

RCA MFG. CO., INC.

MODELS TRK-5, Chassis Nos. KC-3A, RC-429, RS-89A
TT-5, Chassis KC-3
Schematic

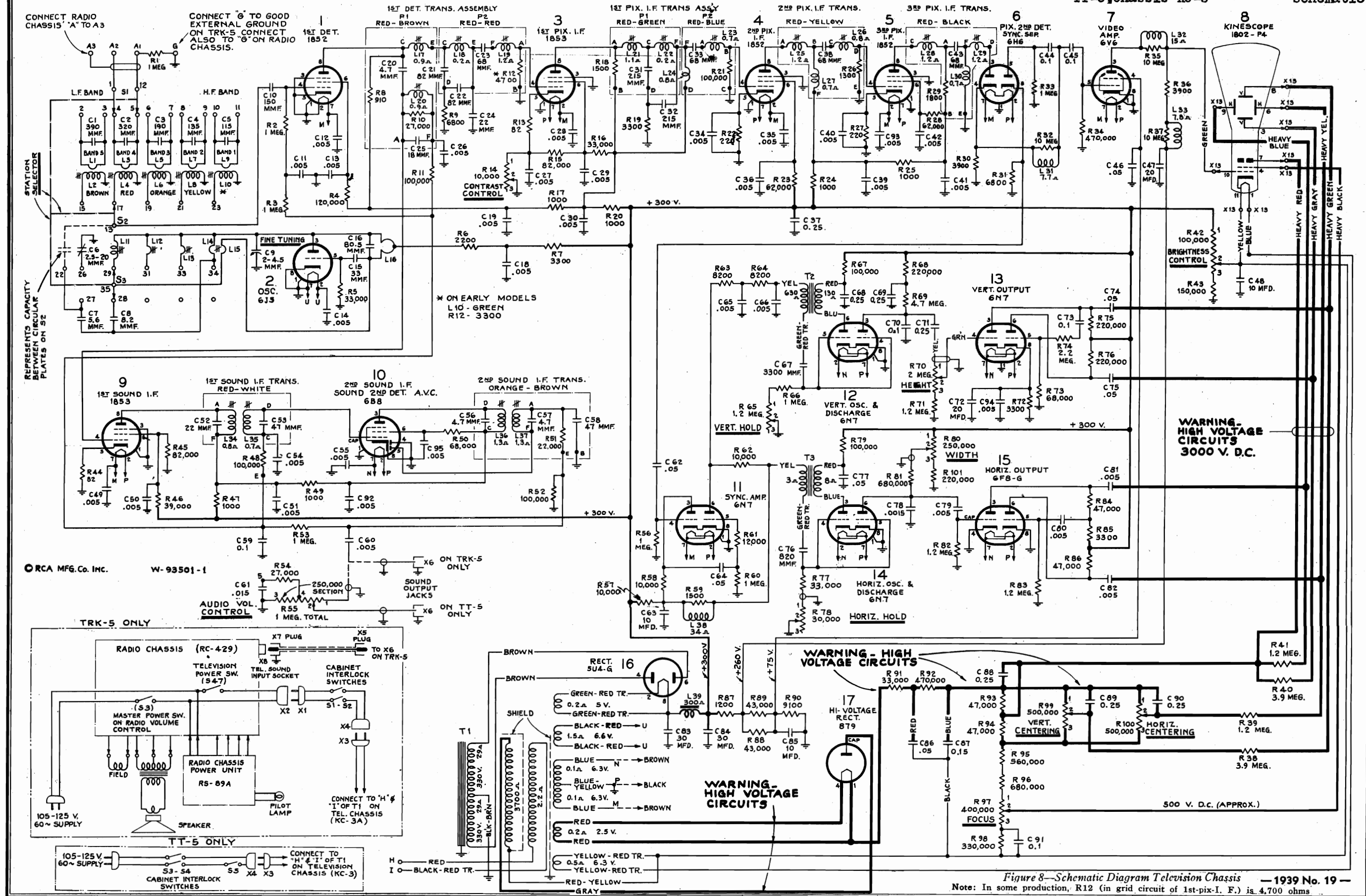


Figure 8—Schematic Diagram Television Chassis —1939 No. 19—
Note: In some production, R12 (in grid circuit of 1st-pix-I. F.) is 4,700 ohms

MODELS TRK-5, Chassis KC-3A

RCA MFG. CO., INC.

POWER SUPPLY RATING
105-125 Volts, 60 Cycles

Model TRK-5

Model TT-5
.... 190 watts

POWER SWITCH
ON TT5 ONLY

TELEVISION CHANNELS
(Selector Switch Positions).

- 1..... 84 to 90 mc.
2..... 78 to 84 mc.
3..... 66 to 72 mc.
4..... 50 to 56 mc.
5..... 44 to 50 mc

WIRE COLOR
CODE

R = RED
G = GREEN
Y = YELLOW
BL = BLUE
BR = BROWN
BK = BLACK
H = HEAVY
TR = TRACER

THESE LEADS CONNECT TO THE BLACK-RED TR., AND RED TRANSFORMER LEADS ON THE TRK-5.

x 3

1802-P4

TOP VIEW,

A diagram of a 12-pin circular connector. The pins are numbered 1 through 12 in a clockwise direction starting from the top. Each pin is connected to a specific color-coded wire. The connections are as follows:

Pin Number	Wire Color
1	GREEN
2	BLUE
3	HEAVY GRAY
4	HEAVY BLACK
5	HEAVY YELLOW
6	HEAVY RED
7	HEAVY GREEN
8	HEAVY BLUE
9	HEAVY BLUE
10	HEAVY GREEN
11	HEAVY RED
12	HEAVY YELLOW

Over-all Band Width (approx.)	2.5 mc.
Scanning	Interlaced, 441 Line
Horizontal (Line) Scanning Frequency (Sawtooth Wave).....	13,230 cps.
Vertical (Field) Scanning Frequency (Sawtooth Wave).....	60 cps.
Frame Frequency.....	30 cps.
Picture Size (approximate mask dimensions)	3 $\frac{3}{8}$ x 4 $\frac{3}{8}$ in.
Chassis Base Dimensions....	13 x 18 in. Max.; height 9 in.

W-93503-0

Operating Notes, Kinescope Installation

RCA MFG. CO., INC. MODELS TRK-5, Chassis KC-3A
TT-5, Chassis KC-3

Operation Model TRK-5

The power-volume control on the broadcast radio receiver turns on the power for the complete receiver. Pushing the button marked "Television" on the push button panel turns on the Television receiver, if the above power control is "On." The volume control of the broadcast receiver also controls the Television sound volume level.

Station Selector and Fine Tuning.—The outer ring "O" section of the central dual control knob on the Television panel selects the station from which it is desired to receive television transmission.

Five television channels are covered as follows:

- (1) 84 to 90 M.C.
- (2) 78 to 84 M.C.
- (3) 66 to 72 M.C.
- (4) 50 to 56 M.C.
- (5) 44 to 50 M.C.

Set the station selector to the number corresponding to the frequency of the station from which it is desired to receive Television Broadcasts.

The inner section "I" of this knob is used for fine tuning and may eliminate moving ripples or distortion if due to interfering radio signals. A slight inward pressure must be exerted on the knob while turning.

Before the Television portion of the receiver is turned "ON" it is advisable to turn the Brightness and Contrast controls completely counter-clockwise to reduce the illumination of the spot which appears on the Kinescope before the sweep circuits have started functioning.

Contrast and Brightness Controls.—The inner "I" section of the "Contrast" "Brightness" controls is the "Contrast" control and varies the black and white tones of the picture being received. Too little contrast makes the picture all half-tones or grays. Turning clockwise increases contrast from grays, to black and white. See Test Patterns Figs. 2, 4, and 5, Page 10-21.

The outer ring "O" is the Brightness Control and affects the average illumination of the picture. Turning clockwise increases the brightness. See test pattern Figs. 2, 4, 5.

Hold Controls.—The dual knobs on the Television panel marked "Horizontal" and "Vertical" Hold, control the picture stability. The inner section designated by a "I" is the Horizontal Hold Control and when being set should be turned slowly to the point at which the picture "locks in" horizontally. See test pattern Fig. 6, Page 10-21.

The outer ring section designated by "O" is the Vertical Hold Control and when being set should be turned to the point where the picture "locks in" vertically. Pattern Fig. 7.

These two controls on this dual knob should not ordinarily require readjustment after good picture reception has once been obtained. An occasional resetting may be necessary due to changing to a different station, and to the gradual ageing of the tubes.

Focus Control.—This control is located on the rear of the Video chassis, and controls the electron beam focus of the Kinescope. Ordinarily, after once being focused the Kinescope should not require re-focusing for a considerable length of time. See test pattern Fig. 3.

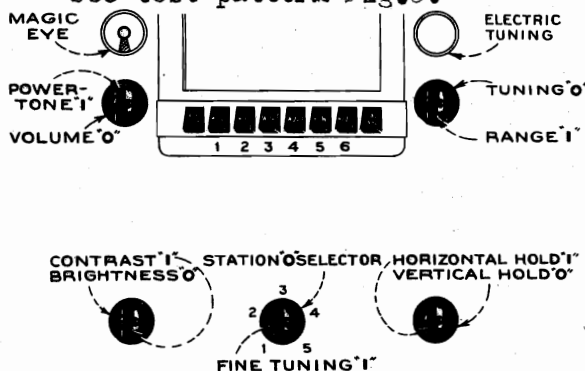


Figure 1—Control Panel Model TRK-5

Operation Model TT-5

The operation of Model TT-5 is the same as that for the Model TRK-5 except that there is a separate "ON-OFF" switch, and a separate sound volume control because the broadcast radio receiver is not included in this model. When Model TT-5 is connected to a broadcast receiver for the Television sound reproduction, the broadcast receiver volume control should be turned to maximum and the Television sound volume controlled with the control on the Television Receiver.

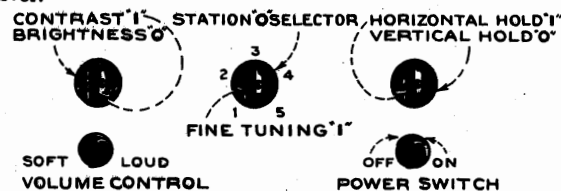


Figure 2—Control Panel Model TT-5

SERVICE DATA

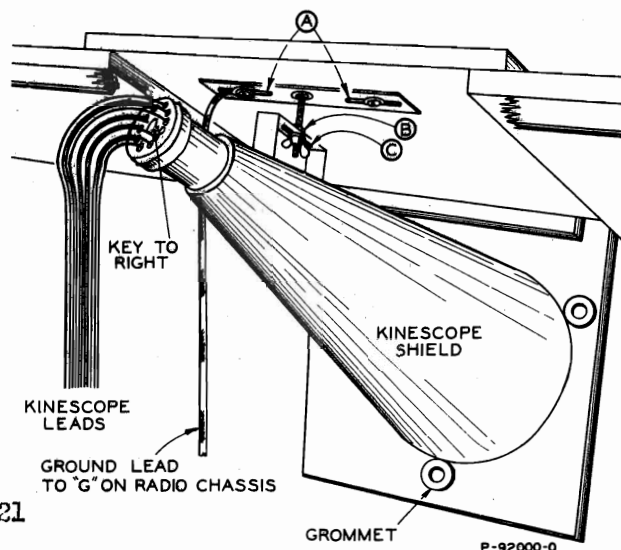


Figure 3—Kinescope Installation

Kinescope Installation Models TRK-5, TT-5: Refer to figure 3.

1. Remove back cover from cabinet.
2. Remove Kinescope mounting shield from shipping carton.
3. Using gloves and goggles remove Kinescope from shipping carton and place in the cone-shaped mounting shield.
4. Guide the Kinescope and mounting shield carefully into the cabinet, placing the Kinescope firmly up against the mask and viewing window. Fasten the mounting shield firmly in place with the thumb screw provided, so that it holds the Kinescope firmly against the mask. If the Kinescope does not line up properly with the mask, loosen the screws "A" and nut "B" and adjust in the direction desired.
5. After the receiver is operating, the Kinescope may be rotated to properly square up the picture with the mask.

CAUTION: When rotating tube the power should be turned "OFF."

Adjustments.—There are a series of screwdriver slot adjustments at the rear of the Video chassis used to obtain the proper picture size and centering. These adjustments are explained fully in the receiver operating instructions, and also in the booklet: *Practical Television* by RCA.

When the receiver is moved from one location to another, some readjustment of these controls may be necessary.

MODELS TRK-5, TT-5

Antenna, Transmission

Line Data,

Voltage

RCA MFG. CO., INC.

Antenna Installation:

In most cases, the antenna should not be installed permanently on the apartment or residence roof until the quality of the picture reception has been observed on a Television Receiver. A temporary transmission line can be run between receiver and the antenna allowing sufficient slack to permit moving the antenna. Then, with a telephone system connecting an observer at the receiver and an assistant on the roof to find an antenna location, the antenna can be positioned to give the most satisfactory results on the received signal. A shift of only a few feet in antenna position or direction may effect a tremendous difference in picture reception. Whenever possible, the antenna location should be chosen or erected so the antenna is not only broadside to the transmitter but removed as far as possible from highways, hospitals and doctors' offices, and similar sources of interference. Auto ignition and diathermy apparatus may cause noise interference which spoils the picture.

In mounting any antenna, care must be taken to keep the antenna rods or pickup wires proper at least $\frac{1}{4}$ wave length (at least 6 feet) away from other antennas, metal roofs and gutters or metal objects.

Under certain extremely unusual conditions, it may be possible to rotate or position the antenna so it receives the

cleanest picture over a reflected path. If such is the case, the antenna should be so positioned. However, such a position may give variable results as the nature of reflecting surfaces may vary with weather conditions, as a wet surface has been known to have different reflecting characteristics than a dry surface.

In short, a television receiving antenna and its installation must conform to much higher standards than an antenna for reception of International Short Wave and Standard Broadcast signals because:

(1) Intervening obstacles have a pronounced shielding effect on the ultra-high frequency waves producing low intensity signals. Severe trouble with multi-path transmissions may be experienced, especially in congested city areas.

(2) The picture signal is comprised of a very wide band or range of frequencies, all of which must be received with good efficiency.

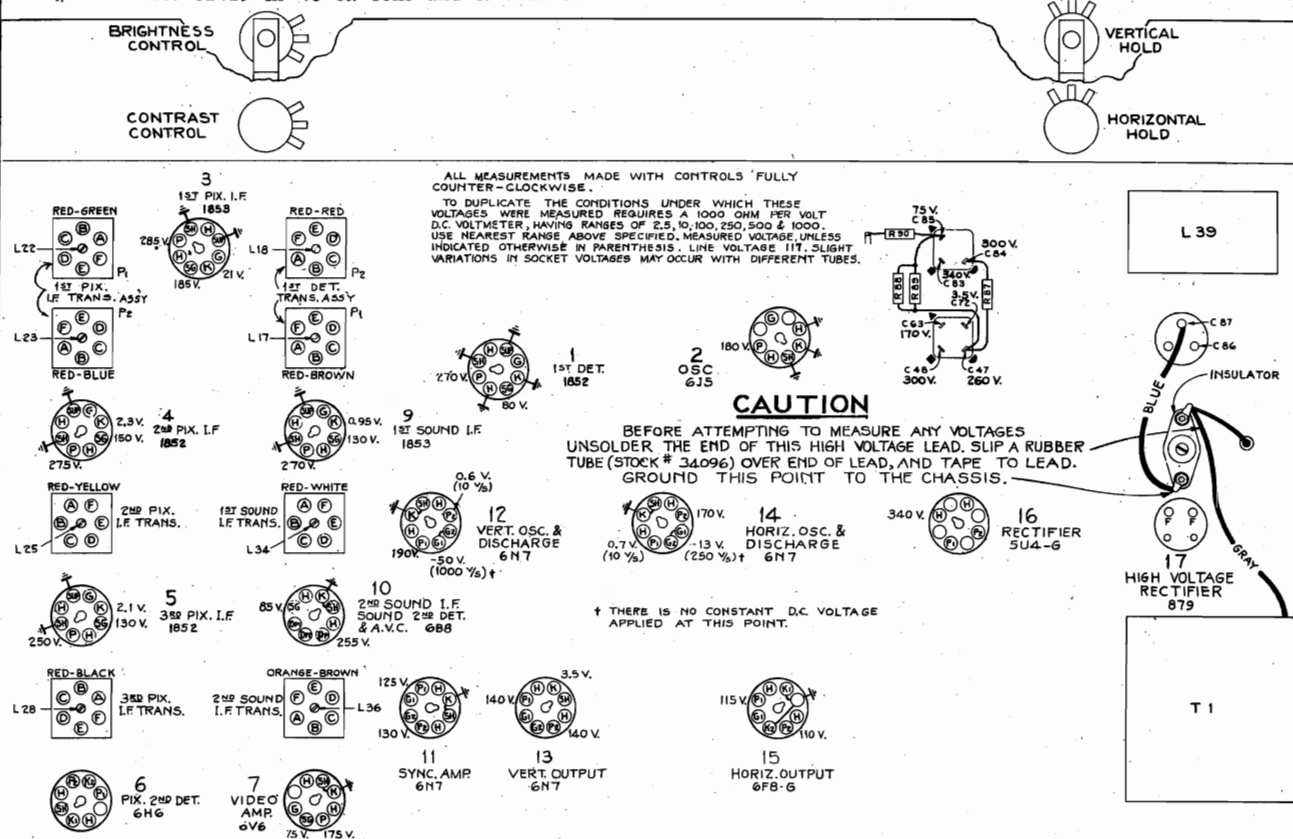
(3) It must be continually remembered that the discernment of the eye is much more critical than that of the ear.

The Transmission Line

RCA Victor has made available two types of exterior transmission lines. One is a special low loss weather-proofed line having the correct surge impedance to match the RCA Victor Television antennas and the RCA Victor Television receivers. It is carried as Stock No. 9882 in 1,000 foot rolls. The second type is a standard weather-proofed line also having the correct surge impedance for proper antenna and receiver matching. It is carried as Stock No. 12430 in 90 ft. rolls, Stock No. 12429 in 40 ft. rolls and is available in

1,000 ft. spools as Stock No. 9881. Use of improper lines may result in excessive loss or may lead to line reflections, resulting in multiple images or "ghosts," thus marring the reception.

For transmission line runs up to 200 feet, and where the signal strength on the antenna is relatively high, the Stock No. 12430, or Stock No. 12429 transmission line may be used. For all other applications the Stock No. 9882 transmission line is recommended.



Rear View, TRK-5

RCA MFG. CO., INC.

MODELS TRK-5, TT-5
Chassis KC-3A, KC-3
Socket, Voltage Data
Trimmers, Antenna

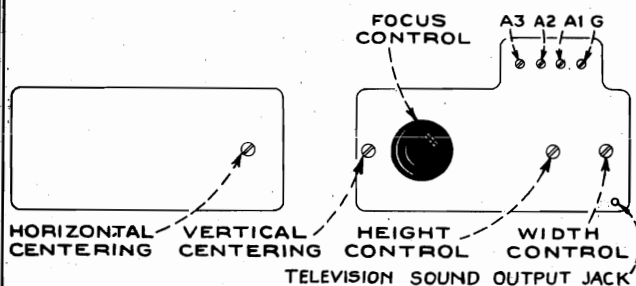


Figure 4—Adjustments at Rear of Chassis

Video Chassis KC-3 (TT-5) KC-3A (TRK-5)

No attempt should ever be made to measure the high (2,000 volts) voltage, because of the dangers and difficulties involved. If at any time it becomes necessary to service the high voltage circuit, the suspected parts should be replaced by parts known to be in good operating condition.

Always replace the red can over the 879 high voltage rectifier.

The most dangerous portion of the receiver is the plate (top cap) lead for the 879 high voltage rectifier. Always be very careful when working near or with this lead.

When working on the high voltage supply portion of this chassis, the following precautions should be observed:

1. Remove power supply cord from the power supply socket.
2. Use only one hand at a time.
3. Connect a shorting lead between ground (firstly) and to the high voltage side.
4. Whenever working with the oil-filled high voltage filter capacitors, keep a constant short across the capacitor, as these capacitors do not completely lose their charge after being discharged a single or several subsequent times.
5. Only one person at a time should work on the unit to prevent any misunderstanding which may result in an accident.

When any changes are made on the Video portion of the chassis, the locations of leads and parts should be returned as closely as possible to their original positions.

Service Hints:

1. In some cases the horizontal sweep oscillator circuit will radiate energy to nearby broadcast receiving antennas and lead-ins, causing interference with standard broadcast receivers. It has been found that this trouble has been cleared up in some cases by use of an RCA "Magic Wave" antenna for the broadcast receiver receiving the interference.
2. If the picture "tears out" when the receiver is jarred it may be due to microphonic 1852, 1853, or 6J5 tubes.
3. The 6J5 oscillator tube should be removed without rocking it in its socket to loosen it, as the motion may cause the 80.5 mmf capacitor C16 to break off.
4. The coils or straps in the h.f. oscillator circuits should not be touched or moved or the alignment of the receiver will be disturbed.
5. The two Video coupling capacitors C44, 45, should be kept clear of chassis.
6. In some cases the metal Kinescope mounting shield may become magnetized by the earth's or some nearby magnetic field, and thus distort the picture on the screen towards the magnetized portion of the shield. The shield can be demagnetized by passing it slowly through a solenoid which is energized by an a.c. current.

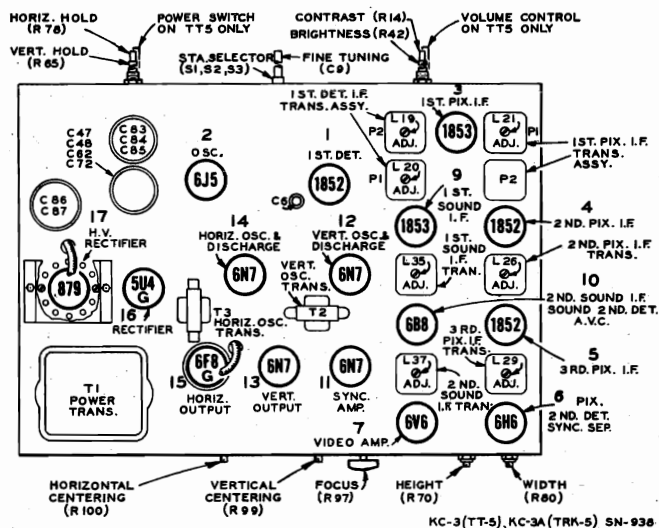


Figure 5—Top View Television Chassis

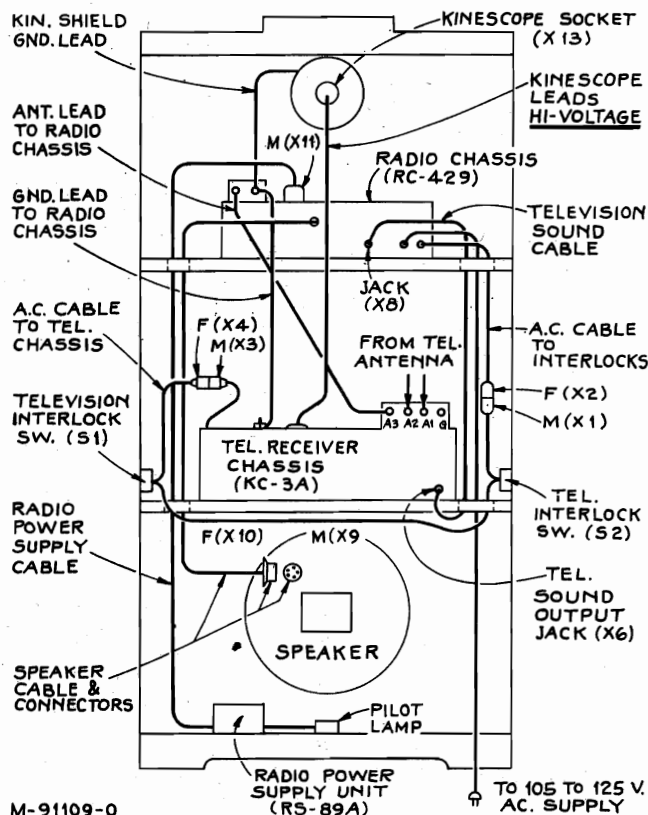


Figure 6—Rear View Model TRK-5

Antenna

The finest television receiver built may be said to be only as good as the antenna design and installation. It is therefore important to use a correctly designed antenna, and use care in its installation.

The RCA Double Dipole Antenna, Stock No. 9871, is recommended for use with these receivers. Both this antenna and the "V" antenna described below are especially designed for a sufficient broad frequency response to cover the contemplated television spectrum with good efficiency and are therefore superior to a single Dipole type antenna.

When greater signal pickup, or where a shielding effect from noise pickup or image reflections are desired, a reflector assembly Stock No. 9872 may be added to the Stock No. 9871 Antenna to obtain an improved signal-to-noise ratio.

The RCA Double "V" Wire type Television Antenna is alternative type of antenna designed for television sight and sound reception. Two points of support are necessary. It serves adequately in suburban areas but may not be sufficiently flexible and efficient for congested city areas where bad reflections and interference are encountered.

MODEL TRK-5

Receiver Chassis RC-429
Specifications, Dial Data

RCA MFG. CO., INC.

MODELS 98T, 98K2
Dial Calibration

Electrical Specifications

FREQUENCY RANGES

Standard Broadcast ("A" band).....540-1720 kc

Intermediate Frequency.....

Medium Wave ("B" band).....2.3-7.0 mc

Short Wave ("C" band).....7.0-22 mc

..... 455 kc

TUBE COMPLEMENT

(1) RCA-6A8-G..... 1st-Det., and Osc.
(2) RCA-6K7..... I-F Amplifier
(3) RCA-6Q7..... 2nd-Det., A.V.C., 1st Audio
(4) RCA-6J5..... Phase Inverter(5) RCA-6K6-G..... Power Output
(6) RCA-6K6-G..... Power Output
(7) RCA-6U5..... "Magic Eye"
(8) RCA-5Y3-G (in SPU RS-89A)..... Full-Wave Rectifier

Dial Lamps Mazda No. 44, 6.3 volts, .25 amp.

Power Supply Rating 105-125 volts, 60 cycles, 75 watts

POWER OUTPUT

Undistorted 5 watts

Maximum 5.5 watts

LOUDSPEAKER (RL-70H-5)

Type 12-inch electrodynamic

Voice-Coil impedance 2.2 ohms at 400 cycles

ELECTRIC TUNING RANGES

Two stations between approximately..... 550-950 kc

Two stations between approximately..... 690-1,225 kc

Two stations between approximately..... 890-1,500 kc

Mechanical Specifications

RC-429 CHASSIS BASE DIMENSIONS:

Height 2-1/2 inches

Width 13 inches

Depth 6-1/2 inches

Over-all Chassis Height 6-1/2 inches

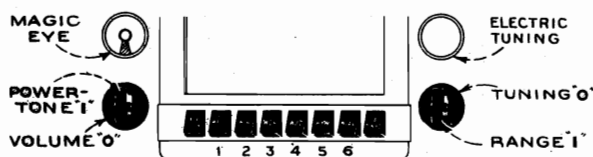
Tuning Drive Ratio 12 to 1

General Description

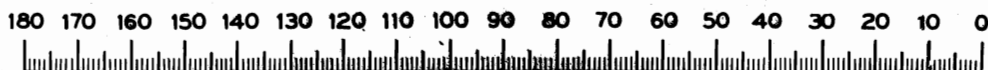
Radio receiver chassis No. RC-429 is used in RCA Victor Television console Model TRK-5.

The audio output of the television chassis is connected to the audio input of the RC-429 chassis by means of jack X-8 and the left-hand push-button switch (S44, S45, S46).

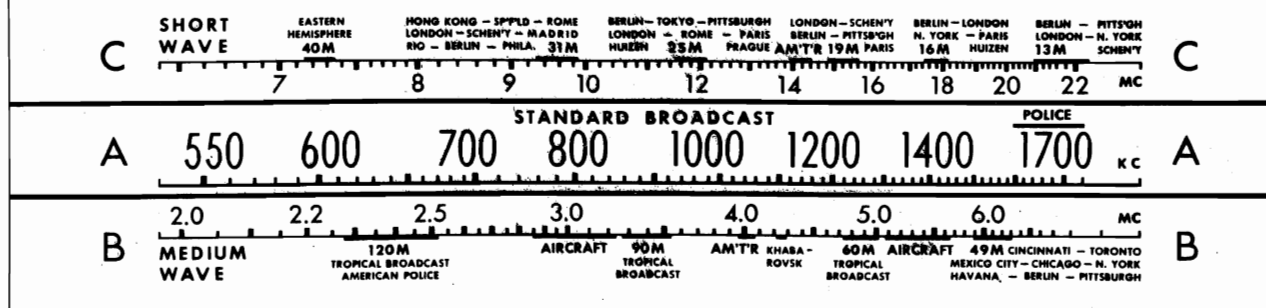
A separate plug-in power supply unit, RS-89A, is used to supply heater and plate voltage to the RC-427 chassis. Service data and diagrams for the power unit are contained in the following pages.



Location of Controls (Radio)



27663



Reduced Reproduction of Receiver Dial, and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example, 28° on the calibration scale corresponds to 1,500 kc on "A" band. Read instructions under "Alignment Procedure."

MODEL TRK-5, Chassis RC-429

RCA MFG. CO., INC.

Socket, Trimmers, Tuner

Alignment

Alignment Procedure (RADIO CHASSIS)

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

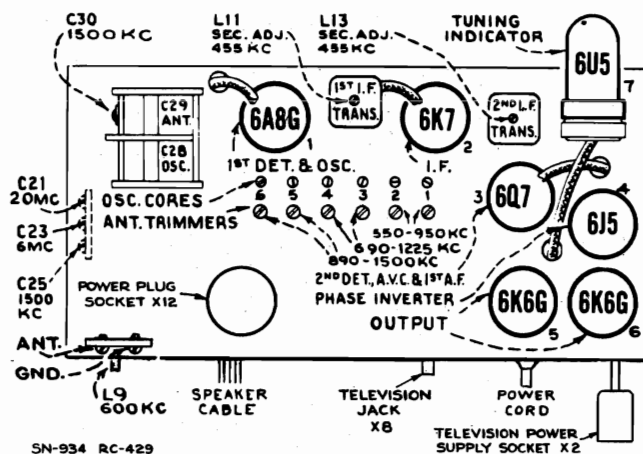
Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver ground terminal (G), and keep the output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial if fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed 3/8-inch. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-



condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

Step	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	"A" band, Quiet Point between 550-750 kc	L12 and L13 (2nd I-F Trans.)
2	6A8-G 1st-Det. grid cap, in series with .01 mfd.			L10 and L11 (1st I-F Trans.)
3	Antenna terminal, in series with 200 mmfd.	600 kc	600 kc 150.5°	L9 (osc.)
4		1,500 kc	1,500 kc 28°	C25 (osc.) C30 (ant.)
5	Repeat steps 3 and 4.			
6	Antenna terminal, in series with 300 ohms	6 mc	6 mc 26.5°	C23 (osc.)*
7		20 mc	20 mc 22°	C21 (osc.)*
8	Follow "Adjustments for Electric Tuning."			

* Use minimum capacity peak if two peaks can be obtained, and check for image by tuning radio approximately 910 kc lower.

Note: The oscillator tracks above the signal on all bands.

Adjustments for Electric Tuning

These models have eight push buttons. The left-hand button is a Television switch. The right-hand button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments.

The procedure is as follows:

1. Make a list of the desired six stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning button, and manually tune in the first station on the list.

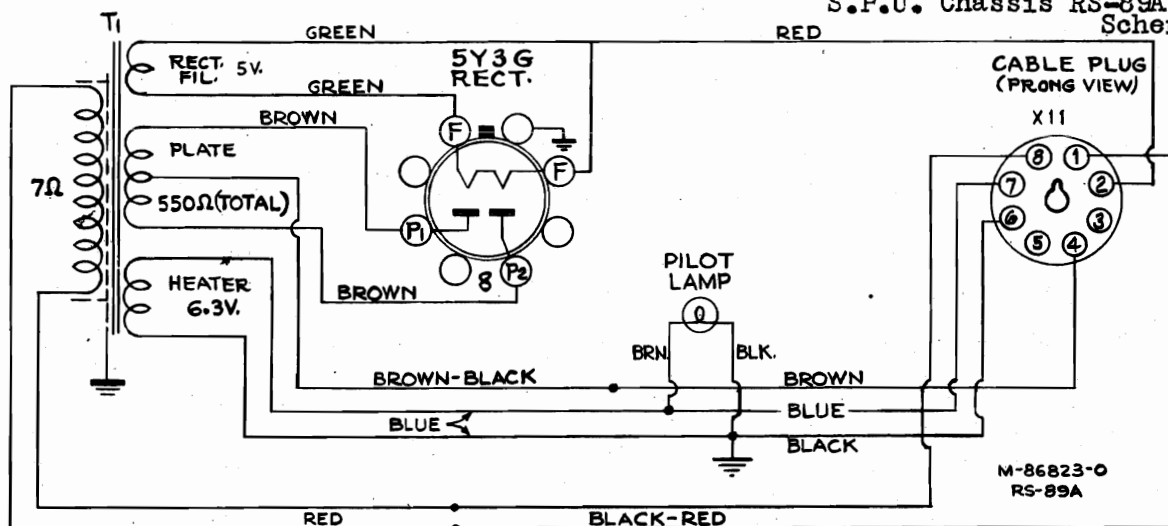
3. Push in station button No. 1 (second from left) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
4. Adjust No. 1 antenna trimmer (C36) for maximum output on this station.

Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

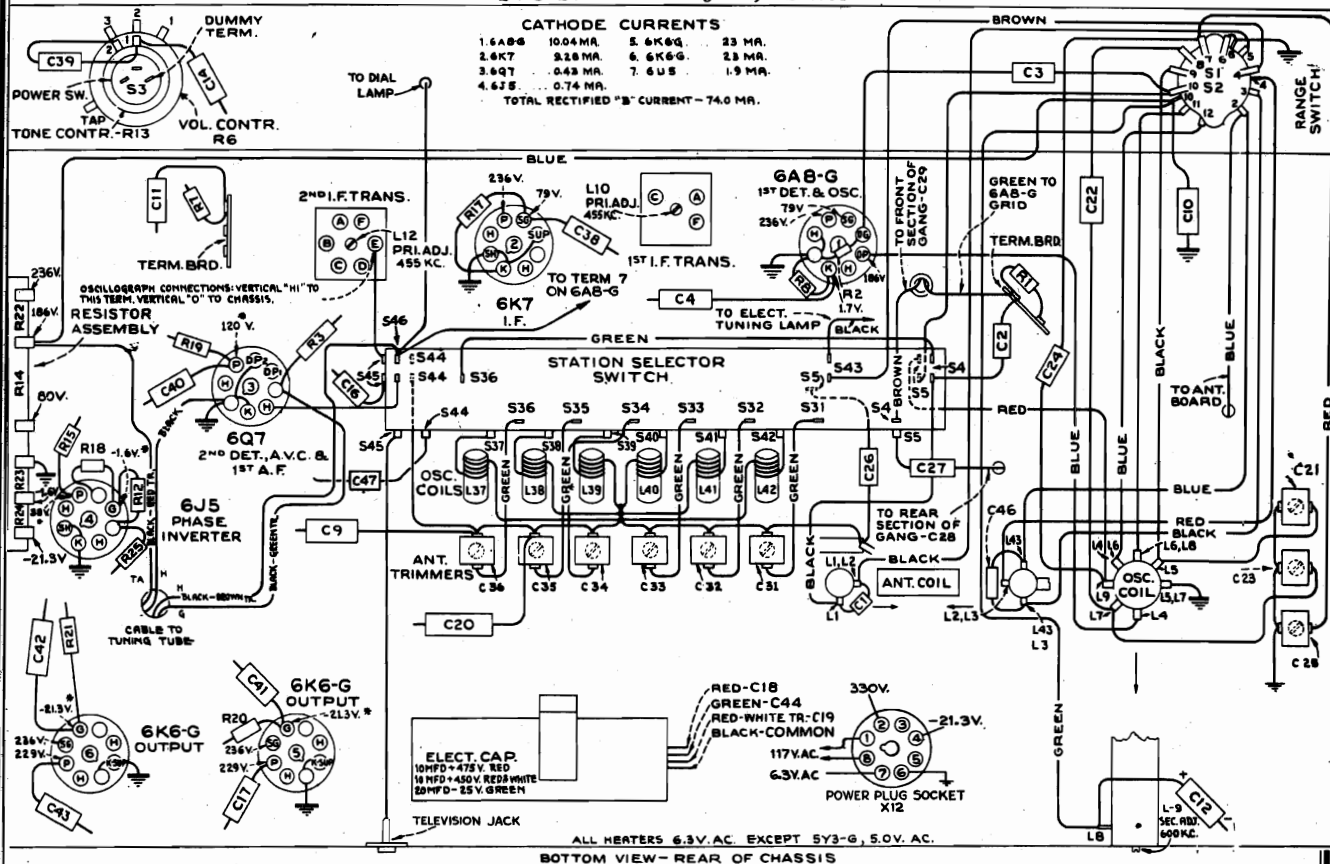
5. Adjust for each of the remaining five stations in the same manner.
6. Make a final careful adjustment of the oscillator cores and antenna trimmers. Use the "Magic Eye" to ensure sharp peaking.

RCA MFG. CO., INC.

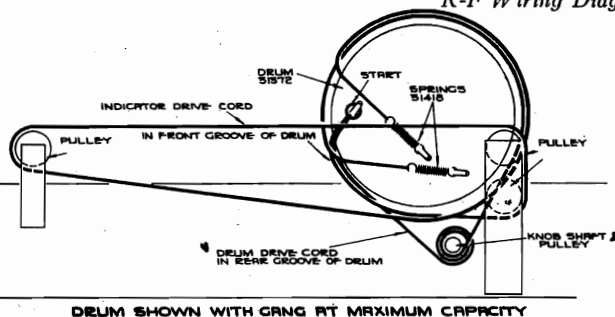
MODEL TRK-5, Chassis RC-429
R-F Chassis Wiring, Voltage
S.P.U. Chassis RS-89A
Schematic



SPU Schematic Diagram, RS-89A



R-F Wiring Diagram, Chassis No. RC-429



Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within approximately $\pm 20\%$ with 117-volt a-c supply.

NOTE: Values with star () are operating voltages in circuits with high series-resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

At Left—Dial Mechanism

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit Price	STOCK No.	DESCRIPTION	Unit Price	STOCK No.	DESCRIPTION	Unit Price
TELEVISION CHASSIS ASSEMBLIES								
33387	TK-5-KC-3A		33774	Control-Dual contrast and brightness control	2.00	33594	Transformer-1st. Ht. Pw. I.F. transformer	2.00
33388	TK-5-KC-3B		33775	Control-Dual horizontal and vertical (R&B)	2.00	33595	Transformer-2nd. Ht. Pw. I.F. transformer	2.50
33389	TK-5-KC-3C		33278	Control-500,000 ohm "Width" control (R86)	1.60	33596	Transformer-3rd. Ht. Pw. I.F. transformer	2.50
33390	TK-5-KC-3D		33279	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33597	Transformer-4th. Ht. Pw. I.F. transformer	2.00
33391	TK-5-KC-3E		33280	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33598	Transformer-5th. Ht. Pw. I.F. transformer	2.00
33392	TK-5-KC-3F		33281	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33599	Transformer-6th. Ht. Pw. I.F. transformer	2.00
33393	TK-5-KC-3G		33282	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33600	Transformer-7th. Ht. Pw. I.F. transformer	2.00
33394	TK-5-KC-3H		33283	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33601	Transformer-8th. Ht. Pw. I.F. transformer	2.00
33395	TK-5-KC-3I		33284	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33602	Transformer-9th. Ht. Pw. I.F. transformer	2.00
33396	TK-5-KC-3J		33285	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33603	Transformer-10th. Ht. Pw. I.F. transformer	2.00
33397	TK-5-KC-3K		33286	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33604	Transformer-11th. Ht. Pw. I.F. transformer	2.00
33398	TK-5-KC-3L		33287	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33605	Transformer-12th. Ht. Pw. I.F. transformer	2.00
33399	TK-5-KC-3M		33288	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33606	Transformer-13th. Ht. Pw. I.F. transformer	2.00
33400	TK-5-KC-3N		33289	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33607	Transformer-14th. Ht. Pw. I.F. transformer	2.00
33401	TK-5-KC-3O		33290	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33608	Transformer-15th. Ht. Pw. I.F. transformer	2.00
33402	TK-5-KC-3P		33291	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33609	Transformer-16th. Ht. Pw. I.F. transformer	2.00
33403	TK-5-KC-3Q		33292	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33610	Transformer-17th. Ht. Pw. I.F. transformer	2.00
33404	TK-5-KC-3R		33293	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33611	Transformer-18th. Ht. Pw. I.F. transformer	2.00
33405	TK-5-KC-3S		33294	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33612	Transformer-19th. Ht. Pw. I.F. transformer	2.00
33406	TK-5-KC-3T		33295	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33613	Transformer-20th. Ht. Pw. I.F. transformer	2.00
33407	TK-5-KC-3U		33296	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33614	Transformer-21st. Ht. Pw. I.F. transformer	2.00
33408	TK-5-KC-3V		33297	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33615	Transformer-22nd. Ht. Pw. I.F. transformer	2.00
33409	TK-5-KC-3W		33298	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33616	Transformer-23rd. Ht. Pw. I.F. transformer	2.00
33410	TK-5-KC-3X		33299	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33617	Transformer-24th. Ht. Pw. I.F. transformer	2.00
33411	TK-5-KC-3Y		33300	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33618	Transformer-25th. Ht. Pw. I.F. transformer	2.00
33412	TK-5-KC-3Z		33301	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33619	Transformer-26th. Ht. Pw. I.F. transformer	2.00
33413	TK-5-KC-3AA		33302	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33620	Transformer-27th. Ht. Pw. I.F. transformer	2.00
33414	TK-5-KC-3AB		33303	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33621	Transformer-28th. Ht. Pw. I.F. transformer	2.00
33415	TK-5-KC-3AC		33304	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33622	Transformer-29th. Ht. Pw. I.F. transformer	2.00
33416	TK-5-KC-3AD		33305	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33623	Transformer-30th. Ht. Pw. I.F. transformer	2.00
33417	TK-5-KC-3AE		33306	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33624	Transformer-31st. Ht. Pw. I.F. transformer	2.00
33418	TK-5-KC-3AF		33307	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33625	Transformer-32nd. Ht. Pw. I.F. transformer	2.00
33419	TK-5-KC-3AG		33308	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33626	Transformer-33rd. Ht. Pw. I.F. transformer	2.00
33420	TK-5-KC-3AH		33309	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33627	Transformer-34th. Ht. Pw. I.F. transformer	2.00
33421	TK-5-KC-3AI		33310	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33628	Transformer-35th. Ht. Pw. I.F. transformer	2.00
33422	TK-5-KC-3AJ		33311	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33629	Transformer-36th. Ht. Pw. I.F. transformer	2.00
33423	TK-5-KC-3AK		33312	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33630	Transformer-37th. Ht. Pw. I.F. transformer	2.00
33424	TK-5-KC-3AL		33313	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33631	Transformer-38th. Ht. Pw. I.F. transformer	2.00
33425	TK-5-KC-3AM		33314	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33632	Transformer-39th. Ht. Pw. I.F. transformer	2.00
33426	TK-5-KC-3AN		33315	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33633	Transformer-40th. Ht. Pw. I.F. transformer	2.00
33427	TK-5-KC-3AO		33316	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33634	Transformer-41st. Ht. Pw. I.F. transformer	2.00
33428	TK-5-KC-3AP		33317	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33635	Transformer-42nd. Ht. Pw. I.F. transformer	2.00
33429	TK-5-KC-3AQ		33318	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33636	Transformer-43rd. Ht. Pw. I.F. transformer	2.00
33430	TK-5-KC-3AR		33319	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33637	Transformer-44th. Ht. Pw. I.F. transformer	2.00
33431	TK-5-KC-3AS		33320	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33638	Transformer-45th. Ht. Pw. I.F. transformer	2.00
33432	TK-5-KC-3AT		33321	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33639	Transformer-46th. Ht. Pw. I.F. transformer	2.00
33433	TK-5-KC-3AU		33322	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33640	Transformer-47th. Ht. Pw. I.F. transformer	2.00
33434	TK-5-KC-3AV		33323	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33641	Transformer-48th. Ht. Pw. I.F. transformer	2.00
33435	TK-5-KC-3AW		33324	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33642	Transformer-49th. Ht. Pw. I.F. transformer	2.00
33436	TK-5-KC-3AX		33325	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33643	Transformer-50th. Ht. Pw. I.F. transformer	2.00
33437	TK-5-KC-3AY		33326	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33644	Transformer-51st. Ht. Pw. I.F. transformer	2.00
33438	TK-5-KC-3AZ		33327	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33645	Transformer-52nd. Ht. Pw. I.F. transformer	2.00
33439	TK-5-KC-3BA		33328	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33646	Transformer-53rd. Ht. Pw. I.F. transformer	2.00
33440	TK-5-KC-3BB		33329	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33647	Transformer-54th. Ht. Pw. I.F. transformer	2.00
33441	TK-5-KC-3BC		33330	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33648	Transformer-55th. Ht. Pw. I.F. transformer	2.00
33442	TK-5-KC-3BD		33331	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33649	Transformer-56th. Ht. Pw. I.F. transformer	2.00
33443	TK-5-KC-3BE		33332	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33650	Transformer-57th. Ht. Pw. I.F. transformer	2.00
33444	TK-5-KC-3BF		33333	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33651	Transformer-58th. Ht. Pw. I.F. transformer	2.00
33445	TK-5-KC-3BG		33334	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33652	Transformer-59th. Ht. Pw. I.F. transformer	2.00
33446	TK-5-KC-3BH		33335	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33653	Transformer-60th. Ht. Pw. I.F. transformer	2.00
33447	TK-5-KC-3BI		33336	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33654	Transformer-61st. Ht. Pw. I.F. transformer	2.00
33448	TK-5-KC-3BJ		33337	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33655	Transformer-62nd. Ht. Pw. I.F. transformer	2.00
33449	TK-5-KC-3BK		33338	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33656	Transformer-63rd. Ht. Pw. I.F. transformer	2.00
33450	TK-5-KC-3BL		33339	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33657	Transformer-64th. Ht. Pw. I.F. transformer	2.00
33451	TK-5-KC-3BM		33340	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33658	Transformer-65th. Ht. Pw. I.F. transformer	2.00
33452	TK-5-KC-3BN		33341	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33659	Transformer-66th. Ht. Pw. I.F. transformer	2.00
33453	TK-5-KC-3BO		33342	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33660	Transformer-67th. Ht. Pw. I.F. transformer	2.00
33454	TK-5-KC-3BP		33343	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33661	Transformer-68th. Ht. Pw. I.F. transformer	2.00
33455	TK-5-KC-3BQ		33344	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33662	Transformer-69th. Ht. Pw. I.F. transformer	2.00
33456	TK-5-KC-3BR		33345	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33663	Transformer-70th. Ht. Pw. I.F. transformer	2.00
33457	TK-5-KC-3BS		33346	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33664	Transformer-71st. Ht. Pw. I.F. transformer	2.00
33458	TK-5-KC-3BT		33347	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33665	Transformer-72nd. Ht. Pw. I.F. transformer	2.00
33459	TK-5-KC-3BU		33348	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33666	Transformer-73rd. Ht. Pw. I.F. transformer	2.00
33460	TK-5-KC-3BV		33349	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33667	Transformer-74th. Ht. Pw. I.F. transformer	2.00
33461	TK-5-KC-3BW		33350	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33668	Transformer-75th. Ht. Pw. I.F. transformer	2.00
33462	TK-5-KC-3BX		33351	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33669	Transformer-76th. Ht. Pw. I.F. transformer	2.00
33463	TK-5-KC-3BY		33352	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33670	Transformer-77th. Ht. Pw. I.F. transformer	2.00
33464	TK-5-KC-3BZ		33353	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33671	Transformer-78th. Ht. Pw. I.F. transformer	2.00
33465	TK-5-KC-3CA		33354	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33672	Transformer-79th. Ht. Pw. I.F. transformer	2.00
33466	TK-5-KC-3CB		33355	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33673	Transformer-80th. Ht. Pw. I.F. transformer	2.00
33467	TK-5-KC-3CC		33356	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33674	Transformer-81st. Ht. Pw. I.F. transformer	2.00
33468	TK-5-KC-3CD		33357	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33675	Transformer-82nd. Ht. Pw. I.F. transformer	2.00
33469	TK-5-KC-3CE		33358	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33676	Transformer-83rd. Ht. Pw. I.F. transformer	2.00
33470	TK-5-KC-3CF		33359	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33677	Transformer-84th. Ht. Pw. I.F. transformer	2.00
33471	TK-5-KC-3CG		33360	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33678	Transformer-85th. Ht. Pw. I.F. transformer	2.00
33472	TK-5-KC-3CH		33361	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33679	Transformer-86th. Ht. Pw. I.F. transformer	2.00
33473	TK-5-KC-3CI		33362	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33680	Transformer-87th. Ht. Pw. I.F. transformer	2.00
33474	TK-5-KC-3CJ		33363	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33681	Transformer-88th. Ht. Pw. I.F. transformer	2.00
33475	TK-5-KC-3CK		33364	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33682	Transformer-89th. Ht. Pw. I.F. transformer	2.00
33476	TK-5-KC-3CL		33365	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33683	Transformer-90th. Ht. Pw. I.F. transformer	2.00
33477	TK-5-KC-3CM		33366	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33684	Transformer-91st. Ht. Pw. I.F. transformer	2.00
33478	TK-5-KC-3CN		33367	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33685	Transformer-92nd. Ht. Pw. I.F. transformer	2.00
33479	TK-5-KC-3CO		33368	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33686	Transformer-93rd. Ht. Pw. I.F. transformer	2.00
33480	TK-5-KC-3CP		33369	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33687	Transformer-94th. Ht. Pw. I.F. transformer	2.00
33481	TK-5-KC-3CQ		33370	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33688	Transformer-95th. Ht. Pw. I.F. transformer	2.00
33482	TK-5-KC-3CR		33371	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33689	Transformer-96th. Ht. Pw. I.F. transformer	2.00
33483	TK-5-KC-3CS		33372	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33690	Transformer-97th. Ht. Pw. I.F. transformer	2.00
33484	TK-5-KC-3CT		33373	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33691	Transformer-98th. Ht. Pw. I.F. transformer	2.00
33485	TK-5-KC-3CU		33374	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33692	Transformer-99th. Ht. Pw. I.F. transformer	2.00
33486	TK-5-KC-3CV		33375	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33693	Transformer-100th. Ht. Pw. I.F. transformer	2.00
33487	TK-5-KC-3CW		33376	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33694	Transformer-101st. Ht. Pw. I.F. transformer	2.00
33488	TK-5-KC-3CX		33377	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33695	Transformer-102nd. Ht. Pw. I.F. transformer	2.00
33489	TK-5-KC-3CY		33378	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33696	Transformer-103rd. Ht. Pw. I.F. transformer	2.00
33490	TK-5-KC-3CZ		33379	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33697	Transformer-104th. Ht. Pw. I.F. transformer	2.00
33491	TK-5-KC-3DA		33380	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33698	Transformer-105th. Ht. Pw. I.F. transformer	2.00
33492	TK-5-KC-3DB		33381	Control-500,000 ohm "Vert. cent." control (R86)	1.60	33699	Transformer-106th. Ht. Pw. I.F. transformer	2.00
33493	TK-5-KC-							

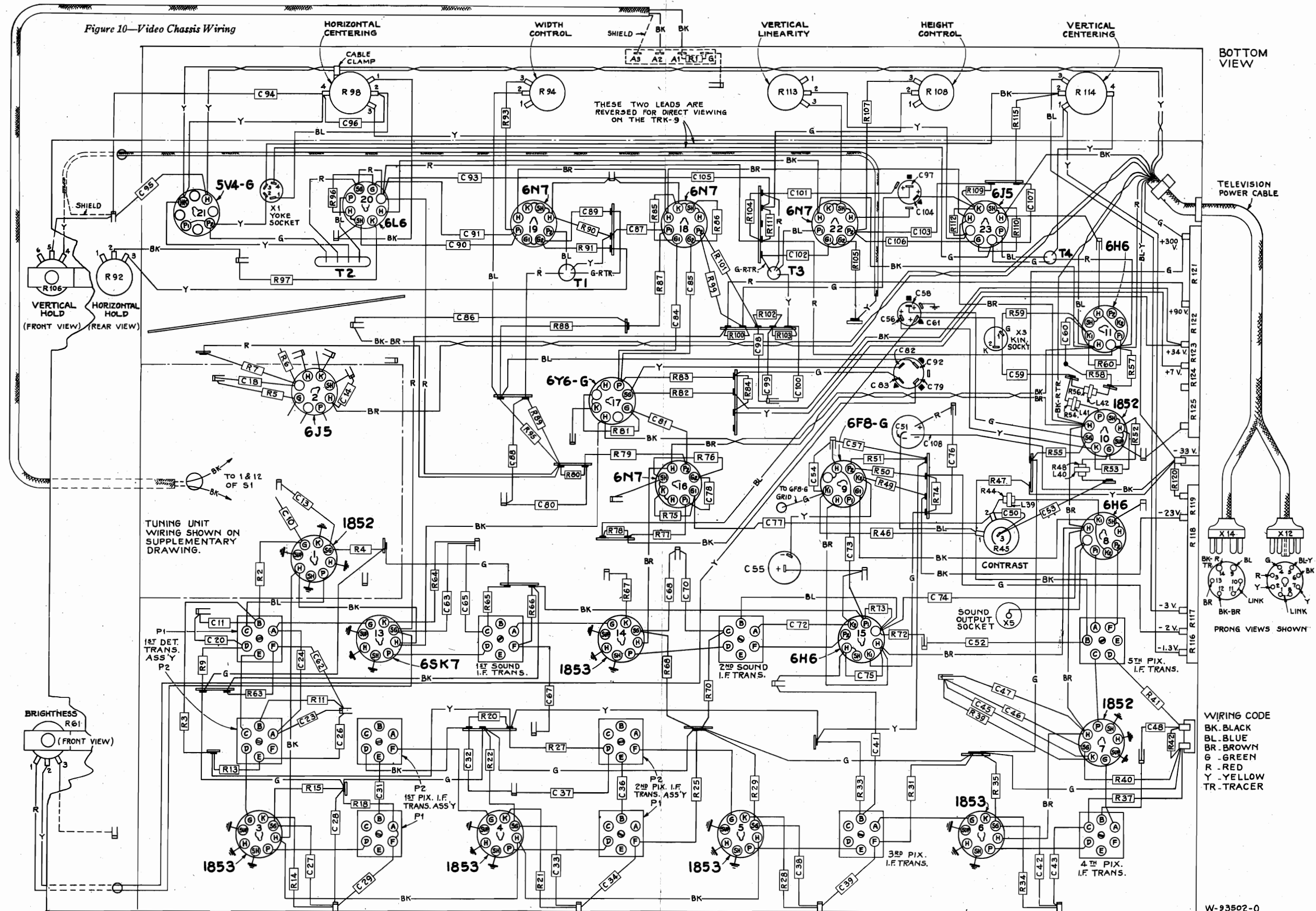
ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

Model TRK-9
Video Chassis No. KC-4A
Video S.P.U. Chas. KK-7A
Receiver Chas. RC-427A
Receiver SPU Chas. RS-83E

Model TRK-12
Video Chassis KC-4
Video S.P.U. Chas. KK-7
Receiver Chas. RC-427
Receiver SPU Chas. RS-83E

MODELS TRK-9, TRK-12
Video Chassis Wiring

RCA MFG. CO., INC.



RCA MFG. CO., INC.

MODEL TRK-12

Assembly, Operating Controls
Specifications

TELEVISION CHANNELS (Selector Switch Positions)

1	84 to 90 mc.
2	78 to 84 mc.
3	66 to 72 mc.
4	50 to 56 mc.
5	44 to 50 mc.

Over-all Video Band Width..... 4 mc.
 Scanning Interlaced, 441 Line
 Horizontal (Line) Scanning Frequency (Sawtooth Wave)..... 13,230 cps
 Vertical (Field) Scanning Frequency (Sawtooth Wave)..... 60 cps
 Frame Frequency (Picture Repetition Rate)..... 30 cps

PICTURE SIZE (Approx. Mask Dimensions)

TRK-9..... $5\frac{1}{2} \times 7\frac{1}{4}$ in.
 TRK-12..... $7\frac{3}{8} \times 9\frac{3}{4}$ in.

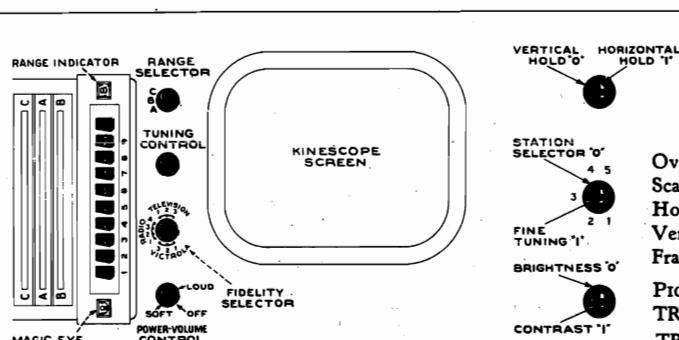


Figure 2—Operating Controls, TRK-12

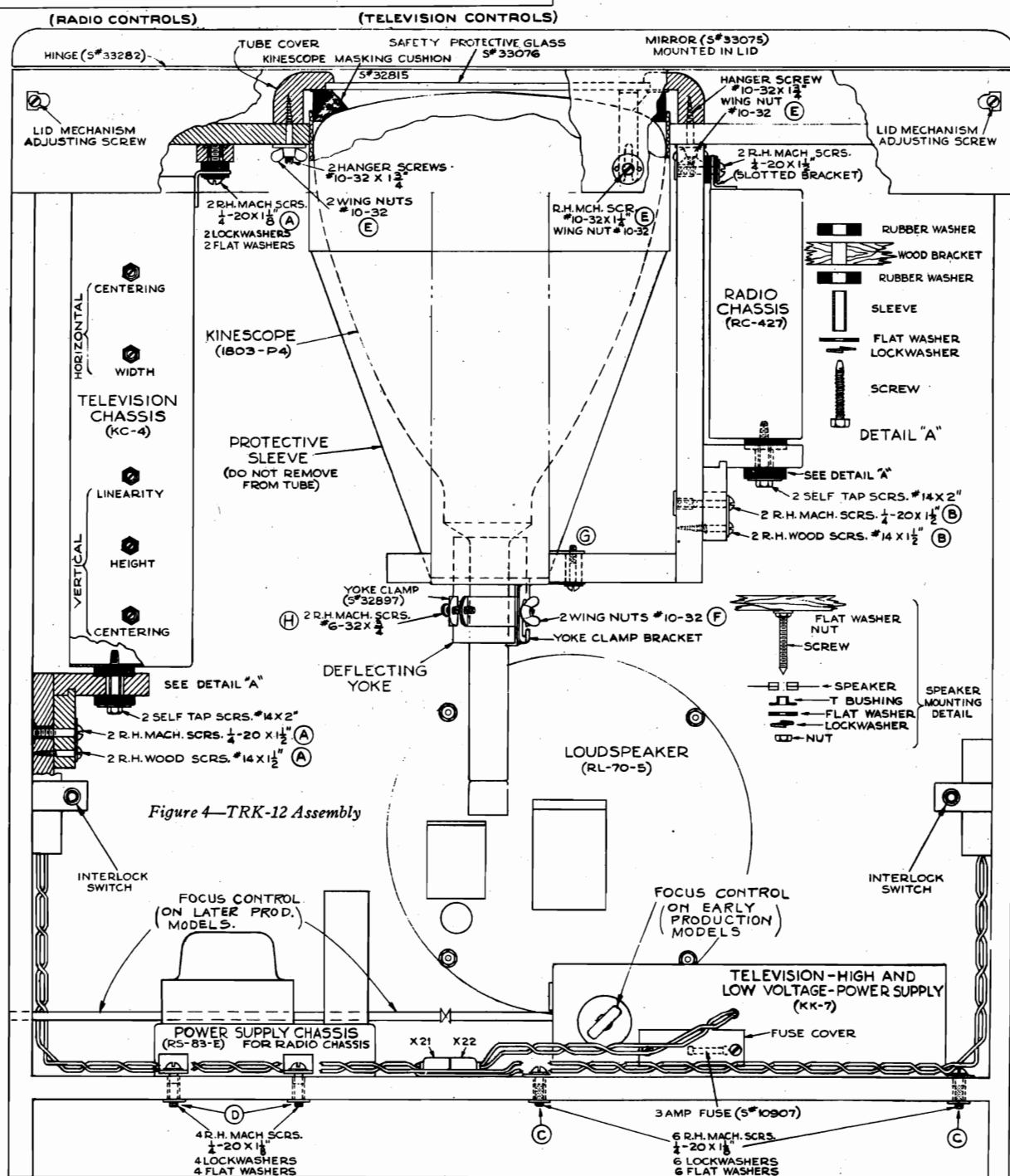


Figure 4—TRK-12 Assembly

MODELS TRK-9, TRK-12
Cabinet Wiring
Socket

RCA MFG. CO., INC.

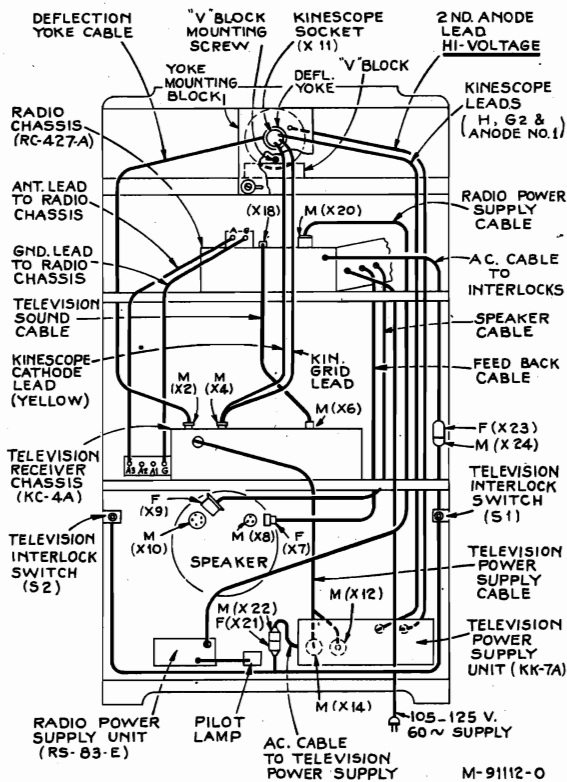


Figure 3—Cabinet Wiring—Model TRK-9

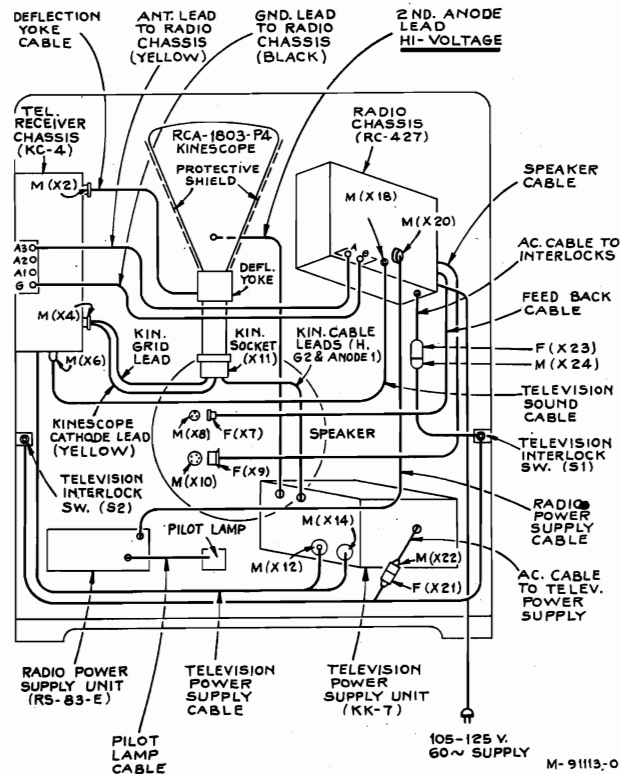
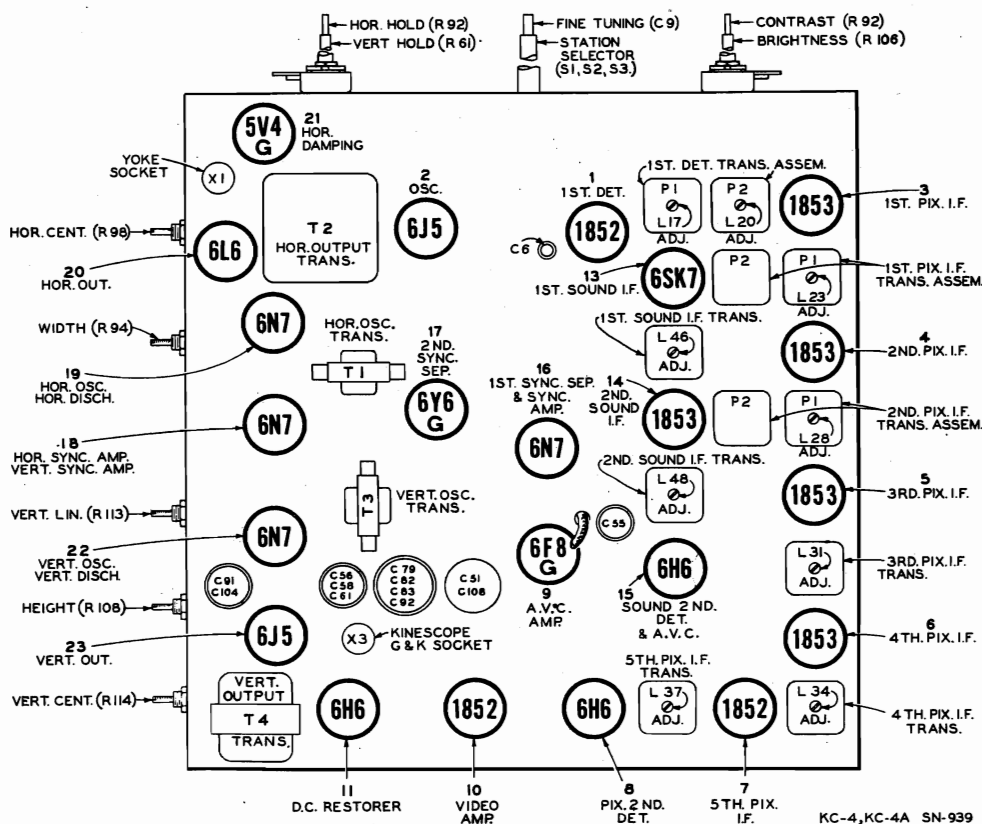
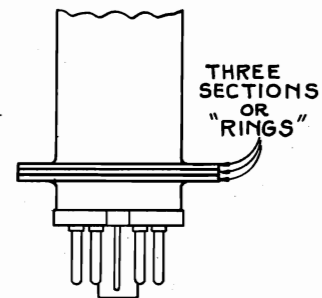


Figure 3a—Cabinet Wiring—Model TRK-12

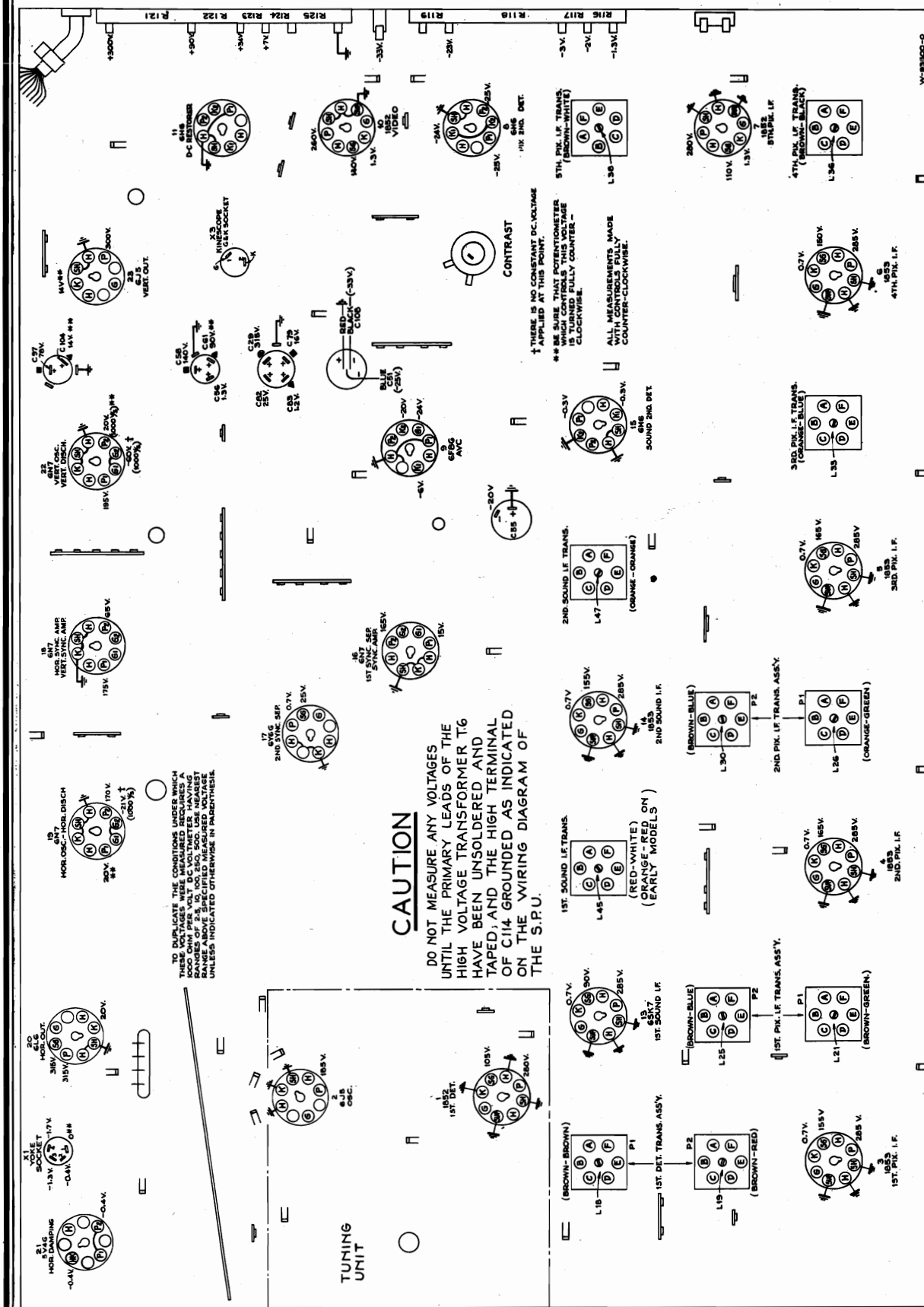


At Left—Figure 5
Top View Video Chassis



(Above) Figure 6
Recommended Type
6L6 Identification

RCA MFG. CO., INC.

MODELS TRK-9, TRK-12
Video Voltage

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and all controls and adjustments full counter-clockwise. Values should hold within $\pm 20\%$ with 117-volt a-c supply.

BOTTOM VIEW

Figure 8—Voltage Diagram

* NOTE: Values with star (*) are operating voltages in circuits with high series-resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

MODELS TRK-9, TRK-12
SPU Chassis KK-7, KK-7A
Chassis Wiring

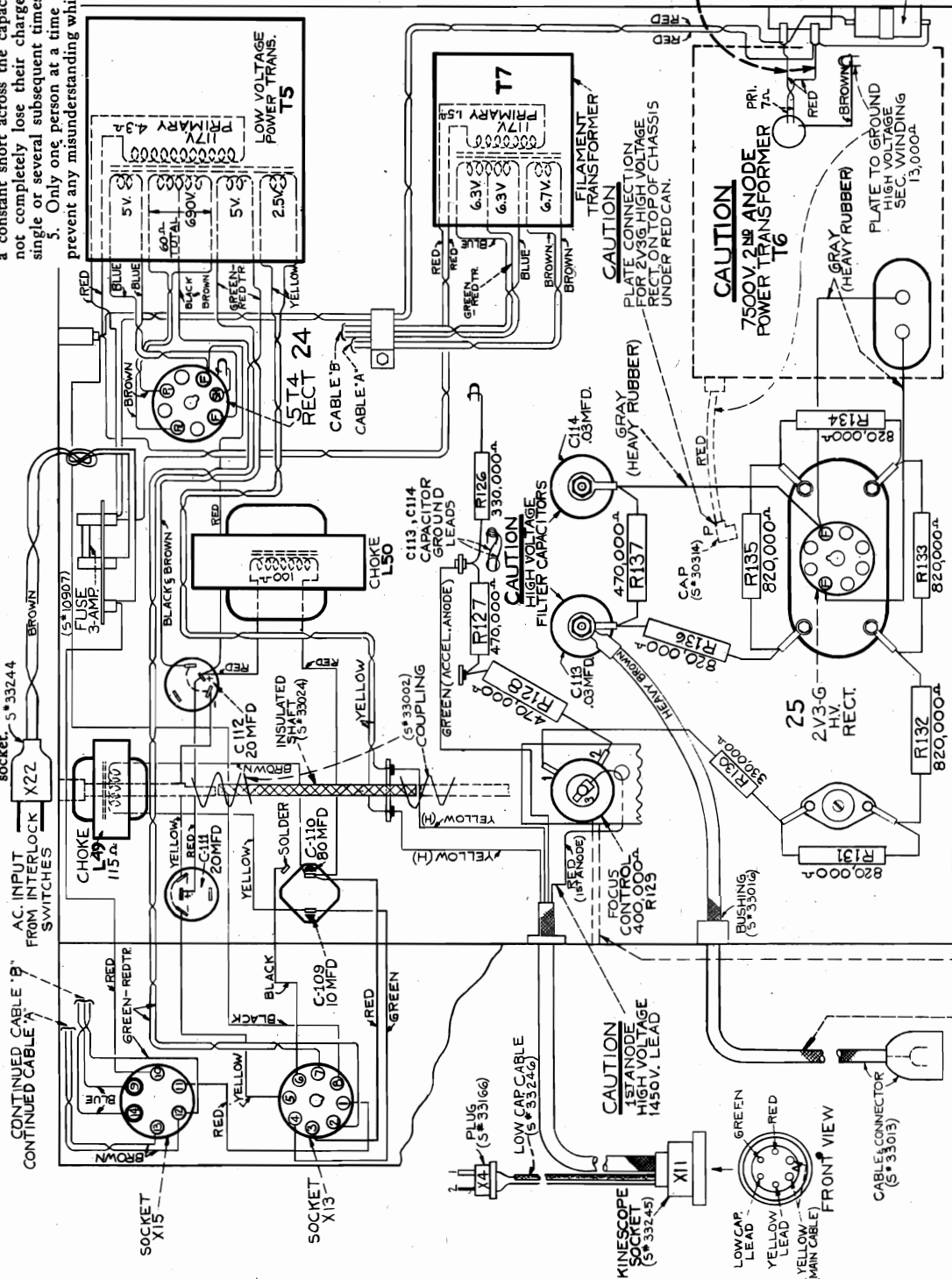
RCA MFG. CO., INC.

2. Use only one hand at a time. It is advisable to keep the other hand in one's pocket.
3. Connect a shorting lead between ground (first) and the high voltage side of C-114.
4. Whenever working with the oil-filled capacitors, keep a constant short across their charge after being discharged a single or several subsequent times.
5. Only one person at a time should work on the unit to prevent any misunderstanding which may result in an accident.

Socket Power Units KK7, KK7A

No attempt should ever be made to measure the high (7,500 volts) voltage because of the difficulties and dangers involved. If, at any time it becomes necessary to service the SPU, the suspected parts should be replaced by parts known to be in good operating condition.

1. Remove power supply cord from the power supply socket, S-33244.



T-88809 - O

Figure 11—SPU Wiring

RCA MFG. CO., INC.

MODELS TRK-5, TT-5
MODELS TRK-9, TRK-12
Test Patterns

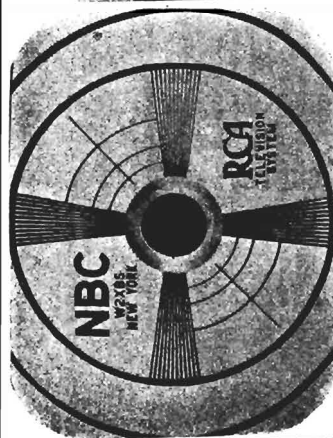


Figure 2—CORRECT PICTURE

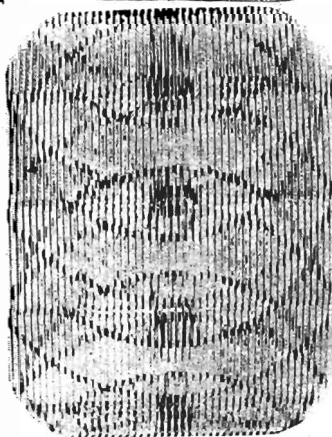


Figure 6—INCORRECT HORIZONTAL HOLD
To correct—Adjust Horizontal Hold Control until picture “locks in”

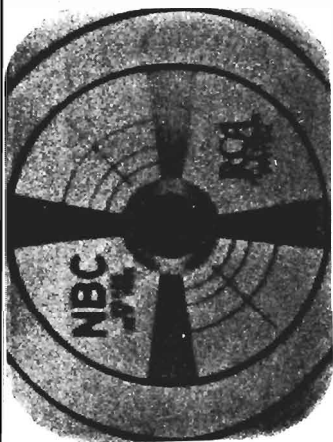


Figure 3—INCORRECT FOCUS
To correct—Adjust Focusing Control for sharpest image



Figure 7—INCORRECT VERTICAL HOLD
To correct—Adjust Vertical Hold Control until picture “locks in”

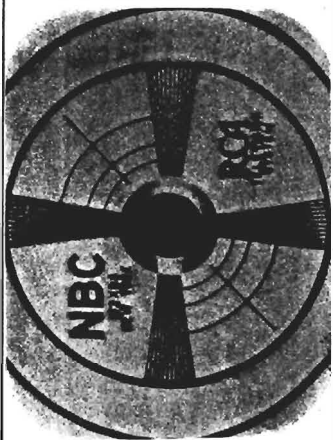


Figure 4—TOO MUCH CONTRAST
To correct—Turn Contrast Control clockwise and Brightness Control counterclockwise

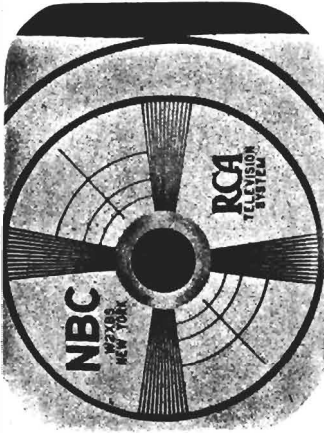


Figure 8—INCORRECT HORIZONTAL CENTERING
To correct—Adjust Horizontal Centering Control (screwdriver adjustment) to center picture horizontally

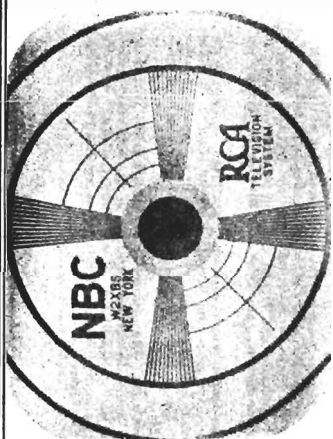


Figure 5—TOO LITTLE CONTRAST
To correct—Turn Contrast Control counterclockwise and Brightness Control clockwise

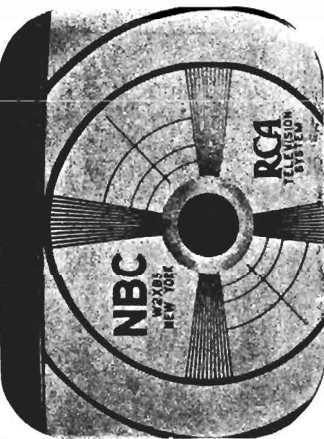


Figure 9—INCORRECT VERTICAL CENTERING
To correct—Adjust Vertical Centering Control (screwdriver adjustment) to center picture vertically

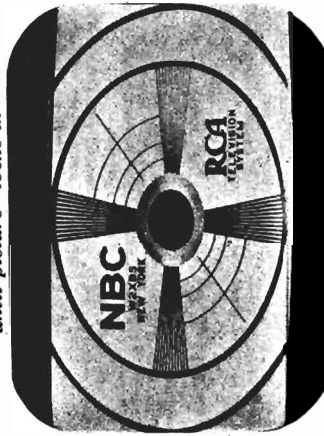


Figure 11—INCORRECT HEIGHT
To correct—Adjust Height Control (screwdriver adjustment) for correct height of picture

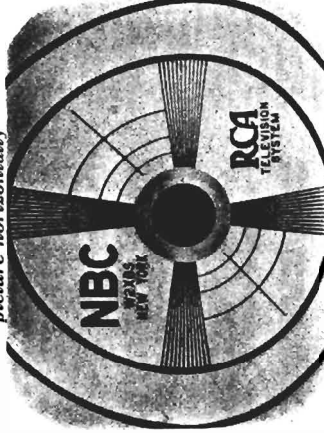


Figure 12—INCORRECT VERTICAL LINEARITY—(Circles flattened at bottom)
To correct—Turn Vertical Linearity Control counterclockwise and Height Control clockwise (screwdriver adjustments)

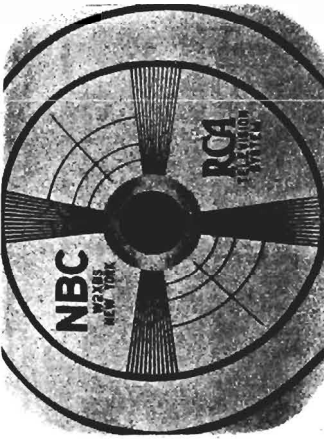


Figure 13—INCORRECT VERTICAL LINEARITY—(Circles flattened at top)
To correct—Turn Vertical Linearity Control clockwise and Height Control counterclockwise (screwdriver adjustments)

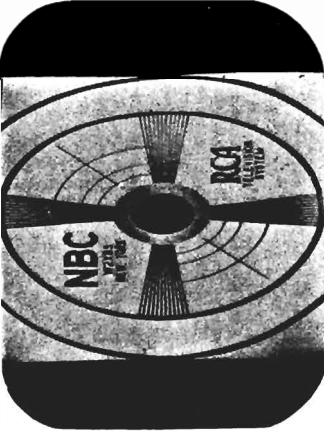


Figure 10—INCORRECT WIDTH
To correct—Adjust Width Control (screwdriver adjustment) for correct width of picture

MODELS TRK-9, TRK-12

Operating Data

RCA MFG. CO., INC.

1. Turn the Fidelity-Selector Control on the radio panel to "Television," fully clockwise.
2. Turn Power-Volume Control on radio panel clockwise and advance about half way.
3. Set the Station Selector on the Television panel to the desired television station 1-2-3-4 or 5.
4. Turn the Contrast Control fully counterclockwise and then turn Brightness Control slowly until illumination of the screen almost disappears. Advance the Contrast Control until the picture appears at its best as viewed in the mirror on the lid. The Contrast Control turned too far clockwise causes blurring. Make final adjustment for best picture by adjusting both the Contrast and Brightness Controls.
5. The illustrations shown in Figures 2, 4 and 5 give an idea of the effect of the Brightness and Contrast Controls. Incorrect setting has effects somewhat similar to under and over exposure on photographic prints.
6. If the picture is not steady, the "Hold" controls will require slight readjustment. If the picture is moving sideways the Horizontal Hold (inner "H" section of the knob) requires readjustment. If the picture is moving up or down or is off position, then the outer ring "O" of the knob, Vertical Hold Control, requires readjustment. See Figures 6 and 7.
7. Adjust the Volume Control and the Tone Control (Fidelity-Selector knob) for best sound reception.
8. If an interfering ripple is observed in the picture, adjustment of the Fine Tuning knob may reduce or eliminate the distortion.
9. If the picture appears out of focus, carefully turning the "Focusing" Control knob on the back of the cabinet will remedy the condition.

As long as the Television Receiver is not moved in any way, only an occasional setting of the other controls will be required.

A spot in the center and also a slight discoloration of the television screen may gradually appear as the Kinescope ages. This is normal and in no way affects good picture reproduction.

Television Fixed Controls

1. **Horizontal Centering**—This is a screwdriver adjustment at the top of the row. It serves to center the picture horizontally on the Kinescope screen and is made at the time of installation of the receiver. It may require resetting due primarily to the earth's magnetic field, if the receiver location is changed, the cabinet turned around, or the Kinescope replaced. Figure 8 shows the effect of incorrect setting of this control.
2. **Width**—The next screwdriver control determines the width of the picture and is adjusted when the receiver is installed. Further adjustment may occasionally be required in order to compensate for the gradual reduction in horizontal deflection with tube life. See Figure 10.
3. **Vertical Linearity**—The third control is spaced in conjunction with the Height Control, No. 4, to give the correct vertical proportions to the picture. It may require readjustment due to changing of the Height Control and due to the gradual ageing of the tubes. See Figures 12 and 13. If the picture fills the frame but is crowded near the top, turn Vertical Linearity Control clockwise and Height Control counterclockwise. If crowded towards the bottom, turn these two controls in the reverse directions.
4. **Height**—The fourth control determines the height of the picture and is adjusted in conjunction with Vertical Linearity when the receiver is installed. Further adjustment will occasionally be necessary in order to compensate for the gradual reduction in vertical deflection with tube life. See Figure 11.
5. **Vertical Centering**—The screwdriver adjustment at the bottom of the row serves to center the picture vertically on the Kinescope screen and is made at the time of installation. It will require resetting whenever the receiver location is changed, the cabinet turned around, or the Kinescope replaced. See Figure 9.

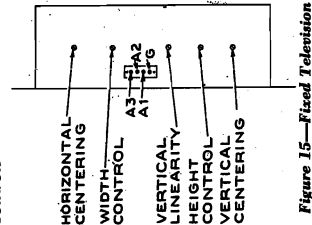


Figure 15—Fixed Television Controls

- (1) Fully counterclockwise modifies tone, reducing surface noise on old recordings and emphasizing low tones.
- (2) The middle Victrola point minimizes bass response, thus emphasizing higher tones.
- (3) The next point in a clockwise direction sets the instrument for full tone phonograph reproduction.
- (4) The position, marked "Radio," sets the instrument for Radio reception and provides four variations of radio tone control. Turning clockwise these are:
 - (1) Reduction of static and circuit hiss, and emphasis on low tones.
 - (2) Speech point with a modification of low tones.
 - (3) Full tone reception for normal reproductions.
 - (4) High Fidelity reception for special musical programs giving all the tone values possible.

The position marked "Television" sets the instrument for Television reception. The first and second points, give modified tones as for "Victrola" position, points (1) and (2), and the third point (3) gives full tone reception.

Horizontal and Vertical Hold Controls—The dual knob at the back of the panel on the right controls the picture stability. The inner section designated by a "H" is the Horizontal Hold Control and when being set should be turned slowly to the point at which the picture "locks" in horizontally. Figure 6 shows the effect of incorrect setting of the control. The outer ring section designated by "O" is the Vertical Hold Control and when being set should be turned to the point where the picture "locks" in vertically. See Figure 7.

These two controls on this dual knob should not ordinarily require readjustment after good picture reception has once been obtained. An occasional resetting will be necessary due to changing to a different station, and to the gradual ageing of the tubes.

Station Selector and Fine Tuning—The outer ring "O" section of the central dual control knob on the right hand side of the panel selects the station from which it is desired to receive television transmissions. The range covers five television channels:

- (1) 84 to 90 M.C.
- (2) 78 to 84 M.C.
- (3) 68 to 74 M.C.
- (4) 50 to 56 M.C.
- (5) 44 to 50 M.C.

The inner "H" section of this knob is used to obtain best picture reception by elimination of distortion resulting from interfering radio signals. These interfering signals in a moving ripple in the picture. A slight downward pressure must be exerted on the knob while turning.

Contrast and Brightness Controls—The inner "C" Contrast section of the dual knob near the front of the cabinet on the right regulates the sensitivity of the receiver, varying the black and white tones of the picture being received. Too much contrast gives blurred details and a lack of half-tones, while too little contrast makes it all half-tones or grays. Turning clockwise increases contrast from grays, to black and white. See Figures 2, 4 and 5.

The outer ring "O" is the Brightness Control and affects the average illumination of the picture. Turning clockwise increases the brightness. See Figures 2, 4 and 5.

Focusing Control—This control is a knob located on the back of the cabinet near the bottom and is used for adjustment of the picture focus. This adjustment affects the sharpness (detail observable) of the picture and must be carefully made when the receiver is first placed in operation. It may be checked occasionally to insure continuous best focusing. See Figure 3.

Pilot Light—A little jewel pilot light at the bottom of the front of the cabinet tells when current is on.

Other Control—There are five other controls on the television chassis. All of these will be permanently adjusted at the time the TRK 12 is installed, but may require occasional resetting. See Figure 15. These controls are accessible from the back of the cabinet. A vertical row of holes in the left side of the back of the cabinet through a vertical row of holes in the

To obtain picture reception, open the lid of the cabinet and:

Receiving the Picture

Antenna

The RCA Model TRK 12 Television set is designed for operation on the present Television Broadcast Bands between 44 and 90 megacycles to reproduce both picture and sound transmissions, and to receive Radio Broadcasts on the three standard major radio bands between 550 and 22,000 Kilocycles.

A television receiving antenna and its installation must conform to much higher standards than an antenna for reception of International Short Wave and Standard Broadcast signals because:

- (1) At the short wave lengths employed, intervening obstacles have a pronounced shielding effect, causing low intensity signals, and often severe trouble with multi-path transmissions; these produce blurring and noise-images.
- (2) The picture signal is comprised of a very wide band of range of frequencies, all of which must be received with good efficiency.

Only an RCA Television Antenna which has been designed for the particular installation should be used with the TRK 12 to insure best results. Three types are available.

1. The Double "Y" Type, Stock No. 9870.
2. The Double Dipole, Stock No. 9871, with Reflector, Stock No. 9872.
3. The Double Dipole, Stock No. 9871, with Reflector, Stock No. 9872.

Under favorable conditions, good pictures may be obtained with the Double "Y" Wire Type. In areas of weak signals or where interference or double images mar the picture a Double Dipole or Double Dipole and Reflector become necessary.

Full instructions accompany all RCA Television antennas and these instructions must be followed implicitly.

The two leads from the antenna transmission line are for connection to the terminals A1 and A2 showing at the back of the cabinet of the television receiver. Terminal C must be connected to a good ground such as a cold water pipe. Terminals A3 and G are connected to the Radio chassis and the circuit is designed so that the Television Antenna is also used for Standard Broadcast and Short-Wave Radio Reception.

An RCA Radio Antenna such as the RCA Magic Wave or RCA Spider may be installed. The connection from "A" on the terminal board on the radio chassis to "A3" on the terminal board on the television chassis must then be removed and the lead from the radio antenna connected to the radio chassis in accordance with the instructions accompanying the antenna. The connection from "C" on the radio chassis to "G" on the television chassis must not be removed. A good ground for the terminal "G" on the antenna lead should be connected to a cold water pipe or equivalent "good ground" is absolutely necessary to avoid possible danger from electric shock.

TELEVISION

The picture is formed on the Kinescope screen under the lid and is reflected in the mirror on the lid. The lid when opened must be set at the correct angle for best viewing of the picture. Once your TRK 12 is installed and giving good reception, the controls on the panel under the lid are all that are necessary for satisfactory pictures and sound. If the instrument is moved to another location in the home, the screwdriver-operated controls in the back, and also the Kinescope yoke, may have to be reset. The ground connection to the antenna terminal board must always be reconnected.

Controls

There are three dual control knobs for Television to the right of the screen, and four single control knobs in the Radio section to the left. Two of these single control knobs are all purpose controls and are used on Television, Radio and Phonograph reproductions. See Figure 1.

Power-Volume Control—The knob nearest the front of the cabinet on the left hand side turns on the power to the receiver when rotated clockwise from its extreme "Off" position. Rotating it further increases sound volume for Television, Radio, or Phonograph (when an attachment is used).

Fidelity-Selector—The second knob from the front in the Radio section selects the type of entertainment i.e. "Victrola," "Radio" or "Television."

Turned to the position marked "Victrola" it provides for operation of a Victrola Attachment such as the RCA R-100 or R-93-C. There are three variations of tone possible:

MODELS TRK-5,TT-5
MODELS TRK-9,TRK-12
Video Band Switch Wiring
MODELS TRK-9,TRK-12
SPU Chassis RS-83E Schematic

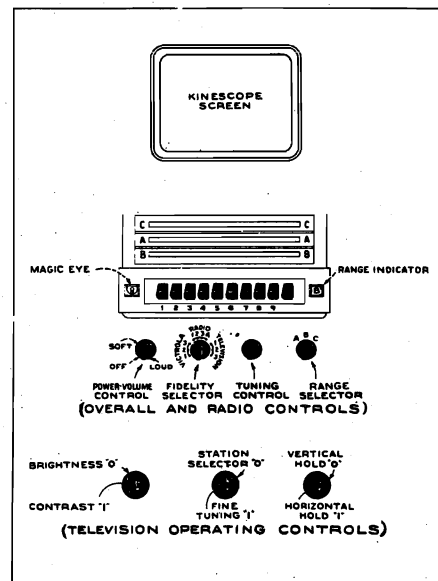
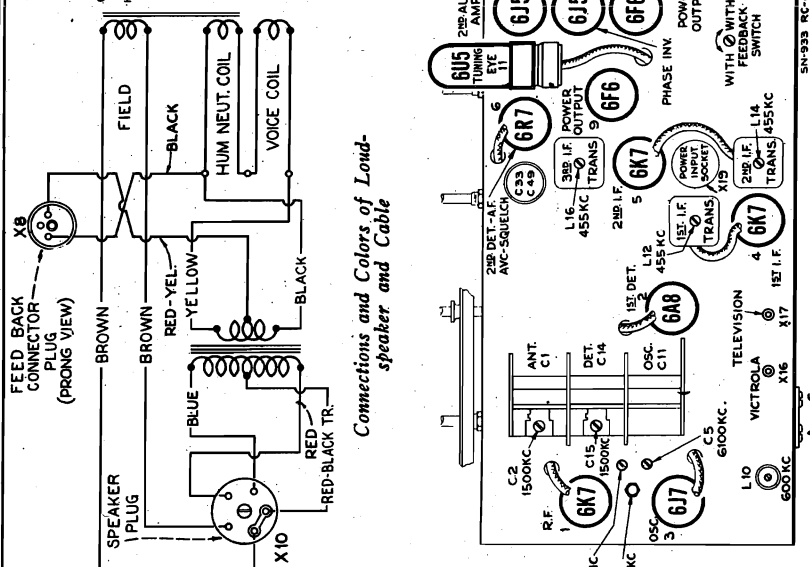
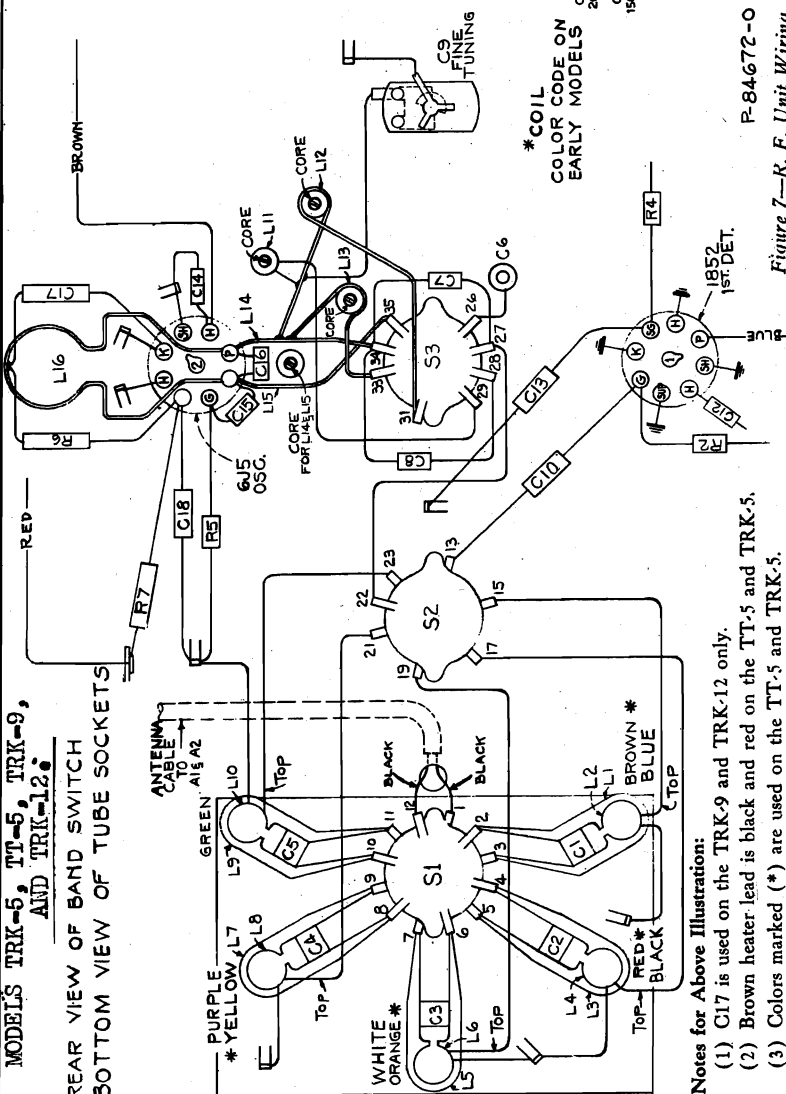
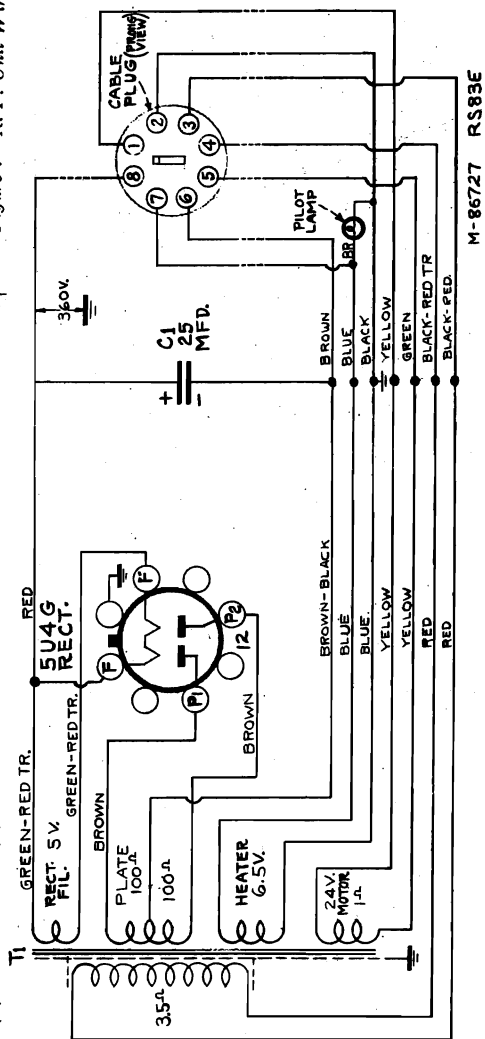


Figure 1—Operating Controls, TRK-9



Notes for Above Illustration:

- (1) C17 is used on the TRK-9 and TRK-12 only.
- (2) Brown heater lead is black and red on the TT-5 and TRK-5.
- (3) Colors marked (*) are used on the TT-5 and TRK-5.



SPU Schematic Diagram, RS-83E

REPLACEMENT PARTS

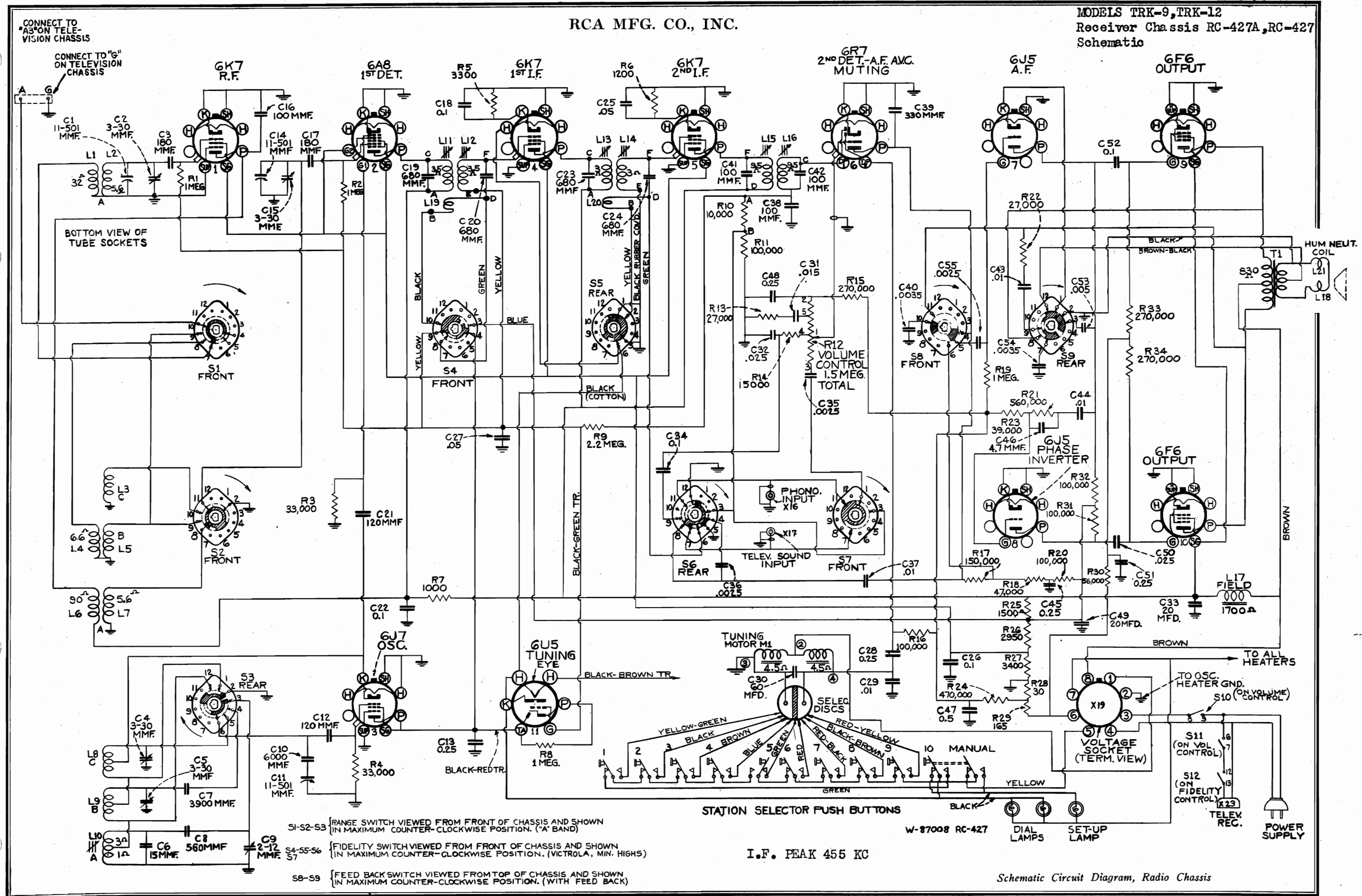
REPLACEMENT PARTS

STOCK No.	Unit Price	DESCRIPTION	STOCK No.	Unit Price	DESCRIPTION	STOCK No.	Unit Price	DESCRIPTION	STOCK No.	Unit Price	DESCRIPTION
TELEVISION CHASSIS ASSEMBLIES											
KC-4 in TRK-12											
KC-4A in TRK-9											
33387	.55	Adjuster—Magnetic core and stud in tube for high frequency adjustment (Used with L1, L2, L3, L4, L5, L6, L7, L8, L9, L10, L11, L12, L13, L14, L15, L16, L17, L18, L19, L20, L21, L22, L23, L24, L25, L26, L27, L28, L29, L30, L31, L32, L33, L34, L35, L36, L37, L38, L39, L40, L41, L42, L43, L44, L45, L46, L47, L48, L49, L50, L51, L52, L53, L54, L55, L56, L57, L58, L59, L60, L61, L62, L63, L64, L65, L66, L67, L68, L69, L70, L71, L72, L73, L74, L75, L76, L77, L78, L79, L80, L81, L82, L83, L84, L85, L86, L87, L88, L89, L90, L91, L92, L93, L94, L95, L96, L97, L98, L99, L100, L101, L102, L103, L104, L105, L106, L107, L108, L109, L110, L111, L112, L113, L114, L115, L116, L117, L118, L119, L120, L121, L122, L123, L124, L125, L126, L127, L128, L129, L130, L131, L132, L133, L134, L135, L136, L137, L138, L139, L140, L141, L142, L143, L144, L145, L146, L147, L148, L149, L150, L151, L152, L153, L154, L155, L156, L157, L158, L159, L160, L161, L162, L163, L164, L165, L166, L167, L168, L169, 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L2144, L2145, L2146, L2147, L2148, L2149, L2150, L2151, L2152, L2153, L2154, L2155, L2156, L2157, L2158, L2159, L2160, L2161, L2162, L2163, L2164, L2165, L2166, L2167, L2168, L2169, L2170, L2171, L2172, L2173, L2174, L2175, L2176, L2177, L2178, L2179, L2180, L2181, L2182, L2183, L2184, L2185, L2186, L2187, L2188, L2189, L2190, L2191, L2192, L2193, L2194, L2195, L2196, L2197, L2198, L2199, L2200, L2201, L2202, L2203, L2204, L2205, L220									

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

RCA MFG. CO., INC.

MODELS TRK-9, TRK-12
Receiver Chassis RC-427A, RC-427
Schematic



RCA MFG. CO., INC.

MODELS TRK-9, TRK-12
Electric Tuning Data

Electric Tuning Mechanism

When a station button is pushed in, it completes the 24-volt circuit through the corresponding station-setting contact and one-half of the brass selector disc, which is connected to one side of the motor field coil. This energizes the motor, and the rotor is pulled forward, engaging with the gear train that drives the tuning condenser and selector disc. The condenser and disc rotate until the insulation line comes under the particular station-setting contact, and the motor circuit is broken.

When the electric tuning mechanism is in action, the motor-supply voltage is fed into a diode rectifier circuit which applies a high bias to the first-audio amplifier. This prevents audio amplification and makes the set quiet or "mute" while the mechanism is operating.

The brass selector disc is fastened to the rear shaft of the tuning condenser by means of two set-screws. When the condenser is at maximum (plates fully meshed) the insulation line should be horizontal, with the operating end at the left (viewed from rear). The brass is beveled at this end.

The selector disc should be set so that the contact-tip plungers in the station-setting contacts project not more than 1/16-in. from the body of the contacts.

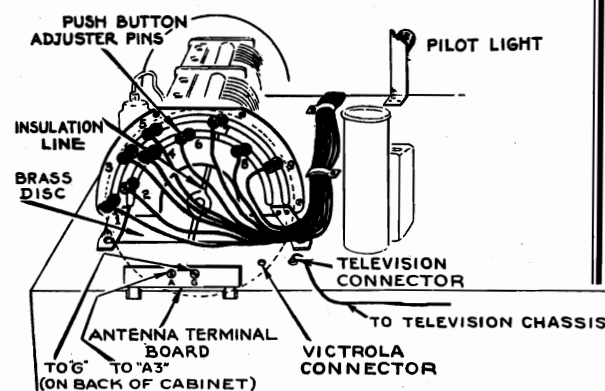
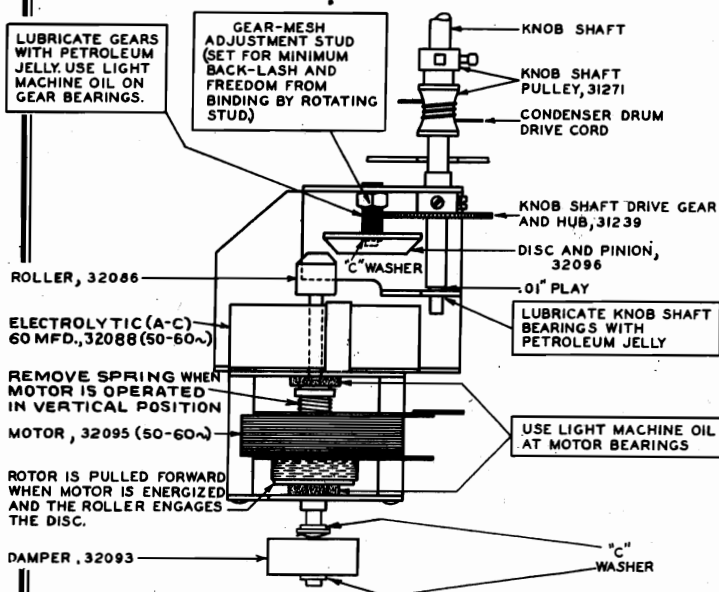
LUBRICATION

Motor bearings and gear bearings; use light machine oil.

Gear faces; use "Pure Oil No. 611" or petroleum jelly.

Dial-indicator pulleys and rails; use "Castordag" or petroleum jelly.

Selector disc; apply thin film of petroleum jelly.



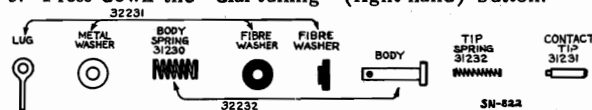
Station Button	Color of Lead To Station-Setting Contact	Station Button	Color of Lead To Station-Setting Contact
No. 1	Yellow-green	No. 6	Red
No. 2	Black	No. 7	Red-black
No. 3	Brown	No. 8	Brown-black
No. 4	Blue	No. 9	Red-yellow
No. 5	Green		

Adjustments for Electric Tuning

With power turned off, disconnect the antenna transmission line and ground connection, turn fidelity control to radio (3rd. radio position—6th position from full counter-clockwise). Remove the back from the cabinet and reconnect the antenna transmission line and ground connection. The two interlock switches on the side panels should not be touched and care should be taken not to press on them when making the push-button set-up. Then turn on power, set range selector to "A," allow a few moments warm-up period and proceed as follows:

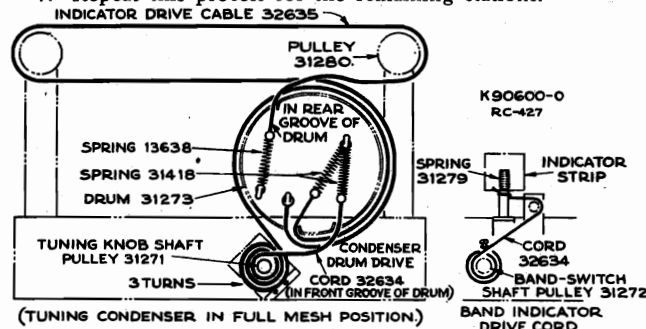
1. Make a list of the desired nine stations, arranged in order from low to high frequencies.
2. Turn on power-volume control, turn range selector to "A" band, and allow a few minutes for warming up.
3. Press down the "dial-tuning" (right-hand) button.

4. Manually tune in the first station on the list, using the "Magic Eye" for accurate tuning.
5. Hold down the "dial-tuning" button and press down station button No. 1 (left-hand). Both buttons will stay down. Move station adjuster contact pin No. 1 to the insulating line on the disc at rear of gang. When the pin is correctly centered on the insulating line, the central dial lamp will go out completely.
6. Press down any other button in order to release the dial-tuning button and station button No. 1. Tune to some other section on the dial, and then press down station button No. 1 again; the electric tuning mechanism will function to tune in the first station, and the central dial lamp will stay on.
7. Repeat this process for the remaining stations.



Components of Station Setting Contact

At Right—Dial Mechanism



MODELS TRK-9, TRK-12

Kinescope Data

Parts List

RCA MFG. CO., INC.

Precautions in Handling Kinescopes

The Kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For these reasons, Kinescopes must be handled with more care than ordinary receiving tubes.

The large end of the Kinescope bulb — particularly that part at the rim of the viewing surface — must not be struck, scratched or subjected to more than moderate pressure at any time. If the tube sticks, or fails to slip into its socket or deflecting yoke smoothly, investigate and remove the cause of trouble. Do not force the tube.

All RCA Kinescopes are shipped in special cartons and should always be left in the cartons until ready for installation in the receiver. Keep the carton for future use.

The RCA-1803-P4 (12-inch) Kinescope is equipped with a protective lid and shield. Do not at any time remove the close-fitting cone-shaped section of the protective shield from the Kinescope. This section should be installed with the tube in the cabinet and is designed to protect the user while handling the glass bulb.

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
7,500 VOLT TELEVISION POWER UNIT			33246	Cable—Low capacity Kinescope grid cable (Model TRK-12 only).....	1.25
TRK-12—KK-7			33605	Cable—Low capacity Kinescope grid cable (Model TRK-9 only).....	1.35
TRK-9—KK-7A			33597	Cap—Blue pilot lamp "Bulls Eye".....	.20
33016	Bushing—Porcelain bushing and spring.....	.25	32897	Clamp—Deflecting yoke clamp assembly.....	.65
33288	Cable—Insulated connector complete with cable for Kinescope (2nd anode).....	2.10	4573	Connector—2-prong female connector for power supply circuit (X23).....	.30
33995	Capacitor—.005-.005 mfd., 1,000 v. (C115, C116).....	xx	33363	Connector—2-prong female connector, used on interlock cable (X21).....	.45
32901	Capacitor—.03 mfd., 7,500 volt (C113, C114).....	3.25	33002	Coupling—Flexible bronze coupling (Used in 2nd production receivers).....	.10
32400	Capacitor—20 mfd., 450 volt (C111, C112).....	1.05	31456	Cover—Eight protective covers for push button markers.....	.08
33023	Capacitor—80-10-mfd., 400 volt (C110, C109).....	2.80	32815	Cushion—Kinescope masking cushion (Model TRK-12 only).....	2.30
14854	Choke—Filter choke (L49).....	1.80	33019	Cushion—Kinescope masking cushion (Model TRK-9 only).....	1.90
32940	Choke—Filter choke (L50).....	3.75	33643	Cushion—Television chassis mounting cushion with screw, spacer and washer (sufficient for one chassis).....	.40
30314	Clip—Plate connector for 2V3G Radiotron.....	.03	33442	Dial—Three-band glass dial scale.....	1.25
33037	Control—Focus control, 400,000 ohms (R129) (Used in 1st production).....	1.00	33329	Escutcheon—Dial escutcheon less buttons, button shaft and dial scale.....	2.60
33971	Control—Focus control, 400,000 ohms (R129) (Used in 2nd production).....	1.00	32083	Frame—Dial frame with screen less pointer, carriage and rod.....	1.20
33002	Coupling—Flexible bronze coupling.....	.10	10907	Fuse—3 ampere line fuse.....	.08
10907	Fuse—3 ampere, 250 volt.....	.08	33074	Glass—6½ by 8½ inch safety protective glass (Model TRK-9 only).....	2.40
33015	Insulator—Stand-off insulator only—less hardware.....	.30	33076	Glass—8½ by 11½ inch safety protective glass (Model TRK-12 only).....	3.90
32937	Knob—Focus control knob.....	.20	33282	Hinge—Piano type lid hinge and screws.....	2.50
33244	Plug—2-prong male connector for A.C. power cord (X22).....	.45	33468	Knob—Radio tuning, volume or range selector knob.....	.15
33166	Plug—Two prong male plug for Kinescope grid-cathode cable (X4).....	.20	33470	Knob—Television "Contrast," "Hor. hold" or "Fine Tuning" knob.....	.20
33501	Resistor—330,000 ohms, 1W (1,000V.) (R126, R130).....	.20	33471	Knob—Television "Brightness" or "Vert. hold" knob.....	.25
33502	Resistor—470,000 ohms, 1W (1,000V.) (R127, R128, R137).....	.20	33472	Knob—Television "Station selector" knob.....	.25
33554	Resistor—820,000 ohms, 1W (1,000V.) (R131, R132, R133, R134, R135, R136).....	.20	33469	Knob—"Victrola"—Radio—Television—Fidelity selection" knob.....	.20
33024	Shaft—Bakelite shaft for focus control.....	.50	11891	Lamp—6.3 V. pilot lamp, Mazda No. 44.....	.17
18007	Socket—Ceramic octal base socket and retaining ring for high voltage rectifier.....	.65	31589	Marker—Complete set of call letter markers.....	.35
33245	Socket—Kinescope socket, less cable (X11).....	.35	31458	Marker—"Dial Tuning" push button marker.....	.01
31251	Socket—Octal base 5T4 rectifier, or television power supply socket (X13).....	.25	31457	Marker—"Victrola" push button marker.....	.01
12143	Socket—6-prong television power supply socket (X15).....	.50	33075	Mirror—20½ by 14½ in. viewing mirror.....	9.00
32909	Support—Rectifier socket, plate, and stand-off insulator assembly.....	2.00	33225	Nut—Speed nut for mounting high frequency coil assemblies.....	.01
32939	Transformer—Filament power transformer (T7).....	5.65	4577	Plug—2-prong male plug for power supply circuit (X24).....	.45
9861	Transformer—High voltage power transformer (T8).....	22.50	33244	Plug—2-prong male plug, used on interlock cable (X22).....	.45
32938	Transformer—Low voltage power transformer (T5).....	10.00	33166	Plug—2-prong male plug for Kinescope grid-cathode cable (X4).....	.20
SPEAKER ASSEMBLY			32816	Plug—4-prong male plug for deflecting yoke cable (X2).....	.20
RL-70F-5			12493	Plug—5-prong female speaker cable plug (X9).....	.30
31825	Cap—Cone center dust cap.....	.05	4574	Plug—6-prong male plug for Television chassis power supply cable (X14).....	.48
11469	Coil—Hum neutralizing coil (L21).....	.30	16836	Plug—8-prong male plug for Television chassis power supply cable (X12).....	.25
11234	Coil—Speaker field coil (L17).....	3.85	31542	Pointer—Station selector pointer with carriage.....	.35
31275	Cone—Speaker cone assembly (L18).....	1.75	31287	Rod—Dial frame pointer slide rod.....	.15
31567	Plug—3-prong male feed back cable plug (X8).....	.15	32083	Screen—Dial frame difusing screen with rivets.....	1.20
31539	Plug—5-prong speaker plug (X10).....	.25	4560	Screw—½20 by 1½ in. long, machine screw, washer and lockwasher for chassis mounting (12 required).....	.08
31556	Speaker—Speaker complete (RL-70F-5).....	13.45	33517	Sleeve—Bell mouth sleeve for screw-driver adjustments (Model TRK-9 only).....	.05
31557	Transformer—Speaker output transformer (T1).....	3.20	14270	Spring—Knob spring for stock Nos. 33468, 33471, 33472, 33469 knobs.....	.05
MISCELLANEOUS ASSEMBLIES			30330	Spring—Knob spring for stock Nos. 33470, knob.....	.03
TRK-12			33362	Switch—Interlock switch with leads.....	1.80
TRK-9			31522	Support—Left hand lid support.....	2.25
31358	Button—Station selector push button.....	.15	31478	Support—Right hand lid support.....	2.20
33676	Cable—17½-inch shielded audio lead with plugs (X6, X18) (Model TRK-9 only).....	.85	9857	Yoke—Deflecting yoke complete with cable and 4-prong plug (L43, L44, R62).....	17.50
33480	Cable—38-inch shielded audio lead with plugs (Model TRK-12 only) (X6, X18).....	1.30			

XX—Price upon application to your RCA Parts Distributor

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

Schematic, Transformer Data Lead Dress, Specifications

RCA MFG. CO., INC. MODELS 5Q5A, 5Q5B, 5Q5C, 5Q5D,
5Q5E, 5Q55, 5Q56, Chassis RC-396
MODEL 6Q7, Chassis RC-414A

FREQUENCY RANGES

"Standard Broadcast" (A)..... 540-1,720 kc (555-174 m)
"Medium Wave" (B)..... 2.3-7.0 mc (130-42.8 m)
"Short Wave" (C)..... 7.0-22.0 mc (42.8-13.6 m)
Intermediate Frequency..... 455 kc

RCA TUBE COMPLEMENT

(1) RCA-6SA7..... First Detector—Oscillator
(2) RCA-6K7..... Intermediate Amplifier
(3) RCA-6SQ7..... Second-Detector, A.V.C., and A-F Amplifier
(4) RCA-6F6-G..... Power Output
(5) RCA-5Y8-G..... Full-Wave Rectifier
(6) RCA-6U5 (Model 6Q7)..... "Magic Eye"
Pilot Lamp (1)..... Mazda 44, 6.3 volts, 0.25 amp.

POWER OUTPUT RATING

Undistorted..... 1.5 watts
Maximum..... 8.3 watts

LOUDSPEAKER

Type (5Q5, 5Q55, 5Q56) RL-78-2..... 5-inch Electrodynamic
(6Q7)..... RL-79-2..... 6-inch Electrodynamic
Voice-Coil Impedance..... 3.4 ohms at 400 cycles

POWER SUPPLY RATINGS

Rating A..... 105-125 volts, 50-60 cycles, 70 watts
Rating B..... 105-125 volts, 25-60 cycles, 70 watts
Rating C..... 105-125/200-250 volts, 50-60 cycles, 70 watts

CABINET DIMENSIONS

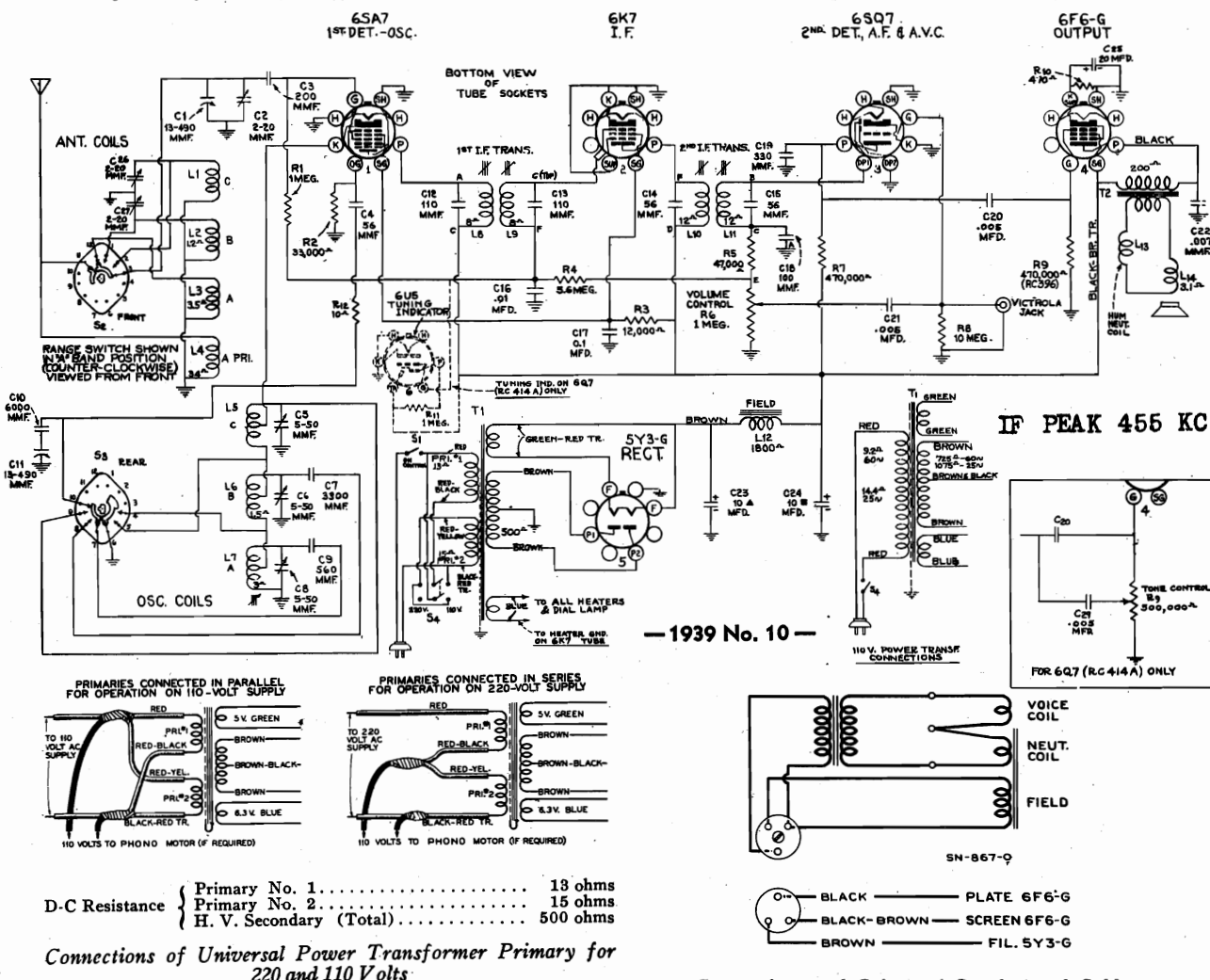
	Models 5Q5, 5Q55 5Q56	Model 6Q7
Height.....	9½ inches	12-5/16 inches
Width.....	13½ inches	14½ inches
Depth.....	8½ inches	8½ inches
Weight (net).....	18½ pounds	16½ pounds
Chassis Base Dimensions.....	12 in. wide, 5½ in. deep, 2½ in. high	
Overall Chassis Height.....	7 inches	
Tuning Drive Ratio.....	18 to 1	

General Description

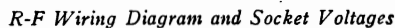
Models 5Q5, 5Q55, 5Q56 and 6Q7 are three-band table type superheterodyne receivers. They are designed to cover the standard broadcast range of 540 to 1,720 kilocycles, and the short-wave range from 2.3 to 22 megacycles.

Models 5Q5 and 6Q7 are Export Types.

Features of design include: Magnetite-core I-F transformers; magnetite-core "A" band oscillator coil; automatic volume control; continuously-variable high-frequency tone control on Model 6Q7; edge-lighted straight-line dial; band indicator in dial; jack for Victrola Attachment; and dust-proof electrodynamic loudspeaker.



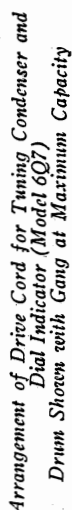
Socket, Trimmers, Voltage
Drive Cord Data, Scale



ALL HEATERS 6.3V.AC, EXCEPT 5Y3G, 5.0V.AC.

BOTTOM VIEW- REAR OF CHASSIS

NOTE: Values with star () are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

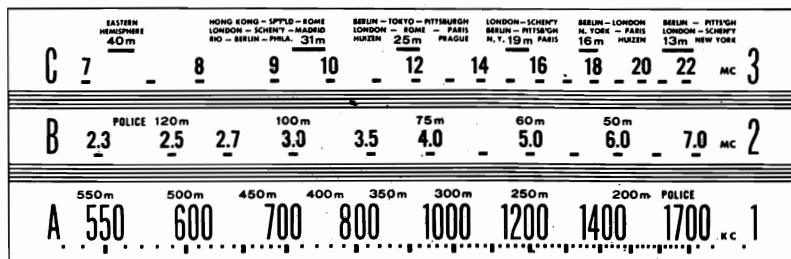


Arrangement of Drive Cords for Tuning Condenser and Dial Indicator (Models 5Q5, 5Q55 and 5Q56)



*Reduced Reproduction of Receiver
Dial, and Corresponding 0-180°
Calibration Scales*

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 33° on the calibration scale corresponds to approximately 7.9 mc on "C" band, and 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."



Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the ground terminal, and keep the output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the rear of the drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 45 degree mark on the drum scale (see "Drum Drive and Indicator Cord Assembly" drawings) must be in a horizontal position when the plates are fully meshed. The distance from the edge of the chassis to the drum must not exceed 8-inch. The drum is held to the shaft by means of a set screw, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "0" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	"A" Band quiet point 550-750 kc	L10 and L11 (2nd I.F. trans.)
2	Tuning condenser (osc. stator) (osc. in series with .01 mfd. **	455 kc		L8 and L9 (1st I.F. trans.)
3	Antenna lead (blue) in series with 200 mmfd.	600 kc (33°)	600 kc "A" Band	L7†
4		1,500 kc	1,500 kc (155.4°) "A" Band	C2 (ant.) C8 (osc.)
5	Repeat steps 3 and 4			
6	Antenna lead (blue) in series with 400 ohms	20 mc	20 mc (155.4°) "C" Band	C5 (osc.) * C26 (ant.)
7		6 mc	6 mc (149°) "B" Band	C6 (osc.) * C27 (ant.)
8	Antenna lead (blue) in series with 200 mmfd.	1,500 kc	1,500 kc (152.4°) "A" Band	C8 (osc.)

* Use minimum capacity peak if two peaks can be obtained.

† Rock gang condenser slightly while adjusting L7.

**** Make test-oscillator connection to lug on tuning condenser (oscillator section) in series with .01 mfd. condenser.**

Note.—Oscillator tracks 455 kc above signal on all bands.

STOCK No.	DESCRIPTION	Unit Price	STOCK No.	DESCRIPTION	Unit Price
CHASSIS ASSEMBLIES					
32832	Bracket—Drive bracket, pulleys, and tuning knob shaft complete (Models 5Q5, 5Q55 and 5Q56)	1.20	32910	Transformer—Power transformer—105-120 volts, 25-60 cycles (T1).....	6.20
32835	Cable and 5Q55 shield cap.....	.24	32911	Transformer—Power transformer—105-120 volts, 50-60 cycles (T1).....	4.10
32837	Cap—First I.F. transformer shield cap.....	.25	32852	Transformer—Power transformer—105-120 and 200-240 volts, 50-60 cycles (T8, S1) (Models 5Q5 and 5Q55).....	4.50
32838	Capacitor—.56 mfd. (C4, C15).....	.25	32918	Volume control and switch (R6, S1) (Models 5Q5 and 5Q55).....	1.50
32839	Capacitor—.109 mfd. (C12, C13).....	.30	32928	Volume control, tone control and power switch (R6, R9, S1) (Model 6Q7).....	2.50
32840	Capacitor—.110 mfd. (C18).....	.30	SPEAKER ASSEMBLIES		
32841	Capacitor—.220 mfd. (C3).....	.35	Models 5Q5, 5Q55 and 5Q56 (RL-78-2)		
32842	Capacitor—.330 mfd. (C16).....	.35	32907	Cap—Cone center dust cap.....	.02
32843	Capacitor—.560 mfd. (C9).....	.35	32903	Coil—Speaker field coil (L12).....	1.25
32844	Capacitor—3.300 mfd. (C7).....	.60	32906	Coil—Speaker hum neutralizing coil (L13).....	1.25
32845	Capacitor—6.000 mfd. (C10).....	.75	32904	Coil—Speaker cone, voice coil, center suspension, and dust cap (L14).....	1.25
32846	Capacitor—Trimmer capacitor bank, 2 sections 2-20 mfd. (C26, C27).....	.40	32905	Phono, 3, and dust cap for speaker.....	1.25
32847	Capacitor—Trimmer capacitor bank, 3 sections mfd. (C10, C28).....	.55	32907	Speaker—Complete.....	1.35
32848	Capacitor—.005 mfd. (C20, C21, C29).....	.25	32908	Transformer—Output transformer (T2).....	1.35
32849	Capacitor—.007 mfd. (C16).....	.30	SPEAKER ASSEMBLIES		
32850	Capacitor—.01 mfd. (C12).....	.30	Model 6Q7 (RL-79-2)		
32851	Capacitor—.01 mfd. (C17).....	.30	32907	Cap—Speaker cone center dust cap.....	.02
32852	Capacitor—.02 mfd. (C17).....	1.45	32903	Coil—Speaker field coil (L12).....	1.25
32853	Coil—Antenna coil A, B, C bands (L1, L2, L3, L4).....	1.35	32906	Coil—Speaker hum neutralizing coil (L13).....	.25
32854	Coil—Oscillator coil—A, B, C bands (L5, L6, L7).....	1.00	32932	Coil—Speaker cone and voice coil (L14) (Model 6Q7).....	1.65
32855	Condenser—2-gang variable condenser (C1, C2, C11).....	2.60	5118	Plug—3-prong male for speaker.....	2.25
32856	Cord—Drive cord.....	1.10	32933	Speaker—Complete.....	5.50
32857	Cord—Core and stud for oscillator coil adjustment Drive cord drum.....	.35	32905	Transformer—Output transformer (T2).....	1.35
32858	Lamp—Dial lamp.....	.17	MISCELLANEOUS ASSEMBLIES		
32859	Plate—Dial back plate and pointer—less dial scale (Model 6Q7).....	1.60	32845	Bracket—Dial mounting bracket and lamp bracket assembly—less pointer and potentiometer slide rods (Models 5Q5, 5Q55 and 5Q56).....	.85
5119	Plug—3-contact female for speaker cable.....	.25	32837	Dial—Dial scale.....	.85
32834	Pulley—Drive cord pulley and mounting bracket (1 pulley).....	.25	32843	Knob—Black range switch knob (Models 5Q5 and 5Q55).....	.15
32851	Pulley—Drive cord pulleys and mounting bracket (3 pulleys) (Model 6Q7).....	.45	32905	Knob—Black tuning knob (Models 5Q5 and 5Q55).....	.25
32861	Resistor—470 ohms, 1 watt (R10).....	.22	32841	Knob—Black volume control knob (Models 5Q5 and 5Q55).....	.15
32832	Resistor—1 meg., 1/10 watt (R11) (Model 6Q7).....	.15	32839	Knob—Brown tuning knob (Models 5Q5 and 5Q55).....	.25
32835	Resistor—12,000 ohms, 3/4 watt (R3).....	.50	32907	Knob—Ivory range switch knob (Models 5Q5 and 5Q55).....	.15
32838	Resistor—3,000 ohms, 1 watt (R2).....	.15	32901	Knob—Ivory tuning knob (Models 5Q5 and 5Q55).....	.25
32839	Resistor—17,000 ohms, 1/10 watt (R5).....	.20	32906	Knob—Maroon range control knob (Models 5Q5 and 5Q55).....	.15
32840	Resistor—1 meg. 1/2 watt (R1).....	.20	32905	Knob—Maroon tuning knob (Models 5Q5 and 5Q55).....	.25
32841	Retainer—Retaining ring for holding tuning knob shaft (Model 6Q7).....	.03	32933	Knob—Maroon volume control knob (Models 5Q5 and 5Q55).....	.25
32842	Retainer—Tuning knob shaft retainer (Models 5Q5, 5Q55 and 5Q56).....	.01	32902	Pointer—Dial pointer, carriage and clip.....	.15
32848	Screw—No. 8-32 square head set screw for drum shaft—tuning knob shaft, eyelet and retainer (Models 5Q5, 5Q55 and 5Q56).....	.30	32847	Rod—Pointer slide rod.....	.35
32832	Shaft—Tuning knob shaft (Model 6Q7).....	.30	32938	Screw—No. 8-32 x 5/16 headless set screw for knob, Stock Nos. 32842, 32843, 32844, 32845, 32846, 32847, 32848, 32849, 32850, 32851, 32852, 32853, 32854, 32855, 32856, 32857, 32858, 32859, 32860, 32861, 32862, 32863, 32864, 32865, 32866, 32867, 32868, 32869, 32870, 32871, 32872, 32873, 32874, 32875, 32876, 32877, 32878, 32879, 32880, 32881, 32882, 32883, 32884, 32885, 32886, 32887, 32888, 32889, 32890, 32891, 32892, 32893, 32894, 32895, 32896, 32897, 32898, 32899, 32900, 32901, 32902, 32903, 32904, 32905, 32906, 32907, 32908, 32909, 32910, 32911, 32912, 32913, 32914, 32915, 32916, 32917, 32918, 32919, 32920, 32921, 32922, 32923, 32924, 32925, 32926, 32927, 32928, 32929, 32930, 32931, 32932, 32933, 32934, 32935, 32936, 32937, 32938, 32939, 32940, 32941, 32942, 32943, 32944, 32945, 32946, 32947, 32948, 32949, 32950, 32951, 32952, 32953, 32954, 32955, 32956, 32957, 32958, 32959, 32960, 32961, 32962, 32963, 32964, 32965, 32966, 32967, 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ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

MODELS 5X5I, 5X5W
Chassis RC-406
Alignment, Parts

RCA MFG. CO., INC.

Model 5X5 Series (Chassis No. RC-406)

Five-Tube, Single-Band, AC-DC Multiplex Superheterodyne Receiver

Model PLF-10

Power Line Filter Coupling Unit

General Description

The following features are incorporated in the design of the Little Nipper Multiplex 5X5 Series Receiver:

First, it is a "standard broadcast" receiver. Second, it will operate any other radio in the home by "remote control" without the use of connecting wires. Third, records may be reproduced through the Little Nipper when used with Victrola Attachment. Fourth, the Model 5X5 (when used with Victrola Attachment) will reproduce records

through any other radio in the home without the use of connecting wires.

When using the 5X5 as a remote control, the Model PLF-10 Power Line Filter Coupling Unit should be used in conjunction with the receiver to be controlled. The filter is connected between the power line receptacle and the receiver being controlled, as shown in accompanying drawing.

Alignment Procedure

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.

The Remote Control Oscillator in the 5X5 is set at the factory to approximately 540 kc. The frequency may be varied between 540 and 800 kc to suit local conditions by adjusting the trimmer condenser C7.

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

If the electric supply circuit is a three-wire system, it may be necessary to connect a $\frac{1}{2}$ mfd 700-volt capacitor between the two outside lines of the three-wire system.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	Tuning condenser stator (osc.) in series with .01 mfd.	455 kc	Quiet point at 1,600 kc end of dial	C1, C2, C3, C4 (1st and 2nd I-F transformers)
2	Antenna term. of ant. trans. in series with 100 mmfd.	1,720 kc	Full clockwise (out of mesh)	C5 (oscillator)
3		1,500 kc	Resonance on 1,500 kc signal	C6 (antenna)

Replacement Parts

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
CHASSIS ASSEMBLIES					
13057	Capacitor—60 mmfd.....	.35	32969	Socket—Dial lamp socket.....	.25
12488	Capacitor—250 mmfd.....	.35	14278	Socket—Phonograph socket.....	.25
12952	Capacitor—300 mmfd.....	.35	32537	Socket—Tube socket.....	.20
30433	Capacitor—400 mmfd.....	.35	30585	Spring—Drive cord spring.....	.08
4838	Capacitor—.005 mfd.....	.25	33324	Switch—Phonograph switch.....	.50
4937	Capacitor—.01 mfd.....	.25	33319	Transformer—First i-f transformer.....	1.40
4870	Capacitor—.025 mfd.....	.20	33057	Transformer—Second i-f transformer.....	1.25
4839	Capacitor—.01 mfd.....	.30	32578	Volume control and power switch.....	1.50
12484	Capacitor—.025 mfd.....	.30	POWER LINE FILTER PLF-10		
33321	Capacitor—Electrolytic, 2 sections 30 mfd. each.....	1.00	13057	Capacitor—60 mmfd.....	.35
32572	Coil—Antenna coil.....	.60	12484	Capacitor—.025 mfd.....	.30
33320	Coil—Duplex oscillator coil.....	.90	33492	Coil—Choke coil.....	.50
32962	Coil—Oscillator coil.....	.60	33493	Receptacle—Power receptacle.....	.40
33323	Condenser—Trimmer 20-150 mmfd.....	.35	33491	Switch.....	.35
32968	Condenser—2-gang variable tuning.....	2.25	SPEAKER ASSEMBLIES		
32634	Cord—Drive cord.....	.10	(39105—2)		
32946	Drum—Condenser drive drum.....	.35	32963	Speaker complete.....	3.95
31480	Lamp—Dial lamp—Mazda No. 47.....	.20	32964	Transformer—Output transformer.....	1.25
12409	Lead—Antenna lead.....	.45	MISCELLANEOUS ASSEMBLIES		
33322	Resistor—5 ohms, 5 watts.....	.20			
14671	Resistor—33 ohms, $\frac{1}{2}$ watt.....	.20	X-639	Cabinet—Ivory finish—Model 5X5I.....(net)	2.20
13428	Resistor—150 ohms, $\frac{1}{2}$ watt.....	.20	X-438	Cabinet—Walnut finish—Model 5X5W.....(net)	1.35
13998	Resistor—22,000 ohms, $\frac{1}{2}$ watt.....	.20	32942	Dial—Glass dial scale.....	.30
12454	Resistor—33,000 ohms, $\frac{1}{2}$ watt.....	.20	33317	Fastener—Push fastener to hold cabinet back...	.02
12412	Resistor—47,000 ohms, $\frac{1}{2}$ watt.....	.20	33306	Knob—Black tuning knob—Model 5X5I.....	.15
12264	Resistor—220,000 ohms, $\frac{1}{2}$ watt.....	.20	32447	Knob—Ivory knob—Model 5X5W.....	.15
12285	Resistor—470,000 ohms, $\frac{1}{2}$ watt.....	.20	32943	Nut—Speed nut to hold dial.....	.01
12679	Resistor—2.2 meg., $\frac{1}{2}$ watt.....	.20	31646	Spring—Knob retaining spring.....	.02
13601	Resistor—10 meg., $\frac{1}{2}$ watt.....	.20			
32945	Shaft—Tuning knob shaft and bushing.....	.20			

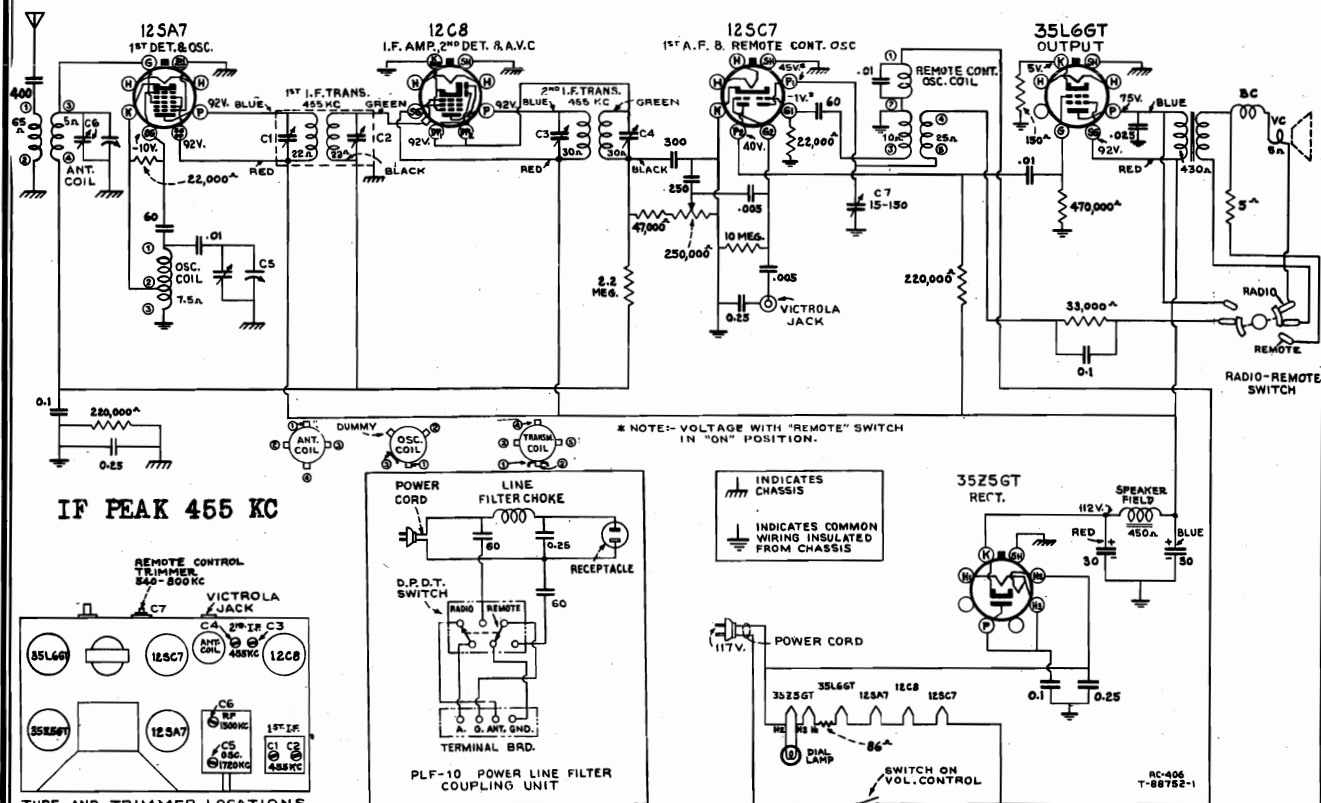
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Socket, Trimmers

RCA MFG. CO., INC.

MODELS 5X5I, 5X5W

Chassis RC-406

MODEL PLF-10 Coupling Unit
Schematics, Tuner, Voltage

—1939 No. 18—

Electrical and Mechanical Specifications

FREQUENCY RANGE

Receiver 540-1,720 kc
 Remote Control Oscillator 540-800 kc

TUBE COMPLEMENT

(1) RCA-12SA7 1st-Detector-Oscillator
 (2) RCA-12C8 I-F Amp., 2nd-Det., and A.V.C.
 (3) RCA-12SC7 1st A-F and Remote Control Osc.
 (4) RCA-35L6GT Power Output
 (5) RCA-35Z5GT Half-Wave Rectifier
 Dial Lamp (1) Mazda 47, 6.3 Volts, .15 amp.
 Intermediate Frequency 455 kc

POWER SUPPLY RATINGS

A-C Rating 100-125 volts, 50-60 cycles, 30 watts
 D-C Rating 100-125 volts, direct current, 30 watts

POWER OUTPUT (125 volt, 60 cycle supply)

Undistorted 1.5 watts
 Maximum 2.0 watts

LOUDSPEAKER

Type 4 inch Electrodynamical
 Cabinet Dimensions (inches) Height 5½, Width 8½, Depth 4½
 Weight (net) 5½ pounds

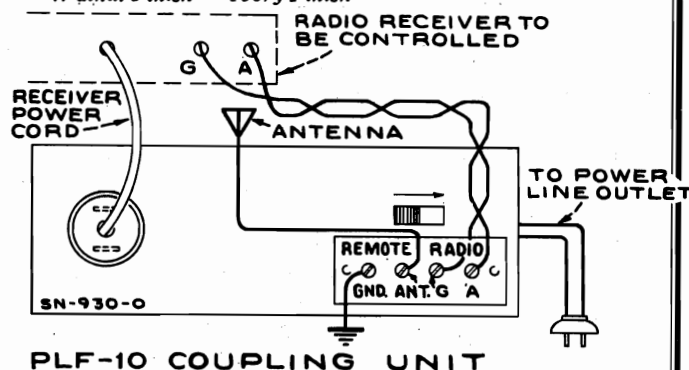
Model 5X5W Walnut Finish
 Model 5X5I Ivory Finish

Set-up Procedure for Remote Control

1. Install the 5X5 and tune in any desired station.
2. Turn the control switch on the back of the 5X5 to its clockwise position marked "Remote." The 5X5 becomes silent. The 5X5 now becomes a small relay station for signalling to the controlled receiver via the power line wiring.
3. Next tune the main receiver to the exact frequency of transmission of the 5X5, usually 540 kc. Tune carefully to this frequency, setting the volume control as high as permissible with regard to hum and noise conditions. The station to which the 5X5 was tuned will be heard. If the receiver is equipped with tuning indicator (Magic Eye) the correct point will most easily be obtained by observing the indicator.
4. Now any station tuned in on the 5X5 dial will be heard on the controlled receiver. The volume will also be controlled with the 5X5 volume control.
5. If it is desired to operate the controlled receiver on its own controls it is only necessary to set the switch on the Power Line Filter Coupling Unit to its position marked "Radio."
6. In the event that, with the 5X5 being used as a remote control, other receivers in the home are in use, trouble may be experienced due to noise and hum. To avoid this, connect a Power Line Filter Coupling Unit, RCA Victor PLF-10, to each of these other receivers, as shown in accompanying drawing.

Precautionary Lead Dress

1. Dress 1st I-F plate and grid leads against chassis and away from each other. Dress plate lead from 12C8 close to chassis.
2. Dress A.V.C. condenser (0.1) close to chassis and tight to 0.25 mmfd. condenser.



Antenna.—The set is equipped with length of antenna wire. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

Victrola Attachment.—A jack is provided on the rear of chassis for connecting a Victrola Attachment into the audio-amplifying circuit. The cable from the Victrola Attachment should be terminated in a Stock No. 31048 plug to fit the jack.

Trademarks "Victrola," "Magic Eye" Reg. U. S. Pat. Off. by RCA Mfg. Co., Inc.

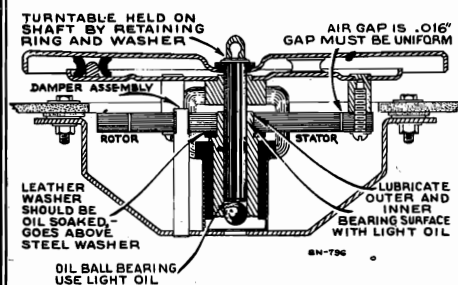
First Edition

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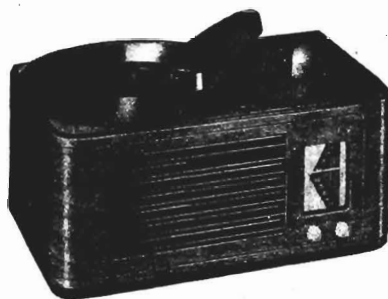
MODELS U8M,U8W
Chassis RC-404A
Motor Assembly,

RCA MFG. CO., INC.

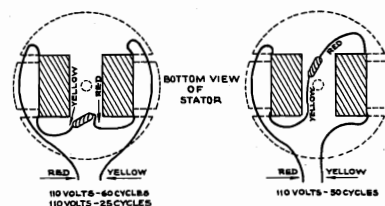
RCA Victor MODEL U-8 (Chassis No. RC-404A)
Five-Tube, Single-Band, A-C, Superheterodyne Victrola



Cross Section of Motor Assembly



Model U-8W
Walnut Finish
Model U-8M
Blonde Mahogany Finish



Motor Coil Assembly and Connections

Replacement Parts

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
CHASSIS ASSEMBLIES			MOTOR ASSEMBLIES		
12488	Capacitor—250 mmfd. ....	.35	31045	Base—Motor support, damper, and bearing cup assembly .....	.60
12952	Capacitor—300 mmfd. ....	.35		Bearing—Rotor bearing .....	.70
4838	Capacitor—.005 mfd. ....	.25	31046	Cap—Turntable spindle cap (rubber) .....	.10
4937	Capacitor—.01 mfd. ....	.25	33553	Coil—Motor field coil—105-120 volts, 25 cycle. ....	.60
33736	Coil—Antenna coil .....	.75	33557	Coil—Motor field coil—105-120 volts, 50 cycle. ....	.70
32962	Coil—Oscillator coil .....	.60	31918	Coil—Motor field coil—105-120 volts, 60 cycle .....	.70
13057	Condenser—60 mmfd. ....	.35	31917	Cushion—One set rubber cushion for turntable mounting .....	.25
30433	Condenser—400 mmfd. ....	.35	31040	Cushion—Rubber cushion for rotor bearing .....	.15
33033	Condenser—.0035 mfd. ....	.40	31047	Frame—Motor frame and spindle—60 cycle	1.30
33584	Condenser—.005 mfd. ....	.25	33941	Lamination—Rotor lamination—60 cycle	1.30
4870	Condenser—.025 mfd. ....	.20	33641	Lamination—Stator laminations—25 cycle	1.30
4839	Condenser—0.1 mfd. ....	.30	33558	Lamination—Stator laminations—less coil 50 cycle	1.00
12536	Condenser—820 mfd. ....	.45	33555	Motor—105-120 volts, 25 cycle	11.75
32576	Condenser—Electrolytic, one section 20 mfd., one section 12 mfd. ....	.90	33551	Motor—105-120 volts, 50 cycle	7.65
32968	Condenser—2-gang variable tuning	2.25	33940	Motor—105-120 volt, 60 cycle	7.30
32634	Cord—Drive cord .....	.10	32075	Ring—Lead ring for turntable—25 cycle	1.85
33289	Dial—Glass dial scale .....	.40	33041	Ring—Retaining ring and washer for spindle cap .....	.06
33297	Drive—Dial drive mechanism—comprising drive drum, cord, shaft, dial color plate, back plate and pulleys assembled. ....	.85	33556	Rotor—Rotor frame, laminations, and spindle shaft assembled—25 cycle	2.55
33006	Feet—Rubber feet .....	.03	33552	Rotor—Rotor frame, laminations, and spindle shaft assembled—50 cycle	2.45
33295	Indicator—Dial pointer .....	.25	31036	Rotor—Turntable and rotor lamination for 60 cycle operation	4.55
32571	Knob—Tan knob (tuning or volume) .....	.15	31042	Stator—Stator assembly comprising coils and laminations for 60 cycle operation	2.50
11765	Lamp—Dial lamp—Mazda 51 .....	.15	32076	Turntable—Finished turntable plate only—25 cycle	1.40
31193	Lead—Antenna lead .....	.50	31039	Turntable—Finished turntable plate only—50 cycle .....	.95
33292	Plate—Dial color plate .....	.25	4083	Washer—Leather Washer .....	.02
33294	Pulley—Drive cord pulley .....	.02	33348	Washers—Leather and metal washers for stator bearing .....	.10
33558	Resistor—86 ohms .....	.15	14231	Washer—Metal spacing washer .....	.02
13428	Resistor—150 ohms, $\frac{1}{2}$ watt .....	.20	32074	Weight—One upper and one lower weight for stator—25 cycle (2 each required) .....	.65
30538	Resistor—330 ohms, $\frac{1}{2}$ watt .....	.20			
13998	Resistor—22,000 ohms, $\frac{1}{2}$ watt .....	.20			
12266	Resistor—39,000 ohms, $\frac{1}{2}$ watt .....	.20			
12412	Resistor—47,000 ohms, $\frac{1}{2}$ watt .....	.20			
12264	Resistor—220,000 ohms, $\frac{1}{2}$ watt .....	.20			
12285	Resistor—470,000 ohms, $\frac{1}{2}$ watt .....	.20			
12679	Resistor—2.2 meg., $\frac{1}{2}$ watt .....	.20			
13601	Resistor—10 meg., $\frac{1}{2}$ watt .....	.20			
33464	Shaft—Tuning knob shaft and bearing .....	.25			
32969	Socket—Dial lamp socket .....	.25			
32537	Socket—Tube socket .....	.20			
32803	Spring—Dial knob spring .....	.01			
31615	Spring—Drive cord tension spring .....	.02			
33296	Spring—Drive drum retaining spring .....	.06			
32667	Spring—Knob or drive drum retaining spring .....	.02			
32966	Transformer—First i-f transformer	1.25			
32967	Transformer—Second i-f transformer	1.05			
33465	Transformer—Output transformer	1.35			
33504	Volume control and power switch	1.50			
PICKUP AND ARM ASSEMBLIES			SPEAKER ASSEMBLIES (RL—78—4)		
33121	Arm—Pickup arm complete—less crystal cartridge	1.75	32907	Cap—Cone dust cap .....	.02
33592	Base—Pickup arm base and pivot arm .....	.70	33809	Coil—Speaker field coil	1.10
33122	Crystal—Pickup crystal cartridge and needle screw	4.35	32904	Cone—Speaker cone and voice coil	1.20
33123	Damper—Viscoloid damper for pickup armature. ....	.15	33466	Speaker complete (no output transformer)	4.25
33529	Screw—Pickup needle screw .....	.15			
			MISCELLANEOUS ASSEMBLIES		
			33467	Control—Tone control and Radio-Record switch	1.35
			33289	Dial—Glass dial scale .....	.40
			30863	Knob—Tone control knob .....	.15
			32895	Knob—Tuning or volume control knob .....	.15
			33530	Mounting—Pickup arm rubber cushion, washer and nut10
			30870	Plug—2-prong plug for motor leads35
			32610	Rest—Pickup arm rest10

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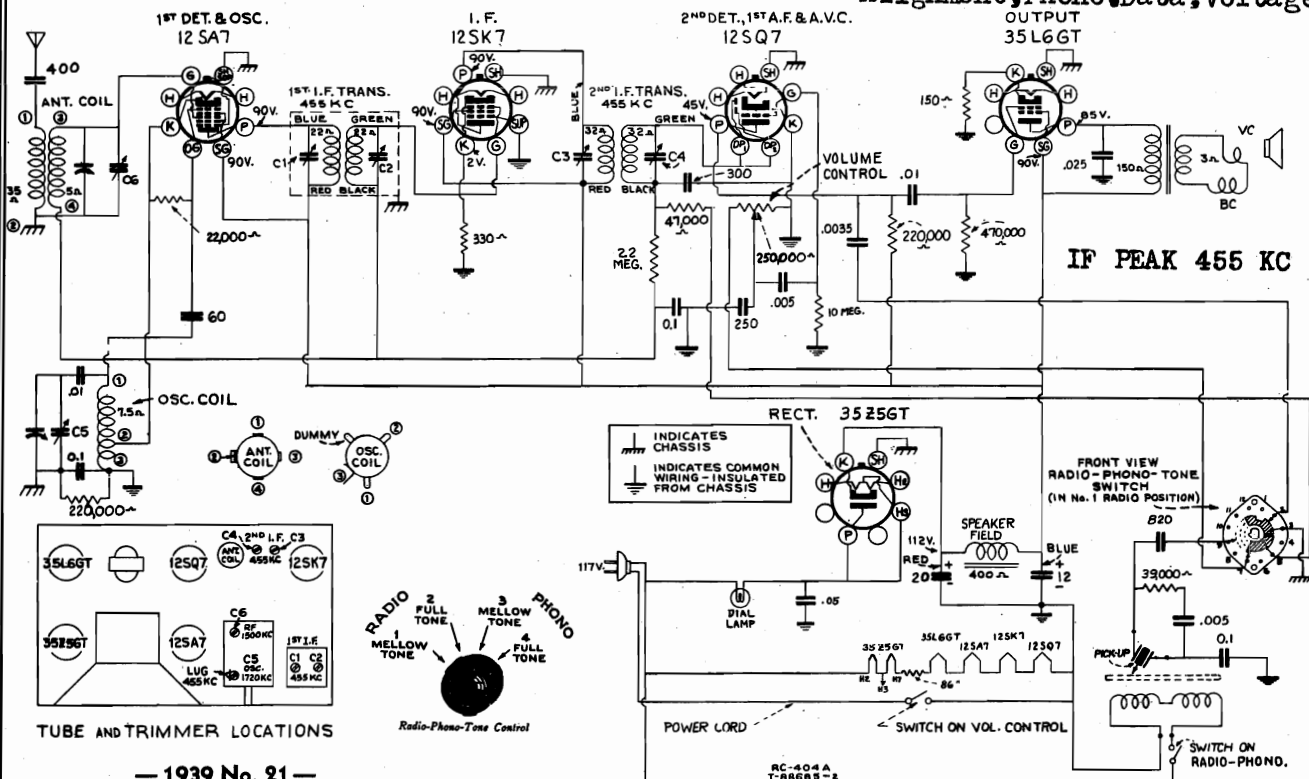
First Edition

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Printed in U. S. A.

RCA MFG. CO., INC. Chassis RC-404A

MODELS U8M, U8W
Schematic, Socket, Trimmers
Alignment, Phono, Data, Voltage



— 1939 No. 21 —

Electrical and Mechanical Specifications

FREQUENCY RANGE 540-1,720 kc
INTERMEDIATE FREQUENCY 455 kc

TUBE COMPLEMENT

- (1) RCA-12SA7 1st-Detector-Oscillator
- (2) RCA-12SK7 I-F Amplifier
- (3) RCA-12SQ7 2nd-Detector, 1st A-F, and A.V.C.
- (4) RCA-35L6GT Power Output
- (5) RCA-35Z5GT Half-Wave Rectifier
- Dial Lamp (1) Mazda 51, 7.5 volts, 0.2 amp.

POWER SUPPLY RATINGS

- A-5 105-125 volts, 50 cycles, 40 watts
A-6 105-125 volts, 60 cycles, 40 watts

POWER OUTPUT (125 volt, 60 cycle supply)

- Undistorted75 watts
Maximum 1.3 watts

LOUDSPEAKER

- Type 5-inch Electrodynamical
Voice-Coil Impedance 3.4 ohms at 400 cycles

PHONOGRAPH

- Records Synchronous (manual starting)
Pickup 10-inch and 12-inch, 78 r.p.m.
Average Output of Pickup 1½ volts at 1,000 c.p.s.
across ½ meg. load

- Cabinet Dimensions (inches) .. Height 6 9/16, Width 14½, Depth 8½
Weight (net) 11½ pounds

Alignment Procedure

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.

Antenna.—The set is equipped with length of antenna wire. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

Precautionary Lead Dress

1. Dress 1st I-F plate and grid leads against chassis and away from each other. Dress plate lead from 12SK7 close to chassis.
2. Dress electrolytic capacitor against chassis apron.

Phonograph Service Data

The motor is started by turning the radio-phono tone control to either 3rd or 4th position clockwise and giving the turntable a clockwise spin with the hand. Smooth starting and running will be insured by keeping the bearings well cleaned and oiled.

Hum and Vibration.—A small amount of hum when starting, decreasing to a negligible amount when running, is normal. If excessive vibration occurs it may be due to:

1. Insufficient lubrication, or any failure that will cause binding.
2. Leather washer not oiled. (Check to make certain that the leather washer is above the steel washer.)
3. Motor not properly supported from motor board.
4. Burrs on poles of rotor or stator. Remove with fine emery cloth.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	Tuning condenser stator (osc.) in series with .01 mfd.	455 kc	Quiet point at 1,600 kc end of dial	C1, C2, C3, C4 (1st and 2nd I-F transformers)
2	Antenna term. of ant. trans. in series with 100 mmfd.	1,720 kc	Full clockwise (out of mesh)	C5 (oscillator)
3		1,500 kc	Resonance on 1,500 kc signal	C6 (antenna)

Power Supply.—Although this model employs an ac-dc chassis, it is not suitable for use on dc, as this would damage the motor.

5. The damper spring must fit without binding or chattering in the slot in the stator. The stator must be free to deflect in either direction between the limits of the damper spring. The damper spring must exert approximately equal force in restoring the stator to its mid-position when the stator is deflected manually in each direction.

Removing Rotor.—The rotor and turntable assembly simply rests on the ball bearing at bottom of vertical bearing. Remove by lifting up.

Rotor Adjustment.—Loosen the three screws that hold the rotor to the turntable, insert three 16-mil shims at equal distances around the gap between the rotor and stator, and then carefully tighten the three screws. The top of rotor must be flush with top of stator; add additional steel washers beneath the stator if necessary.

Lubrication.—Oiling points are indicated in the diagram.

MODELS 9SX-1 to 9SX-8 incl.

Little Nipper

RCA MFG. CO., INC.

MODELS 9TX-1 to 9TX-5 incl.

Little Nipper-2nd

Parts Lists

"Little Nipper" Models 9SX-1, -2, -3, -4, -5, -6, -7, and -8

Five-Tube, Two-Band, AC-DC Superheterodyne Receivers

9SX-1, -2, -3, -4, -5, -6, -7, -8

Replacement Parts

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
31193	Antenna—35 ft. antenna wire—wound on reel	.50	32444	Knob—Station selector knob—Black.....	.25
X-569	Cabinet—Walnut and Ivory cabinet (9SX-2)	3.50 net	32445	Knob—Station selector knob—Maroon.....	.25
X-572	Cabinet—Blue and Onyx cabinet (9SX-6)...	3.50 net	32446	Knob—Volume control or range switch knob—Walnut	.15
X-575	Cabinet—Onyx cabinet (9SX-7).....	3.50 net	32447	Knob—Volume control or range switch knob—Ivory	.15
X-570	Cabinet—Walnut cabinet (9SX-1).....	3.50 net	32448	Knob—Volume control or range switch knob—Red	.15
X-573	Cabinet—Ivory cabinet (9SX-3).....	3.50 net	32449	Knob—Volume control or range switch knob—Blue	.15
X-576	Cabinet—Marble cabinet (9SX-8).....	3.50 net	32450	Knob—Volume control or range switch knob—Black	.15
X-571	Cabinet—Red and Ivory cabinet (9SX-4)...	3.50 net	32451	Knob—Volume control or range switch knob—Maroon	.15
X-574	Cabinet—Black and Marble cabinet (9SX-5)	3.50 net	4340	Lamp—Dial lamp—Mazda 40.....	.17
32392	Capacitor—.0005 mfd.....	.20	30540	Resistor—100 ohms, 1/3 watt.....	.20
32396	Capacitor—.0005 mfd. mica capacitor.....	.30	32397	Resistor—120 ohms, 1/2 watt, Flexohm....	.20
32393	Capacitor—.001 mfd.....	.20	30880	Resistor—150 ohms, 1/3 watt.....	.20
4858	Capacitor—.01 mfd.....	.25	30492	Resistor—20,000 ohms, 1/3 watt.....	.20
31796	Capacitor—.02 mfd.....	.20	3594	Resistor—50,000 ohms, 1/3 watt.....	.20
4886	Capacitor—.05 mfd.....	.20	30493	Resistor—150,000 ohms, 1/3 watt.....	.20
4839	Capacitor—.1 mfd.....	.30	3048	Resistor—500,000 ohms, 1/3 watt.....	.20
32386	Capacitor—10-20 mfd., Electrolytic.....	1.35	30652	Resistor—1 megohm, 1/3 watt.....	.20
32394	Capacitor—Trimmer capacitor 1,500 K.C. adjustment (C4).....	.20	32398	Screw—No. 6-32 fibre screw—back cover mounting	.08
32395	Capacitor—Trimmer capacitor 1,720 K.C. adjustment (C3).....	.20	32390	Socket—8-prong moulded Octal tube socket.	.25
32387	Coil—Antenna coil (T1).....	1.05	32380	Speaker—Dynamic loudspeaker.....	2.90
32388	Coil—Oscillator coil (T2).....	1.05	32381	Transformer—Output transformer (T6)....	1.00
32389	Coil—Short wave antenna coil (T3).....	.85	32382	Transformer—First i.f. transformer (T4)...	1.80
32379	Condenser—2-gang variable tuning condenser	2.35	32383	Transformer—Second i.f. transformer (T5)...	1.80
32384	Cord—Resistance power cord.....	.95	32385	Volume Control and Switch.....	1.50
32399	Dial—Indicator dial scale.....	.35			
32440	Knob—Station selector knob—Walnut.....	.25			
32441	Knob—Station selector knob—Ivory.....	.25			
32442	Knob—Station selector knob—Red.....	.25			
32443	Knob—Station selector knob—Blue.....	.25			

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

"Little Nipper—2nd" Models 9TX-1, -2, -3, -4, and -5

Five-Tube, Single-Band, AC-DC Superheterodyne Receivers

9TX-1, -2, -3, -4, -5

Replacement Parts

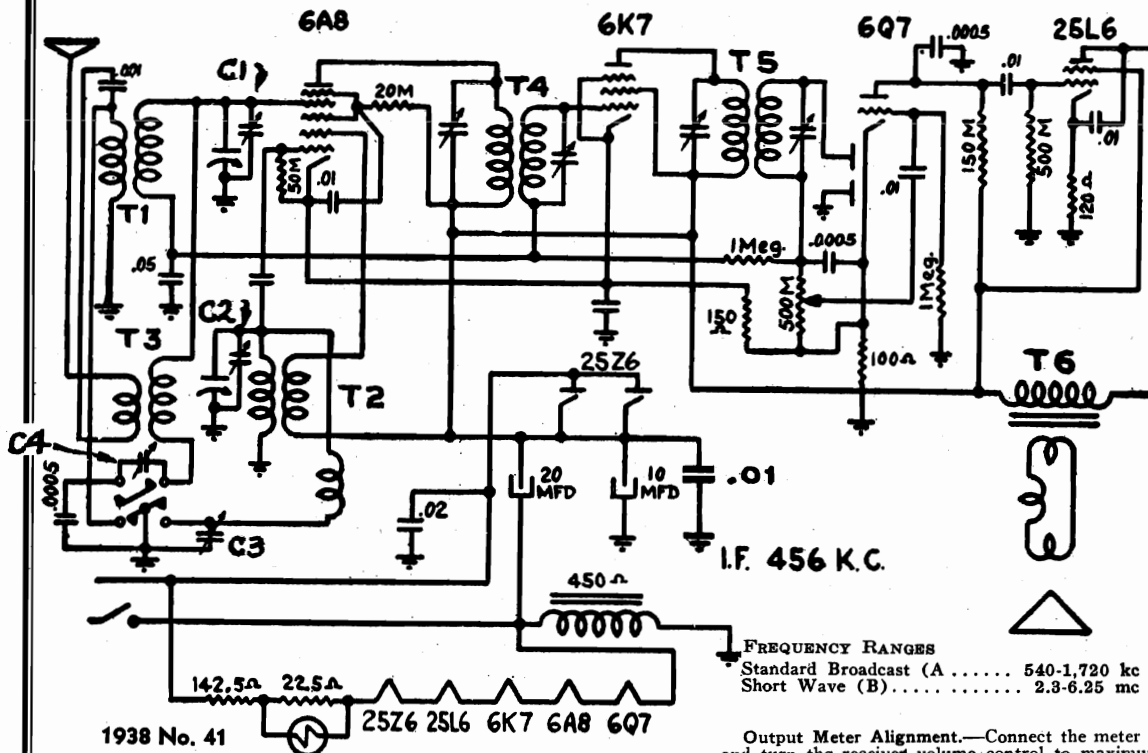
Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
X-587	Cabinet for 9TX1 (Walnut finish).....	1.35 net	32570	Knob—Maroon volume control knob for 9TX4	.15
X-588	Cabinet for 9TX2 (Ivory finish).....	2.20 net	32571	Knob—Tan volume control knob for 9TX1 and 9TX3.....	.15
X-589	Cabinet for 9TX3 (Wood, Mahogany finish)	2.80 net	31480	Lamp—Dial lamp—Mazda 47.....	.20
X-590	Cabinet for 9TX4 (Arizona Cream Onyx finish).....	4.50 net	12409	Lead—Antenna lead.....	.45
X-591	Cabinet for 9TX5 (Brazilian Green Onyx finish).....	4.50 net	14439	Resistor—100 ohms, 1/2 watt.....	.20
32572	Coil—Antenna coil.....	.60	32535	Resistor—120 ohms, wire wound.....	.20
32573	Coil—Oscillator coil.....	.50	12412	Resistor—47,000 ohms, 1/2 watt.....	.20
13057	Condenser—80 mmfd.....	.35	12264	Resistor—220,000 ohms, 1/2 watt.....	.20
12488	Condenser—250 mmfd.....	.35	12285	Resistor—470,000 ohms, 1/2 watt.....	.20
12952	Condenser—300 mmfd.....	.35	12679	Resistor—2.2 meg., 1/2 watt.....	.20
30433	Condenser—400 mmfd.....	.35	13601	Resistor—10 meg., 1/2 watt.....	.20
4858	Condenser—.01 mfd.....	.25	31199	Shield—Dial lamp shield—Models 9TX1, 9TX2, 9TX4, and 9TX5.....	.04
4870	Condenser—.025 mfd.....	.20	32537	Socket—Tube socket.....	.20
4886	Condenser—.05 mfd.....	.20	32575	Speaker—Complete with transformer.....	4.00
4839	Condenser—.1 mfd.....	.30	32574	Transformer—First i.f. transformer.....	1.20
32576	Condenser—Electrolytic, one section 20 mfd., one section 12 mfd.....	.90	32581	Transformer—Output transformer.....	1.25
32579	Condenser—Variable tuning condenser.....	2.25	32534	Transformer—Second i.f. transformer.....	.90
32577	Cord—Resistance power cord.....	.95	32578	Volume Control and Power Switch—Models 9TX1, 9TX2, and 9TX3.....	1.50
32566	Dial—Ivory dial for 9TX2 and 9TX5.....	.45	32580	Volume Control and Power Switch—Models 9TX4 and 9TX5.....	1.50
32567	Dial—Maroon dial for 9TX4.....	.45			
32568	Dial—Tan dial for 9TX1 and 9TX3.....	.55			
32569	Knob—Ivory volume control knob for 9TX2 and 9TX5.....	.20			

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

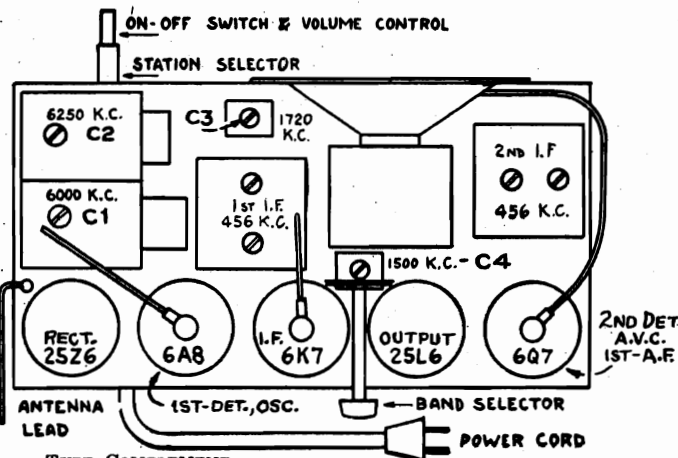
Schematic, Alignment, Socket
Trimmers, Notes

RCA MFG. CO., INC.

MODELS 9SX-1 to 9SX-8 incl.
Little Nipper

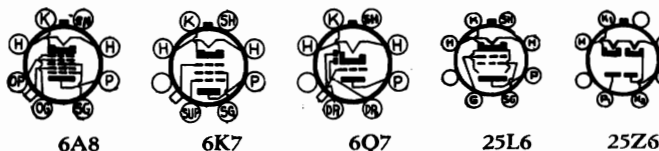
1938 No. 41

- Model 9SX-1, Molded cabinet, walnut finish, ivory knobs.
 Model 9SX-2, Molded cabinet, walnut body, ivory front, walnut knobs.
 Model 9SX-3, Molded cabinet, ivory finish, red knobs.
 Model 9SX-4, Molded cabinet, red body, ivory front, red knobs.
 Model 9SX-5, Molded cabinet, black body, marble front, jet knobs.
 Model 9SX-6, Molded cabinet, blue body, onyx front, blue knobs.
 Model 9SX-7, Molded cabinet, onyx finish, maroon knobs.
 Model 9SX-8, Molded cabinet, marble finish, jet knobs.



TUBE COMPLEMENT

- (1) RCA-6A8..... 1st-Detector—Oscillator
 (2) RCA-6K7..... I-F Amplifier
 (3) RCA-6Q7..... 2nd-Det., 1st A-F. and A.V.C.
 (4) RCA-25L6..... Power Output
 (5) RCA-25Z6..... Half-Wave Rectifier
 Dial Lamp (1)..... Mazda 40, 6.3 volts, .15 amp.



Bottom view of tube sockets

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis through .01 mfd., and keep the output as low as possible to avoid a-v-c action.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	6K7 I-F grid cap, in series with .01 mfd.	456 kc	Quiet point between 1,650-1,720 kc, with range switch at broadcast position (counter-clockwise from rear).	Two trimmers on 2nd I-F trans.
2	6A8 1st-Det. grid cap, in series with .01 mfd.	456 kc		Two trimmers on 1st I-F trans.
3	Antenna Term. on antenna trans., in series with 400 ohms.	6,250 kc	Max. clockwise (out of mesh) "B" band	C2 (osc. gang trimmer)*
4		6,000 kc	Resonance on 6,000 kc signal	C1 (ant. gang trimmer)**
5	Antenna Term. on antenna trans., in series with 90 mmf.	1,720 kc	Max. clockwise (out of mesh)	C3
6		1,500 kc	Resonance on 1,500 kc signal.	C4

* Use minimum capacity peak if two peaks can be obtained.
 ** After this adjustment, check for image by leaving test oscillator at 6,000 kc, and shifting receiver dial to 5,088 kc, where a weaker signal should be received.

Cabinet Dimensions..... Height 4½ inches .. Width 8 inches .. Depth 4½ inches
 Weight..... 7 pounds (shipping)

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Resistor in Power Cord.—The power cord contains a resistor which becomes warm during operation.

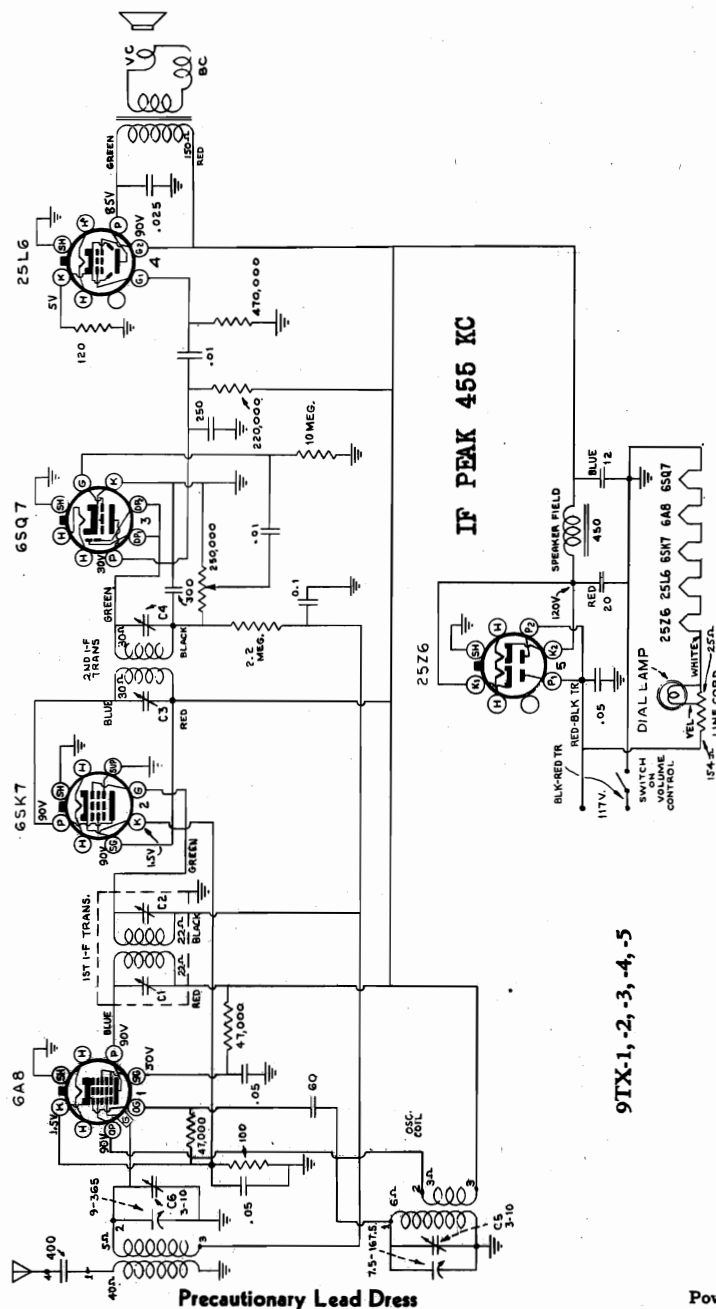
Antenna.—The set is equipped with length of antenna wire. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

POWER SUPPLY RATINGS
 A-C Rating..... 105-125 volts, 50-60 cycles, 50 watts
 D-C Rating..... 105-125 volts, direct current, 50 watts
 Power Output (125 volt, 60 cycle supply)
 Undistorted..... 1.5 watt
 Maximum..... 2.0 watts
 LOUDSPEAKER
 Type..... 4-inch Electrodynamic

MODELS 9TX-1 to 9TX-5 incl.
Little Nipper-2nd

RCA MFG. CO., INC.

Schematic, Voltage, Socket
Trimmers, Alignment



Precautionary Lead Dress

1. Dress 1st I-F plate and grid leads against chassis and away from each other. Dress plate lead from 6SK7 close to chassis.
2. Dress electrolytic capacitor against rear apron.
3. Keep leads away from adjusting screws to allow easy access.
4. Dress output plate lead along front apron and away from 6A8.
5. Dress parts at ends of chassis to clear cabinet bosses.

Electrical and Mechanical Specifications

FREQUENCY RANGE..... 530-1,720 kc

TUBE COMPLEMENT

- (1) RCA-6A8..... 1st-Detector—Oscillator
 - (2) RCA-6SK7..... I-F Amplifier
 - (3) RCA-6SQ7..... 2nd-Det., 1st A-F, and A.V.C.
 - (4) RCA-25L6..... Power Output
 - (5) RCA-25Z6..... Half-Wave Rectifier
- Dial Lamp (1)..... Mazda 47, 6.3 volts, .15 amp.

POWER SUPPLY RATINGS

A-C Rating..... 105-125 volts, 50-60 cycles, 50 watts
D-C Rating..... 105-125 volts, direct current, 50 watts

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Resistor in Power Cord.—The power cord contains a resistor which becomes warm during operation.

Antenna.—The set is equipped with length of antenna wire. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

Model 9TX-3, Two-tone wood cabinet, piano finish, mottled tan dial and knob.

Model 9TX-1, Molded cabinet, walnut finish, mottled tan dial and knob.

Model 9TX-2, Molded cabinet, ivory finish, ivory dial and knob.

Model 9TX-4, Molded Arizona cream onyx cabinet, maroon dial and knob.

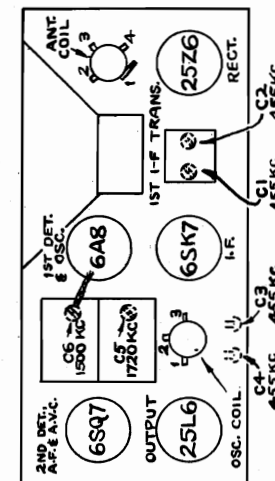
Model 9TX-5, Molded green onyx cabinet, ivory dial and knob.

Alignment Procedure

Test-Oscillator.—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	6A8 1st-Det. grid cap. in series with .01 mfd.	455 kc	Quiet point at 1,600 kc end of dial	C1, C2, C3, C4 (1st and 2nd I-F transformers)
2	Antenna term. of ant. trans. in series with 100 mmfd.	1,720 kc	Full clockwise (out of mesh)	C5 (oscillator)
3		1,500 kc	Resonance on 1,500 kc signal.	C6 (antenna)



INTERMEDIATE FREQUENCY..... 455 kc

POWER OUTPUT (125 volt, 60 cycle supply)

Undistorted..... 1.5 watts
Maximum..... 2.0 watts

LOUDSPEAKER

Type..... 4-inch Electrodynamic

Cabinet Dimensions

	Height	Width	Depth
9TX-1, -2	5 inches	8 1/2 inches	4 1/2 inches
9TX-3	5 1/2 inches	8 1/2 inches	4 1/2 inches
9TX-4, -5	5 1/2 inches	8 1/2 inches	4 1/2 inches

Weight..... 7 pounds (shipping)

Schematic, Voltage, Socket
Trimmers, Alignment, Data

RCA MFG. CO., INC.

Electrical and Mechanical Specifications

MODELS 9TX-21, 9TX-22
Chassis RC-403
MODEL 9TX-23
Chassis RC-403A

FREQUENCY RANGE 530-1,720 kc

INTERMEDIATE FREQUENCY 455 kc

TUBE COMPLEMENT

- (1) RCA-6A8 1st-Detector—Oscillator
(2) RCA-6SK7 I-F Amplifier
(3) RCA-6SQ7 2nd-Det., 1st A-F, and A.V.C.
(4) RCA-25L6 Power Output
(5) RCA-25Z6 Half-Wave Rectifier
Dial Lamp (1) Mazda 47, 6.3 volts, .15 amp.

POWER SUPPLY RATINGS

A-C Rating 105-125 volts, 50-60 cycles, 50 watts
D-C Rating 105-125 volts, direct current, 50 watts

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Resistor in Power Cord.—The power cord contains a resistor which becomes warm during operation.

POWER OUTPUT (125 volt, 60 cycle supply)

Undistorted 1.5 watts
Maximum 2.0 watts

LOUDSPEAKER

Type 4-inch Electrodynamic

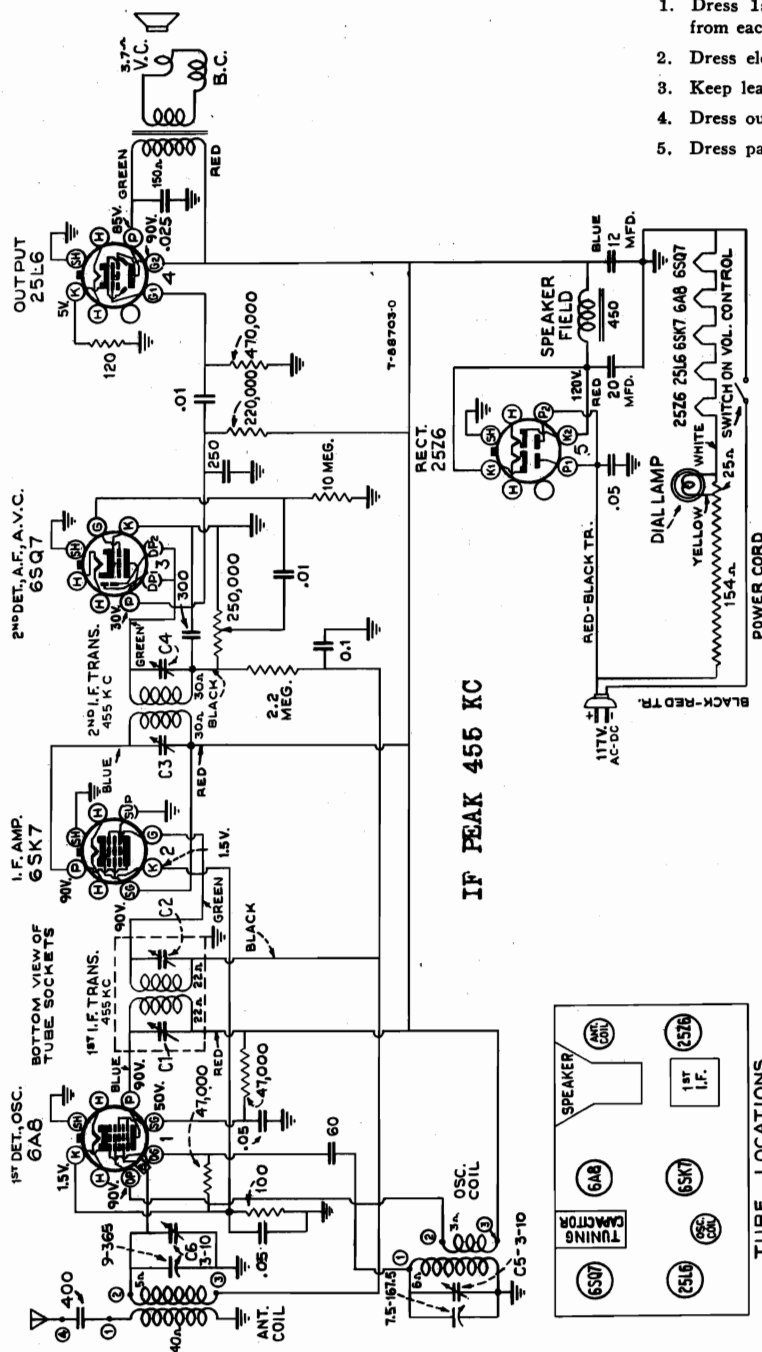
Cabinet Dimensions, 5½ in. high, 8½ in. wide, 4½ in. deep.

Weight (approx.) 7 pounds (shipping)

Antenna.—The set is equipped with length of antenna wire. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

Precautionary Lead Dress

1. Dress 1st I-F plate and grid leads against chassis and away from each other. Dress plate lead from 6SK7 close to chassis.
2. Dress electrolytic capacitor against rear apron.
3. Keep leads away from adjusting screws to allow easy access.
4. Dress output plate lead along front apron and away from 6A8.
5. Dress parts at ends of chassis to clear cabinet bosses.



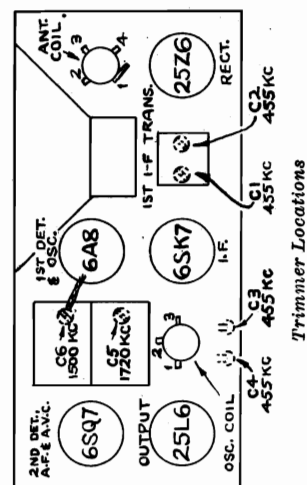
— 1939 No. 5 —

Alignment Procedure

Test-Oscillator.—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible. The antenna should be rolled up and kept at least one foot from chassis during alignment.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	6A8 1st-Det. grid cap, in series with .01 mfd.	455 kc	Quiet point at 1,600 kc end of dial	C1, C2, C3, C4 (1st and 2nd I-F transformers)
2	Antenna term. of ant. trans. in series with 100 mmfd.	1,720 kc	Full clockwise (out of mesh)	C5 (oscillator)
3		1,500 kc	Resonance on 1,500 kc signal.	C6 (antenna)

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.



MODELS 9TX-21, 9TX-22

Chassis RC-403

MODEL 9TX-23, Chas. RC-403A

MODEL 9TX-31, Chas. RC-405

RCA MFG. CO., INC.

MODEL 9TX-32, Chas. RC405A

MODEL 9TX-33, Chas. RC405B

Parts Lists

Models 9TX-21, -22, and -23

Chassis No. RC-403

RC-403

RC-403A

Replacement Parts

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
X-638	Cabinet for 9TX21 (Walnut Finish).....(net)	1.35	32943	Nut—Speed nut to fasten dial—Models 9TX21 and 9TX22.....	.01
X-639	Cabinet for 9TX22 (Ivory Finish).....(net)	2.20	33292	Plate—Dial color plate—Model 9TX23.....	.25
X-640	Cabinet for 9TX23 (Wood-Walnut Finish).....(net)	3.25	33294	Pulley—Drive cord pulley—Model 9TX23.....	.02
32572	Coil—Antenna coil.....	.60	14439	Resistor—100 ohms, $\frac{1}{2}$ watt.....	.20
32573	Coil—Oscillator coil.....	.50	32535	Resistor—120 ohms, wire wound.....	.20
13057	Condenser—60 mmfd.....	.35	12412	Resistor—47,000 ohms, $\frac{1}{2}$ watt.....	.20
12488	Condenser—250 mmfd.....	.35	12264	Resistor—220,000 ohms, $\frac{1}{2}$ watt.....	.20
12952	Condenser—300 mmfd.....	.35	12285	Resistor—470,000 ohms, $\frac{1}{2}$ watt.....	.20
30433	Condenser—400 mmfd.....	.35	12679	Resistor—2.2 meg., $\frac{1}{2}$ watt.....	.20
4858	Condenser—.01 mfd.....	.25	13601	Resistor—10 meg., $\frac{1}{2}$ watt.....	.20
4870	Condenser—.025 mfd.....	.20	32945	Shaft—Tuning knob shaft—Models 9TX21 and 9TX22.....	.20
4886	Condenser—.05 mfd.....	.20	33293	Shaft—Tuning knob shaft and bushing—Model 9TX23.....	.30
4839	Condenser—.01 mfd.....	.30	33290	Socket—Dial lamp socket.....	.15
32576	Condenser—Electrolytic, one section 20 mfd., one section 12 mfd.....	.90	32537	Socket—Tube socket.....	.20
32944	Condenser—2-gang variable tuning.....	2.20	32575	Speaker—Complete with transformer.....	4.00
32634	Cord—Drive cord.....	.10	32803	Spring—Dial knob spring.....	.01
32577	Cord—Resistance power cord.....	.95	32947	Spring—Drive cord tension spring—Models 9TX21 and 9TX22.....	.05
32942	Dial—Glass dial scale—Models 9TX21, 9TX22.....	.30	31615	Spring—Drive cord tension spring—Model 9TX23.....	.02
33289	Dial—Glass dial scale—Model 9TX23.....	.40	33296	Spring—Drive drum retaining spring—Model 9TX23.....	.06
33297	Drive—Dial drive mechanism comprising drive drum, cord, shaft, dial color plate, back plate and pulleys assembled—Model 9TX23.....	.85	32667	Spring—Knob or drive drum retaining spring.....	.02
32946	Drum—Variable condenser drive drum and indicator disc—Models 9TX21 and 9TX22.....	.35	32574	Transformer—First i. f., transformer.....	1.20
33006	Feet—Rubber feet for 9TX23.....	.03	32581	Transformer—Output transformer.....	1.25
33295	Indicator—Dial pointer—Model 9TX23.....	.25	32534	Transformer—Second i. f. transformer.....	.90
32447	Knob—Ivory knob (tuning or volume) Model 9TX22.....	.15	32578	Volume Control and power switch—Models 9TX21 and 9TX22.....	1.50
32571	Knob—Tan knob (tuning or volume) Models 9TX21 and 9TX23.....	.15	33291	Volume Control and switch—Model 9TX23.....	1.50
31480	Lamp—Dial lamp—Mazda 47.....	.20			
12409	Lead—Antenna lead.....	.45			

MODELS 9TX-31, 9TX-32, 9TX-33

Chassis No.

RC-405,

RC-405A,

RC-405B

Replacement Parts

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
X-638	Cabinet for 9TX31 (Walnut Finish).....(net)	1.35	33297	Drive—Dial drive mechanism—comprising drive drum, cord, shaft, dial color plate, back plate and pulleys assembled (Model 9TX33).....	.85
X-639	Cabinet for 9TX32 (Ivory Finish).....(net)	2.20	32946	Drum—Variable condenser drive drum and indicator disc (Models 9TX31 and 9TX32).....	.35
X-640	Cabinet for 9TX33 (Wood—Walnut Finish).....(net)	3.25	33006	Feet—Rubber feet for 9TX33.....	.03
12488	Capacitor—250 mmfd.....	.35	33295	Indicator—Dial pointer (Model 9TX33).....	.25
12952	Capacitor—300 mmfd.....	.35	32447	Knob—Ivory knob (tuning or volume) (Model 9TX32).....	.15
4838	Capacitor—.005 mfd.....	.25	32571	Knob—Tan knob (tuning or volume) (Models 9TX31 and 9TX33).....	.15
4937	Capacitor—.01 mfd.....	.25	31480	Lamp—Dial lamp—Mazda 47.....	.20
12484	Capacitor—.025 mfd.....	.30	12409	Lead—Antenna lead.....	.45
32572	Coil—Antenna coil.....	.60	32943	Nut—Speed nut to fasten dial (Models 9TX31 and 9TX32).....	.01
32962	Coil—Oscillator coil.....	.60	33292	Plate—Dial color plate (Model 9TX33).....	.25
13057	Condenser—60 mmfd.....	.35	33294	Pulley—Drive cord pulley (Model 9TX33).....	.02
30433	Condenser—400 mmfd.....	.35	32970	Resistor—Dial lamp resistor—24 ohms.....	.15
4870	Condenser—.025 mfd.....	.20	32971	Resistor—Series dropping resistor—42 ohms.....	.15
4839	Condenser—.01 mfd.....	.30	13428	Resistor—150 ohms, $\frac{1}{2}$ watt.....	.20
32576	Condenser—Electrolytic, one section 20 mfd., one section 12 mfd.....	.90	30538	Resistor—330 ohms, $\frac{1}{2}$ watt.....	.20
32968	Condenser—2-gang variable tuning.....	2.25	32803	Spring—Dial knob spring.....	.01
32634	Cord—Drive cord.....	.10	32947	Spring—Drive cord tension spring (Models 9TX31 and 9TX32).....	.05
32942	Dial—Glass dial scale (Models 9TX31, 9TX32).....	.30	31615	Spring—Drive cord tension spring (Model 9TX33).....	.02
33289	Dial—Glass dial scale (Model 9TX33).....	.40	33296	Spring—Drive drum retaining spring (Model 9TX33).....	.06
13998	Resistor—22,000 ohms, $\frac{1}{2}$ watt.....	.20	32667	Spring—Knob or drive drum retaining spring.....	.02
12412	Resistor—47,000 ohms, $\frac{1}{2}$ watt.....	.20	32966	Transformer—First i-f transformer.....	1.25
12264	Resistor—220,000 ohms, $\frac{1}{2}$ watt.....	.20	32967	Transformer—Second i-f transformer.....	1.05
12285	Resistor—470,000 ohms, $\frac{1}{2}$ watt.....	.20	32964	Transformer—Output transformer.....	1.25
12679	Resistor—2.2 meg., $\frac{1}{2}$ watt.....	.20	32578	Volume Control and power switch (Models 9TX31 and 9TX32).....	1.50
13601	Resistor—10 meg., $\frac{1}{2}$ watt.....	.20	32545	Volume Control and switch (Model 9TX33).....	1.50
32945	Shaft—Tuning knob shaft (Models 9TX31 and 9TX32).....	.20			
33293	Shaft—Tuning knob shaft and bushing (Model 9TX33).....	.30			
32969	Socket—Dial lamp socket.....	.25			
14278	Socket—Phonograph socket.....	.25			
32537	Socket—Tube socket.....	.20			
32963	Speaker—Complete with transformer.....	3.95			

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RCA MFG. CO., INC.

MODELS 9TX-31, Chas. RC-405
 9TX-32, Chas. RC-405A, 9TX-33
 Chas. RC-405B
 Schematic, Voltage, Socket
 Trimmers, Alignment, Data

Electrical and Mechanical Specifications

FREQUENCY RANGE 530-1,720 kc

INTERMEDIATE FREQUENCY 455 kc

TUBE COMPLEMENT

(1) RCA-12SA7 1st-Detector—Oscillator
 (2) RCA-12SK7 I-F Amplifier
 (3) RCA-12SQ7 2nd-Detector, 1st A-F, and A.V.C.
 (4) RCA-35L6GT Power Output
 (5) RCA-35Z4GT Half-Wave Rectifier

POWER OUTPUT (125 volt, 60 cycle supply)

Undistorted 1.5 watts
 Maximum 2.0 watts

LOUDSPEAKER

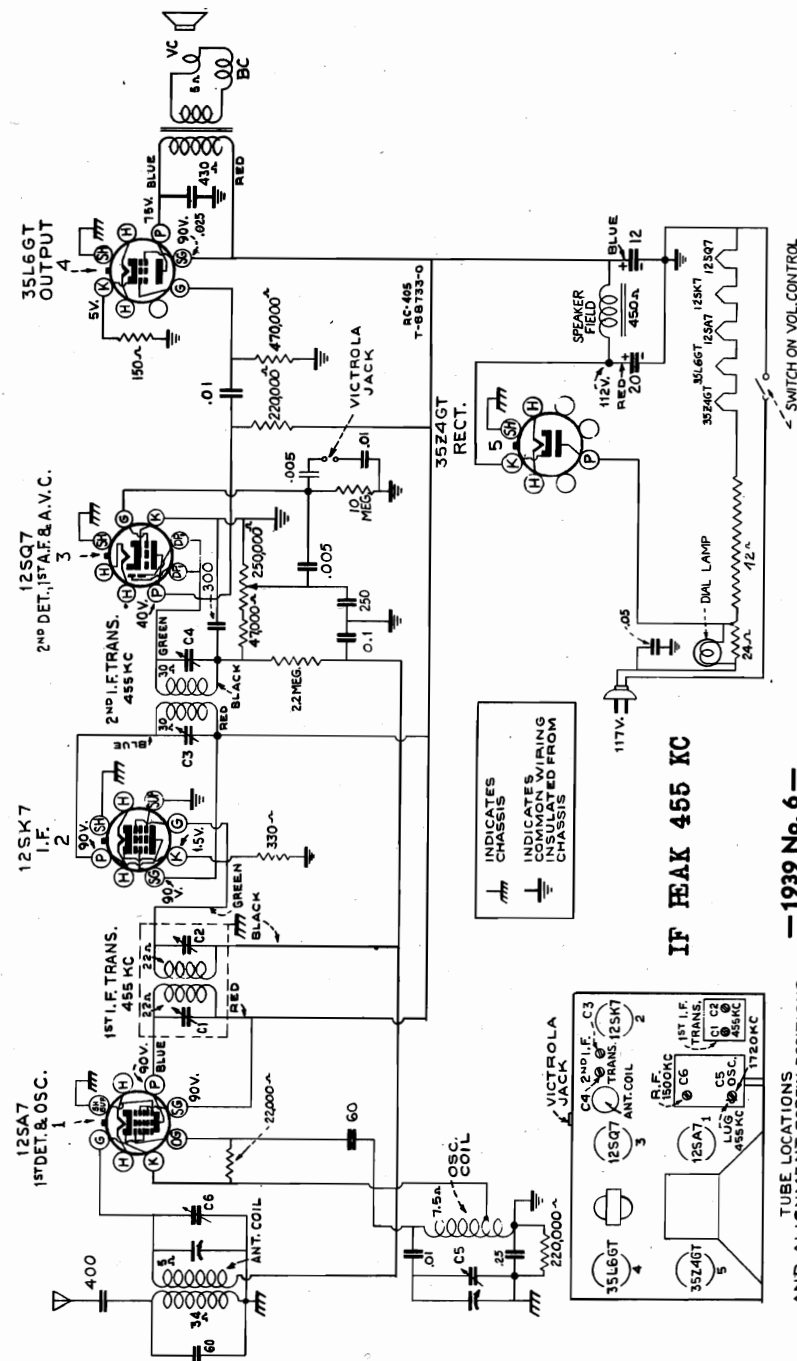
Type 4-inch Electrodynamic

Dial Lamp (1) Mazda 47, 6.3 volts, .15 amp.

POWER SUPPLY RATINGS

A-C Rating 105-125 volts, 50-60 cycles, 30 watts
 D-C Rating 105-125 volts, direct current, 30 watts

Cabinet Dimensions { 9TX-31... 5 1/2 inches Height .. 8 1/2 inches Width .. 4 1/2 inches Depth .. 4 1/2 inches
 9TX-32... 5 1/2 inches Height .. 8 1/2 inches Width .. 4 1/2 inches Depth .. 4 1/2 inches
 9TX-33... 6 1/2 inches Height .. 9 1/2 inches Width .. 4 1/2 inches Depth .. 4 1/2 inches
 Weight (net) 9TX-31, 32... 4 1/2 pounds; 9TX-33... 5 1/2 pounds



Model 9TX-31
 Walnut Finish, Tan Knobs

Model 9TX-32
 Ivory Finish, Ivory Knobs

Model 9TX-33
 Heart Walnut, Ornamental Sides
 Tan Knobs

Precautionary Lead Dress

1. Dress 1st I-F plate and grid leads against chassis and away from each other. Dress plate lead from 12SK7 close to chassis.
2. Dress electrolytic capacitor against rear apron.

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Antenna.—The set is equipped with length of antenna wire. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

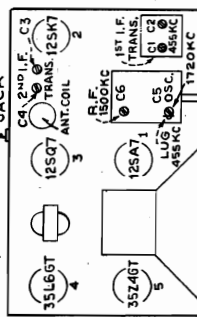
Victrola Attachment.—A jack is provided on the rear of chassis for connecting a Victrola Attachment into the audio-amplifying circuit. The cable from the Victrola Attachment should be terminated in a Stock No. 81048 plug to fit the jack.

Alignment Procedure

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.
Test-Oscillator.—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	Tuning condenser stator (osc.) in series with .01 mfd.	455 kc	Quiet point at 1,600 kc end of dial	C1, C2, C3, C4 (1st and 2nd I-F transformers)
2	Antenna term. of ant. trans. in series with 100 mmfd.	1,720 kc	Full clockwise (out of mesh)	C5 (oscillator)
3		1,500 kc	Resonance on 1,500 kc signal	C6 (antenna)

TUBE LOCATIONS
 AND ALIGNMENT SCREW POSITIONS



IF PEAK 455 KC

—1939 No. 6—

MODEL 9TX-50, Chassis RC-435

Schematic, Voltage, Socket

Trimmers, Alignment, Data, Parts

RCA MFG. CO., INC.

Output Meter Alignment.—Connect the meter across the coil, and turn the receiver volume control to maximum.

Test-Oscillator.—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.

Pre-Setting Dial.—With gang condenser in full mesh, the pointer should be adjusted so that top edge of pointer just touches rivet in dial plate.

Antenna.—The set is equipped with a built-in loop antenna. If an outdoor antenna is used, it may be connected to the "ANT" terminal on rear of cabinet. It should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmi. capacitor in series with the lead-in.

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Victrola Attachment.—A jack is provided on the rear of cabinet for connecting a Victrola Attachment into the audio-amplifying circuit. The cable from the Victrola Attachment should be terminated in a Stock No. 31048 plug to fit the jack.

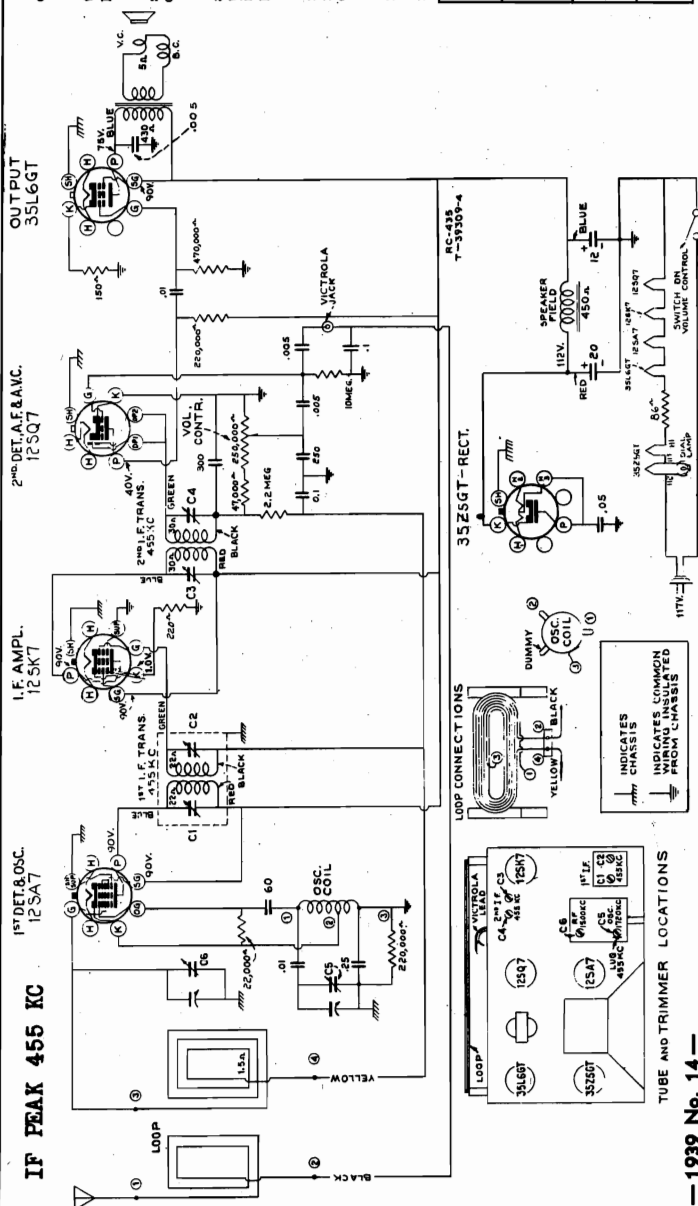
Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	Tuning condenser at 1,800 kc in series with .01 mfd.	455 kc	Quiet point at 1,800 kc end of dial	C1, C2, C3, C4 (1st and 2nd I-F transformers)
2	Antenna term. of ant. loop in series with 100 mmi.	1,720 kc	Full clockwise (out of mesh)	C5 (oscillator)
3		1,500 kc	Resonance on 1,500 kc signal	C6 (antenna)

Precautionary Lead Dress

1. Dress 2nd I-F green lead close to chassis and under other parts.
2. Dress lead from gang condenser to grid of 12SA7 close to chassis and away from 12SQ7 socket.
3. Dress blue 1st I-F lead under volume control close to chassis.
4. Dress blue 2nd I-F lead close to chassis and behind 12SK7 socket.

Electrical and Mechanical Specifications

FREQUENCY RANGE	540-1,720 kc
INTERMEDIATE FREQUENCY	455 kc
TUBE COMPLEMENT	
(1) RCA-12SA7	1st Detector-Oscillator
(2) RCA-12SK7	I-F Amplifier
(3) RCA-12SQ7	2nd Detector, 1st A-F and A.V.C.
(4) RCA-35Z5GT	Power Output
(5) RCA-35Z5GT	Half-Wave Rectifier
Dial Lamp (1)	Mazda 47, 6.3 volts, .15 amp.
POWER SUPPLY RATINGS	
A-C Rating	105-125 volts, 50-60 cycles, 30 watts
D-C Rating	105-125 volts, direct current, 30 watts
POWER OUTPUT (125 volt, 60 cycle supply)	
Undistorted	Maximum
Maximum	1.5 watts
Maximum	2.0 watts
LOUDSPEAKER	
Type	4-inch Electrodynamic
Cabinet Dimensions (inches)	Height 7 3/4, Width 11 1/2, Depth 6 1/2
Weight (net)	6 1/2 pounds



Model 9TX-50

Regular Mahogany Cabinet

Light Mahogany Cabinet

Features of design include: New Type, single-ended tubes (12SA7, 12SK7, and 12SQ7); edge-lighted dial; dust-proof electrodynamic loudspeaker; "Magic Loop" for television; Victrola Attachment Jack; and Beam Power Output.

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealer.

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
32968	Capacitor—2 gang variable tuning	2.25	12985	Resistor—470,000 ohms, 1/2 watt	.30
13057	Capacitor—60 mmi.	.35	12986	Resistor—22 meg., 1/2 watt	.20
12488	Capacitor—250 mmi.	.35	13601	Resistor—10	.30
12952	Capacitor—300 mmi.	.35	32983	Shaft—Tuning knob shaft and bushing	.30
4838	Capacitor—500 mmi.	.35	32987	Socket—Dial Light	.30
32787	Capacitor—.005 mfd.	.25	32537	Socket—Tube Socket	.30
14839	Capacitor—.05 mfd.	.20	31615	Spring—Drive cord tension spring	.02
12484	Capacitor—.25 mfd.	.30	32986	Spring—Drum retaining spring	.08
32576	Capacitor—Electrolytic 20-12 mfd.	.30	32988	Transformer—I. F. Input	1.25
32822	Coil—Oscillator coil	.60	32967	Transformer—I. F. Output	1.25
32982	Coil—Drive cord	.10	32991	Volume Control	1.50
32982	Coil—Drive cord and indicator drum	.10		SPEAKER ASSEMBLIES	
32982	Indicator—Dial pointer	.25	33740	Speaker—Complete	4.00
31480	Lamp—Pilot Lamp	.25	33741	Transformer—Output	1.15
32983	Loop—Antenna loop	1.00		MISCELLANEOUS ASSEMBLIES	
32983	Pulley—Dial cord pulley	.15	33289	Dial—Dial Scale	.40
32983	Resistor—86 ohms	.15	33006	Foot—Rubber foot for cabinet	.03
14861	Resistor—150 ohms, 1/2 watt	.20	33571	Knob—Tuning or volume control knob	.15
13998	Resistor—220 ohms, 1/2 watt	.20	33742	Socket—Phonograph input socket	.30
12738	Resistor—27,000 ohms, 1/2 watt	.20			
12264	Resistor—220,000 ohms, 1/2 watt	.20			

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

Schematic Changes Parts

RCA MFG. CO., INC.

MODEL D22-1A

Model D22-1A

Service Data for Model D22-1 are directly applicable to these instruments except as follows:

- (1) The schematic circuit diagram for Model D22-1A is shown by figure 5.
- (2) The metal rectifier socket wiring for tube No. 14 is shown by figure 2.
- (3) Figure 3 shows the Pickup details.
- (4) The phonograph motor is of the capacitor type. Light machine oil should be used to lubricate the motor bearings. The motor is wired in this instrument as follows: One power-supply lead connects to one terminal of switch S201. The other terminal of S201 connects to one terminal of the brake switch S202. The other terminal of S202 connects to the yellow motor lead. The green motor lead connects to one lead of the motor capacitor. The red motor lead connects to the other capacitor lead and also to the remaining power-supply lead.
- (5) The Radiotron socket voltages (figure 4 herein) apply to all Models D22-1 or D22-1A and should be used in place of figure 4 of the D22-1 Service Data.
- (6) The resistor assembly R44 and R45 is mounted on the front chassis apron instead of the rear chassis apron.
- (7) Change price on Stock No. 11879 Transformer from \$3.50 to \$8.15.
- (8) Change price on Stock No. 11541 Arm from \$0.82 to \$8.15.

SEE RIDER'S VOL. VI FOR OTHER DATA

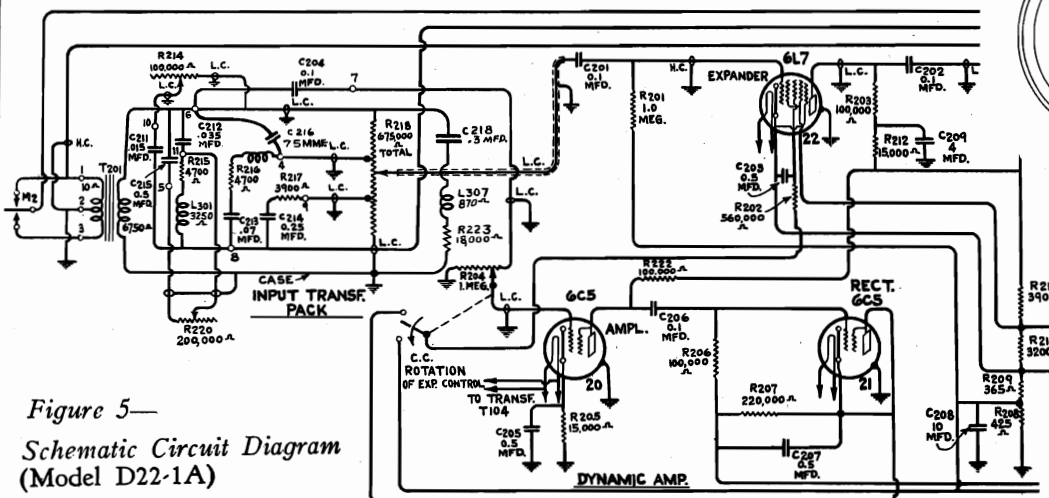
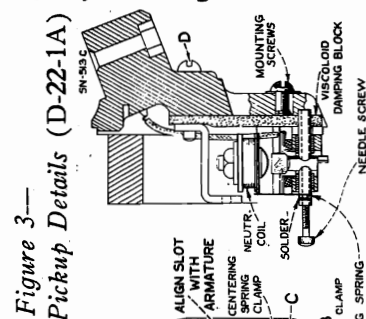
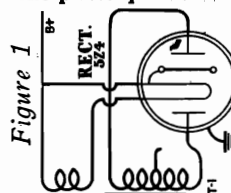
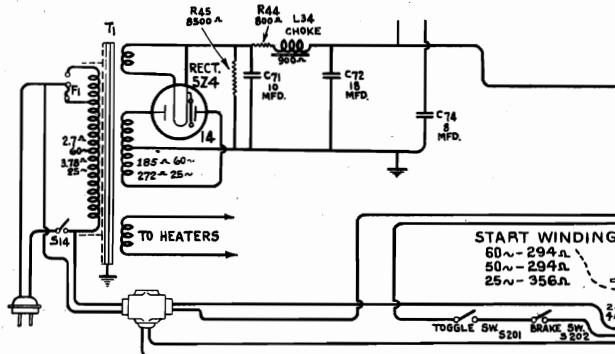
- (9) Change price on Stock No. 11480 Microphone from \$7.05 to \$7.50.

- (10) Refer to Substitute and Additional Replacement Parts contained herein for other parts changes.

Stock No.	Model D22-1A (use replacement parts from D22-1 except as listed below)	LIST PRICE
13405	Armature—Pickup armature.....	.95
4870	Capacitor—.025 mfd. (C47).....	.20
11195	Socket—Five-contact Rectifier Radiotron socket for tube No. 14.....	.15
11887	Transformer—Power transformer—105-125 volts—25-50 cycles.....	6.95
11880	Transformer—Power transformer—105-125 volts—50-60 cycles—(T1).....	5.80
12051	Capacitor—2-mfd. complete with 2-contact male connector for use with motor Stock Nos. 9650 or 9651—(C217)...	4.18
13101	Capacitor—4-mfd. complete with 2-contact male connector for use with motor Stock No. 9735—(C217).....	5.05
4674	Connector—2-contact male connector for capacitor Stock No. 12051 or 13101...	.25
9735	Motor—105-125 volts—25 cycles—(M1)	49.50
9651	Motor—105-125 volts—50 cycles—(M1)	35.35
9650	Motor—105-125 volts—60 cycles—(M1)	35.35
12050	Suspension Spring—Motor mounting spring, washer, and stud assembly—comprising six springs, six cup washers, three spring washers and three studs.....	.60
11997	Capacitor—75 mmfd.—(C216).....	.14
12352	Filter—Microphone and pickup input filter pack—(L307, C218, R223).....	1.85

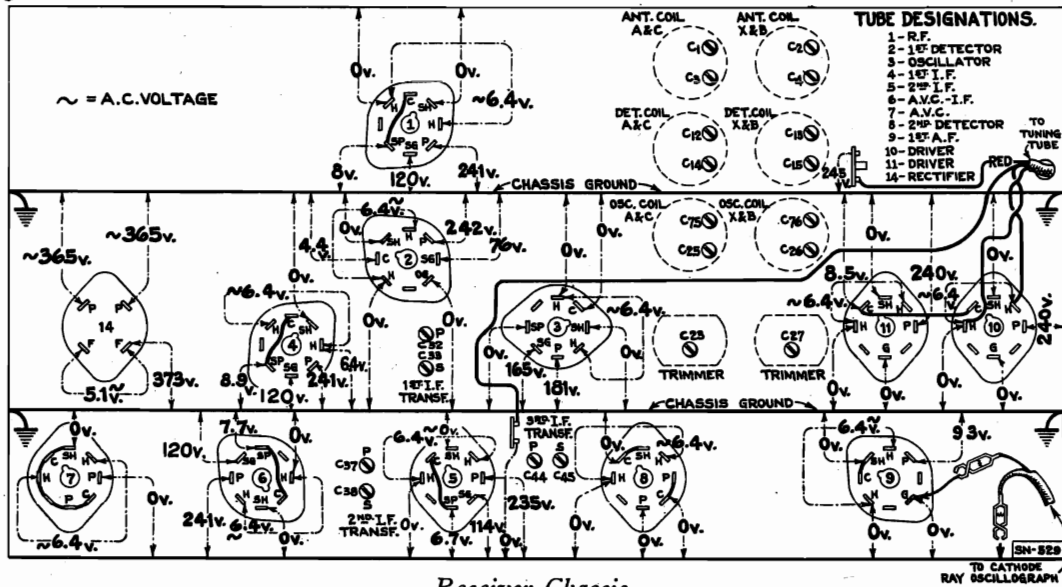
Stock Nos. 4858 (C47), 11273, 4794 (tube 14), 8062, 8061, 9479, 9478, 9477, and 4562, are not used in Model D22-1A.

The prices quoted above are subject to change without notice.



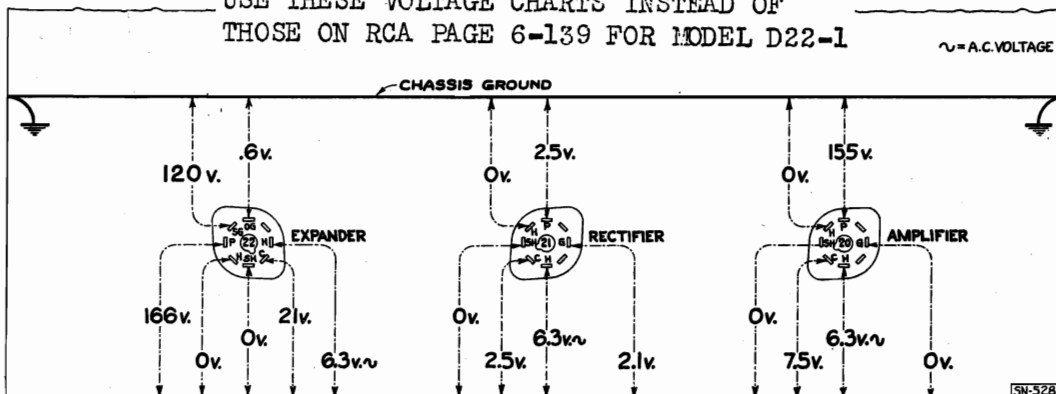
MODEL D22-1
Corrected Voltage
MODEL D22-1A
Voltage

RCA MFG. CO., INC.

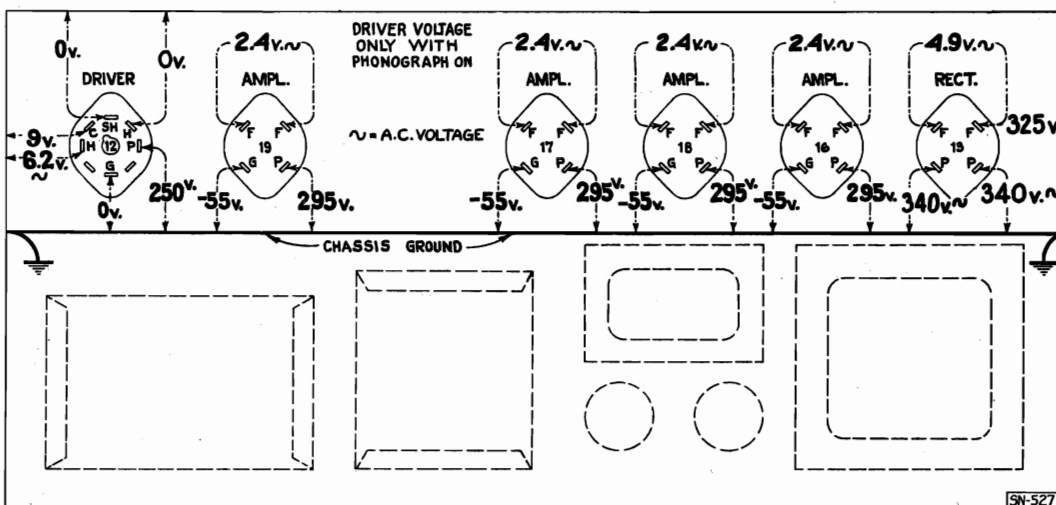


Receiver Chassis

USE THESE VOLTAGE CHARTS INSTEAD OF
THOSE ON RCA PAGE 6-139 FOR MODEL D22-1



Dynamic Amplifier



Power Amplifier

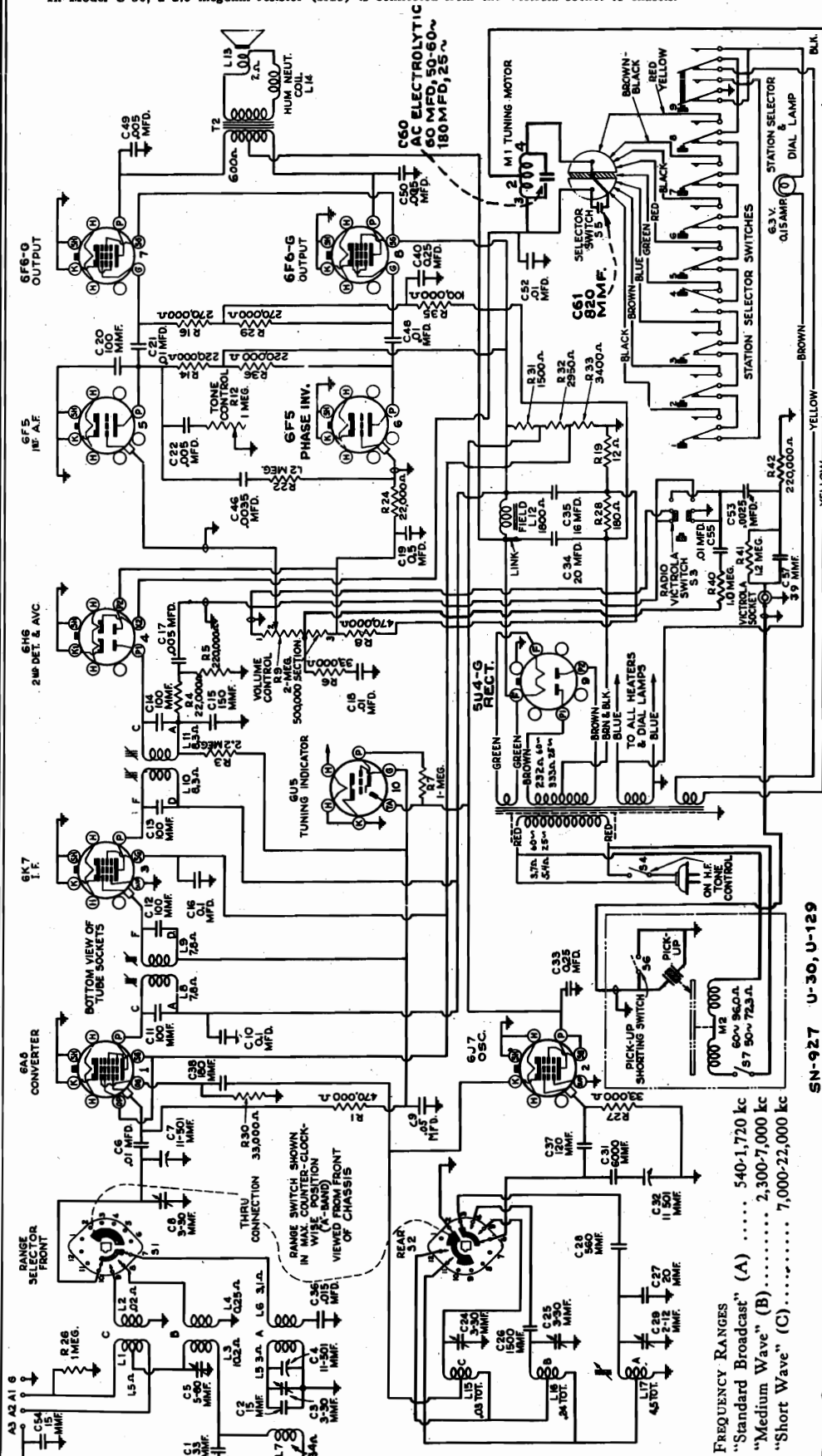
Figure 4—Radiotron Socket Voltages (D22-1 and D22-1A)
Measured at 115 volts, 60-cycle supply—No signal being received

RCA MFG. CO., INC.

MODELS U-30, Chas. RC-335KR
U-129, Chas. RC-335K
Schematic, Data.

Schematic Circuit Diagram

In Model U-80, a 1.0 megohm resistor (R49) is connected from the Victrola socket to chassis.



MODELS U-30 and U-129
Chassis No. RC-335KR,
Ten-Tube, Three-Band, Electric Tuning, A-C Victrolas

— 1939 No. 11 —
FOR DIAL CALIBRATION
SEE INDEX

POWER SUPPLY RATING		Radio Only		Total
A-6	105-125 volts, 50-60 cycles, 120 watts	105-125 volts, 50-60 cycles, 120 watts	145 watts	145 watts
A-6	105-125 volts, 60 cycles, 120 watts	105-125 volts, 60 cycles, 120 watts	145 watts	145 watts
B-2	105-125 volts, 25 cycles, 120 watts	105-125 volts, 25 cycles, 120 watts	145 watts	145 watts
C-6	105-130/140-160/200-250 volts, 50-60 cycles, 120 watts	105-130/140-160/200-250 volts, 50-60 cycles, 120 watts	145 watts	145 watts
C-6	105-130/140-160/200-250 volts, 60 cycles, 120 watts	105-130/140-160/200-250 volts, 60 cycles, 120 watts	145 watts	145 watts

POWER OUTPUT

Undistorted	10 watts
Maximum	12 watts

PHONOGRAPH

Record Capacity	Seven ten or twelve inch
Turntable Speed	78 R.P.M. (Adjustable)

LOUDSPEAKER

Type	12-inch Electrodynamic
Voice Coil Impedance	2.2 ohms at 400 cycles
Type	Crystal
Pickup Impedance	80,000 ohms at 1,000 cycles

FREQUENCY RANGES

"Standard Broadcast" (A)	540-1,720 kc
"Medium Wave" (B)	2,300-7,000 kc
"Short Wave" (C)	7,000-22,000 kc

INTERMEDIATE FREQUENCY
455 kc

SN-927 U-30, U-129

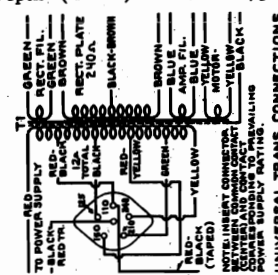
MODELS U-30, Chas. RC-335KR
U-129, Chas. RC-335K
Voltage, Chassis Wiring
Transformer, Notes

RCA MFG. CO., INC.

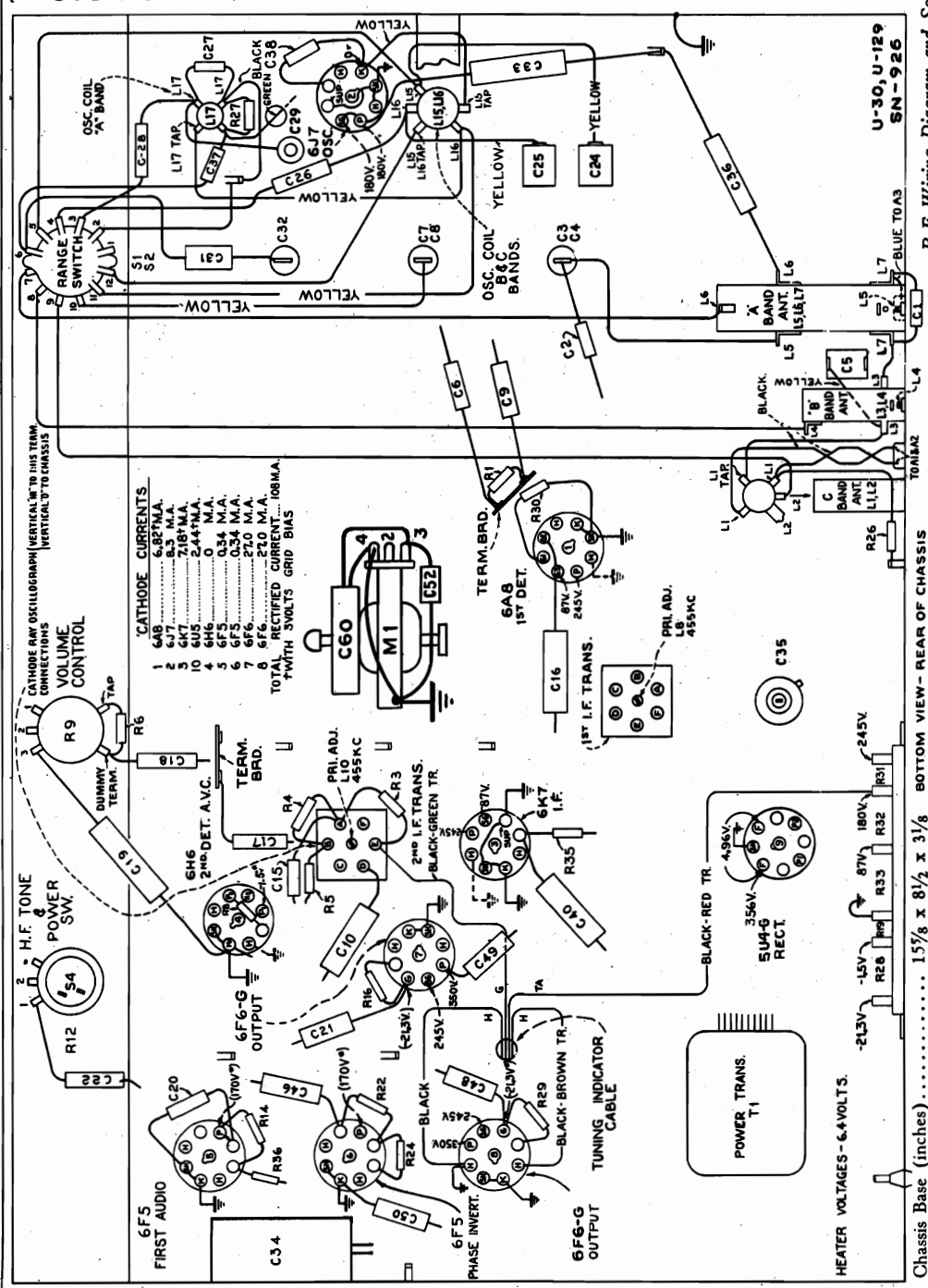
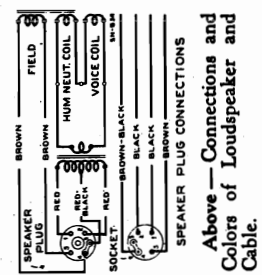
- TUBE COMPLEMENT**
- (1) RCA-6A8..... First Det.
 - (2) RCA-6I7..... Oscillator
 - (3) RCA-6K7..... I-F Amp.
 - (4) RCA-6H6... 2nd Det. and A.V.C.
 - (5) RCA-6F5..... First Audio
 - (6) RCA-6F5..... Phase Inverter
 - (7) RCA-6F6-G.... Power Output
 - (8) RCA-6F6-G.... Power Output
 - (9) RCA-5U4-G.... Rectifier
 - (10) RCA-6U5..... "Magic Eye"

Height (inches).....	U-30	U-129
Width (inches).....	34	35
Depth (inches).....	36 1/4	33 1/4
	17 1/8	17

Weight (Net lbs.).....	U-30	U-129
Weight (Shipping lbs.).....	101	104
	141	134



UNIVERSAL TRANS. CONNECTIONS
Above — Universal Power Transformer Connections.



R-F Wiring Diagram and Socket Voltages

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point, volume control at minimum. Values should hold within approximately $\pm 20\%$ with 117-volt a-c supply.

* NOTE: Values with star (*) are operating voltages in circuits with high series-resistance, and when measured will read lower depending on the voltmeter loading.

U-30, U-129

General Description

These receivers employ a ten-tube, three-band, "Magic Brain" superheterodyne circuit. Features of design include: "Electric Tuning" for eight broadcast stations; a link-coupled antenna circuit; magnetite-core i-f transformers and "A" band oscillator coil; full automatic volume control; "Magic Eye" tuning tube; improved 12-inch dust-proof electro-dynamic loudspeaker; aurally compensated audio volume control; continuously variable high-frequency tone control; provision for armchair control attachment; illuminated band indicator; noise-reducing antenna adjustment on "A" band;

temperature-stabilized capacitors; phase inverter audio amplifier; and push-pull power output stage.

The phonograph has a self-starting motor, crystal pickup, and may be set to play ten-inch and twelve-inch records singly, or automatically. In the automatic position, seven, twelve-inch; eight ten-inch; or a mixed group of seven, ten, and twelve-inch records, may be played in succession. The output of the pickup is "shorted" out when the pickup is on the pickup rest.

RCA MFG. CO., INC.

MODELS U-30, Chas. RC-335KR
U-129, Chas. RC-335K
Alignment, Socket, Trimmers
Tuner Data, Antenna Data

ADJUSTMENTS FOR ELECTRIC TUNING

1. Make a list of the desired eight stations, arranged in order from low to high frequencies.
2. Turn range selector to "A" band, turn power on, and allow a few minutes for warming up.
3. Press down the "dial-tuning" (right-hand) button.
4. Manually tune in the first station on the list, using the "Magic Eye" for accurate tuning.
5. Hold down the "dial-tuning" button, and press down station button No. 1 (second from left). Both buttons will stay down. Move adjusting pin No. 1 to the insulating line on the disc at rear of gang. When the pin is correctly centered on the insulating line, the central dial lamp will go out.
6. Press down any other button in order to release the dial-tuning button and station button No. 1. Then press down station button No. 1 again. The electric tuning mechanism will function to tune in the station, and the central dial lamp will stay on.
7. Repeat this process for the remaining stations.

Antenna Connections

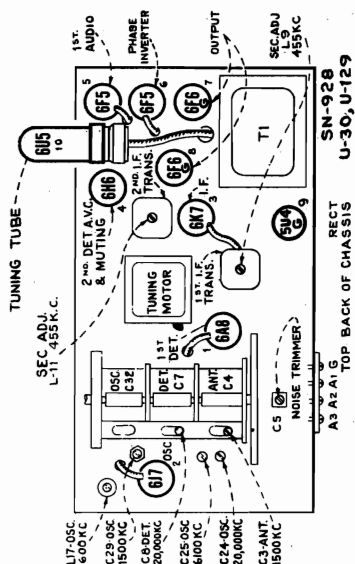
RCA Victor Master Antenna Kit.—Connect the twisted-pair transmission line to terminals A1 and A2 on the terminal board at rear of chassis. Connect the counter-poise to A3. Terminal G may be connected to ground, but this connection is not necessary for correct operation.

Noise-Reducing Adjustment.—After the RCA Victor Master Antenna Kit is connected to the receiver, tune the receiver to a point near 900 kc where no station is heard. Turn volume control clockwise until noise is heard. If no noise of a regular character is audible, start any brush-type motor-driven appliance, such as a vacuum cleaner, electric razor, refrigerator, etc., but do not bring it too near the receiver. This will generate noise as a continuous crackling, or buzz. Adjust C5, which is mounted behind the antenna terminal board, to a point where this noise is reduced to a minimum.

Adjustment of the noise reducing trimmer C5 should be made in the customer's home, with the RCA Victor Master Antenna connected to the receiver.

This adjustment is effective only when the RCA Victor Master Antenna is used. For all other types of antenna, the noise-adjustment trimmer C5 should be screwed all the way down.

Other Antennas.—Use terminals A1 and A3 on the receiver terminal board as antenna and ground connecting points respectively. Terminal A3 may be connected to terminal G, unless this causes interference, in which case this connection should be omitted.



should be cemented in place upon completion of adjustment.

Precautionary Lead Dress.—(1) The lead from the left pilot light should be kept behind the bulb and toward the "Magic Eye," to keep it away from the 6F5 grid cap, (2) leads from mica trimmers to coil should be kept away from the coil and other parts, (3) leads on oscillator coil which are an extended part of the coil winding should be as short as possible, (4) "C" band series capacitor C31 must have leads as short as possible, (5) all leads from antenna board to antenna coils should be dressed toward back apron, (6) the one lead of the line cord and the primary lead of the power transformer which run to the power switch should be twisted together, (7) shielding on leads to Victrola switch should be kept away from the switch terminals and jack.

ALIGNMENT PROCEDURE

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the rear of the indicator-drive-cord drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "0" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improve a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "0" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

Service Data

Loudspeaker.—Centering of the loudspeaker is made in the usual manner with three narrow celluloid or paper feelers after first removing the front dust cover. A dust cover

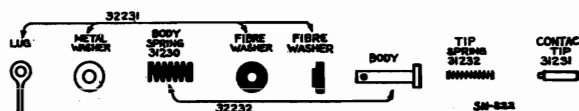
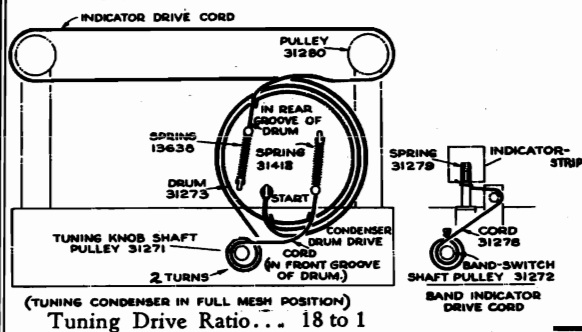
Steps	Connect the high side of test-oscillator to —	Tune test-oscillator to —	Range Selector	Set tuning gang to —	Adjust the following for max. peak output
No. 1	6K7 I-F grid cap in series with .01 mfd.	455 kc	"A"	Quiet point between 550-750 kc	L10, L11 (2nd I-F Transformer)
No. 2	6A8 Det. grid cap in series with .01 mfd.	455 kc	"A"		L8, L9 (1st I-F Transformer)
No. 3	A2. Connect A1 to chassis.	20 mc	"C"	20 mc (147.5°)	C24 (osc.)* C8 (det.†)
No. 4	A2, in series with 100 mmfd. Connect A3 to chassis.	6,100 kc	"B"	6,100 kc (145.5°)	C25 (osc.)**
No. 5	A2, in series with 100 mmfd. Connect A3 to chassis.	1,500 kc	"A"	1,500 kc (151.5°)	C29 (osc.) C3 (ant.)
No. 6	A2, in series with 100 mmfd. Connect A3 to chassis.	600 kc	"A"	600 kc (29.5°)	L17 (osc.)
No. 7	A2, in series with 100 mmfd. Connect A3 to chassis.	1,500 kc	"A"	1,500 kc (151.5°)	C29 (osc.)

* Use minimum capacity peak if two peaks can be obtained. Check to determine that the correct peak has been used by turning to 141.5° (19,090 kc), at which point a weaker signal should be received.

** Use minimum capacity peak if two peaks can be obtained. Check to determine that the correct peak has been used by turning to 124° (5,190 kc), at which point a weaker signal should be received.

† Rock gang condenser and use maximum capacity peak if two peaks can be obtained with C8.

Tuning Mechanism,Data
Armchair Cont.Unit Data



Component Parts of Station-Setting Contact

At left—Dial Mechanism

LUBRICATE GEARS WITH PETROLEUM JELLY. USE LIGHT MACHINE OIL ON GEAR BEARINGS.

GEAR-MESH ADJUSTMENT STUD (SET FOR MINIMUM BACK-LASH AND FREEDOM FROM BINDING BY ROTATING STUD)

KNOB SHAFT DRIVE GEAR AND HUB, 31239

DISC AND PINION, 32096

.01" PLAY

LUBRICATE KNOB SHAFT BEARINGS WITH PETROLEUM JELLY

USE LIGHT MACHINE OIL AT MOTOR BEARINGS

DAMPER, 32093 (USED IN 50-60~ MOTORS ONLY)

KNOB SHAFT

KNOB SHAFT PULLEY, 31271

CONDENSER DRUM DRIVE CORD, 31283

DRIVE GEAR MOUNTING SUPPORT AND STUD ASSEMBLY, 31236

ROLLER, 32086

ELECTROLYTIC (A-C) 60 MFD., 32088 (50-60~) 180 MFD., 32435 (25~)

REMOVE SPRING WHEN MOTOR IS OPERATED IN VERTICAL POSITION

MOTOR, 32095 (50-60~) 32434 (25~)

ROTOR IS PULLED FORWARD WHEN MOTOR IS ENERGIZED AND THE ROLLER ENGAGES THE DISC.

"C" WASHER

When a station button is pushed in, it completes the 24-volt circuit through the corresponding station-setting contact and one-half of the brass selector disc, which is connected to one side of the motor field coil. This energizes the motor, and the rotor is pulled forward, engaging with the gear train that drives the tuning condenser and selector disc. The condenser and disc rotate until the insulation line comes under the particular station-setting contact, and the motor circuit is broken.

When the electric tuning mechanism is in action, the motor-supply voltage is fed into a diode rectifier circuit which applies a high bias to the first-audio amplifier. This prevents audio amplification and makes the set quiet or "mute" while the mechanism is operating.

The brass selector disc is fastened to the rear shaft of the tuning condenser by means of two set-screws. When the condenser is at maximum (plates fully meshed) the insulation line should be horizontal, with the operating-end at the left (viewed from rear). The operating-end has dark insulating material and the brass is beveled at this end.

The selector disc should be set so that the contact-tip plungers in the station-setting contacts project not more than 1/16-in. from the body of the contacts.

Lubrication

Motor bearings and gear bearings; use light machine oil.

Gear faces; use "Pure Oil No. 611" or petroleum jelly.

Dial-indicator pulleys and rails; use "Castordag" or petroleum jelly.

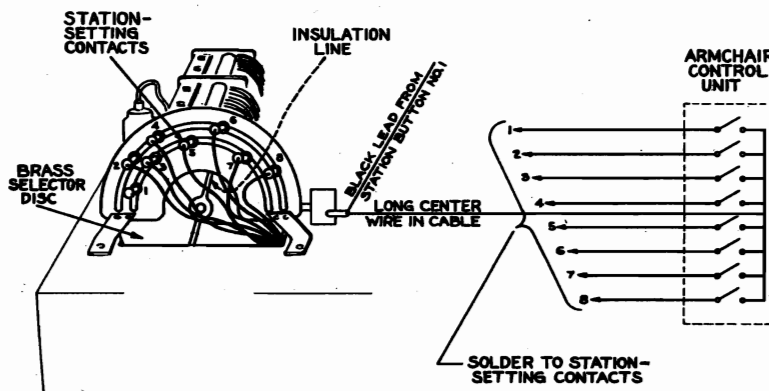
Selector disc; apply *thin* film of petroleum jelly.

Armchair Control Unit

Station-Setting Contacts and Selector Disc

This illustration shows connections for a G8A Armchair Control Unit. This unit is not supplied with the receiver but may be added as an accessory.

Station Button	Color of Lead To Station-Setting Contact
No. 1	Black
No. 2	Brown
No. 3	Blue
No. 4	Green
No. 5	Red
No. 6	Red-black
No. 7	Brown-black
No. 8	Red-yellow



When a Model G8A Armchair Control is connected to the receiver it duplicates the action of the push-buttons on the front panel when No. 1 button is pressed down. The black lead from push-button No. 1 is unsoldered from No. 1 station-setting contact and soldered to a terminal board which is to be mounted on the frame of selector mechanism. If desired one of the other seven station buttons on the set may be used in place of No. 1 button.

This arrangement allows the use of only seven of the eight buttons when tuning in stations at the set, but allows the use of the entire eight buttons on the Armchair Control. In operating the G8A Armchair Control the push-button must be held down until the station has been tuned in. Care must be taken not to hold two of the station-buttons down at one time as both windings of the motor may be engaged instantaneously causing the motor to be inoperative and overheated.

Automatic Record Changer Data, Adjustments

RCA MFG. CO., INC.

MODELS U-30, Chas. RC-335KR
U-129, Chas. RC-335K
MODEL U-125, Chas. RC-386

point at which the roller enters the cam. By bending the pin support either toward or away from trip pawl bearing, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

Lubrication.—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board.

The felt washer between the turntable and spindle bearing should be soaked in light engine oil whenever the turntable is removed, or as required for proper operation.

Do not allow oil or grease to come in contact with, rubber mounting of tone arm base, rubber bumper, or flexible coupling of drive motor.

MISCELLANEOUS SERVICE HINTS

Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual mis-adjustments will enable ready adjustment in most cases.

1. For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A".
2. Needle does not land properly on both 10 and 12 inch records.—Make complete adjustments "D" and "E".
3. Needle does not land properly on 12 inch record but correct on 10 inch.—Effect adjustment "E".
4. Failure to trip at end of record.—Increase clutch "5" friction by means of screw "B". Also, see that levers "7" and "12" are free to move without touching each other.
5. Pickup strikes lower record of stack or drags across top record on turntable.—Adjust lift cable per adjustment "C".
6. Needle does not track after landing.—Friction clutch "5" adjustment "B" may be too tight; bind in tone arm vertical bearing; levers "7" and "12" fouled; or pickup output cable twisted.
7. Cycle commences before record is complete.—Record is defective, or adjustment "B" of friction clutch "5" is too tight.
8. Wow in record reproduction.—Record is defective; flexible coupling between motor and changer mechanism not correctly assembled; or instrument is not being operated at normal room temperature (65° F).
9. Record knives strike edge of records.—Records warped; record edges are rough; or knife adjustments "F" and "G" are incorrect.
10. Record not released properly.—Adjust record shelf assemblies in respect to shaft by means of adjustment "H".
11. Needle lands in 10 inch position on 12 inch record or misses record when playing both types mixed.—Increase tension of pickup locating lever spring "34".

fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "V" on lever "14" is in contact with "Step I" on lever "17". The correct point of landing is 4-11/16 inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17". Leave approximately 1/32 inch end play between hub of lever "20" and pickup base bearing, and tighten the blunt nose screw "D"; run mechanism through several cycles as a check, then tighten cone pointed screw "D".

After adjusting for needle landing on a 10 inch record, place 12 inch record on turntable; push index lever to reject and return to 12 inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5-11/16 inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end adjusts lever "14" to give correct needle landing. The eccentric end of the stud must always be toward the rear of the motor board, otherwise incorrect landing may occur with 10 inch records.

F. & G. Record Separating Knife.—The upper plate (knife) "25" on each of the record posts serves to separate the lower record from the stack and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "27" be accurately maintained. The spacing for the 10 inch record is nominally .038 inch, and for the 12 inch record is .075 inch.

To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut "F" to give .055—.061 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "F" adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072—.078 inch.

H. Record Support Shelf.—The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both posts are rotated simultaneously by a gear and rack coupled to the main lever "15", and it is necessary that adjustments be such that the record is released from both shelves at the same instant. To adjust, place a 12 inch record on the turntable, rotate mechanism into cycle to the point where tone arm is at maximum distance outward from turntable; lift record upward until it is in contact with both separating knives, then loosen screws "H" and shift record shelves so that the curved inner edges of the shelves are uniformly spaced at least 1/16 inch from record edge. Tighten the blunt nose screw "H", run mechanism through cycle several times to check action, then tighten cone pointed screw "H".

If record shelves or knives are bent, or not perfectly horizontal, improper operation and jamming of mechanism will occur.

J. Tone Arm Rest Support (not shown).—When the changer is out-of-cycle, the front lower edge of the pickup head should be 5/16 inch above surface of motor board. This may be adjusted by bending the tone arm support bracket, which is associated with the required direction.

K. Trip Pawl Stop Pin.—The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the

Automatic Record Changer GENERAL INFORMATION

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc. are in good order and are correctly assembled.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

The turntable, spindle, and pinion gear are assembled by means of a 3/32 inch straight pin. This pin may be removed by gently driving with a standard pin punch.

If the record changer or cabinet is not perfectly level, normal operation is likely to be affected.

The 10 and 12 inch records must be absolutely flat for smooth operation when using a mixture of the two sizes.

A shorting switch, located in the pickup head, operates due to pressure when the pickup is placed on the pickup rest.

ADJUSTMENTS

A. Main Lever.—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. One adjustment is provided for the main lever. Rotate the turntable until the changer is out-of-cycle; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate by 1/16 inch.

B. Friction Clutch.—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip lever "7" through a friction clutch "5". If the motion of the pickup is abruptly accelerated or becomes irregular due to swinging in the eccentric groove, the trip finger "7" moves the trip pawl "22" into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw "B". If adjustment is too tight, the needle will repeat grooves; if too loose, tripping will not occur at the end of the record.

C. Pickup Lift Cable Screw.—During the record change cycle, lever "16" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pickup lift cable. To adjust pickup for proper elevation, stop the changer "in-cycle" at the point where pickup is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknuts "C" to obtain 1 inch spacing between needle point and turntable top surface.

D. & E. Needle Landing on Record.—The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10 inch record. Position of eccentric stud "E" governs the landing of the needle on a 12 inch record; this, however, is dependent on the proper 10 inch adjustment.

To adjust for needle landing, place 10 inch record on turntable; push index lever to reject position and return to the 10 inch position; see that pickup locating lever "17" is tilted

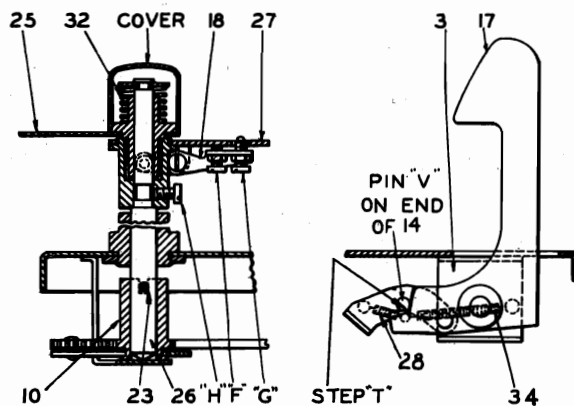
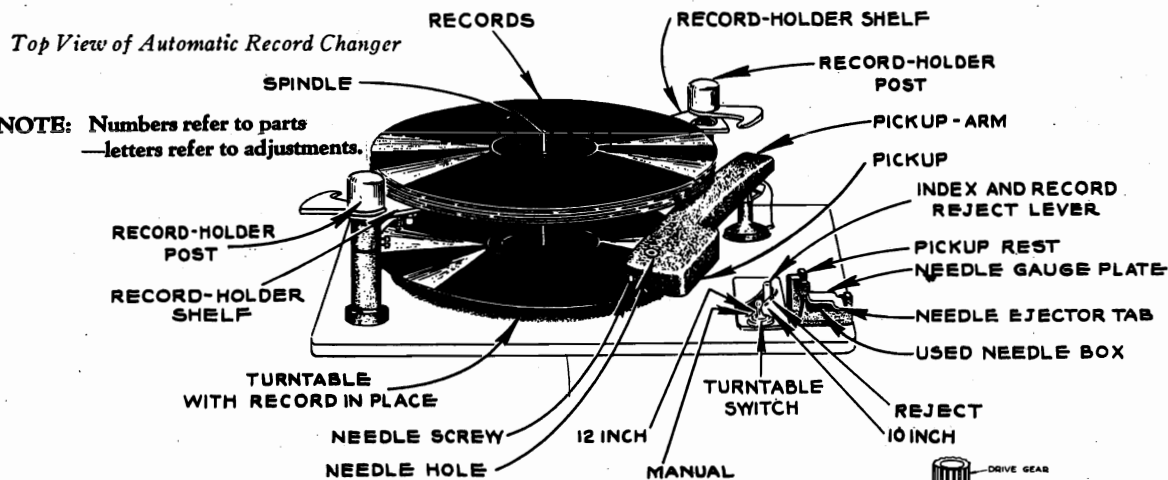
MODELS U-30,U-129
MODEL U-125

RCA MFG. CO., INC.

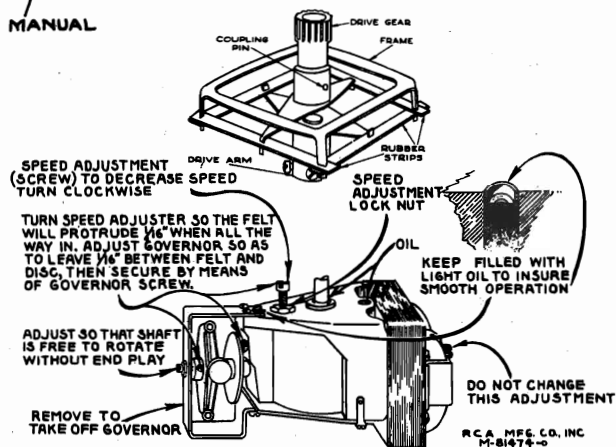
Record Changer
Assembly,Details

Top View of Automatic Record Changer

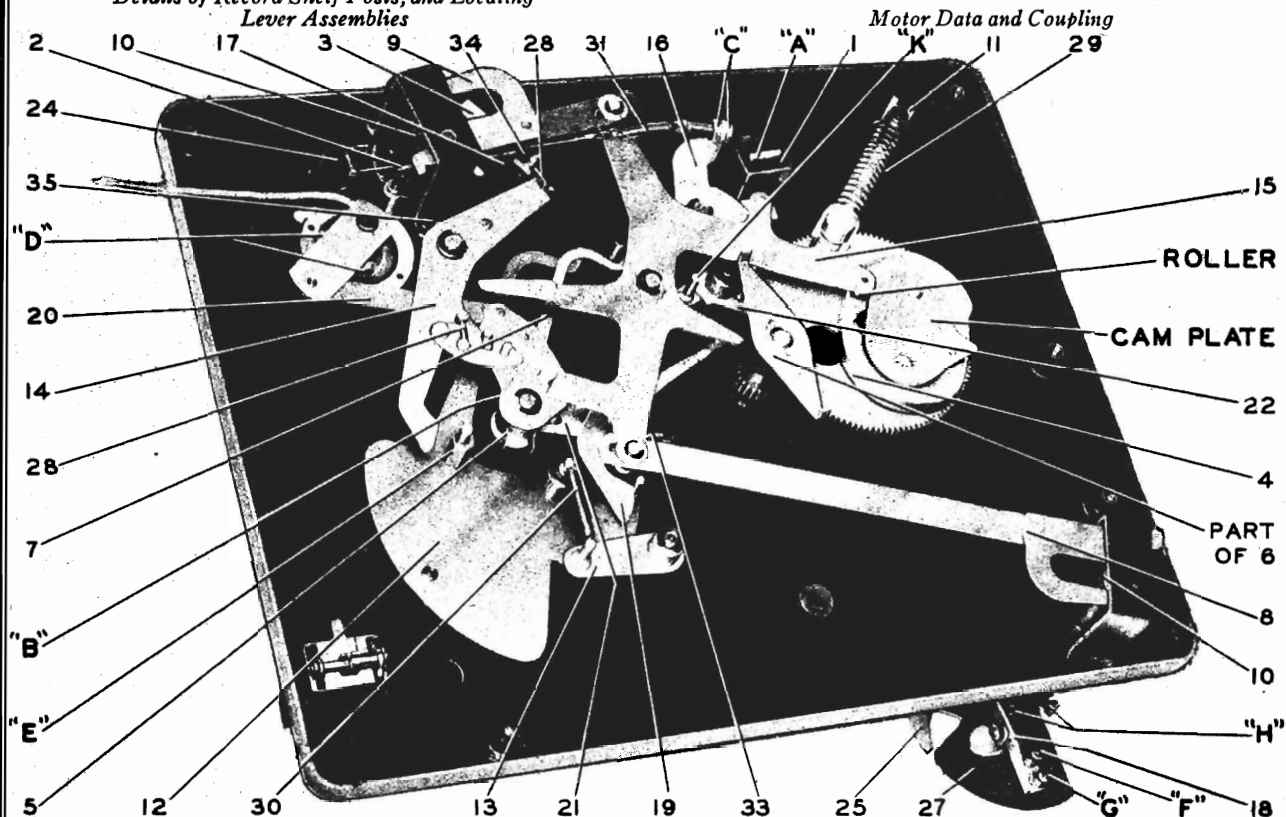
NOTE: Numbers refer to parts
—letters refer to adjustments.



Details of Record Shelf Posts, and Locating Lever Assemblies



Motor Data and Coupling



Bottom View of Automatic Record Changer

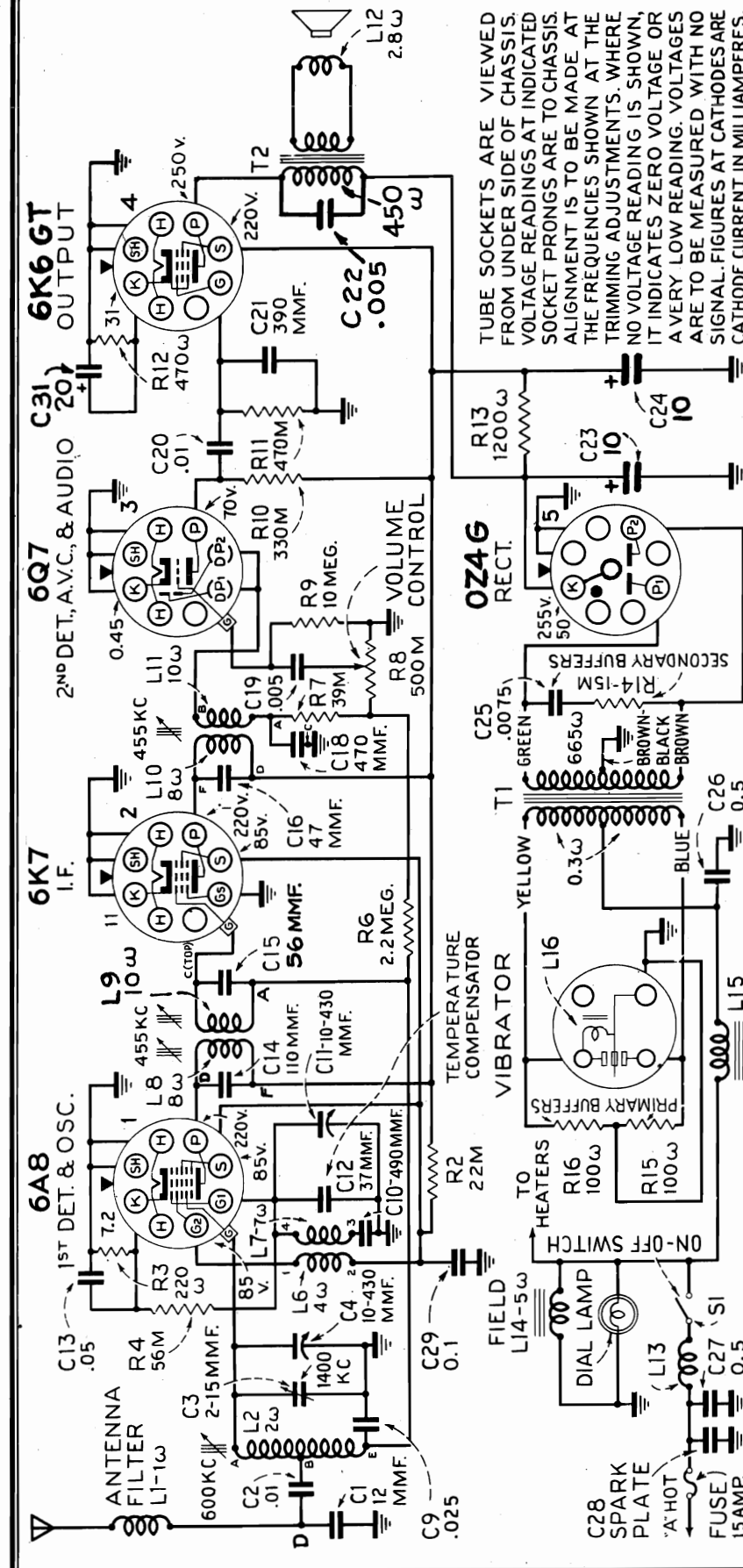
nsist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

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ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

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RCA MFG. CO., INC.

MODEL M50, Chassis RC-357J
Schematic, Voltage, Data

LOUDSPEAKER
Type..... Electrodynamic
Size..... 5 inches
V.C. Impedance..... 3.2 ohms at 400 cycles
Field Coil Resistance..... 5 ohms
Power Supply
"A"..... 6.3 volt Auto Storage Battery
"B"..... Non-Synchronous Vibrator
Current Drain..... 6.0 amps.

CHASSIS FEATURES
No. I.F. Stages..... One
Completely Shielded Ant. Filter
Magnetic-core Adjusted Antenna and I.F. Transformers
Ignition-Noise-Suppression Filters
Antenna Compensator Trimmer
Illuminated Dial

— 1939 No. 22 —

Schematic Circuit Diagram

Electrical Specifications

FREQUENCY RANGE..... 550-1,550 kc
POWER OUTPUT
Type..... Pentode
Undistorted..... 2 watts
Maximum..... 3.5 watts
Dial Lamp..... 6-8 volts, 0.2 amp., Mazda 51

ALIGNMENT FREQUENCIES
I.F..... 455 kc
Ant..... 600 and 1,400 kc
Osc..... No Adjustment

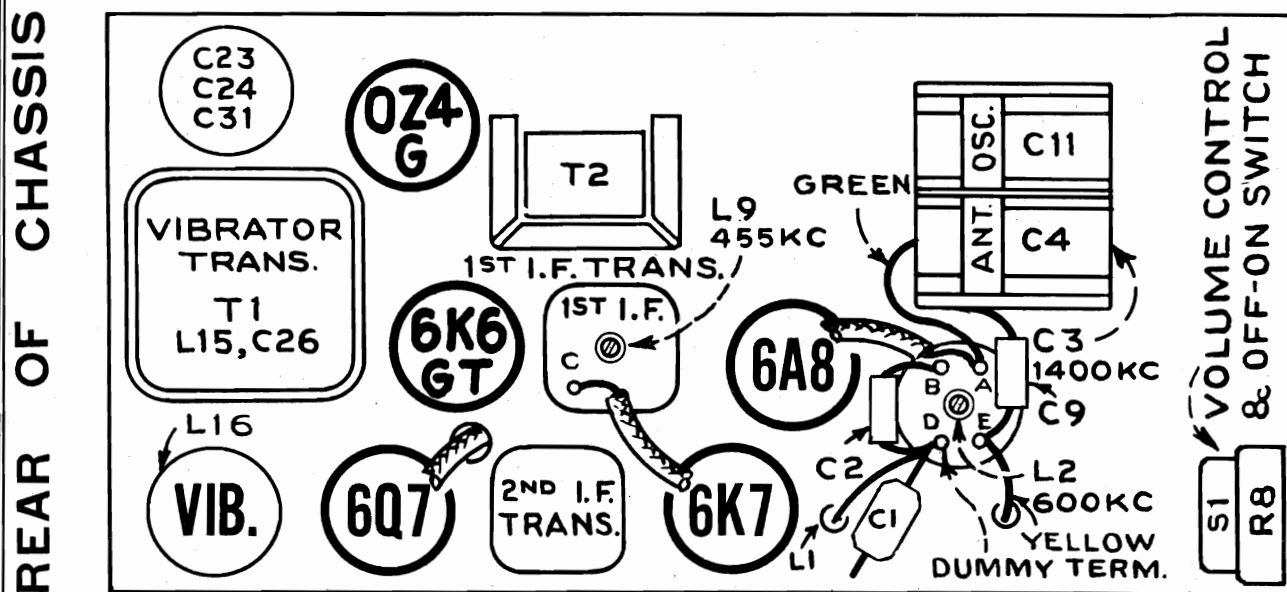
M = 1000 OHMS IF PEAK 455 KC

General Description

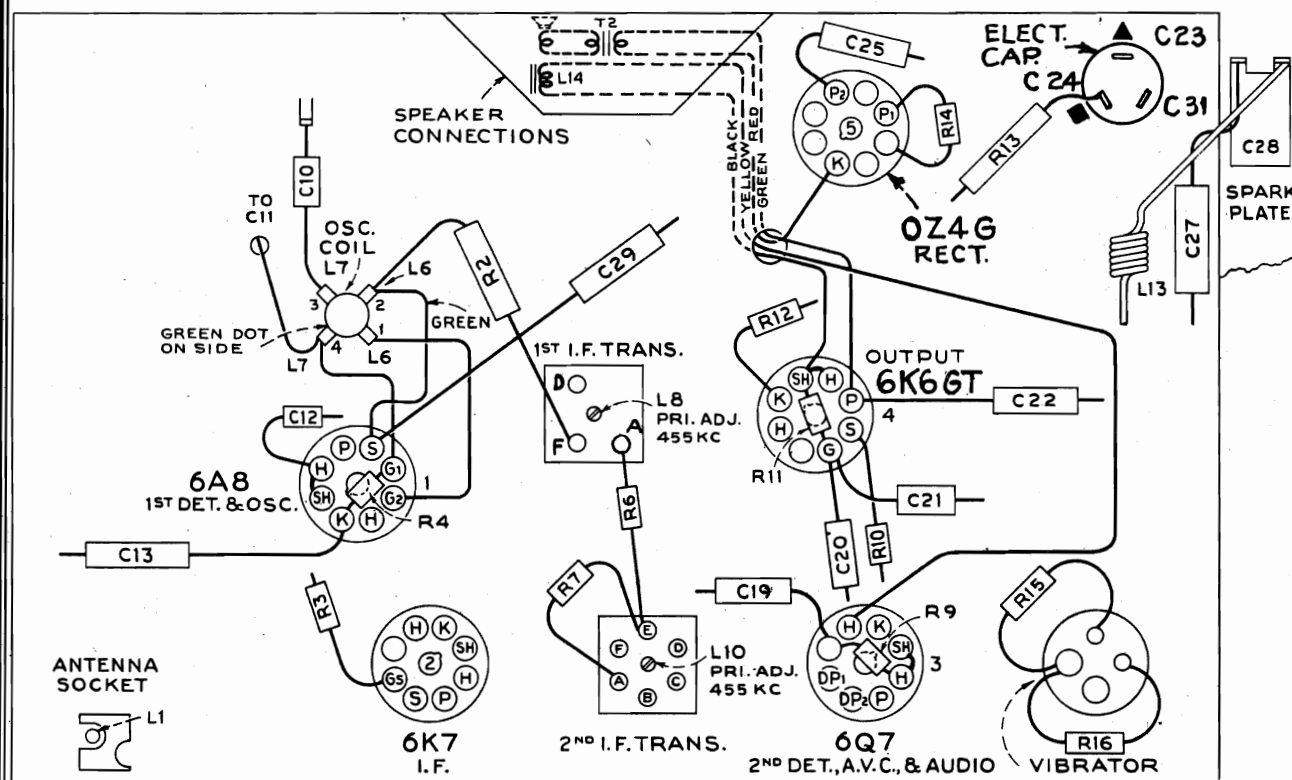
Model M50 is a five-tube superheterodyne receiver with loudspeaker and radio chassis in the same case. It is equipped with five push buttons, for tuning your five favorite broadcast stations, as well as the standard method of dial tuning. Adjustments for push button tuning are explained under the heading "Push Button Tuning Mechanism." The receiver is designed to be mounted under the dash panel. The operating controls are integral with the radio and speaker case.

Loudspeaker.—The loudspeaker voice coil should be centered in the usual manner with three narrow paper feelers, after first removing the front dust cover. The dust cover should be cemented back in place with ambroid cement after adjustment has been completed.

(4) RCA-6K6GT..... Output
(5) RCA-OZ4G..... Rectifier



Location of Parts and Alignment Adjustments on Top of Chassis



Location of Parts and Alignment Adjustments on Bottom of Chassis

RCA MFG. CO., INC.

MODEL M50, Chassis RC-357J

MODEL M60, Chassis RC-357K

Alignment

PRELIMINARY:

Output meter connections..... Across speaker voice coil
 Output meter readings to indicate 1 watt..... 1.8 volts
 Generator ground lead connections..... To chassis
 Generator modulation..... 30%, 400 cycles
 Position of Volume Control..... Fully clockwise
 Chassis must be in its case with front end removed, when aligning R-F circuit.

MODEL M50

Chassis No. RC 357J

Position of Dial Pointer	Generator Frequency	Dummy Antenna	Generator Connection	Adjustment Symbol	Circuit Adjusted
No Signal 550-750 kc	455 kc	.001 mfd.	6K7 Grid	L-10	2nd I.F. Trans.
No Signal 550-750 kc	455 kc	.001 mfd.	6A8 Grid	L-8, L-9	1st I.F. Trans.
1,400 kc	1,400 kc	.0001 mfd. †	Ant. Lead	C-3	Ant.
600 kc	600 kc	.0001 mfd. †	Ant. Lead	L-2	Ant.
1,400 kc	1,400 kc	.0001 mfd. †	Ant. Lead	C-3 *	Ant.

NOTE: No oscillator alignment adjustments are required in this receiver.

† Make the generator connection to the receiver thru a shielded lead-in having not more than 50 mmf. (.00005) capacity with a male connector attached for connection to antenna socket. If C-2 has been changed, as outlined under "Antenna Circuit," for reason of a high capacity antenna, the Dummy Antenna should be the same value as the antenna itself.

* Re-adjust C-3 after installation as outlined under "Antenna Circuit"

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value, to prevent the A.V.C. action of the receiver from interfering with accurate alignment.

Alignment adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular frequency should be used. Grid cap leads should remain in place during alignment.

Oscillator circuit alignment is not required in this receiver at either end of the band; the oscillator coil is pre-adjusted for inductance in the factory.

Since the oscillator coil is unshielded, the case has some effect on its inductance. Therefore alignment must be done either with the chassis in the case or with a steel plate (covering the bottom of chassis), substituting for the case.

MODEL M60

Chassis No. RC 357K

Position of Dial Pointer	Generator Frequency	Dummy Antenna	Generator Connection	Adjustment Symbol	Circuit Adjusted
No Signal 550-750 kc	455 kc	.001 mfd.	6K7 I.F. Grid	L-10, L-11	2nd I.F. Trans.
No Signal 550-750 kc	455 kc	.001 mfd.	6A8 Grid	L-8, L-9	1st I.F. Trans.
Rock Through 600 kc	600 kc	.0001 mfd. †	Ant. Lead	L-7	Osc.
1,400 kc **	1,400 kc	.0001 mfd. †	Ant. Lead	C-5	Det.
1,400 kc **	1,400 kc	.0001 mfd. †	Ant. Lead	C-3	Ant.
Rock Through 600 kc	600 kc	.0001 mfd. †	Ant. Lead	L-7	Osc.
1,400 kc **	1,400 kc	.0001 mfd. †	Ant. Lead	C-5	Det.
1,400 kc **	1,400 kc	.0001 mfd. †	Ant. Lead	C-3*	Ant.

† Make the generator connection to the receiver through a shielded lead-in having not more than 50 mmf. (.00005) capacity with a male connector attached for connection to antenna socket. If a capacitor has been added in series with the lead from antenna filter L-1 to the antenna coil, as outlined under "Antenna Circuit," for reason of a high capacity antenna, the Dummy Antenna should be the same value as the antenna itself.

* Re-adjust C-3 after installation as outlined under "Antenna Circuit."

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value, to prevent the A.V.C. action of the receiver from interfering with accurate alignment.

Alignment adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular frequency should be used. Grid cap leads should remain in place during alignment.

**** OSCILLATOR CIRCUIT**

A magnetite core is used to provide temperature stability. The conventional high frequency trimmer has been replaced with a fixed temperature-compensating capacitor (C-12) which determines the high frequency range. Since the inductance of L-7 is adjustable, the conventional series trimmer has been replaced with a fixed capacitor (C-10). C-10 is a special capacitor having zero temperature coefficient to provide for oscillator stability in the low frequency range. Aligning the receiver for 600 kc is accomplished by adjusting L-7 to the antenna and det. circuits (gang condenser must be rocked while making this adjustment). The 1,400 kc alignment is accomplished by adjusting the antenna and the det. trimmers (C-3 and C-5) to the oscillator.

MODEL M50, Chas. RC-357J

MODEL M60, Chas. RC-357K

Antenna Data,

Tuner Data

RCA MFG. CO., INC.

Antenna Circuit

M50

The antenna circuit is designed to work with a low capacity antenna having a total capacity including the shielded lead-in not to exceed 150 mmf. If larger antennas, such as screened top or a double under the running-board having a total capacity of 200 to 550 mmf. is to be used, it will be necessary to reduce the value of the antenna coupling capacitor C-2 from .01 to approximately 200 mmf. (.0002). For even larger antennas such as insulated steel tops, a correspondingly smaller value of C-2 (approximately 125 to 150 mmf.) should be used keeping in mind to use the largest value possible with which the antenna circuit can be aligned.

M60

The antenna circuit is designed to work with an antenna having a total capacity including the shielded lead-in not to exceed 150 mmf. If an antenna having a larger capacity is to be used, it will be necessary to add a capacitor in series with the lead from antenna filter L-1 to the antenna coil terminal ("A"). Where a "Double Under the Running Board" type of antenna is to be used having a capacity of approximately 200 mmf. the capacitor added should be approximately 300 mmf. The insulated running board type having an approximate capacity of 550 mmf. will require a capacitor of approximately 200 mmf. Cars using an insulated steel top of approximately 3,500 mmf. will require a series capacitor of 150 mmf.

M50 M60

After installation, and with antenna connected, tune in a weak station near 1,400 kc and adjust compensator trimmer (C-3) for maximum signal output. This trimmer is accessible by prying off the nameplate between the control knobs.

Antenna Filter

A filter is included in the antenna circuit. Being completely shielded, it prevents radiating ignition interference within the set. It also reduces the possibility of picking up vibrator interference. The filter unit is mounted inside a steel shell which in turn is welded to the chassis. The shielded antenna lead-in makes contact with the filter unit within the steel shell and is held in place by a bayonet type connector.

Push Button Tuning Mechanism

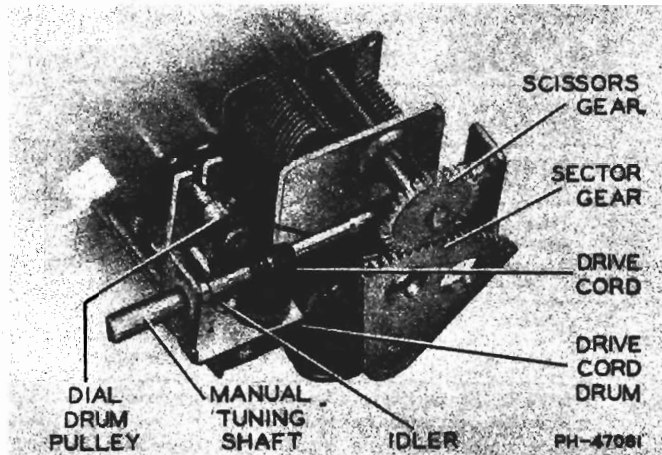
The push button tuning mechanism used in this receiver is of the mechanical type, wherein the movement of the button actually turns the tuning condenser to any pre-determined setting. The movement is actuated thru a Push-Arm, Cam, Rocker Plate and Sector Gear, which meshes with a Scissors Gear directly fastened to the tuning condenser shaft. The scissors gear prevents backlash between the sector gear and the tuning condenser. Since the sector gear is mounted directly on the rocker plate shaft, the position of the rocker plate will accurately determine the position of the tuning condenser.

Setting Up Stations

The push buttons should be adjusted for five favorite stations after the receiver is installed and operating.

Any standard broadcast stations may be chosen. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Loosen the push buttons one-half turn.
2. Using the tuning control, accurately tune in the first station.



Tuning Mechanism

3. With station accurately tuned in, press the first push button fully in and then gently release so as not to jar mechanism.
4. Tighten the push button securely with fingers. Do not force with pliers.
5. Proceed in same manner to adjust the other four push buttons.

Adjustments

The mechanism should be adjusted so that when using either manual or push-button tuning, it operates positively and without backlash or bind. The following hints will be found helpful in adjusting the mechanism properly.

1. With the gang condenser in full mesh, the sector gear should have the two end teeth fully meshed in the scissors gear.
2. The position of the sector gear on the rocker-plate shaft should be adjusted so that there is clearance between the rocker-plates and the frame of the push-button mechanism at both extremities of gang rotation. Thus correct adjustment prevents the rotation of the gang being limited by the rocker plates touching the frame.
3. The drive cord should have $8\frac{1}{2}$ turns around the tuning shaft as shown in the illustration. Three degrees of adjustment of the tension on the drive cord may be obtained by use of the three positions for connecting the drive-cord-tension spring to the drive-cord drum on the condenser shaft as shown.
4. The push-arms, rocker-plate shaft, and pulleys should be lubricated with light grease (sparingly). Care should be taken to keep the lubricant off the drive cord.

Manual Tuning

A manual tuning knob is provided so that additional stations may be tuned in as desired. The manual tuning shaft is connected thru a cord drive to a drum on the rocker plate shaft. This same cord drives the dial drum by passing over a pulley on the drum shaft. A sketch shows the complete cord drive assembly and the correct number of turns which the cord should be wrapped around the drive shaft and dial drum pulley. Stops are provided on the dial drum so that dial scale adjustment is made by tuning the set to the extreme ends of the band.

Parts List, Drive Data

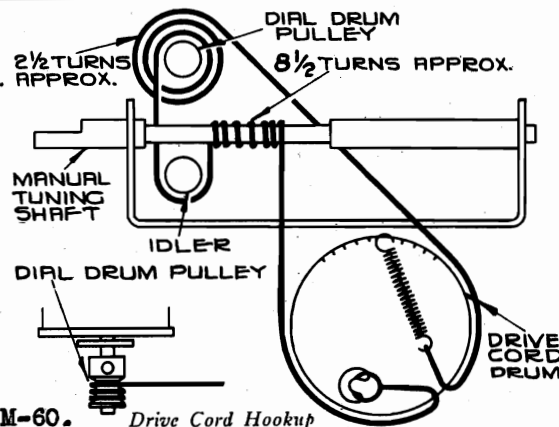
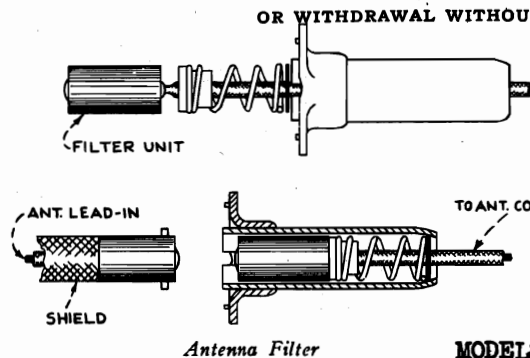
RCA MFG. CO., INC.

MODEL M50, Chas. RC-357J

MODEL M60, Chas. RC-357K

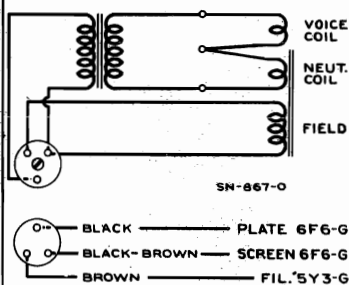
STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
CHASSIS ASSEMBLIES					
MODEL M-50 (RC-357J)					
13002	Capacitor—12 mmfd. (C1)	.35	3584	Ring—R.F. coil retaining ring	.03
31728	Capacitor—37 mmfd. (C12)	.35	31639	Socket—Dial lamp socket	.25
12405	Capacitor—47 mmfd. (C16)	.30	31319	Socket—Tube socket	.25
12629	Capacitor—56 mmfd. (C15)	.35	13686	Socket—Vibrator socket	.20
14262	Capacitor—109 mmfd. (C14)	.30	30902	Transformer—First i-f transformer (L8, L9, C14, C15)	1.90
13894	Capacitor—390 mmfd. (C21)	.35	31593	Transformer—Second i-f transformer (L10, L11, C16, C17)	1.95
30673	Capacitor—470 mmfd. (C18)	.25	31597	Transformer—Vibrator power transformer (T1, L15, C26)	4.85
34250	Capacitor—490 mmfd. (C10)	.40	13688	Vibrator—Plug-in vibrator complete (L16)	3.35
33584	Capacitor—.005 mfd. (C19, C22)	.25	31638	Volume control and power switch (R8, S1)	1.50
30626	Capacitor—.0075 mfd. (C25)	.30	MODELS M-50, M-60 SPEAKER ASSEMBLIES		
4937	Capacitor—.01 mfd. (C2, C20)	.25	(Speaker 84391-1)		
4870	Capacitor—.025 mfd. (C9)	.20	30782	Cone—Speaker cone and voice coil (L12)	1.20
30882	Capacitor—.05 mfd. (C13)	.20	30781	Speaker—Complete	4.40
4839	Capacitor—.1 mfd. (C29)	.30	30783	Transformer—Output transformer (T2)	1.45
12741	Capacitor—.5 mfd. (C27)	.30	(Speaker 84391-3)		
32240	Capacitor—Electrolytic, 2 sections 10 mfd., and 1 section 20 mfd. (C23, C24, C31)	1.45	31771	Cone—Speaker cone and voice coil (L12)	1.25
31596	Clip—Spring clip to hold oscillator coil	.02	31770	Speaker—Complete	4.00
31977	Coil—Antenna filter (L1)	.45	31772	Transformer—Output transformer (T2)	1.20
31594	Coil—Oscillator coil (L6, L7)	.75	MODEL M-60.		
31595	Coil—Oscillator coil (L6, L7)	1.35	TUNING UNIT ASSEMBLIES		
11765	Lamp—Dial lamp	.15	33667	Button—Push button	.20
30641	Lead—"A" lead	.30	31605	Condenser—3-gang variable (C3, C4, C5, C6, C7, C11)	3.60
30540	Resistor—100 ohms, $\frac{1}{2}$ watt (R15, R16)	.20	MODEL M-50		
14561	Resistor—220 ohms, $\frac{1}{2}$ watt (R3)	.20	33666	Button—Push button	.15
30499	Resistor—470 ohms, $\frac{1}{2}$ watt (R12)	.20	31766	Coil—Antenna coil—less shield (L2)	1.05
6134	Resistor—1,200 ohms, 1 watt (R13)	.22	31604	Condenser—2-gang variable (C3, C4, C11)	2.55
12695	Resistor—15,000 ohms, $\frac{1}{2}$ watt (R14)	.20	MODELS M-50, M-60		
13669	Resistor—22,000 ohms, 2 watts (R2)	.25	31614	Cord—Variable condenser drive cord	.10
12266	Resistor—39,000 ohms $\frac{1}{2}$ watt (R7)	.20	31725	Drum—Indicator drum assembly	.40
12286	Resistor—56,000 ohms, $\frac{1}{2}$ watt (R4)	.20	31610	Drum—Variable condenser drive cord drum	.40
14983	Resistor—330,000 ohms, $\frac{1}{2}$ watt (R10)	.20	31612	Gear—Variable condenser drive gear sector—fastens on cam shaft	.60
12285	Resistor—470,000 ohms, $\frac{1}{2}$ watt (R11)	.20	33665	Mechanism—Comprising 5 push arms, cams, cam plate, and mounting bracket assembled—less variable condenser	7.00
12679	Resistor—2.2 meg., $\frac{1}{2}$ watt (R6)	.20	31606	Pulley—Indicator drum pulley	.20
13601	Resistor—10 meg., $\frac{1}{2}$ watt (R9)	.20	31607	Pulley—Pulley for indicator drum bracket	.10
3584	Ring—R.F. coil retaining ring	.03	13471	Ring—Retaining ring for antenna coil	.03
31639	Socket—Dial lamp socket	.25	4389	Screw—No. 6-32 x $\frac{3}{16}$ -in. set screw for pulley, Stock No. 31606	.03
31319	Socket—Tube socket	.25	31613	Screw—No. 8-32 x $\frac{1}{2}$ -in. set screw for gear, Stock No. 31612	.02
13686	Socket—Vibrator socket	.20	31611	Screw—No. 8-32 x $\frac{1}{2}$ -in. set screw for drum, Stock No. 31610	.02
14261	Transformer—First i-f transformer (L8, L9, C14, C15)	2.05	31609	Shaft—Station selector knob shaft	.20
30672	Transformer—Second i-f transformer (L10, L11, C16, C18)	2.10	31615	Spring—Variable condenser drive cord tension spring	.02
31597	Transformer—Vibrator power transformer (T1, L15, C26)	4.85	30585	Spring—Push button arm tension spring	.06
13688	Vibrator—Plug-in vibrator complete (L16)	3.35	2917	Washer—"C" washer to hold knob shaft	.03
31637	Volume control and power switch (R8, S1)	1.50	31608	Washer—"C" washer to hold pulley, Stock No. 31607	.01
CHASSIS ASSEMBLIES					
MODEL M-60 (RC-357K)					
13002	Capacitor—12 mmfd. (C1)	.35	MISCELLANEOUS ASSEMBLIES		
31729	Capacitor—43.5 mmfd., temp. comp. (C12)	.35	4289	Body—Fuse holder body for ammeter lead	.03
30904	Capacitor—100 mmfd. (C14, C15, C16, C17)	.25	5025	Capacitor—Generator capacitor	.45
13894	Capacitor—390 mmfd. (C21)	.35	33668	Case—Receiver case only	5.30
14497	Capacitor—680 mmfd. (C30)	.40	4291	Clip—Spring clip for amateur lead	.06
33584	Capacitor—.005 mfd. (C19, C22)	.25	31456	Covers—8-protective celluloid covers for call letter markers	.08
30626	Capacitor—.0075 mfd. (C25)	.30	33670	Dial—Dial scale and holder	.60
14393	Capacitor—.01 mfd. (C2)	.25	4286	Ferrule—Bushings and ferrule for fuse holder	.03
4937	Capacitor—.01 mfd. (C20)	.25	5025	Fuse—15 amp.	.08
32787	Capacitor—.05 mfd. (C8, C9)	.20	4290	Insulator—Insulating sleeve for fuse holder	.02
30882	Capacitor—.05 mfd. (C13)	.20	7766	Lead—Ammeter lead complete with clip and fuse holder	.40
4839	Capacitor—.1 mfd. (C29)	.30	31589	Markers—One set call letter markers for push buttons	.35
12741	Capacitor—.5 mfd. (C27)	.30	33669	Mounting—Complete set mounting brackets, strap, washers, screws, bolts, and nuts	.85
33903	Capacitor—Electrolytic, 2 sections 10 mfd. each (C23, C24)	1.05	31660	Plate—Name plate	.40
32363	Capacitor—470 mfd. (C10, C18)	.30	31646	Spring—Retaining spring for knobs	.02
31596	Clip—Spring clip to hold oscillator coil	.02	4284	Spring—Spring for fuse holder	.03
33664	Coil—Antenna coil (L2, L3)	1.35	5024	Suppressor—Distributor suppressor	.40
31977	Coil—Antenna filter (L1)	.45	4285	Washer—Insulating washer for fuse holder	.02
31594	Coil—Oscillator coil (L6, L7)	1.35	Drive Cord Hookup		
31600	Coil—R.F. coil—less shield (L4, L5)	1.15			
11765	Lamp—Dial lamp	.15			
30641	Lead—"A" lead	.30			
30540	Resistor—100 ohms, $\frac{1}{2}$ watt (R15, R16)	.20			
13428	Resistor—150 ohms, $\frac{1}{2}$ watt (R3)	.20			
30499	Resistor—470 ohms, $\frac{1}{2}$ watt (R12)	.20			
6134	Resistor—1,200 ohms, 1 watt (R13)	.22			
12695	Resistor—15,000 ohms, $\frac{1}{2}$ watt (R14)	.20			
13998	Resistor—22,000 ohms, $\frac{1}{2}$ watt (R2)	.20			
13477	Resistor—27,000 ohms, $\frac{1}{2}$ watt (R5)	.22			
12454	Resistor—33,000 ohms, $\frac{1}{2}$ watt (R7)	.20			
12286	Resistor—56,000 ohms, $\frac{1}{2}$ watt (R4)	.20			
14983	Resistor—330,000 ohms, $\frac{1}{2}$ watt (R10)	.20			
12285	Resistor—470,000 ohms, $\frac{1}{2}$ watt (R11)	.20			
12679	Resistor—2.2 meg., $\frac{1}{2}$ watt (R6)	.20			
13601	Resistor—10 meg., $\frac{1}{2}$ watt (R9)	.20			

First Edition

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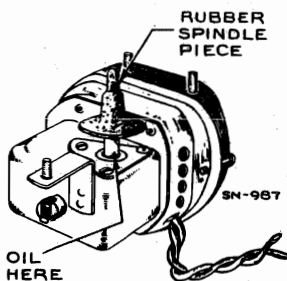
MODELS M-50, M-60.

Drive Cord Hookup

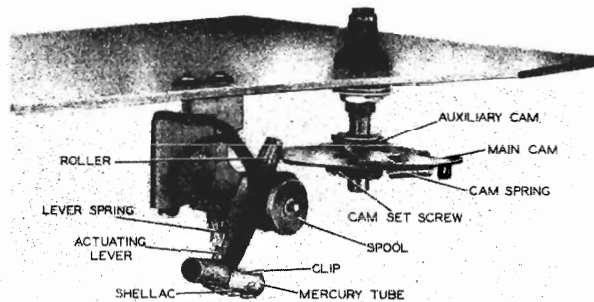
MODEL U50, Chas. RC-414C
Speaker ConnectionsConnections and Colors of
Speaker and Cable

RCA MFG. CO., INC.

Switch Mechanism, Parts



Phonograph Motor



Switch Mechanism

(Shown with pickup in rest position)

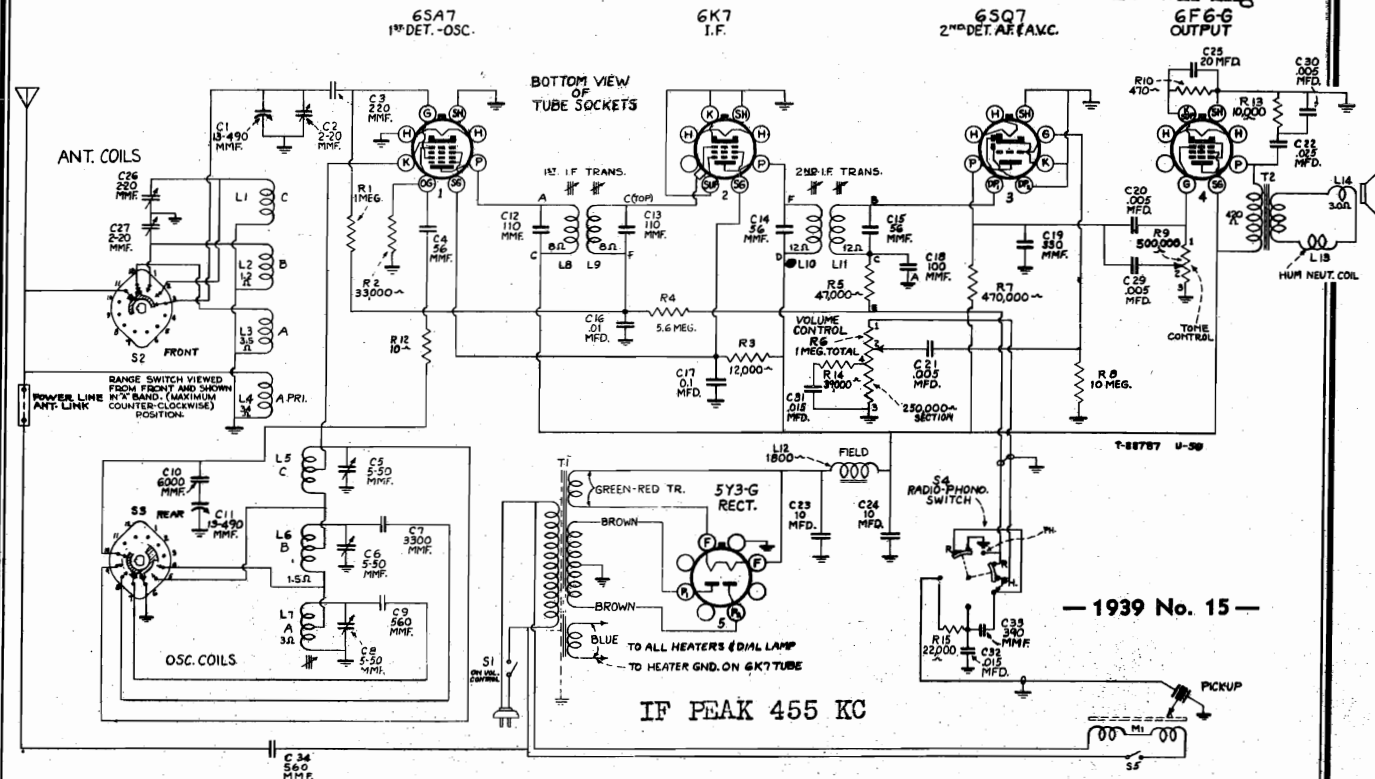
Replacement Parts

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

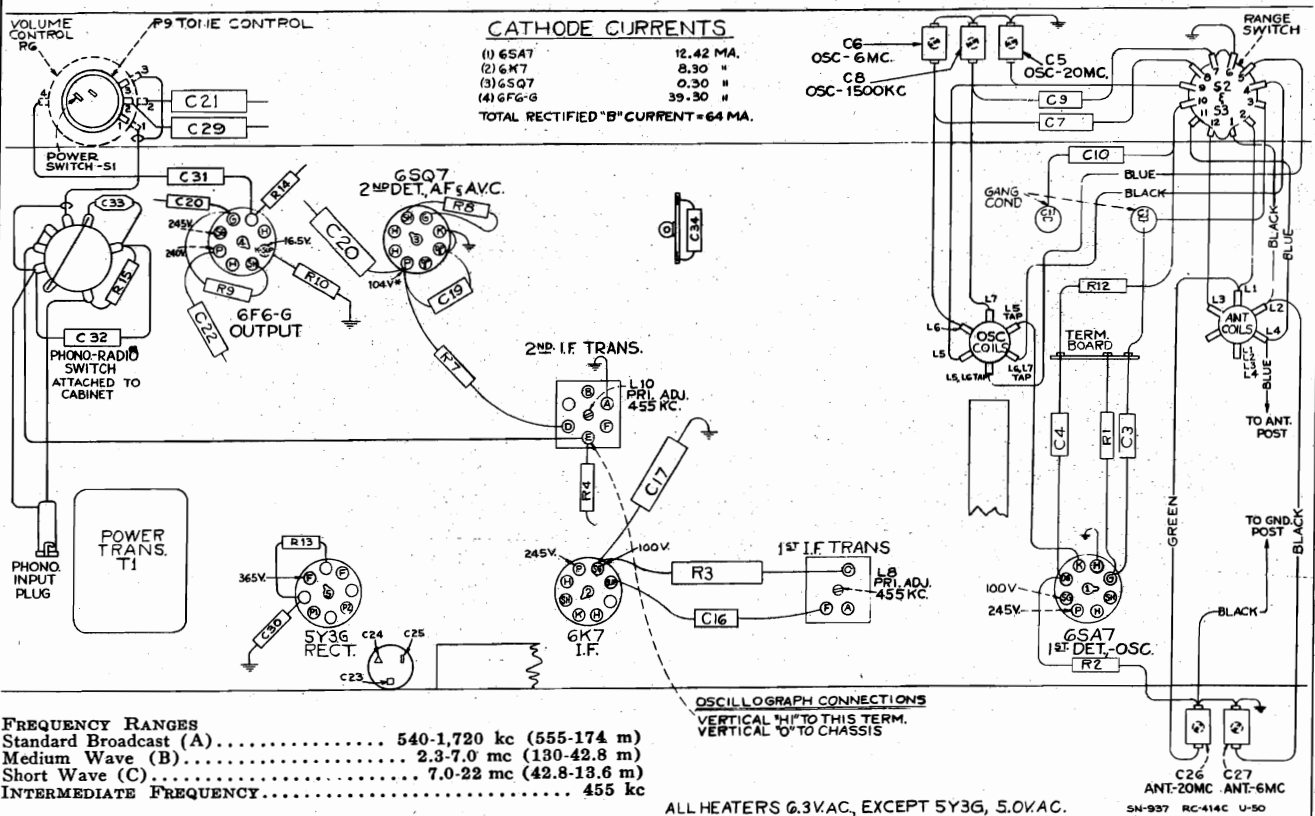
STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
CHASSIS ASSEMBLIES (RC-414-C)			33114	Damper—Viscoloid damper for pickup armature	.15
32834	Bracket—Drive bracket and 1 pulley assembled	.25	31160	Screw—Pickup needle screw	.12
33411	Bracket—Drive bracket and 3 pulleys assembled	.65	MOTOR ASSEMBLIES		
12581	Cap—Top shield cap for i-f transformer	.25	32650	Field—Motor field coils and laminations, 110 volts, 50 cycle	5.10
32830	Capacitor—2-gang trimmer, 2-20 mmfd. each section (C26, C27)	.40	32336	Field—Motor field coils and laminations, 110 volts, 60 cycle	5.10
32829	Capacitor—3-gang trimmer, 5-60 mmfd. each section (C5, C6, C8)	.55	33220	Motor—105-125 volts, 50 cycles—less mounting plate (M1)	11.25
12723	Capacitor—56 mmfd. (C4)	.35	33219	Motor—105-125 volts, 60 cycles—less mounting plate (M1)	10.75
30949	Capacitor—56 mmfd. (C14, C15)	.25	33361	Shaft—Turntable spindle shaft and gear—50 cycle	1.40
14262	Capacitor—109 mmfd. (C12, C13)	.30	33360	Shaft—Turntable spindle shaft and gear—60 cycle	1.40
32238	Capacitor—110 mmfd. (C18)	.30	AUTOMATIC SWITCH ASSEMBLIES		
30232	Capacitor—220 mmfd. (C3)	.35	33221	Cam—Cam assembly comprising main and auxiliary cams, hub, and set screws	.65
12952	Capacitor—330 mmfd. (C19)	.35	32864	Lever—Actuating lever with roller and mercury tube clip	.45
13894	Capacitor—390 mmfd. (C33)	.35	14195	Screw—No. 10-32 x 5/16 cone pointed set screw for cam hub	.05
12537	Capacitor—560 mmfd. (C9, C34)	.35	32869	Screw—No. 10-32 x 5/16 set screw for cam hub	.01
31403	Capacitor—3300 mmfd. (C7)	.60	32868	Spring—Actuating lever tension spring	.05
31405	Capacitor—6000 mmfd. (C10)	.75	32867	Spring—Cam tension spring	.05
33584	Capacitor—.005 mfd. (C30)	.25	32865	Support—Switch support and terminal board	.40
4838	Capacitor—.005 mfd. (C20, C21, C29)	.25	32866	Switch—Mercury tube with leads (S5)	1.75
14393	Capacitor—.01 mfd. (C16)	.30	31608	Washer—"C" washer for actuating lever shaft	.01
11315	Capacitor—.015 mfd. (C31, C32)	.20	SPEAKER ASSEMBLIES (84604-1)		
4870	Capacitor—.025 mfd. (C22)	.20	33406	Cone—Speaker cone and voice coil (L14)	2.10
4839	Capacitor—.1 mfd. (C17)	.30	5118	Plug—3-contact male for speaker	.25
32240	Capacitor—Electrolytic, 2 sections 10 mfd., 400 V., and one section 20 mfd., 25 V. (C23, C24, C25)	1.45	33222	Speaker complete	6.65
32821	Coil—Antenna coil (L1, L2, L3, L4)	1.35	33407	Transformer—Output transformer (T2)	2.00
32824	Coil—Oscillator coil (L5, L6, L7)	1.00	MISCELLANEOUS ASSEMBLIES		
32817	Condenser—2-gang variable tuning (C1, C2, C11)	2.60	10290	Cap—Ventilating cap.	.25
33409	Control—Volume control, tone control, and power switch (R6, R9, S1)	3.00	31464	Damper—Damper plate and rubber sleeve for spindle	.30
32713	Core—Adjustable core and stud for oscillator coil	.35	32837	Dial—Dial scale (glass)	.65
32835	Drum—Drive cord drum with set screw	.55	33415	Escutcheon—Dial scale escutcheon	.80
11891	Lamp—Dial lamp—Mazda No. 44	.17	11771	Foot—Cabinet foot	.02
30868	Plug—2-contact female motor cable plug	.35	33416	Frame—Dial frame, support, color plate, and mounting brackets—less pointer and carriage, and dial scale	1.40
5119	Plug—3-contact female speaker cable plug	.25	32633	Handle—Carrying handle	.90
13988	Resistor—10 ohms, 1/2 watt (R12)	.20	13085	Hinge—Cabinet lid hinge	.22
30681	Resistor—470 ohms, 1 watt (R10)	.22	11865	Holder—Needle cord holder	.30
3078	Resistor—10,000 ohms, 1/2 watt (R13)	.20	33417	Indicator—Dial scale pointer and carriage	.35
31389	Resistor—12,000 ohms, 3/4 watts (R3)	.50	33468	Knob—Radio-Record switch knob	.15
13998	Resistor—22,000 ohms, 1/2 watt (R15)	.20	33506	Knob—Range switch knob (small)	.25
12454	Resistor—33,000 ohms, 1/2 watt (R2)	.20	33470	Knob—Tone control and switch knob (small dual)	.20
12266	Resistor—39,000 ohms, 1/2 watt (R14)	.20	33505	Knob—Tuning knob (large)	.30
5132	Resistor—47,000 ohms, 1/10 watt (R5)	.15	33471	Knob—Volume control knob (large dual)	.25
12285	Resistor—470,000 ohms, 1/2 watt (R7)	.20	33223	Mounting—Complete set motor mounting screws, washers, and spacers	.30
13730	Resistor—1 meg., 1/2 watt (R1)	.20	31054	Mounting—Pickup arm mounting cushion, washers, and nut	.15
11668	Resistor—5.6 meg., 1/2 watt (R4)	.20	30870	Plug—2-contact male for motor leads	.35
13601	Resistor—10 meg., 1/2 watt (R8)	.20	31048	Plug—2-contact male plug for phono. cable	.15
14343	Retainer—Retaining ring to hold tuning knob shaft	.03	32846	Rod—Indicator slide rod	.25
32848	Screw—No. 8-32 square head set screw for drum shaft	.03	33418	Spring—Indicator tension spring	.02
33412	Shaft—Tuning knob shaft	.20	30330	Spring—Retaining spring for tone control knob	.03
31365	Socket—Dial lamp socket (insulated)	.30	4982	Spring—Retaining spring for tuning knob	.05
31251	Socket—Octal base tube socket	.25	14270	Spring—Retaining spring for volume control, range switch, or radio-record switch knob	.05
31418	Spring—Drive cord tension spring	.05	33364	Support—Cabinet lid support (LH)	.50
33413	Switch—Radio-Record switch (S4)	.75	33673	Support—Pickup arm support	.25
33410	Switch—Range switch (S2, S3)	1.00	33414	Turntable	1.55
14376	Transformer—First i-f transformer (L8, L9, C12, C13)	2.45			
32825	Transformer—Second i-f transformer (L10, L11, C14, C15, C18, R5)	2.50			
33112	Transformer—Power transformer 105-125 volts, 50-60 cycle (T1)	4.30			
PICKUP AND ARM ASSEMBLIES					
33216	Arm—Pickup arm—less crystal, needle screw, and cable	2.20			
33218	Base—Pickup arm mounting base and pivot shaft	1.00			
33217	Crystal—Pickup crystal cartridge and needle screw	3.75			

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RCA MFG. CO., INC.

MODEL U50, Chas. RC-414C
Schematic, Voltage
R-F Chassis Wiring

— 1939 No. 15 —



First Edition

R-F Wiring Diagram and Socket Voltages

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within $\pm 20\%$ with 117-volt a-c supply.

NOTE: Values with star () are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

MODEL U50, Chas. RC-414C

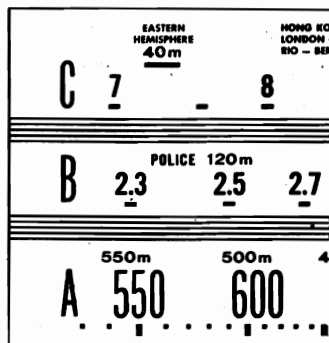
Socket, Trimmers, Dial Data

Alignment, Phono, Data

RCA MFG. CO., INC.

Reduced Reproduction of Receiver Dial, and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 33° on the calibration scale corresponds to approximately 7.9 mc on "C" band, and 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."



0 10 20 30 40 50 60 70 80 9

Calibration Scale On Indicator-Drive Cord Drum.—In most cases it will not be necessary to remove the chassis from the dial scale for alignment, allowing the dial scale to be used for calibration. However, if alignment is made with the receiver chassis removed, the calibration scale attached to the rear of the drum which is mounted on the front shaft of the gang condenser must be used. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 135° mark on the drum scale must be vertical, and directly under the center of the gang-condenser shaft when the plates are fully meshed. The drum is held in place by one set-screw, which must be securely tightened when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the 0° mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

TUBE COMPLEMENT

- (1) RCA-6SA7..... First Detector-Oscillator
- (2) RCA-6K7..... I-F Amplifier
- (3) RCA-6SQ7..... Second Det., A.V.C., and A-F Amplifier
- (4) RCA-6F6-G..... Power Output
- (5) RCA-5Y3-G..... Rectifier

PILOT LAMP (1).....

Mazda No. 44, 6.3 volts, 0.25 amp.

POWER OUTPUT RATING

Undistorted..... 2.0 watts

Maximum..... 3.6 watts

POWER SUPPLY RATINGS

Rating A... 105-125 volts, 50-60 cycles, 105 watts

LOUDSPEAKER (84604-1)

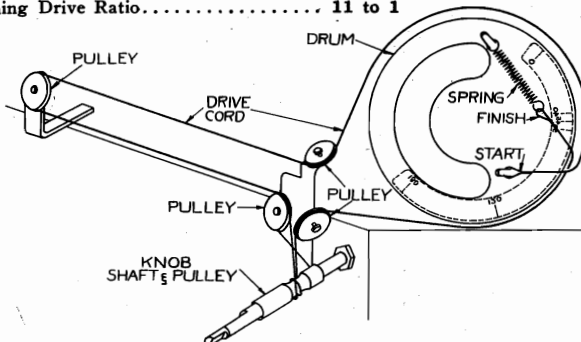
Type..... 8-inch electrodynamic

Voice Coil Impedance... 3.3 ohms at 400 cycles

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	"A" Band quiet point between 550-750 kc	L10 and L11 (2nd I.F. trans.)
2	Tuning condenser stator (osc.) in series with .01 mfd. **	455 kc		L8 and L9 (1st I.F. trans.)
3	Antenna lead in series with 200 mmfd.	600 kc	600 kc (33°) "A" Band	L7†
4		1,500 kc	1,500 kc (152.4°) "A" Band	C2 (ant.) C8 (osc.)
5	Repeat steps 3 and 4			
6	Antenna lead in series with 400 ohms	20 mc	20 mc (155.4°) "C" Band	C5 (osc.) * C26 (ant.)
7		6 mc	6 mc (149°) "B" Band	C6 (osc.) * C27 (ant.)
8	Antenna lead in series with 200 mmfd.	1,500 kc	1,500 kc (152.4°) "A" Band	C8 (osc.)

* Use minimum capacity peak if two peaks can be obtained
† Rock gang condenser slightly while adjusting L7.
** Make test-oscillator connection to lug on tuning condenser stator (oscillator section) in series with .01 mfd. condenser.
Note.—Oscillator tracks 455 kc above signal on all bands.

Tuning Drive Ratio..... 11 to 1



Arrangement of Drive Cord for Tuning Condenser and Dial Indicator. Drum Shown with Gang at Maximum Capacity shaft. The motor may be shut off at any time by placing the pickup on the pickup rest.

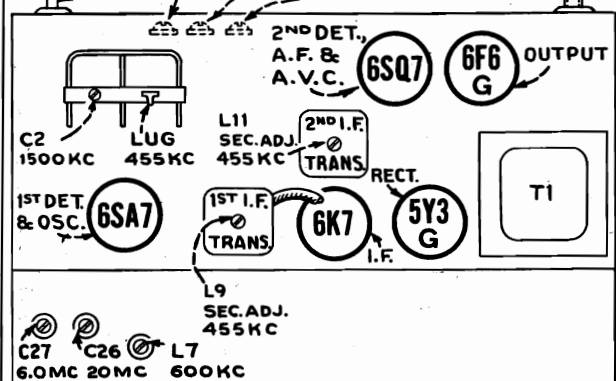
Power-Line Antenna:

At the back of the motorboard is a terminal board for antenna and ground connections. When it is desired to use the power line antenna, a jumper should be placed across the two outside binding-posts, thus connecting the antenna input of the receiver through a capacitor to the power line. The center binding-post is for the ground connection. When an external antenna is used, it should be connected to the post marked "ANT"

Precautionary Lead Dress:

1. Lead from 2nd I-F transformer to volume control should be kept close to the chassis and dressed against front apron.
2. C-10 should be dressed away from the antenna section of the variable condenser (C-1).

RANGE SWITCH C5 20MC C8 1500KC C6 6.0MC TONE CONTROL, VOLUME CONTROL, & POWER SWITCH



SN-981 (RC-414C)

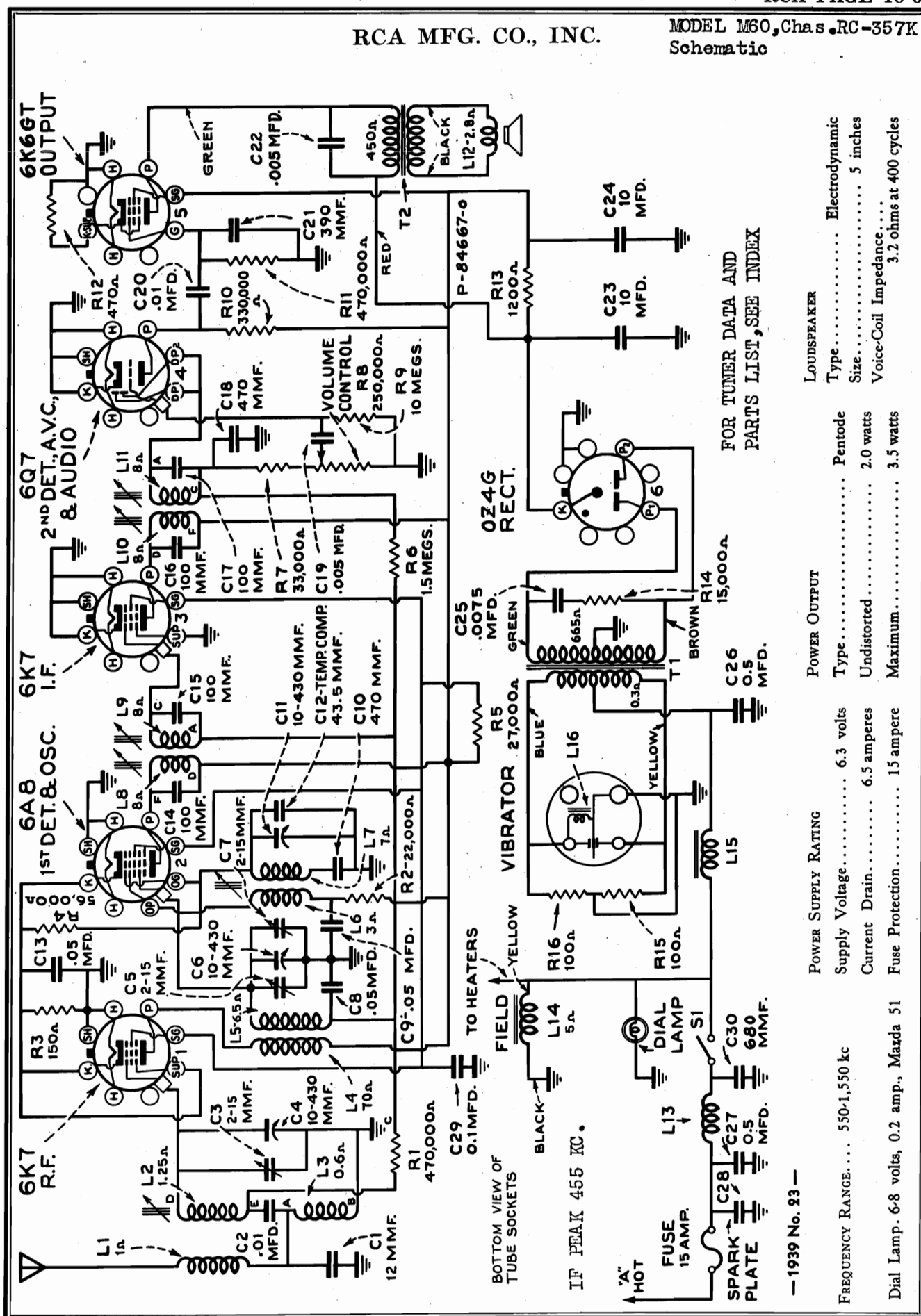
Phonograph Mechanism:

The phonograph motor is a self-starting, constant-speed induction type. It should be lubricated every six months by applying a few drops of light machine oil to the spindle bearing and oil hole.

The motor spindle is tapered, and a conical rubber piece fits snugly on the spindle. The hole in the turntable bushing is tapered to fit the rubber. This provides an excellent self-centering floating mounting.

A metal washer is placed on the spindle under the rubber piece. The washer has ears on the under side which fit over a pin that projects through the spindle.

The motor switch is automatic for both starting and stopping, and when properly adjusted, will turn the motor on as the pickup is moved from the pickup rest toward the turntable. The switch should be adjusted so that it will snap into the "off" position when the pickup needle is 1½ inches from the center line of the spindle



MODEL M60, Chas. RC-357K
Chassis Wiring, Socket
Trimmers
Voltage

RCA MFG. CO., INC.

General Description

Model M60 is a six-tube superheterodyne receiver with loudspeaker and radio chassis in the same case. It is equipped with five push buttons, for tuning your five favorite broadcast stations, as well as the standard method of dial tuning. Adjustments for push button tuning are explained under the heading "Push Button Tuning Mechanism." The receiver is designed to be mounted under the dash panel. The operating controls are integral with the radio and speaker case.

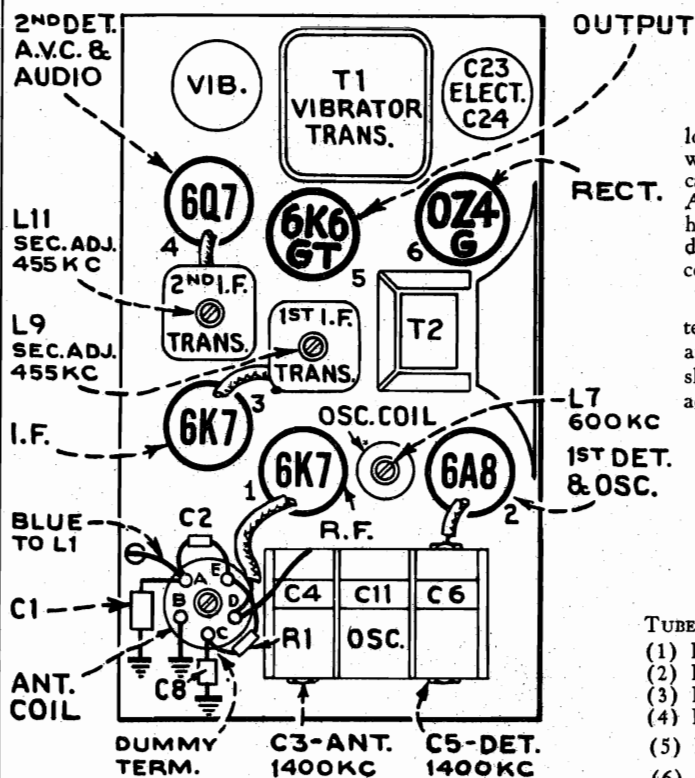
Loudspeaker.—The loudspeaker voice coil should be centered in the usual manner with three narrow paper feelers, after first removing the front dust cover. The dust cover should be cemented back in place with ambroid cement after adjustment has been completed.

ALIGNMENT FREQUENCIES

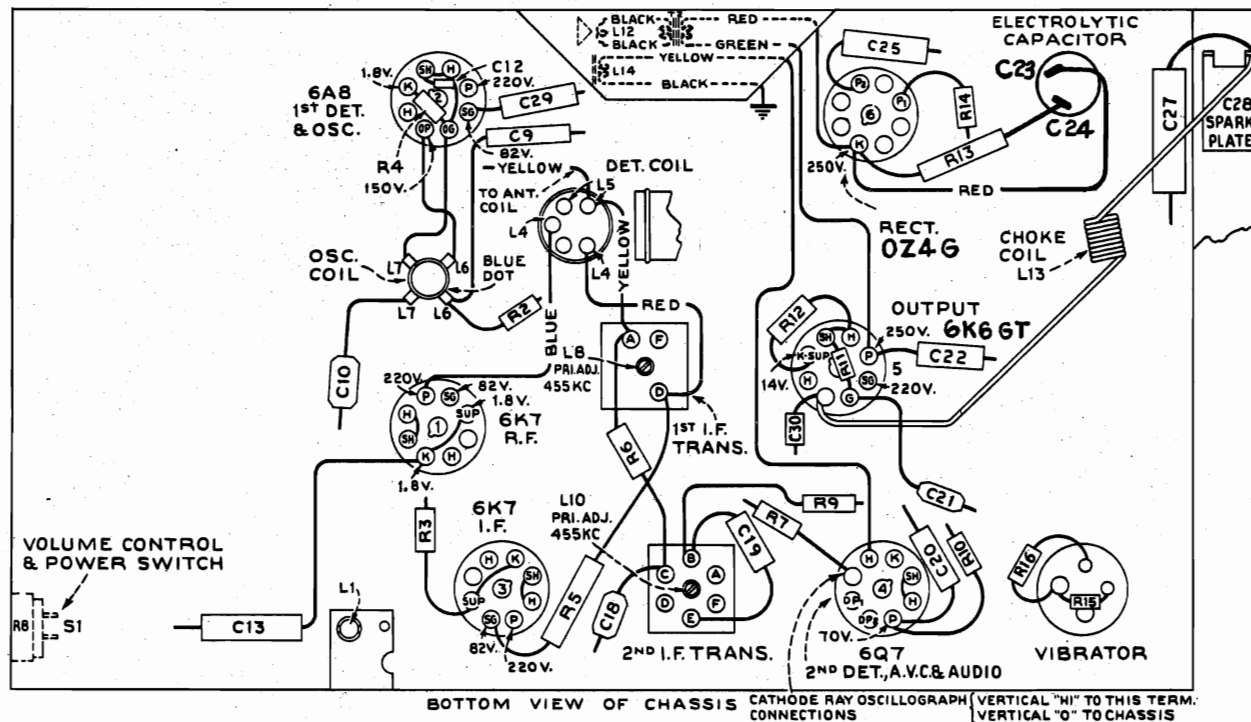
I-F.....	455 kc
Antenna.....	1,400 kc
R-F.....	1,400 kc
Oscillator.....	600 kc

TUBES AND FUNCTIONS

- (1) RCA-6K7..... R-F Amplifier
- (2) RCA-6A8..... First Detector—Oscillator
- (3) RCA-6K7..... I-F Amplifier
- (4) RCA-6Q7... Second Detector, A-F Amplifier and A.V.C.
- (5) RCA-6K6GT Output
- (6) RCA-0Z4G..... Rectifier



Top View of Chassis



Bottom View of Parts and Socket Voltages

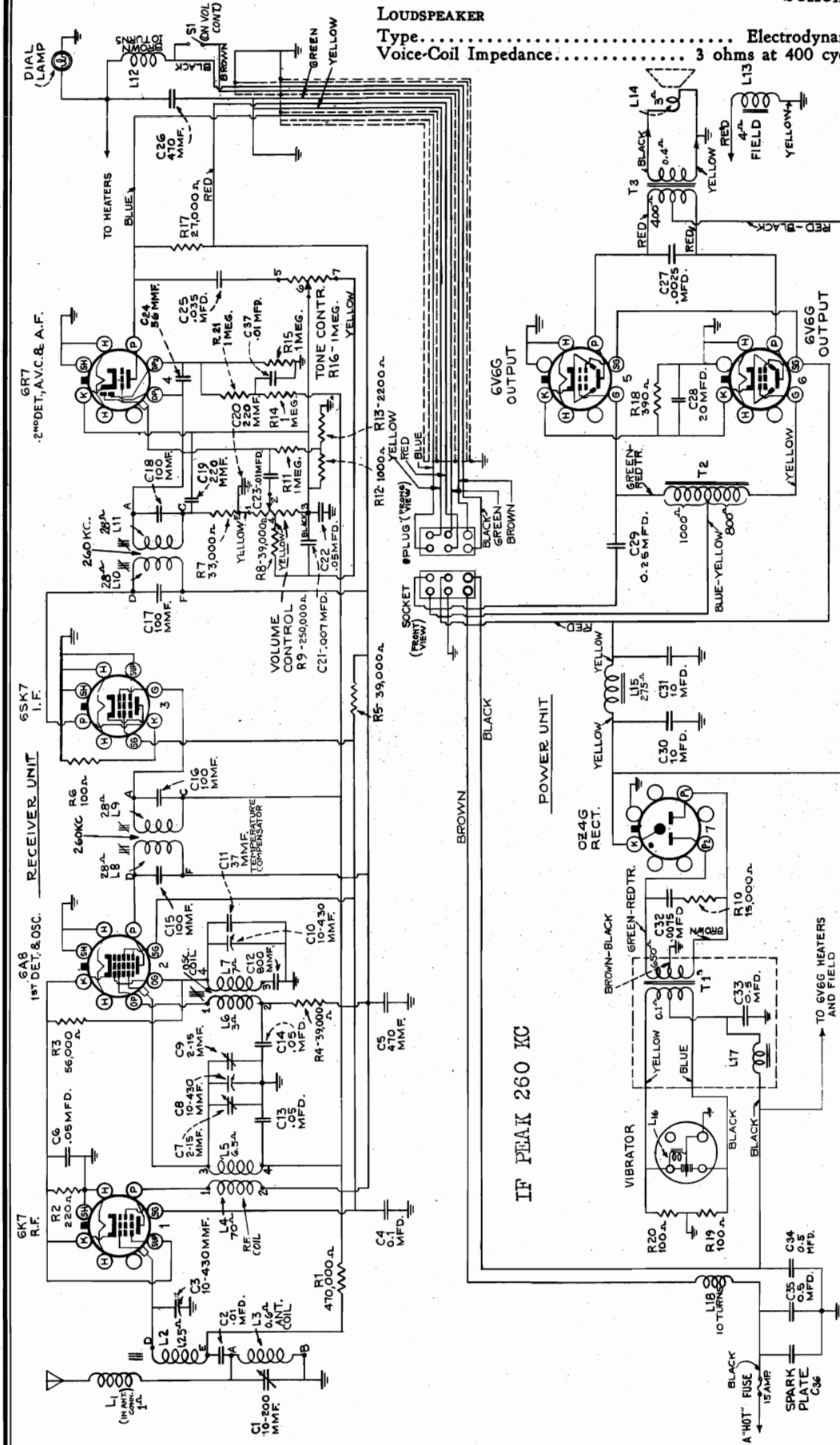
(Measured at 6.3 volts battery supply—Volume control minimum—No signal input—)

To duplicate the conditions under which the above voltages were measured requires a 1,000-ohm-per-volt d-c meter having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the indicated voltage value. Each value should hold within $\pm 20\%$ when the receiver is normally operative at its rated battery voltage.

RCA MFG. CO., INC.

MODEL M70, Chas. RC-394
Schematic

LOUDSPEAKER

Type..... Electrodynamic
Voice-Coil Impedance..... 3 ohms at 400 cycles

Model M-70 consists of a 7-tube, superheterodyne automobile receiver and an eight-inch electrodynamic loudspeaker built in two separately housed components. A small tuning unit for low-frequency tone control; compensating under the instrument panel contains four tubes, while the cylindrical loudspeaker housing for firewall mounting contains three tubes. Design features include an R-F amplifier stage; antenna filter and antenna trimmers; magnetite core antenna, oscillator and I-F transformers; delayed automatic volume control; combined high- and low-frequency tone control; compensated volume control; true tone fidelity; five push button tuning; full-vision, edge-lighted glass dial; illuminated station call letters and a push-pull beam power output stage.

Automobile Receiver

— 1939 No. 12 —

Tuning Range ... 550 to 1,550 kc

INTERMEDIATE FREQUENCY... 260 kc

Pilot Lamp... Mazda No. 51, 6-8 volts, 0.2 ampere

POWER OUTPUT RATINGS

Maximum..... 8 watts

Undistorted..... 6 watts

POWER SUPPLY RATING

Supply Voltage 6.3 volts

Current Drain 8.7 amperes

Fuse Protection 15 ampere

Pilot Lamp... Mazda No. 51, 6-8 volts, 0.2 ampere

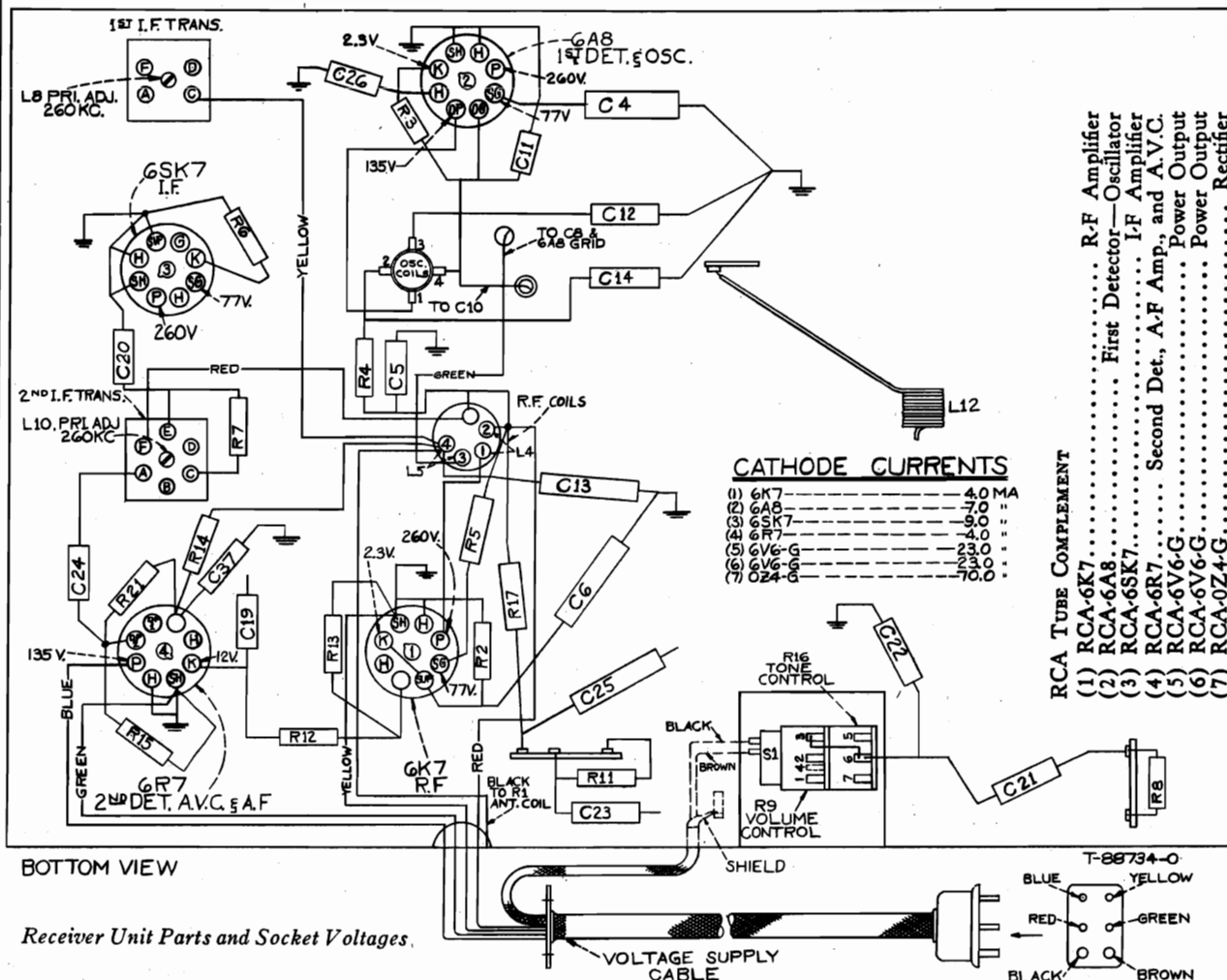
POWER OUTPUT RATINGS

Maximum..... 8 watts

Undistorted..... 6 watts

MODEL M70, Chas. RC-394
Voltage, Chassis Wiring
Tuner Data

RCA MFG. CO., INC.



RECEIVER CASE DIMENSIONS..... Height, 2 1/2 inches; Width, 5 7/8 inches; Depth, 9 1/4 inches

SPEAKER CASE DIMENSIONS..... Diameter, 9 1/2 inches; Depth, 5 inches

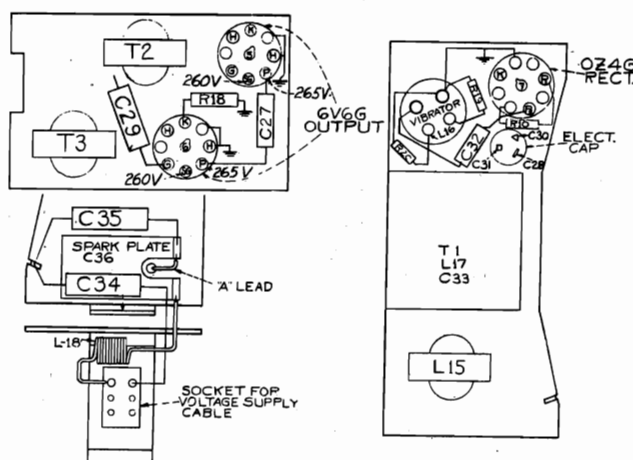
OPERATING CONTROLS..... (Left)—(Plastic Knob) Power-Volume; (Wing Knob) Tone; (Center)—Five Station Push Buttons; (Right)—Manual Tuning; Ratio 7 1/2 : 1.

WEIGHT..... Net, 20 pounds; Shipping, 22 pounds

Adjustment of Push-Button Mechanism

The mechanism should be adjusted so that when using either manual or push-button tuning, it operates positively and without backlash or bind. The following hints will be found helpful in adjusting the mechanism properly.

1. With the gang condenser in full mesh, the sector gear should have the two end teeth fully meshed in the scissor gear, as shown in the illustration.
2. The position of the sector gear on the rocker-plate shaft should be adjusted so that there is clearance between the rocker-plates and the frame of the push-button mechanism at both extremities of gang rotation. Thus correct adjustment prevents the rotation of the gang being limited by the rocker plates touching the frame.
3. The drive cord should have 6 1/2 turns around the tuning shaft as shown in the illustration. Three degrees of adjustment of the tension on the drive cord may be obtained by use of the three positions for connecting the drive-cord-tension spring to the drive-cord drum on the condenser shaft as shown.
4. The push-arms, rocker-plate shaft, and pulleys should be lubricated with light grease (sparingly). Care should be taken to keep the lubricant off of the drive cord.



Power Unit Parts and Socket Voltages

RCA MFG. CO., INC.

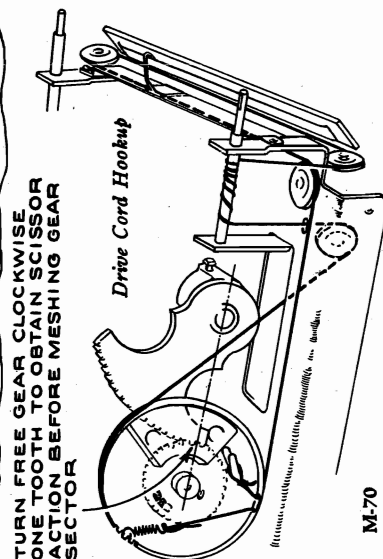
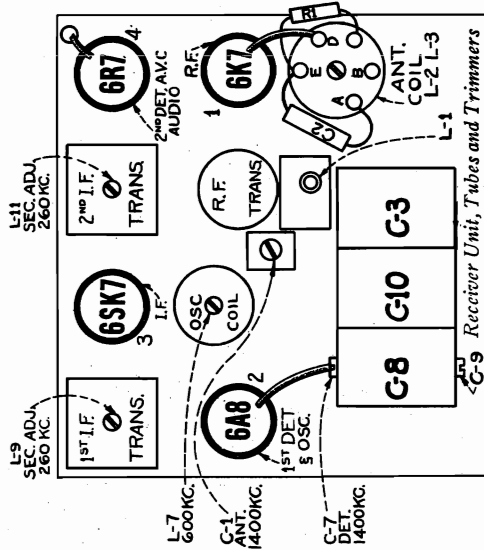
MODEL M70, Chas. RC-394
Alignment, Socket, Trimmers
Tuner Adjustments, Antenna
Drive Cord Data

Push Button Adjustment

The push buttons should be adjusted for five favorite stations after the receiver is installed and operating.

Any standard broadcast stations may be chosen. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Loosen the push buttons one-half turn.
2. Using the tuning control, accurately tune in the first station.
3. With station accurately tuned in, press the first push button fully in and then gently release so as not to jar mechanism.
4. Tighten the push button securely with fingers. Do not force with pliers.
5. Proceed in same manner to adjust the other four push buttons.



TURN FREE GEAR CLOCKWISE
ONE TOOTH TO OBTAIN SCISSOR
ACTION BEFORE MESHING GEAR
SECTOR

Alignment Procedure

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis, and keep the output signal as low as possible to avoid a-v-c action.

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are as follows: Vertical "H1" to terminal "C" on 2nd I-F transformer; vertical "0" to chassis.

Output Meter.—Connect the output meter across the speaker voice-coil and turn the receiver volume control to maximum. (fully clockwise) and tone control to middle of range.

Dial Calibration.—Rotate the gang condenser to its full-mesh (maximum-capacity) position and then adjust dial scale so that the pointer is aligned to the last calibration mark at the low-frequency end of the scale.

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid (No. 4 pin) in series with .01 mfd.	260 kc	No Signal 550-750 kc	L10 and L11 (2nd I-F Trans.)
2	6A8 Det. grid cap in series with .01 mfd.	260 kc		L8 and L9 (1st I-F Trans.)
3†	* Ant. connector in series with 60 mmfd.	600 kc	600 kc	L7 (osc.)
4†	* Ant. connector in series with 60 mmfd.	1,400 kc	1,400 kc signal	C7 (det.) C1 (ant.)
5†	* Ant. connector in series with 60 mmfd.	600 kc	600 kc (rock)	L7 (osc.)
6†	* Ant. connector in series with 60 mmfd.	1,400 kc	1,400 kc signal	C7 (det.) C1 (ant.)**

* Note 1.—This 60 mmfd. capacitor must be inserted at the antenna connector of the receiver. The lead from the test oscillator to the 60 mmfd capacitor may be shielded if desired, but no shielding should be used between capacitor and antenna connector.

† Note 2.—These adjustments should be made with unit enclosed in its shielded case, through holes provided for adjustment purposes.

** Note 3.—Final adjustment of C1 must be made after the receiver has been installed and the antenna connected. See "Antenna Circuit."

Antenna Circuit

It is very important that these instructions be followed when installing the M-70 receiver.

The antenna circuit is designed to work with an antenna having a total capacity including the shielded lead-in not to exceed 150 mmf. If an antenna having a larger capacity is to be used, it will be necessary to add a capacitor in series with the lead from the antenna filter L-1 to the antenna coil terminal ("A"). Where a "Double Under the Running Board" type of antenna is to be used having a capacity of approximately 200 mmf., the capacitor added should be approximately 500 mmf. The insulated running board type having an approximate capacity of 550 mmf. will require a capacitor of approximately 150 mmf. Cars using an insulated

After installation and with antenna connected, tune in a weak station near 1,400 kc and adjust compensator trimmer C-1 for maximum signal output. This trimmer is accessible by removing plug button near antenna jack on top of receiver. If a maximum (peak) signal output cannot be obtained in the range of the antenna trimmer, the effective capacity should be checked and compensated for by varying series capacity as described above.

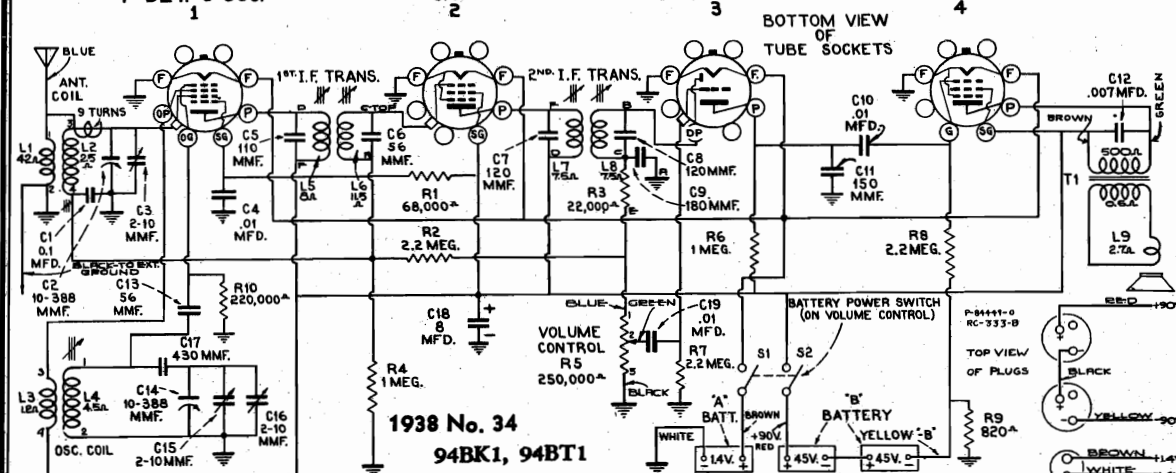
Loudspeaker

The loudspeaker cone may be centered in the usual manner with three celluloid or paper feelers after gently cutting away the front dust cover. A new cover should be cemented in place upon completion of the adjustment.

1N5-G
I.F.
2

1H5-G
2ND DET., A.F. & A.V.C.

1C5-G
OUTPUT



Pre-setting Dial.—With gang condenser in full mesh, the pointer should be horizontal.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
No. 1	1N5-G I-F grid cap, in series with 0.01 mfd.	455 kc	Quiet point between 550-750 kc	L7 and L8 (2nd I-F transformer)
No. 2	1A7-G 1st-det. grid cap, in series with 0.01 mfd.	455 kc		L5 and L6 (1st I-F transformer)
No. 3	Antenna lead, in series with 200 mmfd.	600 kc	600 kc	L4 (oscillator) L2 (antenna)
No. 4	Antenna lead, in series with 200 mmfd.	1,500 kc	1,500 kc	C15† (oscillator) C3 (antenna)

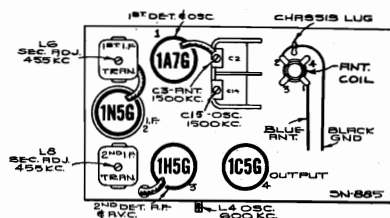
1. Red lead from second i-f transformer to screen terminal of 1N5-G must be dressed close to and along edge of chassis.
2. Twisted green wire from antenna coil to gang must be 9 turns and kept clear of rotor.
3. Blue and green leads to volume control must be dressed close to chassis and between gang and front apron.

	Height	Width	Depth
Cabinet Dimensions (94BT1).....	12½ in.	10½ in.	6½ in.
Cabinet Dimensions (94BK1).....	37½ in.	22 in.	10½ in.
Chassis Base Dimensions.....	2 in.	9½ in.	5½ in.
Over-all Chassis Height.....			6 in.
Weight (94BT1).....	7½ lbs. net; 10½ lbs. shipping		
Weight (94BK1).....	26½ lbs. net; 39½ lbs. shipping		
Operating Controls.....	(1) Power Switch—Volume; (2) Tuning		
Tuning Drive Ratio.....			8 to 1
Frequency Range.....		540 to 1,720 kc	
RF Alignment Frequencies..	600 kc (osc., ant.), 1,500 kc (osc., ant.)		
Intermediate Frequency.....		455 kc	

[illegible]

**Socket Voltages, and Location of Parts
FOR PARTS LIST. SEE INDEX**

BATTERIES REQUIRED
 "A," one 1.4-volt Air Cell or 1.5-volt Dry Cell.
 "B," two 45-volt heavy duty "B" batteries.



Tube and Trimmer Locations

CURRENT CONSUMPTION
 "A" at 1.4 volts, 0.26 amp.
 "B" at 90 volts, 9.6 ma.

BATTERIES REQUIRED



Measurements made to chassis unless otherwise indicated, with set tuned to a quiet point and the volume control at minimum. Values should hold within approximately $\pm 20\%$ with rated battery voltage.

MODELS 94BK2, 94BT2

Chassis RC-390

RCA MFG. CO., INC.

Socket, Trimmers, Alignment

Drive Cord Data, Lead Dress

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown on the chassis drawing.

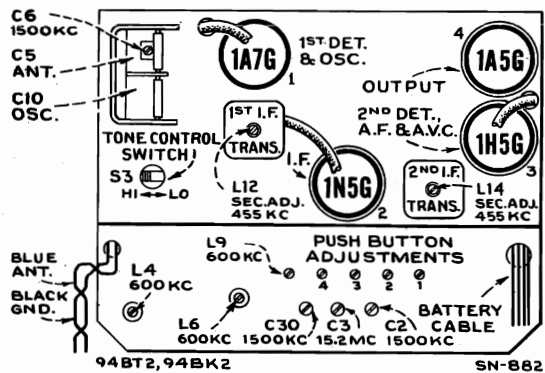
Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Marks.—The tuning dial is fastened in the cabinet and can not be used for reference during alignment. Therefore calibration marks corresponding to dial readings of 600 kc, 1,500 kc, and 15.2 mc have been stamped in the plate on the front of the chassis as shown in the accompanying drawing. These marks are used for reference during alignment.

Dial Indicator Adjustment.—With the gang condenser in full mesh, the indicator should point to the extreme left (low frequency) mark on the dial scale.

For additional details, refer to booklet "RCA Victor Receiver Alignment".



Tube and Trimmer Locations

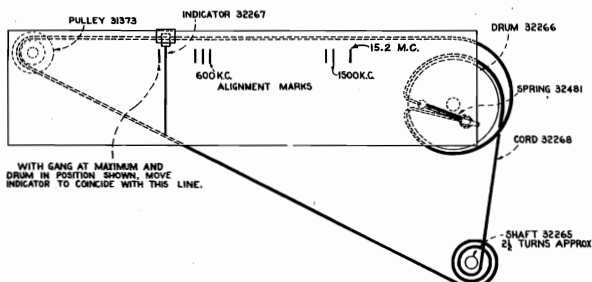
Steps	Connect the High Side of Test Oscillator to:	Tune Test Oscillator to:	Push Button	Turn Radio Dial to:	Adjust for Maximum Peak Output:
1	1N5-G I-F grid cap in series with .01 mfd.	455 kc	B.C. (5)	No Signal between 550—750 kc.	L13 and L14 (2nd I-F Trans.)
2	1A7-G Det. grid cap in series with .01 mfd.	455 kc	B.C. (5)		L11 and L12 (1st I-F Trans.)
3	Antenna Lead (blue) in series with 200 mmfd.	1,500 kc	No. 4		L20-L26 (No. 4 Push Button Adj.) C2 (ant.)
4	Antenna Lead (blue) in series with 200 mmfd.	600 kc	No. 1		L23-L29 *(No. 1 Push Button Adj.) L6 (osc.)
5	Antenna Lead (blue) in series with 200 mmfd.	1,500 kc	No. 4		L20-L26 (No. 4 Push Button Adj.) C2 (ant.)
6	Antenna Lead (blue) in series with 200 mmfd.	600 kc	No. 1		L23-L29 *(No. 1 Push Button Adj.) L6 (osc.)
7	Antenna Lead (blue) in series with 200 mmfd.	1,500 kc	B.C. (5)	1,500 kc Cal. Mark	C30 (osc.) C6 (ant.)
8	Antenna Lead (blue) in series with 200 mmfd.	600 kc	B.C. (5)	600 kc Cal. Mark	L9 (osc.) L4 (ant.)
9	Antenna Lead (blue) in series with 200 mmfd.	1,500 kc	B.C. (5)	1,500 kc Cal. Mark	C30 (osc.) C6 (ant.)
10	Antenna Lead (blue) in series with 300 ohms	15.2 mc	S.W. (6)	Signal Near 15.2 mc Cal. Mark†	**C3 (ant.)
11	Follow the "Adjustments for Electric Tuning."				

* Adjust L23—L29 (No. 1 push button adjustment) and L6 at the same time, rocking in for maximum signal.

** Use maximum capacity peak if two peaks can be obtained, rock in for maximum signal. A weaker signal (image) should be received about one-quarter inch to the left on the dial plate.

† If two signals are received, set the dial to the higher frequency (right hand) position.

Note: The oscillator tracks 455 kc above the signal on all bands. After the receiver has been installed and the antenna connected, it is sometimes advisable to make a slight change in the adjustment of the antenna trimmer, C2. In most cases it is desirable to make this adjustment while receiving a station on No. 4 push button. However, if a station received on one of the other buttons is especially weak, it may be advisable to make the adjustment while receiving the weak station on this button.



Dial Drive Hookup and Alignment Marks

Precautionary Lead Dress

1. Green lead to first detector grid cap should be pulled out of the chassis as far as possible, and dressed away from the tube envelope.
2. Blue lead from push button switch to gang condenser must be dressed over the top of the switch.
3. Leads to push button coils must be dressed close to the coils.
4. Red and blue leads to gang condenser must be dressed away from chassis.
5. Blue antenna lead must be dressed in the end of the chassis away from gang leads and coil windings.

94BK2, 94BT2

RCA MFG. CO., INC.

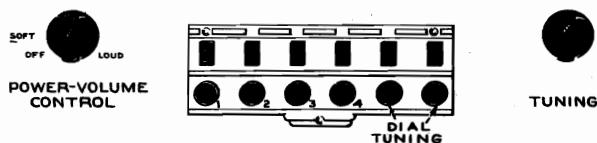
MODELS 94BK2, 94BT2
Chassis RC-390
Tuner Data, Parts

Adjustments for Electric Tuning

These models have six push buttons. The right-hand button connects the receiver for dial tuning on the "Short-wave" band, the next button connects for dial tuning on the "Standard-broadcast" band, and the other four buttons are for electric tuning of four different stations in the standard-broadcast band. Each station button connects separate oscillator and antenna coils which are tandem-tuned by ganged magnetite cores, and may be adjusted for the desired stations. Use a small screwdriver or alignment tool such as RCA Stock No. 31081. Allow at least five minutes warm-up period before making adjustments. Use a regular antenna for the preliminary adjustments.

The procedure is as follows:

1. Make a list of the four desired stations, arranged in order from low to high frequencies.



Location of Controls

2. Push in the broadcast dial-tuning button (second from right), and manually tune in the first station on the list.
3. Push in station button No. 1 (left-hand) and adjust No. 1 push button adjustment to receive this station. Turn the adjusting screw all the way in, to lowest frequency, and then unscrew slowly until the station is received.
4. Adjust for each of the remaining three stations in the same manner. (Clockwise adjustment of the screw tunes the circuits to lower frequencies.)
5. After installation, and with antenna properly connected, re-adjust C2 as outlined in Note under "Alignment Procedure."

Miscellaneous Service Data

To center the loudspeaker voice coil, first remove the front dust cover, then loosen the screws holding the spider assembly. Insert three narrow feelers into the air gap, and tighten the spider screws. Remove the feelers and fasten a dust cover in place with loudspeaker cement.

The push button switch and coil assembly may be removed from the chassis by removing two screws from the front apron, one from the rear apron, removing the 1A7-G grid connector from the grid cap, and disconnecting the seven leads indicated on the Wiring Diagram.

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
RECEIVER ASSEMBLIES					
32259	Capacitor—3-section variable trimmer capacitor 2-10, 3-30, 100-330 mmfd. (C30, C3, C2)...	.65	4669	Screw—No. 8-32 square head set screw from drum	.03
30949	Capacitor—56 mmfd. (C17, C18, C19, C20)...	.25	32261	Screw—Push button oscillator coil adjustment screw and mounting nut	.03
12723	Capacitor—56 mmfd. (C1).....	.35	32265	Shaft—Tuning knob shaft.....	.25
30904	Capacitor—100 mmfd. (C21).....	.25	32149	Shield—Tube shield.....	.20
12720	Capacitor—100 mmfd. (C23).....	.35	32451	Socket—Tube socket.....	.25
12724	Capacitor—120 mmfd. (C7).....	.35	12007	Spring—Drive cord tension spring.....	.05
12952	Capacitor—350 mmfd. (C15).....	.35		Spring—Retaining spring for oscillator coil adjustment screw	.02
30433	Capacitor—470 mmfd. (C28).....	.35	32255	Switch—Push button switch (S18, S19, S20, S21, S22, S23, S26, S27, S28, S29, S32, S33).....	2.95
32269	Capacitor—520 mmfd. (C13).....	.40	30953	Switch—Tone control switch (S3).....	.45
14498	Capacitor—880 mmfd. (C25).....	.45	32263	Transformer—First I-F transformer (L11, L12, C17, C18).....	2.30
12635	Capacitor—1,000 mmfd. (C11, C22, C26).....	.50	32264	Transformer—Second I-F transformer (L13, L14, C19, C20, C21).....	2.50
4881	Capacitor—3,300 mmfd. (C29).....	.60	32262	Volume control and power switch (R5, S1, S2)	1.50
5107	Capacitor—.0025 mfd. (C24).....	.20	SPEAKER ASSEMBLIES (84307-2)		
14393	Capacitor—.01 mfd. (C16).....	.30	Model 94BT2		
4839	Capacitor—.01 mfd. (C14).....	.30	32271	Cone—Speaker cone and voice coil (L15).....	1.70
31323	Capacitor—.16 mfd. (C7).....	.65	5118	Plug—3-contact male for speaker.....	.25
32254	Coil—Broadcast oscillator coil (L9).....	.95	32270	Speaker complete.....	6.00
32258	Coil—Antenna coil (L1, L2, L3, L4).....	1.20	32272	Transformer—Output transformer (T1).....	1.65
32260	Coil—Short wave oscillator coil (L7, L8).....	.70	SPEAKER ASSEMBLIES (84477-1)		
32256	Coil—Push button osc. series coil (L10).....	.60	Model 94BK2		
32250	Coil—Push button ant. and oscillator coil (L23, L29).....	1.15	32274	Cone—Speaker cone and voice coil (L15).....	1.80
32251	Coil—Push button ant. and oscillator coil (L22, L28).....	1.10	5118	Plug—3-contact male for speaker.....	.25
32252	Coil—Push button ant. and oscillator coil (L21, L27).....	1.10	32273	Speaker complete.....	7.00
32253	Coil—Push button ant. and oscillator coil (L20, L26).....	1.10	32272	Transformer—Output transformer (T1).....	1.65
32257	Coil—Push button osc. shunt coil (L5, L6).....	.65	MISCELLANEOUS ASSEMBLIES		
32249	Condenser—2-gang variable condenser (C5, C6, C10).....	2.70	32279	Button—Push button.....	.06
32268	Cord—Drive cord.....	.30	31935	Clip—Spring clip to hold dial scale.....	.10
12800	Core—Variable core and stud for antenna coil No. 32258.....	.35	32276	Dial—Dial scale (glass).....	.60
32266	Drum—Variable condenser drive drum.....	.45	32277	Escutcheon—Dial scale escutcheon and crystal.....	1.10
32267	Indicator—Dial scale pointer.....	.25	32278	Escutcheon—Push button escutcheon.....	.70
32208	Plug—2-prong male for battery cable.....	.20	31355	Knob—Station selector or volume control knob.....	.12
5119	Plug—3-contact female for speaker cable.....	.25	32281	Marker—"Broadcast" marker tab.....	.02
12827	Plug—3-prong male for battery cable.....	.20	32067	Marker—Push button call letter markers.....	.35
31373	Pulley—Drive cord pulley.....	.08	32280	Marker—"Short Wave" marker tab.....	.02
14887	Retainer—Tuning knob shaft retainer or drive cord pulley retaining washer.....	.01	14267	Screw—Chassis mounting screw and washer (4 required), Model 94BT2.....	.04
12262	Resistor—680 ohms, 1/2 watt (R10).....	.20	30467	Screw—Chassis mounting screw and washer (4 required), Model 94BK2.....	.05
13715	Resistor—68,000 ohms, 1/2 watt (R2).....	.20	14270	Spring—Retaining spring for knob.....	.05
14560	Resistor—100,000 ohms, 1/2 watt (R1).....	.20			
13730	Resistor—1 meg., 1/2 watt (R4, R6).....	.20			
12679	Resistor—2.2 meg., 1/2 watt (R9).....	.20			
13167	Resistor—3.9 meg., 1/2 watt (R8).....	.20			
13601	Resistor—10 meg., 1/2 watt (R3, R7).....	.20			

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

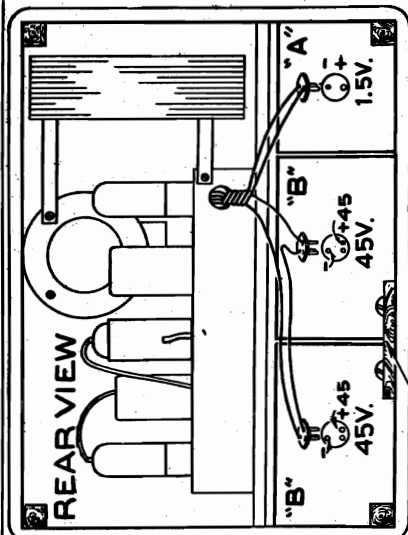
94BK2, 94BT2

MODELS 94BP61, 94BP62, 94BP64, 94BP66
94BP80, 94BP81, Chassis RC-407

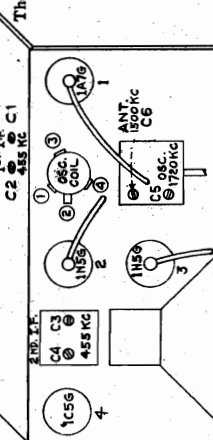
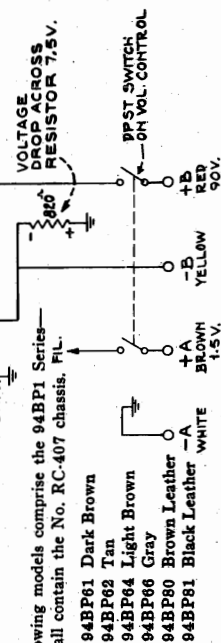
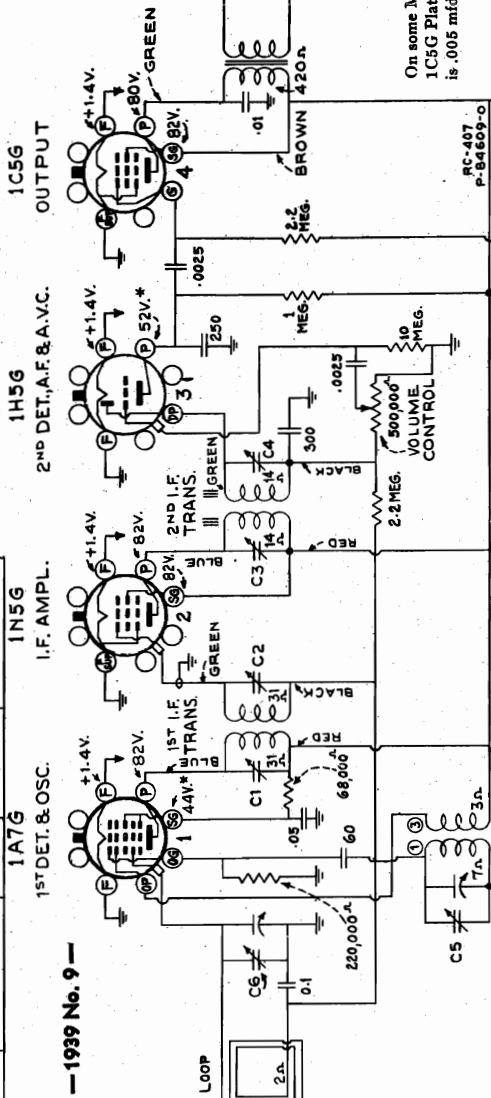
RCA MFG. CO., INC.

Schematic, Voltage, Alignment
Socket, Trimmers, Batt. Data, Parts

Cabinet Dimensions (inches).....	9 1/2	12 1/2	6 1/2
Weight—(Net) less batteries.....			6 pounds
With batteries.....			12 1/2 pounds
Tuning Drive Ratio.....			10 to 1



REMOVE THIS BLOCK-PLACE BATTERIES
IN CABINET AS INDICATED



TUBE LOCATION & TRIMMER ADJUSTMENT POSITIONS

Note: Values with star (*) are operating voltages. Values not starred are actual measured voltages. Measurements are made to chassis unless otherwise indicated, with set tuned to quiet point. Values should hold within approximately ± 20% with rated battery voltage.

Alignment Procedure

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-oscillator.—For all alignment operations, keep the output as low as possible to avoid a-v-c action.

Pre-setting Dial.—With gang condenser in full mesh, the pointer should be horizontal.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	1A7G 1st-Det. grid cap. in series with .01 mfd.	455 kc	Quiet point at 1,500 kc end of dial	C1, C2, C3, C4 (1st and 2nd I-F transformers)
2	Antenna coil loop by means of one turn of wire placed near loop	1,720 kc	Full clockwise (out of mesh)	C5 (oscillator)
3		1,500 kc	Resonance on 1,500 kc signal	C6 (antenna)

—1939 No. 9—

STOCK No.	DESCRIPTION	Unit List Price
CHASSIS ASSEMBLIES (RC-407)		
13057	Capacitor—60 mfd.	.35
12488	Capacitor—250 mfd.	.35
12952	Capacitor—300 mfd.	.35
5107	Capacitor—.0025 mfd.	.20
4838	Capacitor—.005 mfd.	.25
32787	Capacitor—.05 mfd.	.30
4839	Capacitor—.01 mfd.	.30
33303	Capacitor—Electrolytic, 8 mfd.	.70
33055	Coil—Oscillator coil	.50
33060	Condenser—2-gang variable tuning	2.25
32834	Cord—Drive cord	.10
32946	Loop—Drive cord drum	.35
33300	Loop—Complete antenna loop	1.80
32908	Plug—2-contact plug for battery cable	.20
32641	Plug—3-contact male plug for battery cable	.20
14076	Resistor—820 ohms, 1/2 watt	.30
13715	Resistor—22,000 ohms, 1/2 watt	.30
12964	Resistor—220,000 ohms, 1/2 watt	.30
13730	Resistor—1 meg., 1/2 watt	.30
13801	Resistor—2.2 meg., 1/2 watt	.30
33305	Resistor—10 meg., 1/2 watt	.25
32595	Shield—Tuning knob shaft and bushing	.15
32537	Socket—Tube socket	.20
30585	Spring—Drive cord spring	.06
33296	Spring—Drive drum retaining spring	.06
33301	Transformer—First i-f transformer	1.30
33302	Transformer—Second i-f transformer	1.40
33304	Volume control and switch	1.50
SPEAKER ASSEMBLIES (39138-1)		
33058	Speaker complete	4.00
33062	Transformer—Output transformer	1.30
MISCELLANEOUS ASSEMBLIES		
33310	Dial—Glass dial scale	.30
33311	Escutcheon—Dial scale escutcheon	.45
33006	Fest—Cabinet feet	.03
33376	Handle—Carrying handle—Models 94BP61, 94BP62, 94BP64	.55
33377	Handle—Carrying handle—Model 94BP66	.55
33306	Knob—Black tuning knob—Model 94BP66	.15
33308	Knob—Black volume control knob—Model 94BP66	.25
32571	Knob—Tan tuning knob—Models 94BP61, 94BP64, 94BP80	.15
33309	Knob—Tan volume control knob—Models 94BP61, 94BP64, 94BP80	.25
32895	Knob—Walnut tuning knob—Models 94BP62, 94BP81	.15
33307	Knob—Walnut volume control knob—Models 94BP62, 94BP81	.25
33212	Nut—Speed nut to mount dial	.02
33146	Spring—Knob retaining spring	.02

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

Frequency Range..... 550-1,720 kc
Intermediate Frequency..... 455 kc

BATTERIES REQUIRED
"A," one 1.5 volt dry plug-type "A," 2 1/2-in. x 2 1/2-in. x 4-in. (Eveready No. 742 or equivalent)
"B," two 45 volt dry plug-type "B," 2 1/2-in. x 4-in. x 5 1/2-in. (Eveready No. 762 or equivalent)

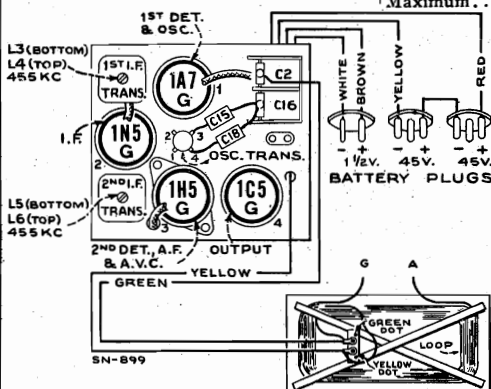
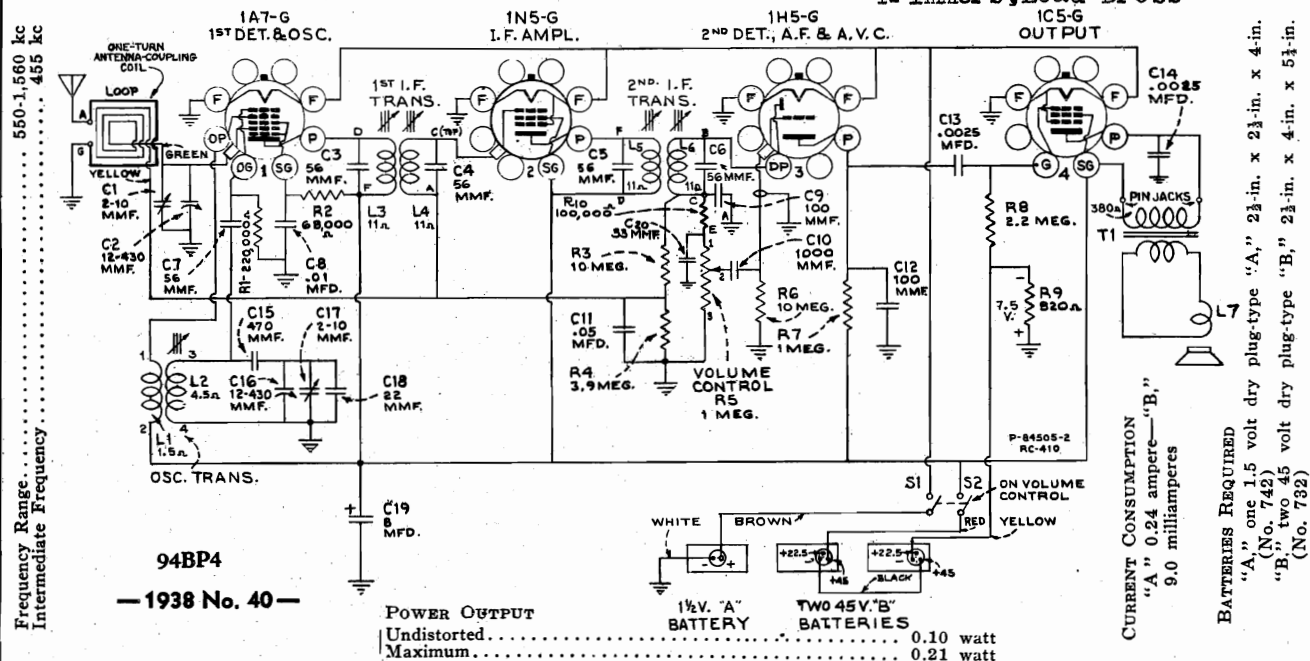
CURRENT CONSUMPTION
"A," 0.24 ampere—"B," 9.0 milliamperes

POWER OUTPUT
Undistorted..... 0.10 watt
Maximum..... 0.21 watt

LOUDSPEAKER
Type..... 4-inch permanent-magnet dynamic
Voice-coil Impedance..... 2 ohms at 400 cycles

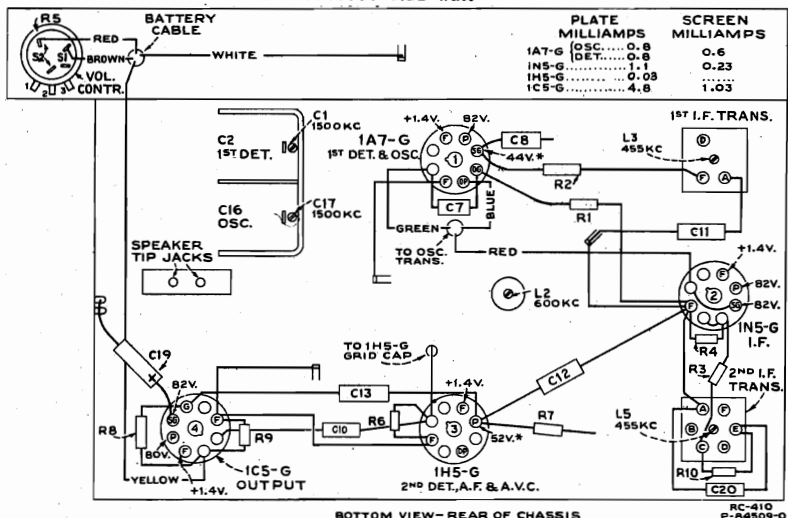
RCA MFG. CO., INC.

MODEL 94BP4, Chassis RC-410
Schematic, Voltage, Alignment
Chassis Wiring, Socket
Trimmers, Lead Dress



Tube Location

Note: Values with star (*) are operating voltages. Values without star are actual measured voltages. Measurements are made to chassis unless otherwise indicated, with set tuned to quiet point. Values should hold within approximately $\pm 20\%$ with rated battery voltage.



R-F Wiring Diagram and Socket Voltages

Alignment Procedure

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-oscillator.—For all alignment operations, keep the output as low as possible to avoid a-v-c action.

Pre-setting Dial.—With gang condenser in full mesh, the pointer should be horizontal.

Precautionary Lead Dress.

1. Dress speaker leads down to chassis.
2. The green lead from the loop to the antenna section of the gang should be dressed between the output and detector tube shields and pulled toward the far corner of the loop by means of the rubber band.
3. The spiral shield on the 1st-A.F. grid lead should be brought as close as possible to the grid cap.
4. Leads to the high side and tap of the volume control should be dressed down to the chassis and away from the output tube plate lead.

Antenna.—An antenna and ground may be connected to "A" and "G" at bottom of cabinet. If total length of antenna and lead-in is more than 150 feet, connect a 300 mmf capacitor in series with lead-in.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	1N5-G grid cap, in series with .001 mfd.	455 kc	Quiet point between 550-750 kc	L5 and L6 (2nd I-F transformer)
2	1A7-G grid cap, in series with .001 mfd.	455 kc		L3 and L4 (1st I-F transformer)
3	Assemble chassis and batteries in correct position in cabinet, and fasten rear cover (loop) in place while making the following adjustments, which are accessible through holes in the bottom of the cabinet.			
4	Antenna terminal, in series with 200 mfd. Connect low side of test-osc. to "G" term.	1500 kc	1500 kc*	C17 (osc.) C1 (ant.)
5		600 kc	600 kc*	L2 (osc.) Rock in
6	Repeat steps 4 and 5.			

* Use bottom of "1" in "150" for 1500 kc calibration point, and use center of "0" in "60" for 600 kc calibration point.

MODELS 94BK1, 94BT1

Chassis RC-333B

RCA MFG. CO., INC.

MODEL 94BP4, Chassis RC-410

Parts List

Model 94BP4

Specifications and Replacement Parts

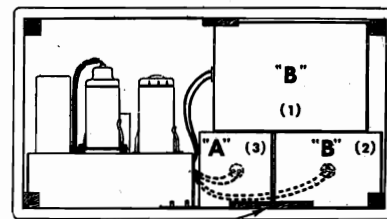
Battery Arrangement

LOUDSPEAKER

Type..... 5-inch permanent-magnet dynamic

Voice-coil Impedance..... 2.2 ohms at 400 cycles

	Height	Width	Depth
Cabinet Dimensions (inches).....	7 $\frac{1}{2}$	14	8 $\frac{1}{2}$
Chassis Base Dimensions (inches).....	2	7 $\frac{1}{2}$	5 $\frac{1}{2}$
Over-all Chassis Height.....		6 $\frac{1}{2}$	inches
Weight—Shipping weight, less batteries.....		12 $\frac{1}{2}$	pounds
Net weight, with batteries.....		16	pounds
Tuning Drive Ratio.....		8 to 1	



REMOVE THIS BLOCK, PLUG IN CABLES
AND PLACE BATTERIES IN CABINET AS
SHOWN, IN THE ORDER INDICATED.
REPLACE CLAMPING BLOCK.

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
CHASSIS ASSEMBLIES (RC-410)					
32592	Bracket—Dial bracket.....	.15	12679	Resistor—2.2 meg., $\frac{1}{2}$ watt (R8).....	.20
12607	Cap—Shield cap for first i.f. transformer.....	.20	13167	Resistor—3.9 meg., $\frac{1}{2}$ watt (R4).....	.20
12581	Cap—Shield cap for second i.f. transformer.....	.25	13601	Resistor—10 meg., $\frac{1}{2}$ watt (R3, R6).....	.20
32598	Cap—Shield cap for 1H5G.....	.08	14887	Retainer—Tuning knob shaft retainer.....	.01
32596	Cap—Tube shield cap.....	.06	4669	Screw No. 8-32 x $\frac{1}{2}$ set screw for drum, Stock No. 30701.....	.03
14021	Capacitor—22 mmfd. (C18).....	.35	32609	Shaft—Dial pointer shaft and pulley.....	.15
12948	Capacitor—33 mmfd. (C20).....	.35	32597	Shaft—Tuning knob shaft.....	.15
30949	Capacitor—56 mmfd. (C3, C4, C5, C6).....	.25	32595	Shield—Tube shield—less cap.....	.15
12723	Capacitor—56 mmfd. (C7).....	.35	31251	Socket—Tube socket.....	4.10
30904	Capacitor—100 mmfd. (C9).....	.25	30956	Socket—2-contact female.....	.30
12720	Capacitor—100 mmfd. (C12).....	.35	14191	Spring—Condenser drive cord spring.....	.04
30433	Capacitor—470 mmfd. (C15).....	.35	30631	Spring—Pointer drive cord spring.....	.03
12635	Capacitor—1,000 mmfd. (C10).....	.50	32263	Transformer—First i.f. transformer (L3, L4, C3, C4).....	2.30
5107	Capacitor—.0025 mfd. (C13, C14).....	.20	32264	Transformer—Second i.f. transformer (L5, L6, C5, C6, C9).....	2.50
14393	Capacitor—.01 mfd. (C8).....	.30	32594	Volume control and switch (R5, S1, S2).....	1.50
4886	Capacitor—.05 mfd. (C11).....	.20	MISCELLANEOUS ASSEMBLIES		
32187	Capacitor—8 mfd., 150 volts (C19).....	.65	32602	Bezel—Dial bezel and crystal.....	1.20
32148	Coil—Oscillator coil (L1, L2).....	.90	32163	Cone—Speaker cone and voice coil (L7).....	2.20
32591	Condenser—2-gang variable (C1, C2, C16, C17).....	2.50	32600	Escutcheon—Knob escutcheon.....	.35
32634	Cord—Condenser and pointer drive cord.....	.10	32603	Grille—Speaker grille and screen.....	.20
32593	Dial—Dial scale.....	.55	32633	Handle—Carrying handle.....	.90
30701	Drum—Drive cord drum.....	.40	11610	Knob—Volume control or tuning knob.....	.30
32605	Indicator—Dial indicator pointer.....	.30	32604	Loop—Antenna loop complete.....	3.10
32208	Plug—2-contact male for "A" leads.....	.20	32601	Retainer—Knob escutcheon retainer.....	.05
32641	Plug—3-contact male for "B" leads.....	.10	32162	Speaker complete.....	5.30
14076	Resistor—820 ohms, $\frac{1}{2}$ watt (R9).....	.20	11349	Spring—Knob retaining spring.....	.05
13715	Resistor—68,000 ohms, $\frac{1}{2}$ watt (R2).....	.20	32164	Transformer—Output transformer (T1).....	1.15
14560	Resistor—100,000 ohms, $\frac{1}{2}$ watt (R10).....	.20			
12264	Resistor—220,000 ohms, $\frac{1}{2}$ watt (R1).....	.20			
13730	Resistor—1 meg., $\frac{1}{2}$ watt (R7).....	.20			

94BK1, 94BT1

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
RECEIVER ASSEMBLIES					
12629	Capacitor—56 mmfd. (C6).....	.35	30952	Shaft—Station selector knob shaft.....	.25
12723	Capacitor—56 mmfd. (C13).....	.35	32149	Shield—Tube shield.....	.20
14262	Capacitor—110 mmfd. (C5).....	.30	11196	Socket—Tube socket.....	.25
12404	Capacitor—120 mmfd. (C7, C8).....	.30	30956	Socket—Speaker socket.....	.30
12725	Capacitor—150 mmfd. (C11).....	.35	14191	Spring—Drive cord tension spring.....	.04
14712	Capacitor—180 mmfd. (C9).....	.30	14261	Transformer—First I.F. (L5, L6, C5, C6).....	2.05
30433	Capacitor—430 mmfd. (C17).....	.35	14308	Transformer—Second I.F. (L7, L8, C7, C8, C9, R3).....	2.90
5148	Capacitor—.007 mfd. (C12).....	.20	30947	Volume control and on-off switch (R5, S1, S2).....	1.50
14393	Capacitor—.01 mfd. (C4, C10, C19).....	.30	SPEAKER ASSEMBLIES		
4839	Capacitor—.01 mfd. (C1).....	.30	Model 94BT1 (Speaker 84226-3)		
32187	Capacitor—8 mfd. (C18).....	.65	32163	Cone—Speaker cone and voice coil (L9).....	2.20
32150	Coil—Antenna coil (L1, L2).....	1.15	32162	Speaker—Complete.....	5.30
32148	Coil—Oscillator coil (L3, L4).....	.90	32164	Transformer—Output transformer (T1).....	1.15
32147	Condenser—2-gang variable tuning condenser (C2, C3, C14, C15, C16).....	2.40	SPEAKER ASSEMBLIES		
30877	Cord—Drive cord.....	.20	Model 94BK1 (Speaker 84145-2)		
30905	Core—Adjustable core for I.F. transformers.....	.35	30973	Cone—Speaker cone and voice coil (L9).....	2.25
32186	Dial—Dial scale, plate, and brackets assembled.....	.55	30972	Speaker—Complete.....	6.30
30701	Drum—Tuning condenser drive cord drum with set screw.....	.40	30974	Transformer—Output transformer (T1).....	1.90
14635	Indicator—Station selector indicator pointer.....	.20	MISCELLANEOUS ASSEMBLIES		
32208	Plug—2-prong male plug for battery cable.....	.20	30975	Crystal—Station selector celluloid crystal.....	.45
12827	Plug—3-prong male plug for battery cable.....	.20	31355	Knob—Tuning or volume control knob.....	.12
14076	Resistor—820 ohms, $\frac{1}{2}$ watt (R9).....	.20	30308	Screw—Chassis mounting screw and washer—(94BT1 only) 4 required.....	.07
14284	Resistor—22,000 ohms, $\frac{1}{2}$ watt (R3).....	.15	30467	Screw—Chassis mounting screw and washer—(94BK1 only) 4 required.....	.05
13715	Resistor—68,000 ohms, $\frac{1}{2}$ watt (R1).....	.20	14270	Spring—Retaining spring for knob.....	.05
12264	Resistor—220,000 ohms, $\frac{1}{2}$ watt (R10).....	.20			
13730	Resistor—1 meg., $\frac{1}{2}$ watt (R4, R6).....	.20			
12679	Resistor—2.2 meg., $\frac{1}{2}$ watt (R2, R7, R8).....	.20			
14887	Retainer—Retainer for knob shaft.....	.01			

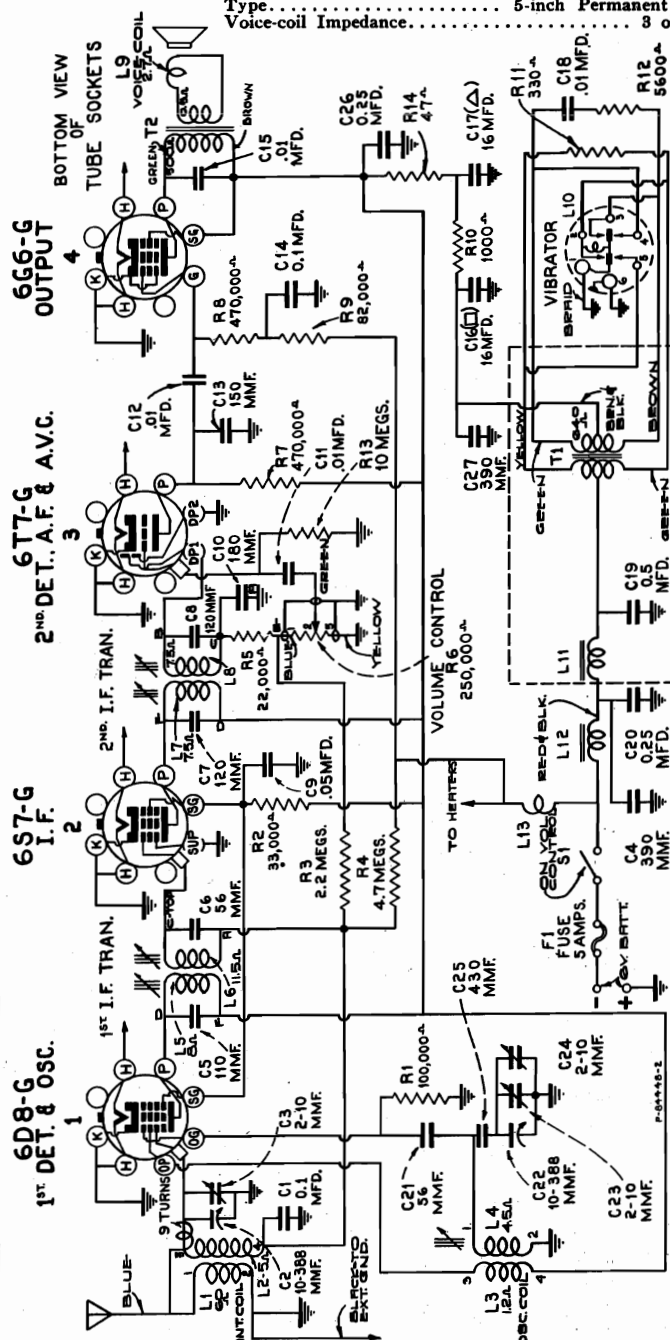
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RCA MFG. CO., INC.

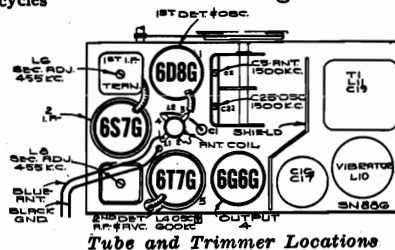
MODEL 94BT61, Chassis RC-333C
Schematic, Voltage, Alignment
Socket, Trimmers,
Chassis Wiring

LOUDSPEAKER

Type..... 5-inch Permanent Magnet Dynamic
Voice-coil Impedance..... 8 ohms at 400 cycles

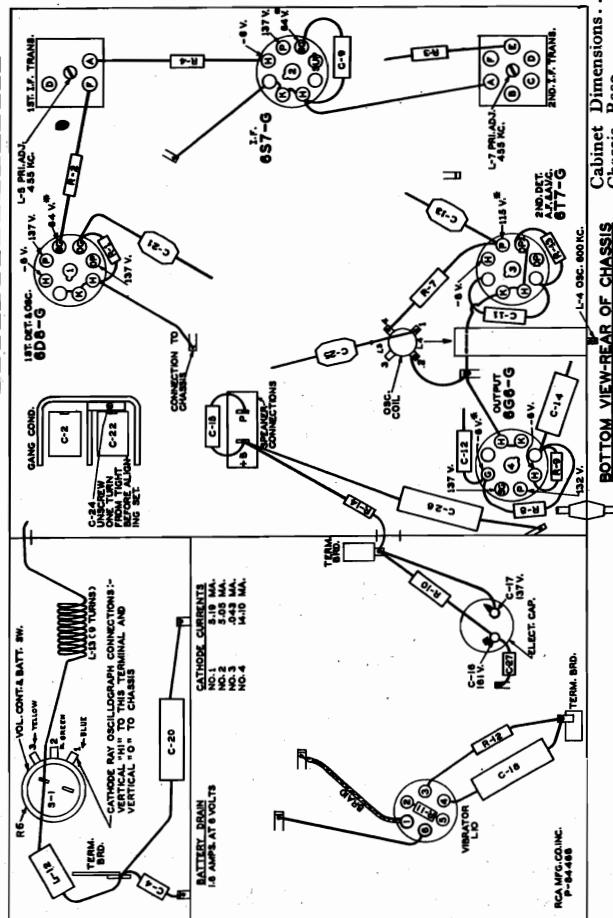


— 1938 No. 35 —



Tube and Trimmer Locations

Depth 6 1/2 in.
Width 10 1/2 in.
Height 12 1/2 in.
Cabinet Dimensions... 12 1/2 in.
Chassis Base..... 2 in.



Socket Voltages and Location of Parts

* NOTE: Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.
Measurements made to chassis unless otherwise indicated, with the set tuned to a quiet point and the volume control at minimum. Values should hold within approximately $\pm 20\%$ with 6 volts "A."

Alignment Procedure

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
No. 1	6S7-G I-F grid cap, in series with .01 mfd.	455 kc	Quiet point between 550-750 kc	L7 and L8 (2nd I-F transformer)
No. 2	6D8-G 1st-det. grid cap, in series with .01 mfd.	455 kc		L5 and L6 (1st I-F transformer)
No. 3	Antenna lead, in series with 200 mmfd.	600 kc	600 kc	L4 (oscillator)
No. 4	Antenna lead, in series with 200 mmfd.	1,500 kc	1,500 kc	C23† (oscillator) C3 (antenna)

† Adjust C24 on gang condenser to one complete turn from tight before adjusting C23.

Frequency Range..... 540 to 1,720 kc
R-F Alignment Frequencies.... 600 kc (osc.), 1,500 kc (osc., ant.)
Intermediate Frequency..... 455 kc

Cathode-ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

Pre-setting Dial.—With gang condenser in full mesh, the pointer should be horizontal.

BATTERY REQUIRED

6-volt Storage "A" Battery.
Power Output (6 volts "A")
Undistorted..... 0.45 watt
Maximum..... 0.8 watt

CURRENT CONSUMPTION

At 6 volts, 1.6 amperes.

MODEL 94BT61, Chas. RC-333C

Lead Dress, Parts

RCA MFG. CO., INC.

MODELS 96BK6, 96BT6

Chassis RC-392

Socket, Trimmers

Alignment Procedure

MODELS 96BK6 and 96BT6

Chassis No. RC-392

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown on the chassis drawing.

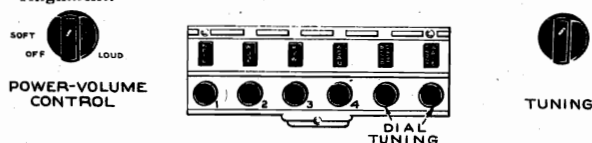
Output Meter Alignment.—If this method is used, connect the output meter across the voice coil, and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

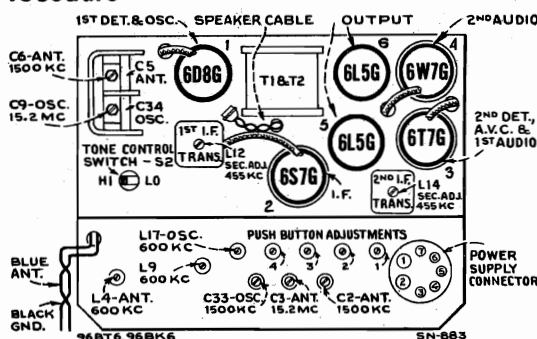
Calibration Marks.—The tuning dial is fastened in the cabinet and can not be used for reference during alignment. Therefore calibration marks corresponding to dial readings of 600 kc, 1,500 kc, and 15.2 mc have been stamped in the plate on the front of the chassis as shown in the accompanying drawing. These marks are used for reference during alignment.

Dial Indicator Adjustment.—With the gang condenser in full mesh, the indicator should point to the extreme left (low frequency) mark on the dial scale.

For additional details, refer to booklet "RCA Victor Receiver Alignment."



Location of Controls



Tube and Trimmer Locations

Miscellaneous Service Data

To center the loudspeaker voice coil, first remove the front dust cover, then loosen the screws holding the spider assembly. Insert three narrow feelers into the air gap, and tighten the spider screws. Remove the feelers and fasten a dust cover in place with loudspeaker cement.

The push button switch and coil assembly may be removed from the chassis by removing two screws from the front apron, one from the rear apron, removing the 6D8-G grid connector from the grid cap, and disconnecting the seven leads indicated on the Wiring Diagram.

MODEL 94BT61

Chassis No. RC-333-C

Precautionary Lead Dress

1. Capacitors C20 and C26 must be grounded with as short a lead as possible. C4 and C27 are soldered direct (no leads).

2. The "A" supply choke (L13) must be dressed clear of chassis. The H.V. secondary leads (brown and green), C18, and R12 must be dressed clear of the chassis and away from other leads.

3. The H.V. secondary mid-tap (brown-black) lead, and the brown lead from L13 to 6G6-G filament must be dressed close to the chassis and away from other parts.

4. The lead from the antenna coil (L1 and L2) to the gang must be 9 turns and kept clear of the rotor.

5. The I-F plate lead (blue) must be dressed close along edge of chassis.

6. R10 must be wired with body as close to terminal board as possible.

Battery Charger Connections.—The positive side of the 6-volt "A" circuit is connected to the receiver chassis, and the chassis is normally grounded. If the charger has a ground on the negative side, the ground should be removed, or changed to the positive. Do not change the length of the leads from the receiver to the battery.

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.
Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
RECEIVER ASSEMBLIES					
30959	Cable—Battery cable complete.....	1.35	14284	Resistor—22,000 ohms, 1/10 watt (R5).....	.15
30967	Cable—Shielded volume control cable.....	.45	12454	Resistor—33,000 ohms, 1/2 watt (R2).....	.20
12581	Cap—Second I.F. transformer shield cap.....	.25	14023	Resistor—82,000 ohms, 1/2 watt (R9).....	.20
12629	Capacitor—56 mmfd. (C6).....	.35	14560	Resistor—100,000 ohms, 1/2 watt (R1).....	.20
12723	Capacitor—56 mmfd. (C21).....	.35	12285	Resistor—470,000 ohms, 1/2 watt (R7, R8).....	.20
14262	Capacitor—110 mmfd. (C5).....	.30	12679	Resistor—2.2 meg., 1/2 watt (R3).....	.20
12404	Capacitor—120 mmfd. (C7, C8).....	.30	30271	Resistor—4.7 meg., 1/2 watt (R4).....	.20
12725	Capacitor—150 mmfd. (C13).....	.35	13601	Resistor—10 meg., 1/2 watt (R13).....	.20
14712	Capacitor—180 mmfd. (C10).....	.30	14887	Retainer—Retainer for knob shaft.....	.01
13894	Capacitor—390 mmfd. (C4, C27).....	.35	30952	Shaft—Station selector knob shaft.....	.25
30433	Capacitor—430 mmfd. (C25).....	.35	3682	Shield—Tube shield.....	.22
14393	Capacitor—.01 mfd. (C11, C12, C15).....	.30	31251	Socket—Tube socket.....	.25
4937	Capacitor—.01 mfd. (C18).....	.25	30956	Socket—Speaker socket.....	.30
30882	Capacitor—.05 mfd. (C9).....	.20	14312	Socket—Vibrator socket.....	.25
30899	Capacitor—.01 mfd. (C1, C14).....	.30	14191	Spring—Drive cord tension spring.....	.04
30965	Capacitor—.025 mfd. (C20, C26).....	.30	14261	Transformer—First I.F. transformer (L5, L6, C5, C6).....	2.05
32152	Capacitor—Comprising 2 sections each 15 mfd. (C16, C17).....	1.05	14308	Transformer—Second I.F. transformer (L7, L8, C7, C8, C10, R5).....	2.90
30968	Coil—"A" filter choke coil (L12).....	.55	32151	Transformer—Vibrator transformer (T1, L11, C19).....	4.10
30950	Coil—Antenna coil (L1, L2).....	1.10	14309	Vibrator—Plug in vibrator (L10).....	4.25
32148	Coil—Oscillator coil (L3, L4).....	.90	30958	Volume control and on-off switch (R6, S1).....	1.50
32147	Condenser—2-gang variable tuning condenser (C2, C3, C22, C23, C24).....	2.40	SPEAKER ASSEMBLIES		
30877	Cord—Drive cord.....	.20	(Speaker 84226-3)		
30905	Core—Adjustable core for I.F. transformers.....	.35	32163	Cone—Speaker cone and voice coil (L9).....	2.20
14289	Clips—Battery clips—1 marked "+" and 1 unmarked.....	.30	32162	Speaker complete.....	5.30
32186	Dial—Dial scale, plate, and brackets assembled.....	.55	32164	Transformer—Output transformer (T2).....	1.15
30701	Drum—Tuning condenser drive cord drum with set screw.....	.40	MISCELLANEOUS ASSEMBLIES		
5140	Fuse—Battery cable fuse (F1).....	.10	30975	Crystal—Station selector celluloid crystal.....	.45
14635	Indicator—Station selector indicator pointer.....	.20	31355	Knob—Tuning or volume control knob.....	.12
12848	Resistor—47 ohms, 1/2 watt (R14).....	.20	30308	Screw—Chassis mounting screw and washer—4 required.....	.07
8063	Resistor—330 ohms, 1/2 watt (R11).....	.20	14270	Spring—Retaining spring for knob, Stock No. 31355.....	.05
30152	Resistor—1,000 ohms, 1 watt (R10).....	.22			
30734	Resistor—5,600 ohms, 1/2 watt (R12).....	.20			

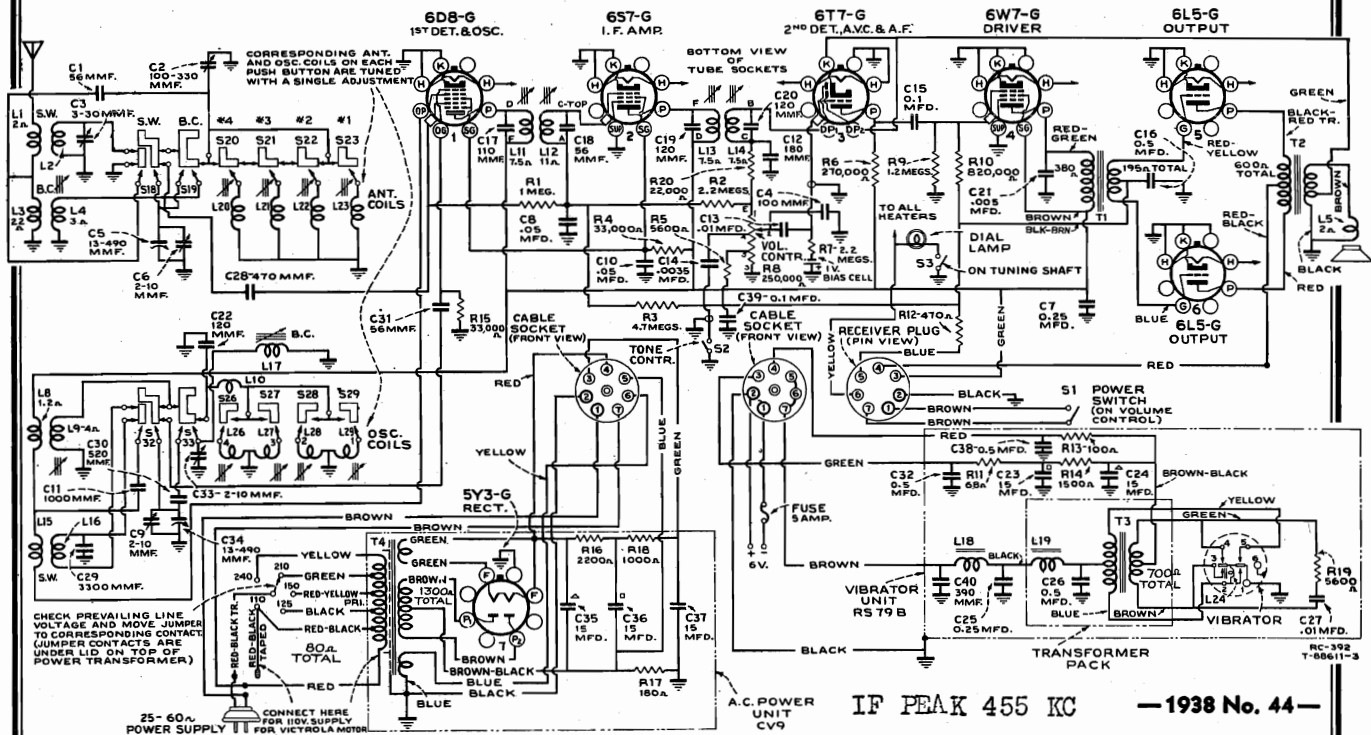
Over-all Chassis Height..... 6 3/4 in.
Weight..... 11 1/2 lbs. net, 14 lbs. shipping

Operating Controls..... (1) Power Switch—Volume; (2) Tuning
Tuning Drive Ratio..... 8 to 1

Schematic, Tuner Data

RCA MFG. CO., INC.

MODELS 96BK6, 96BT6
Chassis RC-392
MODEL CV-9 A-C S.P.U.



Schematic Circuit Diagram for Models 96BK6, 96BT6 and CV-9 A-C Power Unit

FREQUENCY RANGES

Standard Broadcast ("A" Band).....	540—1,720 kc
Short Wave ("C" Band).....	5.8—18 mc
Four Electric Tuning Positions.....	550—1,500 kc
One station between approximately 550—950 kc (Button No. 1)	
One station between approximately 610—1,090 kc (Button No. 2)	
One station between approximately 750—1,370 kc (Button No. 3)	
One station between approximately 845—1,500 kc (Button No. 4)	
Intermediate Frequency.....	455 kc

POWER SUPPLY RATINGS

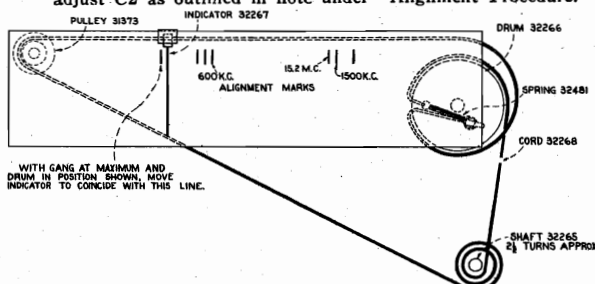
With CV-9 a-c power supply unit:
100-130/140-160/195-250 volts, 25-60 cycles, 45 watts

Adjustment for Electric Tuning

These models have six push buttons. The right-hand button connects the receiver for dial tuning on the "Short-wave" band, the next button connects for dial tuning on the "Standard-broadcast" band, and the other four buttons are for electric tuning of four different stations in the standard-broadcast band. Each station button connects separate oscillator and antenna coils which are tuned by ganged magnetite cores, and may be adjusted for the desired stations. Use a small screw-driver or alignment tool such as RCA Stock No. 31081. Allow at least five minutes warm-up period before making adjustments. Use the regular antenna for all adjustments.

The procedure is as follows:

1. Make a list of the four desired stations, arranged in order from low to high frequencies.
2. Push in the broadcast dial-tuning button (second from right), and manually tune in the first station on the list.
3. Push in station button No. 1 (left-hand) and adjust No. 1 push button adjustment to receive this station. Turn the adjusting screw all the way in, to lowest frequency, and then unscrew slowly until the station is received.
4. Adjust for each of the remaining three stations in the same manner. (Clockwise adjustment of the screw tunes the circuits to lower frequencies.)
5. After installation, and with antenna properly connected, re-adjust C2 as outlined in note under "Alignment Procedure."



Dial Drive Hookup and Alignment Marks

With RS-79B d-c power supply unit:

6.3 volts; total current drain 1.85 amps.

POWER OUTPUT

	Undistorted	Maximum
With a-c power unit	2.2 watts	3.5 watts
With d-c power unit	1.7 watts	2.2 watts

LOUDSPEAKER

Type..... Permanent Magnet Dynamic
Voice Coil Impedance..... 2.2 ohms at 400 cycles
Diameter..... 96BK6, 8 inches; 96BT6, 6 inches

Model 96BT6

Model 96BK6

Height	10 1/2 inches	39 1/2 inches
Width	20 1/2 inches	26 inches
Depth	9 1/2 inches	12 1/2 inches
Net Weight	17 1/2 pounds	21 pounds
Shipping Weight	46 pounds	61 pounds
Chassis Base Dimensions	3 inches x 11 1/2 inches x 5 inches	
Over-all Height of Chassis		7 1/2 inches
Tuning Drive Ratio		12 to 1

The 96BK6 is a console model, the 96BT6 a table model. Each of these receivers is a super-sensitive, six-tube superheterodyne.

Power Supply Units

The receiver chassis has a seven-prong male plug for connection to the power-supply unit. Both a-c and d-c power supply units are available, as listed under "Power Supply Ratings." The receivers are shipped with a d-c power unit for use with a 6-volt supply. If an a-c unit is desired, it must be purchased separately as Model CV-9.

If no receiver chassis is available the a-c unit (CV-9) may be tested for proper operation by connecting a 6,500-ohm, 10-watt resistor between terminals 2 and 4 on the cable socket, and shorting terminals 1 and 7. With one voltmeter prod on terminal 2 (ground) the following readings should be obtained: terminal 3, + 200 volts d.c.; terminal 4, + 200 volts d.c.; terminal 5, -5.9 volts d.c.; terminal 6, 6.5 volts a.c. Values should be within $\pm 20\%$ with rated supply voltage.

Precautionary Lead Dress.—

1. Blue lead from push button switch to gang condenser must be dressed over the top of the switch.
2. Leads to push button coils must be dressed close to the coils.
3. Red and blue leads to gang condenser must be dressed away from chassis.
4. Blue antenna lead must be dressed in the end of the chassis away from gang leads and coil windings.
5. Bias cell must be installed with carbon disc connected to chassis.
6. Leads from power switch to connector plug must be dressed away from other leads.
7. Parts under push button coils must be dressed down away from them.
8. Green lead to first detector grid cap should be pulled out of the chassis as far as possible, and dressed away from the tube envelope.

MODELS 96BK6, 96BT6
Chassis RC-392

RCA MFG. CO., INC.

Alignment, Voltage
Chassis Wiring

Steps	Connect the High Side of Test Oscillator to:	Tune Test Oscillator To:	Press Push Button :	Turn Radio Dial to :	Adjust for Maximum Peak Output:
1	6S7-G I-F grid cap in series with .01 mfd.	455 kc	B.C. (No. 5)	No Station Point between 550—750 kc.	L13 and L14 (2nd I-F Trans.)
2	6D8-G Det. grid cap in series with .01 mfd.	455 kc	B.C. (No. 5)		L11 and L12 (1st I-F Trans.)
3	Antenna Lead (blue) in series with 200 mmfd.	1,500 kc	No. 4		L20-L26 (No. 4 Push Button Adj.) C2 (ant.)
4	Antenna Lead (blue) in series with 200 mmfd.	600 kc	No. 1		L23-L29 * (No. 1 Push Button Adj.) L9 (osc.)
5	Repeat steps 3 and 4 until maximum signal is obtained.				
6	Unscrew C9 (osc.) to minimum capacity.				
7	Antenna Lead (blue) in series with 200 mmfd.	600 kc	B.C. (No. 5)	600 kc Calibration Mark	L17 (osc.) ** L4 (ant.)
8	Antenna Lead (blue) in series with 200 mmfd.	1,500 kc	B.C. (No. 5)	1,500 kc Calibration Mark	C33 (osc.) C6 (ant.)
9	Repeat steps 7 and 8 until maximum signal is obtained.				
10	Antenna Lead (blue) in series with 300 ohms	15.2 mc	S.W. (No. 6)	15.2 mc Calibration Mark	C9 (osc.) † C3 (ant.) ††
11	Antenna Lead (blue) in series with 200 mmfd.	1,500 kc	B.C. (No. 5)	1,500 kc Calibration Mark	C33 (osc.)
12	Follow the "Adjustments for Electric Tuning."				

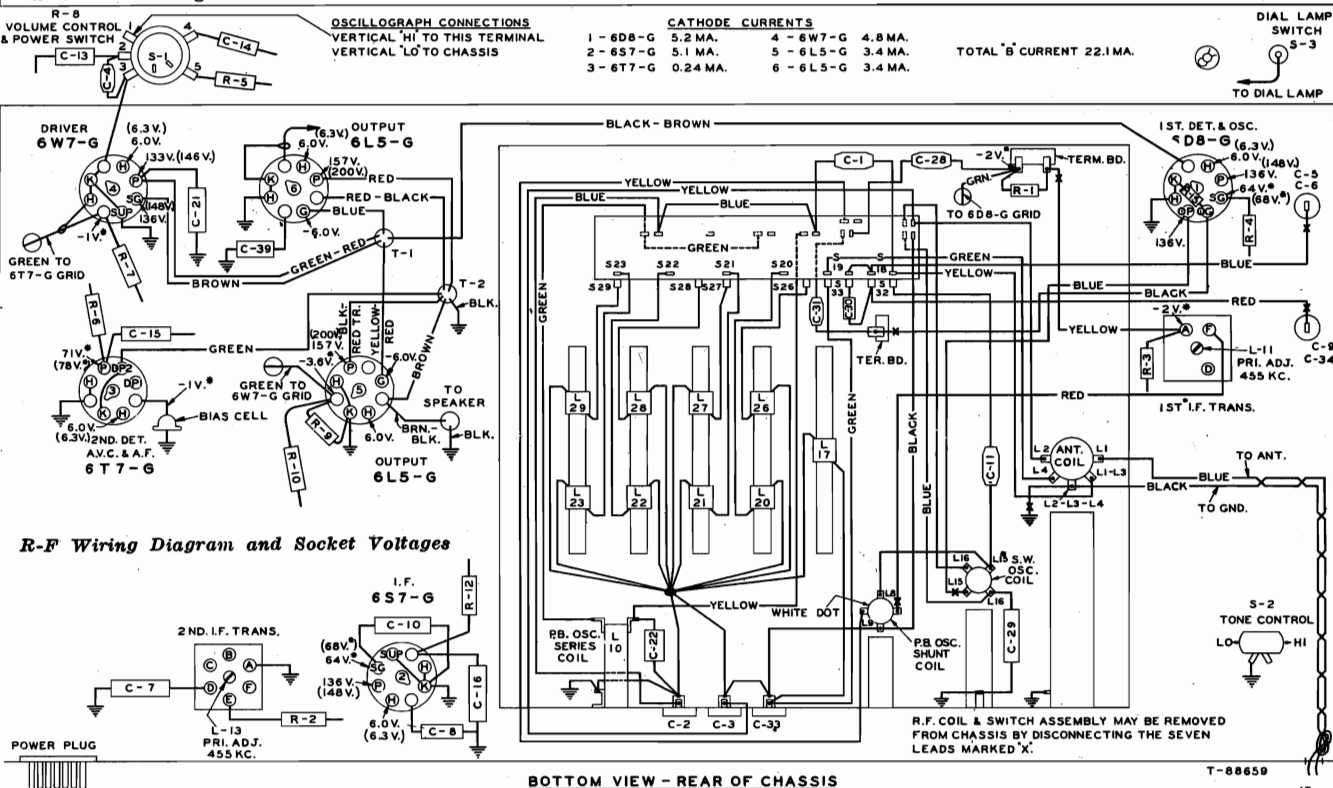
* Adjust L23-L29 (No. 1 push button adjustment) and L9 at the same time, rocking in for maximum signal.

**** Turn L17 adjusting screw all the way out, then turn in slowly until a peak is reached. If two peaks can be obtained the lower inductance setting (screw out) should be used.**

† Use minimum capacity peak if two peaks can be obtained. A weaker signal (image) should be received about one quarter inch to the left on the dial plate.

†† Use maximum capacity peak if two peaks can be obtained, rock in for maximum signal.

Note: The oscillator tracks 455 kc above the signal on all bands. After the receiver has been installed and the antenna connected, it is advisable to make a slight change in the adjustment of the antenna trimmer, C2. In most cases it is desirable to make this adjustment while receiving a station on No. 4 push button. However, if a station received on one of the other buttons is especially weak, it may be advisable to make the adjustment while receiving the weak station on that particular button.



Measurements made to chassis unless otherwise indicated, with set tuned to a quiet point and the volume control at minimum. Values should hold within approximately $\pm 20\%$ with rated supply voltage.

* Note: Values with star (*) are operating voltages in circuits with high series resistance. The actual measured values will be lower, depending on the voltmeter loading.

Bracketed voltages () refer to operation with CV-9 a-c power unit.

MODELS 96BK6,96BT6
MODELS 96E2,96K5,96K6,
96T7,97K2,97T2
Parts Lists

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit Price	96K2	96K3	96K6	96K7	97K2
14517	CHASSIS ASSEMBLIES—						
30752	Board—Antenna ground terminal board.	.25	32869	Switch—Range switch (81, 82).	1.10		
30753	Bracket—Magic eye bracket and holder—Model 9876.	.25	31370	Switch—Range switch (81, 82).	3.85		
30754	Bracket—Indicator drive shaft and lamp brackets.	.20	30903	Transformer—First 14 transformer (L10, L11, L12, L13, L14, L15, C30, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C60, C61, C62, C63, C64, C65, C66, C67, C68, C69, C70, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C83, C84, C85, C86, C87, C88, C89, C90, C91, C92, C93, C94, C95, C96, C97, C98, C99, C100, C101, C102, C103, C104, C105, C106, C107, C108, C109, C110, C111, C112, C113, C114, C115, C116, C117, C118, C119, C120, C121, C122, C123, C124, C125, C126, C127, C128, C129, C130, C131, C132, C133, C134, C135, C136, C137, C138, C139, C140, C141, C142, C143, C144, C145, C146, C147, C148, C149, C150, C151, C152, C153, C154, C155, C156, C157, C158, C159, C160, C161, C162, C163, C164, C165, C166, C167, C168, C169, C170, C171, C172, C173, C174, C175, C176, C177, C178, C179, C180, C181, C182, C183, C184, C185, C186, 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C2159, C2160, C2161, C2162, C2163, C2164, C2165, C2166, C2167, C2168, C2169, C2170, C2171, C2172, C2173, C2174, C2175, C2176, C2177, C2178, C2179, C2180, C2181, C2182, C2183, C2184, C2185, C2186, C2187, C2188, C2189, C2190, C2191, C2192, C2193, C2194, C2195, C2196, C2197, C2198, C2199, C2200, C2201, C2202, C2203, C2204, C2205, C2206, C220			

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE

MODELS 96E2, 96K5, 96K6, 96T7

Chas. RC-351L; 97K2, 97T2

Chassis RC-351K

RCA MFG. CO., INC.

Alignment, Socket, Trimmers
Tuner Adjustments

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

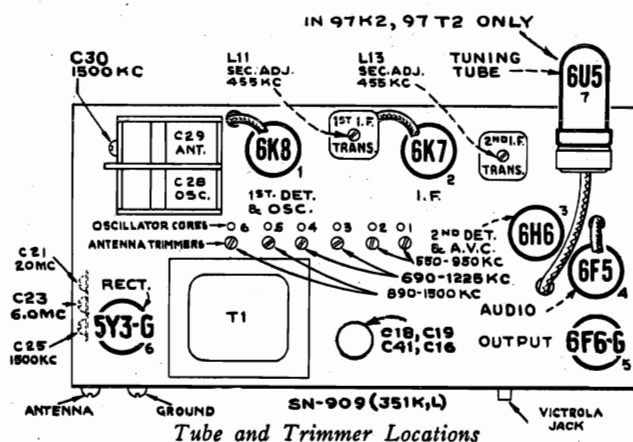
Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed 3/8-inch. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.



Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the left-hand end mark, and gang condenser fully meshed.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	"A" band, Quiet Point between 550-750 kc	L12 and L13 (2nd I-F Trans.)
2	6K8 det. grid cap, in series with .01 mfd.	455 kc		L10 and L11 (1st I-F Trans.)
3	Antenna Terminal, in series with 200 mmf.	600 kc	600 kc (150.5°) "A" band	L9
4		1,500 kc	1,500 kc (28°) "A" band	C25 (osc.) C30 (ant.)
5	Repeat steps 3 and 4.			
6	Antenna Terminal, in series with 400 ohms	6 mc	6 mc (26.5°) "B" band	C23 (osc.)*
7		20 mc	20 mc (22°) "C" band	C21 (osc.)*
8	Follow "Adjustments for Electric Tuning."			

* Use minimum capacity peak if two peaks can be obtained, and rock gang condenser slightly while adjusting C23 and C21.

Note.—Oscillator tracks 455 kc above signal on all bands.

ADJUSTMENTS FOR ELECTRIC TUNING

These models have eight push buttons. The left-hand button is a Victrola switch. The right-hand button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an in-

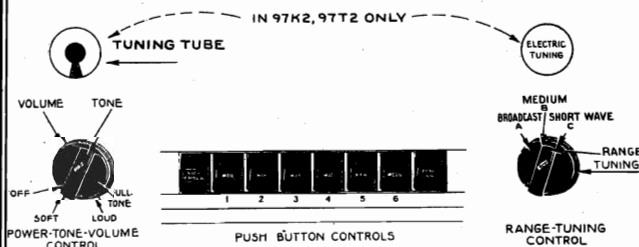
sulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments.

The procedure is as follows:

1. Make a list of the desired six stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning button, and manually tune in the first station on the list.
3. Push in station button No. 1 (second from left) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
4. Adjust No. 1 antenna trimmer (C36) for maximum output on this station.

Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

5. Adjust for each of the remaining five stations in the same manner.
6. Make a final careful adjustment of the oscillator cores and antenna trimmers.



Location of Controls

The left-hand push button is a Victrola-Attachment switch.
The right-hand push button is for dial tuning.

Schematic, Lead Dress

RCA MFG. CO., INC.

MODELS 96E2, 96K5, 96K6, 96T7
Chas. RC-351L; 97K2, 97T2

Chassis RC351K

FREQUENCY RANGES

"Standard Broadcast" (A)..... 540-1,720 kc

"Medium Wave" (B)..... 2.3-7.0 mc

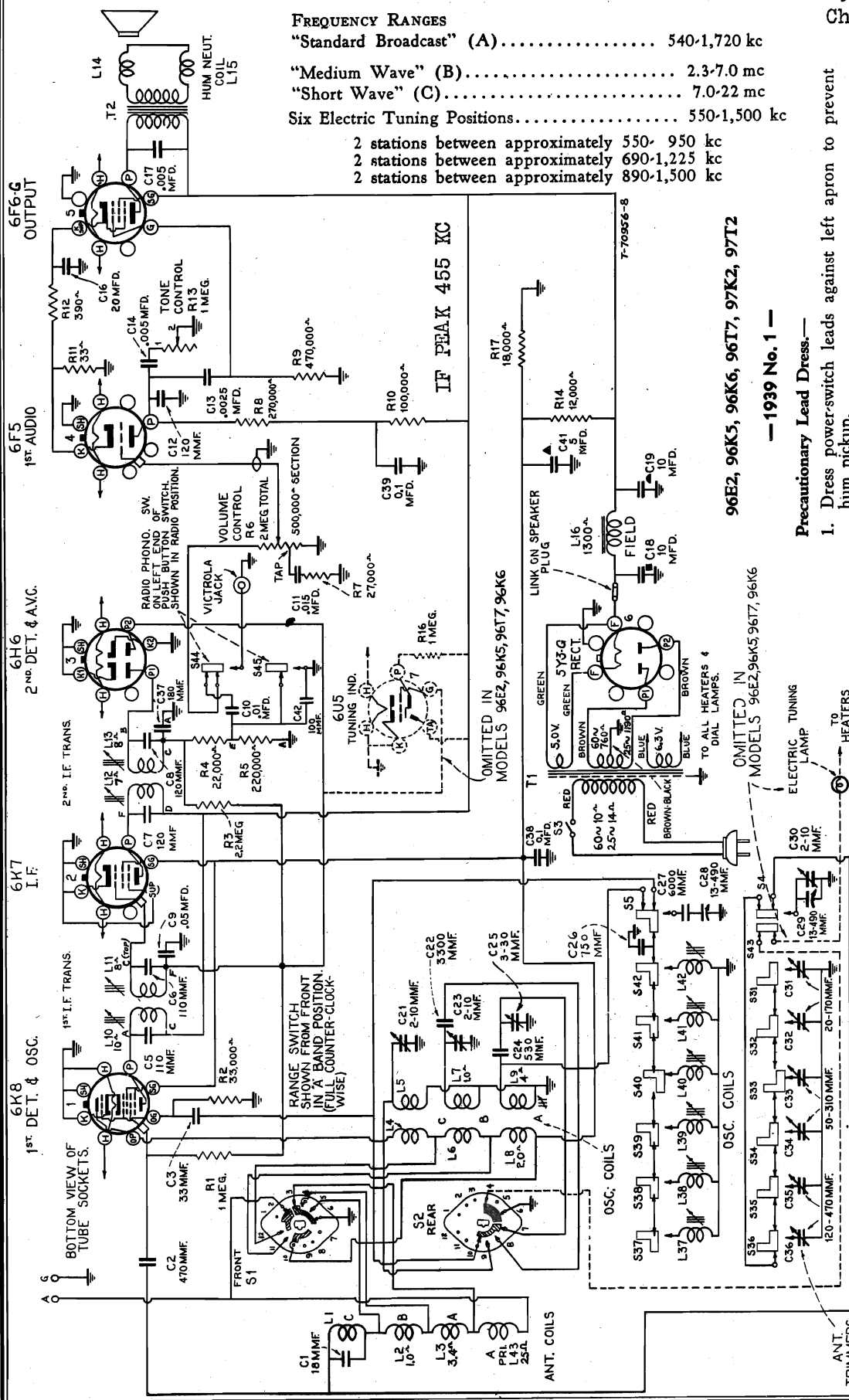
"Short Wave" (C)..... 7.0-22 mc

Six Electric Tuning Positions..... 550-1,500 kc

2 stations between approximately 550- 950 kc

2 stations between approximately 690-1,225 kc

2 stations between approximately 890-1,500 kc



96E2, 96K5, 96K6, 96T7, 97K2, 97T2

— 1939 No. 1 —

Precautionary Lead Dress.—

1. Dress power-switch leads against left apron to prevent hum pickup.
2. Dress R1 away from front of chassis.
3. Electric-tuning lamp leads must be dressed in front of range switch.
4. Dress lead from L5 to range switch away from other leads.
5. Dress leads away from antenna coil.
6. Dress other parts and leads away from R14, as it becomes heated.

96E2, 96K5, 96K6, 97K2

96T7, 97T2

POWER OUTPUT

Undistorted.....

Maximum.....

Rating A.....

Rating B.....

Rating C.....

POWER SUPPLY RATING

Rating A.....

Rating B.....

Rating C.....

MODELS 96E2, 96K5, 96K6, 96T7

Chassis RC-351L

LOUDSPEAKER

RCA MFG. CO., INC.

97K2, 97T2, Chas. RC351K

R-F Chassis Wiring, Data

Type..... Electrodynamic
Voice-coil impedance 84308-1, 84308-4, RL63H-3, RL70H-1... 2.2 ohms, RL79-1..... 3.4 ohms..... at 400 cycles
Pilot Lamps (1 on Models 96K5, 96K6, 96E2, 96T7) (2 on Models 97K2, 97T2)..... Mazda No. 47, 6.3 volts, .15 amp.

Loudspeaker.—Centering of the loudspeaker voice coil is accomplished in the usual manner with three narrow celluloid or paper feelers after first removing the front dust cover. A dust cover should be cemented in place with ambroid upon completion of adjustment.

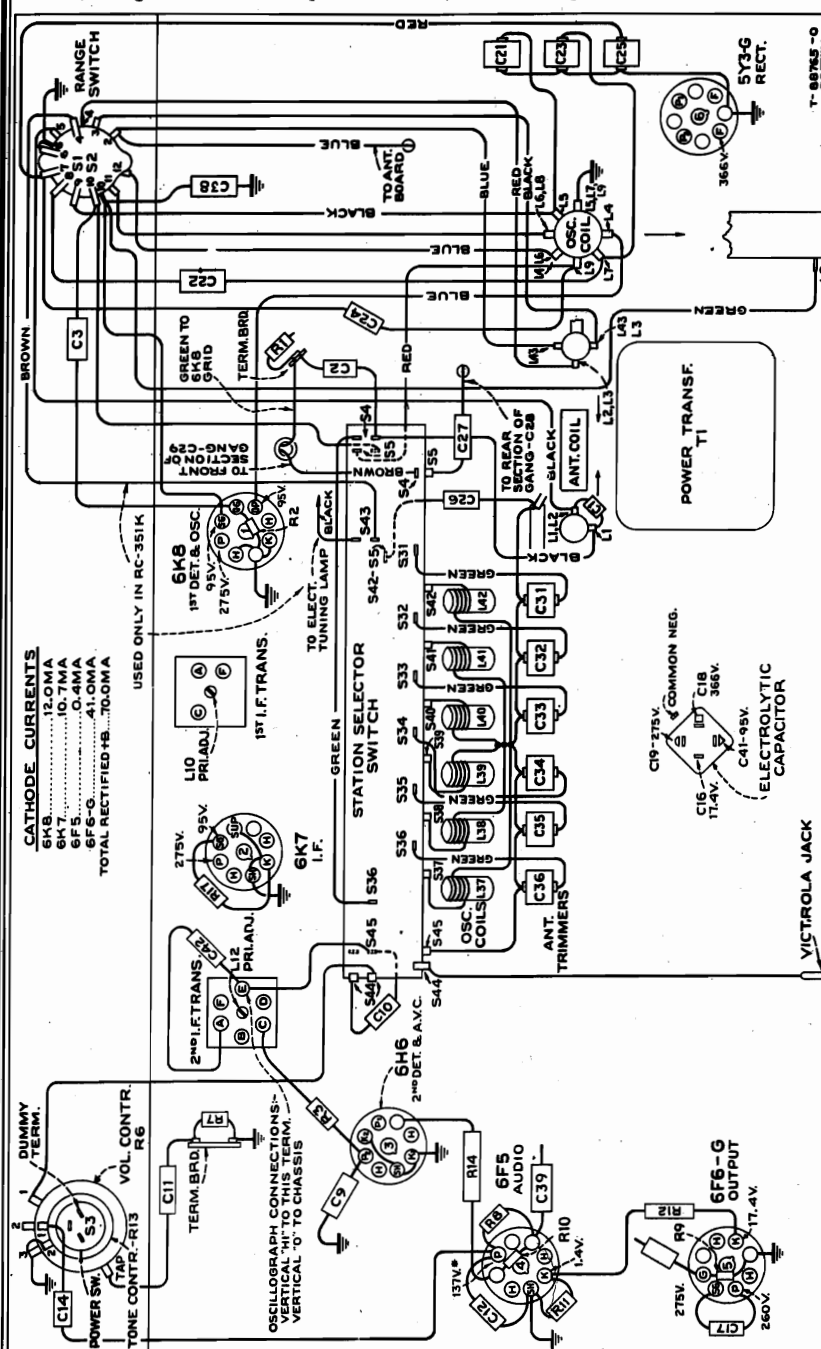
The seven-tube models have a "Magic Eye" tuning tube and illuminated indicator to show when the set is being operated on electric tuning. All models have electric tuning for six stations in the standard broadcast range.

Features of design include: Magnetite-core electric-tuning coils; magnetite-core "A" band oscillator coil; magnetite-core i-f transformers; temperature-compensated capacitor in the oscillator circuit; aural-compensated volume control; high-frequency tone control; jack and switch for Victrola attachment; straight-line dial; dust-proof electrodynamic loudspeaker.

Victrola Attachment.—A jack is provided on the rear of the chassis for connection to a Victrola Attachment. The cable from the Victrola Attachment should be terminated in a Stock No. 31048 plug to fit the jack.

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within $\pm 20\%$ with 117-volt a-c supply.

NOTE: Values with star () are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

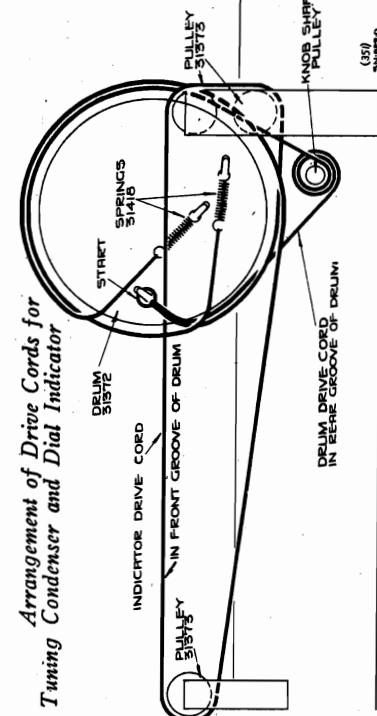


R-F Wiring Diagram and Socket Voltages

BOTTOM VIEW - REAR OF CHASSIS

96E2, 96K5, 96K6, 96T7, 97K2, 97T2

Arrangement of Drive Cords for Tuning Condenser and Dial Indicator



Above — Universal Power Transformer Connections. (110-volt supply for a Victrola Attachment may be obtained by connecting the motor to the red and the red-black leads.)

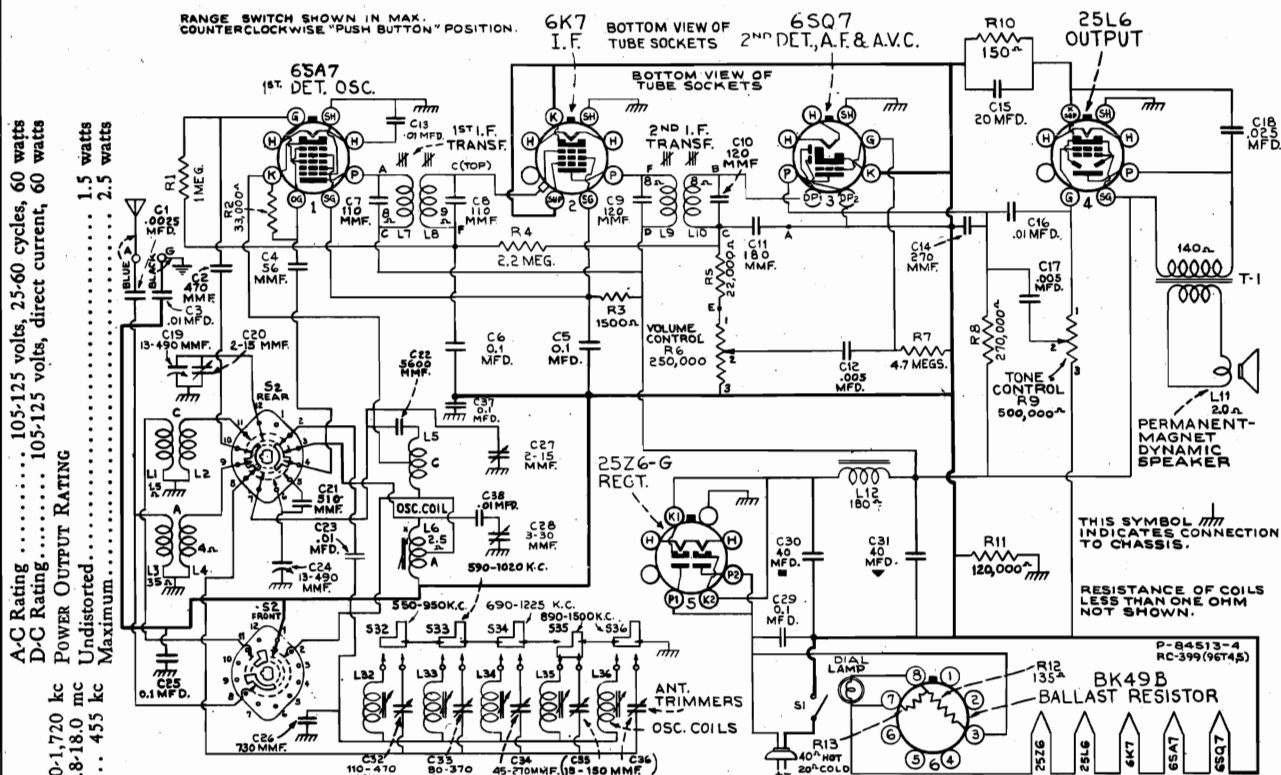
Above — Connections and Colors of Loudspeaker and Cable.

Speaker Plug Connections

Schematic, Voltage
R-F Chassis Wiring

RCA MFG. CO., INC.

MODELS 96T4,96T5,Chas.RC-399
96T6,Chassis RC-399A

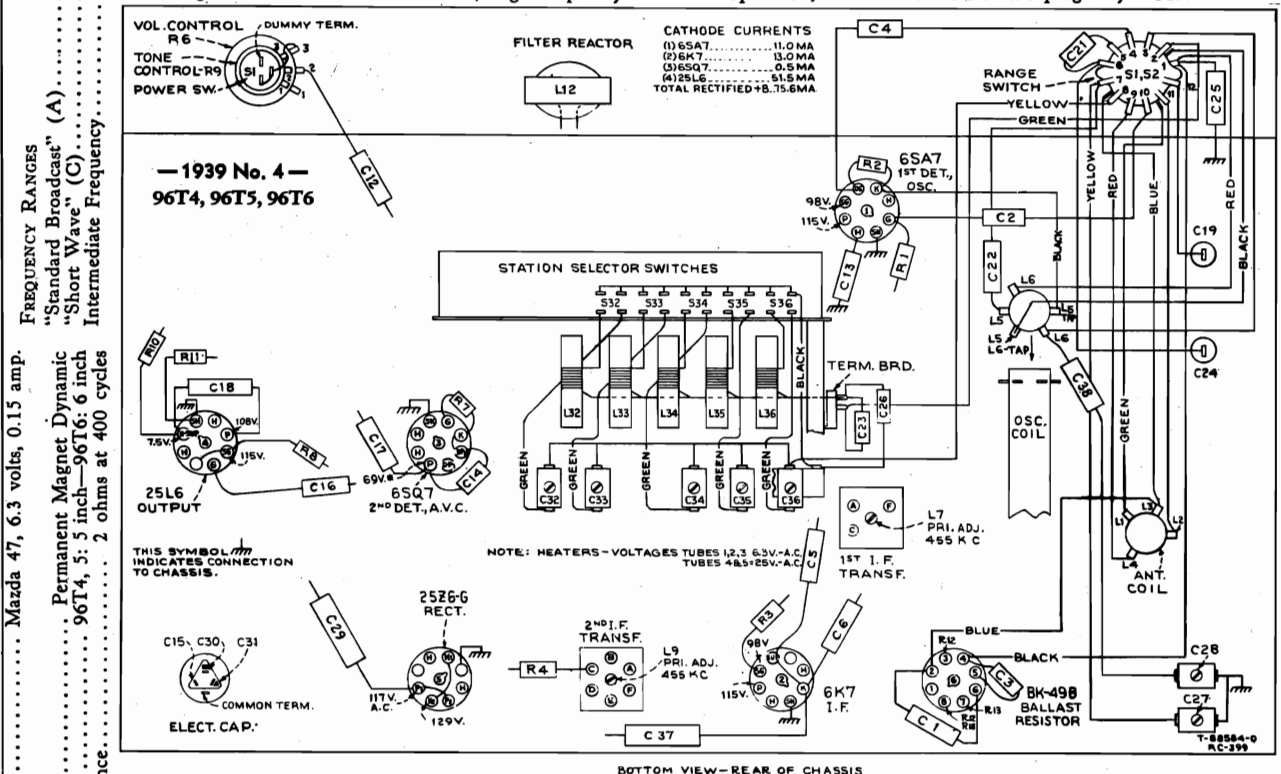


All models have electric tuning for five stations in the standard broadcast range.

Features of design include: Magnetite-core electric-tuning coils; magnetite-core i-f transformers; temperature-compensated capacitor in the oscillator circuit; high-frequency tone

control; straight-line dial; dust-proof permanent magnet
dynamic loudspeaker.

Power Supply Polarity.—On d-c operation, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the position of the plug. On a-c operation, a similar reversal of the plug may reduce hum.



R-F Wiring Diagram and Socket Voltages

Measurements made to low-side of volume control unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within $\pm 20\%$ with 117 volt a-c supply.

* **Note:** Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

MODELS 96T4, 96T5, Chassis RC-399

96T6, Chassis RC-399A

RCA MFG. CO., INC.

Alignment, Socket, Trimmers

Tuner, Lead Dress, Drive Data

Mechanical Specifications

Models	96T4	96T5	96T6
Height (inches).....	9 1/2	9 1/2	11 1/4
Width (inches).....	12	12	15 3/8
Depth (inches).....	6 1/8	6 1/8	6 15/16
Net Weight (pounds).....	11	11	14
Shipping Weight (pounds).....	13	13	17
Chassis Base Dimensions.....	11 1/8 in. wide, 5 in. deep, 2 7/8 in. high		
Over-all Chassis Height.....	8 inches		
Tuning Drive Ratio.....	8 to 1		

Alignment Procedure

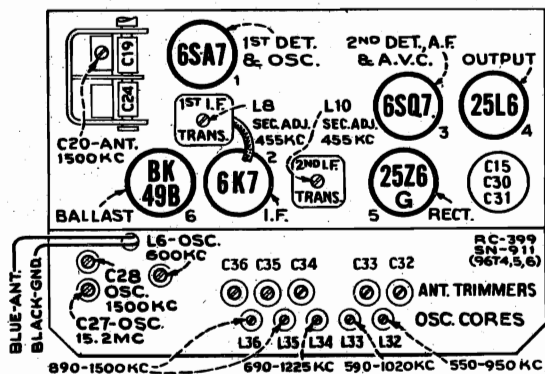
Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the black lead and keep the output as low as possible to avoid a-v-c action.

Calibration Marks.—The tuning dial is fastened in the cabinet and can not be used for reference during alignment. Therefore calibration marks corresponding to dial readings of 600 kc, 1,500 kc, and 15.2 mc. have been stamped in the plate on the front of the chassis as shown in the accompanying drawing. These marks are used for reference during alignment.

Dial Indicator Adjustment.—With the gang condenser in full mesh, the indicator should point to the extreme left mark on the dial scale.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

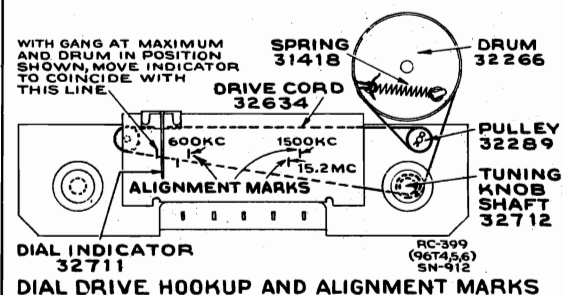


Tube and Trimmer Locations

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	"A" band, Quiet Point between 550-750 kc	L9 and L10 (2nd I-F Trans.)
2	Tuning condenser Stator (osc.) in series with .01 mfd.	455 kc		L7 and L8 (1st I-F Trans.)
3	Antenna Lead (Blue), in series with 200 mmf.	1,500 kc	1,500 kc (Cal. Mark) "A" Band	C28 (osc.) C20 (ant.)
4	Antenna Lead (Blue), in series with 200 mmf.	600 kc	600 kc (Cal. Mark) "A" Band	L6 (osc.)
5	Repeat steps 3 and 4.			
6	Antenna Lead (Blue), in series with 400 ohms	15.2 mc	15.2 mc (Cal. Mark) "C" Band	C27 (osc.)*
7	Follow "Adjustments for Electric Tuning."			

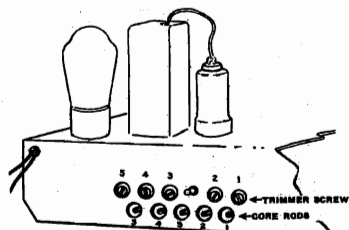
* Rock gang slightly while peaking C27, and use minimum capacity peak if two peaks can be obtained on C27.

Note.—Oscillator tracks 455 kc above signal on both bands.



Dial-Indicator and Drive Mechanism

Refer to "Alignment Procedure" for explanation of the "calibration marks" shown in this drawing.



Push-Button Adjustments

- No. 1—Approximately 550-950 kc.
No. 2—Approximately 590-1,020 kc.
No. 3—Approximately 690-1,225 kc.
Nos. 4, 5—Approximately 890-1,500 kc.

Removing Push-Button Assembly.—The push-button assembly is held to the chassis by two nuts on the front apron and may be quickly and easily swung out for convenient access to the sockets and other parts. No unsoldering is required, as flexible leads are used for all connections from the chassis to the assembly.

- A.C. leads to ballast tube should be dressed away from volume control lead on 2nd I.F. transformer.
- Coupling condensers C2 and C4 should be dressed away from chassis.

Miscellaneous Service Data

Precautionary Lead Dress.—

- Volume control lead from 2nd I.F. transformer (E) should be dressed down on chassis.

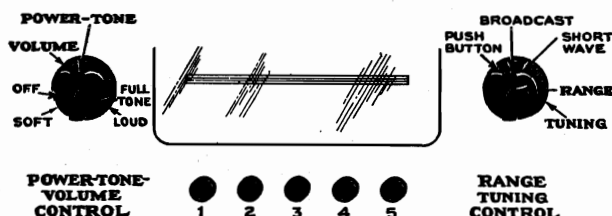
RCA MFG. CO., INC.

MODELS 96T4, 96T5, Chas. RC-399

96T6, Chassis RC-399A

Tuner Adjustments, Parts

96T4, 96T5, 96T6



Location of Controls

Adjustments for Electric Tuning

These models have five push buttons for electric tuning of five different stations in the standard broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjust-

ments. Use a regular antenna for the preliminary adjustments.

The procedure is as follows:

1. Make a list of the five desired stations, arranged in order from low to high frequencies.
2. Turn Range Control Knob to "Broadcast" position and tune in station No. 1 (560 kc in example) by Manual Dial Tuning, for reference.
3. Push in station-button No. 1 and turn Range Selector to "PB" position. Adjust No. 1 oscillator core (L32) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until the station is received.
4. Adjust No. 1 antenna trimmer (C32) for maximum output on this station.
5. Adjust for each of the remaining four stations in the same manner.

(Clockwise adjustment of oscillator cores and antenna trimmers tunes the circuits to lower frequencies.)

6. Make a final careful adjustment of the oscillator cores and antenna trimmers, using one or two feet of wire as an antenna to ensure sharp peaking.

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
CHASSIS ASSEMBLIES					
(RC399—Models 96T4 and 96T5)					
(RC399A—Model 96T6)					
32544	Ballast—Ballast resistor tube—type BK49B (R12, R13).....	.80	13734	Resistor—120,000 ohms, $\frac{1}{2}$ watt (R11).....	.20
31379	Capacitor—Dual trimmer, comprising one 3-30 mmfd. and one 2-10 mmfd. sections (C27, C28).....	.40	12199	Resistor—270,000 ohms, $\frac{1}{2}$ watt (R8).....	.20
12723	Capacitor—56 mmfd. (C4).....	.35	13730	Resistor—1 meg., $\frac{1}{2}$ watt (R1).....	.20
14262	Capacitor—109 mmfd. (C7, C8).....	.30	12679	Resistor—2.2 meg., $\frac{1}{2}$ watt (R4).....	.20
12404	Capacitor—120 mmfd. (C9, C10).....	.30	30271	Resistor—4.7 meg., $\frac{1}{2}$ watt (R7).....	.20
14712	Capacitor—180 mmfd. (C11).....	.30	32544	Resistor—Ballast resistor tube—type BK49B (R12, R13).....	.80
12488	Capacitor—270 mmfd. (C14).....	.35	30340	Retainer—Pulley retaining clip.....	.02
30433	Capacitor—470 mmfd. (C2).....	.35	14343	Retainer—Tuning knob shaft retaining ring.....	.03
12537	Capacitor—560 mmfd. (C21).....	.35	4669	Screw—No. 8-32 x $\frac{1}{2}$ square head set screw for drum.....	.03
32714	Capacitor—730 mmfd. (C26).....	.45	32712	Shaft—Tuning knob shaft and pulley.....	.20
13895	Capacitor—5,600 mmfd. (C22).....	.70	31365	Socket—Dial lamp socket.....	.20
5107	Capacitor—.0025 mfd., 700 volts (C1).....	.20	31251	Socket—Octal base tube socket.....	.25
4838	Capacitor—.005 mfd., 1,000 volts (C12, C17).....	.25	31418	Spring—Drive cord tension spring.....	.05
14393	Capacitor—.01 mfd., 300 volts (C3, C13, C16, C23, C38).....	.30	32703	Switch—Push button switch (S32, S33, S34, S35, S36).....	2.25
4870	Capacitor—.025 mfd., 400 volts (C18).....	.20	32702	Switch—Range switch (S2).....	1.15
4839	Capacitor—.01 mfd., 400 volts (C5, C6, C25, C29, C87).....	.30	14376	Transformer—First i.f. transformer (L7, L8, C7, C8).....	2.45
32708	Capacitor—Electrolytic, comprising two 40 mfd., and one 20 mfd. sections (C15, C30, C31).....	1.35	14308	Transformer—Second i.f. transformer (L9, L10, C9, C10, C11, R5).....	2.90
32705	Capacitor—Push button trimmer capacitor bank (C32, C33, C34, C35, C36).....	1.20	32544	Tube—Ballast resistor tube—type BK49B (R12, R13).....	.80
31382	Clip—Push button coil mounting clip.....	.04	SPEAKER ASSEMBLIES (84226-4)		
32706	Coil—Antenna coil (L1, L2, L3, L4).....	1.25	Models 96T4 and 96T5		
32707	Coil—Oscillator coil (L5, L6).....	.95	32716	Cone—Speaker cone and voice coil in housing (L11).....	1.80
31385	Coil—Push button oscillator coil—less core 550-950 KC. (L32).....	.30	32715	Speaker—Complete.....	6.70
32704	Coil—Push button oscillator coil—less core 590-1,020 KC. (L33).....	.35	32717	Transformer—Output transformer (T1).....	1.40
32340	Coil—Push button oscillator coil—less core 690-1,225 KC. (L34).....	.35	SPEAKER ASSEMBLIES (84307-4)		
31383	Coil—Push button oscillator coil—less core 890-1,500 KC. (L35, L36).....	.30	Model 96T6		
32249	Condenser—2-gang variable (C19, C20, C24).....	2.70	32719	Cone—Speaker cone and voice coil in housing (L11).....	2.00
31413	Control—Volume control, tone control, and power switch (R6, R9, S1).....	3.00	5118	Plug—3-contact male plug for speaker.....	.25
32634	Cord—Drive cord.....	.10	32718	Speaker—Speaker complete.....	6.00
31386	Core—Core and stud for coil, Stock Nos. 31383, 31385, and 32704.....	.15	32720	Transformer—Output transformer (T1).....	1.45
30846	Core—Core and stud for coil, Stock No. 32340.....	.30	MISCELLANEOUS ASSEMBLIES		
32713	Core—Core and stud for oscillator coil, Stock No. 32707.....	.35	31428	Button—Push button and spring.....	.06
32266	Drum—Condenser drive cord drum.....	.45	31487	Clip—Spring clip to hold dial scale.....	.12
32711	Indicator—Dial indicator pointer.....	.20	31095	Cover—One set protective covers for call letter markers.....	.10
31480	Lamp—Dial lamp socket.....	.20	32722	Dial—Glass dial scale.....	.45
32710	Plate—Dial color plate and pointer track.....	.30	31667	Escutcheon—Dial escutcheon (no crystal).....	.55
5119	Plug—3-contact female for speaker cable.....	.25	31355	Knob—Range switch knob.....	.12
32289	Pulley—Indicator drive cord pulley.....	.10	31391	Knob—Tone control knob.....	.15
32709	Reactor—Filter reactor (L12).....	1.40	14359	Knob—Tuning knob.....	.20
30880	Resistor—150 ohms, $\frac{1}{2}$ watt (R10).....	.20	30773	Knob—Volume control knob.....	.15
14499	Resistor—1,500 ohms, $\frac{1}{2}$ watt (R3).....	.20	30991	Markers—One set station call letter markers.....	.40
14284	Resistor—22,000 ohms, 1/10 watt (R5).....	.15	32721	Spring—Push button spring.....	.02
12454	Resistor—33,000 ohms, $\frac{1}{2}$ watt (R2).....	.20	14270	Spring—Retaining spring for range switch or volume control knob.....	.05
			30330	Spring—Retaining spring for tone control knob.....	.03
			4982	Spring—Retaining spring for tuning knob.....	.05

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

MODELS 96X1 to 96X4, Chas. RC-400 RCA MFG. CO., INC.
 96X11 to 96X14, Chas. RC-400A
 MODEL U-104, Chassis RC-345H
 Parts Lists

MODELS 96X-1, -2, -3, -4 and -11, -12, -13, -14

Chassis No. RC-400 and RC-400A

Replacement Parts

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
CHASSIS ASSEMBLIES					
32999	Back—Cardboard back for cabinet.....	.10	4858	Condenser—.01 mfd.....	.25
32544	Ballast—Ballast resistor type BK40B.....	.80	5198	Condenser—.035 mfd.....	.20
32530	Button—Ivory push button for 96X11, 96X12 and 96X14.....	.15	4888	Condenser—.05 mfd.....	.20
32528	Button—Walnut push button for 96X13.....	.15	4839	Condenser—.01 mfd.....	.30
X-580	Cabinet for 96X1.....(net)	3.10	32548	Condenser—Electrolytic, one 12 mfd. and one 20 mfd. sections.....	.65
X-581	Cabinet for 96X2.....(net)	3.10	32536	Condenser—Variable tuning condenser.....	2.40
X-582	Cabinet for 96X3.....(net)	3.35	31456	Cover—1 set protective covers for push button markers.....	.08
X-583	Cabinet for 96X4.....(net)	5.60	32539	Cord—Condenser drive cord.....	.10
X-644	Cabinet for 96X11.....(net)	2.90	32540	Cord—Dial drive cord.....	.10
X-585	Cabinet for 96X12.....(net)	2.90	32526	Dial—Black dial scale for 96X2 and 96X12.....	.35
X-645	Cabinet for 96X13.....(net)	3.00	32527	Dial—Ivory dial scale for 96X4 and 96X14.....	.35
X-646	Cabinet for 96X14.....(net)	5.20	32525	Dial—Walnut dial scale for 96X1, 96X3, 96X11 and 96X13.....	.35
32531	Coil—Antenna coil.....	.75	32290	Gear—Sector gear fastens on cam shaft of tuning mechanism—Models 96X11, 96X12, 96X13, 96X14.....	.50
32532	Coil—Oscillator coil.....	1.00	32542	Indicator—Dial indicator drum.....	.50
31379	Condenser—Trimmer, one 3-30 mmfd. and one 2-10 mmfd. sections (C5, C7).....	.40	32522	Knob—Ivory knob for 96X1, 96X2, 96X4, 96X11, 96X12, 96X14.....	.15
14079	Condenser—6.8 mmfd.....	.35	32520	Knob—Tan knob for 96X3 and 96X13.....	.15
13057	Condenser—60 mmfd.....	.35	31482	Screw—No. 8-32 set screw for condenser drive pulley or sector gear.....	.03
12488	Condenser—250 mmfd.....	.35	32510	Screw—Push button cam locking screw—Models 96X11, 96X12, 96X13, 96X14.....	.10
31399	Condenser—4,700 mmfd.....	.65	32547	Shaft—Tuning knob shaft.....	.15
31480	Lamp—Dial lamp.....	.20	32543	Socket—Dial lamp socket and bracket.....	.20
31589	Marker—1 set push button call letter markers.....	.35	32537	Socket—Tube socket.....	.20
32810	Mechanism—Push button tuning mechanism comprising push arms, cam plate, frame, and mounting bracket assembled—Models 96X11, 96X12, 96X13, 96X14.....	5.40	31615	Spring—Drive cord tension spring.....	.02
32538	Pulley—Condenser drive pulley and gear—Models 96X11, 96X12, 96X13 and 96X14.....	.65	30585	Spring—Push button lever spring—Models 96X11, 96X12, 96X13, 96X14.....	.06
32541	Pulley—Condenser drive pulley—Models 96X1, 96X2, 96X3, 96X4.....	.35	31646	Spring—Retaining spring for knobs.....	.02
31606	Pulley—Indicator drum pulley.....	.20	32546	Switch—Band change switch.....	.65
32544	Resistor—Ballast resistor type BK40B.....	.80	32533	Transformer—First i.f. transformer.....	1.00
14439	Resistor—100 ohms, $\frac{1}{2}$ watt.....	.20	32534	Transformer—Second i.f. transformer.....	.90
32535	Resistor—120 ohms, wire wound.....	.20	32545	Volume control and power switch.....	1.50
14499	Resistor—1,500 ohms, $\frac{1}{2}$ watt.....	.20	SPEAKER ASSEMBLIES (84202-3)		
12454	Resistor—33,000 ohms, $\frac{1}{2}$ watt.....	.20	31202	Cone—Speaker cone and voice coil.....	1.30
12412	Resistor—47,000 ohms, $\frac{1}{2}$ watt.....	.20	31201	Speaker complete.....	3.95
12264	Resistor—220,000 ohms, $\frac{1}{2}$ watt.....	.20	31203	Transformer—Output transformer.....	1.00
12285	Resistor—470,000 ohms, $\frac{1}{2}$ watt.....	.20			
12679	Resistor—2.2 meg., $\frac{1}{2}$ watt.....	.20			
13601	Resistor—10 meg., $\frac{1}{2}$ watt.....	.20			

MODEL U-104

Chassis No. RC-345H

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
CHASSIS ASSEMBLIES (RC-345H)			PICKUP AND ARM ASSEMBLIES		
31198	Ballast—Ballast resistor tube (R7, R8).....	.80	32226	Base—Pickup arm pivot shaft and base assembly.....	.65
4287	Body—Connector body for dial lamp connector.....	.02	4286	Bushing—Bushing and ferrule insert for connector cap.....	.03
30883	Capacitor—300 mmfd. (C9).....	.35	4288	Cap—Pickup cable connector cap.....	.03
12835	Capacitor—1,100 mmfd. (C19).....	.50	31050	Crystal—Pickup crystal and needle screw.....	3.75
4838	Capacitor—.005 mfd., 1,000 V. (C18).....	.25	32227	Pickup arm and crystal complete—less mounting, Stock No. 31054.....	6.70
4858	Capacitor—.01 mfd., 500 V. (C17).....	.25	12539	Screw—Pickup needle screw.....	.15
14393	Capacitor—.01 mfd., 300 V. (C1, C8, C10).....	.30	MOTOR ASSEMBLIES		
11315	Capacitor—.015 mfd., 400 V. (C11).....	.20	9841	Motor—110-volt, 60-cycle—complete with mounting (M1).....	6.50
30938	Capacitor—.025 mfd. (C15).....	.20	31034	Motor—110-volt, 50-cycle—less mounting (M1).....	8.90
30899	Capacitor—.01 mfd., 200 V. (C4).....	.30	31037	Rotor—Turntable and rotor lamination assembly—complete for 50-cycle operation.....	4.55
4839	Capacitor—.01 mfd., 400 V. (C12).....	.30	31036	Rotor—Turntable and rotor lamination assembly—complete for 60-cycle operation.....	4.55
12484	Capacitor—.025 mfd., 350 V. (C20, C16).....	.30	31043	Stator—Stator assembly—complete with coils and laminations for 50-cycle operation.....	2.50
31323	Capacitor—.16 mfd., 150 V. (C13, C14).....	.65	31042	Stator—Stator assembly—comprising coils and laminations for 60-cycle operation.....	2.50
30875	Coil—Antenna coil (L1, L2).....	1.10	SPEAKER ASSEMBLIES (84202-3)		
30876	Coil—R.F. coil (L3, L4).....	1.10	31202	Cone—Speaker cone (L5).....	1.30
31195	Condenser—2-gang variable tuning condenser (C2, C3, C5, C6).....	2.50	31201	Speaker—Speaker complete.....	3.95
14086	Cord—Power cord.....	.65	31203	Transformer—Output transformer (T1).....	1.00
32634	Cord—Variable condenser drive cord.....	.10	MISCELLANEOUS ASSEMBLIES		
31200	Dial—Station selector dial scale and plate assembly.....	.40	31205	Crystal—Station selector dial crystal.....	.20
4286	Ferrule—Ferrule for dial lamp connector.....	.03	30863	Knob—Station selector or power switch knob.....	.15
4340	Lamp—Pilot lamp.....	.17	31054	Mounting—Pickup arm rubber mounting, washer, and nut.....	.15
31193	Lead—Antenna lead.....	.50	30870	Plug—2-contact male plug for motor leads.....	.35
30868	Plug—2-contact female motor cable plug.....	.35	14267	Screw—Chassis mounting screw.....	.04
31196	Pointer—Station selector indicator pointer.....	.25	31053	Screw—Motor mounting screw assembly complete.....	.30
31198	Resistor—Ballast resistor tube (R7, R8).....	.80			
30880	Resistor—150 ohms, $\frac{1}{2}$ watt (R6).....	.20			
13734	Resistor—120,000 ohms, $\frac{1}{2}$ watt (R10).....	.20			
12285	Resistor—470,000 ohms, $\frac{1}{2}$ watt (R4).....	.20			
13730	Resistor—1 megohm, $\frac{1}{2}$ watt (R5).....	.20			
12679	Resistor—2.2 megohms, $\frac{1}{2}$ watt (R3).....	.20			
13601	Resistor—10 megohms, $\frac{1}{2}$ watt (R9).....	.20			
31197	Shaft—Indicator pointer shaft and pulley.....	.10			
31251	Socket—8-contact tube socket.....	.25			
14171	Socket—Lamp socket assembly.....	.40			
4284	Spring—Spring for dial lamp connector.....	.03			
31096	Switch—Phono. switch (S2).....	1.20			
31198	Tube—Ballast resistor tube (R7, R8).....	.80			
32209	Volume Control—(Phono.) (R11).....	1.00			
31966	Volume Control—Volume control power switch (R1, S1).....	1.50			
4285	Washer—Insulating washer for dial lamp connector.....	.02			

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Schematic, Voltage, Socket Trimmers, Alignment, Data

RCA MFG. CO., INC.

MODELS 96X1 to 96X4 inc.
Chassis RC-400
96X11 to 96X14 inc.
Chassis RC-400A

Without Push-Button Tuning
96X-1 96X-2 96X-3 96X-4
Walnut Finish Black Finish Walnut and Ivory Finish
Ivory Finish

With Push-Button Tuning
96X-11 96X-12 96X-13 96X-14
Walnut Finish Black Finish Walnut and Ivory Finish

Electrical and Mechanical Specifications

FREQUENCY RANGES

"Standard Broadcast" (A) (left)..... 540-1,720 kc
"Short Wave" (C) (right)..... 5,800-18,000 kc

TUBE COMPLEMENT

(1) RCA-6K8..... 1st-Detector—Oscillator
(2) RCA-6SK7..... I-F Amplifier
(3) RCA-6SQ7..... 2nd-Det., 1st A-F, and A.V.C.
(4) RCA-25L6..... Power Output
(5) RCA-25Z6G..... Half-Wave Rectifier
(6) RCA-BK-49B..... Ballast
Pilot Lamp..... Mazda No. 47, 6.3 volts, 0.15 amp.

POWER SUPPLY RATINGS

A-C Rating..... 105-125 volts, 50-60 cycle, 50 watts
D-C Rating..... 105-125 volts, direct current, 50 watts

INTERMEDIATE FREQUENCY..... 455 kc

POWER OUTPUT (125 volts, 60 cycle supply)

Undistorted 1.5 watts—Maximum..... 2.0 watts

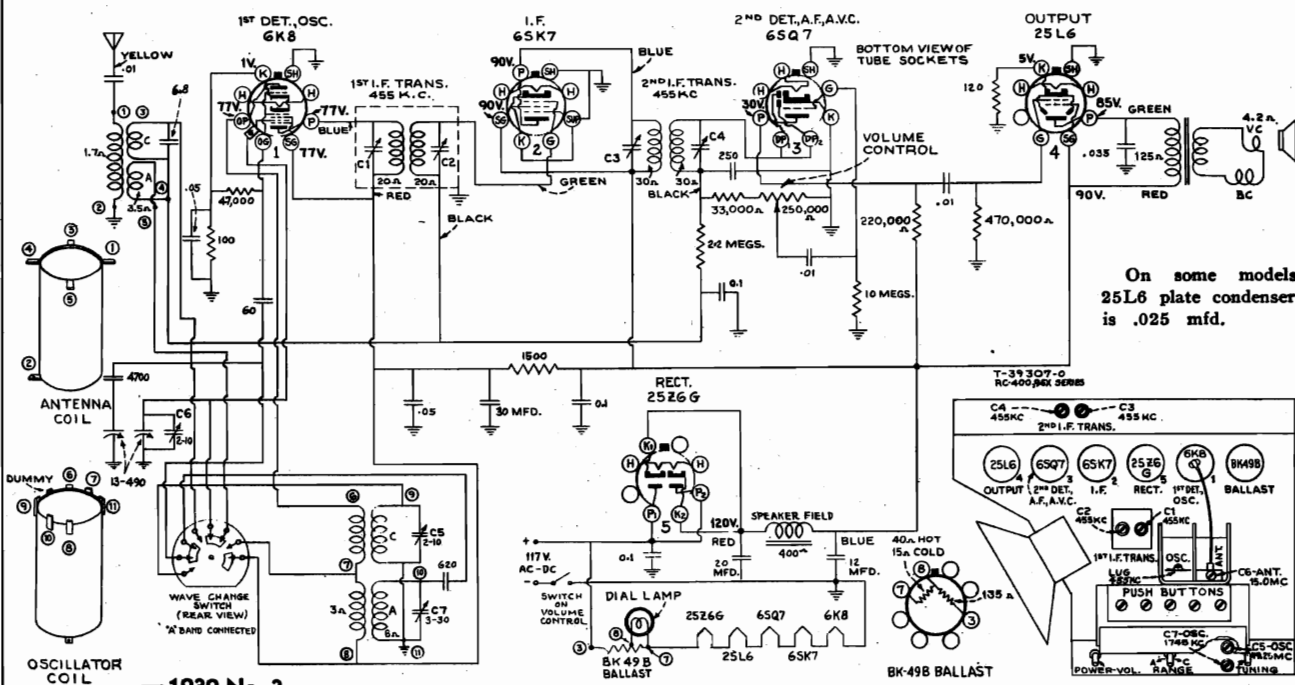
LOUDSPEAKER Type 84202-3..... 5-inch Electrodynamic

Cabinet Dimensions... H. 7½ inches W. 11½ inches D. 7½ inches

Weights (net) 96X1, 2, 3, 4—8½ lbs. 96X11, 12, 13, 14—9½ lbs.

Tuning Drive Ratio..... 8 to 1

25 Cycle Operation.—For 25 cycle operation change filter condensers to 40-40 mfd.



—1939 No. 3—

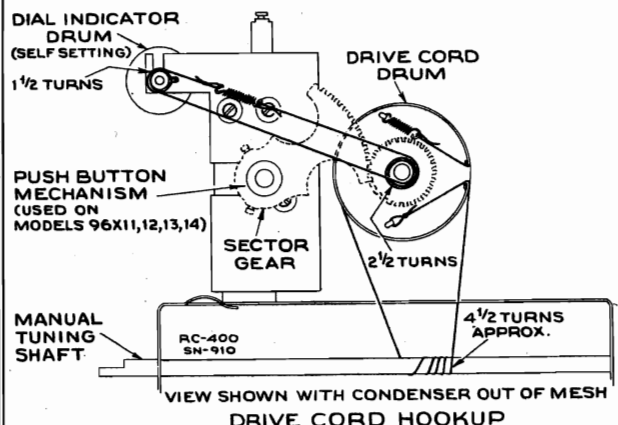
Alignment Procedure

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.

Dial Setting.—To set dial indicator drum, turn tuning condensers fully clockwise and then counter-clockwise.

Push-button Adjustments.—Remove bakelite button and loosen screw two turns with a screwdriver or coin. Tune in the desired station by means of the right-hand control knob. Press push lever down as far as it will go and tighten screw. Release lever and put on push-button.



Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	Tuning condenser stator (osc.) in series with .01 mfd.†	455 kc	Quiet point between 550-750 kc	C1, C2, C3, C4 (1st and 2nd I-F transformer)
2	Antenna lead (yellow) in series with 400 ohms	19.25 mc	Full clockwise (out of mesh) "C" band	C5* (osc.)
3	Same as step 2	15.0 mc	15.0 mc Test oscillator signal	C6** (ant.) See Note No. 1
4	Antenna lead in series with 200 mmf condenser	1,745 kc	Full clockwise (out of mesh) "A" band	C7 (osc.)

* Use minimum capacity peak if two peaks can be obtained.

** Rock gang slightly and check to determine that C5 has been adjusted to the correct peak by tuning to approximately 14.09 mc, where a weaker signal should be received.

† Make test oscillator connection to lug on tuning condenser stator (oscillator section) in series with .01 mfd. condenser.

Note No. 1.—Accurately tune receiver to the 15.0 mc test oscillator signal. This signal will appear twice (14.09 and 15.0 mc) as dial is turned. Use the higher frequency setting of the tuning condensers (gang furthest out of mesh).

Note No. 2.—Oscillator tracks 455 kc above signal on all bands.

MODEL 97K, Chassis RC-351F
RC-351F "M", RC-351F "R"

RCA MFG. CO., INC.

Specifications, Calibration Scale

MODEL 97K**CHASSIS No. RC-351F, RC-351F "M", RC-351F "R"**
Electrical Specifications**FREQUENCY RANGES**

"Standard Broadcast" (A)..... 540-1,720 kc "Short Wave" (C)..... 5.8-18.0 mc

Six Electric Tuning Positions..... 550 to 1,500 kc

Two stations between approximately 550- 950 kc

Two stations between approximately 680-1,180 kc (RC-351F)

Two stations between approximately 690-1,225 kc (RC-351F "M", RC-351F "R")

Two stations between approximately 890-1,500 kc

Intermediate Frequency..... 455 kc

RCA TUBE COMPLEMENT

(1) RCA-6K8..... First Detector-Oscillator

(2) RCA-6K7..... Intermediate-Frequency Amplifier

(3) RCA-6H6..... Second Detector and A.V.C.

(4) RCA-6F5..... Audio Voltage Amplifier

(5) RCA-6F6-G..... Audio Power Output

(6) RCA-5Y3-G..... Full-Wave Rectifier

(7) RCA-6U5..... Tuning Indicator

Pilot Lamps (2)..... Mazda No. 47, 6.3 volts, 0.15 amp.

POWER SUPPLY RATINGS

Rating A..... 105-125 volts, 50-60 cycles, 80 watts

Rating B..... 105-125 volts, 25-60 cycles, 80 watts

Rating C..... 100-130/140-160/195-250 volts, 40-60 cycles, 80 watts

POWER OUTPUT

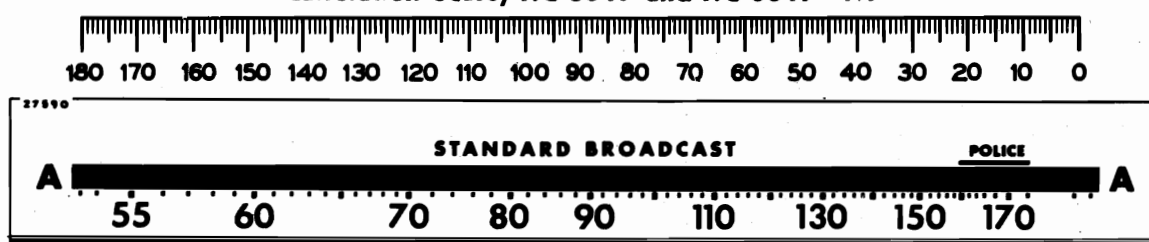
Undistorted..... 2.5 watts

Maximum..... 4.5 watts

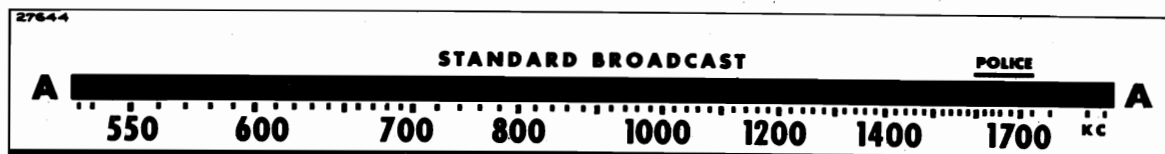
LOUDSPEAKER

Type..... 12-inch, electrodynamic

Voice Coil Impedance at 400 cycles..... 2.2 ohms

Calibration Scale, RC-351F and RC-351F "M"

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the lower calibration to the same point on the upper calibration scale. For example, 28° on the calibration scale corresponds to 1,500 kc on "A" band in RC-351F and RC-351F "M."



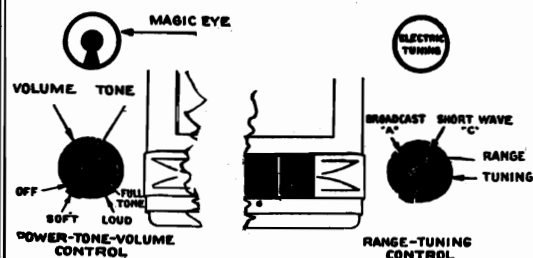
In RC-351F "R," 27.4° corresponds to 1,500 kc, and 15° corresponds to 18 mc.

General Description

This receiver employs a two-band superheterodyne circuit which is operated either manually or by electric tuning on standard broadcast, and includes foreign short-wave, aircraft, police, and amateur stations on the short-wave band.

There are three different productions of Model 97K, conveniently identified by rear chassis stamping as RC-351F, RC-351F "M," and RC-351F "R."

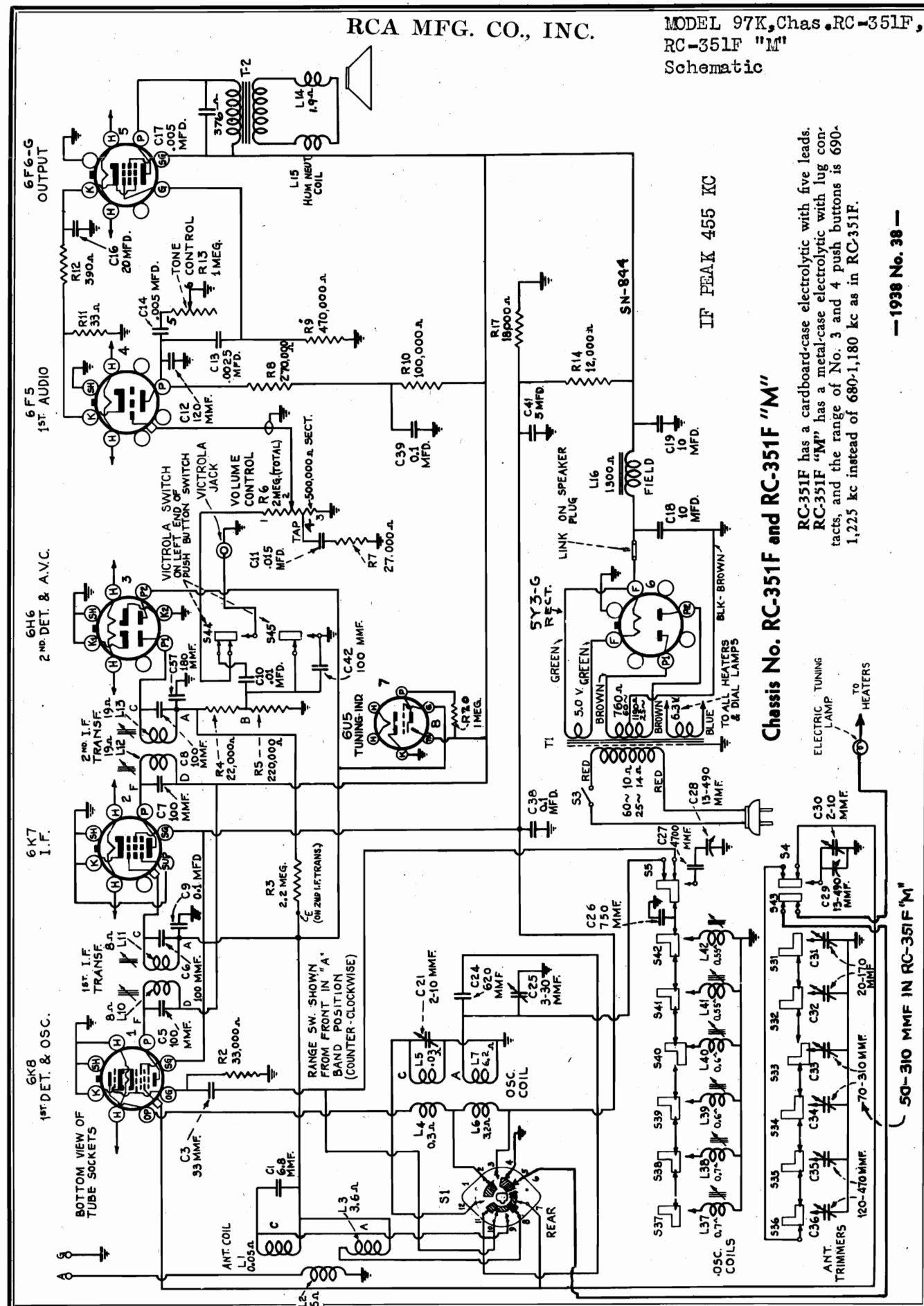
Features of design include magnetite-core adjusted i-f transformers and "Electric Tuning" oscillator coils; jack and switch for Victrola attachment; aural-compensated volume control; continuously variable tone-control; automatic volume control; dust-proof electrodynamic speaker; and straight-line dial.



Precautionary Lead Dress.—(1) Dress 110-volt leads away from audio wiring. (2) All leads in vicinity of antenna and oscillator coils must be dressed away from the coils. (3) Electric Tuning lamp leads from push-button switch must be dressed against front apron. (4) Keep speaker leads away from Victrola jack. (5) Lead from C19 in electrolytic (RC-351F "R") must be dressed around left-end of push-button switch, and against chassis base. (6) The leads across back of chassis in RC-351F must be dressed under the electrolytic capacitor to prevent approaching the Victrola jack.

Victrola Attachment.—A jack is provided on the rear of chassis for connection to a Victrola Attachment. The cable from the attachment should be terminated in a Stock No. 31048 plug to fit the jack.

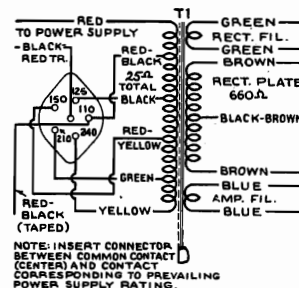
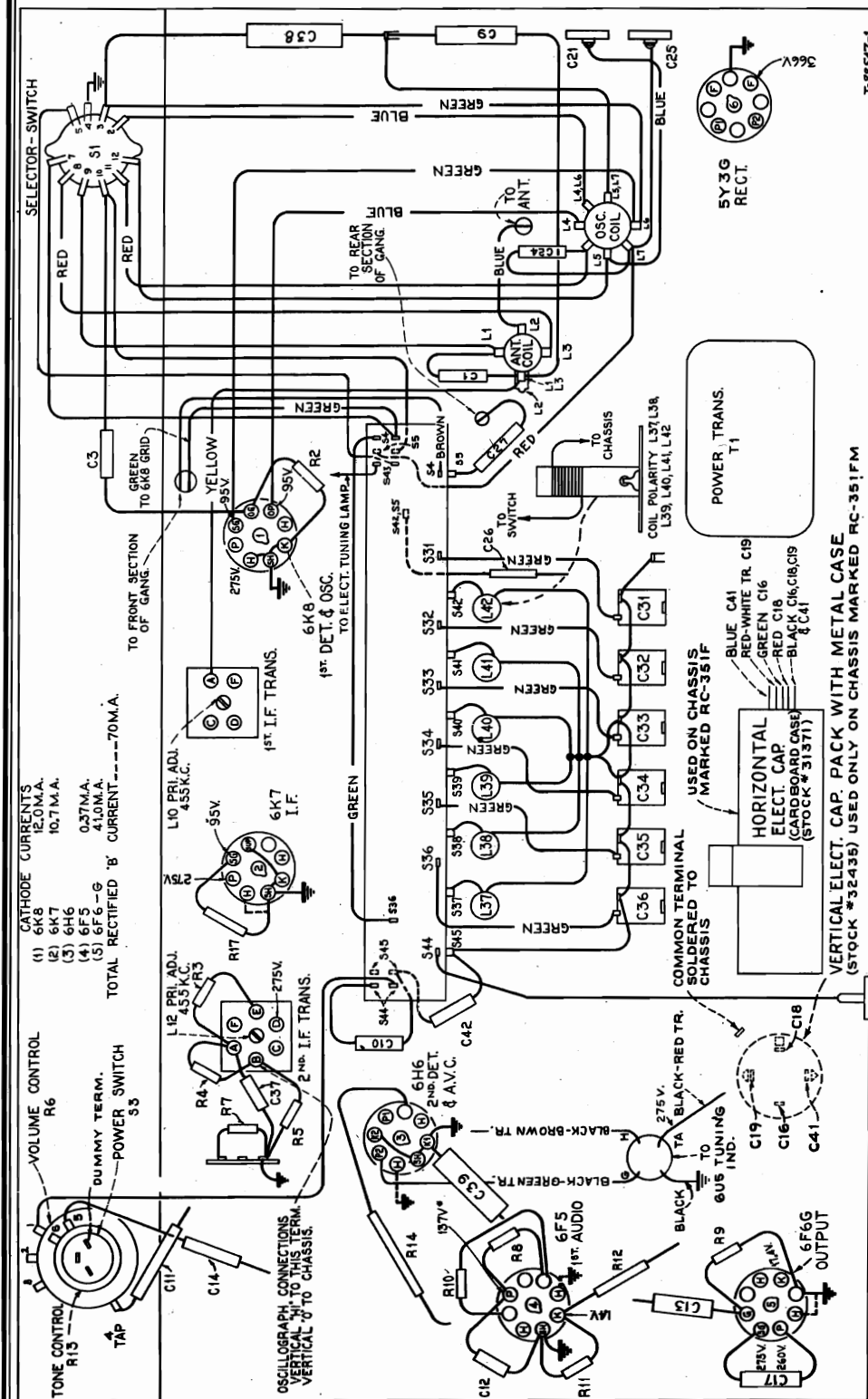
Compliments of www.nucow.com



Chassis No. RC-351F and RC-351F "M"

R-F Wiring Diagram and Socket Voltages

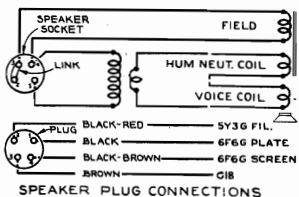
* NOTE: Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltage will be lower, depending on the voltmeter loading.



Above.—Universal Power Transformer Connections. 110-volt supply for a Victrola Attachment may be obtained by connecting the motor to the red and the red-black leads.

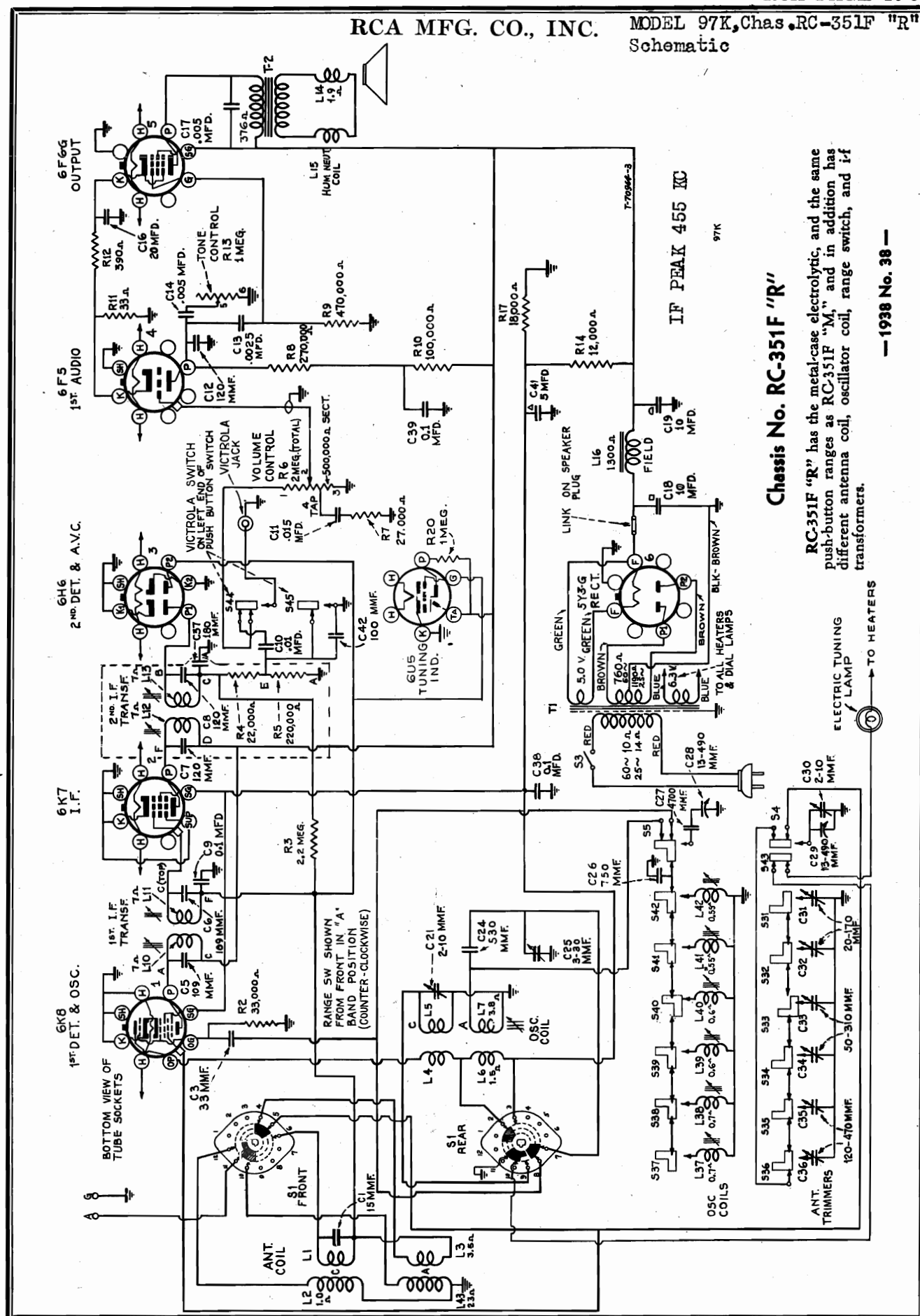
Height (inches).....	41
Width (inches).....	27 ³ / ₈
Depth (inches).....	14 ¹ / ₂
Net Weight (pounds).....	54 ¹ / ₂
Shipping Weight (pounds).....	69
Chassis Base Dimensions.....	13 inches x 6 ¹ / ₂ inches x 2 ¹ / ₂ inches
Overall Chassis Height.....	6 inches
Tuning Drive Ratio.....	12:1

Mechanical Specifications



Above.—Connections and Colors of Loudspeaker and Cable.

RCA MFG. CO., INC.

MODEL 97K, Chas. RC-351F "R"
Schematic

Chassis No. RC-351F "R"

RC-351F "R" has the metal-case electrolytic, and the same push-button ranges as RC-351F "M," and in addition has different antenna coil, oscillator coil, range switch, and if transformers.

ELECTRIC TUNING LAMP

TO HEATERS

—1938 No. 38—

RCA MFG. CO., INC.

MODEL 97K, Chassis RC-351F,
RC-351F "M", RC-351F "R"
Alignment, Socket, Trimmers
Tuner Adjustments

ALIGNMENT PROCEDURE

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed 3/8-inch. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire, so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

RC-351F and RC-351F "M"

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	"A" band, Quiet Point between 550-750 kc	L12 and L13 (2nd I-F Trans.)
2	6K8 det. grid cap, in series with .01 mfd.	455 kc		L10 and L11 (1st I-F Trans.)
3	Antenna Terminal, in series with 400 ohms	15.2 mc	15.2 mc (33.5°) "C" band	C21* (osc.) C30** (ant.)
4	Antenna Terminal, in series with 200 mmf.	1,500 kc	1,500 kc (28°) "A" band	C25 (osc.)
5	Follow "Adjustments for Electric Tuning."			

* Use minimum capacity peak if two peaks can be obtained.

** Rock gang slightly while adjusting C30. Check to determine that C21 has been adjusted to the correct peak by tuning to approximately 40.5° (14.29 mc), where a weaker signal should be received.

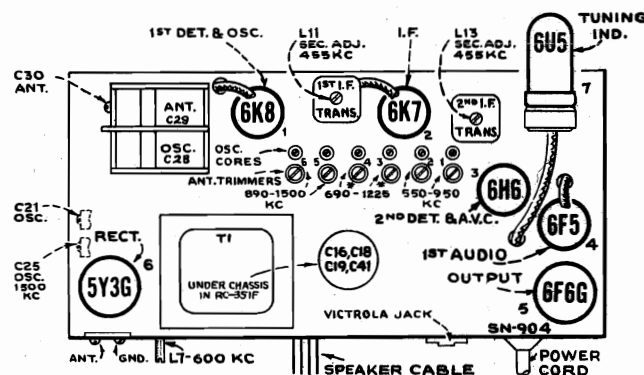
Note.—Oscillator tracks 455 kc above signal on both bands.

ADJUSTMENTS FOR ELECTRIC TUNING

These models have eight push buttons. The left-hand button is a Victrola switch. The right-hand button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments.

The procedure is as follows:

1. Make a list of the desired six stations, arranged in order from low to high frequencies.
2. Use one or two feet of wire as an antenna to ensure sharp peaking.



* In RC-351F, push buttons 3 and 4 cover 680-1,180 kc.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

RC-351F "R"

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	"A" band, Quiet Point between 550-750 kc	L12 and L13 (2nd I-F Trans.)
2	6K8 det. grid cap, in series with .01 mfd.	455 kc		L10 and L11 (1st I-F Trans.)
3	Antenna Terminal in series with 200 mmf.	1,500 kc	1,500 kc (27.4°) "A" band	C25 (osc.) C30 (ant.)
4	Antenna Terminal, in series with 200 mmf.	600 kc	600 kc (148°) "A" band	L7 (osc.)
5	Repeat steps 3 and 4.			
6	Antenna Terminal, in series with 400 ohms	18 mc	18 mc (15°) "C" band	C21 (osc.)*
7	Follow "Adjustments for Electric Tuning."			

* Rock gang slightly while peaking C21, and use minimum capacity peak if two peaks can be obtained on C21.

Note.—Oscillator tracks 455 kc above signal on both bands.

3. Push in the dial-tuning button, and manually tune in the first station on the list.
 4. Push in station button No. 1 (second from left) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
 5. Adjust No. 1 antenna trimmer (C36) for maximum output on this station.
- Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.
6. Adjust for each of the remaining five stations in the same manner.
 7. Make a final readjustment of the magnetite-cores.

MODEL 97K, Chassis RC-351F,
RC-351F "M", RC-351F "R"

RCA MFG. CO., INC.

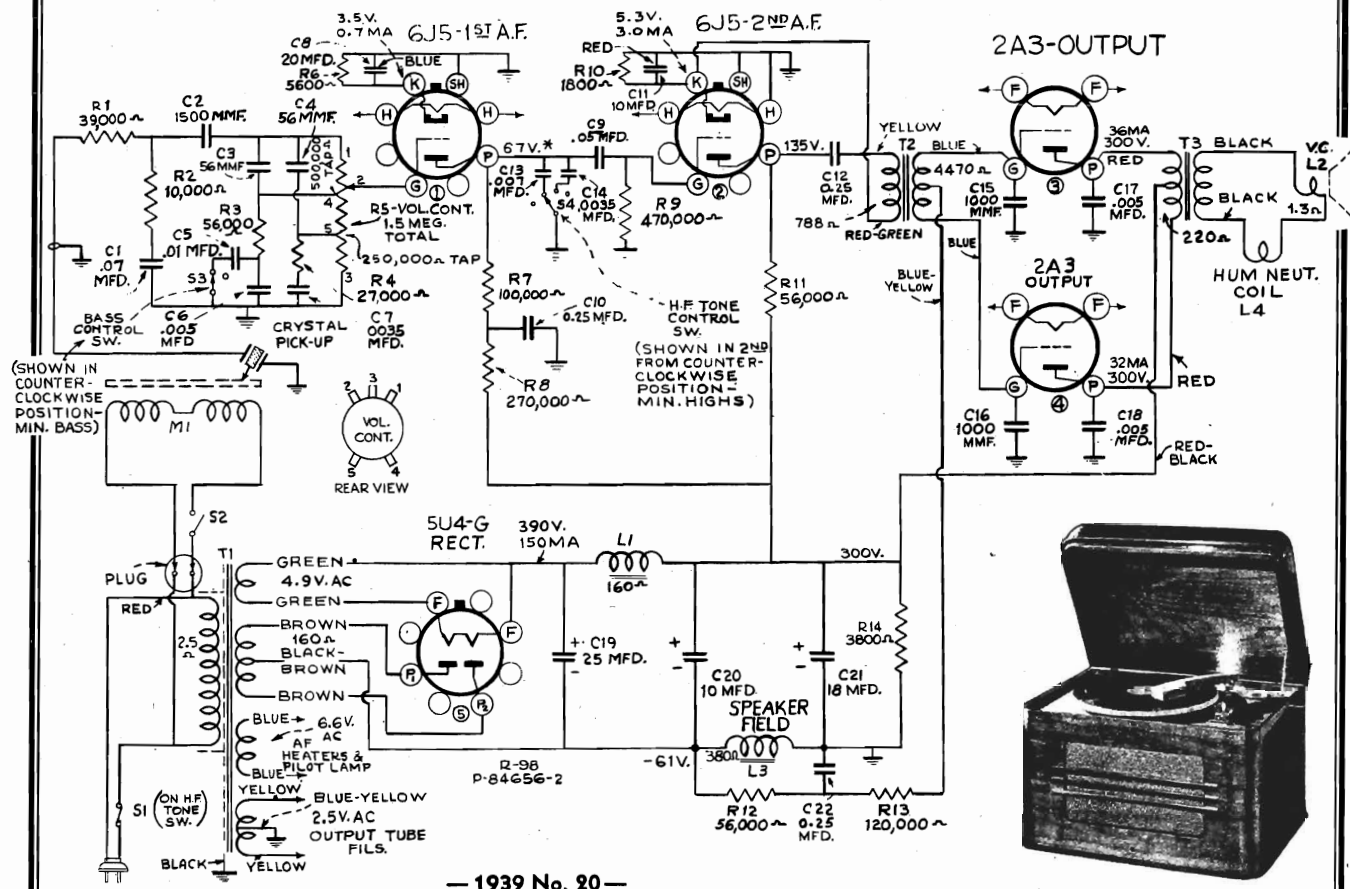
Parts List

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC-351F, RC-351F "M," and RC-351F "R")				
30752	Bracket—Magic Eye mounting bracket.....	.25	12454	Resistor—33,000 ohms, $\frac{1}{2}$ watt (R2).....	.20
14517	Board—Antenna—ground terminal board.....	.25	14560	Resistor—100,000 ohms, $\frac{1}{2}$ watt (R10).....	.20
12110	Cap—Tube shield cap.....	.14	11398	Resistor—220,000 ohms, 1/10 watt (R5) used in RC-351F "R".....	.15
31379	Capacitor—Dual trimmer 2-10 mmfd. and 3-30 mmfd. (C21, C25).....	.40	12264	Resistor—220,000 ohms, $\frac{1}{2}$ watt (R5) used in RC-351F and RC-351F "M".....	.20
14079	Capacitor—8.8 mmfd. (C1) used in RC-351F and RC-351F "M" only.....	.35	12199	Resistor—270,000 ohms, $\frac{1}{2}$ watt (R8).....	.20
12896	Capacitor—15 mmfd. (C1) used in RC-351F "R" only.....	.35	12285	Resistor—470,000 ohms, $\frac{1}{2}$ watt (R9).....	.20
31387	Capacitor—Antenna coil trimmer capacitor bank, (C31, C32, C33, C34, C35, and C36) used in RC-351F only.....	1.30	12013	Resistor—1 meg., 1/10 watt (R20).....	.15
32486	Capacitor—Antenna coil trimmer capacitor bank, (C31, C32, C33, C34, C35, and C36) used in RC-351F "M" and RC-351F "R" only.....	1.40	12679	Resistor—2.2 meg., $\frac{1}{2}$ watt (R3).....	.20
12948	Capacitor—33 mmfd. (C3).....	.35	14343	Retainer—Retaining spring for station selector knob shaft.....	.03
12720	Capacitor—100 mmfd. (C42).....	.35	14887	Retainer—Drive cord pulley retainer.....	.01
30904	Capacitor—100 mmfd. (C5, C6, C7, C8) used in RC-351F and RC-351F "M" only.....	.25	4669	Screw—No. 8-32 square head set screw for drum Stock No. 31372.....	.03
14262	Capacitor—109 mmfd. (C5 and C6) used in RC-351F "R" only.....	.30	31368	Shaft—Station selector knob shaft and pulley..	.30
12404	Capacitor—120 mmfd. (C7 and C8) used in RC-351F "R" only.....	.30	31418	Spring—Indicator, or drum drive cord tension spring.....	.05
12724	Capacitor—120 mmfd. (C12).....	.35	31364	Socket—Dial lamp socket.....	.20
13003	Capacitor—180 mmfd. (C37) mounted under chassis in RC-351F and RC-351F "M" only.....	.35	31365	Socket—Electric tuning indicator lamp socket (insulated).....	.30
14712	Capacitor—180 mmfd. (C37) mounted in 2nd I-F transformer in RC-351F "R" only.....	.30	13871	Socket—Magic Eye socket.....	.45
32492	Capacitor—530 mmfd. (C24) in RC-351F "R" only.....	.40	14278	Socket—Pickup socket.....	.25
31381	Capacitor—620 mmfd. (C24) in RC-351F and RC-351F "M" only.....	.45	31251	Socket—Tube socket.....	.25
31435	Capacitor—750 mmfd. (C26).....	.40	31367	Switch—Range switch (S1) used in RC-351F and RC-351F "M" only.....	1.05
31399	Capacitor—4,700 mmfd. (C27).....	.65	32490	Switch—Range switch (S1) used in RC-351F "R" only.....	1.10
5107	Capacitor—.0025 mfd. (C13).....	.20	32498	Switch—Station selector push-button switch (S4, S5, S31, S32, S33, S34, S35, S36, S37, S38, S39, S40, S41, S42, S43, S44, S45).....	3.85
4838	Capacitor—.005 mfd. (C14, C17).....	.25	30902	Transformer—1st I-F transformer (L10, L11, C5, C6) used in RC-351F and RC-351F "M" only.....	1.90
14393	Capacitor—.01 mfd. (C10).....	.30	14376	Transformer—1st I-F transformer (L10, L11, C5, C6) used in RC-351F "R" only.....	2.45
11315	Capacitor—.015 mfd. (C11).....	.20	30903	Transformer—2nd I-F transformer (L12, L13, C7, C8) used in RC-351F and RC-351F "M" only.....	1.80
4839	Capacitor—.01 mfd. (C9, C38, C39).....	.30	14283	Transformer—2nd I-F transformer (L12, L13, C7, C8, C37, R4, R5) used in RC-351F "R" only.....	3.80
31371	Capacitor—Comprising two 10 mfd., one 20 mfd., and one 5 mfd. sections (C16, C18, C19, C41) (cardboard case type, mounted horizontally and used in RC-351F only).....	2.25	31445	Transformer—Power transformer 100-120 volts, 25-60 cycle (T1).....	7.80
32485	Capacitor—Comprising two 10 mfd., one 20 mfd., and one 5 mfd. sections (C16, C18, C19, C41) (metal case type, mounted vertically and used in RC-351F "R" and RC-351F "M" only).....	1.75	31380	Transformer—Power transformer 100-120 volts, 50-60 cycle (T1).....	6.35
31382	Clip—Oscillator coil and core mounting clip...	.04	31446	Transformer—Power transformer 100-130/140-160/195-250 volts, 50-60 cycle (T1).....	8.05
31378	Coil—Antenna coil, "A" and "C" bands (L1, L2, L3) mounted vertically and used in RC-351F and RC-351F "M" only.....	1.10		SPEAKER ASSEMBLIES (RL-70-F3)	
32488	Coil—Antenna coil, "A" and "C" bands (L1, L2, L3, L43) mounted horizontally and used in RC-351F "R" only.....	1.40	13866	Cap—Dust cap for cone center.....	.03
31377	Coil—Oscillator coil, "A" and "C" bands (L4, L5, L6, L7) mounted vertically (no magnetite core) and used in RC-351F and RC-351F "M" only.....	1.70	12012	Coil—Field coil (L12).....	2.90
32489	Coil—Oscillator coil, "A" and "C" bands (L4, L5, L6, L7) mounted horizontally (with magnetite core) and used in RC-351F "R" only.....	.90	11469	Coil—Hum neutralizing coil (L14).....	.30
31383	Coil—Push-button oscillator coil (L41, L42)...	.30	31275	Cone—Speaker cone and voice coil (L13).....	1.75
31384	Coil—Push-button oscillator coil (L39, L40) used in RC-351F only.....	.30	31302	Plug—4-contact male plug.....	.25
32487	Coil—Push-button oscillator coil (L39, L40) used in RC-351F "M" and "R".....	.35	31300	Speaker—Speaker complete.....	10.95
31385	Coil—Push-button oscillator coil (L37, L38)...	.30	14358	Screw—Screw, washer, and lockwasher to hold core in yoke.....	.04
31369	Condenser—2-gang variable tuning condenser (C28, C29, C30).....	2.65	31301	Transformer—Output transformer (T2).....	1.70
31366	Control—Volume control, tone control, and on-off switch (R6, R13, S3).....	3.00	14357	Washer—Spring washer to hold field coil....	.06
31375	Cord—Indicator pointer drive cord.....	.30		MISCELLANEOUS ASSEMBLIES	
31374	Cord—Variable condenser drum drive cord.....	.15	12038	Band—Rubber band for "Magic Eye".....	.02
30905	Core—Adjustable core and stud for i-f transformer.....	.35	31397	Button—Station selector push button.....	.15
31386	Core—Adjustable core and stud for oscillator coils Stock Nos. 31383, 31384, 31385, 32487	.15	31456	Cover—8 protective covers for push button markers.....	.08
12800	Core—Adjustable core and stud for oscillator coil Stock No. 32489.....	.35	31396	Dial—Dial scale (glass) used in RC-351F and RC-351F "M" only.....	.95
31372	Drum—Variable condenser drive cord drum and calibrator dial.....	.65	32356	Dial—Dial scale (glass) used in RC-351F "R" only.....	.70
31480	Lamp—Dial lamp.....	.20	31395	Escutcheon—Station selector escutcheon—less dial scale and push buttons.....	1.15
5040	Plug—4-contact female plug for speaker cable..	.30	31407	Escutcheon—"Magic Eye" or "Electric Tuning" indicator escutcheon.....	.25
31373	Pulley—Drive cord pulley.....	.08	31392	Indicator—Station selector indicator pointer...	.30
14671	Resistor—33 ohms, $\frac{1}{2}$ watt (R11).....	.20	31355	Knob—Range switch knob.....	.12
31388	Resistor—390 ohms, 1 watt (R12).....	.22	14359	Knob—Station selector knob.....	.20
31389	Resistor—12,000 ohms, wire-wound, 5 watts (R14).....	.50	31391	Knob—Tone control knob.....	.15
30151	Resistor—18,000 ohms, 1 watt (R17).....	.22	30778	Knob—Volume control knob.....	.15
14284	Resistor—22,000 ohms, 1/10 watt (R4).....	.15	31589	Marker—Station call letter markers for push buttons.....	.35
12738	Resistor—27,000 ohms, $\frac{1}{2}$ watt (R7).....	.20	31458	Marker—"Dial Tuning" marker for push button	.01
			31457	Marker—"Victrola" marker for push button....	.01
			31393	Screen—Station selector dial color screen and light diffuser.....	.40
			4982	Spring—Retaining spring for knob Stock No. 14359.....	.05
			14270	Spring—Retaining spring for knob Stock Nos. 31355 and 30773.....	.05
			30330	Spring—Retaining spring for knob Stock No. 31391.....	.03
			31394	Stop—Indicator pointer slide stop.....	.08

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

RCA MFG. CO., INC.

MODEL R-98, Chassis RS-77
Schematic, Voltage, Socket
Speaker Connections

* NOTE: Values with star are operating voltages in circuits with high series-resistance, and when measured will read lower depending on the voltmeter loading.

RCA TUBE COMPLEMENT

- (1) RCA-6J5 1st Audio Amplifier
- (2) RCA-6J5 2nd Audio Amplifier
- (3) RCA-2A3 Power Output
- (4) RCA-2A3 Power Output
- (5) RCA-5U4-G Rectifier

POWER SUPPLY RATING

- A 105-125 volts, 50-60 cycles, 175 watts
- A-6 105-125 volts, 60 cycles, 175 watts

POWER OUTPUT

- Undistorted 12 watts
- Maximum 18.5 watts

- Cabinet Dimension Height 14½ inches Width 19½ inches Depth 14 inches
- Chassis Base Dimensions Height 2½ inches Width 16½ inches Depth 7½ inches
- Weight (Shipping) 54 pounds Weight (Net) 47½ pounds

LOUDSPEAKER

- Type Eight-Inch Electrodynamic
- Voice Coil Impedance 1.3 ohms at 400 cycles

MOTOR BOARD

- Motor Self-starting Induction
- Turntable Speed 78 r.p.m. (adjustable)

PICKUP

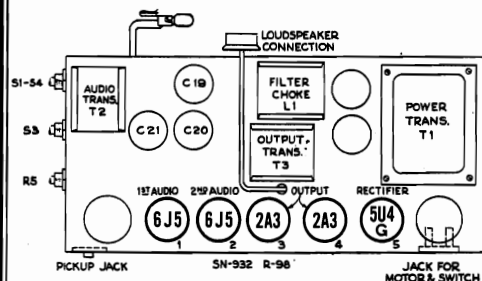
- Type Crystal
- Impedance 100,000 ohms at 1,000 cycles

General Description and Service Data

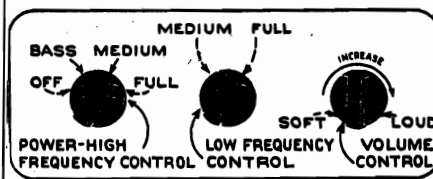
The model R-98 Victrola consists of a crystal pickup, a five tube audio amplifier, a eight inch dust-proof electrodynamic speaker, and a motor turntable mechanism all combined in a hinged-top, table type walnut veneer cabinet. This instrument will reproduce records

up to 12-inches in size.

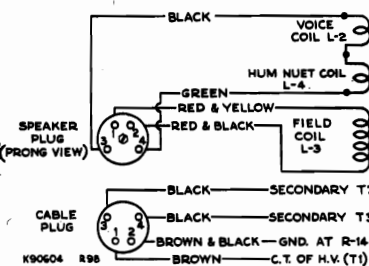
The crystal pickup unit is securely sealed in a metal casing, for protection against extreme changes in atmospheric conditions. If failure occurs, a new replacement crystal unit should be installed.



Top View, Showing Location of Parts



Location of Controls



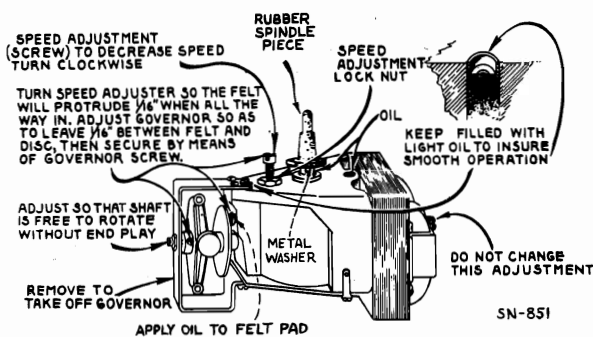
Connections of Loudspeaker and Cable

MODEL R-98, Chassis RS-77
Motor Data, Switch Assembly
Parts List

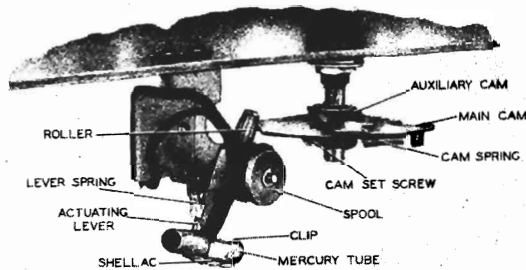
RCA MFG. CO., INC.

RCA Victor MODEL R-98 (Chassis No. RS-77)

Five-Tube, A-C, Electric Victrola (Phono. only)



Motor Lubrication and Adjustments



Mercury Switch Assembly
(Shown with pickup in rest position)

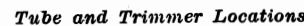
Adjust main cam so that switch trips into the "off" position when needle is $1\frac{3}{4}$ inches from the center line of motor spindle.

Replacement Parts

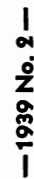
Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
AMPLIFIER ASSEMBLIES					
12723	Capacitor—56 mmfd. (C3, C4).....	.35	31618	Coil—Field coils and laminations for 60 cycle motor.....	5.50
12635	Capacitor—1,000 mmfd. (C15, C16).....	.50	11703	Governor—Governor complete for 50-60 cycle motor.....	3.05
31033	Capacitor—1,500 mmfd. (C2).....	.35	31623	Governor—Governor complete for 60 cycle motor.....	2.80
30303	Capacitor—.0035 mfd. (C7, C14).....	.40	31462	Motor—105-125 volts, 50-60 cycle.....	20.20
4838	Capacitor—.005 mfd. (C8, C17, C18).....	.25	31461	Motor—105-125 volts, 60 cycle.....	17.35
5148	Capacitor—.007 mfd. (C13).....	.20	31616	Screw—Rotor bearing screw and nut for 60 and 50-60 cycle motor.....	.25
4937	Capacitor—.01 mfd. (C5).....	.25	31620	Screw—Speed regulator screw and nut for 60 and 50-60 cycle motor.....	.20
32787	Capacitor—.05 mfd. (C9).....	.20	31621	Shaft—Turntable spindle and gear for 60 and 50-60 cycle motor.....	1.90
14626	Capacitor—.07 mfd. (C1).....	.25	31622	Washer—one felt and one metal thrust washer for turntable spindle.....	.10
12484	Capacitor—.025 mfd. (C10, C12, C22).....	.25	32914	Weight—Governor weight and spring for 50-60 cycle motor.....	.30
11203	Capacitor—Electrolytic, 10 mfd (C20).....	1.15	32912	Weight—Governor weight and spring for 60 cycle motor.....	.25
14273	Capacitor—Electrolytic, one 10 mfd., and one 20 mfd. sections (C8, C11).....	1.10	AUTOMATIC SWITCH ASSEMBLIES		
11496	Capacitor—Electrolytic, 18 mfd. (C21).....	1.35	32863	Cam—Cam assembly comprising main and auxiliary cams, hub, and set screws.....	.65
14531	Capacitor—Electrolytic, 25 mfd. (C19).....	1.55	32864	Lever—Actuating lever with roller and mercury tube clip.....	.45
33396	Control—H.F. tone control and switch (S1, S4).....	1.00	14195	Screw—No. 10-32 x 5/16 cone pointer set screw for cam hub.....	.05
33397	Control—L.F. tone control (S3).....	.45	32869	Screw—No. 10-32 x 5/16 set screw for cam hub.....	.01
5040	Plug—Speaker cable plug.....	.30	32868	Spring—Actuating lever tension spring.....	.05
12466	Reactor—Filter reactor (L1).....	4.20	32867	Spring—Cam tension spring.....	.05
12194	Resistor—1,800 ohms, $\frac{1}{2}$ watt (R10).....	.20	32865	Support—Switch support and terminal board.....	.40
33482	Resistor—voltage divider, 3,800 ohms (R14).....	.75	32866	Switch—Mercury tube with leads (S2).....	1.75
13714	Resistor—5,600 ohms, $\frac{1}{2}$ watt (R6).....	.20	31608	Washer—"C" washer for actuating lever shaft.....	.01
14559	Resistor—10,000 ohms, $\frac{1}{2}$ watt (R2).....	.20	SPEAKER ASSEMBLIES		
12738	Resistor—27,000 ohms, $\frac{1}{2}$ watt (R4).....	.20	(84613-1)		
12266	Resistor—39,000 ohms, $\frac{1}{2}$ watt (R1).....	.20	33648	Cone—Cone assembled with voice coil, center suspension and rim gasket.....	1.75
12286	Resistor—56,000 ohms, $\frac{1}{2}$ watt (R12) (R3).....	.20	5039	Plug—4-prong male connector for reproducer.....	.30
17440	Resistor—56,000 ohms, 1 watt (R11).....	.22	33490	Speaker complete (No Output Transformer).....	5.50
14560	Resistor—100,000 ohms, $\frac{1}{2}$ watt (R7).....	.20	MISCELLANEOUS ASSEMBLIES		
13734	Resistor—120,000 ohms, $\frac{1}{2}$ watt (R13).....	.20	13103	Cap—Pilot lamp bullseye.....	.15
12199	Resistor—270,000 ohms, $\frac{1}{2}$ watt (R8).....	.20	33403	Cup—New needle cup.....	.30
12285	Resistor—470,000 ohms, $\frac{1}{2}$ watt (R9).....	.20	9848	Cup—Used needle cup and pickup arm support.....	.75
4794	Socket—Tube socket—4-prong.....	.25	31464	Damper—Turntable damper sleeve and plate.....	.30
32537	Socket—Tube socket—8-prong.....	.20	11771	Foot—Cabinet foot.....	.02
14275	Socket—2 contact female for motor power.....	.25	13085	Hinge—Cabinet lid hinge.....	.22
14274	Socket—2 contact female for pickup input.....	.25	31355	Knob—Volume control, or tone control knob.....	.12
13964	Transformer—Driver transformer (T2).....	3.70	33402	Mounting—Motor mounting screws, washers, and spacers.....	.40
33405	Transformer—Output transformer (T3).....	3.85	14805	Plug—Plug for motor leads.....	.20
14271	Transformer—Power transformer, 105-120 volts, 50-60 cycles.....	7.95	31155	Spring—Coil spring for used needle cup lid.....	.20
33398	Volume Control (R5).....	1.50	14270	Spring—Retaining spring for knobs.....	.05
PICKUP AND ARM ASSEMBLIES			31164	Support—Cabinet lid support.....	.45
33399	Arm—Pickup arm less crystal cartridge, cable, and base and pivot arm.....	1.60	33401	Turntable.....	2.30
33400	Base—Pickup arm base and pivot shaft.....	1.00	MOTOR ASSEMBLIES		
32885	Cable—Pickup arm cable and plug.....	.25	31617	Bracket—Governor end bearing bracket less bearing screw for 50 and 50-60 cycle motors.....	.30
31156	Crystal—Pickup crystal cartridge and screw.....	4.25	31619	Coil—Field coils and laminations for 50-60 cycle motor.....	7.80
31160	Screw—Pickup needle screw.....	.12			

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Victrola Attachment.—A jack is provided on the rear of the chassis for connection to a Victrola Attachment. The cable from the Victrola Attachment should be terminated in a Stock No. 31048 plug to fit the jack.



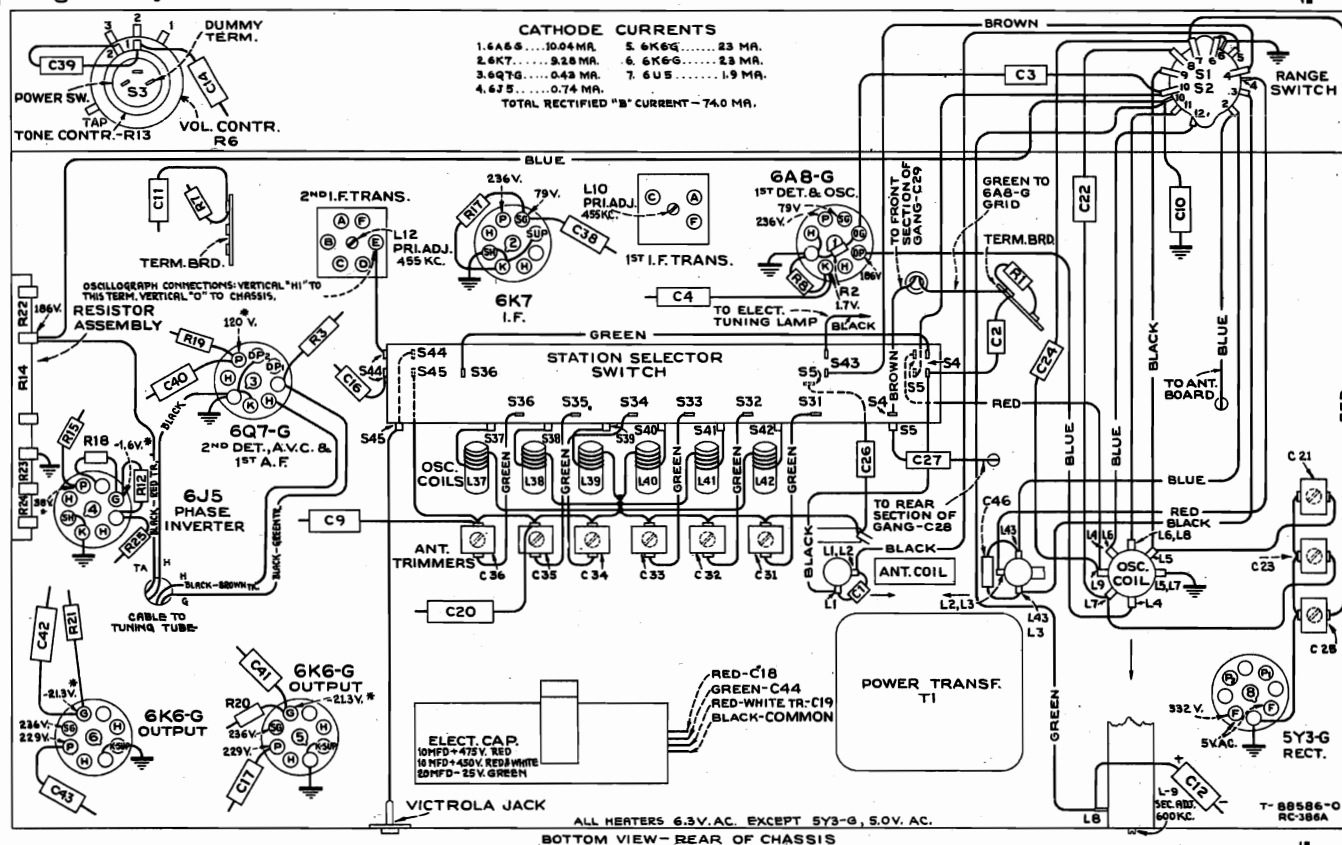
The left-hand push button is a Victrola-Attachment switch.
The right-hand push button is for dial tuning.

FREQUENCY RANGES	
"Standard Broadcast" (A)	540-1.720 kc
"Medium Wave" (B)	2.3-7 mc
"Short Wave" (C)	7-22 mc
Six Electric Tuning Positions	
2 stations between approximately 550-950 kc	(Buttons 1 and 2)
2 stations between approximately 950-1,225 kc	(Buttons 3 and 4)
2 stations between approximately 880-1,225 kc	(Buttons 5 and 6)
Intermediate Frequency	455 kc
POWER SUPPLY RATINGS	
A	105-125 volts, 50-60 cycles, 115 watts
B	105-125 volts, 25-60 cycles, 115 watts
C	100-130/140-160/200-250 volts, 40-60 cycles, 115 watts
POWER OUTPUT	
Undistorted	5 watts
Maximum	5.5 watts
LOUDSPEAKER	
Type	Electrodynamic
Diameter .....	.98T, 6 inches; 98K2, 12 inches
Voice Coil Impedance	2.2 ohms at 400 cycles
	Model 98T
	Model 98K2
Height	12½ inches
Width	13½ inches
Depth	9½ inches
Net Weight	21 pounds
Shipping Weight	55 pounds
Chassis Base Dimensions	73 pounds
Over-all Chassis Height	13 in. x 6½ in. x 2½ in.
Tuning Drive Ratio	6½ inches
	12 to 1

MODELS 98T, 98K2, Chas. RC-386A

Voltage, Chassis Wiring
Alignment, Drive Data

RCA MFG. CO., INC.

**R-F Wiring Diagram and Socket Voltages**

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within $\pm 20\%$ with 117-volt a-c supply.

NOTE: Values with star () are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

Alignment Procedure

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed $\frac{3}{8}$ -inch. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

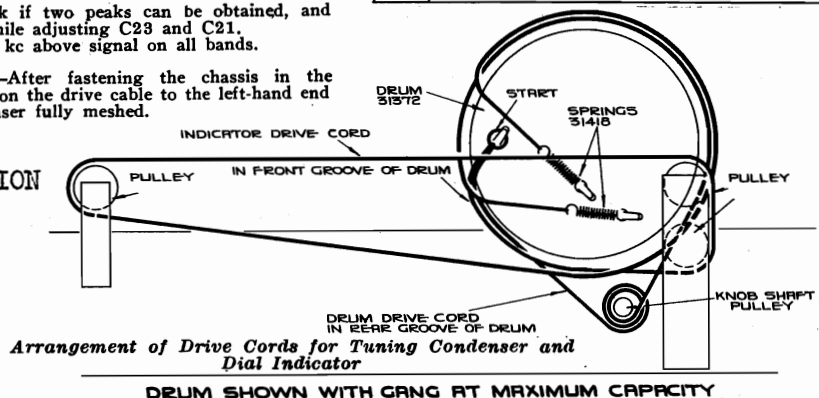
Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

*Use minimum capacity peak if two peaks can be obtained, and rock gang condenser slightly while adjusting C23 and C21.

Note.—Oscillator tracks 455 kc above signal on all bands.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, move the dial indicator on the drive cable to the left-hand end mark on dial, with gang condenser fully meshed.

FOR DIAL CALIBRATION
SEE INDEX



RCA MFG. CO., INC. MODELS 98T, 98K2, Chas. RC-386A Tuner Adjustments, Parts List

Adjustments for Electric Tuning

These models have eight push buttons. The left-hand button is a Victrola switch. The right-hand button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments.

The procedure is as follows:

1. Make a list of the desired six stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning button, and manually tune in the first station on the list.
3. Push in station button No. 1 (second from left) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
4. Adjust No. 1 antenna trimmer (C36) for maximum output on this station.

Clockwise adjustment of cores and trimmers tunes the circuits to

insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

lower frequencies.

5. Adjust for each of the remaining five stations in the same manner.
6. Make a final careful adjustment of the oscillator cores and antenna trimmers.

Precautionary Lead Dress.—

1. Dress red leads from power transformer to power switch (S3), in corner of chassis and away from volume control terminals.
2. Dress brown lead from push-button switch to gang over end of switch, and away from C27 and bus between S5 and range switch.
3. Leads to C27 must be as short as possible.
4. Blue lead from range switch to oscillator coil must be as short as possible and dressed away from other leads. All leads should be dressed away from antenna coil.
5. Leads across back of chassis must be dressed under electrolytic away from Victrola jack.
6. Parts and leads should be dressed away from R22-R14 as it becomes heated.
7. Leads from oscillator coil to trimmers must be dressed away from coil.
8. Green lead from S4 to range switch must be clear of other leads and away from front edge of chassis.

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
CHASSIS ASSEMBLIES (RC-386-A)			14887	Retainer—Retainer for pointer indicator drive cord pulley.....	.01
30752	Bracket—Magic eye bracket and clip.....	.25	14343	Retainer—Retaining ring for tuning knob shaft	.03
14517	Board—"Antenna"—"Gnd" terminal board.....	.25	4669	Screw—No. 8-32 set screw for variable condenser drive cord drum.....	.03
30766	Cap—Rubber cap for magic eye.....	.15	32671	Shaft—Tuning drive shaft and pulley.....	.35
32142	Capacitor—Dry electrolytic capacitor comprising two 10 and one 20 mfd. sections (C18, C19, C44).....	1.90	31199	Shield—Dial lamp shield.....	.04
31400	Capacitor—Mica trimmer capacitor comprising two sections of 2-10 mmfd. and one section of 3-30 mmfd. (C21, C23, C25).....	.50	3682	Shield—Tube shield.....	.22
32486	Capacitor—Trimmer capacitor bank for push button switch (C31, C32, C33, C34, C35, C36).....	1.40	31364	Socket—Dial lamp socket.....	.20
12722	Capacitor—18 mmfd. (C1).....	.35	31365	Socket—Insulated socket for electric tuning indicator lamp.....	.30
12723	Capacitor—56 mmfd. (C3, C46).....	.35	13871	Socket—Magic eye socket.....	.45
30406	Capacitor—100 mmfd. (C39).....	.35	31251	Socket—Octal base tube socket.....	.25
14262	Capacitor—109 mmfd. (C5, C6).....	.30	14278	Socket—Phonograph input socket.....	.25
12404	Capacitor—120 mmfd. (C7, C8).....	.30	12493	Socket—Speaker cable socket.....	.30
14712	Capacitor—180 mmfd. (C37).....	.30	31418	Spring—Coil tension spring for variable condenser or pointer drive cord.....	.05
30232	Capacitor—180 mmfd. (C2).....	.35	32498	Switch—Push button selector switch (S4, S5, S37, S38, S39, S40, S41, S42, S43, S36, S35, S34, S33, S32, S31, S44, S45).....	3.85
32492	Capacitor—530 mmfd. (C24).....	.40	32669	Switch—Range switch (S1, S2).....	1.10
31435	Capacitor—750 mmfd. (C26).....	.40	14376	Transformer—First i.f. transformer (L10, L11, C5, C6).....	2.45
4881	Capacitor—3300 mmfd. (C22).....	.60	14283	Transformer—Second i.f. transformer (L12, L13, C7, C8, C37, R4, R5).....	3.80
31405	Capacitor—6000 mmfd. (C27).....	.75	31445	Transformer—Power transformer, 110 volt, 25/60 cycle (T1).....	7.80
5107	Capacitor—.0025 mfd., 700 volts (C16).....	.20	32144	Transformer—Power transformer, 110 volt, 50/60 cycle (T1).....	4.75
4838	Capacitor—.005 mfd., 1000 volts (C14, C17, C43).....	.25	31446	Transformer—Power transformer, 110-125-150-210-240 volts 40/60 cycle (T1).....	8.05
4858	Capacitor—.01 mfd., 500 volts (C10, C42, C41, C42).....	.25	SPEAKER ASSEMBLIES (RL-70H-5) MODEL 98K2		
14393	Capacitor—.01 mfd., 300 volts (C11).....	.30	13866	Cap—Dust cap for cone center.....	.03
30882	Capacitor—.05 mfd., 200 volts (C4, C9, C38).....	.20	12012	Coil—Field coil (L16).....	2.90
30867	Capacitor—.5 mfd., 200 volts (C20).....	.30	11469	Coil—Neutralizing coil (L15).....	.30
32145	Capacitor—.4 mfd. (C12).....	.70	31275	Cone—Speaker cone and voice coil (114).....	1.75
31382	Clip—Coil and core mounting clip for push button switch.....	.04	31539	Plug—5-contact male plug for speaker.....	.25
32493	Coil—Antenna coil (L1, L2, L3, L43).....	1.35	32146	Speaker complete.....	12.10
31951	Coil—Oscillator coil (L4, L5, L7, L9).....	1.40	14534	Transformer—Output transformer (T2).....	3.85
31385	Coil—Push button oscillator coil 550 to 950 kc. (L37, L38).....	.30	14357	Washer—Spring washer to hold field coil securely.....	.06
32487	Coil—Push button oscillator coil 690 to 1225 kc. (L39, L40).....	.35	SPEAKER ASSEMBLIES (84308-3) MODEL 98T		
31383	Coil—Push button oscillator coil 890 to 1500 kc. (L41, L42).....	.30	32689	Coil—Speaker field coil (L16).....	3.35
31369	Condenser—2-gang variable tuning condenser (C28, C29, C30).....	2.65	32688	Cone—Cone and voice coil mounted and centered on housing (L14).....	1.85
32668	Control—Volume control, tone control and power switch (R6, R13, S3).....	3.00	31539	Plug—5-contact plug or speaker.....	.25
32634	Cord—Variable condenser drive or pointer indicator cord.....	.10	32687	Speaker—Speaker complete.....	5.80
12800	Core and Stud for oscillator coil Stock No. 31951.....	.35	32690	Transformer—Output transformer (T2).....	1.45
31372	Drum—Variable condenser drive cord drum.....	.65	MISCELLANEOUS ASSEMBLIES		
32552	Indicator—Indicator pointer assembly.....	.20	31397	Button—Station selector push button.....	.15
11891	Lamp—Dial or electric tuning indicator lamp.....	.17	31456	Covers—8 Protective covers for push button markers.....	.08
32670	Plate—Dial color plate (Metal).....	.75	32673	Dial—Station selector glass dial.....	.60
31373	Pulley—Pointer drive cord pulley ($\frac{3}{4}$ in. dia.).....	.08	32674	Escutcheon—Station selector escutcheon—less push buttons.....	3.85
30545	Resistor—180 ohms, $\frac{1}{2}$ watt (R8).....	.20	31355	Knob—Range switch knob.....	.12
5114	Resistor—15,000 ohms, $\frac{1}{2}$ watt (R17).....	.15	31391	Knob—Tone control knob.....	.15
14284	Resistor—22,000 ohms, $\frac{1}{10}$ watt (R4).....	.20	14359	Knob—Tuning knob.....	.20
12454	Resistor—33,000 ohms, $\frac{1}{2}$ watt (R2, R12).....	.20	30773	Knob—Volume control knob.....	.15
12266	Resistor—39,000 ohms, $\frac{1}{2}$ watt (R7).....	.20	31458	Marker—"Dial Tuning" push button marker.....	.01
14560	Resistor—100,000 ohms, $\frac{1}{2}$ watt (R25).....	.20	31457	Marker—"Record Player" push button marker.....	.01
11398	Resistor—220,000 ohms, $\frac{1}{10}$ watt (R5).....	.15	31589	Marker—Station markers.....	.35
12199	Resistor—270,000 ohms, $\frac{1}{2}$ watt (R15, R19).....	.20	30330	Spring for tone control knob.....	.03
13479	Resistor—390,000 ohms, $\frac{1}{2}$ watt (R20, R21).....	.20	4982	Spring for tuning knob.....	.05
12486	Resistor—560,000 ohms, $\frac{1}{2}$ watt (R18).....	.20	14270	Spring for volume control or range switch knob.....	.05
13730	Resistor—1 meg., $\frac{1}{2}$ watt (R1).....	.20			
12013	Resistor—1 meg., $\frac{1}{10}$ watt (R16).....	.15			
12679	Resistor—2.2 meg., $\frac{1}{2}$ watt (R3).....	.20			
32143	Resistor—Voltage divider tapped at 22 ohm, 270 ohm, 3000 ohm, 11,000 ohm. (R14, R22, R23, R24).....	.90			

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98T, 98K2

MODEL R-100

Victrola Attachment

Motor Data, Tone Compensation

Parts List

RCA MFG. CO., INC.

RCA Victor Model R-100 Victrola Attachment

Motor Data

Smooth starting and running will be insured by keeping the bearings well cleaned and oiled.

Hum and Vibration—A small amount of hum when starting, decreasing to a negligible amount when running, is normal. If excessive vibration occurs, it may be due to:

1. Insufficient lubrication, or any failure that will cause binding.
2. Leather washer not oiled. (Check to make sure that the leather and steel washers are arranged in proper sequence, as shown in the drawings.)
3. Motor not properly fastened in cabinet.
4. Burrs on poles of motor or stator.
5. Slight eccentricity of rotor or spindle.
6. Loose laminations of the stator.
7. Improper horizontal alignment of the rotor and stator (pertaining only to the type motor shown in Figure 1). Correct

horizontal alignment is as shown in the motor assembly drawing. The position of the stator is raised or lowered by adding or removing washers below the leather washer. In the type motor shown in Figure 2, no adjustment is necessary because correct horizontal alignment is provided by the design of the motor.

The damper spring must fit without binding or chattering, in the slot in the stator. The stator must be free to deflect in either direction between the limits of the damper spring. Any binding in the washers or stator bearing which prevents the movement of the stator may cause speed variations in the motor. The damper spring must exert equal force in restoring the stator to its mid-position when the stator is deflected manually in either direction.

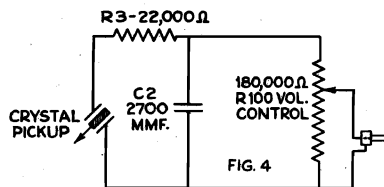
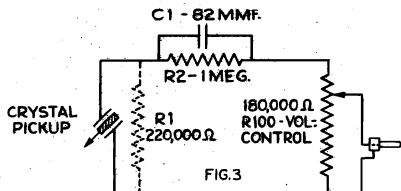
Tone Compensation

Because of the widely varying frequency characteristics of various types of audio amplifiers with which the R-100 may be used, it may be desirable in some cases to make refinements in the pickup circuit of the R-100 to compensate for the characteristics of the amplifier. The following circuits show means of making such refinements.

In Figure 3, R1 controls the low-frequency response; larger values of R1 give increased lows. For maximum low-frequency response, remove R1. R2 controls pickup output, smaller values of R2 giving increased output. C1 controls high-frequency response; to increase highs, increase C1.

Where a decrease in high-frequency response may be desired (for example, as an aid in reducing "needle scratch" on worn records), the circuit in Figure 4 is applicable. In this circuit, C2 acts as loading on the pickup and is also a controlling factor on the high-frequency response. Smaller values of C2 give more pickup output and also more highs. R3 gives a sharper high-frequency reduction; increasing R3 decreases highs.

The suggested values shown in Figures 3 and 4 should serve as a basis from which slight alterations may be made to suit individual cases.



Replacement Parts

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
PICKUP AND ARM ASSEMBLIES					
33121	Arm—Pickup arm complete—less crystal cartridge	1.75	31042	Stator—Stator assembly comprising coils and laminations for 60 cycle operation	2.50
33124	Base—Pickup arm base and pivot shaft	.80	32076	Turntable—Finished turntable plate only—25 cycle	1.40
33122	Crystal—Pickup crystal cartridge and needle screw	4.35	31039	Turntable—Finished turntable plate only—50 cycle	.95
33123	Damper—Viscoloid damper for pickup armature	.15	4083	Washer—Leather washer	.02
33529	Screw—Pickup needle screw	.15	33348	Washers—Leather and metal washers for stator bearing	.10
MOTOR ASSEMBLIES (see figure 1)					
31045	Base—Motor support, damper, and bearing cup assembly	.60	14231	Washer—Metal spacing washer	.02
31046	Bearing—Rotor bearing—50 and 25 cycle	.70	32074	Weight—One upper and one lower weight for stator—25 cycle (2 each required)	.65
33353	Cap—Turntable spindle cap (rubber)	.10	MOTOR ASSEMBLIES (see figure 2)		
33357	Coil—Motor field coil—105-120 volts, 25 cycle	.60	33345	Cap—Turntable spindle cap (rubber) 60 cycle	.15
31918	Coil—Motor field coil—105-120 volts, 50 cycle	.70	33346	Coil—Motor field coil—105-120 volts, 60 cycle	.65
31917	Coil—Motor field coil, 105-120 V., 60 cycle	.70	31040	Cushion—One set rubber cushion for turntable mounting	.25
31040	Cushion—One seat rubber cushion for turntable mounting	.25	33350	Frame—Motor support frame and bearing cup	.45
31047	Cushion—Rubber cushion for rotor bearing	.15	33349	Hanger—Rubber hanger for mounting motor	.10
33941	Frame—Rotor frame and spindle—60 cycle	1.30	33347	Lamination—Stator laminations and bearing—less field coils—60 cycle	1.05
33641	Lamination—Rotor lamination—60 cycle	1.30	33343	Motor—105-120 volts, 60 cycle	6.95
33358	Lamination—Stator laminations—25 cycle	1.00	33041	Ring—Retaining ring and washer for spindle cap	.06
33354	Lamination—Stator laminations—less coil 50 cycle	11.75	33344	Rotor—Rotor frame, laminations, and spindle shaft assembled—60 cycle	2.45
33355	Motor—105-120 volts, 25 cycle	7.65	31039	Turntable—Finished turntable plate only—60 cycle	.95
33351	Motor—105-120 volts, 50 cycle	1.85	33348	Washers—Leather and metal washers for stator bearing	.10
33940	Motor—105-120 V., 60 cycle	1.85	MISCELLANEOUS ASSEMBLIES		
32075	Ring—Lead ring for turntable—25 cycle	.06	31051	Foot—Cabinet foot	.04
33041	Ring—Retaining ring and washer for spindle cap	2.55	3961	Knob—Volume control and switch knob	.10
33356	Rotor—Rotor frame, laminations, and spindle shaft assembled—25 cycle	2.45	32500	Mounting—Pickup arm mounting comprising one rubber cushion, 1 washer, and 1 snap ring	.15
33352	Rotor—Rotor frame, laminations, and spindle shaft assembled—50 cycle	4.55	31048	Plug—2-contact male plugs for output cable	.15
31036	Rotor—Turntable and rotor lamination for 60 cycle operation		33359	Volume control and switch R1, S1	1.50

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First Edition

Motor, Pick-up Details Receiver Connections

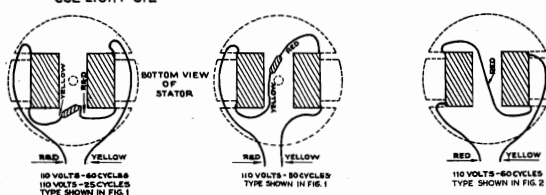
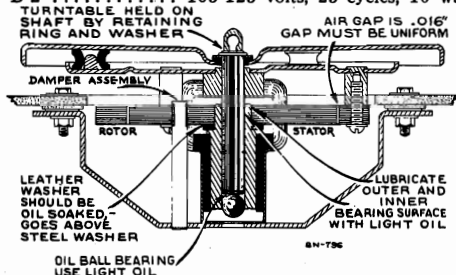
RCA MFG. CO., INC.

MODEL R-100
Victrola Attachment

Electrical and Mechanical Specifications

MOTOR

78 r.p.m. Synchronous (Manual Starting)
POWER SUPPLY RATINGS
 A-6 105-125 volts, 60 cycles, 10 watts
 A-5 105-125 volts, 50 cycles, 10 watts
 B-2 105-125 volts, 25 cycles, 10 watts



At Left—Fig. 1

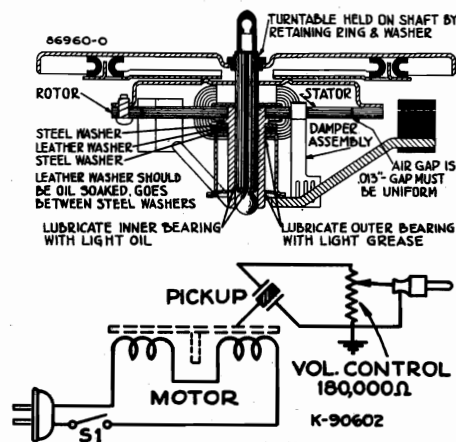
At Right—Fig. 2

Lower Left—Motor Coil Connections

Lower Right—R-100 Schematic Diagram

CRYSTAL PICKUP

Impedance 100,000 ohms at 1,000 cycles
 Average Output Voltage 1½ Volts at 1000 cycles across 250,000 ohms load
 Cabinet Dimensions 5½ x 8½ x 12 inches
 Weight 5½ lbs. (net), 7 lbs. (shipping)



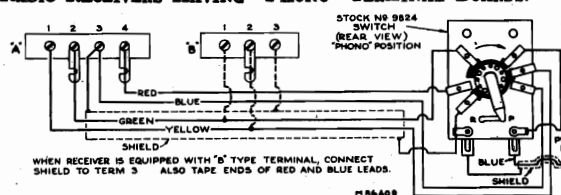
Connecting Victrola Attachment to Radio Receivers

Methods of connecting the Victrola Attachment to various types of audio systems are given in the accompanying text and illustrations. Also included are the model numbers of the various RCA receivers to which the particular method applies. The data given requires that an RCA Stock No. 9824 Radio-Phono switch be used for switching from radio to phonograph, as desired. For ease in connecting the "phono" lead to the Stock No. 9824 switch, the male plug on the end of the lead should be removed by unsoldering or by cutting it off.

1939 RCA RADIOS OF THE "90" SERIES:

Plug male connector on the end of the "phono" lead into the female connector on the receiver chassis. Push or turn the "Phono" switch to "Phono" position, and operate the Victrola Attachment according to instructions.

RADIO RECEIVERS HAVING "PHONO" TERMINAL BOARDS.



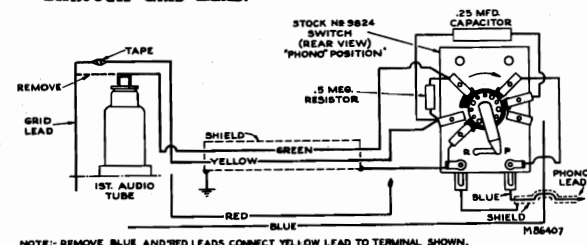
RCA Radio Receivers to which the above illustration applies: 5T1, 5T4, 5T5, 5T6, 5T7, 5T8, 6T5, 6T2, 8T11, 8K11, 85T5, 86E, 86K, 86T, 86T1, 86T4, 86K7, 86T44, 87K, 87T, 87K1, 87K2, 87T2, 88K, 810K, 810K1, 810T, 810T4, 811K, 812K, 813K, 816K, 811T.

For following Receivers, Yellow lead should go on Terminal No. 1. Green lead on Terminal No. 2: 6K2, 6T2, 6K3, 6T10, 7T1, 7K1, 85T8, 86T8, 87T1, 86T2, 86T6, 6K10.

Insulate shield of switch wires from chassis, on following RCA Receivers: 5T, 6T, 6K, 6K1, 7T, 7K, 7X, 8T, 8K, 86X4, 87EY, 87X, 87Y, 8T10, 7X1, 8K1.

Receivers having a Four Terminal Board: 9K, 9T, 9K1, 9K2, 9K3, 9K10, 10T, 10K, 10K1, 13K, 15K. Reverse Red and Blue leads to Terminal Board of C9-6, T9-9, T8-16, C8-17.

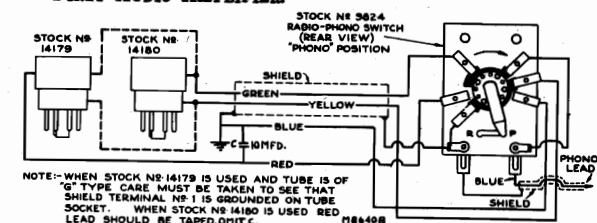
RADIO RECEIVERS WHOSE FIRST AUDIO TUBE IS OF THE GRID CAP TYPE, AND FIXED BIAS FOR TUBE IS OBTAINED THROUGH GRID LEAD.



NOTE: REMOVE BLUE AND RED LEADS. CONNECT YELLOW LEAD TO TERMINAL SHOWN.

In general, the Victrola Attachment must be used with radio receivers having at least two stages of high-gain audio amplification. The output of the Victrola Attachment should be connected to the input of the first audio tube, and at the same time the output of radio receiver portion of the chassis should be shorted or opened, to prevent radio signals being heard while the Victrola Attachment is in operation.

RADIO RECEIVERS USING 6C5 OR 6J5, 6C5G OR 6J5G, TUBE FOR FIRST AUDIO AMPLIFIER.



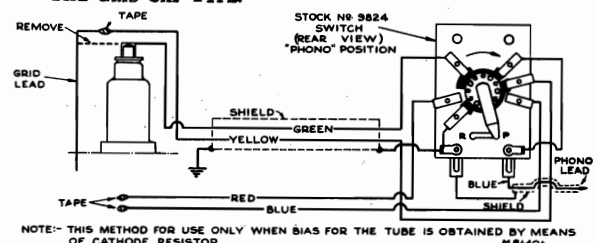
Stock No. 14179 Adaptor opens grid circuit, and inserts 2,700 ohm resistor in cathode of 6C5 or 6J5 tubes, for bias on Phono reproduction.

Stock No. 14180 Adaptor opens grid circuit of 6C5 or 6J5 tube.

Stock No. 14180 Adaptor necessary for RCA: C11-1, C13-2, T10-1, C11-3, C13-3.

Stock No. 14179 Adaptor necessary for RCA: C15-3, C15-4.

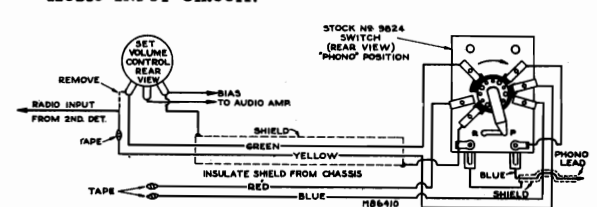
RADIO RECEIVERS WHOSE FIRST AUDIO AMPLIFIER TUBE IS OF THE GRID CAP TYPE.



NOTE: THIS METHOD FOR USE ONLY WHEN BIAS FOR THE TUBE IS OBTAINED BY MEANS OF CATHODE RESISTOR

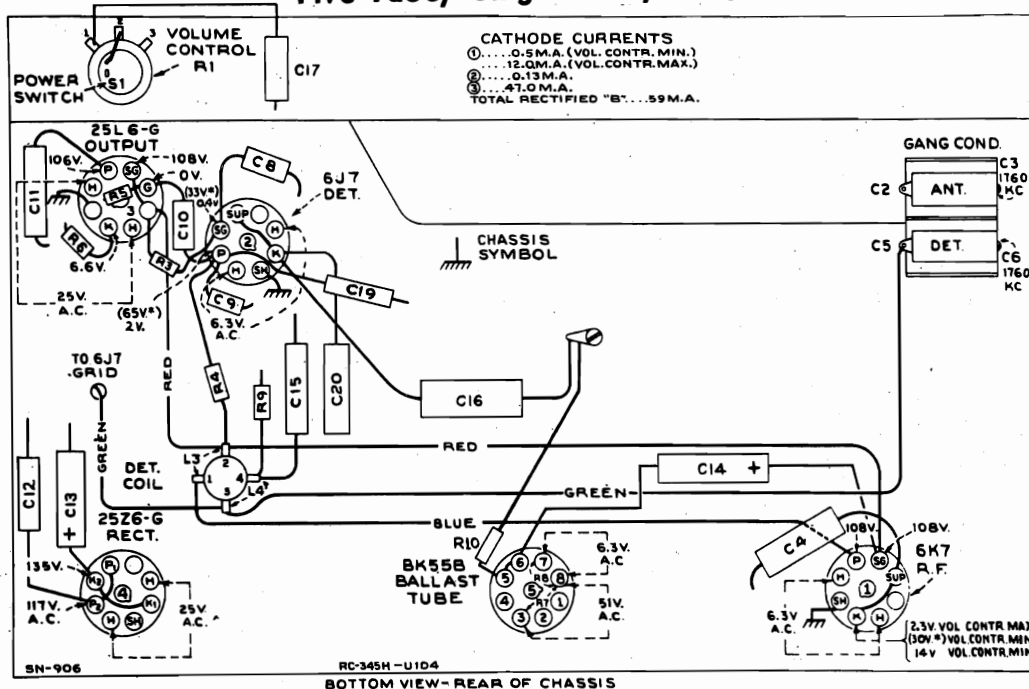
RCA Receivers for which above method applies: 125, 128, 128E, 224E, 225, 226, T6-1, C6-2, T6-9, T7-5, C7-6, T7-12, C7-14, T8-14, C8-15, T8-18, C8-19, C8-20, C9-4, T9-10.

RADIO RECEIVERS WHERE THE VOLUME CONTROL IS IN THE AUDIO INPUT CIRCUIT.



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U-104



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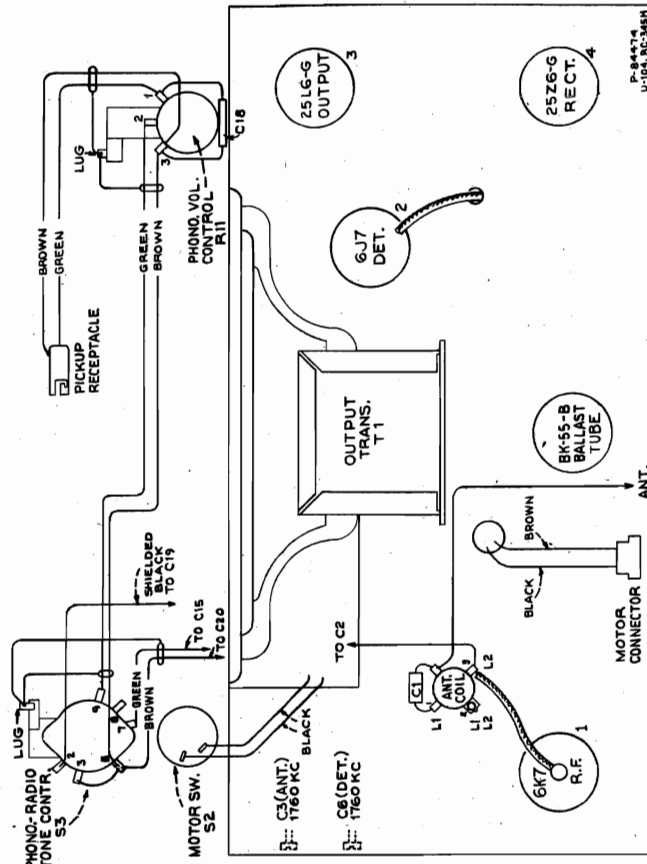
RCA MFG. CO., INC.

MODEL U-104

Chassis RC-345H

Chassis Wiring, Lead Dress

Pick-up, Phono. Data

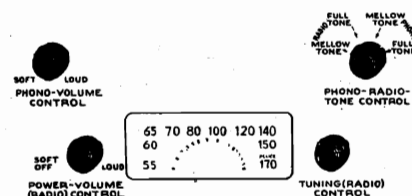


Precautionary Lead Dress

1. Dress power cord and line bypass C12 away from detector coil.
2. Plate lead from 6K7 to detector coil must be dressed close to chassis and run through center of chassis.
3. Green lead from detector coil to gang must be dressed clear of other leads.
4. Green lead from antenna coil to C17 must be dressed against front apron.
5. Dress all heater leads close to base.
6. Yellow lead from cathode 6K7 to volume control must be dressed against chassis, under gang condenser and against front apron.

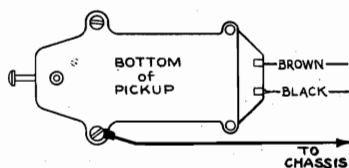
Power Supply.—Although this model employs an ac-dc chassis, it is not suitable for use on dc, as this would damage the motor.

Antenna.—The set is equipped with a 25-foot antenna. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100- to 200-mfd. capacitor in series with the lead-in.



PHONOGRAPH SERVICE DATA

U-104

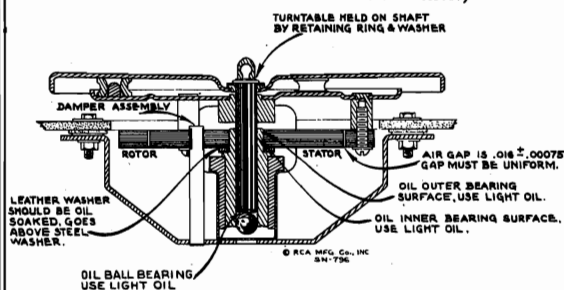


Pickup Connections

The motor is started by turning the phono-radio tone control to either 3rd or 4th position clockwise and giving the turntable a clockwise spin with the hand. Smooth starting and running will be insured by keeping the bearings well cleaned and oiled.

Hum and Vibration.—A small amount of hum when starting, decreasing to a negligible amount when running, is normal. If excessive vibration occurs it may be due to:

1. Insufficient lubrication, or any failure that will cause binding.
2. Leather washer not oiled. (Check to make certain that the leather washer is above the steel washer.)



Cross Section of Motor Assembly

This drawing shows the lubrication points

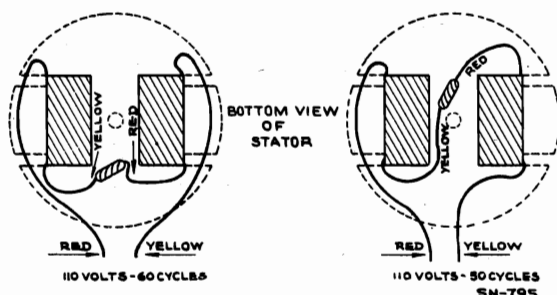
3. Motor not properly supported from motor board.
4. Burrs on poles of rotor or stator. Remove with fine emery cloth.
5. The damper spring must fit without binding or chattering in the slot in the stator. The stator must be free to deflect in either direction between the limits of the damper spring. The damper spring must exert approximately equal force in restoring the stator to its mid-position when the stator is deflected manually in each direction.

Removing Rotor.—The rotor and turntable assembly simply rests on the ball bearing at bottom of vertical bearing. Remove by lifting up.

Rotor Adjustment.—Loosen the three screws that hold the rotor to the turntable, insert three 16-mil shims at equal distances around the gap between the rotor and stator, and then carefully tighten the three screws. The top of rotor must be flush with top of stator; add additional steel washers beneath the stator if necessary.

Lubrication.—Oiling points are indicated in the diagram.

On Phonograph Operation, turn the radio volume control to minimum, and tune to a quiet point on the dial.



Motor Coil Assembly and Connections
D-C resistance of each coil (for 110 volts, 50 and 60 cycles) is approximately 82 ohms

Overall Chassis Height (inches)..... 6
Weight..... 16 lbs. (shipping)
Tuning Drive Ratio..... 1 to 1

Height..... 9 1/2
Width..... 12 1/4
Depth..... 9 5/8
Cabinet Dimensions (inches)..... 2 1/2
Chassis Base (inches)..... 5 1/4

MODEL U-115

Chassis RC-348E

RCA MFG. CO., INC.

Parts List

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
CHASSIS ASSEMBLIES (RC-348E)					
32136	Cable—Shielded cable and female plug for phonograph input.....	\$0.35	32135	Motor—105-125 volts, 60 cycle.....	12.60
12723	Capacitor—58 mmfd. (C4).....	.35	32177	Shaft—Turntable spindle shaft and fibre gear..	1.55
30904	Capacitor—100 mmfd. (C7, C8, C9, C10).....	.25		(Motor No. 84484-2, 3, or 4)	
12725	Capacitor—150 mmfd. (C35).....	.35	32338	Field—Motor field coils and laminations, 110 volts, 60 cycle (For Motor 84484-2).....	5.10
13003	Capacitor—180 mmfd. (C12).....	.35	32650	Field—Motor field coils and laminations, 110 volts, 50 cycle (For Motor 84484-3).....	5.10
12488	Capacitor—270 mmfd. (C32).....	.35	32652	Field—Motor field coils and laminations, 110 volts, 25 cycle (For Motor 84484-4).....	6.90
31435	Capacitor—750 mmfd. (C25).....	.40	32558	Motor—105-125 volts, 60 cycle (84484-2).....	10.50
4838	Capacitor—.005 mfd. (C15, C26, C30).....	.25	32637	Motor—105-125 volts, 50 cycle (84484-3).....	11.20
14393	Capacitor—.01 mfd. (C13, C14).....	.30	32638	Motor—105-125 volts, 25 cycle (84484-4).....	12.80
4870	Capacitor—.025 mfd. (C34).....	.20	32337	Shaft—Turntable spindle shaft and fibre gear—60 cycle (For Motor 84484-2).....	1.40
4886	Capacitor—.05 mfd. (C11).....	.20	32651	Shaft—Turntable spindle shaft and fibre gear—50 cycle.....	1.30
30899	Capacitor—0.1 mfd. (C1, C31).....	.30	32653	Shaft—Turntable spindle shaft and fibre gear—25 cycle.....	1.30
31424	Capacitor—Comprising 2 sections 8 mfd. each (C16, C17) (This type has leads).....	1.65	PICKUP AND ARM ASSEMBLIES		
32342	Capacitor—Comprising 2 sections 10 mfd. each (C16, C17) (This type has terminals).....	1.20	31212	Base—Pickup arm pivot shaft, trip lever, and mounting base assembly.....	.95
31382	Clip—Oscillator coil and core mounting clip.....	.04	32138	Cable—Shielded cable and male plug for pickup arm.....	.20
32338	Coil—Antenna coil (L1, L2).....	.85	31050	Crystal—Pickup crystal and needle screw.....	3.75
31098	Coil—Oscillator coil (L3, L4).....	.85	32137	Pickup and arm complete.....	7.00
31422	Condenser—2-gang variable tuning condenser (C2, C3, C5, C6, C33).....	2.70	12539	Screw—Pickup needle screw.....	.15
32355	Control—Volume control, tone control and power switch.....	3.00	SPEAKER ASSEMBLIES		
30877	Cord—Indicator drive cord.....	.20	31443	Cone—Speaker cone and voice coil (L9)—for Speaker No. 84327-1.....	1.40
30905	Core—Adjustable core and stud for i-f transformers.....	.35	31663	Speaker complete (No. 84327-1).....	4.95
31386	Core—Adjustable core and stud for oscillator coils.....	.15	31477	Transformer—Output transformer (T2) (For Speaker No. 84327-1).....	1.00
31421	Drum—Variable condenser drive cord drum.....	.45	32586	Cone—Speaker cone and voice coil for Speaker No. 84327-3.....	2.40
31420	Indicator—Station selector indicator pointer.....	.10	32587	Coil—Speaker field coil for Speaker No. 84327-3.....	2.45
11891	Lamp—Dial lamp.....	.17	32588	Transformer—Output transformer for Speaker No. 84327-3.....	1.45
31419	Plate—Dial color plate.....	.12	MISCELLANEOUS ASSEMBLIES		
30868	Plug—2-contact female plug for motor power leads.....	.35	14803	Brake—Automatic brake complete.....	2.95
31373	Pulley—Indicator drive cord pulley.....	.08	31428	Button—Station selector switch push button.....	.06
31425	Resistor—Voltage divider—comprising one 22-ohm, one 18,000-ohm, one 8,200-ohm and one 3,900-ohm sections (R3, R11, R12, R15).....	.90	31487	Clip—Spring clip to hold dial.....	.12
31388	Resistor—390 ohms, 1 watt (R9).....	.22	31464	Damper—One rubber cap for motor spindle, and one metal damper plate.....	.30
14559	Resistor—10,000 ohms, 1 watt (R17).....	.20	31429	Dial—Station selector glass dial.....	.40
12738	Resistor—27,000 ohms, 1 watt (R10).....	.20	31095	Disc—10 protective discs for call letter markers.....	.10
12286	Resistor—56,000 ohms, 1 watt (R2).....	.20	31667	Escutcheon—Tuning dial escutcheon.....	.55
3252	Resistor—100,000 ohms, 1 watt (R19).....	.20	32140	Hinge—Cabinet lid hinge.....	.25
13734	Resistor—120,000 ohms, 1 watt (R16).....	.20	31355	Knob—Station selector or radio-record switch knob (small).....	.12
12199	Resistor—270,000 ohms, 1 watt (R7).....	.20	31391	Knob—Tone control and power switch knob (small).....	.15
30963	Resistor—820,000 ohms, 1 watt (R18).....	.20	30773	Knob—Volume control or station selector knob (large).....	.15
12679	Resistor—2.2 meg., 1 watt (R4).....	.20	30991	Markers—Push button call letter markers.....	.40
13601	Resistor—10 meg., 1 watt (R6).....	.20	31054	Mounting—Pickup arm rubber mounting, washers, and nut.....	.15
14887	Retainer—Pulley retainer.....	.01	32139	Mounting—Motor mounting spacers, washers, and screw—sufficient for one motor.....	.25
14350	Screw—No. 8-32 square-head set screw for drum, Stock No. 31421.....	.03	30870	Plug—2-contact male plug for motor leads.....	.35
31364	Socket—Dial lamp socket.....	.20	14270	Spring—Retaining spring for knob, Stock Nos. 30773 and 31355.....	.05
31251	Socket—Tube socket.....	.25	30330	Spring—Retaining spring for knob, Stock No. 31391.....	.03
31418	Spring—Indicator drive cord tension spring.....	.05	30100	Springs—Tension springs for automatic brake—one long and one short.....	.08
31414	Switch—Push button station selector switch (S12, S13, S14, S15, S16, S17, S20, S21, S22, S23, S24, S25).....	3.05	32141	Support—Cabinet lid support.....	.40
30902	Transformer—First i-f transformer (L5, L6, C7, C8).....	1.90	14804	Switch—Automatic brake switch (S26).....	.60
30903	Transformer—Second i-f transformer (L7, L8, C9, C10).....	1.80	12647	Switch—Radio-Record switch (S27).....	.75
31574	Transformer—Power transformer, 100-120 volts, 25-60 cycle (T1).....	9.20	31463	Turntable.....	1.50
31380	Transformer—Power transformer, 100-120 volts, 50-60 cycle (T1).....	6.35	MOTOR ASSEMBLIES *		
31575	Transformer—Power transformer, 100-120 and 200-240 volts, 50-60 cycle (T1).....	8.35	(Motor No. 84430)		
32176	Bearing—Rotor thrust bearing screw and nut.....	.25			
32175	Field—Motor field coils and laminations.....	4.95			

* Motor No. 84430 is type that mounts from below motorboard. Motor No. 84484 is type that mounts from top of motorboard through a cutout.

TRIMMER CAPACITOR BANK AND ELECTRIC-TUNING OSCILLATOR COILS

(Refer to Electrical Specifications for frequency ranges)

DESCRIPTION	Chassis Stamped RC-348E		Chassis Stamped RC-348E "MOD"		Chassis Stamped RC-348E "M"	
	Stock No.	Unit List Price	Stock No.	Unit List Price	Stock No.	Unit List Price
Capacitor—Trimmer capacitor bank (C20, 21, 22, 23, and 24).....	31416	\$1.20	32066	\$1.30	32339	\$1.20
Coil—Oscillator coil (L12).....	31415	.30	31415	.30	31415	.30
Coil—Oscillator coil (L13).....	31384	.30	31415	.30	31415	.30
Coil—Oscillator coil (L14).....	31384	.30	31384	.30	32340	.35
Coil—Oscillator coil (L15).....	31383	.30	31383	.30	31383	.30
Coil—Oscillator coil (L16).....	31383	.30	31383	.30	31383	.30

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

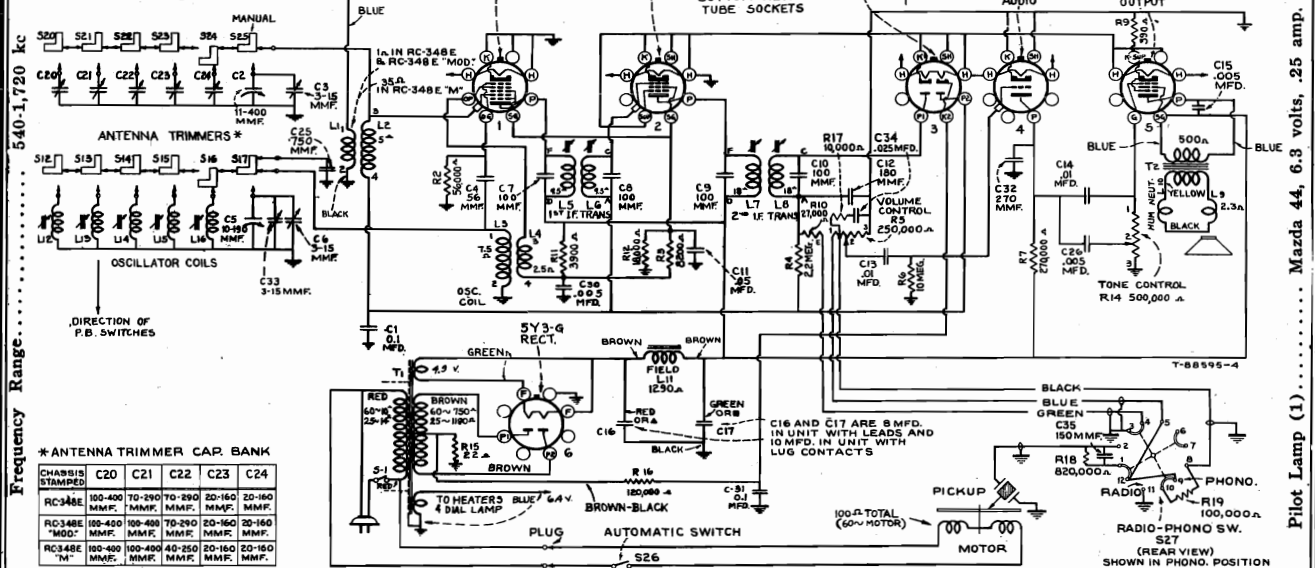
**Schematic, Chassis Wiring,
Trimmers, Voltage Socket
Transformer Data**

RCA MFG. CO., INC.

MODEL U-115

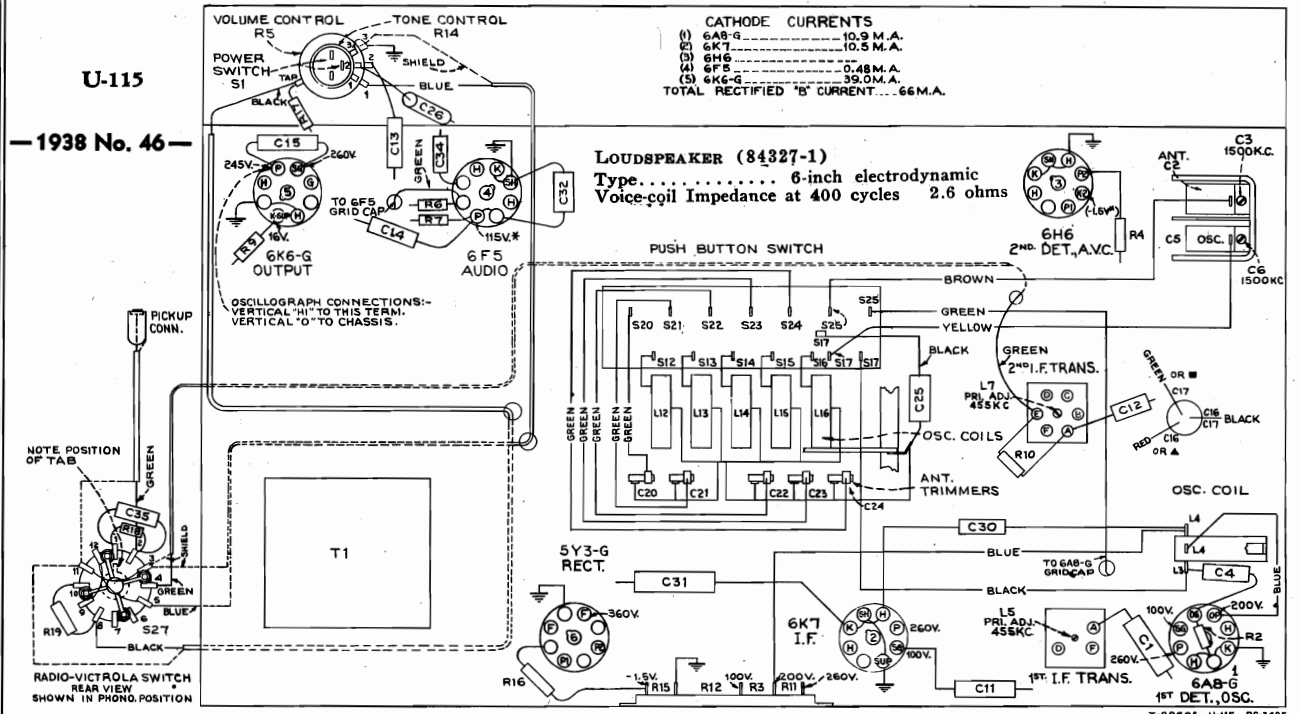
Chassis RC-348E, RC-348E "M"
RC-348E "MOD"

Intermediate Frequency 455 kc



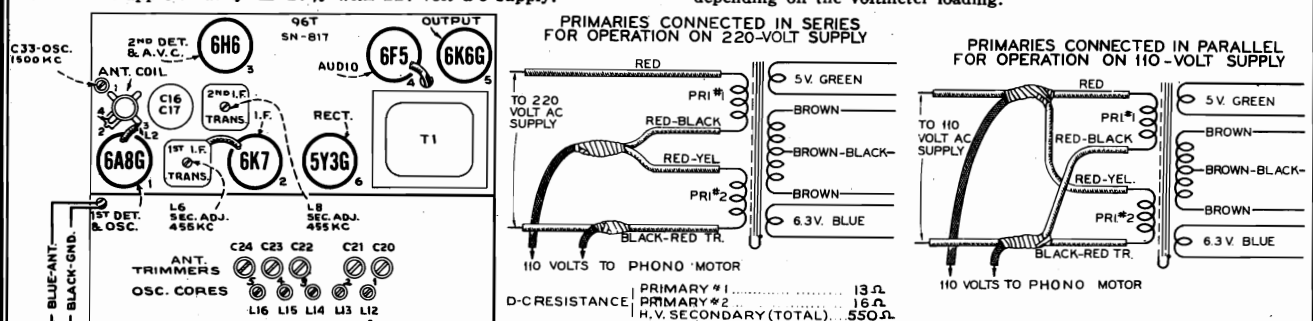
Precautionary Lead Dress.—(1) Dress green lead from antenna coil to switch away from the chassis and gang. (2) Dress lead from 2nd I.F. transformer to volume control away from other leads. (3) Ground bus from 6H6 socket must be close to chassis. (4) Dress

leads away from oscillator coil adjustment screws. (5) Dress power transformer primary leads toward left-hand end of chassis. (6) Dress plate lead to output transformer close to chassis.



Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within approximately $\pm 20\%$ with 117-volt a-c supply.

***NOTE:** Values with star (*) are operating voltages in circuits with high series-resistance. The actual measured voltages will be lower, depending on the voltmeter loading.



MODEL U-115

RCA MFG. CO., INC.

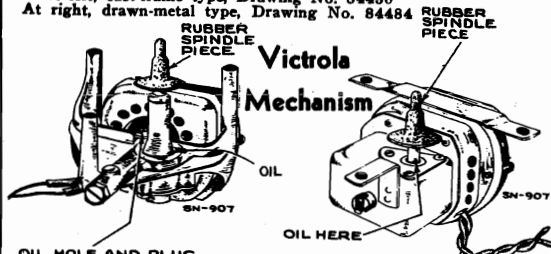
Chassis RC-348E, RC-348E "M", RC-348E "MOD"

Alignment, Phono, Data
Tuner Adjustments

Motors Used in Model U-115

At left, cast-frame type, Drawing No. 84430

At right, drawn-metal type, Drawing No. 84484



OIL HOLE AND PLUG

The crystal pickup is sealed in a metal case as protection against extreme changes of climate. If failure occurs, do not attempt to repair the unit, but install a new crystal unit.

The phonograph motor is a self-starting constant-speed induction type. Two styles of motor are employed: One style (drawing No. 84430) has a cast frame and mounts from below the motorboard. The other style (drawing No. 84484) has a drawn metal case, and mounts from top of motorboard through a cutout. The two types are shown in the accompanying illustrations.

Motor Lubrication.—Apply a few drops of light machine oil to the spindle bearing and oil hole every six months.

The motor spindle is tapered, and a conical rubber piece fits snugly on the spindle. The hole in the turntable bushing is tapered to fit the rubber. This provides an excellent self-centering floating mounting.

A metal washer is placed on the spindle under the rubber piece. The washer has ears on the under side which fit over a pin that projects through the spindle.

The automatic stop should be adjusted so that the lever will snap to the "off" position when the pickup needle is $1\frac{1}{2}$ inches from the center line of the spindle.

Calibration Marks.—The tuning dial is fastened in the cabinet and can not be used for reference during alignment. Therefore calibration marks corresponding to dial readings of 600 kc and 1,500 kc have been stamped in the plate on the front of the chassis, as shown in the accompanying drawing. These marks are used for reference during alignment.

Drum and Dial Indicator Adjustment.—As the first step in r-f alignment, check the position of the drum on the front shaft of the gang condenser. With the gang at maximum (full mesh) the drum set-screw should be pointing directly down as shown in the drawing. With the drum in this position, and the gang at maximum, move the dial indicator

ADJUST SWITCH TO TRIP WHEN NEEDLE IS ON 1-3/4" RADIUS FROM C. OF MOTOR SPINDLE

POWER SUPPLY RATINGS

A-6	105-125 volts, 60 cycles, 100 watts
A-5	105-125 volts, 60 cycles, 100 watts
B-2	105-125 volts, 25 cycles, 100 watts
C-6	105-125, 200-250 volts, 60 cycles, 100 watts
C-5	105-125, 200-250 volts, 60 cycles, 100 watts

POWER-TONE-VOLUME
* CONTROL

	1	2	3	4	5	
PUSH BUTTON RANGES:	RC-348E	RC-348E "MOD"	RC-348E "M"			
Button No. 1 (left)	550-980 kc	550-980 kc	550-980 kc			
Button No. 2	650-1,080 kc	550-980 kc	550-980 kc			
Button No. 3	650-1,080 kc	650-1,080 kc	690-1,225 kc			
Button No. 4	850-1,500 kc	850-1,500 kc	850-1,500 kc			
Button No. 5	850-1,500 kc	850-1,500 kc	850-1,500 kc			

TUNING
CONTROL

along the drive cord to coincide with the left-hand line as shown. The indicator is held to the drive cord by means of spring clips.

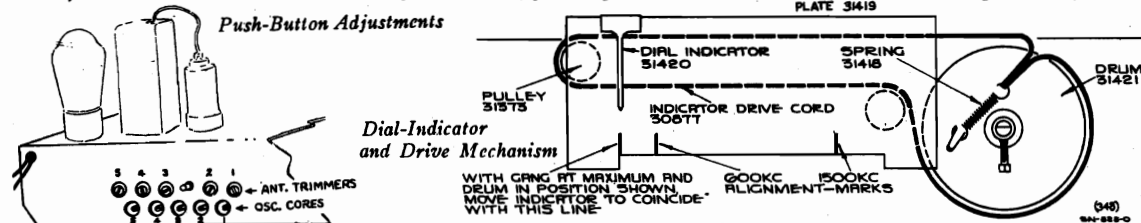
After completion of alignment, and after the chassis has been fastened in the cabinet, turn the gang to maximum and note whether the dial indicator is at the left-hand end mark on the dial; if it is not, loosen the drum set-screw (which is accessible through a slot in the bottom of the cabinet), turn the drum slightly so that the indicator is at this mark, and then tighten the set-screw.

After completion of alignment, seal the i-f core-adjustment screws with household cement.

For additional details, refer to booklet, "RCA Victor Receiver Alignment."

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	Quiet point between 550-750 kc	L7 and L8 (2nd I-F Trans.)
2	6A8-G grid cap, in series with .01 mfd.	455 kc		L5 and L8 (1st I-F Trans.)
3	Antenna lead (blue) in series with 200 mmf.	1,500 kc	1,500 kc calibration mark.	C6 (osc.)* C3 (ant.)
4	Follow "Adjustments for Electric Tuning."			

* The oscillator section of the gang condenser has two trimmers, one on top, accessible through a hole in the chassis, and the other on bottom. It may be necessary to adjust both of these trimmers to secure a peak on 1,500 kc.



Adjustments for Electric Tuning DRUM SHOWN WITH GANG AT MAXIMUM CAPACITY

These models have six push buttons. The right-hand button connects the gang condenser for dial tuning. The other five buttons are for electric tuning of five different stations in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments. Use a regular antenna for the preliminary adjustments.

The procedure is as follows:

1. Make a list of the five desired stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning (right-hand) button, and manually tune in the first station on the list.

3. Push in station-button No. 1 (left-hand) and adjust No. 1 oscillator core (L12) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until the station is received.

4. Adjust No. 1 antenna trimmer (C20) for maximum output on this station.

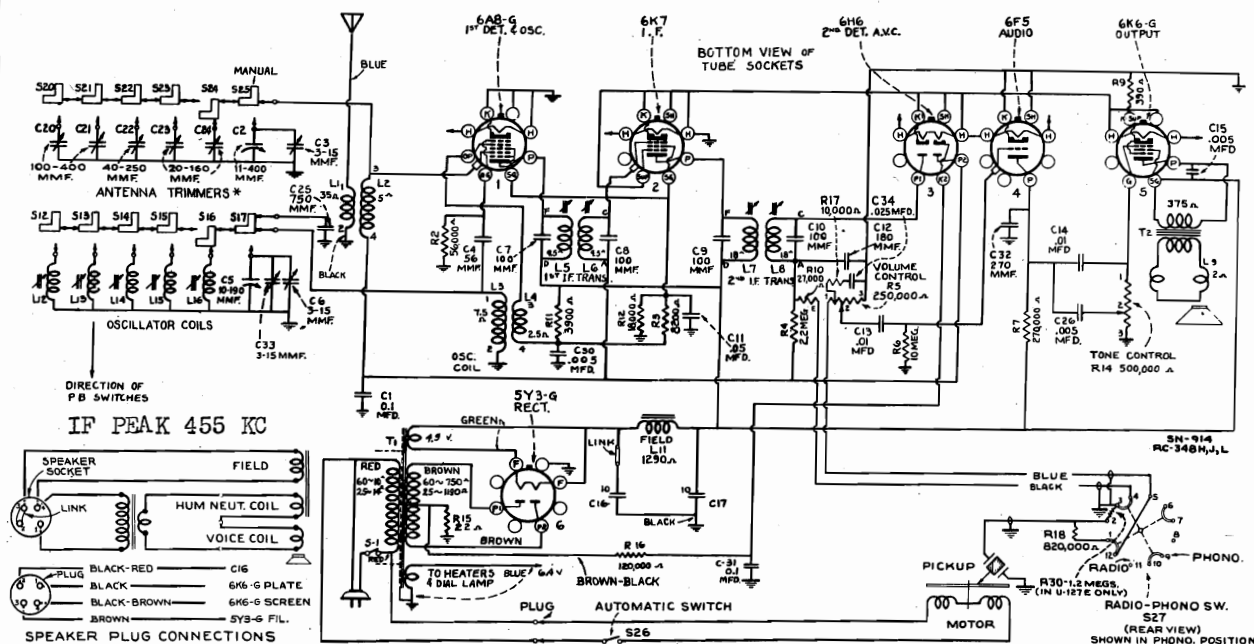
5. Adjust for each of the remaining four stations in the same manner.

(Clockwise adjustment of oscillator cores and antenna trimmers tunes the circuits to lower frequencies.)

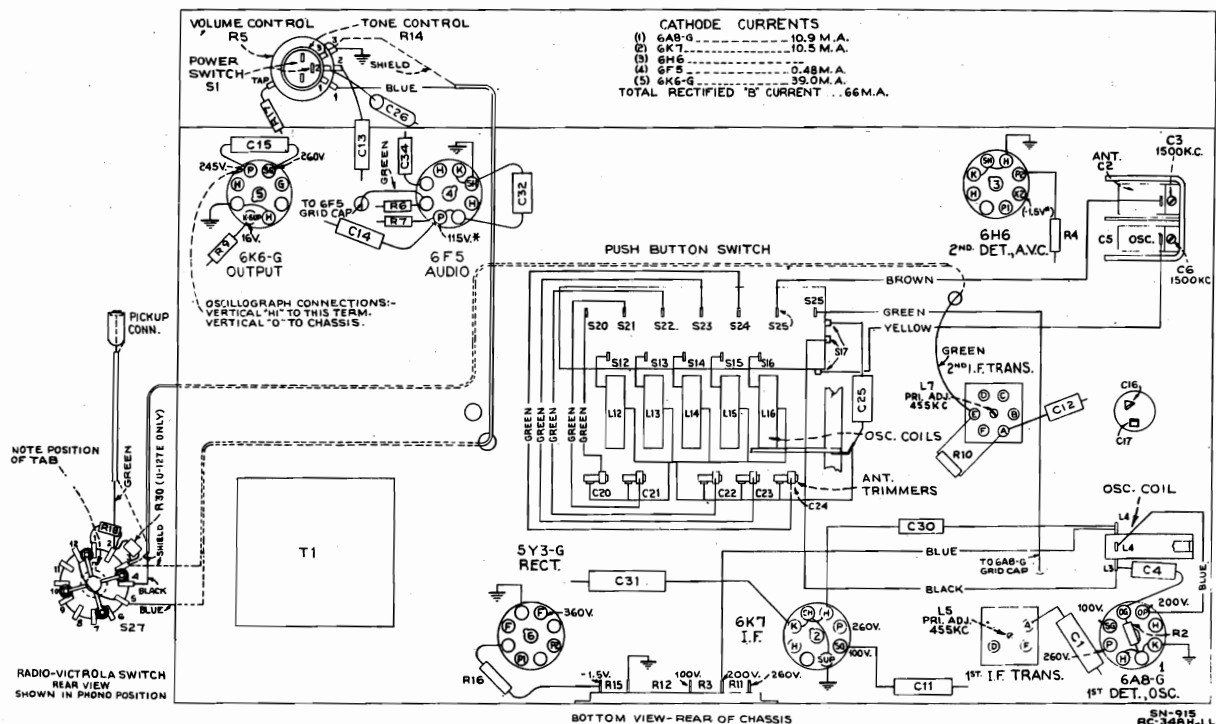
6. Make a final careful adjustment of the oscillator cores using one or two feet of wire as an antenna.

RCA MFG. CO., INC.

MODELS U-121, Ch. RC-348J
 U-123 (Single Band) Ch. RC-348H
 U-127E, Chassis RC-348L
 Schematic, Chassis Wiring
 Voltage



U-121, U-123 (Single-Band), and U-127E

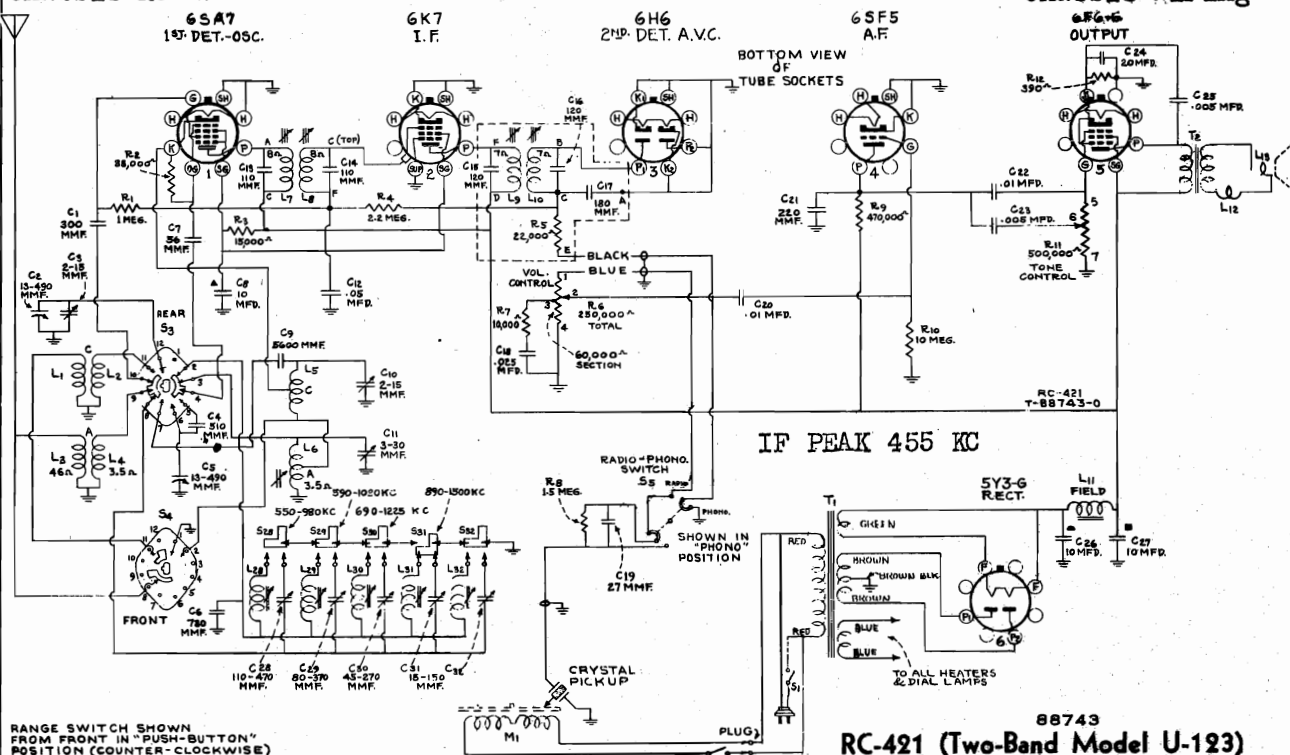


Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within approximately $\pm 20\%$ with 117-volt a-c supply.

* NOTE: Values with star (*) are operating voltages in circuits with high series-resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

MODEL U-123 (2 Bands)
Chassis RC-421

RCA MFG. CO., INC.

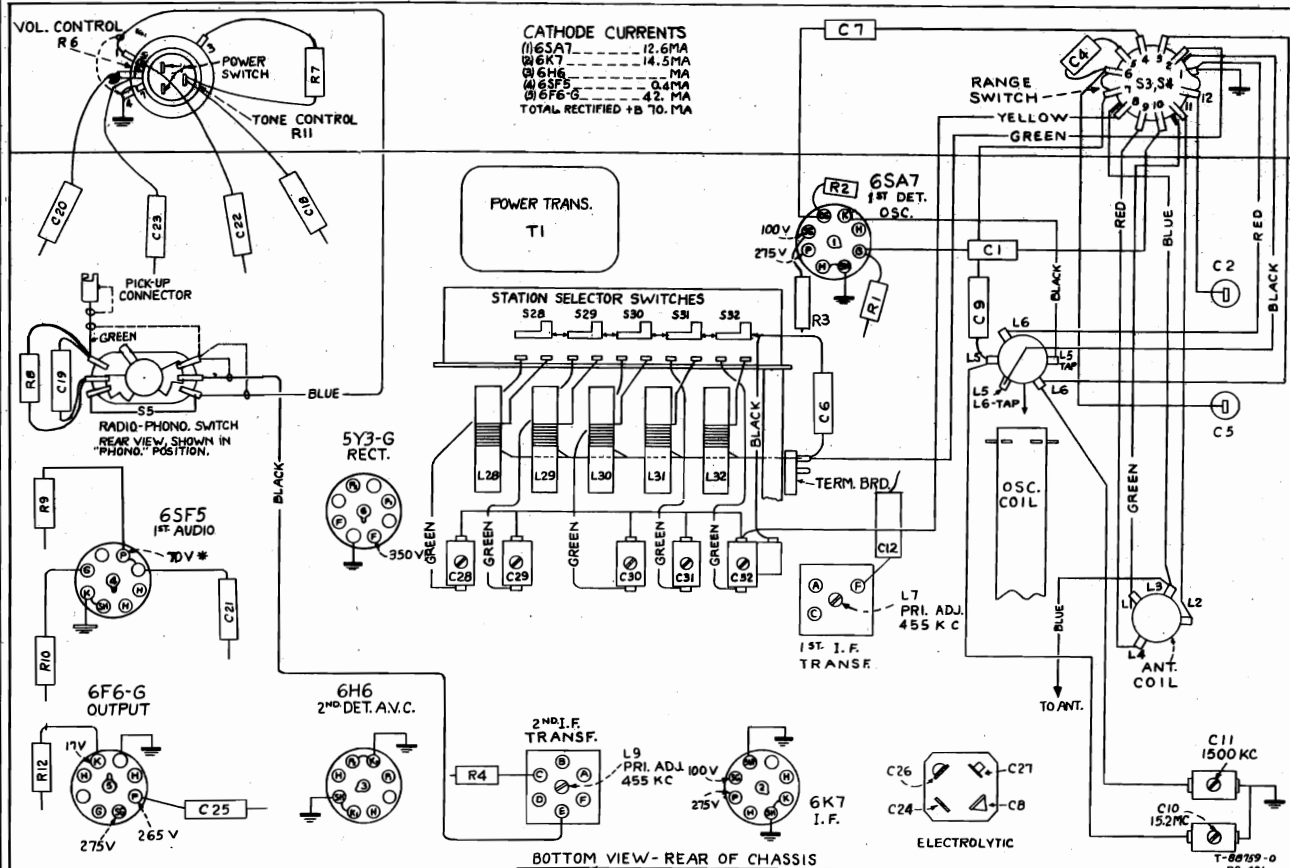
Schematic, Voltage
Chassis Wiring


RANGE SWITCH SHOWN FROM FRONT IN "PUSH-BUTTON" POSITION (COUNTER-CLOCKWISE)

Note the following additional d-c resistances: Voice-coil, 2 ohms; primary of output transformer, 375 ohms; 60-cycle power transformer, primary 9 ohms, secondary 735 ohms.

Precautionary Lead Dress.—Dress the oscillator grid condenser (C7) away from chassis. Leads along back of chassis must be dressed in corner of chassis and away from contact "E" of 2nd i-f

transformer. Keep a-c leads against end of chassis. Dial drum must be 5/32-inch from front apron.



Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within approximately $\pm 20\%$ with 117-volt a-c supply.

*** NOTE:** Values with star (*) are operating voltages in circuits with high series-resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

MODELS U-121, Ch. RC-348J
U-123, Ch. RC-348H, RC-421
U-127E, Chassis RC-348L

RCA MFG. CO., INC. Automatic Record Changer

Automatic Record Changer
Adjustments, Notes

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc. are in good order and are correctly assembled.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable

by hand. Six turntable revolutions are required for one change cycle. If the record changer or cabinet is not perfectly level, normal operation is likely to be affected.

The 10 and 12 inch records must be absolutely flat for smooth operation when using a mixture of the two sizes.

A shorting switch, located in the pickup head, operates due to pressure when the pickup is placed on the pickup rest.

ADJUSTMENTS

A. Main Lever.—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. One adjustment is provided for the main lever. Rotate the turntable until the changer is out-of-cycle; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate by 1/16 inch.

B. Friction Clutch.—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip lever "7" through a friction clutch "5." If the motion of the pickup is abruptly accelerated or becomes irregular due to swinging in the eccentric groove, the trip finger "7" moves the trip pawl "22" into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw "B." If adjustment is too tight, the needle will repeat grooves; if too loose, tripping will not occur at the end of the record.

C. Pickup Lift Cable Screw.—During the record change cycle, lever "16" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pickup lift cable. To adjust pickup for proper elevation, stop the changer "in-cycle" at the point where pickup is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknuts "C" to obtain 1 inch spacing between needle point and turntable top surface.

D. & E. Needle Landing on Record.—The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10 inch record. Position of eccentric stud "E" governs the landing of the needle on a 12 inch record; this, however, is dependent on the proper 10 inch adjustment.

To adjust for needle landing, place 10 inch record on turntable; push index lever to reject position and return to the 10 inch position; see that pickup locating lever "17" is tilted fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "V" on lever "14" is in contact with "Step T" on lever "17." The correct point of landing is 4-11/16 inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17." Leave approximately 1/32 inch end play between hub of lever "14" and pickup base bearing, and tighten the blunt nose screw "D"; run mechanism through several cycles as a check, then tighten cone pointed screw "D."

After adjusting for needle landing on a 10 inch record, place 12 inch record on turntable; push index lever to reject and return to 12 inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5-11/16 inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end adjusts lever "14" to give correct needle landing. The eccentric end of the stud must always be toward the rear of the motor board, otherwise incorrect landing may occur with 10 inch records.

MISCELLANEOUS SERVICE HINTS

Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual misadjustments will enable ready adjustment in most cases.

- For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A."
- Needle does not land properly on both 10 and 12 inch records—Make complete adjustments "D" and "E."
- Needle does not land properly on 12 inch record but correct on 10 inch—Effect adjustment "E."
- Failure to trip at end of record—Increase clutch "5" friction by means of screw "B." Also, see that levers "7" and "12" are free to move without touching each other.
- Pickup strikes lower record of stack or drags across top record on turntable—Adjust lift cable per adjustment "C."
- Needle does not track after landing—Friction clutch "5" ad-

F. & G. Record Separating Knife.—The upper plate (knife) "25" on each of the record posts serves to separate the lower record from the stack and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "27" be accurately maintained. The spacing for the 10 inch record is nominally .058 inch, and for the 12 inch record is .075 inch.

To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut "F" to give .055-.061 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "F" adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072-.078 inch.

H. Record Support Shelf.—The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both posts are rotated simultaneously by a gear and rack coupled to the main lever "15," and it is necessary that adjustment be such that the record is released from both shelves at the same instant. To adjust, place a 12 inch record on the turntable, rotate mechanism into cycle to the point where tone arm is at maximum distance outward from turntable; lift record upward until it is in contact with both separating knives, then loosen screws "H" and shift record shelves so that the curved inner edges of the shelves are uniformly spaced at least 1/16 inch from record edge. Tighten the blunt nose screw "H," run mechanism through cycle several times to check action, then tighten cone pointed screw "H."

If record shelves or knives are bent, or not perfectly horizontal, improper operation and jamming of mechanism will occur.

J. Tone Arm Rest Support (not shown).—When the changer is out-of-cycle, the front lower edge of the pickup head should be 5/16 inch above surface of motor board. This may be adjusted by bending the tone arm support bracket, which is associated with the tone arm mounting base, in the required direction.

K. Trip Pawl Stop Pin.—The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the point at which the roller enters the cam. By bending the pin support either toward or away from trip pawl bearing stud, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

Lubrication.—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board.

Apply a few drops of light machine oil to the motor spindle bearing and oil hole adjacent to the spindle bearing. The oil hole has a screw plug.

Do not allow oil or grease to come in contact with, rubber mounting of tone arm base, rubber bumper, or rubber spindle cap.

Adjustment "B" may be too tight; bind in tone arm vertical bearing; levers "7" and "12" fouled; or pickup output cable twisted.

- Cycle commences before record is complete—Record is defective, or adjustment "B" of friction clutch "5" is too tight.
- Wow in record reproduction—Record is defective; or instrument is not being operated at normal room temperature (65° F).
- Record knives strike edge of records—Records warped; record edges are rough; or knife adjustments "F" and "G" are incorrect.
- Record not released properly—Adjust record shelf assemblies in respect to shaft by means of adjustment "H."
- Needle lands in 10 inch position on 12 inch record or misses record when playing both types mixed—Increase tension of pickup locating lever spring "34."

Specifications, Tuner Data Record Changer Details

RCA MFG. CO., INC.

MODELS U-121, Ch. RC-348J

U-123, Ch. 348H, RC-421

U-127E, Ch. RC-348L

Electrical and Mechanical Specifications

Frequency Range..... 540-1,720 kc
RC-421 also has a short-wave band of..... 5.8-18.0 mc

PUSH BUTTON RANGES (RC-348J, 348H, and 348L)

Two stations between approximately 550- 980 kc
One station between approximately 690-1,225 kc
Two stations between approximately 850-1,500 kc

PUSH BUTTON RANGES (RC-421)

One station between approximately 550- 980 kc
One station between approximately 590-1,020 kc
One station between approximately 690-1,225 kc
Two stations between approximately 890-1,500 kc

TUBE COMPLEMENT

- (1) RCA-6A8-G (6SA7 in RC-421)..... First-Detector, Oscillator
- (2) RCA-6K7..... Intermediate-Frequency Amp.
- (3) RCA-6H6..... Second-Detector, A.V.C.
- (4) RCA-6F5 (6SF5 in RC-421)..... Audio Voltage Amplifier
- (5) RCA-6K6-G (6F6-G in RC-421)..... Power Output
- (6) RCA-5Y3-G..... Full-Wave Rectifier

Loudspeaker (electrodynamic)

Diameter..... 12-inch
Voice-Coil Impedance at 400 cycles..... 2.2 ohms

CABINET DIMENSIONS:

Height (inches)..... 34
Width (inches)..... 25 1/2
Depth (inches)..... 16 1/2
Weight (net) pounds..... 55
Weight (shipping) pounds..... 73
Chassis Base Dimensions..... 3 inches x 11 1/2 inches x 5 inches
Over-all Chassis Height..... 6 1/2 inches
Tuning Drive Ratio..... 6 to 1

POWER OUTPUT (RC-348J, 348H, and 348L)

Undistorted..... 2 watts, Maximum..... 4 watts

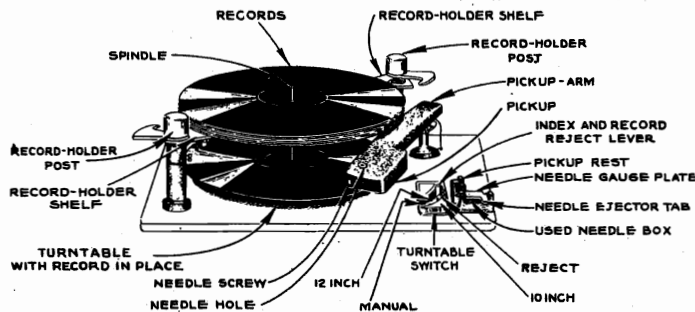
POWER OUTPUT (RC-421)

Undistorted..... 2.5 watts, Maximum..... 4.5 watts

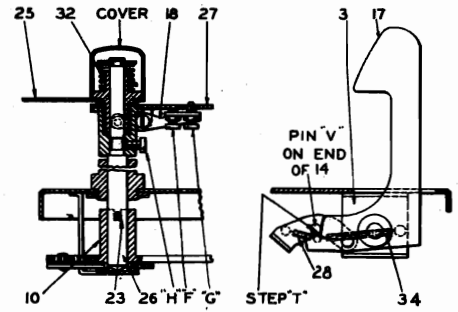
POWER SUPPLY RATINGS

A-6..... 105-125 volts, 60 cycles, 100 watts total
A-5..... 105-125 volts, 50 cycles, 100 watts total
B-2..... 105-125 volts, 25 cycles, 100 watts total
C-6..... 105-125/210-250 volts, 60 cycles, 100 watts total
C-5..... 105-125/210-250 volts, 50 cycles, 100 watts total

U-121	U-123 (RC-348H)	U-123 (RC-421)	U-127E
RL-70F-3	RL-70F-3	RL-70H-6	RL-63H-5
12-inch	12-inch	12-inch	8-inch
2.2 ohms	2.2 ohms	2.2 ohms	2.2 ohms
U-121	U-123	U-127E	
84	84	25 1/2	
25 1/2	30 1/2	29	
16 1/2	17	16 1/2	
55	74	52	
73	94	71	
		3 inches x 11 1/2 inches x 5 inches	
		6 1/2 inches	
		6 to 1	

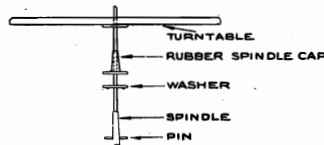


Top View of Automatic Record Changer



Details of Record Shelf Posts, and Locating Lever Assemblies

Radio features include: Magnetite-core electric-tuning oscillator coils and magnetite-core i-f transformers; automatic volume control; automatic bass compensation; continuously-variable high-frequency tone control; temperature-stabilized capacitors in oscillator circuit; electro-dynamic loudspeaker; straight-line dial and electric tuning for five stations in the broadcast range.



Turntable Assembly (All Models)

The crystal pickup is sealed in a metal case as protection against extreme changes of climate. If failure occurs, do not attempt to repair the unit, but install a new crystal unit.

The phonograph motor is a self-starting constant-speed induction type.

Motor Lubrication (Models U-121 and U-127E).—Apply a few drops of light machine oil to the spindle bearing and oil hole every six months. The oil hole is located in the motor casting, adjacent to the spindle bearing, and has a screw plug.

The automatic stop (Models U-121 and U-127E) should be adjusted so that the lever will snap to the "off" position when the pickup needle is 1 1/2 inches from the center line of the spindle.

Adjustments for Electric Tuning

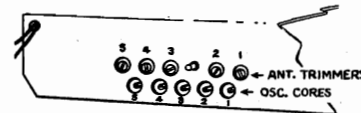
Push-Button Ranges in RC-348J, 348H, and 348L (Single-Band Receivers)

No. 1 and 2..... Approximately 550- 980 kc
No. 3..... Approximately 690-1,225 kc
No. 4 and 5..... Approximately 850-1,500 kc

These models have six push buttons. The right-hand button connects the gang condenser for dial tuning. The other five buttons are for electric tuning of five different stations in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments. Use a regular antenna for the preliminary adjustments.

The procedure is as follows:

1. Make a list of the five desired stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning button, and manually tune in the first station on the list.

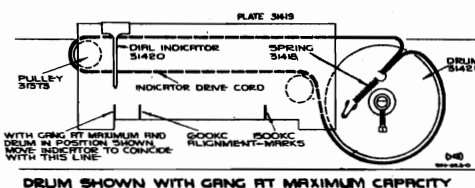


Push-Button Ranges in RC-421 (Two-Band Model U-123)

No. 1..... Approximately 550- 980 kc
No. 2..... Approximately 590-1,020 kc
No. 3..... Approximately 690-1,225 kc
Nos. 4, 5..... Approximately 890-1,500 kc

3. Push in station-button No. 1 and adjust No. 1 oscillator core to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until the station is received.
4. Adjust No. 1 antenna trimmer for maximum output on this station.
5. Adjust for each of the remaining four stations in the same manner.
(Clockwise adjustment of oscillator cores and antenna trimmers tunes the circuits to lower frequencies.)
6. Make a final careful adjustment of the oscillator cores using one or two feet of wire as an antenna.

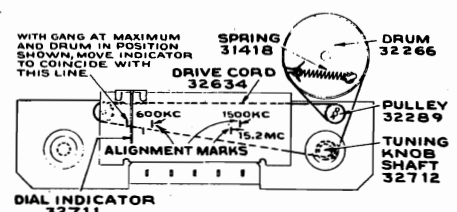
Models U-121 and U-127E have a non-automatic Victrola mechanism, with crystal pickup, automatic stop, and self-starting constant-speed motor. Model U-123 has an automatic Victrola mechanism which permits playing seven 12-inch or eight 10-inch records in succession. It has a crystal pickup and constant-speed self-starting motor.



Dial Mechanism

RC-348J, 348H, and 348L

RC-421



MODELS U-121, Ch. RC-348J
U-123, Ch. RC-348H

RCA MFG. CO., INC.

U-127E, Ch. RC-348L
Parts List

Replacement Parts Models U-121, U-123 (Single-Band), and U-127E

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
CHASSIS ASSEMBLIES			31156	Crystal—Pickup crystal cartridge and needle screw	4.25
(U121-RC348J) (U123-RC348H, Single-Band)			32884	Pickup and arm complete	7.45
(U127E-RC348L)			31160	Screw—Pickup needle screw	.12
82339	Capacitor—Capacitor bank for push button switch assembly (C20, C21, C22, C23, C24)	1.20	31161	Shaft—Pickup pivot arm and shaft assembly	.45
12723	Capacitor—56 mmfd. (C4)	.35	MOTOR ASSEMBLIES		
30904	Capacitor—100 mmfd. (C7, C8, C9, C10)	.25	Model U-121 and U-127E		
13003	Capacitor—180 mmfd. (C12)	.35	31464	Damper—Comprising 1 rubber spindle sleeve and 1 metal damper plate	.30
12488	Capacitor—270 mmfd. (C32)	.35	32652	Field—Motor coils and laminations, 105-120 volts, 25-cycle	6.90
31435	Capacitor—750 mmfd. (C25)	.40	32650	Field—Motor coils and laminations, 105-120 volts, 50-cycle	5.10
4838	Capacitor—.005 mfd., 1,000 volts (C15, C26, C30)	.25	32336	Field—Motor coils and laminations, 105-120 volts, 60-cycle	5.10
14393	Capacitor—.01 mfd. (C13, C14)	.30	32638	Motor—105-120 volts, 25-cycle	12.80
4870	Capacitor—.025 mfd., 400 volts (C34)	.20	32637	Motor—105-120 volts, 50-cycle	11.20
30882	Capacitor—.05 mfd., 200 volts (C11)	.20	32558	Motor—105-120 volts, 60-cycle	10.50
30899	Capacitor—.1 mfd., 200 volts (C1, C31)	.30	30870	Plug—2-contact male for motor leads	.35
32342	Capacitor—10-10 mfd. electrolytic capacitor (C16, C17)	1.20	32653	Shaft—Turntable shaft and gear for 25-cycle motor	1.30
31382	Clip—Coil and core clip for push button oscillator coils	.04	32651	Shaft—Turntable shaft and gear for 50-cycle motor	1.30
32338	Coil—Antenna coil (L1, L2)	.85	32337	Shaft—Turntable shaft and gear for 60-cycle motor	1.40
31098	Coil—Oscillator coil (L3, L4)	.85	MOTOR ASSEMBLIES		
31415	Coil—Push button oscillator coil, 550 to 980 KC. (L12, L13)	.30	Model U-123		
32340	Coil—Push button oscillator coil, 690 to 1,225 KC. (L14)	.35	32956	Coil—Field coil and laminations for 25-cycle motor	7.15
31383	Coil—Push button oscillator coil, 850 to 1,500 KC. (L15, L16)	.30	32955	Coil—Field coil and laminations for 50-cycle motor	5.90
31422	Condenser—2-gang variable tuning condenser (C2, C3, C5, C6, C33)	2.70	32954	Coil—Field coil and laminations for 60-cycle motor	5.35
32355	Control—Volume and tone control and power switch (R5, R14, S1)	3.00	32960	Gear—Motor spindle gear and pin	.75
32634	Cord—Drive cord	.10	32873	Motor—Motor complete, 25-cycle, 110 volts AC	15.95
31386	Core—Core and stud assembly for push button oscillator coils	.15	32872	Motor—Motor complete, 50-cycle, 110 volts AC	13.75
31421	Drum—Tuning drive drum and hub	.45	32871	Motor—Motor complete, 60-cycle, 110 volts AC	13.25
11891	Lamp—Dial lamp	.17	30870	Plug—2-prong male plug—used on motor leads	.35
32136	Lead—Phonograph input shielded lead and connector (U-121 and U-123)	.35	32959	Spindle—Turntable spindle complete with metal pinion and fibre gear for 25-cycle motor	2.90
32908	Lead—Phonograph input shielded lead and socket (U-127E only)	.40	32958	Spindle—Turntable spindle complete with metal pinion and fibre gear for 50-cycle motor	2.90
31419	Plate—Dial color plate	.12	32957	Spindle—Turntable spindle complete with metal pinion and fibre gear for 60-cycle motor	2.90
30868	Plug—2-contact female for motor leads	.35	32875	Switch—Motor control switch	.30
31420	Pointer—Dial indicator pointer	.10	MOTORBOARD ASSEMBLIES		
31373	Pulley—Tuning indicator drive pulley	.08	Model U-121 and U-127E		
31388	Resistor—390 ohms, 1 watt (R9)	.22	14803	Brake—Automatic brake and switch	2.95
14559	Resistor—10,000 ohms, 1/2 watt (R17)	.20	31464	Damper—Comprising one rubber spindle sleeve, and one metal damper plate	.30
12738	Resistor—27,000 ohms, 1/2 watt (R10)	.20	30870	Plug—2-contact male for motor leads	.35
12286	Resistor—56,000 ohms, 1/2 watt (R2)	.20	32610	Rest—Rubber rest for pickup arm	.10
13734	Resistor—120,000 ohms, 1/2 watt (R16)	.20	30100	Springs—One set of springs for automatic brake	.08
12199	Resistor—270,000 ohms, 1/2 watt (R7)	.20	32743	Switch—Radio-Record switch (S27)	.95
30963	Resistor—820,000 ohms, 1/2 watt (R18)	.20	14804	Switch—Switch only for automatic brake (S26)	.60
30208	Resistor—1.2 meg., 1/2 watt (R30) (U127E only)	.20	31463	Turntable—Record turntable	1.50
12679	Resistor—2.2 meg., 1/2 watt (R4)	.20	MOTORBOARD ASSEMBLIES		
13601	Resistor—10 meg., 1/2 watt (R6)	.20	Model U-123		
31425	Resistor—Voltage divider resistor tapped at 22 ohms, 18,000 ohms, 8,200 ohms, and 3,900 ohms (R15, R12, R3, R11)	.90	31149	Base—Tone arm mounting base	.35
14887	Retainer—Indicator drive pulley retainer	.01	32876	Board—Motorboard complete with all riveted and welded posts and brackets—less operating mechanisms	6.50
31482	Screw—No. 8 square head set screw for drive drum	.03	14209	Bumper—Main lever rubber bumper (1)	.08
5040	Socket—4-contact socket for speaker cable	.30	9848	Cup—Used needle cup, rest, and lid complete	.75
31364	Socket—Dial lamp socket	.20	32877	Escutcheon—Index escutcheon	.40
31251	Socket—Octal base tube socket	.25	31151	Guide—Pickup lift cable guide (coil spring, 80T 2-in. large) (2)	.10
31418	Spring—Drive cord tension spring	.05	31150	Mounting—Pickup arm base rubber mounting complete	.45
31414	Switch—Selector switch for push button switch assembly (S20, S21, S22, S23, S24, S25, S12, S13, S14, S15, S16, S17)	3.05	31155	Spring—Needle cup lid tension spring	.04
30902	Transformer—First i.f. transformer (L5, L6, C7, C8)	1.90	OPERATING MECHANISM		
30903	Transformer—Second i.f. transformer (L7, L8, C9, C10)	1.80	Model U-123		
31445	Transformer—Power transformer, 110 volts, 25-60 cycle (T1)	7.80	31134	Bracket—Pickup locating lever mounting bracket (3)	.30
31380	Transformer—Power transformer, 110 volts, 50-60 cycle (T1)	4.75	32878	Cam—Cam and drive gear (42)	2.80
31575	Transformer—Power transformer, 110-220 volts, 50-60 cycle (T1)	8.35	6808	Clutch—Trip lever friction clutch assembly (5)	.35
PICKUP AND ARM ASSEMBLIES			31129	Cover—Cap for top of record post	.45
Model U-121 and U-127E			32883	Damper—Motor spindle rubber drive sleeve and metal damper plate	.30
31212	Base—Pickup arm pivot shaft, trip lever, and mounting base assembly	.95	31116	Finger—Trip lever friction finger assembly (7)	.45
32138	Cable—Shielded cable and male plug for pickup arm	.20	32879	Gear—Rack gear for front left-hand record post (41)	.60
31050	Crystal—Pickup crystal and needle screw	3.75	32880	Gear—Rack gear for rear right-hand record post (40)	.55
32137	Pickup and arm complete	7.00	31121	Gear—Record post gear (10)	.90
12539	Screw—Pickup needle screw	.15	31123	Guide—Main lever spring guide (11)	.40
PICKUP AND ARM ASSEMBLIES			31114	Lever—Index lever assembly (12)	.75
Model U-123 (Single-Band)			31137	Lever—Index lever tension spring lever (13)	.30
31162	Cable—Pickup arm lift cable and clips	.15	31138	Lever—Locating lever and pawl assembly (14)	.70
32885	Cable—Pickup arm output cable	.25	31113	Lever—Main lever assembly (15)	1.35

RCA MFG. CO., INC.

MODELS U-121, Ch. RC-348J
 U-123, Ch. RC-348H, RC-421
 U-127E, Ch. RC-348L

Parts List

MOTOR ASSEMBLIES, MOTORBOARD
 ASSEMBLIES, and OPERATING
 MECHANISM

ALL PRICES ARE SUBJECT TO CHANGE
 OR WITHDRAWAL WITHOUT NOTICE.

Model U-123 (Two Band)
 Same as in Single-Band U-123

Replacement Parts (cont'd) Models U-121, U-123 (Single-Band), and U-127E					
STOCK No.	DESCRIPTION	Unit Price	STOCK No.	DESCRIPTION	Unit Price
31140	Lever-Pickup lift cable lever and spring assembly (16)	.56	31103	Hinge-Cabinet lid hinge (For Model U-127E only)	.50
31135	Lever-Pickup locating lever assembly (17)	.86	32562	Holder-Needle card holder (For Model U-121 only)	.35
31130	Plate-Record separator elevating lever complete with adjusting screws (18)	.80	31391	Knob-Tone control knob	.15
31132	Lever-Trip detaining lever (19)	.30	31355	Knob-Dummy or radio-record switch knob	.15
31115	Lever-Trip lever assembly (20)	1.85	30773	Knob-Volume control or tuning knob	.12
31131	Lever-Trip regulator lever (21)	.25	30991	Marker-One set station call letter markers	.40
31133	Pawl-Trip pawl assembly (22)	.04	31064	Mounting-Pickup arm rubber mounting, washers, and nuts (For Model U-121 and U-127E only)	.15
31124	Pin-Record drive pin (23)	.55	32870	Screen-Photograph compartment lamp screen (For Model U-123 only)	1.00
14207	Roller-Pickup lift cable roller and bracket assembly (24)	.06	31470	Spring-Motorboard mounting springs, bolts, and washers (For Model U-123 only) (4 required)	.03
31118	Screw-Cone pointed set screw for trip lever hub or record post shaft	.04	32721	Spring-Retaining spring for push button	.02
4563	Screw-Pickup lift cable screw and nuts	.04	30330	Spring-Retaining spring for tone control knob	.03
31117	Screw-Special screw to adjust friction clutch tension (B)	.03	14270	Spring-Retaining spring for tuning, volume control, or switch knob	.05
31126	Separator-Record separator knife (25)	.75	11831	Support-Cabinet lid support (For Model U-121 only)	1.85
31122	Shaft-Record separator post shaft (26)	.40	31478	Support-Cabinet lid support (For Model U-123 only)	2.20
31125	Self-Record post shaft assembly (27)	1.25	30946	Support-Cabinet lid support (For Model U-123 only)	.60
3676	Spring-Cam pawl tension spring on main gear (12 turns, 180-in. O.D., 4-3/64-in. lg.)	.04	31687	Switch-Radio-Record switch (For Model U-123 only)	.95
32882	Spring-Main lever tension spring (43) (18 turns, 8-in. O.D., 3-in. lg.)	.05	32743	Escutcheon-Dial scale escutcheon	.55
14190	Spring-Pickup locating lever short spring or locating lever pawl tension spring (38) (18 turns, 180-in. O.D., 19/32-in. lg.)	.08	32799	Escutcheon-Push button escutcheon	.50
31136	Spring-Trip detaining lever tension spring (30) (25 turns, 190-in. O.D., 15/16-in. lg.)	.05	30698	Hinge-Cabinet lid hinge (For Models U-121 and U-123)	.50
3666	Spring-Pickup lift cable tension spring (31) (20 turns, 195-in. O.D., 1-in. lg.)	.04			
31127	Spring-Record separator pressure spring (32) (8 turns, 5/8-in. O.D., 3/4-in. lg.)	.02			
14191	Spring-Trip detaining lever tension spring (33) (16 turns, 190-in. O.D., 3/4-in. lg.)	.04			
31875	Spring-Pickup locating lever tension spring (34) (14 turns, 220-in. O.D., 27/32-in. lg.)	.04			
32436	Spring-Locating lever tension spring (35) (16 turns, 182-in. O.D., 21/32-in. lg.)	.05			
32881	Washer-Complete	2.00			
31128	Washer-"C" washer for top of record post	.04			
SPEAKER ASSEMBLIES (RL-70F3)					
Models U-121 and U-123 (Single-Band)					
13866	Cap-Dust cap for cone center	.03	13805	Capacitor-.27 mmfd. (C7)	.35
12012	Coil-Field coil (L16)	2.90	12723	Capacitor-.56 mmfd. (C7)	.35
12012	Coil-Hum neutralizing coil (L16)	2.90	12404	Capacitor-.109 mmfd. (C13, C14)	.35
31275	Coil-Speaker cone and voice coil (L14)	1.75	14712	Capacitor-.18 mmfd. (C15, C16)	.30
31302	Plug-3-prong male for speaker	.35	30232	Capacitor-.280 mmfd. (C17)	.30
31300	Speaker-Speaker complete	10.95	12952	Capacitor-.300 mmfd. (C17)	.35
14358	Screw-Screw, washer, and lockwasher to hold core in yoke	.04	30608	Capacitor-.510 mmfd. (C8)	.35
31301	Transformer-Output transformer (T2)	1.70	32714	Capacitor-.730 mmfd. (C6)	.45
14357	Washer-Spring washer to hold field coil	.06	14358	Capacitor-.600 mmfd. (C8)	.70
			4838	Capacitor-.005 mfd. (C23, C25)	.02
			4937	Capacitor-.01 mfd. (C30, C32)	.25
			4870	Capacitor-.025 mfd. (C18)	.20
			32787	Capacitor-.05 mfd. (C12)	.20
			33014	Capacitor-Electrolytic-comprising three 10 C27, and one 20 mfd. sections (C8, C34, C26, C29)	1.90
			32705	Capacitor-Push button trimmer capacitor bank (C9, C29, C30, C31, C32)	1.90
			31382	Clip-Push button coil mounting clip	1.04
			32706	Coil-Antenna coil (L1, L2, L3, L4)	.95
			32707	Coil-Oscillator coil (L5, L6)	.15
			31385	Coil-Push button oscillator coil-less core, 550-950 kc (L28)	.30
			32704	Coil-Push button oscillator coil-less core, 550-950 kc (L28)	.30
			32540	Coil-Push button oscillator coil-less core, 890-1,225 kc (L29)	.35
			31383	Coil-Push button oscillator coil-less core, 890-1,500 kc (L30)	.35
			32249	Condenser-220 mfd. electrolytic (C2, C3, C5)	3.00
			32355	Control-Volume control tone control, and power switch (R6, R11, S1)	2.70
			32834	Cord-Drive cord	3.00
			31386	Cord-Core and stud for coil, Stock No. 31383, 31385, and 32704	.10
					.15
		</			

MODEL U-125, Ch. RC-386
Alignment, Tuner Data

RCA MFG. CO., INC.

ALIGNMENT PROCEDURE

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be ver-

tical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed $\frac{3}{8}$ -inch. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

Steps	Connect the high side of test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	"A" band, Quiet Point between 550-750 kc	L12 and L13 (2nd I-F Trans.)
2	6A8-G det. grid cap, in series with .01 mfd.	455 kc		L10 and L11 (1st I-F Trans.)
3	Antenna Terminal, in series with 300 ohms	20 mc	20 mc (23°) "C" band	C21* (osc.) C30** (ant.)
4	Antenna Terminal, in series with 300 ohms	6 mc	6 mc (33°) "B" band	C23 (osc.)†
5	Antenna Terminal, in series with 200 mmf.	1,500 kc	1,500 kc (28½°) "A" band	C25 (osc.)
6	Follow "Adjustments for Electric Tuning"			

* Use minimum capacity peak if two peaks can be obtained.

** Rock gang slightly and use maximum capacity peak if two peaks can be obtained with C30. Check to determine that C21 has been adjusted to the correct peak by tuning to approximately 28° (19.09 mc), where a weaker signal (image) should be received.

† Use minimum capacity peak if two peaks can be obtained. Check to determine that C23 has been adjusted to the correct peak by tuning to approximately 51° (5.09 mc), at which point a weaker signal (image) should be received.

Note.—Oscillator tracks 455 kc above signal on all bands.

ADJUSTMENTS FOR ELECTRIC TUNING

This model has eight push-buttons. The front button is the Victrola switch. The rear button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments.

Use one or two feet of wire as an antenna to ensure sharp peaking.

The procedure is as follows:

1. Make a list of the desired six stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning button, and manually tune in the first station on the list.
3. Push in station button No. 1 (second from front) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
4. Adjust No. 1 antenna trimmer (C36) for maximum output on this station.

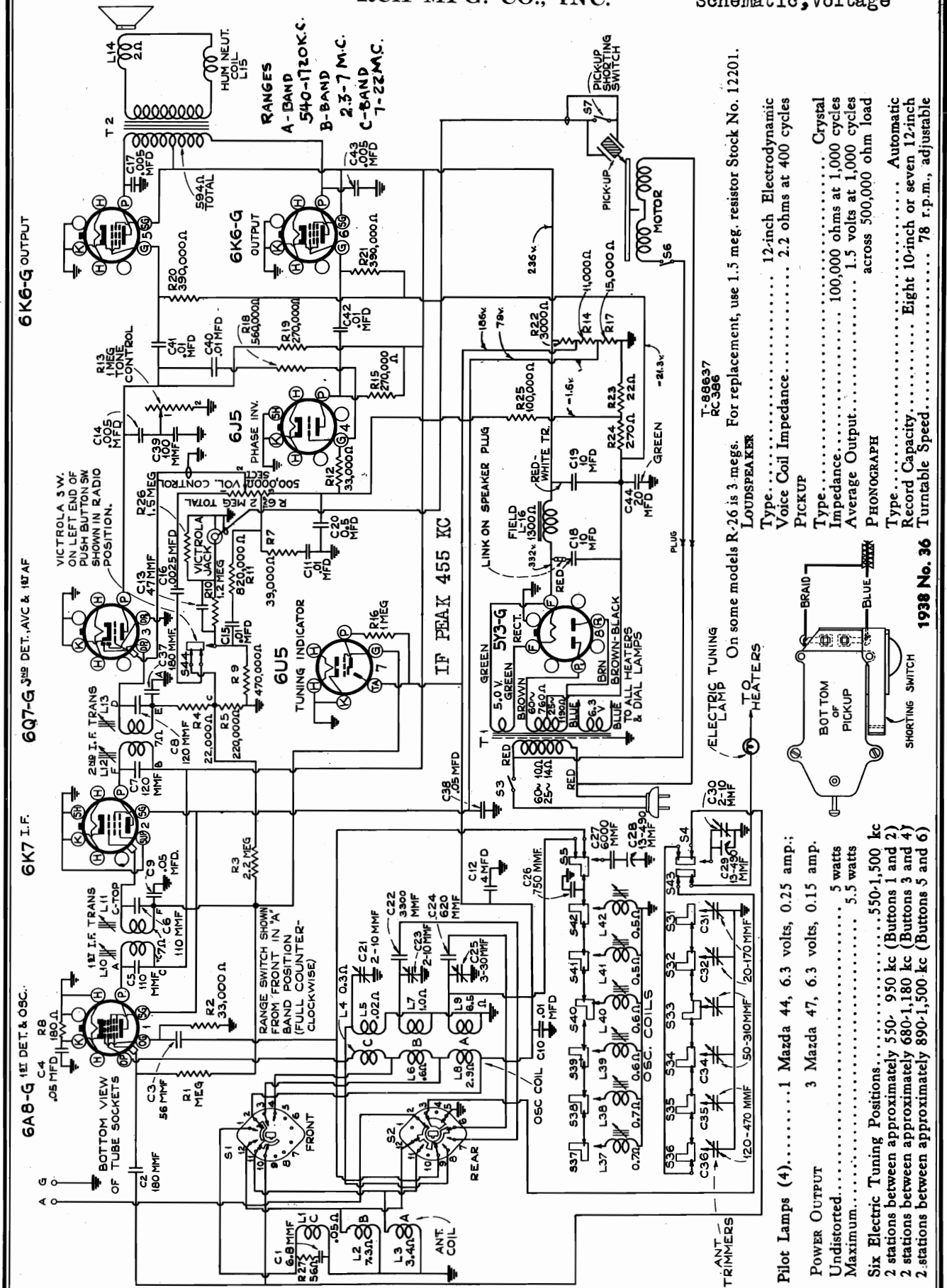
Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

5. Adjust for each of the remaining five stations in the same manner.

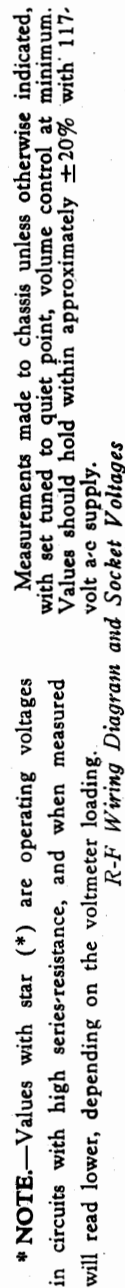
6. Make a final careful adjustment of the oscillator cores and antenna trimmers.

Precautionary Lead Dress.—

1. Dress red leads from power transformer to power switch (S3), in corner of chassis and away from volume control terminals.
2. Dress brown lead from push-button switch to gang over end of switch, and away from C27 and bus between S5 and range switch.
3. Leads to C27 must be as short as possible.
4. Blue lead from range switch to oscillator coil must be as short as possible and dressed away from other leads. All leads should be dressed away from antenna coil.
5. Leads across back of chassis must be dressed under electrolytic away from Victrola jack.
6. Parts and leads should be dressed away from R22-R14 as it becomes heated.
7. Leads from oscillator coil to trimmers must be dressed away from coil.
8. Green lead from S4 to range switch must be clear of other leads and away from front edge of chassis.



MODEL U-125, Ch. RC-386
Chassis Wiring, Voltage



RCA MFG. CO., INC.

MODEL U-125, Ch. RC-386

Parts List

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price	STOCK No.	DESCRIPTION	Unit List Price
RECEIVER ASSEMBLIES					
14517	Board—Antenna ground terminal board.....	.25	14376	Transformer—First i-f transformer (L10, L11, C5, C6).....	2.45
30752	Bracket—Magic Eye mounting bracket.....	.25	14283	Transformer—Second i-f transformer (L12, L13, C7, C8, C37, R4, R5).....	3.80
31400	Capacitor—Triple adjustable trimmer two sections 2-10 mmfd., one section 3-30 mmfd. (C21, C23, C25).....	.50	31445	Transformer—Power transformer 105-125 volts, 25-60 cycles (T1).....	7.80
14079	Capacitor—6.8 mmfd. (C1).....	.35	31446	Transformer—Power transformer 100-130/140-160/200-250 volts, 50-60 cycles (T1).....	8.05
31387	Capacitor—Antenna coil trimmer capacitor bank 20-470 mmfd. (C31, C32, C33, C34, C35, C36).....	1.30	32144	Transformer—Power transformer 105-125 volts, 50-60 cycles (T1).....	4.75
13141	Capacitor—47 mmfd. (C13).....	.35	SPEAKER ASSEMBLIES		
12723	Capacitor—56 mmfd. (C3).....	.35	(RL-70H-5)		
12720	Capacitor—100 mmfd. (C39).....	.35	13866	Cap—Dust cap for cone center.....	.03
12422	Capacitor—110 mmfd. (C5, C6).....	.30	12012	Coil—Field coil (L16).....	2.90
12404	Capacitor—120 mmfd. (C7, C8).....	.30	11489	Coil—Neutralizing coil (L15).....	.30
13003	Capacitor—180 mmfd. (C2).....	.35	31275	Cone—Speaker cone and voice coil (L14).....	1.75
14712	Capacitor—180 mmfd. (C37).....	.30	31539	Plug—5-contact male plug for speaker.....	.25
31381	Capacitor—620 mmfd. (C24).....	.45	32146	Speaker complete.....	12.10
31435	Capacitor—750 mmfd. (C26).....	.40	14534	Transformer—Output transformer (T2).....	3.85
4881	Capacitor—3,300 mmfd. (C22).....	.60	14357	Washer—Spring washer to hold field coil securely	.06
31405	Capacitor—6,000 mmfd. (C27).....	.75	MOTORBOARD ASSEMBLIES		
5107	Capacitor—.0025 mfd. (C16).....	.20	31149	Base—Tone arm mounting base.....	.35
4838	Capacitor—.005 mfd. (C14, C17, C43).....	.25	31152	Board—Record changer base complete with all welded and riveted posts and bearings—less all operating parts.....	7.90
4858	Capacitor—.01 mfd. (C10, C40, C41, C42).....	.25	14209	Bumper—Main lever rubber bumper (1).....	.08
14393	Capacitor—.01 mfd. (C11, C15).....	.30	9848	Cup—Used needle cup, rest, and lid complete...	.75
30882	Capacitor—.05 mfd. (C4, C9, C38).....	.20	31148	Escutcheon—Index escutcheon.....	.40
30867	Capacitor—.05 mfd. (C20).....	.30	31151	Guide—Pickup lift cable guide (Coil spring, 80T 2-in. large) (2).....	.10
32145	Capacitor—4 mfd. (C12).....	.70	31150	Mounting—Pickup arm base rubber mounting complete.....	.45
32142	Capacitor—Comprising two 10 mfd., one 20 mfd. sections (C18, C19, C44).....	1.90	31155	Spring—Needle cup lid tension spring.....	.04
31382	Clip—Oscillator coil and core mounting clip.....	.04	OPERATING MECHANISM		
31402	Coil—Antenna coil—A, B, and C bands (L1, L2, L3).....	1.15	31134	Bracket—Pickup locating lever mounting bracket (3).....	.30
31401	Coil—Oscillator coil—A, B, and C bands (L4, L5, L6, L7, L8, L9).....	2.00	31144	Cam—Cam and gear assembly (4).....	2.80
31383	Coil—Oscillator coil—A band (L41, L42).....	.30	6808	Clutch—Trip lever friction clutch assembly (5).....	.35
31384	Coil—Oscillator coil—A band (L39, L40).....	.30	31146	Coupling—Motor coupling complete with turntable drive gear, rubber strips, motor coupling, and drive arm (6).....	1.80
31385	Coil—Oscillator coil—A band (L37, L38).....	.30	31129	Cover—Cap for top of record post.....	.45
31369	Condenser—2-gang variable tuning condenser (C28, C29, C30).....	2.65	31116	Finger—Trip lever friction on finger assembly (7).....	.45
31366	Control—Volume control, tone control, and on-off switch (R6, R13, S3).....	3.00	31119	Gear—Long arm and rack gear for front left-hand record post (8).....	.60
31375	Cord—Indicator pointer drive cord.....	.30	31120	Gear—Short arm and rack gear for rear right-hand record post (9).....	.55
31374	Cord—Variable condenser drum drive cord.....	.15	31121	Gear—Record post gear (10).....	.90
30905	Core—Adjustable core and stud for i-f transformer	.35	31123	Guide—Main lever spring guide (11).....	.40
31386	Core—Adjustable core and stud for oscillator coil, Stock Nos. 31383, 31384, and 31385.....	.15	31114	Lever—Index lever assembly (12).....	.75
31372	Drum—Variable condenser drive cord drum and calibration dial.....	.65	31137	Lever—Index lever tension spring lever (13).....	.30
11891	Lamp—Phono. compartment lamp.....	.17	31138	Lever—Locating lever and pawl assembly (14).....	.70
31480	Lamp—Dial and "Electric Tuning" lamp.....	.20	31113	Lever—Main lever assembly (15).....	1.35
30868	Plug—2-contact female plug for motor cable.....	.35	31140	Lever—Pickup lift cable lever and spring assembly (16).....	.55
5040	Plug—4-contact female plug for speaker cable.....	.30	31135	Lever—Pickup locating lever assembly (17).....	.85
31373	Pulley—Drive cord pulley.....	.08	31130	Lever—Record separator elevating lever complete with adjustment screws (18).....	.80
32143	Resistor—Voltage divider comprising one 11,000-ohm, one 3,000-ohm, one 22-ohm, and one 270-ohm sections (R14, R22, R23, R24).....	.90	31132	Lever—Trip detaining lever (19).....	.30
13220	Resistor—56 ohms, 1/2-watt (R27).....	.20	31115	Lever—Trip lever assembly (20).....	1.85
30545	Resistor—180 ohms, 1/2-watt (R8).....	.20	31131	Lever—Trip regulator lever (21).....	.25
5114	Resistor—15,000 ohms, 1-watt (R17).....	.22	31133	Pawl—Trip pawl assembly (22).....	.80
14284	Resistor—22,000 ohms, 1/10-watt (R4).....	.15	31124	Pin—Record post drive pin (23).....	.04
12454	Resistor—33,000 ohms, 1-watt (R2, R12).....	.20	14207	Roller—Pickup lift cable roller and bracket assembly (24).....	.55
12266	Resistor—39,000 ohms, 1-watt (R7).....	.20	31118	Screw—Cone pointed set screw for trip lever hub or record post shelf.....	.06
14560	Resistor—100,000 ohms, 1-watt (R25).....	.20	4563	Screw—Pickup lift cable screw and nuts.....	.04
11398	Resistor—220,000 ohms, 1/10-watt (R5).....	.15	14195	Screw—Set screw for flexible coupling.....	.05
12199	Resistor—270,000 ohms, 1-watt (R15, R19).....	.20	31117	Screw—Special screw to adjust friction clutch tension.....	.03
13479	Resistor—390,000 ohms, 1-watt (R20, R21).....	.20	31126	Separator—Record separator knife (25).....	.75
12285	Resistor—470,000 ohms, 1-watt (R9).....	.20	31122	Shaft—Record separator post shaft (26).....	.40
12486	Resistor—560,000 ohms, 1-watt (R18).....	.20	31125	Shelf—Record post shelf assembly (27).....	1.25
30963	Resistor—820,000 ohms, 1-watt (R11).....	.20	31141	Spindle—Turntable spindle shaft and spring.....	1.40
12013	Resistor—1 meg., 1/10-watt (R16).....	.15	3676	Spring—Cam pawl tension spring on main gear (12 turns, .190-in. O.D., 43/64-in. lg.).....	.04
13730	Resistor—1 meg., 1-watt (R1).....	.20	14190	Spring—Pickup locating lever short spring or locating lever pawl tension spring (28) (16 turns, .180-in. O.D., 19/32-in. lg.).....	.08
30208	Resistor—1.2 meg., 1-watt (R10).....	.20	31145	Spring—Main lever tension spring (29) (18 turns, 9/16-in. O.D., 3-in. lg.).....	.05
12201	Resistor—1.5 meg., 1-watt (R26).....	.20	31136	Spring—Index lever tension spring (30) (25 turns, .190-in. O.D., 15/16-in. lg.).....	.05
12679	Resistor—2.2 meg., 1-watt (R3).....	.20	3666	Spring—Pickup lift cable tension spring (31) (20 turns, .195-in. O.D., 1-in. lg.).....	.04
14343	Retainer—Retaining spring for station selector knob shaft.....	.03	31127	Spring—Record separator pressure spring (32) (8 turns, 1/2-in. O.D., 1-in. lg.).....	.02
14887	Retainer—Drive cord pulley retainer.....	.01	14191	Spring—Trip detaining lever tension spring (33) (15 turns, .190-in. O.D., 1-in. lg.).....	.04
4669	Screw—No. 8-32 square head set screw for drum, Stock No. 31372.....	.03	31875	Spring—Pickup locating lever tension spring (34) (14 turns, .220-in. O.D., 27/32-in. lg.).....	.04
31368	Shaft—Station selector knob shaft and pulley.....	.30			
3682	Shield—Tube shield.....	.22			
30868	Socket—2-contact female socket for motor power cable.....	.35			
12493	Socket—5-contact female socket for speaker cable.....	.30			
13871	Socket—Magic Eye socket.....	.45			
14278	Socket—Pickup input socket.....	.25			
31251	Socket—Tube socket.....	.25			
31418	Spring—Indicator or drum drive cord tension spring.....	.05			
31398	Switch—Range switch (S1, S2).....	1.25			
31370	Switch—Station selector push-button switch (S4, S5, S31, S32, S33, S34, S35, S36, S37, S38, S39, S40, S41, S42, S43, S44).....	3.85			

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MODEL U-125, Ch. RC-386

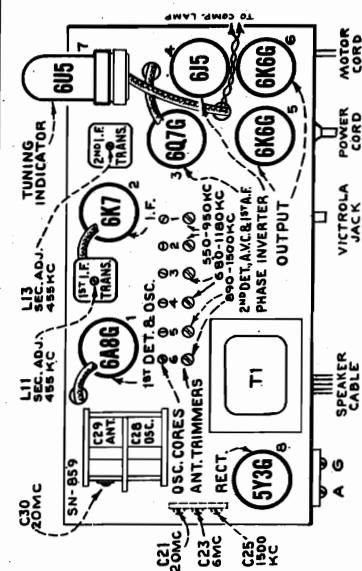
Socket, Trimmers,

Speaker Connections

Drive Cord Data, Transformer Data

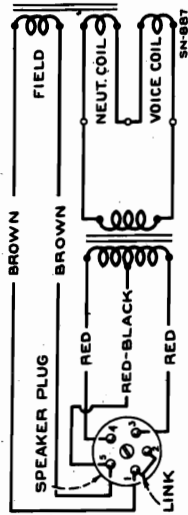
Parts List

RCA MFG. CO., INC.

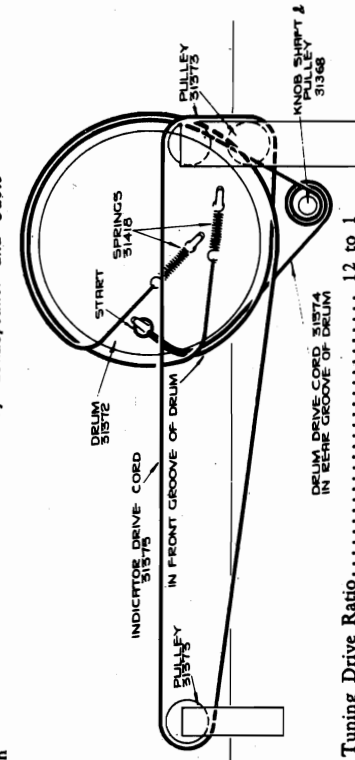


POWER SUPPLY RATINGS

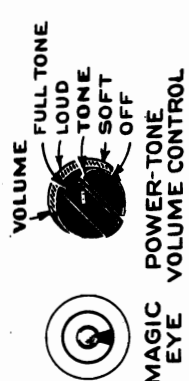
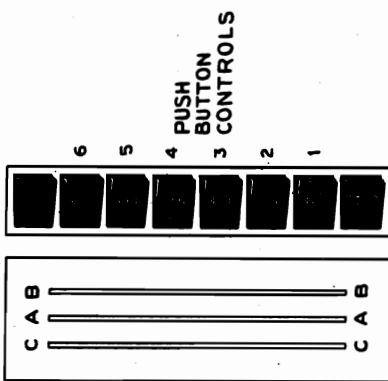
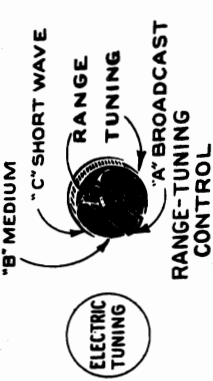
Part	Rating
A-6	105-125 volts, 60 cycles, 115 watts
A	105-125 volts, 50-60 cycles, 115 watts
B-2	105-125 volts, 25 cycles, 115 watts
C-6	100-130/140-160/200-250 volts, 60 cycles, 115 watts
C	100-130/140-160/200-250 volts, 50-60 cycles, 115 watts



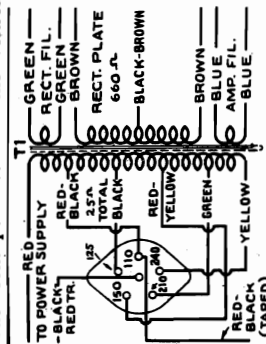
SPEAKER PLUG CONNECTIONS
Connections and Colors of Loudspeaker and Cable



Tuning Drive Ratio..... 12 to 1
DRUM SHOWN WITH GANG AT MAXIMUM CAPACITY
Arrangement of Drive Cords for Tuning Condenser and Dial Indicator



The rear push-button is for dial tuning
The front push-button is the Victrola switch



NOTE: INSERT CONNECTOR BETWEEN COMMON CONTACT AND POWER SUPPLY RATING

UNIVERSAL TRANS. CONNECTIONS

(110-volt supply for the Victrola motor is obtained by connecting the motor to the red and the red-black leads.)

REPLACEMENT PARTS (Continued)

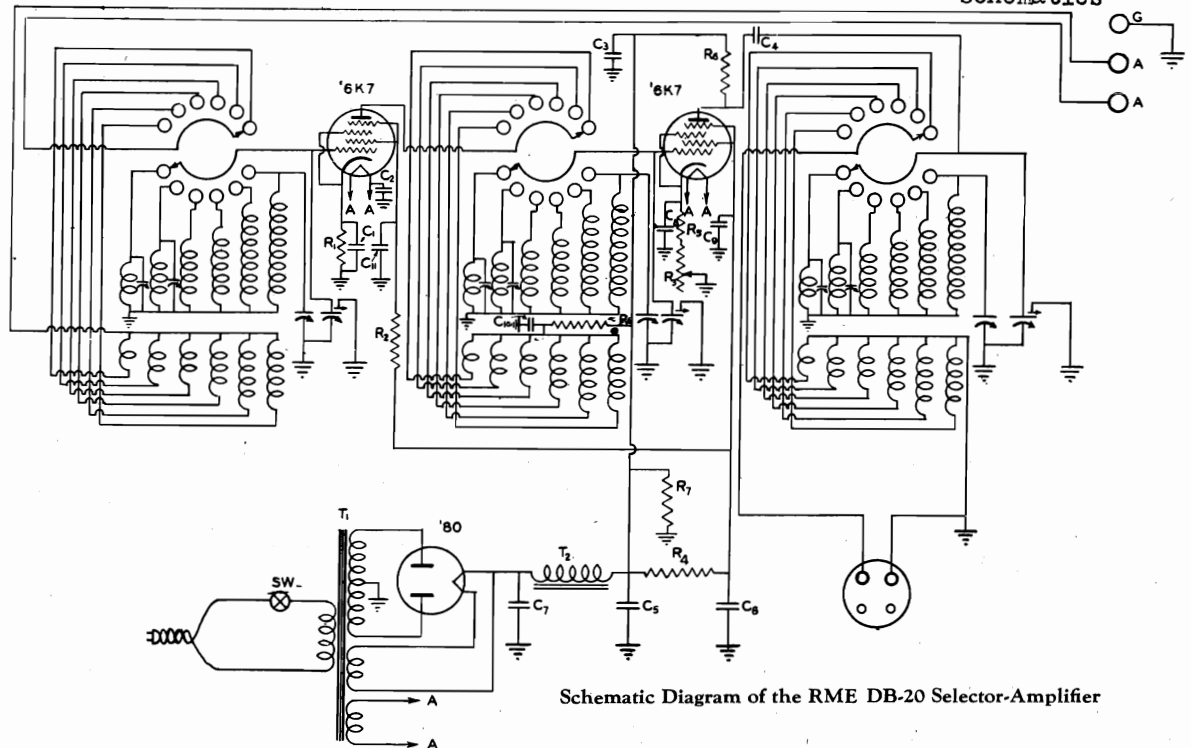
STOCK No.	DESCRIPTION	Unit List Price
32436	Spring—Locating lever tension spring (35) (16 turns, 182-in. O.D., 21/32-in. lg.)	.05
31142	Spring—Turntable spindle spring.....	.03
31147	Strip—Complete set of rubber strips for flexible coupling	.40
31139	Turntable—Assembly—less spindle.....	3.35
31128	Washers—"C" washer for top of record post.....	.04
31143	Washers—Turntable thrust washers (1 steel, 1 bronze, 1 felt).....	.15
MOTOR ASSEMBLIES		
11703	Governor—Motor speed governor (M1).....	3.05
31148	Motor—105-125 volts, 25 cycles (M1).....	23.70
31163	Motor—105-125 volts, 50-60 cycles (M1).....	20.50
31157	Motor—105-125 volts, 60 cycles (M1).....	17.75
30870	Plug—2-contact male plug for motor power cable	.35
31447	Screw—Complete set of motor mounting screws, washers, and spacers—for 25 cycle models only	.40
31158	Screw—Complete set of motor mounting screws, washers, and spacers—for 50-60 cycle models	.25
14206	Switch—Motor toggle switch (S6).....	.80
PICKUP AND ARM ASSEMBLIES		
31162	Cable—Pickup arm lift cable and clips.....	.15
31156	Crystal—Pickup crystal cartridge and needle screw	4.25
31159	Pickup and arm complete.....	7.45
31160	Screw—Pickup needle screw.....	.12
31161	Shaft—Pickup pivot arm and shaft assembly.....	.45
MISCELLANEOUS ASSEMBLIES		
12038	Band—Rubber band for Magic Eye.....	.02
31397	Button—Station selector push-button.....	.15
13103	Cap—Pilot light jewel.....	.15
31456	Cover—8-protective covers for push-button markers	.08
31541	Cushion—Motor plate mounting cushions and clamps sufficient for one instrument.....	.50
31591	Dial—Station selector dial scale.....	.75
31407	Escutcheon—Magic Eye or Electric Tuning indicator escutcheon.....	.60
31395	Escutcheon—Tuning dial escutcheon only, less push-buttons and dial scale.....	1.15
30898	Hinge—Cabinet lid hinge.....	.95
31543	Indicator—Electric Tuning indicator disc.....	.25
31392	Indicator—Indicator plate, carriage, and clip.....	.12
31555	Knob—Range selector knob.....	.12
14359	Knob—Station selector knob.....	.20
31391	Knob—Tone control knob.....	.15
30773	Knob—Volume control knob.....	.15
31460	Marker—"Dial Tuning" marker for push-button.....	.04
31590	Marker—"Victrola" marker for push-button.....	.04
31593	Screen—Dial color screen.....	.40
31760	Screen—Phono. compartment lamp screen.....	.20
11210	Screw—Chassis mounting screws, washers, and lockwashers.....	.05
31470	Springs—Motorboard suspension top spring, bottom spring, screw, and lockwasher (4 reqd.)	.10
4982	Spring—Retaining spring for knob Stock No. 14359.....	.05
14270	Spring—Retaining spring for knob Stock No. 30773 and 31355.....	.05
30330	Spring—Retaining spring for knob Stock No. 31391.....	.03
31478	Support—Cabinet lid support.....	2.20

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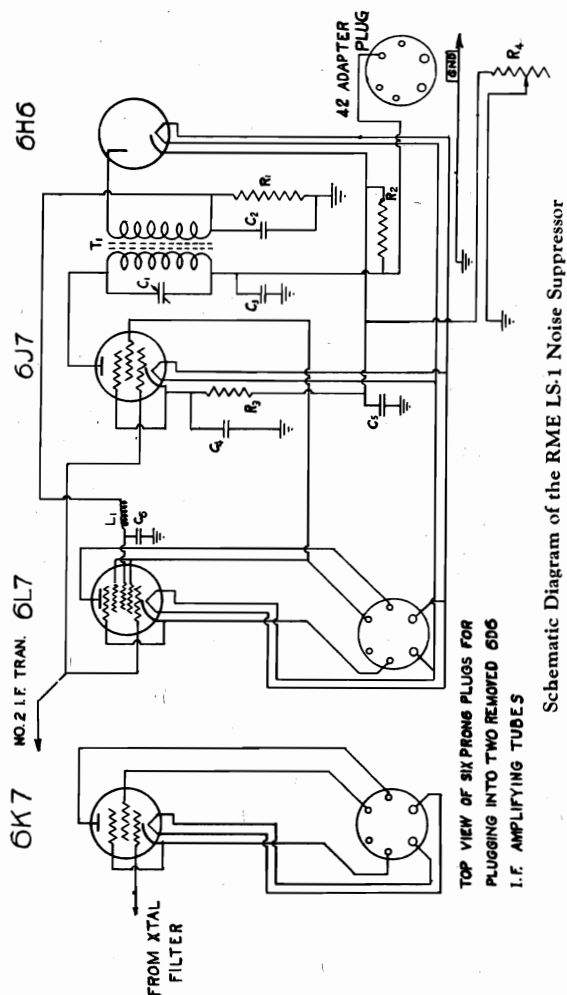
MODEL RME DB-20
Amplifier Schematic

RADIO MFG. ENGINEERS, INC.

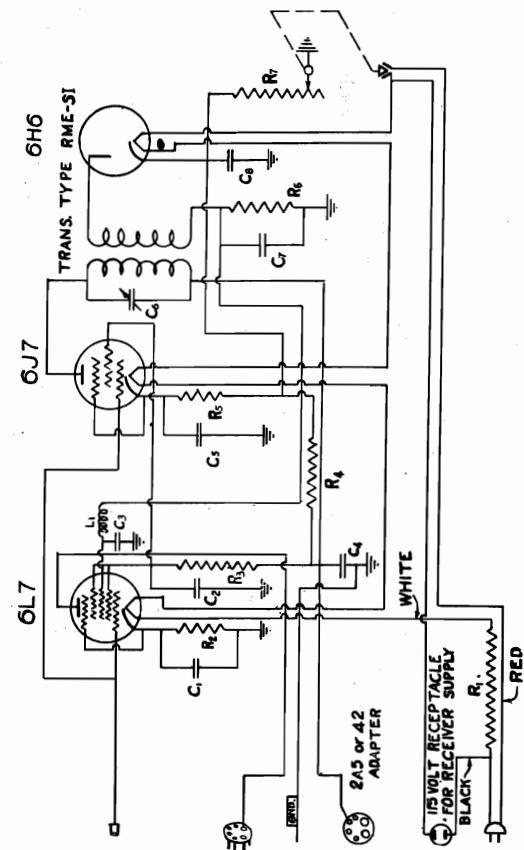
MODEL RME LS-1
MODEL RME LS-2
Noise Suppressors
Schematics



Schematic Diagram of the RME DB-20 Selector-Amplifier



Schematic Diagram of the RME LS-1 Noise Suppressor



Schematic Diagram of the RME LS-2 Noise Suppressor

MODEL RME 69
Socket, Trimmers
Controls

RADIO MFG. ENGINEERS, INC.

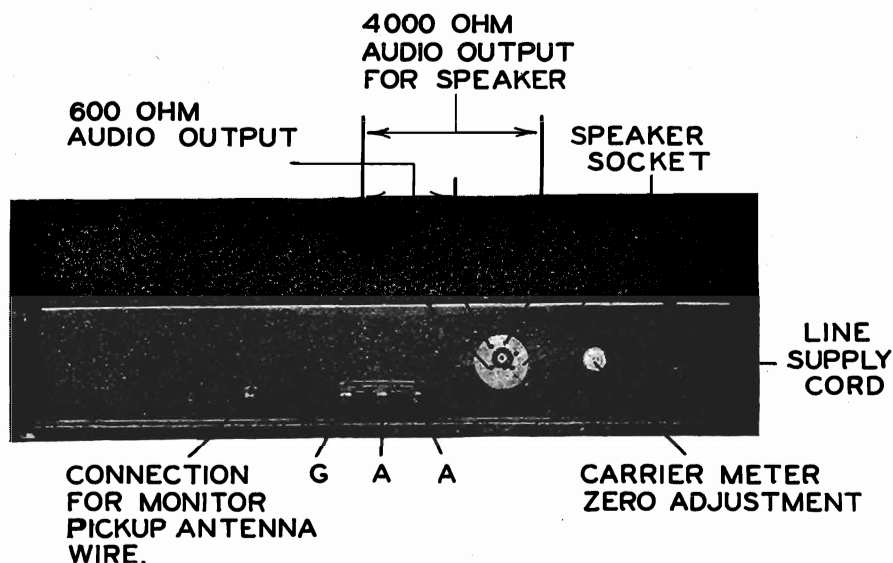


FIG. 3

FOR SCHEMATIC SEE VOLUME VII.

FIG. 6

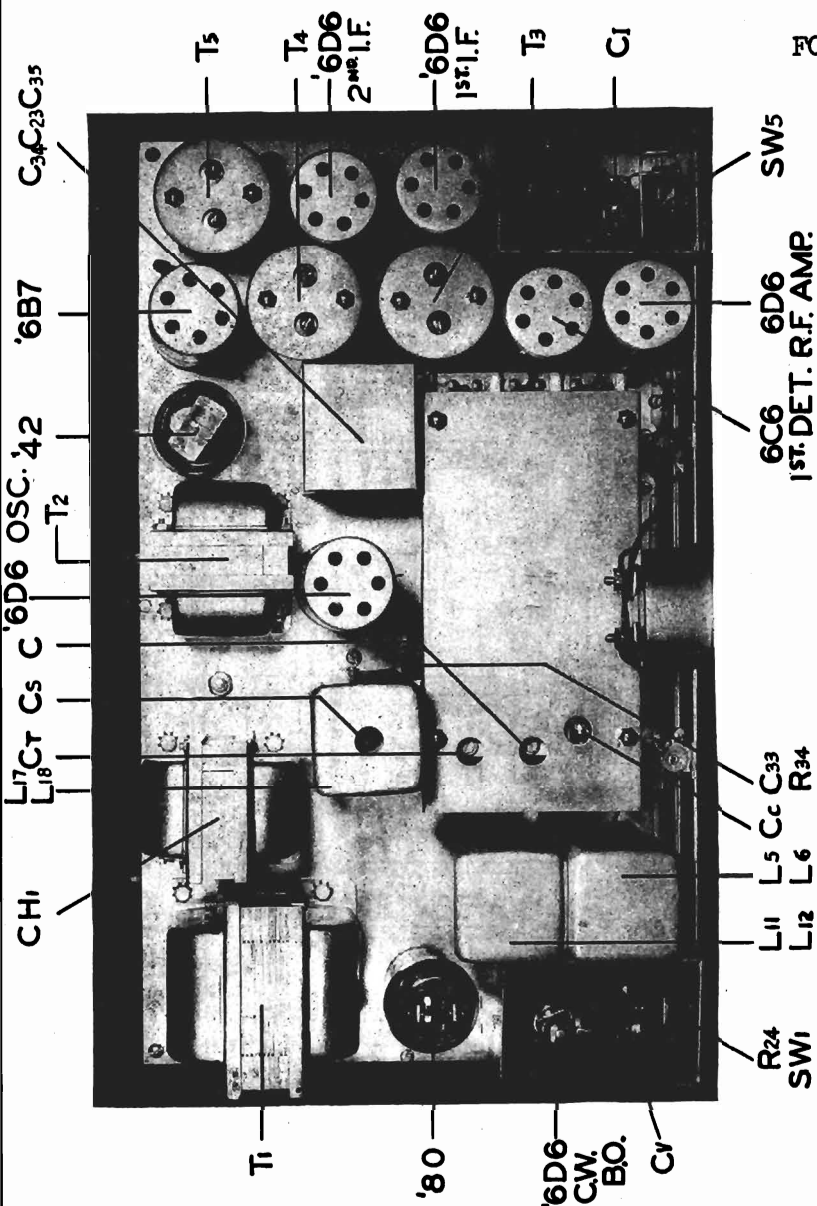
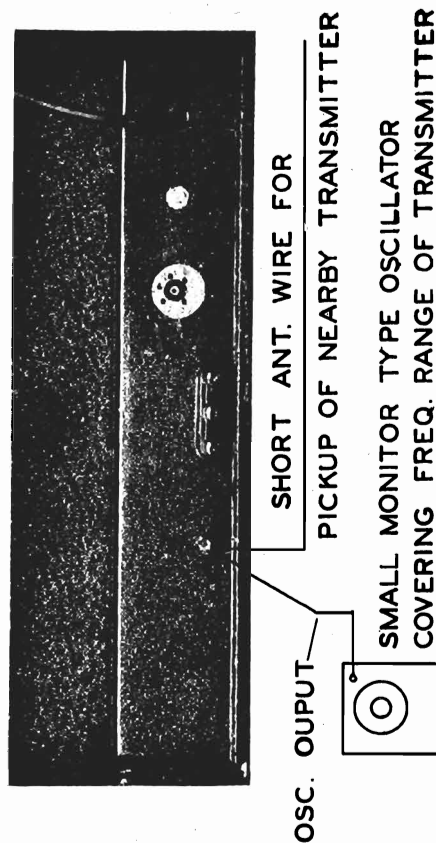


FIG. 4



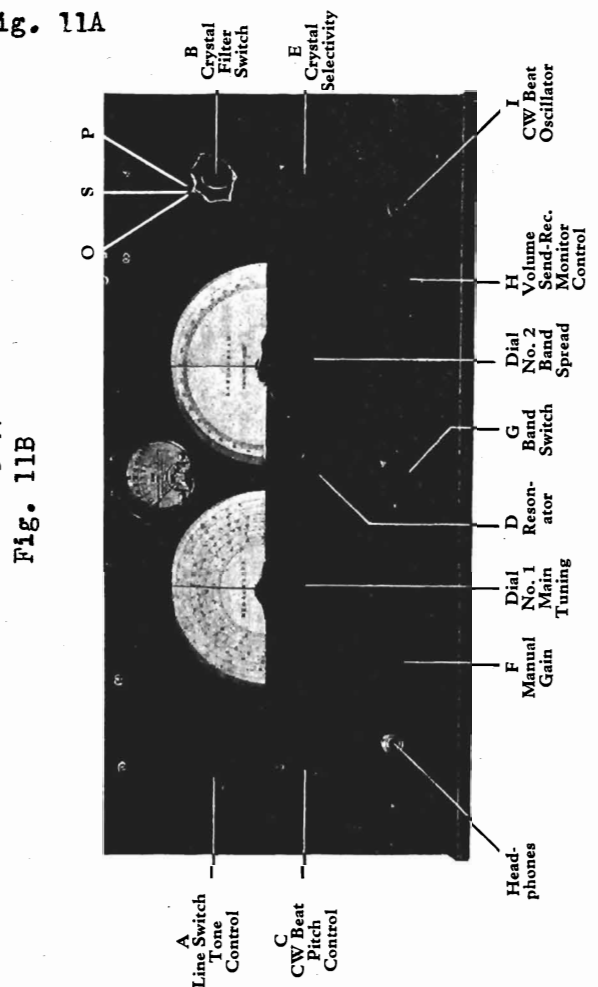
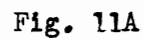
[illegible]

Fig. 2A. Front Panel Layout of the Standard RME-69, AC Model.

MODEL RME 69

Alignment

Part 1

RADIO MFG. ENGINEERS, INC.

receiver in which is installed a quartz filter. It is therefore better if no test oscillator is had, since a broadcast station of constant signal strength will furnish adequate test signal for alignment of the intermediate frequency amplifier, using the quartz filter for establishing the proper IF frequency as indicated in the following procedure.

The meter on the RME-69 receiver affords an excellent method of indicating the peak alignment of each of the transformers. The location of the three intermediate frequency amplifier transformers, T-3, T-4, and T-5 is given on Figure 4 of the illustrated sheet attached. The two padding condensers located in each of these transformers and accessible through apertures in the top of the shields can also be seen.

OUTLINE OF PROCEDURE FOR CORRECT ALIGNMENT OF THE INTERMEDIATE FREQUENCY AMPLIFIER TRANSFORMERS OF THE RME-69 RECEIVER.

The intermediate frequency amplifiers in the RME-69 Receiver are designed for a frequency of 465 KC. Since these receivers are always supplied with a quartz crystal filter, it is essential that the intermediate frequency amplifier transformers be accurately aligned with the crystal frequency. Crystals are supplied in frequencies slightly at variance from the above stated value of intermediate frequency by an amount not greater than one kilocycle plus or minus 465 KC. Rather therefore than align the intermediate frequency amplifier stages of the RME-69 to a set frequency of 465, it is essential that the alignment be done in conjunction with the quartz filter so that alignment of the intermediate frequency amplifier is achieved at the frequency of the filter. This is done as follows and when the process as herein outlined is followed accurately, maximum results will be obtained. The use of any other process of a general type will produce inferior results.

The first step in the alignment procedure is to tune in a broadcast station, preferably in the low frequency portion of the broadcast band. The signal should be one of medium signal strength so that the R meter indicates a signal level of R9 or slightly less. If no station of this amplitude is available but a stronger station is available, a reduction in the efficiency of the antenna by the connection of a short wire to the antenna post may help to bring the signal strength as indicated down to R9. Usually between 550 and 800 KC in most any territory a station can be received at most any time for this test and adjustment.

When the station has been chosen, let us assume that its frequency is 700 KC, the next step is to slightly detune the main tuning control so that the frequency reads approximately 715 or 720 KC. This of course will tune the station out. It does not necessarily have to be the frequency mentioned or the exact frequency of detune, but the general procedure is to tune the main tuning control slightly higher than the chosen station so that it may be brought back to resonance by decreasing the scale reading of the band-spread control. This is done merely to provide vernier tuning.

With the station chosen and resonated on the band-spread scale, the crystal filter is switched to the series position which is the middle position of the three available. The band-spread scale is then adjusted with respect to the signal so

SERVICE NOTES FOR THE RME-69 RECEIVER

ALIGNMENT

One of the first evidences of misalignment in a receiver is low over-all gain of the receiver. In the RME-69 Receiver this is evidenced by low meter readings on signals which were formerly capable of producing higher meter readings. Due to the tremendous gain available in the audio system of the RME-69 Receiver, a misalignment due to loss of gain may not be noticed if the condition of the receiver is judged by audio output, since it may be possible to turn the volume control to the maximum output position and still obtain high values of audio output. Misalignment, however, does not affect the circuits of the audio amplifier and has solely to do with the intermediate frequency amplifier and, to some extent, the radio frequency amplifiers. Principal among the contributions to low gain is the part which the intermediate frequency amplifier plays in providing over-all sensitivity and selectivity of a satisfactory order.

Misalignment of the radio frequency section (principally that part of the section which is made up of the high frequency oscillator) is the control of the receiver calibration. This also is susceptible to certain outside influences which can cause variations to such a degree that the stated calibration of the receiver is changed to other values. However, this effect is not a common effect and usually the calibration of the receiver, unless tampered with by inexperienced hands, will remain very close to its stated value indefinitely.

This loss of gain when occurring in the radio frequency section of the receiver is usually due to the fact that the oscillator has been grossly misaligned so that it is apparent in the frequency calibration of the receiver. In other words, it might well be said that a loss of sensitivity in the receiver occurring simultaneously with a wide-spread condition of off calibration might indicate the fact that the loss of gain is caused by misalignment of the radio frequency section of the receiver.

On the other hand, if the gain of the receiver is low, but the calibration is correct, it might be said without hesitation that the most probable cause for the low gain is the misalignment of the intermediate frequency amplifiers relative to the trimming condensers of the intermediate frequency amplifier transformers.

It is for the purpose of realignment of these intermediate frequency transformers that the following test procedure is outlined. **IMPORTANT NOTE.** It is essential that the 465 KC intermediate signal which is used for realignment of the intermediate frequency amplifier is not set according to any arbitrary calibration on the test oscillator itself since it has been found that commercial test oscillators for service work vary considerably, at least to an extent which will not permit proper alignment of a communication type

RADIO MFG. ENGINEERS, INC.

station, preferably on the low frequency end of Band 1. Then tune the main tuning control slightly to the high frequency side of it, say 10 KC or more higher in frequency than the selected station.

Then resonate the station again by means of the band-spread control. Next set the crystal switch to the series position as indicated on Figure 2A by the position "S" on control "B". Now vary the band-spread control as may be required to produce peak reading of the signal on the R meter by resonating with the crystal resonance peak.

With this setting achieved, vary the dial Number 1 slightly higher and slightly lower by five kilocycles as can be approximated by the calibration of the dial (one half division each way since one division is representative of 10 kilocycles) and notice the drop in the R meter readings. The drop so achieved by varying the setting of Dial 1 five kilocycles above and below the selected signal should be productive of an R meter drop of 40 db. or greater. In other words, if the signal when resonated produces an R meter reading of 60 db. on the R meter scale, setting the dial Number 1 five kilocycles higher in frequency than the frequency of the signal being used should make the R meter fall to 20 db. or less. Similarly, setting the dial Number 1 five kilocycles lower in frequency than the station being used, the R meter should again fall from 60 db. on the scale to 20 db. or less. Should it fail to do this, the phasing condenser (C-1, figure 4) should be adjusted and a test made as just described by five kilocycle above and below adjustment of Dial 1 until the proper variation in the R meter is achieved.

It will be found that the condenser C-1 will usually run at a very low value of capacity, very close to its minimum capacity adjustment. Therefore only slight turning of this condenser will be productive of changes which materially affect the attenuation of the crystal filter. It is usually found that this condenser is not required to be adjusted since it holds its setting very well over long periods of time. The procedure just outlined gives the proper method for checking the phasing and adjusting when necessary.

ALIGNMENT OF RADIO FREQUENCY SECTION OF THE RME-69 RECEIVER

Alignment of the radio frequency section of the receiver will affect principally the calibration of the receiver. Within certain limits this of course will also affect the sensitivity. A small variation in frequency (up to 2%) will not materially reduce the sensitivity of the receiver although they of course will show up as variations in the calibration as indicated by the required setting of the main tuning dial in dioctor. Correction for any variation in calibration can be made by following the suggestions outlined below.

Band 1 includes the frequencies between 550 and 1500 KC. For band one there are two frequency adjustments for adjusting the indicator to proper calibration. One of these, C_2 , is adjusted as indicated on Figure 4 through the top of the shield can just in the rear of the main tuning condenser assembly. Just in front of this aperture and on the main tuning condenser assembly is C_1 which is used to adjust the

that a maximum meter reading is obtained. This procedure is one which requires patience and accuracy of adjustment since the receiver is ultra sharp with the crystal filter in and there will be one definitely sharp peak indicating crystal resonance. The receiver should be tuned to this peak and left on it during all adjustments to be made regarding the intermediate frequency amplifier.

When this peak has been tuned to and the meter is at maximum reading, a small standard intermediate frequency trimmer tool of the insulated screw-driver type should be used. Then the control "F", Figure 2A, should be set so that the condenser it adjusts is set at 50% mesh. Then, without particular attention to a course of procedure in tuning, any transformer may be adjusted at any particular time, the important factor being that they all be adjusted so that the R meter is brought to and left at a maximum meter reading. Usually this adjustment will not require very much turning of the adjustment screws. A good procedure to follow is to start with the No. 1 transformer and align in sequence No. 2 and No. 3. All adjustments should be made as before mentioned so that the meter reading is maximum.

It is advisable from time to time to make sure that the signal is still adjusted to peak resonance of the crystal by slightly varying the adjustment of the band-spread control. When this procedure has been completed as outlined and all transformers have been adjusted and left at maximum meter reading, the intermediate frequency amplifier of the receiver is in peak adjustment and the crystal aligned with it for maximum effectiveness in filter action.

RME-69 RECEIVER INTERMEDIATE FREQUENCY AMPLIFIER ALIGNMENT WITH SILENCER INSTALLED

The general procedure for alignment of the intermediate frequency amplifier as described above also applies to receivers in which the LS-1 silencer has been installed. Preliminary adjustment as above described should be made with the silencer threshold control set at maximum clockwise position, of rotation. When the intermediate frequency transformers have been aligned as outlined, the silencer transformer may be peaked by turning the band switch to No. 6 band on the receiver and tuning in and resonating the frequency band around 30 megacycles so that the receiver is sensitive at that point. Then under conditions of automobile ignition interference the silencer control should be set to maximum counter-clockwise rotation position and the small screw accessible through the hole in the noise rectifier transformer located on the silencer auxiliary chassis should be adjusted for a minimum response, of the interference noise. This insures accurate alignment of the noise amplifying system with that of the intermediate frequency, a condition which must necessarily exist for efficient silencer action.

After the intermediate frequency amplifier has been aligned as per the instructions under the article concerning intermediate frequency transformer alignment, a check of the phasing of the crystal filter should be made. Tune in a broadcast

MODEL RME 69

Alignment, Part 3

RADIO MFG. ENGINEERS, INC.

- Band 2: 2 megacycles and 3 megacycles.
 Band 3: 4 megacycles, 5 megacycles, 6 megacycles.
 Band 4: 7 megacycles, 9 megacycles, 11 megacycles, 13 megacycles.
 Band 5: 14 megacycles, 15 megacycles, 17 megacycles.
 Band 6: 30 megacycles.

After the calibration has been made accurately on all of the frequencies, or if the receiver has been found to be accurately set insofar as its calibration is concerned on all frequencies, the trimmers C_b and C_a have a distinct effect upon the RF grid circuits for bands 5 and 6 respectively. They are adjusted as follows: With a steady incoming signal on between 14 and 15 megacycles and the most effective setting of the control "P" for signal in that region, and with the antenna connected, the condenser C_b is adjusted for maximum meter reading. With these same conditions existing on 30 megacycles, with the band switch set on band 6 and the antenna connected, C_a is adjusted for maximum response on a given steady signal. All other trimming and adjusting is done manually by means of control "P", Figure 2-A, and is a variable RF amplifier and detector grid padder which can be critically adjusted for peak resonance at any frequency it is desired to tune to.

It is of importance to note the setting of the condenser C_c (Figure 4). This is the antenna coupling condenser used when the receiver is set to Band 1. It as well as condenser "C" (Figure 4) should be set to practically its minimum capacity in order to provide constant alignment and proper coupling to the antenna when using Band 1. Excessive capacity in the condenser C_c will cause misalignment of the RF amplifier and hence promiscuous beating of harmonically related broadcast frequencies to the effect that a number of whistling tones will be received on the high frequency end of the broadcast band. Excessive capacity on C will somewhat contribute to the same result but will, more than that, reduce the sensitivity on the broadcast band. When the receiver leaves the factory, they are set at a very small capacity and should not be set at any other capacity or material reduction in the efficiency of operation will be produced.

Whenever the receiver is gone over for alignment, it is well to remove the dust cover from the condenser assembly and inspect the permanence of position of the rotor plates of the ganged condenser controlled by the knob "D". This is located between the two main variable condensers and is located underneath the dust cover which is removable by unscrewing the four acorn nuts holding it down on the condenser assembly. Some times the rotors become loosened and misplaced angularly with respect to each other. They should always be adjusted so that the rotors are at full mesh at the same time. Any slight angular displacement of one rotor with respect to the other will materially reduce the sensitivity of the receiver and destroy the preselection, thereby reducing the image frequency rejection and also the sensitivity, especially on the high frequency bands.

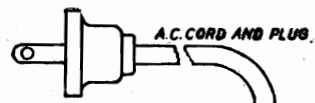
The padders C_b and C_a (Figure 11-B) materially contribute to the image signal rejection on the bands 5 and 6. Special care should therefore be taken in the adjustment of these condensers when the receiver is aligned.

frequency for the high frequency end of Band 1. The procedure is this: Put the main tuning indicator to a position so that the main tuning condensers are fully meshed. The pointer of the main tuning control should then be set at maximum left end of scale so that the pointer falls just below the line above the numbers indicating the various channels. In this respect it will partially cover the top half of the numerals indicating the different tuning bands on this scale. In other words, the line which borders the semi-circular scale at the extreme counter-clockwise position should rest on the top edge of the pointer as it is turned to maximum counter-clockwise rotation and the condenser plates are at full mesh.

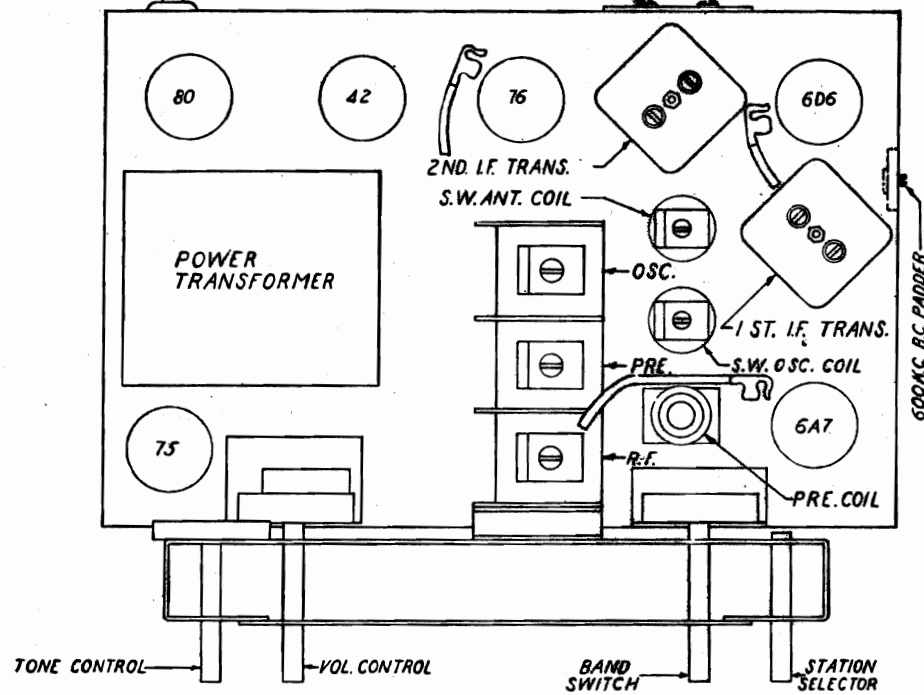
The next step is to choose a station or a signal of accurately known frequency, around 700 KC, and set the main indicator to the frequency of the signal which is going to be used for the test. For example: There is a station available with fairly good signal strength or a test oscillator is available which can ACCURATELY be set at 700 KC. If the receiver indicator on the main tuning dial is set at 700, and the receiver is considerably out of calibration of course the signal will not be received. However, leave the indicator at the correct frequency of the signal being used for the test and set the band-spread control to a reading of 180 on the dial at which position it has no material effect on the tuning circuits of the receiver and permits the calibration of the main tuning dial to indicate accurately the frequency of setting.

Then by means of condenser C_c (Figure 4) accessible through the trimming hole in the oscillator shield can for Band 1, adjust until the signal is brought in with the pointer set at the proper frequency. Then choose a signal at about 1200 or 1300 kilocycles, and set the main tuning dial indicator to the correct frequency for that signal and bring the signal in on that setting with trimmer C_t . It will then be necessary to return to the former frequency setting of 700 KC to make sure that the variation of C_t has not made some slight change in the setting for the lower frequency calibration point and it may be necessary to readjust C_a slightly again. Then in order to make certain of the accuracy of both settings return to the frequency chosen between 1200 and 1300 KC and if necessary, slightly readjust C_t again. After several checks on each frequency, it will be found that the calibration can be made satisfactorily.

Calibrations on the higher frequency bands are controlled for Bands 2, 3, 4, 5, and 6 by the trimmers C_r , C_q , C_p , C_o , C_n (Figure 11-B) respectively. High side beat is used on all frequencies in the RME-69 Receiver which means that all of the condensers C_r , C_q , C_p , C_o , C_n must be set to the lowest capacity setting which will provide a beat and the proper calibration for the frequencies in the respective bands. Calibration frequencies used are as follows:



**SCHEMATIC DIAGRAM
6 TUBE
MODEL-A3**



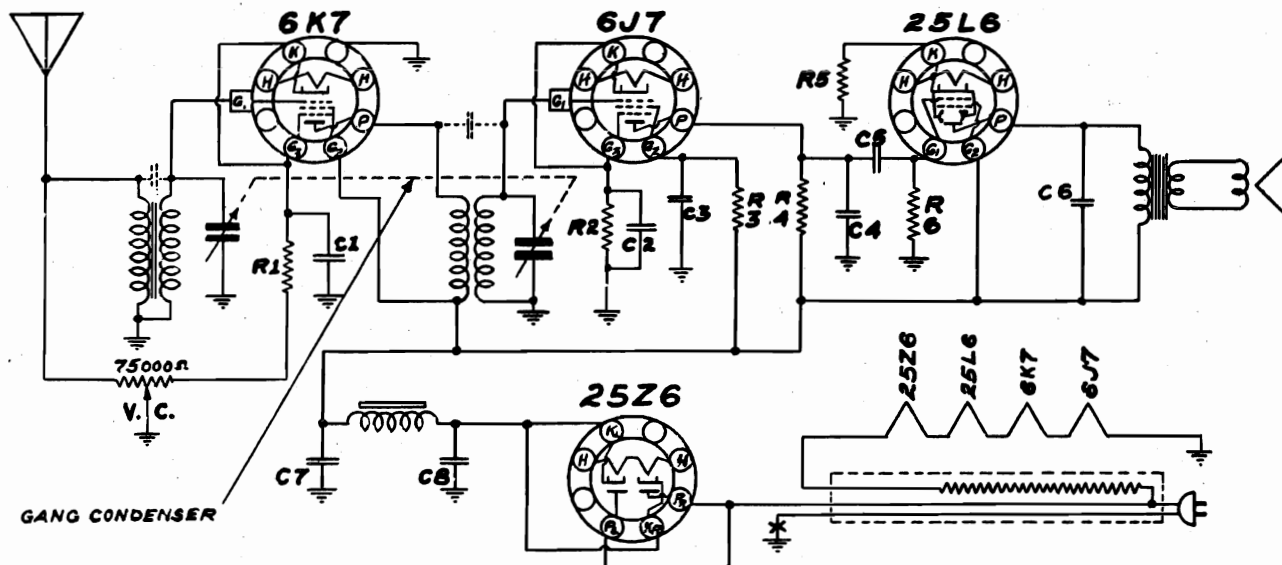
FREQUENCY RANGES AND ALIGNMENT FREQUENCIES;-

BROADCAST - 540 to 1700 KC - Adjust the OSC, RF and ANT. to maximum peak of 1400 KC, then pad the oscillator circuit at 600 KC while rocking gang condenser.
SHORT WAVE - 5800 to 15200 KC - Adjust the OSC and ANT. trimmers to maximum peak of 14000 KC. No padding required.
POLICE - 1700 to 5000 KC - Adjust the ANT. coil trimmer to a maximum peak of 4000 KC. No other adjustments are required.

MODEL 4H

Schematic, Socket
Trimmers, Alignment

RADIO PRODUCTS CORP.



CAPACITORS

N ^o	MFD.	TYPE	N ^o	MFD.	TYPE
C1	.1	200V.	C5	.01	400V.
C2	.25	200V.	C6	.02	400V.
C3	.1	200V.	C7	10.0	ELECT.
C4	.00025	MICA	C8	30.0	

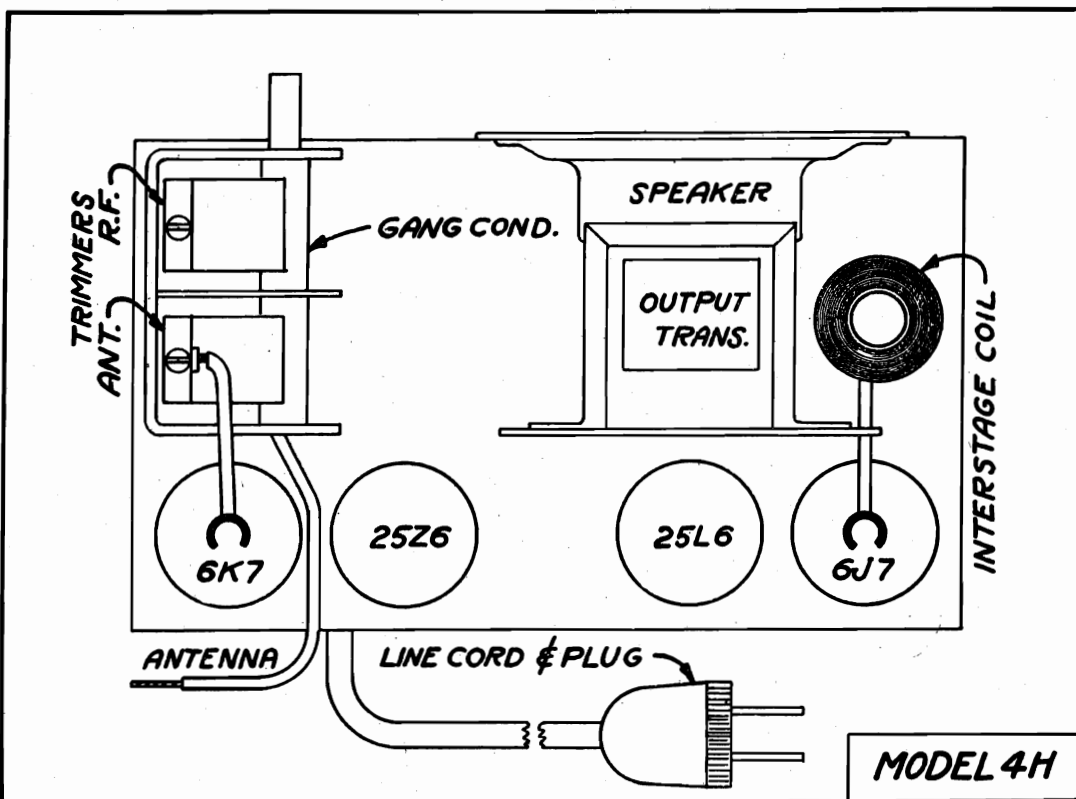
RESISTORS

N ^o	OHMS	WATTS	N ^o	OHMS	WATTS
R1	250	1/4	R4	500,000	1/4
R2	25,000	1/4	R5	110	1/2
R3	2,000,000	1/4	R6	500,000	1/4

RESISTANCE OF LINE CORD 173 OHMS

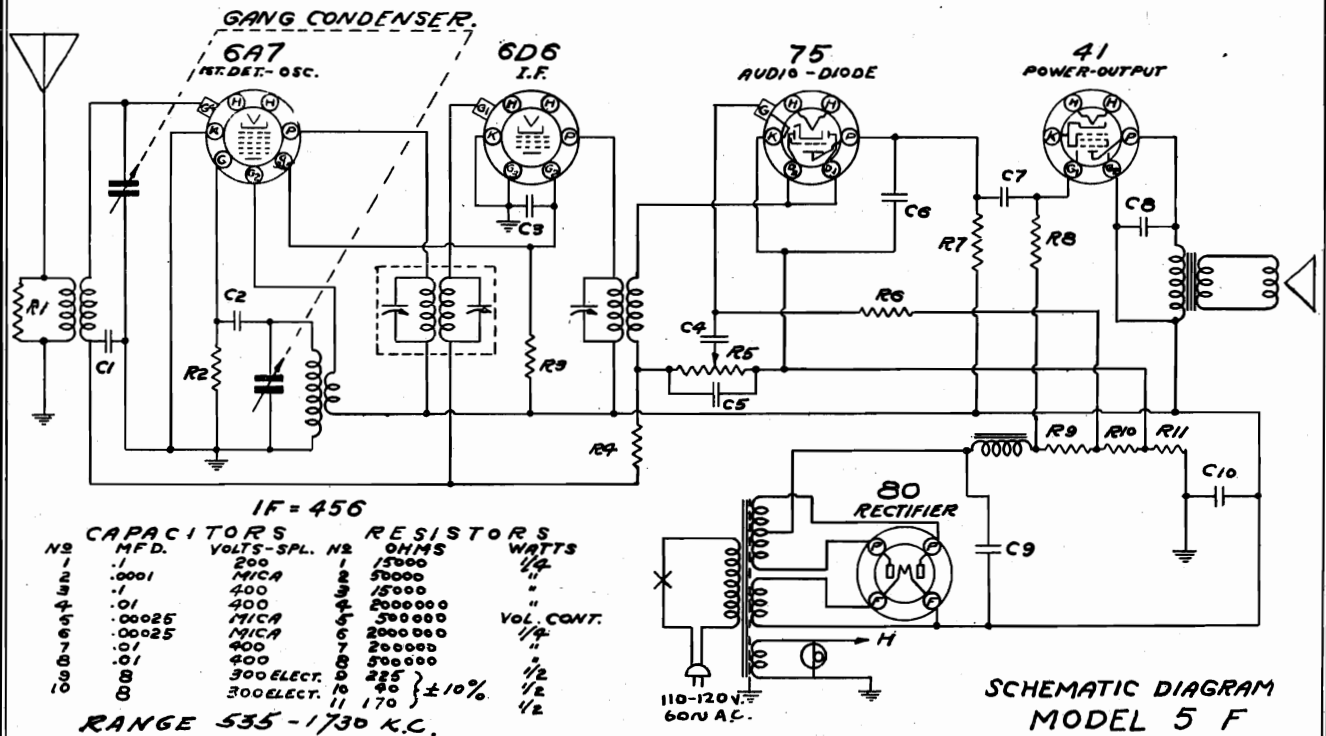
SCHEMATIC DIAGRAM
MODEL 4H

4 TUBE T.R.F. RECEIVER, RANGE 535-1730 KILOCYCLES.
POWER SUPPLY: AC(60 CYCLE) OR DC, 105-125 VOLTS.
CAUTION: DO NOT USE A GROUND ON THIS RECEIVER.
ALIGN AT 1400 KC THROUGH 100 MMF. CONDENSER.

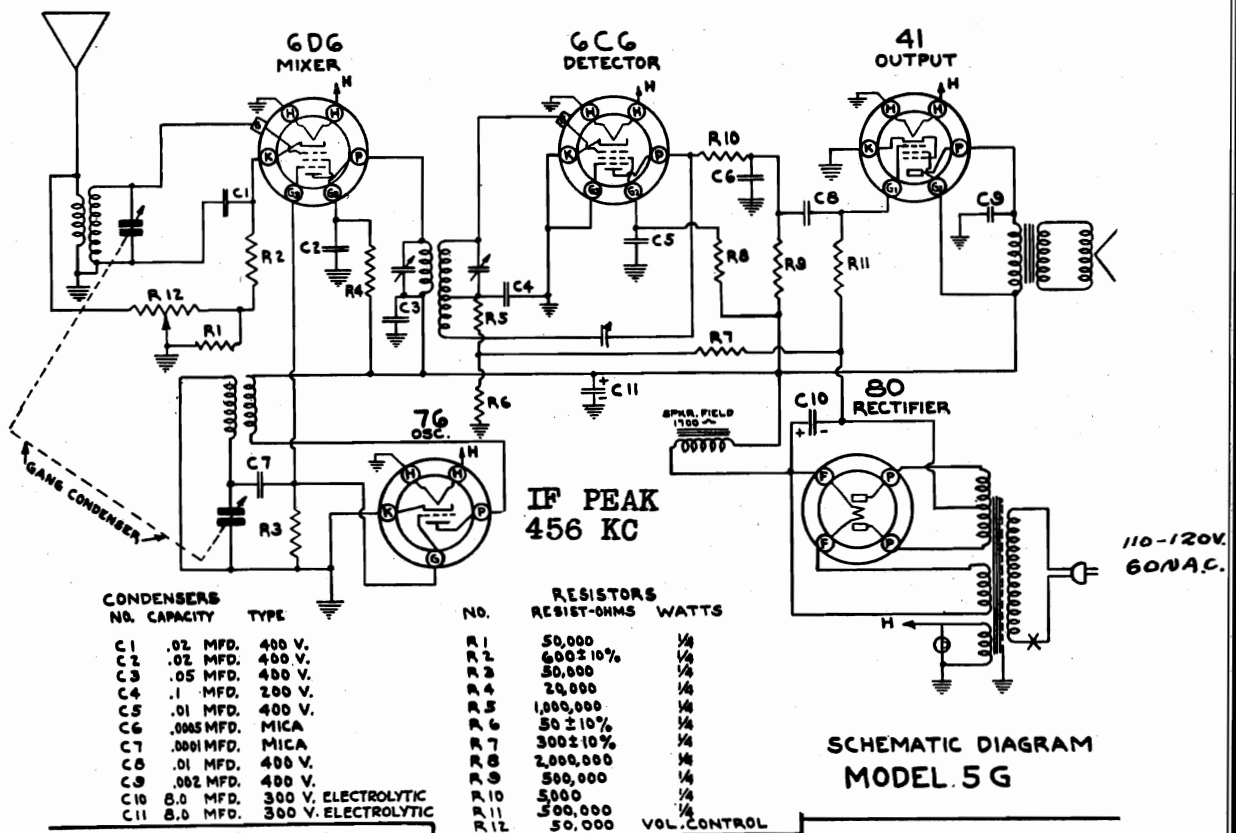


RADIO PRODUCTS CORP.

MODEL 5F
Schematic
Alignment
MODEL 5G
Schematic



FOR ALIGNMENT OF MODEL 5F, SEE THAT FOR MODEL 4A, PAGE 9-1



MODEL 5F

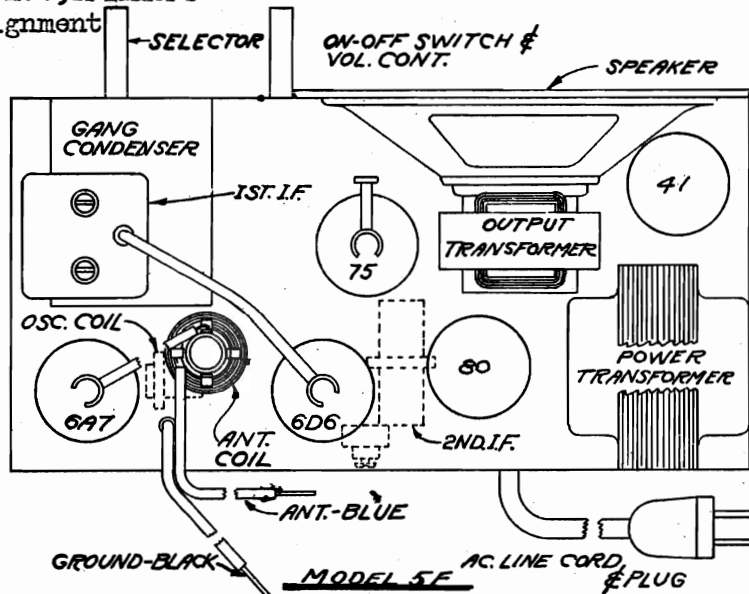
Socket, Trimmers

MODEL 5G

Socket, Trimmers

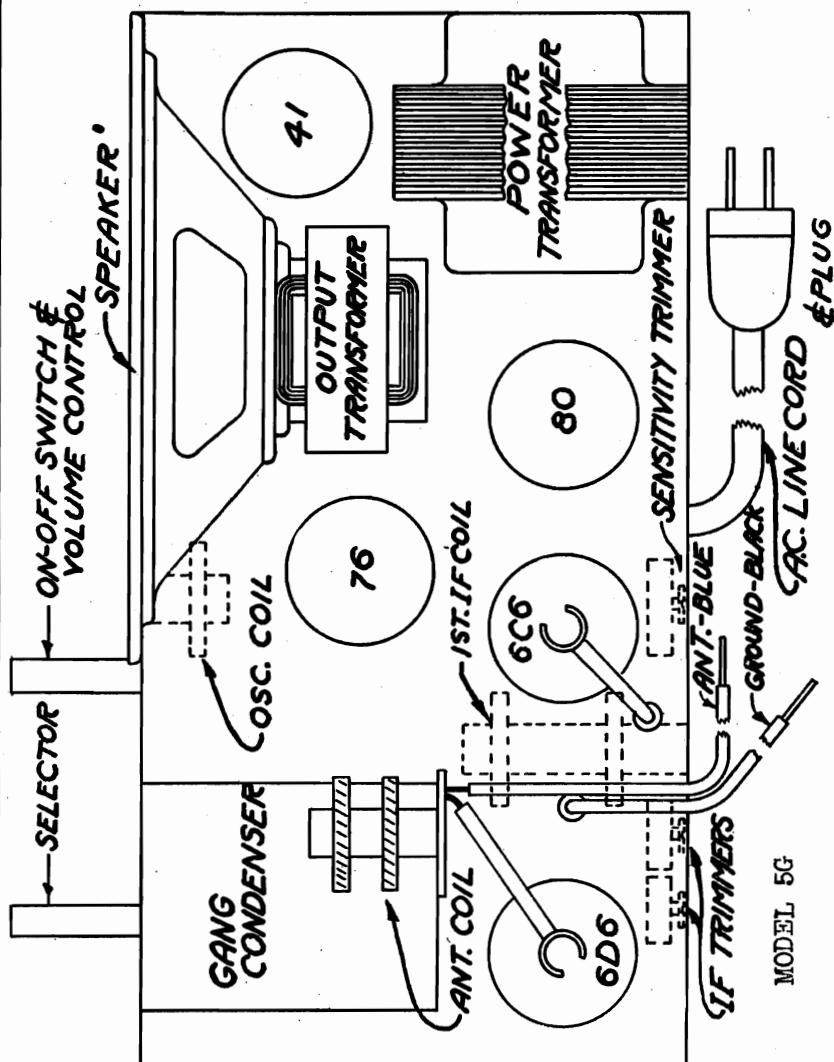
Alignment

RADIO PRODUCTS CORP.



adjusted with a small screw driver or knife blade. This control is adjusted at the factory to give normal sensitivity for a set of this type; and in most locations there will be no need for re-adjustment. However, in rural areas where signal strength is low, the gain of the receiver can be increased by three or four times by turning the trimmer in the following manner:

1. Tune in a station.
2. Increase sensitivity by turning trimmer in a clockwise direction until the station signal is distorted by a whistle.
3. Turn trimmer slowly counter-clockwise until whistle ceases. This is the point of maximum sensitivity.
4. Tune in several stations. If some of these signals still whistle, the sensitivity must be again retarded slightly.



ALIGNMENT DATA AND SERVICING

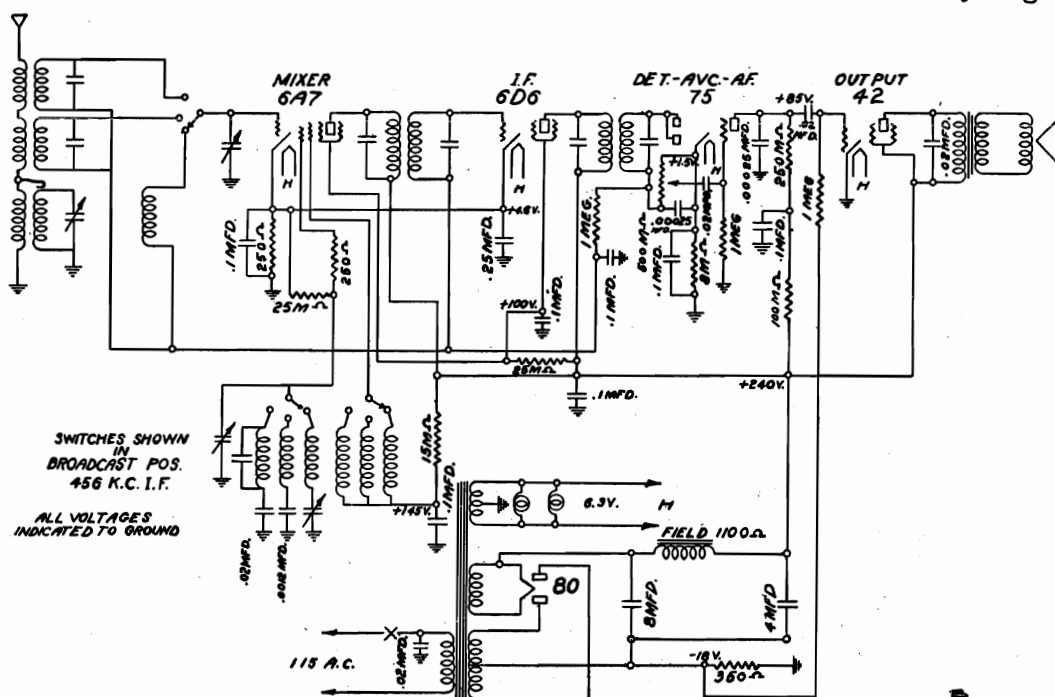
Connect the signal generator through a .1 mfd. condenser to the grid of the 6D6 tube. Connect an output meter across the voice coil of the speaker. Set the generator to 456 K.C. and align the I.F. transformer for maximum reading on the output meter. Set the sensitivity control about 1/4 turn counter-clockwise from the point where the whistles start and re-align the I.F.

Feed the generator through a 100 mmf. condenser to the antenna lead of the receiver. Set the generator to 1400 K.C. Turn the dial of the radio to 1400 K.C. Align the oscillator and antenna trimmers on the gang condenser for maximum output on the meter.

ADJUSTMENT OF SENSITIVITY CONTROL

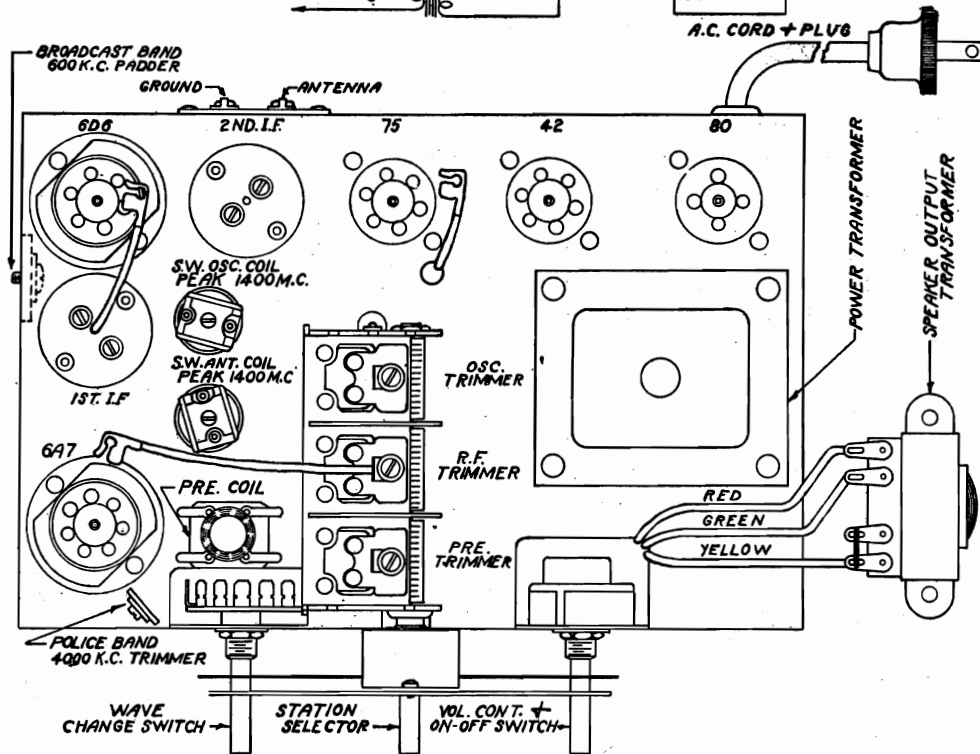
The sensitivity control is accessible from the rear of the cabinet, (see layout) and takes the form of a trimmer condenser, which may be

RADIO PRODUCTS CORP.



SWITCHES SHOWN
IN
BROADCAST POS.
456 K.C. I.F.

ALL VOLTAGES
INDICATED TO GROUND



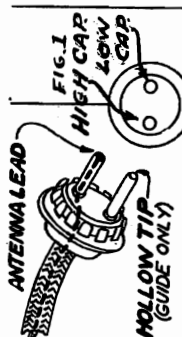
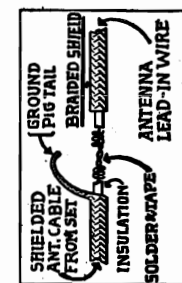
CONVENTIONAL ALIGNMENT - SEE THE SPECIAL SECTION VOL. VIII

FREQUENCY RANGES - BROADCAST - 540 to 1700 KC - Adjust the OSC, RF and ANT trimmers to a maximum peak of 1400 KC, then pad the Oscillator circuit at 600 KC while rocking gang condenser.

SHORTWAVE - 5800 to 15200 KC - Adjust the OSC and ANT trimmers to a maximum peak of 14000 KC. No padding required.

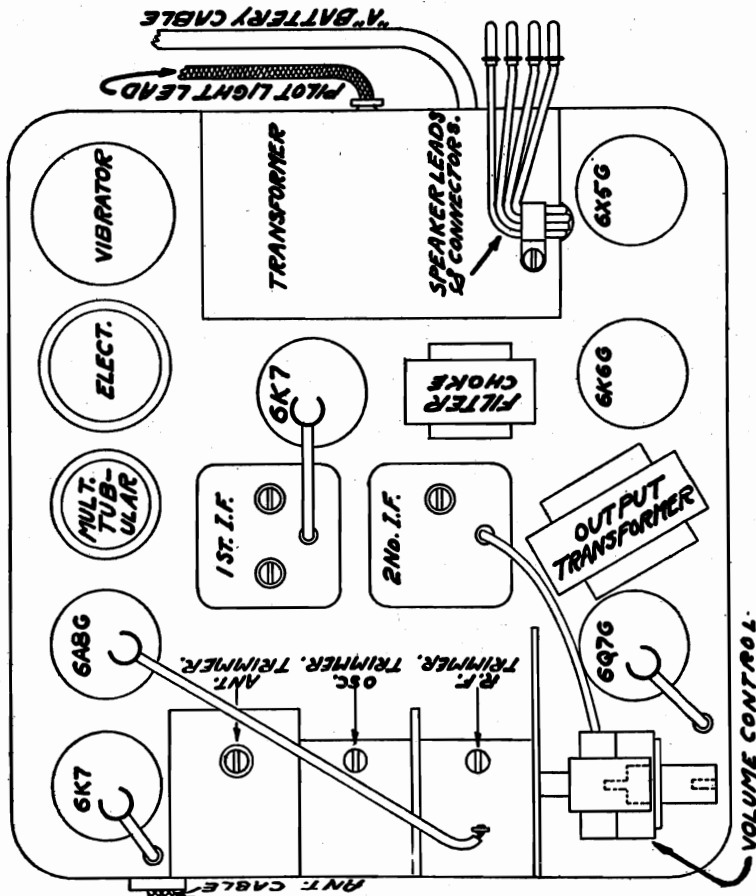
POLICE - 1700 to 5000 KC - Adjust the ANT coil trimmer to a maximum peak of 4000 KC. No other adjustments required.

SYNTHETIC DIAGRAM MODEL 69



I.F. ALIGNMENT. Adjust the test oscillator to 175 K.C. and connect the output to the grid of the first detector tube, 6A8G, through a .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align the trimmers of the first and second I.F. transformers to peak or maximum reading on the output meter.

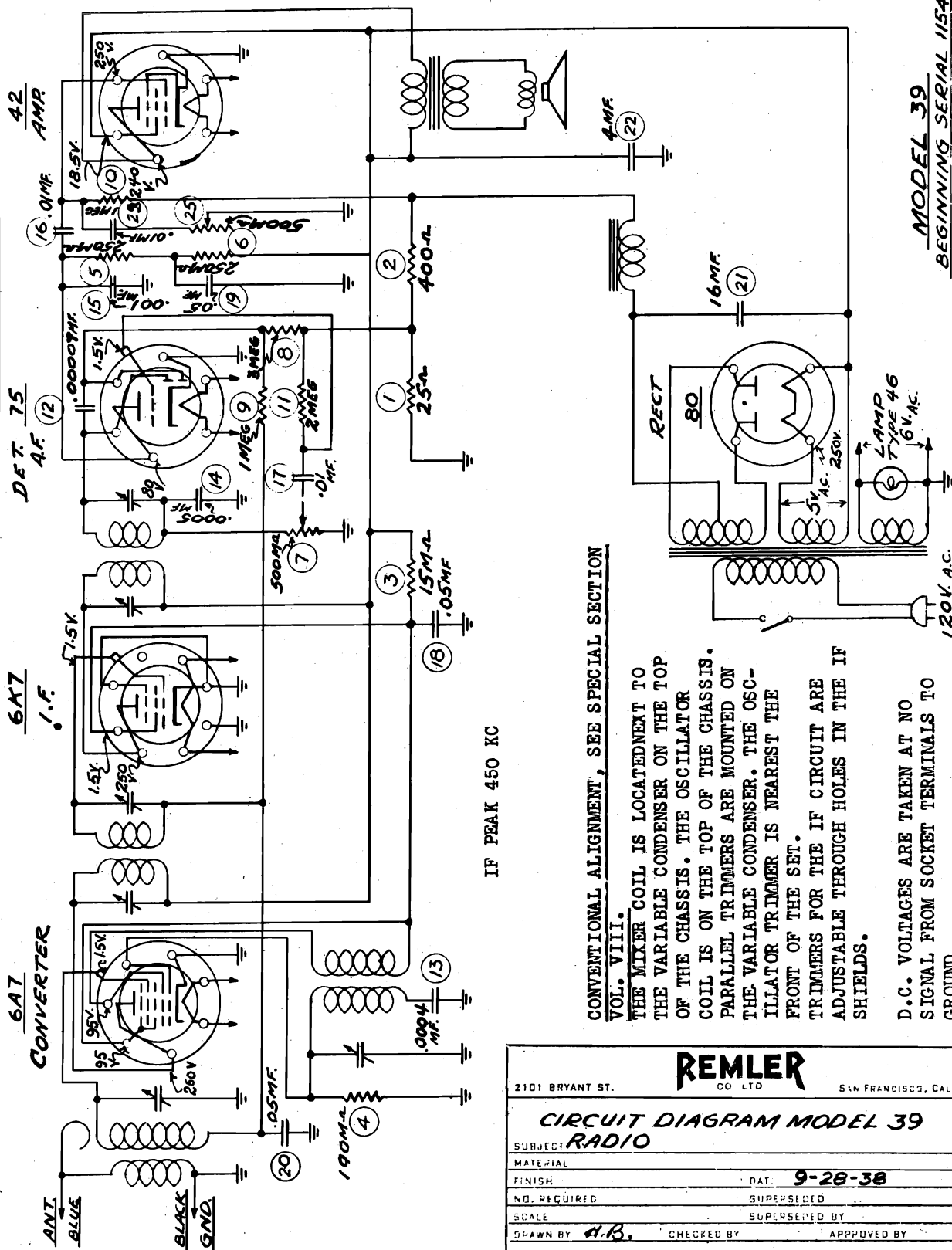
CONDENSERS	CAPACITANCE	WATTAGE
1	.05	200
2	.05	200
3	.05	200
4	.0001	200
5	.1	400
6	.1	400
7	.00025	200
8	.00025	200
9	.1	400
10	.1	200
11	.1	400
12	.25	200
13	.065	200
14	.05	400
15	.5	50
16	.002	MICA
17	.002	MICA
18	.0075	1600
19	6.0	350
20	1.3	350
21	1.2	350
22	1.2	350



VOLUME CONTROLS

REMLER COMPANY, LTD.

MODEL 39, Above Ser. 115439
Schematic, Voltage
Alignment

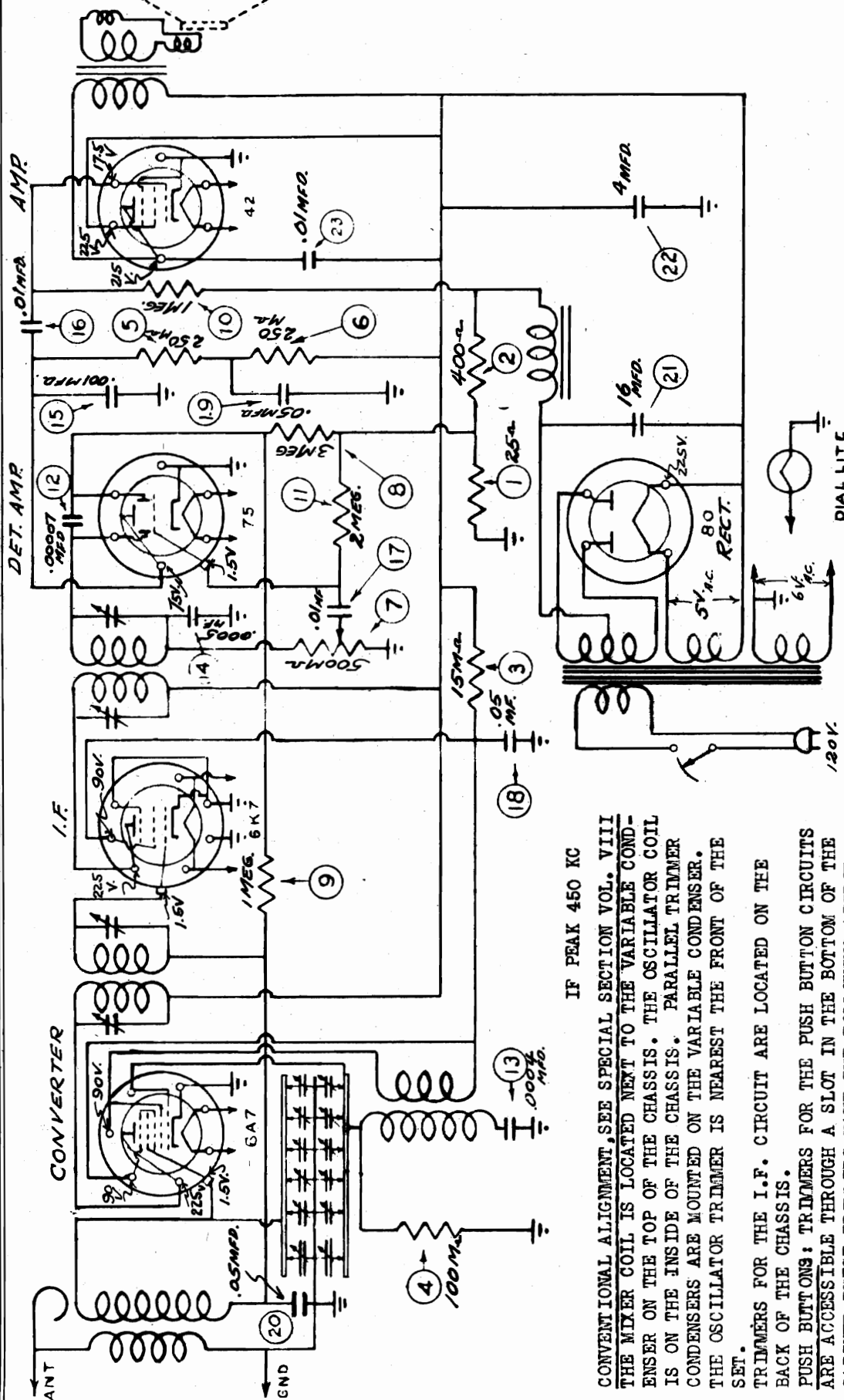


MODEL 39
BEGINNING SERIAL 115439
110-125 V. 50-60N A.C.

2101 BRYANT ST.		REMLER		CO. LTD.		SAN FRANCISCO, CALIF.	
CIRCUIT DIAGRAM MODEL 39							
SUBJECT: RADIO							
MATERIAL							
FINISH							
DATE: 9-26-38							
NO. REQUIRED							
SUPERSEDED							
SCALE							
SUPERSEDED BY							
DRAWN BY: A.B.							
CHECKED BY							
APPROVED BY							
MOD. 39				DWG. No.			

MODEL 55, Above Ser. 114626
Schematic, Voltage, Alignment

REMLER COMPANY, LTD.



IF PEAK 450 KC

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII
THE MIXER COIL IS LOCATED NEXT TO THE VARIABLE COND-
TENSER ON THE TOP OF THE CHASSIS. THE OSCILLATOR COIL
IS ON THE INSIDE OF THE CHASSIS. PARALLEL TRIMMER
CONDENSERS ARE MOUNTED ON THE VARIABLE CONDENSER.
THE OSCILLATOR TRIMMER IS NEAREST THE FRONT OF THE
SET.

TRIMMERS FOR THE I.F. CIRCUIT ARE LOCATED ON THE BACK OF THE CHASSIS.

PUSH BUTTONS: TRIMMERS FOR THE PUSH BUTTON CIRCUITS ARE ACCESSIBLE THROUGH A SLOT IN THE BOTTOM OF THE CABINET, THESE TRIMMERS HAVE THE FOLLOWING APPROXIMATE TUNING RANGES: #1 GROUP, 520-850 KC; #2 GROUP, 520-850 KC; #3 GROUP, 620-1075 KC; #4 GROUP 680-1075 KC; #5 GROUP 975-1500 KC.

VOLTAGE READINGS TAKEN FROM SOCKET TERMINALS. TO GROUND WITH NO SIGNAL.

REMNER

THE UNIVERSITY OF CHICAGO

03103

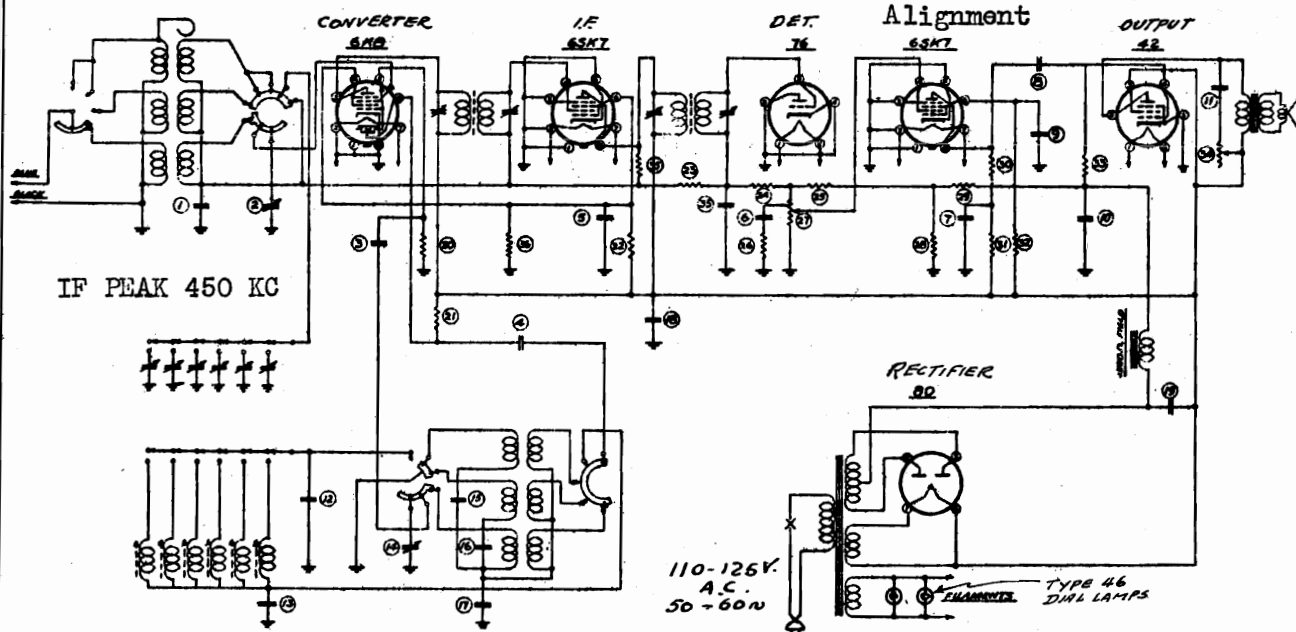
210,000,000

MODEL 55

Beginning Serial No. 114626

110-125 50-60~ A.C.

REMLER COMPANY, LTD. MODEL 73 Schematic, Voltage, Tuner Alignment



NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION
1	.05 MFD. COND. 500 V.	11	.05 MFD. COND. 500 V.	20	25,000 Ω 1/2 W. RESISTOR	30	150K Ω 1/2 W. RESISTOR
2	450 MMFD. VAR. COND.	12	500 MMFD. COND.	21	25,000 Ω 1/2 W. RESISTOR	31	250K Ω 1/2 W. RESISTOR
3	35 MMFD. COND.	13	1000 MMFD. COND.	22	15,000 Ω 1/2 W. RESISTOR	32	5 MFD. 15 W. RESISTOR
4	1000 MMFD. COND.	14	450 MMFD. VAR. COND.	23	1 MFD. 15 W. RESISTOR	33	1 MFD. 15 W. RESISTOR
5	.05 MFD. COND. 500 V.	15	500 MMFD. COND.	24	25,000 Ω 1/2 W. RESISTOR	34	25K Ω POTENTIOMETER
6	.01 MFD. COND. 500 V.	16	1000 MMFD. COND.	25	1 MFD. 15 W. RESISTOR	35	500K Ω 1/2 W. RESISTOR
7	.05 MFD. COND. 500 V.	17	2000 MMFD. COND.	26	500 Ω 1/2 W. RESISTOR	36	50,000 Ω 1/2 W. RESISTOR
8	.05 MFD. COND. 500 V.	18	5 MFD. COND.	27	200K Ω POTENTIOMETER		
9	.1 MFD. COND. 500 V.	19	15 MFD. COND.	28	20 Ω 1/2 W. RESISTOR		
10	15 MFD. COND. 25 V.	20	.0005 MFD. COND.	29	200K Ω 1/2 W. RESISTOR		

REMLER	
CIRCUIT DIAGRAM MODEL 73	
DATE: 11-11-38	DESIGNED BY: J. F. RIDER
DRWN. BY: J. F. RIDER	CHECKED BY: J. F. RIDER
Mod. 73	Dwg. No.

SETTING UP PUSH BUTTONS:-

The push button set up may be changed as follows:

The selection of stations should be arranged with the location of the lowest frequency station on the extreme left button. A resonance indicator or output meter will aid in making the adjustments. With the band switch on "BC", tune in the desired station with the selector, depress the button and turn the band switch to "A". Now with a screwdriver adjust the trimmer on the top of the chassis nearest the back and adjacent to the speaker. When the desired station is tuned in adjust the trimmer nearest the front panel for maximum volume. Now turn the band switch to "BC" to check the adjustment. Proceed with the next lower frequency station for the next set of trimmers with the band switch on "A".

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL.VIII.

The mixer coil is located on the right side of the variable condenser and the oscillator coil on the left side. Trimmers for oscillator and mixer coils are adjustable through holes in the coil supports.

The broadcast trimmers are at the top, the medium wave in the middle and the short wave nearest the bottom of the support.

Trimmers for the I.F. transformers are accessible through openings in the top of the I.F. transformer shields.

VOLTAGE READINGS A.C. voltages:- Line 120 volts; Heaters-6volts; Rectifier filament-5 volts.

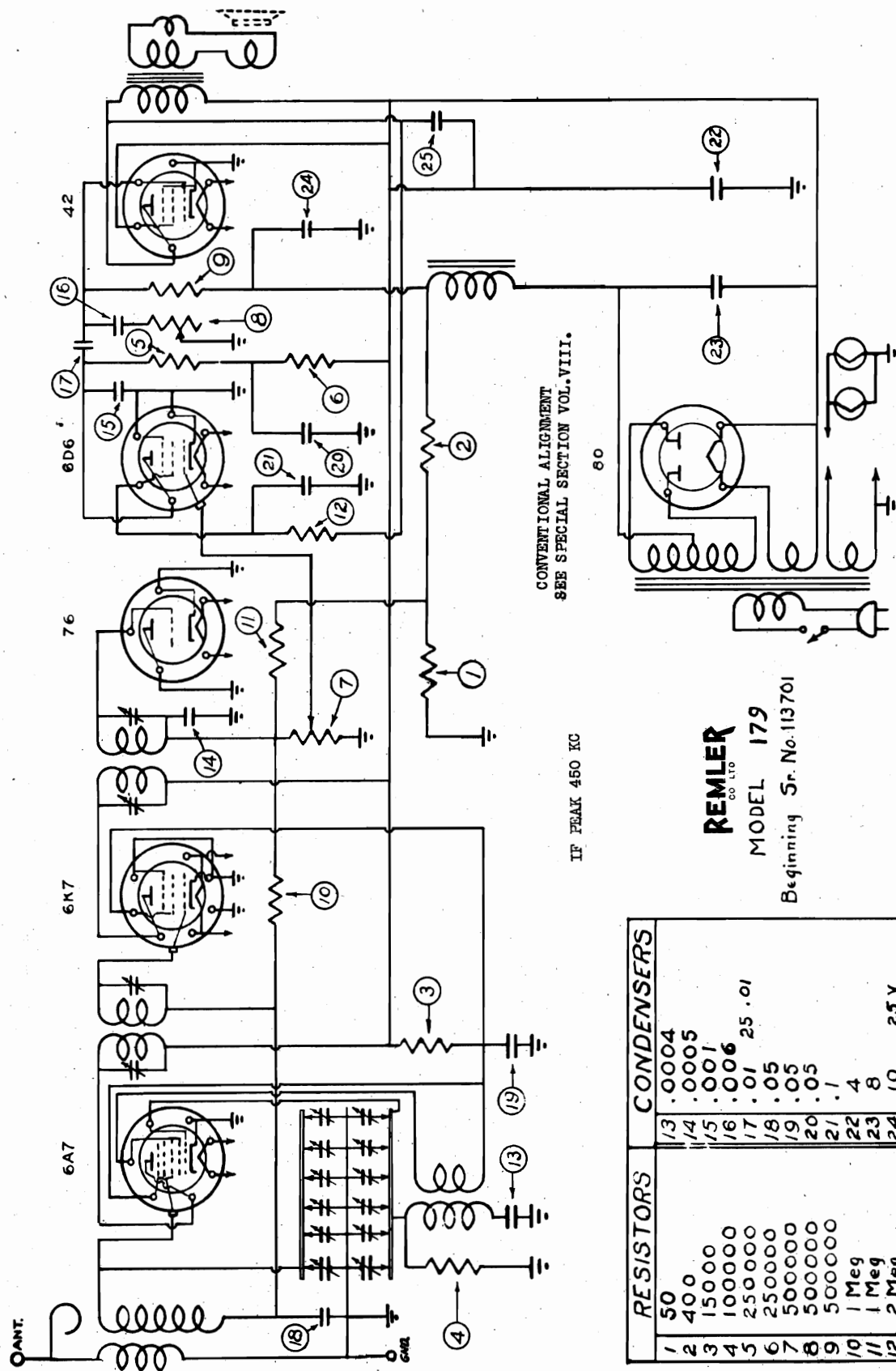
D.C. voltages (Taken with no signal from ground to points indicated) 80 Rectifier filament--250 volts; 42 plate--235 volts; 42 Screen--250 volts; 42 bias--20 volts; 6SK7---audio plate 60,---audio screen 10, I.F. plate 250,---I.F. screen 100,---and I.F.bias 2.5 volts; 6K8---plate 250,---oscillator plate 90,---screen 100, and bias supply 2.5 volts.

MODEL 179

Above Ser. 113701

Schematic, Alignment

REMLER COMPANY, LTD.



REMLER
CO. LTD.

MODEL 179

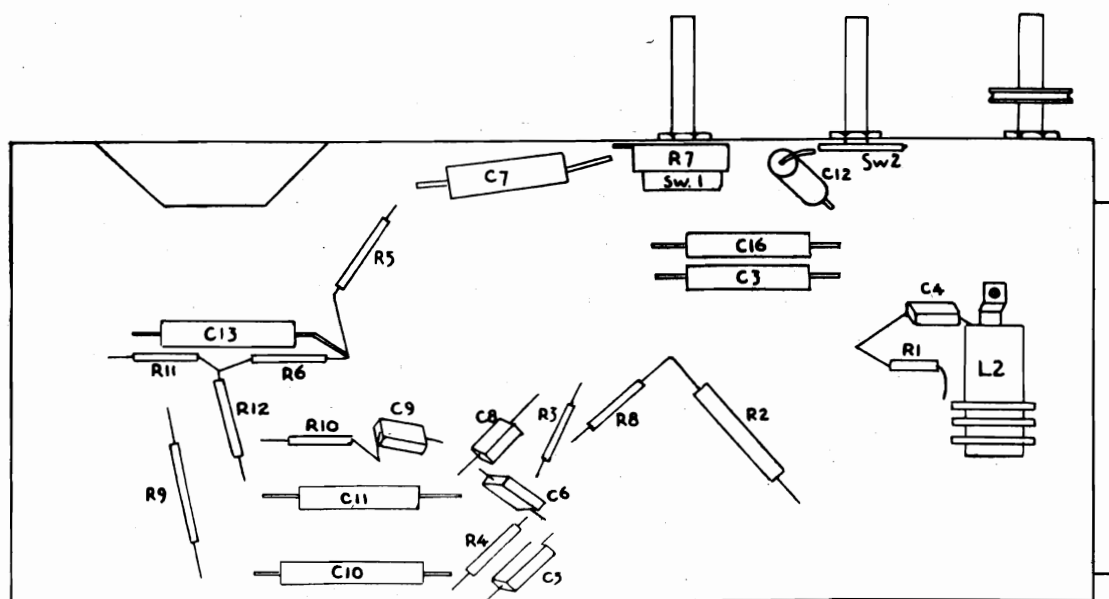
Beginning Sr. No. 113701

RESISTORS		CONDENSERS	
1	50	13	.0004
2	400	14	.0005
3	15000	15	.001
4	100000	16	.006
5	250000	17	.01
6	250000	18	.05
7	500000	19	.05
8	500000	20	.05
9	500000	21	.1
10	1 Meg	22	.4
11	1 Meg	23	8
12	2 Meg	24	1.0
			25 V.

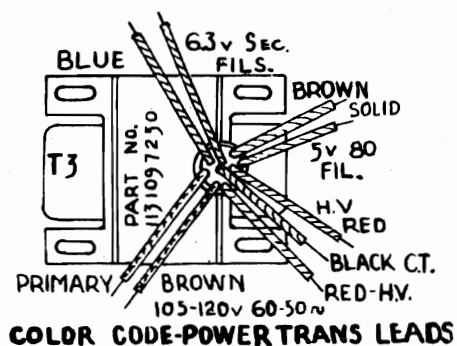
Schematic, Voltage	Chassis, Color Code
100K	Orange-Black
10K	Brown-Black
1K	Brown-Red
100	Brown-Orange
10	Brown-White
1	Brown-Black
0.1	Black-White
0.01	Black-Black

SEARS-ROEBUCK & CO.

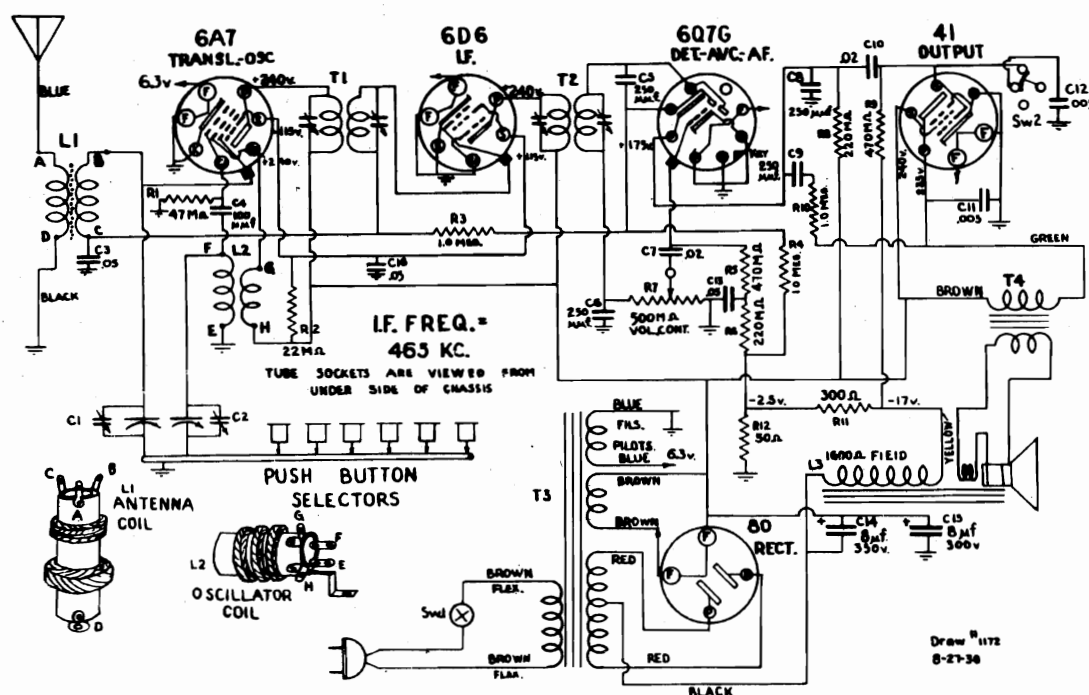
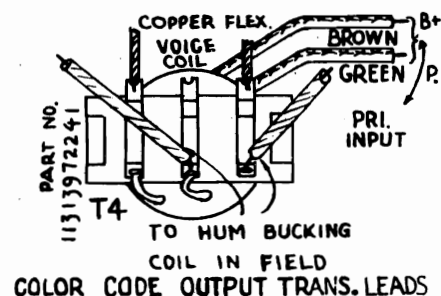
MODEL 3972
Chassis 113.972



LOCATION OF PARTS UNDER CHASSIS



COLOR CODE-POWER TRANS LEADS



MODEL 3972

Ch. 113.972

Alignment, Socket

Trimmers

SEARS-ROEBUCK & CO.

GENERAL INFORMATION & SERVICE HINTS

Should it be necessary to remove the chassis from the cabinet it is important when reassembling the receiver that the selector knob not be pushed on the shaft so far that it will exert pressure on the front of the cabinet, as any friction at this point will cause difficulty in operating the push buttons.

Should there be instances where it is difficult to set the push buttons accurately on a station it is very possible that the trouble is caused by a slight burr on the end of the screw insert in the push button knob; remove the push button in question and remove the burr that might be on the end of the screw.

ELECTRICAL SPECIFICATIONS**TUBES AND FUNCTIONS:**

6A7	Translator-Oscillator	41	Output
6D6	IF	80	Rectifier
6Q7G	AVC, detector, 1st audio		

POWER SUPPLY:

105 - 120 Volts, 50-60 Cycle A.C.	47 Watts
---	----------

FREQUENCY RANGE:

Broadcast	540-1750 KC
---------------------	-------------

ALIGNMENT FREQUENCIES:

	Oscill.	Ant.-Transl.
	Trimmer	Trimmer
Broadcast	1400 KC	1400 KC

INTERMEDIATE FREQUENCY

465 KC

POWER OUTPUT:

Type	Single Pentode
Undistorted	2.25 Watts
Maximum	3.2 Watts

LOUD SPEAKER:

Type	Dynamic
Size	5 inch
Field resistance	1600 ohms

MECHANICAL SPECIFICATIONS**OPERATING CONTROLS:**

1. Left knob. "On-Off" switch and Volume
2. Center knob. Tone Control
3. Right knob. Station Selector

CONTROL OPERATION:

Turning right: Power on: Volume increase
Turning right: Bass, Treble
Tuning ratio: 1:1

AUTOMATIC TUNING CONTROL ADJUSTMENT

Tune the receiver dial to any desired station, choose the push button which you wish to control this station. Unscrew the push button one full turn, then depress the button as far as it will go, with the button in this position turn it until tight. The chosen station may always be received by depressing this button.

Remove call letter disc of station from list supplied and insert in button.

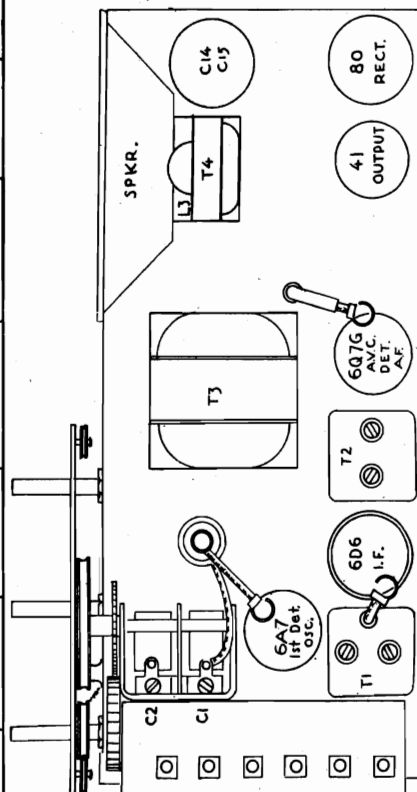
Insert celluloid disc.

In a like manner select a station for each of the other buttons and make necessary adjustments for each station.

ALIGNMENT PROCEDURE**PRELIMINARY:**

Output meter connection	Across loud speaker voice coil
Output meter reading to indicate 500 milliwatts	1.1 volts
Generator ground lead connection	Receiver chassis
Dummy antenna value in series with generator output	See chart below
Connection of generator output lead	See chart below
Generator modulation	30%, 400 cycles
Position of volume control	Fully clockwise
Position of tone control	Clockwise
Position of Dial Pointer with variable fully closed	Over first heavy line below 550 kc

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROX. MICROVOLTS
Open	465 kc.	.1 mfd.	6A7 Grid	T ₂ , T ₁	IF Output IF Input	100
1400 kc.	1400 kc.	.0082 mfd.	Ant. Lead	C ₂ , C ₁	Oscillator Translator	50



LOCATION OF PARTS TOP OF CHASSIS

57 RL 132

SEPT. 8, 1938

SILVERTONE

5 TUBE BROADCAST BAND SUPERHETERODYNE

MODEL 3972

FACTORY IDENTIFICATION NUMBER - 113.972

SEARS-ROEBUCK & CO.

JULY 5, 1938

MODELS 4608A, 4609A, 4628A
4629A, 4638A, 4639A, 4648A
4649A, 4728A, 4748A
Chassis 101.472X
Schematic, Voltage, Socket
Trimmers, Chassis

POWER SUPPLY:

"A" Battery (4½ volt dry) . . . 1 - #5032P
"A" Battery (4 volt storage). 1 - #5049
"B" Batteries 2 - #5131P

"A" Drain 0.3 amperes
"B" Drain 14 ma

FREQUENCY RANGES:

Band "A" 540-1780 kc
Band "P" 1760-6200 kc
Band "F" 5975-18500 kc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant.-Transl. Trimmer	Padder
Band "A"	1400 kc	1400 kc	600 kc
Band "P"	5 mc	5 mc	Fixed
Band "F"	--	15 mc	Fixed

INTERMEDIATE FREQUENCY 465 kc

POWER OUTPUT:

Type Class "B"
Undistorted 0.45 watts
Maximum 0.9 watts

LOUD SPEAKER:

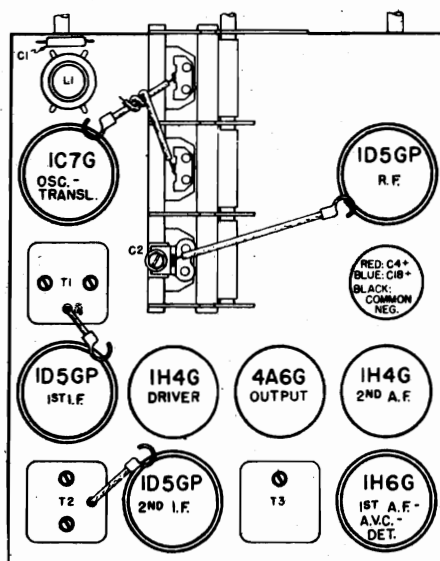
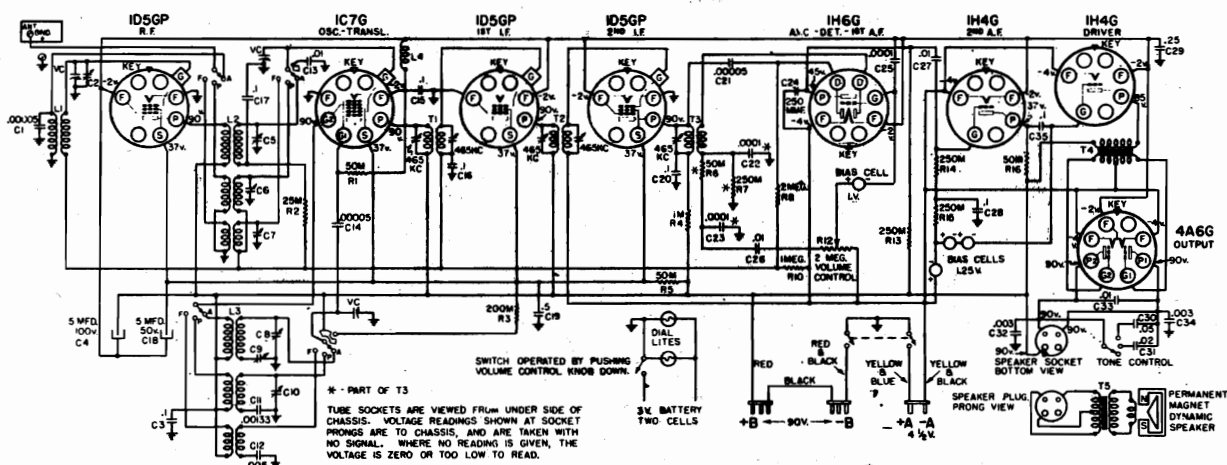
Type Permanent Magnet Dynamic
Size 5 and 8 inch

OPERATING FEATURES:

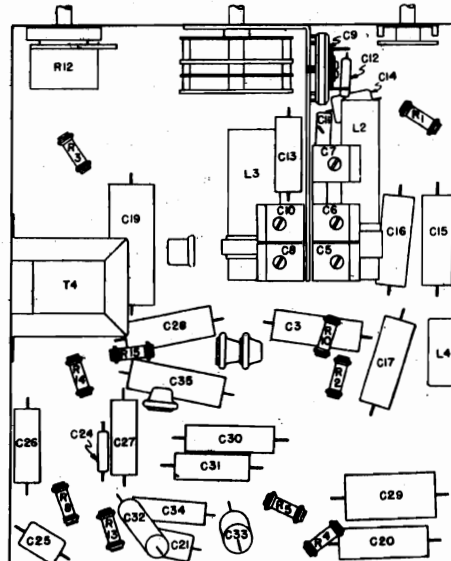
Three position Tone Control
Automatic Volume Control
"On-Off" Indicator
Flash-O-Light Dial Illumination
Short Wave Stations marked on dial
Wave Band Indicator

CHASSIS FEATURES:

Number RF stages . . . One on Broadcast Band
Number IF stages Two
Number condensers in gang . . . Three
Antenna Conventional
Plugs attached to battery cable



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

MODELS 4608A, 4609A, 4628A
4629A, 4638A, 4639A, 4648A
4649A, 4728A, 4748A
Chassis 101.472X

SEARS-ROEBUCK & CO.

MODEL 4700
Chassis 104.235
Alignment Notes

MODEL 4700. CHASSIS 104.235. ALIGNMENT PROCEDURE

PRELIMINARY:
Output meter connections Across loud speaker voice coil
Output meter readings to indicate 1 watt See chart below
Average sensitivity microvolts for 1 watt See chart below
Generator ground lead connection Receiver Chassis
Dummy antenna value to be put in series with generator output See chart below
Connection of generator output lead See chart below
Position of volume control 304, 400 cycles
Position of tone control Fully clockwise
Cover must be on case when making R. F. adjustments.

Position of Dial Pointer	Generator Frequency	Dummy Antenna Connections	Adjustment Symbol	Circuit Adjusted	Approx. Microvolts
No Signal 550-750 KC	455 KC	.001 Mfd. 6X7 grid	C-10 C-9	End IF Trans.	3500
No Signal 550-750 KC	455 KC	.001 Mfd. 6A5 grid	C-8 C-7	1st IF Trans.	35
1520 KC	1520 KC	.0001 Mfd.* Ant. Lead	C-5	Osc.	20
600 KC	600 KC	.0001 Mfd.* Ant. Lead	C-2	Ant.	15
1400 KC	1400 KC	.0001 Mfd.* Ant. Lead	C-6	Ant.	15
600 KC	600 KC	.0001 Mfd.* Ant. Lead	C-2 **	Ant.	15

IMPORTANT ALIGNMENT NOTES

*Make the generator connection to the receiver through a shielded lead having not more than 50 MMF. (.0005) capacity. If a series condenser has been employed as outlined in the first paragraph under "General Information and Service Hints" the dummy antenna should be the same as the antenna itself.
**Readjust C-2 after installation as outlined under "Antenna Matching in Service Hints". Each step of the Alignment Procedure should be repeated in order to afford greater accuracy. Always keep the output from the signal generator at its lowest possible value to prevent any possible AVC action.
Alignment Adjustment screws are shown in Figures 3 and 4.

Only the dummy antenna indicated in the chart for any particular frequency should be used. Grid cap leads should remain in place during alignment.

Oscillator circuit alignment can be made only at high frequencies. A fixed paddler is used in series with the return of the oscillator coil secondary. Oscillator coil inductance is preadjusted at factory.

Values shown under "Microvolts" are only approximate.

Dial Adjustments:

Rotate dial completely to the right. Then rotate dial completely to the left. Now dial will be set to properly.

If controls operate with too much difficulty it indicates that the control cables are bent too sharply. This should be avoided.

CAUSES AND REMEDIES FOR UNUSUAL NOISE CONDITIONS

If after making proper installation of receiver, you encounter noises you cannot eliminate refer to EL's Nos. 2, 6, 40, 41, 72, 73, 117, for suggestions and remedies.

ELIMINATING WHISTLE AT 900 TO 920 KC:

In locations where a strong 910 KC station is in operation, a whistle may be experienced at 900 to 920 KC. This whistle is due to a beat between the second harmonic (910 KC) of the 455 KC I. F. and the 910 KC station. Such a condition can be corrected by changing the I. F. frequency to a higher or lower value until the whistle disappears. However, the I. F. amplifier should not be shifted to a frequency higher than 455 KC nor lower than 445 KC but should be as close to 455 KC as possible.

If the I. F. frequency is changed, it will be necessary to realign the rest of the receiver as described under "Alignment Procedure".

Antenna Matching:

An antenna paddler condenser is used to match antenna capacitances up to 500 MMF. If, in the installation this paddler is not effective, it is because the capacity of the antenna is over 500 MMF. In that case a fixed capacity of .0005 MFD. or less should be connected in series with the antenna. The location of the antenna adjustment is found on Fig. 3.

ALIGNMENT PROCEDURE

PRELIMINARY:
Output meter connection Across speaker voice coil
Output meter reading to indicate 50 milliwatts See chart below
Average sensitivity in microvolts for 50 milliwatts output See chart below
Dummy antenna value to be in series with generator output See chart below
Connection of generator output lead See chart below
Connection of generator ground lead Receiver chassis
Generator modulation 304, 400 cycles
Position of Volume Control Fully on
Position of Tone Control Fully clockwise
Position of Dial Pointer To fall on end line of scale (low frequency end). Loosen dial drum set screws and rotate drum if necessary. Tighten set screws after pointer is properly set.

WAVE BAND SWITCH POSITION	GENERATOR FREQUENCY	DUMMY ANTENNA CONNECTION	GENERATOR (IN ORDER SHOWN)	TRIMMERS ADJUSTED	APPROXIMATE MICROVOLTS
"P"	5 mc	465 kc	.1 mfd.	1073 G-14	13, 12, 11 IF 20
"A"	1400 kc	1400 kc	.0003 mfd.	Ant. Term.	08, 05, 03 Antenna 7
"A"	800 kc	800 kc	.0002 mfd.	Ant. Term.	09 Padder 7
"P"	5 mc	5 mc	400 ohms	Ant. Term.	C10, C8 Oscillator Translator 10
"P"	15 mc	15 mc	400 ohms	Ant. Term.	C7 Translator 15

IMPORTANT ALIGNMENT NOTES

Note that the IF must be adjusted with the Wave Band Switch in the "P" position. Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

Always keep the output from the signal generator at its lowest possible value to prevent the AVC action of the receiver from interfering with accurate alignment. As the receiver sensitivity is increased through alignment, the output from the generator should be decreased to compensate.

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:

1. Left knob "On-Off" Switch; Volume; Flash-O-Light.
2. Center lower knob Wave Band Switch
3. Center upper knob Station Selector
4. Right knob Tone Control

CONTROL OPERATION:

- Turning right: Power on; Volume increase; Pushing down: Flash-O-Light turning right: "A", "P", "P"
Turning Ratio: 30:1
Turning right: "LO", "MED", "HI"

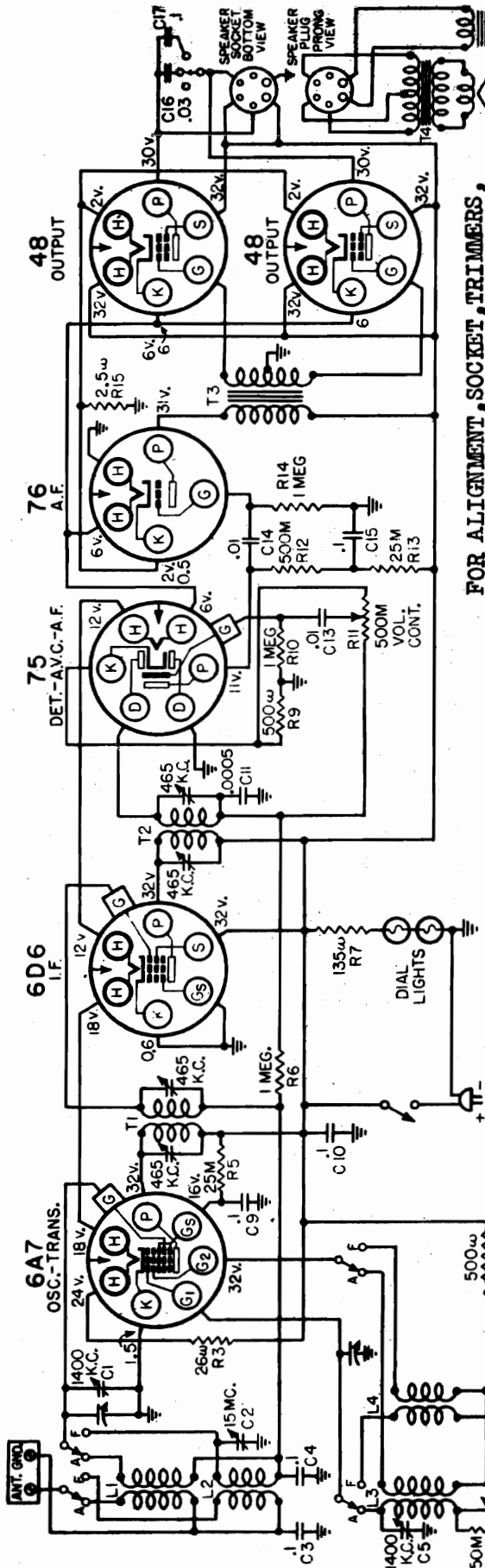
SUBJECT: CIRCUIT REVISIONS TO REDUCE BATTERY DRAIN

Later production of chassis number 101.472X described in EL 491 is identified as 101.472X. As with previous production, the two 1L6G output tubes have been replaced by 1L6G driver tubes and 445G output tubes. These changes reduce the "A" battery drain from .5 amperes to .3 amperes, and reduce the "P" drain from 23 ma. to 15 ma.

The Parts List, Locations of Parts Diagrams, and Wiring Diagram follow. Be sure to mention chassis identification number 101.472X when ordering parts for this chassis.

SEARS-ROEBUCK & CO.

MODELS 4612A, 6162
Chassis 101.533
Schematic, Voltage



FOR ALIGNMENT, SOCKET TRIMMERS,
CHASSIS, SEE NEXT PAGE

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
READINGS TO BE MADE WITH NO SIGNAL, WHERE NO VOLTAGE READING
IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY
LOW READING.

ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE
TRIMMER CONDENSERS.

FIGURES AT CATHODE ARE CATHODE CURRENT IN MILLIAMPERES.

CONTROL OPERATIONS:
Turning right: Volume Increase
Turning right: "AM", "FOR"
Tuning ratio: 17:1
Turning right: ON, HI, MED, LO

POWER SUPPLY: All models available 32 volts, DC; 45 Watts

FREQUENCY RANGES:

Band "AM" 540-1750 kc
Band "FOR" 5.5-16.5 mc

ALIGNMENT FREQUENCIES:

Ant-Transl. Oscill.
Trimmer Oscill.
Band "AM" 1750 kc
Band "FOR" 15 mc

INTERMEDIATE FREQUENCY

. 455 kc

POWER OUTPUT:

Type Push-Pull
Undistorted 0.15 watts
Maximum 0.32 watts

LOUD SPEAKER:

Type Dynamic
Size 8" and 8"
Field coil resistance 175 ohms
Field coil voltage drop 32 volts

OPERATING FEATURES:

Tone Control 3 Position
Automatic Volume Control

CHASSIS FEATURES:

Number IF stages One
Antenna Conventional
Push-Pull Output

OPERATING CONTROLS:

1. Left knob Volume
2. Next to left knob Wave Band Switch
3. Next to right knob Station Selector
4. Right knob Tone Control

GABINET SOURCES: D, J

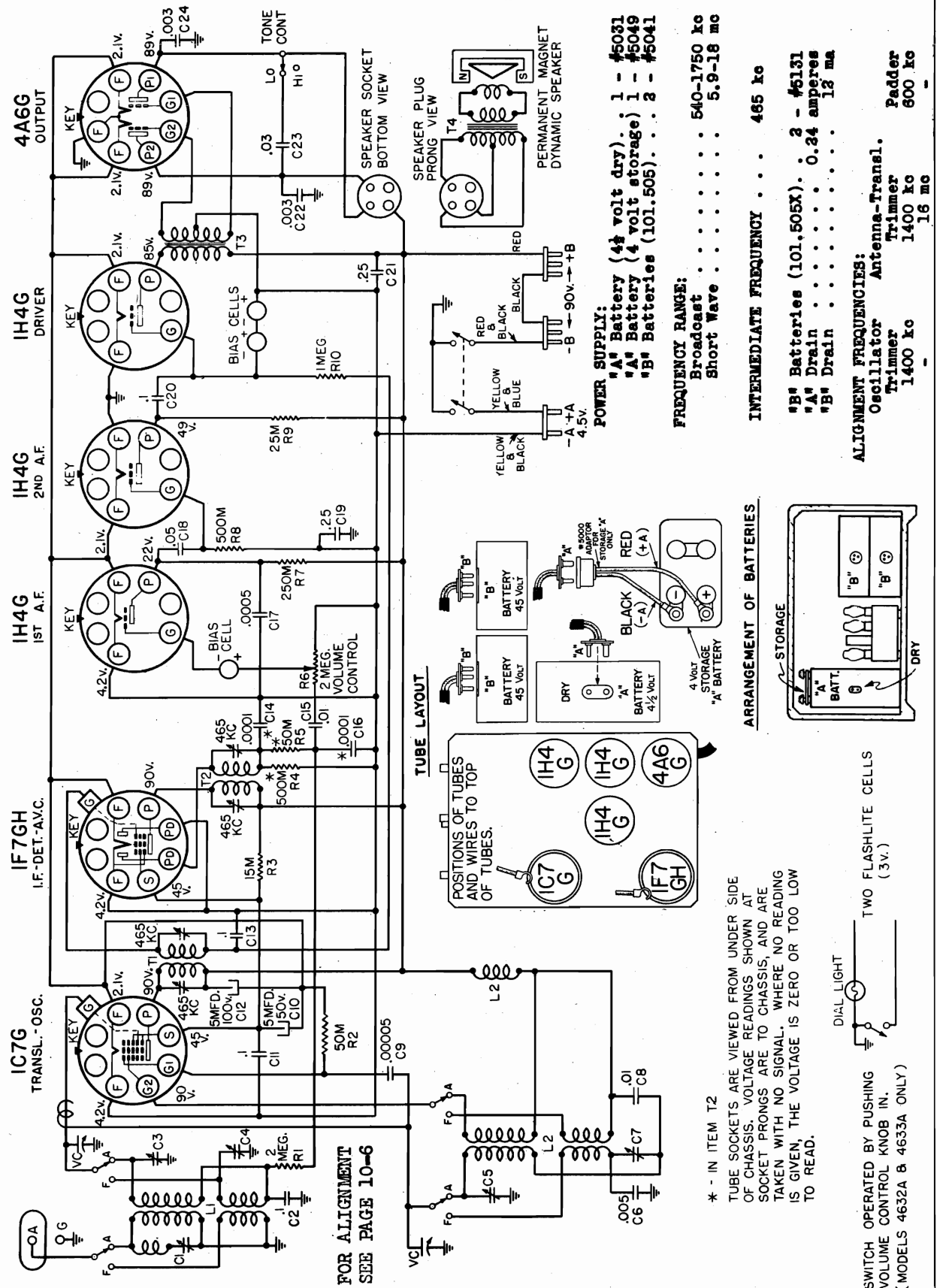
57 RL 135

SEPT. 14, 1938

SEARS-ROEBUCK & CO.

APRIL 15, 1938

MODELS 4632A, 4633A, 6014, 6015
 6044, 6045, 6064, 6144, 6164
 Chassis 101.505, 101.505X
 Schematic, Voltage, Socket



MODELS 4632A, 4633A, 6014
6015, 6044, 6045, 6144, 6164
6064 Ch. 101.505, 101.505X
Socket, Chassis, Notes

SEARS-ROEBUCK & CO.

MODELS 4667, 4767, 4777,
4798. Chassis 101.498
Tuner Condensers, Drive

MODELS 4667, 4767, 4777, 4798, CHASSIS 101.498.

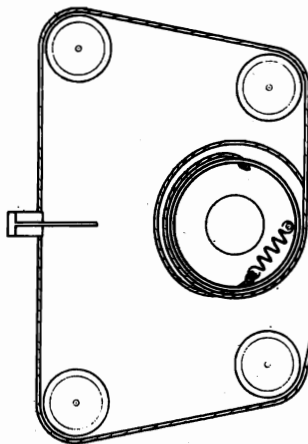
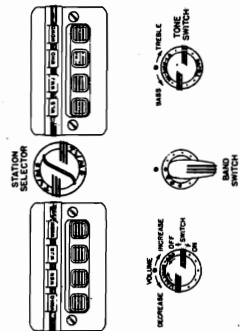
OPERATING CONTROLS:

1. Left knob . . . "On-Off" switch and Volume
2. Lower center knob . . . Wave Band Selector
3. Upper center knob . . . Station Selector
4. Right knob . . . Tone Control

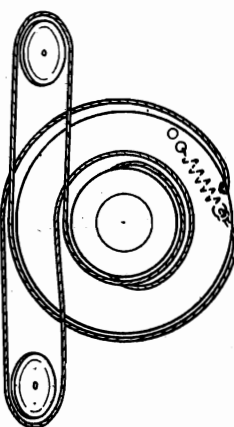
CONTROL OPERATION:

1. Power on: volume increase
2. Turning right: Push Button Tuning, "A" "B", "C", "D"
3. Tuning ratio: 33:1
4. Turning right: "LOW", "MEDIUM", "HIGH"

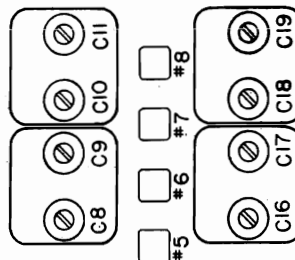
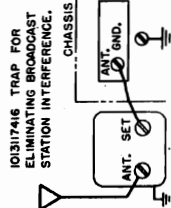
DIAL & KNOB FUNCTIONS



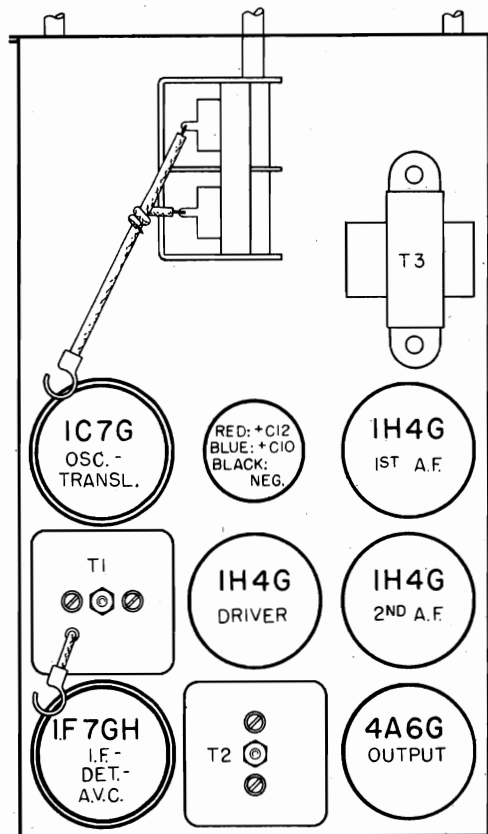
POINTER DRIVE HOOKUP



CONDENSER DRIVE HOOKUP

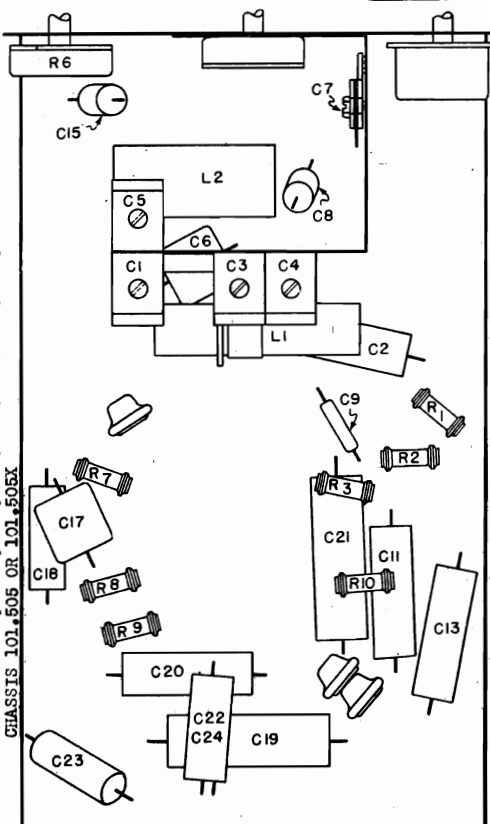


PUSH BUTTON
CONDENSER POSITIONS



LOCATIONS OF PARTS ON TOP OF CHASSIS.

MODELS 4632A, 4633A, 6014, 6015, 6044, 6045, 6064, 6144, 6164.
CHASSIS 101.505 OR 101.505X



LOCATIONS OF PARTS UNDER CHASSIS.

DIFFERENCES BETWEEN 101.505 AND 101.505X:

The Model 101.505X incorporates the Dial FLASH-O-LITE feature. Pushing the Volume Control knob in will cause the dial to become illuminated. Two flash-light cells provide the battery for the dial lamp.

POWER OUTPUT:
Type Class AB
Indicating 0.4 watts
Maximum 0.8 watts

LOUD SPEAKER:
Type FM Dynamic
Size 6 and 8 inch

MODELS 4644A, 4645A
Socket, Chassis
Alignment

SEARS ROEBUCK & CO.

MODELS 6010, 6040
MODELS 6052, 6053
MODELS 6054, 6055
Alignment

MODELS 4644A, 4645A CHASSIS 101.504; 6010, 6040 CHASSIS 101.519; 6052, 6053 CHASSIS 101.525; 6054-5 CHASSIS 101.532.
 USE OF TABLE: ONLY ONE MODEL FOR EACH CHASSIS IS SHOWN IN TABLE BELOW, FOR EXAMPLE 4644A INDICATES CHASSIS 101.504 AND MODEL 4645A.

Output meter connections, Models 4644A, 6010, 6052 ----- Across loud speaker voice coil.
 Model 6054-5 ----- 4000 ohm Weston meter, across speaker terminals.
 Output reading to indicate 50 milliwatts, Models 4644A, 6010, 6052 ----- 0.37 volts.
 Model 6054-5 ----- 9.40 volts.
 Generator Ground lead connection ----- Receiver chassis.
 Dummy antenna value to be in series with generator output ----- See chart below.
 Connection of generator output lead ----- See chart below.
 Generator modulation ----- 30%, 400 cycles.
 Approximate average sensitivity in microvolts for 50 milliwatts output ----- See chart below.
 Position of volume control ----- Fully On.
 Position of Tone control, Models 4644A, 6010, 6052 ----- "HI".

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)				TRIMMER FUNCTION	APPROXIMATE MICROVOLTS			
				MODELS 4644A	6010	6052	6054-5		MODELS 4644A	6010	6052	6054-5
Closed	465 kc	.1 mfd.	1076 Transl. Grid	T ₂ , T ₁	T ₂ , T ₁	T ₂ , T ₁	T ₂ , T ₁	IF	160	185	225	---
600 kc	465 kc *	.0002 mfd.	Antenna Term.	C ₂ *	C ₁₆ *	C ₂ *	C ₁₆ *	IF Wave Trap	---	---	---	---
Fully open	1730 kc	.0003 mfd.	Ant. Clip		C ₄			Oscillator	90			
1400 kc **	1400 kc	.0003 mfd.	Antenna Term	C ₅ , C ₁	C ₁	C ₅ , C ₁	C ₁ , C ₄	Oscillator Translator	66	70	115	110
600 kc (rock)	600 kc	.0002 mfd.	Antenna Term	C ₆	C ₅	C ₆	C ₅	Padder	33	70	80	80

*The generator should be adjusted to give high output. The trimmer should be adjusted for minimum output meter reading instead of usual maximum output meter reading. If the frequency of an interfering code station near 465 kc is known, the generator should be adjusted to that frequency instead of 465 kc.

**Using the dial as a template make a dummy dial of cardboard with only the 1400 kc calibration on it. Slip this dummy dial over the shaft, hold it horizontal so the 1400 mark will come at the same position as the 1400 mark of the actual dial and turn the dial pointer to the 1400 kc mark. (The dial pointer should be horizontal when the condenser is fully open or fully meshed.)

The variable should be rocked back and forth a degree or two while making the 600 kc adjustment. The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

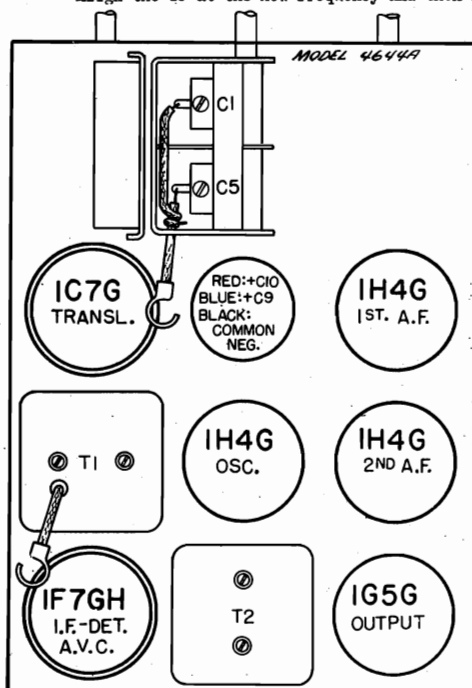
Values shown under "Microvolts" are only approximate.

ELIMINATING WHISTLE AT 930 KC: MODELS 4644A, 6052, 6054-5, 6010.

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

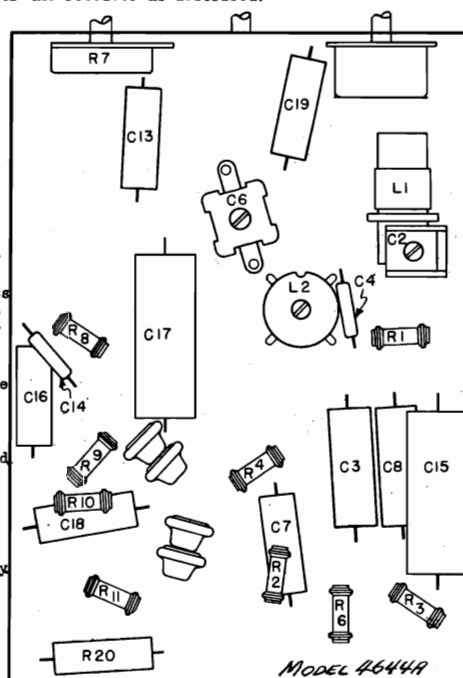
Determine at what point between 900 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to select the new IF frequency as near to 465 kc as possible.

Align the IF at the new frequency and then realign the rest of the receiver as described.



LOCATIONS OF PARTS ON TOP OF CHASSIS.

MODELS 4644A, 4645A; Chassis 101.504
 The dry "A" battery should be replaced when its voltage drops to 3.4 volts, under load. "B" batteries should be replaced when the voltage of each battery has dropped to 34 volts, under load. The life rating of the various size batteries, given are for an average use of three hours a day.



LOCATIONS OF PARTS UNDER CHASSIS

Schematic, Voltage Changes for Jacks

SEARS-ROEBUCK & CO.

 MODELS 4667, 4677, 4767, 4777
4798 Chassis. 101, 498

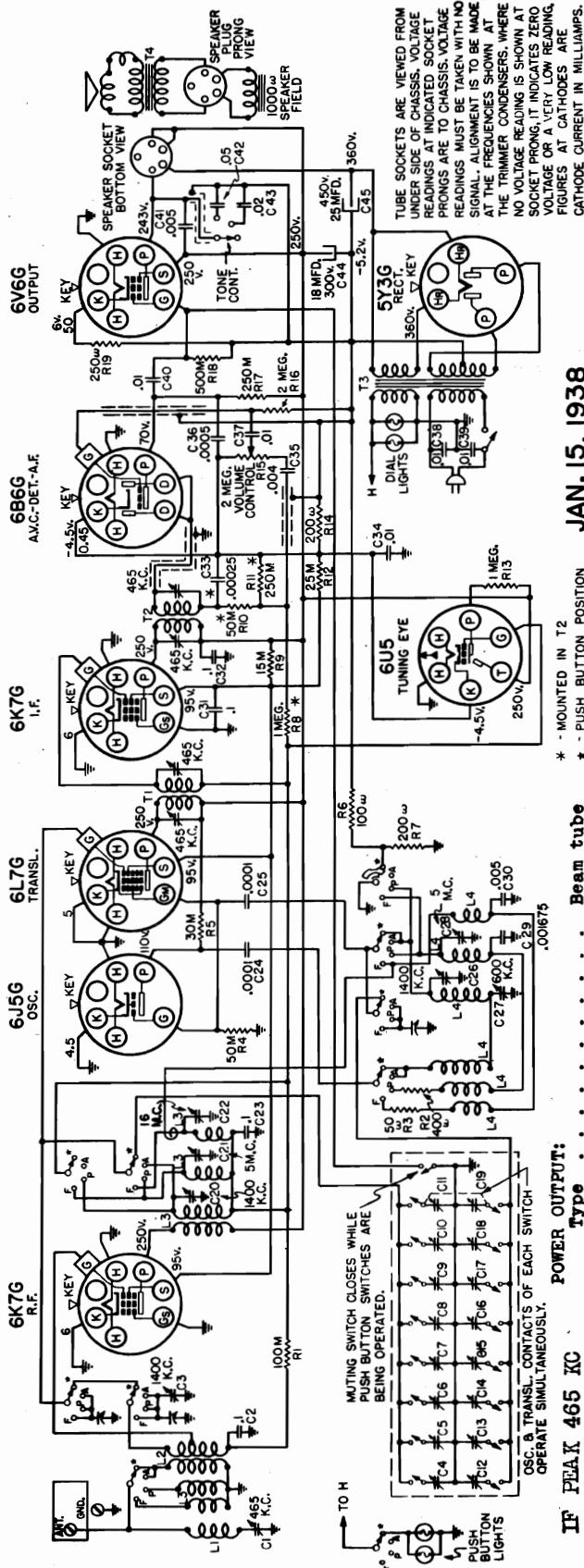
POWER SUPPLY:

 All models available 105-125 volts, 50-60 cycle, 75 watts
 All models available 125-125 volts, 25 cycle, 75 watts

FREQUENCY RANGES:

 Band "A" 540-1750 kc
 Band "B" 2150-3300 kc
 Band "F" 6-18.2 mc

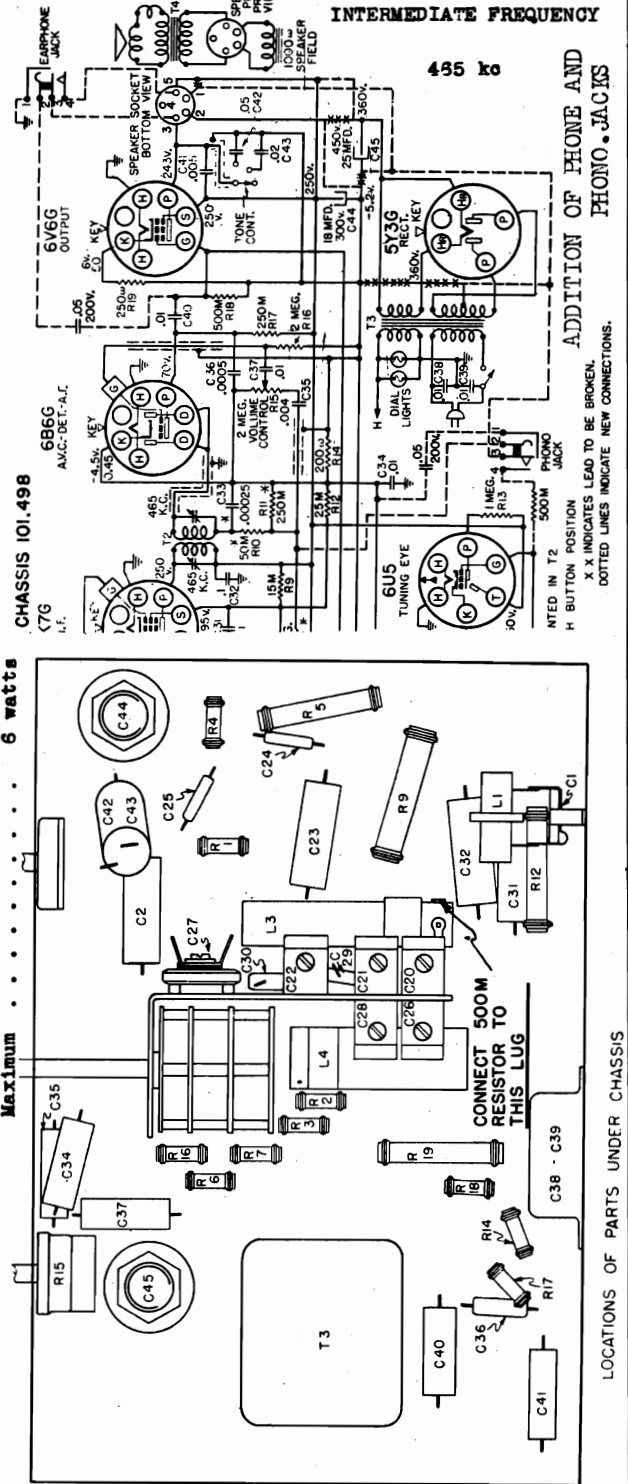
LOUD SPEAKER:

 Type Dynamic
 Size 6", 8", 12"
 App. field coil resistance . . 1000 ohms
 App. field coil voltage drop . . 110 volts


JAN. 15, 1938

 * - MOUNTED IN T2
 * - PUSH BUTTON POSITION

CHASSIS 101, 498

 IF PEAK 465 KC
 POWER OUTPUT:
 type Beam tube
 Undistorted 3 watts
 Maximum 6 watts


LOCATIONS OF PARTS UNDER CHASSIS

MODELS 4667, 4677, 4767

4777, 4798, Ch. 101, 498

Socket, Trimmers, Chassis

Alignment, Transformer

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection Across voice coil leads
Output meter reading to indicate .5 watts output 1.04 volts
Approximate microvolts input for .5 watts output See chart below
Dummy antenna value to be in series with generator output See chart below
Connection of generator output lead See chart below
Connection of generator ground lead To chassis
Generator modulation 30%, 400 cycles
Position of Volume Control Fully clockwise
Position of Tone Control Fully clockwise
Position of Dial Pointer when variable is fully meshed To fall on center of large square block at 550 kc end of dial.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"P"	Closed	485 kc	.1 mfd.	8L7G Grid	T2, T1	IF Output IF Input	105
"A"	Closed	485 kc	.0003 mfd.	Ant. Term.	C1 *	IF Trap	-
"A"	1500 kc	1500 kc	.0003 mfd.	Ant. Term.	C26, C20, C3	Oscillator Transl., RF	11
"A"	800 kc (rock)	800 kc	.0003 mfd.	Ant. Term.	C27	Padder	18
"P"	8 mc	8 mc	400 ohms	Ant. Term.	C28	Oscillator	70
"P"	5 mc (rock)	5 mc	400 ohms	Ant. Term.	C31	Translator	70
"P"	16 mc (rock)	16 mc	400 ohms	Ant. Term.	C32	Translator	80

IMPORTANT ALIGNMENT NOTES

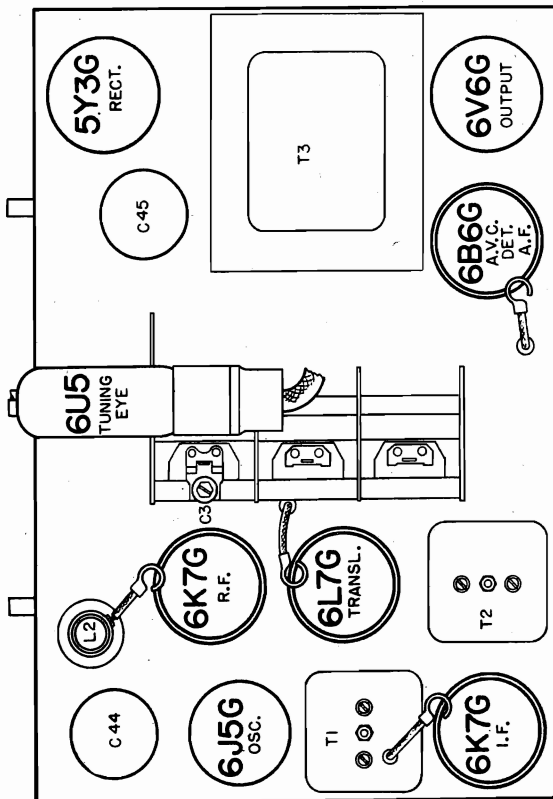
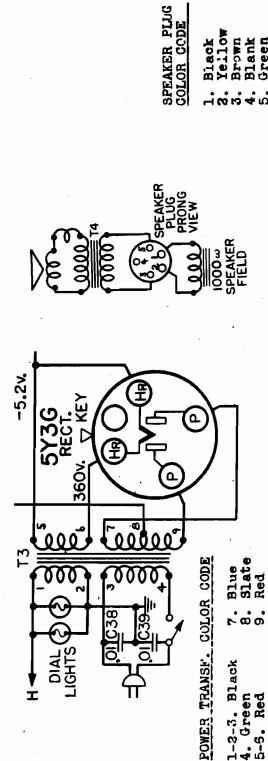
* If the frequency of an interfering code station is known, the generator should be adjusted to that frequency instead of 485 kc. The trap should be adjusted to give minimum output meter deflection instead of the usual maximum reading.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

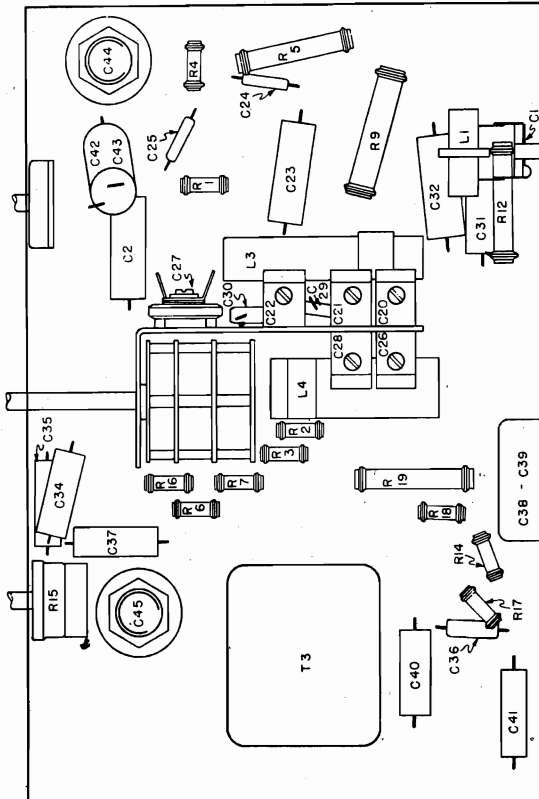
It is necessary to repeat the entire alignment procedure step by step in the original order to secure proper alignment. Perfect alignment is not possible with one adjustment of the trimmers.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

Values shown under, "Microvolts", are only approximate.



LOCATIONS OF PARTS TOP OF CHASSIS.



LOCATIONS OF PARTS UNDER CHASSIS

SEARS-ROEBUCK & CO.

GENERAL INFORMATION & SERVICE HINTS

INSTRUCTIONS FOR SETTING UP PUSH BUTTON STATIONS:

1. Remove the two escutcheons that enclose the push buttons. Remove the celluloid calligraphic letter holders. A label will be seen telling what frequency (kilohertz) stations can be set up on each button. Each button can be used for only ONE station in its frequency range.
2. Turn the Wave Switch knob to the "American" position and use the Tuning Knob to tune in the station chosen for #1 button. Then turn the Wave Band switch to the Push Button position, and push button #1 all the way in.
3. It will be seen that there are two adjusting screws for each button, an upper one and a lower one. Using a screw driver, turn the lower adjusting screw for #1 button until the station is tuned in as accurately as possible, as indicated by the Tuning Eye. If, during the adjustment, you obtain a strong Tuning Eye indication, but do not hear your station, turn the upper adjusting screw one or two turns to the right and then proceed with the lower screw. Turn the Wave Switch knob back to the correct station, turn the Wave Switch knob back to the "American" position momentarily.
4. After the best possible setting of the lower screw has been made, adjust the #1 upper screw right or left to make the slit of the Tuning Eye still narrower.

THE A.V.C. CIRCUIT:

The diode current of the 6880 tube, flowing through the 250M ohm resistor, R11, creates a voltage drop across it. This voltage is applied to the control grids of the RF, Translator, and IF tubes to provide AVC.

OSCILLATION:

Be sure the tube shields are making good contact to their base clips. Poor contact may cause oscillation.

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 485 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 980 kc the whistle will be least objectionable. Dividing this frequency by two will give the new rf frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the rf should be realigned at $915/2$ or 457.5 kc. Try to choose the new rf frequency as near to 485 kc as possible.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURES". It will also be necessary to readjust any stations set up on the Push Button Tuning Mechanism.

WAVE TRAPS:

A wave-trap, designed to eliminate code interference from ship transmitters, airports or air beacon stations in locations where the receiver is near such transmitters, is built into the receiver. As explained in the alignment procedure, this trap should be tuned to the interfering station in the vicinity of 485 kc.

A wave-trap, designed to eliminate whistles and cross modulation troubles on the broadcast band when the receiver is located comparatively near some powerful broadcast station, is available.

This trap can be ordered under part #1013117418 directly from Sears, Roebuck and Co. Retail Store or Mail Order branch, using Purchase Order Blank form F5284. The retail selling price is \$1.30.

Mount the trap to the chassis mounting shelf or to the inside of the cabinet by means of wood screws through the bracket on the trap. It is important to connect a wire from under the head of one of the wood screws to the chassis so that the wave-trap shield becomes grounded to the chassis.

INSTALLATION OF A PHONOGRAPH PICKUP JACK OR AN EARPHONE JACK: FOR CHASSIS 101.498 ONLY

The trap has two terminals marked, "ANT" and "GND". Disconnect the antenna lead-in from the receiver and connect it to the "ANT" terminal of the trap. The ground connection of the trap is to the "GND" terminal of the chassis. The antenna lead-in from the station to be intercepted remains as it was. The trap then is in series between the antenna and the receiver. The trap should be tuned to the frequency of the station to be intercepted. The sensitivity of the receiver will be reduced in the region of the frequency to which the trap is tuned.

PHONOGRAPH PICK-UP JACK:

PHONOGRAPH PICK-UP JACK: A hole, covered with a brass insert, is provided in the back of the chassis. Remove the brass insert and mount the jack in this hole. Insulate the jack with the chassis. Solder the brass insert to the hole. The Schematic shows the connections to the jack. In addition, changes must be made in the wiring of the speaker socket and the electrolytic condenser. As the Schematic Section shows, these wiring changes and the connections to the jack are as follows:

Disconnect the jumper between prongs 1 and 5 of the speaker socket.

Disconnect the lead from prong 3 of the speaker socket and connect it to prong 5.

Disconnect the leads from prong 1 of the speaker socket and connect them to prong 5.

There is a hole in the front apron of the chassis, between the Tone Control and the right side of the chassis. Mount one of the terminal boards, supplied in the kit, in this hole.

There is an electrolytic condenser just above the terminal board mentioned in the preceding paragraph. Remove the three leads that are soldered to the mounting nut of this condenser and connect them to the terminal board mentioned in the preceding paragraph.

Solder a lead from the mounting nut of the electrolytic, mentioned in the preceding paragraph, to prong #1 of the speaker socket.

The slate colored lead of the power transformer is connected to the mounting nut of the electrolytic condenser mounted next to the volume control. Remove this lead from the condenser mounting nut, lengthen the lead by splicing, and run it to prong #1 of the speaker socket.

Solder a lead from the mounting nut of the electrolytic, mentioned in the preceding paragraph, to prong #3 of the speaker socket.

There is a terminal board mounted under one of the nuts that mount the IIF output transformer. Mount the terminal board supplied in the kit under this same nut. Connect the .05 condenser, supplied in the kit, between this new terminal board and terminal #1 of the jack.

Run a lead from the new terminal board to the cathode prong of the 5B6G tube.

There is a two-terminal board mounted on the front of the Wave Switch assembly bracket. Run a lead from the terminal of this board that is nearest the Volume Control to lug #3 of the jack.

Run a lead from lug #3 of the Jack to prong #1 of the speaker socket.

Connect the 500M ohm resistor between lug #4 of the jack and the coil terminal shown in the illustration.

The radio Volume Control and Tone Control will operate for the phonograph pick-up.

EARPHONE JACK: Mount the jack in the hole in the back of the chassis. The jack frame must be grounded to the chassis. Therefore, do not use the insulating washers.

Connect the .05 condenser from terminal #3 of the jack to the grid prong of the 6V6G output tube.

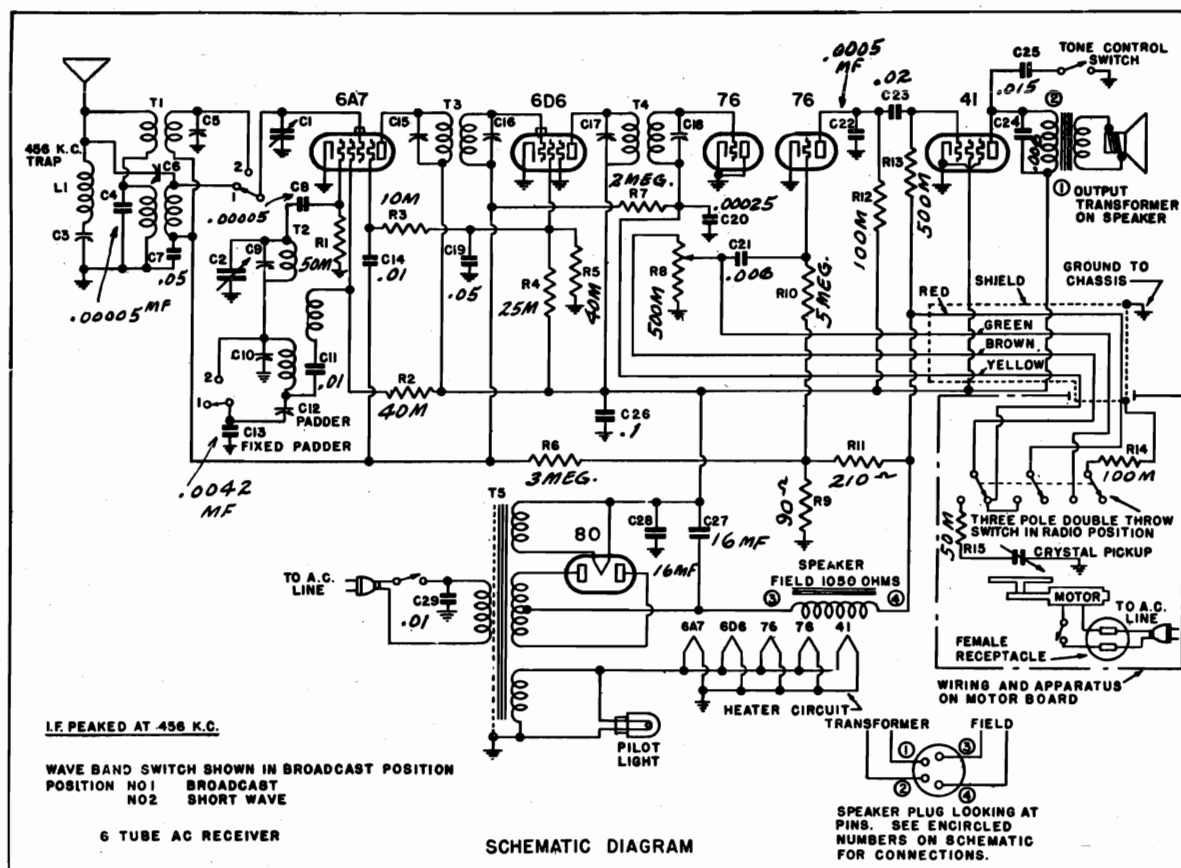
Connect terminal #3 of the jack to terminal #3 of the speaker socket.

Connect terminal #4 of the jack to terminal #5 of the speaker socket.

This is the only wiring necessary. The wiring changes mentioned above for connection of the phonograph pick-up jack are not to be done if only an earphone jack is used.

With the connections as described, the loud speaker will not operate when the earphones are plugged in. If it is desired to have the loud speaker operate at the same time the earphones are plugged in, the connections to terminals 3 and 4 of the jack should be omitted.

SEARS-ROEBUCK & CO.

MODEL 4668, Ch. 103 AR166
Schematic, Voltage

TUBES AND FUNCTIONS:

6A7 Translator-Oscillator
6D6 IF
76 AVC - Detector

76 A. F. Amplifier
41 Output
80 Rectifier

POWER SUPPLY:

All models available 105-125 volts, 60 cycle, 53 watts

FREQUENCY RANGES:

American Band 540-1730 KC
Foreign Band 5.7-18.3 MC

ALIGNMENT FREQUENCIES:

	Oscil.	Oscil.
Band "AM"	1600 kc	600 kc
Band "FOR"	16 mc	Fixed

INTERMEDIATE FREQUENCY 456 kc

POWER OUTPUT:

Type Pentode
Undistorted 2.6 watts
Maximum 3.9 watts

LOUD SPEAKER:

Type Dynamic
Size 6"
Field Coil Resistance 1050 Ohms

OPERATING FEATURES:

Tone Control Two Point
Automatic Volume Control
Crystal Phonograph Pickup

Voltage Table

6A7	244	82	0	118	6.3 a.c.
6D6	244	85	0	—	6.3 a.c.
76	—	—	0	—	6.3 a.c.
76 a-f	85	—	0	—	6.3 a.c.
41	226	244	0	—	6.3 a.c.

Voltage across speaker field—65.

Voltage at 80 filament to B minus (center-tap of high-voltage winding on power transformer)—325.

The grid bias for all the tubes is developed across the resistors R9 and R11 (see schematic No. 1). The total voltage measured across R9 and R11 should be 15 volts, and is the bias for the 41 tube. The voltage measured across R9 should be 5 volts. To check the bias on the 6A7 and 6D6 tubes, measure the values of resistors R6, R7 and R8 (see schematic).

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:

1. Left Knob Wave Change
2. Next to Left Knob Tone Control
3. Next to Right Knob Tuning
4. Right Knob Power Switch

CONTROL OPERATION:

Clockwise "AM" Anti-Clockwise "FOR"

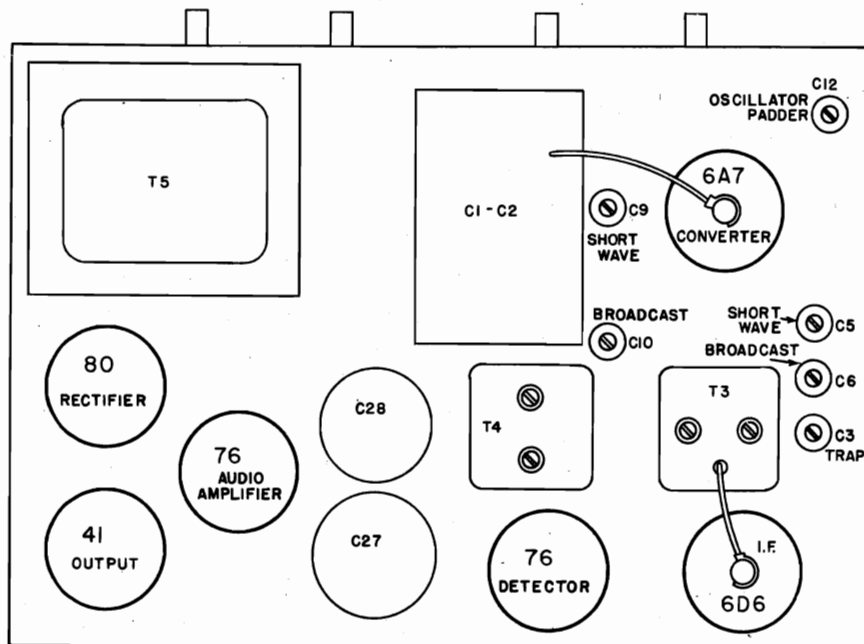
Ratio 12:1
Turn Right: Power On; Volume Increase

MODEL 4668, Ch. 103, AR166

Socket, Trimmers

Alignment

SEARS-ROEBUCK & CO.



LOCATION OF PARTS TOP OF CHASSIS

57RL 75

FEB. 16, 1938

ALIGNMENT PROCEDUREPRELIMINARY:

Output meter connections Across speaker voice coil
 Output meter reading to indicate .050 watt.
 (Meter on 50 V. scale or higher) 18.7 volts
 Average sensitivity in microvolts for .050 watts output See chart below
 Dummy antenna value to be in series with generator output See chart below
 Connection of generator output lead See chart below
 Connection of generator ground lead To chassis
 Generator modulation App. 30% - 400 cycles
 Position of volume control Fully clockwise
 Position of tone control Fully clockwise
 Position of dial pointer with variable fully meshed Horizontal

WAVE BAND SWITCH POSITION	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED IN ORDER SHOWN	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
B.C. 160	456	.02 mfd.	6A7 Grid	C15, C16 C17, C18	I. F.	50
B.C. 160	456	.0002 mfd.	Ant. Lead	C3	Wave trap Trim. for minimum response	
S.W. 16	16 mc.	400 ohm	Ant. Lead	C9, C5	Osc., R. F.	17
B.C. 60 (rock)	600 kc.	.0002 mfd.	Ant. Lead	C12	Osc.	10
B.C. 160	1600	.0002 mfd.	Ant. Lead	C10, C6	Osc., R. F.	12

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

It is advisable to repeat the entire alignment procedure band by band and in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

Values shown under "Microvolts" are only approximate.



FREQUENCY RANGES:

American Band	540-1800 kc
Intermediate Band	1760-8050 kc
Foreign Band	5.9-18.1 mc

INTERMEDIATE FREQUENCY 465 kc

Type	Push-Pull (Beam Tubes)
Undistorted	6 watts
Maximum	10 watts

LOUD SPEAKER:
 Type Dynamic
 Size 10" and 12"
 App. field coil resistance . . 600 ohms
 App. field coil voltage drop . . 85 volts

ALIGNMENT FREQUENCIES:		
	Oscil.	Oscil.
Band "AM"	1500 kc	Ant-Transl. Padder
Band "INT"	5 mc	Trimmer
Band "FOR"	15 mc	1500 kc
		5 mc
		15 mc
		Fixed

POWER SUPPLY:
All mode
All mode

POWER TRANSP. COLOR CODE

1, 3, 3-Red	5-Blue
4-Slate	6, 7, 8-Black
	9-Green

SPEAKER PLUG COLOR CODE

1. Black	4. Red
2. Yellow	5. Green
3. Brown	6. Blank

105-125 volts, 50-80 cycle, 95 watts
105-125 volts, 25 cycle, 100 watts

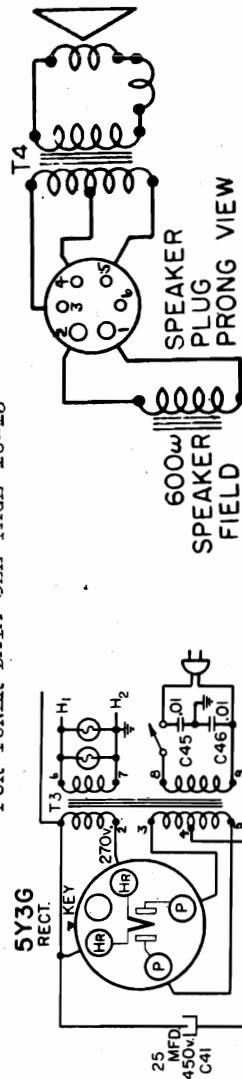
POWER SUPPLY:
All mode
All mode

JAN. 19, 1938

FOR TUNER DATA SEE PAGE 10-13

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. VOLTAGES MUST BE MEASURED WITH NO SIGNAL. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE THINNER CONCENTRATIONS, WHERE NO VOLTAGE READING IS SHOWN. IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. FIGURES 'A' CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.

* - PART OF TI * PUSH BUTTON TUNING POSITION



MODELS 4681, 4781
Chassis 101, 499

SEARS-ROEBUCK & CO.

Phone, Phono. Jacks
Installation, Schematic

INSTALLATION OF A PHONOGRAPH PICKUP JACK OR AN EARPHONE JACK:

A kit, part #1016117189, can be ordered from Colonial Radio Corporation, 354 Rano Street, Buffalo, N. Y. The retail selling price is \$1.11. This kit contains the necessary parts for installing either a phonograph pick-up jack or an earphone jack. If the customer desires both a phonograph pick-up jack and an earphone jack, it will be necessary to use two kits and to drill an additional hole in the back of the chassis for the additional jack.

PHONOGRAPH PICK-UP JACK: A hole, covered with a brass insert, is provided in the back of the chassis. Remove the brass insert and mount the jack in this hole. Insulate the jack from the chassis by means of the two insulating washers supplied in the kit. The Schematic Section shows the connections to the jack.

Disconnect the jumper that is between prongs #1 and #4 of the speaker socket and move the lead on prong #1 to prong #4.

Locate the electrolytic condenser mounted alongside of the power transformer. A green lead runs from the anode (center terminal) of this electrolytic to prong #2 of the speaker socket. Transfer the connections of this lead from the anode to the cathode (mounting nut) of the electrolytic and from prong #2 to prong #1 of the speaker socket.

There is a jumper between the cathodes of the two electrolytics. Disconnect this jumper. Run a jumper between the anodes of the two electrolytics.

There is a four-terminal board mounted under the nut that holds the IF output transformer. Run a lead from the terminal nearest the speaker socket on this board to prong #2 of the speaker socket.

Run a lead from lug #1 of the jack to the cathode of the 6Q7G tube.

Connect the .05 mfd. condenser from lug #2 of the jack to the blank prong (3rd one clockwise from the locating pin when viewed from the underside) of the 6K7G tube socket.

Run a lead from lug #3 of the jack to the coil terminal shown in the illustration.

Connect the 500M ohm resistor, supplied in the kit, between lug #4 of the jack and prong #1 of the speaker socket.

The radio Volume Control and Tone Control will operate for the phonograph pick-up.

EARPHONE JACK: Mount the jack in the hole in the back of the chassis. The jack frame must be grounded to the chassis. Therefore, do not use the insulating washers.

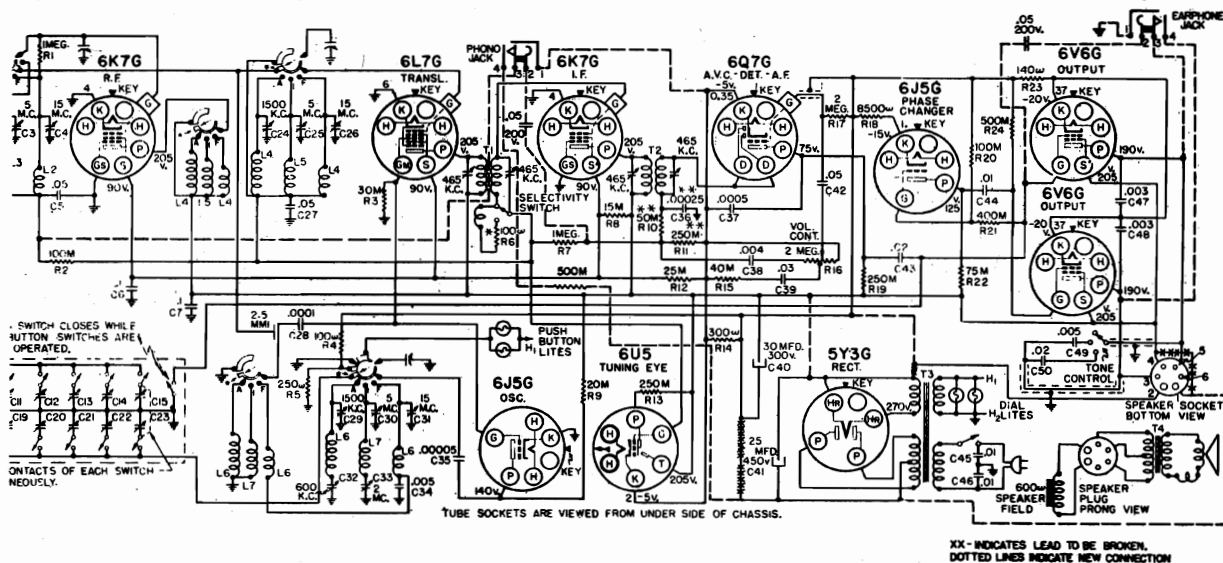
Connect the .05 condenser from terminal #3 of the jack to the grid prong of the 6V6G output tube.

Connect terminal #3 of the jack to terminal #5 of the speaker socket.

Connect terminal #4 of the jack to terminal #3 of the speaker socket.

This is the only wiring necessary. The wiring changes mentioned above for connection of the phonograph pick-up jack are not to be done if only an earphone jack is used.

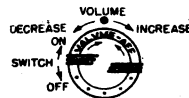
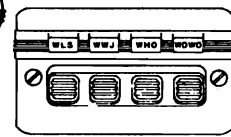
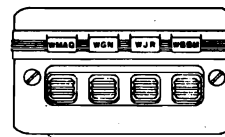
With the connections as described, the loud speaker will not operate when the earphones are plugged in. If it is desired to have the loud speaker operate at the same time the earphones are plugged in, the connections to terminals 3 and 4 of the jack should be omitted.



SEARS-ROEBUCK & CO.

MODELS 4681, 4781
Chassis 101,499
Chassis, Antenna
Wave Trap Data

1. Left knob . . . "On-Off" switch and Volume
2. Next to left knob . . . Wave Band switch and Push Button Tuning
3. Center knob Tuning
4. Next to right knob . . . Selectivity
5. Right knob Tone Control



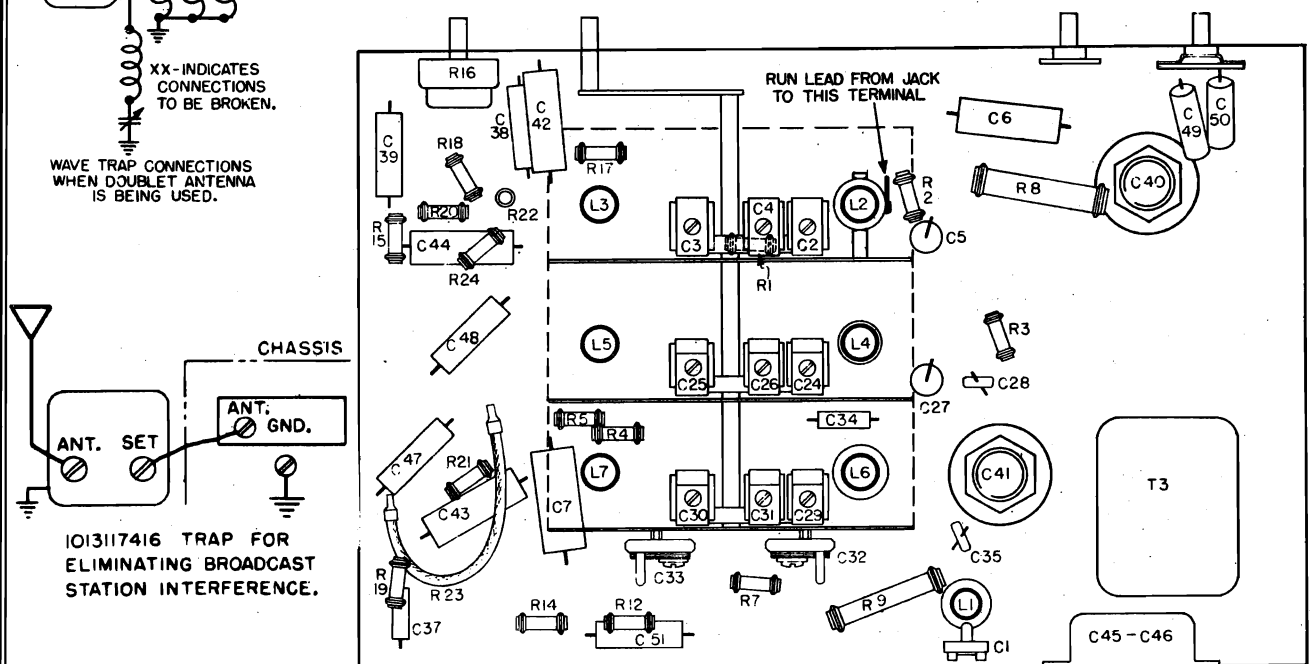
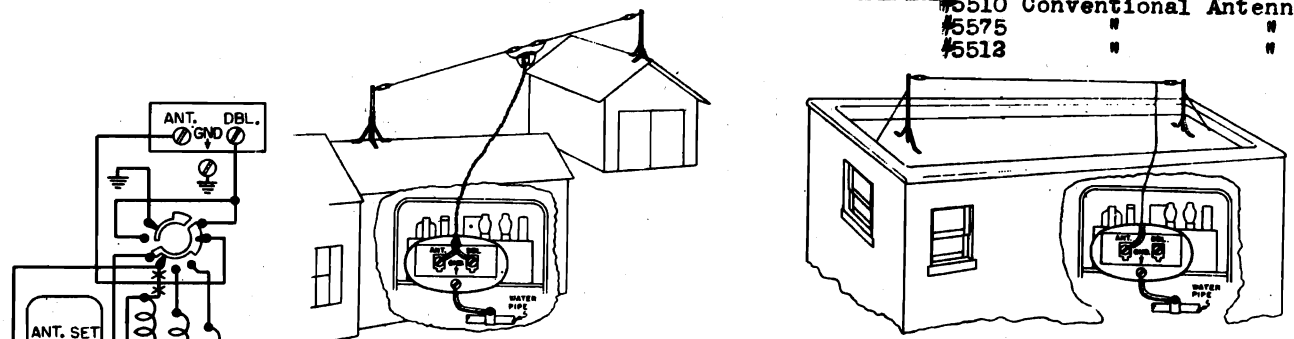
DIAL & KNOB FUNCTIONS

The trap has two terminals marked, "ANT" and "SET". If a conventional antenna is being used (not a doublet), the trap will be connected as follows. Disconnect the antenna leadin from the receiver and connect it to the "ANT" terminal of the trap. Connect a wire

from the "SET" terminal of the trap to the "ANT" terminal of the chassis. The ground connection to the chassis remains as it was. The trap then is in series between the antenna and the receiver. The trap should be tuned to eliminate the interfering station. The sensitivity of the receiver will be reduced in the region of the frequency to which the trap is tuned.

If a doublet antenna is installed with the receiver, the trap must be connected between the antenna lug of the broadcast antenna coil primary and the Wave Switch. Remove the lead between the antenna lug of the primary and the wave switch. Connect the "ANT" terminal of the trap to the wave switch lug. Connect the "SET" terminal of the trap to the antenna coil lug. See Illustration below.

ANTENNA CONNECTIONS #5567 Doublet Antenna
#5510 Conventional Antenna
#5575 " " "
#5513 " " "

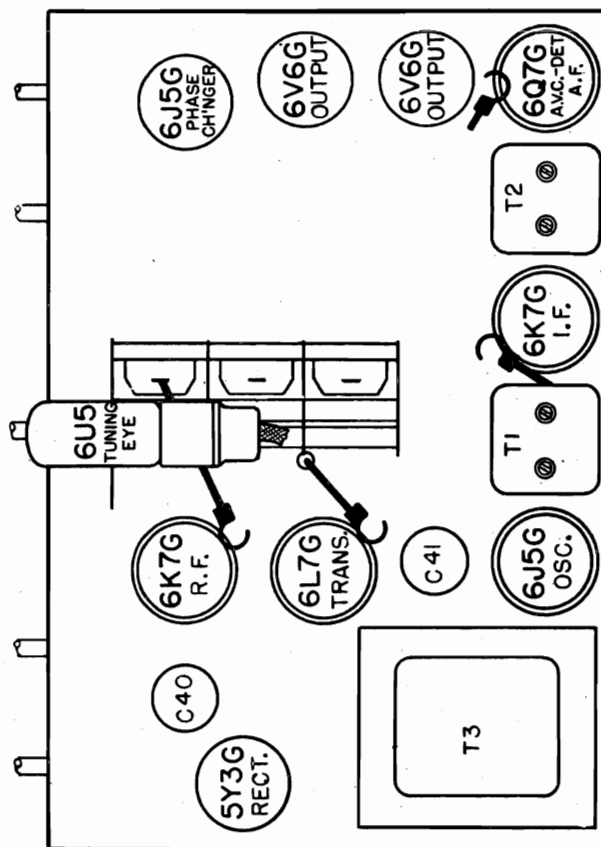


1013117416 TRAP FOR
ELIMINATING BROADCAST
STATION INTERFERENCE.

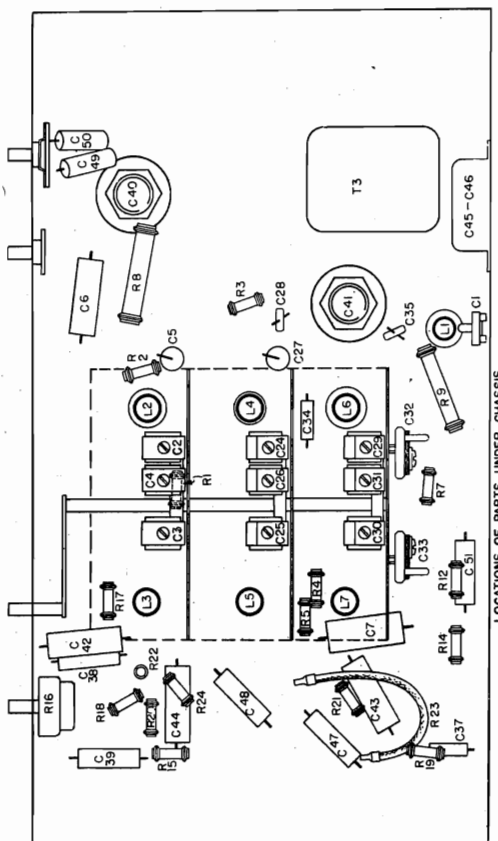
LOCATIONS OF PARTS UNDER CHASSIS

MODELS 4681, 4781
Chassis 101.499
Socket, Trimmers
Alignment, Chassis

SEARS-ROEBUCK & CO.



LOCATION OF PARTS ON TOP OF CHASSIS.



LOCATIONS OF PARTS UNDER CHASSIS

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections Across speaker voice coil
Output meter reading to indicate .5 watts output 1.31 volts
Approximate average sensitivity in microvolts for .5 watts output See chart below
Dummy antenna value to be in series with generator output See chart below
Connection of generator output lead See chart below
Connection of generator ground lead To chassis
Generator modulation 30%, 400 cycles
Position of volume control Fully clockwise
Position of tone control Fully clockwise
Position of selectivity control Sharp
Position of dial pointer with variable fully closed To fall on last calibration mark at 550 kc end of AMERICAN band.

WAVE BAND	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"INT"	1.8 mc	485 kc	.1 mfd.	6L7G Grid	T2, T1	IF	70
"AM"	Closed	485 kc	.0008 mfd.	Ant. Term.	C1 *	IF trap	-
"AM"	1500 kc	1500 kc	.0008 mfd.	Ant. Term.	C39, C24, C2	Oscillator, Transal., RF	30
"AM"	800 kc (rock)	800 kc	.0008 mfd.	Ant. Term.	C32	Padder	18
"INT"	5 mc	5 mc	400 ohms	Ant. Term.	C30	Oscillator	-
"INT"	5 mc (rock)	5 mc	400 ohms	Ant. Term.	C35, C3	Translator, RF	5
"INT"	2 mc (rock)	2 mc	400 ohms	Ant. Term.	C33	Padder	15
"FOR"	15 mc	15 mc	400 ohms	Ant. Term.	C31	Oscillator	-
"FOR"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C38, C4	Transal., RF	5

IMPORTANT ALIGNMENT NOTES

* If the frequency of an interfering code station is known, the generator should be adjusted to that frequency instead of to 485 kc. The trap should be adjusted to give minimum output meter deflection instead of the usual maximum reading.

Where indicated by the word "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

It is necessary to repeat the entire alignment procedure step by step in the original order to secure proper alignment. Perfect alignment is not possible with one adjustment of the trimmers.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

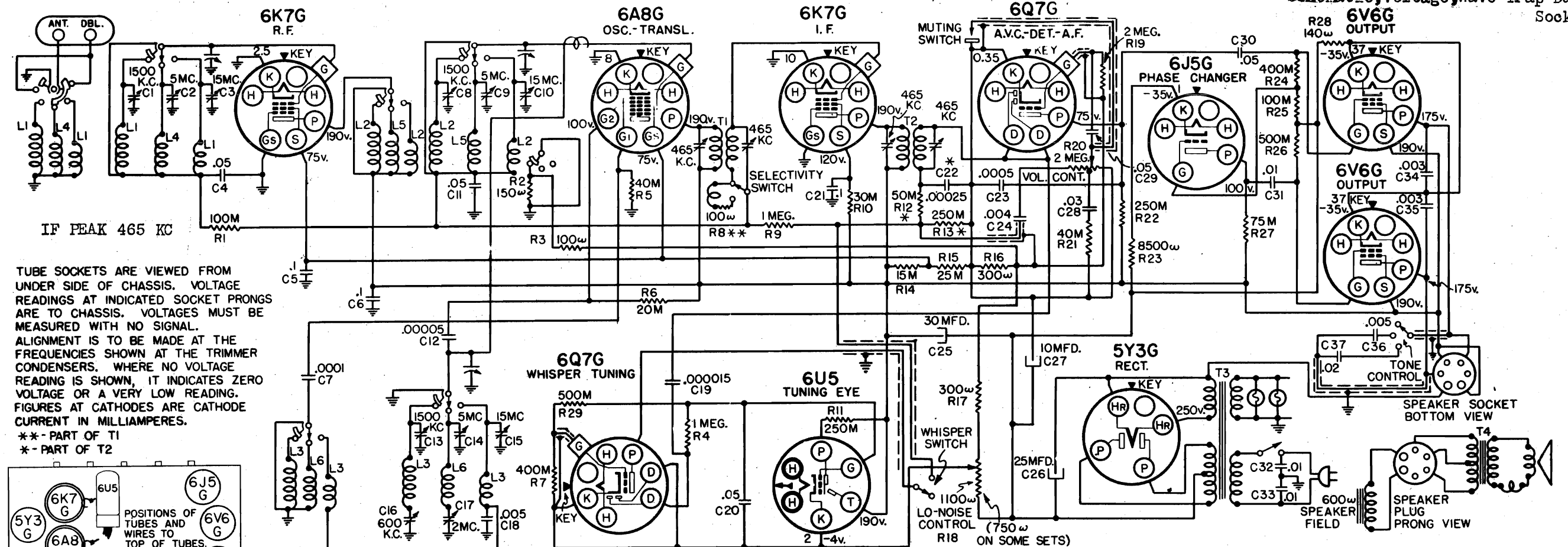
The shield plate that covers the coil assembly should be left in place while making the alignment adjustments. The trimmer screws are accessible through the holes in the shield.

Only the dummy antenna indicated in the chart for any particular band should be used. Remove the dummy antenna used for alignment of any other band.

No connection should be made to the doublet terminal on the antenna connection block.

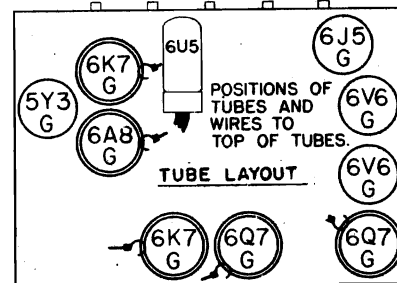
SEARS-ROEBUCK & CO.

MODEL 4786, Chassis 100.196
Schematic, Voltage, Wave Trap Data
Socket



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. VOLTAGES MUST BE MEASURED WITH NO SIGNAL. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS. WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.

** - PART OF T1
* - PART OF T2



FREQUENCY RANGES:
American Band 540-1800 kc
Intermediate Band 1780-8100 kc
Foreign Band 5.9-18.8 mc

INTERMEDIATE FREQUENCY 465 kc

POWER OUTPUT:

Type Push-Pull (Beam Tubes)
Undistorted 6 watts
Maximum 10 watts

OPERATING FEATURES:

Tone Control Three point
Selectivity Control Two point
Lo-Noise Control
Automatic Volume Control
Roll Over dial with only one scale visible at a time.
Automatic Tuning Dial

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:

1. Left knob . . . "On-Off" switch and Volume
2. Next to left knob . . . Wave Band Switch
3. Center knob Tuning
4. Next to right knob. Inner: Selectivity. Outer: Lo-Noise.
5. Right knob Tone Control

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl. Trimmer	Oscil. Padder
Band "AM"	1500 kc	1500 kc	800 kc
Band "INT"	5 mc	5 mc	2 mc
Band "FOR"	15 mc	15 mc	Fixed

LOUD SPEAKER:

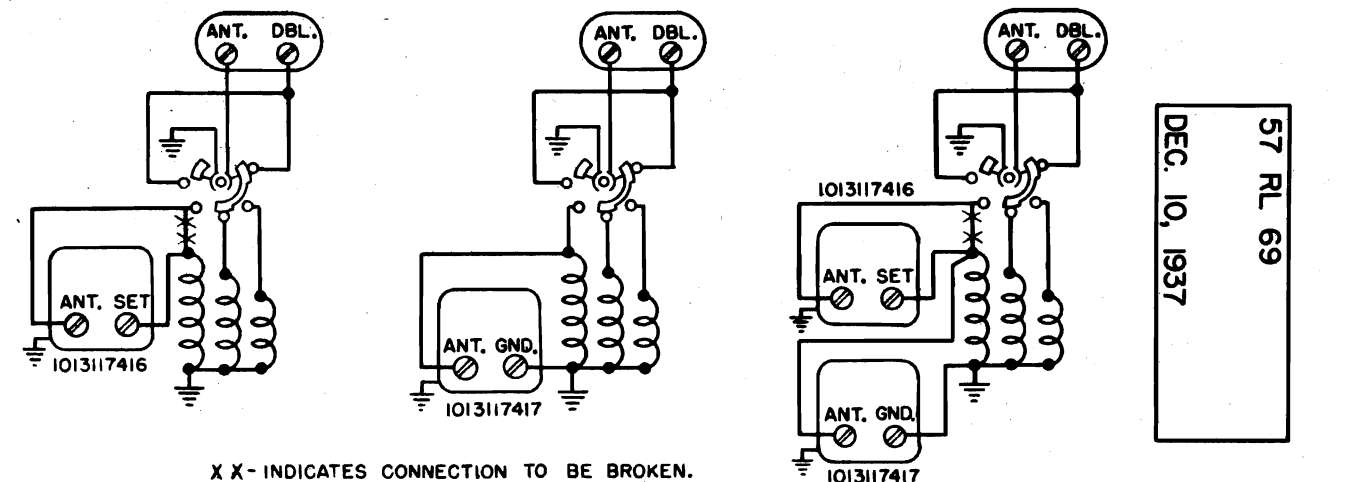
Type Dynamic
Size 6", 8", 10", 12"
Field coil resistance 800 ohms
App. field coil voltage drop . . . 60 volts

CHASSIS FEATURES:

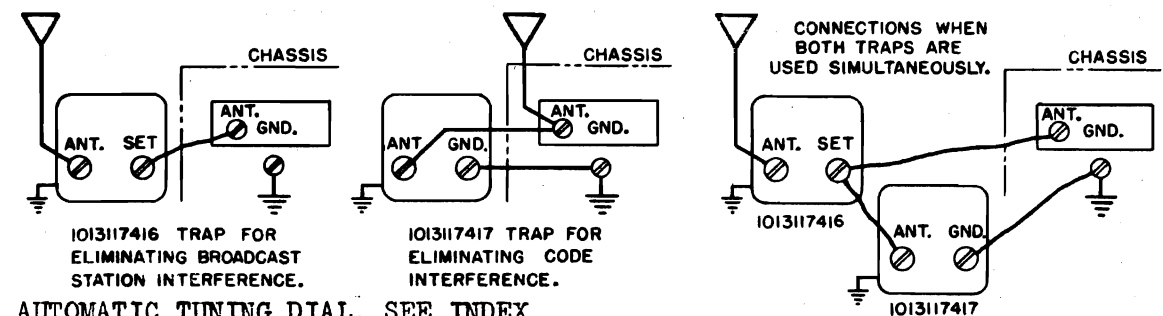
Number RF stages One
Number IF stages One
Antenna Doublet or Conventional
Line Noise Filter Condensers
Tuning Eye
Dual Tuning Ratio
Provision for Phonograph Pick-Up Connections

CONTROL OPERATION:

Turning right: Power on; volume increase
Turning right: American, Intermediate, Foreign
Tuning ratio: 6:1; 30:1
Turning right, inner: Sharp, Broad.
Turning right, outer: Normal, Lo-Noise.
Turning right: "LO", "MEDIUM", "HI"



XX-INDICATES CONNECTION TO BE BROKEN.
WAVE TRAP CONNECTIONS WHEN DOUBLET ANTENNA IS BEING USED



FOR AUTOMATIC TUNING DIAL, SEE INDEX

57 RL 69
DEC. 10, 1937

Automatic Tuner Data
Part 2

When all of the buttons have been adjusted and the caps put on them, the mechanism will appear as in Fig. 28. If you have selected fewer than 11 stations, not all of the buttons will be adjusted. A cap with the discs should be put on the unadjusted button but instead of using a disc with printed station call letters use one of the discs that has a printed star.

Push out the disc containing the call letters of your selected #1 station. Place one of the clear celluloid discs into one of the metal caps and then place the disc with your station call letters in the cap. Be sure to put the disc in so that the call letters are readable from the front of the cap. See Fig. 17.

Push the cap into place on the button for your station. See Fig. 19. Be sure the cap is put on so that the letters are upright and can be read easily.

Again unlock the dial mechanism by moving the stud to the left as shown by the finger and arrow in Fig. 20. As before, the mechanism must be held firmly with one hand, being careful not to push in any of the buttons, while unlocking the mechanism.

MAIL ORDER MODELS.

Turn in the second station on your selected list. This can be done by rotating the center tuning shaft as shown in Fig. 21. In this illustration the station to be selected is 590 kc. The Tuning Eye shows the station as being tuned and that button #2 is in position to be selected. Your station for button #2 may be any station between approximately 580 kc and 590 kc since this is the frequency range for button #2. See Fig. 19.

Insert the key (Fig. 12) into button #11 and turn the button the way in by means of the key. Turn the key (Fig. 12) into button #11 with the button turned in. Turn the key in the direction but that it cannot be turned for more than one-half a circle. See Fig. 13.

There is a notch in the outer edge of the button that will tell you in what direction to turn the button. The button should be turned so that the notch would fall on an imaginary line drawn straight down from the center of the AUTOMATIC TUNING dial. When the notch falls straight down, you will find that all three rotations of the button will cause the same AUTOMATIC TUNING dial reading. This is the correct position for the button. When the AUTOMATIC TUNING dial is set to the station you wish to tune, the button should be turned so that the key on that station will be tuned in exactly. The station cannot be heard unless the button is pushed in by means of the key, so that the tuning key cannot be used for precise tuning as described.

For setting the tuning key, a varactor, set 590 98, is used. The dial is connected to the tuning key by a key allowing the button to snap back into position. If the button sticks when you try to pull the key out, shake it slightly and it should snap out. See Fig. 23. The button must be out before proceeding to the next step. When the button is out, it must not be pushed in again until the mechanism has been looked at as described in the following section.

Lock the mechanism by moving the stud to the right as indicated by the forefinger and thumb in Fig. 24. Note that one hand is holding the mechanism at the outer edge of the button so that they are not pushed in accidentally.

You can check the accuracy of your setting of the button by turning the P.W. AUTOMATIC TUNING mechanism about an inch or so, so that your station is no longer tuned in. Then push #6 button; you have just adjusted all the way in with your finger and turn the mechanism until it reaches its stop. Then remove your finger from the button and your station will be tuned in again. If it can be tuned any more exactly by rotating the center shaft as illustrated in Fig. 21. Use the Tuning Eye to determine exactness of tuning. If you find that you can tune now slightly more exactly by means of the center shaft than by means of the AUTOMATIC TUNING button, repeat steps 19 through 21. If you find that you cannot tune more exactly, the procedure should be repeated more accurately.

After the AUTOMATIC TUNING dial button has been adjusted properly and the mechanism locked as described, you are ready to insert the cap with the station's call letters. If you purchased your radio from a Sears' Retail Store proceed as follows:

RETAIL STORE MODELS:

Push out the disc containing the call letters of your selected #3 station. Place one of the clear cellulose discs into one of the metal caps and then place the disc with your station call letters on the cap. Be sure to put the disc in so that the call letters are readable from the front of the cap. See Fig. 25.

Push the cap into place on the button for your station. See Fig. 26. Be sure the cap is put on so that the letters are upright and can be read easily.

MAIL ORDER MODELS:

The same perforated paper sheet with station call letters and the "Beacon" callid discs are used for Retail Store Models. However, if you wish the station call letters to be illuminated, the perforated paper sheet and the clear celluloid discs will not be used. Instead, the colored celluloid discs will be used. It will be necessary to cut out the call letters of the station and cut out the outline of the printed circle. Place one of the unprinted colored celluloid discs in one of the metal caps, then the cut-out cellophane disc with the call letters in the cap. See Fig. 27. Then place the cap into position on the button.

Proceed in the same manner with each of the other stations on your adjusted list. Always unhook the mechanism before attempting to adjust any of the buttons. Be careful to turn the cap in and turn any of the adjusted buttons while the mechanism is in the unlocked position. Always be sure to lock the mechanism before putting on the cap with the station call letters. Otherwise, the button might be turned while the cap is being pushed on, upsetting the adjustment.

If there is no broadcast station on your selected list for button #11, this button can be used for "POLICE" stations. If the button is adjusted when the Roll Over dial pointer is set about 1850 Kc, various POLICE stations will be heard at this setting. However, if there is a particular POLICE transmitter to which you wish to adjust the button, tune in the station and adjust button #11 in the same manner as was done for broadcast stations.

When all of the buttons have been adjusted and the caps put on them, the mechanism will appear as in Fig. 28. If you have selected fewer than 11 stations, not all of the buttons will be adjusted. A cap with the discs should be put on the unadjusted button but instead of using a disc with printed station call letters use one of the discs that has a printed star.

Push out the disc containing the call letters of your selected fl station. Place one of the clear celluloid discs into one of the metal caps and then place the disc with your station call letters in the cap. Be sure to put the disc in so that the call letters are readable from the front of the cap. See Fig. 17.

Push the cap into place on the button for your station. See Fig. 19. Be sure the cap is put on so that the letters are upright and can be read easily.

Again unlock the dial mechanism by moving the stud to the left as shown by the finger and arrow in Fig. 20. As before, the mechanism must be held firmly with one hand, being careful not to push in any of the buttons, while unlocking the mechanism.

MAIL ORDER MODELS.

Turn in the second station on your selected list. This can be done by rotating the center tuning shaft as shown in Fig. 21. In this illustration the station to be selected is 590 kc. The Tuning Eye shows the station as being tuned and that button #2 is in position to be selected. Your station for button #2 may be any station between approximately 580 kc and 590 kc since this is the frequency range for button #2. See Fig. 19.

Insert the key (Fig. 12) into button #11 with the button cap turned in either direction but that it cannot be turned for more than one-half a circle. See Fig. 13.

There is a notch in the outer edge of the button that will tell you in what direction to turn the button. The button should be turned so that the notch would fall on an imaginary line drawn straight down from the center of the AUTOMATIC TUNING dial. When the notch falls straight down, you will find that all three rotations of the button will cause the same amount of AUTOMATIC TUNING dial rotation. This is the correct position to turn the button to. Carefully turn the key so that your 40 station will be tuned in exactly the same dial. Carefully turn the button is pushed in by means of the key, so that the tuning eye cannot be used for precise tuning as described.

For the 40 station tuning key a varactor, 2N5904, is used. When the dark portion at the bottom of the dial coincides with the varactor, 5904, it is tuned in exactly even though the Roll over dial position is 5904.8. Fig. 22

Remember to pull out the key allowing the button to snap back into position. If the button sticks when you try to pull the key out, shake it slightly and it should snap out. See Fig. 23. The button must be out before proceeding to the next step. When the button is out, it must not be pushed in again until the mechanism has been looked at as described in the following section.

Lock the mechanism by moving the stud to the right as indicated by the forefinger and thumb in Fig. 24. Note that one hand is holding the mechanism at the outer edge of the button so that they are not pushed in accidentally.

You can check the accuracy of your setting of the button by turning the P.W. and AUTOMATIC TUNING mechanisms about an inch or so, so that your station is no longer tuned in. Then push the #6 button that you have just adjusted all the way in with your finger and turn the mechanism until it is just out of the button. Now remove your finger from the button and your station will be tuned in again. If it is not, turn the P.W. and AUTOMATIC TUNING mechanisms until it is just out of the button. Now see if it can be tuned any more exactly by rotating the center shaft as illustrated in Fig. 21. Use the TUNING Eye to determine exactness of tuning. If you find that you can tune the station more exactly by means of the center shaft than by means of the AUTOMATIC TUNING button, then stop turning the P.W. and AUTOMATIC TUNING mechanisms and readjust the button. The procedure should be repeated more accurately.

After the AUTOMATIC TUNING dial button has been adjusted properly and the mechanism locked as described, you are ready to insert the cap with the station's call letters. If you purchased your radio from a Sears' Retail Store proceed as follows:

RETAIL STORE MODELS:

Push out the disc containing the call letters of your selected #3 station. Place one of the clear cellulose discs into one of the metal caps and then place the disc with your station call letters on the cap. Be sure to put the disc in so that the call letters are readable from the front of the cap. See Fig. 25.

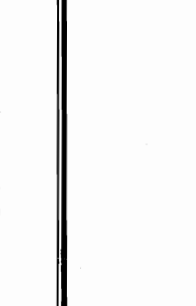
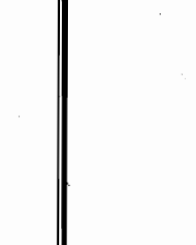
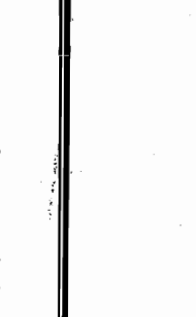
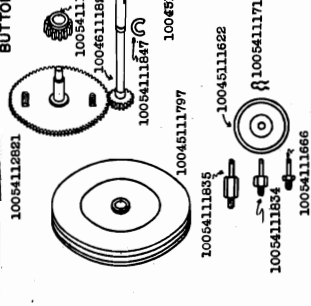
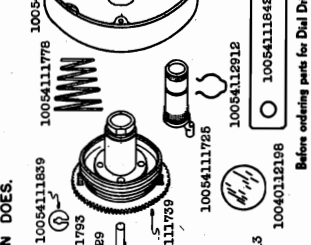
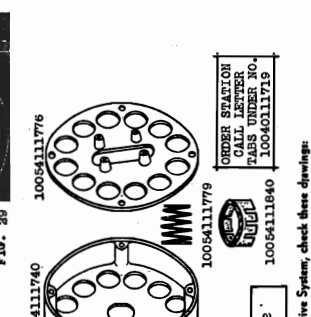
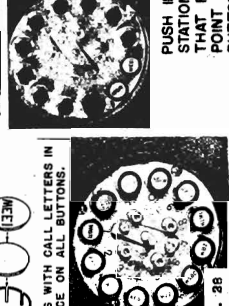
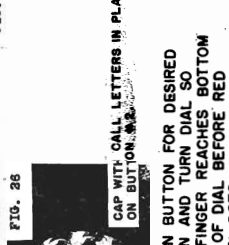
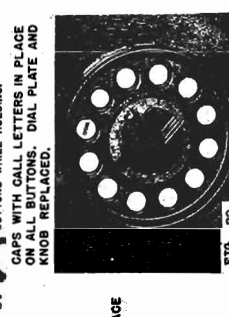
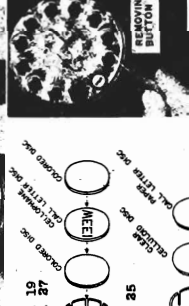
Push the cap into place on the button for your station. See Fig. 26. Be sure the cap is put on so that the letters are upright and can be read easily.

MAIL ORDER MODELS:

The same perforated paper sheet with station call letters and the "Beacon" call disk is used for Retail Store Models. However, if you wish the station call letters to be illuminated, the perforated paper sheet and the clear celluloid discs will not be used. Instead, the 500-gram celluloid discs will be used. It will be necessary to cut out the call letters of the station call disk, using a scissors and cutting around the outline of the printed circle. Place one of the unprinted colored celluloid discs in one of the metal caps, then the cut-out cellophane call letters in the center of the disc. The unprinted colored celluloid disc in the cap. See Fig. 27.

Proceed in the same manner with each of the other stations on your adjusted list. Always unhook the mechanism before attempting to adjust any of the buttons. Be careful to turn the cap in and turn any of the adjusted buttons while the mechanism is in the unlocked position. Always be sure to lock the mechanism before putting on the cap with the station call letters. Otherwise, the button might be turned while the cap is being pushed on, upsetting the adjustment.

If there is no broadcast station on your selected list for button #11, this button can be used for "POLICE" stations. If the button is adjusted when the Roll Over dial pointer is set about 1850 Kc, various POLICE stations will be heard at this setting. However, if there is a particular POLICE transmitter to which you wish to adjust the button, tune in the station and adjust button #11 in the same manner as was done for broadcast stations.



Automatic Tuner Data
Part 3

SEARS-ROEBUCK & CO.

MODEL 4786, Ch. 100.196
MODELS 4610, 4669, 4769
4789, Ch. 101.482

JULY 15, 1937

SUBJECT: READJUSTING THE AUTOMATIC TUNING DIAL STOP BUTTON TO MAKE IT POSSIBLE TO SET UP DESIRED STATIONS, THAT ARE CLOSE IN FREQUENCY, ON ADJACENT BUTTONS.

By referring to ranges it will be seen that WMAQ, 670 kc, would be set up on button #4. WGN, 720 kc, would be set up on button #4 or #5. WBBM, 770 kc, would be set up on button #5. Since these three stations come within the frequency range of only two of the buttons, the customer would ordinarily have to give up one of the three stations for AUTOMATIC TUNING.

It is possible, however, to change the setting of the "fixed" button and make it possible to set up three such stations, close together in frequency, on three separate buttons. The method of doing this is as follows:

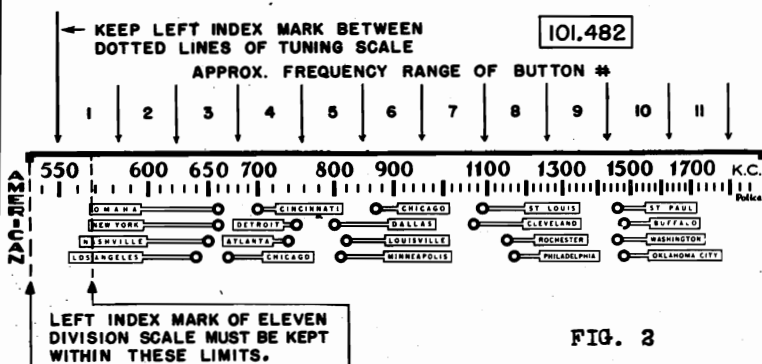


FIG. 2

FIRST:-

Make a full size reproduction of button frequency ranges on a suitable paper or cardboard, - an eleven division scale, one division for each button range as illustrated.

SECOND:-

Likewise make a full size reproduction of the AMERICAN band on suitable paper or cardboard.

Make a light pencil mark on the reproduction of the tuning scale at the frequency of each of the eleven desired stations. Then lay the eleven division scale against the reproduction of the tuning scale and move the eleven division scale to such a position that each of the pencil marked positions for the eleven desired stations will fall within the range of a different button. However, the eleven division scale can only be moved so that its left index mark comes between the dotted lines of the reproduction of the tuning scale, as shown in Fig. 2. In Fig. 2 it will be seen that by moving the eleven division scale to the point shown, WMAQ will be within the range of button #3; WGN will be within the range of button #4; and WBBM will be within the range of button #5.

When a position of the eleven division scale is found that will allow the eleven desired stations to fall within the range of separate buttons, carefully note at what point on the reproduction of the dial scale the left index mark of the eleven division scale comes. In the illustration for stations WMAQ, WGN, and WBBM, the index mark is just about opposite 550 kc on the dial scale. (Fig. 2).

Remove the chassis from its cabinet. Leave the AUTOMATIC TUNING dial escutcheon off.

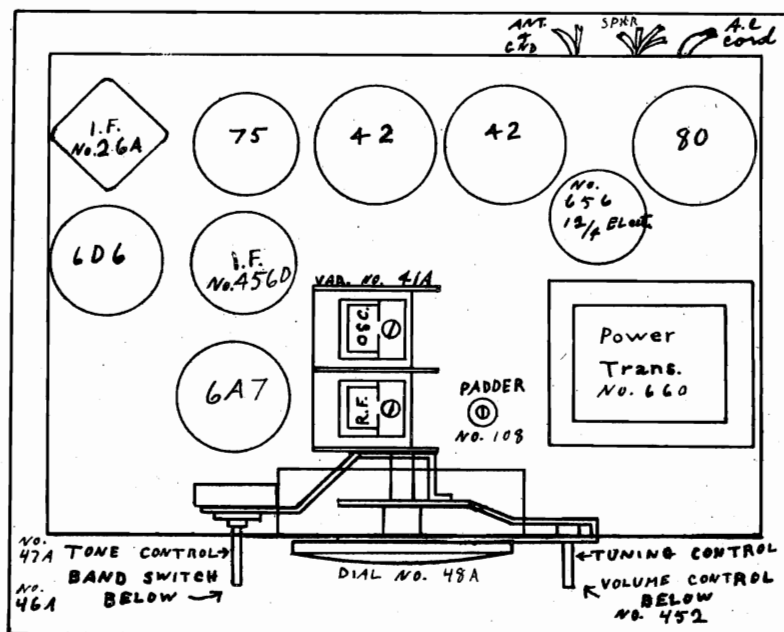
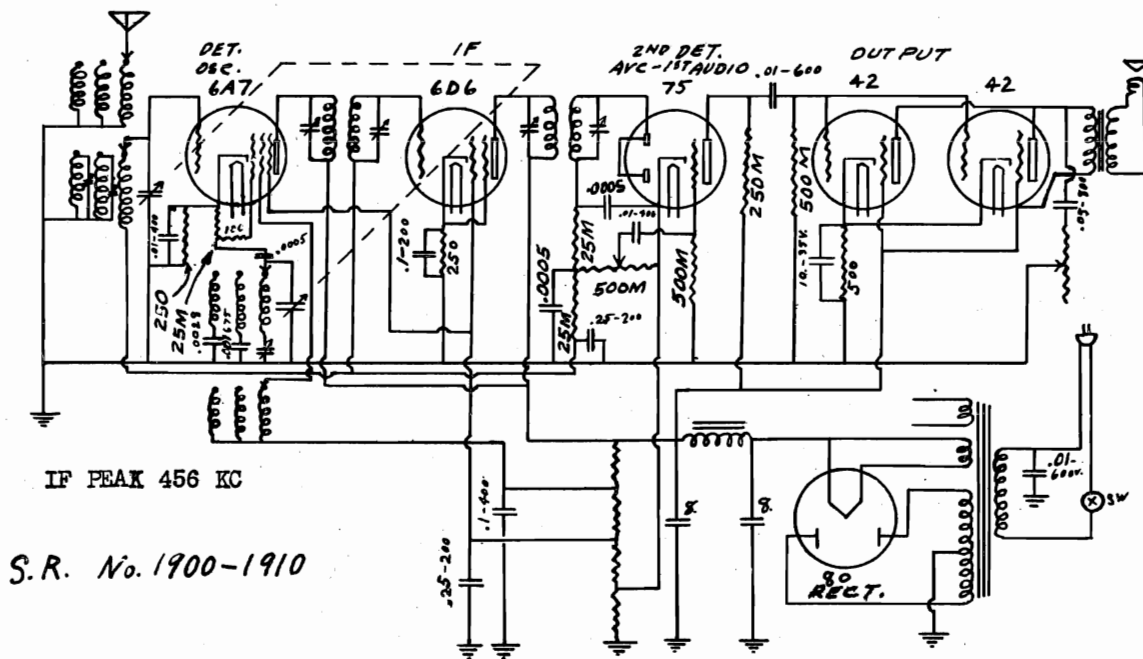
Turn the AUTOMATIC TUNING dial to its stop so that the variable is fully meshed. Now move the pointer along its drive cable to the point on the dial that corresponds exactly to the position of the left index mark of the eleven division scale, as described in the preceding paragraph. As can be seen by inspection, the pointer is pinched onto the drive cable and it will be necessary to pry this pinching open slightly so that the pointer can be moved along the cable. The AUTOMATIC TUNING dial must be kept turned all the way to the left to its stop during the operation of moving the pointer. After the pointer has been moved to its new position it should be pinched onto the cable again so that it cannot slip.

Loosen the set screw that holds the variable condenser drive drum to the variable condenser shaft.

Unlock the AUTOMATIC TUNING dial mechanism by moving the studs counter-clockwise. Pull out the "hair pin" clip that will be found on the unnumbered stop button. This button can then be pushed in and turned the same as the other eleven numbered buttons. Push in the unnumbered button and turn it to such position that when the AUTOMATIC TUNING dial mechanism is turned to its limit the pointer will be at its original stop at the left end of the dial. Then lock the mechanism by rotating the studs clockwise. (Be careful not to push in button #1 while the unnumbered button is pushed in as this may jam the mechanism. If this should happen the mechanism can be freed by pushing in the stop latch, as will be seen by inspection.) Replace the "hair pin" clip on the unnumbered button.

With the mechanism turned all the way to the left to its stop and with the dial pointer at its left limit on the dial, fully mesh the variable condenser by turning the movable plates with the fingers. Then re-tighten the set screw that holds the condenser drive drum to the variable condenser shaft.

The eleven desired stations can then be set up on the eleven adjustable buttons in accordance with the instructions. (SEE PRECEDING PAGES). The new frequency ranges for the buttons will be determined by holding the eleven division scale against the reproduction of the tuning scale, with the left index mark of the eleven division scale at the proper point between the dotted lines on the reproduction of the Tuning dial scale.



- 1- Apply 456 KC note to control grid of 6A7 and peak IF trans. for max. gain.
- 2- Apply 4000 KC note to antenna wire; set band switch to 2nd band and align trimmer on oscillator section of variable condenser to track with 4000 KC on dial.
- 3- Turn Band switch to Broadcast band; apply 1500 KC note to antenna wire, adjust trimmer on RF section of variable condenser for maximum gain.
- 4- Apply 600 KC note to antenna, adjust padler condenser for maximum gain, swinging condenser back and forth across 600 KC signal.
- 5- Check 1400 KC signal for alignment.
- 6- Turn band switch to 2nd band; check 4000 KC signal for alignment and adjust trimmer on antenna coil for greatest gain at 4000 KC.
- 7- Turn band switch to last band and adjust trimmer on antenna coil for greatest noise on 12 megacycles.

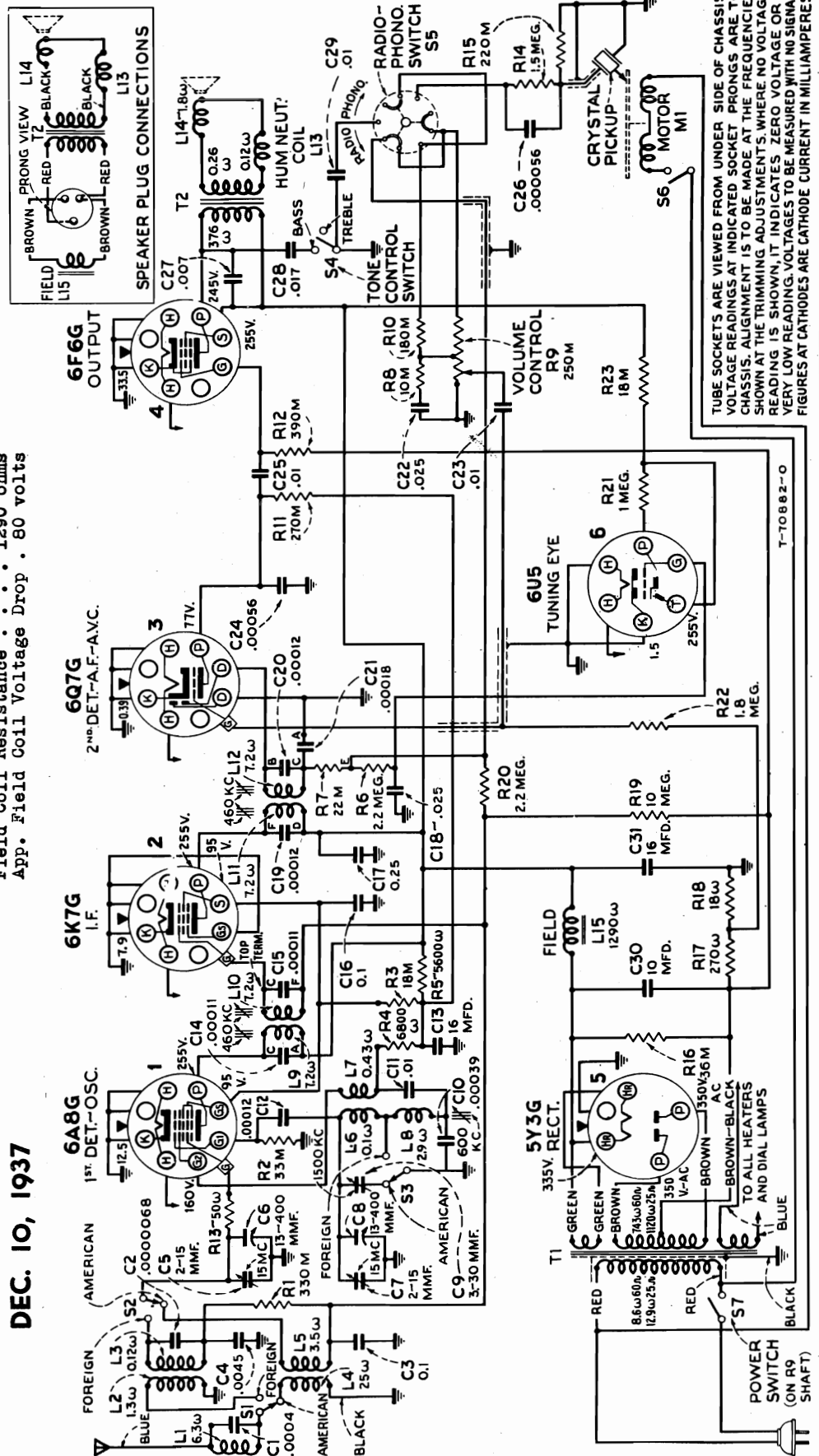
540 - 1720 kilocycles; 1720 - 5000 kilocycles; 5.5 - 16 megacycles

SEARS-ROEBUCK & CO.

MODEL 4796, Ch. 126.201
Schematic, Voltage

POWER SUPPLY RATING	105-125 volts, 60 cycles . .	Radio Only	Total
		75 watts . .	105 watts
FREQUENCY RANGES:			
American Band	540-1720 kc		
Foreign Band	5.8-18 mc		
INTERMEDIATE FREQUENCY	460 kc		
POWER OUTPUT:			
Type	Pentode		
Undistorted	2.5 watts		
Maximum	4.5 watts		
LOUDSPEAKER:			
Type	Electrodynamic		
Size	12 inches		
V.C. Impedance	2.25 ohms at 400 cycles		
Field Coil Resistance	1290 ohms		
App. Field Coil Voltage Drop . .	80 volts		
OPERATING FEATURES:			
Phonograph-Radio operation			
Automatic Phonograph Mechanism with			
self-starting, governor-type motor			
Two-point Tone Control			
Automatic Volume Control			
PHONOGRAPH:			
Type	Automatic-Manual		
Record Capacity	Eight 10-inch		
Turntable Speed	78 R.P.M.		
Type of Pickup	Crystal		
Pickup Impedance	75,000 ohms at 1000 cycles		

DEC. 10, 1937



MODEL 4796, Ch. 126.201

Alignment, Data

SEARS-ROEBUCK & CO.

GENERAL INFORMATION AND SERVICE HINTS

ELIMINATING WHISTLE AT 920 KC.

A whistle due to a beat between the second harmonic (920 kc) of the 460 kc I.F. and a 920 kc signal may be experienced. In localities where the 920 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the I-F frequency of the receiver.

Determine at what point between 890 kc and 950 kc the whistle will be least objectionable. Dividing this frequency by two will give the new I-F frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 905 kc would not be objectionable, the I-F should be re-aligned at $905/2$ or 452.5 kc. Try to select the new I-F frequency as close as possible to 460 kc.

An interfering whistle may also be caused by two stations having a frequency difference equal to the I-F frequency (460 kc) of the receiver and will be evidenced by a whistle appearing when the receiver is tuned to either of the stations. It may be further localized by tuning the receiver to each of these stations and then stopping the oscillator in each case, by grounding the oscillator station of the variable tuning condenser C8 to chassis. If the whistle, in each case, still persists, it is being caused by the beat between these two stations and may be corrected by shifting the I-F frequency of the receiver, to a frequency other than the difference frequency of the two local or strong signals (stations).

The I-F amplifier should not be shifted to a frequency higher than 475 kc, nor lower than 445 kc, but should be as close to 460 kc as possible.

Align the I-F at the new frequency and then re-align the rest of the receiver as described under "ALIGNMENT PROCEDURE."

AUTOMATIC RECORD MECHANISM:

The record changing mechanism is designed to be simple and fool-proof. Certain adjustments may be required occasionally. The adjustments are illustrated in this booklet.

It is important, when servicing the automatic mechanism, to have it placed on a level support. It is also important to refrain from forcing the mechanism if there is any tendency to bind or jam, since bent levers and broken parts may result. Application of oil to the felt pad which rubs against the motor governor disc will insure smooth operation.

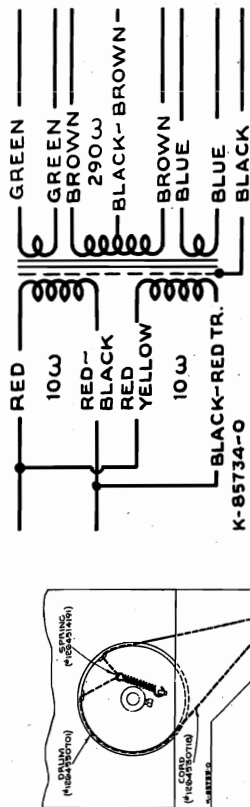
CAUTION:--Do not leave records stacked on record-holder posts, when not in use, as they are liable to warp, particularly so in warm climates.

LOUDSPEAKER:

Centering of the loudspeaker is made in the usual manner with three, narrow-paper feelers, setting it so that the center of the cone is directly over the center of the cabinet with a light application of sections using care not to allow the cone to touch the cabinet or air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

DIAL POINTER AND CONDENSER DRIVE HOOK-UP:

The drive hook-up for the dial pointer and the variable condenser is illustrated.



CONNECTIONS FOR 110 VOLT, 60 CYCLE
REPLACEMENT POWER TRANSFORMER
(1261030607)

DIAL DRIVE HOOKUP

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections Across speaker voice coil
Output meter reading to indicate 1.0 watt output 1.5 volts
Approximate average sensitivity in microvolts for 1.0 watt output See chart below
Dummy antenna value to be inserted in series with generator output See chart below
Connection of generator output lead See chart below
Connection of generator ground lead To chassis
Generator modulation 30%, 400 cycles
Position of Radio-Phono. switch Countar-clockwise
Position of Volume Control Fully clockwise
Position of Tone Control Fully clockwise
Position of Dial Pointer with variable tuning condenser fully closed To fall on last calibration mark at 540 kc end of "American" band.

WAVE-BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	No signal 550-750 kc	460 kc	.001 mfd.	6K7-G Grid.	L11, L12	End I-F Trans.	15,000
"AM"	No signal 550-750 kc	460 kc	.001 mfd.	6AB-G Grid	L9, L10	1st I-F Trans.	200
"FOR"	15 mc	15 mc	300 ohms (blue)	Ant. Lead (blue)	C7**	"FOR" Osc.	-
"FOR"	15 mc (rock)	15 mc	300 ohms	Ant. Lead (blue)	C8*	"FOR" Det.	60
"AM"	1500 kc (rock)	1500 kc	.0002 mfd.	Ant. Lead (blue)	C9	"AM" Osc.	-
"AM"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Lead (blue)	L8	"AM" Osc.	29
"AM"	1500 kc (rock)	1500 kc	.0002 mfd.	Ant. Lead (blue)	C9	"AM" Osc.	97

IMPORTANT ALIGNMENT NOTES

**Use maximum capacity peak if two peaks can be obtained.

*Use minimum capacity peak if two peaks can be obtained.

Where indicated by the word "Rock," the variable tuning condenser should be rocked back and forth a degree or two while making this adjustment.

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value, to prevent the a-v-o action of the set from interfering with accurate alignment.

Adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular band should be used. Remove the dummy antenna used for alignment in any other band. Grid cap leads should remain in place during alignment.

Values shown under, "Microvolts," are only approximate.

CHASSIS FEATURES:

No. I-F stages One
Antenna Doublet or Conventional
Tuning Eye Magnetron
Line Noise Electrostatic Transformer Shield
Aural-Compensated Radio and Phonograph
Fixed Wave-Trap
Magnetron-Compensated IF Transformers
and "American" Band Low-Frequency Oscillator Tracking

SEARS-ROEBUCK & CO.

MODEL 4796, Ch. 126.201
Socket, Trimmers
Chassis

OPERATING CONTROLS:

RADIO PANEL:

1. Left knob . . . "Radio-Phono." Switch
2. Next to left knob . . . "On-Off" Switch and Volume
3. Center knob . . . Wave-Band Switch
4. Next to right knob . . . Tuning
5. Right knob Tone Control

PHONO. COMPARTMENT:

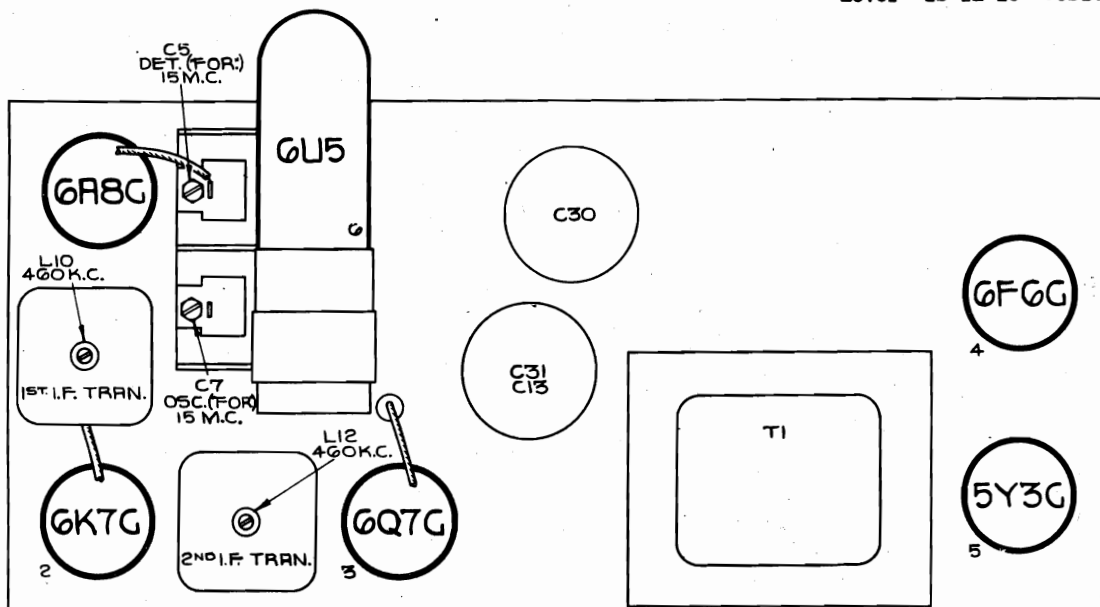
6. Turntable Switch
7. Index Lever

8. Record Ejector

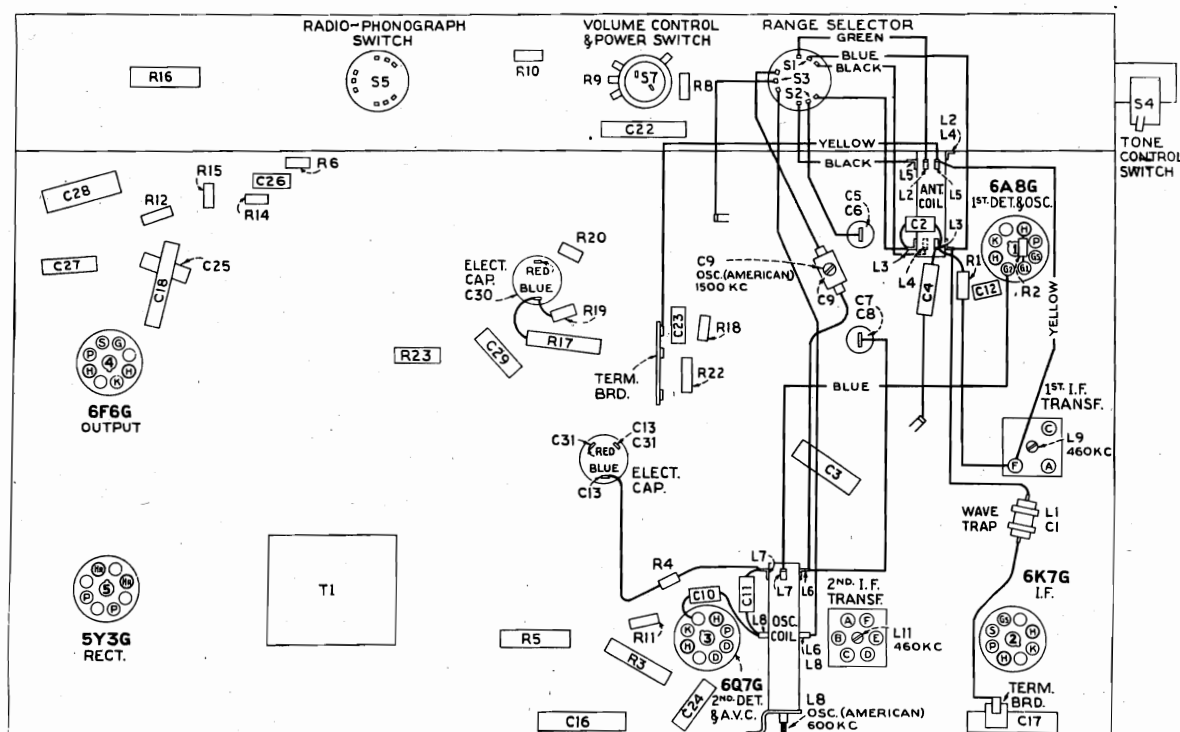
CONTROL OPERATION:

Turning right: Radio; Phonograph
Turning right: Power on; Volume Increase
Turning right: "American," "Foreign"
Tuning ratio: 10 to 1
Turning right: Bass, Treble

Toggle: Phono. Motor "On-Off"
Front 10" Automatic or Manual Operation
Rear 12" Manual Operation
Pushing to Left Rejects When "Index Lever" is in 10" Position



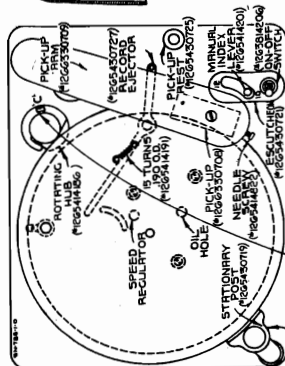
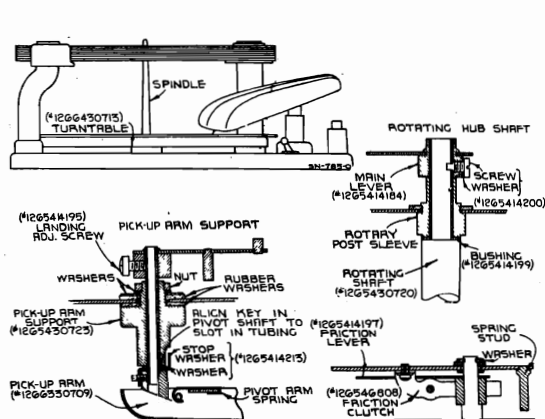
LOCATION OF PARTS AND ALIGNMENT ADJUSTMENTS TOP OF CHASSIS



LOCATION OF PARTS AND ALIGNMENT ADJUSTMENTS BOTTOM OF CHASSIS

MODEL 4796, Ch. 126.201
Phono. Wiring, Details

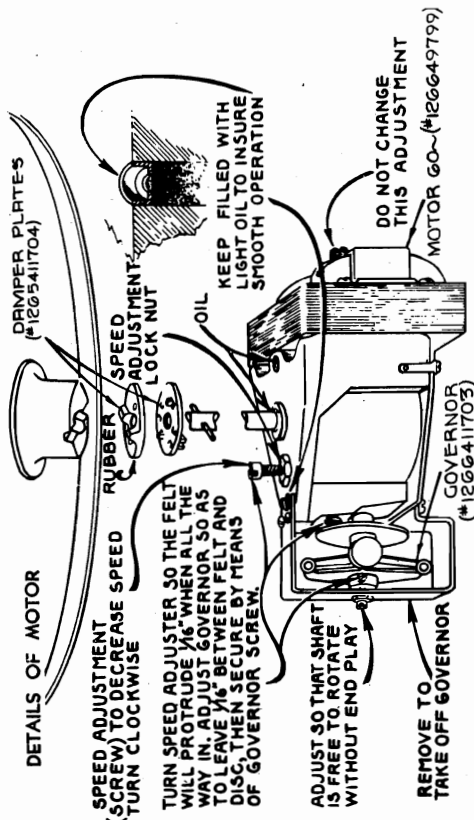
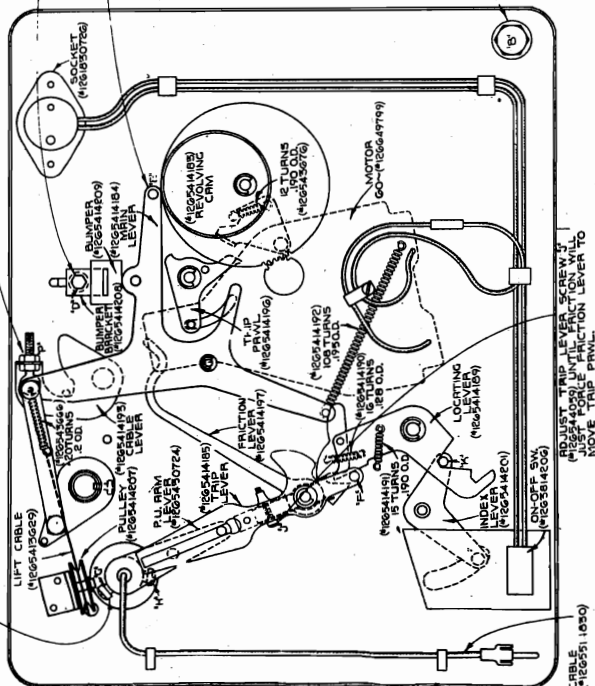
SEARS-ROEBUCK & CO.



TO ADJUST RECORD POSITION OVER SPINDLE SO THAT IT RESTS ON THE LOWER CHIEF OF THE ROT. HUB MOVE STATIONARY RECORD POST TO TABLE AND THE BEVELED SHELF PROTRUDES UNDER THE RECORD ARM. STAY ON LOWER SHELF OF ROTATING HUB ROLLER SCREW (1265414182) SO THAT THE BEVELED TONGUE ON THE SEPARATING ARM CLEARS THE COMPLETE UNIT IS RESTING ON THE FOUR MOTOR BOARD BUSHINGS.

ADJUST THE RISE OF THE TONE ARM SO THE TOP OF THE TURNABLE DURING CYCLE THE SPRING LOCK NUTS (1265430725) ON THE CABLE LEVER.

TO ADJUST THE LANDING POSITION OF THE NEEDLE THE TURNABLE SPINDLE WITH THE LOCKING THE TONE ARM TO THE TONE ARM SUPPORT. WHEN CORRECT POSITION IS OBTAINED, TIGHTEN CONE POINTED SCREW (1265414195) ON TONE ARM SUPPORT.



DETAILS OF MOTORBOARD



MODEL 5731

Moto-Matic Tuner
Part 128.15600

SEARS-ROEBUCK & CO.

For MODELS 6000, 6001
Ch. 101.495X, 101.496X
MODELS 6100, 6101
Ch. 101.495, 101.496
Details, Schematics, Data

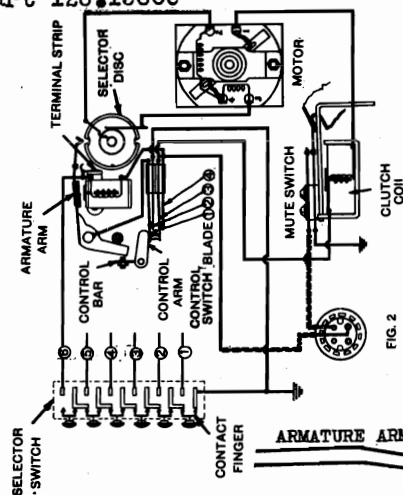


FIG. 2

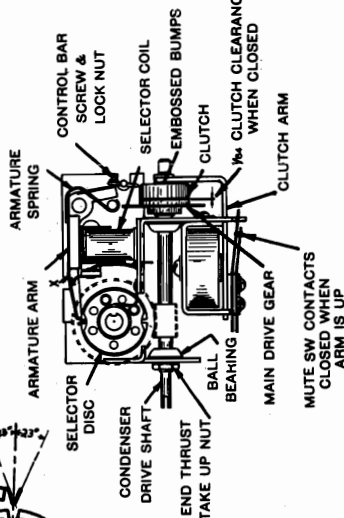


FIG. 3

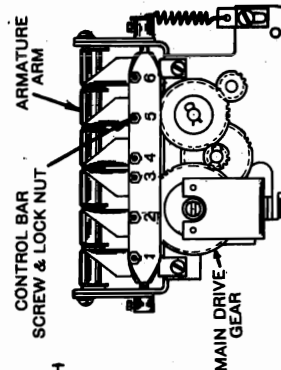


FIG. 4

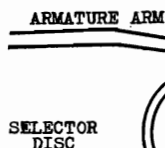


FIG. 5

ANGULAR ADJUSTMENT
OF THE ARMATURE ARM "V":

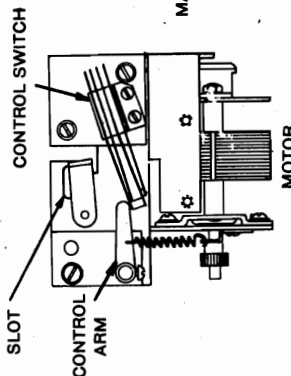


FIG. 6

Power Supply 5 to 8 volts D.C. Starting current . . . 6 amps. for 1 second
No current used while at rest Returning current . . . 5 amps. for 2 seconds

GENERAL INFORMATION AND SERVICE HINTS

MOUNTING MOTO-MATIC TUNER:

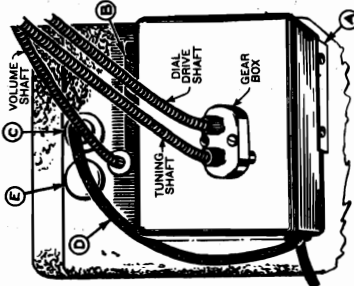


FIG. 1

Fasten mounting brackets A and B to receiver with four #8-32 machine screws and lockwashers.

Determine the angular position of key in variable condenser drive fitting that is located directly under the tuning cable opening in the radio case. Lower Moto-matic tuner into place between mounting brackets and rotate shaft on Moto-matic tuner so that slot has the same angular position as the key on variable condenser drive fitting. When lowered all the way into place no play should exist between key on variable condenser drive fitting and the slot on Moto-matic shaft. This is very important, and if there is play it should be corrected by lightly pinching together the slot on Moto-matic shaft.

Fasten tuner with four #8-32 machine screws and lockwashers. Remove plug button C as shown in Fig. 1 and plug in power lead.

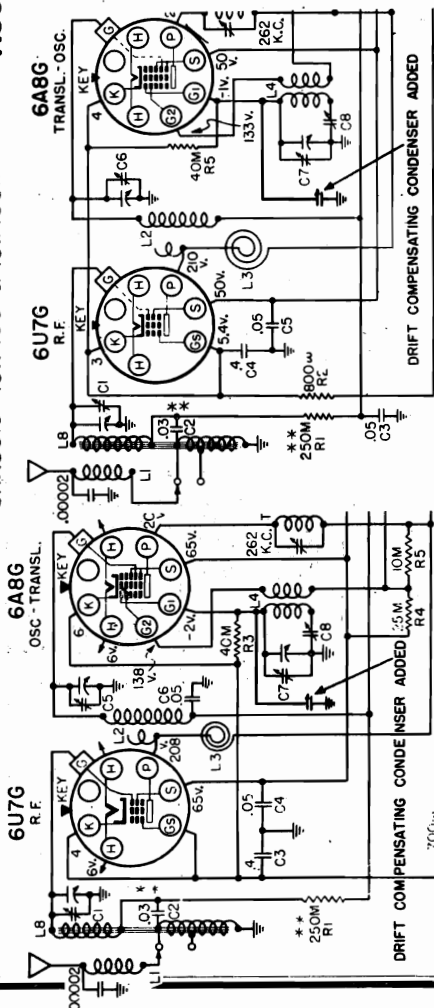
NOTE: Check worm gear on the gang condenser for slippage of the clutch which is provided, as this will cause the tuner to tune inaccurately. This gear should not slip except when the condenser plates are all the way open or all the way closed when the worm is rotated in the direction to open or close the plates.

SUBJECT: ADDITION OF A DRIFT COMPENSATING CONDENSER TO MAINTAIN ACCURACY OF STATION TUNING.

A drift compensating condenser, to eliminate frequency drift of the receiver as it warms up, is available from source 101. This condenser is connected across the oscillator trimmer as shown by the Schematic sections in this Supplement.

AUGUST 25, 1938

CHASSIS 101.496 & 101.496X CHASSIS 101.495 & 101.495X



The 5 volt check for setting up battery charger checks the ability of the armature amp to hold into the selector. To make this check connect a 5 volt battery charger with an output of 10 amperes or more that is adjustable up to 10 amperes. Connect two cells (4 poles) and allow charger to raise the voltage to 5 volts. Connect a wire across battery terminals and make this check when voltage is at 5 volts. The armature amp should not pull out under this load. While the selector battery is held down, the armature amp should not pull out under the same load. This also checks that you are in the proper gear between the pad and core and that you are up on sector coil.

When a selector switch button is depressed the contact finger opens the common circuit to the other selector switch and closes the selector switch to the common terminal strip. The contact finger also opens the contact to the terminal strip. (See Fig. 2.) The contact holds the selector coil circuit closed so that when pressure on the button of the selector switch is released the coil will complete itself, the armature being held down on the selector disc which completes the circuit to one of the fields of the motor and through the clutch coil. The half of selector disc that is common to the shaft causes the motor to rotate in a clockwise direction, viewing the motor from the pinion end. The other half of the selector disc will give counter clockwise rotation, through the reduction gear, the selector disc being turned in the opposite direction. The selector disc is turned by the armature of the selector circuit with the selector disc being turned until the formed end of the armature falls into the V groove on the selector disc. This moves the control bar and control arm which opens the control switch. The control switch opens the motor and clutch coil circuits, and immediately resets for the next selection. The Motorshaft drive shaft has revolved to the proper point which rotated the gang condenser to the angular position of the station setting. When a selector switch is rotated the gang condenser to the angular position of the station setting. The V groove of the selector disc by holding a selector switch button down, which holds the armature down on the selector disc, causes the selector switch to remain closed. The selector switch is turned from running and the clutch from disengaging while manually tuning to set up a station on any button.

MODEL 5731

Moto-Matic Tuner

Part 128.15600

SEARS-ROEBUCK & CO.

Adjustments, Part 2
Parts List

HOW TO ORDER PARTS FOR THIS MOTO-MATIC TUNER - IDENTIFICATION NUMBER 128.15600

1. Use Purchase Order Form 5264.

2. On the Purchase Order always give the following information:
 (1) PART NUMBER and DESCRIPTION for each part ordered, as given in this parts list, regardless of number printed on part itself. When no part number is assigned, order by description and rating. Also give PRICE of part (indicate if no selling).
 (2) The IDENTIFICATION NUMBER, which is 128.15600. This number is found inside the top cover of the unit.

Authorized Replacement Parts for this model may be obtained from any Sears, Roebuck and Co. Retail Store or Mail Order branch. Always give part numbers and the chassis identification number.

PARTS LIST-SOURCE NO. 128

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION	SELLING PRICE EACH
A	12815582	Armature Shaft	.10
	12815427	Armature Shaft Bearing	.05
A1	12815543	Armature Stop Shaft	.05
A2	12815549	Armature Arm R.H.	.25
	12815695	Armature Arm L.H.	.25
	12815540	Armature Spring	5 for .20
	12815428	Case Mounting Bracket (Large)	.18
	12815429	Case Mounting Bracket (Small)	.05
	12815430	Clutch Coil	.18
	12815431	Clutch Spring Bracket	.11
C2	12815412	Clutch Sleeve and Pin Assembly	.41
	12815413	Clutch Throwout Spring	.02
	12815333	Control Switch	.81
C3	12815340	Control Bar Screw	3 for .05
	12815798	Control Bar Nut	3 for .05
C1	12815370	Control Bar Collar	.07
	12815420	Control Arm Tension Spring	.11
C	12815421	Control Arm Tension Spring Adjusting Bracket	.05
	12815580	Control Arm Tension Spring Assembly	.20
	12815544	Cover (Set Side)	.21
	12815583	Cover and Bushing Assembly (Tuning Side)	.47
	12815555	Intermediate Gear Assembly	.50
	12815648	Motor and Idler Gear Retainer Spring (2 required)	6.25
	12815538	Motor and Idler Gear Retainer Spring	.25
	12815539	Motor and Idler Gear Retainer Spring	.25
	12815576	Mounting Bracket, Worm Shaft, Worm and Idler Assembly	.87
	12815471	Power Lead and Plug Assembly	4.00
	12815582	Selector Switch and Lead Assembly	.06
	12815602	Selector Switch Back Cover	.10
	12815839	Selector Switch Steering Column Strap (2 required)	.09
	12815606	Selector Switch Mounting Bracket (2 Required)	.15
	12815607	Selector Switch Mounting Bracket (2 Required)	.07
	12815608	Selector Switch Mounting Bracket (2 Required)	.07
	12815609	Selector Switch Push Button	.94
	12815633	Selector Switch Plunger Spring	3 for .05
	12815240	Selector Switch Case	.75
	12815244	Selector Coil Assembly Mounting Clip	.05
	12815495	Selector Coil Assembly	2.50
	12815503	Selector Disc and Shaft Assembly	3.50
	12815507	Station Call Letter Tab Retaining Plate	.10
	12815615	Station Call Letter Tab Retaining Plate	.10
	12815616	Station Call Letter Tab Retaining Plate	.10
	12815796	Selector Coil Terminal Strip Assembly	.35
	12815797	Selector Coil Terminal Strip Assembly	.35
	12815567	Terminal Strip Stud	3 for .05
	12815468	Terminal Strip Assembly	.38
	12815522	Moto-Matic Tuner Adjusting Kit (Order into stock at 85¢ each Cost. No Selling) - 85¢ each Cost.	.10

DETAIL SELLING PRICES PREPARED BY SEARS-ROEBUCK & CO.
 PRICES SUBJECT TO CHANGE WITHOUT NOTICE

TENSION ADJUSTMENT OF SELECTOR DISC:

On one end of the selector disc cam shaft will be found two 3/8" nuts that determine the tension of the selector disc. These are permanently adjusted at the factory and should not require any adjustment. When the selector disc is removed, the selector disc should be removed. When necessary, the adjustment nut until the armature arm will hold and turn the selector disc when the selector coil is energized by 5 volts. Tighten the lock nut. The purpose of this adjustment is to keep the selector disc as tight as possible and still loose enough so that the armature arm will not be forced out of the "V" slot when setting up a station.

Angular Adjustment of the Armature Arm "W":

The angular position of the sides of the "W" of the armature arm is correct when the angle of each side is the same with respect to the radius of the selector disc. (See Fig. 8). Too much angle on one side will cause the armature arm to stick. Any adjustments to the armature arm of the armature arm "W" should be made carefully with a pair of long nose pliers. Sticking armature arm may be caused by a burr on the face of the armature arm "W" that is out into the metal by the edge of the groove of the selector disc slot. This burr may be removed by carefully filing this surface with a fine file.

IMPROPER ALIGNMENT OF CONDENSER DRIVE SHAFT WITH WORM DRIVE FITTING ON VARIABLE CONDENSER:

On earlier production the mounting bracket holes were too small to allow for production variations. If trouble is experienced with the mounting of the unit to the receiver case or if it is found that the mounting bracket is not properly aligned with respect to the worm drive fitting, re-drill the mounting holes of the brackets with a 3/16" drill.

Remove the cover of the receiver and mount the Motomatic tuner making sure the condenser drive shaft is centered in the worm drive fitting on the variable condenser.

MAGNETIC CLUTCH ARM ADJUSTMENT:

There may be an occasional complaint or observation of a chattering or skipping of the Motomatic tuner clutch when under full load. This is caused by the engaging pins not being engaged deep enough into the main driving gear. Press the clutch down by hand over the top of the coil and note if the clutch engages properly. If not, the clutch may be adjusted. The clutch is adjusted by loosening the screws on the clutch arm and bending the clutch arm to the proper position. The clutch arm is made of soft annealed steel and bends easily. Replace and check; several trials may be necessary.

After making magnetic clutch adjustments it may be necessary to readjust the stop located above the clutch to the correct position. The stop is adjusted by loosening the screws and bending the stop manually. NOTE: When clutch is disengaged it is important that the clutch pins do not drag when tuning manually.

Sticking open of clutch when a button is depressed may be caused by many adjustments. First - the clutch arm may be warped during the process of bending so that the end of the arm is not on the outside edge of the clutch face. Correct this by rebending clutch arm. Second - it is the operative that both embossed bumps on the underside of the clutch arm apply an equal pressure to the clutch face when the button is depressed. Check this by depressing clutch arm and measuring a predetermined clearance with the "0" rule. The clearance should be .005". If the clearance is more than .005", embossed bumps from the clutch face. Correct any differences by bending slightly the forked section of the clutch arm.

SELECTOR SWITCH:

Failure of tuner to operate may lie in the selector switch. Remove back plate and place jumper wire from the first terminal on the end where lead enters switch case to the second terminal. The tuner should cause tuner to operate on #1 button. Now repeat, going to the red to blue, blue to brown, and brown to white terminals. Each one of these should operate an armature arm. Doing this will give a check as to whether the selector switch is properly adjusted. If the selector switch is not properly adjusted, the selector switch may be adjusted. The selector switch is adjusted by loosening the screws on the selector switch and bending the selector switch to the proper position. The selector switch is made of soft annealed steel and bends easily. Replace and check; several trials may be necessary.

First - it may be necessary to bend contact fingers so that good connection is made. Second - The selector switch contact case may be bulged in the center. This can be corrected by placing a strap across both sides.

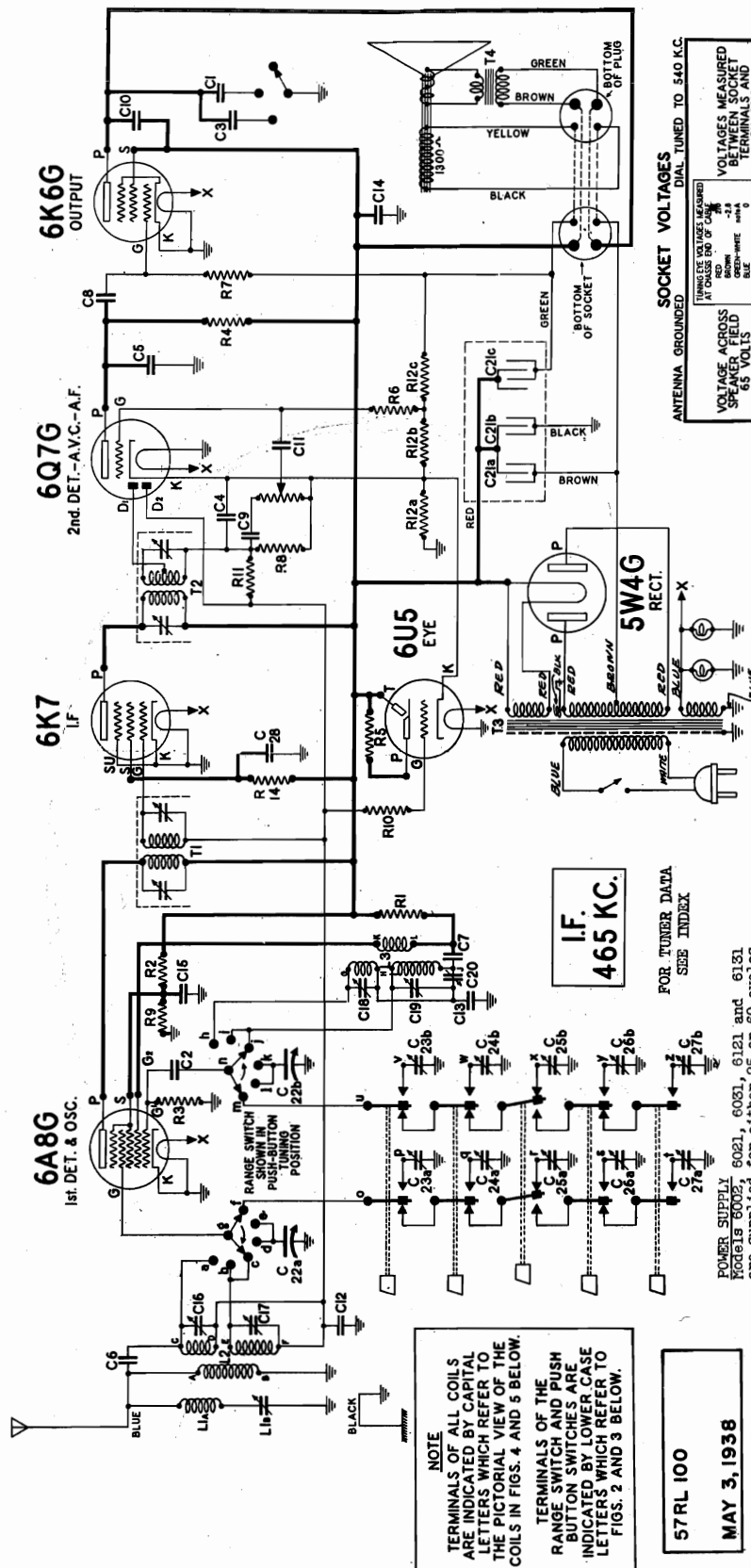
The selector switch plunger back up plate may become loosened, in which case it will be necessary to push back in place and put a wood wedge between this plate and switch case.

CONDENSER DRIVE SHAFT END PLATE:

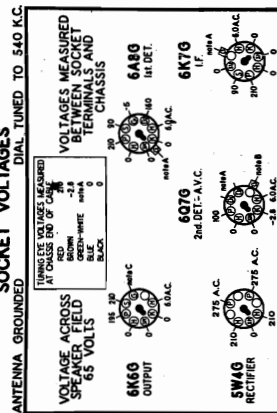
The condenser drive shaft (Fig. 9) should not have any lateral or axial play. If some does exist, it is caused by the condenser drive shaft not being properly adjusted. The condenser drive shaft should be adjusted by loosening the nut, loosening tabs and taking up on the nut until no play is felt and no additional torque required to turn shaft.

SEARS-ROEBUCK & CO.

MODELS 6002, 6021, 6031
6121, 6131. Ch. 100. 195
Schematic, Voltage



SOCKET VOLTAGES



Use a high resistance voltmeter of 1000 ohms per volt.
NOTE A: The bias for the control grids of the 6A8-G, 6K7-G, 6Q7-G, and the diode plates of the 6Q7-G tubes is measured across resistor R12a.
NOTE B: The bias for the control grids of the 6K7-G and R12b is measured across resistors R12a and R12b.
NOTE C: The bias for the control grid of the 6K6-G tube is measured across resistors R12a and R12b.

ANTENNA COIL

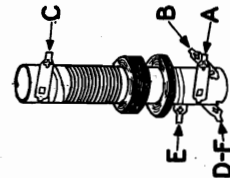


FIG. 5

OSCILLATOR COIL

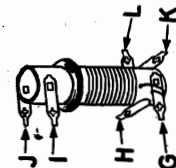


FIG. 4

PUSH-BUTTON TUNER SWITCH

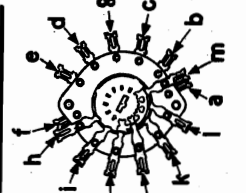


FIG. 3

SWITCH RANGE

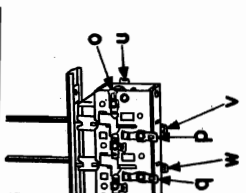


FIG. 2

POWER SUPPLY
Models 6002, 6021, 6031, 6121 and 6131
are supplied for either 25 or 60 cycles
power.

57RL 100

MAY 3, 1938

FORM NO. 6601

PRINTED IN THE UNITED STATES OF AMERICA

105-125 Volt - 25 cycles - 53 watts
105-125 Volt - 50 - 60 cycles - 53 watts

MODELS 6002, 6021, 6031
6121, 6131, Ch. 100, 195

SEARS-ROEBUCK & CO.

Socket, Trimmers, Chassis
Alignment

POWER OUTPUT

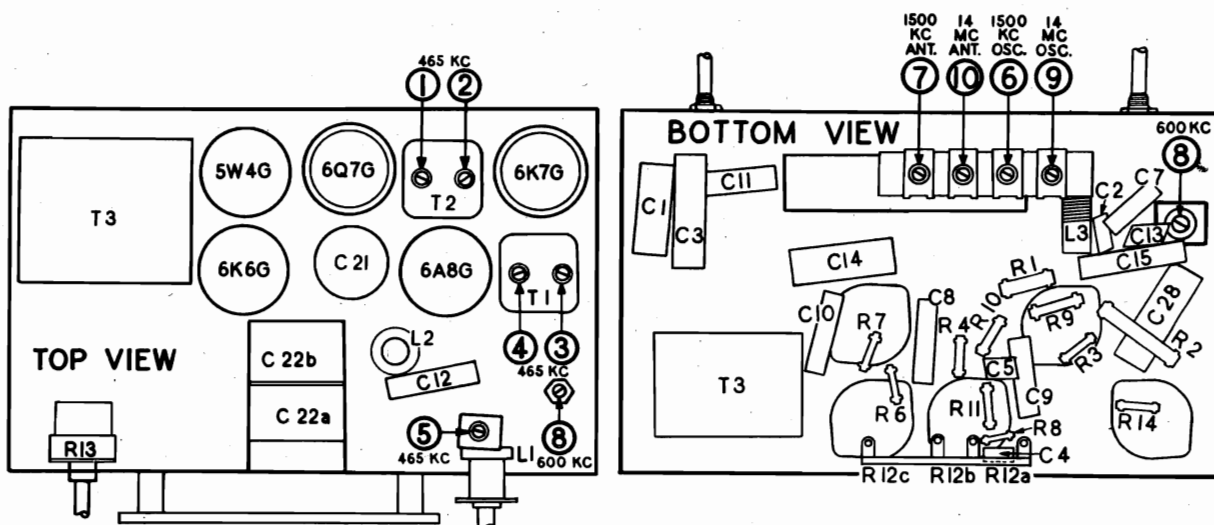
Type.....Pentode
Undistorted.....1.8 watts
Maximum.....3.5 watts

ALIGNMENT PROCEDURE

Before attempting to align the receiver check to see that the dial pointer is in a horizontal position when the gang condenser is in full mesh. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang condenser in the full mesh position.

Output meter connections-----Across voice coil leads
Output meter reading to indicate 0.2 watt output-----0.835 volts
Average sensitivity in microvolts for 0.2 watt output-----See chart below
Connection of Generator Ground-----Receiver chassis
Dummy Antenna in series with Generator Output Lead-----See chart below
Connection of Generator Output Lead-----See chart below
Generator modulation-----30%, 400 cycles
Position of volume control-----Maximum clockwise

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	SENSITIVITY MICROVOLTS	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6AB-G TUBE	465 KC	AMERICAN "AM" (Center)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	2nd I.F.	85	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
					3-4	1st I.F.		
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	465 KC	AMERICAN "AM" (Center)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	-	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	1500 KC	AMERICAN "AM" (Center)	1500 KC	6	"AMERICAN" OSCILLATOR (Shunt)	-	ADJUST TRIMMER TO BRING IN SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	1500 KC	AMERICAN "AM" (Center)	TUNE TO 1500 KC GENERATOR SIGNAL	7	"AMERICAN" ANTENNA	40	ADJUST FOR MAXIMUM OUTPUT.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	600 KC	AMERICAN "AM" (Center)	TUNE TO 600 KC GENERATOR SIGNAL	8	"AMERICAN" OSCILLATOR (Series Pad)	30	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	14 MC	FOREIGN "FOR" (Counter-clockwise)	14 MC	9	"FOREIGN" OSCILLATOR (Shunt)	-	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 13.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 14 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	14 MC	FOREIGN "FOR" (Counter-clockwise)	14 MC	10	"FOREIGN" ANTENNA	30	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.



SEARS-ROEBUCK & CO.

MODELS 6002, 6021, 6031
6121, 6131, Ch. 100.195
MODEL 6157 Ch. 100.198
Parts Lists

Model 6157 Chassis 100.198
PARTS LIST-SOURCE NO. 100
RETAIL SELLING PRICES PREPAID
PRICES SUBJECT TO CHANGE WITHOUT NOTICE
ELECTRICAL PARTS

Part Number	Schematic Location	Description	Selling Price Each
10031112796	L1	Coil - Wave trap (with trimmer)-----	.50
10028113295	L2	Coil - Antenna (broadcast)-----	1.20
10028113296	L3	Coil - R.F. (broadcast)-----	1.30
10028113297	L4	Coil - Oscillator (broadcast)-----	.48
10028113298	L5	Coil - Antenna (police)-----	.50
10028113301	L6	Coil - Antenna (short wave)-----	.52
10028113412	L7	Coil - Oscillator (police)-----	1.20
10028113607	L8	Coil - Oscillator (short wave)-----	.52
1001983539	C1-C2	Condenser - mica 280 mmfd.-----	.20
1001985061	C3-C4-C5	Condenser - mica, 110 mmf. (10%)-----	.20
	C6	Condenser - mica 51 mmfd.-----	.15
	C7	Condenser - paper .02 mfd. 400 volt-----	.25
	C8	Condenser - paper .004 mfd. 400 volt-----	.25
	C9-C10	Condenser - paper .01 mfd. 400 volt-----	.25
	C11-C12	Condenser - paper .05 mfd. 200 volt-----	.25
	C13	Condenser - paper .1 mfd. 300 volt-----	.25
	C15-C16	Condenser - paper .1 mfd. 400 volt-----	.25
	C17	Condenser - paper .004 mfd. 750 volt-----	.24
1002089937	C18	Condenser - elect. 30 mfd. 450 volt-----	1.80
10020110377	C19	Condenser - elect. 10 mfd. 35 volt-----	.80
	C20-C21	Condenser - paper .05 mfd. 400 volt-----	.13
	C22	Condenser - mica 1850 mmfd. (3%)-----	.30
10019112426	C24	Condenser - mica 4050 mmfd. (3%)-----	.40
10020113261	C25	Condenser - elect. 30 mfd. 450 volt-----	1.40
10017113319	C26-C27	Condenser - trimmer - 3 section-----	.54
	C28	Condenser - trimmer - 3 section-----	.54
10017113320	C29-C30	Condenser - trimmer - 3 section-----	.54
10017113346	C31	Condenser - padding-----	.38
10016114650	C33-C34	Condenser - variable gang-----	5.95
	C35	Condenser - variable gang-----	5.95
10017114697	C36 to C47	Trimmer condenser strip - for push buttons-----	2.98
1005485321		Connector - Ground-----	.01
10049110629		Lamp - 6.3 volt .25 amps-----	.15
	R1-R2	Resistor - carb. 47,000 ohms $\frac{1}{2}$ W-----	.12
	R3-R4	Resistor - carb. 220,000 ohms $\frac{1}{2}$ W-----	.12
	R5-R6-R7	Resistor - carb. 220,000 ohms $\frac{1}{2}$ W-----	.12
	R8-R9-R10	Resistor - carb. 1 meg. 1/4 watt-----	.12
	R11-R12	Resistor - carb. 4700 ohm 1/4 watt-----	.12
	R13	Resistor - carb. 4700 ohm 1/4 watt-----	.12
	R14	Resistor - carb. 470,000 ohms $\frac{1}{2}$ W-----	.12
	R15	Resistor - carb. 100,000 ohms $\frac{1}{2}$ W-----	.12
	R16	Resistor - carb. 15,000 ohms 1 watt-----	.15
	R17	Resistor - carb. 4700 ohms $\frac{1}{2}$ W (10%)-----	.12
	R18	Resistor - carb. 2200 ohms 1/4 watt-----	.12
10023110596	R19	Resistor - carb. 15000 ohms 3 watts-----	.25
	R20	Resistor - carb. 10,000 ohms 1 watt-----	.25
10023112956	R21	Resistor - carb. 220000 ohm $\frac{1}{2}$ W (10%)-----	.12
10023112992	R22	Resistor - carb. 39000 ohm $\frac{1}{2}$ W (10%)-----	.12
		Resistor - Bias Strip-----	
10021114662	R23-R24	Section R23 - 240 ohms-----	.46
		Section R24 - 35 ohms-----	
10024114651	R25	Volume control & off-on switch (1 megohm)-----	1.10
R-10058115037		Speaker - dynamic 10 inch-----	9.95
R-10057114733		Cone and voice coil for R-10058115037 speaker)-----	2.76
10038114652		Switch - for push buttons-----	3.70
10038114141		Switch - radio phone (D.P.D.T.)-----	.44
10037114649		Range switch-----	2.10
10034111581		Terminal strip - phone-----	.13
10033114665	T1	Transformer - 1st I.F.-----	1.44
10034114667	T2	Transformer - 2nd I.F.-----	1.44
10031114663	T3	Transformer - output-----	1.96
10010114668	T4	Transformer - power 117 V. 60 C-----	6.72
10011114758	T4	Transformer - power 117 V. 25 C-----	9.98*

DIAL & MISCELLANEOUS PARTS

Part Number	Description	Selling Price Each
10054114728	Band Indicator Slide and strip-----	.30
10045114032	Bracket & Pulley Assembly - right hand-----	.34
10045114034	Bracket & Pulley Assembly - left hand-----	.34
10054113442	Bracket - for tuning eye-----	.16
10054113149	Button - for push button tuner-----	.08
10055114088	Cable & Plug - for tuning eye-----	.60
10053114360	Cap - for tube shield-----	.06
10045114042	Clamp - for dial scale-----	.10
10054112745	Clip - coil mounting (osc. & ant.)-----	.01
10054112798	Clip - for mtg. wave trap coil-----	.01
10054114031	Collar - for band switch shaft-----	.01
1005485321	Connector - ground-----	.01
10045113178	Cord - band indicator (28" required) (supplied in 4 ft. lengths)-----	.30
10054111302	Cord - dial drive 6 or 50 ft. lgths. Per Ft.-----	.05
10054111973	Cushion rubber rest for back of chassis-----	.06
10045114036	Dial mtg. plate-----	.45
10045114048	Dial pointer & slide-----	.20
10042114600	Dial Scale - glass-----	.84
10045113338	Drum - dial drive-----	.54
10044114623	Escutcheon - for dial-----	2.40
10044113135	Escutcheon - for eye-----	.25
10044114624	Escutcheon - ground push buttons-----	1.28
10054113207	Gear - pinion on auxiliary range sw. shaft-----	.25
10054113347	Gear - on range switch shaft-----	.20
10039114727	Knob - for range switch-----	.19
10040114726	Knob - for tuning-----	.19
10040114725	Knob - for volume control-----	.19

Models 6002, 6021, 6031, 6121, 6131, Chassis 100.195
PARTS LIST-SOURCE NO. 100
RETAIL SELLING PRICES PREPAID
PRICES SUBJECT TO CHANGE WITHOUT NOTICE
ELECTRICAL PARTS

Part Number	Schematic Location	Description	Selling Price Each
10031112796	L1-L1b	Coil - Wave Trap (with trimmer)-----	.50
10028113011	L2	Coil - Ant. - broadcast & short-wave-----	1.20
10013113015	L3	Coil Assembly - oscillator-----	1.00
	C1	Condenser - paper .02 mfd. 600 volt-----	.35
1001985061	C2	Condenser - mica 51 mmfd.-----	.15
	C3	Condenser - paper .04 mfd. 600 volt-----	.35
1001983539	C4-C5	Condenser - mica 250 mmfd.-----	.20
1001985454	C6	Condenser - mica 11 mmf.-----	.15
	C7-C8-C9	Condenser - paper .01 mfd. 400 volt-----	.25
		Condenser - Ceramic tube .006 mfd.-----	.25
	C10	Condenser - 600 volt-----	.25
	C11-C12	Condenser - paper .05 mfd. 200 volt-----	.25
100198587	C13	Condenser - mica .0042 mfd.-----	.35
	C14	Condenser - paper .1 mfd. 400 volt-----	.25
	C15	Condenser - paper .1 mfd. 200 volt-----	.25
10017112893	C16-C17	Condenser - trimmer (4 section)-----	.60
	C18-C19	Condenser - trimmer (4 section)-----	.60
10017112799	C20	Condenser - padder (530 to 630 mmfd) electrolytic (dry)-----	.36
10020112863	C21a-C21b	Condenser - (Section A - 8 mfd. - 400 volt)-----	1.80
	C21c	Condenser - (Section B - 4 mfd. - 400 volt)-----	
		Condenser - (Section C - 4 mfd. - 400 volt)-----	
10016112888	C22a-C22b	Condenser - variable gang-----	2.90
10017112890	C23a-C23b	Condenser - dual push button trimmer (1100 KC to 1700 KC)-----	.36
10017112891	C24a-C24b	Condenser - mer (1100 KC to 1700 KC)-----	.45
10017112892	C25a-C25b	Condenser - dual push button trimmer (770 KC to 1350 KC)-----	.50
	C26a-C26b	Condenser - dual push button trimmer (550 KC to 1000 KC)-----	.25
	C27a-C27b	Condenser - paper .1 mfd. 400 volt-----	.25
	C28	Cone - voice coil assem. (10057-115019-U Speaker)-----	1.60
10057113409-U		Cone - voice coil assem. (10057-115019-U Speaker)-----	1.60
10057113410-U		Cone - voice coil assem. (10057-115020-U Speaker)-----	1.85
10049110629		Lamp - 6.3 volt .25 amps-----	.15
	R1	Resistor - carb. 10,000 ohms $\frac{1}{2}$ watt-----	.15
	R2	Resistor - carb. 15,000 ohms 1 watt-----	.15
	R3	Resistor - carb. 47,000 ohms $\frac{1}{2}$ watt-----	.12
	R4	Resistor - carb. 220,000 ohms $\frac{1}{2}$ watt-----	.12
	R5-R6	Resistor - carb. 1 megohm 1/4 watt-----	.12
	R7	Resistor - carb. 470,000 ohms $\frac{1}{2}$ watt-----	.12
	R8	Resistor - carb. 220,000 ohms $\frac{1}{2}$ watt-----	.12
	R9	Resistor - carb. 22,000 ohms $\frac{1}{2}$ watt-----	.12
	R10	Resistor - carb. 2.2 meg. 1/4 watt-----	.15
	R11	Resistor - carb. 3.3 meg. 1/4 watt-----	.12
	R12	Resistor - (Section A - 55 ohms)-----	.40
10021112789	R12a-R12b	Resistor - (Section B - 30 ohms)-----	
	R12c	Resistor - (Section C - 240 ohms)-----	
	R14	Resistor - carb. 68,000 ohms $\frac{1}{2}$ watt-----	.12
10058115019-U		Speaker - dynamic 8"-----	5.30
10058115020-U		Speaker - dynamic 8"-----	7.70
10037112868		Switch - range-----	.96
10038112869		Switch Assembly - for push buttons-----	2.90
10038112870		Switch - Tone Control-----	.40
10033112884	T1	Transformer - 1st I.F.-----	1.20
10035113496	T2	Transformer - 2nd I.F.-----	1.25
10010112887	T3	Transformer - power 117 V. -60 cycle-----	3.50
10010113473	T4	Transformer - power 117 V. -25 cycle-----	5.00
10013113408-U		Transformer - output for 10013115020-U or 10013115019-U speaker-----	1.20
10024112889	R13	Volume Control - 500,000 ohms with off-on switch-----	.90

DIAL DRIVE & MISCELLANEOUS PARTS

Part Number	Description	Selling Price Each
10054113149	Button - for push button tuner-----	.08
10018113130	Cable & Plug - for tuning eye-----	.55
10054112745	Clip - coil mounting (osc. & ant.)-----	.01
10054112798	Clip - wave trap coil mtg.-----	.01
10054113019	Clip - dial scale retaining-----	.01
10054111302	Cord - dial drive 6 or 50 ft. lgths. Per Ft.-----	.05
10054112233	Drum & Bushing - for dial drive-----	.35
10044113146	Escutcheon - for dial-----	.84
10044113147	Escutcheon - for push buttons-----	.48
10044113148	Escutcheon - for tuning eye-----	.20
10059113378	Instruction Book - Model 100.195-----	.10
10039113131	Knob - Tone Control-----	.12
10039113132	Knob - Range switch-----	.12
10039113133	Knob - Volume control-----	.14
10039113134	Knob - Tuning-----	.14
10054113136	Mtg. Plate & Bracket - for dial-----	.42
10054110496	Plug - Speaker (4 prong)-----	.12
10041113183	Pointer - dial-----	.12
1005481145	Retaining Ring - for drive shaft-----Per C	.50

MODELS 6003, 6004, 6024
6034, 6124, 6134
Chassis 101.510

SEARS-ROEBUCK & CO.

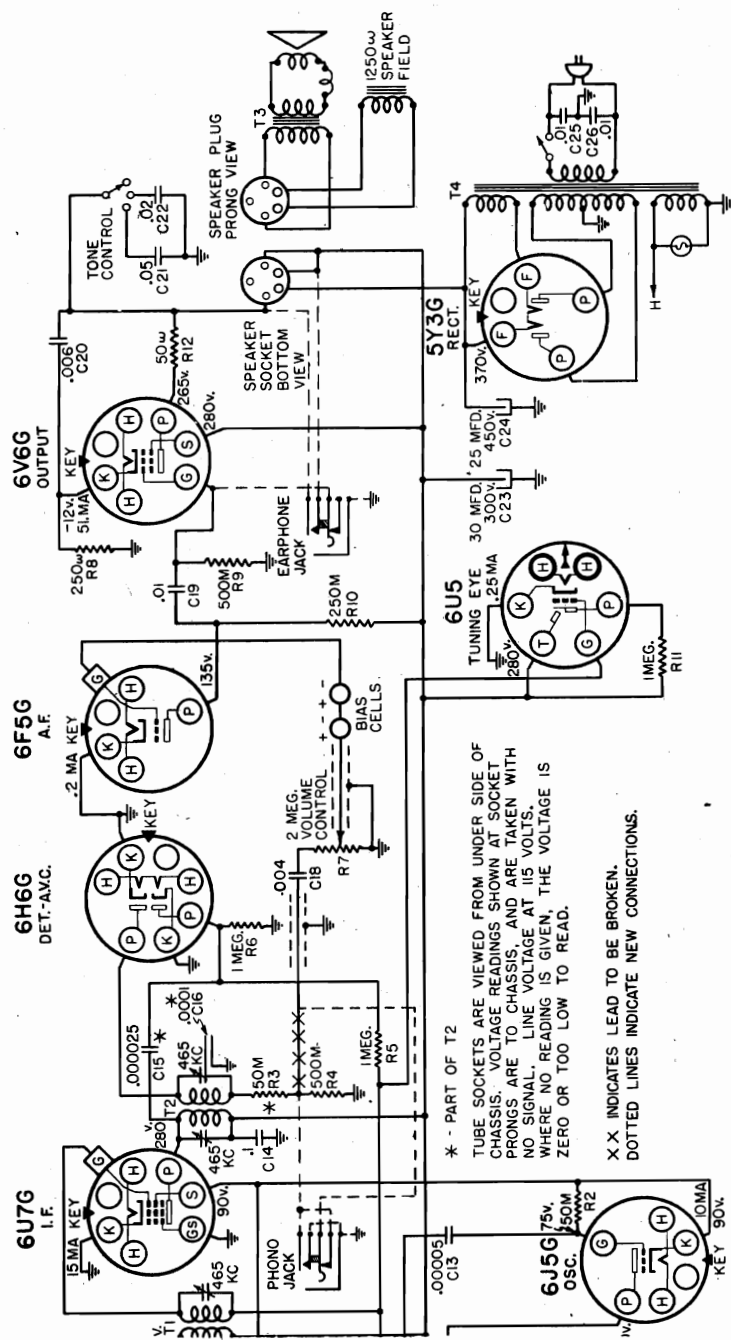
Jacks Installation Schematic Alignment

SUBJECT: CONNECTION OF EARPHONE AND PHONOGRAPH PICKUP JACKS:

Part number 1015119531 Jack, for connection of earphones or phonograph pick-up, can be ordered directly from source 101. Retail selling price is 79¢.

The schematic section on the back of this sheet shows the connections.

If a crystal pick-up is used, a filter composed of a .01 mfd. condenser and a 100M ohm resistor connected in series, should be connected across the pick-up to prevent excessive bass response. This filter will also act as a partial scratch filter.



ALIGNMENT PROCEDURE

PRELIMINARY.
Output meter connection Across loud speaker voice coil
Output meter reading to indicate 500 milliwatts 0.85 volts
Average sensitivity in microvolts for 500 milliwatts output See chart below
Generator ground lead connection Receiver chassis
Dummy antenna value to be in series with generator output See chart below
Connection of generator output lead See chart below
Generator modulation 30%, 400 cycles
Position of Volume Control Fully clockwise
Position of Tone Control
Position of Dial Pointer with variable fully closed Center of block to left of 550 kc calibration mark.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA CONNECTION	GENERATOR ANT. Term.	TRIMMER FUNCTION (IN ORDER SHOWN)	APPROXIMATE MICROVOLTS
"AM"	Closed	455 kc	.1 mfd.	6A8G Grid	T2, T1	90
"SW"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	O5	50
"9FOR"	9.55 mc	9.55 mc	400 ohms	Ant. Term.	C7*, O6	80
"AM"	Fully open	1730 kc	.0002 mfd.	Ant. Term.	O8	90
"AM"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	O3, O2	75
"AM"	500 kc (rock)	500 kc	.0002 mfd.	Ant. Term.	O9	80

IMPORTANT ALIGNMENT NOTES

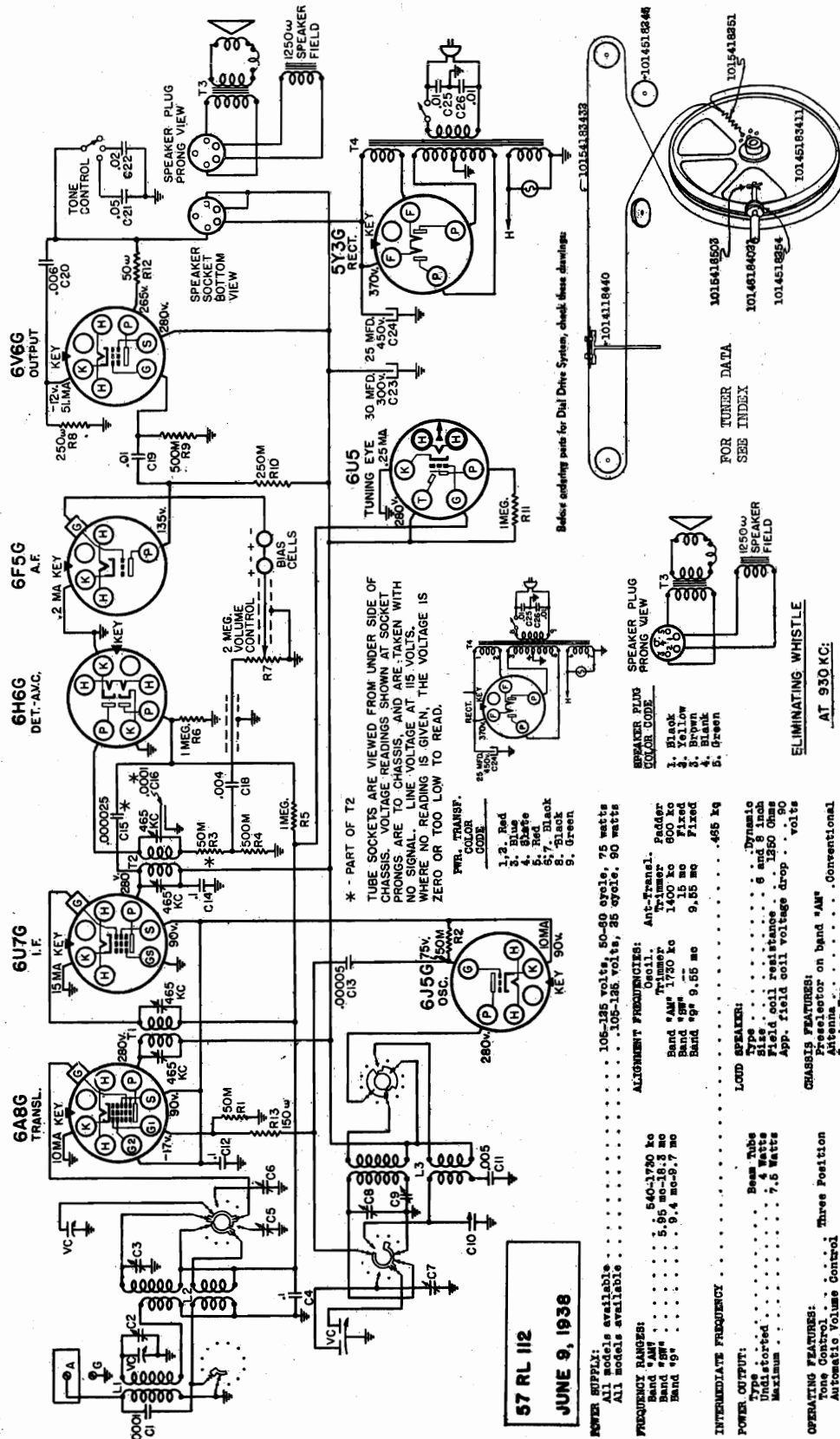
The alignment must be done in the order given.

*Two peaks can be had, one with the trimmer screwed further out than the other. The correct adjustment is with the trimmer screwed further out. The other peak is the image. Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

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.

Schematic, Voltage
Drive Data

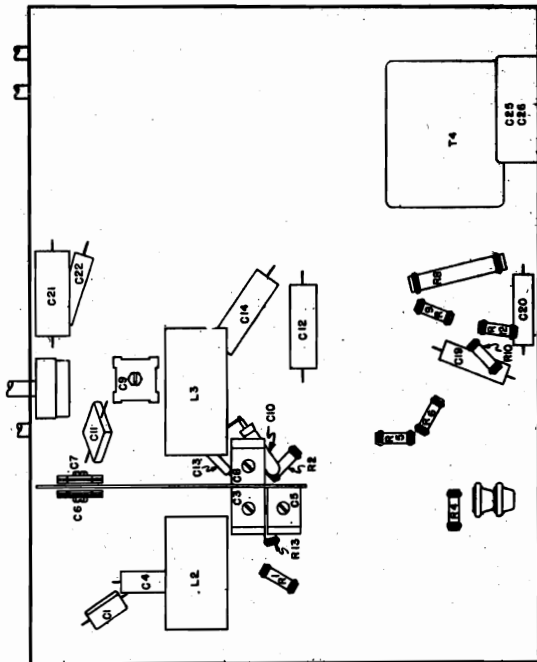
SEARS-ROEBUCK & CO.

MODELS 6003, 6004, 6024
6034, 6124, 6134
Chassis 101.510

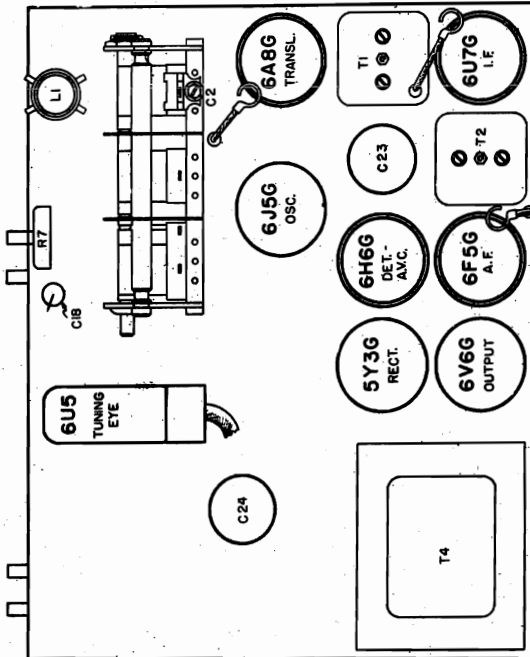
MODELS 6003,6004,6024
6034,6124,6134
Chassis 101.510

SEARS-ROEBUCK & CO.

MODELS 6005,6071,6076
6171,6176.Ch.101.507
Socket,Trimmers,Chassis



LOCATIONS OF PARTS UNDER CHASSIS.
MODELS 6003, 6004, 6024, 6034, 6124, 6134
CHASSIS 101.510



LOCATIONS OF PARTS ON TOP OF CHASSIS.

SILVERTONE BATTERY CHARGERS AVAILABLE:

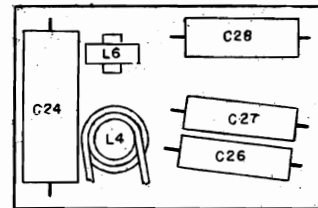
The customer should be told about the SILVERTONE GAS-O-POWER and the SILVERTONE SUPER AIR-CHARGER. Either of these units provides an economical means of keeping the storage battery charged. The customer should be informed of the advisability of frequent hydrometer testing of the storage battery to prevent it from becoming too low in charge. A battery that is allowed to run too low before re-charging will not have as long a life as one that is re-charged more frequently.

LOUD SPEAKER:

Type PM Dynamic
Size 6"
POWER OUTPUT:
Type Pentode
Undistorted25 watts
Maximum5 watts

CHASSIS FEATURES:

Number of IF stages One
Number condenser in gang Two
Antenna Conventional
Tuning Eye
Built-in IF Wave Trap
Synchronous Vibrator-Rectifier



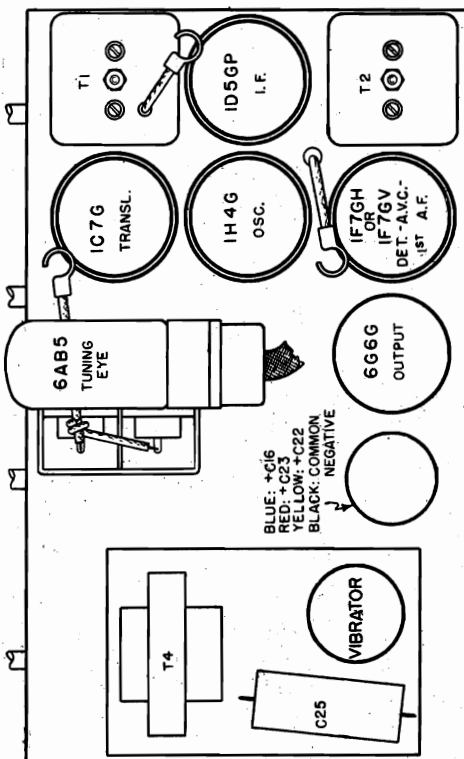
LOCATIONS OF PARTS UNDER POWER SUPPLY

MODELS 6005, 6071, 6076
6171, 6176 CHASSIS 101.507

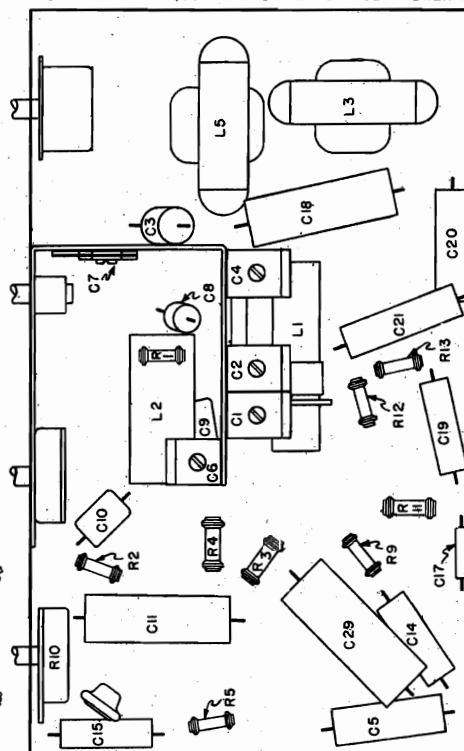
OPERATING FEATURES:
Tone Control Two position
Automatic Volume Control

OPERATING CONTROLS:
1. Left knob Volume Control
2. Next to left knob Wave Switch
3. Next to right knob Station Selector
4. Right knob On-Off Switch and Tone Control

CONTROL OPERATION:
Turning right: "A", "sp"
Turning left: "131"
Turning right: On, "HI"; "LO"



LOCATIONS OF PARTS ON TOP OF CHASSIS.

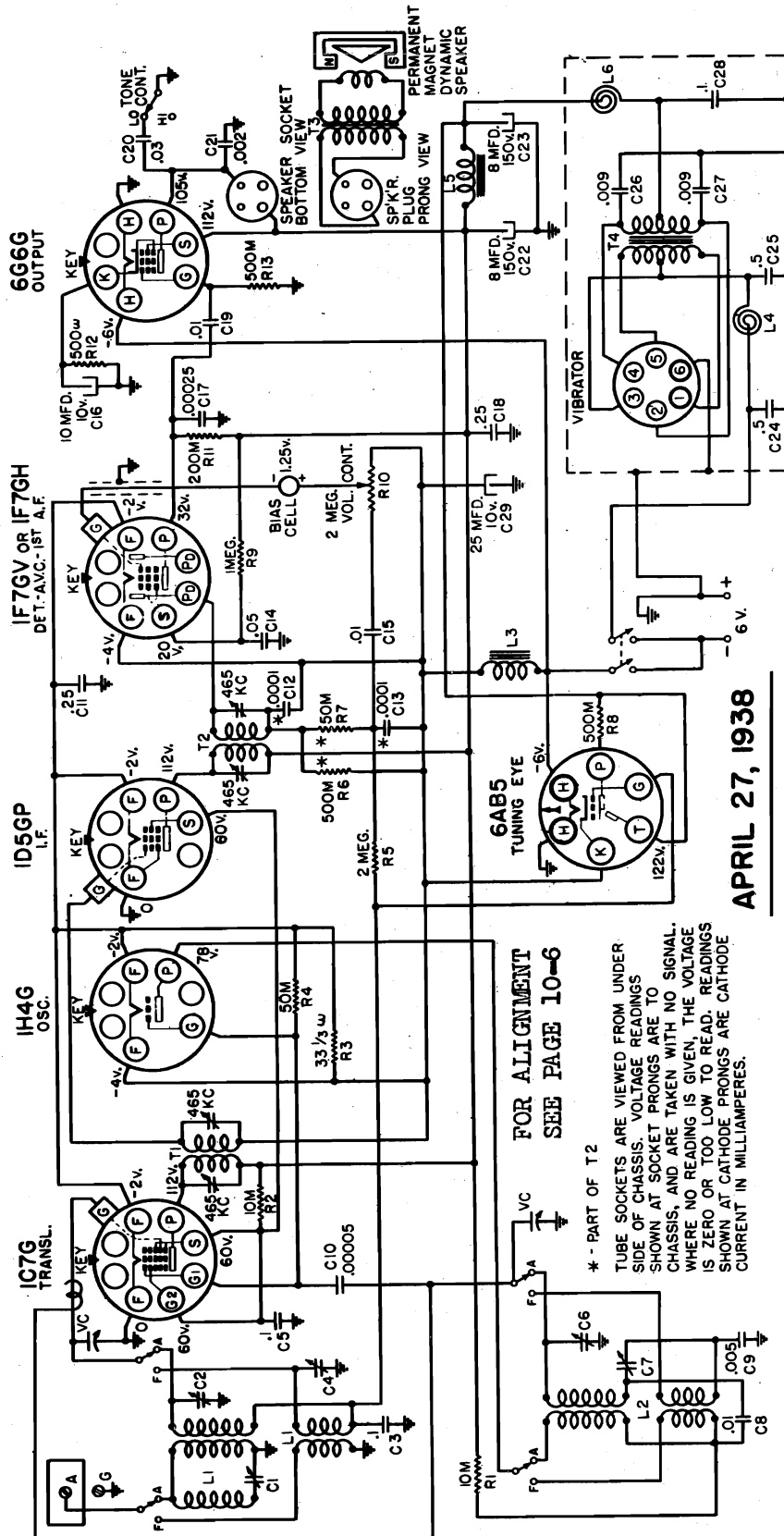


LOCATIONS OF PARTS UNDER CHASSIS.

SEARS-ROEBUCK & CO.

MODELS 6005, 6071, 6076
6171, 6176, Ch. 101, 507
Schematic, Voltage
Socket

FOR ALIGNMENT, SEE INDEX.

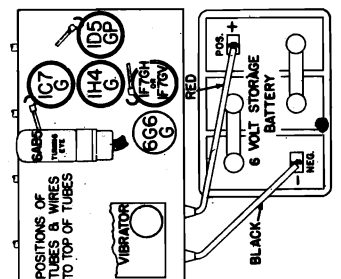


FOR ALIGNMENT
SEE PAGE 10-6

* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER
SIDE OF CHASSIS. VOLTAGE READINGS
SHOWN AT SOCKET PRONGS ARE TO
CHASSIS, AND ARE TAKEN WITH NO SIGNAL.
WHERE NO READING IS GIVEN, THE VOLTAGE
IS ZERO OR TOO LOW TO READ. READINGS
SHOWN AT CATHODE PRONGS ARE CATHODE
CURRENT IN MILLIAMPERES.

TUBE LAYOUT



POWER SUPPLY:
Six volt storage battery

FREQUENCY RANGES:

Band "A" 540-1750 kc
Band "F" 5.9-18.2 mc

Battery drain 1.5 amperes

ALIGNMENT FREQUENCIES:

Oscill. Ant.-Transl. Padder
Trimmer 600 kc
Band "A" 1400 kc
Band "F" 16 mc
Fixed 465 kc

POWER TRANSF. COLOR CODE

1, 2, 3 - Enamel
4 - Red
5 - Slate
6 - Blue

INTERMEDIATE FREQUENCY

CHASSIS 101.511, 101.515 101.517, 101.524, 101.534 Alignment

SEARS-ROEBUCK & CO.

MODEL 6036

MODELS INDICATED AS 6008 INCLUDES MODELS, 6009, 6018, 6019, 6048, 6049, 6068, 6069, 6148, 6168, CHASSIS 101.524.

.. .. 6074 CHASSIS 101.515.
.. .. 6036 CHASSIS 101.511.
.. .. 6038 CHASSIS 101.517.
.. .. 6140 CHASSIS 101.534.

FOR LOCATION OF TRIMMERS SEE INDEX.

Output meter connection Across loud speaker voice coil.

Output meter reading to indicate 50 milliwatts, MODEL 6008, 6074, 0.37 volts,
to indicate 500 milliwatts, MODELS 6036, 6140, 0.96 volts; for MODEL 6038,
1.06 volts.

Approximate microvolts input for 50 milliwatts output:-

For Models 6008, 6074 see chart below.

For 500 milliwatts output, for Models 6036, 6038, 6140, see chart below.

Generator ground lead connection Receiver chassis.

Dummy antenna value to be in series with generator output see chart below.

Connection of generator output lead see chart below.

Generator modulation 30%, 400 cycles.

Position of volume control Fully clockwise.

Position of tone control Fully clockwise.

Position of dial pointer with variable fully closed Center of block to left

of 550 kc calibration mark.

MODEL 6008.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA CONNECTION	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	Closed	465 kc	.1 mfd.	1076 Grid	T3, T2, T1	IF Output IF Input	16
"AM"	800 kc	465 kc	.0003 mfd.	Ant. Term.	C3*	Wave Trap	--
"SW"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	O4	Translator	15
"SPOR"	9.55 mc	9.55 mc	400 ohms	Ant. Term.	O3, O5	Osc., Transl.	20
"AM"	1400 kc	1400 kc	.0003 mfd.	Ant. Term.	O7, O1	Osc., Transl.	15
"AM"	800 kc (rock)	800 kc	.0003 mfd.	Ant. Term.	O3	Padder	15

MODEL 6074

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA CONNECTION	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	Closed	465 kc	.1 mfd.	6086 Grid	T2, T1	IF Output IF Input	75
"AM"	800 kc	465 kc	.0003 mfd.	Ant. Term.	O1*	Wave Trap	--
"SW"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	O4	Translator	50
"SPOR"	9.55 mc	9.55 mc	400 ohms	Ant. Term.	O7*, O5	Oscillator Translator	85
"AM"	Fully open	1780 kc	.0003 mfd.	Ant. Term.	O10	Oscillator	75
"AM"	1400 kc	1400 kc	.0003 mfd.	Ant. Term.	O3	Translator	45
"AM"	800 kc (rock)	800 kc	.0003 mfd.	Ant. Term.	O11	Padder	35

MODELS 6008, 6074.

IMPORTANT ALIGNMENT NOTES

The alignment must be done in the sequence given.

The generator should be adjusted for high output. The trimmer should be adjusted for minimum reading of the output meter. The variable should be adjusted to the frequency of the interfering station around 465 kc is known, the generator should be adjusted to the frequency of that station instead of to 465 kc.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

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.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA CONNECTION	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	Closed	465 kc	.1 mfd.	8488 Grid	T3, T1	IF Output IF Input	--
"SW"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	O5	Translator	25
"SP"	9.55 mc	9.55 mc	400 ohms	Ant. Term.	O11*	Oscillator Translator	40
"11"	11.8 mc	11.8 mc	400 ohms	Ant. Term.	O10*	Oscillator Translator	35
"15"	15 mc	15 mc	400 ohms	Ant. Term.	O8*	Oscillator Translator	25
"AM"	1400 kc	1400 kc	.0003 mfd.	Ant. Term.	O15, O4, O1	Osc. Transl., RF	35
"AM"	800 kc (rock)	800 kc	.0003 mfd.	Ant. Term.	O13	Padder	40

MODEL 6038.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA CONNECTION	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	Closed	465 kc	.1 mfd.	8488 Grid	T3, T2, T1	IF Output IF Input	--
"SW"	18 mc	18 mc	400 ohms	Ant. Term.	O39*	Oscillator	--
"SW"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	O11, O4	Translator, RF	10
"SP"	9.55 mc	9.55 mc	400 ohms	Ant. Term.	O28*	Oscillator Translator	20
"11"	11.7 mc	11.7 mc	400 ohms	Ant. Term.	O37*	Oscillator Translator	13
"15"	14.9 mc	14.9 mc	400 ohms	Ant. Term.	O34*	Oscillator Translator	10
"AM"	1400 kc	1400 kc	.0003 mfd.	Ant. Term.	O10	Oscillator Translator	15
"AM"	600 kc (rock)	600 kc	.0003 mfd.	Ant. Term.	O21	Padder	40

MODEL 6140.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA CONNECTION	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"AM"	Closed	465 kc	.1 mfd.	8488 Grid	T2, T1	IF Output IF Input	90
"SW"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	O5	Translator	50
"SPOR"	9.55 mc	9.55 mc	400 ohms	Ant. Term.	O7*	Oscillator Translator	80
"AM"	1400 kc	1400 kc	.0003 mfd.	Ant. Term.	O6, O3, O2	Osc. Transl., Ant.	75
"AM"	900 kc (rock)	900 kc	.0003 mfd.	Ant. Term.	O9	Padder	80

MODELS 6036, 6038, 6140. IMPORTANT ALIGNMENT NOTES

The alignment must be done in the order given.

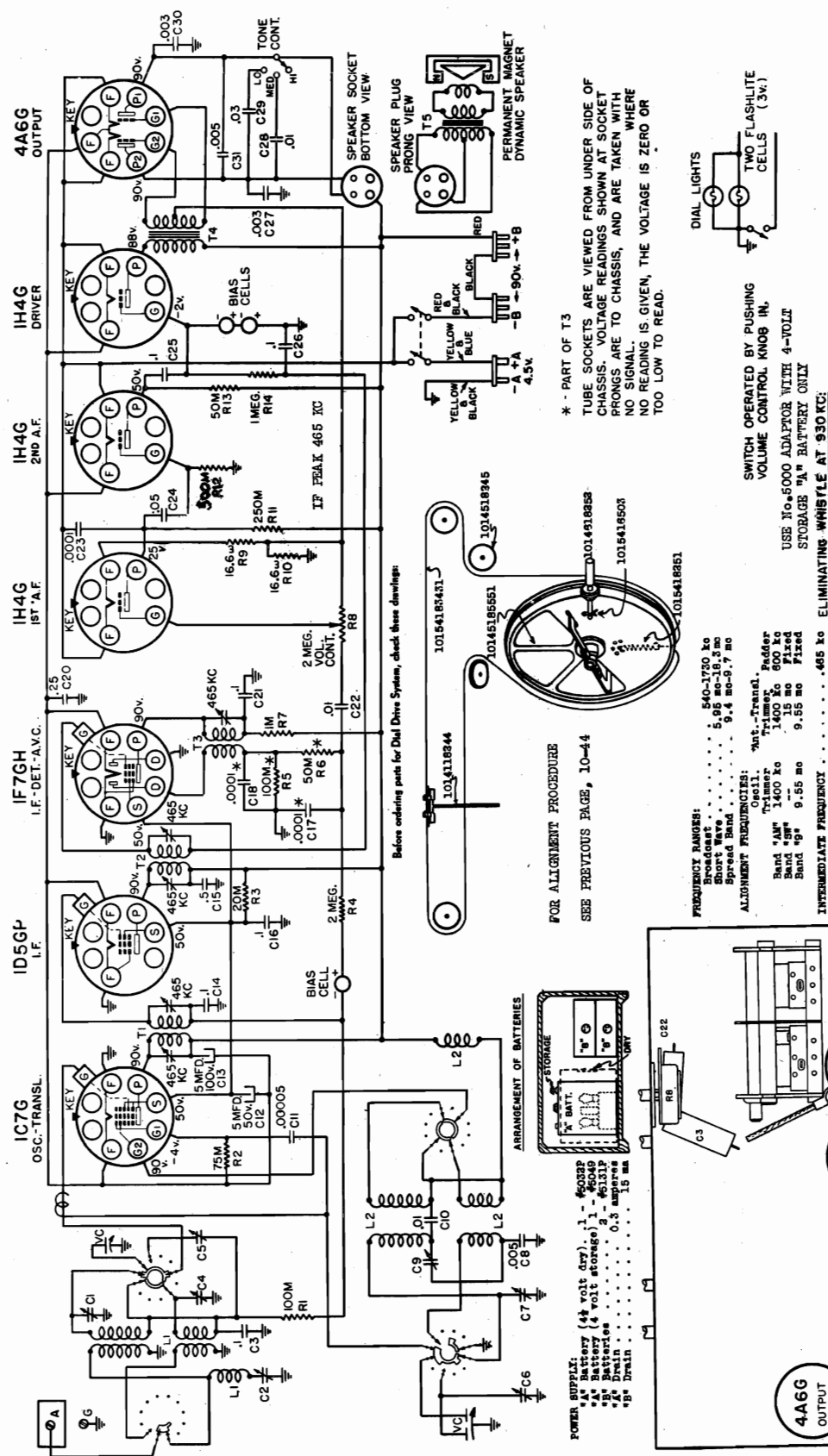
*Two peaks can be had, one with the trimmer screwed further out than the other. The correct adjustment is with the trimmer screwed further out. The other peak is the image. Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

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.

Schematic,Socket,Trimmers
Drive Data,Notes

SEARS ROEBUCK & CO.

MODELS 6008,6009,6018
6019,6048,6049,6068,6069
6148,6168 Chassis 101.524



A whistle, due to a beat between the second harmonic (930 kc) of the 455 to 475 kc IF and 930 kc, should also be pronounced. In locations where the 930 kc station is one that is pronounced, it will be desirable to shift the whistle to some other point where it is not so pronounced. This can be done by shifting the IF frequency of the receiver. It will not be objectionable. This can be done by shifting the IF frequency of the receiver. It will not be objectionable.

Determine at what point between 900 kc and 940 kc the whistle will be least objectionable. Dividing this frequency by 2 will give the new IF frequency to which the receiver should be aligned. For example, if it is found that the whistle is least pronounced at 915/3 or 457.5 kc, try to select the new IF frequency as near as possible to 485 kc.

Align the IF at the new frequency and then realign the rest of the receiver as described under "ALIGNMENT PROCEDURE".

Align the IF at the new funder. "ALIGNMENT PROCEDURE".

FOR ALIGNMENT PROCEDURE

SEE PREVIOUS PAGE. 10-44

FREQUENCY RANGES:	
Broadcast	540-1720 kc
Short Wave	5.95 mc-18.75 mc
Spread Band	9.4 mc-9.7 mc

ALLOCATION FREQUENCIES:	
Ampl.	Ant.-Transd.
Ocell.	Trimmer
Band "AM"	1400 kc
Band "FM"	100 kc
Band "9"	9.55 mc
Band "9"	9.55 mc

INSTRUMENT DATE FREQUENCY	
Antenna	4455 kc

POWER OUTPUT:	
Type	Class "B"
Undistorted . . . . .	.0.5 watts
Maximum . . . . .	.0.8 watts
LOUD SPEAKER:	
Type	PM Dynamic
Size	6 and 8 inch

57RL108

JUNE 16, 1938

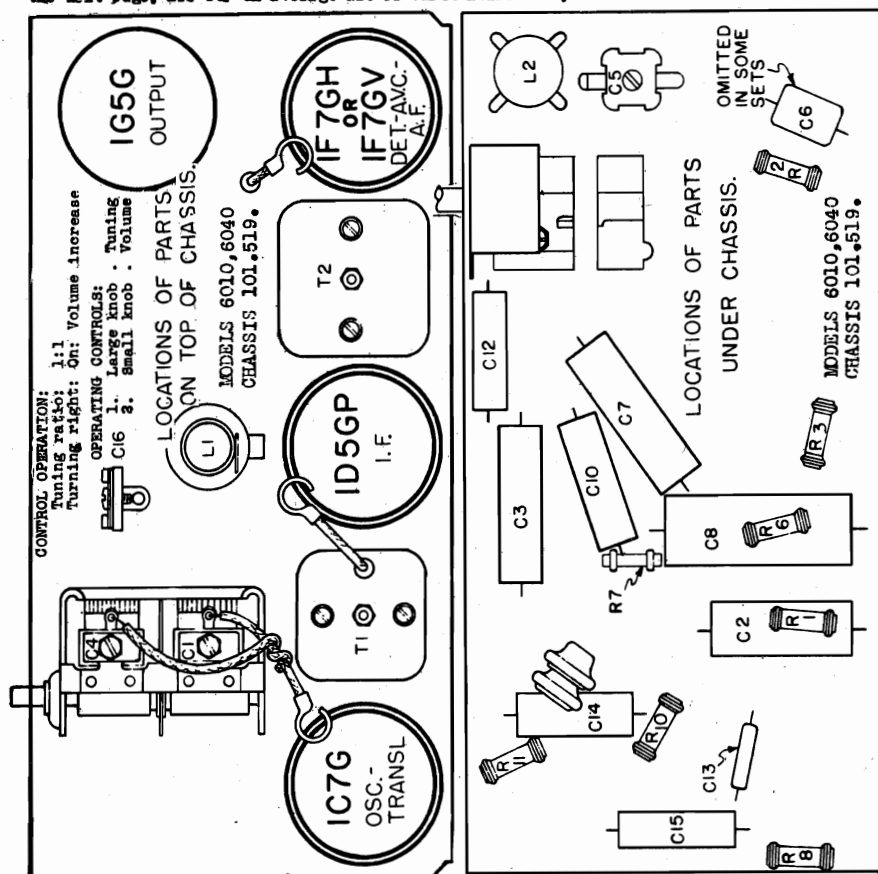
LOCATIONS OF PARTS ON TOP OF CHASSIS:

MODELS 6008,6009,6018
6019,6048,6049,6068,6069
6148,6168.Ch. 101.524
Chassis Layout,Data

MODELS 6010,6040,Ch.101.519
SEARS-ROEBUCK & CO.Socket,Trimmers,Chassis
Notes

BATTERY REPLACEMENT:

The dry 4½ volt "A" battery should be replaced when its voltage drops to 3.4 volts, under load. The 6½ volt "B" battery should be replaced when the voltage of the battery has dropped to 4½ volts, under load. The life rating of the various size batteries, given on the next page, are for an average use of three hours a day.

**THE "A" SUPPLY:**

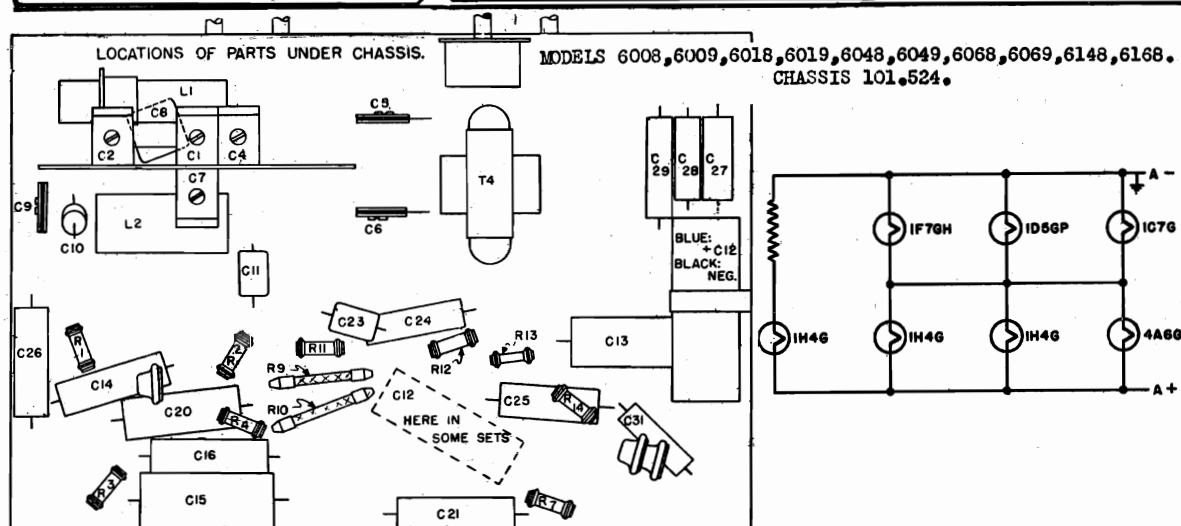
These models may be used with either a 4½ volt dry "A" battery or a 4 volt storage "A" battery. Catalog #5000 adaptor is necessary to make the connection between the "A" plug and the terminals of the storage battery.

THE FILAMENT CIRCUIT:

Since the tubes have two volt filaments and the "A" supply is four volts, a series parallel arrangement is used for the filament circuit. Accordingly, if any tube burns out, its companion will not light either. The full "A" voltage will appear across the filament terminals of the burnt out tube.

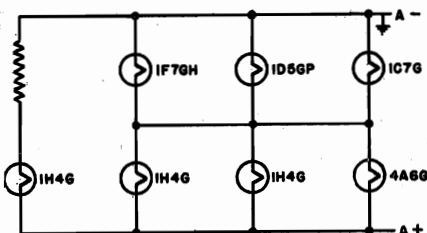
THE AVC CIRCUIT:

Diode current of the 1F7GH tube, flowing through the 500M ohm resistor, R5, creates a voltage drop across it. This voltage is applied to the control grid of the 1C7G tube to provide AVC.

**THE FILAMENT CIRCUIT:**

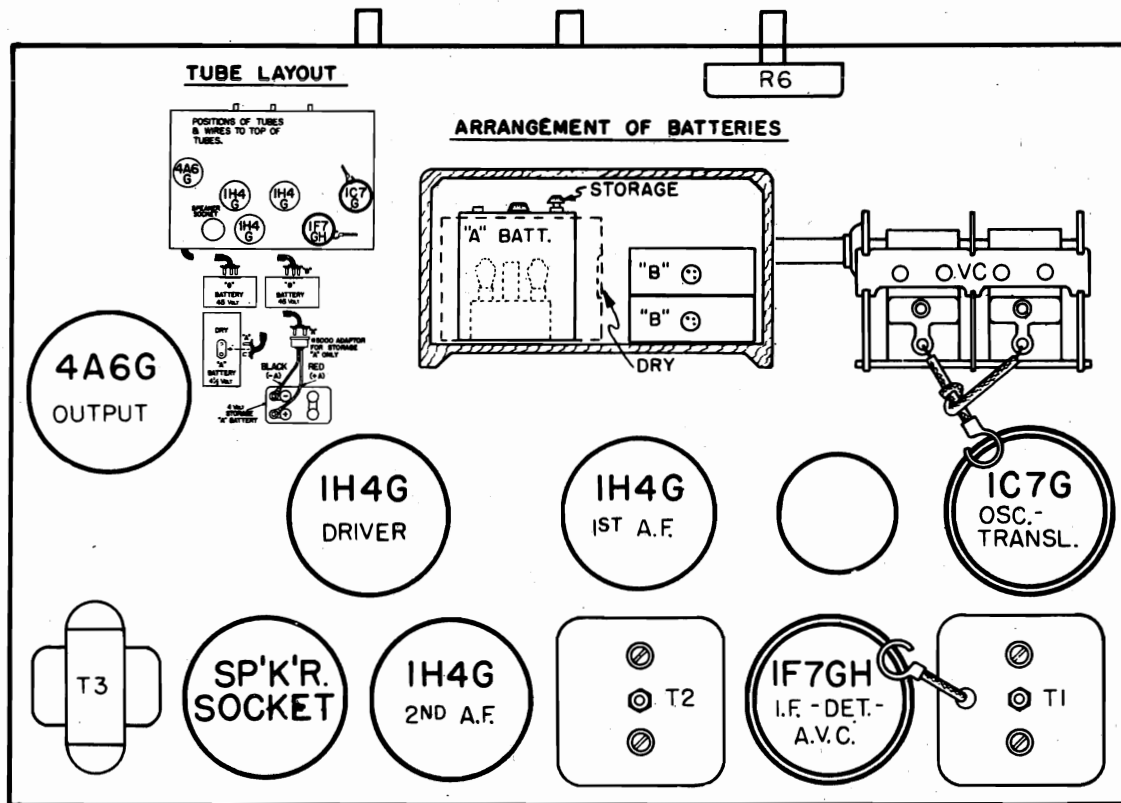
Since the "A" supply is four volts and the tube filaments are rated at two volts, a series parallel arrangement is used for the filament circuit. A simplified diagram is shown below. If any one tube burns out (except the 1H4G first AF), the filament voltage and current of the other tubes will be affected.

A Catalog #5000 adaptor must be used on the "A" cable plug when a storage "A" battery is used. The owner should be warned not to attempt the use of a six volt automobile storage battery. Only a four volt storage "A" battery should be used.

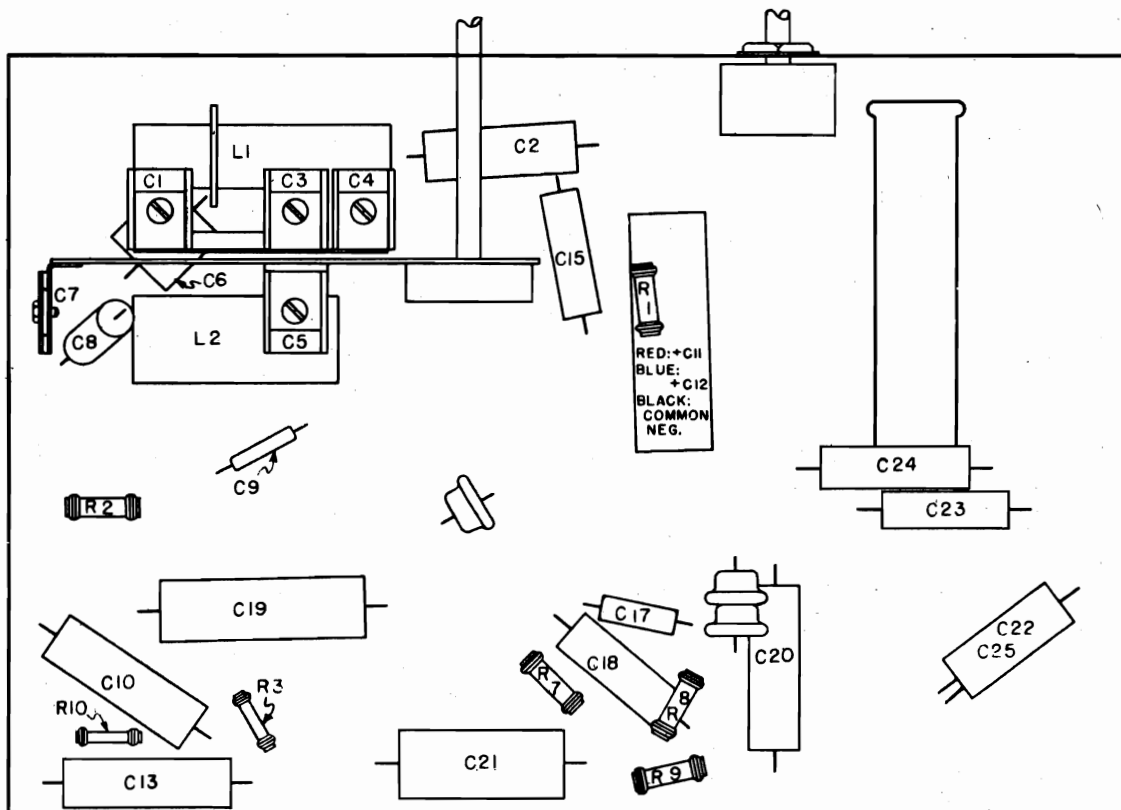


MODELS 6016, 6017, 6046
6047, 6146 Ch. 101.512
Socket, Trimmers, Chassis

SEARS-ROEBUCK & CO.



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS.

OPERATING FEATURES:

Tone control Three position

Automatic Volume Control

"On-Off" Indicator

Dial FLASH-O-LITE

Push Button Tuning

POWER OUTPUT:

Type Class "B"

Undistorted 0.4 watts

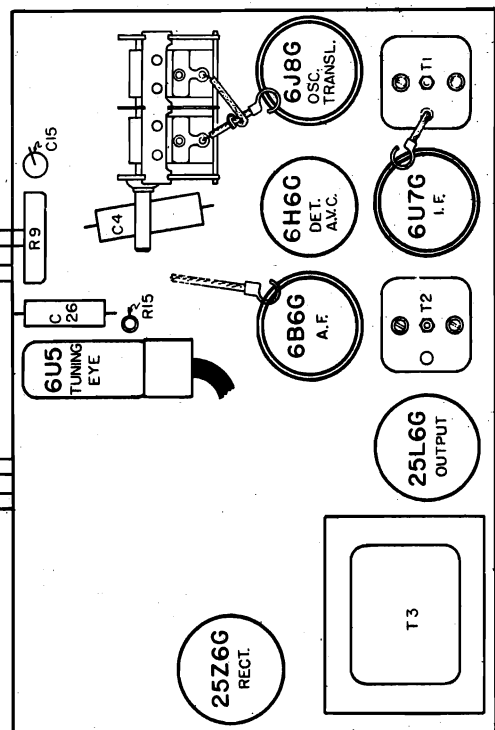
Maximum 0.8 watts

LOUD SPEAKER:

Type PM Dynamic

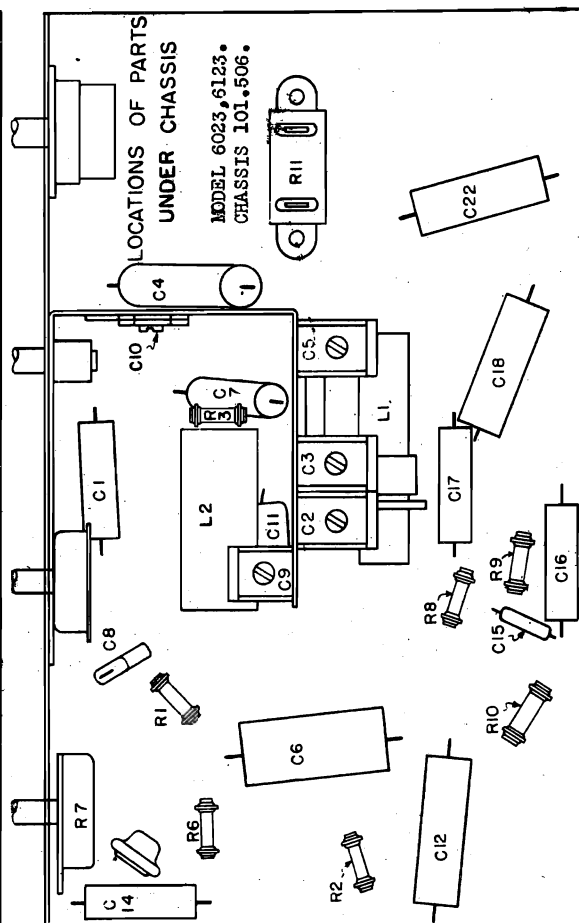
Size 6"

SEARS-ROEBUCK & CO.



LOCATIONS OF PARTS ON TOP OF CHASSIS.

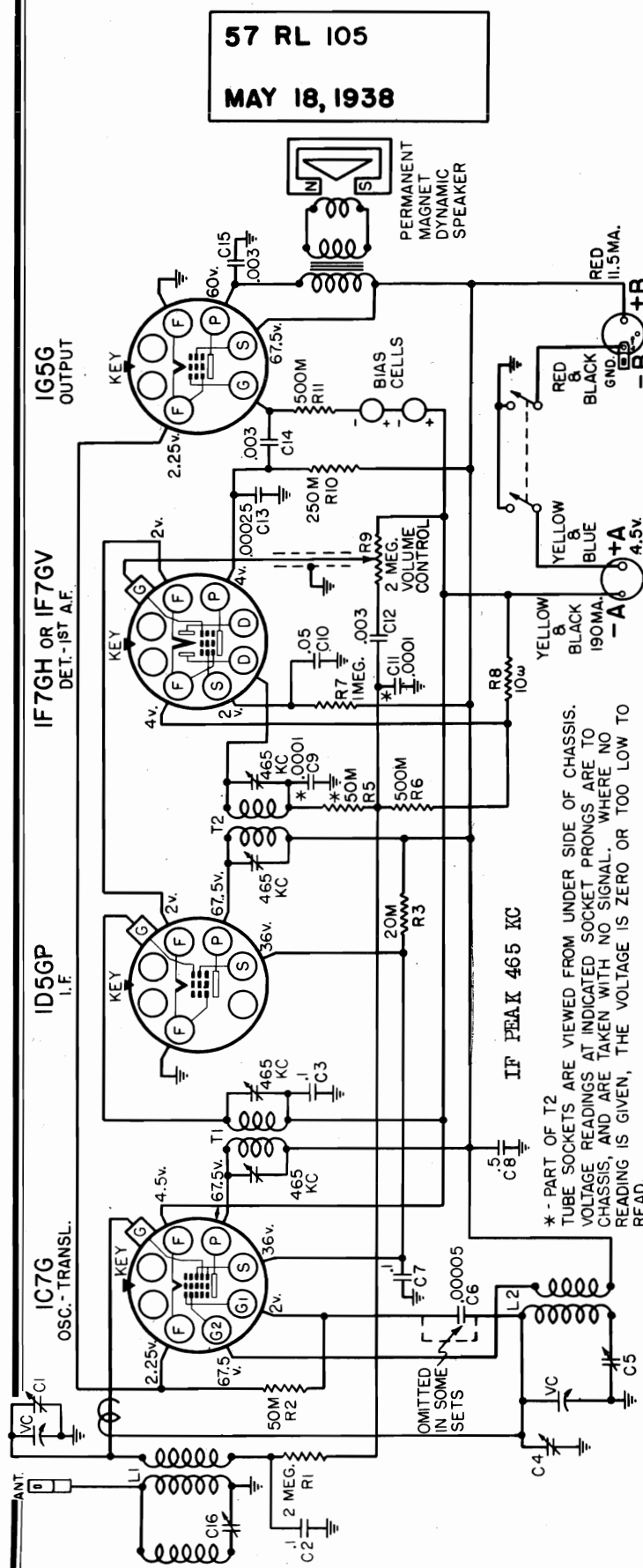
MODELS 6022, 6122, 6132. CHASSIS 101.509.



LOCATIONS OF PARTS UNDER CHASSIS.

SEARS-ROEBUCK & CO.

MODELS 6010, 6040, Ch. 101.519
Schematic, Voltage, Socket
Trimmers, Change



POWER SUPPLY:
"A" Battery (4½ volt dry) . . . 1 - #5030
"A" Battery (4 volt storage) . . . 1 - #5049
"B" Battery 1 - #5040
"A" Drain 0.18 amperes
"B" Drain 13.5 ma

ALIGNMENT FREQUENCIES:
Oscillator 1730 kc
Antenna-Transl. 465 kc
Padder 600 kc
Trimmer 1400 kc

LOUD SPEAKER:
Type P.M. Dynamic
Size 5 inch

CHASSIS FEATURES:
Number IF stages One
Built-in Wave Trap
Plugs attached to battery cable

FREQUENCY RANGE:
Broadcast 540-1730 kc

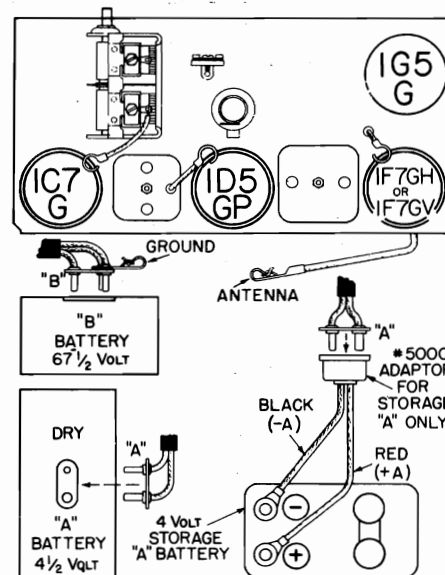
INTERMEDIATE FREQUENCY 540-1730 kc

POWER OUTPUT:
Type Single Pentode
Undistorted125 watts
Maximum35 watts

OPERATING FEATURES:
Calibrated tuning knob
Automatic Volume Control

OMISSION OF C6:
It has been found that C6 is not necessary; that a direct connection from the oscillator
coil to the IC7G tube is permissible. Accordingly, C6 was omitted from later production.

TUBE LAYOUT

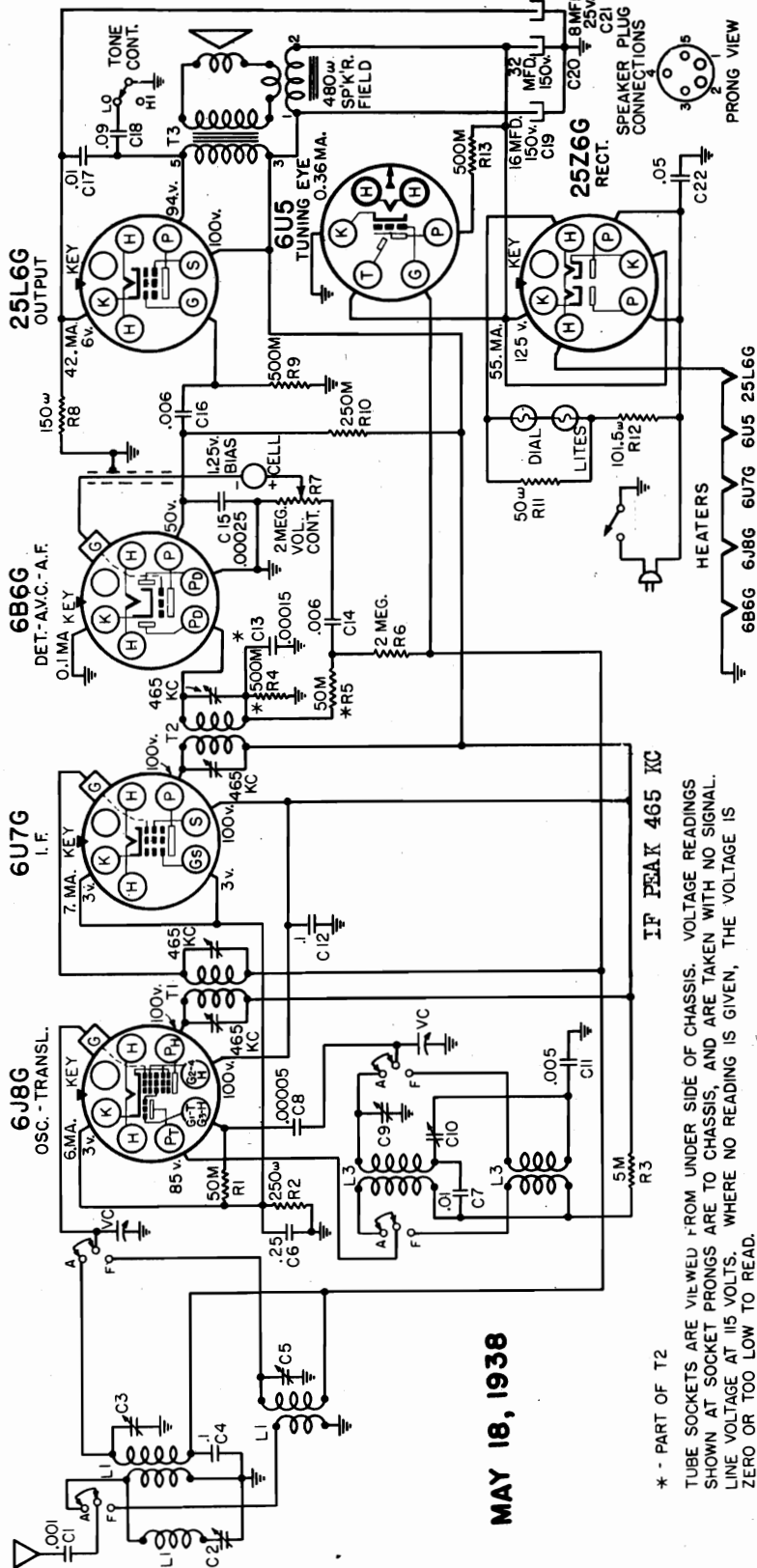


MODELS 6023, 6123, Ch. 101.506
Schematic, Voltage, Notes

SEARS ROEBUCK & CO.

OPERATING CONTROLS:

1. Left knob Volume
2. Next to left knob . . . Wave Band Switch
3. Next to right knob . . . Station Selector
4. Right knob "On-off" switch and tone

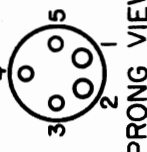


FOR ALIGNMENT, SEE INDEX.

SPEAKER PLUG CONNECTIONS

SPEAKER PLUG CONNECTIONS

1. Yellow
2. Black
3. Brown
4. Blank
5. Green



CONTROL OPERATION:
Turning right: Volume increase
Turning right: "A", "F"
Turning ratio: 13:1
Turning right: "ON", "HI", "LO".

105-125 volts, 50-60 cycle, or DC, 50 watt

ALIGNMENT FREQUENCIES:

Oscil.	Ant.-Transl.
Trimmer	Padder
Band "A" 1400 kc	500 kc
Band "F" --	15 mc
Fixed	435 kc

LOUD SPEAKER:

Type	Dynamic
Size	5"
Field coil resistance	480 ohms
App. field coil voltage drop	35 volts

POWER OUTPUT:

Type	Beam
Undistorted	1.4 watt
Maximum	2 watt

POWER SUPPLY AND HEATER CIRCUIT:

All of the tube heaters are connected in series. Accordingly, if any one tube burns out the others will not light. The full line voltage will appear across the heater terminals of the burnt out tube. Under certain conditions, the chassis may be above ground potential by an amount equal to the line voltage. Accordingly, appropriate precaution should be taken when working on the chassis.

MAY 18, 1938

* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

POWER SUPPLY:

All models available

FREQUENCY RANGES:

Band "A"	540-1750 kc
Band "F"	5.9-18.2 mc

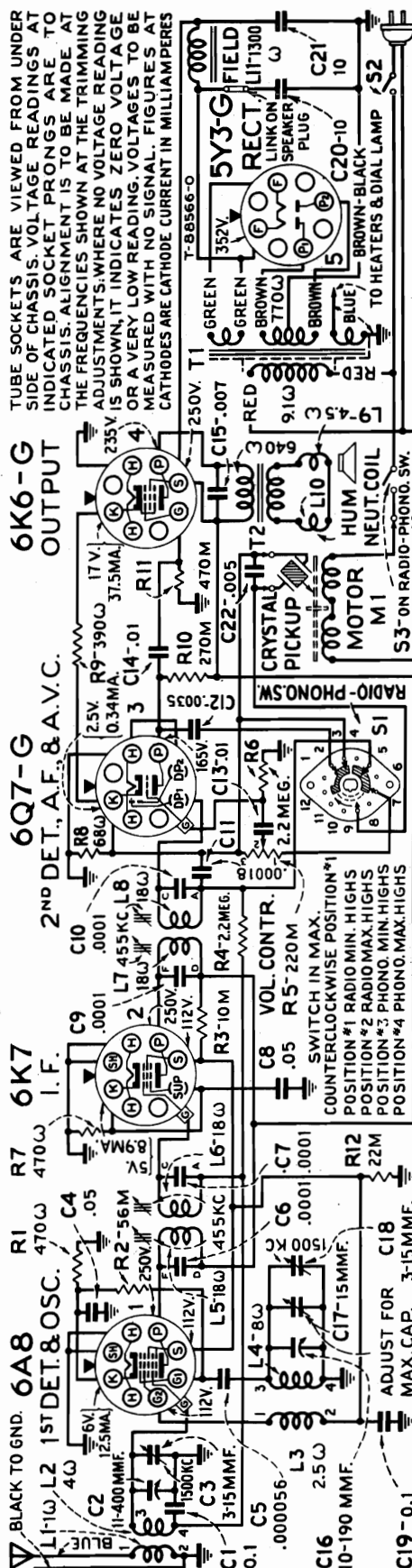
INTERMEDIATE FREQUENCY

Motor, Pick-up Wiring Alignment

SEARS-ROEBUCK & CO.

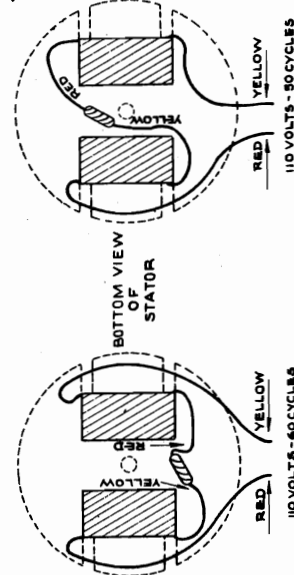
JULY 20, 1938

MODEL 6028
Chassis 126.204
Schematic, Voltage
Speaker Wiring



CONVENTIONAL ALIGNMENT, SEE
SPECIAL SECTION, VOL. VIII

IF PEAK 455 KC



MOTOR COIL WIRING

POWER SUPPLY RATINGS AVAILABLE.....

FREQUENCY RANGE:

Broadcast..... 540-1,720 kc

ALIGNMENT FREQUENCY:

Broadcast..... 1,500 kc (osc., ant.)

INTERMEDIATE FREQUENCY.....

Loudspeaker:

Centering of the loudspeaker voice-coil is made in the usual manner with three, narrow paper feelers, after first removing the front dust-cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid after adjustment has been completed.

PICKUP CONNECTIONS

Dial lamp..... 6.3 volts, 0.25 ampere

..... 105-125 volts, 60 cycles, 80 watts

..... 105-125 volts, 50 cycles, 80 watts

POWER OUTPUT:

Type..... Pentode

Undistorted..... 2.0 watts

Maximum..... 3.5 watts

LOUDSPEAKER:

Type..... 5-inch electrodynamic

V.C. Impedance..... 5 ohms at 400 cycles

Field Coil Resistance..... 1,300 ohms

App. Field Coil Voltage Drop..... 100 volts

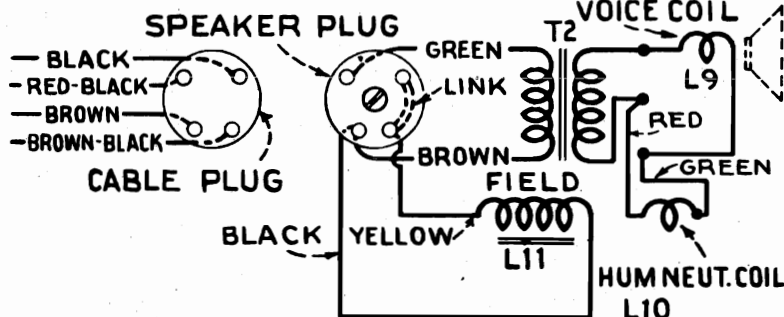
PHONOGRAPH:

Type..... Manual

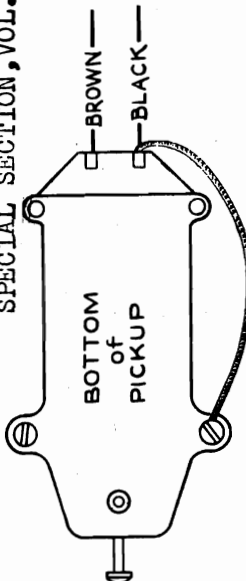
Turntable Speed..... 78 R.P.M.

Type of Pickup..... Crystal

Pickup Impedance..... 80,000 ohms at 1,000 cycles



LOUDSPEAKER WIRING

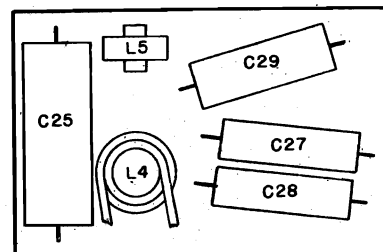
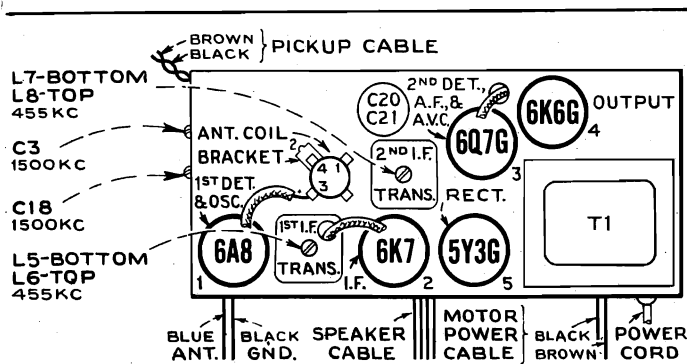
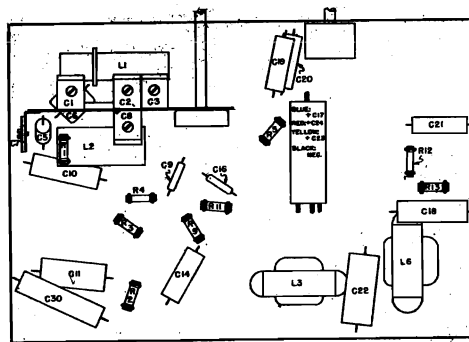
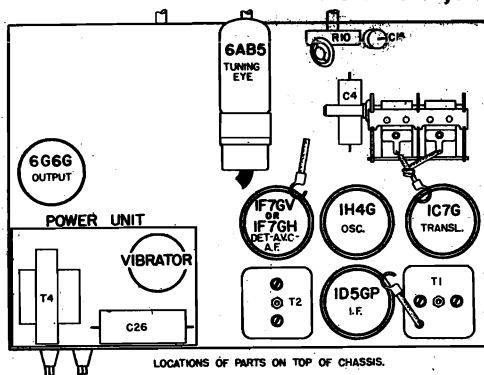


MODEL 6028, Ch. 126.204
Motor Details, Trimmers
Chassis Wiring, Socket

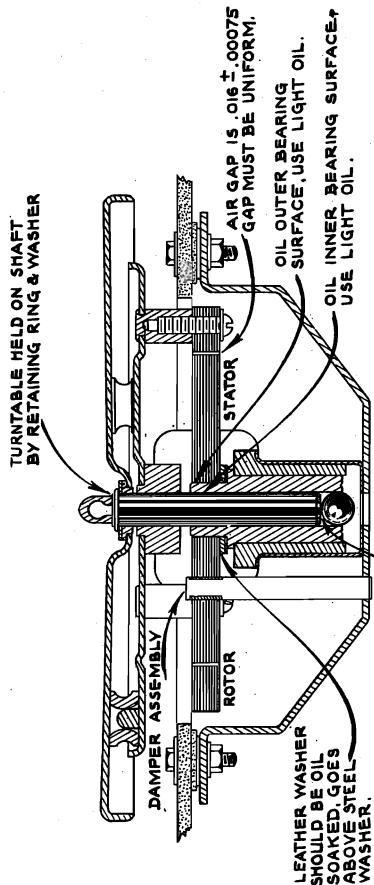
SEARS-ROEBUCK & CO.

MODELS 6072, 6077, 6172
Chassis 101.513
Socket, Trimmers, Chassis

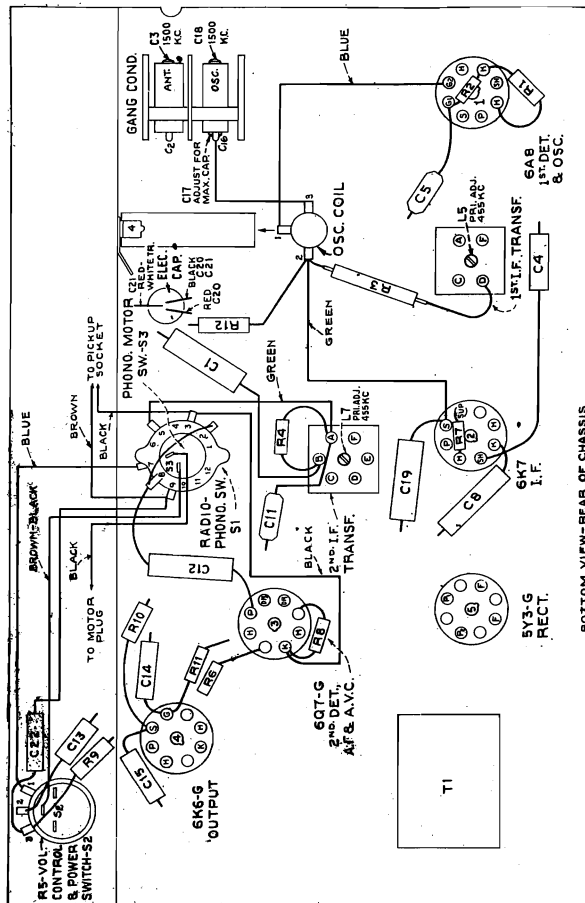
MODELS 6072, 6077, 6172. CHASSIS 101.513.



MODEL 6028. CHASSIS 126.204.



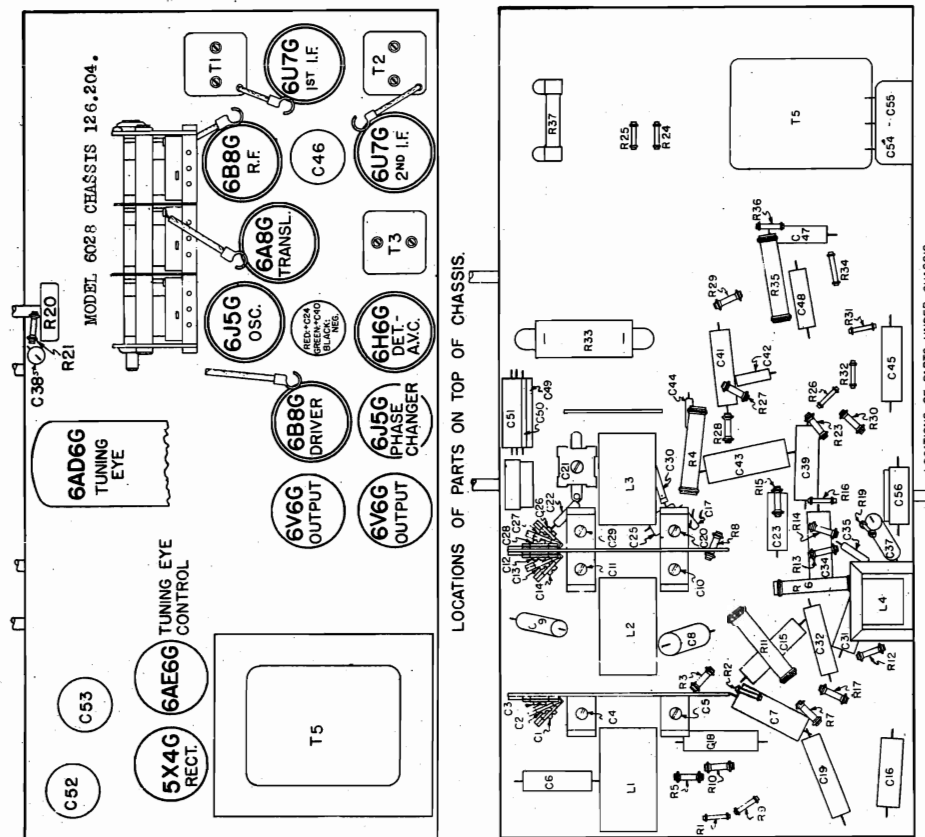
MOTOR DETAILS



MODELS 6038, 6138
Chassis 101.517
Alignment, Motor Data

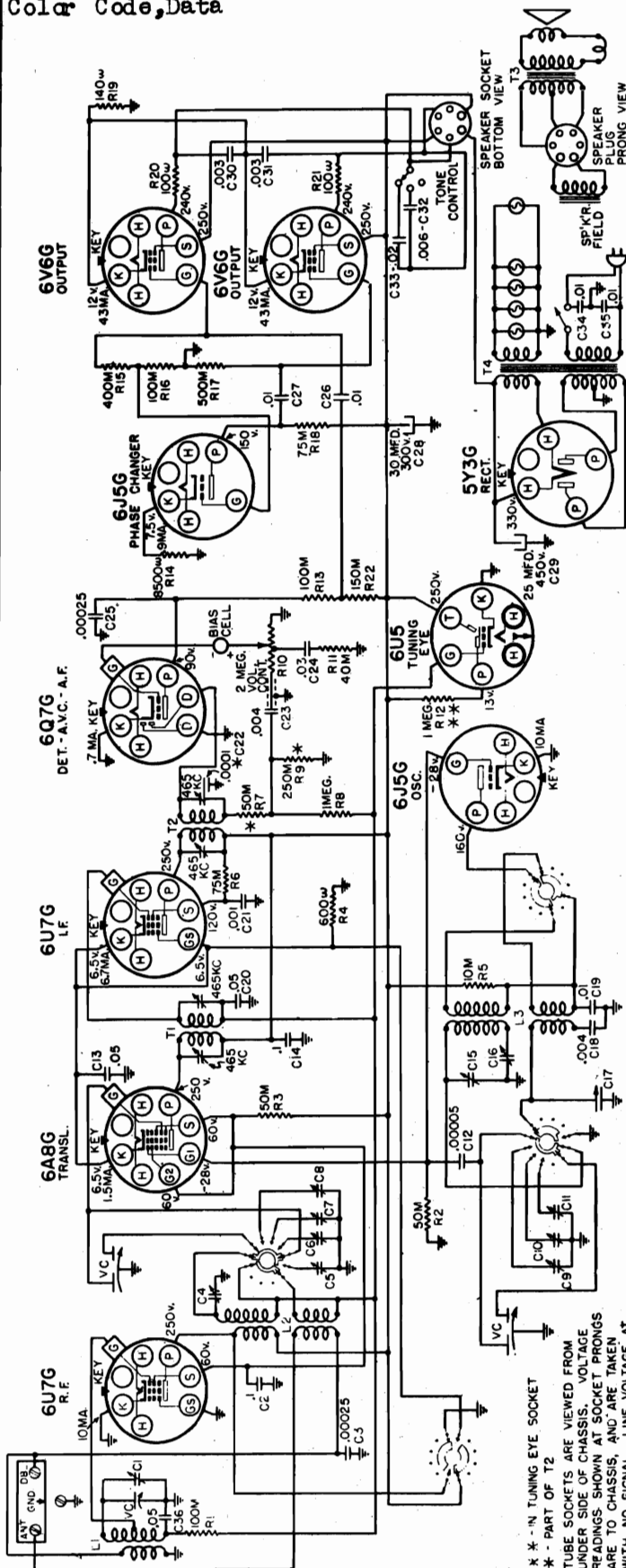
SEARS-ROEBUCK & CO.

MODEL 6028, Ch. 126.204
Socket, Trimmers, Chassis



MODELS 6036, 6136
Chassis 101.511
Schematic, Voltage
Color Code, Data

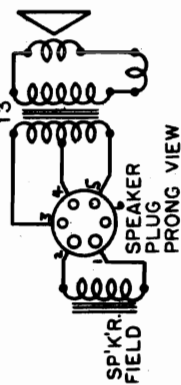
SEARS-ROEBUCK & CO.



FOR ALIGNMENT
SEE PAGE 10-44

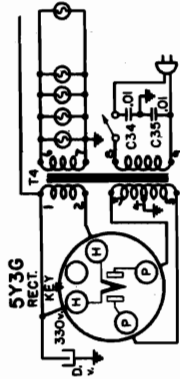
SPEAKER PLUG
COLOR CODE

1. Black
2. Yellow
3. Brown
4. Red
5. Green
6. Blank



PWR. TRANSF.
COLOR CODE

- 1, 3. Red
2. Red
4. Slate
5. Blue
- 6, 7. Black
8. Green
9. Black



JULY 1, 1938

IF PEAK 465 KC

POWER SUPPLY:
All models available 105-125 volts, 50-60 cycle, 102 watts
All models available 105-135 volts, 35 cycle, 115 watts

ALIGNMENT FREQUENCIES:

Band "AM"	540-1750 kc	Ant-Transl.	485 kc
Band "SW"	5.95-18.3 mc	Trimmer	600 kc
Band "9"	9.4-9.7 mc	Fixed	1400 kc
Band "11"	11.5-13.1 mc	Fixed	15 mc
Band "15"	14.3-15.4 mc	Fixed	9.55 mc
		Fixed	11.7 mc
		Fixed	15 mc

INTERMEDIATE FREQUENCY 485 kc

LOUD SPEAKER:

Type	Dynamic
Size	10 and 12 inch
Field coil resistance	600 ohms
App. field coil voltage drop	95 V.

POWER OUTPUT:

Distorted	5 watts
Type	Push pull beam tubes
Maximum	10 watts

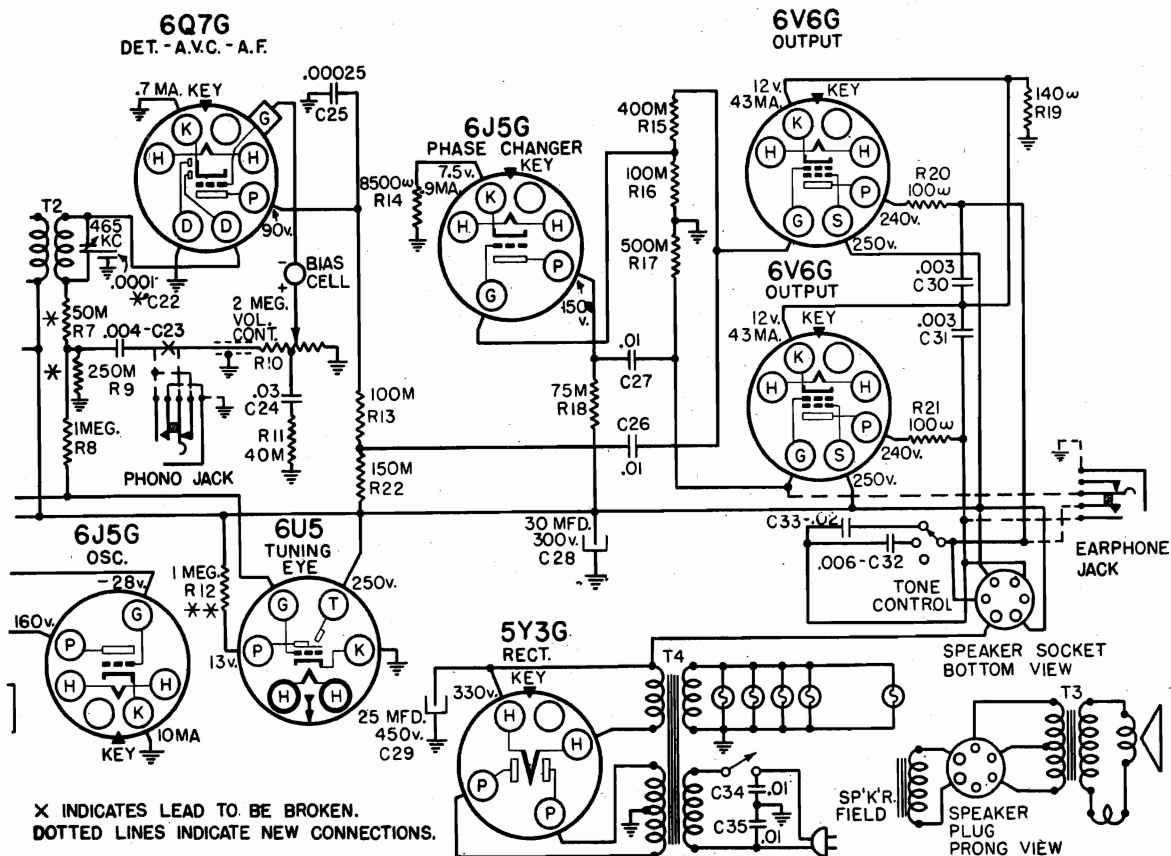
SEARS-ROEBUCK & CO.

MODELS 6036, 6136
Chassis 101.511
Phone, Phono. Jacks
Drive Data, Notes

SUBJECT: CONNECTION OF EARPHONE AND PHONOGRAPH PICKUP JACKS:

Part number 1015119531 Jack, for connection of earphones or phono-graph pick-up, can be ordered directly from source 101.

If a crystal pick-up is used, a filter composed of a .01 mfd. condenser and a 100M ohm resistor connected in series, should be connected across the pick-up to prevent excessive bass response. This filter will also act as a partial scratch filter.



OPERATING FEATURES:

Tone Control Three position
Automatic Volume Control
Three Spread Bands
Push Button Tuning (8 button)
Band Indicator

OPERATING CONTROLS:

1. Upper left knob Volume
2. Lower left knob . . . "On-Off" Switch
and Tone
3. Lower right knob . . Wave Band Switch
4. Upper right knob . . Station Selector

THE AVC CIRCUIT:

The diode current of one of the 6Q7G diode plates, flowing through the 250M ohm resistor, R9, creates a voltage drop across it. This voltage is applied to the control grids of the RF, translator, and IF tubes, to provide AVC.

ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to select the new IF frequency as near as possible to 465 kc.

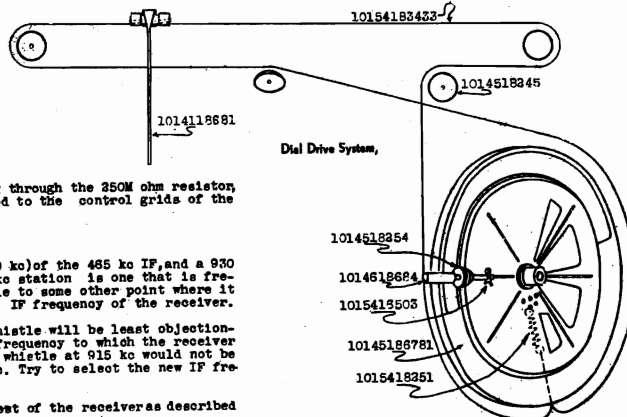
Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

CHASSIS FEATURES:

Number RF stages . . . One (on Band "AM")
Number IF stages One
Tuning Eye
Number condensers in gang . . . Three
Antenna Doublet

CONTROL OPERATION:

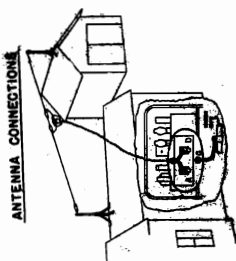
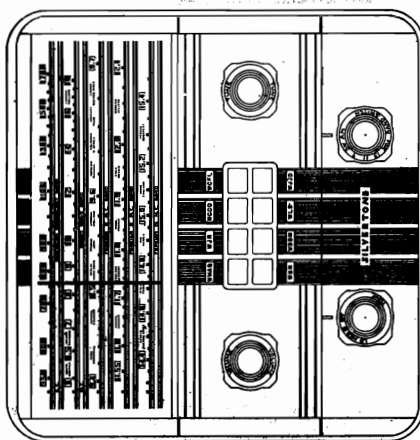
Turning right: Volume increase
Turning right: . . "ON", "HI", "MED", "LO"
Turning right: "AM", "SW", "9", "11", "15"
Tuning ratio: 13:1



MODELS 6036, 6136
Chassis 101.511
Socket, Trimmers
Chassis, Tuner Data

SEARS-ROEBUCK & CO.

CHASSIS 101.509, 101.510,
101.512, 101.513,
101.515, 101.517,
101.524, 101.534
Tuner Data



TUNER DATA FOR CHASSIS :-
101.509, 101.510, 101.512,
101.513, 101.515, 101.517,
101.524 and 101.534.

PUSH BUTTON TUNING

SETTING UP:

Leave the radio turned on for about 15 minutes before adjusting the push buttons. This "warming up" period will insure permanent and accurate settings.

1. Make a list of the stations that you want to set up for push button tuning. It is advisable, but not necessary, to arrange the stations in the order of their frequency (kilocycles) that is, the lowest frequency station first and the highest last. If you wish, short wave stations can be tuned in on the "11", or "15" bands can be set up for push button tuning. The stations selected must give strong and reliable reception. The Band Switch knob must be turned to the proper position for the stations selected.

2. Pull the volume control and tuning knobs off of their shafts. Remove the snap-in buttons that were covered by the knobs. Be careful not to lose the snap-in buttons. (The buttons protrude) can then be removed. Be careful not to lose the snap-in buttons.

3. Replace the tuning knob on its shaft. Push the knob in and turn it so that the dial pointer comes to the left end of the dial. A key will be found in the Instruction Leaflet envelope. Engage this key with the slotted shaft that is between the tuning knob and the push buttons. Unlock the mechanism by pushing the shaft in and unscrewing it (turn counter-clockwise as far as it will go. Do not force it. About 8 turns is sufficient to loosen it completely. (A screw driver can be used for unlocking the mechanism instead of the key supplied.) Then remove the key.

4. Push the button that you wish to use for your #1 station, all the way in and hold it in firmly. Push the tuning knob in and turn it until your #1 station is tuned in exactly as indicated by the tuning eye. Be as exact as possible in tuning your station since this will determine how accurately your station will be tuned whenever you use the push button. Then let go of the push button, making sure not to turn the tuning knob until you have let go the push button. (Turning the knob while the button is pushed in would spoil the accuracy of the adjustment.)

5. Push in your #2 button. Hold it in firmly and tune in your #2 station accurately. Then let go of the push button and then the tuning knob. Proceed in the same manner for the other stations on your list.

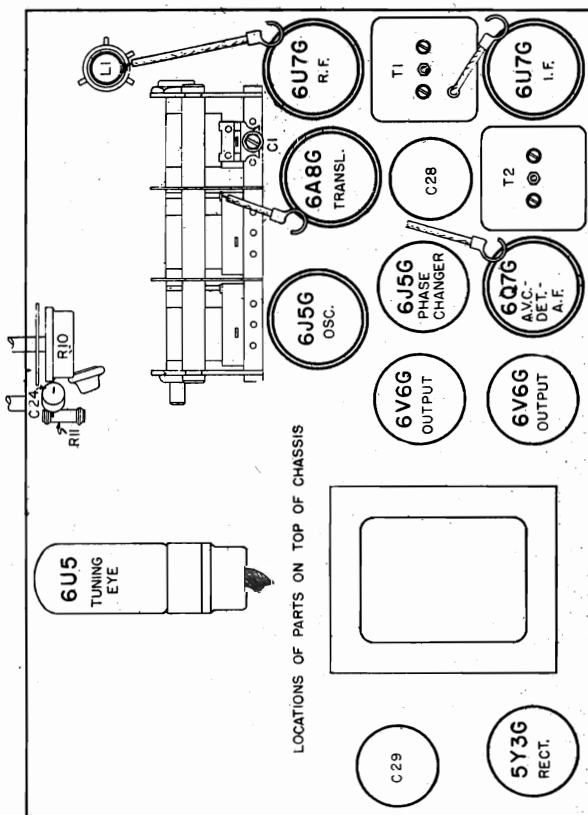
6. When all of the stations have been set up, push the tuning knob in and turn it so that the dial pointer comes to the left end of the dial. Then turn the knob clockwise, if tightening (turning clockwise) the slotted shaft, using the key supplied or a screw driver.

7. Punch out the call letters of your desired stations from the call letter sheets supplied. Insert the call letters in the celluloid holders at the back of the escutcheon. Be sure to insert the call letters so that they are opposite their respective push buttons. Then replace the escutcheon.

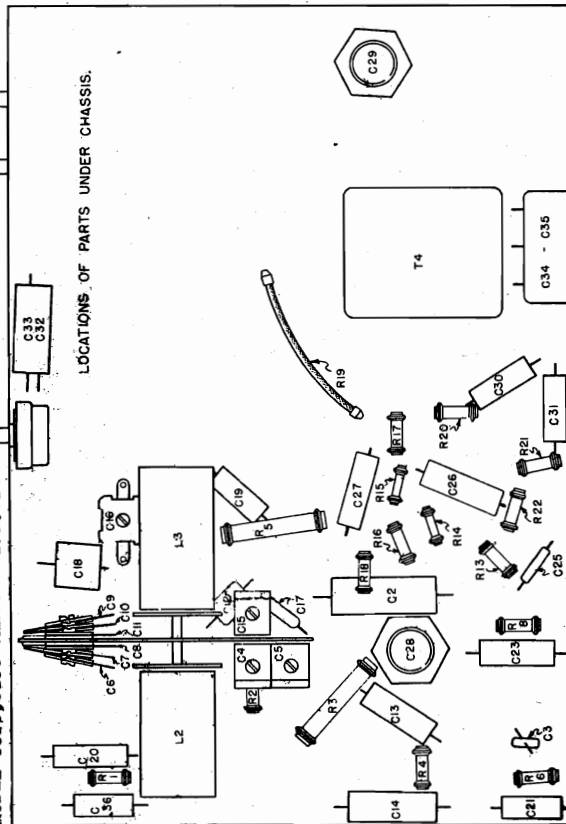
8. You may change your choice of stations at any time by unlocking the mechanism as described in Step 3 and adjusting the button to the new station, as described in Step 4. Then relock the mechanism as described in Step 5. The call letters of the new station should be inserted in the call letter holder in their proper position.

OPERATION:

Push the button, indicated for your desired station, all the way in. Your station then will be tuned in. If you have selected short wave stations for push button tuning, be sure the band switch is turned to the proper band. The button will remain part way in, indicating that station is tuned in, until you push another button or the tuning knob.



MODEL 6036, 6136 CHASSIS 101.511

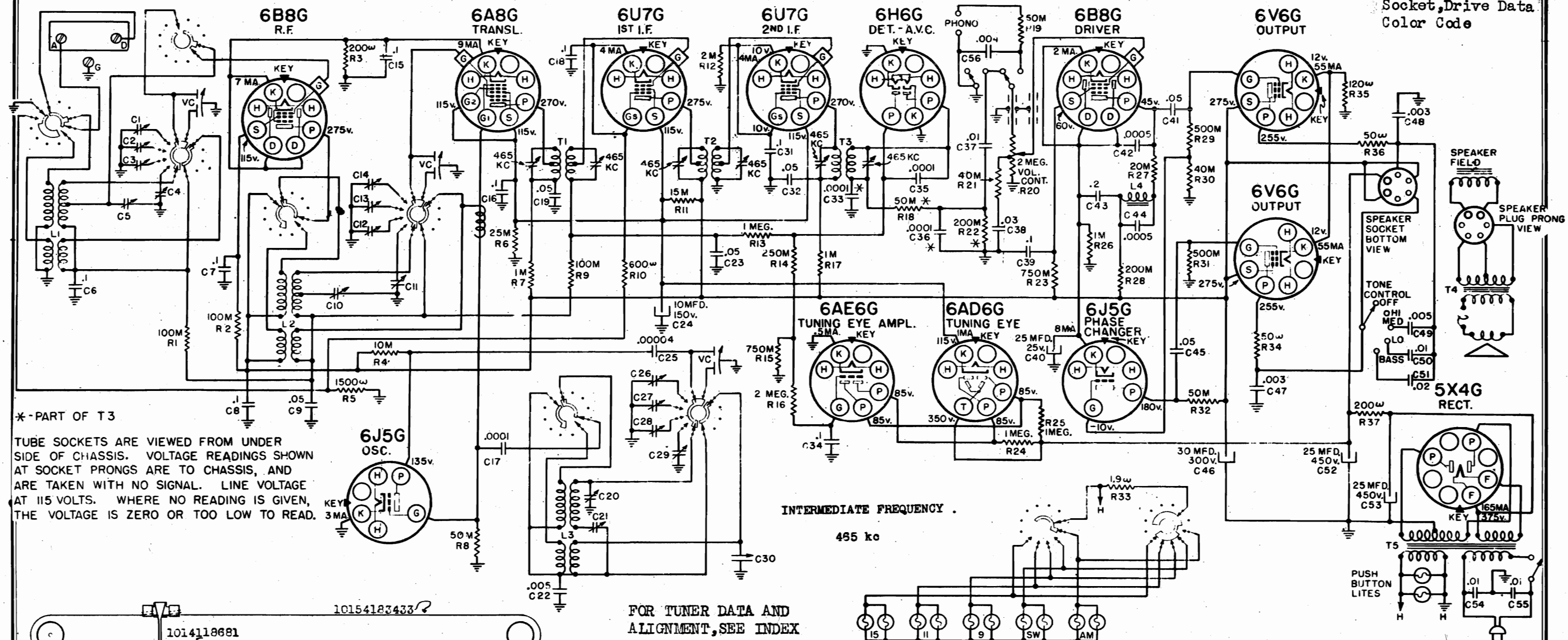


LOCATIONS OF PARTS UNDER CHASSIS.

SEARS-ROEBUCK & CO.

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.517

MODELS 6038, 6138
Chassis 101.517
Schematic, Voltage
Socket, Drive Data
Color Code



* - PART OF T3

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

FOR TUNER DATA AND ALIGNMENT, SEE INDEX

FREQUENCY RANGES:

Band "AM"	543-1750 kc
Band "SW"	5.9 mc-18.1 mc
Band "9"	9.4 mc-9.7 mc
Band "11"	11.5 mc-12.1 mc
Band "15"	14.6 mc-15.8 mc

LOUD SPEAKER:

Type	Dynamic
Size	13 inch
Field coil resistance	480 ohms
App. field coil voltage drop	55 V.

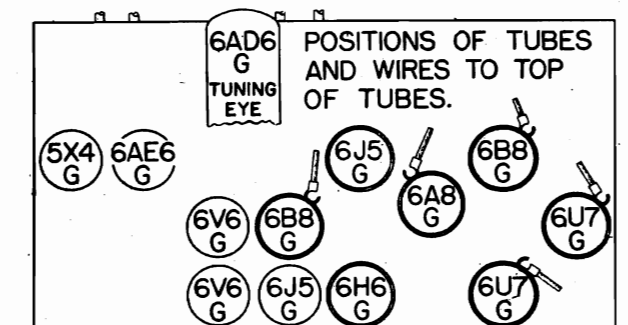
SPEAKER PLUG COLOR CODE

1. Black
2. Yellow
3. Brown
4. Red
5. Green
6. Blank

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl. Trimmer	Padder
Band "AM"	1400 kc	1400 kc	600 kc
Band "SW"	18 mc	15 mc	Fixed
Band "9"	9.55 mc	9.55 mc	Fixed
Band "11"	11.7 mc	11.7 mc	Fixed
Band "15"	14.9 mc	14.9 mc	Fixed

TUBE LAYOUT



POWER OUTPUT:

Type	Push pull beam tubes
Undistorted	8.5 watts
Maximum	13 watts

POWER SUPPLY:

All models available

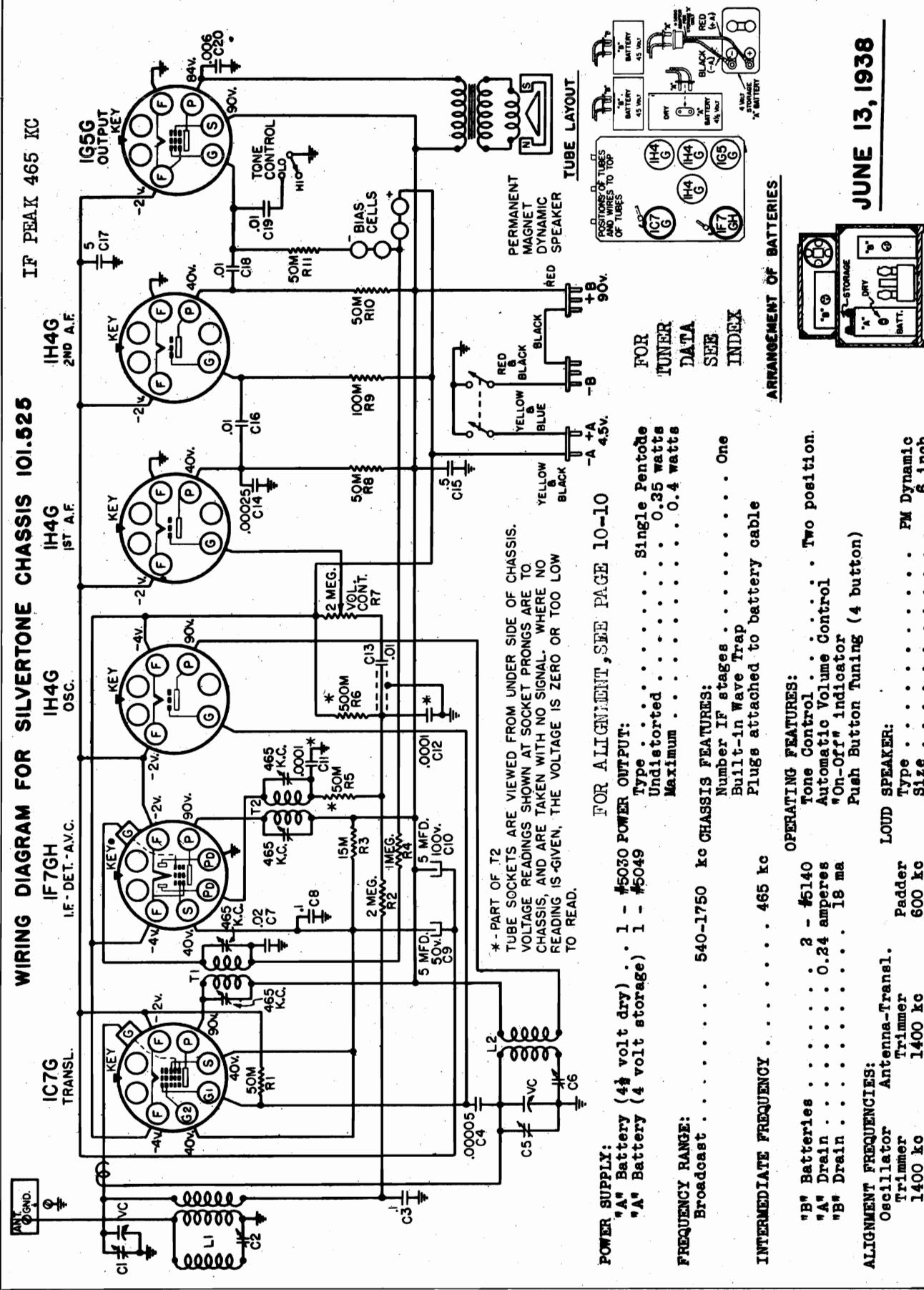
105-125 volts, 50-60 cycle, 145 watts
105-125 volts, 35 cycle, 150 watts

57 RL 119

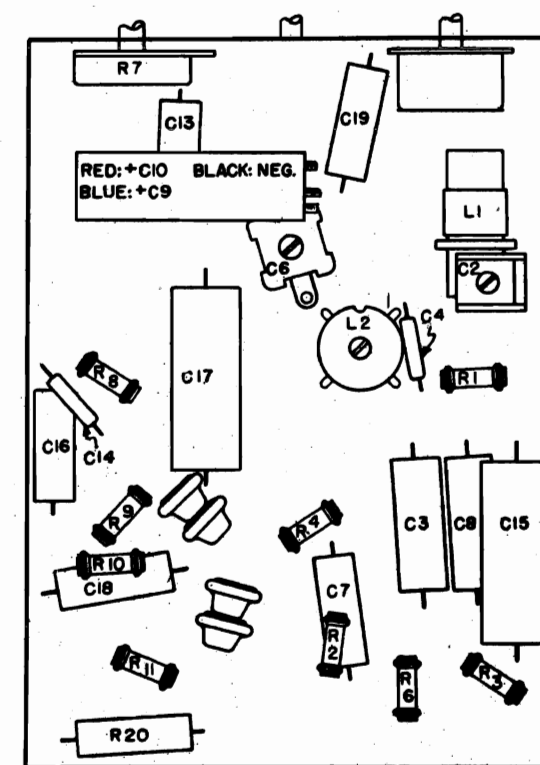
JUNE 27, 1938

Schematic, Voltage
Socket, Data

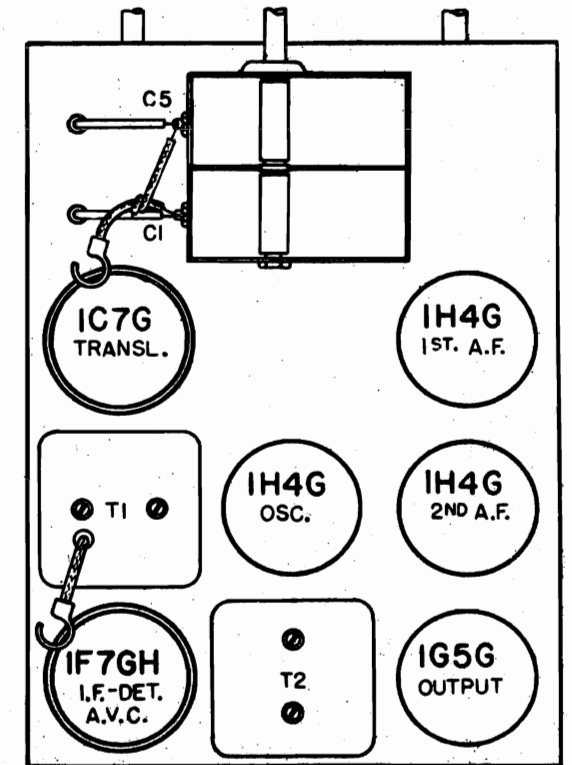
SEARS-ROEBUCK & CO.

MODELS 6052, 6053
Chassis 101.525MODELS 6052, 6053
Chassis 101.525
Socket, Trimmers
Chassis

SEARS-ROEBUCK & CO.

MODELS 6052, 6053.
CHASSIS 101.525,MODELS 6110, 6111
Chassis 101.508
Socket, Trimmers
Chassis Alignment

LOCATIONS OF PARTS UNDER CHASSIS

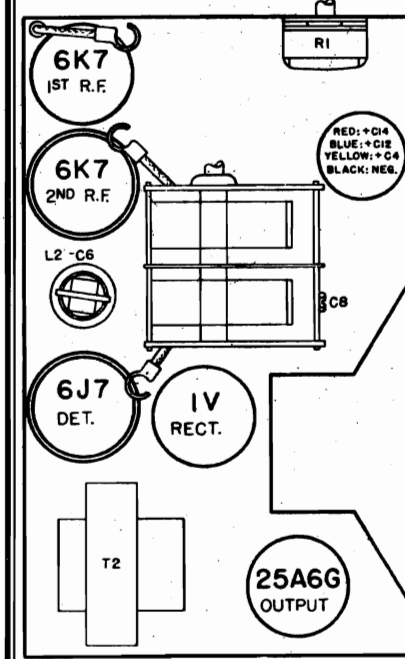


LOCATIONS OF PARTS ON TOP OF CHASSIS.

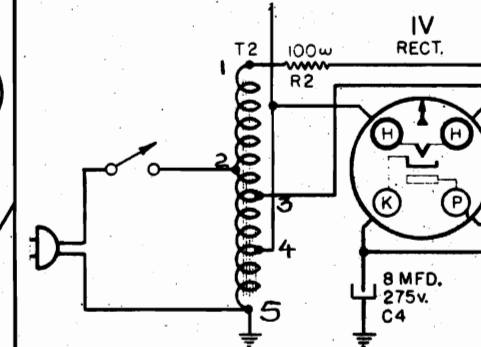
ALIGNMENT PROCEDURE:

FOR CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION
VOL. VIII INDEX

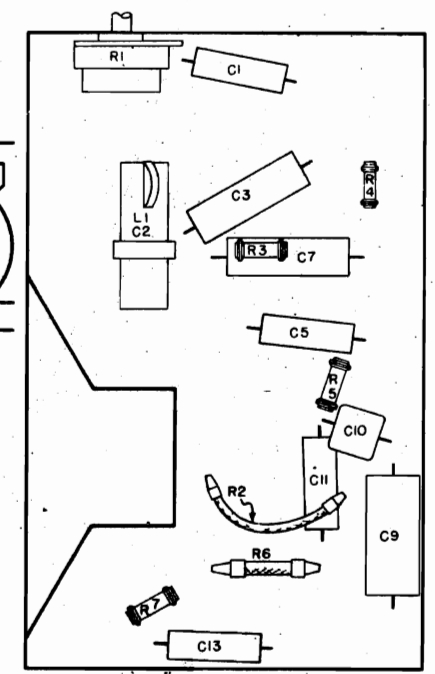
Either a broadcast station of about 1400 kc or a signal generator can be used for alignment. The chassis must be taken out of the cabinet for alignment of the trimmer, C8. The volume control setting should be reduced so that the signal is just audible in order to facilitate accuracy of adjustment. This set has no AVC so that a strong input signal may be used.

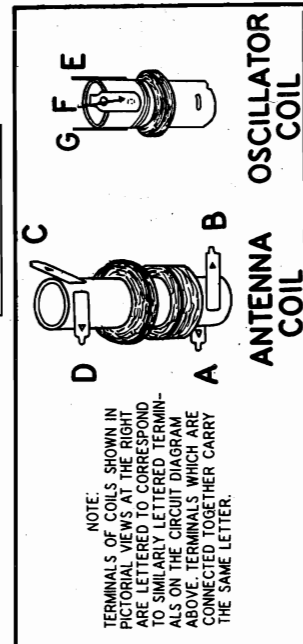


LOCATIONS OF PARTS ON TOP OF CHASSIS.

MODELS 6110, 6111
Chassis 101.508PWR. TRANSF.
COLOR CODE

1. Red
3. Green
3. Yellow
4. Blue
5. Black





Use a high resistance voltmeter of 1,000 ohms

NOTE A: The bias for the control grid of the 6W-G tube is -1.0 volt supplied by a bias cell. Due to the high resistance of the cell the voltmeter will indicate only a fraction of a volt.

IMPORTANT: The bias for the control grid of the 1P5-GP tube is -2.0 volts measured across the filament of the 1C7-G tube. The bias for the control grid of the 1P5-G tube is -4.0 volts measured from the low side of the 1P5-G tube filament to ground.

FORM NO. 8725 PRINTED IN U.S.A.

```
POWER OUTPUT
Type.....
Undistorted..
Maximum.....
```

OPERATING FEATURES
Fidelity Range.....
Volume Stabilizer...
Number of I.F. Stag

.....	Pentode
.....	0.31 Watts
.....	0.55 Watts

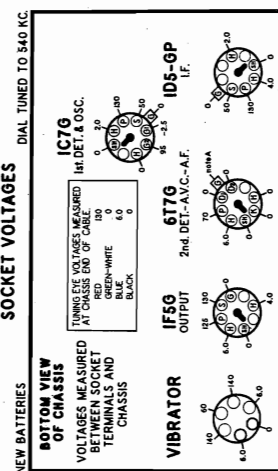
.....50-5000 Cycles
.....A.V.C. System
.....One

LOUD SPEAKER

Type.....	Perm. Magnet Dynamic
Size.....	5"

CHASSIS FEATURES

Number of Cond. in Gang.....Two
Antenna.....Conventional
465 KC. Wave Trap



SOCKET VOLTAGES

DIAL TUNED TO 540 KC.

REAR OF CHASSIS

POWER SUPPLY
All models available.
"R" supply vibrator.

FREQUENCY RANGE
537 to 1730 KC.

INTERMEDIATE FREQUENCY.

MODELS 6070, 6170
Chassis 100.189
Socket, Trimmers
Chassis Alignment

SEARS-ROEBUCK & CO.

MODEL 7225, Ch. 110.255
Alignment

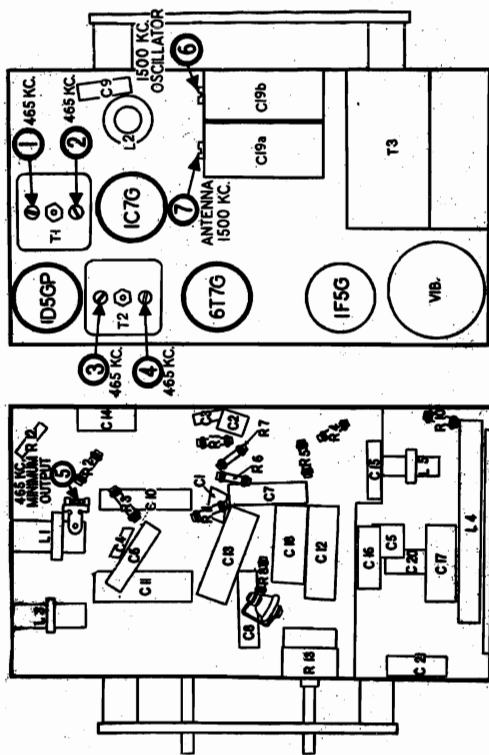
Model 6070, 6170 Chassis 100.189

ALIGNMENT PROCEDURE

Before attempting to align the receiver check to see that the dial pointer is opposite the last scale division on the low frequency end of the full scale when the generator is in full wave. If the pointer is not exactly in this position, it is merely necessary to move the pointer to the correct position by hand, while holding the gang condenser in the full-wave position.

Output meter connections: Across voice coil leads
Average sensitivity in microvolts for 0.05 watt output: -0.5 volts
Connection of generator ground lead: See chart below
Connection of generator output lead: See chart below
Generator modulation: 30%, 400 cycles
Position of volume control: Maximum clockwise

POINT OF ALIGNMENT	CONNECTION OF SIG. GENERATOR TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	SENSITIVITY IN MICROVOLTS	TYPE OF ADJUSTMENT
1. 100 WPT. CONDENSER	CONTROL GRID OF 107-6 TUBE	465 KC	ANT. POINT DOES NOT AFFECT THE SIGNAL	1-2	1st I.F.	200	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
200 WPT. TUNA CONDENSER	ANTENNA TERMINAL	465 KC	ANT. POINT DOES NOT AFFECT THE SIGNAL	5	HAVE TRAP	-	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
200 WPT. TUNA CONDENSER	ANTENNA TERMINAL	1500 KC	1500 KC	6	OSCILLATOR	-	ADJUST TRIMMER TO BRING IN SIGNAL
200 WPT. TUNA CONDENSER	ANTENNA TERMINAL	1500 KC	TUNE TO GENERATOR SIGNAL	7	ANTENNA	50	ADJUST FOR MAXIMUM OUTPUT.



TOP VIEW

BOTTOM VIEW

Model 7225 Chassis 110.255

ALIGNMENT PROCEDURE

Output Meter Connections: Across Primary Output Transformer
Output Meter reading to indicate 0.050 watt output: 9 volts
For Maximum Output Meter on 100 volt scale: 9 volts
Average sensitivity in microvolts for 0.05 watt output: 100 microvolts
Dummy antenna value in series with generator output: 100 ohms
Connection of generator ground lead: App. 50% at 400 cycles
Generator modulation: Fully clockwise
Position of volume control: Fully clockwise

POINT OF ALIGNMENT	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMER ADJUSTED	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
1. 100 WPT. CONDENSER	465 KC	Gr1A 606	27, 26, 25	I.F.	4500
2. 200 WPT. TUNA CONDENSER	465 KC	Gr1A 647	27, 26, 25	I.F.	60
3. 200 WPT. TUNA CONDENSER	600 KC	Ant.	P	Osc.	15
4. 200 WPT. TUNA CONDENSER	1500 KC	Ant.	23, 22	Osc. A.F.	20
5. 200 WPT. TUNA CONDENSER	455 KC	Ant.	21	wave trap	***

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

It is advisable to repeat the entire alignment procedure band by band and in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

Values shown under "Microvolts" are only approximate.

**Short oscillator section of variable condenser.

Second I.F. alignment must be done with the antenna connected to antenna signal input.

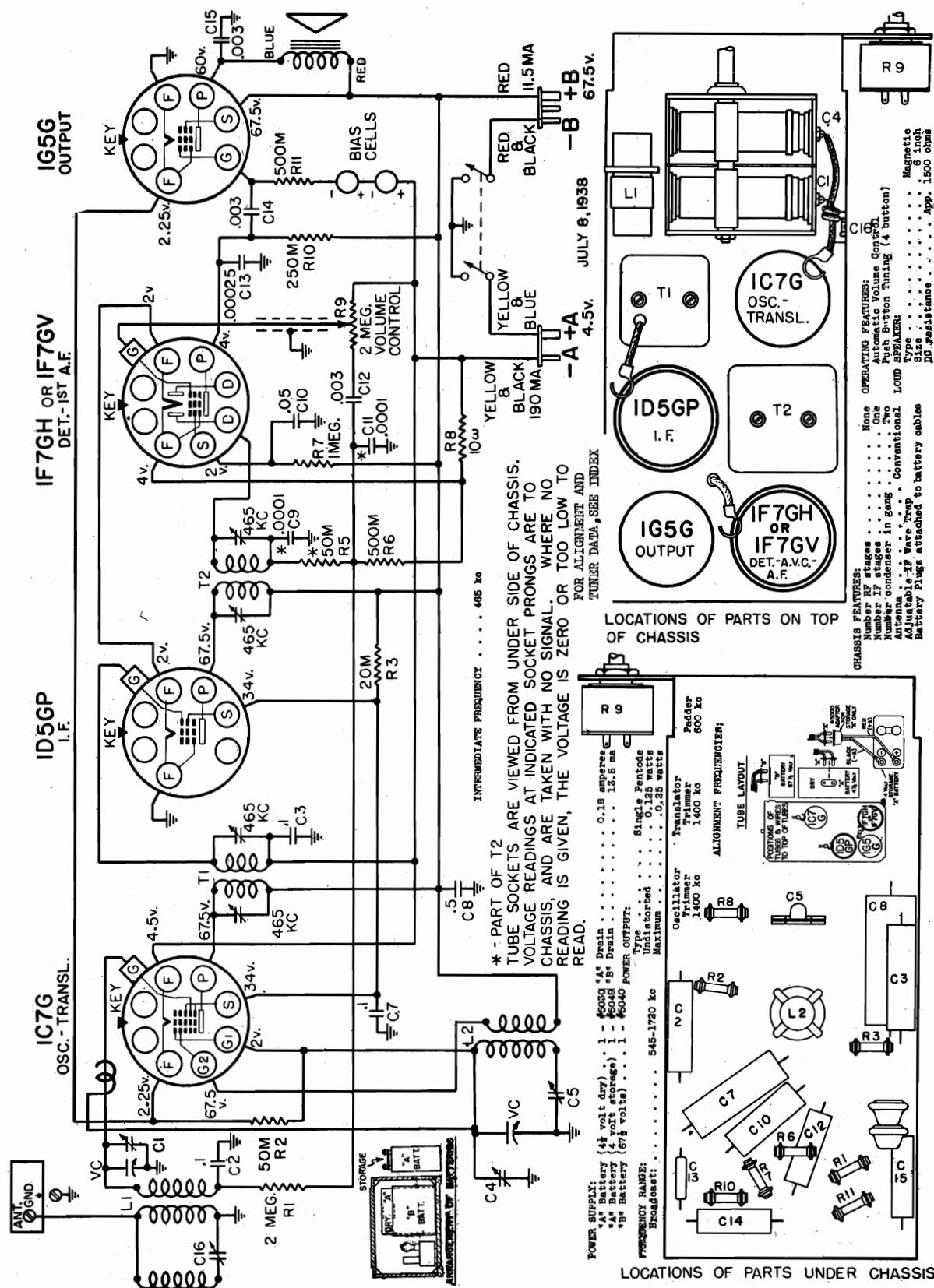
**Adjust trimmer for maximum signal response with maximum signal input.

*First time it is misaligned about one turn by loosening center screw.

Socket, Trimmers
Chassis

SEARS-ROEBUCK & CO.

MODELS 6054,6055
Chassis 101.532
Schematic, Voltage

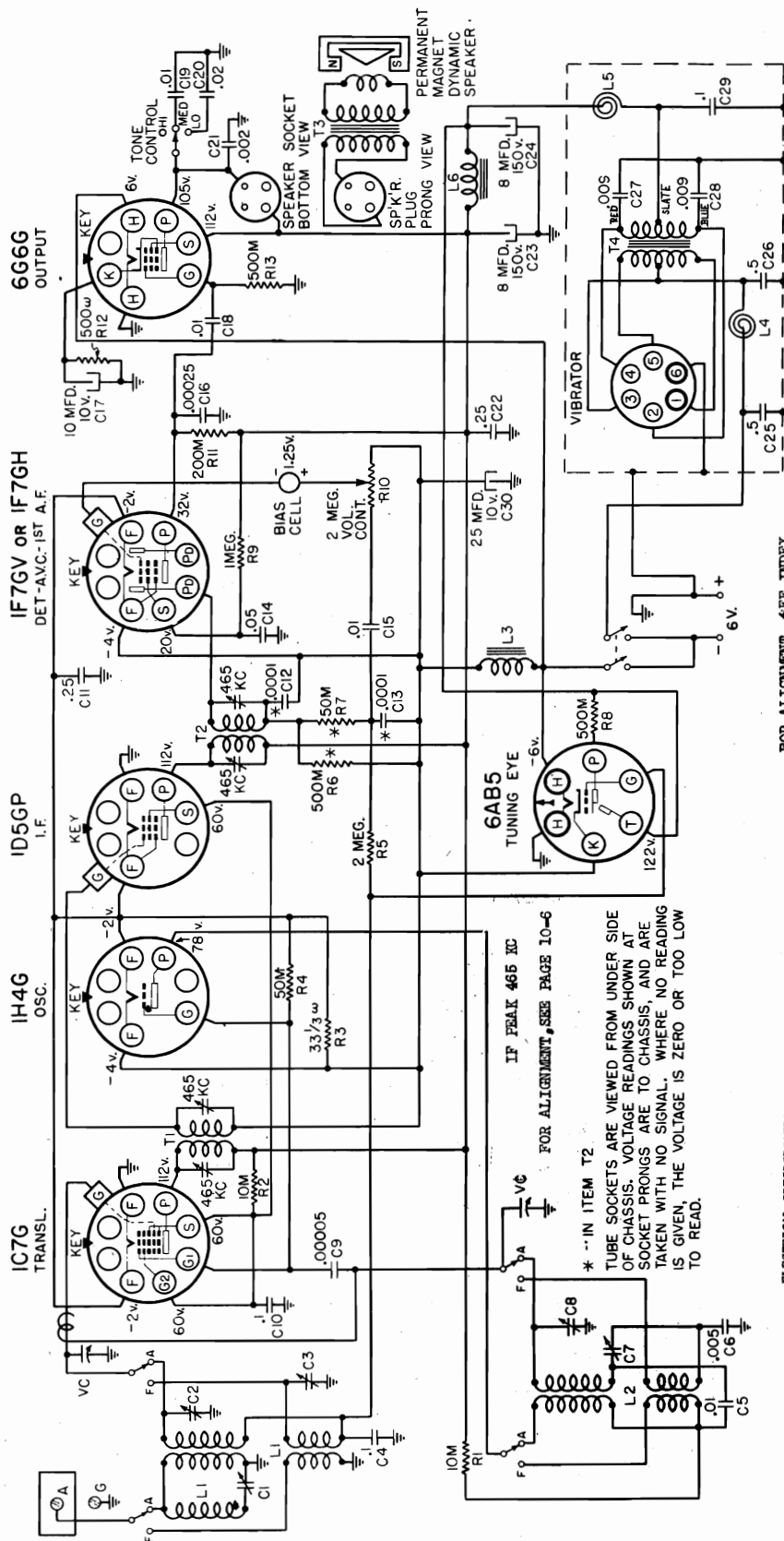


MODELS 6072, 6077, 6172

Chassis 101.513

Schematic, Voltage

SEARS-ROEBUCK & CO.



57 RL 116

JUNE 15, 1938

CHASSIS FEATURES:
 Number of stages One
 Number of IF stages Two
 Automatic volume control Conventional
 Antenna key Synchronous Vibrator-Rectifier
 Built-in IF Wave Trap

CONTROL OPERATIONS:
 Turning right: Volume increase
 Turning left: "AM", "MED", "LO"
 Turning right: "ON", "OFF", "TONE"
 Tuning ratio: 10:1

MECHANICAL SPECIFICATIONS

OPERATING FEATURES:
 Tone Control Three position
 Automatic Volume Control Push Button Tuning (5 button)

OPERATING CONTROLS:
 1. Upper left knob Volume
 2. Lower left knob Band Switch
 3. Lower right knob "On-Off" Switch and Tone
 4. Upper right knob Station Selector

ELECTRICAL SPECIFICATIONS

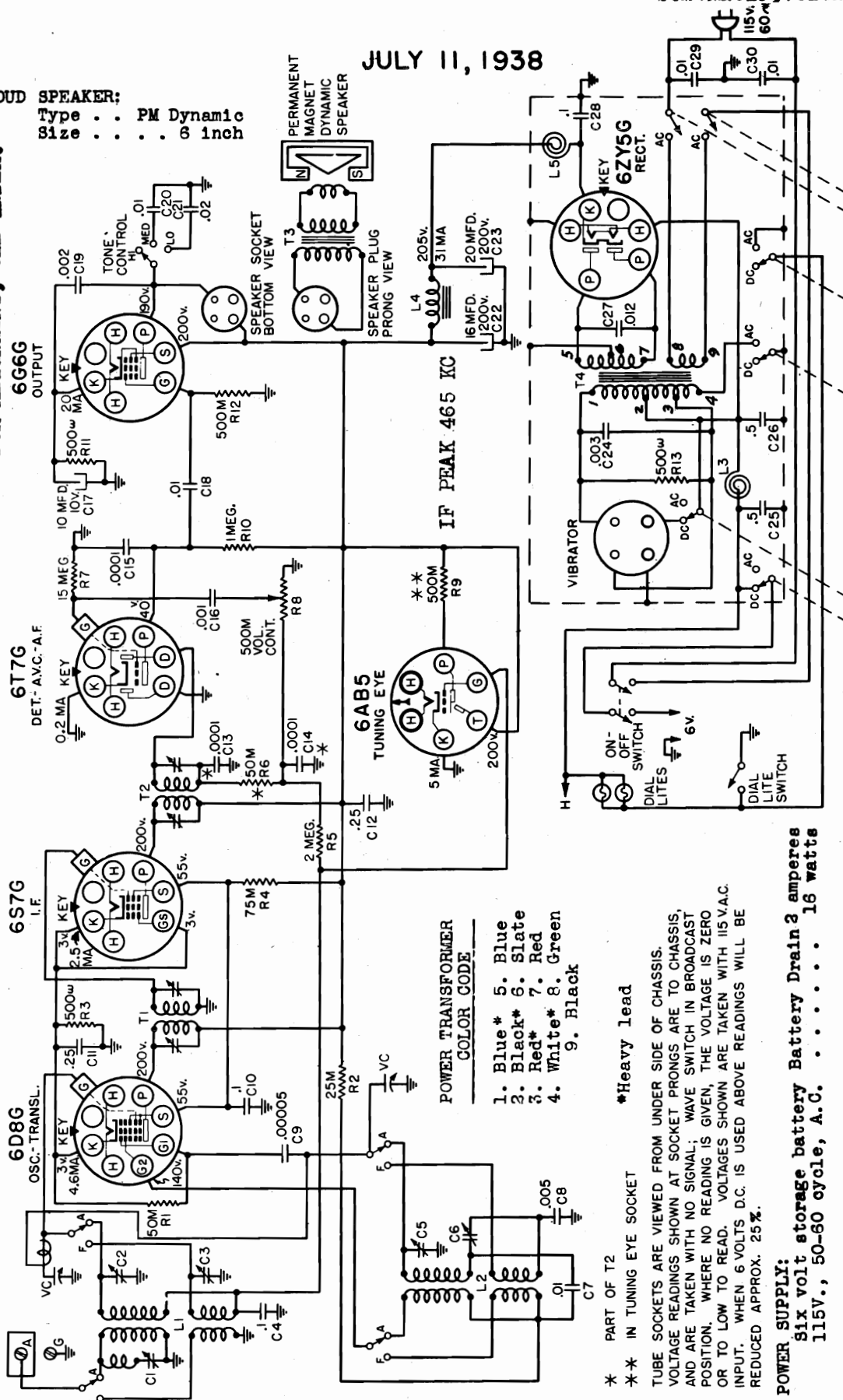
TUBES AND FUNCTIONS:	1F7GV or 1F7GH Detector-AVC-AF
1D5GP 1st af	6G6G Output
1H4G Osc.	6AB5 Tuning Eye
1C7G Transl.	
POWER SUPPLY:	Battery drain 1.5 amperes
Six volt storage battery	
FREQUENCY RANGES:	ALIGNMENT FREQUENCIES:
Band "FOR" 540-1750 kc	Oscill. Ant-Transl.
Band "FOR" 5.9-18.3 mc	Trimmer 600 kc
	Band "FOR" 1400 kc
	Band "FOR" 16 mc
	Band "FOR" 485 kc
INTERMEDIATE FREQUENCY:	
Type Pentode	
Undistorted 0.25 Watts	
Maximum 0.5 Watts	
LOUD SPEAKER:	
Type PM Dynamic	
Size 8 and 8 inch	

SEARS-ROEBUCK & CO. MODELS 6073, 6173, Ch. 101.528
Schematic, Voltage

JULY 11, 1938

LOUD SPEAKER:
Type . . . PM Dynamic
Size . . . 8 inch

FOR ALIGNMENT, SEE INDEX.



MODELS 6073, 6173

Chassis 101.528

Socket, Trimmers, Chassis

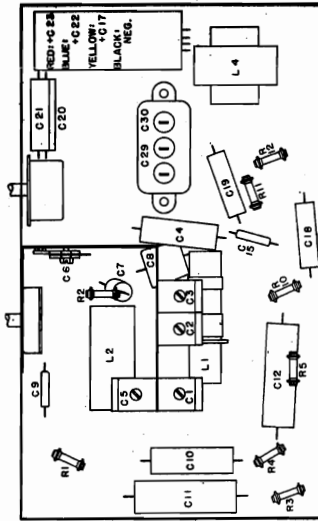
SEARS-ROEBUCK & CO.

MODEL 6101, Ch. 101.496

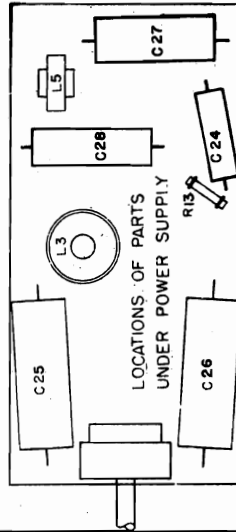
Socket, Trimmers, Chassis

Antenna Coil, Trimmers

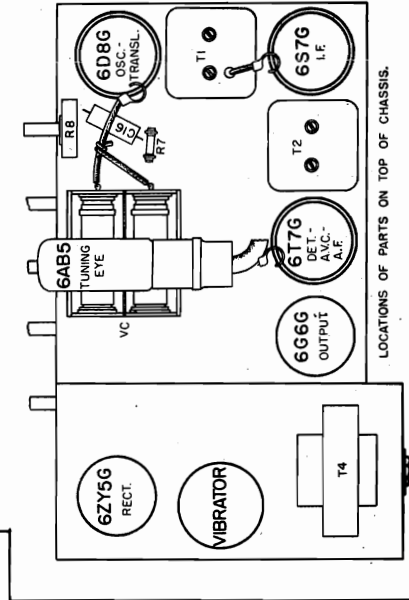
MODELS 6073, 6173. CHASSIS 101.528.



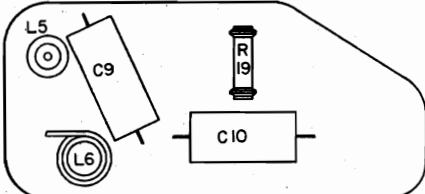
LOCATION OF PARTS UNDER CHASSIS.



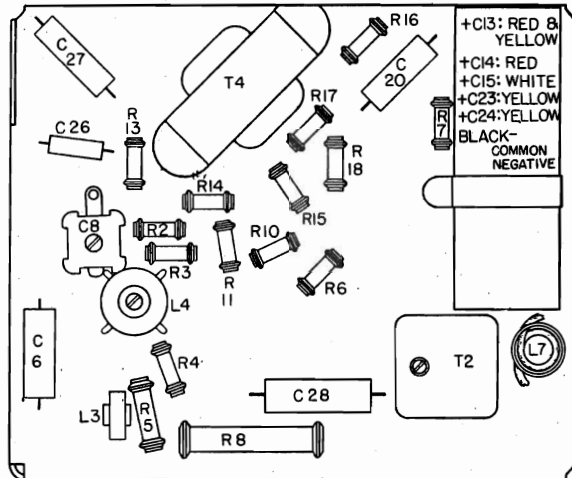
LOCATIONS OF PARTS UNDER POWER SUPPLY



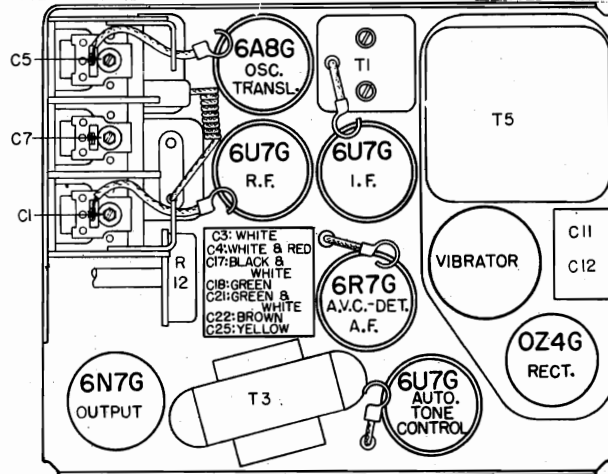
LOCATIONS OF PARTS ON TOP OF CHASSIS.



LOCATIONS OF PARTS UNDER POWER SUPPLY
USE INSULATED TYPE RESISTORS FOR REPLACEMENT
WHERE USED ORIGINALLY



LOCATIONS OF PARTS UNDER CHASSIS
USE INSULATED TYPE RESISTORS FOR REPLACEMENT WHERE USED ORIGINALLY



LOCATIONS OF PARTS ON TOP OF CHASSIS

MODEL 6101. CHASSIS 101.496.

ANTENNA MATCHING:

Two separate adjustments are provided for matching the receiver to the particular ear antenna. One adjustment consists of two taps on the antenna coil. The second adjustment is a trimmer, C1, on the variable condenser. It is accessible through a hole in the bottom cover of the receiver case. These adjustments are to be made as follows:

THE TAPPED ANTENNA COIL:

The adjustment of the tapped antenna coil should be made before installing the receiver on the set. Remove the bottom cover of the receiver and locate the antenna coil. It is located in the center of the bottom board. The antenna coil has four jack holes, only two of which are used. These two are marked with the numerals "1" and "2". The sets are shipped with the plug in hole #2.

THE ANTENNA TRIMMER ADJUSTMENT.

With the set tuned to a weak station at about 1500 kilocycles, turn the adjusting screw (accessible through the hole in the bottom cover) to the point affording maximum volume. A weak station must be used to prevent the AVC action of the receiver from interfering with accurate peaking. If a peak cannot be reached with the trimmer, the capacity of the ear's antenna may be such that the other antenna tap adjustment should be used.

The plug position should be changed to hole #1 if a WHIP type aerial, such as Catalog #5582, or any other aerial of less than 125 mmf. capacity is used.

CHASSIS FEATURES:

- Automatic Tone Control
- Non-synchronous vibrator
- Provision for combined Tone and Sensitivity control unit accessory.
- Provision for Push Button Automatic Motor Tuner Accessory.
- Provision for Auxiliary Speaker.

SEARS-ROEBUCK & CO.

MODEL 6100, Ch. 101.495
Schematic, Voltage
Color Codes

ALIGNMENT FREQUENCIES:

Oscillator
Trimmer
1530 kc

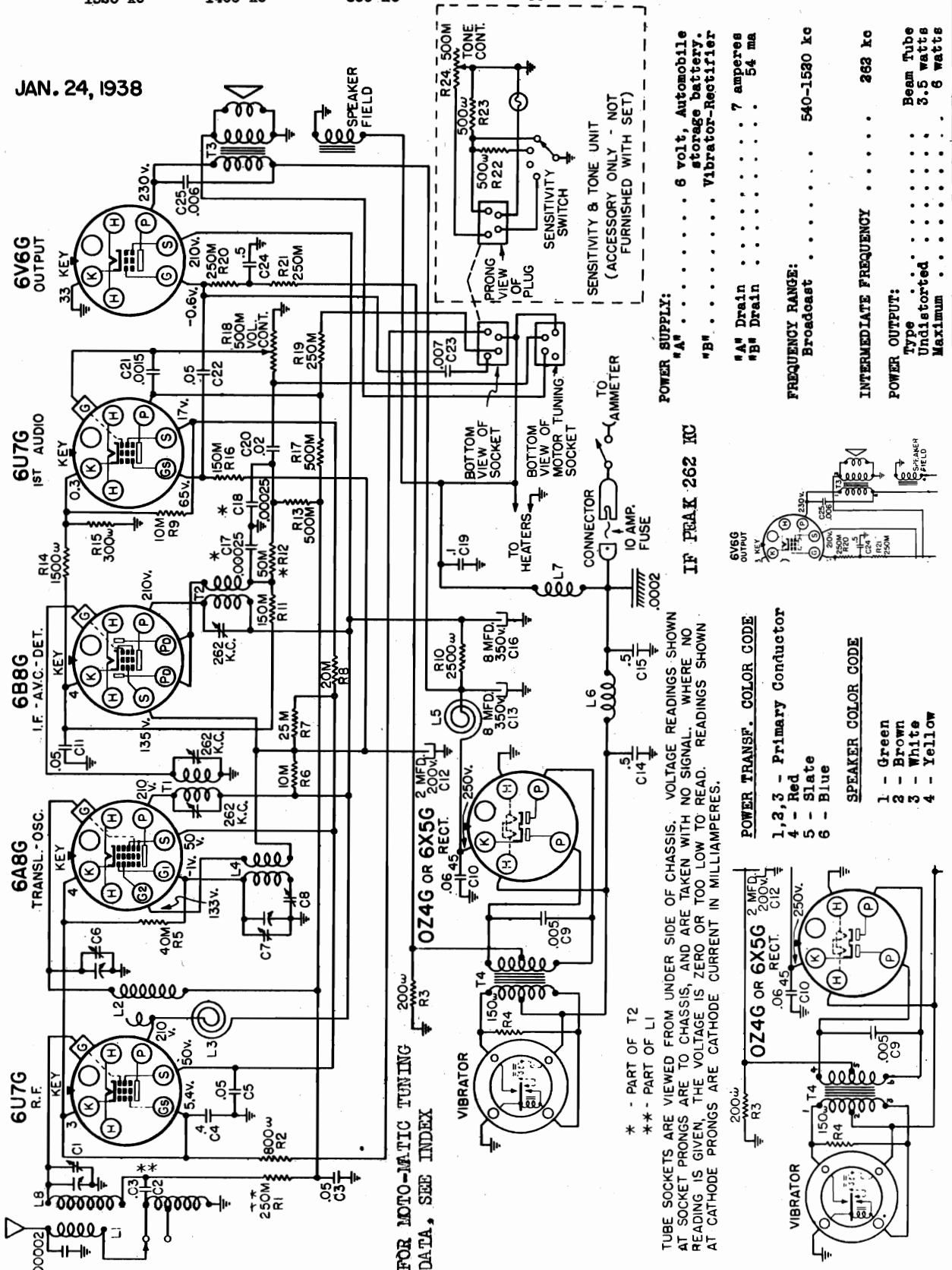
Ant.-Translator
Trimmer
1400 kc

Padder
800 kc

LOUD SPEAKER:

Type Dynamic
Size 8"
Approximate field resistance . . . 4 ohms

JAN. 24, 1938



MODEL 6100, Ch. 101.495
Socket, Trimmers, Chassis
Alignment

SEARS-ROEBUCK & CO.

MODEL 6101, Ch. 101.496
Alignment

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections Across loud speaker voice coil
Output meter reading to indicate 1 watt Model 6101-1.05 watts, Model 6100-1.05 watts
Average sensitivity microvolts for 1 watt output See chart below
Generator ground lead connection Receiver chassis
Dummy antenna value to be in series with generator output See chart below
Connection of generator output lead See chart below
Generator modulation 30%, 400 cycles
Position of Volume Control Fully on
Position of Antenna Tap #2 hole
The chassis must be in its case although the covers may be removed during the alignment procedure.

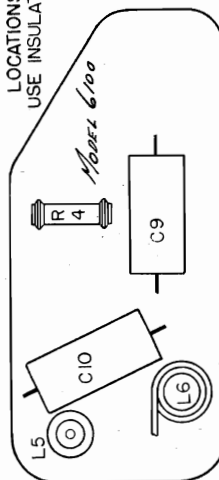
POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	253 kc	.1 mfd.	5A8G Grid	T2, T1	IF	600 600
Fully Open	1530 kc	.0003 mfd.	Antenna Conn.	C7	Oscillator, Trimmer	1.5 1.0
1400 kc	1400 kc	.0003 mfd.	Antenna Conn.	*C1, C8	Antenna, Translator	1.5 1.0
600 kc (rock)	600 kc	.0003 mfd.	Antenna Conn.	C8	Padder	2.8 2.0

IMPORTANT ALIGNMENT NOTES

*MODEL 6101 - C1, C5
The variable should be rocked back and forth a degree or two while making the 600 kc adjustment.
The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.
Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

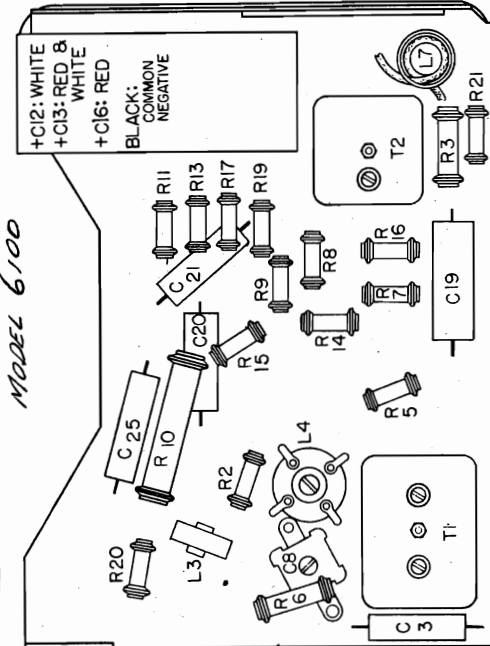
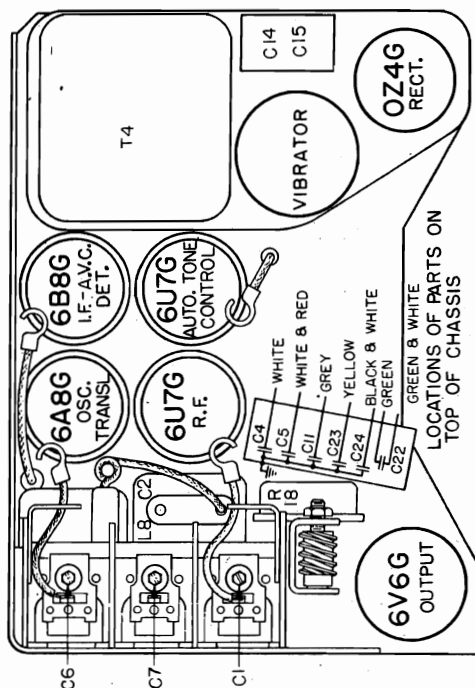
LOCATIONS OF PARTS UNDER POWER SUPPLY WHERE USED ORIGINALLY

CHASSIS FEATURES:
Automatic Tone Control
Number IF Stages One
Number IF Stages One
Number condensers in gang Three
Antenna filter
Tapped antenna coil for matching antenna capacity.
Variable antenna trimmer
Non-synchronous vibrator
Provision for combined Tone and Sensitivity control unit accessory.
Provision for Push Button Automatic Motor Tuner Accessory.
Provision for Auxiliary Speaker.



OPERATING FEATURES:

Automatic Volume Control



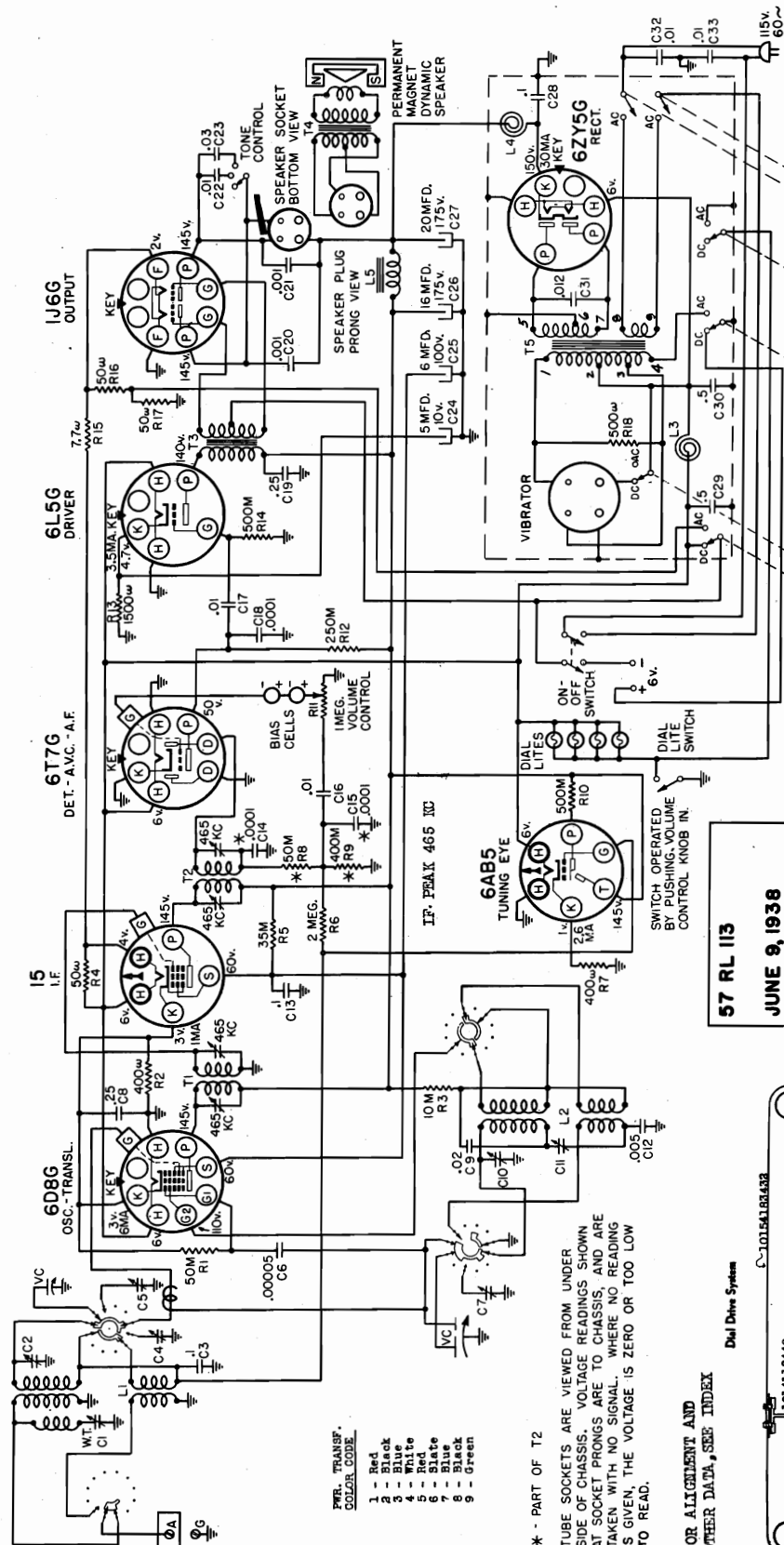
LOCATIONS OF PARTS UNDER CHASSIS WHERE USED ORIGINALLY

THE ANTENNA TRIMMER ADJUSTMENT:

With the set tuned to a weak station at about 1500 kilocycles, turn the adjusting screw (accessible through the hole in the bottom cover) to the point affording maximum volume. A weak station must be used to prevent the AVC action of the receiver from interfering with accurate peaking. If a peak cannot be reached with the trimmer, the capacity of the car's antenna may be such that the other antenna tap adjustment should be used.

SEARS-ROEBUCK & CO.

MODELS 6074, 6079
Chassis 101.515
Schematic, Voltage
Drive Data



POWER SUPPLY:
Six volt storage battery
115 volt, 50-60 cycle, A.C.

ALIGNMENT FREQUENCIES:
Ant-Tuned. Padder
Cell. 1400 kc
Band "AM" 1730 kc
Band "SW" 15 mc
Band "9" 9.55 mc

INTERMEDIATE FREQUENCY 455 kc
POWER OUTPUT:
Type Undistorted
Maximum 1.5 watts on A.C.
0.9 watts on D.C.
2.5 watts on A.C.
1.5 watts on D.C.

LOUD SPEAKER:
Type 6 and 8 inch
Size 6 and 8 inch

MODEL 6101, Ch. 101.496
Schematic, Voltage
Color Code

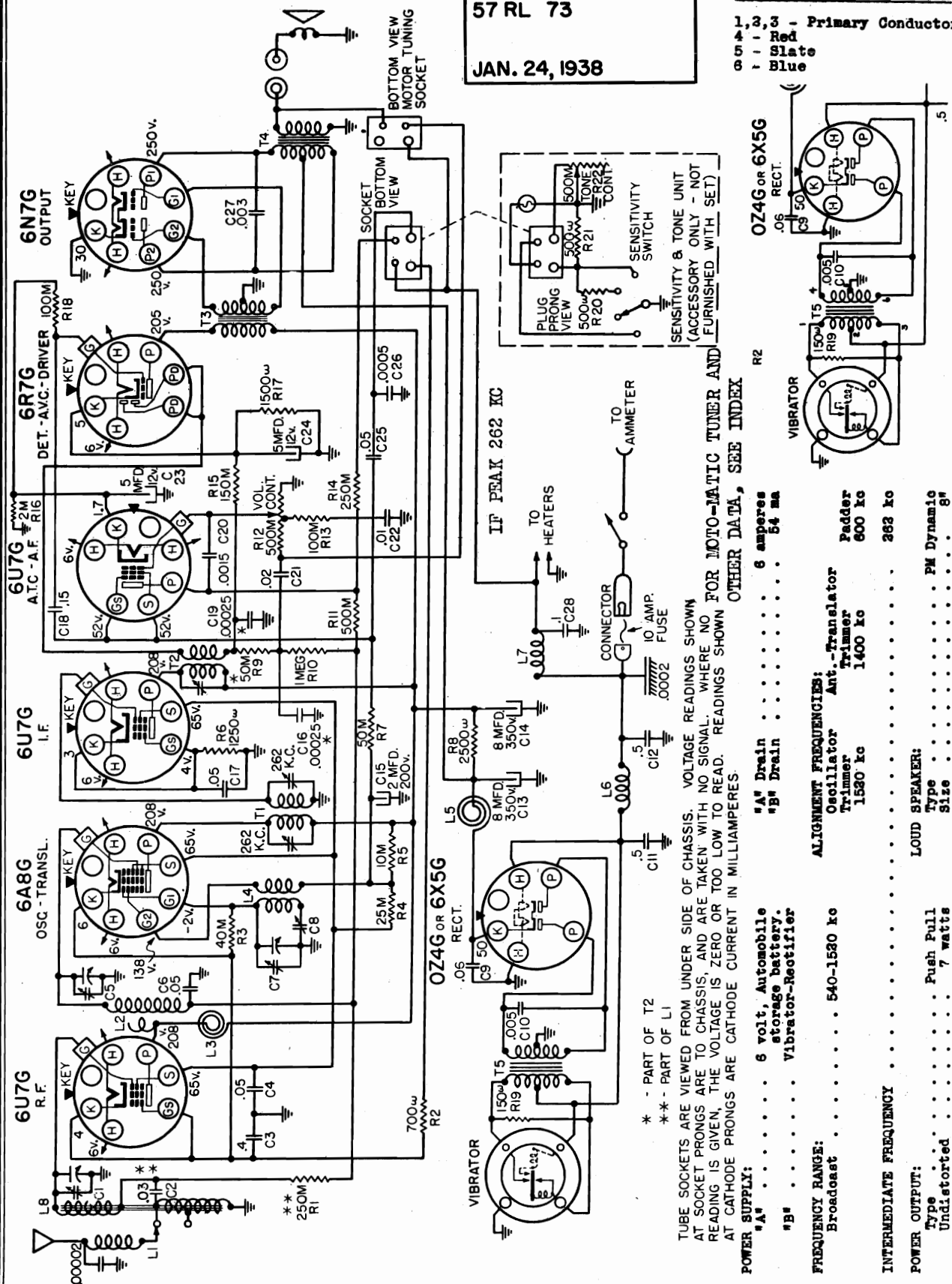
SEARS-ROEBUCK & CO.

57 RL 73

JAN. 24, 1938

POWER TRANSF. COLOR CODE

1,3,3 - Primary Conductor
4 - Red
5 - Slate
6 - Blue



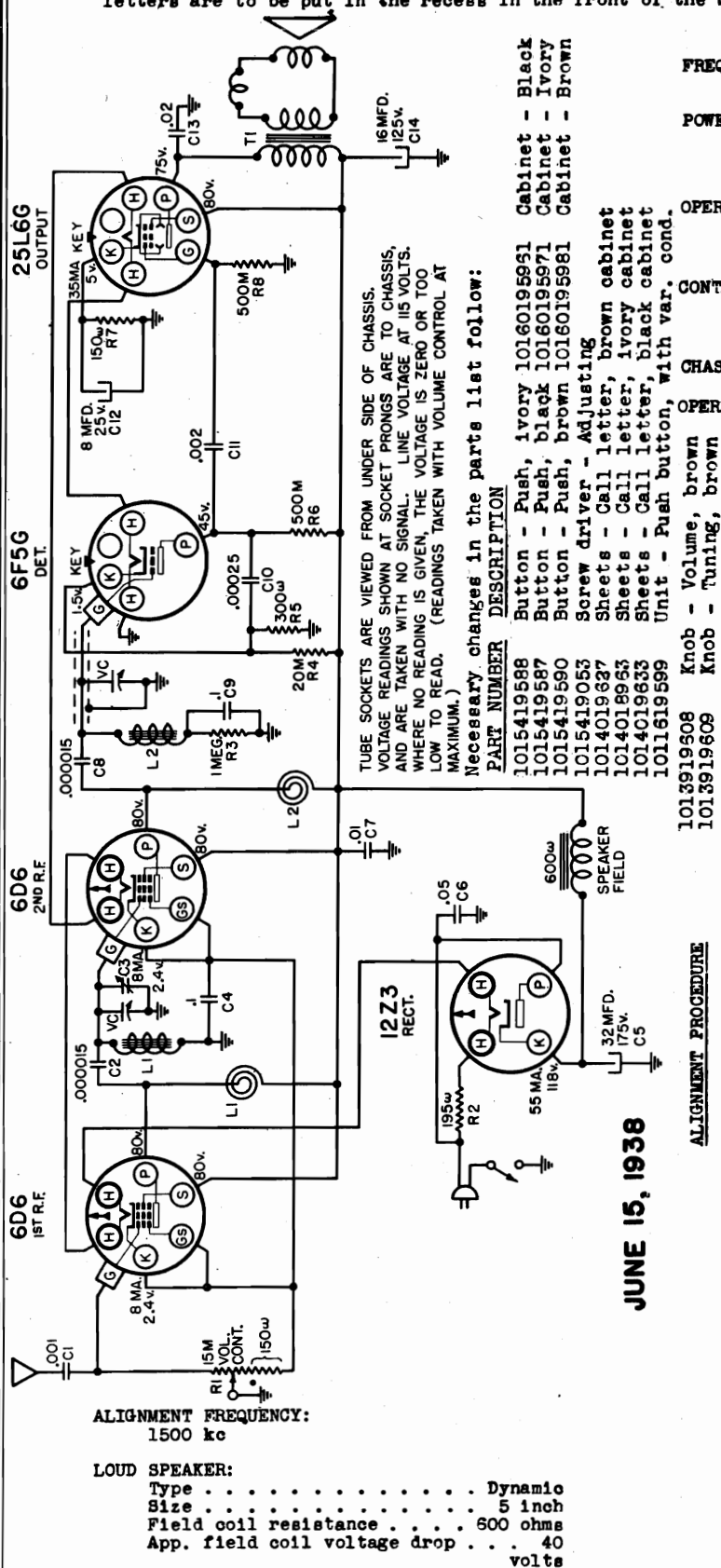
Schematic, Voltage, Alignment Tuner Changes

SEARS-ROEBUCK & CO.

MODELS 6102,6102A,6103,6103A
6105,6105A. Chassis 101.526,
101.526-1

PUSH BUTTON TUNING:

Push buttons are set up in the following manner: Unlock the button by turning it counter-clockwise. Push the button all the way in. While holding it in, tune in the desired station. Then, with the button still pushed in, lock it by turning it clockwise. The station's call letters are to be put in the recess in the front of the button.



FREQUENCY RANGE:
Broadcast 540-1730 kc

POWER OUTPUT:

Type	Beam Tube
Undistorted	0.85 watts
Maximum	1.5 watts

OPERATING CONTROLS:

1. Small knob: "On-Off" Switch
and Volume
2. Large knob: Station Selector

CONTROL OPERATION:
Turning right: . . . Volume increase

Tuning ratio: Direct

CHASSIS FEATURES:
Attached antenna

OPERATING FEATURES:
Push Button Tuning (4 button)

1013919508	Knob - Volume, brown
1013919609	Knob - Tuning, brown

ALIGNMENT PROCEDURE

The receiver need not be taken out of the cabinet for alignment.

Either a broadcast signal of about 1500 kc should be tuned in or else a signal generator, connected through a .0003 mfd. condenser to the set's antenna, should be used.

Tune in the signal and adjust the trimmer (accessible through the hole in the bottom of the cabinet) for maximum loud speaker response. This can be done most accurately, if the volume control setting is reduced to give low volume level. (This set has no AVC.) The variable should be rooked a degree or two during the adjustment. An insulated screw driver should be used, since the chassis may be above ground potential as explained previously.

SUBJECT: CHANGES IN PUSH BUTTON MECHANISM.

Chassis embodying these changes have the identification number 101.536-1. The suffix letter "A" also has been added to the catalog number.

The design of the push button tuning mechanism has been changed somewhat. Stations are set up as follows:

Full the push buttons off of their levers. Using the small screw driver supplied, unscrew the push button screw two or three turns. With screw and lever pushed in firmly, tune in the desired station. Then securely tighten the screw. Check the accuracy of the setting by pushing the lever to get the station and then seeing if the station can be still more accurately tuned with the tuning knob. If necessary, repeat the adjustment to obtain a more accurate setting. Punch out the station's call letters from the sheet, insert them in the recess in the front of the button, cover them with the clear celluloid disc, and replace the button. Proceed in the same manner for the remaining buttons.

MODELS 6102, 6102A, 6103
6103A, 6105, 6105A
Chassis 101.526, 101.526-1
Socket, Chassis

SEARS-ROEBUCK & CO.

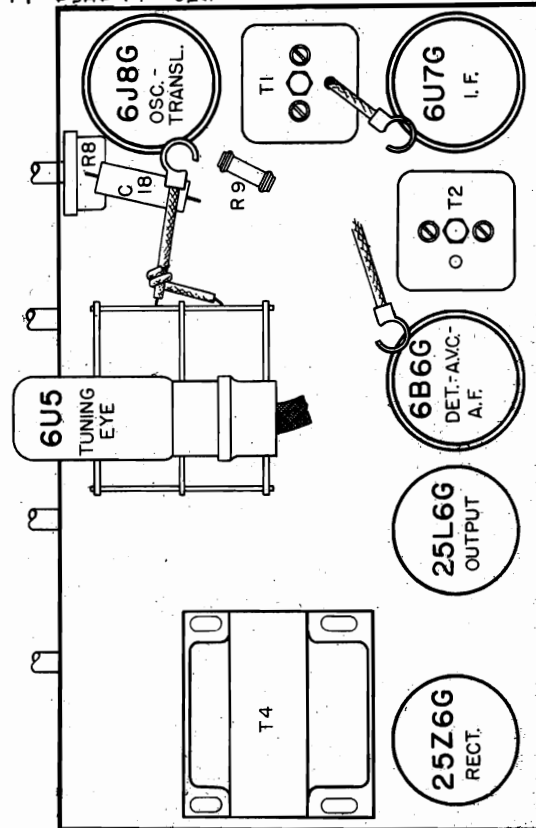
MODEL 6125, Ch. 101.527
Socket, Trimmers, Chassis
Notes

THE ANTENNA: MODEL 6125, CHASSIS 101.527.

An attached antenna wire is supplied with the receiver. It should be uncoiled and extended as far from the radio as possible. If interference between stations is encountered, incoiled antenna wire should be used. In locations remote from broadcasting stations additional pick-up can be had by connecting the end of the antenna to a conventional outdoor antenna lead-in.

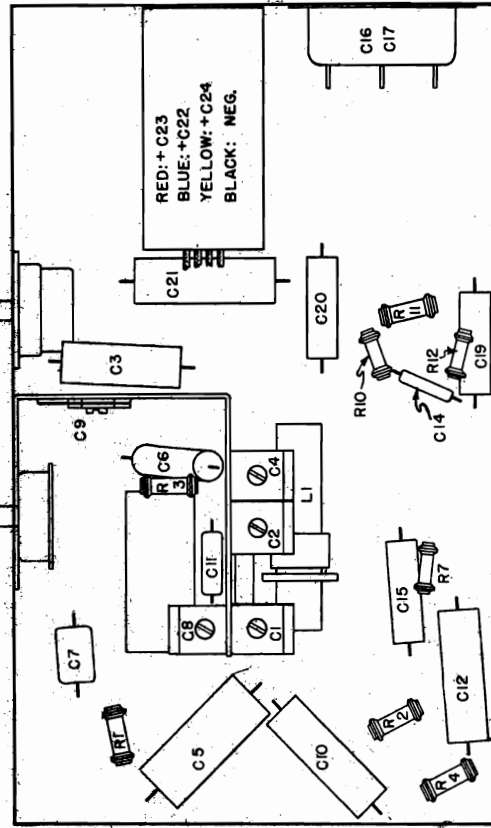
THE FILAMENT CIRCUIT:

All of the tubes are connected in series. Accordingly, if any one tube burns out, the others will not light. The full line voltage will appear across the heater prongs of the burnt out tube. The power cord contains a resistor, in series with the tube heaters, and it is normal for the cord to become warm during operation.

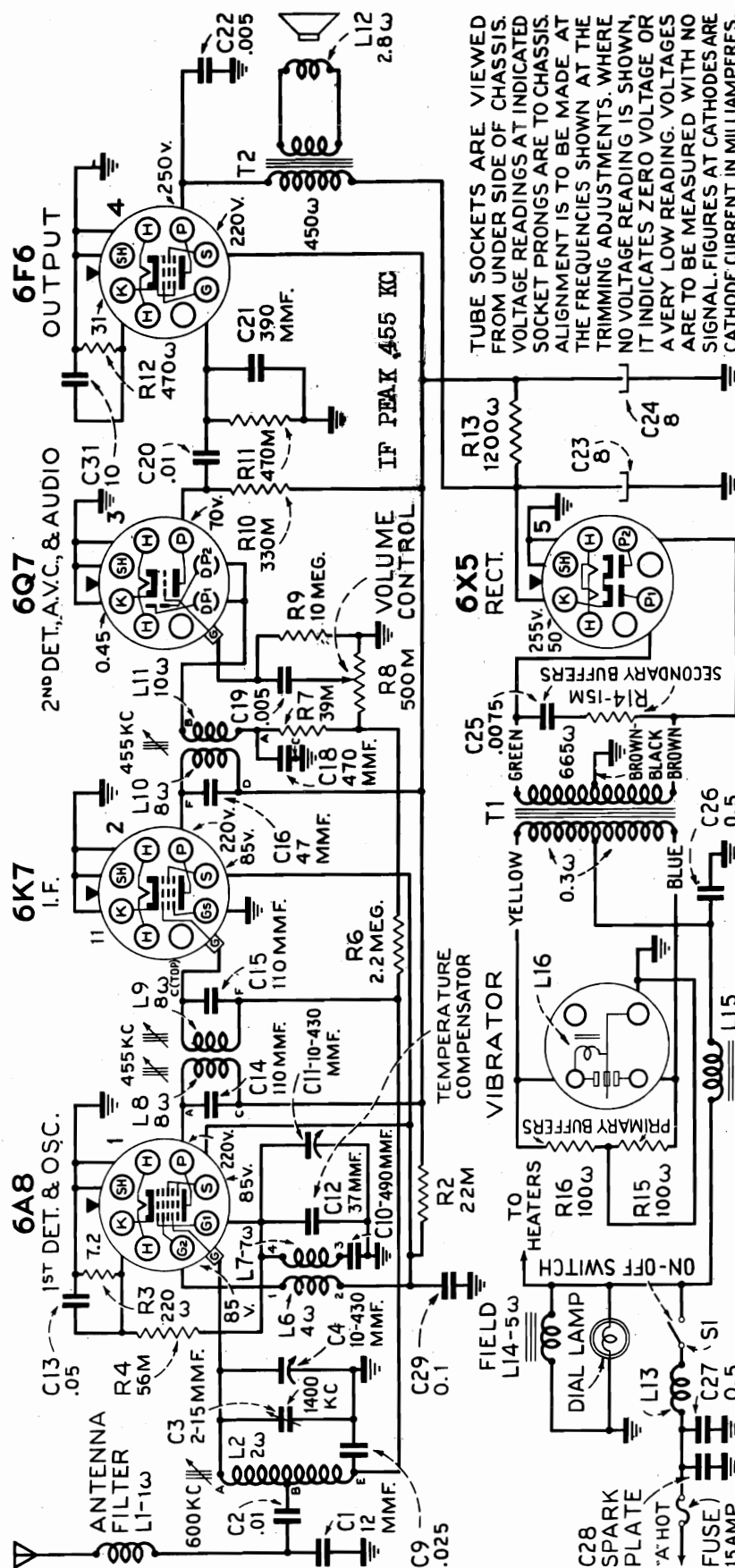


LOCATIONS OF PARTS ON TOP OF CHASSIS.

MODEL 6125, CHASSIS 101.527.



JUNE 30, 1938



ALIGNMENT FREQUENCIES:

I.F.....	455 kc
Ant.....	600 and 1,400 kc
Osc.....	No Adjustment

LOUDSPEAKER:

Type.....	Electrodynamic
Size.....	5 inches
V.C. Impedance.....	3.2 ohms at 400 cycles
Field Coil Resistance.....	5 ohms
App. Field Coil Voltage Drop.....	6 volts

FREQUENCY RANGE..... 550-1,550 kc

POWER OUTPUT:

Type.....	Pentode
Undistorted.....	2.1 watts
Maximum.....	4.1 watts

POWER SUPPLY:

"A"	6.3 volt Auto Storage Battery
"B"	Non-Synchronous Vibrator
Current Drain	6.75 amps.

MODEL 6104, Ch. 126.203
Tuner Assembly, Data

SEARS-ROEBUCK & CO.

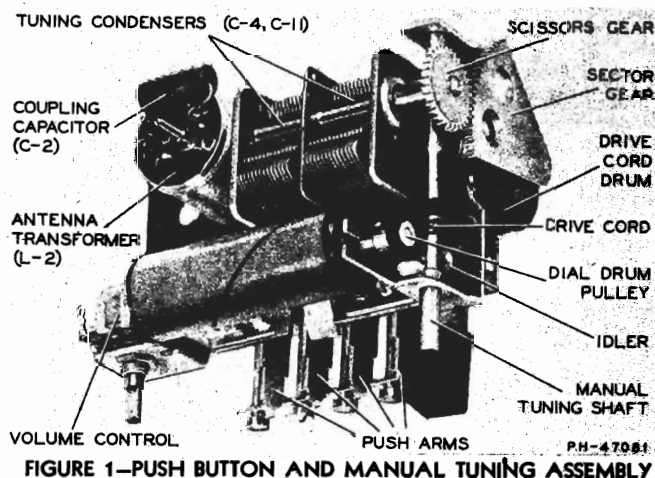
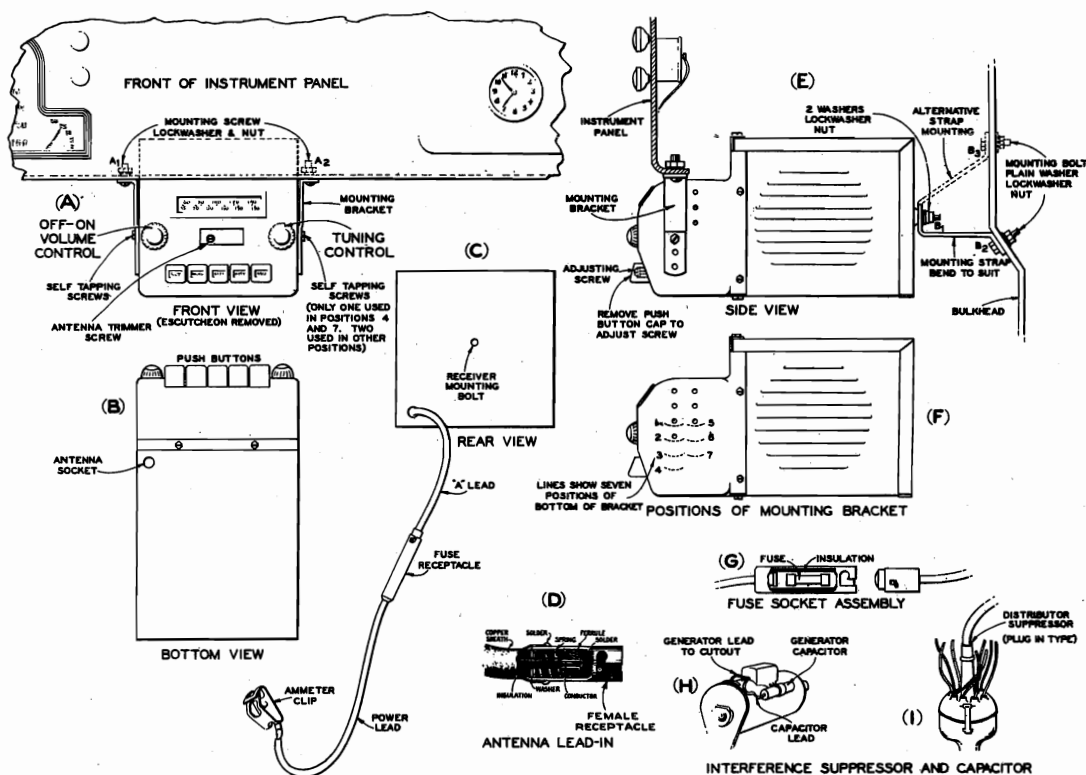


FIGURE 1—PUSH BUTTON AND MANUAL TUNING ASSEMBLY

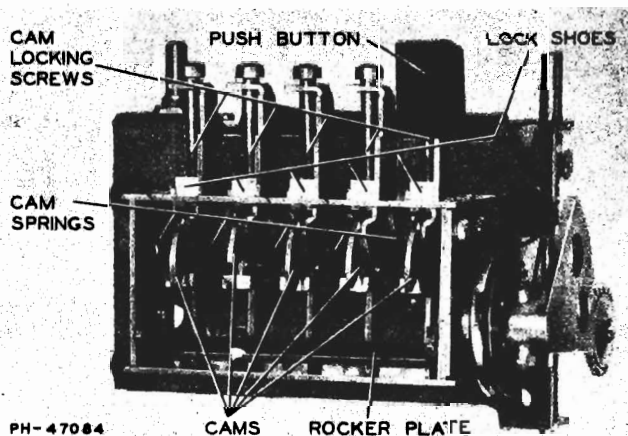


FIGURE 2—BOTTOM VIEW OF PUSH BUTTON MECHANISM

Push Button Tuning Mechanism:

The push button tuning mechanism used in this receiver is of the mechanical type, wherein the movement of the button actually turns the tuning condenser to any pre-determined setting. The movement is actuated thru a Push-Arm, Cam, Rocker Plate and Sector Gear, which meshes with a Scissors Gear directly fastened to the tuning condenser shaft. (See Figures 1 and 2.) The scissors gear prevents backlash between the sector gear and the tuning condenser. Since the sector gear is mounted directly on the rocker plate shaft, the position of the rocker plate will accurately determine the position of the tuning condenser.

The cams (Figure 2) which determine the stop points for each button are mounted on the push arms and are locked in place by the locking screws and lock-shoes, which press firmly against the cams when the locking screws are tightened. Care should be used when locking screws are tightened not to use excessive force as the threads may become damaged or stripped.

Adjustments for Push Button Tuning are very easily made. To adjust a push button for any station proceed as follows:

- (1) Pull the push button off the push arm.
- (2) Loosen the cam locking screw one-half turn.
- (3) Using the Dial Tuning Control tune in the station.
- (4) Press the push arm in as far as it will go and accurately retune station.
- (5) With the push button still held down, tighten cam locking screw.
- (6) Replace the push button.

With the locking screw tight, the cam is locked in position and when the button is pushed in, the cam pressure causes the rocker plate to assume the position that tunes in the desired station (See Figure 2.)

Manual Tuning Dial:

A manual tuning knob is provided so that additional stations may be tuned in as desired. The manual tuning shaft is connected thru a cord drive to a drum on the rocker plate shaft. This same cord drives the dial drum by passing over a pulley on the drum shaft. Figure 6 shows the complete cord drive assembly and the correct number of turns which the cord should be wrapped around the drive shaft and dial drum pulley. Stops are provided on the dial drum so that dial scale adjustment is made by tuning the set to the extreme ends of the band.

PRELIMINARY:	
Output meter connections.....	Across speaker voice coil
Output meter readings to indicate 1 watt..... 1.8 volts
Generator ground lead connections.....	To chassis
Dummy antenna value to be in series with generator output.....	See chart below
Dummy antenna value to be in series with generator output.....	See chart below
Connection of generator output lead.....	30%, 400 cycles
Generator modulation.....	Fully clockwise
Position of Volume Control.....
Chassis must be in its case with front end removed, when aligning R-F circuit.	

Position of Dial Pointer	Generator Frequency	Dummy Antenna	Generator Connections	Adjustment Symbol	Circuit Adjusted	Approx. Microvolts
No Signal 550-750 kc	455 kc.	.001 mfd.	6K7 Grid	L-10	2nd I.F. Trans.	3,500
No Signal 550-750 kc	455 kc	.001 mfd.	6A8 Grid	L-8, L-9	1st I.F. Trans.	35
1,400 kc	1,400 kc	.0001 mfd. †	Ant. Lead	C-3	Ant.	9
600 kc	600 kc	.0001 mfd. †	Ant. Lead	L-2	Ant.	3
1,400 kc	1,400 kc	.0001 mfd. †	Ant. Lead	C-3*	Ant.	3

NOTE: No oscillator alignment adjustments are required in this receiver.

† Make the generator connection to the receiver thru a shielded lead-in having not more than 50 mmf. (.00005) capacity with a male connector attached for connection to antenna socket. If C-2 has been changed, as outlined under "Antenna Circuit," for reason of a high capacity antenna, the Dummy Antenna should be the same value as the antenna itself.

* Re-adjust C-3 after installation as outlined under "Antenna Circuit" in "Service Hints."

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the A.V.C. generator at its lowest possible value, to prevent the A.V.C. action of the receiver from interfering with accurate alignment.

Alignment adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular frequency should be used. Grid cap leads should remain in place during alignment.

Since the oscillator coil is unshielded, the case has some effect on its inductance. Therefore alignment must be done either with the chassis in the case or with a steel plate (covering the bottom of chassis), substituting for the case. Values shown under "Microvolts" are only approximate.

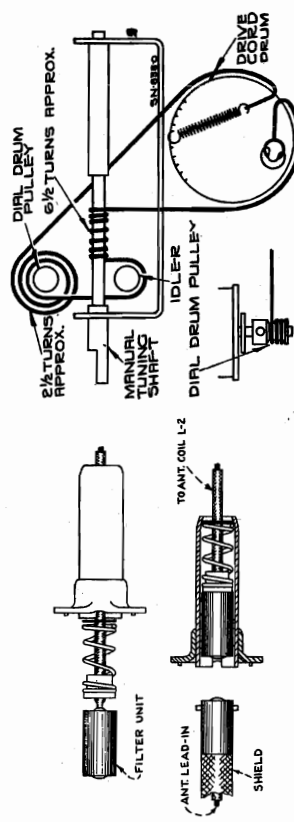


FIGURE 5—ANTENNA FILTER

FIGURE 6—DRIVE CORD HOOKUP

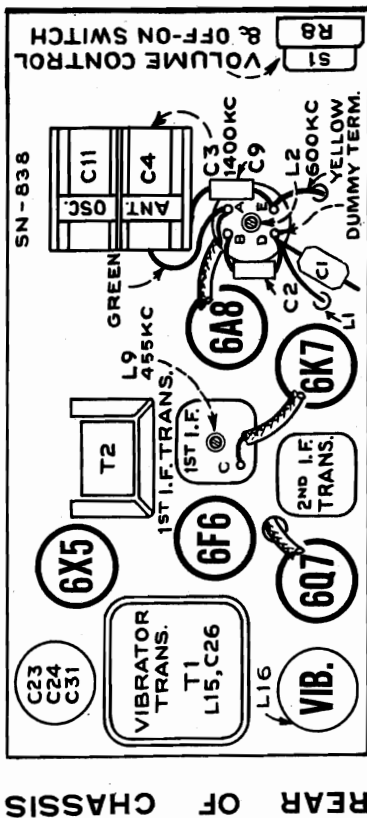


FIGURE 3—LOCATION OF PARTS AND ALIGNMENT ADJUSTMENTS ON TOP OF CHASSIS

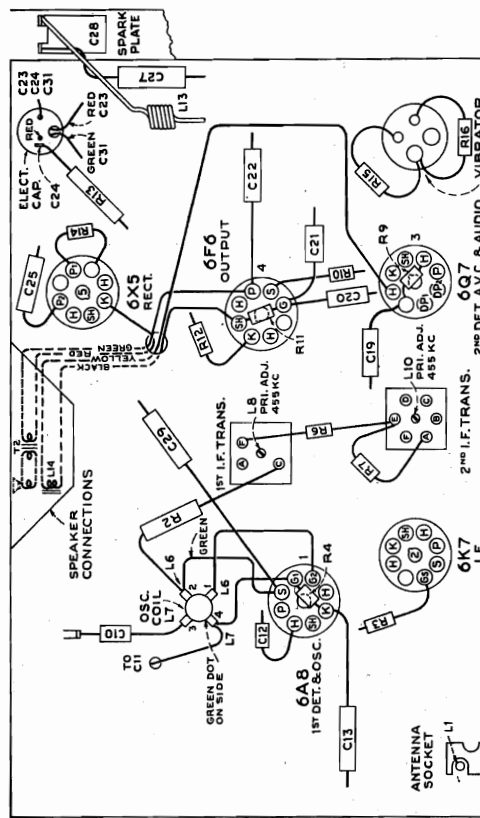
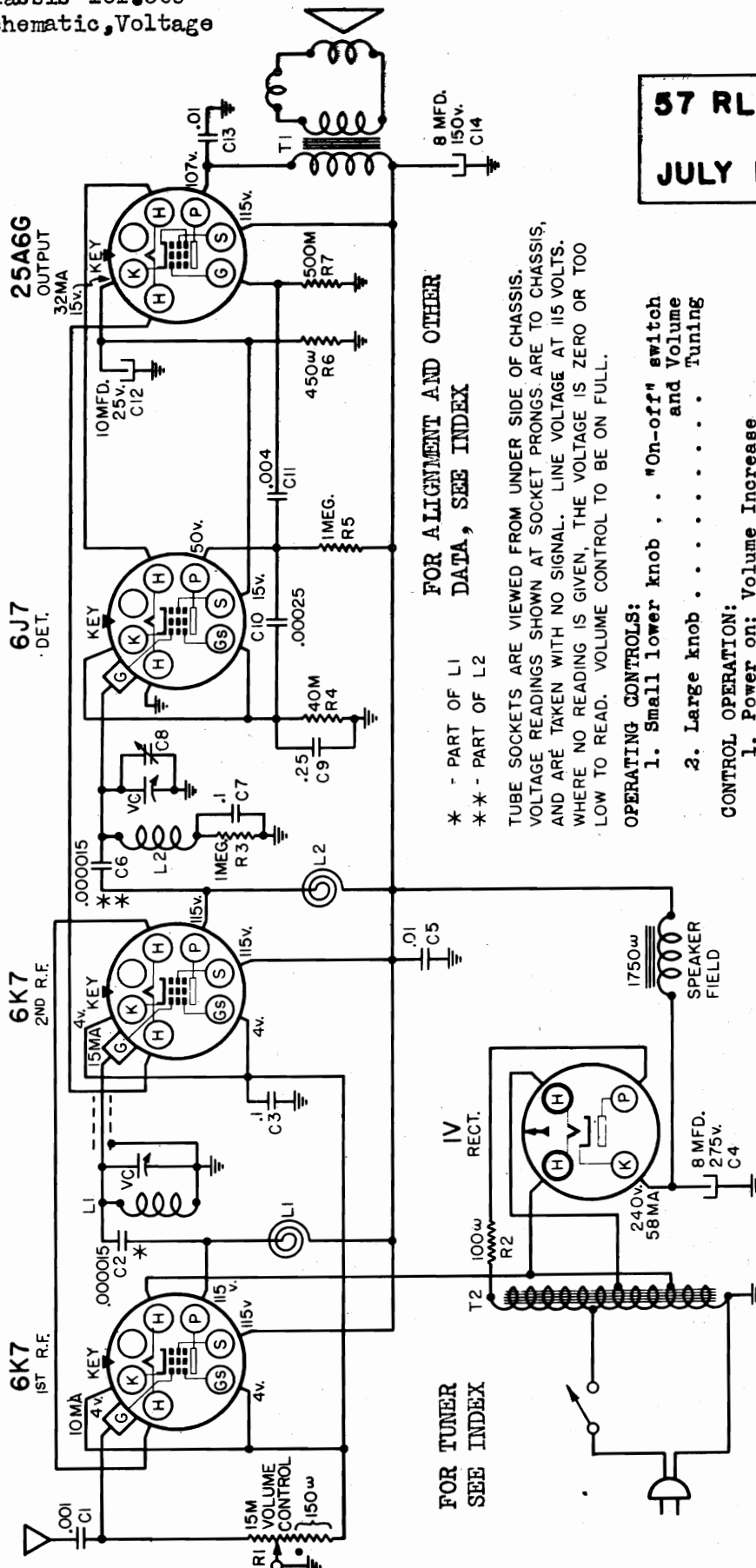


FIGURE 4. LOCATION OF PARTS AND ALIGNMENT ADJUSTMENTS ON BOTTOM OF CHASSIS

57 RL 122

JULY 1, 1938



FOR ALIGNMENT AND OTHER
DATA, SEE INDEX

* - PART OF L1
** - PART OF L2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. VOLUME CONTROL TO BE ON FULL.

OPERATING CONTROLS:

1. Small lower knob , . "On-off" switch
2. Large knob and Volume Tuning

CONTROL OPERATION:

1. Power on: Volume Increase
3. Tuning ratio: Direct

... 105-125 volts, 50-60 cycles, 34 watts

ALIGNMENT FREQUENCY: 1400 kc

CHASSIS FEATURES:

Number of RF stages	Two
Number condensers in gang	Two
Antenna	Attached

LOUD SPEAKER:

Type	Dynamic
Size	5"
Field coil resistance . . .	1750 ohms

POWER SUPPLY:

SUPPLI:
All models available

FREQUENCY RANGE: 545-1730 kc

OPERATING FEATURES:

Push button tuning (6 button)
Frequency calibrated tuning knob

POWER OUTPUT:

Type	Pentode
Undistorted	0.85 watts
Maximum	1.6 watts

SEARS ROEBUCK & CO.

MODELS 6112, 6113, 6118
Chassis 101.521
Schematic, Voltage, Tuner
Socket, Chassis

ALIGNMENT PROCEDURE:

Either a broadcast station of about 1400 kc or a signal generator can be used for alignment. The chassis must be taken out of the cabinet for alignment of the trimmer, C8. The volume control setting should be reduced so that the signal is just audible in order to facilitate accuracy of adjustment. This set has no AVC so that a strong input signal may be used.

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS,
AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS.
WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO
LOW TO READ. VOLUME CONTROL TO BE ON FULL.

OCT. 6, 1938

* - PART OF L1
** - PART OF L2

25A6G
OUTPUT

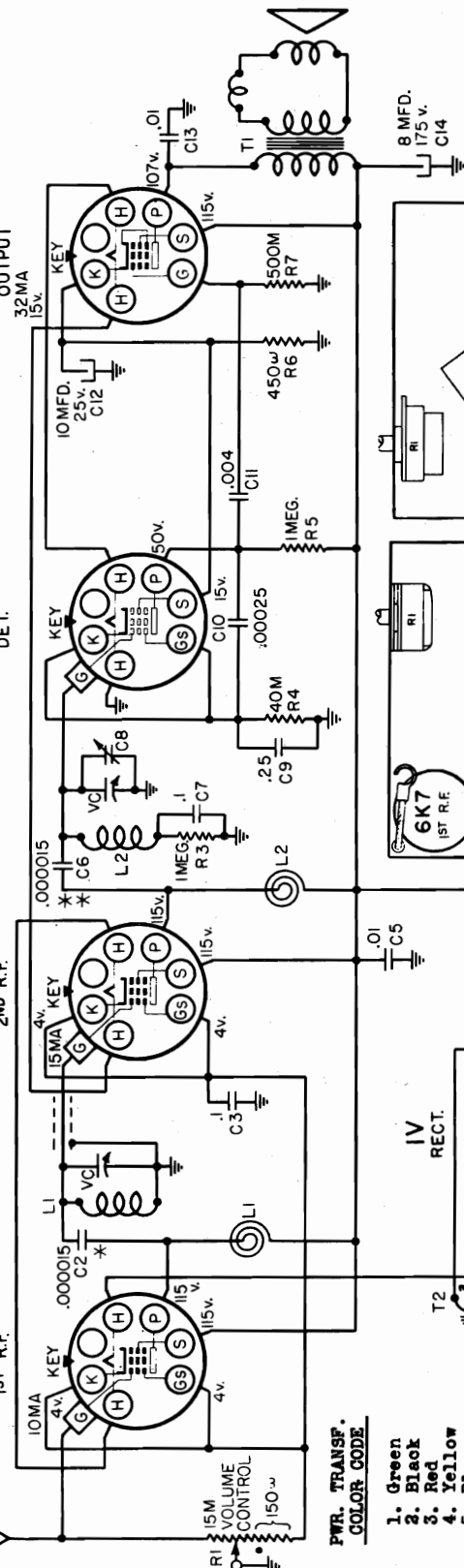
6J7
DET.

6K7
2ND R.F.

6K7
1ST R.F.

ADJUSTING THE PUSH BUTTONS:

Unhook the mechanism by loosening the screw at the center of the tuning knob, for a few turns. Push the button all the way in and tune in the desired station while the button is held in firmly. Then release the button before tuning in the next station. Proceed in the same manner for the remaining buttons. Lock the mechanism by tightening the screw in the tuning knob. Punch out the station call letters from the sheet supplied and insert them in the recesses in each button. Cover the call letters with the clear celluloid discs, supplied. Be careful not to drop the call letter tabs inside the receiver when inserting them in the push buttons.



PWR. TRANSF.
COLOR CODE

1. Green
2. Black
3. Red
4. Yellow
5. Blue
6. Slate

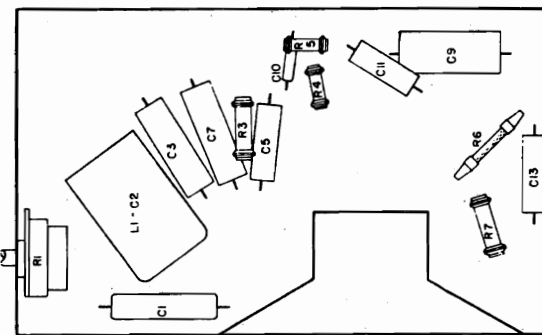
CHASSIS FEATURES:

Number of RF stages Two
Number condensers in gang Two
Antenna Attached
Underwriters' Approval

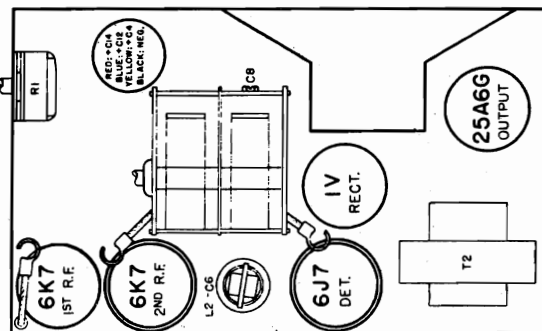
LOUD SPEAKER:

Type
Size
Field coil resistance

Dynamic
5"
1750 ohms



LOCATIONS OF PARTS UNDER CHASSIS.



LOCATIONS OF PARTS ON TOP OF CHASSIS.

OPERATING FEATURES:

Push button tuning (6 button)
Frequency calibrated tuning knob

POWER OUTPUT:

Type Pentode
Undistorted 0.85 watts
Maximum 1.6 watts

POWER SUPPLY:

All models available 105-125 volts, 50-60 cycles, 40 watts

FREQUENCY RANGE: 545-1720 kc

ALIGNMENT: 1400 kc

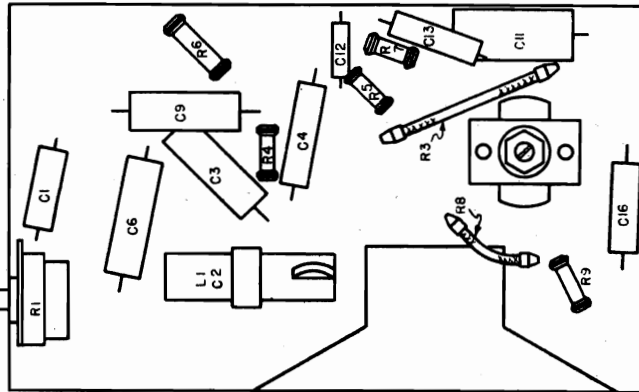
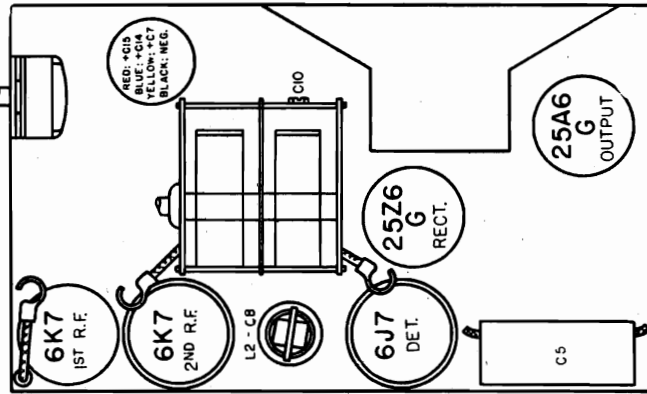
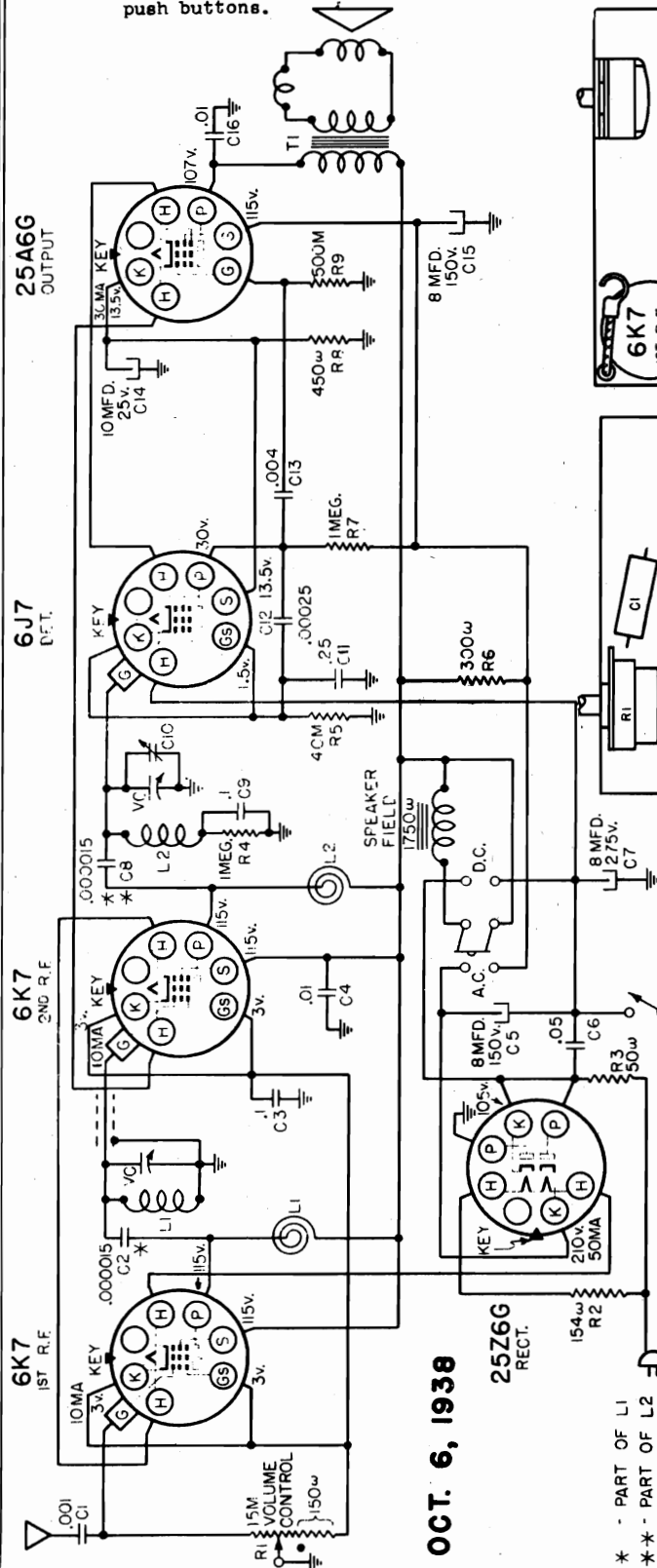
MODELS 6114, 6115, Ch. 101-522

Schematic, Voltage, Chassis
Socket, Alignment, Tuner

SEARS-ROEBUCK & CO.

ADJUSTING THE PUSH BUTTONS:

Unlock the mechanism by loosening the screw at the center of the tuning knob, for a few turns. Push the button all the way in and tune in the desired station while the button is held in firmly. Then release the button before tuning in the next station. Proceed in the same manner for the remaining buttons. Lock the mechanism by tightening the screw in the tuning knob. Punch out the station call letters from the sheet supplied and insert them in the recess in each button. Cover the call letters with the clear celluloid discs, supplied. Be careful not to drop the call letter tabs inside the receiver when inserting them in the push buttons.

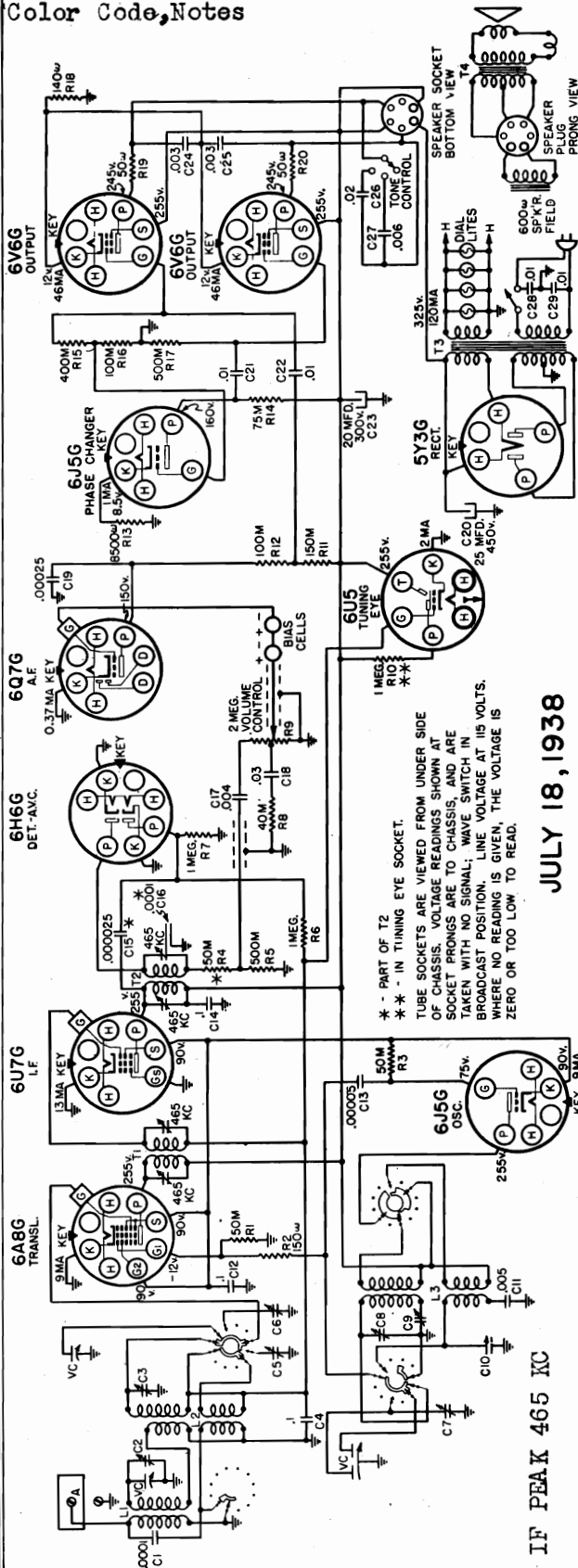


Tone Control Two position
 Automatic Volume Control
 Push Button Tuning (5 button)
 Tuning Eye

ons is desired, the old call letters can be removed with

Proceed in the same manner for the remaining buttons. If a change in selection of stations is desired, the old call letters can be removed with a pin inserted in the slot under the call letters.

PWR. TRANSF.
COLOR CODE



JULY 18, 1938

POWER SUPPLY:

Coil Li.	
All models available	105-125 volts, 50-60 cycle, 105 watts
All models available	105-125 volts, 35 cycle, 120 watts

FREQUENCY RANGES:

Band	"AM"	540-1730 kc
Band	"SW"	5.95 mc-18.3 mc
Band	"9"	9.4 mc-9.7 mc

INTERMEDIATE FREQUENCY

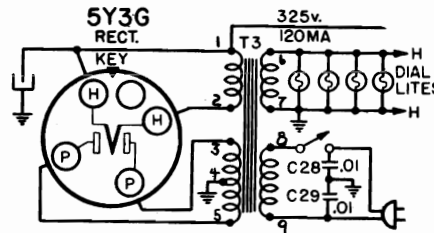
POWER OUTPUT:	
Type.....	Push pull beam tubes
Undistorted.....	6 watts
Maximum.....	10 watts

OPERATING FEATURES:

... TONE CONTROL... THREE POSITION
... AUTOMATIC VOLUME CONTROL
... SPREAD BAND TUNING
... PUSH BUTTON TUNING (8 button)

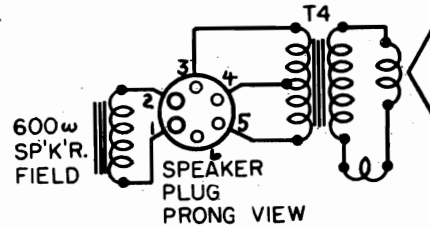
OPERATING CONTROLS:

1. Upper left knob Volume
2. Lower left knob "On-off" switch & Tone
3. Lower right knob Band switch
4. Upper right knob Station Selector



**SPEAKER PLUG
COLOR CODE**

1. Black
2. Yellow
3. Brown
4. Red
5. Green
6. Blank



ALIGNMENT FREQUENCIES:

Band	"AM"	Trimmer	Oscil.	Ant.-Transl.	Padder
Band "AM"	1400 kc			Trimmer	600 kc
Band "SW"	--			15 mc	Fixed
Band "9"	9.55 mc			9.55 mc	Fixed

LOUD SPEAKER:

Type	Model	6-140	Dynamic
Size	Model	6-152	13 inch
Size	Model	6-153	10 inch
Field coil resistance			500 ohms
App. field coil voltage drop			70 volts

IS FEATURES:

Presselector on band "AM"	Conventional
Antenna	
Tuning Eye	

CONTROL OPERATION:

Turning right:	. . . Volume increase
Turning right:	. . . "HI", "MED", "LOW"
Turning right:	. . . "HI", "MED", "LOW"
Turning right:	. . . "AM", "SW", "9"
Tuning ratio:	. . . . . 13:1

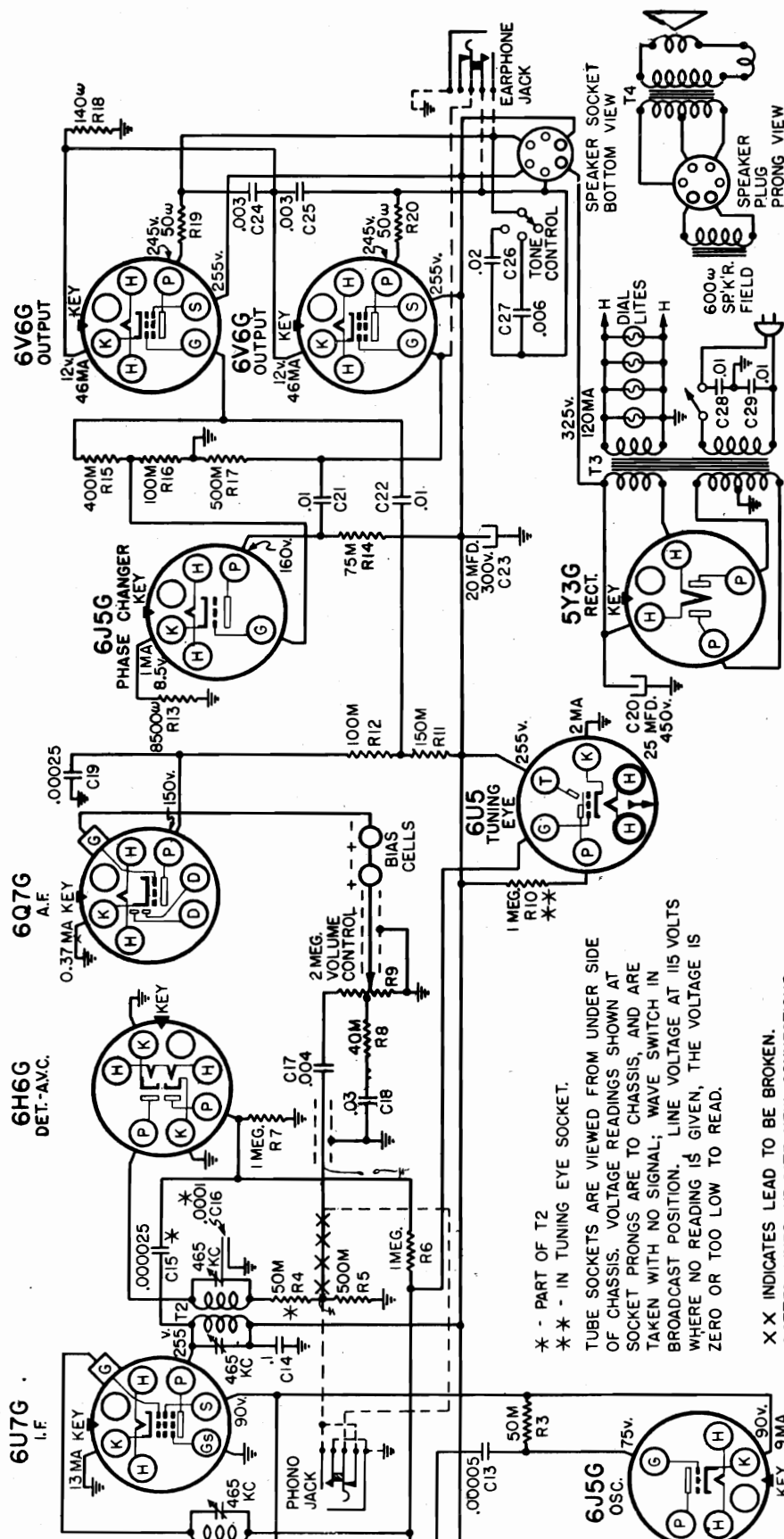
SEARS-ROEBUCK & CO.

MODEL 6140, Ch. 101.534

MODELS 6152, 6153

Chassis 101.537

Phone, Phono, Jacks Data

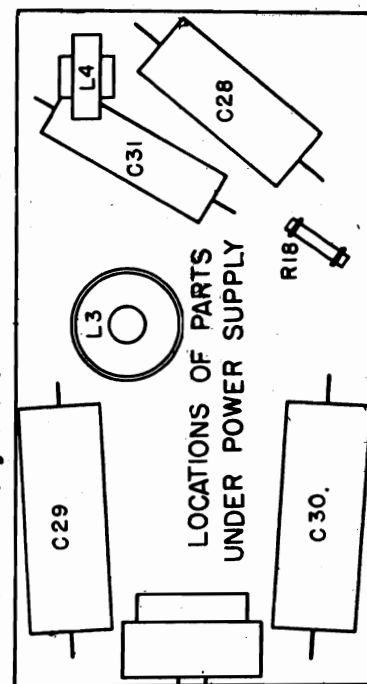
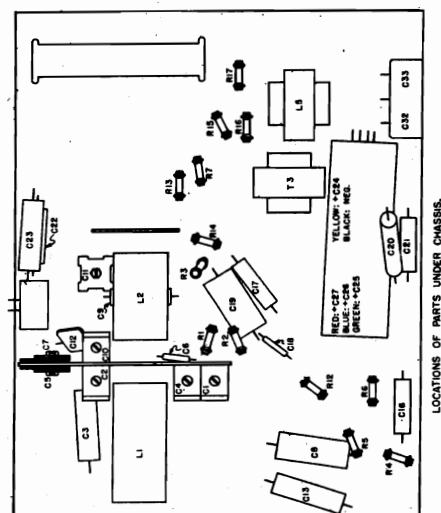
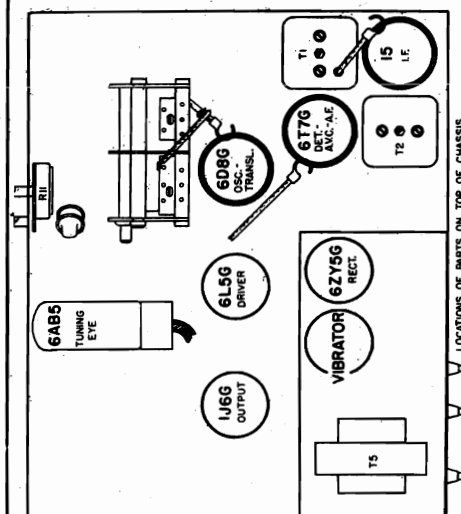
**DIAL LIGHT REPLACEMENT:**

The lamps that illuminate the push button call letters are made accessible for replacement by removing the push button escutcheon.

SUBJECT: CONNECTION OF EARPHONE AND PHONOGRAPH PICKUP JACKS:

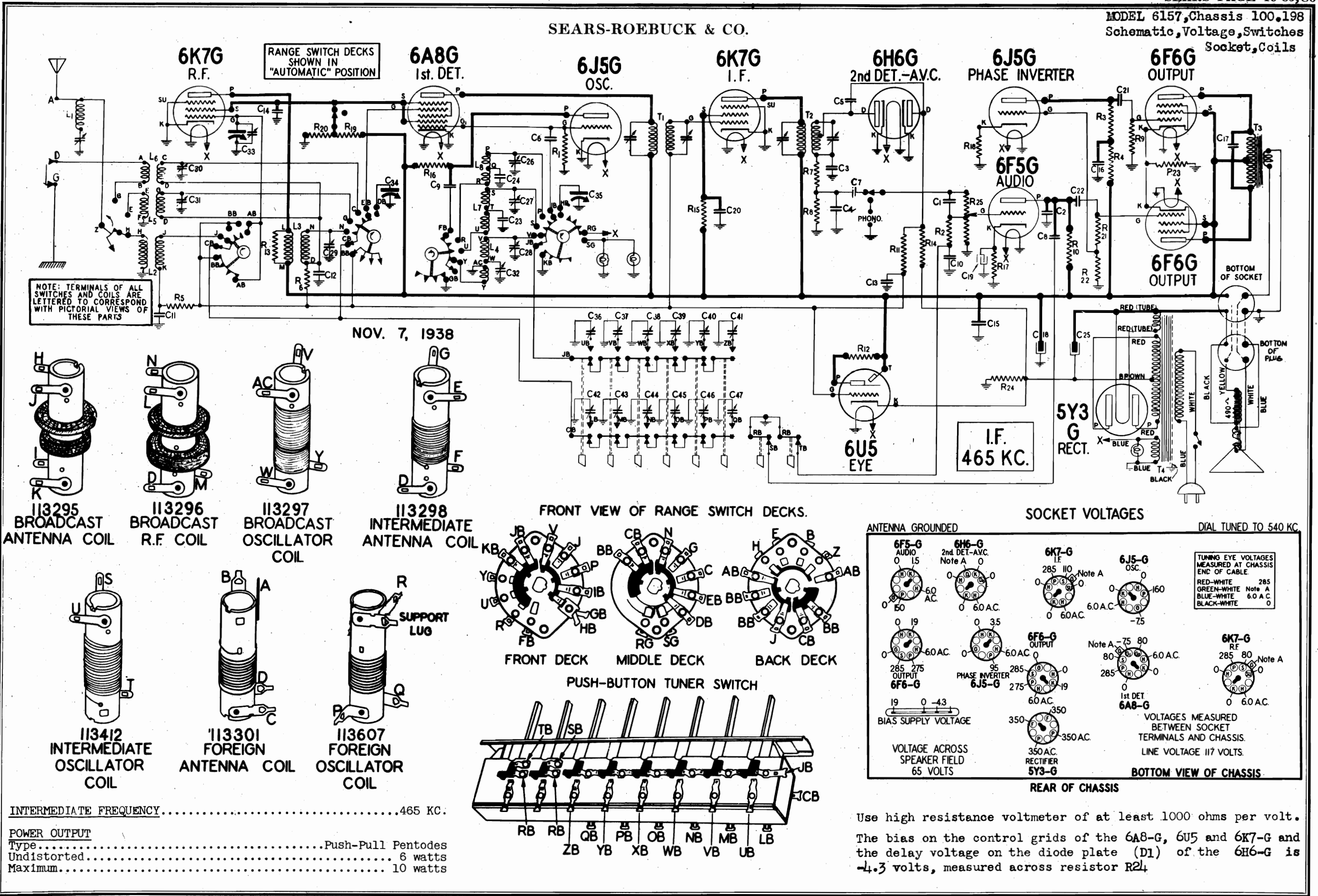
Part number 1016119531 jack, for connection of earphones or phonograph pick-up, can be ordered directly from source 101.

If a crystal pick-up is used, a filter composed of a .01 mfd. condenser and a 100M ohm resistor connected in series, should be connected across the pick-up to prevent excessive bass response. This filter will also act as a partial scratch filter.



SEARS-ROEBUCK & CO.

MODEL 6157, Chassis 100.198
Schematic, Voltage, Switches
Socket, Coils



SEARS-ROEBUCK & CO.

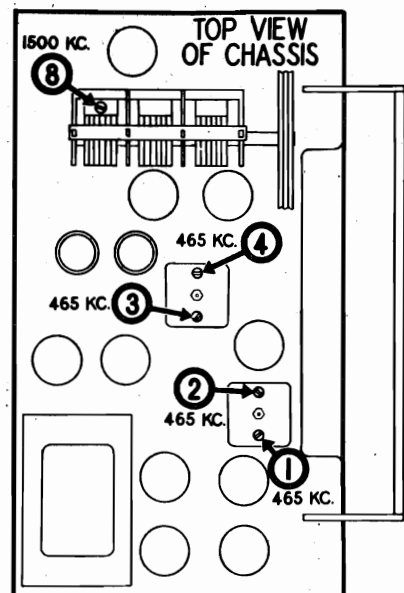
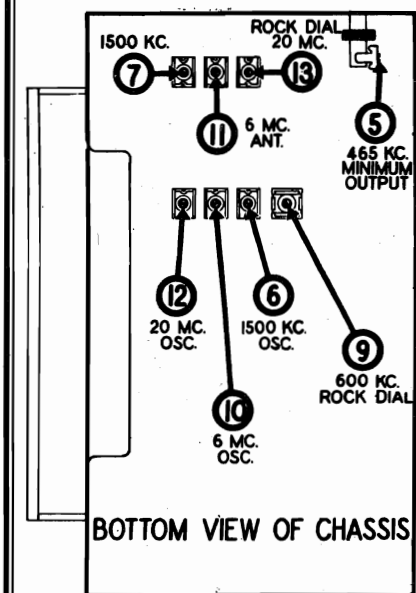
MODEL 6157, Ch. 100.198
Alignment, Trimmers

ALIGNMENT PROCEDURE

Before attempting to align the receiver, see that the dial pointer is correctly set. With the gang condenser in full mesh, set the pointer to the last mark on the left end of the dial scale. If the pointer is incorrectly set, it is only necessary to loosen the set screw on the dial cord drive drum and push the gang condenser in full mesh with the pointer properly set, then retighten the set screw.

Output meter connections-----Across voice coil leads
Output meter reading to indicate 0.5 watt output-----1.325 volts
Average sensitivity in microrvolts for 0.5 watt output-----See chart below
Connection of Generator Ground-----Receiver chassis
Dummy antenna in series with Generator Output Lead-----See chart below
Connection of Generator Output Lead-----See chart below
Generator modulation-----30%, 400 cycles
Position of volume control-----Maximum clockwise

DUMMY ANT IN SERIES WITH SIGNAL GENERATOR	CONNECTION OF SIGNAL GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	SENSITIVITY MICROVOLTS	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6AG5 TUBE	465 KC	BROADCAST	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	2ND I.F.	7000	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
					3-4	1ST I.F.	150	
200 MMFD. CONDENSER	ANTENNA TERMINAL	465 KC	BROADCAST	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP		ADJUST FOR MINIMUM OUTPUT. USING A STRONG GENERATOR SIGNAL.
200 MMFD. CONDENSER	ANTENNA TERMINAL	1500 KC	BROADCAST	1500 KC	6	BROADCAST OSCILLATOR (SHUNT)		ADJUST FOR MAXIMUM OUTPUT.
200 MMFD. CONDENSER	ANTENNA TERMINAL	1500 KC	BROADCAST	TUNE TO 1500 KC GENERATOR SIGNAL	7	BROADCAST DETECTOR	30	ADJUST FOR MAXIMUM OUTPUT.
					8	BROADCAST ANTENNA	6	
200 MMFD. CONDENSER	ANTENNA TERMINAL	600 KC	BROADCAST	TUNE TO 600 KC GENERATOR SIGNAL	9	BROADCAST OSCILLATOR (SERIES)	5	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	6 MC	INTERMEDIATE	6 MC	10	INTERMEDIATE OSCILLATOR		ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 5.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 6 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	6 MC	INTERMEDIATE	TUNE TO 6 MC GENERATOR SIGNAL	11	INTERMEDIATE ANTENNA	30	ADJUST FOR MAXIMUM OUTPUT.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	20 MC	FOREIGN	20 MC	12	FOREIGN OSCILLATOR		ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 19.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 20 MC WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	20 MC	FOREIGN	TUNE TO 20 MC GENERATOR SIGNAL	13	FOREIGN ANTENNA	65	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.



POWER SUPPLY
Model 6157 can be supplied for operation from either 25 or 60 cycle power supplies.

105-125 volt - 25 cycles - 110 watts
105-125 volt - 50 - 60 cycles - 110 watts

ALIGNMENT FREQUENCIES

20 MC.; 6 MC.;
1500 KC.; 600 KC.

FREQUENCY RANGES

Broadcast Band.....540 to 1730 KC.
Intermediate Band.....2.2 to 7.0 MC.
Foreign Band.....6.8 to 22.5 MC.

MODEL 6157, Ch. 100.198
Tuner Data, Drive Data

SEARS-ROEBUCK & CO.

MODELS 6002, 6021, 6031
6121, 6131, Ch. 100.195
Tuner Data

HOW TO SET UP AND USE YOUR PUSH BUTTON TUNER.

SET-UP PRELIMINARY

- Be sure that your set is connected to a good antenna system.
- Turn on the set and allow it to operate at least one quarter hour before setting-up the push buttons.

3. Make a list of station call letters for six nearby powerful broadcast stations for which you wish to set up the buttons. Arrange the stations in your list in the order of frequency. That is, the station of lowest frequency will be first; the next higher, second, and so on. Write the call letters and frequency of each station on the radio log furnished with this receiver and you will be able to determine the proper frequency for each station. After you have marked down the frequencies on your chart, alongside of the station call letters and arranged them in their proper order, number them 1, 2, 3, 4, 5, 6, 7 and 8 respectively. Check each frequency using Figs. 1 & 2. If each frequency falls within the range of its button, proceed as outlined in the following paragraphs.

A typical list of stations and the buttons that would be used to set them up is shown below:-

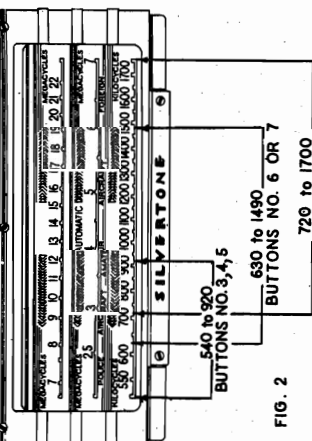


FIG. 2

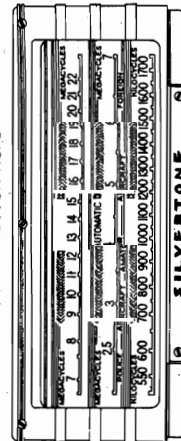


FIG. 1

4. Notice in Fig. 1 that buttons 1 and 2 are for use as tone control buttons. Buttons 3 to 8 inclusive are so set-up for automatic station tuning. The frequency range of buttons 3 and 4 is 540 to 600 KC and 600 to 700 KC respectively. Buttons 5 and 6 are set-up on buttons 3 and 4. Stations with a frequency assignment between 600 and 700 KC may be set-up on button 5 and 6. Button No. 8 may be used for setting up a station between 720 KC and 1700 KC. There can be only one station on your list that has a frequency rating between 1490 KC and 1700 KC and it must be set-up on button No. 8. However, on the same button it is possible to set-up a station whose frequency is as low as 720 KC.

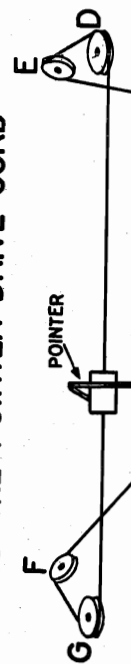
5. Remove the escutcheon around the push buttons by taking out the six screws holding it to the cabinet. This will bring into view the six pairs of adjustment screws, each pair of which is used to tune in a station that you wish to set-up on a particular button.

SET-UP PROCEDURE

- Turn the band switch (right hand knob) to the right (clockwise) until the word "BROADCAST" appears in the lower part of the dial scale, then using the tuning knob (center) tune in the station.

- New turn the band switch to the extreme clockwise position until the word "AUTOMATIC" appears in the dial opening.
- Push in the button to which you wish to set up the station (See Fig. 1).
- Use a small screw driver and insert it in the "a" screw for that button (See Fig. 1).
- Rotate the screw back and forth slowly until the program previously heard is heard again. If trouble is experienced in setting the station, turn the volume control to the right. NOTE: Be sure that you adjust this particular screw until the sides of the tuning eye "shadow" are closest together. If you are not successful in tuning in the station by turning the "a" screw back and forth, carefully re-read paragraphs "C" and "D", and repeat procedure 1, 2, 3, 4 and 5.
- Check to see if you have the proper station by changing the band switch from "Automatic" to "Broadcast" and vice versa.
- Now insert the screw driver in the "b" screw for that button (See Fig. 1) and turn it to the left or right until the program is received with maximum volume. The correct setting for this screw is when the sides of the tuning eye "shadow" are closest together.
- Re-adjust the "a" and "b" screws slightly while the band switch is in the "Automatic" position until the sides of the tuning eye "shadow" are closest together.
- Set-up buttons 4, 5, 6, 7 and 8 following steps 1 to 7 inclusive.
- Call letter tabs and celluloid windows are supplied with your receiver. The tabs are used to label the six push buttons set-up for stations. The celluloid tabs are supplied as a reference which is to be broken into eight sections. Select the proper call letter tabs from station call letter sheets supplied.
- Place the call letter tabs in back of the celluloid window and insert them in their respective slots in the push button escutcheon.
- Replace the escutcheon with its six retaining screws.

REPLACING THE POINTER DRIVE CORD



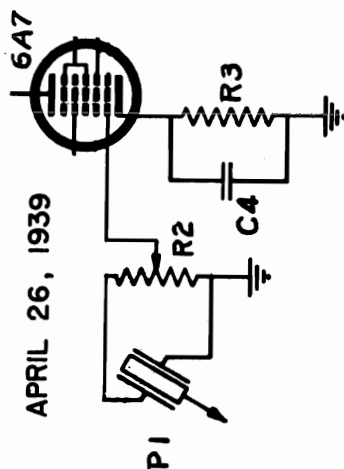
- Tie one end of 51" of special dial cord (part number 111302) to the spring, which is attached to Lug H.
- Thread the free end of the cord through hole A in drum C. (Threading from the inside of the drum out) See Fig. 3.
- After pulling the cord through hole A, make one half turn around the drum C in a clockwise direction (viewed from the front) using the front groove in the drum.
- Continuing draw the cord up around the back of pulley F to pulley G. From this point continue across to pulley D and around to pulley E.
- Go over pulley E and down to the bottom of the front groove on drum C. Continue up around the drum to hole B.
- Draw the cord through hole B and tie it to the end of the tension spring in such a manner that when the spring is clipped on to lug H it will be extended to about 1 1/8" long.

FIG. 3

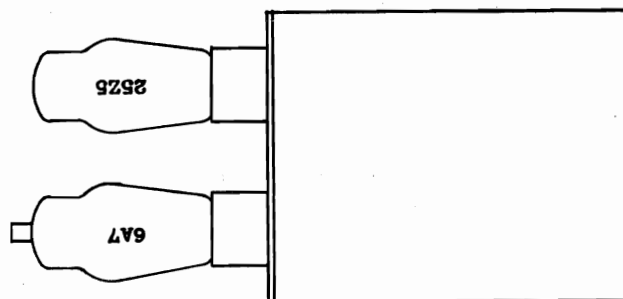
THIS DIAGRAM SHOWS POINTER DRIVE CORD ONLY

SEARS-ROEBUCK & CO.

MODEL 6226, Chassis 134.802
Wireless Record Player
Schematic, Notes
Chassis 134.802-1
Schematic Changes, Notes
BOTTOM VIEW OF CHASSIS



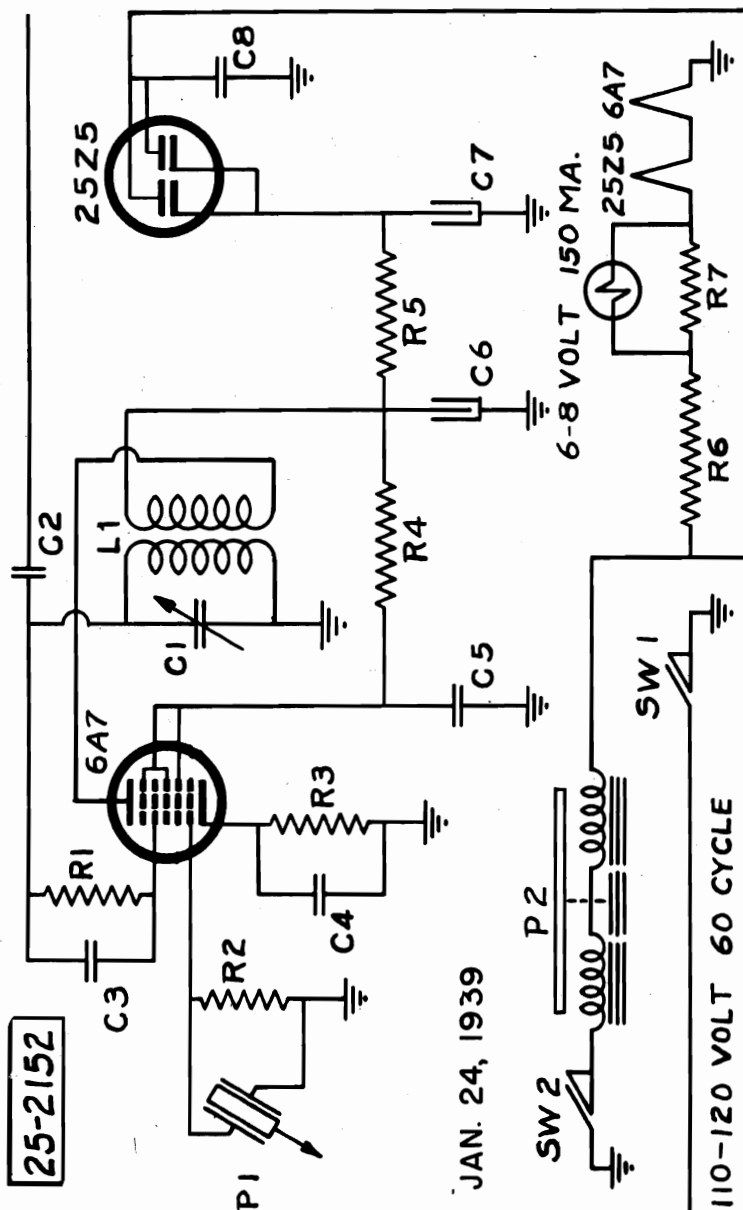
CHASSIS 134.802-1



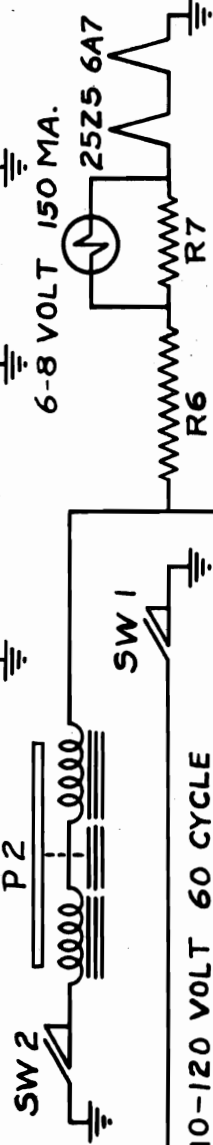
CHASSIS TUBE LAYOUT

FRONT

SCHEMATIC DIAGRAM FOR CHASSIS NO. 134.802



JAN. 24, 1939



SUBJECT: ADDITION OF VOLUME CONTROL WITH A "MASTER" SWITCH.

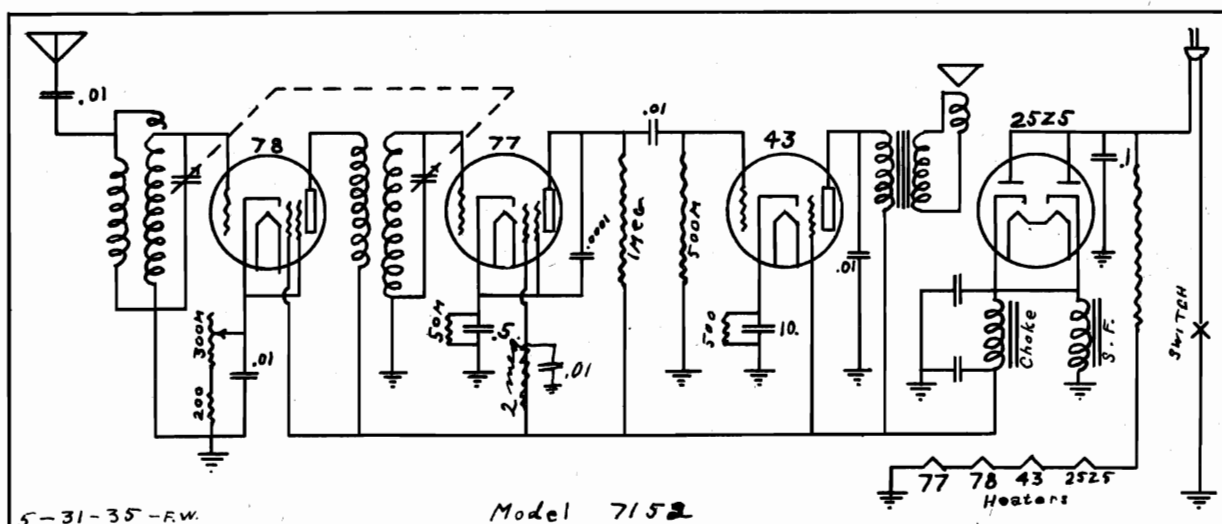
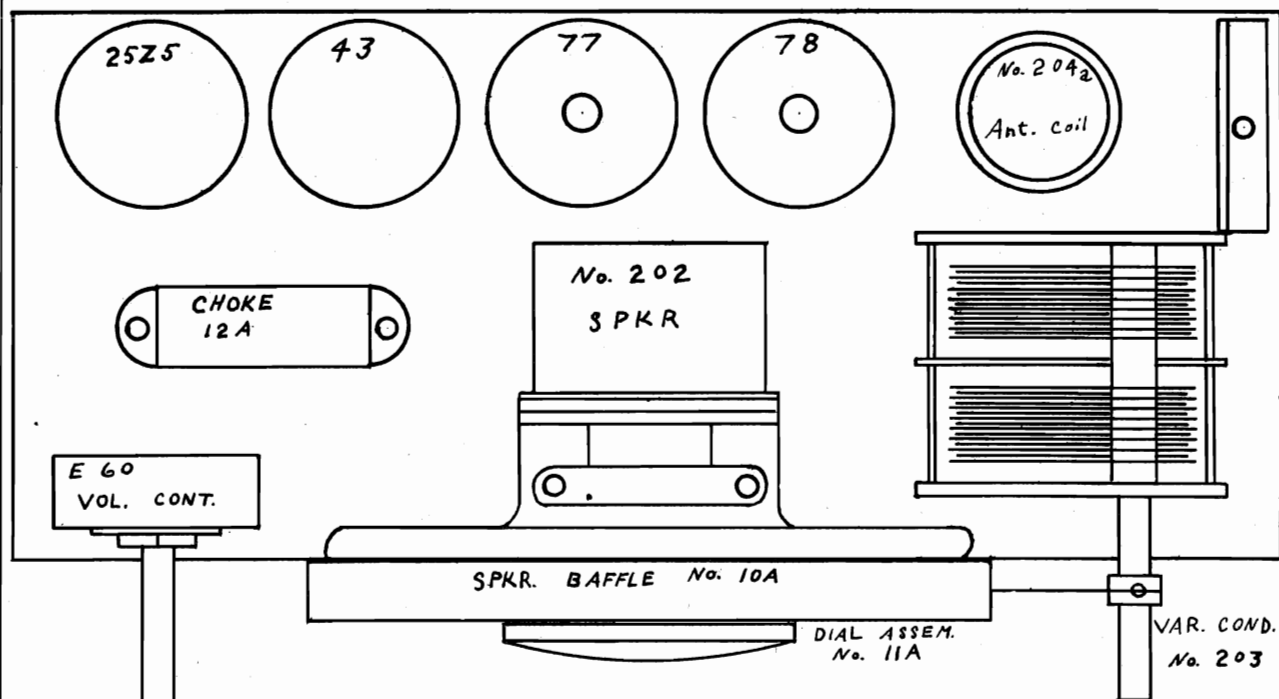
There has been effected a change to further promote the satisfaction to be derived from this equipment by the incorporation of a volume control with the "Master" switch control.

To place the volume control in a position for easier operation, the "Master" switch has been placed on the right hand side of the equipment, the "Motor" switch taking up its position on the left hand side of the equipment.

To place the equipment in operation, the right hand switch marked "Master" should be turned on and advanced to the limit of its clockwise turn, which will place the volume control "Full-on". Slightly to the left of the right hand control will be noticed a small metal cap. This should be pried up with the screw driver furnished to gain entrance to the tuning control, instead of making this adjustment from the bottom as directed -- then the usual procedure should be gone through as indicated under "Set Up Procedure".

The volume control can now be set at a level indicated by the satisfaction of the user. Turning the control to the right increases volume, turning it to the left decreases volume.

FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII

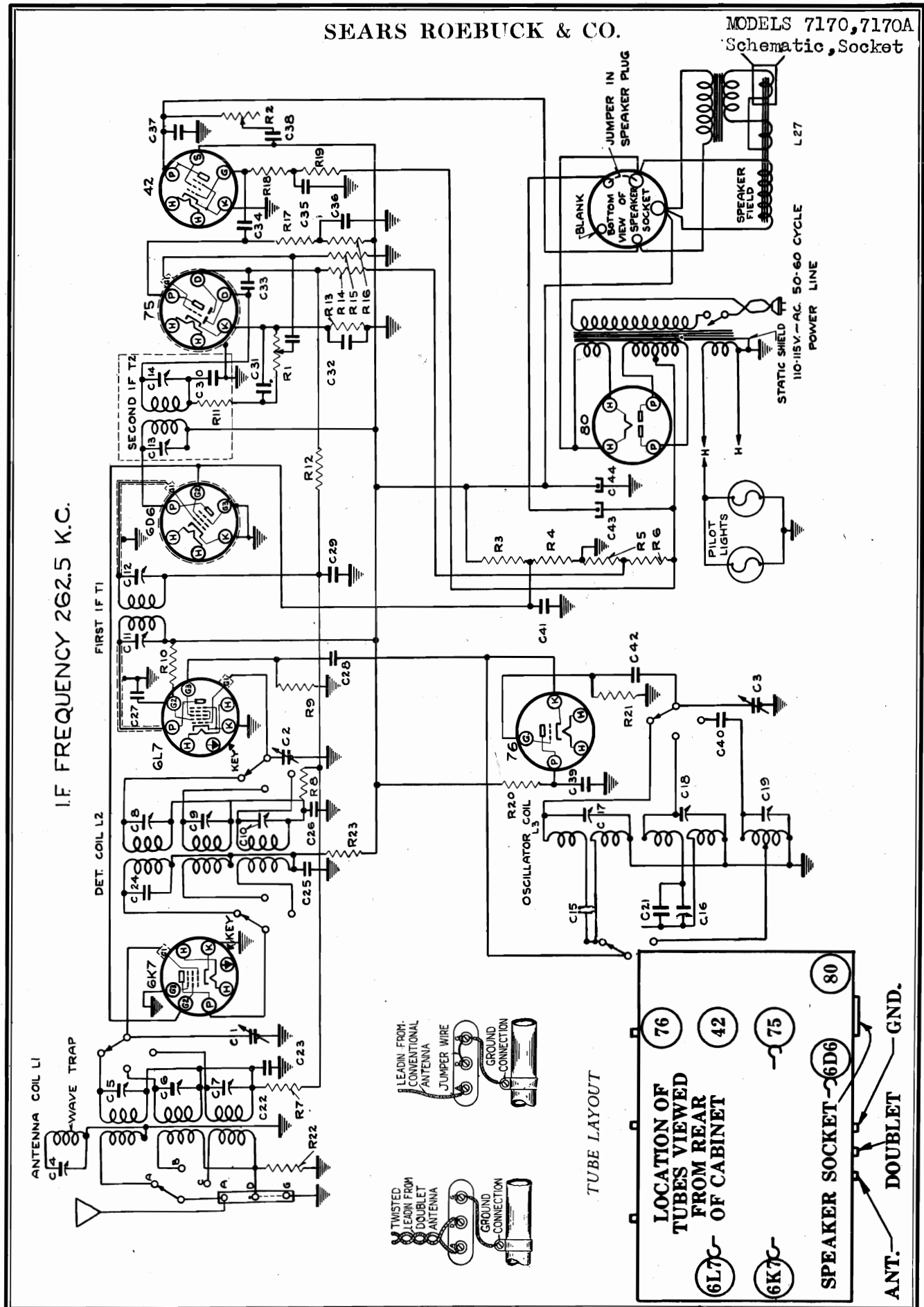


SOCKET VOLTAGES						
TUBE	POSITION	EF	EK	EG2	EG3	EP
78	RF	6.3	2.1	110	2.1	108
77	Det.	6.3	1.4	14	1.4	18
43	PR. OUTPUT	25	16	110	-	100

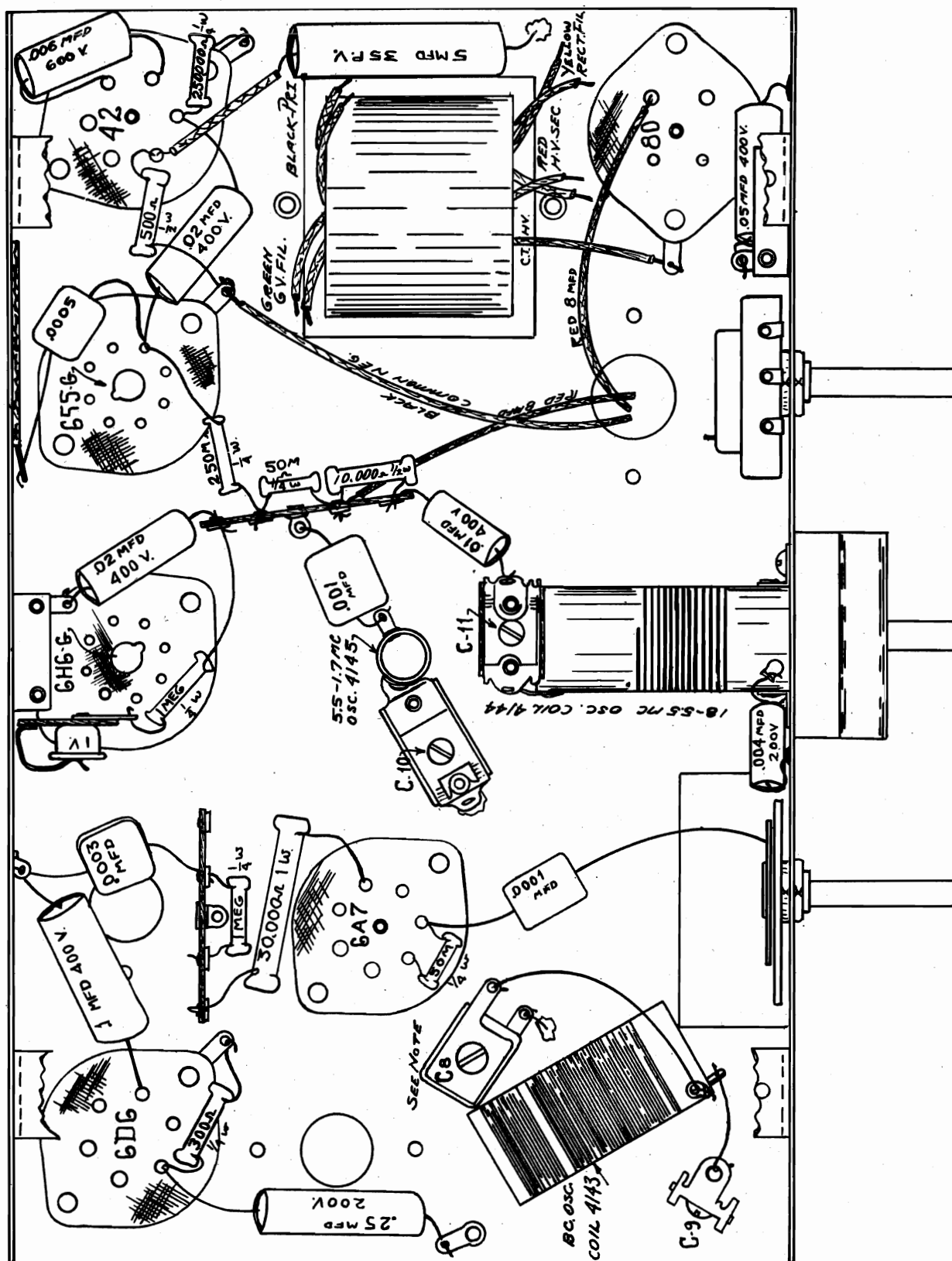
Line voltage 115 Volts - Voltage control all the way up
All voltages taken with 1000 ohms per volt D.C. meter except
heaters. from points indicated to ground.

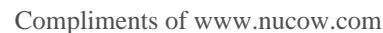
F - Filament K - Cathode G2 - Screen Grid
G3 - Suppressor grid P - Plate

SEARS ROEBUCK & CO.

MODELS 7170, 7170A
Schematic, Socket

SEARS-ROEBUCK & CO.





MODEL 7171

Alignment

SEARS-ROEBUCK & CO.

Peak oscillator trimmer C-10 to 5 M.C. from test oscillator. And Ant. coil trimmer C-6 to same frequency.

NOTE: After adjusting the two high bands at 17 megacycles and 5 megacycles the test oscillator input to antenna should be increased and receiver dial advanced to .9 megacycle lower and note if test oscillator signal is heard.

In case there is no response the oscillator trimmers have been pulled down too tightly. The trimmers should be released until this condition exists then go back to original point of alignment - reduce antenna input voltage and correct the trimmer adjustment.

EXAMPLE: The receiver has been adjusted to 17 megacycles. Tune receiver to approximately 16.9 M.C.

Increase oscillator signal by "opening up" the alternator. Move the dial back and forth at 16.9 M.C.

If no signal is heard, let oscillator trimmer off until it is heard at 16.9 M.C.

Reduce signal voltage from generator, go back to 17 M.C. and slightly correct this last trimmer adjustment.

The same thing applies to the 5 M.C. adjustment.

IV THE BROADCAST BAND

1. Turn wave band switch all the way to left and dial hand set to 1400 KC (the top scale).

2. Peak oscillator trimmer C-9 to 1400 KC., the Antenna selector C-12 (variable condenser trimmer) to 1400 KC, and trimmer C-5 to 1400 KC.

3. Set dial hand to 550 KC and adjust oscillator padding condenser C-8 to 550 KC.

4. Recheck dial at 1400 KC as in number (1) and (2).

5. Points in the middle of the dial may be checked and if necessary the plates of the front section of variable condenser may be bent for alignment.

V NOTES.

1. Seal all trimmers after their final adjustment.

2. Be sure that the settings are being made to the true fundamental signal from the oscillator and not on a harmonic or image frequency.

3. Refer to the schematic for the voltages at the tube sockets.

THE ALIGNMENT PROCEDURE

The following alignment instructions are given with the assumption that the service station has an oscillator capable of accurately covering the range of the receiver.

The only other apparatus necessary is a meter connected in the output stage to indicate resonance. This can be 0 to 3 volt AC meter connected across the voice coil of the speaker or preferably an output meter connected in the plate circuit of the 42 power tube in series with an 8 MFD paper condenser.

I THE I.F. STAGES

The I.F.'s are aligned by the usual system of feeding the intermediate frequency of 465KC into the grid of the 6A7 tube.

The two trimmers in each of the I.F. cans should be very carefully peaked to resonance as they are very critical and will greatly affect the performance of the set. These are trimmers number C1, C2, C3, C4. (See pictorial diagram).

The sensitivity of the I.F. stages will be 40 microvolts or better.

Always use as low an output as possible from the test oscillator in making the various adjustments.

II ALIGNMENT OF SHORTWAVE BAND 5.5 TO 18 M.C.

First check the position of the dial hand by rotating the condenser shaft to the left to full capacity. At this point the dial hand should be straight across in line with the lines dividing the scale in half. If the hand is off position it can be easily lined up by loosening the set screw behind the dial card in the drive hub.

1. Set the test oscillator to 17 megacycles.

2. Turn wave band switch all the way to right for highest S.W. band, and set dial hand to 17 M.C.

3. Peak trimmer condenser C-11 of the oscillator coil (See pictorial 6-2) to resonance with 17 M.C. fed into antenna.

4. Peak Ant. coil trimmer C-7 at same setting to 17 M.C.

III SHORT WAVE BAND 1.7 TO 5.5 M.C.

1. Turn wave switch to middle position.

2. Set dial hand to 5 megacycles on the 1.7 to 5.5 M.C. inner scale.

Schematic, So
Alignment

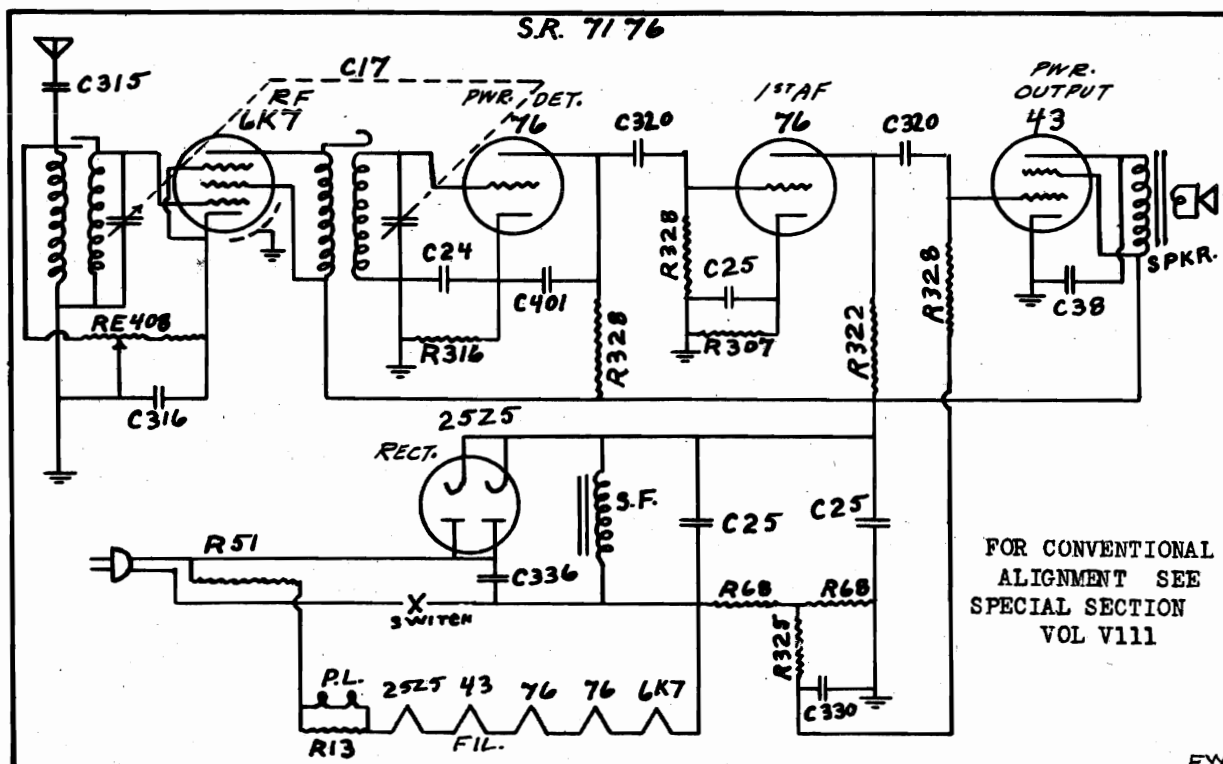
ALIGNMENT PROCEDURE					
CONNECT SIGNAL GENERATOR	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL TUNED TO	RECEIVER WAVE BAND SWITCH AT	TRIMMER	OUTPUT SIGNAL
6A7 Grid	456 KC			All I.F.	Max.
Antenna	6. MC		SW	Oscillator #1	Max.
Antenna	" "	" "	"	SW antenna #2	Max.
Note: SW low frequency padder, not to be adjusted, but must oscillate at 2.5 MC.					
Antenna	1720 KC	1720 KC	BC	BC Oscillator #3	Max.
Antenna	1720 KC	1720 KC	BC	Antenna #4	to 1720 KC
Antenna	600 KC	600 KC	BC	to 1720 KC	Max.
Antenna	1720 KC (Recheck 1720 KC alignment for maximum output)				Max.

*1- Located under chassis near electrolytic condenser.
 *2- " on top of chassis near dial.
 *3- " under chassis near outer edge.
 *4- " on top of chassis near IF transformers.

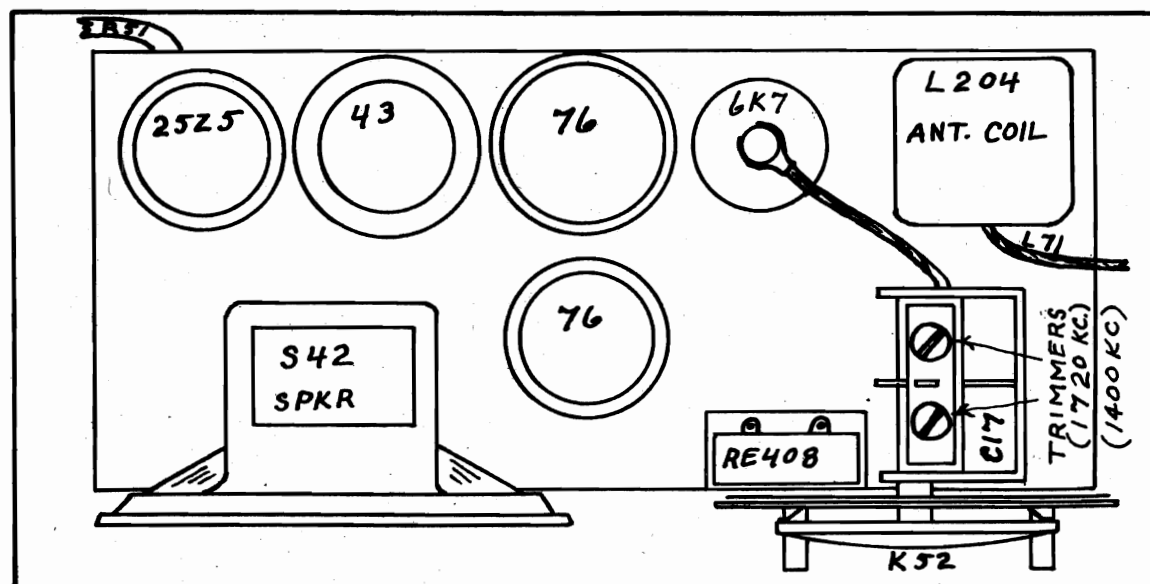
MODEL 7176

Schematic, Socket, Trimmers
Alignment

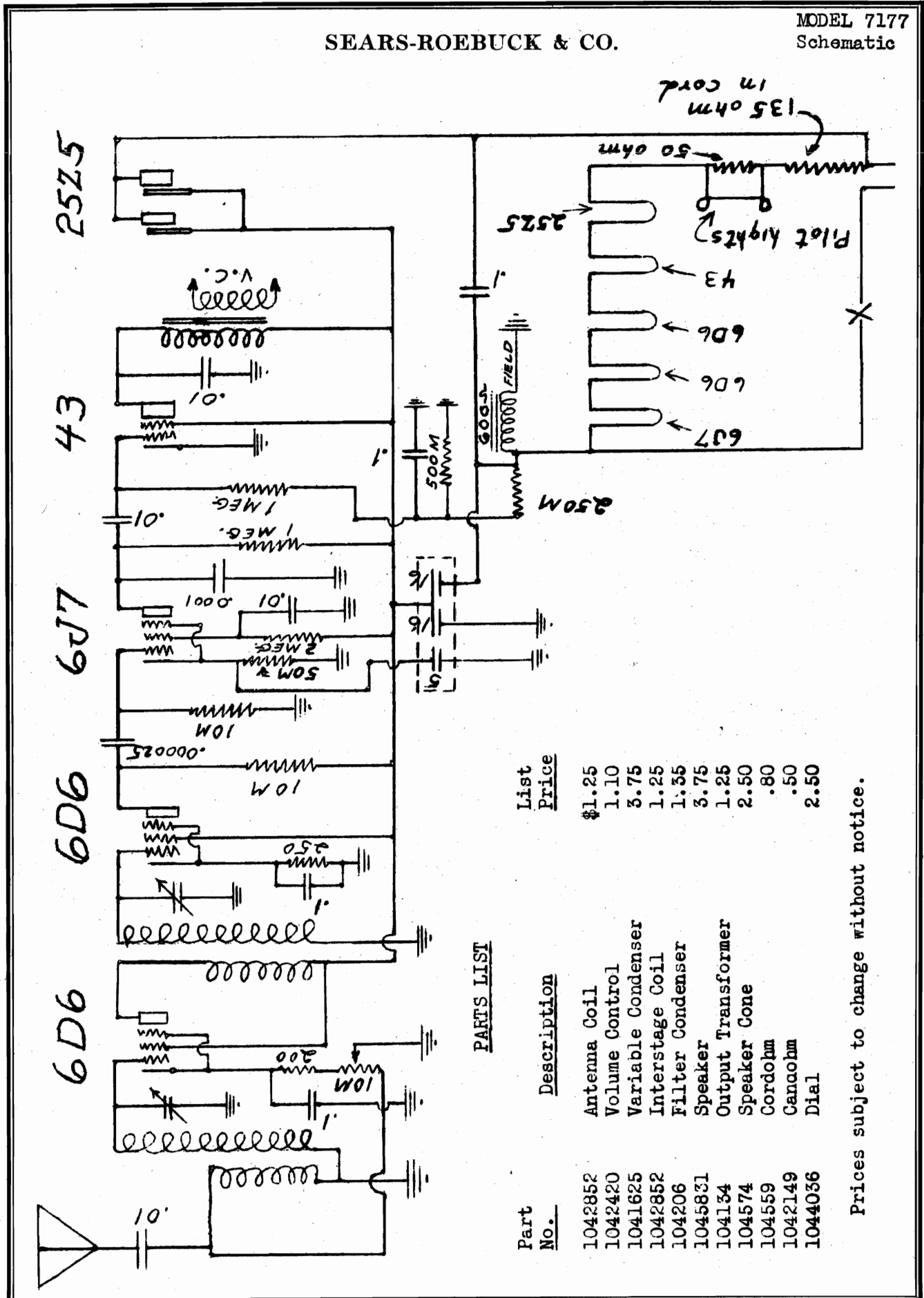
SEARS-ROEBUCK & CO

LEGEND

- | | |
|---------------------------|--------------------------------|
| C17 - 360 MMF. Var. Cond. | R13 - 50 OHMS. |
| C24 - 5 MFD. 35V. Elect. | R51 - 135 OHM. Cordohm |
| C25 - 16-8-5 MFD | R68 - 400 OHMS |
| C38 - .003 MFD. 800V. | R307 - 2,500 OHMS |
| C315 - .01 MFD. 200V | R316 - 15,000 OHMS |
| C316 - .01 MFD. 400V | R322 - 50,000 OHMS |
| C320 - .02 MFD. 200V | R328 - 1 MEG. |
| C330 - .05 MFD. 200V | RE408 - 300,000 OHM Vol. Cont. |
| C336 - .1 MFD. 400V | P.L. - Pilot Lights |
| C401 - .0001 Mica | S.L. - Speaker Field |



SEARS-ROEBUCK & CO.

MODEL 7177
Schematic

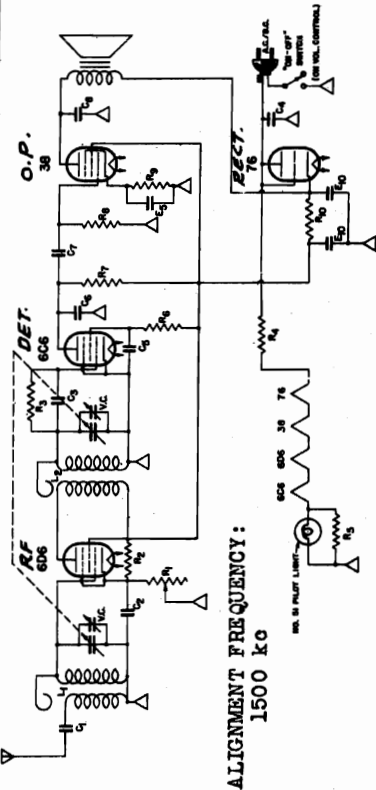
PARTS LIST

Part No.	Description	List Price
1042852	Antenna Coil	\$1.25
1042420	Volume Control	1.10
1041625	Variable Condenser	3.75
1042852	Interstage Coil	1.25
104206	Filter Condenser	1.35
1045831	Speaker	3.75
104134	Output Transformer	1.25
104574	Speaker Cone	2.50
104559	Cordohm	.80
1042149	Canohm	.50
1044036	Dial	2.50

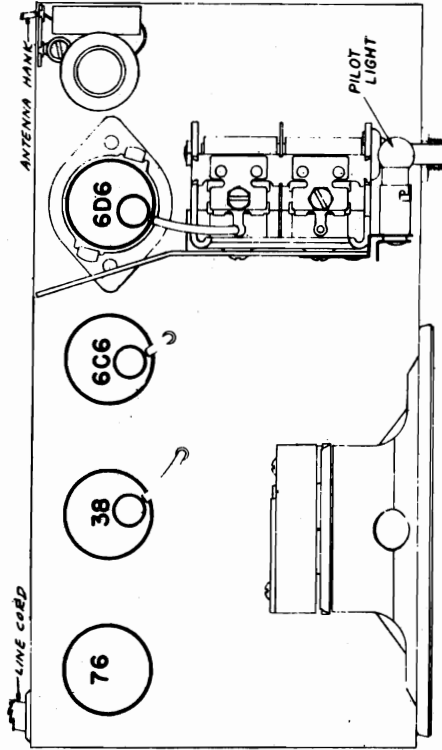
Prices subject to change without notice.

MODEL 7211, Ch. 110.7211
 MODELS 7212, 7212A
 Chassis 110.7212
 Schematics, Socket, Trimmers
 Alignment

SEARS-ROEBUCK & CO.



R ₁	25,000 OHM VOL. CONTROL	C ₁	.005 400 V.
R ₂	35,000 - 1/4 WATT	C ₂	.02 100 V.
R ₃	3,000,000 - 1/4 WATT	C ₃	.005 400 V.
R ₄	250 - 1/4 WATT	C ₄	.05
R ₅	31 - 1/4 WATT	C ₅	.02 200 V.
R ₆	6,000,000 - 1/4 WATT	C ₆	.00005 MCA
R ₇	1,000,000 - 1/4 WATT	C ₇	.02 200 V.
R ₈	1,000 - 1/4 WATT	C ₈	.005 400 V.
R ₉	2,700 - 1/4 WATT		

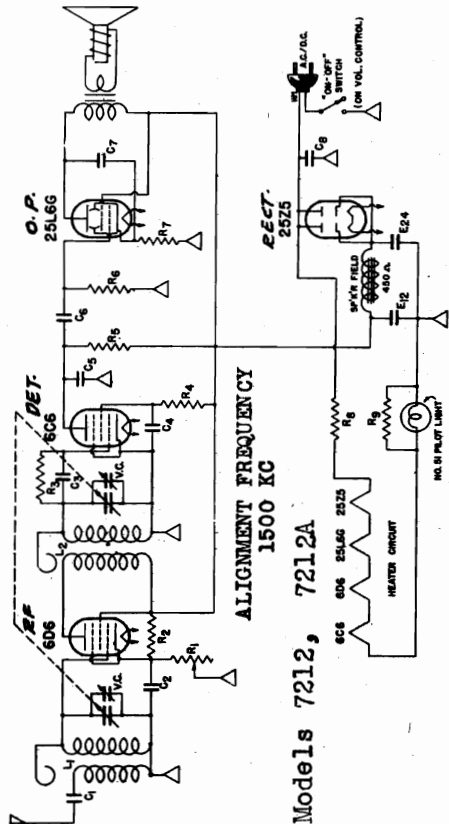


POWER SUPPLY:
 All models 105-125 volts, 25-60 cycle or DC, 35 watts

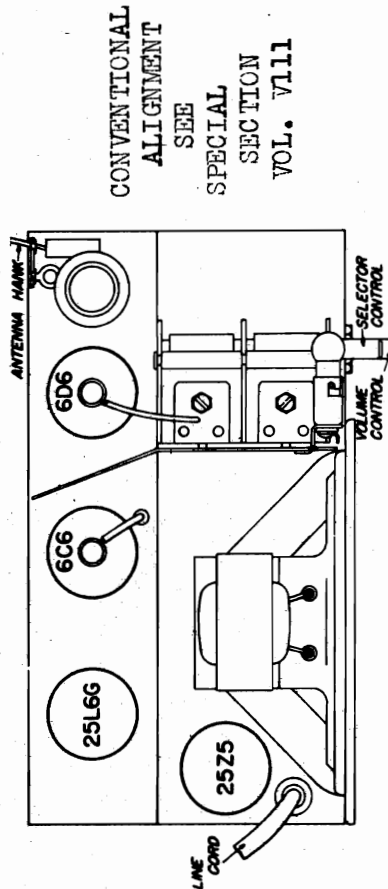
FREQUENCY RANGE:
 Broadcast 540-1700 kc

POWER OUTPUT:
 Type Single Pentode
 Undistorted3 watts
 Maximum6 watts

APRIL 7, 1938



R ₁	25,000 OHM VOL. CONTROL	C ₁	.005 - 400 V.
R ₂	35,000 - 1/4 WATT	C ₂	.02 200 V.
R ₃	3,000,000 - 1/4 WATT	C ₃	.005 - 400 V.
R ₄	250 - 1/4 WATT	C ₄	.02 - 200 V.
R ₅	31 - 1/4 WATT	C ₅	.00025 - MCA
R ₆	6,000,000 - 1/4 WATT	C ₆	.02 - 200 V.
R ₇	1,000,000 - 1/4 WATT	C ₇	.01 - 400 V.
R ₈	150 - 1/4 WATT	C ₈	.1
R ₉	165 - 1/4 WATT		



POWER SUPPLY:
 All models 105-125 volts, 50-60 cycle or DC, 40 watts

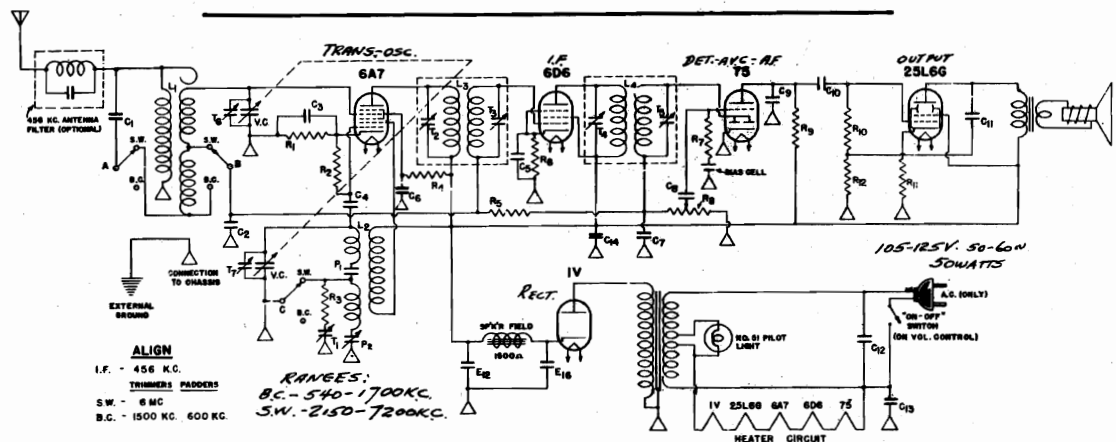
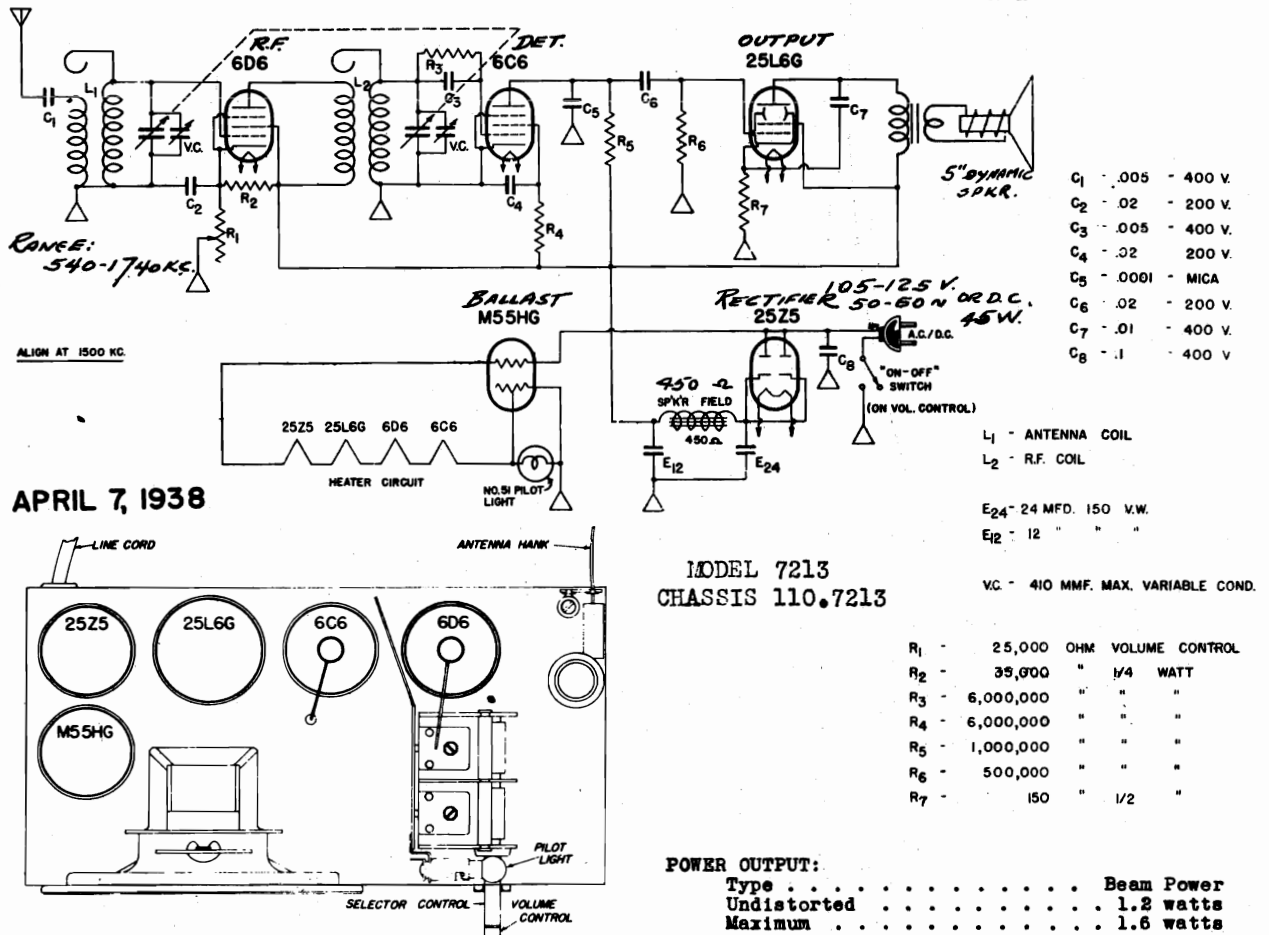
FREQUENCY RANGE:
 Broadcast 540-1470 KC

POWER OUTPUT:
 Type Beam Power
 Undistorted1 watt
 Maximum 1.5 watts

APRIL 7, 1938

SEARS ROEBUCK & CO.

MODEL 7213, Ch. 110.7213
Schematic, Socket, Trimmers
MODEL 7214, Ch. 110.7214
Schematic



R ₁	400	OHM	1/4 WATT
R ₂	50,000	"	"
R ₃	85	"	"
R ₄	35,000	"	"
R ₅	3,000,000	"	"
R ₆	400	"	"
R ₇	750,000	"	"
R ₈	500,000	"	VOL. CONTROL
R ₉	500,000	"	1/4 WATT
R ₁₀	500,000	"	"
R ₁₁	300	"	1/2 "
R ₁₂	600 TO 800	"	1/4 "

SWITCHES A,B,C, 3 POLE DOUBLE
THROW WAVE BAND SWITCH

POWER OUTPUT:

Type	Beam Power
Undistorted	1.75 watts
Maximum	2.5 watts

LOUD SPEAKER:

Type	Dynamic
Size	5"
Field Resistance	1500 ohms

APRIL 7, 1938

MODEL 7214, Ch. 110.7214
Socket, Trimmers, Alignment SEARS-ROEBUCK & CO.
MODEL 7215, Ch. 110.7215
Tuner, Alignment

MODEL 7215
FACTORY IDENTIFICATION NO. 110.7215
AUTOMATIC TUNING CONTROL ADJUSTMENT

This radio leaves the factory with the push button unmet, and the user will have to make the necessary adjustments for setting the buttons.

The following is the procedure to be followed in making the adjustments for each station.

Note: Before attempting to set buttons read through the ENTIRE PROCEDURE VERY CAREFULLY.

1. Decide on station you wish to receive.
2. From the radio section of your daily newspaper find the transmitting frequency in kilocycles of the station.

3. Refer to the diagram underneath cabinet and see which set of adjustment screws will have a tuning range that includes the frequency of the station desired. This is the pair of screws to be adjusted for this particular station. The ranges are listed under each pair of adjustment screws.

4. From the same diagram, after finding where the proper pair of adjustment screws are located, trace the dotted line connecting these screws to one of the push buttons. This is the button which, after the adjustments are completed, will tune in the station.

5. Push button located by paragraph 4 "IN".

6. Turn volume control knob on full (to the extreme right) and adjust screw marked "0V" until desired station is heard. If when making this adjustment, a number of stations can be brought in as the screw is turned and it is doubtful which station is the correct one, press button No. 6 (Manual Tuning) "IN" and more dial pointer by turning station selector knob to the number on the dial that corresponds to the frequency of the station. (The number on the dial must be multiplied by ten to obtain required frequency in kilocycles). Listening to the program being broadcast will identify the station when adjusting screw "0V".

7. Adjust screw marked "A" for maximum volume, retarding the volume control and readjusting if necessary. This completes the adjustments for this particular station.

8. Cut out name of station from list supplied and insert in button.

9. Insert celluloid disc.

10. In a like manner select a station for each of the other buttons and make necessary adjustments for each station.

ALIGNMENT PROCEDURE

Output Meter Connections Across Primary Output Transformer
 Output Meter Reading to indicate 0.050 watt
 For Weston Type 571 Output Meter on 15 volt scale 9 volts
 Average sensitivity in MV for .05 watts output See chart below
 Connection of generator ground lead To chassis
 Connection of generator antenna lead To chassis
 Generator modulation App. 30% at 400 cycles
 Position of volume control Fully clockwise

PUSHBUTTON SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMERS ADJUSTED	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Manual	**	456 KC	Grid 6D6	T ₂ , T ₃ , T ₁₀	I.F.	5000
	**	456 KC	Grid 6A7	T ₆ , T ₇	I.F.	120
	600 (Rock)	600 KC	Ant.	P	Osc.	25
	1500	1500	Ant.	T ₁₂ , T ₁₁	Osc. R.F.	22

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

It is advisable to repeat the entire alignment procedure band by band and in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

Values shown under "Microvolts" are only approximate.

**Short oscillator section of variable condenser.

First time T₉ is about one turn misaligned by loosening center screw.

MODEL 7214
FACTORY IDENTIFICATION NO. 110.7214
ALIGNMENT PROCEDURE

PRELIMINARY:

Output Meter connections Across output transformer
 Output Meter Reading to indicate 0.050 watt
 For Weston Type 571 Output Meter on 15 volt scale 9 volts
 Average sensitivity in MV for .05 watts output See chart below
 Dummy antenna value in series with generator output 100 Mads.
 Connection of generator ground lead To chassis
 Generator modulation App. 30% at 400 cycles
 Position of volume control Fully clockwise

WAVE BAND POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	GENERATOR CONNECTION	TRIMMERS ADJUSTED	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"5B"	6 MC	456 KC	6A7 Grid	T ₂ , T ₃ , T ₄ , T ₅ , T ₇ , T ₈	I.F.	140
"5B"	6 MC	6 MC	Ant. lead	P2	Osc., R.F.	50
"5C"	600 (Rock)	600 KC	Ant. lead	T1	Osc.	30
"5C"	1500	1500 KC	Ant. lead	T1	Osc.	45

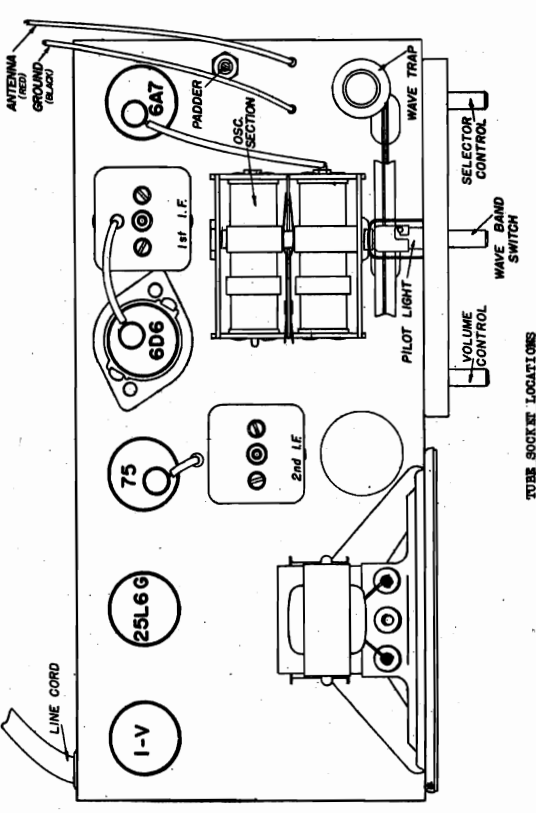
IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

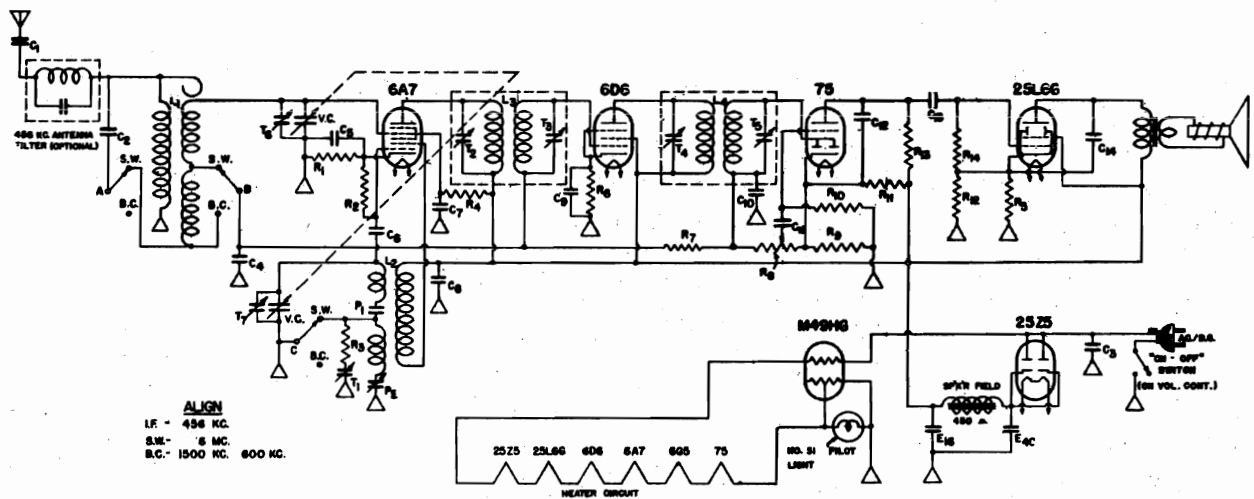
It is advisable to repeat the entire alignment procedure band by band and in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

Values shown under "Microvolts" are only approximate.



SEARS-ROEBUCK & CO.

MODEL 7220, Ch. 110.7220
Schematic Notes

ALIGN
 I.F. - 455 KC.
 S.W. - 5 MC.
 B.C. - 1500 KC. 600 KC.

R ₁	400	OHM	1/4 WATT
R ₂	50,000	"	"
R ₃	85	"	"
R ₄	33,000	"	"
R ₅	150	"	1/2
R ₆	400	"	1/4
R ₇	3,000,000	"	"
R ₈	500,000	"	VOL. CONTROL
R ₉	200	"	1/2 WATT
R ₁₀	750,000	"	"
R ₁₁	25,000	"	"
R ₁₂	600 to 800	"	"
R ₁₃	500,000	"	"
R ₁₄	500,000	"	"

SWITCHES A,B,C - 3 POLE DOUBLE
 THROW WAVE BAND SWITCH

L₁ - COMBINATION ANTENNA COIL
 L₂ - COMBINATION OSCILLATOR COIL
 L₃ - 455 K.C. INPUT I.F.
 L₄ - 455 K.C. OUTPUT I.F.

P₁ - 1380 MMF. MICA PADDER
 P₂ - 700 MMF. MAX. PADDER

E₁₆ - 16 MFD. 150 V.W.
 E₄₀ - 40 " " "

V.C. - 410 MMF. MAX. VARIABLE COND.

T₁ - 3-35 MMF. TRIMMER

C ₁	.005	-	400 V.
C ₂	.005	-	"
C ₃	.1	-	400 V.
C ₄	.05	-	200 V.
C ₅	.05	-	"
C ₆	.0001	-	MICA
C ₇	.02	-	200 V.
C ₈	.02	-	200 V.
C ₉	.05	-	"
C ₁₀	.00025	-	MICA
C ₁₁	.02	-	200 V.
C ₁₂	.00025	-	MICA
C ₁₃	.02	-	200 V.
C ₁₄	.01	-	400 V.

ELECTRICAL SPECIFICATIONS

APRIL 7, 1938

TUBES AND FUNCTIONS:

6A7 Translator-Oscillator
 6D6 IF
 75 AVC, detector, 1st audio

25L66 Output
 25Z5 Rectifier
 M49HG Ballast tube

POWER SUPPLY:

All models available 105-125 volts, 25-60 cycle or DC, 45 watts

FREQUENCY RANGES:

Broadcast 540-1700 KC
 Short Wave 2150-7200 KC

ALIGNMENT FREQUENCIES:

	Oscil.	Oscil.
	Trimmer	Padder
Broadcast	1500 KC	600 KC
Short Wave	6 MC	Fixed

POWER OUTPUT:

Type	Beam Power
Undistorted	.8 watts
Maximum	1.5 watts

LOUD SPEAKER:

Type	Dynamic
Size	5"
Field resistance	450 ohms

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:

Left Knob . . "On-Off" switch, volume control
 Center Knob Wave change switch
 Right Knob Tuning

CONTROL OPERATION:

Turning right; power on; volume increase
 Left Foreign; right Broadcast.

Under certain conditions, the chassis may be above ground potential. Do not allow any grounded object to come into contact with the chassis while the line cord is plugged in. Also, be careful when working on the chassis out of its cabinet, to avoid shocks.

If the power supply is DC, the power cord plug must be in its receptacle in the proper way. If the receiver does not operate after being turned on for a minute, reverse the polarity by removing the power cord plug from its receptacle and turning it half way around before re-inserting it in the receptacle.

MODEL 7220, Ch. 110.7220
MODEL 7226, Ch. 110.880
Socket, Trimmers
Alignment

SEARS-ROEBUCK & CO.

ALIGNMENT PROCEDURE

MODEL 7226 CHASSIS 110.880

ALIGNMENT PROCEDURE

7220 CHASST 110-7220

Output Meter Connections	Across Primary Output Transformer
Output meter reading to indicate 0.05 watt	
Output meter reading to indicate 100 watts	
Output meter Type 571 Output meter on 15 volt scale	
Average sensitivity in mV for .05 watt output	9 volts
See chart for 100 watt output	See Chart
Bummy antenna value in series with generator output	100 mho
Connection of generator ground lead	To chassis
Position of volume control	App. 30% off
Position of tone control	Fully clockwise

Output-Meter Connections	Across primary of output transformer
Output meter reading to indicate 0.000 watt	
For testing type 871 output meter on 100 ohms	9 volts
Output	See chart below
Thumseterminal value in series with generator output	100 MUFOS
Connection of generator ground lead	To chassis
Generator modulation	App. 30% at 400 cycles
Position of volume control	Fully clockwise

Position of Dial Pointer	Generator Frequency	Generator Connection	Transformers Aided	Transformer Function	Approximate Max Voltage
**	456 KC	Grid 6D6	T ₂ , T ₆ , T ₈ T ₇ , T ₆ , T ₈	I.P.	2600
**	456 KC	Grid 6A7	T ₄ , T ₅	I.P.	37
900 KC (Rock)	600 KC	Ant.	F	Org.	20
1500 KC	1500 KC	Ant.	T ₂ , T ₃	Org., R. P.	16
500 KC	456 KC	Ant.	T ₁	Wave Trap	***

<u>WAVE BAND</u>	<u>POSITION</u>	<u>GENERATOR</u>	<u>GENERATOR</u>	<u>TRIMMERS</u>	<u>TRIMMER</u>	<u>APPROXIMATE</u>
	<u>CONNECTION</u>	<u>FREQUENCY</u>	<u>CONNECTION</u>	<u>ADJUSTED</u>	<u>FUNCTION</u>	<u>MICROVOLTS</u>
	SW	6 MC	6A7 Grid	T2, T3, T4, T5	I.F.	70
	SW	6 MC	Ant. lead	T7, T6	Osc., H.F.	45
	BC	600 (Rock)	Ant. lead	P2	Osc.	12
	BC	1500	Ant. lead	T1	Osc.	16

IMPORTANT ALIGNMENT NOTES

IMPORTANT ALIGNMENT NOTES

Where indicated by the word "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

Always keep the output from the test oscillator at its lowest possible value, as the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

Values shown under "Microvolts" are only approximate.

*First time T7 is misaligned about one turn by loosening center screw.

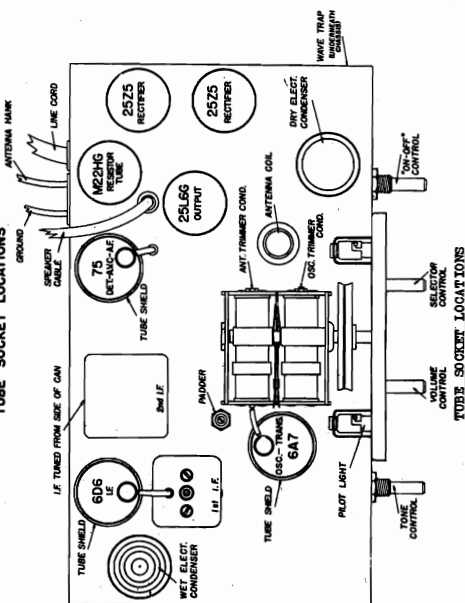
***Short oscillator section of variable condenser.

***We have
two different conditions of one

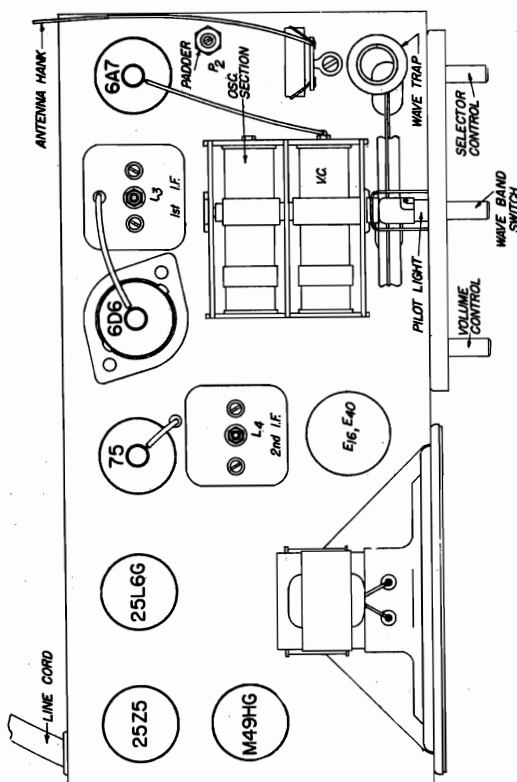
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TUBE SOCKET LOCATIONS

TUBE SOCKET LOCATIONS



CUBE SOCKET LOCATIONS



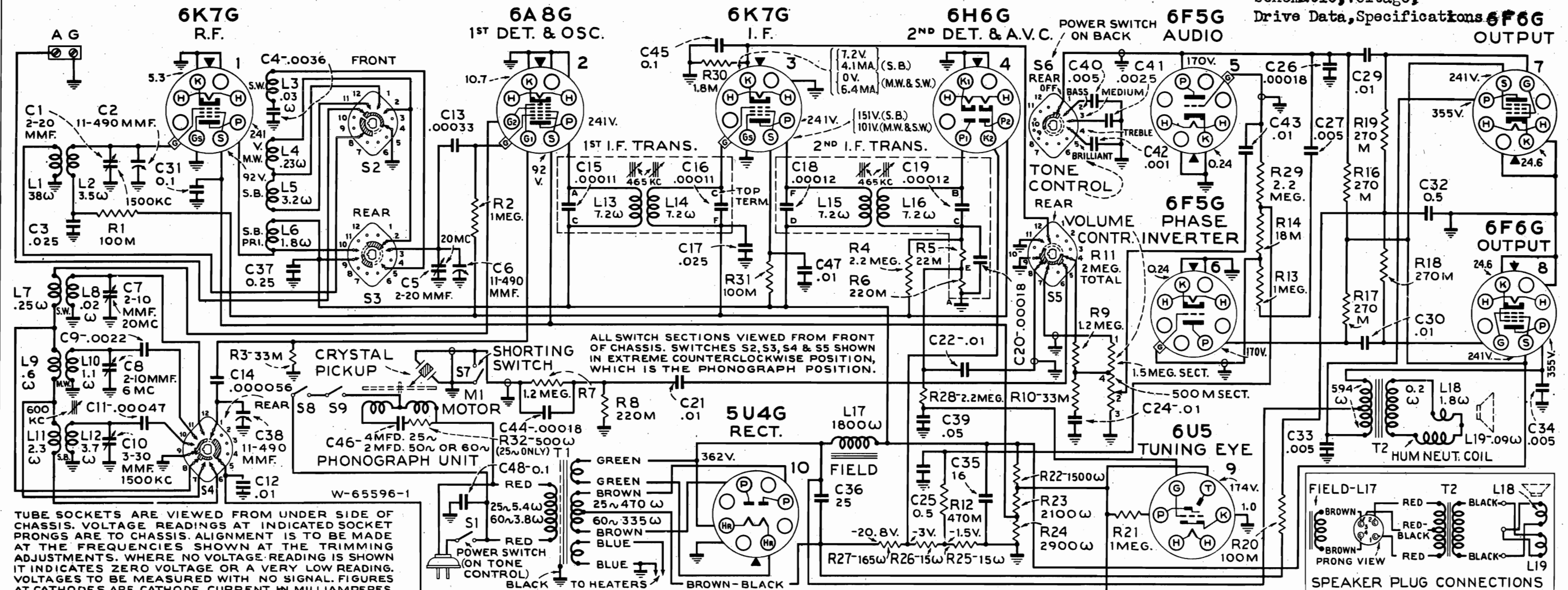
SEARS-ROEBUCK & CO.

MODEL 7221, Chassis 126.202

Schematic, Voltage,

Drive Data, Specifications & P6G

OUTPUT



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMING ADJUSTMENTS. WHERE NO VOLTAGE READING IS SHOWN IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. VOLTAGES TO BE MEASURED WITH NO SIGNAL. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.

ALL SWITCH SECTIONS VIEWED FROM FRONT OF CHASSIS. SWITCHES S2, S3, S4 & S5 SHOWN IN EXTREME COUNTERCLOCKWISE POSITION, WHICH IS THE PHONOGRAPH POSITION.

In cases where the customer objects to "boominess," the following circuit change may be made to minimize low-frequency response.

Change condenser C43 to .001 mfd., or in the most stubborn cases to .0001 mfd.

Add a 2 megohm resistor across the crystal pickup circuit connecting it from junction of pickup cable, C44, and R7 to chassis. This will reduce low-frequency response.

Mount the speaker away from the baffle by about 1/4" to 3/8".

POWER SUPPLY RATINGS AVAILABLE..... 105-125 volts, 60 cycles 120 watts 150 watts
105-125 volts, 50 cycles 120 watts 155 watts
105-125 volts, 25 cycles 120 watts 150 watts

FREQUENCY RANGES:

Standard Broadcast (S.B.)..... 540-1,720 kc
Medium Wave (M.W.)..... 2.3-7.5 mc
Short Wave (S.W.)..... 7.5-22 mc

INTERMEDIATE FREQUENCY.....

POWER OUTPUT:

Type..... Push-Pull Pentode
Undistorted..... 10 watts
Maximum..... 12 watts

OPERATING FEATURES:

Phonograph-Radio operation
Automatic Phonograph Mechanism with
self-starting, synchronous-type motor

Four-point Tone Control
Automatic Volume Control

PHONOGRAPH:

Type..... Automatic-Manual
Record Capacity.... Eight 10-inch or Seven 12-inch
Turntable Speed..... 78 R.P.M.
Type of Pickup..... Crystal
Pickup Impedance..... 80,000 ohms at 1,000 cycles

ALIGNMENT FREQUENCIES:

Band "S.W."..... 20 mc (osc., ant.)
Band "M.W."..... 6 mc (osc.)
Band "S.B."..... 1,500 kc (osc., ant.), 600 kc (osc.)

LOUDSPEAKER:

Type..... Electrodynamic
Size..... 12 inches
V.C. Impedance..... 2.25 ohms at 400 cycles
Field Coil Resistance..... 1,800 ohms
App. Field Coil Voltage Drop..... 115 volts

CHASSIS FEATURES:

No. R-F stages (Band "S.B.")..... One
No. I-F stages..... One
Antenna..... Doublet or Conventional
Tuning Eye
Line Noise Electrostatic Transformer Shield
Aural-Compensated Volume Control
Magnetite-Core Adjusted I-F Transformers and Band
"S.B." Low-Frequency Oscillator Tracking

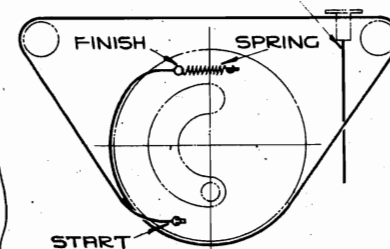
DIAL DRIVE SYSTEM

AND POINTER DRIVE HOOKUP

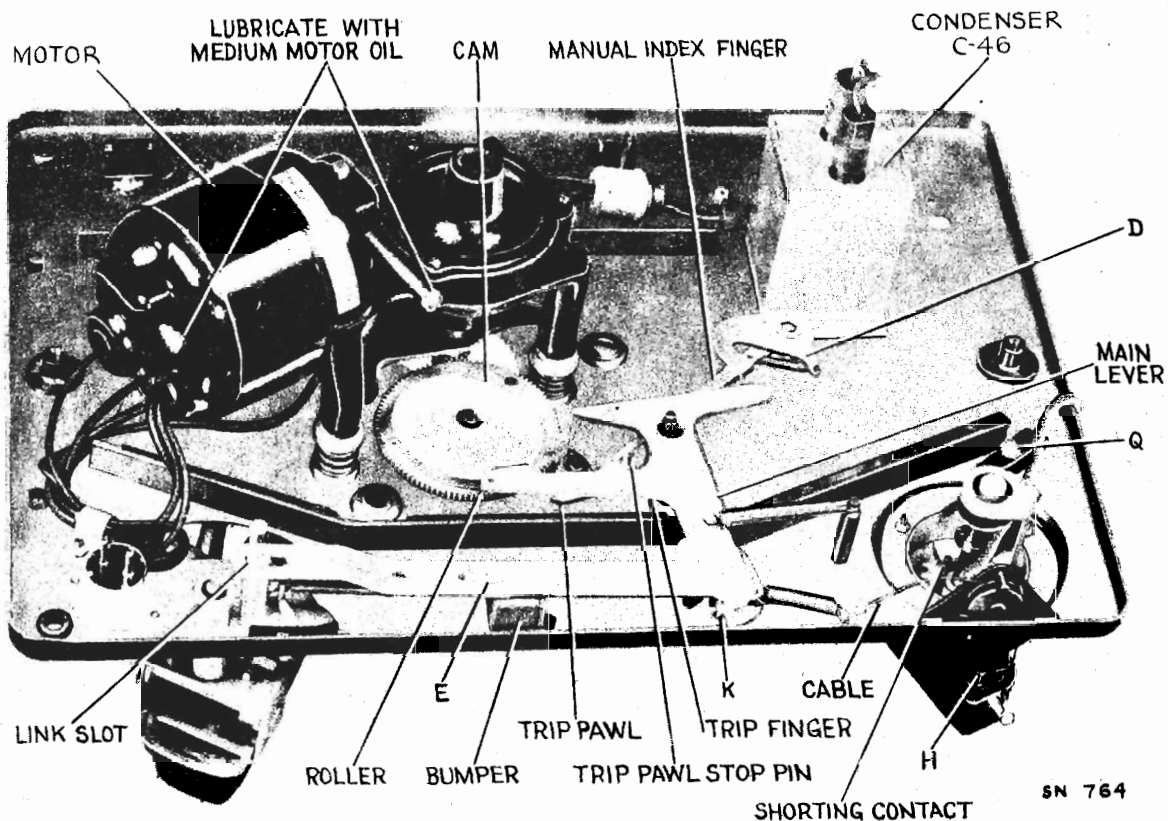
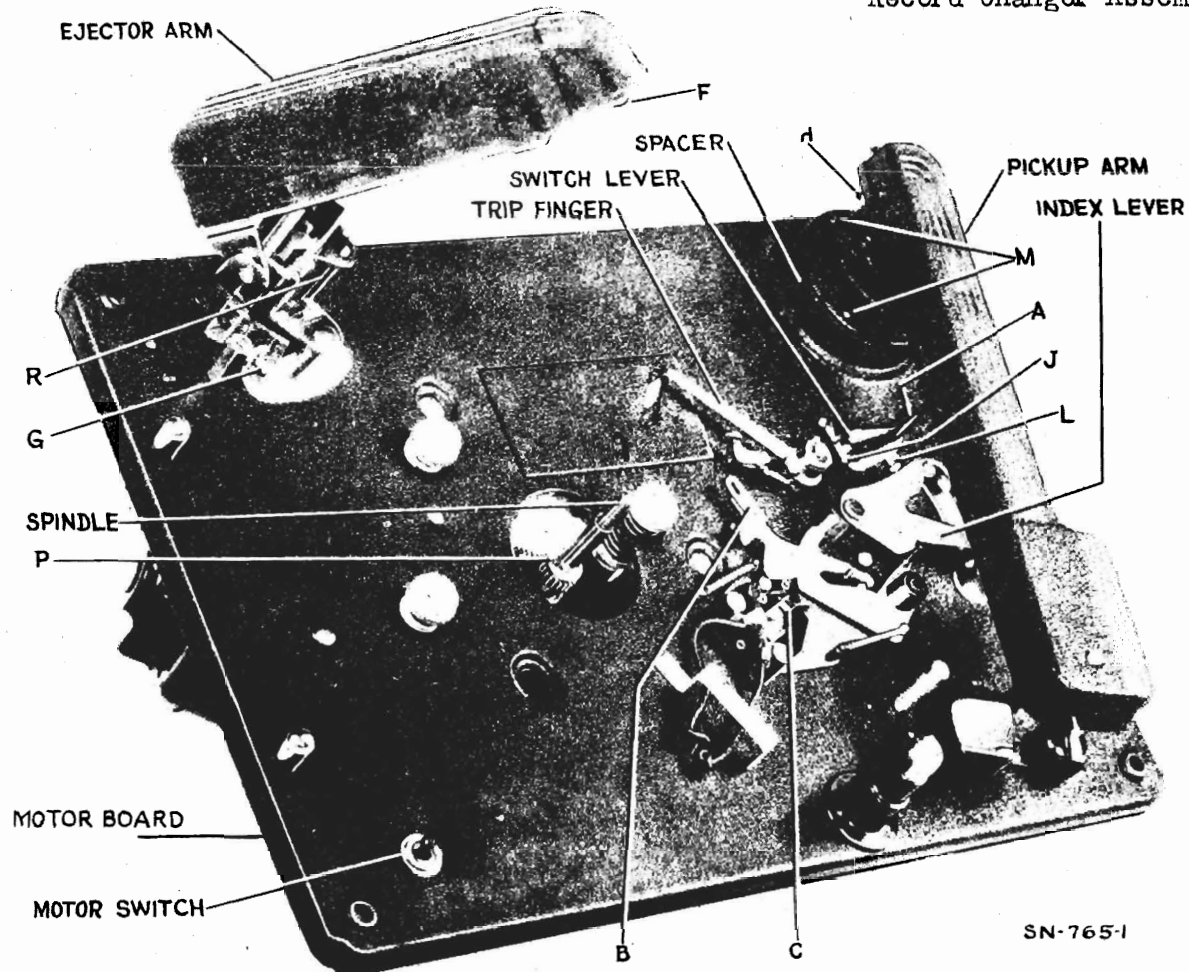
57 RL 106

MAY 27, 1938

POINTER SOLDERED TO DRIVE CORD

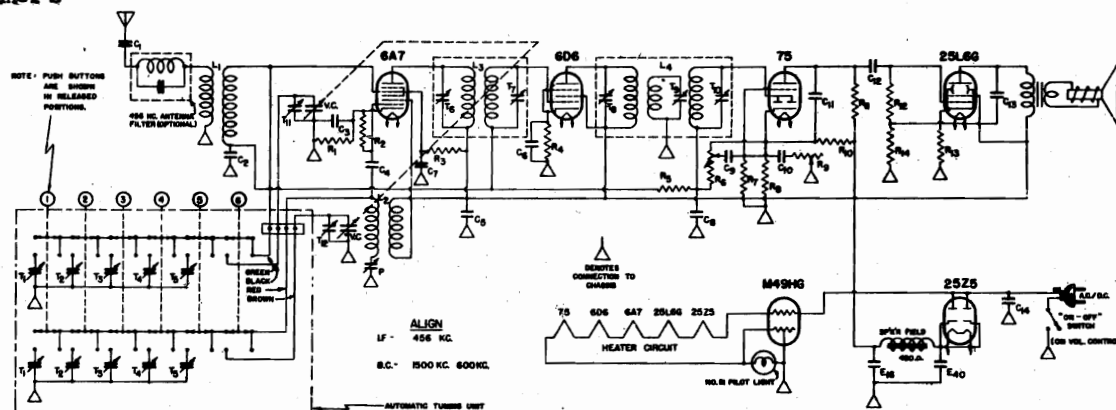


SEARS-ROEBUCK & CO.

MODEL 7221, Ch. 126.202
Record Changer Assembly

MODEL 7215, Ch. 110.7215
Schematic, Socket, Tuner
Trimmers

SEARS-ROEBUCK & CO.



R ₁	400	OHM	1/4	WATT
R ₂	50,000	"	"	"
R ₃	35,000	"	"	"
R ₄	400	"	"	"
R ₅	3,000,000	"	"	"
R ₆	500,000	"	"	"
R ₇	750,000	"	1/4	WATT
R ₈	800	"	1/2	"
R ₉	500,000	"	"	"
R ₁₀	25,000	"	1/4	WATT
R ₁₁	500,000	"	"	"
R ₁₂	500,000	"	"	"
R ₁₃	150	"	"	"
R ₁₄	500 TO 800	"	"	"

L ₁	ANTENNA COIL
L ₂	OSCILLATOR COIL
L ₃	455 KC. INPUT I.F.
L ₄	455 KC. TRIPLE TUNED OUTPUT I.F.
P	700 MMF. MAX. PADDER
E ₁	16 MFD. 150 V.W.
E ₄₀	40 " "
VC	410 MMF. MAX. VARIABLE COND.
T ₁	150-420 MMF.
T _{2, T₃}	100-300 MMF.
T ₄	50-200 MMF.
T ₅	20-140 MMF.

C ₁	.005	400	V.
C ₂	.05	200	V.
C ₃	.05	200	V.
C ₄	.0001	MCA	"
C ₅	.05	200	V.
C ₆	.05	"	"
C ₇	.02	"	"
C ₈	.00025	MCA	"
C ₉	.02	200	V.
C ₁₀	.005	400	V.
C ₁₁	.00025	MCA	"
C ₁₂	.02	200	V.
C ₁₃	.01	400	V.
C ₁₄	.1	"	"

POWER SUPPLY:

All models available 105-125 volts, 25-60 cycle or DC, 45 watts

FREQUENCY RANGE:

Broadcast 540-1700 KC

ALIGNMENT FREQUENCIES:

	Oscil.	Oscil.
	Trimmer	Padder
Broadcast	1500 KC	600 KC

POWER OUTPUT:

Type	Beam Power
Undistorted	1.2
Maximum	1.6

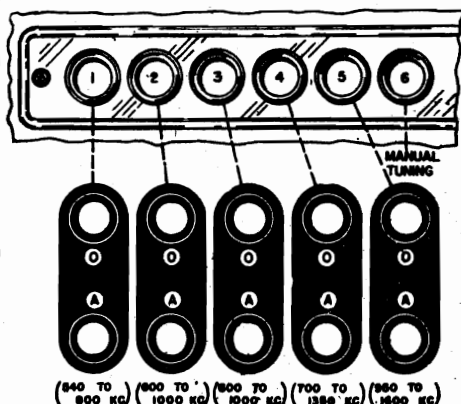
LOUD SPEAKER.

Type	Dynamic
Size	5"
Field resistance	450 ohms

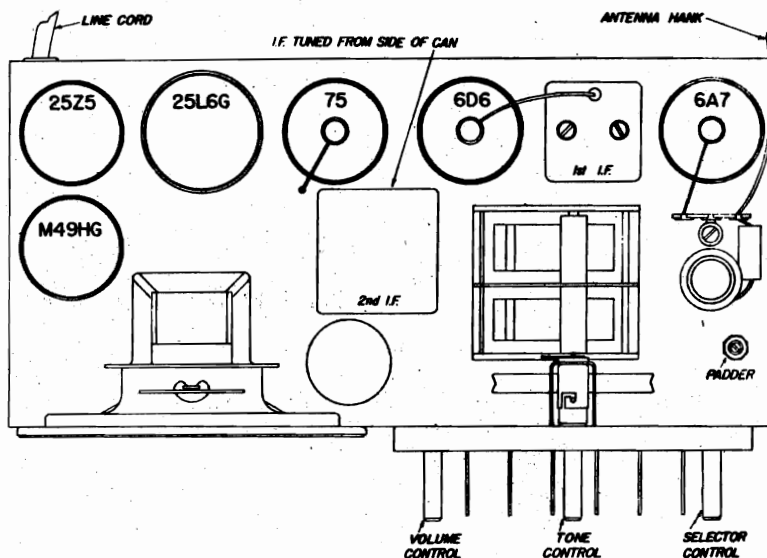
AUTOMATIC TUNING CONTROL:

There are six buttons on the front panel. Five of them can be set so that by simply pushing the button marked with the station's call letters, any of five different broadcast stations can be received.

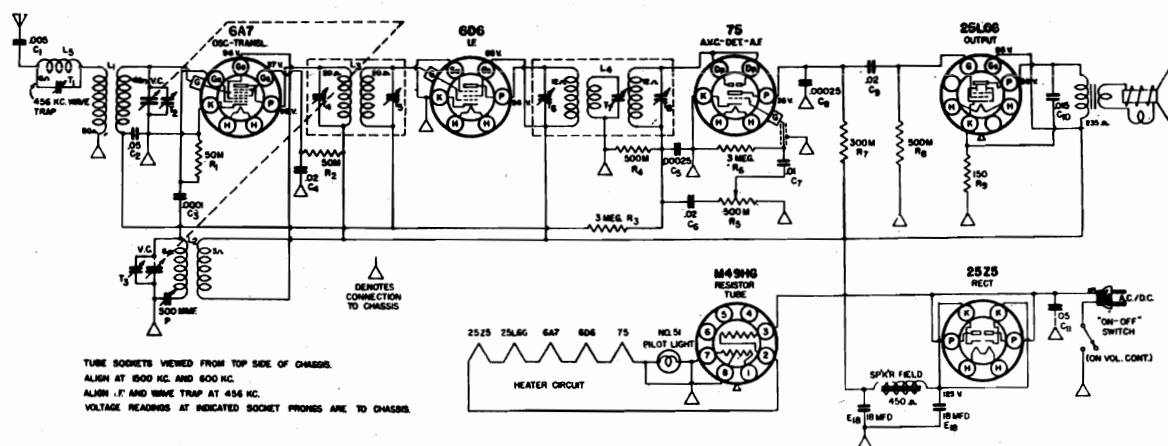
The sixth button is used to cut out the automatic tuning and convert the set for use with the regular dial and manual tuning.



AUTOMATIC TUNING ADJUSTMENTS



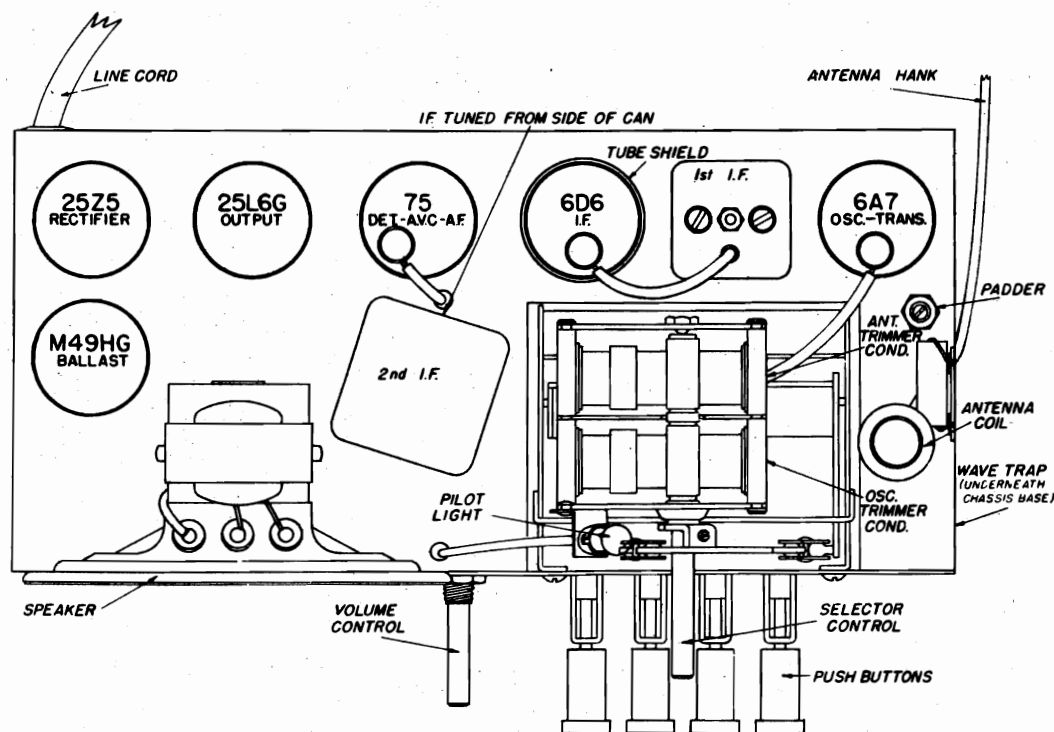
APRIL 7, 1938



FOR TUNER, SEE INDEX

Type	Dynamic
Size	5"
Field resistance	450 ohms

Left knob, "On-Off" switch, volume control
Upper Right Knob tuning



57RL109

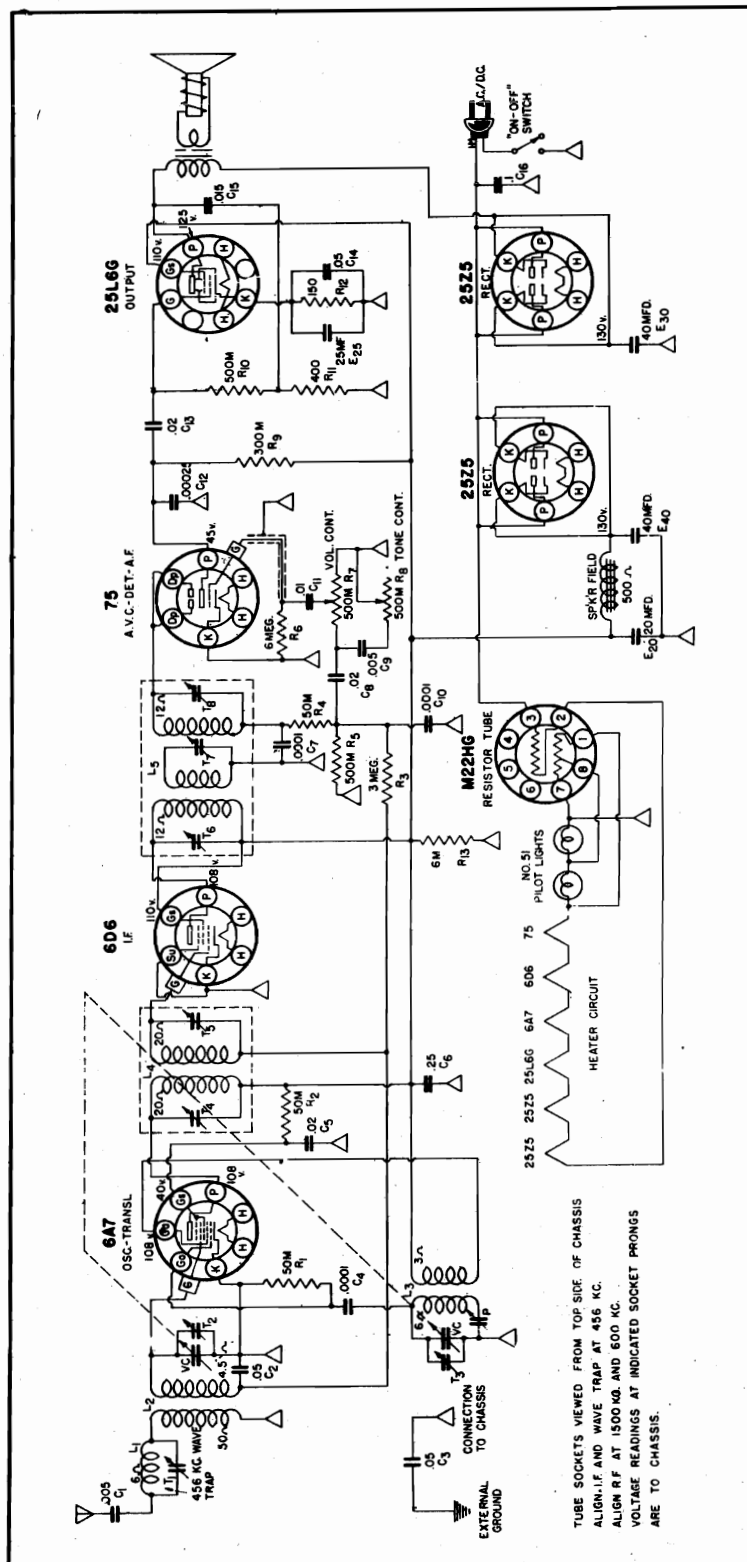
JUNE 16, 1938

MODEL 7226, Ch. 110.880
Schematic, Voltage
Alignment

SEARS-ROEBUCK & CO.

57RL 121

JULY 11, 1938



POWER SUPPLY:
All models available 105-125 volts, 25-60 cycle or DC, 45 watts

FREQUENCY RANGE:
Broadcast 540-1740 KC

POWER OUTPUT:
Type Beam Power
Undistorted 1.7 Watts
Maximum 2.7 Watts

OPERATING CONTROLS:
Left Knob Tone control
Left Center Volume control
Right Center Selector control
Right Knob "On-Off" switch

MECHANICAL SPECIFICATIONS

CONTROL OPERATION:
Turning right;
Turning right;
Turning right;

mellow to brilliant
volume increase
power on

ALIGNMENT FREQUENCIES:

Oscill.
Trimmer
Padder
1500 KC 600 KC

LOUD SPEAKER:

Type Dynamic
Size 8"
Field Resistance 500 ohms

THE GROUND:

In noisy locations, it may be desirable to connect the black lead in rear of chassis to a water pipe or radiator. This may eliminate much of the interference.

CAUTION: Do not connect a ground wire directly to the chassis; otherwise harm will result.

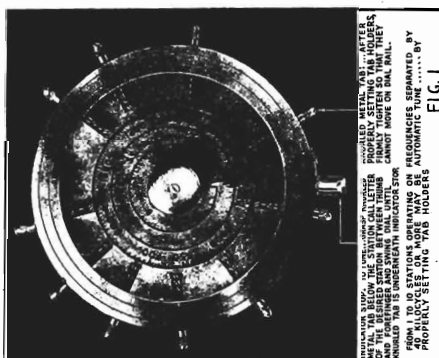
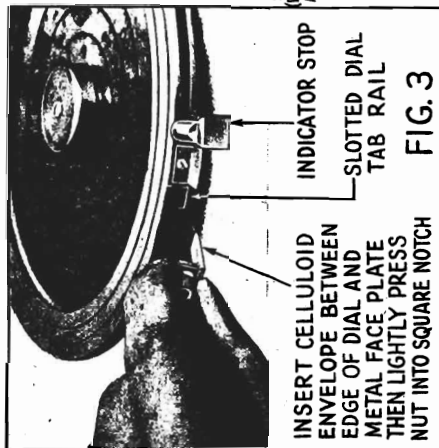
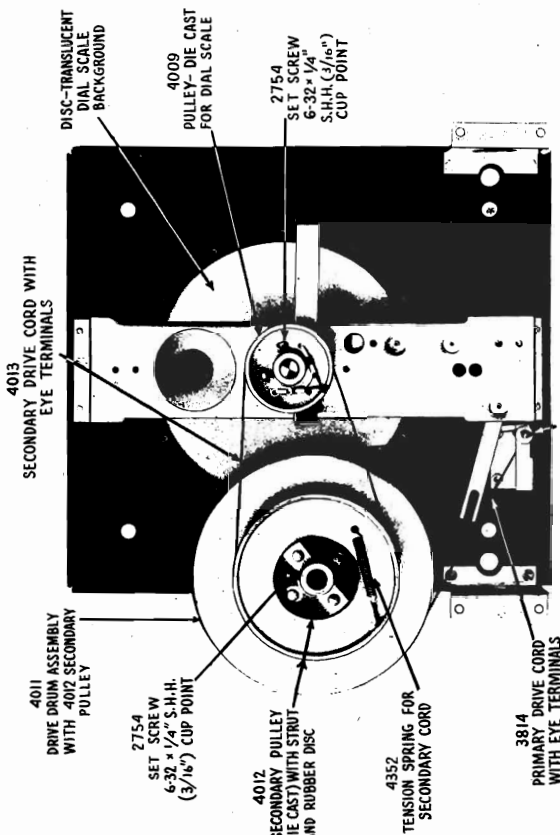
SENTINEL RADIO CORP.

MODEL "Automatic Tune"
Wheel Dial
Assembly, Details, Notes
For MODELS 78B, 78BE, 82A
82AE, 86AE, 91B, 95B

SERVICE NOTES for "AUTOMATIC-TUNE" WHEEL DIAL

USED WITH MODELS 78B, 78BE, 82A, 82AE, 86AE, 91B AND 95B

DIAL MECHANISM



4. INSERT CELLULOID ENVELOPE INTO A METAL TAB FRAME BY:

- Hold curved end of celluloid envelope to metal tab holder and insert celluloid into tab frame.
- Gently push celluloid inward until curved end of envelope touches edge of celluloid envelope tab frame.
- Arrange tabs in numerical order according to station frequency.

5. SET THE METAL TAB HOLDERS ON DIAL BY: (See Fig. 3)

- Set the first metal tab holder for the station that broadcasts on the lowest frequency—next number tab for the selected station operating on the next lowest frequency, continuing on in this way until a tab has been set for all of the selected stations.
- Carefully tune in the station which broadcasts on the lowest frequency—least number of kilocycles.
- Insert celluloid envelope between edge of dial and metal tab holder. Push down on end of knurled tab into square notch in slotted dial rail—then slide tab holder along rail until the knurled tab is underneath the indicator stop on the dial at which point station call letter strip will appear directly below the indicator line on the face of the dial.
- Tighten tab holders as much as possible without moving dial by turning knurled tab to the right—then swing dial so knurled tab is away from indicator stop on the dial and firmly tighten so that it cannot move on the dial rail. DO NOT USE PLIERS TO TIGHTEN.

REPLACING No. 4000 DIAL GLASS SCALE ASSEMBLY

As it requires special tools to properly set part No. 4005 shaft assembly on part No. 4000 glass scale—we will ship all orders for No. 4000 glass scales with the No. 4005 shaft assembled on the glass scale.

While an "Automatic-Tune" tab may be set for distant weak stations, better results will be obtained by setting the "Automatic-Tune" tabs for strong nearby or local stations.

AFTER IT IS DETERMINED WHAT STATIONS YOU WISH TO "AUTOMATIC-TUNE", OBTAIN THE "AUTOMATIC-TUNE" TABS, AND SET STATION TABS BY:

- Lay station call letter tab sheet on flat surface and with a razor or sharp knife cut out desired station tabs by cutting around black edges of each tab.
- To illustrate the proper setting of station paper strip and metal tab holder the receiver is shipped from the factory with station tab properly set from the factory. Since the station tab properly set appears directly below the 720 kilocycle calibration on the face of the dial and that the knurled tab is firmly secured against the dial rail. If the WGN is not one of the selected stations or if a tab is to be set for a station which operates on a frequency less than 720 kilocycles, remove the WGN celluloid envelope and station call letter paper strip tab holder by grasping knurled end of metal tab with finger tips and turn one or two turns to the left.
- Slide the metal holder tab to square notch on dial rail and push down on end of knurled tab attached tab stop—and pull outward on tab until it is pulled free from tab holder rail.
- Slide the celluloid envelope out of the metal holder.

3. PLACE EACH SELECTED STATION CALL LETTER ENVELOPE BY:

- Hold celluloid envelope with curved end up.
- Place station call letter paper strip inside of celluloid envelope with printed call letters upward.

WHEN INSTALLING PART No. 4000 GLASS ASSEMBLY WITH No. 4005 SHAFT ATTACHED carefully follow procedure in order given:

- Insert No. 4005 shaft into main bushing attached to the cadmium plated bracket on back of dial face.
- Place steel spacer washer and brass tension spring in order named over end of No. 4005 shaft.
- Place the small die cast primary pulley No. 4009 on shaft—do not tighten No. 2754 set screws.
- Loosen the two set screws in brass spacer collar on the No. 4005 shaft.

Adjust brass spacer collar—by sliding collar on shaft—so that there will be approximately 1/8" clearance between the bottom of metal tab holder and the face plate. Firmly retighten brass collar and No. 2754 die cast pulley set screws. Failure to provide proper clearance will result in scratches on dial face and the dial mechanism will not operate freely.

TO INSTALL No. 3814 PRIMARY DRIVE CORD:

- Looking at back of dial, wrap dial cord twice around No. 4355 drive shaft in CLOCKWISE direction.
- Hook No. 3462 tension spring into loops at end of dial cord.

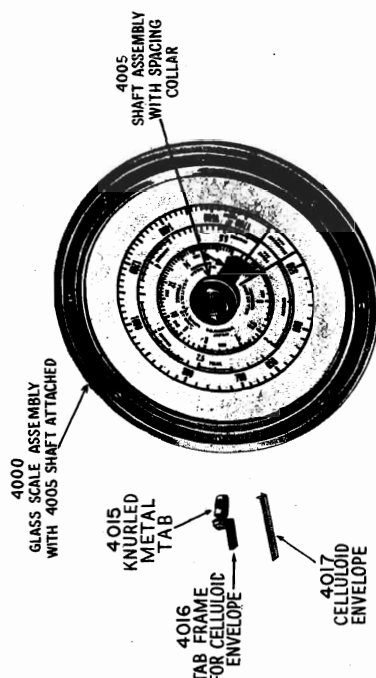
NEVER LOOSEN THE FOUR SCREWS THAT HOLD THE CADMIUM PLATED BRACKET TO DIAL FACE—OTHERWISE THE MAIN BUSHING WILL BE THROWN OUT OF CENTER.

MODEL "Automatic Tune"

Wheel Dial

Installation, Details, Parts

SENTINEL RADIO CORP.



COMPLETE WHEEL DIAL ASSEMBLY LESS ESCUTCHEON

Part No.	Part Name	Description	List Price
205	Dial Assembly	Used With Model 78B Complete Assembly Less Escutcheon.	\$12.75
206	Dial Assembly	Used With Model 78BE Complete Assembly Less Escutcheon.	12.75
207	Dial Assembly	Used With Model 82A Complete Assembly Less Escutcheon.	12.75
201	Dial Assembly	Used With Model 82AE & 86AE Complete Assembly Less Escutcheon.	12.75
204	Dial Assembly	Used With Model 91B & 95B Complete Assembly Less Escutcheon.	12.25
MISCELLANEOUS PARTS USED IN ABOVE ASSEMBLIES			
4016	Celluloid Envelope	Station Call Letter Cover	.05
3814	Cord	Primary Drive Cord	.15
4013	Cord	Secondary Drive Cord	.15
3995	Band Indicator Assem.	For Model 78BE-78B-91B-95B	.75
3992	Band Indicator Assem.	For Model 82AE-82A-86AE	.75
4011	Drive Drum Assem. with	4012 Secondary Pulley and Rubber Disc Coupler.	1.25
4355	Drive Shaft		.12
4027	Disc	Translucent Dial Scale Background for Model 78BE	.50
3984	Disc	Translucent Dial Scale Background for Model 82AE & 86AE	.55
4024	Disc	Translucent Dial Scale Background for Model 82A	.55
4029	Disc	Translucent Dial Scale Background for Model 91B, 95B & 78B.	.50
3771	Escutcheon	For Cabinet—All Models	1.00
4017	Frame	Metal Holder for Celluloid Envelope.	.05
4040	Hub Cap		.15
4015	Knurled Tab	Dial Scale Drive (Die Cast)	.05
4009	Pulley	Calibrated Glass Scale With 4005 Shaft Assem.	.45
4000	Scale	For Hub Cap 3-48 x 1/4" O.H.I.M.	2.75
8071	Screw	For Pulley 6-32 x 1/4" S.H.H. Cup Point.	.005
2754	Screw	For Drive Shaft.	.01
4356	Spring Lock	For Drive Shaft.	.01 net
4352	Spring Tension	For Secondary Cord	.07
3462	Spring Tension	For Primary Cord	.07

Prices are subject to change without notice.

TO INSTALL No. 4013 SECONDARY DRIVE CORD:

The dial mechanism picture shows and refers to eye terminals on drive cord—these were used in early production. Loops made by knots in the cords are now used to attach cord to lugs in the No. 4009 die cast pulley and to the No. 4352 & 3462 tension springs.

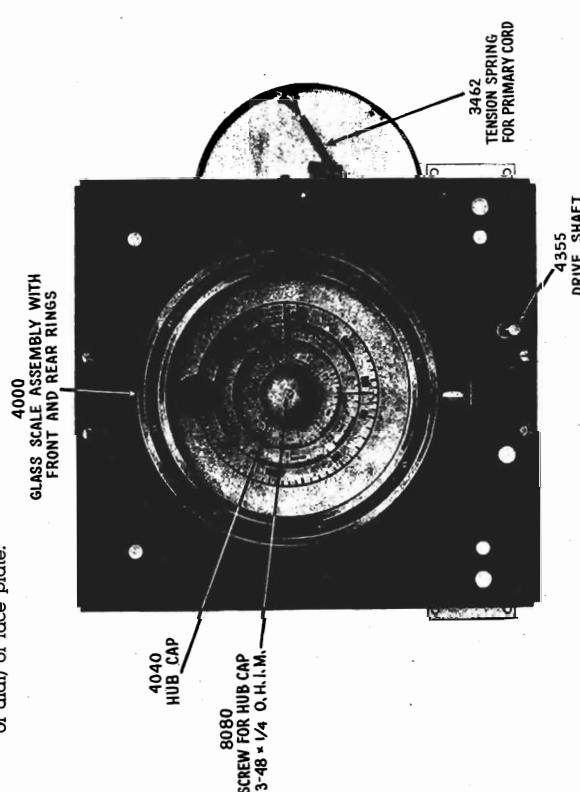
(a) Looking at the front of the dial rotate dial scale COUNTER-CLOCKWISE until dial stop is reached.

(b) Loosen the two No. 2754 set screws in small die cast pulley No. 4009.

(c) Looking at front of dial turn the small die cast pulley so that the cut out in pulley will be towards the left and approximately in line with the upper edge of the dial light bracket. This bracket which is only used in six volt battery and 110 volt AC models is shown mounted on the cadmium plated dial face plate bracket in dial mechanism picture.

(d) Hook No. 4352 tension spring in dial cord loop.

(e) Turn No. 4011 drum so that the hole in the No. 4012 large die cast pulley—through which the secondary drive cord is pulled—is towards the top of face plate. This will bring the hole approximately in line with the left hand edge (looking at back of dial) of face plate.

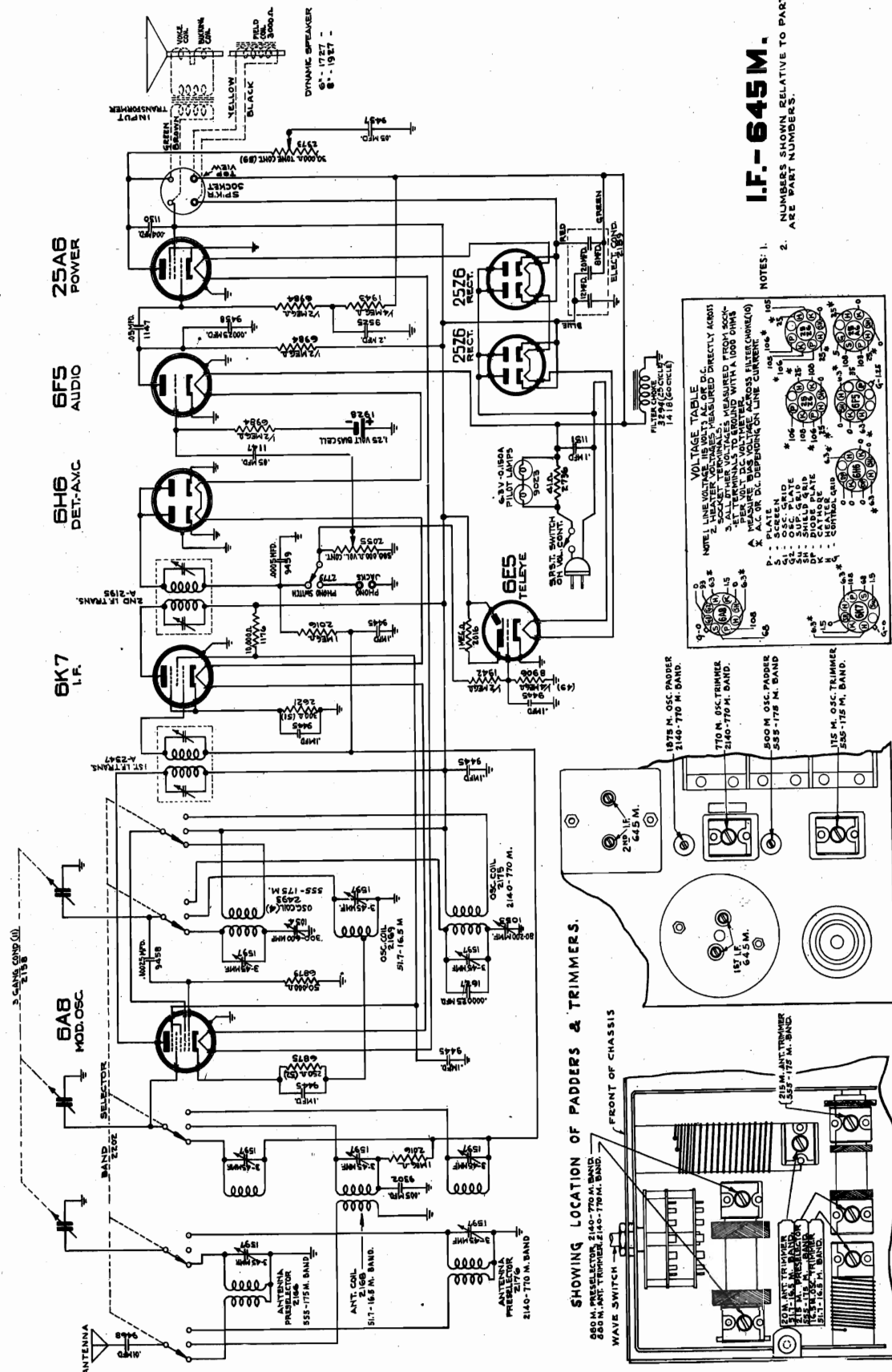


(f) Take long end of No. 4013 secondary drive cord—measured from knot at spring to end of cord—then looking at the front of dial, wrap cord one complete turn COUNTER-CLOCKWISE around the No. 4009 small die cast pulley. The other end of the cord (short end) is placed on bottom half of secondary and primary die cast pulleys.

(g) Firmly tighten No. 2754 set screws in small die cast pulley.

I.F.-645M.

1. **LF-645M.**
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.



BOTTOM VIEW OF CHASSIS.

TOP VIEW

BOTTOM VIEW

MODEL 56U

MODEL 67L

MODELS 68B, 68BE

Alignment

SENTINEL RADIO CORP.

Model 56U Eight Tube AC-DC Superheterodyne Receiver

ALIGNING I. F. STAGE AT 645 METERS:

- Connect the high side of the test oscillator output to the control grid of the 6A8 modulator tube through a .02 Mfd. condenser. Leave the grid cap connected to the grid terminal of the tube, and connect the ground side of the test oscillator to the receiver base through a .2 Mfd. condenser.
- Set test oscillator frequency to 645 meters (this must be accurate).
- Peak each of the second I. F. transformer trimmers.
- Peak each of the first I. F. transformer trimmers.

To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

ALIGNING 16.5-51.7 METER BAND:

- Connect the high output side of the test oscillator through a 400 ohm resistor to receiver antenna lead and the low side to the set ground through a .02 Mfd. condenser.
- Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop, (complete in mesh), at which point the dial needle must be exactly even with the last line at the high wave length end of the dial calibration. If the dial needle does not point exactly to the last line, move needle to correct position.
- Place the band selector switch for operation on the 16.5-51.7 meter band, tune receiver dial and set test oscillator frequency to EXACTLY 16.5 METERS. Then tune in the 16.5 METER SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 16.5 METER OSCILLATOR TRIMMER.

NOTE: When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE RIGHT PEAK IS USED FOR ALIGNING THE RECEIVER AT 16.5 METERS. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the SECOND PEAK which is the proper one to use is tuned in. If the trimmer is screwed down only to the point where the first peak is received, the incorrect peak will be tuned in.

- Tune the receiver dial and set test oscillator frequency to EXACTLY 20 METERS. Adjust 20 meter antenna trimmer for maximum 20 meter test signal sensitivity.

ALIGNING 175-555 METER BAND:

- Replace the 400-ohm resistor in series with test oscillator lead with a 200 Mfd. condenser, place the band selector switch for operation on the 175-555 meter band, tune receiver dial and set test oscillator frequency to EXACTLY 175 METERS. BRING IN THE 175 METER TEST OSCILLATOR SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 175 METER OSCILLATOR TRIMMER.
- Set test oscillator frequency and receiver dial to EXACTLY 215 METERS. Adjust 215 meter pre-selector and antenna trimmers for maximum 215 test oscillator signal sensitivity.
- Tune receiver dial and set test oscillator frequency to approximately 500 meters. While rocking gang condenser slightly to right and left adjust 500 meter oscillator padder for maximum sensitivity.

ALIGNING 770-2140 METER BAND:

- Place band selector switch for operation on the 770 to 2140 meter band, and set test oscillator frequency and receiver dial to EXACTLY 770 METERS. BRING IN 770 METER TEST SIGNAL TO MAXIMUM OUTPUT WITH 770 METER OSCILLATOR TRIMMER.
- Tune receiver dial and set test oscillator frequency to EXACTLY 880 METERS. Adjust 880 meter antenna and pre-selector trimmers for maximum 880 meter test signal response.
- Set receiver dial and test oscillator frequency to approximately 1875 meters. Then while rocking gang condenser slightly to right and left adjust 1875 meter padding condenser for maximum sensitivity.

Model 67L Six Tube Superheterodyne Receiver

ALIGNING I.F. STAGE AT 465 KILOCYCLES:

- Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead to the grid cap of the 6A7 tube through a .02 Mfd. condenser DO NOT REMOVE GRID CLIP.
- Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.
- Peak each of the second I.F. transformer trimmers.
- Peak each of the first I.F. transformer trimmers.

ADJUSTING 465 KILOCYCLE WAVE TRAP:

- Connect the high output side of the test oscillator through a .00025 Mfd. condenser to the receiver antenna lead and the low side to the set ground.
- Set test oscillator frequency to EXACTLY 465 kilocycles and adjust the 465 K.C. wave trap trimmer condenser mounted on and accessible through hole in rear of chassis for MINIMUM 465 kilocycle signal response.

ALIGNING 1720-540 KILOCYCLE BAND:

- Adjust band selector switch for operation on 1720-540 kilocycle band and leave test oscillator lead connected to receiver antenna lead through the .00025 Mfd. series condenser.
- Set test oscillator frequency and receiver dial to EXACTLY 1720 kilocycles.
- Adjust 1720 K. C. oscillator trimmer to bring in 1720 kilocycle test oscillator signal to maximum output.
- Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.
- Adjust 1400 K.C. antenna trimmer for maximum sensitivity.
- Set receiver dial and test oscillator frequency to approximately 600 kilocycles.
- While rocking gang condenser slightly to right and left adjust 600 K.C. padder for maximum sensitivity.

ALIGNING 2.3-6.3 MEGACYCLE BAND:

- Replace .00025 Mfd. test oscillator lead series condenser with a 400 ohm resistor. Adjust band selector switch for operation on 6.3 to 2.3 megacycle band, and tune receiver dial and set test oscillator frequency to EXACTLY 6.3 megacycles.
- Adjust 6.3 M.C. oscillator trimmer to bring in 6.3 megacycle test oscillator signal to maximum output.
- Tune receiver dial and set test oscillator frequency to 5.8 megacycles, and while rocking gang condenser slightly to right and left adjust 5.8 M.C. antenna trimmer for maximum sensitivity.
- No adjustment is required at low frequency end of this band as a fixed oscillator pad is used.

To assure more accurate trimmer setting repeat all above adjustments several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

ALIGNING 1.8-5.8 MEGACYCLE BAND:

- Replace .00025 Mfd. test oscillator antenna lead series condenser with a 400 ohm resistor.
- Adjust band selector switch to 1.8-5.8 megacycles, tune receiver dial and set test oscillator frequency to EXACTLY 5.8 megacycles. Bring in 5.8 megacycle test signal to maximum output by adjusting 5.8 M.C. oscillator trimmer.
- Tune receiver dial and set test oscillator frequency to EXACTLY 5 megacycles, and adjust 5 M.C. antenna trimmer for maximum sensitivity.

ALIGNING 5.8-18.3 MEGACYCLE BAND:

- Leave 400 ohm resistor in series with test oscillator lead and place band selector switch for operation on 5.8-18.3 megacycle band, tune receiver dial and set test oscillator frequency to EXACTLY 18 megacycles.

Adjust 18 M.C. oscillator trimmer to bring in 18 megacycle test signal to maximum output. **NOTE:** When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 18 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the FIRST PEAK which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 18 megacycles, always check to see if the proper peak has been used. To do this leave test oscillator frequency at 18 megacycles, increase the output of the test oscillator and tune receiver dial to approximately 17 megacycles. Then vary the receiver dial slightly to the right and left of 17 megacycles, and if the fundamental peak was used in aligning at 18 megacycles the test oscillator signal will be heard at approximately 17 megacycles on the receiver dial.

- Tune receiver dial and set test oscillator frequency to EXACTLY 15 megacycles.
- Rock gang condenser slightly to right and left and adjust 15 M.C. antenna trimmer for maximum 15 megacycle test signal response.

Model 68B-68BE—Three Band Superheterodyne Receiver

ALIGNING I.F. STAGE AT 465 KILOCYCLES:

- Attach the ground lead of the test oscillator to the chassis. Connect the other lead to the grid cap of the 6A7 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.
- Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.
- Peak each of the second I.F. transformer trimmers.
- Peak each of the first I.F. transformer trimmers.

ALIGNING 1720-540 KILOCYCLE BAND:

- Check tuning dial adjustment by turning 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 the dial needle does not point exactly to the last line move needle to correct position.
- Remove test oscillator lead from grid of 6A7 tube and connect to receiver antenna lead through a .00025 Mfd. series condenser.
- Adjust band selector switch for operation on the 1720-540 kilocycle band.
- Set test oscillator frequency and receiver dial to EXACTLY 1720 kilocycles, and BRING IN 1720 KILOCYCLE TEST OSCILLATOR SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1720 KILOCYCLE OSCILLATOR TRIMMER.

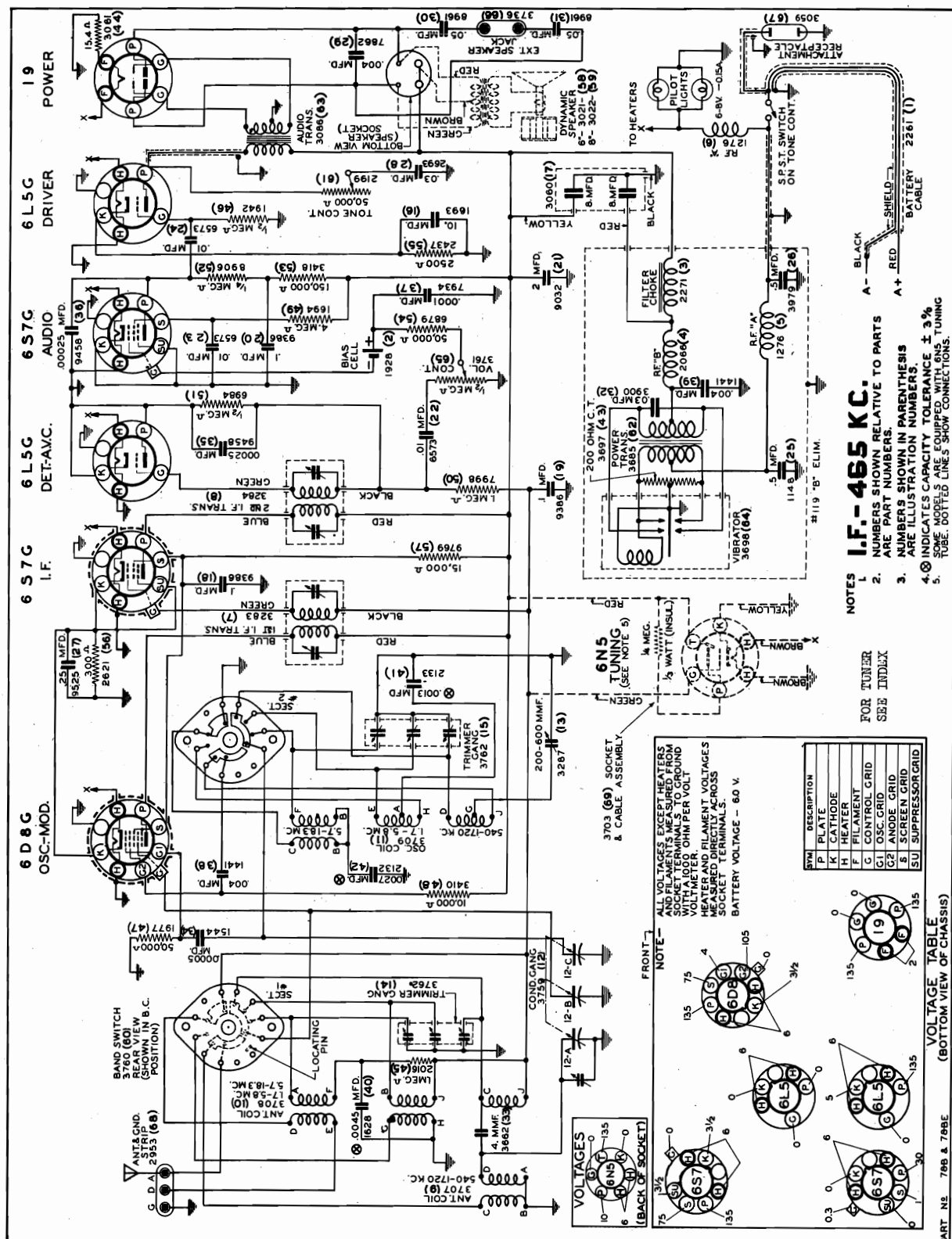
- Tune receiver dial and set test oscillator frequency to EXACTLY 1400 K.C. Adjust 1400 K.C. pre-selector and antenna trimmers for maximum sensitivity.
- Set test oscillator frequency and receiver dial to approximately 600 kilocycles. Then while rocking gang condenser slightly to right and left, adjust 600 K.C. oscillator padder for maximum signal response.





SENTINEL RADIO CORP.

MODELS 78B, 78BE
Schematic, Voltage
Socket



NOTES
1.F.-465 KC.

- I.F.-465 KC.**
1. **NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.**
 2. **NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.**
 3. **NUMBERS SHOWN IN PARENTHESIS INDICATES CAPACITY TOLERANCE $\pm 3\%$.**
 4. **SOME MODELS ARE EQUIPPED WITH 6N5 TUBE. DOTTED LINES SHOW CONNECTIONS.**

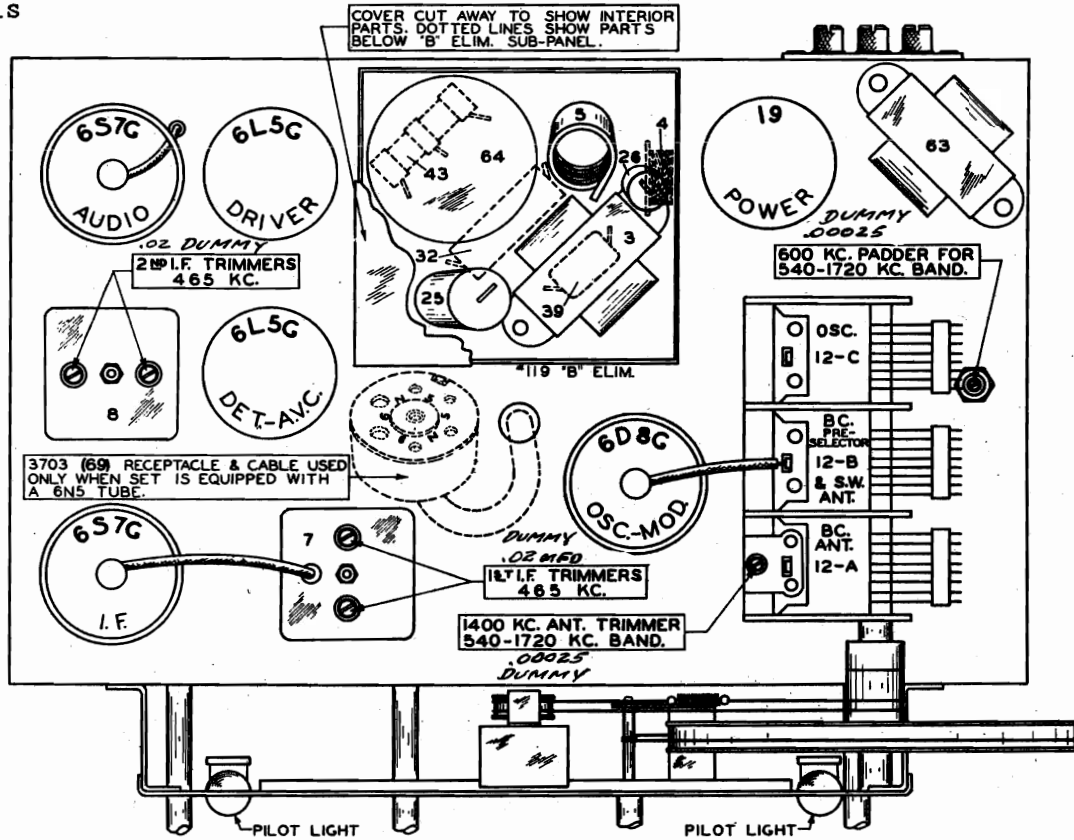
FOR TUNER

SYM	DESCRIPTION
P	PLATE
K	CATHODE
H	HEATER
F	FILAMENT
G	CONTROL GRID
G1	OSC. GRID
G2	ANODE GRID
S	SCREEN GRID
SU	SUPPRESSOR GRID

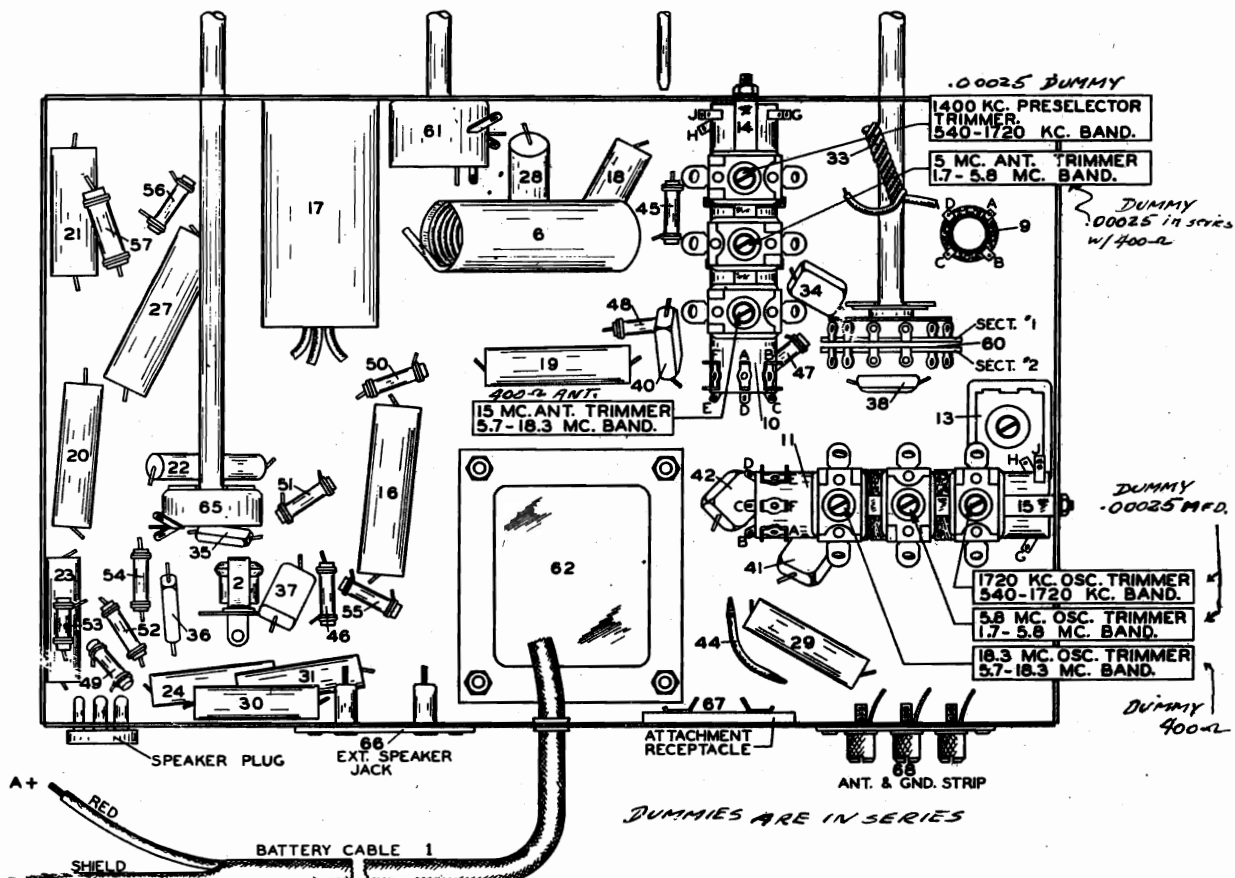
VOLTAGE TABLE (BOTTOM VIEW OF CHASSIS)

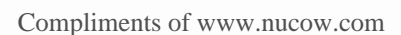
MODELS 78B, 78BE
Alignment, Trimmers
Chassis

SENTINEL RADIO CORP.



CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.



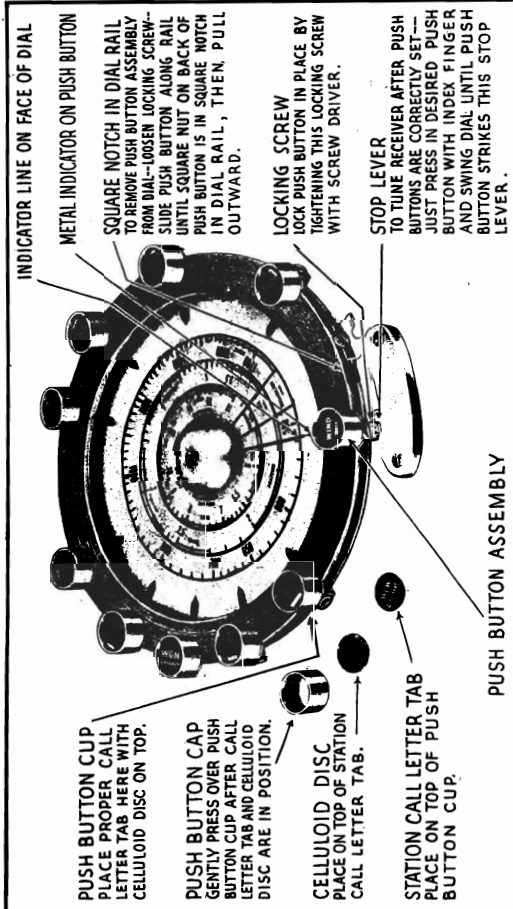


MODEL Push Button Dial
Assembly, Instructions
Parts List

SENTINEL RADIO CORP.

For MODELS 78B, 78BE
82A, 82AE, 86AE, 91B, 95B

SERVICE NOTES for PUSH BUTTON DIAL



FROM ONE TO TEN STATIONS OPERATING ON FREQUENCIES SEPARATED BY FORTY KILOCYCLES OR MORE MAY BE AUTOMATICALLY TUNED BY PROPERLY SETTING PUSH BUTTONS.

- IT IS A SIMPLE MATTER TO "AUTOMATIC TUNE" AFTER THE STATION PUSH BUTTONS HAVE BEEN PROPERLY SET. THE FOLLOWING INSTRUCTIONS WILL SHOW HOW TO SET THE STATION PUSH BUTTONS HAVING CALL LETTERS OF THE DESIRED STATION PUSHER INWARD—THEN SWING DIAL UNTIL DIAL STOPS, AT WHICH POINT THE DESIRED STATION CALL LETTERS WILL BE IN POSITION. THE STATION INDICATOR ATTACHED TO THE PUSH BUTTON SHOULD POINT TO THE INDICATOR LINE ON FACE OF DIAL. If reception is slightly distorted—which may be particularly noticeable when tuning weak stations—retune for maximum clarity by using conventional tuning knob.
- WHILE A PUSH BUTTON MAY BE SET FOR DISTANT WEAK STATIONS, IT IS BEST TO SET THE STATION PUSH BUTTON TUNING ARE STRONG NEARBY OR LOCAL STATIONS.
- AFTER IT IS DETERMINED WHAT STATIONS YOU WISH TO "AUTOMATIC PUSH BUTTON TUNE" OBTAIN THE CALL LETTERS OF THESE STATIONS AND SET PUSH BUTTONS BY:
- To illustrate the proper installation and setting of the Push Button, the proper station call letters are shown on the Push Button properly set for station WGN, Chicago, 720 kilocycles. If station WGN is not one of the selected stations, remove call letters by:
 - Grasp cap section of Push Button between fingers and gently pull outward until it is clear of dial.
 - Grasp cap section of Push Button between fingers and gently pull outward until it is clear of dial.
- AFTER THE TEN PUSH BUTTONS HAVE BEEN PROPERLY SET THEY WILL NOT REQUIRE FURTHER ATTENTION — EXCEPT WHEN MOVED FROM THEIR POSITION OR WHEN AN ADDITIONAL TAB IS INCLUDED WHICH WOULD DISTURB THE POSITION OF THE OTHER TABS.

PARTS LIST

COMPLETE PUSH BUTTON DIAL ASSEMBLY LESS ESCUTCHEON

Part No.	Part Name	Description	List Price
211	Dial Assembly	Used With Model 78B Complete Assembly Less Escutcheon	\$12.75
212	Dial Assembly	Used With Model 78BE Complete Assembly Less Escutcheon	12.75
208	Dial Assembly	Used With Model 82A Complete Assembly Less Escutcheon	12.75
209	Dial Assembly	Used With Model 82AE & 86AE Complete Assembly Less Escutcheon	12.75
210	Dial Assembly	Used With Model 91B & 95B Complete Assembly Less Escutcheon	12.25

MISCELLANEOUS PARTS USED IN ABOVE ASSEMBLIES

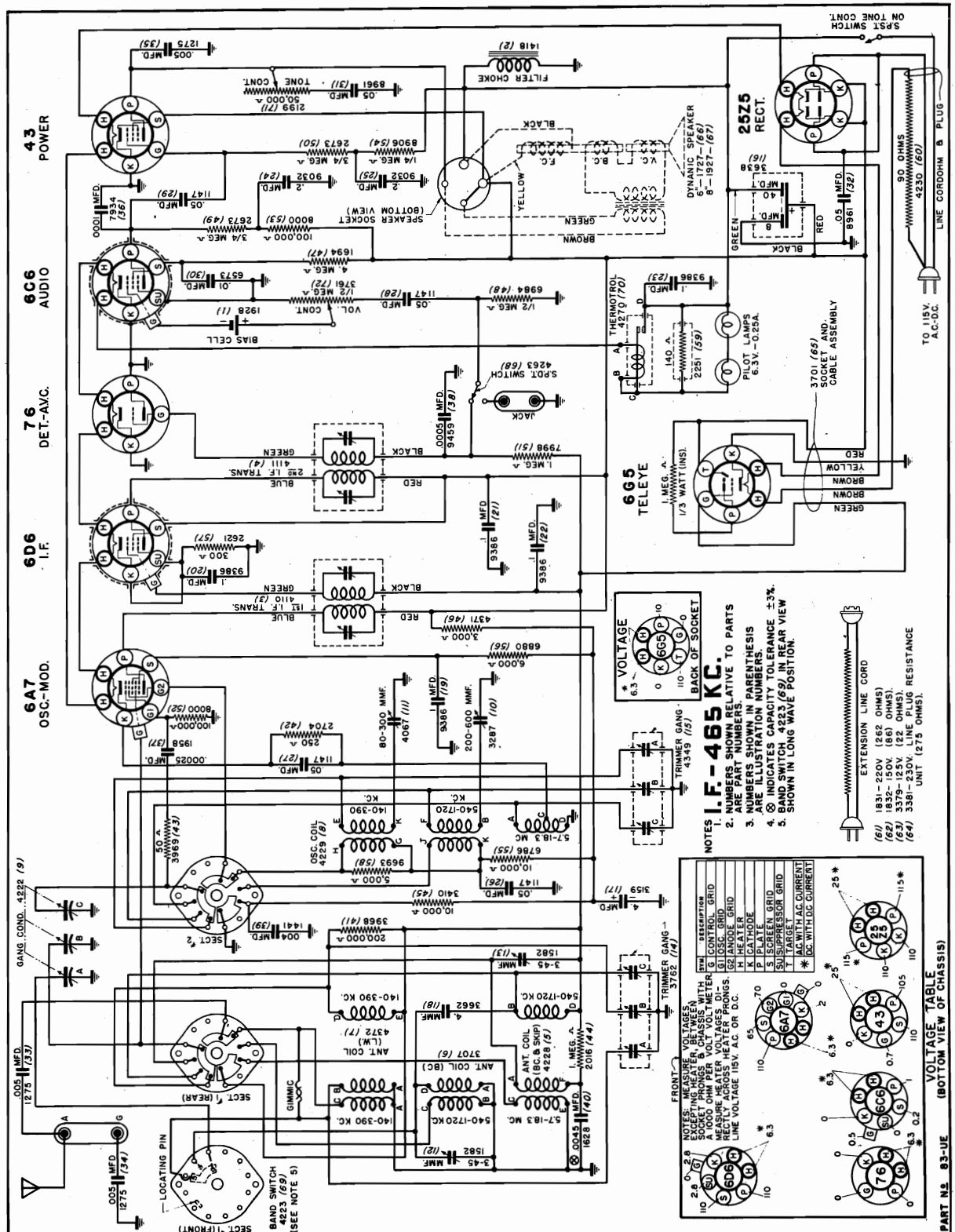
4047	Cap	Push Button	.15
4046	Celluloid Disc	Station Call Letter Cover	.05
3814	Cord	Primary Drive Cord	.15
4013	Cord	Secondary Drive Cord	.15
4041	Cup Assembly	Push Button—With Clip and Compression Spring	.15
3995	Band Indicator Assem.	For Model 78BE-78B-91B-95B	.75
3992	Band Indicator Assem.	For Model 82AE-82A-86AE	.75
4011	Drive Drum Assem. with	4012 Secondary Pulley and Rubber Disc Coupler	1.25
4355	Drive Shaft		.12
4027	Disc	Translucent Dial Scale Background for Model 78BE	.50
3984	Disc	Translucent Dial Scale Background for Model 82AE & 86AE	.55
4024	Disc	Translucent Dial Scale Background for Model 82A	.55
4029	Disc	Translucent Dial Scale Background for Model 91B, 95B & 78B	.50
3771	Escutcheon	For Cabinet—All Models	1.00
4040	Hub Cap		.15
4009	Pulley	Dial Scale Drive (Die Cast)	.45
4039	Plate	Slide Stop	.10
4000	Scale	Calibrated Glass Scale With 4005 Shaft Assem.	.275
8071	Screw	For Hub Cap 3-48 x 1/4" O.H.I.M.	.005
2754	Screw	For Pulley 6-32 x 1/4" S.H.H. Cup Point	.01
4037	Slide Stop	Push Button Stop	.10
4356	Spring Lock	For Drive Shaft	.01 net
4352	Spring Tension	For Secondary Cord	.07
3462	Spring Tension	For Primary Cord	.07

Prices are subject to change without notice.
When ordering parts be sure to mention part number and order all parts from:

Printed in U.S.A.

SENTINEL RADIO CORP.

MODEL 83UE
Schematic, Voltage
Socket



[illegible]

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.

15 MC. ANT. TRIMMER 5.7-19.3 MC. BAND.

TRIMMER GANG 14
A
350 KC. ANT. TRIMMER 140-390 KC. BAND.
B
350 KC. PRESELECTOR TRIMMER 140-390 KC. BAND.
C
1400 KC. PRESELECTOR TRIMMER 540-1720 KC. BAND.

00025 DUMMY

00025 DUMMY
1400 KC. ANT. TRIMMER FOR 540-1720 KC. BAND.

TRIMMER GANG 15
A
390 KC. OSC. TRIMMER 140-390 KC. BAND.
B
1720 KC. OSC. TRIMMER 140-1720 KC. BAND.
C
18.3 MC. OSC. TRIMMER 5.7-18.3 MC. BAND.

A-B - 00025 DUMMY
C - 00025 w/400-2 DUMMY
UNITS IN SERIES
TO 115V. A.C.-D.C.

SPEAKER PLUG

JACK

LINE CORD OHM & PLUG

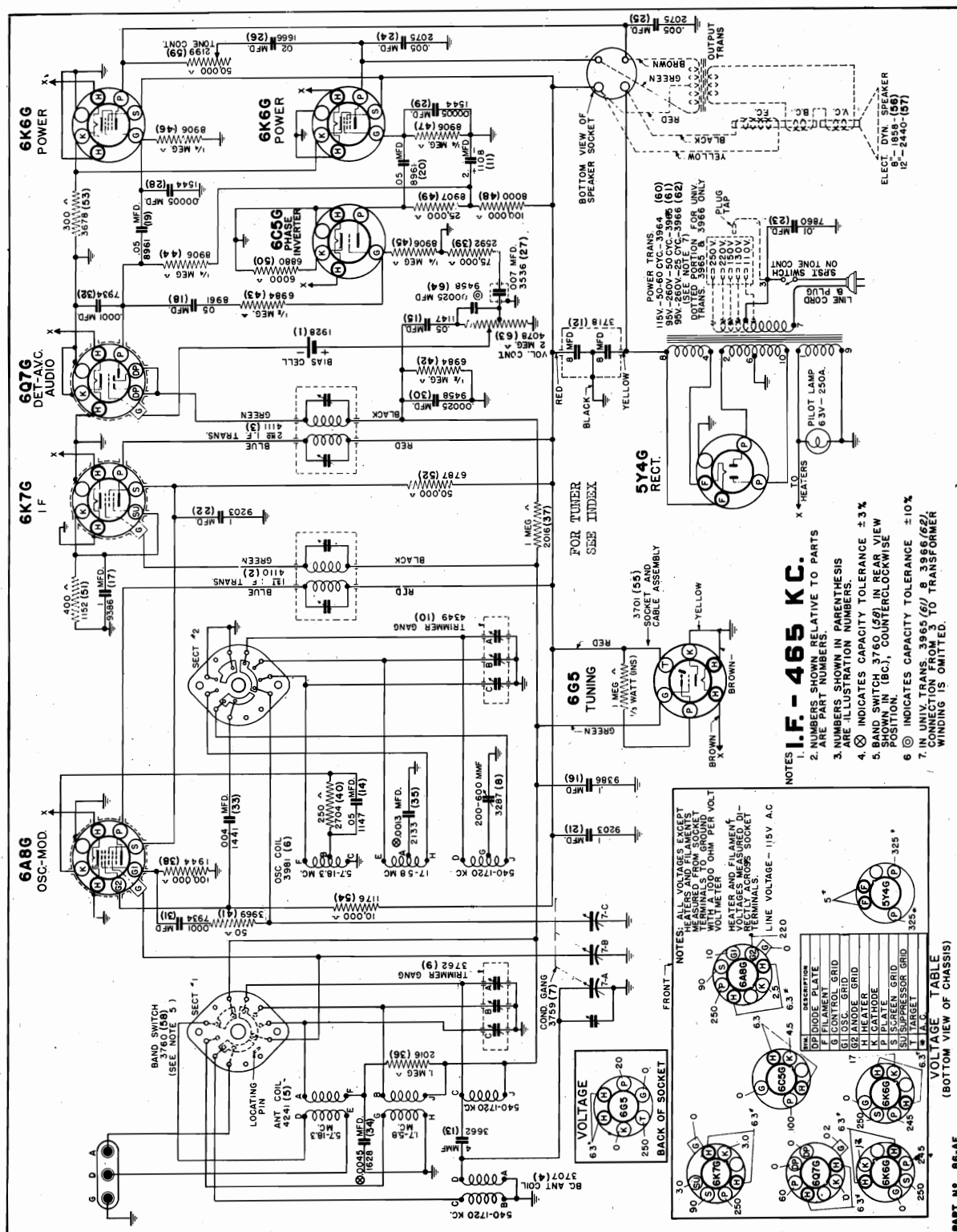


Diagram illustrating the layout of a vacuum tube radio chassis, showing various components and their connections:

- 6K6G POWER** (Two tubes)
- 6Q7G DET.-AVC. AUDIO**
- 6C5G PHASE INVERTER**
- 6A8G OSC.-MOD.**
- 5Y4G RECT.**
- 12** (Resistor)
- 00025 DUMMY** (Two locations)
- 600 KC. OSC. PADDER FOR 540-1720 KC. BAND.**
- OSC. 7-C**
- B.C. PRE-SEL 7-B**
- B SW. ANT.**
- BC ANT 7-A**
- 1ST I.F. TRIMMERS 465 KC.**
- 2ND I.F. TRIMMERS 465 KC.**
- 1400 KC. ANT. TRIMMER 540-1720 KC. BAND**
- 02 DUMMY**

•00025 mf
DUMMY

1400 KC. PRESELECTOR TRIMMER
540-1720 KC. BAND

5 MC. ANT. TRIMMER
17-5.8 MC. BAND

RED DOT

15 MC. ANT. TRIMMER
5.7-18.3 MC. BAND

400-ohm DUMMY

1720 KC. OSC. TRIMMER
540-1720 KC. BAND

5.8 MC. OSC. TRIMMER
1.7-5.8 MC. BAND

18.3 MC. OSC. TRIMMER
5.7-18.3 MC. BAND

400-ohm DUMMY

•00025 DUMMY

•00025 w/ 400-ohm DUMMY

400-ohm DUMMY

DUMMIES: (ALL UNITS IN SERIES)
I.F. - .02 MFD SERIES COND.
170-540 KC. 00025
17-5.8 MC. 00025 IN SERIES W 400-ohm
5.7-18.3 MC. - 400 OHM RESISTOR.

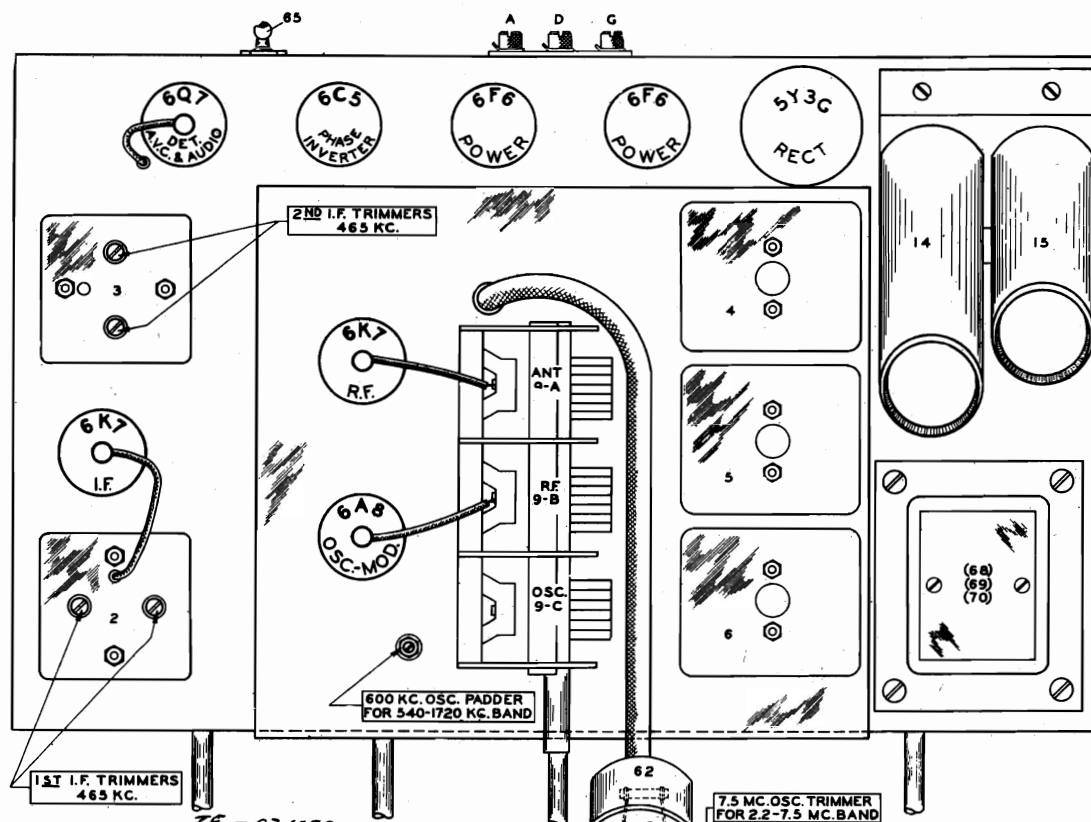
PEAKER CABLE

LINE CORD & PLUG

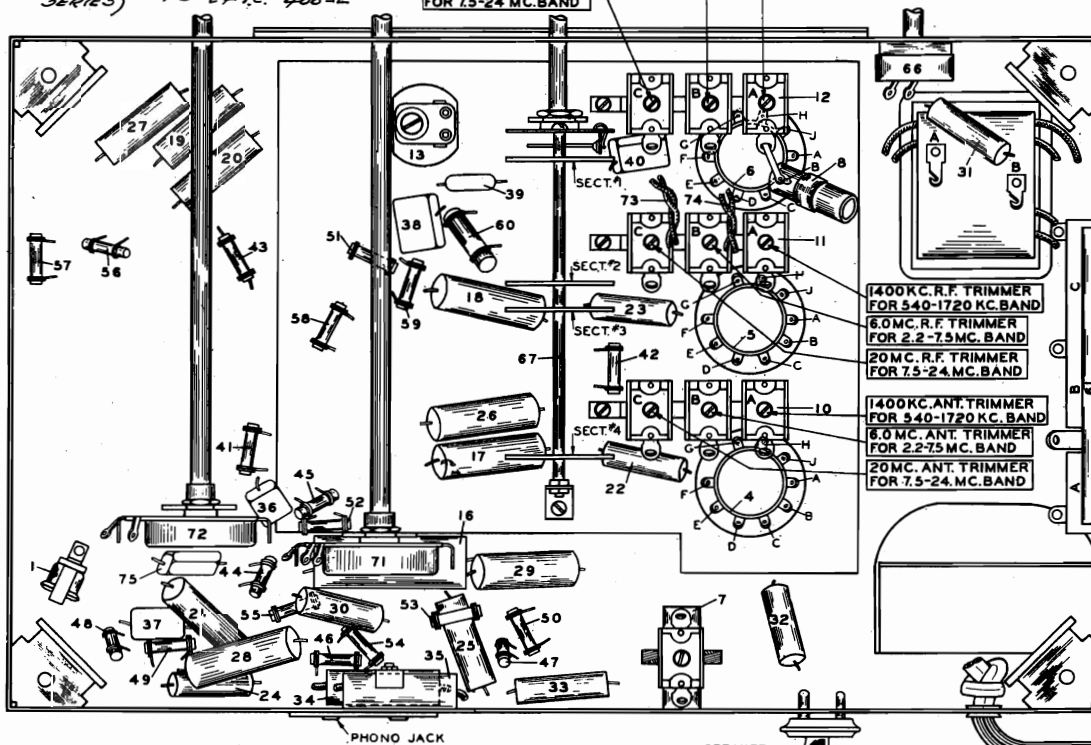


MODEL 87AE
Alignment, Trimmers
Chassis

SENTINEL RADIO CORP.

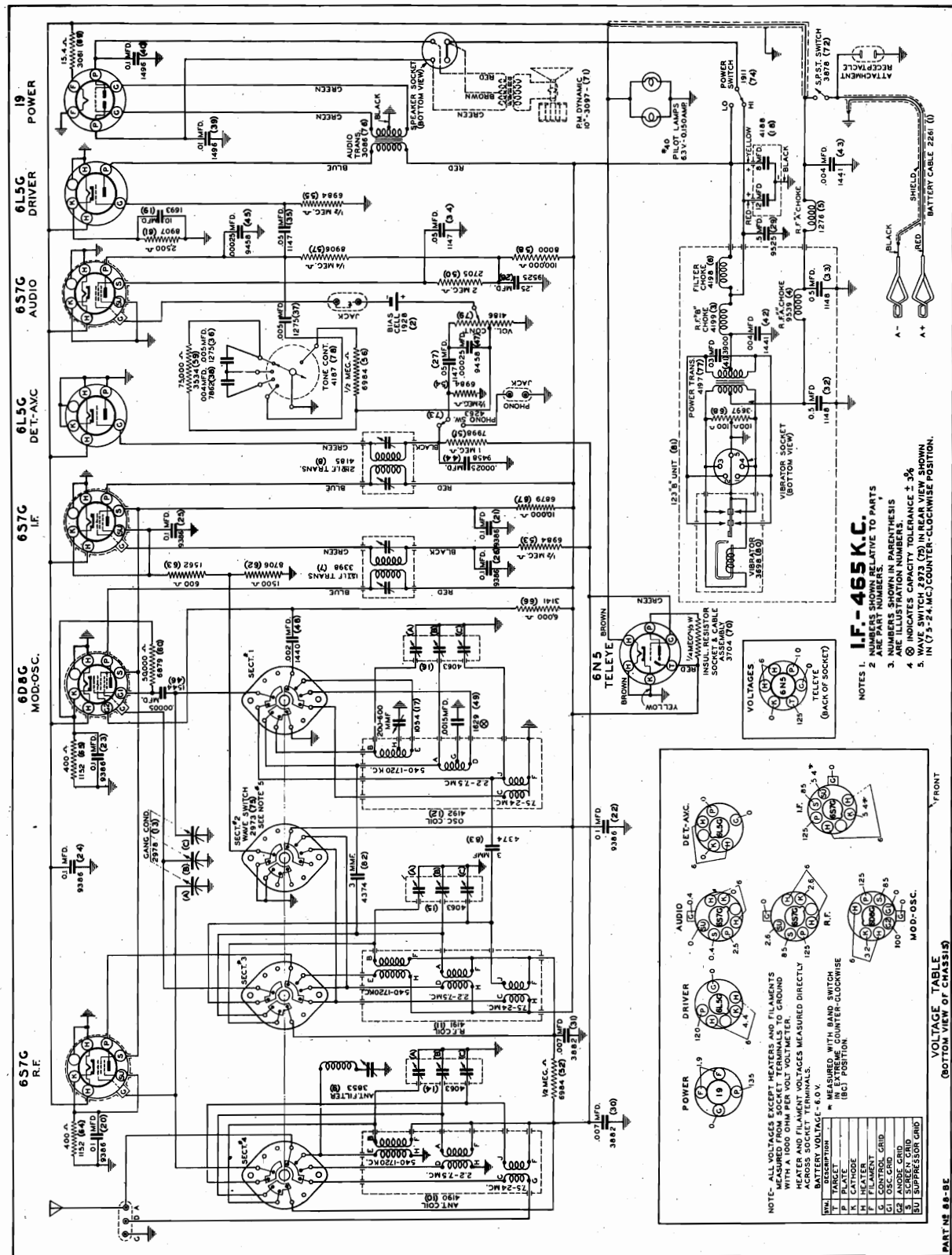


IF - .02 MFD
DUMMIES: TRAP - "
(ALL UNITS
ARE IN
SERIES)
1750-540 KC. 0.0025 MFD.
2.2-7.5 MC. 0.0015 MFD.
7.5-24 MC. 400-2



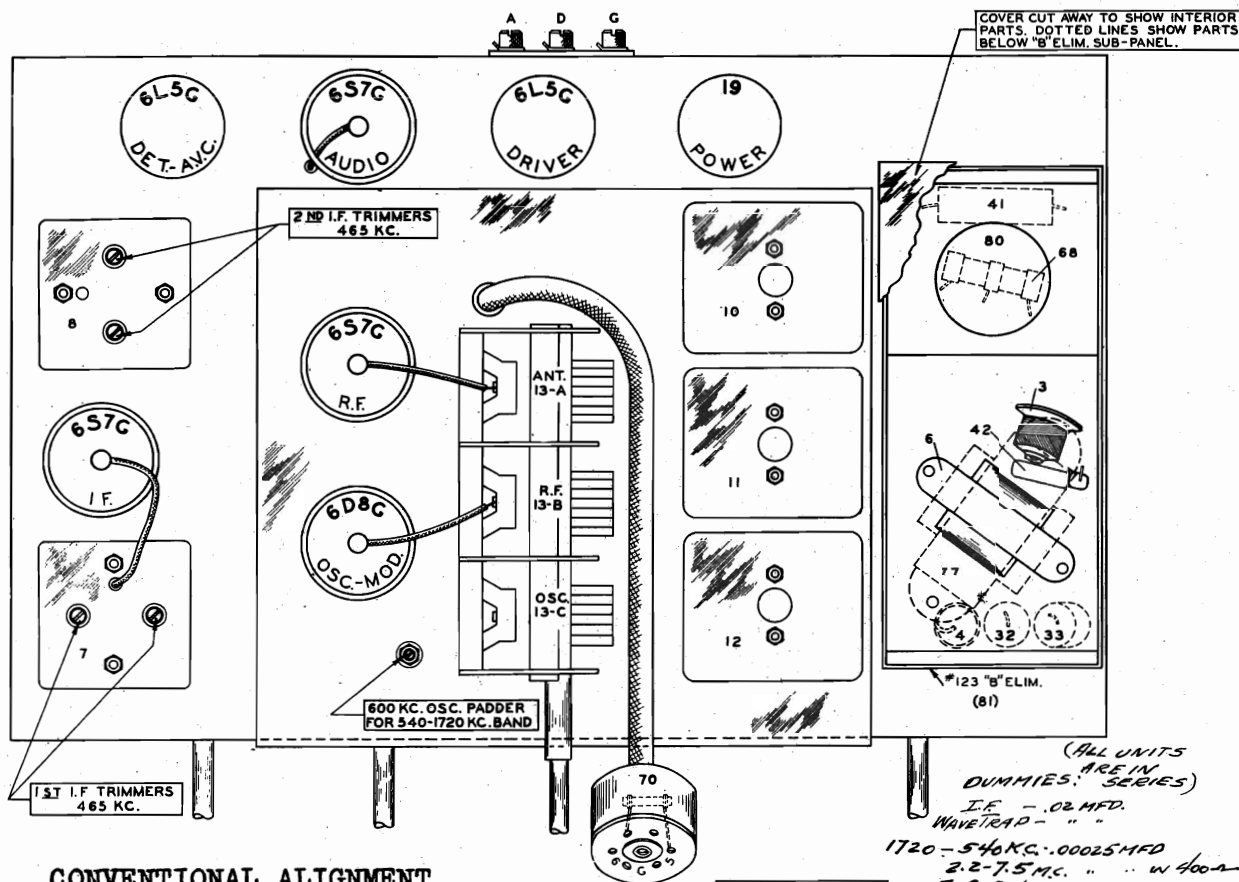
CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.

SENTINEL RADIO CORP.

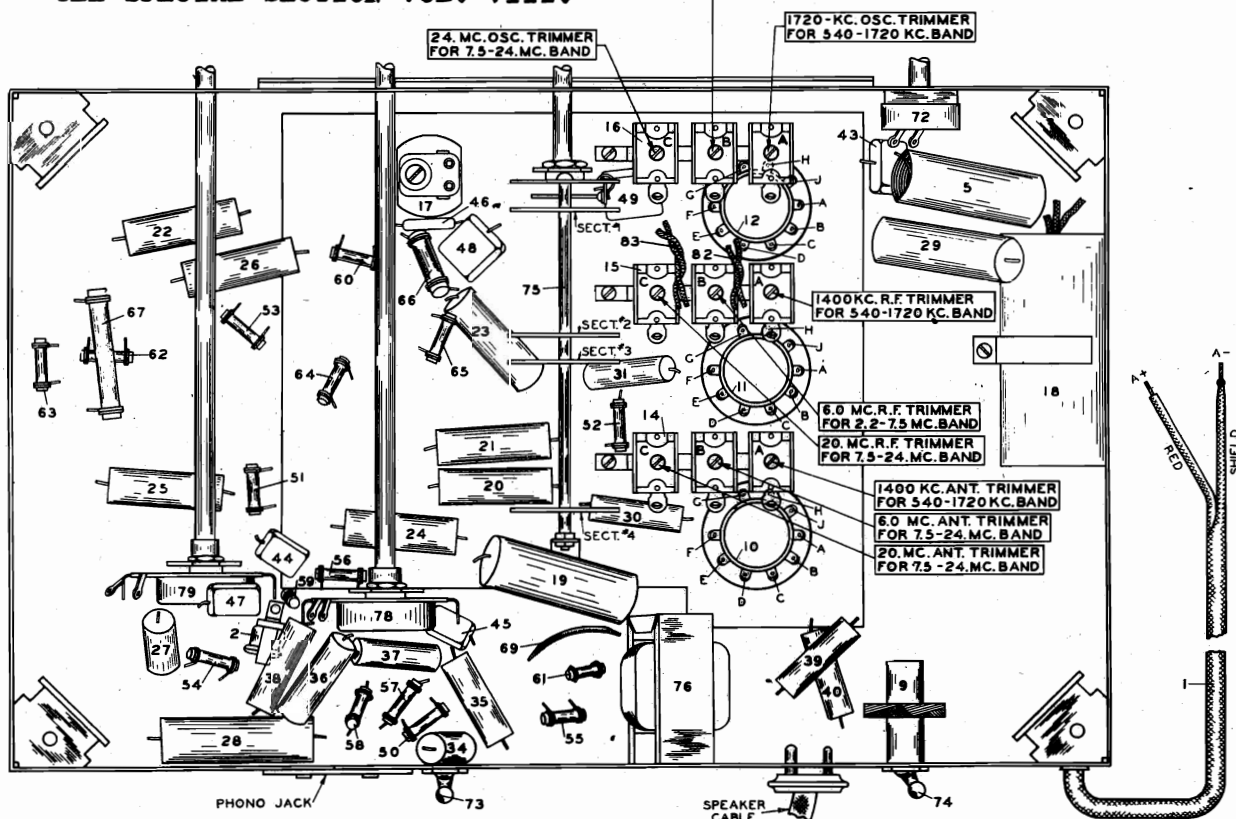
MODEL 88BE
Schematic, Voltage
Socket

MODEL 88BE
Alignment, Trimmers
Chassis

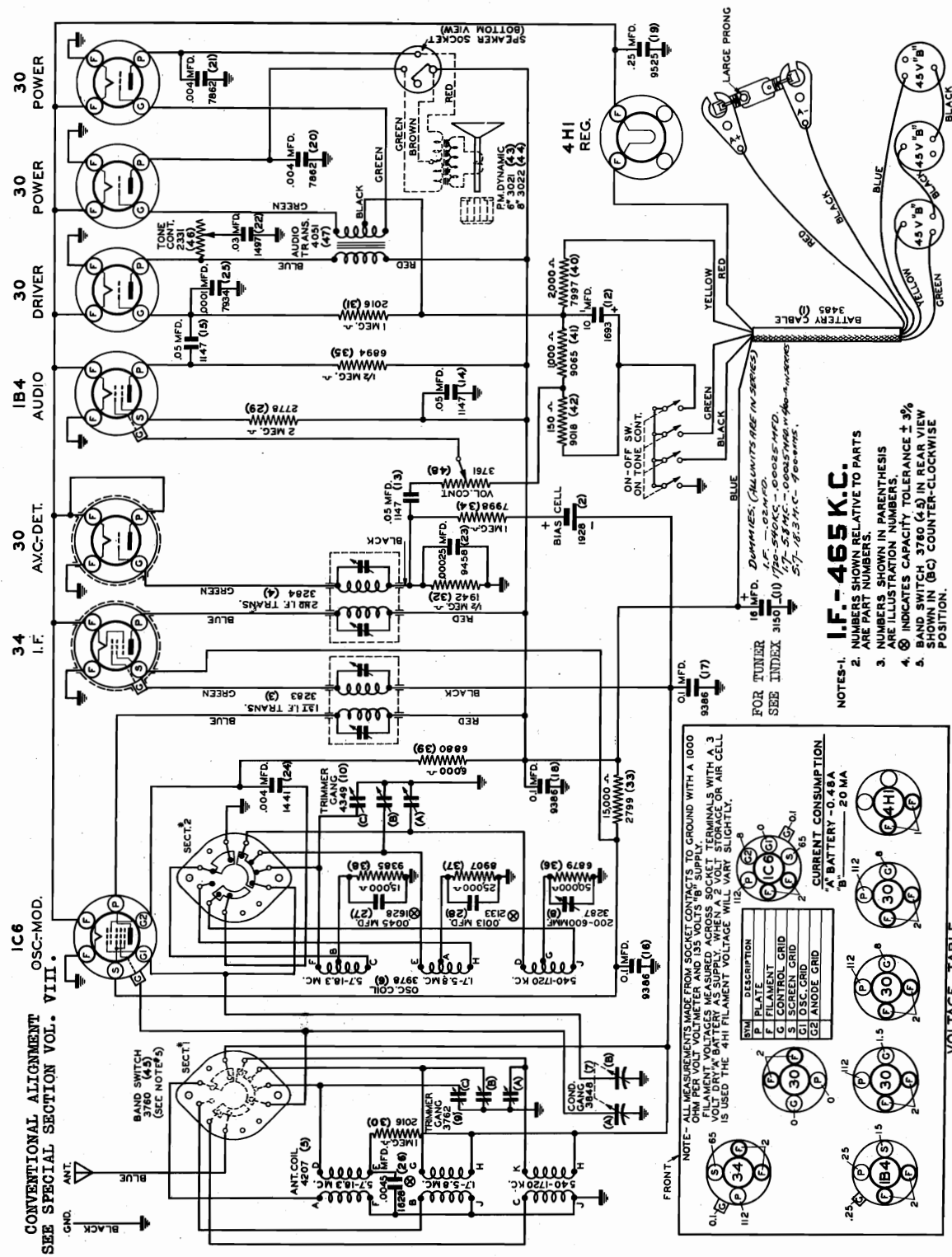
SENTINEL RADIO CORP.



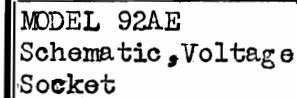
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.



SENTINEL RADIO CORP.

MODEL 91B
Schematic, Voltage
Socket, Alignment

MODEL 92AE
Schematic, Voltage
Socket

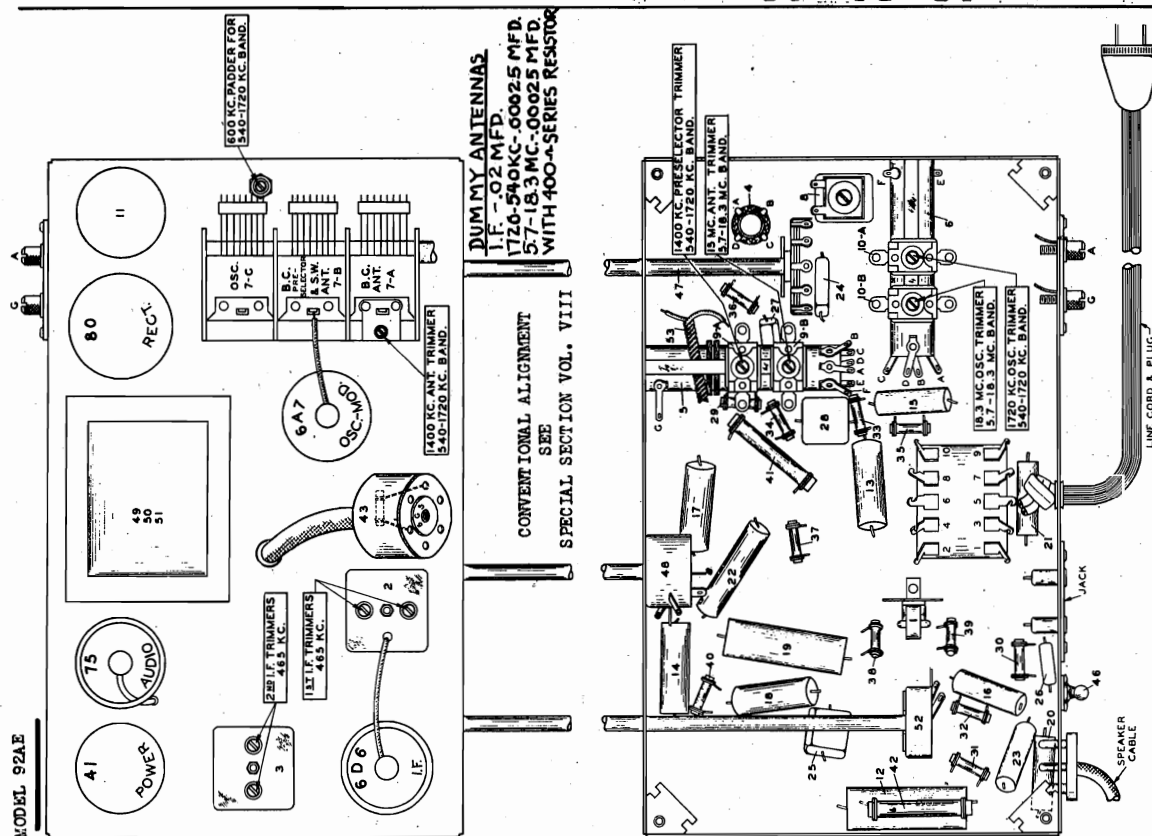
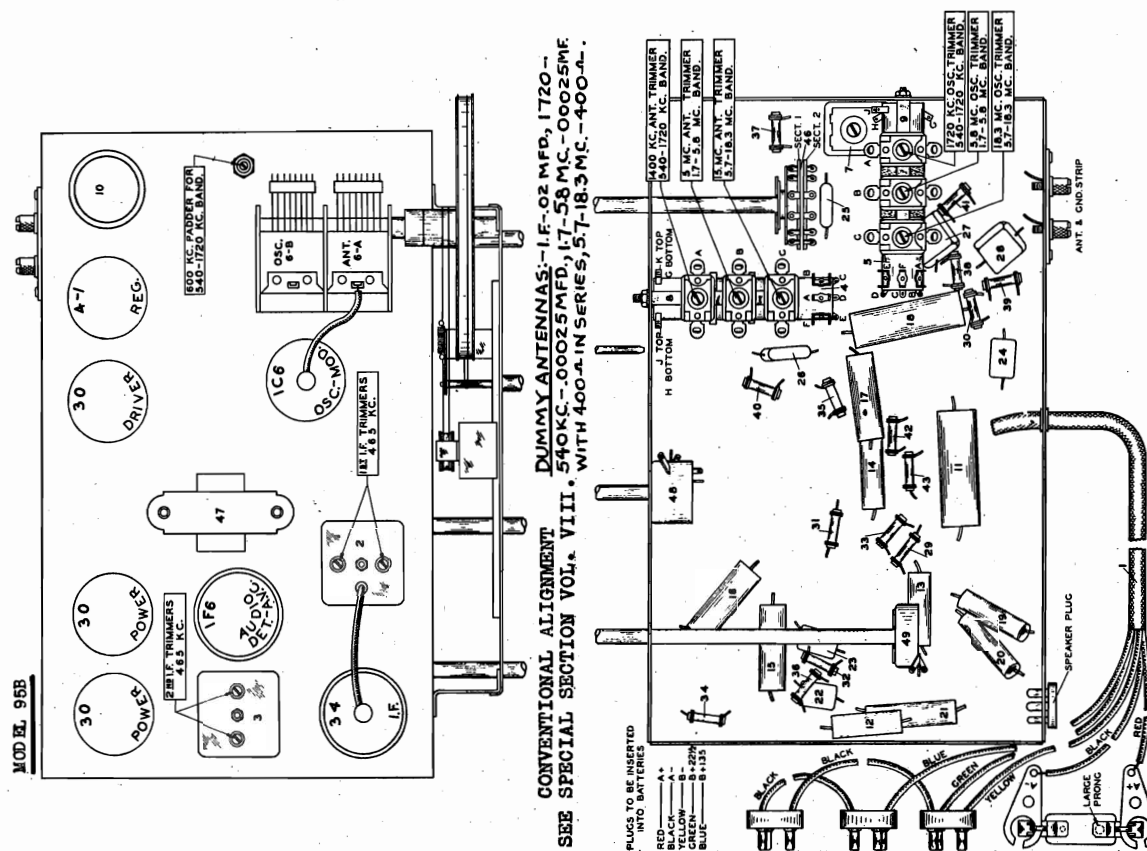


SENTINEL RADIO CORP.

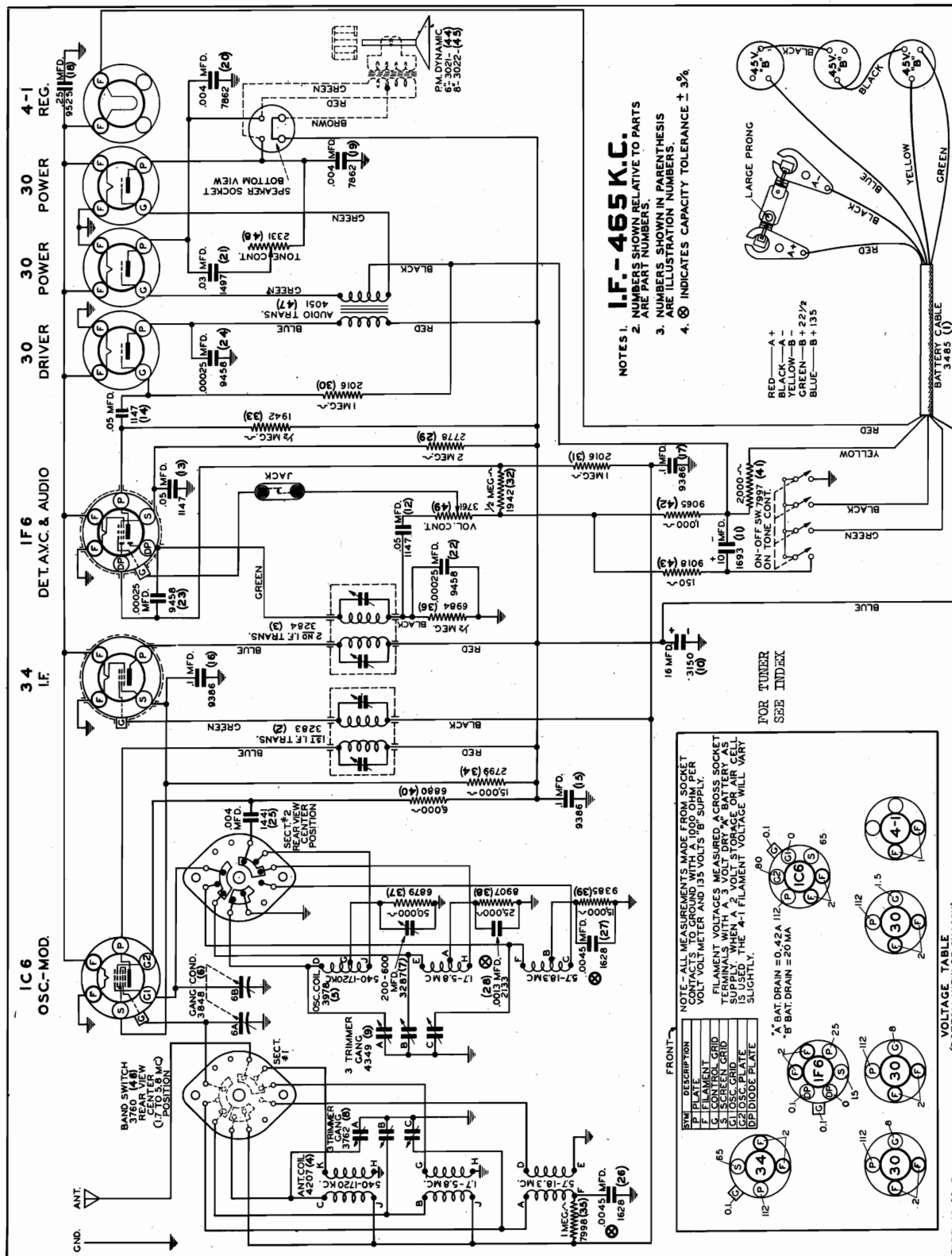
MODEL 92AE

MODEL 95B

Alignment, Trimmers
Chassis



SENTINEL RADIO CORP.



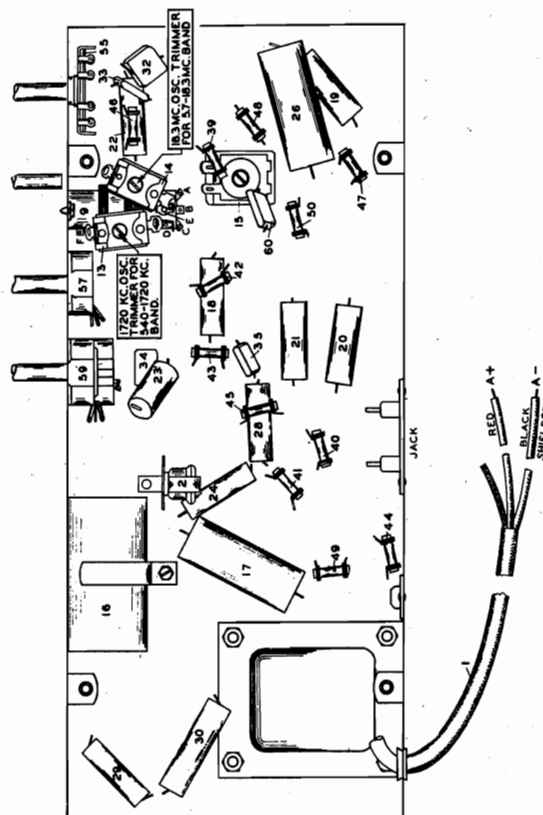
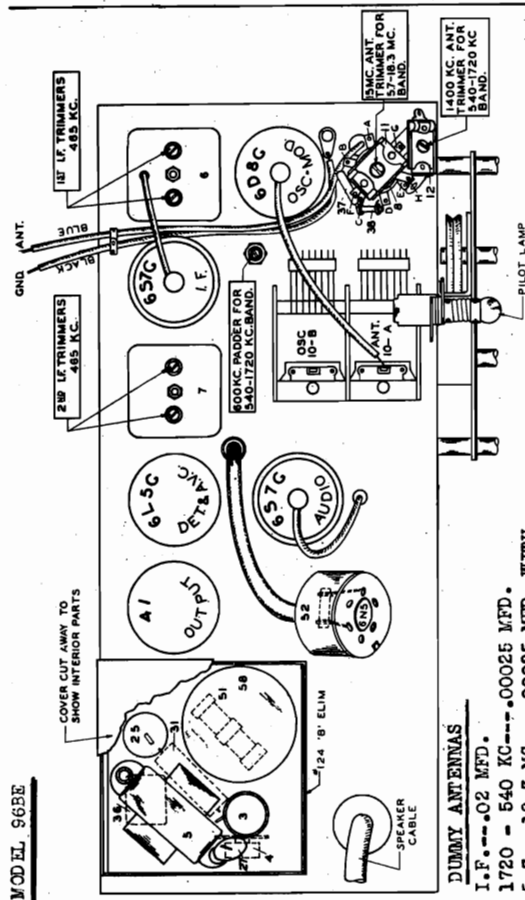
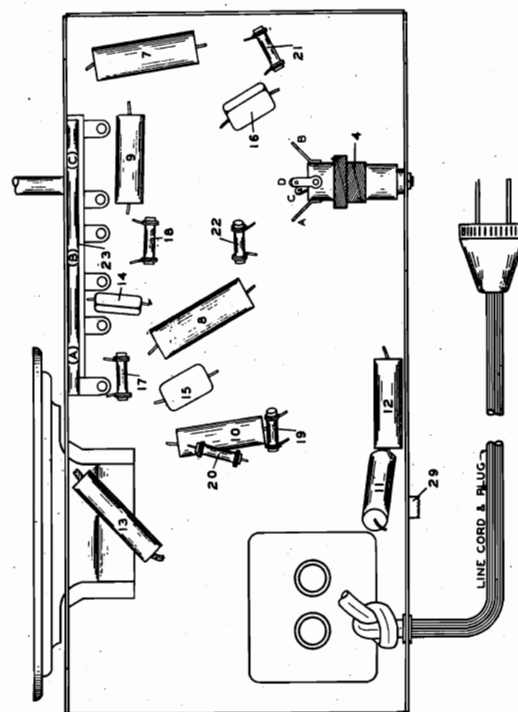
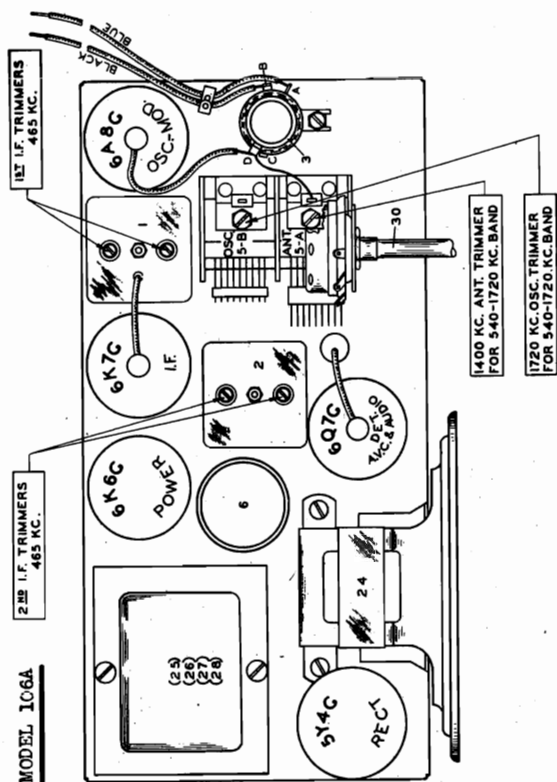
MODEL 96BE

Alignment, Trimmers
Chassis

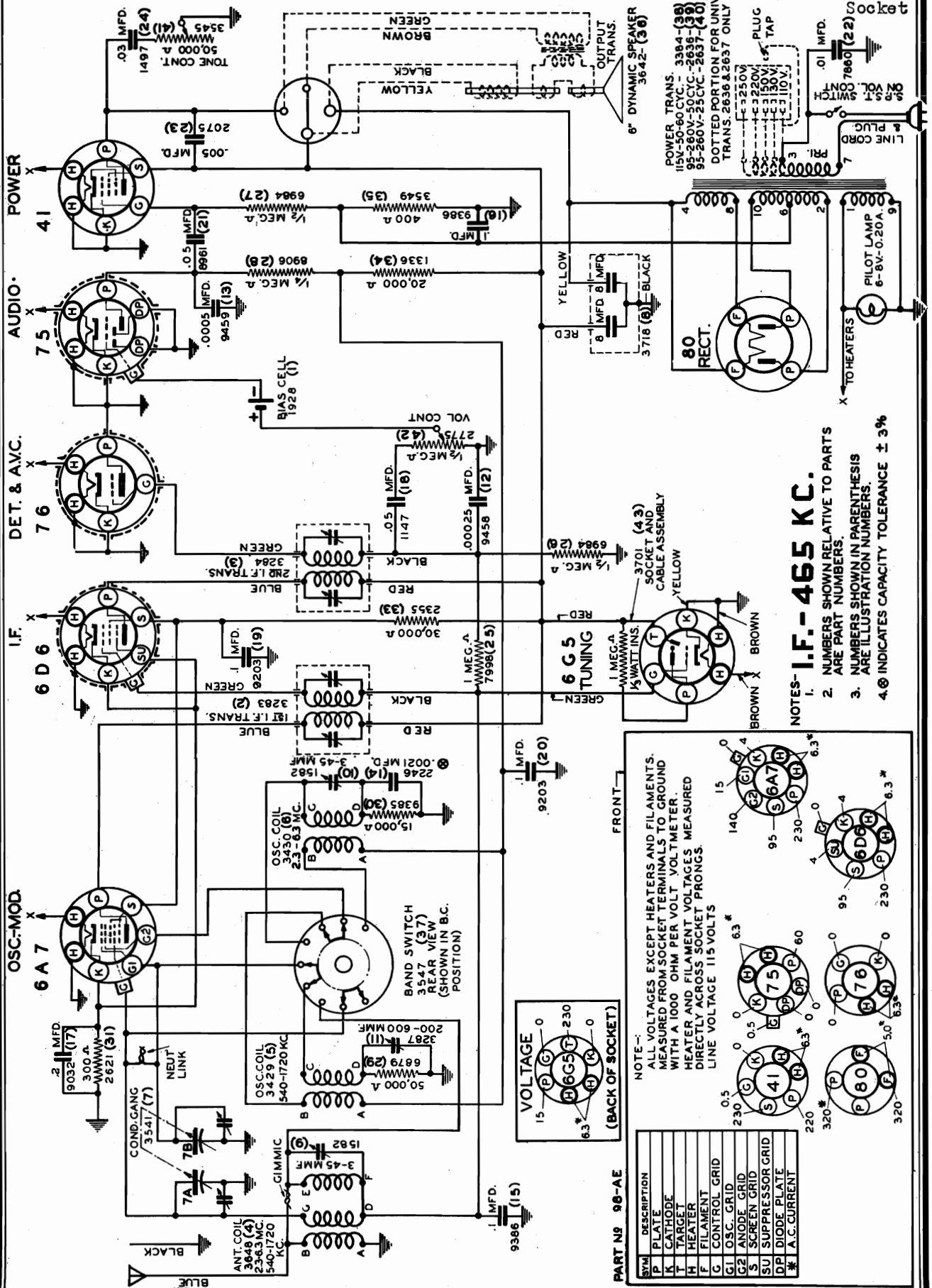
SENTINEL RADIO CORP.

MODEL 106A

Trimmers, Chassis



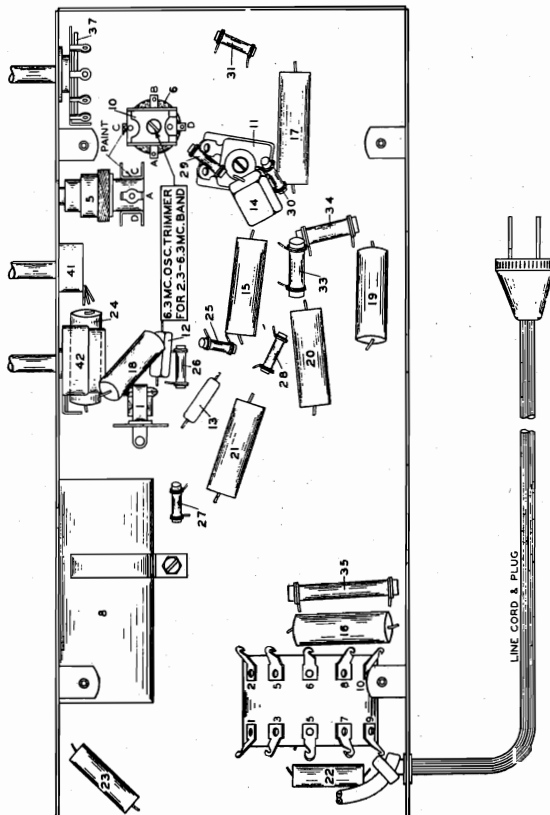
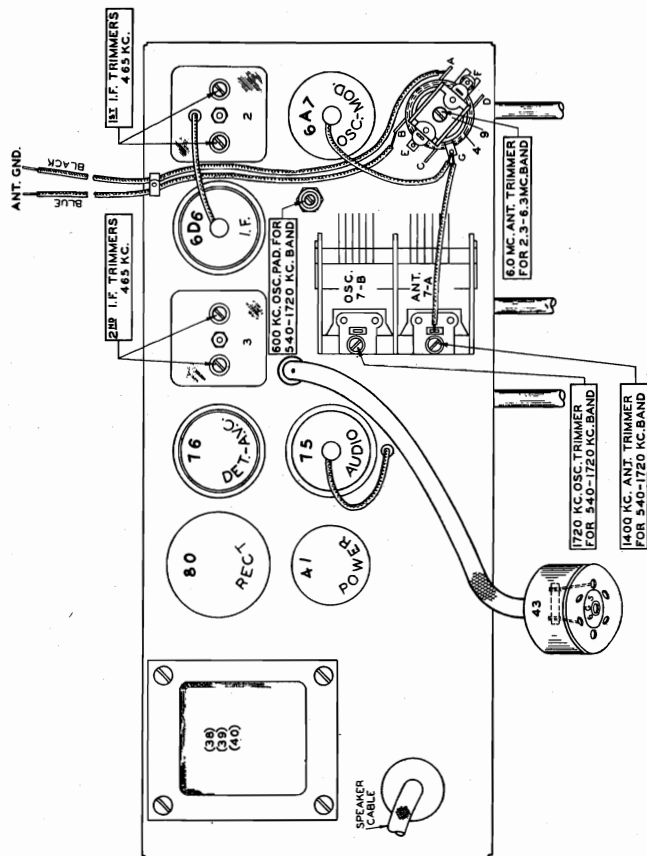
SENTINEL RADIO CORP.

MODEL 98AE
Schematic, Voltage

MODEL 98AE

Trimmers, Chassis
Alignment

SENTINEL RADIO CORP.



ALIGNMENT PROCEDURE:

Lack of sensitivity, selectivity or 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, inadequate or excessively long antenna, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

NOTE: BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT.

IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

ALIGNING I.F. STAGE AT 465 KILOCYCLES:

- Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead of the test oscillator to the grid cap of the 6A7 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.
 - Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.
 - Peak each of the second I.F. transformer trimmers.
 - Peak each of the first I.F. transformer trimmers.
- To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

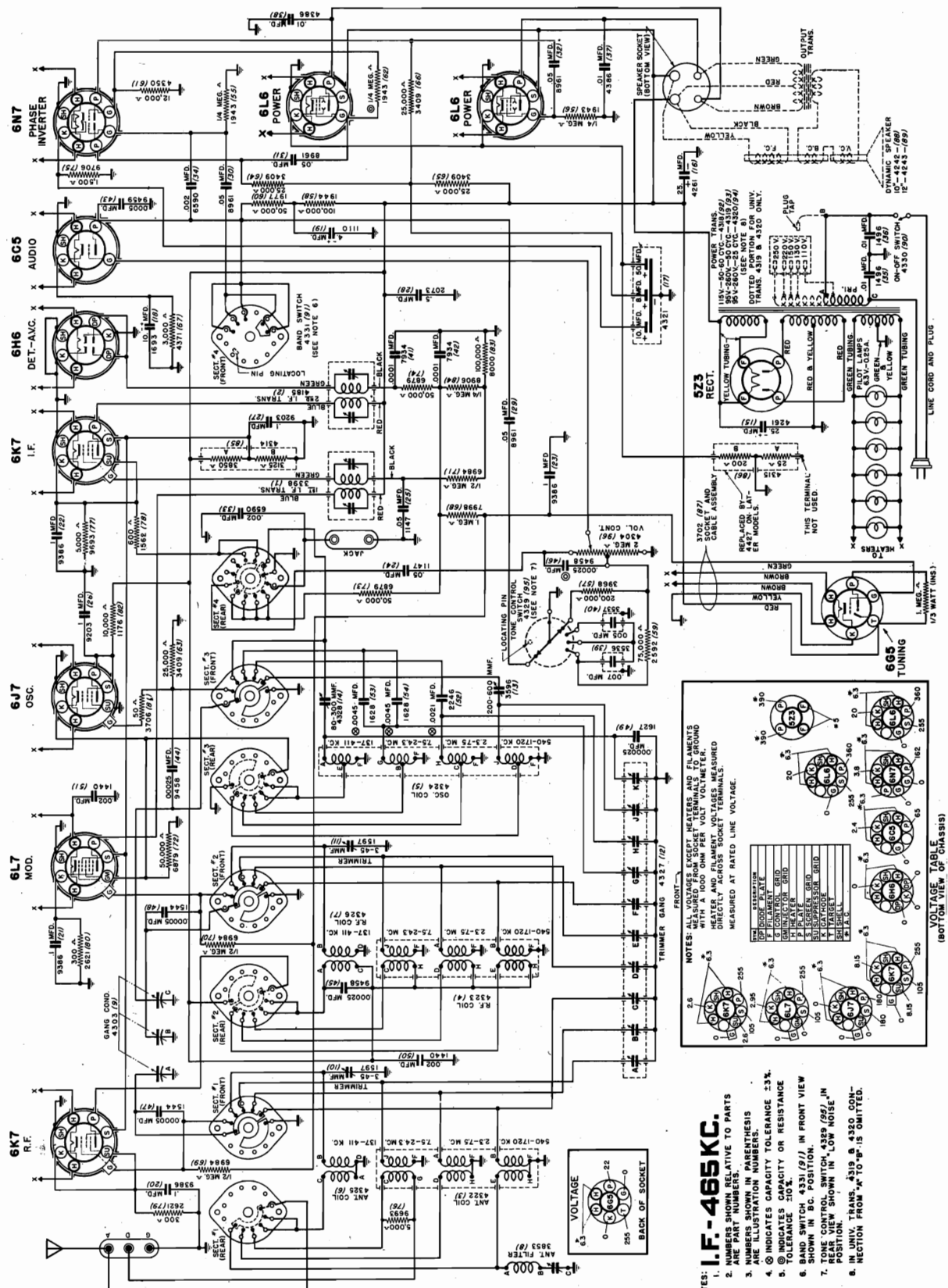
ALIGNING 1720-540 KILOCYCLE BAND:

- Remove test oscillator lead from grid of the 6A7 tube and attach it to the receiver antenna lead through a .00025 Mfd. series condenser.
- Check tuning dial adjustment by turning 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 the dial needle does not point exactly to the last line move needle to correct position.
- Set receiver dial and test oscillator frequency to EXACTLY 1720 kilocycles.
- Bring in 1720 KC test oscillator signal to maximum output by adjusting the trimmer condenser mounted on top of the oscillator section of the gang condenser. Looking at the front of the receiver the rear section of the gang condenser is the oscillator section.
- Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.
- Adjust trimmer on top of the front section gang condenser (antenna section) for maximum 1400 kilocycle test signal response.
- Tune receiver dial and set test oscillator frequency to approximately 600 kilocycles.
- While rocking the tuning condenser back and forth adjust 600 KC oscillator padder condenser which is accessible through the hole in the top of the chassis adjacent to the gang condenser for maximum 600 kilocycle signal response.

ALIGNING 2.3-6.3 MEGACYCLE BAND:

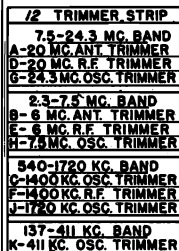
- Replace .00025 Mfd. Test oscillator antenna lead series condenser with a 400 ohm resistor.
- Adjust band selector switch for 2.3-6.3 megacycles band operation, tune receiver dial and set test oscillator frequency to EXACTLY 6.3 megacycles.
- Bring in 6.3 megacycycle test oscillator signal to maximum output by adjusting 6.3 M.C. oscillator trimmer on top of coil located underneath chassis.
- Tune receiver dial and test oscillator frequency to EXACTLY 6 megacycles, and adjust 6 M.C. antenna trimmer which is mounted on coil located on top of chassis for maximum sensitivity.

SENTINEL RADIO CORP.

MODEL 99AE
Schematic, Voltage
SocketNOTES:
I.F.-465KC.

1. NUMBERS SHOWN RELATIVE TO PARTS
2. NUMBERS SHOWN IN PARENTHESES ARE ILLUSTRATION NUMBERS.
3. INDICATES CAPACITY OR RESISTANCE
4. INDICATES CAPACITY TOLERANCE $\pm 3\%$
5. BAND SWITCH POSITION
6. TONE CONTROL SWITCH POSITION
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100. TONE CONTROL SWITCH POSITION

SENTINEL RADIO CORP.



SENTINEL RADIO CORP.

MODEL 99AE
 MODELS 144X, 144XE
 MODELS 149A, 149AE, 159AE
 Alignment

SENTINEL-ERLA MODEL 99AE ALIGNMENT PROCEDURE:

Lack of sensitivity, selectivity or 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, inadequate or excessively long antenna, etc. Never attempt to readjust set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

NOTE: BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING. OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMER AND PADDING CONDENSERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON PARTS DIAGRAM.

IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

ALIGNING I.F. STAGE AT 465 KILOCYCLES:

- Connect the ground lead of the test oscillator to the chassis or set ground post. Connect the other lead of the test oscillator to the grid cap of the 6L7 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.
- Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.
- Peek each of the second I.F. transformer trimmers.
- Peek each of the first I.F. transformer trimmers.

To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

ADJUSTING 465 KILOCYCLE WAVE TRAP:

- Connect the high output side of the test oscillator through a .00025 Mfd. condenser to the receiver antenna "A" post and the low side to the set ground.
- Set test oscillator frequency to EXACTLY 465 kilocycles and adjust 465 kilocycle wave trap trimmer condenser for MINIMUM 465 kilocycle signal response.

ALIGNING 137-411 KILOCYCLE BAND:

- Check tuning dial adjustment by turning 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 the dial needle does not point exactly to the last line move needle to correct position.
- Leave test oscillator lead connected to receiver antenna "A" post through a .00025 Mfd. series condenser.
- Adjust band selector switch for operation on 137-411 kilocycle band, tune receiver dial and set test oscillator frequency to EXACTLY 411 kilocycles.
- Bring in 411 kilocycle test signal to maximum output by adjusting 411 K.C. (K) oscillator trimmer.
- Tune receiver dial and set test oscillator frequency to EXACTLY 350 kilocycles. Adjust 350 K.C. antenna and R.F. trimmers for maximum sensitivity.
- Tune receiver dial and set test oscillator frequency to approximately 150 kilocycles—then while rocking gang condenser slightly to right and left adjust 150 kilocycle oscillator paddler for maximum sensitivity.

ALIGNING 1720-540 KILOCYCLE BAND:

- Leave .00025 Mfd. condenser in series with test oscillator lead. Adjust band selector switch for operation on the 1720-540 kilocycle band.
- Set test oscillator frequency and receiver dial to EXACTLY 1720 kilocycles. ADJUST 1720 KILOCYCLE OSCILLATOR TRIMMER (I) TO BRING IN 1720 KILOCYCLE TEST OSCILLATOR SIGNAL TO MAXIMUM OUTPUT.
- Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles. Adjust 1400 K.C. antenna (C) and R.F. (F) trimmers for maximum sensitivity.
- Set test oscillator frequency and receiver dial to approximately 600 kilocycles. Then while rocking gang condenser slightly to right and left, adjust 600 K.C. oscillator paddler for maximum signal response.

ALIGNING 23-7.5 MEGACYCLE BAND:

- Replace .00025 Mfd. test oscillator lead series condenser with a 400 ohm carbon resistor.

- Adjust band selector switch to 23-7.5 megacycle band, tune receiver dial and set test oscillator frequency to EXACTLY 7.5 megacycles—then adjust 7.5 megacycle oscillator (H) trimmer for maximum 7.5 megacycle test signal output.

- Tune receiver dial and set test oscillator frequency to EXACTLY 6 megacycles—adjust 6 M.C. antenna (B) and R.F. (F) trimmers for maximum sensitivity.

ALIGNING 7.5-24.3 MEGACYCLE BAND:

- Leave 400 ohm resistor in series with test oscillator lead and place band selector switch for operation on 7.5-24.3 megacycle band, tune receiver dial and set test oscillator frequency to EXACTLY 24.3 megacycles.

NOTE: When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 24.3 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the FIRST PEAK which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 24.3 megacycles, always check to see if the proper peak has been used. To do this leave test oscillator frequency at 24.3 megacycles, increase the output of the test oscillator and tune receiver dial to approximately 23.3 megacycles. Then vary the receiver dial slightly to the right and left of 23.3 megacycles and if the fundamental peak was used in aligning at 24.3 megacycles the test oscillator signal will be heard at approximately 23.3 megacycles on the receiver dial.

- Tune receiver dial and set test oscillator frequency to EXACTLY 20 megacycles.
- Adjust 20 M.C. antenna (A) and R.F. (D) trimmers for maximum 20 megacycle test signal response.

To assure most accurate trimmer setting, repeat all above adjustments several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

MODELS 144X, 144XE, 149A, 149AE, and 159AE.

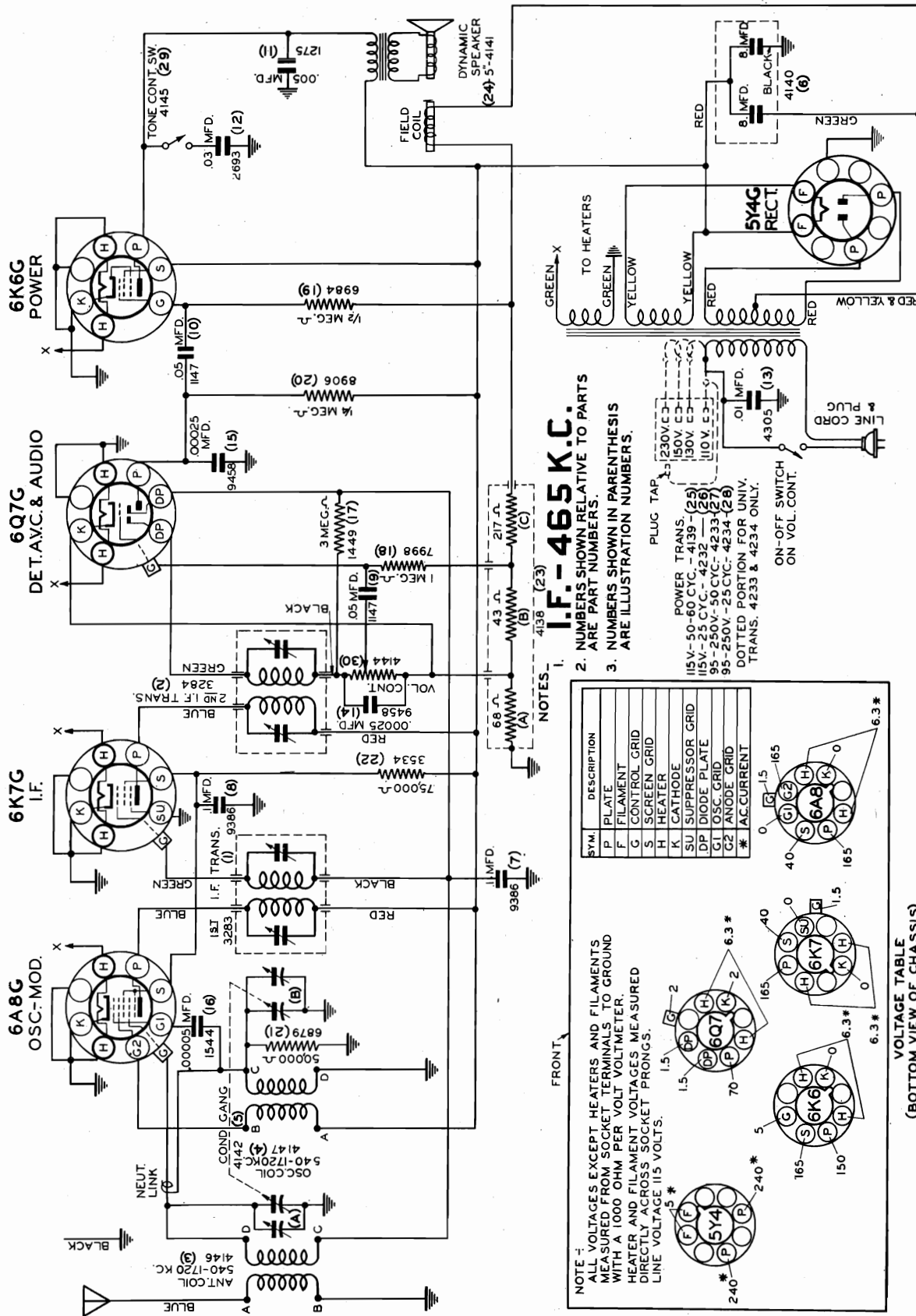
ALIGNMENT PROCEDURE IN TABULATED FORM

Be sure to follow procedure carefully and in the order shown—otherwise the receiver will be inaccurate and the dial calibration incorrect. For alignment procedure read instructions from left to right. If more than one adjustment is required on any one band, make the adjustment marked (U) first, then next (C) third, and so on. After each adjustment, check tuning dial adjustment by: Turn gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial indicator must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly use an accurately calibrated test oscillator with some type of output measuring device.

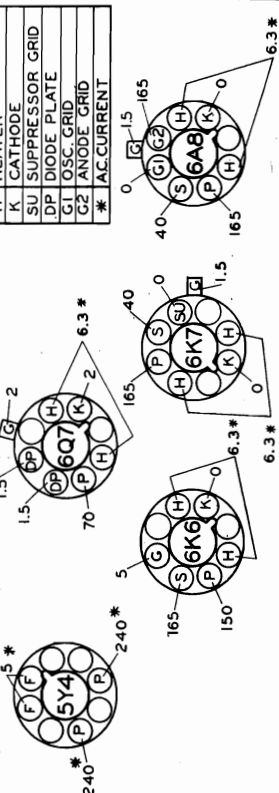
Place band selector switch for operation on:	Set receiver dial to:	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below each:
I.F. alignment use any band position	Any point where no interfering signal is received	Exactly 455 K.C.	.02 Mfd. condenser	High cap of 8BD3 tube. Do not remove cap.	
	1 1730 K.C.	Exactly 1730 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output.
	2 1400 K.C.	Exactly 1400 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	Adjust 1730 K.C. oscillator trimmer for maximum output.
	3 Approximately 600 K.C.	Approximately 600 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	Adjust 1400 K.C. antenna trimmer for maximum output. While rocking gang condenser adjust 600 K.C. oscillator paddler for maximum output.
1730 to 540 K.C.	Exactly 1730 K.C.	Exactly 1730 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	
540 to 1730 K.C.	Exactly 1400 K.C.	Exactly 1400 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	
1730 to 540 K.C.	Approximately 600 K.C.	Approximately 600 K.C.	.00025 Mfd. condenser	Receiver blue antenna lead	
58 to 18.1 M.C. BAND	Exactly 18.1 M.C.	Exactly 18.1 M.C.	400 Ohm carbon resistor	Receiver blue antenna lead	Adjust R.F. M.C. oscillator trimmer for maximum output—then screw down the trimmer until the needle is exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly use an accurately calibrated test oscillator with some type of output measuring device.
18.1 to 15 M.C. BAND	Exactly 15 M.C.	Exactly 15 M.C.	400 Ohm carbon resistor	Receiver blue antenna lead	Adjust 15 M.C. antenna trimmer for maximum output.

grid cap of 6L7 tube
 MODELS 149A, 149AE, and 159AE

4138 (123)
1. **I.F. - 465 K.C.**
2. NUMBERS SHOWN RELATIVE TO PARTS
ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS
ARE ILLUSTRATION NUMBERS



SYM.	DESCRIPTION
P	PLATE
F	FILAMENT
G	CONTROL GRID
S	SCREEN GRID
H	HEATER
K	CATHODE
SU	SUPPRESSOR GRID
DP	DIODE PLATE
G1	OSC. GRID
G2	ANODE GRID
*	AC CURRENT



**VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)**

SENTINEL RADIO CORP.

MODEL 106A
MODEL 107AE
Alignment

- (b) Carefully tune in the selected station that broadcasts on the lowest frequency—the least number of kilocycles.

- (c) Place a little mastic or celluloid on back of paper tab. Press the paper call letter tab—so that the printed call letters of the station tuned in are at the same angle as the printing on the dial—into the round depression on the cabinet front that is nearest to the dial pointer. By placing call letter tab on angle the call letter can easily be read with cabinet in either a horizontal or upright position.

- (d) Tune in the next selected station having the next lowest station frequency, pressing the call letter for this station into the round cabinet depression nearest to the dial pointer needle—continuing on in this way until station call letters have been placed into all nine cabinet depressions.

After the station call letters are set it will be a simple matter to determine the approximate dial position of any of these stations—just rotate tuning knob until dial pointer needle points to station call letter of desired station. It must be remembered that only the approximate tuning location will be indicated by the dial pointer needle—each station must be correctly tuned in by **ROTATING THE TUNING CONTROL KNOB UNTIL A STATION IS TUNED IN WITH GREATEST CLARITY.**

ALIGNMENT PROCEDURE:

Lack of sensitivity, selectivity, or 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, inadequate or excessively long antenna, etc. Never attempt to rectify set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

NOTE: BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING. OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS AND PADDING CONDENSERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

ALIGNING I.F. STAGE AT 465 KILOCYCLES:

- (a) Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead of the test oscillator to the grid cap of the 6A8G tube through a .02 Mfd. series condenser. **DO NOT REMOVE GRID CLIP.**
- (b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.
- (c) Peak each of the second I.F. transformer trimmers.
- (d) Peak each of the first I.F. transformer trimmers.

To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

ALIGNING 1720-540 KILOCYCLE BAND:

- (a) Remove test oscillator lead from grid of 6A8G tube and attach it to the receiver antenna lead through a .00025 Mfd. series condenser.
- (b) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the lost line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.
- (c) Set receiver dial and test oscillator frequency to EXACTLY 1720 kilocycles.
- (d) Bring in 1720 KC test oscillator signal to maximum output by adjusting the trimmer condenser mounted on top of the oscillator section of the gang condenser. Looking at the front of the receiver the rear section of the gang condenser is the oscillator section.
- (e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.
- (f) Adjust trimmer on top of the front section gang condenser (antenna section) for maximum 1400 kilocycle test signal response.

SENTINEL-ERLA MODEL 107AE

ALIGNMENT PROCEDURE:

Lack of sensitivity, selectivity, or 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, inadequate or excessively long antenna, etc. Never attempt to rectify set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

NOTE: BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING. OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS AND PADDING CONDENSERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM. IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

ALIGNING I.F. STAGE AT 465 KILOCYCLES:

- (a) Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead of the test oscillator to the grid cap of the 6A7 tube through a .02 Mfd. series condenser. **DO NOT REMOVE GRID CLIP.**
- (b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.
- (c) Peak each of the second I.F. transformer trimmers.
- (d) Peak each of the first I.F. transformer trimmers.

To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

ALIGNING 1720-540 KILOCYCLE BAND:

- (a) Remove test oscillator lead from grid of the 6A7 tube and attach it to the receiver antenna lead through a .00025 Mfd. series condenser.
- (b) Check tuning dial adjustment by turning 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 the dial needle does not point exactly to the last line move needle to correct position.
- (c) PLACE BAND SELECTOR SWITCH FOR 1720-540 K.C. OPERATION. PRESS IN MANUAL PUSH-BUTTON AND set receiver dial and test oscillator frequency to EXACTLY 1720 kilocycles.
- (d) Bring in 1720 KC test oscillator signal to maximum output by adjusting the trimmer condenser mounted on top of the oscillator section of the gang condenser. Looking at the front of the receiver the rear section of the gang condenser is the oscillator section.
- (e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.
- (f) Adjust trimmer on top of the front section gang condenser (antenna section) for maximum 1400 kilocycle test signal response.
- (g) Tune receiver dial and set test oscillator frequency to approximately 600 kilocycles.
- (h) While rocking the tuning condenser back and forth adjust 600 KC oscillator padder condenser which is accessible through the hole in the top of chassis adjacent to the gang condenser for maximum 600 kilocycle signal response.

ALIGNING 2.3-6.3 MEGACYCLE BAND:

- (a) Replace .00025 Mfd. test oscillator antenna lead series condenser with a 400 ohm resistor.
- (b) Adjust band selector switch for 2.3-6.3 megacycle band operation, tune receiver dial and set test oscillator frequency to EXACTLY 6.3 megacycles.
- (c) Bring in 6.3 megacycles test oscillator signal to maximum output by adjusting 6.3 M.C. oscillator trimmer.
- (d) Tune receiver dial and set test oscillator frequency to EXACTLY 6 megacycles, and adjust 6 M.C. antenna trimmer for maximum sensitivity.

MODEL 106A

FOR TRIMMER LOCATIONS
AND CHASSIS, SEE INDEX

THIS RADIO IS DESIGNED SO THAT IT MAY BE PLACED IN A HORIZONTAL OR UPRIGHT POSITION. AS THE OPERATION AND PERFORMANCE OF THE RECEIVER IS THE SAME IN EITHER POSITION, IT IS A MATTER OF PERSONAL PREFERENCE AS TO WHICH POSITION TO USE.

The approximate position on the dial that any nine stations will be tuned in may be quickly determined—by pressing a paper tab having the station call letters into the round depressions on the front of the cabinet.

THE STATIONS SELECTED MUST OPERATE ON A FREQUENCY 40 KILOCYCLES OR MORE APART. OTHERWISE IT WILL BE IMPOSSIBLE TO PLACE THE CALL LETTER TABS IN THEIR PROPER POSITION IN CABINET DEPRESSIONS.

While it will be found that only the approximate location will be indicated, the station call tabs properly located will be an extremely helpful tuning aid.

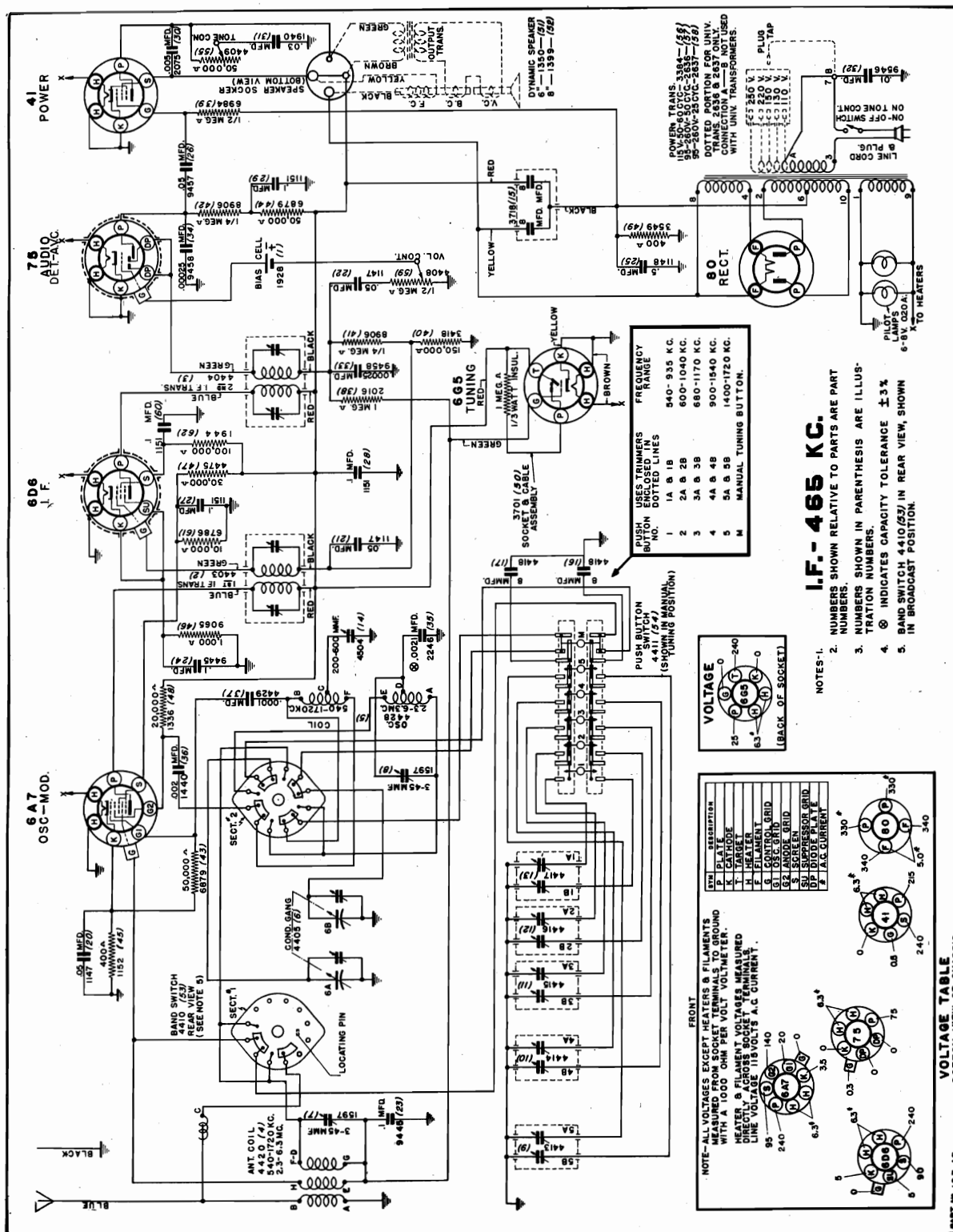
To set the proper station call letter tabs into the cabinet depressions proceed as follows:

- (a) Determine which nine stations call letters you wish to have on the cabinet—press call letter tabs out of the call letter sheets provided.

MODEL 107AE

Schematic, Voltage
Socket

SENTINEL RADIO CORP.



INSTRUCTIONS FOR INSTALLING AND OPERATING "AUTOMATIC PUSH BUTTON"

Five stations operating in the 1720-540 kilocycle broadcast band may be "AUTOMATIC PUSH-BUTTON" tuned by properly setting the ten trimmer screws accessible through holes in the back of the chassis.

AS THE PUSH-BUTTONS ARE NOT
PRE-SET AT THE FACTORY FOR ANY
DEFINITE STATION BE SURE TO SET
THEM BY:

(a) It is important to have the aerial, which will be used with the set, attached to the radio when adjusting the trimmers.

- (b) **DO NOT OPERATE THE SET AT LEAST ONE-HALF HOUR BEFORE ADJUSTING TRIMMERS.** If set is not properly warmed up, the trimmers will not adjust thoroughly when shifted up when trimmers are adjusted, the trimmers may shift position after they become warm resulting in poor tone, weak signal, and excessive background noise.
- (c) **DO NOT OPERATE THE SET AT LEAST ONE-HOUR AFTER STOPPING THE SET.** This will allow the trimmers to return to normal position.
- (d) **DO NOT OPERATE THE SET AT STATION ONLY.** Obtain the transmitter frequency—number of kilocycles—and call letters of the station you wish to "Push-Button" tune.
- (e) **DO NOT OPERATE THE SET AT STATION ONLY.** Place band selector switch for operation on 1720-540 kilocycles.
- (f) **DO NOT OPERATE THE SET AT STATION ONLY.** Press in "MANUAL" tuning button—see diagram.

(f) Press in "MANUAL" tuning button—see diagram.

(g) It is advisable that if a station is selected whose transmitter frequency is somewhat above 940-935 kilocycles that the frequency is somewhat below 940-935 K.C. on paper label attached to back of chassis be adjusted first.

(h) Using "MANUAL" tuning knob carefully tune in selected station whose transmitter frequency is between 940-935 kilocycles.

(i) Press in push-button marked "940-935 K.C."—see diagram.

(j) If station is heard and in "C" position, it is probably being distorted and, in some instances, another station may be heard.

NOTE:

AS THE TRIMMERS SHOULD NEVER BE TOO LOOSELY PROPER TRIMMERS BE USED.

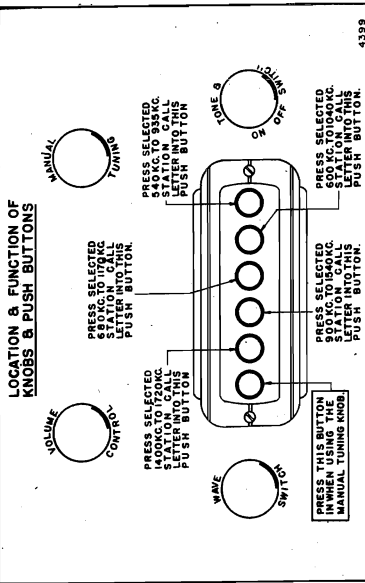
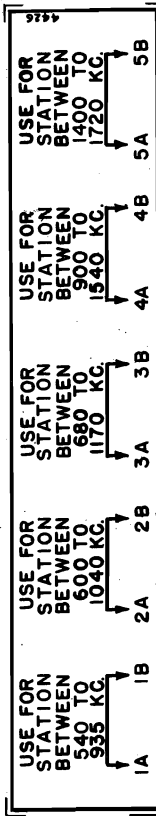
PROPER TRIMMERS BE USED.

It may be noticed that the transmitter frequency—number of kilocycles—of a selected station falls within the range of more than one group of trimmers. Generally the transmitter frequency of the selected station will fall well within the minimum and maximum ranges of one set trimmer and slightly outside the range of another set. This is so because the minimum or maximum frequency of trimmers is not always exactly the same as the center frequency of the other set of trimmers. For example, if a selected station transmitter frequency is 600 kilocycles it would be possible to use the first set of trimmers. In some instances it may be necessary after the set is operated to heat humbirds, etc.

In some instances it may be necessary after the set is operated to heat, humidity, etc.

This diagram, which is similar to the one attached to the back of chassis over trimmer holes, shows the minimum-maximum range of the five groups of trimmers.

IMPORTANT: WHEN LISTENING TO STATIONS ON BROADCAST BAND, THE "MANUAL PUSH BUTTON" OR ONE OF THE OTHER "PUSH BUTTONS" MUST BE PUSHED IN—OTHERWISE NO STATION WILL BE HEARD. DO NOT PRESS IN MORE THAN ONE "PUSH BUTTON" AT ONE TIME—IF MORE THAN ONE "PUSH BUTTON" IS PRESSED INWARD ONLY THE HIGHEST FREQUENCY STATION WILL BE HEARD.



(i) With a small screw driver carefully tune in the selected 540-935 KC station. The frequency of the station is 14,000 cycles above the tuning fork. The station is on the edge of the dial. Turn the tuning fork to the left to adjust the frequency. BE SURE TO WATCH TUNING AND ADJUST. TUNING IS ON THE TUNING END OF THE GREEN INVERTED "V" ON THE TUNING EYE OF THE GREEN INVERTED "V" ON THE TUNING EYE ARE CLOSEST TOGETHER. AT THIS POINT THE SIGNAL WILL BE HEARD WITH GREATEST VOLUME AND CLARITY. ONE. TWO. THREE. FOUR. FIVE. SIX. SEVEN. EIGHT. NINE. TEN. ELEVEN. TWELVE. THIRTEEN. FOURTEEN. FIFTEEN. SIXTEEN. SEVENTEEN. EIGHTEEN. NINETEEN. TWENTY. TWENTY ONE. TWENTY TWO. TWENTY THREE. TWENTY FOUR. TWENTY FIVE. TWENTY SIX. TWENTY SEVEN. TWENTY EIGHT. TWENTY NINE. THIRTY. THIRTY ONE. THIRTY TWO. THIRTY THREE. THIRTY FOUR. THIRTY FIVE. THIRTY SIX. THIRTY SEVEN. THIRTY EIGHT. THIRTY NINE. FORTY. FORTY ONE. FORTY TWO. FORTY THREE. FORTY FOUR. FORTY FIVE. FORTY SIX. FORTY SEVEN. FORTY EIGHT. FORTY NINE. FIFTY. FIFTY ONE. FIFTY TWO. FIFTY THREE. FIFTY FOUR. FIFTY FIVE. FIFTY SIX. FIFTY SEVEN. FIFTY EIGHT. FIFTY NINE. SIXTY. SIXTY ONE. SIXTY TWO. SIXTY THREE. SIXTY FOUR. SIXTY FIVE. SIXTY SIX. SIXTY SEVEN. SIXTY EIGHT. SIXTY NINE. SEVENTY. SEVENTY ONE. SEVENTY TWO. SEVENTY THREE. SEVENTY FOUR. SEVENTY FIVE. SEVENTY SIX. SEVENTY SEVEN. SEVENTY EIGHT. SEVENTY NINE. EIGHTY. EIGHTY ONE. EIGHTY TWO. EIGHTY THREE. EIGHTY FOUR. EIGHTY FIVE. EIGHTY SIX. EIGHTY SEVEN. EIGHTY EIGHT. EIGHTY NINE. NINETY. NINETY ONE. NINETY TWO. NINETY THREE. NINETY FOUR. NINETY FIVE. NINETY SIX. NINETY SEVEN. NINETY EIGHT. NINETY NINE. HUNDRED. HUNDRED ONE. HUNDRED TWO. HUNDRED THREE. HUNDRED FOUR. HUNDRED FIVE. HUNDRED SIX. HUNDRED SEVEN. HUNDRED EIGHT. HUNDRED NINE. THOUSAND. THOUSAND ONE. THOUSAND TWO. THOUSAND THREE. THOUSAND FOUR. THOUSAND FIVE. THOUSAND SIX. THOUSAND SEVEN. THOUSAND EIGHT. THOUSAND NINE. FIFTY THOUSAND. FIFTY THOUSAND ONE. FIFTY THOUSAND TWO. FIFTY THOUSAND THREE. 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(k) After trimmers 1A and 1B have been properly set for the selected station operating between 540-935 Kilocycles, adjust other trimmers in the same manner and in the following order.

(l) Set trimmers 2A and 2B for selected station operating between 900-1040 Kilocycles.

(m) Adjust trimmer 3B for the selected station operating between 680-1170 Kilocycles.

(n) Set trimmers 4A and 4B for selected station operating between 900-1540 Kilocycles.

(c) Adjust trimmers 5A and 5B for selected station operating between 900-1540 kilocycles.

trimmers marked "1A and 1B" or trimmers marked "2A and 2B." Trimmers marked 2A and 2B should not be used because they would have to be loosely adjusted, which is objectionable because TRIMMERS SHOULD NEVER BE TOO LOOSELY or TOO TIGHTLY ADJUSTED. Inasmuch as 600 kilocycles falls well within the minimum-maximum range of trimmers marked "1A and 1B," these should be used instead.

and 1B," these should be used instead.

PUSH-BUTTON ADJUSTMENT

Nine stations operating in the 1500-540 kilocycle band may be automatically push button tuned by properly setting each station selector push button.

AS THE PUSH BUTTONS ARE NOT PRE-SET AT THE FACTORY FOR ANY DEFINITE STATIONS BE SURE TO SET EACH ONE.

Before Attempting to Set Push Buttons Be Sure to:

- Have aerial which will be used with the radio attached to the receiver when setting push buttons.
- Operate radio at least 15 minutes before adjusting push buttons.
- Obtain transmitter frequency—number of kilocycles—and call letters of the nine stations you wish to push button tune from radio log or newspaper radio station list.

Adjust Push Buttons for Selected Stations by:

- (a) Rotate band switch knob to the NEXT TO MAXIMUM RIGHT HAND POSITION—540/1730 KILO-CYCLE BAND MANUAL TUNING POSITION.
- (b) Using regular manual tuning knob carefully tune in one of the selected stations whose transmitter frequency is somewhere between 535-880 kilocycles. Make a mental note of the kind of program on this station, so that when push button is actuated for this particular station (as instructed in paragraph (e)) it will be easy to recognize the station by the type of program being transmitted.
- (c) Rotate band switch knob to maximum right hand position.

(d) Press in one of the three push buttons marked 535-880 klycycles on diagram.

(e) GRASP END OF PUSH BUTTON JUST PRESSED IN AND BY SLOWLY TURNING THIS BUTTON CAREFULLY TUNE IN THE SELECTED 535-880 KILOCYCLE STATION THAT WAS PREVIOUSLY TUNED IN WITH MANUAL CONTROL.

Slowly—turn first in one direction, then if the wanted station is not heard turn in opposite direction. WATCH TUNING EYE AND ADJUST SO THAT THE TWO OPEN ENDS OF THE GREEN INVERTED "V" ON THE TUNING EYE ARE CLOSEST TOGETHER—AT WHICH POINT THE SIGNAL WILL BE HEARD WITH GREATEST VOLUME AND CLEAREST TONE.

(f) Press station call letter of the station just tuned in out of call letter sheet supplied and insert into de-
mand with character of CLOWE and CLEAUCOI PONE.
Press station call letter of the station just tuned in out of call letter sheet supplied and insert into de-
pression adjacent to push button just adjusted.

(g) After the first 535-880 kilocycle push button has been properly set, the other eight push buttons should be adjusted in the same manner preferably in the following order:

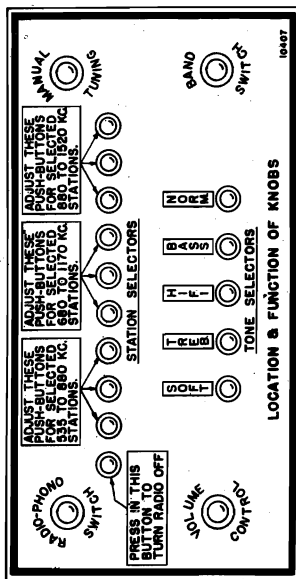
1. Set remaining two push buttons marked 535-880 kilocycles on diagram for any two stations operating between 535-880 kilocycles.

2. The three push buttons marked 680-1170 kilocycles on diagram should be adjusted for any three ranging between 330-850 kilocycles.

3 Adjust the three push buttons marked 880-1520 kilocycles on diagram for any three selected stations operating between 880 and 1520 kilocycles.

IMPORTANT

For Manual Tuning the Band Switch must be in next to maximum right hand position. When adjusting Push Buttons or when Push Button tuning after Push Buttons have been set, Band Switch must be in maximum right hand position.



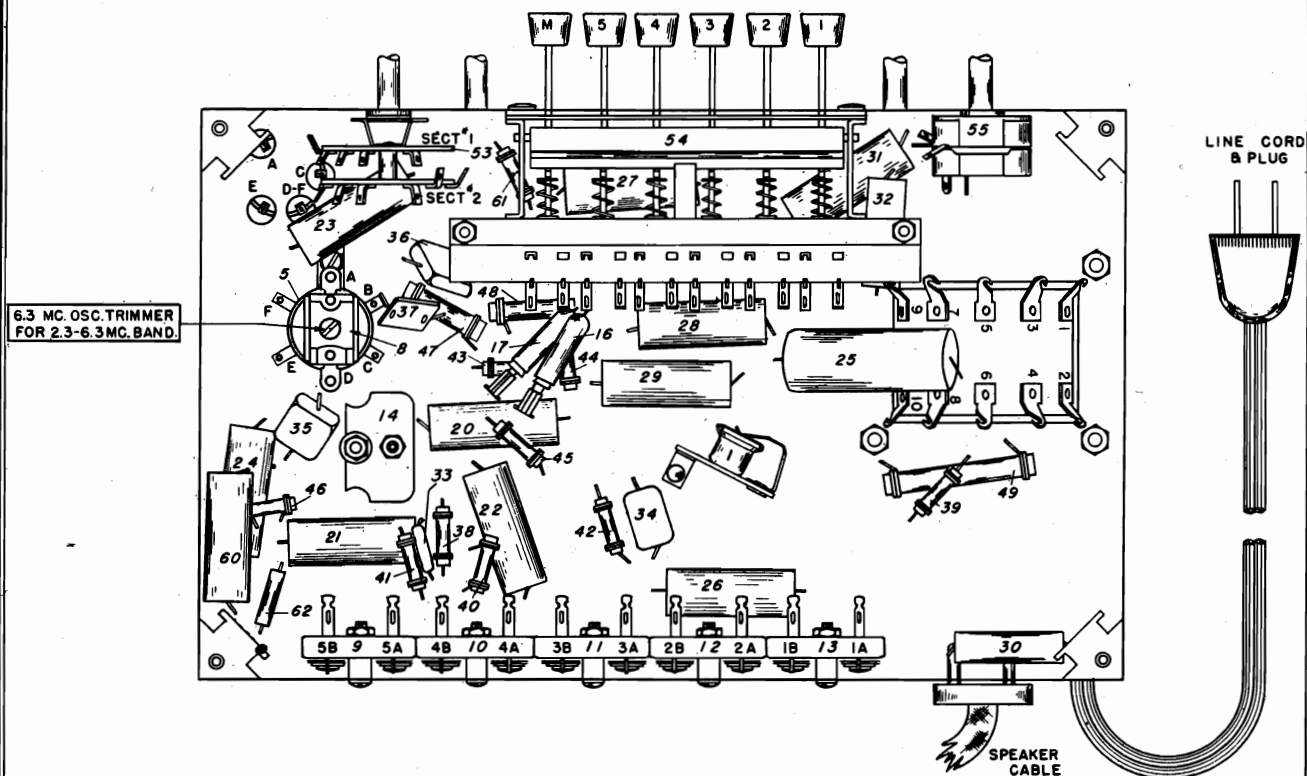
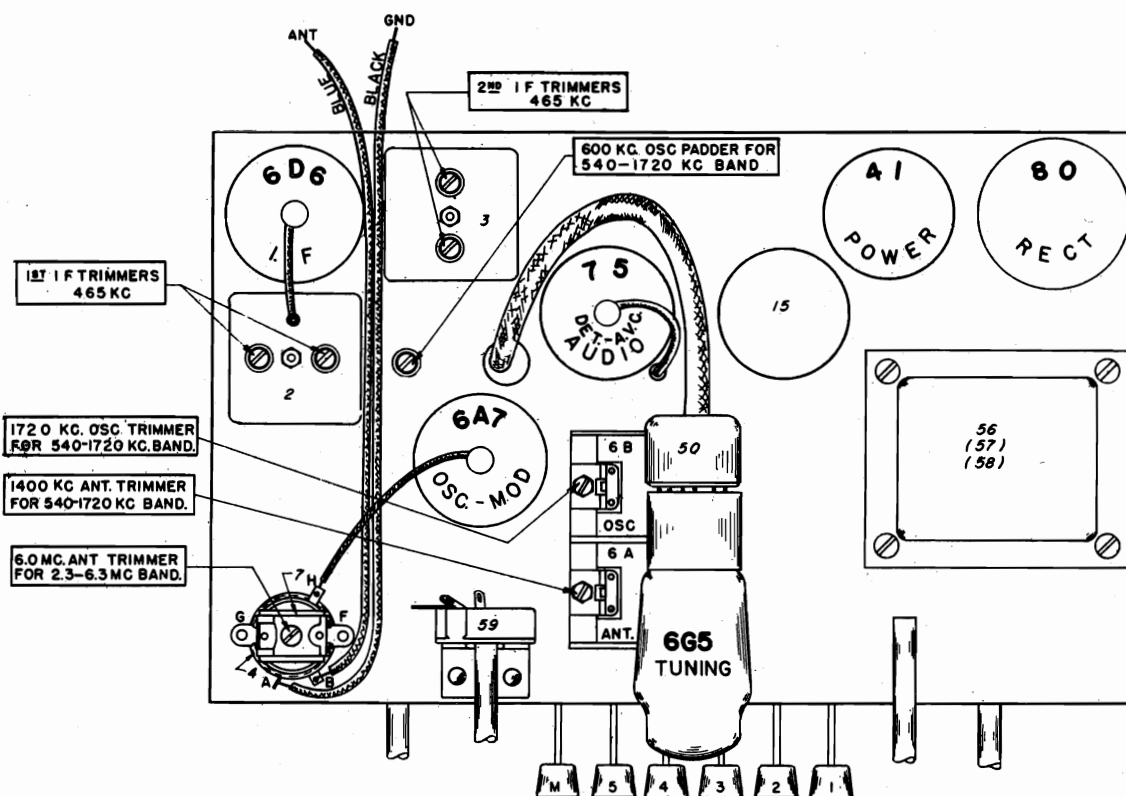
Sentinel Model 107AE

Sentinel Model 145AE

MODEL 107AE

Trimmers, Chassis

SENTINEL RADIO CORP.





ALIGNING 5.55-18.5 MEGACYCLE BAND:

- (e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles. Adjust 1400 K.C. R.F. and antenna trimmers for maximum sensitivity.
 - (f) Set test oscillator frequency and receiver dial to approximately 600 kilocycles. Then while rocking gang condenser slightly to right and left, adjust 600 K.C. oscillator paddler for maximum signal response.
- ALIGNING 1.68-5.6 MEGACYCLE BAND:**
- (a) Replace .00025 Mfd. test oscillator antenna lead series condenser with a 400 ohm resistor.
 - (b) Adjust band selector switch to 1.68-5.6 megacycles, tune receiver dial and set test oscillator frequency to EXACTLY 5.6 megacycles. Bring in 5.6 megacycle test signal to maximum output by adjusting 5.6 M. C. oscillator trimmer.
 - (c) Tune receiver dial and test oscillator frequency to EXACTLY 5 Megacycles and adjust 5 M.C. antenna trimmer for maximum sensitivity.

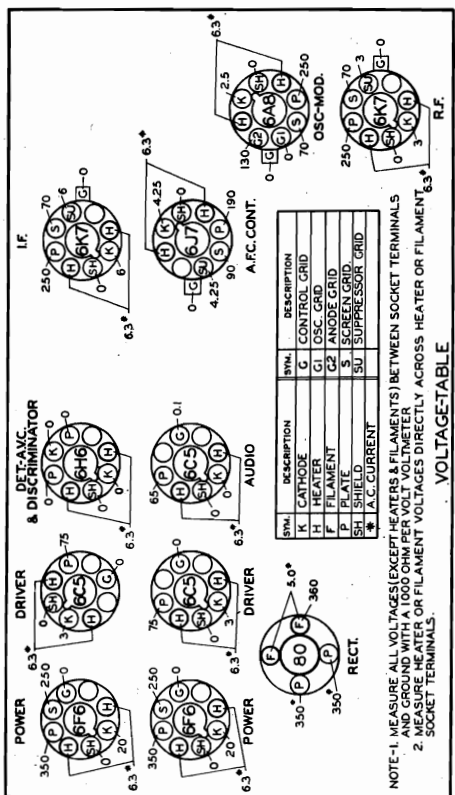
ALIGNING 1.68-5.6 MEGACYCLE BAND:

- (c) Turn receiver on, place A.F.C. switch knob in left position and if meter needle jumps off scale adjust output of test oscillator until an approximate 2 M.A. deflection is obtained on the 0 to 5 millimeter scale.
- (d) Place band selector switch for operation on 1720-540 K.C. broadcast band—and set receiver dial somewhere near 1000 kilocycles at a point where no station is heard.
- (e) Rotate A.F.C. switch knob from maximum left hand to middle position and note whether the millimeter reading changes as the position of the A.F.C. switch is changed. No change in reading indicates probable proper discriminator trimmer adjustment, while a noticeable change indicates improper discriminator trimmer adjustment.
- (f) **IMPORTANT: DO NOT ADJUST DISCRIMINATOR TRIMMER UNLESS IT IS ABSOLUTELY NECESSARY.** Place A.F.C. switch in middle position and note millimeter reading, then place A.F.C. switch in maximum left hand position. With A.F.C. switch in maximum left hand position, CAREFULLY ADJUST DISCRIMINATOR TRIMMER UNTIL MILLIAMETER READING IS EXACTLY THE SAME IN BOTH POSITIONS.

NOTE: As the discriminator trimmer screw is screwed in (increasing capacity) the milliammeter reading should decrease and as the discriminator trimmer is unscrewed (decreasing capacity) the milliammeter reading should increase. IF WHEN ADJUSTING THE DISCRIMINATOR TRIMMER THE MILLIAMMETER READING DOES NOT SHARPLY INCREASE OR DECREASE AS THE TRIMMER IS ADJUSTED EVEN AFTER SEVERAL TURNS OF THE TRIMMER SCREW, THIS DOES NOT INDICATE PROPER BALANCING BUT DOES INDICATE INCORRECT ADJUSTMENT AND THE DISCRIMINATOR TRIMMER SHOULD BE SET TO ABOUT $\frac{1}{2}$ CAPACITY AND THE ADJUSTMENT OF THE DISCRIMINATOR TRIMMER MADE ALL OVER AGAIN.

ALIGNING 1720-540 KILOCYCLE BAND:

- a) Check tuning dial adjustment by turning 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 the dial needle does not point exactly to the last line, move needle to correct position.
- b) Remove test oscillator lead from grid of 6AS tube and connect to receiver "A" antenna post through a J00025 MFD. condenser.
- c) Place A.F.C. control knob in middle A.F.C. "off" position. Adjust band selector switch for operation on the 1720-540 kilocycle band.
- d) Set test oscillator frequency and receiver dial to EXACTLY 1720 kilocycles, and BRING IN 1720 KILOCYCLE TEST OSCILLATOR SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1720 KILOCYCLE OSCILLATOR TRIMMER.



- NOTE-1. MEASURE ALL VOLTAGES(EXCEPT HEATERS & FILAMENTS) BETWEEN SOCKET TERMINALS AND GROUND WITH A 1000 OHM PER VOLT VOLTMETER
2. MEASURE HEATER OR FILAMENT VOLTAGES DIRECTLY ACROSS HEATER OR FILAMENT SOCKET TERMINALS.

ALIGNMENT PROCEDURE:

SHOULD REALIGNMENT BE NECESSARY, THERE ARE SEVERAL PRECAUTIONS THAT MUST BE CAREFULLY OBSERVED, THESE ARE:

1. Do not align set until it has reached normal operating temperature. Place the receiver in operation at least 15 minutes before attempting to realign the set.
2. The importance of using the proper type of test equipment and FOLLOWING THE ALIGNMENT PROCEDURE EXACTLY AS GIVEN CANNOT BE TOO STRONGLY EMPHASIZED—failure to do so will result in low sensitivity, poor selectivity, incorrect dial calibration, distortion and unsatisfactory operation of the automatic frequency control.
3. It is absolutely necessary that an accurately calibrated test oscillator with some type of output measuring device and a double scale milliammeter—0 to 1 M. A. and 0 to 5 M.A. be used.

ALIGNING I.F. STAGE AT 465 KILOCYCLES:

- (a) Place automatic frequency control knob in the middle A.F.C. "off" position.
- (b) Attach the ground lead of the test oscillator to the chassis. Connect the other lead to the grid cap of the 6A8 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.
- (c) Set test oscillator to EXACTLY 465 kilocycles and turn volume control on full.

ALIGNING DISCRIMINATOR CIRCUIT:

- (a) Place switch underneath push button plate assembly above gang condenser in A.F.C. "on" position. Leave test oscillator set to EXACTLY 465 Kilocycles and connect to grid of 6A8 tube through a .02 Mfd. Condenser—insert lead of double scale 0 to 1 and 0 to 5 millimeter into A.F.C. test jack located on top of chassis adjacent to the 6A7 tube. To avoid possibility of damaging the meter should one of the millimeter leads short to the metal chassis,
- ALWAYS TURN OFF RECEIVER WHEN INSERTING OR REMOVING MILLIAMMETER LEADS FROM A.F.C. TEST JACK.**

(b) Short out A.F.C. mute switch by grounding the second from the left (looking at the front of the chassis) of the four lugs mounted on top of the dial assembly. The proper lug to ground is indicated in the "Note X" on chassis top parts view.

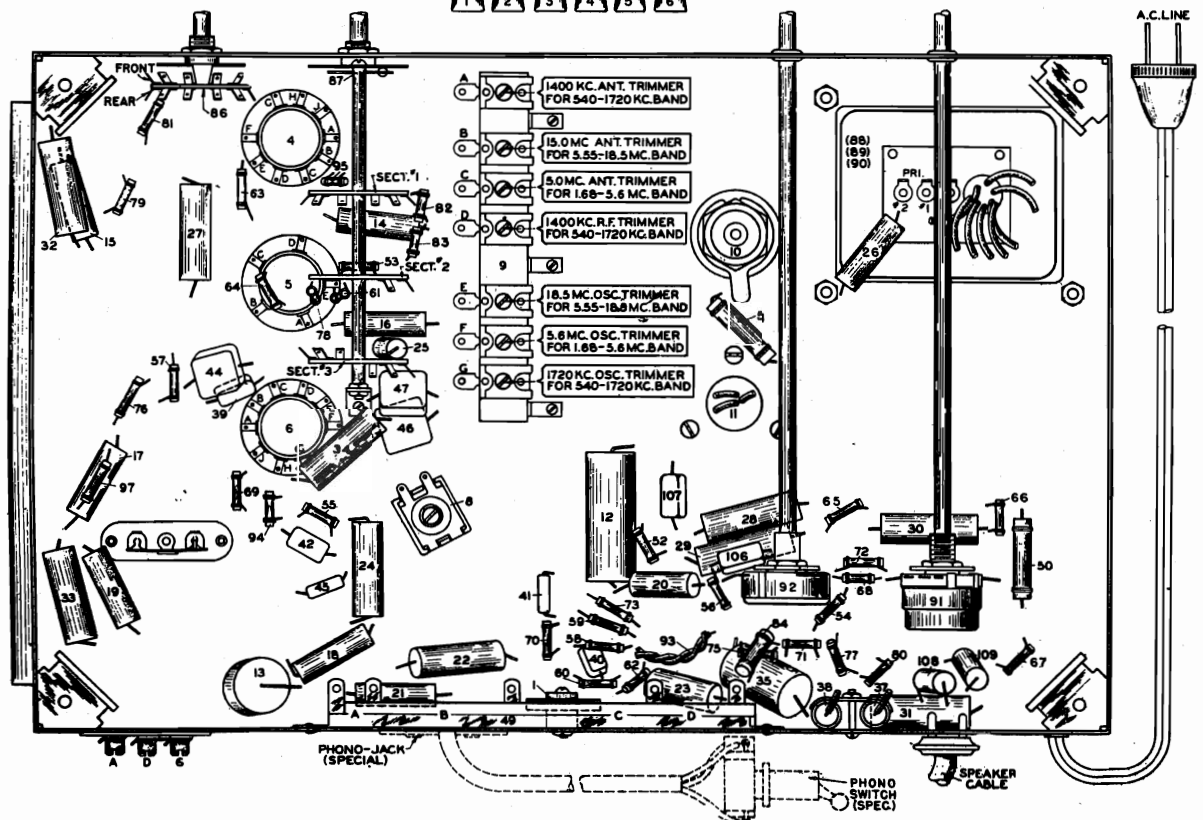
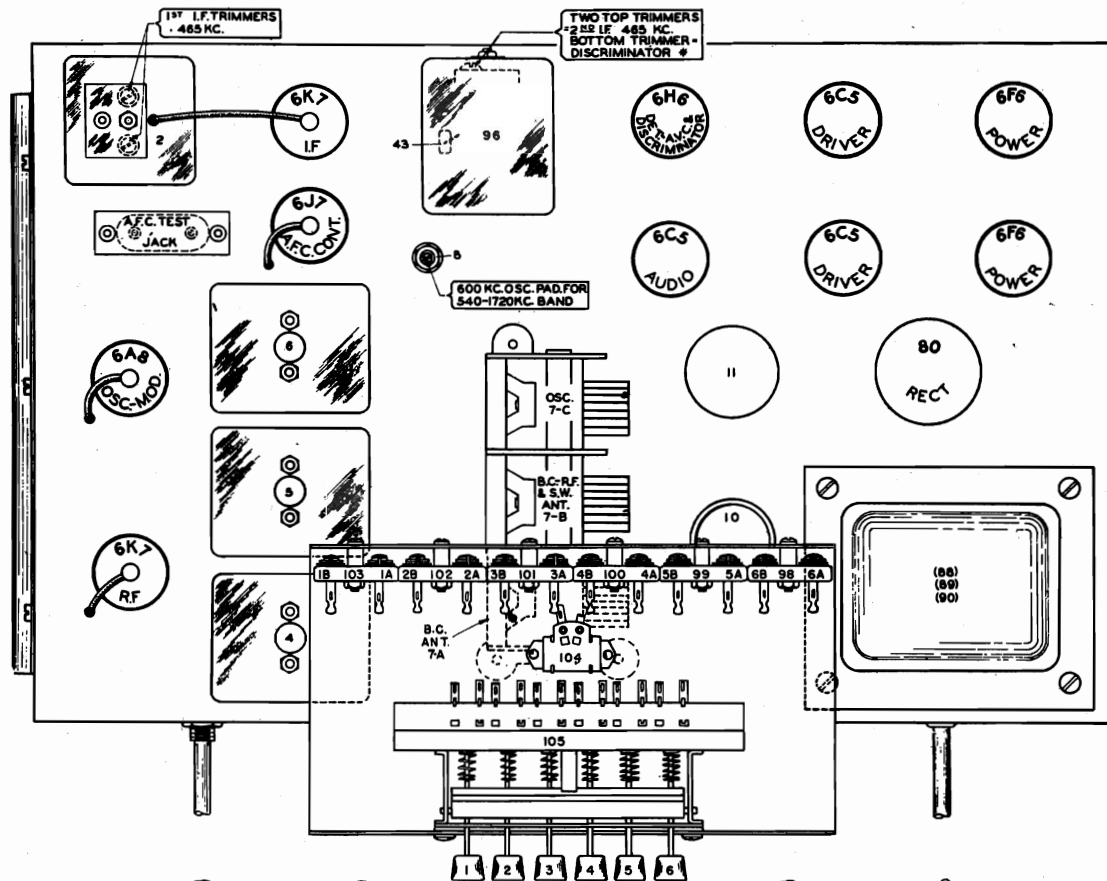
BOTTOM VIEW OF CHASSIS

10

- (d) Remove shields held in position by snap fasteners over A.F.C. test lead and over trimmer screw holes in the first and second I.F. transformer shield cans.
- (e) Peak second I.F. transformer trimmers for maximum 465 kilocycle output by adjusting the two trimmers accessible through the two top holes in the second I.F. transformer shield can. DO NOT TOUCH DISCRIMINATOR (BOTTOM) SCREW.
- (f) Peak each of the first I.F. transformer trimmers for maximum 465 kilocycle signal output.

SENTINEL RADIO CORP.

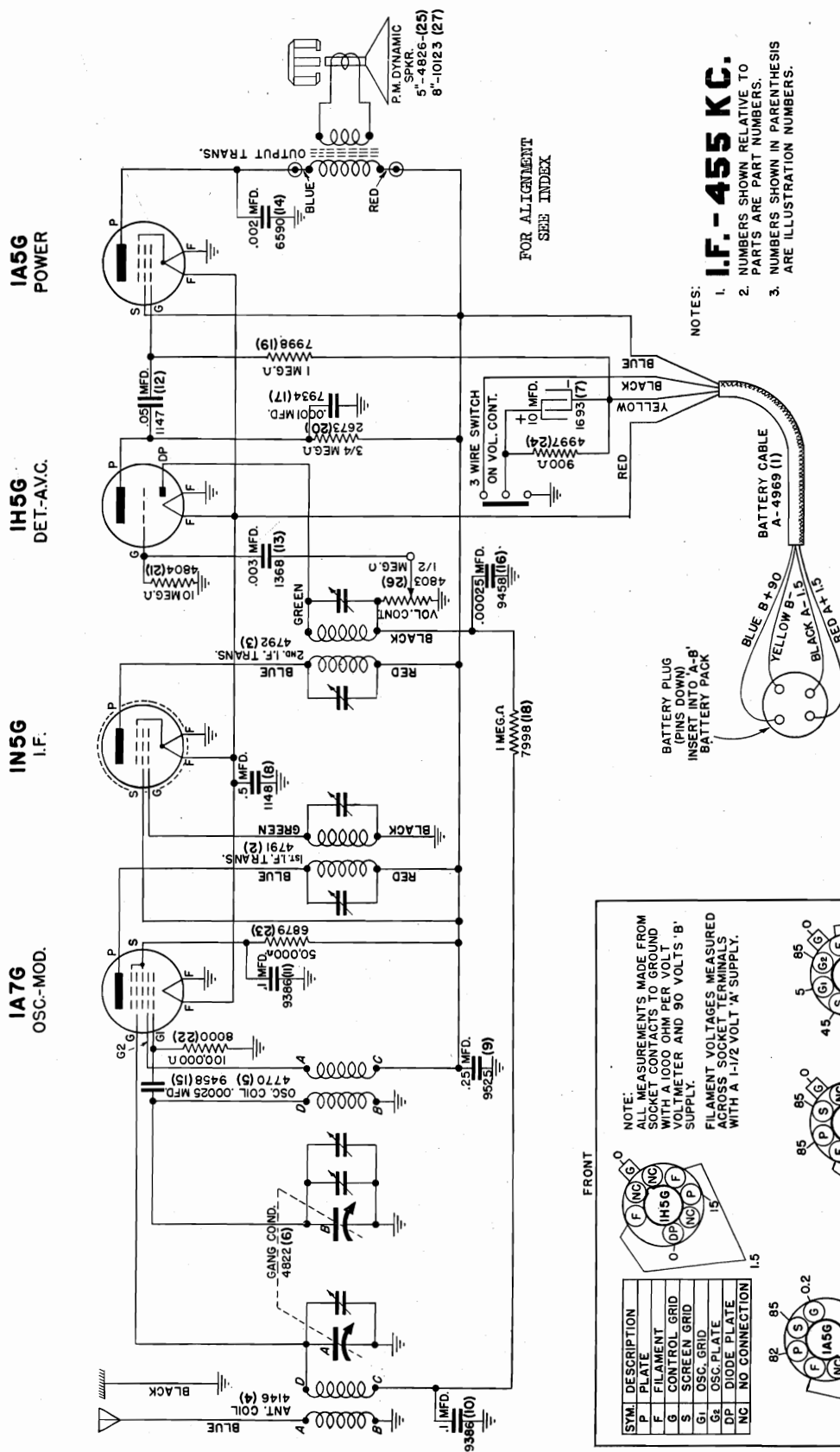
MODEL 110A
Trimmers
Chassis



I.F. - 455 KC.

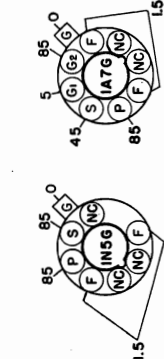
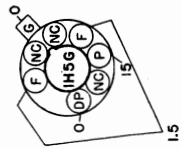
- I.F.-455 KC.**

4 TUBE — SENTINEL MODEL 118B
1½ Volt Battery Operated Superheterodyne Receiver



SYM.	DESCRIPTION
P	PLATE
F	FILAMENT
G	CONTROL GRID
S	SCREEN GRID
G ₁	OSC. GRID
G ₂	OSC. PLATE
DP	DIODE PLATE
NC	NO CONNECTION

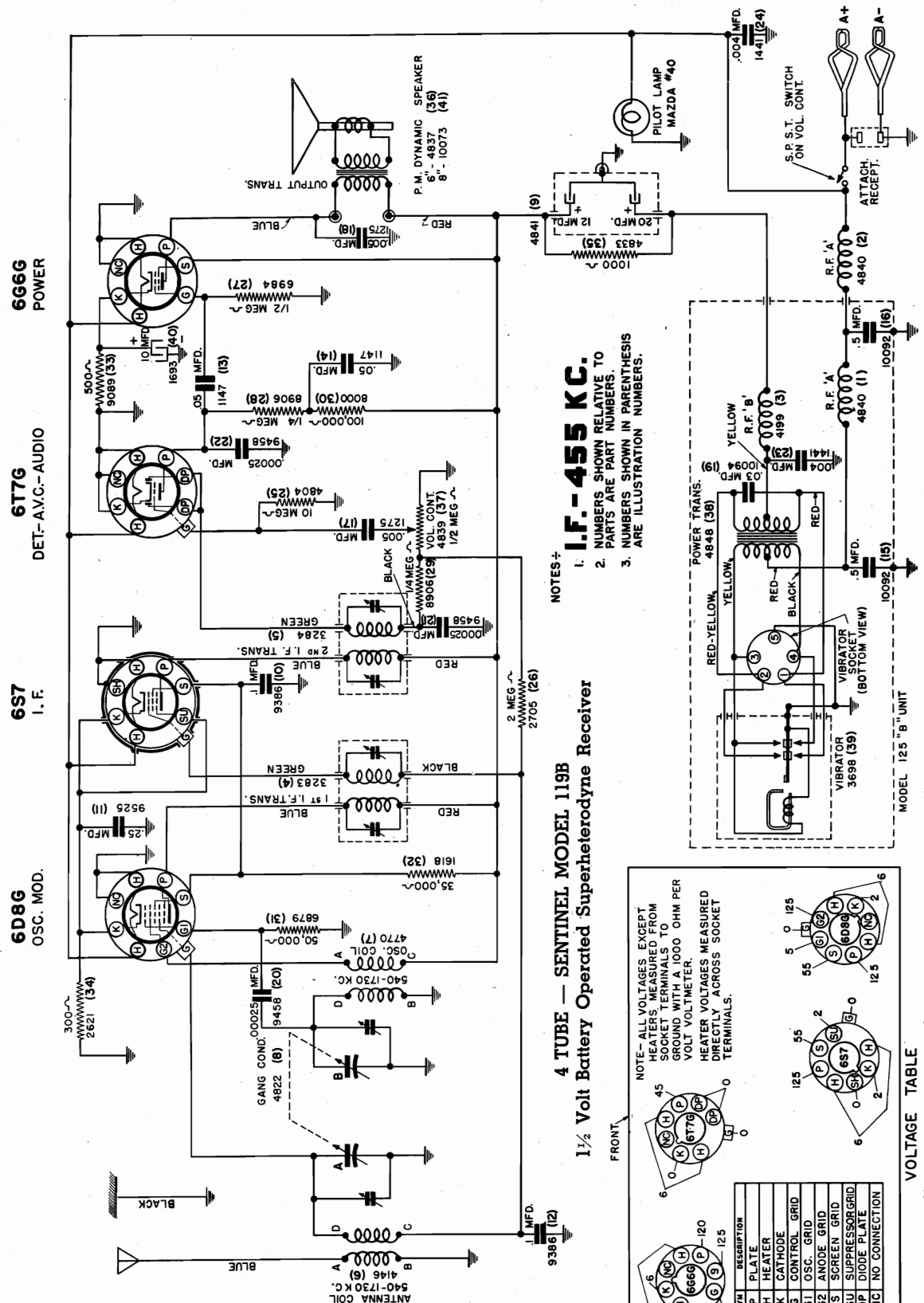
NOTE: ALL MEASUREMENTS MADE FROM SMALL SOCKET CONTACTS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER AND 90 VOLTS 'B' SUPPLY.



**VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)**

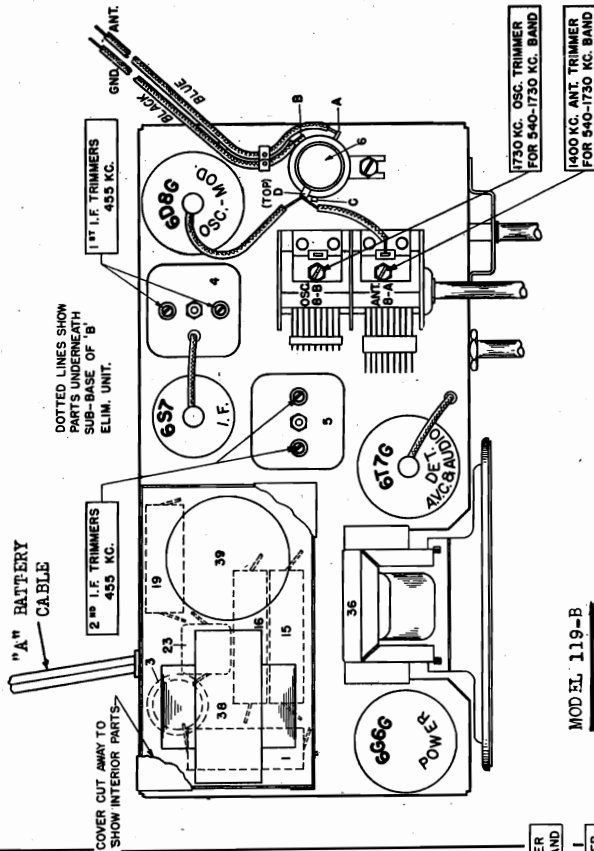
SENTINEL RADIO CORP.

MODEL 119B
Schematic, Voltage
Socket

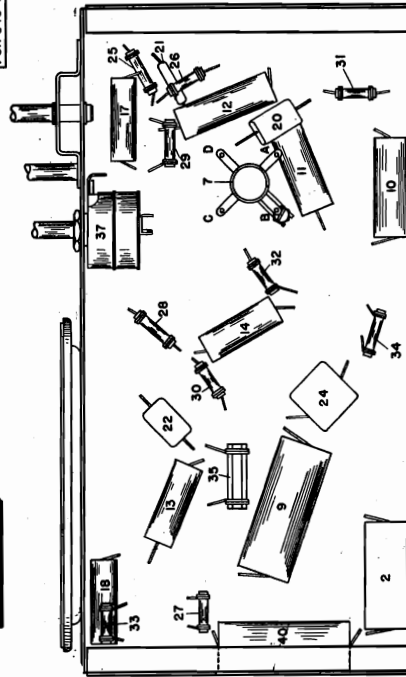


SENTINEL RADIO CORP.

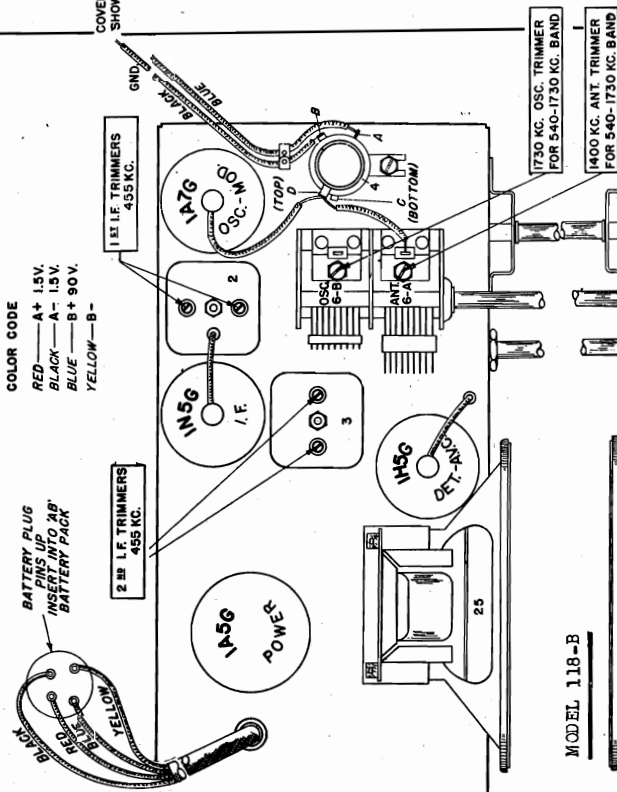
ALIGNMENT:- I.F. 455 KC THROUGH A .02 MFD. CONDENSER TO GRID CAP OF 6DG6 TUBE--DO NOT REMOVE CAP-- ADJUST IF-TRIMMERS TO MAXIMUM OUTPUT. AT 1750 KC THROUGH .00025 MFD. CONDENSER TO RECEIVER ANTENNA (BLUE) LEAD, ADJUST OSCILLATOR TRIMMER TO MAX. AT 1400 KC, ANTENNA TRIMMER TO MAX.



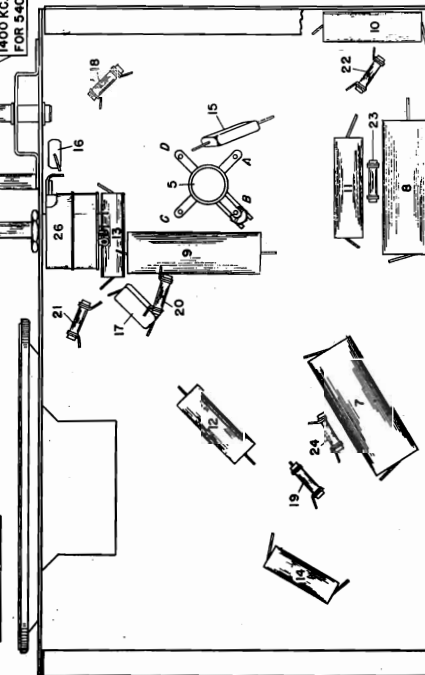
MODEL 119-B



ALIGNMENT:-I.F. 455 KC THROUGH A .02 MFD. CONDENSER TO GRID CAP OF 1A7G TUBE--DO NOT REMOVE GRID CAP--ADJUST IF TRIMMERS TO MAXIMUM OUTPUT AT 1730 KC THROUGH .00025 MFD. CONDENSER TO RECEIVERS ANTENNA (BLUE) LEAD, ADJUST OSCILLATOR TRIMMER TO MAXIMUM. AT 1400 KC ANT. TRIMMER TO MAX.

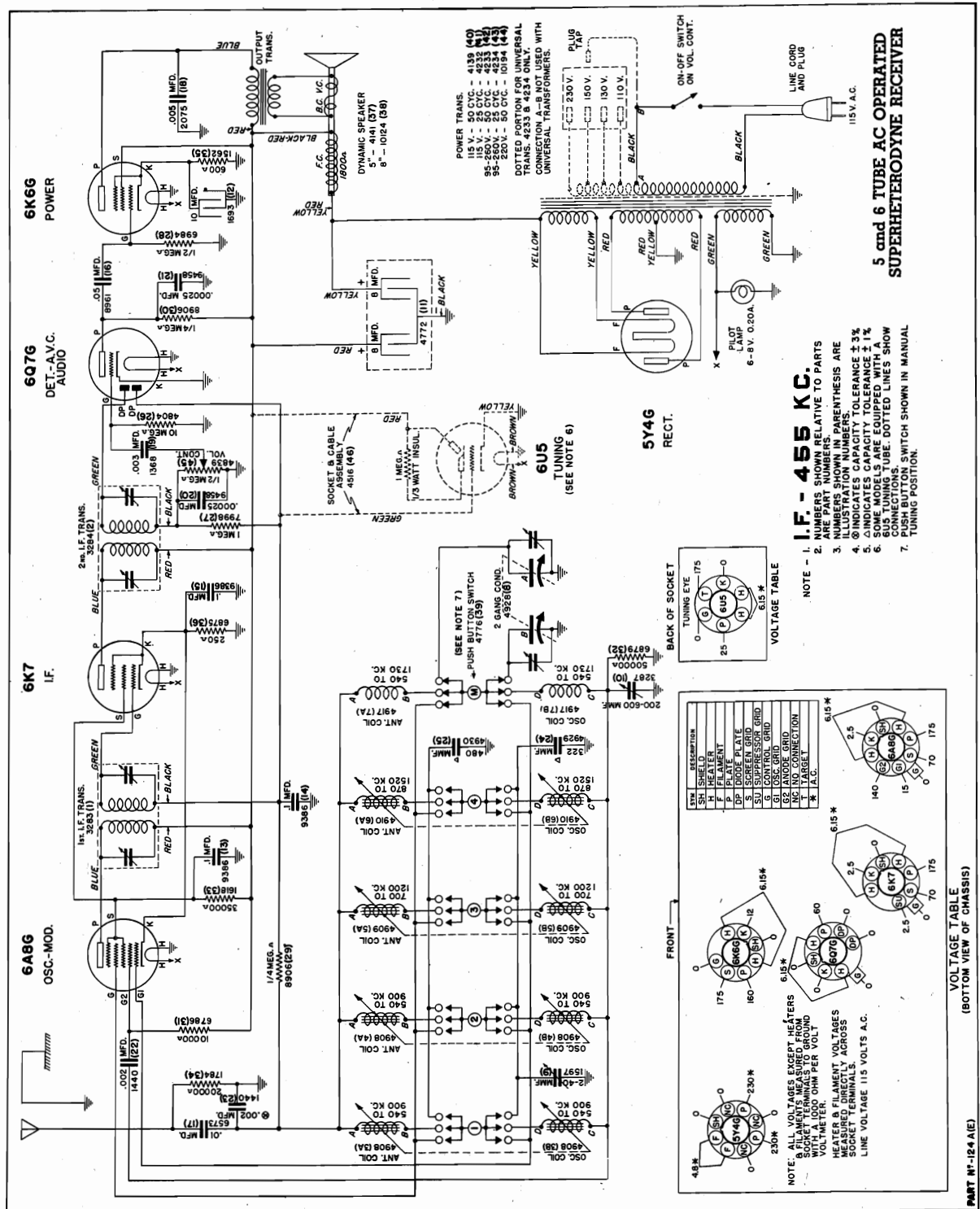


MODEL 118-B



SENTINEL RADIO CORP.

MODELS 124A, 124AE
Schematic, Voltage
Socket



MODELS 124A, 124AE
Alignment, Trimmers
Chassis

SENTINEL RADIO CORP.

ALIGNMENT PROCEDURE IN TABULATED FORM

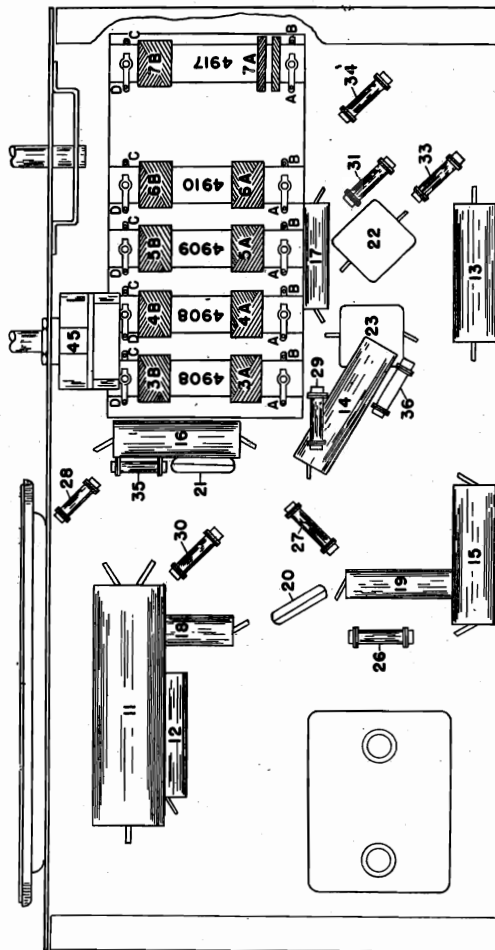
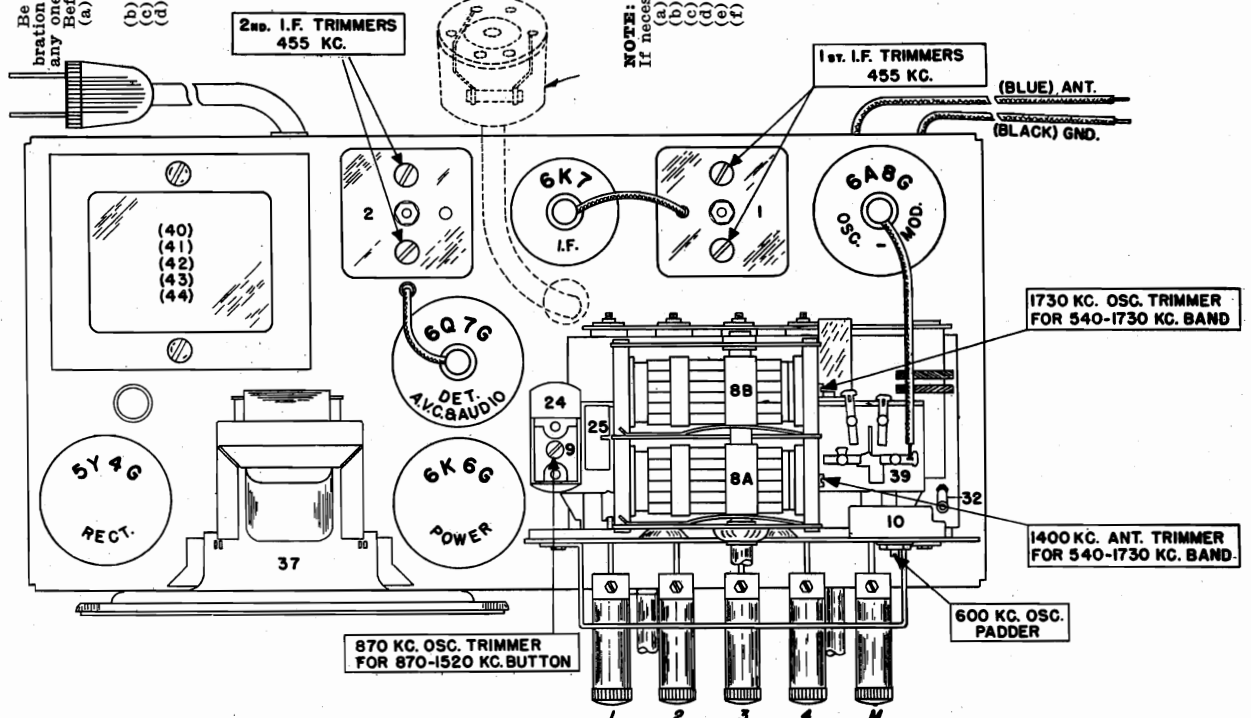
Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

- Before starting alignment:
- Check tuning dial adjustment by turning 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.
 - Use an accurately calibrated test oscillator with some type of output measuring device.
 - Press in manual tuning button.

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:	
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.
(1) Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD. condenser	Adjust 1730 K. C. oscillator trimmer for maximum output.
(2) Exactly 1400 K. C.	Approx. 1400 K. C.	.00025 MFD. condenser	Adjust 1400 K. C. antenna trimmer for maximum output.
(3) Approx. 600 K. C.	Approx. 600 K. C.	.00025 Mfd. condenser	While rocking gang condenser adjust 600 K.C. oscillator padder for maximum response.

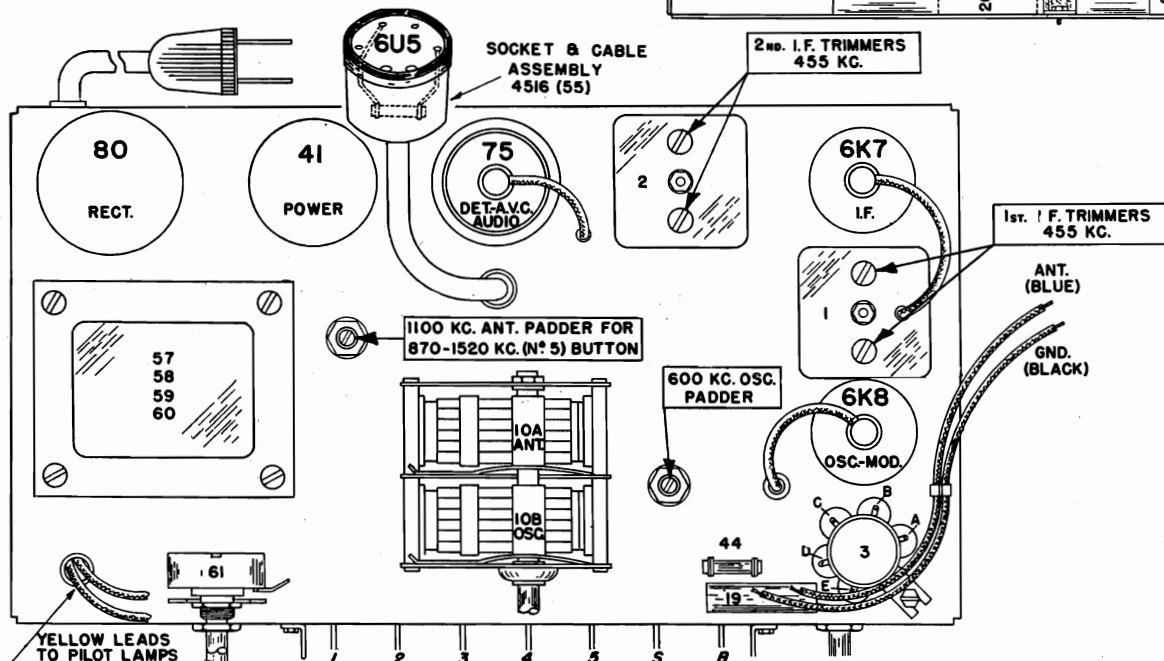
NOTE: 870 K.C. oscillator trimmer need be adjusted only if 870-1520 K.C. Push Button does not tune from 870 to 1520 K.C. If necessary to adjust, proceed by set antenna and ground leads.

- Set test oscillator exactly 850 K.C.—with attenuator adjusted for maximum signal output.
- Reset 870-1520 K.C. push button.
- Adjust 870-1520 K.C. oscillator push button to bring in 850 K.C. test signal to maximum output & leave in this position.
- Reset test oscillator frequency to exactly 870 K.C.
- Adjust 870 K.C. oscillator trimmer to bring in 870 K.C. test oscillator signal to maximum output.



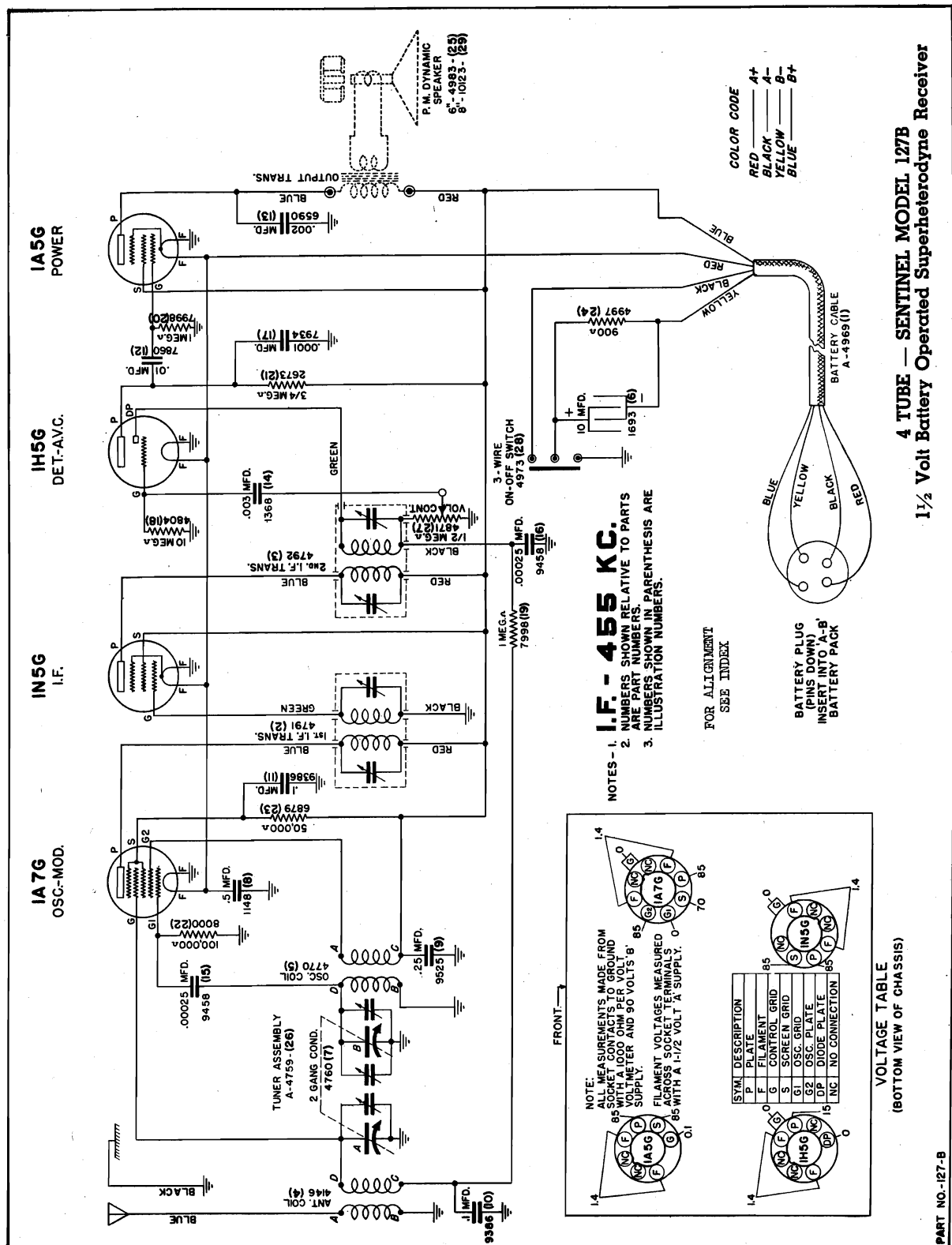
Alignment, Trainers

Chassis

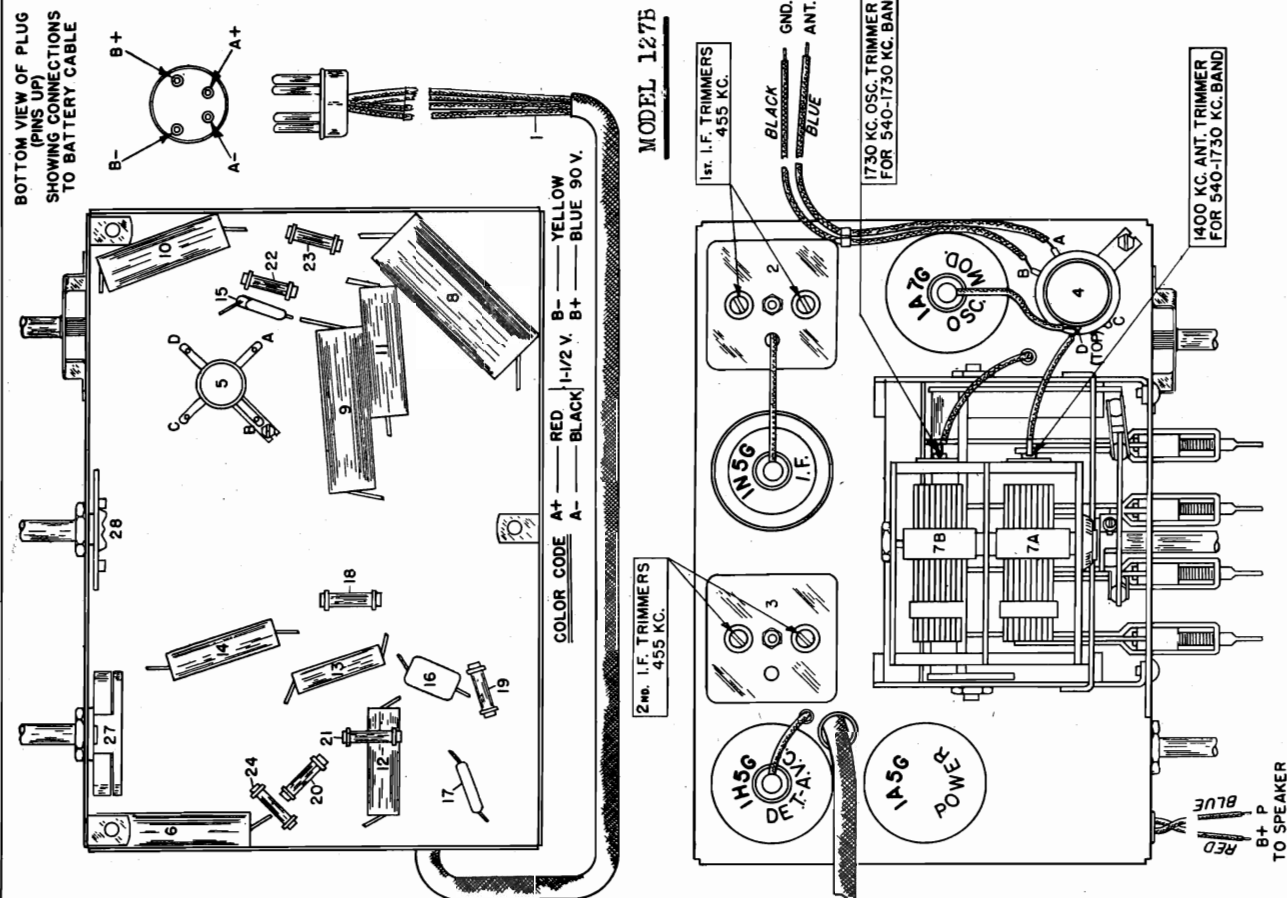
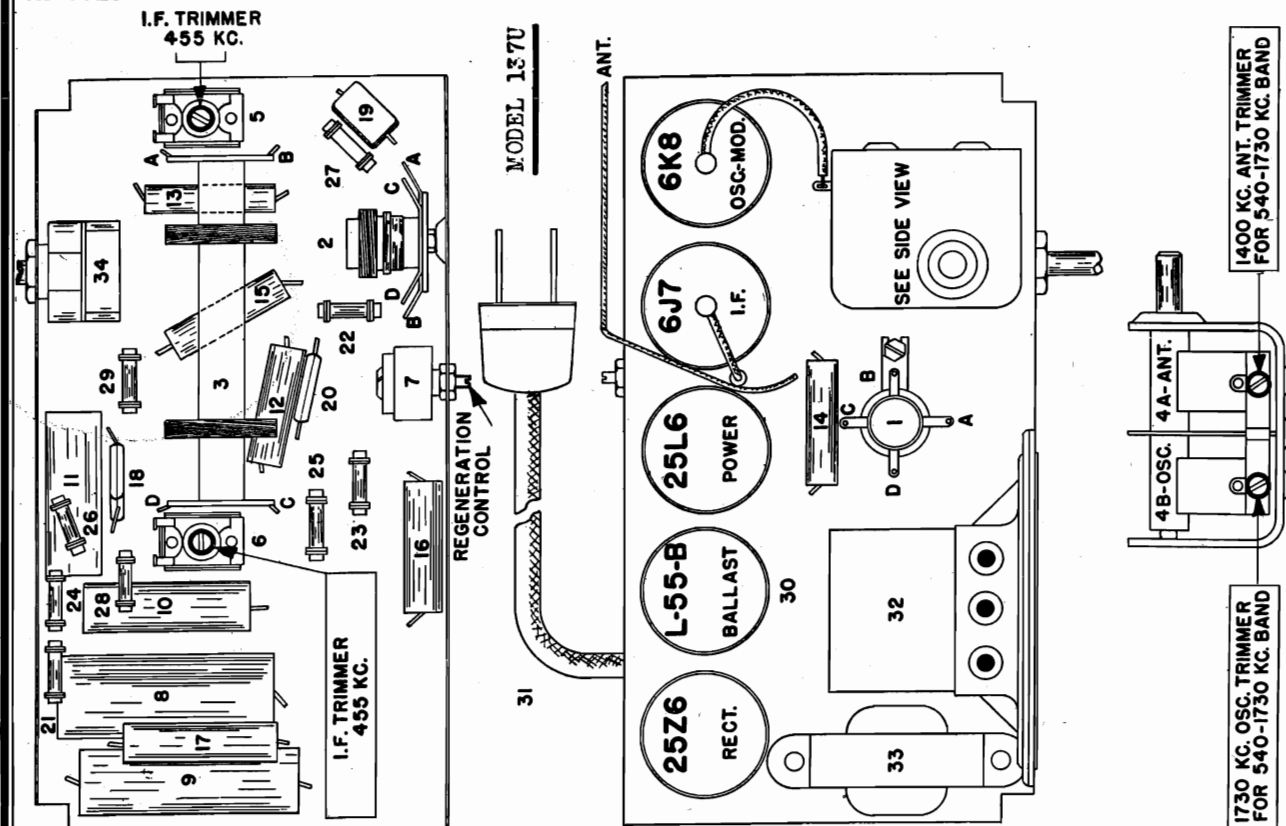


SENTINEL RADIO CORP.

MODEL 127B
Schematic, Voltage
Socket



**I.F. TRIMMER
455 KC.**

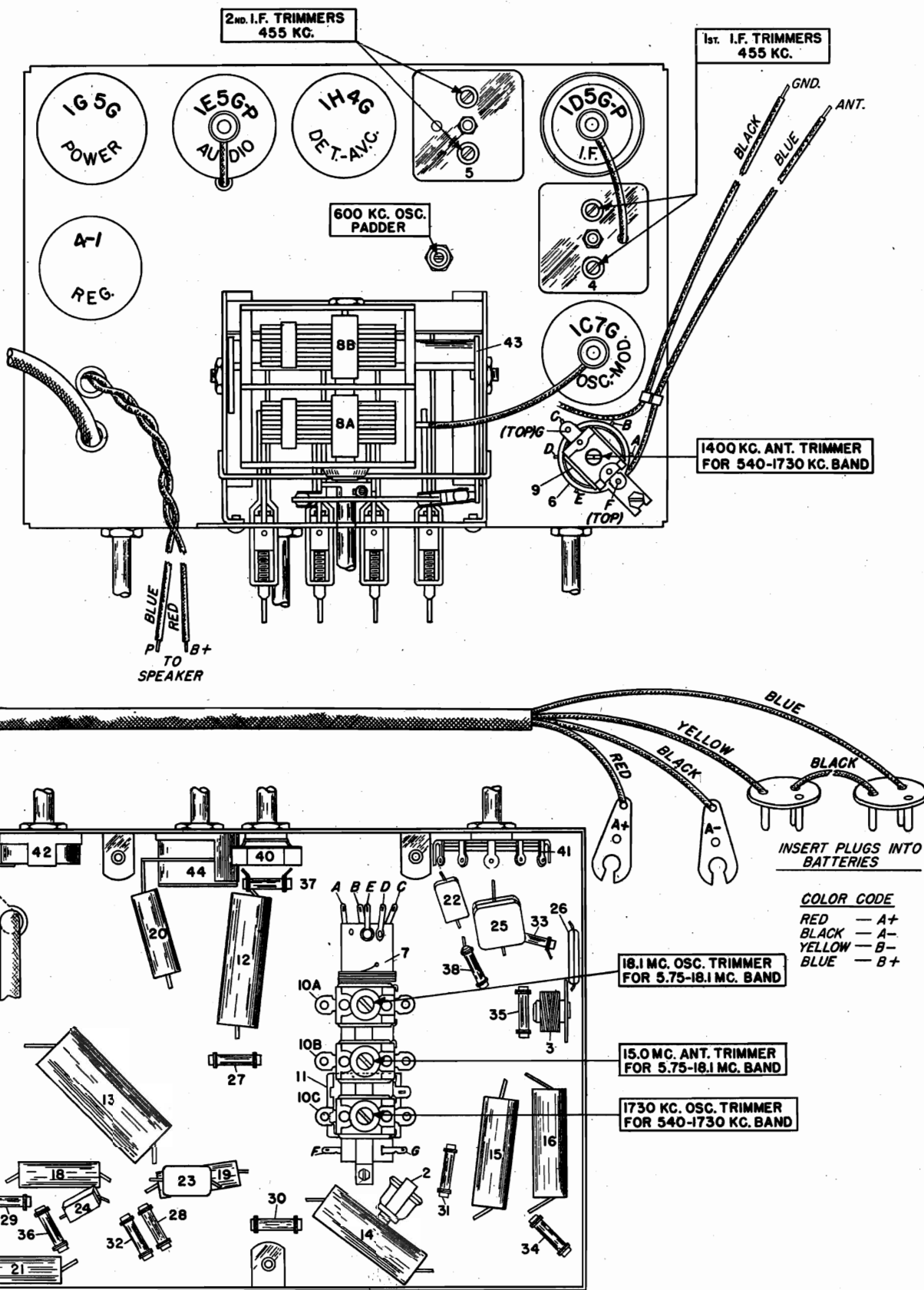


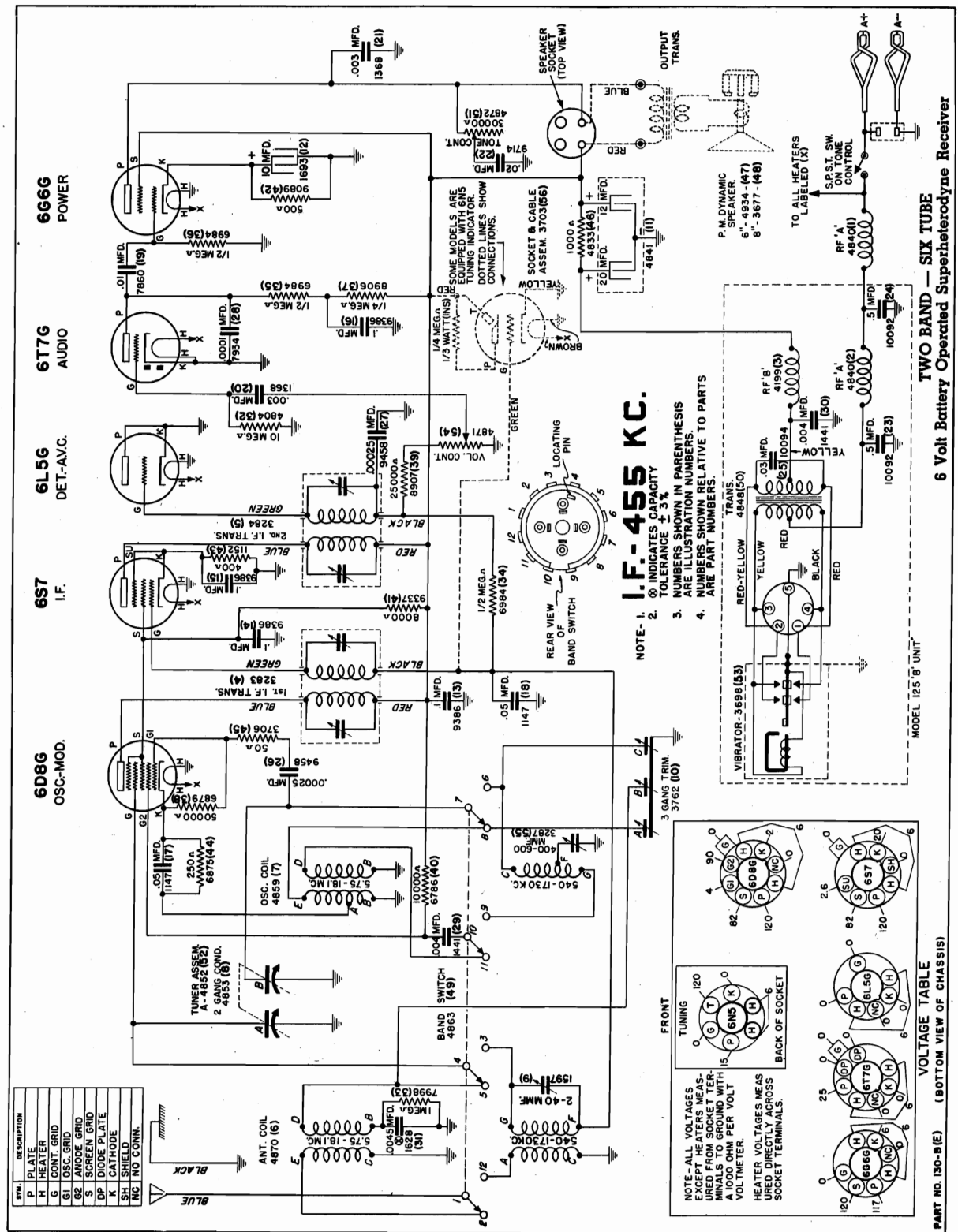
MODEL 128B

Trimmers

Chassis

SENTINEL RADIO CORP.



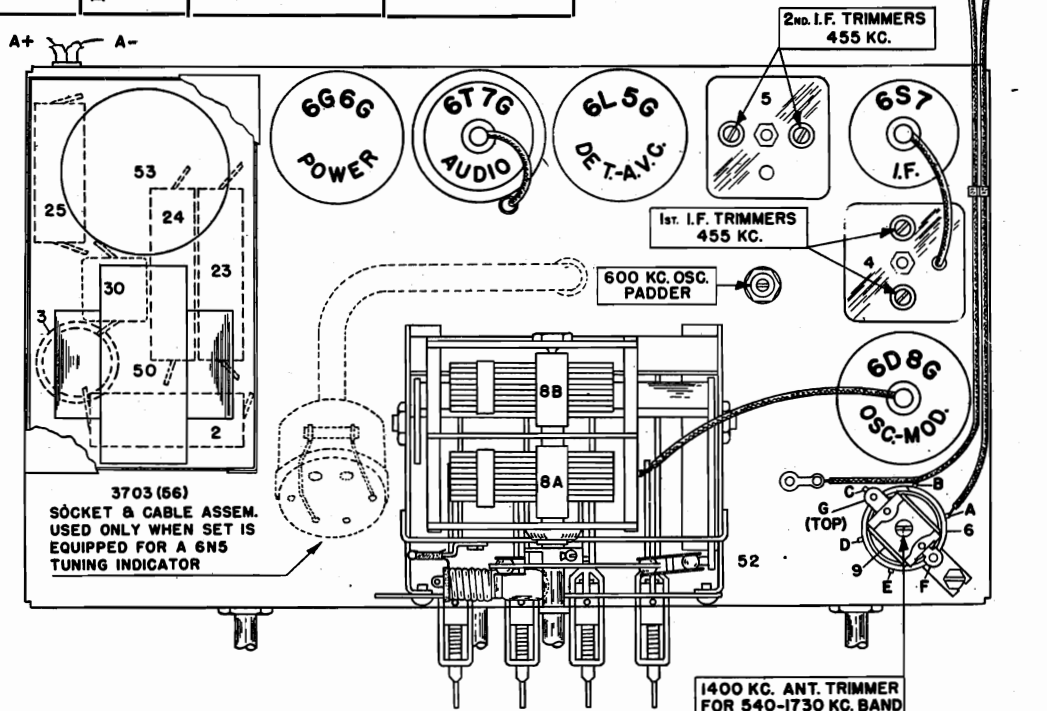
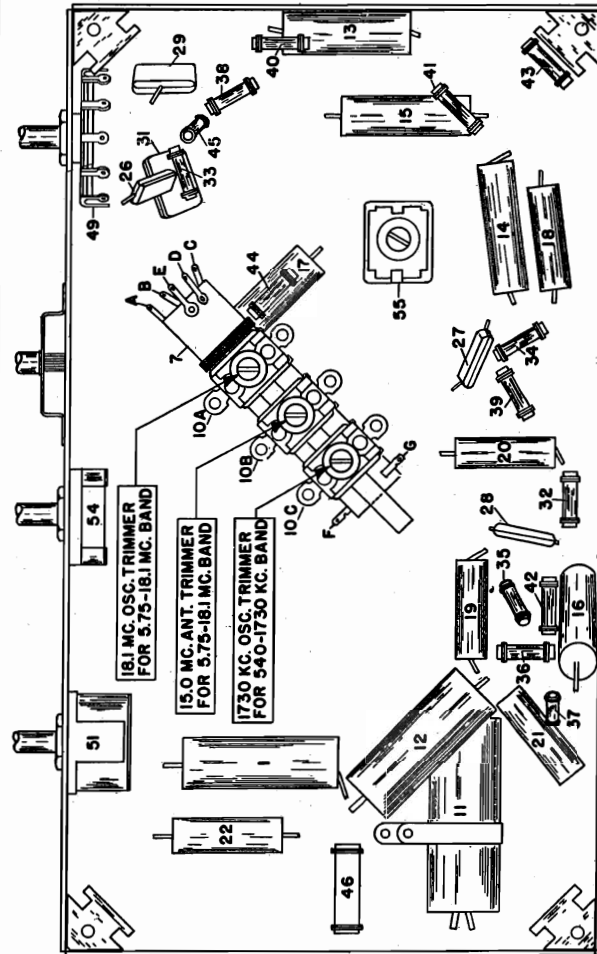


SENTINEL RADIO CORP.

ALIGNMENT PROCEDURE IN TABULATED FORM

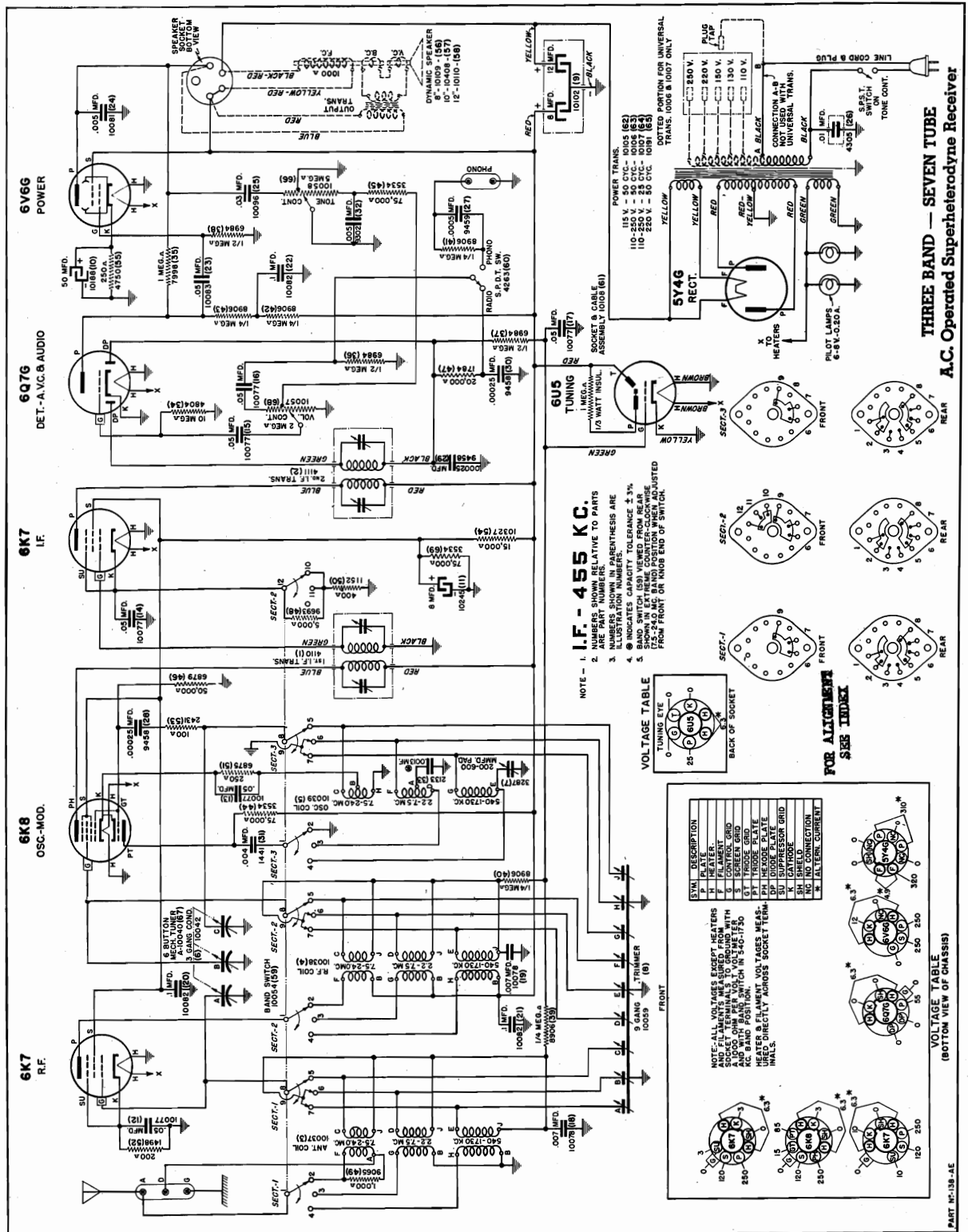
33
32
31
30
29

Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR			Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	attach output of test oscillator to:	
LF. ALIGNMENT use any band position	Any point where no interfering signal is received	Exactly 455 K.C.	.02 Mid. condenser	High side to grid cap of 6D8G tube. Do not remove cap.	Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output.
	(1) Exactly 1730 K.C.	Exactly 1730 K.C.	.00025 Mid. condenser	Receiver blue antenna lead	Adjust 1730 K.C. oscillator trimmer for maximum output.
	(2) Exactly 1400 K.C.	Exactly 1400 K.C.	.00025 Mid. condenser	Receiver blue antenna lead	While rocking gang condenser adjust 1400 K.C. antenna trimmer for maximum output.
5.75 TO 18.1 M.C. BAND	(3) Approx. 600 K.C.	Approx. 600 K.C.	.00025 Mid. condenser	Receiver blue antenna lead	While rocking gang condenser adjust 600 K.C. oscillator podder for maximum output.
	(1) Exactly 18.1 M.C.	Exactly 18.1 M.C.	400 Ohm carbon resistor	Receiver blue antenna lead	Adjust 18.1 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in.
	(2) Exactly 15 M.C.	Exactly 15 M.C.	400 Ohm carbon resistor	Receiver blue antenna lead	While rocking gang condenser adjust 15 M.C. antenna trimmer for maximum output.



SENTINEL RADIO CORP.

MODEL 138AE
Schematic, Voltage
Socket

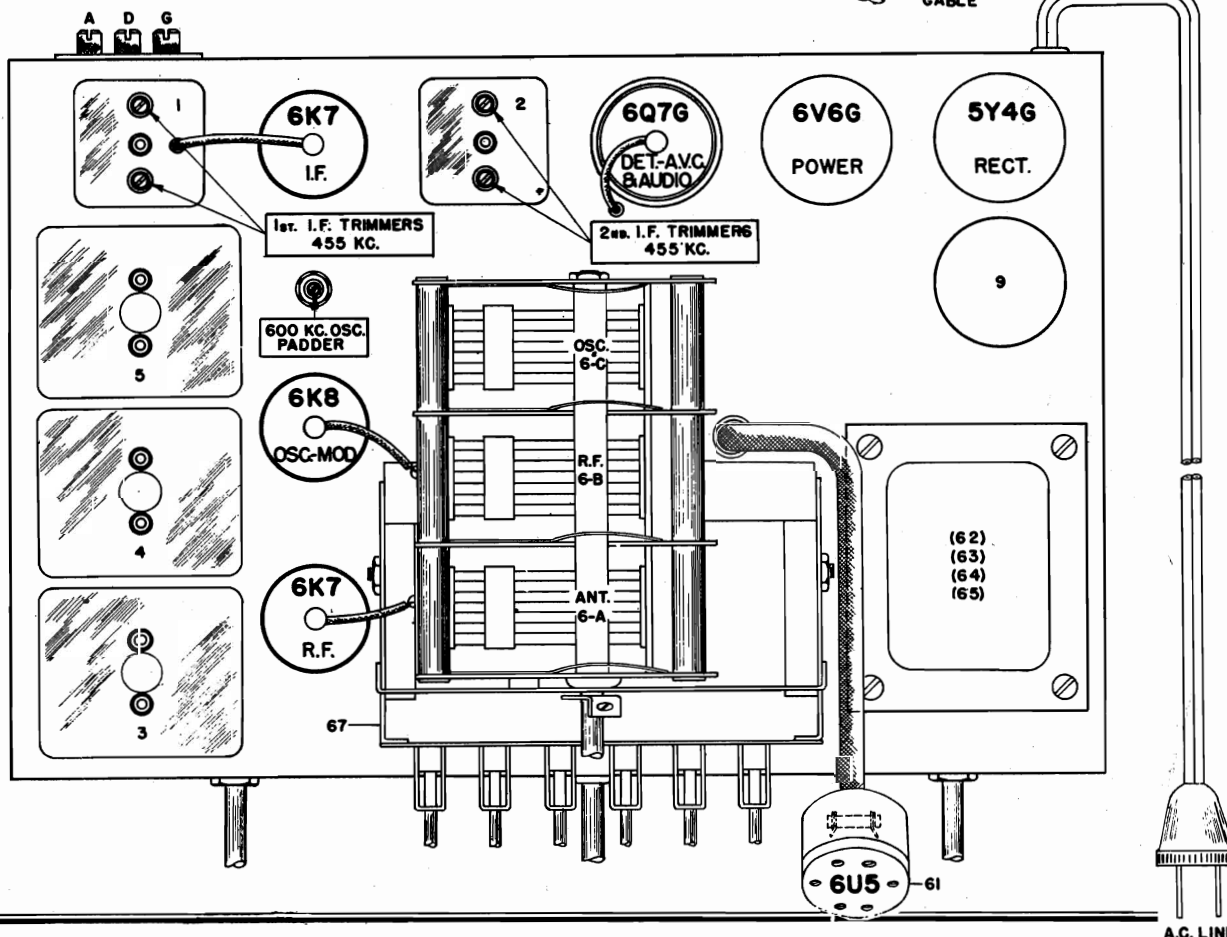
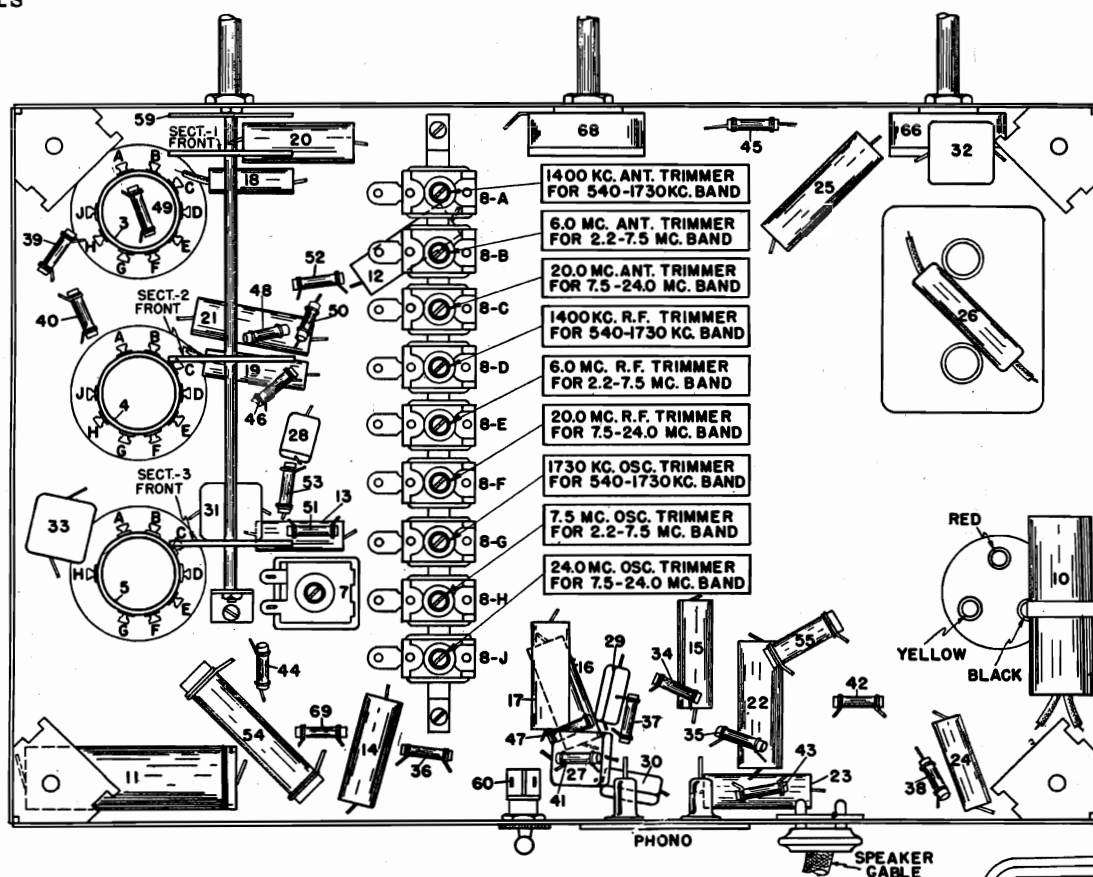


MODEL 138AE

Trimmers

Chassis

SENTINEL RADIO CORP.



MODEL 139UE
Schematic, Voltage
Socket

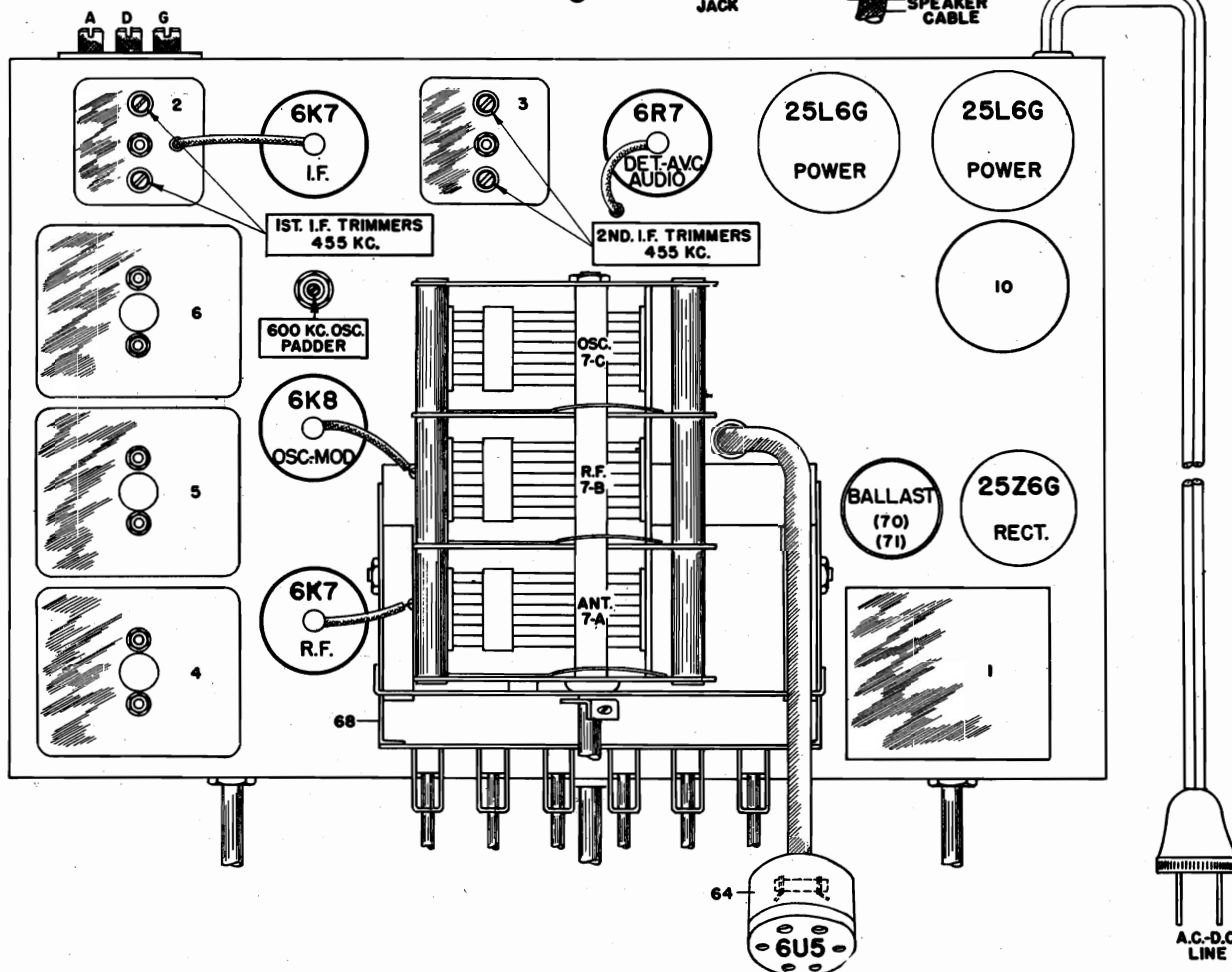
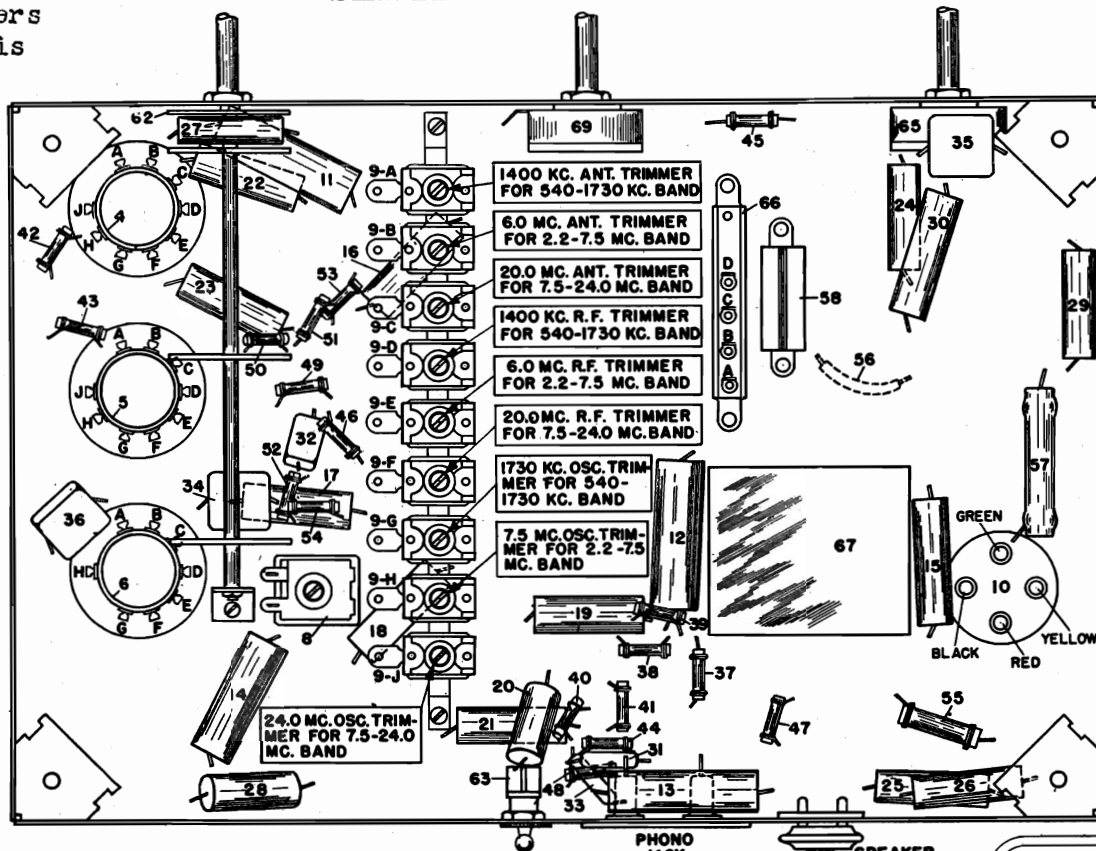


MODEL 139UE

Trimmers

Chassis

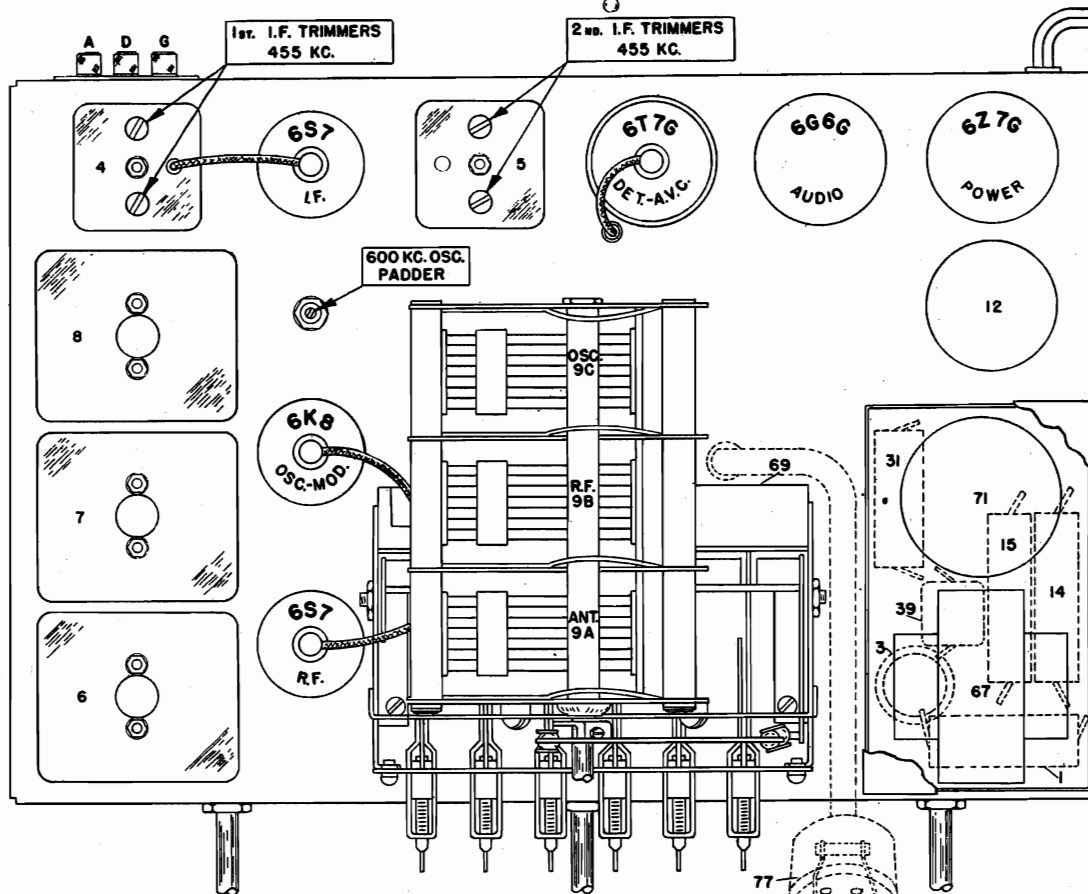
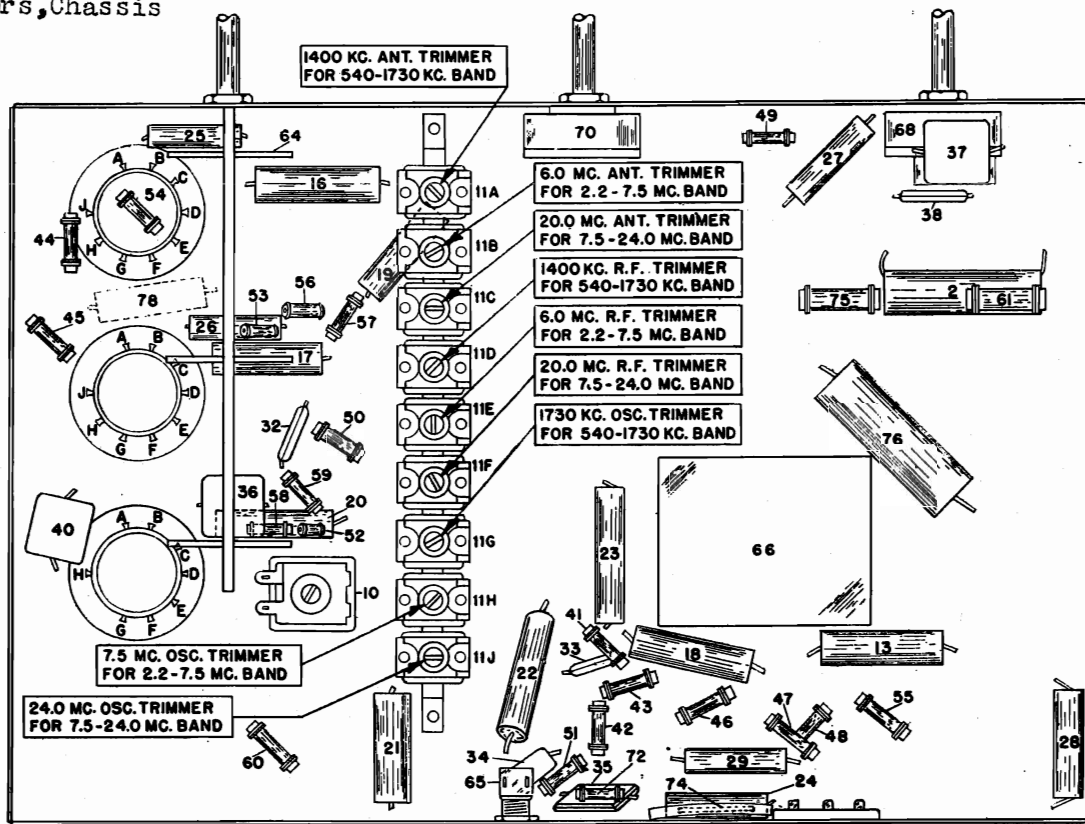
SENTINEL RADIO CORP.





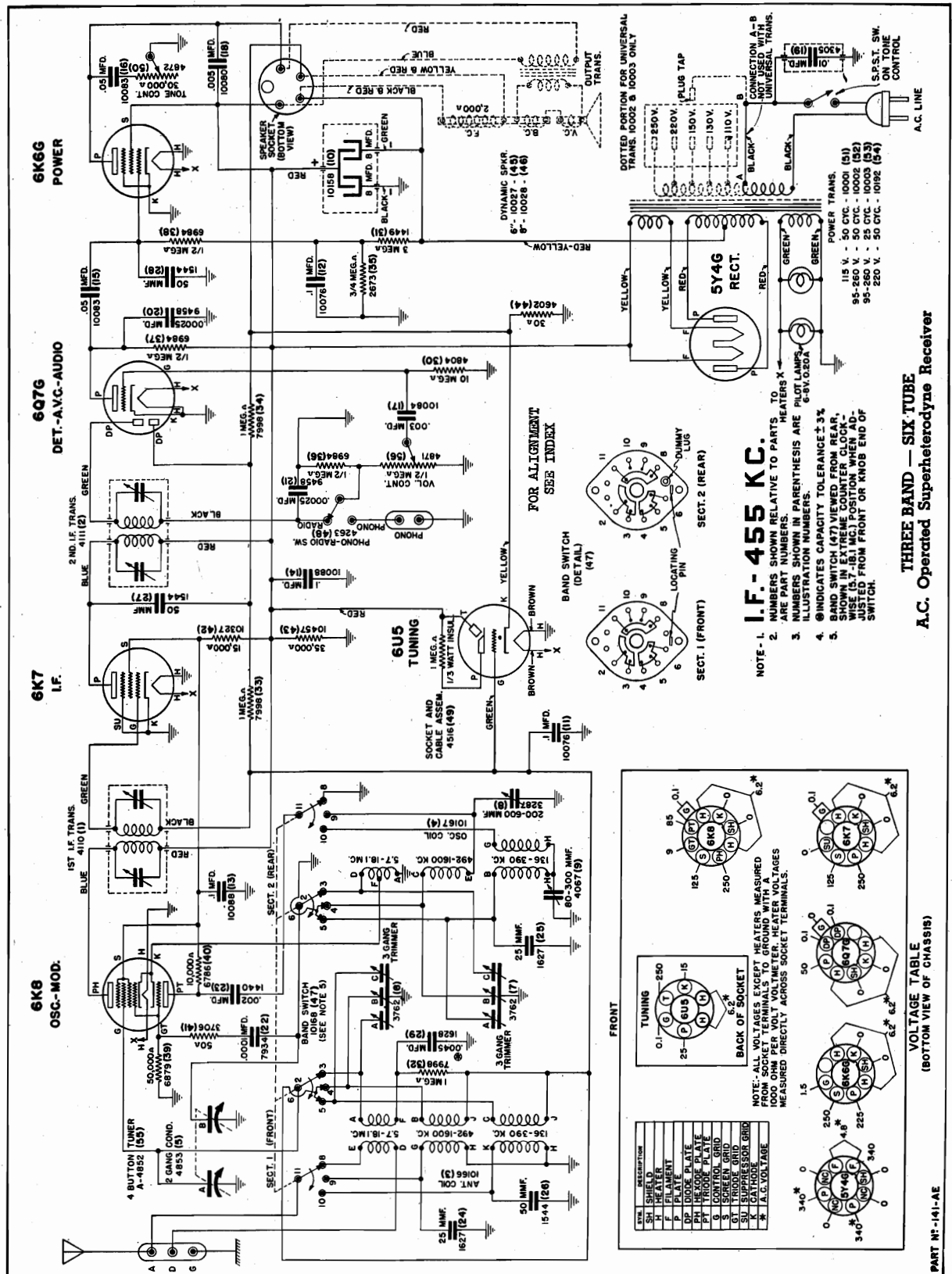
MODELS 140B, 140BE
Trimmers, Chassis

SENTINEL RADIO CORP.



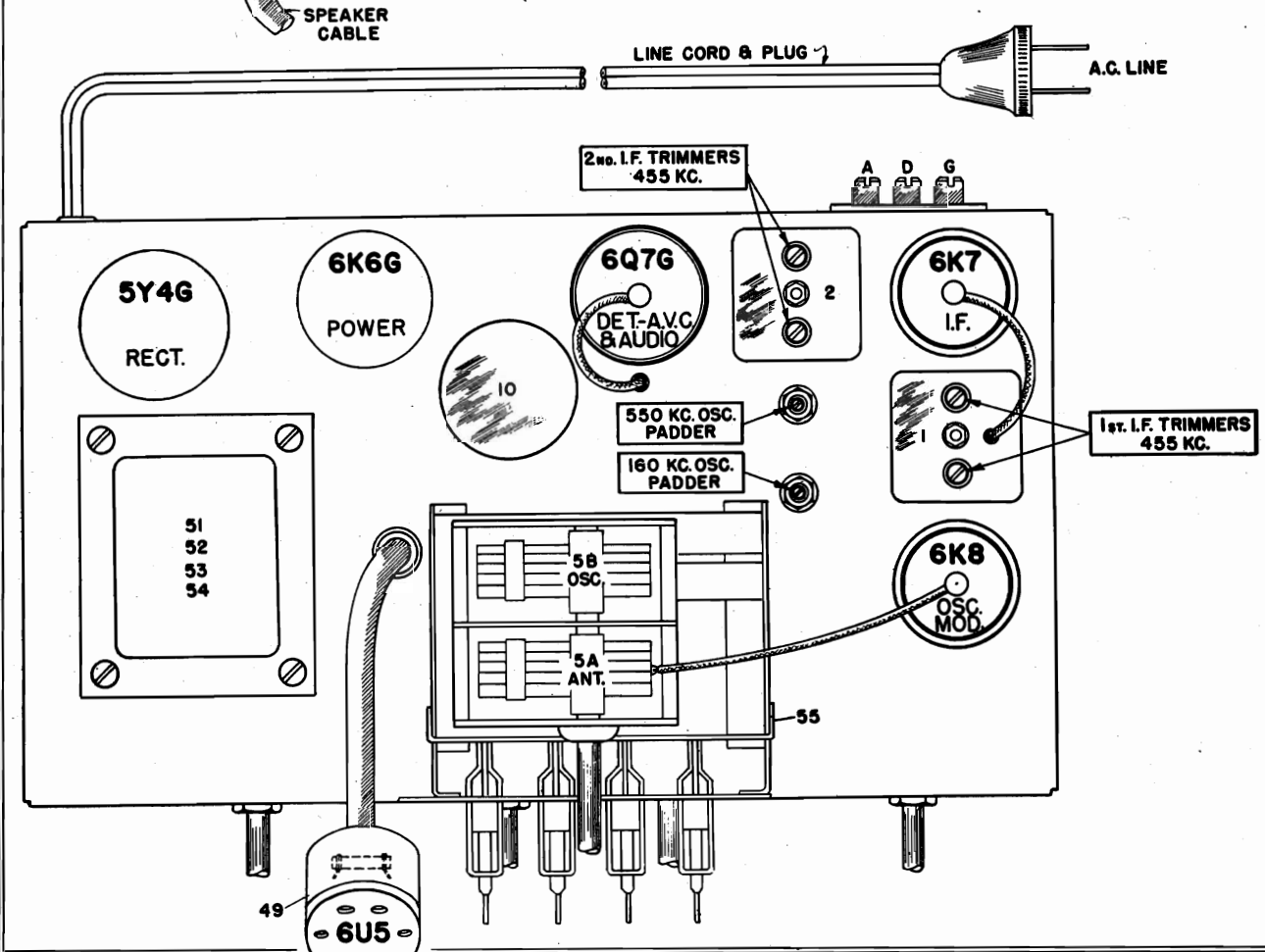
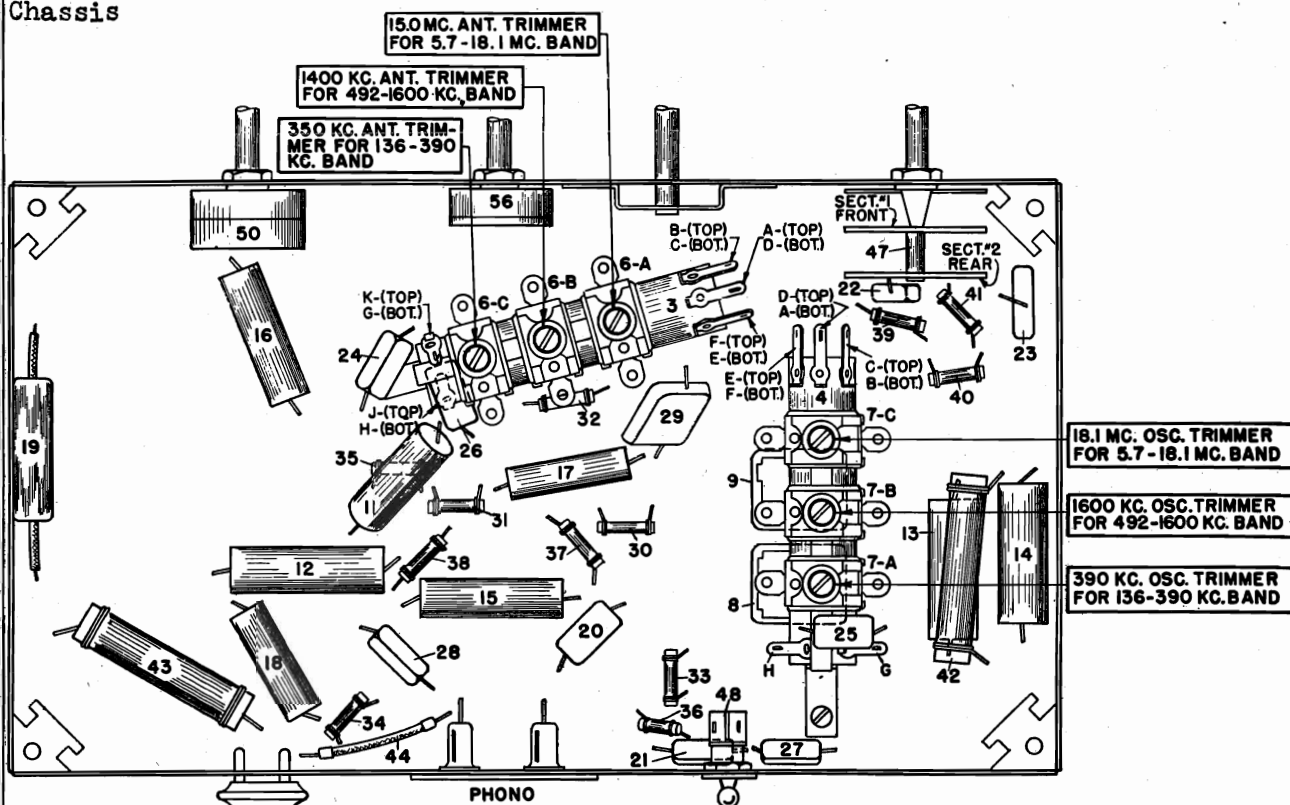
SENTINEL RADIO CORP.

MODEL 141AE
Schematic, Voltage
Socket

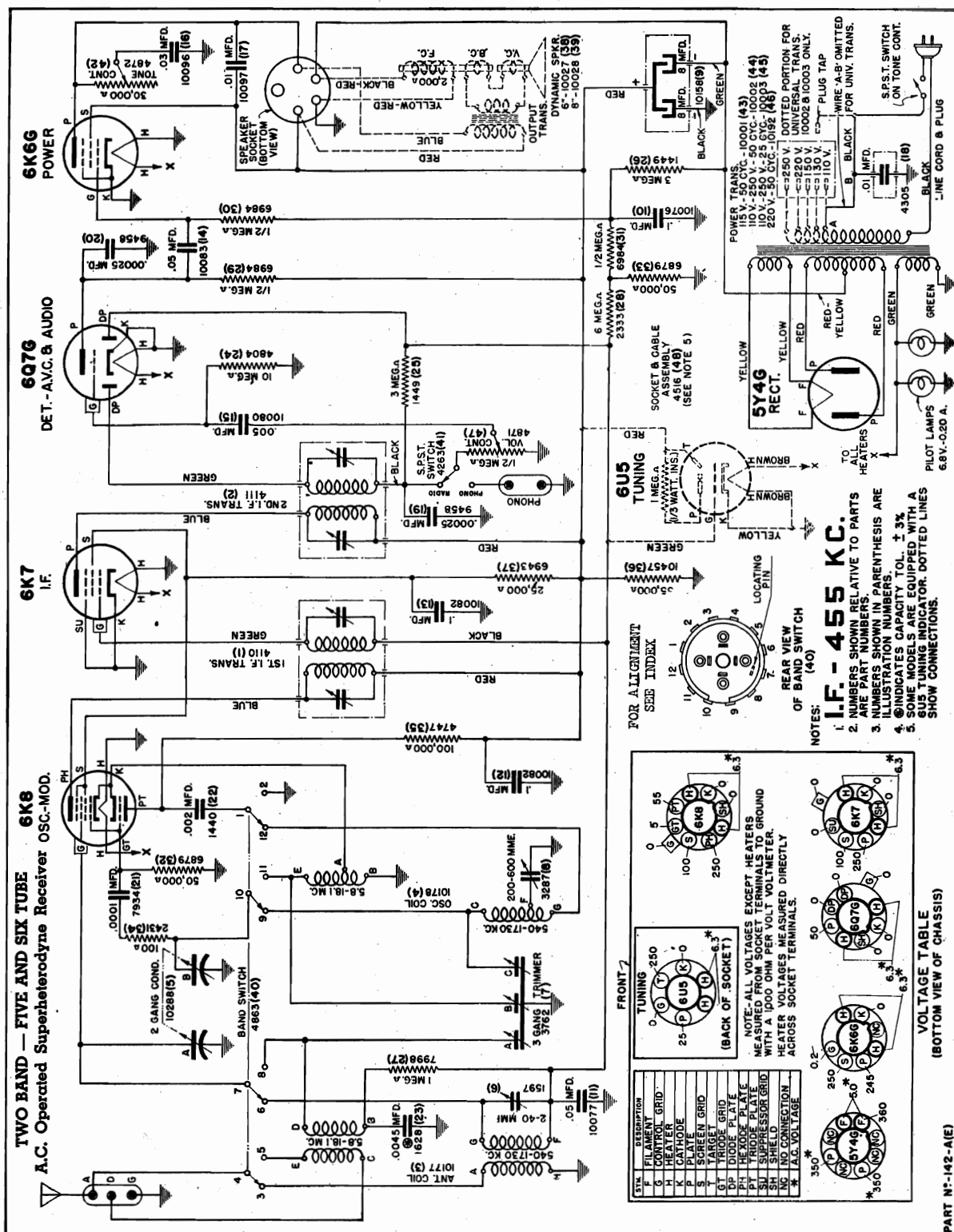


MODEL 141AE
Trimmers
Chassis

SENTINEL RADIO CORP.



SENTINEL RADIO CORP.



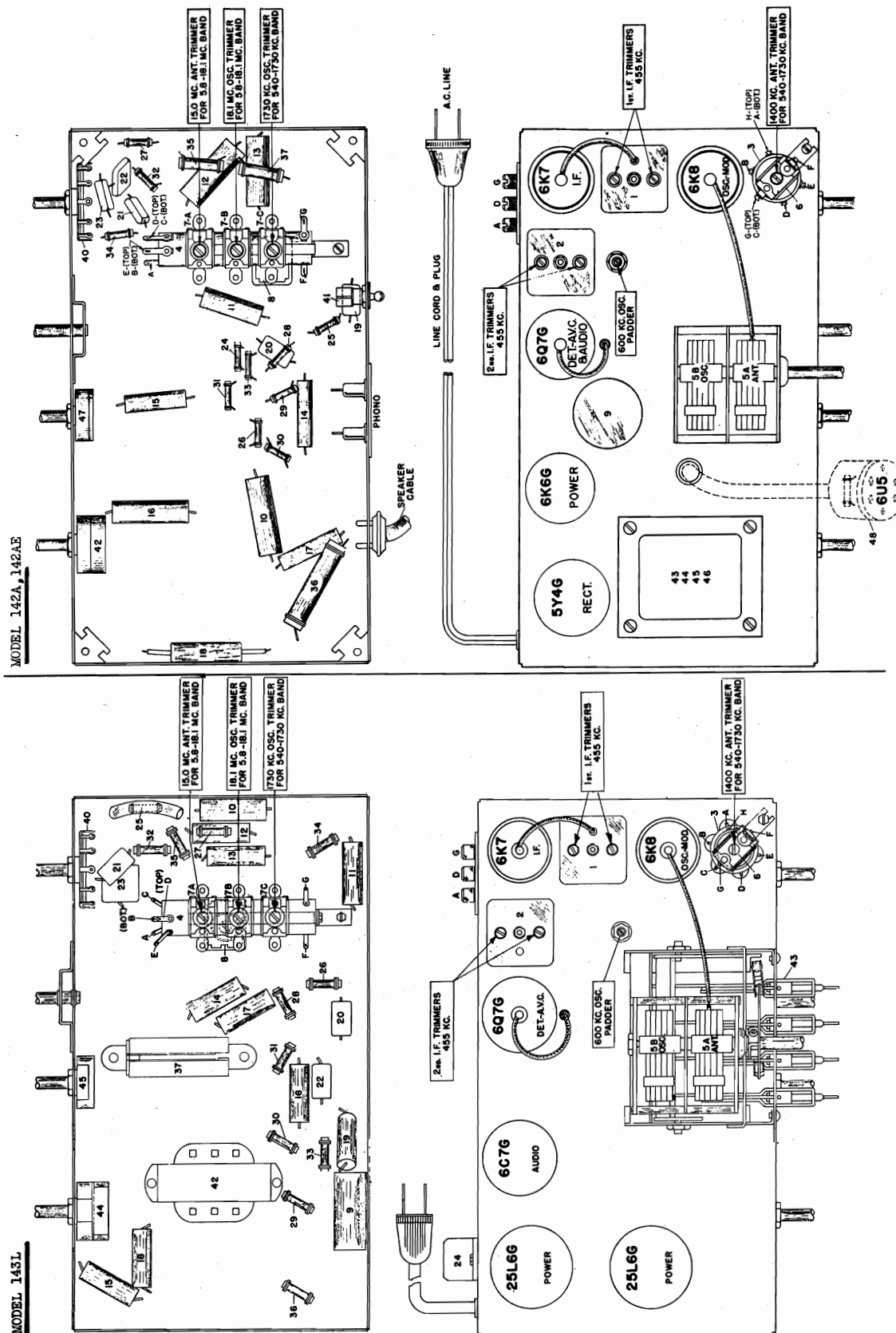


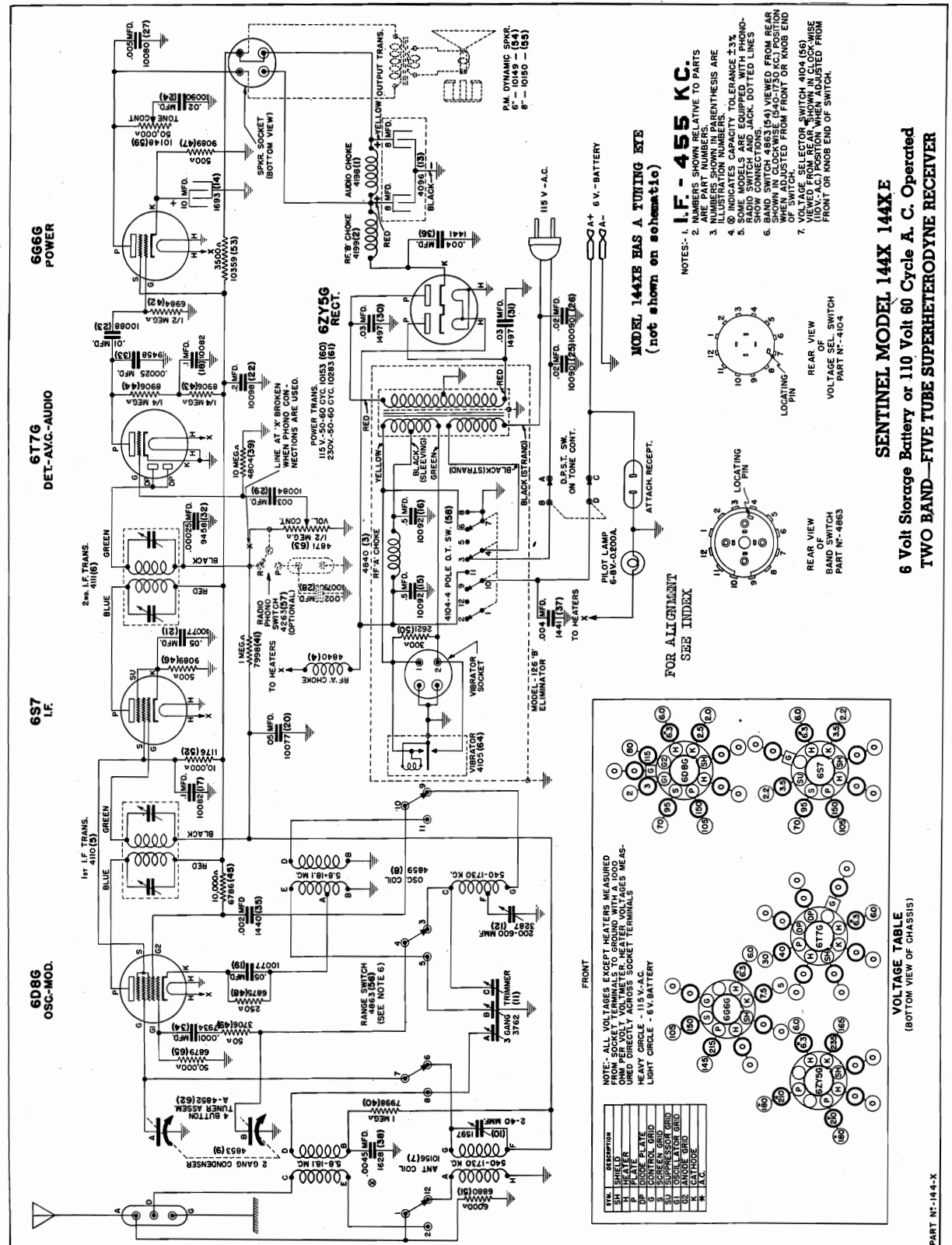
MODELS 142A, 142AE

MODEL 143L

Trimmers, Chassis

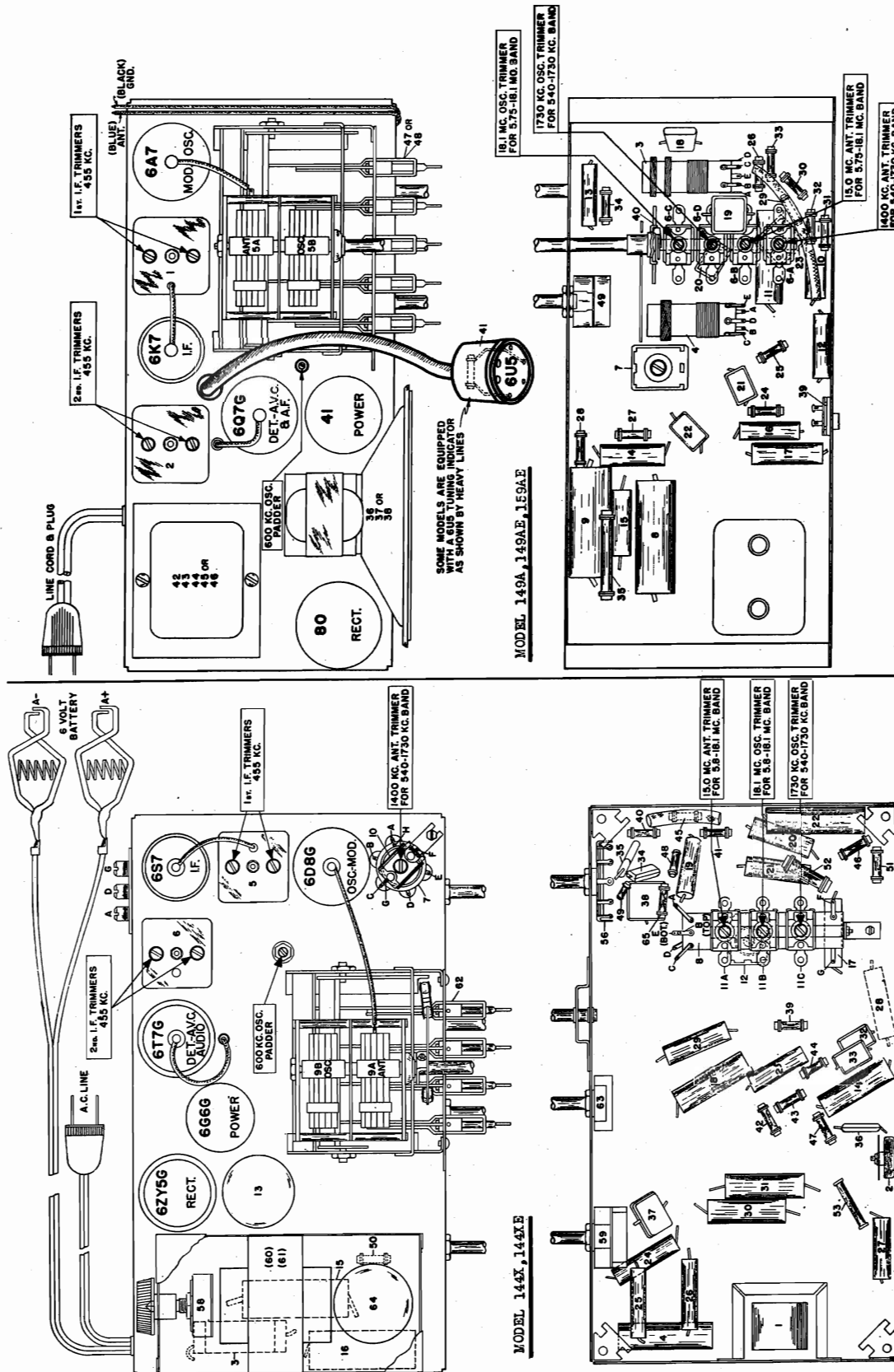
SENTINEL RADIO CORP.





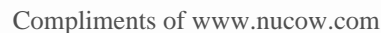
MODELS 144X, 144XE
MODELS 149A, 149AE, 159AE
Trimmers, Chassis

SENTINEL RADIO CORP.



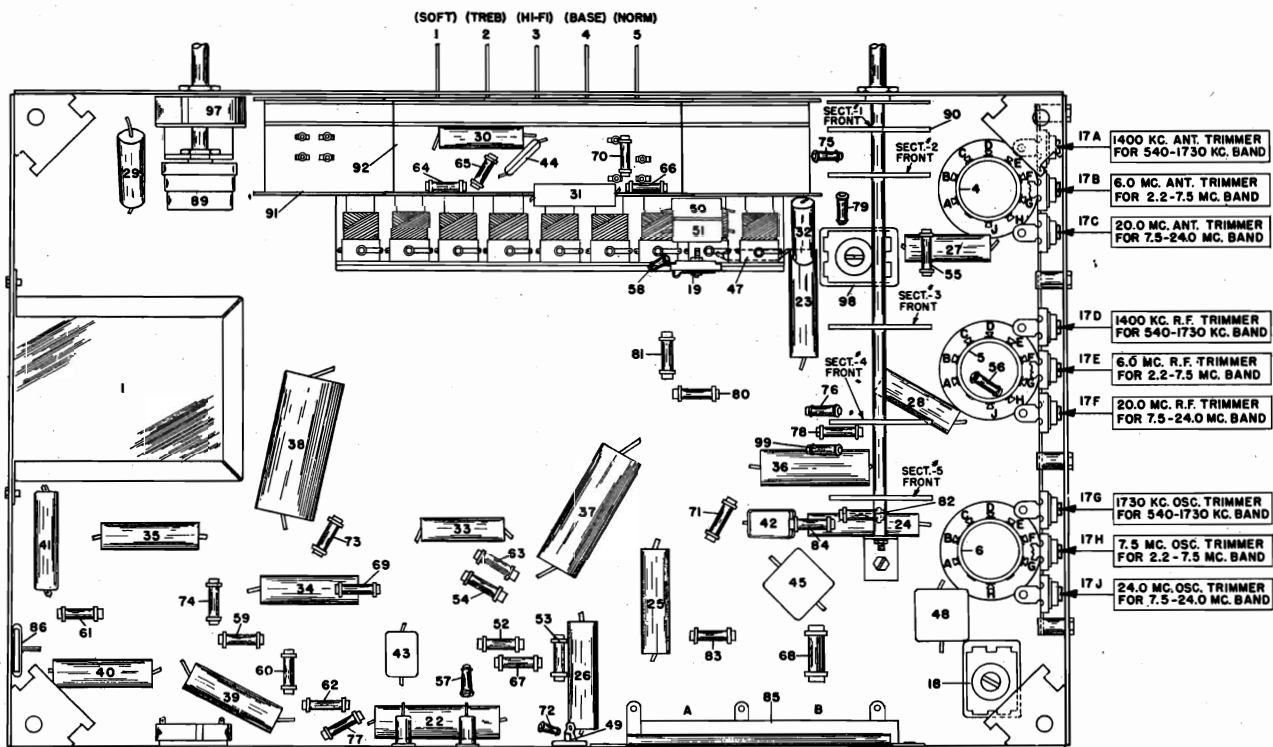
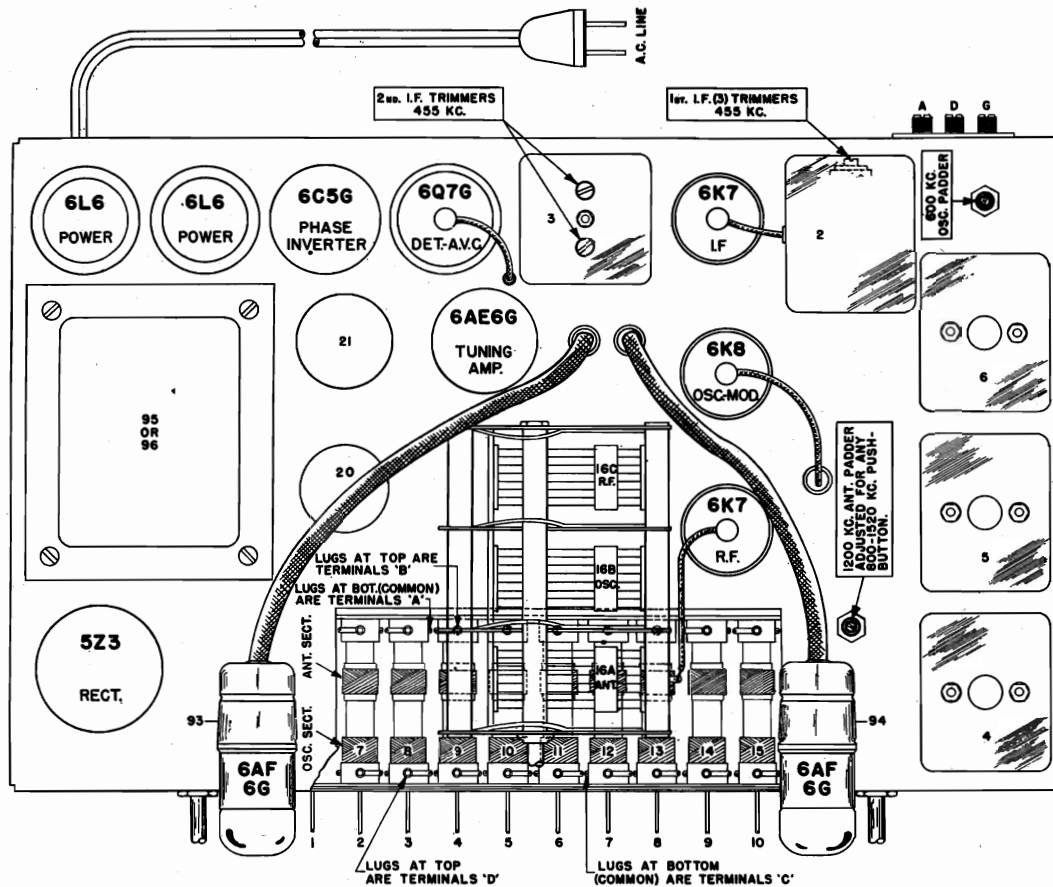
DETAIL OF BAND SIXTH SECTIONS (SEE NOTE & FRONT VIEW)

SECT. 6 REAR SECT. 6 FRONT SECT. 6 REAR SECT. 6 FRONT SECT. 6 REAR SECT. 6 FRONT SECT. 6 REAR SECT. 6 FRONT SECT. 6 REAR SECT. 6 FRONT



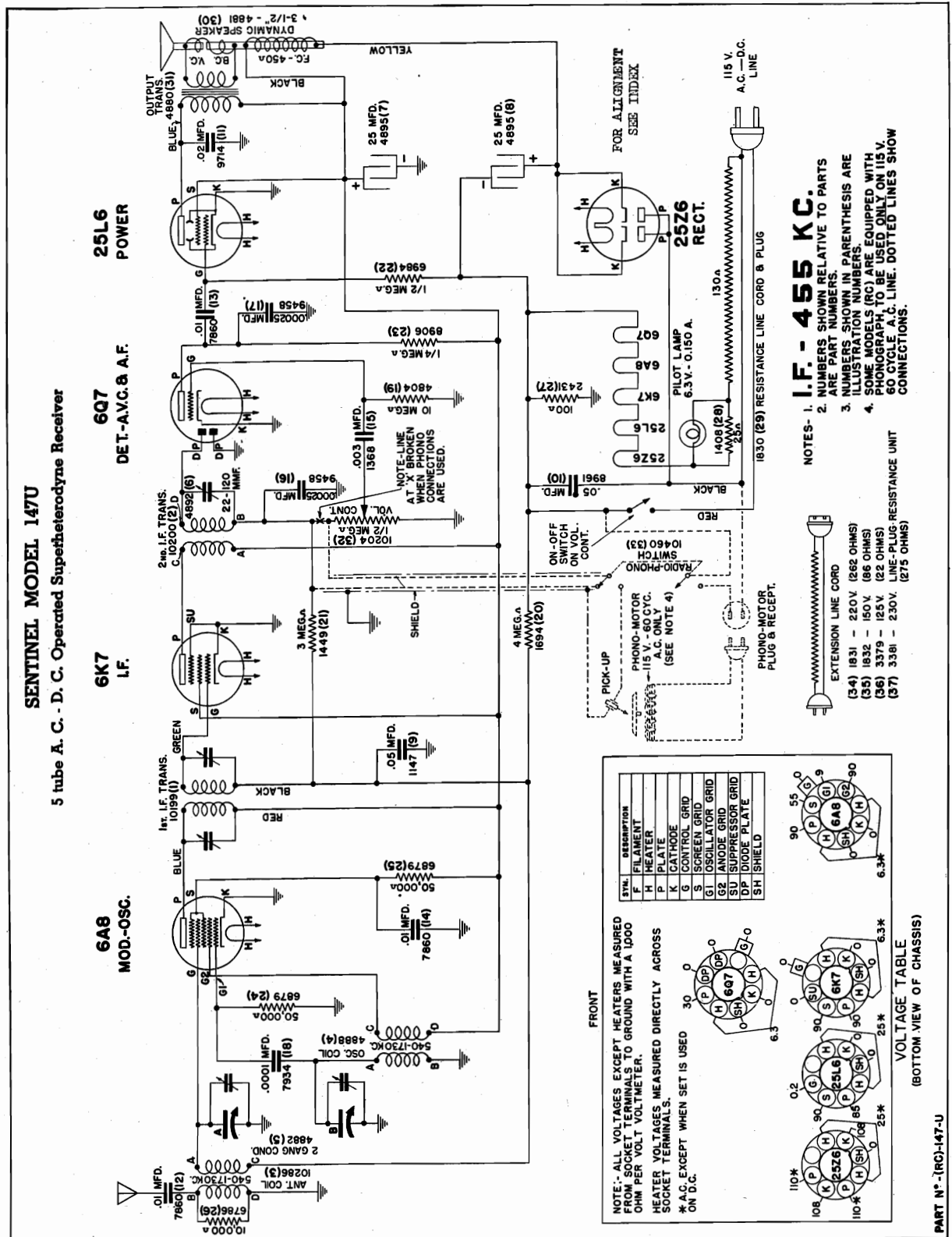
MODEL 145AE
Trimmers
Chassis

SENTINEL RADIO CORP.



SENTINEL RADIO CORP.

MODEL 147U
Schematic, Voltage
Socket

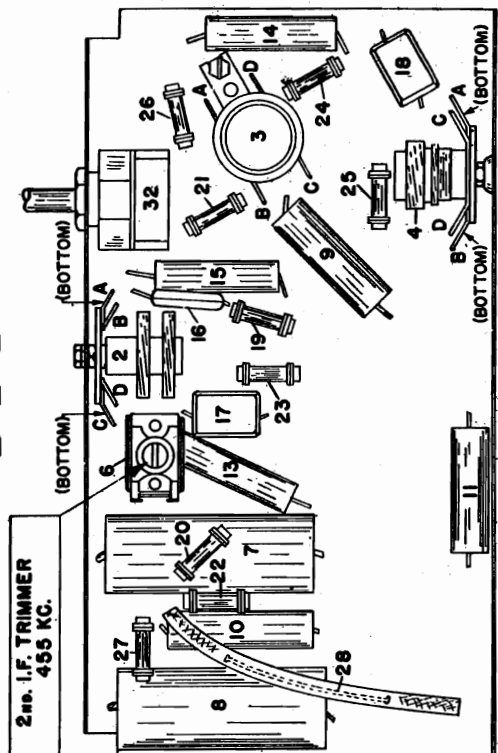
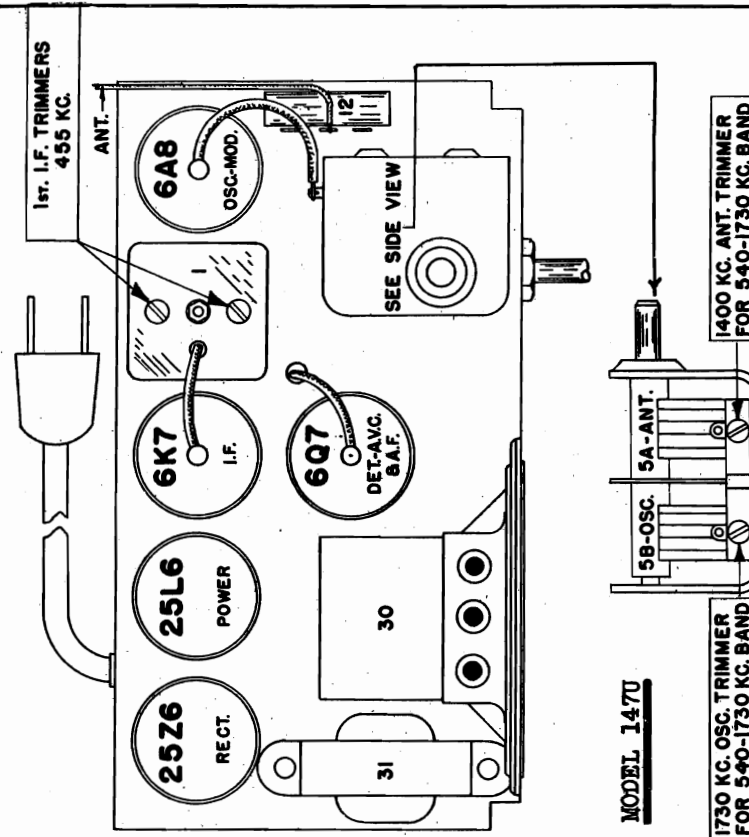
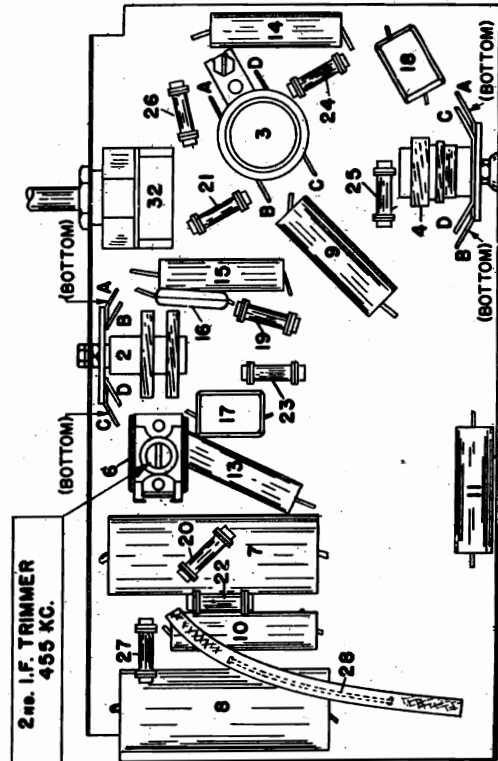
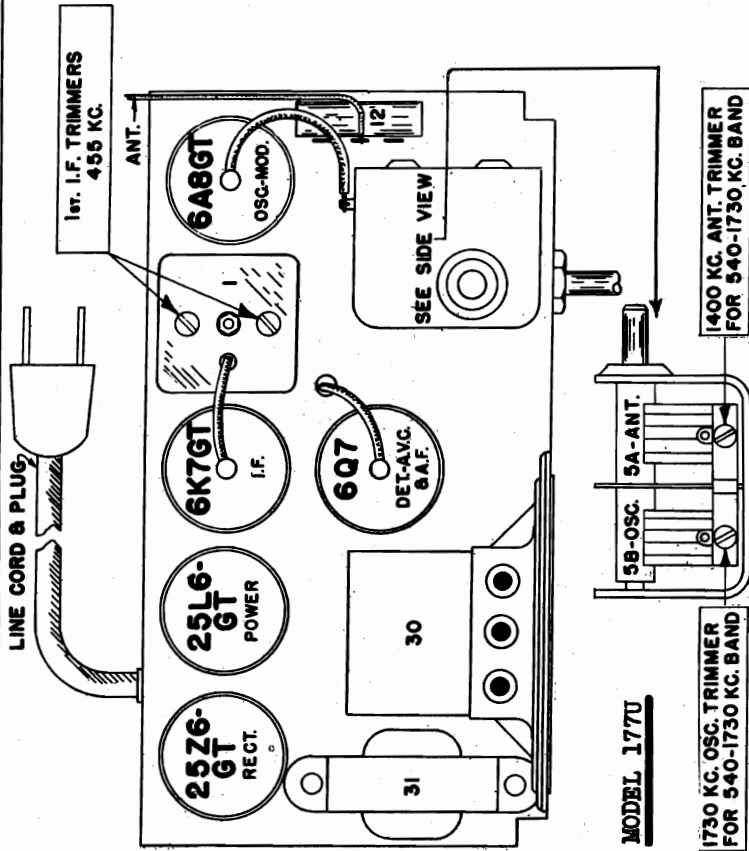


MODEL 147U

MODEL 177U

Trimmers, Chassis

SENTINEL RADIO CORP.





MODEL 148A
Alignment, Trimmers
Chassis

SENTINEL RADIO CORP.

MODEL 151BL
Alignment

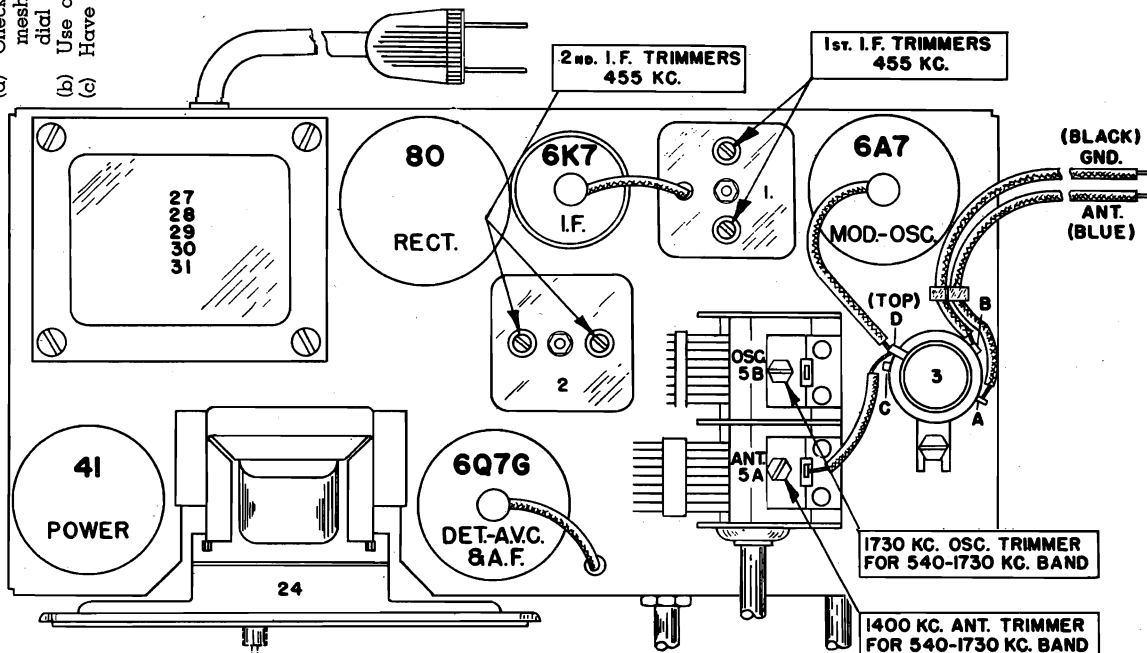
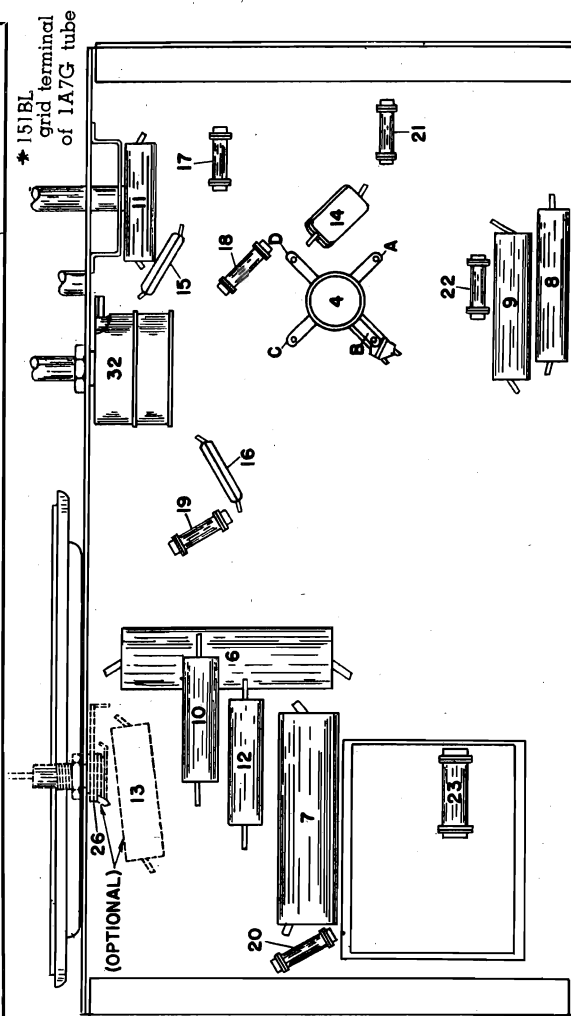
ALIGNMENT PROCEDURE IN TABULATED FORM

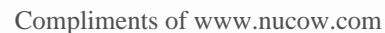
Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:

- Check tuning dial adjustment by turning 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.
- Use an accurately calibrated test oscillator with same type of output measuring device.
- Have ground lead of test oscillator attached to chassis.

TEST OSCILLATOR			
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:
I.F. Any point where no interfering signal is received	455 K. C.	.02 MFD condenser	High side to * grid terminal of 6A7 tube DO NOT REMOVE CAP.
1 Exactly 1730 K. C.	Exactly 1730 K. C.	.00025 MFD condenser	Receiver blue antenna lead
2 Exactly 1400 K. C.	Exactly 1400 K. C.	.00025 MFD condenser	Receiver blue antenna lead
Refer to parts layout diagram for location of trimmers mentioned below: Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output. Adjust 1730 K. C. oscillator trimmer for maximum output. While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output.			





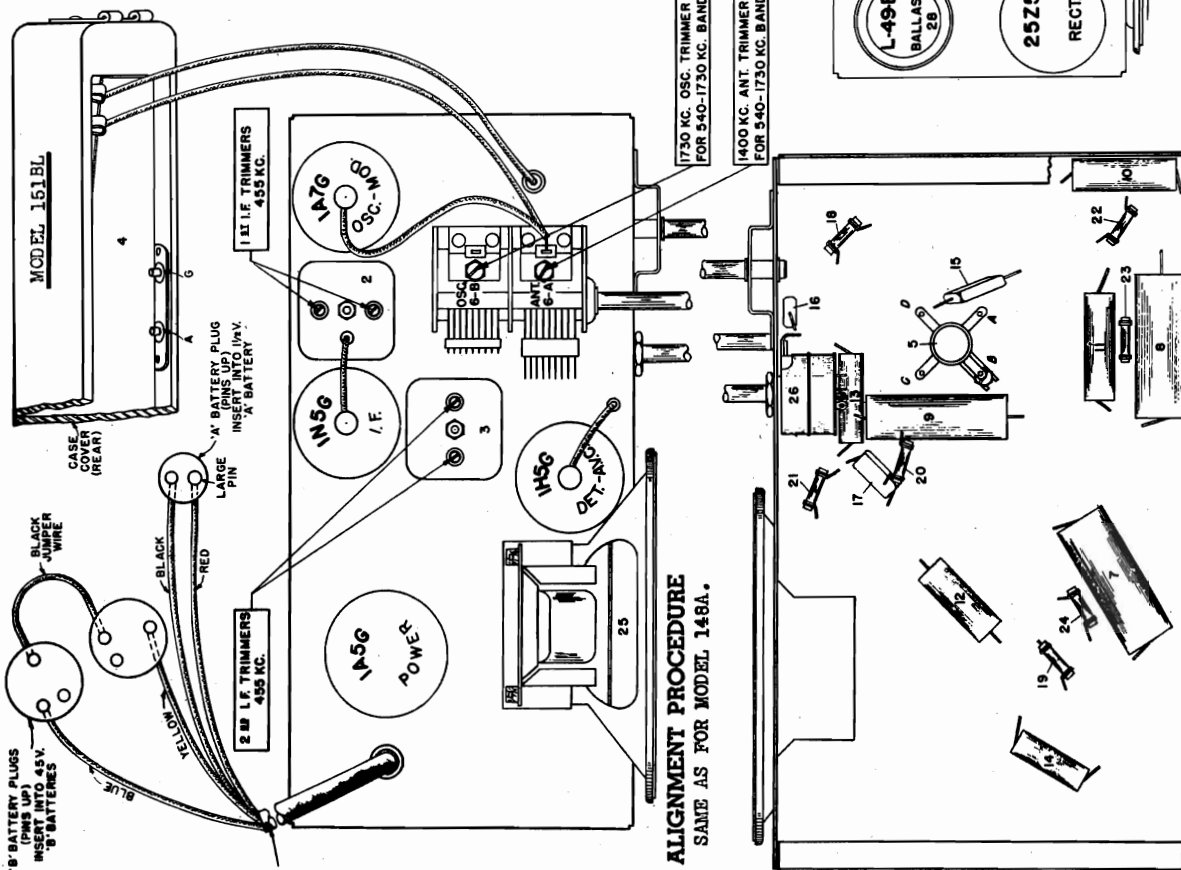
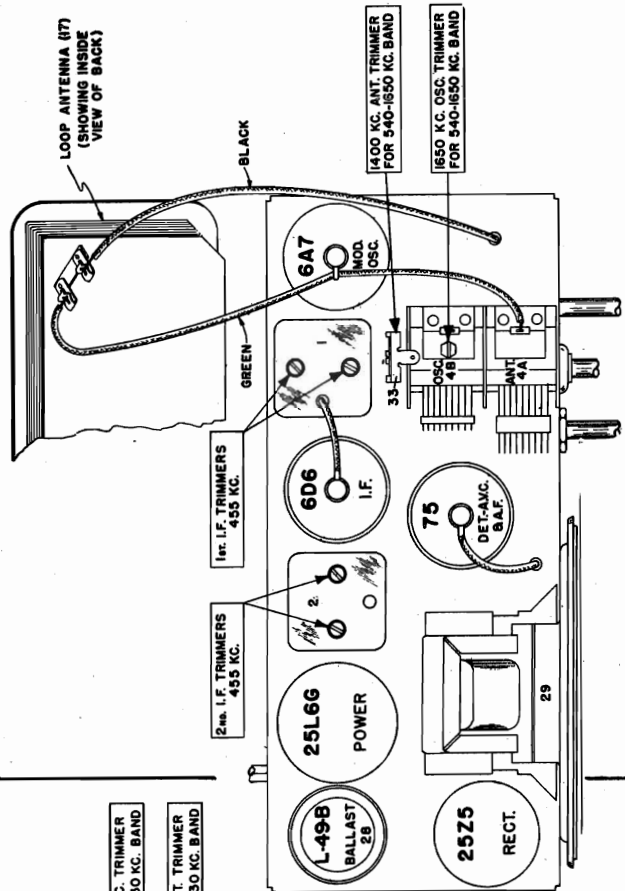
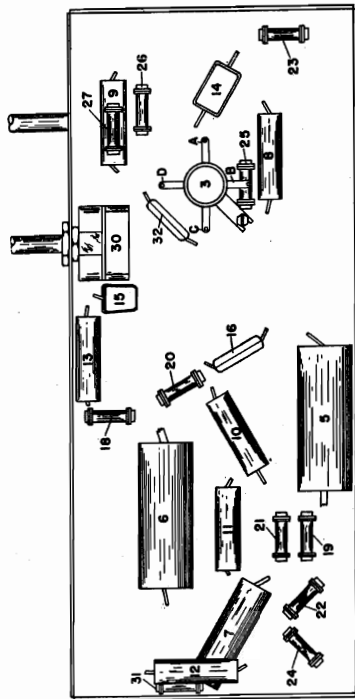
MODEL 151BL

MODEL 163UL

Trimmers, Chassis

SENTINEL RADIO CORP.

MODEL 163UL

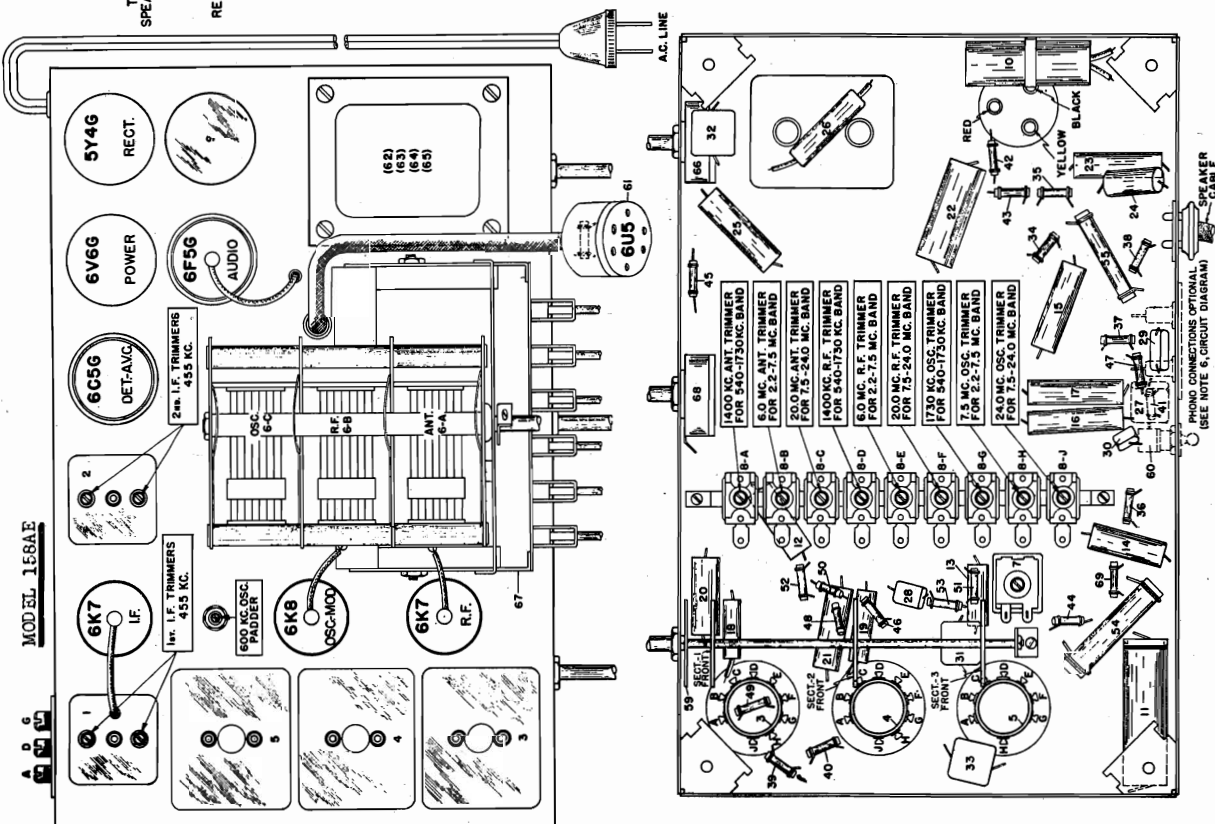
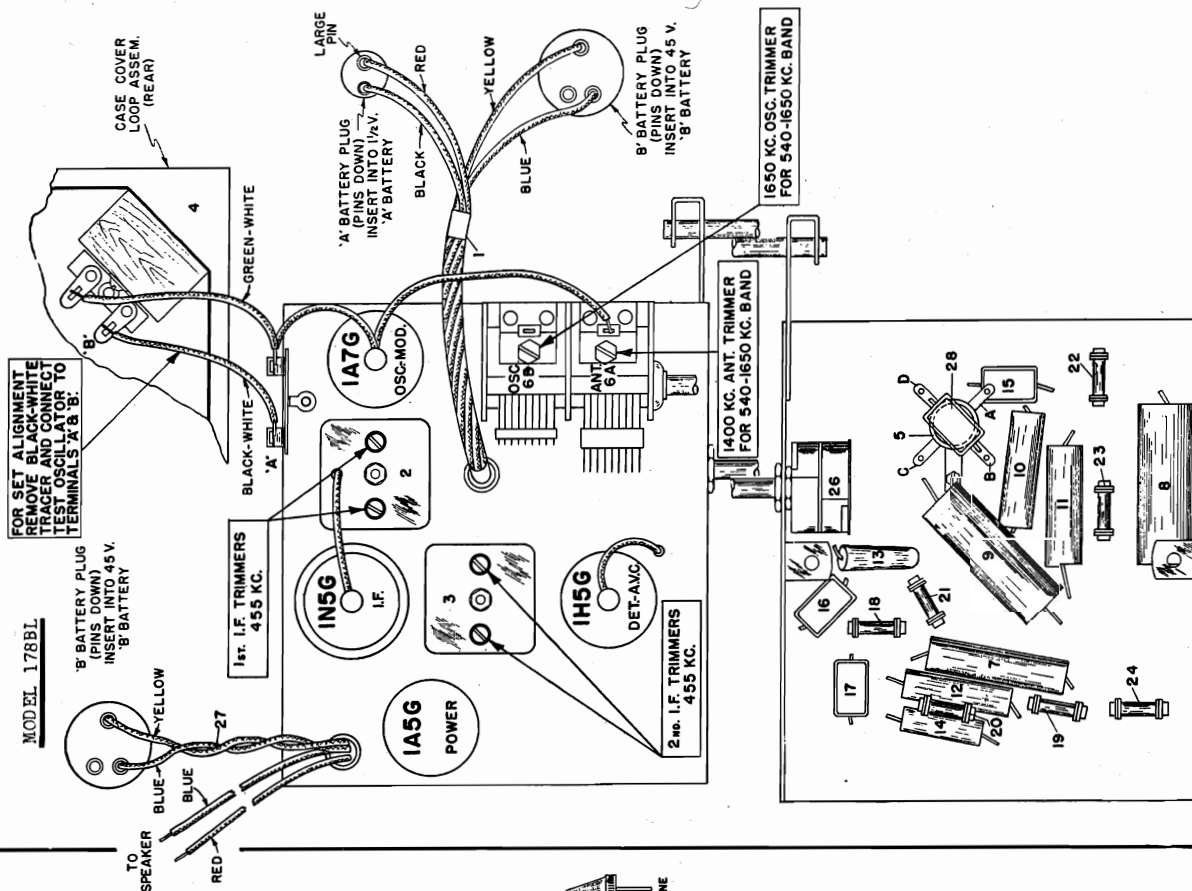


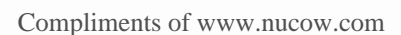
MODEL 158AE

MODEL 178BL

Trimmers, Chassis

SENTINEL RADIO CORP.





MODEL 163UL

Alignment

MODEL 167U

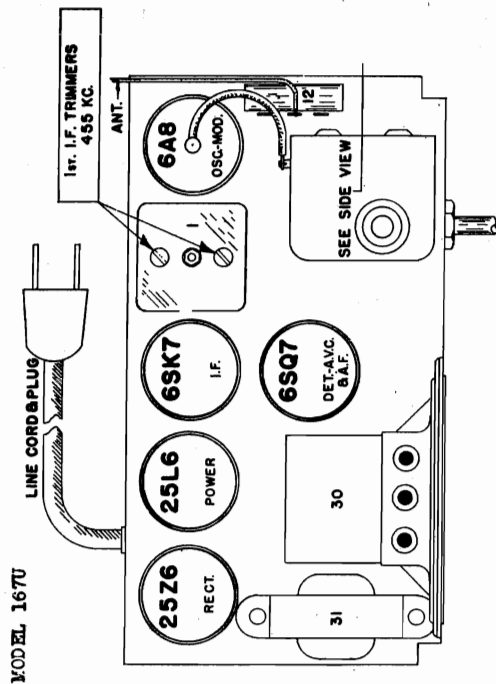
Socket, Trimmers

Chassis

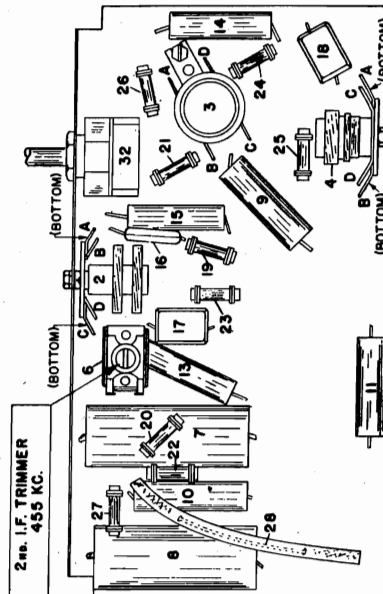
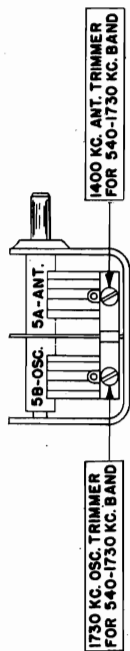
SENTINEL RADIO CORP.

MODEL 178BL

Alignment



ALIGNMENT PROCEDURE
SEE INDEX.



ALIGNMENT PROCEDURE IN TABULATED FORM

Before starting alignment, check tuning dial adjustment by: turn gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial indicator 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 needle to correct position.
Use an accurately calibrated test oscillator with some type of output measuring device.

MODEL 163UL

BEFORE ALIGNING, PLACE LOOP ANTENNA AND THE "A" AND "B" BATTERIES IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED. When adjusting 1650 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, place test oscillator in series with set loop by:

1. Remove the black with white tracer wire used to connect loop antenna to Fohensstock clip on chassis.
2. Attach test oscillator to terminals marked "A" and "B" on parts layout diagram.

IMPORTANT—No condenser should be in series with generator leads.

TEST OSCILLATOR			
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:
I. F. Any point where no interfering signal is received	455 K. C.	.02 MFD condenser	Refer to parts layout diagram for location of trimmers mentioned below—and:
(1) Exactly 1650 K. C.	Exactly 1650 K. C.	None	High side to grid terminal of 1A7G tube Low side to chassis DO NOT REMOVE CAP.
(2) Approx. 1400 K. C.	Exactly 1400 K. C.	None	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output. Adjust 1650 K. C. oscillator trimmer for maximum output. Adjust 1400 K. C. antenna trimmer for maximum output.

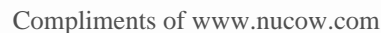
MODEL 178BL

IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS IT WILL BE IN WHEN THE SET IS IN THE CABINET AND THE BACK ATTACHED.

When adjusting 1650 K.C. oscillator trimmer and 1400 K.C. antenna trimmer, couple test oscillator to set loop by placing lead from high side of test oscillator on top of or near set loop. Be sure that neither the loop or test oscillator lead moves during alignment.

DO NOT ATTACH LOW SIDE OF TEST OSCILLATOR TO RECEIVER—LEAVE UNCONNECTED.

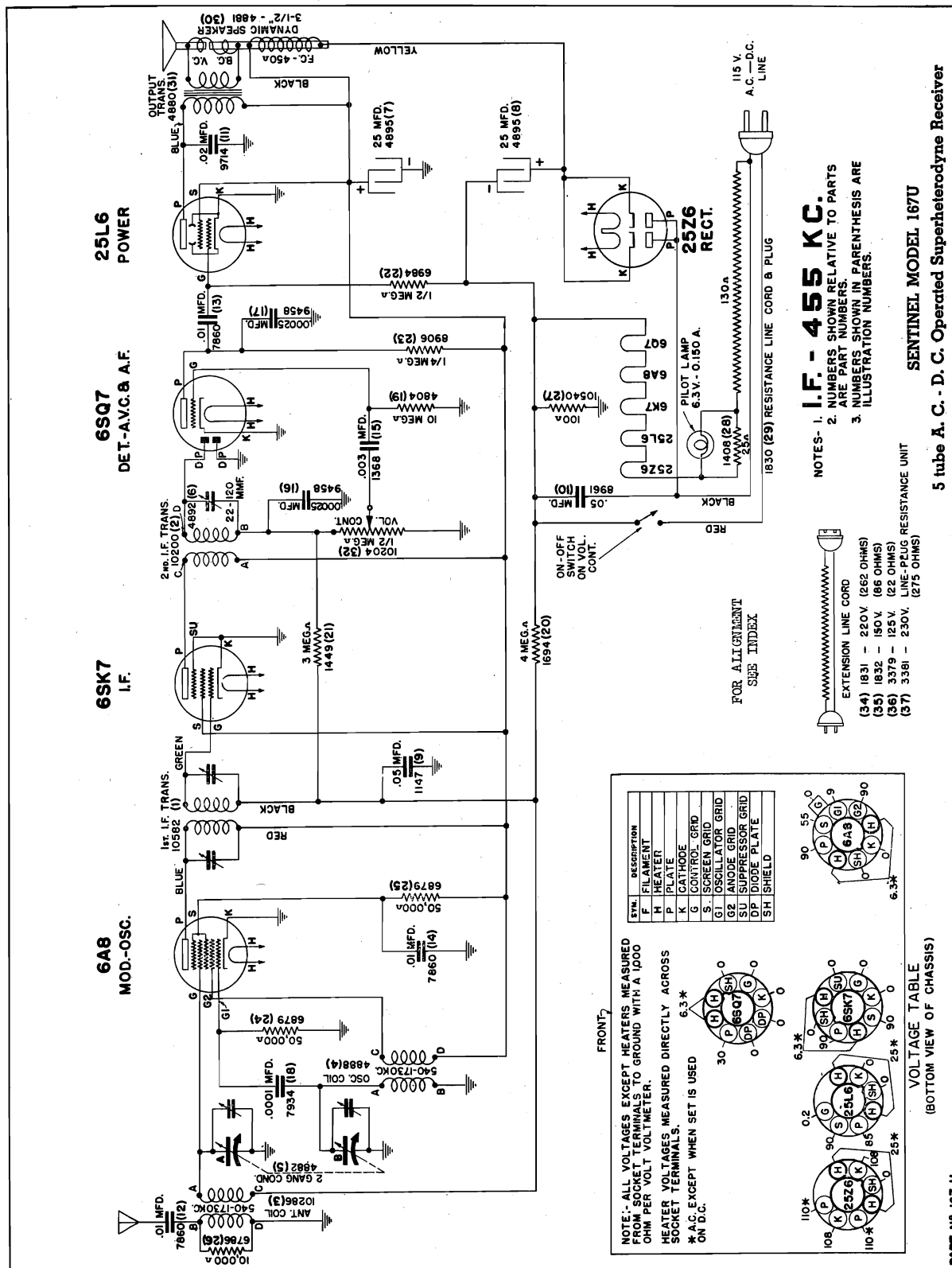
TEST OSCILLATOR			
Set receiver dial to:	Adjust test oscillator frequency to:	Use dummy antenna in series with output of test oscillator consisting of:	Attach output of test oscillator to:
I. F. Any point where no interfering signal is received	455 K. C.	.02 MFD condenser	Refer to parts layout diagram for location of trimmers mentioned below—and:
(1) Exactly 1650 K. C.	Exactly 1650 K. C.	None	High side to grid terminal of 6A7 tube DO NOT REMOVE CAP.
(2) Approx. 1400 K. C.	Exactly 1400 K. C.	None	Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output. Adjust 1650 K. C. oscillator trimmer for maximum output. Adjust 1400 K. C. antenna trimmer for maximum output.



MODEL 167U

Schematic, Voltage
Socket

SENTINEL RADIO CORP.



MODEL 127B MODEL 128B
MODEL 137U MODEL 138AE
MODEL 139UE MODELS 140B, 140BE

SENTINEL RADIO CORP.

MODEL 141AE MODEL 147U
MODEL 145AE MODEL 158AE
MODEL 167U MODEL 177U
Alignment

Sentinel Model 141AE

Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR		Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Attach output of test oscillator to:	
I. F. ALIGNMENT use any band position	Any point where no interfering signal is received	Exactly 455 K.C.	.02 MFD condenser	High side to grid cap of 1C7G tube. Do not remove cap.
	(1) Exactly 1600 K.C.	Exactly 1600 K.C.	.00025 MFD condenser	Adjust 1600 K.C. oscillator trimmer for maximum output.
	(2) Approx. 1400 K.C.	Approx. 1400 K.C.	.00025 MFD condenser	While rocking gang condenser adjust 1400 K.C. antenna trimmer for maximum output.
136 TO 390 K.C. BAND	(1) Exactly 350 K.C.	Exactly 350 K.C.	.00025 MFD condenser	While rocking gang condenser adjust 350 K.C. oscillator trimmer for maximum output.
	(2) Approx. 300 K.C.	Approx. 300 K.C.	.00025 MFD condenser	While rocking gang condenser adjust 300 K.C. antenna trimmer for maximum output.
	(3) Approx. 160 K.C.	Approx. 160 K.C.	.00025 MFD condenser	While rocking gang condenser adjust 160 K.C. antenna trimmer for maximum output.
5.7 TO 18.1 M.C. BAND	(1) Exactly 18.1 M.C.	Exactly 18.1 M.C.	400 Ohm carbon resistor	Adjust 18.1 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, then screw down trimmer (add capacity) until the second peak—which is the proper one—is obtained.
	(2) Approx. 15 M.C.	Approx. 15 M.C.	400 Ohm carbon resistor	While rocking gang condenser adjust 15 M.C. antenna trimmer for maximum output.

ALIGNMENT PROCEDURE IN TABULATED FORM

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. If more than one adjustment is required, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial indicator must be exactly even with the calibration line at the low frequency end of the dial calibration.

(b) If dial needle does not point exactly to last line move needle to correct position.

(c) Have ground lead of test oscillator attached to chassis.

Models 138AE, 139UE, 140B, 140BE, 145AE and 158AE

Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR		Refer to parts layout diagram for location of trimmers mentioned below:
		Adjust test oscillator frequency to:	Attach output of test oscillator to:	
I. F. ALIGNMENT use any band position	Any point where no interfering signal is received	Exactly 455 K.C.	.02 MFD condenser	High side to grid cap of 1C7G tube. Do not remove cap.
	(1) Exactly 1730 K.C.	Exactly 1730 K.C.	.00025 MFD condenser	Adjust 1730 K.C. oscillator trimmer for maximum output.
	(2) Approx. 1400 K.C.	Approx. 1400 K.C.	.00025 MFD condenser	While rocking gang condenser adjust 1400 K.C. antenna trimmer for maximum output.
1720 TO 540 K.C. BAND	(1) Exactly 1730 K.C.	Exactly 1730 K.C.	.00025 MFD condenser	Adjust 1730 K.C. oscillator trimmer for maximum output.
	(2) Approx. 1400 K.C.	Approx. 1400 K.C.	.00025 MFD condenser	While rocking gang condenser adjust 1400 K.C. antenna trimmer for maximum output.
	(3) Approx. 600 K.C.	Approx. 600 K.C.	.00025 MFD condenser	While rocking gang condenser adjust 600 K.C. oscillator trimmer for maximum output.
2.2 TO 7.5 M.C. BAND	(1) Exactly 7.5 M.C.	Exactly 7.5 M.C.	400 Ohm carbon resistor	Adjust 7.5 M.C. oscillator trimmer for maximum output.
	(2) Exactly 6 M.C.	Exactly 6 M.C.	400 Ohm carbon resistor	While rocking gang condenser adjust 6 M.C. antenna trimmer for maximum output.
5.7 TO 24 M.C. BAND	(1) Exactly 24 M.C.	Exactly 24 M.C.	400 Ohm carbon resistor	Adjust 24 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, then screw down trimmer (add capacity) until the second peak—which is the proper one—is obtained.
	(2) Approx. 20 M.C.	Approx. 20 M.C.	400 Ohm carbon resistor	While rocking gang condenser adjust 20 M.C. antenna trimmer for maximum output.

Sentinel Models 127B, 137U, 147U, 167U, and 177U.

ALIGNMENT PROCEDURE IN TABULATED FORM

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. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial indicator must be exactly even with the calibration line at the low frequency end of the dial calibration.

(b) If dial needle does not point exactly to last line move needle to correct position.

(c) Use an accurately calibrated test oscillator with some type of output measuring device.

(d) Have ground lead of test oscillator attached to gang condenser frame.

Set receiver dial to:	TEST OSCILLATOR		Refer to parts layout diagram for location of trimmers mentioned below—and:
	Adjust test oscillator frequency to:	Attach output of test oscillator to:	
Any point where no interfering signal is received	Exactly 455 K.C.	.02 MFD condenser	High side to grid cap of 1A7G tube. DO NOT REMOVE CAP.
	(1) Exactly 1730 K.C.	.00025 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 1400 K.C.	.00025 MFD condenser	While rocking gang condenser adjust 1400 K.C. antenna trimmer for maximum output.
1 1730 K.C. BAND	Exactly 1730 K.C.	Receiver blue antenna lead	Adjust 1730 K.C. C. oscillator trimmer for maximum output.
	Exactly 1400 K.C.	Receiver blue antenna lead	Adjust 1400 K.C. C. antenna trimmer for maximum output.

Sentinel Model 128B

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. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial indicator must be exactly even with the calibration line at the low frequency end of the dial calibration.

(b) If dial needle does not point exactly to last line move needle to correct position.

(c) Use an accurately calibrated test oscillator with some type of output measuring device.

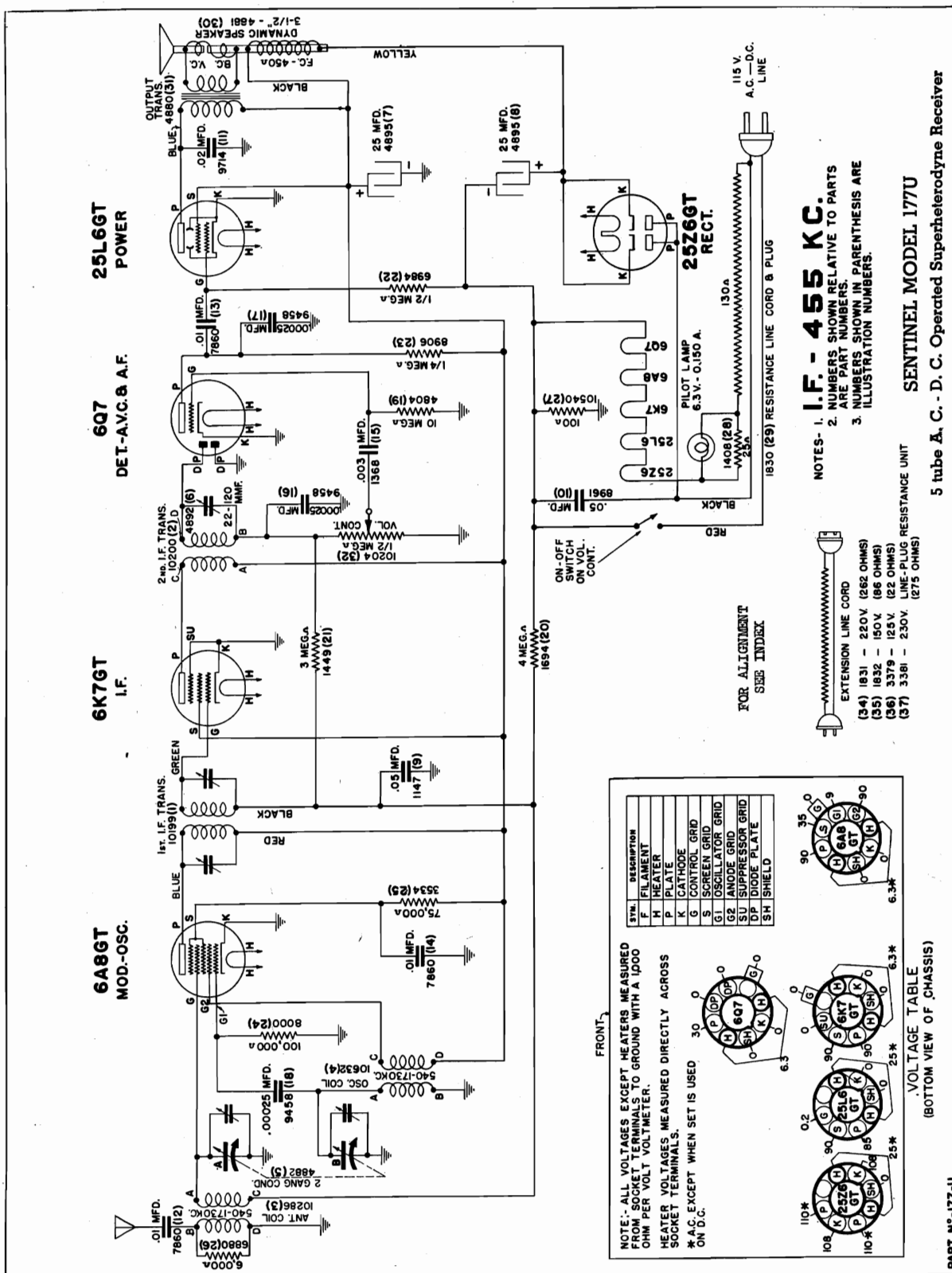
(d) Have ground lead of test oscillator attached to chassis.

Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR		Refer to parts layout diagram for location of trimmers mentioned below and:
		Adjust test oscillator frequency to:	Attach output of test oscillator to:	
I. F. alignment use any band position	Any point where no interfering signal is received	Exactly 455 K.C.	.02 Mfd. condenser	High side to grid cap of 1C7G tube. Do not remove cap.
	(1) Exactly 1730 K.C.	Exactly 1730 K.C.	.00025 Mfd. condenser	Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output.
	(2) Exactly 1400 K.C.	Exactly 1400 K.C.	.00025 Mfd. condenser	While rocking gang condenser adjust 1400 K.C. antenna trimmer for maximum output.
1730 TO 540 K.C. BAND	(1) Exactly 1730 K.C.	Exactly 1730 K.C.	.00025 Mfd. condenser	Adjust 1730 K.C. oscillator trimmer for maximum output.
	(2) Exactly 1400 K.C.	Exactly 1400 K.C.	.00025 Mfd. condenser	Adjust 1400 K.C. antenna trimmer for maximum output.
	(3) Approximately 600 K.C.	Approximately 600 K.C.	.00025 Mfd. condenser	While rocking gang condenser adjust 600 K.C. oscillator trimmer for maximum output.
5.7 TO 18.1 M.C. BAND	(1) Exactly 18.1 M.C.	Exactly 18.1 M.C.	400 Ohm carbon resistor	Adjust 18.1 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, then screw down trimmer (add capacity) until the second peak—which is the proper one—is obtained.
	(2) Exactly 15 M.C.	Exactly 15 M.C.	400 Ohm carbon resistor	Adjust 15 M.C. antenna trimmer for maximum output.

MODEL 177U

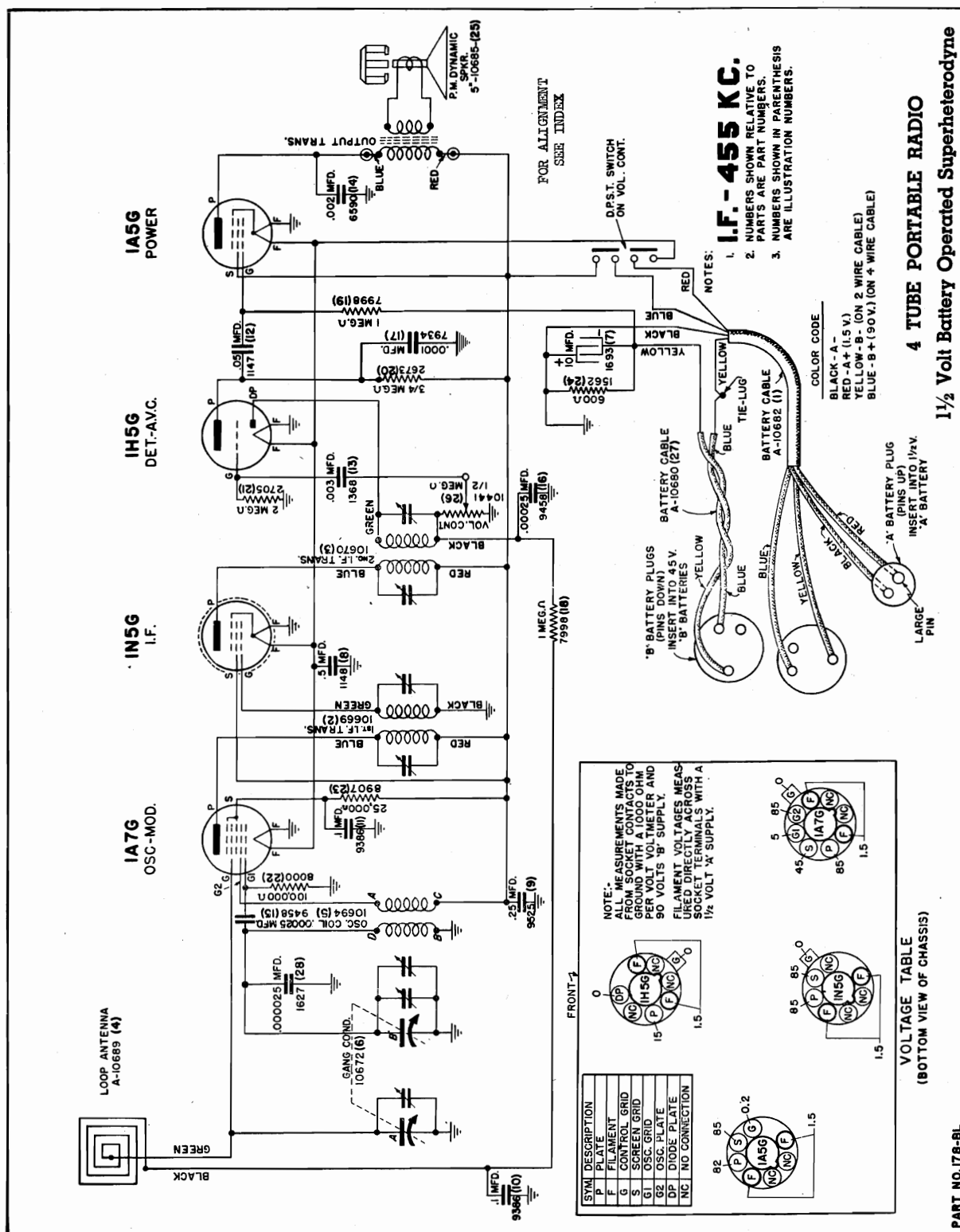
Schematic, Voltage
Socket

SENTINEL RADIO CORP.

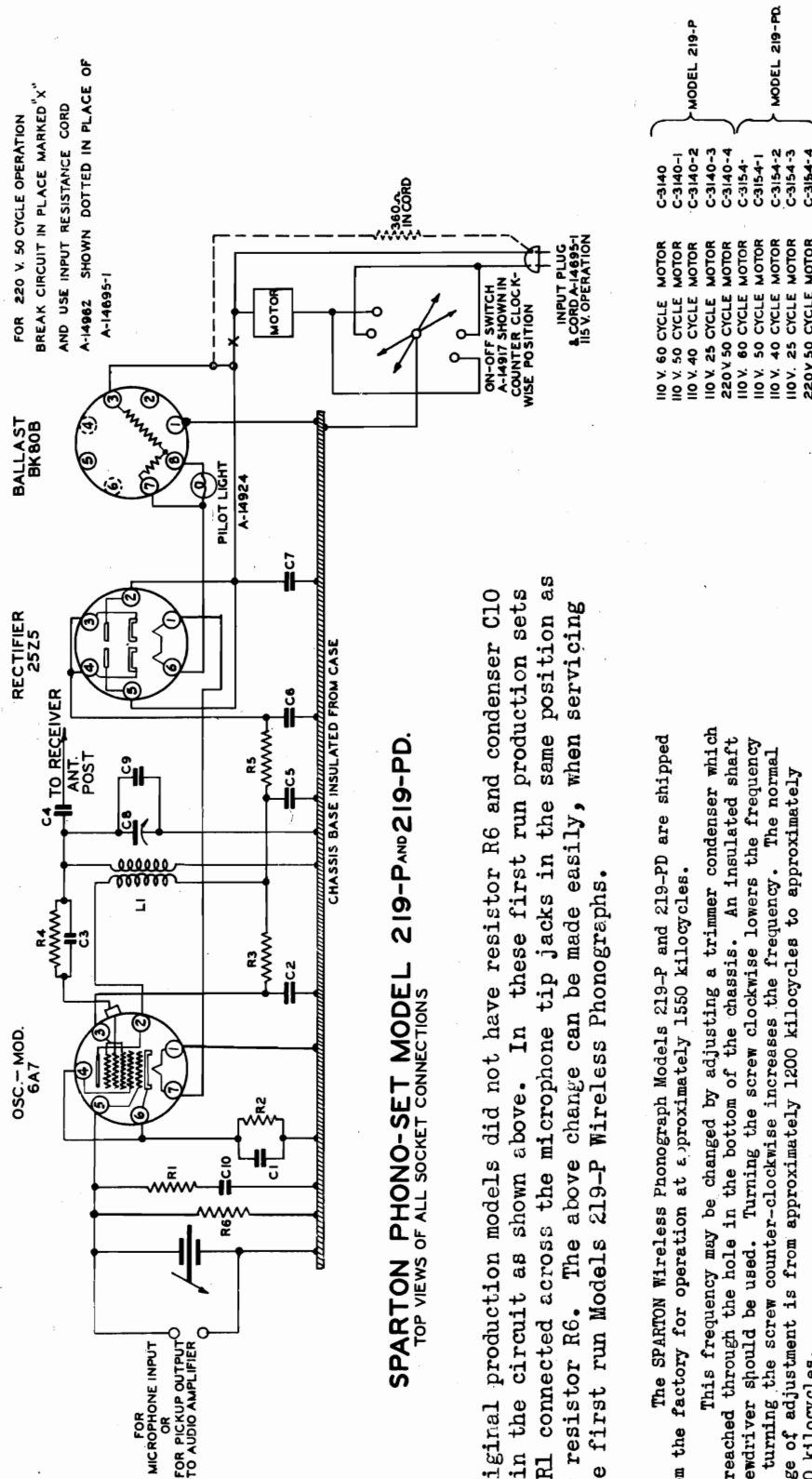


SENTINEL RADIO CORP.

MODEL 178BL
Schematic, Voltage
Socket



SPARKS WITHINGTON CO.

MODELS 219-P, 219-PD
Wireless Phonograph
Schematic, Voltage
Adjustments, Changes

SPARTON PHONO-SET MODEL 219-P AND 219-PD.
 TOP VIEWS OF ALL SOCKET CONNECTIONS

NOTE: Original production models did not have resistor R6 and condenser C10 included in the circuit as shown above. In these first run production sets resistor R1 connected across the microphone tip jacks in the same position as shown for resistor R6. The above change can be made easily, when servicing any of the first run Models 219-P Wireless Phonographs.

The SPARTON Wireless Phonograph Models 219-P and 219-PD are shipped from the factory for operation at approximately 1550 kilocycles.

This frequency may be changed by adjusting a trimmer condenser which is reached through the hole in the bottom of the chassis. An insulated shaft screwdriver should be used. Turning the screw clockwise lowers the frequency and turning the screw counter-clockwise increases the frequency. The normal range of adjustment is from approximately 1200 kilocycles to approximately 1700 kilocycles.

VOLTAGE CHART

Line Voltage: 115 volts		Antenna Not Connected.							
Control Switch in Center Position		Microphone Not Connected.							
Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)							
No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap	
6A7	Oscillator-Modulator	0	120	80	4.5	0	4.5	6.3*	0
25Z5	Rectifier	6.3*	117*	150	117*	31.3*	-	-	-
BK-80B	Ballast	0	-	117*	-	-	31.3*	37*	-

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - 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. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.

*AC volts.

C1	.1 MFD. 200 V.	C-3202-38C
C2	.1 MFD. 200 V.	C-3202-38C
C3	50 MMFD. MICA	C-720-343
C4	10 MMFD. MICA	C-720-367
C5	10 MFD. 150V. ELECT.	A-14927-1
C6	15 MFD. 150V. ELECT.	C-3202-38C
C7	.1 MFD. 200V.	A-14911-3A
C8	95-470 MMFD. MICA TRIM.	A-14922
C9	75 MMFD.	C-3204-88C
C10	.006 MFD. 400V.	C-2795-80B
R1	33,000Ω .25 W.	C-2795-61B
R2	820Ω .25 W.	C-2795-74B
R3	10,000Ω .25 W.	C-2795-74B
R4	10,000Ω .25 W.	C-2795-70C
R5	4700Ω .5 W.	C-2795-89B
R6	180,000Ω .25 W.	A-14926-1
L1	OSCILLATOR COIL	

(Original) Effective November 1, 1938

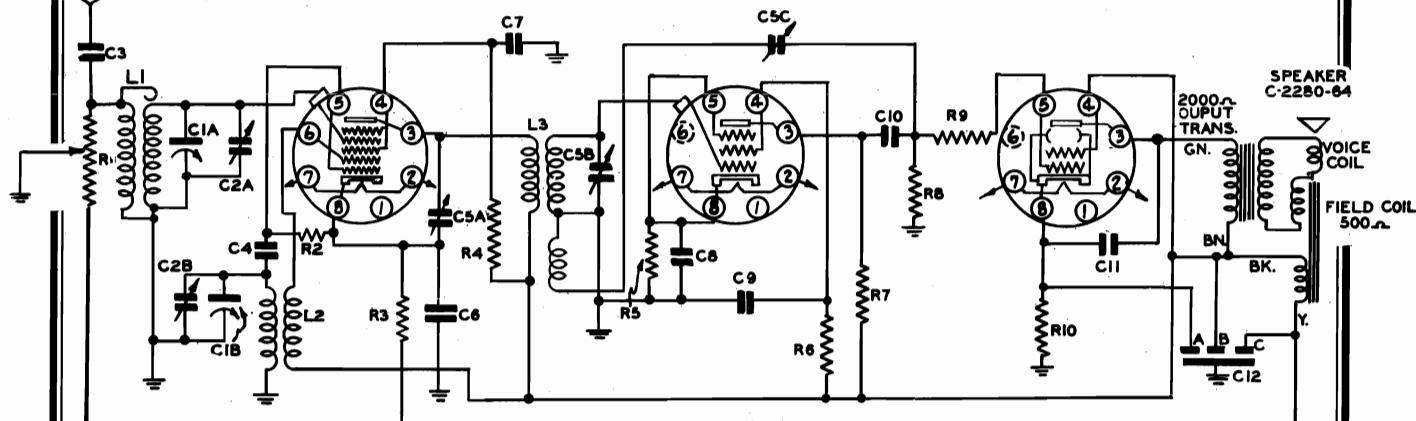
MODEL 409-GL
Schematic

SPARKS WITHINGTON CO.

Trimmers, Alignment

Voltage
SocketPOWER OUTPUT
25L6GTDETECTOR
6J7GTCONVERTER
6A8GT

ANTENNA

MODEL 409-GL
INTERMEDIATE
FREQUENCY 456 K.C.BK3AJ
25Z6GT
RECT.
PWR. AMP.
6J7GT
DETECTORSTATION
SELECTOR
OFF-ON
SW.-VOL. CONTR.INPUT PLUG & CORD
A-14971
(65 IN. CORD)
A.C. SWITCH ON
VOL. CONTROL
C5B }
C5A } I.F.
C5C }
6A8GT
CONVERTERBALLAST BK3AJ RECTIFIER
25Z6GT25L6GT 6A8GT 6J7GT
HEATER CIRCUIT

TOP VIEWS OF ALL SOCKET CONNECTIONS

C1A&B VARIABLE CONDENSER B-7288
C2A&B ON VARIABLE CONDENSER
C3 .001 MFD. 400 V. C-3204-2C
C4 50 MMF. MICA C-720-343
C5A&B I.F. TRIMMER A-14792
C6 .01 MFD. 200V. C-3202-78C
C7 .05 MFD. 200V. C-3202-28C
C8 10 MFD. 25 V. A-14782-2
C9 .01 MFD. 200V. C-3202-20C
C10 .01 MFD. 200 V. C-3202-20C
C11 .02 MFD. 400V. C-3204-78C
C12A&B 20-25 MFD. ELECT. A-14972
C13 .05 MFD. 400V. C-3204-28C

R1 VOL. CONTROL & SWITCH A-12708-AI
R2 56000 Ω .25W. C-2795-83B
R3 390 Ω .25 W. C-2795-57B
R4 39000 Ω .25 W. C-2795-81B
R5 27000 Ω .25 W. C-2795-79B
R6 6.2 MEGOHM .25W. C-2795-250B
R7 560 000 Ω .25 W. C-2795-95B
R8 560 000 Ω .25 W. C-2795-95B
R9 100 000 Ω .25 W. C-2795-86B
R10 150 Ω .5 W. C-2796-52C
L1 B.C. ANT. COIL A-14974
L2 B.C. OSC. COIL A-14975
L3 I.F. TRANS A-12989-5

VOLTAGE CHART

Line Voltage: 115 volts		Position of Volume Control: Full with Antenna Disconnected†								
Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
6A8GT	Converter	0	11*	115	42	-2.8	115	5*	1.8	0
6J7GT	Detector	0	5.8*	**	**	**	115	0	**	0
25L6GT	P.O.	0	54*	105	115	0	0	7*	7.2	-
25Z6GT	Rectifier	0	58*	115*	146*	115*	0	54*	146*	-
BK3AJ	Ballast	0	0	62*	62*	0	0	58*	0	-

Notes: Voltage readings are for schematic diagram.

Allow 15% + or - 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. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.

*AC volts.

**Cannot be measured accurately with 1000 ohms per volt voltmeter.

† A regular outside antenna 50 feet in length excluding lead-in and 25 to 50 feet in height should be used for best results with this model.

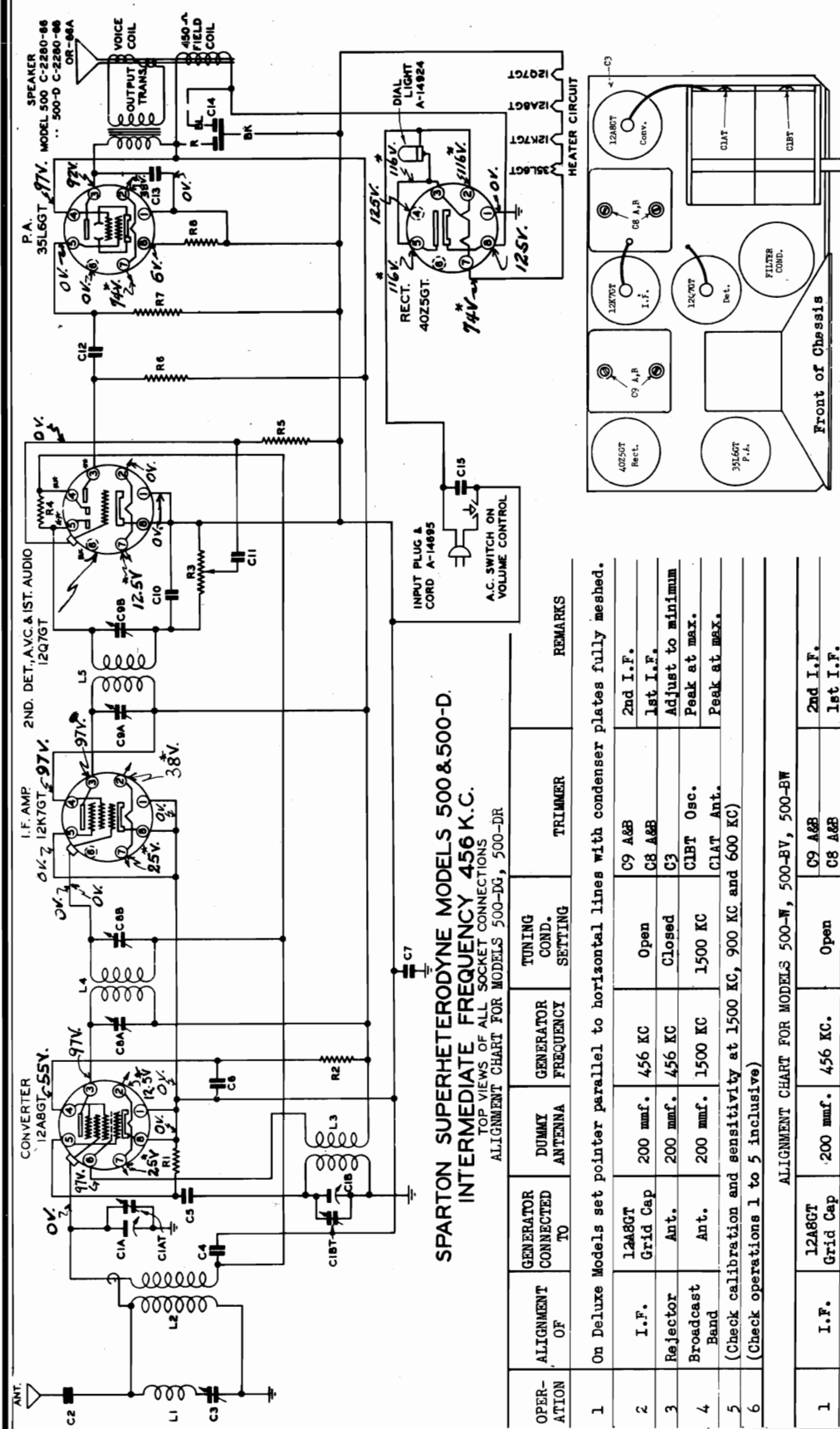
ALIGNMENT

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	REMARKS
1							(Set dial pointer to last mark on scale when condenser plates are flush)*
2							(Back off, i.e. turn counterclockwise, regeneration cond. C5C "red spot" before I.F. is aligned)
3	I.F.	6A8GT	.1 mf.	456 K.C.	Open	C5A,B	
4							(Adjust C5C "red spot" turning in clockwise until greatest sensitivity is obtained. If oscil. occurs, turn out C5C until oscil. stops)
5	Broadcast Band	Ant.	200 mmf.	1500 KC	1500 KC	C2B Osc.	Peak accurately
6						C2A Ant.	Peak accurately
7							(Check calibration and sensitivity at 600 KC, 1000 KC, 1500 KC)
8							(Connect set to regular antenna and check reception of stations. Readjust C5C if set howls or oscillates on strong signals. Then recheck sensitivity)

*Model 409-GL chassis may be completely aligned without removing from cabinet.

SPARKS WITHINGTON CO.

MODELS 500DG, 500DR, 500W
500BV, 500BW
Schematic, Voltage, Socket
Trimmers, Alignment



50,000 μ . .25W
22,000 μ . .25W
500,000 OHM MODEL 500
VC. & SW. MODEL 500-D
1.8 MEGOHM .25W.
5.6 MEGOHM .25W.
270,000 μ . .25W.
560,000 μ . .25W.
150 μ . .3W

C-2795-838
C-2795-788
A-15129-1
C-2795-1018
C-2795-1078
C-2795-918
C-2795-958
C-2795-55C

R1
R2
R3
R4
R5
R6
R7
R8
R9
L1
L2
L3
L4
L5

50,000 μ . .25W
22,000 μ . .25W
500,000 OHM MODEL 500
VC. & SW. MODEL 500-D
1.8 MEGOHM .25W.
5.6 MEGOHM .25W.
270,000 μ . .25W.
560,000 μ . .25W.
150 μ . .3W

C-2795-838
C-2795-788
A-15129-1
C-2795-1018
C-2795-1078
C-2795-918
C-2795-958
C-2795-55C

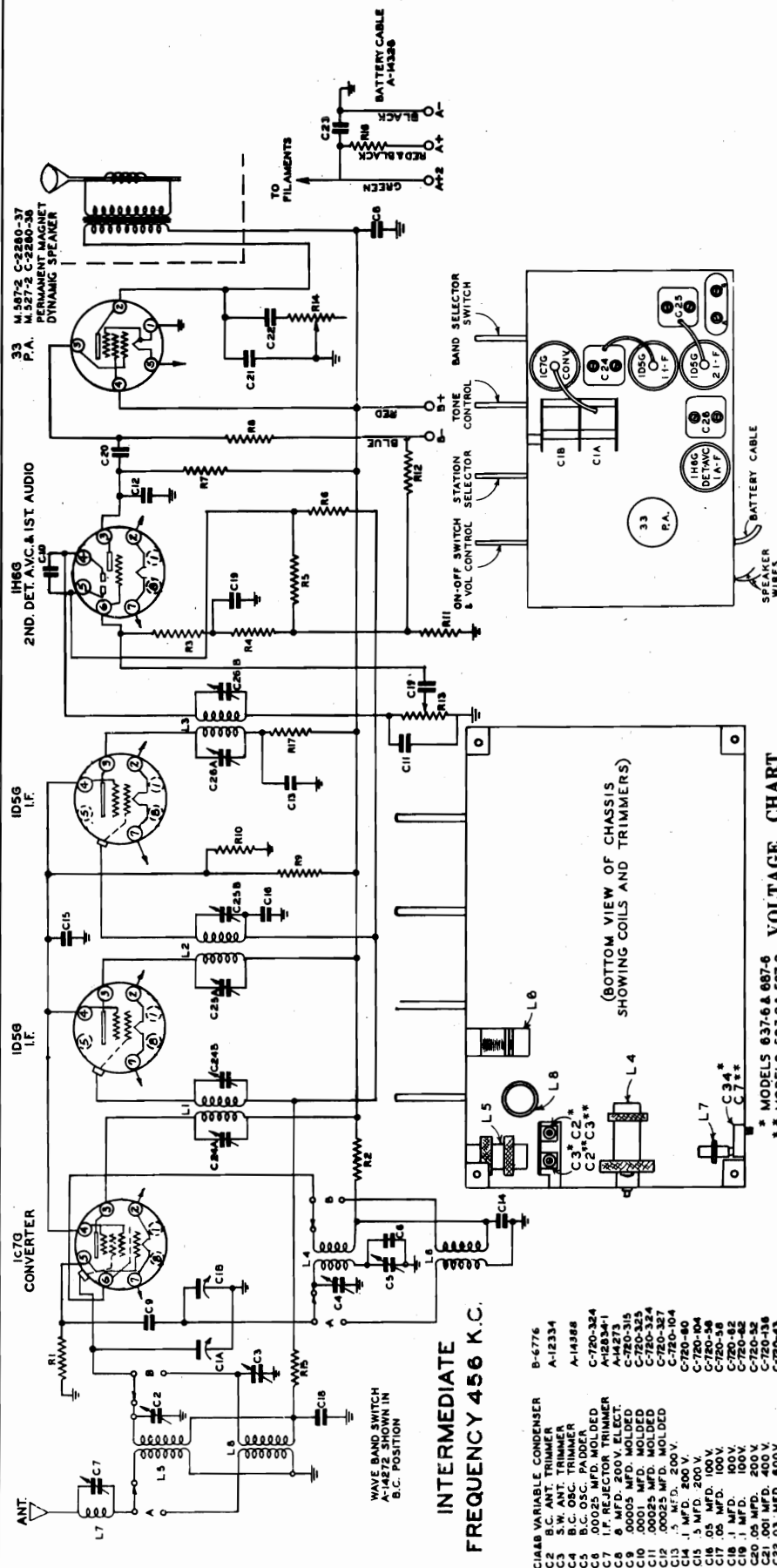
L1 I.F. REJECTOR COIL
L2 B.C. ANTENNA COIL
L3 B.C. OSC. COIL
L4 NO. 1 I.F. COIL
L5 NO. 2 I.F. COIL

A-14718-1
A-14794-1
A-14873
A-12084-32
A-12084-17

(Original) Effective May 1, 1939

SPARKS WITHINGTON CO.

MODELS 527-2, 587-2
Schematic, Voltage, Socket
Trimmers



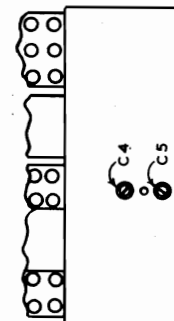
Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast

Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8	Grid
0	115	64	0	110	2	2	2	*
0	113	56	0	0	2	2	2	*
0	111	56	0	0	2	2	2	*
2	111	*	*	*	0	0	0	-
2	120	*	120	0	0	0	0	-

"A" Battery Voltage: 2 volts
"B" Battery Voltage: 135 volts

FOR ALIGNMENT
SEE INDEX

VOLTAGE CHART



END VIEW OF CHASSIS

MODEL 527-2 & 587-2

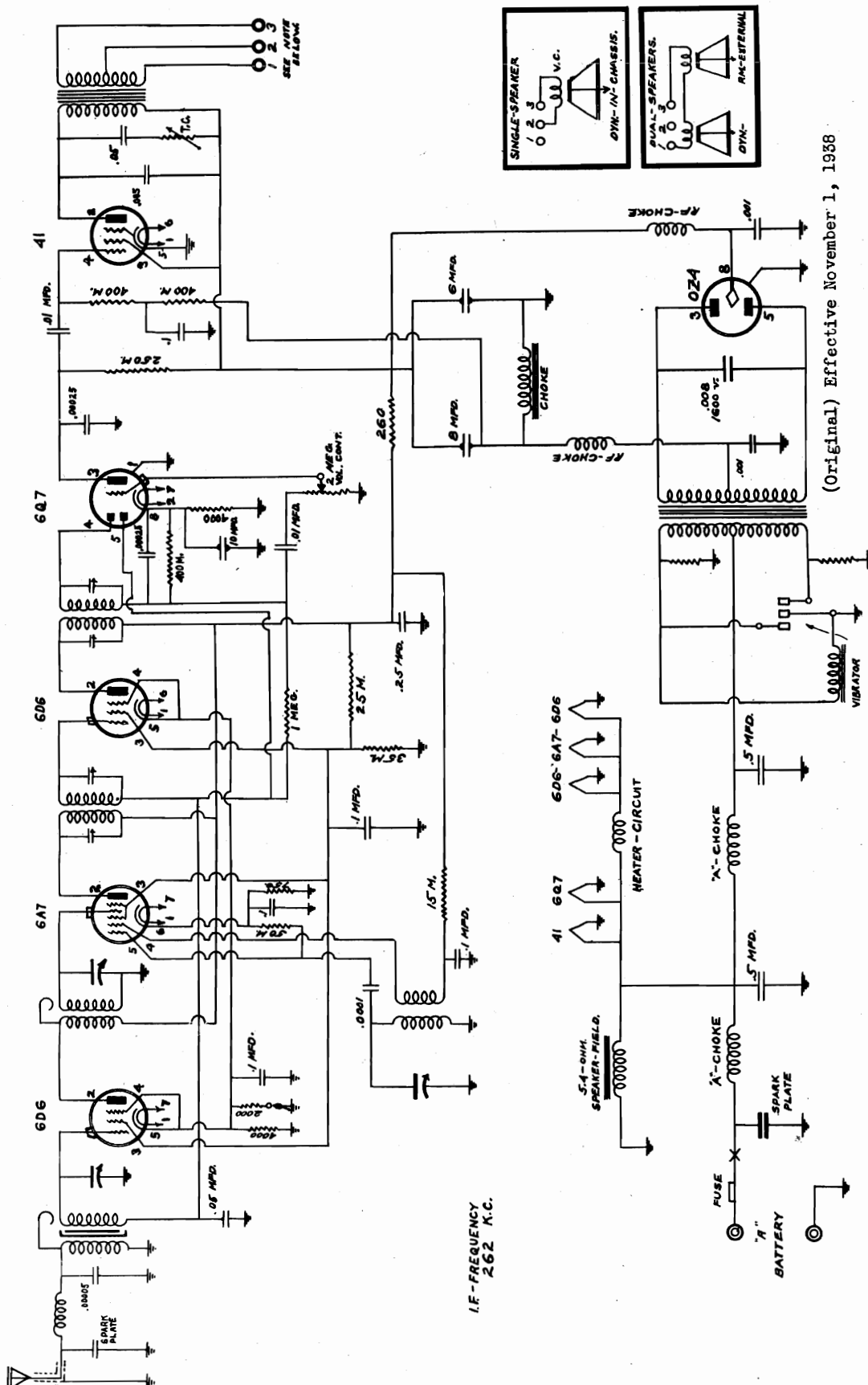
MODEL 699

Schematic

Speaker Connections

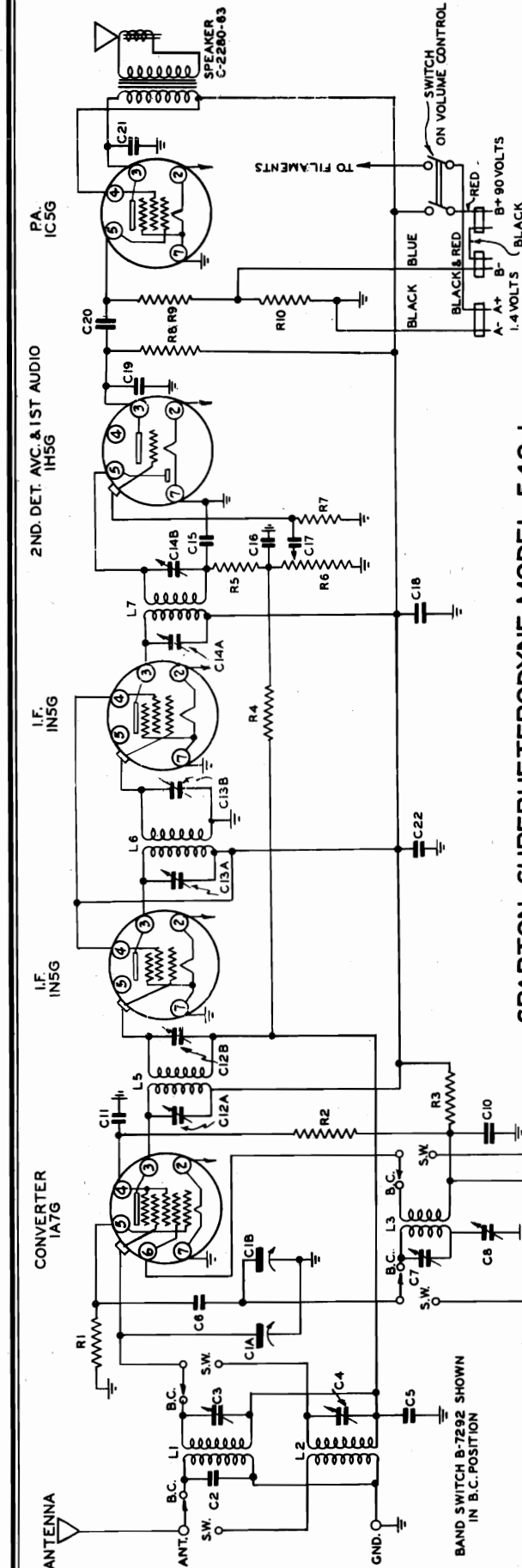
SPARKS WITHINGTON CO.

**SPARTON SUPERHETERODYNE AUTOMOBILE RADIO MODEL 699
INTERMEDIATE FREQUENCY 262. K.C.**



(Original) Effective November 1, 1938

SPARKS WITHINGTON CO.

MODEL 549-1
Schematic, VoltageSPARTON SUPERHETERODYNE MODEL 549-1
INTERMEDIATE FREQUENCY 456 K.C.

Tube	Function	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
1A7G	Converter	80	1.4	80	30	*	70	0	69	*
1N5G	1st I.F. Amp.	*	1.4	78	80	0	-	0	0	0
1N5G	2nd I.F. Amp.	0	1.4	78	80	0	0	-	0	0
1H5G	2nd Det.-AVC-1st Audio	0	1.4	*	0	-1	-	0	-	0
1C5G	Power Amp.	0	1.4	78	80	0	7.5	0	-	0

VOLTAGE CHART

Condition of "A" Battery - Good (1.5 volts) Position of Volume Control: Full with Antenna Disconnected
 Condition of "B" Battery - Good (90 volts) Position of Band Selector Switch: Broadcast Band

Tube	Function	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
1A7G	Converter	80	1.4	80	30	*	70	0	69	*
1N5G	1st I.F. Amp.	*	1.4	78	80	0	-	0	0	0
1N5G	2nd I.F. Amp.	0	1.4	78	80	0	0	-	0	0
1H5G	2nd Det.-AVC-1st Audio	0	1.4	*	0	-1	-	0	-	0
1C5G	Power Amp.	0	1.4	78	80	0	7.5	0	-	0

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - 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.

*Cannot be accurately measured with Model 665 Weston analyzer.

(Original) Effective Feb. 1, 1939

MODEL 549-1

Alignment, Socket, Trimmers

MODEL 699

Voltage, Alignment

SPARKS WITHINGTON CO.

Model 549-1

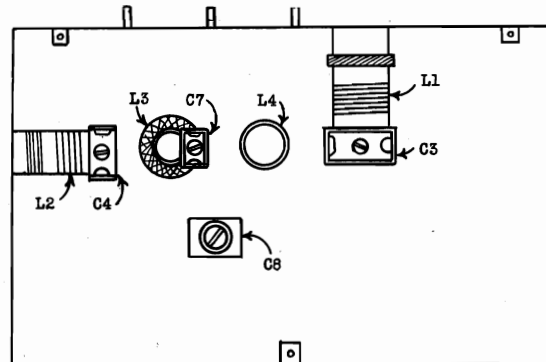
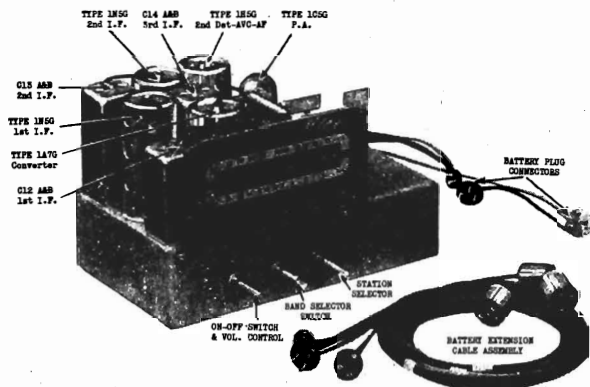
ALIGNMENT

Sparton Superheterodyne

OPER- ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set pointer to end of scale with tuning condenser gang closed)							
2	I.F.	1A7G Grid	.1 mf.	456 KC	BC	Open	C14 A,B	3 I.F. Transformer
							C13 A,B	2 I.F. Transformer
							C12 A,B	1 I.F. Transformer
3	Broad- cast	Ant.	200 mmf.	1500 KC	BC	1500 KC	C7 Osc.	Peak accurately
4	Band			600 KC	BC	600 KC	C3 Ant.	Peak accurately
							C8 Pad.	Rock C14A&B for max. output
5	(Repeat operation 3)							
6	(Check calibration and sensitivity at 600 KC, 900 KC, and 1500 KC)							
7	SW Band	Ant.	*	18 MC	SW	18 MC	C4 Ant.	**
8	(Check calibration and sensitivity at 6 MC and 18 MC)							
9	(Check operations 1 to 8 inclusive)							

* 200 mmf. condenser and 100 ohm non-inductive resistor in series.

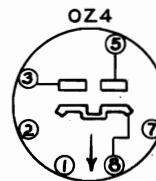
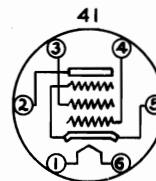
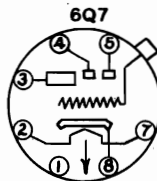
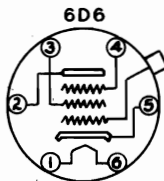
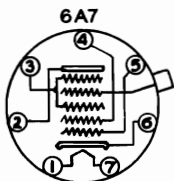
** Rock tuning control around 18 MC while adjusting this trimmer, and make sure that the signal is peaked on the fundamental rather than on the image.



CHASSIS DIAGRAM (Bottom View)

Sparton Superheterodyne Model

699



VOLTAGE CHART

Battery Voltage: 6.3 volts

Position of Volume Control: Full with Antenna Disconnected

Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)								Grid Cap
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	
6D6	R.F. Amp.	0	200	75	6.2*	6.2*	5.5	-	-	0
6A7	Converter	5.5	200	75	105	-1.5	5	0	-	0
6D6	I.F.	0	200	75	6.2*	6.2*	5.5	-	-	0
6Q7	2nd Det. AVC 1st Audio	0	0	7.2	.1	.1	.1	5.6	1.2	0
41	P.A.	5.6	195	200	-.3	0	0	-	-	-
OZ4	Rectifier	0	0	290**	0	290**	0	0	205	-

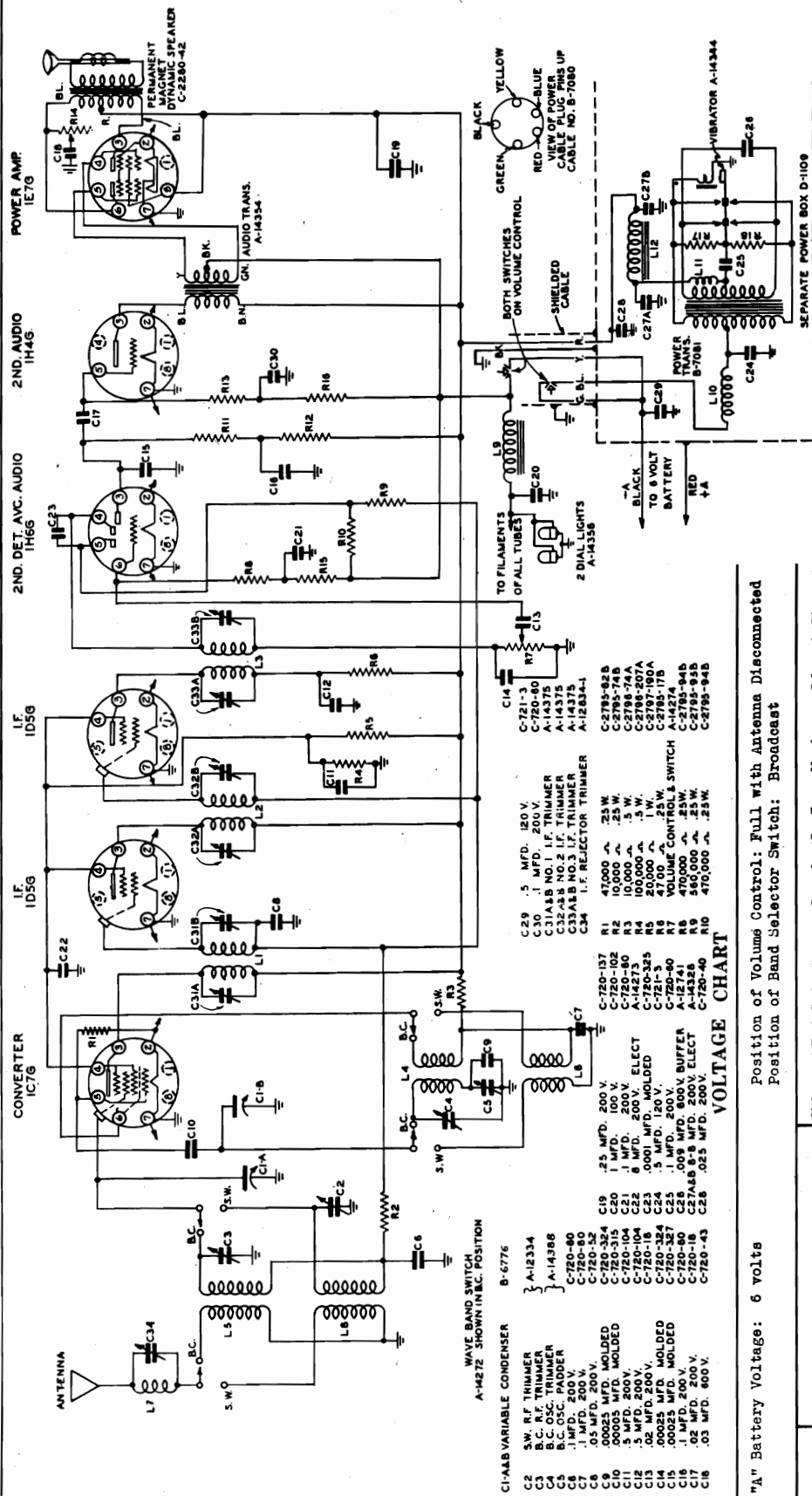
*Or 8.6 volts depending on position of sensitivity switch.

**AC volts.

ALIGNMENT

OPER- ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	REMARKS
1	I.F.	6A7 Grid	.1 mf.	262	Closed	2 trimmers	2nd I.F.
						2 trimmers	1st I.F.
2	Broad. Osc.	Ant.	250 mmf.	1580	Open	Osc.	Adj. to max.
3	Broad. Ant. & R.F.	Ant.	250 mmf.	1400	1400	Ant.	Adj. to max.
						R.F.	Adj. to max.
4	Check sensitivity at 1000 KC and 600 KC.						
5	Check operations 1 to 4 inclusive.						

**SPARTON SUPERHETERODYNE MODEL 637-6 & 687-6
INTERMEDIATE FREQUENCY 456 K.C.**



Tube	Function	Voltage of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)									
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8	Grid Cap	
1C7G	Converter	-	0	112	60	.05†	107	2	-	.05†	
1D5G	First I-F Amplifier	-	0	112	47	-	-	2	-	.06†	
1D5G	Second I-F Amplifier	-	0	108	48	-	-	2	-	.05†	
1H6G	Det-AVC-1st A-F Amplifier	-	0	.2	0	.04†	*	2	-	-	
1H4G	Second A-F Amplifier	-	0	112	-	-	*	2	-	-	
1F7G	Power amplifier	-	-	122	5.2	5.2	122	2	122	-	

Notes: Voltage readings are for schematic diagram shown on back of this page. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits, except as noted below. All measurements made with Weston Selective Analyzer No. 665, Type 2.

* Cannot be measured with Weston Selective Analyzer No. 665, Type 2.

2. (ORIGINAL) EFFECTIVE DEC 28, 1936

SPARKS WITHINGTON CO.

MODELS 527-2, 587-2

Alignment

MODELS 637-6, 687-6

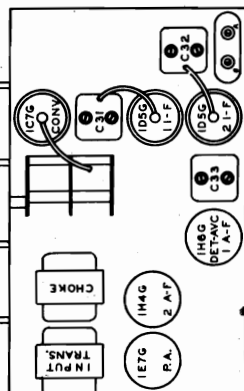
Alignment, Socket, Trimmers

for 15,000 kilocycles would be 15,000 kilocycles minus twice 456 kilocycles or approximately 14,100 kilocycles. Therefore, a signal of this frequency may be found with the test oscillator generating a 15,000 kilocycle signal.

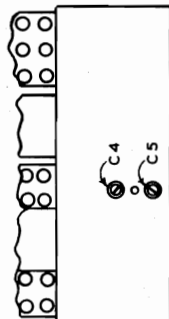
Note: There are no other trimmers for the short-wave or foreign band.

Important: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.

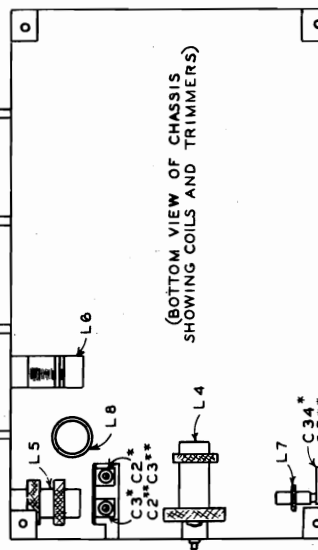
ON-OFF SWITCH STATION TONE BAND SELECTOR A VOL. CONTROL SELECTOR SWITCH



SPEAKER WIRES SHIELDED CABLE TO POWER BOX



END VIEW OF CHASSIS

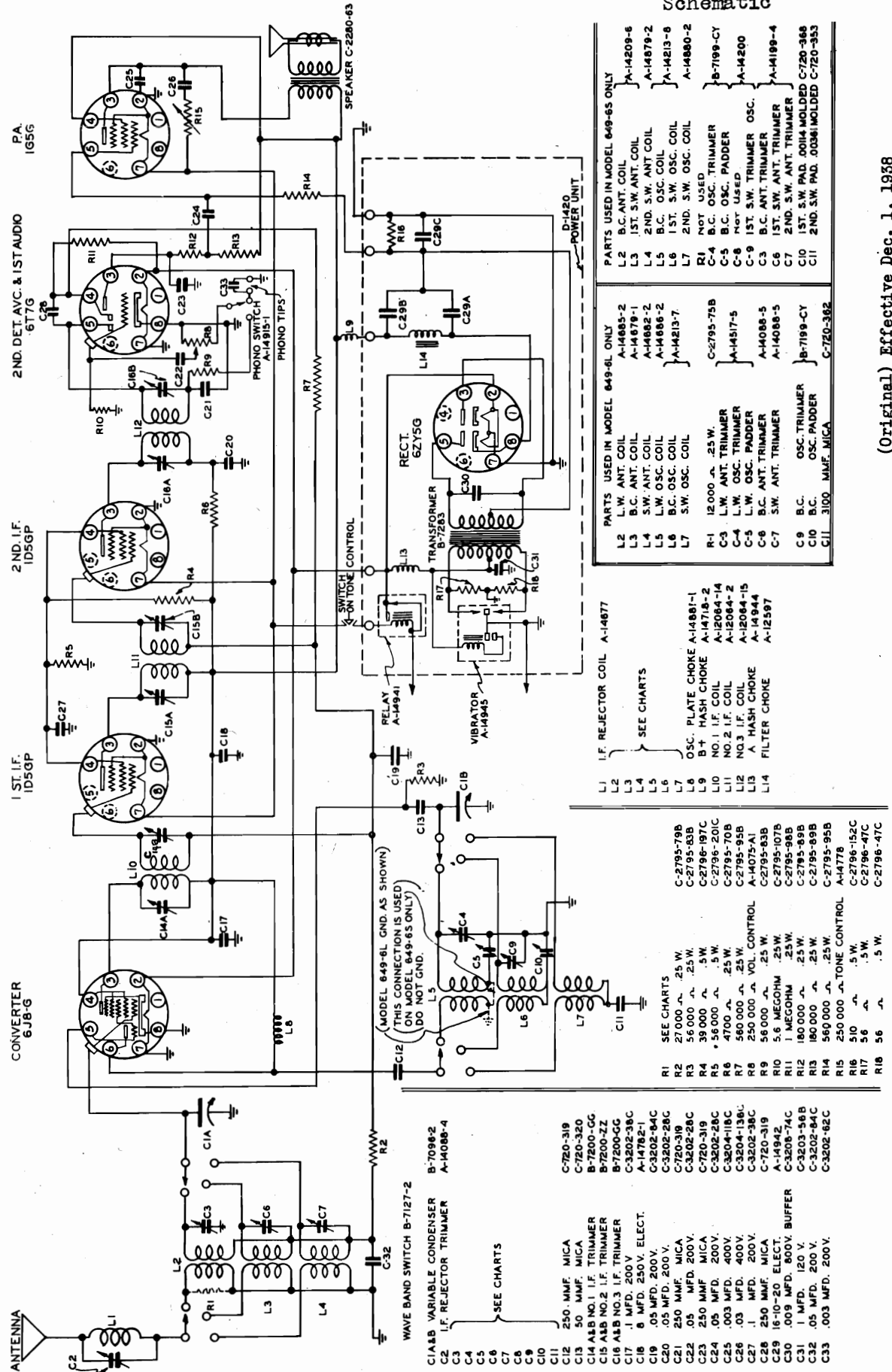


SPARKS WITHINGTON CO.

MODELS 649-6L, 649-6S

Schematic

SPARTON SUPERHETERODYNE MODELS 649-6S & 649-6L
INTERMEDIATE FREQUENCY 456 K.C.
TOP VIEWS OF ALL SOCKET CONNECTIONS



MODELS 649-6L, 649-6S
Voltage, Socket, Chassis

SPARKS WITHINGTON CO.

Sparton Superheterodyne Models

649-6L 649-6S

VOLTAGE CHART

Battery Condition: Good
Battery Voltage: 6.3 volts

Position of Volume Control: Full with Antenna Disconnected
Band Selector Switch: Broadcast

Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
6J8G	Converter	0	6.2	140	140	-14	140	0	0	.14
1D5GP	1st I-F Amp.	0	0	140	49	140	-	2.4	0	.2
1D5GP	2nd I-F Amp.	0	2.4	130	49	0	-	0	0	.2
6T7G	Det-AVC-1st A.F.	0	0	3.6 A	-2 B	-2 B	-	6.2	0	.02
1G5G	Power Amplifier	0	0	133	138	-1 C	-	2.4	0	-
6ZY5G	Rectifier	0	6.3	180*	0	180*	6	0	150	-

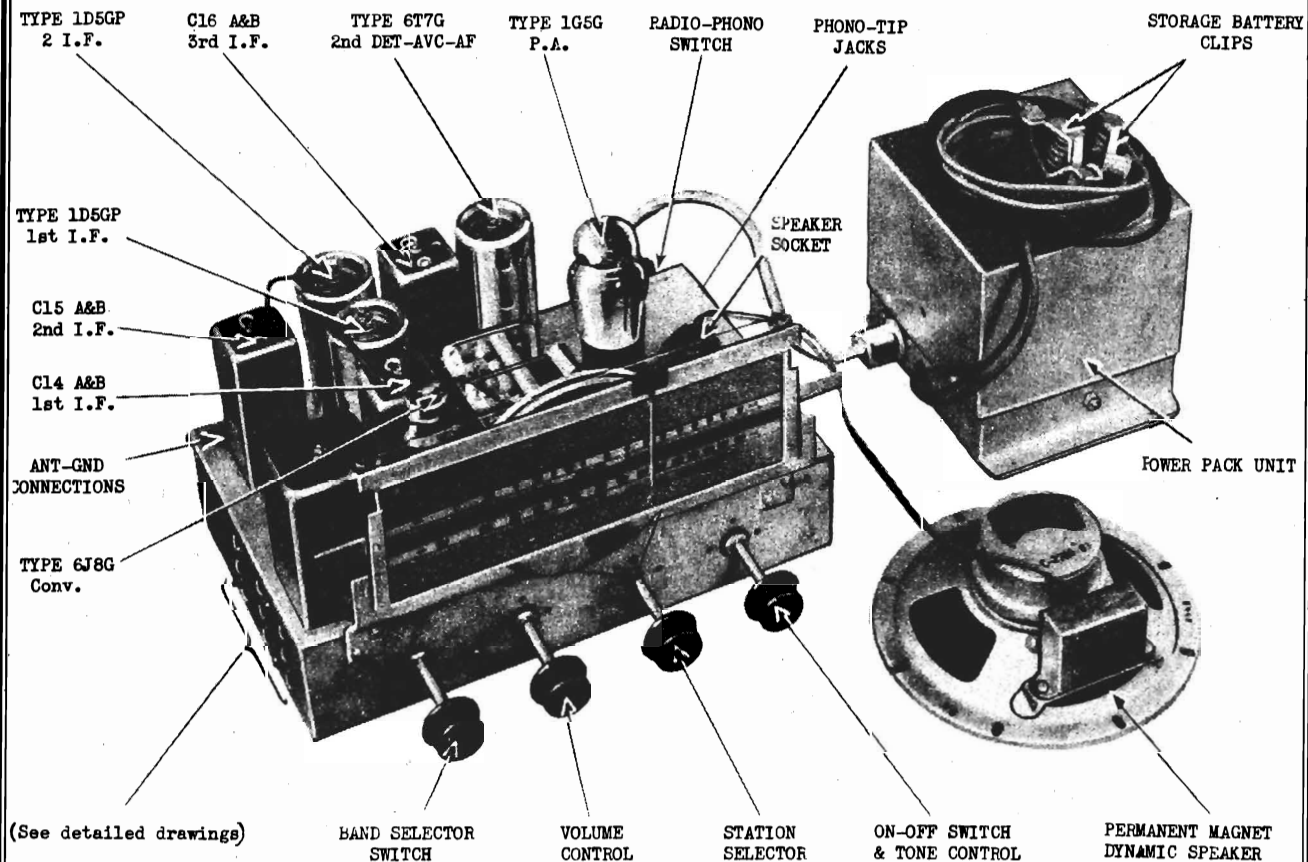
Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are - DC voltages.

*AC

A - 10 V. Scale

B - 25 V. Scale

C - 1 V. Scale

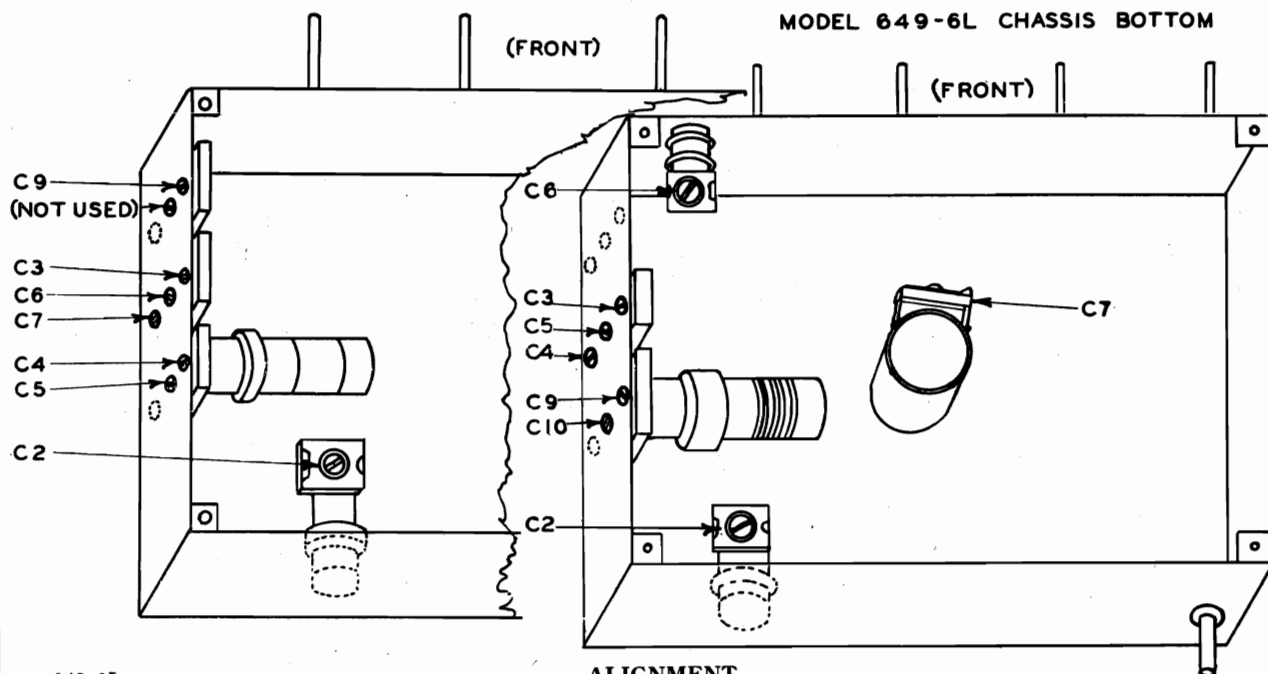


SPARKS WITHINGTON CO.

MODELS 649-6L, 649-6S
Alignment, Trimmers

MODEL 649-6S CHASSIS BOTTOM

MODEL 649-6L CHASSIS BOTTOM



649-6L

ALIGNMENT

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set dial pointer to last calibrated mark below 550 KC)							
2	I.F.	6J8G Grid Cap	.1 mf.	456 KC	BC	(Open)	C16 A&B C15 A&B C14 A&B	3rd I.F.T. 2nd I.F.T. 1st I.F.T.
3	Rejector	Ant.	200 mmf.	456 KC	BC	(Open)	C2	Adj. to minimum
4	Broad-cast Band	Ant.	200 mmf.	1500 KC	BC	1500 KC	C9 Osc. C6 Ant.	
5				600 KC	BC	600 KC	C10 Pad.	
6	(Repeat operation 4)							
7	(Check calibration and sensitivity at 600 KC, 1000 KC and 1500 KC)							
8	Long-Wave Band	Ant.	200 mmf.	400 KC	LW	400 KC	C4 Osc. C3 Ant.	
9				150 KC	LW	150 KC	C5 Pad.	
10	(Repeat operation 8)							
11	(Repeat operations 8, 9 and 10 if necessary, to insure accurate alignment)							
12	(Check calibration and sensitivity at 150 KC, 260 KC and 400 KC)							
13	Short Wave Band	Ant.	*	18 MC	SW	18 MC	C8 Osc. C7 Ant.	Rock dial
14	(Check calibration and sensitivity at 6 MC, 15 MC and 18 MC)							

* 200 mmf. condenser and 100 ohm non-inductive resistor in series.

649-6S

ALIGNMENT

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set dial pointer to last calibrated mark below 550 KC)							
2	I.F.	6J8G Grid Cap	.1 mf.	456 KC	BC	(Open)	C16 A&B C15 A&B C14 A&B	3rd I.F.T. 2nd I.F.T. 1st I.F.T.
3	Rejector	Ant.	200 mmf.	456 KC	BC	(Open)	C2	Adj. to minimum
4	Broad-cast Band	Ant.	200 mmf.	1500 KC	BC	1500 KC	C4 Osc. C3 Ant.	
5				600 KC	B.C.	600 KC	C5 Pad.	
6	(Repeat operation 4)							
7	(Check calibration and sensitivity at 600 KC, 1000 KC, & 1500 KC)							
8	1st short wave Band	Ant.	*	7.0 MC	1 SW	7.0 MC	C9 Osc. C6 Ant.	
9	(Check calibration and sensitivity at 2.5 MC, 4.0 MC & 7.0 MC)							
10	2nd SWband	Ant.	*	21.0 MC	2 SW	21.0 MC	C7 Ant.	**
11	(Check calibration and sensitivity at 7.0 MC, 15 MC & 21 MC)							

* 200 mmf. condenser and 100 ohm non-inductive resistor in series.

** Rock dial while trimming.

If dial reading is off calibration, some adjustment may be made by moving the oscillator condenser lead toward or away from the chassis base plate.

7. When all trimmers have been properly adjusted, replace Viso-dio tube and socket in clamp, replace type 6AG6 Discriminator tube and attach Selectrons to chassis. Mount chassis in front of cabinet.
8. Any of the six stations to which the SPARCON Selectrons have been adjusted may now be instantly changed to any other station by means of the buttons for the desired station with the Band Switch knob pushed in; that is, in the automatic position.
- Note: In case all six of the buttons should become depressed through improper manipulation of the buttons, simply reach into the Selectrons box (front of cabinet) and push the buttons back to the Viso-dio, and apply a slight pressure of the fingers under the latching bar which runs across the frame work in front of the trimmer box. This will immediately release all buttons.
- (MODEL 108-B/368-1508-01 ONLY)*
- NOTES: In case all six of the buttons should become depressed through improper manipulation of the buttons, simply reach into the Selectrons box and push the buttons back to the Viso-dio, and apply a slight pressure of the fingers to any one of the buttons. This will immediately release all buttons.
- WARNING - Never attempt to adjust the Selectrons with the 6AG6 Discriminator tube in the socket.

Unless the 8HG Discriminator tube is removed when the Selectron is adjusted, automatic frequency control will prevent correct trimmer adjustments, with the result that unsatisfactory reception of stations may occur. With the 8HG Discriminator tube left in the socket, automatic frequency control will bring in the station and close the Viso-glo before the trimmers have been completely adjusted.

IMPORTANT

Always check the discriminator circuit to see if it is in proper adjustment and adjust it if necessary before adjusting the Selectronne.

TO CHECK THE ADJUSTMENT OF THE DISCRIMINATOR
GAIN, turn the automatic frequency control
knob clockwise until the station which
normally has a strong station which will nearly
close the Vaso-Glo. Turn the A.F.C. knob to
the "On" position. WATCH THE VASO-GLO. Re-
peat the procedure from "Off" to "On" several
times. The Vaso-Glo should show the same posi-
tion. If there is any variation in the Vaso-
Glo, it is an indication that the Discrimina-
tor adjustment is not correct. The adjustment
should be made before any attempt is made to
adjust on the Selectrons.

IMPORTANT: The Type 6SG Discriminator tube must be in its socket when adjusting the discriminator circuit, and out of its socket when adjusting the Selectronne trimmers.

TO ADJUST THE DISCRIMINATOR CIRCUIT, it is necessary to access the chassis from the rear cabinet. Place the A.P.C. knob in the "Off" position and manually tune in a strong station so that the Visc-o knob closes as much as possible. Then switch the A.P.C. knob to the "On" position. Using an insulated (bakelite) screw-driver, turn the Discriminator circuit trimmer (see diagram on front of sheet) very slightly one way or the other until the station is just clear of the cutoff point. Switch the Visc-o knob to the "Off" position again. The Visc-o knob should show the same position. If it does not, adjust more accurately.

CAUTION - The blade of the screw driver positively must be an insulated (hatalite) one.

WARNING - Do not attempt to adjust the other trimmers. Only adjust the one shown in the diagram as "Discriminator Trimmer".

TIME 1938

- (A) These trimmers are provided for each one of the three stations. They are reached through the three holes arranged in rows one above the other in the back cover of the Selectronne.
- (B) In the back cover of the Selectronne.
- (C) Tune in the station in the usual way using manual tuning, watching the Vico-dio so that the manual will be perfectly tuned in.
- (D) Push in the band selector switch knob.
- (E) Push in the band selector switch knob. This will extinguish the dial lights and illuminate the Selectronne Indicator, showing that the Selectronne is now connected.
- (F) Turn the band selector switch knob to the desired station (indicated by the Vico-dio) to the automatic (Selectronne) position.
- (G) Push in the Selectronne button which corresponds to the station just tuned in.
- (H) Now from the back of the cabinet, with an ordinary screw-driver adjust the oscillator trimmer (center hole) in the row corresponding to the proper station, until the saw station that was heard in manually is heard. This station may be heard again until the remaining trimmers have been adjusted.

It is important that the same station is heard with this adjustment and not some other network station carrying the same program. Screw this trimmer to the right or left until the station is loudest.

Care should be taken in turning the adjusting screws so that they will not become disengaged from the trimmers by being turned out too far.

(F) In the same manner adjust first the R.F. trimmer (bottom hole) and then the antenna trimmer (top hole) to this same station.

Note: Perfect adjustment of these trimmers is easily obtained by removing the Visco-Alo tube and sockets from its clamp and turning the tube toward the back of the cabinet so that every adjustment of the trimmers may be watched in the Visco-Alo. Perfect adjustment is obtained when further turning of the trimmers will not result in any smaller shadowing of the trimmer than the green light section of the Visco-Alo.

CHOOFL 0618 ONLY

(5) In the same manner adjust to bulb base station.

NOTE: No Vico-Gic tube is supplied with this model. However, the chassis is wired for, and equipped with, a socket at the back of the chassis, for using a Type 6ES5. Operation of this tube will be more easily observed if an extension cable and socket (or right-angle adapter) is used when making tuning adjustments.

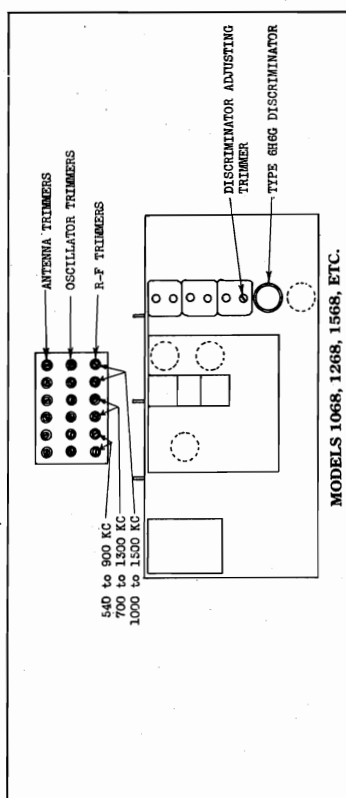
(g) Re-adjust the oscillator trimmer (bottom hole) while watching the Viso-Glo to see if the shaded area can be made smaller.

(h) Re-adjust the oscillator trimmer (center hole) while watching the Viso-Glo to see if the shaded area can be made smaller.

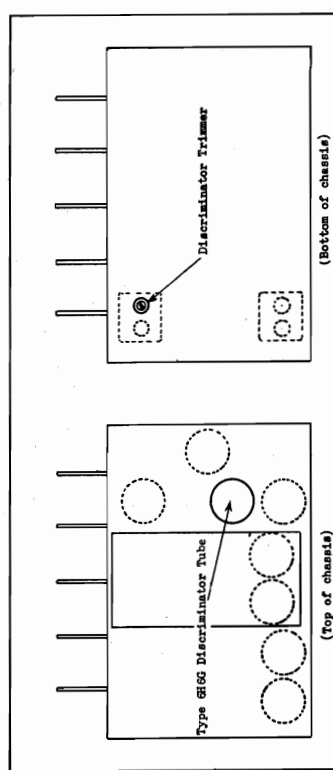
(H) Check the above adjustments by pulling the band switch knob up and without touching the manual tuning controls, observe if the Viso-glo shows any difference in the amount of shaded area in the tube as compared to the shaded area with the band switch knob pushed in. If the shaded area is larger with the band switch pushed in, readjust the Solactronne trimmers until the shaded area is equal to that obtained with the Band Switch knob pulled out.

6. Repeat the procedure in paragraph 5 for each of the six stations.

- For example: A station having a frequency of 110 kc. should be placed in the 540 to 560 kc. group, a station at 560 should be placed in the 560 to 580 kc. group, etc.
- MODEL SIXES ONLY**
- The six trims of the Selectrons are arranged in three groups according to frequency limits - 540 to 760 kc., 760 to 1250 kc. and 1100 to 1500 kc. (See illustration also back cover of Selectron). Each trim is also back coded to the Selectron. The Selectrons are arranged in the steel plants in the order of their broadcast stations which correspond to the frequency limits of each station so that the frim is in the frequency limits of the proper group.
- MODEL SEVENS ONLY**
- For example: A station having a frequency of 610 kc. should be placed in the 540 to 760 kc. group, a station at 760 should be placed in the 760 to 1250 kc. group, etc.
- Note: Each group has considerable overlap to allow for the selection of six stations which may have frequency allocations comparatively close together.
4. Remove type 8665 tube (Discriminator) from chassis (see illustration).
 5. Adjust Selectron trims for each one of the six stations as follows:



MODELS 1068, 1268, 1568, ETC.



CHASSIS DIAGRAM OF MODEL. 8618



MODEL 728X

Alignment, Trimmers
Socket, Chassis

SPARKS WITHINGTON CO.

MODEL 1089

Socket, Trimmers, Chassis

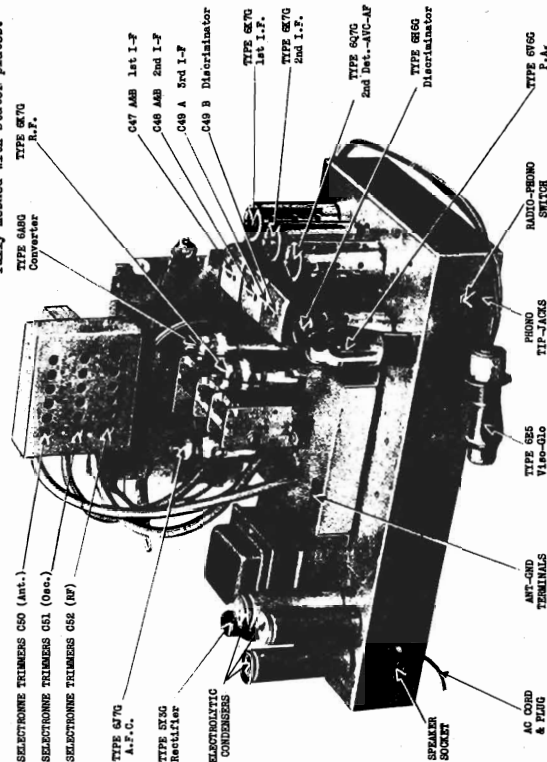
MODEL 728X ALIGNMENT (see note)									
OPER- ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS	
1	I.F.	Conv. Grid	.1 mf.	456	BC	Open	C35A C35B	2nd I.F. Trans.	
2	Broadcast Band	Ant.	200 mmf.	1500	BC	1500	C34A C34B	1st I.F. Trans.	
3		Ant.	200 mmf.	800	BC	800	C32	Ant.	
4		Ant.	200 mmf.	600	BC	600	C31	Pad	*
5									
6	Long Wave Band	Ant.	200 mmf.	400	L.W.	400	C39	Osc.	
7		Ant.	200 mmf.	400	L.W.	400	C38	RF	
8		Ant.	200 mmf.	150	L.W.	150	C37	Ant.	*
9	1st short wave band	Ant.	100 ohm 200 mmf. series	7 MC.	1st S.W.	7 MC.	C3	Osc.	
10		Ant.	100 ohm 200 mmf. series	7 MC.	1st S.W.	7 MC.	C6	RF	
11	2nd short wave band	Ant.	100 ohm 200 mmf. series	21 MC.	2nd S.W.	21 MC.	C10	Osc.	
12		Ant.	100 ohm 200 mmf. series	21 MC.	2nd S.W.	21 MC.	C7	RF	
13		Ant.	100 ohm 200 mmf. series	21 MC.	2nd S.W.	21 MC.	C4	Ant.	

NOTE: Check to see that dial pointer points to last calibrated mark on right hand side of dial when variable condenser rotor plates are fully meshed with stator plates.

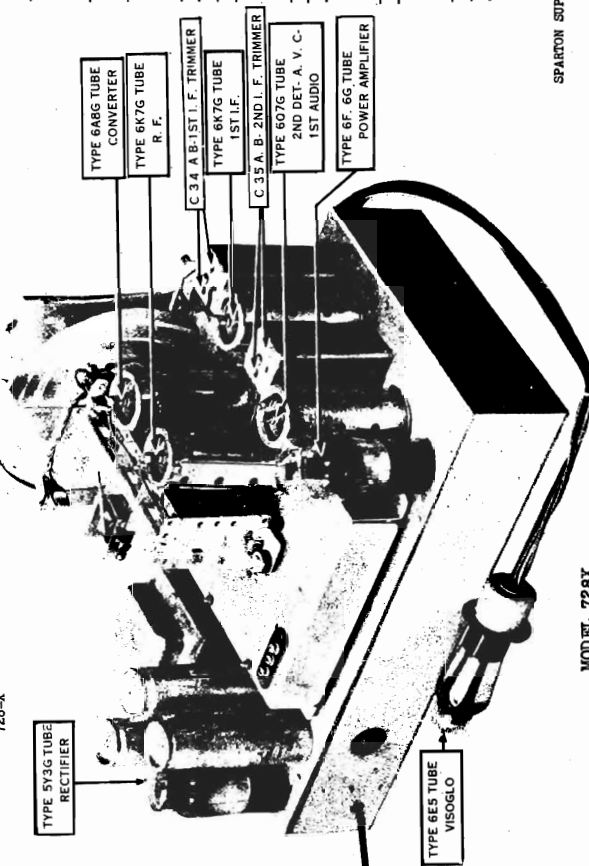
*Rock variable condenser slightly while adjusting for maximum output.

NOTE: Check to see that dial pointer points to last calibrated mark on right hand side of dial when variable condenser rotor plates are fully meshed with stator plates.

SPARTON SUPERHETERODYNE MODEL 1089



SPARTON SUPERHETERODYNE MODEL 728-X

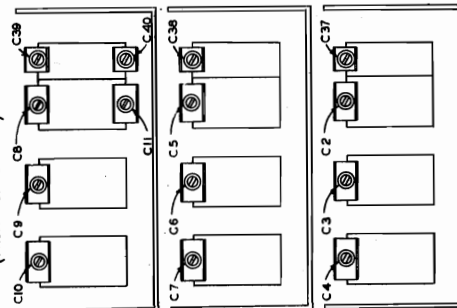


MODEL 728X

TRIMMER LOCATIONS

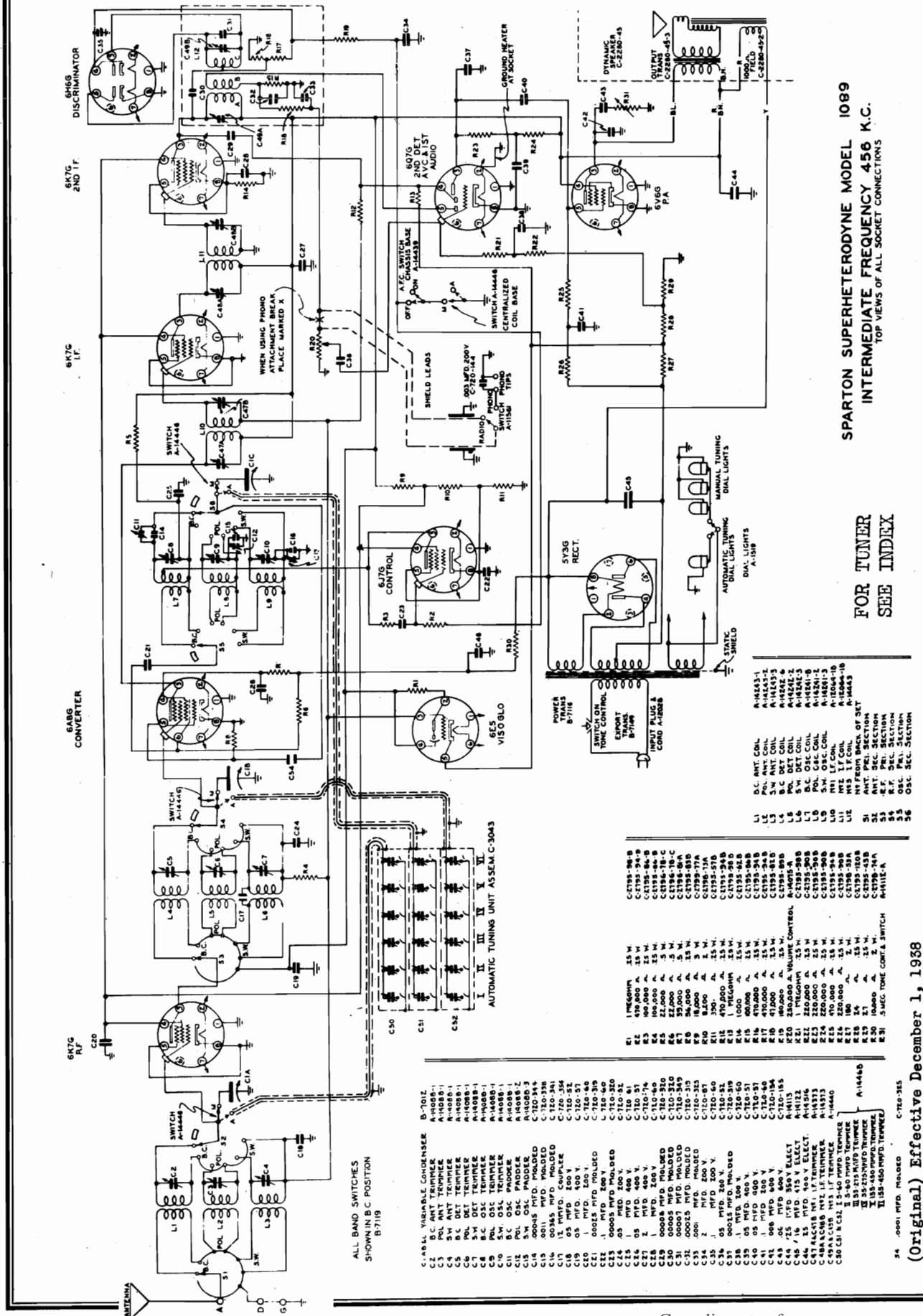
(under chassis)

(FRONT OF CHASSIS)



SPARTON SUPERHETERODYNE MODEL 1089
INTERMEDIATE FREQUENCY 456 K.C.
TOP VIEWS OF ALL SOCKET CONNECTIONS

FOR TUNER
SEE INDEX



(Original) Effective December 1, 1938

MODEL 1089

Voltage, Alignment
Trimmers

SPARKS WITHINGTON CO.

Viso-Glo tube in socket

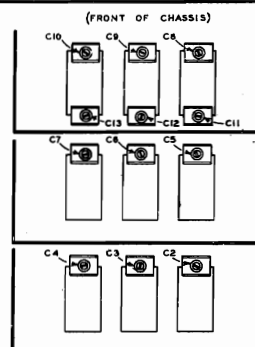
AFC Switch "OFF"

ALIGNMENT (see note)

OPER- ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	I.F.	Conv. Grid	.1 mf.	456	BC	Open	C47 A,B	1st I.F. Trans.
							C48 A,B	2nd I.F. Trans.
							C48 A	3rd I.F. (Pri.)
2	Discrim.	Conv. Grid	.1 mf.	456	BC	Open	C49 B	Adjust to minimum
3	Broadcast Band	Ant.	200 mmf.	1500	BC	1500	C8 Osc.	
							C5 RF	
							C2 Ant.	
4		Ant.	200 mmf.	600	BC	600	C11 Pad	
5	(Repeat operation 3)							
6	(Check calibration and sensitivity 1500 KC, 900 KC and 600 KC) *							
7	1st Short Wave	Ant.	100 ohm 200 mmf. series	6 MC.	1st S.W.	6 MC.	C9 Osc.	
							C6 RF	
							C3 Ant.	
8		Ant.	200 mmf.	1.95 MC.	1st S.W.	1.95 MC.	C12 Pad	
9	(Repeat operation 7)							
10	(Check calibration and sensitivity at 6 MC. and 1.95 MC.)							
11	2nd Short- Wave Band	Ant.	100 ohm 200 mmf. series	18 MC.	2nd S.W.	18 MC.	C10 Osc.	Rock dial slightly while adjusting
							C7 R.F.	
							C4 Ant.	
12		Ant.		6 MC.	2nd S.W.	6 MC.	C13 Pad	
13	(Repeat operation 11)							
14	(Check calibration and sensitivity at 18 MC. and 6 MC.)							
15	(Check operations 1 to 14 inclusive)							

* Check AFC by connecting generator to converter grid cap and tuning generator and receiver to 1500 KC. Note output meter reading with AFC switch "off". Switch AFC "on" and if output changes appreciably, touch up discriminator trimmer until there is no change in sensitivity.

NOTE: Check to see that dial pointer is parallel to horizontal lines on dial when variable condenser rotor plates are fully meshed with stator plates.

TRIMMER LOCATIONS
(under chassis)

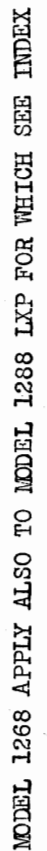
VOLTAGE CHART

Line Voltage: 115 volts

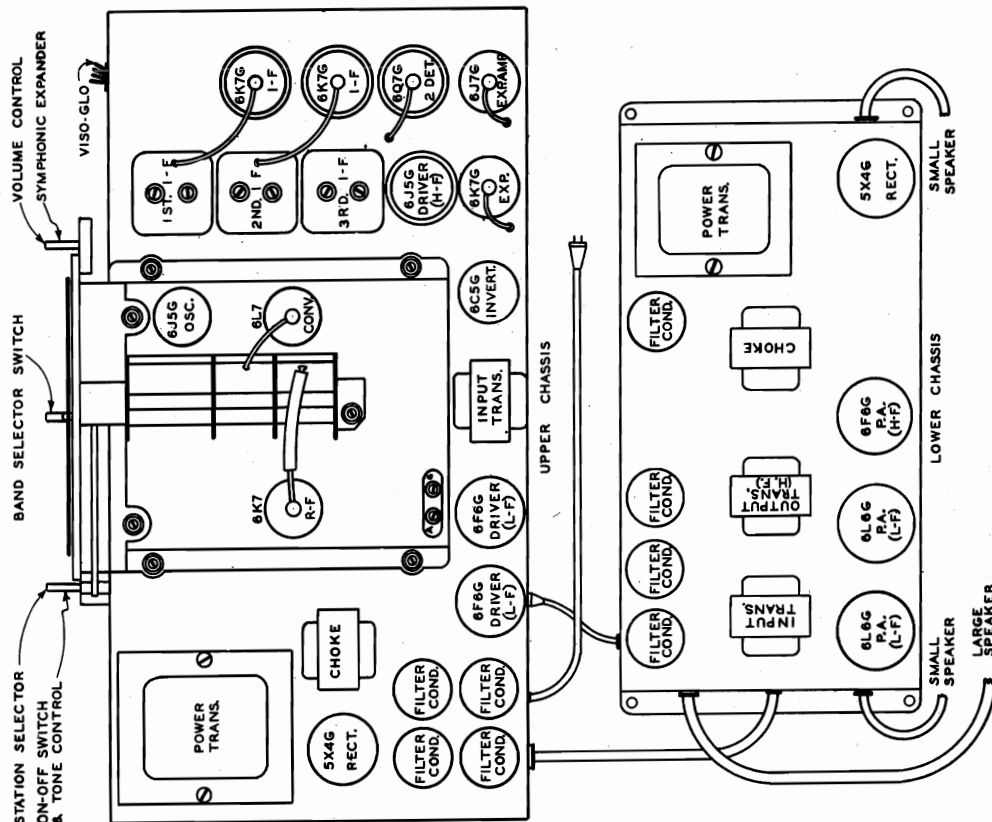
Position of Volume Control: Full with Antenna Disconnected

Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7*	No. 8	Grid Cap
6K7G	R.F.	0	0	300	75	0	-	6.3	0	-.2
6A8G	Converter	0	0	300	91	-5.5	135	6.3	0	-.2
6K7G	I.F.	0	0	300	75	0	-	6.3	0	-2.6
6K7G	2nd I.F.	0	0	300	75	4	-	6.3	4.1	0
6H6G	Discriminator	0	0	.5	0	.5	-	6.3	0	-
6J7G	A.F.C.	0	0	300	85	4.5	-	6.3	4.4	0
6Q7G	2nd Det. AVC-1st audio	0	0	100	-.2	-.1	-	6.3	0	0
6V6G	P.A.	0	0	275	290	.5	.6	6.3	0	-
5Y3G	Rect.	-	350*	-	350*	-	350*	-	350*	-
6E5	Viso-Glo	6.3	50	-3	280	-4	0	-	-	-

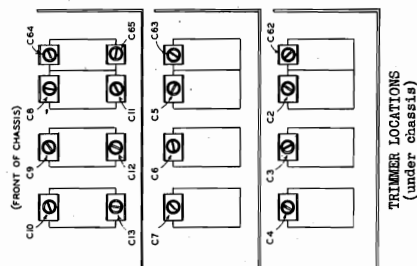
Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.



Model 1867



OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	I. F.	Conv. Grid	.1 mf.	456	BC	Open	C30 A,B	1st I. F. Transformer
2	Discrim.	Conv. Grid	.1 mf.	456	BC	Open	C31 A,B	2nd I. F. Transformer
3	Broadcast Band	Ant.	200 mmf.	1500	BC	1500 C5 RF	C35A	3rd I. F. Trans. (Pri.)
4							C35B	Adjust for minimum
5							C8 Osc.	
6							C2 Ant.	
7							C11 Pad	**
8								
9								
10	1st Short-Wave Band	Ant.	200 mmf.	150	L.W.	150	C65 Pad	**
11								
12								
13								
14	2nd Short Wave Band	Ant.	200 mmf.	18 MC.	2nd S.W.	18 MC.	C7 RF	**
15								
16								
17								
18								

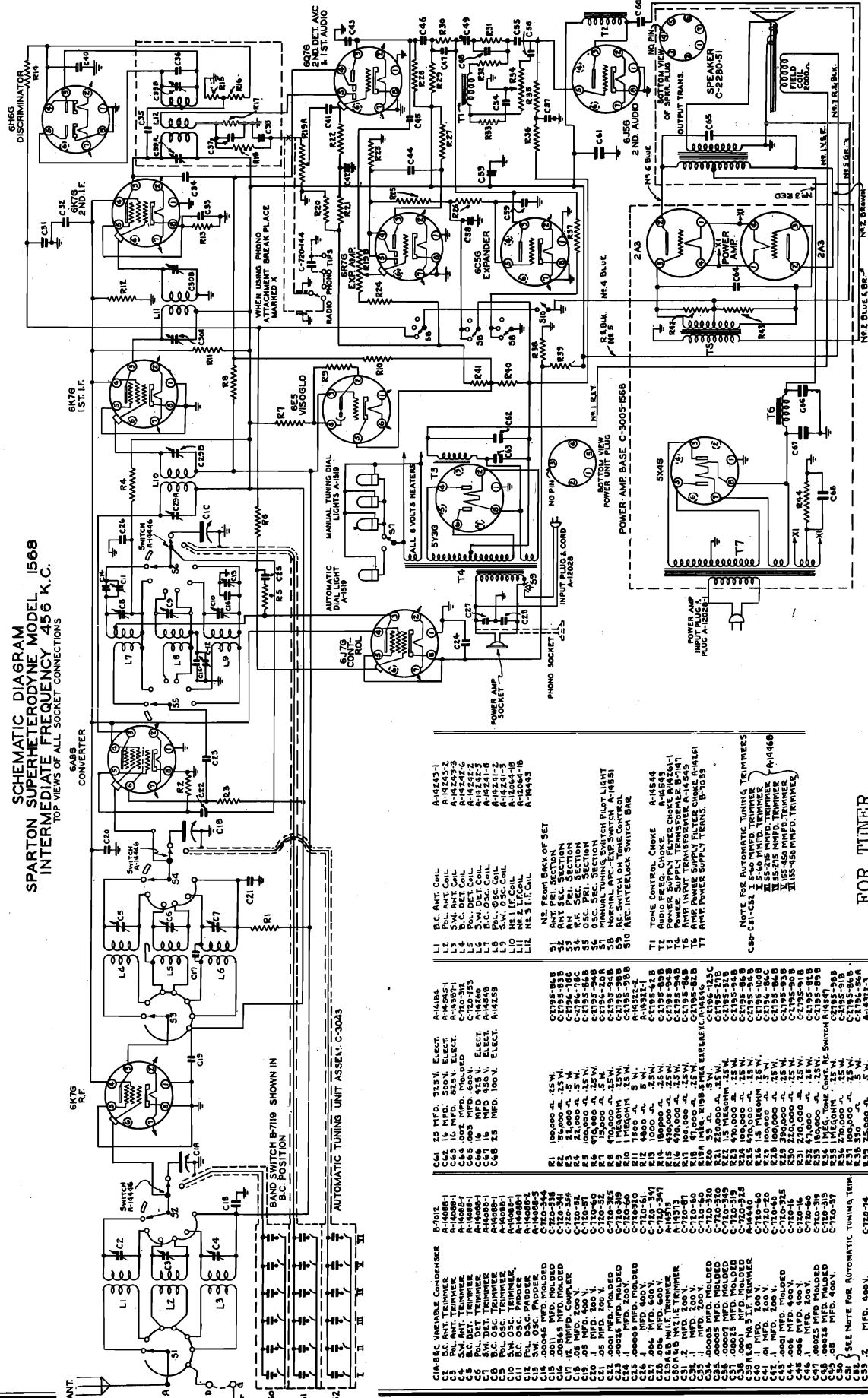


- * Check AFC by connecting generator to converter grid and tuning generator and reactor to 1500 KC. Note motor and read with AFC switch "off". Switch AFC "on" and if output changes appreciably, touch up discriminator trimmer until there is no change in sensitivity.
- * Rock variable condenser slightly while adjusting for maximum output.

NOTE: Check to see that dial pointer is parallel to horizontal lines on dial when variable condenser rotor plates are fully meshed with stator plates.

(Original) Effective Jan. 2, 1938

SCHEMATIC DIAGRAM
SPARTON SUPERHETERODYNE MODEL 1568
INTERMEDIATE FREQUENCY 456 K.C.



FOR TUNER
SEE INDEX

(Original) Effective Jan. 2, 1938

Early, Late Productions
Voltage

SPARKS WITHINGTON CO.

(SERIAL NO. 000001 to 000750 INCLUSIVE)

MODEL 1867

Below Ser. 000751

Schematic Changes

The Schematic Diagram for the SPARTON Models 1867 (Serial Numbers 000001 to 000750 inclusive) is the same as shown except for the three general circuit changes as noted below:

(1) Change in Tone Control circuit as in Fig. 1.

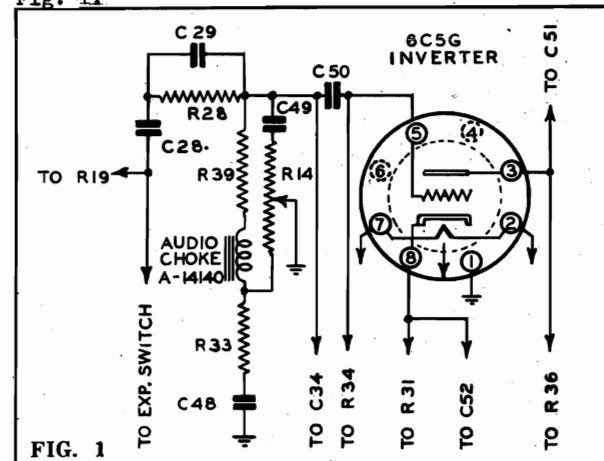


FIG. 1

(1) DETAILS OF TONE CONTROL to conform to schematic

Resistor R39 (27000 ohms .25 w.) removed
Resistor R33 (100000 ohms .25 w.) removed
Audio choke (A-14140) removed

Resistor R65 (180000 ohms .25 w.) added
Resistor R66 (470000 ohms .25 w.) added
Condenser C85 (.02 mf. 200 v.) added

(Change in circuit as in Fig. 1) VOLTAGE TABLE

Line Voltage: 110 volts
Symphonic Expander Control: Off

FOR EARLY
AND LATE
MODELS

Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast

Tube	Function	Voltage of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram)								
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8	Grid Cap
6K7	R-F Amplifier	0	6	272	117	0	-	0	0	0
6L7	Converter	0	6	260	140	-35	0	0	0	0
6J5G	Oscillator	0	6	260	0	0	0	0	0	-
6K7G	First I-F Amplifier	0	6	270	110	0	0	0	0	0
6K7G	Second I-F Amplifier	0	6	280	121	0	0	0	0	0
6Q7G	Det-AVC-First A-F Amplifier	0	6	200	0	0	0	0	0	0
6J7G	Expander Amplifier	0	6	9	16	0	0	0	0	0
6K7G	Symphonic Expander	0	6	1.2	97	.25	90	0	92	90
6C5G	Inverter	0	6	233	265	0	0	0	0	-
6J5G	Driver (High Frequency)	0	6	235	0	0	0	0	0	-
(2) 6F6G	Driver (Low Frequency)	0	6	250	250	0	0	0	13	-
5X4G	Rectifier (Upper Chassis)	0	0	375	0	375	0	.02	5.2	-
6E5	Viso-Glo	6	1.4	0	265	0	0	-	-	-
6F6G	Power Amplifier (High Frequency)	0	0	280	280	0	0	6.3	0	-
(2) 6L6G	Power Amplifier (Low Frequency)	0	0	395	305	0	0	6.3	16.5	-
5X4G	Rectifier (Lower Chassis)	0	0	380	0	380	0	5.2	.1	-

Notes: Voltage readings are for schematic diagram. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits except as noted below. All measurements made with Weston Selective Analyzer No. 665, Type 2.

1 10 volts A-C

2 250 volts D-C

3 5 volts D-C

4 25 volts D-C

(2) Change in Cathode Resistor Network of Type 6F6G High Frequency Power Amplifier as in Fig. 2.

(3) Change in Bias Resistor of Type 6K7G 1st. I-F Amplifier.

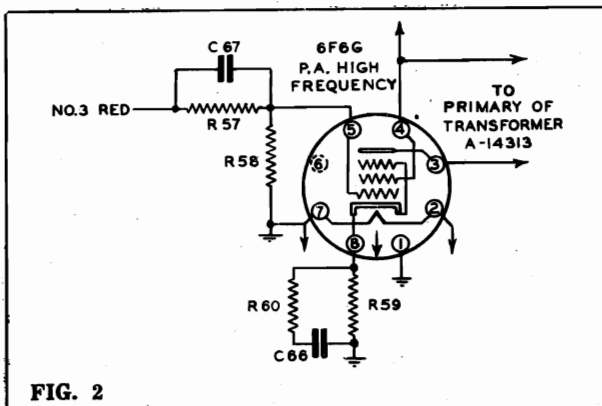


FIG. 2

(2) DETAILS OF RESISTOR NETWORK change in Cathode of Type 6F6G High Frequency Power Amplifier:

Resistor R60 (180 ohms .25 w.) removed.

(3) DETAILS OF BIAS RESISTOR change in Type 6K7G 1st. I-F Amplifier:

Substitute R56 1200 ohm .5 w. resistor (C-2796-63C) in place of 10000 ohm .5 w. resistor (C-2796-74C).

MODEL 1867

Alignment

Trimmers

SPARKS WITHINGTON CO.

This type of mis-alignment may also be detected by tuning the test oscillator to a frequency of 15 megacycles and the station selector to approximately 15,900 kilocycles. If a strong signal is found approximately at this frequency, it indicates that the band has been adjusted to the image frequency. The normal image frequency for 15 megacycles or 15,000 kilocycles would be 15,000 kilocycles minus twice 456 kilocycles or approximately 14,100 kilocycles. Therefore a signal of this frequency may be found with the test oscillator generating a 15 megacycle signal.

G. Alignment of Ultra High-Frequency Band

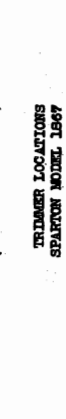
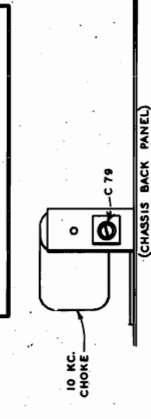
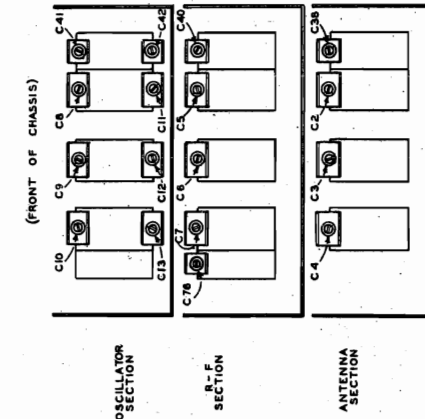
(1) Turn the band selector switch to the ultra high frequency band (tan diamond illuminated).

(2) Tune test oscillator and receiver to 50 megacycles and adjust condenser C76 (R-F trimmer).

(3) Check operation of receiver at 20 megacycles.

(Condenser C76 is the only adjustment in the ultra high frequency band).

CAUTION: All adjustments should be re-checked to assure accuracy and stability of adjustment and calibration.



10 KC. CHOKES
(CHASSIS BACK PANEL)
TRIMMER LOCATIONS
SPARTON MODEL 1867

(4) Return test oscillator and receiver to 345 kilocycles and check the adjustments of condensers C41, C40 and C38.

E. Alignment of 1st. Short-Wave Band

(1) Turn band selector switch to the 1st short-wave band (red diamond illuminated).

(2) Tune test oscillator and receiver to 6 megacycles and check the adjustments of condensers C9, C8 and C5.

(3) Turn test oscillator and receiver to 1.95 megacycles and adjust condenser C12 (oscillator trimmer).

(4) Return test oscillator and receiver to 6 megacycles and check the adjustments of condensers C9, C8 and C5.

(5) Tune test oscillator and receiver to 1.95 megacycles and adjust condenser C12 (oscillator trimmer).

(6) Return test oscillator and receiver to 6 megacycles and check the adjustments of condensers C9, C8 and C5.

F. Alignment of 2nd Short-Wave Band

(1) Connect the 100 ohm non-inductive dummy antenna resistor in series with the 200 mf. condenser connected between the test oscillator "antenna" lead and the grid cap of the 6J7 converter tube.

(2) Turn the band selector switch to the 2nd short-wave band (blue diamond illuminated).

(3) Tune test oscillator and receiver to 18 megacycles and adjust the following condensers in the order given:

C10 - Oscillator trimmer

C7 - R-F trimmer

C4 - Ant. trimmer

(4) Tune test oscillator and receiver to 6 megacycles and adjust condenser C15 (oscillator trimmer).

(5) Return test oscillator and receiver to 18 megacycles and check adjustments of condensers C10, C7 and C4.

CAUTION: To obtain the best sensitivity at 18 megacycles on this band, the dial should be turned back and forth slightly while adjusting the antenna and R-F trimmers.

CAUTION: On this band care must be taken to adjust the various condensers to the fundamental of the signal and not the image. The image signal is equal to the fundamental minus twice the intermediate frequency of the receiver. A set that is adjusted to the image frequency instead of to the fundamental may be detected by tuning over the band and checking the sensitivity at various points. If a dead spot appears near the center of the band, the adjustable condensers for that band have probably been adjusted to the image instead of the fundamental.

(4) Return test oscillator and receiver to 1500 kilocycles and check the adjustments of condensers C9, C8 and C5.

(5) Calibration of the broadcast band should also be checked at 900 kilocycles and 600 kilocycles.

NOTE: The operation of the expansion circuit may be checked at this point as follows:

(6) Tune test oscillator and receiver to 1500 kilocycles.

(7) Turn volume control of receiver to low volume position, and turn attenuator of test oscillator so that oscillator is delivering maximum output.

(8) Turn expander switch on. Watch output meter carefully and turn volume control of receiver to a point where about half scale deflection is obtained. The output reading should continue to increase for a few moments after the receiver volume control has stopped turning.

C. Alignment of 10 KC. Filter

NOTE: The purpose of this filter circuit is to eliminate the 10,000 cycle note caused by the beating of any two stations operating simultaneously on adjacent channels. It is very important that this filter circuit be adjusted to exactly 10,000 cycles, otherwise the very purpose of the filter is defeated.

(1) Connect output meter from plate of Type 6F6G high-frequency power output tube to ground.

(2) Connect lead from audio oscillator to grid cap of Type 6J7G 2nd det. tube.

(3) Turn receiver volume control to the off position and set tone control to give a convenient deflection on the output meter.

(4) Adjust condenser C79 (mounted directly in back of the Antenna Coil Section shield) so that minimum deflection of the output meter is obtained.

D. Alignment of Long-Wave Band

(1) Turn the band selector switch to the long wave position (yellow diamond illuminated).

(2) Tune test oscillator and receiver to 345 kilocycles and adjust the following condensers in the order given:

C41 - Oscillator trimmer

C40 - R-F trimmer

C38 - Ant. trimmer

(3) Tune test oscillator and receiver to 1500 kilocycles and adjust condenser C42 (oscillator trimmer).

STEP BY STEP PROCEDURE

NOTE: For proper alignment of these chassis, the procedure should be followed in the same order as given. The dial pointer should be exactly parallel with the horizontal line of the kilocycle scale when the condenser plates are fully meshed. If the pointer does not read correctly, loosen the set screw holding the pointer, hold the rotor plates fully meshed with the stator plates and set the pointer so that it is parallel with the horizontal lines on the kilocycle scale, then tighten the set screw.

A. Alignment of Intermediate-Frequency Stages

(1) Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.

(2) Turn the band selector switch to the Broadcast position (with white diamond illuminated) and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.

(3) Connect "antenna" of test oscillator to the grid cap of Type 6J7 converter tube and "ground" of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate of Type 6L6G Low-Frequency power output tube to ground. NOTE: It is advisable to read carefully the operating instructions included with the test oscillator.

(4) Tune test oscillator to obtain a signal of 456 kilocycles.

(5) Turn tone control to low note (base) position.

(6) Turn expander control to "off" position.

(7) Turn volume control of receiver on full and adjust I-F trimmers C81, C82 and C85 which are reached from the top of the chassis.

NOTE: The intermediate frequency circuits are quite selective and care must be taken to insure proper adjustment.

B. Alignment of Broadcast Band

(1) Disconnect "antenna" lead of test oscillator from grid cap of converter tube and connect in series with a 200 mf. condenser dummy antenna to the antenna terminal of the chassis.

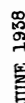
(2) Tune receiver and test oscillator to a frequency of 1500 kilocycles and adjust the following condensers in the order given:

C9 - Oscillator trimmer

C5 - R-F trimmer

C2 - Ant. trimmer

(3) Tune test oscillator and receiver to 600 kilocycles and adjust condenser C11 (oscillator trimmer).



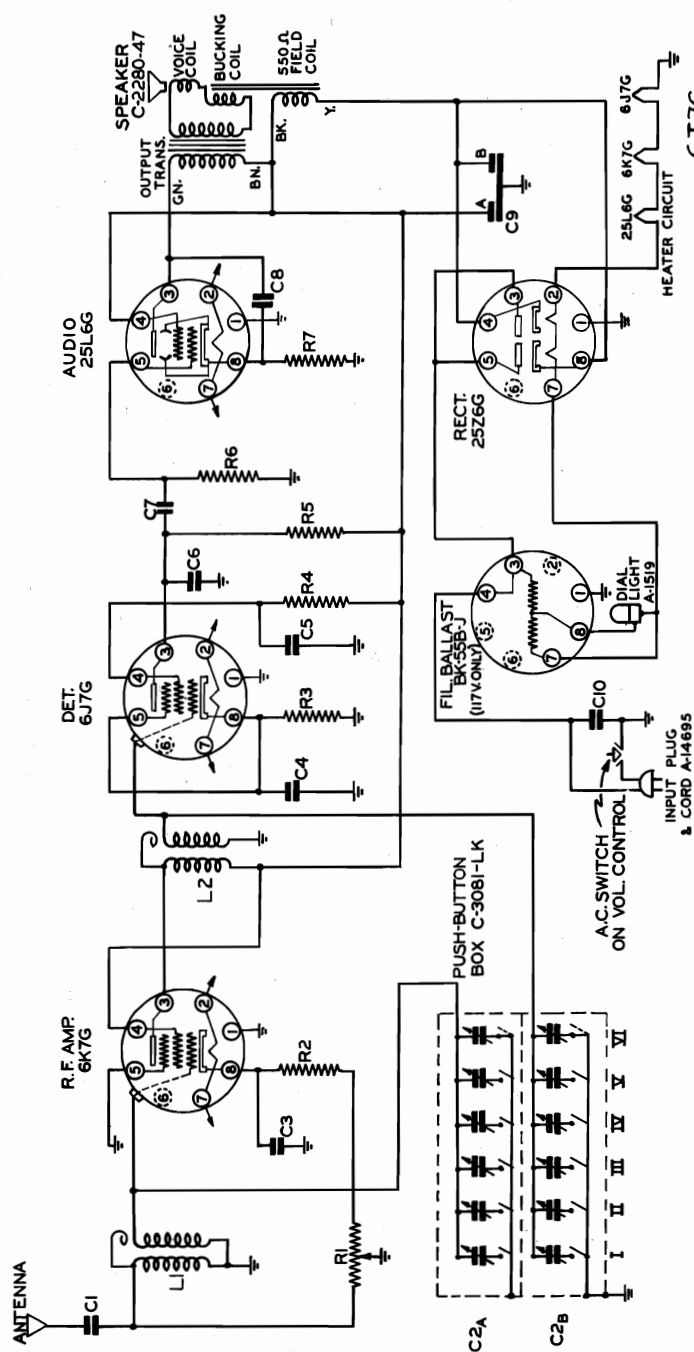
MODEL 5018

Schematic, Voltage
Alignment, Chassis

SPARKS WITHINGTON CO.

ALIGNMENT

OPER- ATION	ALIGNMENT OF TRIMMERS	PUSH BUTTON NO.	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY
1	R.F. & Det.	1	Ant.	200 mmf.	1500 kc.
2	R.F. & Det.	2	Ant.	200 mmf.	1400 kc.
3	R.F. & Det.	5 or 4	Ant.	200 mmf.	1000 kc.
4	R.F. & Det.	5 or 6	Ant.	200 mmf.	600 kc.
5	(Check operations 1 to 4 inclusive)				



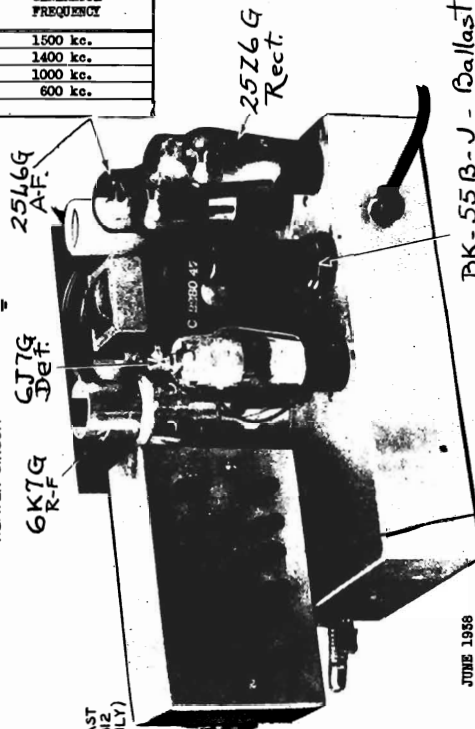
RI 50,000 Ω VOL. CONTROL A-14855
 R2 330 Ω .25 W C-2795-56B
 R3 27,000 Ω .25 W C-2795-79B
 R4 6.2 MEGOHM .25 W C-2795-250B
 R5 510,000 Ω .25 W C-2795-224B
 R6 560,000 Ω .25 W C-2795-95B
 R7 150 Ω .5 W C-2796-52C
 C1 .001 MFD. 400 V C-3204-2C
 C2-A & B PUSH-BUTTON TRIMMERS
 I-II 75-350 MMF. TRIM. B-7199-SSK
 III 35-290 MMF. TRIM. B-7199-GKK
 IV 12-140 MMF. TRIM. B-7199-AAK
 C3 .02 MFD. 200 V C-3202-22C
 C4 10 MFD. 25 V A-14782
 C5 .01 MFD. 200 V C-3202-20C
 C6 250 MMF. MOLDED C-720-324
 C7 .003 MFD. 200 V C-3202-6C
 C8 .03 MFD. 400 V C-3204-80C
 C9-A & B 25-25 MFD. ELECT. A-14691
 C10 .05 MFD. 400 V C-3204-28C

L1 ANTENNA COIL A-14663
 L2 R.F. COIL A-14664

VOLTAGE CHART

Line Voltage: 115 volts		Position of Volume Control: Full with Antenna Disconnected							
Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)							
No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap	
6K7G	R.F.	0	6	102	102	0	0	5	0
6J7G	Det.	0	12	2.5	0	5	6	1.5	0
25L6G	Power Amp.	0	56	80	102	0	12	7	-
25Z6G	Rect.	0	60	115	134	115	56	134	-
BK-168-B12	Ballast	0	-	115	115	-	0	55	60

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% ± or - 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. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.

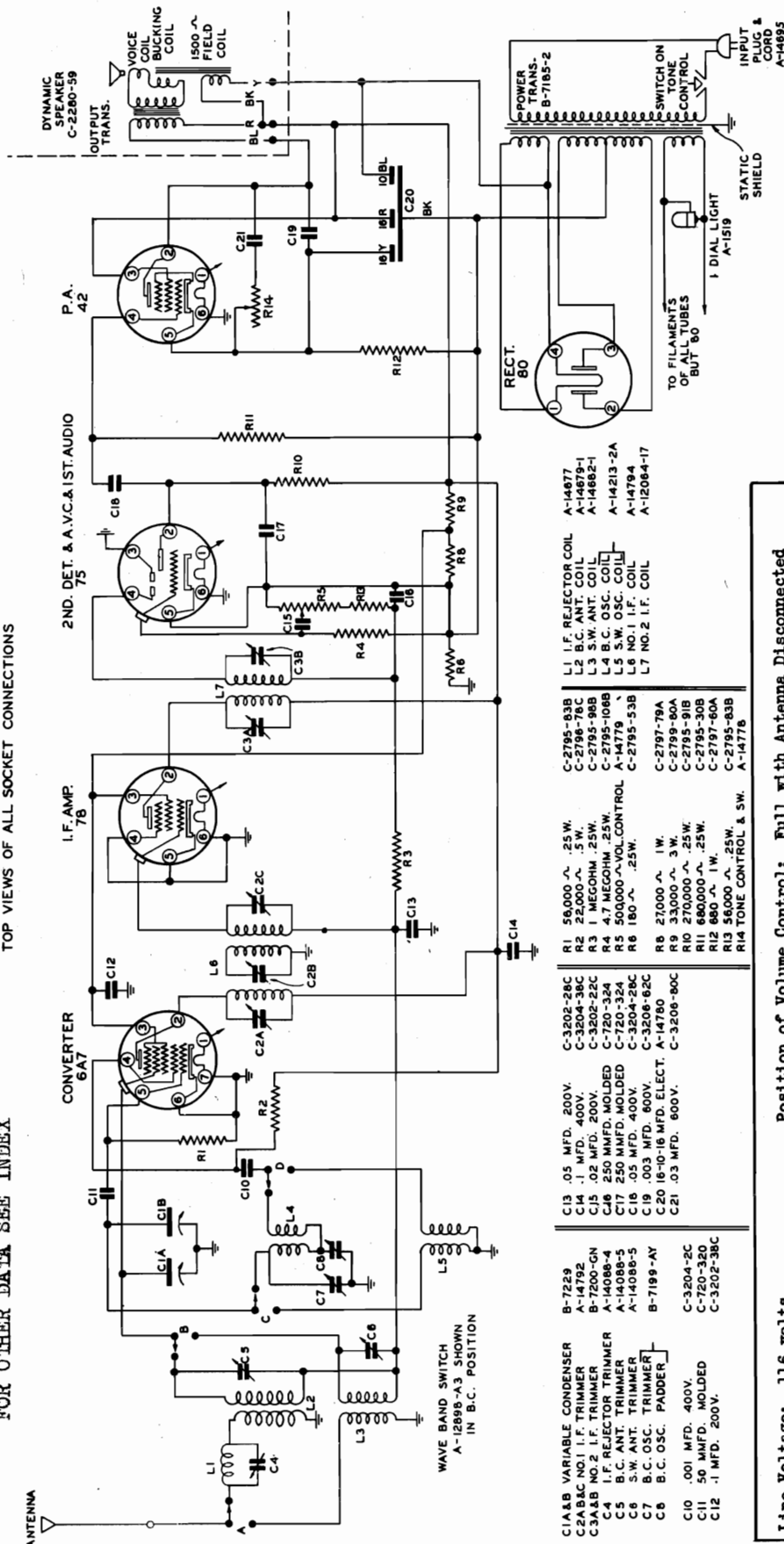


JUNE 1938

SPARKS WITHINGTON CO.

MODEL 5218
Schematic, Voltage
TrimmersSCHEMATIC DIAGRAM
SPARTON SUPERHETERODYNE MODEL 5218
INTERMEDIATE FREQUENCY 456 K.C.
TOP VIEWS OF ALL SOCKET CONNECTIONS

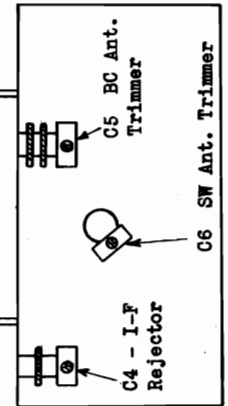
FOR OTHER DATA SEE INDEX



Position of Volume Control: Full with Antenna Disconnected

Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
6A7	Converter	6.2	252	17	225	-4.5	0	0	0
78	I.F. Amp.	6.2	252	17	0	0	0	-	0
75	2nd Det. AVC-Audio	6.2	65	0	-2	-3	0	-	-2
42	P.A.	6.2	240	258	0	22	0	-	-
80	Rectifier	570	500	500	570	-	-	-	-

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - 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. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.



TRIMMER LOCATIONS UNDER CHASSIS

MODEL 5218
Alignment, Tuner
MODELS 6218, 7618
Voltage, Alignment
Tuner

SPARKS WITHINGTON CO.

HOW TO ADJUST THE SPARTON SELECTRONNE IN THE MODELS

5218 6218 7618

1. Select six favorite nearby broadcast stations and detach the corresponding call letter tabs from the station call letter tab sheets.
2. Remove the Selectronne escutcheon plate from the front of the cabinet by means of the two screws and insert the station call letter tabs. Any tab may be used for any button, but it is usually more convenient for the operator if the tabs are arranged in sequence so that the tab for the lowest frequency station (station having lowest number of kilocycles (K.C.)) will be at the extreme left.
3. Using a small screwdriver or other tool that will fit the slot in the end of the button, push the button in as far as it will go and turn to the right or left until the dial pointer has moved to

the desired station frequency. Be sure the button is pushed all the way in and the station is tuned in accurately.

4. Repeat the procedure in paragraph 3 for each of the remaining five buttons.

5. Check all buttons by pushing them in, one at a time, to determine whether desired stations are tuned properly.

6. Replace Selectronne escutcheon.

7. Any of the six stations to which the SPARTON Selectronne has been adjusted may now be received simply by pushing the Selectronne button for the desired station.

Model 6218, 7618

VOLTAGE CHART

Line Voltage: 115 volts		Position of Volume Control: Full with Antenna Disconnected								
Tube	Function	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
6A7	Converter	6.1	250	60	150	-9	0	0	-	0
78	I.F. Amp.	6.1	250	60	0	0	0	-	-	0
75	2nd Det. AVC-Audio	6.1	37	0	-5	-1.5	0	-	-	-.7
76	Driver	6.1	250	0	10	0	-	-	-	-
6AC5G	P.A.	0	0	225	0	10	0	6.1	-	-
80	Rectifier	325	270	270	325	-	-	-	-	-
6E5	Viso-Glo	6.1	50	.2	230	5	0	-	-	-

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - 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. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
The Viso-Glo 6E5 is not used on Model 6218.

Models 5218; 6218, 7618.

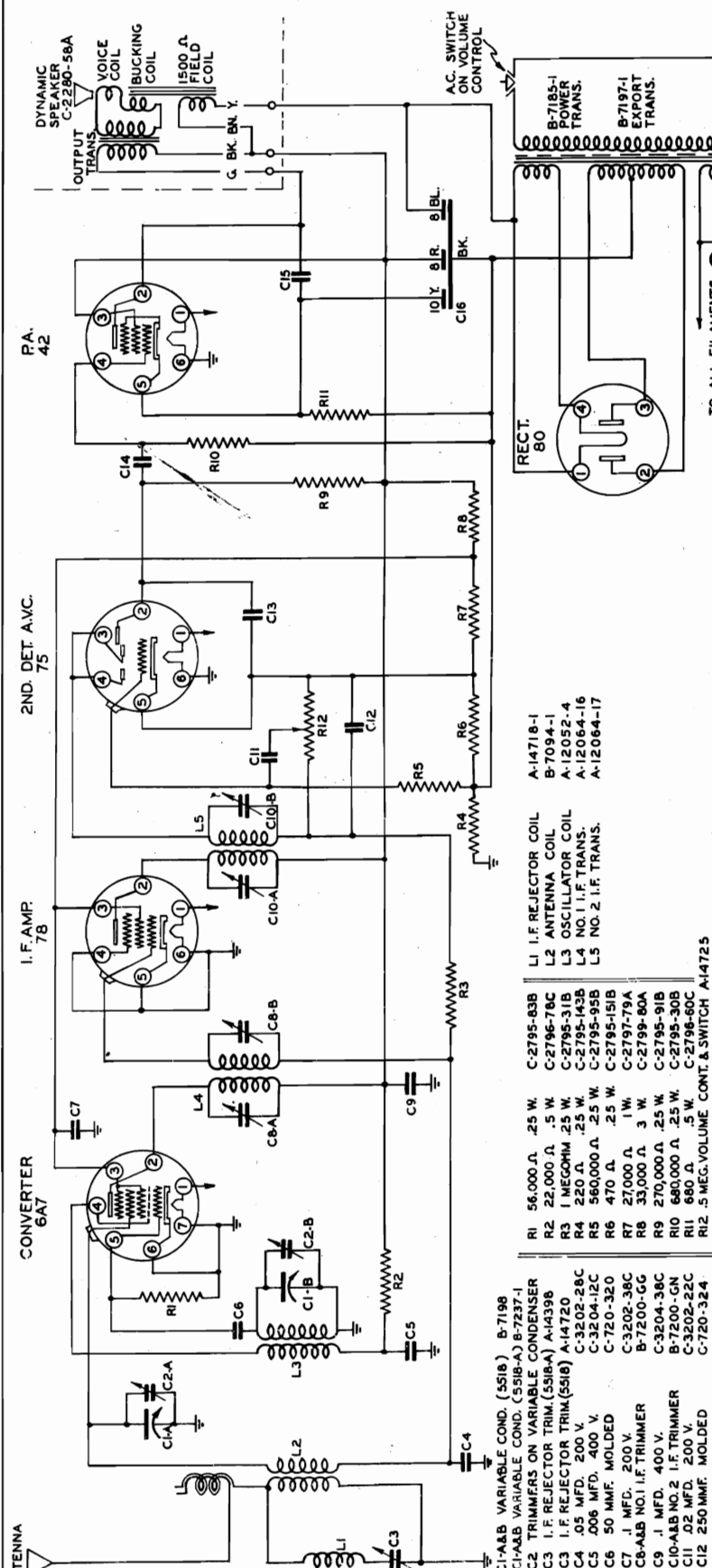
ALIGNMENT

OPER- ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set dial pointer to last mark on scale when condenser plates are flush)							
2	I.F.	6A7 Grid	.1 mf.	456 KC	BC	Open	C5A,B;C2A,B,C	Adjust to approx. peak
3							C2B (Transfer)	Detune by tightening $\frac{1}{2}$ t.
4							C5A,B;C2A,C	Peak accurately
5							C2B	Peak accurately*
6	Rejector	Ant.	200 mmf.	456 KC	BC	Open	C4	Adjust to minimum
7	Broad- cast Band	Ant.	200 mmf.	1500 KC	BC	1500 KC	C7 BC osc trim	Peak accurately
8				600 KC	BC	600 KC	C5 BC anttrim	Peak accurately
9							C8 BC osc pad	Peak accurately
10	(Repeat operations 7 and 8)							
11	(Check calibration and sensitivity at 600 KC, 1000 KC and 1500 KC)							
12	S.W. Band	Ant.	*	18 MC	SW	18 MC	C6 SW anttrim	**
13	(Check calibration and sensitivity at 6.0 MC and 18 MC)							
14	(Check operations 1 to 13 inclusive)							

*100 ohm non-inductive resistor and 200 mmf. condenser in series.

**Rock dial while making this adjustment. Make certain that adjustment is made on fundamental signal and not on image. Peak accurately.

SPARKS WITHINGTON CO.

MODELS 5518, 5518A, 5518AX
Schematic, Voltage

SCHEMATIC DIAGRAM SPARTON SUPERHETERODYNE MODEL INTERMEDIATE FREQUENCY 456 K.C.

VOLTAGE CHART TOP VIEW OF ALL SOCKET CONNECTIONS

Tube	Function	Position of Volume Control: Full with Antenna Disconnected							
		Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram)							
No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap	
6A7	250	69	170	-12	0	0	-	0	
78	250	69	0	0	0	0	-	0	
75	89	-1.4	-1.4	-1.4	0	0	-	1.1	
42	225	250	0	17	0	0	-	-	
80	350	300	350	-	-	-	-	-	

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - 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. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.

NOTE: Model 5518 has 6 push-buttons only -- no manual tuning. Models 5518A and 5518AX have 4 push-buttons and manual tuning. The same chassis is used in all three models with the exceptions as noted in the parts list.

JUNE 1938

MODELS 5518, 5518A
5518AX

SPARKS WITHINGTON CO.

Alignment, Chassis, Trimmers

MODELS 5518A, 5518AX

Tuner Data

ALIGNMENT

OPER- ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set dial pointer to end of scale with condenser gang closed)						
2	I.F.	6A7 Grid	.1 mf.	456	Closed	C10 A,B C8 A,B	(2nd I.F.) (1st I.F.)
3	Rejector	Ant.	150 mmf.	456	Closed	C3	Adjust to min.
4	Broadcast Band	Ant.	150 mmf.	1500	1500	C2 A Ant. C2 B Osc.	
5	(Check for dial reading and sensitivity at 600 kc., 1000 kc.)						
6	(Check operations 1 to 5 inclusive)						

1. Select four favorite nearby broadcast stations and detach the corresponding call letter tabs from the station call letter tab sheets.

2. The tabs should be inserted in the ends of the knobs. For convenience it is recommended that the call letter tabs be arranged in sequence so that the tab for the station having the highest frequency (greatest number of kilocycles (k.c.)) will be at the extreme left. This, however, is not vital, since the Selectronne will operate with any arrangement of the tabs.

3. TO ADJUST SELECTRONNE BUTTONS, loosen selected button by turning one-half turn to left (counter-clockwise). Push this loosened button in as far as it will go, and while in this position, tune in manually the station desired or indicated by tab in end of this loosened button.

Then, with the button still pushed in as far as it will go, tighten by turning button to the right (clockwise) until it can be tightened no more.

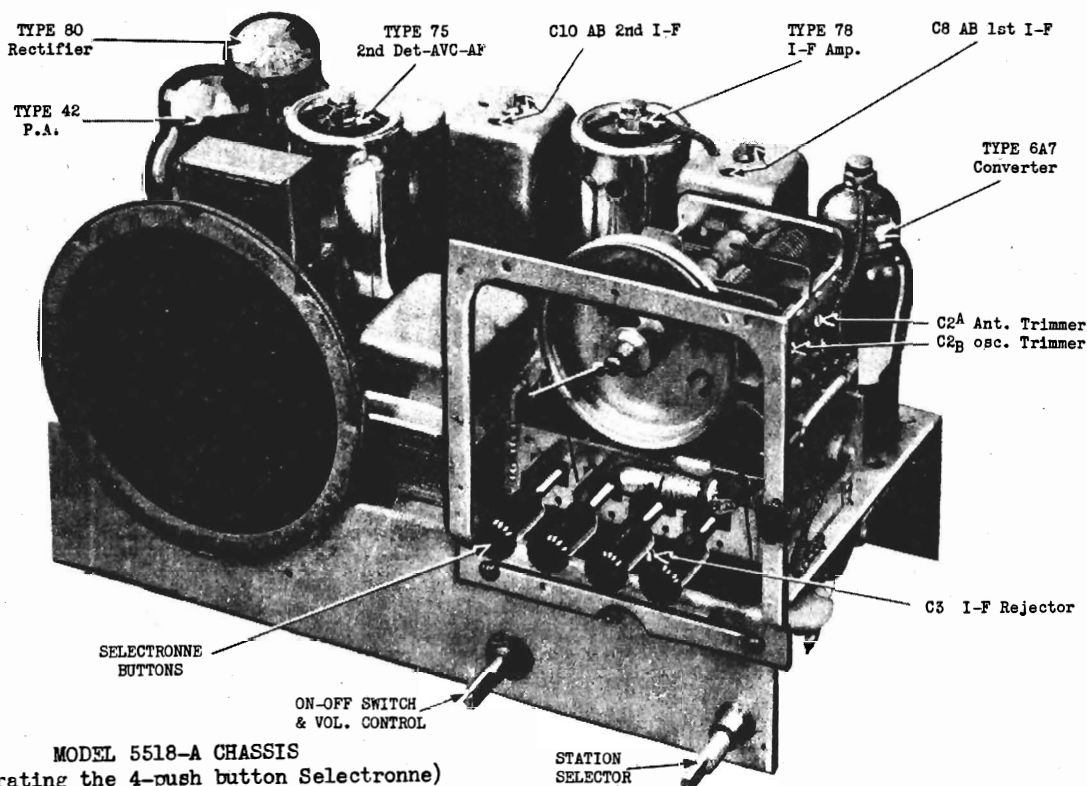
Be sure the station is tuned in accurately when pushed in button is tightened.

4. Repeat the procedure in paragraph 3 for each of the remaining three buttons and stations.

5. Be sure the Selectronne buttons have been tightened firmly.

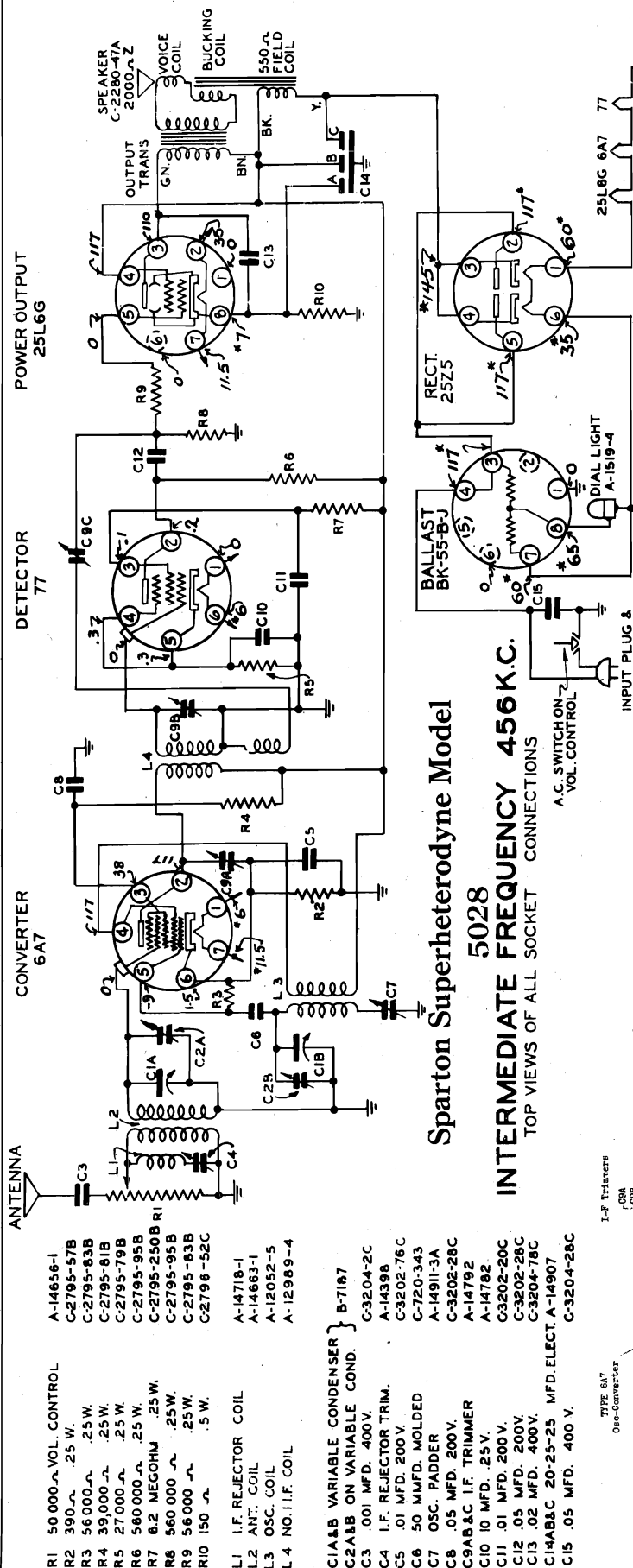
6. Check all buttons by pushing them in, one at a time, to determine whether desired stations are tuned in properly.

7. Any of the four stations to which the SPARTON Selectronne has been adjusted may now be instantly received simply by pushing the Selectronne Button for the desired station.



SPARKS WITHINGTON CO.

MODEL 5028

Schematic, Voltage, Trimmers
Socket, Alignment

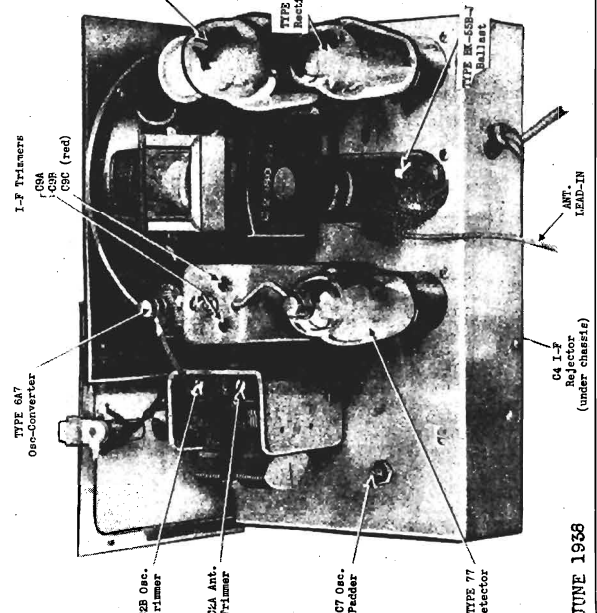
Notes: Voltage readings are for schematic diagram. Voltage of Socket Prongs to Gnd. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages are + DC voltages. Allow 15% + or - on all measurements. *AC volts.

Line Voltage: 117 volts Position of Volume Control: Full with Antenna Disconnected

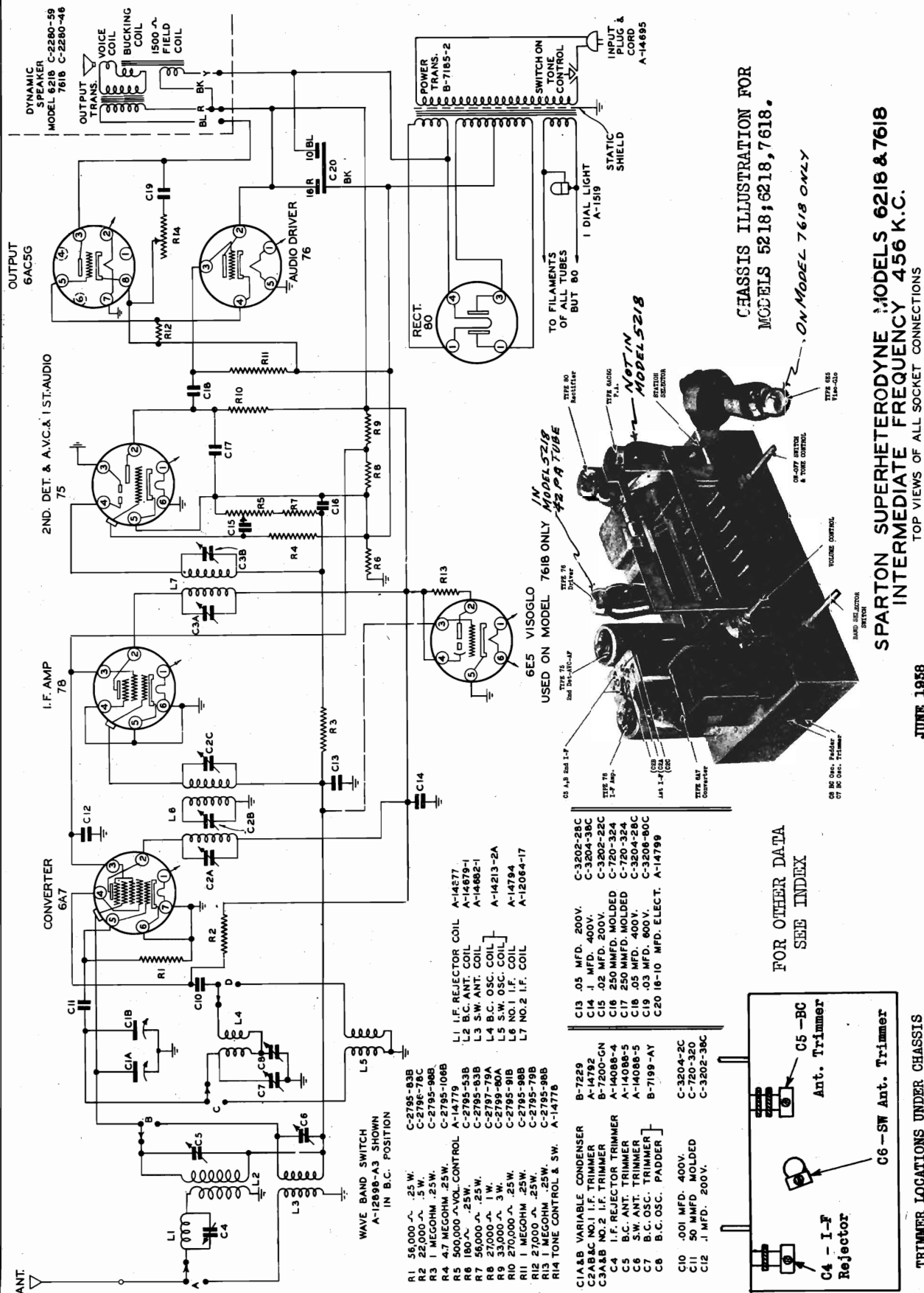
ALIGNMENT

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set dial pointer at horizontal lines at end of scale with condenser closed)							
2	(Back off, i.e., turn counter-clockwise, regeneration cond. C9C "red spot" before I.F. is aligned)			456 KC	*	Open	C9 A, B	
3	(Adjust C9C "red spot", turning in clockwise until oscil. occurs, turn out C9C until oscil. stops)			456 KC	*	Open	C4	Adjust to minimum
4	(Adjust C9C "red spot", turning in clockwise until oscil. occurs, turn out C9C until oscil. stops)			456 KC	*	Open	C2B Osc.	
5	(Repeat operation 6)			1500 KC	*	1500 KC	C1B Ant.	
6	(Repeat operation 6)			600 KC	*	600 KC	C7 Pad.	
7	(Repeat operation 6)			600 KC	*	600 KC	C7 Pad.	
8	(Repeat operation 6)			600 KC	*	600 KC	C7 Pad.	
9	(Check calibration and sensitivity at 600 KC, 1000 KC and 1500 KC)							
10	(Connect set to regular antenna and check reception of stations. Readjust C9C if set howls or oscillates on strong signals. Then recheck sensitivity)							

* This model has Broadcast Band only.



JUNE 1938

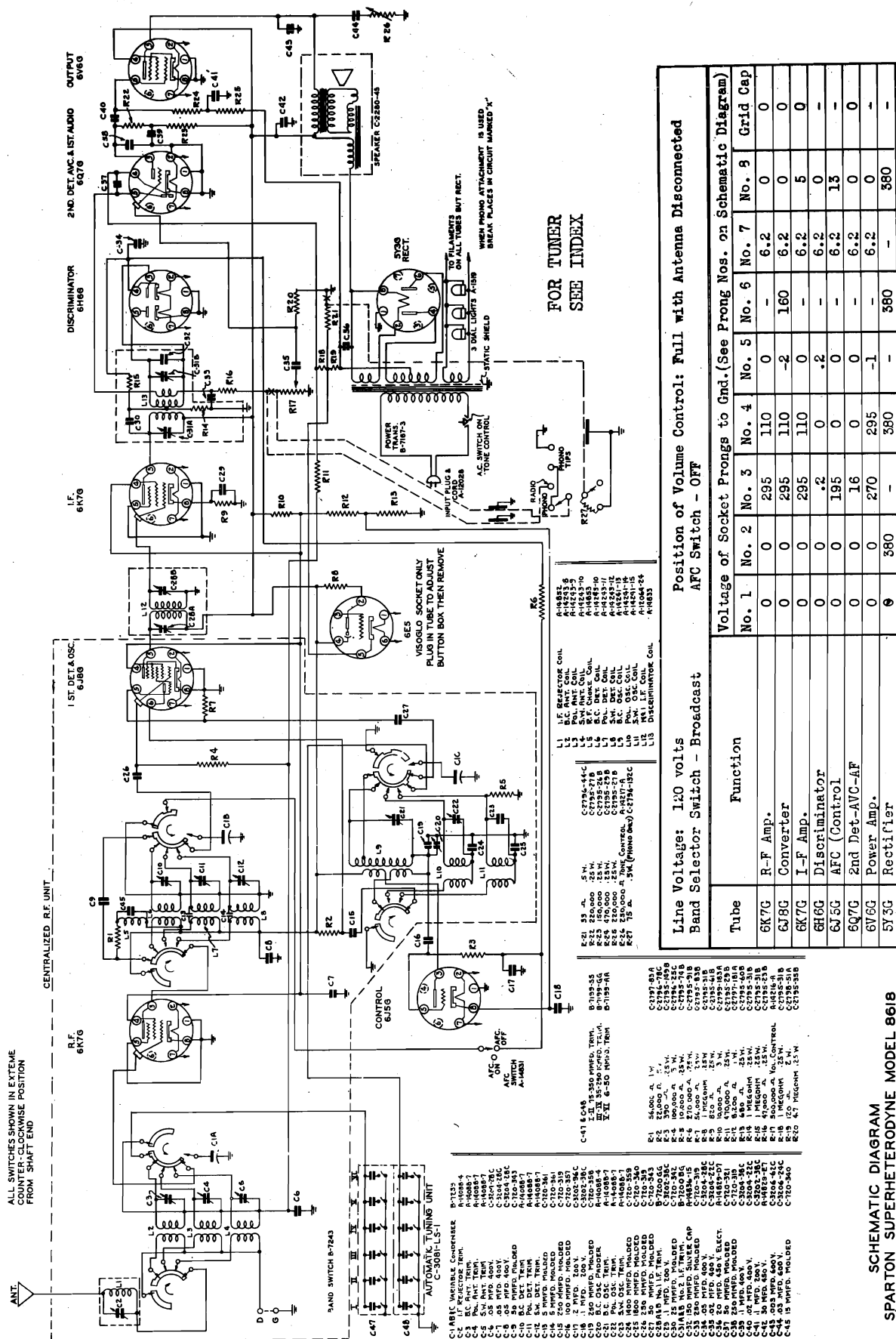


FOR OTHER DATA
SEE INDEX

TRIMMER LOCATIONS UNDER CHASSIS

JUNE 1958

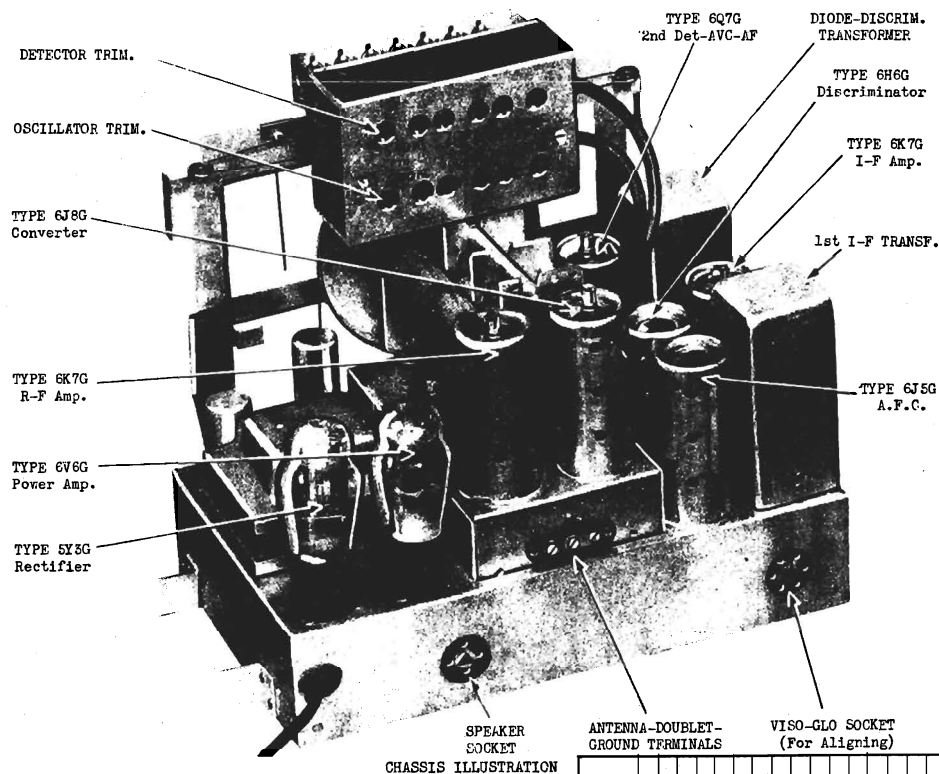
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MODEL 8618
Schematic, Voltage

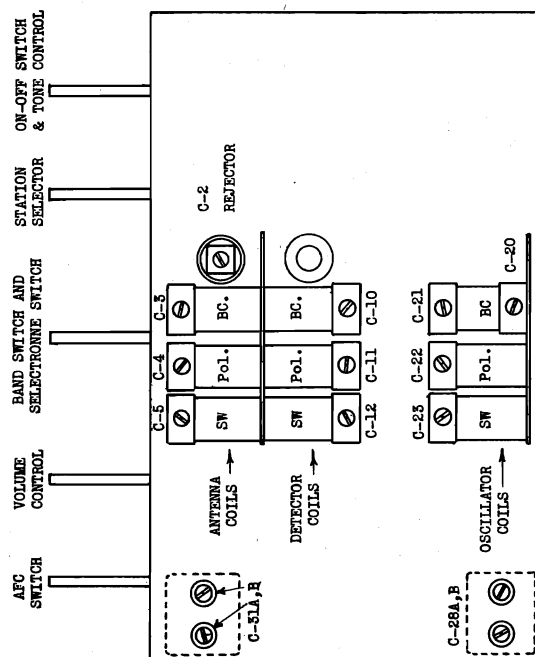
MODEL 8618

Alignment, Socket
Trimmer's, Chassis

SPARKS WITHINGTON CO.



CHASSIS ILLUSTRATION



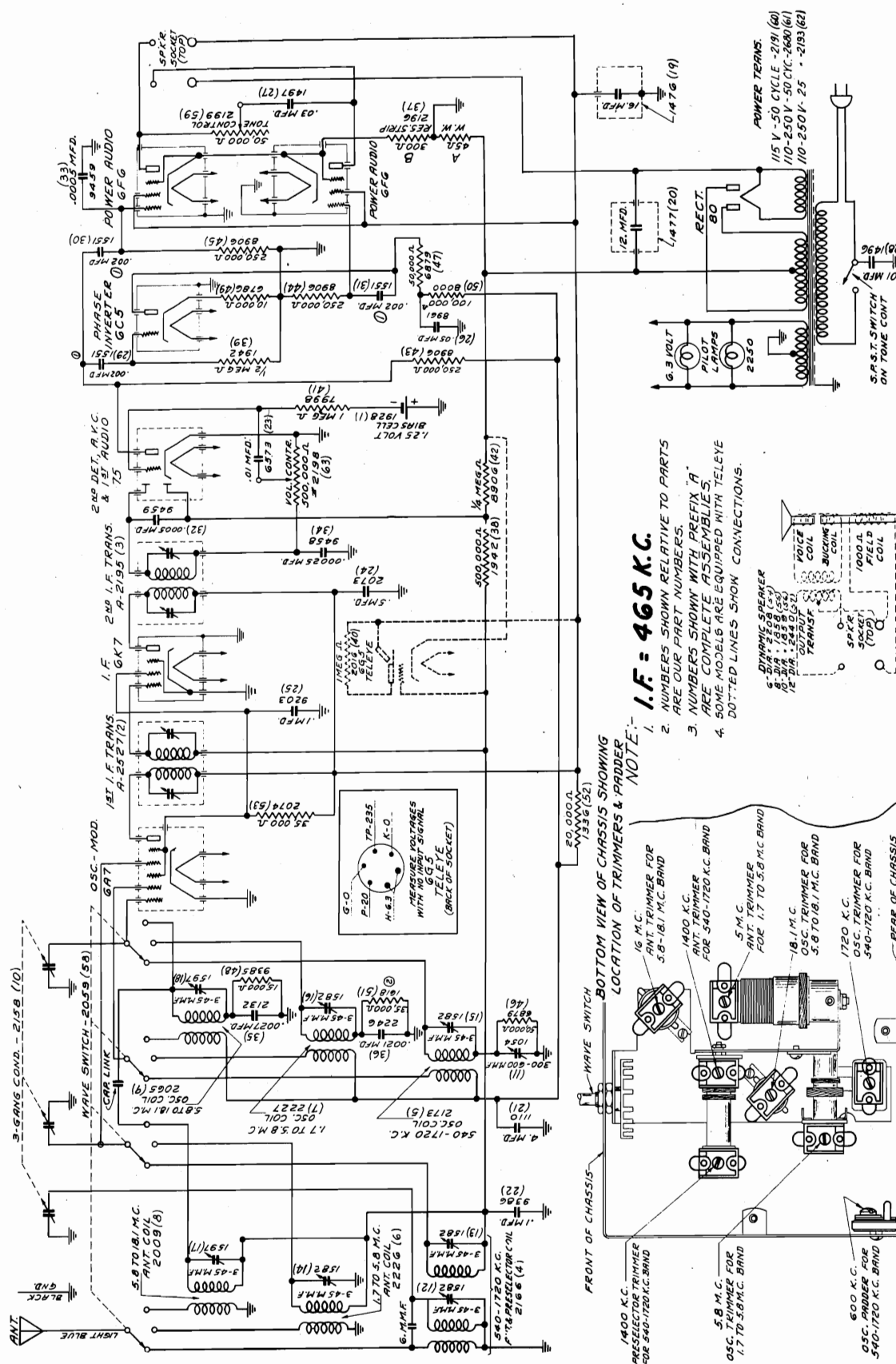
BOTTOM VIEW OF CHASSIS SHOWING TRIMMER LOCATIONS

ALIGNMENT

OPER- ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set pointer to last mark below 550 KC with tuning condenser plates flush)							
2	I.F.	6J8 Grid	.1 mfd.	456	BC	Open	C28, 31(A,B)	Adjust to max. AFC off.
3	Reflector	Ant.	200 mfd.	456	BC	Closed	C-2	Adjust to minimum.
4	Broadcast	Ant.	200 mfd.	1500	BC	1500	C21 Osc. C10 RF C-3 Ant.	
5	(Repeat operation 4)			600	BC	600	C20 Pad.	
6	(Check calibration and sensitivity at 800 KC, 1000 KC and 1500 KC)							
7	(Check operation of AFC circuit*)							
8	Police	Ant.	100 ohm series	5 MC.	Police	5 MC.	C22 Osc. C11 RF C4 Ant.	
9	Short	Ant.	100 ohm series	15 MC.	S.W.	15 MC.	C23 Osc. C12 RF C5 Ant.	
10	Wave	Ant.	200 ohm series	15 MC.	S.W.	15 MC.		
11	Band	Ant.	200 ohm series	15 MC.	S.W.	15 MC.		
12	(Check calibration and sensitivity at 6.0 MC., 9.0 MC. and 15 MC.)							

*Check operation of AFC circuit by connecting generator to grid cap of 6J8 and tune generator and receiver to 1500 KC. Increase generator signal so that Viso-Glo just closes. Tune accurately with AFC switch "OFF". Now snap AFC switch "ON" and note the sensitivity as indicated on the Viso-Glo. If the sensitivity changes, the AFC (Discriminator) is not properly aligned and should be touched up (trimmer C-31B) until the AFC switch can be snapped "ON" and "OFF" without any change on the Viso-Glo.

SPIEGEL INC.



$LF = 465 \text{ K.C.}$

H 1336 (52)
BOTTOM VIEW OF CHASSIS SHOWING
LOCATION OF TRIMMERS & PADDERS
NOTE

1. ***I.F. = 465 K.C.***
2. ***NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.***
3. ***NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.***
4. ***SOME MODELS ARE EQUIPPED WITH TELEVE DOTTED LINES SHOW CONNECTIONS.***

DYNAMIC SPEAKER

VOICE COIL
BUCKING COIL
1000- Ω FIELD COIL
SPKR SOCKET (TOP)
OUTPUT TRANSF

POWER TRANS.

50 CYCLE - 2191 (60)
50 V - 50 CYC. - 2680 (61)
50 V - 25 - - 2193 (62)

17010017 07 100

1

1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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Compliments of www.nucow.com

MODEL 134, Chassis 46A
Alignment, Voltage, Socket
Tuning Eye Notes

SPIEGEL INC.

ALIGNMENT PROCEDURE:

Realignment of this receiver should never be necessary unless one of the oscillator, antenna, or I. F. coils has been replaced. Lack of sensitivity, selectivity, and poor tone quality may be due to any one or a combination of causes, such as weak or defective tubes or speaker, inadequate or excessively long antenna, open or grounded bias resistor, bypass condenser, etc. Under no circumstances should realignment be attempted until all other possible sources have been first thoroughly investigated and have been definitely proven not to be the cause.

If an I. F. tube is replaced it is advisable to realign the I. F. Amplifier particularly if the replacement tube is one of a different manufacture than the one in the receiver. It is important when aligning to carefully follow the procedure in the order given, otherwise the receiver will lack sensitivity and the dial calibration will be incorrect.

IT IS IMPERATIVE THAT AN ACCURATELY CALIBRATED OSCILLATOR BE USED WITH SOME TYPE OF OUTPUT MEASURING DEVICE.

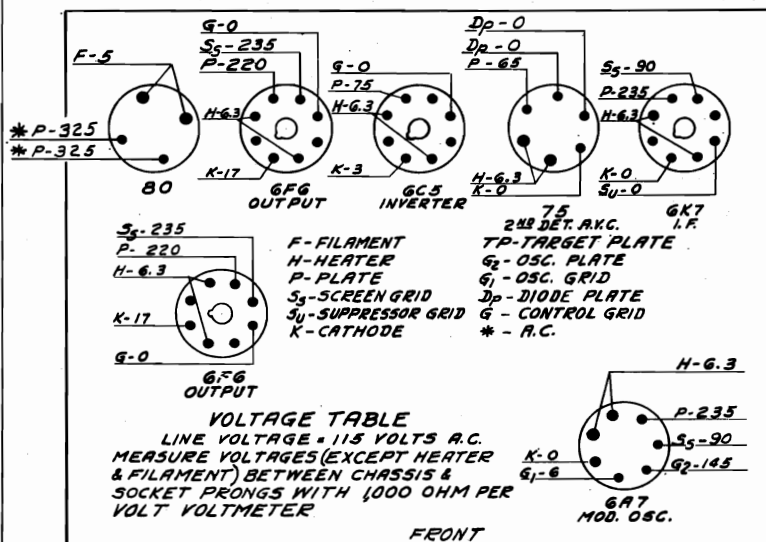
INTERMEDIATE ALIGNMENT:

1. Connect the high side of the test oscillator output to the control grid of the 6D6 modulator tube through a .02 Mfd. condenser. Leave the grid cap connected to the grid terminal of the tube, and connect the ground side of the test oscillator to the receiver ground.
2. Set the test oscillator frequency to 465 kilocycles (this must be accurate).
3. Align the second intermediate transformer by turning one of the trimmer screws accessible through holes in the top of the transformer shields up and down (increasing and decreasing capacity) until maximum reading is obtained on the output meter, after which adjust the other trimmer screw of the same transformer for maximum sensitivity.
4. Adjust the first intermediate transformer in the same manner as the second I. F. transformer.

TO ALIGN THE VARIABLE CONDENSER:

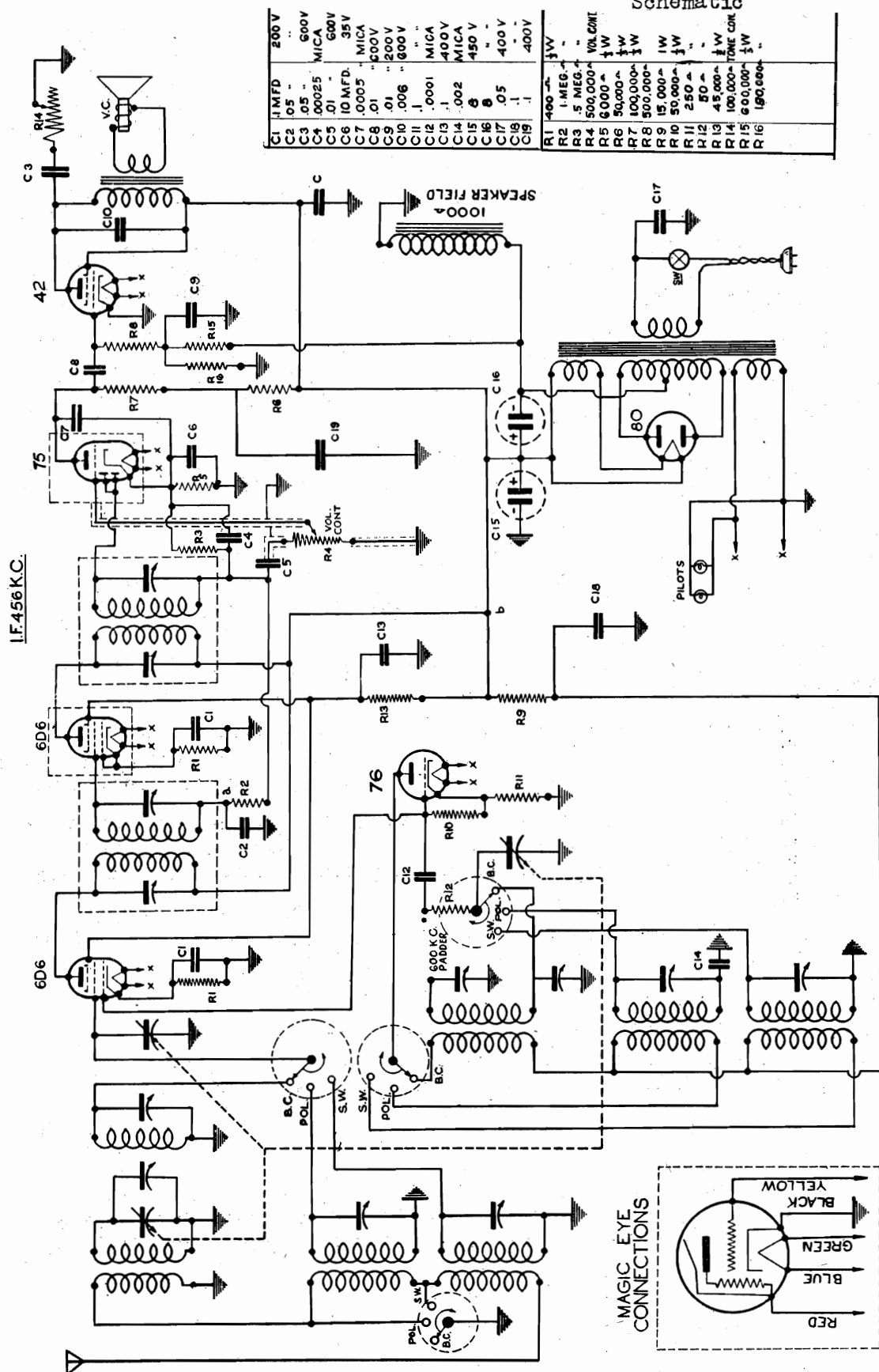
It is important when aligning the gang condenser, padding and trimmer condensers to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The padding and trimmer condensers located underneath the chassis will be referred to by their function as indicated on the circuit diagram.

1. Connect the high output side of the test oscillator through a 400 ohm resistor to the receiver antenna lead and the low side to the set ground.
2. Place the band selector switch for operation on the 5.8 to 18.1 megacycle band, tune the receiver dial, and set the test oscillator frequency to EXACTLY 18.1 MEGACYCLES.
3. Tune in the 18.1 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 18.1 MEGACYCLE OSCILLATOR TRIMMER. When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 18.1 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 18.1 megacycles always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 18.1 megacycles, increase the output of the test oscillator and tune the receiver dial to approximately 17.1 megacycles, and if the fundamental peak was used in aligning at 18.1 megacycles the test oscillator signal will be heard at approximately 17.1 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 18.1 megacycle oscillator trimmer must be properly re-adjusted.
4. With band selector switch set for operation on 5.8 to 18.1 megacycle band tune the receiver dial and set test oscillator frequency to EXACTLY 16 MEGACYCLES. Adjust 16 megacycle antenna trimmer for maximum 16 megacycle signal sensitivity.
5. Place band selector switch for operation on 1.7 to 5.8 megacycle band, tune the receiver dial, and set test oscillator frequency to EXACTLY 5.8 MEGACYCLES. BRING IN 5.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 5.8 megacycle oscillator trimmer.
6. With the band selector switch set for operation on the 1.7 to 5.8 megacycle band tune receiver dial and set test oscillator frequency to EXACTLY 5 MEGACYCLES. Then adjust 5 megacycle antenna trimmer for maximum 5 megacycle signal sensitivity.
7. Replace the 400 ohm resistor in series with test oscillator lead with a 200 Mmfd. condenser, place the band selector switch for operation on the 540 to 1720 kilocycle band, tune receiver dial, and set test oscillator frequency to EXACTLY 1720 KILOCYCLES. NEXT BRING IN THE 1720 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1720 KILOCYCLE OSCILLATOR TRIMMER.
8. With band selector switch placed for operation on the 540 to 1720 kilocycle band set test oscillator frequency and receiver dial to EXACTLY 1400 KILOCYCLES. Adjust 1400 kilocycle preselector and antenna trimmers for maximum 1400 kilocycle signal sensitivity.
9. Leave band selector switch for operation on 540 to 1720 kilocycle band, tune receiver dial and set test oscillator frequency to approximately 600 kilocycles. While rocking gang condenser slightly to right and left adjust 600 kilocycle oscillator padder for maximum sensitivity.



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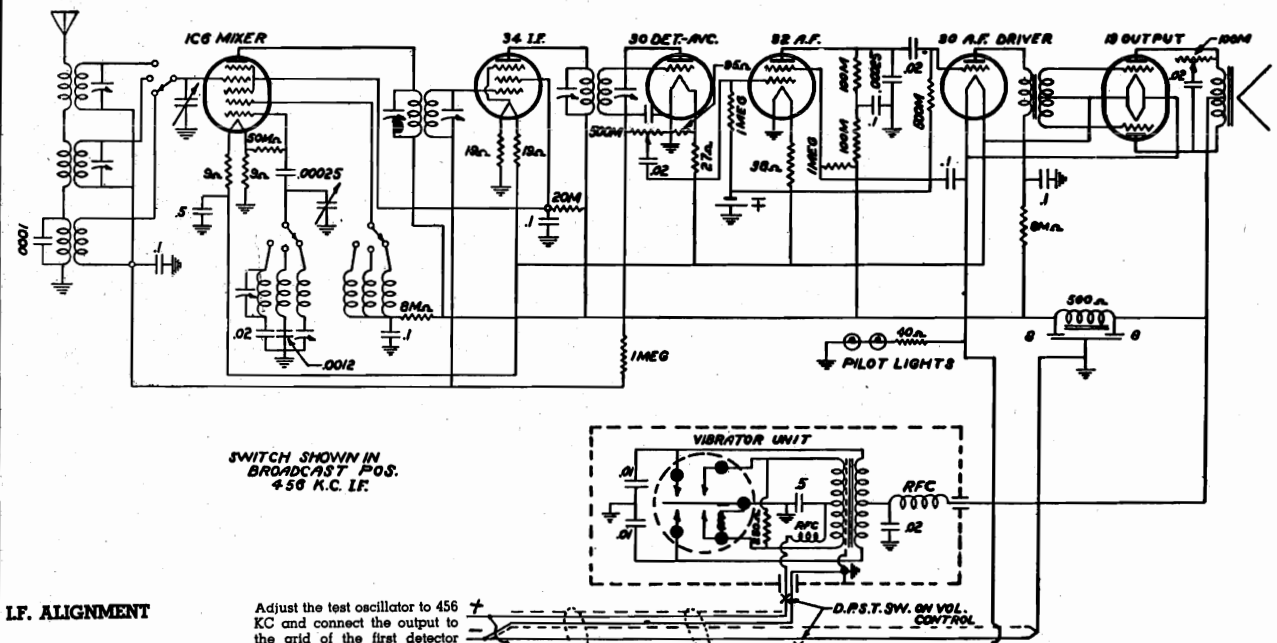
MODELS 160,180,184,6500,6504
6518,6546,6550,6562,6564
Chassis 603 (1936)
Schematic



Schematic, Socket, Trimmers Alignment

SPIEGEL INC.

MODELS 102, 104, 112, 114, 124
172, 6750, 6752 Chassis Z4



LF. ALIGNMENT

Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (1C6) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT

Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the rear gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak. The front condenser section tunes the RF or grid circuit of the 1C6 tube. Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the 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. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the R.F. section. The padding condenser is located on the left hand side of the chassis, directly to the left of the 1C6 tube and in front of the first I.F. transformer. Return to 1400 KC 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 KC. This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and must always be done before attempting to align the Short Wave Bands.

FOREIGN BAND ALIGNMENT

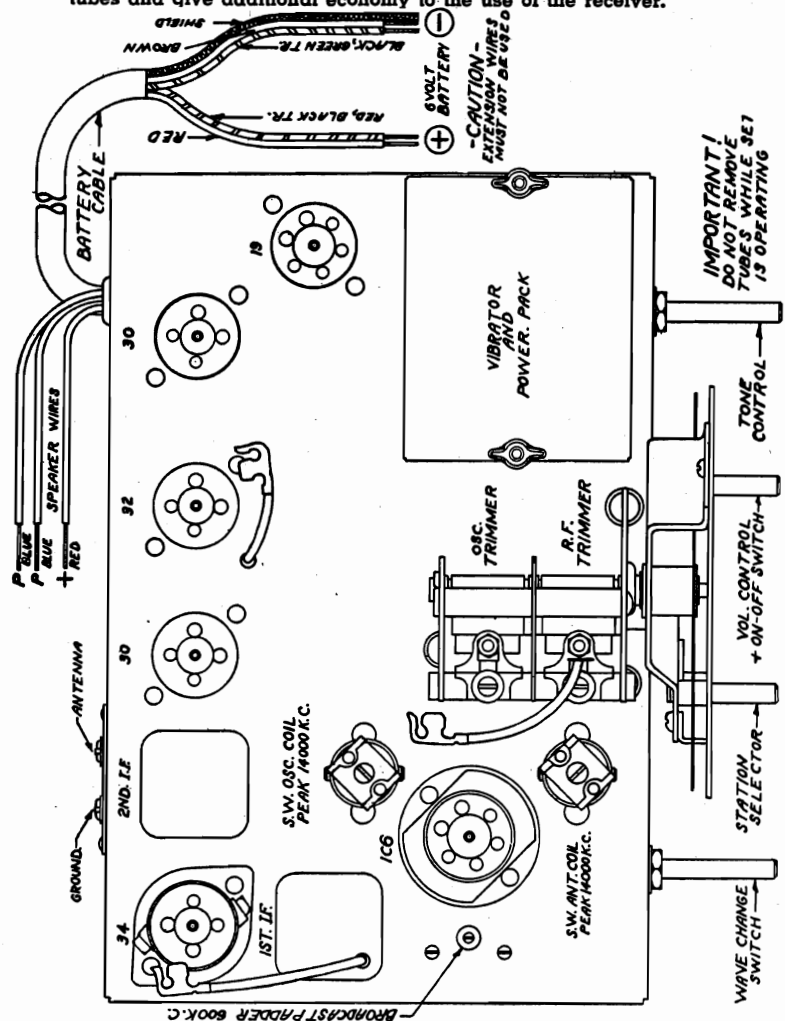
The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coils located on the top of the chassis. Set the test oscillator to 14,000 KC. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. The oscillator coil is located near the 1st I.F. Transformer and the antenna or R.F. coil is located directly in front of the Short Wave oscillator coil and alongside the front section of the gang condenser. These two trimmers should be adjusted for peak at 14,000 KC and as the inherent design of the circuit has been expressly developed for simplicity in servicing, no other adjustments are necessary for aligning this band. **Note:** Always start this procedure by having the oscillator coil trimmer loose (out all the way), and the antenna coil trimmer fairly tight (in all the way); otherwise it is possible to make a false alignment on the image frequency. In order to prevent alignment on the image frequency, it is suggested that the following check be made: Readjust the pointer to 13,100 KC where the image frequency should be found. If, however, the signal at 13,100 KC is found to be stronger than the signal at 14,000 KC, it signifies that alignment was incorrectly made on the image frequency.

IMPORTANT: Do not attempt any adjustment of the gang condenser trimmers in aligning the Foreign Band as this will throw the Broadcast Band out of alignment.

POLICE BAND ALIGNMENT

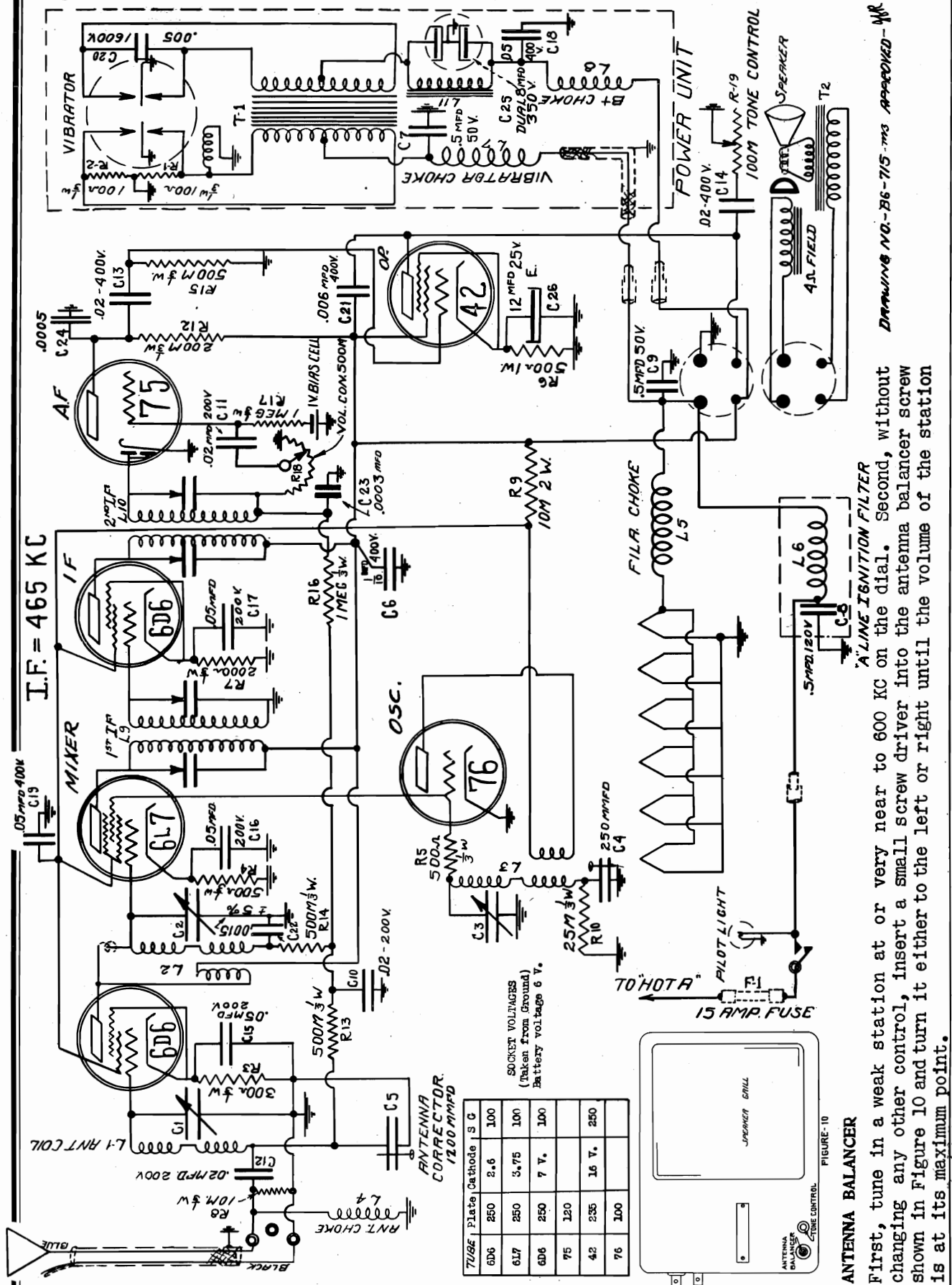
There is only one adjustment to be made in the alignment of the Police Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary. Set the dial pointer to 4000 KC (also the test oscillator) and adjust the antenna coil trimmer to resonance. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment. The two police band coils are under the chassis and the antenna coil trimmer is mounted on the end of the antenna coil. **Important:** This is the only adjustment necessary for the Police Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Police Band, otherwise the Broadcast Band will be thrown out of alignment.

IMPORTANT NOTE: The battery must never be charged while set is in operation. If a windcharger is used, it should always be disconnected from the battery when the receiver is being used. An inexpensive single pole switch can be used for disconnecting the windcharger from the battery. This will increase the life of the tubes and give additional economy to the use of the receiver.



MODEL 169, Chassis H1
Schematic, Voltage
Alignment

SPIEGEL INC.

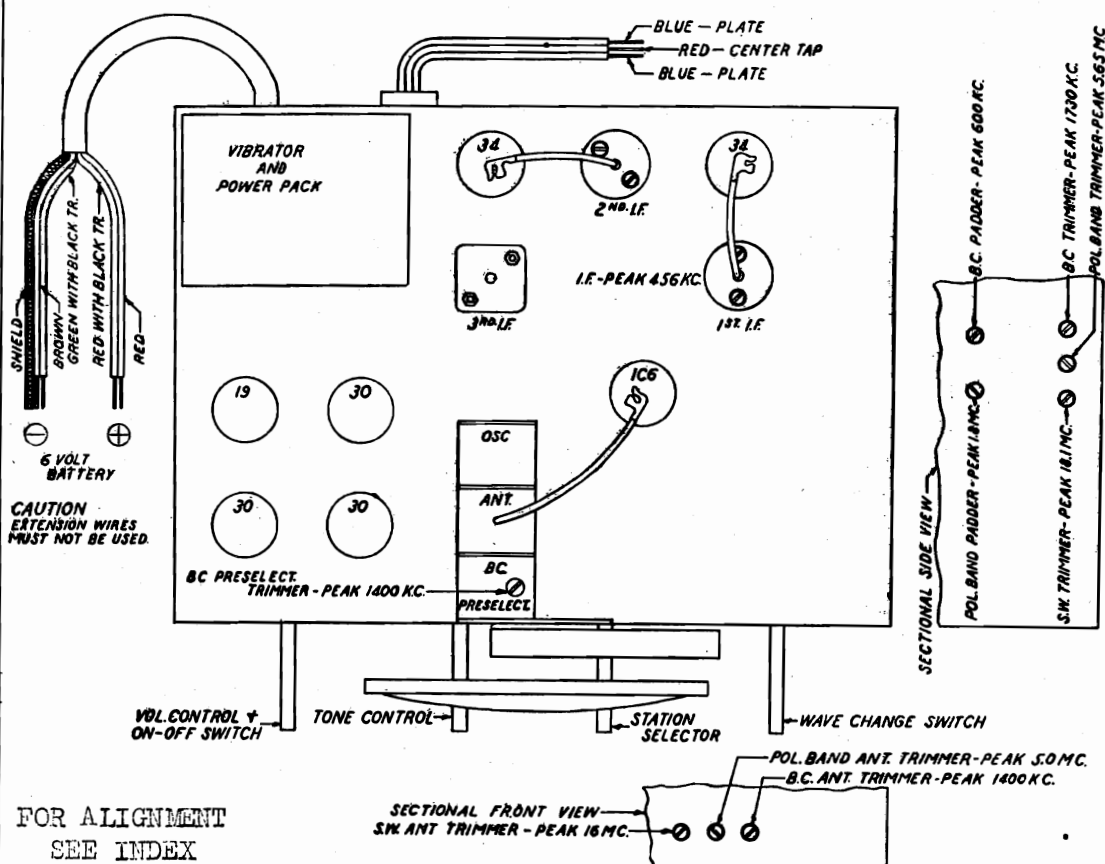


ANTENNA BALANCER
First, tune in a weak station at or very near to 600 KC on the dial. Second, without changing any other control, insert a small screw driver into the antenna balancer screw shown in Figure 10 and turn it either to the left or right until the volume of the station is at its maximum point.

POWER UNIT
100M TONE CONTROL
4.5A FIELD
T2

FIGURE-10
ANTENNA BALANCER
TONE CONTROL
SPEAKER GAIL

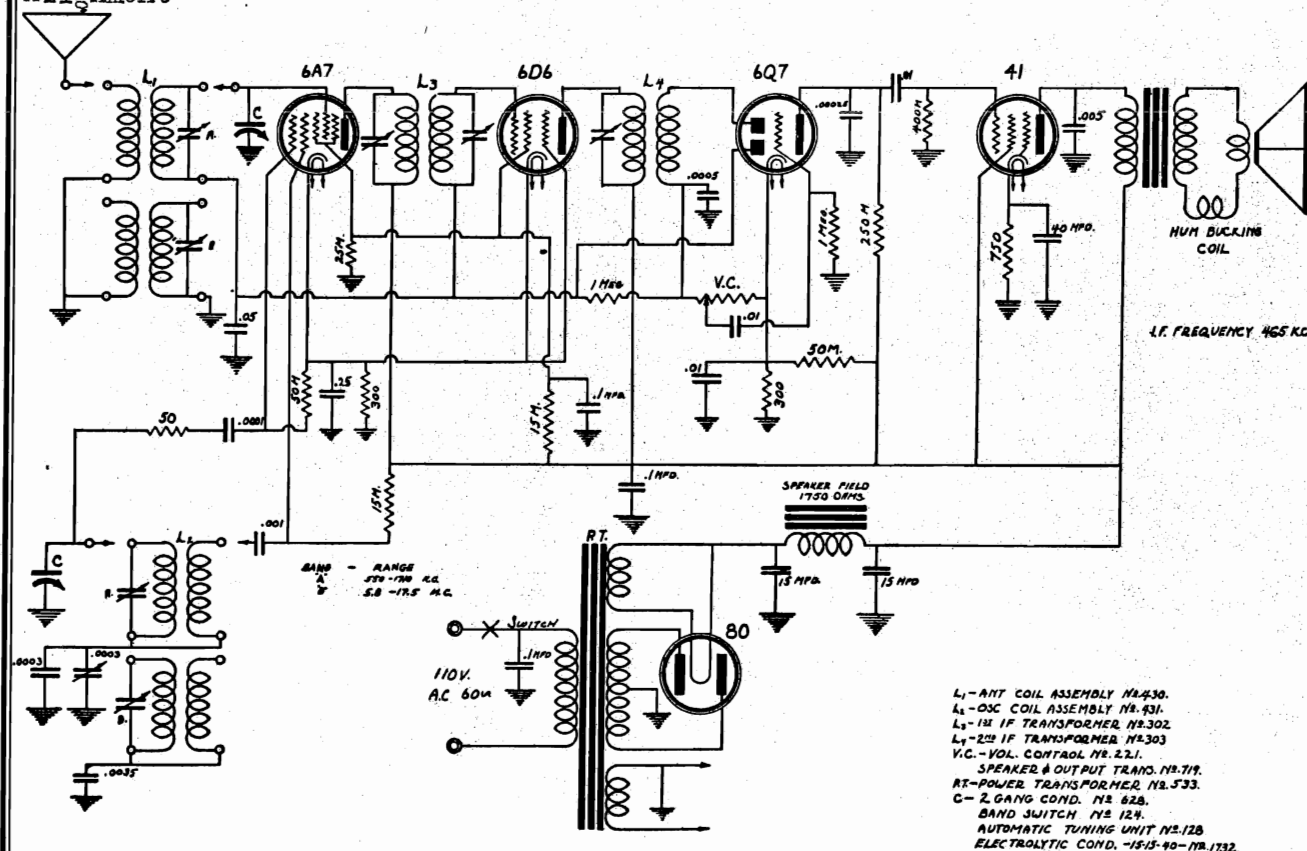
DRAWING NO.-B6-715-MS APPROVED-MR



This receiver is designed to operate over three tuning ranges: the broadcast range which extends from 540 to 1700 Kilocycles (KC) (175 to 550 meters), Police and Aviation Band which extends from 1700 to 5500 Kilocycles (KC) (52 to 175 Meters) and the International Short Wave Band which extends from 5500 to 18,100 Kilocycles (KC) (16.5 to 55 meters). This latter range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.

MODELS 1002, 1003, Chassis 219
Schematic, Socket, Trimmers
Alignment

SPIEGEL INC.



This receiver is designed to operate over two tuning ranges. The broadcast range which extends from 540 K.C. to 1730 and the foreign short wave band which extends from 5800 K.C. to 18000 K.C. The short wave range includes the five important short wave channels 19, 25, 31, 39 and 49 meter bands.

ALIGNMENT DATA

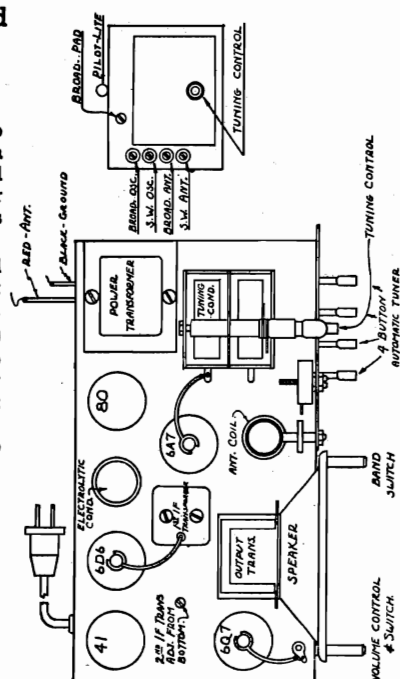
The alignment of this receiver requires the use of a test oscillator that will cover the following frequencies, 465, 600, 1400, 6000, and 15000 K.C. and an output meter which is to be connected across the output transformer on the speaker. All alignments should be made with the volume control set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the broadcast padding condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.

INTERMEDIATE FREQUENCY: Set oscillator to 465 KC. Feed this to the grid of the pentagrid (6A7) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

BROADCAST BAND: Set the band switch for broadcast reception. Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the broadcast padding condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.

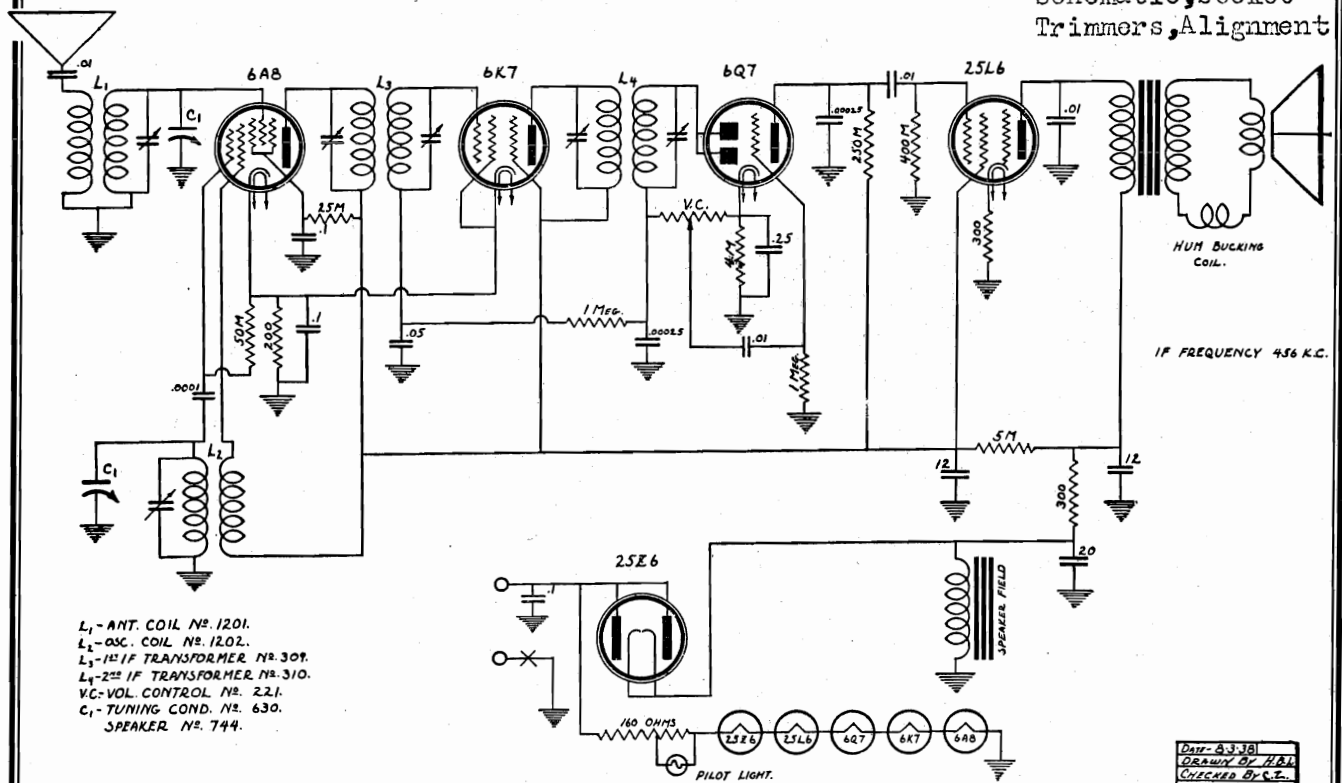
SHORT WAVE: Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 400 ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.

It is advisable to check the sensitivity at 6000 KC to determine whether the circuits are properly aligned. Should the receiver lack sensitivity at this frequency check the .0035 mica condenser for short circuit.



SPIEGEL INC.

MODELS 1010, 1011
Chassis 216
Schematic, Socket
Trimmers, Alignment

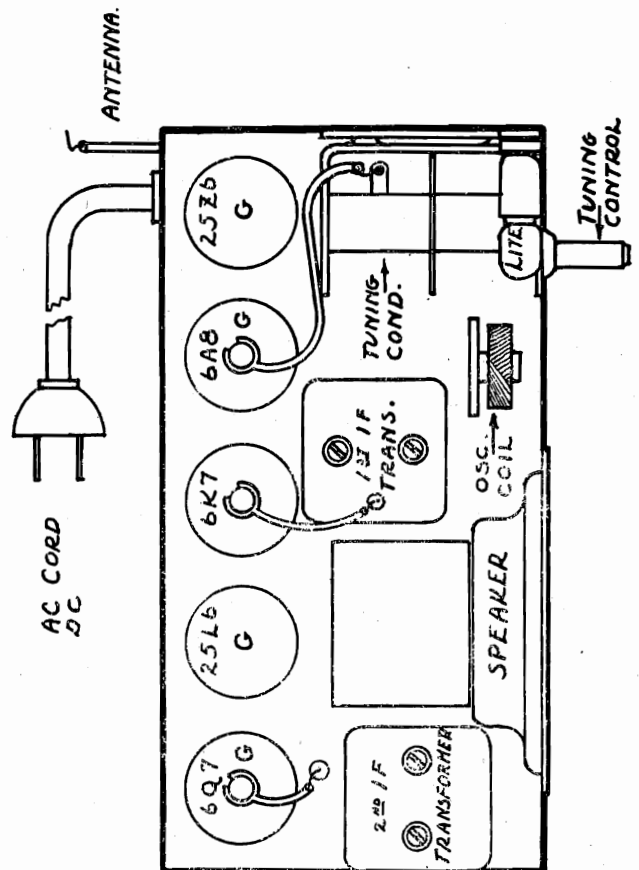


INSTALLATION: For operation on 110-120 volts, 60 cycle A.C. or D.C. power supply.

ALIGNMENT: All alignments should be made with the volume control set at maximum and the output of the test oscillator set as low as possible to prevent the automatic volume control from operating and thus giving incorrect readings during alignment.

INTERMEDIATE FREQUENCY: Set oscillator to 456 KC. Feed this to the grid of the pentagrid (648) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

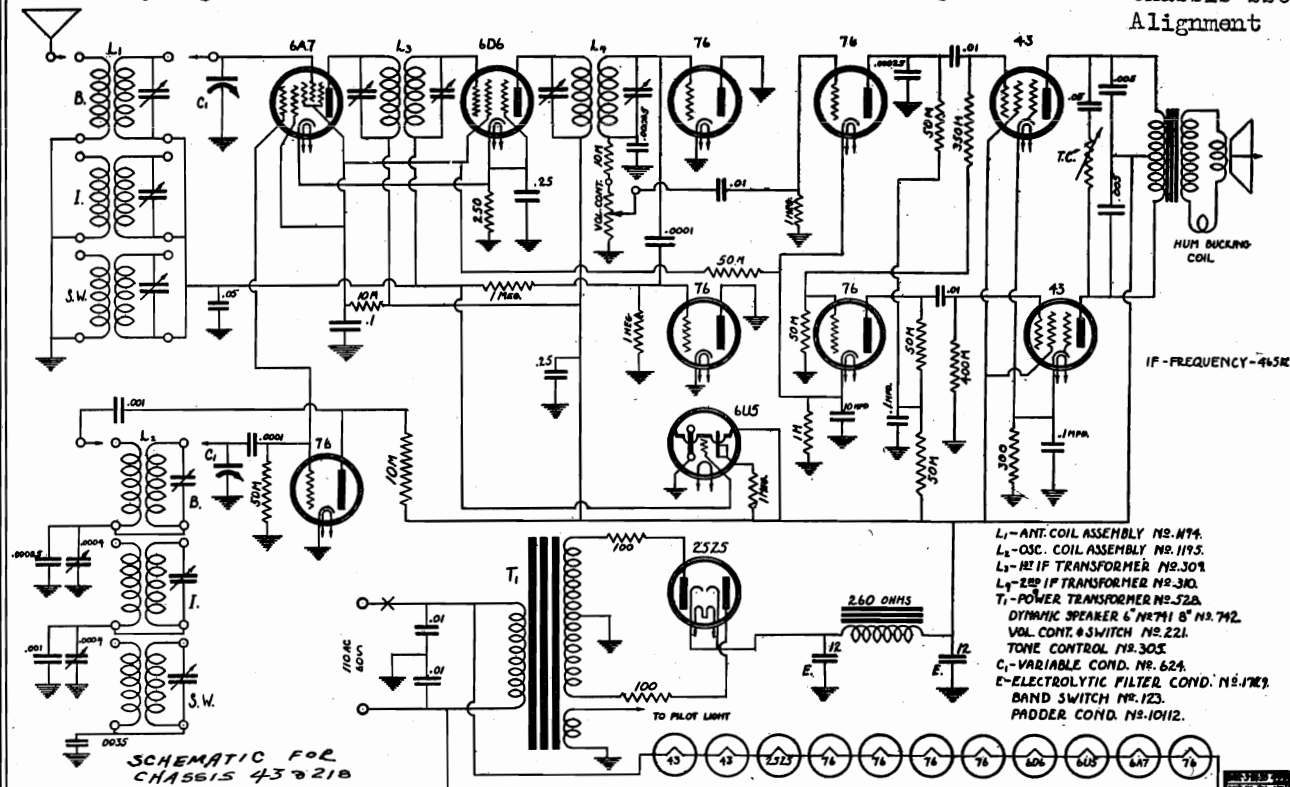
BROADCAST BAND: Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the antenna and oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 600 KC and check for alignment.



MODELS 2066, 2067, 2068
Chassis 43
Schematic, Alignment

SPIEGEL INC.

MODELS 1052, 1053, Chassis 218
Schematic, Socket, Trimmers
Alignment
Chassis 220
Alignment



SWITCH POSITION

Left
Center
Right

BAND

Broadcast
Intermediate
Short Wave (foreign)

RANGE IN KILOCYCLES

540—1710 KC
1710—5800 KC
5800—17500 KC

FOR CHASSIS
43 SOCKET
LAYOUT
SEE INDEX.

ALIGNMENT: The alignment of this receiver (Chassis 43, 218, 220) should be made with the volume control set at maximum and the output of the test oscillator set as low as possible to prevent the automatic volume control from operating and thus giving incorrect readings during alignment.

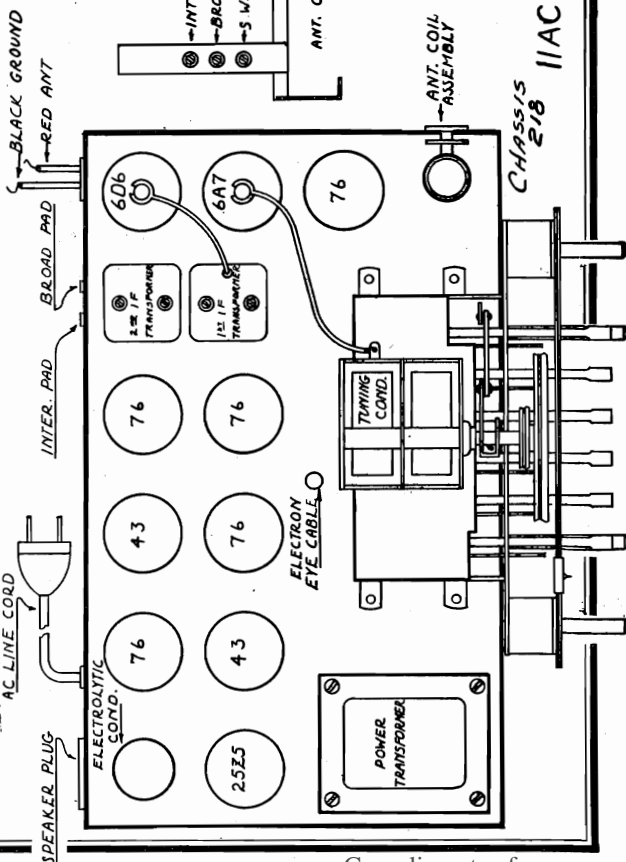
INTERMEDIATE FREQUENCY: Set oscillator to 465 KC. Feed this to the grid of the (6A7) tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

BROADCAST BAND: Set the band switch for broadcast reception. Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the broadcast padding condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.

INTERMEDIATE BAND: For a dummy antenna use a .0002 mfd. mica condenser in series with a 400 ohm carbon resistor. Set band switch to the intermediate band position and feed a 5100 KC signal from the oscillator. Set dial pointer at 5100 KC. Adjust intermediate antenna and intermediate oscillator trimmers for maximum output. Re-set oscillator and set dial to approximately 1800 KC. Slowly increase or decrease the intermediate padding condenser while tuning back and forth across the signal with the station selector control until the maximum reading is obtained on the output meter. Re-check the 5100 KC adjustment.

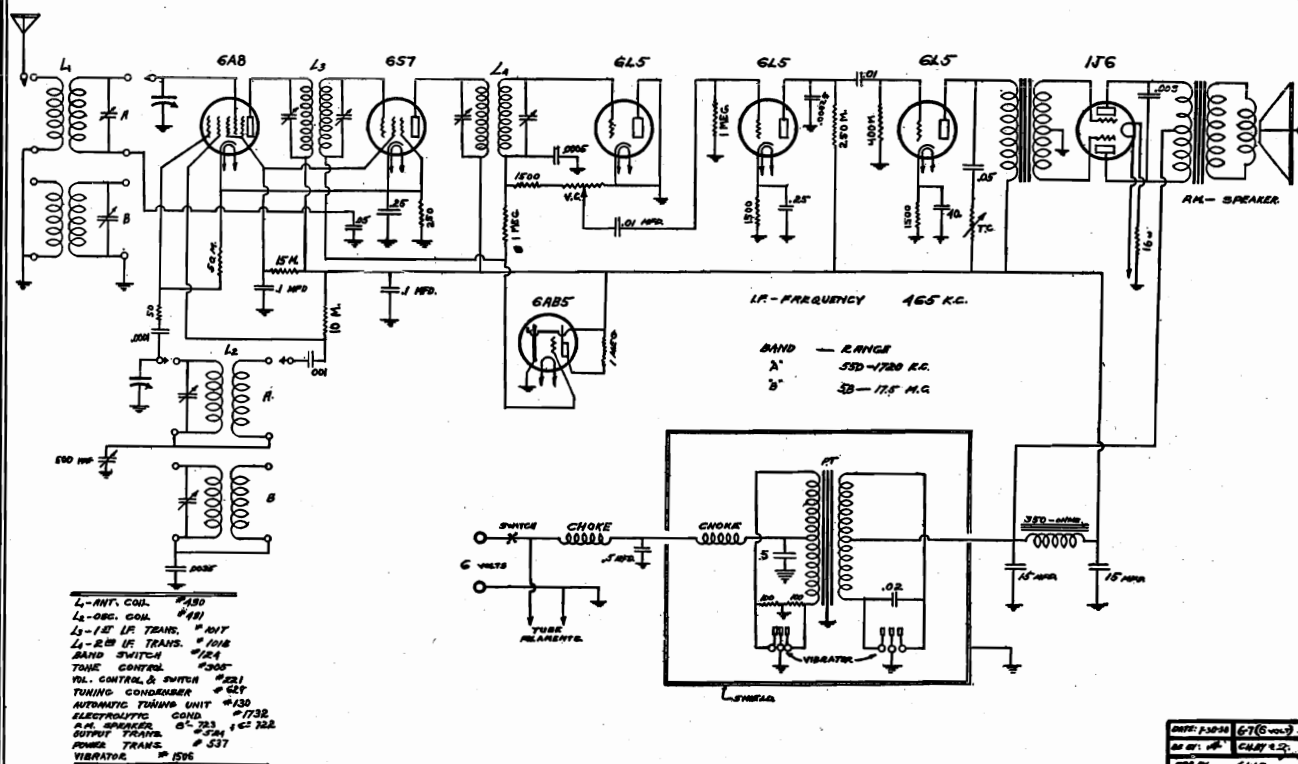
SHORT WAVE: Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 400 ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.

It is advisable to check the sensitivity at 8000 KC to determine whether the circuits are properly aligned. Should the receiver lack sensitivity at this frequency check the .0035 mica condenser for short circuit.



SPIEGEL INC.

MODELS 1100 to 1103 inc.Ch. 202
 MODELS 1150 to 1153 inc.Ch.212
 Schematic,Alignment



Automatic Tuner Dual Range 6 Volt Superheterodyne

This receiver is designed to operate over two tuning ranges. The broadcast range which extends from 540 K.C. to 1730 and the foreign short wave band which extends from 5800 K.C. to 18000 K.C. The short wave range includes the five important short wave channels 19, 25, 31, 39 and 49 meter bands.

ALIGNMENT DATA

The alignment of this receiver requires the use of a test oscillator that will cover the following frequencies, 465, 600, 1400, 6000, and 15000 K.C. and an output meter which is to be connected across the output transformer on the speaker. All alignments should be made with the volume control set at maximum and the output of the test oscillator set as low as possible to prevent the automatic volume control from operating and thus giving incorrect readings during alignment.

INTERMEDIATE FREQUENCY: Set oscillator to 465 KC. Feed this to the grid of the pentagrid (6A7) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

BROADCAST BAND: Set the band switch for broadcast reception. Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the broadcast padding condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.

SHORT WAVE: Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 400 ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.

It is advisable to check the sensitivity at 6000 KC to determine whether the circuits are properly aligned. Should the receiver lack sensitivity at this frequency check the .0035 mica condenser for short circuit.

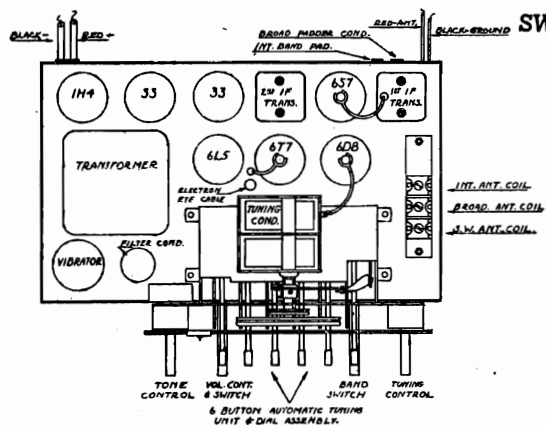
[illegible]

MODELS

1104
1105
1106
1107
1154
1155
1156
1157

DATE: 8-9-20 8-64
DRAWN BY: H.B.L.
CHECKED BY:
APPROVED BY: W.K.

FOR ALIGNMENT SEE MODEL 1052.



SWITCH POSITION

Left
Center
Right

BAND

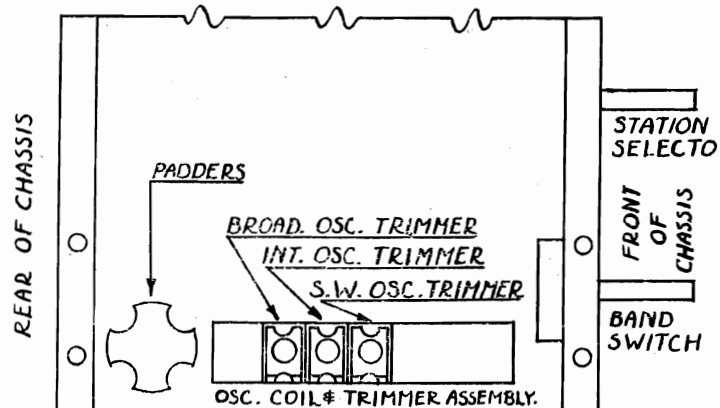
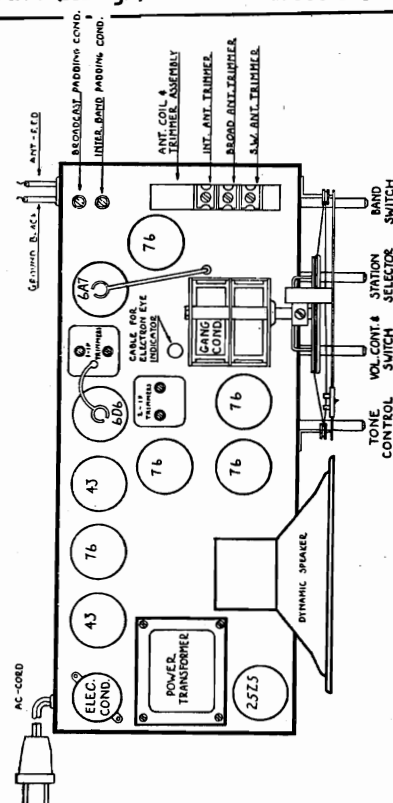
**Broadcast
Intermediate
Short Wave (foreign)**

RANGE IN KILOCYCLES

540— 1710 KC
1710— 5800 KC
5800—17500 KC

MODELS

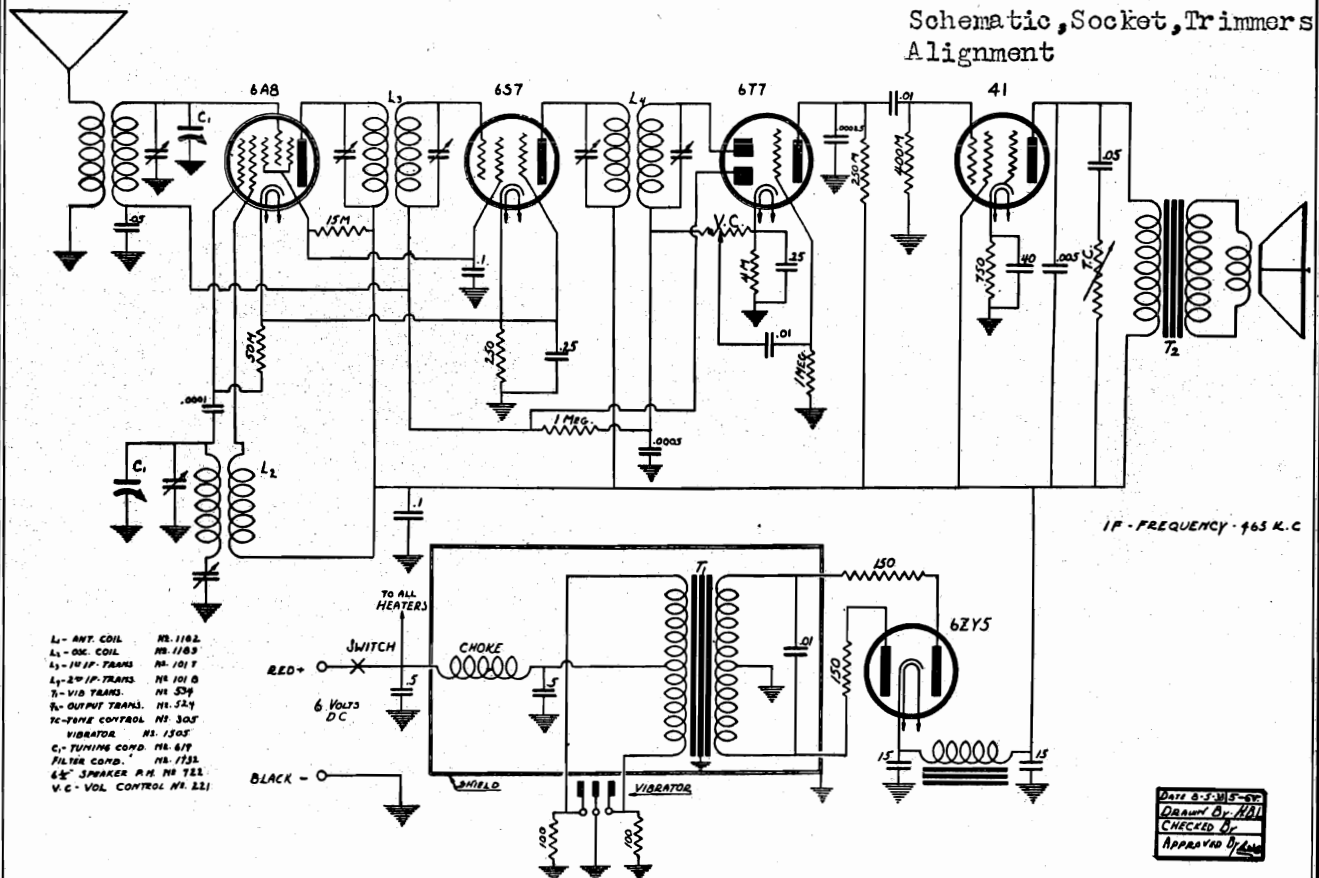
2066
2067
2068



BOTTOM VIEW OF CHASSIS:

SPIEGEL INC.

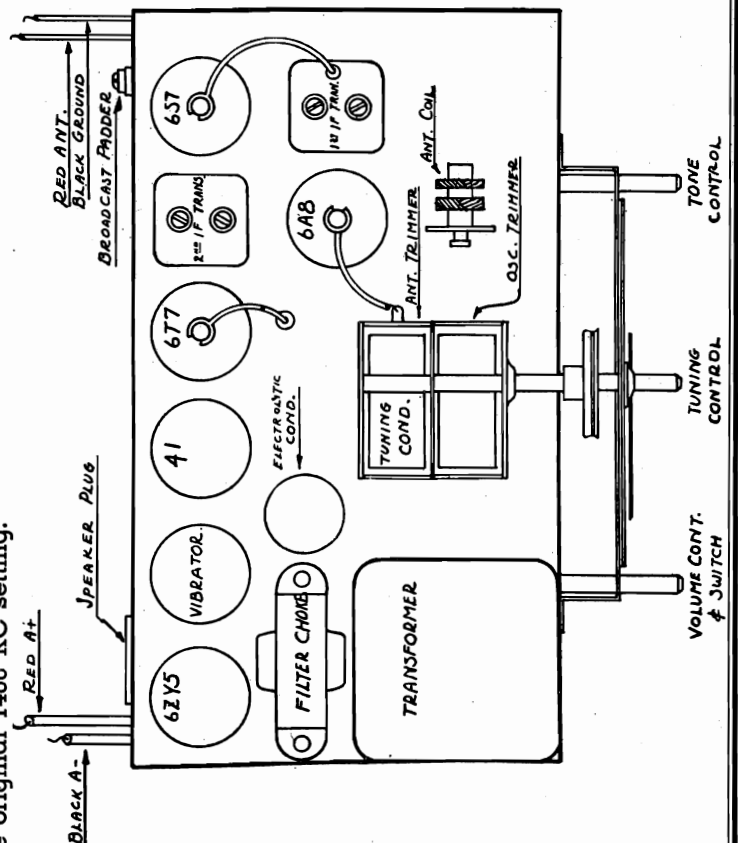
MODELS 1108 to 1111 inc.
Chassis 211
Schematic, Socket, Trimmers
Alignment



All alignments should be made with the volume control set at maximum and the output of the test oscillator set as low as possible to prevent the automatic volume control from operating and thus giving incorrect readings during alignment.

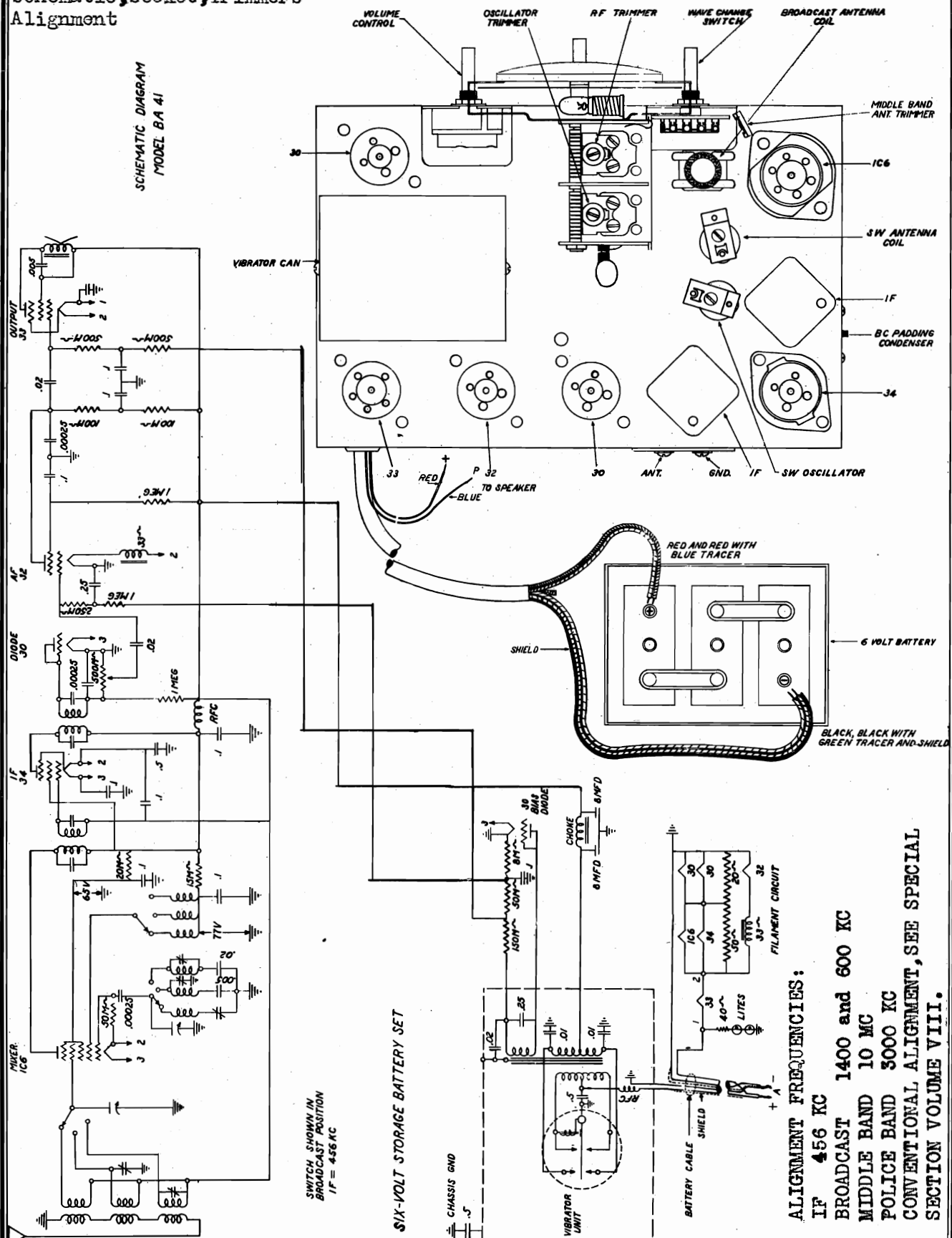
INTERMEDIATE FREQUENCY: Set oscillator to 465 KC. Feed this to the grid of the pentagrid (6A7) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

BROADCAST BAND: Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Reset the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the broadcast padding condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.



MODELS 1901,1907,1911,1921
1932,1955,1957,1961,1981
Chassis X6,BA41
Schematic,Socket,Trimmers
Alignment

SPIEGEL INC.





MODELS 1903, 1960, Chassis 14A
Alignment, Voltage

SPIEGEL INC.

TO ALIGN THE VARIABLE CONDENSER:

It is important when aligning the gang condenser, padding and trimmer condensers to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The padding and trimmer condensers located underneath the chassis and inside of and accessible through the holes found in the top of the catacomb shield (mounted on top and in the left front corner of the receiver) will be referred to by their function as indicated on the circuit diagram.

1. Connect the high output side of the test oscillator through a 400 ohm resistor to the receiver antenna lead and the low side to the set ground.

2. Place the band selector switch for operation on the 5.8 to 18.8 megacycle band, tune the receiver dial, and set the test oscillator frequency to EXACTLY 18.8 MEGACYCLES.

Rotate gang condenser so that plates are completely out of mesh and then tune in the 18.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 18.8 MEGACYCLE OSCILLATOR TRIMMER. When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 18.8 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of the oscillation trimmer at 18 megacycles always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 18.8 megacycles, increase the output of the test oscillator and tune the receiver dial to approximately 17.8 megacycles. Then vary the receiver dial slightly to the right and left of 17.8 megacycles, and if the fundamental peak was used in aligning at 18.8 megacycles the test oscillator signal will be heard at approximately 17.8 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 18.8 megacycle oscillator trimmer must be properly readjusted.

3. With band selector switch set for operation on 5.8 to 18.8 megacycle band tune the receiver dial and set test oscillator frequency to EXACTLY 15 MEGACYCLES. Adjust 15 megacycle antenna and R.F. trimmers to maximum 15 megacycle signal sensitivity.

4. Leave band selector switch for operation on the 5.8 to 18.8 megacycle band, tune the receiver dial and set the test oscillator frequency to approximately 6 megacycles. While rocking gang condenser slightly to right and left adjust 6 megacycle oscillator padder for maximum sensitivity.

5. Place band selector switch for operation on 1.8 to 5.8 megacycle band, tune the receiver dial, and set test oscillator frequency to EXACTLY 5.8 MEGACYCLES.

Rotate gang condenser so that plates are completely out of mesh and then BRING IN 5.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT by adjusting 5.8 megacycle oscillator trimmer.

6. With the band selector switch set for operation on 1.8 to 5.8 megacycle band tune receiver dial and set test oscillator frequency to EXACTLY 5 MEGACYCLES. Then adjust 5 megacycle antenna and R.F. trimmers for maximum 5 megacycle signal sensitivity.

7. Leave band selector switch for operation on 1.8 to 5.8 megacycle band, tune receiver dial and set test oscillator frequency to approximately 2 megacycles. While rocking gang condenser slightly to right and left adjust 2 megacycle oscillator padder for maximum sensitivity.

8. Replace the 400 ohm resistor in series with test oscillator lead with a 200 Mmfd. condenser, place the band selector switch for operation on the 540 to 1730 kilocycle band and set test oscillator frequency to EXACTLY 1730 KILOCYCLES.

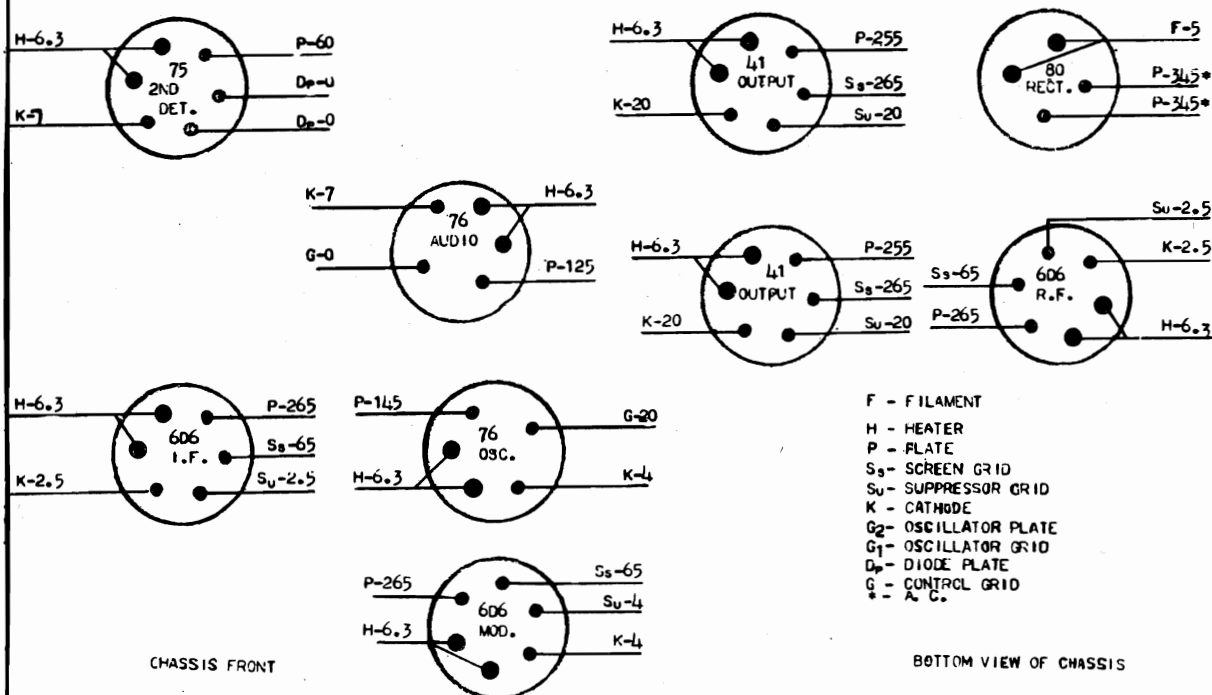
Rotate gang condenser so that plates are completely out of mesh and BRING IN THE 1730 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1730 KILOCYCLE OSCILLATOR TRIMMER.

9. With band selector switch placed for operation on the 540 to 1730 kilocycle band set test oscillator frequency and receiver dial to EXACTLY 1400 KILOCYCLES. Adjust 1400 kilocycles R. F. and antenna trimmers for maximum 1400 kilocycle signal sensitivity.

10. Leave band selector switch for operation on 540 to 1720 kilocycle band, tune receiver dial and set test oscillator frequency to approximately 600 kilocycles. While rocking gang condenser slightly to right and left adjust 600 kilocycle oscillator padder for maximum sensitivity.

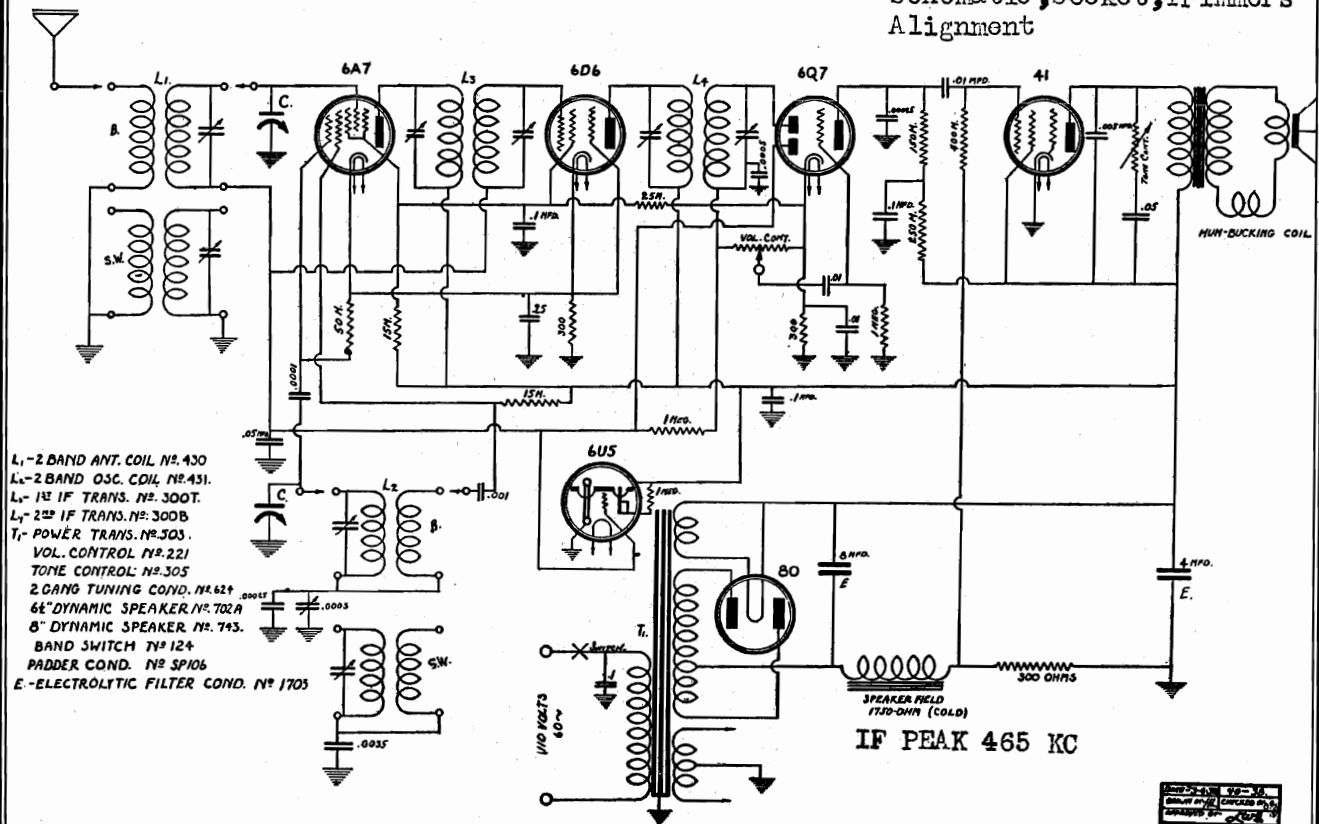
VOLTAGE TABLE

LINE VOLTAGE : 115 VOLTS AC
MEASURE VOLTAGES BETWEEN CHASSIS AND SOCKET PRONGS



SPIEGEL INC.

MODELS 2000, 2001, 2050, 2051
2008, 2009, 2018, 2019
Chassis 40
Schematic, Socket, Trimmers
Alignment



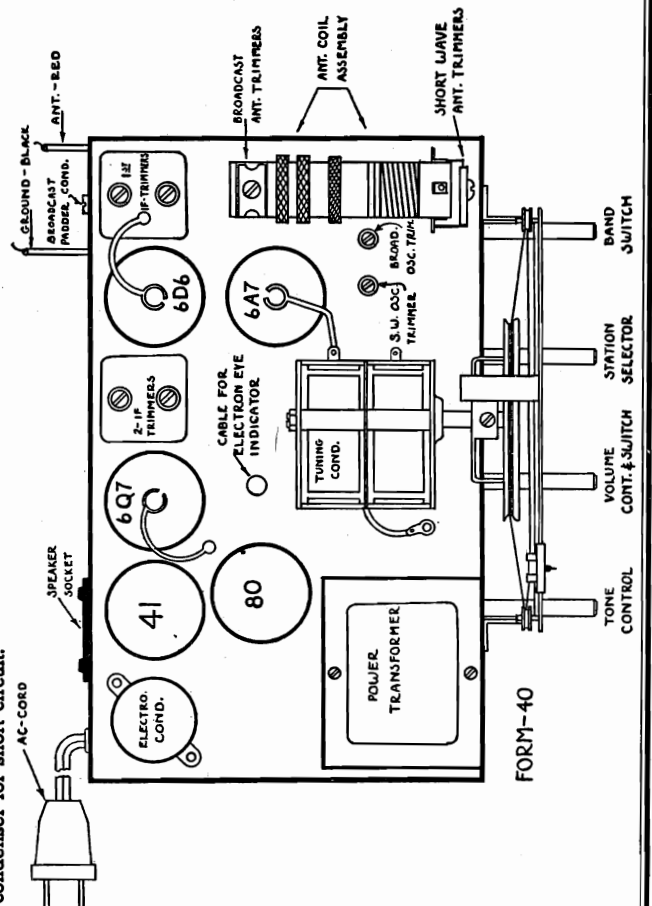
ALIGNMENT DATA

The alignment of this receiver requires the use of a test oscillator that will cover the following frequencies, 465, 600, 1400, 6000, and 15000 K.C. and an output meter which is to be connected across the output transformer on the speaker. All alignments should be made with the volume control set at maximum and the output of the test oscillator set as low as possible to prevent the automatic volume control from operating and thus giving incorrect readings during alignment.

INTERMEDIATE FREQUENCY: Set oscillator to 465 KC. Feed this to the grid of the pentagrid (6A7) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer. **BROADCAST BAND:** Set the band switch for broadcast reception. Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the broadcast padding condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.

SHORT WAVE: Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 400 ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.

It is advisable to check the sensitivity at 6000 KC to determine whether the circuits are properly aligned. Should the receiver lack sensitivity at this frequency check the .0035 mica condenser for short circuit.



MODELS 2000, 2001, 2050, 2051
2008, 2009, 2018, 2019
MODELS 2064, 2065, 4014, 4064
4066 (1937)

SPIEGEL INC.

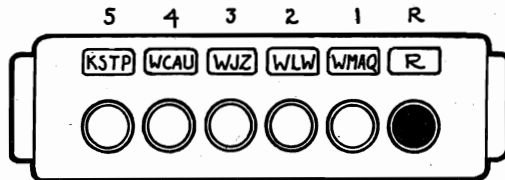
MODELS 2070, 2071, 4076 (1937)
Tuner Data

MODELS 2000, 2001, 2050, 2051, 2008, 2009,
2018, 2019 Chassis 40

Push Button Station Selector

ADJUSTMENT

The five stations wanted should be decided upon as this will determine which button must be used. Button number 1 as indicated in figure one is used for stations whose transmitting frequencies are between 820 K.C. and 1500 K.C. (as shown on the dial). Buttons 2 and 3 for stations whose frequencies are between 750 and 1400 K.C. Button number 4 for stations whose frequency is from 590 to 1150 and button 5 for those stations whose frequencies are between 540 and 1000 K.C.



FRONT VIEW

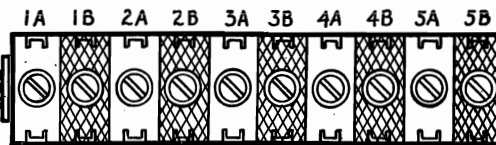
FIGURE 1

If a desired station falls in the range of button 1, tune the radio to this station with the colored button on the push button control panel pressed in (this button releases the automatic tuner and provides for manual tuning of the receiver.)

Press in button 1 and with a screw driver turn adjusting screw 1B as shown in figure 2 until this same station is heard, then turn screw 1A until the station is heard with maximum volume as indicated by the closing of the electric eye on the front panel. Carefully re-adjust 1A and 1B again for maximum volume.

DO NOT FORCE the screws as the threads may be sheared and rendered useless. This may happen if you do not observe what range the station falls into, and thus use the wrong push button.

Proceed with button 2 in a similar way, first pressing in the manual tuning button and tuning to the desired station then pressing button 2 and adjusting screws 2B and 2A to the same program. Buttons 3, 4, and 5 are adjusted in a similar manner using screws 3B and 3A for the third button; 4B and 4A for the fourth button, etc.



CONNECTIONS

REAR VIEW

FIGURE 2

TO CHASSIS.

FIG. 2

NOTE:—In some models the odd color release button is located to the extreme left instead of to the right as indicated in figure one. Thus if the release button is to the extreme left the adjustment screws in figure 2 are reversed. Reading from left to right they become 5B-5A-4B-4A etc.

CAUTION

It is important that the adjustments be carefully made otherwise the reception of the radio station will be distorted and lacking in volume. In some instances it is advisable to re-adjust all the screws a few days after the initial setting to compensate for any drift due to room temperature, humidity, etc.

OPERATION

For manual tuning, press the release button and proceed to tune stations in the usual manner with the station selector knob.

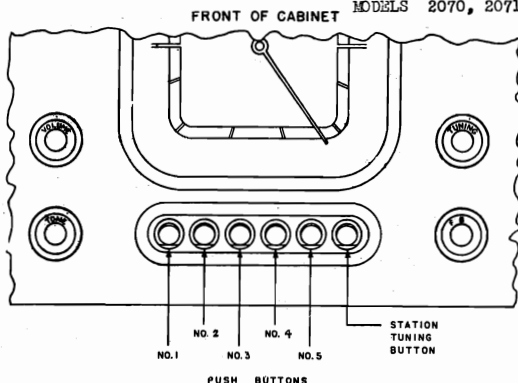
Do not attempt to press more than one button at a time as this will not tune any additional stations. Although this will not in any way injure the unit, it may result in the radio receiver squealing and having excessive interference.

To operate the automatic station tuning control it is only necessary to press in any one of the five station tuning buttons. This automatically disengages the manual tuning control from the electrical circuit. Thus it is possible to leave the dial tuned to any station and yet use the automatic push button station selector.

THE ODD COLORED RELEASE BUTTON SHOULD ALWAYS BE IN WHENEVER THE REGULAR TUNING KNOB IS USED TO SELECT THE STATIONS.

Station Call Letters may be inserted in the spaces provided and can be changed at will.

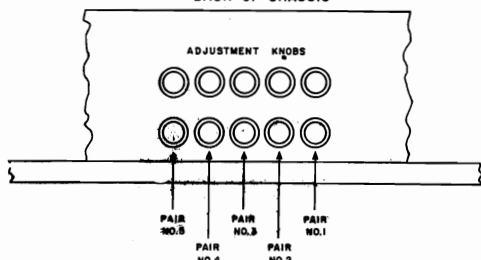
MODELS 2064, 2065, 4014, 4064, 4066 (1937) Chassis 745
MODELS 2070, 2071, 4076 (1937) Chassis 1105



PUSH BUTTONS

If desired the tuning dial may be left set to a station which is not set up on one of the buttons. The "Dial Tuning" button will then tune in this station when it is pressed. This will give an extra Instamatic tuned station, making a total of six different stations which can be instantly tuned in by simply pressing a button.

BACK OF CHASSIS



The approximate frequency coverage of each of the "Instamatic" control buttons is as follows:

- 1—Stations between 540 and 1000 K.C.
- 2—Stations between 540 and 1000 K.C.
- 3—Stations between 750 and 1200 K.C.
- 4—Stations between 750 and 1200 K.C.
- 5—Stations between 1000 and 1500 K.C.

INSTAMATIC TUNING

The purpose of Instamatic tuning is to give the user instant, automatic tuning of any one of a selection of favorite broadcast stations. The control buttons are conveniently located just below the tuning dial. Pushing in any button will release any other button which happens to be already in. After the Instamatic tuning feature has been properly adjusted, this will instantly and automatically tune in the station selected by this button.

Before attempting to adjust or use Instamatic tuning, the "Installation" and "Operation" instructions must be carefully followed. When the receiver is operating satisfactorily using the tuning dial with the "Dial Tuning" button pressed in, the Instamatic feature may be easily adjusted by carefully following these instructions.

Located on the back of the chassis is a row of five pair of small bakelite adjustment knobs. Each pair of these knobs controls the tuning of the station for the Instamatic button which is in the same relative position.

With the receiver operating with the "Dial Tuning" button in and the wave switch on broadcast position, turn the tuning knob to the left until the 540 KC end of the band has been reached. Then turn the tuning knob to the right until a station, for which it is desired to have Instamatic tuning, is heard. Press in the Button No. 1: This is the button at the left hand end of the row. Reach around to the back of the receiver and turn upper knob of the Pair No. 1 until the same program is heard. Unless the wrong knob is being turned, several different stations will be heard during this procedure. If necessary to check that the same program is now tuned in, the "Dial Tuning" button may again be pressed. In this way it can be determined that the same station is tuned in with the Instamatic button as when the "Dial Tuning" button is in. If it is not the same station the adjustment knob should be turned again and these operations repeated until the same program is heard when either of these two buttons is pressed.

The bottom adjustment knob of the first pair is now turned until the station is heard the best. Both top and bottom knobs may then be adjusted to exact tuning by watching the magic eye and adjusting until the two edges of the green section are as close together as it is possible to get them.

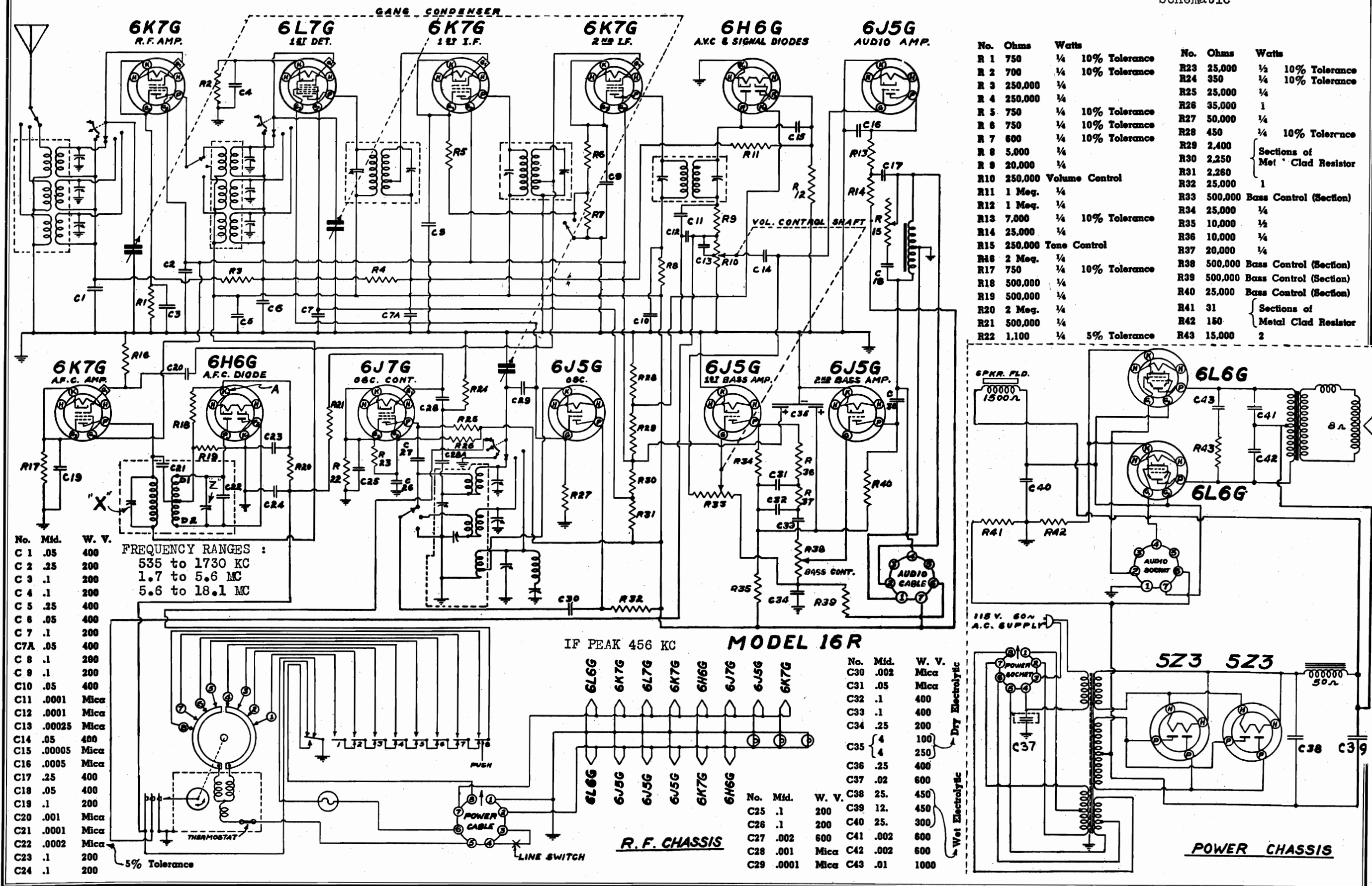
The first Instamatic button is now properly adjusted for the station which was tuned in on the dial and the station's call letters may be pushed out of the button list, moistened on the back, and pressed into the hollow end of the button.

With the "Dial Tuning" button pressed in, the tuning knob is again turned to the right until the next station for which Instamatic tuning is wanted, is tuned in. The adjustment process for this station is the same as before, except that Button No. 2 and Pair No. 2 adjustment knobs are used. Proceeding in this way all five of the buttons may be properly adjusted for the stations desired.

It must be remembered that the "Dial Tuning" button must be pressed in whenever it is desired to tune in stations with the tuning knob, regardless of which wave band is in use. It must also be remembered that the wave switch must be in the broadcast position when Instamatic tuning is being used.

SPIEGEL INC.

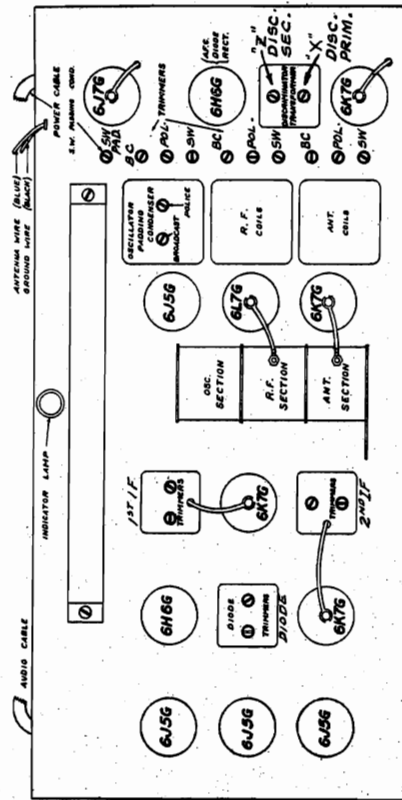
MODELS 2060,2061,4056,4074
Chassis 16R
Schematic



No.	Ohms	Watts		No.	Ohms	Watts	
R 1	750	¼	10% Tolerance	R23	25,000	½	10% Tolerance
R 2	700	¼	10% Tolerance	R24	350	¼	10% Tolerance
R 3	250,000	¼		R25	25,000	¼	
R 4	250,000	¼		R26	35,000	1	
R 5	750	¼	10% Tolerance	R27	50,000	¼	
R 6	750	¼	10% Tolerance	R28	450	¼	10% Tolerance
R 7	600	¼	10% Tolerance	R29	2,400	{	Sections of Met ' Clad Resistor
R 8	5,000	¼		R30	2,250		
R 9	20,000	¼		R31	2,260		
R10	250,000	Volume Control		R32	25,000	1	
R11	1 Meg.	¼		R33	500,000	Bass Control (Section)	
R12	1 Meg.	¼		R34	25,000	¼	
R13	7,000	¼	10% Tolerance	R35	10,000	½	
R14	25,000	¼		R36	10,000	¼	
R15	250,000	Tone Control		R37	20,000	¼	
R16	2 Meg.	¼		R38	500,000	Bass Control (Section)	
R17	750	¼	10% Tolerance	R39	500,000	Bass Control (Section)	
R18	500,000	¼		R40	25,000	Bass Control (Section)	
R19	500,000	¼		R41	31	{	Sections of Metal Clad Resistor
R20	2 Meg.	¼		R42	150		
R21	500,000	¼		R43	15,000	2	
R22	1,100	¼	5% Tolerance				

No.	Mid.	W. V.
C 1	.05	400
C 2	.25	200
C 3	.1	200
C 4	.1	200
C 5	.25	400
C 6	.05	400
C 7	.1	200
C7A	.05	400
C 8	.1	200
C 9	.1	200
C10	.05	400
C11	.0001	Mica
C12	.0001	Mica
C13	.00025	Mica
C14	.05	400
C15	.00005	Mica
C16	.0005	Mica
C17	.25	400
C18	.05	400
C19	.1	200
C20	.001	Mica
C21	.0001	Mica
C22	.0002	Mica
C23	.1	200
C24	.1	200

No.	Mfd.	W.
C30	.002	Mico
C31	.05	Mico
C32	.1	400
C33	.1	400
C34	.25	200
C35	$\left\{ \begin{array}{l} 4 \\ 4 \end{array} \right.$	$\left\{ \begin{array}{l} 100 \\ 250 \end{array} \right.$
C36	.25	400
C37	.02	600
C38	25.	450
C39	12.	450
C40	25.	300
C41	.002	600
C42	.002	600
C43	.01	1000



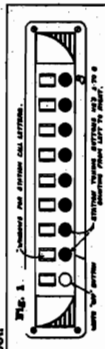
I.F. ALIGNMENT - Generator at 456 KC, connected to control grid of 6L7 thru .05 MFD condenser, align 1st, 2nd, and Diode transformer trimmers to peak. Connect a 0-200 micro-ammeter between the ungrounded cathode of the 6HG AFG diode rectifier and ground. The methods indicated are point "A" in the schematic. Place a 100 MPPD condenser across the secondary of the discriminator transformer. These terminals are indicated as points "B" and "C" in the schematic. The primary is tuned to the secondary circuit during the following primary adjustment: The primary is tuned to the secondary circuit during the signal grid of the 6L7 and adjusting the trimmer marked "A" so that the schematic and the chassis layout, to give a maximum meter indication. Signal strength should be approximately 100,000 micro volts for the adjustment. With reduced signal strength, the adjustments of the entire I.F. system, for maximum sensitivity. The volume control should be on full for all adjustments. Without disturbing the generator or any of the other adjustments, the trimmer "B" (Disc. Sec.) should be adjusted as follows: Remove the 100 MPPD condenser from across the discriminator secondary, increase the generator signal to approximately 100,000 micro volts, with volume control turned down to limit audio output, slowly turn the trimmer "B" until a sudden sharp drop in current occurs. The meter will now probably read in reverse and off scale. Reverse trimmer adjustment bringing meter reading to zero. Used only a non-metallic screw driver. It is some-times convenient to use an offset of "remote zero" setting of the micro ammeter in making the adjustments so that zero current setting is higher on the scale. After the discriminator has been brought to zero by the above described method the I.F. alignment and discriminator tuning is completed, and R.F. alignment may be accomplished.

BROADCAST BAND - Generator at 1730 KC, connected to the antenna thru a 200 MFD condenser, variable condenser at minimum, peak oscillator trimmer. Generator at 1400 KC, tuning in signal, peak the RF and antenna trimmer. Generator at 800 KC, while rocking variable condenser, peak the oscillator peaking condenser.

POLICE BAND - Generator at 5600 KC, connected to antenna thru 400 Ohm resistor, variable condenser at minimum, peak oscillator trimmer. Generator at 5000 KC, tune in signal, peak RF and antenna trimmer. Generator at 1800 KC, while rocking variable across resistor, peak the oscillator circuit for maximum response.

SHORWAVE BAND - Generator at 18100 KC, gang condenser at minimum, peak oscillator trimmer. Generator at 15000 KC, locate signal on receiver, peak RF and antenna trimmer. Generator at 8000 KC, while rocking variable across signal, peak SW peaking condenser.

est frequency. After all eight (8) stations have been adjusted, check each adjustment by tuning in each station. NOTE: In the window above the white button insert the word "OFF" found in the call letter sheet.



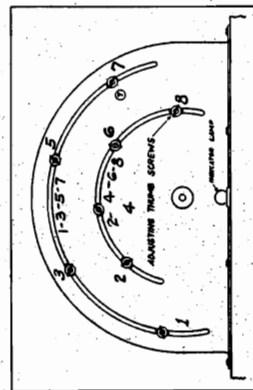
HOW TO TUNE IN STATIONS USING THE ELECTRIC PUSH BUTTON TUNER

ELECTRIC PUSH BUTTON TUNER

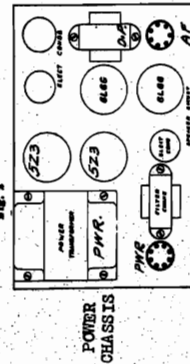
If the station fails to come in clearly, check the adjustment by following the adjustment procedure described in the paragraph above. If by chance all of the buttons are pressed in, they may be released by pressing any one button all the way in.

Pressure and Push One button can do the way an antenna can. To change from electronic tuning to manual selecting, simply press in the white button. When the white button is in, the set may be tuned as a conventional receiver. **Note:** If it is desired to tune Short Wave or Police while the set is being operated with push buttons, it is not necessary to change over from push button tuning to manual tuning. Simply turn the band

button tuning to manual tuning. Simply turn the band switch and proceed to tune with the selector knob. When the band switch is returned to broadcast the station last selected by button will automatically tune in by itself.

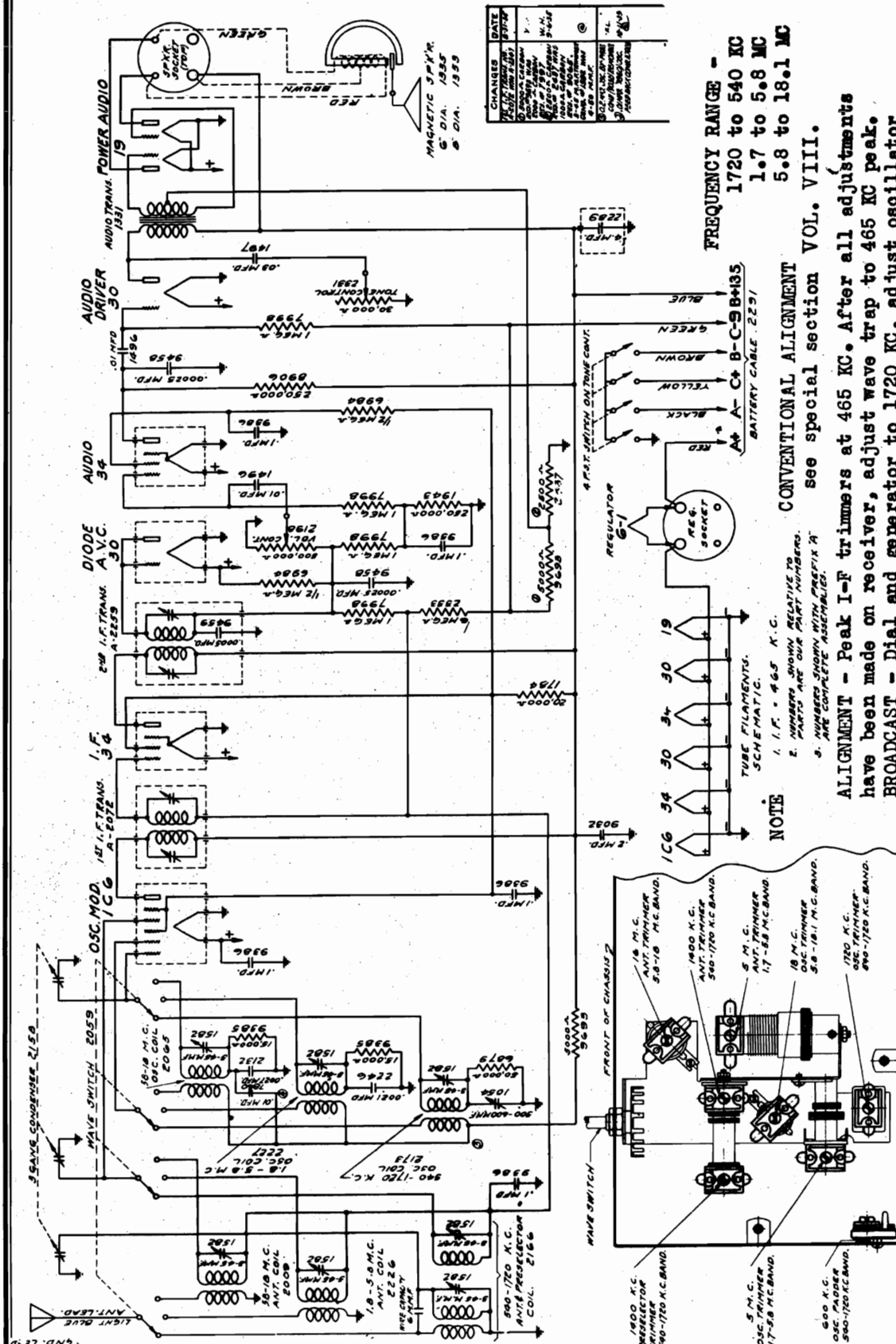


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By pressing the white button in the car air it will go. With the white button still in, tune in the station of the next highest frequency and holding the white button, press in button number two (2). Both buttons are now locked into place. Loosen thumb screw number two (see Figure 2) and slide back and forth until a point is reached at which the pilot lamp in the rear goes out; tighten the thumb screw. Insert the proper station call into the window of button number two (2). Follow this same procedure for the remaining stations, always choosing the station with the next highest

Let more oil spill, raising an estimated \$400 million



FREQUENCY RANGE -
1720 to 540 KC
1.7 to 5.8 MC
5.8 to 18.1 MC

CONVENTIONAL ALIGNMENT
see special section VOL. VIII.
5.8 t

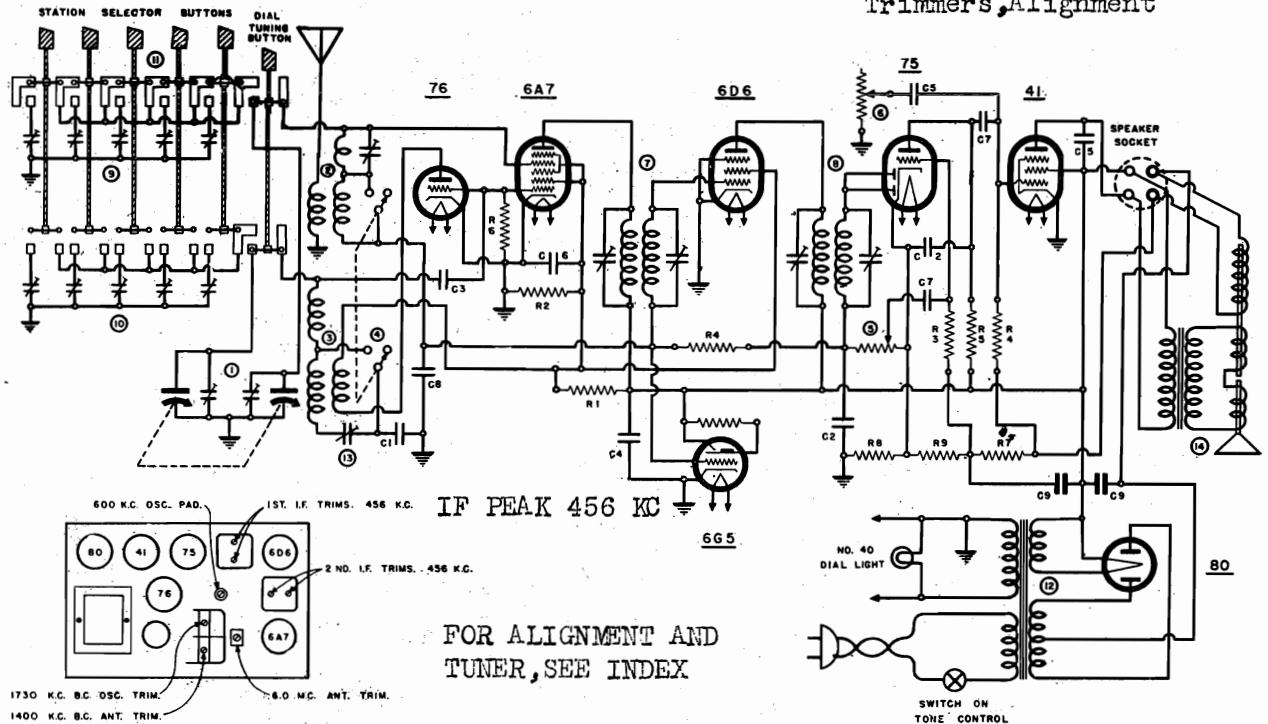
ALIGNMENT - Peak I-F trimmers at 465 KC. After all adjustments have been made on receiver, adjust wave trap to 465 KC peak. BROADCAST - Dial and generator to 1720 KC, adjust oscillator trimmer to peak. Dial and generator to 1400 KC, adjust antenna trimmer to peak. Dial and generator to 600 KC, pad oscillator. DIAL - Dial and generator to 5 MC, peak oscillator trimmer, WAVE FOREIGN BAND - Dial and generator to 18 MC, peak the generator to 16 MC and peak the antenna trimmer. NOTE - Rook the on broadcast band. No padding required on other bands.

REAR OF CHASSIS

BOTTOM VIEW OF CHASSIS SHOWING
LOCATION OF TRIMMERS & PADDERS.

SPIEGEL INC.

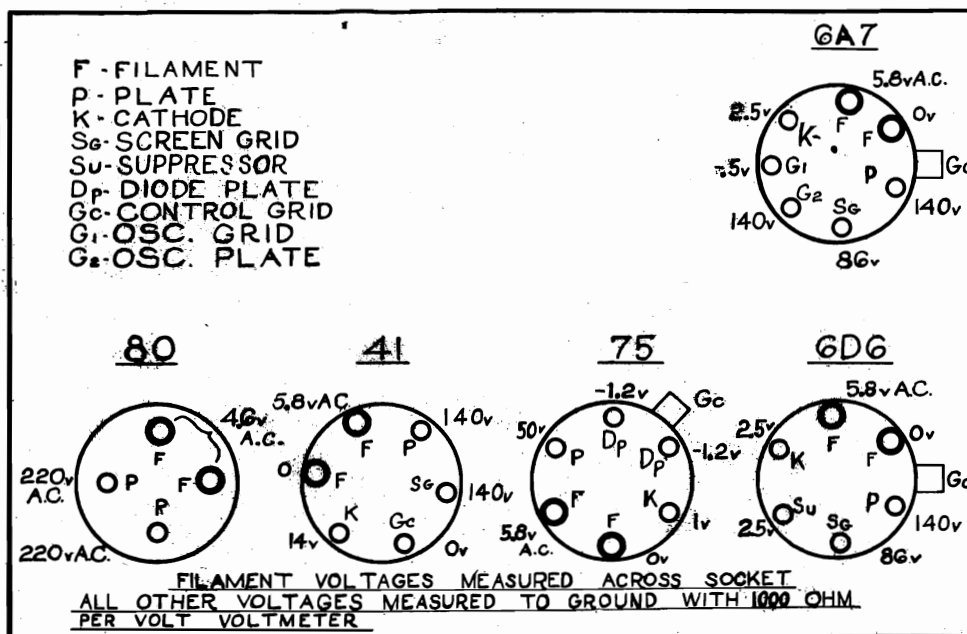
MODELS 2064, 2065, 4014, 4064
4066 Chassis 745 (1937)
Schematic, Voltage, Socket
Trimmers, Alignment



FOR ALIGNMENT AND
TUNER, SEE INDEX

PART NO.	DESCRIPTION	PART NO.	DESCRIPTION	PART NO.	DESCRIPTION	745
R1 60-152	6000 OHM 2W. CARBON RES.	C1 15-101	.00148 MFD. MICA COND. 45V.	1 19-113	2 GANG CONDENSER	
R2 6117	25,000 - 1/2W.	C2 1504	.00025 - - -	2 10-173	ANT. COIL	
R3 6020	2 MEG. - 1/3W.	C3 1503	.00005 - - -	3 10-147	OSC. COIL	
R4 6018	500,000 - - -	C4 1602	1 MFD. 600V TUBULAR COND.	4 69-108	WAVE SWITCH	
R5 6024	250,000 - - -	C5 1651	.004 - - -	5 24-105	VOLUME CONTROL	
R6 6028	40,000 - - -	C6 1607	.05 - 400V. - -	6 26-106	TONE CONTROL WITH SWITCH	
R7 60-100	200 OHM 1W. WIRE WOUND	C7 1603	.01 - - -	7 10-201	1ST. I.F. TRANSFORMER	
R8 60-101	50 - 1/2W - - -	C8 1622	.05 - 200V. - -	8 10-202	2ND. I.F. - -	
R9 60-104	20 - - - - -	C9 18-213	DUAL 8 MFD. 300V. ELECTROLYTIC	9 20-106	ANT. TRIMMER STRIP	
				10 20-107	OSC. - -	
				11 69-115	PUSH BUTTON SWITCH	
				12 80-137	POWER TRANSFORMER	
				13 20-100	OSC. PADGING COND.	
				14	CF-SPEAKER	

SOCKET VOLTAGES



DESCRIPTION

This receiver is a 7 tube alternating current operated superheterodyne.

The tubes used are a 76 as oscillator, a 6A7 as modulator, a 6D6 as I. F. amplifier, a 75 as A. V. C. and audio rectifier and audio voltage amplifier, a 41 as power audio amplifier, an 80 as a power rectifier and a 6G5 as tuning indicator.

This receiver is made to cover 2 tuning bands, the standard broadcast band which ranges from 1730 K.C. to 535 K.C. and the middle or police band which has a frequency range of from 6.4 M.C. to 2.1 M.C.

MODELS 2070, 2071, 4076
Chassis 1105
Schematic, Voltage
Socket

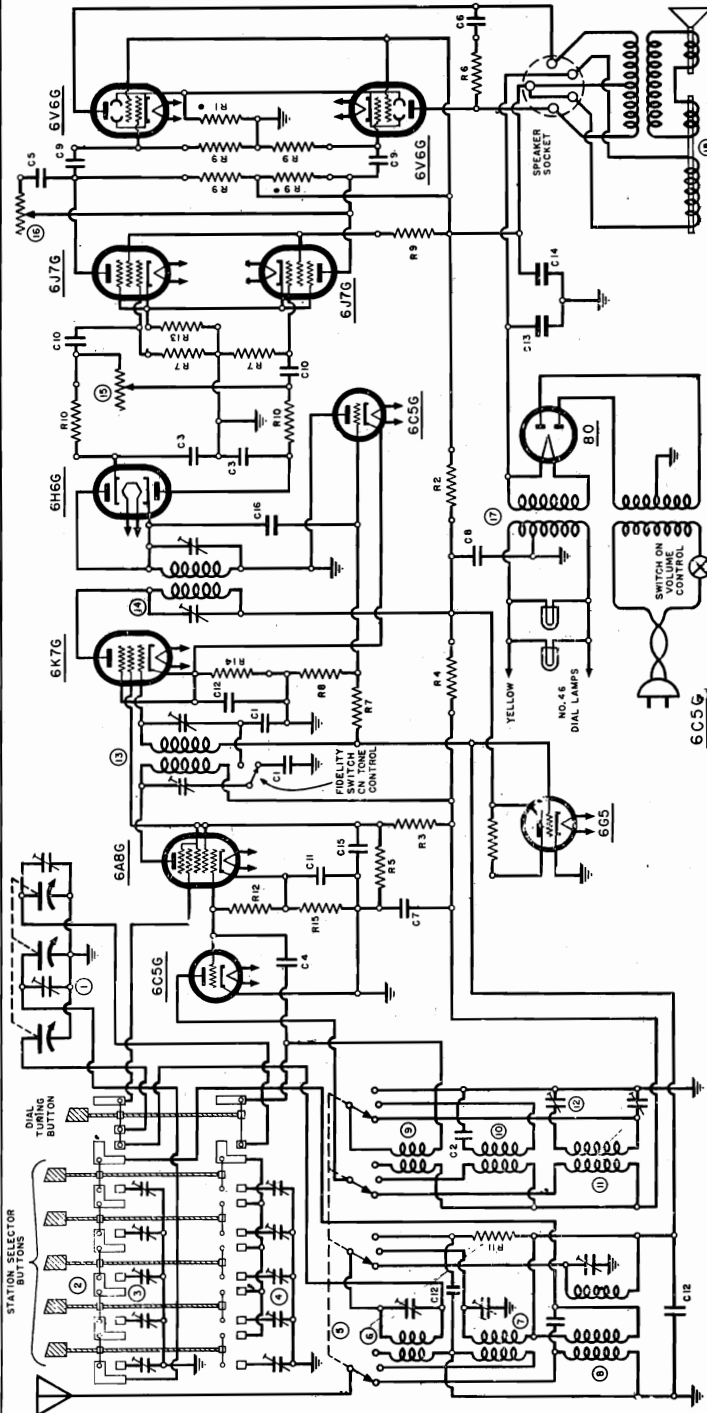
SPIEGEL INC.

DESCRIPTION

This receiver is an 11 tube alternating current operated superheterodyne.

The tubes used are a 6C5G oscillator, a 6A8G modulator, a 6K7G I.F. amplifier, a 6C5G A.V.C. rectifier, a 6H6G detector, a pair of 6J7G audio amplifiers, a pair of 6V6G power amplifiers, an 80 rectifier, and a 6G5 tuning indicator or magic eye.

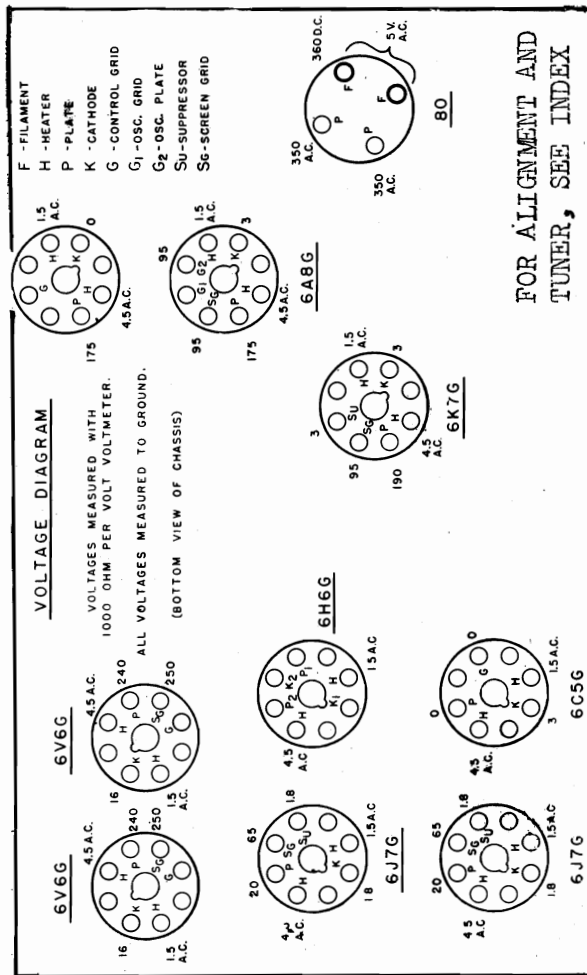
This receiver is made to cover 3 tuning bands, the standard broadcast band which ranges from 1680 K.C., to 535 K.C., the middle or police band which has a frequency range of from 5.4 M.C. to 1.7 M.C. and the high frequency or foreign band which is from 19 M.C. to 5.0 M.C.



PART NO.	DESCRIPTION
R1 6844	250 OHM 1/2W. MET. WOUND RES.
R2 80-143	3000 OHM 1/2W. CARBON RES.
R3 4509	5000 OHM 1/2W.
R4 4508	1000 OHM 1/2W.
R5 6105	100,000 OHM 1/2W.
R6 6017	1.0 MEGOHM 1/2W.
R7 6018	500,000 OHM 1/2W.
R8 6025	100,000 OHM 1/2W.
R9 6026	50,000 OHM 1/2W.
R10 6027	100,000 OHM 1/2W.
R11 6028	100,000 OHM 1/2W.
R12 6029	100,000 OHM 1/2W.
R13 6030	100,000 OHM 1/2W.
R14 6031	300 OHM 1/2W.
R15 6032	250 OHM 1/2W.

PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
1 19-121	3 GANG. CONDENSER	10 10-180	8 C. 1/2" DIA. TRANS.
2 69-115	6 BUTTON PUSH BUTTON SWITCH	11 10-180	8 C. 1/2" DIA. TRANS.
3 20-106	ANT. TRIMMER STRIP	12 10-207	2ND. " "
4 20-107	OSC. TRIMMER STRIP	13 10-207	1ST. OF TRANS.
5 10-183	5W. ANT. COIL	14 10-207	2ND. " "
6 10-182	POL. " " PRESELECTION COIL	15 24-115	VOLUME CONTROL WITH SWITCH
7 10-182	POL. " " PRESELECTION COIL	16 60-142	POWER TRANS.
8 10-182	POL. " " PRESELECTION COIL	17 80-141	SPEAKER
9 10-182	POL. " " PRESELECTION COIL	18	

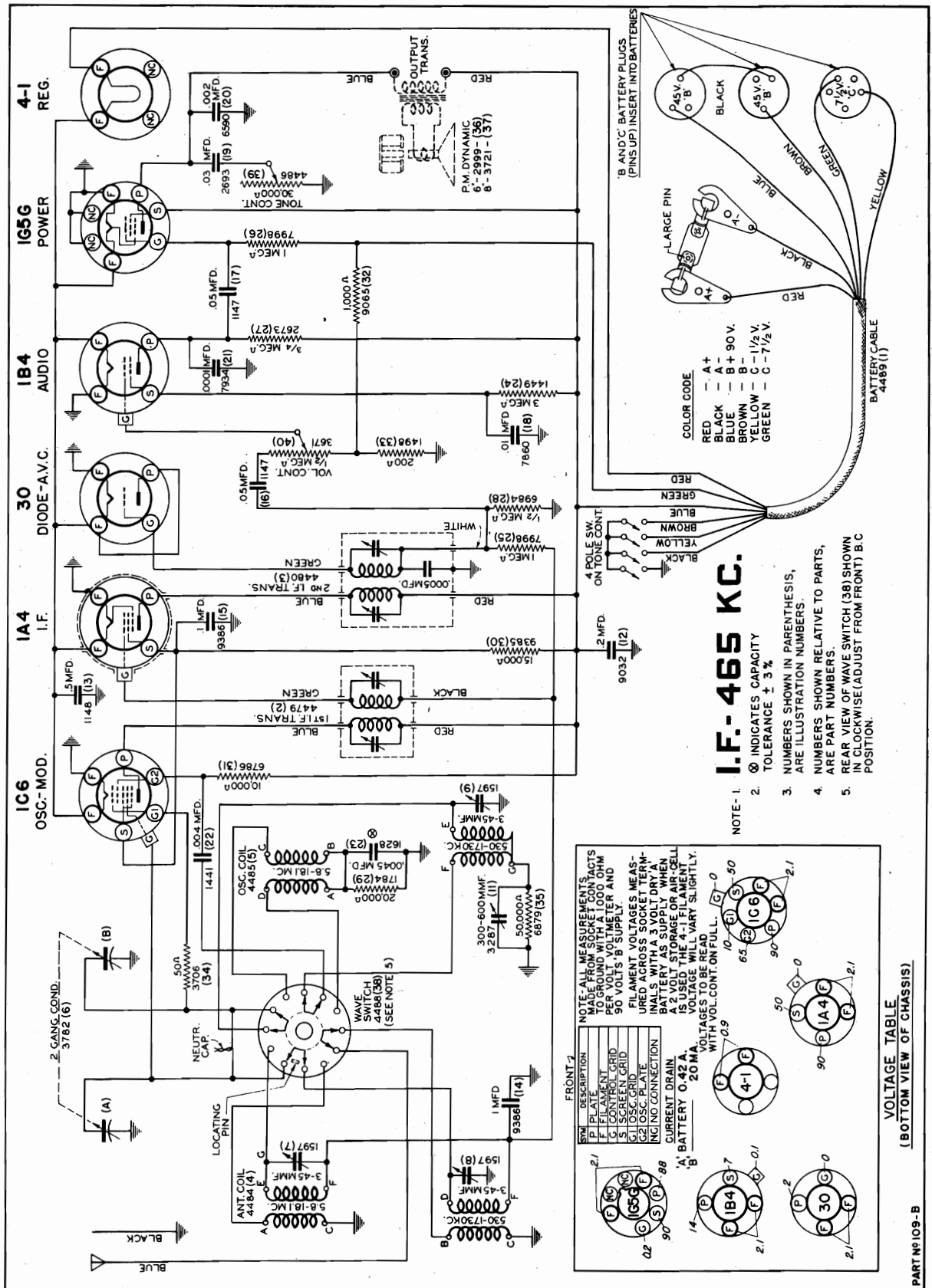
IF PEAK 456 KC



FOR ALIGNMENT AND
TUNER, SEE INDEX

SPIEGEL INC.

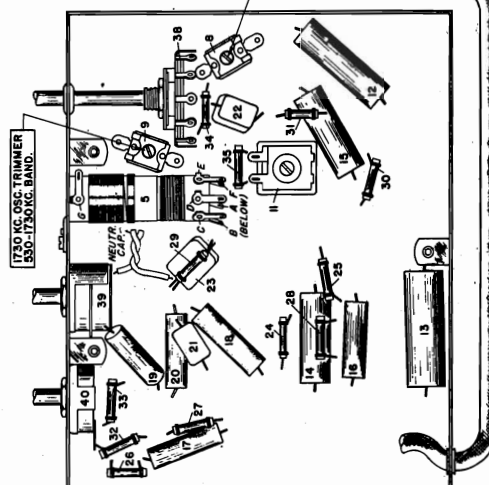
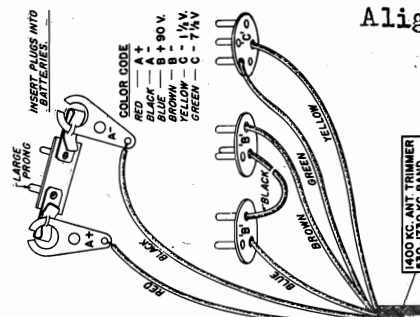
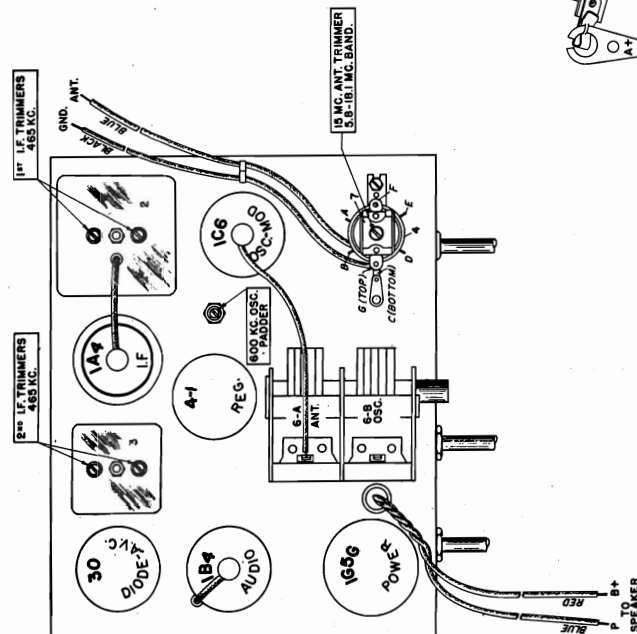
MODELS 2100 to 2103 inc.
2150 to 2153 inc.
Chassis 109B
Schematic, Voltage, Socket



MODELS 2100 to 2103 inc.
2150 to 2153 inc.
Chassis 109B
Alignment, Trimmers, Chassis

SPIEGEL INC.

MODELS 2112, 2113, 2120
2121 Chas. 90B
2108 to 2111
Chassis 1090B
Alignment



ALIGNMENT PROCEDURE:

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, low battery voltage, open or grounded bias resistor, bypass condenser, inadequate, or excessively long antenna, etc. Never attempt to rectify set until all other possible sources of trouble have been first thoroughly investigated and definitely proven 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 TRIMMER AND PADDING CONDENSER WILL BE REFERRED TO BY THEIR FUNCTION, AS SHOWN IN PARTS DIAGRAM.

ALIGNING I.F. STAGE AT 465 KILOCYCLES:

(a) Attach the ground lead of the test oscillator to the chassis. Connect the other lead to the grid of the 1C6 tube through a .02 Mfd. series condenser. **DO NOT REMOVE GRID CLIP.**

(b) Set test oscillator to EXACTLY 465 KILOCYCLES and turn receiver volume control on full.

(c) Peak each of the second I.F. transformer trimmers.

(d) Peak each of the first I.F. transformer trimmers.

ALIGNING 1730-530 KILOCYCLE BAND:

(a) Check tuning dial adjustment by turning 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 the dial needle does not point exactly to the last line move needle to correct position.

(b) Remove test oscillator lead from grid of 1C6 tube and connect to receiver antenna lead through a .00025 Mfd. series condenser.

(c) Adjust band selector switch for operation on the 1730-530 kilocycle band.

(d) Set test oscillator frequency and receiver dial to EXACTLY 1730 kilocycles. Turn chassis on end and adjust 1730 kilocycle oscillator trimmer for maximum 1730 kilocycle test oscillator signal sensitivity.

(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles and adjust 1400 K. C. antenna trimmer for maximum sensitivity.

(f) Set test oscillator frequency and receiver dial to approximately 600 kilocycles. Then while rocking gang condenser slightly to right and left, adjust 600 K.C. oscillator paddler for maximum sensitivity.

ALIGNING 5.8-18.1 MEGACYCLE BAND:

(a) Replace .00025 Mfd. test oscillator antenna lead series condenser with a 400 ohm resistor, and place band selector switch for operation on 5.8-18.1 megacycle band.

(b) Tune receiver dial and set test oscillator frequency to approximately 15 megacycles.

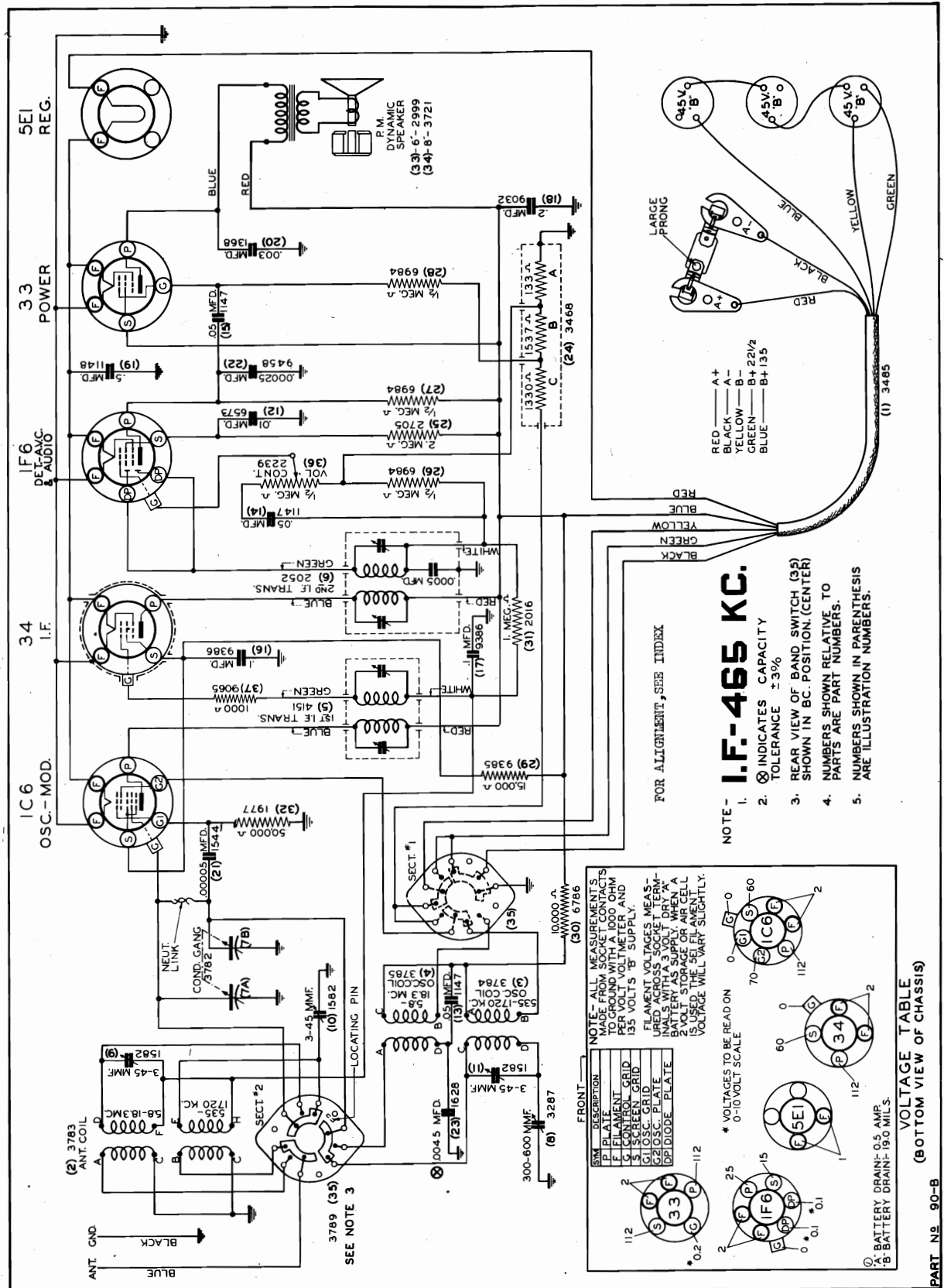
(c) Rock gang condenser slightly to right and left and adjust 15 M.C. antenna trimmer for maximum 15 megacycle test signal response.

To assure more accurate trimmer setting, repeat all above adjustments several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

Schematic, Voltage, Socket

SPIEGEL INC.

MODELS 2112, 2113, 2120,
2121 Chassis 90B
2108 to 2111
Chassis 1090B



MODELS 2112, 2113, 2120, 2121
2108 to 2111 incl.
Socket, Trimmers, Chassis

SPIEGEL INC.

MODELS 2070, 2071, 4076
MODELS 4004, 4052
MODEL 4068
Alignment

MODELS 2070 - 2071 - 4076 , 4004 - 4052 , 4068.

ALIGNMENT PROCEDURE

The equipment required for re-aligning this receiver is an output meter and a modulated source of radio frequency (a signal generator or microvolter). This source of radio frequency must be accurately calibrated in frequency and must have a method of varying the output.

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 10,000 ohms, to the two plate pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Press in the dial Tuning button. Models 2070, 2071, 4076 and 4068.

Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

Leaving the signal generator connected to the grid cap of the 6A7, turn the wave switch to the right hand (short wave) position. Set the dial and the signal generator to 15.0 M.C. Tune in the signal by adjusting the 15.0 M.C. oscillator trimmer. The signal will be heard at two different settings of the trimmer. The proper setting is the one where the signal is heard when the trimmer is the loosest. Also when the dial of the receiver is turned the signal will be heard again at about 14.0 M.C. If the signal is heard at about 16.0 M.C. on the dial instead of 14.0 M.C. the wrong setting has been used and should be corrected.

Set the wave switch on broadcast position, turn the dial to the extreme high frequency end. Feed a 1680 K. C. signal to the receiver antenna post through a .00025 M.F. mica condenser. Adjust the 1680 K.C. broadcast oscillator trimmer for maximum output. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. broadcast antenna trimmer and the 1500 K.C. broadcast preselector trimmer for maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output while tuning the receiver back and forth across the signal from the generator. This completes the alignment of the broadcast band.

The police band is aligned by feeding a 4.0 M.C. signal to the receiver antenna lead through the .00025 M.F. mica condenser. Turn the wave switch to the center position and tune the receiver to this signal. Adjust the 4.0 M.C. police antenna trimmer for best output.

grid cap of the 6A8G tube Models 2070, 2071, and 4076.

The short wave band is aligned in the same way using a 15 M.C. signal and adjusting the 15 M.C. short wave antenna trimmer after having turned the wave switch to the right hand position.

MODELS 2064 - 2065 - 4014 - 4064 - 4066.

ALIGNMENT PROCEDURE

The following alignment procedure is for use only by competent service men having the proper equipment. Re-alignment is very seldom needed and is usually only required after some major part has been replaced because of damage to the receiver.

The equipment required for re-aligning this receiver is an output meter and a modulated source of radio frequency (a signal generator or microvolter). This source of radio frequency must be accurately calibrated in frequency and must have a method of varying the output.

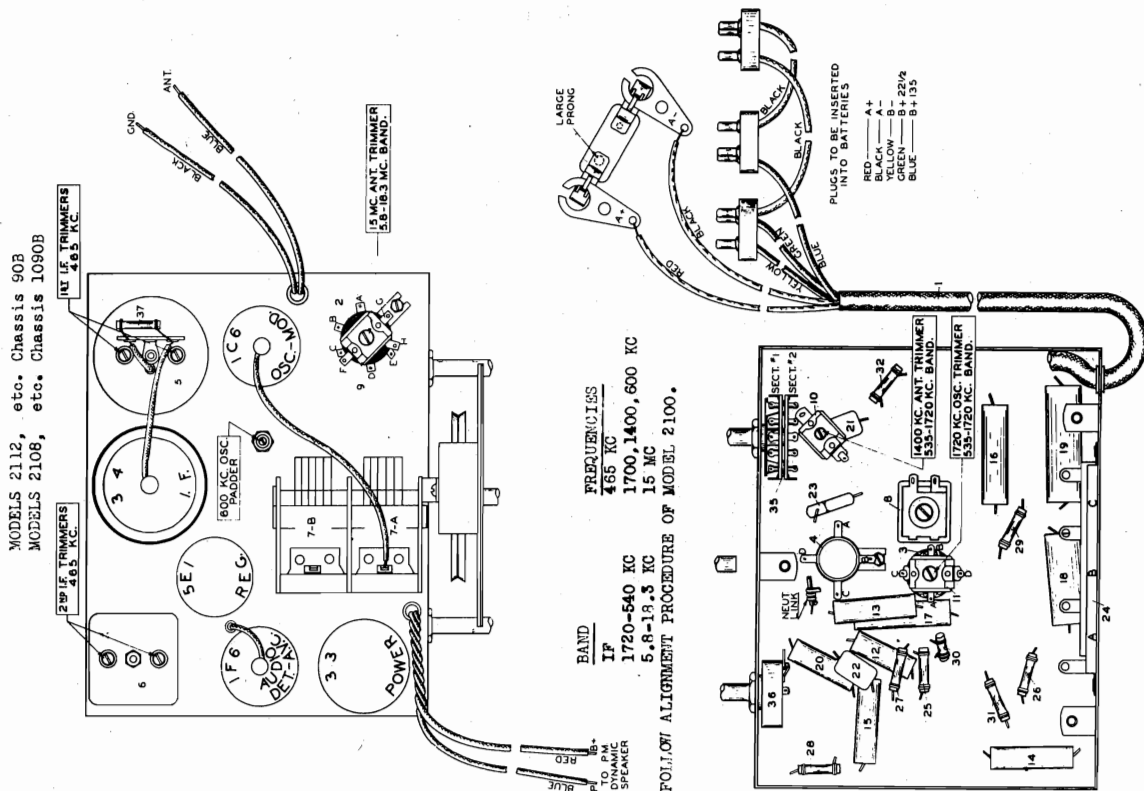
All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

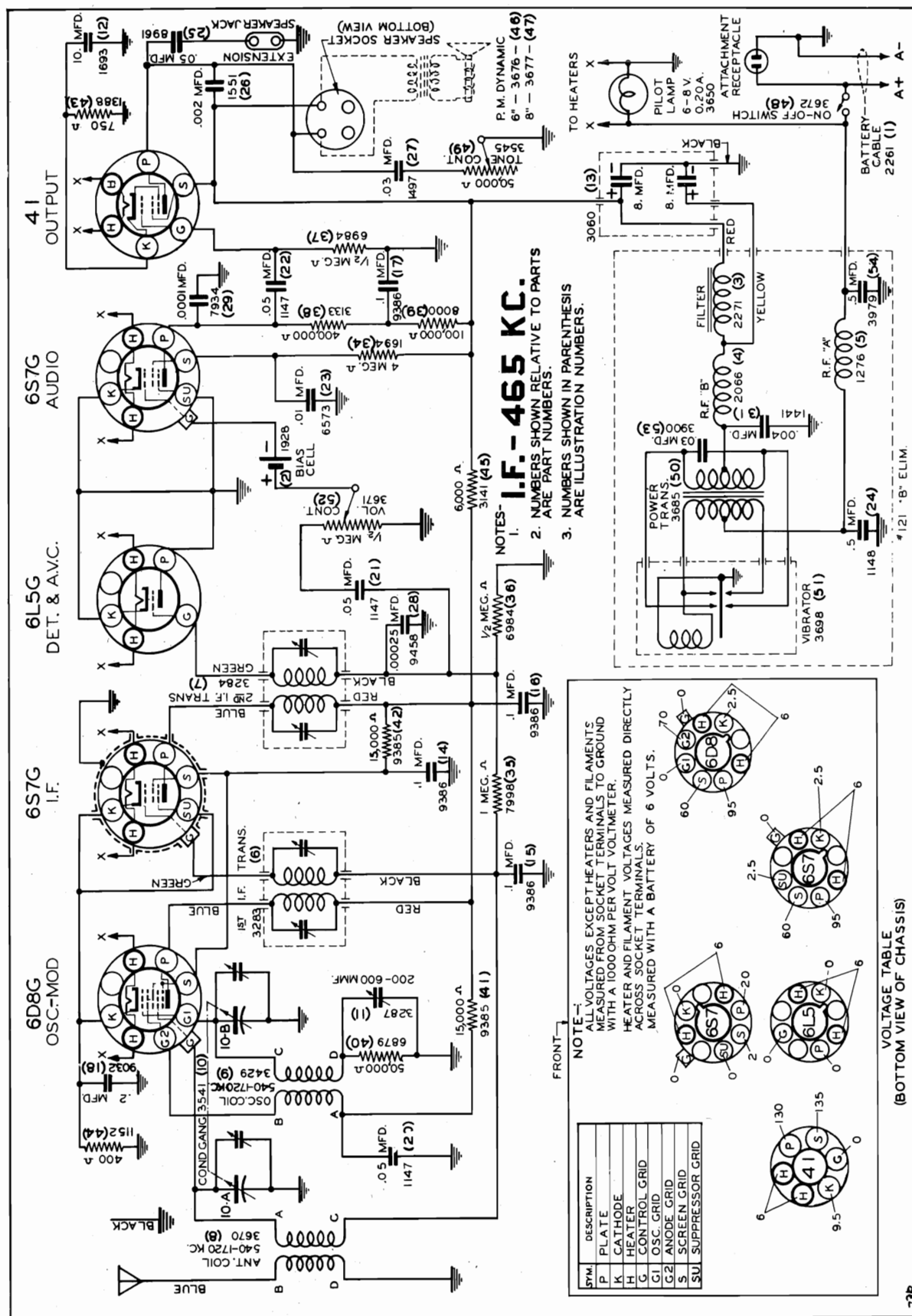
Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. With the wave switch on broadcast position, press in the dial tuning button and set the dial to about 1000 K.C. Then feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

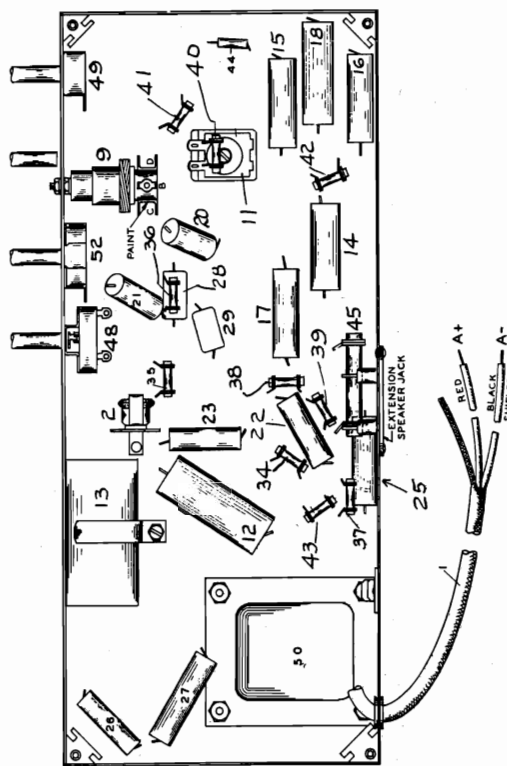
Leaving the wave switch on broadcast position turn the dial to the extreme high frequency end. Feed a 1730 K.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1730 K.C. broadcast oscillator trimmer until maximum output is shown. Set the generator to 1400 K.C. and tune in this signal on the receiver. Then adjust the 1400 K.C. broadcast antenna trimmer to maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output while tuning the receiver back and forth across the signal from the generator. This completes the alignment of the broadcast band.

The short wave band is aligned while feeding a 6.0 M.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Turn the wave switch to short wave position and tune in the 6.0 M.C. signal. Adjust the 6.0 M.C. short wave trimmer to maximum output.



MODELS 2222 to 2229 inc.
Chassis 73B
Schematic, Voltage





- (g) Tune receiver dial and set test oscillator frequency to approximately 600 kilocycles.
- (h) While rocking the tuning condenser back and forth adjust 600 K.C. oscillator pad-der condenser which is accessible through the hole in the top of the chassis adja-cent to the gang condenser for maximum 600 kilocycle signal response.

SPIEGEL INC.

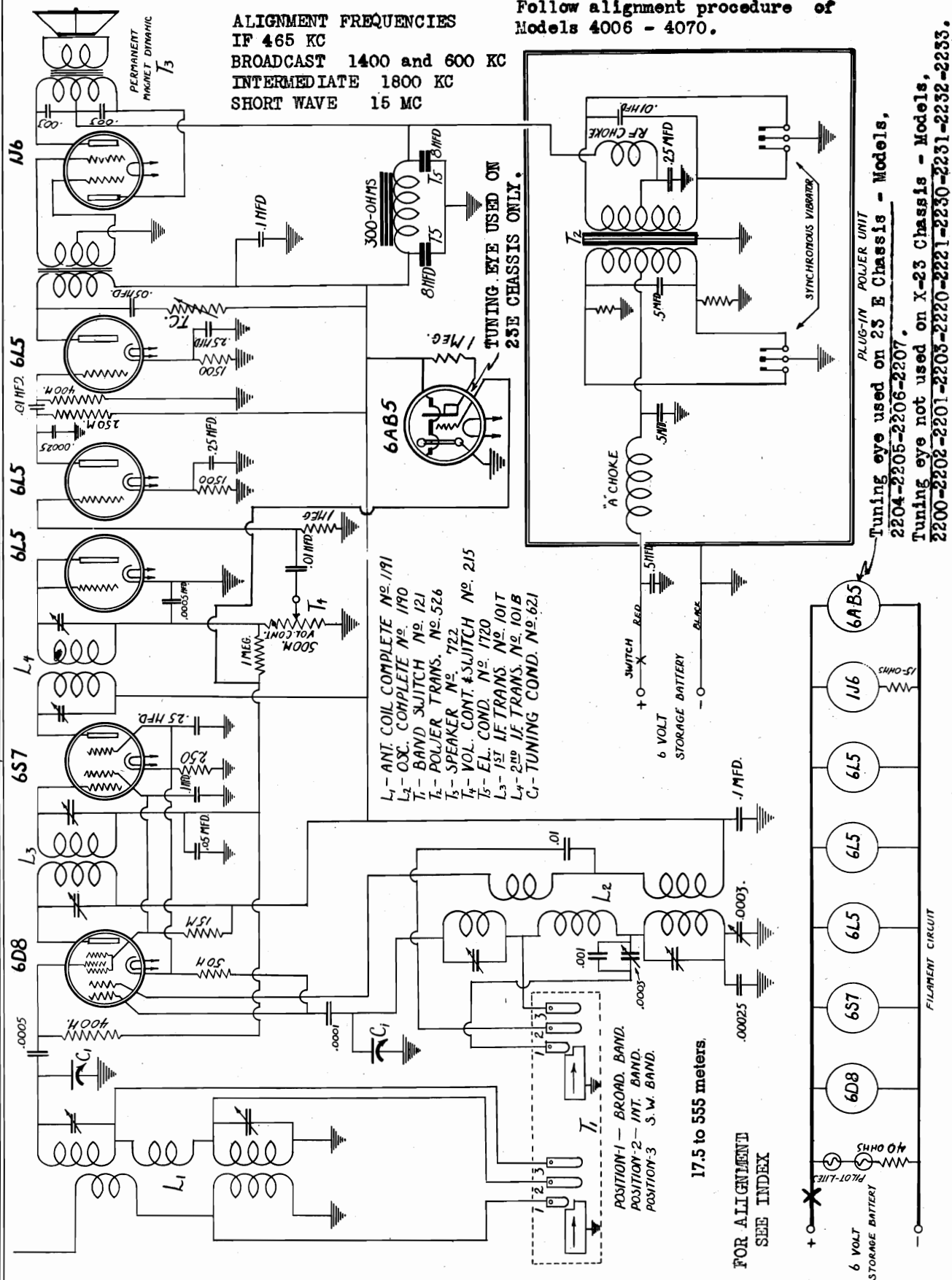
MODELS 2204 to 2207 inc.Chas. 23E
2200 to 2203 inc.,2220,2221
2230 to 2233 inc.Chas. X-23

Schematic Alignment Notes

Follow alignment procedure of Models 4006 - 4070.

ALIGNMENT FREQUENCIES
IF 465 KC
BROADCAST 1400 and 600 KC
INTERMEDIATE 1800 KC
SHORT WAVE 15 MC

**TUNING EYE USED ON
23E CHASSIS ONLY.**

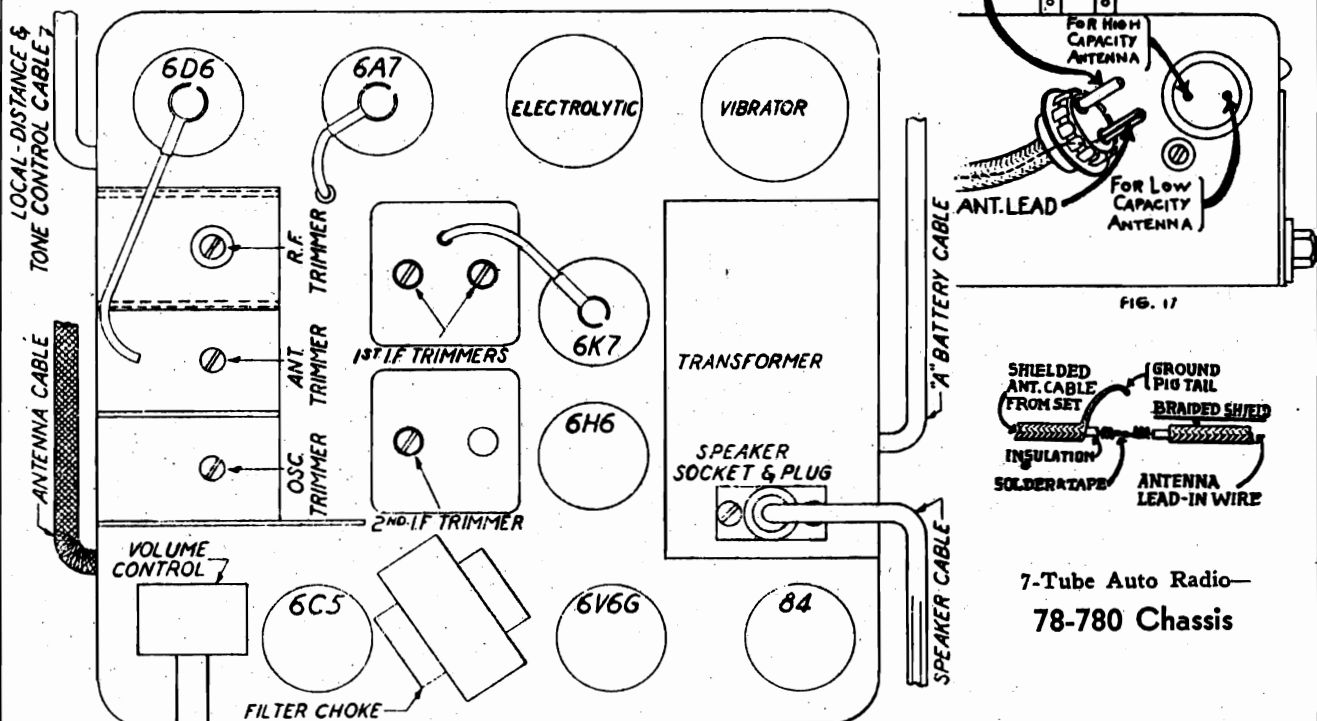
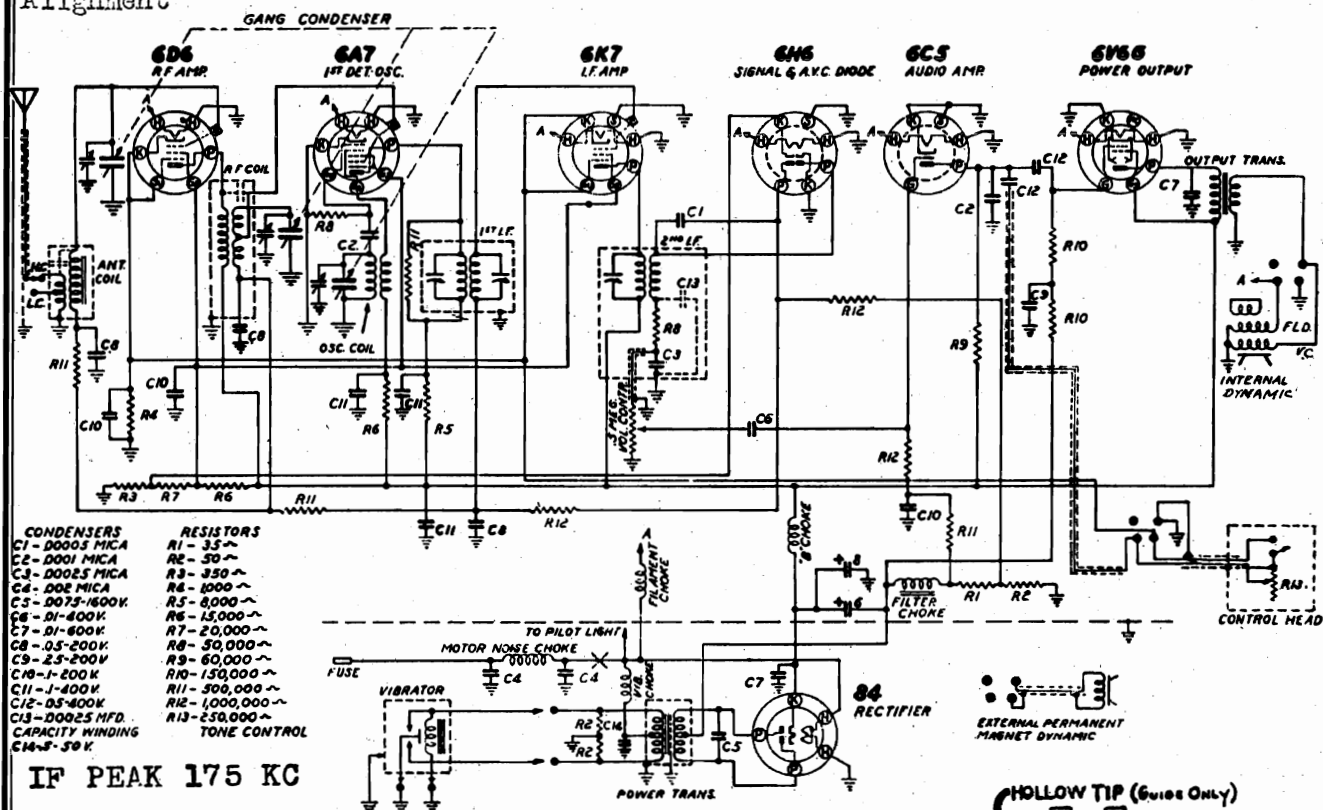


Tuning eye used on 23 E Chassis - Models.

2204-2205-2206-2207.
Tuning eye not used on X-23 Chassis - Models,
2200-2202-2201-2205-2220-2221-2230-2231-2232-2233.

MODELS 2302, 2303 Chas. 78-780
Schematic, Socket, Trimmers
Alignment

SPIEGEL INC.



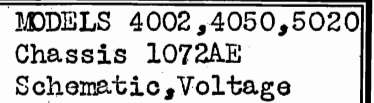
I.F. ALIGNMENT. Adjust the test oscillator to 175 K.C. and connect the output directly to the grid of the first detector tube (6A7), without the use of any series condenser or resistor; the omission of series condenser and resistor to block out the AVC action. The ground on the test oscillator can be connected to the chassis ground. Align the trimmers of the first and second I.F. transformers to peak or maximum reading on the output meter.

OSCILLATOR ALIGNMENT. Adjust the test oscillator to 1400 K.C. and connect the output to the antenna through

a .0001 mfd. mica condenser to give the equivalent of a low capacity type average auto antenna. Set the dial pointer to 1400 K.C. and adjust the oscillator trimmer to peak. (Front section of gang condenser.)

R.F. ALIGNMENT. The next step is to adjust the center and rear trimmers of the gang condenser to peak. The center section of the gang condenser tunes the antenna amplifier stage (6D6 tube), and the rear condenser section tunes the detector grid coil of the 6A7 tube.

MODELS 4002,4050,5020
Chassis 1072AE
Schematic,Voltage



MODELS 4002,4050,5020
Chassis 1072AE

SPIEGEL INC.

Socket, Trimmers, Chassis
Alignment

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.

Peak IF at 465 KC. Connect oscillator at 6A7 grid cap. Use .02 mfd. series condenser, DO NOT REMOVE GRID CAP. Peak second and first IF trimmers. 1720-540 KC Band.

Connect oscillator to antenna lead through .00025 mfd. series condenser. Gang condenser at maximum capacity, calibrate dial so needle falls on last line in this position.

Set oscillator signal at 1720 KC, tune dial to 1400 KC. Trim osc. sect. of gang condenser to maximum output.

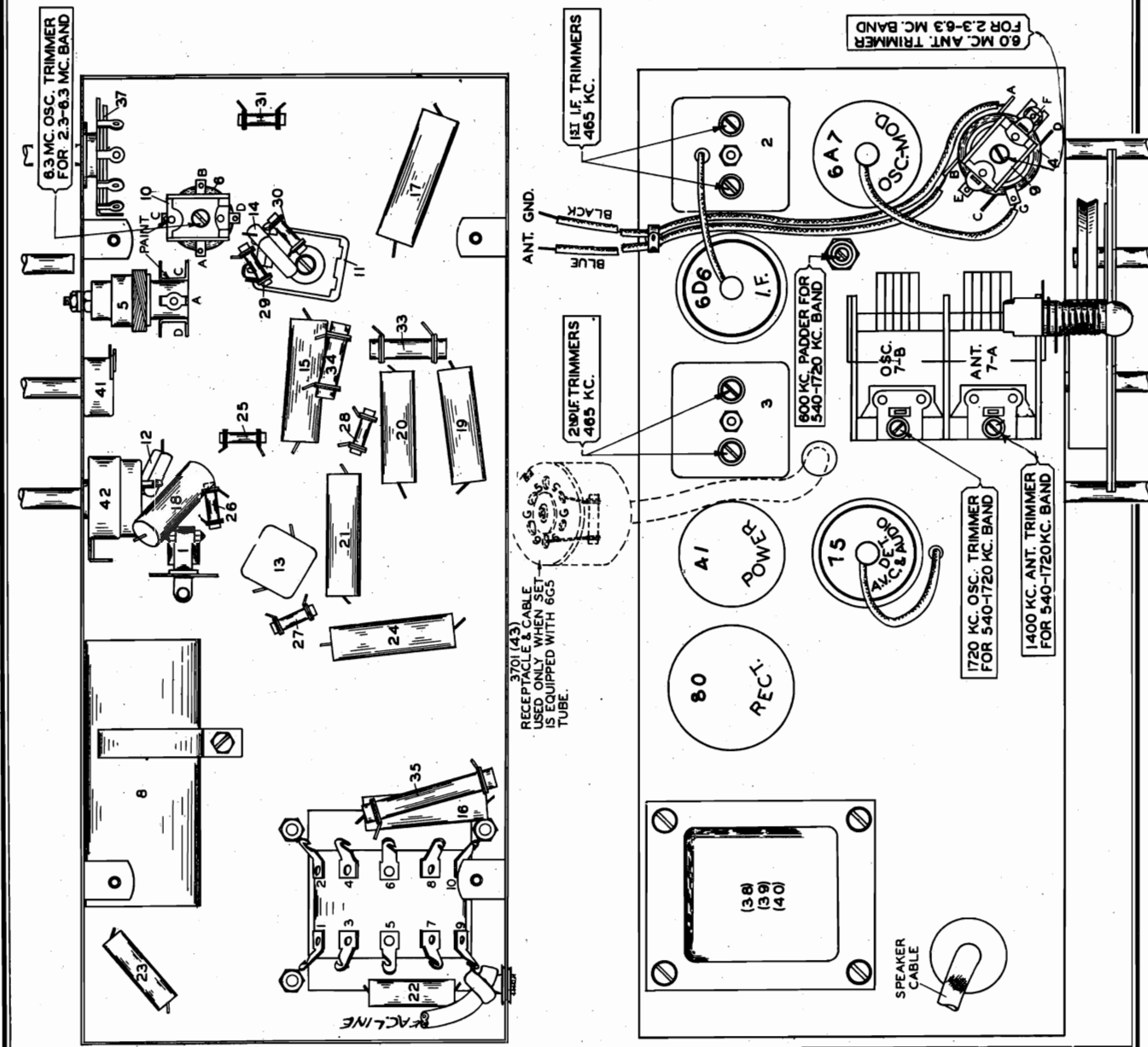
With signal generator at 1400 KC, trim antenna section of gang condenser for maximum output.

Now adjust 600 KC padder for maximum signal while rocking condenser.

2.3-6.3 MC Band

Signal at 6.3 MC through 400 ohm and .00025 mfd. dummy to antenna lead.
Band switch in 2.3-6.3 MC position. Adjust 6.3 MC osc. trimmer to maximum output.

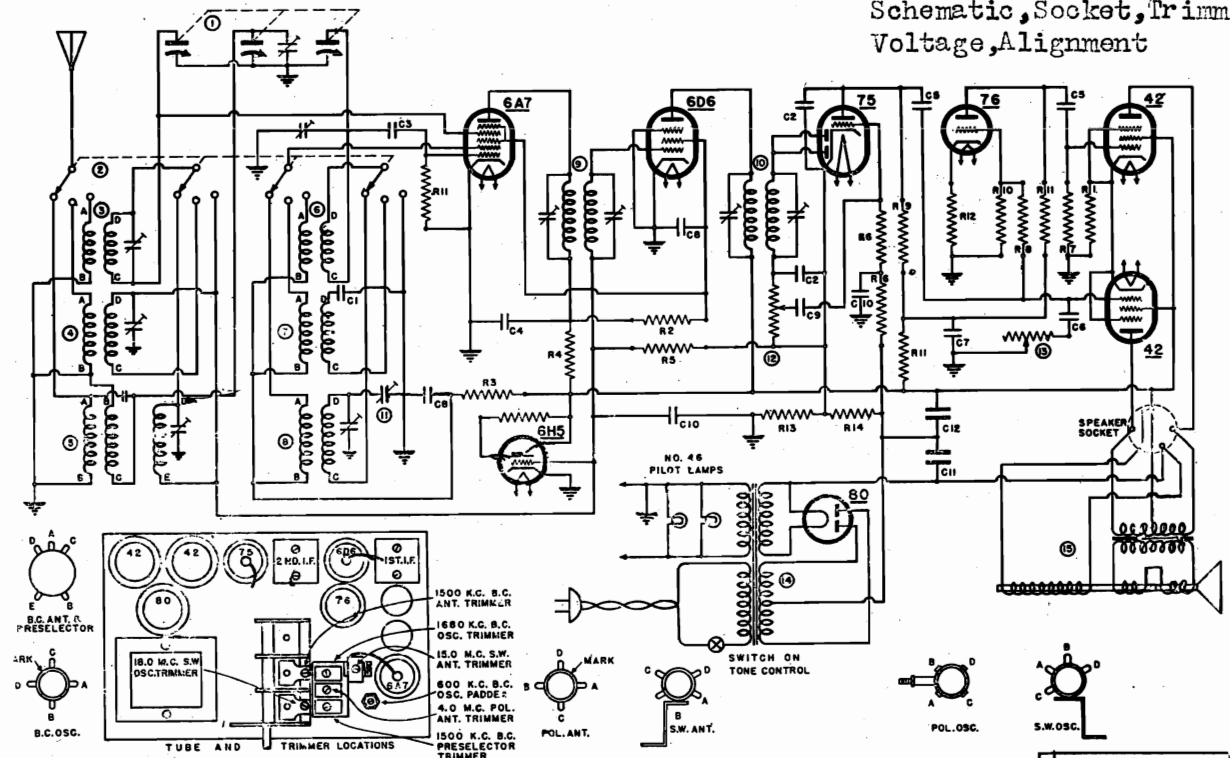
Tune dial to 6 MC. Signal at 6 MC. Adjust 6 MC antenna trimmer for maximum sensitivity.



SPIEGEL INC.

MODELS 4004, 4052

Chassis 871

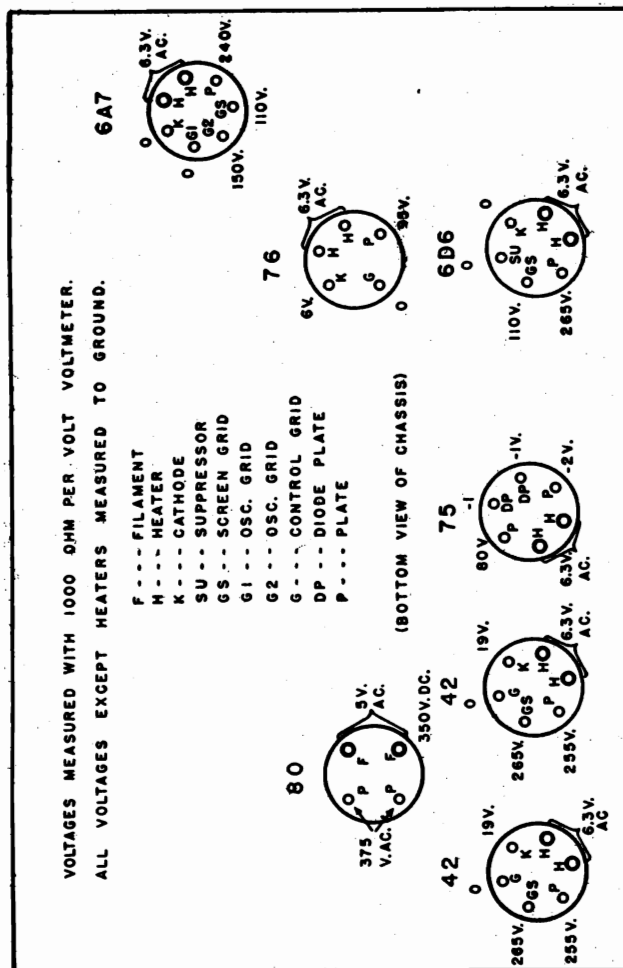
Schematic, Socket, Trimmers
Voltage, Alignment

IF PEAK 456 KC

DESCRIPTION

This receiver is an 8 tube alternating current operated superheterodyne. The tubes used are a 6A7 as oscillator modulator, a 6D6 as I.F. amplifier, a 75 as A.V.C. and audio rectifier and audio voltage amplifier, a 76 as audio phase inverter, an 80 as a power rectifier, a 6H5 as tuning indicator and two type 42 tubes as push pull audio power amplifiers.

This receiver is made to cover 3 tuning bands, the standard broadcast band which ranges from 1680 K.C. to 535 K.C., the middle or police band which has a frequency range of from 5.6 M.C. to 1.7 M.C. and high frequency or foreign band which is from 20 M.C. to 5.4 M.C.

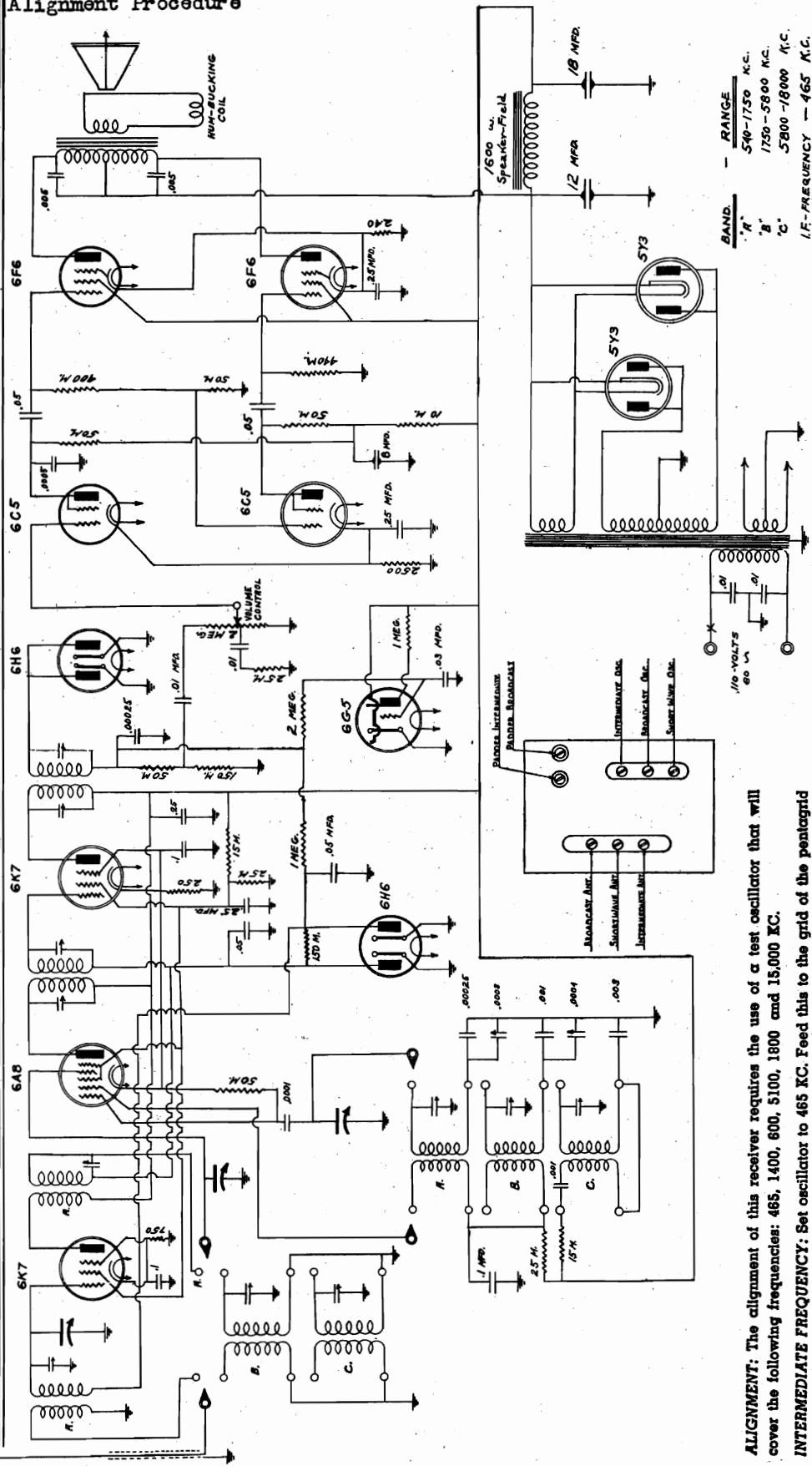


CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII

DESCRIPTION			PART NO.			DESCRIPTION			PART NO.			DESCRIPTION		
2 WATT CARBON REL. 10%			C1 15-102			5% MFD. MICRA CONDENSER			1			1 GANG VARIABLE CONDENSER		
R1 60-23	350	1	50K	10%	C2 15-104	0.0005	MFD.	600 VOLT PAPER CONDENSER	15106	3 GANG VARIABLE CONDENSER	1	69-107 BAND SWITCH		
R2 60-11	15,000	1	50K	10%	C3 15-103	0.0005	MFD.	600 VOLT PAPER CONDENSER	15107	5 GANG VARIABLE CONDENSER	1	10-132 SHORT WAVE ANTENNA COIL		
R3 60-12	10,000	1	50K	10%	C4 15-104	0.0005	MFD.	600 VOLT PAPER CONDENSER	15108	5 GANG VARIABLE CONDENSER	1	10-137 B.C. AT. OR PRESELECTION COIL		
R4 60-13	10,000	1	50K	10%	C5 15-104	0.0005	MFD.	600 VOLT PAPER CONDENSER	15109	5 GANG VARIABLE CONDENSER	1	10-138 B.C. AT. OR PRESELECTION COIL		
R5 60-14	10,000	1	50K	10%	C6 16-101	0.04	"	"	15110	5 GANG VARIABLE CONDENSER	1	10-133 SHORT WAVE OSCILLATOR COIL		
R6 60-15	10,000	1	50K	10%	C7 16-101	0.04	"	"	15111	5 GANG VARIABLE CONDENSER	1	10-134 B.C. OSCILLATOR COIL		
R7 60-16	10,000	1	50K	10%	C8 16-101	0.04	"	"	15112	5 GANG VARIABLE CONDENSER	1	10-135 B.C. OSCILLATOR COIL		
R8 60-17	10,000	1	50K	10%	C9 16-105	.02	"	"	15113	5 GANG VARIABLE CONDENSER	1	10-136 B.C. OSCILLATOR COIL		
R9 60-18	10,000	1	50K	10%	C10 16-105	.02	"	"	15114	5 GANG VARIABLE CONDENSER	1	10-137 B.C. OSCILLATOR COIL		
R10 60-19	10,000	1	50K	10%	C11 16-202	10	"	"	15115	5 GANG VARIABLE CONDENSER	1	10-138 B.C. OSCILLATOR COIL		
R11 60-20	10,000	1	50K	10%	C12 18-201	12.0	"	"	15116	5 GANG VARIABLE CONDENSER	1	10-139 B.C. OSCILLATOR COIL		
R12 60-21	10,000	1	50K	10%	C13 18-202	12.0	"	"	15117	5 GANG VARIABLE CONDENSER	1	10-140 B.C. OSCILLATOR COIL		
R13 60-22	10,000	1	50K	10%	C14 18-202	12.0	"	"	15118	5 GANG VARIABLE CONDENSER	1	10-141 B.C. OSCILLATOR COIL		
R14 60-23	10,000	1	50K	10%	C15 18-202	12.0	"	"	15119	5 GANG VARIABLE CONDENSER	1	10-142 B.C. OSCILLATOR COIL		
R15 60-24	10,000	1	50K	10%	C16 18-202	12.0	"	"	15120	5 GANG VARIABLE CONDENSER	1	10-143 B.C. OSCILLATOR COIL		
R16 60-25	10,000	1	50K	10%	C17 18-202	12.0	"	"	15121	5 GANG VARIABLE CONDENSER	1	10-144 B.C. OSCILLATOR COIL		
R17 60-26	10,000	1	50K	10%	C18 18-202	12.0	"	"	15122	5 GANG VARIABLE CONDENSER	1	10-145 B.C. OSCILLATOR COIL		
R18 60-27	10,000	1	50K	10%	C19 18-202	12.0	"	"	15123	5 GANG VARIABLE CONDENSER	1	10-146 B.C. OSCILLATOR COIL		
R19 60-28	10,000	1	50K	10%	C20 18-202	12.0	"	"	15124	5 GANG VARIABLE CONDENSER	1	10-147 B.C. OSCILLATOR COIL		
R20 60-29	10,000	1	50K	10%	C21 18-202	12.0	"	"	15125	5 GANG VARIABLE CONDENSER	1	10-148 B.C. OSCILLATOR COIL		
R21 60-30	10,000	1	50K	10%	C22 18-202	12.0	"	"	15126	5 GANG VARIABLE CONDENSER	1	10-149 B.C. OSCILLATOR COIL		
R22 60-31	10,000	1	50K	10%	C23 18-202	12.0	"	"	15127	5 GANG VARIABLE CONDENSER	1	10-150 B.C. OSCILLATOR COIL		
R23 60-32	10,000	1	50K	10%	C24 18-202	12.0	"	"	15128	5 GANG VARIABLE CONDENSER	1	10-151 B.C. OSCILLATOR COIL		
R24 60-33	10,000	1	50K	10%	C25 18-202	12.0	"	"	15129	5 GANG VARIABLE CONDENSER	1	10-152 B.C. OSCILLATOR COIL		
R25 60-34	10,000	1	50K	10%	C26 18-202	12.0	"	"	15130	5 GANG VARIABLE CONDENSER	1	10-153 B.C. OSCILLATOR COIL		
R26 60-35	10,000	1	50K	10%	C27 18-202	12.0	"	"	15131	5 GANG VARIABLE CONDENSER	1	10-154 B.C. OSCILLATOR COIL		
R27 60-36	10,000	1	50K	10%	C28 18-202	12.0	"	"	15132	5 GANG VARIABLE CONDENSER	1	10-155 B.C. OSCILLATOR COIL		
R28 60-37	10,000	1	50K	10%	C29 18-202	12.0	"	"	15133	5 GANG VARIABLE CONDENSER	1	10-156 B.C. OSCILLATOR COIL		
R29 60-38	10,000	1	50K	10%	C30 18-202	12.0	"	"	15134	5 GANG VARIABLE CONDENSER	1	10-157 B.C. OSCILLATOR COIL		
R30 60-39	10,000	1	50K	10%	C31 18-202	12.0	"	"	15135	5 GANG VARIABLE CONDENSER	1	10-158 B.C. OSCILLATOR COIL		
R31 60-40	10,000	1	50K	10%	C32 18-202	12.0	"	"	15136	5 GANG VARIABLE CONDENSER	1	10-159 B.C. OSCILLATOR COIL		
R32 60-41	10,000	1	50K	10%	C33 18-202	12.0	"	"	15137	5 GANG VARIABLE CONDENSER	1	10-160 B.C. OSCILLATOR COIL		
R33 60-42	10,000	1	50K	10%	C34 18-202	12.0	"	"	15138	5 GANG VARIABLE CONDENSER	1	10-161 B.C. OSCILLATOR COIL		
R34 60-43	10,000	1	50K	10%	C35 18-202	12.0	"	"	15139	5 GANG VARIABLE CONDENSER	1	10-162 B.C. OSCILLATOR COIL		
R35 60-44	10,000	1	50K	10%	C36 18-202	12.0	"	"	15140	5 GANG VARIABLE CONDENSER	1	10-163 B.C. OSCILLATOR COIL		
R36 60-45	10,000	1	50K	10%	C37 18-202	12.0	"	"	15141	5 GANG VARIABLE CONDENSER	1	10-164 B.C. OSCILLATOR COIL		
R37 60-46	10,000	1	50K	10%	C38 18-202	12.0	"	"	15142	5 GANG VARIABLE CONDENSER	1	10-165 B.C. OSCILLATOR COIL		
R38 60-47	10,000	1	50K	10%	C39 18-202	12.0	"	"	15143	5 GANG VARIABLE CONDENSER	1	10-166 B.C. OSCILLATOR COIL		
R39 60-48	10,000	1	50K	10%	C40 18-202	12.0	"	"	15144	5 GANG VARIABLE CONDENSER	1	10-167 B.C. OSCILLATOR COIL		
R40 60-49	10,000	1	50K	10%	C41 18-202	12.0	"	"	15145	5 GANG VARIABLE CONDENSER	1	10-168 B.C. OSCILLATOR COIL		
R41 60-50	10,000	1	50K	10%	C42 18-202	12.0	"	"	15146	5 GANG VARIABLE CONDENSER	1	10-169 B.C. OSCILLATOR COIL		
R42 60-51	10,000	1	50K	10%	C43 18-202	12.0	"	"	15147	5 GANG VARIABLE CONDENSER	1	10-170 B.C. OSCILLATOR COIL		
R43 60-52	10,000	1	50K	10%	C44 18-202	12.0	"	"	15148	5 GANG VARIABLE CONDENSER	1	10-171 B.C. OSCILLATOR COIL		
R44 60-53	10,000	1	50K	10%	C45 18-202	12.0	"	"	15149	5 GANG VARIABLE CONDENSER	1	10-172 B.C. OSCILLATOR COIL		
R45 60-54	10,000	1	50K	10%	C46 18-202	12.0	"	"	15150	5 GANG VARIABLE CONDENSER	1	10-173 B.C. OSCILLATOR COIL		
R46 60-55	10,000	1	50K	10%	C47 18-202	12.0	"	"	15151	5 GANG VARIABLE CONDENSER	1	10-174 B.C. OSCILLATOR COIL		
R47 60-56	10,000	1	50K	10%	C48 18-202	12.0	"	"	15152	5 GANG VARIABLE CONDENSER	1	10-175 B.C. OSCILLATOR COIL		
R48 60-57	10,000	1	50K	10%	C49 18-202	12.0	"	"	15153	5 GANG VARIABLE CONDENSER	1	10-176 B.C. OSCILLATOR COIL		
R49 60-58	10,000	1	50K	10%	C50 18-202	12.0	"	"	15154	5 GANG VARIABLE CONDENSER	1	10-177 B.C. OSCILLATOR COIL		
R50 60-59	10,000	1	50K	10%	C51 18-202	12.0	"	"	15155	5 GANG VARIABLE CONDENSER	1	10-178 B.C. OSCILLATOR COIL		
R51 60-60	10,000	1	50K	10%	C52 18-202	12.0	"	"	15156	5 GANG VARIABLE CONDENSER	1	10-179 B.C. OSCILLATOR COIL		
R52 60-61	10,000	1	50K	10%	C53 18-202	12.0	"	"	15157	5 GANG VARIABLE CONDENSER	1	10-180 B.C. OSCILLATOR COIL		
R53 60-62	10,000	1	50K	10%	C54 18-202	12.0	"	"	15158	5 GANG VARIABLE CONDENSER	1	10-181 B.C. OSCILLATOR COIL		
R54 60-63	10,000	1	50K	10%	C55 18-202	12.0	"	"	15159	5 GANG VARIABLE CONDENSER	1	10-182 B.C. OSCILLATOR COIL		
R55 60-64	10,000	1	50K	10%	C56 18-202	12.0	"	"	15160	5 GANG VARIABLE CONDENSER	1	10-183 B.C. OSCILLATOR COIL		
R56 60-65	10,000	1	50K	10%	C57 18-202	12.0	"	"	15161	5 GANG VARIABLE CONDENSER	1	10-184 B.C. OSCILLATOR COIL		
R57 60-66	10,000	1	50K	10%	C58 18-202	12.0	"	"	15162	5 GANG VARIABLE CONDENSER	1	10-185 B.C. OSCILLATOR COIL		
R58 60-67	10,000	1	50K	10%	C59 18-202	12.0	"	"	15163	5 GANG VARIABLE CONDENSER	1	10-186 B.C. OSCILLATOR COIL		
R59 60-68	10,000	1	50K	10%	C60 18-202	12.0	"	"	15164	5 GANG VARIABLE CONDENSER	1	10-187 B.C. OSCILLATOR COIL		
R60 60-69	10,000	1	50K	10%	C61 18-202	12.0	"	"	15165	5 GANG VARIABLE CONDENSER	1	10-188 B.C. OSCILLATOR COIL		
R61 60-70	10,000	1	50K	10%	C62 18-202	12.0	"	"	15166	5 GANG VARIABLE CONDENSER	1	10-189 B.C. OSCILLATOR COIL		
R62 60-71	10,000	1	50K	10%	C63 18-202	12.0	"	"	15167	5 GANG VARIABLE CONDENSER	1	10-190 B.C. OSCILLATOR COIL		
R63 60-72	10,000	1	50K	10%	C64 18-202	12.0	"	"	15168	5 GANG VARIABLE CONDENSER	1	10-191 B.C. OSCILLATOR COIL		
R64 60-73	10,000	1	50K	10%	C65 18-202	12.0	"	"	15169	5 GANG VARIABLE CONDENSER	1	10-192 B.C. OSCILLATOR COIL		
R65 60-74	10,000	1	50K	10%	C66 18-202	12.0	"	"	15170	5 GANG VARIABLE CONDENSER	1	10-193 B.C. OSCILLATOR COIL		
R66 60-75	10,000	1	50K	10%	C67 18-202	12.0	"	"	15171	5 GANG VARIABLE CONDENSER	1	10-194 B.C. OSCILLATOR COIL		
R67 60-76	10,000	1	50K	10%	C68 18-202	12.0	"	"	15172	5 GANG VARIABLE CONDENSER	1	10-195 B.C. OSCILLATOR COIL		
R68 60-77	10,000	1	50K	10%	C69 18-202	12.0	"	"	15173	5 GANG VARIABLE CONDENSER	1	10-196 B.C. OSCILLATOR COIL		
R69 60-78	10,000	1	50K	10%	C70 18-202	12.0	"	"	15174	5 GANG VARIABLE CONDENSER	1	10-197 B.C. OSCILLATOR COIL		
R70 60-79	10,000	1	50K	10%	C71 18-202	12.0	"	"	15175	5 GANG VARIABLE CONDENSER	1	10-198 B.C. OSCILLATOR COIL		
R71 60-80	10,000	1	50K	10%	C72 18-202	12.0	"	"	15176	5 GANG VARIABLE CONDENSER	1	10-199 B.C. OSCILLATOR COIL		
R72 60-81	10,000	1	50K	10%	C73 18-202	12.0	"	"	15177	5 GANG VARIABLE CONDENSER	1	10-200 B.C. OSCILLATOR COIL		
R73 60-82	10,000	1	50K	10%	C74 18-202	12.0	"	"	15178	5 GANG VARIABLE CONDENSER	1	10-201 B.C. OSCILLATOR COIL		
R74 60-83	10,000	1	50K	10%	C75 18-202	12.0	"	"	15179	5 GANG VARIABLE CONDENSER	1	10-202 B.C. OSCILLATOR COIL		
R75 60-84	10,000	1	50K	10%	C76 18-202	12.0	"	"	15180	5 GANG VARIABLE CONDENSER	1	10-203 B.C. OSCILLATOR COIL		
R76 60-85	10,000	1	50K	10%	C77 18-202	12.0	"	"	15181	5 GANG VARIABLE CONDENSER	1	10-204 B.C. OSCILLATOR COIL		
R77 60-86	10,000	1	50K	10%	C78 18-202	12.0	"	"	15182	5 GANG VARIABLE CONDENSER	1	10-205 B.C. OSCILLATOR COIL		
R78 60-87	10,000	1	50K	10%	C79 18-202	12.0	"	"	15183	5 GANG VARIABLE CONDENSER	1	10-206 B.C. OSCILLATOR COIL		
R79 60-88	10,000	1	50K	10%	C80 18-202	12.0	"	"	15184	5 GANG VARIABLE CONDENSER	1	10-207 B.C. OSCILLATOR COIL		
R80 60-89	10,000	1	50K	10%	C81 18-202	12.0	"	"	15185	5 GANG VARIABLE CONDENSER	1	10-208 B.C. OSCILLATOR COIL		
R81 60-90	10,000	1	50K	10%	C82 18-202	12.0	"	"	15186	5 GANG VARIABLE CONDENSER	1	10-209 B.C. OSCILLATOR COIL		
R82 60-91	10,000	1	50K	10%	C83 18-202	12.0	"	"	15187	5 GANG VARIABLE CONDENSER	1	10-210 B.C. OSCILLATOR COIL		
R83 60-92	10,000	1	50K	10%	C84 18-202	12.0	"	"	15188	5 GANG VARIABLE CONDENSER	1	10-211 B.C. OSCILLATOR COIL		
R84 60-93	10,000	1	50K	10%	C85 18-202	12.0	"	"	15189	5 GANG VARIABLE CONDENSER	1	10-212 B.C. OSCILLATOR COIL		
R85 60-94	10,000	1	50K	10%	C86 18-202	12.0	"	"	15190	5 GANG VARIABLE CONDENSER	1	10-213 B.C. OSCILLATOR COIL		
R86 60-95	10,000	1	50K	10%	C87 18-202	12.0	"	"	15191	5 GANG VARIABLE CONDENSER	1	10-214 B.C. OSCILLATOR COIL		
R87 60-96	10,000	1	50K	10%	C88 18-202	12.0	"	"	15192	5 GANG VARIABLE CONDENSER	1	10-215 B.C. OSCILLATOR COIL		
R88 60-97	10,000	1	50K	10%	C89 18-202	12.0	"	"	15193	5 GANG VARIABLE CONDENSER	1	10-216 B.C. OSCILLATOR COIL		
R89 60-98	10,000	1	50K	10%	C90 18-202	12.0	"	"	15194	5 GANG VARIABLE CONDENSER	1	10-217 B.C. OSCILLATOR COIL		
R90 60-99	10,000	1	50K	10%	C91 18-202	12.0	"	"	15195	5 GANG VARIABLE CONDENSER	1	10-218 B.C. OSCILLATOR COIL		
R91 60-100	10,000	1	50K	10%	C92 18-202	12.0	"	"	15196	5 GANG VARIABLE CONDENSER	1	10-219 B.C. OSCILLATOR COIL		
R92 60-101	10,000	1	50K	10%	C93 18-202	12.0	"	"	15197	5 GANG VARIABLE CONDENSER	1	10-220 B.C. OSCILLATOR COIL		
R93 60-102	10,000	1	50K	10%	C94 18-202	12.0	"	"	15198	5 GANG VARIABLE CONDENSER	1	10-221 B.C. OSCILLATOR COIL		
R94 60-103	10,000	1	50K											

MODELS 4006,4070,Chas. 12AC
Schematic,Alignment,Trimmers
MODELS 2204 to 2207,2200 to 2203,
2230 to 2233 inc. 2220,2221
Alignment Procedure

SPIEGEL INC.



ALIGNMENT: The alignment of this receiver requires the use of a test oscillator that will cover the following frequencies: 485, 1400, 600, 5100, 1800 and 15,000 KC.

INTERMEDIATE FREQUENCY: Set oscillator to 485 KC. Feed this to the grid of the pentagrid converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

BROADCAST BAND: Set the band switch for broadcast reception. Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Adjust trimmer (underneath chassis) on R.F. coil for greatest output. Re-set the dial pointer on the receiver and on the test oscillator to 500 KC. Slowly increase or decrease the broadcast coupling condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 500 KC may have slightly disturbed the original 1400 KC setting.

INTERMEDIATE BAND: For a dummy antenna use a .0002 mid. mica condenser in series with a 400 ohm carbon resistor. Set band switch to the intermediate band position and feed a 100 KC signal from the oscillator. Set dial pointer at 5100 KC. Adjust intermediate antenna and intermediate oscillator trimmers for maximum output. Re-set oscillator and set dial to approximately 1800 KC. Slowly increase or decrease the intermediate padding condenser while tuning back and forth across the signal with the station selector control until the maximum reading is obtained on the output meter. Re-check the 5100 KC adjustment.

SHORT WAVE: Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 400 ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.

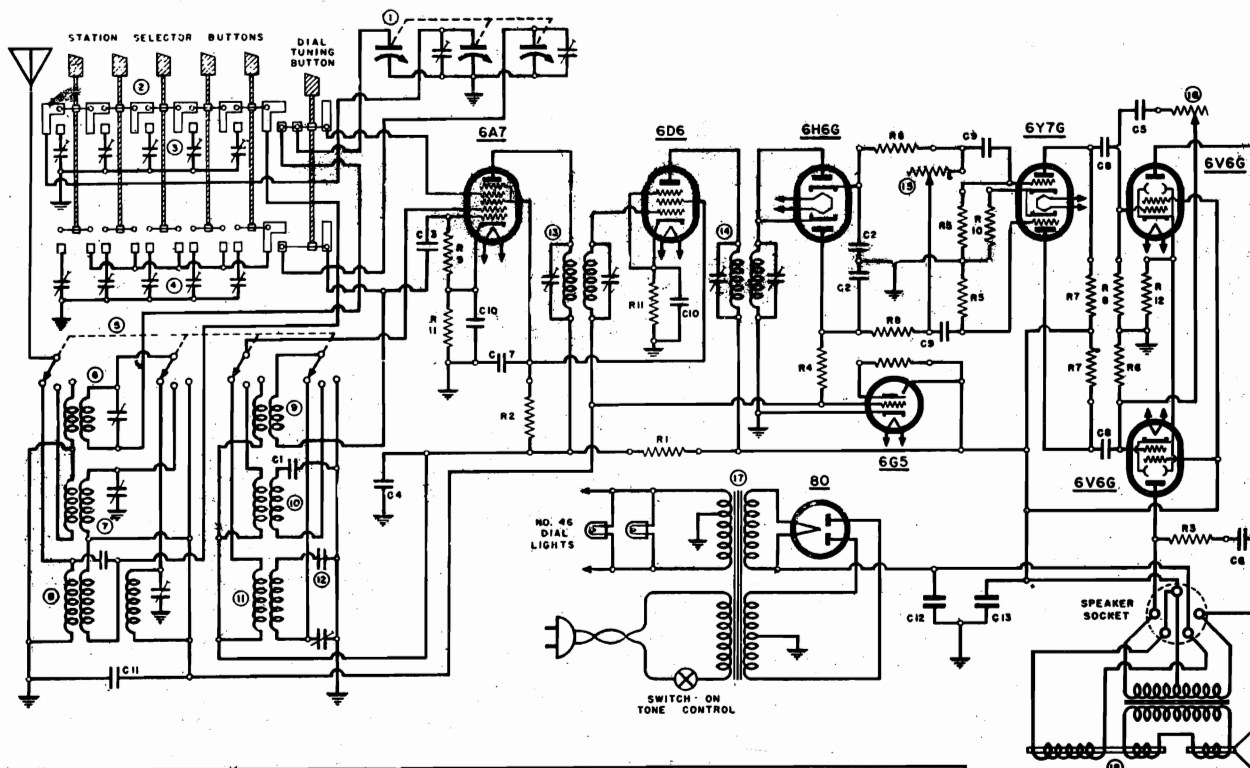
MODEL 4010, Chassis 11X
Schematic, Alignment



To align broadcast band it is only necessary to align receiver at 1400 KC because of the initial setting at the factory. A 200 mmfd. condenser is necessary for a dummy antenna. This is inserted in series with the test oscillator and the antenna connection of the radio receiver. Set oscillator and pointer on dial to 1400 KC and adjust the two trimmer condensers on the tuning condenser for maximum output. Turn Band Switch to Short Wave position. Feed a 4000 KC signal from the test oscillator and check receiver.

MODEL 4068, Chassis 885
Schematic, Voltage, Socket

SPIEGEL INC.



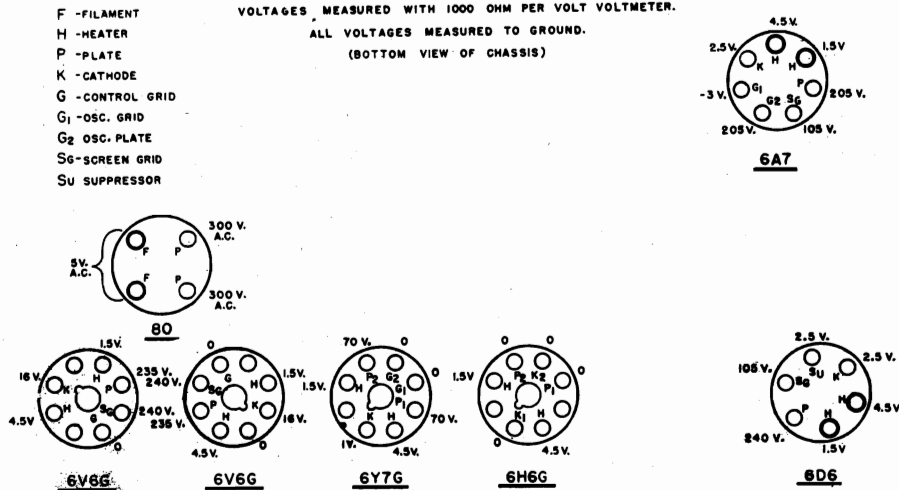
PART NO.	DESCRIPTION	PART NO.	DESCRIPTION	PART NO.	DESCRIPTION	885
R1 60-143	3000 OHM 11/2W CARBON RES.	C1 15-105	.0011 MFD. MICA CONDENSER 4.5%	1 19-121	3 GANG CONDENSER	
R2 6221	20,000 " " " "	C2 1504	.00025 " " " "	2 69-115	PUSH BUTTON SWITCH	
R3 60-114	10,000 " " " "	C3 1503	.00005 " " " "	3 20-106	ANT. TRIMMER STRIP	
R4 6010	2 MEG. " " " "	C4 1502	1 MFD. 600V. TUBULAR CONDENSER	4 20-107	OSC. " " " "	
R5 6017	" " " " " "	C5 1611	.006 " " " "	5 69-107	WAVE SWITCH	
R6 6018	200,000 " " " "	C6 1609	.002 " " " "	6 10-184	S.W. ANT. COIL	
R7 6024	250,000 " " " "	C7 1601	.1 " " " "	7 10-182	POL. " " " "	
R8 60-125	100,000 " " " "	C8 1607	.05 " " " "	8 10-179A	S.C. ANT. & PRESELECTOR COIL	
R9 6025	50,000 " " " "	C9 1605	.02 " " " "	9 10-183	S.W. OSC. COIL	
R10 6053	1000 " " " "	C10 1600	1 " " " "	10 10-181	POL. " " " "	
R11 6012	250 " " " "	C11 1622	.05 " " " "	11 10-180	S.C. " " " "	
R12 60-144	250 OHM 2W. WIRE WOUND	C12 18-202	10 " " " "	12 20-100	S.C. OSC. PAD. COND.	
		C13 18-201	12 " " " "	13 10-201	1ST. I.F. TRANSFORMER	
				14 10-202	2ND. " " " "	
				15 24-113	VOLUME CONTROL	
				16 28-110	TOUCH CONTROL WITH SWITCH	
				17 80-129	POWER TRANSFORMER	
				18	SPEAKER	

IF PEAK 456 KC

VOLTAGE DIAGRAM

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER.
ALL VOLTAGES MEASURED TO GROUND.
(BOTTOM VIEW OF CHASSIS)

F - FILAMENT
H - HEATER
P - PLATE
K - CATHODE
G - CONTROL GRID
G1 - OSC. GRID
G2 - OSC. PLATE
SG - SCREEN GRID
SU - SUPPRESSOR



DESCRIPTION

This receiver is an 8 tube alternating current operated superheterodyne. The tubes used are a 6A7 as oscillator modulator, a 6D6 as IF amplifier, a 6H6G as A.V.C. and audio rectifier, a 6Y7G as audio voltage amplifier, an 80 as a power rectifier, a 6G5 as tuning indicator and two type 6V6G tubes as push pull audio power amplifiers.

This receiver is made to cover 3 tuning bands, the standard broadcast band which ranges from 1680 K.C. to 535 K.C., the middle or police band which has a frequency range of from 5.4 M.C. to 1.7 M.C. and the high frequency or foreign band which is from 19 M.C. to 5.0 M.C.

The schematic diagram illustrates a vacuum tube radio receiver circuit. It begins with an antenna connected to a tuned circuit consisting of coils L1 and L2, and capacitors C1 and C2. The signal is then processed by four vacuum tubes:

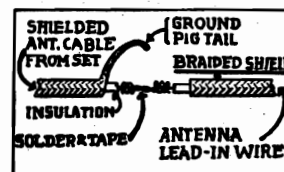
- 6D6 R.F.A.M.R.**: Radio Frequency Amplifier and Mixer stage.
- 6A7 1st DET. OSC.**: First Detector and Oscillator stage, which includes a variable capacitor (VC) and a coil (L3).
- 6D6 L.F.A.M.P.**: Low Frequency Audio Amplifier stage.
- 75 2nd DET. AUDIO AMP.**: Second Detector and Audio Amplifier stage.
- 41 POWER OUTPUT**: Power Output stage, which drives a speaker or earphone through a transformer (T1).

The circuit also features a power supply section with a battery (B), a filter capacitor (C4), and a rectifier diode (VD). Various resistors (R1 through R10) and capacitors (C1 through C11) are used throughout the circuit for tuning, biasing, and coupling. A note at the bottom right specifies resistor values: R1 = 50Ω and R2 = 350Ω.

IF PEAK 175 KC

RESISTORS
 $R_1 = 50 \sim$
 $R_2 = 350 \sim$
 $R_3 = 500 \sim$
 $R_4 = 5,000 \sim$
 $R_5 = 15,000 \sim$
 $R_6 = 20,000 \sim$
 $R_7 = 50,000 \sim$
 $R_8 = 100,000 \sim$
 $R_9 = 500,000 \sim$
 $R_{10} = 1,000,000 \sim$

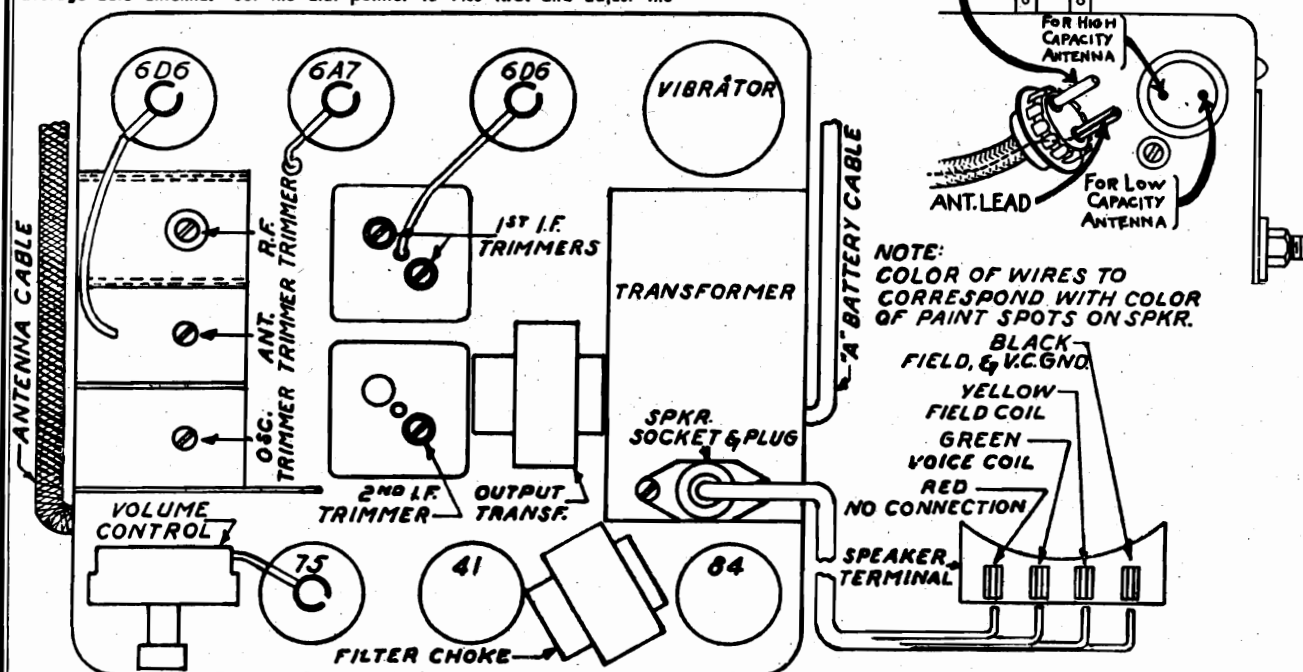
66 & 660 Chassis



R.F. ALIGNMENT The next step is to adjust the center and rear trimmers of the gang condenser to peak. The center section of the gang condenser tunes the R.F. antenna amplifier stage (6D6 tube), and the rear condenser section tunes the detector grid coil of

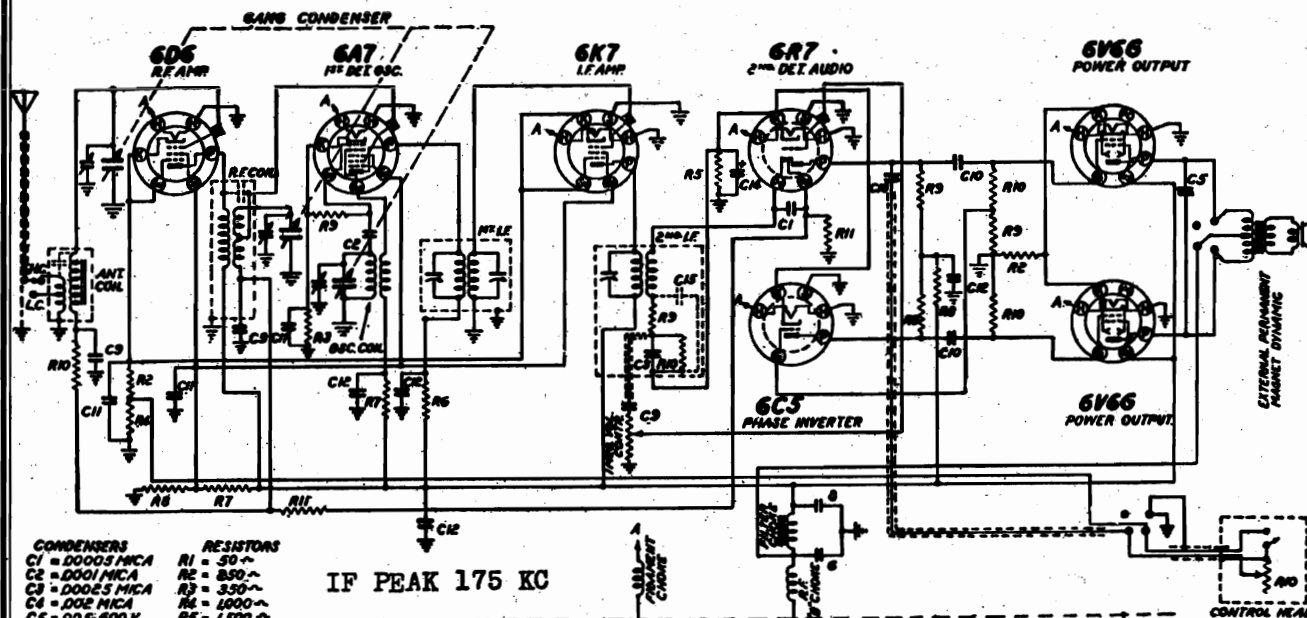
OSCILLATOR ALIGNMENT Adjust the test oscillator to 1400 K.C. and connect the (6D6 tube), a output to the antenna through a .0001 mfd. mica con-the 6A7 tube. denser to give the equivalent of a low capacity type average auto antenna. Set the dial pointer to 1400 K.C. and adjust the

average auto antenna. Set the dial pointer to 1400 K.C. and adjust the



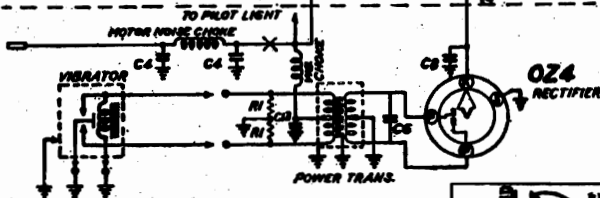
MODEL 4212, Chassis 88-880
Schematic, Socket, Trimmers
Alignment, Connections

SPIEGEL INC.

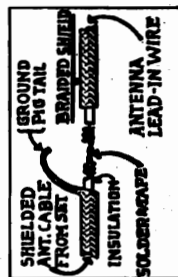
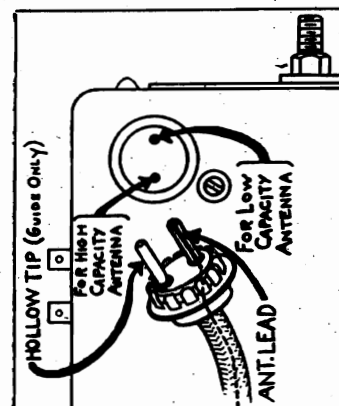


- CONDENSERS**
C1 = 0.0005 MICA
C2 = 0.001 MICA
C3 = 0.0025 MICA
C4 = 0.02 MICA
C5 = 0.05-600 V.
C6 = 0.025-1000 K
C7 = 0.1-200 K
C8 = 0.1-600 V
C9 = 0.5-600 K
C10 = 0.5-600 K
C11 = 1-200 K
C12 = 1-600 K
C13 = 5-50 K
C14 = 5 ELEC.
C15 = 0.0005 MFD.
CAPACITY WINDING
- RESISTORS**
R1 = 30 ~
R2 = 850 ~
R3 = 350 ~
R4 = 1000 ~
R5 = 1500 ~
R6 = 8,000 ~
R7 = 15,000 ~
R8 = 20,000 ~
R9 = 50,000 ~
R10 = 250,000 ~
R11 = 1,000,000 ~

IF PEAK 175 KC



88-880 Chassis



ALIGNMENT DATA

I.F. ALIGNMENT. Adjust the test oscillator to 175 K.C. and connect the output directly to the grid of the first detector tube (6A7), without the use of any series condenser or resistor; the omission of series condenser and resistor to block out the AVC action. The ground on the test oscillator can be connected to the chassis ground. Align the trimmers of the first and second I.F. transformers to peak or maximum reading on the output meter.

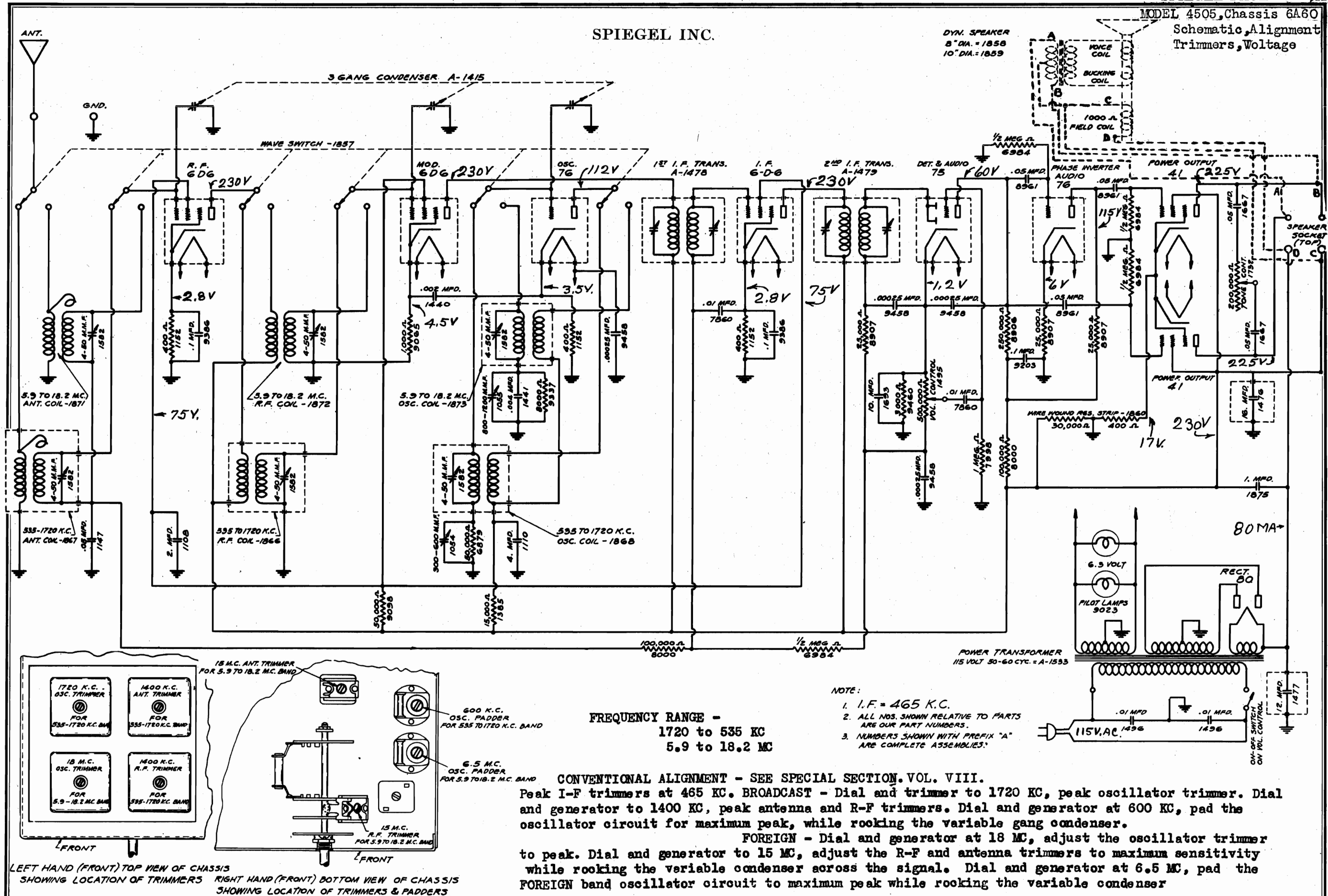
OSCILLATOR ALIGNMENT. Adjust the test oscillator to 1400 K.C. and connect the output to the antenna through a .0001 mfd. mica condenser to give the equivalent of a low capacity type average auto antenna. Set the dial pointer to 1400 K.C. and adjust the oscillator trimmer to peak. (Front section of gang condenser.)

R.F. ALIGNMENT. The next step is to adjust the center and rear trimmers of the gang condenser to peak. The center section of the gang condenser tunes the antenna amplifier stage (6D6 tube), and the rear condenser section tunes the detector grid coil of the 6A7 tube.

SPIEGEL INC.

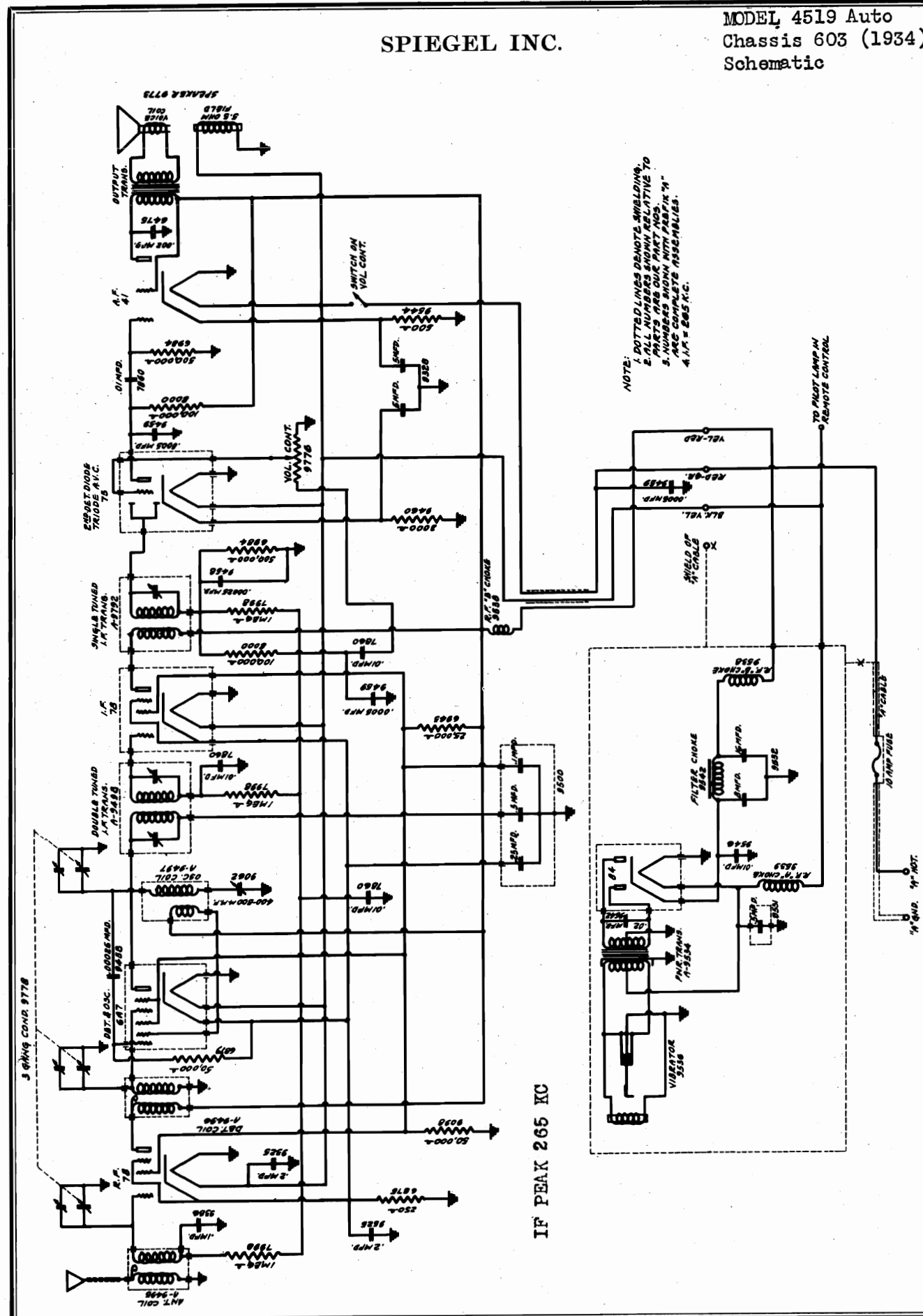
MODEL 4505, Chassis 6A60

Schematic, Alignment
Trimmers, Voltage



FREQUENCY RANGE -
1720 to 535 KC
5.9 to 18.2 MC

BAND CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION.VOL. VIII.
Peak I-F trimmers at 465 KC. BROADCAST - Dial and trimmer to 1720 KC, peak oscillator trimmer. Dial and generator to 1400 KC, peak antenna and R-F trimmers. Dial and generator at 600 KC, pad the oscillator circuit for maximum peak, while rooking the variable gang condenser.
FOREIGN - Dial and generator at 18 MC, adjust the oscillator trimmer to peak. Dial and generator to 15 MC, adjust the R-F and antenna trimmers to maximum sensitivity while rooking the variable condenser across the signal. Dial and generator at 6.5 MC, pad the FOREIGN band oscillator circuit to maximum peak while rooking the variable condenser



MODEL 4519 Auto
Chassis 603 (1934)
Voltage, Alignment

SPIEGEL INC.

TUBE VOLTAGE

Type of Tube	Position of Tube	Fil. Volts	Plate Volts	Cathode Volts	Screen Volts	Grid No.1	Grid No.2	Grid No.3	Grid No.5
78	Radio Frequency	6	225	4	92				
6A7	Oscillator & Modulator	6	225	4		6.2	225	92	92
78	Intermediate Frequency	6	225	4	92				
75	2nd Detector Diode & AVC	6	135	1.5					
41	Output	6	218	13	225				
84	Rectifier	6	260*	235					

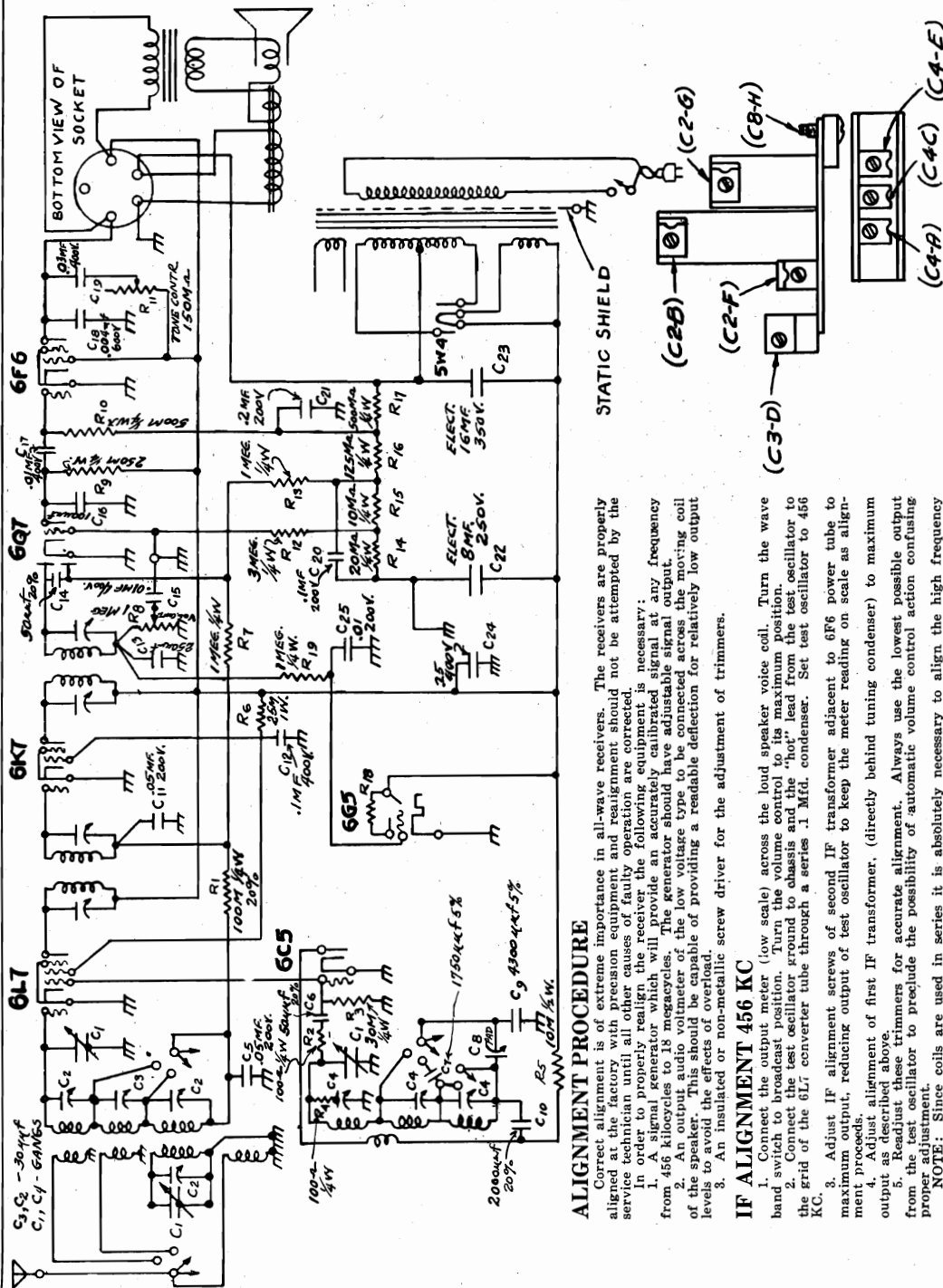
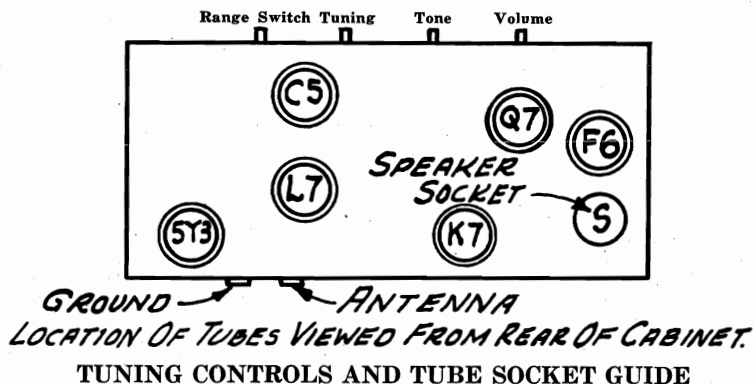
* A.C. each plate
Total "A" current - 6.2 amperes.

INTERMEDIATE FREQUENCY: Unless an intermediate transformer has become defective due to an open or burned out winding it should never be necessary to readjust the intermediate stage. Should this occur it is essential that an oscillator be used with some type of output measuring device to correctly tune the I.F. Transformers. Connect the high side of the oscillator output to the control grid cap (grid No. 4) of the 6A7 oscillator modulator tube leaving the grid cap disconnected. CONNECT A 50,000 OHM RESISTOR FROM THE CONTROL GRID CAP OF THE 6A7 TUBE TO THE ROTOR FRAME OF THE VARIABLE CONDENSER. If the output of the oscillator is too great the value of this resistor may be reduced. The ground side of the test oscillator should be connected to the chassis. Set the oscillator to 265 K.C. (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter. Align the first intermediate transformer by turning the intermediate frequency transformer trimmer screw up and down until maximum reading is obtained on the output meter. Both the primary and secondary trimmer screws should be adjusted in this manner. It is always best to recheck the grid side of the intermediate frequency transformer adjustment to make certain the alignment of the secondary has not been changed by the adjustment of the primary trimmer. The first I.F. transformer is double-tuned, the trimmers of which are accessible through the top of the I.F. can, one section of which is adjusted by turning the brass hex nut and other section by screwing in and out the set screw that is accessible through the hole provided in the brass hex nut. The second intermediate transformer has but one trimmer which is likewise accessible from the top of the intermediate transformer shield can. After both intermediate transformers are correctly adjusted the alignment of the intermediate stage is complete and the trimmers should not be further disturbed. The grid cap should be connected to the grid of the 6A7 tube and 50,000 ohm resistor removed.

VARIABLE CONDENSER ALIGNMENT: If the intermediate frequency stage has been realigned or if the antenna, R.F. or oscillator coil have been replaced it will be necessary to realign the variable condensers. If the receiver is not mounted in the set housing it will be necessary to place a metal shield along side of the variable condenser and flush against the side of the set chassis nearest the variable condenser trimmers. It is necessary to do this otherwise when the receiver is placed in the set housing the metal housing will detune the receiver. Three holes should be made in the shield to correspond with the hole provided in the set housing which permits alignment of the receiver when the set is in the housing. Be sure the shield is properly grounded to the receiver chassis. NOTE: When the receiver and "B" unite is removed from the set housing be sure to set the receiver on top of the "B" unit, otherwise considerable R.F. and audio hash will be encountered. Regardless of whether the receiver is mounted in the set housing or not the alignment procedure is the same. Adjust the variable condenser to minimum capacity. Connect the high output side of the set oscillator to set antenna lead and the low side to antenna shield lead or chassis. Then adjust the test oscillator to 1500 K. C. Next, BRING THIS SIGNAL IN BY ADJUSTING THE VARIABLE CONDENSER OSCILLATOR SECTION TRIMMER. Looking at the front of the receiver, the variable condenser trimmers are mounted on the left side of the set on the variable condenser and reading from the bottom up the trimmers are, oscillator, R.F. and antenna. After the oscillator section has been properly peaked, adjust the antenna and R.F. trimmers in the order mentioned. After the variable condenser trimmers have been correctly adjusted at 1500 K.C. tune the receiver to 600 K.C. and adjust the oscillator to this frequency. Then adjust the oscillator padding condenser which is located on the left hand side to the rear of the chassis, to obtain maximum reading on the output meter. If the set is mounted in the receiver housing the padding condenser is accessible through the small hole in the side of the set housing. It may be necessary to turn the variable condenser slightly to the right and left to find the point where greatest output is obtained. If the alignment procedure is correctly followed the receiver will now track correctly over the entire tuning range. It is always advisable to align the receiver with the tubes to be used in the set whenever possible.

[illegible]

MODELS 6502, 6552, Chas. 7AC
Schematic, Socket, Trimmers, Alignment SPIEGEL INC.



TRIMMER LAYOUT

BROADCAST BAND 535 TO 1800 KC

1. With test oscillator connected to antenna and ground through a 200 Mfd. condenser set oscillator and receiver dial to 1600 kilocycles.
2. Adjust antenna circuit trimmer (C4-E) to obtain maximum response.
3. Adjust prescaler trimmer (C2-F) for maximum output.
4. Set test oscillator and dial to 600 kilocycles and tune in the signal, then adjust broadcast band tuning condenser (C2-G) to maximum output.
5. Adjust oscillator trimmer (C3-D) to maximum response. This adjustment is made by adjusting the hole in the chassis pan. Rock the condenser back and forth a degree or two in order to obtain proper accuracy.
6. Repeat the 1600 KC adjustments described above for greater accuracy.

ALIGNMENT PROCEDURE

Correct alignment is of extreme importance in all-wave receivers. The receivers are properly aligned at the factory with precision equipment and readjustment should not be attempted by the service technician unless the following instructions are carefully followed.

1. A signal generator which will provide an accurately calibrated signal at any frequency from 456 kilocycles to 18 megacycles. The generator should have adjustable signal output.
2. An output audio voltmeter of the low voltage type to be connected across the moving coil of the speaker. This should be capable of providing a readable deflection for relatively low output levels to avoid the effects of overload.
3. An insulated or non-metallic screw driver for the adjustment of trimmers.

IF ALIGNMENT 456 KC

1. Connect the output meter (low scale) across the loud speaker voice coil. Turn the wave band switch to broadcast position. Turn the volume control to its maximum position.
2. Connect the test oscillator ground to chassis and the "hot" lead from the test oscillator to the grid of the 6L7 converter tube through a series .1 Mfd. condenser. Set test oscillator to 456 KC.
3. Adjust IF alignment screws of second IF transformer adjacent to 6F6 power tube to maximum output, reducing output of test oscillator to keep the meter reading on scale as alignment procedure is followed.
4. Adjust alignment of first IF transformer, (directly behind tuning condenser) to maximum output as described above.
5. Readjust these trimmers for accurate alignment. Always use the lowest possible output from the test oscillator to preclude the possibility of automatic volume control action confusing proper adjustment.

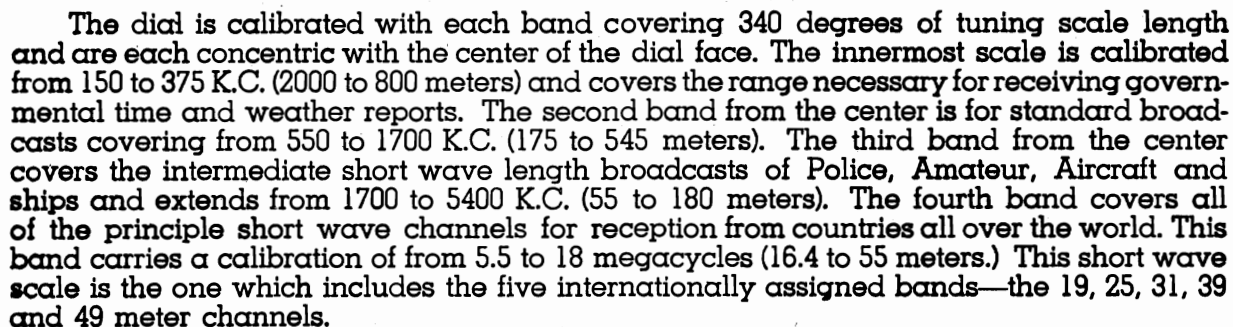
NOTE: Since coils are used in series it is absolutely necessary to align the high frequency bands first, in the order indicated.

FOREIGN BAND 5.7 TO 18.5 MEGACYCLES

1. With test oscillator connected to the antenna and ground terminals through a 400 ohm resistor set oscillator at 16 megacycles.
2. Set the dial scale to 16 megacycles and adjust the oscillator trimmer condenser (C4-A) to resonance using the counterclockwise or low capacity point.
3. Adjust input circuit trimmer (C3-D) to maximum response, rocking the gang condenser back and forth a degree or two to obtain proper maximum.

POLICE OR MIDDLE BAND 1.75 TO 5.8 MEGACYCLES

1. With the test oscillator connected as above set the oscillator and dial to 5.5 megacycles.
2. Adjust oscillator trimmer condenser (C4-C) for maximum response using the counterclockwise or low capacity point.
3. Adjust input circuit trimmer (C3-D) to maximum response rocking the gang condenser as described above.



5W4

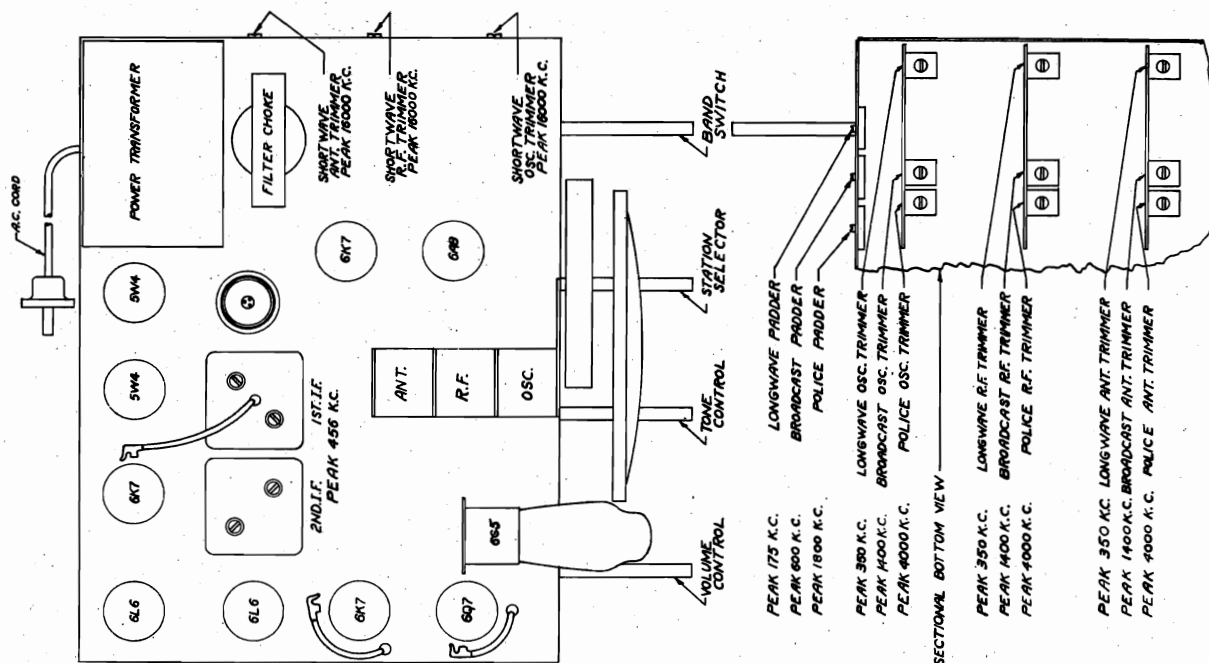
RESISTORS

- R_1 - 100 Ω
- R_2 - 250
- R_3 - 500
- R_4 - 1000
- R_5 - 4000
- R_6 - 7000
- R_7 - 8000
- R_8 - 12000
- R_9 - 15000
- R_{10} - 25000
- R_{11} - 50000
- R_{12} - 100000
- R_{13} - 500000
- R_{14} - 1000000
- R_{15} - 2000000

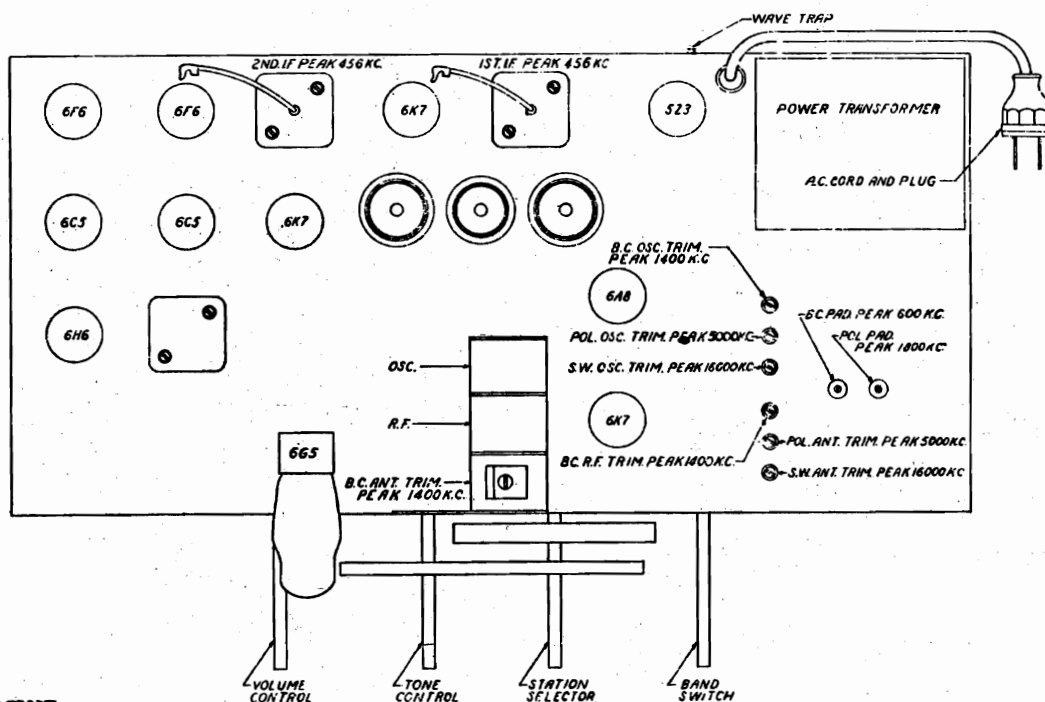
CONDENSERS

- C_1 - 6001 MFD.
- C_2 - .0002
- C_3 - .001
- C_4 - .002
- C_5 - .00275 $\pm 5\%$
- C_6 - .005
- C_7 - .01
- C_8 - .02
- C_9 - .05
- C_{10} - .1
- C_{11} - .4
- C_{12} - 5

SWITCH IN SHORT WAVE POSITION



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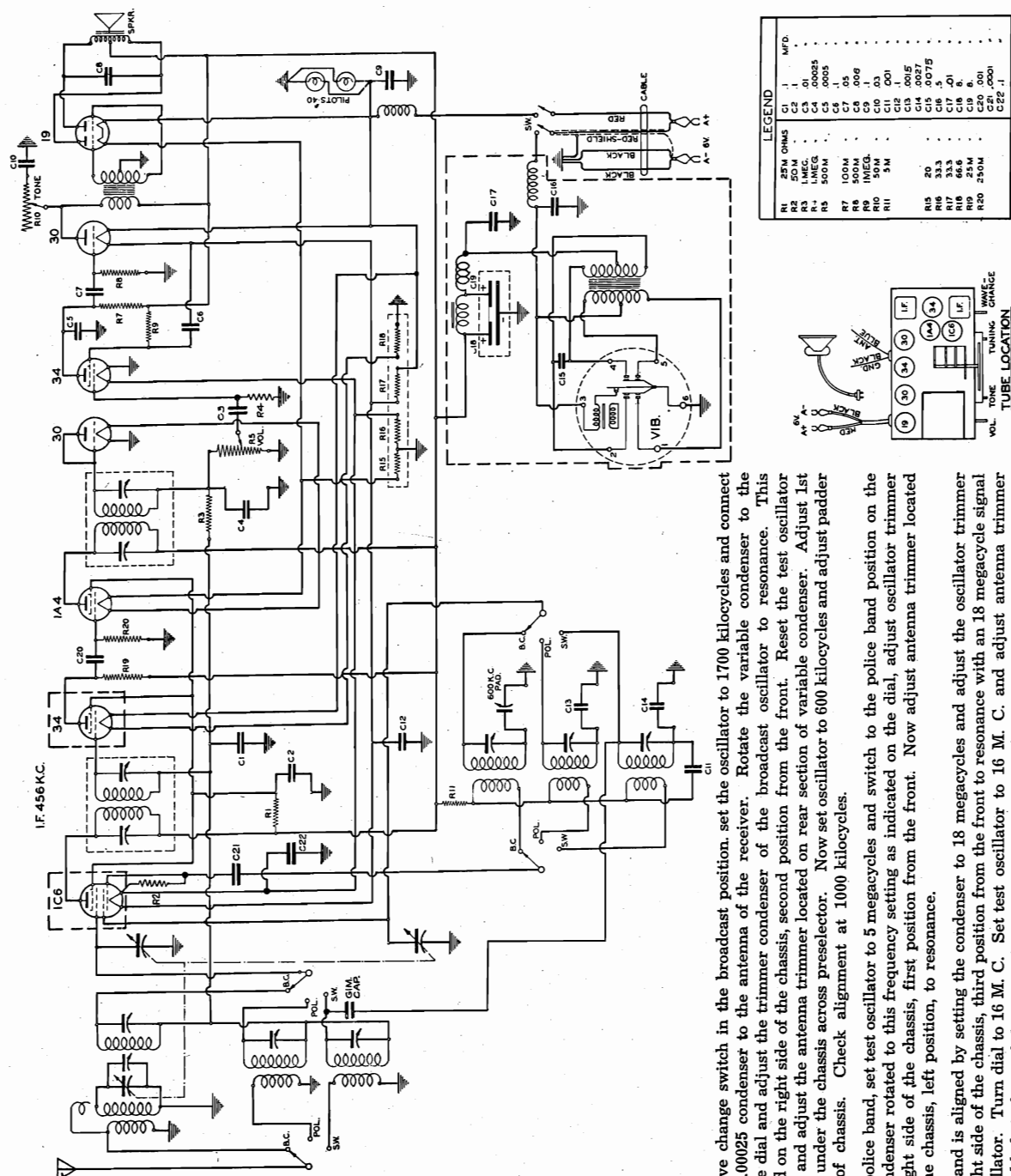
IF trimmer adj. at 456 KC through .05 or .1 mf dummy condenser.
BC osc. trimmer and ant. trimmer adj. at 1400 KC through .001 mf dummy.
 Padder at 600 KC. Recheck at 1400 KC.
Foreign Band: Through .0001 mf dummy, adj. at 14000 KC both the S.W.
 oscillator and S.W. trimmers. Check for image frequency at 13100 KC
 for proper weaker signal.
Police Band: Through 400 ohm resistor .0001 mf cond. series dummy, adjust
 osc. trimmer and ant. trimmer at 4000 KC. Padder adj. 1800 KC. Recheck at
 4000 KC.
Wave Trap: At rear of chassis near grd. & ant.post adj. wave trap screw
 at 456 KC.
Dial Calibration - Government & Weather Reports - 150 to 375 KC.
 Broadcast 550 to 1700 KC.
 Police, Amateur, Aircraft & Ships 1700 to 5400 KC.
 Short Wave 5.5 to 18 megacycles.

MODELS 5256, 5260, 6760, 6770
6776 Chassis 700
Schematic, Socket, Alignment

SPIEGEL INC.

I. F. Alignment:

Connect the oscillator through a .1 condenser to the grid of the 1C6 tube and set the oscillator to 456 kilocycles. Peak each I. F. stage to resonance as indicated by maximum output on the output meter.



7-Tube, 6-Volt Battery Operated Superheterodyne

R. F. Alignment:

With the wave change switch in the broadcast position, set the oscillator to 1700 kilocycles and connect in series with a .00025 condenser to the antenna of the receiver. Rotate the variable condenser to the 1700 setting of the dial and adjust the trimmer condenser of the broadcast oscillator to resonance. This trimmer is located on the right side of the chassis, second position from the front. Reset the test oscillator to 1400 kilocycles and adjust the antenna trimmer located on rear section of variable condenser. Adjust 1st detector trimmer under the chassis across preselector. Now set oscillator to 600 kilocycles and adjust padder located on side of chassis. Check alignment at 1000 kilocycles.

For aligning the police band, set test oscillator to 5 megacycles and switch to the police band position on the set. With the condenser rotated to this frequency setting as indicated on the dial, adjust oscillator trimmer located on the right side of the chassis, first position from the front. Now adjust antenna trimmer located on the front of the chassis, left position, to resonance.

The short wave band is aligned by setting the condenser to 18 megacycles and adjust the oscillator trimmer located on the right side of the chassis, third position from the front to resonance with an 18 megacycle signal from the test oscillator. Turn dial to 16 M. C. Set test oscillator to 16 M. C. and adjust antenna trimmer through right hand hole in front of chassis, rocking variable condenser slightly back and forth to get maximum peak.



[illegible]

NOTE:

1. $I_f = 465 \text{ K.C.}$
2. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.
4. $L_1 \text{ \& } L_2 = 350 \text{ TO } 1850 \text{ K.C. ANT. \& DET.}$
5. $L_2 \text{ \& } L_3 = 1.6 \text{ TO } 4.2 \text{ M.C. ANT. \& I.F.}$
6. $L_5 = \text{OSCILLATOR TUNER.}$
7. $L_6 = 350 \text{ TO } 1850 \text{ K.C. OSCILLATOR. SEC.}$
8. $L_7 = 1.6 \text{ TO } 4.2 \text{ M.C. OSC. SECONDARY.}$

TWO BAND
FIVE TUBE AC/DC SUPERHETERODYNE
1850-540 Kilocycles
1.5- 4.8 Megacycles

VOLTAGE TABLE
Line Voltage : 116

TUBE	FIL.	PLATE	SCREEN	CATHODE	GRID NO. 2	GRID NO. 3 and 5
6A7 Modulator and Oscillator	6	105	60	1.8	100	60
6BE I. F. Amplifier	6	105	105	2.7		
75 2nd Det. Diode, Triode & AVC	6	40*		.5		
43 Output	24	100	105	18**		
25Z5 Rectifier	24					

IF 465 KC (Leave grid cap disconnected)

CONVENTIONAL ALIGNMENT:
ALIGNMENT FREQUENCIES

BROADCAST 1400 KC, 600 KC.
SHORT WAVE 1700 KC, 3.4 MC.

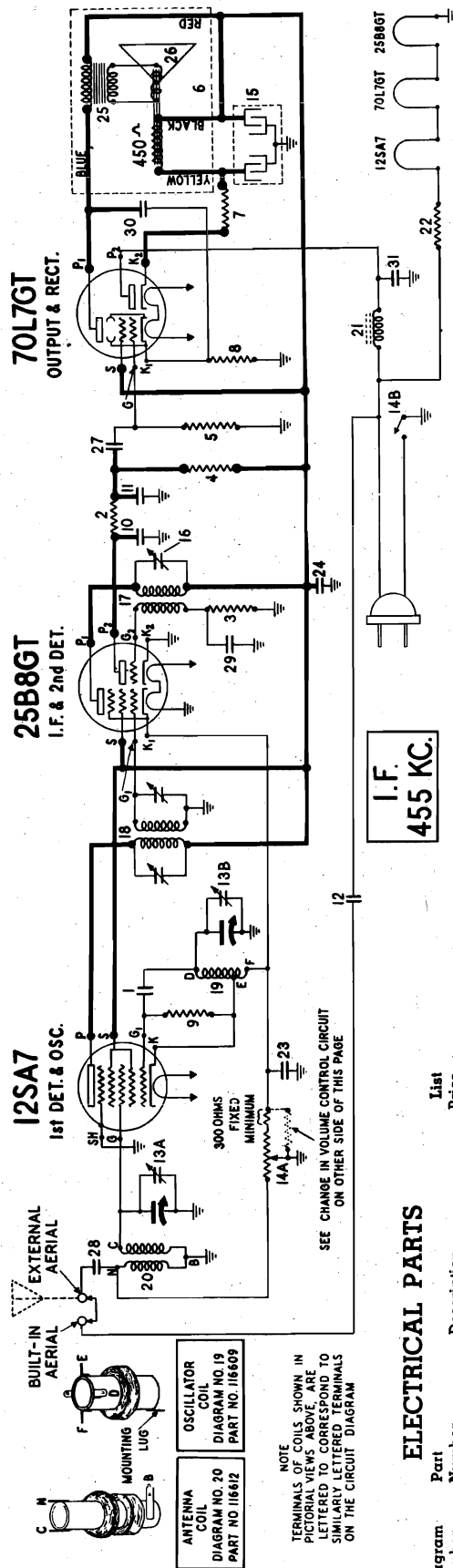
Align in order given, - check
SEE SPECIAL SECTION VOL. VIII.

Tioid plate voltage. Comparative only is not the true voltage applied. The voltmeter, when readings are taken at this point, is in series with a very high resistance.

** Bias for the 43 output tube is obtained by the voltage drop across the filter choke. Read bias voltage from cathode to negative side of filter choke.

STEWART-WARNER CORP.

MODEL A6, Air Pal,
Chassis 07-31
Schematic, Voltage, Socket



ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1	83783	Condenser—mica 110 mmf.	\$.20
2	110566	Resistor—carbon 33,000 ohms 1/4 watt.	.12
3-4-5	112971	Resistor—insulated 470,000 ohms 1/4 watt	.15
6	R-115053	Speaker—dynamic 3"	4.00
7	116013	Resistor—wire wound 50 ohms 1 watt.	.18
8	116064	Resistor—insulated 100 ohms (10%) 1/2 watt	.14
9	116066	Resistor—insulated 68,000 ohms (10%) 1/4 watt	.12
10-11-12	116224	Condenser—mica 260 mmf. 500 volt.	.15
13A-13B	116578	Condenser—2 gang	2.50
14A-14B	116579	Volume control—20,000 ohms, with switch	1.10
15	116587	Condenser—electrolytic 20-20 mfd. 150 volt	.95
16	116599	Trimmer condenser (2nd I.F.)	.15
17	116603	Transformer—2nd I.F.	.70
18	116605	Transformer—1st I.F.	.80
19	116609	Coil—oscillator	.34
20	116612	Coil—antenna	.60
21	116616	R. F. Choke coil	.32
22	116618	Resistor—65 ohms (10%), 2 W., w. w.	.20
23-24	116625	Condenser—1 mfd. 600 volt.	.25
25	R-116633	Transformer—output for R-115053 speaker	1.50

Diagram Number	Part Number	Description	List Price
26	R-116635	Cone & Voice coil assembly for R-115053 speaker	1.45
27	116640	Condenser—.01 mfd. 600 volt.	.15
28	116647	Condenser—.004 mfd. 600 volt.	.15
29	116819	Condenser—.05 mfd. 600 volt.	.20
30-31	116893	Condenser—.02 mfd. 600 volt.	.15

MISCELLANEOUS PARTS

Part Number	Description	List Price
116637	Cabinet—(w/lnut)	\$2.65
116657	Cabinet (sprayed ivory) for 07-313	2.65
112745	Clip—coil mounting	.01
116576	Insulator—fibre for base (inside)	.04
116716	Insulator—fibre for base (outside)	.06
116532	Knob—volume control (red)	.18
116533	Knob—tuning (red)	.18
116886	Knob—volume control (ivory)	.24
116887	Knob—tuning (ivory)	.24
116584	Rubber foot for bottom of cabinet.	.02
116629	Screw—No. 8-32x1 1/2 Bind. H.M.S.	.01
116630	Screw—No. 8-32x1 1/2 Bind. H.M.S.	.01
116583	Terminal Strip (for antenna)	.12
116592	Tube shield	.10

SOCKET VOLTAGES

VOLUME CONTROL SET AT MAXIMUM VOLUME POSITION
ANTENNA GROUNDED
DIAL TUNED TO 540 KC

BOTTOM VIEW

12SA7
1st DET. & OSC.
LINE VOLTAGE 117 VOLTS

70L7GT
OUTPUT & RECT.

25B8GT
I.F. & 2nd DET.

VOLTAGE ACROSS SPEAKER FIELD
29 VOLTS

REAR OF CHASSIS

NOTE A: Due to the high resistance of resistor No. 4, only a small voltage will be read on a meter having a resistance of 1000 ohms per volt.

May 26, 1959

MODEL A6, Air Pal
Chassis 07-31
Alignment, Trimmers
Antenna Notes, Change

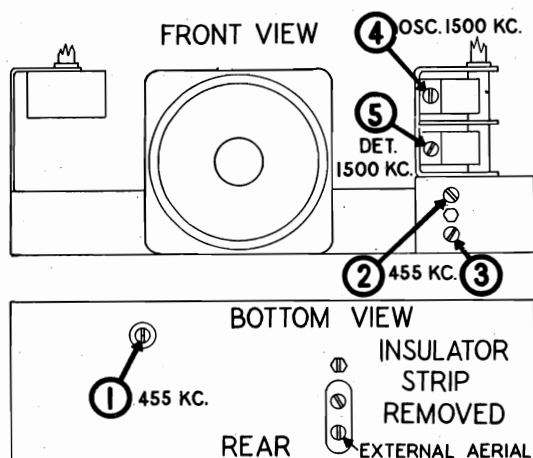
STEWART-WARNER CORP.

ALIGNMENT PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator are required.

1. Solder the output meter leads from output plate (P₁) to screen (S) of the 70L7GT tube (See voltage chart). The leads must be soldered since the bottom cover must be replaced during alignment. The output meter leads can be brought through the power cord opening.
2. Connect the ground lead of the signal generator through a .25 mfd. condenser to some portion of the chassis in the VICINITY OF THE GANG CONDENSER.
3. Remove the connector between the antenna terminals on the bottom of the set.
4. Turn the volume control to the maximum volume position and keep it in this position while aligning.
5. The tuning knob should be adjusted so that the nick which appears on the outer part of the knob is accurately centered and points away from the chassis when the gang condenser is in full mesh.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Lug on bottom gang condenser	455 KC	Any point where it does not affect signal	1	2nd I.F.	Adjust for maximum output. Then repeat adjustment. (If the set oscillates, see precautions under heading "I. F. Oscillation".)
				2-3	1st I.F.	
200 MMFD. Mica Condenser	Antenna Terminal on bottom (Terminal nearest back of chassis)	1500 KC	1500 KC	4	Broadcast Oscillator (Shunt)	Adjust trimmer for maximum output.
200 MMFD. Mica Condenser	Antenna Terminal on bottom (Terminal nearest back of chassis)	1500 KC	Tune to 1500 KC Generator Signal	5	Broadcast Antenna	Adjust for maximum output.



CHANGE IN VOLUME CONTROL CIRCUIT

On early releases of this model, a volume control was used which required a 4700 ohm resistor connected as shown by the dotted lines in the circuit diagram. In later production sets, a volume control with a different taper was used so the 4700 ohm resistor was not required. This later volume control carries the same part number.

When replacing a control using the resistor with a later type control, the connections are the same but the 4700 ohm resistor is omitted. Only the new controls are carried in stock by Stewart-Warner.

I. F. OSCILLATION

When aligning this set, I. F. oscillation may be encountered if the following precautions are not observed:

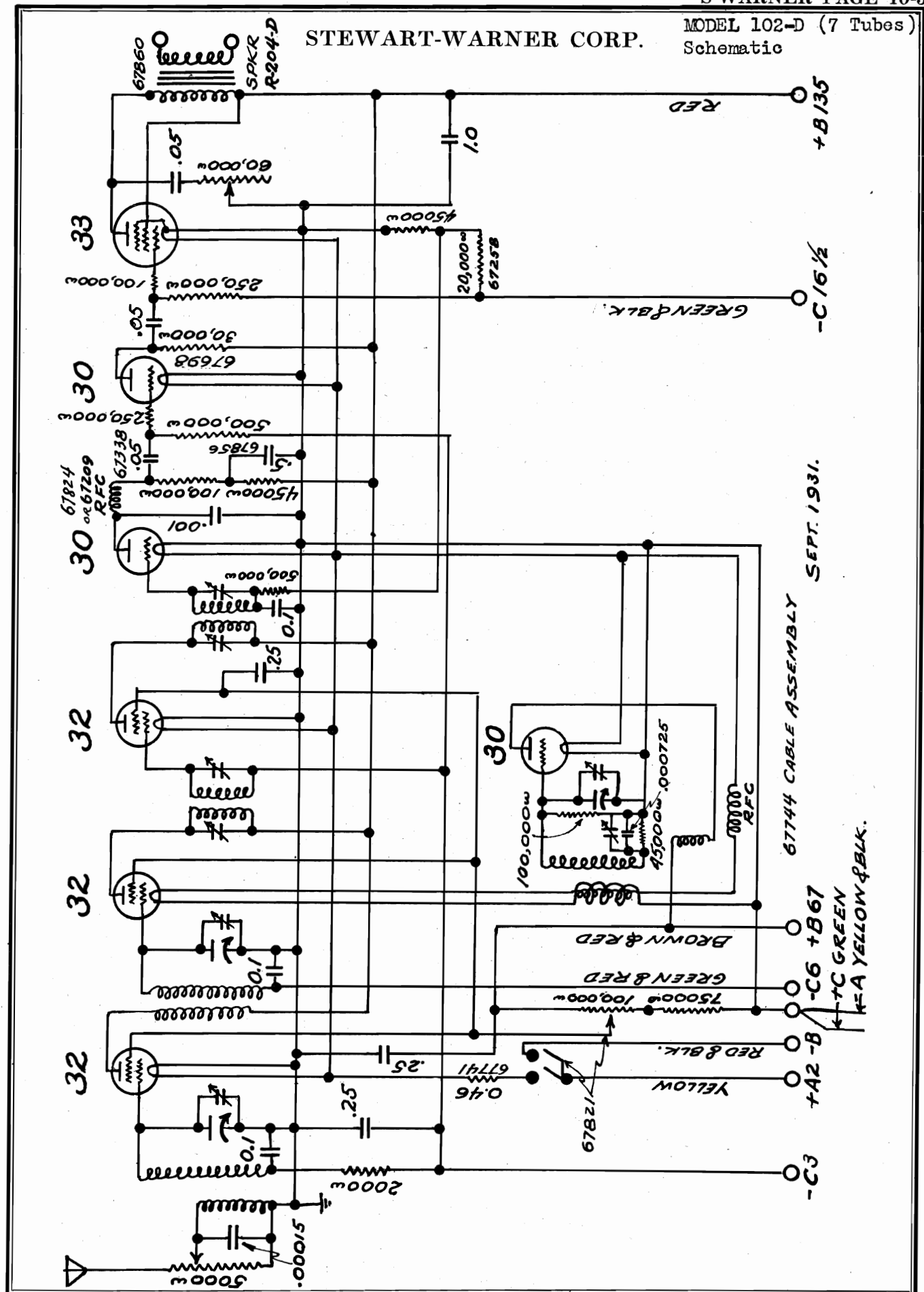
1. Keep the bottom cover plate on during alignment.
2. Keep the signal generator leads as far from the chassis as possible in order to prevent unnecessary feed-back.
3. Connect the ground lead of the signal generator through a .25 mfd. condenser to some part of the chassis in the VICINITY OF THE GANG CONDENSER.
4. Keep the orange lead of the volume control away from the 2nd I.F. transformer. Separating this lead from the others surrounding it at the base of the 25B8GT tube will also help.

BUILT-IN ANTENNA SYSTEM

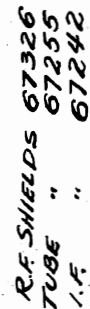
The Built-In Antenna incorporated in this receiver will generally give very satisfactory results in localities where powerful broadcast stations exist. This Built-In Antenna will function when the terminals on the bottom of the chassis are connected together. In cases where noise is excessive or greater sensitivity is desired, remove the jumper connecting these terminals and connect an external antenna to the terminal marked "External Aerial." This is the terminal nearest the back of the set.

The Built-In Antenna Condenser No. 12 couples the primary of the antenna coil to one side of the power line, which acts as the antenna. The R. F. choke No. 21 is an iron-core choke whose impedance is high at broadcast frequencies. This choke serves to prevent condenser No. 31 from by-passing the signal voltage picked up by the power line. It also prevents feed-back into the antenna circuit of radio frequency energy generated in the set itself.

When aligning this receiver, the jumper connecting the antenna terminals on the bottom of the set should be removed. This will prevent picking up signals which might interfere with the alignment procedure.



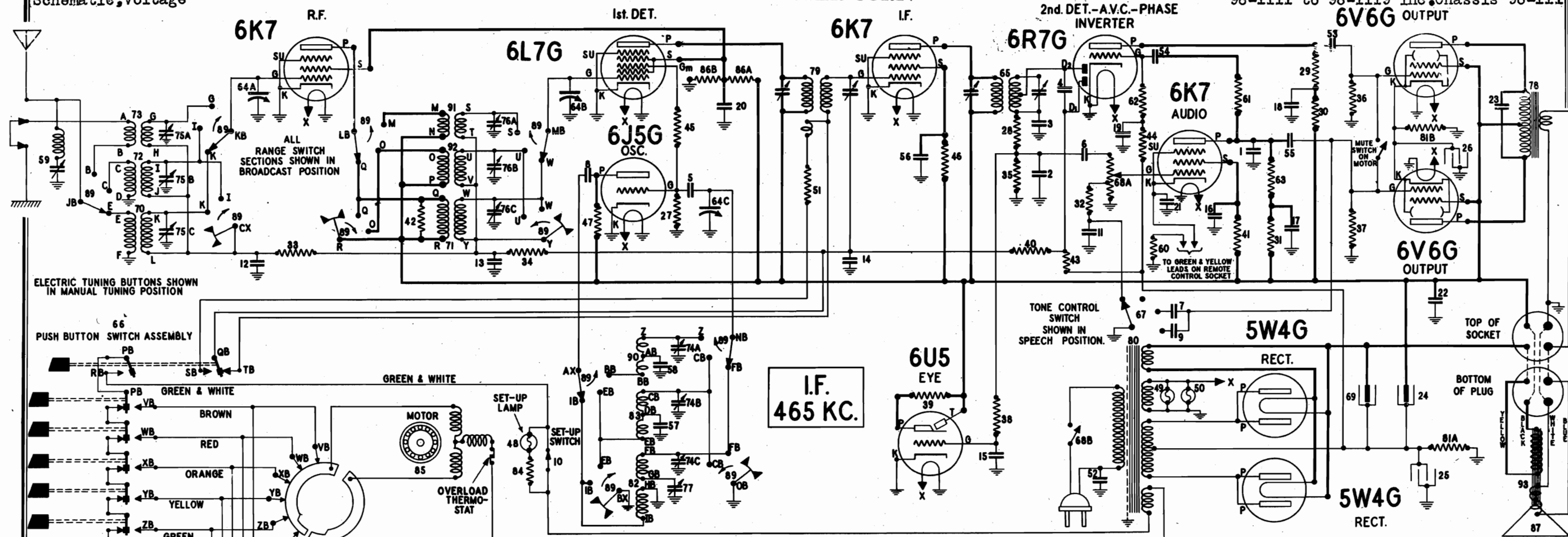
STEWART-WARNER CORP.



910-1111 to 910-1119 inc. Chassis 910-111
Schematic, Voltage

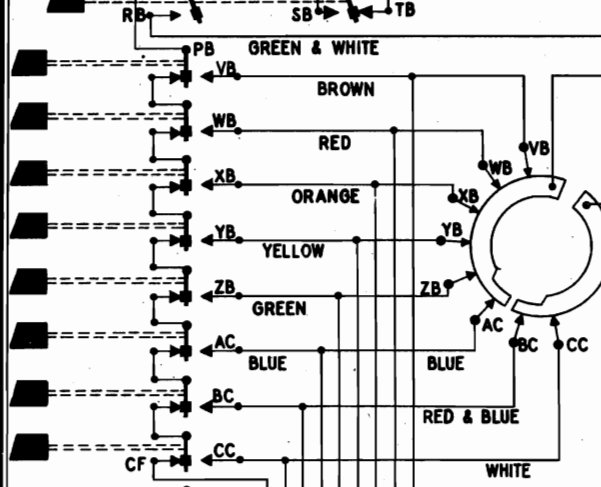
STEWART-WARNER CORP.

MODELS 91-1111 to 91-1119 inc. Chassis 91-111
98-1111 to 98-1119 inc. Chassis 98-111



ELECTRIC TUNING BUTTONS SHOWN
IN MANUAL TUNING POSITION

PUSH BUTTON SWITCH ASSEMBLY



THIS BUTTON (#10)
LABELLED "REMOTE"
ACTS AS A MECH-
ANICAL RELEASE FOR
ALL OTHER BUTTONS

THIS CONNECTOR MUST BE INSERTED IN THE
TWO HOLES ADJACENT TO THE WHITE DOT
IF THE REMOTE UNIT IS NOT USED.

NOTE: TERMINALS OF ALL
SWITCHES AND COILS ARE
LETTERED TO CORRESPOND
WITH PICTORIAL VIEWS OF
THESE PARTS ON PAGE 3.

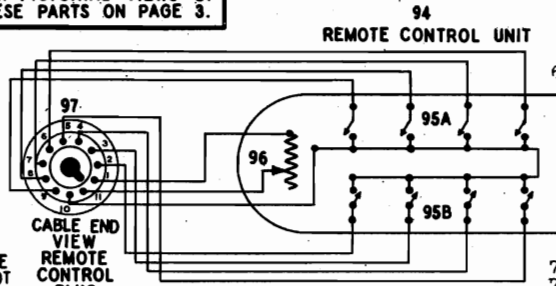


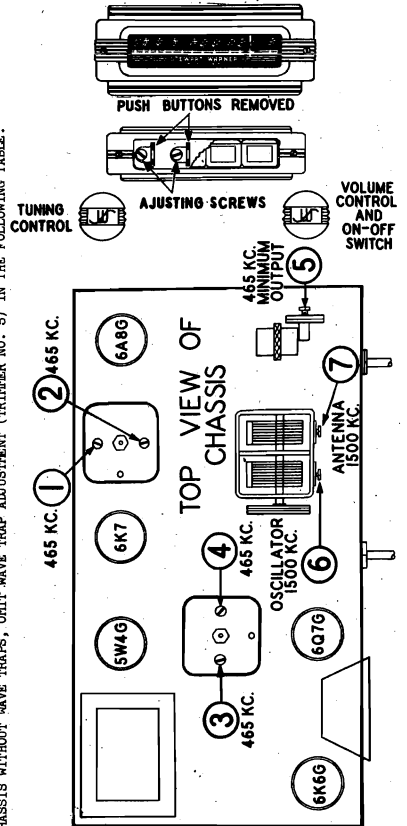
DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE	DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	83539	Condenser - mica 260 mmfd.	.20	33-34-35	110553	Resistor - carb. 220,000 ohms $\frac{1}{2}$ W.	.12
2-3-4	83783	Condenser - mica 110 mmfd.	.20	36-37			
5	85061	Condenser - mica 51 mmfd.	.15	38-39	110554	Resistor - carb. 1 meg. $\frac{1}{4}$ watt	.12
6	88026	Condenser - paper .02 mfd. 400 V.	.25	40-41			
7	88029	Condenser - paper .004 mfd. 400V.	.25	42	110557	Resistor - carb. 4,700 ohm $\frac{1}{4}$ W.	.12
8-9	88030	Condenser - paper .01 mfd. 400 V.	.25	43-44	110559	Resistor - carb. 470,000 ohms $\frac{1}{2}$ W.	.12
10	88054	Switch - for set up	.30	45	110560	Resistor - carb. 100 ohm $\frac{1}{2}$ watt	.12
11	88185	Condenser - ceramic tube .006 mfd. 600 volt	.25	46	110564	Resistor - carb. 100,000 ohm $\frac{1}{2}$ W.	.12
12-13	88189	Condenser - paper .05 mfd. 200 V.	.25	47	110568	Resistor - carb. 15,000 ohm $\frac{1}{2}$ W.	.15
14-15				48-49-50	110629	Lamp - 6.3 volt .25 amps.	.15
16-17-18	88191	Condenser - paper .1 mfd. 300 V.	.25	51	110975	Resistor - W.W. 33 ohm $\frac{1}{2}$ watt	.12
19	88990	Condenser - paper .5 mfd. 150 V.	.35	52	111214	Condenser - paper .01 mfd. 600 V.	.24
20	89421	Condenser - paper .1 mfd. 200 V.	.25	53-54	111252	Condenser - paper .05 mfd. 400 V.	.13
21	89532	Condenser - paper .25 mfd. 200 V.	.32	57	112426	Condenser - mica 1650 mmfd. (3%)	.30
22	89643	Condenser - paper .25 mfd. 300 V.	.40	58	112427	Condenser - mica 4050 mmfd. (3%)	.40
23	89826	Condenser - paper .004 mfd. 750V.	.24	59	112796	Coil - wave trap (with trimmer)	.50
24	89937	Condenser - elect. 30 mfd. 450 V.	1.60	60	112955	Resistor - carb. 1000 ohms $\frac{1}{4}$ watt (10%)	.12
25-26	110377	Condenser - elect. 10 mfd. 25 V.	.80	61	112956	Resistor - carb. 220,000 ohms $\frac{1}{4}$ watt (10%)	.12
27-28-29	110552	Resistor - carb. 47,000 ohms $\frac{1}{2}$ W.	.12				
30-31-32							

STEWART-WARNER CORP.



DUPLEX ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER TUNING SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER	CONTROL GRID OF 6AB-6 TUBE	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	1st I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
				3-4	2nd I.F.	
400 OHM CARBON RESISTOR	ANTENNA (Blue Wire)	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE SIGNAL TRAP	ADJUST FOR MINIMUM OUTPUT SIGNAL AND A STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	1500 KC	1500 KC	6	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	1500 KC	TUNE TO 1500 KC BROADCAST OSCILLATOR SIGNAL	7	BROADCAST ANTENNA (Shunt)	ADJUST FOR MAXIMUM OUTPUT.

ALIGNMENT OF CHASSIS HAVE TRAPS IS TO BE CARRIED OUT ACCORDING TO THE FOLLOWING TABLE. WHEN ALIGNING CHASSIS WITHOUT WAVE TRAPS, OMIT WAVE TRAP ADJUSTMENT (TRIMMER NO. 5) IN THE FOLLOWING TABLE.



MODELS 91-511 to 91-519

98-511 to 98-519

910-511 to 910-519

Voltage, Socket, Tuner, Drive Cord

STEWART-WARNER CORP. Tuner, Drive Cord Data

MODELS 97-521 to 97-529

Frequency
90 cycles
25 cycles
50-133

Voltage
117
117
100-240

These chassis are 5 tube, single band push-button tuning superheterodyne receivers. The tuning range is 540 to 1725 KC. The intermediate frequency is 460 KC.

Incorporated in each chassis is a four-button mechanical push-button tuner unit. These push buttons may be set to any station desired by the method described below under "How to Set Up the Push-Button Tuner".

The accuracy of tuning when using the push-button tuner, depends to a large extent upon the amount of "play" in the moving parts of this system. In cases where slight inaccuracy in tuning occurs check the following points:

1. Check to see that the button is correctly set to the station. If not, reset the button.
2. The tension must be maintained between the anti back-lash springs must be in place in the gear and compressed slightly.
3. Note the small adjusting lug over the push-button shafts at the point where they enter into the tuner. The lug is held in place by a hex-head screw. These lugs should be adjusted for a minimum amount of "play". In other words the push-button shaft must have a minimum of movement in the tuning direction.
4. Place an eyelet (part number 85448) on the end of the cord, close to the shaft, and squeeze it on so that the cord is taut. Then tie a large knot in the cord up close to the eyelet.
5. Close the other end of the cord, run it down the front of the dial, and tie a knot in the cord. These knots should be placed on the shaft between holes Z and E.
6. Thread the end of the cord down through hole E and up through hole F in the tuning shaft and pull through.
7. Place an eyelet on the end of the cord and squeeze as in step 4. Then tie a large knot in the cord up close to the shaft so the cord cannot slip back through the hole. The tension spring in place in the drum. This will take up any remaining slack in the cord.
8. Pull off the entire button cap by grasping the button in the tuning direction. The button cap should be moved, a round head adjusting screw will be exposed. Insert a screw-driver in this screw and loosen it (about one turn counter-clockwise will be sufficient).
9. Keeping the screw-driver in the screw slot, PUSH AGAINST THE SCREW-DRIVER UNTIL THE PUSH-BUTTON SHAFT IS FORCED ALL THE WAY IN. While the button is held in this position, grasp the tuning knob and tune in the station desired. Then turn the screw clockwise until reasonably tight.
10. WARNING: Do not attempt to turn the screw until it reaches a definite resistance. Never turn it further may result in damage to the mechanism.
11. The set-up for this button is now complete. Replace the push button by pushing it on firmly.
12. Set up the three remaining buttons in a similar manner.
13. Label each button with the call letters of the stations you have selected, using the call letter tab and the celluloid cover. The call letter tab should be inserted in the button by holding the ends and flexing it slightly, allowing it to snap into place. The celluloid cover tab should be flexed in a similar manner and placed on top of the paper tab.

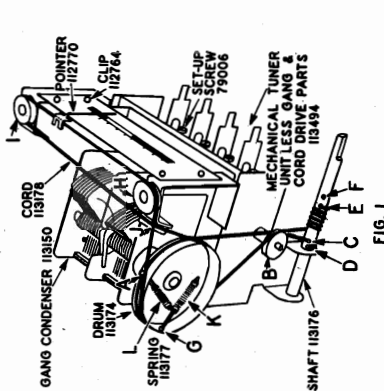


FIG. 1

- TO THREAD THE DIAL POINTER DRIVE CORD PROCEED AS FOLLOWS:
1. Close the gang condenser and thread one end of the cord through eyelet G.
 2. Carry the other end of the cord over the drum to the front around pulley H and then across to pulley I and counter-clockwise around it.
 3. Continue back to pulley J and down the front of the drum counter-clockwise around it.
 4. Carry the end of the cord on around the drum and thread eyelet G.
 5. Tie both ends extending through eyelet G to tension spring K, in so doing, allow enough slack in the cord so that it will be extended only if the push-button is extended too much, it will tend to make the push-button operate too hard because of overloading.
 6. Set the dial pointer to the last dial division mark on the dial and push the button to the cord. (Be sure the gang condenser is closed before clipping the pointer to the cord.)

Used In Receiver Models

91-511 to 91-519
98-511 to 98-519
910-511 to 910-519

Chassis Model

91-51
98-51
910-51

DIAGRAM

PART

NUMBER

DESCRIPTION

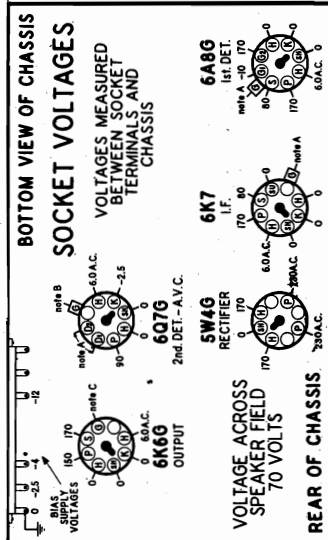
- 1-83007-Condenser - paper .02 mfd. 600 V.
- 2-83539-Condenser - mica 260 mfd.
- 3-85081-Condenser - mica 51 mfd.
- 4-88054-Switch - Tone Control
- 5-88189-Condenser - paper .05 mfd. 200 V.
- 6-88191-Condenser - paper .1 mfd. 300 V.
- 7-110510-Resistor - wire 3 mfd.
- 8-110582-Resistor - carb. 47,000 ohms ± W.
- 9-110583-Resistor - carb. 220,000 ohms ± W.
- 10-110584-Resistor - carb. 1 meg. 1/4 W.
- 11-110585-Resistor - carb. 470,000 ohm ± W.
- 12-110586-Resistor - carb. 33,000 ohms ± W.
- 13-110587-Resistor - carb. 3.3 meg. 1/4 W.
- 14-110588-Resistor - carb. 3.3 meg. 1/4 W.
- 15-110589-Resistor - carb. 3.3 meg. 1/4 W.
- 16-110590-Resistor - carb. 3.3 meg. 1/4 W.
- 17-111282-Condenser - paper .05 mfd. 400 V.
- 18-111283-Resistor - wire wound
- 19-112751-Transformer - Power 117 V. 60 C. (Section A - 217 ohms)
- 20-112752-Transformer - Power 117 V. 25 C. (Section B - 43 ohms)
- 21-112753-Transformer - Power 100 to 240 volt 50 to 133 cycles
- 22-112796-Coil - Wave trap (with trimmer)
- 23-112803-Transformer - 1st I.F.
- 24-113035-Condenser - ceramic tube .006 mfd. 800 volt
- 25-113042-Coil - oscillator
- 26-113047-Transformer - 2nd I.F.
- 27-113049-Volume Control - 500,000 ohms with off-on switch
- 28-113098-Condenser - elect. 8-8 mfd. 350 V.
- 29-113536-Condenser - elect. dual 8-8 mfd. 350 volt (for model 910-51 only)
- 30-113097-Coil - Antenna
- 31-113239-Condenser - variable gang
- 32-U-113239-Cone - voice coil assembly for U-115008 Spkr.
- 33-U-113240-Transformer - output for U-115008 speaker
- 34-U-115008-Speaker - Dynamic (5 inch.)
- 35-2894-Screw-wood chassis mtg. #8 X 5/8" (models 91-513; 98-513 & 910-513)
- 36-77223-Washer - chassis mtg. (for models 910-513; 98-513; 91-513)
- 37-79008-Screw - #6-32 X 7/8 Fin. Hd. Mach. (for setting up push button)
- 38-81145-Retaining Ring - for drive shaft - Per C
- 39-85040-Screw - #6 Hex. Hd. for mtg. adjusting washer - Per C
- 40-85299-Screw - chassis mtg. #10 X 3/8" (for models 910-513; 98-513 & 91-513)
- 41-85427-Socket - octal base (standard)
- 42-85815-Spring - between gear sections
- 43-86346-Eyelet - for dial cord
- 44-89746-Washer - for back of knobs - Per doz.
- 45-110829-Washer - flat steel, for mtg. chassis

- 112745-Clip - coil mtg. (osc. & ant.)
- 112762-Pulley - dial cord drive (at left side)
- 112764-Clip - dial scale retaining
- 112765-Scale - dial
- 112770-Pointer - dial
- 112776-Celluloid cover - over dial face
- 112798-Clip - for mtg. wave trap coil
- 112871-Cup Washer for mtg. models 91-513; 98-513 & 910-513
- 112872-Screw - chassis mtg. #8 X 1 1/4 O.H. (models 91-513; 98-513 & 910-513)
- 112874-Screw - #10 X 1-1/8 chassis mtg.
- 112878-Screw - escutcheon mtg. #2 X 3/8 (models 91-514; 98-514, 910-514)
- 112879-Screw - escutcheon mtg. #2 X 3/8
- 112914-Escutcheon - dial
- 113022-Knob - Round Volume or Tuning
- 113025-Socket - octal base (with special ground)
- 113052-Escutcheon - for dial (models 91-514; 98-514 & 910-514)
- 113053-Escutcheon - for push buttons
- 113054-Escutcheon - for push buttons (models 91-514; 98-514 & 910-514)
- 113093-Socket - for dial lamp
- 113103-Push Button
- 113124-Speaker Grille Bar - (chrome plate) (for models 91-514; 98-514 & 910-514)
- 113125-Speaker Grille Support Track (for models 91-514; 98-514 & 910-514)
- 113136-Knob - octagon - volume or tuning
- 113156-Gear - & bushing assembly for dial drive
- 113169-Spring - for key return
- 113170-Adjusting Lug - for button shafts
- 113172-Bracket - for dial & condenser mtg.
- 113174-Dial Drum - and pinton assembly
- 113176-Shaft - dial drive
- 113177-Spring - dial cord tension
- 113178-Cord - for dial drive (38" req.) supplied in 4 ft. lengths
- 113189-Tab - celluloid - for push button-Per doz.
- 113232-Mtg. plate - for spade models 91-513; 98-513 & 910-513
- 113321-Tab - station call letters (4 sheets) (brown)
- 113322-Tab - station call letters (4 sheets) (black)
- 113494-Mechanical Tuner assembly - keys and housing only

HOW TO REPLACE THE DIAL CORD

TO THREAD THE GANG CONDENSER DRIVE CORD PROCEED AS FOLLOWS:

1. Close the gang condenser. The set screw in the drum, Fig. 1, must be on the top side.
2. Take 19 inches of cord, double it in the middle and stick the loop end through eyelet A, Fig. 1, on the drum.
3. Tie tension spring L to this loop end, inside drum.
4. Take one of the free ends of the cord; carry it down around the back of the drum and over the front of pulley B.
5. Thread the end of the cord down through hole C in the drum.
6. Taking half turn around the shaft clockwise (when facing the unit).
7. Thread the end of the cord down through hole D in the tuning shaft and pull through the slack in the cord.



DIAL TUNED TO 540. KC
ANTENNA GROUND

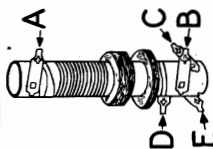
Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The bias for the control grids of the 6A8-G, 6K7, and the diode plates of the 6Q7-G tubes is -2.5 volts measured across resistor 18C.

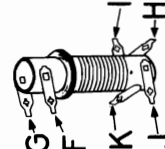
NOTE B: The bias for the control grid of the triode section of the 6Q7-G is -4 volts measured across resistors 18B and 18C.

NOTE C: The bias for the control grid of the 6K6-G output tubes is -12 volts measured across resistors 18A, 18B and 18C.

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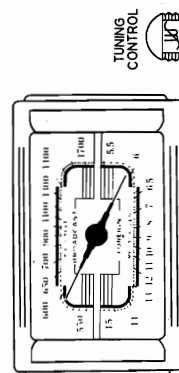


OSCILLATOR



NOTE

NOTE
TERMINALS OF SWITCH AND COILS SHOWN IN PICTORIAL VIEWS ABOVE, ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM AT THE RIGHT. TERMINALS WHICH ARE CONNECTED TOGETHER CARRY THE SAME LETTER.



ON-OFF
SWITCH
AND
VOLUME
CONTROL

PUSH-BUTTON TUNER SWITCH

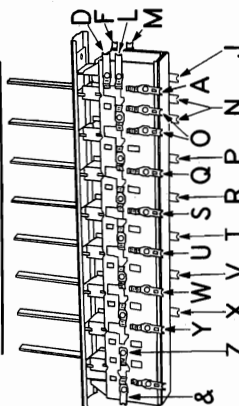
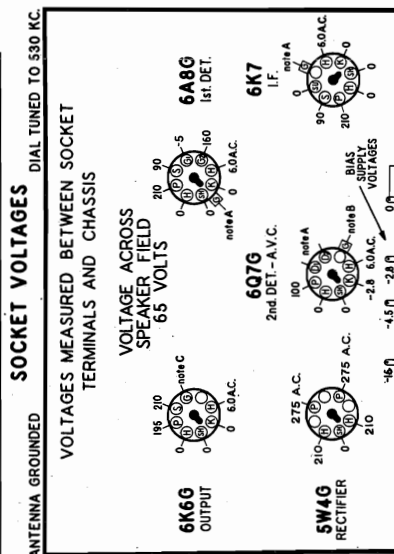


FIG. 1

991-53, 98-53 AND 910-53 CHASSIS

JUNE 1938



Use a high resistance voltmeter of 1000 ohms per volt. REAR OF CHASSIS

NOTE A: The bias for the control grids of the 6A8-G, 6K7, and the diode plates of the 6Q7-G tubes is -2.6 volts measured across resistor 25A.

NOTE B: The bias for the control grid of the triode section of the 6Q7-G is -4.5 volts measured across resistors 26A and 26B.

NOTE C: The bias for the control grid of the 6K6-G output tubes is -16 volts measured across resistors 26A, 26B and 26C.

MODELS 91-531 to 91-539

Chassis 91-53

STEWART - WARNER CORP.

98-531 to 98-539

Chassis 98-53

910-531 to 910-539

Chassis 910-53

Alignment, Trimmers

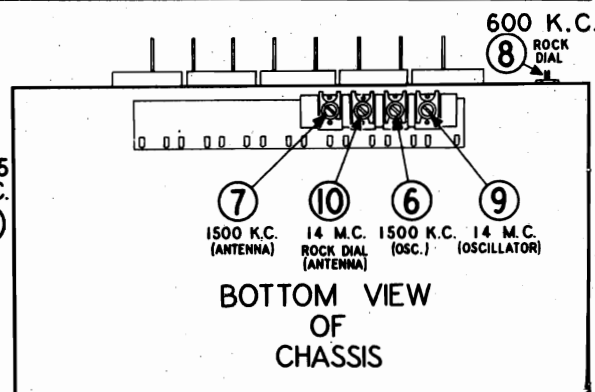
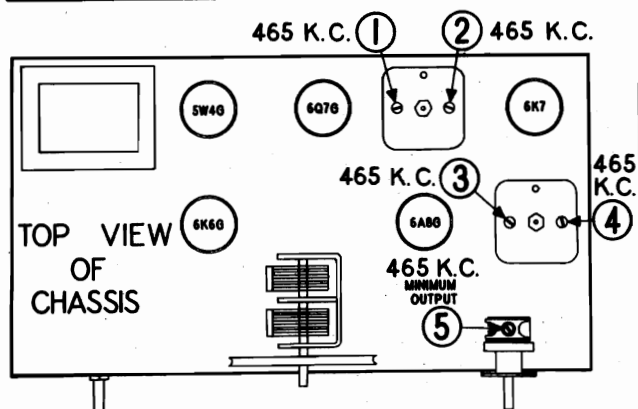
Chassis Model	Used In Receiver Models	Voltage	Frequency
91-53	91-531 to 91-539	117	60 cycles
98-53	98-531 to 98-539	117	25 cycles
910-53	910-531 to 910-539	100-240	50-133

These chassis are 5-tube, two band, push-button tuning superheterodyne receivers. The tuning ranges are 540 to 1725 KC and 5.4 to 15.4 MC. The I. F. is 465 KC.

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 14 MC are required.

- 1 Connect the output meter across the voice coil or between the plate of the 6K6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
- 2 Connect the ground lead of the signal generator to the black (ground) wire or the chassis.
- 3 Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
- 4 With the gang condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang in the full mesh position.

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6A8-G TUBE	465 KC	BROADCAST BUTTON PUSHED IN	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.	
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	465 KC	BROADCAST BUTTON PUSHED IN	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	1500 KC	BROADCAST BUTTON PUSHED IN	1500 KC	6	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	1500 KC	BROADCAST BUTTON PUSHED IN	TUNE TO 1500 KC GENERATOR SIGNAL	7	BROADCAST ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	600 KC	BROADCAST BUTTON PUSHED IN	TUNE TO 600 KC GENERATOR SIGNAL	8	BROADCAST OSCILLATOR (Series Pad)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	14 MC	FOREIGN BUTTON PUSHED IN	14 MC	9	FOREIGN OSCILLATOR (Shunt)	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 13.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 14 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	14 MC	FOREIGN BUTTON PUSHED IN	14 MC	10	FOREIGN ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.



STEWART-WARNER CORP.

MODELS 91-531 to 91-539

98-531 to 98-539

910-531 to 910-539

Tuner Data, Parts List

PART NUMBER	DESCRIPTION	LIST PRICE
17	110653-Resistor - carbon 220,000 ohms \pm W.	.12
18-19	110654-Resistor - carbon 1 meg. 1/4 watt	.12
21	110655-Resistor - carbon 470,000 ohms \pm W.	.12
22	110656-Resistor - carbon 22,000 ohms \pm W.	.12
24-25	110629-Lamp - 8.3 volt - .25 amps	.15
26A - 26B	112798-Resistor - (Section A - 55 ohms) (Section B - 30 ohms)	.40
27	112799-Transformer - output	1.26
28A - 28B	112790-Condenser - trimmer (4 section)	.60
29	112795-Coil - wave trap (with trimmer)	.50
30	112795-Condenser - padder (530-530 mfd.)	.36
31	112800-Transformer - power 117 V. 50-60 C.	3.40
	112823-Transformer - power 100-240 volt - 50-135 cycle	6.50
	112836-Transformer - power 117 V. 25 cycle	5.00
32A - 32C	112802-Condenser - electrolytic (dry) (Section A - 8 mfd. 400 volt) (Section B - 4 mfd. 400 volt) (Section C - 4 mfd. 400 volt)	1.80
33	112803-Transformer - 1st I.F.	1.20
34A - 34B	112842-Condenser - dual push button trimmer (1100 KC to 1700 KC)	.36
35A - 35B	112842-Condenser - dual push button trimmer (770 KC to 1350 KC)	.45
36A - 36B	112843-Condenser - dual push button trimmer (550 KC to 1000 KC)	.50
37A - 37B	113011-Coil - ant. - broadcast-short-wave	1.20
38A - 38B	113011-Coil - ant. - broadcast-short-wave	1.00
40	113021-Push Button Switch Assembly	4.20
41	113021-Push Button Switch Assembly	.80
42A - 42B	113024-Volume Control (500,000 ohm) (with switch)	1.10
43	113047-Transformer - 2nd I.F.	2.50
44A - 44B	113126-Condenser - variable gang	1.50
45	113243-Condenser - voice coil assembly for R-115009 speaker	1.80
	U-115015 speaker	3.50
46	115009-Speaker - dynamic (6 inch)	6.00
	U-115015-Speaker - dynamic (8 inch)	
81145	Retaining Ring - for drive shaft - Per C	.50
85040	Screw - 1/8 Hex. Head (self-tapping) - Per C	.35
85427	Socket - octal base	.15
89746	Washer - (paper) for back of knobs	.005
110466	Plug - speaker (4 prong)	.12
110501	Socket - 4 prong (for speaker)	.16
110623	Washer - flat steel, for mtg. chassis	.01
111302	Cord - dial drive 6 or 50 ft. lghs. Per Ft.	.06
111357	Spring - drive cord tension	.03
111855	Shield Base - for tube shields	.02
112232	Drum and Bushing - for dial drive	.35
112745	Clip - coil mounting (osc. & ant.)	.01
112747	Nut - #6-32 Hex.	.01
112786	Scale - dial	.68
112874	Screw #10 X 1-1/8 Chassis Mtg.	.01
112945	Shunt - tuning	.10
113019	Clip - dial scale retaining	.10
113022	Knob - for controls	.15
113028	Socket - octal base (with special ground)	.15
113038	Escutcheon - dial	1.24
113040	Light shield, cardboard (between button and escutcheon)	.06
113077	Shield tube only	.15
113102	Push Button only	.08
113104	Escutcheon Plate - for trimmer screws	.84
113114	Pointer - dial	.12
113144	Socket - for dial lamp	.22
113189	Tab - celluloid - for push button Per doz.	.09
113321	Tab - station call letters (4 sheets) (brown)	.40
113323	Tab - trimmer range (550 to 1000) Per doz.	.09
113324	Tab - trimmer range (770 to 1350) Per doz.	.09
113325	Tab - trimmer range (1100 to 1700) Per doz.	.09
113326	Tab - "Speech"	.09
113327	Tab - "Broadcast"	.09
113328	Tab - "Foreign"	.09
113544	Screws - escutcheon mtg. #2 X 3/8	.03
113545	Screws - P.B. escutcheon mtg. #3 X 3/8	.01
113666	Shield - for pilot light	.07

HOW TO SET UP THE PUSH-BUTTON TUNER

1. Be sure that the set is connected to a good antenna system.

2. Turn on the set and allow it to operate for at least one-half hour before setting up the push buttons.

3. Make a list of the five nearby stations to which you wish to set up the buttons. Be sure to select near-by, powerful stations, since weak signals will generally give poor results. Also be sure to select stations falling within the tuning range of the individual buttons, as indicated in Fig. 1.

Each of the buttons on the Push-Button Tuner has a definite operating range, as shown in Fig. 1; therefore, it is imperative that you select a station which is in the operating range of a button before attempting to set up that button for the particular station. AS THE TRIMMER SCREWS SHOULD NEVER BE TOO LOOSELY OR TOO TIGHTLY ADJUSTED, IT IS IMPORTANT THAT THE PROPER BUTTON BE SELECTED. For example, suppose you want to set a button associated with station WLM whose frequency is 700 KC. Refer to Fig. 1 which shows that this frequency falls within the operating range of buttons No. 1 and No. 2 whose range is 550 to 1000 KC. Therefore, either of these buttons may be set to WLM.

4. Remove the escutcheon surrounding the push-buttons by taking out the five screws holding it to the cabinet. This will expose to view ten trimmer adjustment screws, each pair of which is used to set a button for a station.

5. Push in the button which is labelled "Broadcast" and use the tuning knob to bring in the station that you desire on button No. 1. This is done so that you may identify the station by hearing its program.

6. Push in button No. 1 (See Fig. 1). You will note that when this button is pushed in, your station will probably not be heard. Using a small screw-driver, insert it in the second screw from the left (oscillator trimmer No. 1a, Fig. 1). Rotate the screw SLOWLY until the program that you have previously tuned in manually is again heard. If it cannot be heard, advance the volume control. BE SURE THAT YOU ADJUST THIS PARTICULAR TRIMMER SCREW (1a) TO THE POINT WHERE THE STATION IS HEARD WITH THE LEAST HISS OR DISTORTION AND NOT TO THE POINT OF GREATEST VOLUME. It is advisable that you turn the trimmer screw in and out so that it will tune across the station several times, in order that you may be sure that you have located this correct point. Now insert the screw-driver in the first trimmer screw on the left (antenna trimmer No. 1b, Fig. 1). Adjust this screw until the program is received with the maximum volume. Reduce the volume as necessary. Now go back to trimmer screw No. 1a and see if any improvement in reception can be made by adjusting it. Also repeat this operation for trimmer screw No. 1b.

NOTE: Trimmer screws indicated by letter "a" are oscillator trimmers. Trimmer screws indicated by letter "b" are antenna trimmers.

In some instances it may be found necessary after the set has been operated for a month or more, to re-adjust the push-button trimmers to compensate for a slight drift due to extreme climatic changes.

HOW TO CHANGE THE OPERATING RANGE OF A BUTTON

The operating range of a button may be changed by merely changing the dual trimmer used with that button. Dual trimmers with the ranges indicated below can be obtained from your Stewart-Warner distributor, or directly from the Stewart-Warner Corporation, under the following part numbers:

Part Number	Tuning Range	List Price
112942	1100 to 1700 KC.	\$ 0.36
112943	770 to 1350 KC.	.45
112944	550 to 1000 KC.	.50

To make the change proceed as follows:

1. Remove the chassis from the cabinet.
2. By referring to Fig. 1, determine the dual trimmer associated with the button whose range you wish to change.
3. Unsolder the leads from the four terminals on the back of this dual trimmer.

4. Remove the 6/32 machine screw holding the dual trimmer to the front of the chassis.

5. From the above list select a dual trimmer which will cover the desired range.

6. Mount it on the front of the chassis with the 6/32 machine screw, and solder the leads to its four terminals.

The button is now ready to be set to any strong station whose frequency is within the range of this new trimmer unit.

7. Set up button No. 2 for the selected station in a similar manner, using trimmer screws No. 2a and No. 2b. Proceed to set the remaining buttons in the same manner.

8. Label each button with the call letters of the stations you have selected, using the call letter tabs and the celluloid covers packed with the receiver. The printed paper tab should be inserted in the button by holding the ends and flexing it slightly, allowing it to snap into place. The celluloid cover tab should be flexed in a similar manner and placed on top of the paper tab.

PART NUMBER	DESCRIPTION	LIST PRICE
1-11	82217-Condenser - paper .04 mfd. 800 volt	.35
2-3	82559-Condenser - mica .240 mfd.	.20
4	85061-Condenser - mica .51 mfd.	.15
5	85454-Condenser - mica .11 mfd.	.15
6-7	88030-Condenser - paper .01 mfd. 400 volt	.25
8	88185-Condenser - ceramic tube .006 mfd.	.25
9-10	88189-Condenser - paper .05 mfd. 200 volt	.25
11	88587-Condenser - mica .0042 mfd.	.35
12	89421-Condenser - paper .1 mfd. 400 volt	.25
13	89421-Condenser - paper .1 mfd. 400 volt	.25
14	110550-Resistor - carbon 10,000 ohms \pm W.	.15
15	110551-Resistor - carbon 15,000 ohms \pm W.	.15
16	110552-Resistor - carbon 47,000 ohms \pm W.	.12

MODELS 1471 to 1479

Chassis R-147

MODELS 1481 to 1489

Chassis R-148

Hum Elimination

STEWART-WARNER CORP. Speaker Cone Replacements

HUM ELIMINATION IN THE MODEL R-147 CHASSIS November 28, 1936FOR RESIDUAL HUM: (Between-station hum)

- Remove the .5 mfd. condenser, part number 89990, connected from chassis, to the mounting nut of the electrolytic condenser (the one nearest the power transformer). Replace the .5 mfd. condenser with a 10 mfd. 25 volt electrolytic condenser, our part number 89053. The positive terminal of this condenser must be connected to the chassis. This change should always be made in combination with the following one, since either change may increase the hum if made alone.
- Locate the 210,000 ohm resistor connected from the plate of the 6C5 tube to one of the 5Z4 socket terminals.
 - Disconnect the end of this resistor going to the 5Z4 socket.
 - Connect the added 51,000 ohm resistor in series with the disconnected end of the above 210,000 ohm resistor and the lug on the 5Z4 socket from which it was unsoldered.
 - Connect the added .25 mfd. condenser from chassis to the junction of the above two resistors.
- Remove the twisted green and brown wires connecting to the tone control and replace them with the shielded pair supplied by Stewart-Warner. Ground the shield at both ends. Route the shielded wire so that the shielding does not ground the mounting nut on the electrolytic condenser nearest the power transformer.
- Separate the single green volume control wire from the power transformer and the A.C. leads.
- In all cases of either residual or modulation hum, tighten down the power transformer mounting screws after the set is hot.
- Early production sets did not have the resistance-capacity filter consisting of the 260,000 ohm resistor and the .1 mfd. condenser in the grid circuit of the 6F5. In these early sets a 1.1 megohm resistor was connected from the 6F5 grid to the bias resistor network. The later sets used a 760,000 ohm resistor connected from the grid to the filter resistor and condenser. If you are working on any of the early sets which do not have the filter, you should add a 260,000 ohm, 1/4 watt resistor in series with the end of the 1.1 megohm grid resistor which connects to the bias network. Then connect a .1 mfd., 150 volt condenser from chassis to the junction of the 260,000 ohm and 1.1 megohm resistors.

FOR MODULATION HUM: (On stations only) - Make this change even though no modulation hum is heard in the shop.

- Replace the .1 mfd. screen-grid by-pass condenser, diagram No. 28, connected to the 6A8 socket with the .5 mfd., 150 volt by-pass condenser, part number 88990 which was disconnected from the mounting nut of the input electrolytic condenser.

IMPORTANT

If there is still too much hum after making the above changes be sure to check for defective tubes.

The following material is required for this work:

- 1 - 89532 - .25 mfd. 200 volt Tubular Paper Condenser
- 1 - 89053 - 10 mfd., 25 volt Electrolytic Condenser
- 1 - 83080 - 51,000 ohm 1/4 watt Carbon Resistor
- 1 - Special Shielded Tone Control Cable

HUM ELIMINATION IN THE MODEL R-148 CHASSIS

December 4, 1936

FOR MODULATION HUM: (On stations only) Make this change even though no modulation hum is heard in the shop.

- Remove the .1 mfd., 150 volt condenser connected to the screen grid circuit of the 6K7 R.F. tube.
- Replace it with a .5 mfd., 150 volt paper condenser, our part number 88990.

FOR RESIDUAL HUM: (Between-station hum)

- Locate the red-blue wire running from the 5V4G socket heater terminal to the speaker socket.
 - Disconnect one end of the wire and re-route the wire along the back of the chassis so that it is at least two inches above the 6H6 and 6C5 sockets when the chassis is upside down. Re-connect the wire.
- The blue and black twisted wire supplied by Stewart-Warner should be placed along the front of the chassis so it can be used to connect the heater terminals of the 6K7 R.F. and the 6L6 sockets. First connect the black wire to the grounded heater terminal of the 6K7 R.F. socket (the heater terminal near the front of the chassis) and the blue wire to the hot heater terminal of the same socket. The other end of the black wire must be connected to the grounded heater terminal of the 6L6 nearest the front of the chassis and the other end of the blue wire must be connected to the hot heater terminal of the other 6L6 socket (the one nearest the 6C5).
- Remove the input audio transformer mounting screw nearest the front of the set. Rotate the transformer around its other mounting screw until the free end is toward the rear of the chassis. There is a hole in the chassis at the proper point to mount the transformer by means of the small machine screw, lock-washer and nut. Pull the transformer leads away from the tube sockets. Sometimes an intermediate position of the transformer will result in less hum but this necessitates drilling either one or two new mounting holes.
- Tighten down the power transformer mounting bolts preferably when the set is hot.

SPEAKER CONE REPLACEMENT IN 1937 RADIO MODELS

We can now supply replacement cones which can be installed without special tools in all 1936-1937 Stewart-Warner speakers including staked spider models with the exception of some of the small five inch speakers. In describing the replacement of the cones we are dividing the various speaker models into three general groups as follows:

(A) - 8 and 12 INCH SPEAKERS WITH SPIDERS STAKED TO THE POLE PIECE

In order to facilitate the replacement of the cones in our 8 and 12 inch speakers with the spiders staked to the center of the pole piece, we will furnish special cones which can be installed without any special tools or equipment as described under "INSTALLING NEW CONES".

These cones have spiders fastened to the outside of the voice coils. The spiders are mounted on the speaker shells by means of screws. The necessary holes are already punched in the shell. The special cones are supplied complete with the necessary gaskets and mounting hardware under the part numbers in the table shown on page two of this bulletin.

(B) - SPEAKERS HAVING SPIDERS MOUNTED WITH SCREWS

The cones in these speakers can be replaced in the conventional manner as described later in this bulletin under "INSTALLING NEW CONES". The correct part numbers are tabulated below.

(C) - FIVE INCH SPEAKERS WITH SPIDERS STAKED TO THE POLE PIECE

Speakers in this group cannot be satisfactorily repaired without special equipment and therefore must be returned to the factory for repair. If the cone is damaged or if the speaker is out of the warranty the cost of replacing the cone will be the price of the cone plus a fifty cent labor charge. We will assume no transportation charges under these conditions.

INSTRUCTIONS FOR INSTALLING NEW CONES

- In staked spider models cut the old cone around the outer edge and break the spider away from the washer under which it is mounted. This washer should be left in place. In models having the spider fastened with screws, remove the screws and then cut out the cone around the outer edge. Remove the cone, voice coil and spider assembly and clean away all traces of the old cone and cement where the cone was cemented to the frame.
- Clean any particles from the air gap.
- Spread an even coat of quick drying household or speaker cement over the face of the speaker frame. If two complete cardboard gaskets are packed with the cone put the thin one on the frame and cover it with cement. If only one complete gasket is enclosed it should be applied later as described in paragraph 8.
- Set the replacement cone in place with the voice coil in the air gap. Make sure that the holes in the spider mounting line up with the holes in the speaker shell.
 - In the R-247-A, R-258-D and R-266-A speakers, place the small spacing bushings between the spider and the shell. Insert the screws through the shell, spacers and spider, then put on the lock washers and screw the nuts on loosely.
 - In other speakers place the small brackets, Part No. 89028, over the spider mounting bracket with the ends in the slots in the shell, and place the mounting screws through the holes in the shell and screw them into the brackets. Leave the screws loose.
- Insert three or four thin shims in the inside air gap to keep the voice coil centered.
- Firmly press down the edges of the cone.
- Cement the thick cardboard gasket to the edge of the cone, then lay the speaker on its face until the cement is thoroughly dry.
- Tighten the spider mounting screws, and then remove the thin shims from the air gap.
- Make sure that the voice coil is centered by pressing in on the cone near the outer edge and listening for evidence of rubbing. If the voice coil is rubbing, the spider mounting screws should be loosened and the voice coil centered so it does not rub.
- Solder the flexible voice coil leads to the proper terminals.

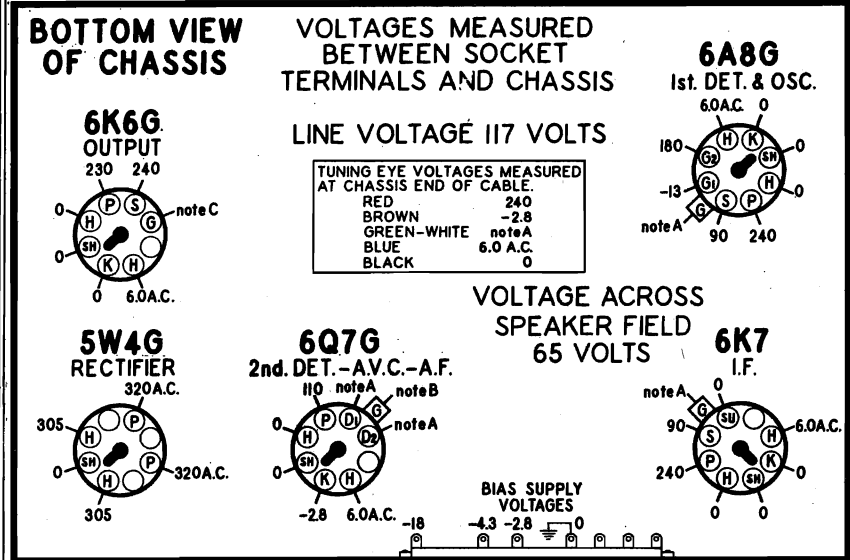
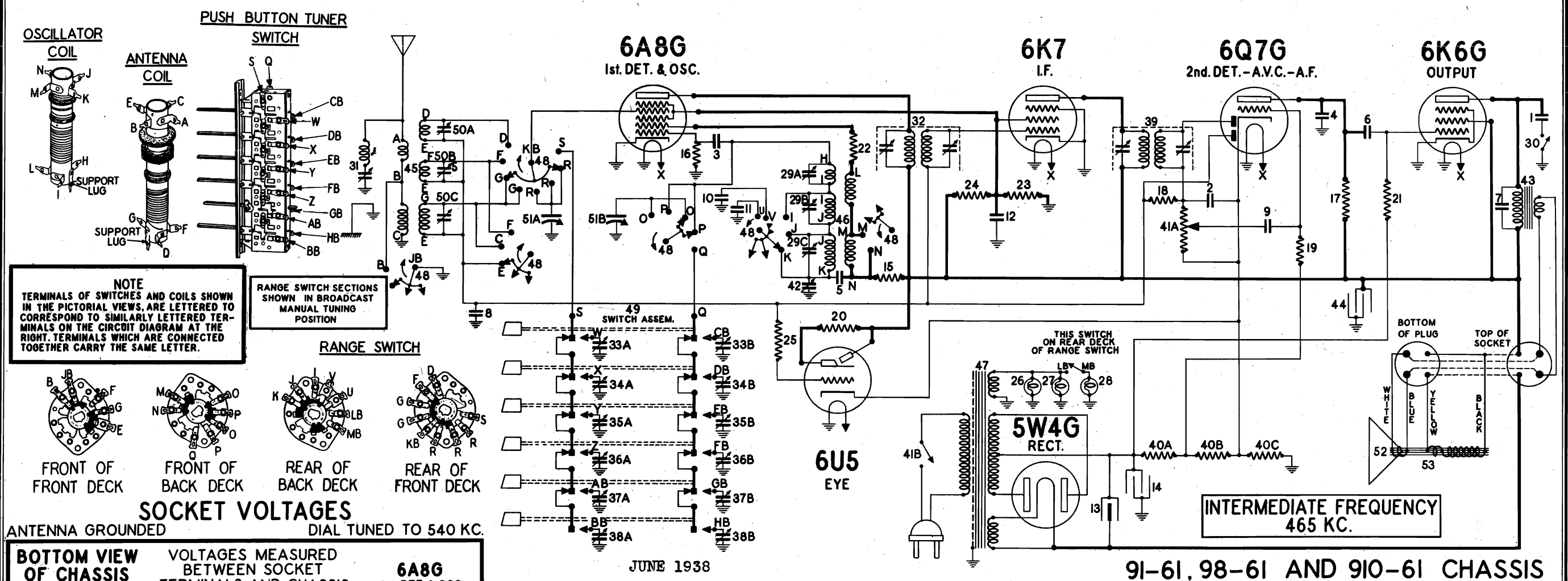
REPLACEMENT CONE PART NUMBERS

(FOR ALL 1936-1937 SPEAKER MODELS)

Speaker Model	Receiver Model	Replacement Cone part number	List Price of Replacement Cone
R-234-D.....	1611D, 1621D.....	Magnetic - Replace speaker	
R-235-D.....	1625D.....	Magnetic - Replace speaker	
R-243-A.....	1421.....	(Early production-spider fastened with screw, order cone #88100) (Late production-with staked spider-return to factory for repair)	
R-244-A.....	1425.....	88133.....	2.00
R-245-A.....	1601.....	88328.....	2.10
R-246-A.....	1441, 1671.....	Return to factory for repair	
R-247-A.....	1451, 1461, 1695, 1721, & 1731.....	110435.....	1.35
R-248-A.....	1455, 1465, 1725, 1735.....	110461.....	2.60
R-253-A.....	1475, 1705, 1709.....	110461.....	2.60
R-254-A.....	1485.....	89014.....	2.25
R-255-A.....	1495.....	89167.....	2.50
R-256-A.....	1495.....	89193.....	2.40
R-257-D.....	1631D, 1641D.....	89428.....	1.75
R-258-D.....	1635D, 1645D.....	110434.....	1.35
R-262-A.....	1493-P.....	89193.....	2.40
R-263-A.....	1493-P.....	89263.....	1.80
R-265-A.....	1585.....	89555.....	1.75
R-266-A.....	1471-X, 1701-X.....	110434.....	1.35
R-267-A.....	1691, 1751-X.....	89428.....	1.75
89966.....	1711.....	Return to factory for repair	

STEWART-WARNER CORP.

MODELS 91-611 to 91-619, Chassis 91-61
98-611 to 98-619, Chassis 98-61
910-611 to 910-619, Chassis 910-61
Schematic, Voltage, Socket, Coils



REAR OF CHASSIS
Use a high resistance voltmeter of 1000 ohms per volt.
NOTE A: The bias for the control grids of the 6A8-G, 6K7, 6U5, and the diode plates of the 6Q7-G tubes is -2.8 volts measured across resistor 40C.
NOTE B: The bias for the control grid of the triode sections of the 6Q7-G is -4.3 volts measured across resistor 40B and 40C.
NOTE C: The bias for the control grid of the 6K6-G output tubes is -18 volts measured across resistor 40A, 40B and 40C.

ELECTRICAL PARTS			DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE	DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	83217	Condenser - paper .04 mfd. 600 V.	39	113047	Transformer - 2nd I.F.	1.10	89746	Washer - (paper) for back of knobs		.005
2	83539	Condenser - mica 260 mfd.	40A to 40C	113057	Resistor - Metal Clad Section A - 160 ohms 1 watt Section B - 25 ohms 1 watt Section C - 40 ohms 1 watt	.48	110496	Plug - speaker (4 prong)		.12
3	85061	Condenser - mica 51 mfd.					110501	Socket - 4 prong (for speaker)		.16
4	85394	Condenser - mica 510 mfd.					110829	Washer - flat steel, for mtg. chassis		.01
5	88030	Condenser - paper .01 mfd. 400 V.	41A - 41B	113062	Volume Control - (500,000 ohms with switch)	.92	111085	Sleeve - felt for tuning eye		.03
7	88185	Condenser - ceramic tube .006 mfd. 600 volt					111302	Cord - dial drive 6 or 50 ft. lghs. Per ft.		.05
8-9	88189	Condenser - paper .05 mfd. 200 V.	42	113063	Condenser - padder	.56	111357	Spring - drive cord tension		.03
10	88473	Condenser - mica .00123 mfd. (3%)	43	113064	Transformer - output	1.70	111855	Shield Base - for tube shields		.02
11	88681	Condenser - mica .00255 mfd. (3%)	44	113066	Condenser - elect. 8 mfd. 450 V.	.98	112233	Drum & Bushing - for dial drive		.35
12	89421	Condenser - paper .1 mfd. 200 V.	45	113068	Coil - antenna	.94	112798	Clip - for mtg. wave trap coil		.01
13	89937	Condenser - elect. 30 mfd. 450 V.	46	113071	Coil - oscillator	1.20	112874	Screw #10 X 1 1/8 chassis mtg.		.01
14	110377	Condenser - elect. 10 mfd. 25 V.	47	113078	Transformer - power 117 volt (50-60 cycle)	4.00	112876	Screw - P.B. escutcheon mtg. #3 X 3/8		.01
15	110550	Resistor - carb. 10,000 ohms 1/2 W.					112879	Screw - eye escutcheon mtg. #2 X 3/8		.03
16	110552	Resistor - carb. 47,000 ohms 1/2 W.	48	113639	Transformer - power 117 volt (25 cycle)	6.00	113019	Clip - dial scale retaining		.01
17	110553	Resistor - carb. 220,000 ohms 1/2 W.					113025	Socket - octal base (with special ground)		.15
18-19-20	110554	Resistor - carb. 1 meg. 1/4 watt	49	113083	Switch - range	1.80	113040	Light Shield - cardboard (between button holes and dial frame)		.06
21	110559	Resistor - carb. 470,000 ohms 1/2 W.	50A to 50C	113084	Push Button Switch Assembly	3.00	113041	Knob - push on		.10
22	110560	Resistor - carb. 100 ohm 1/4 watt	51A - 51B	113095	Condenser - trimmer (3 section)	1.25	113077	Shield - tube		.15
23	110561	Resistor - carb. 15,000 ohm 2 W.					113080	Shaft - dial drive		.12
24	110568	Resistor - carb. 15,000 ohm 1 W.	52	R-113342	Cone - voice coil assem. for R-115011 speaker	1.80	113086	Bracket - dial frame & light		.34
25	110570	Resistor - carb. 2.2 meg. 1/4 watt	53	R-115011	Speaker - dynamic 8 inch	8.00	113089	Scale - dial		1.20
26-27-28	110629	Lamp - 6.3 volt - .25 amp.					113093	Socket - for dial lamp		.18
29A to 29C	112072	Condenser - trimmer - 3 section					113098	Escutcheon - dial		1.50
30	112793	Switch - tone control	DIAL & MISCELLANEOUS PARTS				113099	Escutcheon - push button		1.44
31	112796	Coil - wave trap (with trimmer)	DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE	113101	Pointer		.18
32	112803	Transformer - 1st I.F.	33A - 33B	112942	Condenser - dual push button trimmer (1100 KC to 1700 KC)	.36	113102	Push Button - only		.08
34A - 34B	112942	Condenser - dual push button trimmer (1100 KC to 1700 KC)	35A - 35B	112943	Condenser - dual push button trimmer (770 KC to 1350 KC)	.45	113105	Knob - Push on		.10
36A - 36B	112943	Condenser - dual push button trimmer (770 KC to 1350 KC)	37A - 37B	112944	Condenser - dual push button trimmer (550 KC to 1000 KC)	.50	113130	Cable & Plug - for tuning eye		.55
38A - 38B	112944	Condenser - dual push button trimmer (550 KC to 1000 KC)					113189	Tab - celluloid - for push button-Per dz.		.09
							113321	Tab - station call letters(4 sheets) (brown)		.40
							113323	Tab - trimmer range (550 to 1000)-Per dz.		.09
							113324	Tab - trimmer range (770 to 1350)		.01
							113325	Tab - trimmer range (1100 to 1700)		.01

STEWART-WARNER CORP.

ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output π -or and an accurately calibrated signal generator with a tuning range from 485 KC to 50 MC are required.

- 1 Connect the output meter across the voice coil or between the plate of the 6X6-0 output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

2. Connect the ground lead of the signal generator to the black (ground) wire or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it is necessary to move the pointer to the correct position by hand, while holding the pointer in the full mesh position.

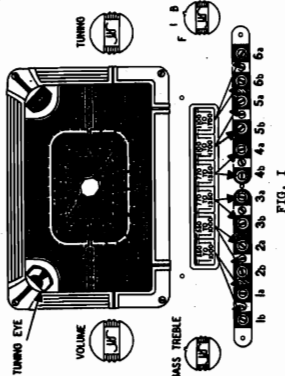
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Chassis Model	Used in Receiver Models	Voltage	Frequency
98-61	91-611 to 91-619	117	60 cycles
98-61	98-611 to 98-619	117	25 cycles
910-61	910-611 to 910-619	100-240	50-133

These chassis are 6 tube, three band, push-button tuning superheterodyne receivers. The tuning ranges are 540 to 1720 KC, 2.2 to 7.0 MC and 6.7 to 23 MC.

HOW TO SET UP THE PUSH-BUTTON TUNER

1. Be sure that your set is connected to a good antenna system.
2. Turn on the set and allow it to operate at least one-half hour before setting up the push-buttons.



9. Label each button with the call letters of the station you have selected, using the call letter tabs and celluloid covers packed with your receiver. The printed celluloid cover tab should be inserted in the button by holding the tabs and flexing them slightly, allowing the tab to snap into place. The celluloid cover tab should be flexed in a similar manner and placed over the paper tab.

HOW TO CHANGE THE OPERATING RANGE OF A BUTTON

In some instances it may be necessary, after the set is operated for a month or more, to reset the screws as they may drift due to heat, humidity, etc.

RANGE OF A BUTTON

The operating range of a button may be changed by merely changing the dual trimmer used with that button. Dual trimmers with the ranges indicated below can be obtained from your Stewart-Warner distributor, or directly from the Stewart-Warner Corporation, under the following part numbers:

<u>Part Number</u>	<u>Tuning Range</u>	<u>List Price</u>
112842	1100 to 1700 KC.	\$ 0.36
112845	2000 to 2750 KC.	0.45

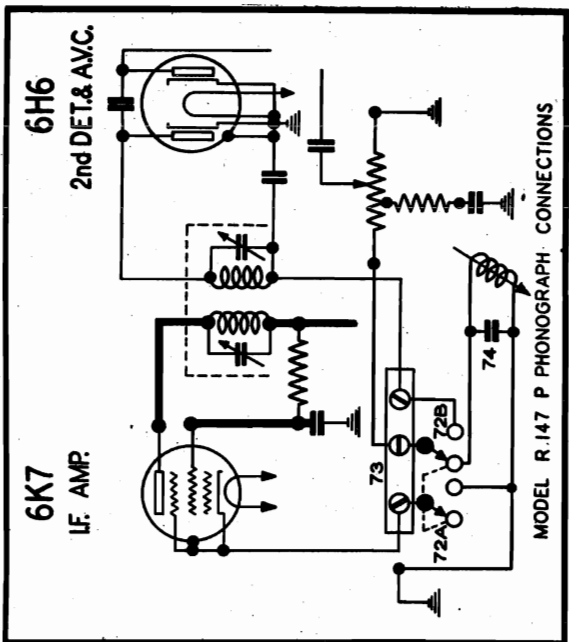
To make the change proceed as follows:

1. Remove the chassis from the cabinet.

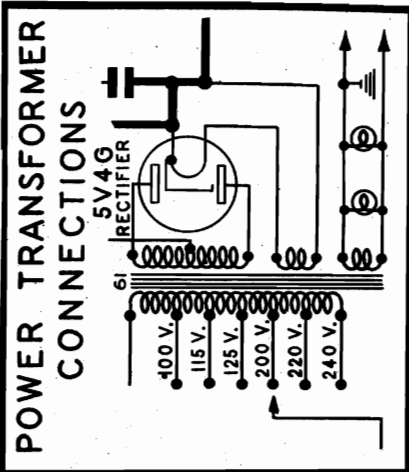
2. By referring to Fig. 1, determine the dual trimmer potentiometer which has the range you wish to change.
 3. Un solder the leads from the four terminals on the back of this dual trimmer.
 4. Remove the 6/32 machine screw holding the dual trimmer to the front of the chassis.
 5. From the above list select a dual trimmer which will cover the desired range.
 6. Mount it on the front of the chassis with the 6/32 machine screw, and solder the leads to its four terminals.
- The battery is now ready to be set to any strong frequency within the range this new trimmer will cover.

NOTE: Trimmer screws indicated by letter "a" are oscillator trimmers. Trimmer screws indicated by letter "b" are antenna trimmers.

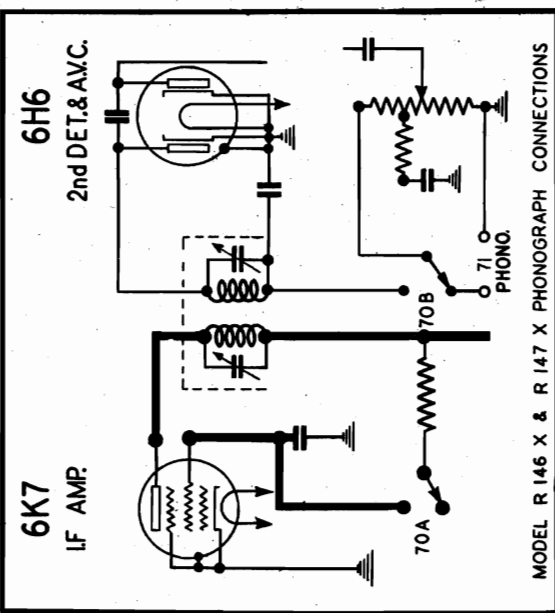
STEWART WARNER CORP.

Phonograph Connections
Universal Transformer
Data

ADDITIONAL PARTS USED ON
MODELS R-146-X, R-147-X and R-147-P



UNIVERSAL TRANSFORMER USED
WITH MODELS R-146-X ; R-147-X ;
AND R-147-P.



The diagrams on this sheet show the phonograph and the connections for the R-146-X, R-147-X and these chassis are otherwise identical with the R-146-X. Only additional parts for these models are listed. Parts and service data will be found in the R-146-X and R-147-X sections.

POWER TRANSFORMERS AND FUSES

Since the models R-146-X, R-147-X and R-147-P can be operated on a range of line voltages ranging from 100 to 240 volts different fuses must be used for different voltages. Proper values for different voltages are listed below.

MODEL	100 - 125 VOLTS		200 - 240 VOLTS	
	PART NUMBER OF FUSE	CURRENT RATING OF FUSE	PART NUMBER OF FUSE	CURRENT RATING OF FUSE
R-146-X	38841	1 Amp.	88055	3/4 Amp.
R-147-X	89002	1.5 Amp.	38841	1 Amp.
R-147-P	89002	1.5 Amp.	38841	1 Amp.

SPEAKERS AND OUTPUT TRANSFORMERS

The R-266-A 8-inch dynamic speaker is used with model R-1471-X, and the R-255-A 12-inch dynamic speaker is used with model R-1475-X. Please note that these speakers require different output transformers. Speakers and output transformers are listed below for the models R-146-X, R-147-X and R-147-P respectively.

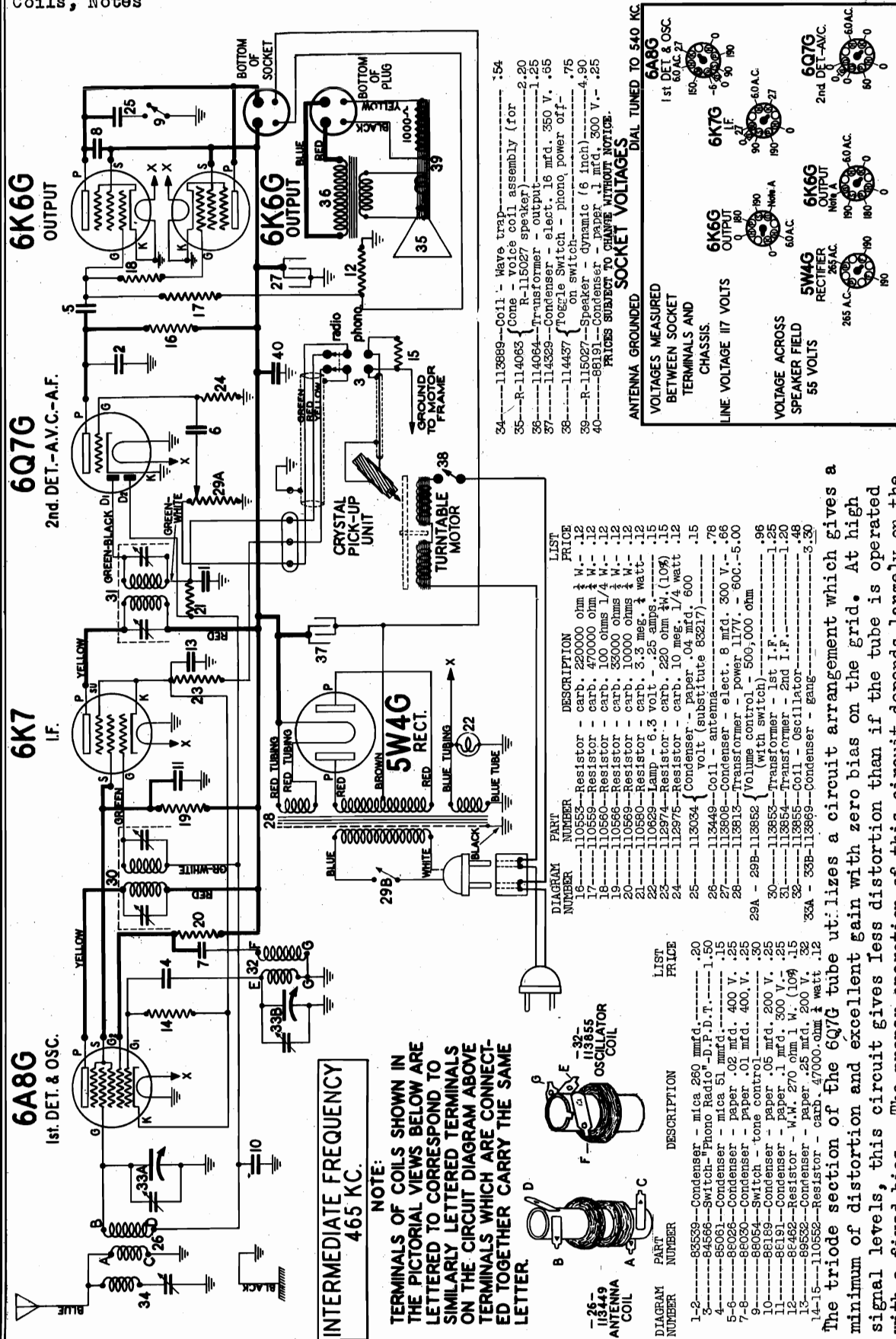
MODEL	SPEAKER		SIZE	OUTPUT TRANSFORMER	
	PART NO.			PART NO.	
R-1461-X	R-247-A		8-inch	98539	
R-1465-X	R-248-A		12-inch	98796	
R-1471-X	R-266-A		8-inch	98622	
R-1475-X	R-253-A		12-inch	98570	
R-1479-P	R-253-A		13-inch	98570	

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

910-641 to 910-649
Chassis 910-64
Schematic, Voltage, Socket
Coils, Notes

STEWART-WARNER CORP.

MODELS 91-641 to 91-649
Chassis 91-64
98-641 to 98-649
Chassis 98-64



MODELS 91-641 to 91-649
98-641 to 98-649
910-641 to 910-649

STEWART-WARNER CORP.

Alignment, Trimmers
Phono Data, Tuner Data

ALIGNMENT EQUIPMENT & PROCEDURE

For alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 1500 KC. are required.

- 1- Connect the output meter across the voice coil or between the plate of either of the 6K6G tubes and ground through a .1 mfd. condenser. (these tubes are connected in parallel, not push-pull). The connection will depend upon the type of meter. (The more sensitive type should be connected across the voice coil.)
- 2- Connect the ground lead of the signal generator to the chassis of the receiver and keep it connected in this manner throughout the entire alignment procedure.
- 3- Turn the volume control to the maximum volume position and leave it in this position throughout the entire alignment procedure.
- 4- With the gang condenser in full mesh, set the pointer to the last mark on the left end of the dial scale. If the pointer is only slightly off calibration, loosen the set screw in the pointer cord drive drum, which is the outer drum on the left hand side of the gang condenser and with the gang condenser in full mesh turn the drum until the pointer is in the correct position. If the pointer is off calibration several dial divisions, release it from the pointer drive cord by spreading the clip on the pointer. Then slide the pointer along the cord until it is set to the last division on the left end of the dial scale. Hold the pointer in place and check to see if the gang condenser is still fully meshed, then tighten the pointer clip being careful not to cut the cord. Place a drop of household or speaker cement on the cord and pointer clip to prevent the pointer from slipping.

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER	CONTROL GRID OF 6AG6 TUBE (Do not remove grid clip)	465 KC.	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.
200 MMFD. MICA CONDENSER	ANTENNA LEAD	465 KC.	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING STRONG GENERATOR SIGNAL.
200 MMFD. MICA CONDENSER	ANTENNA LEAD	1500 KC.	1500 KC.	6	BROADCAST OSCILLATOR	ADJUST FOR MAXIMUM OUTPUT.
200 MMFD. MICA CONDENSER	ANTENNA LEAD	1500 KC.	1500 KC.	7	BROADCAST ANTENNA	ADJUST FOR MAXIMUM OUTPUT.

DIAL AND MISCELLANEOUS PARTS

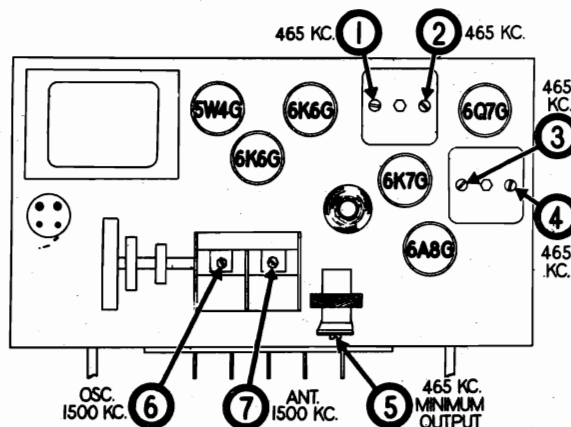
PART NUMBER	DESCRIPTION	LIST PRICE
112745	Clip - coil mounting (osc. & ant.)	.01
112798	Clip - for mtg. wave trap coil	.01
113178	Cord - band indicator (28" required) (supplied in 4 ft. lengths)	.30
113882	Condenser - drive drum & pinion gear	.70
113884	Dial drive drum and hub	.42
113812	Dial Frame & Pulley Assembly	.54
114321	Dial Scale	.50
113861	Dial Scale Retainer	.03
113755	Escutcheon - dial	.40
113758	Escutcheon - push button	.32
113158	Gear - and bushing assembly for dial drive	.22
113022	Knob - round - volume or tuning	.10
113170	Adjusting Lug - for button shafts	.01
110496	Plug - speaker (4 prong)	.12
113858	Pointer	.06
112762	Pulley - dial cord drive (at left side)	.04
113762	Push Button	.04
113880	Push Button Tuner Unit Assembly	4.80
81145	Retaining Ring - for drive shaft	Per C .50
113483	Rubber Bushing - motor mtg.	.03
113672	Rubber Grommet (on tuning shaft)	.02
85040	Screw - #6 Hex. Hd. for mtg. adjusting washer	Per C .35
112874	Screw - #10 X 1 1/8 chassis mtg.	.01
112879	Screw - escutcheon mtg. #2 X 3/8	.03
114431	Screw #6-40 X 7/8 - for setting up buttons	.01
85827	Set Screw - 8/32 square head	.02
113860	Shaft - tuning	.08
113875	Socket - for dial lamp	.15
110501	Socket - 4 prong (for speaker)	.16
113025	Socket - octal base (with special ground)	.15
85427	Socket - octal base (standard)	.15
113177	Spring - dial cord tension	.09
85815	Spring - between gear sections	.01
113189	Spring - for key return	.01
114041	Tab - station call letters	.35
84412	Terminal strip - phono	.03
110829	Washer - flat steel 2 for mtg. chassis	.01
89746	Washer - (paper) for back of knobs	.005

PHONOGRAPH CONNECTIONS

This receiver is equipped with a phonograph turntable and a crystal pickup unit for phonograph operation. The phonograph turntable motor is wired directly to the line cord. A socket is inserted in parallel with this power supply line into which is plugged the short power cord from the radio chassis.

The crystal pickup unit is switched into the audio amplifier section of the radio by means of a double pole double throw switch located in the top panel. With this switch in the phonograph position the receiver volume control is disconnected from the low side of the 2nd I.F. transformer and connected across the crystal pickup unit. The radio frequency section of the receiver is at the same time silenced by the opening of the cathodes of the 6AG6 and 6K7G tubes.

TESTING When the phonograph pickup leads are disconnected as this model chassis is removed from the cabinet for testing, the set will not operate unless the proper connections are made at the phonograph terminal strip. The two outside terminals must be connected together and the center terminal must be grounded to the chassis.



The connections to the phonograph unit are made at the terminal strip located on the back of the radio chassis. IMPORTANT: If the receiver chassis is removed from the cabinet for test, you must put a jumper wire between the two outside terminals of this terminal strip. Also the center terminal must be grounded to the chassis.

HOW TO SET-UP AND USE THE PUSH BUTTON TUNER.

1. Connect receiver to good antenna system.
2. Remove escutcheon surrounding push buttons.
3. Select five nearby stations to which you wish to set up the buttons. Be sure to select nearby, powerful stations, since weak signals will generally give better results when tuned manually. Any button may be used for a station on any part of the dial.
4. Loosen the screw at the side of the push button shaft (about one turn counter-clockwise will be sufficient).
5. Keep the screw driver inserted in the screw slot and push against the screw. At the same time tune in the station using the tuning knob. YOU MUST PUSH AGAINST THE SCREW DRIVER DURING THE ENTIRE TIME THAT YOU ARE TUNING. Be sure that you tune in the station to the point where the program is heard with the least hiss and deepest tone, and not to the point of greatest volume. Now, still pushing against the screw driver, retighten the screw, turning it to the right (clockwise) until it is REASONABLY TIGHT. To turn further may result in damage to the mechanism.
6. The set up for this button is now complete. Set-up the remaining buttons in the same manner and replace the escutcheon.

[illegible]

ELECTRICAL PARTS LIST

Diagram Number	Part Number	Description	List Price
1	83539	Condenser—mica 260 mmfd.	\$.20
2-3	83783	Condenser—mica 110 mmf.	.20
4	84566	Switch—"phone-radio", D.P.D.T.	1.50
5	84572	Cable—Shielded for Phono. Pickup.	.60
6	85061	Condenser—mica 51 mmfd.	.15
7-8	88026	Condenser—paper .02 mfd. 400 Volt	.25
9	88030	Condenser—paper .01 mfd. 400 Volt	.25
10	88054	Switch for tone control	.30
11	88189	Condenser—paper .05 mfd. 200 Volt	.25
12	88191	Condenser—paper .1 mfd. 300 Volt	.25
13	88462	Resistor—W. W. 270 ohms 1/2 W. 10%	.15
14	89532	Condenser—paper .25 mfd. 200 Volt	.32
15	110552	Resistor—carbon 47,000 ohms 1/4 W. 12	.12
16	110553	Resistor—carbon 220,000 ohms 1/4 W. 12	.12
17	110559	Resistor—carbon 470,000 ohms 1/4 W. 12	.12
18-19	110566	Resistor—carbon 33,000 ohms 1/4 W. 12	.12
20	110569	Resistor—carbon 10,000 ohms 1/4 W. 12	.12
21	110580	Resistor—carbon 3.3 meg. 1/4 watt (10%)	.15
22	110629	Dial bulb—6.3 volt .25 amps.	.15
23	112974	Resistor—carbon 220 ohms 1/4 W. 12	.12
24	112975	Resistor—carbon 10 meg. 1/4 watt.	.12

SOCKET VOLTAGES

ANTENNA GROUNDED

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS

6A8G
1st DET & OSC 180

REAR OF CHASSIS

NOTE A: The bias for the control grid of the 6F6G tube is -13.5 volts measured across resistor number 13.

MODEL 91-648, Ch. 91-64
(With "S" stamped on chassis) STEWART-WARNER CORP.
Alignment, Trimmers, Tuner
Phono. Connections

THIS APPLIES ONLY TO THE 91-648 RECEIVER IDENTIFIED BY THE LETTER S STAMPED ON BACK OF CHASSIS.

ALIGNMENT PROCEDURE

FOR ALIGNMENT, an output meter and an accurately calibrated signal generator are required.

1. Connect the output meter across the voice coil or between the plate of the 6F6G output tube and ground through a .1 mfd. condenser. The connection will depend upon the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the chassis of the receiver and keep it connected in this manner throughout the entire alignment procedure.
3. Turn the volume control to the maximum volume position and leave it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, the pointer should be at the last dial division at the left end of the dial scale. With the gang condenser in this position the set screw on the large drum should be nearly straight down.
5. IF YOU DISCONNECT THE PHONOGRAPH PICK-UP CABLE, PUT A JUMPER BETWEEN THE TWO OUTSIDE TERMINALS OF THE TERMINAL STRIP, AND GROUND THE CENTER TERMINAL TO CHASSIS.

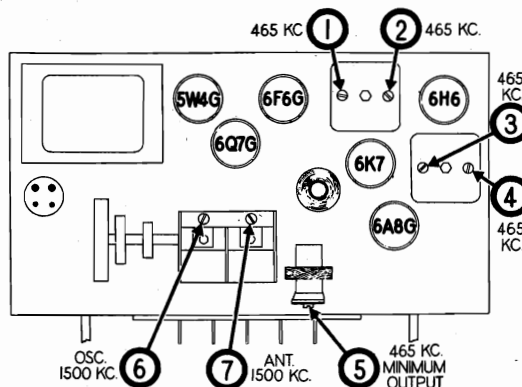
Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 Mfd. Condenser	Control Grid of 6A8G Tube (Do not remove grid clip)	465 KC	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then Repeat Adjustment.
				3-4	1st I.F.	
400 Ohm Carbon Resistor	Antenna Lead	465 KC	Any Point Where It Does Not Affect the Signal	5	Wave Trap	Adjust for Minimum Output Using Strong Generator Signal.
400 Ohm Carbon Resistor	Antenna Lead	1500 KC	1500 KC	6	Broadcast Oscillator	Adjust for Maximum Output.
400 Ohm Carbon Resistor	Antenna Lead	1500 KC	Tune to 1500 KC Generator Signal	7	Broadcast Antenna	Adjust for Maximum Output.

DIAL AND MISCELLANEOUS PARTS

Part No.	Description	List Price
113170	Adjusting Lug for Push Button shaft	\$0.01
112745	Clip—for coil mtg.	.01
112798	Clip—for wave trap coil mtg.	.01
89912	Clip—Grounding for Tube Base	.02
113178	Cord—dial drive (supplied in 4 ft. lengths)	.30
113882	Drive drum (small) and Pinion Gear for gang condenser	.70
113894	Dial drive drum and hub (large)	.42
113812	Dial Frame and Pulley Assembly	.54
114321	Dial scale	.50
113861	Dial Scale Retainer Clip	.03
113755	Escutcheon for dial	.40
113756	Escutcheon for push buttons	.32
113022	Knob	.10
114320	Mechanical Push Button Mechanism, complete	7.50
84571	Needle Cup for Phonograph	.10
110496	Plug for speaker	.12
113856	Pointer—dial	.06
113762	Push Buttons	.04
116165	Receptacle for 2 prong plug for phono. motor	.50
81145	Retaining Clip for tuning shaft	Per C
114598	Rubber tube for tuning shaft	.01
85040	Screw—for mtg. adjusting lug No. 6x1/4 Hex. Hd.	.35
112874	Screw—chassis mtg. No. 10x1 1/8"	.01
114431	Screw—for setting up push buttons No. 6-40x3/8"	.01
114914	Screw—for mtg. escutcheon, Phillips head	Per doz.
116185	Screw—for push button escutcheon mtg. No. 2x3/8"	.01
116423	Screw—Needle, for head	.01
85827	Set Screw—No. 8-32 Square Head	.02
113860	Shaft—tuning	.08
88164	Shield Cap	.06
88161	Shield, tube	Per section
89911	Shield—Base	.04
85427	Socket—octal base (standard)	.15
113025	Socket—octal base (with special ground)	.15
110501	Socket for speaker plug	.16
113875	Socket—for dial lamp	.15
113169	Spring—return for push buttons	.01
113177	Spring—for dial cord tension	.09
114041	Tab—station call letters	.35
84412	Terminal Strip—phono.	.03
116410	Turntable	2.00
116530	Washer—for back of knob paper	.005
110829	Washer—for chassis mtg.	.01

PHONOGRAPH CONNECTIONS

This receiver is equipped with a phonograph turntable and a crystal pickup unit for phonograph operation. The crystal pickup unit is switched into the audio amplifier section of the radio by means of a double-pole double-throw switch adjacent to the turntable. With this switch in the phonograph position (marked P) the receiver volume control is disconnected from the low side of the 2nd I.F. transformer and connected across the crystal pickup unit. The radio frequency



section of the receiver is at the same time silenced by the opening of the cathodes of the 6A8G and 6K7 tubes.

The connections to the phonograph unit are made at the terminal strip located on the back of the radio chassis. **IMPORTANT:** If the receiver chassis is removed from the cabinet for test, you must put a jumper wire between the two outside terminals of this terminal strip. Also the center terminal must be grounded to the chassis.

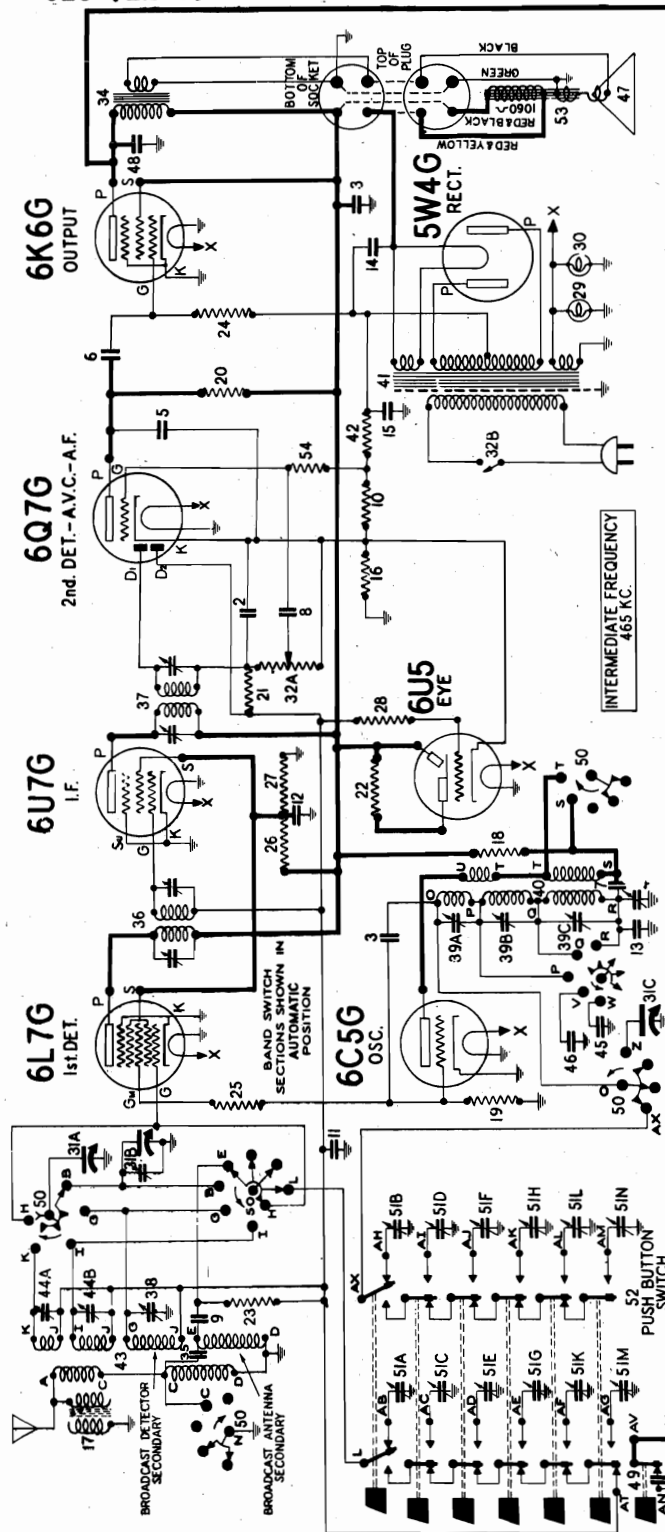
HOW TO SET UP AND USE THE PUSH BUTTON TUNER

1. Connect receiver to good antenna system and operate for fifteen minutes, then remove escutcheon surrounding push buttons.
2. Select five nearby stations to which you wish to set up the buttons. Be sure to select nearby, powerful stations, since weak signals will generally give better results when tuned manually. Any button may be used for a station on any part of the dial.
3. Loosen the screw at the side of the push button shaft (about one turn counter-clockwise will be sufficient). Keep the screw driver, inserted in the screw slot and push against the screw. At the same time carefully tune in the station using the tuning knob. **YOU MUST PUSH AGAINST THE SCREW DRIVER DURING THE ENTIRE TIME THAT YOU ARE TUNING.** Now, still pushing against the screw driver, retighten the screw, turning it to the right (clockwise) until it is REASONABLY TIGHT. To turn further may result in damage to the mechanism.
4. The setup for this button is now complete. Set up the remaining buttons in the same manner and replace the escutcheon

MODELS 91-711 to 91-719
Chassis 91-71
98-711 to 98-719
Chassis 98-71
910-711 to 910-719

STEWART-WARNER CORP.

Chassis 910-71
Schematic, Voltage, Coils
Tuner Switch, Notes



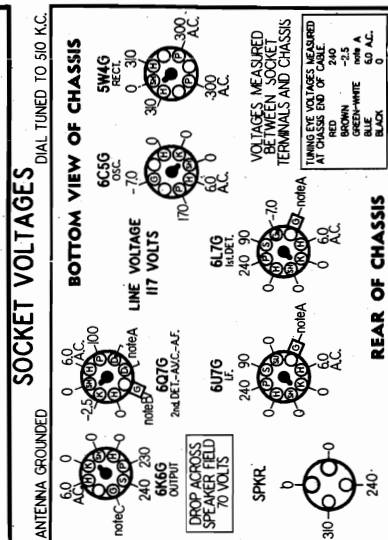
Chassis Model	Used in Receiver Models	Voltage	Frequency
91-71	91-711 to 91-719	117	60 cycles
98-71	98-711 to 98-719	117	25 cycles
910-71	910-711 to 910-719	100-240	50-133

These chassis are 8 tube, three band, push button tuning superheterodyne receivers. The tuning ranges are 525 to 1780 KC; 1.7 to 5.6 MC; and 5.3 to 18.1 MC.

Incorporated in each chassis is an eight button tuner switch. The first two buttons on the left are tone controls. Four different tone qualities may be imparted to a program by properly

setting these tone buttons. The remaining six buttons are used for automatic tuning. Automatic tuning is accomplished by substituting pre-set trimmers for the variable gang condenser. The push button switch provides a simple rapid method of effecting this substitution.

It should be noted that this receiver utilizes a special preselector stage when operated on Manual Tuning for the broadcast band. When the band switch is in the automatic position the secondary of the broadcast antenna coil is connected to the grid of the 6L7G tube and the push button trimmers are shunted across this secondary for tuning of the antenna stage. The broadcast detector coil is disconnected from the circuit when the band switch is in the automatic position.

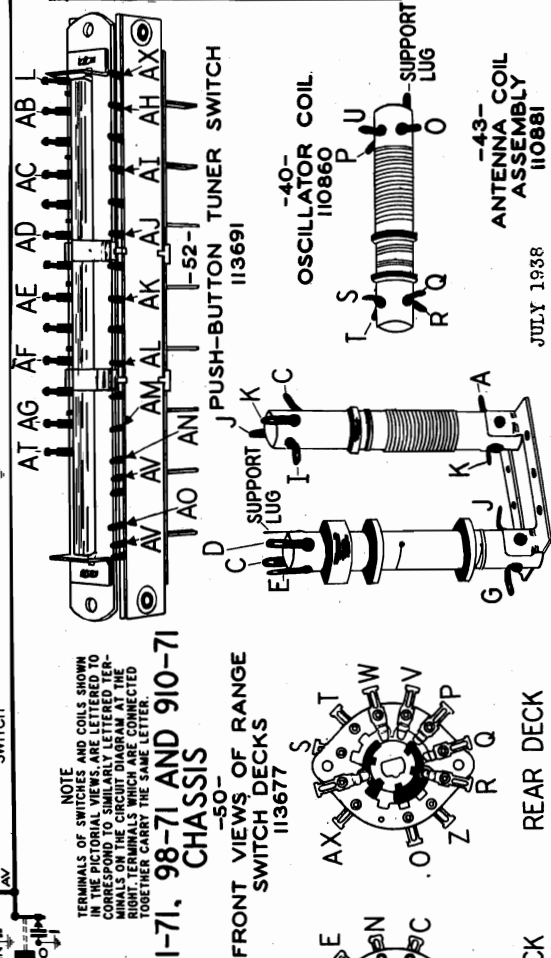


IMPORTANT: Use a high resistance voltmeter of at least 1,000 ohms per volt.

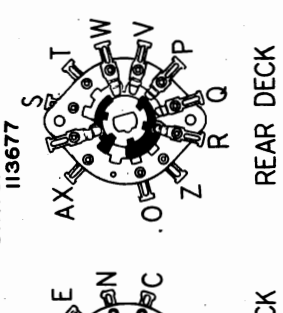
NOTE A: The bias for the control grids of the 6L7G, 6U7G, 6U5, and the diode plates of the 6Q7G is -2.5 volts measured across resistor number 16.

NOTE B: The bias for the control grid of the 6Q7G is -4 volts measured across resistors 10 and 16.

NOTE C: The bias for the control grid of the 6K6G output tube is -16 volts measured across resistors 10, 16, and 42.



NOTE: TERMINALS OF SWITCHES AND COILS SHOWN IN THE PICTORIAL VIEWS ARE LETTERED TO CORRESPOND TO THE LETTERS SHOWN IN THE SCHEMATIC. TERMINALS WHICH ARE CONNECTED TOGETHER CARRY THE SAME LETTER.



FRONT DECK
REAR DECK

MODELS

91-711 to 91-719

98-711 to 98-719

STEWART-WARNER CORP.

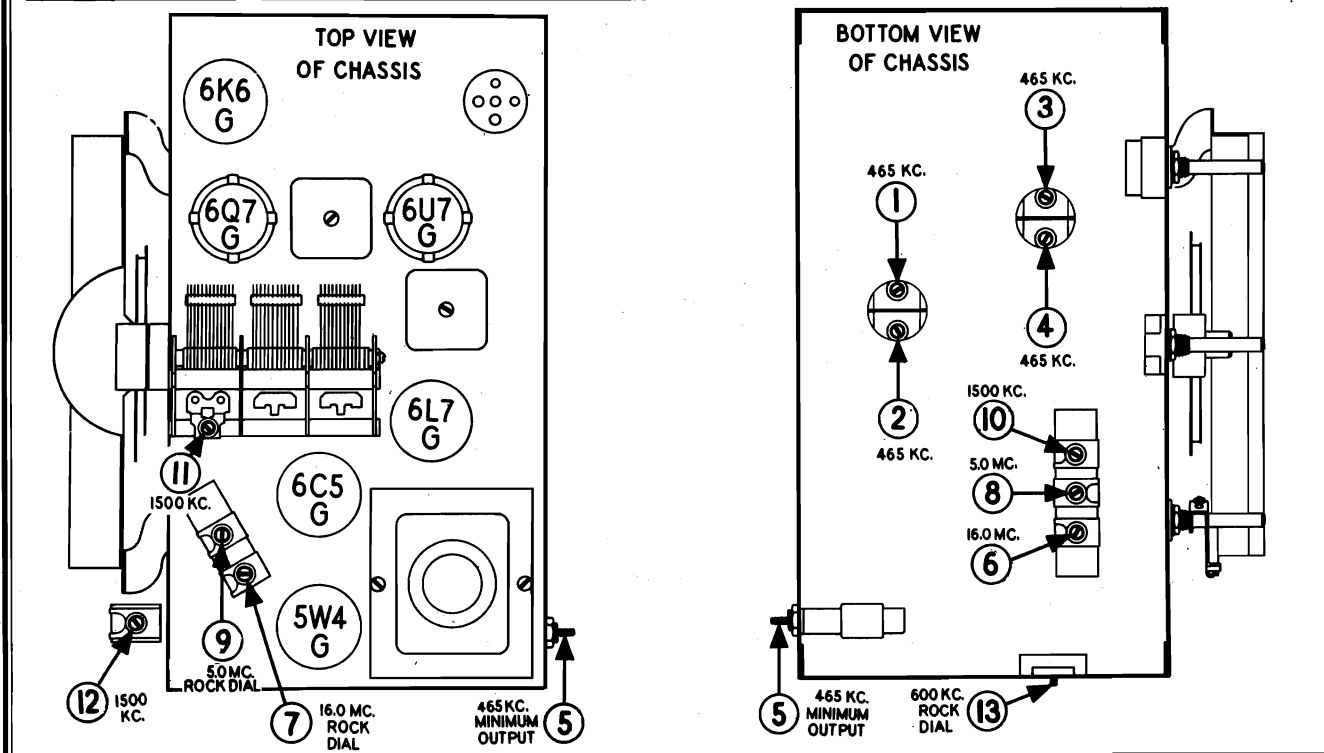
ALIGNMENT EQUIPMENT & PROCEDURE910-711 to 910-719
Alignment, Trimmers

For alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 16.0 MC. are required.

- 1- Connect the output meter across the voice coil or between the plate of the 6K6 tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
- 2- Connect the ground lead of the signal generator to the chassis of the receiver.
- 3- Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
- 4- With the gang condenser in full mesh set the pointer on the last scale division on the low frequency end of the dial. This may be accomplished by releasing the clip on the pointer slider; where it attaches to the dial cord.

IMPORTANT: THE BROADCAST BAND MUST BE ALIGNED AFTER THE SHORT-WAVE BAND.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECTION OF SIG. GEN. OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6L7G TUBE	465 KC.	BROADCAST (MANUAL TUNING)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	1ST I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT
					3-4	2ND I.F.	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	465 KC.	BROADCAST (MANUAL TUNING)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC.	SHORT WAVE (Counter-clockwise)	16 MC.	6	SHORT WAVE OSCILLATOR	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 15.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 16 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC.	SHORT WAVE (Counter-clockwise)	TUNE TO 16 MC. GENERATOR SIGNAL	7	SHORT WAVE 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	ANTENNA TERMINAL	5.0 MC.	POLICE	5.0 MC.	8	POLICE OSCILLATOR	ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 4.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 5.0 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5.0 MC.	POLICE	TUNE TO 5.0 MC. GENERATOR SIGNAL	9	POLICE 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	ANTENNA TERMINAL	1500 KC.	BROADCAST (MANUAL TUNING)	1500 KC.	10	BROADCAST OSCILLATOR (Shunt)	ADJUST FOR MAXIMUM OUTPUT.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (MANUAL TUNING)	TUNE TO 1500 KC. GEN. SIG.	11	ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
					12	DETECTOR	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	600 KC.	BROADCAST (MANUAL TUNING)	TUNE TO 600 KC. GENERATOR SIGNAL	13	BROADCAST OSCILLATOR (Series Pad)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.



see if any improvement in reception can be made by adjusting it. Also repeat this operation for trimmer screw No. 3b.

PART	DESCRIPTION	LIST PRICE
67449Z	Screw - 8 X 3/8" self Tapping (for dial brackets)-	.03
67558Z	Washer - uncoated	.05
67559Z	Washer - electrolytic	.05
81088Z	dial drive (25' tuning eye)	.10
81098Z	Spring for tightening drive rope	.15
85427Z	Socket - octal base (standard)	.15
85785Z	Terminal Strip - antenna - ground	.15
88181Z	Shield - tube (short section)	.08
88182Z	Shield - tube (long section)	.08
88194Z	Shield Cap - tube, grid type	.06
88810Z	Rubber Mounting Bushing	.03
89746Z	Washer - (paper) for back of knobs	.005
89911Z	Shield - tube base	.04
89912Z	Clip - grounding, for tube base	.02
90004Z	Wg. speaker (4 prong)	.12
90005Z	Wg. speaker (2 prong)	.13
110501Z	Socket - dial lamp	.20
110527Z	Socket - dial lamp	.20
110567Z	Knob - tuning	.25
110569Z	Drum - and dial assembly	.48
110592Z	Bracket - dial support (R.H.)	.25
110594Z	Bracket - dial support (L.H.)	.25
110707Z	Frame - dial; with scale complete	1.70
110711Z	Scale - dial	.85
110715Z	Shaft - dial drive (with brkt. & indic. assem.)	1.00
110785Z	Pointer - dial	.14
110817Z	Speed nut - retainer for eutecticon to cabinet	.01
110829Z	Washer - flat steel, for mag. chassis	.01
110830Z	Screen - #10 X for chassis mag.	.05
111030Z	Washer - with glass window	.05
111085Z	Sleeve - felt for tuning eye	.10

PART	DESCRIPTION	LIST PRICE
67449Z	Screw - 8 X 3/8" self Tapping (for dial brackets)-	.03
67558Z	Washer - uncoated	.05
67559Z	Washer - electrolytic	.05
81088Z	dial drive (25' tuning eye)	.10
81098Z	Spring for tightening drive rope	.15
85427Z	Socket - octal base (standard)	.15
85785Z	Terminal Strip - antenna - ground	.15
88181Z	Shield - tube (short section)	.08
88182Z	Shield - tube (long section)	.08
88194Z	Shield Cap - tube, grid type	.06
88810Z	Rubber Mounting Bushing	.03
89746Z	Washer - (paper) for back of knobs	.005
89911Z	Shield - tube base	.04
89912Z	Clip - grounding, for tube base	.02
90004Z	Wg. speaker (4 prong)	.12
90005Z	Wg. speaker (2 prong)	.13
110501Z	Socket - dial lamp	.20
110527Z	Socket - dial lamp	.20
110567Z	Knob - tuning	.25
110569Z	Drum - and dial assembly	.48
110592Z	Bracket - dial support (R.H.)	.25
110594Z	Bracket - dial support (L.H.)	.25
110707Z	Frame - dial; with scale complete	1.70
110711Z	Scale - dial	.85
110715Z	Shaft - dial drive (with brkt. & indic. assem.)	1.00
110785Z	Pointer - dial	.14
110817Z	Speed nut - retainer for eutecticon to cabinet	.01
110829Z	Washer - flat steel, for mag. chassis	.01
110830Z	Screen - #10 X for chassis mag.	.05
111030Z	Washer - with glass window	.05
111085Z	Sleeve - felt for tuning eye	.10

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	PRICE
1	83007	Condenser - paper .02 mfd. 600 volt	.35
2	83539	Condenser - mica 280 mfd.	.25
3	85051	Condenser - mica 51 mfd.	.15
4	85285	Condenser - padding	.40
5	85394	Condenser - mica 510 mfd.	.25
6	88026	Condenser - paper .02 mfd. 400 volt	.25
7	88030	Condenser - paper .01 mfd. 400 volt	.25
8	88189	Condenser - paper .05 mfd. 200 volt	.25
9	88465	Wire Wound Resistor 25 ohms $\frac{1}{2}$ watt	.15
10	88465	Condenser - paper .05 mfd. 150 volt	.25
11	88534	Condenser - paper .1 mfd. 200 volt	.25
12	89421	Condenser - mica 345 mfd. (3%)	.40
13	89564	Condenser - paper .30 mfd. 450 volt	1.60
14	89837	Condenser - elect. 30 mfd. 250 volt	.80
15	110377	Condenser - elect. 10 mfd. 450 volt	1.12
16	110534	Resistor - wire wound 40 ohm $\frac{1}{2}$ watt	1.02
17	110536	Coil - wave trap	.90
18	110550	Resistor - carbon 10,000 ohms $\frac{1}{2}$ W.	1.12
19	110552	Resistor - carbon 47,000 ohms $\frac{1}{2}$ W.	1.12
20	110553	Resistor - carbon 220,000 ohms $\frac{1}{2}$ W.	1.12
21	110553	Resistor - carbon 1 meg. 1/4 watt	.18
22	110554	Resistor - carbon 470,000 ohms $\frac{1}{2}$ W.	1.12
23	110559	Resistor - carbon 100 ohm 1/4 watt	.30
24	110560	Resistor - carbon 15,000 ohms $\frac{1}{2}$ W.	1.12
25	110561	Resistor - carbon 22,000 ohms $\frac{1}{2}$ W.	1.15
26	110562	Resistor - carbon 2.2 meg. 1/4 watt	.15
27	110570	Resistor - carbon 2.2 meg. 1/4 watt	.15
28	110570	Lamp - 6.3 volt - .25 amps.	4.50
29-30	110629	Condenser - variable gang	.90
31A to C	110743	Condenser - 1 meg. (with on-off switch)	1.25
32A-32B	110766	off switch	1.65
33	110768	Condenser - elect. 8 mfd. 450 volt	.18
34	110789	Transformer - output	1.85
35	110850	Condenser - wire - 7 mmf.	1.85
36	110851	Transformer - 1st I.F.	1.85
37	110852	Transformer - 2nd I.F.	1.85
38	110854	Condenser - trimmer (single section)	.24
39	110854	Condenser - trimmer	.85
39A to C	110859	(3 section for osc. coil)	1.40
40	110860	Coil - osc. (less trimmers)	5.00
41	110862	Transformer - power (115 V. 60 cycle)	7.50
41	112076	Transformer - power (115 V. 25 cycle)	.90
42	110872	Resistor - wire wound 160 ohms 1 W.	.12
43	110881	Coil - assembly (antenna & presselector) with trimmers	.44
44A-44B	110882	Condenser - trimmer (2 section for ant. coil)	.40
45	110908	Condenser - mica .00332 mfd. (3%)	.30
46	110907	Condenser - mica 950 mfd. (3%)	1.80
47	110945	Cone - and voice coil assen. (for R-279A spkr.)	.24
48-49	111214	Condenser - paper .01 mfd. 600 volt (115 V. 25 cycle)	7.50
50	113677	Range Switch	1.20
51A to N	113690	Trimmer condenser for push button complete assembly	2.75
52	113691	Push button switch (8 keys)	4.20
53	R-279-A	Speaker - dynamic 10 inch	8.00
54	110554	Resistor - carbon 1 meg. 1/4 watt	.12

MODELS 91-811 to 91-819

Chassis 91-81

98-811 to 98-819

Chassis 98-81

910-811 to 910-819

Chassis 910-81

Tuner Data,

Drive Cord Data

STEWART-WARNER CORP.

CHASSIS MODEL	USED IN RECEIVER MODELS	VOLTAGE	FREQUENCY
91-81	91-811 to 91-819	117	60 cycles
98-81	98-811 to 98-819	117	25 Cycles
910-81	910-811 to 910-819	100-240	50-133

These chassis are 8 tube, three band, push button tuning superheterodyne receivers. The tuning ranges are 530 to 1730 KC, 2.2 to 7.0 MC and 6.8 to 22.5 MC.

Incorporated in each chassis is an eight button tuner switch. The first two buttons on the left are tone controls. Four different tone qualities may be imparted to a program by properly setting these tone buttons. The remaining six buttons are used for automatic tuning. Automatic tuning is accomplished by substituting pre-set trimmers for the variable gang condenser. The push-button switch provides a simple rapid method of effecting this substitution.

It should be noted that the R.F. stage in this receiver operates only on the Broadcast Band. When the band switch is in the "Automatic", "Intermediate" or "Foreign" positions this R.F. stage is not utilized.

A feature of this set is the special push-pull output stage. Instead of using a push-pull input transformer or a separate phase inverter tube the phase inversion is accomplished as follows. One of the 6K6G output tubes has a 3,300 ohm load resistor in its screen circuit across which is built up an audio voltage which is 180 electrical degrees out of phase with respect to the input grid voltage. This phase inverted voltage obtained across the screen resistor is now applied to the grid of the other output tube in this push-pull output combination. NOTE: It can be readily seen from the above explanation that if the 6K6G output tube, from which the phase inversion voltage is obtained, is removed from the set or becomes defective, it will be impossible for any signal to be heard in the speaker.

HOW TO SET UP THE PUSH-BUTTON TUNER

1. Be sure that the customer has an adequate antenna system and that the push button trimmers are set-up using this antenna (not the antenna in the service shop) otherwise the antenna trimmer will be incorrectly aligned.
2. Turn on the set and allow it to operate at least one quarter-hour before setting up the push buttons.
3. Make a list of the frequencies, of six nearby stations to which you wish to set-up the buttons. Be sure to select nearby, powerful stations, since weak signals will generally give poor results. Also BE SURE TO SELECT STATIONS FALLING WITHIN THE TUNING RANGE OF THE INDIVIDUAL BUTTONS, as indicated in Fig. 1.

Each of the buttons on your Push Button Tuner has a definite operating range, as shown in Fig. 1, therefore, it is imperative that you select a station whose frequency is in the operating range of a button before attempting to set-up that button for the particular station.

AS THE ADJUSTING SCREWS SHOULD NEVER BE TOO LOOSELY OR TOO TIGHTLY ADJUSTED, IT IS IMPORTANT THAT THE PROPER BUTTON BE SELECTED. The frequencies of your local stations may be obtained from your newspaper or radio call magazine. For example, suppose you want to set a button to station WLW whose frequency is 700 kilocycles. Refer to Fig. 1 which shows that this frequency falls within the operating range of buttons No. 3 or No. 4, whose range is 550 to 1000 KC. Therefore either button No. 3 or No. 4 can be used for the automatic tuning of WLW.

IT SHOULD BE NOTED THAT WHENEVER IT IS POSSIBLE TO USE TWO BUTTONS HAVING DIFFERENT RANGES, TO SET TO A GIVEN STATION THE CORRECT BUTTON TO USE WILL BE THAT ONE FOR WHICH THE TRIMMER SCREWS ARE NOT TOO LOOSELY SET. "DRIFTING" IS A DIRECT RESULT OF LOOSE TRIMMER SCREWS AND THEREFORE SUCH SETTINGS OF TRIMMER SCREWS SHOULD BE AVOIDED IF POSSIBLE.

4. Remove the escutcheon around the push-button by taking out the six screws holding it to the cabinet. This will expose to view twelve adjusting screws, each pair of which is used to tune a button to its correct station. The trimmers associated with each button are shown in Figure 1.

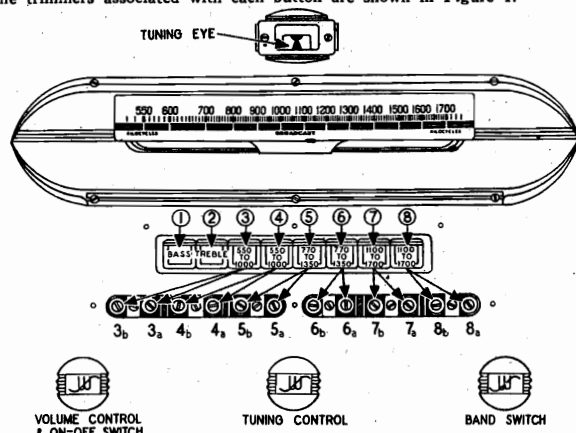


Fig. 1

5. Turn the band switch control (Right hand knob) clockwise until the BROADCAST SCALE appears on the roller dial. Then using the tuning knob (center) tune in the station you desire to set to button No. 3. This is done so that you may identify the station by hearing its program.

6. Now turn the band switch knob to the extreme clockwise position (The words "MAGIC KEYBOARD" will now appear in the dial scale opening). You will note when this switch is turned the station tuned in will not be heard.

7. Now push in the third button from the left (No. 3 in Fig. 1). Using a small screw driver insert it in the second screw from the left (No. 3a in Fig. 1). Rotate the screw SLOWLY until the program that you have previously tuned in manually is again tuned in. If it cannot be heard, advance the volume control. BE SURE THAT YOU ADJUST THIS PARTICULAR SCREW (3a) TO THE POINT WHERE THE TWO OPEN ENDS OF THE INVERTED "V" SHADOW IN THE "TUNING EYE" ARE CLOSEST TOGETHER. It is advisable that you turn the screw in and out so that it will tune across the station several times in order that you may be sure that you have located this correct tuning point.
8. Next insert the screw-driver in the first screw on the left (No. 3b Fig. 1) and turn it until the program is received with maximum volume. The correct position is indicated by the ends of the inverted "V" in the "Tuning Eye" being closest together. Now go back to screw No. 3a and see if any im-

provement in the reception can be made by adjusting it. Also repeat this operation for screw No. 3b.

9. Set up button No. 4 for the selected station in a similar manner, using screws No. 4a and 4b, and proceed to set up the remaining buttons in the same fashion, always tuning in the station initially with the "a" screw for that particular button.

10. Label each button with the call letters of the station you have selected using the call letter tabs and celluloid covers packed with your receiver. The printed paper tab should be inserted in the button by holding the ends and flexing them slightly and then allowing the tab to snap into place. The celluloid cover tab should be flexed in a similar manner and placed over the paper tab.

IMPORTANT

11. In some instances it may be necessary, after the set is operated for a month or more, to reset the screws as they may change their setting due to heat, humidity, etc.

HOW TO CHANGE THE OPERATING RANGE OF A BUTTON

The operating range of a button may be changed by merely changing the dual trimmer used with that button. Dual trimmers with the ranges indicated below can be obtained from your Stewart-Warner distributor, or directly from the Stewart-Warner Corporation, under the following part numbers:

Part Number	Tuning Range	List Price
112942	1100 to 1700 KC.	\$0.36
112943	770 to 1350 KC.	.45
112944	550 to 1000 KC.	.50

To make the change proceed as follows:

1. Remove the chassis from the cabinet.
 2. By referring to Fig. 1, determine the dual trimmer associated with the button whose range you wish to change.
 3. Unsolder the leads from the four terminals on the back of this dual trimmer.
 4. Remove the 6/32 machine screw holding the dual trimmer to the front of the chassis.
 5. From the above list select a dual trimmer which will cover the desired range.
 6. Mount it on the front of the chassis with the 6/32 machine screw, and solder the leads to its four terminals.
- The button is now ready to be set to any strong station whose frequency is within the range of this new trimmer unit.

REPLACING THE ROLLER DIAL DRIVE CORD

1. Tie a tension spring, part number 113177, to one end of about 30" of special dial cord part No. 111302.
2. Tie a large knot in the cord, 6 1/4" from the tension spring.
3. Turn the range switch to the Short-Wave position—all the way counter-clockwise. Pulley A on the range switch shaft should be in the position shown in Fig. 2.
4. Place the knot on the cord in slot B.
5. With the long free end of the cord (not the end with the spring attached), take 1 1/2 turns clockwise around pulley A, then thread the end up through hole C back of pulley D and up to the front of pulley E.

6. Turn pulley E until the slot F is up as shown in the figure. Now, with the free end of the cord, wind clockwise; 1 1/2 turns around E, out through slot F, 1 turn around G, back through slot F, and 1 1/4 turns around E.
7. Bring the cord down back of pulley H and leave it hang for the time being.

8. With the end of the cord to which the tension spring is attached, take 1 1/2 turns counter-clockwise around pulley A, (when viewed from the right end) and bring the cord up through hole C.
9. Tie the free end of the cord hanging over pulley H, to the upper end of the tension spring. The spring should be extended so it is approximately 1 1/2" long when the tension in the cord system is equalized.

If the Short Wave scale on the dial is not in the proper position under the pointer, loosen the set screw in hub G, rotate the dial scale to the proper position and tighten the set screw.

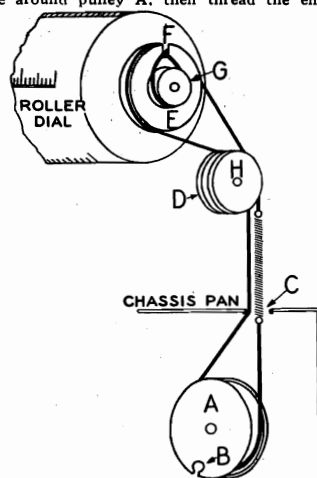
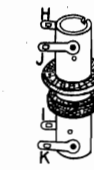
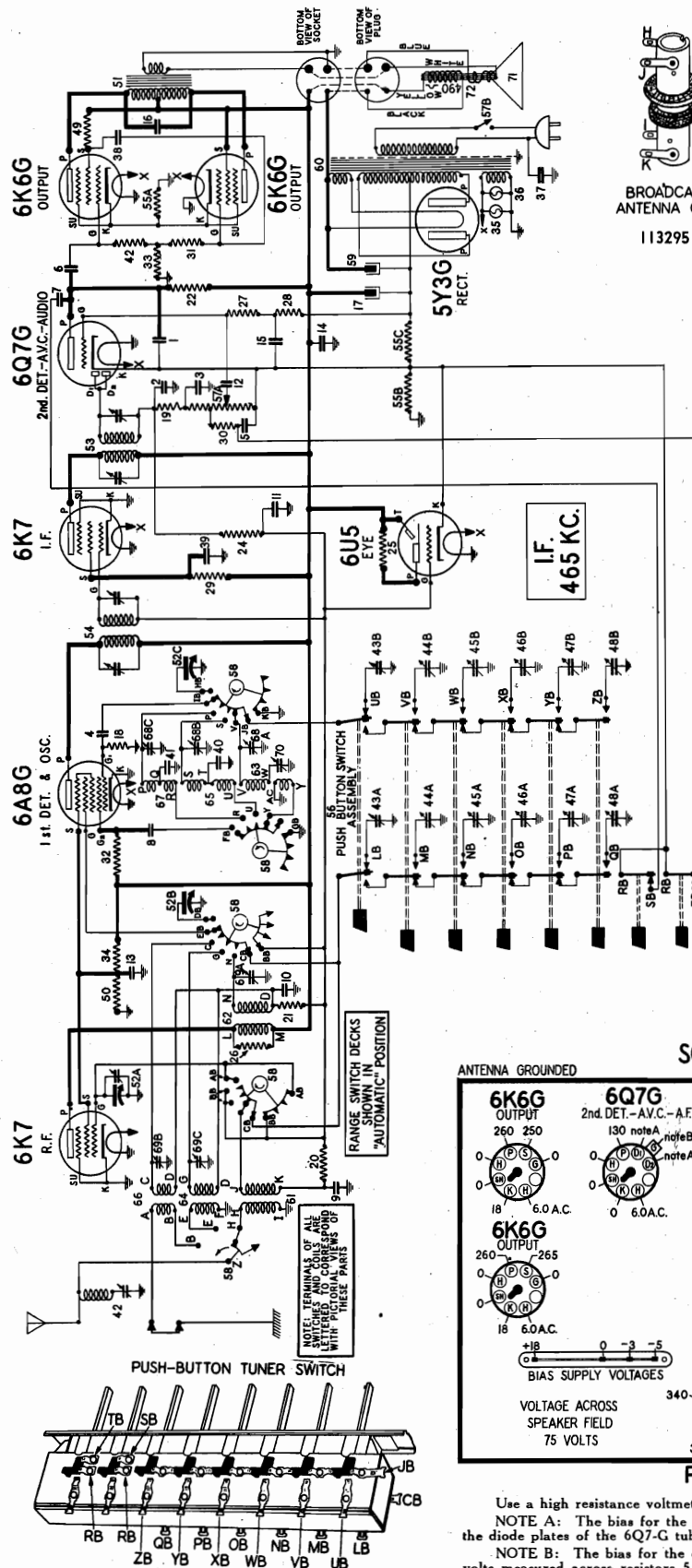


Fig. 2

MODELS 91-811 to 91-819
98-811 to 98-819
910-811 to 910-819

STEWART-WARNER CORP. Schematic, Voltage, Socket Tuner Switch, Coils



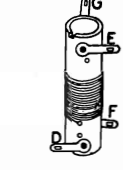
BROADCAST
ANTENNA COIL
113295



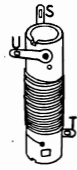
BROADCAST
R.F. COIL
113296



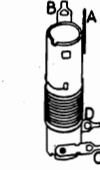
BROADCAST
OSCILLATOR
COIL
113297



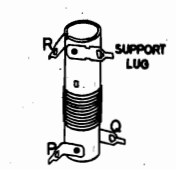
INTERMEDIATE
ANTENNA COIL
113298



INTERMEDIATE
OSCILLATOR
COIL
113299



FOREIGN
ANTENNA COIL
113301

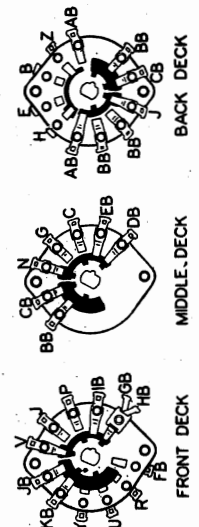


FOREIGN
OSCILLATOR
COIL
113302

JUNE 1938

91-81, 98-81 AND 910-81 CHASSIS

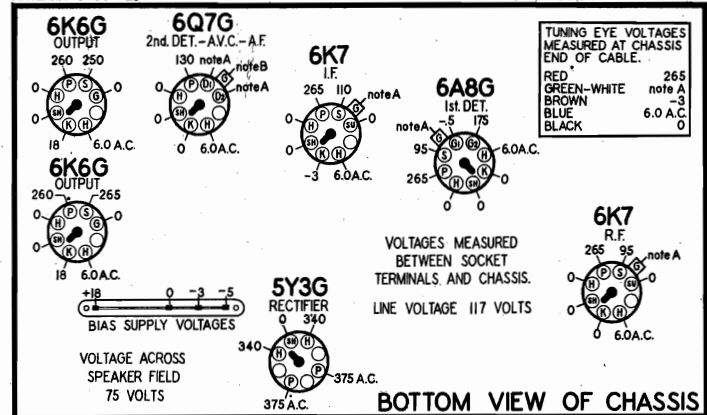
FRONT VIEW OF RANGE SWITCH DECKS.



SOCKET VOLTAGES

ANTENNA GROUNDING

DIAL TUNED TO 530 KC.



REAR OF CHASSIS

Use a high resistance voltmeter of at least 1000 ohms per volt.

NOTE A: The bias for the control grids of the 6A8-G, 6K7 R. F., 6K7 I. F., 6U5 and the diode plates of the 6Q7-G tubes is -3 volts measured across resistor 55B.

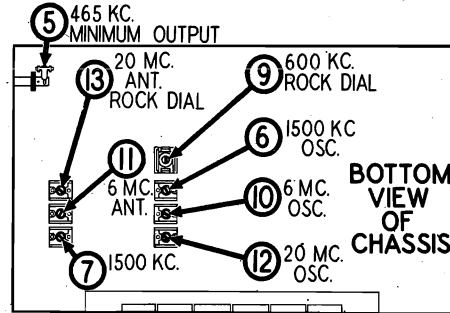
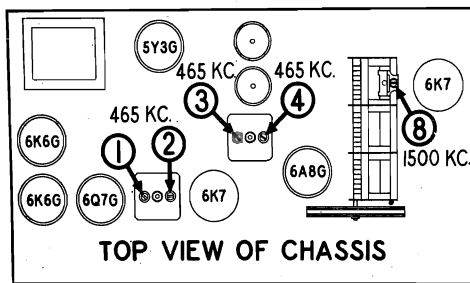
NOTE B: The bias for the control grid of the triode section of the 6Q7-G tube is -5 volts measured across resistors 55B and 55C.

MODELS 91-811 to 91-819
98-811 to 98-819
910-811 to 910-819
Alignment, Trimmers, Parts

STEWART-WARNER CORP.

DIAL AND MISCELLANEOUS PARTS

Part No.	Description	Price
11302	Cord-dial drive 6 or 50 ft. lengths.	Per ft.
11303	Shield base for tube shields.	Per doz.
11304	Knob-push on for tuning eye.	Per doz.
11305	Thrust plate for tuning shaft.	Per doz.
11306	Push-on auxiliary range switch shaft.	Per doz.
11307	Push-on auxiliary range switch shaft.	Per doz.
11308	Push-on auxiliary range switch shaft.	Per doz.
11309	Push-on auxiliary range switch shaft.	Per doz.
11310	Push-on auxiliary range switch shaft.	Per doz.
11311	Push-on auxiliary range switch shaft.	Per doz.
11312	Push-on auxiliary range switch shaft.	Per doz.
11313	Push-on auxiliary range switch shaft.	Per doz.
11314	Push-on auxiliary range switch shaft.	Per doz.
11315	Push-on auxiliary range switch shaft.	Per doz.
11316	Push-on auxiliary range switch shaft.	Per doz.
11317	Push-on auxiliary range switch shaft.	Per doz.
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11319	Push-on auxiliary range switch shaft.	Per doz.
11320	Push-on auxiliary range switch shaft.	Per doz.
11321	Push-on auxiliary range switch shaft.	Per doz.
11322	Push-on auxiliary range switch shaft.	Per doz.
11323	Push-on auxiliary range switch shaft.	Per doz.
11324	Push-on auxiliary range switch shaft.	Per doz.
11325	Push-on auxiliary range switch shaft.	Per doz.
11326	Push-on auxiliary range switch shaft.	Per doz.
11327	Push-on auxiliary range switch shaft.	Per doz.
11328	Push-on auxiliary range switch shaft.	Per doz.
11329	Push-on auxiliary range switch shaft.	Per doz.
11330	Push-on auxiliary range switch shaft.	Per doz.
11331	Push-on auxiliary range switch shaft.	Per doz.
11332	Push-on auxiliary range switch shaft.	Per doz.
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11360	Push-on auxiliary range switch shaft.	Per doz.
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11396	Push-on auxiliary range switch shaft.	Per doz.
11397	Push-on auxiliary range switch shaft.	Per doz.
11398	Push-on auxiliary range switch shaft.	Per doz.
11399	Push-on auxiliary range switch shaft.	Per doz.
11400	Push-on auxiliary range switch shaft.	Per doz.



FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 20 MC are required.

- Connect the output meter across the voice coil or across the plates of the 6K6G output tubes depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
- Connect the ground lead of the signal generator to the receiver chassis or to the "G" terminal at the back of the chassis. NOTE: The "G" and "D" terminals on this terminal strip must be connected together.
- Turn the volume control to the maximum volume position and keep it in this position throughout the alignment procedure.
- With the gang condenser in full mesh, set the pointer to the last mark on the left end of the dial scale. If the pointer is incorrectly set, it is only necessary to loosen the set screw on the dial cord drive drum and push the gang condenser to full mesh with the pointer properly set, then retighten the set screw.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position (Indicated by Roller Dial)	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD Condenser	Control Grid of 6A8-G Tube	465 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then Repeat Adjustment.
400 OHM Carbon Resistor	Antenna Terminal	465 KC	Broadcast	Any Point Where It Does Not Affect the Signal	3-4	1st I.F.	Adjust for Maximum Output. Then Repeat Adjustment.
400 OHM Carbon Resistor	Antenna Terminal	1500 KC	Broadcast	1500 KC	5	Wave Trap	Adjust for Minimum Output. Using a Strong Generator Signal.
400 OHM Carbon Resistor	Antenna Terminal	1500 KC	Broadcast	1500 KC	6	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
400 OHM Carbon Resistor	Antenna Terminal	1500 KC	Broadcast	1500 KC	7	Broadcast Detector	Adjust for Maximum Output.
400 OHM Carbon Resistor	Antenna Terminal	1500 KC	Broadcast	1500 KC	8	Broadcast Antenna	Adjust for Maximum Output.
400 OHM Carbon Resistor	Antenna Terminal	600 KC	Broadcast	600 KC	9	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
400 OHM Carbon Resistor	Antenna Terminal	6 MC	Intermediate	6 MC	10	Intermediate Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 5.1 MC. If Image does not appear, Readjust at 6MC. with Trimmer. Screw farther Out. Recheck Image.
400 OHM Carbon Resistor	Antenna Terminal	6 MC	Intermediate	6 MC	11	Intermediate Antenna	Adjust for Maximum Output.
400 OHM Carbon Resistor	Antenna Terminal	20 MC	Foreign	20 MC	12	Foreign Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 19.1 MC. If Image does not appear, Readjust at 20MC with Trimmer Screw farther Out. Recheck Image.
400 OHM Carbon Resistor	Antenna Terminal	20 MC	Foreign	20 MC	13	Foreign Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is obtained.

ELECTRICAL PARTS

Diagram Number	Description	Price
1	Condenser-mica 240 mmfd.	\$ 0.20
2	Condenser-mica 110 mmfd.	3
3	Condenser-mica 52 mmfd.	15
4	Condenser-mica 26 mmfd.	25
5	Condenser-paper .004 mid. 400 volt.	25
6	Condenser-paper .01 mid. 400 volt.	25
7	Condenser-paper .02 mid. 400 volt.	25
8	Condenser-paper .05 mid. 400 volt.	25
9	Condenser-paper .1 mid. 400 volt.	25
10	Condenser-paper .2 mid. 400 volt.	25
11	Condenser-paper .5 mid. 400 volt.	25
12	Condenser-paper 1 mid. 400 volt.	25
13	Condenser-paper 2 mid. 400 volt.	25
14	Condenser-paper 5 mid. 400 volt.	25
15	Condenser-paper 10 mid. 400 volt.	25
16	Condenser-paper 20 mid. 400 volt.	25
17	Condenser-paper 50 mid. 400 volt.	25
18	Condenser-paper 100 mid. 400 volt.	25
19	Condenser-paper 200 mid. 400 volt.	25
20	Condenser-paper 400 mid. 400 volt.	25
21	Condenser-paper 800 mid. 400 volt.	25
22	Condenser-paper 1600 mid. 400 volt.	25
23	Condenser-paper 3200 mid. 400 volt.	25
24	Condenser-paper 6400 mid. 400 volt.	25
25	Condenser-paper 12800 mid. 400 volt.	25
26	Condenser-paper 25600 mid. 400 volt.	25
27	Condenser-paper 51200 mid. 400 volt.	25
28	Condenser-paper 102400 mid. 400 volt.	25
29	Condenser-paper 204800 mid. 400 volt.	25
30	Condenser-paper 409600 mid. 400 volt.	25
31	Condenser-paper 819200 mid. 400 volt.	25
32	Condenser-paper 1638400 mid. 400 volt.	25
33	Condenser-paper 3276800 mid. 400 volt.	25
34	Condenser-paper 6553600 mid. 400 volt.	25
35	Condenser-paper 13107200 mid. 400 volt.	25
36	Condenser-paper 26214400 mid. 400 volt.	25
37	Condenser-paper 52428800 mid. 400 volt.	25
38	Condenser-paper 104857600 mid. 400 volt.	25
39	Condenser-paper 209715200 mid. 400 volt.	25
40	Condenser-paper 419430400 mid. 400 volt.	25
41	Condenser-paper 838860800 mid. 400 volt.	25
42	Condenser-paper 1677721600 mid. 400 volt.	25
43	Condenser-paper 3355443200 mid. 400 volt.	25
44	Condenser-paper 6710886400 mid. 400 volt.	25
45	Condenser-paper 13421772800 mid. 400 volt.	25
46	Condenser-paper 26843545600 mid. 400 volt.	25
47	Condenser-paper 53687091200 mid. 400 volt.	25
48	Condenser-paper 107374182400 mid. 400 volt.	25
49	Condenser-paper 214748364800 mid. 400 volt.	25
50	Condenser-paper 429496729600 mid. 400 volt.	25
51	Condenser-paper 858993459200 mid. 400 volt.	25
52	Condenser-paper 1717986918400 mid. 400 volt.	25
53	Condenser-paper 3435973836800 mid. 400 volt.	25
54	Condenser-paper 6871947673600 mid. 400 volt.	25
55	Condenser-paper 13743895347200 mid. 400 volt.	25
56	Condenser-paper 27487790694400 mid. 400 volt.	25
57	Condenser-paper 54975581388800 mid. 400 volt.	25
58	Condenser-paper 109951162777600 mid. 400 volt.	25
59	Condenser-paper 219902325555200 mid. 400 volt.	25
60	Condenser-paper 439804651110400 mid. 400 volt.	25
61	Condenser-paper 879609302220800 mid. 400 volt.	25
62	Condenser-paper 1759218604441600 mid. 400 volt.	25
63	Condenser-paper 3518437208883200 mid. 400 volt.	25
64	Condenser-paper 7036874417766400 mid. 400 volt.	25
65	Condenser-paper 14073748835532800 mid. 400 volt.	25
66	Condenser-paper 28147497671065600 mid. 400 volt.	25
67	Condenser-paper 56294995342131200 mid. 400 volt.	25
68	Condenser-paper 112589980684262400 mid. 400 volt.	25
69	Condenser-paper 225179961368524800 mid. 400 volt.	25
70	Condenser-paper 450359922737049600 mid. 400 volt.	25
71	Condenser-paper 900719845474099200 mid. 400 volt.	25
72	Condenser-paper 1801439690948198400 mid. 400 volt.	25
73	Condenser-paper 3602879381896396800 mid. 400 volt.	25
74	Condenser-paper 7205758763792793600 mid. 400 volt.	25
75	Condenser-paper 14411517527585587200 mid. 400 volt.	25
76	Condenser-paper 28823035055171174400 mid. 400 volt.	25
77	Condenser-paper 57646070110342348800 mid. 400 volt.	25
78	Condenser-paper 115292140220684697600 mid. 400 volt.	25
79	Condenser-paper 230584280441369395200 mid. 400 volt.	25
80	Condenser-paper 461168560882738790400 mid. 400 volt.	25
81	Condenser-paper 922337121765477580800 mid. 400 volt.	25
82	Condenser-paper 1844674235530955161600 mid. 400 volt.	25
83	Condenser-paper 3689348471061910323200 mid. 400 volt.	25
84	Condenser-paper 7378696942123820646400 mid. 400 volt.	25
85	Condenser-paper 14757393884247641292800 mid. 400 volt.	25
86	Condenser-paper 29514787768495282585600 mid. 400 volt.	25
87	Condenser-paper 59029575536990565171200 mid. 400 volt.	25
88	Condenser-paper 118059151073981130342400 mid. 400 volt.	25
89	Condenser-paper 236118302147962260684800 mid. 400 volt.	25
90	Condenser-paper 472236604295924521369600 mid. 400 volt.	25
91	Condenser-paper 944473208591849042739200 mid. 400 volt.	25
92	Condenser-paper 1888946417183698085478400 mid. 400 volt.	25
93	Condenser-paper 3777892834367396170956800 mid. 400 volt.	25
94	Condenser-paper 7555785668734792341913600 mid. 400 volt.	25
95	Condenser-paper 15111571337469584683827200 mid. 400 volt.	25
96	Condenser-paper 30223142674939169367654400 mid. 400 volt.	25
97	Condenser-paper 60446285349878338735308800 mid. 400 volt.	25
98	Condenser-paper 120892570699756677470617600 mid. 400 volt.	25
99	Condenser-paper 241785141399513354941235200 mid. 400 volt.	25
100	Condenser-paper 483570282799026709882470400 mid. 400 volt.	25
101	Condenser-paper 967140565598053419764940800 mid. 400 volt.	25
102	Condenser-paper 1934281131196106839529881600 mid. 400 volt.	25
103	Condenser-paper 3868562262392213679059763200 mid. 400 volt.	25
104	Condenser-paper 7737124524784427358119526400 mid. 400 volt.	25
105	Condenser-paper 15474249049568854716239052800 mid. 400 volt.	25
106	Condenser-paper 30948498099137709432478105600 mid. 400 volt.	25
107	Condenser-paper 61896996198275418864956211200 mid. 400 volt.	25
108	Condenser-paper 123793992396550837729912422400 mid. 400 volt.	25
109	Condenser-paper 247587984793101675459824844800 mid. 400 volt.	25
110	Condenser-paper 495175969586203350919649689600 mid. 400 volt.	25
111	Condenser-paper 990351939172406701839299379200 mid. 400 volt.	25
112	Condenser-paper 1980703878344813403678598758400 mid. 400 volt.	25
113	Condenser-paper 3961407756689626807357197516800 mid. 400 volt.	25
114	Condenser-paper 7922815513379253614714395033600 mid. 400 volt.	25
115	Condenser-paper 15845631026758507229428790667200 mid. 400 volt.	25
116	Condenser-paper 31691262053517014458857581334400 mid. 400 volt.	25
117	Condenser-paper 63382524107034028917715162668800 mid. 400 volt.	25
118	Condenser-paper 126765048214068057835430325337600 mid. 400 volt.	25
119	Condenser-paper 253530096428136115670860650675200 mid. 400 volt.	25
120	Condenser-paper 507060192856272231341721301350400 mid. 400 volt.	25
121	Condenser-paper 1014120385712544462683442602700800 mid. 400 volt.	25
122	Condenser-paper 2028240771425088925366885205401600 mid. 400 volt.	25
123	Condenser-paper 4056481542850177850733770410803200 mid. 400 volt.	25
124	Condenser-paper 8112963085700355701467540821606400 mid. 400 volt.	25
125	Condenser-paper 16225926171400711402935081643212800 mid. 400 volt.	25
126	Condenser-paper 32451852342801422805870163286425600 mid. 400 volt.	25
127	Condenser-paper 64903704685602845611740326572851200 mid. 400 volt.	25
128	Condenser-paper 12980740937120569122348065144502400 mid. 400 volt.	25
129	Condenser-paper 25961481874241138244696128289004800 mid. 400 volt.	25
130	Condenser-paper 51922963748482276489392256578009600 mid. 400 volt.	25
131	Condenser-paper 103845927497644552978784513156019200 mid. 400 volt.	

Schematic, Voltage
Socket, Tuner Switch

STEWART WARNER CORP.

MODELS 91-821 to 91-829, Chassis 91-82
98-821 to 98-829, Chassis 98-82
910-821 to 910-829, Chassis 910-82

ELECTRICAL PARTS

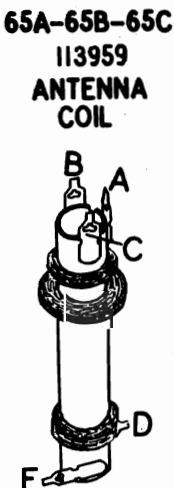
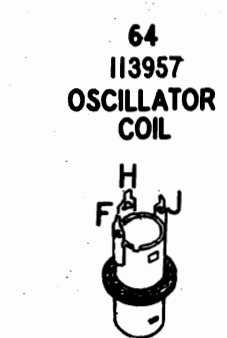
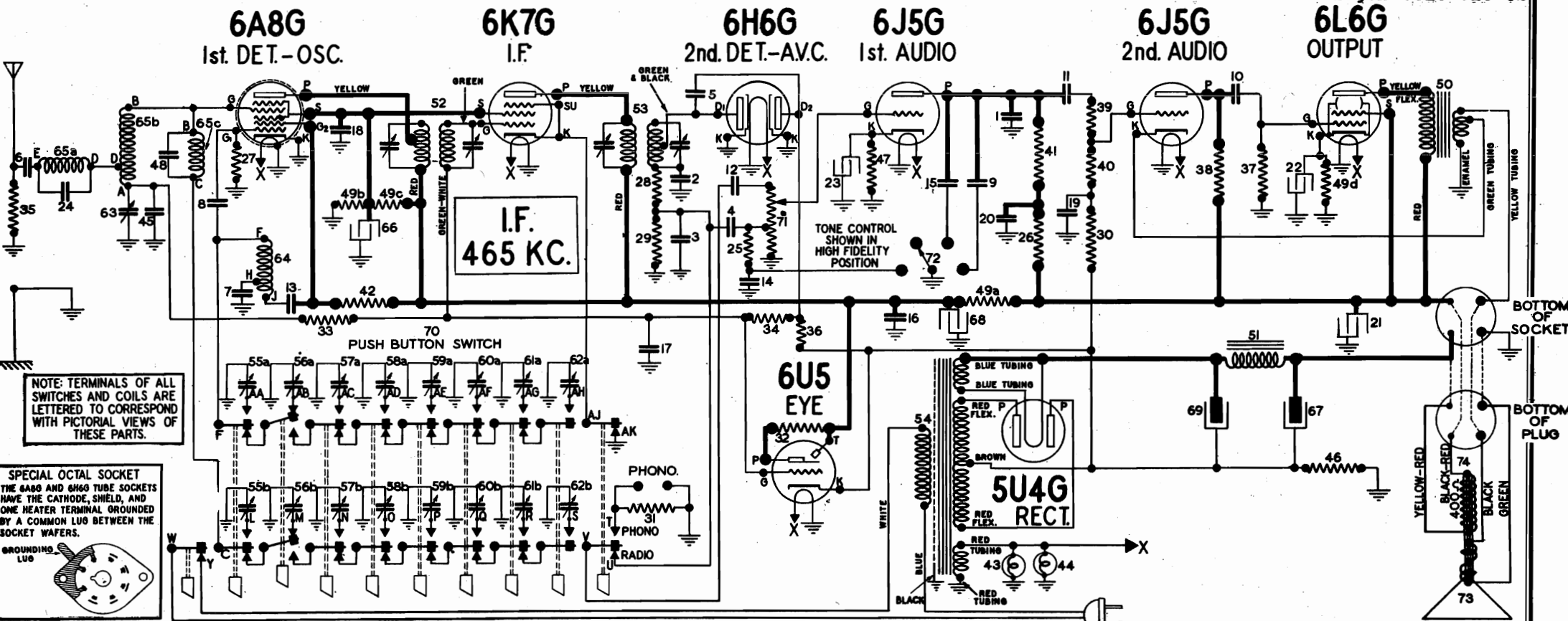
DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	83539	Condenser - mica 280 mmfd.	.20
2-3-4-5	83783	Condenser - mica 110 mmfd.	.20
6	83784	Condenser - mica .0011 mfd.	.25
7	84371	Condenser - mica .0004 mfd. 10%	.20
8	85061	Condenser - mica 51 mmfd.	.15
9-10-11-12	88026	Condenser - paper .02 mfd. 400 volt.	.25
13-14-15	88030	Condenser - paper .01 mfd. 400 volt.	.25
16	88191	Condenser - paper .1 mfd. 300 volt.	.25
17-18	89421	Condenser - paper .1 mfd. 200 volt.	.25
19	89532	Condenser - paper .25 mfd. 200 volt.	.32
20	89643	Condenser - paper .25 mfd. 300 volt.	.40
21	89937	Condenser - elect. 30 mfd. 450 volt.	1.60
22-23	110377	Condenser - elect. 10 mfd. 25 volt.	.80
24	110510	Condenser - wire 3 mmfd.	.12
25-26	110552	Resistor - carb. 47,000 ohms 1 watt.	.12
27-28	110553	Resistor - carb. 220,000 ohms 1 watt.	.12
29-30-31	110554	Resistor - carbon 1 megohm 1/4 watt.	.12
32-33-34	110557	Resistor - carb. 4,700 ohms 1/4 watt.	.12
35	110559	Resistor - carb. 470,000 ohms 1 watt.	.12
36	110564	Resistor - carb. 100,000 ohms 1 watt.	.12
37-38-39	110592	Resistor - carb. 22,000 ohms 1 watt.	.12
40-41	110629	Lamp - 6.3 volt .25 amps.	.15
42	111122	Condenser - mica 3,580 mmfd. (3%)	.48
43-44	112182	Resistor - wire wound 27 ohm 1 watt.	.12
45	112961	Resistor - carb. 2,700 ohm 1/4 watt.	.12
46	113886	Condenser - mica .0002 mfd. (3%)	.22
47	113895	Resistor - Bleeder	
48		Section A - 1500 ohms	
49A to 49D		Section B - 2800 ohms	1.15
		Section C - 2800 ohms	
		Section D - 170 ohms	
50	113896	Transformer - output	1.92
51	113899	Filter Choke	2.10
52	113941	Transformer - 1st I.F.	1.54
53	113948	Transformer - 2nd I.F.	1.50
54	113948	Transformer - power 117 V. 50-60 C.	9.20
55A-55B	113953	Condenser - trimmer (1170 to 1350 KC)	.46
56A-56B			
57A-57B			
58A-58B	113954	Condenser - trimmer (650 to 1300 KC)	.60
59A-59B			
60A-60B			
61A-61B	113955	Condenser - trimmer (540 to 770 KC)	.62
62A-62B			
63	113956	Condenser - padder	.34
64	113957	Coil - oscillator	.42
65A-65B-65C	113959	Coil - antenna	1.10
66	113961	Condenser - elect. 10 mfd. 200 volt.	.60
67	113962	Condenser - elect. 10 mfd. 450 volt.	.72
68	113963	Condenser - elect. 16 mfd. 350 volt.	.68
69	113965	Condenser - elect. 16 mfd. 450 volt.	1.04
70	113966	Switch - push button	5.40
71	113967	Volume control	.84
72	113968	Switch - tone control	.66
73	J-114138	Cone - voice coil assembly for	2.90
74	J-115029	Speaker - dynamic (10 in.)	8.90

DIAL & MISCELLANEOUS PARTS.

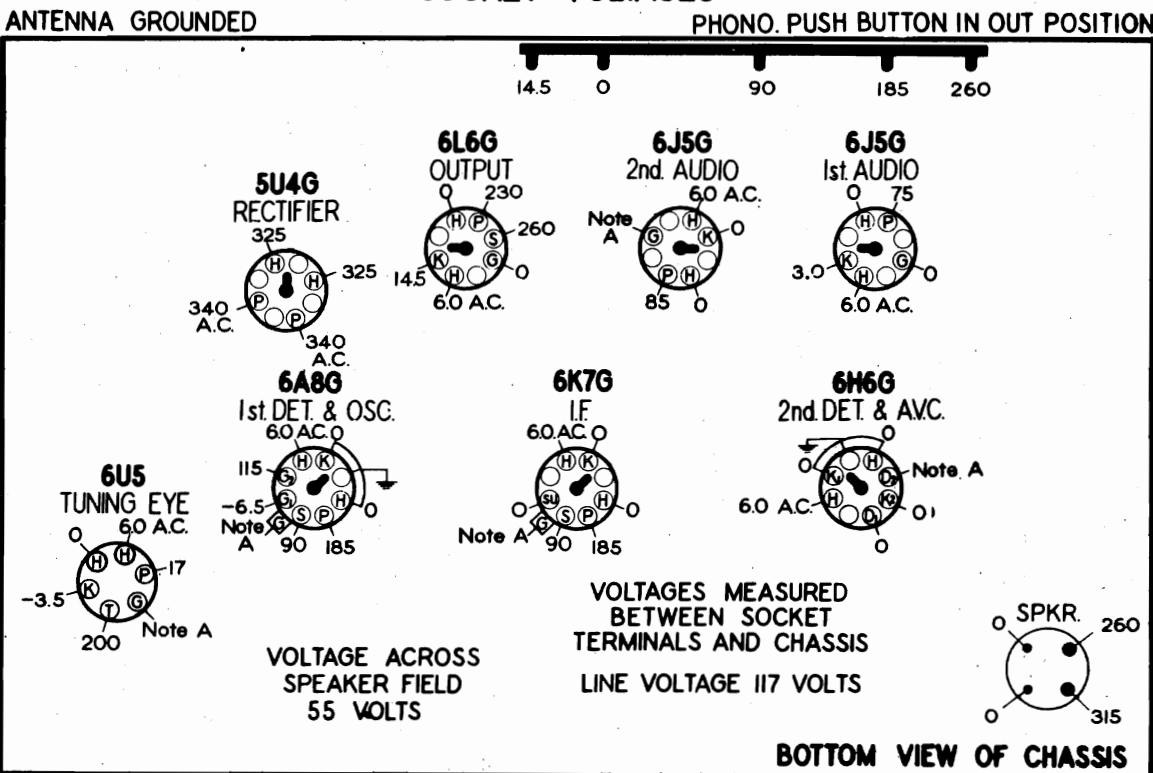
PART NUMBER	DESCRIPTION	LIST PRICE
114451	Cabinet Leg - Front	1.00
114452	Cabinet Leg - Rear	1.00
112745	Clip for coil mounting	.01
114297	Escutcheon - for push buttons	1.60
114211	Knobs - for volume or tone	.16
110496	Plug - Speaker (4 prong)	.12
113651	Push button	.08
114096	Screw - chassis mtg. #10-32 X 1 1/4	.02
112879	Screw - escutcheon mtg. #2 X 3/8	.03
113077	Shield - tube	.15
81834	Socket - 6 prong	.10
110501	Socket - 4 prong (for speaker)	.16
114223	Socket - dial lamp	.18
114611	Socket - octal base (standard)	.15
114612	Socket - octal base (with special ground)	.15
114250	Tab - station call letters	.55
85785	Terminal strip - antenna - ground	.15
89709	Terminal strip - phono	.15
87588	Washer - embossed (for mtg. electrolytic)	.05
110829	Washer - flat steel, for mtg. chassis	.01
89746	Washer - (paper) for back of knobs	.005

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

MODELS 91-82, 98-82 AND 910-82 CHASSIS

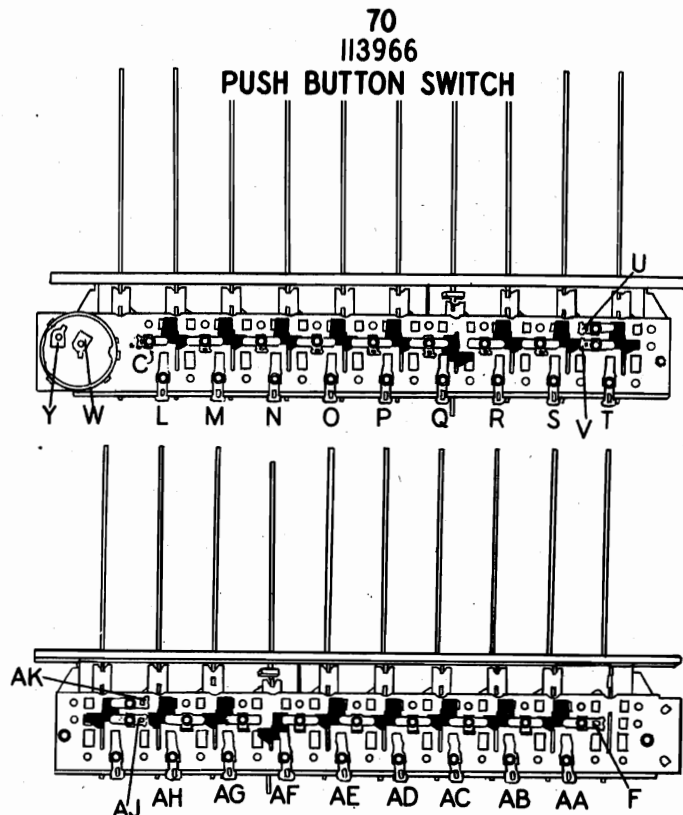


SOCKET VOLTAGES



Use a high resistance voltmeter of at least 1000 ohms per volt.

NOTE A: The bias for the control grids of the 6J5-G 2nd audio, 6A8-G, 6K7-G, 6U5, and the diode plate of the 6H6-G tubes is -3.5 volts measured across resistor No. 46.



NOVEMBER 1938

STEWART-WARNER CORP.

MODELS 91-821 to 91-829
98-821 to 98-829
910-821 to 910-829
Alignment, Trimmers
Antenna Data

ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1.5 MC are required.

1. Connect the output meter across the voice coil or, in series with .1 mfd. condenser, from the plate of the 6L6-G output tube to ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the "G" post on the antenna terminal strip at the rear of the chassis, or to the metal chassis. The ground and antenna terminals on the antenna terminal strip must be connected together throughout the alignment procedure.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

DUMMY ANT IN SERIES WITH SIGNAL GENERATOR	CONNECTION OF SIGNAL GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	PUSH IN BUTTON	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER	CONTROL GRID OF 6A8-G TUBE	465 KC.	PUSH IN ANY BUTTON EXCEPT NO. 1 OR 10	1-2 3-4	2ND I.F. 1ST I.F.	ADJUST FOR MAXIMUM OUTPUT THEN REPEAT ADJUSTMENT
200 MFD. CONDENSER	ANTENNA TERMINAL	465 KC.	#9 (TRIMMER #9a & 9b TUNED TO APPROXIMATELY 600 KC.)	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.

- IMPORTANT -

RE-TUNE PUSH-BUTTON TRIMMERS TO STATIONS AS RE-ALIGNING THE I.F. STAGES MAY HAVE CAUSED DETUNING OF THE STATIONS TO WHICH THE BUTTONS WERE SET.

DESCRIPTION OF ANTENNA CIRCUIT AND ITS FUNCTIONS

Since the antenna circuit of this receiver differs radically from the conventional type, a detailed explanation of the functions of the various sections of this special circuit, and the reasons for the above alignment procedure is given below.

The purposes of this antenna circuit are (1) to transfer the incoming station signal, with maximum gain, to the grid of the first detector tube, (2) to reduce to a minimum, code interference or other undesired signals in the vicinity of the intermediate frequency (465 KC.) (3) to reduce to a minimum the response of image signals. The three coils which perform these functions are wound on a single form and are indicated by No. 65a, No. 65b and No. 65c in the figure at the lower right.

The primary circuit of this antenna system consists of an antenna in series with condenser No. 6, the condenser and coil combination between points E and D, the section of coil 65b between points D and A and the two condensers Nos. 63 and 45 to ground. The resistor No. 35 is shunted directly across this antenna primary circuit and its purposes will be covered later.

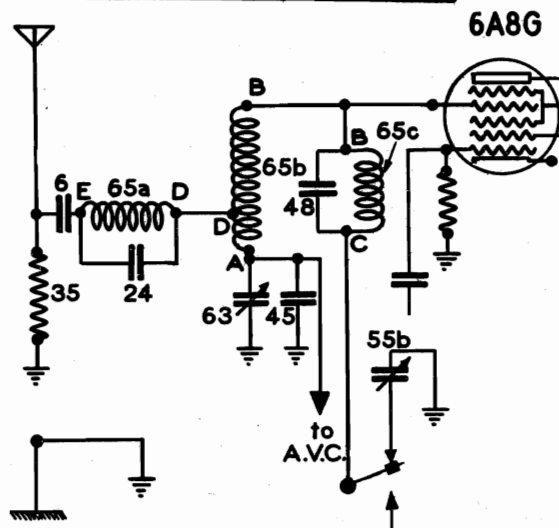
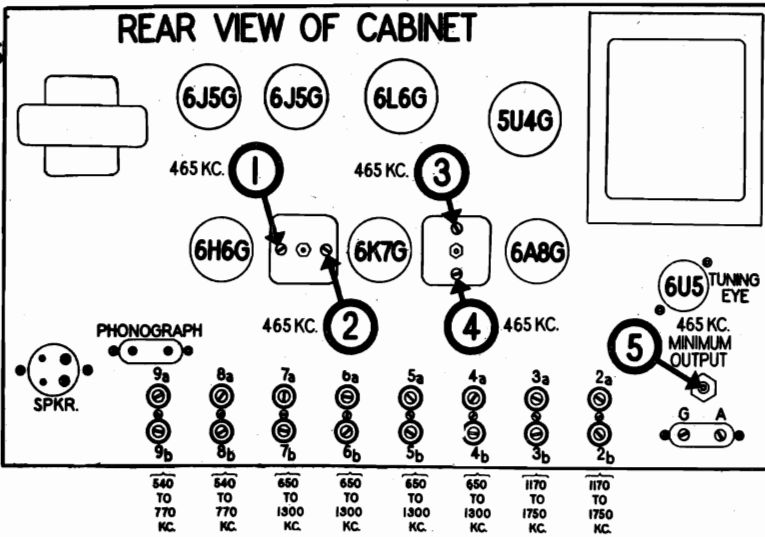
The secondary circuit consists of the two parallel condensers Nos. 63 and 45 which are in series with the section of the antenna coil between points A and B, also in series with the coil and condenser combination between points B and C, and the antenna section of the push button trimmer condenser No. 55b. The secondary circuit is tuned to resonance with the incoming station signal, by the push button trimmer condenser No. 55b.

Reduction of image response is accomplished with the aid of the section No. 65c of the antenna coil. This section of the antenna coil acts as a wave trap resonated 930 KC higher than the signal. It is a part of a series resonant circuit made up of the 65c section of the coil and the push button trimmer condenser #55b. This circuit will be approximately resonant to the image signals AT ALL TIMES and will effectively reduce image interference caused by code or police stations operating at the high frequency end of the broadcast band. The purpose of condenser No. 48 is to cause this image reduction circuit to "track" properly.

The wave trap circuit for reduction of 465 KC code signals is composed of the section DA of coil 65b which is in series with condensers No. 63 and 45 (condenser No. 63 is trimmer No. 5 in the above alignment chart). It should be noted that coil section D-A is inductively coupled to the B-D section of the coil and is considered a part of the wave trap circuit. Trimmer condenser No. 63 is adjusted for minimum output with a 465 KC incoming signal at the antenna. At minimum output the voltage developed across coil A-B will be balanced out by the voltage developed across condensers No. 63 and 45 which is 180° out of phase with the voltage developed across the coil. Therefore, it will be seen that any 465 KC interference signals will only develop a very very small voltage between the control grid of the 6A8-G and ground thus effectively eliminating 465 KC code interference.

The 65a section of the antenna coil between points E and D when considered in series with section D-A and condenser 63 and 45, has a resonant peak at 600 KC. The purpose of this circuit being to increase the gain of the receiver on the low end of the Broadcast band. Condenser No. 24 which is shunted across coil section 65a has for its purpose the reduction of image responses from signals in the vicinity of 2.5 MC.

Condenser No. 6 is a direct current blocking condenser which keeps the bias voltage and the voltage developed by the A.V.C. system from being shorted out to ground by resistor No. 35.



35. Resistor No. 35 was shunted across the primary antenna circuit for two reasons: (1) to make the overall sensitivity of the receiver more uniform and (2) to eliminate detuning effects in the secondary antenna circuit when different types of antenna systems are used with this receiver.

MODELS 91-821 to 91-829
98-821 to 98-829
910-821 to 910-829
Tuner Data, Phono., Notes

STEWART WARNER CORP.

Chassis Model	Used in Receiver Models	Voltage	Frequency
91-82	91-821 to 91-829	117	60 cycles
98-82	98-821 to 98-829	117	25 cycles
910-82	910-821 to 910-829	100-240	50-135

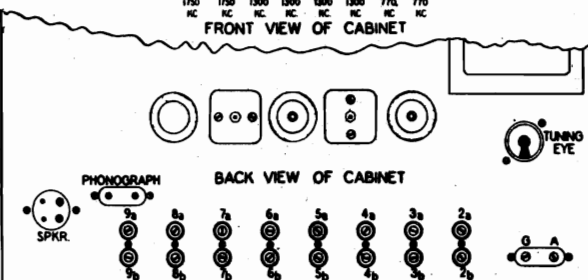
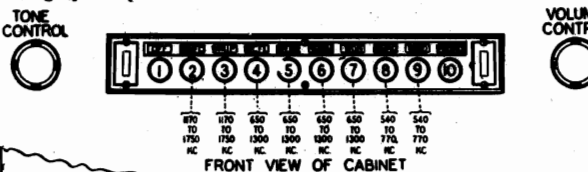
These chassis are 8 tube single band push button tuning superheterodyne receivers. The tuning range covered by the eight tuning buttons is 540 to 1750 kilocycles. These receivers also incorporate the new Peri-dynamic speaker system which is an exclusive Stewart-Warner feature and was designed for the express purpose of giving you the ultimate in tone quality and high fidelity reception.

For greatest ease and simplicity in tuning, these chassis are provided with eight push buttons (Nos. 2 to 9 in Fig. 1). These buttons automatically tune in the stations for which they are labelled. Two other buttons are provided on the keyboard (Nos. 1 and 10 in Fig. 1). Button No. 1 is pushed in only WHEN IT IS DESIRED TO TURN THE RECEIVER OFF. Button No. 10 is pushed in when you desire to use the phonograph pick up. TO TURN THE RECEIVER ON MERELY PUSH ANY ONE OF THE BUTTONS FROM NO. 2 TO 9.

HOW TO SET UP THE PUSH BUTTONS.

The push buttons of your radio receiver are not previously set to stations at the factory. Therefore, unless your dealer has already set and labelled the various push buttons, it will be necessary to make the following adjustments before any stations can be received by using these buttons, proceed as outlined below:

1. Be sure that your set is connected to a good antenna system.
2. Turn on the set at least one quarter hour before setting up the push buttons.



3. Make a list of the frequencies or eight nearby stations to which you wish to set up the buttons. Be sure to select the most powerful nearby stations, since weak signals will not give as satisfactory results.

4. Each of the buttons on your push button tuner has a definite tuning range, as shown in Fig. 1 (both back and front view of cabinet.) It is imperative that, in setting up the buttons, you select stations whose frequency is in the indicated tuning range of that button. The correct frequencies of your local stations may be obtained from your newspaper or radio call magazine. EXAMPLE: This example illustrates the proper way to select a station to be set to a particular button. Suppose you want to set station WLM, whose frequency is 700 KC., to some button on your receiver. Referring to Fig. 1 will show that this frequency falls within the operating range of Buttons No. 4, 5, 6 and 7. Therefore any of these buttons may be used to set up this station. Failure to select the proper button will result in the incorrect setting of the trimmer adjusting screw and will also cause "drifting".

5. Place the receiver in such a position that the back of the cabinet is readily accessible. Refer to Fig. 1 (showing the back of the cabinet.) In the figure, the eight pairs of trimmer adjusting screws are numbered to correspond to the numbers of push buttons shown in the front view of Fig. 1. These screws are used to tune the receiver to the station selected for each button.

6. Push in Button No. 2. Then insert a screw driver in Trimmer Screw No. 2a and turn this screw to the left or right until the desired station is heard. The point at which the screw will be correctly set will be indicated when the open ends of the "V" shadow in the tuning eye are closest together. If the station cannot be heard, advance the volume control. By having available a daily radio log from your newspaper, you can identify the station by knowing what its scheduled program is.

7. Now insert the screw driver in Trimmer Screw No. 2b and turn it to the right or left until the open ends of the "V" shaped shadow in the tuning eye are closest together. Now re-check the setting of Trimmer Screw No. 2a using the tuning eye shadow to indicate the correct setting.

8. The set-up for Button No. 2 is now complete.

9. Push in Button No. 2 and set up trimmers No. 3a and 3b to the desired station in a similar manner.

10. Set up the remaining six buttons using their corresponding trimmer screws.

11. Call letter tabs are supplied with your receiver, with which to label the various push buttons. Select the tabs bearing the call letters of the stations to which you have set the buttons, loosen them on their gummed side, and insert them in their proper place in the escutcheon openings above the push buttons.

12. In some instances it may be necessary, after the set is operated for a month or more, to re-set the trimmer adjusting screws as they may change their setting due to heat and humidity. Changes in the setting of the trimmer screws will cause poor tone quality.

USE OF THE TUNING EYE.

The tuning eye is located at the rear of the chassis (as shown in Fig. 1) and should be used when setting up the push buttons to the various stations. Its purpose is to indicate visually the exact point at which the receiver is correctly tuned to a station. Any station is correctly tuned in when the two open ends of the "V" shadow in the tuning eye are closest together. On strong signals the ends will come together - on weaker stations, they will be more separated. REGARDLESS OF WHETHER YOU ARE TUNING IN A STRONG OR A WEAK STATION, THE TRIMMER SCREWS SHOULD ALWAYS BE ADJUSTED TO THE POINT WHERE THE ENDS OF THE "V" IN THE EYE ARE CLOSEST TOGETHER.

NOTE: This tuning eye should be removed from its socket in the chassis after the push buttons have all been set-up. Failure to remove this tube may result in buzzing or rattling sounds such as described below under "Rattles and Buzzes".

CONNECTING A PHONOGRAPH PICK-UP UNIT.

The connections to your receiver from a high impedance pick-up unit are made to the terminal strip on the back of the chassis (see Fig. 1, back view, for this terminal strip labeled "PHONOGRAPH"). The two leads from the phonograph pick-up unit are connected to the two terminals on this strip. In case hum is encountered when using this unit, reverse the connections to this terminal strip. If the hum persists, make sure that the receiver has a ground wire connected to it as described under "GROUND CONNECTIONS".

HOW TO CHANGE THE OPERATING RANGE OF A BUTTON.

The operating range of a button may be changed by merely changing the dual trimmer used with that button. Dual trimmers with the ranges indicated below can be obtained from your Stewart-Warner distributor, or directly from the Stewart-Warner Corporation, under the following part numbers:

Part Number	Tuning Range	List Price
113953	1170 to 1750 KC.	.46
113954	650 to 1300 KC.	.60
113955	540 to 770 KC.	.62

To make the change proceed as follows:

1. Remove the chassis from the cabinet.
2. By referring to Fig. 1, determine the dual trimmer associated with the button whose range you wish to change.
3. Unsolder the leads from the four terminals on the back of this dual trimmer.
4. Remove the 6/32 machine screw holding the dual trimmer to the front of the chassis.
5. From the above list, select a dual trimmer which will cover the desired range.
6. Mount it on the chassis with the 6/32 machine screw, and solder the leads to its four terminals.

The button is now ready to be set to any strong station whose frequency is within the range of this new trimmer unit.

RATTLES & BUZZES.

If during normal operation, buzzing or rattling sounds are heard in the receiver, they will in all probability originate in one or more of the sources listed in this paragraph. These rattles or buzzes generally occur with the tone control in the bass position and with the volume control advanced to a fairly loud level. Check the following for probable sources of noise.

- (1) Loose tube shields. See that shields are properly located, and making good mechanical contact with tube shield base.
- (2) Loose elements in any of the tubes. This applies especially to the 6U5 tuning eye tube. This tube should be removed from the chassis after the buttons have been set-up.
- (3) Loose escutcheon or cabinet parts. Check for mechanical vibration of any parts not securely fastened.

MODELS 97-521 to 97-529

Chassis 97-52

Alignment, Trimmers

STEWART WARNER CORP.

Chassis Model

97-52

Used In Receiver Models

97-521 to 97-529

Voltage

117 volts A.C. or D.C.

This chassis is a 5 tube, single band push-button tuning superheterodyne receiver. It is designed for operation on either alternating or direct current, and incorporates an L-49-B ballast resistor tube. The tuning range of this receiver is 540 to 1725 KC. The intermediate frequency is 465 KC.

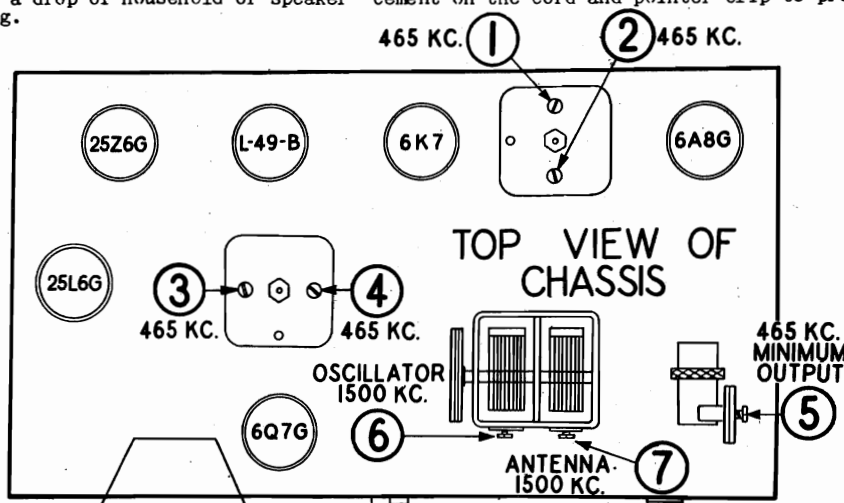
Incorporated in each chassis is a four-button mechanical push-button tuner unit. These push buttons may be set to any station desired by the method described below under "How To Set Up The Push-Button Tuner".

The accuracy of tuning when using the push-button tuner, depends to a large extent upon the amount of "play" in the moving parts of this system. In cases where slight inaccuracy in tuning occurs check the following points:

1. Check to see that the button is correctly set to the station. If not, reset the button.
2. The tension must be maintained between the two sections of the anti back-lash gear on the left side of the unit in order that it functions properly--both anti back-lash springs must be in place in the gear and compressed slightly.
3. Note the small adjusting lug over the push-button shafts at the point where they slide into the tuner. The lug is held in place by a hex-head screw. These lugs should be adjusted for a minimum amount of "play" in other words the push-button shaft must have a minimum of movement in a vertical direction.

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

- ① Connect the output meter across the voice coil or between the plate of the 25L6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
- ② Connect the ground lead of the signal generator to the chassis of the receiver through a .1 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as one side of the power line may be grounded in the signal generator.
- ③ Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
- ④ With the gang condenser in full mesh, set the pointer to the last mark on the right end of the dial scale. If the pointer is only slightly off calibration, loosen the set-screw in the dial drive drum at the left side of the gang condenser and set the pointer to the last mark on the right end of the dial when the gang condenser is in full mesh. If the pointer is off calibration several dial divisions, release it from the pointer drive cord by spreading the clip on the pointer. Then slide the pointer along the cord until it is set to the last dial division on the right end of the dial. Holding it in place check to see if the gang condenser is in full mesh, and tighten the pointer clip, being careful not to cut the cord. Place a drop of household or speaker cement on the cord and pointer clip to prevent the pointer from slipping.

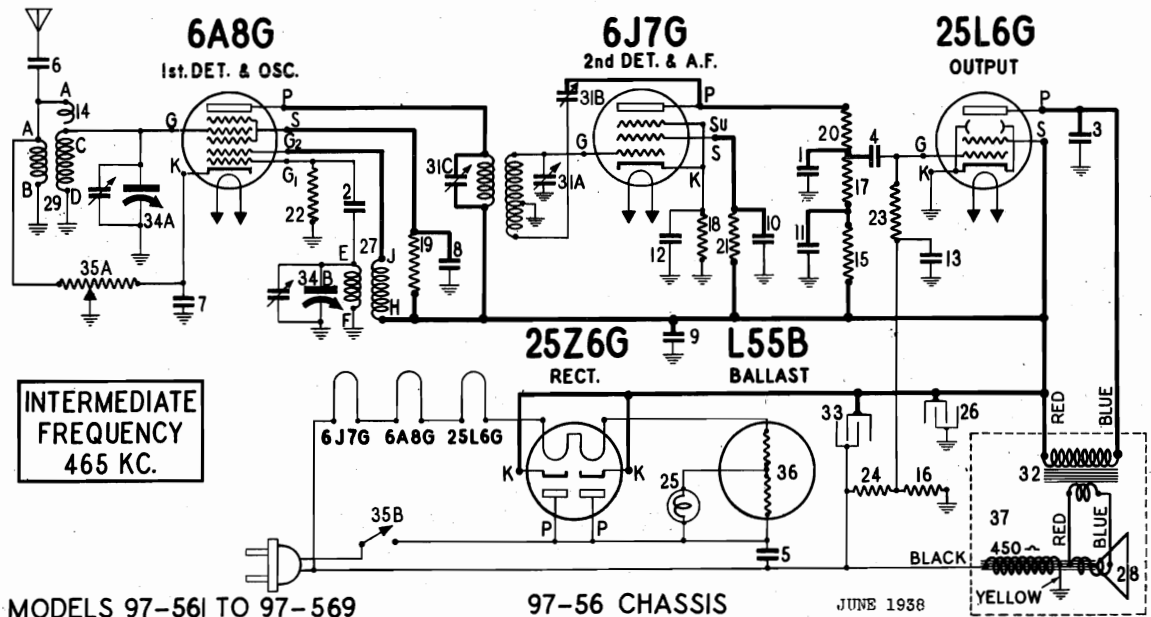


DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 6A8-G TUBE	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	1st I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
				3-4	2nd I.F.	
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	1500 KC	1500 KC	6	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA LEAD (Blue Wire)	1500 KC	TUNE TO 1500 KC GENERATOR SIGNAL	7	BROADCAST ANTENNA (Shunt)	ADJUST FOR MAXIMUM OUTPUT.

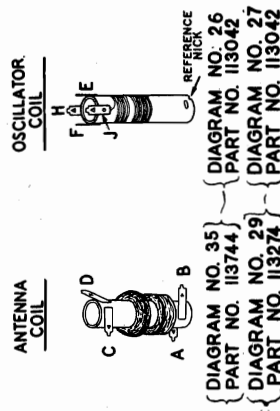
Schematics, Voltage,
Socket

MODELS 97-561 to 97-569
STEWART-WARNER CORP. Chassis 97-56

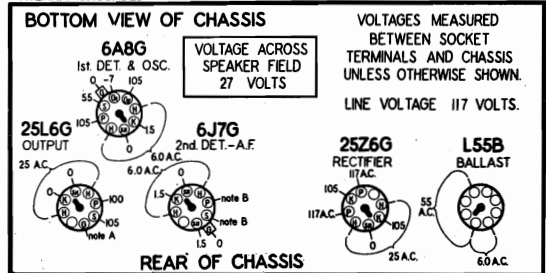
97-561S to 97-569S
Chassis 97-56S



NOTE
TERMINALS OF COILS SHOWN IN PICTORIAL
VIEWS BELOW ARE LETTERED TO CORRES-
POND TO SIMILARLY LETTERED TERMINALS
ON THE CIRCUIT DIAGRAM ABOVE. TERMIN-
ALS WHICH ARE CONNECTED TOGETHER
CARRY THE SAME LETTER.



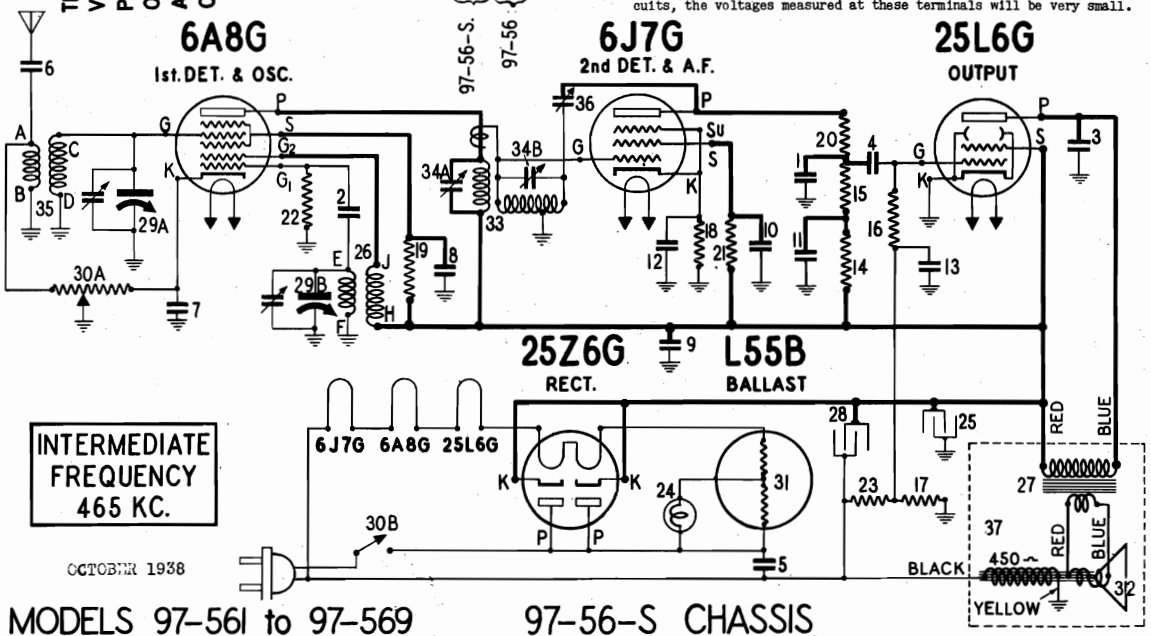
SOCKET VOLTAGES CHASSIS 97-56, 97-56-S. DIAL TUNED TO 540 KC.
ANTENNA GROUND



Use a high resistance voltmeter of a least 1000 ohms per volt.

NOTE A: The bias for the control grid of the 25L6G output tube is -8.0 volts. Due to the high resistance in this grid circuit the voltage measured will be extremely small.

NOTE B: Due to the high resistance in the plate and screen grid circuits, the voltages measured at these terminals will be very small.



MODELS 97-561 to 97-569

97-561S to 97-569S

Tuner Data, Alignment

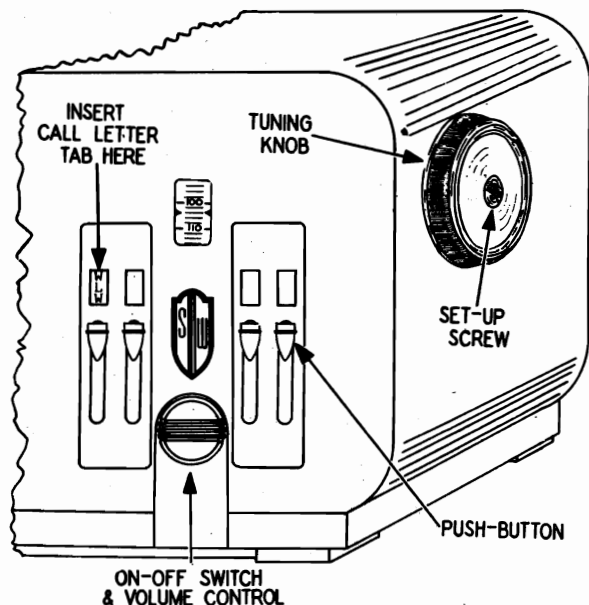
MODELS 97-571 to 97-579

Tuner Data

CHASSIS 97-56, 97-56S AND 97-57

HOW TO SET UP THE PUSH-BUTTON TUNER.

1. Be sure that your set is connected to a good antenna system.
2. Turn on the set and allow it to operate at least one-quarter hour before setting up the push buttons.
3. Select the four nearby stations to which you wish to set up the buttons. Be sure to select nearby, powerful stations, since weak signals will generally give poor results. Any button may be set to any desired station.



4. The large tuning knob at the side of your set has a screw located in the center. Grasp this tuning knob firmly and then using a screw-driver or a coin turn the screw counter-clockwise not more than two whole turns. (When viewed from the side of the cabinet.)

5. Push down any one of the four buttons that you wish to set to a station. Be sure to push the button all the way down, otherwise the setting will be incorrect.

6. Holding the push-button down firmly, turn the tuning knob until the station you desire is tuned in. Tune in strong nearby stations for best results. Be sure to tune in the stations correctly by tuning to the point where the program is heard with the least hiss or distortion and not to the point of greatest volume.

7. Release the push button that you have just set up. **WARNING:** Do not attempt to use any button until you have completed the set-up of all four buttons. Do not re-tighten the set-up screw until all buttons have been set-up.

8. Proceed to set-up the next button by pushing down on the button firmly and tuning in the desired station, using the tuning knob. The rest of the buttons should be set-up in a similar manner.

9. After all of the buttons have been set-up **YOU MUST RE-TIGHTEN THE SCREW IN THE TUNING KNOB; OTHERWISE ALL SETTINGS OF THE BUTTONS WILL BE DESTROYED. GRASP THE KNOB FIRMLY AND THEN USE A SCREW DRIVER OR A COIN TO TIGHTEN THE SCREW SECURELY.**

10. The push buttons should now be labelled with their proper call letters. The call letter sheets are supplied with your receiver. The individual call letter tab should be moistened on its gummed side and stuck to the small square in the cabinet panel just above the push button.

97-56 CHASSIS ONLY

THE INTERMEDIATE FREQUENCY AMPLIFIER.

This 97-56 chassis employs one stage of intermediate frequency amplification. The intermediate frequency transformer is adjusted to 465 KC and is tuned in the usual manner. In addition to the two trimmers used in tuning the windings to their proper frequency, this transformer has mounted on it an additional trimmer condenser which is used to feed back a portion of the intermediate frequency signal appearing in the plate circuit of

the 6J7-G tube. This signal is introduced into the 6J7-G grid circuit through a coupling coil, which is a part of the secondary coil. This regeneration increases the amplification and selectivity obtainable from this stage, and makes the performance of this set comparable to that which is obtained from a set employing an additional I.F. transformer.

When aligning the intermediate frequency amplifier, the output of the signal generator is set at 465 KC and is coupled to the grid of the 6A8-G tube in the customary manner. The primary and secondary windings are tuned by adjusting Trimmer Screws No. 1 and No. 2 until a maximum deflection is obtained on the output meter. If the set has a tendency to oscillate when adjusting these trimmer screws, turn Trimmer Screw No. 5 to the left (counter-clockwise) until the oscillation ceases. The signal generator is next coupled to the antenna lead, and Trimmers No. 3 and No. 4 are aligned for maximum output, using a generator frequency of 1500 KC. Now connect the set to the CUSTOMER'S antenna and tune in a station on the low frequency end of the dial. The regeneration control, Trimmer No. 5 is now adjusted to give maximum output of the set, consistent with good stability and tone quality. After changing the setting of Trimmer No. 5 it is necessary to re-adjust Trimmers No. 1 and No. 2, as their setting will be found to have changed slightly. The output of the signal generator is set at 465 KC and is coupled to the grid of the 6A8-G tube through a .1 mfd. condenser and Trimmers No. 1 and No. 2 adjusted, as was done previously.

A-C OPERATION

When the set is used on alternating current, all D-C potentials are supplied by a 25Z6G rectifier tube and its associated filter circuit. The tube is connected for half-wave rectification of the A-C supply.

If any hum is noticed when the set is used on A-C, reversing the power plug in the receptacle will sometimes reduce the hum level. When the set has not been used for some time, or the filter condensers have been replaced, a slight hum may be audible when the set is first turned on. This hum may not clear up immediately upon reversal of the power plug. However, it will probably be eliminated after approximately five minutes operation by which time the anode plates of the electrolytic capacitors in the filter system will have reformed.

D-C OPERATION

If the set fails to operate after allowing time for the tubes to reach their normal operating temperatures, reverse the power plug in the receptacle. When the set is used on direct current, the 25Z6G rectifier tube and the filter system remains in the circuit and serve two purposes. If the power cord should be plugged in with incorrect polarity, the 25Z6G tube protects the filter condensers from damage. On correct D-C polarity the 25Z6G tube passes the D-C and the filter circuit aids in smoothing the supply voltage, thus minimizing line noises.

97-56-S CHASSIS ONLY

I.F. TRANSFORMER & REGENERATION CONTROL

This 97-56-S chassis employs only one intermediate frequency transformer, the windings of which are capacitively coupled. The two trimmers used to tune the primary and secondary of this transformer are mounted on the transformer assembly, and are accessible from the rear of the chassis. Also associated with this intermediate frequency transformer is an additional trimmer condenser, which is accessible through a hole in the rear of the chassis. This condenser is used to feed back a portion of the intermediate frequency signal appearing in the plate circuit of the 6J7-G tube. This signal is introduced into the 6J7-G grid circuit through a coupling coil, which is a part of the secondary coil. The regeneration obtained increases the amplification and selectivity obtainable from the intermediate frequency transformer, and makes the performance of this set comparable to that which is obtained from a set employing an intermediate frequency stage.

ADJUSTMENT OF REGENERATION CONTROL.

IF DISTANT STATIONS COME IN WITH INSUFFICIENT VOLUME: Through the opening near the bottom of the center of the back of the cabinet, you will see an adjusting screw. Using a non-metallic instrument (a piece of wood whittled in the shape of a screw driver will serve the purpose), turn this screw to the left (counter-clockwise). As you turn counter-clockwise the volume will be increased up to a certain point at which the set will begin to squeal. Turn the screw back until the squeal just disappears and good tone quality is obtained.

IF THE RECEIVER HOWLS OR SQUEALS: Using the same screw mentioned above and a non-metallic instrument (a piece of wood whittled in the shape of a screw driver will serve the purpose) turn the screw clockwise very, very slightly until the squeal or howl ceases.

MODELS 97-561 to 97-569

97-561S to 97-569S

STEWART WARNER CORP.

Alignment, Trimmers

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

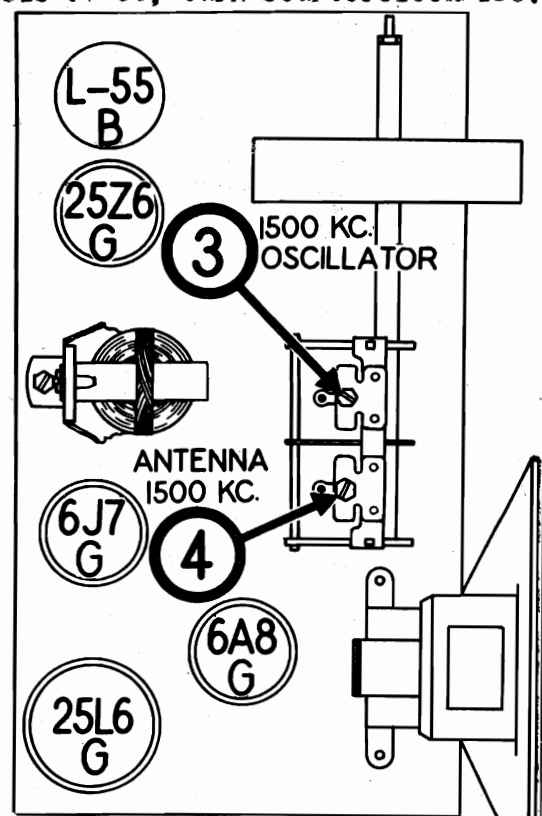
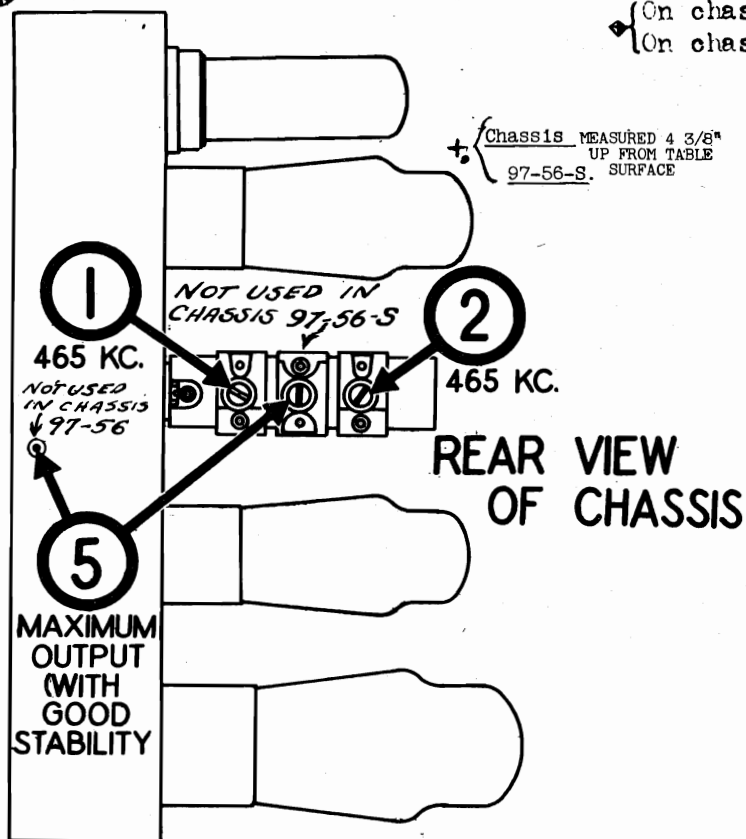
- ① Connect the output meter across the voice coil or between the plate of the 25L6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
- ② Connect the ground lead of the signal generator to the chassis of the receiver through a .1 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as one side of the power line may be grounded in the signal generator.
- ③ Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
- ④ With the gang condenser in full mesh, set the indicator to the last mark on the top end of the dial scale. If the pointer is only slightly off calibration, it may be possible to slip the dial drum just enough to correct for this slight mis-calibration. If the dial is several divisions off calibration, loosen the set screw on the condenser shaft. Then grasp the end of the tuning shaft and turn the dial until the last division of the scale is directly under the indicator, when the gang is in full mesh. Then retighten the set-screw.
- ④ TO CALIBRATE THE DIAL:— Remove the chassis from the cabinet and set it on a flat surface (insulated from ground). Release the set screw in the collar which connects the gang condenser shaft with the tuning unit. Holding the gang in full mesh turn the dial until the last dial division (just below 55) on the low frequency end is exactly 4 3/8 inch above the table surface. Now retighten the set screw in the coupler collar. The 4 3/8 inch division on the ruler (when measured vertically from table surface) is to be used as the dial indicator for all calibrations and alignment.

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER	CONTROL GRID OF 6A8-G TUBE	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	I. F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT. IF OSCILLATION OCCURS TURN REGENERATION CONTROL TRIMMER #5 ONE-QUARTER TURN
200 MMFD. CONDENSER	ANTENNA LEAD (BLUE WIRE)	1500 KC	+ 1500 KC	3	BROADCAST OSCILLATOR (SHUNT)	ADJUST FOR MAXIMUM OUTPUT.
200 MMFD. CONDENSER	ANTENNA LEAD (BLUE WIRE)	1500 KC	TUNE TO 1500 KC GEN. SIG.	4	BROADCAST ANTENNA (SHUNT)	ADJUST FOR MAXIMUM OUTPUT.
CONNECT RECEIVER TO CUSTOMER'S ANTENNA OR TO A .50 MMFD. MICA CONDENSER IN SERIES WITH THE SIGNAL GENERATOR.		TUNE IN A WEAK SIGNAL ON THE LOW FREQUENCY END OF THE DIAL. A WEAK SIGNAL IS REQUIRED SO THAT VOLUME CONTROL MAY BE SET TO MAXIMUM VOLUME POSITION.		5	REGENERATION CONTROL	ADJUST TRIMMER TO GIVE MAXIMUM OUTPUT, CONSISTENT WITH GOOD STABILITY AND TONE QUALITY.
.1 MFD. CONDENSER	CONTROL GRID OF 6A8-G TUBE	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	I. F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.

⊗ THIS ADJUSTMENT MUST AGAIN BE MADE AFTER THE REGENERATION CONTROL TRIMMER HAS BEEN SET.

On chassis 97-56-3, turn clockwise.

On chassis 97-56, turn counterclockwise.



MODELS 97-561 to 97-569

97-561S to 97-569S STEWART-WARNER CORP.

Parts Lists

97-56 CHASSIS

97-56-S CHASSIS

ELECTRICAL PARTS

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1-----	83539	Condenser - mica 260 mmfd.	.20
2-----	83783	Condenser - mica 110 mmfd.	.20
3-4-5-----	88026	Condenser - paper .02 mfd.	.25
6-----	88029	Condenser - paper .004 mfd.	.25
7-8-9-10-----	89421	Condenser - paper .1 mfd.	.25
11-----	89421	200 volt	.25
12-13-----	89532	Condenser - paper .25 mfd.	.32
14-----	110510	Condenser - wire 3 mmfd.	.12
15-16-----	110553	Resistor - carbon 220,000 ohm 1/4 watt	.12
17-----	110559	Resistor - carbon 470,000 ohm 1/4 watt	.12
18-----	110565	Resistor - carbon 22,000 ohm 1/4 watt	.12
19-----	110566	Resistor - carbon 33,000 ohm 1/4 watt	.12
20-----	110569	Resistor - carbon 10,000 ohm 1/4 watt	.12
21-----	110570	Resistor - carbon 2.2 meg. 1/4 watt	.15
22-----	110578	Resistor - carbon 68,000 ohm 1/4 watt	.12
23-----	110584	Resistor - carbon 330,000 ohm 1/4 watt	.12
24-----	110591	Resistor - carbon 680,000 ohm 1/4 watt	.12
25-----	110629	Lamp - 6.3 volt - .25 amps.	.15
26-----	112898	Condenser - electrolytic 16 mfd. 150 volt	.50
27-----	113042	Coil - oscillator	.45
28-----	R-113241	Cone - voice coil assem. for R-115013 spkr.	1.25
29-----	113274	Coil - antenna	.65
30-----	113275	Transformer - I.F. (with trimmer)	1.44
31A to 31C-----	113278	Condenser - trimmer (3 section for I.F.)	.46
32-----	R-113343	Transformer - output for R-115013 spkr.	1.00
33-----	113472	Condenser - electrolytic 40 mfd. 150 volt	.56
34A - 34B-----	113478	Condenser - variable gang	3.20
35A - 35B-----	113501	Volume Control-20,000 ohms with on-off switch	.92
36-----	113506	Ballast Resistor - L55B	.65
37-----	R-115013	Speaker - dynamic 5 inch	4.75

DIAL & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
83624-----	Screw - Self Tapping 8 X 1/4 for mounting I.F. transformer	\$.01
85427-----	Socket - tube, 8 prong	.15
85827-----	Set Screw - 8/32 square head	.02
112745-----	Clip - coil mounting (osc. & ant.)	.01
113500-----	Mechanical Tuner Unit - less tenite tips for push buttons	3.90
113504-----	Collar - Coupling (between tuner unit and gang cond. shaft)	.08
113510-----	Tip - for push button (walnut)	.05
113529-----	Tip - for push button (ivory)	.06
113530-----	Knob - tuning (walnut)	.25
113531-----	Knob - tuning (ivory)	.30
113537-----	Screw for tuning knob & set-up	.18
113543-----	Socket - dial lamp	.18
113545-----	Tab - station call letters	.28
113557-----	Key - for push button tuner (left hand)	.24
113558-----	Clutch Spring - for tuner (on cam shaft)	.04
113559-----	Spring - for key return	.02
113560-----	Dial Scale - Celluloid Strip	.22
113572-----	Key - for push button (right hand)	.24
113573-----	Knob - Volume (walnut)	.18
113574-----	Knob - Volume (ivory)	.18

Chassis Model

97-56

This chassis is a 5 tube single band push-button tuning superheterodyne receiver. It is designed for operation on either alternating or direct current, and incorporates an L-55-B ballast resistor tube. The tuning range of the receiver is 540 to 1720 KC.

IMPORTANT: In cases where it is found that the push-button tuner does not tune in stations correctly due to extreme sharpness in tuning it is only necessary to back off (turn counter clockwise) the regeneration control trimmer (#5) slightly. This will make tuning broader and will result in more accurate tuning when using the push button tuner.

Chassis Model

Used in Receiver Models

Voltage

97-56-S.....97-561 to 97-569.....117 Volts A.C. or D.C.

This chassis is a 5 tube single band push-button tuning superheterodyne receiver. It is designed for operation on either alternating or direct current, and incorporates an L-55-B ballast resistor tube. The tuning range of the receiver is 540 to 1720 KC.

IMPORTANT: In cases where it is found that the push-button tuner does not tune in stations correctly due to extreme sharpness in tuning it is only necessary to turn the regeneration control trimmer (#5) slightly clockwise. This will make tuning broader and will result in more accurate tuning when using the push button tuner.

ELECTRICAL PARTS

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1-----	83539	Condenser - mica 260 mmfd.	.20
2-----	83783	Condenser - mica 110 mmfd.	.20
3-4-5-----	88026	Condenser - paper .02 mfd.	.25
6-----	88029	Condenser - paper .004 mfd.	.25
7-8-9-----	89421	Condenser - paper .1 mfd.	.25
10-11-----	89421	200 volt	.25
12-13-----	89532	Condenser - paper .25 mfd.	.32
14-----	110553	Resistor - carbon 220,000 ohm 1/4 watt	.12
15-16-----	110559	Resistor - carbon 470,000 ohm 1/4 watt	.12
17-----	110564	Resistor - carbon 100,000 ohm 1/4 watt	.12
18-----	110565	Resistor - carbon 22,000 ohm 1/4 watt	.12
19-----	110566	Resistor - carbon 33,000 ohm 1/4 watt	.12
20-----	110569	Resistor - carbon 10,000 ohm 1/4 watt	.12
21-----	110570	Resistor - carbon 2.2 meg. 1/4 watt	.15
22-----	110578	Resistor - carbon 68,000 ohm 1/4 watt	.12
23-----	110584	Resistor - carbon 330,000 ohm 1/4 watt	.12
24-----	110629	Lamp - 6.3 volt - .25 amps.	.15
25-----	112898	Condenser - electrolytic 16 mfd. 150 volt	.50
26-----	113042	Coil - oscillator	.45
27-----	R-113343	Transformer - output for R-115013 speaker	1.00
28-----	113472	Condenser - electrolytic 40 mfd. 150 volt	.56
29A - 29B-----	113478	Condenser - variable gang	3.20
30A - 30B-----	113501	Volume control-20,000 ohms with on-off switch	.92
31-----	113506	Ballast Resistor - L55B	.65
32-----	R-113737	Cone - voice coil assem. for R-115025 speaker	1.90
33-----	113738	Transformer - I.F. (with trimmer)	1.26
34A - 34B-----	113743	Condenser - trimmer (2 section for I.F.)	.30
35-----	113744	Coil - antenna	.72
36-----	113745	Condenser - trimmer (regen. control)	.28
37-----	R-115025	Speaker - dynamic - 5" (sub. R-115013)	4.80

DIAL & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
83624-----	Screw - self tapping 8 X 1/4 for mounting I.F. transformer	.01
85427-----	Socket - tube, 8 prong	.15
85827-----	Set screw - 8/32 square head	.02
88161-----	Shield Tube - (short section)	.08
88162-----	Shield Tube - (long section)	.08
88164-----	Shield Cap - tube, grid type	.08
88911-----	Shield - Tube, base	.04
88912-----	Clip - grounding, for tube base	.02
112745-----	Clip - coil mounting (osc. & ant.)	.01
113500-----	Mechanical Tuner Unit - less tenite tips for push buttons	3.90
113504-----	Collar - Coupling (between tuner unit and gang condenser shaft)	.08
113537-----	Screw for tuning knob & set-up	.18
113543-----	Socket - dial lamp	.18
113548-----	Felt Pad - behind push buttons	.01
113550-----	Tab - station call letters	.28
113557-----	Key-for push button tuner (left hand)	.24
113558-----	Clutch spring - for tuner (on cam shaft)	.04
113559-----	Spring - for key return	.02
113572-----	Dial Scale - celluloid strip	.22
113573-----	Key - for push button (right hand)	.24
113582-----	Dial Window - celluloid	.12
113636-----	Screw - #8 X 3/4" for chassis mtg.	.01
113638-----	Screw - Back cover retaining	.01
113699-----	Screw - #8 X 1" for chassis mtg.	.01

Voltage

117 volts A.C. or D.C.

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1-----	83539	Condenser - mica 260 mmfd.	.20
2-----	83783	Condenser - mica 110 mmfd.	.20
3-4-5-----	88026	Condenser - paper .02 mfd.	.25
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10-11-----	89421	200 volt	.25
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15-16-----	110559	Resistor - carbon 470,000 ohm 1/4 watt	.12
17-----	110564	Resistor - carbon 100,000 ohm 1/4 watt	.12
18-----	110565	Resistor - carbon 22,000 ohm 1/4 watt	.12
19-----	110566	Resistor - carbon 33,000 ohm 1/4 watt	.12
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35-----	113744	Coil - antenna	.72
36-----	113745	Condenser - trimmer (regen. control)	.28
37-----	R-115025	Speaker - dynamic - 5" (sub. R-115013)	4.80

KNOBS AND PUSH-BUTTONS

WHEN ORDERING GIVE COLOR AS WELL AS PART NUMBER

97-56-S

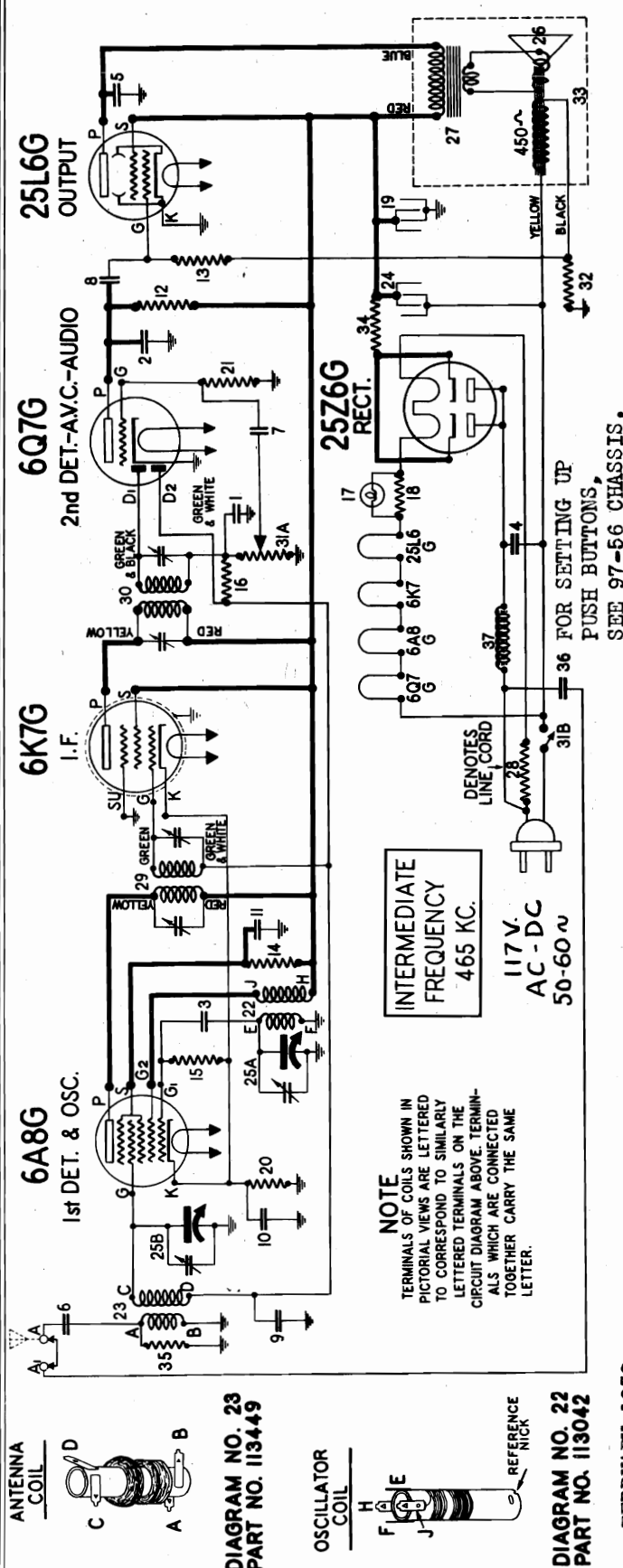
STEWART-WARNER CORP.

MODELS 97-571 to 97-579

Chassis 97-57

Schematic, Voltage

Socket, Changes



FEBRUARY 1939.

CIRCUIT CHANGE

Resistor No. 18 connected in parallel with the dial bulb has been changed to a 3 watt molded wire wound resistor, Part No. 116479. This size is being used in place of the original 1/2 watt rating, to prevent failure of the resistor if the dial bulb burns out. The 3 watt resistor should be used for replacement in all cases.

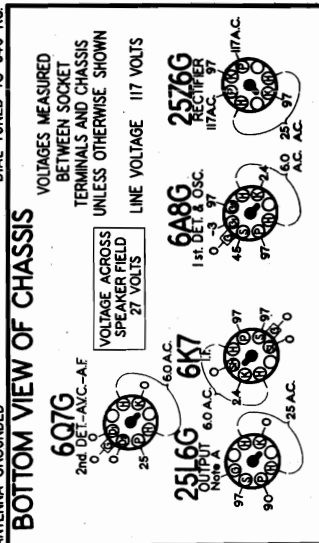
TUBE CHANGE

A small percentage of these chassis was equipped with 6K7 metal I.F. tubes but most of them are using the 6K7G glass tube. Because of shield requirements, these tubes cannot be used interchangeably. In other words, a metal tube must be used to replace a metal tube, while in a chassis originally equipped with a glass I.F. tube, a glass tube must be used as a replacement.

CORRECTING OSCILLATION & SQUEALING

If a "squeal" develops with the volume control fairly well advanced, separate the 6Q7G grid lead and the speaker wires as much as possible by pulling the grid lead to the side of the 6Q7G nearest the variable condenser. If there is a loud heterodyne whistle when tuning in stations, the I.F. stage may be oscillating. If this happens, move the lead from the 6A8G cathode to the 6Q7G cathode as close to the chassis and as far from other wires as possible. If necessary, connect a .05 mfd. 200 volt condenser to one of the above cathode terminals which does not already have such a condenser connected directly to it.

ANTENNA GROUND
BOTTOM VIEW OF CHASSIS
DIAL TUNED TO 540 KC.



MODELS 97-571 to 97-579
Alignment, Trimmers, Parts
Antenna Notes

STEWART WARNER CORP.

ALIGNMENT EQUIPMENT & PROCEDURE

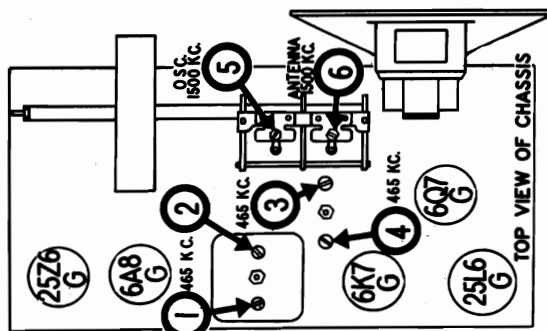
FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

- ① Connect the output meter across the voice coil or between the plate of the 25L5-G output tube and ground through a .1 mfd. condenser, depending upon the type of meter. The more sensitive type should be connected across the voice coil.
- ② Connect the ground lead of the signal generator to the chassis of the receiver through a .25 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as the signal generator may be connected to one side of the power line, or it may be grounded externally.
- ③ Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
- ④ TO CALIBRATE THE DIAL:-- Remove the chassis from the cabinet and set it on a flat surface (insulated from ground). Release the set screw in the collar which connects the gang condenser shaft with the tuning unit. Holding the gang in full mesh turn the dial until the last dial division (just below 65) on the low frequency end is exactly 4 3/8 inch above the table surface. Now retighten the set screw in the coupler collar. The 4 3/8 inch division on the ruler (when measured vertically from table surface) is to be used as the dial indicator for all calibrations and alignment.

DUMMY ANT IN SERIES WITH SIGNAL GENERATOR	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
200 MMFD. MICA CONDENSER	CONTROL GRID OF 6AS-6 TUBE	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	1ST I. F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT
				3-4	2ND I. F.	
200 MMFD. MICA CONDENSER	ANTENNA LEAD (Blue Wire)	1500 KC	1500 KC	5	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
200 MMFD. MICA CONDENSER	ANTENNA LEAD (Blue Wire)	1500 KC	TUNE TO 1500 KC GENERATOR SIGNAL	6	BROADCAST ANTENNA (Shunt)	ADJUST FOR MAXIMUM OUTPUT.

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1-2	83539	Condenser - mica 260 mmfd.	.20
3	83783	Condenser - mica, 110 mmf.	.20
4	111252	Condenser - paper .05 mfd. 400 V.	.13
5	88028	Condenser - paper .02 mfd. 400 V.	.25
6	88029	Condenser - paper .004 mfd. 400 V.	.25
7-8	88030	Condenser - paper .01 mfd. 400 V.	.25
9-10	88189	Condenser - paper .05 mfd. 200 V.	.25
11	89421	Condenser - paper .1 mfd. 200 V.	.25
12	110553	Resistor - carb. 220,000 ohms \pm W.	.12
13	110559	Resistor - carb. 470,000 ohms \pm W.	.12
14	110566	Resistor - carb. 33,000 ohms \pm W.	.12
15	110578	Resistor - carb. 68,000 ohms \pm W.	.12
16	110580	Resistor - carb. 3.3 meg. 1/4 watt	.12
17	110629	Lamp - 6.3 volt - .25 amps.	.15
18	110975	Resistor - W. W. 33 ohms \pm W.(10%)	.12
19	112898	Condenser - elect. 16 mfd. 150 V.	.50
20	112974	Resistor - carb. 220 ohm \pm W.(10%)	.15
21	112975	Resistor - carbon 10 meg. 1/4 watt	.12
22	113042	Coil - oscillator	.45
23	113449	Coil - antenna	.78
24	113472	Condenser - elect. 40 mfd. 150 V.	.56
25A - 25B	113478	Condenser - variable gang	3.20
26	R-114061	Cone - voice coil assembly (for R-115039 speaker)	1.50
27	R-114062	Transformer - output	1.20
28	114797	Power cord - (series resistance 145 ohms) Brown	.98
	114951	Power cord - (series resistance 145 ohms) Ivory	1.00
29	114802	Transformer - 1st I.F.	1.10
30	114804	Transformer - 2nd I.F.	.85
31A - 31B	114814	Volume control 1 megohm with off-on switch	.96
32	114815	Resistor - W.W. 110 ohms \pm W.(10%)	.14
33	R-115039	Speaker - dynamic 5 inch	3.95
34	116013	Resistor - W.W. 50 ohms 1 watt	.18
35	110569	Resistor - carb. 10,000 ohms \pm W.	.12
36	116224	Condenser - mica 260 mmfd. 500 V.	.15
37	116232	R. F. Choke	.48

PART NUMBER	DESCRIPTION	LIST PRICE
112745	Clip - coil mounting (osc. & ant.)	.01
89912	Clip - grounding, for tube base	.02
113558	Clutch Spring - for tuner (on cam shaft)	.04
113504	Collar - Coupling (between tuner unit and gang condenser shaft)	.08
85321	Connector - for Internal Antenna	.01
113560	Dial Scale - celluloid strip	.22
113582	Dial Window - celluloid	.12
113557	Key - for push button tuner (left hand)	.24
113572	Key - for push button tuner (right hand)	.24
113500	Mechanical Tuner Unit - less tenite tips for push buttons	3.90



KNOBS & PUSH BUTTONS

WHEN ORDERING GIVE COLOR AS WELL AS PART NUMBER

COLOR	PUSH BUTTON	TUNING KNOB	VOLUME KNOB
IVORY	113529	113531	113574
LITE WALNUT	114710	114711	114712
METALLIC BLUE	116132	116133	116134
METALLIC GREEN	116137	116138	116139
METALLIC RED	116141	116142	116143

PUSH BUTTON & CONTROL KNOB PRICES

COLOR	PUSH BUTTON	TUNING KNOB	VOLUME KNOB
IVORY	.05	.30	.18
LITE WALNUT	.05	.28	.18
METALLIC COLORS	.09	.40	.22

PART NUMBER	DESCRIPTION	LIST PRICE
113499	Screw - #8 X 1" for chassis mounting	.01
113537	Screw - for tuning knob (antique bronze)	.18
113538	Screw - for tuning knob (chrome head)	.14
112865	Shield - base; for tubes	.03
86185	Shield Cap - for tubes (plain)	.06
112864	Shield - for tubes	.08
86181	Shield Tube - (short section)	.08
86427	Socket - octal base (standard)	.15
113543	Socket - dial lamp	.18
113559	Spring - for key return	.02
113550	Tab - station call letters	.28
116223	Terminal Strip - A - A1	.12

BUILT-IN ANTENNA SYSTEM

The Built-In Antenna incorporated in this receiver will generally give very satisfactory results in localities where powerful broadcast stations exist. This Built-In Antenna will function when terminals A and A₁ on the back of the chassis are connected together. In cases where noises are excessive or greater sensitivity is desired, remove the jumper connecting terminals A and A₁ and connect an external antenna to terminal A. In some locations, due to peculiar power line conditions, hum or noise may be excessive when the Built-In Antenna is used. In such cases reverse the power line plug. If this doesn't correct the condition, remove the connector between A and A₁ on the back of the chassis, and connect an external antenna to A.

1851W to 1859W
Alignment

STEWART WARNER CORP.

MODELS 1851 to 1859
1851A to 1859A
1851B to 1859B

The model R-185 chassis, is all tube, three band, automatic tuning, superheterodyne receiver. It has an intermediate frequency of 465 KC. and tuning range of 525 KC. to 16,100 KC. The circuit is of the latest design.

Incorporating such refinements as a special high efficiency R.F. unit, automatic frequency control, reactance dimmer, tuning indicator, and iron core I.F. transformers.

ALIGNMENT EQUIPMENT & PROCEDURE

① Before attempting to align the receiver check to see that the dial pointer is opposite the last scale division on the low frequency end of the dial when the gang condenser is in full mesh. Also when the gang condenser is in full mesh the stop pin on the left side of the tuner should be resting against the back stop. If after examination it is found that the gang is in full mesh and the stop pin is against the back stop, but the pointer is set to the wrong position, it will only be necessary to loosen the set screw on the dial drive gear at the left side of the mechanism, then grasp the large drum on the same side of the tuner and turn it until the pointer is set correctly. Now retighten the set screw on the gear being careful to see that the gear is meshing properly.

On the other hand if the stop pin does not rest against the back stop with the gang condenser in full mesh, loosen the set screw on the gang condenser side of the flexible coupler. Then turn the tuning knob until the stop pin rests against the back stop on the tuner. Now re-

tighten the set screw in the flexible coupler and proceed to set the pointer to its correct position by the method described in the previous paragraph.

② Connect the output meter across the two plates of the two 6V6 power output tubes or across the voice coil of the speaker, depending on the type of meter. The more sensitive type should be connected across the voice coil.

③ Connect the ground lead of the signal generator to the chassis and leave it there throughout the entire alignment procedure.

④ Turn the volume control to the maximum volume position.

⑤ Keep the Ground and Doublet connections on the antenna terminal strip connected together throughout the entire alignment procedure.

TYPE OF DUMMY ANT. IN SERIES WITH SIG. GEN.	POINT TO CONNECT OUTPUT OF SIGNAL GENERATOR.	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER (see diagram next page)	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
1 MFD CONDENSER	CONTROL GRID OF 6L7 TUBE	465 KC.	BROADCAST (Counter-clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	1ST I.F.	Adjust for maximum output. Then repeat adjustment.
					3-4	2ND I.F.	
					5	3RD I.F.	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	465 KC.*	BROADCAST (Counter-clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	6	WAVE TRAP	Adjust for minimum output using a strong generator signal.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (Counter-clockwise)	1500 KC.	7	BROADCAST OSCILLATOR (Shunt)	Adjust trimmer to bring in signal.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST (Counter-clockwise)	TUNE TO 1500 KC. GENERATOR SIGNAL	8	BROADCAST DETECTOR	Adjust for maximum output.
					9	BROADCAST ANTENNA	
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	600 KC.	BROADCAST (Counter-clockwise)	TUNE TO 600 KC. GENERATOR SIGNAL	10	BROADCAST OSCILLATOR (Series Pad)	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5 MC.	POLICE (Center)	5 MC.	12	POLICE OSCILLATOR (Shunt)	Adjust to bring in signal. Check to see if proper peak was obtained by tuning in image at approx. 4.1 MC. If image does not appear realign at 5 MC. with trimmer screw farther out. Recheck image.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5 MC.	POLICE (Center)	TUNE TO 5 MC. GENERATOR SIGNAL	13	POLICE DETECTOR	
					14	POLICE 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	ANTENNA TERMINAL	16 MC.	SHORT-WAVE (Clockwise)	16 MC.	15	SHORT-WAVE OSCILLATOR (Shunt)	Adjust to bring in signal. Check to see if proper peak was obtained by tuning in image at approx. 15.1 KC. If image does not appear realign at 16 KC. with trimmer screw farther out. Recheck image.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16 MC.	SHORT-WAVE (Clockwise)	16 MC.	16	SHORT-WAVE DETECTOR	
					17	SHORT-WAVE ANTENNA	Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.

A.F.C. ALIGNMENT.

IMPORTANT: The following adjustment must be made after every re-adjustment of the I.F. and broadcast band trimmers.

The A.F.C. Discriminator should be adjusted as follows:

- Be sure no buttons are depressed. Loosely couple the output of the signal generator to the 6L7 control grid by clipping the signal generator output lead to the insulation on the control grid wire, or connect to the grid clip through a 50 mfd. mica condenser. BE SURE THE RANGE SWITCH IS IN THE BROADCAST (COUNTER-CLOCKWISE) POSITION.
- Adjust the signal generator to resonance with I.F. system by tuning the signal generator dial for maximum output meter deflection. Be sure that the receiver dial is at stop point where it has no tuning effect on the generator signal. Switch off the modulation.
- With the signal generator connected and operating as in #2, connect antenna and manually tune in powerful local station in region of 1000 KC. or lower. (Avoid stations around 930 KC. which might beat with second harmonic of test oscillator.)
- Adjust receiver tuning dial to obtain zero beat between the test oscillator and the incoming signal. (A very slight adjustment is all that is required. Be careful not to tune off signal.)
- Refer to the figure on the right. It is now necessary to open the A.F.C. contacts & allow it to function. This may be done by placing a piece of smooth cardboard between the A.F.C. contacts as shown in the figure. Be careful not to bend or deform the switch in any way.
- Now, adjust the secondary of the discriminator transformer (Trimmer #11) to restore zero beat. NOTE: This trimmer should be adjusted to the point where the frequency of the beat note increases rapidly if the trimmer is turned in either direction. Other zero beat points may be found with the trimmer all the way in or all the way out, but these settings are incorrect.

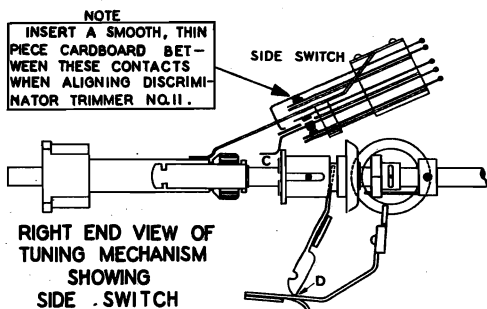
THE AFC MUST NOW BE ALIGNED.

If this operation has been performed correctly, the opening or closing of the A.F.C. contacts on the side switch by inserting or removing the cardboard, should not change the beat note by more than a slight rumble.

NOTE: Where a second signal generator is available step #3 above may be varied as follows:

Connect second signal generator (set at about 1000 KC.) to antenna and tune in its signal. Switch off modulation and proceed as before.

This method is somewhat preferable to the first as the zero beat setting is more easily determined when both signals are unmodulated.



RIGHT END VIEW OF TUNING MECHANISM SHOWING SIDE SWITCH

MODELS 1851 to 1859
1851A to 1859A

STEWART-WARNER CORP.

1851B to 1859B
1851W to 1859W

Trimmers, Phono. Data
"Magic Keyboard" Data
Parts List

DIAL DRIVE & MISCELLANEOUS PARTS.

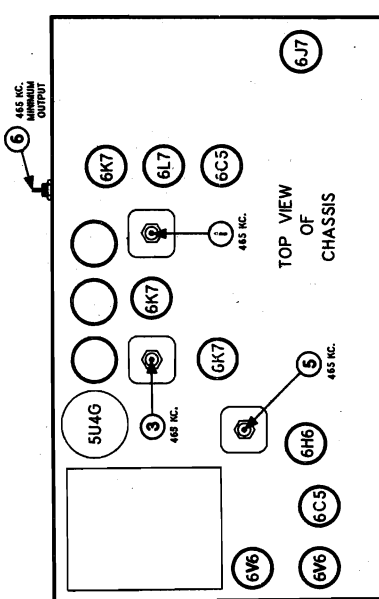
FOR A COMPLETE PARTS LIST SEE THE SPECIAL "MAGIC KEYBOARD" WHEREVER THE WORD RIGHT OR LEFT APPEARS IN THE FOLLOWING LIST, IT IS UNDERSTOOD THAT YOU ARE STANDING IN FRONT OF THE RECEIVER.

PART NUMBER	DESCRIPTION	PRICE
111930	Band Indicator - and frame assembly	.40
111931	Ball - for range switch drive	.06
111932	Ball - chassis mfg. (#14 X 1-1/4)	.03
111933	Pusher - rubber (for chassis mfg.)	.08
111934	Pusher - rubber, mastic mechanism mfg. to chassis	.02
111935	Clip - for pulley retaining	.01
111936	Core - for band ind. (2 ft. required) - Per Ft.	.04
111937	Core - dial drive (6 ft. lengths)	.04
111938	Friction - for dial (with glass)	5.00
111939	Friction - for dial (with glass)	5.00
111940	Friction - for dial (with glass)	5.00
111941	Friction - for dial (with glass)	5.00
111942	Friction - for dial (with glass)	5.00
111943	Friction - for dial (with glass)	5.00
111944	Friction - for dial (with glass)	5.00
111945	Friction - for dial (with glass)	5.00
111946	Friction - for dial (with glass)	5.00
111947	Friction - for dial (with glass)	5.00
111948	Friction - for dial (with glass)	5.00
111949	Friction - for dial (with glass)	5.00
111950	Friction - for dial (with glass)	5.00
111951	Friction - for dial (with glass)	5.00
111952	Friction - for dial (with glass)	5.00
111953	Friction - for dial (with glass)	5.00
111954	Friction - for dial (with glass)	5.00
111955	Friction - for dial (with glass)	5.00
111956	Friction - for dial (with glass)	5.00
111957	Friction - for dial (with glass)	5.00
111958	Friction - for dial (with glass)	5.00
111959	Friction - for dial (with glass)	5.00
111960	Friction - for dial (with glass)	5.00
111961	Friction - for dial (with glass)	5.00
111962	Friction - for dial (with glass)	5.00
111963	Friction - for dial (with glass)	5.00
111964	Friction - for dial (with glass)	5.00
111965	Friction - for dial (with glass)	5.00
111966	Friction - for dial (with glass)	5.00
111967	Friction - for dial (with glass)	5.00
111968	Friction - for dial (with glass)	5.00
111969	Friction - for dial (with glass)	5.00
111970	Friction - for dial (with glass)	5.00
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111979	Friction - for dial (with glass)	5.00
111980	Friction - for dial (with glass)	5.00
111981	Friction - for dial (with glass)	5.00
111982	Friction - for dial (with glass)	5.00
111983	Friction - for dial (with glass)	5.00
111984	Friction - for dial (with glass)	5.00
111985	Friction - for dial (with glass)	5.00
111986	Friction - for dial (with glass)	5.00
111987	Friction - for dial (with glass)	5.00
111988	Friction - for dial (with glass)	5.00
111989	Friction - for dial (with glass)	5.00
111990	Friction - for dial (with glass)	5.00
111991	Friction - for dial (with glass)	5.00
111992	Friction - for dial (with glass)	5.00
111993	Friction - for dial (with glass)	5.00
111994	Friction - for dial (with glass)	5.00
111995	Friction - for dial (with glass)	5.00
111996	Friction - for dial (with glass)	5.00
111997	Friction - for dial (with glass)	5.00
111998	Friction - for dial (with glass)	5.00
111999	Friction - for dial (with glass)	5.00

TESTING THE A.F.C. SYSTEM.

A.F.C. system is not as marked at stations near the low frequency end of the dial scale as it is at the higher broadcast frequencies. This is characteristic of A.F.C. systems. However, if opening the A.F.C. contacts on the side switch (by inserting the piece of cardboard between the contacts) has no effect on the beat note, or if the beat note is changing in one direction only, check the receiver as follows:

- Re-align I.F., broadcast band, and discriminator trimmers.
- Check all the tubes in the receiver. Defective 6V6 and 6J7 tubes may cause poor A.F.C. action.
- If the above procedure fails to remedy the defect in A.F.C. action, check the entire A.F.C. circuit itself for possible troubles.



HOW TO SET-UP THE "MAGIC KEYBOARD"

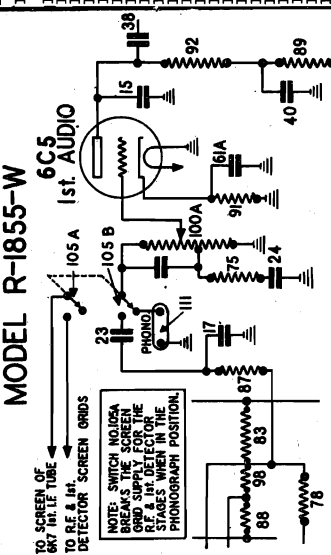
SELECTING THE PROPER STATIONS: When setting up the "Magic Keyboard" select powerful nearby stations. Avoid weak or fading stations.

LABELLING THE PUSH BUTTONS: Call letter labels are supplied with each set. To label any button, remove the cap of the push button, BY PULLING ON THE TOP END. Remove the black cardboard disc, and insert the call letter tab. IN REPLACING THE CAP SPREAD AT THE BOTTOM AND PRESS ON THE TOP.

STEP BY STEP PROCEDURE:

- Connect a good outside aerial to the receiver and allow the receiver to operate for 20 minutes before setting-up.
- Pull off the large tuning knob. As this knob is removed another small "set-up" knob on the same shaft will appear partly hidden behind the panel face.
- Pull out this set-up knob AS FAR AS IT WILL GO.
- Rotate the set-up knob clockwise. After dial pointer reaches the end of the dial scale continue to turn the knob clockwise until you have forced it to a definite stop. This last twist unlocks the cams.
- Push any button you wish to set to a station. The tuner will operate and carry the pointer to some new point on the dial scale.
- Turn the set-up knob counter-clockwise until the dial pointer reaches the MINIMUM ILLUMINATION SO THAT THE RECEIVER WILL BE CORRECTLY TUNED TO THE STATION.
- Push in the next button you want to set up for a station. This causes its button to pop out. Do not push in any buttons that are already set up and which you do not wish to change, since pushing a button with the cams unlocked will shift its setting.
- Tune in the station for the button that is now depressed.
- Set-up other buttons as desired in the same manner, that is, push in the button, tune in the station, then push in the next button.

PHONOGRAPH CONNECTIONS FOR MODEL R-1855-W

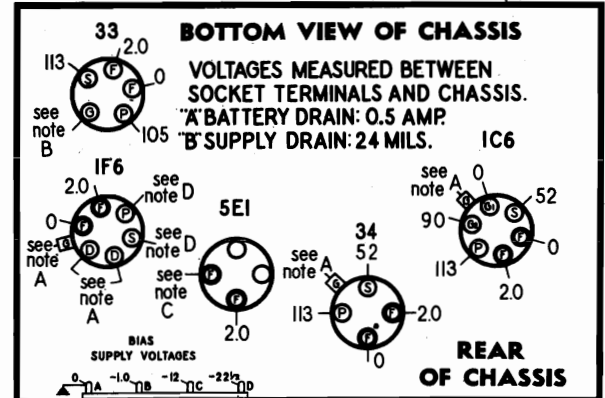


"MAGIC KEYBOARD" PARTS LIST

FOR A COMPLETE PARTS LIST SEE THE SPECIAL "MAGIC KEYBOARD"

PART NUMBER	DESCRIPTION	PRICE
112727	Mystic Mechanism - complete with all dials - ready to mount on chassis	\$60.00
112500	Mystic Mechanism only, less dial frame assembly	35.00
112498	Button Body - for tuner action	.10
111876	Button Window - for push button	.01
112547	Button Reinforcing Disc - for push button	.01
111577	Button Retaining Spring - inside push button	.005
111578	Button Washer - in push button	.005
111579	Button Washer - in push button	.005
111146	Clutch - bushing, spring and gear	.45
111137	Drive Ring - rubber	.06
111390	Motor - 6 volt, 25 to 80 cycles	4.40
112354	Spring - with 25 to 80 cycles	5.90
111398	Spring - with 25 to 80 cycles	.02
111574	Switch Side - (multiple contact) (above tuning shaft)	.95
112564	Switch Back - (multiple contact)	1.25
112561	Wrench - for key stop and kickout arm	.06
112483	Tip - adjustable for key stop and kickout arm	.07
112482	Wrench - for fluted hd. set screws #8	.07
117468	Spring Banders - for fluted hd. set screws #8	.75

MODELS 1901 to 1909
Chassis R-190D



NOTE A: Use a high resistance voltmeter of 1,000 ohms per volt.
NOTE B: The bias for the control grids of the 106, 34, 1F8 and the diode plates of the 1F8 is -1.0 volt measured across section AB of resistor number 32.
NOTE C: The bias for the control grid of the 35 output tube is -12 volts measured across section AB of resistor number 32.
NOTE D: This voltage will vary between 2 and 3 volts depending upon the terminal voltage of the A battery.
NOTE E: Due to the high resistance in these circuits (1/2 megohm in the plate circuit and 2 megohms in the screen) only a slight deflection of the voltmeter will be obtained unless a vacuum tube voltmeter is used.

NEW BATTERIES DIAL TUNED TO 540 KC.

SOCKET VOLTAGES

5E1
REG.

OCTOBER 1937

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	112207	Coil - antenna, broadcast & S.W.	\$.95
2	112208	Coil - oscillator, broadcast	.95
3	112209	Coil - oscillator, S.W.	.95
4	83429	Condenser - paper .5 mfd.	.300 volt-
5-6-7	83437	Condenser - paper .05 mfd.	200 volt-
8-9	83474	Condenser - paper .1 mfd.	200 volt-
10	88030	Condenser - paper .01 mfd.	200 volt-
11	81155	Condenser - mica 500 mfd.	.25
12	81157	Condenser - mica 250 mfd.	.25
13	88173	Condenser - mica 50 mfd.	.20
14	89962	Condenser - paper .2 mfd.	200 volt-
15	112048	Condenser - padding (300-600 mfd.)	.63
16A-16B	112211	Condenser - variable	4-00
17-18-19	112213	Condenser - trimmer (3-45 mfd.)	.25
20	112214	Condenser - paper .003 mfd.	400 volt-
21	112215	Condenser - mica .0045 mfd.	.50
22	112221	Cone - voice coil assm. for 6" spkr.	1.90
	112222	Cone - voice coil assm. for 8" spkr.	2.05
23	66022	Resistor - carbon 50,000 ohms 1 watt.	.18

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

R-190-D CHASSIS

The Model R-190-D chassis is a five tube battery receiver using "A" and "B" batteries. The standard superheterodyne circuit which this receiver employs includes automatic volume control and a class A single pentode output system. The tuning range covers the standard broadcast range from 540 to 1720 KC. and the popular short wave bands from 5.7 to 18.3 MC. Automatic volume control is accomplished by supplying the filtered A.C. voltage to the control grids of both the 10B and 34 tubes.

An unusual arrangement of a combined on-off switch and range switch is also utilized in the circuit of this receiver. The action of this switch is as follows: 1. In the extreme counter-clockwise position the receiver is turned off with both the "A" and "B" supply circuits open. 2. With the switch in the middle position the "A" and "B" supplies are connected and the antenna and oscillator coils for the broadcast band are now in circuit to permit tuning on that band. 3. In the extreme clockwise position, the receiver will tune in the short wave band.

MODELS 1901 to 1909
Chassis R-190D
Alignment, Trimmers
Battery Connections

STEWART-WARNER CORP.

POWER SUPPLY & BATTERY CONNECTIONS

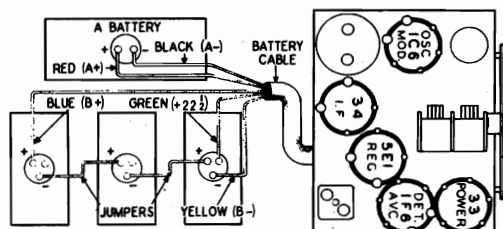
The power supply of this receiver consists of three "B" batteries and one "A" battery. No "C" battery is needed as the first 22-1/2 volts of the "B" battery supply serves as a "C" battery. Proper intermediate bias voltages are secured from the tapped candohm resistor number 32.

The +22-1/2 volt tap on the "B" battery is the negative connection for the plate supply and it is connected to "A" and ground. This allows a maximum plate supply voltage of 113-1/2 volts with fresh batteries.

The "A" supply may be a 2-1/2 volt Air Cell, a 3 volt dry battery, or a 2 volt storage battery since the filaments of all tubes in the receiver are supplied through a type 5E1 voltage regulator tube. The purpose of this tube is to maintain a safe filament voltage with battery voltages ranging from 2 to 3 volts. The voltage drop across the tube will decrease as the battery voltage decreases thus maintaining nearly a constant filament potential.

If a 2 volt storage cell is to be used and the tubes in the receiver are not new it is desirable to remove the 5E1 voltage regulator tube and replace it by a plug which merely shorts out the two large terminals of the 5E1 tube socket. This plug may be made up by removing the base of an old 4 prong tube and connecting the two large pins together with a piece of wire. **BE CAREFUL NOT TO CONNECT ANYTHING TO EITHER OF THE SMALL PINS OR THE OTHER TUBES MAY BE BURNED OUT.**

In order to simplify connections to the batteries, plugs are provided and the method of connection to the batteries is shown in the diagram on the right.

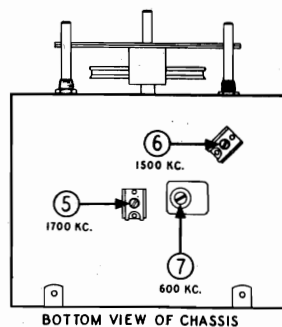
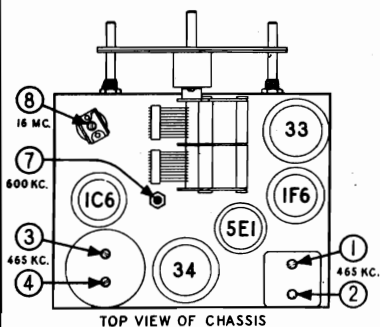
**ALIGNMENT EQUIPMENT & PROCEDURE**

For proper alignment, an output meter and an accurately calibrated signal generator with a tuning range from 485 KC. to 16 MC. are required.

- ① Connect the output meter across the voice coil or between the plate of the 33 tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
- ② Connect the ground lead of the signal generator to the chassis of the receiver.
- ③ Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
- ④ With the gang condenser in full mesh set the pointer on the horizontal black line below 540 KC. on the dial.
- ⑤ Using a bakelite screw driver proceed to align in exactly the same order as shown in the table below.

ORDER OF ALIGN.	DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
A	.1 MFD. CONDENSER	CONTROL GRID OF 34 TUBE (Do not remove grid clip)	485 KC.	BROADCAST (Center Position)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1 2	2ND. I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
B	DITTO	CONTROL GRID OF 1C6 TUBE (Do not remove grid clip)	DITTO	DITTO	DITTO	3 4	1ST. I.F.	ADJUST TRIMMERS 3 & 4 FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT OF TRIMMERS NO. 1 & 2. <u>SEE NOTE A BELOW.</u>
C	400 OHM CARBON RESISTOR	ANTENNA LEAD	1700 KC.	DITTO	1700 KC.	5	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
D	DITTO	DITTO	1500 KC.	DITTO	TUNE TO 1500 KC. GENERATOR SIGNAL	6	BROADCAST ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
E	DITTO	DITTO	600 KC.	DITTO	TUNE TO 600 KC. GENERATOR SIGNAL	7	BROADCAST OSCILLATOR (Series Pad)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
F	DITTO	DITTO	16 MC.	SHORT-WAVE (Clockwise)	TUNE TO 16 MC. GENERATOR SIGNAL	8	SHORT-WAVE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.

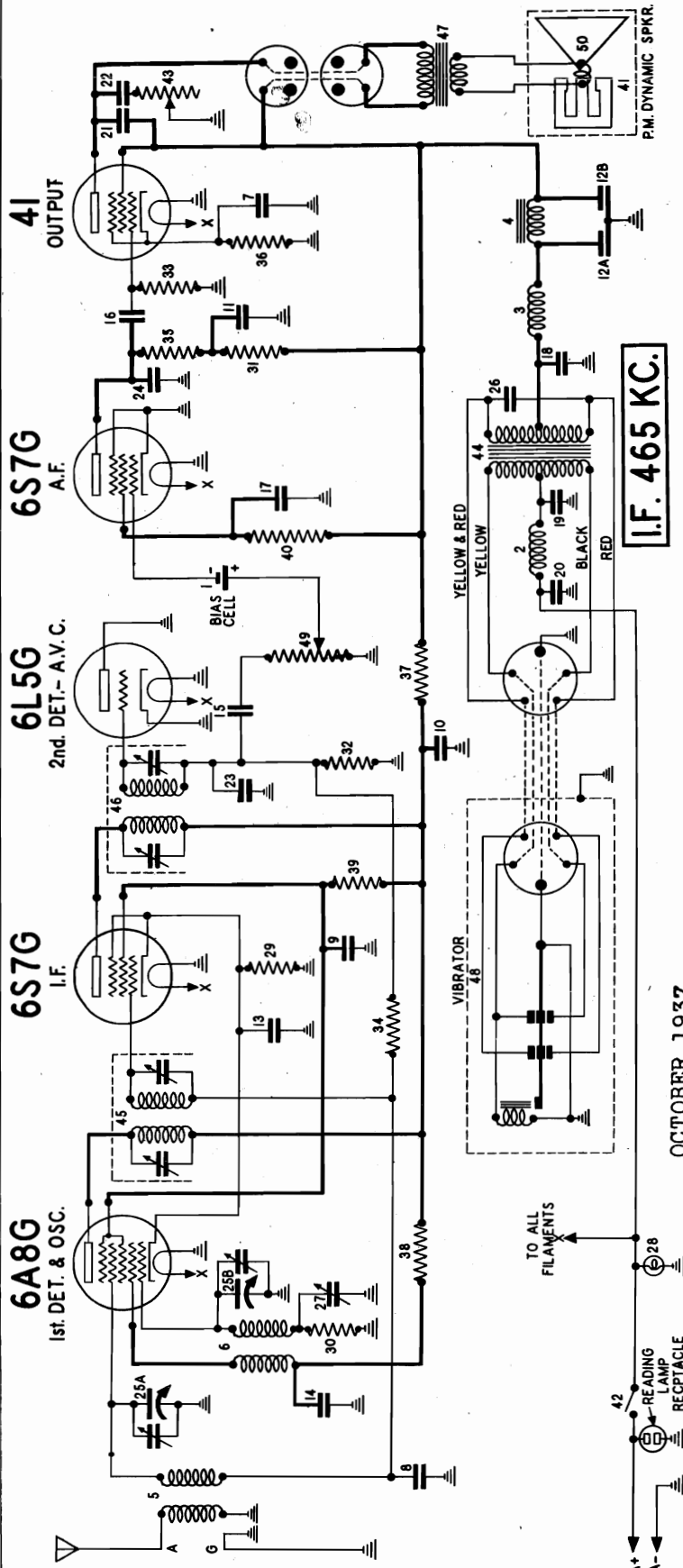
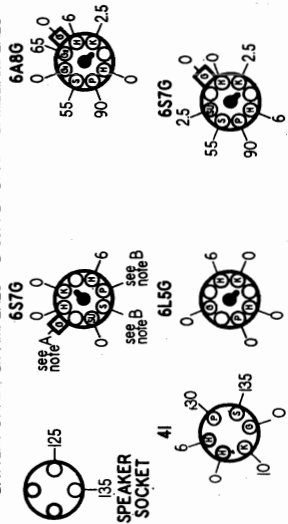
NOTE A: Now repeat adjustment of trimmers 3 and 4 again for greater sensitivity. This may cause oscillation. If oscillation occurs repeat steps A and B and disregard the adjustment mentioned in this note, i.e., after adjusting 1 and 2, do not repeat adjustment of 3 and 4. Important: Please note that in repeating step A, the signal generator must be connected to the 34 control grid. In step B, the connection is to the 1C6 grid.

**DIAL DRIVE & MISCELLANEOUS PARTS**

PART NUMBER	DESCRIPTION	LIST PRICE
112206	Cable - battery (with plugs)	\$.90
112224	Dial - complete assembly	2.70
112087	Escutcheon - with window	1.75
112226	Knob - tuning	.25
112227	Knob - volume and range switch	.25
112228	Plug - "B" battery (3 prong)	.15
112229	Plug - "A" battery (2 prong)	.12
112230	Pointer - dial	.35
112225	Scale - dial	1.00

Schematic, Voltage
Socket

STEWART-WARNER CORP.

MODELS 1911 to 1919
Chassis R-191DBATTERY VOLTAGE 60
SOCKET VOLTAGESBOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS
BATTERY DRAIN-27 AMPERES 'B' SUPPLY DRAIN-21 MILLIAMPERES

REAR OF CHASSIS

IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The bias for the control grid of the 6S7-G A.F. tube is 1.0 volt supplied by the bias cell. Due to the high resistance of the cell, the voltmeter will only indicate a fraction of a volt.

NOTE B: Because of the high resistance in the plate and screen circuits of the 6S7-G A.F. tube only a slight deflection of the voltmeter will be obtained unless a vacuum tube voltmeter is used.

R-191-D CHASSIS

MODELS 1911 to 1919

OCTOBER 1937

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE	DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	89849	Coil - bias (1.25 volt)	.22	28	84058	Lamp - pilot 6.3 volt .2 amp.	.15
2	112041	Choke - R.F. ("B" supply)	.60	29	67081	Resistor - carbon 50,000 ohm 1/4 watt	.25
3	112042	Choke - R.F. ("B" supply)	.50	30	89859	Resistor - carbon 100,000 ohm 1/4 watt	.15
4	112043	Choke - R.F. ("B" supply)	1.40	31	67280	Resistor - carbon 100,000 ohm 1/4 watt	.15
5	112044	Coil - antenna	1.00	32	67282	Resistor - carbon 100,000 ohm 1/4 watt	.15
6	112045	Coil - oscillator	1.00	33	67283	Resistor - carbon 100,000 ohm 1/4 watt	.15
7	89053	Condenser - electrolytic 10 mfd.25 volt	.92	34	67339	Resistor - carbon 1 megohm 1/2 watt	.25
8-9	83974	Condenser - paper .1 mfd. 200 volt	.25	35	67851	Resistor - carbon 400,000 ohm 1/4 watt	.15
10-11	110804	Condenser - paper .1 mfd. 200 volt	1.60	36	112049	Resistor - carbon 750 ohm 1/3 watt	.15
12A-12B	89862	Condenser - paper .05 mfd. 200 volt	.23	37	112050	Resistor - carbon 6,000 ohm 1/3 watt	.15
13	89862	Condenser - paper .05 mfd. 200 volt	.23	38	112051	Resistor - carbon 16,000 ohm 1/3 watt	.15
14-15-16	83437	Condenser - paper .05 mfd. 200 volt	.30	39	112052	Resistor - carbon 4 megohm 1/2 watt	.15
17	88030	Condenser - paper .01 mfd. 400 volt	.25	40	112053	Speaker - P.M. dynamic (6 inch)R-191-D	8.50
18	84200	Condenser - mica .004 mfd.	.50	41	112054	Switch - on-off (S.P.S.T.)	9.50
19-20	83429	Condenser - paper .002 mfd. 300 volt	.55	42	112055	Transformer - power	1.05
21	84650	Condenser - paper .002 mfd. 300 volt	.55	43	112056	Transformer - power	1.05
22	84650	Condenser - paper .002 mfd. 300 volt	.55	44	112057	Transformer - power	1.05
23	81157	Condenser - mica 100 mfd.	.25	45	112058	Transformer - power	1.05
24	81157	Condenser - mica 100 mfd.	.25	46	112059	Transformer - power	1.05
25A-25B	81157	Condenser - mica 100 mfd.	.25	47	112060	Transformer - output for 6 inch spkr.	1.70
26	112047	Condenser - variable ganged	4.30	48	112061	Transformer - output for 8 inch spkr.	2.00
27	112048	Condenser - padding (300-600 mfd.)	.60	49	112062	Vibrator - synchronous	1.90
				50	112063	Volume control - 1/2 megohm	1.90
					112064	Cone - voice coil assm. for 6" spkr.	2.05
					112065	Cone - voice coil assm. for 8" spkr.	2.05

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

MODELS 1911 to 1919
Chassis R-191D

STEWART-WARNER CORP.

Alignment, Trimmers
Circuit Data

CIRCUIT DESCRIPTION

The model R-191-D chassis is a six volt battery powered superheterodyne receiver. It has an intermediate frequency of 465 KC. and the tuning range is from 540 to 1720 KC.

The incoming signal picked up by the antenna is induced in the tuned secondary of the antenna coil and impressed on the control grid of the 6A8 first detector and oscillator tube. The oscillator circuit is tuned to a frequency 465 KC. higher than that of the incoming signal, and the resultant 465 KC. output is amplified in the I.F. stage, using a 6S7G tube. The amplified I.F. voltage is impressed on the grid of the 6L5G second detector tube. The plate of the 6L5G tube is grounded and the grid acts as the plate of a linear diode detector and A.V.C. source. The direct current voltage developed across the 1/2 megohm diode load resistor is used as A.V.C. voltage and applied to the control grids of the 6A8G and 6S7G (I.F.) tubes through a resistance capacity filter system. Self bias is obtained across the cathode resistor 25 to maintain bias at all times.

The potentiometer type volume control 49 serves as a continuously variable voltage divider of the audio voltage developed. Any portion of the audio voltage can be applied to the control grid of the 6S7G A.F. tube. It should be noted that the bias for the 6S7G A.F. tube is obtained from a bias cell. The 6S7G A.F. tube is resistance coupled to the 4I power output tube. Grid bias for the output tube is obtained across the cathode resistor 36.

The continuously variable resistor type tone control regulates the high note content of the audio output.

All tube heaters are connected directly to the six volt supply circuit. "B" voltage is supplied by a synchronous full wave vibrator (48). The complete "B" supply, consisting of vibrator, power transformer, chokes and condensers, is housed in a metal shield to eliminate interference. R.F. filter chokes in the power supply input and output circuit prevent interference from getting into the "A" and "B" leads.

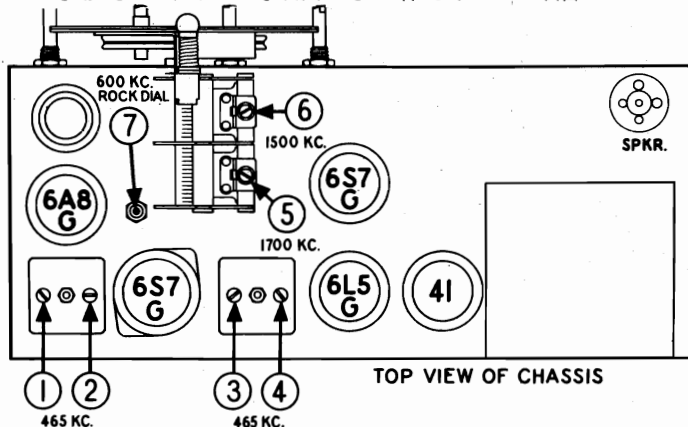
ALIGNMENT EQUIPMENT & PROCEDURE

For proper alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 1800 KC. are required.

- 1—Connect the output meter between the plate of the 4I tube and ground, or across the voice coil, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
- 2—Connect the ground lead of the signal generator to the chassis of the receiver.
- 3—Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure. Turn tone control to brilliant position.
- 4—With the gang condenser in full mesh set the pointer on the black horizontal line below 550 KC. on the dial.
- 5—Proceed to align in exactly the same order as shown in the table below.

ORDER OF ALIGN.	DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
A	.1 MFD. CONDENSER	CONTROL GRID OF 6A8G TUBE	465 KC.	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1 2	1ST I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
B	.1 MFD. CONDENSER	CONTROL GRID OF 6A8G TUBE	465 KC.	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	3 4	2ND I.F.	ADJUST TRIMMERS 3 & 4 FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT OF TRIMMERS NO. 1 & 2.
C	250 MTF. CONDENSER	ANTENNA LEAD	1700 KC.	1700 KC.	5	OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
D	250 MTF. CONDENSER	ANTENNA LEAD	1500 KC.	TUNE TO 1500 KC. GENERATOR SIGNAL	6	ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
E	250 MTF. CONDENSER	ANTENNA LEAD	600 KC.	TUNE TO 600 KC. GENERATOR SIGNAL	7	OSCILLATOR (Series Pad)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.

DIAL DRIVE & MISCELLANEOUS PARTS



PART NUMBER	DESCRIPTION	LIST PRICE
112064	Cable - battery	\$1.40
112065	Dial - complete assembly	2.50
112067	Escutcheon - with window	1.75
112068	Knob - all controls	.25
110782	Cord - for dial drive (2 ft.)	.10
112066	Scale - dial (riveted to support)	.80
111357	Spring - drive cord tension	.03
112069	Shield - for vibrator and "B" supply	1.50

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

MODELS 1921 to 1929

Chassis R-192D

Alignment, Trimmers

STEWART-WARNER CORP.

MODEL R-192-D CHASSIS (RECEIVER MODELS 1921 to 1929)

The model R-192-D is a six volt battery powered superheterodyne receiver. The circuit employed includes automatic volume control and a push pull class B output system.

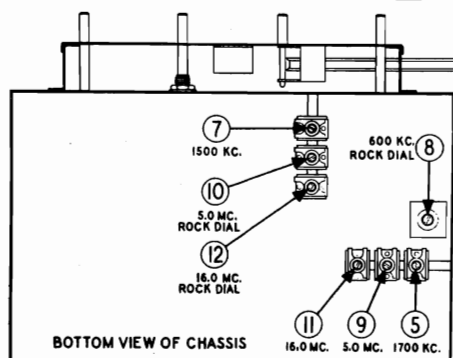
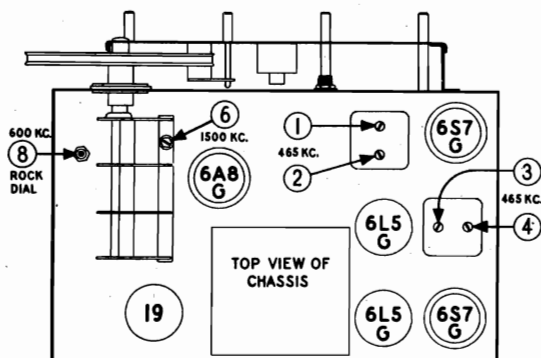
The 6L5G second detector is connected as a diode, the plate being grounded and the control grid acting as a diode plate. "B" voltage is supplied by a synchronous full-wave vibrator.

ALIGNMENT EQUIPMENT & PROCEDURE

For proper alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 18 MC. are required.

- ① Connect the output meter across the plates of the 19 tube, or across the voice coil, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
- ② Connect the ground lead of the signal generator to the chassis of the receiver and keep it connected in this manner throughout the entire alignment procedure.
- ③ Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure. Turn tone control to brilliant position.
- ④ With the gang condenser in full mesh set the pointer on the black horizontal line below 550 KC. on the dial.
- ⑤ Proceed to align in exactly the same order as shown in the table below.

ORDER OF ALIGN.	DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
A	.1 MFD. CONDENSER	CONTROL GRID OF 6A8G TUBE	465 KC.	BROADCAST Clockwise	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1	1ST I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
B	.1 MFD. CONDENSER	CONTROL GRID OF 6A8G TUBE	465 KC.	BROADCAST Clockwise	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	2	2ND. I.F.	ADJUST TRIMMERS 3 & 4 FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT OF TRIMMERS NO. 1 & 2.
C	400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1700 KC.	BROADCAST Clockwise	1700 KC.	3	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
D	400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST Clockwise	TUNE TO 1500 KC. GEN.SIG.	4	BROADCAST ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
E	400 OHM CARBON RESISTOR	ANTENNA TERMINAL	1500 KC.	BROADCAST Clockwise	TUNE TO 1500 KC. GEN.SIG.	5	BROADCAST 1ST DET.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT OF TRIMMER 6.
F	400 OHM CARBON RESISTOR	ANTENNA TERMINAL	600 KC.	BROADCAST Clockwise	TUNE TO 600 KC. GENERATOR SIGNAL	6	BROADCAST OSCILLATOR Series Pad	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
G	400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5.0 MC.	POLICE (Center)	5.0 MC.	7	POLICE OSCILLATOR	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 4.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 5.0 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
H	400 OHM CARBON RESISTOR	ANTENNA TERMINAL	5.0 MC.	POLICE (Center)	TUNE TO 5.0 MC. GENERATOR SIGNAL	8	POLICE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
I	400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16.0 MC.	SHORT-WAVE Counter-clockwise	16.0 MC.	9	SHORT-WAVE OSCILLATOR	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 15.1 KC. IF IMAGE DOES NOT APPEAR REALIGN AT 16 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
J	400 OHM CARBON RESISTOR	ANTENNA TERMINAL	16.0 MC.	SHORT-WAVE Counter-clockwise	TUNE TO 16 MC. GENERATOR SIGNAL	10	SHORT-WAVE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.



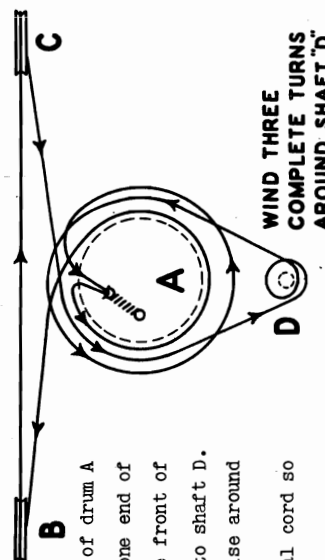
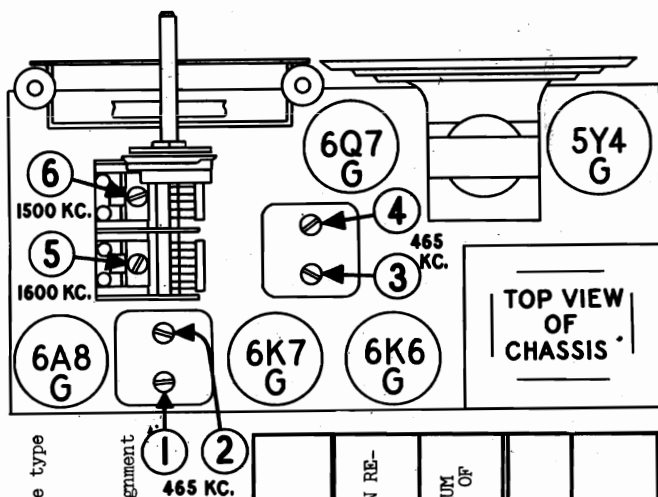
DIAL DRIVE & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE	PART NUMBER	DESCRIPTION	LIST PRICE
112651	Arm - for band indicator drive	.25	112258	Scale - dial	\$1.50
112064	Cable - battery	1.40	112654	Shaft - for pointer	.10
110782	Cord - for band indicator (2 ft.)	.10	112655	Shaft - dial drive	.10
112257	Dial - complete mechanism	7.50	112669	Shield - for vibrator & "B" supply	1.50
112259	Escutcheon - with celluloid	2.80	89283	Socket - dial lamp	.10
112226	Knob - all controls	.25	111357	Spring - drive cord tension	.03
112652	Link - for band indicator	.06	112256	Terminal strip - O.D.A.	.35
89170	Plug - for extension lamp	.15	112657	Pulley - for pointer drive (on pointer shaft)	.20
112280	Pointer - for dial	.30	112656	Drum - & flexible coupler	1.20
112653	Retaining ring - for drive shaft	.05			

MODELS 3041 to 3049
Chassis R-304, R-304A

STEWART-WARNER CORP.

Alignment, Trimmers
Drive Cord Data, Notes



ALIGNMENT EQUIPMENT & PROCEDURE

For proper alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 1600 KC. are required.

1. Connect the output meter between the plate of the 6K6 tube and ground, or across the voice coil, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the chassis of the receiver.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh set the pointer to the 540 KC. division on the dial.
5. Proceed to align in exactly the same order as shown in the table below.

ORDER OF ALIGN.	DUMMY ANT. IN SERIES WITH SIG.-GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
A	.1 MFD. CONDENSER	CONTROL GRID OF 6A8 TUBE	465 KC.	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1 2	1ST I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
B	.1 MFD. CONDENSER	CONTROL GRID OF 6A8 TUBE	465 KC.	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	3 4	2ND I.F.	ADJUST TRIMMERS 3 & 4 FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT OF TRIMMERS NO. 1 & 2.
C	400 OHM CARBON RESISTOR	ANTENNA LEAD	1600 KC.	1600 KC.	5	OSCILLATOR	ADJUST TO BRING IN SIGNAL. SEE NOTE BELOW TABLE.
D	400 OHM CARBON RESISTOR	ANTENNA LEAD	1500 KC.	TUNE TO 1500 KC. CARBON GENERATOR SIGNAL	6	ANTENNA	ADJUST FOR MAXIMUM OUTPUT.

NOTE: The oscillator section of the gang is provided with two trimmers connected in parallel, one on the top (No. 5) and one on the bottom. Normally the bottom trimmer will require no adjustment, but if trimmer No. 5 has to be turned too far out or too far in the bottom trimmer should be adjusted until trimmer No. 5 peaks about half way in.

DIAL CORD INSTALLATION: The dial cord to be used should be approximately 27 inches long.

Open the gang condenser all the way (plates all out) and unclip the tension spring from drum A.

1. Thread both ends of the dial cord through the opening at the top of drum A and tie them to one end of the tension spring.
2. Wind one complete turn counter-clockwise around drum A. (Use only one end of the cord).
3. Run the cord around pulley C, over drum A (in back of windings) down to the front of pulley C.
4. Run the cord around pulley B from back to front, then across to the front of drum A.
5. Wind three complete turns around shaft D.
6. Run the cord up to drum A and wind one complete turn counter-clockwise around the drum.
7. Fasten the tension spring to the clip inside the drum.
8. With the gang condenser fully closed clip the pointer to the dial cord so that it comes opposite the 540 KC. marking on the dial.

MODELS
3041 to 3049
CHASSIS
R-304,
R-304-A

ELIMINATION OF OSCILLATION: Some of the model R-304 receivers may oscillate or "growl" especially when tuned to weak stations or between stations. This oscillation can always be eliminated by connecting a ground to the receiver. However, if the set is to be used without a ground, it can be kept from oscillating by connecting a buffer condenser from one side of the power line to the chassis within the receiver. The condenser should have a capacity of .01 mfd. and a voltage rating of 1000 volts.

Later production receivers are built with such a line buffer condenser to prevent oscillation. Sets using the condenser can be identified by the letter "G" on the back of the chassis also on the packing carton near the serial number.

08-521 to 08-529
Chassis 08-52
010-521 to 010-529
Chassis 010-52
Schematic, Voltage, Socket
Coils, Tuner Switch

STEWART-WARNER CORP.

MODELS 01-521 to 01-529
Chassis 01-52

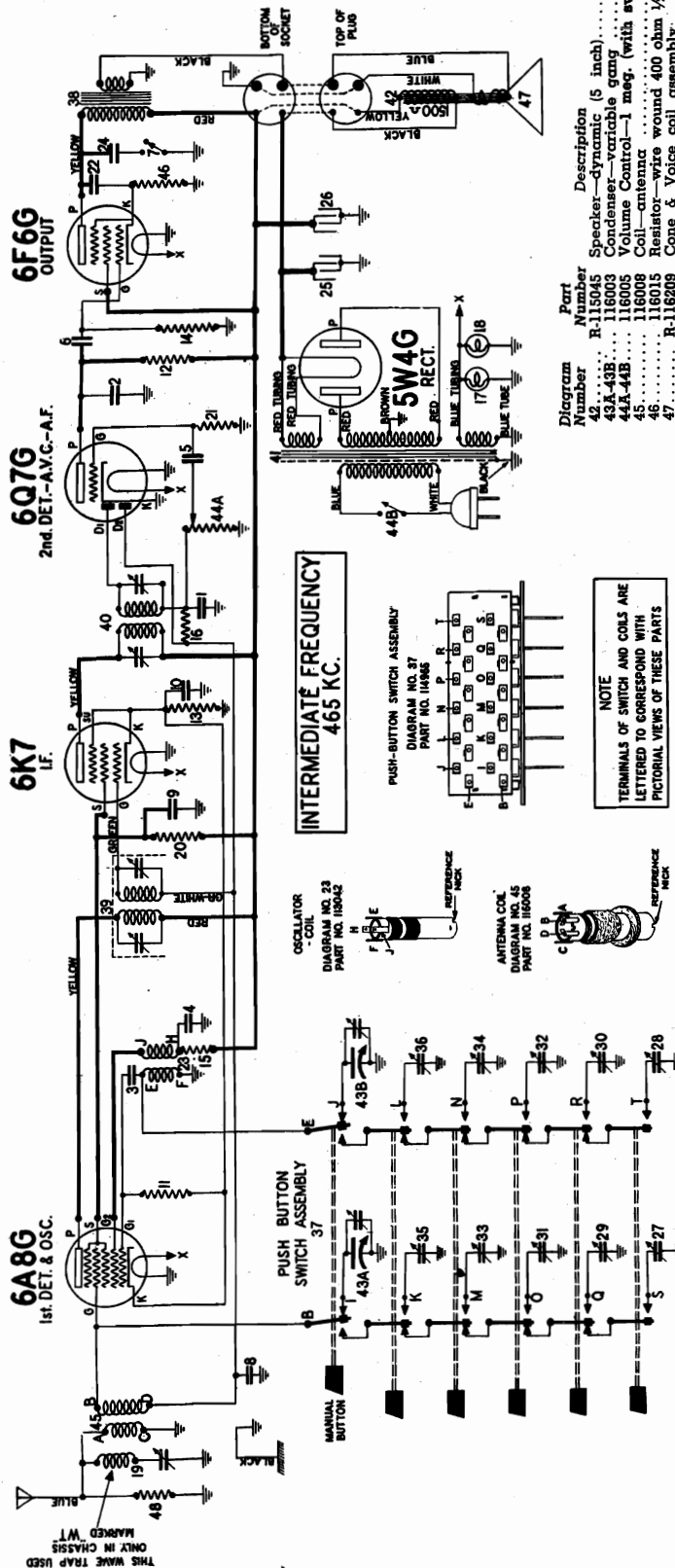


Diagram Number	Part Number	Description	List Price
43A-43B	R-115043	Speaker—dynamic (5 inch)	4.96
44A-44B	115005	Condenser—variable gang	2.90
45	115008	Volume Control—1 meg. (with switch)	.96
46	115008	Coil—antenna	.70
47	115015	Resistor—wound 400 ohm 1/2 W.	.12
48	R-115020	Conc. & Voice coil assembly (For R-115045 chassis)	1.40
	110569	Resistor—carb. 10,000 ohms 1/4 watt	.12

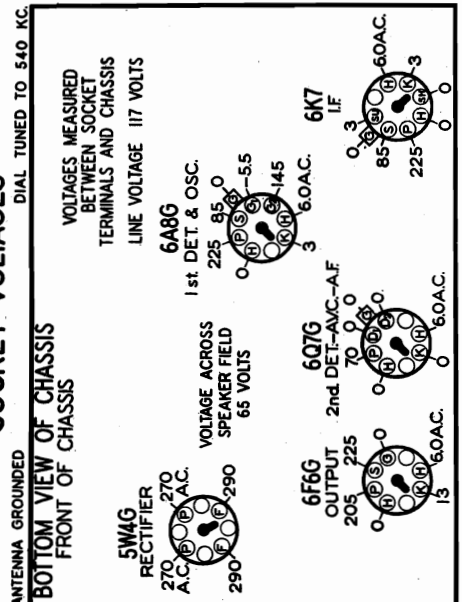
DIAL & MISCELLANEOUS PARTS

Diagram Number	Part Number	Description	List Price
114955		Clamp—for dial cord	\$0.01
112745		Clip—for oscillator coil mtg.	.01
112798		Clip—for mtg. wave trap coil	.01
113019		Clip—dial scale retaining	.01
116009		Clip—for antenna coil mtg.	.01
114954		Dial Cord—(19" required)	Per Ft. .03
116006		Dial scale	.22
112233		Drum & Bushing—for dial drive	.35
113146		Escutcheon—for dial	.84
113022		Knobs—for tuning or volume	.10
113138		Mtg. Plate & Bracket for dial	.42
110496		Plug—speaker (4 prong)	.12
114977		Pointer—for dial	.16
113102		Push Button	.08
85545		Retaining ring—for drive shaft	Per C .50
112974		Set Screw—3/32 Square head	.02
114974		Screw—No. 10 x 1/8 Chassis Mtg.	.01
114974		Special Head—for mtg. escutcheon	Per .15
112945		Shaft—tuning	.10
110501		Socket—4 prong (for speaker)	.16
114878		Socket—dial base with special ground	.15
114968		Socket—for dial map	.13
114968		Spring—dial cord tension	.03
113169		Tob—celluloid—for push button	Per Dt. .40
113321		Tube—station coil letters (4 sheets brown)	Per Set .05
110530		Washer—paper for back of knobs	.01
110829		Washer—flat steel for mtg. chassis	.01
111456		Washer—spring washer	Per C .50

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1-2	85539	Condenser—mica 260 mmid.	\$0.20
3	85061	Condenser—mica 51 mmid.	.15
4-5-6	88030	Switch—tone control	.25
7	88054	Condenser—paper .01 mid. 400 volt.	.30
8	88189	Condenser—paper .05 mid. 200 volt.	.25
9	88682	Condenser—paper .1 mid. 200 volt.	.25
10	89532	Condenser—paper .25 mid. 200 volt.	.32
11	110552	Resistor—carb. 47,000 ohms 1/4 watt.	.12
12	110553	Resistor—carb. 220,000 ohms 1/4 watt.	.12
13	110556	Resistor—carb. 330 ohms 1/4 watt.	.12
14	110559	Resistor—carb. 470,000 ohms 1/4 watt.	.12
15	110562	Resistor—carb. 22,000 ohms 1/4 watt.	.12
16	110580	Resistor—carb. 3.3 meg. 1/4 watt.	.12
17-18	110629	Lamp—6.3 volt .25 amp.	.15
19	112796	Wave trap (with trimmer) (Model 01-52 WT only)	.50
20	112960	Resistor—carb. 47,000 ohms 1/2 watt.	.12
21	112965	Resistor—carb. 10 meg. 1/4 watt.	.12
22	112975	Resistor—carb. .006 mid. 600 volt.	.14
23	113042	Coil—oscillator	.15
24	113202	Condenser—paper .02 mid. 500 volt.	.15
25-26	114258	Condenser—elect. 8 mid. 450 ohms	.36
27-28-29-30	116501	Push Button Trim. (550 KC to 1000 KC)	.40
31-32-33-34	116502	Push Button Trim. (700 KC to 1400 KC)	.40
35-36	116503	Push Button Trim. (850 KC to 1720 KC)	.40
37	114985	Switch Assembly—for push buttons	2.85
38	114984	Transformer—output	1.25
39	114987	Transformer—1st L.F.	1.00
40	114987	Transformer—2nd L.F.	.85
41	114989	Transformer—power 117 volt 60 cycle 3.50	3.50

SOCKET VOLTAGES

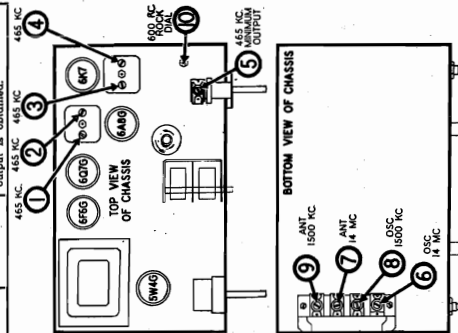


MODELS 01-531 to 01-539
01-531S to 01-539S
010-531 to 010-539
010-531S to 010-539S
Alignment, Trimmers

ALIGNMENT EQUIPMENT & PROCEDURE

1. Connect the output meter across the voice coil or between the plate of the 6ES6 output tube and ground in series with a .1 mfd. condenser, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the black (ground) wire of the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang in the full mesh position.

Dummy Series in Sig. Gen.	Connection of Sig. Generator Output To	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
1 MFD. Condenser	Control Grid of 6AG Tube	465 KC	Broadcast Clockwise	Any Point in The Scale Does Not Affect The Signal	1-2	2nd I. F.	Adjust for maximum output. Then repeat adjustment.
200 MMFD. Mica Condenser	Antenna Terminal or Antenna Lead	465 KC	Broadcast Clockwise	Where It Does Not Affect The Signal	3-4	1st I. F.	
400 OHM Carbon Resistor	Antenna Terminal or Antenna Lead	14 MC	Foreign (Counter- Clockwise)	14 MC	6	Foreign Oscillator (Shunt)	Adjust for minimum output using a strong generator signal.
400 OHM Carbon Resistor	Antenna Terminal or Antenna Lead	14 MC	Foreign (Clockwise)	14 MC	7	Foreign Antenna	Adjust for maximum output. Then tune trimmer and receiver dial until maximum output is obtained.
200 MMFD. Mica Condenser	Antenna Terminal or Antenna Lead	1500 KC	Broadcast Clockwise	1500 KC	8	Broadcast Oscillator (Shunt)	Adjust for maximum output.
200 MMFD. Condenser	Antenna Terminal or Antenna Lead	1500 KC	Broadcast Clockwise	Tune To 1500 KC Trimmer Signal	9	Broadcast Antenna	Adjust for maximum output.
200 MMFD. Condenser	Antenna Terminal or Antenna Lead	600 KC	Broadcast Clockwise	Tune To 600 KC Generator Signal	10	Broadcast Trimmer (Series Feed)	Adjust for maximum output. Then tune trimmer and receiver dial until maximum output is obtained.



ALIGNMENT EQUIPMENT & PROCEDURE

1. Connect the output meter across the voice coil or between the plate of the 6F6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil).

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
1 MFD CONDENSER	CONTROL GRID OF 6AS-6 TUBE	465 KC	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	ANTENNA LEAD (Blue Wire)	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	3-4	1st I.F.	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL
200 MMFD. MICA CONDENSER	ANTENNA LEAD (Blue Wire)	1500 KC	1500 KC	6	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO RING IN SIGNAL
200 MMFD. MICA CONDENSER	ANTENNA LEAD (Blue Wire)	1500 KC	TUNE TO 1500 KC GENERATOR SIGNAL	7	BROADCAST ANTENNA (Shunt)	ADJUST FOR MAXIMUM OUTPUT.

Select the most powerful nearby stations for automatic tuning, since weak signals will not give as good results.

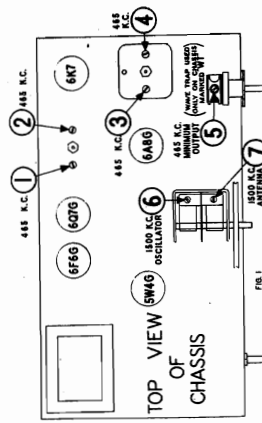
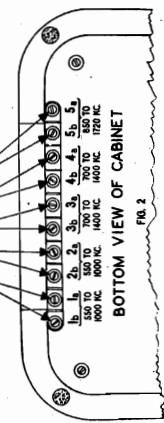


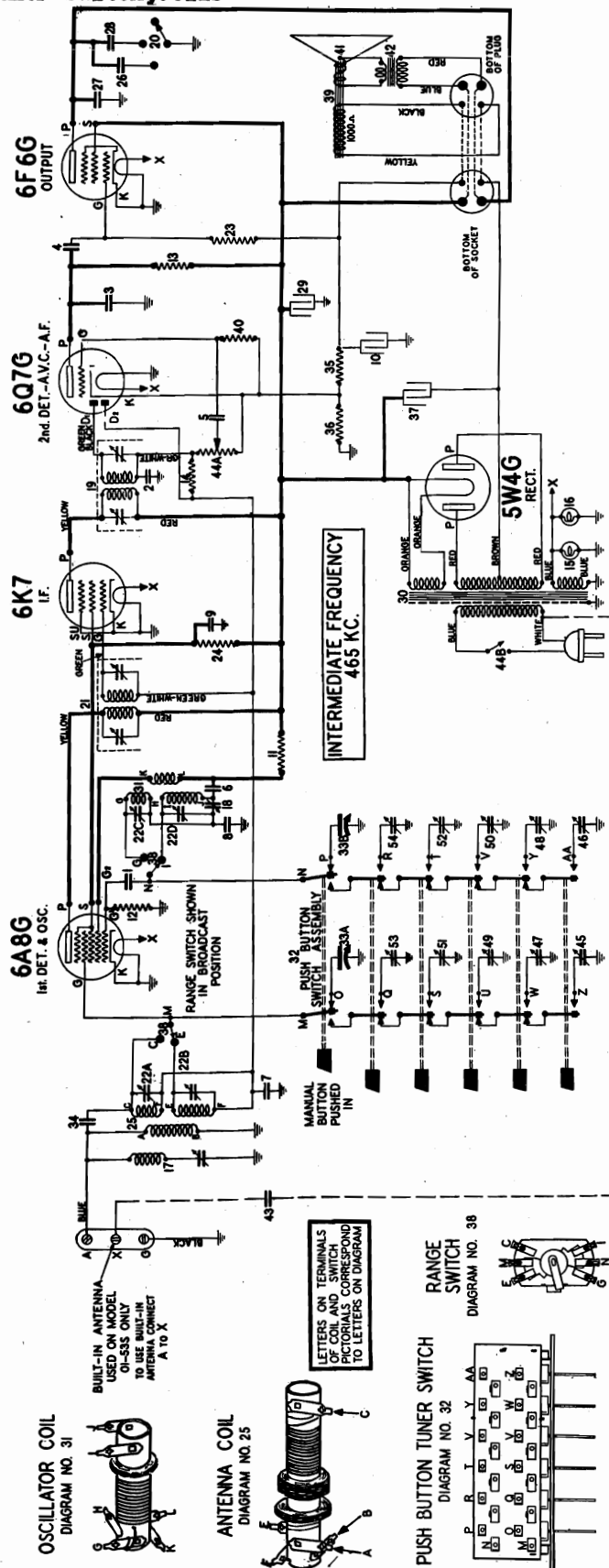
Fig. 2 is a bottom view of the cabinet, showing the station selector trimmer condensers used with the push buttons. The arrows in this diagram indicate the two trimmers for each button.



01-531S to 01-539S
Chassis 01-53S
010-531S to 010-539S
Chassis 010-53S
Schematic, Voltage, Socket
Tuner Switch, Coils

STEWART-WARNER CORP.

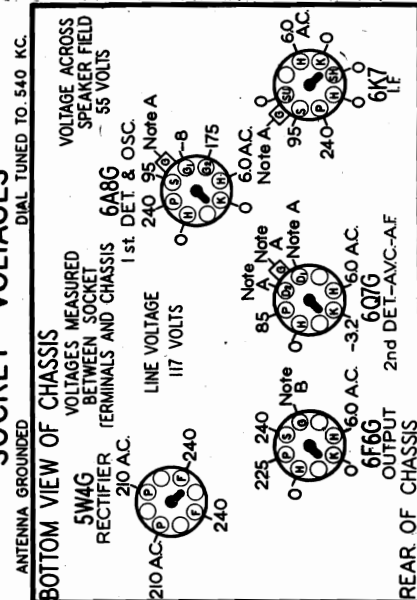
MODELS 01-531 to 01-539
Chassis 01-53
010-531 to 010-539
Chassis 010-53



ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1	85061	Condenser—mica 51 mmfd.	\$0.15
2-3	85394	Condenser—mica 510 mmfd.	.25
4	88826	Condenser—paper .02 mfd. 400 volt.	.25
5-6	88030	Condenser—paper .01 mfd. 400 volt.	.25
7	88189	Condenser—paper .05 mfd. 200 volt.	.25
8	88587	Condenser—mica .0042 mfd.	.35
9	88682	Condenser—paper .1 mfd. 400 volt.	.25
10	110377	Condenser—electrolytic 10 mfd. 35 volt.	.80
11	110550	Resistor—carbon 10,000 ohm 1/2 watt.	.15
12	110552	Resistor—carbon 47,000 ohms 1/2 watt.	.12
13	110553	Resistor—carbon 220,000 ohms 1/2 watt.	.12
14	110580	Resistor—carbon 3.3 meg. 1/2 watt.	.12
15-16	110629	Lamp—dial 6.3 volt 25 amps.	.15
17	112113	Condenser—electrolytic 10 mfd. 50 V. (Model 010-53 & 010-53S)	.85
18	112796	Wave trap (with trimmer).	.50
19	112799	Condenser—padder (530 to 630 mmfd.).	.36
20	112804	Transformer—2nd I.F. (Model 010-53S).	1.00
21	112870	Switch—tone control	.40
22	112884	Transformer—1st I.F. (Model 010-53S).	1.20
23	112893	Condenser—trimmer 4 section.	.60
24	112971	Resistor—insulated 470,000 ohms 1/2 watt.	.15
25	113011	Resistor—carbon 33,000 ohms 1 watt.	.20
26	116421	Coil—antenna	1.20
	116421	Coil—antenna (Model 010-53S).	.90
	113034	Condenser—paper .04 mfd. 600 volt.	.15
	113035	Condenser—paper .006 mfd. 600 volt.	.14
	113022	Condenser—paper .02 mfd. 600 volt.	.15
	114258	Condenser—electrolytic 8 mfd. 450 volt.	.98
	114530	Power transformer 117 volt 60 cycle.	3.50
	116352	Power transformer 100-240 V., 40-133 cycles 7.75	.75
	114959	Coil—oscillator (Model 010-53S).	.65
	116419	Coil—oscillator (Model 010-53S).	.285
	114965	Switch—for push buttons.	.285
	33A-33B	Condenser—variable gang	.285
	116430	Condenser—gang (Model 010-53S).	2.50
	114969	Condenser—mica 15 mmfd.	.12
	114970	Resistor—wire wound 240 ohms 1 watt.	.12
	114971	Resistor—wire wound 60 ohms 1/2 watt.	.12
	114972	Condenser—electrolytic 16 mfd. 450 volt.	.78
	114988	Switch—range	.60
	U-15043	Speaker—dynamic (6 in.).	4.50
	116050	Resistor—insulated 10 meg. 1/2 watt.	.12
	U-15043	Cone—assm. (for U-15043 speaker).	1.65
	U-16211	Output transformer (for U-15043 speaker).	1.50
	116212	Volume control, 500,000 ohms, with switch	.95
	116224	Volume control, 500,000 ohms, with switch	7.00
	116352	Transformer—1st I.F. (Model 010-53S).	1.00
	116352	Transformer—2nd I.F. (Model 010-53S).	1.00
	116430	Coil—antenna (Model 010-53S).	.90
	116430	Coil—antenna (Model 010-53S).	.250
	45-48-47-48	Push Button Trimmer (550 KC to 1000 KC)	.40
	49-50-51-52	Push Button Trimmer (700 KC to 1400 KC)	.40
	53-54	Push Button Trimmer (850 KC to 1720 KC)	.40

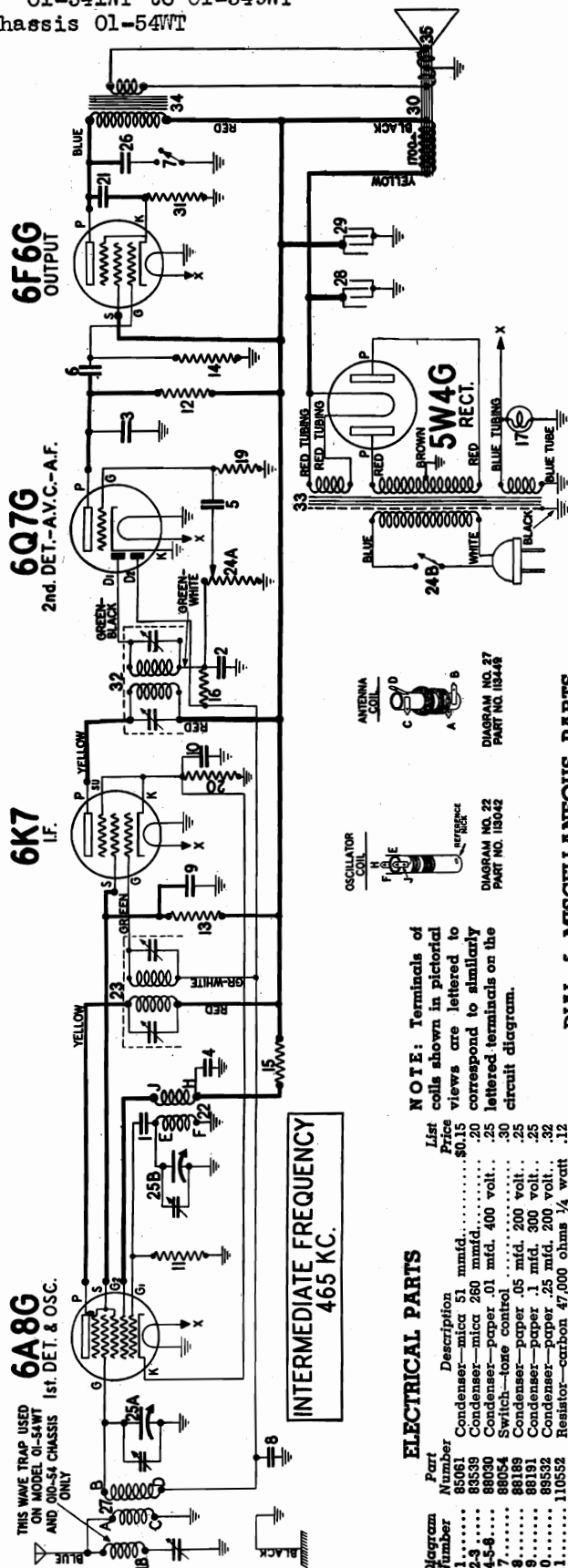
SOCKET VOLTAGES



MODELS 01-541 to 01-549
Chassis 01-54
01-541S to 01-549S
Chassis 01-54S
01-541WT to 01-549WT
Chassis 01-54WT

STEWART-WARNER CORP.

08-541 to 08-549
Chassis 08-54
010-541 to 010-549
Chassis 010-54
010-541S to 010-549S
Schematic, Voltage, Socket



DIAL & MISCELLANEOUS PARTS

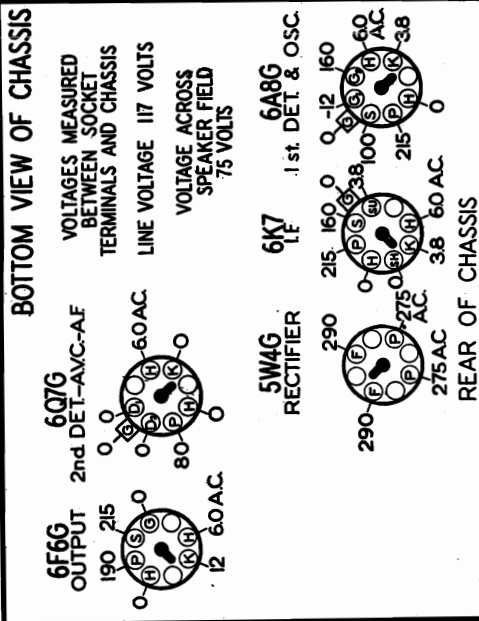
Part No.	Description	List Price
113170	Adjusting lug—for button shafts.	\$0.01
113171	Bracket—for dial & condenser mtg.	.01
113172	Celluloid Cover—over dial face.	.06
112745	Clip—coil mtg. (Oscillator & antenna).	.01
112746	Clip—dial scale retaining.	.01
112747	Clip—for mtg. wave trap.	.01
113173	Card—dial (supplied in 4 ft. lengths).	.30
113174	Dial Drum—and pinion assembly.	.40
113175	Dial scale.	.35
113176	Escutcheon—dial.	.32
113177	Escutcheon—for push buttons.	.32
113178	Gear—and pushing assembly for dial drive.	.22
113179	Knob—tone & volume control.	.10
113180	Mechanical tuner assembly—keys & housing only.	3.00
113181	Pointer—dial.	.08
113182	Pulley—dial.	.04
113183	Push button (volume).	.06
113184	Rotary cap for volume switch on transformer.	.50
113185	Rotary cap for volume switch on transformer.	.50
113186	Rubber tubing—for drive shaft.	.01
113187	Rubber tubing—for drive shaft.	.01
113188	Screw No. 6 Hex. Hd. for mtg. adjusting washer.	.35
113189	Set Screw—9/32 Square Head.	.02
113190	Screw No. 10x1 1/2 Chassis Mtg.	.01
113191	Screw No. 6-40x3/8 for setting up buttons.	.01
113192	Screw—No. 6-40x3/8 for setting up buttons.	.15
113193	Shaft—dial drive.	.18
113194	Socket—for dial lamp.	.15
113195	Socket—dial base.	.15
113196	Socket—dial base—with special ground.	.15
113197	Spring—between gear sections.	.01
113198	Spring—for key return.	.01
113199	Spring—dial cord tension.	.09
113200	Tab—celluloid for push button.	.09
113201	Tab—station coil letter (4 sheets) (Brown).	.40
113202	Washer—paper for back of knobs.	.005
113203	Washer—flat steel for mtg. chassis.	.01

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1	85081	Condenser—mica 51 mmid.	\$0.15
2	85339	Condenser—mica 260 mmid.	.20
3	88030	Condenser—paper .01 mid. 400 volt.	.25
4	88054	Switch—tone control.	.30
5	88189	Condenser—paper .05 mid. 200 volt.	.25
6	88191	Condenser—paper .1 mid. 300 volt.	.32
7	88532	Condenser—paper .25 mid. 200 volt.	.32
8	110533	Resistor—carbon 47,000 ohms 1/4 watt.	.12
9	110534	Resistor—carbon 220,000 ohms 1/4 watt.	.12
10	110535	Resistor—carbon 33,000 ohms 1/4 watt.	.12
11	110536	Resistor—carbon 47,000 ohms 1/4 watt.	.12
12	110537	Resistor—carbon 10,000 ohms 1/4 watt.	.12
13	110538	Resistor—carbon 3.3 meg. 1/4 watt.	.12
14	110539	Lamp—dial 6 volt .25 amp.	.15
15	112756	Wave trap (Models 01-54 WT, 010-54 and 010-54S chassis only).	.50
16	112975	Resistor—carbon 10 meg. 1/4 watt.	.12
17	112994	Resistor—carbon 220 ohm 1/4 watt.	.12
18	113035	Condenser—ceramic tube .006 mid.	.14
19	113042	Coil—oscillator.	.45
20	113046	Transformer—1st I.F.	1.00
21	113047	Transformer—1st I.F. (Model 010-54S only).	1.10
22	113049	Volume control—500,000 ohms with switch.	1.00
23	113150	Condenser—variable gang.	3.00
24	113202	Condenser—paper .02 mid. 600 volt.	.13
25	113203	Coil—antenna.	.78
26	113204	Condenser—electrolytic 8 mid. 450 volt.	.98
27	113205	Speaker—dynamic; 5 inch.	4.00
28	113206	Resistor—wire wound 400 ohms 1/2 watt.	1.12
29	113207	Transformer—2nd I.F.	1.00
30	113208	Transformer—2nd I.F. (Model 010-54S only).	1.05
31	113209	Transformer—power 117 volt 60 cycle.	1.05
32	113210	Transformer—power 100-240 volt; 40-133 cycles.	3.75
33	113211	Transformer—output, for U-115047 speaker.	1.50
34	113212	Cone & Voice coil—for U-115047 speaker.	1.50
35	113213	Transformer—power 100-240 volt; 40-133 cycles.	7.75
36	113214	Transformer—1st I.F. (Model 010-54S only).	1.10
37	113215	Transformer—2nd I.F. (Model 010-54S only).	1.05

SOCKET VOLTAGES

ANTENNA GROUNDED
DIAL TUNED TO 540 KC.



Use a high resistance voltmeter of at least 1,000 ohms per volt.

CHASSIS 01-61, 01-61S
010-61, 010-61S
Alignment, Trimmers

STEWART-WARNER CORP.

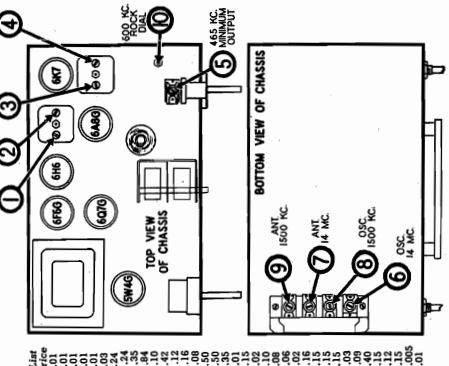
CHASSIS 01-54, 01-54S
01-54WT, 08-54, 010-54
010-54S
Alignment, Trimmers
Tuner, Drive Cord Data

01-61, 01-61S, 010-61 and 010-61S CHASSIS ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 14 MC are required.

1. Connect the output meter across the voice coil or between the plate of the 8K5-G output tube and ground in series with a .1 mfd. condenser, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Turn the ground control of the signal generator to the black (ground) wire or the chassis.
3. Connect the ground lead of the signal generator to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang in the full mesh position.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
1 MFD. Condenser	Control Grid (8K5-G Tube)	465 KC	Broadcast Clockwise	Any Point Where It Does Not Affect The Signal	1-2	2nd I. F.	Adjust for maximum output. Then repeat adjustment.
200 MMFD. Condenser	Antenna or Antenna Lead	465 KC	Broadcast Clockwise	Any Point Where It Does Not Affect The Signal	3-4	1st I. F.	Adjust for maximum output. Then repeat adjustment.
400 OHM Carbon Resistor	Antenna Terminal (Antenna Lead)	14 MC	Foreign (Counter-Clockwise)	14 MC	5	Wave Trap	Adjust for minimum output using a strong generator signal.
400 OHM Resistor	Antenna Terminal (Antenna Lead)	14 MC	Foreign (Counter-Clockwise)	14 MC	6	Foreign Oscillator (Shunt)	Adjust for maximum output. Then repeat adjustment. Image at approx. 13.1 MC will be obtained by tuning in a strong generator signal at 14 MC with trimmer screw at 14 MC with trimmer screw further out. Recheck image.
200 MMFD. Condenser	Antenna or Antenna Lead	1500 KC	Broadcast Clockwise	1500 KC	7	Foreign Antenna	Adjust for maximum output. Then repeat adjustment. Image at approx. 13.1 MC will be obtained by tuning in a strong generator signal at 14 MC with trimmer screw at 14 MC with trimmer screw further out. Recheck image.
200 MMFD. Condenser	Antenna or Antenna Lead	1500 KC	Broadcast Clockwise	1500 KC	8	Broadcast Oscillator (Shunt)	Adjust for maximum output. Then repeat adjustment. Image at approx. 13.1 MC will be obtained by tuning in a strong generator signal at 14 MC with trimmer screw at 14 MC with trimmer screw further out. Recheck image.
200 MMFD. Condenser	Antenna or Antenna Lead	1500 KC	Broadcast Clockwise	1500 KC	9	Broadcast Antenna	Adjust for maximum output. Then repeat adjustment. Image at approx. 13.1 MC will be obtained by tuning in a strong generator signal at 14 MC with trimmer screw at 14 MC with trimmer screw further out. Recheck image.
200 MMFD. Condenser	Antenna or Antenna Lead	600 KC	Broadcast Clockwise	600 KC	10	Broadcast Oscillator (Series Pad)	Adjust for maximum output. Then repeat adjustment. Image at approx. 13.1 MC will be obtained by tuning in a strong generator signal at 14 MC with trimmer screw at 14 MC with trimmer screw further out. Recheck image.



DIAL & MISCELLANEOUS PARTS

Part No.	Description	Per C
11485	Clamp for dial mounting	.01
11486	Clamp for dial mounting	.01
11487	Clamp for dial mounting	.01
11488	Clamp for dial mounting	.01
11489	Clamp for dial mounting	.01
11490	Clamp for dial mounting	.01
11491	Clamp for dial mounting	.01
11492	Clamp for dial mounting	.01
11493	Clamp for dial mounting	.01
11494	Clamp for dial mounting	.01
11495	Clamp for dial mounting	.01
11496	Clamp for dial mounting	.01
11497	Clamp for dial mounting	.01
11498	Clamp for dial mounting	.01
11499	Clamp for dial mounting	.01
11500	Clamp for dial mounting	.01
11501	Clamp for dial mounting	.01
11502	Clamp for dial mounting	.01
11503	Clamp for dial mounting	.01
11504	Clamp for dial mounting	.01
11505	Clamp for dial mounting	.01
11506	Clamp for dial mounting	.01
11507	Clamp for dial mounting	.01
11508	Clamp for dial mounting	.01
11509	Clamp for dial mounting	.01
11510	Clamp for dial mounting	.01
11511	Clamp for dial mounting	.01
11512	Clamp for dial mounting	.01
11513	Clamp for dial mounting	.01
11514	Clamp for dial mounting	.01
11515	Clamp for dial mounting	.01
11516	Clamp for dial mounting	.01
11517	Clamp for dial mounting	.01
11518	Clamp for dial mounting	.01
11519	Clamp for dial mounting	.01
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11558	Clamp for dial mounting	.01
11559	Clamp for dial mounting	.01
11560	Clamp for dial mounting	.01
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11562	Clamp for dial mounting	.01
11563	Clamp for dial mounting	.01
11564	Clamp for dial mounting	.01
11565	Clamp for dial mounting	.01
11566	Clamp for dial mounting	.01
11567	Clamp for dial mounting	.01
11568	Clamp for dial mounting	.01
11569	Clamp for dial mounting	.01
11570	Clamp for dial mounting	.01
11571	Clamp for dial mounting	.01
11572	Clamp for dial mounting	.01
11573	Clamp for dial mounting	.01
11574	Clamp for dial mounting	.01
11575	Clamp for dial mounting	.01
11576	Clamp for dial mounting	.01
11577	Clamp for dial mounting	.01
11578	Clamp for dial mounting	.01
11579	Clamp for dial mounting	.01
11580	Clamp for dial mounting	.01
11581	Clamp for dial mounting	.01
11582	Clamp for dial mounting	.01
11583	Clamp for dial mounting	.01
11584	Clamp for dial mounting	.01
11585	Clamp for dial mounting	.01
11586	Clamp for dial mounting	.01
11587	Clamp for dial mounting	.01
11588	Clamp for dial mounting	.01
11589	Clamp for dial mounting	.01
11590	Clamp for dial mounting	.01
11591	Clamp for dial mounting	.01
11592	Clamp for dial mounting	.01
11593	Clamp for dial mounting	.01
11594	Clamp for dial mounting	.01
11595	Clamp for dial mounting	.01
11596	Clamp for dial mounting	.01
11597	Clamp for dial mounting	.01
11598	Clamp for dial mounting	.01
11599	Clamp for dial mounting	.01
11600	Clamp for dial mounting	.01

01-54, 01-54S, 08-54, 010-54, and 010-54S CHASSIS ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

1. Connect the output meter across the voice coil or between the plate of the 8K5-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the black (ground) wire or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, set the pointer to the last mark on the right end of the dial scale. If the pointer is only slightly off calibration, loosen the set-screw in the dial drive drum at the left side of the gang condenser and set the pointer to the last mark on the right end of the dial when the gang condenser is in full mesh. If the pointer is off calibration several dial divisions, release it from the gang condenser by spreading the clip on the pointer. Then slide the pointer along the cord until it is set to the last dial division on the right end of the dial. Holding it in place check to see if the gang condenser is in full mesh, and tighten the pointer clip, being careful not to cut the cord. Place a drop of household or speaker cement on the cord and pointer clip to prevent the pointer from slipping.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
1 Mfd Condenser	Control Grid (8K5-G Tube)	465 KC	Any Point Where It Does Not Affect The Signal	1-2	1st I.F.	Adjust for Maximum Output
200 MMFD. Condenser	Antenna Lead (Blue Wire)	465 KC	Any Point Where It Does Not Affect The Signal	3-4	2nd I.F.	Adjust for Maximum Output
200 MMFD. Condenser	Antenna Lead (Blue Wire)	1500 KC	1500 KC	5	Wave Trap	Adjust for Minimum Output
200 MMFD. Condenser	Antenna Lead (Blue Wire)	1500 KC	1500 KC	6	Broadcast Oscillator (Shunt)	Adjust for Maximum Output
200 MMFD. Condenser	Antenna Lead (Blue Wire)	1500 KC	1500 KC	7	Broadcast Antenna	Adjust for Maximum Output

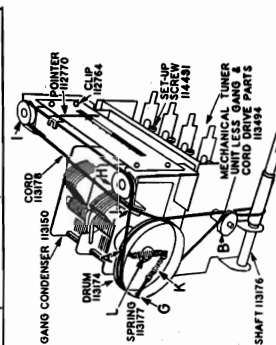


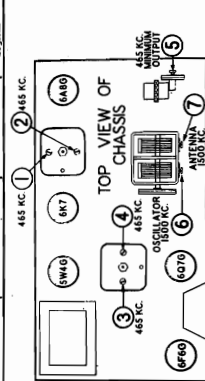
FIG. 1

HOW TO REPLACE DIAL POINTER DRIVE CORD

1. Close the gang condenser and thread one end of the cord through the dial drive drum and the other end through the dial drive drum.
2. Carry the other end of the cord over the drum to the front around the dial drive drum and then carry it to the rear of the dial drive drum and then carry it to the front around the dial drive drum and then carry it to the rear of the dial drive drum.
3. Continue back to pulley J and down the front of the drum. Carry the end of the cord around the drum and thread through pulley K.
4. To both ends extending through pulley K to location spring K. IMPORTANT: In so doing, allow enough slack in the cord so that when spring K is hooked in place in the drum, it will be extended only a very little. If the spring is extended too much, it will tend to make the push button operate too hard because of overstretching.
5. To the last dial division mark on the right and clip it to the cord.

HOW TO SET UP PUSH BUTTONS

1. Before setting up the push buttons, pull off the button cap by grasping the button and pulling outward on it. When the button is removed, the screw-driver in this screw and loosens it (about one turn counter-clockwise will be sufficient). The screw slot, PUSH AGAINST THE SCREW-DRIVER UNTIL THE PUSH BUTTON SHAFT IS FORCED ALL THE WAY IN. While the button is held in this position, the push button shaft is held in place by the push button spring. The push button spring is held in place by the push button spring. The push button spring is held in place by the push button spring.
2. To the last dial division mark on the right and clip it to the cord.
3. To the last dial division mark on the right and clip it to the cord.



HOW TO REPLACE THE DIAL DRIVE CORD

1. To the last dial division mark on the right and clip it to the cord.
2. To the last dial division mark on the right and clip it to the cord.
3. To the last dial division mark on the right and clip it to the cord.

010-611S to 010-619S
Chassis 010-61S
Schematic, Voltage
Socket, Coils

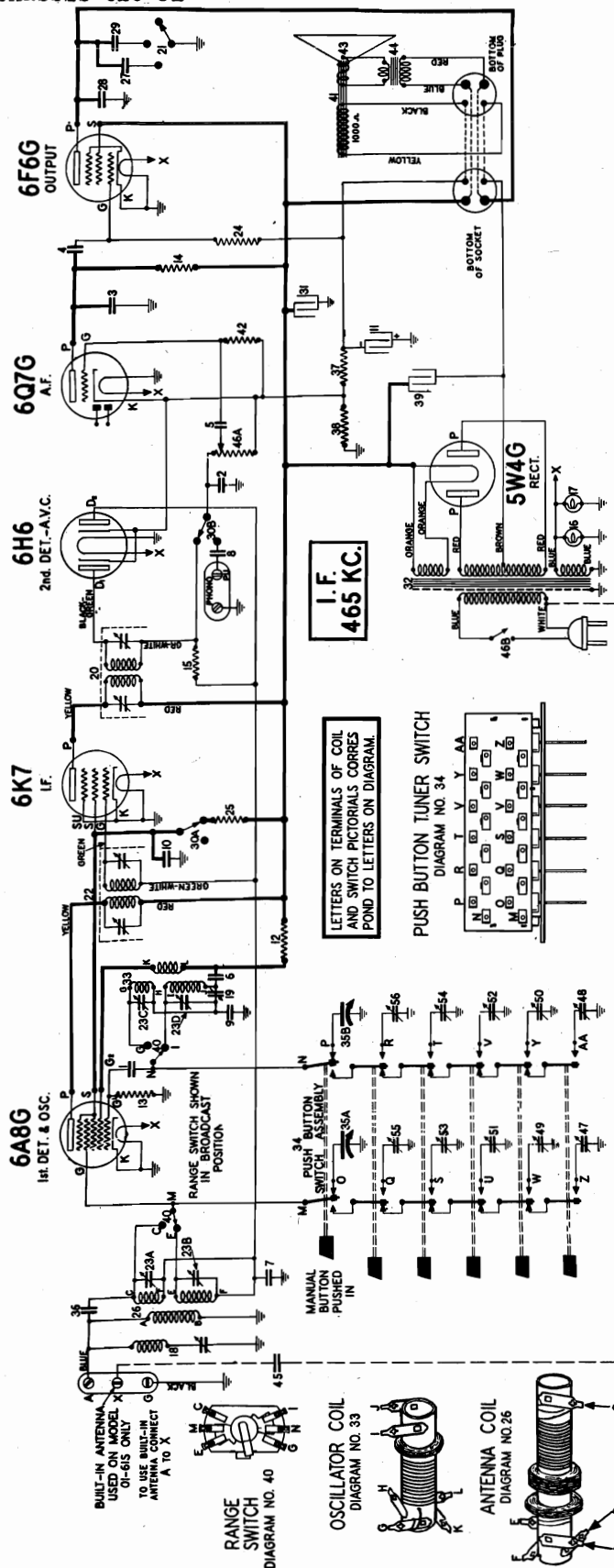
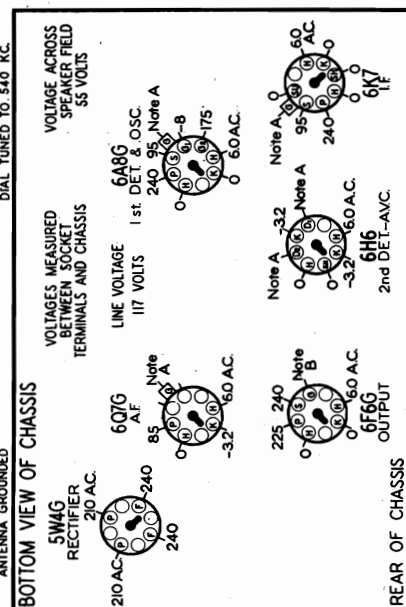


Diagram Number	Part Number	Description	List Price	Diagram Number	Part Number	Description	List Price
1	85N61	Condenser—mica 51 mmfd.	.....	28	113035	Condenser—paper .006 mfd. 600 volt.	.....15
2	85N64	Condenser—mica 510 mmfd.	\$0.15	29	113022	Condenser—paper .02 mfd. 600 volt.	.....14
3	85N94	Condenser—paper .02 mfd. 400 volt	.....25	30	30A-30B	Switch—radio phono (D.P.D.T.)	.....15
4	86026	Condenser—paper .01 mfd. 400 volt	.....25	31	114141	Condenser—electrolytic 8 mfd. 450 volts.	.....44
5	86030	Condenser—paper .05 mfd. 200 volt	.....25	32	114258	Power transformer 117 volt 60 cycle	.....98
6	86030	Condenser—paper .05 mfd. 200 volt	.....25	33	114530	Power transformer 100-240 V., 40-133 cycles	.....350
7	86189	Condenser—mica .0042 mfd.	.....25	34	114532	Coil—oscillator	.....75
8	86587	Condenser—paper 1 mfd. 400 volt.	.....25	35	114959	Coil—oscillator (Model 010-61S only).	.....75
9	86682	Condenser—electrolytic 10 mfd. 35 volt.	.....80	36	114965	Switch assembly—for push buttons.	.....2.85
10	110377	Condenser—electrolytic 10 mfd. 30 volt.	.....85	37	114966	Condenser—variable gang	.....2.85
11	112113	(Model 010-61 & 010-61S)	.....12	38	35A-35B	Condenser—variable gang (Model 010-61S)	.....2.50
12	110550	Resistor—carbon 10,000 ohms 1/2 watt.	.....15	39	114968	Condenser—mica 15 mmfd.	.....12
13	110552	Resistor—carbon 10,000 ohms 1/4 watt.	.....12	40	114970	Resistor—wire wound 240 ohms 1 watt.	.....12
14	110554	Resistor—carbon 200,000 ohms 1/4 watt.	.....12	41	114971	Resistor—wire wound 60 ohms 1/2 watt.	.....12
15	110560	Resistor—carbon 33 meg. 1/4 watt.	.....15	42	114972	Condenser—electrolytic 16 mfd. 450 volt.	.....78
16	110563	Condenser—electrolytic 10 mfd. 50 volt	.....85	43	114988	Switch—range	.....60
17	112113	(Model 010-61 & 010-61S)	.....12	44	U-115043	Speaker—dynamic 6"	.....4.50
18	112796	Coil—wave trap (with trimmer)	.....50	45	116050	Resistor—insulated 10 meg. 1/4 watt.	.....12
19	112799	Condenser—powder (530 to 630 mmfd.)	.....36	46	U-116212	Coner—assembly (for U-115043 speaker)	.....1.65
20	112804	Transformer—2nd I.F. (Model 010-61S)	.....1.00	47	U-116212	Output transformer (for U-115043 speaker)	.....1.50
21	116362	Transformer—2nd I.F. (Model 010-61S)	.....1.00	48	U-116224	Condenser—260 mmfd. (Model 01-61S)	.....1.50
22	112870	Switch—tone control	.....1.20	49	46A-46B	Volume control—500,000 ohms (with switch)	.....96
23	112884	Transformer—1st I.F. (Model 010-61S)	.....1.20	50	116236	Power transformer—100-240 V., 40-133 C.	.....775
24	116358	Transformer—1st I.F. (Model 010-61S)	.....1.00	51	116352	Transformer—1st I.F. (Model 010-61S)	.....1.00
25A to 23D	112893	Condenser—trimmer 4 section.	.....60	52	116362	Transformer—2nd I.F. (Model 010-61S)	.....1.00
26	112971	Resistor—insulated 470,000 ohms 1/4 watt.	.....20	53	116419	Coil—oscillator (Model 010-61S)	.....65
27	112999	Resistor—carbon 33,000 ohms 1 watt.	.....20	54	116421	Coil—oscillator (Model 010-61S)	.....90
28	113011	Coil—antenna	.....1.20	55	116430	Condenser—variable gang (Model 010-61S)	.....2.50
29	116421	Coil—antenna (Model 010-61S)	.....90	56	47-48-49	Push button trimmer (550 KC to 1000 KC)	.....40
30	116421	Coil—antenna (Model 010-61S)	.....90	57	51-52-53-54	Push button trimmer (700 KC to 1400 KC)	.....40
31	116421	Coil—antenna (Model 010-61S)	.....90	58	55-56	Push button trimmer (950 KC to 1720 KC)	.....40

SOCKET VOLTAGES



Use a high resistance voltmeter of at least 1000 ohms per volt.

Use a high resistance voltmeter of at least 1000 ohms.

NOTE A: The bias for the control grids of the 6A8-4 tubes and on the diode plates of the 6H6 tube is —3.5 volts across resistor 38. **NOTE B:** The bias for the control tube is —16 volts measured across resistors 37 and 38.

Schematic, Voltage, Socket
Tuner Switch, Coils

STEWART-WARNER CORP.

MODELS 01-811 to 01-819, Chassis 01-81
08-811 to 08-819, Chassis 08-81
010-811 to 010-819, Chassis 010-81

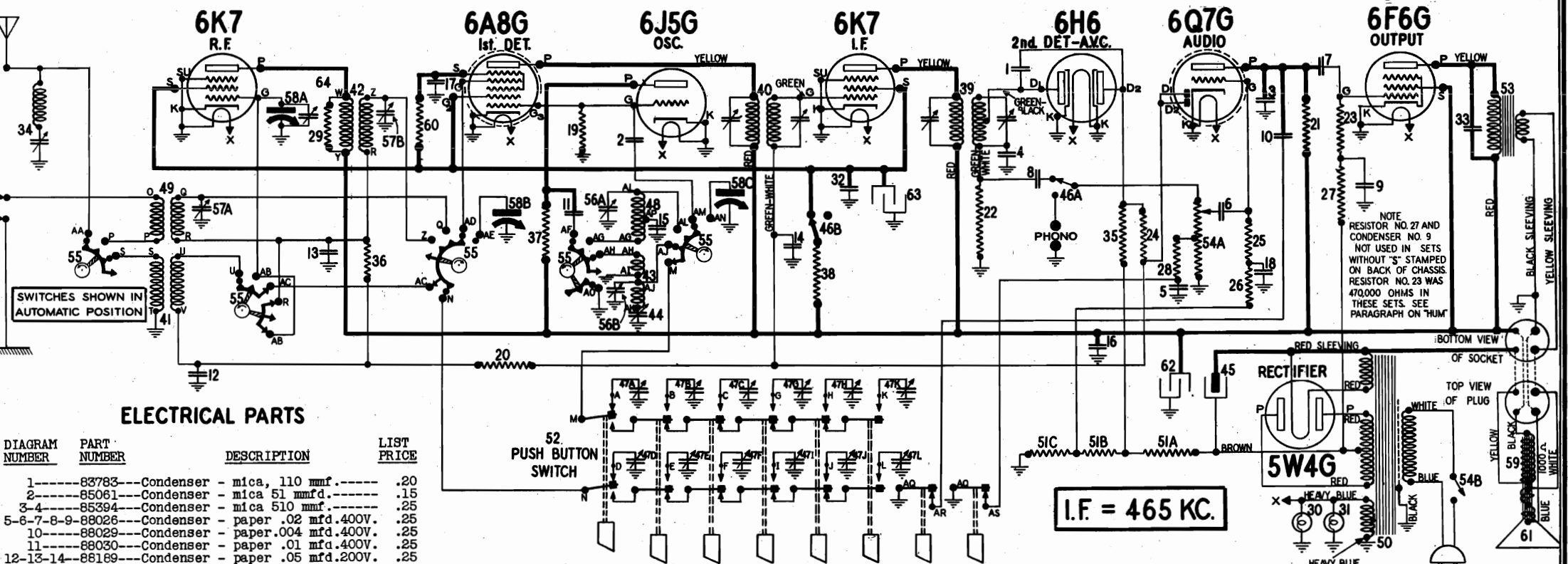
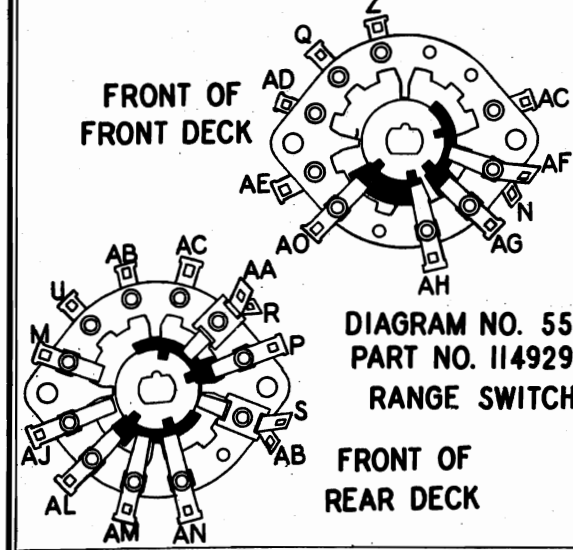
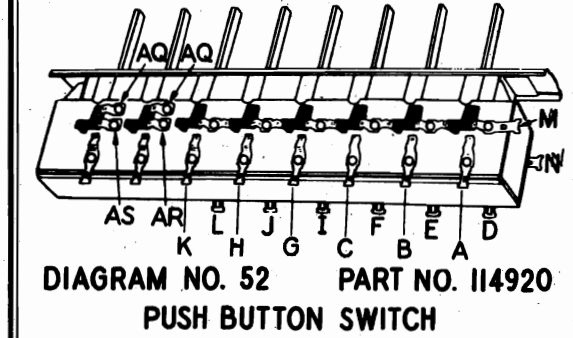
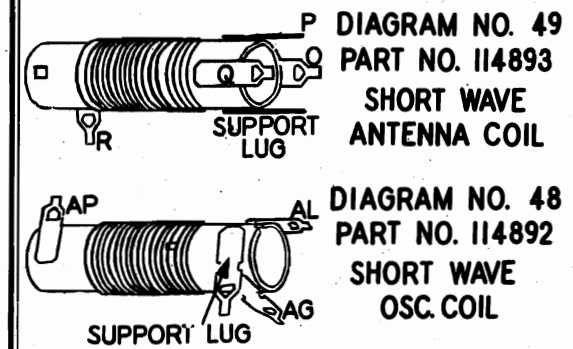
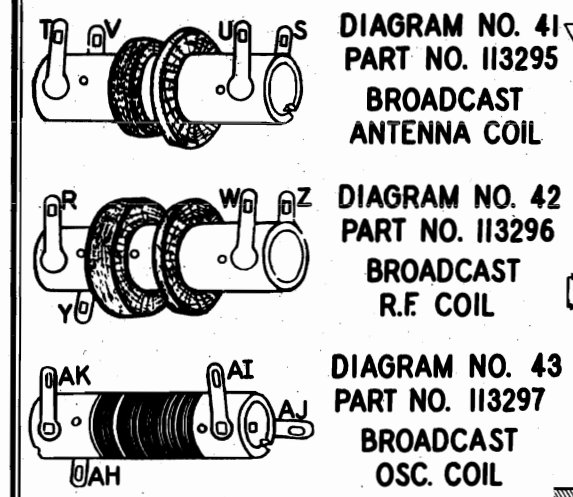


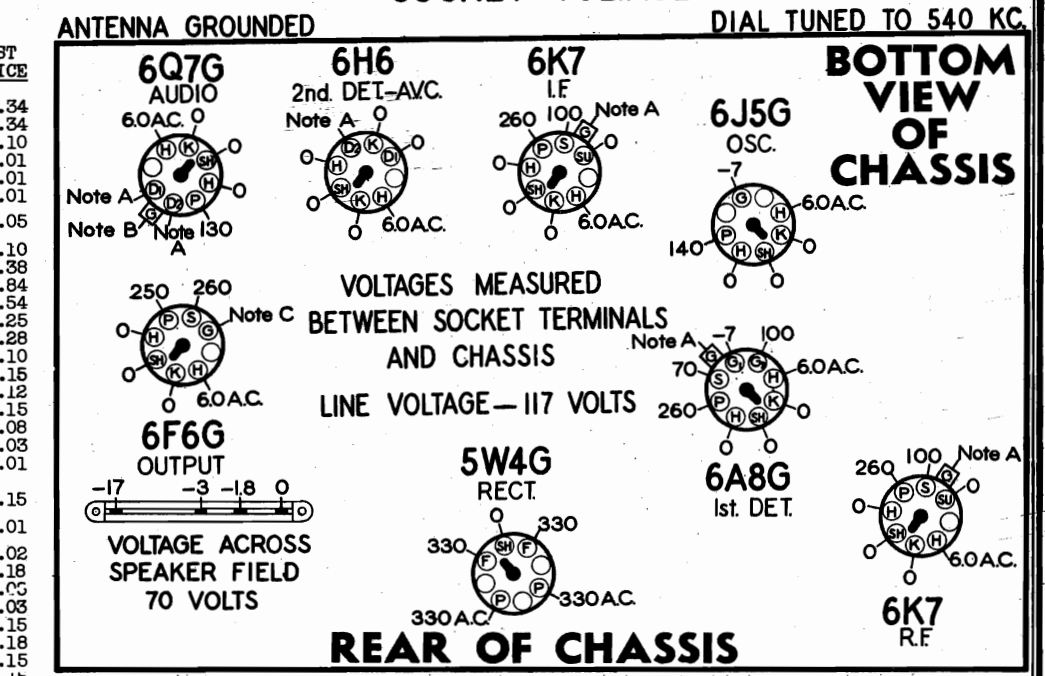
DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1	83783	Condenser - mica, 110 mmf.	.20
2	85061	Condenser - mica 51 mmfd.	.15
3-4	85394	Condenser - mica 510 mmf.	.25
5-6-7-8-9	88026	Condenser - paper .02 mfd. 400V.	.25
10	88029	Condenser - paper .004 mfd. 400V.	.25
11	88030	Condenser - paper .01 mfd. 400V.	.25
12-13-14	88189	Condenser - paper .05 mfd. 200V.	.25
15	88587	Condenser - mica .0042 mfd.	.35
16-17	88682	Condenser - paper .1 mfd. 400V.	.25
18	89421	Condenser - paper .1 mfd. 200V.	.25
19	110552	Resistor-carb. 47,000 ohms ± W.	.12
20-21	110553	Resistor - carbon 220,000 ohms	.12
22-23	110554	Resistor-carb. 1 meg. 1/4 watt	.12
24-25	110559	Resistor-carb. 470,000 ohms ± W.	.12
26	110564	Resistor-carb. 100,000 ohms ± W.	.12
27	110565	Resistor-carb. 22,000 ohms ± W.	.12
28	110573	Resistor-carb. 2,200 ohms ± W.	.12
29-31	110629	Lamp - 6.3 volt .25 amps.	.15
32	111252	Condenser - paper .05 mfd. 400V.	.13
33	111346	Condenser - mica 2,000 mmfd.	.20
34	112796	Coil - wave trap (with trimmer)	.50
35	112971	Resistor-insul. 470,000 ohm ± W.	.15
36	112987	Resistor-insul. 220,000 ohm ± W.	.15
37	112997	Resistor - carb. 22,000 ohms ± W.	.15
38	112998	Resistor-insul. 22,000 ohms 2 W.	.20
39	113229	Transformer - 2nd I.F.	1.64
40	113237	Transformer - 1st I.F.	1.20
41	113295	Coil - antenna (B.C.)	1.20
42	113296	Coil - R.F. (B.C.)	1.30
43	113297	Coil - oscillator (B.C.)	.48
44	113346	Condenser - padding	.38
45	113965	Condenser-elect. 16 mfd. 450 V.	1.04
46A - 46B	114141	Switch - radio phono (D.P.D.T.)	.44
47A to 47F	116501	Trimmer Condenser (100-450 mmfd)	.40
47G to 47J	116502	Trimmer Condenser (25-300 mmfd)	.40
47K - 47L	116503	Trimmer Condenser (15-200 mmfd)	.40
48	114892	Oscillator Coil - short wave	.60
49	114893	Antenna Coil - short wave	.60
50	114897	Transformer-power 117 V. 60 C.	4.35
51	114906	Resistor - metal clad Section A - 190 ohms Section B - 17 ohms Section C - 26 ohms	.44
52	114920	Push Button Switch Assembly	3.60
53	114927	Transformer - output	1.50
54A - 54B	114928	Volume control 1 meg. with off-on switch	1.00
55	114929	Range Switch	1.85
56A - 56B	114937	Condenser - trimmer 2 sections	.30
57A - 57B	114949	Condenser - variable gang	6.00
58A - 58B	115042	Speaker - dynamic 10"	8.75
59	116059	Resistor-insul. 22,000 ohms ± W.	.12
60	116210	Cone & Voice Coil Assembly for R-115042 Speaker	2.25
61	116262	Condenser-elect. 16 mfd. 450 V.	.78
62	116263	Condenser-elect. 4 mfd. 450 V.	.58
63	113468	Trimmer - Single Section (Used on some sets only)	.15
64	113468	Trimmer - Single Section (Used on some sets only)	.15

TERMINALS OF SWITCHES AND COILS SHOWN IN THE PICTORIAL VIEWS ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM ABOVE.

DIAL AND MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
114032	Bracket & Pulley Assembly - right hand	.34
114034	Bracket & Pulley Assembly - left hand	.34
114042	Clamp - for dial scale	.10
112745	Clip - coil mounting	.01
112798	Clip - for mtg. wave trap coil	.01
85321	Connector - ground	.01
111302	Cord - dial drive 6 or 50 ft. lengths	.05
114921	Dial back ground - brown suede paper	.10
114915	Dial mtg. plate	.38
114922	Dial scale - glass	.84
113336	Drum - dial drive	.54
114912	Escutcheon for dial	2.25
114624	Escutcheon for push buttons	1.28
113041	Knob for tuning or volume	.10
116335	Knob for range switch	.15
110496	Plug - speaker (4 prong)	.12
116302	Pointer & slide assembly	.15
113149	Push button	.08
113463	Rubber bushing - chassis mtg.	.03
112874	Screw - #10 X 1 1/8 chassis mtg.	.01
114914	Screw-special head-for mtg. escutcheon	.15
116185	Screw-#2 X 3/8 for push button escutcheon mtg.	.01
85827	Set Screw - 8/32 square head	.02
114025	Shaft - tuning	.18
112864	Shield - for tubes	.03
112865	Shield - base, for tubes	.03
113094	Socket - pilot light assem.	.15
114117	Socket - dial lamp	.18
114876	Socket - octal base	.15
114878	Socket - octal base with spec. ground	.15
110501	Socket - speaker (4 prong)	.16
113177	Spring - dial cord tension	.09
116311	Tab - station call letter sheets	.35
114698	Tab - celluloid for push buttons	.03
84407	Terminal Strip - phono	.12
85068	Terminal Strip - G.D.A.	.20
87588	Washer - embossed (for mtg. elect.)	.05
116530	Washer - (paper) for back of knobs	.005
110829	Washer - flat steel, for mtg. chassis	.01

01-81, 08-81 AND 010-81 CHASSIS
SOCKET VOLTAGES



Use a high resistance voltmeter of at least 1000 ohms per volt.

NOTE A: The bias for the 6K7 R.F., 6A8G, 6K7 I.F., Diode Plates D₁ and D₂ of the 6Q7G and Diode Plate D₂ of the 6H6 tube is -3 volts, measured across resistors 51B and 51C.

NOTE B: The bias for the control grid of the 6Q7G tube is -1.8 volts, measured across resistor 51C.

NOTE C: The bias for the control grid of the 6F6G tube is -17 volts, measured across resistors 51A, 51B and 51C.

- ① Connect the output meter across the voice coil or between the plate of the 6FGG output tube and ground, in series with a .1 mfd. condenser depending upon the type of meter. (The more sensitive type should be connected across the voice coil.)
- ② Connect the ground lead of the signal generator to the receiver chassis or to the "g" terminal at the back of the chassis. NOTE:- The "g" and "d" terminals on this terminal strip must be connected together.
- ③ Turn the volume control to the maximum volume position and keep it in this position throughout the alignment procedure.
- ④ With the gang condenser in full mesh, set the pointer to the last mark on the left end of the dial scale. If the pointer is incorrectly set, it is only necessary to loosen the set screw on the dial cord drive drum and push the gang condenser in full mesh with the pointer properly set, then retighten the set screw.

5 465 KC. MINIMUM OUTPUT

9 600 KC. ROCK DIAL

6 1500 KC. OSC.

10 14 MC. OSC.

11 14 MC. ANT. ROCK DIAL

7 1500 KC.

8 1500 KC. (SEE NOTE BELOW)

6K7

6A8G

6J5G

5W4G

465 KC.

4

3

2

1

6F6G

6Q7G

6H6

6K7

465 KC.

TOP VIEW OF CHASSIS

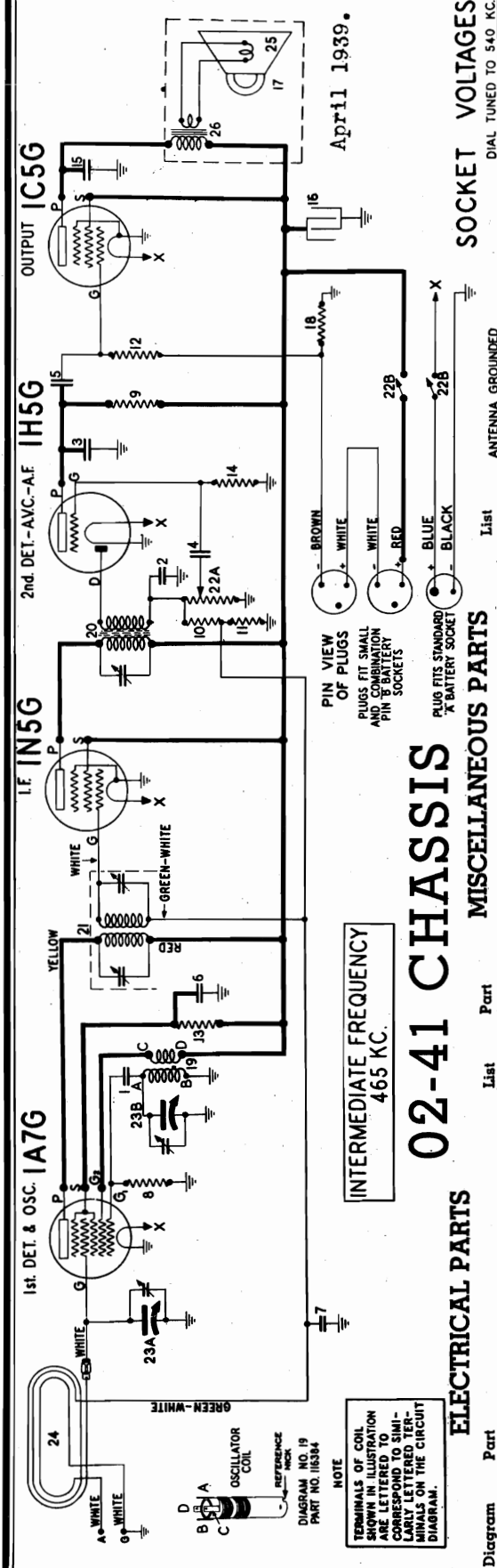
BOTTOM VIEW OF CHASSIS

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STEWART-WARNER CORP.

MODELS 02-411 to 02-419
Chassis 02-41
Schematic, Voltage
Socket, Notes



02-41 CHASSIS

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1-2-3	85061	Condenser—mica .51 mmfd.	\$.05
4-5	88030	Condenser—paper .01 mfd. 400 volt	.25
6-7	88189	Condenser—paper .05 mfd. 200 volt	.25
8	110553	Resistor—carbon 220,000 ohms 1/4 watt	.12
9	110554	Resistor—carbon 1 megohm 1/4 watt	.12
10-11-12	110570	Resistor—carbon 2.2 meg. 1/4 watt	.15
13	110578	Resistor—carbon 68,000 ohms 1/4 watt	.12
14	110580	Resistor—carbon 3.3 meg. 1/4 watt	.12
15	113035	Condenser—ceramic tube .006 mfd. 600 volt	.14
16	113118	Condenser—electrolytic 8 mfd. 150 volt	.56
17	R-115049	Speaker—P.M. dynamic (5 1/4")	6.25
18	116061	Resistor—800 ohm 1/4 watt 10%	.12
19	116384	Coil—oscillator	.45
20	116395	Transformer—2nd I.F.	.90
21	116396	Transformer—1st I.F.	1.20
22A-22B	116393	Volume control—1 meg. (with on-off switch)	.96
23A-23B	116401	Condenser—variable gang	2.75
24	116437	Loop antenna assembly	1.60
25	R-116461	Cone and voice coil for R-115049 speaker	1.55
26	R-116462	Transformer—output for R-115049 speaker	.90

MISCELLANEOUS PARTS

Part Number	Description	List Price
116399	Cable—for batteries	\$.60
116441	Cabinet	6.25
112745	Clip—coil mounting	.01
113019	Clip—dial scale retaining	.01
113178	Cord—dial (supplied in 4 ft. lengths)	.30
116442	Dial scale	.18
116418	Grille—for speaker	.40
116405	Indicator—on-off	.18
116411	Indicator lever assembly	.09
116416	Knob—for tuning or volume	.12
116488	Nut—No. 8-32 wing nut	.01
116409	Pointer	.05
81145	Retaining ring—for drive shaft	.50
116455	Screw—chassis mounting (No. 10x3/4)	.01
85827	Set screw—No. 8-32 square head	.02
116403	Shaft, tuning	.08
116395	Shield—tube	.08
116396	Shield cap—tube	.02
116392	Shield base—tube	.03
114876	Socket—octal base	.15
113169	Spring—for indicator lever	.01
111981	Spring—for dial cord tension	.03
85795	Terminal strip—antenna—ground	.15
84015	Washer—paper, for back of knobs	.01
116414	Window dial	.25

In this receiver, the loop antenna on the back of the cover of the case, takes the place of the antenna, and the batteries must be mounted in the cabinet in their correct position.

Holes are provided in the bottom of the case to permit the adjustment of both antenna and oscillator trimmers with the receiver completely assembled. These two adjustments should be made with a signal generator but without an output meter since it is impractical to keep the output meter connected when the back is mounted on the cabinet. That is, the antenna and oscillator trimmers can be adjusted by ear using a signal generator. The I F trimmers must be adjusted with an output meter in the conventional way.

MODELS 02-411 to 02-419
Chassis 02-41
Alignment, Trimmers
Loop, Battery Data

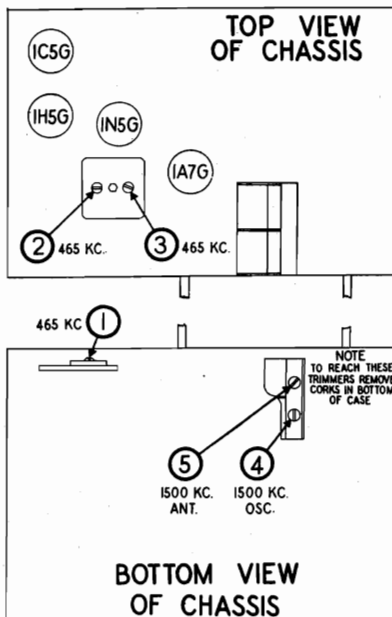
STEWART-WARNER CORP.

ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT an output meter and an accurately calibrated signal generator are required.

1. Connect the output meter across the voice coil or between the plate of the 1C5G output tube and ground through a 0.1 Mfd. condenser, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the Ground Terminal or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position while aligning.
4. With the gang condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang in the full mesh position.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Control Grid of 1A7G	465 KC	Any Point Where It Does Not Affect Signal	1	2nd I.F.	Adjust for maximum out- put. Then repeat adjust- ment.
				2-3	1st I.F.	
Before proceeding further with alignment, disconnect the output meter, and replace chassis, batteries and loop in cabinet, being sure to connect the loop. Using a weak signal from the signal generator, make the following adjustments by ear. The trimmers may be reached through the holes in the bottom of the cabinet by removing corks.						
400 Ohm Carbon Resistor	Antenna Terminal On Bottom Of Cabinet	1500 KC	1500 KC	4	Broadcast Oscillator (Shunt)	Adjust trimmer for max- imum output.
400 Ohm Carbon Resistor	Antenna Terminal On Bottom Of Cabinet	1500 KC	Tune To 1500 KC Generator Signal	5	Broadcast Antenna	Adjust for maximum output.



LOOP ANTENNA

A built-in loop antenna is incorporated in this receiver. Due to the directional effect of this type of antenna it will often be possible to increase the signal volume by rotating the entire set.

In some locations it may be desirable to install an external antenna to increase the volume of weak or distant stations. This external antenna should be connected to the screw marked A on the terminal strip located on the bottom of the receiver case. Connect a ground wire to the post marked G on the same terminal strip.

NOTE: You must connect a ground wire to this receiver when using a separate outside aerial, otherwise you will not obtain a satisfactory increase in signal pickup.

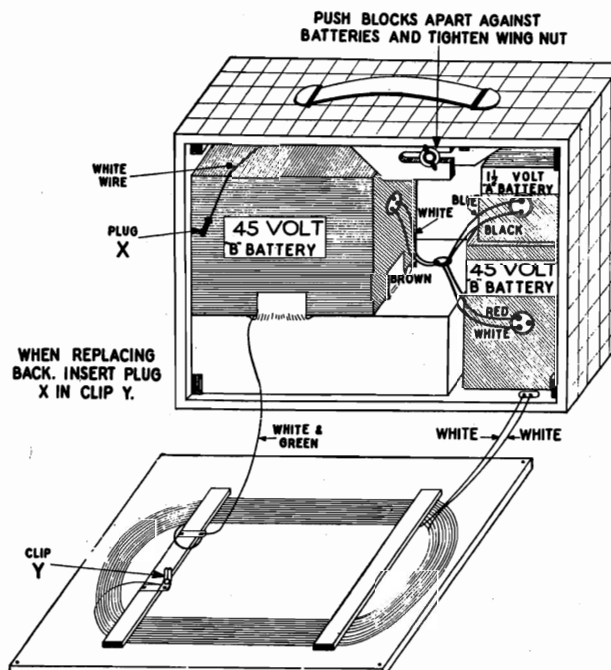
INSTALLATION OF BATTERIES

The following 1½ volt "A" batteries will fit the space provided: Burgess No. 4FAP1, Eveready No. 742, or Ray-O-Vac No. P94A.

"B" batteries of the proper size are Burgess B30PI, Eveready No. 762 and Ray-O-Vac No. 5303.

A plug and clip connection on the loop is provided to facilitate the installation of batteries. Before replacing the back of the cabinet always be sure that this plug is pushed into the clip and that the blocks are holding the batteries firmly in their positions.

Do not permit any of the battery cable plugs to come in contact with the receiver chassis or any battery terminal other than that to which it is to be connected.

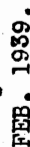


To prevent filter condenser and rectifier tube failure caused by line surges, a 50 ohm resistor is connected in the rectifier cathode circuit.

Chassis 07-51

07-5118 to 07-5198

50 ohm resistor is connected in the rectifier cathode circuit.



<u>DIAGRAM</u>	<u>PART</u>	<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>LIST</u>
				<u>PRICE</u>
1-2	85539	Condenser	mica 280 mfd.	.20
3	87963	Condenser	mica 110 mfd.	.20
4	88024	Connector	ground	.01
5	88024	Connector	ground	.01
6-7	88028	Condenser	paper .004 mfd. 400 volt	.25
8	88189	Condenser	paper .05 mfd. 200 volt	.25
9	88278	Resistor	wire wound 140 ohms $\frac{1}{2}$ w.	.25
10	88278	Resistor	wire wound 140 ohms $\frac{1}{2}$ w.	.25
11	10554	Condenser	paper 220 mfd. 200 volt	.12
12	10554	Condenser	paper 220 mfd. 200 volt	.12
13	10559	Resistor	carb. 670,000 ohms $\frac{1}{2}$ watt	.12
14	10578	Resistor	carb. 400,000 ohms $\frac{1}{2}$ watt	.12
15	10580	Resistor	carb. 3.3 meg. $\frac{1}{4}$ watt	.12
16	10589	Lamp	6.3 volt - .25 amps	.15
17	10592	Condenser	paper 100 mfd. 200 volt	.12
18	11252	Condenser	paper 100 mfd. 200 volt	.12
19	12875	Resistor	carbon 10 meg. $\frac{1}{4}$ watt	.12
20	12894	Resistor	carbon 10 meg. $\frac{1}{4}$ watt	.12
21	12896	Resistor	carb. 220 ohms $\frac{1}{4}$ watt	.15
22	14108	Condenser	carb. 15,000 ohms $\frac{1}{4}$ w.	.25
23	14197	Condenser	paper 100 mfd. 750 volt	.98
24	14197	Condenser	paper 100 mfd. 750 volt	.98
25	14802	Transformer	1st. t.f.	1.10
25A	14868	Cond.	dual output, 18 mfd. 150 V.	
26	14870	Condenser	variable gang	.25
27	14870	Condenser	variable gang	.25
28	14873	Antenna coil		.25
29	14873	Antenna coil		.25
29A	14879	Volume control	1 meg. with switch	
30	14880	Transformer	2nd t.f.	
31	14885	Transformer	output for R-115041 spkr	
32	14885	Transformer	output for R-115041 spkr	
33	R-14886	Cons & Voice Coil	for C-15041 phor	
34	O-16543	Cons & Voice Coil	for C-15041 phor	
35	R-15041	Speaker	dynamic (4 inch)	
36	R-15041	Speaker	dynamic (4 inch)	
37	16013	Resistor	50 ohms 1 watt	
38	16024	Condenser	mica 280 mfd. 500 volt	
39	16024	Condenser	mica 280 mfd. 500 volt	
39A	16542	Output transformer	for C-115041 spkr	
39B	16542	Output transformer	for C-115041 spkr	
39C	16543	Cons & Voice Coil	for C-115041 spkr	
39D	16543	Cons & Voice Coil	for C-115041 spkr	
39E	16543	Cons & Voice Coil	for C-115041 spkr	
39F	16543	Cons & Voice Coil	for C-115041 spkr	
39G	16543	Cons & Voice Coil	for C-115041 spkr	
39H	16543	Cons & Voice Coil	for C-115041 spkr	
39I	16543	Cons & Voice Coil	for C-115041 spkr	
39J	16543	Cons & Voice Coil	for C-115041 spkr	
39K	16543	Cons & Voice Coil	for C-115041 spkr	
39L	16543	Cons & Voice Coil	for C-115041 spkr	
39M	16543	Cons & Voice Coil	for C-115041 spkr	
39N	16543	Cons & Voice Coil	for C-115041 spkr	
39O	16543	Cons & Voice Coil	for C-115041 spkr	
39P	16543	Cons & Voice Coil	for C-115041 spkr	
39Q	16543	Cons & Voice Coil	for C-115041 spkr	
39R	16543	Cons & Voice Coil	for C-115041 spkr	
39S	16543	Cons & Voice Coil	for C-115041 spkr	
39T	16543	Cons & Voice Coil	for C-115041 spkr	
39U	16543	Cons & Voice Coil	for C-115041 spkr	
39V	16543	Cons & Voice Coil	for C-115041 spkr	
39W	16543	Cons & Voice Coil	for C-115041 spkr	
39X	16543	Cons & Voice Coil	for C-115041 spkr	
39Y	16543	Cons & Voice Coil	for C-115041 spkr	
39Z	16543	Cons & Voice Coil	for C-115041 spkr	

OSCILLATOR COIL

ANTENNA COIL

DIAGRAM NO. 27
PART NO. 114872

DIAGRAM NO. 28
PART NO. 114873

A OF CHASSIS, and connect all external and **BOTTOM VIEW OF CHASSIS**

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS UNLESS

LINE VOLTAGE 117 VOLTS.

VOLTAGE ACROSS SPEAKER FIELD 20 VOLTS

NOTE

TERMINALS OF COILS SHOWN
IN PICTORIAL VIEWS ABOVE ARE
LETTERED TO CORRESPOND TO
SIMILARLY LETTERED TERMINALS
ON THE CIRCUIT DIAGRAM.

REAR OF CHASSIS

Resistor No.

IMPORTANT: Use a high resistance voltmeter of at least 1000 ohms per volt.

MODELS 07-511 to 07-519

07-511S to 07-519S

STEWART-WARNER CORP.

Alignment, Trimmers

Antenna Notes

07-51 CHASSIS

ALIGNMENT PROCEDURE

ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

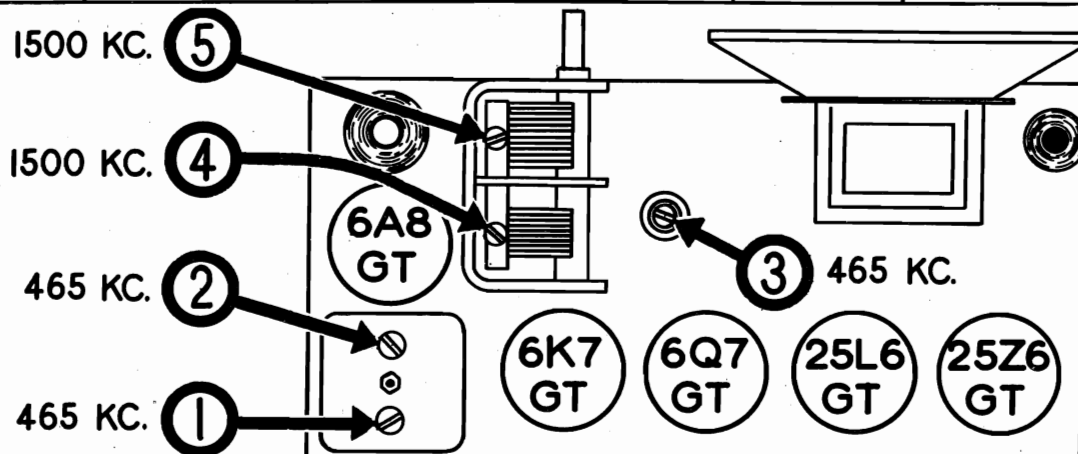
Connect the output meter across the voice coil or between the plate of the 25L6-GT output tube and ground through a .1 mfd. condenser, depending upon the type of meter. The more sensitive type should be connected across the voice coil.

Connect the ground lead of the signal generator to the chassis of the receiver through a .25 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as the signal generator may be connected to one side of the power line, or it may be grounded externally.

Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

Remove the connector between Terminals A and A₁.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECTION OF SIG. GENERATOR TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
200 MMFD. MICA CONDENSER	CONTROL GRID OF 6A8-G TUBE	465 KC	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	1ST I. F.	ADJUST FOR MAXIMUM OUTPUT THEN REPEAT ADJUSTMENT
				3	2ND I. F.	
200 MMFD. MICA CONDENSER	ANTENNA TERMINAL (A)	1500 KC	1500 KC	4	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
200 MMFD. MICA CONDENSER	ANTENNA TERMINAL (A)	1500 KC	TUNE TO 1500 KC GENERATOR SIGNAL	5	BROADCAST ANTENNA (Shunt)	ADJUST FOR MAXIMUM OUTPUT.



MISCELLANEOUS PARTS

BUILT-IN ANTENNA SYSTEM

The Built-In Antenna incorporated in this receiver will generally give very satisfactory results in localities where powerful broadcast stations exist. This Built-In Antenna will function when terminals A and A₁ on the back of the chassis are connected together. In cases where noises are excessive or greater sensitivity is desired, remove the jumper connecting terminals A and A₁ and connect an external antenna to terminal A.

Refer to the circuit diagram on the opposite page. Condenser No. 35 couples the primary of the antenna coil to one side of the power line, which acts as the antenna. The R. F. choke No. 36 is an iron-core choke whose impedance is high at broadcast frequencies. This choke serves to prevent feed-back into the antenna circuit, of radio frequency energy generated in the set itself. It also prevents condenser No. 18 from by-passing the signal voltage picked up by the power line.

When aligning this receiver, the jumper connecting terminals A and A₁ should be removed. This will prevent picking up signals which might interfere with the alignment procedure. When the I. F. channel is being aligned, the gang condenser should be set at a point where no interfering signal will be received.

PART NUMBER	DESCRIPTION	LIST PRICE
112745	Clip - coil mounting	.01
114876	Socket - octal base	.15
114982	Socket - for dial lamp	.20
116223	Terminal Strip - for antenna (A-A ₁)	.12

CABINETS

114900	Cabinet - ivory (plaskon) for 07-512	5.50
114950	Cabinet - walnut; for 07-511	3.00
116338	Cabinet - sprayed ivory for 07-513	4.25
116339	Cabinet - metallic blue	4.25
116340	Cabinet - metallic red	4.25
116341	Cabinet - metallic green	4.25

CABINET BACKS

116369	Cabinet back (ivory) for 07-512	.10
116370	Cabinet back (ivory) for 07-512-S	.10
116371	Cabinet back (walnut) for 07-511 & 07-513	.10

TUNING KNOBS

114973	Knob - tuning (red)	.45
116297	Knob - tuning (ivory)	.40

VOLUME KNOBS

114867	Knob - volume (red)	.08
116299	Knob - volume (ivory)	.08

07-551 to 07-559

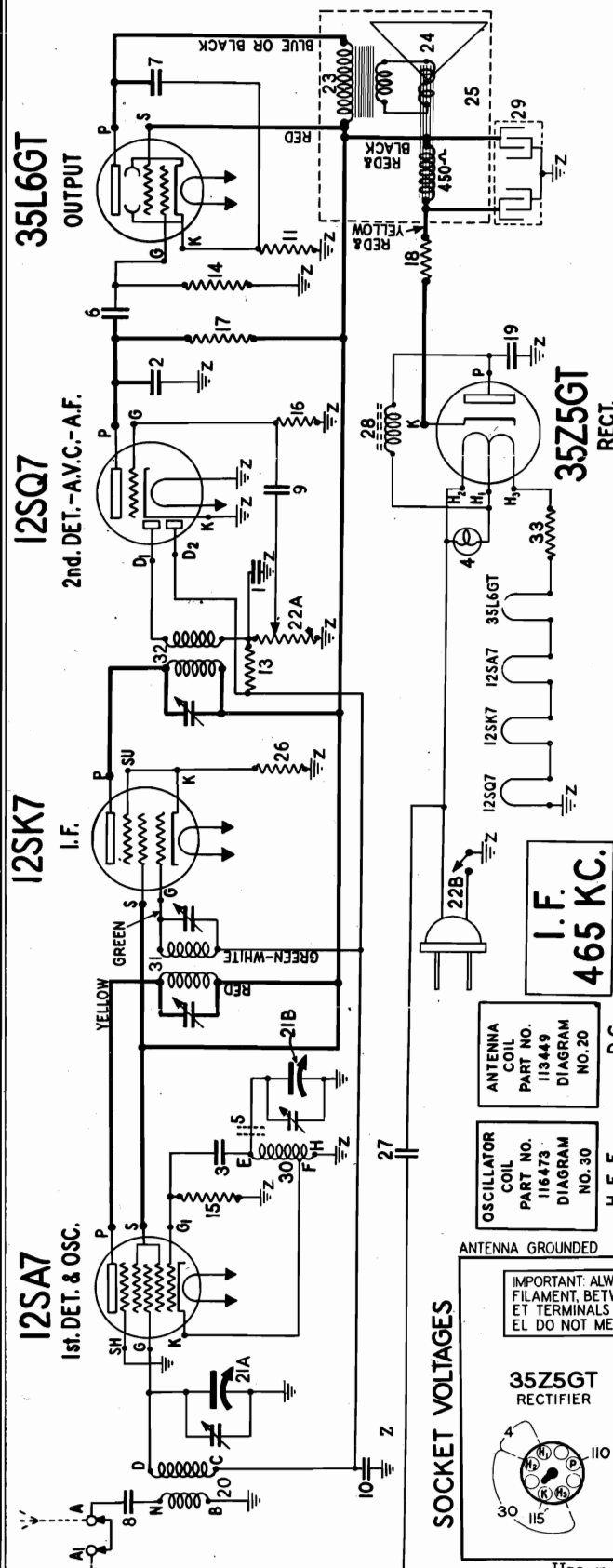
MODELS 07-511H to 07-519H

Chassis 07-55

Schematic, Voltage

Socket, Notes

STEWART-WARNER CORP Chassis 07-51H



APPLIES ONLY TO CHASSIS STAMPED 07-51H OR 07-55.

Diagram Number	Part Number	Description	List Price
1-2	85559	Condenser—mica 260 mfd.	2.85
3	85783	Condenser—mica, 110 mfd.	.96
4	85296	Lamp—dial 6 to 8 volt, 25 amps.	1.75
5	88026	Condenser—paper .02 mfd., 400 volt (07-55 only)	1.25
6-7	88026	Condenser—paper .02 mfd., 400 volt	1.65
8-9	88029	Condenser—paper .05 mfd., 200 volt	\$1.00
10	88189	Condenser—paper .05 mfd., 200 volt	1.50
11	89276	Resistor—wire wound 140 ohms 1/2 watt	4.70
13-14	89421	Condenser—paper 1 mfd. 200 volt	4.70
15	110559	Resistor—carbon 470,000 ohms 1/4 watt	3.75
16	110578	Resistor—carbon 68,000 ohms 1/4 watt	.12
17	110580	Resistor—carbon 3.3 meg. 1/4 watt	.15
18	110591	Resistor—carbon 680,000 ohms 1/2 watt (10%)	.48
19	110975	Resistor—wire wound 33 ohms 1/2 watt	1.75
20	111252	Condenser—paper .05 mfd., 400 volt	1.50
21	113449	Coil—antenna	.35
22	116232	R. F. Choke	1.10
23	0-115051	Speaker—dynamic 4" (07-51H)	1.25
24	0-115041	Speaker—dynamic 4" (07-51H)	1.65
25	0-115051	Speaker—dynamic 4" (07-55)	1.25
26	116062	Resistor—150 ohms \pm 20% 1/4 watt	.12
27	116224	Condenser—mica 260 mfd., 500 volt	.15
28	0-116342	Transformer—output for 0-115041 speaker	1.75
29	0-116343	Cone & voice coil assembly for 0-115041	1.50
30	116470	Coil—oscillator	.35
31	116473	Transformer—1st i.F.	1.10
32	116475	Transformer—2nd i.F.	1.00
33	0-116487	Transformer—output for 0-115051 speaker	1.25
	R-116524	Transformer—output for R-115051 speaker	1.65
	116527	Resistor—100 ohms \pm 10% 3 watt W.W.	.26

GROUNDS MARKED "Z"

07-55 CHASSIS: ALL GROUNDS MARKED "Z" ARE NOT CONNECTED DIRECTLY TO CHASSIS BUT ARE CONNECTED TOGETHER AND GROUNDED TO CHASSIS THROUGH .1 MFD. CONDENSER (PART NO. 89421).

07-51H CHASSIS: GROUNDS MARKED "Z" CONNECTED DIRECTLY TO CHASSIS.

ANTENNA GROUNDED

IMPORTANT: ALWAYS MEASURE ALL VOLTAGES, EXCEPT FILAMENT, BETWEEN THIS LUG AND THE TUBE SOCKET TERMINALS ON THE 07-55 CHASSIS. IN THIS MODEL DO NOT MEASURE VOLTAGES TO CHASSIS.

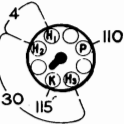
VOLUME CONTROL

DIAL TUNED TO 540 KC

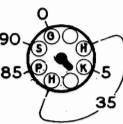
LINE VOLTAGE 117 VOLTS

VOLTAGE ACROSS SPEAKER FIELD 25 VOLTS

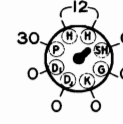
35Z5GT RECTIFIER



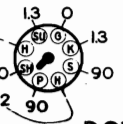
35L6GT OUTPUT



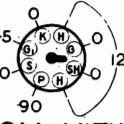
12SQ7 2ND DET.-A.V.C.-A.F.



12SK7 I.F.



12SA7 1ST DET & OSC



MODELS 07-511H to 07-519H

Chassis 07-51H

07-551 to 07-559

Chassis 07-55

Alignment, Trimmers

Antenna Data

STEWART-WARNER CORP.

ALIGNMENT PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator are required.

1. On the 07-51H, connect the output meter across the voice coil or between the plate of the 35L6GT output tube and chassis through a .1 mfd. condenser, depending upon the type of meter. The more sensitive type should be connected across the voice coil. THE CONNECTIONS FOR THE 07-55 ARE THE SAME EXCEPT CONNECT THE GROUND LEAD TO THE POINT SHOWN IN FIG. 2 INSTEAD OF TO CHASSIS.
2. When aligning the 07-51H chassis, connect the ground lead of the signal generator to the chassis of the receiver through a .25 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. FOR THE GROUND LEAD CONNECTION TO THE 07-55 CHASSIS, REFER TO "BOTTOM VIEW," FIG. 2.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. Remove the connector between Terminals A and A₁.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator To Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
200 MMFD. Mica Condenser	Trimmer Lug On Front Section Of Variable Condenser	465 KC	1750 KC	1	2nd I.F.	Adjust for Maximum Output. Then Repeat Adjustment.
				2-3	1st I.F.	
200 MMFD. Mica Condenser	Antenna Terminal (A)	1500 KC	1500 KC	4	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
200 MMFD. Mica Condenser	Antenna Terminal (A)	1500 KC	Tune To 1500 KC Generator Signal	5	Broadcast Antenna (Shunt)	Adjust for Maximum Output.

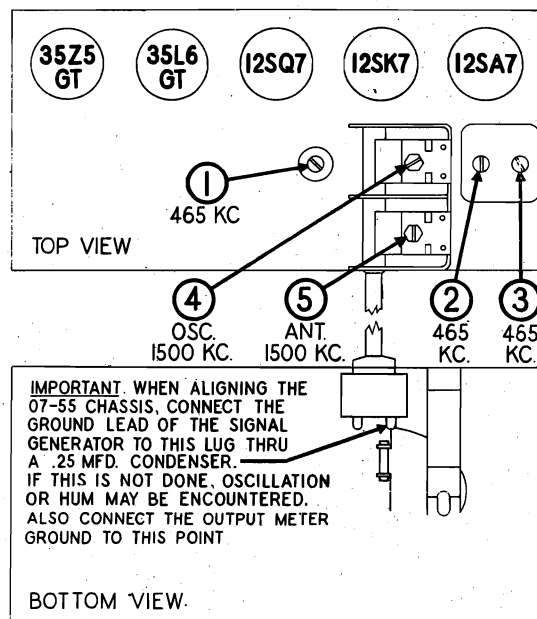


Fig. 2

BUILT-IN ANTENNA SYSTEM

The Built-In Antenna incorporated in this receiver will generally give very satisfactory results in localities where powerful broadcast stations exist. This Built-In Antenna will function when terminals A and A₁ on the back of the chassis are connected together. In cases where noise is excessive or greater sensitivity is desired, remove the jumper connecting terminals A and A₁ and connect an external antenna to terminal A.

The Built-In Antenna Condenser No. 27 couples the

primary of the antenna coil to one side of the power line, which acts as the antenna. The R. F. choke No. 28 is an iron-core choke whose impedance is high at broadcast frequencies. This choke serves to prevent condenser No. 19 from by-passing the signal voltage picked up by the power line. It also prevents feed-back into the antenna circuit of radio frequency energy generated in the set itself.

When aligning this receiver, the jumper connecting terminals A and A₁ should be removed. This will prevent picking up signals which might interfere with the alignment procedure.

MISCELLANEOUS PARTS

Part No.	Description	List Price
116485	Asbestos Pad-Model 07-55 only.....	\$0.03
116467	Base-Condenser Mounting.....	.04
116471	Cover for elect. condenser-(07-55) only.....	.05
116651	Clamp for power cord-(07-55) only.....	.02
112745	Clip-coil mounting.....	.01
114982	Socket-for dial lamp.....	.20
114876	Socket-octal base.....	.15
85040	Screw-No. 6 Hex. Hd.-Per C.....	.35
116223	Terminal strip-antenna (A-A ₁).....	.12

CABINETS

116750	Cabinet (wood)-(07-514H) and (07-554).....	7.00
116341	Cabinet (metallic green)-(07-513H) (07-553).....	2.75
116340	Cabinet (metallic red)-(07-513H) (07-553).....	2.75
116339	Cabinet (metallic blue)-(07-513H) (07-553).....	2.75
116338	Cabinet (sprayed ivory)-(07-513H) (07-553).....	2.75
114950	Cabinet (walnut)-(07-511H) (07-551).....	2.00
114900	Cabinet (ivory plaskon)-(07-512H) (07-512H-S) (07-552S) (07-552).....	3.40

CABINET BACK

116497	Cabinet Back (walnut) (07-511H) (07-513H).....	.12
116496	Cabinet Back (ivory) (07-513H) (07-512H).....	.12
116481	Cabinet Back (ivory) (07-552S).....	.12
116480	Cabinet Back (walnut) (07-551) (07-553).....	.12
116477	Cabinet Back (ivory) (07-551) (07-553) (07-552).....	.12

TUNING KNOBS

116297	Knob-tuning (ivory)-(07-513H) (07-553).....	.40
114975	Knob-tuning (walnut)-(07-511H) (07-551) (07-514H).....	.45
114973	Knob-tuning (red)-(07-512H) (07-512H-S) (07-513H) (07-553) (07-552) (07-552S).....	.45

VOLUME KNOBS

116299	Knob-tuning (ivory) (07-513H) (07-553).....	.08
114933	Knob-tuning (walnut) (07-511H) (07-514H) (07-551).....	.12
114867	Knob-tuning (red) (07-512H-S) (07-512H) (07-513H) (07-552S) (07-552) (07-553).....	.08

STEWART-WARNER CORP.

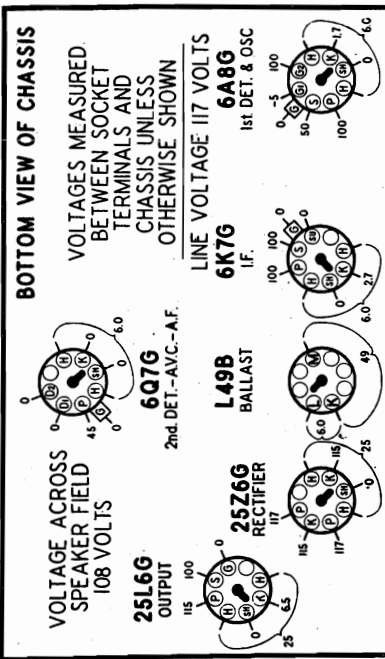


NOTE: Terminals of coils shown in pictorial views are lettered to correspond to similarly lettered terminals on the circuit diagram.

DIAGRAM NO. 26
PART NO. 113042

DIAGRAM NO. 32
PART NO. 113449

ANTENNA GROUNDED
SOCKET VOLTAGES
DIAL TUNED TO 540 KC



REAR OF CHASSIS

Use a high resistance voltmeter of at least 1,000 ohms per volt.

DIAL & MISCELLANEOUS PARTS

Part No.	Description	List Price
113170	Adjusting lug—for button shafts.	
113171	Bracket—for dial and condenser mtg.	\$0.01
112776	Celluloid cover—over dial face	.64
112745	Clip for coil mtg.	.28
112764	Clip—dial scale retaining.	.01
112798	Clip for wave trap mtg.	.01
113178	Cord—dial (supplied in 4 ft. lengths).	.01
113179	Dial Drum—and pinion assembly	.30
116175	Dial scale	.44
113015	Escutcheon—for push buttons	.44
113013	Escutcheon—dial	.32
112951	Gear and Bushing assembly for dial drive	.30
113025	Knob—tone and volume control.	.35
113026	Mechanical tuner assembly; keys & housing only	.22
113470	Plastic—dial	.10
112770	Puller—dial cord drive	3.00
112762	Puller—dial cord drive	.08
113103	Push button—dial drive	.04
113103	Push button (waicut)	.06
81145	Retaining Ring—for tuning shaft	.50
114598	Rubber tube—for tuning shaft	Per C
85040	Screw—No. 6 x 1/4 Hex. Hd. for Mtg. Adjust. Lug	.01
112874	Screw for chassis mtg. 10 "1/2"	.35
114431	Screw—No. 6-40 x 3/8" for setting up buttons.	.01
114914	Screw special head for mtg. escutcheon. Per dz.	.15
85827	Set Screw—8-32 square head	.12
113176	Shaft—dial drive	.18
112864	Shield—for tubes	.08
112865	Shield—base; for tubes	.03
112847	Socket—for dial lamp	.22
114876	Socket—octal base	.15
113189	Spring—for key return.	.01
113177	Spring—dial cord tension.	.09
113189	Tab—celluloid for push button.	Per dz.
113321	Tabs—station call letters for push buttons.	.09
116530	Washer—paper for back of knobs.	.005
110829	Washer for chassis mtg.	.01

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1-2	83539	Condenser-mica 260 mmfd.	\$0.20
3	85061	Condenser-51 mmfd.	.15
4-5	88026	Condenser-paper .02 mfd. 400 volt.	.25
6	88029	Condenser-paper .04 mfd. 400 volt.	.25
7	88030	Condenser-paper .01 mfd. 400 volt.	.25
8	88054	Switch-tone control	.30
9	88168	Condenser-paper .05 mfd. 200 volt.	.25
10-11-12	89421	Condenser-paper 1 mfd. 200 volt.	.12
13	110632	Resistor-carbon 47,000 ohms $\frac{1}{4}$ watt	.12
14	110633	Resistor-carbon 220,000 ohms $\frac{1}{4}$ watt	.12
15	110634	Resistor-carbon 470,000 ohms $\frac{1}{4}$ watt	.12
16	110635	Resistor-carbon 33,000 ohms $\frac{1}{4}$ watt	.12
17	110636	Resistor-carbon 33 meg. $\frac{1}{4}$ watt.	.12
18	110639	Knob	.12
19-20	112628	Resistor-electrolytic 16 mfd. 150 v.	.50
21-22	112951	Resistor-carbon 10 meg. $\frac{1}{4}$ watt.	.12
23	112975	Resistor-carbon 10 meg. $\frac{1}{4}$ watt.	.12
24	113024	Condenser-paper .04 mfd. 600 volt.	.15
25	113035	Condenser-paper .006 mfd. 600 volt.	.45
26	113042	Coil-oscillator	.45
27	113046	Transformer-1st I.F.	1.00
28	113047	Transformer-2nd I.F.	1.10
29	113119	Coil-wave trap (with trimmer)	.50
30-30A-30B	113150	Condenser-variable gang	3.00
31	113365	Ballast Resistor (tube) L-43-B.	.50
32	113449	Coil-antenna	.78
33	113472	Condenser-electrolytic 40 mfd. 150 v.	.56
34	U-115044	Speaker-dynamic 5"	4.80
35	118060	Resistor-carbon 1500 ohms $\frac{1}{2}$ watt	.15
36	118272	Volume control-1 meg. with switch	.94
37	118275	Resistor-wire wound 50 ohms $\frac{1}{2}$ watt	.15
38	118301	Resistor-wire wound 80 ohms 1 watt	.15
39	U-118306	One-volt coil for U-115044 speaker	1.40
40	U-118307	Output transformer for U-115044 spkr.	1.75

MODELS 07-631 to 07-639
Chassis 07-63
Alignment, Trimmers, Tuner
Drive Cord Data

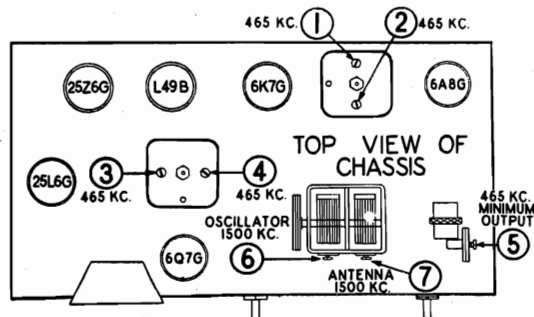
STEWART-WARNER CORP.

ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

1. Connect the output meter across the voice coil or between the plate of the 25L6-G output tube and chassis through a .1 mfd. condenser, depending upon the type of meter. The more sensitive type should be connected across the voice coil.
2. Connect the ground lead of the signal generator to the chassis of the receiver through a .25 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as the signal generator may be connected to one side of the power line, or it may be grounded externally.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, set the pointer to the last mark on the right end of the dial scale. If the pointer is only slightly off calibration, loosen the set-screw in the dial drive drum at the left side of the gang condenser and set the pointer to the last mark on the right end of the dial when the gang condenser is in full mesh. If the pointer is off calibration several dial divisions, release it from the pointer drive cord by spreading the clip on the pointer. Then slide the pointer along the cord until it is set to the last dial division on the right end of the dial. Holding it in place check to see if the gang condenser is in full mesh, and tighten the pointer clip, being careful not to cut the cord. Place a drop of household or speaker cement on the cord and pointer clip to prevent the pointer from slipping.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
200 MMFD. Mica Condenser	Control Grid of 6A8-G Tube	465 KC	Any Point Where It Does Not Affect The Signal	1-2	1st I.F.	Adjust for Maximum Output. Then Repeat Adjustment.
				3-4	2nd I.F.	
200 MMFD. Mica Condenser	Antenna Lead (Blue Wire)	465 KC	Any Point Where It Does Not Affect The Signal	5	Wave Trap	Adjust for Minimum Output Using a Strong Generator Signal.
200 MMFD. Mica Condenser	Antenna Lead (Blue Wire)	1500 KC	1500 KC	6	Broadcast Oscillator (Shunt)	Adjust Trimmer to Bring in Signal.
200 MMFD. Mica Condenser	Antenna Lead (Blue Wire)	1500 KC	Tune To 1500 KC Generator Signal	7	Broadcast Antenna (Shunt)	Adjust for Maximum Output.

**HOW TO SET UP PUSH BUTTONS**

1. Before setting up buttons, turn on set for at least 15 minutes. To set up a push button, pull off the button cap by grasping the button and pulling upward on it. When the button is removed, the set-up screw will be exposed to view (See Fig. 1). Insert a screw-driver in this screw and loosen it (about one turn counter-clockwise will be sufficient).
2. Keeping the screw-driver in the screw slot, PUSH AGAINST THE SCREW-DRIVER UNTIL THE PUSH BUTTON SHAFT IS FORCED ALL THE WAY IN. While the button is held in this position, grasp the tuning knob and tune in the desired station. Then retighten the adjusting screw, turning clockwise until reasonably tight.

WARNING: Do not attempt to turn the screw until it reaches a definite stop. Merely turn until you meet with appreciable resistance. To turn further may result in damage to the mechanism.

HOW TO REPLACE THE DIAL DRIVE CORD

1. Close the gang condenser. The set screw in the drum, Fig. 1, must be on the top side.
2. Tie one end of the dial cord to the spring L and thread the other end through hole A and down the front of the drum to the tuning shaft. Continue around the shaft, then over pulley B and up the rear side of the drum.

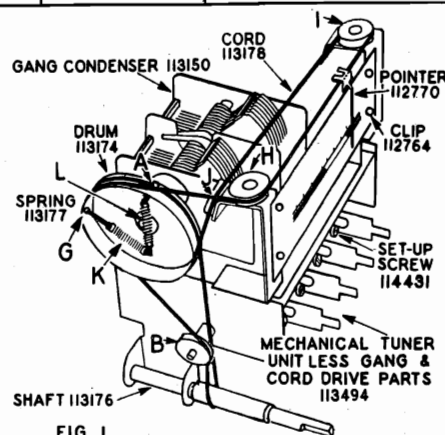


FIG. 1

3. Thread the cord through hole A and tie the other end to spring L. Tie the cord so that spring L will be extended to about 3/4 inch.

HOW TO REPLACE DIAL POINTER DRIVE CORD

1. Close the gang condenser and thread one end of the cord through eyelet G and tie it to spring K.
2. Carry the other end of the cord over the drum to the front around pulley H and then across to pulley I and counter-clockwise around it.
3. Continue back to pulley J and down the front of the drum. Carry the end of the cord on around the drum and thread through eyelet G.
4. Tie both ends extending through eyelet G to tension spring K.
IMPORTANT: In so doing, allow enough slack in the cord so that when spring K is hooked in place in the drum, it will be extended only a very little. If the spring is extended too much, it will tend to make the push button operate too hard because of overloading.
5. Be sure the gang condenser is closed, then set the dial pointer to the last dial division mark on the right and clip it to the cord

MODELS 255L, 255LB

STROMBERG-CARLSON TEL. MFG. CO. Schematic

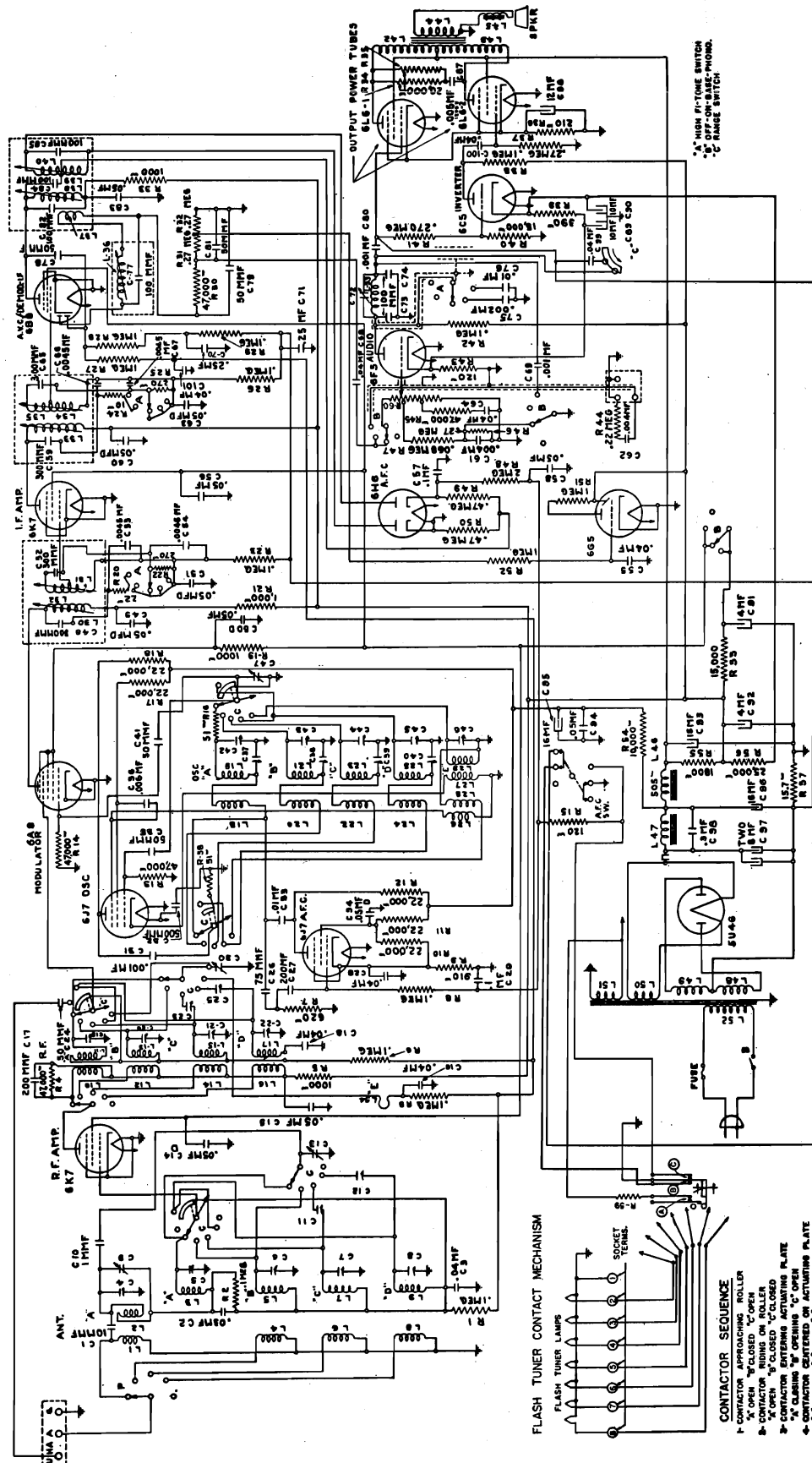


Fig. 2. Schematic Circuit.

APPARATUS SPECIFICATIONS

No. 255-L 50 to 60 Cycles; P-27633 Chassis; P-27504 Loud Speaker
 No. 255-LB 25 to 60 Cycles; P-27634 Chassis; P-27504 Loud Speaker

IF PEAK 465 KC

MODELS 255L, 255LB

Chassis Views

STROMBERG-CARLSON TEL. MFG. CO.

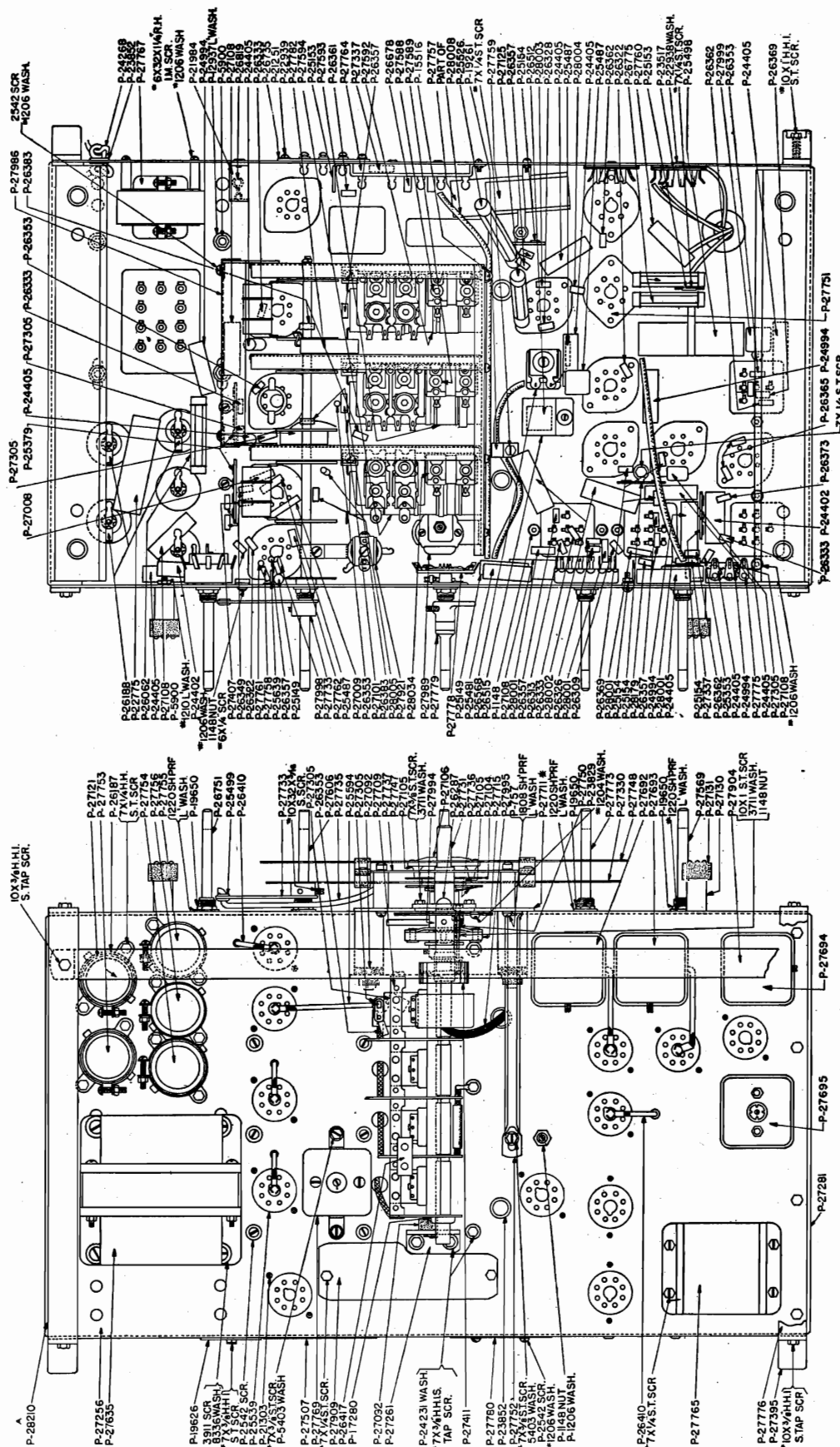


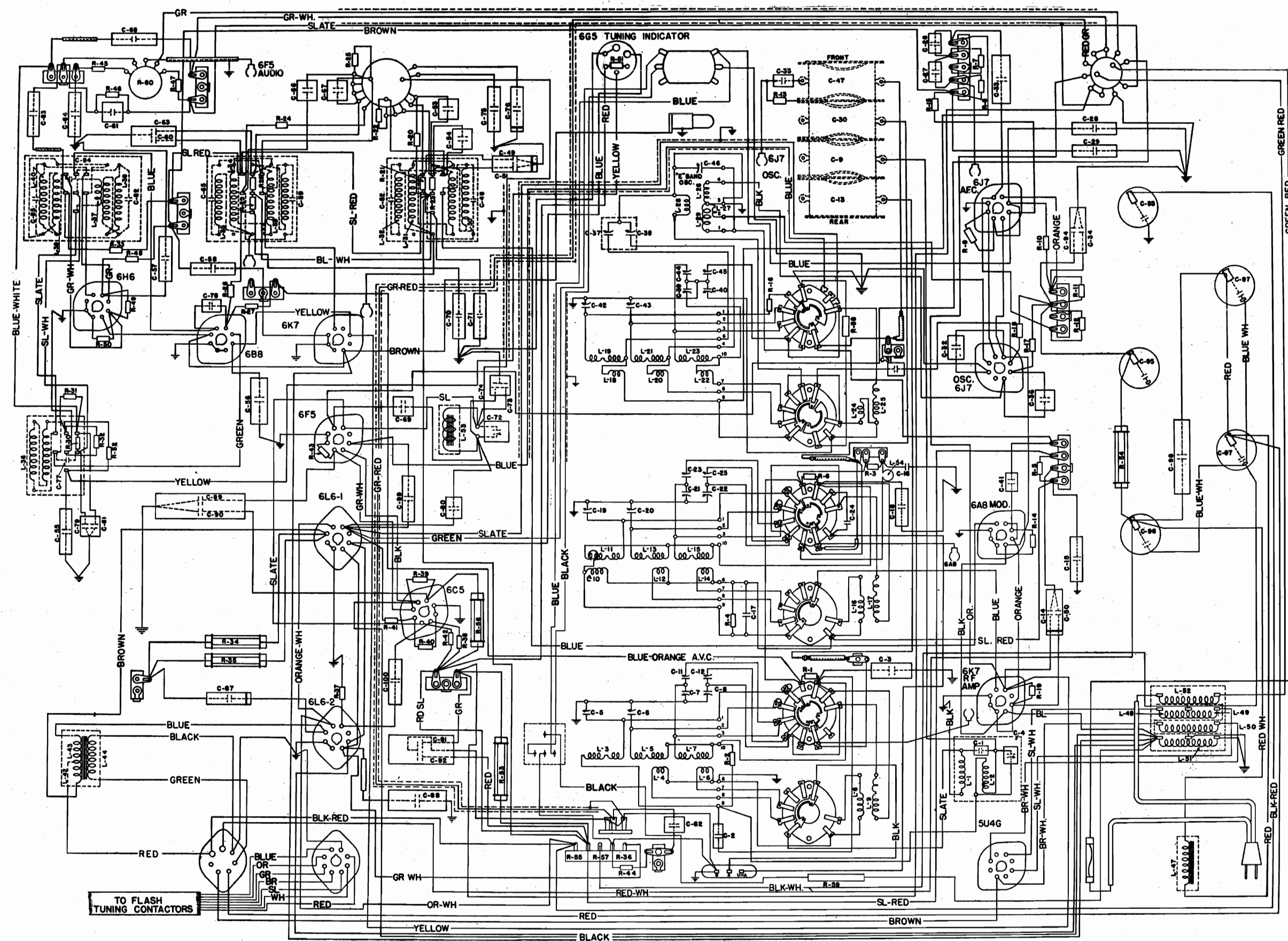
Fig. 6. Chassis Assembly.

Stromberg-Carlson

No. 255 Radio Receivers

Type of Circuit.....	Superheterodyne with Automatic Frequency Control
Tuning Ranges.....	A—530 to 1600 Kc.; B—1600 to 4800 Kc.; C—4800 to 11,000 Kc. D—11,000 to 22,000 Kc.; E—22,000 to 60,000 Kc.
Number and Types of Tubes.....	2 No. 6K7, 1 No. 6A8, 2 No. 6J7, 1 No. 6B8, 1 No. 6H6, 1 No. 6F5 1 No. 6C5, 2 No. 6L6, 1 No. 6G5, 1 No. 5U4G
Input Voltage Rating.....	105 to 125 Volts A. C.
Power Frequency Rating.....	25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating.....	145 Watts
Frequency of Intermediate Amplifier.....	465 Kilocycles

STROMBERG-CARLSON TEL. MFG. CO.



505 TUNING INDICATOR

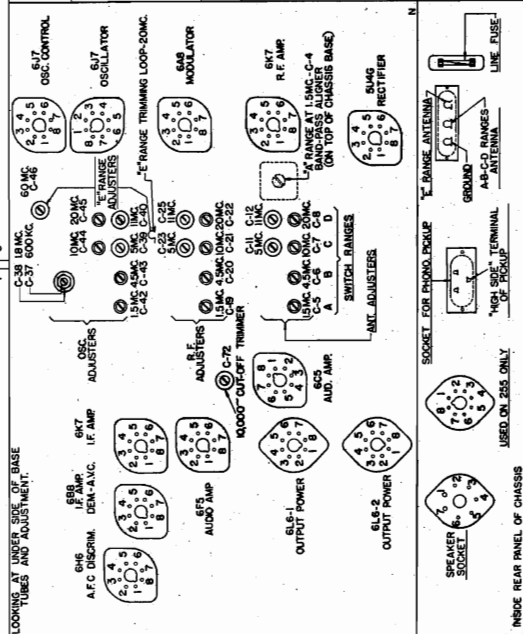


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Adjusting Components.

CONTINUITY TEST FOR NO. 255 RECEIVER. ALSO MODEL 250 Nov. 1, 1937.

For making a continuity test on the No. 255 Receivers, use the same test chart and instructions as are used on the No. 250 Receivers.

1. Remove Flash Tuner Lamp Plug from Flash Tuner Lamp Socket. (This socket is located next to the speaker socket on rear of chassis).

2. Operate A.F.C. to "On" position (This switch is located directly under dial on front of chassis). Operate tuning dial until Finger No. 2 on Flash Tuner Unit makes contact on Switch (See Flash Tuner Sketch on Page 8 of Engineering Data Sheet for the No. 255 Receiver for the correct location of fingers). Read from No. 1 terminal of Flash Tuner Socket to chassis base, reading should be "5". Operate A.F.C. switch to "Off" position. Reading should be "0".

Read from No. 2 terminal of Flash Tuner Socket to chassis base, reading should be "0".

Operate A.F.C. Switch to "On" position. Read from No. 2 terminal of Flash Tuner Socket to chassis base, reading should be "10".

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contact and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1 shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 100 volts, and allowance should be made for differences when the line voltage is higher or lower than 100 volts.

The D. C. voltages shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-25, 0-50, 0-100, 0-200, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 250 Volt scale was used.

Tube	Circuit	Cap	Terminals of Sockets								Heater Voltages Between Heater Terminals	
			1	2	3	4	5	6	7	8	Socket Terminals	Volts
6K7	R. F. Amp.	0	0	0	+250	+90	0	+80	6.1	0	2-7	6.1
6A8	Modulator	0	0	0	+250	+80	-2.0	+80	6.1	0	2-7	6.1
6J7	Oscillator	0	0	6.1	+60	+180	0	0	0	0	2-7	6.1
6J7	Oscillator Control	0	0	0	+190	+110	+5.8	0	6.1	+5.8	2-7	6.1
6K7	I. F. Amp.	0	0	0	+255	+90	0	0	6.1	0	2-7	6.1
6I8	I. F. Amp. Dem.-A. V. C.	0	0	6.1	+225	-0.1	-0.1	+90	0	0	2-7	6.1
6H6	A. F. C. Discriminator	-	0	0	-0.25	0	-0.2	-0.2	6.1	0	2-7	6.1
6F5	Audio Amp.	0	0	0	+135	+135	0	0	6.1	+1.3	2-7	6.1
6C5	Audio Amp.	-	0	0	+100	+135	0	+1.3	6.1	+5.2	2-7	6.1
6L6 No. 1	Audio Output	-	0	0	+300	+305	0	0	6.1	+22	2-7	6.1
6L6 No. 2	Audio Output	-	0	0	+300	+305	0	0	6.1	+22	2-7	6.1
6C5	Tuning Indicator	-	6.1	+0.5	-0.2*	+245	0	0	-	-	1-6	6.1
6U4G	Rectifier	-	0	+430	-	395	-	395	-	+430	2-8	4.8
Speaker Socket	-	-	+420	0	0	+430	+430	0	+320	-	-	-

A. C. voltages are indicated by italics. Receiver tuned to 1000 kc., no signal.

3. Operate tuning dial until Finger No. 3 on Flash Tuner Unit makes contact on switch. Read from No. 3 terminal of Flash Tuner socket to chassis base, reading should be "10".

Operate A.F.C. switch to "Off" position. Read from No. 3 terminal of Flash Tuner socket to chassis base, reading should be "0".

4. Proceed in the same manner to test the rest of this circuit.

Operate the A.F.C. Switch to "On" position. Operate the tuning dial until the next finger of the meter makes contact on switch. Move the test prong of the meter to the terminal of the Flash Tuner sockets which corresponds to the finger to be tested. The readings for each of the contacts should be "10" with A.F.C. Switch operated to "On" position and "0" with A.F.C. Switch in "Off" position.

NOTE: The readings from the Flash Tuner Socket are usually taken from the top of the socket. Therefore, the terminals will be numbered in a counter-clockwise direction.

MODELS 255L, 255LB
Socket, Trimmers
Voltage, Continuity
MODELS 250L, 250LB
Continuity Test

MODELS 255L, 255LB
Phonograph Data STROMBERG-CARLSON TEL. MFG. CO.
Flash Tuner Assembly

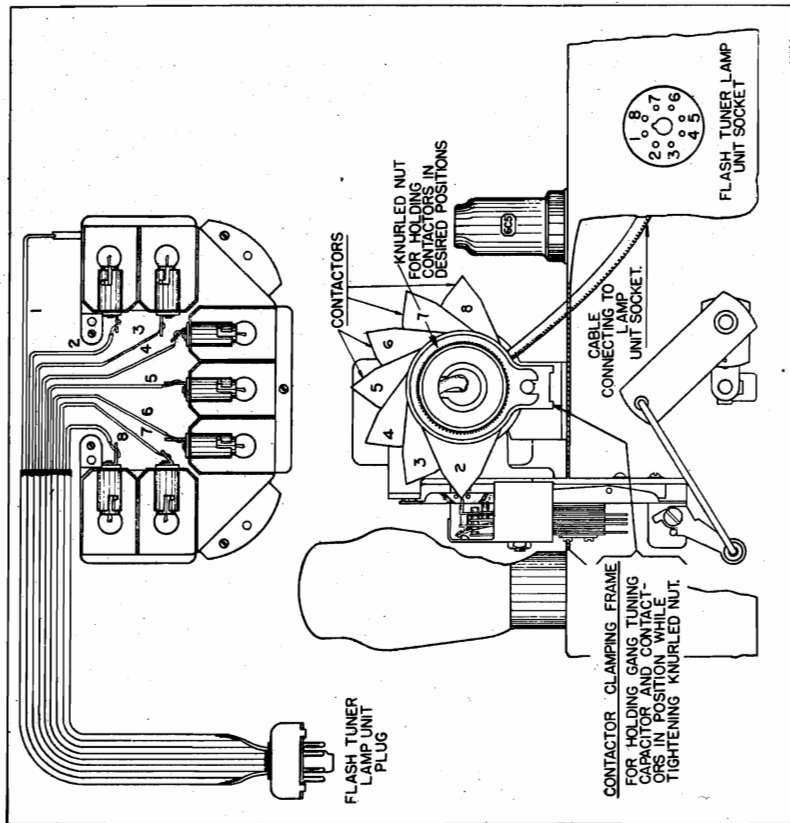


Fig. 4. Showing Flash Tuner Lamp Unit with Escutcheon Plate Removed (Top Figure) and Rear View of Receiver Showing Flash Tuner Mechanism (Bottom Figure).

PROCEDURE FOR OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

A socket having three contacts is provided on the rear of the chassis base, and is wired to the "Off-On-Off" switch assembly located on the front of the receiver. A three prong plug is also inserted in the socket so that if at any time it is desired to use an electric pick-up and phonograph unit in conjunction with this receiver, it may readily be accomplished.

In order to obtain the best quality of phonograph reproduction when using an electric pick-up and phonograph unit with this receiver, a Stromberg-Carlson No. 10 Record Player is recommended. This record player is a specially designed unit which is designed to be used in conjunction with a Stromberg-Carlson No. 10 Record Player. To attach this instrument to a No. 255 Receiver, it is necessary to remove the three-prong plug furnished with the receiver and insert the three-prong plug which comes with the unit into the three-prong socket located on the rear of the chassis base. Then, the power supply plug of the phonograph unit should be inserted into a suitable power supply receptacle, and the unit will be ready for use.

If the Stromberg-Carlson No. 10 Record Player is not used and the electric pick-up to be used is of the high impedance type, it will be necessary to connect a low capacity shielded cable between the three-prong plug of the record player and the three-prong socket of the receiver. The cable should be of the type having a high capacity to prevent the excessive cutting of high frequencies which is caused when shielded cable having high capacity is used. The length of the shielded cable used should be kept as short as possible.

If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong plug and the pick-up. The transformer should be located as near to the receiver as possible, in which case it will not be necessary to use a shielded cable.

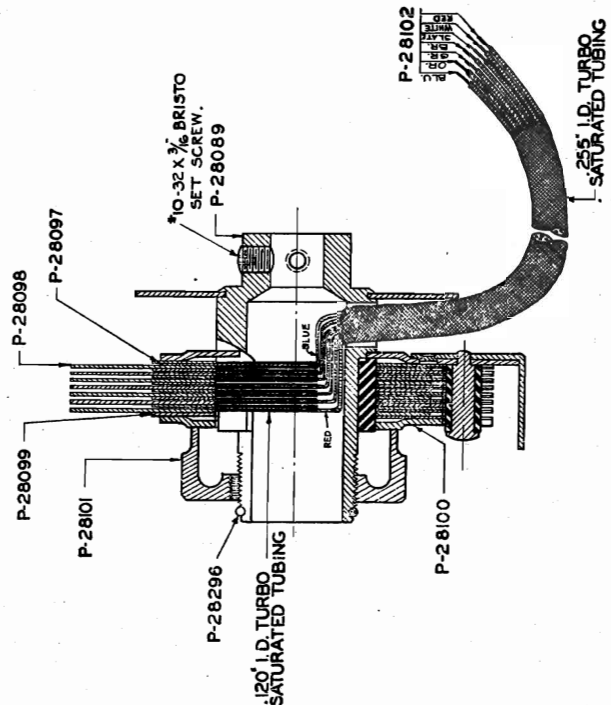


Fig. 5. Section View of Flash Tuner Contactor Assembly.

STROMBERG-CARLSON TEL. MFG. CO. Alignment, Part 1

MODELS 255L, 255LB

sary to make use of a signal generator whose high frequency range does not extend beyond 20 megacycles, using harmonics of 20 megacycles for aligning this range on 60 megacycles.

In aligning the radio frequency circuits for this range, replace the 0.1 mfd capacitor which was placed in series with the Range Switch on the receiver chassis with a 100-ohm resistor. This resistor is located on the rear of the receiver chassis. The ground terminal (or low side) of the signal generator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the "E" range position and set the signal generator's frequency and the receiver's tuning dial to 60 megacycles.
2. Adjust the aligning capacitor C-46 until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 20 megacycles and adjust the "E" range trimming loop, L-54, until maximum voltage output is obtained on the output meter. The adjustment of this loop is obtained by distorting its normally circular shape until it offers the correct inductive effect. If the oscillator does not track with the tuning dial scale at this frequency, it will be necessary to also adjust the oscillator's tuning loop.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 60 megacycles and repeat operation No. 2.

Alignment of Short-Wave Range (Also referred to as "D" Band)

In aligning the radio frequency circuits for this range use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminals of the signal generator as was used for aligning the Ultra-Short Wave Range. This lead to the antenna binding post marked "A" located on the rear of the receiver chassis, and align as follows:

1. Operate the Range Switch on the receiver chassis to the "D" range position and set the signal generator's frequency and the receiver's tuning dial to 20 megacycles.
2. Adjust aligning capacitors C-45, C-22, and C-8 respectively; and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 11 megacycles and adjust aligning capacitors C-40, C-25, and C-12 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 20 megacycles and repeat operation No. 2.

Alignment of Short-Wave Range (Also referred to as "C" Band)

In aligning the radio frequency circuits for this range use the same artificial antenna and binding post on the receiver chassis as was used for aligning the "D" range.

1. Operate the Range Switch on the receiver chassis to the "C" range position and set the signal generator's frequency and the receiver's tuning dial to 10 megacycles.
2. Adjust the aligning capacitors C-44, C-21, and C-7 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 5 megacycles and adjust the aligning capacitors C-39, C-23, and C-11 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 10 megacycles and repeat operation No. 2.

Alignment of Aircraft Range (Also referred to as "B" Band)

In aligning the radio frequency circuits for this range, use the same artificial antenna and antenna binding post as was used for aligning the "C" range, and align this range as follows:

1. Operate the Range Switch on the receiver chassis to the "B" range position and set the signal generator's frequency and the receiver's tuning dial to 4.5 megacycles.
2. Adjust the aligning capacitors C-43, C-20, and C-6 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 1.5 megacycles and adjust the aligning capacitors C-38, C-24, and C-10 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 4.5 megacycles and repeat operation No. 2.

Alignment of Standard Broadcast Range (Also referred to as "A" Band)

In aligning the radio frequency circuits for this range, replace the 400-ohm resistor in series with the signal generator's output with a 200-micro-microfarad capacitor and align this range as follows:

1. Operate the Range Switch to the "A" range position and set the signal generator's frequency and the receiver's tuning dial to 1.5 megacycles (1500 Kilocycles).
2. Adjust the aligning capacitors C-42, C-19, C-4, and C-5 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.

ALIGNMENT DATA

Dial Adjustment

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the gang tuning capacitor. To align the tuning dial, the dial is set correctly with respect to the gang tuning capacitor, then the "Range Station Selector" knob in a counter-clockwise direction so that the gang tuning capacitor is set to its maximum capacity position. Then, with the receiver turned "on", the illuminated dial indicator line should be exactly centered over the dial alignment lines (black lines) which are located at the extreme low frequency end of each scale on the dial. If these lines do not center over the illuminated dial indicator line, loosen the two set screws located on the hub of the dial. Then, rotate the dial so that these alignment lines are centered over the illuminated dial indicator line. The two set screws of the dial hub should then be securely tightened.

Intermediate Frequency and A. F. C. Circuit Adjustments

The intermediate frequency system employed in this receiver is a complex circuit. The first I. F. amplifier is coupled to the second I. F. amplifier through the No. 6K7 tube. The second and third I. F. transformers are coupled through the pentode section of the No. 6B8 tube. The third I. F. transformer is in effect a distributing network rather than a transformer only; it contains a primary winding coupled to two other networks. One of these networks links the diode stage (Demodulator-A. N. C.) with the I. F. signal, while the other network resembles the secondary of a push-pull transformer. The No. 6B8 tube supplies the characteristic voltage demanded by the Discriminator network. The No. 6B8 tube also supplies the characteristic voltage demanded by the oscillator control tube. The fourth I. F. transformer feeds the diode plates of the No. 6B8 tube.

The intermediate frequency used in these receivers is 465 kilocycles. Because of the necessity of obtaining the proper shape of resonance curve of these stages in tuning, it is recommended that unless a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed:

1. Operate the Range Switch of the receiver to the "A" range position, and set the tuning dial to its extreme low frequency position. Set the Fidelity Control to its "Normal" position, the Automatic Frequency Control knob to the "Off" position and the "Off-On-Bass" Control knob to its "Normal" position. Never attempt to align the R. F. or I. F. circuits of this receiver with the Fidelity Control knob set at any position other than the "Normal Fidelity" position, and the Automatic Frequency Control knob set at any "On" position unless specifically directed in the following paragraphs.
2. Align between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator tube, a modulated signal of 465 kilocycles from the signal generator, using a 0.1 mfd. capacitor in series with the connection between the output terminal of the signal generator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the signal generator should be connected to either the chassis base or the ground binding post terminal.
3. Now noting from Figure 1, the alignment adjustments for the First, Second, Third, and Fourth I. F. Transformers, align the I. F. circuits in the following manner:

Adjust the third I. F. transformer primary circuit for maximum output.

Adjust the fourth I. F. transformer circuit for maximum output.

Adjust the third I. F. transformer "Discriminator" circuit midway between the peaks where maximum output is obtained.

Adjust the second I. F. transformer secondary circuit for maximum output.

Adjust the second I. F. primary circuit for maximum output.

Adjust the first I. F. secondary circuit for maximum output.

Adjust the first I. F. primary circuit for maximum output.

Carefully make all the above adjustments, watching carefully the output meter and reduce the output of the test oscillator as required.

To make the final adjustment of the "Discriminator" circuit proceed as follows:

Check the position of the A. F. C. control knob which should be set to the "off" position. Before making this circuit adjustment be sure that the I. F. Amplifier is tuned exactly to 465 kilocycles. With the signal generator still set at a frequency of 465 kilocycles, adjust the signal generator output for a reading of the milliammeter of 50/100 to 100/100. The milliammeter is in series with the cathode of the No. 6A7 oscillator control tube. Rotate the A. F. C. Control knob to the "on" position, and observe whether there is any difference in the reading of the milliammeter. When this circuit is correctly adjusted, there should be no difference in the reading of the milliammeter when the A. F. C. Control knob is rotated from the "off" to the "on" position. If there is any difference in the milliammeter reading while rotating the Automatic Frequency Control knob to the "off" and "on" position, at a rate of about two cycles per second, adjust the "Discriminator" circuit until the milliammeter reading is the same regardless of whether the A. F. C. Control knob is rotated to the "on" or "off" position. When this condition is obtained the "Discriminator" circuit of these receivers is properly adjusted.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

When making any aligning adjustments of these circuits, the A. F. C. Control knob should be rotated to the "off" position; the Fidelity Control knob should be set for "Normal" operation, and the "Off-On-Bass-Phono-graph" Control knob should also be set for "Normal" operation.

Alignment of Ultra-Short Wave Range (Also referred to as "E" Band)

In order to align the circuits of this range, it is desirable to have a signal generator whose high frequency range will go to 60 megacycles. Such equipment, however, is rare and costly, and in most cases it will be necessary to make use of a signal generator whose high frequency range does not extend beyond 20 megacycles, using harmonics of 20 megacycles for aligning this range on 60 megacycles.

MODELS 255L, 255LB

Alignment, Part 2 STROMBERG-CARLSON TEL. MFG. CO.

Parts List

REPLACEMENT PARTS

Part Number	Schematic Circuit Designation	Part
21984		Fuse Block Assembly
22776	C98	Capacitor, 4 Mfd.
23517		Tube Socket, 7 Prong
24268		Cord, Power Supply
24314	C1	Capacitor, Type "O", 10 Mmfd.
24402	C29, C57	Capacitor, 1 Mfd.
24405	C3, C18, C18, C28, C35, C64, C86, C98, C100, C101	Capacitor, .04 Mfd.
24559	C84	Capacitor, Type "O", 100 Mmfd.
24994	C15, C56, C58, C83	Capacitor, .05 Mfd.
25149	C33, C78	Capacitor, .01 Mfd.
25481	C75	Capacitor, .002 Mfd.
25487	C31, C96, C99	Capacitor, Type "W", .001 Mfd.
25498	C86, C99	Electrolytic Capacitor, 10 Mfd., 35 Volts; 10 Mfd., 25 Volts
25526	R53	Resistor, Type "E", 15,000 Ohms
25539		Tube Socket, 8 Prong
26002	R54	Resistor, Type "E", 10,000 Ohms
26287		Pilot Lamp
26309	R124	Resistor, Type "E", 10 Ohms
26313	R50	Resistor, Type "E", 22 Ohms
26322	R15, R43	Resistor, Type "E", 120 Ohms
26326	R22, R25	Resistor, Type "E", 270 Ohms
26328	R39	Resistor, Type "E", 390 Ohms
26335	R5, R19, R21, R32	Resistor, Type "E", 1,000 Ohms
26349	R10, R11, R12, R17	Resistor, Type "E", 2,000 Ohms
26353	R4, R13, R14, R30, R45	Resistor, Type "E", 47,000 Ohms
26357	R2, R8, R12, R26, R29, R38	Resistor, Type "E", .1 Megohm
26361	R42	Resistor, Type "E", .22 Megohm
26362	R31, R32, R37, R46	Resistor, Type "E", 27 Megohm
26365	R49, R50	Resistor, Type "E", 47 Megohm
26369	R27, R28, R51, R52	Resistor, Type "E", 1 Megohm
26373	R48	Resistor, Type "E", 2.2 Megohms
26383	R1, R3, R6	Resistor, Type "E1", 1 Megohm
26410		Grid Clip Assembly
27430	L48, L49, L50, L51, L52	Power Transformer (25 to 60 Cycles Chassis)
27431	L8, L9	Antenna Transformer, "D" Range
27444	L16, L17	R. F. Transformer, "D" Range
27445	L24, L25	Oscillator Transformer, "D" Range
27492	L30, L31, L32	First I. F. Transformer
27493	L23, L34, L35	Second I. F. Transformer
27494	L37, L38, L39, L40	Third I. F. Transformer
27495	L36	Fourth I. F. Transformer
27710	C9, C13, C30, C47	Gang Tuning Capacitor
27715		Coupling Assembly (Tuning Drive)
27720		Gear and Bracket Assembly
27728		Spring
27731		Drive Assembly
27732		Mask Assembly
27733		Lever Assembly, Mask Actuator
27735		Knob
27736		Spring Washer
27737		Indicator Frame Assembly
27748		Dial
27751		Tube Socket, 8 Prong
27752		Brace, Dial Support
27753	C97	Electrolytic Capacitor, 8 Mfd., 500 Volts
27754	C96	Electrolytic Capacitor, 16 Mfd., 480 Volts
27755	C95	Electrolytic Capacitor, 18 Mfd., 350 Volts
27756	C96	Electrolytic Capacitor, 16 Mfd., 300 Volts
27757	C91, C92	Electrolytic Capacitor, 4 Mfd., 250 Volts; 4 Mfd., 100 Volts
27758	C26	Capacitor, Type "O", 75 Mmfd.
27759	C88	Capacitor, 12 Mfd., 30 Volts
27760	C87	Capacitor, .005 Mfd., 1,000 Volts
27761	R7	Resistor, Type "E", 220 Ohms
27762	R9	Resistor, Type "EB", 910 Ohms
27764	R36, R55, R57	Resistor, "B" Voltage Divider
27765	L48, L49, L54	Output Transformer
27767	L47	Choke Assembly
27769	L1, L2	Antenna Transformer, "A" Range
27773		Switch Assembly, High Fidelity-Tone Control
27778		Switch, A. F. C.
27779		Crank Arm
27782	C2	Capacitor, .03 Mfd.
27816	L28, L27, L28, L29	Capacitor, H. F. Aligner for "A" Range Antenna Transformer
27821	O40	Oscillator Transformer, "E" Range
27886	L54	Capacitor, Aligner, "E" Range
27890	C37, C38	Shield, "D" and "E" Range Coils
27894		Antenna Transformer Tuning Loop, "E" Range
27896		L. F. Aligners for "A" and "B" Range Oscillators
27898		Pilot Lamp Socket Assembly
27899	C27	Cable Assembly (Tuning Indicator Unit)
27900	C79, C81	Capacitor, Type "O", 200 Mmfd.
28001	C83, C84, C86, C87	Capacitor, Type "WD", 50 Mmfd.
28002	C70, C71	Capacitor, Type "W", .0015 Mfd.
28003	R40	Capacitor, 25 Mfd., 150 Volts
28004	R41	Resistor, Type "E", 15,000 Ohms
28005	R16, R58	Resistor, Type "E", 27 Megohm
28006		Resistor, Type "E", 51 Ohms
28007		Cable Assembly, Phonograph Switch to Phonograph Socket
28008	C30, C40, C42, C43, C44, C45	Capacitors, Aligning
28009		Resistor, Type "EB", 68,000 Ohms
28010	C10	Capacitor (Gimmick)
28011	C73, C74	Capacitor, Two, Type "W", 100 Mmfd.
28012	L53	Coil Assembly (High Frequency Cut-Off Filter)
28013		Socket (Tuning Indicator Tube)
28014	C72	Capacitor (High Frequency Cut-Off Filter)
28015		Socket, Phonograph Unit
28016		Antennas and Ground Binding Posts
28017	R34, R35	Switch Assembly, "Off-On-Bass-Phono" Control
28018		Resistor, Type "F", 20,000 Ohms
28019		Fuse, 5 Amperes
28020	C30	Capacitor, Type "W", .006 Mfd.
28021	C32	Capacitor, Type "E", 200 Mmfd.
28022	C77, C82, C85	Capacitor, 100 Mmfd.
28023	C17	Rubber Bushing
28024		Capacitor, Type "O", 200 Mmfd.
28025		Washer, Felt
28026		Washer, Dial Clamp
28027	C14, C34, C48, C50, C51, C50	Capacitor, Two, .05 Mfd.
28028	C83, C84	Insulating Tube
28029	R56	Resistor, Type "E", 25,000 Ohms
28030	C84, C85, C41, C78	Capacitor, Type "O", 50 Mmfd.
28031	C48, C52, C59, C65	Fixed Capacitor, First I. F. Transformer
28032	C61, C62	Capacitor, Type "W", .004 Mfd.
28033	R18	Resistor, Type "EB", 22,000 Ohms
28034	L45, L46	Clamp Assembly
28035	R60	Load Speaker
28036	C5, C6, C7, C8, C11, C12	Potentiometer, Volume Control
28037	C10, C20, C21, C22, C23, C25	Capacitors, Aligning
28038	L3, L4, L5, L6, L7	Capacitors, Aligning
28039	L10, L11, L12, L13, L14, L15	Bi-Resonator Coil "A" Range, Antenna Transformer "B" and
28040	L18, L19, L20, L21, L22, L23	R. F. Transformer, "A", "B", and "C" Ranges
28041		Capacitor Transformer, "A", "B", and "C" Ranges
28042		Range Switch Assembly
28043	L48, L49, L50, L51, L52	Power Transformer (50 to 60 Cycles Chassis)

MISCELLANEOUS PARTS

Knob Assembly (Used on Volume, Range Switch and Off-On-Bass-Phonograph Control Shaft)
Knob Assembly (Used on Fidelity and A. F. C. Control Shafts)
Knob Assembly (For Rapid Station Selector Control Shaft)
Knob Assembly (For Vernier Station Selector Control Shaft)
Felt Washer (Used on Volume, Fidelity, Range Switch, A. F. C. and Off-On-Bass-Phonograph Control Shafts)
Felt Washer (Used on Rapid Station Selector Control Shaft)

A. F. C. FLASH TUNER PARTS

Spring Washer
Lever
Knob for Actuating A. F. C. Switching Mechanism
Lever and Spring Combination
Control Assembly
Control Disc for Control
Insulation Disc between Contactors
Blue Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
Orange Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
Green Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
Brown Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
White Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
Red Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
Black Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
A. F. C. Switch Cable Assembly
Resistor, Flexible, 10 Ohms

- Set the signal generator's frequency and the receiver's tuning dial to 0.6 megacycles (600 kilocycles) and adjust the aligning capacitor C-7; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
- Reset both the signal generator's frequency and the receiver's tuning dial to 1.5 megacycles and repeat operation No. 2.

Adjustment of 10 Kilocycle Audio Cut-Off Filter

The adjustment of this filter is correctly made at the factory and no additional adjustment is required.

Instructions for Setting Up the A. F. C. Flash Tuning Unit

- Remove the flash tuner lamp unit escutcheon plate by removing the four screws.
- Remove the lists of station letters from the P-28420 package assembly which is tucked inside of the cabinet.
- Remove the seven paper squares on which are printed the words "Tone", "Beauty", "Value", "Action", "Flash", "Tuning", and "Radio" from the square frames located on the rear side of the lamp unit escutcheon plate.
- Remove the station letters of the seven stations which it is desired to set up in the flash tuning unit from the list of stations. It will be noted that the letters of the stations are printed on partly cut squares to facilitate ease in removing the desired letters. Insert one of these seven station letters into each frame of the flash tuner lamp unit. The recommended method of inserting these station letters into the frames of the escutcheon plate is to arrange them according to the frequency of the stations as follows:

Looking at the front of the escutcheon plate the station having the highest frequency should appear in the top right-hand frame, and then in successive order according to frequency the remaining station letters should be inserted into the other frames; the top left-hand frame containing the station letters of this station having the lowest frequency. The remaining station letters should be inserted into the frames having the letters located between two pieces of transparent material.

- Fasten the escutcheon plate again to the lamp unit by means of the four screws. The receiver is now ready to be operated and the flash unit contactors located on the rear of the chassis base adjusted for the seven favorite stations.
- Rotate the "On-Off-Bass-Phonograph" Control knob from its complete counter-clockwise position, slightly clockwise from this position which turns the set on (indicated by illumination of the dial).

Control knob which should be rotated to the "Off" position and set the Fidelity Control knob to the "Normal" position. Now carefully tune in the desired station having the highest frequency, watching the tuning indicator so that the receiver will be exactly tuned to this station.

- After carefully tuning in the desired station rotate the A. F. C. Control knob to the "On" position. Now noting from Figure 4, the sketch which shows the contactor clamping frame and knurled nut, hold the clamping frame with one hand and loosen the knurled nut with the other hand. Then move the contactor, numbered 2, so that its point is engaged between the two small rollers of the switching mechanism as also shown in Figure 4. When the point is properly engaged between the rollers, the lamp of the flash unit is lighted. Then the contactor is held in the "On" position by the knurled nut. When the lamp is lighted, the contactor is held in the "On" position by the knurled nut. When the lamp is lighted, the contactor is held in the "On" position by the knurled nut. When the lamp is lighted, the contactor is held in the "On" position by the knurled nut.

It is extremely important to keep the gang tuning capacitor and the contactors from rotating when tightening the large knurled nut.

Now rotate the A. F. C. Control knob to the "Off" position and note whether the tuning has been shifted by watching the tuning indicator. If a change is noted it will be necessary to repeat operation No. 7.

When no change is noticed after performing the above operations Nos. 7 and 8, the remaining six favorite stations should be set up in the same manner.

With the A. F. C. flash tuning unit in operation, the receiver will be automatically kept in tune with any one of the seven favorite stations as long as the station is operating or provided there is no unusual change in the tuning indicator. If the tuning indicator is not in tune with the station, the tuning indicator will be found that the Automatic Frequency Control will not hold this station if a strong signal is present in either adjacent channel. This same phenomenon will occur if two stations in adjacent channels are almost of equal signal strength with the weakest signal fading slightly; with this condition the strong signal will have a tendency to "pull in" when the receiver is tuned to the station which is slightly weaker and fading.

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 320H, 320HB
320T, 320TBSchematic, Socket
Trimmers

Type of Circuit Superheterodyne
 Tuning Ranges A—530 to 1700 Kc.; C—5900 to 18,000 Kc.
 Number and Types of Tubes 1 No. 6A8, 1 No. 6K7, 1 No. 6Q7G, 1 No. 6V6G, 1 No. 80
 Voltage Rating 105 to 125 Volts, A. C.
 Input Power Frequency 25 to 60 Cycles and 50 to 60 Cycles
 Input Power Rating 40 Watts
 Frequency of Intermediate Amplifier 455 Kilocycles

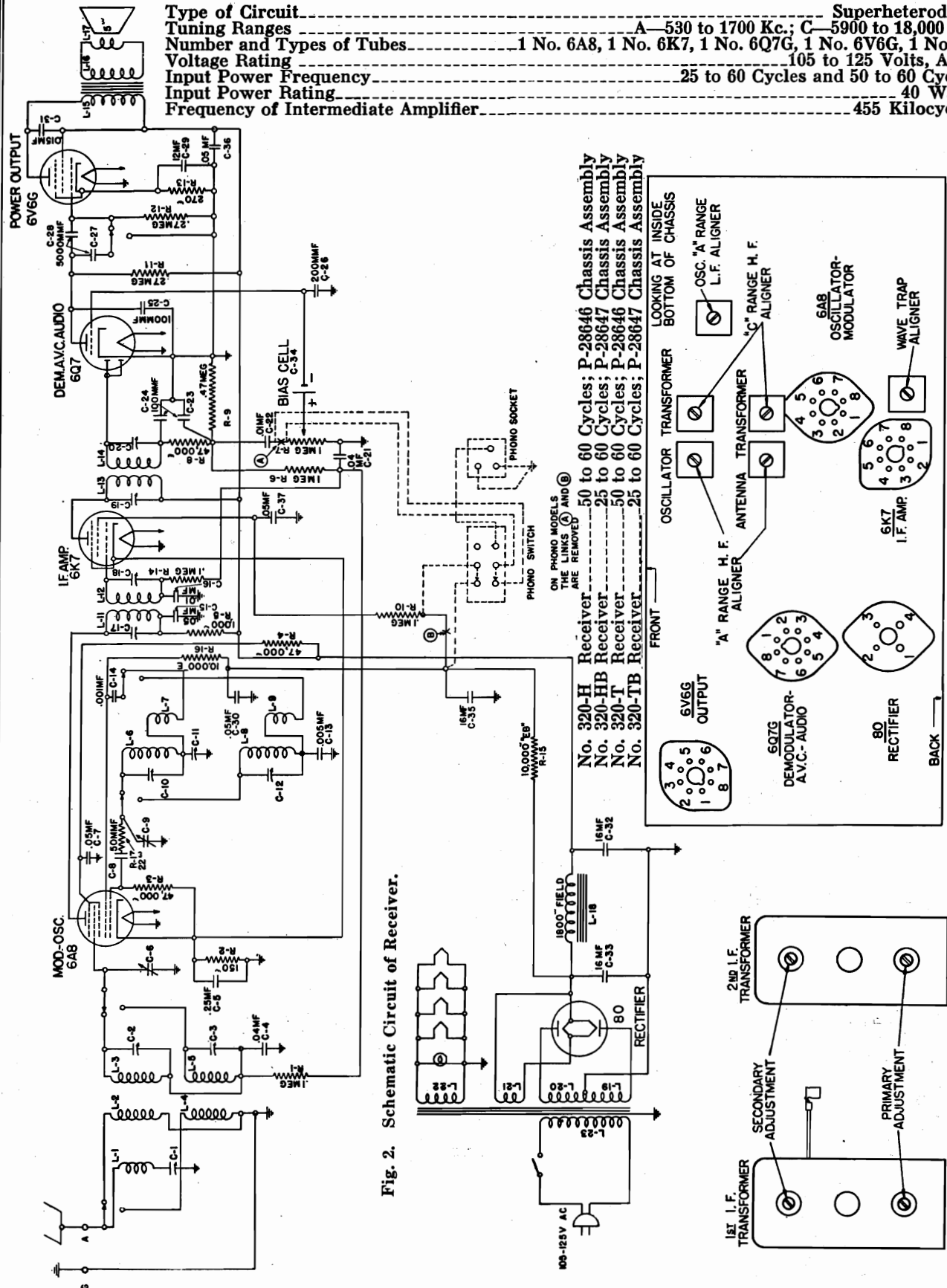


Fig. 2. Schematic Circuit of Receiver.

Fig. 1. Terminal Layout

MODELS 320H, 320HB

320T, 320TB

STROMBERG-CARLSON TEL. MFG. CO.

Chassis Wiring, Voltage

Tube	Circuit	Cap	Terminals of Sockets								Heater Voltages Between Heater Terminals	
			1	2	3	4	5	6	7	8	Socket Terminal Numbers	Volts
6A8	Mod.—Osc.	0	0	0	+174	+64	—7.2	+176	6.1	+1.8	2-7	6.1
6K7	I. F. Amp.	0	0	0	+176	+62	+1.8	+210	6.1	+1.8	2-7	6.1
6Q7G	Dem.—A. V. C.—Audio	0	0	0	+65*	0	0	+65*	6.1	0	2-7	6.1
6V6G	Audio Output	—	0	0	+167	+176	0	0	6.1	+8.2	2-7	6.1
80	Rectifier	—	+260	258	258	+260	—	—	—	—	1-4	4.8

Receiver tuned to 1000 Kc., no signal. A. C. voltages are indicated by italics.

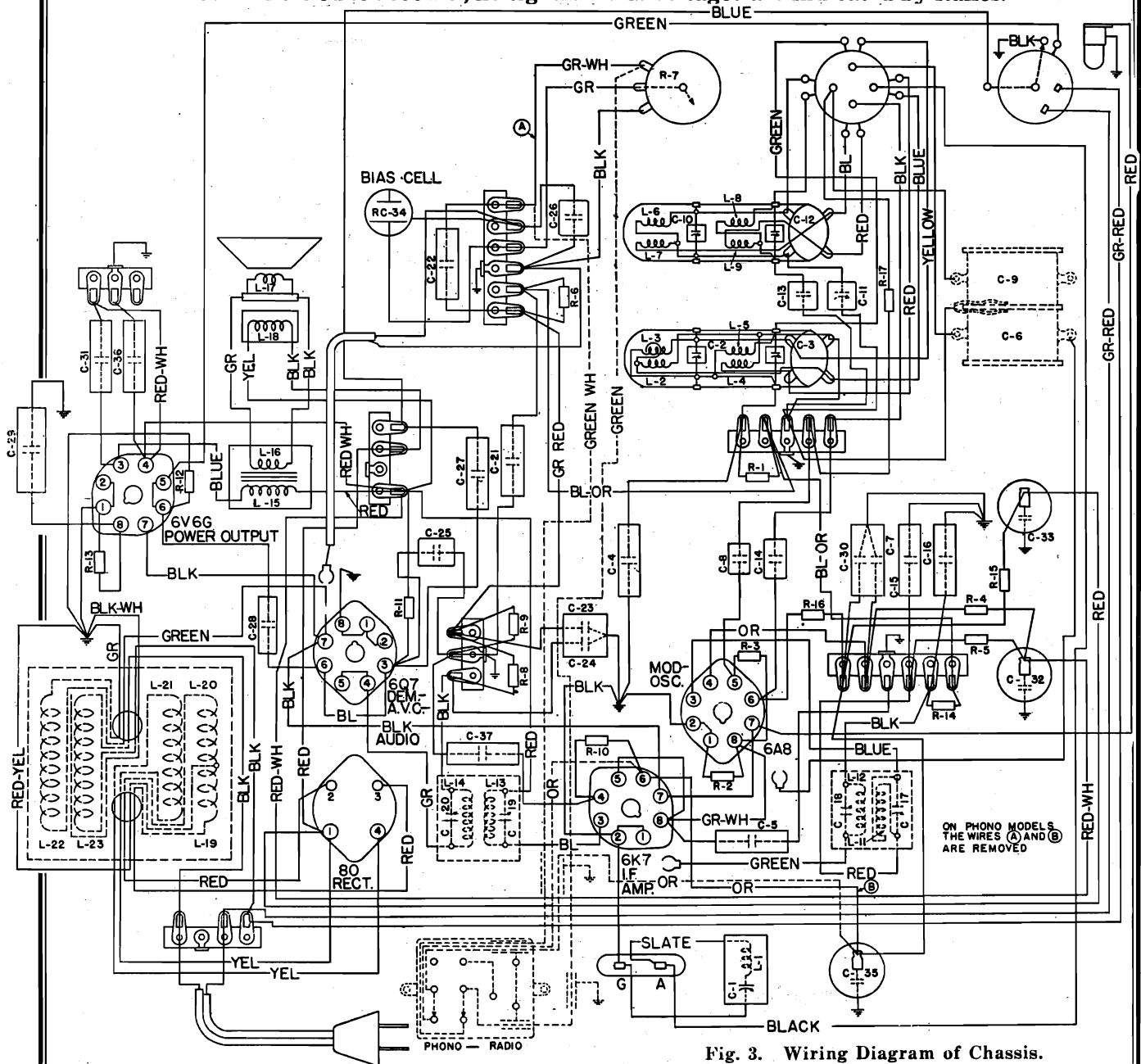
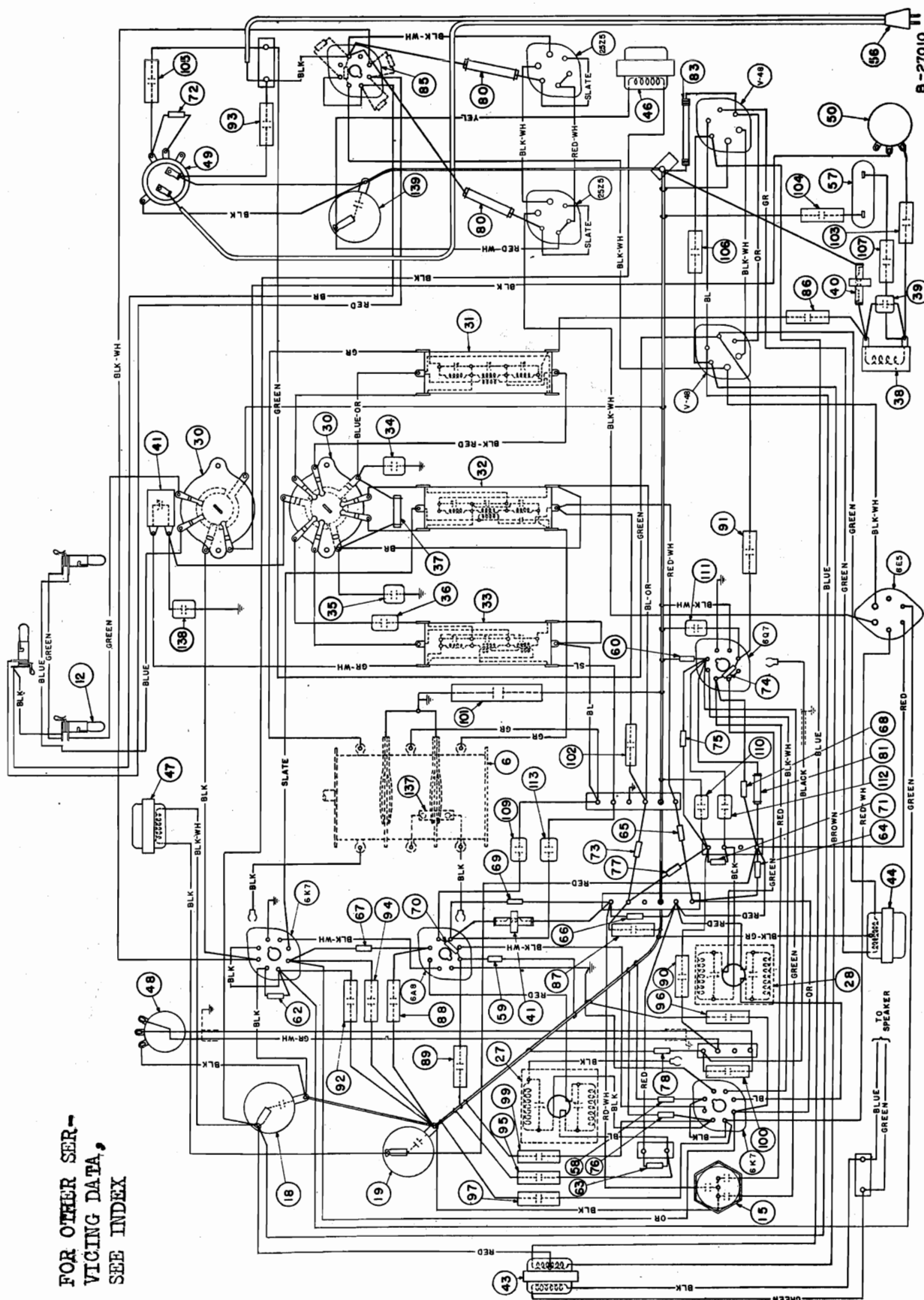


Fig. 3. Wiring Diagram of Chassis.

No. 127-H	50 to 60 Cycles	P-26845	Chassis Assembly; P-26887	Loud Speaker
No. 127-M	50 to 60 Cycles	P-26845	Chassis Assembly; P-26887	Loud Speaker

FOR OTHER SER-
VICING DATA,
SEE INDEX



STROMBERG-CARLSON TEL. MFG. CO.

MODELS 325J, 325JB

325N, 325NB

325S, 325SB

ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyne with Electric Tuning
Tuning Ranges	A—530 to 1700 Kc.; C—5800 to 18,000 Kc.
Number and Type of Tubes	1 No. 6A8, 1 No. 6K7, 1 No. 6Q7G, 1 No. 6V6G, 1 No. 80
Voltage Rating	105 to 125 Volts
Power Frequency Rating	25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating	42 Watts
Frequency of Intermediate Amplifier	455 Kilocycles

Schematic, Socket
Trimmers

APPARATUS SPECIFICATIONS

No. 325-J Receiver	50 to 60 Cycles; P-28816 Chassis Assembly
No. 325-JB Receiver	25 to 60 Cycles; P-28817 Chassis Assembly
No. 325-N Receiver	50 to 60 Cycles; P-28816 Chassis Assembly
No. 325-NB Receiver	25 to 60 Cycles; P-28817 Chassis Assembly
No. 325-S Receiver	50 to 60 Cycles; P-28816 Chassis Assembly
No. 325-SB Receiver	25 to 60 Cycles; P-28817 Chassis Assembly

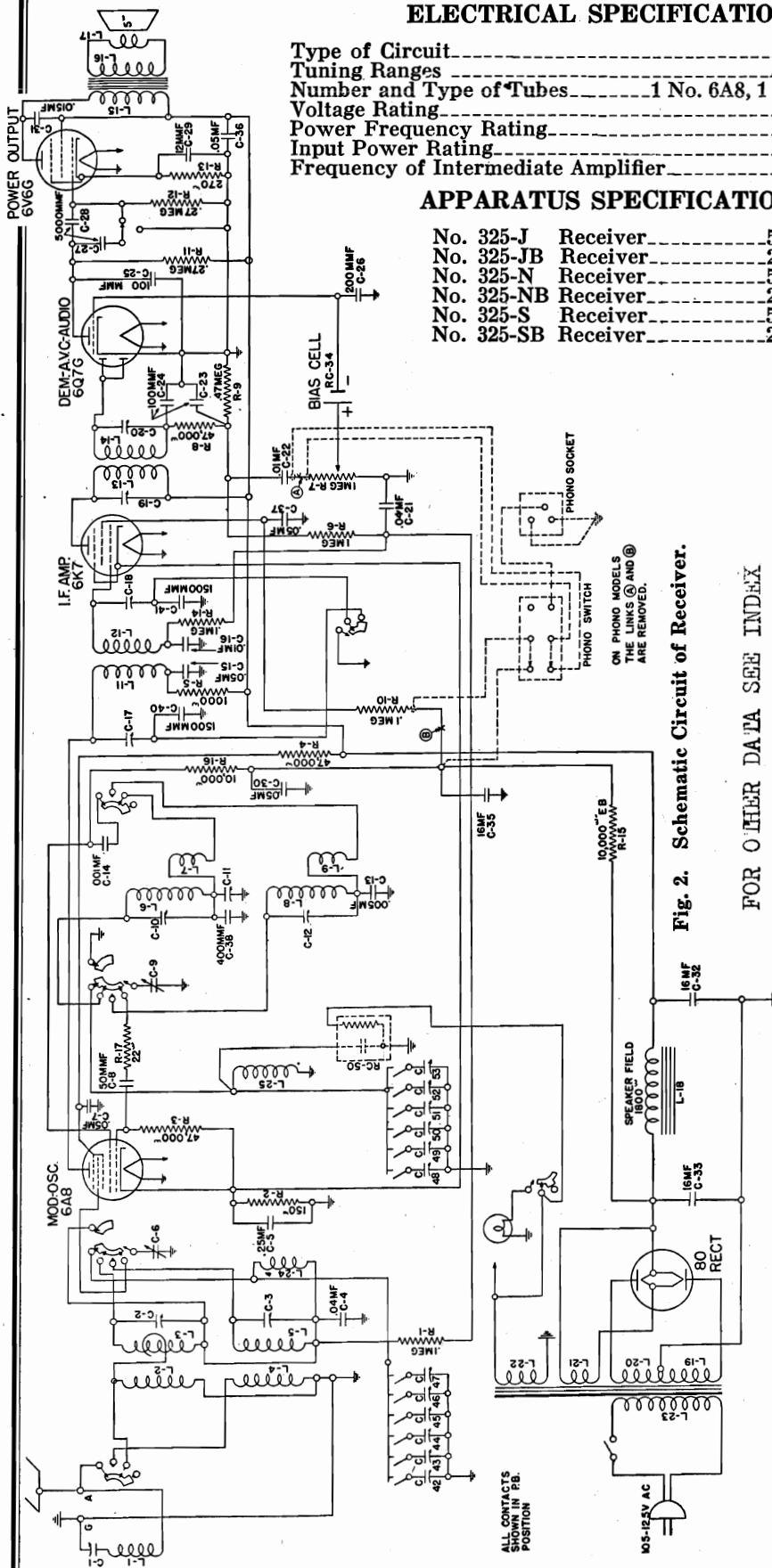


Fig. 2. Schematic Circuit of Receiver.

FOR OTHER DATA SEE INDEX

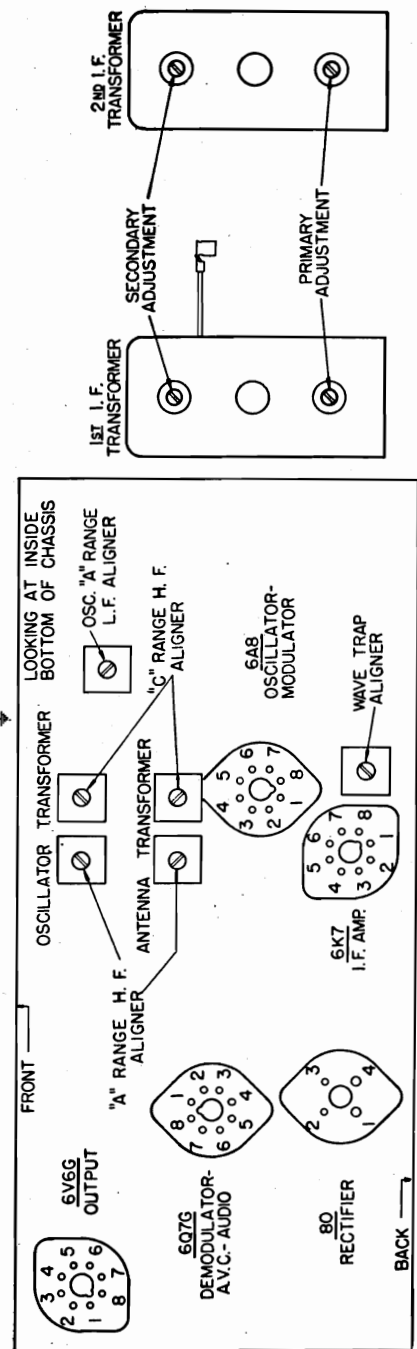
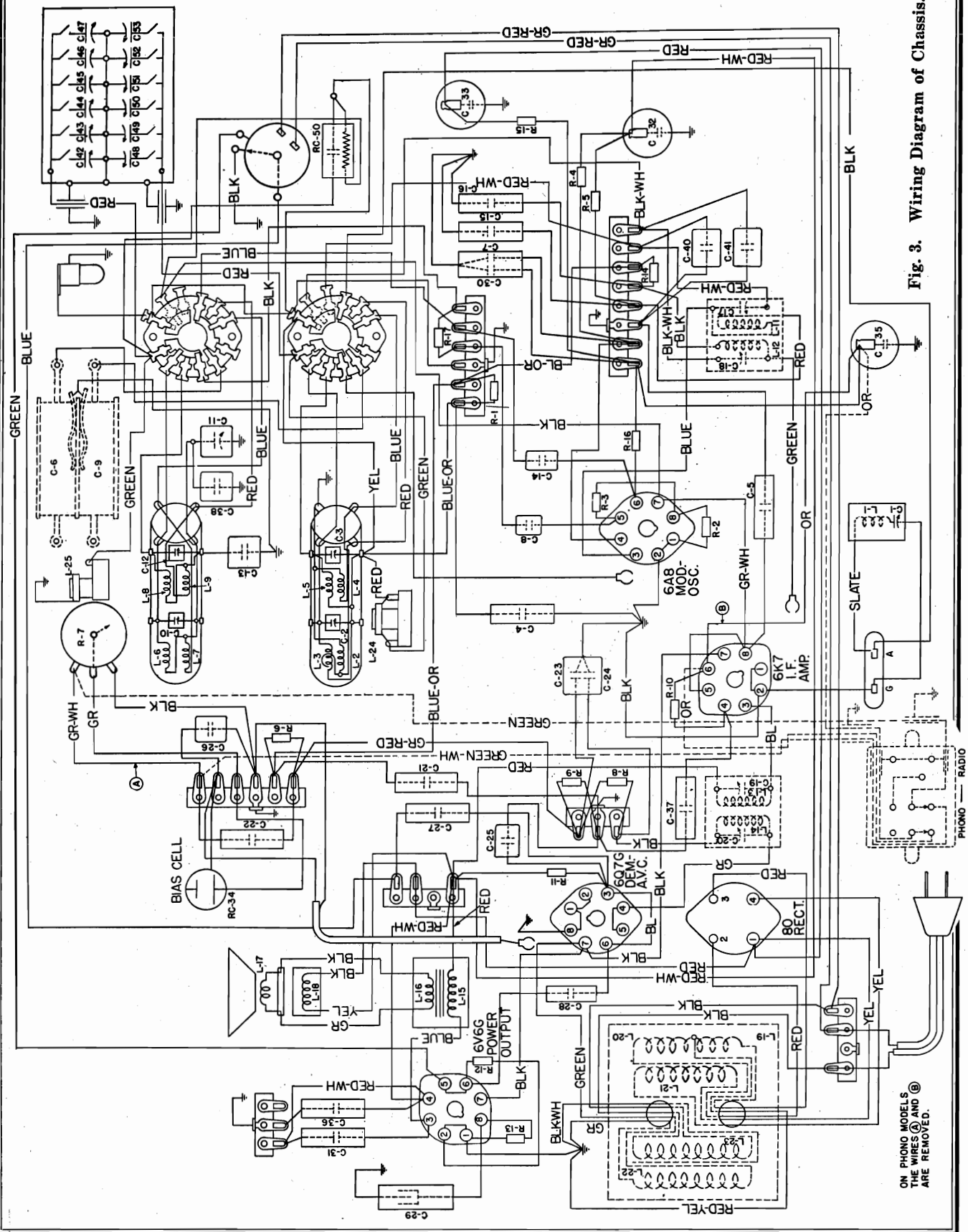


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

MODELS 325J, 325JB
325N, 325NB
325S, 325SB

STROMBERG-CARLSON TEL. MFG. CO.

Chassis Wiring .



Voltage, Alignment
Phonograph Data

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 325J, 325JB
325N, 325NB
325S, 325SB

microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal.

- Now, noting from Figure 1, the aligning capacitors for the first and second I. F. transformers, align the I. F. circuits in the following manner:

- Secondary of second I. F. transformer.
- Primary of second I. F. transformer.
- Secondary of first I. F. transformer.
- Primary of first I. F. transformer.

Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

Alignment of Short Wave Range (Also Referred to as "C" Range)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Rotate the Electric Tuning and Range Switch control knob to the Short Wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial to 17 megacycles.
2. Adjust the oscillator's "C" range high frequency aligner for maximum output.
3. Adjust the antenna's "C" range high frequency aligner for maximum output and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Standard Broadcast Range (Also Referred to as "A" Range)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Rotate the Range Switch control knob to the Standard Broadcast ("A") range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.
2. Adjust the oscillator's "A" range high frequency aligner for maximum output.
3. Adjust the antenna's "A" range high frequency aligner for maximum output.
4. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
5. Adjust the oscillator's "A" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
6. Reset both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations in steps 2 and 3.

Wave Trap Adjustment

In adjusting the wave trap circuit, set the Electric Tuning and Range Switch control knob to the Standard Broadcast range position and set the dial pointer to 1000 kilocycles.

Connect a 200-micro-microfarad capacitor in series with the output terminal of the modulated test oscillator and the antenna binding post on the receiver, and the ground terminal of the test oscillator to the ground binding post on the receiver. Then, with the modulated test oscillator set at the frequency of the intermediate amplifier, 455 kilocycles, supply a fairly strong signal to the receiver and adjust the wave trap aligner until a minimum indication is obtained on the output meter.

PROCEDURE FOR OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

In order to obtain reproduction of phonograph records in conjunction with the No. 325 Receiver, the following instructions should be followed.

To equip these receivers for phonograph operation, it will be necessary to purchase and install a Stromberg-Carlson P-28009 Switch Assembly. Complete instructions on how to install and operate this switch are furnished with each P-28009 Switch Assembly.

To obtain the best quality of phonograph reproduction from this receiver, a Stromberg-Carlson Record Player is recommended. The record player is equipped with a correctly designed single record playing motor unit, and uses a crystal type pick-up in conjunction with a specially equalized circuit.

If the Stromberg-Carlson Record Player is not used and the electric pick-up to be used is of the high impedance type, it will be necessary to install a shielded cable between the record player and the receiver. The plug of the P-28009 Switch Assembly, and the pick-up. This shielded cable should be of the low capacity type, in order to prevent excessive cutting of high frequencies which is caused when a shielded cable having high capacity is used. The length of the shielded cable used should be kept as short as possible.

If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong socket and plug of the P-28009 Switch Assembly, and the pick-up. The transformer should be located as near to the receiver as possible, in which case it will not be necessary to use a shielded cable.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-25, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 250 volt scale was used.

Tube	Circuit	Cap	Terminals of Sockets								Heater Voltages Between Heater Terminals	
			1	2	3	4	5	6	7	8	Socket Terminal Numbers	Volts
6A8	Mod.-Osc.	0	0	0	+174	+64	-7.2	+176	6.1	+1.8	2-7	6.1
6K7	I. F. Amp.	0	0	0	+176	+62	+1.8	+210	6.1	+1.8	2-7	6.1
6Q7G	Dem.-A. V. C. -Audio	0	0	0	+65*	0	0	+65*	6.1	0	2-7	6.1
6V6G	Audio Output	—	0	0	+167	+176	0	0	6.1	+8.2	2-7	6.1
80	Rectifier	—	+280	258	258	+280	—	—	—	—	1-4	4.8

Receiver tuned manually to 1000 Kc., no signal. A. C. voltages are indicated by italics.

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the alignment procedure given in the following paragraphs should be carefully followed. In order to make these alignment adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-27657 and P-27658 aligning tools be used.

To accurately align the circuits in these receivers, it is necessary to use a high grade, modulated test oscillator (Signal Generator), the output voltage of which can be varied. In conjunction with this test oscillator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker.

In making any alignment adjustments, always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal. Before proceeding with the alignment of any circuits in these receivers be sure that the "Off-On-Tone" control knob is set for maximum treble response (loudspeaker control knob set to the "On" position, the "Off-On-Tone" control knob is set to position where set turns "on"). Figure 1, shows the location of all the aligning capacitors in these receivers.

In making any alignment adjustments on these receivers, it will not be necessary to remove the chassis from the cabinet. The chassis is designed so that the radio frequency circuits of these receivers are easily accessible either through the bottom of the cabinet or through the bottom of the cabinet shelf depending upon the style of cabinet.

Dial Adjustment

Before aligning the circuits of any of these receivers, the tuning dial must be properly aligned to track with the gang tuning capacitor. The tuning dial is set correctly with a set screw which is located on the back of the dial. The "Station Selector" knob in a clockwise direction so that the gang tuning capacitor is set to its maximum capacity position. Then, with the gang tuning capacitor in this position, the dial pointer should be placed on the horizontal center line of the dial. To do this, align the pointer with the short black line located at the extreme right-hand edge of the dial plate.

Intermediate Frequency Adjustments

The intermediate frequency used in these is 455 kilocycles. In making these circuit adjustments always align the circuits in the order given in these instructions.

1. Rotate the Electric Tuning and Range Switch control knob to the Standard Broadcast Range position (arrow on knob pointing in direction of letters BK.).
- Set the dial pointer to the extreme low frequency position on the receiver's dial. Rotate the "Off-On-Tone" control knob slightly clockwise from its most counter-clockwise position which is the "normal" position. Rotate the Volume control knob to its maximum clockwise position (maximum volume).
2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator-oscillator tube, a modulated signal of 455 kilocycles from the test oscillator, using a 0.1-

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 335L, 335LB

336P, 336PB

Schematic

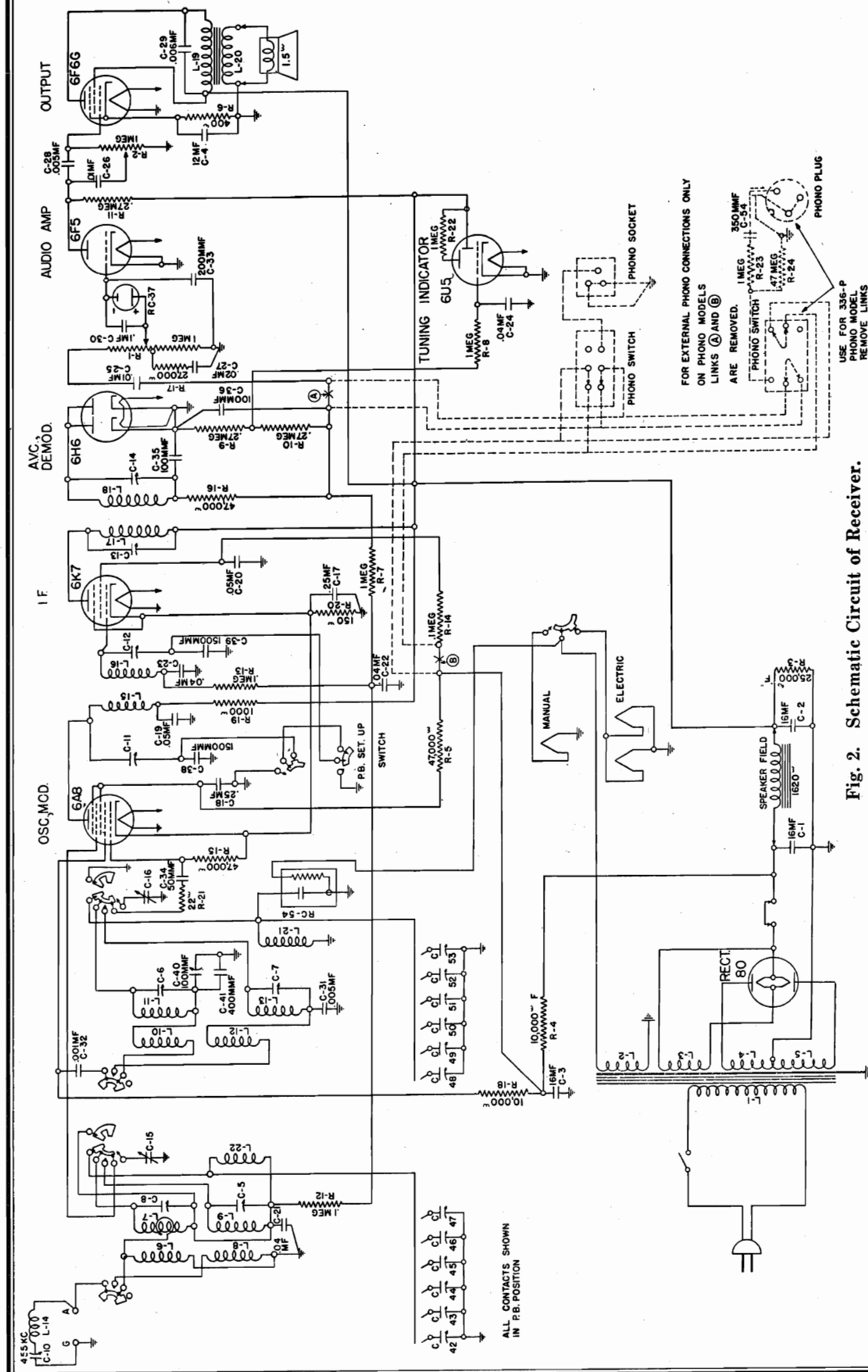


Fig. 2. Schematic Circuit of Receiver.

Type of Circuit.....	Superheterodyne with Electric Tuning
Tuning Ranges.....	Range "A", 530 to 1700 Kc.; Range "C", 5900 to 18,000 Kc.
Number and Type of Tubes.....	1 No. 6A8; 1 No. 6K7; 1 No. 6H6; 1 No. 6F5; 1 No. 6F6G; 1 No. 6U5; 1 No. 80
Power Supply Voltage.....	105 to 125 Volts, A. C.
Power Frequency Rating.....	50 to 60 Cycles and 25 to 60 Cycles
Input Power Rating.....	
Radio Models Only.....	65 Watts
Radio-Phono. Models.....	80 Watts
Frequency of Intermediate Amplifier.....	455 Kilocycles

MODELS 335L, 335LB

336P, 336PB STROMBERG-CARLSON TEL. MFG. CO.

Chassis Wiring

No. 335-L Receiver..... 50 to 60 Cycles; P-28818 Chassis Assembly; P-27605 Loud Speaker
 No. 335-LB Receiver..... 25 to 60 Cycles; P-28819 Chassis Assembly; P-27605 Loud Speaker
 No. 336-P Receiver..... 60 Cycles Only; P-29415 Chassis; P-29439 Phono Unit; P-29464 Loud Speaker
 No. 336-PB Receiver..... 25 Cycles Only; P-29416 Chassis; P-29440 Phono Unit; P-29464 Loud Speaker

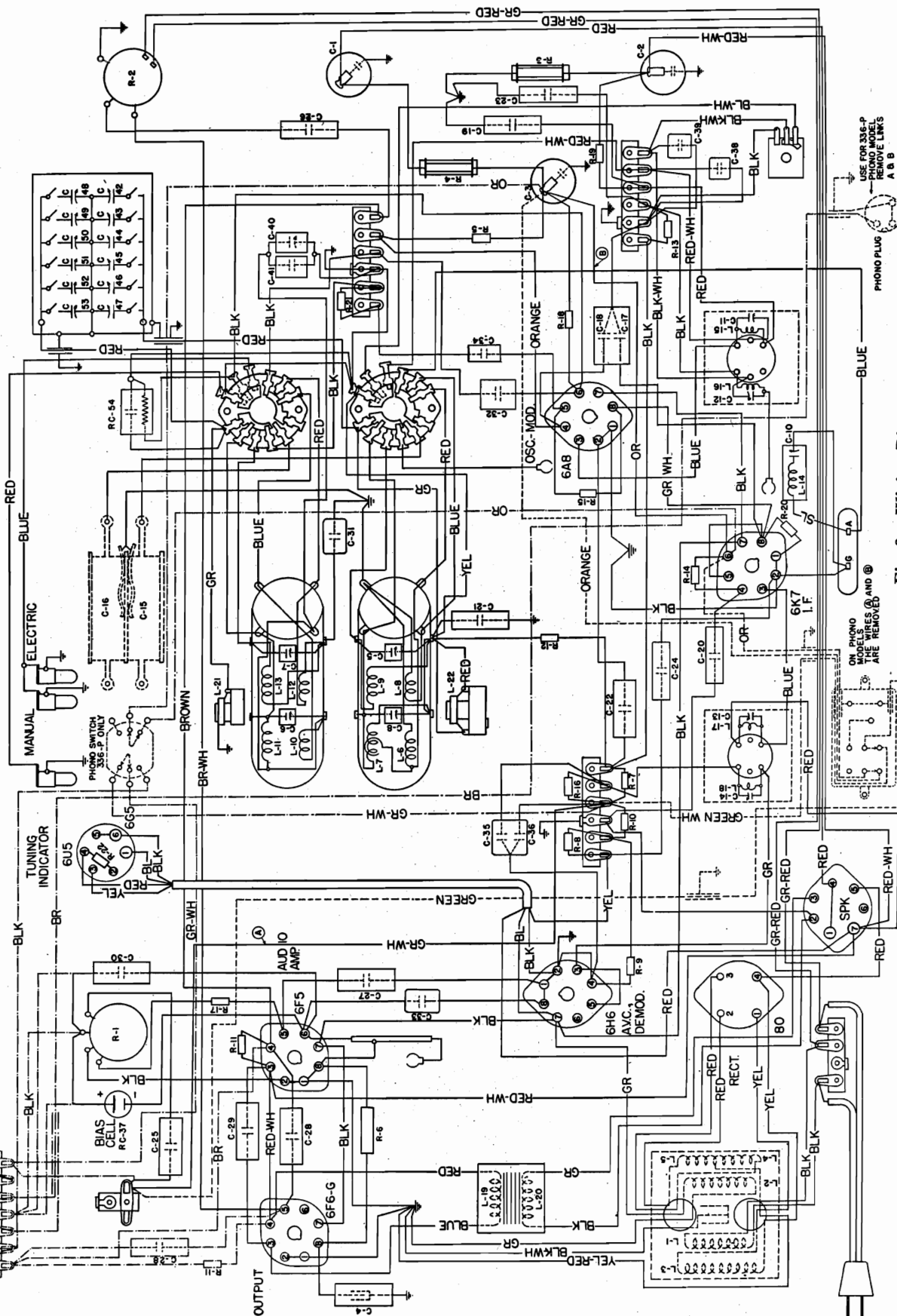


Fig. 3. Wiring Diagram of Chassis.

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 337H, 337HB

337L, 337LB

Schematic

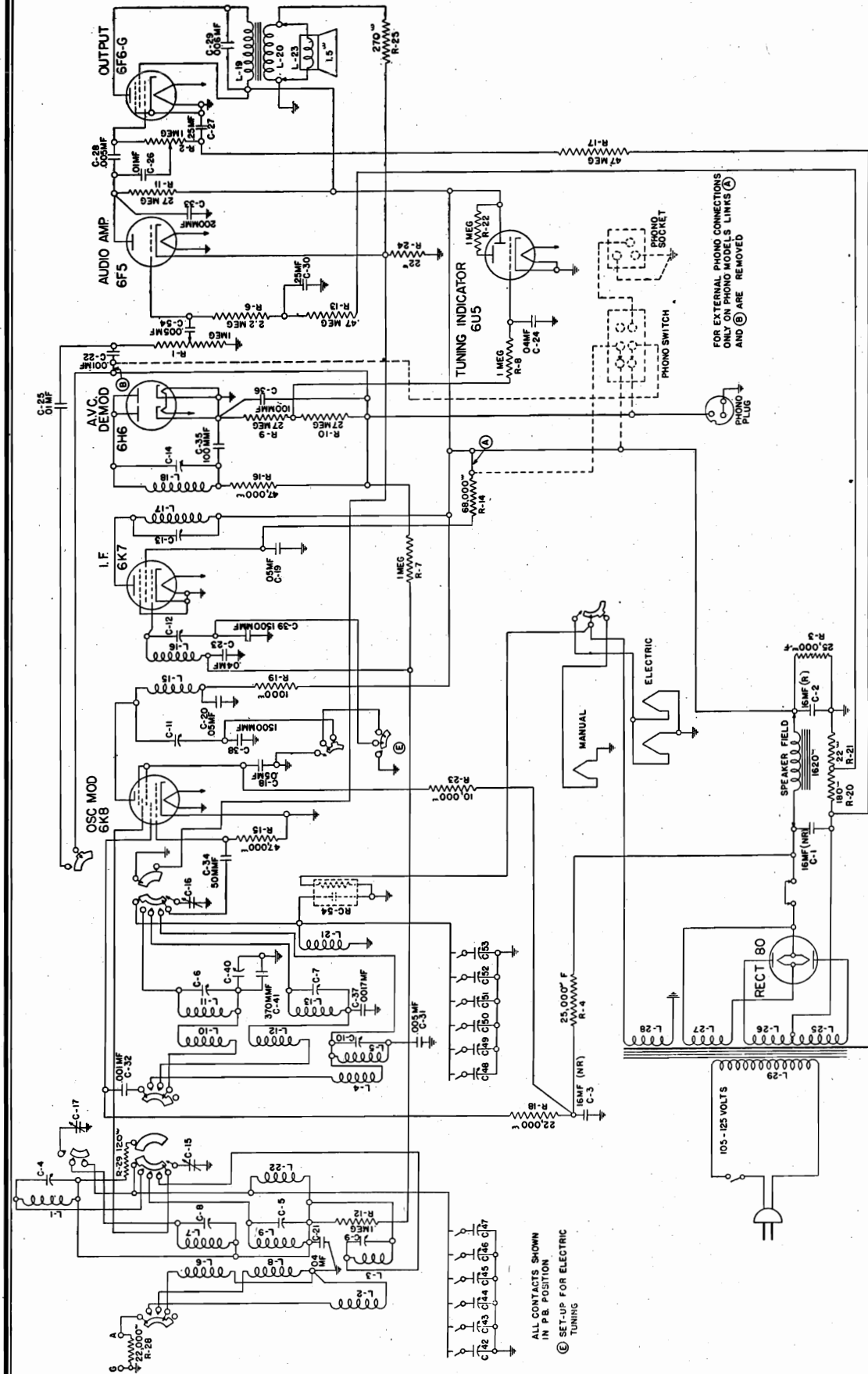


Fig. 2. Schematic Circuit of Receiver.

Type of Circuit	Superheterodyne with Electric Tuning
Tuning Ranges	.53 to 1.7 Mc.; 2.25 to 7.6 Mc.; 7.6 to 23 Mc.
Number and Type of Tubes	1 No. 6K8, 1 No. 6K7, 1 No. 6F5, 1 No. 6F6G, 1 No. 6U5, 1 No. 80
Voltage Rating	105 to 125 Volts
Power Frequency Rating	25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating	70 Watts
Frequency of Intermediate Amplifier	455 Kilocycles

MODELS 337H, 337HB

337L, 337LB

STROMBERG-CARLSON TEL. MFG. CO.

Chassis Wiring

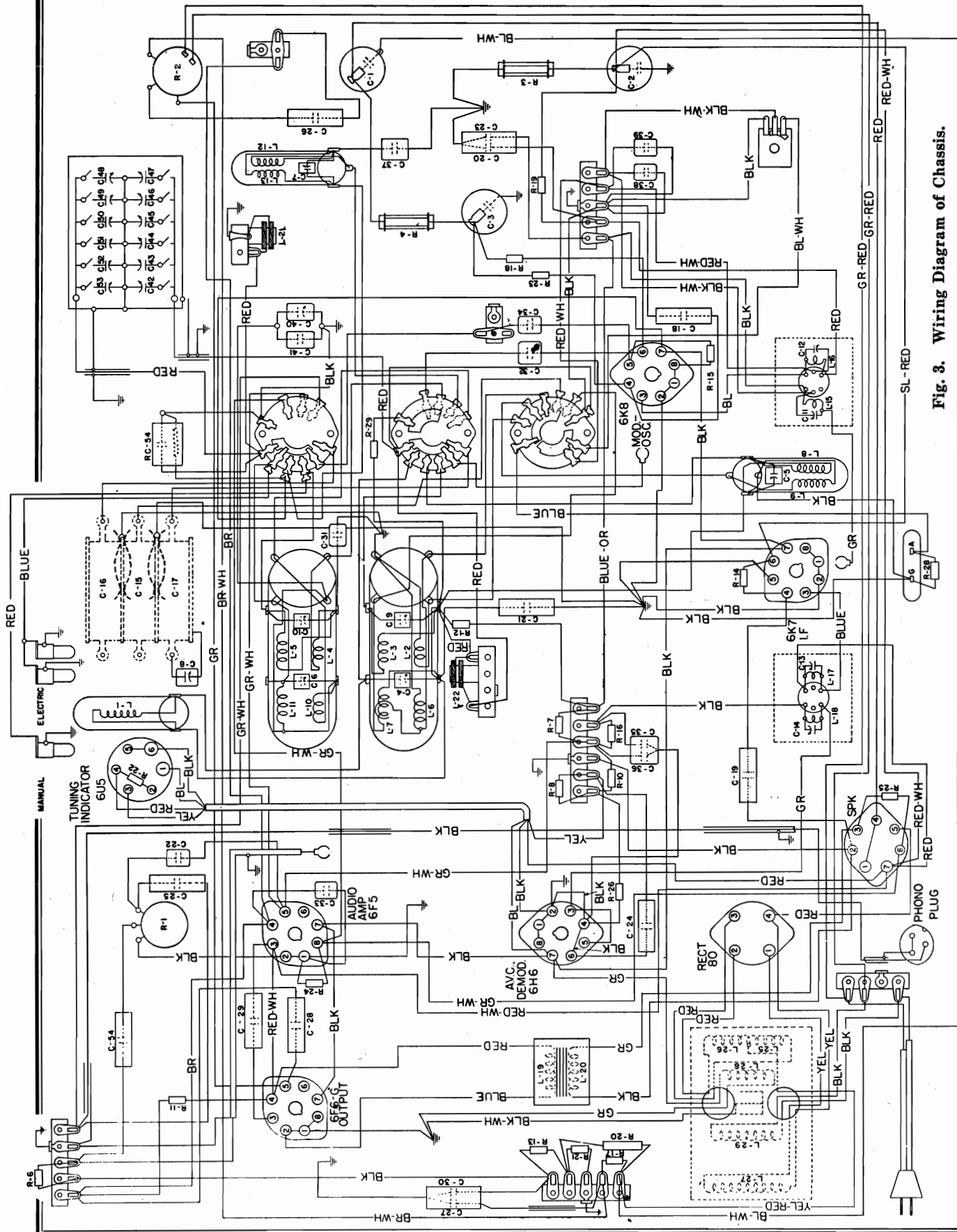


Fig. 3. Wiring Diagram of Chassis.

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 337H, 337HB
337L, 337LB
Alignment, Phono.
Tuner Data

is easily obtainable by simply rotating the Range Switch control knob so that the arrow on the knob points in the direction of the designation for the desired type of tuning. When manually tuning the receiver in either the Standard Broadcast or Short Wave ranges, the electric tuning alignment is made inoperative and the dial of the Range Switch control knob pointing in direction of the start of the electric tuning (arrow on Range Switch control knob) is set for electric tuning. When manually tuning these receivers or when setting up the six desired stations for electric tuning, resonance with a signal is indicated by means of the tuning indicator tube which operates on the cathode-ray principle.

1. Set the Electric Tuning and Range Switch control knob to the manual tuning standard broadcast position (arrow on knob pointing in direction of letter "A"). Set the dial pointer by means of the Station Selector knobs to the extreme low frequency position on the receiver's dial. Rotate the "Off-On-Tone" control knob to the "On" position. When the manual tuning has been attained, rotate the Range Switch control knob to the "Set-Up" position. By aid of a screwdriver rotate the slotted shaft of the Electric Tuning Set-Up Switch located at the rear of the chassis base, so that the slot of the shaft points in the direction of the word "Set-Up" (maximum clockwise volume). Rotate the Volume control knob to its maximum clockwise position (maximum volume).
2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6K3 modulator-oscillator tube, a modulated signal of 455 kilocycles from the test oscillator, using a 0.1 microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6K3 tube. The No. 6K3 tube should be connected to either the chassis base or the ground binding post terminal.
3. Now, noting from Figure 1, the aligning capacitors for the first and second I. F. transformers, align the I. F. circuits in the following manner:

Secondary of second I. F. transformer.

Primary of second I. F. transformer.

Secondary of first I. F. transformer.

Primary of first I. F. transformer.

Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

CAUTION: Be sure that the Electric Tuning Set-Up Switch is set to the "Set-Up" position.

Alignment of Short Wave Range (Also Referred to as "C" Range)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver's chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Rotate the Electric Tuning and Range Switch control knob to the Short Wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial to 20 megacycles.
2. Adjust the receiver's oscillator "C" range high frequency aligner for maximum output.
3. Adjust the antenna "C" range high frequency aligner for maximum output and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Short Wave Range (Also Referred to as "B" Range)

In aligning the radio frequency circuits for this range, use the same artificial antenna and antenna binding post as was used for aligning the "C" range, and align this range as follows:

1. Rotate the Electric Tuning and Range Switch control knob to the Short Wave ("B") range position, and set the test oscillator's frequency and the receiver's tuning dial to 7 megacycles.
2. Adjust the receiver's oscillator "B" range high frequency aligner for maximum output.
3. Adjust the antenna "B" range high frequency aligner for maximum output and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Standard Broadcast Range (Also Referred to as "A" Range)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Rotate the Electric Tuning and Range Switch control knob to the manual tuning, Standard Broadcast ("A") range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.
2. Adjust the receiver's oscillator "A" range high frequency aligner for maximum output.
3. Adjust the antenna "A" range high frequency aligner for maximum output.
4. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
5. Adjust the receiver's oscillator "A" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
6. Reset both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2 and 3.

OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

These receivers are equipped with a three-contact phono socket, which is connected to the receiver circuit by a short, shielded cable running from the rear of the chassis base. A three-prong plug is also furnished for connecting the pick-up cable to the phono socket.

To obtain the best quality of phonograph reproduction from these receivers, a Stromberg-Carlson Record Player is recommended. The Record Player is equipped with a correctly designed single record playing motor unit, and uses a crystal type pick-up in conjunction with a specially equalized circuit.

In order to prevent radio signals from interfering with the phonograph reproduction, it is necessary to set the station selector knobs to the "on" position. When the turntable has attained speed, raise the tone arm (which should be held in the "on" position) and place the needle point on the record groove. The volume pick-up and lower it gently on to the record so that the needle point enters the outside groove. The volume (sound level) and the tone for phonograph reproduction can be controlled the same as for radio reception, i. e., by means of the "Volume" and "Off-On-Tone" control knobs located on the front panel of the radio receiver.

If the Stromberg-Carlson Record Player is not used and the electric pick-up to be used is of the high impedance type, it will be necessary to connect a shielded cable between the three-prong socket plug and the pick-up. For best reproduction, this shielded cable should be of the low capacity type. The length of this shielded cable should be about 10 feet. When the turntable has attained speed, raise the tone arm and place the needle point on the record so that the needle point enters the outside groove. The volume pick-up and lower it gently on to the record so that the needle point enters the outside groove. The volume (sound level) and the tone for phonograph reproduction can be controlled the same as for radio reception, i. e., by means of the "Volume" and "Off-On-Tone" control knobs located on the front panel of the radio receiver.

If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong socket plug and the pick-up. The transformer should be located as near to the receiver as possible, in which case it will not be necessary to use a shielded cable.

Instructions for Setting Up the Electric Tuning Arrangement

1. Before proceeding to set up the stations for electric tuning, the radio receiver should be turned "on" for approximately twenty to thirty minutes.
2. Set the Range switch control knob to the manual tuning position for the Standard Broadcast range (arrow on knob pointing in direction of the letter "A").
3. Remove the list of station letters from the P-2871 package assembly which is tacked inside of the cabinet.
4. Remove the two screws which hold the electric tuning escutcheon plate (metal plate). Then, remove from the escutcheon, the strip of transparent material and the strip of paper on which the six stars are printed.
5. Remove the five screws which hold the electric tuning escutcheon to the front panel.
6. From the lists of stations, remove the call letters of the six stations which it is desired to set up for electric tuning. These six stations should preferably be selected and set up in the daytime so that the best service will be obtained at all times.

CAUTION: Each button adjustment for electric tuning has assigned frequency limits. These limits are designated for each adjustment on the cover plate which covers the electric tuning adjusting capacitors. Before making any adjustments, the frequency of each station will be within the assigned frequency limits of its associated push button.

It will be noted that the station letters are printed on partially cut squares to facilitate ease in removing the desired station letters. In setting up these six favorite stations, the following order should be followed:

Looking at the front of the receiver, the station letters of the station having the highest frequency should be inserted into the farthest left-hand square of the escutcheon. Then, in successive order, according to the frequency, insert the station letters of the remaining five stations into the other five squares of the electric tuning escutcheon; the station letters of the station having the lowest frequency being inserted into the farthest right-hand square of the escutcheon.

After the six station call letters have been inserted into the escutcheon, the transparent strip should be replaced over the station call letters, and the escutcheon plate then fastened into its position on the electric tuning escutcheon by means of the two screws.

The tuning adjustments for the six favorite stations can now be made, starting with the station having the highest frequency and proceeding as follows:

7. **IMPORTANT:** By aid of a screwdriver, rotate the slotted shaft of the electric tuning switch, which is mounted on the rear of the receiver, so that the slot of the shaft points in the direction of the word, "Set-Up" (maximum clockwise rotation).
8. With the receiver turned "on", and the Range Switch control knob set to the standard broadcast position (arrow on knob pointing in direction of letter "A"), tune the receiver in the conventional manner for the station having the highest frequency. When the manual tuning has been attained, rotate the Range Switch control knob to the electric tuning arrangement and carefully note the program which it is broadcasting. Then, rotate the Range Switch control knob to the electric tuning position, arrow on knob pointing in direction of the small star (large star and station letters become illuminated).

MODELS 337H, 337HB
337L, 337LB
MODELS 350M, 350MB
350R, 350RB, 350P
350PB, 350V, 350VB

STROMBERG-CARLSON TEL. MFG. CO.

Voltage, Socket Trimmers

APPARATUS SPECIFICATIONS

No. 337-H	50 to 60 Cycles; P-29588 Chassis Assembly; P-27557 Speaker
No. 337-HB	25 to 60 Cycles; P-29589 Chassis Assembly; P-27557 Speaker
No. 337-L	50 to 60 Cycles; P-29588 Chassis Assembly; P-27605 Speaker
No. 337-LB	25 to 60 Cycles; P-29589 Chassis Assembly; P-27605 Speaker

A special temperature controlled compensating capacitor is used in the oscillator circuit of these receivers when operating the electric tuning arrangement in order to eliminate drift in the oscillator's frequency. These receivers are also provided with a low level bass frequency compensating circuit in conjunction with the volume control circuit so that balanced reproduction is obtained for any setting of the volume control.

NORMAL VOLTAGE READINGS

The values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in full operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D.C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given value in which case the 250 volt scale was used.

Tube	Circuit	Terminals of Sockets										Heater Voltages Between Header Terminals	
		Cap	1	2	3	4	5	6	7	8	Socket Terminal Numbers	Volts	
3K3	Mod., Osc.	0	0	0	+230	+92	-6.5	+73	6.3	0	2-7	6.3	
5K7	I. F. Amp.	0	0	0	+230	+70	—	+230	6.3	0	2-7	6.3	
6H6	Dem., A. V. C.	—	0	0	0	0	0	0	6.3	0	2-7	6.3	
6F5	Audio Amp.	0	0	0	+230	+56	0	0	6.3	0	2-7	6.3	
6F6G	Audio Output	—	0	0	+212	+227	0	—	6.3	0	2-7	6.3	
6U5	Tuning Ind.	—	0	0	+220	0	+45*	6.3	—	—	1-6	6.3	
80	Rectifier	—	+350	345	345	+350	—	—	—	—	1-4	4.8	
90	Rectifier	—	+350	0	0	+350	+350	0	+230	—	—	—	
Breaker Socket													

Receiver tuned manually to 1000 Kc., no signal. A. C. voltages are indicated by italics.

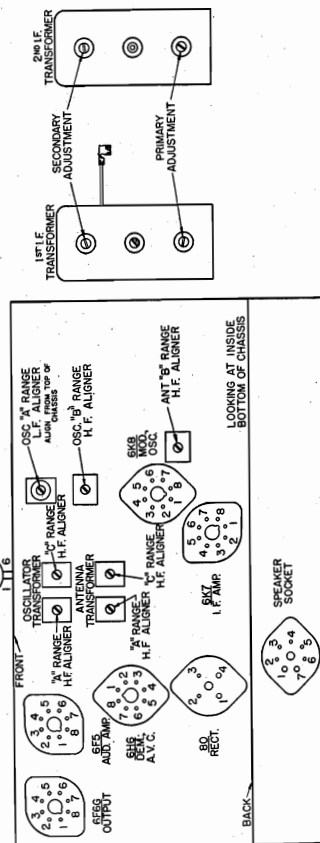


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Capacitors.

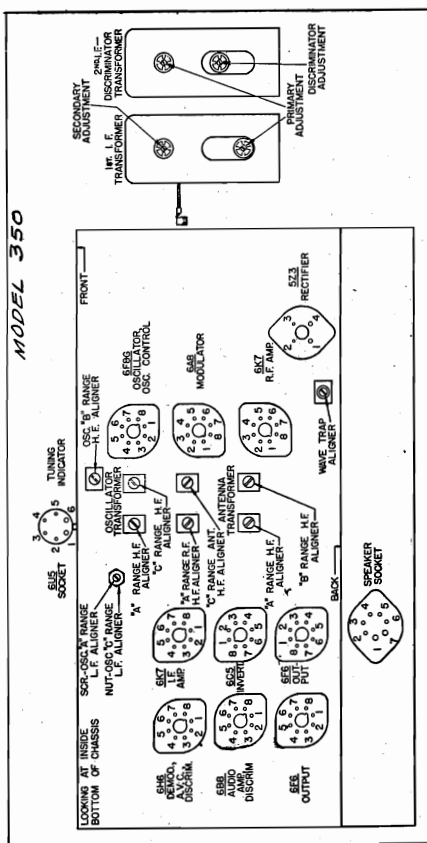


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Adjustments for the R-F, I-F, and Discriminator Circuits.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with all the tubes in their respective sockets except the No. 6U5 tube. The receiver is, therefore, in operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltagages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-25, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value, in which case the 500 volt scale was used.

		Terminals of Sockets										Heater Voltages Between Header Terminals	
Tube	Circuit	Cap	1	2	3	4	5	6	7	8	Terminals		
											Socket Terminal Numbers	Volts	
6BK7	R. F. Amp.	0	0	0	+205	+99	0	0	6.2	0	2-7	6.2	
6BA8	Modulator	0	0	0	+227	+99	-5.9	+99	6.2	0	2-7	6.2	
6BF8-G	Oscillator and Oscillator Control	0	0	0	+153	+7.8	-5.9	+152	6.2	0	2-7	6.2	
6BK7	I. F. Amp.	0	0	0	+210	+57	0	+57	6.2	0	2-7	6.2	
6BH6	Discriminator, Demodulator, A. V. C.	—	0	0	0	0	0	0	6.2	0	2-7	6.2	
6BH8	Discriminator, Audio Amp.	0	0	0	+20*	0	0	+38*	6.2	0	2-7	6.2	
6C5	Audio Inv.	—	0	0	+120	+215	0	0	6.2	+5.9	2-7	6.2	
6BF6	Audio Output	—	0	0	+300	+308	0	0	6.2	+19	2-7	6.2	
6BF6	Audio Output	—	0	0	+300	+308	0	0	6.2	+19	2-7	6.2	
6LU5†	Tuning Ind.	—	6.2	+19	0	+217	-3	0	—	—	1-6	6.2	
5253	Rectifier	—	+410	397	397	+410	—	—	—	—	1-4	4.8	
Speaker Socket	Rectifier	—	+390	0	0	+410	+410	0	+308	—	—	—	

Receiver tuned manually to 1000 Kc., no signal. A. C. voltages are indicated by italics.

MODELS 340F, 340FB
340H, 340HB, 340M
340MB, 340V, 340VB
340P, 340PB, 341R
341RB, 341P, 341PB
Schematic

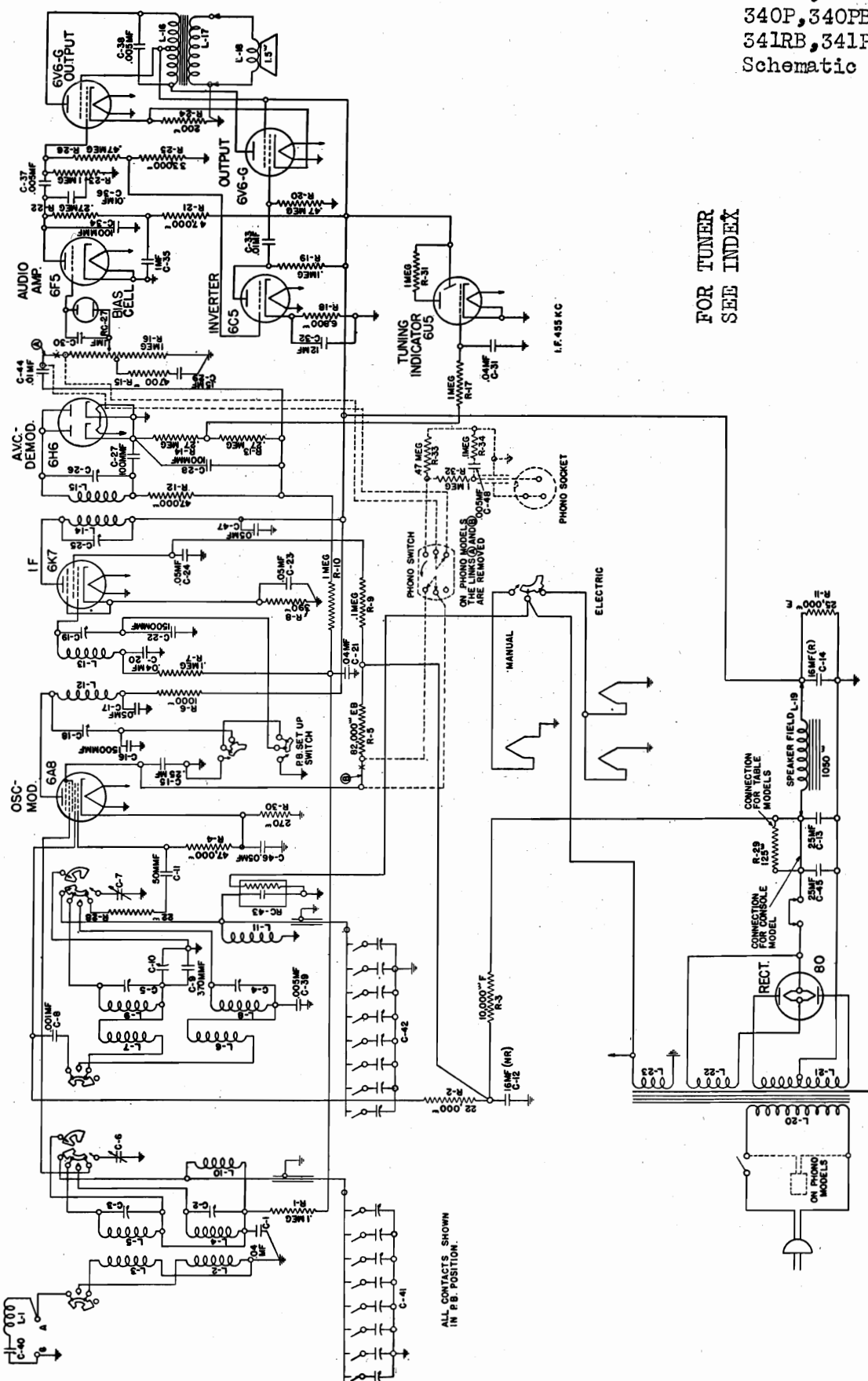


Fig. 2. Schematic Circuit of Receiver.

MODELS 340F, 340FB
340H, 340HB, 340M
340MB, 340V, 340VB
340P, 340PB, 341R
341RB, 341P, 341PB
Chassis Wiring

STROMBERG-CARLSON TEL. MFG. CO.

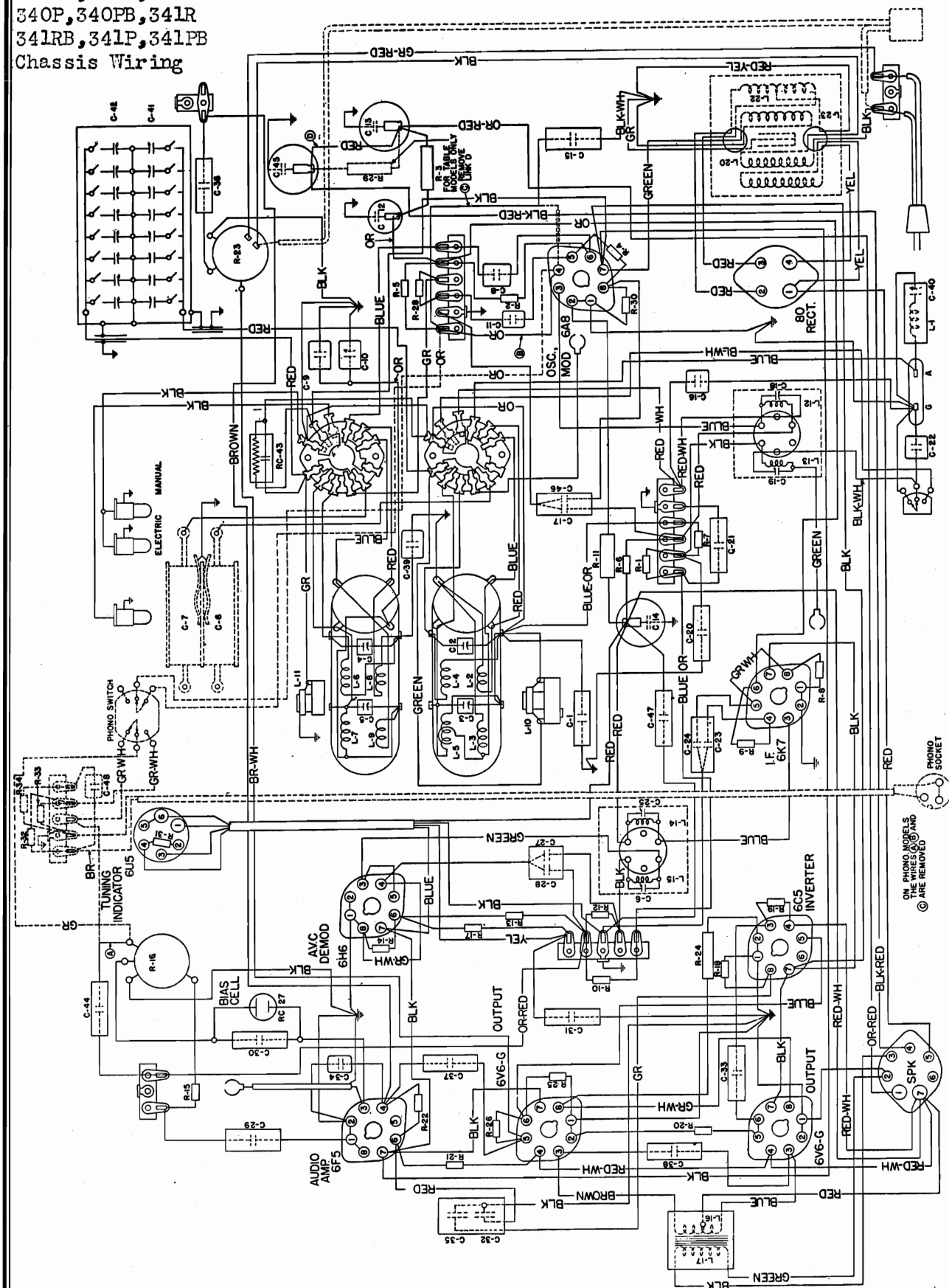


Fig. 3. Wiring Diagram of Chassis.

STROMBERG-CARLSON TEL. MFG. CO.

Due to the use of the 125-ohm resistor, R-29, in the chassis used in table models, some socket terminals in the voltage table have two listed voltages; the lower voltage being obtained from those chassis which are equipped with this resistor, and the upper voltages are those obtained from chassis not equipped with this resistor.

Tube	Circuit	Cap	Terminals of Sockets										Heater Voltages Between Heater Terminals	
			1	2	3	4	5	6	7	8	Socket Terminal Numbers	Volts		
5A8	Mod., Osc.	0	0	0	+245 +240	+109	-14	+205	6.3	+2.35	2-7	6.3		
9K7	I. F. Amp.	0	0	0	+250 +244	+109*	0	+290	6.3	+3.3	2-7	6.3		
9H6	Dem., A. V. C.	—	0	0	0	0	0	0	6.3	0	2-7	6.3		
6BF5	Audio Amp.	0	0	0	0	+100*	0	+290* +218*	6.3	0	2-7	6.3		
6C5	Audio Inv.	—	0	0	+138* +136*	+250 +244	0	0	6.3	+4.8	2-7	6.3		
6V6-G	Audio Output	—	0	0	+244 +237	+250 +244	0	0	6.3	+13.8	2-7	6.3		
6V6-G	Audio Output	—	0	0	+244 +237	+250 +244	0	0	6.3	+13.8	2-7	6.3		
6U5	Tuning Ind.	—	6.3	372	+139* +135*	+250 +244	0	0	—	—	1-6	6.3		
80	Rectifier	—	+970	372	+970	+370	—	—	—	—	1-4	5		
Speaker Socket		+370	0	0	+370	+370	0	—	—	—	—	—		

Receiver tuned manually to 1000 kc., no signal. A. C. voltages are indicated by italics.

[illegible]

Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Capacitors.

P-29976 Issue 1 Printed in U. S. A.

MODELS 340F, 340FB
340H, 340HB, 340M
340MB, 340V, 340VB

STROMBERG-CARLSON TEL. MFG. CO.

340P, 340PB, 341R
341RB, 341P, 341PB
Alignment

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the alignment procedure given in the following paragraphs should be carefully followed. In order to make these aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-24608 aligning tool be used.

To accurately align the circuits in these receivers, it is necessary to use a high grade, modulated test oscillator (Signal Generator), the output voltage of which can be varied. In conjunction with this test oscillator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker.

In making any alignment adjustments, always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal. Before proceeding with the alignment of any circuits in these receivers be sure that the "Off-On-Tone" control knob is set for maximum treble response (position where knob is rotated from its maximum counter-clockwise position, slightly clockwise to position where set turns "on"), and that the slotted shaft of the electric tuning set-up switch, located on the rear of the chassis base, pointing in the direction of the word "Set-Up". With the test oscillator set at 455 kilocycles, the test oscillator's output should be adjusted so that the slot points in the direction of the word, "Operate". Figure 1, shows the location of all the aligning capacitors in these receivers.

Dial Adjustment

Before aligning the circuits of any of these receivers, the tuning dial must be properly aligned to track with the gang tuning capacitors. To check whether the dial is set correctly with respect to the gang tuning capacitors, rotate the "Station Selector" knob in a clockwise direction so that the gang tuning capacitors are set to their maximum capacity position. Then, with the gang tuning capacitors in this position, the dial pointer should be placed on the horizontal center line of the dial. To do this, align the pointer with the short black line located at the extreme right-hand edge of the dial plate.

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 455 kilocycles. In making these circuit adjustments always align the circuits in the order given in these instructions.

1. Set the Electric Tuning and Range Switch control knob to the manual tuning standard broadcast position (arrow on knob pointing in direction of letters "BR."). Set the dial pointer by means of the Station Selector knob to the extreme low frequency position on the receiver's dial. Rotate the "Off-On-Tone" control knob slightly clockwise from its most counter-clockwise position, which is the "normal" position. By aid of a screwdriver rotate the slotted shaft of the Electric Tuning Set-Up switch located at the rear of the chassis base, so that the slotted shaft points in the direction of the word "Set-Up" (maximum volume). Rotate the Volume control knob to its maximum clockwise position.

2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator-oscillator tube, a modulated signal of 455 kilocycles from the test oscillator, using a 0.1 microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The test oscillator should be connected to the grid lead of the test oscillator should be connected to either the chassis base or the ground binding post terminal.

3. Now, noting from Figure 1, the aligning capacitors for the first and second I. F. transformers, align the I. F. circuits in the following manner:

Secondary of second I. F. transformer.

Primary of second I. F. transformer.

Secondary of first I. F. transformer.

Primary of first I. F. transformer.

Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

Alignment of Short Wave Range (Also Referred to as "C" Range)

In aligning the radio frequency circuits for this range, replace the 0.1 microfarad capacitor which was placed in series with the connection between the output terminal of the test oscillator and the grid of the No. 6A8 tube with a 400-ohm resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Rotate the Electric Tuning and Range Switch control knob to the Short Wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial to 17 megacycles.

2. Adjust the oscillator's "C" range high frequency aligner for maximum output.

3. Adjust the antenna's "C" range high frequency aligner for maximum output and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Standard Broadcast Range (Also Referred to as "A" Range)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Rotate the Electric Tuning and Range Switch control knob to the manual tuning, Standard Broadcast ("A") range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.

2. Adjust the oscillator's "A" range high frequency aligner for maximum output.

3. Adjust the antenna's "A" range high frequency aligner for maximum output.

4. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.

5. Adjust the oscillator's "A" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.

6. Reset both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2 and 3.

Wave Trap Adjustment

In adjusting the wave trap circuit, set the Electric Tuning and Range Switch control knob to the manual tuning, Standard Broadcast position (arrow on knob pointing in direction of letters "BR."). Set the dial pointer to 1000 kilocycles and the Electric Tuning Set-Up Switch, located on the back of the receiver chassis, to the "Set-Up" position.

Connect a 200-micro-microfarad capacitor in series with the output terminal of the modulated test oscillator and the receiver's antenna binding post. Then, with the modulated test oscillator set at the frequency of the intermediate amplifier, 455 kilocycles, supply a fairly strong signal to the receiver and adjust the wave trap aligner until a minimum indication is obtained on the output meter.

IMPORTANT: When all the aligning adjustments have been completed, it is important that the Electric Tuning Set-Up Switch (located on the rear of the receiver chassis) be re-set to the "Operate" position.

OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS FOR NOS. 340 AND 341 RECEIVERS NOT EQUIPPED WITH A RECORD PLAYING UNIT

In order to obtain reproduction of phonograph records in conjunction with these receivers, the following instructions should be followed.

To equip these receivers for phonograph operation, it will be necessary to purchase and install a Stromberg-Carlson, P-29712 Package Assembly. The rear of the chassis base of the receiver is already drilled for this assembly. Complete instructions on how to install and operate this assembly are furnished with each P-29712 Package Assembly.

To obtain the best quality of phonograph reproduction from these receivers, a Stromberg-Carlson Record Player is recommended. The Record Player is a specially equalized circuit which uses a crystal type pick-up in conjunction with a specially equalized circuit.

If the Stromberg-Carlson Record Player is not used and the electric pick-up to be used is of the high impedance type, it will be necessary to connect a low capacity shielded cable between the three-prong socket and plug of the P-29712 Package Assembly, and the pick-up. This shielded cable should be of the low capacity type. The length of the shielded cable used should be kept as short as possible.

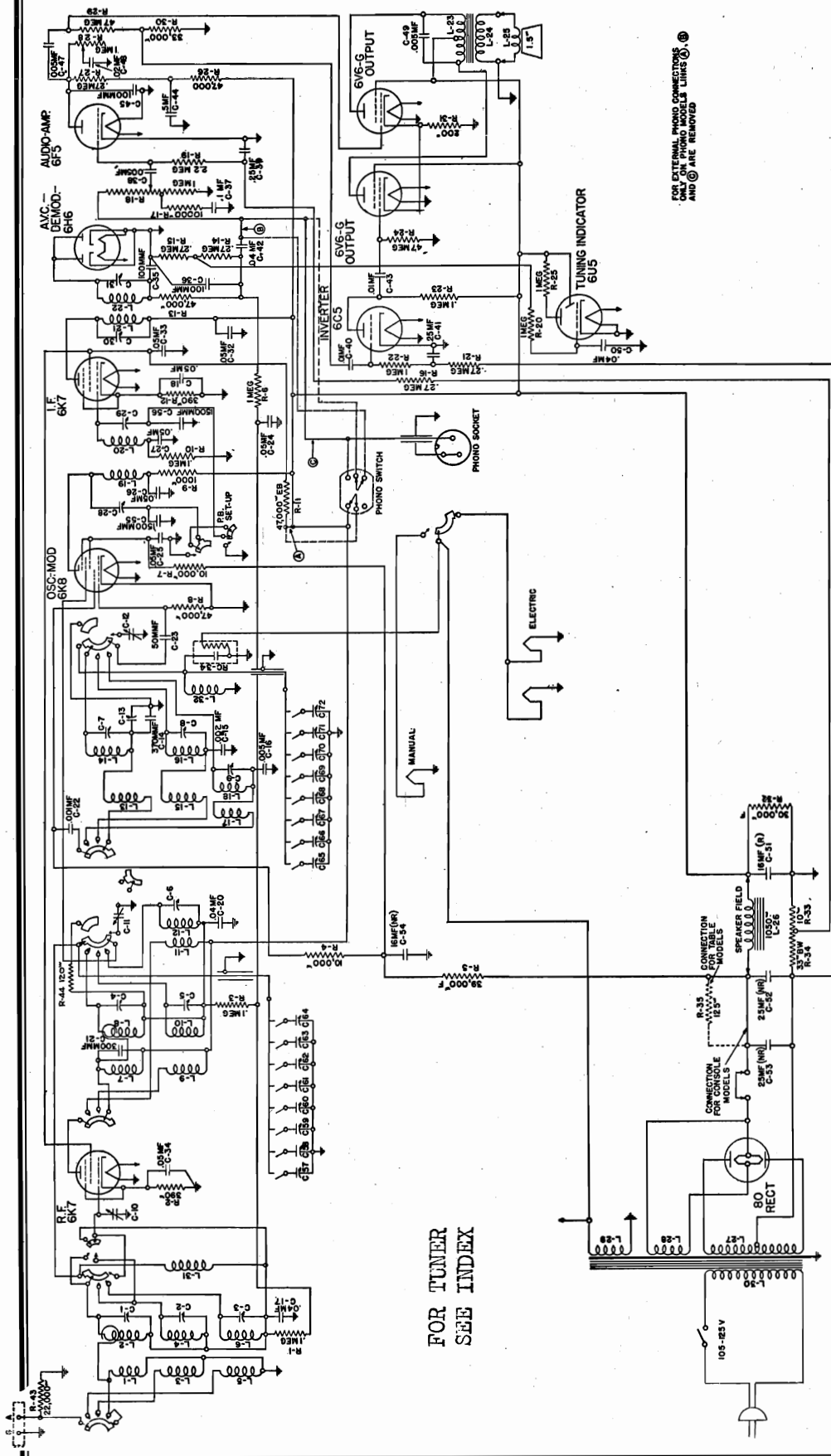
If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong socket and plug of the P-29712 Package Assembly, and the pick-up. The transformer should be located as near to the receiver as possible in which case it will not be necessary to use a shielded cable.

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 345F, 345FB

345M, 345MB

Schematic



ELECTRICAL SPECIFICATIONS

Type of Circuit..... Superhetrodyne with Electric Tuning
 Tuning Ranges..... A—53 to 1.7 Mc.; B—2.25 to 7.6 Mc.; C—7.6 to 23 Mc.
 Number and Type of Tubes..... 1 No. 6K8, 2 No. 6K7, 1 No. 6H6, 1 No. 6F5, 1 No. 6U5, 1 No. 80
 Voltage Rating..... 105 to 125 Volts
 Power Frequency Rating..... 25 to 60 Cycles and 50 to 60 Cycles
 Input Power Rating..... 85 Watts
 Frequency of Intermediate Amplifier..... 455 Kilocycles

APPARATUS SPECIFICATIONS

No. 345-F Receiver..... 50 to 60 Cycles; P-29447 Chassis Assembly; P-26170 Speaker
 No. 345-FB Receiver..... 25 to 60 Cycles; P-29448 Chassis Assembly; P-26170 Speaker
 No. 345-M Receiver..... 50 to 60 Cycles; P-29447 Chassis Assembly; P-26170 Speaker
 No. 345-MB Receiver..... 25 to 60 Cycles; P-29448 Chassis Assembly; P-26170 Speaker

MODELS 345F, 345FB

345M, 345MB

STROMBERG-CARLSON TEL. MFG. CO.

Chassis Wiring

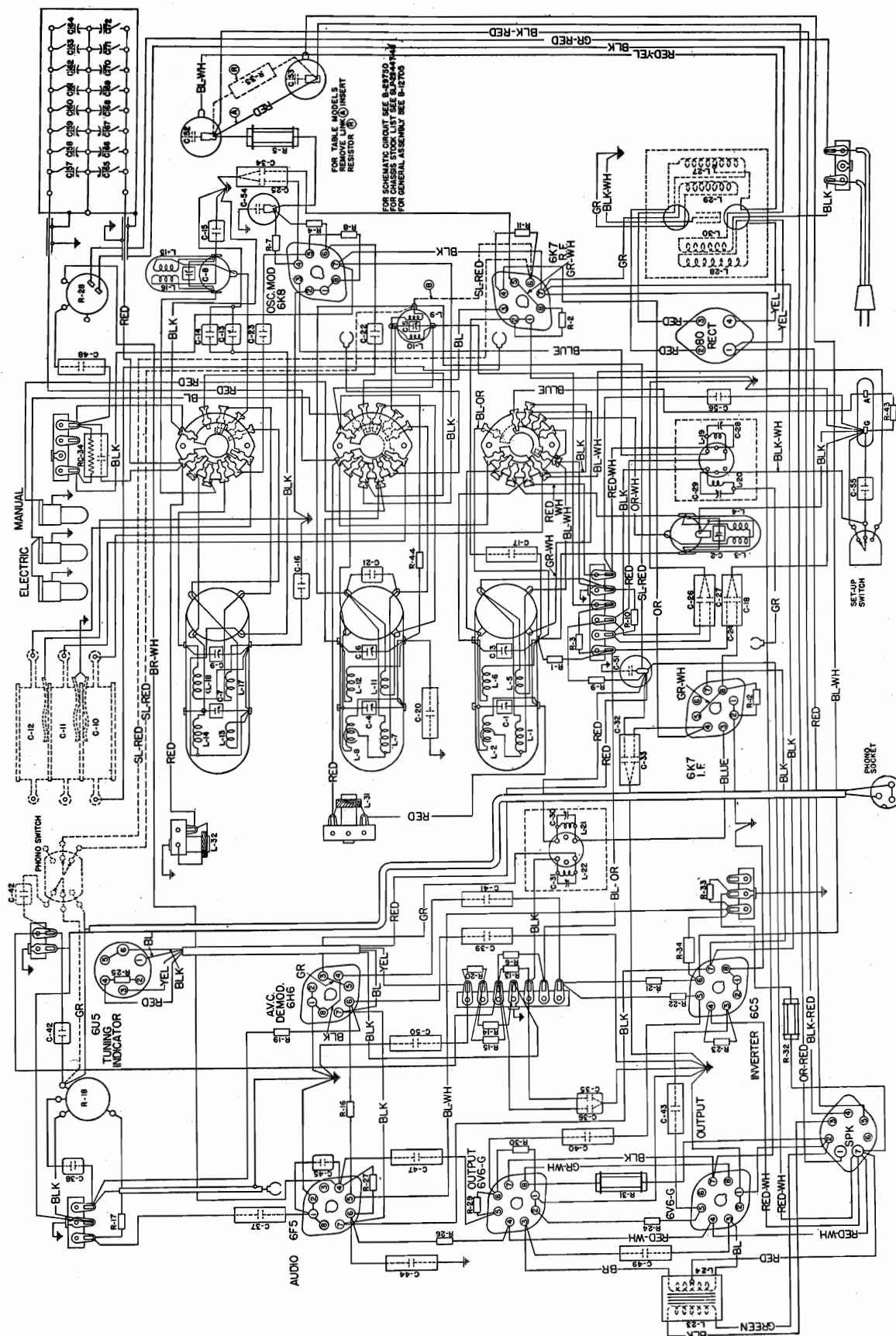


Fig. 3. Wiring Diagram of Chassis.

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 345F, 345FB
345M, 345MB
Voltage Alignment

Turn the control knob slightly clockwise from its most counter-clockwise position. By aid of a screwdriver rotate the slotted shaft of the Electric Tuning Set-Up Switch located at the rear of the chassis base, so that the slot points in the direction of the word "Set-Up". Rotate the Volume control knob to its maximum clockwise position (maximum volume).

2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6K3 modulator-oscillator tube, a modulated signal of 455 kilocycles from the test oscillator, using a 0.1 microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6K3 tube. In making this connection, be sure that the test oscillator is connected to the ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal of the receiver.

3. Now, noting from Figure 1, the aligning capacitors for the first and second I. F. transformers, align the I. F. circuits in the following manner:

Secondary of second I. F. transformer.

Primary of second I. F. transformer.

Secondary of first I. F. transformer.

Primary of first I. F. transformer.

- Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

CAUTION: Be sure that the Electric Tuning Set-Up Switch is set to the "Set-Up" position.

Alignment of Short Wave Range, "C"

In aligning the radio frequency circuits for this range, replace the 0.1 microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver's chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Rotate the Electric Tuning and Range Switch control knob to the "C" Short Wave range position, and set the test oscillator's frequency and the receiver's tuning dial to 20 megacycles.
2. Adjust the receiver's oscillator "C" range H. F. aligner for maximum output.
3. Adjust the R. F. transformer "C" range H. F. aligner for maximum output and at the same time rotate the gang tuning capacitors back and forth through resonance until maximum output is obtained.
4. Adjust the antenna "C" range H. F. aligner for maximum output and at the same time rotate the gang tuning capacitors back and forth through resonance until maximum output is obtained.

Alignment of Short Wave Range, "B"

In aligning the radio frequency circuits for this range, use the same artificial antenna (400 ohm resistor) and antenna binding post as was used for aligning the "C" range, and align as follows:

1. Rotate the Electric Tuning and Range Switch control knob to the "B" Short Wave range position, and set the test oscillator's frequency and the receiver's tuning dial to 7 megacycles.
2. Adjust the receiver's oscillator "B" range H. F. aligner for maximum output.
3. Adjust the R. F. transformer's "B" range H. F. aligner for maximum output and at the same time rotate the gang tuning capacitors back and forth through resonance until maximum output is obtained.
4. Adjust the antenna "B" range H. F. aligner for maximum output and at the same time rotate the gang tuning capacitors back and forth through resonance until maximum output is obtained.

Alignment of Standard Broadcast Range, "A"

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Rotate the Electric Tuning and Range Switch control knob to the manual tuning Standard Broadcast range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.
2. Adjust the receiver's oscillator "A" range H. F. aligner for maximum output.
3. Adjust the R. F. transformer's "A" range H. F. aligner for maximum output.
4. Adjust the antenna "A" range H. F. aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
6. Adjust the receiver's oscillator "A" range L. F. aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitors slightly back and forth through resonance until maximum output is obtained.
7. Reset both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2, 3 and 4.

NORMAL VOLTAGE READINGS

The values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tube in place. The receiver is therefore, in the "Set-Up" position, and the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter with a range of 0-1000 volts should be used for measuring the D.C. voltages, and a meter with a range of 0-250, 0-500, 0-1000 volts should be used for measuring the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 250 volt scale was used.

Tube	Circuit	Terminals of Sockets								Heater Voltages Between Heater Terminals	
		1	2	3	4	5	6	7	8	Socket Terminal Numbers	Volts A. C.
6K7	R. F. Amp.	0	0	0	+240	+81	+2.5	+240	6.3	+2.5	2-7 6.3
6K8	Mod., Osc.	0	0	0	+215	+73	-6.0	+81	6.3	0	2-7 6.3
6K7	I. F. Amp.	0	0	0	+240	+81	+2.5	0	6.3	+2.5	2-7 6.3
6H6	Dem., A. V. C.	0	0	0	0	0	0	0	6.3	0	2-7 6.3
6F5	Audio Amp.	0	0	0	0	+83*	-1.0	+190	6.3	0	2-7 6.3
6C5	Audio Inv.	0	0	0	+105	+240	+1	-5.0	6.3	0	2-7 6.3
6V6G	Audio Output	0	0	0	+235	+240	0	0	6.3	+14	2-7 6.3
6V6G	Audio Output	0	0	0	+235	+240	0	0	6.3	+14	2-7 6.3
6U5	Tuning Ind.	6.3	+20*	+1	0	0	0	0	—	—	1-6 6.3
80	Rectifier	—	+370	360	360	+370	—	—	—	—	1-4 4.9
Speaker Socket		—	+370	0	0	+370	+370	0	+240	—	—

Receiver tuned manually to 1000 Kc., no signal. A. C. voltages are indicated by italics.

ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no re-alignments are necessary. However, should it become necessary to make any re-alignments, the alignment procedure given in the following paragraphs should be carefully followed. In order to make these aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson F-2408 aligning tool be used.

To accurately align the circuits in these receivers, it is necessary to use a high grade, modulated test oscillator (Signal Generator), the output voltage of which can be varied. In conjunction with this test oscillator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker.

IMPORTANT: In making any R. F. or I. F. alignment adjustments, always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal. Before proceeding with the alignment of any R. F. or I. F. circuits in these receivers, be sure that the "Off-Off" one control knob is set for the "Set-Up" position. When the aligning adjustments have been completed the Electric Tuning Set-Up Switch should be rotated back to the "Operate" position. Figure 1, shows the location of all the aligning capacitors in these receivers.

Dial Adjustment

Before aligning the circuits of any of these receivers, the tuning dial must be properly aligned to track with the gang tuning capacitors. To check whether the dial is set correctly with respect to the gang tuning capacitors, rotate the "Station Selector" knob in a clockwise direction so that the gang tuning capacitors are set to their maximum capacity position. Then, with the gang tuning capacitors in this position, the dial pointer should be placed on the horizontal center line of the dial. To do this, align the pointer with the short black line located at the extreme right-hand edge of the dial plate.

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 455 kilocycles. In making these circuit adjustments always align the circuits in the order given in these instructions.

1. Set the Electric Tuning and Range Switch control knob to the manual tuning Standard Broadcast range position (arrow on knob pointing in direction of letter "A"). Set the dial pointer by means of the Station Selector knobs to the extreme low frequency position on the receiver's dial. Rotate the "Off-On-

MODELS 335L, 335LB

336P, 336PB

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 345F, 345FB

345M, 345MB

Voltage, Socket, Trimmers

Socket, Trimmers

Bass Response Data

APPARATUS SPECIFICATIONS

No. 335-L Receiver.....50 to 60 Cycles; P-28318 Chassis Assembly; P-27605 Loud Speaker
 No. 335-LB Receiver.....25 to 60 Cycles; P-28319 Chassis Assembly; P-27605 Loud Speaker
 No. 336-P Receiver.....60 Cycles Only; P-29439 Chassis; P-29439 Phono Unit; P-29464 Loud Speaker
 No. 336-PB Receiver.....25 Cycles Only; P-29416 Chassis; P-29440 Phono Unit; P-29464 Loud Speaker

NORMAL VOLTAGE READINGS

The values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base with the tube in the socket. The chassis is connected to the ground in full operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowances should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used. The following D. C. voltages are shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 250 volt scale was used.

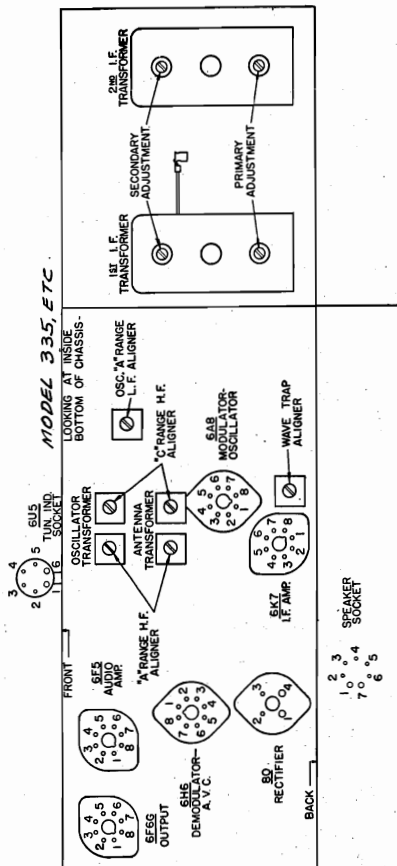


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Capacitors.

		Terminals of Sockets										Header Voltages Between Header Terminals	
		1	2	3	4	5	6	7	8	Socket Terminal Numbers	Volts		
Tube	6A8	Mod., Osc.	0	0	+245	+68	-10	+235	6.2	+2.8	2-7	6.2	
	6K7	I. F. Amp.	0	0	0	+250	+78	+2.8	6.2	+2.8	2-7	6.2	
	6H6	Dem., A. V. C.	—	0	0	0	0	0	6.2	0	2-7	6.2	
	6F5	Audio Amp.	0	0	0	+250	+56	0	6.2	0	2-7	6.2	
	6F6G	Audio Output	—	0	0	+235	+250	0	6.2	+14.5	2-7	6.2	
	6U5	Tuning Ind.	—	6.2	+18*	-1.5	+250	0	—	—	1-6	6.2	
Speaker Socket	Rectifier	—	+360	350	350	+360	—	—	—	—	1-4	5.0	
	Socket	—	+360	0	0	+360	+360	0	+250	—	—	—	

Receiver tuned manually to 1000 Kc., no signal. A. C. voltages are indicated by italics.

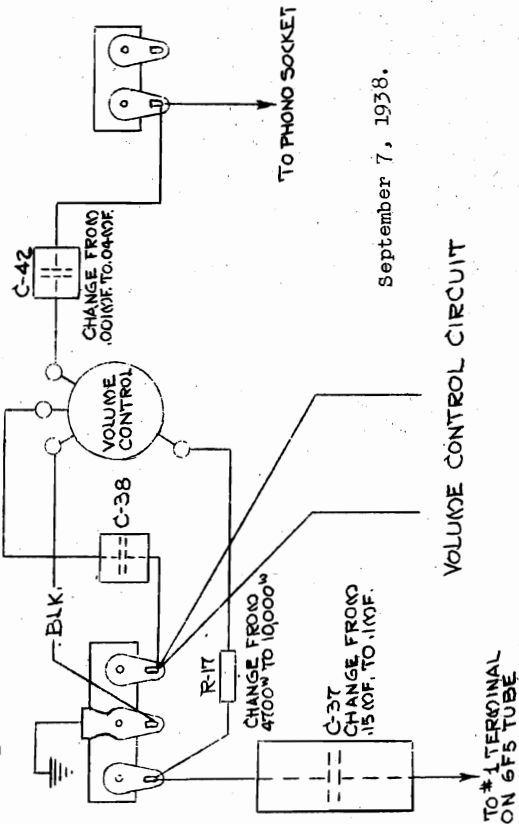
Increasing Bass Response of 345 Receivers

Remove the 4700 ohm resistor (R-17) from the volume control tap and replace with a 10,000 ohm resistor, P. 26345.

Remove the .15 mf capacitor (C-37) from the volume control tap and replace with a .1 mf capacitor, P. 24402.

Remove the .001 mf capacitor (C-42) from the high side of the volume control and replace with a .04 mf capacitor, P. 24405.

Caution: Do not mistake capacitor C-38 for one of the capacitors to be changed.



September 7, 1938.

VOLUME CONTROL CIRCUIT

MODEL 345

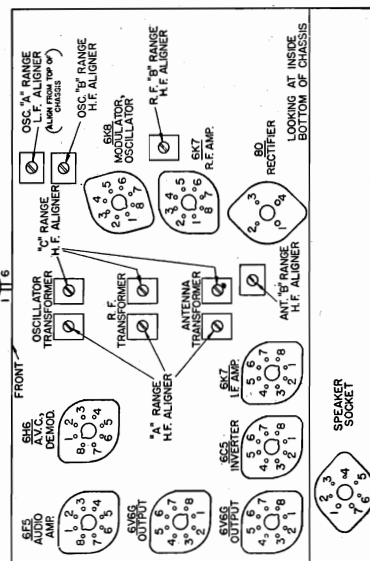
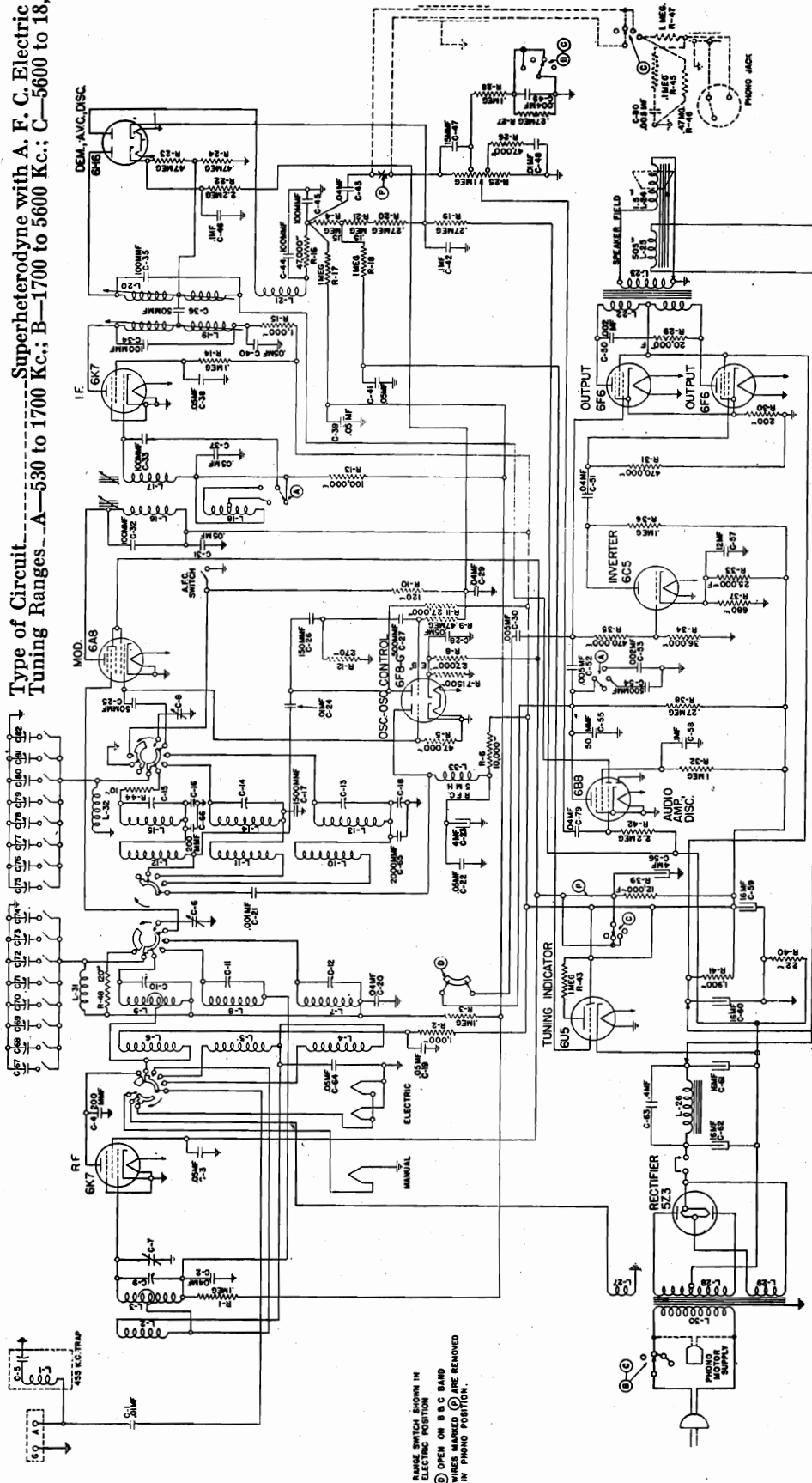


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

STROMBERG-CARLSON TEL. MFG. CO.

MODELS 350M, 350MB
350R, 350RB, 350P
350PB, 350V, 350VB
Schematic

Superheterodyne with A. F. C. Electric Tuning
Tuning Ranges A—530 to 1700 Kc.; B—1700 to 5600 Kc.; C—5600 to 18,000 Kc.



Voltage Rating 105 to 125 Volts, A. C.
Power Frequency Rating See "Apparatus Specifications"

Input Power Rating:
Radio Models Only 120 Watts

Radio-Phono Models 140 Watts

Frequency of Intermediate Amplifier 455 Kilocycles

APPARATUS SPECIFICATIONS

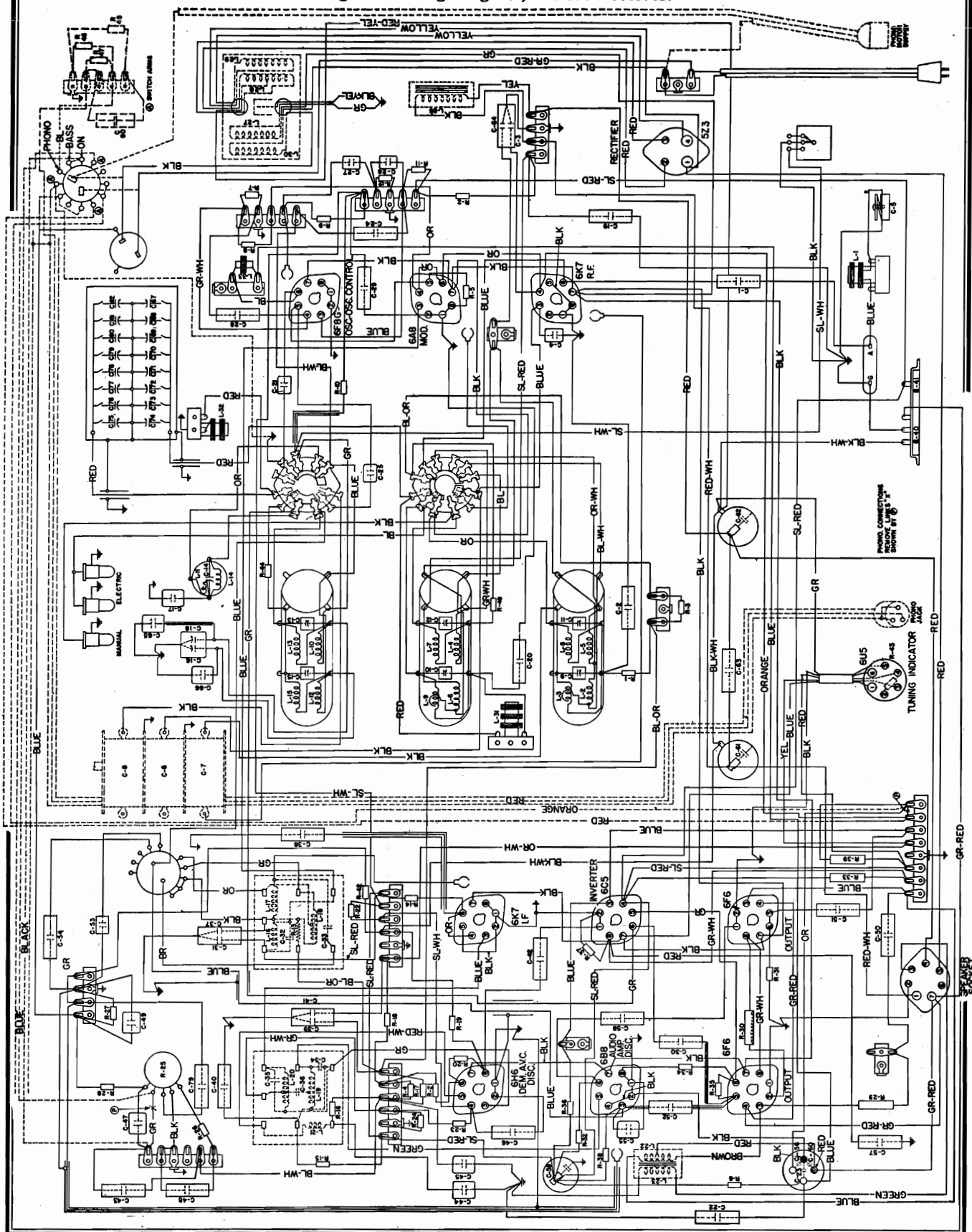
No. 350-M Receiver	50 to 60 Cycles; P-29043 Chassis; P-27504 Speaker
No. 350-MB Receiver	25 to 60 Cycles; P-29044 Chassis; P-27504 Speaker
No. 350-R Receiver	50 to 60 Cycles; P-29043 Chassis; P-27504 Speaker
No. 350-RB Receiver	25 to 60 Cycles; P-29044 Chassis; P-27504 Speaker
No. 350-P Receiver	60 Cycles Only; P-29066 Chassis; P-29443 Phono. Motor Unit
No. 350-PB Receiver	25 Cycles Only; P-29067 Chassis; P-29444 Phono. Motor Unit
No. 350-V Receiver	50 to 60 Cycles; P-29043 Chassis; P-27504 Speaker
No. 350-VB Receiver	25 to 60 Cycles; P-29044 Chassis; P-27504 Speaker

FOR TUNER
SEE INDEX

MODELS 350M, 350MB
350R, 350RB, 350P
350PB, 350V, 350VB
Chassis Wiring

STROMBERG-CARLSON TEL. MFG. CO.

Fig. 3. Wiring Diagram, No. 350 Receiver.



When making any aligning adjustments of these circuits, the Fidelity Control knob should be set for "Normal" operation, and the "On-Off-Bass" control knob should also be set for "Normal" operation.

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the short wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial to 16 megacycles.
2. Adjust the receiver's oscillator "C" range high frequency aligner for maximum output.
3. Adjust the antenna "C" range high frequency aligner for maximum output, at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
4. Set the test oscillator's frequency and the receiver's tuning dial to 6 megacycles.
5. Adjust the receiver's oscillator "C" range low frequency aligner (series aligner), and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
6. Reset both the test oscillator's frequency and the receiver's tuning dial to 16 megacycles and repeat operations Nos. 2 and 3.

In aligning the radio frequency circuits for this range, use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the test oscillator as was used for aligning the short-wave range.

1. Operate the Range Switch on the receiver chassis to the Medium Wave ("B") range position, and set the test oscillator's frequency and the receiver's tuning dial to 5 megacycles.
2. Adjust the receiver's oscillator "B" range high frequency aligner for maximum output.
3. Adjust the antenna "B" range high frequency aligner for maximum output, and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Operate the Range Switch to the manual tuning Standard Broadcast "A" range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.
2. Adjust the receiver's oscillator "A" range high frequency aligner for maximum output.
3. Adjust the R. F. interstage "A" range high frequency aligner for maximum output.
4. Adjust the antenna's "A" range high frequency aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
6. Adjust the receiver's oscillator "A" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
7. Reset both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2, 3 and 4.

In adjusting the wave trap circuit, set the Electric Tuning and Range Switch control knob to the manual tuning, Standard Broadcast position (arrow on knob pointing in direction of gold dot). Set the tuning dial to 1000 kilocycles.

Connect a 200-micro-microfarad capacitor in series with the output terminal of the modulated test oscillator and the antenna binding post on the receiver, and the ground terminal of the test oscillator to the ground binding post on the receiver. Then, with the modulated test oscillator set at the frequency of the intermediate amplifier, 455 kilocycles, supply a fairly strong signal to the receiver and adjust the wave trap aligner until a minimum indication is obtained on the output meter.

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the procedure given in these instructions should be carefully followed. The preferred method of aligning these receivers is by the use of a suitable cathode ray oscillograph and frequency modulator unit in conjunction with the standard signal generator.

To accurately align circuits in these receivers, it is necessary to use a high grade signal generator capable of being modulated 30% and having an output voltage of at least 100,000 microvolts per centimeter. We have this output voltage controlled so that only a few microvolts may be fed into the receiver. In conjunction with the signal generator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker. In addition to this equipment, it will be necessary when "checking" the alignment of a radio receiver having a range of 0 to 10 mc., to use a variable capacitor having a range from .001 to .01 millifarads connected in series with that cathode of No. 6B8-5 milliamperes inserted between the tube and its socket. The leads to the meter should not be longer than 15", and should be shunted at the socket connections by a capacitor of not less than 0.25 Mfd.

In order to make the aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-24608 aligning tool be used.

Before proceeding with the alignment of any circuits in these receivers, except when specifically directed, be sure that the Fidelity Control knob is set for the "Normal" position. The "Off-On-Bass" control should be set to the "Off" position. After making any alignment adjustments always adjust the test oscillator's output voltage to the minimum value which will be obtained, except when specifically directed in these instructions. Figure 1 shows the location of all the aligning capacitors or adjustments for this receiver.

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the gang tuning capacitor. To check whether the dial is set correctly with respect to the gang tuning capacitor, set its tuning to the "Radio Station Selector" position. Then, with the receiver turned "on," the illuminated dial should be at maximum capacity position. Then, with the receiver turned "off," the illuminated dial should be exactly centered over the dial alignment lines (black lines) which are located at the extreme ends of each scale on the dial. If these lines do not center over the illuminated dial indicator line, loosen the two set screws located on the hub of the dial. Then, rotate the dial so that these alignment lines are centered over the illuminated dial indicator line. The two set screws of the dial hub should then be securely tightened.

The intermediate frequency used in these receivers is 455 kilocycles. Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that uniformity of the resonance curve be maintained throughout the factory these adjustments are made by means of a variable capacitor which allows the shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this must be done, the following procedure should be followed.

1. Operate the Range Switch of the receiver to the manual tuning, Standard Broadcast range position, and set the frequency position. Set the Fidelity control knob to its "Normal" position, and the "Off-On-Bass" control knob to its normal position.
2. CAUTION: Never attempt to align the R, F or I. circuits of this receiver with the Fidelity control knob set at any position other than the Normal position and the Range Switch control knob set at the manual tuning position. Specifically, in the following paragraphs, also, do not make any aligning adjustments of the R, F, or I. circuits with the A. F. switch (which is located on rear of the chassis base) set at the "set-up" position.
3. Align between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 tube, the grid of the No. 6X4 tube, the grid of the signal generator, using a ground lead, capacitor in series with the connection between the output terminal of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the signal generator should be connected to either the chassis base or the ground binding post.
4. Now, noting from Fig. 1, the alignment adjustments for the First and Second I. F. transformers, align the R. F. circuits in the following order:

Adjust the Second I. F. transformer primary circuit for maximum output.

Adjust the First I. F. transformer primary circuit for maximum output.

Adjust the First L.F. transformer secondary circuit for maximum output

Carefully make all of the above adjustments, watching carefully the output meter so that the peak reading is obtained for each adjustment. As each adjustment is made reduce the output of the test oscillator as required.

4. To adjust the Discriminator circuit proceed as follows:

Check the position of the Range Switch control knob which should be set to the manual tuning Standard Broadcast position.

CAUTION: Before adjusting this circuit be sure that the I. F. amplifier is tuned exactly to 455 kilocycles. With the signal generator still set at a frequency of 455 kilocycles, adjust the signal generator's

MODELS 235H, 235HB
235L, 235LB

STROMBERG-CARLSON TEL. MFG. CO.

Continuity Test

Continuity test chart for No. 235 Receivers.

Jan. 17, 1938.

1. Test speaker socket with speaker left out.
2. Plug speaker in speaker socket for all other tests.
3. Set A.F.C. Switch on rear of chassis base to "Operate" position for all tests unless otherwise specified.
4. Before making continuity test, disconnect one end of the spring from the Manual-Electric switch lever. Pull Manual-Electric switch lever out for "Manual" operation. Push Manual-Electric switch lever in for "Electric" operation.

- A. Operate A.F.C. switch on rear of chassis to "Set Up" position; should read 120W.

Operate A.F.C. switch on rear of chassis to "Operate" position; should read 4 M.

- B. Operate A.F.C. switch on rear of chassis to "Set Up" position; should read 550,000W.

Operate A.F.C. switch on rear of chassis to "Operate" position; should read 4 M.

- C. Operating volume control clockwise should read from "S" to 800,000W.

FOR OTHER SERVICING
DATA, SEE INDEX

Other tests not shown on chart.

Test from Electric tuning pilot lamp socket. Operate Manual-Electric switch to "Manual" position; should read "0". Operate Manual-Electric switch to "Electric" position; should read "S".

Test from main dial pilot lamp socket. Operate Manual-Electric switch to "Manual" position; should read "S". Operate Manual-Electric switch to "Electric" position; should read "0".

Test from Ant. terminal on back of chassis base. Operate range switch to "A" band; should read 8W. Operate range switch to "B" band; should read 1W. Operate range switch to "C" band; should read .5W.

Test from Grd. terminal on back of chassis base; should read "S".

Test from terminals of A.C. plug to chassis base; should read "0".

Test between terminals of AC plug; should read 8W with A.C. switch closed; should read "0" with A.C. switch open.

Test from the Stator Plates of the oscillator section of the variable capacitor (located near front of chassis) to the switch side of the .001 capacitor (located next to the "A" and "B" band series aligner). Operate range switch to "A" band; should read 10W. Operate range switch to "B" band; should read 2W. Operate range switch to "C" band; should read 1W.

Tube	Circuit	Grid Clip	Terminals of Sockets							
			1	2	3	4	5	6	7	8
6-J-5	Osc. Control		S	S	55000W	A	B	30000W	S	2700W
6-A-8	Mod. Osc.	1.8M	S	S	11000W	55000W	55000W	20000W	S	300W
6-K-7	I.F. Amp.	3. M	S	S	12000W	150000W	400W	20000W	S	400W
6-H-6	Discrimin.		S	S	450000W	1. M	450000W	450000W	S	S
	Dem.									
6-B-8	A.V.C. Audio	C	S	S	550000W	S	800000W	800000W	S	270W
6-F-6	Output		S	S	11000W	11000W	900000W	20000W	S	400W
6-U-5	Tuning Ind.		S	1.1M	1.5M	12000W	270W	S		
5-Y-4G	Rectifier		0	0	170W	0	200W	0	12000W	12000W
	Spk. Socket									
	Output Rear of Chas.		300000W	S	S	300000W	0	0	12000W	

STROMBERG-CARLSON TEL. MFG. CO.

CIRCUIT DESCRIPTION

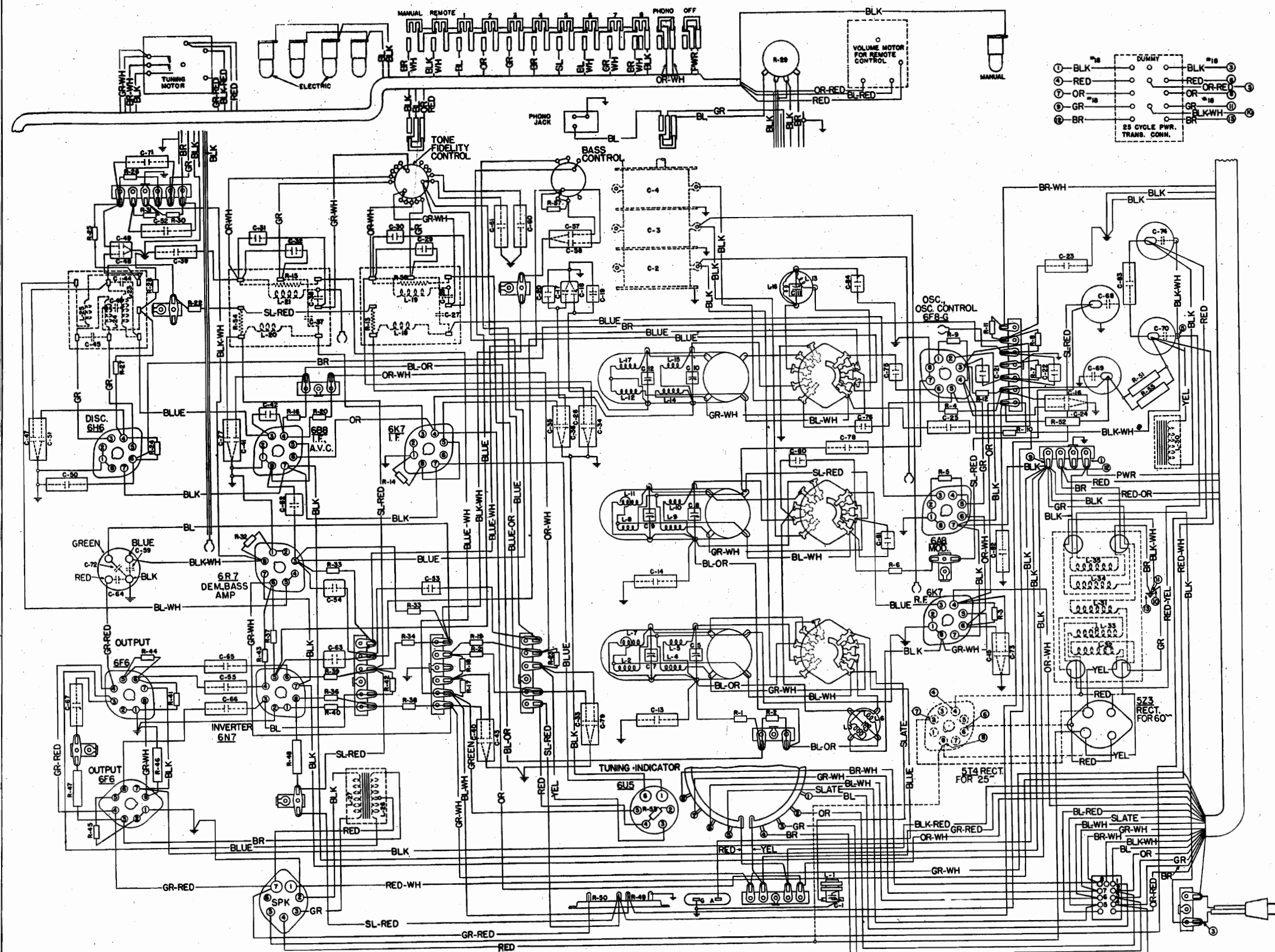


Fig. 3. Wiring Diagram of Chassis.



For data on setting up electric tuning system and remote control see Index.

Type of Circuit	Superheterodyne with A. F. C. Electric Tuning
Tuning Ranges	A—530 to 1700 Kc.; B—1700 to 5600 Kc.; C—5600 to 18,000 Kc. { 2 No. 6K7, 1 No. 6A8, 1 No. 6F8-G, 1 No. 6B8, 1 No. 6H6, 1 No. 6R7, 1 No. 6N7, 2 No. 6F6, 1 No. 6U5, 1 No. 5Z3, 105 to 125 Volts, A. C.
Number and Type of Tubes	See "Apparatus Specifications"
Voltage Rating	140 Watts
Power Frequency Rating	455 Kilocycles
Input Power Rating	
Frequency of Intermediate Amplifier	

APPARATUS SPECIFICATIONS

No. 360-M Receiver	50 to 60 Cycles; P-29068 Chassis; P-29072 Speaker
No. 360-MB Receiver	25 to 60 Cycles; P-29069 Chassis; P-29072 Speaker

To accurately align circuits in these receivers, it is necessary to use a high grade signal generator capable of having substituted 30% and having an output voltage of at least 100,000 microvolts; it will also be necessary to have this output voltage controlled so that only a few microvolts may be fed into the receiver. In conjunction with the signal generator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker. In addition to this equipment, it will be necessary when making a final adjustment of the "Discriminator" tuned circuit to use a high resistance voltmeter having a resistance of at least 1000 ohms per volt.

In order to make the aligning adjustments in an easy and satisfactory manner, it is recommended that the Strouberg-Carlson F-2408S aligning tool be used.

Dial Adjustment

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the incoming tuning fork. To accomplish this, rotate the "Manual Stations" selector knob in a clockwise direction so that the gang tuning capacitors are set to their maximum capacity position. With the gang tuning capacitors at this position, the dial pointer should be located between the two dial alignment marks located near the extreme right-hand edge of the dial. One of these marks is a small dot located beneath the short wave scale of the dial. If the dial pointer does not point over these two marks, the dial pointer assembly should be loosened so that the pointer can be centered over the two marks. When this has been accomplished the screw should be securely tightened again.

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 455 kilocycles. Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that undue emphasis be placed on the visual system which allows the operator to see the exact shape of the resonance curve. For this reason, the following procedure should be followed. However, in the case where this cannot be done, the following procedure should be followed.

1. Push in the push button which is located under the designation, "Manual On". Operate the Runga receiver to the Shanghai range position, and set the tuning dial pointer to its extreme low frequency position. Set the Treble control knob and the Bass control knob to their normal positions.
2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator tube, a modulated signal of 455 kilocycles from the signal generator, using a 0.1 megohm resistor in series with the connection between the output terminal of the signal generator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the signal generator should be connected to either the chassis base or the ground binding post.
3. Now, noting from Figure 1, the alignment adjustments for the First, Second, and Third I. F.—Discriminator transformers, align the I. F. circuits in the following order:

CAUTION: Never attempt to align the "No. 1" or I. F. circuits of this receiver with the Treble control knob in the "Normal" position. The "No. 1" or I. F. circuits may be aligned only with the Treble control knob in the "Discriminator" position with any push button other than the one located under the designation "Manual On" pushed in.

Secondary of Third I. F.-Discriminator transformer for maximum output.

Primary of Third I. F.-Discriminator transformer for maximum output.

Secondary of Second I. F. transformer for maximum output.

Primary of Second I. F. transformer for maximum output.

Secondary of First I. F. transformer for maximum output

Primary of First I. F. transformer for maximum output.

Carefully make all of the above adjustments, watching the output meter so that the peak reading is obtained for each adjustment. As each adjustment is made reduce the output of the test oscillator as required.

Adjustment of the Discriminator Circuit

1. Before making this circuit adjustment be sure that the I. F. amplifier and signal generator are exactly in resonance at 455 kilocycles.

All controls should be set the same as instructed for the intermediate frequency adjustments. Connect the signal generator to the intermediate frequency amplifier, C-51. The signal generator should remain connected to the grid of the No. 6A8 modulator tube in the same manner as connected when making the aligning adjustments of the intermediate frequency amplifier circuits. The signal generator's output control should be adjusted so that a signal of 10,000 microvolts is fed into the modulator tube. Under these conditions the voltmeter connected across C-51 should read an rms value of 100 millivolts.

Connect a 200-micro-microfarad capacitor in series with the output terminal of the modulated test oscillator and the antenna binding post on the receiver, and the ground terminal of the test oscillator to the ground binding post on the receiver. Then, with the modulated test oscillator set at the frequency of the intermediate amplifier, 455 kilocycles, supply a fairly strong signal to the receiver and adjust the wave trap aligner until a minimum indication is obtained on the output meter.

Wave Trap Adjustment

In adjusting the wave trap circuit, set the Range Switch control knob to the Standard Broadcast position (arrow on knob pointing in direction of gold dot). Push the push button located under the designation "Manual On" and set the tuning dial to 1000 kilocycles.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

When making any aligning adjustments of the specimen.

Alignment of Short Wave Range (Also Referred to as "C" Range)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the 1.5° alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the short wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial to 10 megacycles.
2. Adjust the receiver's oscillator "C" range high frequency aligner for maximum output.
3. Adjust the B. Interstage "C" range high frequency aligner for maximum output and at the same time rotate the gang tuning capacitors back and forth through resonance until maximum output is obtained.
4. Adjust the antenna "C" range high frequency aligner for maximum output, at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
5. Set the test oscillator's frequency and the receiver's tuning dial to 6 megacycles.
6. Adjust the receiver's oscillator "C" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
7. Reset both the test oscillator's frequency and the receiver's tuning dial to 16 megacycles and repeat operations Nos. 2, 3 and 4.

Alignment of Medium Wave Range (Also Referred to as "B" Range)

In aligning the radio frequency circuits for this range, use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the test oscillator as was used for aligning the short-wave

1. Operate the Range Switch on the receiver chassis to the Medium Wave ("B") range position, and set the test oscillator's frequency and the receiver's tuning dial to 5 megacycles.
2. Adjust the receiver's oscillator "B" range high frequency aligner for maximum output.
3. Adjust the antenna "B" range high frequency aligner for maximum output, and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

Alignment of Standard Broadcast Range (Also Referred to as "A" Range)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Operate the Range Switch to the manual tuning Standard Broadcasts "A" range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.

2. Adjust the receiver's oscillator "A" range high frequency aligner for maximum output.
3. Adjust the R. interstage "A" range high frequency aligner for maximum output.
4. Adjust the antenna's "A" range high frequency aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
6. Adjust the receiver's oscillator "A" range low frequency aligner (series aligner) for maximum output, then adjust the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
7. Reset both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2, 3 and 4.

CIRCUIT DESCRIPTION

The various tubes are used in these receivers as follows: One No. 6K7 is used in the R. F. Amplifier and the other two in the I. F. Amplifier. The No. 6A3 tube is used as the Modulator tube and the No. 6F8-G tube is used for both Oscillator and Oscillator Control tube. One No. 6H6 tube is used as the Demodulator and Automatic Volume Control tube and the other No. 6H6 tube is used in the Discriminator circuit for Automatic Frequency Control. The No. 6B7 tube is used in the Bass Amplifier and the No. 6F5 tube is used in the Audio Amplifier. The No. 6C5 tube is used as the Phase Inverter tube of the Audio Amplifier circuit and the two No. 6L6 tubes are used in the Audio Power Output Stage. The No. 6D5 tube is used for indicating resonance in the Tuning Indicator System. The No. 6A3 tube is used in the Rectifier circuit for the power supply having a frequency of 50 to 60 cycles; models of these receivers designed for operation on a power supply having a frequency of 25 to 60 cycles, use a No. 574 tube in the Rectifier tube of the power supply.

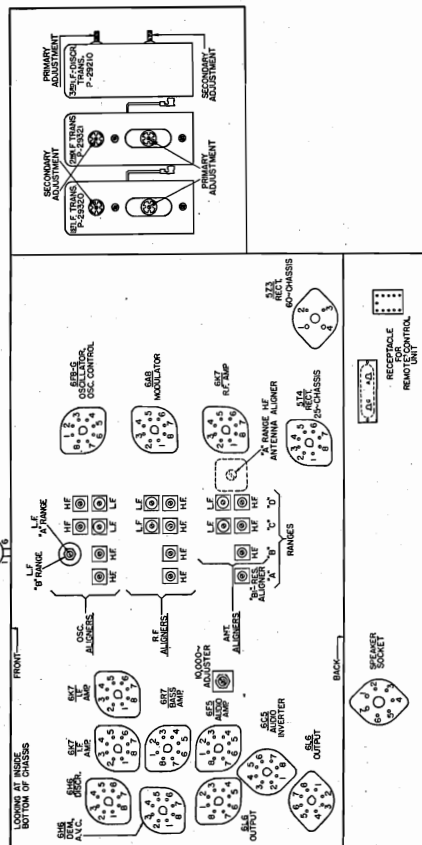


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Adjustments.

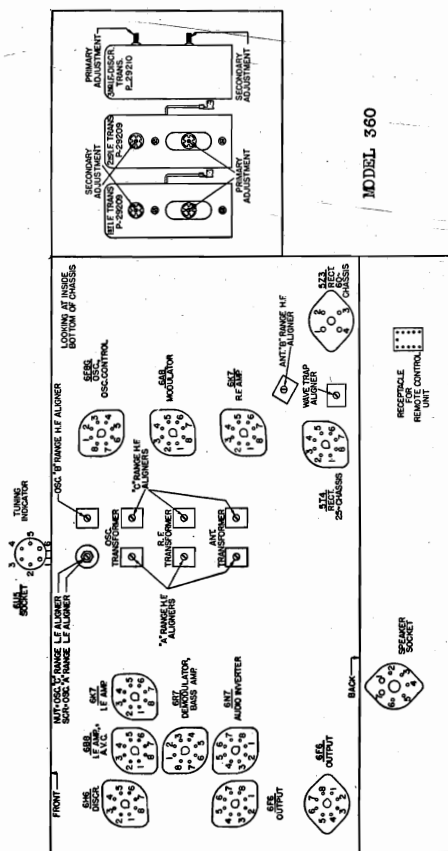


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Adjustments.

NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with all the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Volts are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the following ranges: 0-25, 0-10, 0-100, 0-250, 0-500, 0-1000 volts, except when an asterisk appears after any given voltage value, in which case the 500 volt scale was used, or when a double asterisk appears the 1000 volt scale was used.

Terminals of Sockets										Heater Voltages Between Heater Terminals		
Tube	Circuit	Cap						Socket Terminal Numbers		Volts		
			1	2	3	4	5	6	7		8	
6K7	R. F. Amp.	0	0	0	+230	+104	0	+82	6.2	0	2-7	6.2
6A8	Modulator	0	0	0	+227	+82	-8.6**	+82	6.2	0	2-7	6.2
6F8-G	Oscillator and Oscillator Control	0	0	0	+172	+8.3	-8.6**	+170	6.2	0	2-7	6.2
6K7	I. F. Amp.	0	0	0	+240	+104	+3.3	0	6.2	+3.3	2-7	6.2
6B8	I. F. Amp. and A. V. C.	0	0	0	+218	0	0	+104	6.2	0	2-7	6.2
	Demodulator and Bass Amp.	0	0	0	+100*	0	0	+25*	6.2	+3.8	2-7	6.2
6H6	Discriminator	—	0	0	0	0	0	0	6.2	0	2-7	6.2
6N7	Audio Inv.	—	0	0	+160	0	0	+155	6.2	+29	2-7	6.2
6F6	Audio Output	—	0	0	+312	+320	0	0	6.2	+19.5	2-7	6.2
6F6	Audio Output	—	0	0	+312	+320	0	0	6.2	+19.5	2-7	6.2
6U5	Tuning Ind.	—	6.2	+12.4	-1.4	+237	-2.8	0	—	—	1-6	6.2
5Z3	Rectifier	—	+435	430	420	+435	—	—	—	—	1-4	4.8
Speaker Socket		—	+415	0	0	+440	+440	0	+320	—		

22 Receiver tuned manually to 1000 Kc., no signal. A. C. voltages are indicated.

Receiver tuned manually to 1000 Kc., no signal. A. C. voltages are indicated by italics.

Schematic

STROMBERG-CARLSON TEL. MFG. CO.

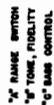
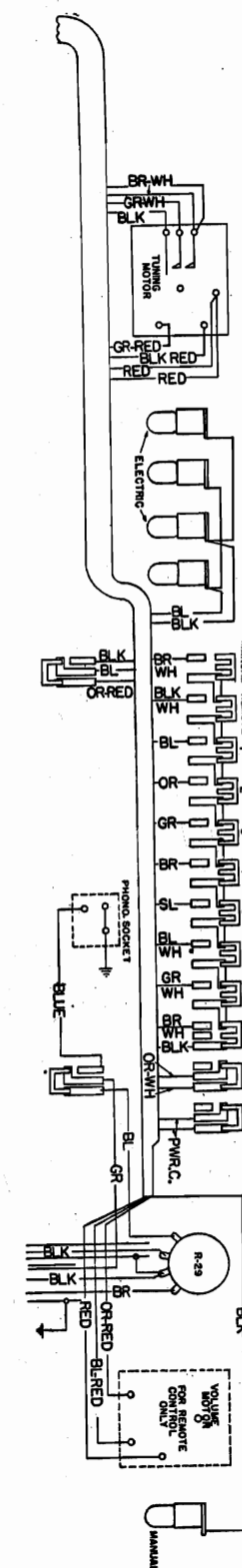


Fig. 2. Schematic Circuit of Receiver.

Voltage Rating	105 to 125 Volts, A. C.
Power Frequency Rating	See "Apparatus Specifications"
Input Power Rating	155 Watts
Frequency of Intermediate Amplifier	455 Kilocycles



ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the procedure given in these instructions should be carefully followed. The preferred method of aligning these receivers is by the use of a suitable cathode ray oscillograph and frequency modulator unit in conjunction with the standard signal generator.

To accurately align circuits in these receivers, it is necessary to use a high grade signal generator capable of being modulated 30% and having an output voltage of at least 100,000 microvolts; it will also be necessary to use a standard 455 kilocycle signal generator. The signal generator should be connected to the antenna terminal of the receiver, and the signal voltage developed across the voice coil of the loud speaker. In addition to this equipment, it will be necessary when making a final adjustment of the "Discriminator" tuned circuit to use a high resistance voltmeter having a resistance of at least 1000 ohms per volt.

In order to make the aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson F-2400S aligning tool be used.

Before proceeding with the alignment of any circuits in these receivers, be sure that the Treble Control knob is in the "Normal" position. After the alignment is completed, the "Manual On" button should be pushed, and any alignment adjustments always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained, except when specifically directed otherwise in these instructions. Figure 1 shows the location of all the aligning capacitors or adjustments for these receivers.

Dial Adjustment

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "truck" with the gang tuning capacitors. To check whether the dial is set correctly with respect to the gang tuning capacitors, rotate the "Manual Stations" selector knob in a clockwise direction so that the gang tuning capacitors are set to their maximum capacity position. With the gang tuning capacitors at this position, the dial pointer should be centered over the two dial alignment marks located near the extreme right-hand edge of the dial. One of these marks is a circular line located between the standard and the intermediate frequency ranges. The other mark is a horizontal line located at the bottom of the dial. If the dial pointer does not center over these two marks, the tuning dial assembly should be loosened so that the pointer can be centered over the two marks. When this has been accomplished the screw should be securely tightened again.

Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 455 kilocycles. Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that tuning is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed.

1. Push in the push button which is located under the designation, "Manual On". Operate the Range switch of the receiver to the Standard Broadcast range position, and set the tuning dial pointer to its extreme low frequency position. Set the Treble control knob and the Bass control knob to their normal position.

CAUTION: Never attempt to align the R. F. or I. F. circuits of this receiver with the Treble control knob in the "Boost" position. The "Manual On" button should be pushed, and the "Manual Stations" selector knob should be set to the "Manual On" position. The "Manual On" button should be pushed, and the "Manual Stations" selector knob should be set to the "Manual On" position.

2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator tube, a modulated signal of 455 kilocycles from the signal generator, using a 0.1 mfd. capacitor in series with the connection between the output terminal of the signal generator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the signal generator should be connected to either the chassis base or the ground binding post.
3. Now, noting from Figure 1, the alignment adjustments for the First, Second, and Third I. F.-Discriminator transformers, align the I. F. circuits in the following order:
 - Secondary of Third I. F.-Discriminator transformer for maximum output.
 - Primary of Third I. F.-Discriminator transformer for maximum output.
 - Secondary of Second I. F. transformer for maximum output.
 - Primary of Second I. F. transformer for maximum output.
 - Secondary of First I. F. transformer for maximum output.
 - Primary of First I. F. transformer for maximum output.

Carefully make all of the above adjustments, watching the output meter so that the peak reading is obtained for each adjustment. As each adjustment is made reduce the output of the test oscillator as required.

Adjustment of the Discriminator Circuit

1. Before making this circuit adjustment be sure that the I. F. amplifier and signal generator are exactly in resonance at 455 kilocycles. All controls should be set the same as instructed for the intermediate frequency adjustments. Connect a high resistance voltmeter, having a resistance of at least 1000 ohms per volt, across the capacitor, C-78, in parallel with the grid lead of the No. 6A8 tube. The ground (or low side) terminal of the voltmeter should be connected to the chassis base or the ground binding post, in the same manner as connected when making the aligning adjustments of the intermediate frequency amplifier.

Circuits. The signal generator's output control should be adjusted so that a signal of 10,000 microvolts is fed into the modulator tube. Under these conditions the voltmeter connected across the capacitor, C-78, should read zero.

The above conditions are not obtained, the signal generator should be set to exact resonance with the signal generator, and the signal generator should be set to exact resonance with the signal generator. The signal generator should be set to exact resonance with the signal generator.

Now, adjust the signal generator's frequency a slight amount (approximately 5 kilocycles) each side of 455 kilocycles, noting at the same time the reading of the voltmeter; a decreased reading from the increase in the signal generator's frequency (455 kilocycles) should make the voltmeter give a decreased indication from zero.

Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified. When making any aligning adjustments of these circuits, all controls, with the exception of the "Manual Stations" control, should be set at the positions mentioned for the Intermediate Frequency adjustments.

Alignment of 11 to 22 Megacycles Short Wave Range (Referred to as "D" Range)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the L. F. alignments, with a 400-ohm carbon type resistor. The antenna terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the 11 to 22 megacycles short wave ("D") range position, and set the test oscillator's frequency and the receiver's tuning dial pointer to 20 megacycles.
2. Adjust the receiver's oscillator "D" range H. F. (high frequency) aligner for maximum output.
3. Adjust the R. F. interstage "D" range H. F. aligner for maximum output.
4. Adjust the antenna "D" range H. F. aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial pointer to 11 megacycles.
6. Adjust the receiver's oscillator "D" range L. F. (low frequency) aligner for maximum output.
7. Adjust the R. F. interstage "D" range L. F. aligner for maximum output.
8. Adjust the antenna "D" range L. F. aligner for maximum output.
9. Repeat operations Nos. 2, 3, and 4.

Alignment of 4.8 to 11 Megacycles Short Wave Range (Referred to as "C" Range)

In aligning the radio frequency circuits for this range, use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the test oscillator as was used for aligning the short-wave range.

1. Operate the Range Switch on the receiver chassis to the 4.8 to 11 megacycles short wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial pointer to 10 megacycles.
2. Adjust the receiver's oscillator "C" range H. F. aligner for maximum output.
3. Adjust the R. F. interstage "C" range H. F. aligner for maximum output.
4. Adjust the antenna "C" range H. F. aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial pointer to 5 megacycles.
6. Adjust the receiver's oscillator "C" range L. F. aligner for maximum output.
7. Adjust the R. F. interstage "C" range L. F. aligner for maximum output.
8. Adjust the antenna "C" range L. F. aligner for maximum output.
9. Repeat operations Nos. 2, 3, and 4.

Alignment of Medium Wave Range (Referred to as "B" Range)

In aligning the radio frequency circuits for this range, use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the test oscillator as was used for aligning the short wave ranges.

1. Operate the Range Switch on the receiver chassis to the Medium Wave ("B") range position, and set the test oscillator's frequency and the receiver's tuning dial pointer to 4.5 megacycles.
2. Adjust the receiver's oscillator "B" range H. F. aligner for maximum output.
3. Adjust the R. F. interstage "B" range H. F. aligner for maximum output.
4. Adjust the antenna "B" range H. F. aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial pointer to 1.8 megacycles.
6. Adjust the receiver's oscillator "B" range L. F. aligner for maximum output.
7. Repeat operations Nos. 2, 3, and 4.

Alignment of Standard Broadcast Range (Referred to as "A" Range)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

4

10. After the eight favorite stations' brushes have all been positioned in the commutator's slot as mentioned in paragraph 7, 8, and 9, move the clamping screw of the tuning indicator. Remove the tuning indicator unit (with its clamp) from its position and place it on rest on the chassis base with the end of the tuning indicator tube facing the rear of the receiver.

11. Repeat the operation mentioned in paragraph 7 above, for the favorite station having the highest frequency. When resonance with this station is obtained, watch the aperture of the tuning indicator. When resonance with this station is obtained, watch the aperture of the tuning indicator. When resonance with this station is obtained, watch the aperture of the tuning indicator.

12. Proceed to check the settings of the adjustable station brushes for the remaining seven chosen stations according to frequency in exactly the same manner as mentioned in 11, above.

When this has been accomplished, again mount the tuning indicator unit into its proper operating position. This completes the operations necessary for setting up the eight favorite stations.

IMPORTANT: With the electric tuning system in operation, the receiver will be automatically kept in tune with any one of the eight favorite stations as long as the station is operating or provided it has no unusual tuning characteristics. If a distant station which is very weak is set up in the electric tuning system, the station will be tuned in, and the control circuit will not hold this station if a strong signal is present in either adjacent channel. This condition is obtained where there is no change in the aperture of the tuning indicator tube when the station is switched from manual to electric tuning.

			Terminals of Sockets								Heater Voltages Between Heater Terminals		
Tube	Circuit	Cap	1	2	3	4	5	6	7	8	Socket Terminal Numbers	Volts	
6K7	R. F. Amp.	0	0	0	+235	+95	0	+95	6.2	0	2-7	6.2	
6A8	Modulator	0	0	0	+240	+95	-6.9	+95	6.2	0	2-7	6.2	
6F8-G	Oscillator and Oscillator Control	0	0	6.2	+150	+8.5	-6.9	+165	0	0	2-7	6.2	
6K7	1st I. F. Amp.	0	0	0	+235	+95	0	-2.6	6.2	0	2-7	6.2	
6K7	2nd I. F. Amp.	0	0	0	+235	+95	0	-2	6.2	0	2-7	6.2	
6H6	Demodulator and A. V. C.	—	0	0	0	-0.25	0	0	+240	6.2	0	2-7	6.2
6H6	Discriminator	—	0	0	0	0	0	0	6.2	0	2-7	6.2	
6K7	Bass Amp.	0	0	0	+170	0	0	0	6.2	+8	2-7	6.2	
6F5	Audio Amp.	0	0	0	0	0	+110	0	+15	6.2	+16	2-7	6.2
6C5	Audio Inv.	—	0	0	+120	—	0	+240	6.2	+5	2-7	6.2	
6L6	Audio Output	—	0	0	+310	+320	0	—	6.2	+23	2-7	6.2	
6L6	Audio Output	—	0	0	+310	+320	0	—	6.2	+23	2-7	6.2	
6U5	Tuning Ind.	—	6.2	+18	-1.25	+235	-2.6	0	—	—	1-6	6.2	
5Z3	Rectifier	—	+425	400	400	+425	—	—	—	—	1-4	4.6	
Speaker Socket		—	+310	0	0	+425	+425	—	+415	—			
Voltage Across Motor Wdg. 20 AC													

Receiver tuned manually to 1000 kc., no signal. A. C. voltages are indicated by italics.

1. Operate the Range Switch on the receiver chassis to the Standard Broadcast ("A") range position and set the test oscillator's frequency and the receiver's tuning dial pointer to 1.5 megacycles.

2. Adjust the receiver's oscillator "A" range H. F. aligner for maximum output.

3. Adjust the R. F. interstage "A" range H. F. aligner for maximum output.

4. Adjust the Bi-Resonator's aligner for maximum output.

5. Adjust the antenna's "A" range H. F. aligner for maximum output.

6. Set the test oscillator's frequency and the receiver's tuning dial pointer to 0.6 megacycles.

7. Adjust the receiver's oscillator "A" range L. F. aligner for maximum output.

8. Reset both the test oscillator's frequency and receiver's tuning dial pointer to 1.5 megacycles and repeat operations Nos. 2, 3, 4, and 5.

Adjustment of 10 Kilocycle Audio Cut-Off Filter

The adjustment of this filter is correctly made at the factory and no additional adjustment is required.

INSTRUCTIONS FOR SETTING UP ELECTRIC TUNING SYSTEM

1. Before proceeding with setting up the eight favorite broadcast stations for electric tuning, it is preferable that the radio receiver be turned "on" for approximately twenty minutes. This is accomplished by simply pushing in the push button immediately below the designation, "Manual On" (indicated by illumination of the dial).

2. Check the position of the "Treble" control knob. When setting up or tuning in stations, this control knob should be set at the "Normal" position (pointer on knob pointing in direction of gold dot).

3. Set the Range switch control knob to the "Broadcast" position (pointer on knob pointing in direction of gold dot).

4. Remove the lists of station letters from the P-26781 package assembly which is tacked inside of the cabinet.

5. Remove the three screws which hold the electric tuning escutcheon plate (metal plate) to the electric tuning escutcheon. Then, remove from the escutcheon, the strip of transparent material and the strip of paper on which the eight stars are printed.

6. From the lists of stations, remove the call letters of the eight stations which it is desired to set up for electric tuning. These eight stations should preferably be selected and set up in the daytime so that the best service will be obtained at all times.

CAUTION: When setting up these stations it is necessary to see that the separation of these stations on the dial is sufficient to allow adjacent "Adjustable Station Brushes" to be properly located in the desired station letters. In setting up these eight favorite stations, the following order should be followed:

Looking at the front of the receiver, the station letters of the station having the highest frequency should be inserted into the farthest left-hand square of the escutcheon. Then, in successive order, according to the frequency, insert the station letters of the remaining seven stations into the other seven squares of the escutcheon. The station letters of the station having the lowest frequency should be inserted into the farthest right-hand square of the escutcheon.

After the eight station call letters have been inserted into the escutcheon, the transparent strip should be replaced over the station call letters, and the escutcheon plate then fastened into its position on the electric tuning escutcheon by means of the three screws.

The tuning adjustments for the eight favorite stations can now be made, starting with the station having the highest frequency and proceeding as follows:

7. With the Range switch control knob set to the "Broadcast" position, and the "Manual On" button pushed in, tune the receiver in the conventional manner by means of the "Manual Stations" (Station Selector) control knob to that station having the highest frequency.

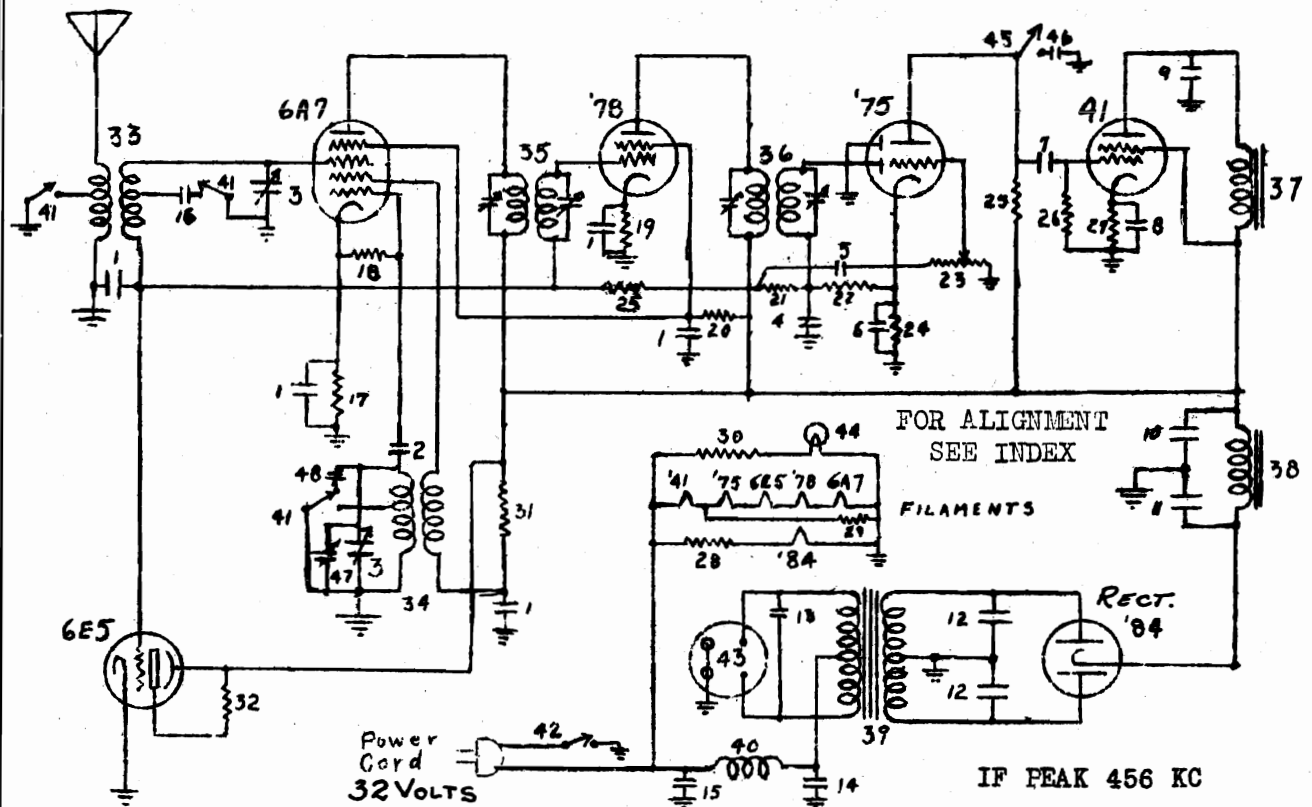
IMPORTANT: When manually tuning in a station, or when setting up a station in the electric tuning system, exact resonance with the desired station should always be obtained by observing the tuning indicator.

8. Facing the rear of the receiver, it will be observed that the commutator assembly located on the rear of the receiver has eight adjustable station brushes and dial pointer. After manually tuning in the broadcast station as mentioned in paragraph 7 above, it will be seen that the commutator dial's pointer also indicates the frequency of the station; now, slide the "Adjustable Station Brush" (which is nearest to the high frequency end of the commutator dial) in the slot until it is directly in line (and centered) with the high frequency end of the commutator's dial pointer.

9. Now, in successive order, according to frequency, proceed to set up the remaining seven favorite stations in the same manner as was mentioned in paragraphs 7 and 8 above for the favorite station having the highest frequency.

When the eight adjustable station brushes have all been set up for the eight stations, the brush nearest the high frequency end of the commutator's dial should be set at the frequency of the station having the lowest frequency.

L'TATRO MFG. CO.

MODELS EQ-39, FQ-39
Schematic

VOLTAGES --

Plates 6A7, 78, and 41 ... 210 volts.
 Plate 75 60 v.
 Screen 41 210 v.
 Screens 6A7 and 78 65 v.
 Anode grid 6A7 160 v.

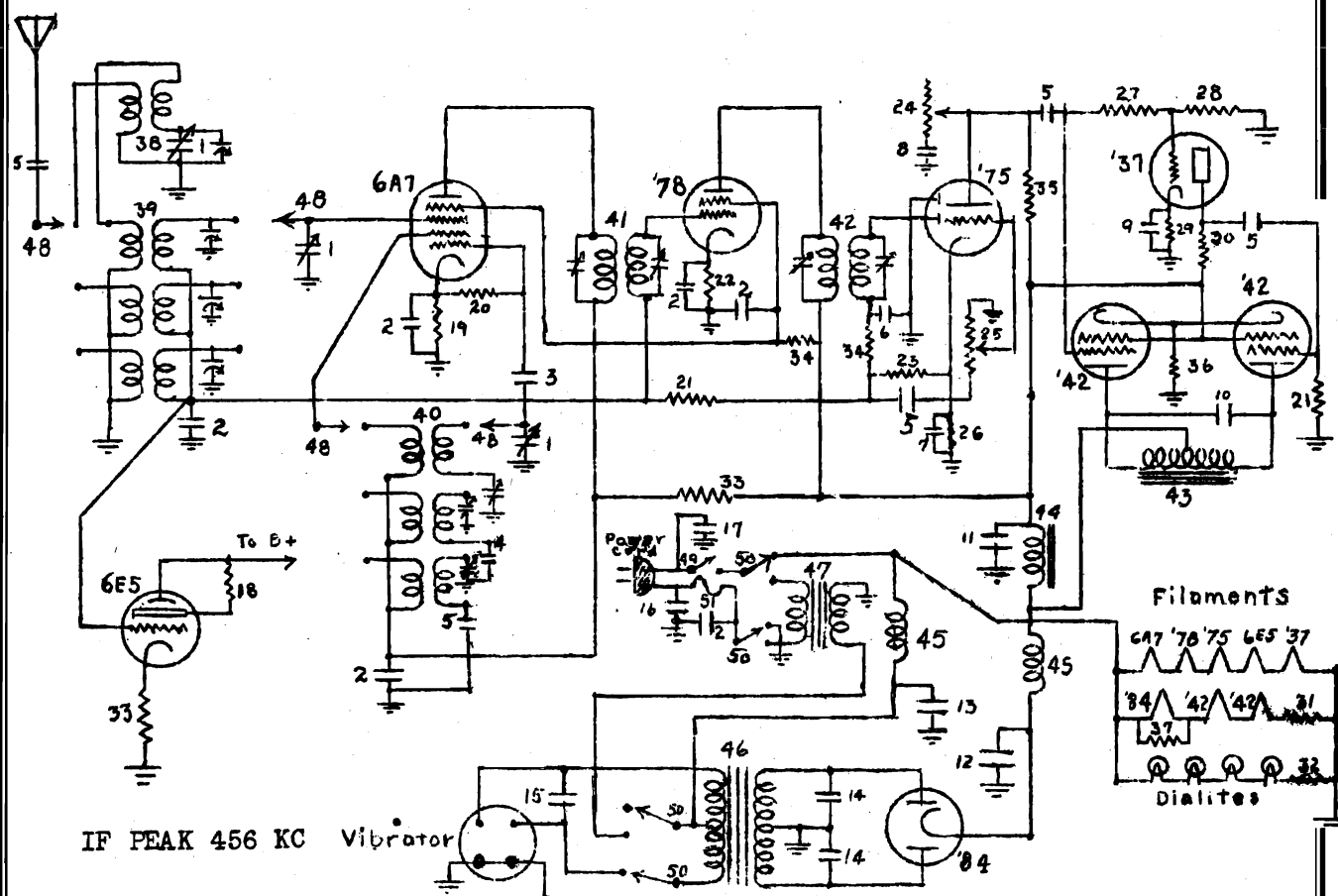
Cathodes (as measured by a 1000 ohm per volt meter)
 6A7 and 78 ... 3 v.
 75 1 v.
 41 14v.

1	.1 mfd.	17	400 ohms	34	Oscillator coil
2	.0001 mfd.	18	50M ohms	35	I.F. Coil
3	Gang condenser	19	200 ohms	36	I.F. Coil
4	.00025 mfd.	20	50M ohms	37	Speaker
5	.01 mfd.	21	25M ohms	38	Filter choke
6	10 mfd. electr.	22	$\frac{1}{2}$ Megohm	39	Power trans.
7	.01 mfd.	23	$\frac{1}{2}$ Meg. control	40	R.F. Choke
8	10 mfd. electr.	24	10M ohms	41	Band switch
9	.01 mfd.	25	$\frac{1}{2}$ megohm	42	Power switch
10	8 mfd. electr.	26	1 megohm	43	Vibrator
11	16 mfd. electr.	27	650 ohms	44	Pilot light
12	.01 mfd. 1600 v.	28	50 ohms	45	Tone switch
13	.25 mfd.	29	200 ohms	46	.002 mfd.
14	.5 mfd	30	160 ohms	47	S.W. Padder
15	20 mfd.	31	10M ohms	48	B.C. Padder
16	.002 mfd.	32	$\frac{1}{2}$ megohm		
		33	Antenna coil		

The antenna for the Model EQ (table model) and FQ (console) should be about 100 feet long and as high as possible. No ground connection is necessary. A continuously variable tone control is used in Model FQ.

MODELS HQ-39
Schematic

L'TATRO MFG. CO.



--- VOLTAGES---

Plates 6A7, 78, and 42's ...	200 v.	Cathode 6A7 .....	.25 v
Plate 37	50 v.	" 78	2 v.
Plate 75	30 v.	" 75 .....	.5 v
Screens 6A7 and 78	50 v.	" 37	4 v.
		" 42's	15 v.

1 Gang condenser	18 $\frac{1}{2}$ megohm	35 $\frac{1}{2}$ megohm
2 .1 mfd.	19 53 ohms	36 400 ohms
3 .0001 mica	20 25M ohms	37 33 ohms
4 .002 mfd.	21 $\frac{1}{2}$ megohm	38 Presselector coil
5 .01 mfd.	22 800 ohms	39 Antenna coil
6 .0005 mfd.	23 $\frac{1}{2}$ megohm	40 Oscillator coil
7 10 mfd. electr.	24 $\frac{1}{2}$ meg. control	41 I.F. coil
8 .005 mfd.	26 7500 ohms	42 I.F. coil
9 5 mfd. electr.	27 $\frac{1}{2}$ megohm	43 Speaker
10 .0025 mfd.	28 25M ohms	44 Filter choke
11 8 mfd. electr.	29 3500 ohms	45 R.F. choke
12 16 mfd. electr.	30 100M ohms	46 Power trans.
13 .25 mfd.	31 20 ohms	47 Stepdown trans.
14 .02 mfd.	32 50 ohms	48 Band switch
15 .25 mfd.	33 800 ohms	49 Off-on switch
16 1 mfd.	34 50M ohms	50 Power switch
17 .25 mfd.	25 $\frac{1}{2}$ meg. control	51 2 amp. fuse

Alignment, Socket
Trimmers

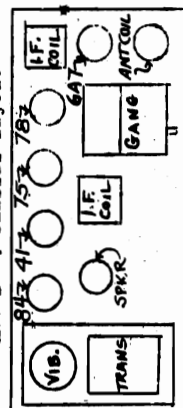
L'TATRO MFG. CO.

MODELS EQ-39, FQ-39
MODEL HQ-39
MODELS SP-67, TP-67
MODELS AQ-69, BQ-69

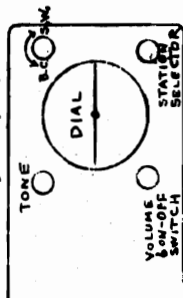
ALIGNMENT PROCEDURE

Adjust IF coils to 456 KC.
Switch to shortwave band; turn dial to 5 MC and adjust trimmer on the rear section of the gang condenser to maximum output.
Switch to broadcast band and turn dial to 1400 KC. Adjust trimmer connected to switch to maximum output. Track antenna by adjusting trimmer on antenna section of the gang condenser.
Switch to shortwave, turn dial to 5 MC and track antenna by adjusting trimmer on top of the antenna coil.

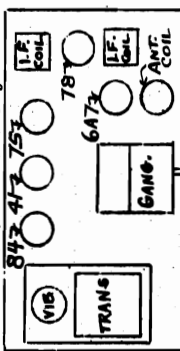
Model EQ chassis layout



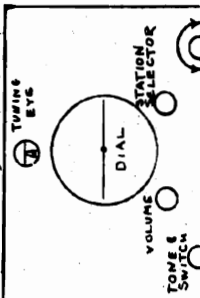
Control panel, EQ



Model FQ chassis layout



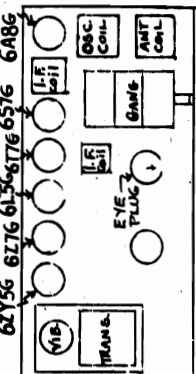
Control panel FQ



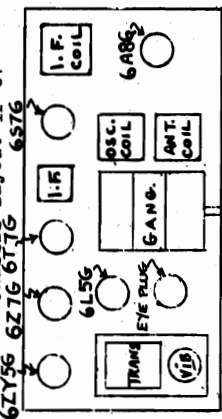
ALIGNMENT PROCEDURE

Turn dial to closed gang position to make certain that the dial needle coincides with the end of the scale. Turn dial to about midpoint and adjust the I.F. coils to 456 KC.
Switch to shortwave band, set dial needle to 15 MC and adjust bottom trimmer in antenna and oscillator coils to maximum output.
Switch to broadcast (middle band) set dial at 5 MC and adjust the second trimmers from the bottom to maximum output.
Switch to broadcast, set dial at 1400 KC and adjust the third trimmer from the bottom. Then adjust the ladder located on the front section of the gang condenser. Turn to 600 KC and adjust the top trimmer in the oscillator coil. This is the series tracking condenser.
The type 6A83 tube has been found to give better oscillator performance than the 6D9G and is used in present production. The switch which turns the tuning eye and dialites off and on is located on the back of the panel.

Chassis layout SP-67

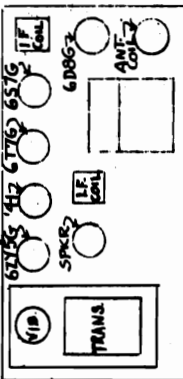


Chassis layout TP-67

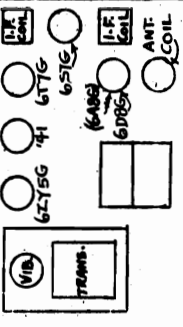


Adjust IF coils to 456 KC.
Switch to shortwave band; turn dial to 5 MC and adjust trimmer on the rear section of the gang condenser to maximum output.
Switch to broadcast and turn dial to 1400 KC. Adjust trimmer connected to switch to maximum output. Track antenna by adjusting trimmer on antenna section of the gang condenser.
Switch to shortwave, turn dial to 5 MC and track antenna by adjusting trimmer on top of the antenna coil.

Model AQ chassis layout



Model BQ chassis layout



Model RF has the same circuit as the EQ plus a tuning eye. The type 6A8G tube has been found to give better oscillator performance than the 6D9G and is used in all Model RF's except those built in the earlier part of the season.

Model HQ-39 may be operated on either 32 volts DC or 110 volts AC. To switch the set for 110 volt operation, the following instructions must be carried out:

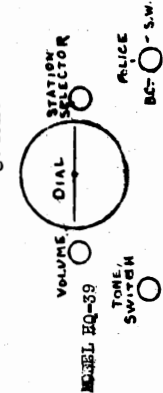
1. Disconnect set from 32 volt line.
2. Remove cover from power rack and pull out vibrator.
3. Replace cover and fit switch lever back into slot in switch shaft.
4. Remove screw holding lever and throw switch to right.
5. Reset screw in hole at the right.

If set is inoperative, check fuse. (2 amp. 250 volt. An ordinary car fuse may be substituted). The fuse protects the set from lightning as well as from line voltage overloads.

ALIGNMENT PROCEDURE

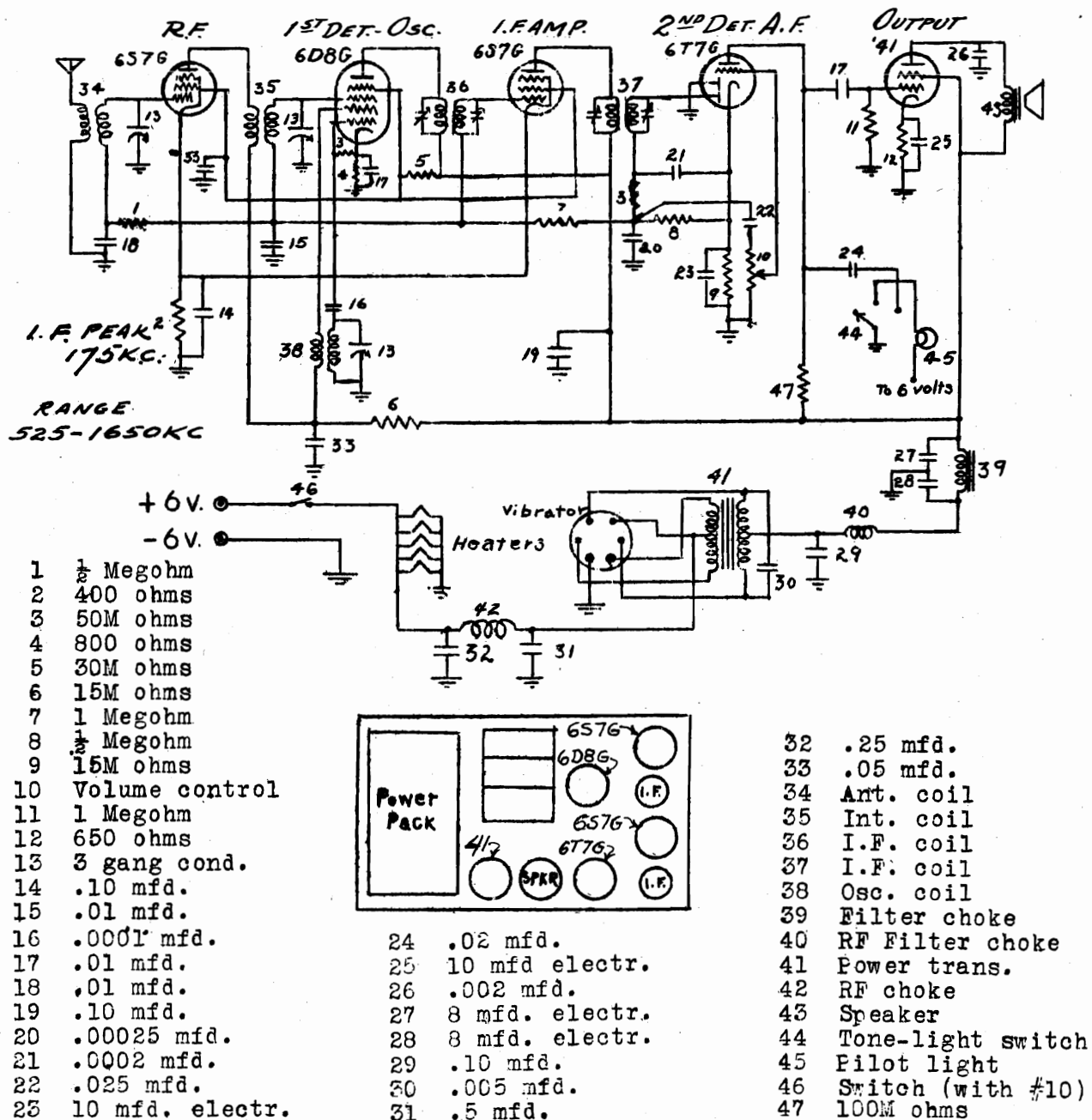
Turn dial to closed gang position and make certain that the dial needle coincides with the end of the scale. Turn dial to about midpoint and adjust IF coils to 456 KC.
Switch to shortwave band, set dial needle to 15 MC and adjust bottom trimmers on antenna and oscillator coils to maximum output.
Switch to police band (middle band) and set dial at 5 MC. Adjust second trimmers from the bottom to maximum output.
Switch to broadcast, set dial at 1400 KC and adjust the third trimmers from the bottom. Then adjust the ladder located on the front section of the gang condenser. Turn to 600 KC and adjust the top trimmer in the oscillator coil. This is the series tracking condenser.

Knob arrangement



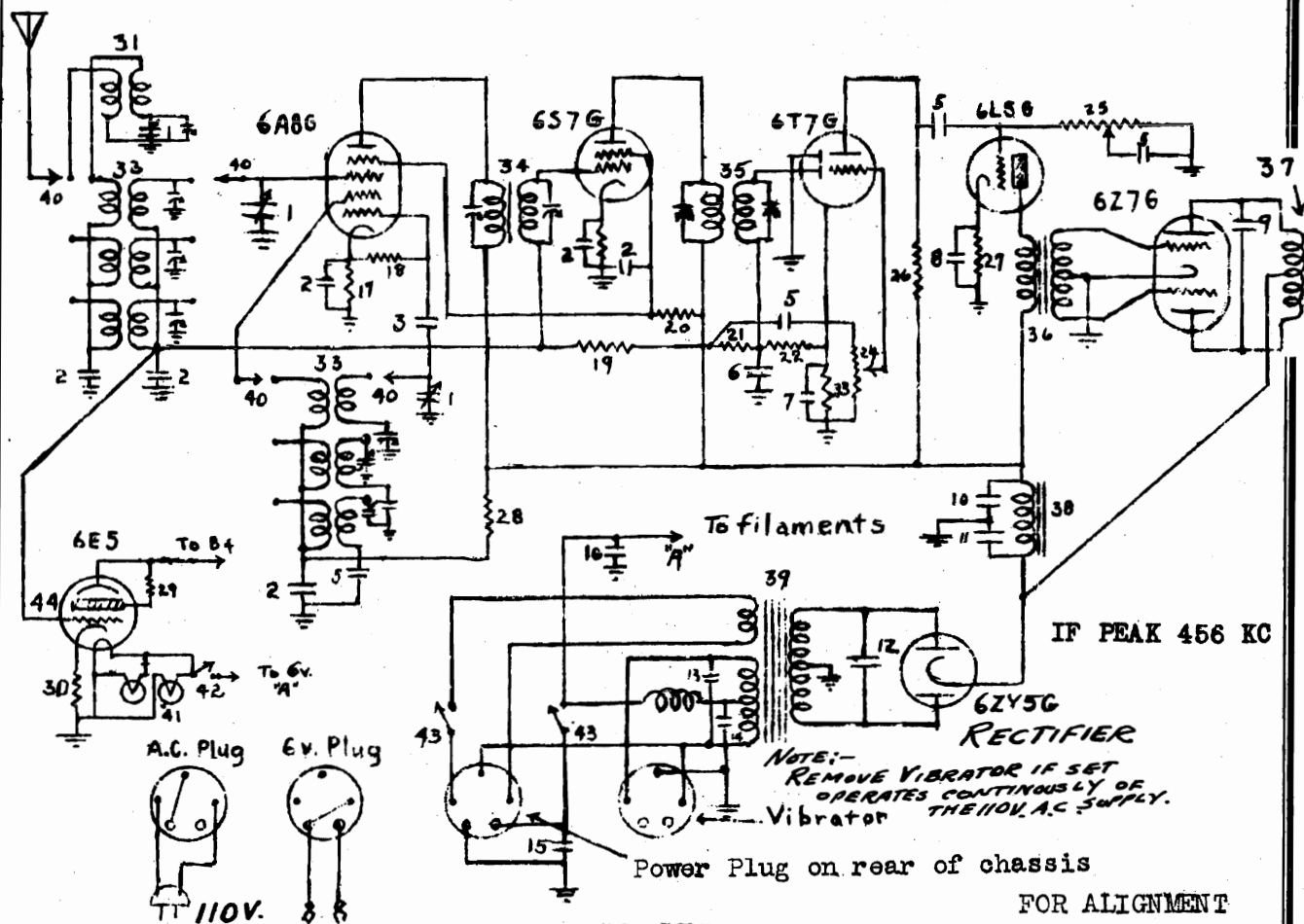
MODELS NO-65,00-65
Schematic, Socket
Trimmers, Alignment

L'TATRO MFG. CO.



Voltages on the Model NO(table model) are somewhat lower than the above. Some changes in circuit constants in sets built prior to Aug. 1937, will be found. "Motorboating on this set can be corrected by separating the grid leads on the gang condenser as far as possible.

L'TATRO MFG. CO.

MODELS SP-67, TP-67
Schematic

IF PEAK 456 KC

RECTIFIER

NOTE:-
REMOVE VIBRATOR IF SET
OPERATES CONTINUOUSLY OF
THE 110V. A.C. SUPPLY.

Power Plug on rear of chassis

FOR ALIGNMENT
SEE INDEX

-- VOLTAGES --

Plates 6A8G, 6S7G, 6L5G, 6Z7G and oscillator grid of 6A8G 140 v
 Plate 6T7G 12 v.
 Screens 6A8G and 6S7G 40 v.

Cathodes: 6A8G and 6S7G 1.5 v.
 6T7G5 v.
 6L5G 5 v.

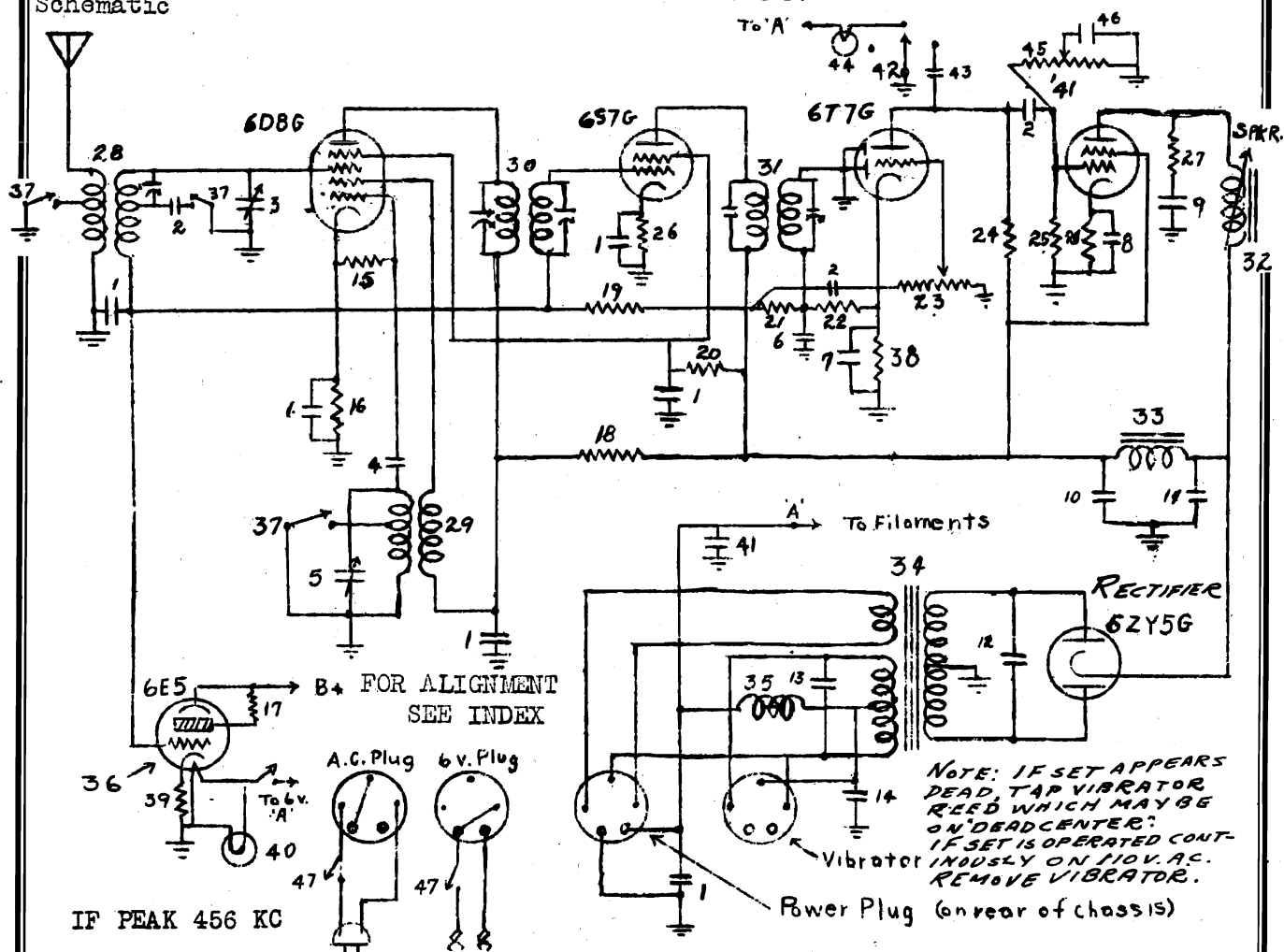
Voltages when set is on AC are higher.

1	Gang condenser	16	.25 mfd.	31	Preselector coil
2	.10 mfd.	17	400 ohms	32	Antenna coil
3	.00025 mfd	18	25M ohms	33	Oscillator coil
4	.002 mfd.	19	1 megohm	34	Iron core I.F.
5	.01 mfd.	20	50M ohm	35	I.F. coil
6	.00025 mfd.	21	25M ohm	36	Input trans.
7	10 mfd. electr.	22	$\frac{1}{2}$ megohm	37	Speaker
8	5 mfd. electr.	23	5M ohms	38	Filter choke
9	.0025 mfd.	24	$\frac{1}{2}$ meg. control	39	Power trans.
10	8 mfd. electr.	25	Tone control	40	Band switch
11	16 mfd. electr.	26	$\frac{1}{4}$ megohm	41	Pilot lights
12	.005 mfd. 1600 v.	27	1500 ohms	42	Tuning eye and dialite switch
13	10 mfd. electr.	28	10M ohms	43	Power switch
14	.5 mfd.	29	$\frac{1}{2}$ megohm.	44	Tuning eye
15	.10 mfd.	30	1500 ohms		

The TP-67 is a console model; the SP-67 is a table model. The antenna should be as high as possible and about 100 feet long. A good ground is essential for good reception. The blue wire from the set is the antenna lead. If the set is to be operated on 110 volts continuously, the vibrator should be removed.

MODELS AQ-69, BQ-69
Schematic

L'TATRO MFG. CO.



TRANSFORMER CORP. OF AMER.

MODEL TC-31

Schematic
Alignment

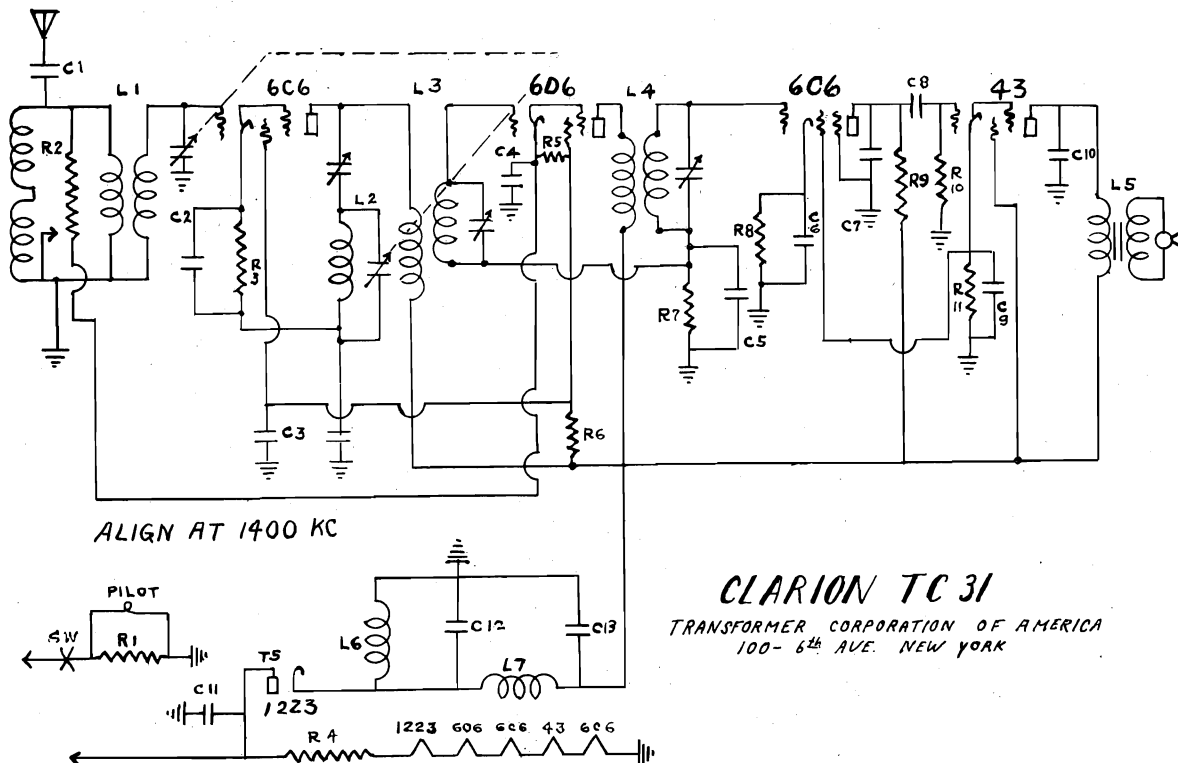
SERVICE SUGGESTIONS

CIRCUIT: The receiver uses a superhet circuit. The tubes used are: type 6G6 as oscillator and modulator, a type 6D6 in the I.F. stage, a type 6C6 as second detector and audio amplifier and a type 43 output tube. The I.F. is 456 K.C.

ALIGNING THE SET: Only in rare cases will it be found necessary to adjust any trimmers. If the volume is low, everything else should be checked before attempting to align the set. The only case where the fault is in the alignment is when both low volume and poor selectivity are present. To align the I.F.: set the test oscillator to 456 K.C. and connect it to the grid of the first 6C6 tube and adjust the upper screw on the first I.F. transformer and the screw on the second I.F. (small round can) for maximum output. Now set the test oscillator to 1400 K.C. The signal should come in between 15 and 20 on the dial. Adjust the two trimmers on the tuning condenser for maximum output. Check at 600 K.C. The lower trimmer on the first I.F. transformer is the oscillator coupling condenser and should not be changed.

Price and Parts List for Clarion TC-31

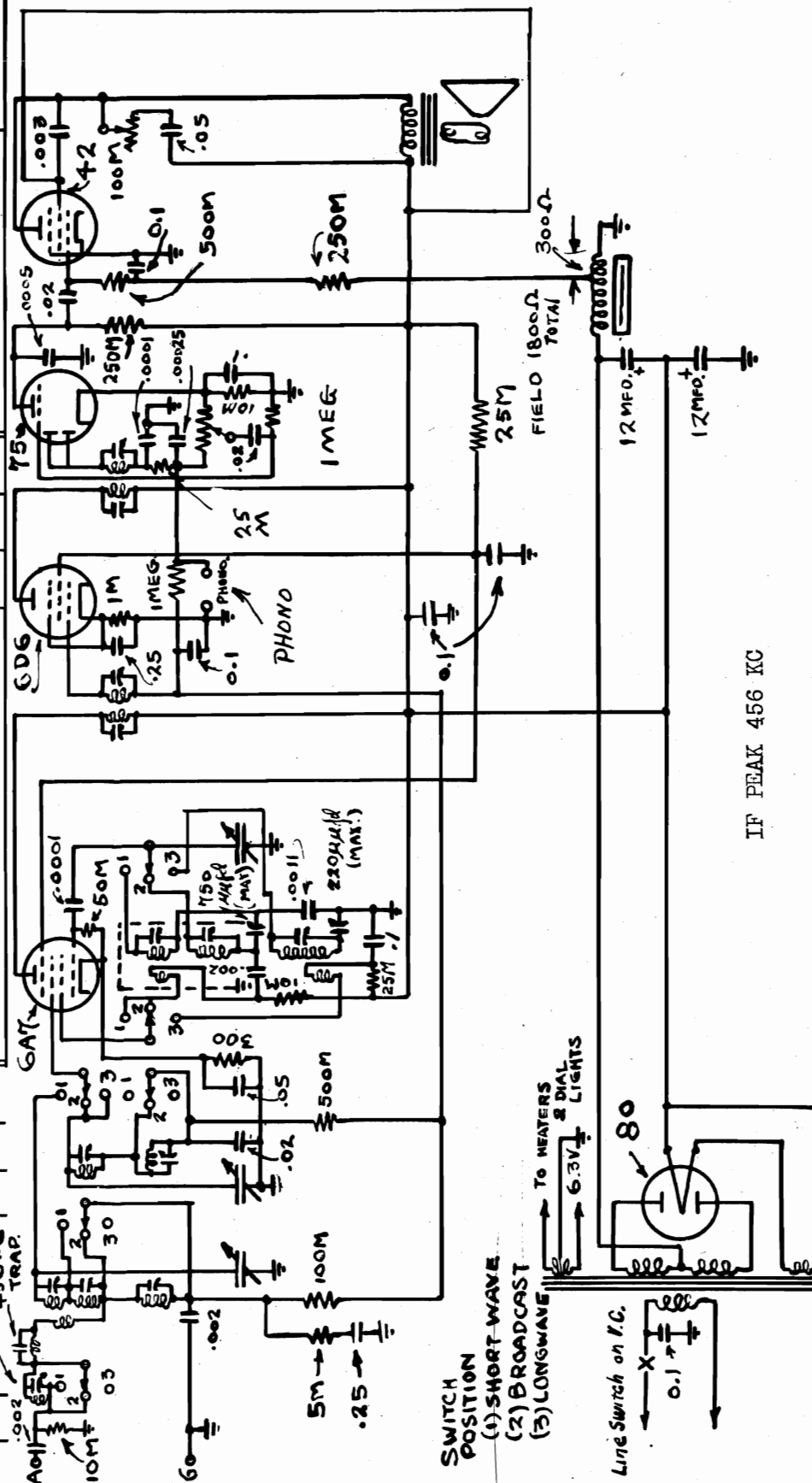
Stock No.	Code No.	Description	Price
TPE2010	L1	Antenna Coil	\$.95
TPE2020	L2	Oscillator coil	.95
TPE2030	L3	First I. F.	1.50
TPE2040	L4	Second I. F.	1.50
TPE2050	L5	Speaker Transformer	4.50
TPE2060	L6	Speaker Field	1.25
TPE2070	L7	Choke	.25
TPE2080	R1	Pilot shunt	1.10
TPE2090	R2&SW	Volume control and switch	.19
TPE2100	R3	7500 ohm carbon resistor	1.10
TPE2110	R4	Filament resistor 200 ohms	.19
TPE2120	R5	50,000 ohm carbon resistor	.19
TPE2130	R6	10,000 ohm carbon resistor	.19
TPE2140	R7	500,000 ohm carbon resistor	.19
TPE2150	R8	25,000 ohm carbon resistor	.19
TPE2160	R9	300,000 ohm carbon resistor	.19
TPE2170	R10	500,000 ohm carbon resistor	.19
TPE2180	R11	750 ohm carbon resistor	.19
TPE2190	C1	.1 mfd. paper condenser	.14
TPE2200	C2	.002 mfd. paper condenser	.14
TPE2210	C3	.1 mfd. paper condenser	.14
TPE2220	C4	.1 mfd. paper condenser	.14
TPE2230	C5	.1 mfd. paper condenser	.14
TPE2240	C6	10 mfd. electrolytic condenser	.70
TPE2250	C7	.001 mfd. paper condenser	.13
TPE2260	C8	.05 mfd. paper condenser	.14
TPE2270	C9	10 mfd. electrolytic condenser	.70
TPE2280	C10	.006 mfd. paper condenser	.15
TPE2290	C11	.05 mfd. paper condenser	.14
TPE2300	C12	16 mfd. electrolytic condenser	.90
TPE2310	C13	8 mfd. electrolytic condenser	.60
		1/3 watt carbon resistor any value	.19



TRANSFORMER CORP.
OF AMERICA
NEW YORK, N.Y. U. S. A.

USED ON TC 35L.W.

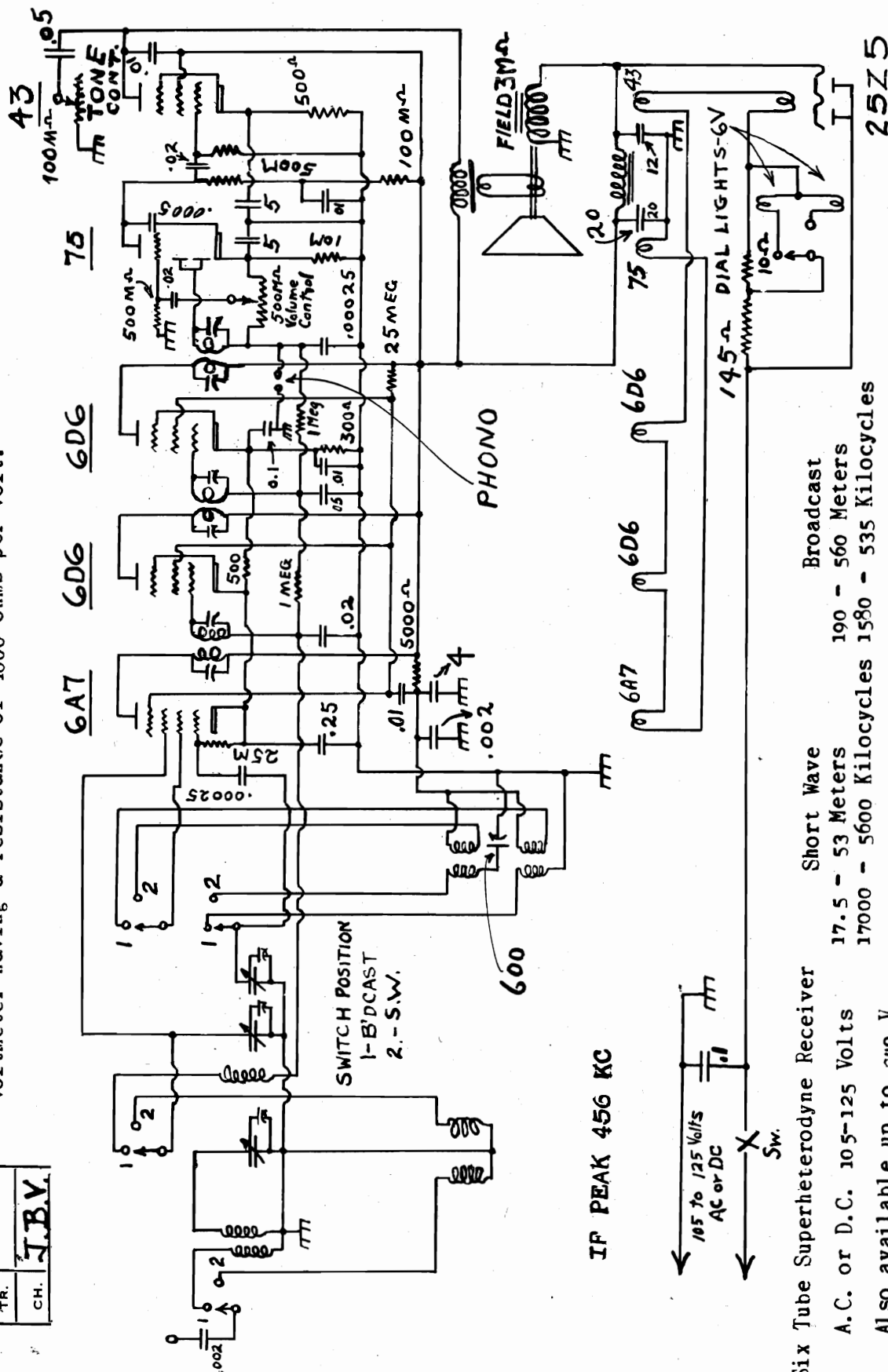
SCALE



TRANSFORMER CORP. OF AMERICA

VOLTAGE READINGS:

Readings should be taken with volume control fully on. Use a D.C. Voltmeter having a resistance of 1000 ohms per volt.



Six Tube Superheterodyne Receiver

**Short Wave
17.5 - 53 Meters**

**Broadcast
190 - 560 Meters**

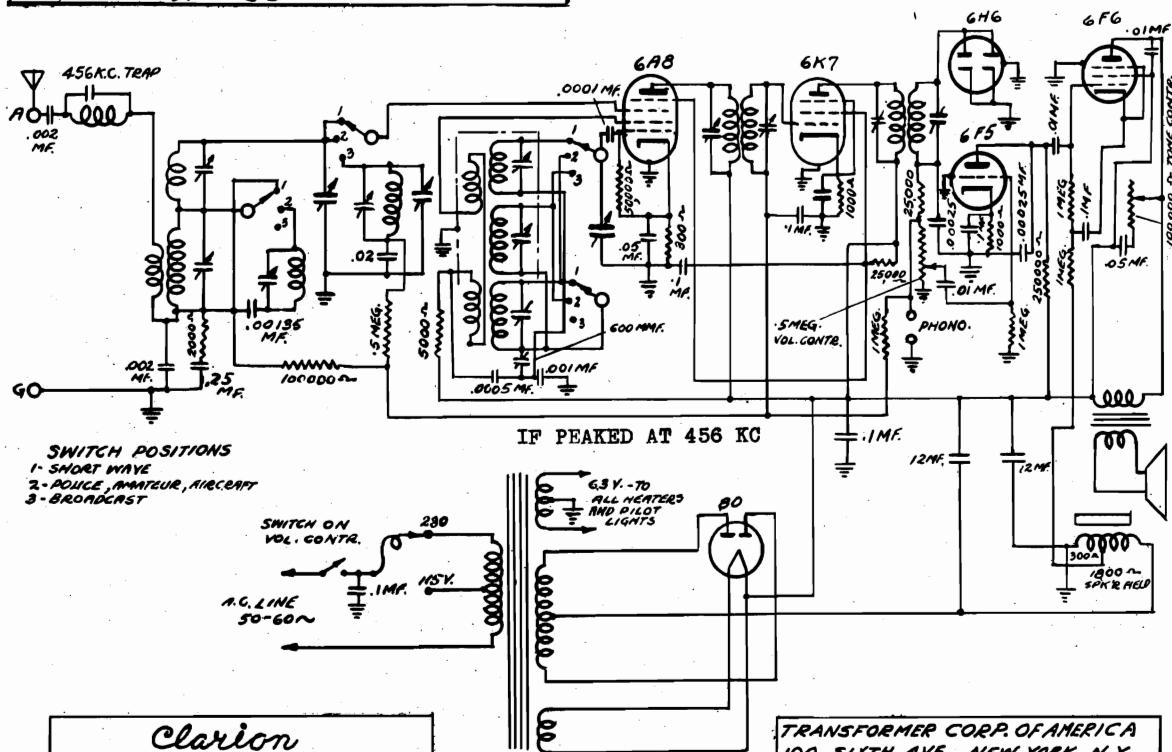
A.C. or D.C. 105-125 Volts
Also available up to 240 V.



[illegible]

TRANSFORMER CORPORATION OF AMERICA
100-6TH AVE NEW YORK, N. Y.
1-20-36

IF PEAK
456 KC



Clarion
MODELS TC-75 & TC-76
6TUBE 3 BAND A.C. SUPERHETERODYNE

TRANSFORMER CORP. OF AMERICA
100 SIXTH AVE. NEW YORK, N.Y.
DRAWN BY *BF* 12-14-35

MODEL 5-Tube-6 Volt Batt.

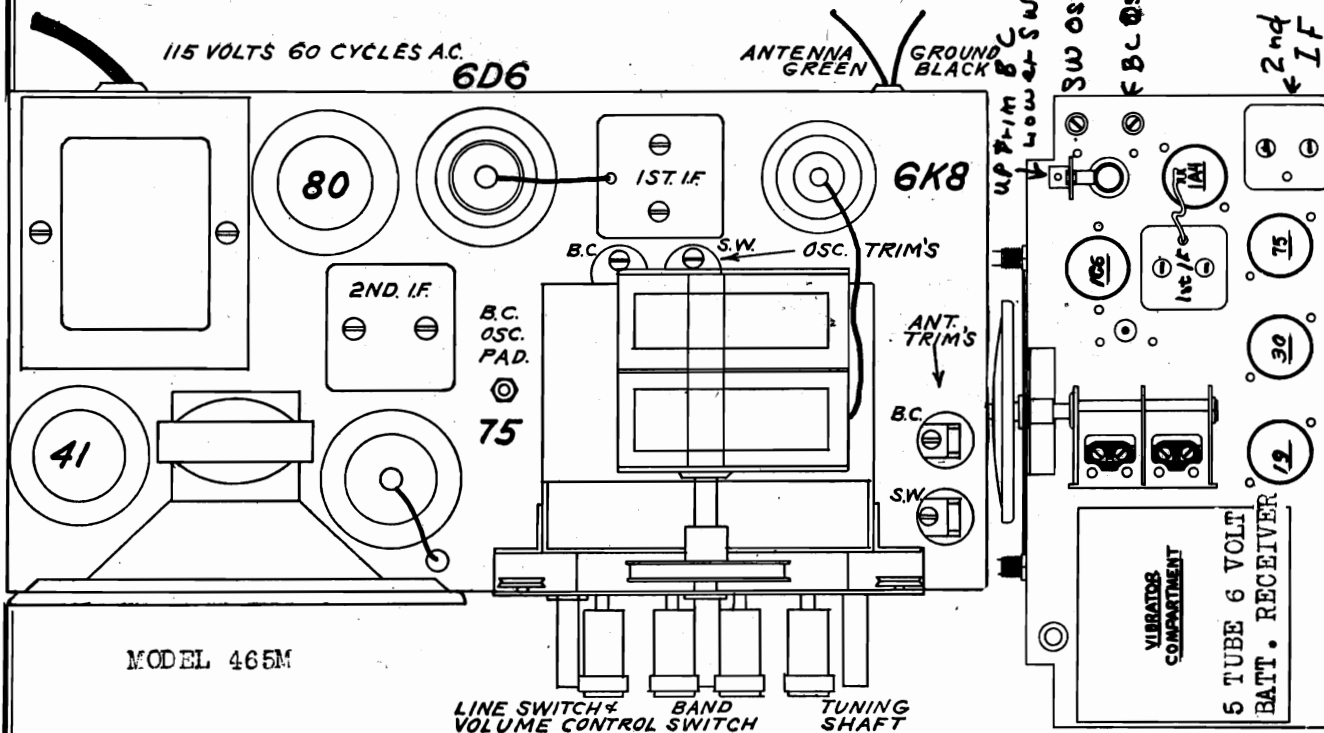
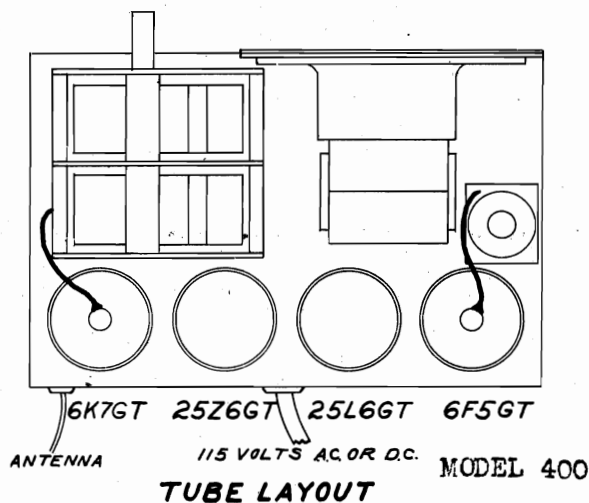
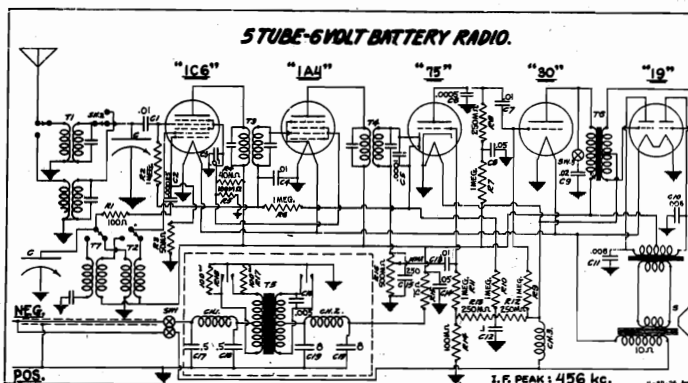
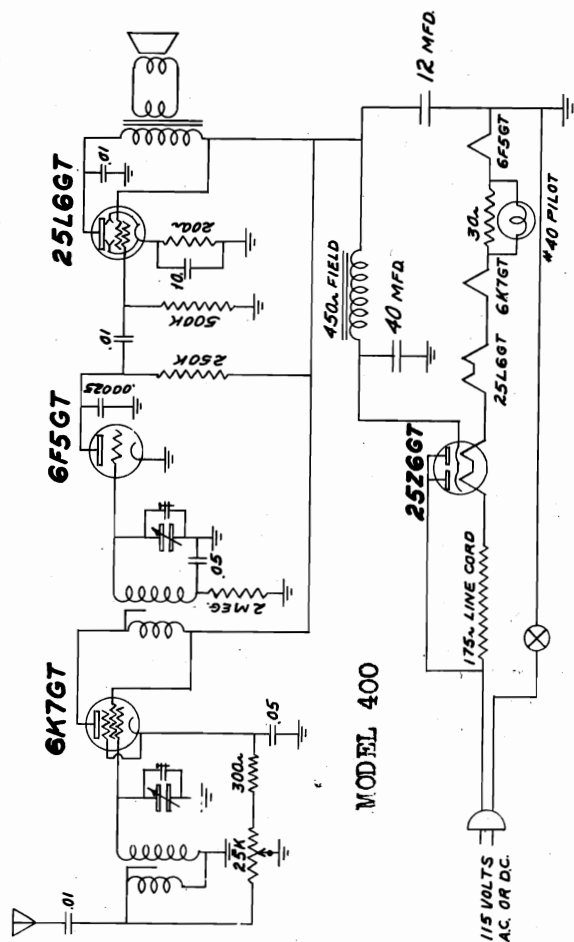
MODEL 400

Schematics, Socket

TRAV-LER RADIO & TELEVISION CORP.

MODEL 465M

Socket, Trimmers

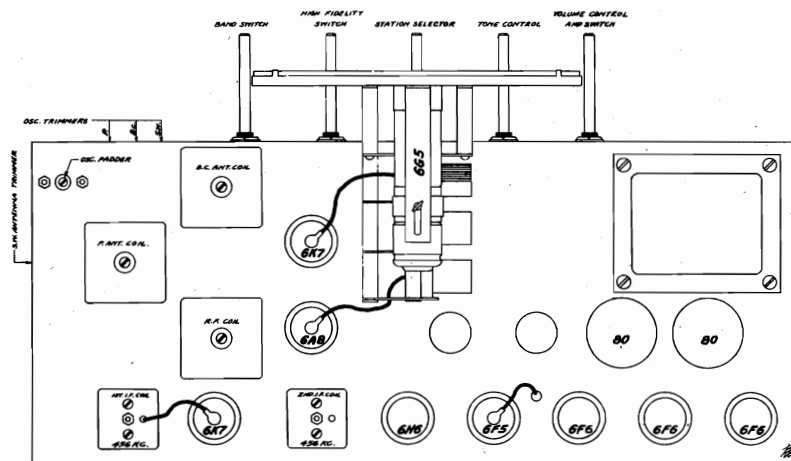
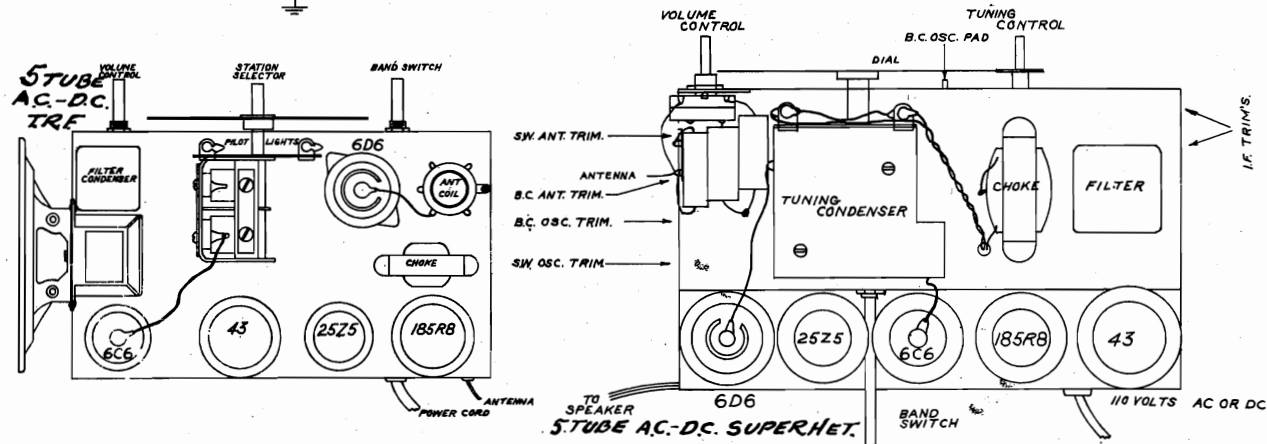
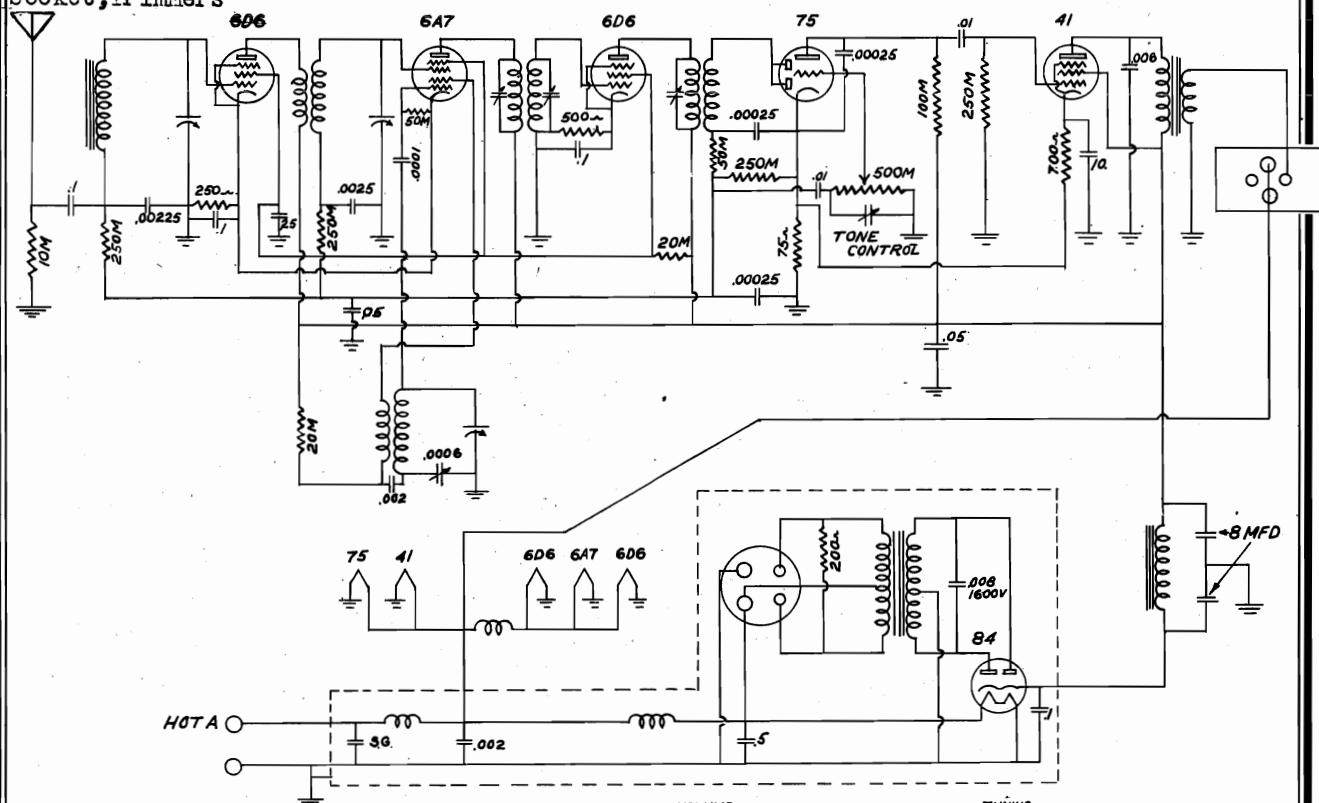


MODEL 5-Tube AC-DC TRF **TRAV-LER RADIO & TELEVISION CORP.**
 MODEL 5-Tube AC-DC Superhet
 MODEL 11-Tube A-C Superhet.
 Socket, Trimmers

6 TUBE AUTO SET I.F. = 262 KC.

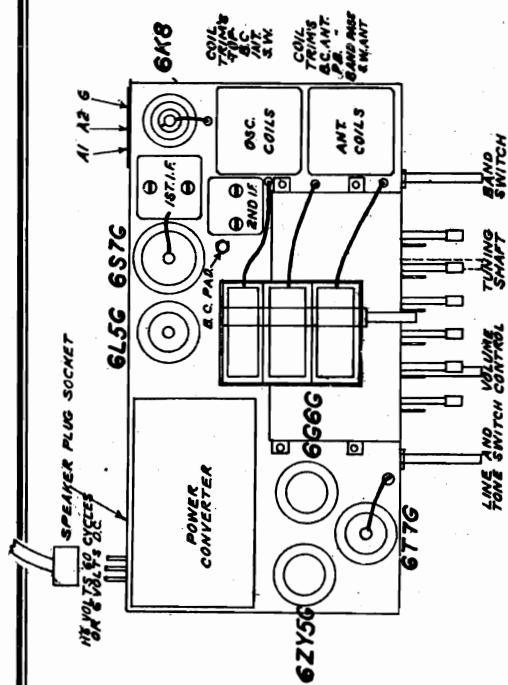
MODEL 6-Tube Auto
Schematic

6 TUBE AUTO SET I.F. = 262 K.C.



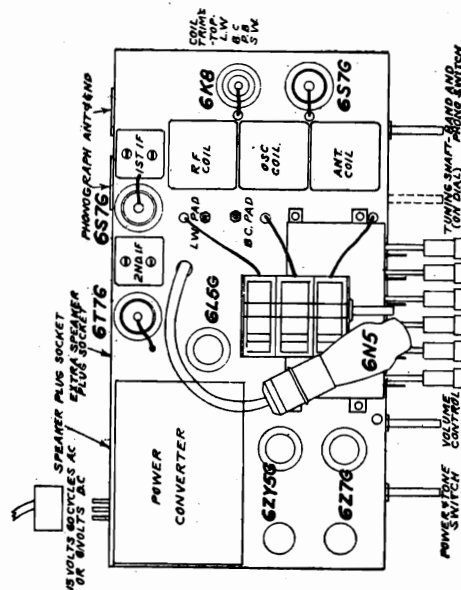
11 TUBE A.C. SUPER HET.

Schematics Socket Trimmers



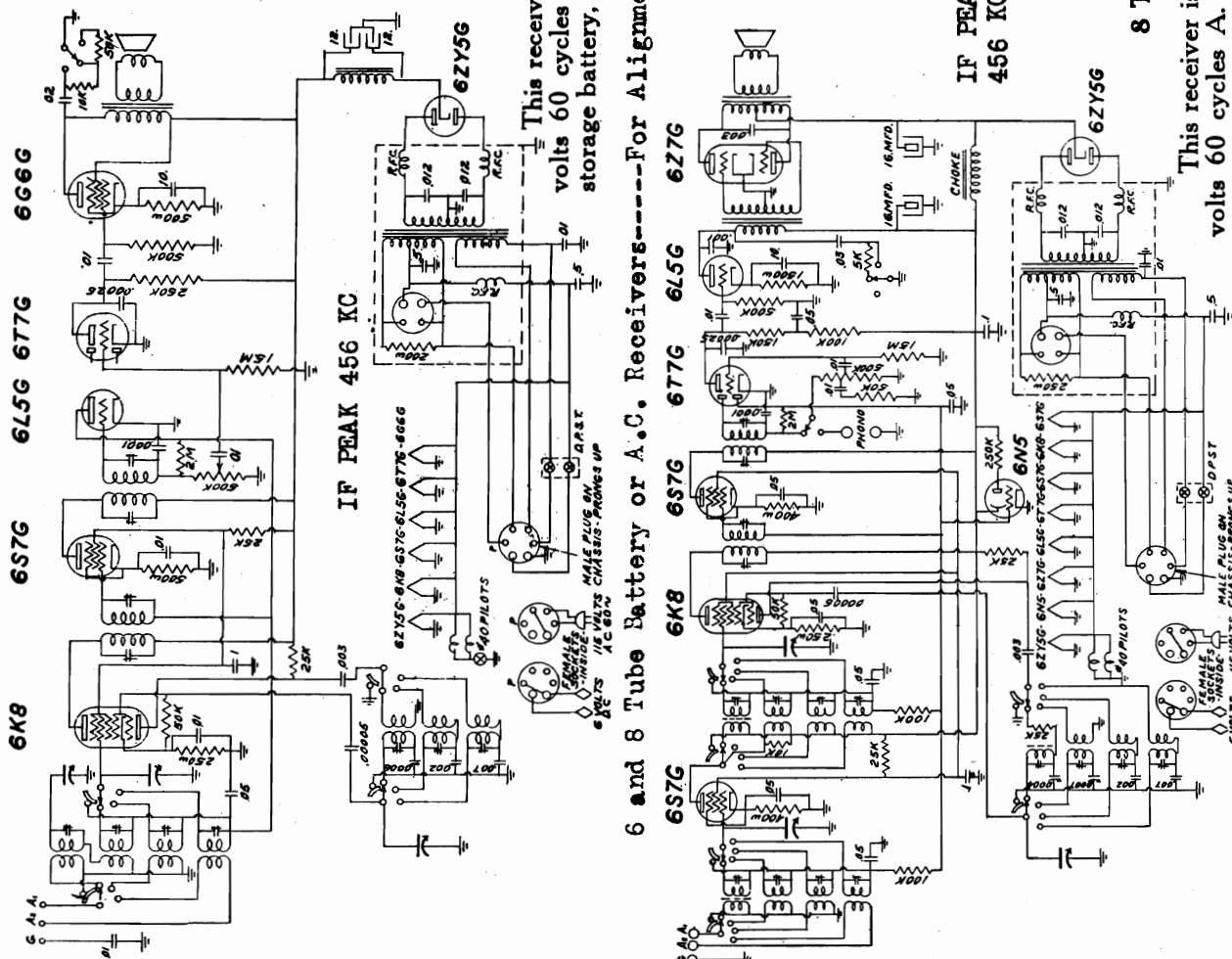
6 Tube Battery or A. C. Operated Receiver

--- This receiver is designed to operate on a 6 volt storage battery, or 115 volts 60 cycles A. C. only. The special model will operate on a 6 volt storage battery, or 220 volts 60 cycle A. C. only.



8 Tube Battery or A. C. Operated Receiver

† This receiver is designed to operate on a 6 volt storage battery, or 115 volts 60 cycles A. C. **only.** The special model will operate on a 6 volt storage battery, or 220 volts 60 cycle A. C. **only.**

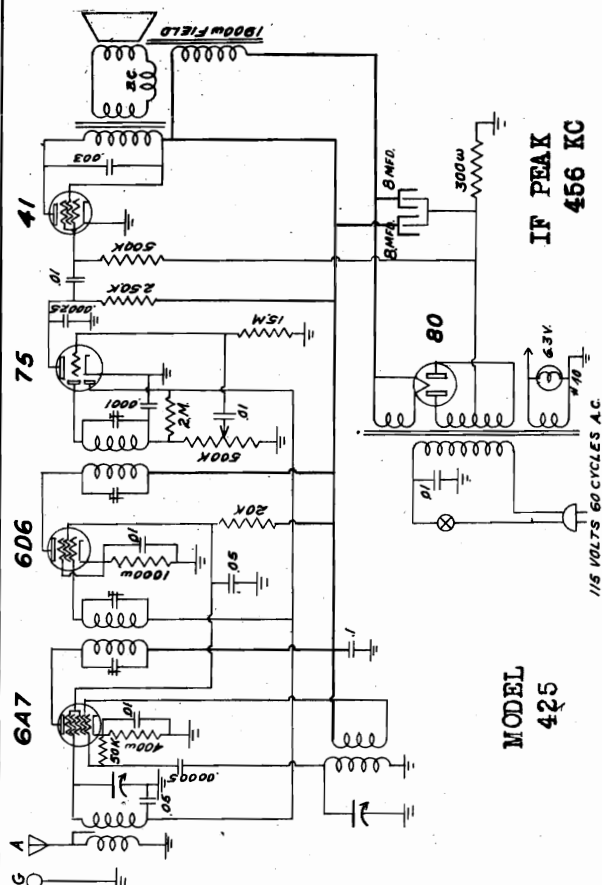


6 and 8 Tube Battery or A.C. Receivers-----Fo

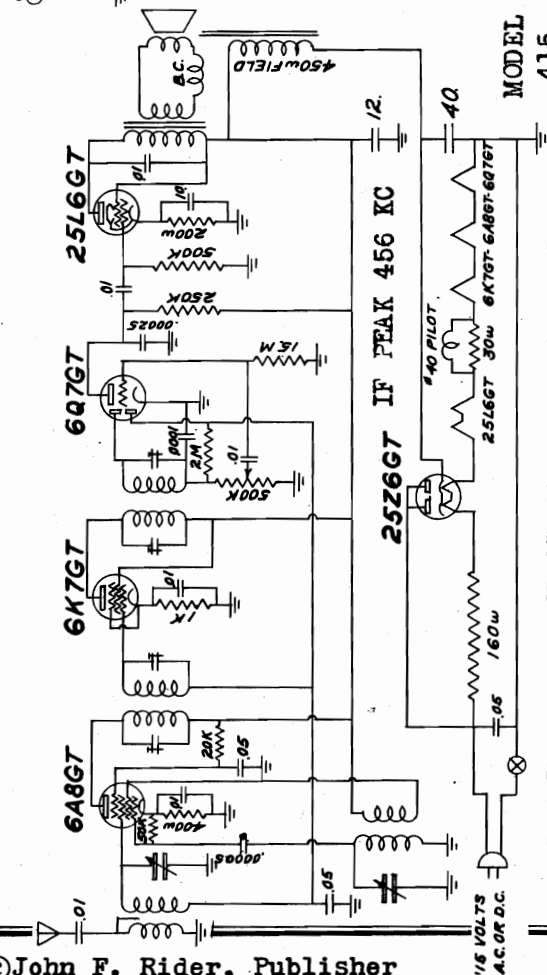
Schematics
Alignment

TRAV-LER RADIO & TELEVISION CORP.

MODEL 415
MODEL 425
MODEL 426
MODEL 560



MODEL 425



MODEL 415

ALIGNMENT:-----MODELS 415, 425, 426 and 560.

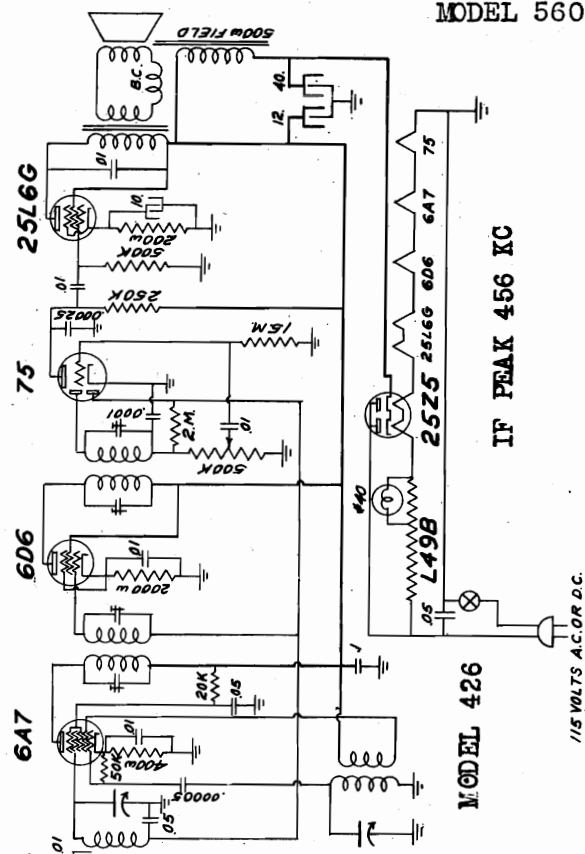
I.F. Set dial at 1720, adjust at 456 KC.

B.C. Dummy antenna .0002 mfd. condenser, adjust oscillator trimmer at 1720 KC.

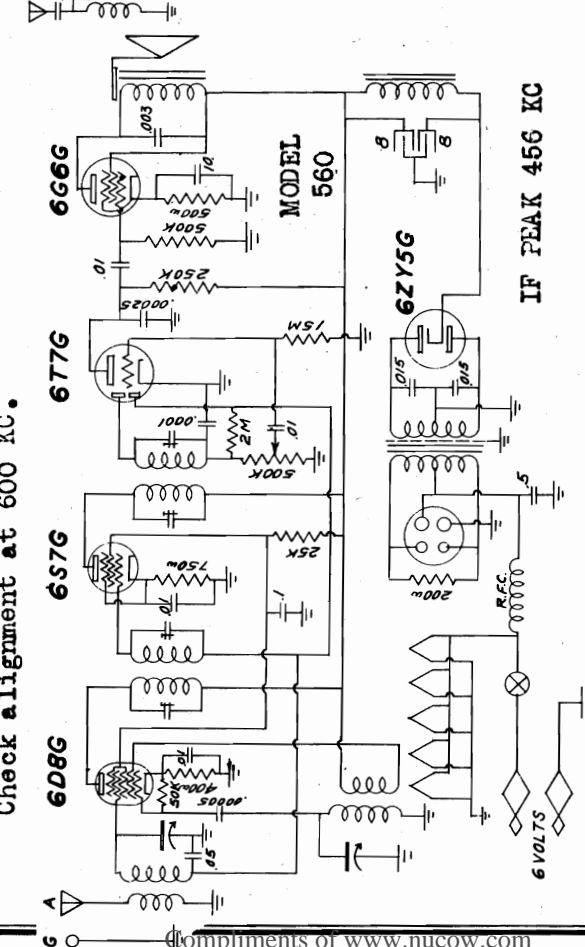
Adjust antenna trimmer at 1400 KC.

Check alignment at 600 KC.

FOR OTHER DATA
SEE INDEX



MODEL 426

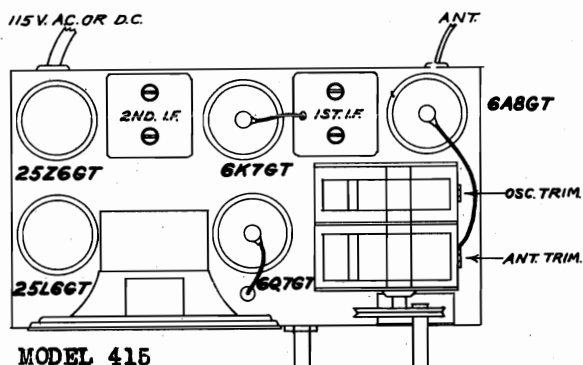


MODEL 560

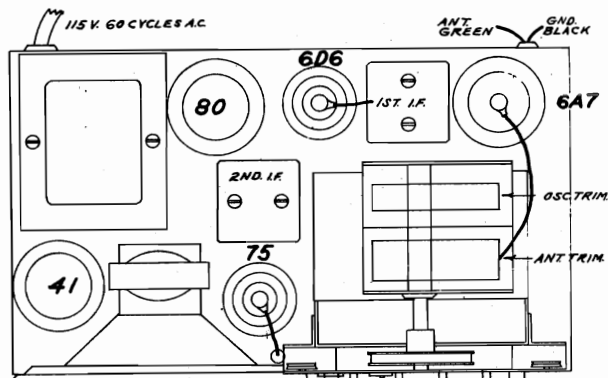
MODEL 415 MODEL 437M
MODEL 425 MODEL 536M
MODEL 426 MODEL 539M

TRAV-LER RADIO & TELEVISION CORP.

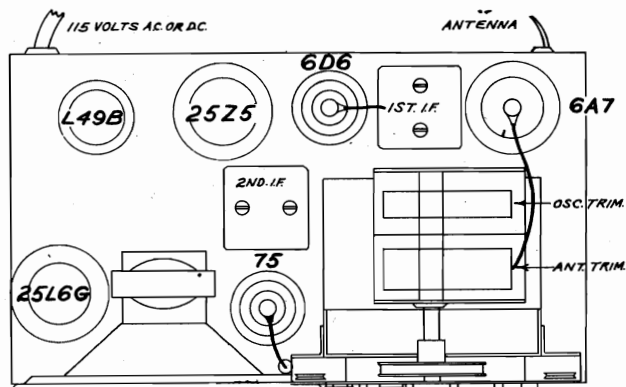
MODEL 552B
MODEL 560
Socket, Trimmers



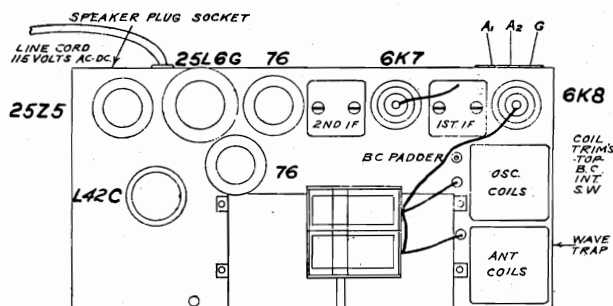
MODEL 415



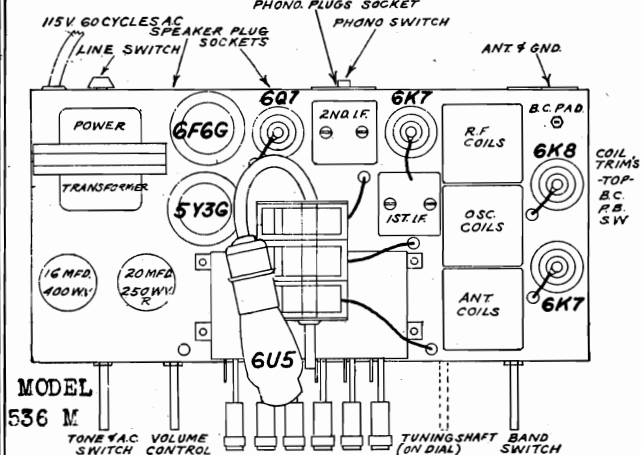
MODEL 425



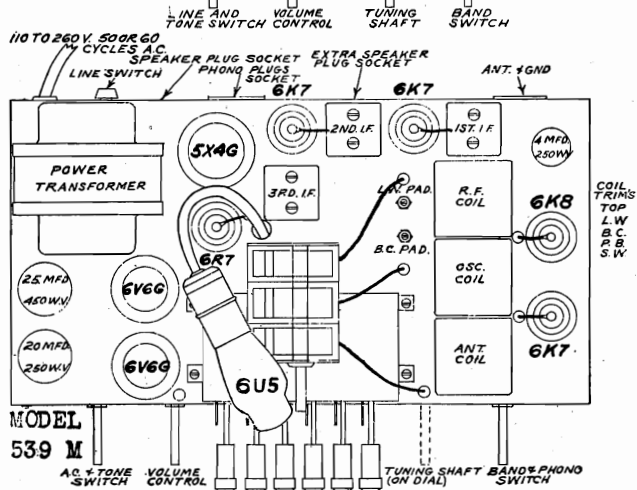
MODEL 426



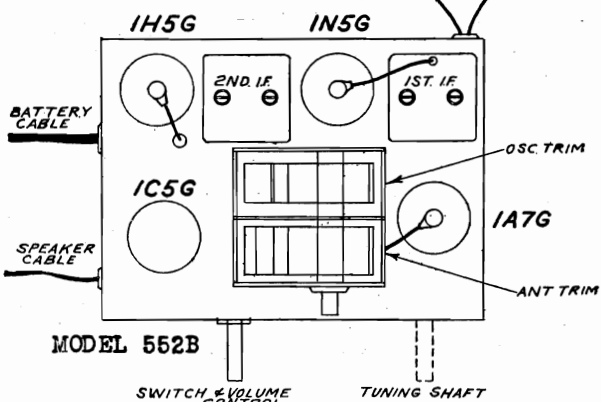
MODEL 437M



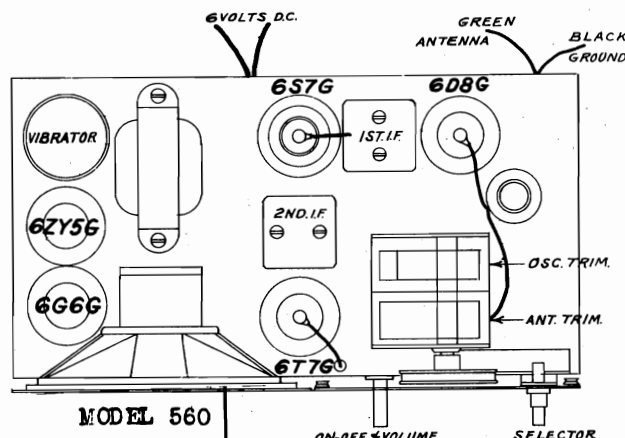
MODEL 536 M



MODEL 539 M



MODEL 552B

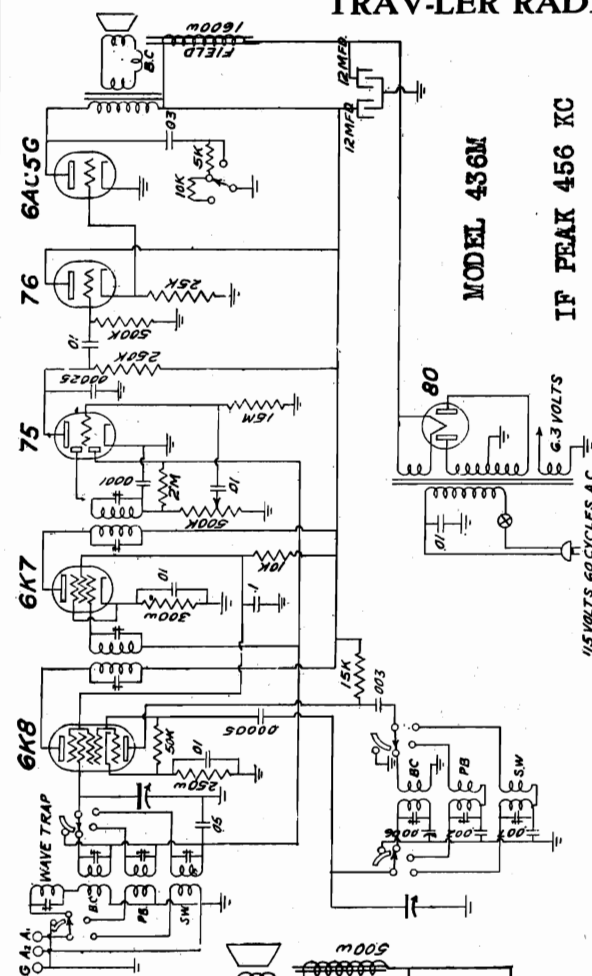


MODEL 560

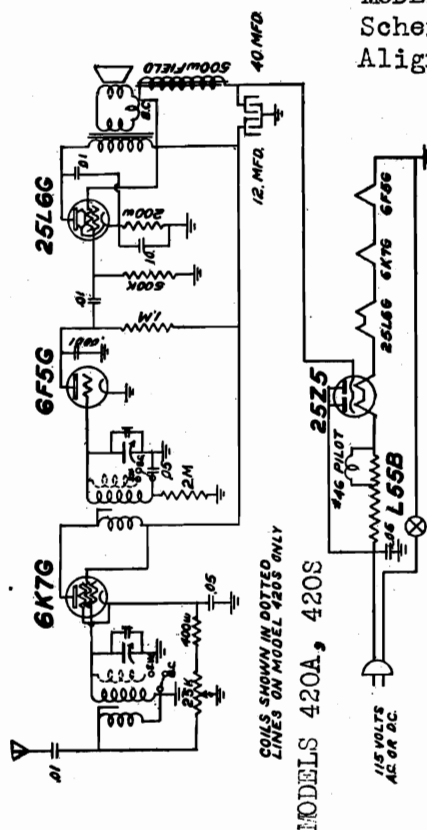
TRAV-LER RADIO & TELEVISION CORP.

MODELS 420A, 420S
MODEL 436M
MODEL 437M
MODEL 455L
Schematics
Alignment

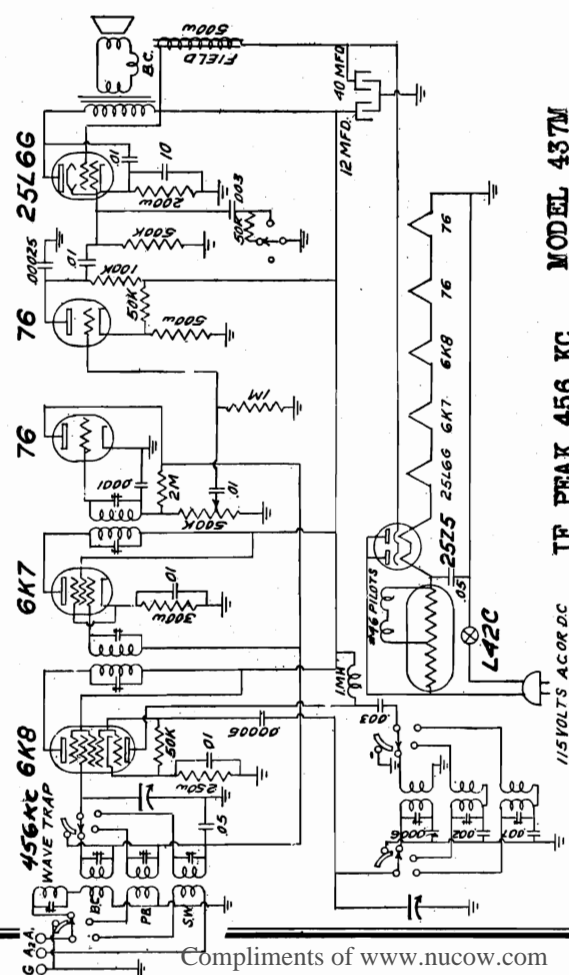
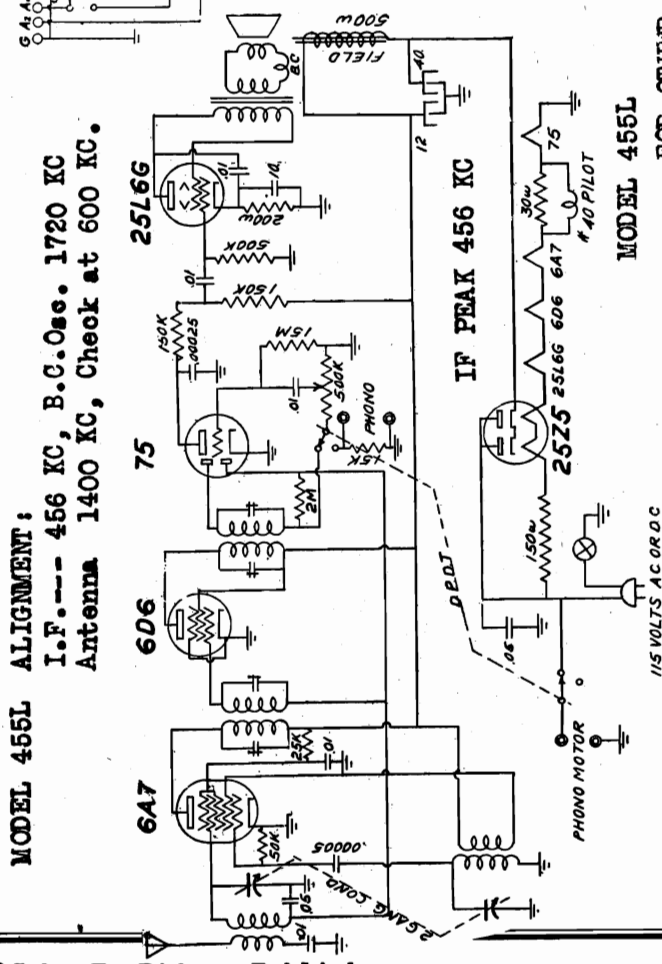
MODEL 420A (1 BAND)	MODEL 420S 2 BAND)
ALIGNMENT:	ALIGNMENT:
R.F. Trimmer---1730 KC	R.F. Trimmer--- 1560 KC
Ant. Trimmer---1400 KC	Ant. Trimmer--- 1400 KC
Check at 600 KC.	SW Band--No adjustment.



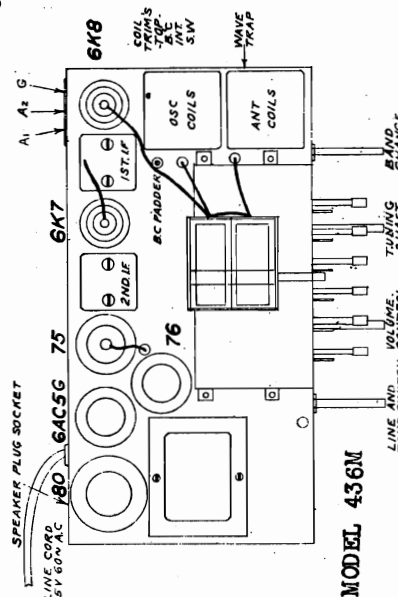
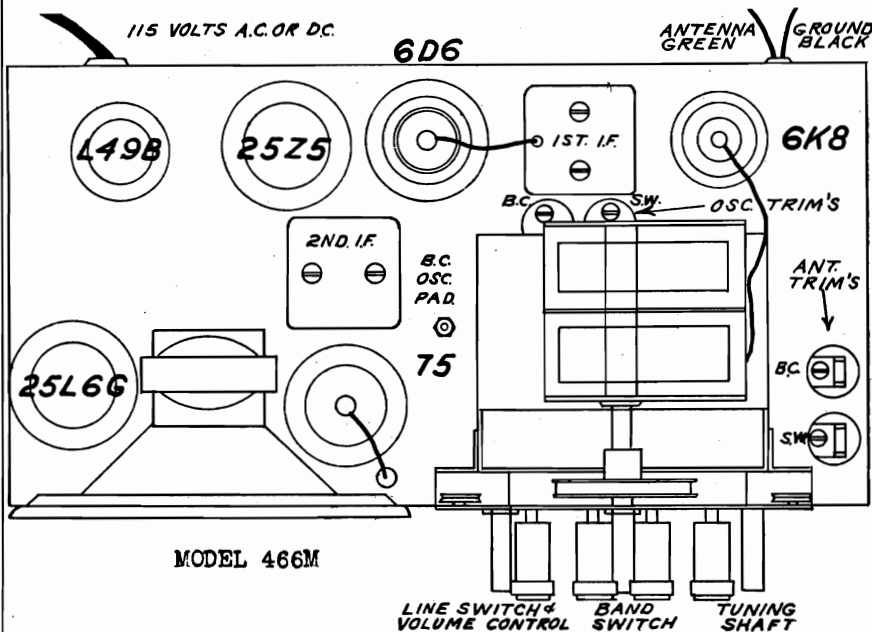
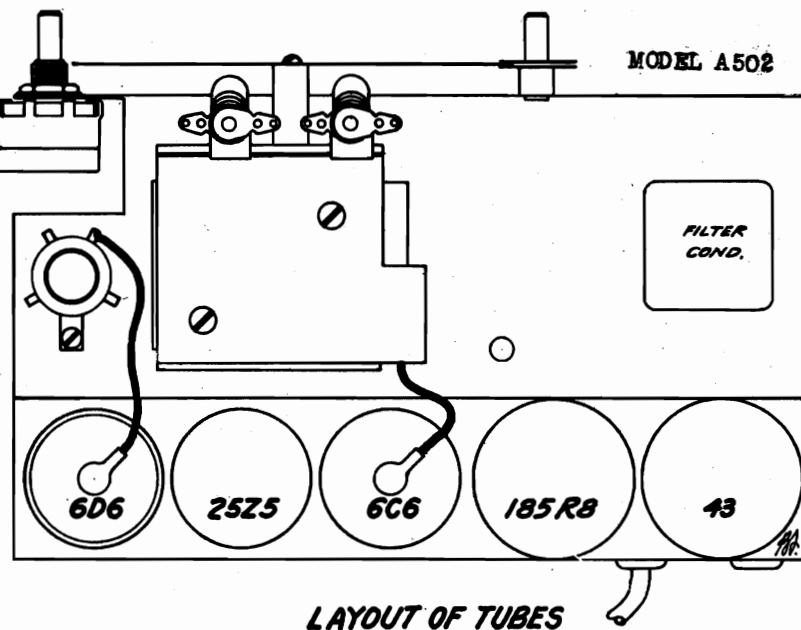
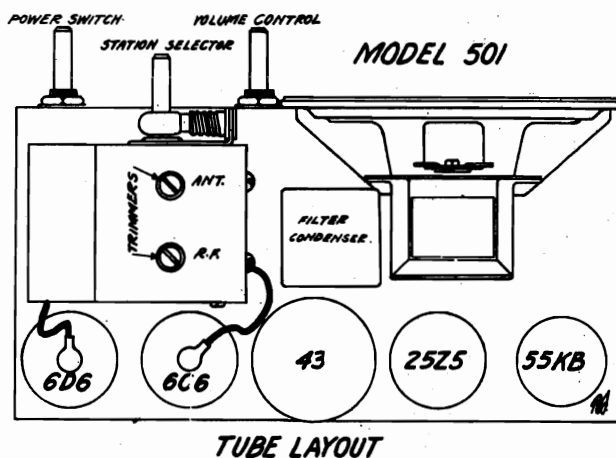
FOR OTHER DATA, SEE INDEX.



MODELS 420A, 420S
COILS SHOWN IN DOTTED
LINES ON MODEL 420S ONLY

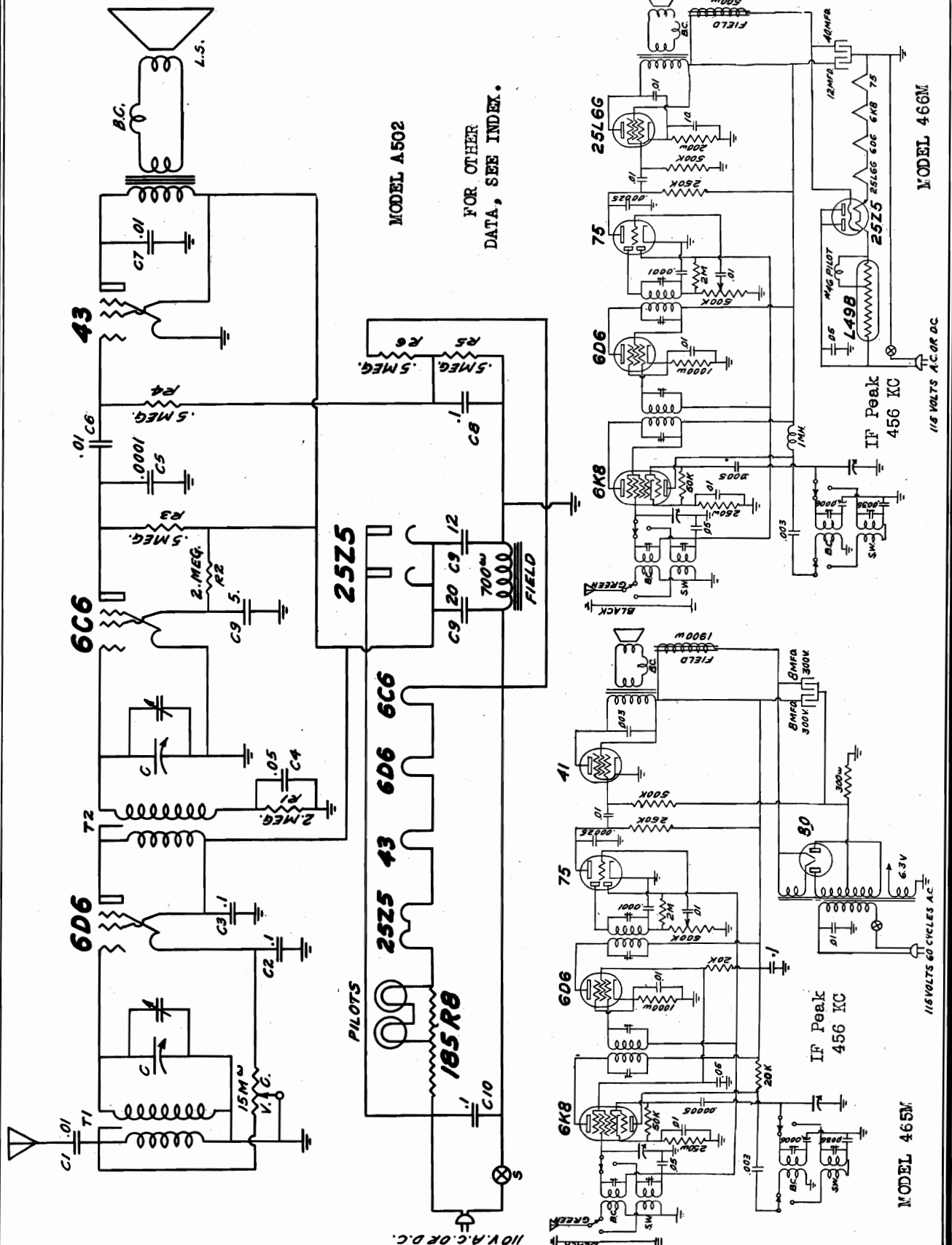


MODELS 420A, 420S
MODEL 436M
MODEL 455L
MODEL 466M



TRAV-LER RADIO & TELEVISION CORP.

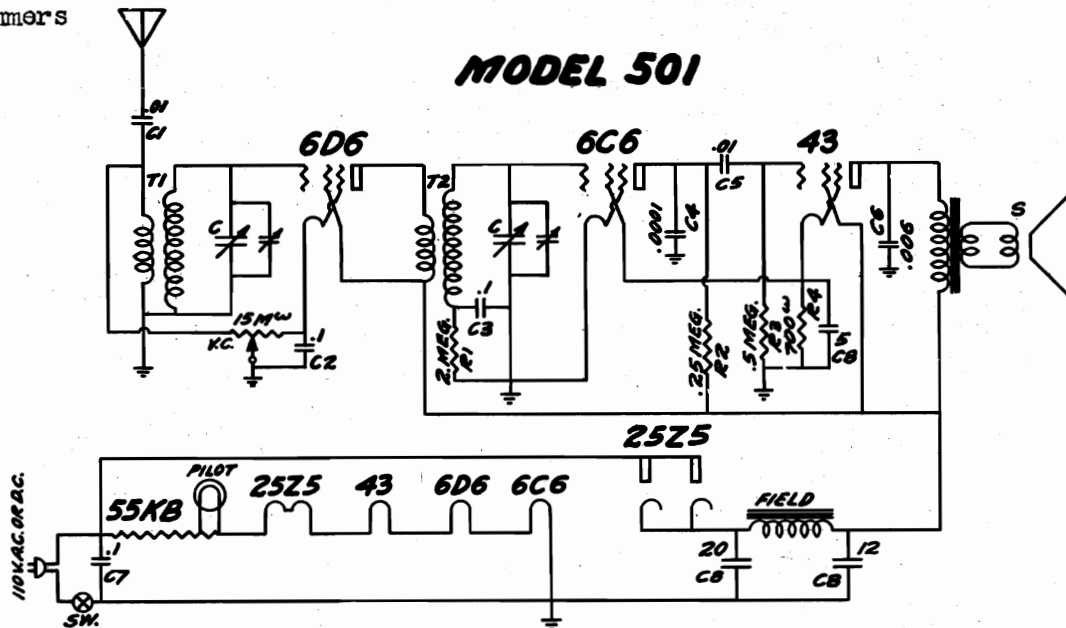
MODEL 465M
MODEL 466M
MODEL A502
Schematics



MODEL 501
Schematic
MODEL 645E
Schematic, Socket
Trimmers

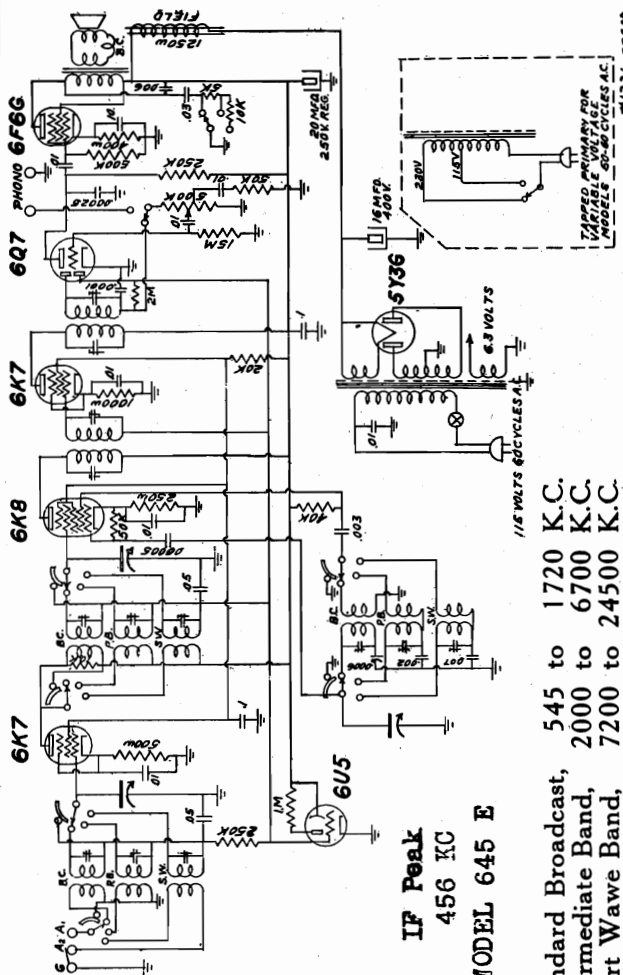
TRAV-LER RADIO & TELEVISION CORP.

MODEL 501



SUPPLY VOLTAGE

This receiver operates from any 110 volt light socket of any frequency AC or straight DC. When operating on a DC socket, the plug may have to be reversed in the socket to obtain the correct polarity, as it will work only in one position on DC current.

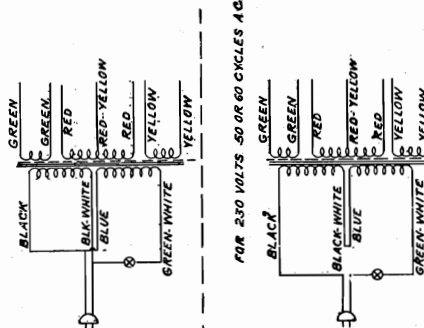


IF Peak
456 KC
MODEL 645 E

Standard Broadcast, 545 to 1720 K.C.
Intermediate Band, 2000 to 6700 K.C.
Short Wave Band, 7200 to 24500 K.C.

FOR OTHER DATA, SEE INDEX

WIRING DIAGRAM FOR MODEL 645E
UNIVERSAL POWER TRANSFORMER
FOR 115 VOLTS 50 OR 60 CYCLES AC



MODEL 645 E

CURRENT SUPPLY

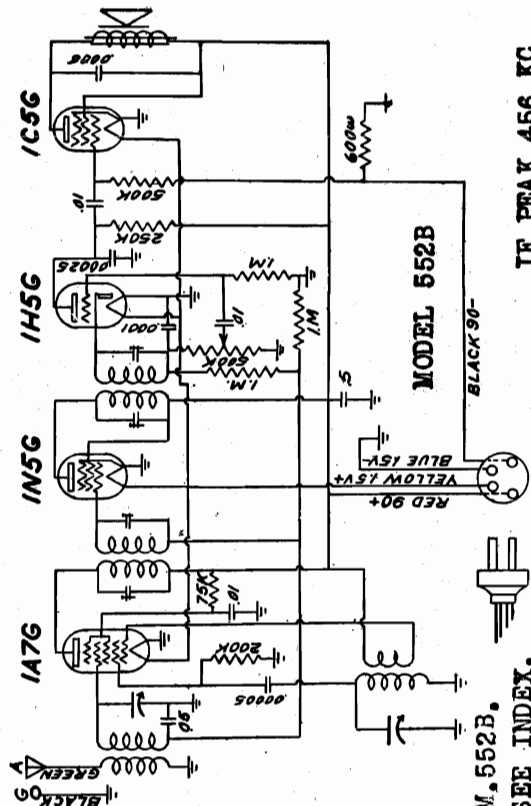
The current supply switch at the rear of the chassis must be set to 115 or 230 volts to correspond to the available current and should never be changed while that current is being used! Be absolutely sure this switch is set right before you plug in the radio. If it is set for 115 volts and 230 volts is used, the transformer will burn out.

Schematics
Alignment

TRAV-LER RADIO & TELEVISION CORP.

MODEL 536M
MODEL 539M
MODEL 552B

ALIGNMENT: MODELS 536M, 539M, 552B.
I.F. TRIMMERS----- 456 KC.
B.C. OSC. TRIMMERS---1720 KC.
ANT. TRIMMERS---1400 KC.
CHECK ALIGNMENT AT 600 KC.



IF PEAK 456 KC

MODELS 536M, 539M, 552B.
FOR OTHER DATA, SEE INDEX.

SUBSTITUTE POWER SUPPLY FOR ABOVE RECEIVER

THIS RADIO IS DESIGNED TO OPERATE FROM A SINGLE, COMMON, PLUG-IN UNIT

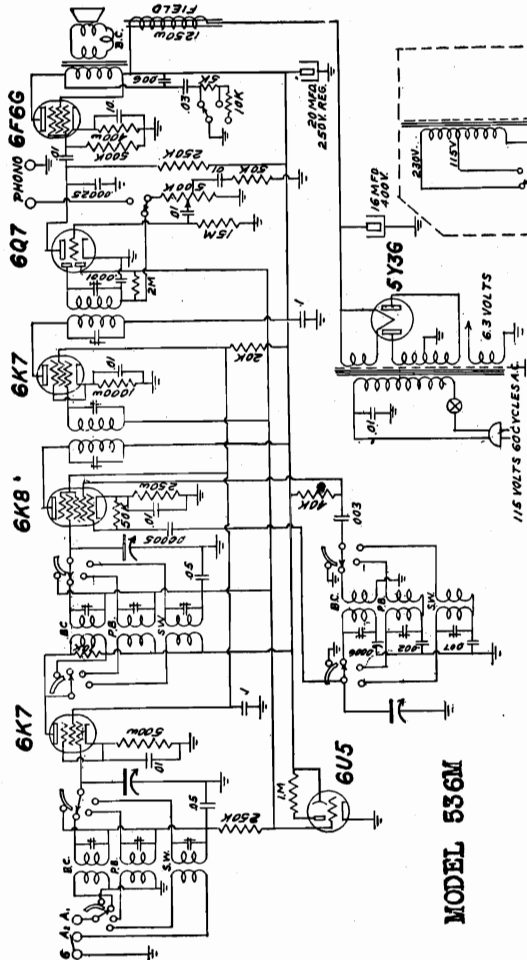
SUBSTITUTES MAY BE USED

FOR 'A' BATTERIES, SINGLE 15 VOLT CELLS

OR SEVERAL 1.5 VOLT CELLS MAY BE USED IN PARALLEL CONNECTION.

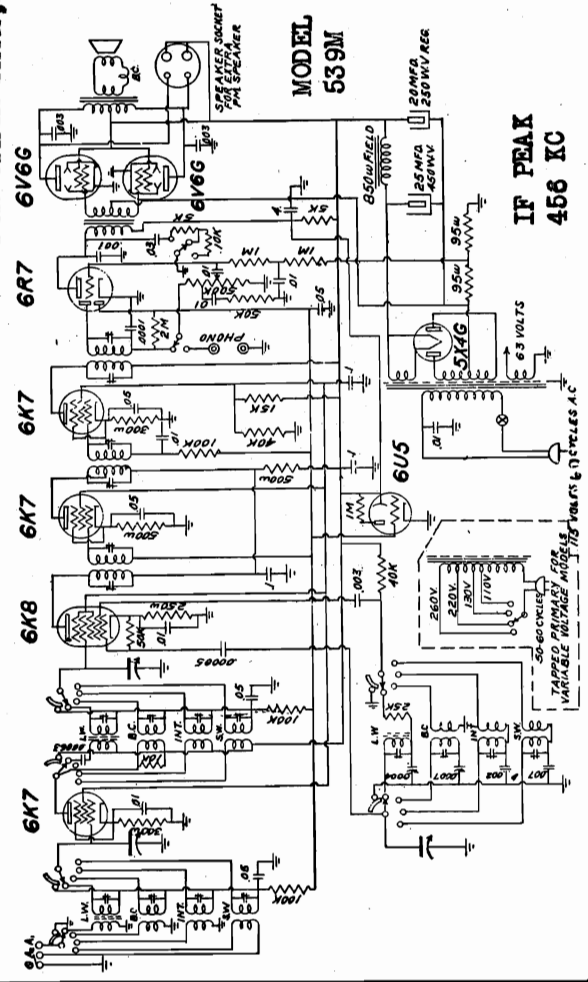
FOR 'B' BATTERIES, TWO 45 VOLT UNITS MAY BE USED, CONNECTED IN SERIES.

MODEL 552B



IF PEAK 456 KC

MODELS 536M, 539M, 552B.
FOR OTHER DATA, SEE INDEX.



IF PEAK 456 KC

MODEL 6-Tube Auto
Voltage, Socket
Trimmers, Alignment
MODELS 6-, 8-Tube Batt.
or A-C Sets

TRAV-LER RADIO & TELEVISION CORP.

MODELS 436M, 437M
MODELS 465M, 466M
Alignment, Tuner

MODEL 536M
MODEL 645E
MODEL 539M
Alignment
MODELS 425, 426
Tuner Data

ALIGNMENT: 8 TUBE BATTERY OR A.C. and MODEL 539M.

I. F. ALIGNMENT

From a good signal generator, connect the proper leads, one to the radio chassis, the other thru a .1 mfd. condenser to the grid cap of the 6K8 with the set's grid lead still in place. Set the radio dial to 1720 K.C. and the signal generator to 456 K.C. With the set's volume control full on, increase the generator output until the signal is heard in the radio speaker. Adjust the I.F. trimmers for maximum output, starting with the third I.F. and working back. Decrease the generator output as the speaker output increases.

LONG WAVE ALIGNMENT

Connect the signal generator lead thru a .0002 mfd. condenser as dummy antenna, to terminal "A1," with the metal strip connected across A2 and G. Set the dial and generator to 362 K.C. and adjust the L.W. oscillator trimmer for maximum output. Align the L.W. RF and ANT trimmers at 320 K.C. Align the L.W. oscillator pad for maximum output at 200 K.C. by adjusting the dial and padder together. Check the alignment again at 320 K.C.

BROADCAST BAND ALIGNMENT

Using the .0002 mfd. condenser as dummy antenna, adjust the B.C. oscillator trimmer at 1720 K.C. Align the RF and ANT trimmers at 1400 K.C. Align the B.C. oscillator padder at 600 K.C. by adjusting the dial and padder together. Check the alignment again at 1400 K.C.

INTERMEDIATE BAND ALIGNMENT

Using a 400 ohm resistor as dummy antenna, adjust the Intermediate Band oscillator trimmer at 6.7 M.C. and the R.F. and Antenna trimmers at 6 M.C. Check for alignment at 2.2 M.C.

SHORT WAVE BAND ALIGNMENT

Using the 400 ohm resistor as dummy antenna, adjust the S.W. oscillator trimmer at 24.5 M.C., and the R.F. and Antenna trimmers at 22 M.C. Check for alignment at 8 M.C.

NOTICE

If a Standard All Wave dummy Antenna is available, it should be used in place of the .0002 mfd. condenser, and the 400 ohm resistor. On all bands the oscillator trimmers are adjusted with the variable condenser full open.

ALIGNMENT: MODELS 6Tube Battery or A.C., 437M, 436M, 466M, 465M, 536M, and 645E.

NOTE: No intermediate band on Models 465M and 466M.

I.F. From a good signal generator, connect the proper leads, one to the radio chassis, the other thru a .1 mfd. condenser to the grid cap of the 6K8 with the set's grid lead still in place. Set the radio dial to 1720 K.C. and the signal generator to 456 K.C. With the set's volume control full on, increase the generator output until the signal is heard in the radio speaker. Adjust the I.F. trimmers for maximum output, decreasing the generator output as the speaker output increases.

B.C.1. Connect the signal generator lead thru a .0002 mfd. condenser as dummy antenna to the "A1" terminal, with the metal strip connected across A2 and G. Set the signal generator and radio dial to 1720 K.C. and adjust the B.C. oscillator trimmer for maximum output.

2. Set the signal generator and radio dial to 1400 K.C. and adjust the B.C. R.F. and ANT. trimmers for maximum output.

3. Set the signal generator to 600 K.C. and the radio dial to approximately 600 K.C., and adjust the B.C. oscillator padder for maximum output by adjusting dial and pad together.

Check the alignment again at 1400 K.C.

INT. Connect the signal generator lead thru a 400 ohm resistor as dummy antenna to A1. Set the dial and generator to 6700 K.C. and adjust the P.B. oscillator trimmer until signal is picked up. Adjust the R.F. and ANT. trimmers at 6000 K.C. and check for alignment at 2200 K.C.

S.W. Still using the 400 ohm resistor as dummy antenna, adjust the S.W. oscillator trimmer at 24.5 M.C. on dial and generator. Adjust the R.F. and ANT. trimmers at 22 M.C. and check for alignment at 8 M.C.

ALIGNMENT: 6 TUBE AUTO RADIO

1. Set variable condenser with rotor plates in open position. Set signal generator to 1620 kc., connect generator lead to grid cap of 6A7 using a .1 mfd. condenser as a dummy antenna. Adjust IF trimmers for maximum output, reducing signal generator output as signal increases.
2. Set signal generator to 1620 kc., connecting generator lead to antenna lead on set using a .00025 condenser as dummy antenna. Rotate oscillator trimmer until signal is picked up. Set generator at 1400 kc., pick up signal by rotating variable condenser then adjust RF and antenna trimmers for maximum signal, reducing generator output as speaker signal increases. Set signal generator to 600 kc., rotate variable condenser to pick up signal then adjust for maximum sensitivity by rotating oscillator padder while rotating variable condenser.
3. Recheck alignment adjustments at 1620 and 1400 kc.

PUSH BUTTONS: MODELS 6 and 8 Tube Battery or A.C., 425, 426, 436M, 437M, 465M and 466M.

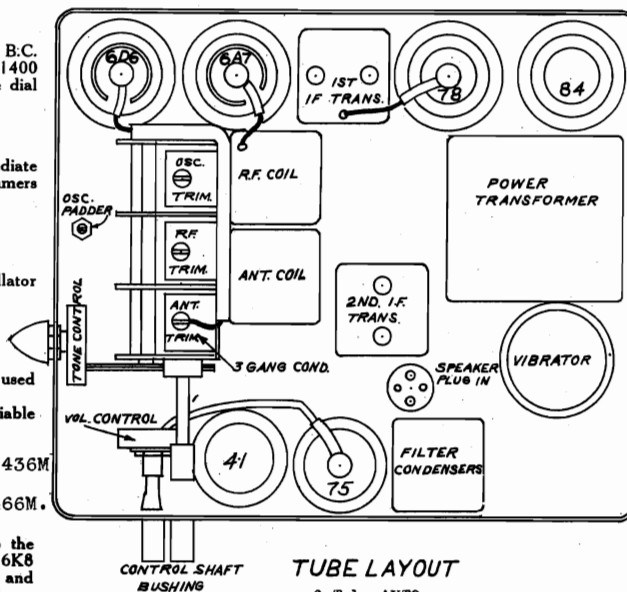
Six Push Button Station Selectors are incorporated in this receiver. Each button may be adjusted to select any station or frequency in the Broadcast Band. To adjust each button, perform the following operations:

1. Tune in a desired station with the Selector knob, watching the eye for the narrowest shadow.
2. Twist the Push button you want set up for this station, to the left about one full turn to loosen the mechanism.
3. Push this Push Button in as far as it will go, while holding the Selector knob firmly so the station will not be detuned.
4. With the Push Button pressed all the way in, twist it to the right until it is tight, and then release it.

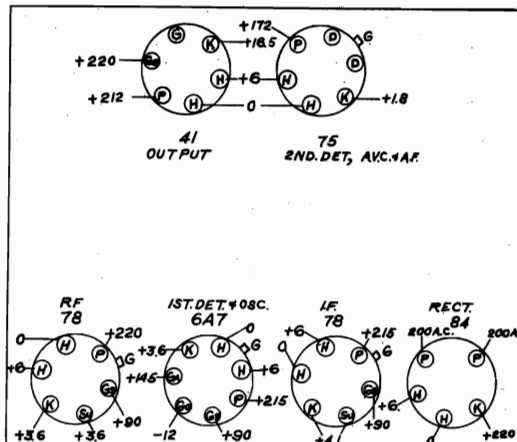
Follow this procedure with the other five Push Buttons, setting each for a different station.

Now, when any button is pushed, the station for which that button is set should become perfectly tuned in. If it is not tuned in perfectly, repeat the above procedure until satisfactory results are obtained.

Select the Call Letter Tabs to correspond to the stations the Push Buttons are set up for, and insert them in the places provided above each button.



VOLTAGE DATA 6 TUBE AUTO RADIO

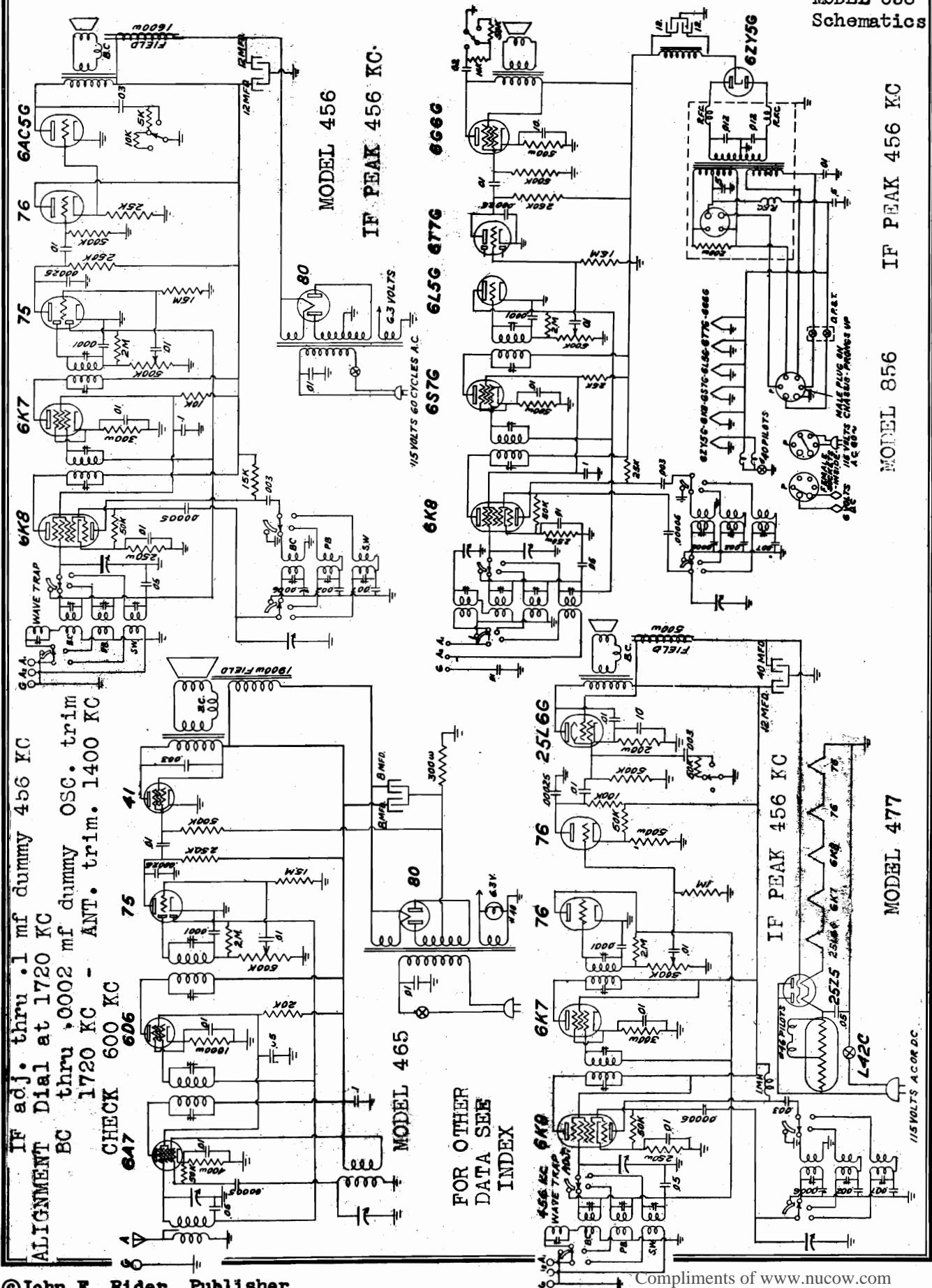


Bottom view of 6-tube auto set showing socket positions and voltages from socket terminals to ground. All voltage measurements taken with volume control at maximum and with no signal applied. Use volt-meter of 1000 ohms per volt.

MODEL 465
Schematic, Alignment

ULTRAMAR MFG. CORP.

MODEL 456
MODEL 477
MODEL 856
Schematics

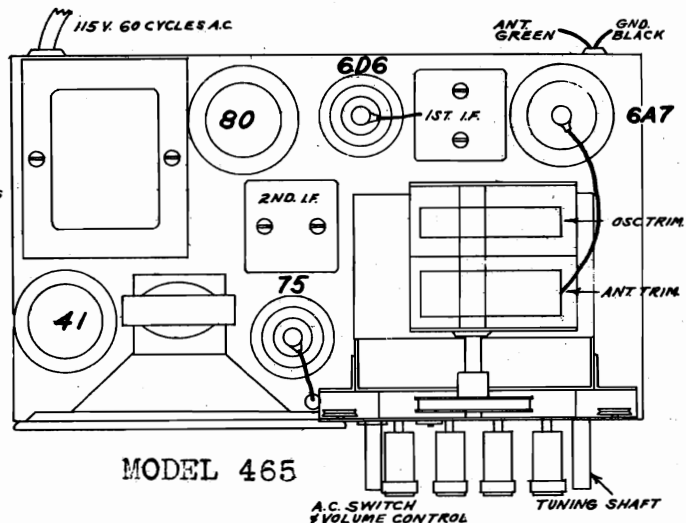
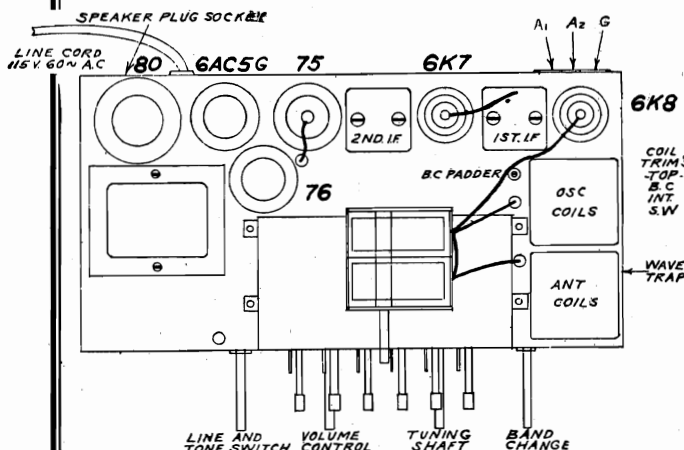


MODEL 456
MODEL 465
MODEL 477

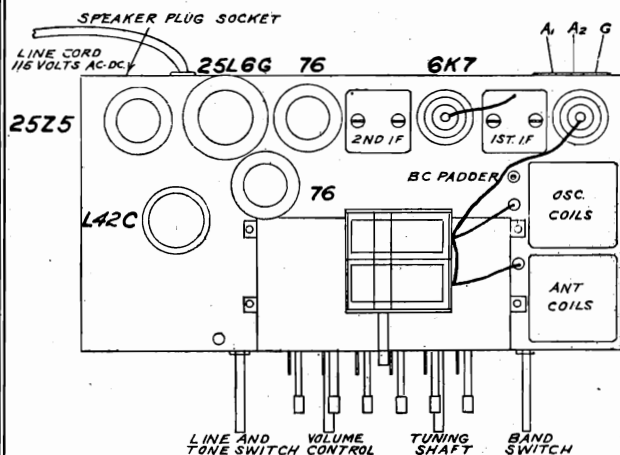
ULTRAMAR MFG. CORP.

MODEL 856
MODEL 877
MODEL 889
Socket, Trimmers

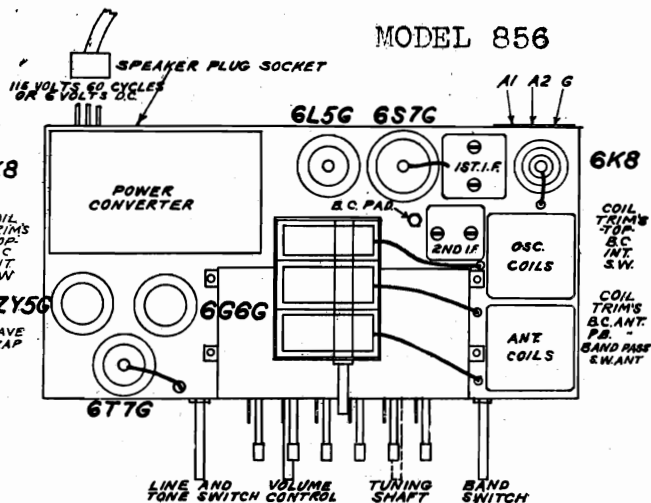
MODEL 456



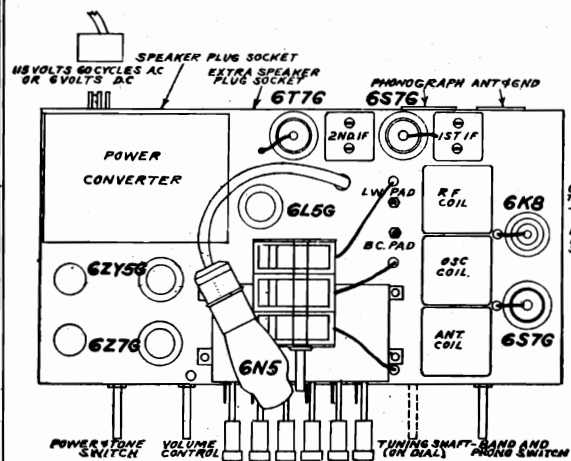
MODEL 477



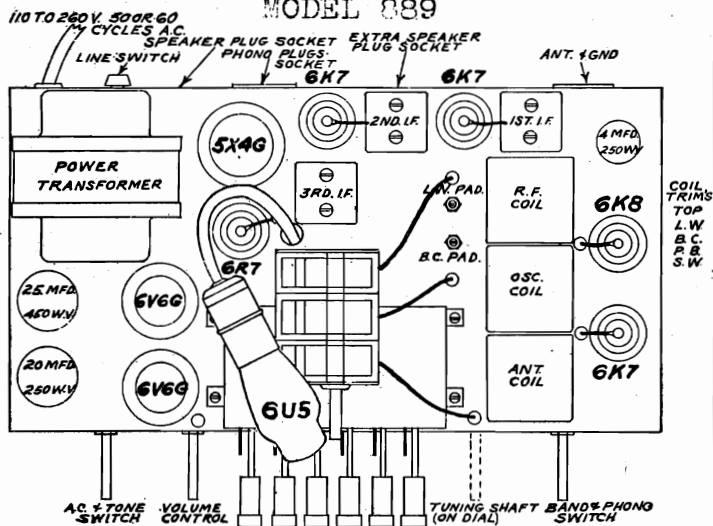
MODEL 856



MODEL 877



MODEL 889

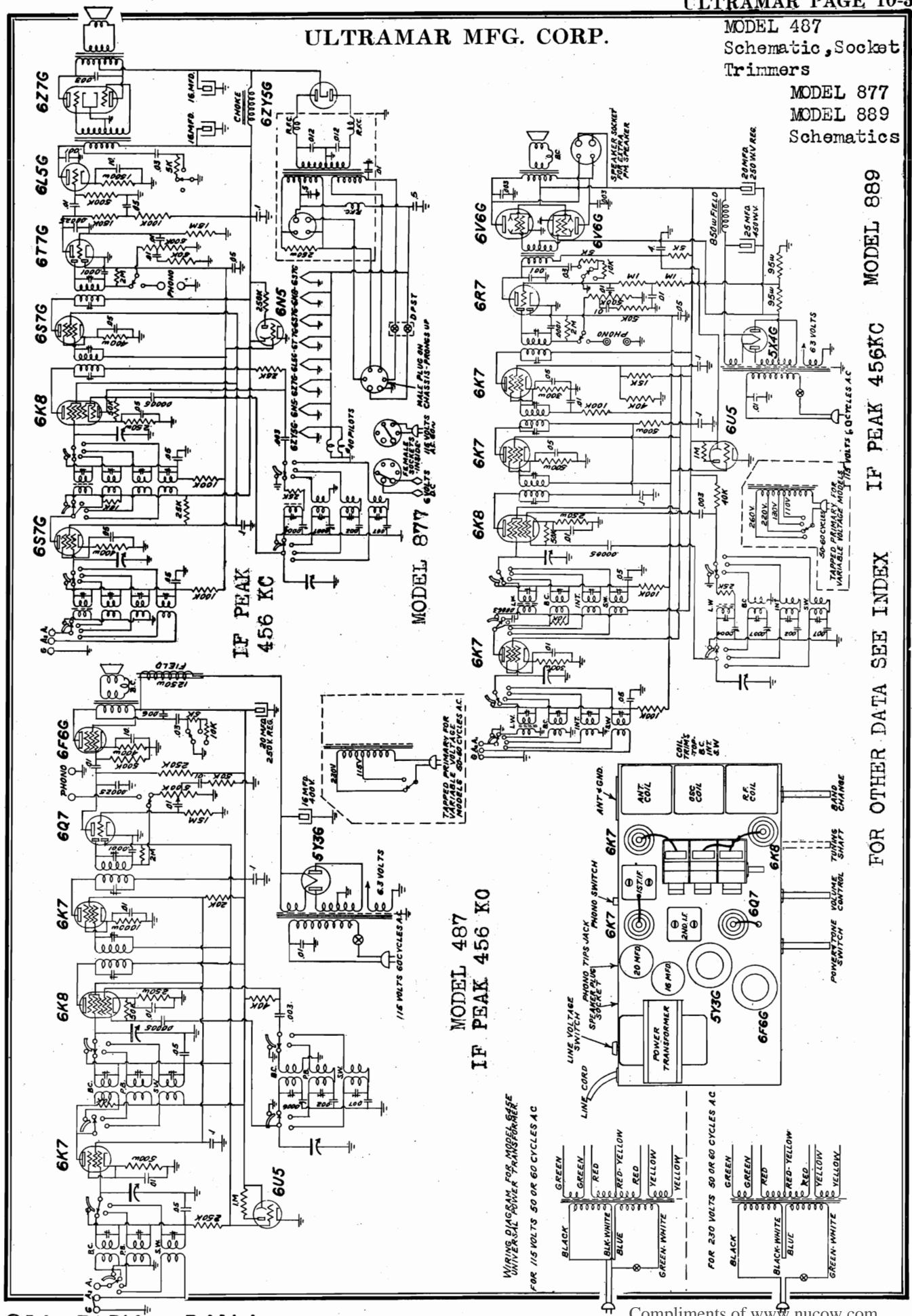


MODEL 877
MODEL 889
Schematics

MODEL 889

IF PEA 456KC

FOR OTHER DATA SEE INDEX



MODELS 306, 316

Schematic, Socket

Trimmers, Alignment

MODEL 487 MODEL 465

Alignment Tuner Data

ULTRAMAR MFG. CORP.

MODEL 456 MODEL 477

MODEL 856 MODEL 877

MODEL 889

Alignment, Tuner

MODELS 877 & 889

TECHNICAL INSTRUCTIONS

A good output meter should be used in all alignment adjustments.

I. F. ALIGNMENT

From a good signal generator, connect the proper leads, one to the radio chassis, and the other thru a .1 mfd. condenser to the grid cap of the 6K8, with the tube's grid lead still in place. Set the radio dial to 1720 K.C. and the signal generator to 456 K.C. With the set's volume control full on, increase the generator output until the signal is heard in the radio speaker. Adjust the I. F. trimmers for maximum output, decreasing the generator output as the radio output increases.

LONG WAVE ALIGNMENT

Connect the signal generator lead thru a .0002 mfd. condenser as dummy antenna, to the "A" terminal, with the metal strip connected across A and G. Set the dial and generator to 362 K. C. and adjust the oscillator trimmer for maximum output. Align the L.W., R.F. and antenna trimmers at 320 K.C.

Align the L.W. oscillator padder at 200 K.C. by adjusting the dial and padder together. Check the alignment again at 320 K.C.

BROADCAST BAND ALIGNMENT

Using the .0002 mfd. condenser as dummy antenna, adjust the B.C. oscillator trimmer at 1720 K.C. for maximum output. Align the R.F. and antenna trimmers at 1400 K.C. Align the B.C. oscillator padder at 600 K.C. by adjusting the dial and padder together. Check the alignment again at 1400 K.C.

INTERMEDIATE BAND ALIGNMENT

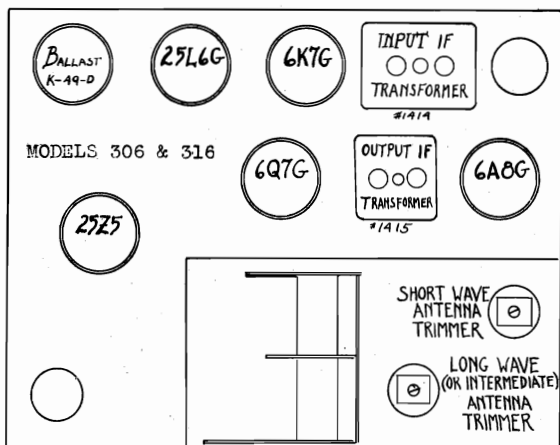
Using a 400 ohm resistor as dummy antenna, adjust the Intermediate Band oscillator trimmer at 6.7 M.C. and the R.F. and Antenna trimmers at 6 M.C.

Check for alignment at 2.2 M.C.

SHORT WAVE BAND ALIGNMENT

Using the 400 ohm resistor as dummy antenna, adjust the S.W. oscillator trimmer at 24.5 M.C., and the R.F. and Antenna trimmers at 22 M.C.

Check for alignment at 8 M.C.



MODELS 487, 456, 477, & 856

TECHNICAL INSTRUCTIONS

A good output meter should be used in all alignment adjustments

I. F. ALIGNMENT

From a good signal generator connect the proper leads, one to the radio chassis, the other thru a .1 mfd. condenser to the grid cap of the 6K8, with the set's grid lead still in place. Set the radio dial to 1720 kilocycles and the signal generator to 456 K.C. With the set's volume control "full on," increase the generator output until the signal is heard in the radio speaker. Adjust I. F. trimmers for maximum output, decreasing the generator output as the speaker output increases.

B. C. ALIGNMENT

1. Connect the signal generator lead thru a .0002 mfd. condenser as dummy antenna to the "A1" terminal, with the metal strip connected across A2 and G. Set the signal generator and radio dial to 1720 K.C. and adjust the B.C. oscillator trimmer for maximum output.

2. Set the signal generator and radio dial to 1400 K.C. and adjust the B.C. R.F. and ANT. trimmers for maximum output.

3. Set the signal generator to 600 K.C. and the radio dial to approximately 600 K.C., and adjust the B.C. oscillator padder for maximum output by adjusting dial and pad together.

Check the alignment again at 1400 K.C.

INTERMEDIATE BAND ALIGNMENT

Connect the signal generator lead thru a 400 ohm resistor as dummy antenna to A1. Set the dial and generator to 6700 K.C. and adjust the P.B. oscillator trimmer for maximum output. Adjust the R.F. and ANT. trimmers at 6000 K.C. and check for alignment at 2200 K.C.

SHORT WAVE ALIGNMENT

Still using the 400 ohm resistor as dummy antenna, adjust the S.W. oscillator trimmer at 24.5 M.C. on dial and generator. Adjust the R.F. and ANT. trimmers at 22 M.C. and check for alignment at 8 M.C.

MODELS 456, 465, 477, 856, 877 & 889

PUSH BUTTON OPERATION

Six Push Button Station Selectors are incorporated in this receiver. Each button may be adjusted to select any station or frequency in the Broadcast Band. To adjust each button, perform the following operations:

1. Tune in a desired station with the Selector knob.

2. Twist the Push Button you want set up for this station, to the left about one full turn to loosen the mechanism.

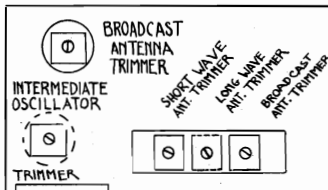
3. Push this button in as far as it will go, while still holding the Selector knob firmly so the station will not be detuned.

4. With the button pressed all the way in, twist it to the right until it is tight and then release it.

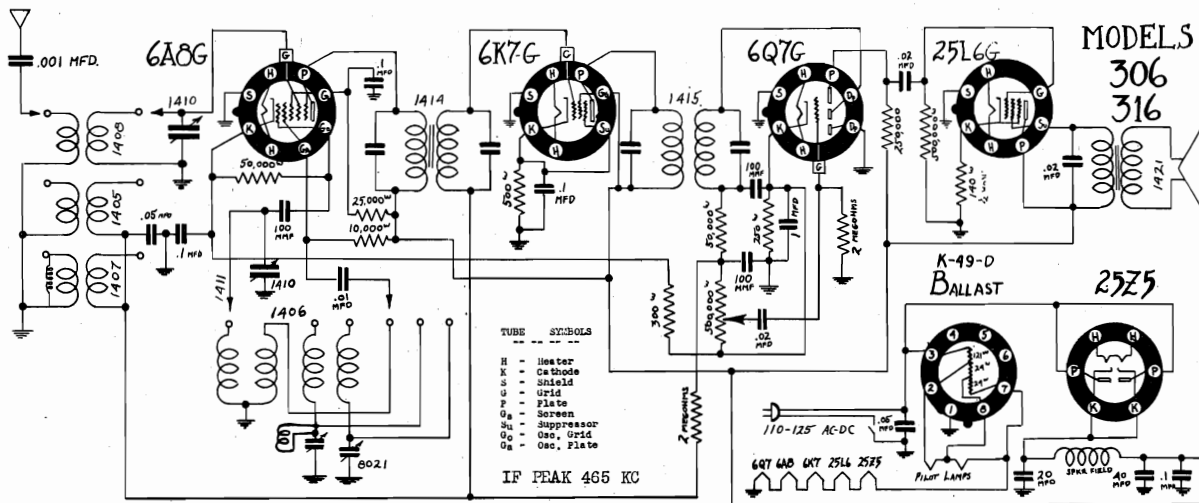
Follow this procedure with the other five buttons, setting each for a different station.

Now, when any Push Button is pressed, the station for which that button is set, should appear perfectly tuned in. If it is not perfectly tuned, repeat the above procedure until satisfactory results are obtained.

Select the Call Letter Tabs to correspond to the stations the buttons are set for, and insert them in places provided above each button.



ALIGNMENT
ALIGN IF TRANSFORMERS AT 465 KILOCYCLES.
ALIGN BAND B AT 1400 KC. (214 METERS) - BY ADJUSTING BC ANTENNA AND BC OSCILLATOR TRIMMERS. ADJUST BC PADDER AT 500 METERS.
ALIGN BAND A AT 60 METERS BY ADJUSTING SW ANTENNA AND SW OSCILLATOR TRIMMERS.
ALIGN BAND C FOR MODEL 306 AT 5 MEGACYCLES BY ADJUSTING INTERMEDIATE ANTENNA AND OSCILLATOR TRIMMERS FOR MAXIMUM RESPONSE.
ALIGN BAND C FOR MODEL 316 AT 900 METERS BY ADJUSTING LW ANTENNA AND OSCILLATOR TRIMMERS. ADJUST LW PADDER AT 1800 METERS.
MAKE ALL ADJUSTMENTS FOR MAXIMUM RESPONSE ON OUTPUT METER---USING SIGNAL GENERATOR.



MODELS 306 316



MODEL R663 Delco
Socket, Trimmers
Alignment, Chassis

UNITED MOTORS SERVICE, INC.

MODELS R664 to R669
Alignment

(c) Repeat adjustments made under "Aligning at 1400 K.C."

5. Checking I-F Band Spread

The Model 165 Cathode Ray Oscillograph should be used to check the I-F band spread after completing the "Alignment Procedure". Slight adjustment of the I-F stages may be found necessary in order to obtain a symmetrical selectivity curve. Connect Cathode Ray from connection "I" (Fig. 4) to ground.

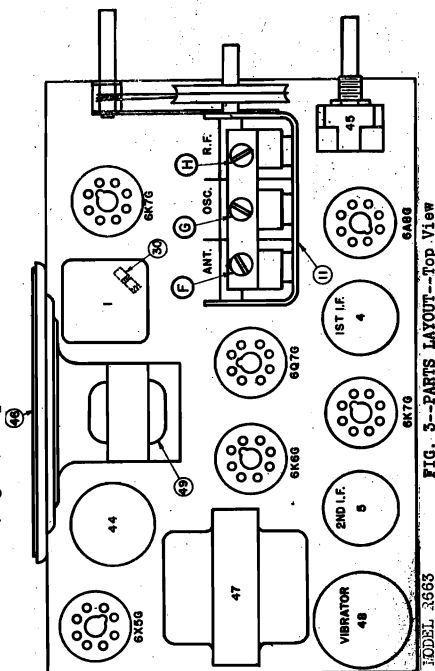


FIG. 3--PARTS LAYOUT--Top View
CONNECT CATHODE RAY AT THIS POINT & AT GRD.

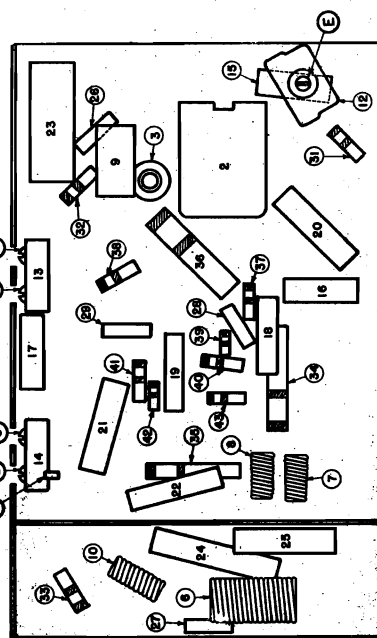


FIG. 4--PARTS LAYOUT--Bottom View

ALIGNMENT FOR MODELS R663, R664, R665, R666, R667, R668, and R669.

NOTE:- FIGURE REFERENCES IN THE TEXT REFER TO FIGURES SHOWN WITH EACH MODEL.

1. Aligning I-F Stages at 262 Kilocycles

- Connect the ground lead of the Signal Generator to the chassis case. Connect the signal lead of the Signal Generator to the grid cap of the 6AG6 tube, through a .1 mfd. condenser, leaving the tube's grid clip in place.
- Connect output meter from plate of 6AG6 (R665, 6, 7) tube to ground.
- Set Signal Generator to exactly 262 kilocycles and turn volume control on full.

- Turn condenser gang to a position where no squeals or beat notes can be noticed, also so that when the tuning condenser is rotated within narrow limits there is no appreciable change in output.

- Adjust trimmers A-B-C-D through the cut outs on the side of the chassis (illus. 13 & 14, Fig. 4) carefully for maximum output.

- Repeat adjustments of I-F trimmers A-B-C-D with as low an output from the Signal Generator as possible, for more accurate alignment.

2. Aligning at 1530 Kilocycles

- Leave Signal Generator leads connected the same as for I-F adjustments.

- Turn tuning condenser plates all the way out and against high frequency stop.

- Set Signal Generator to exactly 1530 kilocycles and adjust oscillator trimmer "G" (Fig. 3) on middle section of condenser gang carefully for maximum output.

3. Aligning at 1400 Kilocycles

- Remove signal lead of Signal Generator from grid cap of 6AG6 tube and connect to antenna terminal of receiver through a .0002 mfd. mica condenser.

- Set the Signal Generator to 1400 kilocycles and tune the receiver to this signal.

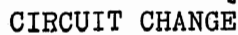
- Adjust the parallel trimmers "P" and "H" (Fig. 3) of the condenser gang carefully for maximum output. Do not disturb the 1530 kilocycle adjustment of the middle section of the condenser gang.

4. Aligning at 600 Kilocycles

- Set Signal Generator to approximately 600 kilocycles and turn condenser gang plates until this signal is tuned in with maximum output.

- Adjust trimmer "E" on Delco Syncro-Tuning condenser (illus. 12, Fig. 4) located next to antenna receptacle on bottom of chassis, rocking gang condenser plates back and forth through the signal until maximum output is obtained. (It will be necessary to readjust this condenser to the car antenna upon installation of the set.)

*(Model R664, illus. 11, Fig 4)

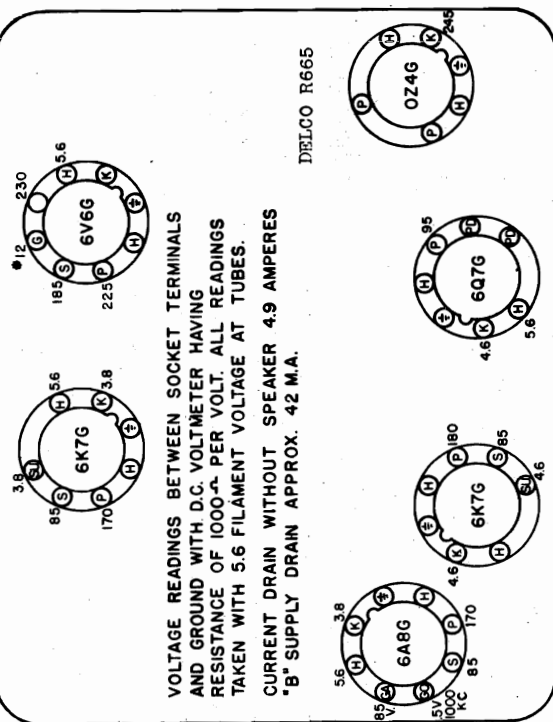


Some sets were made with the 2 mfd. section of the electrolytic omitted (Illus. #52C) and Illus. #58 .05 mfd. 600 volt tubular condenser added. For replacement of electrolytic in these sets clip the green lead of replacement condenser.

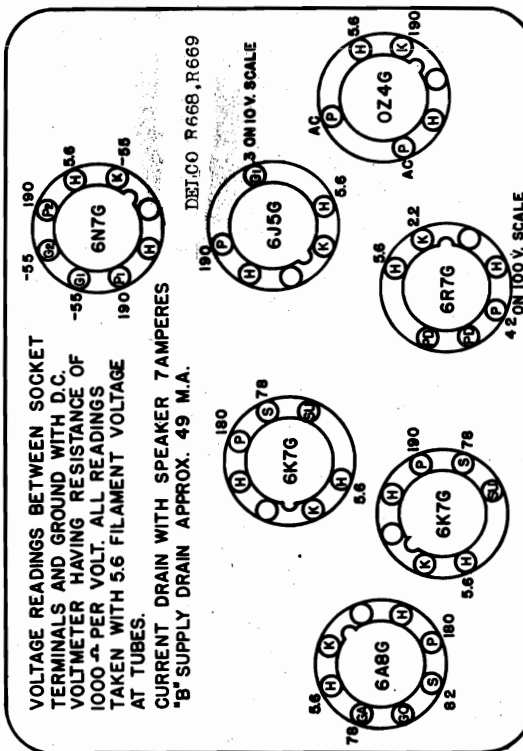
FIG. 2--DELCO MODEL R-664 CIRCUIT DIAGRAM

1-10-38

Voltages

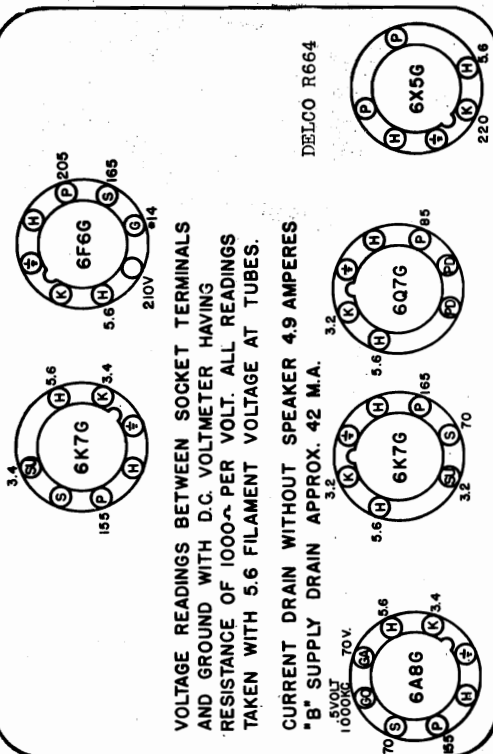


*THIS READING IS TAKEN BETWEEN NEGATIVE SIDE OF 300 OHM RESISTOR (ILLUS.NO. 50) AND GROUND.

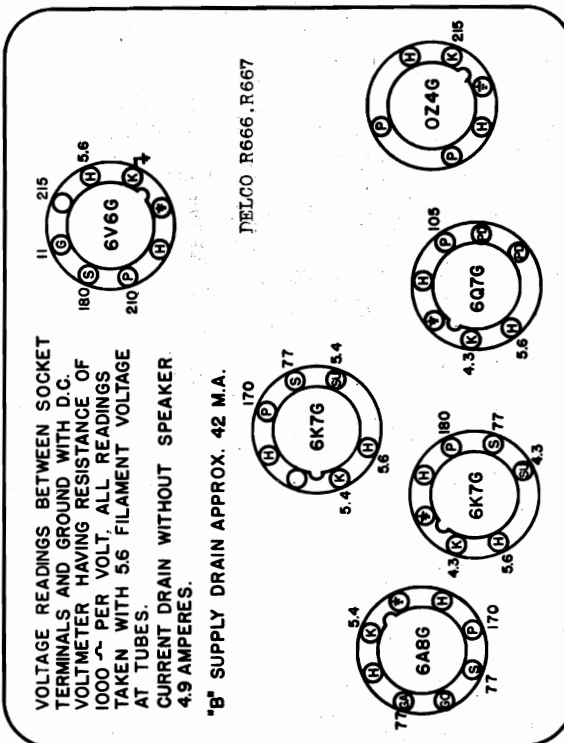


VOLTAGE READINGS BETWEEN SOCKET
TERMINALS AND GROUND WITH D.C.
VOLTMETER HAVING RESISTANCE OF
10000 \pm PER VOLT. ALL READINGS
TAKEN WITH 5.6 FILAMENT VOLTAGE
AT TUBES.

**CURRENT DRAIN WITH SPEAKER 7 AMPERES
"B" SUPPLY DRAIN APPROX. 49 M.A.**



* THIS READING IS TAKEN BETWEEN NEGATIVE SIDE OF 400 OHM RESISTOR (ILLUS. NO.43) AND GROUND.



THIS READING IS TAKEN BETWEEN NEGATIVE SIDE OF 300 OHM RESISTOR (ILLUS. NO. 53) AND GROUND.



MODEL R665 Delco
Schematic

UNITED MOTORS SERVICE, INC.

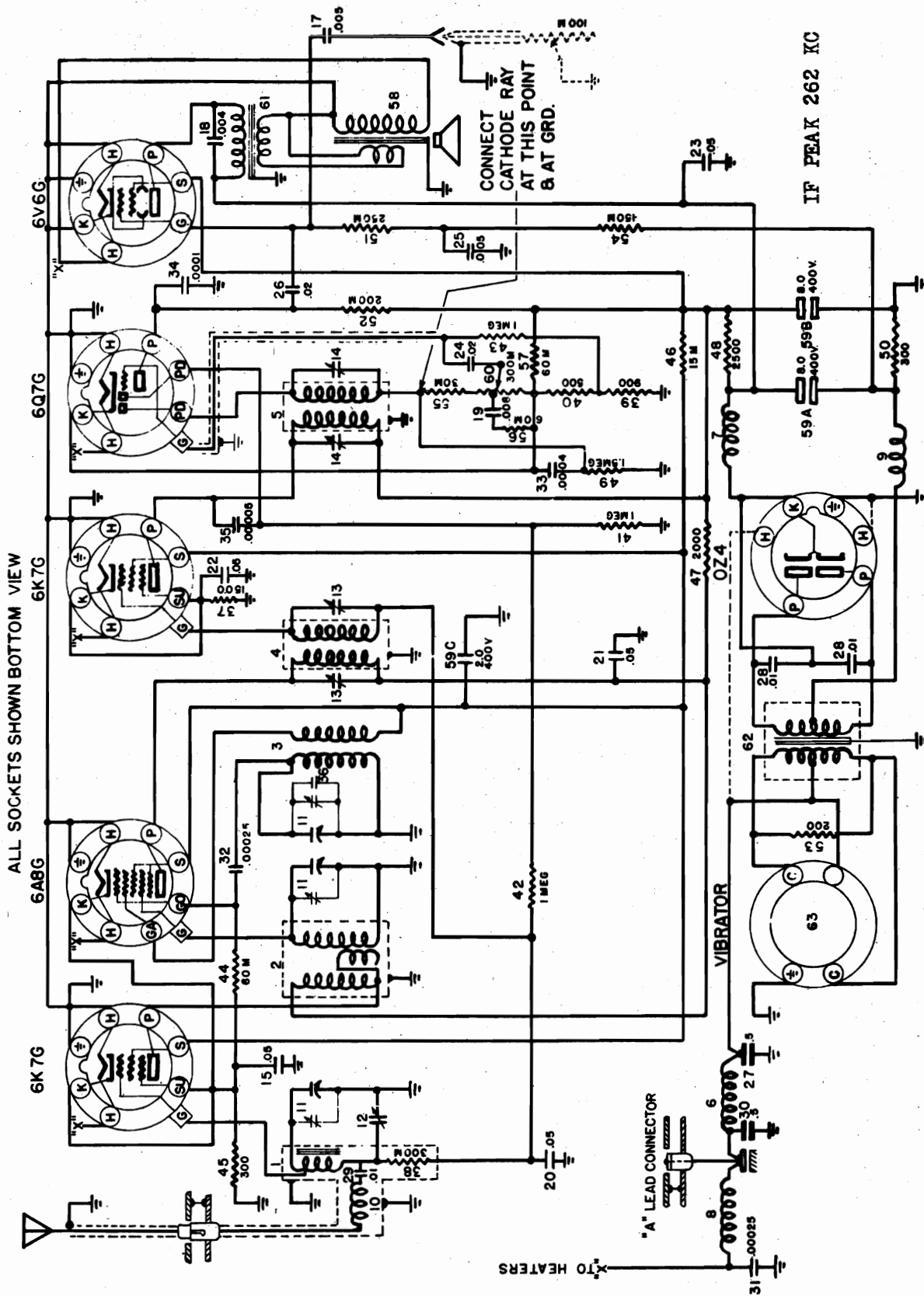
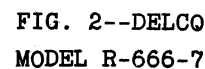


FIG. 2--DELCO MODEL R-665 CIRCUIT DIAGRAM

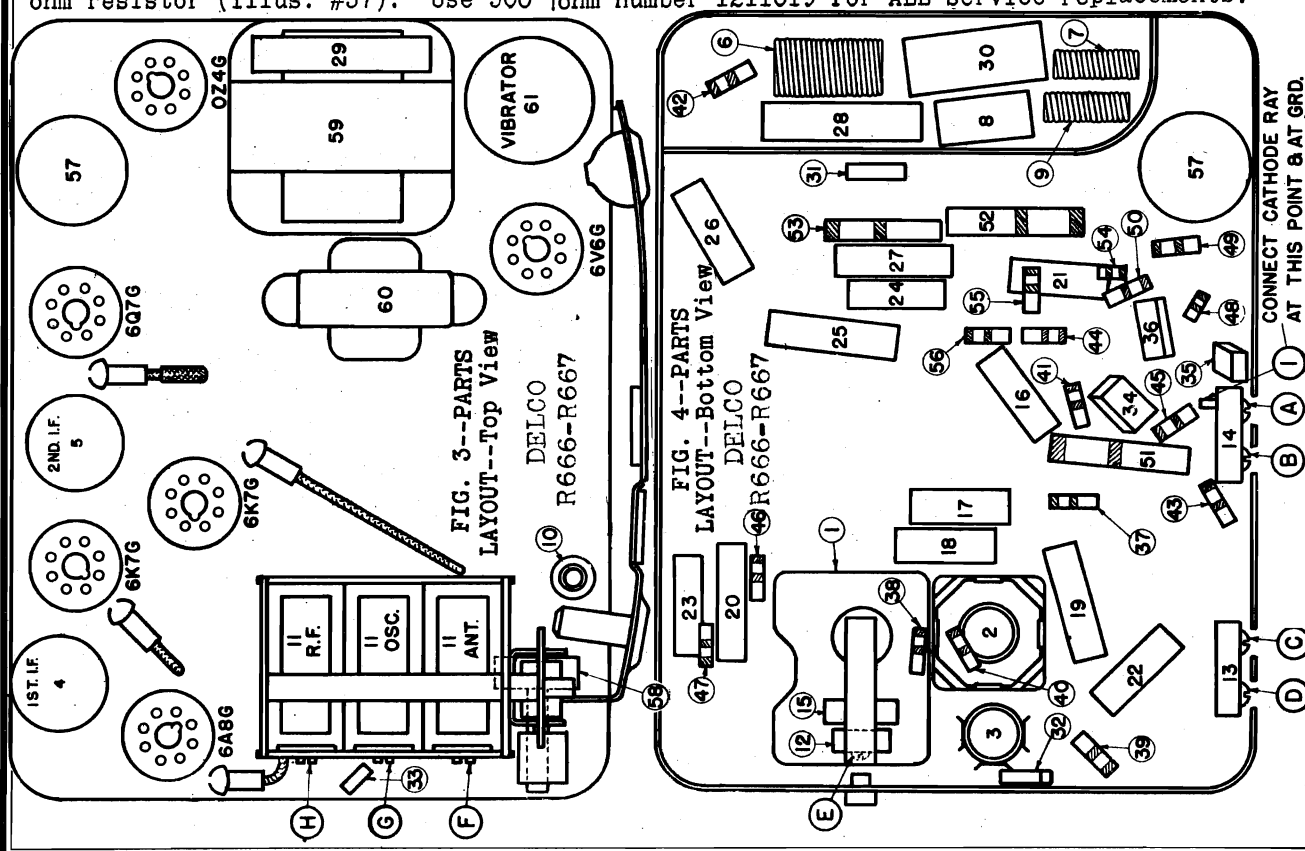
1-10-38

ALL SOCKETS SHOWN BOTTOM VIEW



CIRCUIT CHANGE

Some early sets were made with 300 ohm resistor (Illus. #37). Use 500 ohm number 1211019 for ALL service replacements.



MODELS R667, R669 Delco
Delco-Matic Tuner
Schematic, Parts

UNITED MOTORS SERVICE, INC.

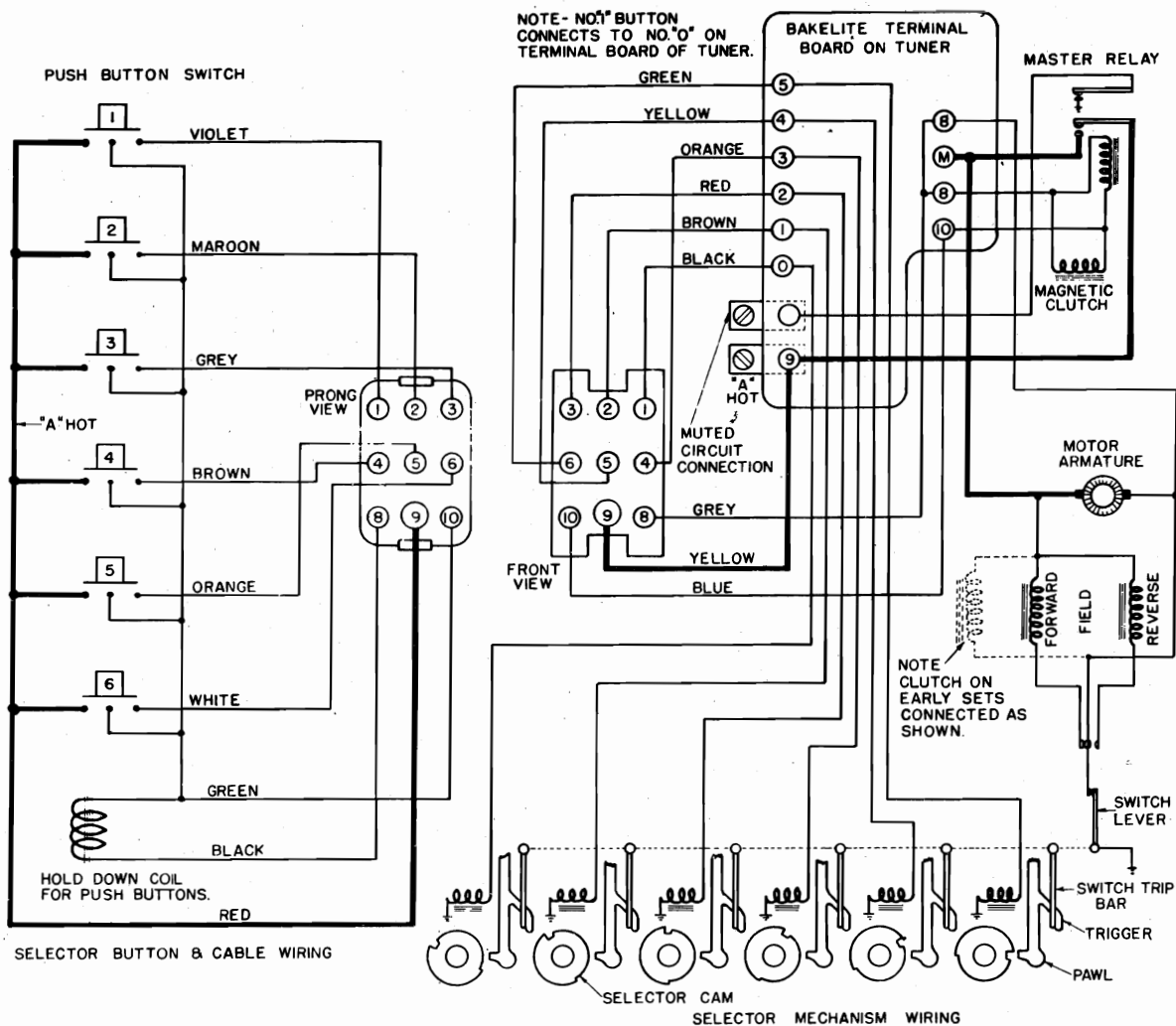


FIG. 1--CIRCUIT DIAGRAM--DELCO-MATIC TUNER

Part No.	Part Name	Description	Part No.	Part Name	Description
*1880010	Switch	Motor reversing	134530	Nut	Pivot screw locking
122159	Screw	Switch mounting	7234957	Gear	Large drive
1880007	Lever	Switch contact assy.	7234768	Washer	Mounting
147460	Screw	Switch lever set screw	7234769	Screw	Mounting
7234714	Bracket	Mounting	7232713	Spacer	Rubber mounting
132892	Screw	Mounting bracket	138530	Washer	#8 int. shakeproof
1880065	Spring	Trip bar	7234745	Shaft	Condenser drive--flex.
7235711	Spring	Pawl	1880122	Control	Push button--complete
1880049	Screw	Long pivot			
1880066	Screw	Short pivot			

* For replacement only on late sets having metal stops between switch contact blades.

UNITED MOTORS SERVICE, INC. Models R667, R669 Delco
Delco-Matic Tuner
Parts Layouts

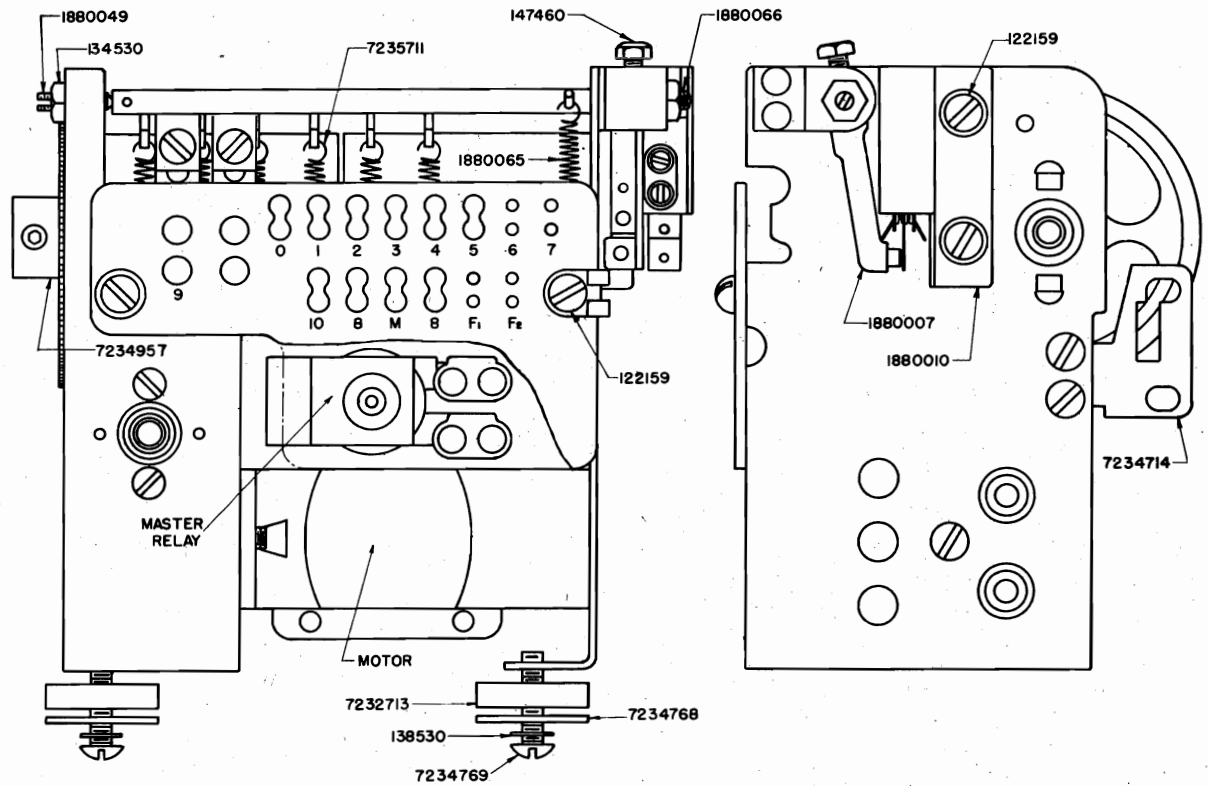


FIG. 2--PARTS LAYOUT--DELCO-MATIC TUNER

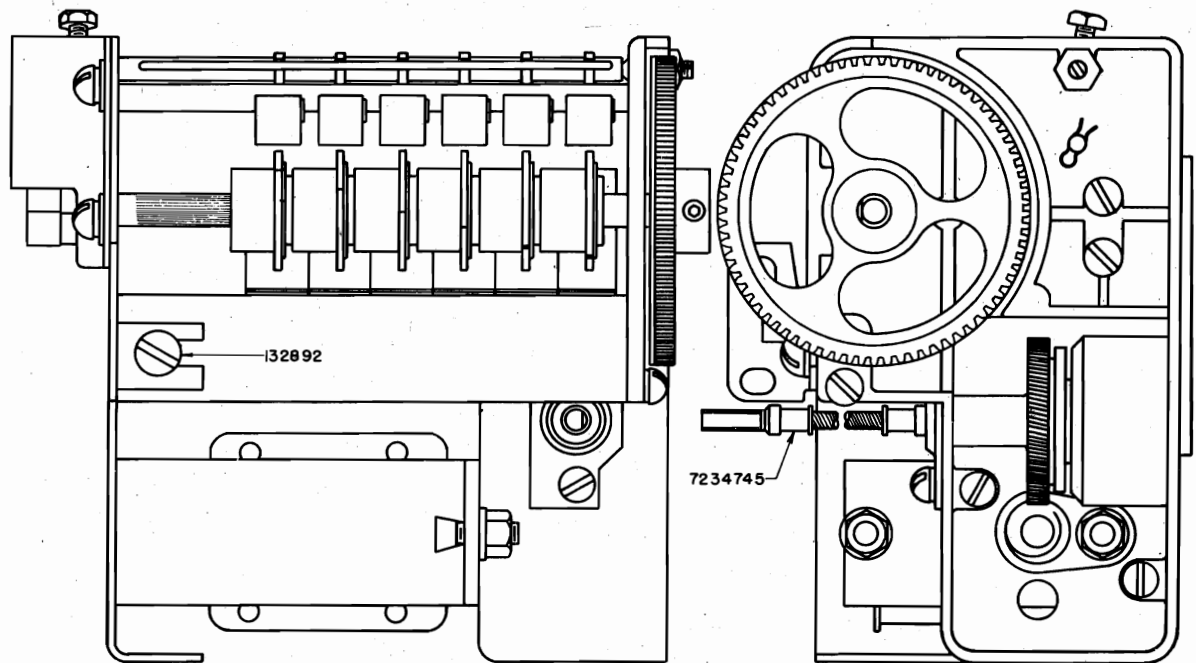


FIG. 3--PARTS LAYOUT--DELCO-MATIC TUNER

MODELS R667, R669

Delco-Matic Tuner

Operating and Service Notes, Part 1

UNITED MOTORS SERVICE INC.

GENERAL: The Delco Model R-667 is a six tube, two unit auto radio with "Delco-Matic" Flash tuning. The service parts and alignment procedure are identical to the Delco Model R-666.

The Delco Model R-669 is a seven tube, two unit auto radio with "Delco-Matic" Flash tuning. The service parts and alignment procedure are identical to the Delco Model R-668.

SETTING-UP "DELCO-MATIC" TUNER

- (a) Press a button and allow the selector mechanism to come to rest.
- (b) Continue to hold the button down, and tune in the desired station by manual control.
- (c) Release button, and set up remaining buttons in the same manner.

When the button is held down after the mechanism has come to rest, the pawl is held in the cam slot, locking the cam in position. The cam is allowed to slip on its shaft during the manual tuning process, by a clutch spring which is a part of the cam shaft assembly.

OPERATION OF "DELCO-MATIC" TUNER

The "Delco-Matic" Tuner is a motor driven mechanical device for tuning in stations quickly and silently by remote push button control. When a button is depressed, a relay coil pulls a corresponding pawl against a selector cam (Fig. 1). At the same time, a hold down coil in the control head holds the button down until the cycle of operation is complete. A trigger on the pawl presses against a switch operating trip rod, which in turn operates the power switch. The degree of movement of the trip rod, which is controlled by a high and low side on the selector cam, determines the direction of motor rotation. When the cam is rotated to a position where the pawl drops into the selector cam slot, the degree of movement of the trip rod opens the ground contact on the power switch which cuts the current to the motor and magnetic clutch and releases all relays.

1. PUSH BUTTON HEAD

The push buttons in the control head complete the circuit for the operation of the hold-down magnet, master relay and the corresponding station selector magnet. The buttons are held down magnetically until released by the "cut-off" switch on the tuner unit, actuated by the station selector pawl dropping into the slot in the selector cam.

2. STATION SELECTOR PAWLS

The station selector pawls are magnetically operated and controlled directly from the contacts in the push-button head. Upon pressing a button in the control head, a circuit is closed, energizing a station selector magnet coil which pulls a corresponding pawl down on a station selector cam. The pawl rides on the cam until it drops into the cam slot and cuts the motor off and releases all relays.

3. STATION SELECTOR CAMS

The station selector cams are circular discs with high and low sides for operation of the motor reversing switch and a stop slot for operation of the motor cut-off switch. Six of these cams are provided on a shaft, each with a friction clutch which allows the cam to be slipped on the shaft in setting the cam on the desired station.

4. REVERSING AND CUT-OFF SWITCH

The reversing and cut-off switch is a combination switch actuated by the trigger on the station selector pawl. The reversing switch causes the motor to run in the right direction for direct to the station tuning and the cut-off switch cuts the motor off when a station is tuned in, and also releases the push-button hold-down magnet and the magnetic clutch.

The forward and reverse positions of the reversing switch are dependent upon whether the station pawl is pulled against the high or low side of the station selector cam. The cut-off switch is actuated when the pawl drops into the cam slot as a station is tuned in.

5. MAGNETIC CLUTCH

The magnetic clutch consists of an electro magnet and two iron discs which are held together magnetically when the field is energized. One of the discs is coupled to the motor and the other to the condenser gang.

The clutch is designed to cut the motor driving power from the tuning condenser gang at the same instant the pawl drops into the cam slot and actuates the motor cut off switch.

6. MASTER RELAY

The master relay is controlled directly from the push-button head and the purpose is to allow the motor current to be fed directly to the motor rather than through the push-button circuits. A set of "mute" contacts are provided along with the "A" power contacts for muting the audio system of the set while the motor is driving the tuning mechanism.

SERVICE PROCEDURE

The logical procedure to employ in servicing the automatic tuner will depend to a large extent upon the nature of the trouble encountered and

whether the tuner is partially or totally inoperative. However, in most cases the solution to the trouble will be found by checking the below points in the order named:

1. TUNING CONTROL and CABLE
2. BATTERY VOLTAGE AT TUNER
3. STATION SELECTOR PAWLS
4. PUSH BUTTON HEAD
5. REVERSING AND CUT-OFF SWITCH

The tuning control and tuning cable should be checked along with the battery voltage at the "A" terminal on tuner before removing chassis or push button head from car for servicing on the bench. Make all checks on bench with a tuning control connected to the tuner for proper loading. Detailed procedure for checking the above points is as follows:-

Checking Tuning Control and Cables

In order for the automatic tuner to operate properly it is necessary that the tuning control be free from kinks and binds, so as not to impose an excessive load on the tuner motor. Turn tuning control knob manually and note if drag is excessive or if any kinks or binds are apparent. If trouble is evident, disconnect flexible tuning cable from chassis case bushing and turn tuning knob to determine whether trouble is in set or tuning control. If trouble is in set, a careful check of the large die-cast gears should be made for proper meshing.

Checking Battery Voltage at "A" Terminal on Tuner

The magnets, relays and the motor in the automatic tuner have been designed to operate satisfactorily on voltages as low as 4.5 volts measured at the "A" terminal on the tuner unit with the motor running. Low battery voltages will cause erratic operation of the tuner.

BEFORE ATTEMPTING ANY TUNER REPAIRS, FIRST MEASURE THE "A" VOLTAGE AT THE LARGE "A" TERMINAL ON THE TUNER UNIT WITH THE TUNER MOTOR OPERATING. In order to allow the motor to run long enough to get an accurate reading before it cuts off, set two cams which appear to be working normally at opposite ends of the dial and press corresponding buttons, reading meter carefully while motor is running. If voltage is lower than 4.5 volts, check all connectors and terminals for poor contact. Measure voltage at car ammeter with set load only. This should be 5.5 volts or more.

NOTE: In testing these automatic tuners on UMS Radio Test Panels, it is very important that proper voltage be available for test, otherwise incorrect diagnosis of the trouble will be made. A heavy duty battery and a Power Unit should be used. Also, all connections should be clean and heavy "A" supply leads used for connecting sets to "A" supply terminals. On the #552 Test Panel it is recommended that all automatic tuner tests be made using the power supply terminals on the left side of the panel. This will give a slightly higher "A" voltage to test.

Checking Station Selector Pawls

In most instances a visual inspection will determine if the station selector pawls are operating satisfactorily. A check can be made by simply pressing the push buttons and noting if the corresponding pawls pull down against the selector cam. Failure of the pawl to operate may be caused by excessive spring tension on the pawl spring, open selector magnet circuit or low voltage.

To reduce spring tension on pawl spring, unhook top end of spring with a pair of long nose pliers and stretch spring slightly. Be careful not to stretch spring too far or pawl will have a tendency to stick in the cam slot when a station is tuned in.

Voltage measured at selector magnet coil terminals on bakelite terminal board should not be less than 4.5 volts.

Checking Push Button Head

The push button head is working normally when the following actions take place.

1. Buttons should stay down magnetically when pressed, until station is tuned in or pawl drops in cam slot.
2. Corresponding station pawl in tuner should pull down against cam.
3. Both the button pressed and its corresponding station pawl in the tuner should release when a station is tuned in or when the pawl drops into cam slot.

It should be noted that buttons will not release unless tuner motor is operating and station pawl trips the cut-off switch.

If push button head does not function as covered above and a duplicate head (Part #1880122) is not available for substitution, make complete check of head as follows with push button cable plug disconnected from receiver-chassis.

MODELS R667, R669 Delco **UNITED MOTORS SERVICE, INC.** Delco-Matic Tuner Service Notes, Part 2

TESTING PUSH BUTTON HEAD

A. MECHANICAL TEST OF PUSH BUTTON HEAD:

- (a) Disconnect push button control plug from receiver chassis.
- (b) Press buttons down and release slowly. Note if any button or buttons have a tendency to stick or do not extend out the full distance when released. Failure of a button to release to the full extent will cause the station selector pawl to stick in the cam slot when a station is tuned in (See Paragraph "C").
- (c) If sticking buttons are encountered, remove the mechanism from the die-cast head, removing the back cover plate and taking out the four round head screws. A small burr on either the small bakelite insulators or the push-button shaft, or in the push button holes in the die-casting or wires touching the button shafts will cause the buttons to stick. Removal of the burrs with fine sandpaper will eliminate this sticking.

NOTE: Do not hold the control head in an inverted position when removing mechanism from case.

B. CHECKING MAGNET FOR HOLD-DOWN

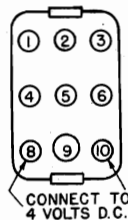


FIG. 5--CONTROL CABLE PLUG Facing Plug

- (a) Remove control cable plug from receiver chassis.
- (b) Connect 4 volts D.C. across prongs #8 and #10 as shown.
- (c) Press buttons one at a time, interrupting battery circuit to release button after each test.
- (d) If none of the buttons will stay down when pressed, make continuity check across prongs #8 and #10 for open circuit in hold down magnet or cable wiring.

(e) If one or two buttons will not stay down when pressed, first check to see if any wires are caught behind button shafts. If not, then remove mechanism from die-cast head and check for excessive spring tension in switch contact springs or the button shaft kick-out spring.

C. CHECKING PUSH BUTTON SWITCH CONTACTS:

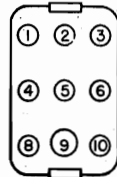


FIG. 6--CONTROL CABLE PLUG Facing Plug

- (a) The switches in the control head start to make contact during the first 1/8" of downward travel. It is, therefore, important that the buttons extend out the full distance when released by the hold down magnet, as covered in the "Mechanical Test of Push-Button Head".
- (b) The switch contacts may be checked by applying 4 volts D.C. across the prongs 8 and 9, pressing each button under test, and interrupting the circuit after each test. Check remaining contacts similarly as follows:

Press Button No.	Apply 4 volts D.C. across--
1	Prong #8 and 1
2	" 8 " 2
3	" 8 " 3
4	" 8 " 4
5	" 8 " 5
6	" 8 " 6

It will be noted that if the switch contacts are making proper contact and all preceding checks made, the hold down magnet in the head will be energized as each button is pressed.

Checking the Reversing and Cut-Off Switch

Proper operation of the switch mechanism on the tuner is of vital importance. Erratic action of the tuner due to low battery voltage very often results in the trouble being erroneously diagnosed as switch trouble. It is therefore important that all other points be checked first for possible causes of the trouble before attempting any adjustments to the switching mechanism.

There are four positions of the switch mechanism, "normal", "pawl on high side of cam", "pawl on low side of cam" and "pawl in slot". Figures 7 to 10 illustrate the exact position of the switch contacts in each of the four switch positions. These contacts can be checked visually by observing their

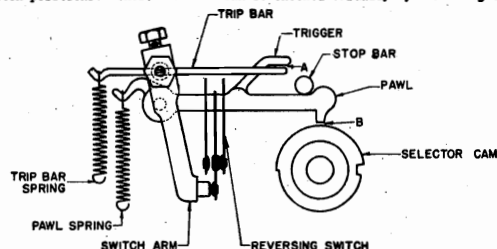


FIG. 7--NORMAL POSITION

action under actual operating conditions or by disconnecting the "A" power and duplicating the position by pressing the pawls down against the cams manually. Before making any adjustments it should first be definitely known that an adjustment is necessary.

In the normal position it will be noted that one set of reversing contacts are closed and that the ground contact on the switch arm is making contact. Also, there should be a slight gap ("A" on Fig. 7) between the trigger and the trip bar to prevent any movement of the switch arm when the pawl is pressed against the high side of the cam.

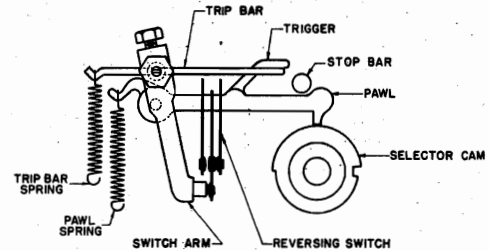


FIG. 8--PAWL ON HIGH SIDE OF CAM

In this position the contacts should be in exactly the same position as in the "normal position". The trigger rests against the trip bar but there should not be sufficient movement of the trip bar to open the normally closed reversing contacts at any point on the high side of the cam.

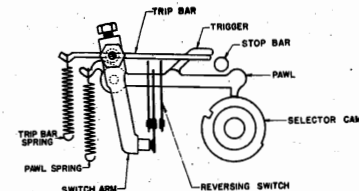


FIG. 9--PAWL ON LOW SIDE OF CAM

In this position the pawl is riding on the low side of the cam and a complete change has taken place in the reversing switch. The set of contacts which were normally closed when the pawl was riding on the high side of the cam have opened and the other set of contacts are now closed. The ground contact on the switch arm remains closed.

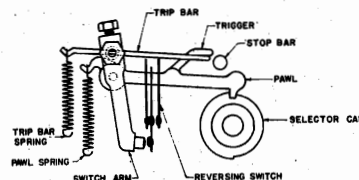


FIG. 10--PAWL IN SLOT

It will be noted in this position that the set of contacts which are closed when the pawl is riding on the low side of the cam remain closed and the ground contact on the switch arm which has remained closed through each of the three previous positions is now open.

SWITCH ADJUSTMENTS

In the case where not more than two or three cams are not working satisfactorily, individual adjustments can be made to the station selector pawls by bending the small trigger arms up or down with a pair of pliers, to obtain proper action of the reversing and cut-off switches.

In making these adjustments it is very important that the triggers be adjusted so that they do not open the reversing contacts normally closed when the pawl is riding on the high side of the cam. Also, there should be a slight gap in the ground contact on the cut-off switch arm when the pawl drops to the bottom of the cam slot. This ground gap should be kept as small as possible, retaining sufficient clearance so that the contacts will remain open when the condenser gang is turned from one end of its travel to the other, with the station pawl holding the cam stationary.

In cases where the switching mechanism does not operate satisfactorily on any cam, a careful check should be made of the switch trip bar to see that it does not move the switch lever when the pawls are pressed against the high side of the cams.

DO NOT CHANGE POSITION OF EITHER THE REVERSING SWITCH OR SWITCH ARM AS SPECIAL EQUIPMENT IS REQUIRED TO OBTAIN ACCURATE ALIGNMENT OF THESE PARTS.

The normal position of the phosphor bronze switch springs with the switch arm pulled back should be as shown in Fig. 10 illustrating the switch position with the pawl in the cam slot.

If a complete test of the tuning mechanism indicates that it cannot be repaired or adjusted as outlined, a replacement of the complete chassis should be made in accordance with Mr. C. D. Wyner's letter of April 11, 1938, Subject--"Service Policy--Delco Auto Radio Models R-667 and R-669 Automatic Tuners".

MODELS R668, R669 Delco
Schematic, Socket
Trimmers, Chassis

UNITED MOTORS SERVICE, INC.

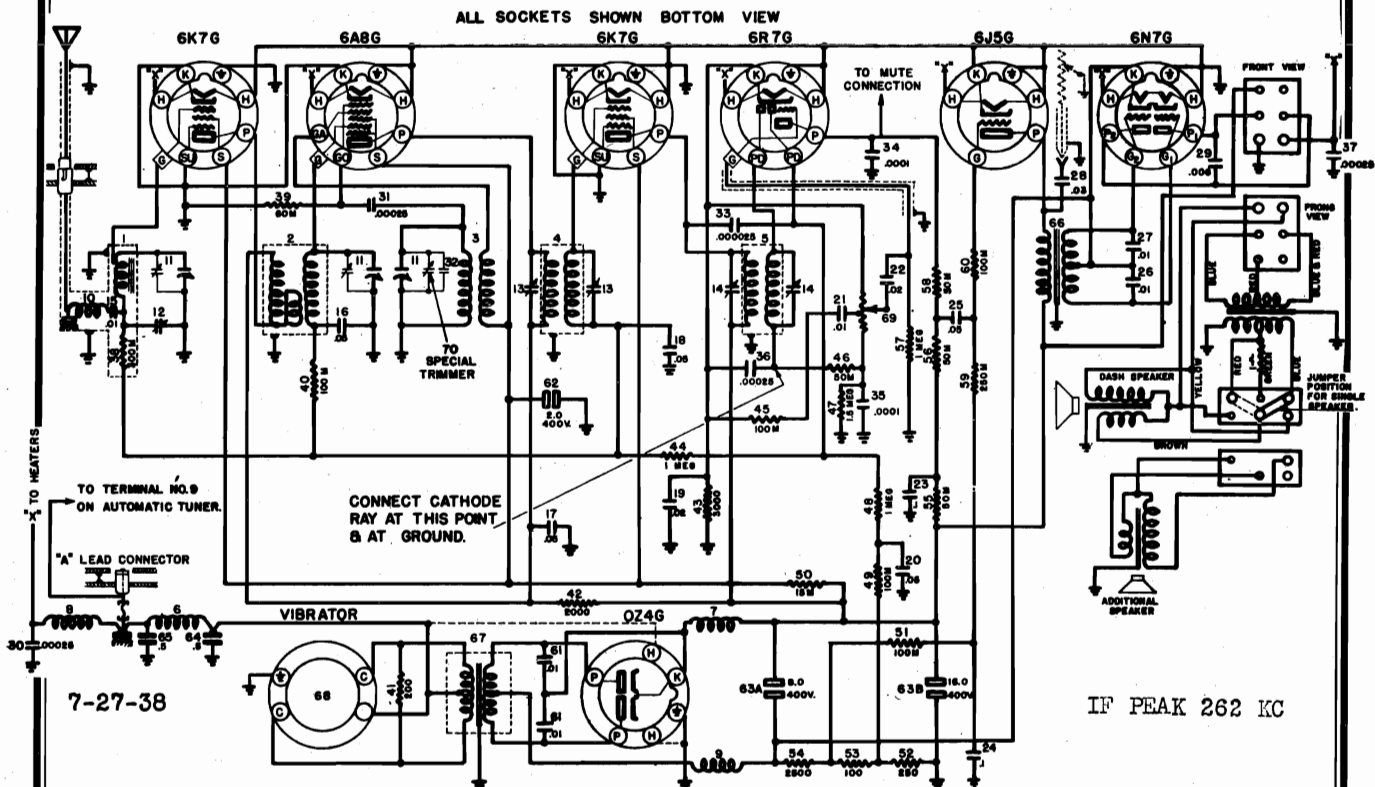
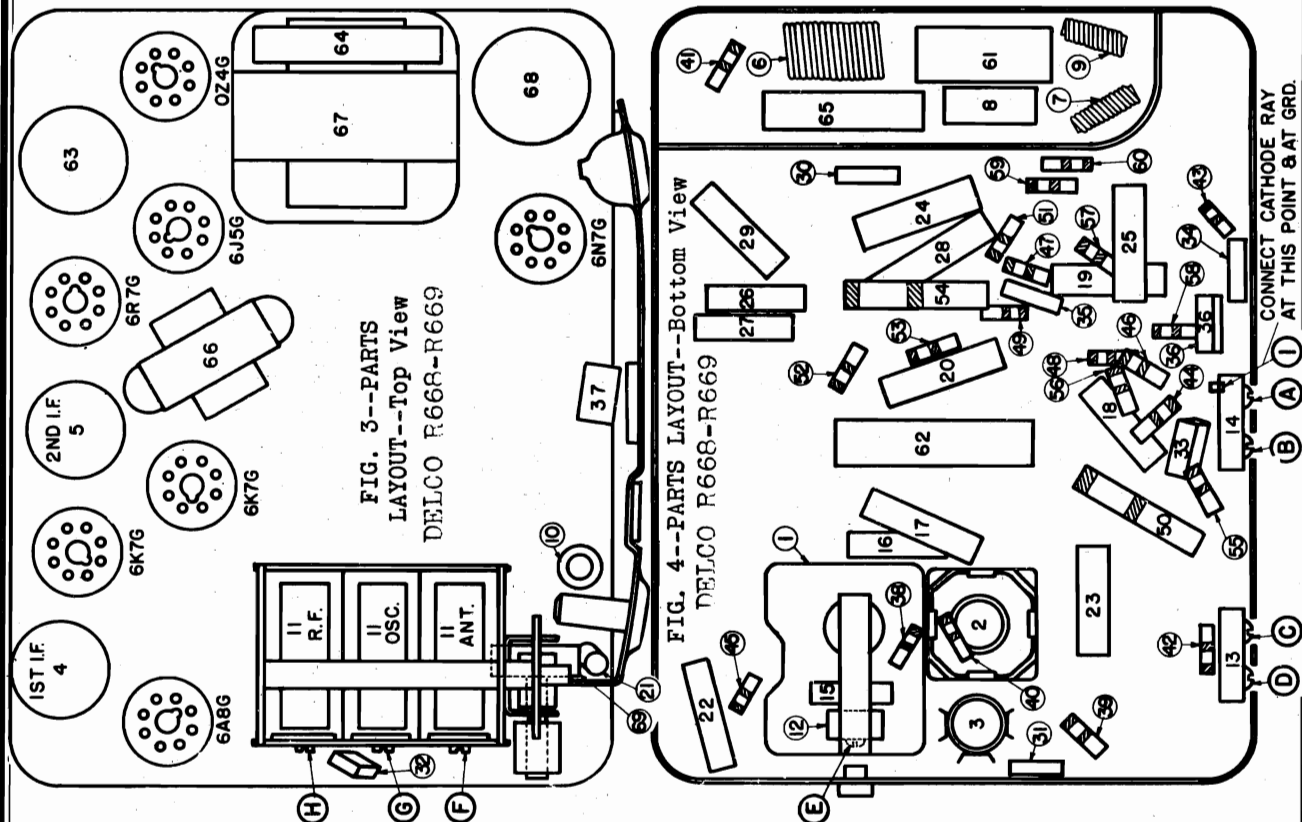


FIG. 2--DELCO MODEL R-668-9 CIRCUIT DIAGRAM



UNITED MOTORS SERVICE, INC.

MODEL R673 Delco
Schematic

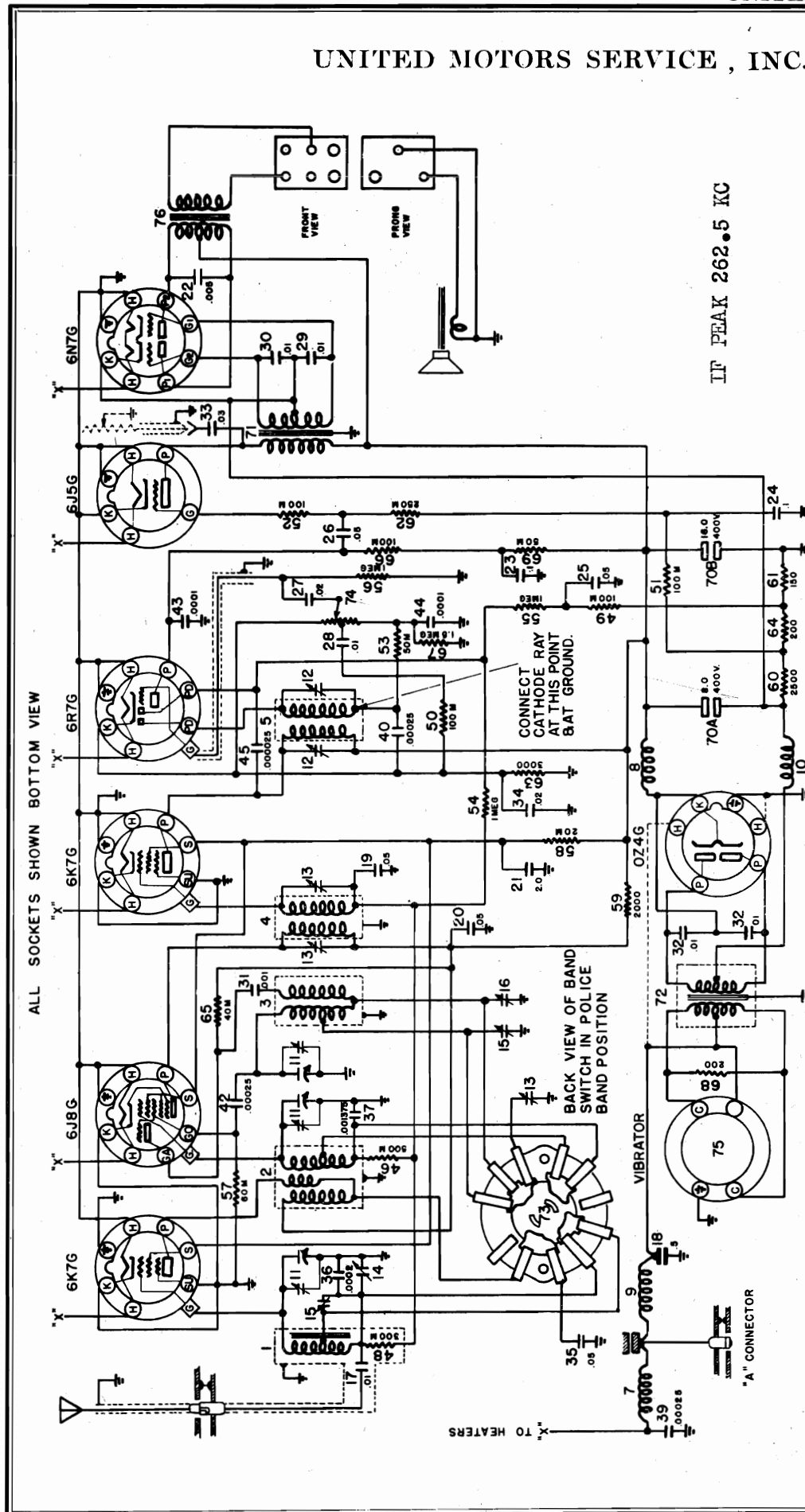


FIG. 3--DELCO MODEL R-673 CIRCUIT DIAGRAM

GENERAL: The Delco Model R-673 is a seven tube two unit receiver with short wave and broadcast band. Coverage of short wave band from 5000 kilocycles to 1600 kilocycles, broadcast 1530 kilocycles to 540 kilocycles. Special features such as base compensation, tone control and 6N7G push pull output.

MODEL R673 Delco
Voltage, Socket
Trimmers, Chassis

UNITED MOTORS SERVICE, INC.

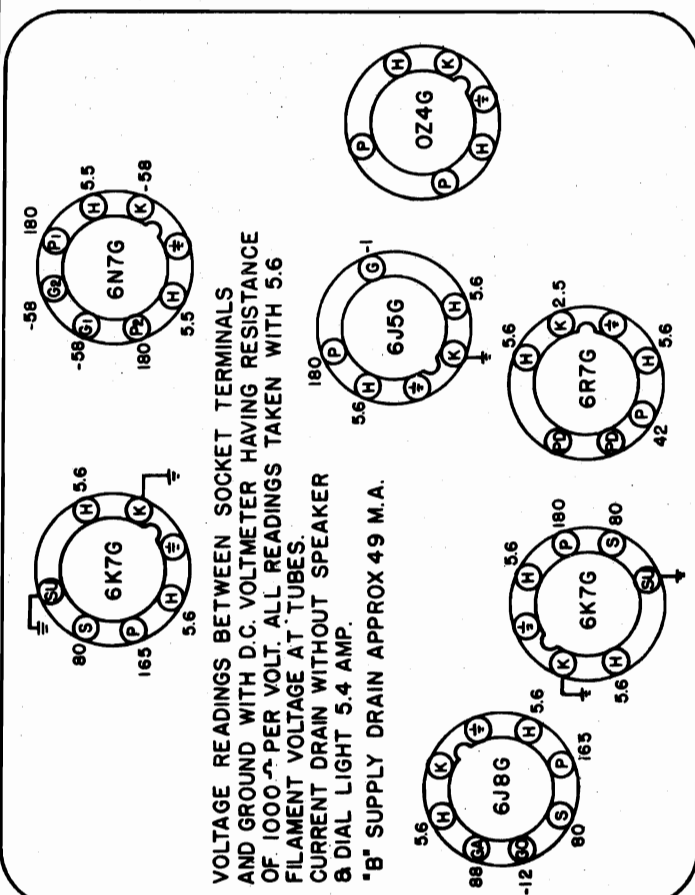
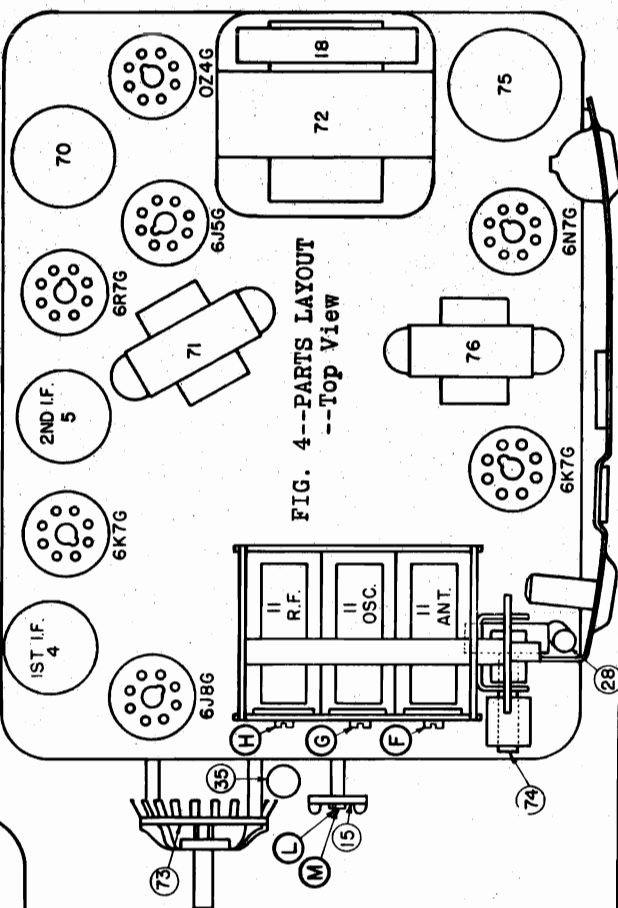
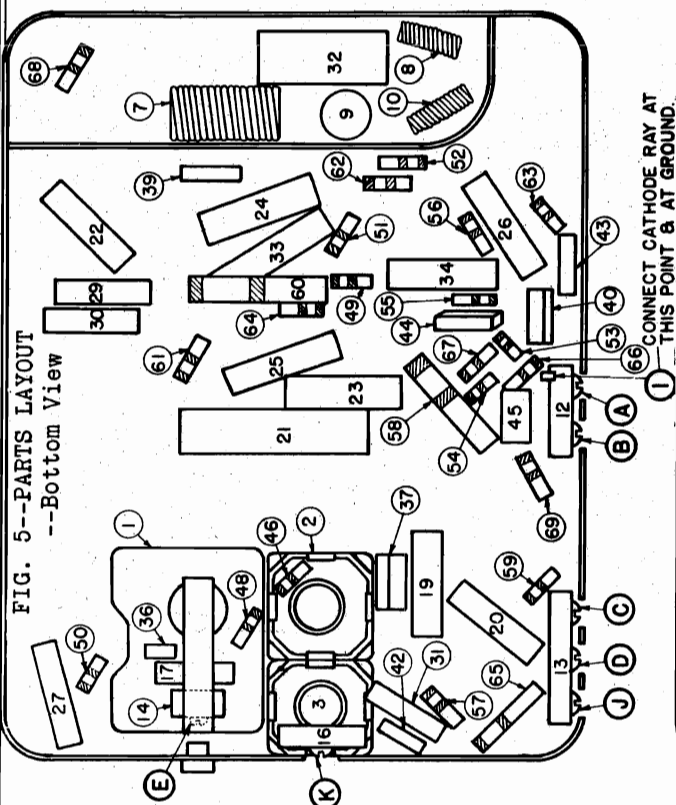


FIG. 1--TUBE SOCKET VOLTAGES

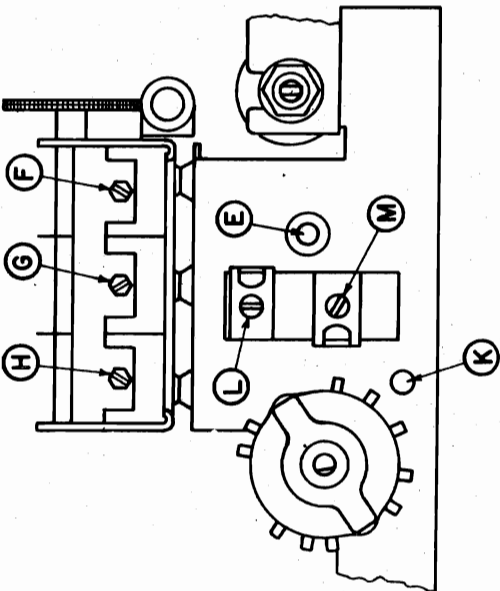


FIG. 2--TRIMMER LOCATIONS

UNITED MOTORS SERVICE, INC.

MODEL R673 Delco
Alignment

1. Aligning I-F Stages at 262.5 Kilocycles
 - (a) Connect the ground lead of the Signal Generator to the chassis case. Connect the signal lead of the Signal Generator to the grid cap of the 6J8G tube, through a .1 mfd. condenser, leaving the tube's grid clip in place.
 - (b) Connect output meter across plates of 6N7G tube.
 - (c) Set Signal Generator to exactly 262.5 kilocycles and turn volume control on full.
 - (d) Turn condenser gang to a position where no squeals or beat notes can be noticed, also so that when the tuning condenser is rotated within narrow limits there is no appreciable change in output.
 - (e) Adjust trimmers A, B, C & D through the cut-outs on the side of the chassis (illus. 12 & 13, Fig. 5) carefully for maximum output.
 - (f) Repeat adjustments of I-F trimmers A, B, C & D with as low an output from the Signal Generator as possible, for more accurate alignment.
 2. Aligning at 5000 Kilocycles
 - (a) Turn band switch to police band (clockwise).
 - (b) Leave Signal Generator leads connected the same as for I-F adjustments.
 - (c) Turn tuning condenser plates all the way out and against high frequency stop.
 - (d) Set Signal Generator to exactly 5000 kilocycles and adjust oscillator trimmer "G" (Fig. 4) carefully for maximum output, being careful to peak the signal received with trimmer screw out at minimum capacity.
 3. Aligning at 1530 Kilocycles
 - (a) Turn band switch to broadcast band (counter clockwise).
 - (b) Set Signal Generator to 1530 kilocycles and leave the tuning condenser against high frequency stop.
 - (c) Adjust oscillator trimmer "I" (Fig. 4) for maximum output.
 4. Aligning at 600 Kilocycles
 - (a) Connect Signal Generator leads to 6K7G, R-F grid, leaving the grid clip in place.
 - (b) Set Signal Generator to 600 kilocycles and tune the receiver to this signal.
 - (c) Adjust oscillator padder condenser "K" (Fig. 5) rocking gang con-
- denser plates back and forth through the signal until maximum output is obtained.
- (d) Remove signal generator lead from 6K7G tube clip and connect to the antenna terminal through a .0002 mfd. condenser.
 - (e) Adjust antenna series condenser "E" (Fig. 5) for maximum output.
5. Aligning at 1400 Kilocycles
 - (a) Set Signal Generator at 1400 kilocycles.
 - (b) Tune set to this signal and adjust R-F trimmer "H" (Fig. 4) and antenna trimmer "M" (Fig. 4) to maximum output.
 6. Aligning at 4000 Kilocycles
 - (a) Turn band switch to police band.
 - (b) Set Signal Generator to 4000 kilocycles and tune receiver to this signal.
 - (c) Adjust police band antenna trimmer "F" (Fig. 4) for maximum output.
 7. Aligning at 1800 Kilocycles
 - (a) Set Signal Generator at 1800 kilocycles and tune receiver to this signal.
 - (b) Adjust oscillator padder condenser "J" (Fig. 5) rocking gang condenser plates back and forth through the signal until maximum output is obtained.
 - (c) Close gang and check to see if tuning range extends to 1600 kilocycles.
 8. Realigning at 1400 Kilocycles
 - (a) Turn band switch to broadcast band.
 - (b) Set Signal Generator to 1400 kilocycles.
 - (c) Tune set to this signal and adjust R-F trimmer "H" and antenna trimmer "M" to maximum output (Fig. 4).
 9. Realigning at 600 Kilocycles
 - (a) Check alignment of antenna series condenser "E" (Fig. 5) for maximum output.
 10. Checking I-F Band Spread

The Model 165 Cathode Ray Oscilloscope should be used to check the I-F band spread after completing the "Alignment Procedure". Slight adjustment of the I-F stages may be found necessary in order to obtain a symmetrical selectivity curve. Connect Cathode Ray from connection "I" (Fig. 3) to ground.

MODELS R1134, R1135
R1139 Delco
Schematic, Voltage

UNITED MOTORS SERVICE, INC.

Socket, Trimmers
Chassis

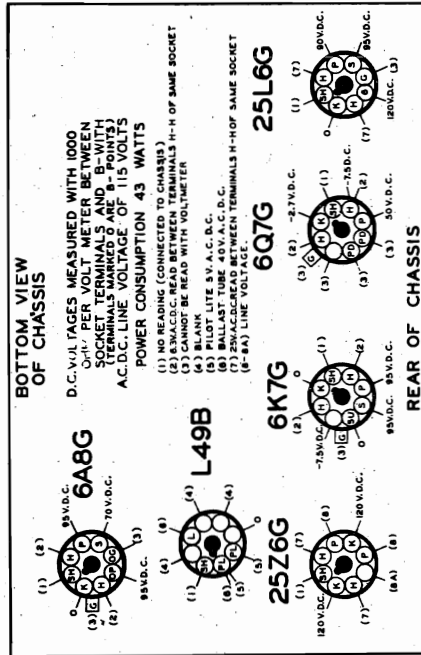


FIG. 1--TUBE SOCKET VOLTAGES.

3-6-39

FIG. 3--PARTS LAYOUT--Top View

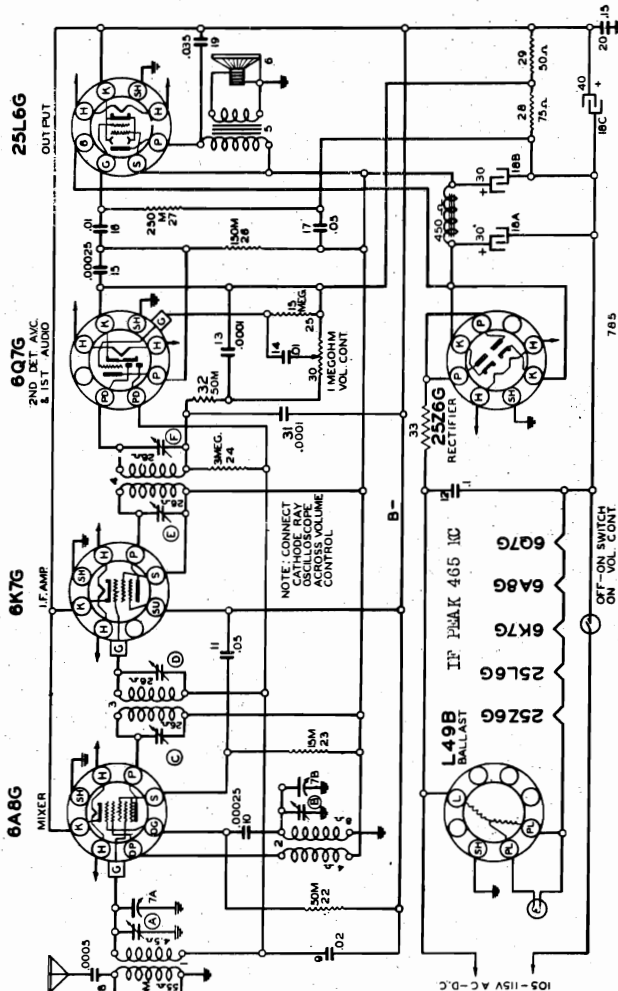
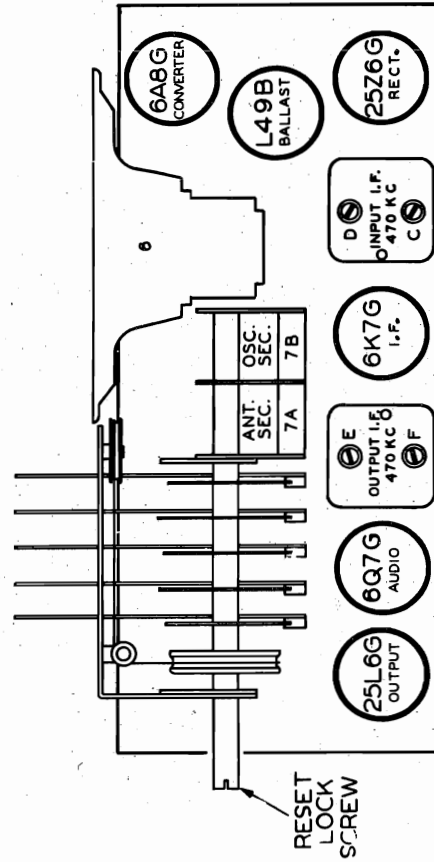


FIG. 2--DELCO MODELS R-1134-35-39 CIRCUIT DIAGRAM

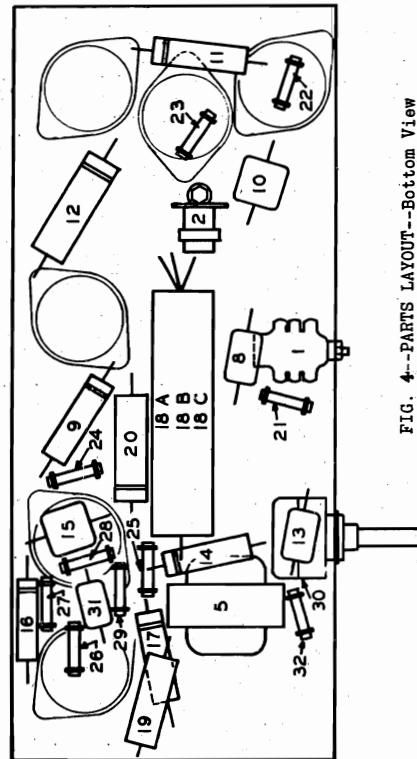


FIG. 4--PARTS LAYOUT--Bottom View

MODEL R3215 Delco Alignment

UNITED MOTORS SERVICE, INC.

MODELS R1134, R1135 R1139 Delco Alignment, Tuner

DELCO MODEL R-3215 CIRCUIT ALIGNMENT

1. Aligning I-F Stages at 455 Kilocycles

- (a) Attach the ground lead of the signal generator to the chassis ground post. Connect the other lead to the grid cap of the 6K8 tube through a .02 mfd. series condenser. DO NOT REMOVE GRID CLIP.
- (b) Set the signal generator to EXACTLY 455 kilocycles and turn receiver volume control on full.
- (c) Peak each of the 2nd I-F coil trimmers, 2A & 2B, (Illus. 2, Fig. 3).
- (d) Peak each of the 1st I-F coil trimmers, 1A & 1B, (Illus. 1, Fig. 3).
- (e) To assure most accurate trimmer setting repeat above adjustments several times always using lowest possible signal generator output consistent with readable output meter scale deflection.

2. Aligning "American Broadcast" 1730-540 Kilocycle Band

- (a) Connect signal generator antenna lead to receiver antenna terminal through a .00025 mfd. condenser, and the other signal generator lead to ground terminal.
- (b) Adjust band selector switch for operation on 1730-540 kilocycle band.
- (c) Check tuning dial adjustment by turning 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 the needle does not point exactly to the last line move needle to correct position.
- (d) Set signal generator frequency and receiver dial to EXACTLY 1730 kilocycles, and bring in 1730 kilocycle signal generator signal to maximum output by adjusting 1730 kilocycle oscillator trimmer, (Illus. 7C Fig. 4).
- (e) Set signal generator frequency and receiver dial to approximately 600 kilocycles. Then while rocking gang condenser slightly to right and left, adjust 600 kilocycle oscillator padder (Illus. 6, Fig. 3) for maximum output.
- (f) Padder (Illus. 8, Fig. 3) for maximum signal response.

3. Aligning "Foreign Short Wave" 5.8-18.1 Megacycle Band

- (a) Place band selector switch for operation on 5.8-18.1 megacycle band, tune receiver dial and set signal generator frequency to EXACTLY 18.1 megacycles.
- (b) Adjust 18.1 megacycle oscillator trimmer (Illus. 7B, Fig. 4) to bring in 18.1 megacycle test signal to maximum output. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down the trimmer (add capacity) until the second peak is tuned in.
- (c) Tune receiver dial and set signal generator frequency to EXACTLY 15 megacycles.
- (d) While rocking gang condenser slightly to right and left, adjust 15 megacycle antenna trimmer (Illus. 7A, Fig. 4) for maximum 15 megacycle test signal response.

SETTING UP AUTOMATIC TUNING DELCO MODELS R-1134-35-39 HOME RADIO

1. Loosen RESET LOCK SCREW in center of tuning knob.

2. Press any one of the automatic tuner levers all the way down. Stations may be set up in any sequence desired.

3. Hold the lever down firmly and tune set to station desired. When desired station is clearly tuned in, release the lever and follow same procedure until all levers have been set up.

4. Rotate the tuning knob to the right (clockwise) as far as it will turn and firmly tighten RESET LOCK SCREW.

DELCO MODELS R-1134-35-39 CIRCUIT ALIGNMENT

1. Aligning I-F Stages at 465 Kilocycles

- (a) Connect the ground lead of the signal generator in series with a .1 mfd. condenser to B- (pin #8 on 25L6G tube). Connect the signal lead of the signal generator to the grid cap of the 6AG6 tube, leaving grid clip in place.
- (b) Connect the output meter across the plate (pin 3) and screen (pin 4) of the 25L6G output tube.
- (c) Set signal generator to exactly 465 kilocycles and turn volume control on full.
- (d) Turn the rotor plates of the condenser gang all the way out of mesh and against the high frequency stop.
- (e) Adjust the trimmers (E-F) on the second I-F coil and then the trimmers on the first I-F coil (C-D Fig. 3) carefully for maximum output.
- (f) Repeat adjustments of the four I-F trimmers with as low an output from the signal generator as possible, for more accurate alignment.

2. Aligning at 1720 Kilocycles

- (a) Leave ground lead of signal generator connected to B- through a .1 mfd. condenser as before. Connect the signal lead of signal generator through a .0001 mfd. condenser to the antenna terminal.
- (b) Turn tuning condenser plates all the way out and against high frequency stop.
- (c) Set signal generator to exactly 1720 kilocycles and adjust oscillator trimmer (7B Fig. 3) carefully for maximum output, being careful to peak the signal with trimmer screw out or at minimum capacity.

3. Aligning at 1400 Kilocycles

- (a) Set signal generator to 1400 kilocycles and turn condenser gang plates until this signal is tuned in with maximum output.
- (b) Adjust the antenna trimmer (7A Fig. 3) for maximum output. Do not disturb the 1720 kilocycle adjustment of the oscillator trimmer.

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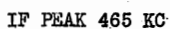


FIG. 2--DELCO MODEL R-1140 CIRCUIT DIAGRAM

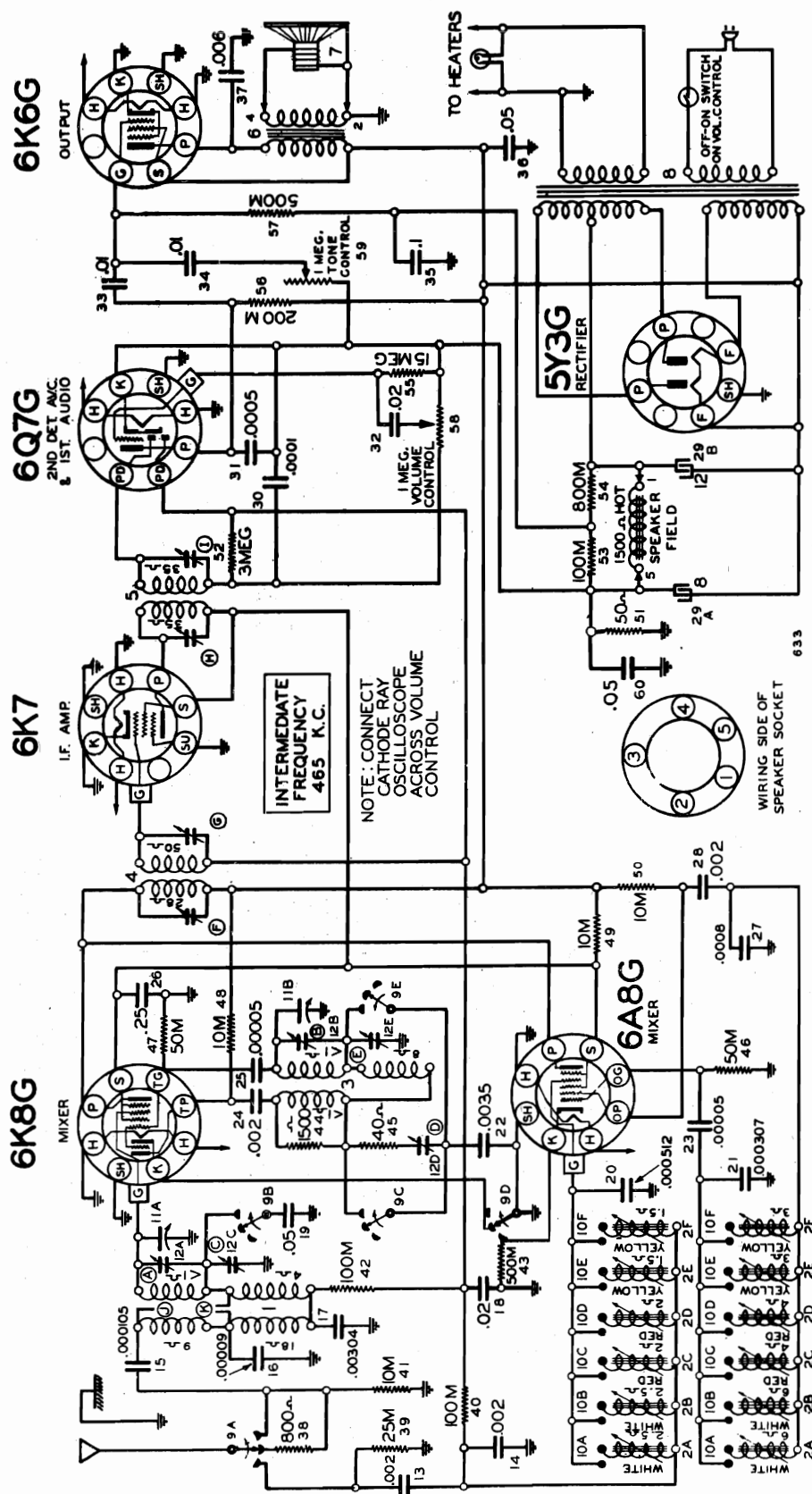


- ## REAR OF CHASSIS

(e) Set the signal generator to exactly 465 kilocycles and turn the rotor plates of the condenser gang all the way out of mesh and against the high frequency stop.

MODEL R1141 Delco
Schematic

UNITED MOTORS SERVICE, INC.



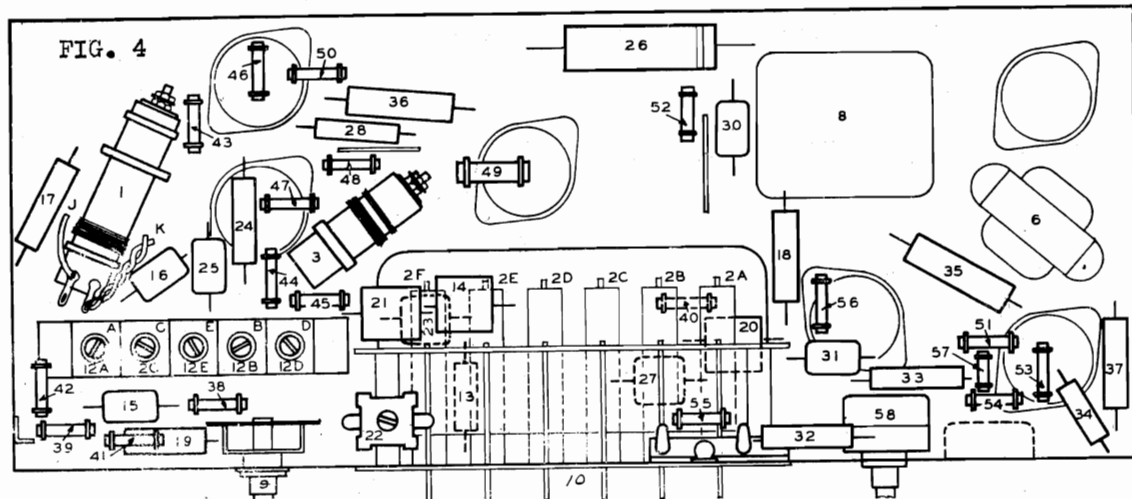
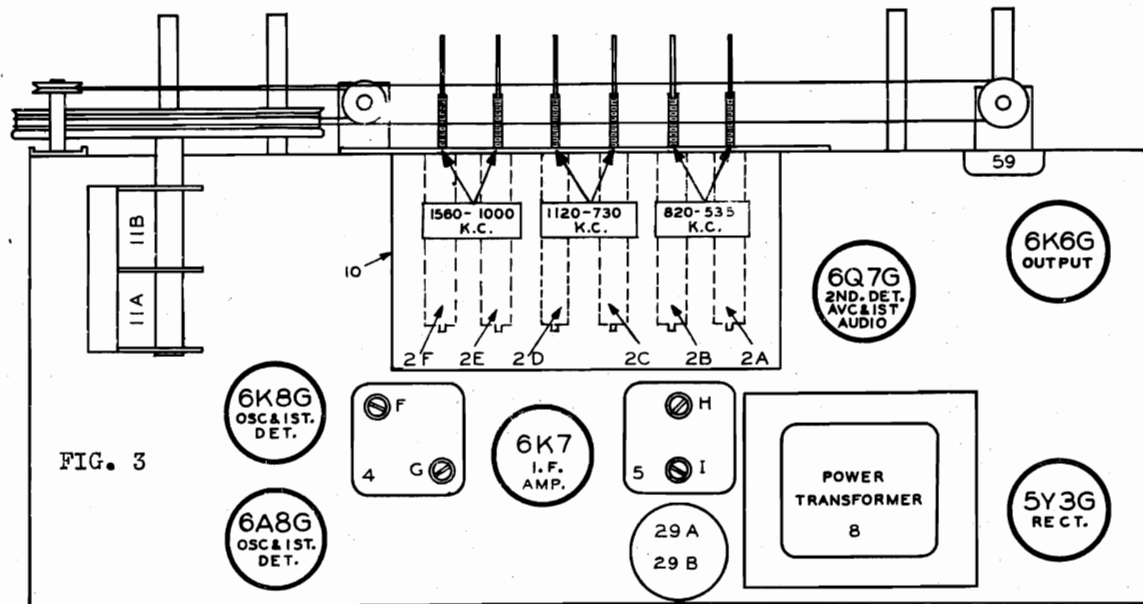
Date: 9-13-38

GENERAL: The Delco Model R-1141 is a six tube, two band superheterodyne receiver with a 6" dynamic speaker. Tuning is accomplished by means of the conventional manual control, or by push button switches which control adjustable permeability tuned coils. The frequency ranges of the push buttons are, left to right:

1. 535 to 820 K.C.
2. 535 to 820 K.C.
3. 720 to 1120 K.C.
4. 720 to 1120 K.C.
5. 1000 to 1560 K.C.
6. 1000 to 1560 K.C.

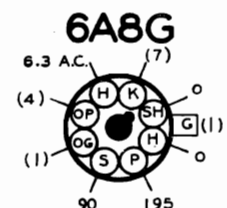
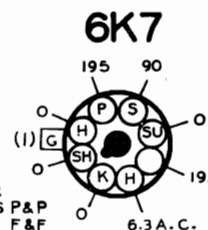
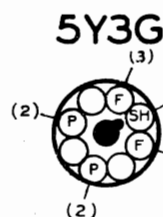
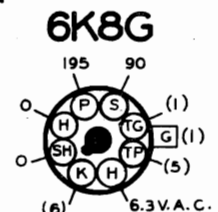
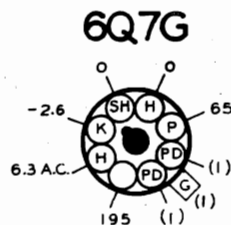
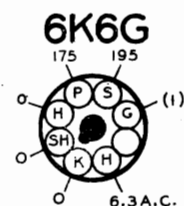
UNITED MOTORS SERVICE, INC.

MODEL R1141 Delco
Voltage, Socket
Trimmers, Chassis



BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000
OHM PER VOLT METER BETWEEN
SOCKET TERMINALS AND CHASSIS.
A.C. LINE VOLTAGE 115 VOLTS.
POWER CONSUMPTION 50 WATTS



- (1) CANNOT BE READ WITH VOLTMETER
(2) 650 V. A.C. READ ACROSS TERMINALS P & P
(3) 5 V. A.C. READ ACROSS TERMINALS F & F
(4) 155 V. IN PUSH BUTTON OPERATION
(5) 130 V. IN MANUAL OPERATION
(6) O IN MANUAL OPERATION
(7) O IN PUSH BUTTON OPERATION

REAR OF CHASSIS

621

MODELS R1141, R1142, R1143

Alignment, Tuner

UNITED MOTORS SERVICE, INC.

MODEL R1144 Delco

Tuner Data

MODELS R1141, R1142, R1143 and R1144

SETTING UP AUTOMATIC ELECTRIC TUNING

Setting up the push buttons for pre-selected stations is accomplished by means of a single adjustment for each button, accessible from the front of the cabinet. These screw driver adjustments are made through the small openings in the escutcheon, in which the call letter tabs are placed.

1. Turn the set "on" and set the band change switch to the broadcast manual (center) position and allow about 15 minutes to warm up.
2. Tune in the desired station by means of the manual tuning control.
3. Press one of the buttons which most conveniently covers the frequency of the stations, turn the band change switch to the automatic (left hand) position and, with a small screw driver, adjust the screw directly above the button, until the station is tuned in accurately.
4. Turn the band change switch back to the center position to check the accuracy of the adjustment.
5. Insert the call letters of the station in the opening and cover with the celluloid tab provided.
6. Repeat the operation for the other buttons.

ALIGNMENT FOR MODELS R1141, R1142, and R1143.

NOTE: FIGURE REFERENCES IN THE TEXT REFER TO FIGURES SHOWN WITH EACH MODEL.

1. Aligning I-F Stages at 465 Kilocycles

- (a) Connect the ground lead of the signal generator to the chassis frame.
- (b) Connect the signal lead of the signal generator to the grid cap of the 6AG6 tube through a 1.0 mfd. condenser, leaving the grid clip in place. *4. 6K8G (R1143)*
- (c) Connect the output meter across the plate and screen of the 6F6G tube.
- (d) Press a button, turn the band change switch to the automatic (left hand) position, volume control on full, and the tone control in the treble position. **R1143 Use #10 Button; Variable Fully Open*
- (e) Set the signal generator to exactly 465 kilocycles and adjust the trimmers on the second I-F coil (illus. 5, Fig. 3) and the first I-F coil (illus. 4, Fig. 3) for maximum output. Use as low a signal from the signal generator as will give a readable indication on the output meter. DO NOT REALIGN THE I-F COILS IN THE MANUAL (CENTER) POSITION (MODEL R1144 ONLY).
- (f) After completing the Alignment Procedure, the alignment should be checked with the Model 165 Cathode Ray Oscillograph. Connect the oscillograph across the volume control. **For R1143 Across #40 Cond. Rg2.*

2. Aligning at 17 Megacycles

- (a) Remove the signal lead of the signal generator from the grid of the 6AG6 and connect to the antenna terminal of the receiver through a 400 ohm resistor. **R1143 (6K8G)*
- (b) Turn the band change switch to the short wave (right hand) position. **FOR R1143 - Press #8 Button (Auto-Manual Tuning)*
- (c) Set the signal generator to exactly 17 megacycles and rotate the variable section of the condenser gang to indicate 17 megacycles on the test scale. *R1142 (ILLUS. 12D, FIG. 4)*
- (d) Adjust the oscillator trimmer condenser (illus. B, Fig. 4) for maximum output. *R1141, R1143 (ILLUS. B, FIG. 4) - R1143*
- (e) Adjust the antenna trimmer (illus. K, Fig. 4) while rocking the condenser gang back and forth through the signal, until maximum output is obtained. **FOR MODEL R1142 SEE (ILLUS. 12A, FIG. 4)*
- (f) Increase the signal from the signal generator and check for image frequency response. If the image does not fall at approximately 1630 megacycles, repeat section 2.

3. Aligning at 1735 Kilocycles (MODELS R1141, R1142 ONLY)

- (a) Remove the 400 ohm resistor and connect the signal lead of the signal generator to the antenna terminal of the receiver through a .0002 mfd. mica condenser.

3. Aligning at 5 Megacycles *MODEL R1143 ONLY*

- (a) Press #9 button (Intermediate wave--manual tuning).
- (b) Set the signal generator to exactly 5 megacycles and rotate the variable section of the condenser gang to indicate 5 megacycles on the test scale.
- (c) Adjust the oscillator trimmer condenser (illus. G, Fig. 3) for maximum output.
- (d) Adjust the antenna trimmer condenser (illus. C, Fig. 3) for maximum output.

4. Aligning at 1690 Kilocycles *MODEL R1143 ONLY*

- (a) Remove the 400 ohm resistor and connect the signal lead of the signal generator to the antenna terminal of the receiver through a .0002 mfd. mica condenser.
- (b) Press #10 button (Broadcast--manual tuning).
- (c) Turn the variable plates of the condenser gang completely out of mesh and against the high frequency stop.
- (d) Adjust image trimmer (illus. E, Fig. 3) two turns up from tight.
- (e) Set the signal generator to exactly 1690 kilocycles.
- (f) Adjust the oscillator trimmer condenser (illus. H, Fig. 3) for maximum output.
- (b) Turn the band change switch to the broadcast Manual (center) position.
- (c) Turn the variable plates of the condenser gang completely out of mesh and against the high frequency stop.
- (d) Set the signal generator to exactly 1735 kilocycles.
- (e) Adjust the oscillator trimmer condenser (illus. E, Fig. 4) for maximum output. *MODEL R1141
FOR MODEL R1142 SEE (ILLUS. 12E, FIG. 4)*

4. Aligning at 1400 Kilocycles

- (a) Set the signal generator to approximately 1400 kilocycles.
- (b) Rotate the variable plates of the condenser gang until the signal is tuned in with maximum output.
- (c) Adjust the antenna trimmer (illus. C, Fig. 4) for maximum output. *MODEL R1141 ONLY
FOR MODEL R1142 (ILLUS. 12B, FIG. 4)
R1143 (ILLUS. D, FIG. 3)*

5. Aligning at 600 Kilocycles

- (a) Set the signal generator to approximately 600 kilocycles.
- (b) Rotate the variable plates of the condenser gang until the signal is tuned in. *FOR R1143 - SEE (ILLUS. FIG. 3)
FOR R1142 - SEE (ILLUS. 12C, FIG. 4)
FOR R1141 - SEE (ILLUS. 12D, FIG. 4)*
- (c) Adjust the oscillator series condenser (illus. D, Fig. 4) while rocking the condenser gang back and forth through the signal until maximum output is obtained.

6. Aligning for Image Frequency Response

- (a) Set the signal generator at 2100 kilocycles. *FOR R1143 AT 1930 KC.*
- (b) Rotate the variable plates of the condenser gang until the image of this signal is tuned in at 1170 kilocycles. *FOR R1143 AT 1000 KC.*
- (c) Adjust the two-wire capacitor (illus. K, Fig. 4) by twisting, until a minimum output is obtained. *FOR R1143 - SEE (ILLUS. FIG. 3)
FOR R1142 - SEE (ILLUS. 12C, FIG. 4)
FOR R1141 - SEE (ILLUS. 12D, FIG. 4)*
- (d) Set the signal generator at 2630 kilocycles.
- (e) Rotate the variable plates of the condenser gang until the image of this signal is tuned in at 1700 kilocycles.
- (f) Adjust the single wire capacitor (illus. J, Fig. 4) by moving it either toward or away from the coil winding until a minimum output is obtained.

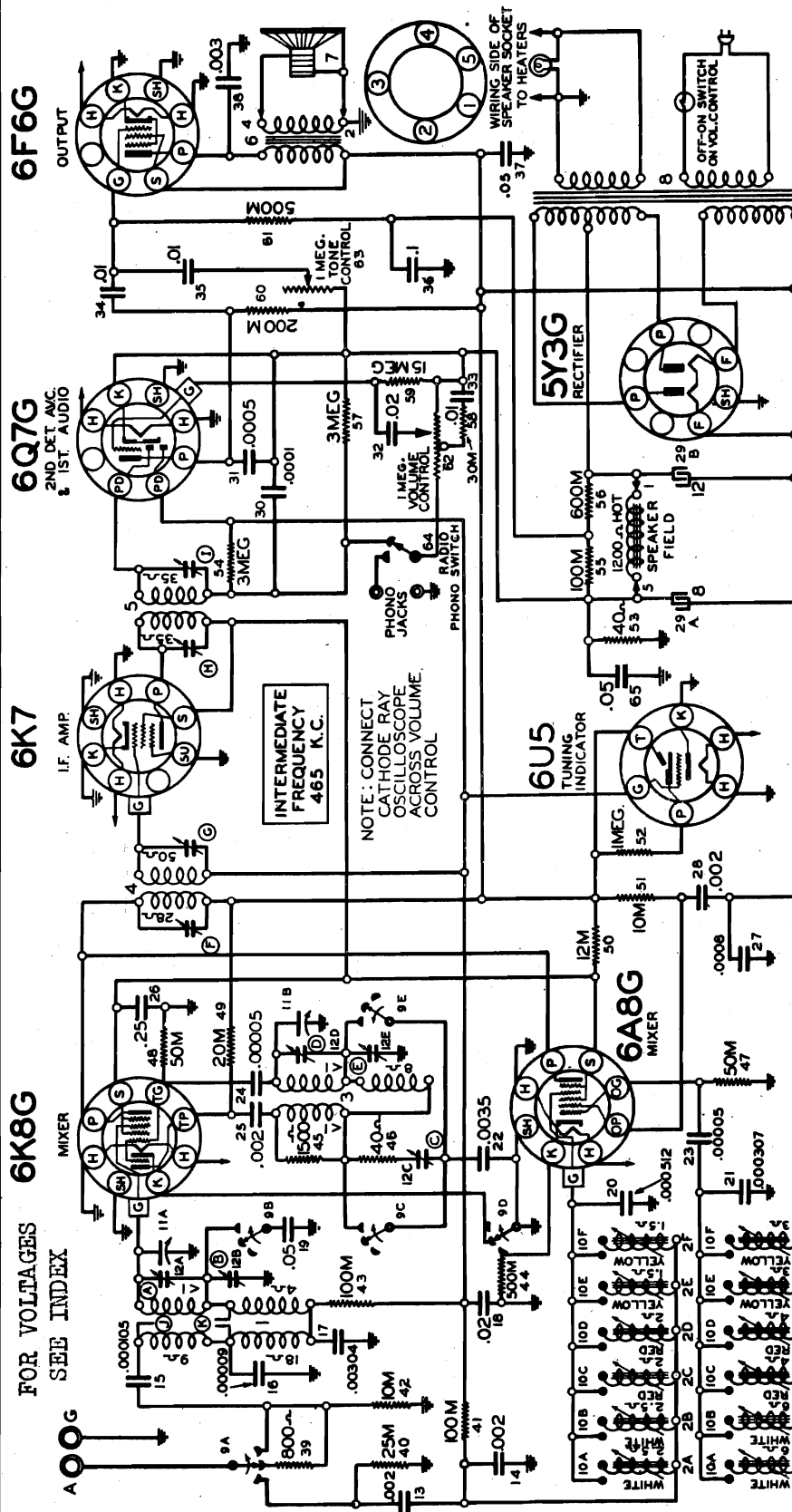
7. Repeat Sections 4 and 5 for Maximum Output

8. Repeat Section 6 for Minimum Output

9. Repeat Section 2 (e) for Maximum Output

UNITED MOTORS SERVICE, INC.

MODEL R1142 Delco
Schematic Notes



9-8-38

A phono switch and connector are mounted on the rear flange of the chassis and may be used in conjunction with a crystal pickup without a matching transformer.

The switch must be in the "radio" position during the alignment procedure

- GENERAL: The Delco Model R-1142 is a seven tube, two band superheterodyne receiver with a 10" dynamic speaker. Tuning is accomplished by means of the conventional manual control, or by push button switches which control adjustable permeability tuned coils. The frequency ranges of the push buttons are, left to right:
1. 535 to 820 K.C.
 2. 535 to 820 K.C.
 3. 730 to 1120 K.C.
 4. 730 to 1120 K.C.
 5. 1000 to 1560 K.C.
 6. 1000 to 1560 K.C.

MODEL R1142 Delco
Socket, Trimmers
Chassis

UNITED MOTORS SERVICE, INC.

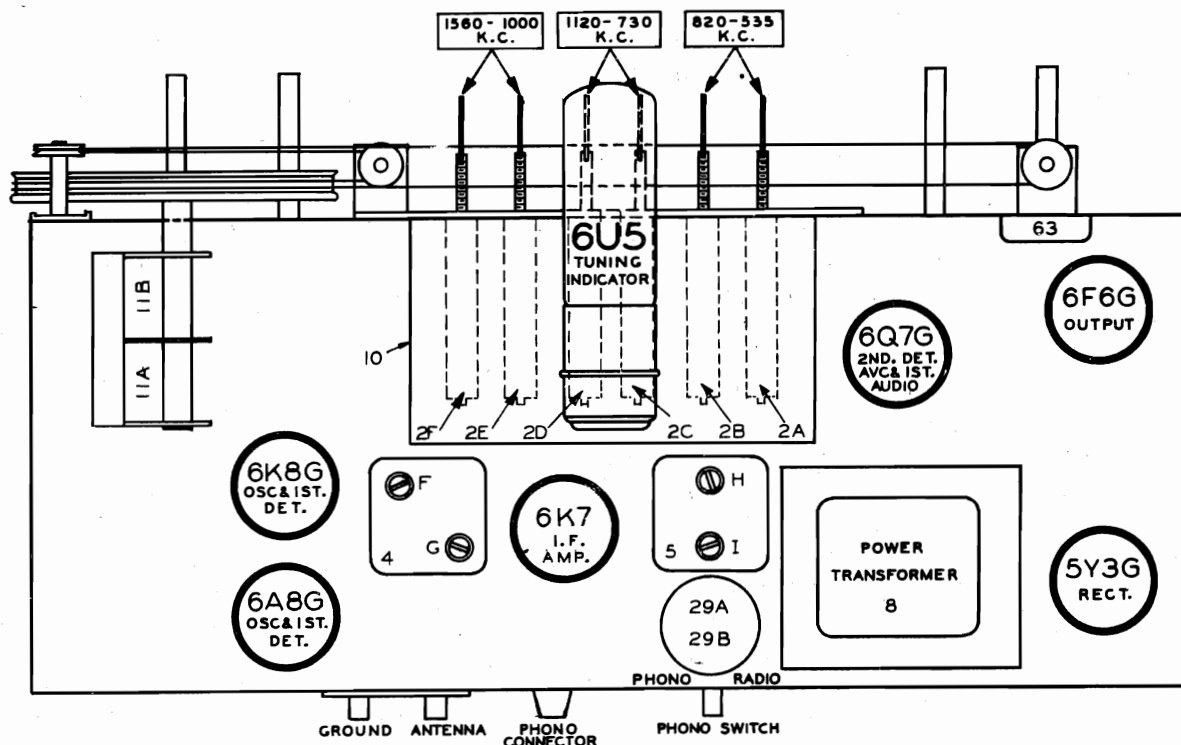


FIG. 3--PARTS LAYOUT--Top View

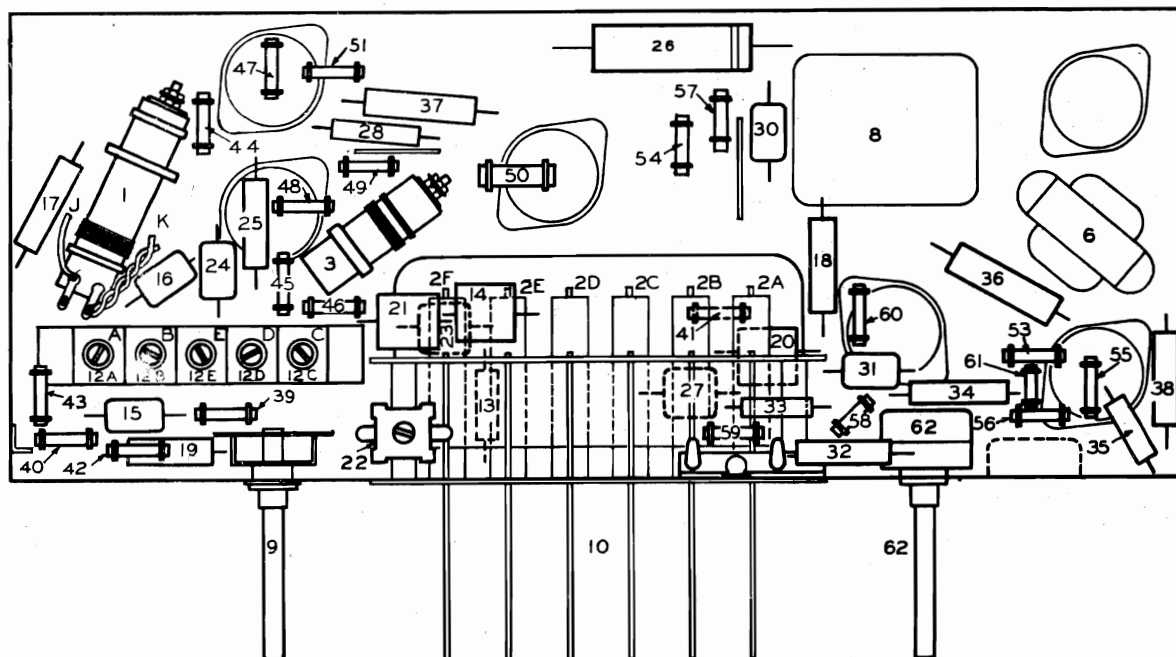
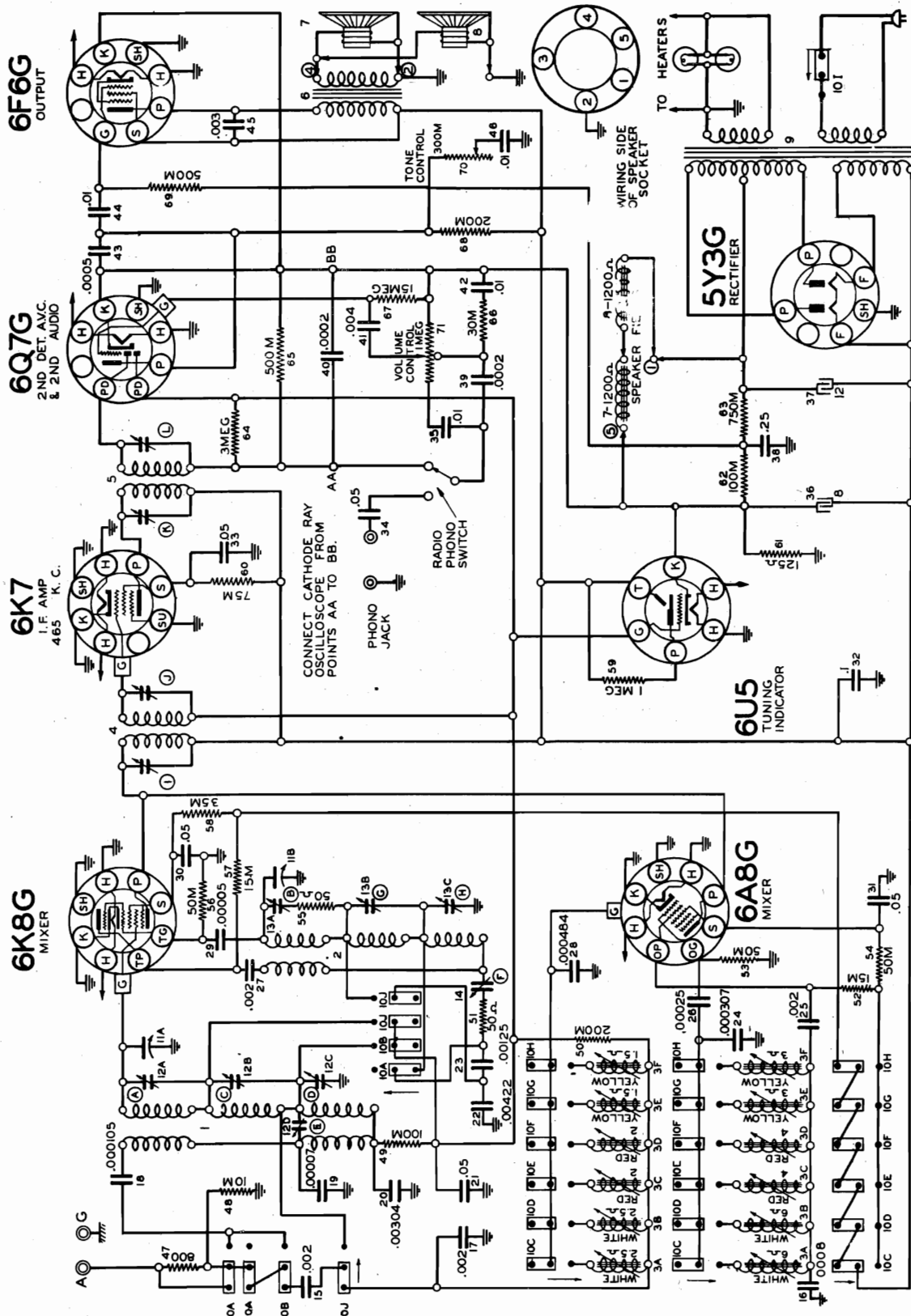


FIG. 4--PARTS LAYOUT--Bottom View

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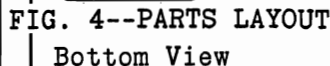
MODEL R1143 Delco
Schematic



IF PEAK 465 KC

FIG. 2--DELCO MODEL R-1143 CIRCUIT DIAGRAM

FOR ALIGNMENT AND
TUNER, SEE INDEX

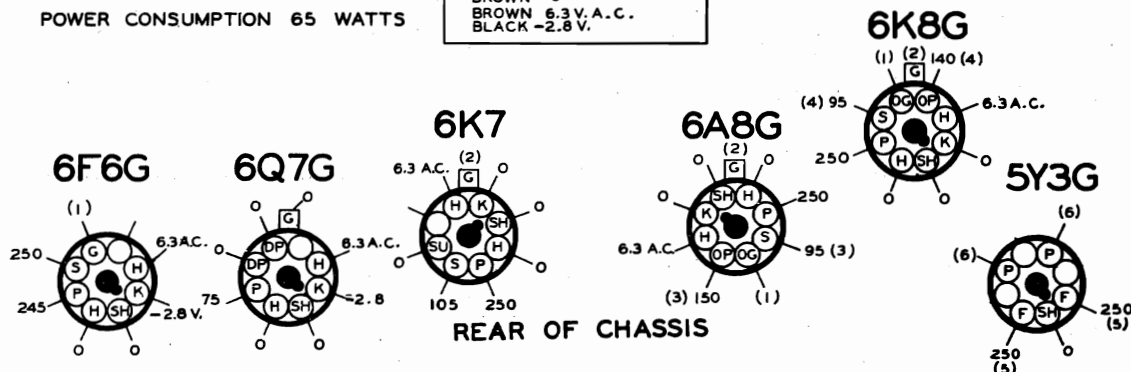


BOTTOM VIEW OF CHASSIS

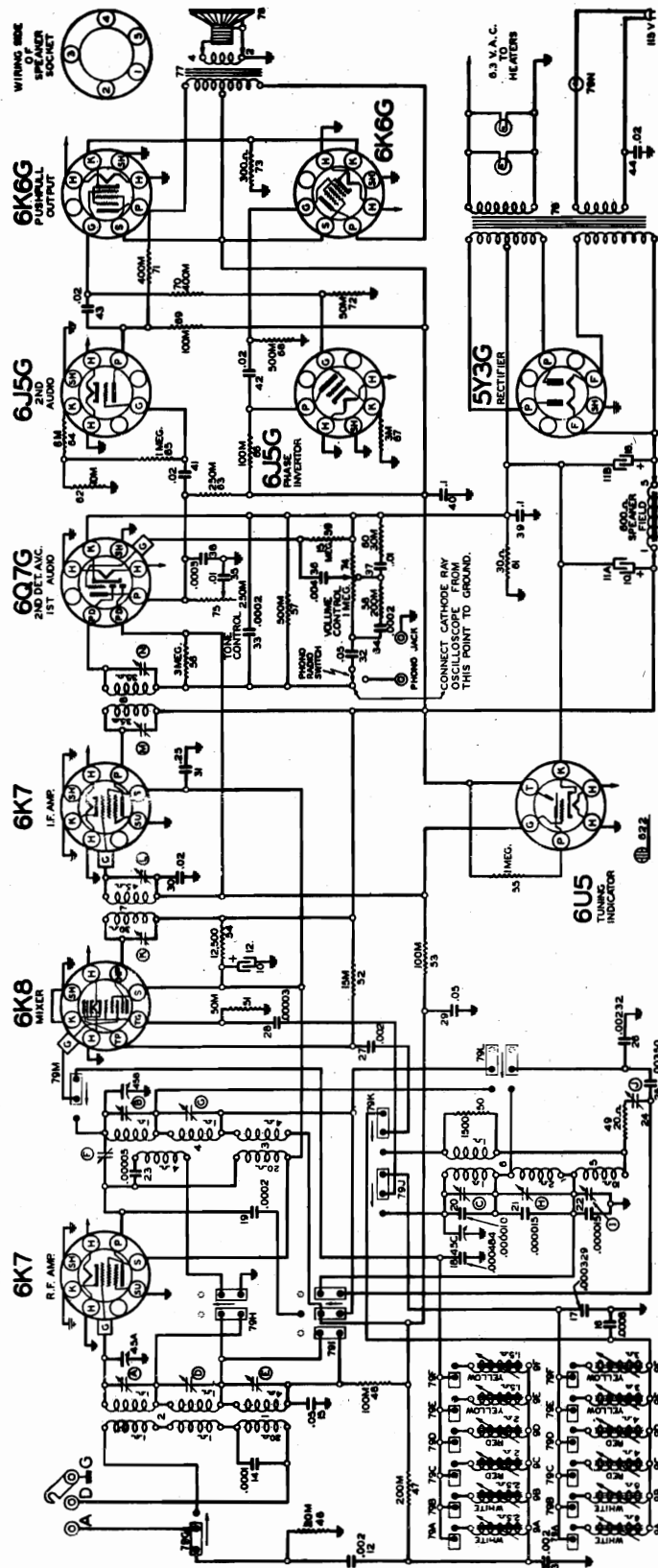
A.C. LINE VOLTAGE 115 VOLTS.
POWER CONSUMPTION 65 WATTS

TUNING EYE VOLTAGES AT CHASSIS END OF CABLE.
RED 250 V.
GREEN 0
BROWN 0
BROWN 6.3 V. A.C.
BLACK -2.8 V.

- (1) CANNOT BE READ WITH A VOLT METER
- (2) BIAS 2.8V. AS READ ACROSS RESISTOR 6I
- (3) CAN BE READ ONLY WHEN PUSH BUTTONS
2 TO 7 ARE "IN"
- (4) CAN BE READ ONLY WHEN PUSH BUTTONS
8, 9, & 10 ARE "IN"
- (5) HEATER VOLTAGE 5.0V. A.C. ACROSS
PINS F & F.
- (6) 750 V. A.C. AS READ ACROSS PINS P & P.



UNITED MOTORS SERVICE, INC.

MODEL R1144 Delco
Schematic NotesFOR TUNER
SEE INDEX

9-2-38

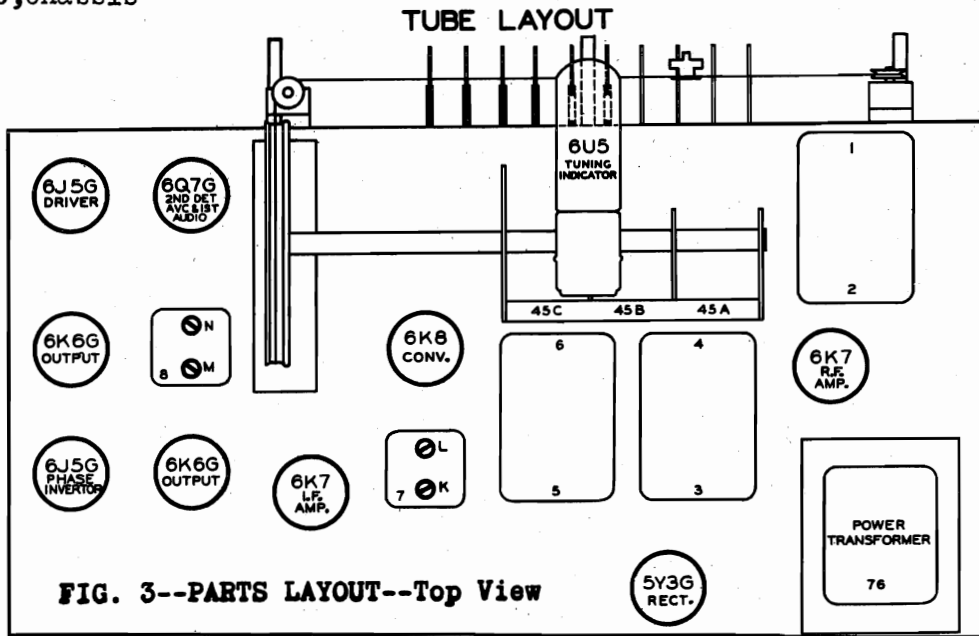
GENERAL: The Delco Model R-1144 is a ten tube, A.C., three band super-heterodyne receiver with a 12" dynamic speaker. Tuning is accomplished by means of the conventional manual control or by push button switching which control adjustable permeability tuned coils. Band switching is accomplished by the same series of switches which are, left to right:

1. Off Switch
2. Broadcast Band (Manual Tuning) 535-1690 K.C.
3. Intermediate Band (Manual Tuning) 1660-5500 K.C.
4. Short Wave Band (Manual Tuning) 5.3 - 18.0 M.C.
5. Broadcast Band (Automatic Tuning) 980 - 1560 K.C.
6. Broadcast Band (Automatic Tuning) 980 - 1560 K.C.
7. Broadcast Band (Automatic Tuning) 700 - 1100 K.C.
8. Broadcast Band (Automatic Tuning) 700 - 1100 K.C.
9. Broadcast Band (Automatic Tuning) 520 - 830 K.C.
10. Broadcast Band (Automatic Tuning) 520 - 830 K.C.

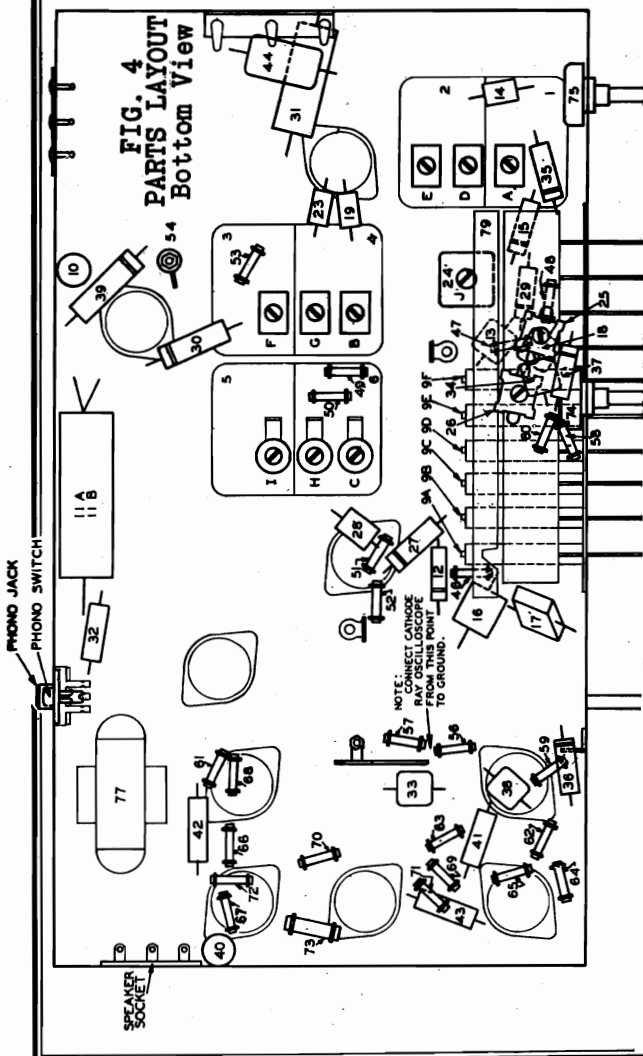
A phono switch and connector are mounted on the rear flange of the chassis and may be used in conjunction with a crystal pickup without a matching transformer. The switch must be in the "radio" position during the alignment procedure.

MODEL R1144 Delco
Socket, Trimmers
Voltage, Chassis

UNITED MOTORS SERVICE INC.



9-2-38



BOTTOM VIEW OF CHASSIS

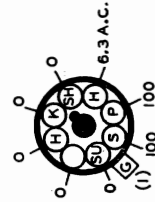
VOLTAGES MEASURED WITH 1000
OHM PER VOLT METER BETWEEN
SOCKET TERMINALS AND CHASSIS.
A.C. LINE VOLTAGE 115 VOLTS.
POWER CONSUMPTION 85 WATTS

TUNING EYE VOLTAGES AT
CHASSIS END OF CABLE.
RED 280 V.
GREEN (2)
BROWN 6.3 V. A.C.
BLACK 2.75 V.

TUBE SOCKET VOLTAGES

FIG. 1

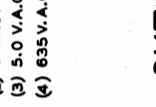
6K7



6K8



6K6G



6Q7G



6J5G



5Y3G



6K7



6K6G



6J5G



REAR OF CHASSIS

UNITED MOTORS SERVICE, INC.

MODEL R1144 Delco
MODEL R1145 Delco
Alignment

ALIGNMENT MODEL R1144

1. Aligning I-F Stages at 465 Kilocycles

- (a) Connect the ground lead of the signal generator to the chassis frame.
- (b) Connect the signal lead of the signal generator to the grid cap of the 6K8 tube through a .1 mfd. condenser, leaving the grid clip in place.
- (c) Connect the output meter across the plates of the 6K6G tube.
- (d) Press #2 button (Broadcast:Manual), turn the volume control on full and the tone control on treble and turn the variable plates of the condenser gang completely out of mesh and against the high frequency stop.
- (e) Set the signal generator to exactly 465 kilocycles and adjust the trimmers on the second I-F coil (Illus. NAM, Fig. 3) and the first I-F coil (Illus. K&L, Fig. 3) for maximum output. Use as low a signal from the signal generator as will give a readable indication on the output meter.
- (f) After completing the Alignment Procedure, the alignment should be checked with the Model 165 Cathode Ray Oscilloscope. Connect the oscilloscope from point (Fig. 4) to ground.

2. Aligning at 1690 Kilocycles

- (a) Disconnect the signal lead of the signal generator from the grid of the 6K8 and connect to the antenna terminal of the receiver through a .002 mfd. mica condenser.
- (b) With the controls set as before, adjust the broadcast oscillator trimmer for maximum output (Illus. I, Fig. 4).

3. Aligning at 1400 Kilocycles

- (a) Set the signal generator to approximately 1400 kilocycles.
- (b) Rotate the variable section of the condenser gang until the signal is tuned in with maximum output.
- (c) Adjust the antenna trimmer (Illus. E, Fig. 4) and R-F trimmer (Illus. F, Fig. 4) for maximum output.

4. Aligning at 600 Kilocycles

- (a) Set the signal generator to approximately 600 kilocycles.
- (b) Rotate the variable section of the condenser gang until this signal is tuned in with maximum output.
- (c) Adjust the oscillator series condenser (Illus. J, Fig. 4) while rocking the condenser gang back and forth through the signal, until maximum output is obtained.

5. Aligning at 17. Megacycles

- (a) Remove the .0002 mfd. condenser and connect the signal lead of the signal generator to the antenna trimmer of the receiver through a 400 ohm resistor.
- (b) Press #4 button (Short Wave Band:Manual).
- (c) Set the signal generator to exactly 17. megacycles and rotate the variable section of the condenser gang to indicate 17. megacycles on the test scale.
- (d) Adjust the oscillator trimmer condenser (Illus. C, Fig. 4) for maximum output.
- (e) Adjust the R-F trimmer condenser (Illus. B, Fig. 4) and antenna trimmer (Illus. A, Fig. 4) while rocking the condenser gang back and forth through the signal, until maximum output is obtained.
- (f) Increase the signal output from the signal generator and check for image frequency. If the image does not fall at approximately 1630 megacycles, repeat section 5.

6. Aligning at 5. Megacycles

- (a) Press #3 button (Medium Wave Band:Manual).
- (b) Set the signal generator to exactly 5. megacycles and rotate the variable section of the condenser gang to indicate 5. megacycles on the test scale.
- (c) Adjust the oscillator trimmer condenser (Illus. H, Fig. 4) R-F trimmer (Illus. G, Fig. 4) and antenna trimmer (Illus. D, Fig. 4) for maximum output.

7. Repeat Sections 2, 3 and 4.

ALIGNMENT MODEL R1145

1. Aligning I-F Stages at 465 Kilocycles

- (a) Connect the ground lead of the signal generator to the chassis frame.
- (b) Connect the signal lead of the signal generator to the grid cap of the 6K8G tube through a .1 mfd. condenser, leaving the grid cap clip in place.
- (c) Connect the output meter from the plate of the 6AC5G tube to B plus.
- (d) Turn the rotor plates of the gang condenser to a point where no whistles or beat notes are heard.
- (e) Set the signal generator to exactly 465 kilocycles.
- (f) Adjust the trimmers on the first I-F coil (Illus. G & H, Fig. 3) and the second I-F coil (Illus. I & J, Fig. 3) for maximum output.
- (g) After completing the alignment procedure, the alignment should be checked with a cathode ray oscilloscope. Connect the oscilloscope from the high side of the volume control to ground.

2. Aligning at 1750 Kilocycles

- (a) Remove the signal lead of the signal generator from the grid of the 6K8G and connect to the antenna terminal of the receiver through a .0002 mfd. mica condenser.
- (b) Set the signal generator to exactly 1750 kilocycles.
- (c) Turn the rotor plates of the gang condenser completely out of mesh and against the high frequency stop.
- (d) With the band change switch in the Broadcast position, adjust the oscillator trimmer condenser (Illus. F, Fig. 3) for maximum output.

3. Aligning at 1500 Kilocycles

- (a) Leave the signal generator leads connected as before.
- (b) Set the signal generator to 1500 kilocycles.
- (c) Rotate the variable plates of the gang condenser until this signal is tuned in with maximum output.
- (d) Adjust the antenna trimmer (Illus. A, Fig. 3) for maximum output.

4. Aligning at 600 Kilocycles

- (a) Set the signal generator to 600 kilocycles.
- (b) Rotate the variable plates of the gang condenser until this signal is tuned in with maximum output.
- (c) Adjust the oscillator padder condenser (Illus. C, Fig. 3) while rocking the rotor plates back and forth through the signal until maximum output is obtained.

5. Aligning at 17 Megacycles

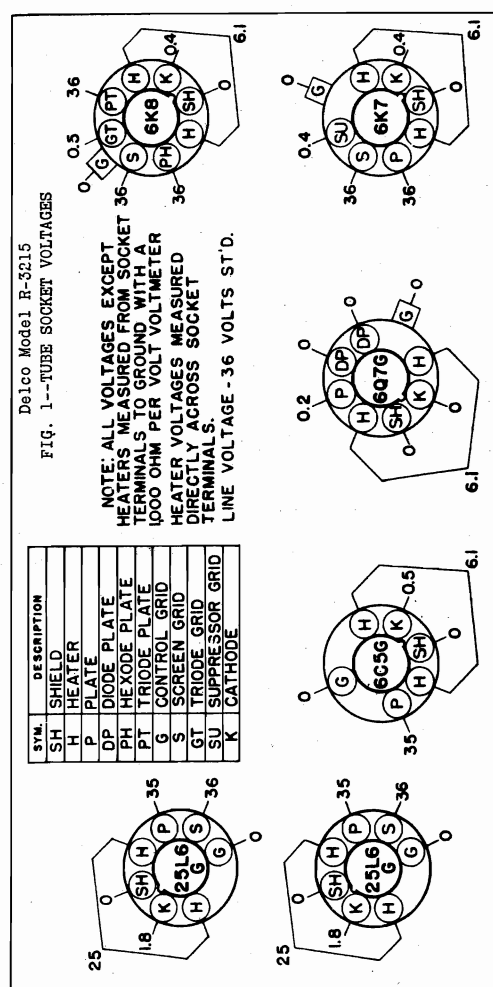
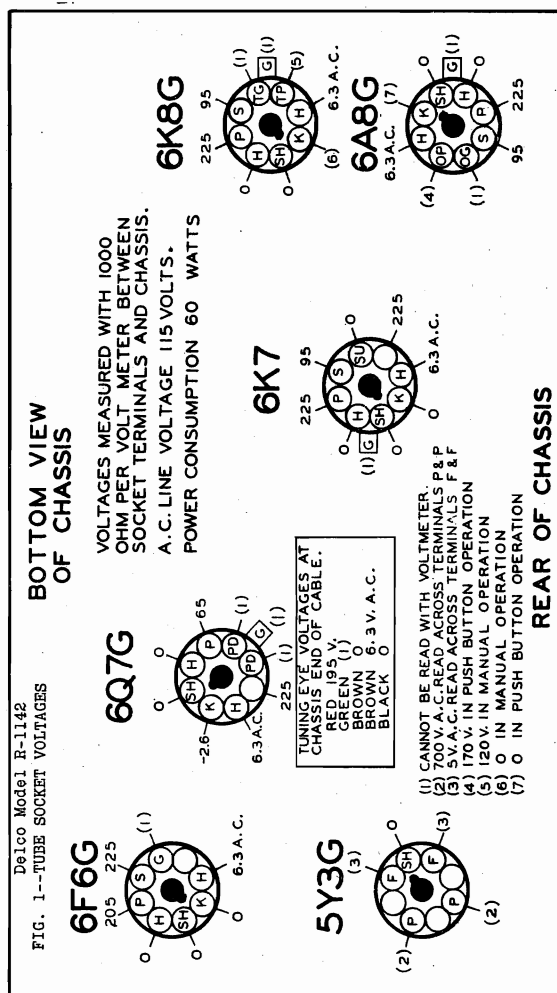
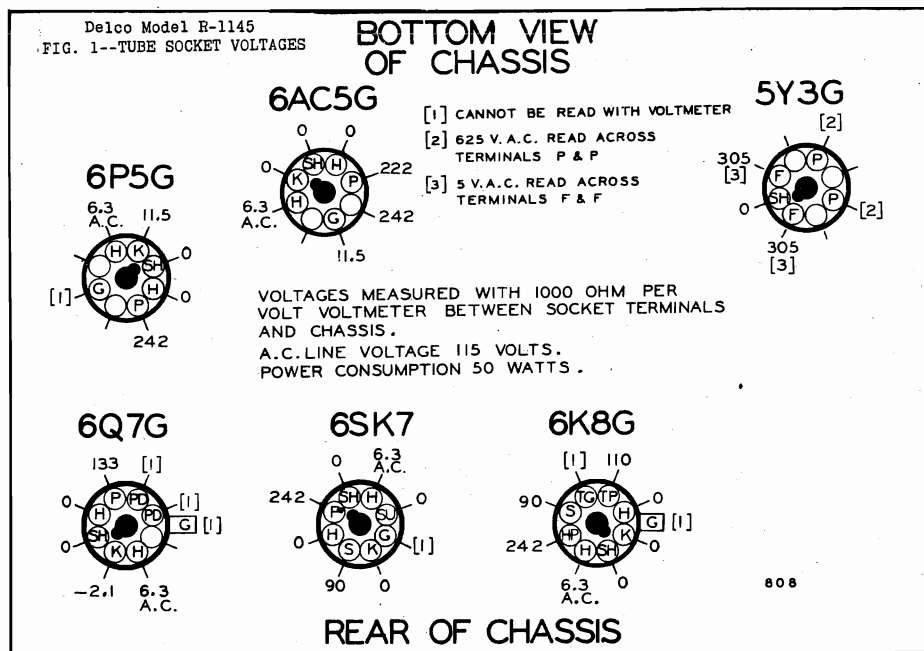
- (a) Remove the .0002 mfd. mica condenser coupling the signal generator lead to the antenna terminal of the receiver and replace with a 400 ohm resistor.
- (b) Turn the band change switch to short wave position.
- (c) Set the signal generator to 17 megacycles.
- (d) Turn the rotor plates of the gang condenser until this signal is tuned in with maximum output.
- (e) Adjust the oscillator trimmer (Illus. E, Fig. 3) and the antenna trimmer (Illus. B, Fig. 3) for maximum output.

6. Aligning at 6 Megacycles

- (a) Set the signal generator to 6 megacycles.
- (b) Turn the rotor plates of the gang condenser until this signal is tuned in with maximum output.
- (c) Adjust the oscillator padding condenser (Illus. D, Fig. 3) while rocking the rotor plates back and forth through the signal until maximum output is obtained.

MODEL R1142 Delco
MODEL R1145 Delco
MODEL R3215 Delco
Voltage

UNITED MOTORS SERVICE INC.



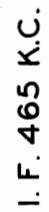


FIG. 2--DELCO MODEL R-1145 CIRCUIT DIAGRAM

3-24-39

Date:

MODEL R1145 Delco
Socket, Trimmers
Chassis

UNITED MOTORS SERVICE, INC.

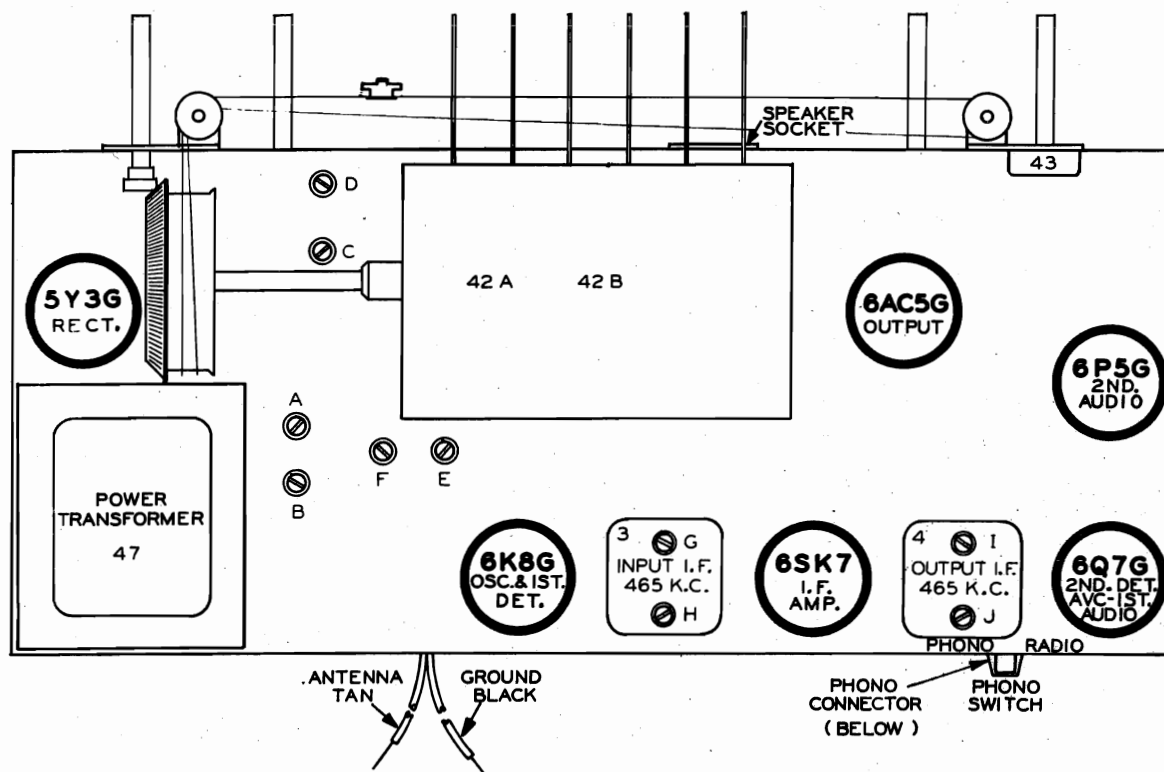


FIG. 3--PARTS LAYOUT--Top View

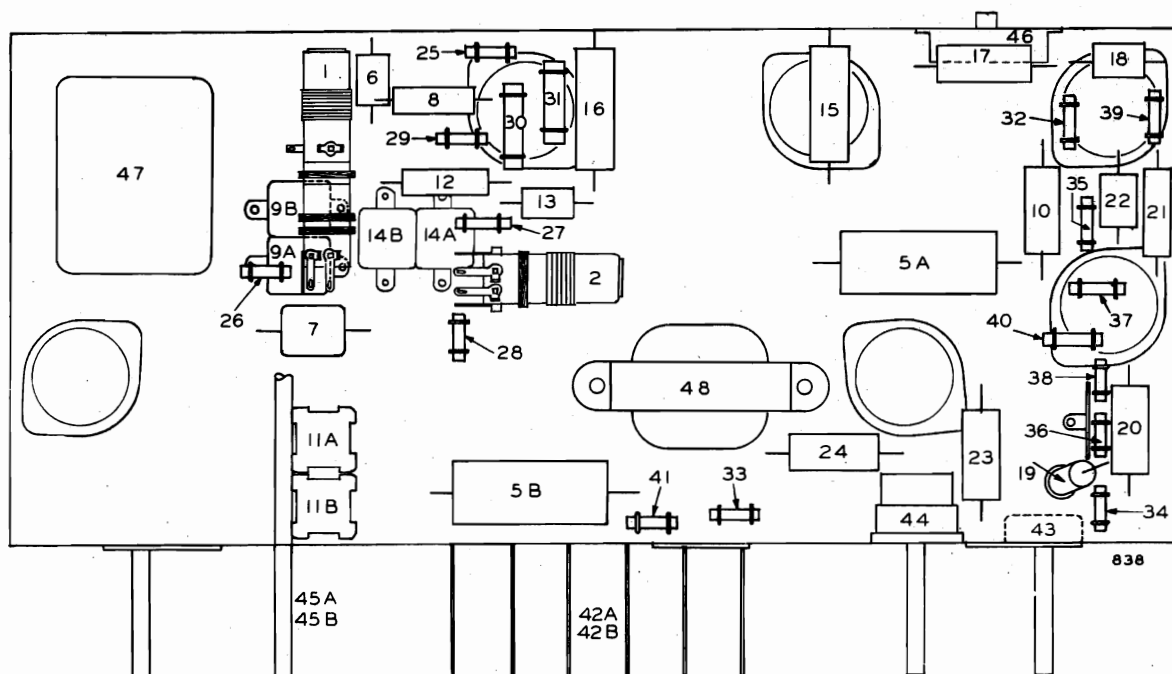


FIG. 4--PARTS LAYOUT--Bottom View

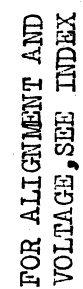


FIG. 2--DELCO MODEL R-3215 CIRCUIT DIAGRAM

GENERAL: The Delco Model R-3215 is a six tube, two band, 32 volt radio with A.V.C. and tone control.

MODEL R3215 Delco
Socket, Trimmers
Chassis

UNITED MOTORS SERVICE, INC.

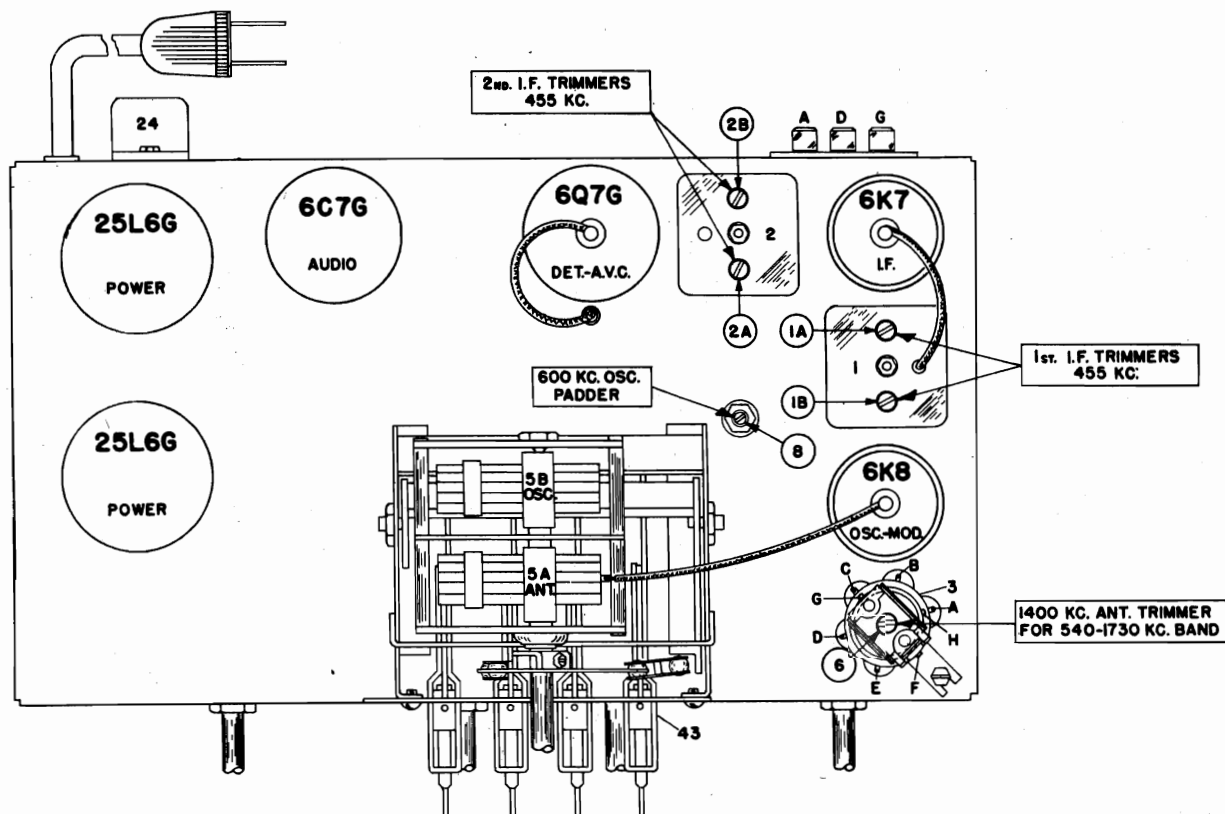


FIG. 3--PARTS LAYOUT--Top View

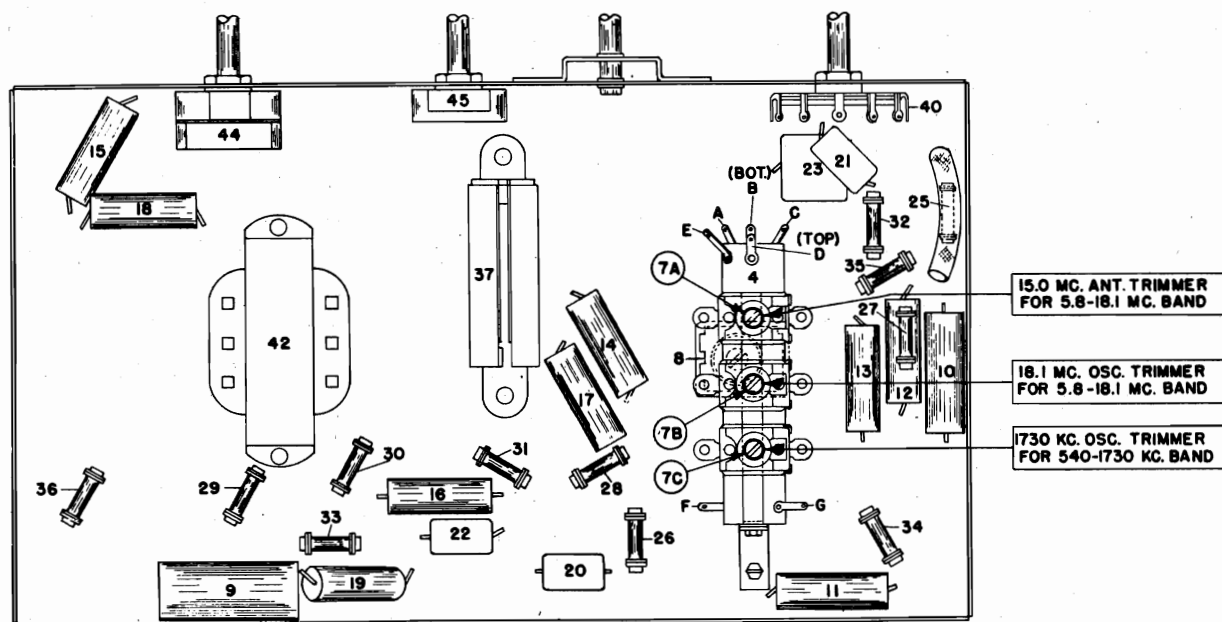


FIG. 4--PARTS LAYOUT--Bottom View

3-24-39

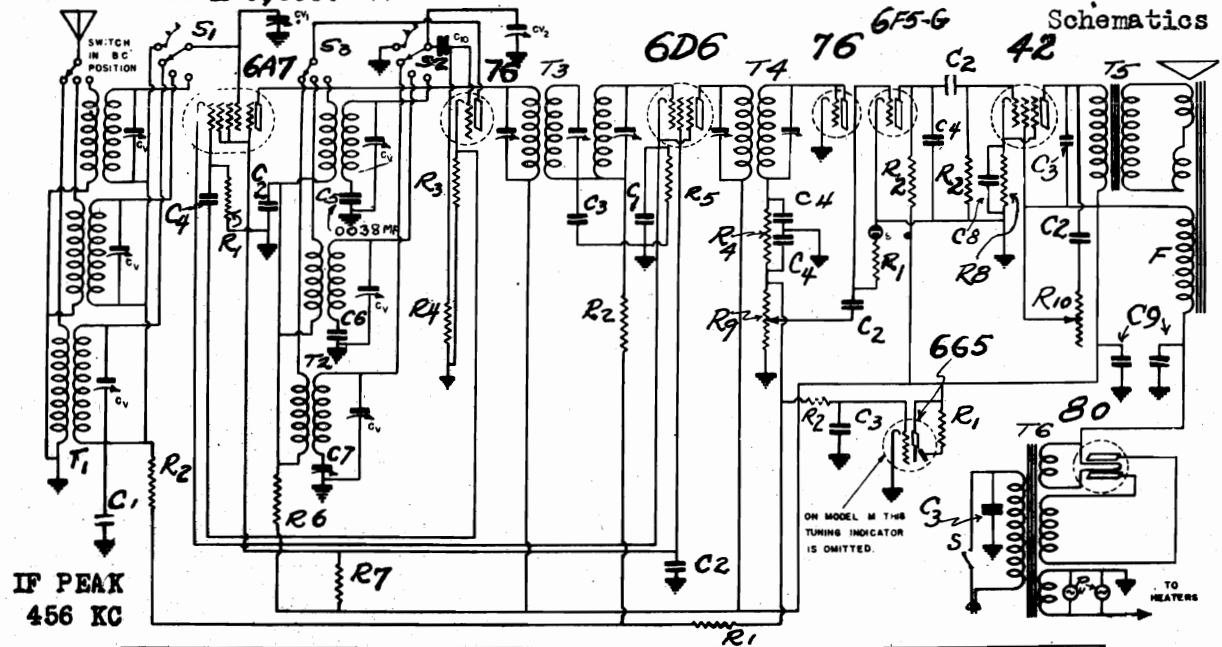
WALGREEN CO.

MODELS M-8,800

Chassis M,ME

MODELS M-8,800. 8(7) TUBE 3 BAND SUPERHETERODYNE RECEIVER - AC MODEL 30

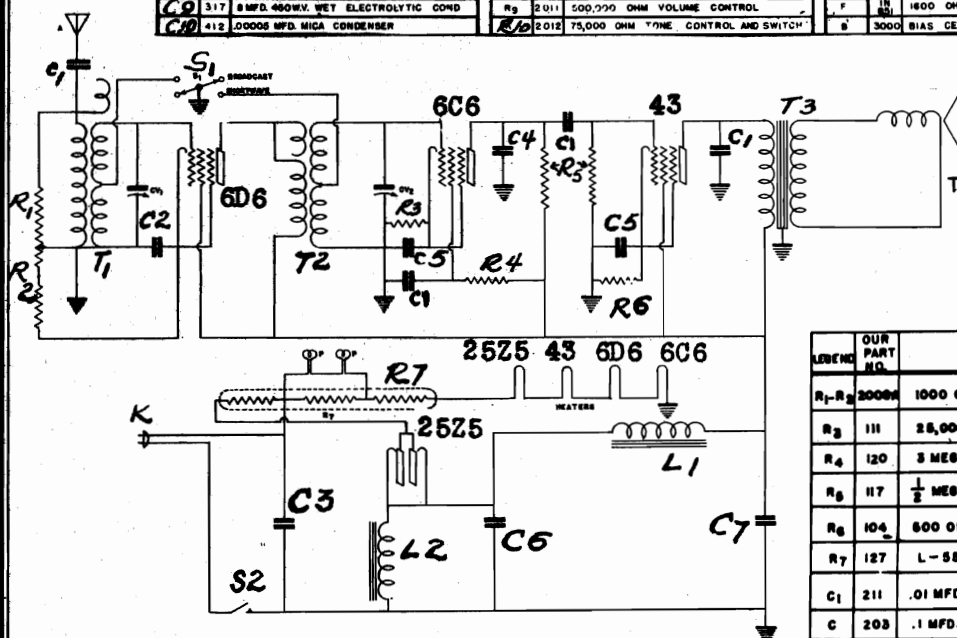
Schematics



LEGEND	OUR PART NO.	DESCRIPTION
C1	203	.005 MFD. 200V TUBULAR CONDENSER
C2	206	.005 MFD. 400V TUBULAR CONDENSER
C3	203	.005 MFD. 400V TUBULAR CONDENSER
C4	401	.00025 MICA CONDENSER
C5	418	.00025 MICA CONDENSER
C6	401	.00025 MICA CONDENSER
C7	502	5-30 MFD. TRIMMER CONDENSERS
C8	500	5-30 MFD. TRIMMER CONDENSERS
C9	317	8 MFD. 450V. WET ELECTROLYTIC COND.
C10	412	.00005 MFD. MICA CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
R1	811	2 500K VARIABLE CONDENSER
R2	119	1 MEGOHM 1/2 WATT CARBON RESISTOR
R3	117	1/2 MEGOHM 1/2 WATT CARBON RESISTOR
R4	105	1,000 OHMS 1/2 WATT CARBON RESISTOR
R5	113	50,000 OHMS 1/2 WATT CARBON RESISTOR
R6	103	250 OHMS 1/2 WATT CARBON RESISTOR
R7	111	25,000 OHMS 1/2 WATT CARBON RESISTOR
R8	112	25,000 OHMS 1/2 WATT CARBON RESISTOR
R9	122	420 OHMS 2 WATT WIRE WOUND RESISTOR
R10	2011	500,000 OHM VOLUME CONTROL
R11	2012	75,000 OHM TONE CONTROL AND SWITCH

LEGEND	OUR PART NO.	DESCRIPTION
T1	1215	SHIELDED 3 BAND ANTENNA COIL
T2	1406	SHIELDED 3 BAND OSCILLATOR COIL
T3	1508	TRIPLE TUNED I.F. TRANSFORMER
T4	1506	DUAL I.F. TRANSFORMER
T5	1601	SPKR TRANSFORMER
T6	1012	POWER TRANSFORMER
S1	1913	2 BAND BAND SWITCH
P	2902	MAZDA #46 PILOT LIGHT
S	—	SWITCH ON TONE CONTROL
F	1800	1800 OHM SPEAKER FIELD
B	3000	BIAS CELL



LEGEND	OUR PART NO.	DESCRIPTION
C1	206	.005 MFD. 400 VOLT TUBULAR CONDENSER
C2	401	.00025 MFD. MICA CONDENSER
C3	IN 308	10 MFD. 35 VOLT PEAK ELECTROLYTIC CONDENSER
C4	IN 308	20 MFD. 220 VOLT PEAK ELECTROLYTIC CONDENSER
C5	IN 308	10 MFD. 220 VOLT PEAK ELECTROLYTIC CONDENSER
T1	1205	TWO BAND ANTENNA TRANSFORMER
T2	1305	TWO BAND INTERSTAGE TRANSFORMER
L1	804	SPEAKER FIELD (2500 OHM)

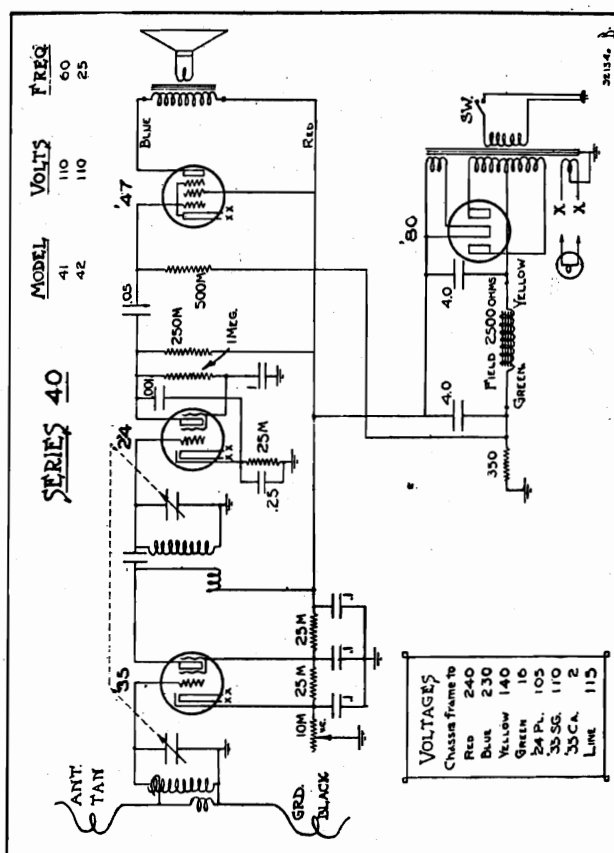
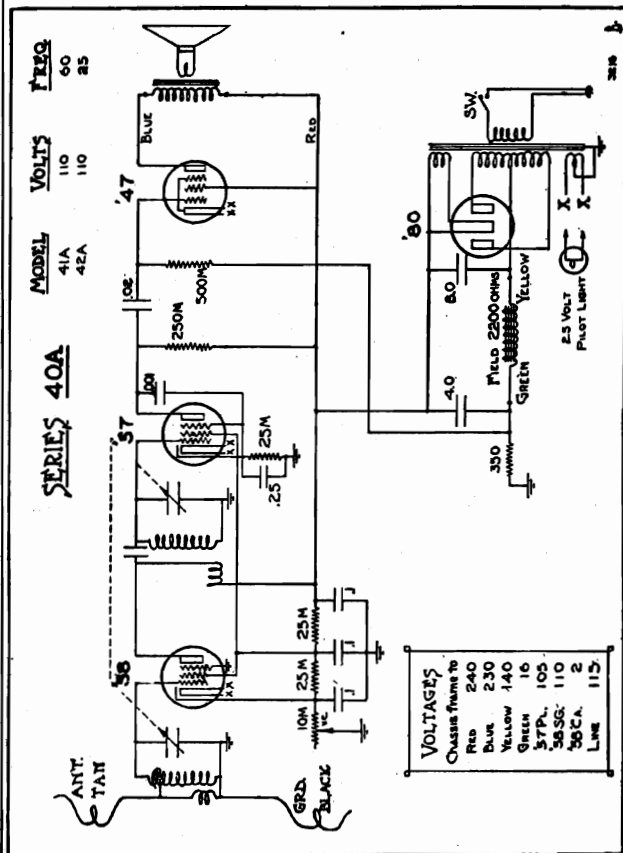
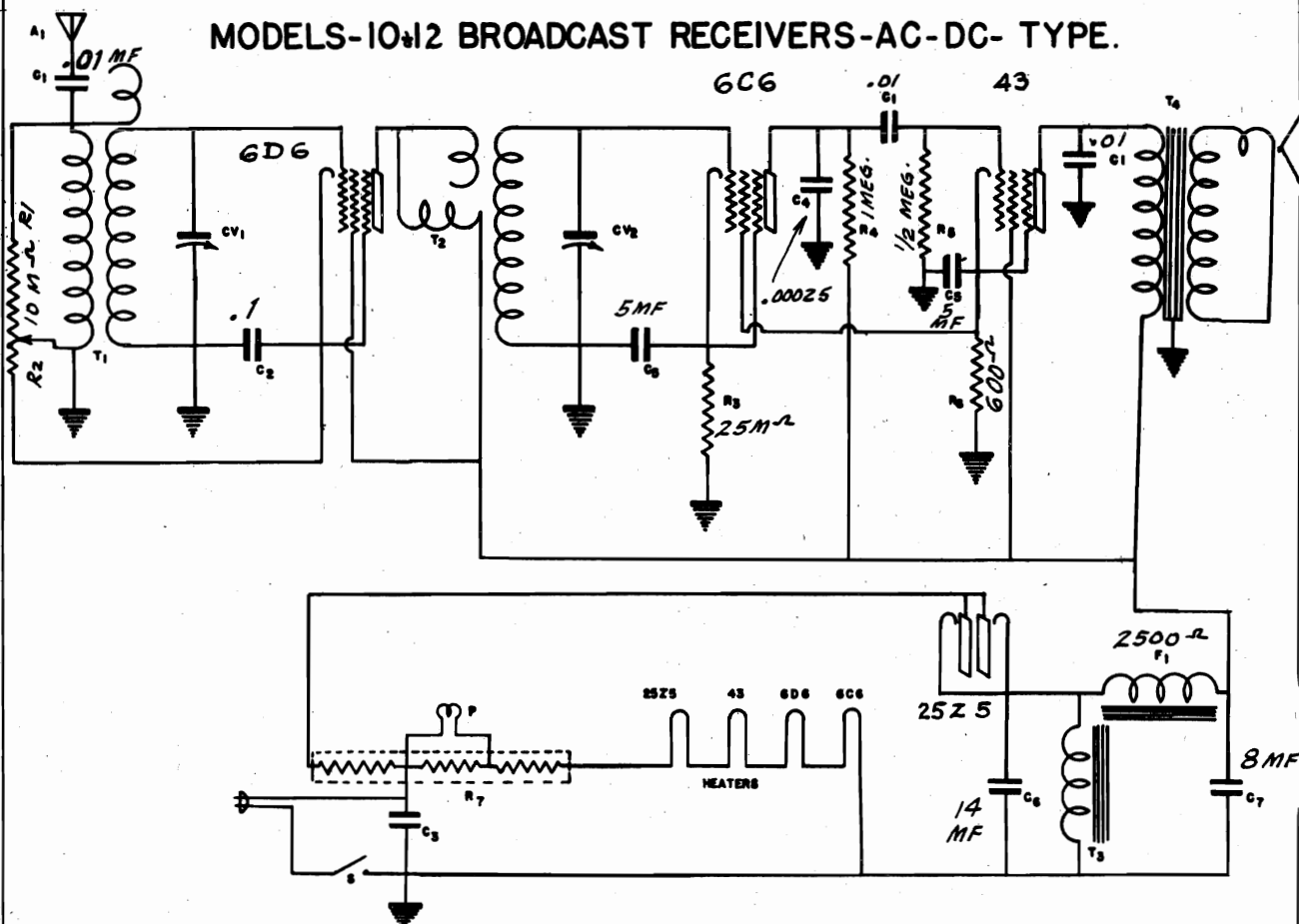
LEGEND	OUR PART NO.	DESCRIPTION
R1-R2	2000	1000 OHM VOLUME CONTROL (275 OHM MIN.)
R3	111	25,000 OHM 1/2 WATT CARBON RESISTOR
R4	120	3 MEGOHM 1/2 WATT CARBON RESISTOR
R5	117	1/2 MEGOHM 1/2 WATT CARBON RESISTOR
R6	104	600 OHM 1/2 WATT CARBON RESISTOR
R7	127	L-55-S2 BALLAST TUBE
C1	211	.01 MFD. 400 VOLT TUBULAR CONDENSER
C	203	.1 MFD. 200 VOLT TUBULAR CONDENSER
T3	804A	5" DYNAMIC SPEAKER TRANSFORMER
L1	800	IRON CORE FILTER CHOKES
A	1805	20 FEET INDOOR AERIAL
P	2902	MAZDA #46 PILOT LIGHT
S1	1902	BAND SELECTOR SWITCH
S	—	LINE SWITCH ON VOLUME CONTROL
CV1	601	TWO BAND VARIABLE CONDENSER
K	1800	RUBBER COVERED LINE CORD

MODELS 10,12
MODELS 41,42

WALGREEN CO.

MODELS 41A,42A
Schematics

MODELS-10+12 BROADCAST RECEIVERS-AC-DC- TYPE.



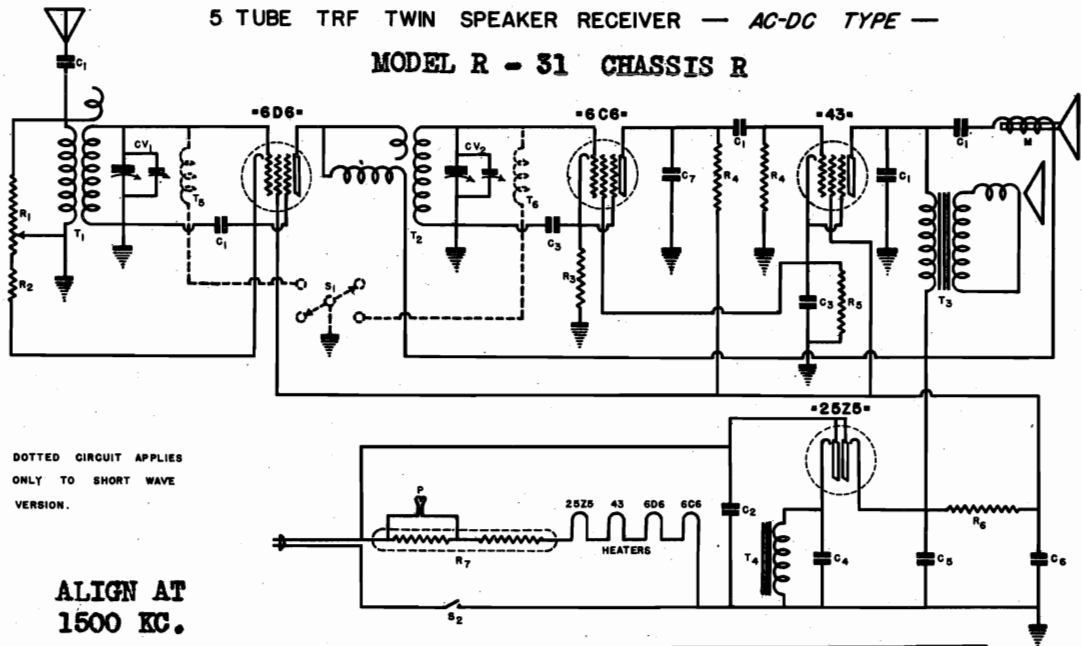
DECIMAL ARE MICROFARADS. WHOLE NUMBERS ARE OHMS.

WALGREEN CO.

MODEL R-31, Chassis R
MODEL 360, Chassis HE
Schematics

5 TUBE TRF TWIN SPEAKER RECEIVER — AC-DC TYPE —

MODEL R - 31 CHASSIS R



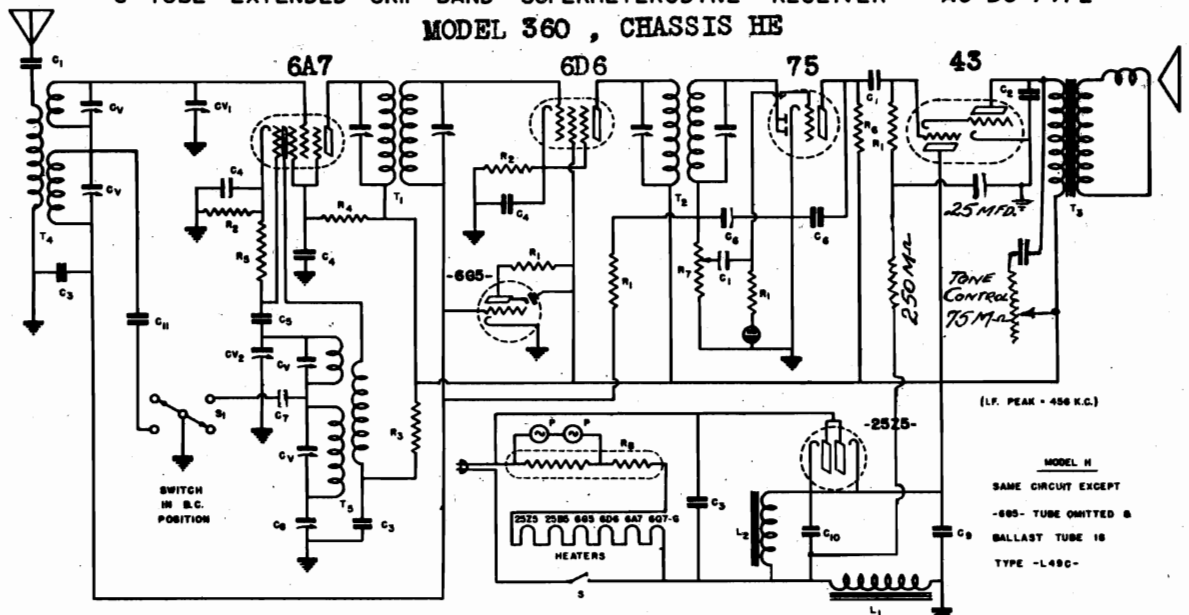
LEGEND	OUR PART NO.	DESCRIPTION
R ₁	2006	10,000 OHM VOLUME CONTROL
R ₂	—	275 OHM (Minimum as Volume Control)
R ₃	111	25,000 OHM 1/2 WATT CARBON RESISTOR
R ₄	117	500,000 OHM 1/2 WATT CARBON RESISTOR
R ₅	104	500 OHM 1/2 WATT CARBON RESISTOR
R ₆	108	5000 OHM 1/2 WATT CARBON RESISTOR
R ₇	2903	L-55-B BALLAST TUBE
P	2902	MAZDA # 46 PILOT LIGHT

LEGEND	OUR PART NO.	DESCRIPTION
CV ₁	610	2 GANG VARIABLE CONDENSER
C ₁	211	.01 MFD. 400V. TUBULAR CONDENSER
C ₂	210	.1 MFD. 400V. TUBULAR CONDENSER
C ₃	316	5MFD. 25WV. ELECTROLYTIC CONDENSER
C ₄	316	4MFD. 150WV. ELECTROLYTIC CONDENSER
C ₅	316	14MFD. 150WV. ELECTROLYTIC CONDENSER
C ₆	316	8MFD. 150WV. ELECTROLYTIC CONDENSER
C ₇	401	.00025 MFD. MICA CONDENSER
M	900	MAGNETIC SPEAKER

LEGEND	OUR PART NO.	DESCRIPTION
S ₁	1914	BAND SELECTOR SWITCH
S ₂	—	LINE SWITCH ON VOLUME CONTROL
T ₁	1200	ANTENNA COIL
T ₂	1300	RF COIL
T ₃	810	SPEAKER OUTPUT TRANSFORMER
T ₄	810	2500 OHM SPEAKER FIELD
T ₅	1612	SHORT WAVE ANTENNA SHUNT
T ₆	1612	SHORT WAVE RF SHUNT

6 TUBE EXTENDED SKIP-BAND SUPERHETERODYNE RECEIVER — AC-DC TYPE

MODEL 360, CHASSIS HE



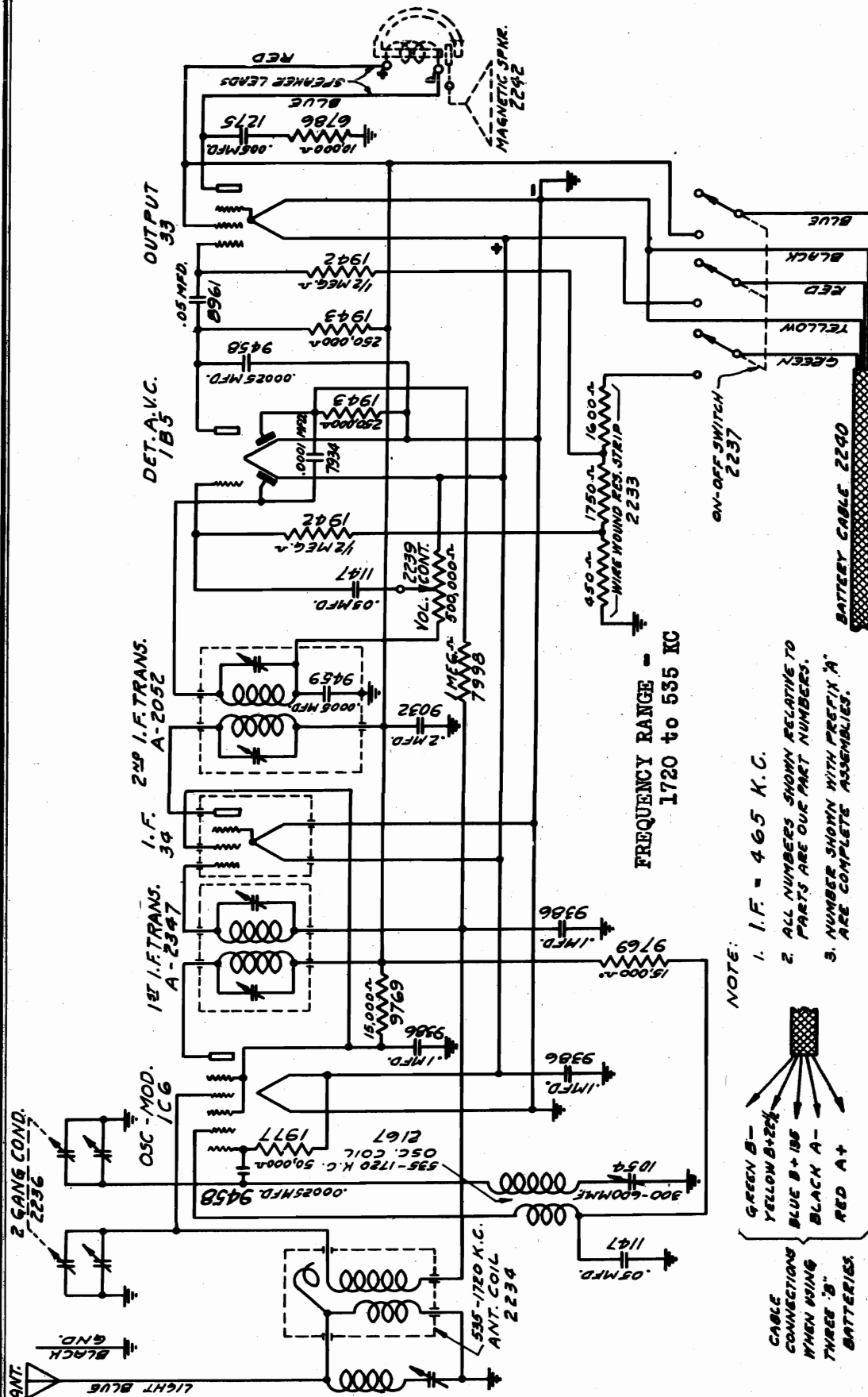
LEGEND	OUR PART NO.	DESCRIPTION
C ₁	211	.01 MFD-400V TUBULAR CONDENSER
C ₂	208	.05 MFD-400V TUBULAR CONDENSER
C ₃	210	.1 MFD-400V TUBULAR CONDENSER
C ₄	203	.1 MFD-200V TUBULAR CONDENSER
C ₅	400	.0001 MICA CONDENSER
C ₆	401	.00025 MICA CONDENSER
C ₇	411	.00125 MICA CONDENSER
C ₈	507	5 PLATE PADDING CONDENSER
C ₉	314	10 MFD 150W.V. ELECTROLYTIC COND.
C ₁₀	311	20 MFD 150 W.V. ELECTROLYTIC COND.

LEGEND	OUR PART NO.	DESCRIPTION
CV ₁	612	2 GANG VARIABLE CONDENSER
R ₁	119	1 MEGOHM 1/2 WATT CARBON RESISTOR
R ₂	103	250 OHMS 1/2 WATT CARBON RESISTOR
R ₃	108	10,000 OHMS 1/2 WATT CARBON RESISTOR
R ₄	111	25,000 OHMS 1/2 WATT CARBON RESISTOR
R ₅	113	50,000 OHMS 1/2 WATT CARBON RESISTOR
R ₆	116	250,000 OHMS 1/2 WATT CARBON RESISTOR
R ₇	2009	50,000 OHMS VOLUME CONTROL & SWITCH
R ₈	2905	L-49-C BALLAST TUBE (MODEL H)
R ₉	2906	L-42-C BALLAST TUBE (MODEL HE)
C	212	.05 MFD - 200 V TUBULAR CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
T ₁	1503	1st I.F. TRANSFORMER
T ₂	1506	DIODE I.F. TRANSFORMER (2500 OHMS)
T ₃	825	SPEAKER OUTPUT TRANSFORMER
T ₄	1210	ANTENNA COIL
T ₅	1404	OSCILLATOR COIL
L ₁	1101	CHOKE
L ₂	809	SPEAKER FIELD (2500 OHMS)
S ₁	1914	BAND SELECTOR SWITCH
S	—	SWITCH ON TONE CONTROL
P	2902	MAZDA # 46 PILOT LIGHT

MODEL 32B
Schematic
Alignment

WALGREEN CO.

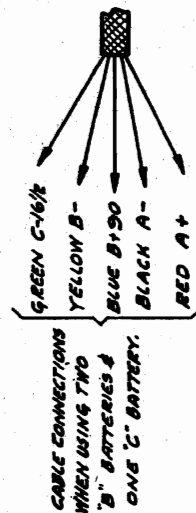
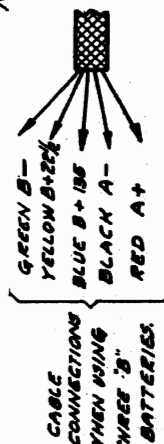


NOTE:

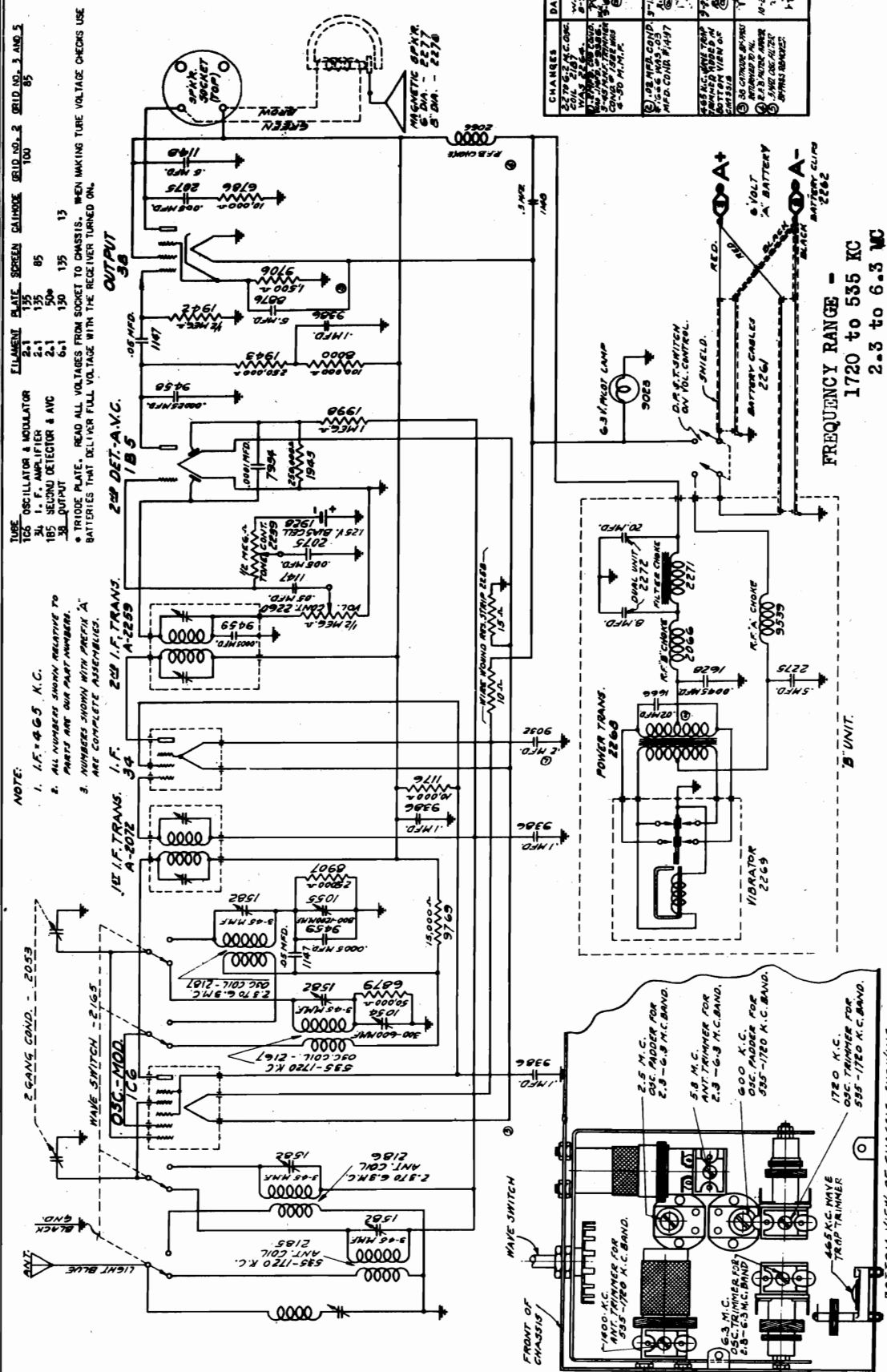
1. I.F. = 465 K.C.

2. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.

3. NUMBER SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.



CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION VOL. VIII.
Align I-F trimmers at 465 KC. Dial and generator at 1715 KC, peak oscillator trimmer. Dial and generator at 1400 KC, peak antenna trimmer. Dial and generator at 600 KC, peak the oscillator trimmer to peak.

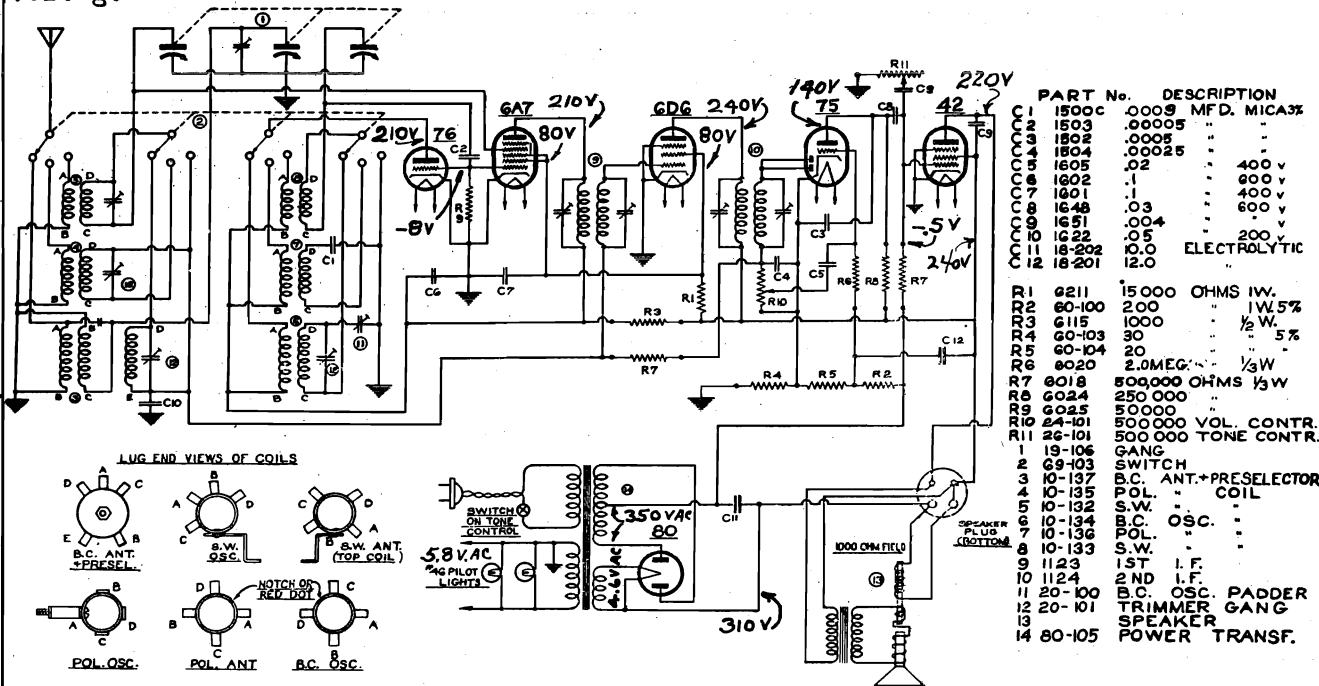


ALIGNMENT - Peak IF trimmers at 465 KC. **BROADCAST BAND** - Dial and generator to 1720 KC, adjust oscillator trimmer to peak, dial and generator to 1400 KC, then adjust antenna trimmer to peak. Dial and generator to 600 KC, pad oscillator circuit to maximum peak. **SHORTWAVE BAND** - Dial and generator to 6.3 MC, peak oscillator trimmer. Dial and generator to 5.8 MC, adjust antenna trimmer to peak. Dial and generator to 2.5 MC, pad oscillator circuit to peak. Rock variable condenser during padding adjustments. Repeat adjustments for maximum response. Peak wave trap at 465 KC.

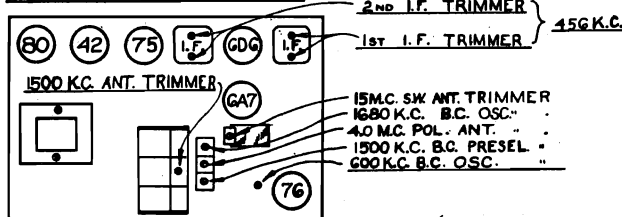
MODEL 166RIS

Schematic, Socket
Trimmers, Alignment
Voltage

WALGREEN CO.



TUBE + TRIMMER LOCATION



IF PEAK 456 KC

MODEL No. 166 RIS

DESCRIPTION

This receiver is a 7 tube alternating current operated superheterodyne. The tubes used are a 76 as oscillator, a 6A7 as modulator, a 6D6 as I.F. amplifier, a 75 as A.V.C. and audio rectifier and audio voltage amplifier, a 42 as power audio amplifier, an 80 as a power rectifier and a 6G5 as tuning indicator.

This receiver is made to cover 3 tuning bands, the broadcast band which ranges from 1680 K.C. to 535 K.C., the middle or police band which has a frequency range of from 5.6 M.C. to 1.7 M.C. and the high frequency or foreign band which is from 20 M.C. to 5.4 M.C.

ALIGNMENT PROCEDURE

The following alignment procedure is for use only by competent service men having the proper equipment. Re-alignment is very seldom needed and is usually only required after some major part has been replaced because of damage to the receiver.

The equipment required for re-aligning this receiver is an output meter and a modulated source of radio frequency (a signal generator or micro-volter). This source of radio frequency must be accurately calibrated in frequency and must have a method of varying the output.

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground post of the receiver. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

Leaving the wave switch on broadcast position turn the dial to the extreme high frequency end. Feed a 1680 K.C. signal to the receiver antenna post through a .00025 M.F. mica condenser. Adjust the 1680 K.C. broadcast oscillator trimmer for maximum output. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. broadcast antenna trimmer and the 1500 K.C. broadcast preselector trimmer for maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output *while tuning the receiver back and forth across the signal* from the generator. This completes the alignment of the broadcast band.

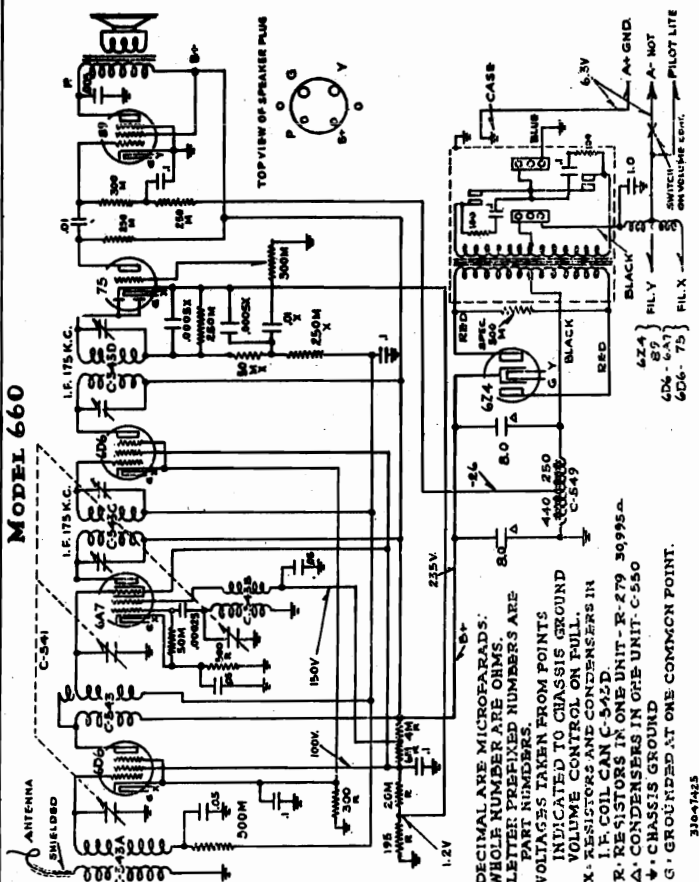
The police band is aligned by feeding 4.0 M.C. signal to the receiver antenna lead through the .00025 condenser. Turn the wave switch to the center position and tune the receiver to this signal. Adjust the 4.0 M.C. police antenna trimmer for best output.

The short wave band is aligned in the same way using a 15 M.C. signal and adjusting the 15 M.C. short wave antenna trimmer after having turned the wave switch to the right hand position.

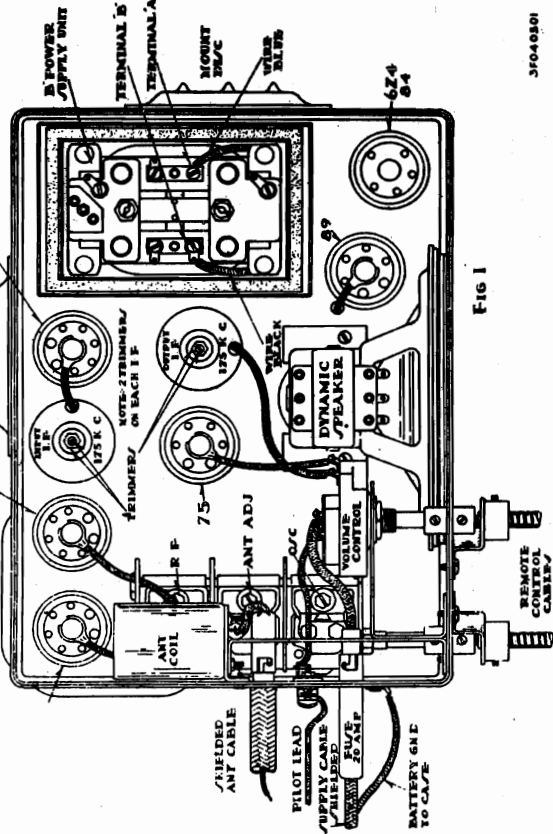
MODEL 400
Schematic, Socket

WALGREEN CO.

MODEL 660 Auto
Schematic, Voltage
Socket, Trimmers



IF PEAK 175 KC



37649801

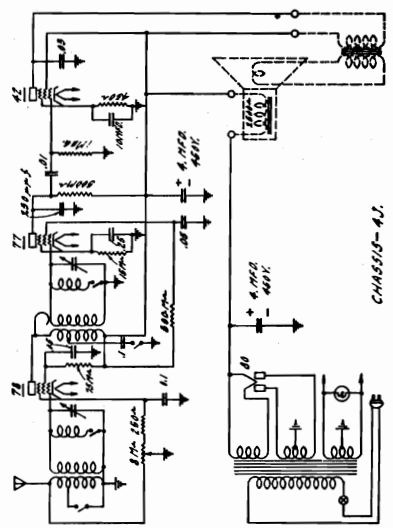
Fig 1

SCHEMATIC CIRCUIT
DIAGRAM
MODEL 660 AUTORADIO

PARTS LIST

Part No.	Description	List Price Each
A 660	Battery Cable—Plug Type	1.75
B 104	8 Battery Cable Brackets	.35
B 660	Antenna Cable—Plug Type	.80
C 106	Shaft Couplings	.35
C 117	"A" Choke—Small	.25
C 118	"A" Choke—Large	.35
C 144	Dual 1-200 Volt Con- denser	.35
C 152	.00025 Mica Condenser	.20
C 155	.0005 Mica Condenser	.25
C 522	.01-400 Volt Condenser	.25
C 531A	Dual .05 Condenser	.30
C 535	Dual 1-200 Volt Con- denser	.35
C 541B	3 Gang Condenser	.375
C 543	R.F. Coil	.80
C 543A	Antenna Coil	.80
C 543B	Oscillator Coil	.70
C 543C	Input I.F. Transformer	1.25
C 543D	Output I.F. Transformer with Parts	2.50
C 547	1-200 Volt Condenser	.30
C 549	690 Ohm Choke	1.40
C 550	8-8 Mfd. Electrolytic Condenser	2.25
C 551	1 Mfd.—120 Volt Con- denser	.35
C 553	.05-200 Volt Condenser	.25
C 554	.5 Mfd. Generator Con- denser	.50
R 232A	Spec al 500M Ohm Resistor Identified with 2 Yellow Dots	.35
R 279	30,995 Ohm Resistor	.60
R 281	100 Ohm Resistor	.20
S 338	18" Volume Control Shaft	1.25
S 339	18" Selector Control Shaft	1.25
S 338S	Special 24" Volume Con- trol Shaft	1.50
S 339S	Special 24" Selector Con- trol Shaft	1.50
V 660	Complete "B" Unit—OAK	8.00
V 603	Volume Control	1.50
V 660	Remote Control Head Com- plete Less Shafts	5.00
	20 Ampere Fuses	.10
	Mounting Bolts	.10
	All carbon resistors	.20
	All sockets	.20
	Dynamic speakers	5.00

MODEL 400

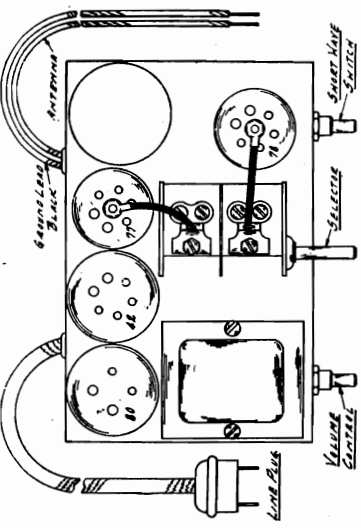


105 to 125 volts, 50-60 cycles, A.C. power supply.

The four tubes used in this set are as follows: 1—No. 280 Full Wave Rectifier; 1—No. 77 Radio Audio Amplifier; 1—No. 78 Detector; 1—No. 42 Audio Amplifier.

Set band switch in the left-hand position, broadcast stations on frequencies between 550 and 1600 Kilocycles will be received. When the band switch is thrown to the right, stations operating on frequencies ranging from 1500 to 4800 Kilocycles will be heard.

CHASSIS 4J



SERVICE SUGGESTIONS

In changing tubes always remove the plug from light socket. Make sure all tubes are pushed firmly into their proper sockets and that clips are always fastened to caps on tops of tubes. Be sure that aerial and ground are properly connected. A thirty to fifty-foot aerial is recommended for best operation. To remove chassis from cabinet, first remove knobs. Then remove four screws from bottom of cabinet holding base. Re- move screws holding speaker in cabinet and remove speaker and chassis as a unit.

WALGREEN CO.

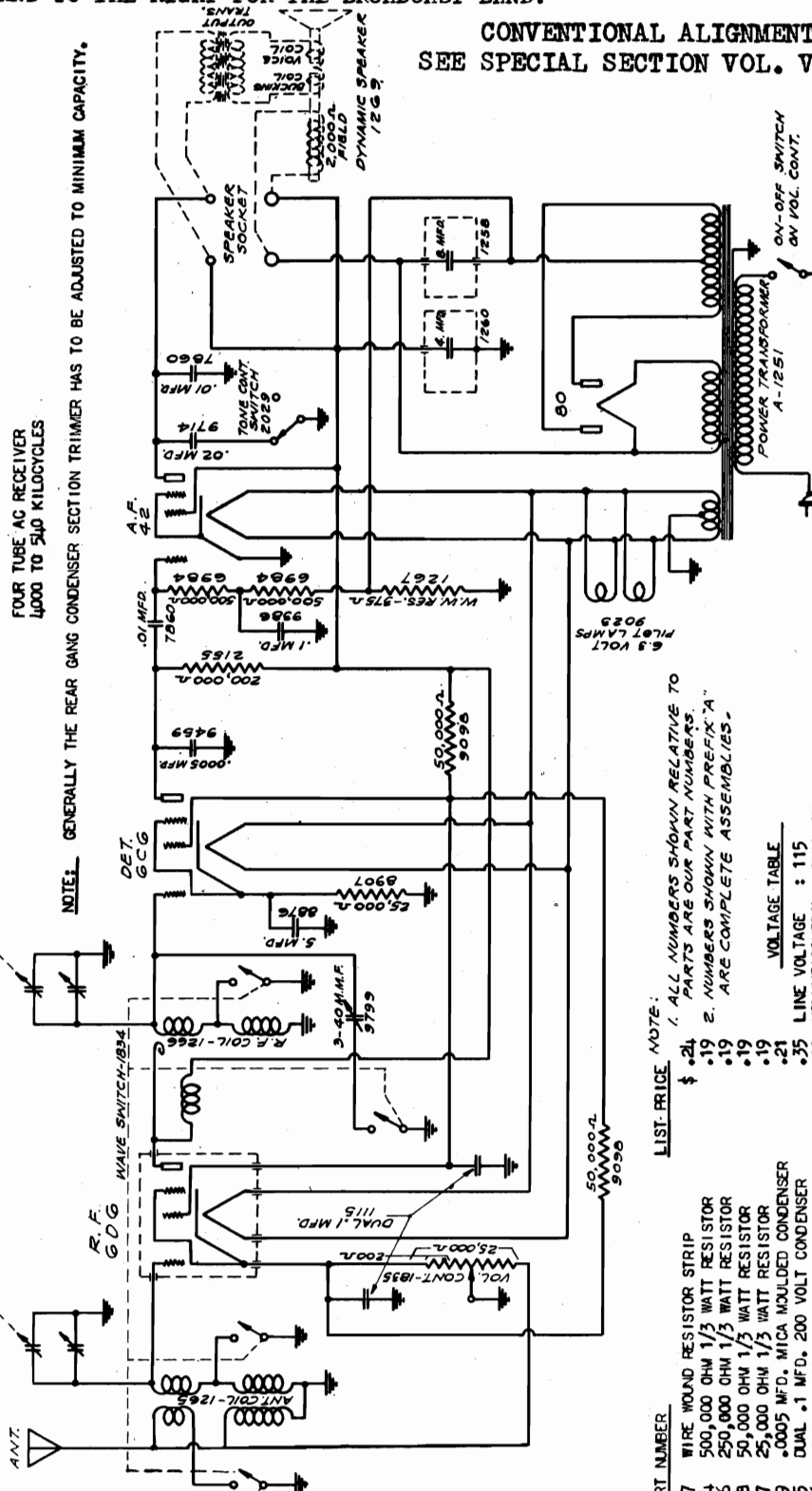
MODEL 401
Schematic, Voltage
Alignment

BAND SELECTOR SWITCH

THIS RECEIVER IS DESIGNED FOR TWO FREQUENCY BANDS. BROADCAST BAND FROM 1720 TO 540 KC. POLICE, AIRCRAFT AND AMATEUR BAND 1.5 MC. TO 4 MC. SWITCH TO LEFT POSITION FOR SHORT WAVE AND TO THE RIGHT FOR THE BROADCAST BAND.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.

NOTE: GENERALLY THE REAR GANG CONDENSER SECTION TRIMMER HAS TO BE ADJUSTED TO MINIMUM CAPACITY.



NOTE: 1. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
2. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.

VOLTAGE TABLE	
LINE VOLTAGE	: 115
VOLUME CONTROL	: FULL ON
WAVE BAND	: BROADCAST
TUBE	
606	RADIO FREQUENCY
606	DETECTOR
42	OUTPUT
80	RECTIFIER

READ ALL VOLTAGES FROM SOCKET PRONG TO GROUND UNLESS OTHERWISE SPECIFIED. (EXCEPT FILAMENT)

** READ FROM 375 OHM RESISTOR #1267 TO GROUND.

* COMPARATIVE VOLTAGE IS NOT TRUE VOLTAGE APPLIED.

- TO ALIGN THE VARIABLE CONDENSER: IT IS IMPORTANT WHEN ALIGNING TO FOLLOW THE PROCEDURE CAREFULLY, OTHERWISE THE RECEIVER WILL LACK SENSITIVITY AND THE DIAL CALIBRATION WILL BE INCORRECT.
1. CONNECT THE HIGH OUTPUT SIDE OF THE OSCILLATOR TO THE RECEIVER ANTENNA LEAD AND THE GROUND TO THE CHASSIS.
 2. PLACE THE BAND SELECTOR SWITCH FOR OPERATION ON THE BROADCAST BAND, TUNE THE RECEIVER TO EXACTLY 1400 KILOCYCLES ON THE DIAL AND SET THE TEST OSCILLATOR FREQUENCY TO 1400 KILOCYCLES. THEN BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE TRIMMER CONDENSERS LOCATED ON TOP OF THE GANG CONDENSER.
 3. SET THE BAND SELECTOR SWITCH FOR OPERATION ON THE SHORT WAVE BAND, TUNE THE RECEIVER DIAL TO EXACTLY 4 MEGACYCLES AND SET THE OSCILLATOR TO THIS FREQUENCY. THEN ADJUST THE TRIMMER CONDENSER MOUNTED ON THE COIL LOCATED UNDERNEATH THE CHASSIS FOR MAXIMUM SENSITIVITY. ROCK GANG CONDENSER WHEN MAKING THIS ADJUSTMENT.

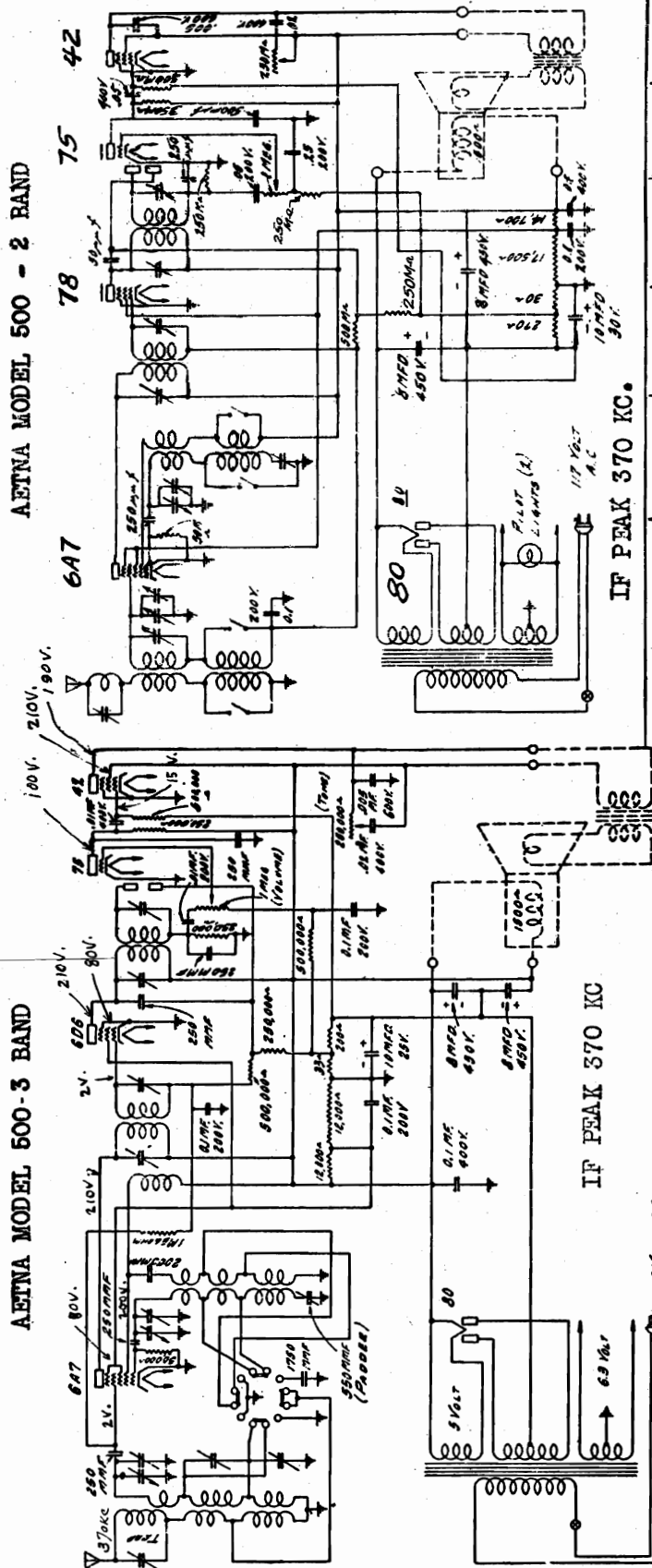
PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

PART NUMBER	LIST PRICE
1267	WIRE WOUND RESISTOR STRIP
5984	500,000 OHM 1/3 WATT RESISTOR
8906	250,000 OHM 1/3 WATT RESISTOR
9098	50,000 OHM 1/3 WATT RESISTOR
8907	25,000 OHM 1/3 WATT RESISTOR
9459	.0005 MFD. MICA MOLDED CONDENSER
1155	DUAL .1 MFD. 200 VOLT CONDENSER
9386	.1 MFD. 200 VOLT CONDENSER
7860	.01 MFD. 400 VOLT CONDENSER
9714	.02 MFD. 400 VOLT CONDENSER
1739	15/16" KNOB
1269	DYNAMIC SPEAKER
1265	ANTENNA COIL
1266	R. F. COIL
2017	TWO GANG CONDENSER
9799	TRIMMER CONDENSER
2105	DIAL ASSEMBLY (SPECIFY REQUIRED NAME)
1834	WAVE SWITCH
9023	PILOT LIGHT LAMP BULB 6.3 VOLTS
1251	POWER TRANSFORMER
1258	8 MFD. WET ELECTROLYTIC CONDENSER
1260	4 MFD. WET ELECTROLYTIC CONDENSER
8876	5 MFD. DRY ELECTROLYTIC CONDENSER
1835	VOLUME CONTROL
2029	2029

MODEL 500(2 Bands)
MODEL 500(3 Bands)
Schematic, Voltage
Alignment

WALGREEN CO.

ALIGN. FREQS.:—
I.F. 370 KC
BC 1400 KC - PADDER 600 KC.
5W PADDER 10 M.C.
HAVE TRAP 370 KC



Tube Number	Control Grid to Cathode	Screen to Cathode	Plate to Cathode	M.A. Plate	Tube Socket Voltage Heater or Filament Voltage
6A7 1st Det.	*1.75	92	225	4	6.3
75 OSC.	0	0	225	4	6.3
78—I. F.	*1.75	92	225	7	6.3
75—2nd Det.	*1.75	0	*110	.8	6.3
42—2nd Audio	***17	225	212	34	6.3
80—Rect.					

***Voltage from No. 1 terminal on voltage divider to ground using 250 volt scale.

**Voltage from plate to ground using 250 volt scale.

*Voltage from ground to second terminal on voltage divider using 10 volt scale.

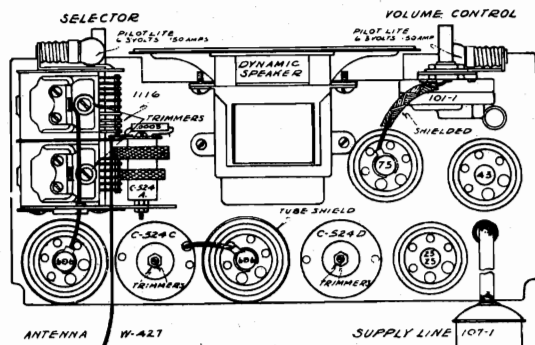
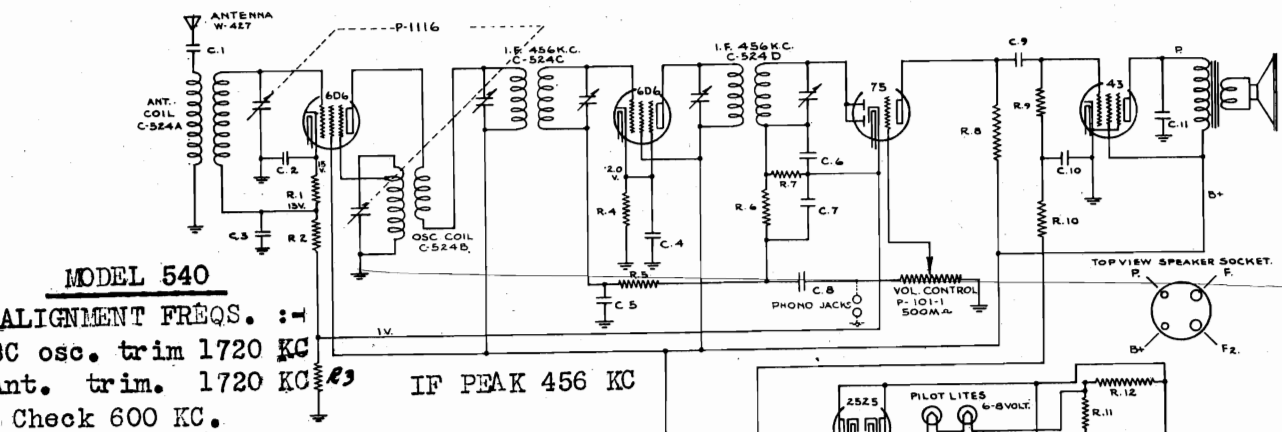
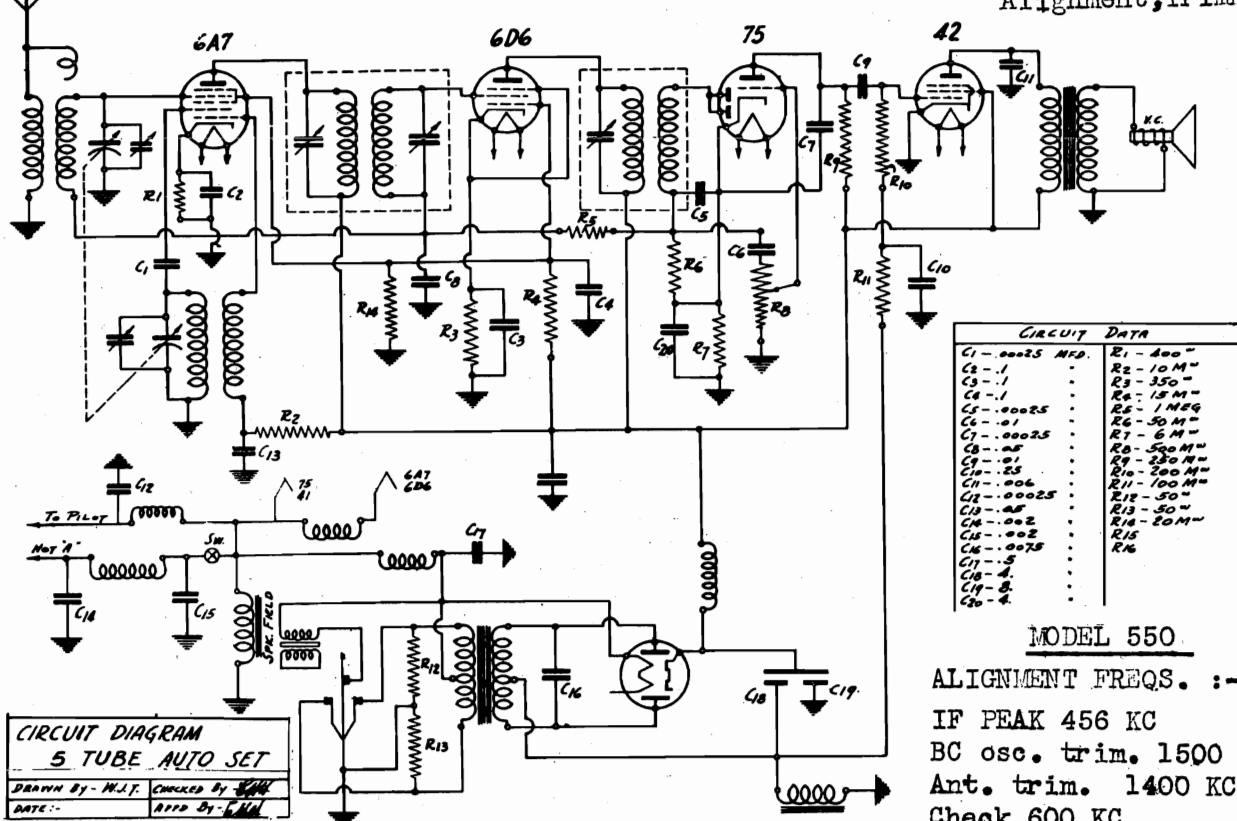
The above voltage readings were taken with 1,000 ohm per volt Volt Meter.

For conventional align. see spec. sect. Vol VIII

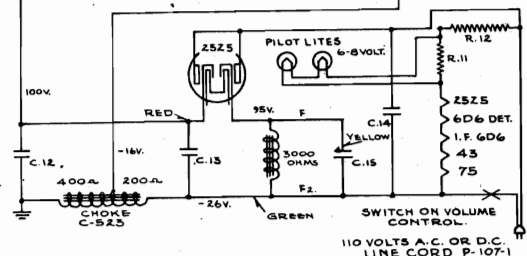
To adjust the R. F. circuits: (1) Set pointer on tuning chart to 1400 K. C. with band switch in the broadcasting position. (2) Adjust test oscillator to 1400 K. C. and connect to antenna lead on chassis. (3) Adjust trimmer on the oscillator section of the tuning condenser for maximum reading. (4) Reset dial pointer on receiver and test oscillator to 600 K. C. (5) Adjust 600 K. C. padding condenser for maximum reading moving tuning condenser back and forth slowly while making adjustment (the 600 K. C. padding condenser is mounted on the base at the left of the tuning condenser). (6) Reset oscillator and tuning pointer on the receiver to 1400 K. C. and readjust trimmer on oscillator section of tuning condenser for maximum reading. (7) Reset dial pointer on receiver and test oscillator to 15 megacycles. (8) Set band change switch in the right hand position. (9) Adjust trimmer on first section of tuning condenser for maximum reading. (10) Reset dial pointer on receiver and test oscillator to 3.6 megacycles. (11) Set band change switch in left hand position. (12) Adjust 3.6 megacycle trimmer condenser for maximum reading (the 3.6 megacycle trimmer is mounted under the chassis and directly in front of the band change switch. (13) Reset dial pointer on receiver and test oscillator to 1400 K. C. (14) Set band change switch in broadcasting position and adjust 1400 K. C. trimmer for maximum reading (the 1400 K. C. trimmer is mounted under the chassis directly over the antenna coil).

MODEL 550 Auto
Schematic, Alignment

WALGREEN CO.

MODEL 540
Schematic, Socket
Alignment, Trimmers


NOTE:-
* R1, R2 & R3 IN ONE UNIT PART NUMBER R-268.
* C13 AND C15 IN ONE UNIT PART NUMBER C-525-C
NUMBERS PREFIXED BY LETTERS ARE PARTS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS
GROUND. VOLUME CONTROL ON FULL MEASURED ON
A.C. CURRENT.



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

LEGEND

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

105-115 volts alternating current 50-60 cycles - 60 watts.
GREEN (Broadcast band) 530 - 1550 Kilocycles
RED (Short wave band) 1550 - 14,000 Kilocycles

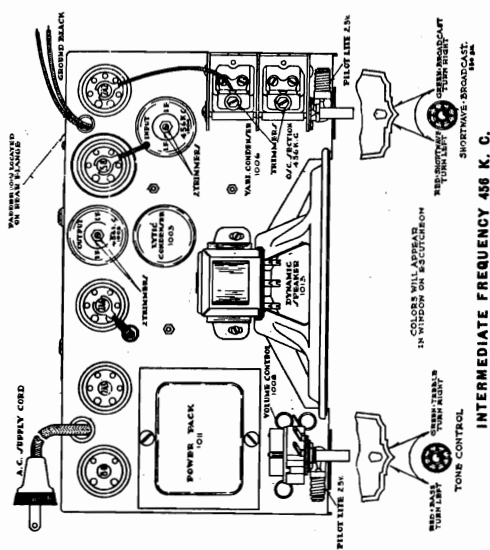
*R.2, R.4, R.5, R.6, R.7 & R.8 IN ONE UNIT P-1012
*C.16 & C.17 IN ONE UNIT P-1003
X R.9, R.10, R.11, C.8, C.9 & C.10 IN 1 F. CAN P-1005

To peak I.F. transformers connect oscillator (set at 456 KC) to grid of 2A7 tube and (Black) ground wire. With variable condenser set at minimum capacity, (extreme left of its rotation) adjust four trimmers (one nut and one screw on each transformer trimmer) to resonance (maximum deflection on an output meter) connected across the primary of the speaker input transformer.

To align Broadcast band, set wave changing switch to Green (right turn) and with variable condenser set minimum capacity disconnect antenna wire and connect 1500 KC oscillator to antenna coil in series with a 75 MMFD condenser. Adjust oscillator (front) section trimer to resonance. Set oscillator to 1400 KC, rotate variable condenser until signal is tuned in, then adjust R.F. (rear) section trimer to resonance. Check output at 1200, 1000, 800, and 600 Kilocycles if necessary bend plates (of rear R.F. section of variable only).

To align Short wave band, set wave changing switch to RED (left turn) and with input oscillator connected as above and set at 1720 KC, tune in signal, adjust padding condenser on rear of chassis to resonance. Check for output at 1550 KC and at harmonics of 1000 KC (2000 KC), of 1200 KC (2400 KC), of 1400 KC (2800 KC), and of 1720 KC (3440 KC). DO NOT BEND PLATES.

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



WALGREEN CO.

Service Notes

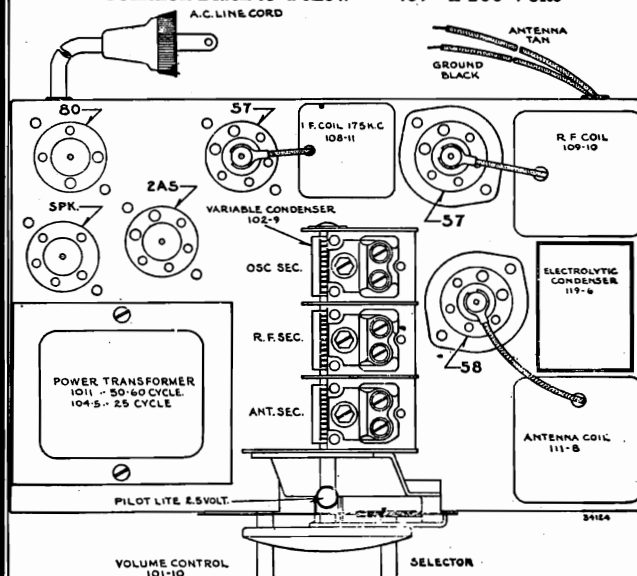
Voltages taken from different points of circuit to chassis are measured with volume control full on, using a voltmeter having a resistance of 1000 ohms per volt. These voltages are indicated on the schematic circuit diagram.

Part No. 145-2

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

Part No. 145-3

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



Aligning I. F. Transformer Voltage

1. With volume control full on, at extreme right of its rotation, and with variable condenser at its maximum capacity position (extreme right of its rotation) make the following adjustments:

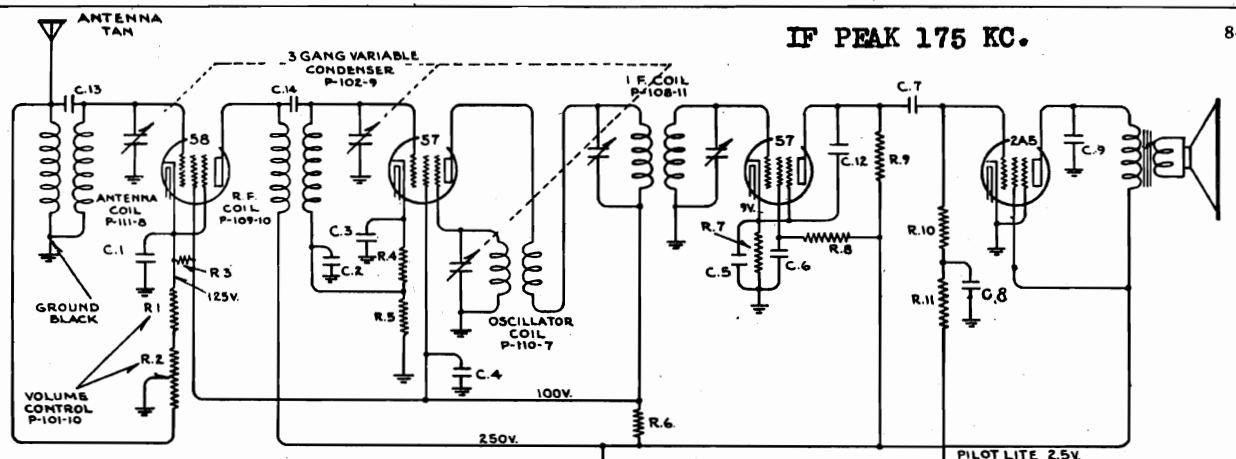
- Connect an external oscillator adjusted to 175 kilocycles, in series with a .1 mfd. condenser, to the control grid cap of the type 57 tube located between the R. F. coil (part numbers 109-10) and the I. F. transformer (part number 108-11) and chassis.
- Adjust trimming condensers of I. F. transformer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

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

Aligning R. F. and Oscillator Circuits

1. Connect the external oscillator set at 1720 kilocycles and in series with a 200 Mfd. condenser, between the antenna (tan) and ground (black) leads.

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



IF PEAK 175 KC.

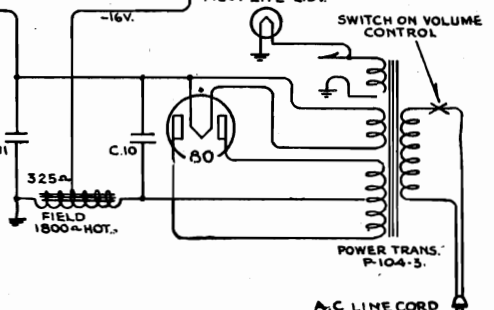
8-1-34

MODEL 575 SUPERHETERODYNE 530 to 1720 Kilocycles
FIVE TUBES: 1-58, 1-2A5, 1-80, 2-57

~LEGEND~

CONDENSERS	RESISTORS
Nº VALUE	Nº VALUE
C.1-.05X200V.	R.1-100
C.2-.05X200V.	R.2-75M
C.3-.05X200V.	R.3-50M ½W.
C.4-.1X200V.	R.4-450
C.5-.25X200V.	R.5-5M
C.6-1X200V.	R.6-19M
C.7-.05X200V.	R.7-50M ½W.
C.8-1X200V.	R.8-1MEG. ½W.
C.9-.003X600V.	R.9-250M ½W.
C.10-.80MFD.X400V.	R.10-200M ½W.
C.11-.80MFD.X400V.	R.11-300M ½W.
C.12-.001 MICA.	
C.13-10MFD. GIMMICK	
C.14-4MFD. GIMMICK	

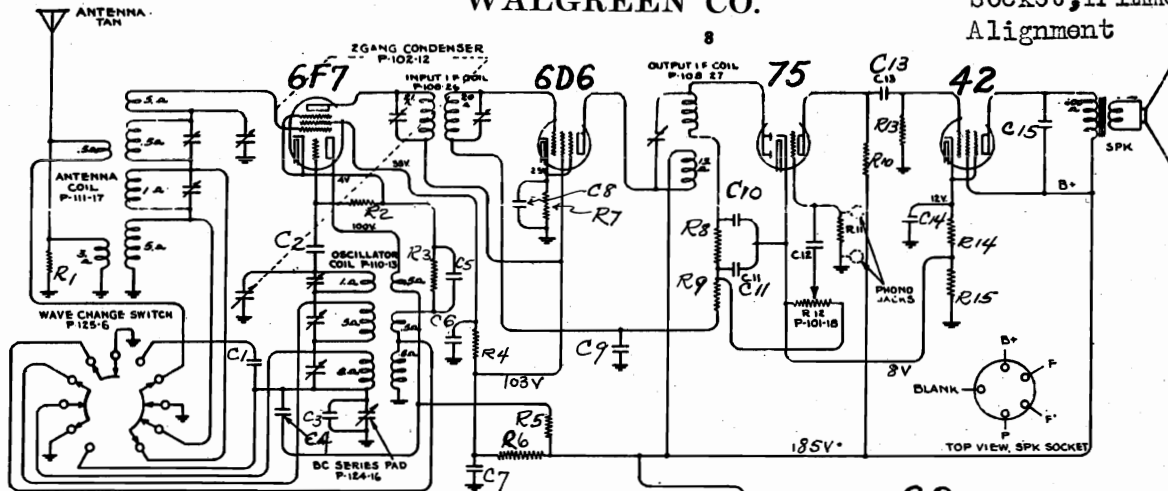
~NOTE~
CONDENSERS C.10, C.11, IN ONE UNIT P-119-6.
CONDENSERS C.1, C.2, C.3, C.4 IN ONE UNIT P-145-3.
RESISTORS R.4, R.5, IN ONE UNIT P-106-10.
NUMBERS PREFIXED BY LETTER 'P' ARE PART NUMBERS.
PHRASE GIMMICK IS A WIRE WOUND AROUND ANOTHER WIRE.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND, VOLUME CONTROL ON FULL, CONDENSERS C.5, C.6, C.7, C.8, C.9 IN ONE UNIT P-145-2.



MODEL 585, Series A

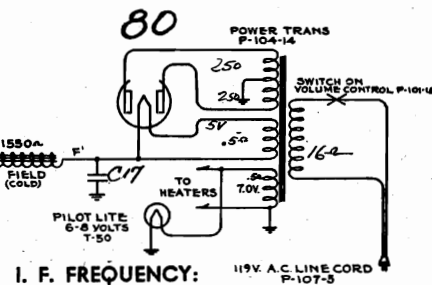
WALGREEN CO.

Schematic, Voltage
Socket, Trimmers
Alignment



CONDENSERS	RESISTORS
C.1- 2570 MICA	R.1- 800 Ω 1/2W
C.2- 100	R.2- 50M Ω
C.3- 475	R.3- 700 Ω
C.4- 1X200V	R.4- 100M Ω
C.5- 1X200V	R.5- 20M Ω 1/2W
C.6- 1X200V	R.6- 15M Ω 1/2W
C.7- 1X200V	R.7- 200 Ω
C.8- 1X200V	R.8- 50M Ω 1/2W
C.9- 1X200V	R.9- 1MEG
C.10- 500 MICA	R.10- 250M Ω
C.11- 500 MICA	R.11- 2MEG
C.12- 05X200V	R.12- 500M Ω VOL. CONTROL
C.13- 01X400V	R.13- 500M Ω 1/2W
C.14- 4.0MFD X 25V	R.14- 500 Ω
C.15- .015X400V	R.15- 35 Ω
C.16- 3.0MFD X 250V	
C.17- 4.0MFD X 300V	

NOTE:
C.7, C.9 ARE IN ONE UNIT P-118-1
C.14, C.16, C.17, ONE UNIT LYTC P-119-11
R.7, R.14, R.15, ONE UNIT P-106-18
NUMBERS PREFIXED BY LETTER 'P' ARE PART NUMBERS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.
WAVE CHANGE SWITCH P-125-6, 3 POSITIONS, ROTATING CLKWISE -
1ST POSITION - BC 1720-540 KC
2ND - 5W 7.6-2.5 MC
3RD - 5W 23.0-7.5 MC
SWITCH SHOWN AT 5W POSITION



ALIGNING INSTRUCTIONS—

Description of various dummy antennas used and referred to in these instructions:

- (1) I.F. Dummy—Consists of a .1 mfd. condenser connected in series with the external oscillator.
- (2) Broadcast Dummy—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.
- (3) Intermediate and Short Wave Dummy—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 output 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 volt meter should be used.

SERIES A

Alignment

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 line 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. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the three bolts by which it is fastened and the speaker plug which you will find on the front flange of the chassis.

Aligning I. F. Transformers

1. With volume control full on, the extreme right of its rotation, and with wave changing switch in the broadcast position, extreme left of its rotation, and with variable condenser at its minimum capacity position, plates entirely out of mesh, adjust the I.F. transformers (adjustments at the top of parts number 108-26 and 108-27—see top view).
- (a) Connect external oscillator in series with I.F. dummy antenna. With external oscillator adjusted to 370 kilocycles, in series with I.F. dummy antenna to the control grid cap of the type 6D6 tube and chassis ground, adjust output I.F. transformer, part number 108-27, to resonance.

Note: Output I.F. transformer, part number 108-27, has only one adjustment.

- (b) Move generator output clip from grid of 6D6 to grid cap of type 6F7 tube and align input I.F. transformer, part number 108-26, to resonance. NOTE: IT IS EXTREMELY NECESSARY TO ALIGN BOTH I.F. STAGES SEPARATELY.

**Broadcast Band Alignment—
(540 - 1720 Kilocycles)**

1. With wave changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with broadcast dummy antenna to an antenna lead and black ground lead, make the following adjustments:
 - (a) Set external oscillator to 1720 kilocycles and adjust oscillator trimmer to resonance. This adjustment is the rear adjustment of a group of three located next to the variable condenser.
 - (b) Readjust external oscillator to 600 kilocycles and adjust broadcast series pad to resonance by rotating condenser to approximately 600 kilocycles, rocking it slowly to and fro until by adjusting pad maximum output is attained. This adjustment is located at the front of the chassis next to the variable condenser and wave changing switch.
 - (c) Check for tracking and sensitivity at 1400 and 1000 kilocycles. Note: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

**Short Wave Band Alignment—
(7.5 - 23.0 Megacycles)**

1. This band is aligned after the I.F. adjustments have been completed. Set wave selector switch in the short wave position, extreme right of its rotation, set pointer of dial to 21 megacycles.
 - (a) With external oscillator set at 21 megacycles, and connected to the tan antenna lead in series with the short wave dummy and to the black ground lead, adjust the oscillator short wave trimmer until generator signal is picked up. This trimmer is the one closest to the front of the chassis of the group of three trimmers located next to the gang condenser (see top view of chassis).
 - (b) Adjust short wave antenna trimmer to resonance. This adjustment is to the right of the 6F7 tube and is the one closest to the front of the chassis (see top view).
 - (c) Re-set external oscillator to 9 megacycles and pick up oscillator signal by rotating variable condenser, moving dial pointer. Check for tracking and sensitivity and do not bend plates. Note: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

**Intermediate Band Alignment—
(2.3 - 7.6 Megacycles)**

1. With wave selector switch in the center position and with dial pointer set to 7 megacycles, makes the following adjustments:
 - (a) With external oscillator set at 7 megacycles and connected in series with the short wave dummy antenna to the tan antenna lead and black ground lead, same as for short wave adjustments, adjust center trimmer of oscillator coil, part number 110-13, until 7 megacycle signal is picked up. This is the center adjustment of a group of three located next to the gang condenser (see top view).
 - (b) Adjust antenna trimmer to resonance, this adjustment is the rear of a group of two located at the right of the chassis next to the 6F7 tube (see top view).
 - (c) Re-set external oscillator to 2.5 megacycles (2500 kilocycles), pick up signal by rotating condenser and moving dial pointer. Check for tracking and sensitivity. Do not bend plates. Note: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

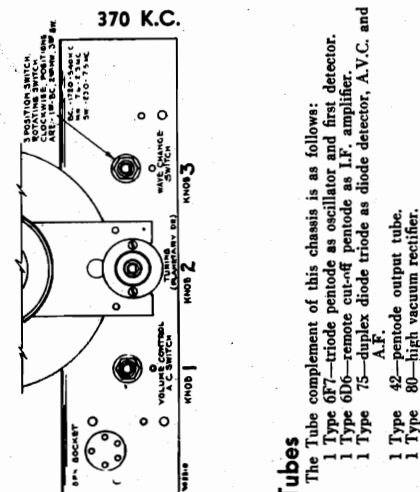
Service Notes

To check for open by-pass condensers, short each condenser with another of similar capacity and of the same voltage rating, which is known to be good, until the defective unit is located. Open by-pass condensers frequently cause oscillation and distorted tone. Defective and shorted electrolytic filter condensers cause excessive hum, motor-boating, low volume and a reduction in all D.C. voltages. Open or shorted electrolytic and by-pass condensers (across bias resistor of type 42 tube) will cause low volume and distorted tone.

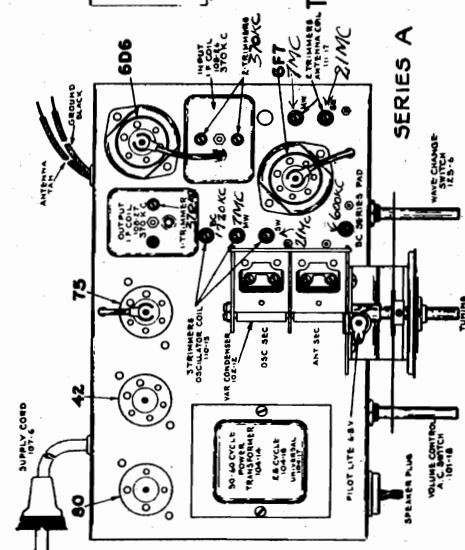
Should the planetary vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked or broken compression spring. The drive may be disassembled to replace the compression spring (part number 112-31) by removing the two screws which fasten it to the dial bracket. Before reassembling all parts should be carefully cleaned and a small amount of vaseline applied to the ball bearings. All other dial parts are hardened and should cause no trouble.

Notes

25 Cycle chassis differ from regular 60 cycle and 40 cycle chassis in that a larger electrolytic filter condenser is used. The regular condenser is part number 119-11 and the larger unit for the 25 cycle chassis is part number 119-12.
Part number 106-18, a metal clad resistor, consists of the following sections with resistances and wattages as noted: one, 500 ohms; one, 35 ohms, one, 200 ohms, all 1/3 watt, plus or minus 10%.



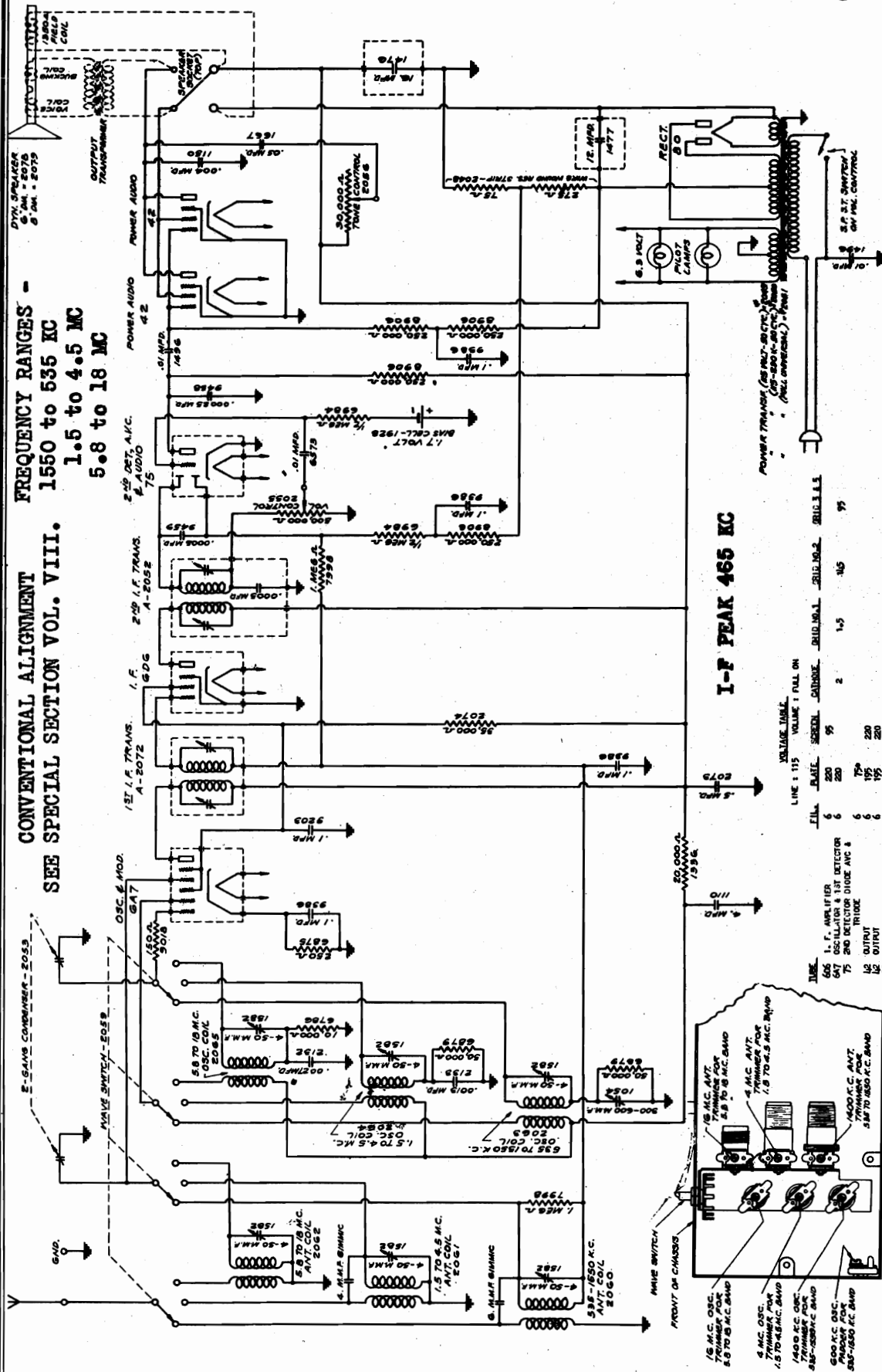
Tubes
The Tube complement of this chassis is as follows:
1 Type 6F7—triode pentode as oscillator and first detector.
1 Type 6D6—remote cut-off pentode as I.F. amplifier.
1 Type 75—duplex diode triode as diode detector, A.V.C. and A.F.
1 Type 42—pentode output tube.
1 Type 80—high vacuum rectifier.



WALGREEN CO.

MODEL 651

Schematic, Voltage Alignment, Trimmers



Align I-F transformer trimmers to 465 KC. BROADCAST - Dial and generator to 1400 KC, peak the oscillator and antenna trimmers. Dial and generator to 600 KC, pad the oscillator circuit to maximum peak while rooking variable condenser. POLICE - Dial and generator to 4 MC, peak oscillator trimmer and antenna trimmer. SHORTWAVE - Dial and generator to 16 MC, peak oscillator and antenna trimmers.

MODEL 675

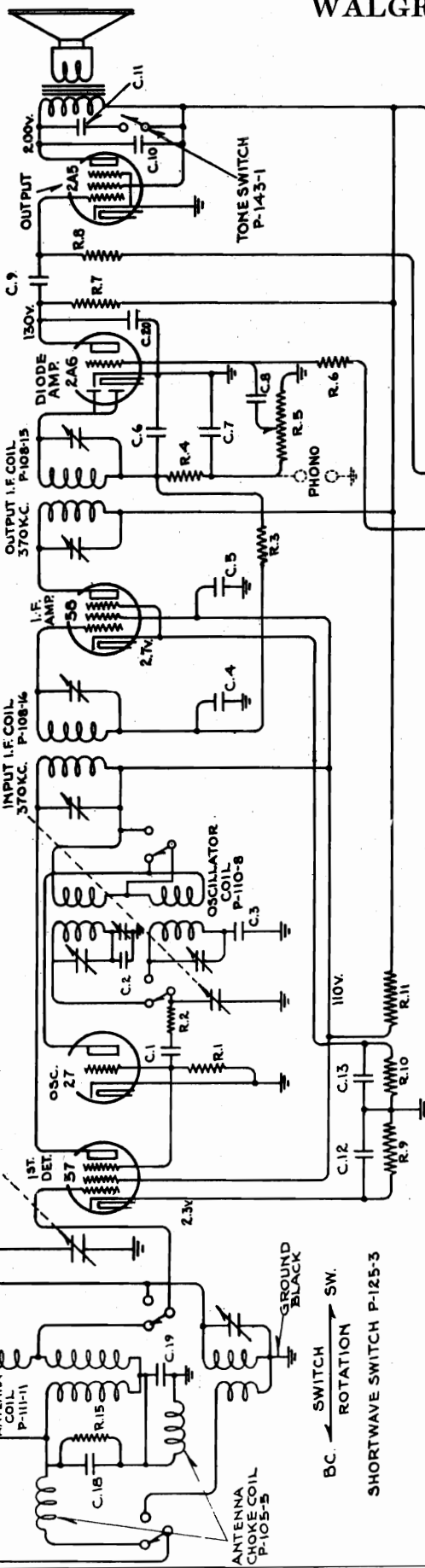
WALGREEN CO.

Schematic, Voltage
Socket, Trimmers
Alignment

CONVENTIONAL ALIGNMENT, SEE
SPECIAL SECTION VOL. VIII
Standard Broadcast Band 530-1720 Kilocycles
Short Wave Band 5.4-17 Megacycles (17.5 to 55 Meters)

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

2 GANG CONDENSER
P-102-10

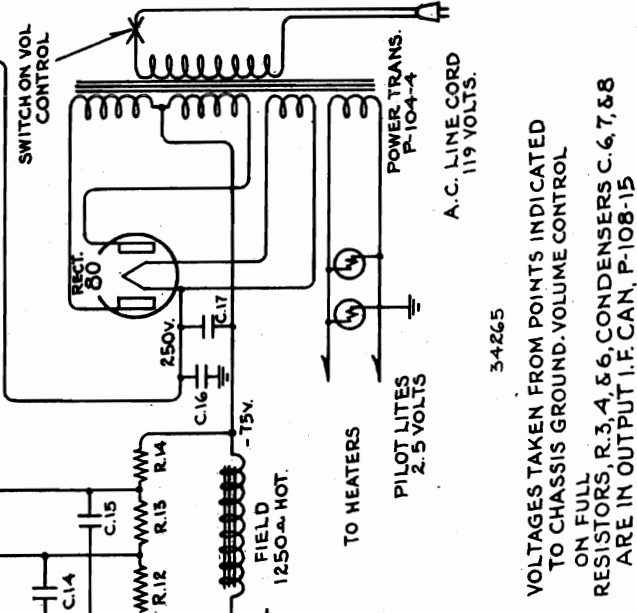


IF PEAK 370 KC.

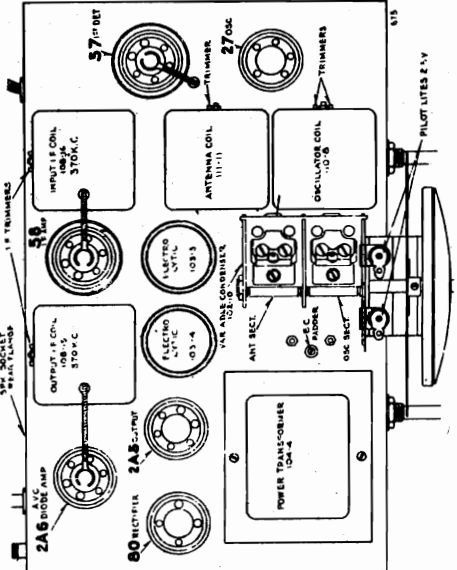
ALIGN. FREQS:-
IF 370 KC - 50 OSC. TRIM. 535 KC
(DET. GANG COND. & PHR)
BE OSC. SHUNT TRIM. TO 1712 KC (TOP ADJ. IN
OSC. COIL CAN)
SW ANT. TRIM. 15 MIC (BOTTOM
COIL CAN)
VOLUME CONTROL P-101-11

CONDENSERS	RESISTORS
No	No
VALUE	VALUE
C.1:- 50 MICA	R.1:- 50M. 1/2W.
C.2:- 490 MICA	R.2:- 50 1/2W.
C.3:- 5M MICA	R.3:- 500M 1/2W.
C.4:- 05X200V.	R.4:- 50M 1/2W.
C.5:- 05X400V.	R.5:- 500M 1/2W.
C.6:- 100 MICA	R.6:- 500M 1/2W.
C.7:- 100 MICA	R.7:- 250M 1/2W.
C.8:- 05X200V.	R.8:- 250M 1/2W.
C.9:- 05X400V.	R.9:- 1000 1/2W.
C.10:- 003X400V.	R.10:- 275 1/2W.
C.11:- 02X400V.	R.11:- 13M 1/2W.
C.12:- 1X200V.	R.12:- 25M 1/2W.
C.13:- 1X200V.	R.13:- 250M 1/2W.
C.14:- 25X200V.	R.14:- 750M 1/2W.
C.15:- 25X200V.	R.15:- 10M 1/2W.
C.16:- 18MFD. 350V. P-103-3	
C.17:- 16MFD 400V. P-103-4	
C.18:- 12044f.	
C.19:- .0144f.	
C.20:- .0005 MICA.	

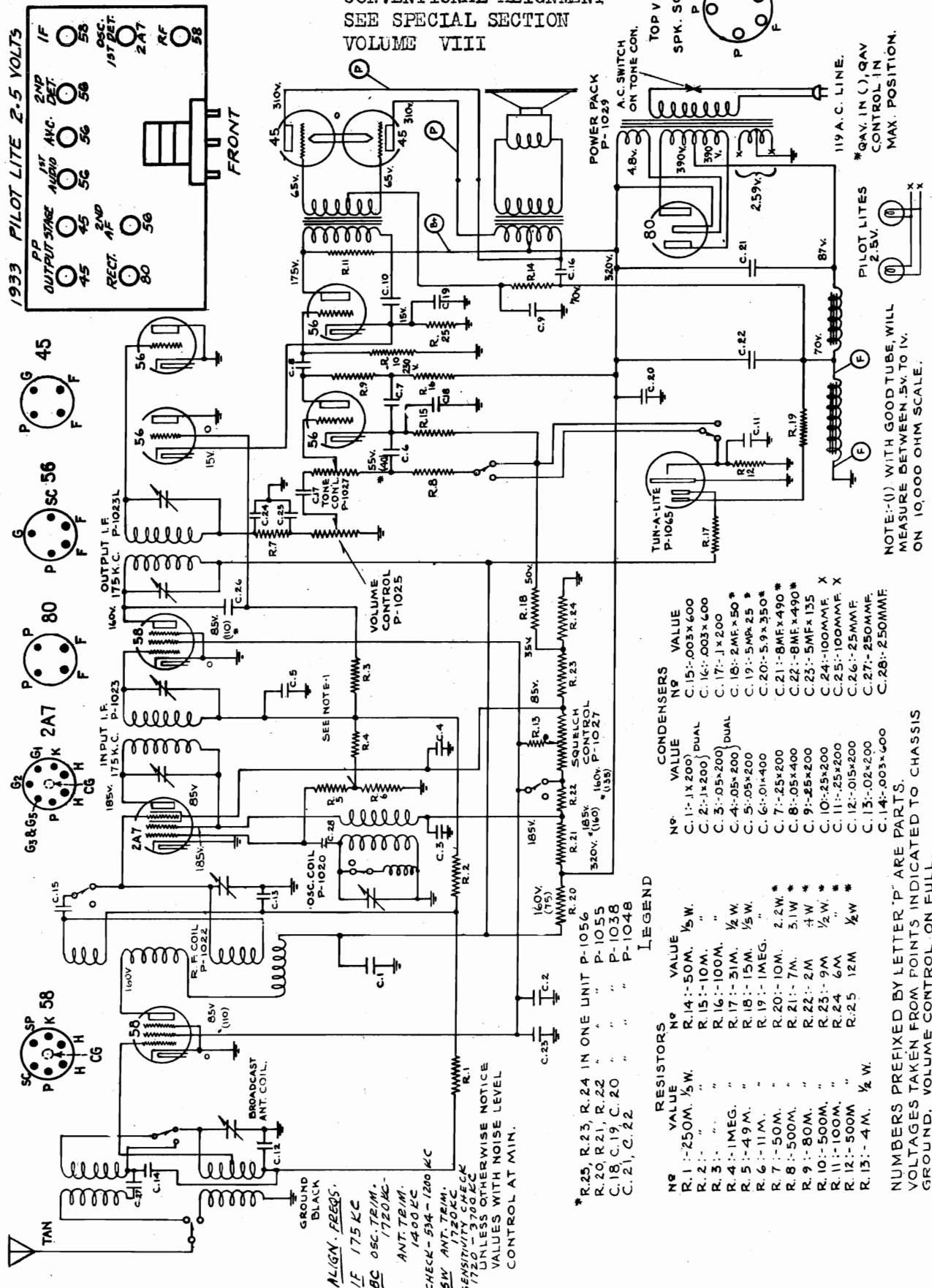
NOTE:-
CONDENSERS C.10, C.11 IN DUAL UNIT.
C.14, C.15 " " "
C.13, C.4 " " "
RESISTORS R.9, R.10, R.11 IN ONE UNIT P-106-13
NUMBERS PREFIXED BY LETTER 'P' ARE
PART NUMBERS.



VOLTAGES TAKEN FROM POINTS INDICATED
TO CHASSIS GROUND. VOLUME CONTROL
ON FULL
RESISTORS, R.3, 4, 5, 6, CONDENSERS C.6, 7, 8
ARE IN OUTPUT I.F. CAN, P-108-15

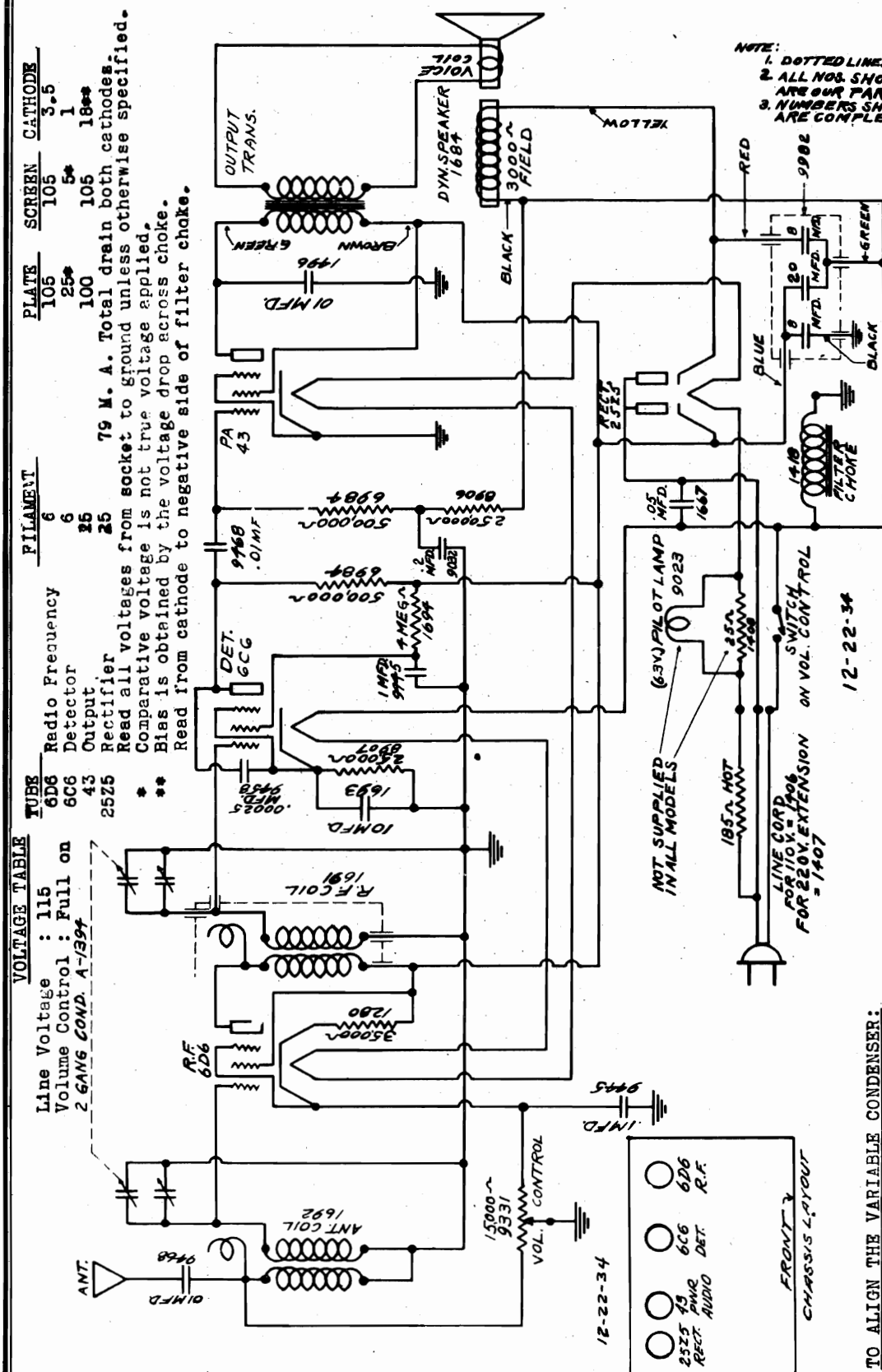


WALGREEN CO.
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII



NOTE:

1. DOTTED LINES DENOTE SHIELDING.
2. ALL NOS. SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.



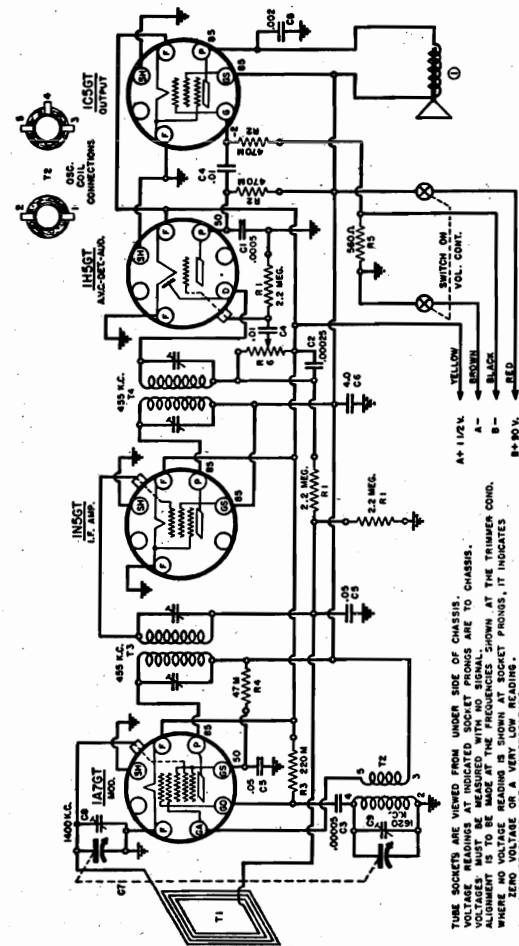
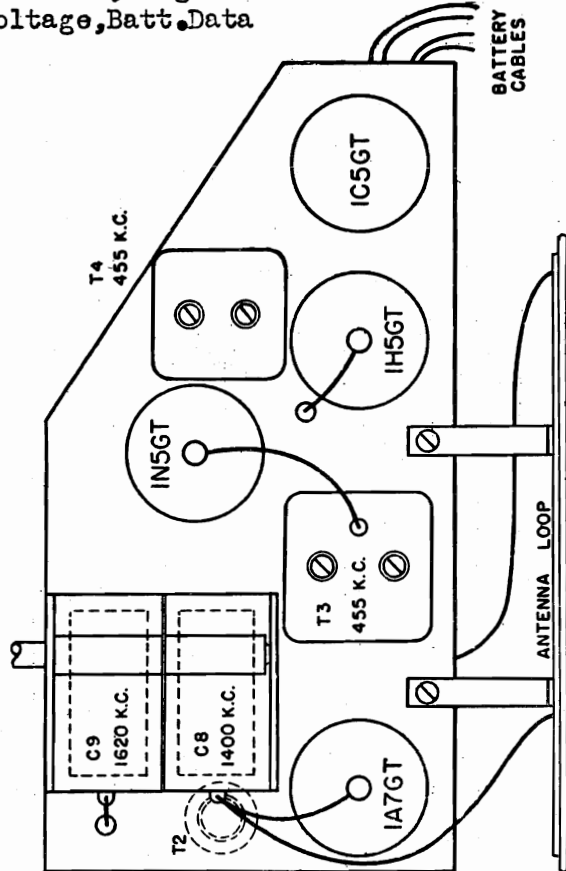
TO ALIGN THE VARIABLE CONDENSER:

1. Connect the high output side of the oscillator to the receiver antenna lead and the ground to the chassis.
 2. Place the band selector switch for operation on the broadcast band, tune the receiver to exactly 1400 kilocycles on the dial and set the test oscillator frequency to 1400 kilocycles. THEN BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE TRIMMER CONDENSERS LOCATED ON TOP OF THE GANG CONDENSER.
- If the RF and antenna coils are not defective, and if the rotor and stator plates of the gang condenser have not been bent so as to destroy proper spacing, the receiver will correctly track over the entire tuning range.

Trimmers, Alignment
Voltage, Batt. Data

WARWICK MFG. CORP.

MODEL 0-407
Schematic, Socket

[illegible]

DESCRIPTION

This receiver is a portable, four (4) tube, battery operated superheterodyne with self-contained loop antenna and batteries.

The tubes used are a 1A7GT as an oscillator converter; a 1N5GT as an I. F. amplifier; a 1H5GT as an A.V.C. detector and audio amplifier; and a 1C5GT as a power output.

This receiver is made to cover the standard broadcast band from 1620 K.C. to 535 K.C.

BATTERIES

Listed below are various manufacturers of batteries and their part numbers that may be used to make up the combination of batteries to be used with this receiver.

Their Part No.

B Battery

A Battery

B Battery

A Battery

A Battery

B Battery
A Battery

A: Battery

B Battery

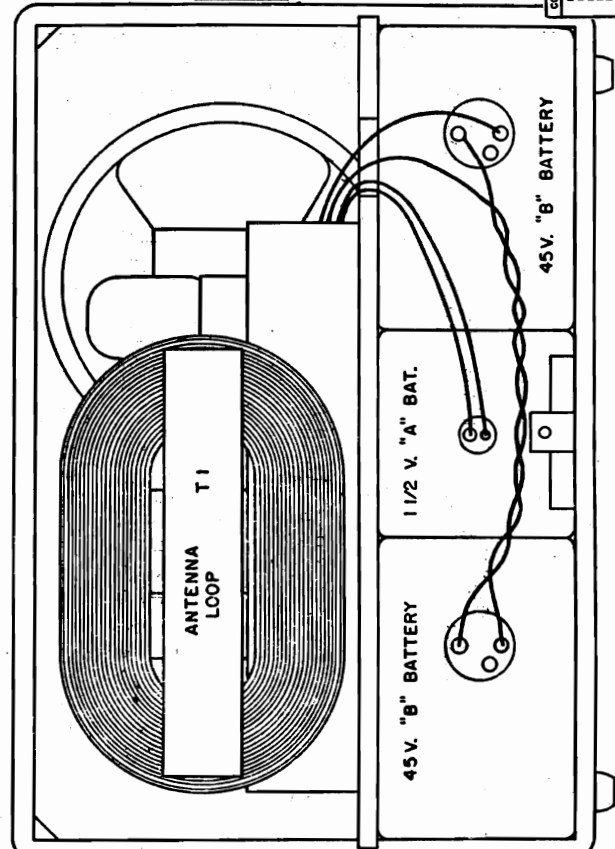
B30

4E

P-5303

P-94A

UFG-762

102
742V730B
V742V30B
4E1

MODEL 9-23

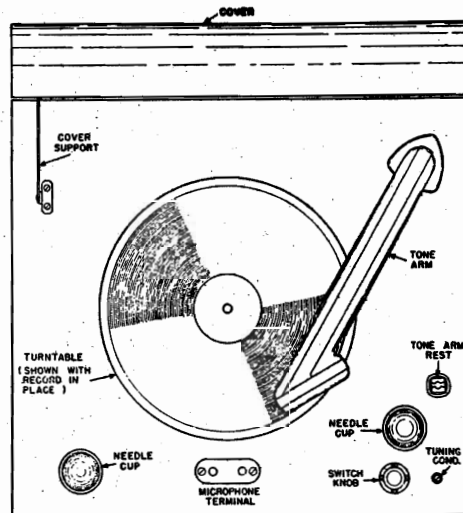
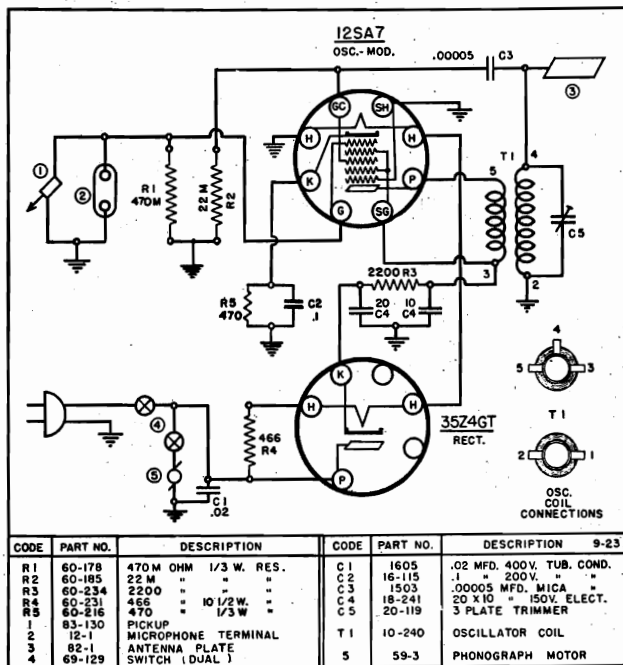
Wireless Record Player
Schematic Data

WARWICK MFG. CORP.

ATTACHMENT

There is incorporated in this Phono-Oscillator unit a tip jack terminal strip microphone connection. The microphone is supplied as an attachment and can be purchased under the part No. 79-263 from your dealer. In its attachment to the receiver, plug in the ends of the microphone cord into the tip jacks (see pictorial) and have switch in the first position. That is, in the position to operate the oscillator but not the phono-motor.

Note:—Be sure to shut off the record player completely when it is not in use by turning the switch to the "off position".



PARTS PRICE LIST

Part No.	DESCRIPTION	Price
83-130	Tone Arm Assem.....	\$ 8.25
59-3	Motor Assem.....	7.00
42-213	Cabinet and Cover Assem.....	8.75
12-1	Microphone Jack.....	.40
79-263	Microphone Supplied as an Attachment.....	5.00
69-129	Switch Dual.....	.75
10-240	Oscillator Trans.....	.75
20-119	Trimmer.....	.25
18-241	Electrolytic Cond. 20x10 mf. 150 V.....	1.00
60-231	Res. 466 Ohms.....	.50

Prices subject to change without notice.

PHONO-OSCILLATOR

DESCRIPTION

This unit is a Two Tube Phono-Oscillator. The tubes used are a 12SA7 as an oscillator and a 35Z4GT as a power rectifier.

This unit should be operated between 1500 K.C. and 1700 K.C. and is so designed that the playing of a record on the unit makes it possible that you receive this same recording from any radio set within a nearby vicinity.

INSTALLATION

This Phono-Oscillator is designed to operate from a 105-130 volt 60 cycle A.C. current supply only; do not connect this to any other source unless so specified. If in doubt about your power supply, your local power company will give you this information.

There are no connections needed between the Radio Receiver and the Phono-Oscillator. The only needed connection is the power supply line cord to an electric outlet.

For best results it would be advisable to use medium or soft needles. They will assure you longer record life and are not as severe on the tone arm as other types of needles.

The tone arm is a sensitive unit and precaution should be taken in handling. It would be injurious to drop or rest the tone arm on the point of the needle. Always use arm rest when the Phono-Oscillator is not in use.

OPERATION

Place the Phono-Oscillator near an electric outlet and within a distance of about 30 feet of the Radio Receiver which you intend to use. Do not set this unit near a radiator or other heater since the cabinet may be damaged.

Attach line cord plug to the nearest outlet.

Adjust your radio receiver to maximum volume and set tuning dial to a point at the high frequency end between 1500 K.C. and 1700 K.C. where minimum interference from outside stations is noticed.

Allowing the Radio Receiver to remain at that adjustment, turn switch knob on the Phono-Oscillator (see pictorial diagram) in a clockwise direction until the first click is noticed. This will turn the oscillator section of the unit on, and about 1/2 minute should be allowed for tubes to heat up. With a record in the proper position on the turn table turn the same switch knob further toward the right (in a clockwise direction) until another click is heard. This will turn the Phono-Motor on and when the record has reached its proper speed of rotation, set the pick-up arm with its needle lightly upon the record.

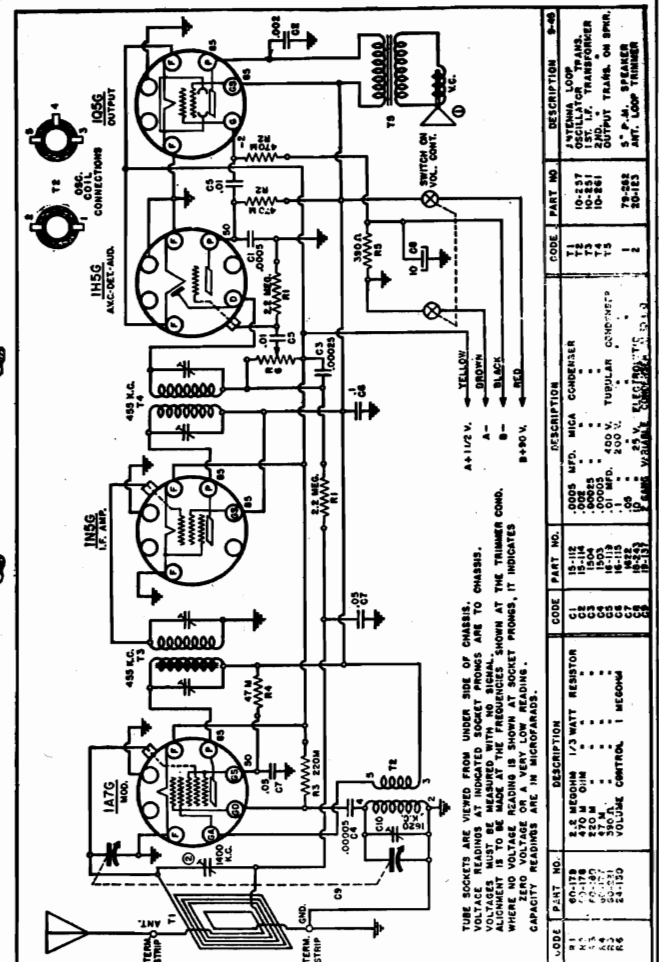
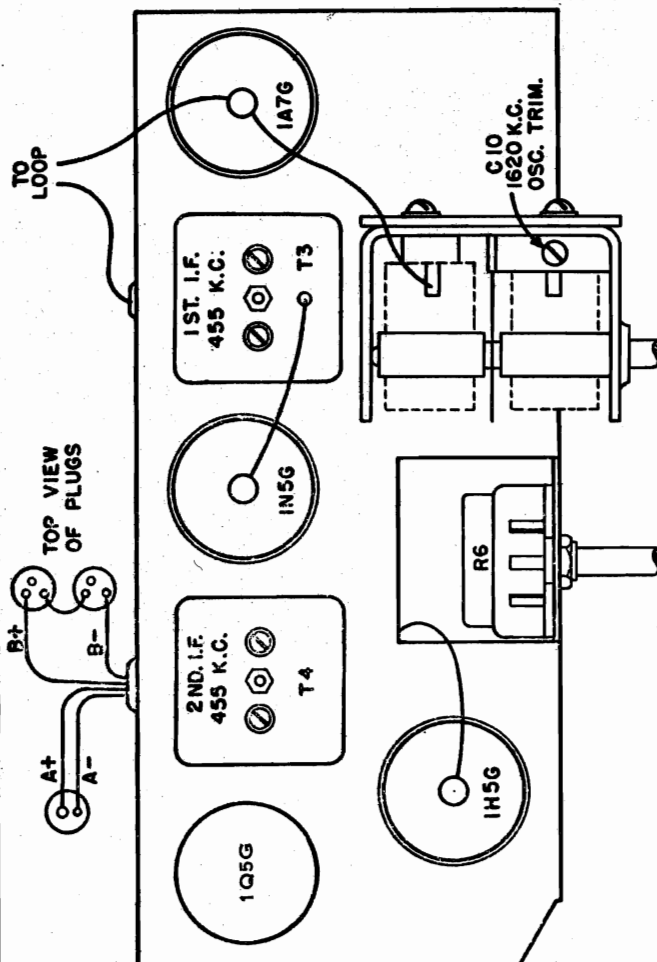
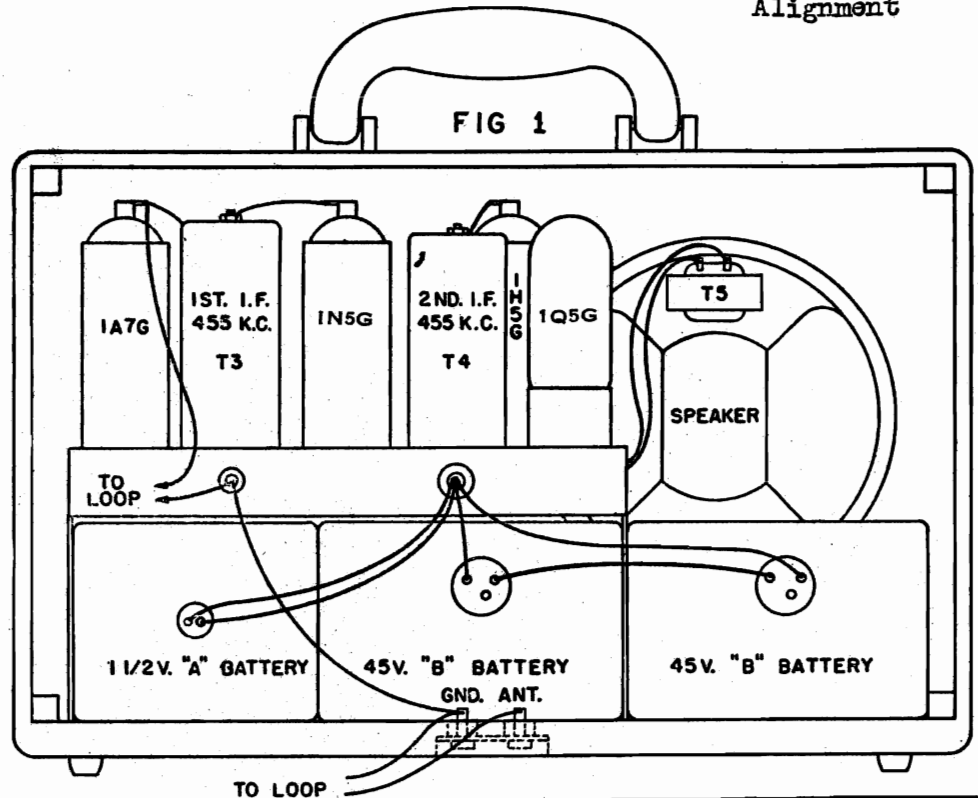
The Phono-Oscillator is now operating and if it is not being heard over the radio it will indicate that it is oscillating at a different frequency than that set up on the Radio Receiver. In order to set the oscillator to the same position as the radio receiver there is incorporated a tuning condenser, (see pictorial layout). Turn this condenser with a screw driver in a clockwise rotation, slowly and carefully until the response of the record is picked up by the Radio Receiver. If when turning the tuning condenser as mentioned above you do not get a response after 3 or 4 turns it will indicate that you have gone past the point. It will be necessary to turn in the opposite direction (counter clockwise) until the response is obtained.

In order to get maximum volume and clarity it would be advisable to tune your radio a few degrees one way or the other until the best result is obtained.

WARWICK MFG. CORP.

MODELS 9-43, 9-45
Schematic, Voltage
Socket, Trimmers
Alignment

FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL VIII
This receiver is made to cover
the standard broadcast band from 1620
K. C. to 535 K. C.

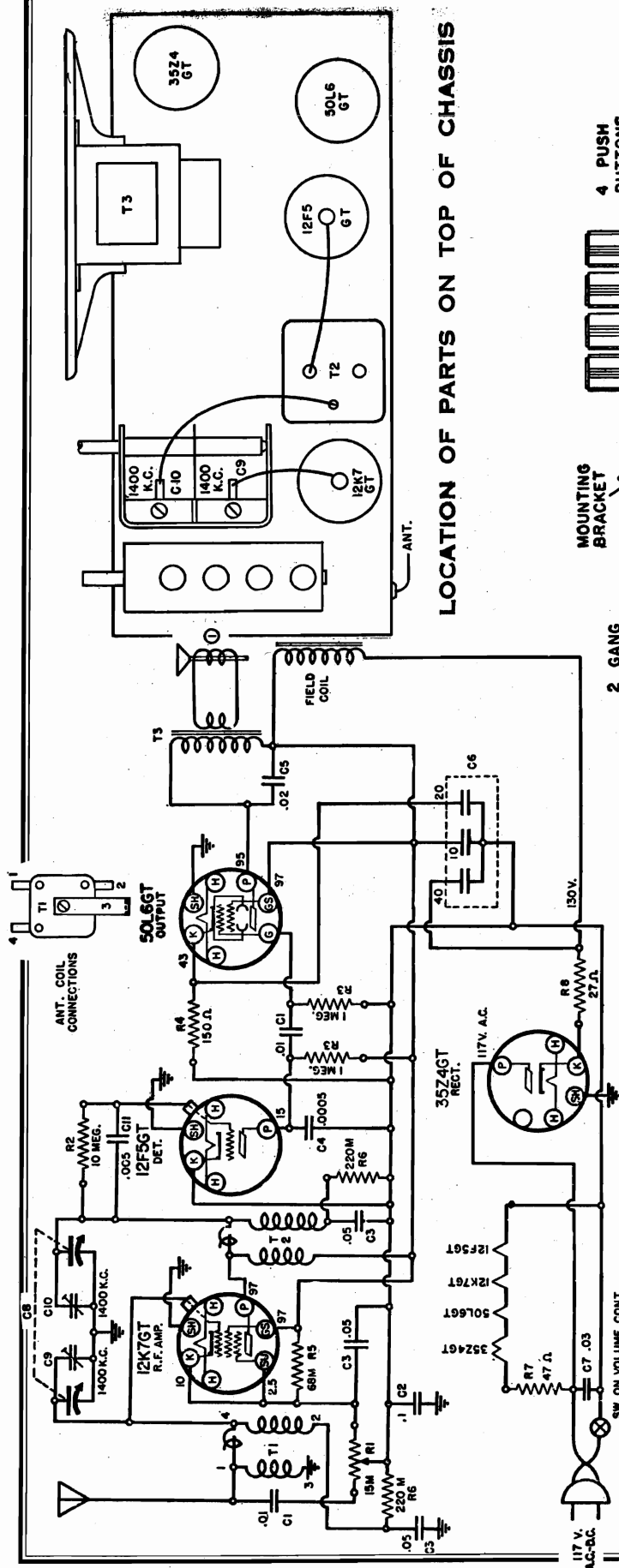


MODEL 9-46

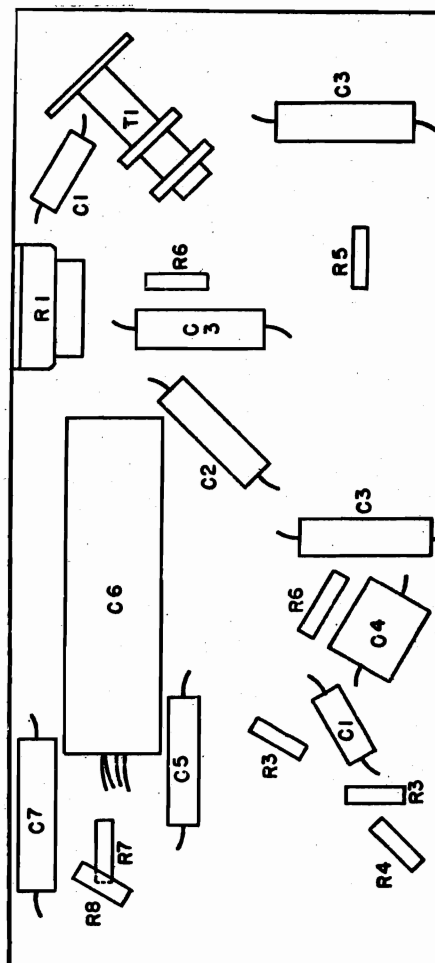
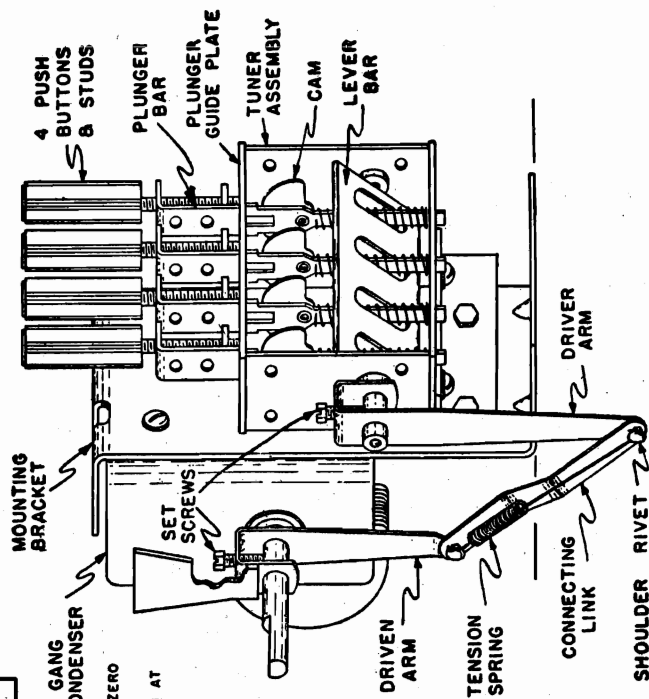
Schematic, Voltage, Socket

WARWICK MFG. CORP.

Trimmers, Chassis
Tuner



LOCATION OF PARTS ON TOP OF CHASSIS

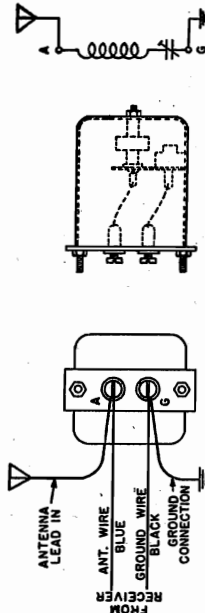


LOCATION OF PARTS UNDER CHASSIS

MODEL 9-58 Alignment, Tuner Data

WARWICK MFG. CORP.

MODEL 9-46 Alignment, Wave Trap Notes Tuner Data



Model 9-46

In localities where particular interference is noticed from radio transmitters it would be advisable to attach to the receiver an antenna wave trap. Connect the antenna wire from the receiver (blue lead) and the antenna lead-in from your antenna to the binding post marked "A" on the wave trap. Connect the ground wire of your receiver (black lead) and the ground lead coming from your ground connection to the binding post marked "G" on the wave trap. This antenna wave trap can be obtained under the part No. 1016310255 as a service part.

This wave trap is supplied tuned to a frequency of 455 K.C. If there is only one interfering station it would be advisable to tune the wave trap to the frequency of the interference. Where there are more than one interference it would be advisable to have the wave trap tuned to a frequency of 455 K.C. to keep the interference at a minimum.

HOW THE AUTOMATIC PUSH-BUTTON TUNER FUNCTIONS:

Model 9-46

This unit is mechanically operated by means of a proven cam and lever action, designed to rotate a shaft 90 degrees. Since the variable gang condenser must rotate 180 degrees, a 2 to 1 step up mechanical lever action is incorporated to give full rotation to the gang condenser. Three links are used to transmit the motion of the push-button to the variable gang condenser. The first link is connected to the drum shaft, the second, a driven lever connected to the gang condenser shaft and third, a connecting link, connecting the two levers together mechanically.

The plunger bar that retains the screw type push-buttons also holds a cam to itself by a shoulder rivet. This cam fits on the rivet proper and is locked into position with a small square plate, facing in the plunger bar. To lock cam into position, screw the push-button knob toward the right (clockwise). The end of the push-button screw will then force a small square plate known as a brake shoe against the periphery of the cam. To change the setting of the cam, the push-button knob must be loosened by turning it toward the left (counter-clockwise). When this push-button screw is loosened, it will automatically release the brake shoe from the cam, leaving the cam free to rotate and set its new position to the setting of the lever bar.

If it becomes necessary to realign the tuner in relation to the gang condenser, the following procedure should be followed to assure perfect tuning operation:

1. Slip driver arm on to the tuner shaft and the driven arm on to the variable condenser shaft. Do not tighten set screws.
2. Connect these two lever arms by slipping the connecting link over the heads of the shoulder rivets. This link has a slight offset and precaution should be taken when assembling to see that it is installed in the proper manner as illustrated in the Pictorial. It will be necessary to tilt the link slightly in order to slip it over the head of the shoulder rivet. Then attach spring as shown.
3. In making the final adjustment, that of setting the condenser in relation to the tuner, set the condenser to the station desired and then raise the lever bar raised as high as possible (see Pictorial). With the lever arm in a vertical position as shown, tighten set screws.

It is essential that all set screws be tightened securely so as to prevent a variation from original setting. If for some reason, a replacement is necessary for some particular item on the tuner proper, such as a lever bar, cam, plunger bar or brake shoe, it would be advisable to return the complete tuner proper for replacement.

HOW THE AUTOMATIC PUSH-BUTTON TUNER FUNCTIONS:

Model 9-58

This unit is mechanically operated by means of a proven cam and lever action, designed to rotate a shaft 90 degrees. Since the variable gang condenser must rotate 180 degrees, a 2 to 1 step up mechanical lever action is incorporated to give full rotation to the gang condenser. Three links are used to transmit the motion of the push-button to the variable gang condenser; first, a driver lever or link connected to the tuner shaft, second, a driven lever connected to the gang condenser shaft and third, a connecting link, connecting the two lever arms together mechanically.

If it becomes necessary to realign the tuner in relation to the gang condenser, the following procedure should be followed to assure perfect tuning operation:

1. Attach driver arm to the lever bar by means of two machine screws, making sure that they are assembled with lockwashers and tightened securely.
2. Slip the drum assembly, which consists of the drum, drum hub, and the driven arm, over the variable condenser shaft but do not tighten set screws.
3. Connect these two lever arms by slipping the connecting link over the heads of the shoulder rivets. This link has a slight bend (offset) about 1/3 of its length and is to be installed with the shorter end toward the top and the offset towards the rear when looking at it from the drum end. Attach the tension spring between the two shoulder rivets. This spring is incorporated to take up all the unnecessary slack in the drive.
4. In making the final adjustment, that of setting the condenser in relation to the tuner, close the condenser arm comes gradually down to within 1/4 of an inch of the variable condenser shaft. When in this position, tighten set screws in the drum hub with the right hand.

ALIGNMENT PROCEDURE

Model 9-46

PRELIMINARY	Output Meter Connections	Across Loud Speaker Voice Coil
Output Meter Reading to Indicate 1 Watt	195 Volts	Receiver Chassis
Generator Ground Lead Connection	See Chart Below	See Chart Below
Dummy Antenna Value to Be in Series with Generator Output	30%, 400 Cycles	30%, 400 Cycles
Connection of Generator Output Lead	See Chart Below	See Chart Below
Generator Modulation	30%, 400 Cycles	30%, 400 Cycles
Position of Volume Control	Fully On	Fully On

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTIONS (In Order Shown)	TRIMMER ADJUSTMENT	TRIMMER FUNCTION
1400 KC	1400 KC	.0002 mfd.	Antenna Conn.	C10	F. Trimmer
1400 KC	1400 KC	.0002 mfd.	Antenna Conn.	C9	Ant. Trimmer

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTIONS (In Order Shown)	TRIMMER ADJUSTMENT	TRIMMER FUNCTION
Closed	455 Kc.	.1 mfd.	12A8GT	T4-T5	I.F.
Fully Open	455 Kc.	.0002 mfd.	Antenna Conn.	T1 (Min. Output)	Wave Trap
Fully Open	1700 K.C.	.0002 mfd.	Antenna Conn.	C13	Osc. Trimmer
Fully Open	1400 K.C.	.0002 mfd.	Antenna Conn.	C12	Ant. Trimmer

INDEX TABS

Model 9-46

Cut the call letters of your four (4) selected stations from the list supplied with your receiver and slip them into the top of the Push-Buttons. Arrange the call letters in the buttons with the call letter of the highest frequency station, the one that comes in closest to the number 100 on the tuning knob, toward the rear of the receiver and work progressively toward the front so that the lowest frequency station, the one that comes closest to the number 90 on the tuning knob, would be toward the front.

SETTING PUSH-BUTTONS

1. By means of the Station Selector Knob, tune in WITH THE RIGHT HAND AS ACCURATELY AS POSSIBLE the station having the highest frequency—that is, your selected station which is tuned in nearest number 100 on the Station Selector Knob.
2. After the station has been tuned in accurately with the right hand, continue to hold it in its exact position firmly, and with the left hand turn the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).
3. Continuing to hold the Station Selector Knob in its exact position, PUSH THE PUSH-BUTTON IN ALL THE WAY with the left hand.
4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.

The Push-Button tuning system is now correctly set up for your first selected station of highest frequency and the Call Letter Tab for this station should be in the Push-Button nearest the rear of the receiver.

Follow through with this same procedure, setting up the other 3 stations in the order of their frequency—that is, the second station set up will be second highest in frequency and the third station set up will be third highest in frequency.

INDEX TABS

Model 9-58

Cut the call letters of your four (4) selected stations from the list supplied with your receiver and slip them into the Tab Holder from the front, with the clear celluloid in front of the call letters to protect them. Arrange the call letters in the Buttons from right to left. Have the call letters of the lowest frequency station, that is, the station that comes in nearest to the top of the dial scale, at the extreme right-hand button and work progressively to the left so that the highest frequency call letters will be in the extreme left-hand button.

SETTING PUSH-BUTTONS:

1. By means of the Station Selector Knob, tune in WITH THE RIGHT HAND AS ACCURATELY AS POSSIBLE the station having the lowest frequency—that is, your selected station which is tuned in nearest the bottom of the dial scale.
2. After the station has been tuned in accurately with the right hand, continue to hold it in its exact position firmly, and with the left hand loosen the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).
3. Continuing to hold the Station Selector Knob in its exact position, PUSH THE PUSH-BUTTON IN ALL THE WAY with the left hand.
4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.

The Push-Button tuning system is now correctly set up for your first selected station of lowest frequency and the Call Letter Tab for this station should be at the extreme right of the Call Letter Holder.

Follow through with this same procedure, setting up the other 3 stations in the order of their frequency—that is, the second station set up will be second lowest in frequency and the third station set up will be third lowest in frequency.

Carefully check each Push-Button for the accuracy of its setting. If, when tuning in any station with its own call letters, the station does not come in clearly to that obtained with manual tuning, this may indicate the automatic adjustment for that station was not set correctly. Should this occur, the receiver in any one of the Push-Button adjustments, correction can be made by repeating the above procedure for that button only. Do not reset those Push-Buttons that are accurately adjusted.

No further adjustments are necessary to operate your radio automatically or manually. To receive any one of your selected stations for automatic operation, merely push in ALL THE WAY the Button set up for that station.

To receive all other stations in the regular manner turn the tuning knob to the frequency of the station desired.

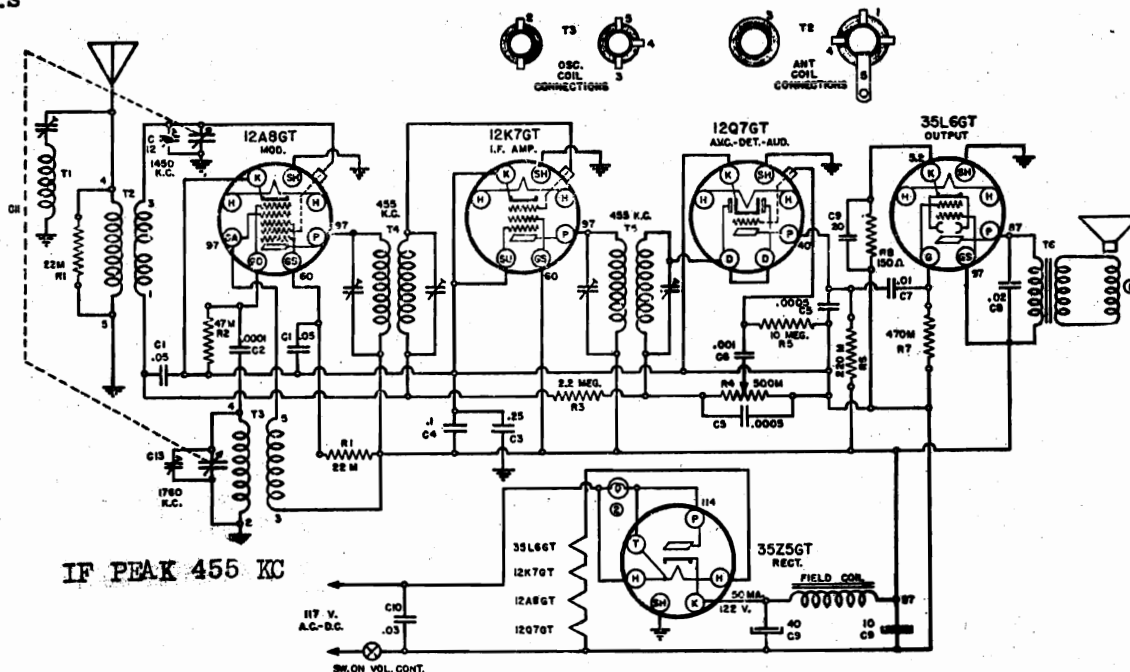
MODEL 9-58

Schematic, Voltage

Socket, Trimmers

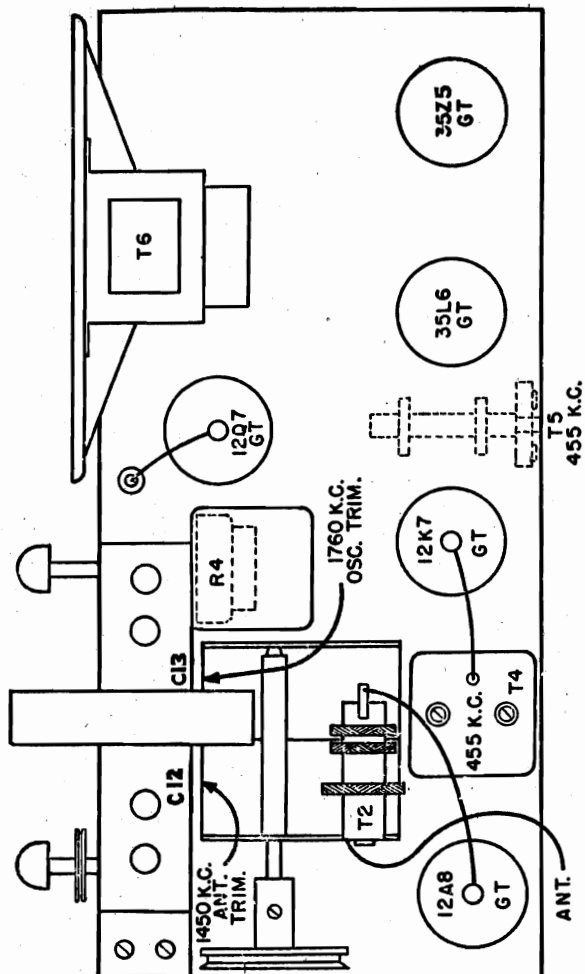
Chassis

WARWICK MFG. CORP.

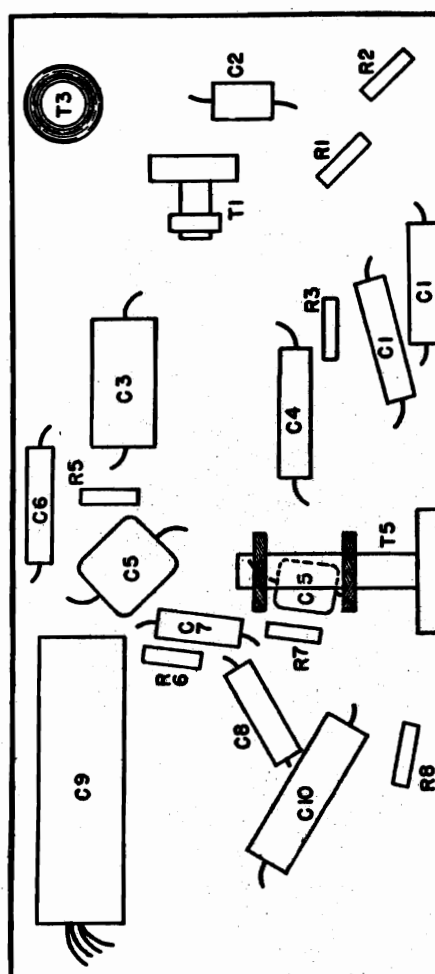


TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO COMMON GROUND.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
CAPACITY VALUES ARE IN MICROFARADS.

ALIGNMENT IS TO BE MADE AT THE FREQUENCY, SHOWN AT EACH
TRIMMER CONDENSER.
WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO
VOLTAGE OR A VERY LOW READING.



LOCATION OF PARTS ON TOP OF CHASSIS

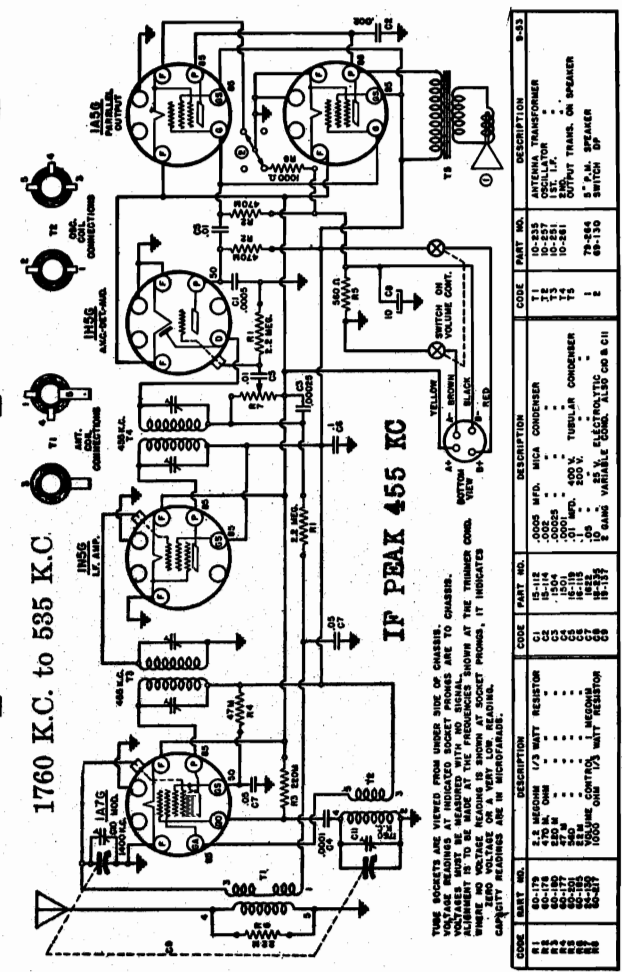
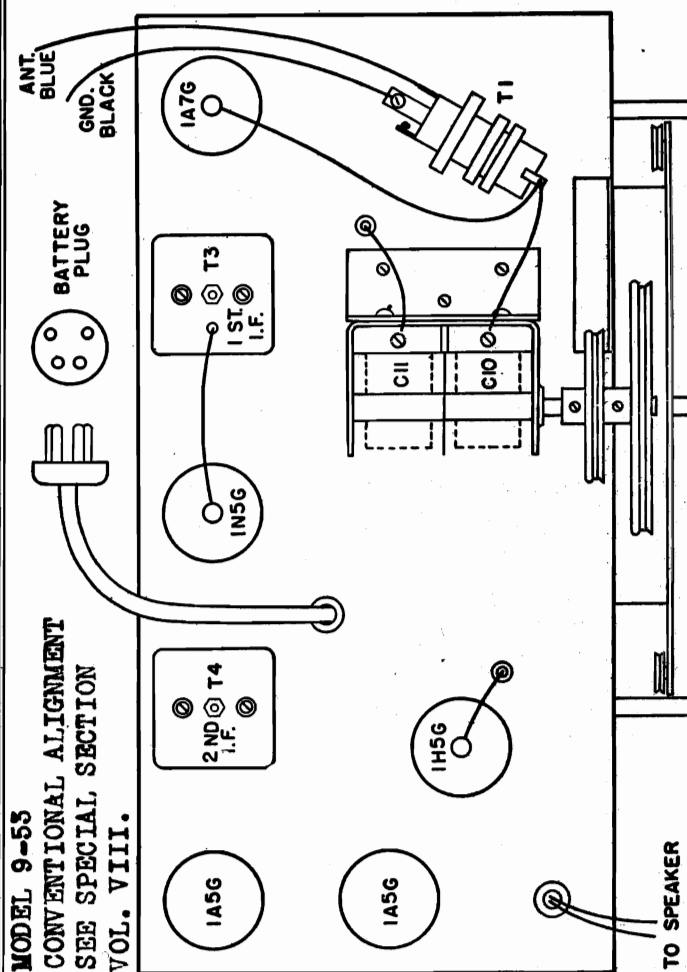
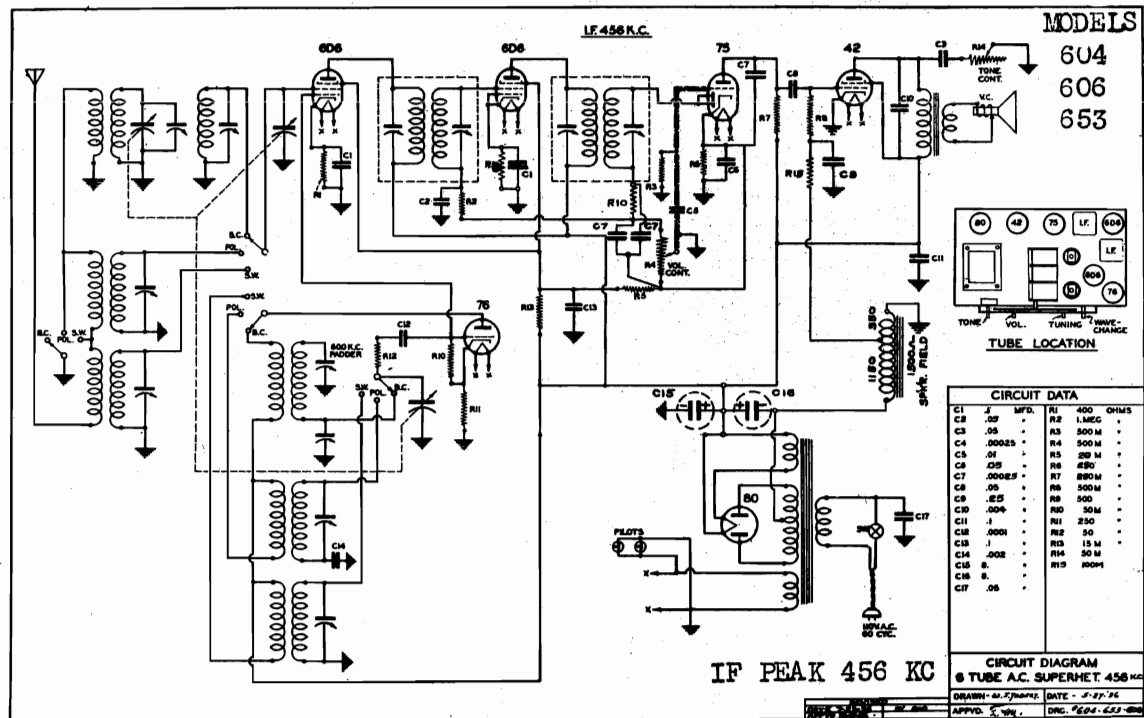


LOCATION OF PARTS UNDER CHASSIS

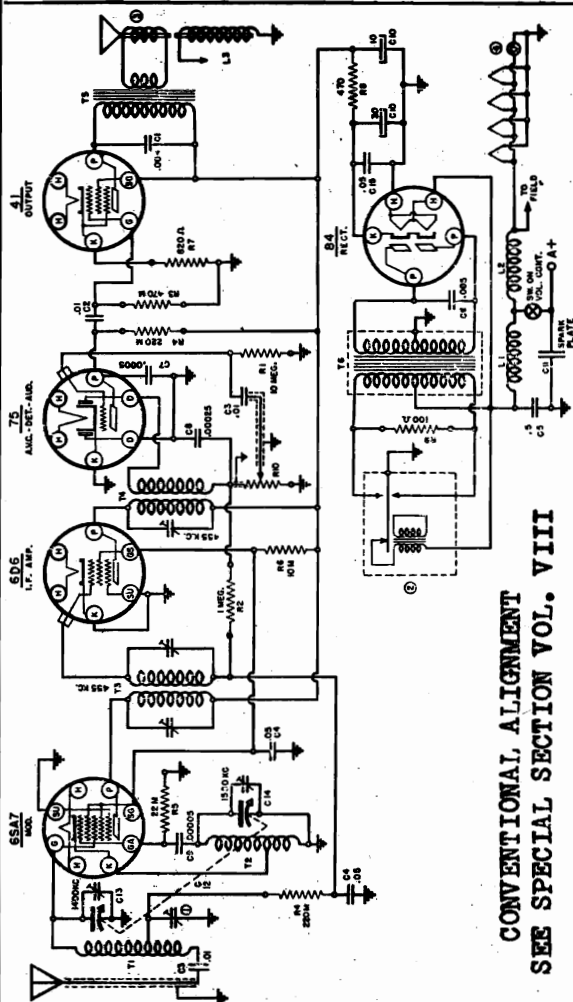
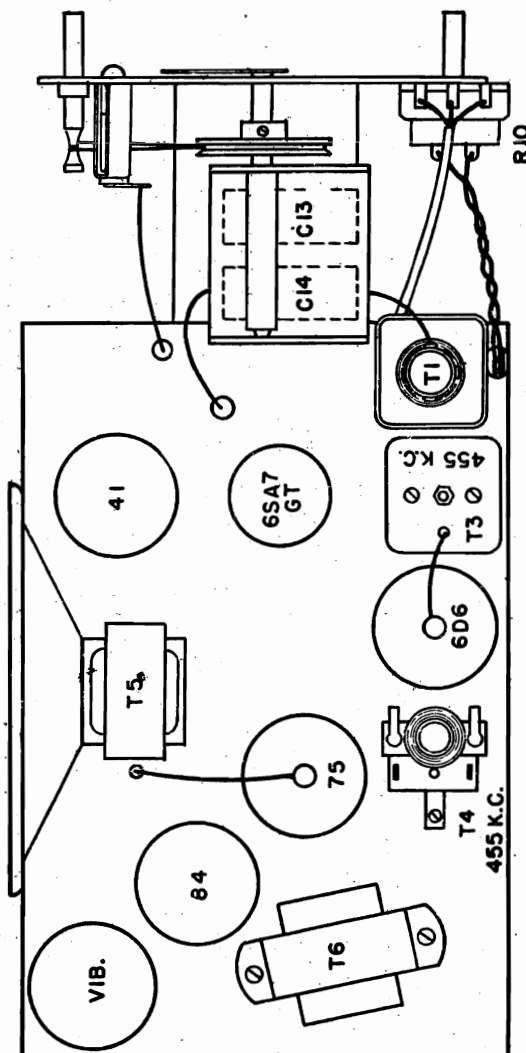
MODELS 604, 606, 653
Schematic, Socket

WARWICK MFG. CORP.

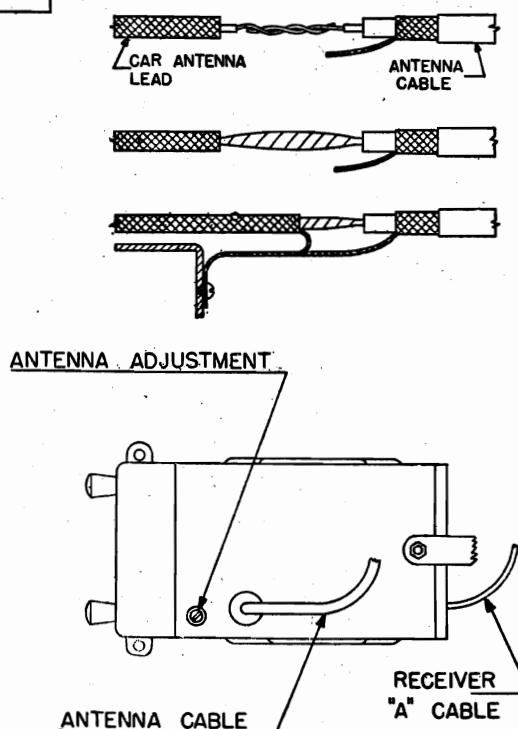
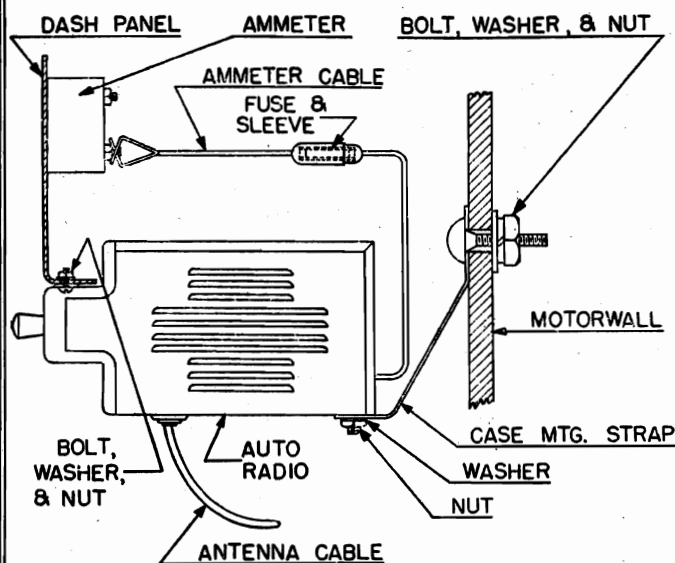
MODEL 9-53
Schematic, Voltage, Socket
Trimms, Alignment



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

[illegible]

Frequency Range 540-1520 Kilocycles



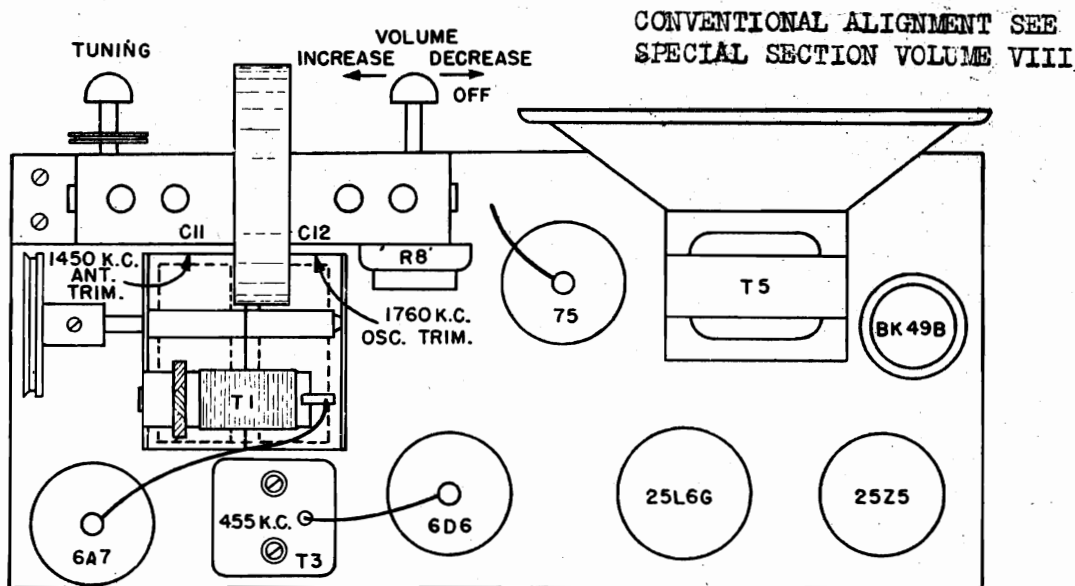
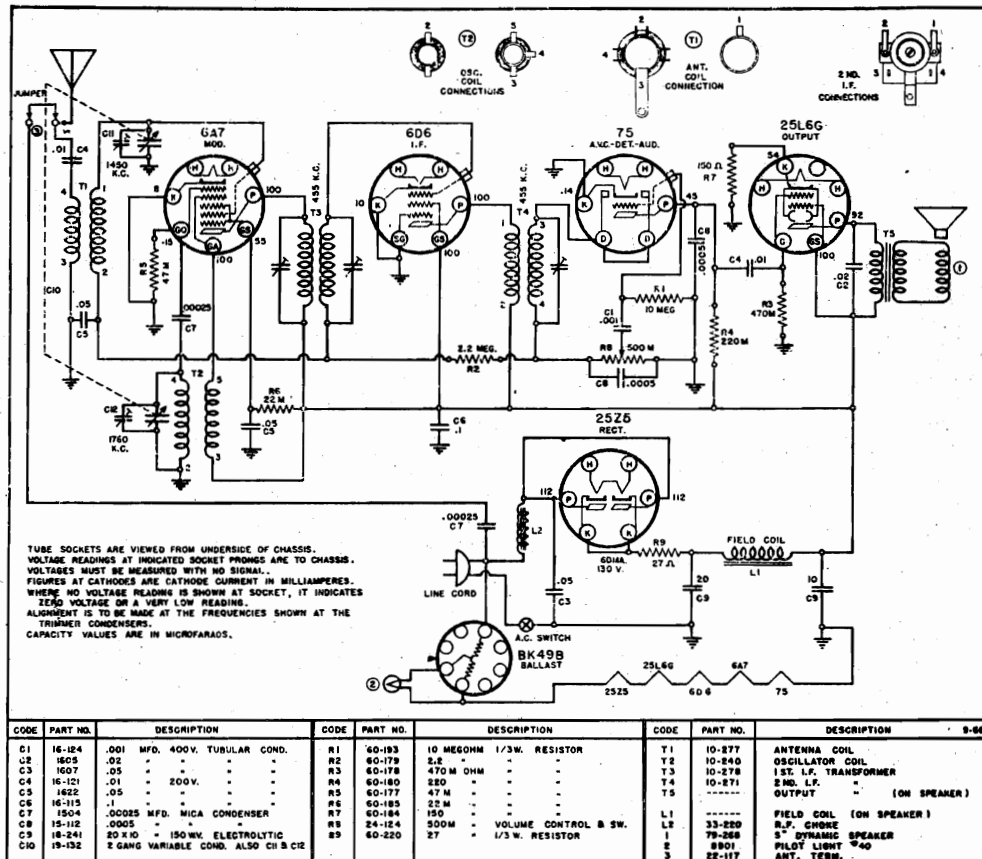
WARWICK MFG. CORP.

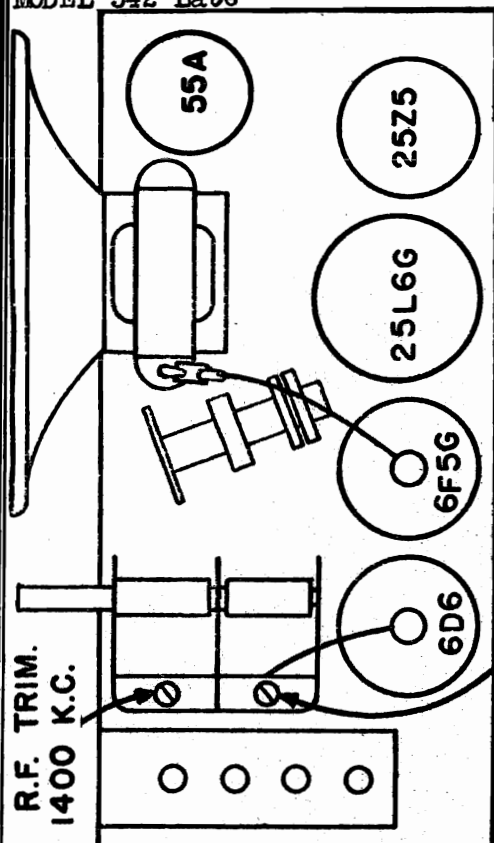
MODEL 9-66
Schematic, Voltage
Socket, Trimmers
Alignment

This receiver is a 6-tube AC/DC current operated Superheterodyne.

The tubes used are: a 6A7 as an oscillator-converter; a 6D6 as an I. F. amplifier; a 75 as an A.V.C. detector and audio amplifier; a 25L6G as a beam output; a 25Z5 as a power rectifier; and a BK49B as a voltage divider.

This receiver is made to cover from 1750 KC. to 535 KC., which covers the standard broadcast band and the first police band.

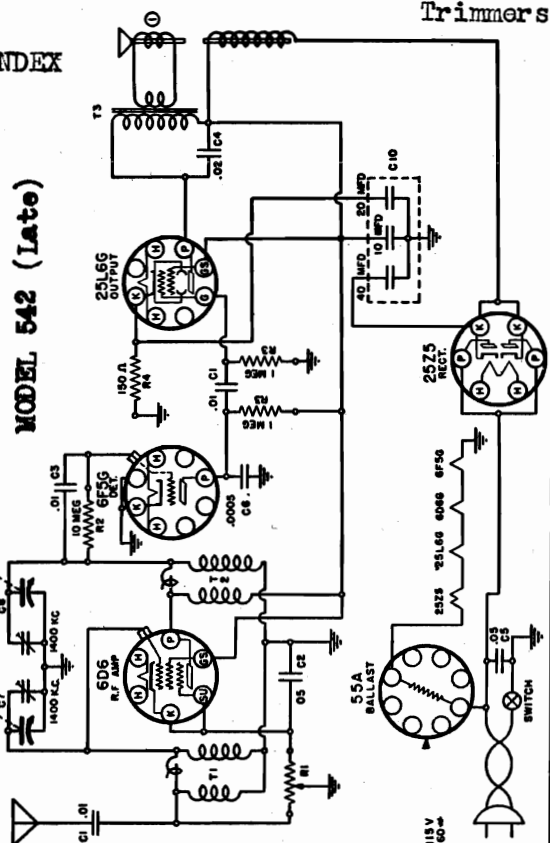




FOR TUNER SEE INDEX

[illegible]

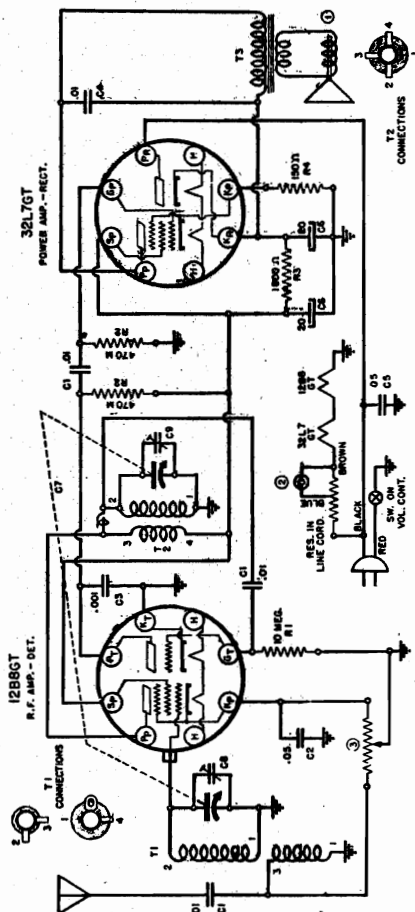
This receiver is a 5 tube AC/DC current operated T.R.F. This receiver is made to cover from 1750K.C. to 535K.C.



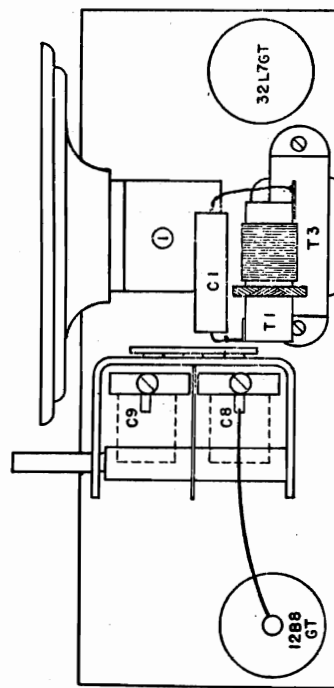
Model No. 9-22 is a 2-tube T.R.F. radio receiver for operation on a 117 Volt A.C. 60 cycle or 117 Volt D.C. supply. The tubes used are a 12B8GT as an R.F. Amplifier and Detector and a 35L7GT as a Power Amplifier and Rectifier.

This receiver covers a frequency range from 540 Kilocycles to 1760 Kilocycles (K.C.).

The scale is calibrated in kilocycles (less the final zero). Standard broadcast stations are listed in kilocycles in most station lists.

[illegible]

MODEL No.
9-220 to 9-229,
Inclusive

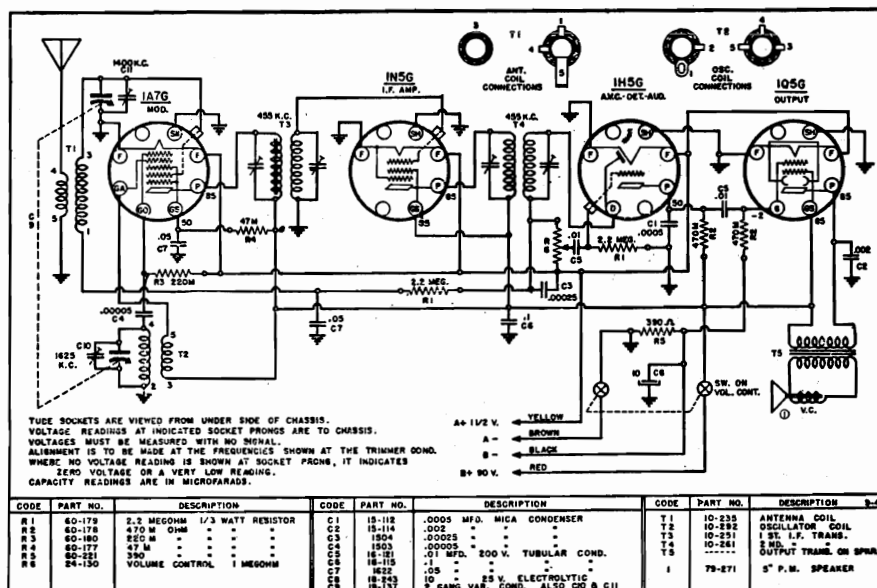


LOCATION OF PARTS ON TOP OF CHASSIS

WARWICK MFG. CORP.

MODELS 9-480 to 9-489 inc.
MODELS 9-680 to 9-689 inc.
Schematics, Voltage, Socket
Trimmers, Alignment

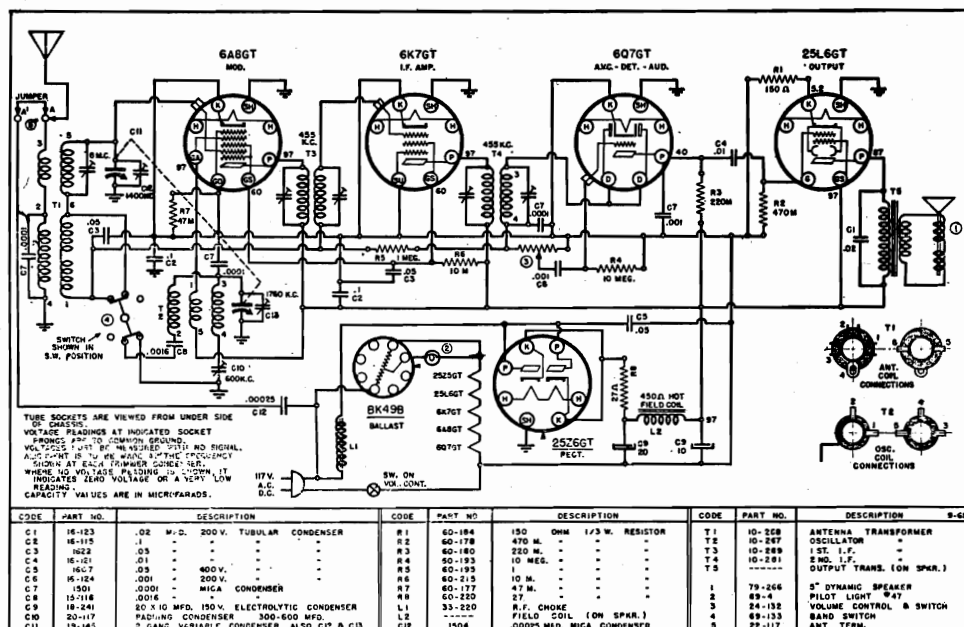
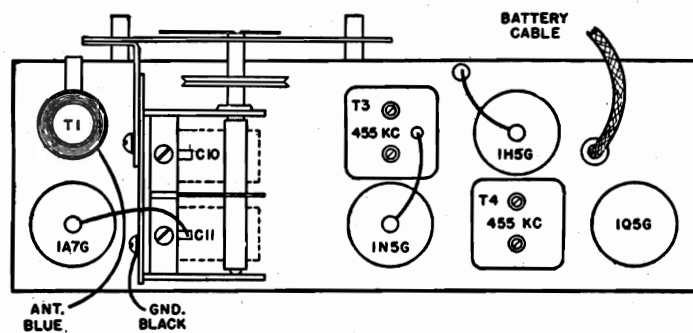
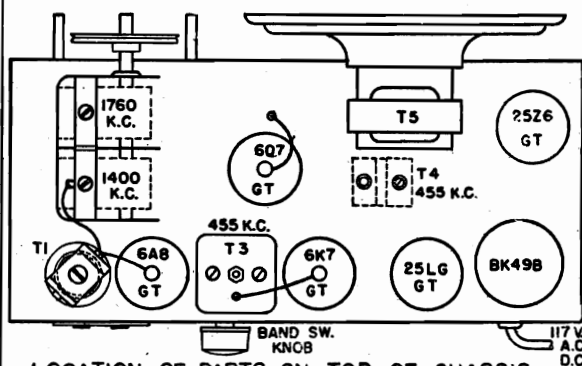
CONVENTIONAL ALIGNMENT SEE
SPECIAL SECTION VOLUME VIII



Models 9-480 to 9-489 inclusive

One of the following batteries may be used with this receiver and is to be put inside and towards the rear of the cabinet.

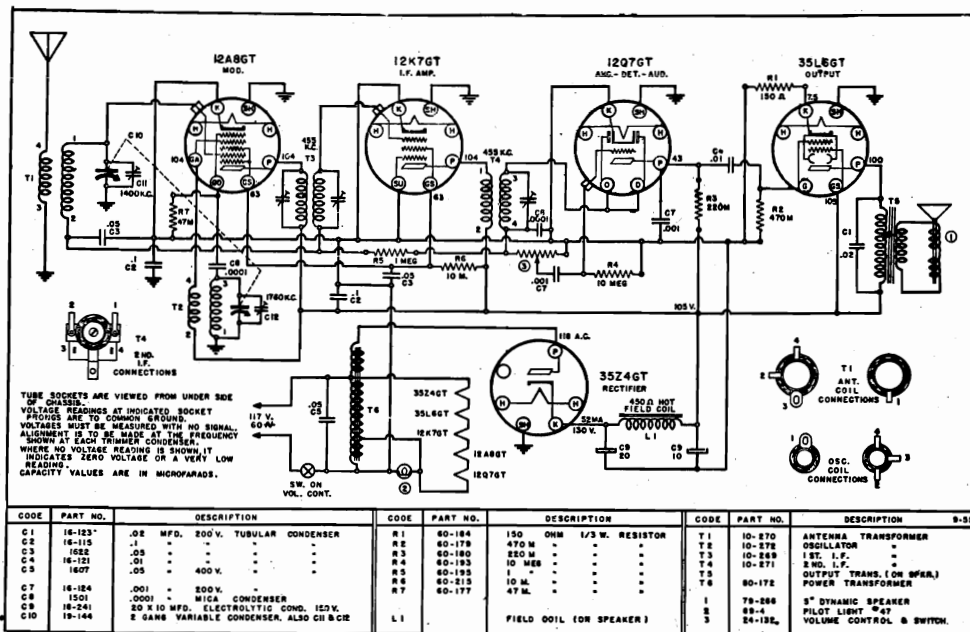
Ray-O-Vac..No."AB" 82
Burgess..No.17G-D60
General..No.60DL11L



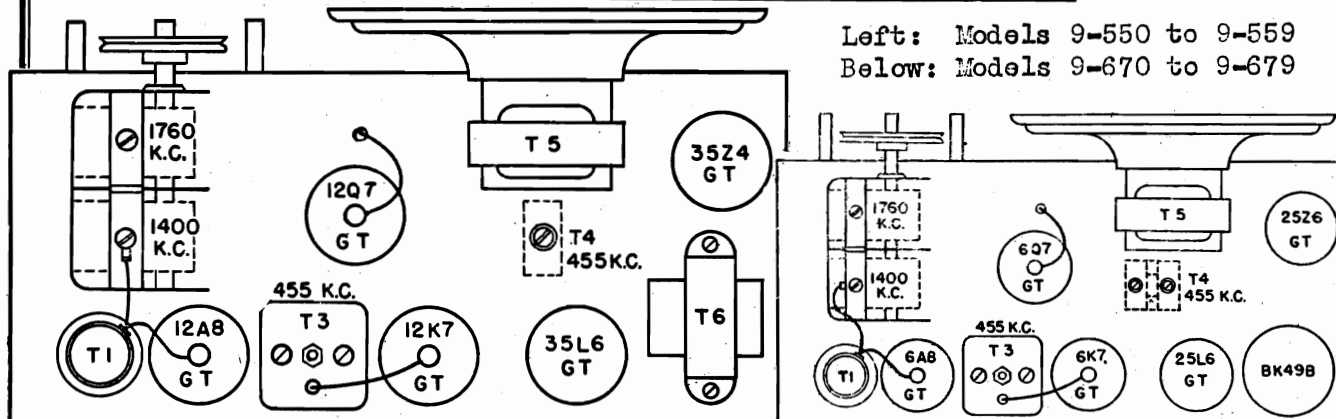
Models
9-680 to 9-689
inclusive

Tuning Ranges:
Broadcast
536 - 1760 KC
Short-Wave
2.35 - 7.4 MC

MODELS 9-550 to 9-559 inc
MODELS 9-670 to 9-679 inc. **WARWICK MFG. CORP.**
Schematics, Voltage, Socket Alignment, Trimmers FOR CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII



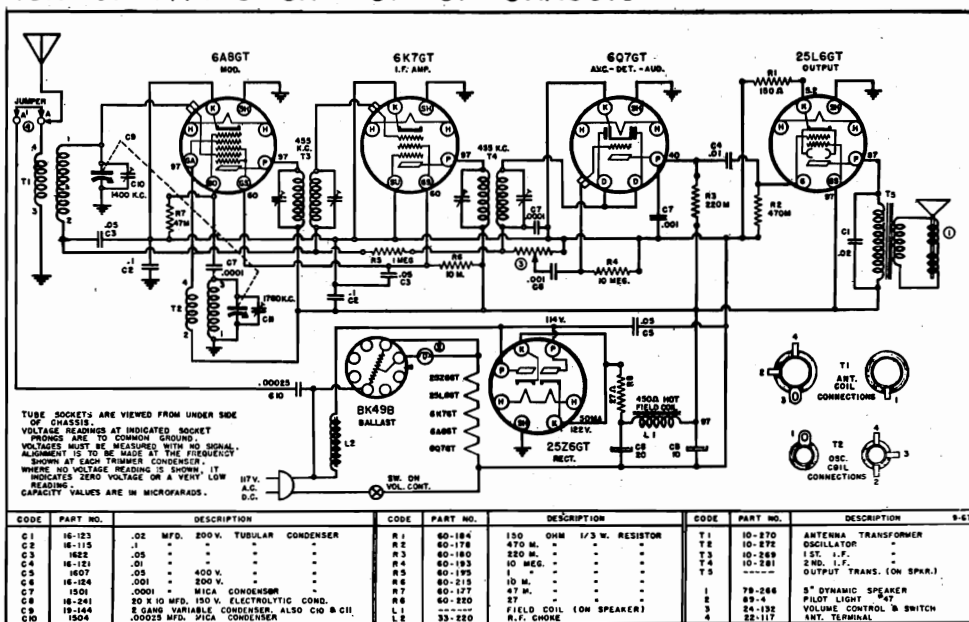
Models
9-550
to
9-559



Left: Models 9-550 to 9-559
Below: Models 9-670 to 9-679

LOCATION OF PARTS ON TOP OF CHASSIS

LOCATION OF PARTS ON TOP OF CHASSIS

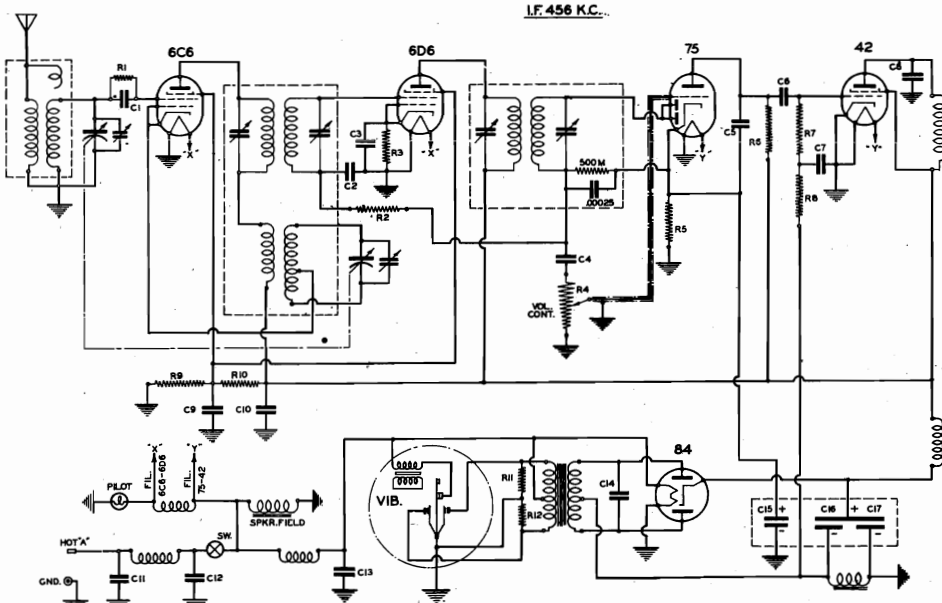


Models
9-670
to
9-679

Schematics, Socket
Alignment, Trimmers

WARWICK MFG. CORP.

MODEL 401
MODEL 401LW
MODEL 550-C



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL VIII.



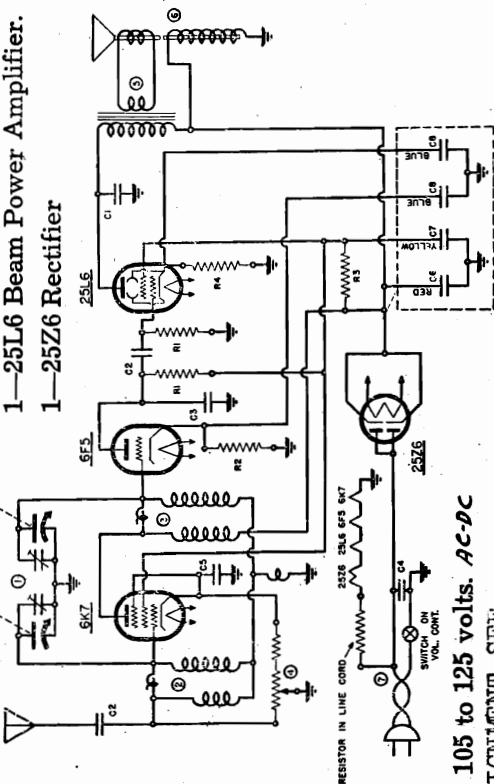
CIRCUIT DATA

C1	.00025 MFD.
C2	.05
C3	.1
C4	.01
C5	.00025
C6	.01
C7	.25
C8	.004
C9	.1
C10	.1
C11	.002
C12	.002
C13	.5
C14	.0075
C15	.4
C16	.8
C17	.8

R1	500M OHMS
R2	1MEG.
R3	300
R4	1MEG.
R5	5M
R6	250M
R7	250M
R8	100M
R9	25M
R10	25M
R11	50
R12	50

CIRCUIT DIAGRAM
5 TUBE SUPER AUTO SET.
DRAWN - G. J. HART DATE - 5-15-36
APPROVED - R. H. H. DRG. NO. 550-C

1-6K7 R. F. Amplifier
1-25L6 Beam Power Amplifier.
1-25Z6 Rectifier



MODEL 401

105 to 125 volts. AC-DC

FOR CONVENTIONAL ALIGNMENT SEE
SPECIAL SECTION VOLUME VIII

PART NO.	DESCRIPTION	401
R1	1 MEG. OHM 1/2W. CARBON RES.	
R2	33000	
R3	4700	
R4	250	
C1	.02 MFD. 600V. TUBULAR COND.	
C2	.01	
C3	.05	
C4	.05	
C5	.05	
C6	.05	
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MODEL 404

MODEL 510-C

Schematics, Socket
Alignment, Trimmers

WARWICK MFG. CORP.

MODEL 404

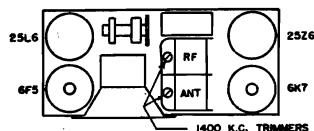
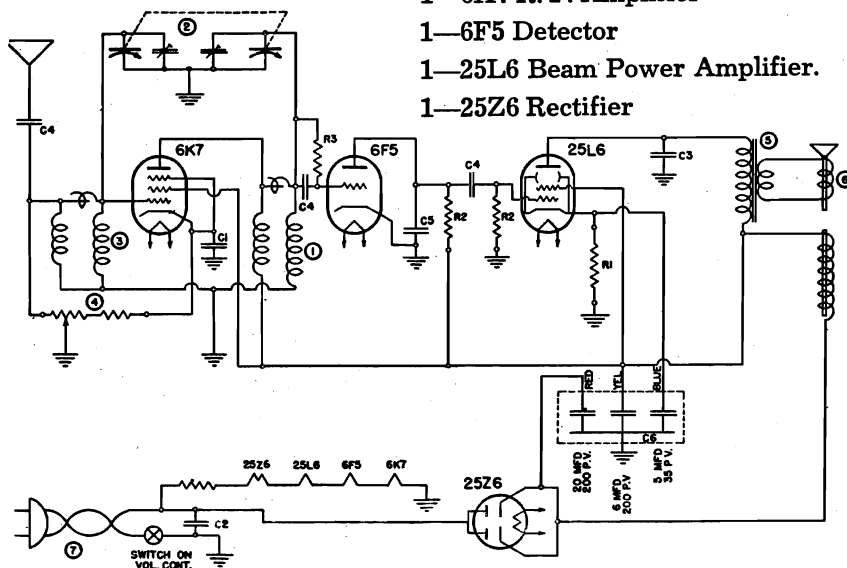
This receiver will operate on either alternating or direct current, from a power supply of 105 to 125 volts. Do not connect it to any other source.

1—6K7 R. F. Amplifier

1—6F5 Detector

1—25L6 Beam Power Amplifier.

1—25Z6 Rectifier

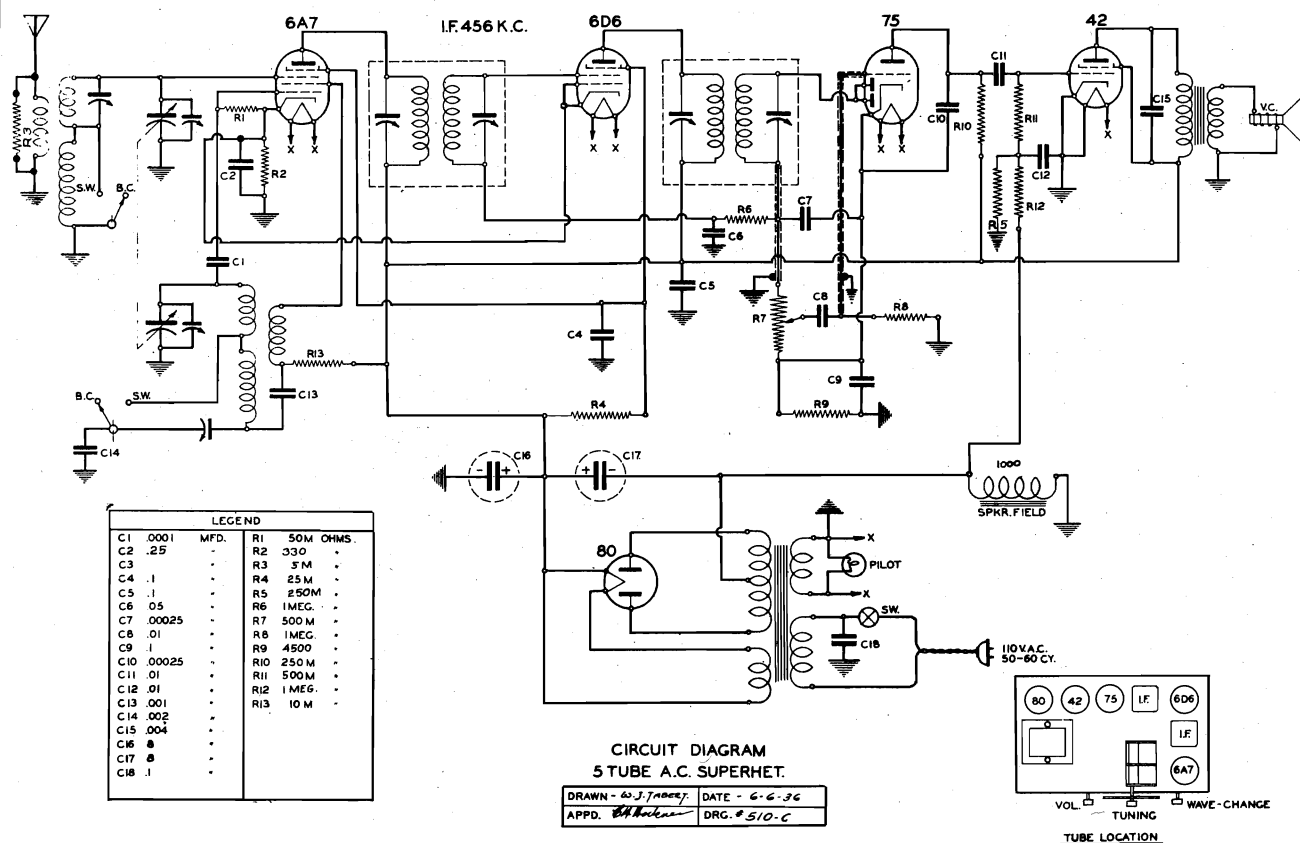


CODE	PART NO.	DESCRIPTION	404
1	10-234	R.F. COIL	
2	19-124	2 GANG CONDENSER	
3	10-233	ANTENNA COIL	
4	24-117	VOLUME CONTROL & SWITCH	
5	80-148	OUTPUT TRANSFORMER	
6	79-244	SPEAKER	
7	23-117	LINE CORD	

CODE	PART NO.	DESCRIPTION
R1	60-184	150 OHM 1/2 WATT RESISTOR
R2	60-187	1 MEGOHM 1/2 WATT
R3	60-183	68 MEGOHM 1/2 WATT
C1	16-109	.05 MFD 200 V TUBULAR CONDENSER
C2	16-107	.05 MFD 500 V
C3	16-108	.02 MFD 600 V
C4	16-110	.01
C5	1804	.00025 MFD MICA CONDENSER
C6	18-230	FILTER CONDENSER

CONVENTIONAL
ALIGNMENT: SEE
SPECIAL SECTION
VOL. VIII.

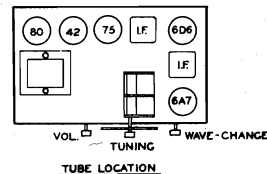
MODEL 510C



LEGEND	
C1 .0001	MFD.
C2 .25	
C3	
C4 .1	
C5 .1	
C6 .05	
C7 .00025	
C8 .01	
C9 .1	
C10 .00025	
C11 .01	
C12 .01	
C13 .001	
C14 .002	
C15 .004	
C16 .1	
C17 .1	
C18 .1	
R1	50M OHMS
R2	330
R3	5M
R4	25M
R5	250M
R6	1MEG.
R7	500M
R8	1MEG.
R9	4500
R10	250M
R11	500M
R12	1MEG.
R13	10M

CIRCUIT DIAGRAM
5 TUBE A.C. SUPERHET.

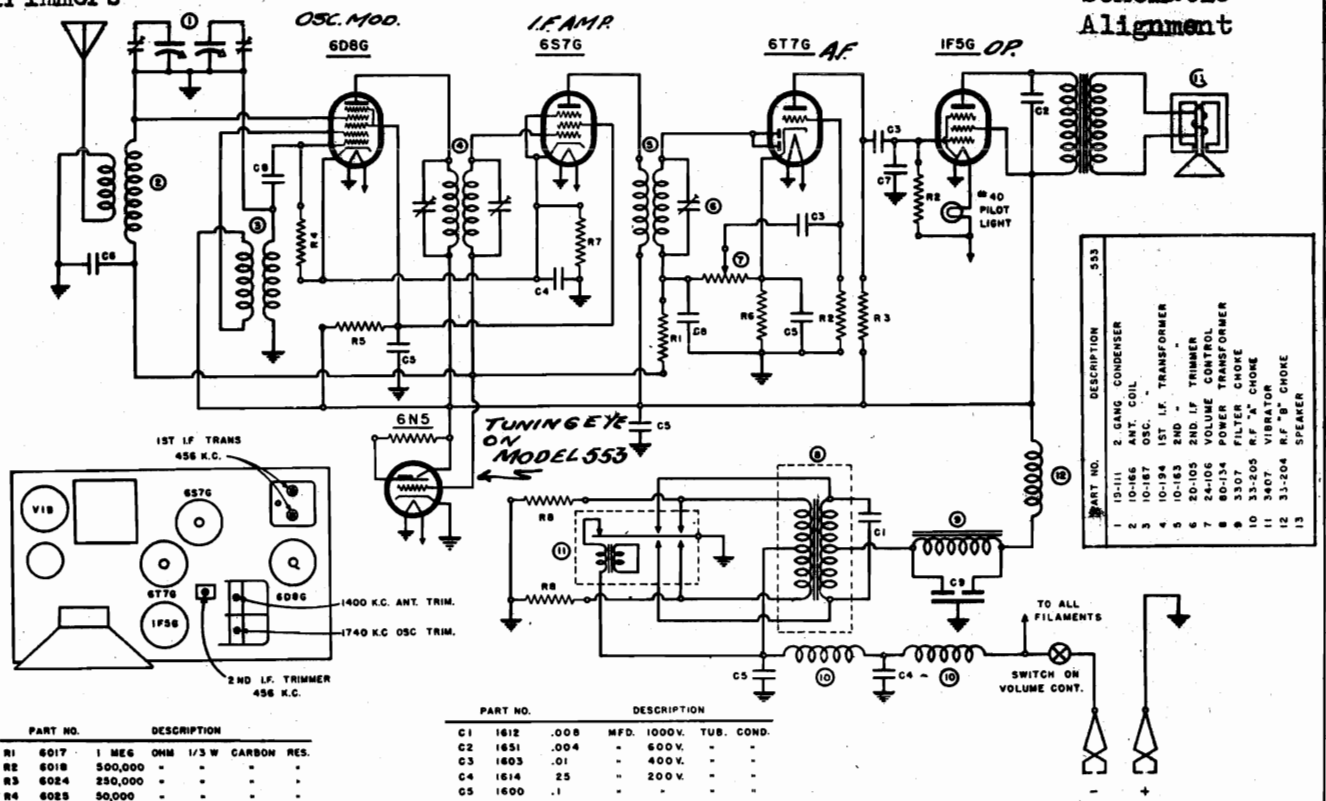
DRAWN - W.J. TAYLOR DATE - 6-6-36
APPD. - H. H. BAKER DRG. # 510-C



Voltage, Socket Trimmers

WARWICK MFG. CORP.

MODELS 453, 553
Schematic
Alignment



DESCRIPTION

This receiver is a 4 tube, 6 volt storage battery operated superheterodyne. The tubes used are 6D86 as oscillator modulator, 6S7G as I.F. amplifier, a 6T7G as A. V. C. and audio rectifier and audio voltage amplifier and a IF5G as power audio amplifier.

This receiver is made to cover the standard broadcast band, from 1730 K.C. to 535 K.C.

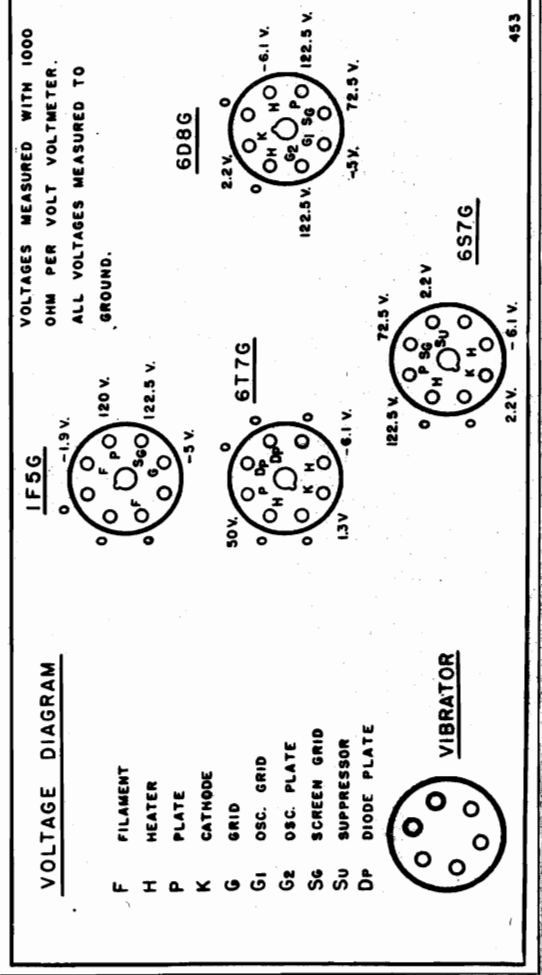
ALIGNMENT PROCEDURE

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 10,000 ohms, to the two plate and screen pins of the IF5G tube.

Connect the signal generator to the grid cap of the 6D8G tube through a 1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. Set the dial to about 1000 K.C., feed in a 456 K.C. signal. Adjust the first and second I.F. trimmers until the maximum output is obtained. This aligns the I.F.

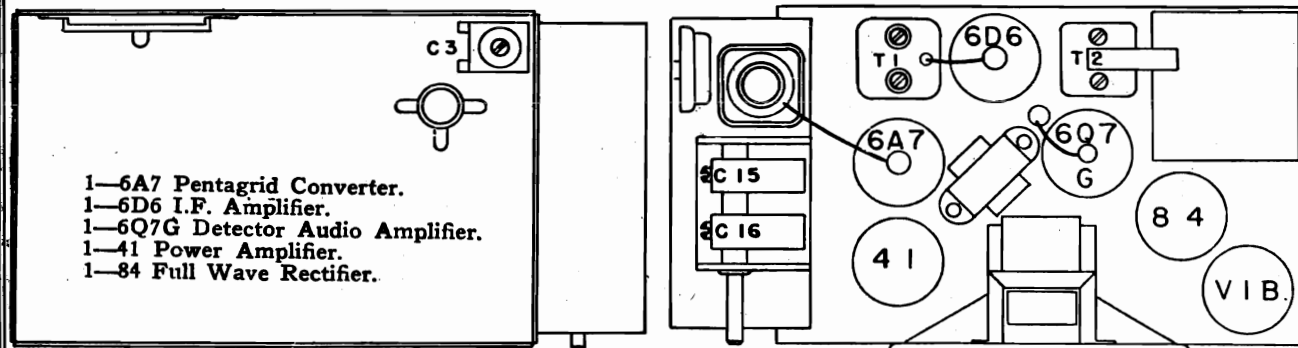
Turn the dial to the extreme high frequency end. Feed a 1740 K.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1740 K.C. oscillator trimmer until maximum output is shown. Set the generator to 1400 K.C. and tune in this signal on the receiver. Then adjust the 1400 K.C. antenna trimmer to maximum output. This completes the alignment.



MODELS 559,579 with
150-Cycle Vibrator

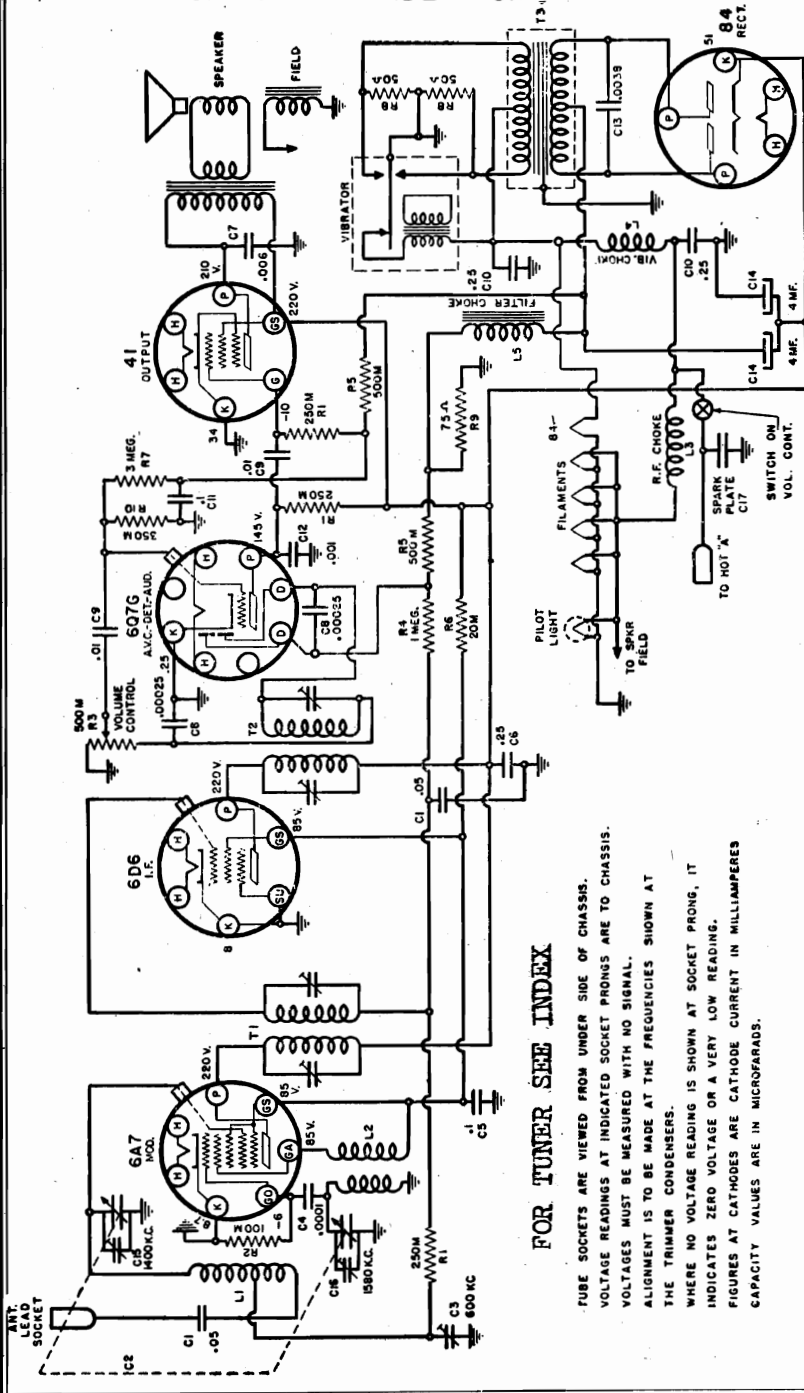
WARWICK MFG. CORP.

Schematic, Voltage, Socket
Trimners, Alignment



LOCATIONS OF PARTS UNDER CHASSIS

LOCATIONS OF PARTS ON TOP OF CHASSIS



ALIGNMENT PROCEDURE

PRELIMINARY

Output Meter Connections
Output Meter Reading to Indicate 1 Watt
Generator Ground Lead Connection
Dummy Antenna Value to Be in Series with Generator Output
Connection of Generator Output Lead
Generator Modulation
Position of Volume Control

Across Loud Speaker Voice Coil
1.85 Volts
Receiver Chassis
See Chart Below
See Chart Below
30%, 400 Cycles
Fully On

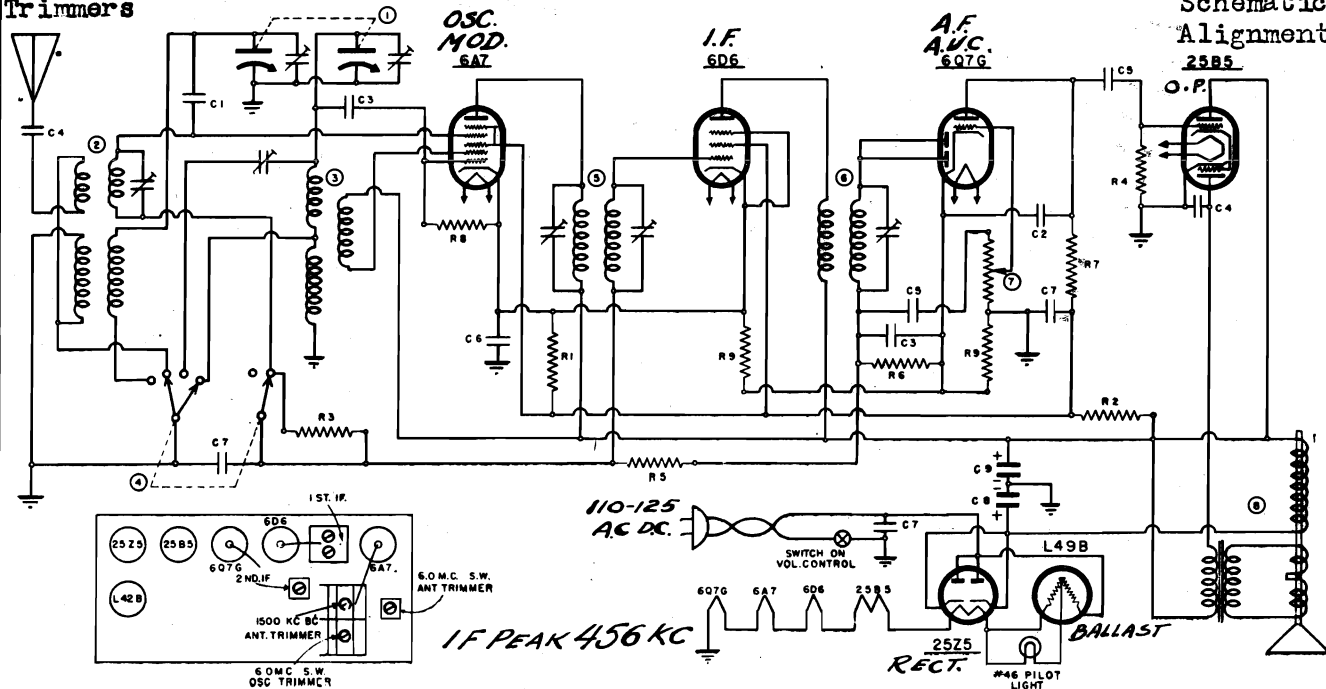
Position of Variable	Generator Frequency	Dummy Antenna	Generator Connection	Trimmer Adjustments (In Order Shown)	Trimmer Function
Closed	456 KC	.1 mfd.	6A7 Grid	T2, T1	I. F.
Fully Open	1580 KC	.0002 mfd.	Antenna Conn.	C16	Oscillator Trimmer
1400 KC	1400 KC	.0002 mfd.	Antenna Conn.	C15	Antenna Trimmer
600 KC	600 KC	.0002 mfd.	Antenna Conn.	C3	Antenna Padder

The variable condenser should be at 600 k.c. for antenna adjustment.
The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy. A final adjustment of antenna padder condenser C3 is always made after the receiver is installed in the car, in order to match the car antenna.
Always keep the output power from the generator at its lowest possible value to prevent the A.V.C. of the receiver from interfering with accurate alignment.

Voltage, Socket
Trimmers

WARWICK MFG. CORP.

MODEL 610
Schematic
Alignment



PART NO	DESCRIPTION	PART NO	DESCRIPTION	PART NO	DESCRIPTION
R1 6104	5000 OHM 1/2 WATT CARBON RES	C1 15-105	00056 MFD. MICA CONDENSER ±3%	1 19-114	2 GANG VARIABLE CONDENSER
R2 60-131	3,000	C2 1504	00025	2 10-174	ANT. COIL
R3 6020	2 MEG	C3 1501	0001	3 10-178	OSC. COIL
R4 607	1 M	C4 1651	004	4 69-109	WAVE BAND SWITCH
R5 6018	500,000	C5 1603	01	5 10-177	1ST. IF TRANSFORMER
R6 6024	250,000	C6 1614	25	6 10-163	2ND. IF TRANSFORMER
R7 6036	200,000	C7 1622	05	7 24-106	VOL. CONTROL WITH SWITCH
R8 6025	50,000	C8 18-211	30	8 79-221	DYNAMIC SPEAKER
R9 6009B	50	C9 18-211	8		

The two tuning
bands covered are
1720 K.C. to 540 K.C.
6.2 M.C. to 2.28 M.C.

ALIGNMENT PROCEDURE

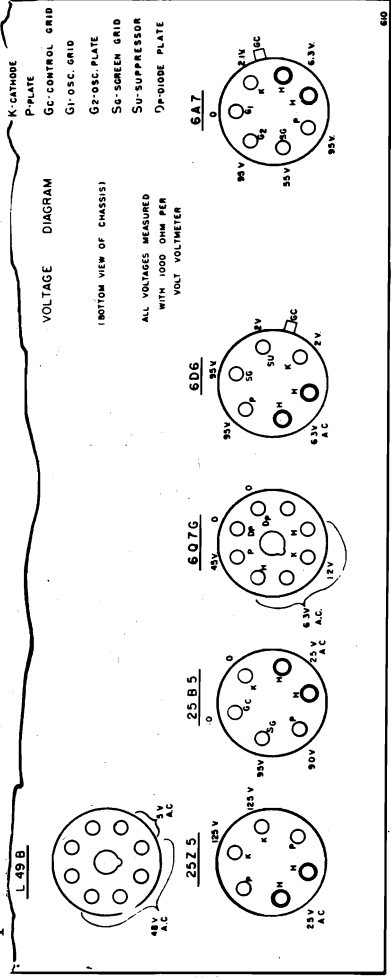
All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter. Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the receiver chassis through another .1 M.F. condenser. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

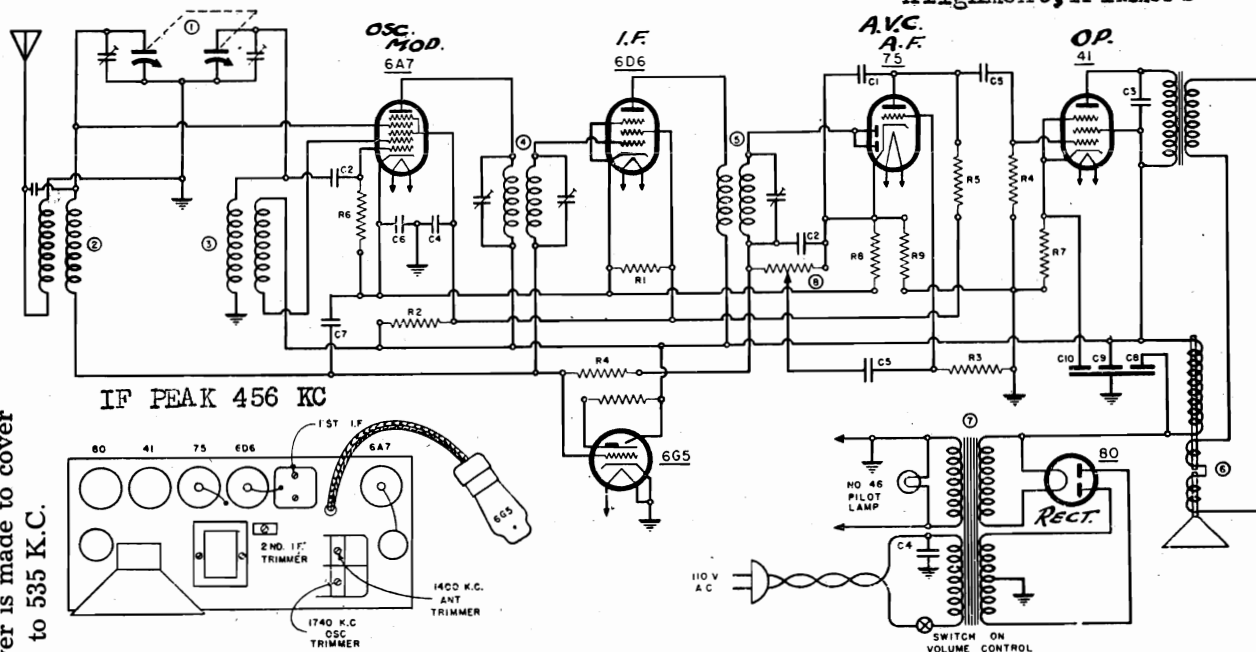
Turn the wave switch to the short wave position and set the dial to 6.0 M.C. Feed a 6.0 M.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Tune the 6.0 M.C. Oscillator trimmer to give resonance. Two points may be found where this signal can be heard. The correct setting is the one where the trimmer is screwed the loosest. This may also be checked by turning the dial to about 5.0 M.C. where the signal should again be heard.

Then turn the wave switch to broadcast position and turn the dial to the extreme high frequency end. Feed in a 1720 K.C. signal and adjust the broadcast oscillator trimmer, which is located under the receiver at the wave switch, to resonance. Then set the signal generator to 1500 K.C. and tune in this signal on the receiver. Adjust the 1500 K.C. antenna trimmer for maximum output.

Again turn the wave switch to short wave position and tune in a 6.0 M.C. signal from the generator. Adjust the 6.0 M.C. antenna trimmer to maximum output.



Schematic, Voltage, Socket
Alignment, Trimmers



PART NO. DESCRIPTION				PART NO. DESCRIPTION				PART NO. DESCRIPTION				829
R1	6117	25,000	OHM 1/2 WATT CARBON RES	C1	1504	.00025	MFD. MICA CONDENSER	1	19-111	2 GANG VARIABLE CONDENSER		
R2	6105	10,000	" " " "	C2	1501	.0001	" " " "	2	10-166	ANTENNA COIL		
R3	6017	1 MEG.	" " 1/3 " "	C3	1651	.004	" 600 V. PAPER CONDENSER	3	10-167	OSCILLATOR COIL		
R4	6018	500,000.	" " " "	C4	1607	.05	" 400V. " "	4	10-162	1ST. LF TRANSFORMER		
R5	6056	200,000	" " " "	C5	1603	.01	" " " "	5	10-163	2ND. LF TRANSFORMER		
R6	6025	50,000	" " " "	C6	1614	.25	" 200V. " "	6	78-239	SPEAKER		
R7	6052	800	" " " "	C7	1622	.05	" " " "	7	80-104	POWER TRANSFORMER		
R8	60-122	175	" " " " 10%	C8	8.0	"	" 250V. ELECTROLYTIC COND.	8	24-104	VOLUME CONTROL WITH SWITCH		
R9	60098	50	" " " " 10%	C9	18-102	4.0	" " " "					
				C10	5.0	"	" 25V. " "					

This receiver is made to cover from 1740 K.C. to 535 K.C.

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to plate and screen pins of output tube, or a low voltage A.C. meter may be used connected across speaker voice coil. The output meter remains connected during the entire alignment procedure.

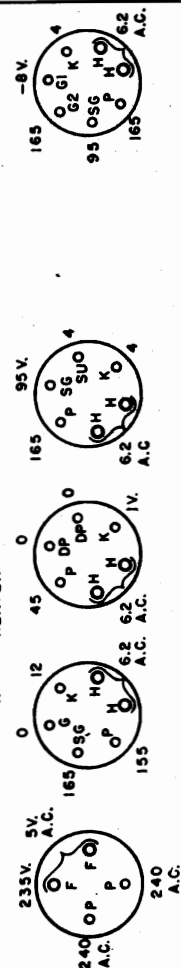
Connect the signal generator to the grid cap of the 6A7 tube through a 1.1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. Set the dial to about 1000 K.C., feed in a 456 K.C. signal. Adjust first and second I.F. trimmers for maximum output. Refer to chassis lay-out for location of trimmers.

Turn the dial to the extreme high frequency end. Feed a 1740 K.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1740 K.C. oscillator trimmer until maximum output is shown. Set the generator to 1400 K.C. and tune in this signal on the receiver. Then adjust the 1400 K.C. antenna trimmer to maximum output. This completes the alignment.

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER.
ALL VOLTAGES EXCEPT HEATERS MEASURED TO GROUND.

G --- GRID	GRID
G1 -- OSCILLATOR	OSCILLATOR
G2 -- OSCILLATOR	OSCILLATOR
SC -- SCREEN GRID	SCREEN GRID
SSU -- SUPPRESSOR	SUPPRESSOR
P --- PLATE	PLATE

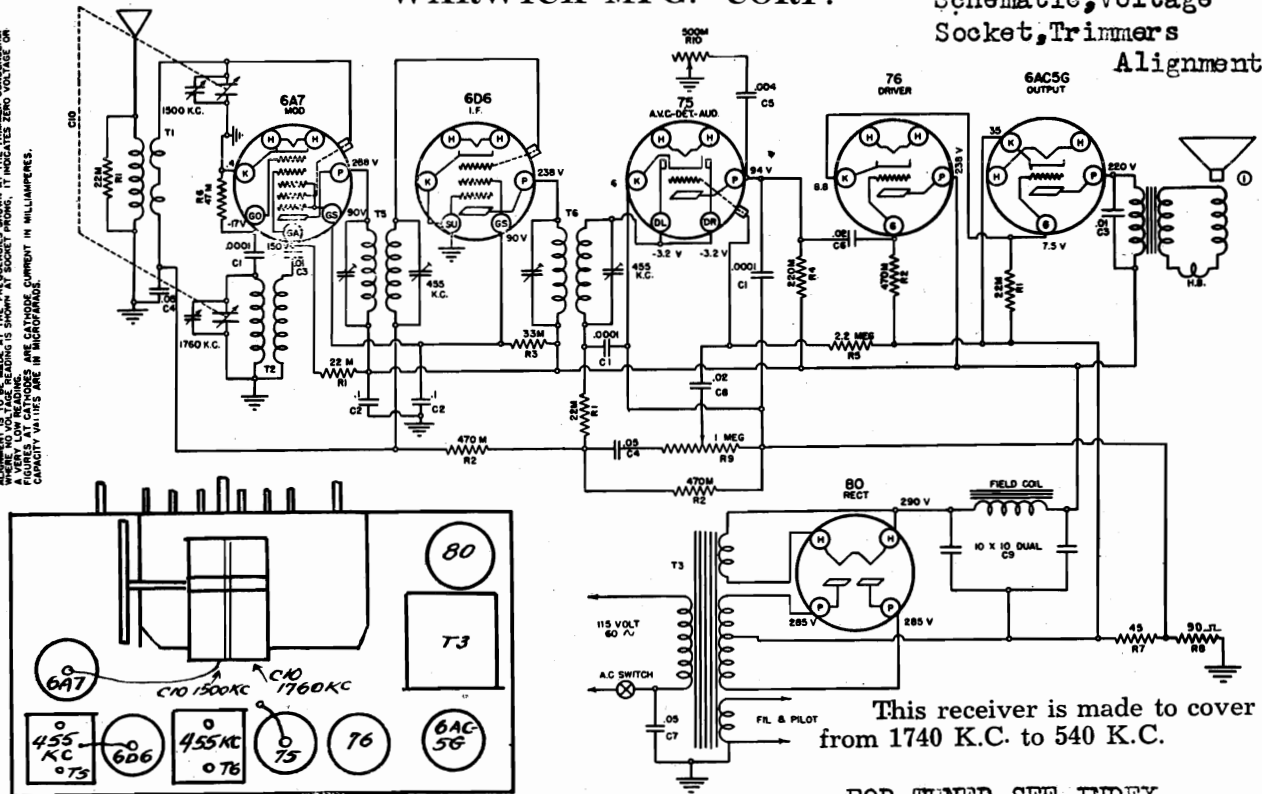
(BOTTOM VIEW OF CHASSIS)



WARWICK MFG. CORP.

MODELS 648, 648B, 655B
Schematic, Voltage
Socket, Trimmers
Alignment

NOTES:
TUBE SOCKET NUMBERS FROM JAMES BEE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET NUMBERS ARE TO CHASSIS.
WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR
WHERE NO CURRENT READING IS SHOWN, IT INDICATES ZERO CURRENT.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
CAPACITANCE VALUES ARE IN MICROFARADS.



This receiver is made to cover
from 1740 K.C. to 540 K.C.

FOR TUNER SEE INDEX

CHASSIS LAYOUT FOR MODEL 655B.

ALIGNMENT PROCEDURE

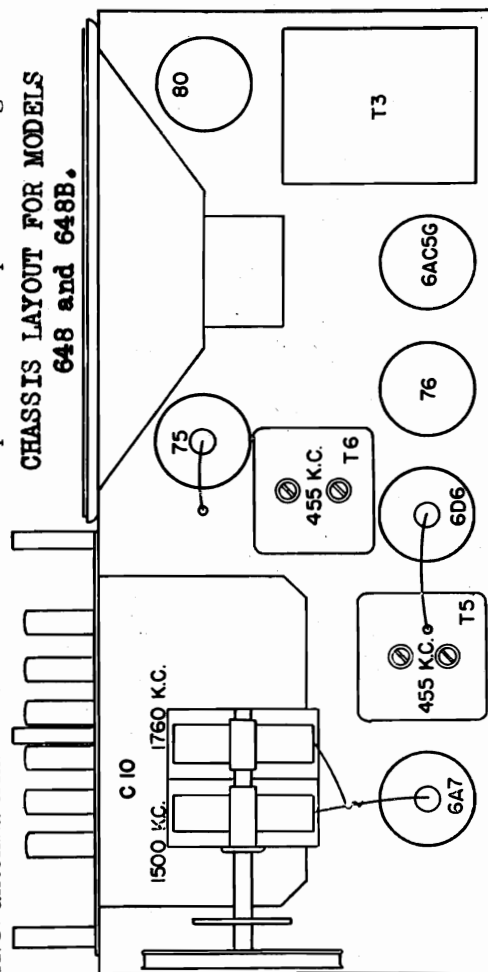
All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to plate of output tube and B+, or a low voltage A. C. meter may be used connected across speaker voice coil. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. Set the dial to about 1000 K.C., feed in a 455 K.C. signal. Adjust first and second I.F. trimmers for maximum output. Refer to chassis lay-out for location of trimmers.

Turn the dial to the extreme high frequency end. Feed a 1760 K.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1760 K.C. oscillator trimmer until maximum output is shown. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. antenna trimmer to the maximum output. This completes the alignment.

CHASSIS LAYOUT FOR MODELS 648 and 648B.



CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION
6A7	6A7	6A7	6A7	6A7	6A7
6D6	6D6	6D6	6D6	6D6	6D6
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT	6AC5G OUTPUT
76 RECT	76 RECT	76 RECT	76 RECT	76 RECT	76 RECT
1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.	1500 K.C.
1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.	1760 K.C.
455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.	455 K.C.
75	75	75	75	75	75
76	76	76	76	76	76
6AC5G	6AC5G	6AC5G	6AC5G	6AC5G	6AC5G
75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER	75 DRIVER
6AC5G OUTPUT	6AC5G OUTPUT	6AC5G			

MODEL 654

Schematic, Voltage, Socket

WARWICK MFG. CORP.

Trimmers, Alignment

This receiver is made to cover 3 tuning bands, the standard broadcast band which ranges from 1680 K.C. to 535 K.C., the middle or police band which has a frequency range of from 5.4 M.C. to 1.7 M.C. and high frequency or foreign band which is from 19 M. C. to 5.0 M.C.

This receiver is a 6 tube, 6 volt storage battery operated superheterodyne.

PART NO.	DESCRIPTION
C1 15-106	.0011 MFD. MICA COND. +5%
C2 15-104	.00025 "
C3 15-103	.00005 "
C4 16-04	.01 MFD. 600V. TUBULAR COND.
C5 16-11	.004 "
C6 16-16	.25 " 400V.
C7 16-01	.1 " "
C8 16-03	.01 " 200V.
C9 16-14	.25 " "
C10 16-00	.1 " "
C11 16-55	.5 " 180V.
C12 18-45	150V. ELECTROLYTIC
C13 16-100	25V. TUB. ELECT.

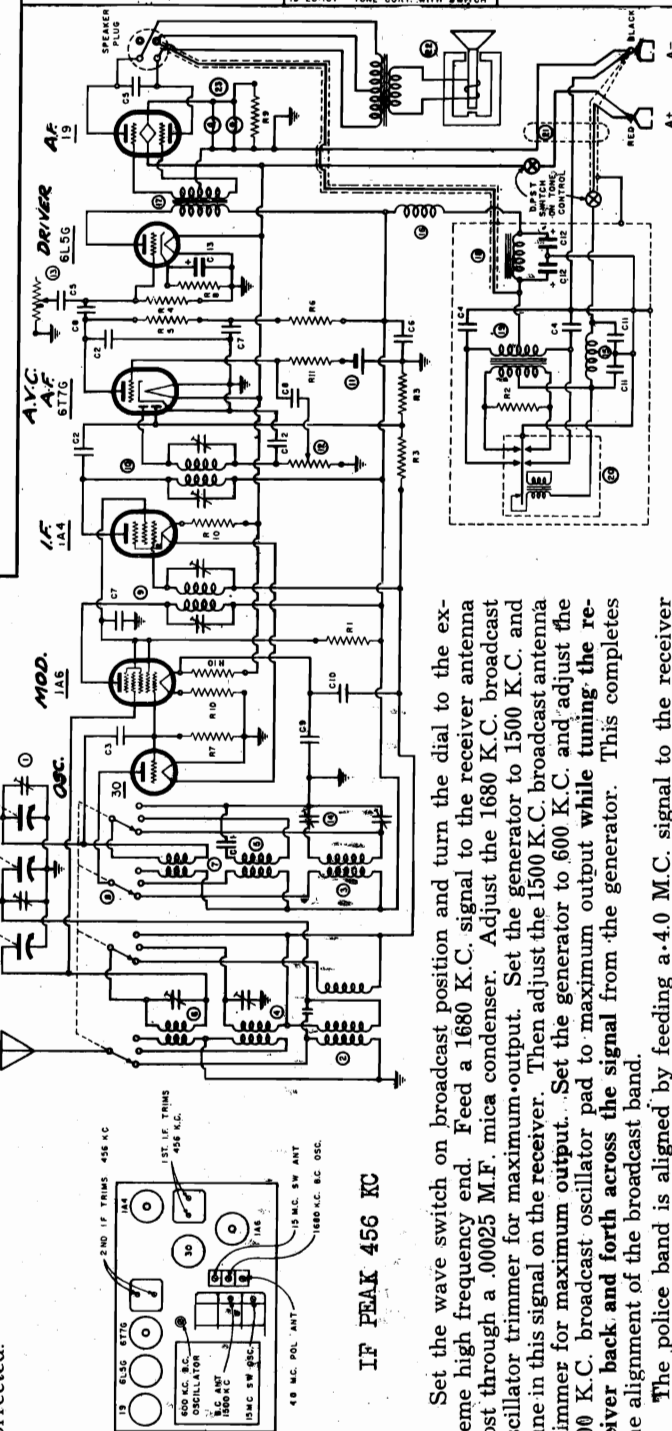
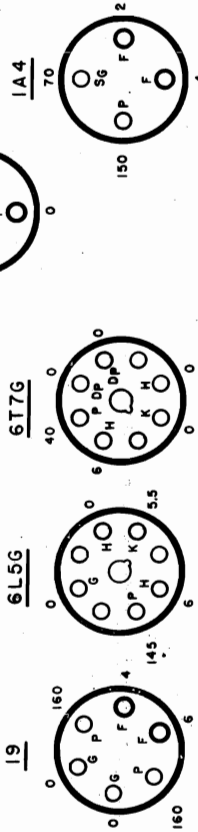
PART NO.	DESCRIPTION	PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
R1 61-06	15,000 OHM 1/2W CARBON RES.	1 19-121	3 GANG CONDENSER	14 20-100	BC OSC PAD
R2 61-01	100 "	2 10-179A	BC ANT & PRES COIL	15 33-13	R.F. "A" CHOKE
R3 60-17	1 MEG "	3 10-180	BC OSC. COIL	16 33-204	R.F. "B" CHOKE
R4 60-18	500,000 "	4 10-182	POL ANT COIL	17 80-10	P.P. AUDIO TRANS.
R5 60-24	250,000 "	5 10-181	POL OSC COIL	18 33-07	FILTER CHOKE
R6 60-26	100,000 "	6 10-183	S.W. ANT COIL	19 80-41	POWER TRANS.
R7 60-25	50,000 "	7 10-184	S.W. OSC COIL	20 34-07	VIBRATOR
R8 60-06	1500 "	8 69-107	WAVE SWITCH	21 23-103	BATTERY CABLE
R9 60-07	200 "	9 10-145	1ST IF TRANSFORMER	22	SPEAKER
R10 60-102	33 1/3 "	10 10-146	2ND IF TRANSFORMER	23	NO 40 DIAL LIGHT
R11 60-20	2 MEG "	11 48-00	BIAS CELL		
		12 24-105	VOLUME CONTROL		
		13 26-107	TONE CONT. WITH SWITCH		

VOLTAGE DIAGRAM

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER.

ALL VOLTAGES MEASURED TO GROUND

- F - FILAMENT
- H - HEATER
- P - PLATE
- K - CATHODE
- G - GRID
- G1 - OSC. GRID
- G2 - OSC. PLATE
- DP - DIODE PLATE
- SG - SCREEN GRID



The short wave band is aligned in the same way using a 15 M.C. signal and adjusting the 15 M.C. short wave antenna trimmer after having turned the wave switch to the right hand position.

ALIGNMENT PROCEDURE

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 10,000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 1A6 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground post of the receiver. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

Leaving the signal generator connected to the grid cap of the 1A6, turn the wave switch to the right hand (short wave) position. Set the dial and the signal generator to 15.0 M.C. Tune in the signal by adjusting the 15.0 M.C. oscillator trimmer. The signal will be heard at two different settings of the trimmer. The proper setting is the one where the signal is heard when the trimmer is the loosest. Also when the dial of the receiver is turned the signal will be heard again at about 14.0 M.C. If the signal is heard at about 16.0 M.C. on the dial instead of 14.0 M.C. the wrong setting has been used and should be corrected.

Set the wave switch on broadcast position and turn the dial to the extreme high frequency end. Feed a 1680 K.C. signal to the receiver antenna post through a .00025 M.F. mica condenser. Adjust the 1680 K.C. broadcast oscillator trimmer for maximum output. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. broadcast antenna trimmer for maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output while tuning the receiver back and forth across the signal from the generator. This completes the alignment of the broadcast band.

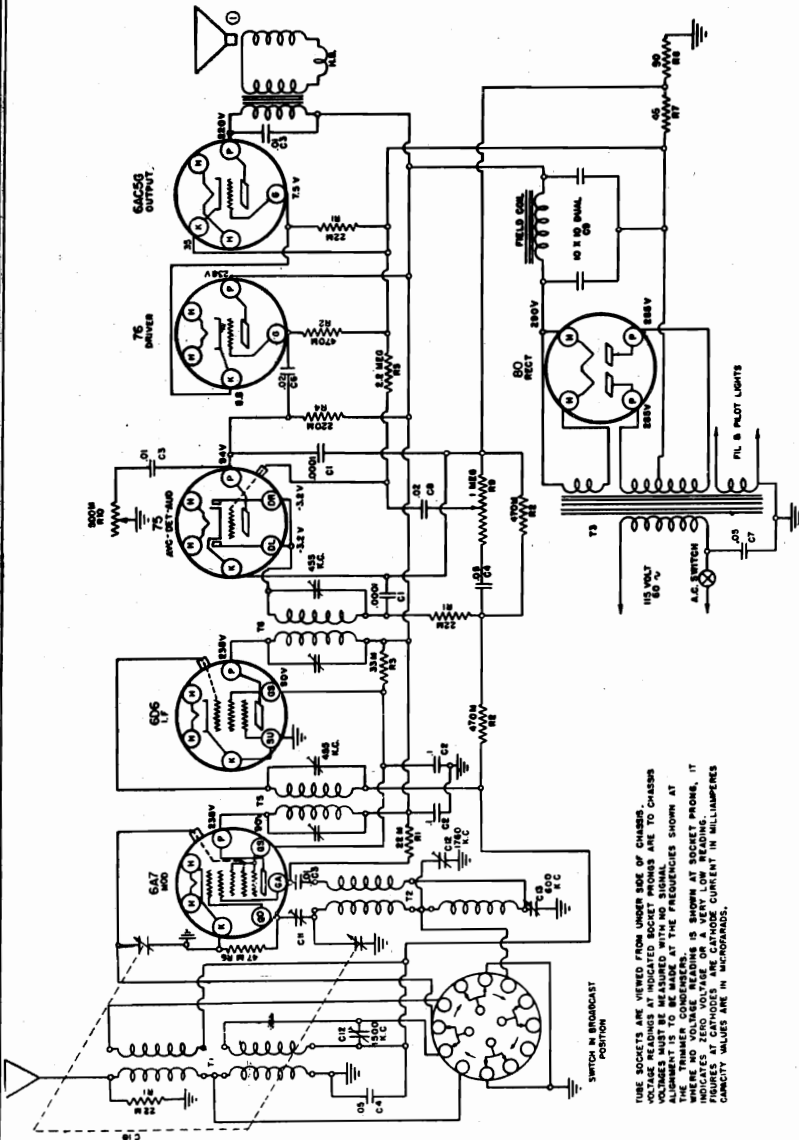
The police band is aligned by feeding a 4.0 M.C. signal to the receiver antenna lead through the .00025 condenser. Turn the wave switch to the center position and tune the receiver to this signal. Adjust the 4.0 M.C. police antenna trimmer for best output.



MODELS 668, 668B

Schematic, Voltage, Socket
Alignment, Trimmers

WARWICK MFG. CORP.



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PINS ARE TO CHASSIS
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT
THE TUBE SOCKETS. CURRENT READINGS ARE SHOWN AT SOCKET PINS. IT
INDICATES ZERO VOLTAGE OR A VERY LOW READING.
CURRENT READINGS ARE IN MILLIAMPERES.
CURRENT VALUES ARE IN MICROAMPERES.

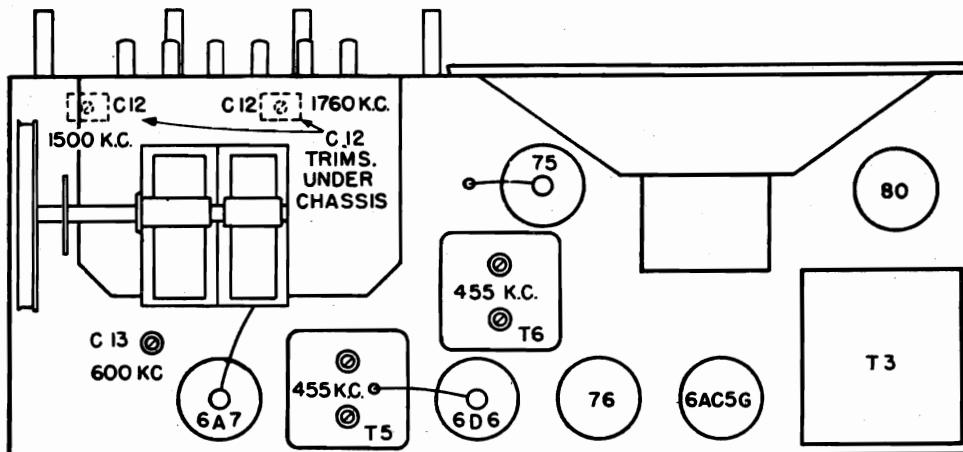
CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION
R1	40-118	250 OHM 1/2 WATT RESISTOR	C1	150	100 MMF MICA CONDENSER	C1	150	100 MMF MICA CONDENSER
R2	40-118	250 OHM 1/2 WATT RESISTOR	C2	150	100 MMF MICA CONDENSER	C2	150	100 MMF MICA CONDENSER
R3	40-118	250 OHM 1/2 WATT RESISTOR	C3	150	100 MMF MICA CONDENSER	C3	150	100 MMF MICA CONDENSER
R4	40-118	250 OHM 1/2 WATT RESISTOR	C4	150	100 MMF MICA CONDENSER	C4	150	100 MMF MICA CONDENSER
R5	40-118	250 OHM 1/2 WATT RESISTOR	C5	150	100 MMF MICA CONDENSER	C5	150	100 MMF MICA CONDENSER
R6	40-118	250 OHM 1/2 WATT RESISTOR	C6	150	100 MMF MICA CONDENSER	C6	150	100 MMF MICA CONDENSER
R7	40-118	250 OHM 1/2 WATT RESISTOR	C7	150	100 MMF MICA CONDENSER	C7	150	100 MMF MICA CONDENSER
R8	40-118	250 OHM 1/2 WATT RESISTOR	C8	150	100 MMF MICA CONDENSER	C8	150	100 MMF MICA CONDENSER
R9	40-118	250 OHM 1/2 WATT RESISTOR	C9	150	100 MMF MICA CONDENSER	C9	150	100 MMF MICA CONDENSER
R10	40-118	250 OHM 1/2 WATT RESISTOR	C10	150	100 MMF MICA CONDENSER	C10	150	100 MMF MICA CONDENSER
R11	40-118	250 OHM 1/2 WATT RESISTOR	C11	150	100 MMF MICA CONDENSER	C11	150	100 MMF MICA CONDENSER
R12	40-118	250 OHM 1/2 WATT RESISTOR	C12	150	100 MMF MICA CONDENSER	C12	150	100 MMF MICA CONDENSER
R13	40-118	250 OHM 1/2 WATT RESISTOR	C13	150	100 MMF MICA CONDENSER	C13	150	100 MMF MICA CONDENSER
R14	40-118	250 OHM 1/2 WATT RESISTOR	C14	150	100 MMF MICA CONDENSER	C14	150	100 MMF MICA CONDENSER
R15	40-118	250 OHM 1/2 WATT RESISTOR	C15	150	100 MMF MICA CONDENSER	C15	150	100 MMF MICA CONDENSER
R16	40-118	250 OHM 1/2 WATT RESISTOR	C16	150	100 MMF MICA CONDENSER	C16	150	100 MMF MICA CONDENSER
R17	40-118	250 OHM 1/2 WATT RESISTOR	C17	150	100 MMF MICA CONDENSER	C17	150	100 MMF MICA CONDENSER
R18	40-118	250 OHM 1/2 WATT RESISTOR	C18	150	100 MMF MICA CONDENSER	C18	150	100 MMF MICA CONDENSER
R19	40-118	250 OHM 1/2 WATT RESISTOR	C19	150	100 MMF MICA CONDENSER	C19	150	100 MMF MICA CONDENSER
R20	40-118	250 OHM 1/2 WATT RESISTOR	C20	150	100 MMF MICA CONDENSER	C20	150	100 MMF MICA CONDENSER
R21	40-118	250 OHM 1/2 WATT RESISTOR	C21	150	100 MMF MICA CONDENSER	C21	150	100 MMF MICA CONDENSER
R22	40-118	250 OHM 1/2 WATT RESISTOR	C22	150	100 MMF MICA CONDENSER	C22	150	100 MMF MICA CONDENSER
R23	40-118	250 OHM 1/2 WATT RESISTOR	C23	150	100 MMF MICA CONDENSER	C23	150	100 MMF MICA CONDENSER
R24	40-118	250 OHM 1/2 WATT RESISTOR	C24	150	100 MMF MICA CONDENSER	C24	150	100 MMF MICA CONDENSER
R25	40-118	250 OHM 1/2 WATT RESISTOR	C25	150	100 MMF MICA CONDENSER	C25	150	100 MMF MICA CONDENSER
R26	40-118	250 OHM 1/2 WATT RESISTOR	C26	150	100 MMF MICA CONDENSER	C26	150	100 MMF MICA CONDENSER
R27	40-118	250 OHM 1/2 WATT RESISTOR	C27	150	100 MMF MICA CONDENSER	C27	150	100 MMF MICA CONDENSER
R28	40-118	250 OHM 1/2 WATT RESISTOR	C28	150	100 MMF MICA CONDENSER	C28	150	100 MMF MICA CONDENSER
R29	40-118	250 OHM 1/2 WATT RESISTOR	C29	150	100 MMF MICA CONDENSER	C29	150	100 MMF MICA CONDENSER
R30	40-118	250 OHM 1/2 WATT RESISTOR	C30	150	100 MMF MICA CONDENSER	C30	150	100 MMF MICA CONDENSER
R31	40-118	250 OHM 1/2 WATT RESISTOR	C31	150	100 MMF MICA CONDENSER	C31	150	100 MMF MICA CONDENSER
R32	40-118	250 OHM 1/2 WATT RESISTOR	C32	150	100 MMF MICA CONDENSER	C32	150	100 MMF MICA CONDENSER
R33	40-118	250 OHM 1/2 WATT RESISTOR	C33	150	100 MMF MICA CONDENSER	C33	150	100 MMF MICA CONDENSER
R34	40-118	250 OHM 1/2 WATT RESISTOR	C34	150	100 MMF MICA CONDENSER	C34	150	100 MMF MICA CONDENSER
R35	40-118	250 OHM 1/2 WATT RESISTOR	C35	150	100 MMF MICA CONDENSER	C35	150	100 MMF MICA CONDENSER
R36	40-118	250 OHM 1/2 WATT RESISTOR	C36	150	100 MMF MICA CONDENSER	C36	150	100 MMF MICA CONDENSER
R37	40-118	250 OHM 1/2 WATT RESISTOR	C37	150	100 MMF MICA CONDENSER	C37	150	100 MMF MICA CONDENSER
R38	40-118	250 OHM 1/2 WATT RESISTOR	C38	150	100 MMF MICA CONDENSER	C38	150	100 MMF MICA CONDENSER
R39	40-118	250 OHM 1/2 WATT RESISTOR	C39	150	100 MMF MICA CONDENSER	C39	150	100 MMF MICA CONDENSER
R40	40-118	250 OHM 1/2 WATT RESISTOR	C40	150	100 MMF MICA CONDENSER	C40	150	100 MMF MICA CONDENSER
R41	40-118	250 OHM 1/2 WATT RESISTOR	C41	150	100 MMF MICA CONDENSER	C41	150	100 MMF MICA CONDENSER
R42	40-118	250 OHM 1/2 WATT RESISTOR	C42	150	100 MMF MICA CONDENSER	C42	150	100 MMF MICA CONDENSER
R43	40-118	250 OHM 1/2 WATT RESISTOR	C43	150	100 MMF MICA CONDENSER	C43	150	100 MMF MICA CONDENSER
R44	40-118	250 OHM 1/2 WATT RESISTOR	C44	150	100 MMF MICA CONDENSER	C44	150	100 MMF MICA CONDENSER
R45	40-118	250 OHM 1/2 WATT RESISTOR	C45	150	100 MMF MICA CONDENSER	C45	150	100 MMF MICA CONDENSER
R46	40-118	250 OHM 1/2 WATT RESISTOR	C46	150	100 MMF MICA CONDENSER	C46	150	100 MMF MICA CONDENSER
R47	40-118	250 OHM 1/2 WATT RESISTOR	C47	150	100 MMF MICA CONDENSER	C47	150	100 MMF MICA CONDENSER
R48	40-118	250 OHM 1/2 WATT RESISTOR	C48	150	100 MMF MICA CONDENSER	C48	150	100 MMF MICA CONDENSER
R49	40-118	250 OHM 1/2 WATT RESISTOR	C49	150	100 MMF MICA CONDENSER	C49	150	100 MMF MICA CONDENSER
R50	40-118	250 OHM 1/2 WATT RESISTOR	C50	150	100 MMF MICA CONDENSER	C50	150	100 MMF MICA CONDENSER
R51	40-118	250 OHM 1/2 WATT RESISTOR	C51	150	100 MMF MICA CONDENSER	C51	150	100 MMF MICA CONDENSER
R52	40-118	250 OHM 1/2 WATT RESISTOR	C52	150	100 MMF MICA CONDENSER	C52	150	100 MMF MICA CONDENSER
R53	40-118	250 OHM 1/2 WATT RESISTOR	C53	150	100 MMF MICA CONDENSER	C53	150	100 MMF MICA CONDENSER
R54	40-118	250 OHM 1/2 WATT RESISTOR	C54	150	100 MMF MICA CONDENSER	C54	150	100 MMF MICA CONDENSER
R55	40-118	250 OHM 1/2 WATT RESISTOR	C55	150	100 MMF MICA CONDENSER	C55	150	100 MMF MICA CONDENSER
R56	40-118	250 OHM 1/2 WATT RESISTOR	C56	150	100 MMF MICA CONDENSER	C56	150	100 MMF MICA CONDENSER
R57	40-118	250 OHM 1/2 WATT RESISTOR	C57	150	100 MMF MICA CONDENSER	C57	150	100 MMF MICA CONDENSER
R58	40-118	250 OHM 1/2 WATT RESISTOR	C58	150	100 MMF MICA CONDENSER	C58	150	100 MMF MICA CONDENSER
R59	40-118	250 OHM 1/2 WATT RESISTOR	C59	150	100 MMF MICA CONDENSER	C59	150	100 MMF MICA CONDENSER
R60	40-118	250 OHM 1/2 WATT RESISTOR	C60	150	100 MMF MICA CONDENSER	C60	150	100 MMF MICA CONDENSER
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R70	40-118	250 OHM 1/2 WATT RESISTOR	C70	150	100 MMF MICA CONDENSER	C70	150	100 MMF MICA CONDENSER
R71	40-118	250 OHM 1/2 WATT RESISTOR	C71	150	100 MMF MICA CONDENSER	C71	150	100 MMF MICA CONDENSER
R72	40-118	250 OHM 1/2 WATT RESISTOR	C72	150	100 MMF MICA CONDENSER	C72	150	100 MMF MICA CONDENSER
R73	40-118	250 OHM 1/2 WATT RESISTOR	C73	150	100 MMF MICA CONDENSER	C73	150	100 MMF MICA CONDENSER
R74	40-118	250 OHM 1/2 WATT RESISTOR	C74	150	100 MMF MICA CONDENSER	C74	150	100 MMF MICA CONDENSER
R75	40-118	250 OHM 1/2 WATT RESISTOR	C75	150	100 MMF MICA CONDENSER	C75	150	100 MMF MICA CONDENSER
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R78	40-118	250 OHM 1/2 WATT RESISTOR	C78	150	100 MMF MICA CONDENSER	C78	150	100 MMF MICA CONDENSER
R79	40-118	250 OHM 1/2 WATT RESISTOR	C79	150	100 MMF MICA CONDENSER	C79	150	100 MMF MICA CONDENSER
R80	40-118	250 OHM 1/2 WATT RESISTOR	C80	150	100 MMF MICA CONDENSER	C80	150	100 MMF MICA CONDENSER
R81	40-118	250 OHM 1/2 WATT RESISTOR	C81	150	100 MMF MICA CONDENSER	C81	150	100 MMF MICA CONDENSER
R82	40-118	250 OHM 1/2 WATT RESISTOR	C82	150	100 MMF MICA CONDENSER	C82	150	100 MMF MICA CONDENSER
R83	40-118	250 OHM 1/2 WATT RESISTOR	C83	150	100 MMF MICA CONDENSER	C83	150	100 MMF MICA CONDENSER
R84	40-118	250 OHM 1/2 WATT RESISTOR	C84	150	100 MMF MICA CONDENSER	C84	150	100 MMF MICA CONDENSER
R85	40-118	250 OHM 1/2 WATT RESISTOR	C85	150	100 MMF MICA CONDENSER	C85	150	100 MMF MICA CONDENSER
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R91	40-118	250 OHM 1/2 WATT RESISTOR	C91	150	100 MMF MICA CONDENSER	C91	150	100 MMF MICA CONDENSER
R92	40-118	250 OHM 1/2 WATT RESISTOR	C92	150	100 MMF MICA CONDENSER	C92	150	100 MMF MICA CONDENSER
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R96	40-118	250 OHM 1/2 WATT RESISTOR	C96	150	100 MMF MICA CONDENSER	C96	150	100 MMF MICA CONDENSER
R97	40-118	250 OHM 1/2 WATT RESISTOR	C97	150	100 MMF MICA CONDENSER	C97	150	100 MMF MICA CONDENSER
R98	40-118	250 OHM 1/2 WATT RESISTOR	C98	150	100 MMF MICA CONDENSER	C98	150	100 MMF MICA CONDENSER
R99	40-118	250 OHM 1/2 WATT RESISTOR	C99	150	100 MMF MICA CONDENSER	C99	150	100 MMF MICA CONDENSER
R100	40-118	250 OHM 1/2 WATT RESISTOR	C100	150	100 MMF MICA CONDENSER	C100	150	100 MMF MICA CONDENSER

DESCRIPTION

This receiver is a 6-tube alternating current operated superheterodyne.

The tubes used are—a 6A7 as oscillator modulator, a 6D6 as I. F. amplifier, a 76 as A. V. C. and audio rectifier and audio voltage amplifier, a 76 as a direct coupled driver, a 6AC5G as a power audio amplifier, and a 80 as a power rectifier.

This receiver is made to cover two tuning bands—the standard broadcast band which ranges from 1740 KC to 540 KC, and the short wave band which has a frequency range of from 24 MC to 5.9 MC.



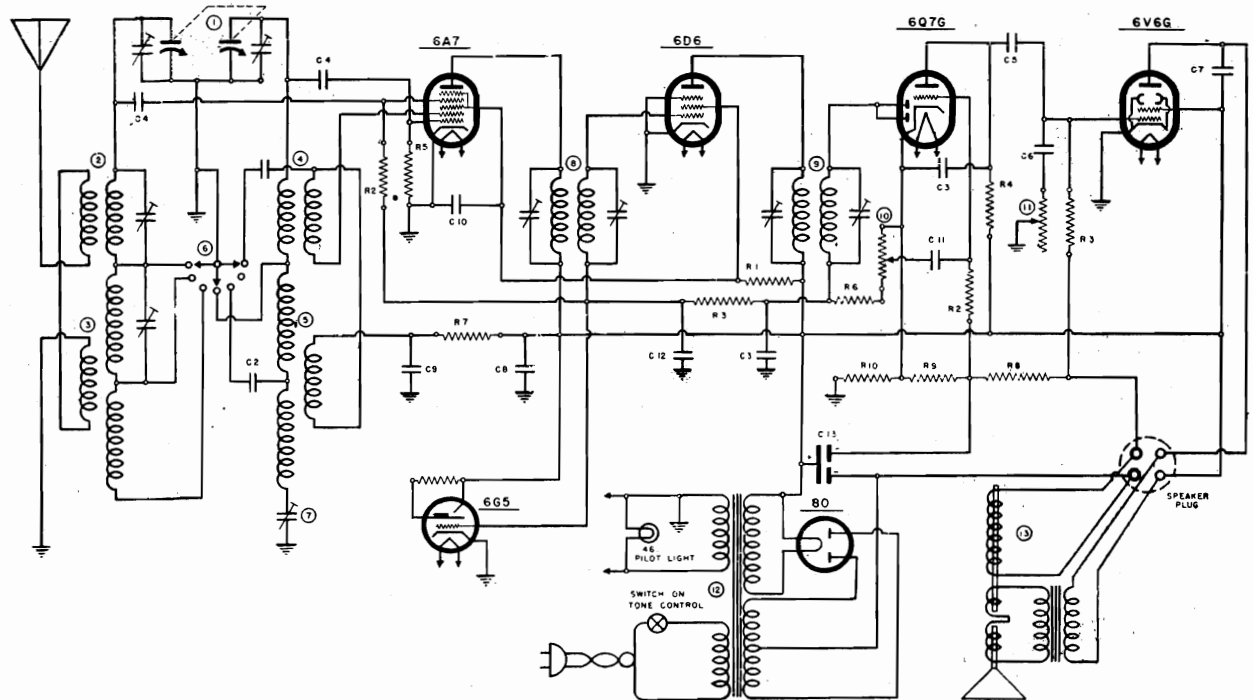
ALIGNMENT

FOLLOW PROCEDURE AS FOR MODEL 648 BUT ALIGN OSC-PAD, (C13 shown on chassis layout above) AT 600 KC as a final adjustment.

FOR TUNER SEE INDEX

WARWICK MFG. CORP.

MODEL 683

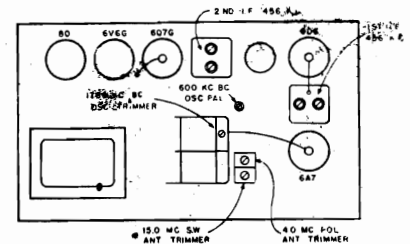
Schematic, Voltage, Socket
Trimmers, Alignment**ALIGNMENT**

IF Through 0.1 mfd. dummy antenna, adjust trimmers at 456 KC.

BC Adjust osc. trimmer at 1760 KC through 0.0025 dummy. Adjust padders at 600 KC.

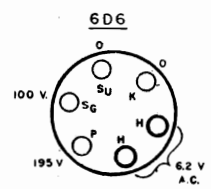
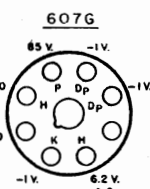
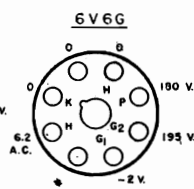
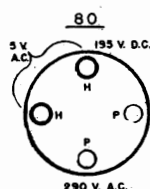
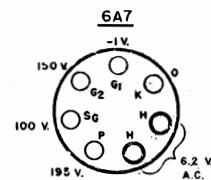
POLICE Through 0.00025 mfd. dummy, adjust antenna trimmer at 4 MC.

Short Wave Adjust antenna trimmer at 15 MC.

**VOLTAGE DIAGRAM**

H HEATER
K CATHODE
P PLATE
Gc CONTROL GRID
Gi OSC. GRID
Gp OSC. PLATE
Sg SCREEN GRID
Su SUPPRESSOR
Dp DIODE PLATE

(BOTTOM VIEW OF CHASSIS)
ALL VOLTAGES MEASURED
WITH 1000 OHM PER
VOLT VOLTMETER



- 1 12-119 2 GANG CONDENSER
- 2 10-126 5W ANT COIL
- 3 10-128 8C 8 POS ANT COIL
- 4 10-127 5W OSC COIL
- 5 10-125 8C 8 POS OSC COIL
- 6 69-14 WAVE BAND SWITCH
- 7 20-100 BC OSC PADDING COND
- 8 10-175 15T-17 TRANSFORMER
- 9 10-176 2ND 11 TRANSFORMER
- 10 24-109 VOL CONTROL
- 11 26-108 TONE CONTROL WITH SWITCH
- 12 80-137 POWER TRANSFORMER
- 13 SPEAKER

- | | | |
|-----|--------|-----------------------------|
| R1 | 6221 | 20,000 OHM 1/2 W CARBON RES |
| R2 | 6020 | 2 MEG |
| R3 | 6018 | 500,000 |
| R4 | 6024 | 250,000 |
| R5 | 6028 | 40,000 |
| R6 | 6030 | 20,000 |
| R7 | 6021 | 10,000 |
| R8 | 60-140 | 150 1/2 W WIRE |
| R9 | 60-103 | 50 1/2 W |
| R10 | 60-126 | 14 |

- | | | |
|-----|--------|---------------------------|
| C1 | 1509 | 0.02 MFD MICA CONDENSER |
| C2 | 15-100 | 0.001 MFD |
| C3 | 1504 | 0.001 MFD |
| C4 | 1501 | 0.001 MFD |
| C5 | 1604 | 0.01 600 V PAPER COND |
| C6 | 1611 | 0.01 |
| C7 | 1651 | 0.004 |
| C8 | 1616 | 25 400 V |
| C9 | 1601-5 | 1 |
| C10 | 1607 | 05 |
| C11 | 1603 | 01 |
| C12 | 1622 | 05 300 V |
| C13 | 16-213 | 8 300 V DUAL ELECTROLYTIC |

683

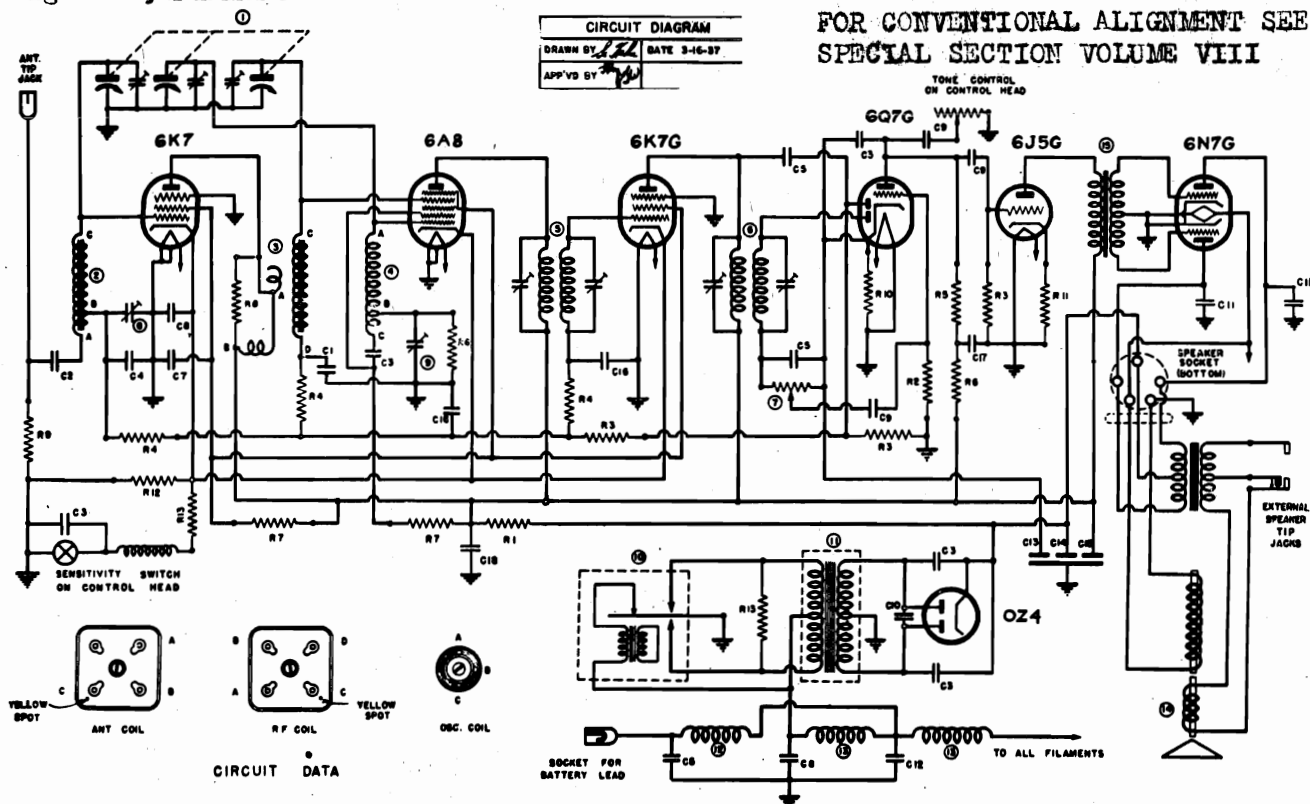
MODEL 746

Schematic, Voltage, Socket
Alignment, Trimmers

WARWICK MFG. CORP.

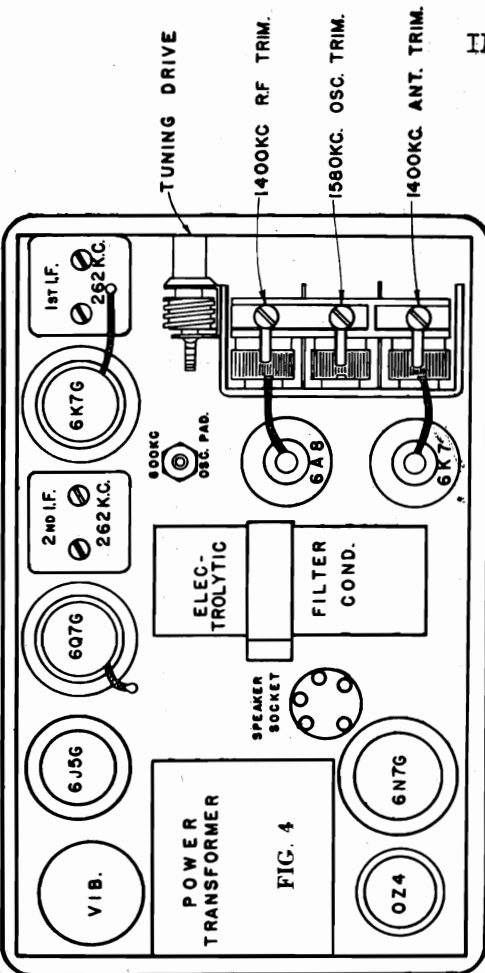
CIRCUIT DIAGRAM
DRAWN BY: DATE 3-6-57
APP'VD BY:

FOR CONVENTIONAL ALIGNMENT SEE
SPECIAL SECTION VOLUME VIII

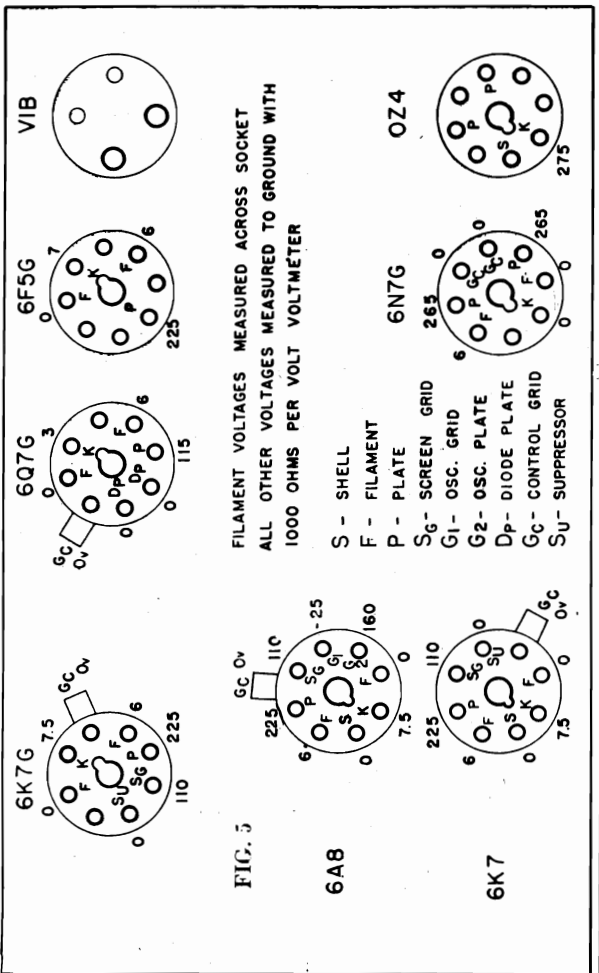


CIRCUIT DATA

IF PEAK 262 KC



COMPONENT	VALUE	COMPONENT	VALUE
C1	100P	R1	50K
C2	100P	R2	50K
C3	100P	R3	50K
C4	100P	R4	50K
C5	100P	R5	50K
C6	100P	R6	50K
C7	100P	R7	50K
C8	100P	R8	50K
C9	100P	R9	50K
C10	100P	R10	50K
C11	100P	R11	50K
C12	100P	R12	50K
C13	100P	R13	50K
C14	100P	R14	50K
C15	100P	R15	50K
C16	100P	R16	50K
C17	100P	R17	50K
C18	100P	R18	50K
C19	100P	R19	50K
C20	100P	R20	50K
C21	100P	R21	50K
C22	100P	R22	50K
C23	100P	R23	50K
C24	100P	R24	50K
C25	100P	R25	50K
C26	100P	R26	50K
C27	100P	R27	50K
C28	100P	R28	50K
C29	100P	R29	50K
C30	100P	R30	50K
C31	100P	R31	50K
C32	100P	R32	50K
C33	100P	R33	50K
C34	100P	R34	50K
C35	100P	R35	50K
C36	100P	R36	50K
C37	100P	R37	50K
C38	100P	R38	50K
C39	100P	R39	50K
C40	100P	R40	50K
C41	100P	R41	50K
C42	100P	R42	50K
C43	100P	R43	50K
C44	100P	R44	50K
C45	100P	R45	50K
C46	100P	R46	50K
C47	100P	R47	50K
C48	100P	R48	50K
C49	100P	R49	50K
C50	100P	R50	50K

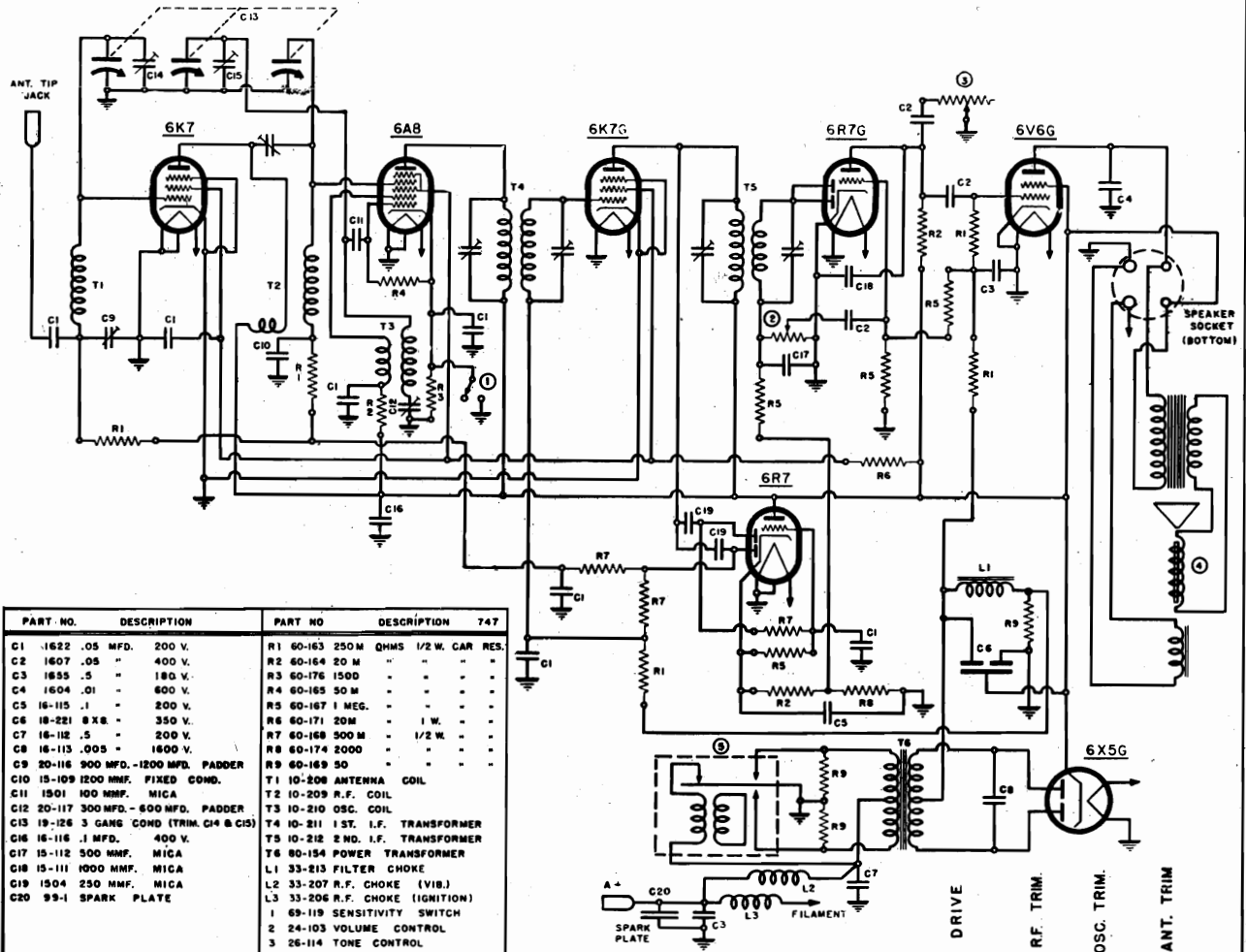


FILAMENT VOLTAGES MEASURED ACROSS SOCKET
ALL OTHER VOLTAGES MEASURED TO GROUND WITH
1000 OHMS PER VOLT VOLTMETER

S - SHELL
F - FILAMENT
P - PLATE
SG - SCREEN GRID
G1 - OSC. GRID
G2 - OSC. PLATE
Dp - DIODE PLATE
GC - CONTROL GRID
SU - SUPPRESSOR

FIG. 5

WARWICK MFG. CORP.

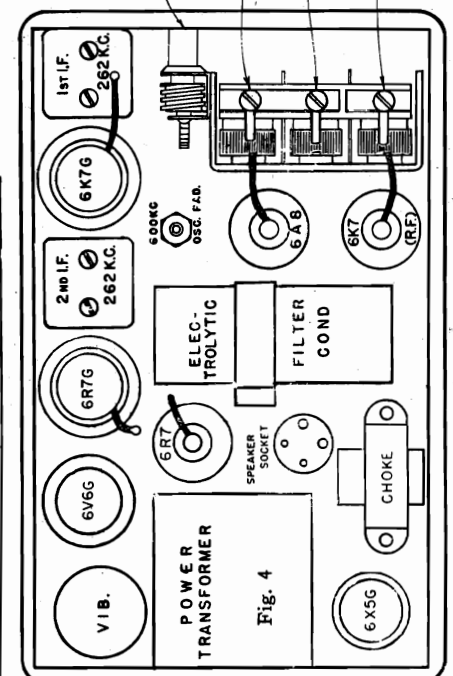
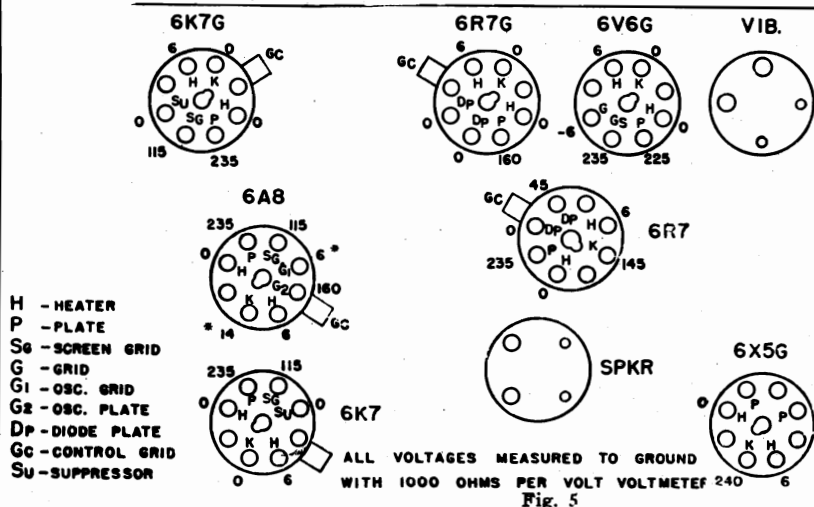
MODEL 747
Schematic, Voltage, Socket
Alignment, Trimmers


PART NO.	DESCRIPTION	PART NO.	DESCRIPTION	747
C1	.1622 .05 MFD. 200 V.	R1	60-163 250M OHMS 1/2 W. CAR. RES.	
C2	.1607 .05 " 400 V.	R2	60-164 20 M "	
C3	.1655 .5 " 180 V.	R3	60-176 1500 " "	
C4	.1604 .01 " 600 V.	R4	60-165 50 M "	
C5	.16-115 .1 " 200 V.	R5	60-167 1 MEG. "	
C6	.16-221 8 X 8 " 350 V.	R6	60-171 20 M " 1 W.	
C7	.16-112 .5 " 200 V.	R7	60-168 500 M " 1/2 W.	
C8	.16-113 .005 " 1600 V.	R8	60-174 2000 " "	
C9	20-116 300 MFD. -1200 MFD. PADDER	R9	60-169 50 " "	
C10	15-109 1200 MMF. FIXED COND.	T1	10-208 ANTENNA COIL	
C11	1501 100 MMF. MICA	T2	10-209 R.F. COIL	
C12	20-117 300 MFD. - 600 MFD. PADDER	T3	10-210 OSC. COIL	
C13	19-126 3 GANG COND (TRIM. C14 & C15)	T4	10-211 1 ST. I.F. TRANSFORMER	
C16	.16-116 .1 MFD. 400 V.	T5	10-212 2 ND. I.F. TRANSFORMER	
C17	15-112 500 MMF. MICA	T6	80-154 POWER TRANSFORMER	
C18	15-111 1000 MMF. MICA	L1	33-213 FILTER CHOKE	
C19	1504 250 MMF. MICA	L2	33-207 R.F. CHOKE (VIB.)	
C20	99-1 SPARK PLATE	L3	33-206 R.F. CHOKE (IGNITION)	
		1	69-119 SENSITIVITY SWITCH	
		2	24-103 VOLUME CONTROL	
		3	26-114 TONE CONTROL	
		4	79-242 SPEAKER	
		5	34-101 VIBRATOR	

ALIGNMENT

IF Through 0.1 mfd. dummy antenna, adjust trimmers at 262 KC.

BC Through 0.00025 dummy, adjust osc. trimmer at 1580 KC. Adjust antenna trimmer at 1400 KC. Adjust padder at 600 KC. Adjust antenna compensator at 600 KC. for best sensitivity with signal.



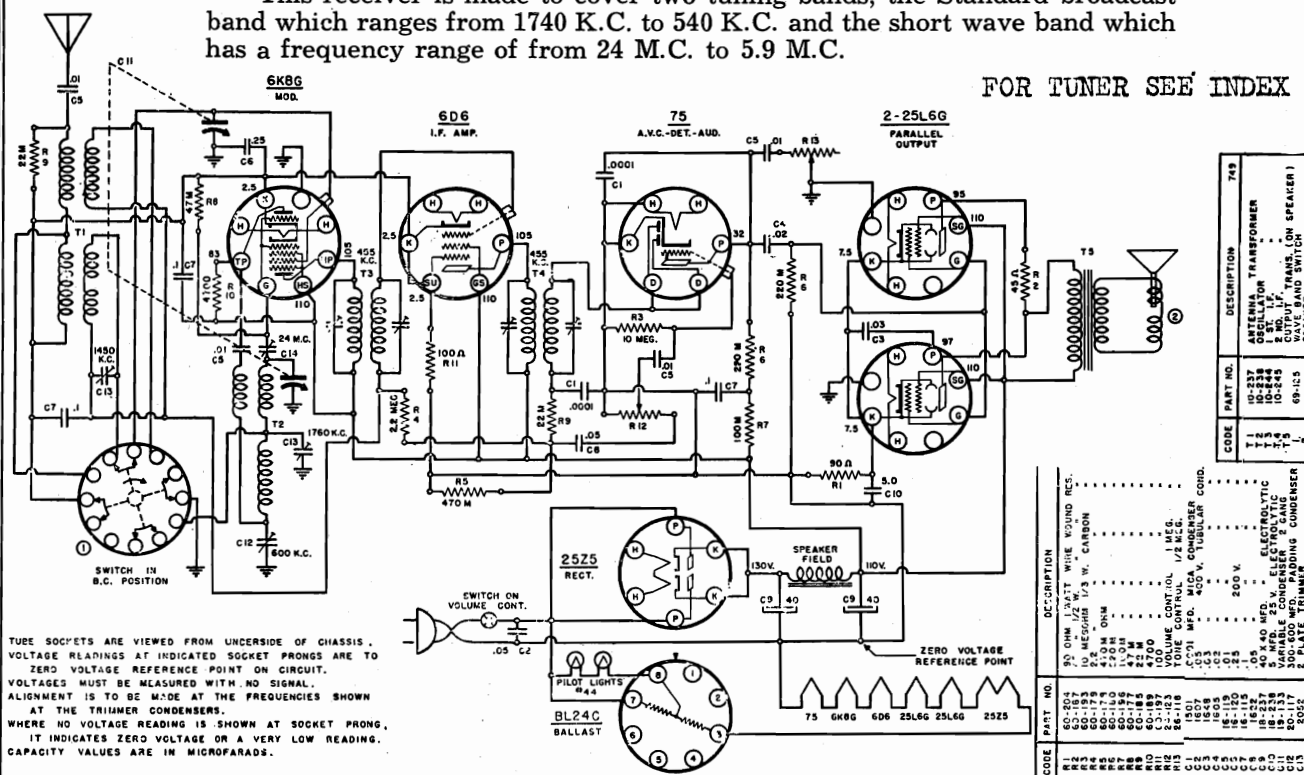
MODELS 749, 749B Late

Schematic, Voltage, Socket Alignment, Trimmers

WARWICK MFG. CORP.

This receiver is made to cover two tuning bands, the Standard broadcast band which ranges from 1740 K.C. to 540 K.C. and the short wave band which has a frequency range of from 24 M.C. to 5.9 M.C.

FOR TUNER SEE INDEX



TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO ZERO VOLTAGE REFERENCE POINT ON CIRCUIT. VOLTAGES MUST BE MEASURED WITH NO SIGNAL. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS. WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. CAPACITY VALUES ARE IN MICROFARADS.

CODE	PART NO.	DESCRIPTION
1	10-204	50 OHM 1/4WATT WHITE WOUND RES.
2	10-205	100 OHM 1/4WATT WHITE WOUND RES.
3	10-206	200 OHM 1/4WATT WHITE WOUND RES.
4	10-207	300 OHM 1/4WATT WHITE WOUND RES.
5	10-208	400 OHM 1/4WATT WHITE WOUND RES.
6	10-209	500 OHM 1/4WATT WHITE WOUND RES.
7	10-210	600 OHM 1/4WATT WHITE WOUND RES.
8	10-211	700 OHM 1/4WATT WHITE WOUND RES.
9	10-212	800 OHM 1/4WATT WHITE WOUND RES.
10	10-213	900 OHM 1/4WATT WHITE WOUND RES.
11	10-214	1000 OHM 1/4WATT WHITE WOUND RES.
12	10-215	1500 OHM 1/4WATT WHITE WOUND RES.
13	10-216	2000 OHM 1/4WATT WHITE WOUND RES.
14	10-217	3000 OHM 1/4WATT WHITE WOUND RES.
15	10-218	4000 OHM 1/4WATT WHITE WOUND RES.
16	10-219	5000 OHM 1/4WATT WHITE WOUND RES.
17	10-220	6000 OHM 1/4WATT WHITE WOUND RES.
18	10-221	7000 OHM 1/4WATT WHITE WOUND RES.
19	10-222	8000 OHM 1/4WATT WHITE WOUND RES.
20	10-223	9000 OHM 1/4WATT WHITE WOUND RES.
21	10-224	10000 OHM 1/4WATT WHITE WOUND RES.
22	10-225	15000 OHM 1/4WATT WHITE WOUND RES.
23	10-226	20000 OHM 1/4WATT WHITE WOUND RES.
24	10-227	30000 OHM 1/4WATT WHITE WOUND RES.
25	10-228	40000 OHM 1/4WATT WHITE WOUND RES.
26	10-229	50000 OHM 1/4WATT WHITE WOUND RES.
27	10-230	60000 OHM 1/4WATT WHITE WOUND RES.
28	10-231	70000 OHM 1/4WATT WHITE WOUND RES.
29	10-232	80000 OHM 1/4WATT WHITE WOUND RES.
30	10-233	90000 OHM 1/4WATT WHITE WOUND RES.
31	10-234	100000 OHM 1/4WATT WHITE WOUND RES.
32	10-235	150000 OHM 1/4WATT WHITE WOUND RES.
33	10-236	200000 OHM 1/4WATT WHITE WOUND RES.
34	10-237	300000 OHM 1/4WATT WHITE WOUND RES.
35	10-238	400000 OHM 1/4WATT WHITE WOUND RES.
36	10-239	500000 OHM 1/4WATT WHITE WOUND RES.
37	10-240	600000 OHM 1/4WATT WHITE WOUND RES.
38	10-241	700000 OHM 1/4WATT WHITE WOUND RES.
39	10-242	800000 OHM 1/4WATT WHITE WOUND RES.
40	10-243	900000 OHM 1/4WATT WHITE WOUND RES.
41	10-244	1000000 OHM 1/4WATT WHITE WOUND RES.
42	10-245	1500000 OHM 1/4WATT WHITE WOUND RES.
43	10-246	2000000 OHM 1/4WATT WHITE WOUND RES.
44	10-247	3000000 OHM 1/4WATT WHITE WOUND RES.
45	10-248	4000000 OHM 1/4WATT WHITE WOUND RES.
46	10-249	5000000 OHM 1/4WATT WHITE WOUND RES.
47	10-250	6000000 OHM 1/4WATT WHITE WOUND RES.
48	10-251	7000000 OHM 1/4WATT WHITE WOUND RES.
49	10-252	8000000 OHM 1/4WATT WHITE WOUND RES.
50	10-253	9000000 OHM 1/4WATT WHITE WOUND RES.
51	10-254	10000000 OHM 1/4WATT WHITE WOUND RES.
52	10-255	15000000 OHM 1/4WATT WHITE WOUND RES.
53	10-256	20000000 OHM 1/4WATT WHITE WOUND RES.
54	10-257	30000000 OHM 1/4WATT WHITE WOUND RES.
55	10-258	40000000 OHM 1/4WATT WHITE WOUND RES.
56	10-259	50000000 OHM 1/4WATT WHITE WOUND RES.
57	10-260	60000000 OHM 1/4WATT WHITE WOUND RES.
58	10-261	70000000 OHM 1/4WATT WHITE WOUND RES.
59	10-262	80000000 OHM 1/4WATT WHITE WOUND RES.
60	10-263	90000000 OHM 1/4WATT WHITE WOUND RES.
61	10-264	100000000 OHM 1/4WATT WHITE WOUND RES.
62	10-265	150000000 OHM 1/4WATT WHITE WOUND RES.
63	10-266	200000000 OHM 1/4WATT WHITE WOUND RES.
64	10-267	300000000 OHM 1/4WATT WHITE WOUND RES.
65	10-268	400000000 OHM 1/4WATT WHITE WOUND RES.
66	10-269	500000000 OHM 1/4WATT WHITE WOUND RES.
67	10-270	600000000 OHM 1/4WATT WHITE WOUND RES.
68	10-271	700000000 OHM 1/4WATT WHITE WOUND RES.
69	10-272	800000000 OHM 1/4WATT WHITE WOUND RES.
70	10-273	900000000 OHM 1/4WATT WHITE WOUND RES.
71	10-274	1000000000 OHM 1/4WATT WHITE WOUND RES.
72	10-275	1500000000 OHM 1/4WATT WHITE WOUND RES.
73	10-276	2000000000 OHM 1/4WATT WHITE WOUND RES.
74	10-277	3000000000 OHM 1/4WATT WHITE WOUND RES.
75	10-278	4000000000 OHM 1/4WATT WHITE WOUND RES.
76	10-279	5000000000 OHM 1/4WATT WHITE WOUND RES.
77	10-280	6000000000 OHM 1/4WATT WHITE WOUND RES.
78	10-281	7000000000 OHM 1/4WATT WHITE WOUND RES.
79	10-282	8000000000 OHM 1/4WATT WHITE WOUND RES.
80	10-283	9000000000 OHM 1/4WATT WHITE WOUND RES.
81	10-284	10000000000 OHM 1/4WATT WHITE WOUND RES.
82	10-285	15000000000 OHM 1/4WATT WHITE WOUND RES.
83	10-286	20000000000 OHM 1/4WATT WHITE WOUND RES.
84	10-287	30000000000 OHM 1/4WATT WHITE WOUND RES.
85	10-288	40000000000 OHM 1/4WATT WHITE WOUND RES.
86	10-289	50000000000 OHM 1/4WATT WHITE WOUND RES.
87	10-290	60000000000 OHM 1/4WATT WHITE WOUND RES.
88	10-291	70000000000 OHM 1/4WATT WHITE WOUND RES.
89	10-292	80000000000 OHM 1/4WATT WHITE WOUND RES.
90	10-293	90000000000 OHM 1/4WATT WHITE WOUND RES.
91	10-294	100000000000 OHM 1/4WATT WHITE WOUND RES.
92	10-295	150000000000 OHM 1/4WATT WHITE WOUND RES.
93	10-296	200000000000 OHM 1/4WATT WHITE WOUND RES.
94	10-297	300000000000 OHM 1/4WATT WHITE WOUND RES.
95	10-298	400000000000 OHM 1/4WATT WHITE WOUND RES.
96	10-299	500000000000 OHM 1/4WATT WHITE WOUND RES.
97	10-300	600000000000 OHM 1/4WATT WHITE WOUND RES.
98	10-301	700000000000 OHM 1/4WATT WHITE WOUND RES.
99	10-302	800000000000 OHM 1/4WATT WHITE WOUND RES.
100	10-303	900000000000 OHM 1/4WATT WHITE WOUND RES.
101	10-304	1000000000000 OHM 1/4WATT WHITE WOUND RES.
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105	10-308	4000000000000 OHM 1/4WATT WHITE WOUND RES.
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107	10-310	6000000000000 OHM 1/4WATT WHITE WOUND RES.
108	10-311	7000000000000 OHM 1/4WATT WHITE WOUND RES.
109	10-312	8000000000000 OHM 1/4WATT WHITE WOUND RES.
110	10-313	9000000000000 OHM 1/4WATT WHITE WOUND RES.
111	10-314	10000000000000 OHM 1/4WATT WHITE WOUND RES.
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132	10-335	1500000000000000 OHM 1/4WATT WHITE WOUND RES.
133	10-336	2000000000000000 OHM 1/4WATT WHITE WOUND RES.
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179	10-382	80000000000000000000 OHM 1/4WATT WHITE WOUND RES.
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181	10-384	100000000000000000000 OHM 1/4WATT WHITE WOUND RES.
182	10-385	150000000000000000000 OHM 1/4WATT WHITE WOUND RES.
183	10-386	200000000000000000000 OHM 1/4WATT WHITE WOUND RES.
184	10-387	300000000000000000000 OHM 1/4WATT WHITE WOUND RES.
185	10-388	400000000000000000000 OHM 1/4WATT WHITE WOUND RES.
186	10-389	500000000000000000000 OHM 1/4WATT WHITE WOUND RES.
187	10-390	600000000000000000000 OHM 1/4WATT WHITE WOUND RES.
188	10-391	700000000000000000000 OHM 1/4WATT WHITE WOUND RES.
189	10-392	800000000000000000000 OHM 1/4WATT WHITE WOUND RES.
190	10-393	900000000000000000000 OHM 1/4WATT WHITE WOUND RES.
191	10-394	1000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
192	10-395	1500000000000000000000 OHM 1/4WATT WHITE WOUND RES.
193	10-396	2000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
194	10-397	3000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
195	10-398	4000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
196	10-399	5000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
197	10-400	6000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
198	10-401	7000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
199	10-402	8000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
200	10-403	9000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
201	10-404	10000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
202	10-405	15000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
203	10-406	20000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
204	10-407	30000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
205	10-408	40000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
206	10-409	50000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
207	10-410	60000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
208	10-411	70000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
209	10-412	80000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
210	10-413	90000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
211	10-414	100000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
212	10-415	150000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
213	10-416	200000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
214	10-417	300000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
215	10-418	400000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
216	10-419	500000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
217	10-420	600000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
218	10-421	700000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
219	10-422	800000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
220	10-423	900000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
221	10-424	1000000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
222	10-425	1500000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
223	10-426	2000000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
224	10-427	3000000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
225	10-428	4000000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
226	10-429	5000000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
227	10-430	6000000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
228	10-431	7000000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
229	10-432	8000000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
230	10-433	9000000000000000000000000 OHM 1/4WATT WHITE WOUND RES.
231	10-434	1000000000000000000000000

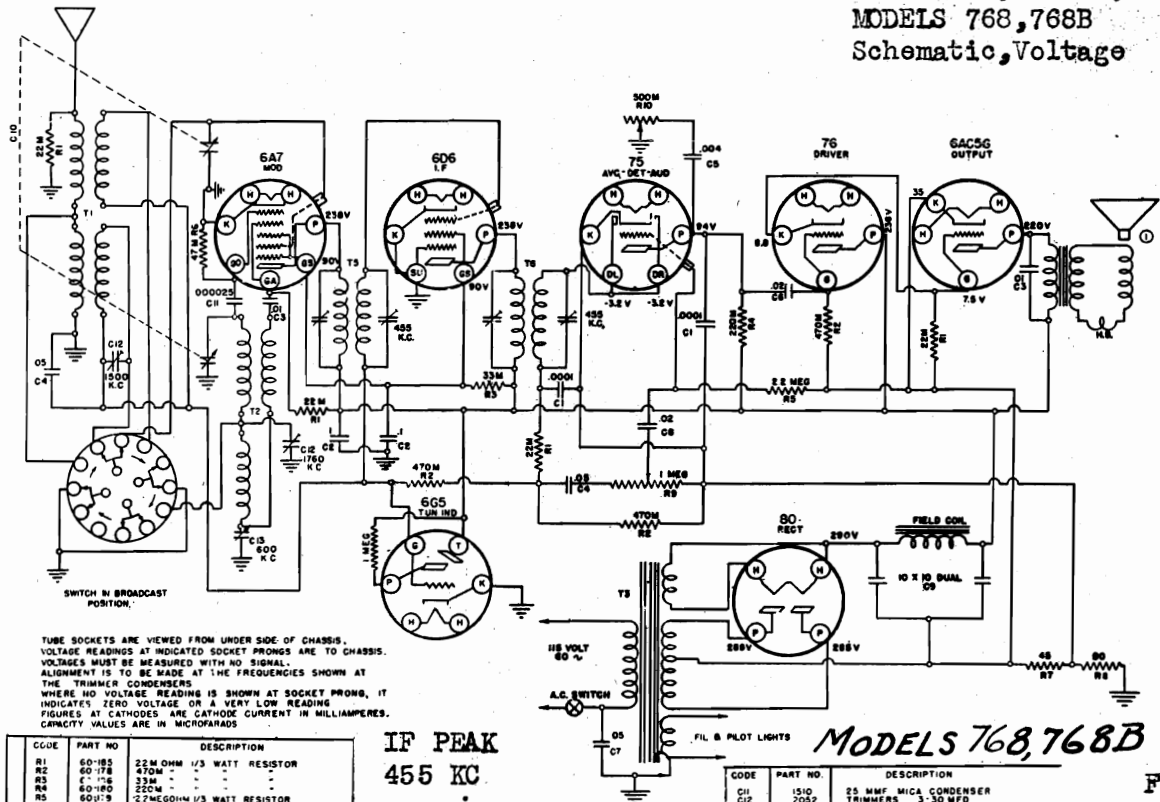
WARWICK MFG. CORP.

MODEL 761

Schematic, Socket, Trimmers

MODELS 768, 768B

Schematic, Voltage

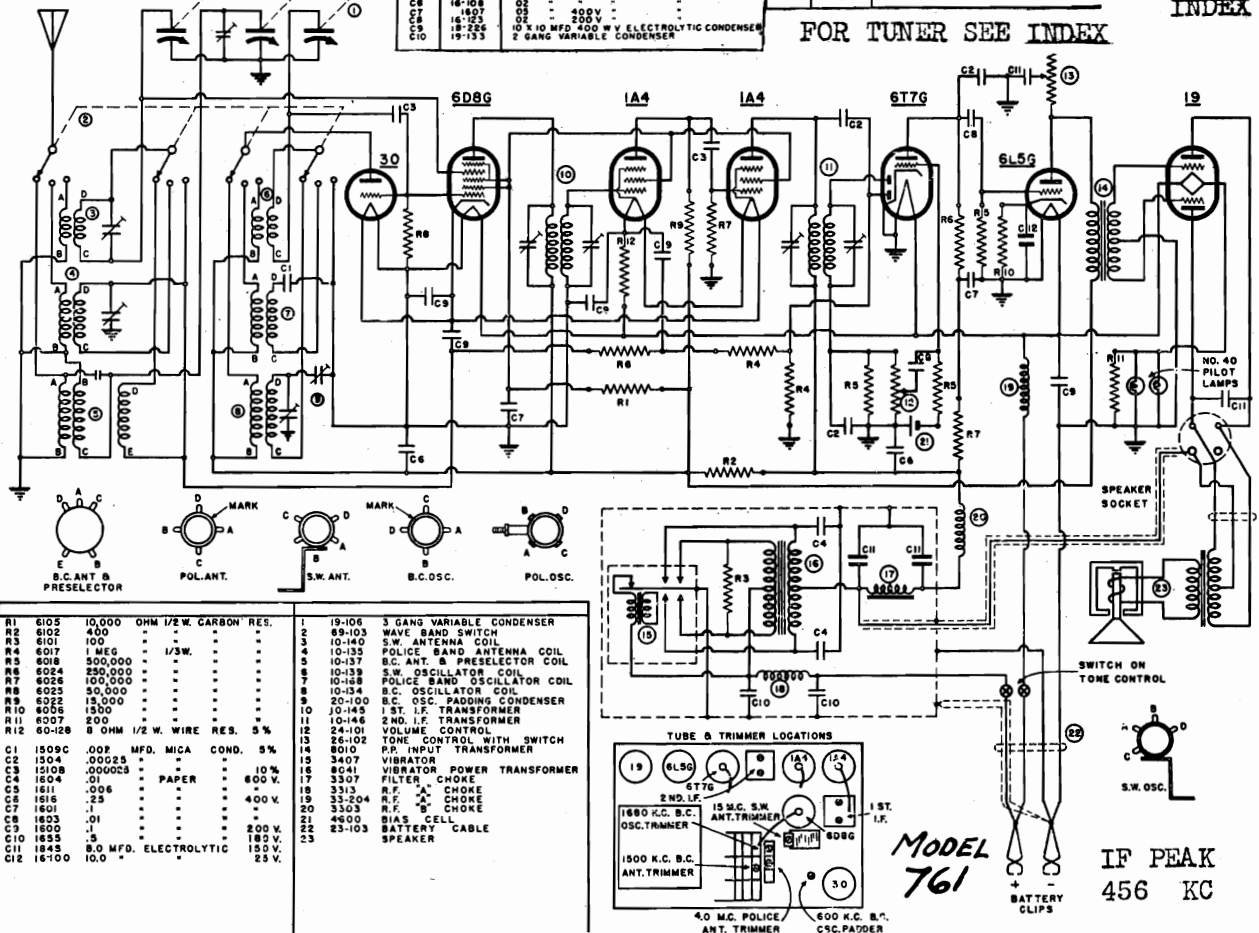


CODE	PART NO.	DESCRIPTION
R1	60-178	22M OHM 1/2 WATT RESISTOR
R2	60-178	470M
R3	60-178	33M
R4	60-180	250M
R5	60-179	2.2MEG OHM 1/2 WATT RESISTOR
R6	60-177	47M OHM 1/2 WATT RESISTOR
R7	60-187	45
R8	60-181	70
R9	24-123	1 MEG OHM VOLUME CONTROL & SW
R10	26-118	500M OHM TONE CONTROL & SW

CODE	PART NO.	DESCRIPTION
C1	1501	180 MMF MICA CONDENSER
C2	16-116	1 MFD 400V TUBULAR CONDENSER
C3	16-116	0.1 MFD 500V
C4	16-116	0.01 MFD 500V
C5	16-116	0.01 MFD 500V
C6	16-116	0.01 MFD 500V
C7	16-116	0.01 MFD 500V
C8	16-116	0.01 MFD 500V
C9	16-116	0.01 MFD 500V
C10	19-133	2 GANG VARIABLE CONDENSER

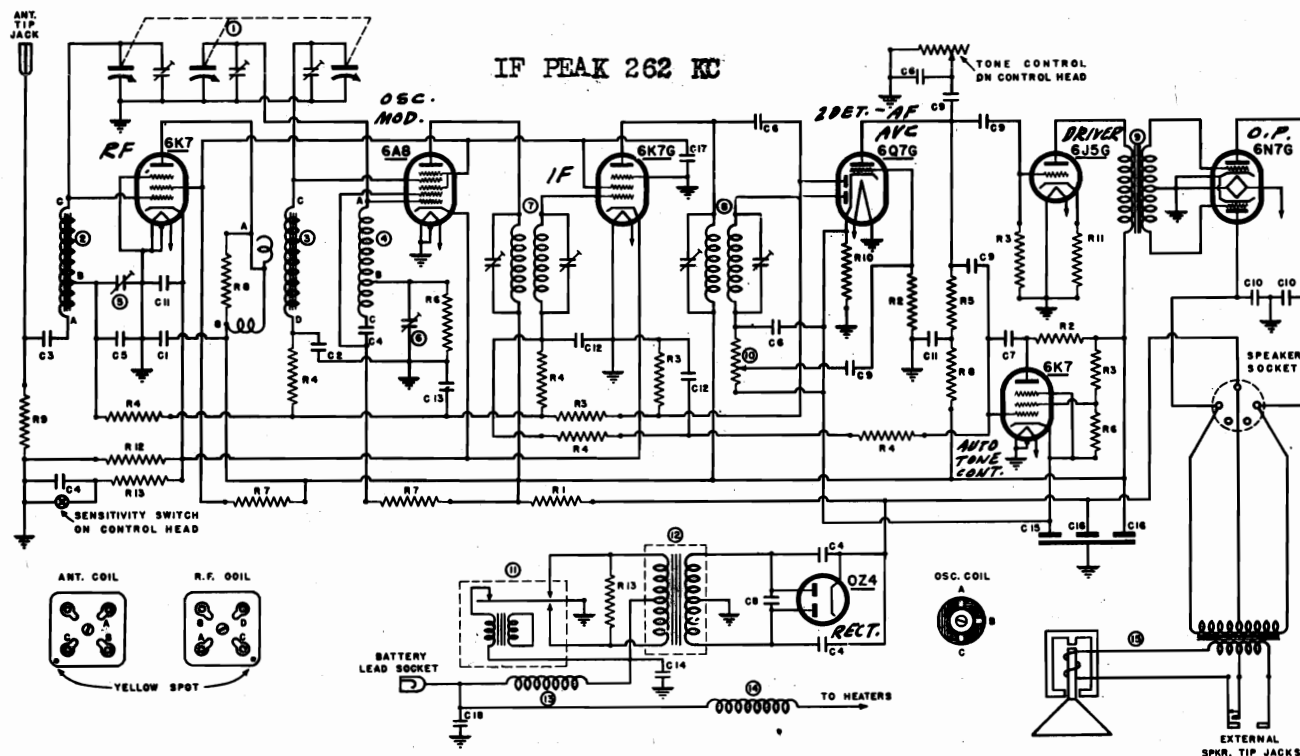
CODE	PART NO.	DESCRIPTION
C11	150	25 MMF MICA CONDENSER
C12	2052	TRIMMERS 3-50 MFD
C13	20-117	PADDING CONDENSER 300-600 MMFD
T1	10-237	ANTENNA COIL
T2	10-238	OSCILLATOR COIL
T3	10-239	POWER TRANSFORMER
T4	10-240	1ST I.F. TRANSFORMER
T5	10-241	2ND I.F. TRANSFORMER
T6	10-242	3RD I.F. TRANSFORMER
T7	10-243	SPEAKER

FOR TUNER SEE INDEX

FOR ALIGNMENT
SEE INDEX

MODEL 846
Schematic, Socket
Alignment, Trimmers

WARWICK MFG. CORP.



For Conventional Alignment See Special Section Vol. VIII

FREQUENCY CALIBRATION ADJUSTMENT

While a station of known frequency is tuned in, remove the pilot light socket. In the tuning control head, immediately in front of position from which the dial light socket has been removed, will be seen a small screw head. This is the calibration adjustment screw. By turning this screw with a small screw driver, the frequency indicated by the dial may be made to correspond to the frequency of the station tuned in. After adjusting calibration by this means the dial light socket is replaced.

After the receiver is installed the 600 K.C. antenna compensator condenser is adjusted to give best sensitivity while the receiver is tuned to as weak a station as can be heard near 600 K.C. The volume control should be turned full on while making this adjustment.

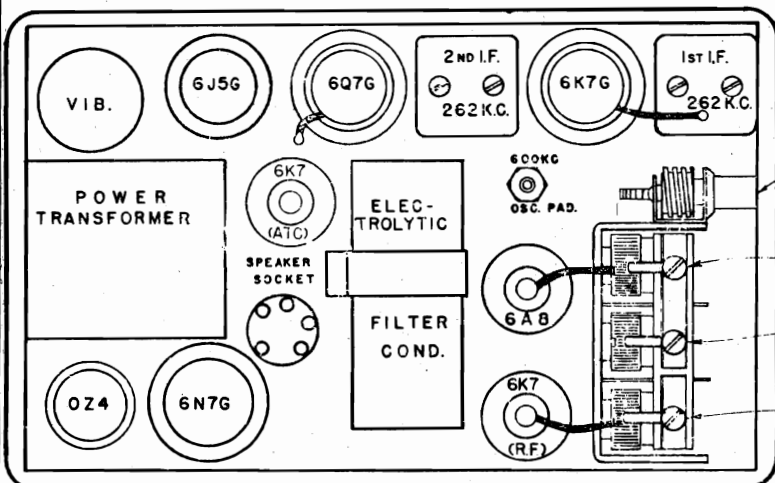


FIG. 4

C1	1508	.004	MICA CONDENSER	5%
C2	1511	.0027		
C3	1508	.002		
C4	1500	.001		
C5	1500C	.001		
C6	1504	.00025		
C7	1501	.0001		
C8	15-102	.008 MFD.	PAPER CONDENSER	1600V
C9	1504	.01		60V
C10	1531	.004		400V
C11	1501	.001		200V
C12	1500	.01		180V
C13	1522	.05		
C14	1535	.5		
C15	15-204	4.0	ELECTROLYTIC CONDENSER	
C16	15-118	8.0		
C17	15-205	8.0		
C18	105-1	.00025	SPARK PLATE	
R1	60-100	2000	OHM	1 WATT CARBON RES.
R2	60-107	1 MEG		
R3	60-108	500,000		
R4	60-109	250,000		
R5	60-110	100,000		
R6	60-111	50,000		
R7	60-112	20,000		
R8	60-117	15,000		
R9	60-114	10,000		
R10	60-115	1800		
R11	60-116	800		
R12	60-118	400		
R13	60-115	200		
1	15-102	3 GANG VARIABLE CONDENSER		
2	15-113	ANTENNA COIL		
3	15-114	R.F. COIL		
4	15-110	OSCILLATOR COIL		
5	20-100	ANTENNA COMPENSATOR CONDENSER		
6	20-100	OSCILLATOR PADDING CONDENSER		
7	10-171	1ST I.F. TRANSFORMER		
8	10-172	2ND		
9	80-119	R.P. AUDIO INPUT TRANSFORMER		
10	24-103	VOLUME CONTROL		
11	30-100	VIBRATOR		
12	80-111	VIBRATOR POWER TRANSFORMER		
13	33-200	R.F. CHOKE		
14	33-203			
15	79-217	DYNAMIC SPEAKER		

MODEL 872
Schematic, Voltage, Socket
Alignment, Trimmers

IF Adjust at 456 KC through a 0.1 mfd. condenser.

SW Proper adjustment is loose trimmer setting at 15 MC, as signal is heard at 2 settings. Signal must be heard only at about 14 MC dial setting and not at 16 MC.

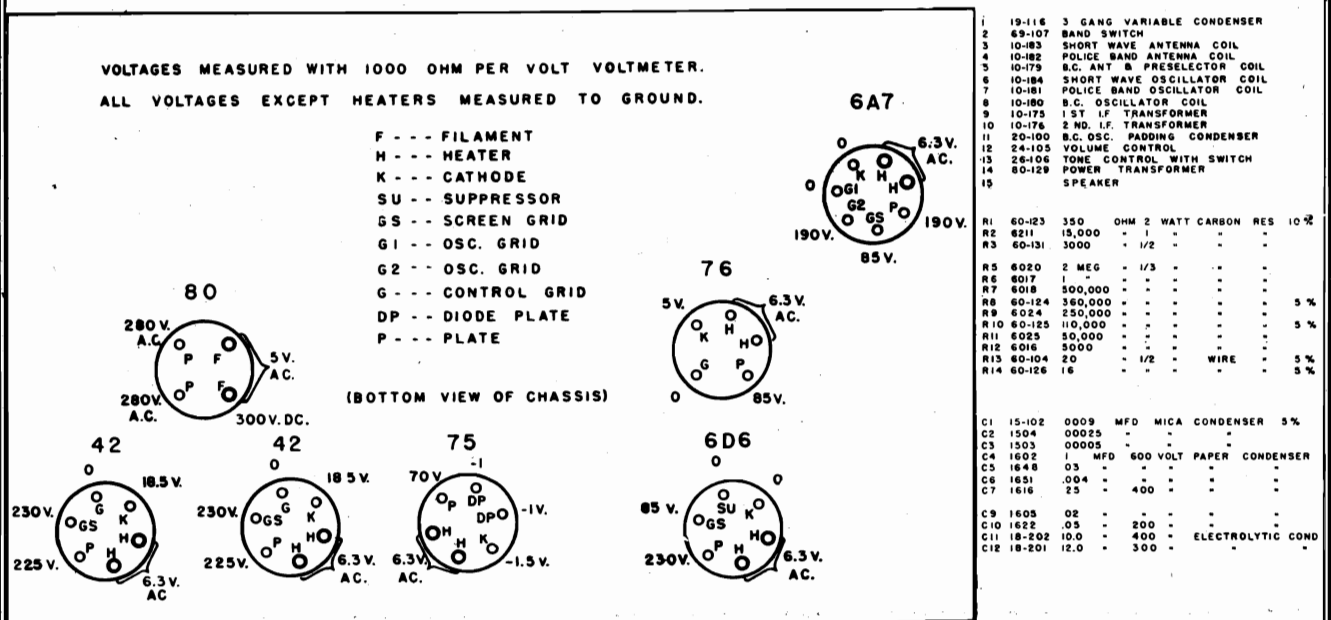
BC Adjust oscillator trimmer at 1680 KC through 0.00025 mfd. condenser. Adjust antenna trimmer at 1500 KC. Adjust padder at 600 KC.

Police Adjust antenna trimmer at 4 MC., through 0.00025 condenser.

ALL VOLTAGES EXCEPT HEATERS MEASURED TO GROUND.

F - - - FILAMENT
H - - - HEATER
K - - - CATHODE
SU - - SUPPRESSOR
GS - - SCREEN GRID
G1 - - OSC. GRID
G2 - - OSC. GRID
G - - - CONTROL GRID
DP - - DIODE PLATE
P - - - PLATE

(BOTTOM VIEW OF CHASSIS)



WELLS-GARDNER & CO.

MODEL 7-Station Automatic Tuning Panel
For MODELS A2,A3,A4,A5 Series
Installation Data,Panel View,Details

Instructions for Mounting the New 7 Station Automatic Tuning Panel on the 7, 9, 11 and 13 Tube Chassis (REPLACING MOTOR DRIVE PANEL)

New 7 Station Automatic Tuning Panel

There are 8 push buttons. Buttons Nos. 1 to 3 and 5 to 8 are Automatic Tuning Station Buttons. Button No. 4 is the Manual Tuning Button - See Fig. 1. When this button is depressed, the radio is in the manual tuning position.

The small buttons above the push buttons are still used for setting the stations. However, with the new panel, this is done by turning the button clockwise or counter-clockwise until the desired station is tuned in.

The aligning screw, shown in Fig. 1, when turned, moves the iron core of the antenna coil for aligning purposes.

Old Parts Used

Use the following parts of the old assembly:

- Escutcheon Plate,
- Station Buttons and Hairpin Springs,
- Setting Buttons,
- Glass Screen and Rubber Bands.

The Following New Parts are Supplied

7 Station Automatic Tuning Panel Assembly.

The parts shown in the list at the end of these instructions.

Removing Old Motor Drive Panel from Chassis

Remove the knobs. Two are set screw knobs and three are the push-on type.

Remove the station buttons by pushing down the lower end of the small hairpin spring at the back of the button and, at the same time, pulling the button off the shaft. Remove the setting buttons by pulling them off.

The screws in the wooden support behind the electric drive panel must be unscrewed and the support removed from the cabinet.

Remove the speaker plug from the socket at the back of the chassis and also the tuning eye tube from its clamp bracket. Loosen the screw holding the bottom shield connection to the back of the chassis. Unscrew and remove the shipping bolts and the "L" bolts from beneath the chassis shelf.

The chassis may then be removed.

Remove the old tuning eye tube bracket from the cabinet.

Turn the electric-manual lever to the electric position.

Unsolder the wire to the silencer switch at the back of the chassis and also the two motor leads at the A. C. terminal strip under the chassis. Early models used a metal shell condenser which was connected at the same terminal strip. Remove this condenser if one is installed.

Take off the collars from the volume and tone control shafts.

Remove the glass screen by taking out the two screws and removing the two brackets.

Remove the four red mounting screws.

The panel can then be pulled straight out from the chassis.

Mounting New Automatic Tuning Panel on the Chassis

Put a piece of insulating tape on the surface of the support casting at the point shown in Fig. 2. This will prevent possible short circuiting of the switch contacts.

Before mounting the new panel on the chassis, cut off any leads not required, as shown in the table - Fig. 7. Bring the tuner panel near the chassis and pass the white-blue tracer and white-red tracer leads through the hole in the chassis under the front section of the gang condenser. Turn the gang condenser until the spring clip on the drive drum is at its lowest position - See Fig. 2 lower left. Line up the drive arm on the large panel drive pulley with the spring clip on the gang condenser drive

drum. Since the drive arm will line up with the spring clip under two conditions, refer to Fig. 2 lower left for the correct relation of drive cord winding to drive arm.

Spread the spring clip SLIGHTLY with a small screw driver, bringing this screw driver up from beneath the chassis. Then push the panel toward the chassis, lowering it slightly so that the large drive pulley may be brought up in back of the bracket below the projector compartment. Insert the drive arm in the spring clip.

Mount the panel on the chassis using the four mounting screws at the four points shown in Fig. 1.

Secure the two braces to the back of the panel as shown in Fig. 2.

Remove the two screws at the top of the lens housing support bracket. Using the two 8-32 X 3/8" screws supplied, secure the back end of the braces in place. When attaching the brace to the tuner switch side of the lens housing bracket, ground the lug of the braided wire under the screw head as illustrated.

Replace the glass screen using clamps, nuts, and lock washers supplied.

Replace the collars on the volume control and tone control shafts.

Wire the panel in the circuit following Figs. 3, 4, 9, 10, 15, and 16.

Replace chassis in cabinet reversing procedure followed when removing the chassis. The wooden shipping support is not used.

The electric-manual lever is not used. A cover plate is supplied which covers the opening left by the removal of this lever. This plate is so made that the back portion should fit snugly into the opening in the cabinet. If it does not, file the cabinet until it fits snugly in place.

Then put the tuning knob on the shaft.

Knobs and Cover Plate

The 5 control knobs formerly used with the motor drive panel are also used with the new automatic tuning panel.

The cover plate used under the tuning knob is described in the previous article.

Alignment

After the new panel is installed, realign the chassis using as a guide the alignment procedure given in the service manual for each chassis.

If a definite peak cannot be reached when making the 1830 KC adjustment on the B range, cut off the compensating condenser C16 in the 9 and 11 tube models, C14 in the 13 tube model, and C13 in the 7 tube model.

If a definite peak cannot be reached when making the 22,000 KC adjustment on the D range, simply back off this trimmer as far as it will go and proceed with the 20,000 KC adjustment.

Next align the automatic tuner. The automatic tuning system is aligned by turning the aligning screw which shifts the position of the iron core of the antenna coil while the coil remains stationary.

Depress station button No. 1 - See Fig. 1. Tune in a signal of the frequency shown below for button No. 1. Turn setting button No. 1 clockwise or counter-clockwise until this signal is accurately tuned in. Then turn the aligning screw of button No. 1 clockwise or counter-clockwise until maximum output is obtained.

Follow the same procedure with regard to the other station tuning buttons using the frequencies shown below.

- Button No. 1...Aligning Frequency 700 KC
- Button No. 2...Aligning Frequency 700 KC
- Button No. 3...Aligning Frequency 850 KC
- Button No. 5...Aligning Frequency 850 KC
- Button No. 6...Aligning Frequency 850 KC
- Button No. 7...Aligning Frequency 1100 KC
- Button No. 8...Aligning Frequency 1100 KC

Mounting New Panel on Early Chassis Equipped with First Motor Drive Panels

Chassis equipped with the early type motor drive panel may be identified by the fact that when the chassis is removed from the cabinet and the electric-manual lever is in the electric position, all four red mounting screws can be seen - See Fig. 23. On late models, the two top red screws are behind the glass screen and cannot be seen unless this screen is removed - See Fig. 22.

To mount the new automatic tuning panel on the early chassis, first, using a hack saw, cut off the portion of the bracket assembly below the projector compartment as shown in Fig. 21.

Mount the new panel on the chassis using the two bottom mounting screws. Extend a pencil or pointed instrument through the center of the two upper panel mounting holes and place a mark on the bracket extending down from the projector compartment.

Remove the two lower mounting screws and take off the new panel. Drill and tap two holes for the two upper 8-32 mounting screws in the bracket. The new panel can then be mounted by means of the four mounting screws.

Parts Shipped With 7 Station Automatic Tuning Panel

QUANTITY	ITEM	APPLICATION
1.....	20,000 Ohm Resistor.....	To be used when installing panel on 9, 11, and 13 tube chassis only.
2.....	Braces.....	To secure the panel to top of projector assembly.
4.....	8-32 X 3/8" screws.....	2 used for front end of above brace. 2 used for back end of above brace.
2.....	#8 Shakeproof Lock Washers.....	To secure above brace to panel.
2.....	8-32 Hex Nuts.....	To secure above brace to panel.
2.....	Glass Retainer Clamps.....	To hold the glass screen in place.
2.....	6-32 X 1/4" Round Head Screws...	For above.
2.....	#6 Split Lock Washers.....	For above.
1.....	Circular Cardboard Tab with Words "Manual Tuning" on it.....	To be put into manual switch button (4th button from left).
1.....	Round Celluloid Tab.....	To be pushed into above mentioned button over the cardboard tab.
4.....	8-32 X 1/4" Mounting Screws.....	To mount panel to chassis.
4.....	#8 Split Lock Washers.....	For above.
1.....	Round Cover Plate.....	To cover opening in front panel of cabinet left by removal of the electric-manual lever.

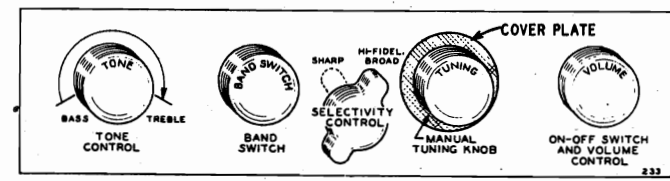
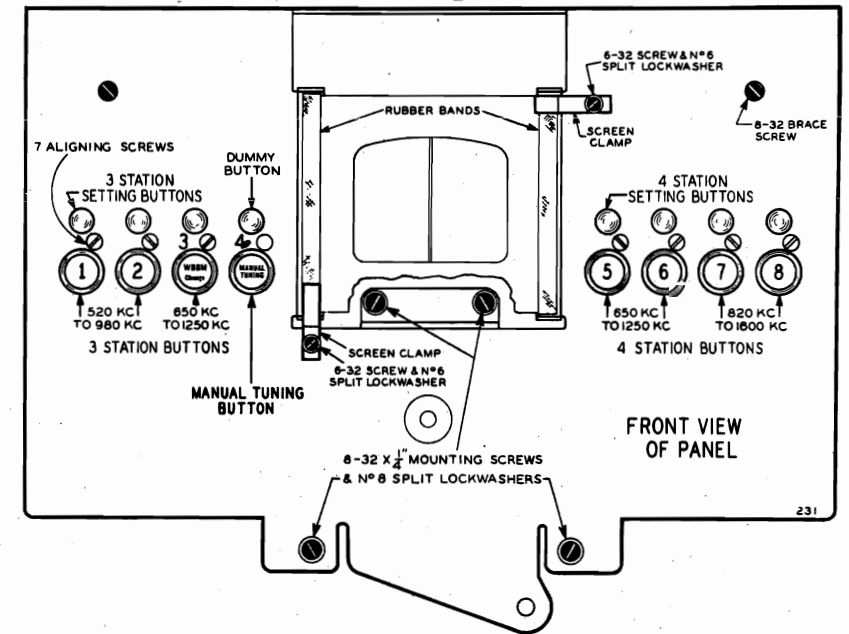


Fig. 1—Automatic Tuning Panel—Front View

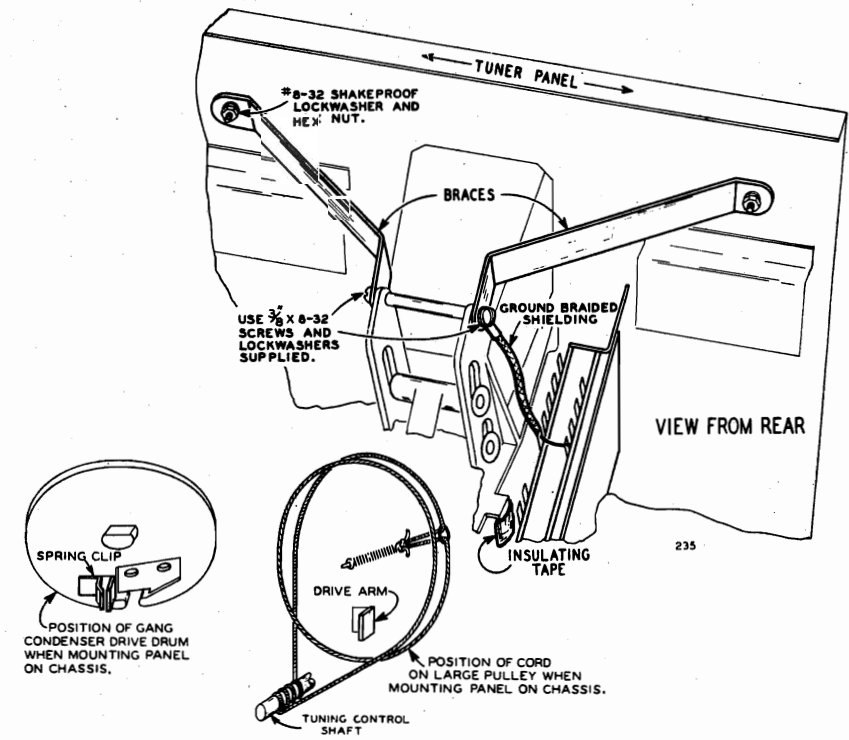


Fig. 2 Automatic Tuning Panel—Back View

MODEL 7-Station Automatic Tuning Panel
Installation Data for MODEL A3 Series

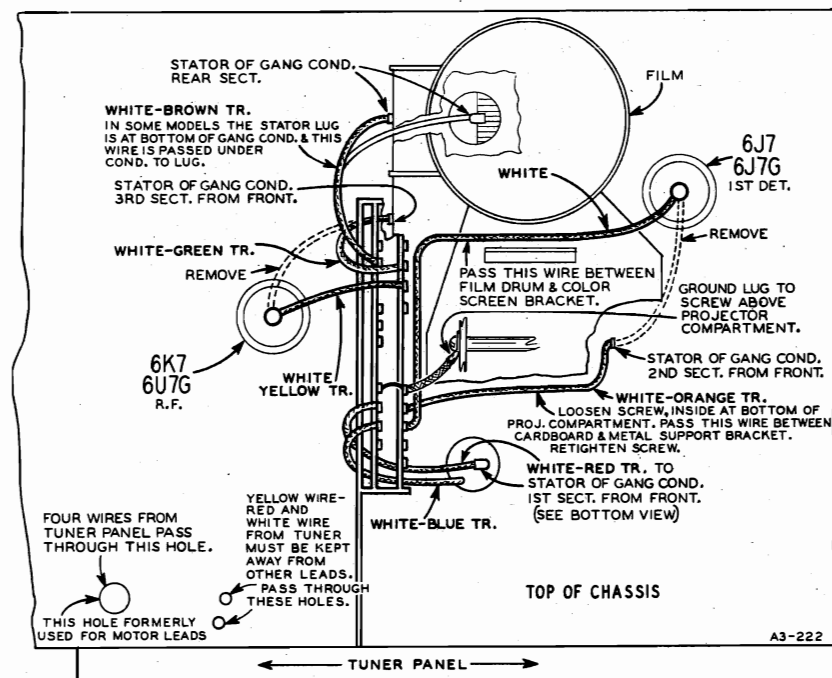


Fig. 3-13 Tube Chassis—Top View

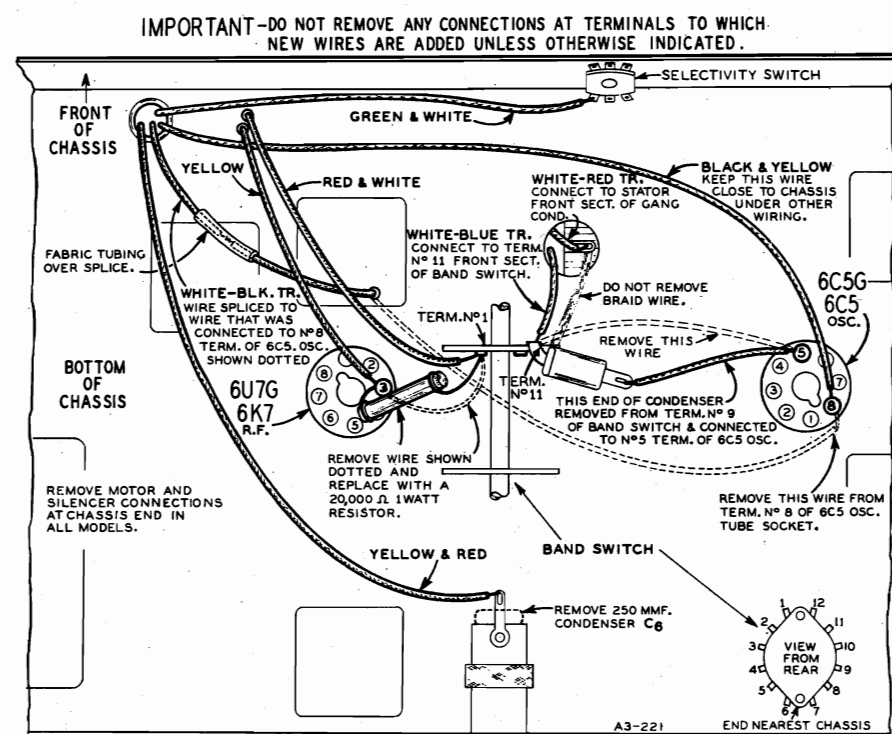


Fig. 4-13 Tube Chassis—Bottom View

WELLS-GARDNER & CO.

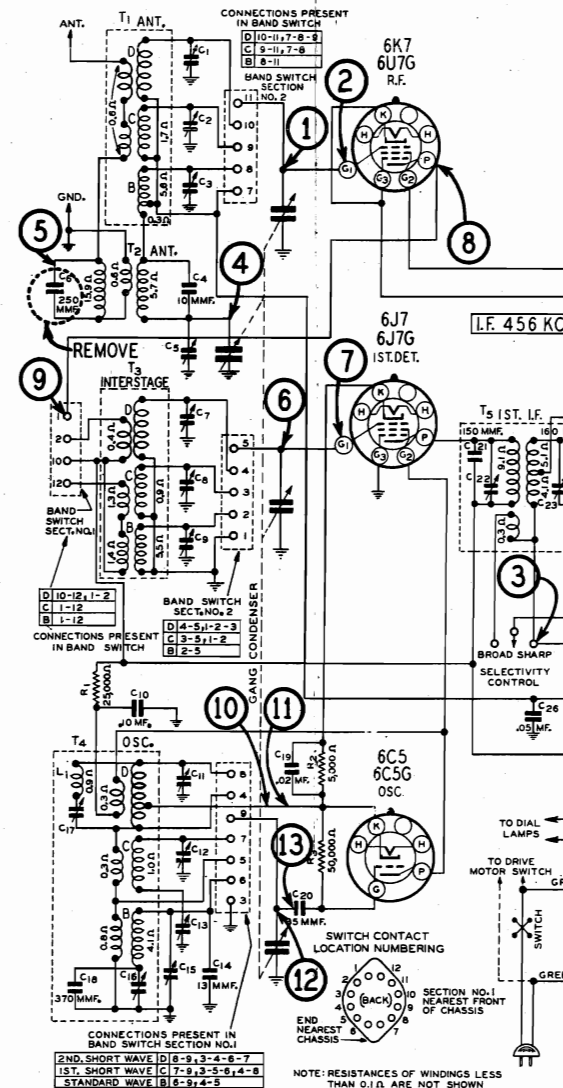


Fig. 5-13 Tube Schematic Diagram

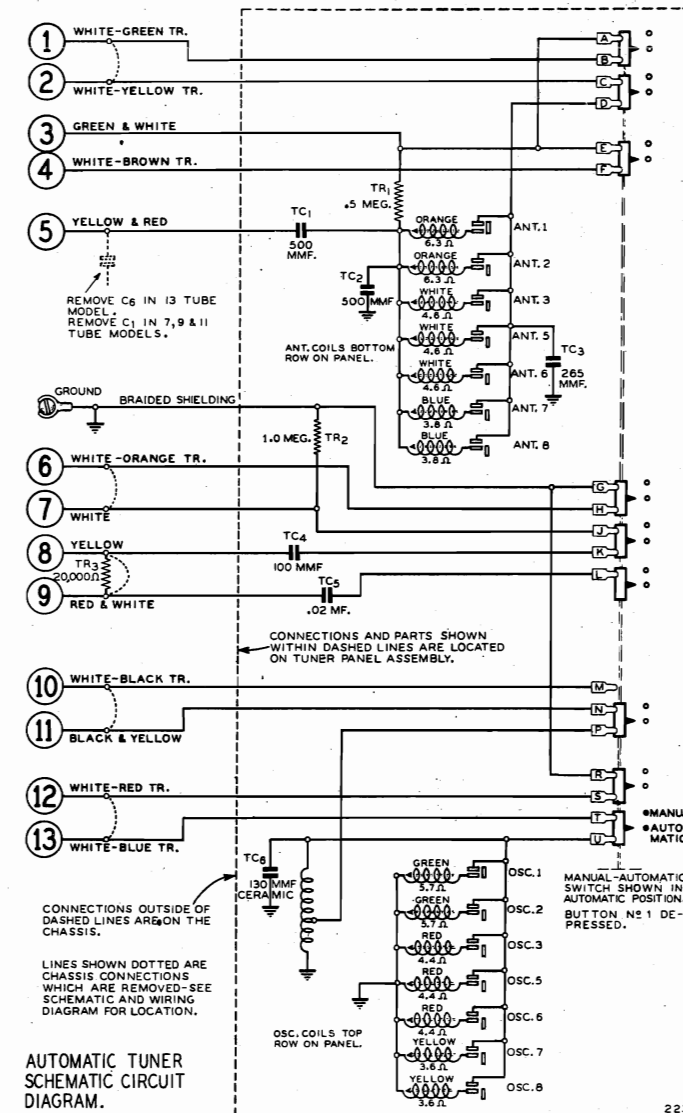


Fig. 6-Tuning Panel Schematic Diagram

13 TUBE MODEL-USE ALL 13 WIRES & GROUND LEAD.

9 & 11 TUBE MODELS-CLIP OFF WHITE-BROWN TR. (4) AT SWITCH CONTACT (P).

7 TUBE MODEL-CLIP OFF THE FOLLOWING WIRES:
WHITE-ORANGE TR. (6) AT SWITCH CONTACT (H).
WHITE (7) AT SWITCH CONTACT (I).
YELLOW (8) & RED & WHITE (9) AT CONDENSER TERMINAL STRIP.
TR₃ 20,000 OHM RESISTOR IS NOT USED.

Fig. 7-Table of Tuning Panel Leads Used

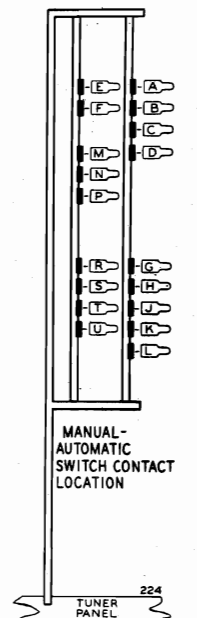


Fig. 8-Tuning Panel Switch Terminals

13 TUBE RADIO

WELLS-GARDNER & CO.

MODEL 7-Station Automatic Tuning Panel
Installation Data for MODELS A2 and A5 Series

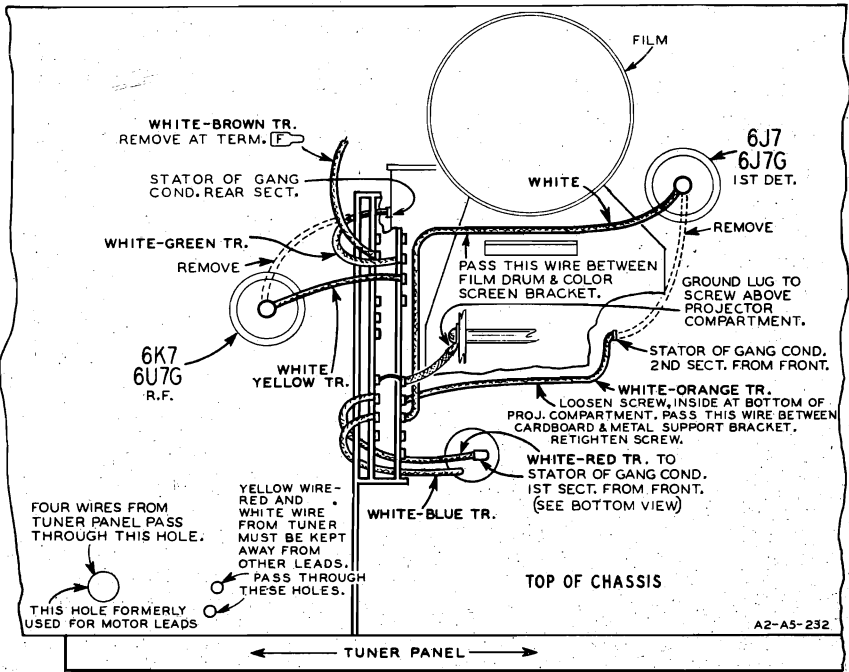


Fig. 9-9 and 11 Tube Chassis—Top View

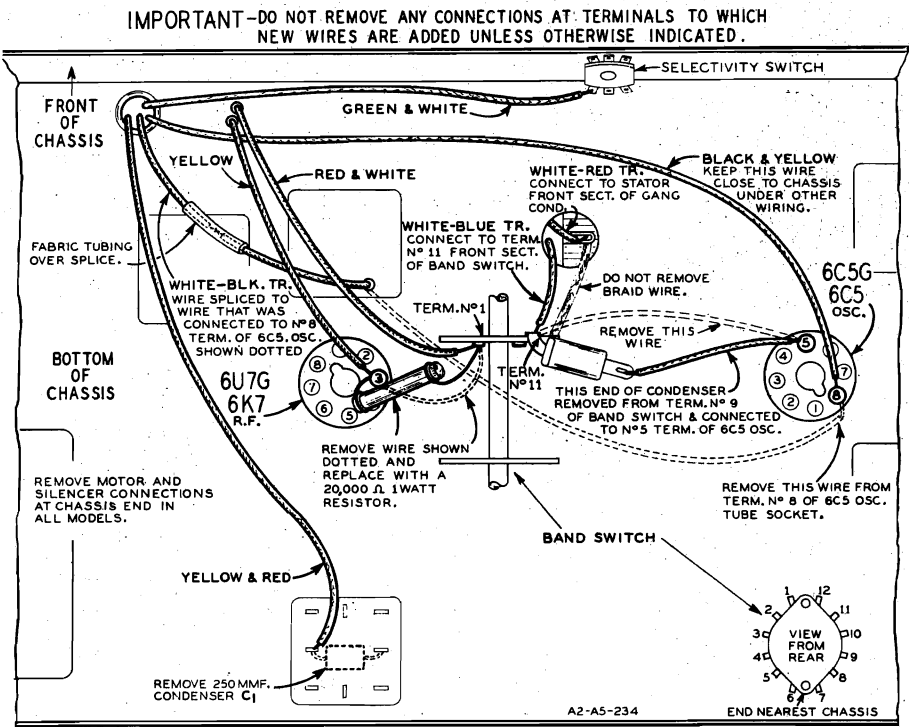


Fig. 10-9 and 11 Tube Chassis—Bottom View

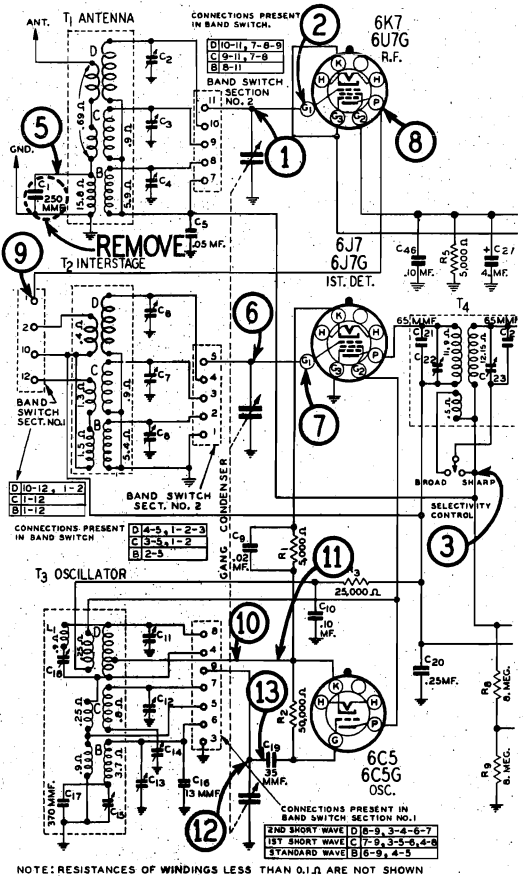


Fig. 11-9 and 11 Tube Schematic Diagram

- 13 TUBE MODEL-USE ALL 13 WIRES & GROUND LEAD.
- 9 & 11 TUBE MODELS-CLIP OFF WHITE-BROWN TR. (4) AT SWITCH CONTACT (F)
- 7 TUBE MODEL-CLIP OFF THE FOLLOWING WIRES:
WHITE-ORANGE TR. (6) AT SWITCH CONTACT (F)
WHITE (7) AT SWITCH CONTACT (F)
YELLOW (8) & RED & WHITE (9) AT CONDENSER TERMINAL STRIP.
TR3 20,000 OHM RESISTOR IS NOT USED.

Fig. 12-Table of Tuning Panel Leads Used

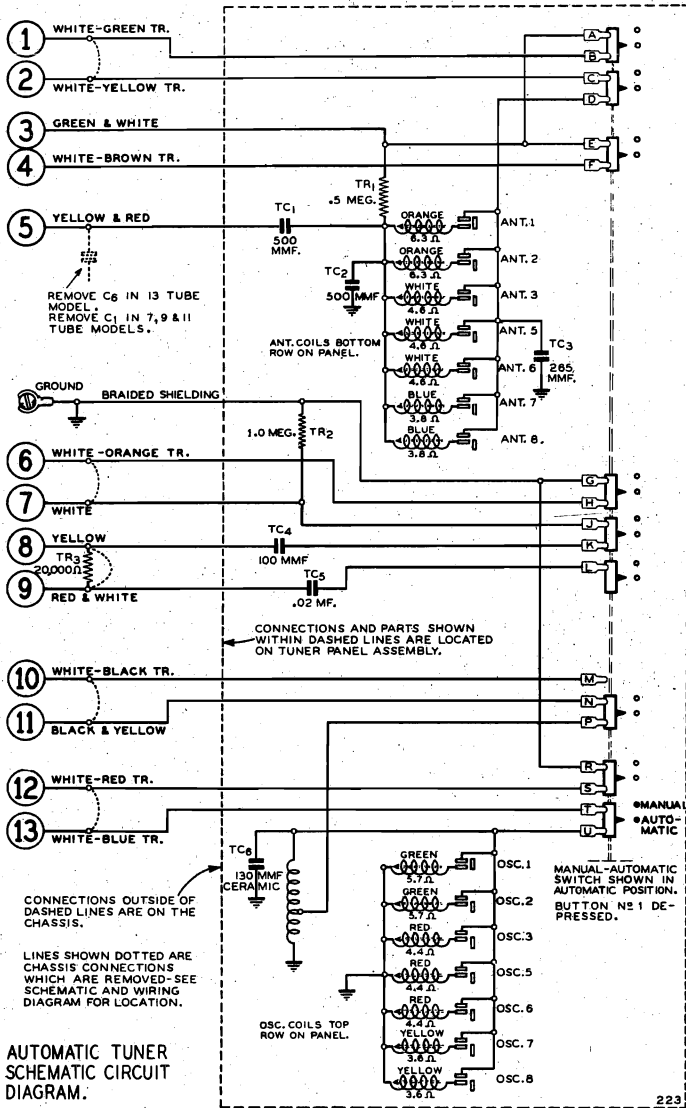


Fig. 13-Tuning Panel Schematic Diagram

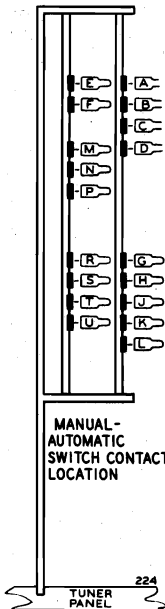


Fig. 14-Tuning Panel Switch Terminals

9 AND 11 TUBE RADIOS

Fig. 17—Tuning Panel Switch Terminals

ANT.

6J7
1ST. DET.

CONNECTIONS
PRESENT IN
BAND SWITCH

T₁ ANTENNA

GND.

REMOVE
I.F. 456 KC.

T₂ ANT.

T₃ OSCILLATOR

CONNECTIONS
PRESENT IN
BAND SWITCH

GANG CONDENSER

605
OSC.

STANDARD WAVE
SHORT WAVE

Fig. 18-7 Tube Schematic Diagram

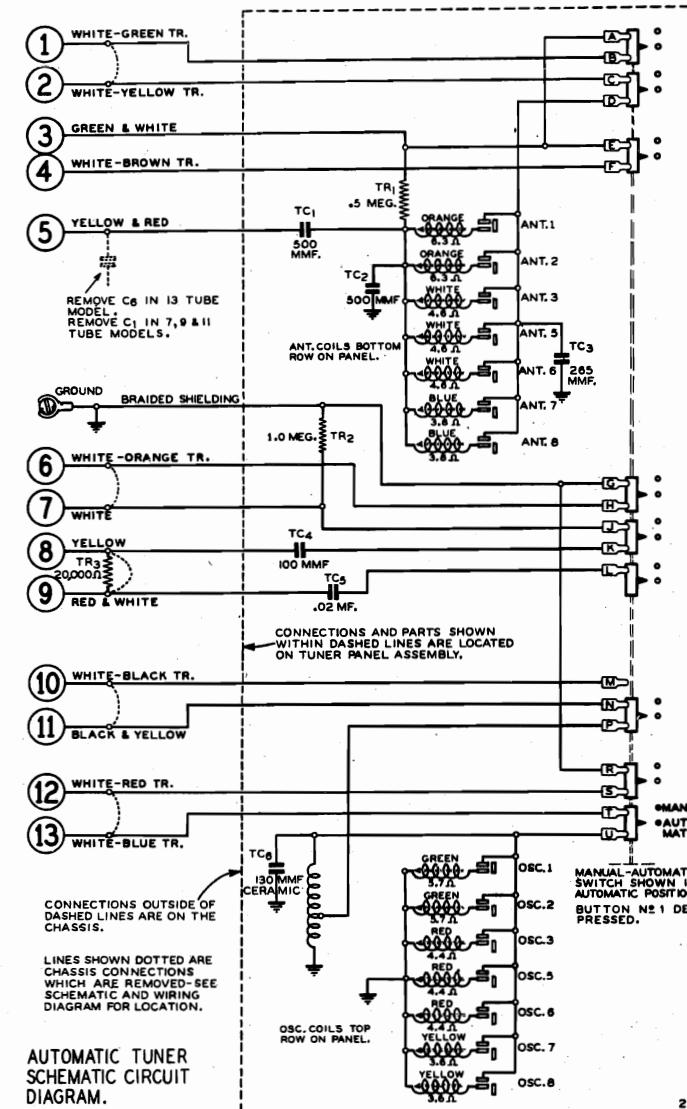


Fig. 19—Tuning Panel Schematic Diagram

13 TUBE MODEL-USE ALL 13 WIRES & GROUND LEAD.

9 & 11 TUBE MODELS-CLIP OFF WHITE -BROWN TR. (4) AT SWITCH CONTACT (F)

7 TUBE MODEL-CLIP OFF THE FOLLOWING WIRES:
WHITE-ORANGE TR. (8) AT SWITCH CONTACT (H)
WHITE (7) AT SWITCH CONTACT (J)
YELLOW (8) & RED & WHITE (9) AT CONDENSER TERMINAL STRIP.
TR. 3 20000 OHM RESISTOR IS NOT USED.

Fig. 20—Table of Tuning Panel Leads Used

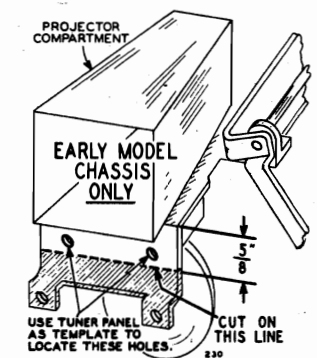


Fig. 21—Cutting Support Bracket—Early Models

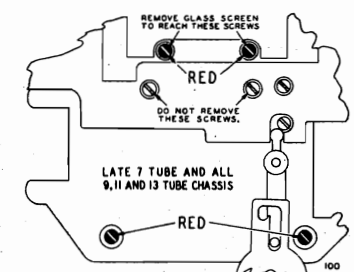


Fig. 22—Location of 4 Red Mounting Screws in Late Models

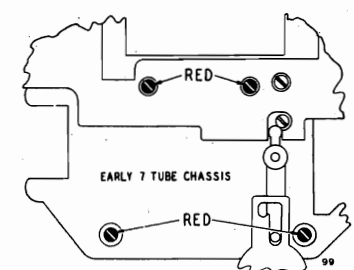


Fig. 23—Location of 4 Red Mounting Screws in Early Models

MODEL B1 Series
Schematic, Voltage
Socket, Trimmers
Alignment

Tube	Function	Across Flament	Plate to Ground	Screen to Ground	Control Grid
ID7G	1st Det.-Osc.	2.0	87 87(1)	64	3.5(2)
ID5G	I.F.	2.0	87	64	3.5(2)
IH6G	2nd Det.-1st Audio	2.0	32(3)		1.25(4)
IF5G	Power	2.0	82	87	3.5(2)

- (1) Anode Grid (G2) to ground
- (2) As read across R6 and R7
- (3) As read on 100 volt scale (1000 ohm per volt meter). Subject to variation.
- (4) As read across R7

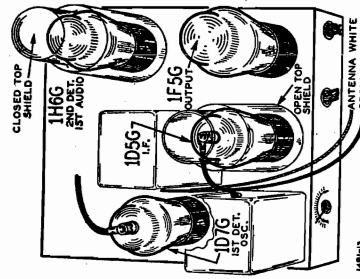


Fig. 2—
Tube
Arrangement

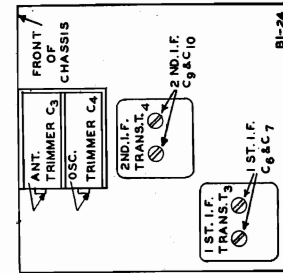


Fig. 3—Trimmer Location

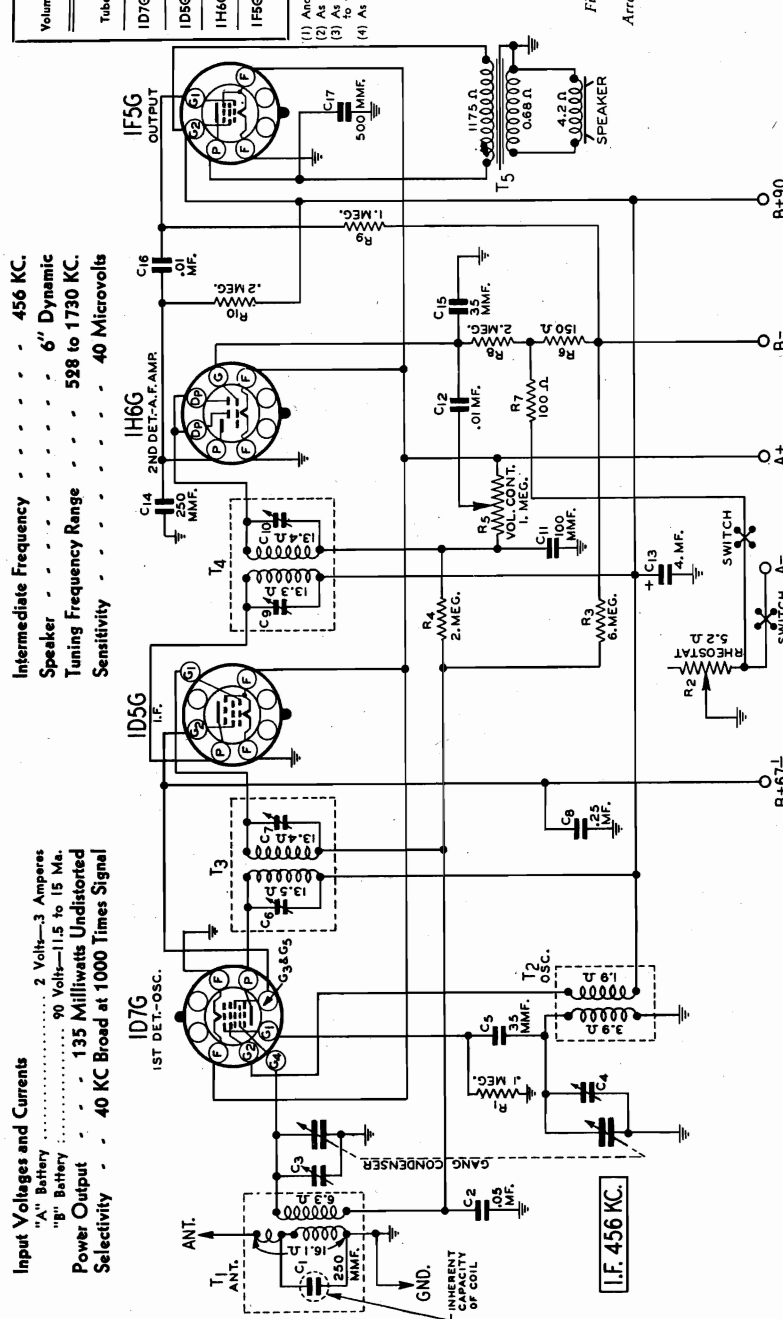


Fig. 1—Schematic Circuit Diagram

ALIGNMENT PROCEDURE

STEP (Follow Order as Given)	DUMMY ANTENNA	PROCEDURE	
		SIGNAL GENERATOR FREQUENCY SETTING	TRIMMERS ADJUSTED See Illustration
I. F.	.1 mf.	456 KC	Grid of 1st Det. 2nd I. F. (C9) & (C10) 1st I. F. (C6) & (C7)
1730 KC Adj.	200 mmf.	1730 KC	Antenna Lead Turn rotor to full open Adjust to Maximum Output
1500 KC Adj.	200 mmf.	1500 KC	Antenna Lead Turn Rotor to Max. Output Adjust to Maximum Output

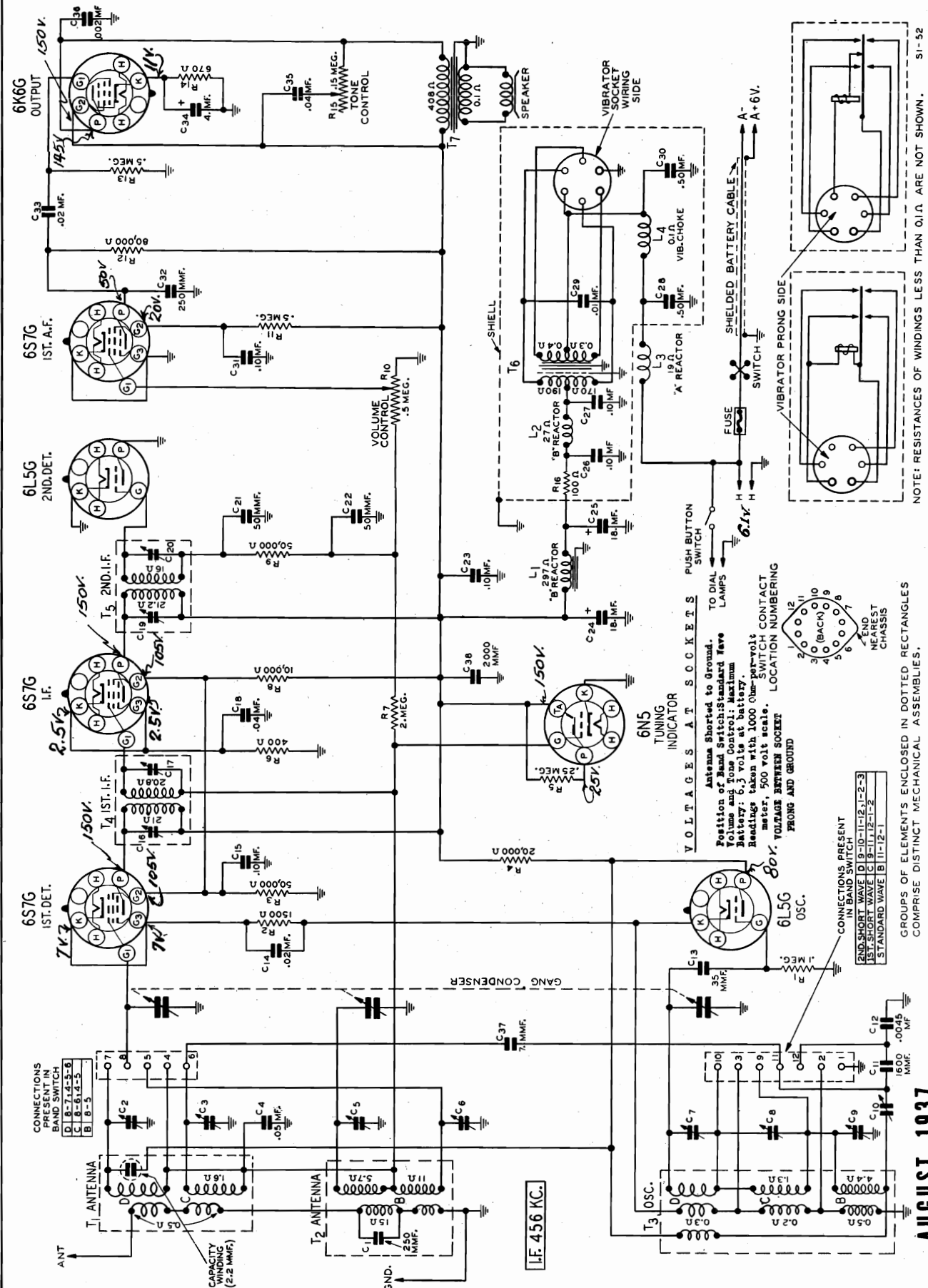
Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

the position of the pointer and remove the chassis from the cabinet. Loosen the pointer screw and set the pointer so that it will be at the 800 KC mark. Tighten the pointer screw and replace the chassis in the cabinet. If the pointer is not at the 800 KC mark another adjustment will be necessary.

NOTE—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, note

MODEL S1 Series
Schematic, Voltage

WELLS-GARDNER & CO.



AUGUST, 1937

WELLS-GARDNER & CO.

MODEL S1 Series
Alignment, Trimmers
MODEL S2 Series
Alignment, Trimmers, Tuner

ALIGNMENT PROCEDURE

SERIES S1

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., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR		TRIMMERS ADJUSTED See Illustration	PROCEDURE	
			FREQUENCY SETTING	CONNECTION AT RADIO		INITIAL STEPS	ADJUSTMENT
I. F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C19) & (C20)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C16) & (C17)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C7)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Antenna Range D (C2)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor—See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C8)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Antenna Range C (C3)	Turn Rotor to Max. Output	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C9)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	1st Ant. Range B (C5) 2nd Ant. Range B (C6)	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C10)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor—See Note B

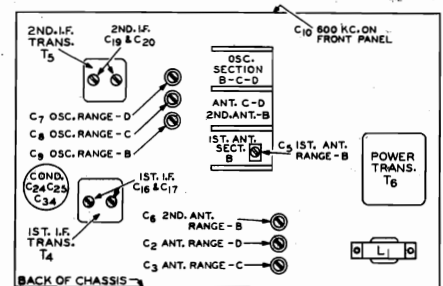
Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—Loosen the pointer set screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.



ALIGNMENT PROCEDURE Series S2

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., 200 mmf., and 400 ohms.

SIGNAL GENERATOR		DUMMY ANTENNA	BAND SWITCH	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
FREQUENCY SETTING	CONNECTION AT RADIO				
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. (C21) & (C22)
RANGE B					
1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C7)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Ant. Range B (C5)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C8) Rock Rotor—See Note B
RANGE D					
18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C6)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C3) Rock Rotor—See Note B
PERMEABILITY TUNING UNIT					
		BUTTON DEPRESSED (Band Switch in Push Button Position)	TURN SETTING SCREW TO MAXIMUM OUTPUT		ADJUST COIL POSITION TO MAXIMUM OUTPUT —See Note C
1100 KC	Antenna Lead		No. 1	Setting Screw No. 1	Antenna Coil No. 1
1100 KC	Antenna Lead	200 mmf.	No. 2	Setting Screw No. 2	Antenna Coil No. 2
850 KC	Antenna Lead	200 mmf.	No. 3	Setting Screw No. 3	Antenna Coil No. 3
850 KC	Antenna Lead	200 mmf.	No. 4	Setting Screw No. 4	Antenna Coil No. 4
700 KC	Antenna Lead	200 mmf.	No. 5	Setting Screw No. 5	Antenna Coil No. 5
700 KC	Antenna Lead	200 mmf.	No. 6	Setting Screw No. 6	Antenna Coil No. 6

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

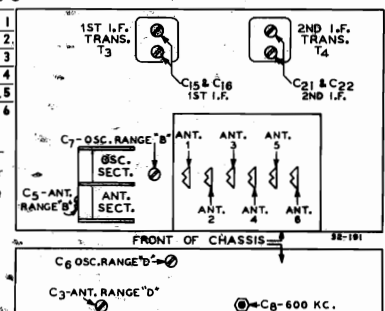
After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—At the top of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

Fig. 2—
Trimmer
Location



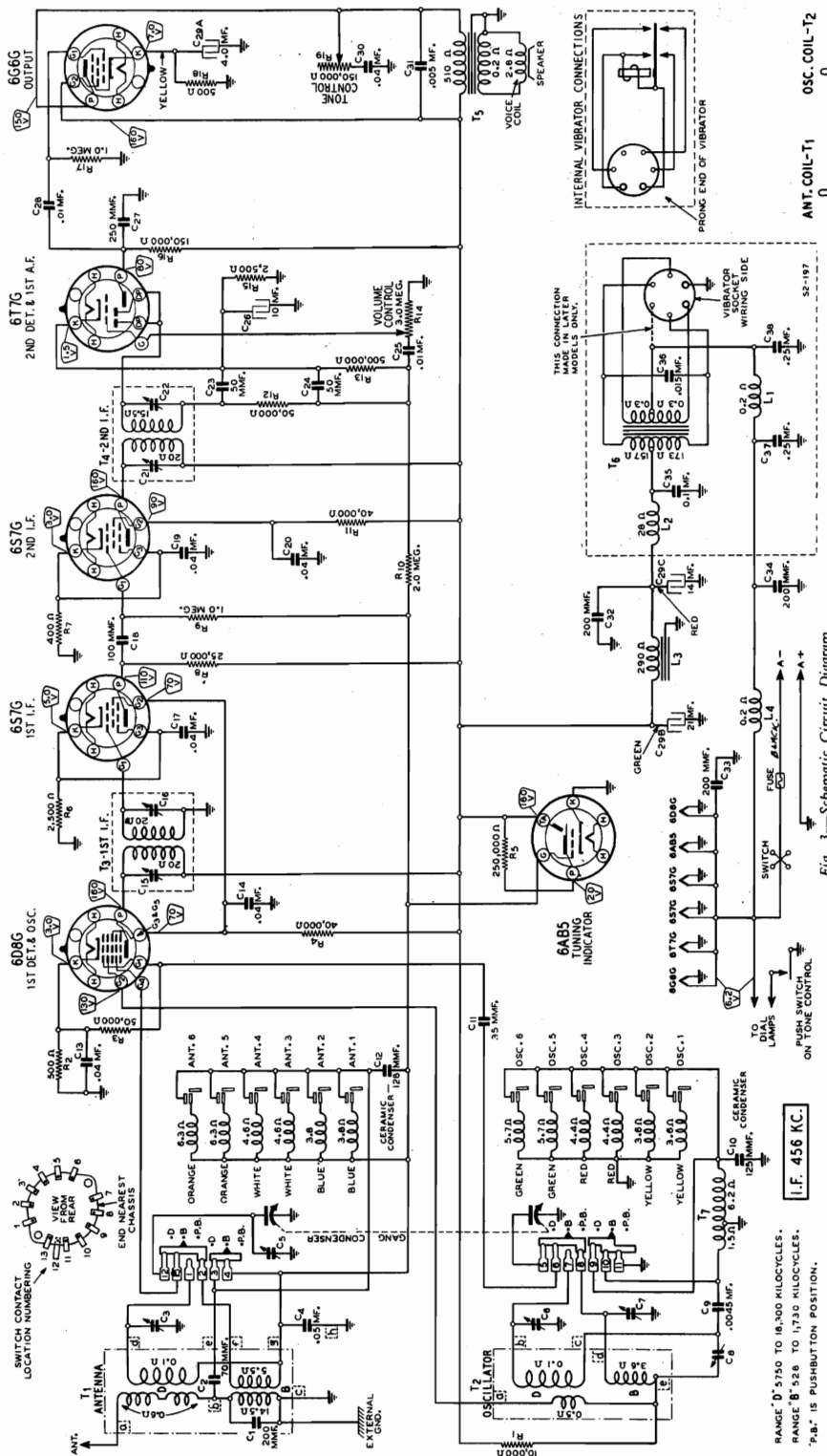
MODEL S2 Series
Schematic, Voltage
Socket, Coils, Notes

WELLS-GARDNER & CO.

Power Consumption - 2.45 Amperes at 6.3 Volts
Power Output - .8 Watt Undistorted
1.4 Watts Maximum
Selectivity - 41 KC Broad at 1000 times Signal
Sensitivity
B Range (Manual Tuning).....6 Microvolts Average
B Range (Automatic Tuning).....8 Microvolts Average
D Range.....8 Microvolts Average

Intermediate Frequency - 456 KC.
Speaker - 6" or 8" P. M. Dynamic
Tuning Frequency Range

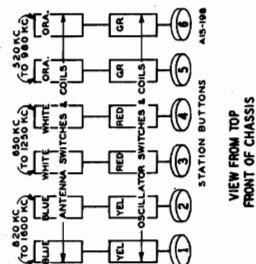
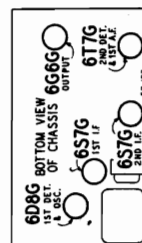
B Range (Manual Tuning).....528 to 1730 KC
D Range (Manual Tuning).....5750 to 18300 KC
Buttons 1 and 2 (Automatic Tuning).....820 to 1600 KC
Buttons 3 and 4 (Automatic Tuning).....650 to 1250 KC
Buttons 5 and 6 (Automatic Tuning).....520 to 980 KC



The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

These voltages are read under the following conditions:
Battery Voltage—6.3.
Volume Control—Maximum.
Antenna Shorted to Ground.
Readings taken with 1000 ohm-per-volt meter.

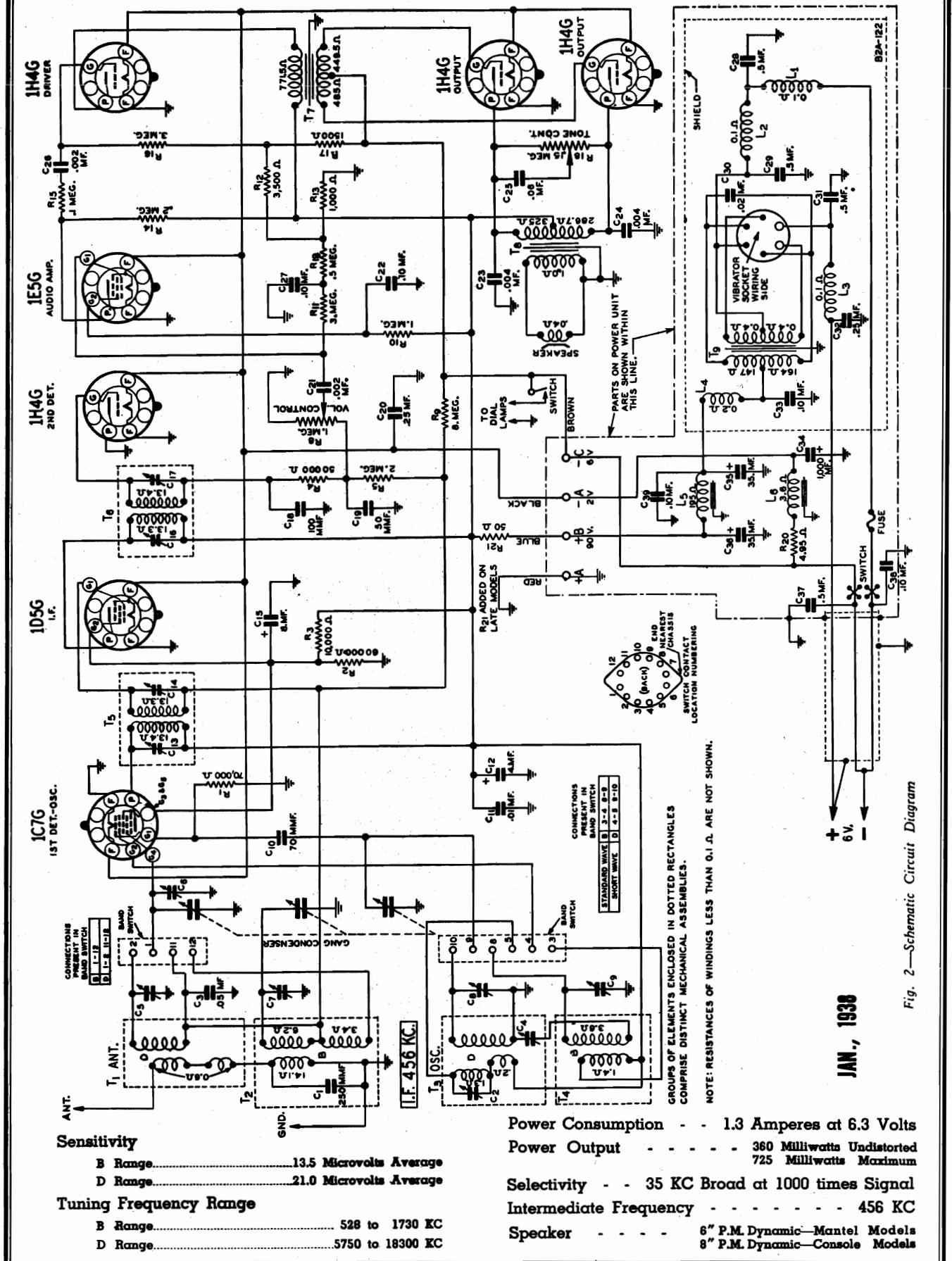
FOR DIAL AND DRIVE
DATA, SEE INDEX



Tuning of the R.F. and oscillator fixed tuned circuits to the desired frequency is accomplished by varying the inductance of the tuning coils by changing the permeability of the magnetic circuit. This is done by moving an iron core in and out of the coil. The iron cores within the antenna and oscillator automatic tuning coil forms are secured to a brass rod. This rod is moved back and forth by a screw located at the front of the radio.

AUGUST, 1938

WELLS-GARDNER & CO.

MODEL B2A Series
Schematic, Specifications

MODEL B2A Series
Alignment, Voltage
Socket, Trimmers, Coils

WELLS-GARDNER & CO.

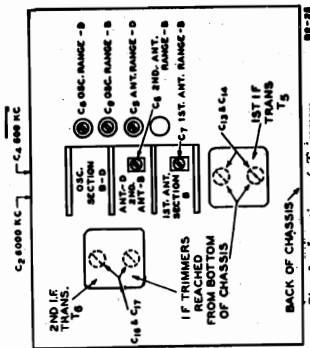
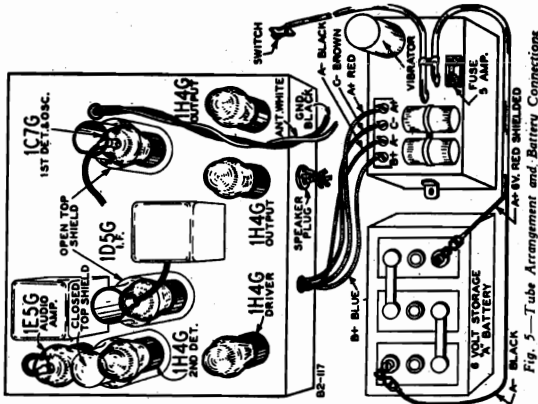


Fig. 3—Location of Trimmers



WELLS-GARDNER & CO.

MODEL T2 Series
Schematic, Voltage
Socket, Coils, Notes

Power Consumption - 1.45 Amperes at 32 Volts DC

Power Output - .17 Watts Undistorted
.40 Watts Maximum

Selectivity - 30 KC Broad at 1000 times Signal

Sensitivity

B Range (Manual Tuning).....6.0 Microvolts Average

B Range (Automatic Tuning).....6.0 Microvolts Average

D Range.....6.0 Microvolts Average

Intermediate Frequency - 456 KC

Speaker - 8" Dynamic

Tuning Frequency Range

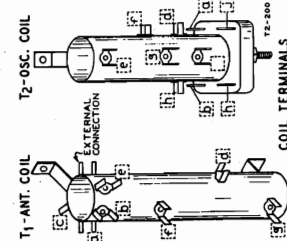
B Range (Manual Tuning)... 528 to 1730 KC (Kilocycles)

D Range (Manual Tuning)... 5750 to 18300 KC (Kilocycles)

Buttons 1 and 2 (Automatic Tuning)..... 820 to 1600 KC

Buttons 3 and 4 (Automatic Tuning)..... 850 to 1250 KC

Buttons 5 and 6 (Automatic Tuning)..... 520 to 980 KC



Line Voltage Range

The radio will operate satisfactorily within a line voltage range of 25 to 42 volts. If the line voltage is higher than 42, it will be necessary to use a series resistor to cut it down. If the voltage varies, a variable resistor may be required.

Starting Current

When first turned on, the drain for a few seconds is slightly higher than normal until the tubes heat up. Some automatic plants are adjusted to start under a load of 200 to 300 watts. If a number of devices such as lights or motors are being used and the radio set is turned on the total drain may be sufficient to start the plant.

This radio is designed for use on farms and in those places where the power supply consists of a 32 volt direct current generating plant.

Polarity of Power Supply

There is a red mark on the plug at the end of the power supply cord of the radio. The prong of the plug at which the red mark is placed must be plugged into the positive side of the line.

Caution

If used on any other type of power supply than 32 volt DC, severe damage may be done to the receiver.

Do not turn the radio on unless all of the tubes and the dial lamps are in the proper sockets. Use only No. 51 dial lamps.

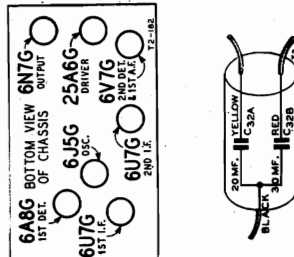
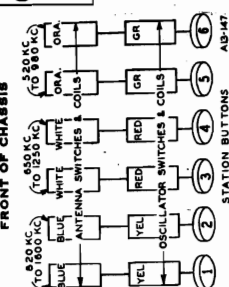
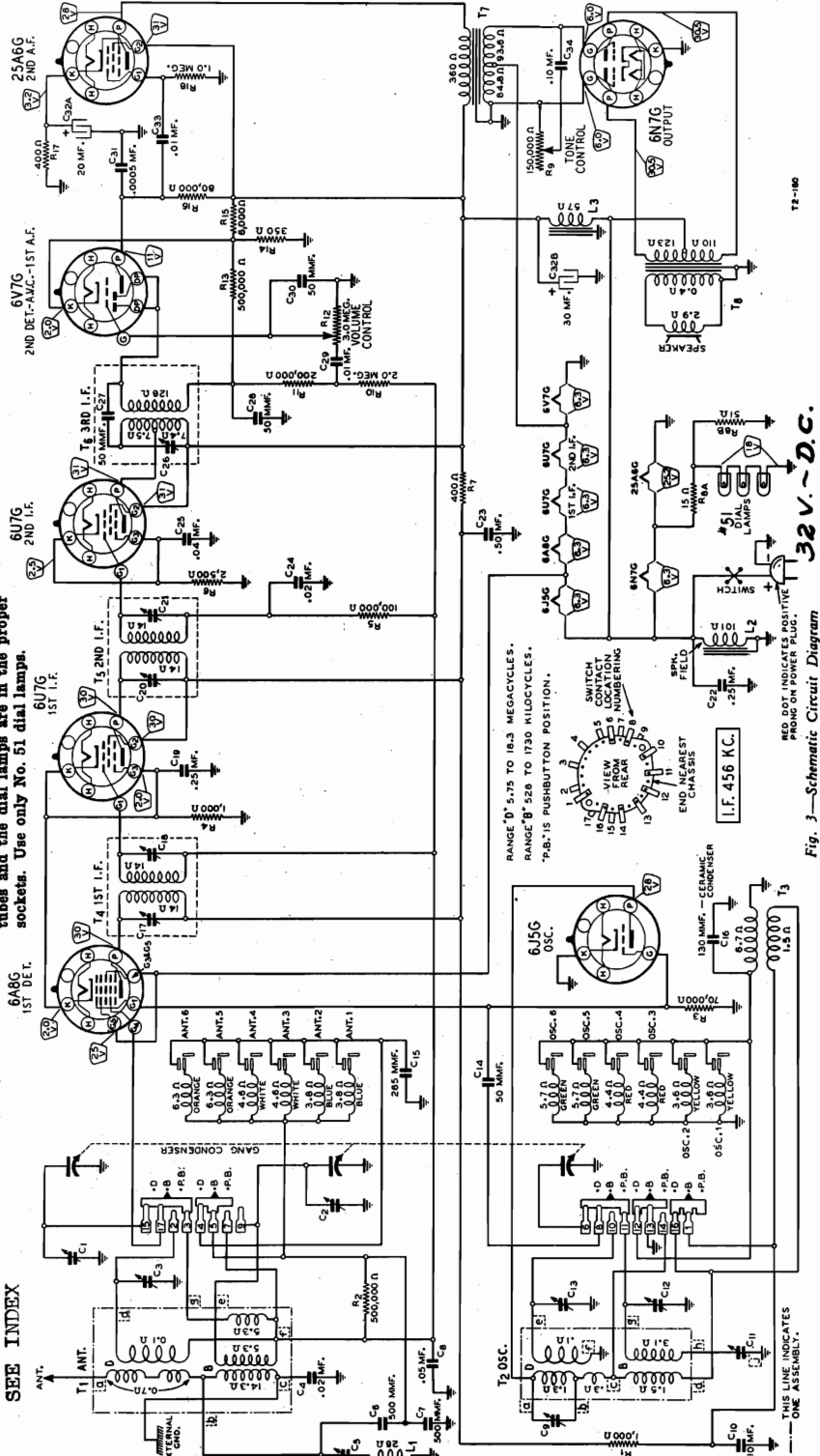
VIEW FROM TOP
FRONT OF CHASSISFOR OTHER DATA
SEE INDEX

Fig. 3—Schematic Circuit Diagram

MODEL T2 Series
Alignment, Trimmers

WELLS-GARDNER & CO.

MODEL A17 Series
Alignment, Trimmers
Coils, Notes

MODEL T2

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.

SIGNAL GENERATOR FREQUENCY SETTING	DUMMY ANTENNA CONNECTION AT RADIO	BAND SWITCH	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)
I. F.	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open
RANGE B				
1710 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 1000 KC— See Note A
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Rock Rotor—See Note B
WAVE TRAP				
455 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to 400 KC Adjust Sig. Gen.—See Note C
RANGE D				
18,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output Rock Rotor—See Note B
4000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output Rock Rotor—See Note B
PERMEABILITY TUNING UNIT				
1100 KC	Antenna Lead	200 mmf.	No. 1	Set Screw No. 1
1100 KC	Antenna Lead	200 mmf.	No. 2	Set Screw No. 2
850 KC	Antenna Lead	200 mmf.	No. 3	Set Screw No. 3
850 KC	Antenna Lead	200 mmf.	No. 4	Set Screw No. 4
700 KC	Antenna Lead	200 mmf.	No. 5	Set Screw No. 5
700 KC	Antenna Lead	200 mmf.	No. 6	Set Screw No. 6

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.

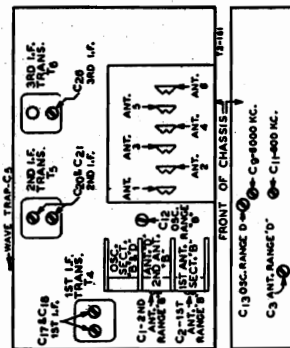
NOTE A—If the pointer is not at 1000 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1000 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Leave condenser rotor at the 600 KC setting and adjust the signal generator until maximum output is obtained at or near 455 KC.

NOTE D—At the top of the permeability tuning unit can be seen a pair of long conical springs. The "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the plates or screwdriver until maximum output is obtained.

CAUTION—When aligning the short wave band be sure that the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The longer signal, which is much weaker, will be heard at 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The longer signal, which is much weaker, will be heard at 15,000 KC.



15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The longer signal, which is much weaker, will be heard at 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The longer signal, which is much weaker, will be heard at 15,000 KC.

MODEL A17

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.
IMPORTANT—Follow procedure in the order shown.

SIGNAL GENERATOR FREQUENCY SETTING	DUMMY ANTENNA CONNECTION AT RADIO	BAND SWITCH	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F.	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open
RANGE D				
18,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output
RANGE C				
5400 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open
5000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output
RANGE B				
1600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open
1400 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC— See Note B
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Rock Rotor—See Note A

Phonograph Connections

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—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE B—If the pointer is not at 1400 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1400 KC mark, and tighten the clamps.

CAUTION—When aligning the short wave band be sure that the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The longer signal, which is much weaker, will be heard at 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The longer signal, which is much weaker, will be heard at 15,000 KC.

Voltagages at Sockets

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

These voltages are read under the following conditions:
1. Volume Control—Maximum.
2. Antenna Shield to Ground.
3. Readings taken with 1000 ohm-per-volt meter.

NOTE: The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

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Tone Control

There are 3 wiring lugs on the tone control. One of the end lugs connects to one end of the tone control resistor. The center lug connects to the slider. The other end lug on the tone control is used for external wiring purposes only and is not connected to the tone control resistor in any way. One side of the tone control resistor is connected to ground.

NOTE: The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

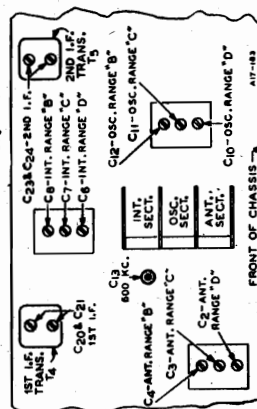
NOTE: The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

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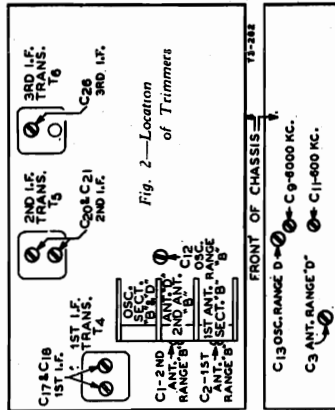


Location of Trimmers

WELLS-GARDNER & CO.

MODEL T3 Series
Schematic, Voltage
Socket, Trimmers
Coils, Notes

Power Consumption - 1.45 Amperes at 32 Volts DC Intermediate Frequency - 456 KC
Power Output - .17 Watts Undistorted Speaker - 6" or 8" Electro-Dynamic
Selectivity - 30 KC Broad at 1000 times Signal Tuning Frequency Range
Sensitivity (For .05 watt output):
B Range 6.0 Microvolts Average B Range 528 to 1730 KC (Kilocycles)
D Range 6.0 Microvolts Average D Range 5750 to 18300 KC (Kilocycles)



Schematic, Voltage, Socket
Trimmers, Alignment, Coils

MODELS B3 Series (Portable)
B4 Series (Table Models)
WELLS-GARDNER & CO.

Input Voltages and Currents

"A" Battery 1.5 Volts—30 Amperes
"B" Battery 90 Volts—12 to 15 Ma.

Power Output - - - 140 Milliwatts Undistorted

Selectivity - - 41 KC Broad at 1000 Times Signal

Intermediate Frequency - - - - - 456 KC.

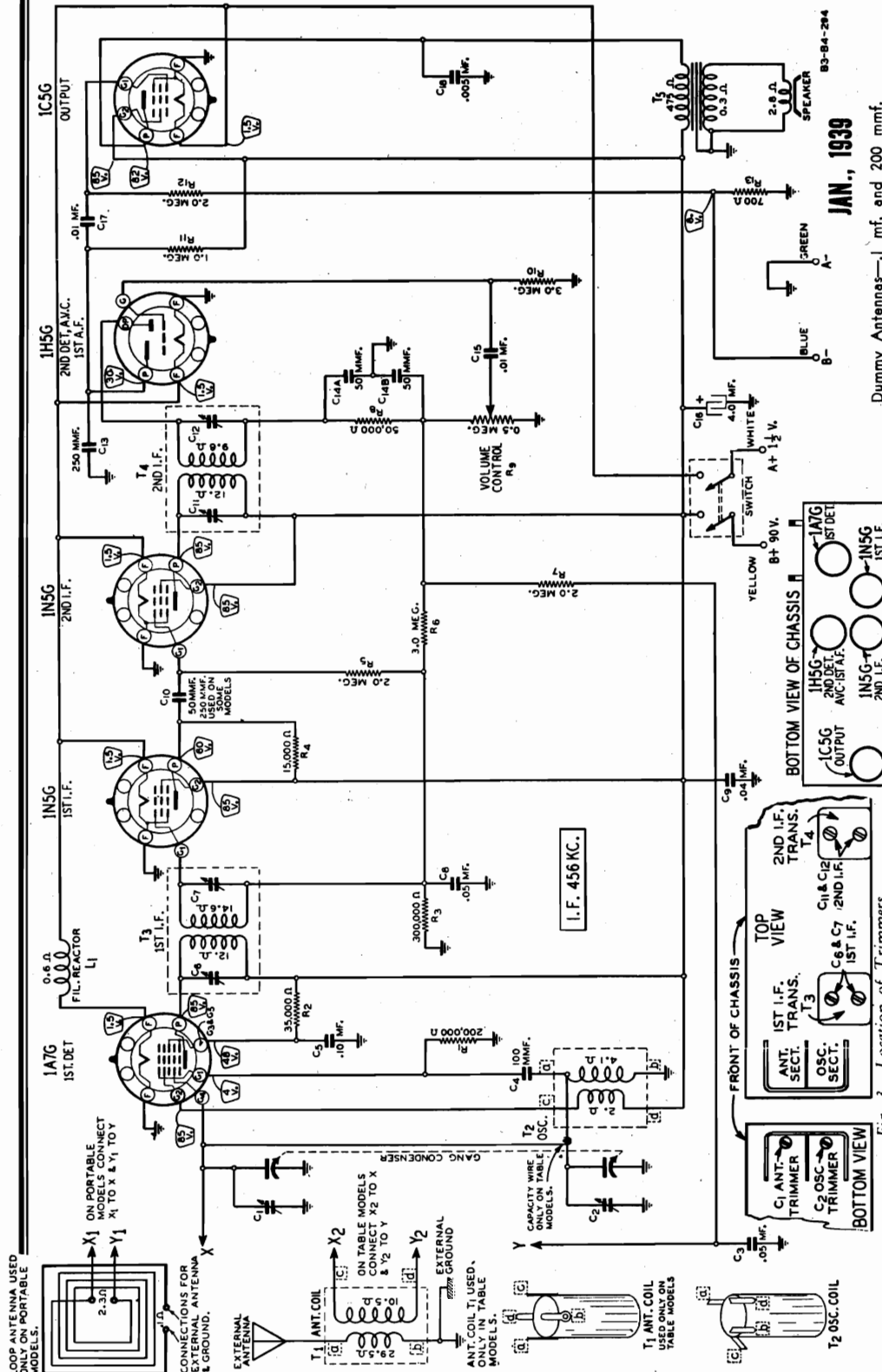
Speaker - - - - - 6" P.M. Dynamic

Tuning Frequency Range - - - 540 to 1600 KC.

Sensitivity (For .05 Watt Output)

Table Model 10.5 Microvolts Average

Portable Model 20 Microvolts Per Meter Average



Dummy Antennas—.1 mf. and 200 mmf.

NOTE—Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Secure the back in place on the cabinet. Connections for the output meter may be made through the opening for the outside antenna and ground connecting posts. This opening is at the bottom of the cabinet near the back. Place radio approximately 3 feet from loop so as to pick up signal. Radio should not be in proximity to any metal (metal bench, etc.).

CALIBRATION—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, loosen the pointer screw, set the pointer at the 800 KC mark and retighten the pointer screw.

JAN., 1939

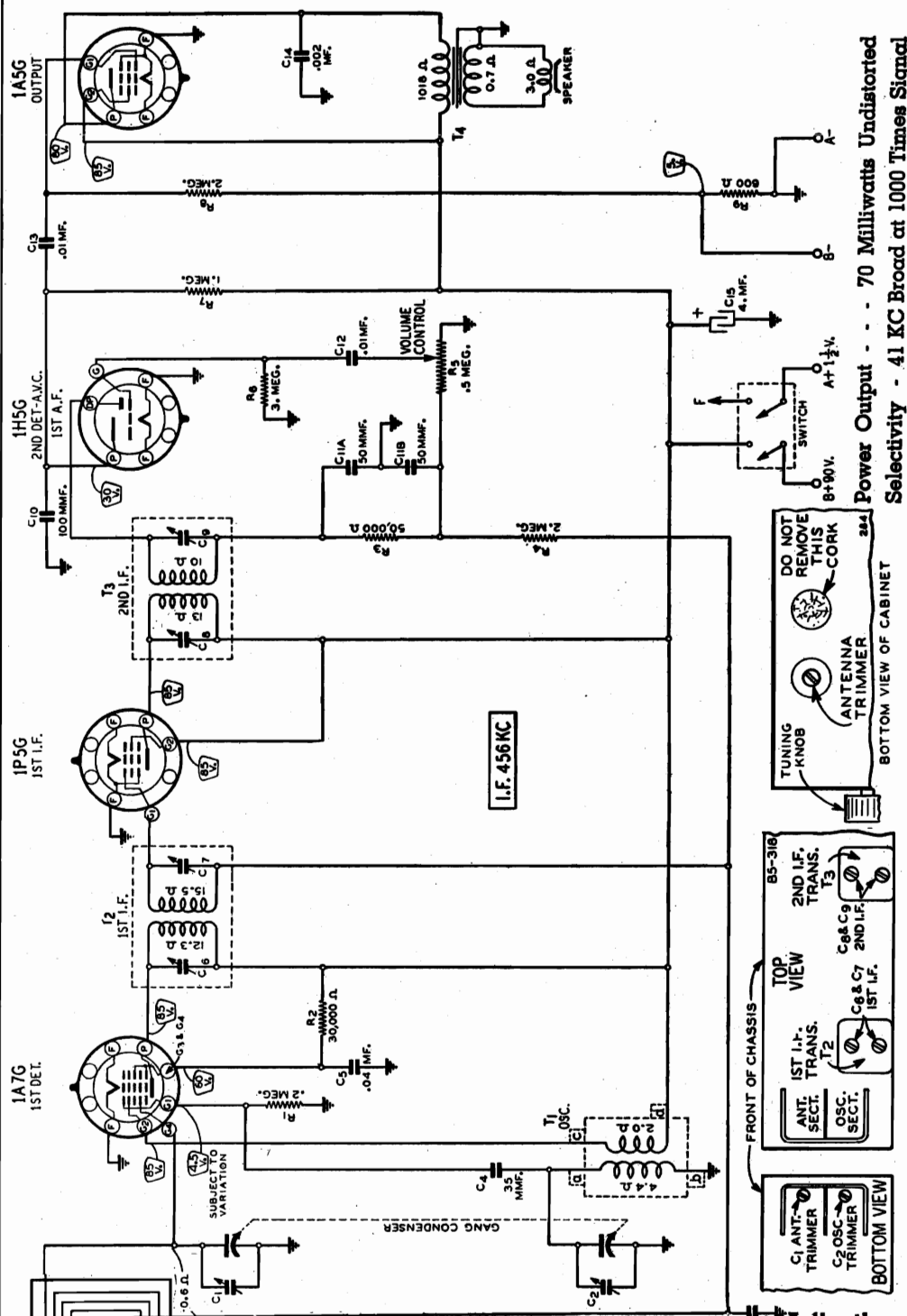
Fig. 3—Location of Trimmers

SIGNAL GENERATOR FREQUENCY SETTING	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Fig. 3)
456 KC	.1 mf.	Turn rotor to full open	1st I.F. (C6) & (C7) 2nd I.F. (C11) & (C12)
1600 KC	.1 mf.	Turn rotor to full open	Oscillator (C2)
TABLE MODEL ONLY 1500 KC	200 mmf.	Turn rotor to max. output	Antenna (C1)
PORTABLE MODEL ONLY 1500 KC	None—See Note	Turn rotor to max. output	Antenna (C1)

MODEL 4B5 Series
Schematic, Voltage

WELLS-GARDNER & CO.

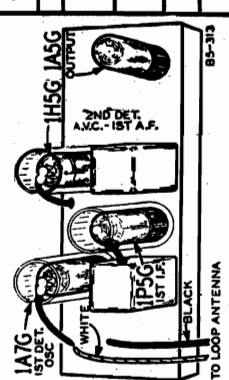
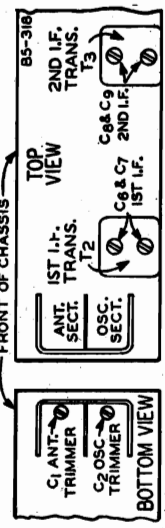
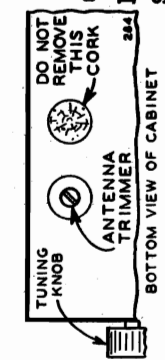
Socket, Trimmers
Alignment



ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments. Allow Chassis and Signal Generator to "Heat Up" for several minutes.

SIGNAL GENERATOR		ADJUST TRIMMERS TO MAXIMUM	
FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	CONDENSER SETTING
456 KC	Grid of 1st Det.	.1 mf.	Turn rotor to full open
1600 KC	Grid of 1st Det.	.1 mf.	Turn rotor to full open
1500 KC	None—See Note		Oscillator (C2)
			Antenna (C1)



CALIBRATION (For models with pointer in front of dial scale)—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, loosen the pointer screw, set the pointer at the 800 KC mark and retighten the pointer screw.

CALIBRATION (For model with pointer in back of celluloid dial scale)—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. IF THE POINTER IS AT A HIGHER KC MARK THAN 800 KC, grasp the drive cord below the tension spring. Hold the tuning control shaft motionless and slowly pull the drive cord down until the pointer is at the 800 KC mark. IF THE POINTER IS AT A LOWER KC MARK THAN 800 KC, grasp the drive cord above the tension spring. Hold the tuning control shaft motionless and slowly pull the drive cord up until the pointer is at the 800 KC mark.

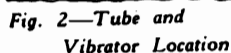
Adjusting Antenna Trimmer

After the batteries are installed and the back of the cabinet is in place, adjust the antenna trimmer.

Accurately tune in a weak station signal between 1400 and 1500 KC on the dial. With a screwdriver turn the adjusting screw of the antenna trimmer up or down until maximum output is obtained. This trimmer is reached through an opening in the bottom of the cabinet—see illustration. CAUTION: Do not remove the cork from the other opening at the bottom of the cabinet.

WELLS-GARDNER & CO.

Speaker - - - - - 6" Electro-Dynamic

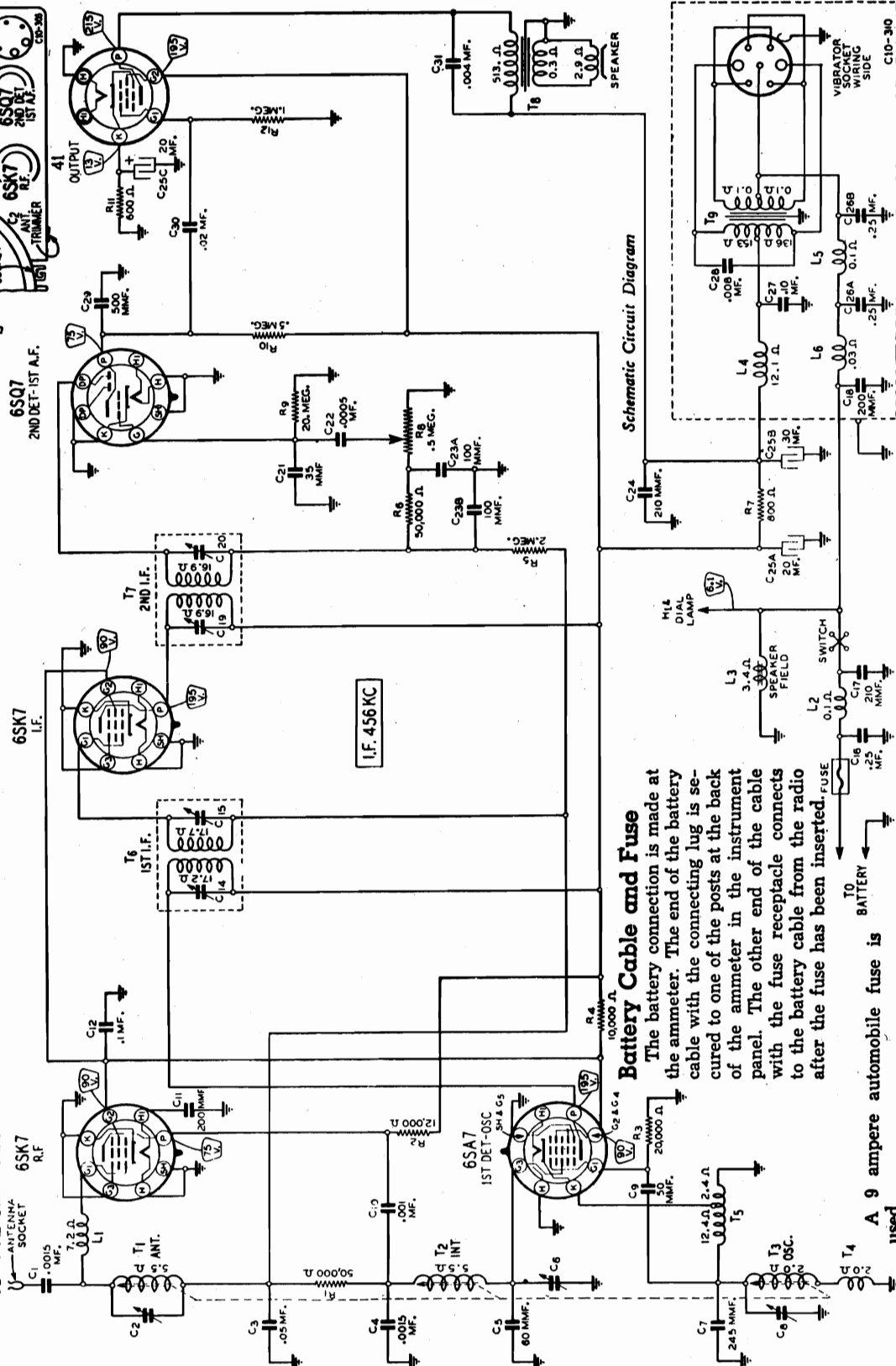


**FOR SETTING PUSH BUTTONS,
SEE INDEX.**

IF ALIGNMENT
Adjust at 456 KC through 0.05 mfd. condenser.

BC ALIGNMENT
Adjust oscillator trimmer C8 at 1560 KC.
Adjust C6 and C2 trimmers at 1000 KC.

FOR CONVENTIONAL ALIGNMENT. SEE SPECIAL SECTION
OF VOLUME VIII



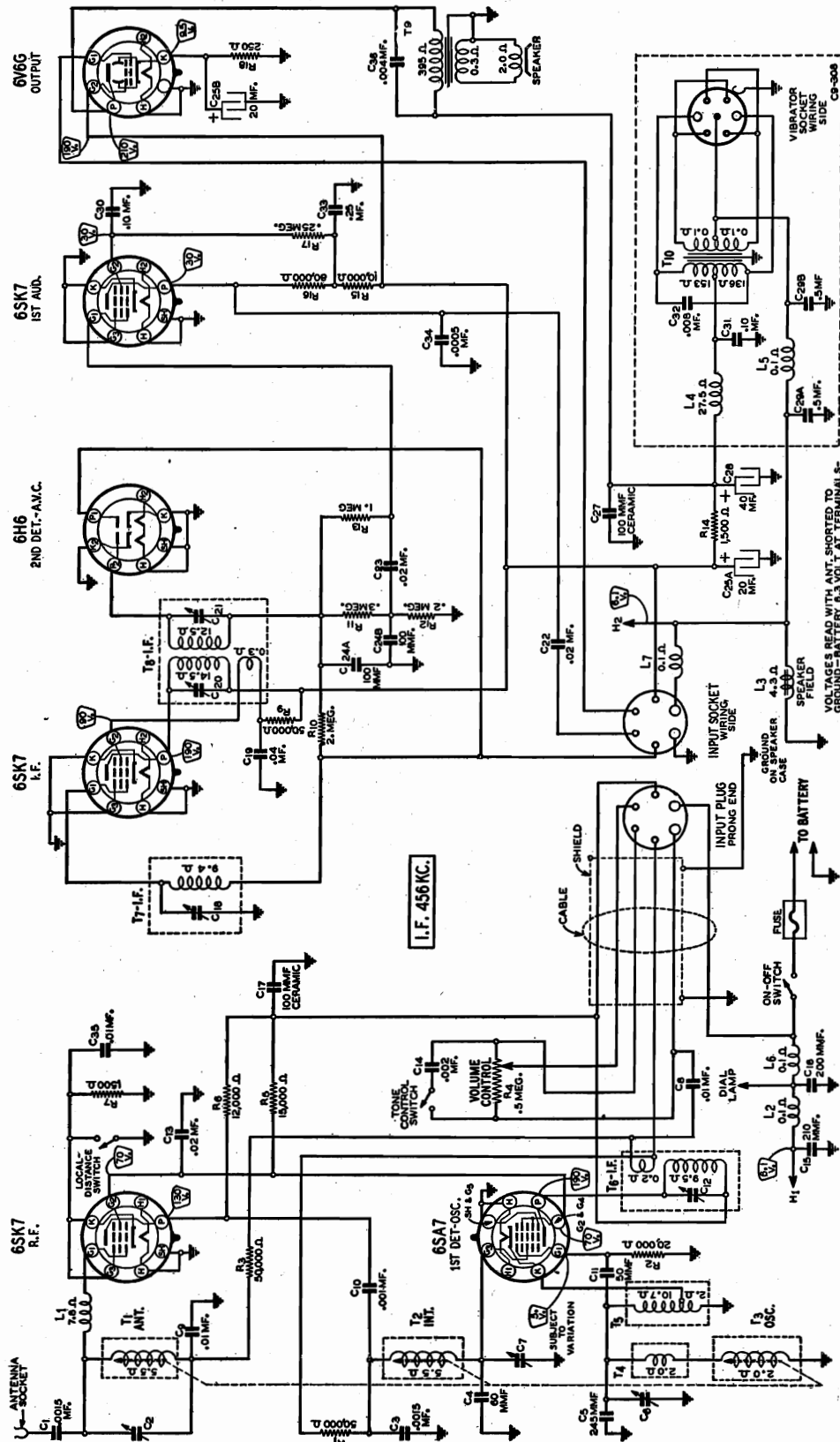
10,000 ft. Battery Cable and Fuse

The battery connection is made at the ammeter. The end of the battery cable with the connecting lug is secured to one of the posts at the back of the ammeter in the instrument panel. The other end of the cable goes with the fuse receptacle connects to the battery cable from the radio after the fuse has been inserted. ^{FUSE}

A 9 ampere automobile fuse is used

WELLS-GARDNER & CO.

MODEL 6C9 Series
Schematic, Voltage
Socket, Trimmers



Power Consumption - 6.8 Amperes at 6.3 Volts
Power Output - - - - 3 Watts Undistorted
Sensitivity - - 1.5 Microvolts at .5 Watt Output
(L-D Switch in Distance Position)
Selectivity - 39 KC Broad at 1000 Times Signal
Tuning Frequency Range - - - 540 to 1560 KC
Intermediate Frequency - - - - 456 KC
Speaker - - - - 6" Electro-Dynamic

Fig. 5—Schematic Circuit Diagram

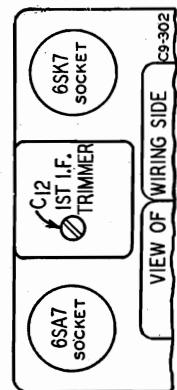


Fig. 6—Location of 1st I.F. Trimmer in Tuning Unit

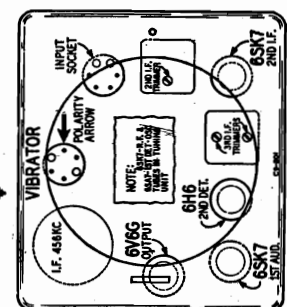


Fig. 7—Tube and Vibrator Location

MODEL 6C9 Series
Alignment, Tuner
MODEL 5C10 Series
Tuner Data

WELLS-GARDNER & CO.

Antenna

A shielded antenna cable with bayonet connector plug is required.

The plug on the antenna cable is inserted in the socket at the bottom of the tuning unit case as shown in Fig. 1. The wire at the other end of the cable is connected to the antenna.

LOW CAPACITY ANTENNA

This radio is designed for a low tuning unit.

The antenna should be mounted on the same side of the car as the tuning unit.

If this radio is to be installed with a high capacity car antenna (200 mmf. total capacity of antenna and shielded cable) an adapter must be used. The adapter is inserted in the socket at the bottom of the tuning unit case. Then the antenna plug is inserted in the adapter.

Types of Low Capacity Antennas—Door hinge; fishpole; over-the-roof types which are mounted quite a distance from the metal-roof of the car.

When the antenna cable is connected to an antenna lead coming down the pillar post, the shielded cable should be pushed several inches up into the pillar post.

In the case of a running board antenna, the antenna lead

For the door hinge and over-the-roof type antennas, the antenna lead must be shielded the entire distance from the radio to the point where the lead goes through the car body to the pillar post, the shielded cable should be pushed several inches up into the pillar post.

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Procedure for Setting the Station Buttons

There are 5 buttons on the automatic tuning dial by means of which 5 stations may be set.

Any button may be used for any station you can receive. Make a list of your favorite stations, those which you tune in regularly.

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.

Depress the manual tuning button and keep it depressed during the entire setting operation as described below. See Fig. 1 for location of buttons. Turn the manual tuning knob so that the indicator moves toward the 1500 KC end of the dial until the stop is reached.

UNLOCK THE TUNING MECHANISM by inserting a screwdriver, as shown in Fig. 1, in the locking screw opening at the bottom of the tuning unit. Loosen the locking screw by turning it counter-clockwise as far as it will go.

TO SET STATIONS ACCURATELY, DO NOT JAR THE RADIO OR BUTTONS WHILE THE MECHANISM IS UNLOCKED. KEEP THE MANUAL TUNING BUTTON DEPRESSED WITH ONE HAND and, with the other hand, push the OFF button to be pushed station button which is depressed. Should the OFF button be pushed all the way in to the depressed position, no harm will be done except that the dial will not be illuminated.

Turn the manual tuning knob so that the indicator moves toward the first station from the list you have made and tune in this station.

Remove grille and speaker from speaker unit.

Remove the chassis from tuning unit case in accordance with the article under "General Installation Items" in this manual.

Set the signal generator for 450 KC and connect the output of the signal generator through a .05 mfd. condenser to the control grid of the 6SA7 1st detector tube (prong No. 8). Connect the ground lead of the signal generator to the tuning unit chassis. Set the volume control at maximum and the Local-Distance switch to the distance position. Attenuate the signal from the signal generator to prevent the leveling off action of the AVC.

Then adjust the 4 IF trimmers until maximum output is obtained. Three of the trimmers are in the speaker unit—See Fig. 2. One trimmer is at the top of the tuning unit output—See Fig. 6.

—See Fig. 6.

Alignment Procedure

Reassemble the radio and install it in the automobile. Insert the car antenna cable. Tune in a weak signal near 1000 KC and readjust the antenna trimmer C2 for maximum output.

Calibration—If it is necessary to calibrate the radio, remove the chassis from the tuning unit case—See article on that subject in this manual. Accurately tune in a signal of known frequency near 1000 KC. Loosen the set screw of the large gear that drives the dial drum. Turn the dial drum until the indicator line is at the frequency of the station tuned in. Tighten the set screw and reassemble.

Adjusting Antenna Trimmer

After the antenna is connected, tune in a weak signal at approximately 1000 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna trimmer (C2) up or down until maximum output is obtained. See Fig. 1 for location of this trimmer.

Fig. 1 for location of this trimmer.

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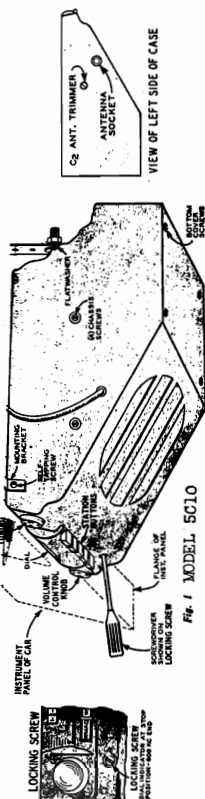
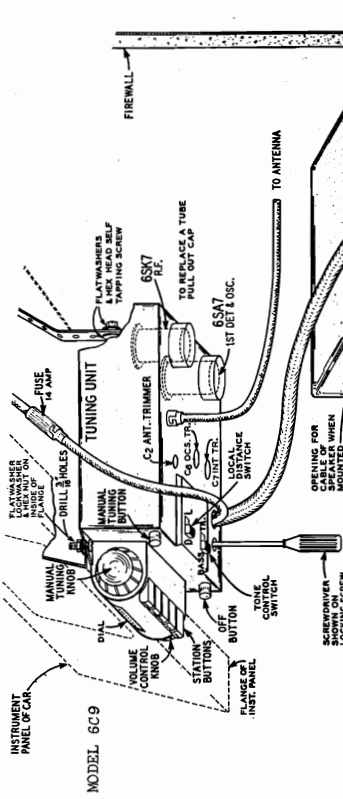


Fig. 1 MODEL 5C10



MODEL 6C9

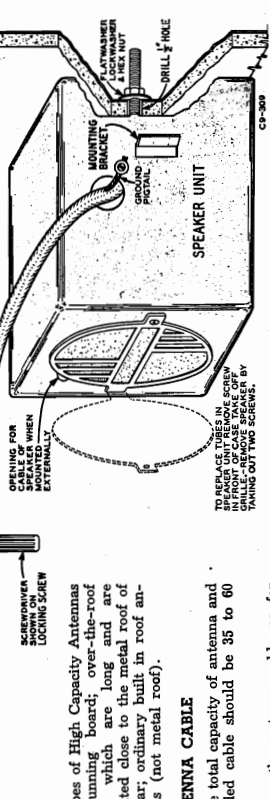


Fig. 1—Details of Mounting Tuning and Speaker Units

For the door hinge and over-the-roof type antennas, the antenna lead must be shielded the entire distance from the radio to the point where the lead goes through the car body to the pillar post, the shielded cable should be pushed several inches up into the pillar post.

When the antenna cable is connected to an antenna lead coming down the pillar post, the shielded cable should be pushed several inches up into the pillar post.

In the case of a running board antenna, the antenna lead

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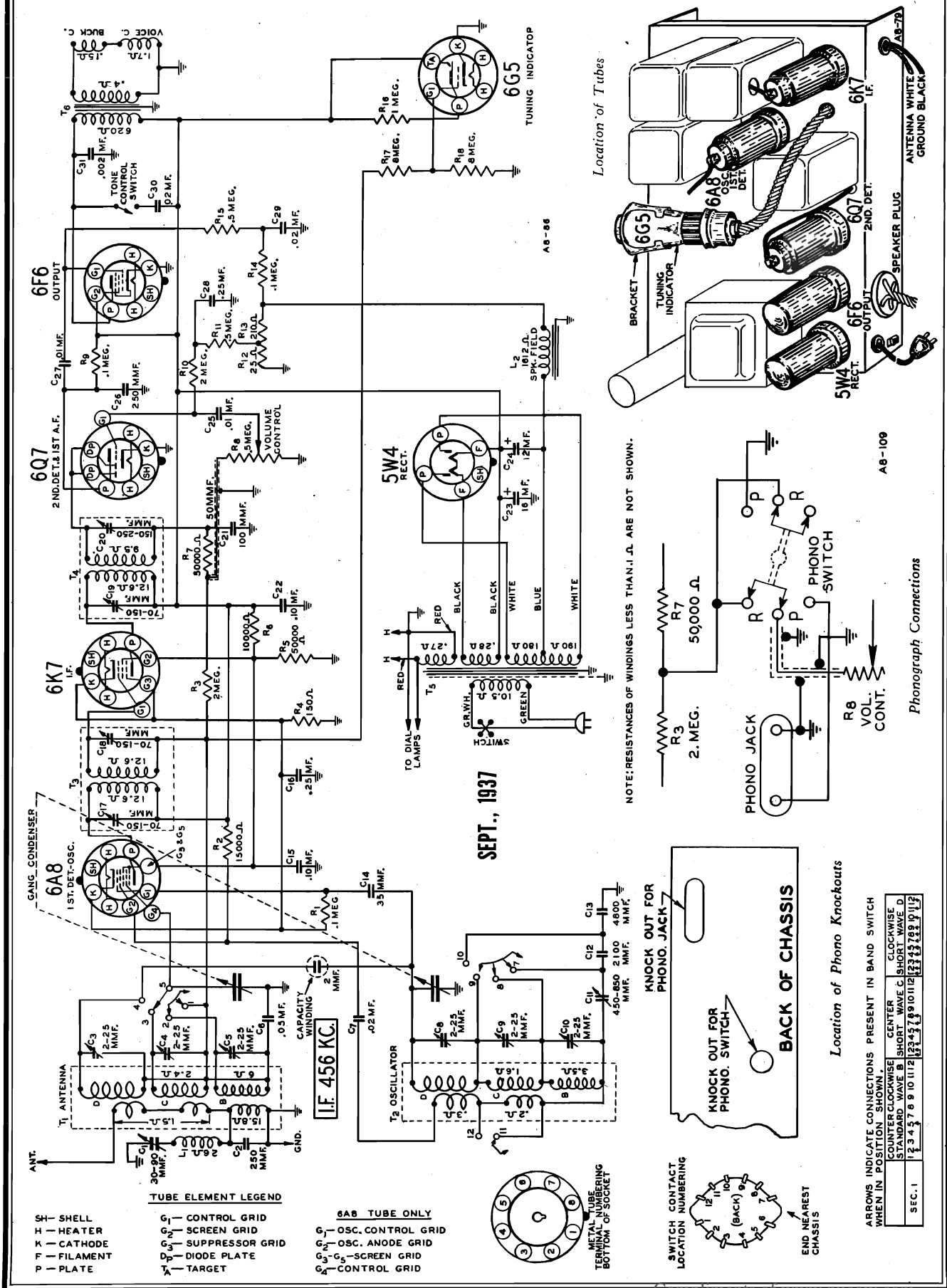
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In the case of a running board antenna, the antenna lead



MODEL A8 Series
Alignment, Trimmers
Voltage, Parts

WELLS-GARDNER & CO.

VOLTAGES AT SOCKETS									
Line Voltage: 115			Volume Control: Maximum				Antenna Shorted to Ground		
TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6A8	1st Def.-Osc.	0	6.3(1)	200	110		160	6.3(1)	3
6K7	I.F.	0	6.3(1)	200	110	3		6.3(1)	3
6Q7	2nd Def.	0	6.3(1)	110	0	0		6.3(1)	0(2)
6F6	Output	0	6.3(1)	185	200	12.5(3)		6.3(1)	0
5W4	Rectifier	0	5.1(4)		620(5)		620(5)		5.1(4)
6G5	Tuning Indicator ...	Plate to Ground 18		Target to Ground 200.		Cathode to Ground 0		Across Heater 6.3 A.C.	

- (1) A.C. voltage as read across heater terminals 2 and 7.
(2) Bias (1.5 volts) as read across resistor R12.
(3) Read across resistor R12 and R13.
(4) A.C. voltage as read across heater terminals 2 and 8.
(5) A.C. voltage read across terminals 4 and 6.

6 Tube - 3 Band - All-Wave Radio

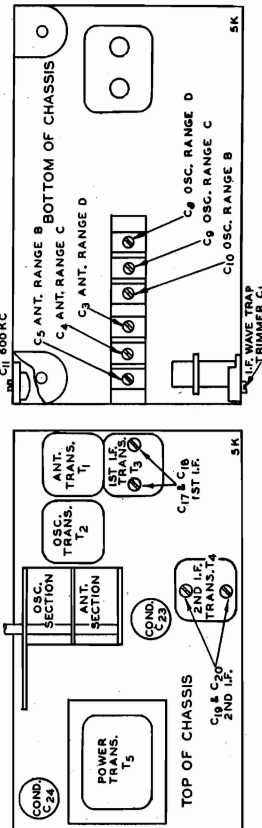
ALIGNMENT PROCEDURE

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 mf., 200 mmf., and 400 ohms.

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.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	INITIAL STEPS	PROCEDURE	ADJUSTMENT
I. F.								
2nd I.F. Adj.	Range B	.1 mf.	455 KC	Grid of I.F. Tube	2nd I.F. (C19) & (C20)	Turn Rotor to Full Open	Adjust to Maximum Output	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	455 KC	Grid of 1st Tube	1st I.F. (C17) & (C18)	Turn Rotor to Full Open	Adjust to Maximum Output	Adjust to Maximum Output
I.F. Wave Trap	Range B	200 mmf.	455 KC	Antenna Lead	I.F. Wave Trap (C1)	Turn Rotor to Full Open	Adjust to Minimum Output	Adjust to Minimum Output
RANGE D								
18,300 KC	Range D	400 Ohm	18,300 KC	Antenna Lead	Oscillator Range D (C8)	Turn Rotor to Full Open	Adjust to Maximum Output	Adjust to Maximum Output
15,000 KC	Range D	400 Ohm	15,000 KC	Antenna Lead	Antenna Range D (C3)	Turn Rotor to Max. Output	Adjust to Maximum Output	Adjust to Maximum Output
RANGE C								
5800 KC	Range C	400 Ohm	5800 KC	Antenna Lead	Oscillator Range C (C9)	Turn Rotor to Full Open	Adjust to Maximum Output	Adjust to Maximum Output
5000 KC	Range C	400 Ohm	5000 KC	Antenna Lead	Antenna Range C (C4)	Turn Rotor to Max. Output	Adjust to Maximum Output	Adjust to Maximum Output
RANGE B								
1730 KC	Range B	200 mmf.	1730 KC	Antenna Lead	Oscillator Range B (C10)	Turn Rotor to Full Open	Adjust to Maximum Output	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	Ant. Range B (C5)	Turn Rotor to Max. Output	Adjust to Maximum Output	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C11)	Turn Rotor to Max. Output	Adjust to Maximum Output	Adjust to Maximum Output



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—Loosen the pointer set screw and set the pointer of the 1500 KC mark on the standard wave generator to the 1500 KC mark on the dial of the radio. Realign the set screw.
NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.
CAUTION—When aligning the short wave bands, be sure NOT to adjust the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The signal which is the image frequency will be heard at 5000 + 917 KC or 5917 KC. If the signal is heard at 5917 KC, it is necessary to increase the input signal to hear the image.

CONDENSERS

Part No.	Code	Capacitance	Voltage	List Price
46X80	C4	.05 mf.	180	\$0.15
46X202	C1	.02 mf.	340	.15
46X98	C9	.10 mf.	180	.20
46X117	C14	.25 mf.	180	.25
46X105	C22	.10 mf.	340	.20
46X120	C27	.01 mf.	340	.15
46X117	C28	.25 mf.	180	.25
46X172	C29	.02 mf.	180	.15
46X205	C30	.02 mf.	480	.15
46X100	C31	.002 mf.	400	.15

MOLDED

47X49	C2	250 mmf.		.15
47X75	C12	2100 mmf.		.25
47X74	C13	4800 mmf.		.25
47X53	C14	35 mmf.		.10
47X57	C21	180 mmf.		.10
47X45	C24	250 mmf.		.15

ELECTROLYTIC

44X32	C23	16 mf. 250 Wet		.75
44X31	C24	12 mf. 340 Wet		.80

TRIMMERS

17A44	C1	30-90 mmf. Wave Trap Trimmer		.25
	C2	2-25 mmf. Range "D" Antenna Trimmer		
	C3	2-25 mmf. Range "C" Antenna Trimmer		
17A59	C8	2-25 mmf. Range "D" Antenna Trimmer		.40
	C9	2-25 mmf. Range "C" Antenna Trimmer		
	C10	2-25 mmf. Range "D" Oscillator Trimmer		
	C11	2-25 mmf. Range "C" Oscillator Trimmer		
17A40	C12	450-850 mmf. 600 KC Trimmer		.45
17A33	C18	70-150 mmf. 1st I.F. Trimmers		.40
17A34	C19	70-150 mmf. 2nd I.F. Trimmers		.40
	C20	150-250 mmf.		

MISCELLANEOUS

14A41		2 Gang Condenser less Dial and Drive Assembly		2.90
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RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A94104	R1	100,000 Ohm	0.2	\$0.15
A95153	R2	15,000 Ohm	0.2	.10
A95205	R3	2 Megohm	0.2	.10
A94151	R4	150 Ohm	0.2	.15
B94503	R5	50,000 Ohm	0.5	.15
C94103	R6	10,000 Ohm	1.0	.10
A95033	R7	50,000 Ohm	0.2	.10
A95104	R9	100,000 Ohm	0.2	.10
A95205	R10	2 Megohm	0.2	.10
A95034	R11	500,000 Ohm	0.2	.15
A94104	R14	100,000 Ohm	0.2	.15
A94504	R15	500,000 Ohm	0.2	.15
A95105	R16	1 Megohm	0.2	.10
A95035	R17	8 Megohm	0.2	.10
A95035	R18	8 Megohm	0.2	.10

WIRE WOUND

43X49	R12	25 Ohm	.25	.35
	R13	210 Ohm	2.0 J	

VARIABLE

36X227	R8	0.5 Megohm Volume Control and On-Off Switch		1.00
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PHONO ATTACHMENT PARTS

Part No.	Description	List Price
P-2A31	Phono Switch (Double Pole Double Throw Switch)	.40
P-3A12	Phono Jack	.10
P-10A36	Switch Knob	.20

SPEAKERS

12A257	6" Dynamic Speaker Compl. with Output Transformer (T4)	5.80
12A246	8" Dynamic Speaker Compl. with Output Transformer (T4)	6.35
12A258	10" Dynamic Speaker Compl. with Output Transformer (T4)	6.85

KNOBES

Specify Name of Knob and Model of Radio		
Tuning Control — Set Screw Type		.15
Volume Control — Push-On Type		.20
Band Switch — Push-On Type		.20

GENERAL

2X38	Felt Washer (Used behind knobs)	doz.	.10
8X23	Rubber Chassis Mounting Cushion	doz.	.10
2A47	Band Change Switch		.85
2A41	On Control Switch		.10
30X44	Grid Clip Only	doz.	.10
4A50	Terminal Strip (2 lugs insulated with mounting hole in center)		.10
4A49	Terminal Strip—Single Lug Insulated (With Mounting Hole at One End)		.10
26X378	Clamp Bracket for Tuning Eye Tube		.10
13X80	Line Cord and Plug		.50
13X214	Antenna and Ground Lead Assembly		.50
25X122	Chassis Mounting Feet	ea.	.10
23A61	Gang Condenser Mounting Cushion Assembly		.15
	Includes 3—Rubber Cushions		
	3—Hex Shoulder Nuts		
	3—No. 6 Flat Washers		

DIAL AND DRIVE ASSEMBLY

Part No.	Description	List Price
11A132	Dial Assembly complete with Gang Condenser, less Dial Lamp and Dial Lamp Sockets	4.60
15A120	Dial Scale and Bracket Assembly	.85
25X422	Bracket only for Dial Scale	.30
58X243	Celluloid Dial Scale only	.50
15X117	Pointer	.15
	Dial Lamp—No. 51 Mazda	.20
7A40	Dial Lamp Socket	.10
4X219	Dial Crystal and Escutcheon Assembly	1.50
25X428	Dial Support Bracket ("L" Shaped)	.10
25X427	Bracket and Bushing for Drive Shaft	.30
14A95	Drive Shaft only	.50
19X21	Horseshoe Washers for above Shaft	Doz. .10
24X317	Drive Drum and Pointer Shaft	.50
31X21	20" Drive Cord for Tuning Condenser	.45
28X27	Tension Spring for Drive Cord	.20

TRANSFORMERS AND COILS

Part No.	Description	List Price
9A492	T1 Antenna Transformer and Can Assembly	\$2.20
9A493	T2 Oscillator Coil and Can Assembly	1.30
9A494	T3 1st I.F. Transformer and Can Assembly	1.30
9A495	T4 2nd I.F. Transformer and Can Assembly	1.45
53X134	T5 115 Volt, 40 Cycle Power Transformer	3.70
53X136	T6 115-230 Volt, 40 Cycle Power Transformer	4.70
53X131	L1 Output Transformer (Part of Speaker Assembly)	2.45
9A714	L1 Wave Trap (455 KC)	.45

MISCELLANEOUS SOCKETS

Part No.	Description	List Price
3A258	Tube Socket—Octal (7 prong)	.15
3A259	Tube Socket—Octal (5 prong)	.10
3A340	Tube Socket—Octal (8 prong)	.10
3A358	Speaker Socket, 5 Prong	.10
13X255	6G5 Tube Socket and Cable Assembly	.45

Series A8 — Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

WELLS-GARDNER & CO.

MODEL A10 Series Schematic

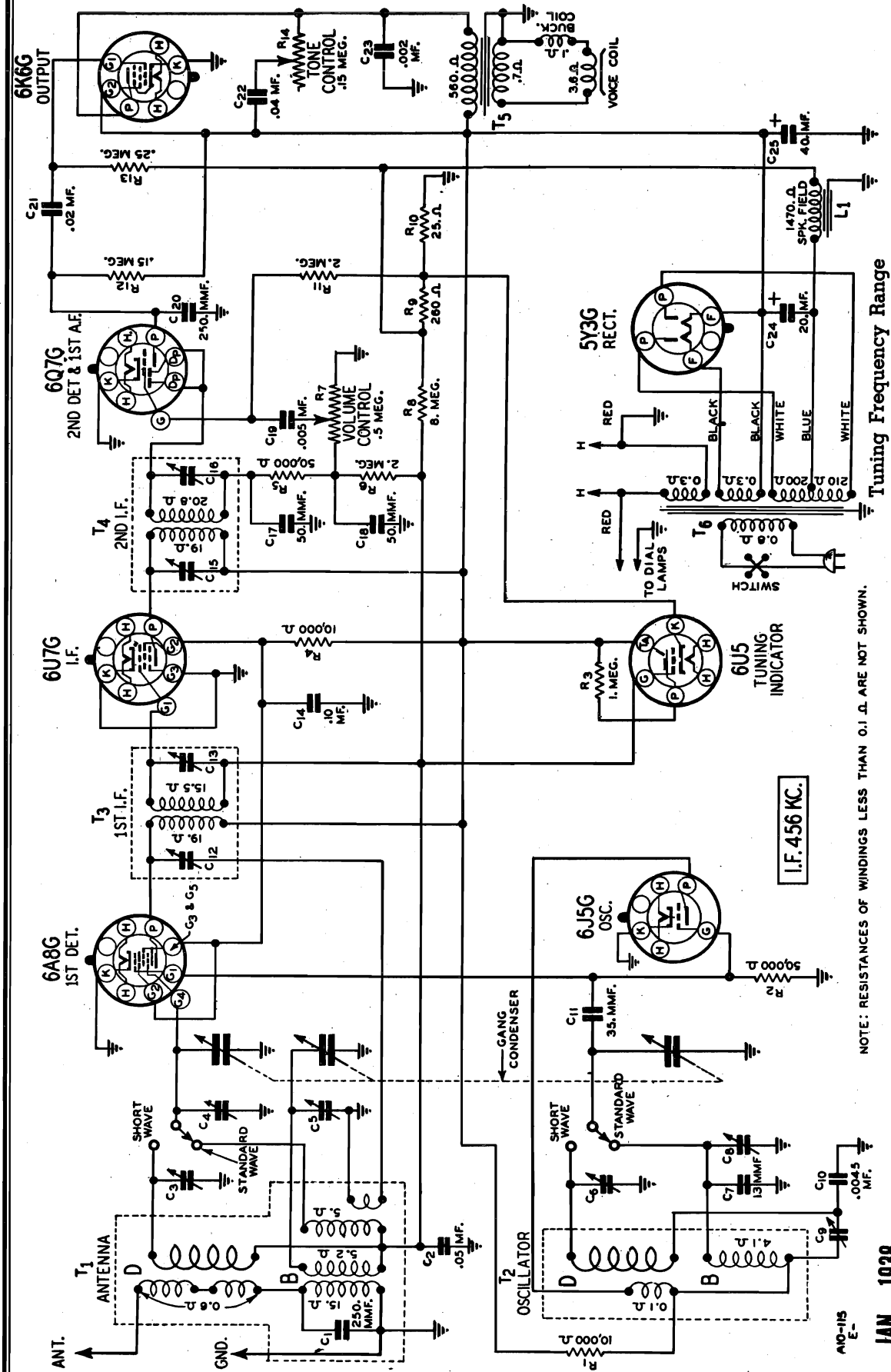


Fig. 1—Schematic Circuit Diagram

NOTE: RESISTANCES OF WINDINGS LESS THAN 0.1 Ω ARE NOT SHOWN.

JAN., 1938

Power Consumption - 50 Watts(At 117 volts 60 cycles)

Power Output	- - - - -	1.0 Watts Undistorted
		2.0 Watts Maximum

Selectivity - - 38 KC Broad at 1000 times Signal

Tuning Frequency Range

B Range..... 528 to 1730 KC (Kilocycles)

D Range 5750 to 18300 KC (Kilocycles)

Sensitivity

Speaker - - - 6" or 8" Dynamic

B Range.....15 Microvolts Average

D Range.....20 Microvolts Average

MODEL A10 Series Alignment, Trimmers Voltage, Socket Tuner, Drive Cord Data

WELLS-GARDNER & CO.

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., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR		TRIMMERS ADJUSTED See Illustration	PROCEDURE	
			FREQUENCY SETTING	CONNECTION AT RADIO		INITIAL STEPS	ADJUSTMENT
I.F.							
456 KC	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C12) & (C13) 2nd I.F. (C15) & (C16)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B							
1730 KC	Range B	200 mmf.	1730 KC	Antenna Lead	Oscillator Range B (C8)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	1st Ant. Range B (C5) 2nd Ant. Range B (C4)	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Adjust to Maximum Output
400 KC	Range B	200 mmf.	400 KC	Antenna Lead	600 KC (C9)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor—See Note B
RANGE D							
18300 KC	Range D	400 Ohm	18300 KC	Antenna Lead	Oscillator Range D (C6)	Turn Rotor to Full Open	Adjust to Maximum Output
15000 KC	Range D	400 Ohm	15000 KC	Antenna Lead	Ant. Range D (C3)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor—See Note B

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.

After alignment of Range D has been completed, do not make any adjustments of the Range B trimmers. If this is done, it will be necessary to realign Range D.

NOTE A—After the 1500 KC adjustment is made, the dial indicator should be at the 1500 KC mark on the dial scale. If it is not, the position of the indicator on the drive cord must be changed. This procedure, however, should not be followed unless it is absolutely necessary as there is danger of breaking the clamp which holds the indicator in place.

If the indicator must be moved, loosen the clamp at the back which holds it in place, move the indicator to the correct position, and bend the clamp back into place again.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

at 15000 on the dial of the radio. The image signal which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

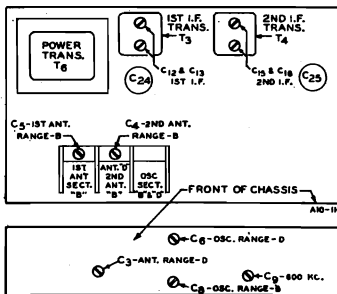


Fig. 2—Location of Trimmers

Replacing Drive Cords

Three drive cords, Nos. 1, 2, and 3, as shown in Fig. 5, are used. To replace any of these cords, proceed as follows:

Cord No. 1

Turn the gang condenser to full open position.

Turn the drive shaft so that the holes for the cord are vertical. The positions of the drive shaft and drive drum are shown in Fig. 5.

Tie a double knot in one end of the cord. From the bottom of hole (A) in the drive shaft, thread the other end of the cord through the hole.

Slide a 1/2 inch length of fabric tubing on the cord, placing it near the free end. Fasten the shorter of the two springs used to the free end of the cord, making the distance between the two knots 22 3/4 inches.

Starting at the point where the cord leaves hole (A), wind it around the shaft 3/4 of a turn as shown in Fig. 5. Bring the end up to the wide groove (B) in the drive drum and wind on 2 1/4 turns, progressing toward the edge of the groove. Pass the cord through the slot at (C), placing the fabric tube (F) in position to protect the cord from being cut, and hook the spring to the pin at (D).

Cord No. 2

The gang condenser and tuning shaft should be in the same position as explained for Cord No. 1.

Tie a double knot in one end of the cord. From the top of hole (E) in the drive shaft, thread the other end of the cord through the hole.

Slide a 1/2 inch length of fabric tubing on the cord, placing it near the free end. Tie a slip knot with a small loop in the free end of the cord so that the length of the cord is 12 inches between the knots.

Starting at the point where the cord leaves hole (E), wind it around the shaft 3/4 turns as shown in Fig. 5. Do not attempt to wind the cord on the drive drum, but put the loop in the slip knot over pin (G). Rotate the drive drum clockwise about 1/2 a turn. This will unwind the cord on the drive shaft at (E).

Pass the cord through the slot at (C), placing the fabric tube (F) in position to protect the cord from being cut. While holding the cord on the wide flange, rotate the drive drum counterclockwise. The cord will be pulled into position in the groove.

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum.
Readings taken with a 1000 Ohm-per-volt meter.

Antenna Shorted to Ground.
Position of Band Switch: Standard Wave.

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6A8G	1st Det.	0	Δ(1)	165	90	Δ.5	90	Δ(1)	0
ΔJ5G	Osc.	0	Δ(1)	125		Δ.5		Δ(1)	0
6U7G	I.F.	0	Δ(1)	165	90	0		Δ(1)	0
6Q7G	2nd Det. & 1st. Audio	0	Δ(1)	80				Δ(1)	(02)
ΔK6G	Output	0	Δ(1)	155	165	12.5(3)		Δ(1)	0
5Y3G	Rectifier	0	4.7(4)		480(5)		480(5)		4.7(4)
6U5	Tuning Indicator	Plate to Ground 35	Target to Ground 165			Cathode to Ground 1		Across Heater Δ.1 A.C.	

- (1) A.C. voltage read across heater terminals 2 and 7.
- (2) Bias (1.2 volts) as read across R10.
- (3) Bias voltage as read across R9 and R10.

- (4) A.C. voltage as read across filament terminals 2 and 8.
- (5) A.C. voltage as read across terminals 4 and 6.

Cord No. 3

The gang condenser and drive drum should be in the same position as explained for Cord No. 1.

Tie one end of the cord on hook (H).

Slide a 1/2 inch length of fabric tubing over the cord. Place this tubing approximately 13 1/2 inches from the end of the cord to be attached to the spring.

Tie the other end of the cord to the longer of the two springs used. The length of the cord between the knots should be 34 3/4 inches.

Pass the cord through slot (J) in groove (P) of the drive drum. Bring the cord up to pulley (K), around the other pulleys as shown in Fig. 5, and down to groove (P). After passing the cord around the drive drum 1/2 turn in groove (P), fasten the spring to hook (Q).

Attaching Dial Pointer—Tune in a station of known frequency. Move the pointer to this frequency on the dial scale. After the pointer has been moved to the correct position, clamp it tightly over the fabric tubing on the cord—See Fig. 5.

Lever Tuning Assembly Adjustments

Pressure of Spacers on Heart Cams—The heart cams must rotate freely relative to the shaft spacers when the tightening lever is in the "loose" position and must not rotate relative to the shaft spacers when this lever is in the "tight" position.

Pressure of the spacers against the heart cams is determined by the position of nut (R) on the threaded shaft—See Fig. 5. If, after the tightening lever is turned to the "tight" position, the cams can turn relative to the shaft, this nut must be tightened.

Bend back the ears of washer (S)—See Fig. 5, and tighten nut (R) about 1/2 turn. Bend the ears of the washer down again on nut (R). Tighten the tightening lever and see if the cams are sufficiently tight.

In general, nut (R) should be at such a position on the threaded shaft that the stop on the tightening lever moves to about 1/4 inch from the end of the slot in the tightening washers when a reasonable amount of pressure is exerted on this lever.

Connection between Gang Condenser and Cam Shaft—One screw only should be used in the universal joint connection between the condenser shaft and the cam shaft. If 2 screws are used, considerably more pressure must be exerted on the station levers to rotate the cam shaft.

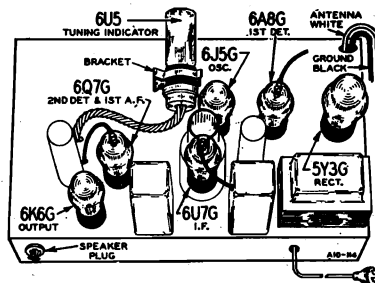


Fig. 4—Location of Tubes

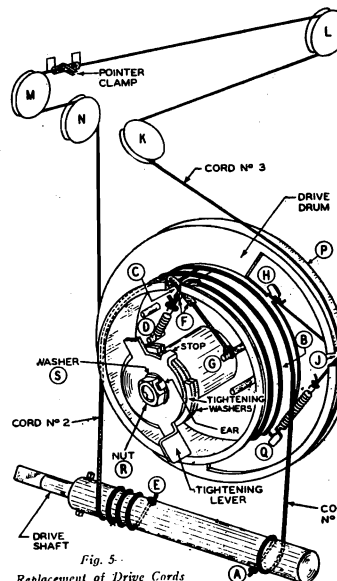
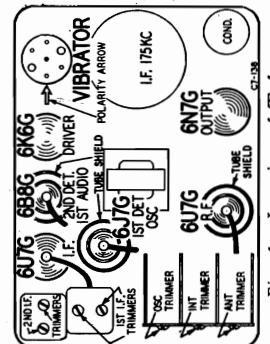


Fig. 5—Replacement of Drive Cords

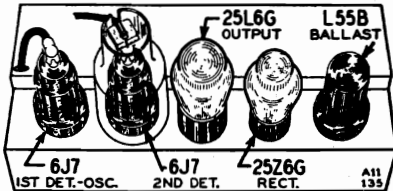
Power Consumption	- 7.6 Amperes at 6.3 Volts	Selectivity	- 38 KC Broad at 1000 Times Signal
Power Output	- - - 6 Watts Undistorted	Tuning Frequency Range	- - 530 to 1581 KC
Sensitivity	- - - 1 Microvolt at 1 Watt Output (L-D Switch in Distance Position)	Intermediate Frequency	- - - 175 KC
		Speaker	- - - 6" Dynamic



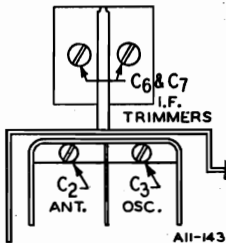
**Fig. 1—Location of Tubes
and Vibrator**

MODEL All Series Schematic, Voltage Alignment, Socket

DC OPERATION—Filament and ballast tube voltages will be the same as AC (for 117 volt line). The plate, screen and bias voltages will be slightly lower than those shown above. When operated on DC, the rectifier tube acts as a low resistance series resistor with a drop of approximately 6 volts between plate and cathode.



CAUTION—In any service work on the AC-DC chassis, keep it on a wood or other insulated surface to avoid contacts with ground.



MAY, 1938

Power Consumption - 48 Watts (At 117 volts AC Supply)
Power Output - .8 Watts Undistorted
Selectivity - 30 KC Broad at 100 times Signal.
Tuning Frequency Range - - - - - 530 to 1730 KC
Sensitivity - - - - - 180 Microvolts Average

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments. Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

SIGNAL GENERATOR	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Illustration)
456 KC Grid of 1st Det.	.1 mf.	Turn rotor to full open	I.F. (C6) & (C7)
1730 KC Antenna Lead	200 mmf.	Turn rotor to full open	Oscillator (C3)
1500 KC Antenna Lead	200 mmf.	Turn rotor to max. output	Antenna (C2)

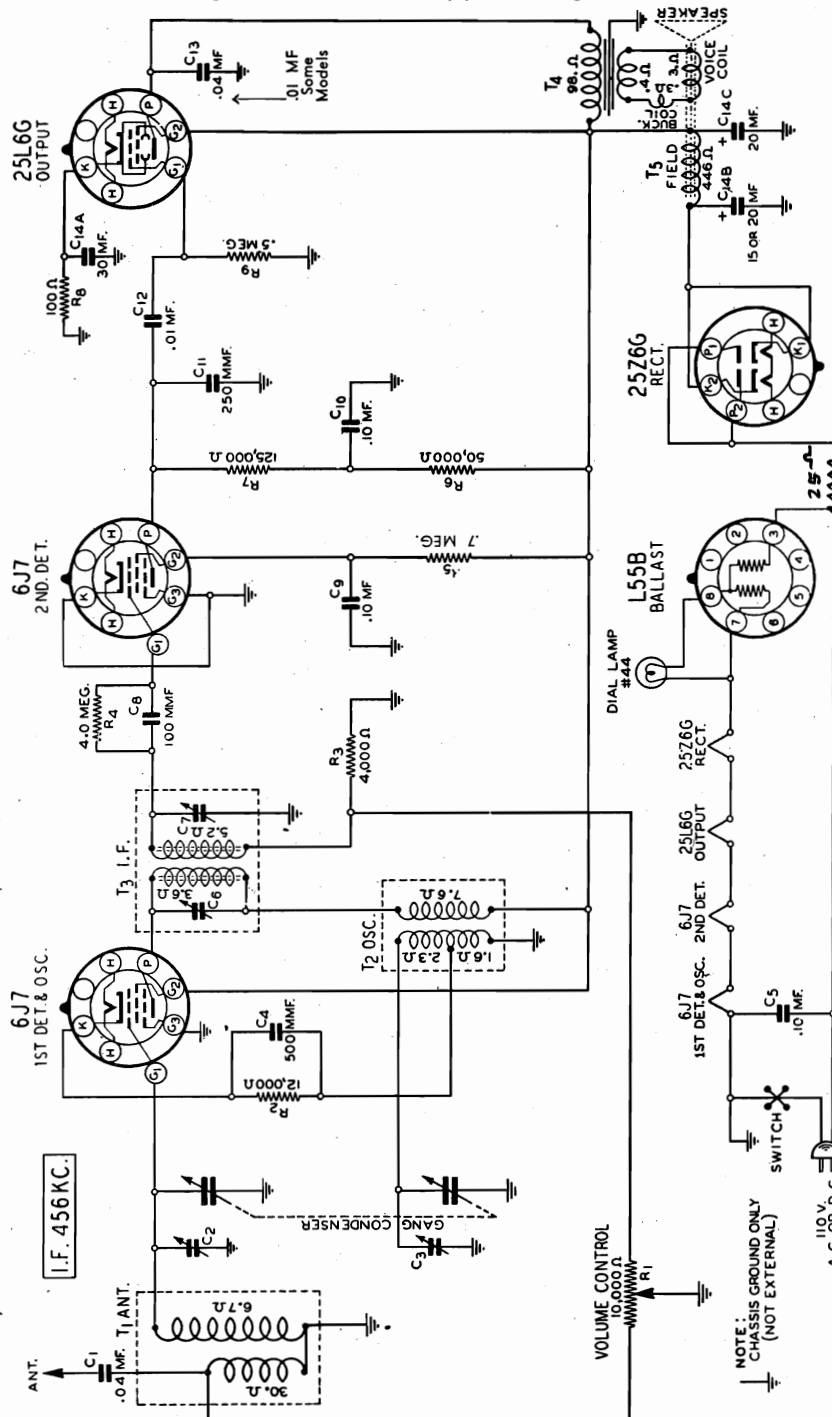
The following equipment is required for aligning:
Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas—.1 mf. and 200 mmf.

NOTE—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, loosen the pointer screw, set the pointer at the 800 KC mark and retighten the pointer screw.

WELLS-GARDNER & CO.

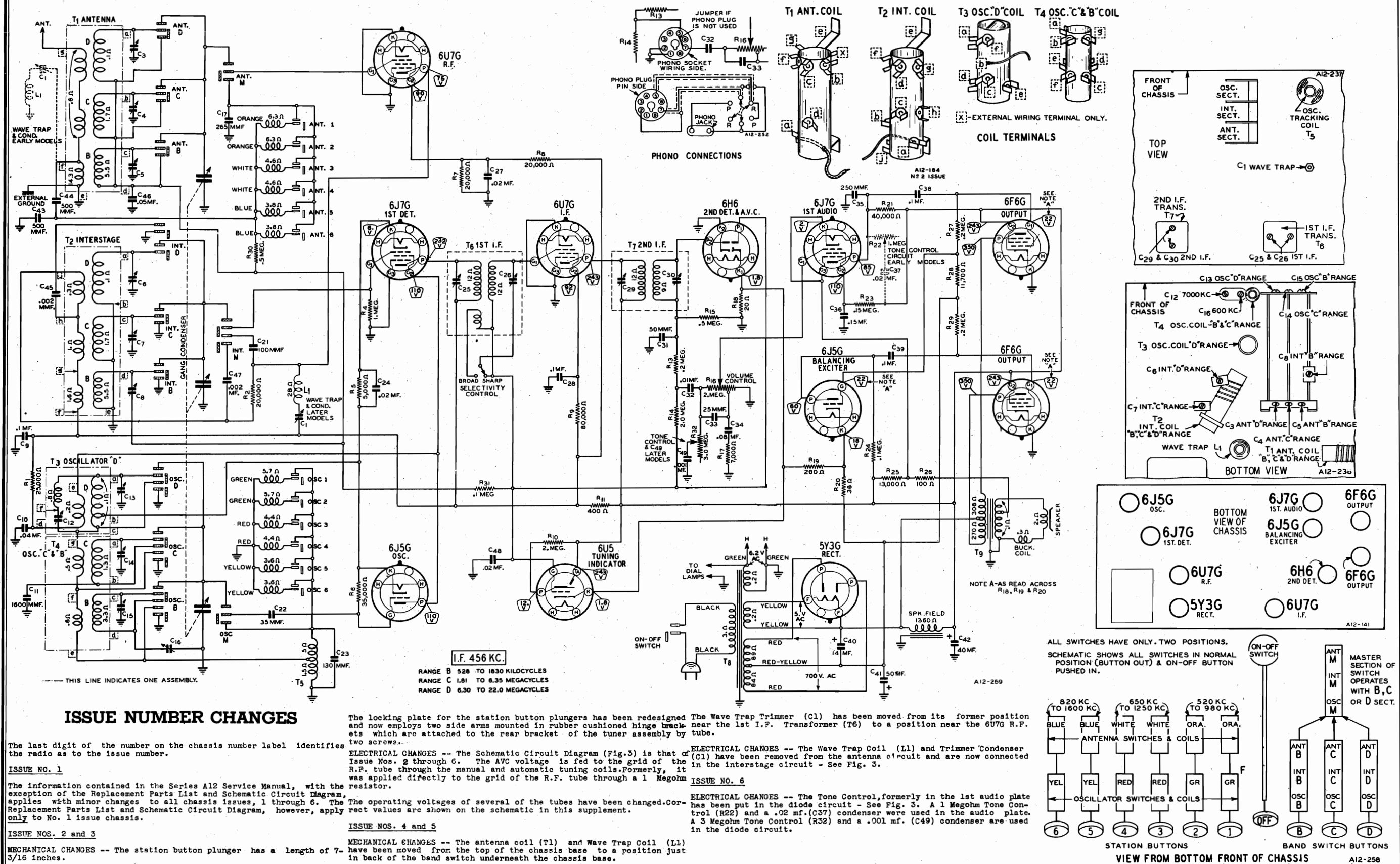
VOLTAGES AT SOCKETS FOR 117 VOLT AC LINE									
See Note Below Regarding Voltages when Operated on DC									
Volume Control Maximum—Antenna Lead Grounded—Readings taken with 1000 Ohm-per-volt Meter.									
		Voltage Between Socket Prong and Ground (Unless Otherwise Indicated)							
TUBE	FUNCTION	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6J7	1st Det. & Osc.....		6.3 ⁽¹⁾	98	98			6.3 ⁽¹⁾	6.0
6J7	2nd Det.....		6.3 ⁽¹⁾	10	13			6.3 ⁽¹⁾	
25L6G	Output.....		24 ⁽¹⁾	92	98			24 ⁽¹⁾	5
25Z6G	Rectifier.....		24 ⁽¹⁾	117 ⁽²⁾	125	117 ⁽²⁾		24 ⁽¹⁾	125
L55B	Ballast.....			56.6 ⁽³⁾				56.6 ⁽³⁾	4.5 ⁽⁴⁾

- (1) AC voltage across terminals 2 and 7. (3) AC voltage across terminals 3 and 7.
(2) AC voltage to ground. (4) AC voltage across terminals 7 and 8.



WELLS-GARDNER & CO.

MODEL A12 Series Late
Schematic, Voltage, Socket
Trimmers, Changes
Tuner Switches





B Range (Manual Tuning).....	15 Microvolts	Average
B Range (Automatic Tuning).....	15 Microvolts	Average
D Range	25 Microvolts	Average

B Range (Manual Tuning).....	528 to 1730 KC (Kilocycles)
D Range (Manual Tuning).....	5750 to 18300 KC (Kilocycles)
Buttons 1 and 2 (Automatic Tuning).....	820 to 1600 KC
Buttons 3 and 4 (Automatic Tuning).....	650 to 1250 KC
Buttons 5 and 6 (Automatic Tuning).....	520 to 980 KC

Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—1 mf., 200 mmf., and 400 ohms.

15,000 less 912 KC; or 14,088 KC on the dial.
It may be necessary to increase the input
signal to hear the image.

AUGUST, 1938

A15-176

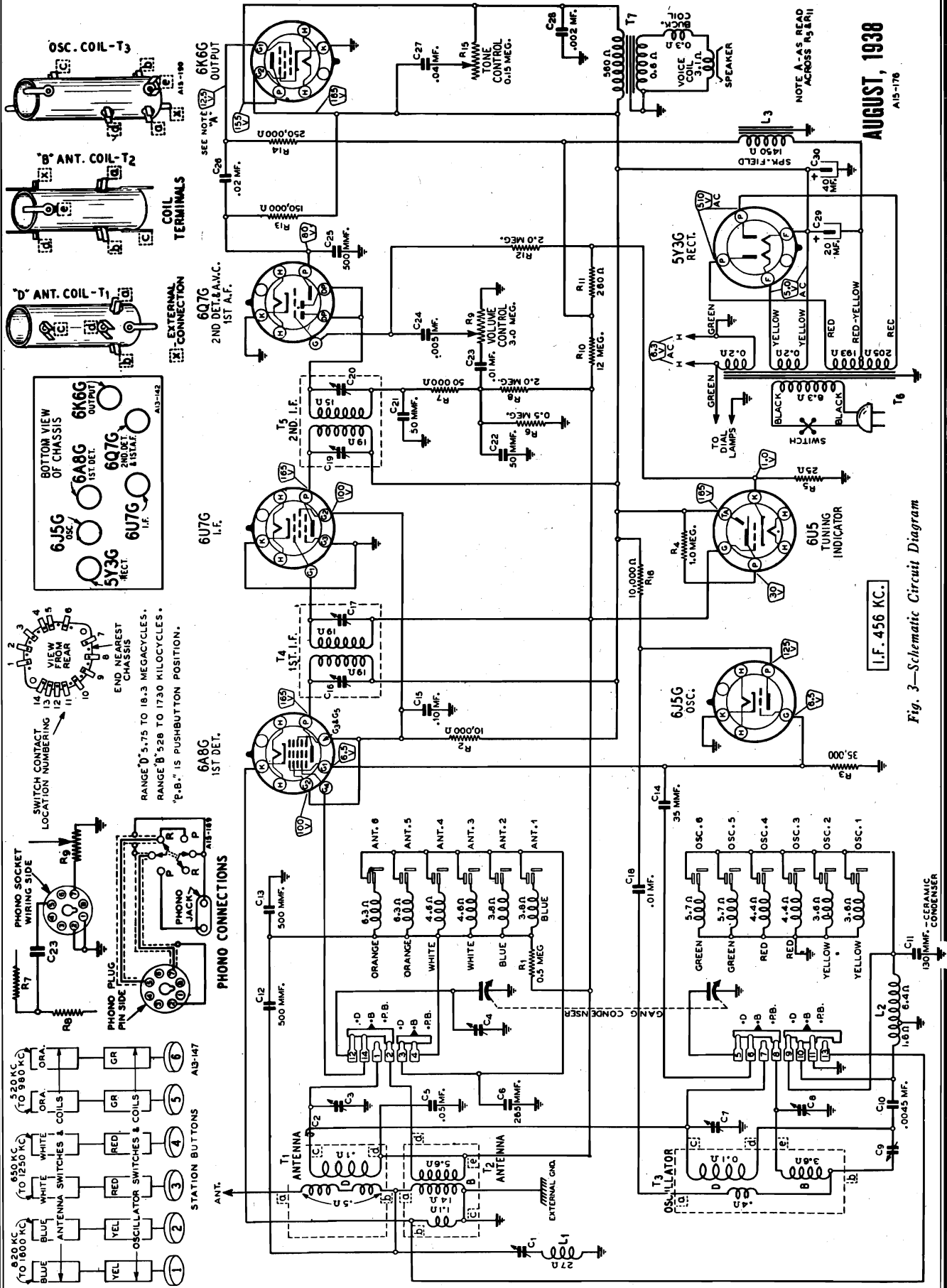


Fig. 3—Schematic Circuit Diagram

MODEL A15 Series
Alignment, Trimmers

WELLS-GARDNER & CO.

Specifications

Power Consumption - 50 Watts (At 117 volts 60 cycles)

Power Output - 1.0 Watts Undistorted
2.0 Watts Maximum

Selectivity - 38 KC Broad at 1000 times Signal

Sensitivity

B Range (Manual Tuning).....15 Microvolts Average

B Range (Automatic Tuning).....15 Microvolts Average

D Range25 Microvolts Average

Intermediate Frequency - 456 KC

Speaker - 6" or 8" Dynamic

Tuning Frequency Range

B Range (Manual Tuning).... 528 to 1730 KC (Kilocycles)

D Range (Manual Tuning)....5750 to 18300 KC (Kilocycles)

Buttons 1 and 2 (Automatic Tuning).....820 to 1600 KC

Buttons 3 and 4 (Automatic Tuning).....650 to 1250 KC

Buttons 5 and 6 (Automatic Tuning).....520 to 980 KC

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., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C16) & (C17) 2nd I.F. (C19) & (C20)
RANGE B					
1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C8)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Ant. Range B (C4)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C9) Rock Rotor—See Note B
WAVE TRAP					
456 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to 600 KC Adjust Sig. Gen.—See Note C	Wave Trap (C1) Adjust for MINIMUM Output
RANGE D					
18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C7)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C3) Rock Rotor—See Note B
PERMEABILITY TUNING UNIT					
			BUTTON DEPRESSED (Band Switch in Push Button Position)	TURN SETTING SCREW TO MAXIMUM OUTPUT —See Instruction Book	ADJUST COIL POSITION TO MAXIMUM OUTPUT —See Note D
1100 KC	Antenna Lead	200 mmf.	No. 1	Setting Screw No. 1	Antenna Coil No. 1
1100 KC	Antenna Lead	200 mmf.	No. 2	Setting Screw No. 2	Antenna Coil No. 2
850 KC	Antenna Lead	200 mmf.	No. 3	Setting Screw No. 3	Antenna Coil No. 3
850 KC	Antenna Lead	200 mmf.	No. 4	Setting Screw No. 4	Antenna Coil No. 4
700 KC	Antenna Lead	200 mmf.	No. 5	Setting Screw No. 5	Antenna Coil No. 5
700 KC	Antenna Lead	200 mmf.	No. 6	Setting Screw No. 6	Antenna Coil No. 6

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 pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Leave condenser rotor at the 600 KC setting and adjust the signal generator until maximum output is obtained at or near 456 KC.

NOTE D—At the top of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for

15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at

15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

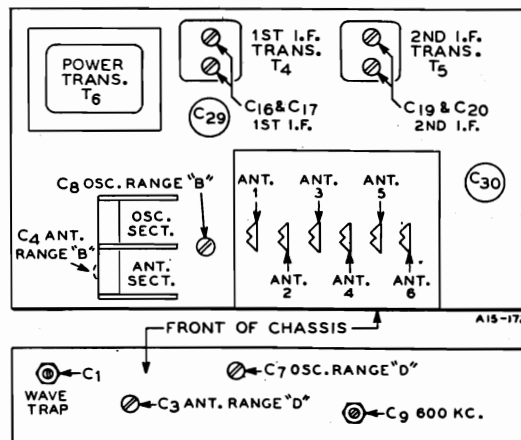


Fig. 2—Location of Trimmers

MODEL A16 Series Schematic, Voltage Socket, Alignment Notes

WELLS-GARDNER & CO.

ALIGNMENT

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—Hold the tuning knob and turn the film drum until it is at the 1500 KC mark on the dial.

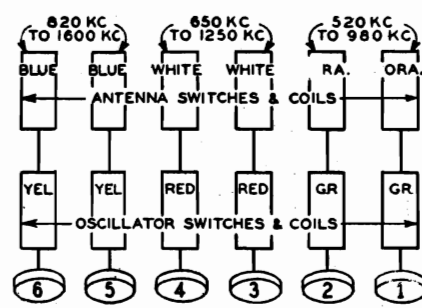
NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—At the bottom of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

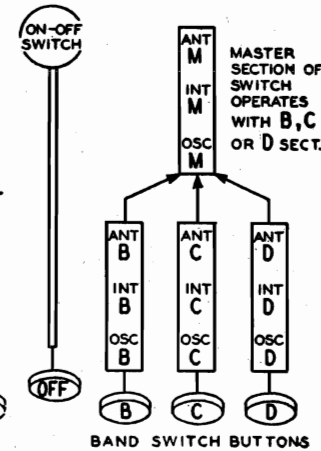
CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows:

ALL SWITCHES HAVE ONLY TWO POSITIONS.

SCHEMATIC SHOWS ALL SWITCHES IN NORMAL POSITION (BUTTON OUT) & ON-OFF BUTTON PUSHED IN.

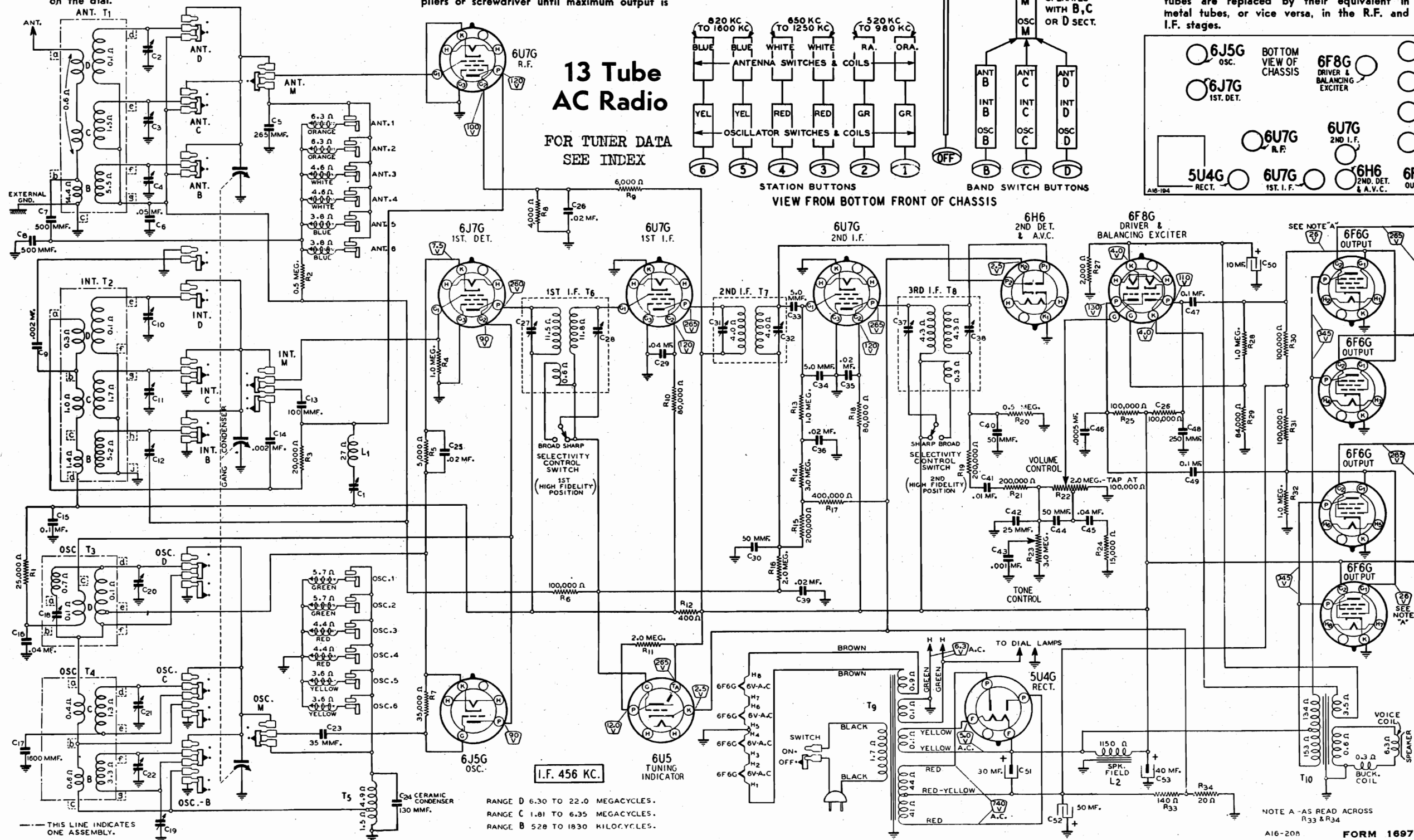
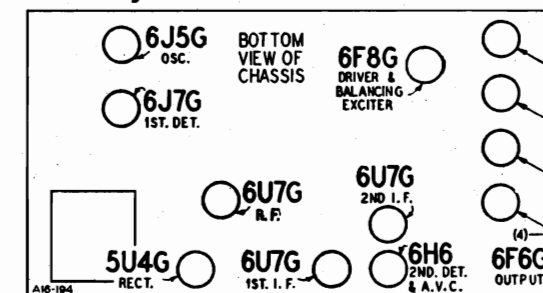


VIEW FROM BOTTOM FRONT OF CHASSIS



Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.



THIS LINE INDICATES ONE ASSEMBLY.

RANGE D 6.30 TO 22.0 MEGACYCLES.
RANGE C 1.81 TO 6.35 MEGACYCLES.
RANGE B 528 TO 1830 KILOCYCLES.

NOTE A—AS READ ACROSS R33 & R34

A16-208 FORM 1697

WELLS-GARDNER & CO.

MODEL A16 Series
Alignment, Trimmers
Phono. Data, Changes
Movie Dial Data

Movie Dial Adjustments and General Service Data

Adjusting Height of Image on Screen
each band will be centered on the screen.
Depress the B band (Broadcast) button. If the image is not centered, turn the nut on the screen, loosen the nut of the image height adjusting screw until the image is centered on the screen.

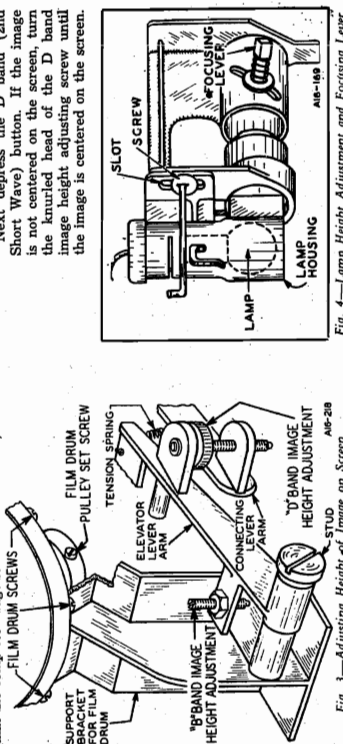


Fig. 3—Adjusting Height of Image on Screen

Calibrating the Radio

To calibrate the radio, tune in a station of known frequency between 800 and 1,000 KC on the Broadcast band.
Hold the tuning knob in position and turn the film drum until it is at the correct kilocycle mark on the dial scale. Care should be taken not to touch the film drum until it is at the correct position. The dial will permit the drum to be rotated a small distance.

If the drum must be rotated an additional amount in order to calibrate, loosen the film drum pulley set screw (Fig. 6) and turn the film drum until it is at the correct position. Then tighten this set screw.
EARLY MODELS—Some of the first production models employed a film drum pulley bushing with a small set screw hole. See Fig. 6. Two types of film drum pulleys were used with this bushing: one employed a 3/16 inch brass set screw, the other a 3/16 inch steel set screw. In calibrating, the latter screw should not be passed through the set screw hole in the bushing, but should be tightened against the outer wall of the bushing. If calibration cannot be made without passing the set screw through the hole, loosen the 6 screws around the edge of the film drum and carefully rotate the film a slight amount

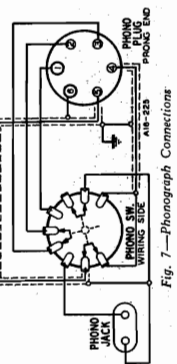


Fig. 7—Phono Connections

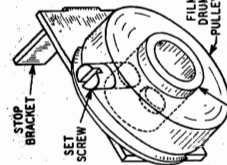


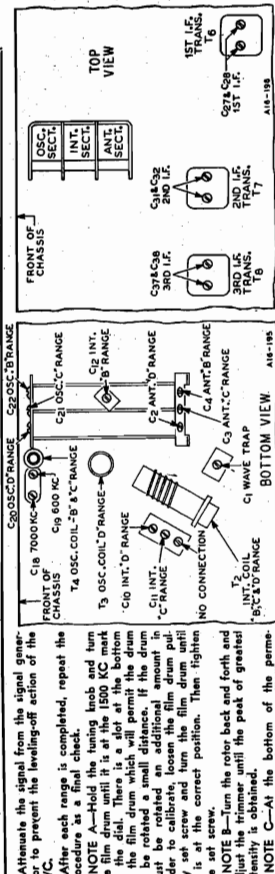
Fig. 6—Film Drum Pulley and Bushing

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position 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.

SIGNAL GENERATOR		DUMMY ANTENNA		BUTTON DEFLECTED		CONDENSER SETTING		ADJUST TRIMMERS TO MAXIMUM	
FREQUENCY	SETTING	CONNECTION	AT RADIO	ANTENNA	DEFLECTED	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM	ADJUST TRIMMERS TO MAXIMUM	ADJUST TRIMMERS TO MAXIMUM
WAVE TRAP									
455 KC	Grid of 2nd I.F. Tube	1 mF.	B Range	Turn Rotor to Full Open	3d I.F. (C37) & (C38)				
455 KC	Grid of 1st I.F. Tube	1 mF.	B Range	Turn Rotor to Full Open	2d I.F. (C31) & (C32)				
455 KC	Grid of 1st Det.	1 mF.	B Range	Turn Rotor to Full Open	1st I.F. (C27) & (C28)				
RANGE B									
455 KC	Antenna Lead	200 mF.	No. 1	Wave Trap (C1)	Adjust for MINIMUM Output				
1830 KC	Antenna Lead	200 mF.	B Range	Turn Rotor to Full Open	Oscillator Range B (C22)				
1500 KC	Antenna Lead	200 mF.	B Range	Turn Rotor to Max. Output	Ant. Range B (C4)				
600 KC	Antenna Lead	200 mF.	B Range	Turn Rotor to Max. Output	400 KC (C19)				
6350 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C21)				
6000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Ant. Range C (C3)				
22,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C20)				
20,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C10)				
7000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	7000 KC (C18)				
PERMEABILITY TUNING UNIT									
700 KC	Antenna Lead	200 mF.	No. 1	Setting Screw No. 1	Antenna Coil No. 1				
700 KC	Antenna Lead	200 mF.	No. 2	Setting Screw No. 2	Antenna Coil No. 2				
850 KC	Antenna Lead	200 mF.	No. 3	Setting Screw No. 3	Antenna Coil No. 3				
850 KC	Antenna Lead	200 mF.	No. 4	Setting Screw No. 4	Antenna Coil No. 4				
1100 KC	Antenna Lead	200 mF.	No. 5	Setting Screw No. 5	Antenna Coil No. 5				
1100 KC	Antenna Lead	200 mF.	No. 6	Setting Screw No. 6	Antenna Coil No. 6				

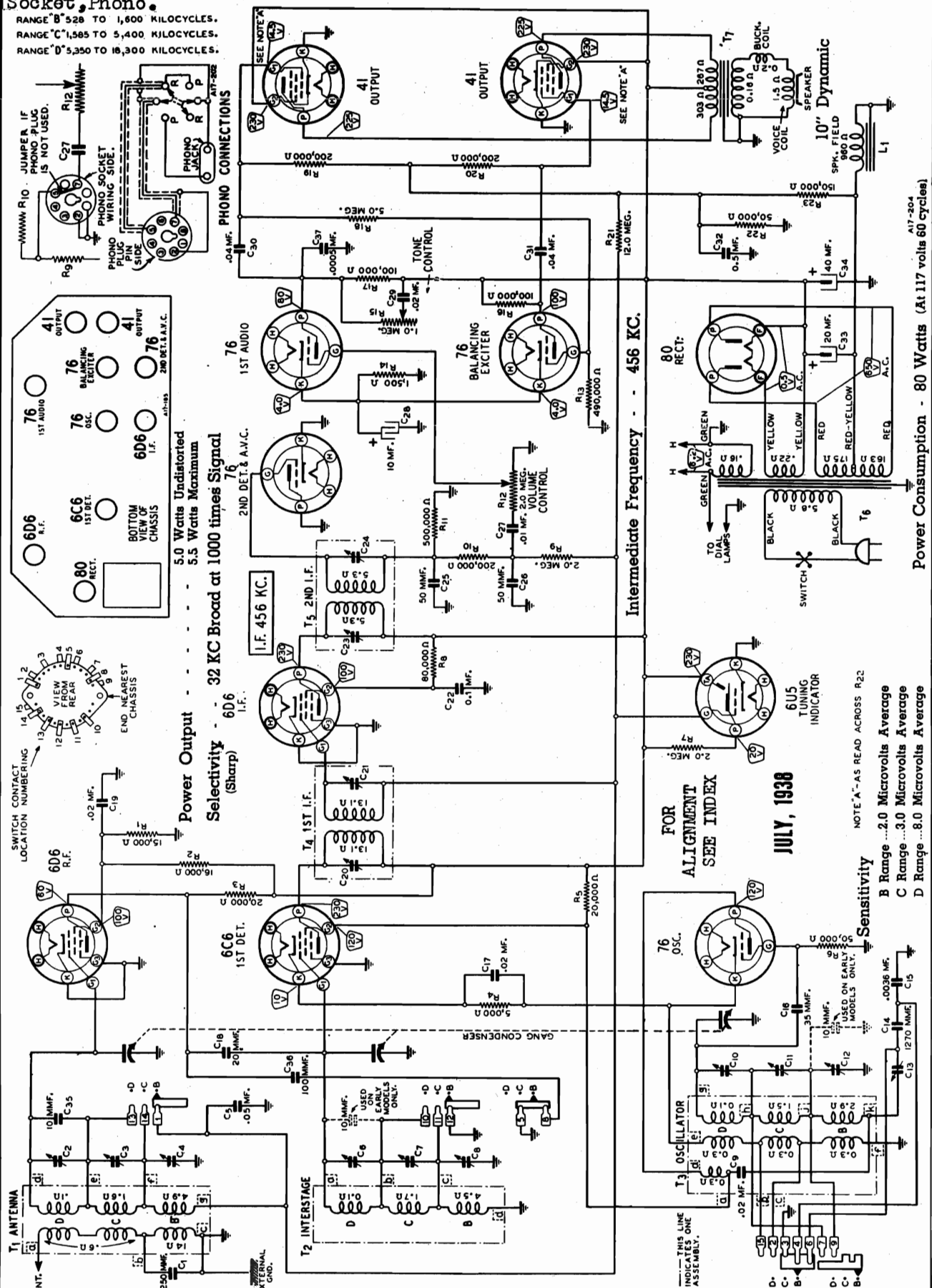


CAUTION—When aligning the short wave bands, be sure NOT to adjust the image frequency. This can be checked as follows: Tune in 5000 KC. The signal will then be heard at 5000 KC.

MODEL A17 Series
Schematic, Voltage
Socket, Phono.

RANGE B 528 TO 1,600 KILOCYCLES.
RANGE C 1,565 TO 5,400 KILOCYCLES.
RANGE D 5,350 TO 18,300 KILOCYCLES.

WELLS-GARDNER & CO.



Power Consumption - 80 Watts (At 117 volts 60 cycles)

MODEL A20 Series

Alignment, Phono. Data

Drive Cord Data, Trimmers

WELLS-GARDNER & CO.

MODELS T2, A12, A13, A15

A22, A23, A24 Series

Tuner Data

SETTING PUSH BUTTONS WG SERIES A15, A22, A23, A24.

Selecting the Stations to be Set

There are 6 buttons on the push button tuning dial by means of which 6 stations may be set for quick tuning. They are numbered 1 to 6 in Fig. 2.

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 highest kilocycle number first, the station with the next lower kilocycle number next, and so on.

Frequencies Covered by Each Button

The frequency range of each station button is shown in Fig. 2. Any station within the range of a button may be set. Although, in some cases, it may be possible to set a certain station on several buttons, it is better to set the stations so that the kilocycle numbers decrease from buttons 1 to 6.

Setting a Station Button

Select a station from the list you have prepared, preferably the station with the highest kilocycle number, and tune in this station with the tuning knob in the usual way. Determine what program is being broadcast.

At each side of the escutcheon plate is an escutcheon screw—See Fig. 2. Remove the escutcheon plate by unscrewing these two screws. Be careful to avoid scratching the plate.

When this is done, the setting screws above the six buttons will be exposed.

Turn the band switch knob to the PUSH BUTTON TUNING position—See Fig. 2. The station tuned in previously will probably disappear.

If the kilocycle number of the station tuned in is within the range of button No. 1, push this button in. The same station or a different station may be heard.

With a small screw driver, slowly turn the setting screw above button No. 1 in or out until the desired station (the one previously tuned in) is heard. Turning the screw in (clock-

wise) will tune in stations with higher kilocycle numbers while turning the screw out (counter-clockwise) will tune in stations with lower kilocycle numbers. Be sure not to tune in some other station broadcasting the same program. Using the tuning eye as a guide, accurately tune in this station. The station is now set on this button.

To determine whether the correct station has been set, turn the band switch knob back to the BROADCAST position. The same station should be heard (provided the tuning knob has not been turned). If it is not, turn the band switch knob to the PUSH BUTTON TUNING position again and retune with the setting screw.

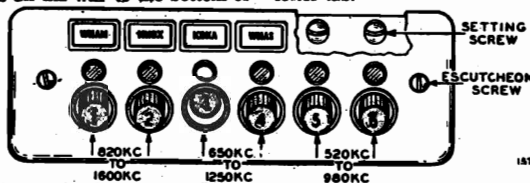
Remove the station call letter tab from the sheets provided and push the tab all the way to the bottom of

the rectangular space above the correct station button opening in the escutcheon plate. Then cover the call letter tab with one of the clear celluloid tabs.

Proceed in the same manner to set stations on any of the remaining buttons. Use blank tabs above buttons on which stations are not set.

After all of the stations have been set, carefully replace the escutcheon plate.

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. The old call letter tab may be removed by sticking a pin through the notch in the celluloid tab and through the call letter tab.



WG SERIES A20 ALIGNMENT, DRIVE CORD DATA, PHONOGRAPH NOTES.

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.

IMPORTANT—Follow procedure in the order shown.

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., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)
I. F. 456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C16) & (C17) 1st I.F. (C14) & (C15)
WAVE TRAP 456 KC	Antenna Lead	200 mmf.	B Range	600 KC	Wave Trap (C5) Adjust for MINIMUM Output
RANGE B 1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C11)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Ant. Range B (C3)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C9) Rock Rotor—See Note B
RANGE D 18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C8)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note B

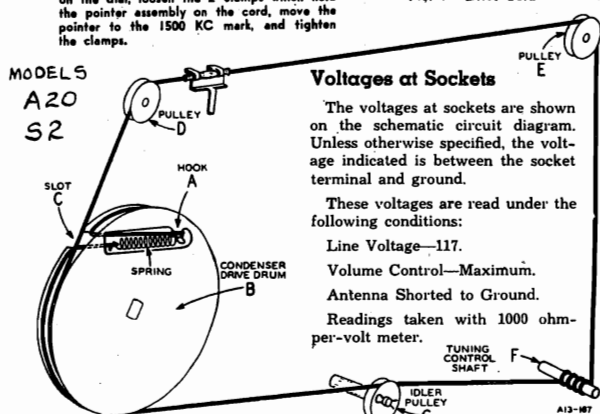
Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

Fig. 4—Drive Cord



Voltages at Sockets

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage 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-volt meter.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

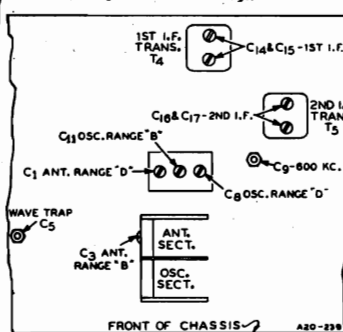


Fig. 2—Location of Trimmers

Drive Cord Replacement

Tie a knot with a small loop at one end of the new drive cord. Slide a 1 1/4-inch length of fabric tubing on the cord. Tie the free end of the drive cord to the tension spring. The distance between knots should be 4 1/2 inches.

Arrange to keep the gang condenser in the completely closed position.

Place the looped end of the drive cord over hook A on condenser drive drum B (See Fig. 4). Pass the cord through slot C in the drum rim and wind one turn in a clockwise direction (from front of chassis) on condenser drive drum. Pass drive cord over pulleys D and E as shown. See that the fabric tubing is now between pulleys D and E. Continue cord down to shaft F and wind 2 1/4 turns clockwise, progressing towards the chassis. Bring cord over pulley G to bottom of condenser drive drum B as shown. Wind drive cord clockwise (from front of chassis) around condenser drive drum B to slot C. See that the drive cord does not cross in groove of condenser drive drum. Pass the remaining drive cord and tension spring through slot C and secure the free end of the spring on hook A.

DIAL POINTER ATTACHMENT

Tune in a station of known frequency. Move the pointer to this frequency on the dial scale. Clamp pointer tightly over the fabric tubing on the cord—See Fig. 4.

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram—Fig. 3. On the back panel of the chassis base is a round knockout 1-9/64 inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic.

A phono cable assembly may then be purchased (See parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

MODEL A22 Series
MODEL A24 Series
Alignment, Trimmers
Drive Data
MODEL A23 Series
Drive Data

WELLS-GARDNER & CO.

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.

IMPORTANT—Follow procedure in the order shown.

SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER OR DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)
I. F. 456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C16) & (C17) 1st I.F. (C14) & (C15)
WAVE TRAP 456 KC	Antenna Lead	200 mmf.	B Range	600 KC	Wave Trap (C5) Adjust for MINIMUM Output
RANGE B				Turn Rotor to Full Closed Position. Pointer should be at low frequency end mark on scale—See Note A.	
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor until dial pointer is at 1500 KC	Oscillator Range B (C11)
1500 KC	Antenna Lead	200 mmf.	B Range	Leave Rotor at above setting	Ant. Range B (C3)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C9) Rock Rotor—See Note B
RANGE D					
18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C8)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note B

NOTE A—The low frequency end mark is a small dot at the left side of the short wave scale under the "5." of the number 5.8 and to the right of the "C" of the letters MC. If the pointer is not at this mark on the dial, move the pointer to this mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

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.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

General Service Data

Drive Cord Replacement

Tie a knot with a small loop at one end of the new drive cord. Tie the other end to the tension spring, leaving a distance of 64½ inches between the knots.

Turn the gang condenser to the full open position. Secure the free end of the spring over hook A—See Fig. 4. Turn the gang condenser to the completely closed position.

Pass the cord through slot B and, guiding the cord in the groove of the drive drum, turn the gang condenser to the full open position. Hook the cord in slot B and turn the gang condenser to the completely closed position. Unhook the cord from slot B and pass over pulleys C, D, and E as shown. Pass the cord in front of idler pulley F. Wind 2½ turns counter-clockwise (from front of chassis)

around the drive shaft spool, progressing away from the chassis. Pass cord up and over the drive drum. Guiding the cord in the groove of the drive drum, turn the gang condenser to the full open position. If necessary, stretch the tension spring and pull the drive cord taut. Pass drive cord through slot B and secure the loop to the tension spring at point G.

EARLY MODELS—In the early models using a larger drive shaft spool (See Fig. 4), there should be a distance of 65½ inches between the knots.

DIAL POINTER ATTACHMENT—Tune in a station of known frequency. Move the pointer to the approximate frequency on the dial scale. Pass the cord through the slotted head—See Fig. 4. Hold the drive cord and slide the pointer to the exact frequency on the dial scale

Rack and Pinion Assembly

If it is ever necessary to re-assemble the automatic tuning unit, proceed as follows: The pinion gear shaft should be held in such a position that the flat portion is vertical or turned slightly counter-clockwise from the vertical as shown in Fig. 5.

The lower rack should be meshed with the pinion gear so that the 8th tooth from the front on each side of the rack is in line with the axis of the pinion gear shaft—See Fig. 5. The upper rack should then be lined up with the lower rack and meshed with the pinion gear. The 8th tooth from the front on each side of the upper rack will then line up with the axis of the pinion gear shaft.

The rear and side brackets can then be mounted on the rack and pinion assembly.

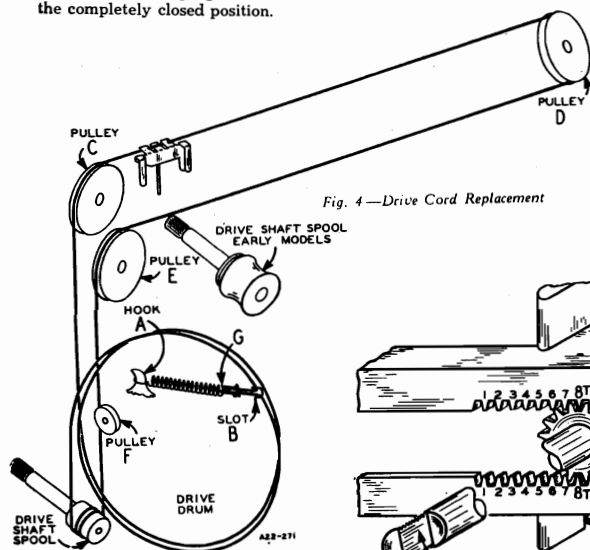


Fig. 4—Drive Cord Replacement

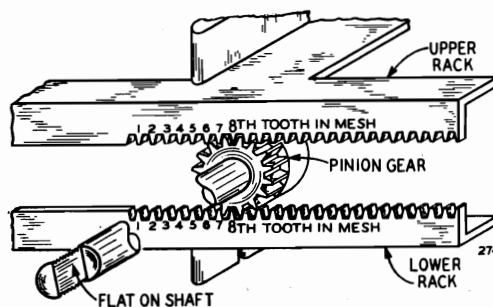


Fig. 5—Rack and Pinion Assembly

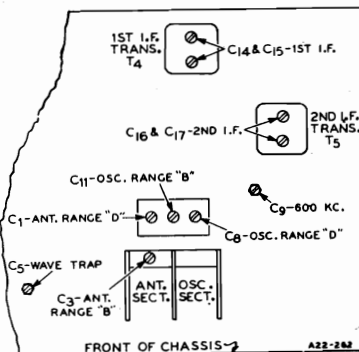


Fig. 2—Location of Trimmers

DEC., 1938

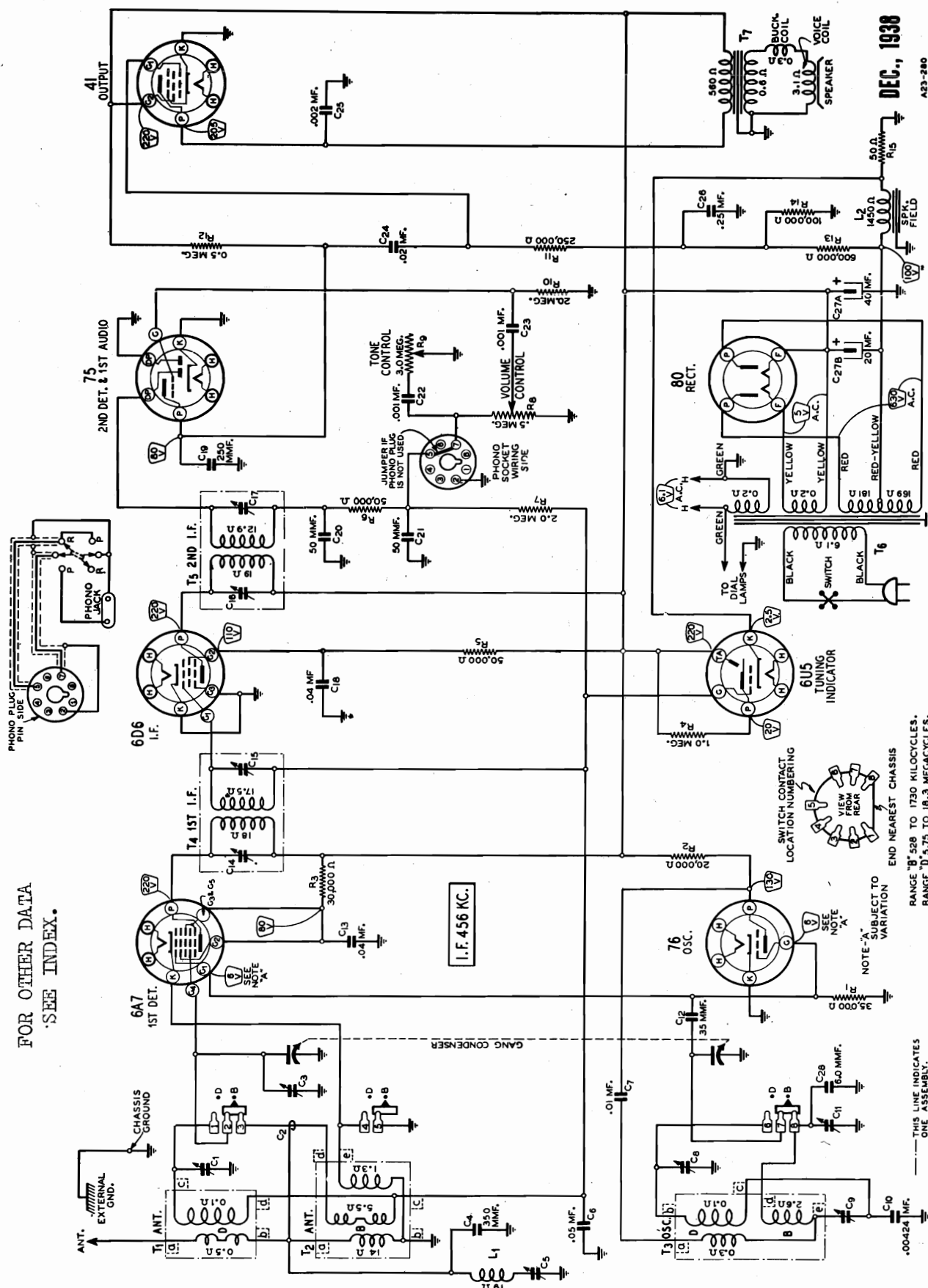


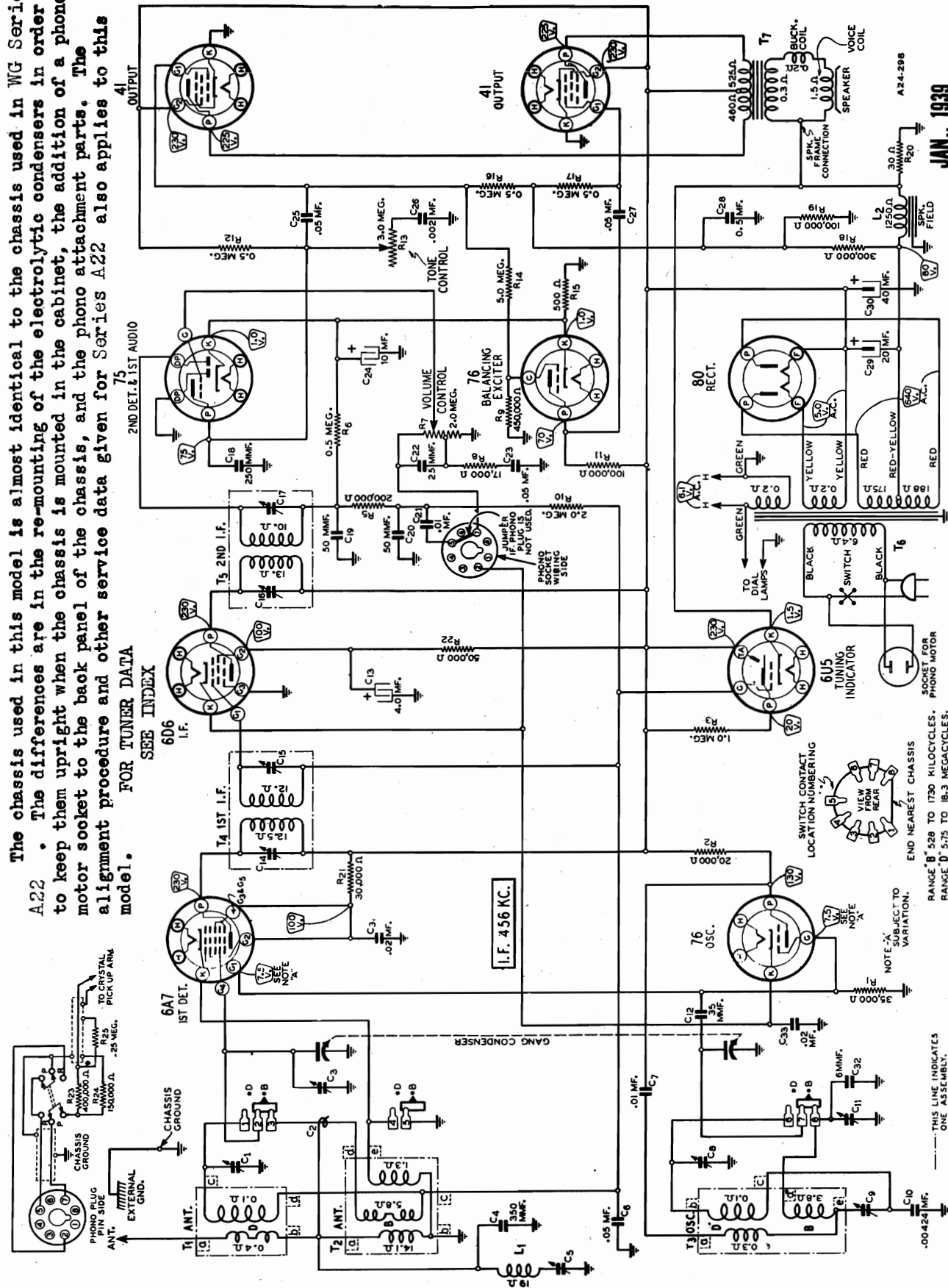
Fig. 3—Schematic Circuit Diagram

MODEL A24 Series
Schematic, Voltage
Phono, Data

WELLS-GARDNER & CO.

The chassis used in this model is almost identical to the chassis used in WG Series A22. The differences are in the re-mounting of the electrolytic condensers in order to keep them upright when the chassis is mounted in the cabinet, the addition of a phono motor socket to the back panel of the chassis, and the phono attachment parts. The alignment procedure and other service data given for Series A22 also applies to this model.

FOR TUNER DATA
SEE INDEX



JAN., 1939

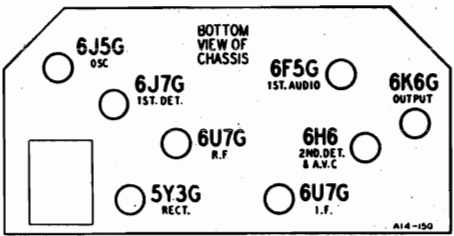
WESTERN AUTO SUPPLY CO.

MODEL D689
Schematic, Voltage, Coils
Socket, Sensitivity

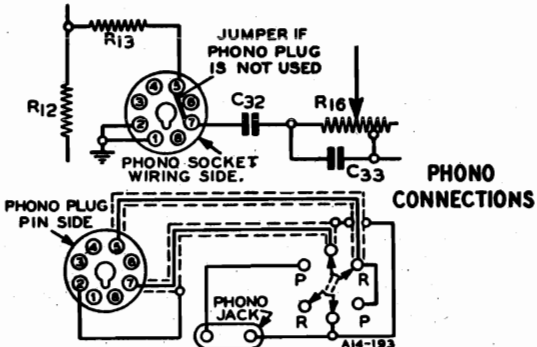
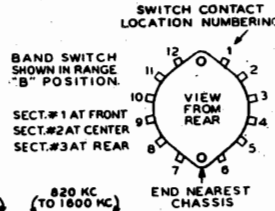
SPECIFICATIONS

Power Consumption - 70 Watts (At 117 volts 60 cycles)
Power Output - 3.0 Watts Undistorted
4.0 Watts Maximum
Selectivity - 31.5 KC Broad at 1000 times Signal
(Sharp)
Sensitivity
B Range (Manual Tuning).....1.0 Microvolt Average
B Range (Automatic Tuning).....1.0 Microvolt Average
C Range.....3.0 Microvolts Average
D Range.....5.0 Microvolts Average

Intermediate Frequency - 456 KC.
Speaker - 10" or 12" Dynamic
Tuning Frequency Range
B Range (Manual Tuning).....528 to 1830 KC
C Range (Manual Tuning).....1810 to 6350 KC
D Range (Manual Tuning).....6300 to 22000 KC
Buttons 1 & 2 (Automatic Tuning).....520 to 980 KC
Buttons 3 & 4 (Automatic Tuning).....650 to 1250 KC
Buttons 5 & 6 (Automatic Tuning).....820 to 1600 KC



RANGE "D" 6.30 TO 22.0 MEGACYCLES
RANGE "C" 1.81 TO 6.35 MEGACYCLES
RANGE "B" 528 TO 1830 KILOCYCLES
"P.B." IS PUSHBUTTON POSITION



HOME RADIO • A. C. POWER SUPPLY
9 TUBE • 3 BAND • ALL WAVE
WITH AUTOMATIC TUNING

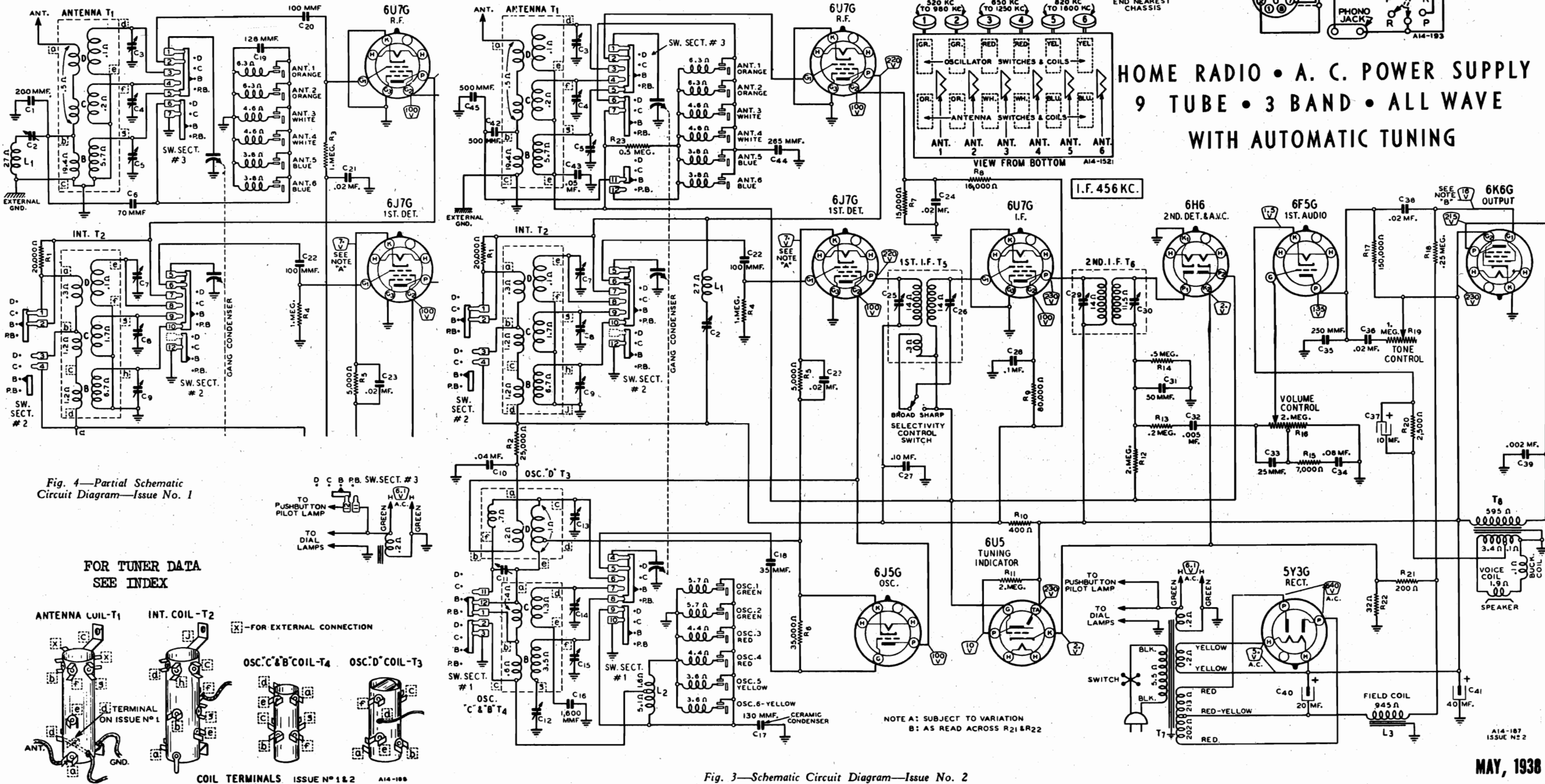
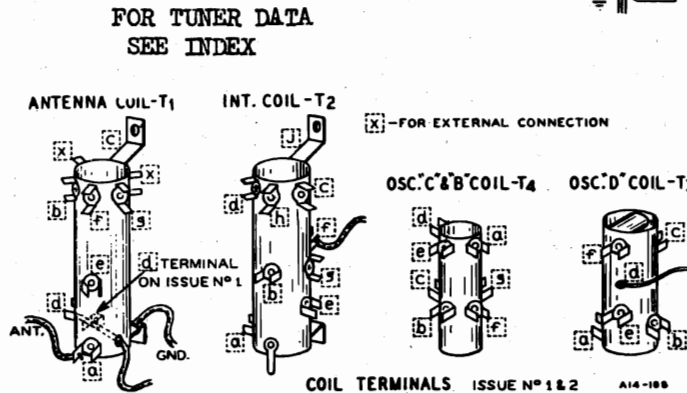


Fig. 4—Partial Schematic
Circuit Diagram—Issue No. 1

Fig. 3—Schematic Circuit Diagram—Issue No. 2



WESTERN AUTO SUPPLY CO.

MODEL D689
Alignment, Trimmers
Parts
MODEL D705, Issue 1
Parts List

Replacement Parts

NOTICE: There is a chassis number label on the chassis base. The chassis number identifies the radio as to chassis, dial, and issue number. When ordering parts or writing, be sure to mention the chassis number.

SPEAKERS

When ordering parts for speakers, specify part number of speaker 14A73 and letters preceding part number stamped on the speaker.

12A310	10" Dynamic Speaker	4.75
12A311	Cone and Voice Coil Assembly for above Speaker	2.00
12A312	12" Dynamic Speaker	4.00
12A313	Cone and Voice Coil Assembly for above Speaker	2.00
12A314	10" Dynamic Speaker	4.75
12A315	Cone and Voice Coil Assembly for above Speaker	2.00

TRANSFORMERS AND COILS

Part No.	Description	Price
1A193	Antenna Transformer Assembly (Issue No. 1 only)	\$1.45
1A194	12" R.F. Interstage Transformer Assembly	1.45
1A195	Oscillator Coil Assembly—D Range	1.45
1A196	Oscillator Coil Assembly—E Range	1.45
1A197	1st I.F. Transformer and Can Assembly	1.45
1A198	2nd I.F. Transformer and Can Assembly	1.45
1A199	17 Volt, 25 Cycle, Standard Power Transformer	4.00
1A200	17 Volt, 450 Cycle, Universal Power Transformer	4.00
1A201	Output Transformer	1.45
1A202	Wave Trap Coil	1.45
1A203	Oscillator Transformer	1.45

RESISTORS

CARBON

Part No.	Resistance	Wattage	Price
1A204	20,000 Ohm	1/2	1.45
1A205	25,000 Ohm	1/2	1.45
1A206	30,000 Ohm	1/2	1.45
1A207	35,000 Ohm	1/2	1.45
1A208	40,000 Ohm	1/2	1.45
1A209	45,000 Ohm	1/2	1.45
1A210	50,000 Ohm	1/2	1.45
1A211	55,000 Ohm	1/2	1.45
1A212	60,000 Ohm	1/2	1.45
1A213	65,000 Ohm	1/2	1.45
1A214	70,000 Ohm	1/2	1.45
1A215	75,000 Ohm	1/2	1.45
1A216	80,000 Ohm	1/2	1.45
1A217	85,000 Ohm	1/2	1.45
1A218	90,000 Ohm	1/2	1.45
1A219	95,000 Ohm	1/2	1.45
1A220	100,000 Ohm	1/2	1.45

VARIABLE

Part No.	Description	Price
1A221	2 Megohm Volume Control and On-Off Switch	1.45
1A222	1 Megohm Volume Control and On-Off Switch	1.45

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 mt., 200 mfm., and 400 ohms.

SIGNAL GENERATOR	DUMMY ANTENNA	BAND SWITCH	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
1. F.	455 KC Grid of 1st Tube	B Range	Turn Rotor to Full Open	2nd I.F. (C29) & (C30)
WAVE TRAP	455 KC Antenna Lead	B Range	Turn Rotor to Full Open	1st I.F. (C25) & (C26)
RANGE B	200 mfm. Antenna Lead	Push Button Position	Depressed	Wave Trap (C2)
1330 KC	200 mfm. Antenna Lead	B Range	Turn Rotor to Full Open	Oscillator Range B (C18)
1500 KC	200 mfm. Antenna Lead	B Range	Turn Rotor to Full Open	Ant. Range B (C5)
600 KC	200 mfm. Antenna Lead	B Range	Turn Rotor to Max. Output	Int. Range B (C9)
5350 KC	400 Ohm Antenna Lead	C Range	Turn Rotor to Full Open	Oscillator Range C (C14)
6000 KC	400 Ohm Antenna Lead	C Range	Turn Rotor to Max. Output	Ant. Range C (C4)
RANGE D	400 Ohm Antenna Lead	D Range	Turn Rotor to Full Open	Oscillator Range D (C13)
22,000 KC	400 Ohm Antenna Lead	D Range	Turn Rotor to Max. Output	Ant. Range D (C3)
20,000 KC	400 Ohm Antenna Lead	D Range	Turn Rotor to Max. Output	7000 KC (C17)
7000 KC	400 Ohm Antenna Lead	D Range	Turn Rotor to Max. Output	Rock Rotor—See Note 8

DIAL AND DRIVE ASSEMBLY

No. 9 DIAL
No. 10 DIAL

SEE PARTS MODEL D705 Issue 1

Models using this dial may be identified by the round push button used on the tuning unit. The station call letters are mounted in the cutout above the buttons.

Models using this dial may be identified by the rectangular push button used on the tuning unit. The station call letters are mounted in the cutout above the buttons.

SEE PARTS MODEL D705 Issue 1

Models using this dial may be identified by the round push button used on the tuning unit. The station call letters are mounted in the cutout above the buttons.

Models using this dial may be identified by the rectangular push button used on the tuning unit. The station call letters are mounted in the cutout above the buttons.

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Models using this dial may be identified by the round push button used on the tuning unit. The station call letters are mounted in the cutout above the buttons.

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SEE PARTS MODEL D705 Issue 1

Models using this dial may be identified by the round push button used on the tuning unit. The station call letters are mounted in the cutout above the buttons.

Models using this dial may be identified by the rectangular push button used on the tuning unit. The station call letters are mounted in the cutout above the buttons.

SEE PARTS MODEL D705 Issue 1

Models using this dial may be identified by the round push button used on the tuning unit. The station call letters are mounted in the cutout above the buttons.

Models using this dial may be identified by the rectangular push button used on the tuning unit. The station call letters are mounted in the cutout above the buttons.

SEE PARTS MODEL D705 Issue 1

Models using this dial may be identified by the round push button used on the tuning unit. The station call letters are mounted in the cutout above the buttons.

Models using this dial may be identified by the rectangular push button used on the tuning unit. The station call letters are mounted in the cutout above the buttons.

SEE PARTS MODEL D705 Issue 1

Models using this dial may be identified by the round push button used on the tuning unit. The station call letters are mounted in the cutout above the buttons.

Models using this dial may be identified by the rectangular push button used on the tuning unit. The station call letters are mounted in the cutout above the buttons.

SEE PARTS MODEL D705 Issue 1

Models using this dial may be identified by the round push button used on the tuning unit. The station call letters are mounted in the cutout above the buttons.

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SEE PARTS MODEL D705 Issue 1

Models using this dial may be identified by the round push button used on the tuning unit. The station call letters are mounted in the cutout above the buttons.

Automatic Tuning Assembly

Automatic Tuning Assembly Complete with 12

Parts for Tuning Assembly—Includes 6 Setting Screws

Front Bracket for Tuning Assembly—Includes 6 Setting Screws

Setting Screw Only—Part of above Bracket

Rear Bracket for Tuning Assembly—Includes 6 Setting Screws

Coil Spring—Part of above Bracket

Station Button Plunger with 2 Switch Contacts mounted on

Fiber Strips and 1 Rubber Bumper—Issue No. 1 Only

Station Button Plunger with 2 Switch Contacts mounted on

Fiber Strips and 1 Rubber Bumper—Issue No. 2

Rubber Bumper only for above Station Button Plunger

Compression Spring for Station Button Plunger

Locking Plate for Button Plungers (At Rear of Assembly)

Washer and 1 Compression Spring (for Button No. 1)

Flat Pressure Spring for Locking Plate

Shaped Stop Bracket used behind above Spring (At back of

Tuning Unit Button Assembly)—Issue No. 1 Only

Locking Plate for Button Plungers (At rear of Assembly)

Issue No. 2

Hinge Bracket for Locking Plate—Issue No. 2

Rubber Bumper for Hinge Bracket—Issue No. 2

Adjustable Coil Support Bracket for Rear Button Plunger

Spring Clamps for holding front and rear coils in place

Tuning Rod Assembly—Includes 2 Iron Cores, One 3/16"

Washer, and 1 Compression Spring (for Button No. 1)

2-32-100 KC)

Tuning Rod Assembly—Includes 2 Iron Cores, One 3/16"

Washer, and 1 Compression Spring (for Button No. 2)

2-32-100 KC)

Tuning Rod Assembly—Includes 2 Iron Cores, One 3/16"

Washer, and 1 Compression Spring (for Button No. 3)

2-32-100 KC)

Tuning Rod Assembly—Includes 2 Iron Cores, One 3/16"

Washer, and 1 Compression Spring (for Button No. 4)

2-32-100 KC)

Tuning Rod Assembly—Includes 2 Iron Cores, One 3/16"

Washer, and 1 Compression Spring (for Button No. 5)

2-32-100 KC)

Tuning Rod Assembly—Includes 2 Iron Cores, One 3/16"

Washer, and 1 Compression Spring (for Button No. 6)

2-32-100 KC)

Tuning Rod Assembly—Includes 2 Iron Cores, One 3/16"

Washer, and 1 Compression Spring (for Button No. 6)

2-32-100 KC)

Tuning Rod Assembly—Includes 2 Iron Cores, One 3/16"

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2-32-100 KC)

Tuning Rod Assembly—Includes 2 Iron Cores, One 3/16"

MODEL D690

Alignment

Tuner Data

WESTERN AUTO SUPPLY CO.

INSTRUCTIONS FOR ADJUSTMENT AND OPERATION OF THE ELECTRIC AUTOMATIC TUNING SYSTEM

Before attempting to adjust the automatic tuner, read the following instructions carefully and proceed exactly as directed. Setting up the *Master Selector* requires no tools, and is very easily accomplished when the proper procedure is followed.

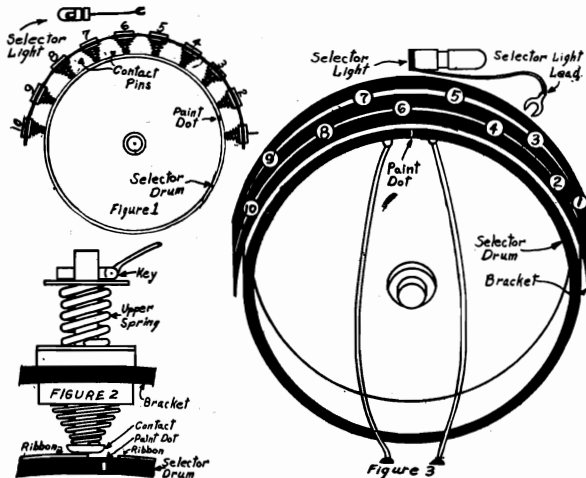
The tuning unit consists essentially of three parts, which may be described briefly as follows:

Master Selector: This includes the *Selector Drum*, the *Selector Pins*, and the *Selector Light*. These parts are mounted on the rear of the variable condenser, together with their associated brackets and wiring.

Motor and Drive: This assembly consists of an induction motor having a mechanical drive clutch with magnetic throw-out, and a train of gears operating directly onto the *Manual Station Selector* drive shaft. No oiling is necessary.

Push Button Assembly: These buttons are located on the front of the chassis, and extend through the escutcheon above the dial. Stations are tuned in automatically when the button with the call letters of the desired station is depressed and held down until the motor stops and the station is heard. When the button is pushed down, an automatic silencer mutes the receiver until the desired station is exactly on tune.

SETTING UP THE MASTER SELECTOR



As a means of simplifying these operations, list ten of your favorite local or strong near-by stations according to frequency or position on the dial. Setting up weak or distant stations is not recommended. Call the station nearest the left-hand end of the dial (nearest 600 kc) the No. 1 station, and number the other stations similarly going from left to right across the dial. For example, assume that your favorite stations operate on frequencies of 600 kc, 700 kc, 800 kc, 900 kc, 1000 kc, 1100 kc, 1200 kc, 1300 kc, 1400 kc, and 1500 kc. Then the 600 kc station would be No. 1, the 700 kc station would be No. 2, and so on down the list with the 1500 kc station being designated No. 10. Reference to the push buttons is not necessary since they are not used until After the Master Selector has been set up.

On the back of the receiver will be found the *Selector Drum* and the ten *Contact Pins* which determine the points at which the tuner will stop when the buttons are pressed. Referring to the diagrams, Fig. 1 shows the general layout and relation of the drum and contacts. Fig. 2 shows one of the contact pins in detail: note that while the position of the contact may be varied at will by sliding it along the slot in the bracket, it is held securely by a strong spring which will not allow it to move when the selector drum turns under it. Fig. 3 shows the arrangement of the *Contact Pins*, each pin being numbered according to the system suggested for numbering the stations; thus pin No. 1 will be used for Station No. 1, pin No. 2 will be used for Station No. 2, and so on down the list.

On the *Selector Drum* are two pairs of *Contact Ribbons*. Note that there is a *Paint Dot* on the edge of the drum directly opposite the break in the ribbons on the upper half of the drum. This *Paint Dot* is for the purpose of locating the approximate position at which a given *Contact Pin* should be set in order to have the *Drum* stop for a particular station.

It is very important that the following steps be followed exactly as outlined; any deviation may necessitate re-setting some of the stations:

1. Set the receiver for reception of Standard Broadcast Stations as outlined previously under "Operation." Turn the Master Control Switch to the extreme right-hand position and wait about ten minutes to allow the tubes to reach their final operating temperature.

2. Using the Manual Station Selector (upper right) knob, tune in the No. 1 station, that is, the one nearest the 600 kc end of the dial. Watch the tuning eye closely, making certain that the station is tuned in perfectly.

3. Face the rear of the chassis. Attach the lead from the *Selector Light* to the No. 1 *Contact Pin*; unless the pin happens to be set exactly, the lamp will glow when the lead is touched to the pin.

4. Observe the position of the *Paint Dot* on the edge of the *Drum*. Grasp the No. 1 pin firmly and slide it toward the *Paint Dot*, being careful not to break the connection between the *Selector Light* lead and the pin. When the pin is directly opposite the *Paint Dot*, the light will go out, indicating that the contact is properly set. To insure greatest accuracy in making the setting, slide the pin back and forth across the break between the ribbons, leaving it set half way between the points where the lamp lights. Be very careful not to move the *Selector Drum* while the pin is being set. When the pin is definitely in its proper position, Disconnect the *Selector Light* Lead from the Pin.

5. Repeat the above procedure for the No. 2 station; tune in the station, connect the *Selector Light* lead to the No. 2 contact pin, move this pin opposite the *Paint Dot* so that the light goes out, then Disconnect the *Selector Light* Lead.

6. Using similar procedure, set up the other eight stations, in each case using the *Contact Pin* bearing the same number as that assigned to the station being set up. Always Disconnect the

ALIGNMENT PROCEDURE

The Master Control Switch must be turned to the extreme right hand position for all alignment.

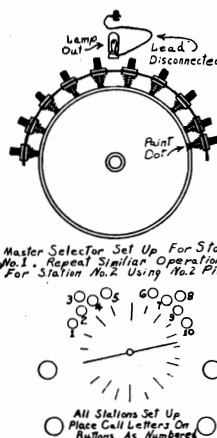
IF. Connect generator ground to receiver chassis. Using 1 mfd. condenser in series with the high side of the generator, apply 45 kc. signal to grid of the 6D6 second IF amplifier tube and tune the PRIMARY only of the third IF transformer. (See above diagram.) Repeat for transformer No. 1 of 6A7 IF tube and align the second IF transformer. Repeat for transformer No. 1 of 6A7 transformer.

RF. (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1810 kc. signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1500-1600 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the paddler. The tuning condenser should be rocked back and forth through the signal while varying the paddler in order to assure perfect alignment.

A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alignment of the two short wave bands. Set the band selector switch in the center position, adjust the oscillator trimmer for 6250 kc., then align the antenna and RF trimmers at about 6000 kc. With the band selector in the extreme right position, adjust the top frequency of the high frequency to 18,100 kc., and align the antenna and RF trimmers at about 16,000 kc. In order to make sure that the top end of the last band is set properly, it is best to screw the oscillator trimmer down tight, then unscrew to the second peak. The antenna and RF trimmers should be screwed down tight, then unscrew to the first peak. This procedure must be followed in spot that the oscillator and RF circuits will be set in the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

AFC. Connect a high resistance DC voltmeter between the cathode of the 6D6 AFC control tube and ground. Turn the Master Control Switch to the CENTER position and the Band Selector Switch to the extreme left hand position. Apply a strong 456 kc. signal to the grid of the 6A7 translator and adjust the secondary of the third IF transformer until the voltage is the same as with no signal.

FOR OPERATING SUGGESTIONS SEE MODEL D691.



Selector Light Lead as soon as a station has been set up; failure to do so will cause the receiver to hum, and may result in the lamp being burned out.

7. After all the stations have been set up, located the Call Letters of your stations on the printed sheets supplied with the receiver. Remove the desired call letter discs from the sheets. Remove the metal ferrules from the buttons, place the call letter discs behind the celluloid and press the ferrules back on the proper buttons.

8. The only operations necessary to receive any of the ten stations set up as outlined above are: Turn the Master Control Switch to the Center position, allow about one minute for the tubes to heat, press the button with the call letters of the desired station Holding the Button Down Until the Pointer Stops Moving and the Station is Heard, then adjust the tone and volume. Be sure that the Band Selector switch is in the proper position for reception of Standard Broadcast stations.

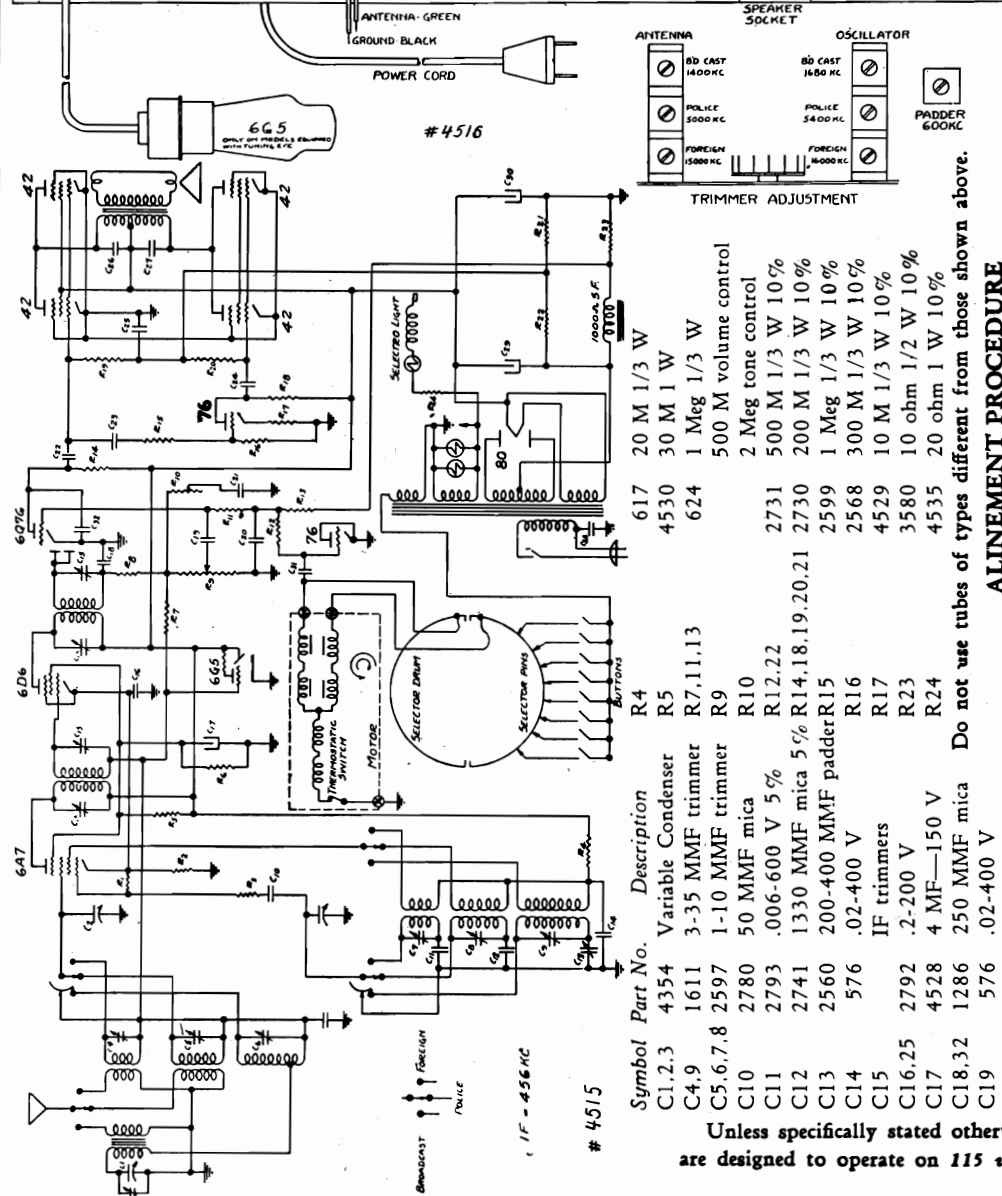
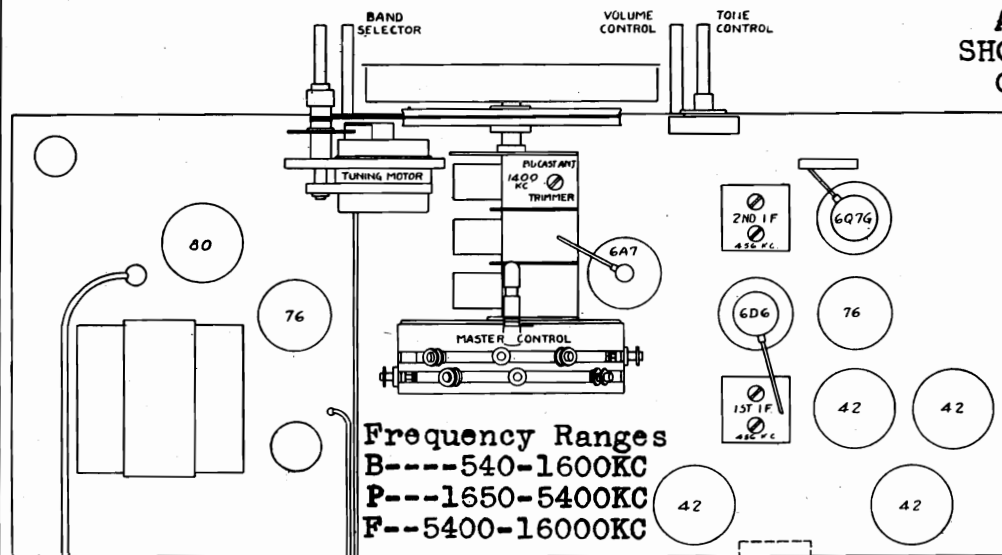
Master Control Switch: The extreme left position turns the power off. The center position connects the motor and the automatic frequency control. The right hand position disconnects the motor and automatic frequency control, and increases sensitivity for manual tuning of weak stations. (The right hand position is also used for setting up stations for automatic tuning.)

WESTERN AUTO SUPPLY CO.

MODEL D691

Schematic, Socket
Trimmers, Alignment

ALIGNMENT OF SHORT-WAVE BANDS ON NEXT PAGE



IF. Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of the generator, apply 456 kc. signal to the grid of the 6D6 IF amplifier tube and align second IF transformer trimmers. Repeat for first IF transformer, applying signal to grid of the 6A7 tube. (See above diagram for location of tubes and transformers.)

RF. (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1680 kc. signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1400-1500 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the paddler. The tuning condenser should be rocked back and forth through the signal while varying the paddler in order to assure perfect alignment.

ALIGNMENT PROCEDURE

Symbol	Part No.	Description	R4	R5	R7,11,13	R9	R10	R12,22	R14,18,19	R15	R16	R17	R23	R24	Do not use this
C1,2,3	4354	Variable Condenser													
C4,9	1611	3-35 MMF trimmer													
C5,6,7,8	2597	1-10 MMF trimmer													
C10	2780	50 MMF mica													
C11	2793	.006-.600 V 5%													
C12	2741	1330 MMF mica													
C13	2560	200-400 MMF padder													
C14	576	.02-.400 V													
C15		IF trimmers													
C16,25	2792	.2-200 V													
C17	4528	4 MF-150 V													
C18,32	1286	250 MMF mica													
C19	576	.02-.400 V													
C20	572	.1-200 V													
C21	581	.005-.600 V													
C22,24	2600	.02-.600 V													
C23	563	.05-.400 V													
C26,27	2601	.01-.600 V													
C28	3135	.003-.800 V													
C29	3375	16 MF-450 V													
C30	4062	30 MF-275 V													
C31	580	.05-.200 V													
R1,6,8	631	50 M 1/3 W													
R2,3	2689	100 ohm 1/3 W 10%													

Unless specifically stated otherwise, these receivers are designed to operate on 115 volts 60 cycles alternating current only.

MODEL D691 Tuner Data Alignment

WESTERN AUTO SUPPLY CO.

ALIGNMENT OF SHORT-WAVE BANDS

A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alignment of the two short wave bands. Set the band selector switch in the center position, adjust the oscillator top frequency for 5400 kc., then align the antenna trimmer at about 5000 kc. With the band selector in the extreme right position, adjust the top frequency of the high frequency band to 16,000 kc., and align the antenna trimmer at about 15,000 kc. In order to make sure that the top end of the last band is set properly, it is best to screw the oscillator trimmed down tight, then unscrew to the second peak. The antenna trimmer should be screwed down tight, then unscrewed to the first peak. This procedure must be followed in order that the oscillator and RF circuits will be set in the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

Tubes required are:

- 1-6A7 Oscillator-translator
- 1-6D6 Intermediate Frequency Amplifier
- 1-6Q7G Detector AVC—First Audio Amplifier
- 1-76 Driver—Phase Inverter
- 1-76 Silencer
- 4-42 Power Output
- 1-80 Rectifier
- 1-6G5 Cathode Ray, Tuning Tube (on models equipped with "eye" tuning indicator)

3. Face the rear of the chassis. Attach the lead from the Selector Light to the No. 1 Contact Pin; unless the pin happens to be set exactly, the lamp will glow when the lead is touched to the pin.
4. Observe the position of the Paint Dot on the edge of the Drum. Grasp the No. 1 pin firmly and slide it toward the Paint Dot, being careful not to break the connection between the Selector Light lead and the pin. When the pin is directly opposite the Paint Dot, the light will go out, indicating that the contact is properly set. To insure greatest accuracy in making this setting, slide the pin back and forth across the break between the ribbons, leaving it set half way between the points where the lamp lights. Be very careful not to move the Selector Drum while the pin is being set. When the pin is definitely in its proper position, Disconnect the Selector Light Lead from the Pin.
5. Repeat the above procedure for the No. 2 station; tune in the station, connect the Selector Light lead to the No. 2 contact pin, move this pin opposite the Paint Dot so that the light goes out, then Disconnect the Selector Light Lead.
6. Using similar procedure, set up the other six stations, in each case using the Contact Pin bearing the same number as that assigned to the station being set up. Always Disconnect the Selector Light Lead as soon as a station has been set up; failure to do so will cause the receiver to hum, and may result in the lamp being burned out.
7. After all the stations have been set up, locate the Call Letters of your stations on the printed sheets supplied with the receiver. Remove the desired call letter blocks from the sheets, and insert them in the proper pockets above the push buttons.
8. The only operations necessary to receive any of the eight stations set up as outlined above are: Turn the power switch on by rotating the lower left knob to the right—turn the control a few degrees beyond the point at which the switch snaps on—allow about one minute for the tubes to heat; press the button under the call letters of the desired station Holding the Button Down Until the Pointer Stops Moving and the Station is Heard, then adjust the tone and volume. Be sure that the Band Selector switch is in the proper position for reception of Standard Broadcast Stations.

OPERATING SUGGESTIONS

Be sure that your stations are listed in the proper order according to frequency or position on the dial.

Do not confuse frequency (kilocycles) with wave length (meters).

Be sure that your stations are tuned in exactly before setting the contact pins.

Do not set up weak stations, or distant stations too weak to afford clear reception at all times.

Do not press more than one button at a time. Hold down more than one button will cause inaccurate tuning, or the motor may not turn at all.

Do not leave the Selector Light Lead connected after pins are set up.

Do not run the motor for excessively long periods of time. While no damage will result, a protective cut-out will shut off the power to the motor after four to five minutes of continuous operation, and the automatic tuner will not function again until the motor has been allowed to cool for several minutes.

When tuning stations, do not release the button until the pointer stops moving.

Do not attempt to set adjacent pins in the same slot too close together.

Do not expect good results unless a good outdoor antenna is used.

Do not change the relative positions of the contact pins; keep them in the same order as shown on the diagram (Figure 3).

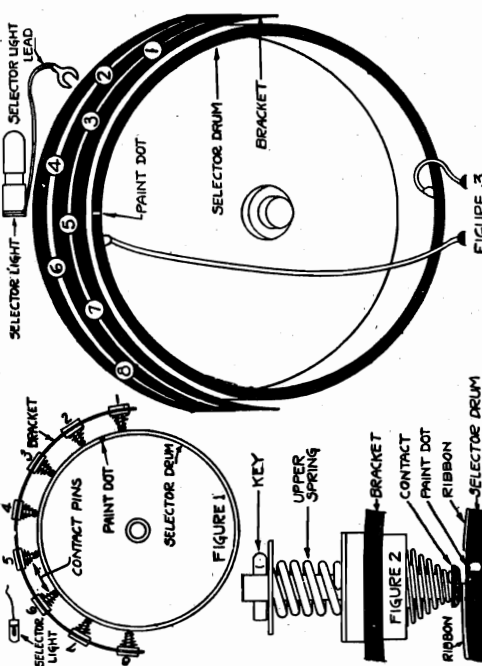
INSTRUCTIONS FOR ADJUSTMENT AND OPERATION OF THE D691 ELECTRIC AUTOMATIC TUNING SYSTEM

Before attempting to adjust the automatic tuner, read the following instructions carefully and proceed exactly as directed. Setting up the Master Selector requires no tools, and is very easily accomplished when the proper procedure is followed.

The tuning unit consists essentially of three parts, which may be described briefly as follows:
Master Selector: This includes the Selector Drum, the Selector Pins, and the Selector Light. These parts are mounted on the rear of the variable condenser, together with their associated brackets and wiring.
Motor and Drive: This assembly consists of an induction motor having a mechanical drive clutch with magnetic throw-out, and a train of gears operating directly onto the Manual Station Selector drive shaft. No oiling is necessary.
Push Buttons Assembly: These buttons are located on the front of the chassis, and extend through the cutout in the dial. They are automatically pushed down by the motor when the station is heard. When the button is pushed down, an automatic silencer mutes the receiver until the desired station is exactly on tune.

SETTING UP THE MASTER SELECTOR

As a means of simplifying these operations, list eight of your favorite local or strong near-by stations according to frequency or position on the dial. Setting up weak or distant stations is not recommended. Call the station nearest the left-hand end of the dial (nearest 1600 kc) the No. 1 station, and number the other



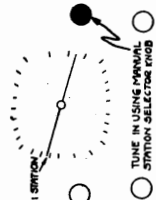
stations similarly going from left to right across the dial. For example, assume that you favorite stations operate on frequencies of 1500 kc, 1400 kc, 1300 kc, 1200 kc, 1000 kc, 900 kc, 700 kc, and 600 kc. Then the 1500 kc station would be No. 1, the 1400 kc station would be No. 2, and so on down the list with the 600 kc station being designated No. 8. Reference to the push buttons is not necessary since they are not used until After the Master Selector has been set up.

On the back of the receiver will be found the Selector Drum and the eight Contact Pins which determine the points at which the tuner will stop when the buttons are pressed. Referring to the diagrams, Fig. 1 shows the general layout and relation of the drum and contacts. Fig. 2 shows one of the contact pins in detail: note that while the position of the contact may be varied at will by sliding it along the slot in the bracket, it is held securely by a strong spring which will not allow it to move when the selector drum turns under it. Fig. 3 shows the arrangement of the Contact Pins, each pin being numbered according to the system suggested for numbering the stations, thus pin No. 1 will be used for Station No. 1, pin No. 2 will be used for Station No. 2, and so on down the list.

On the dial, there are two pairs of Contact Ribbons. Note that there is a Paint Dot on the edge of the drum directly across the break between the ribbons, and the upper half of the drum. This Paint Dot is for the purpose of locating the approximate position at which a given Contact Pin should be set in order to have the Drum stop for a particular station.

It is very important that the following steps be followed exactly as outlined: any deviation may necessitate re-setting some of the stations:

1. Set the receiver for reception of Standard Broadcast Stations, as outlined previously under "Operation." Turn the receiver "On," let it run for at Least Ten Minutes to allow the tubes to reach their final operating temperature.
2. Using the Manual Station Selector (upper right) knob, tune in the No. 1 station, that is, the one nearest the 1600 kc end of the dial. Watch the tuning eye closely, making certain that the station is tuned in perfectly.



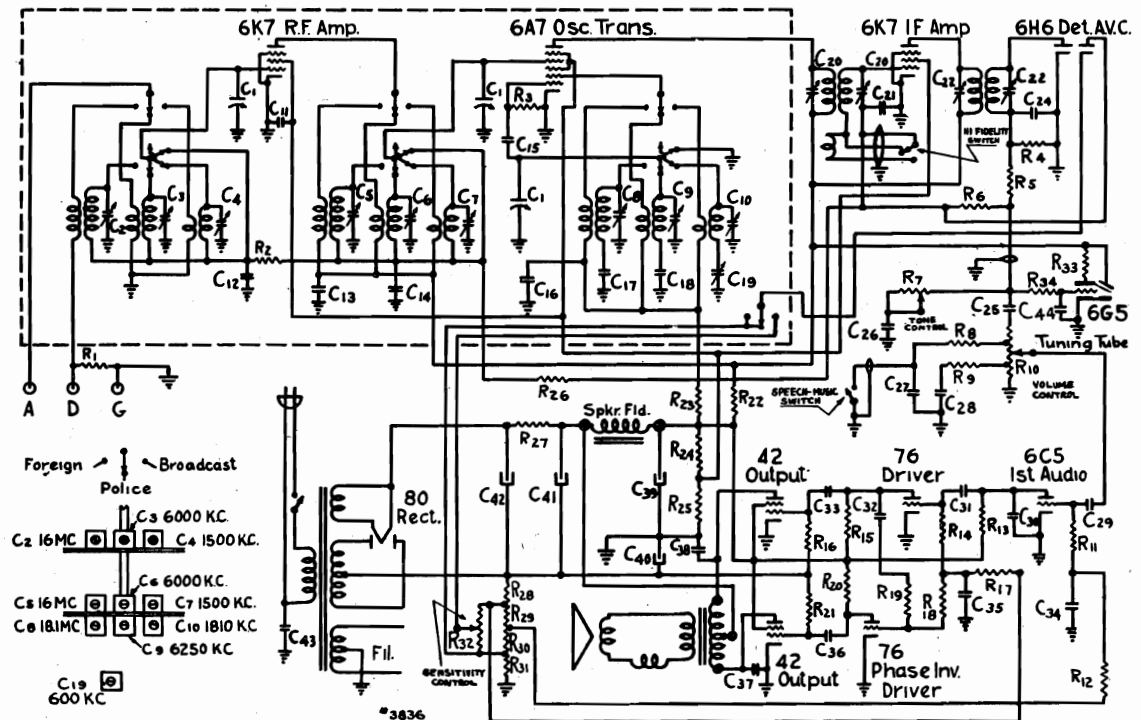
WESTERN AUTO SUPPLY CO.

MODEL D692, Early
Schematic

Tubes

Tubes required are:
1—6K7 Radio frequency amplifier
1—6A7 Oscillator—translator
1—6K7 Intermediate frequency amplifier
1—6H6 Detector—automatic volume control
1—6C5 First audio amplifier

1—6G5 Cathode ray tuning tube (on models equipped with "eye" tuning indicator)
1—76 Driver
1—76 Driver-phase inverter
2—42 Power output
1—80 Rectifier



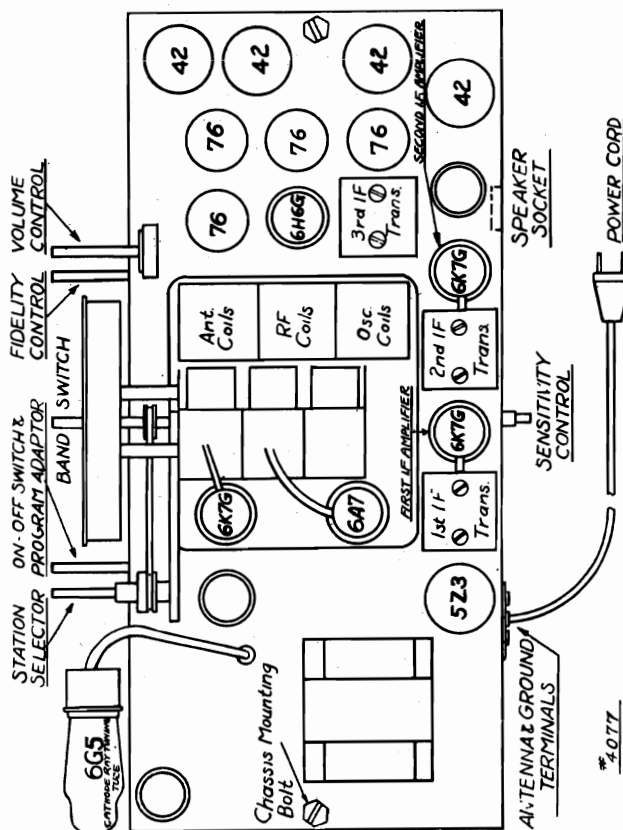
IF PEAK 456 KC

Symbol	Part No.	Description	Symbol	Part No.	Description
C1	3814	9-400 mmf Variable	R9,23	617	20 M 1/3 W.
C2,3,4	3822	2-35 triple trimmer	R10	3800	3 meg volume control
C5,6,7	3822	2-35 triple trimmer	R11,12	624	1 meg 1/3 W.
C8,9,10	3822	2-35 triple trimmer	R18	2688	60 M 1/3 W. 10%
C11,21,34	572	.1—200 V.	R19	2731	500 M 1/3 W. 10%
C12,14	580	.05 200 V.	R22	2421	1 M 1/3 W.
C13	575	.1 400 V.	R24	3805	7 M 3.5 W.
C15,24	2780	50 mmf mica	R25	3805	8 M 1.5 W.
C16	568	.01 400 V.	R27	3809	100 ohms 2 W. 10%
C17	2694	.005 5% tolerance	R28	3806	120 ohms 1.5 W. 10%
C18	2741	1330 mmf 5% tolerance	R29	3808	50 ohms .75 W. 10%
C19	2560	350 mmf variable padder	R30	3807	35 ohms .5 W. 10%
C20,22		IF Trimmers	R31	3870	15 ohms .5 W. 10%
C25,28	2385	.02 200 V.	R32	3801	2 M Variable
C26	2695	.003 600 V.		3796	Power transformer
C27	824	.002 600 V.		3797	No. 1 IF transformer
C29	576	.02 400 V.		3798	No. 2 IF transformer
C30	1286	250 mmf mica		2981	Tuning tube cable
C31,33,36	2600	.02 600 V.		3838	12" Speaker
C32	563	.05 400 V.		2898	Tuning tube clamp
C35	579	.25 200 V.		3815	RF coil
C37,38	3138	.001 800 V.		3943	Oscillator coil
C39	3113	16 MF regulating		3817	Antenna coil
C40	3136	20 MF 25 V.		3825	Planetary drive
C41	3112	16 MF 450 V.		3826	Drive belt
C42	3111	16 MF 500 V.		3198	Idler pulley
C43	3135	.003 800 V.		3199	Idler spring
R1,5,15,20,26	603	100 M 1/3 W.		3831	Minute pointer
R2,3,13	631	50 M 1/3 W.		3832	Tuning pointer
R4,14,16,21	615	500 M 1/3 W.		3802	On-off switch
R6	2693	2 meg 1/3 W.		3818	RF and Antenna switch
R7	3799	2 meg tone control		3819	Oscillator switch
R8,17	2568	300 M 1/3 W.			

MODEL D692, Early
MODEL D694
Alignment, Socket
Trimmers

WESTERN AUTO SUPPLY CO.

MODEL D-694



Connect a high impedance AC voltmeter across the loudspeaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from the generator, strong signals tend to cause improper adjustments.

Be sure that the fidelity control is NOT in the HIGH FIDELITY position. It will not be possible to properly align the receiver unless this control is turned part way toward its "bass" position.

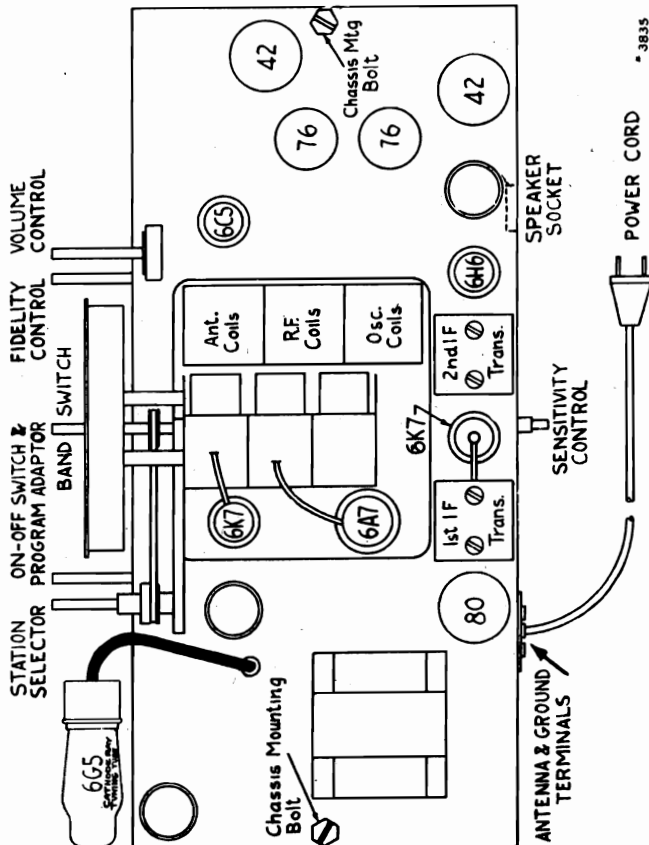
IF. Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of generator, apply 456 kc. signal to grid of 6K7G second IF amplifier and align transformer No. 3. Repeat for transformer No. 2, applying signal to grid of 6K7G first IF amplifier. Repeat for transformer No. 1, applying signal to grid of 6A7 translator. (See above diagram for location of tubes and transformers.)

RF. (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1810 kc. signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1500-1600 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alignment.

A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alignment of the two short wave bands. Set the band selector switch in the center position, adjust the oscillator top frequency for 6250 kc., then align the antenna and RF trimmers at about 6000 kc. With the band selector in the extreme right position, adjust the top frequency of the high frequency to 18,100 kc. and align the antenna and RF trimmers at about 16,000 kc. In order to make sure that the top end of the last band is set properly, it is best to screw the oscillator trimmer down tight, then unscrew to the second peak. The antenna and RF trimmers should be screwed down tight, then unscrew to the first peak. This procedure must be followed in order that the oscillator and RF circuits will be in the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

MODEL D-692 (EARLY)

TUBE LAYOUT and CONNECTION DIAGRAM



Connect a high impedance AC voltmeter across the loudspeaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from the generator, strong signals tend to cause improper adjustments.

Be sure that the fidelity control is NOT in the HIGH FIDELITY position. It will not be possible to properly align the receiver unless this control is turned part way toward its "bass" position.

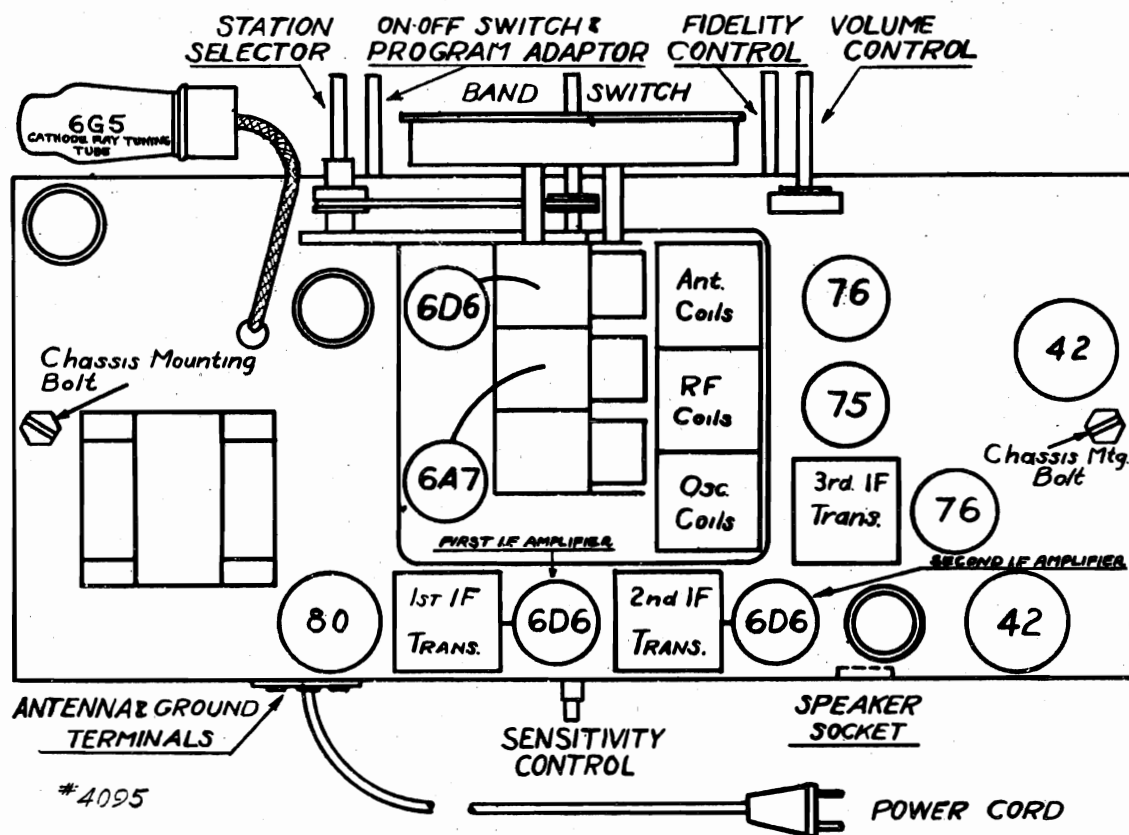
IF. Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of the generator, apply 456 kc. signal to the grid of the 6K7 IF amplifier tube and align second IF transformer trimmers. Repeat for first IF transformer, applying signal to grid of the 6A7 tube. (See above diagram for location of tubes and transformers.)

RF. (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1810 kc. signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1500-1600 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alignment.

A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alignment of the two short wave bands. Set the band selector switch in the center position, adjust the oscillator top frequency for 6250 kc., then align the antenna and RF trimmers at about 6000 kc. With the band selector in the extreme right position, adjust the top frequency of the high frequency to 18,100 kc. and align the antenna and RF trimmers at about 16,000 kc. In order to make sure that the top end of the last band is set properly, it is best to screw the oscillator trimmer down tight, then unscrew to the second peak. The antenna and RF trimmers should be screwed down tight, then unscrew to the first peak. This procedure must be followed in order that the oscillator and RF circuits will be in the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

MODEL D692, Late
Socket, Trimmers
Antenna Data

WESTERN AUTO SUPPLY CO.



Tubes must be in proper position and connected as shown.

Tubes required are:

- 1—6D6 Radio Frequency Amplifier
- 1—6A7 Oscillator-translator
- 2—6D6 Intermediate Frequency Amplifiers
- 1—76 Automatic Bias Control
- 1—75 Detector AVC—First Audio Amplifier

- 1—76 Driver—Phase Inverter

- 2—42 Power Output

- 1—80 Rectifier

- 1—6G5 Cathode Ray Tuning Tube (on models equipped with "eye" tuning indicator)

Do not use tubes of types different from those shown above. When replacing tubes or checking connections, refer to the TUBE LAYOUT CHART.

Connections

Turn the lower right knob to the left as far as it will go. This turns the power switch "off."

Connect the antenna and ground leads to the receiver as shown on the diagrams below. For use with a single wire antenna, connect as shown on Figure 1. If used with a doublet antenna, connect according to Figure 2.

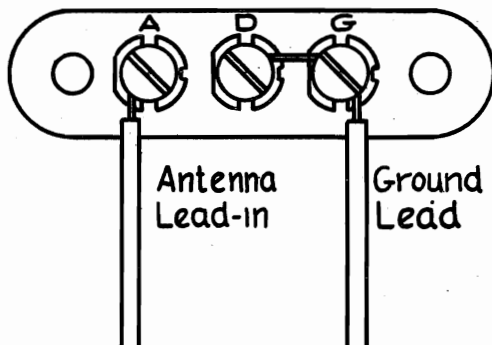


Fig. 1

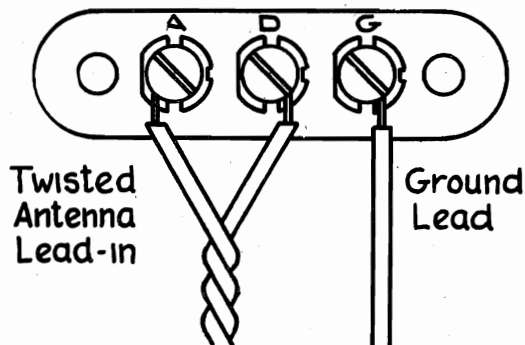


Fig. 2

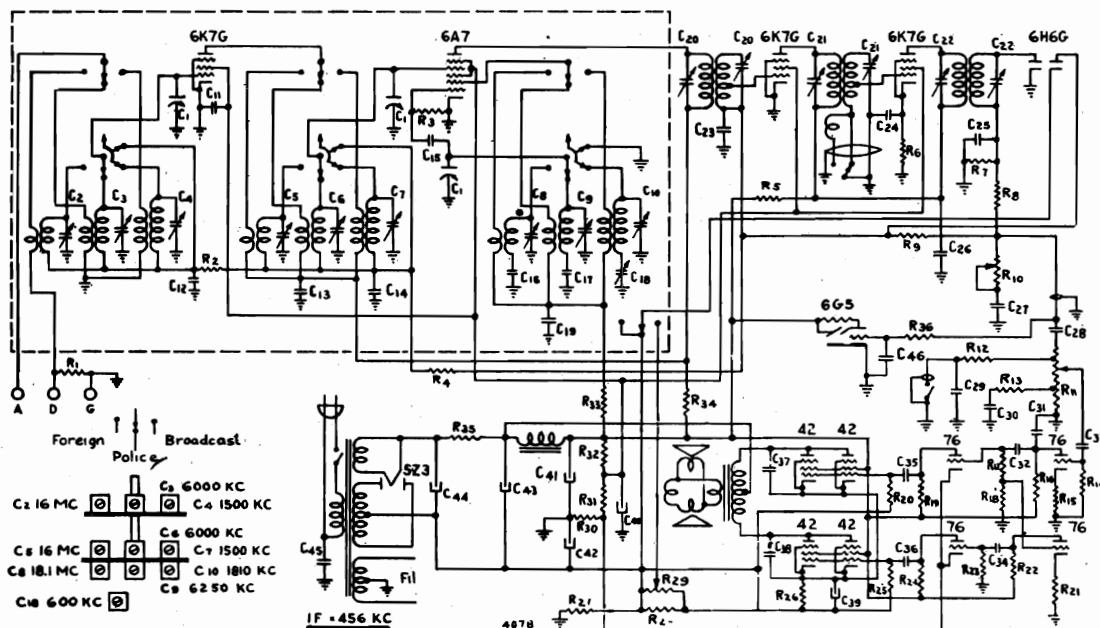
WESTERN AUTO SUPPLY CO.

MODEL D694
Schematic

Tubes

Tubes required are:
1—6K7G Radio frequency Amplifier
1—6A7 Oscillator—Translator
2—6K7G Intermediate frequency Amplifiers
1—6H6G Detector—AVC—Bias control
1—6G5 Cathode ray tuning tube (on models equipped with "eye" tuning indicator)

1—76 First Audio Amplifier
1—76 Phase Inverter
2—76 Drivers
4—42 Power Output
1—5Z3 Rectifier



FOR ALIGNMENT, SEE INDEX

Symbol	Part No.	Description	Symbol	Part No.	Description
C1	3814	9-400 mmf variable	R12,20,25	2568	300 M 1/3 W.
C2,3,4	3822	2-35 triple trimmer	R13,33	617	20 M 1/3 W.
C5,6,7	3822	2-35 triple trimmer	R14	624	1 meg 1/3 W.
C8,9,10	3822	2-35 triple trimmer	R15,21	614	5 M 1/3 W.
C11,23	572	.1 200V.	R17	2731	500 M 10% 1/3 W.
C12,14,46	580	.05 200V.	R18	2880	100 M 10% 1/3 W.
C13	575	.1 400V.	R26	4068	300 ohm 10% 3 W. flex.
C15,25	2780	50 mmf mica	R27	3808	50 ohm 10% 3/4 W. flex.
C16	2694	.005 5% tolerance	R28	4069	200 ohm 10% 2 W. flex.
C17	2741	1330 mmf 5% tolerance	R29	3801	2 M variable
C18	2560	350 mmf variable padder	R30	639	750 ohm 1/3 W.
C19,24	568	.01 400V.	R31	3805	8 M 1.5 W.
C20,21,22		IF trimmers	R32	3805	7 M 3.5 W.
C26	563	.05 400V.	R35	4070	100 ohm 10% 3 W. flex.
C27	2695	.003 600V.		4058	Power transformer
C28,33	576	.02 200V.		4061	No. 1 IF transformer
C29	824	.002 600V.		4060	No. 2 IF transformer
C30	4072	.03 200V.		3968	No. 3 IF transformer
C31	1286	250 mmf mica		2981	Tuning tube cable
C32,34,35,36	2600	.02 600V.		4082	12" Dynamic speaker
C37,38	3138	.001 800V.		4079	12" P.M. speaker
C39,42	4071	20 MF 35 WV.		2898	Tuning tube clamp
C40	3079	8 MF 150V.		3815	RF coil
C41	4062	30 MF 275V. Reg.		3943	Oscillator coil
C43	3112	16 MF 450V.		3817	Antenna coil
C44	3111	16 MF 500V.		3825	Planetary drive
C45	3135	.003 800V.		3826	Drive belt
R1,4,8,16,19,22,24	603	100 M 1/3 W.		3198	Idler pulley
R2,3	631	50 M 1/3 W.		3199	Idler spring
R5,6,34	2421	1 M 1/3 W.		3831	Minute pointer
R7,23	615	500 M 1/3 W.		3832	Tuning pointer
R9	2693	2 meg 1/3 W.		3802	On-off switch
R10	3799	2 meg tone control		3818	RF and antenna switch
R11	3800	3 meg volume control		3819	Oscillator switch

MODEL D695(1936)
Socket, Trimmers
Phono, Data, Coils

WESTERN AUTO SUPPLY CO.

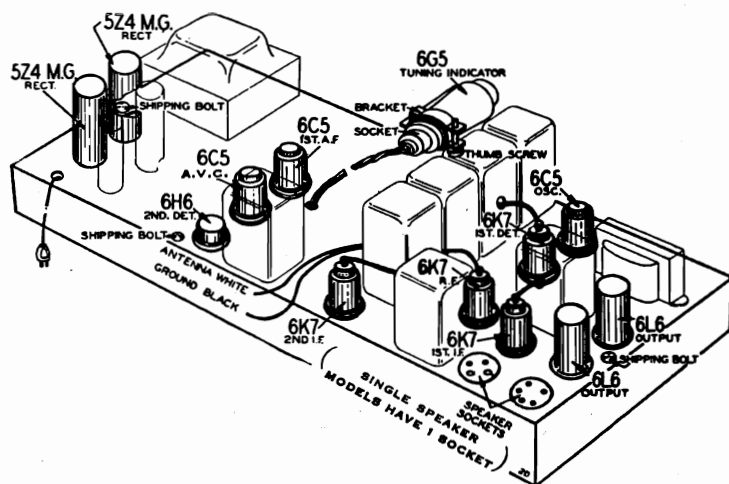


Fig. 5—Location of Tubes

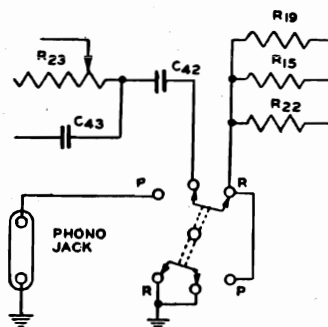


Fig. 7—Phonograph Connections

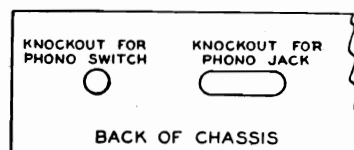
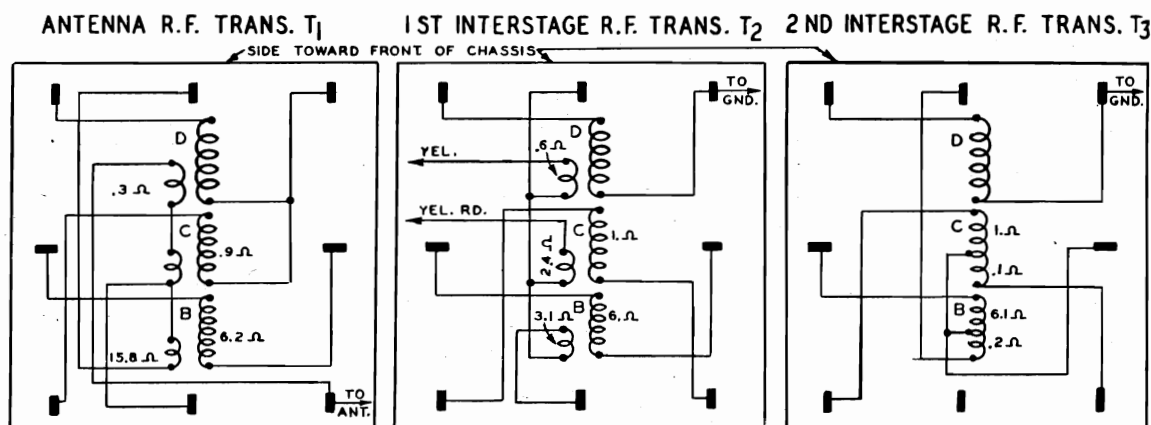


Fig. 8—Location of Phono Knockouts



NOTE: RESISTANCES OF WINDINGS LESS THAN .1 Ω ARE NOT SHOWN.

Fig. 6—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

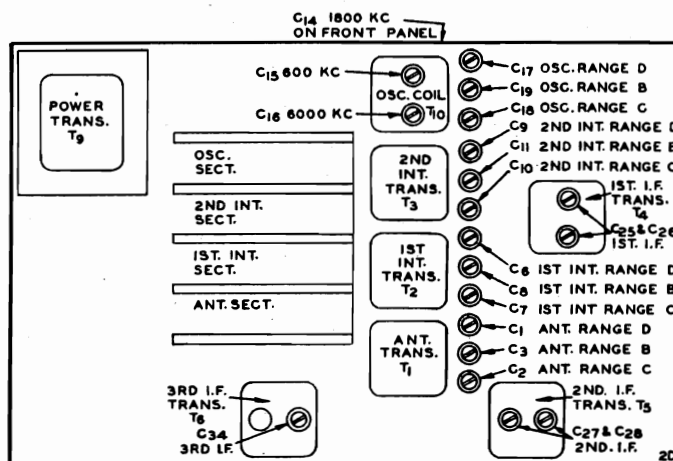
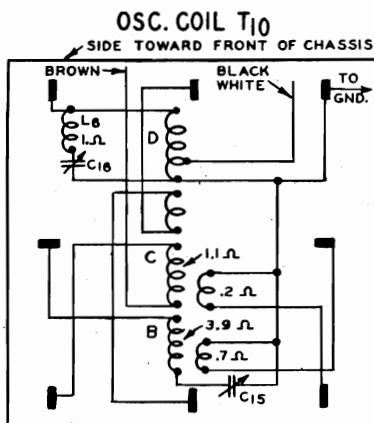
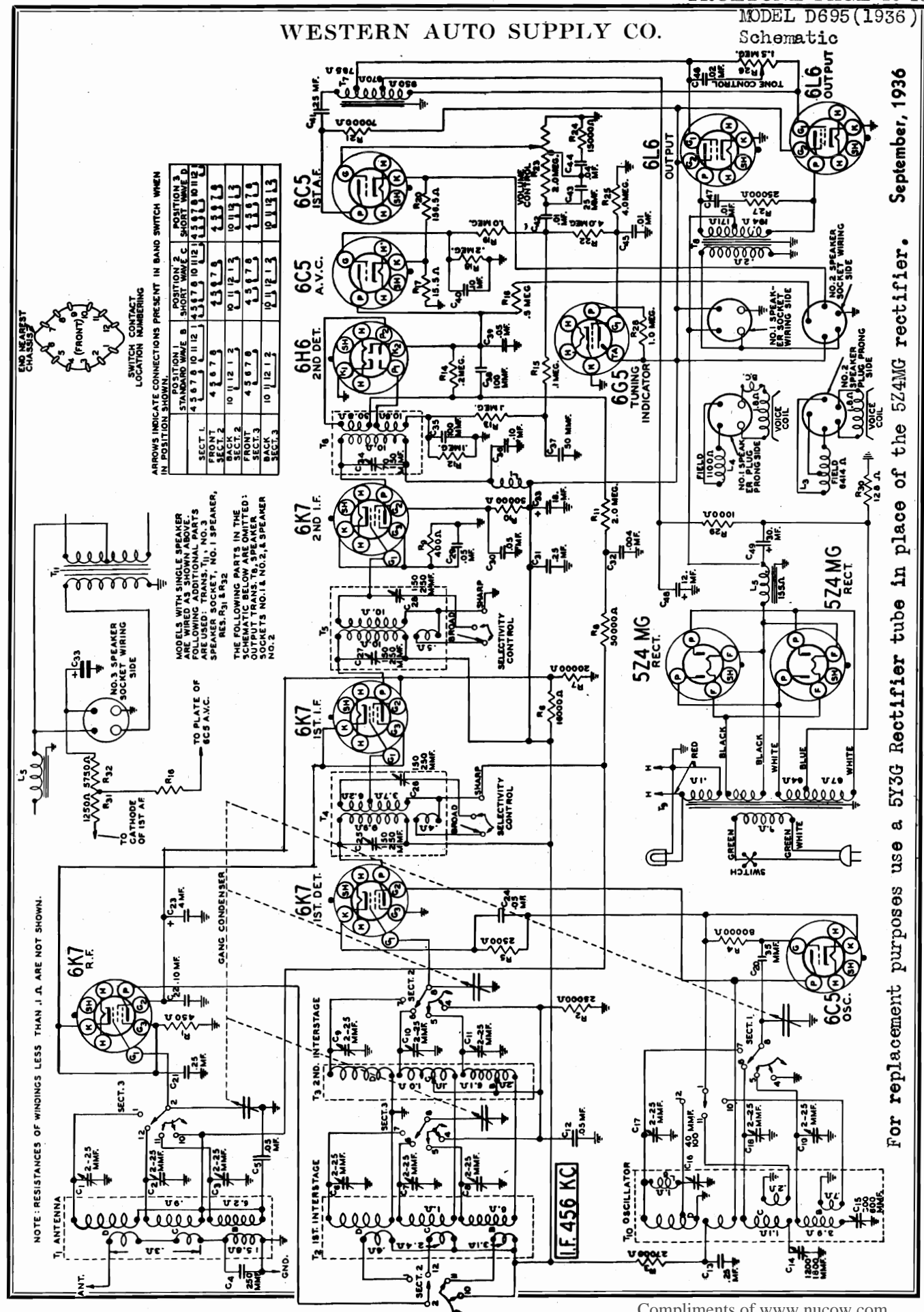


Fig. 3—Location of Trimmers



MODEL D695(1936)
Voltage, Alignment
Phono. Data, Notes

WESTERN AUTO SUPPLY CO.

Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required are shown in the parts list. Knockouts are provided in the back of the chassis for mounting the phono jack and phono switch—See Fig. 8.

The phono switch should be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. This is done by removing the wire connecting condenser C42 to resistors R15, R19 and R22, at the terminal strip located near the back of the planetary drive. Cut this wire to correct length and solder it to the proper terminal on the phono switch—See Fig. 7, keeping the wire close to the back of the chassis base.

A wire is then connected from the lug on the above mentioned terminal strip to which C42 was connected, to the correct terminal on the phono switch—See Fig. 7. This wire should be brought directly to the back of the chassis at a point close to the phono jack pin tip nearest the channel provided for a chassis mounting bolt, and then routed over to the switch.

Complete the other connections as illustrated in Fig. 7.

It will be necessary to re-route the AC line cord away from the 6CY 1st audio grid lead by running it between the volume control and the filter choke and, then straight back to the hole provided for it in the chassis base.

If a hum is heard when the phono pickup is touched, reverse the two pickup leads.

Twenty-five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC. Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire or solder to support the trimmer assembly. In replacing a trimmer, be sure to keep the lead as short as possible and keep the ungrounded lead as far from ground as possible.

Planetary Drive Assembly

The planetary assembly is the unit that is integral with the tuning shaft.

If the nut on the back end of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect.

If this nut is too loose, the drive will slip in slow speed. The remedy in this case, of course, is to tighten the nut.

Should the condenser drive cord slip when the planetary pulley is turning, inspect the tuning condenser, drive drum and gears to see if they are turning properly or if they are being obstructed in some way.

If the drive turns unevenly (rough in spots), this may mean that the planetary assembly is defective or damaged internally and a new unit will be required.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

5800 KC Adjustment

Set the signal generator for 5800 KC. Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band). Adjust the oscillator Range C trimmer (C18) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range C trimmers (C7 and C10) and antenna Range C trimmer (C2) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC. Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 1800 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC. Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C17) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range D trimmers (C6 and C9) and antenna Range D trimmer (C1) to maximum.

When adjusting the 2nd interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

I. F. Adjustment

Set the signal generator for a signal of 456 KC. Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector. Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band). Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position. Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC. Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC. Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position. Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action. Adjust the oscillator Range B trimmer (C19) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

In sets using pointers, loosen the screw of the large pointer and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

In sets using the moving beam of light, there is moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until it is at the 1500 KC mark on the dial. Retighten the screw.

Adjust the 1st and 2nd interstage Range B trimmers (C8 and C11) and antenna Range B trimmer (C3) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

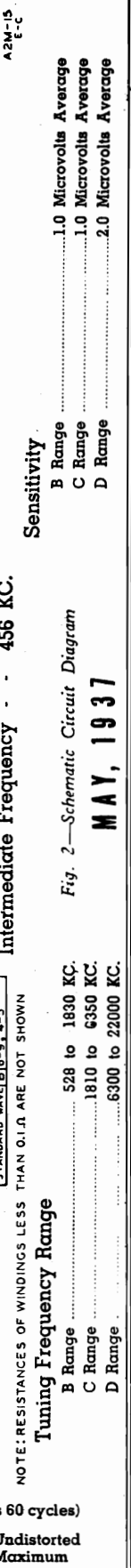
Set the signal generator for 600 KC. Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Line Voltage: 115 Volume Control: Maximum		Position of Band Switch: Standard Wave									
		TUNE	FUNCTION	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
487	R.F.	.....	.....	0	6.2(1)	280	110	7.8(10)	.....	6.2(10)	7.8(9)
487	1st Det.	.....	.....	0	6.2(1)	280	110	.....	.....	6.2(10)	9.0
628	Osc.	.....	.....	0	6.2(1)	110	.....	.....	.....	6.2(10)	7.8(9)
487	1st I.F.	.....	.....	0	6.2(1)	280	110	7.5	.....	6.2(10)	5.0
487	2nd I.F.	.....	.....	0	6.2(1)	280	148	9(10)	.....	6.2(10)	.....
484	2nd Det.	.....	.....	0	6.2(1)	8(13)	.....	.....	.....	6.2(10)	6.5
628	A.V.C.	.....	.....	0	6.2(1)	180	.....	.....	.....	6.2(10)	6.0
487	1st A.F.	.....	.....	0	6.2(1)	180	.....	.....	.....	6.2(10)	.....
416	Power	.....	.....	0	6.2(1)	380	280	20(10)	.....	6.2(10)	.....
524469	Rectifier	.....	.....	0	5.0(5)	.....	102(40)	.....	102(40)	.....	5.0(5)
485	Tuning Indicator	.....	.....	Plate to Ground (250)	.....	.....	.....	.....	.....	.....	.....

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) A.C. voltage as read across heater terminals 2 and 8.
(3) A.C. voltage as read across heater terminals 4 and 6.
(4) A.C. voltage as read across heater terminals 2 and 7.
(5) A.C. voltage as read across heater terminals 2 and 8.
(6) A.C. voltage as read across heater terminals 4 and 6.

MODEL D697
Schematic, Phono. Data
Transformer Data



Power Output - - - - - 9.8 Watts Undistorted
12 Watts Maximum

MODEL D697

Alignment, Circuit Data **WESTERN AUTO SUPPLY CO.**
Trimmers, Coils

11 TUBE • 3 BAND • ALL WAVE

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position 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., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	ADJUSTMENT
I. F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C29) & (C30)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C22) & (C23)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C13)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	Ant. Range B (C4) Int. Range B (C8)	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C15)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor—See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C12)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Antenna Range C (C3) Int. Range C (C7)	Turn Rotor to Max. Output	Adjust to Maximum Output
2000 KC	Range C	400 Ohm	2000 KC	Antenna Lead	2000 KC (C14)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor—See Note B
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C11)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Ant. Range D (C2) Int. Range D (C6)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor—See Note B
7000 KC	Range D	400 Ohm	7000 KC	Antenna Lead	7000 KC (C18)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor—See Note B

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—In sets using the telephone dial tuning, there will be seen inside the telephone dial button ring an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. (Do not tighten these screws too much.)

In sets using the moving beam of light indicator, there is a moving light assembly held to the front of the drive drum by means of a screw. Loosen this

screw and move the light assembly until the beam is at the 1500 KC mark on the dial. Retighten the screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

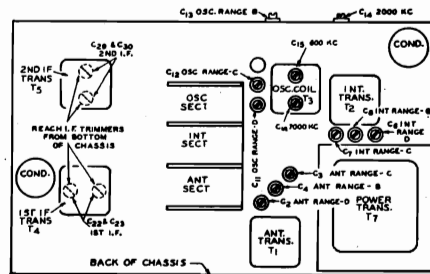


Fig. 3—Location of Trimmers

When the selectivity control is in the broad position, the coupling winding which is wound under the primary in the case of T4 is connected in series with the secondary. In the case of T5, the coupling winding which is wound under the secondary is in series with the primary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

A 6H6 tube functions as a diode 2nd detector. AVC voltage is applied to the control grid circuits of the R.F. and I.F. tubes.

Across the volume control resistor R12 is a filter composed of condensers C34 and C35 and resistor R13. At high volume settings, the filter is not effective. At low volume settings, the action of the filter results in an increase of high and low frequency amplitudes relative to the other frequency amplitudes.

The output of the 2nd detector is applied to the 6J7 1st A. F. tube. The output of this tube is fed thru resistance coupling into the 6K6 output tube shown nearest to it in the schematic.

A portion of the voltage developed across the output tube grid resistor is applied to the control grid of the 6C5 balancing exciter tube. This tube functions as a phase inverter and applies the audio voltage of proper phase and amplitude to the other 6K6 output tube. The two output tubes operate as a stage of Class A push-pull amplification. The balancing exciter tube thus replaces a push-pull input transformer. A dynamic reproducer is employed.

The power unit uses a 5Y3G full wave rectifier. A 6C5 tuning indicator tube is employed.

Glass and Metal Tubes

All sets of this series use a 6H6 metal tube and 5Y3G and 6C5 glass tubes.

It will be noted in the schematic that there are two tube type numbers shown at the other sockets. The "metal" tube sets use the upper tube type numbers which are for metal tubes while the "glass" tube sets use the lower tube type numbers which are for glass tubes.

Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

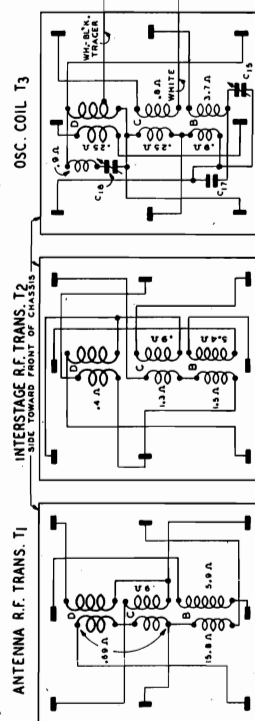


Fig. 6—Coil Terminal Arrangement and DC Resistance of Windings

Circuit

This model is a three band AC operated radio with a tuning range as shown in the specifications above.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R.F. transformer assemblies and T3 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively.

The band switch completes connections to the coils in use. The band switch sections are designated in the schematic as section 1 and section 2.

The antenna transformer with tuned secondary feeds into a type 6K7 R.F. amplifier tube. The output of this tube is fed through the interstage R.F. transformer with tuned secondary into a 6J7 tube which functions as the 1st detector.

A separate type 6C5 tube is employed in the oscillator circuit. The oscillating circuit is always resonant at 456 KC above the frequency to which the R.F. amplifier is tuned.

One stage of I.F. amplification is employed using a 6K7 tube. The primaries and secondaries of the

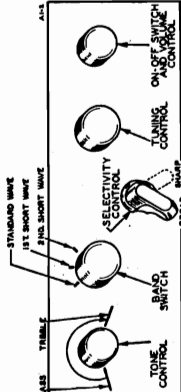


Fig. 1—Arrangement of Controls

1st and 2nd I.F. transformers are tuned by small trimmer condensers.

Referring to the 1st and 2nd I.F. transformers T4 and T5 in Fig. 2, it will be noted that there is a coupling winding shown below the primary of T4 and below the secondary of T5.

When the selectivity control is in the sharp position, the coupling windings are open circuited and the loose coupling which exists between the primary and secondary of these transformers results in high selectivity.

WESTERN AUTO SUPPLY CO.

MODEL D697
Voltage, Socket
Changes, Phono Data
Parts List

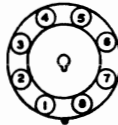


Fig. 7—Octal Tube Terminal Numbering (bottom of socket).

Twenty-Five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true—the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram Fig. 2. On the front panel of the chassis base is a round knockout 1 1/2 inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic. METAL TUBES ARE IN SAME POS. AS GLASS EQUIVALENTS SHOWN IN LAYOUT.

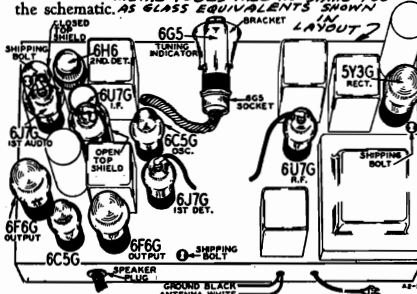


Fig. 4—Location of Tubes

A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

Some models are shipped from the factory equipped with the phono socket. A jumper is inserted in this socket which must be removed if the phonograph installation is made—see Fig. 2.

117-234 Volt Power Transformers

Some models are equipped with a 117-234 volt 40 to 60 cycle power transformer. Connections as shown in Fig. 2 are completed to a special octal socket mounted on the back panel of the chassis. A plug which goes with this socket may then be inserted for either the 117 volt or 234 volt connection.

If one of these transformers is to be installed in a chassis equipped with a regular transformer, there is a 1 1/2 inch round knockout on the back panel which may be removed to permit installation of the octal socket mentioned above.

Dial and Drive Assembly

Complete information regarding the dial and drive assemblies will be found in the Dial and Drive Service Notes issued for this chassis. (see index)

Changes in Later Models

Later models of this series have the following changes incorporated in them.

On the first models, the 2nd I.F. Coil was not expanded. In other words, the extra selectivity coupling winding was not incorporated in the early type coil. Models with the letter "C" or any later issue stamped on the chassis use the new type coil with the selectivity coupling winding. Because of the change in coil connections, the selectivity switch used on the late model is not interchangeable with that on the early model.

When ordering parts, therefore, it is important that the issue letter on the chassis be noted and the correct part number as shown in the parts list be specified.

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum
Readings taken with 1000 Ohm-per-volt meter.

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7	R.F.	0	6.1(1)	250	105	2.5		6.1(1)	2.5
6J7	1st Det.	0	6.1(1)	250	125	0		6.1(1)	5.8
6C5	Osc.	0	6.1(1)	125(2)				6.1(1)	0
6K7	I.F.	0	6.1(1)	250	100	2.5		6.1(1)	2.5
6H6	2nd Det.—A.V.C.	0	6.1(1)					6.1(1)	0
6J7	1st A.F.	0	6.1(1)	110	120	0(3)		6.1(1)	0(3)
6C5	Balancing Exciter	0	6.1(1)	100				6.1(1)	18.5
6F6	Output	0	6.1(1)	330	250			6.1(1)	0(4)
6V3	Rectifier	0	4.8(5)		730(4)		730(4)		4.8(5)
6G5	Tuning Indicator	Plate to Ground 20		Target to Ground 250		Cathode to Ground 0		Across Heater 6.1 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Subject to variation.
(3) Bias (2.5 volts) as read across resistor R22.

(4) Bias (24 volts) as read across resistors R22, R23, & R24.
(5) A.C. voltage as read across filament terminals 2 and 8.
(6) A.C. voltage as read across terminals 4 and 6.

The R.F. circuit of early models was slightly different from that used in later models. The screen grids of the R.F. and I.F. tubes now supplied by separate voltage sources were formerly connected together and supplied from a single source. On the latter models, resistor R 28 and condenser C 46 were not used.

Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

MISCELLANEOUS

Part No.	Description	List Price
3A254	Tube Socket—Octal (7 Prong)	.15
3A263	Tube Socket—Octal (8 Prong)	.15
3A261	Tube Socket—Octal (5 Prong)	.10
3A262	Speaker Socket (4 Prong)	.15
12B25	Tuning Eye Tube Socket and Cable Assembly	.55
3A264	Phone Socket—Octal (4 Prong)	.10
3A262	Dual Key Socket—Octal (8 Prong)	.10
6A214	Transformer Connections—Used with above Socket	.15

SPEAKERS

When ordering parts for speakers, specify part number of speaker and latter preceding part number stamped on the speaker.

12A289	12" Dynamic Speaker, complete with Output Trans. (Ta)	7.70
	Cone and Voice Coil Assembly for above speaker	4.60
	Output Transformer only (Ta)	2.45

KNOB

Specify Name of Knob & Model of Radio	Volume Control Knob	.15
	Tone Control Knob	.15
	Tuning Control Knob	.15
	Selectivity Control Knob	.25

GENERAL

25X378	Clamp Bracket for Tuning Eye Tube	.10
22X350	Tube Shield—Closed Top (Used on glass and metal tube chassis)	.15
22X32	Tube Shield—Open Top (Used only on models having glass tubes)	.15
22X51	Tube Shield Base	.10
22X38	Felt Washers (Used Behind Knobs)	doz.
8X23	Rubber Cushions (Chassis Mounting)	.10
30X44	Grid Clip only	doz.
2A78	Selectivity Switch (Early Type—Used when 2nd I.F. is not expanded)	.40
2A83	Selectivity Switch (Late Type—Used when 2nd I.F. is expanded)	.45
4A38	Terminal Strip (1 lug insulated, one lug used for mg.)	.10
4A53	Terminal Strip (3 lugs insulated, mounting hole used)	.10
4A48	Terminal Strip (3 lugs insulated)	.30
13C214	Antenna and Ground Lead Assembly	.50
12X30	Line Cord and Plug	1.45
2A79	Band Switch (2 section, 3 position)	

TRANSFORMERS AND COILS

Part No.	Description	List Price
5A779	T1 Antenna Transformer and Can Assembly	\$2.15
5A780	T2 R.F. Interstage Transformer and Can Assembly	2.30
5A781	T3 Oscillator Coil and Can Assembly	2.40
5A782	T4 1st I.F. Transformer and Can Assembly	2.40
5A783	T5 2nd I.F. Transformer and Can Assembly (Early Type—Without selectivity coupling winding)	2.25
5A857	T6 2nd I.F. Transformer and Can Assembly (Late Type—With selectivity coupling winding)	2.25
5X148	T7 Output Transformer (See "Speakers")	4.45
5X149	T7 117 Volt, 40 Cycle, Standard Power Transformer	7.15
5X150	T7 117-234 Volt, 40-60 Cycle, Universal Power Transformer	6.75

CONDENSERS

Part No.	Code	Capacitance	Voltage	List Price
44X280	C10	.05 mf.	180	\$0.15
44X187	C1	.02 mf.	180	.10
44X105	C5	.10 mf.	360	.20
44X121	C20	.25 mf.	360	.30
44X117	C25	.25 mf.	180	.25

CONDENSERS (Cont.)

Part No.	Code	Capacitance	Voltage	List Price
45X223	C27	1 mf.	150 Dry	\$0.75
45X11	C43	1 mf.	250 Wet	1.10
44X30	C44	14 mf.	450 Wet	1.00
45X222	C45	30 mf.	25 Dry	.75

MOLED

47X49	C1	250 mmf.	.15
47X81	C19	35 mmf.	.25
47X54	C32	50 mmf.	.10
47X55	C34	100 mmf.	.15
47X45	C39	250 mmf.	.15

TRIMMER

17A73	C2	2-25 mmf.	Range "D" Antenna Trimmer	.35
	C3	2-25 mmf.	Range "C" Antenna Trimmer	.35
	C4	2-25 mmf.	Range "B" Antenna Trimmer	.35
	C5	2-25 mmf.	Range "A" Antenna Trimmer	.35
17A74	C6	2-25 mmf.	Range "D" Interstage Trimmer	.35
	C7	2-25 mmf.	Range "C" Interstage Trimmer	.35
	C8	2-25 mmf.	Range "B" Interstage Trimmer	.35
	C9	2-25 mmf.	Range "A" Interstage Trimmer	.35
17A75	C10	2-25 mmf.	Range "D" Oscillator Trimmer	.25
	C11	2-25 mmf.	Range "C" Oscillator Trimmer	.25
	C12	2-25 mmf.	Range "B" Oscillator Trimmer	.25
	C13	1-12 mmf.	Range "A" Oscillator Trimmer	.20
17A76	C14	1000-1700 mmf.	2000 KC Adjustment	.50
	C15	40-120 mmf.	Oscillator 1000 KC Adjustment	.40
17A77	C16	40-100 mmf.	Oscillator 7000 KC Adjustment	.40
17A78	C17	15-55 mmf.	1st I.F. Trimmer	.40
17A79	C18	15-55 mmf.	2nd I.F. Trimmer	.40

MISCELLANEOUS

47X80	C16	13 mmf.	Compensating Capacitor	.50
47X81	C17	370 mmf.	Iron Clad	.30
47X91	C21	45 mmf.	Iron Clad	.25
47X91	C24	45 mmf.	Iron Clad	.25
47X91	C25	45 mmf.	Iron Clad	.25
47X83	C31	150 mmf.	Iron Clad	.35
14A70	3	Section Gang Condenser	(less dial and drive assembly)	4.20

RESISTORS

Part No.	Code	Resistance	Wattage	List Price
4A4502	R1	5,000 Ohm	0.2	\$0.15
4A4503	R2	50,000 Ohm	0.2	.15
C14523	R3	25,000 Ohm	1.0	.15
4A4514	R4	150 Ohm	0.2	.15
4A4502	R5	5,000 Ohm	1.0	.30
4A4502	R6	4,000 Ohm	5.0	.40
4A4505	R7	1 Megohm	0.2	.10
4A4505	R8	8 Megohm	0.2	.15
4A4505	R9	8 Megohm	0.2	.15
4A4503	R10	50,000 Ohm	0.2	.10
4A4506	R11	10 Megohm	0.2	.10
4A4504	R12	2,000 Ohm	0.2	.10
4A4505	R14	2 Megohm	0.2	.10
4A4503	R15	50,000 Ohm	0.2	.10
4A4504	R16	100,000 Ohm	0.2	.10
4A4514	R17	150,000 Ohm	0.2	.15
4A4503	R18	40,000 Ohm	0.5	.15
4A4503	R20	2 Megohm	0.2	.10
4A4504	R21	500,000 Ohm	0.2	.10
4A4504	R24	57 Ohm	0.5	.20
4A4504	R25	200,000 Ohm	0.2	.10
4A4514	R26	14,000 Ohm	0.2	.10
4A4504	R27	200,000 Ohm	0.2	.10
4A4503	R28	80,000 Ohm	0.5	.15

WIRE WOUND

43X77	R22	27 Ohm	0.25	.35
	R23	175 Ohm	1.0	

VARIABLE

3A236	R12	500,000 Ohm	Volume Control and On-Off Switch	1.00
40X224	R19	1 Megohm	Tone Control	.45

* Used on late models only.

PHONO ATTACHMENT PARTS

Part No.	Description	List Price
13X298	30" Phono Cable Assembly Complete (Includes Plug, Double-Tip Phono Jack, Switch, and Knob)	\$2.85
3A264	Phono Socket—Octal (4 Prong)—Must be ordered for Chassis not equipped with this socket	.10
6A218	Plug (8 Prong) Only of Phono Cable	.15
6A212	Phono Jack Only of Phono Cable	.10
2A50	Phono Switch Only of Phono Cable	.20
10A90	Knob Only of Phono Cable	.30

DIAL AND DRIVE PARTS WILL BE FOUND IN SPECIAL DIAL AND DRIVE NOTES. (see index)
Prices Subject to Change Without Notice.

MODEL D697

MODEL D698

Telephone Dial Data

WESTERN AUTO SUPPLY CO.

NOS. 9, 10, & 11—17 BUTTON TELEPHONE DIAL

NOS. 3 & 7—PHANTOM LIGHT DIAL

APRIL, 1937

Identification of Dial and Chassis

The following description will identify the different dials:

No. 9 Dial—17 Button Telephone Dial—Station call letters in black push buttons.

No. 11 Dial—Same as No. 9 Dial except push buttons are brown.

No. 10 Dial—17 Button Telephone Dial—Station call letters are rectangular in shape and are mounted in rectangular openings in escutcheon ring. Equipped with visible tone and volume indicators.

No. 3 Dial—Glass dial—Moving beam of light indicators—Tone and volume indicated by series of circles.

No. 7 Dial—Glass dial—Moving beam of light indicators—Tone and volume indicated by slanting lines.

The following description will identify the chassis used with the above dials:

8 Tube—D698

11 Tube—D697

Telephone Dial Assembly

The telephone dial assembly provides a means of pre-setting a number of broadcasting stations and tuning in these stations at any time by depressing a button and rotating the dial to a stop position.

The apparatus is mounted on an assembly attached at the front of the chassis. An examination of this assembly will clearly show the method of operation.

Silencer Circuit—A silencer circuit is provided which results in silent tuning between stations when using the telephone dial buttons.

When a telephone dial button is depressed, a circuit is established between the ungrounded end of the volume control and the chassis ground. Referring to Fig. 1 it will be noted that contact is made between the line from the volume control, contact ring, contact washer arm (when button is depressed), spring and pulley ring stud. Since the pulley ring is at ground potential, this grounds the audio voltage and no signal will be heard until the button is released to break the contact.

It should be noted that the contact ring is part of the pulley ring assembly, but is insulated from it.

In the case of powerful local stations a slight amount of signal may be heard when the button is depressed.

Telephone Dial Adjustments

Noise When Tuning in a Signal with a Telephone Dial Button

As explained in the article on "Silencer Circuit" in this manual, no noise or signal should be heard when tuning in a signal with a telephone dial button until the button is released. If noise is heard while tuning in a signal with one of these buttons, it can be corrected as follows:

If Noise Occurs on All Buttons—This is probably due to a poor contact between the flat contact spring and the contact ring—See Fig. 1. Clean the flat contact spring and contact ring to insure a good electrical connection. Ordinary cleaning fluid may be used and will be effective in most cases in cleaning the surface without affecting the plating. If the contact is still not satisfactory, a piece of fine emery cloth may be used.

If Noise Occurs on One Button Only—This is due to a poor contact between the pulley ring stud, spring, contact washer, and contact ring—See Fig. 1. Clean all of these items of the particular button, in the same manner as mentioned previously, so as to provide a good electrical connection.

Telephone Dial Drive Cord Slipping

If the telephone dial drive cord slips on the tuning shaft pulley, this may be remedied by adjusting the drive cord tension pulley. Loosen the tension pulley bracket screw and adjust pulley assembly until the desired tension is obtained.

Position of Stop Pin

When the telephone dial assembly is on the chassis, the gang condenser rotor should not com-

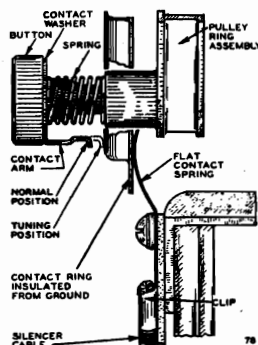


Fig. 1—Silencer Assembly

pletely open or close. The travel of the rotor in this respect is controlled by the gang stop pin on the pulley ring—See Fig. 4. This is necessary to protect the gang condenser in case the telephone dial is swung rapidly to either of the extreme positions. When the gang stop pin is properly set, it will serve as the stop at both extreme positions. If the rotor is seen to open completely or close completely, the stop pin should be pulled back and re-set to overcome this condition.

Greasing and Oiling

After a period of time, put some light grease on the pulley ring shaft and on the teeth of the pulley ring. Use light oil on the drive shaft assembly bearing, care being taken not to get any on the drive cord.

Telephone Dial Replacements

Replacing Complete Dial and Condenser Assembly

Remove the grid lead clip from tube grid cap. Remove silencer cable from the contact spring assembly. Unsolder dial lamp lead from terminal of tube socket.

Unsolder the three stator section connections of the gang condenser. Unsolder the three braided shield leads which ground the gang condenser frame to the chassis, taking care not to loosen the connections of any other units which are grounded at these common points.

At the back of the gang condenser is a stud which secures the assembly to an "L" bracket which is secured to the chassis.

Through this stud is a cotter pin. Remove only the cotter pin, metal washer, and rubber washer.

Viewing the assembly from the back, on the left is a brass bolt which holds the dial support bracket to the chassis—remove this bolt from underneath the chassis.

Grasp the dial support brace and move entire assembly toward the front of the chassis. When the support casting rubber cushions slip clear of the slot in front of chassis, lift entire assembly clear of chassis.

To replace this assembly, reverse the procedure as given above.

Replacing Pulley and Button Ring Assembly Only

Remove drive cord.

From underneath the chassis, unsolder the dial lamp lead from prong of the tube socket. Pull this lead through and out to the front of the assembly.

Remove the four escutcheon screws which hold the escutcheon ring and glass crystal in place. The dial scale pointer is removed by unhooking it from the center stud. Unscrew and remove center stud, washers, and dial scale. Slide pulley ring assembly off the center shaft.

On the No. 10 dial, two strips of celluloid between the escutcheon ring and the glass crystal will have to be removed.

To replace the pulley ring assembly, proceed as follows: Lay the assembly face down and adjust the stop pin. The stop pin (Fig. 2) is directly in back of the wide spacer on the dial button ring. Pull this pin back and adjust it to the center position—See Fig. 2.

Rotate tuning condenser rotor counter-clockwise (from front) as far as possible—See Fig. 2.

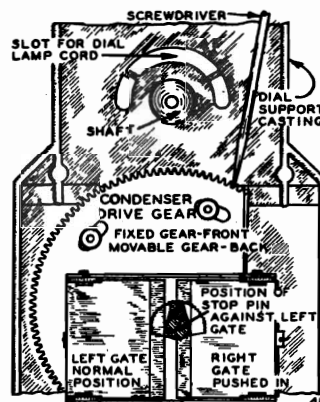


Fig. 2—Replacing Pulley Ring Assembly

Place the pulley ring assembly on the shaft with the knot of the dial lamp lead at the top—do not engage the gears.

Pull the dial lamp lead through the slot in the dial support casting. Then place this lead through the clip under the dial support brace and out through the opening in the back of this brace.

With the gears still disengaged, rotate the pulley ring clockwise (from front) 1/2 revolution until the stop pin passes over the right gate and comes to rest against the left gate—See Fig. 2.

With the condenser rotor fully closed, push the pulley ring on the shaft until the pulley ring gear engages the fixed gear only (front) of the condenser drive gear assembly. Hold the pulley ring assembly and with a fine blade screw driver, move the movable (back) gear clockwise one tooth relative to the fixed gear—See Fig. 2. Then push the pulley ring all of the way on, engaging the movable gear.

Now lay the chassis on its back. Replace in the order given the large washer with rectangular hole, dial scale, washers, center stud, dial pointer, glass crystal, and escutcheon. Resolder the lamp lead.

For the No. 10 dial, before putting the escutcheon on, lay the two celluloid strips on the glass crystal with the inside flange facing away from the glass. Then lay the escutcheon on top of the celluloid strips. The section not cut out for station call letters should be at the wide spacer in the button spacer ring. Center the small holes in the celluloid discs in the station call letter openings and then tighten the escutcheon screws.

The stop pin must now be adjusted, as explained in article "Position of Stop Pin," until the condenser does not open or close fully. Injury to the condenser will result if allowed to open or close fully.

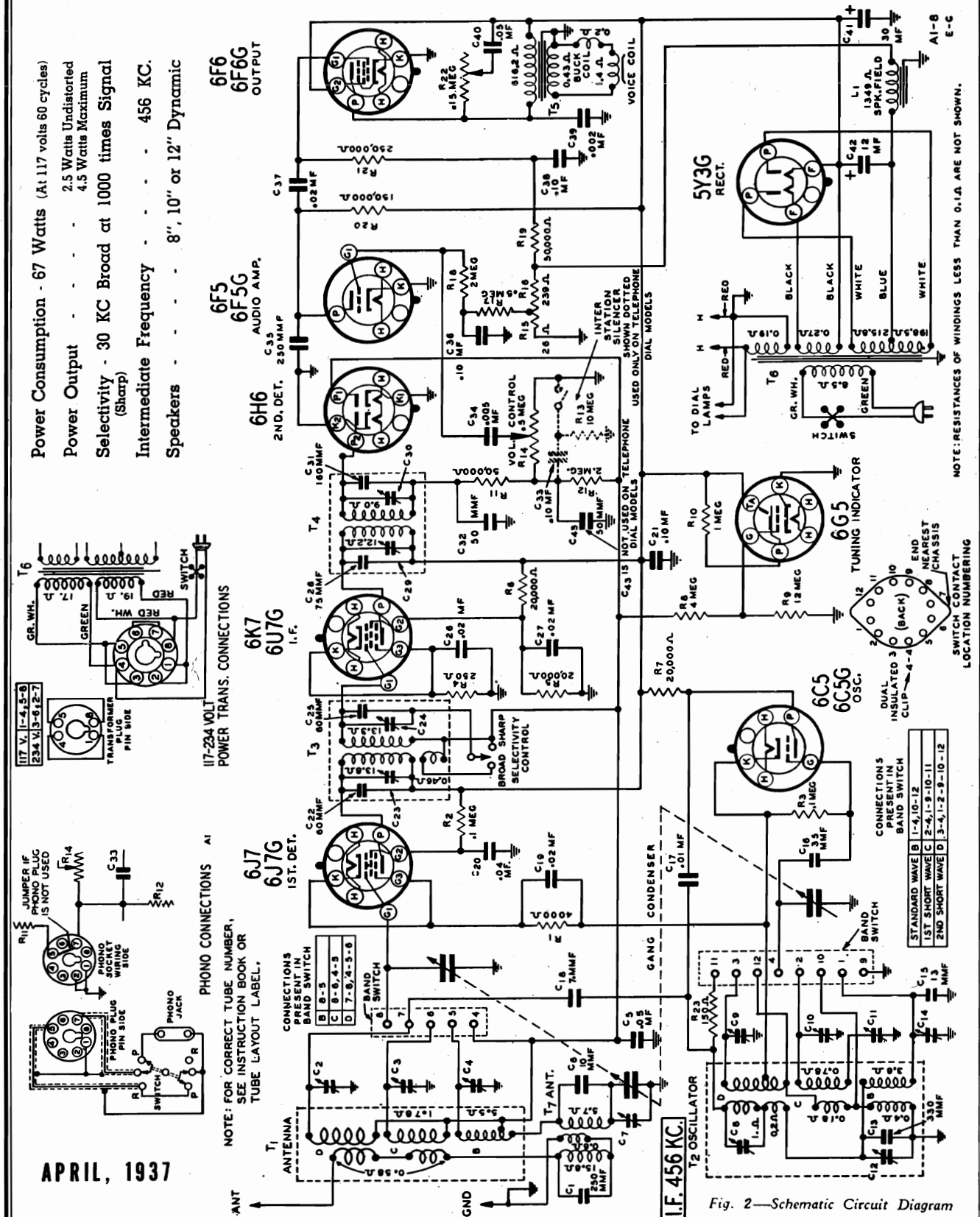
Replace the drive cord as explained in the article "Replacing Drive Cord."

Replacing Gates

After a great amount of use, one or both of the stop gates may wear, making it necessary to replace the stop gate assembly. This is done by first removing the pulley ring assembly as explained in the article "Replacing Pulley and Button Ring Assembly."

The stop gate assembly is then removed by taking out the two screws at the bottom of the assembly.

Compliments of www.nucow.com



MODEL D698

Alignment, Voltage
Socket, Trimmers, Coils

WESTERN AUTO SUPPLY CO.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position 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., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	ADJUSTMENT
I. F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C29) & (C30)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C23) & (C24)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C14)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	2nd Ant. Range B (C7) 1st Ant. Range B (C4)	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C12)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C10)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Antenna Range C (C3)	Turn Rotor to Max. Output	Adjust to Maximum Output
2000 KC	Range C	400 Ohm	2000 KC	Antenna Lead	2000 KC (C11)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C9)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Antenna Range D (C2)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
7000 KC	Range D	400 Ohm	7000 KC	Antenna Lead	7000 KC (C8)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

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—In sets using the telephone dial tuning, there will be seen inside the telephone dial button a ring of an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. [Do not tighten these screws too much.]

In sets using the moving beam of light indicator, there is a moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until the beam is at the 1500 KC mark on the dial. Retighten the screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

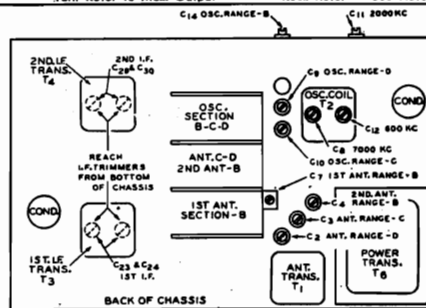


Fig. 3—Location of Trimmers

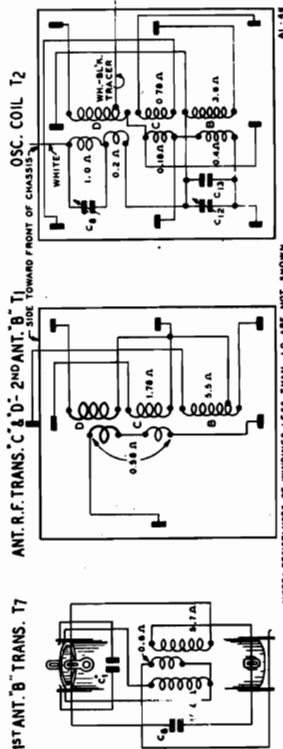


Fig. 7—Circuit Connections and D.C. Resistance of Windings in early models, write the factory for detailed instructions.

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram Fig. 2. On the side panel of the chassis base is a round knockout 1 1/4 inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic.

A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug and on the other end is a phonograph radio switch and double tip jack.

Some models are shipped from the factory equipped with the phono socket. A jumper is inserted in this socket which must be removed if the phonograph installation is made—See Fig. 2.

Early Models—A few of the early models did not have the circular knockout for the phonograph socket as mentioned above. If a phonograph installation is to be made in connection with one of these

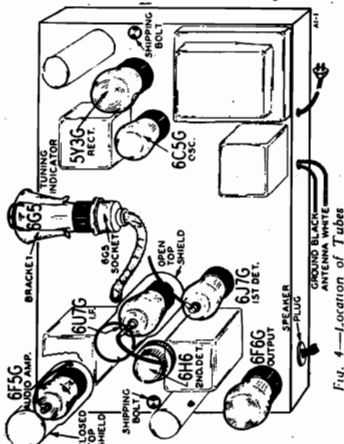


Fig. 4—Location of Tubes

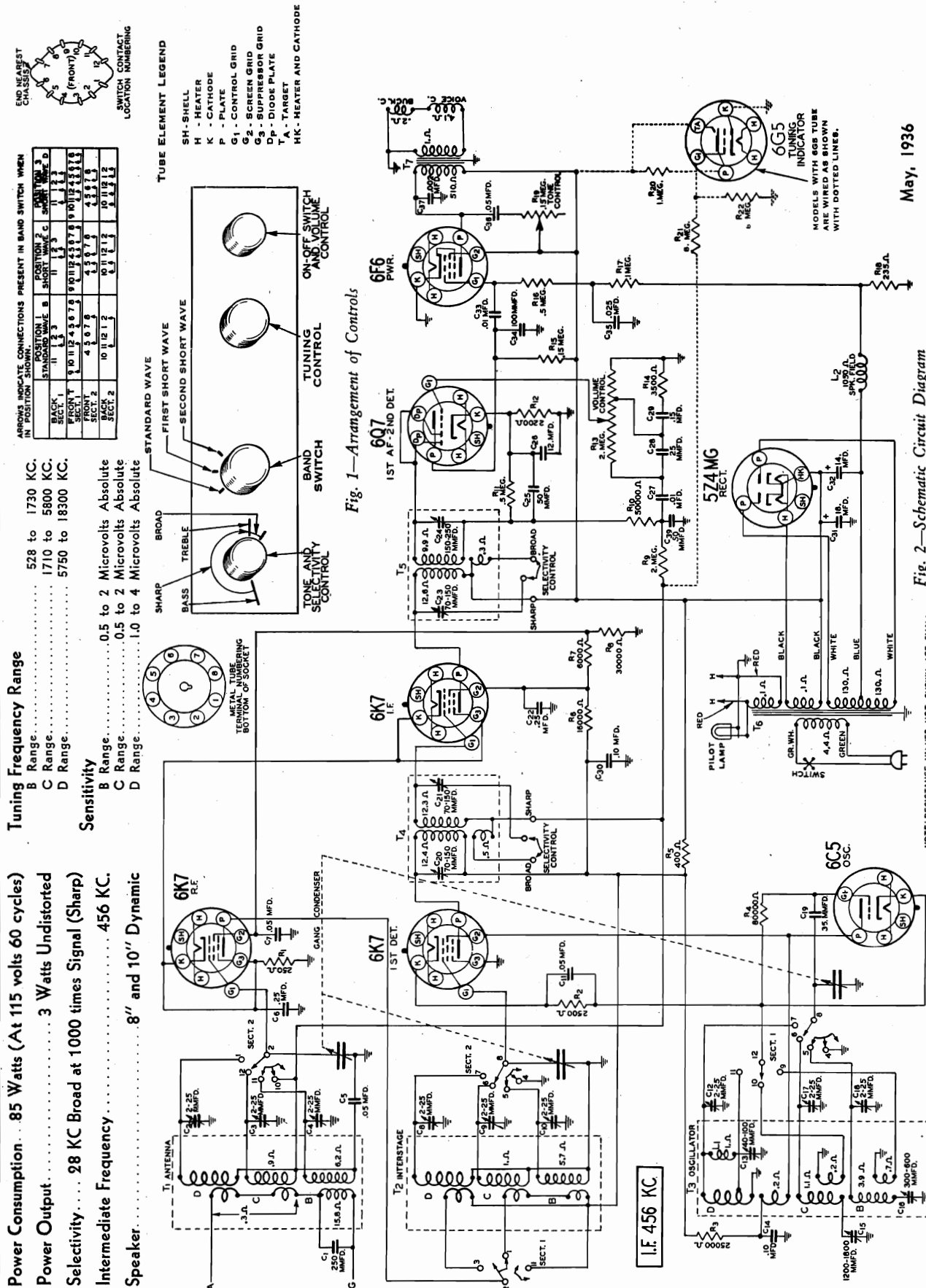
VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum
Readings taken with 1000 Ohm-per-volt meter.

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated)										Tuning Indicator
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8	Prong No. 9	Prong No. 10	
6J7	1st Det.	0	6.1(1)	220	100	7.9		6.1(1)	7.9	0		
6C5	Osc.	0	6.1(1)	140				6.1(1)		0		
6U7	I.F.	0	6.1(1)	220	100	2		6.1(1)	2	0		
6H6	2nd Det.	0	6.1(1)		0			6.1(1)		0		
6F5	Audio Amp.	0	6.1(1)		75			6.1(1)		0(2)		
6F5	Power	0	6.1(1)	215	220			6.1(1)		0(3)		
6Y3	Rectifier	0	4.9(4)		610(5)			610(5)		4.9(4)		
6G5												
									</			

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) A.C. voltage as read across filament terminals 2 and 8.
(3) A.C. voltage as read across filament terminals 4 and 6.
(4) A.C. voltage as read across heater terminals 2 and 7.
(5) A.C. voltage as read across filament terminals 4 and 6.

MODELS D701, D721, S721 (1936)
WESTERN AUTO SUPPLY CO. Schematic Specifications



May, 1936

MODELS D701, D721

S721 (1936)

WESTERN AUTO SUPPLY CO.

Circuit Data, Alignment

Circuit

This model is a three band radio with a tuning range in each band as shown in the specifications above. Three band coverage is accomplished by means of three sets of R.F. and oscillator coils and a two-section triple throw switch.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R.F. transformer assemblies and T3 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively. The band switch sections are designed as section one and section two.

The band switch completes connections to the coils in use. It also short circuits the R.F. transformer secondary and oscillator coil of lower frequency not in use.

The antenna transformer with tuned secondary feeds into a type 6K7 R.F. amplifier tube. The output of this tube is fed through the interstage R.F. transformer with tuned secondary into another 6K7 tube which functions as the 1st detector.

A separate type 6C5 tube is employed in the oscillator circuit. The oscillating circuit is always resonant at 456 KC above the frequency to which the R.F. amplifier is tuned.

The oscillator potential is fed into the cathode circuit of the 6K7 1st detector tube. This results in the intermediate or beat frequency of 456 KC being present in the plate circuit of this tube.

Two stages of I.F. amplification are employed using 6K7 tubes. The primary of the first I.F. transformer and second I.F. transformer and the primary of the 3rd I.F. transformer are tuned by small trimmer condensers.

Referring to the 1st and 2nd I.F. transformers T4 and T5 in Fig. 2, it will be noted that there is a coupling winding shown in the illustration below the primary of T4 and below the secondary of T5.

When the selectivity control is in the sharp position, the coupling windings are open, circuited and the loose coupling which exists between the primary and secondary of these transformers results in high selectivity.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary in the case of T4 is connected in series with the secondary. In the case of T5, the coupling winding which is wound under the secondary is in series with the primary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

A type 6Q7 duo-diode triode tube functions as the second detector and a one stage amplifier. The two diode plates are connected together. AVC voltage is applied through isolating resistors to the control grid circuits of the R.F. and I.F. tubes. The audio voltage developed across volume control resistor R13 is applied through the movable arm to the control grid of the 6Q7 tube.

Across the volume control resistor R13 is a filter composed of condensers C28 and C29 and resistor R14. A tap connection near the low potential end of the volume control is connected between the two condensers. At high volume settings, the filter is not effective. At the low volume settings, as the pointer approaches the tap, the higher frequencies are by-passed through condenser C28 to ground. The high frequencies are transmitted through condenser C29. At low volume settings the low frequency amplitudes are increased as a result.

Resistance coupling is used between the first audio stage and the output stage which employs type 6G6 output pentode tube. A type 12AG (full wave glass tube) full wave rectifier is used in the power unit.

The models with the tuning indicator tube are wired as shown in the schematic. This tube contains a triode and cathode ray section in one envelope.

The cathode ray is produced by the attraction of electrons from the upper end of the cathode to the coated target or anode, which is operated at a high positive potential. When this electron stream strikes the target the coating glows. The electron stream is controlled by an additional element, or control electrode, in the tube.

As a signal is tuned in, the control grid of the triode section of the 6G6 cathode ray tube becomes increasingly negative, the negative bias voltage being taken from the AVC line. The AVC voltage is reduced to a suitable value by the potentiometer arrangement of the 10 and 1.5 megohm resistors. The increased bias voltage reduces the triode plate current. This reduces the voltage drop across the 1 megohm plate resistor and raises the triode plate voltage. The triode plate is connected to the control electrode of the cathode ray section of the tube.

The shape and size of the area on the target struck by the cathode ray is governed by the voltage of the control electrode. When the signal is tuned to resonance, practically no plate current flows and the voltage of the control electrode is the same as that of the target. There is no opposition to the flow of electrons to the target. Tuning off resonance decreases the control electrode voltage, because of the increased flow of the target to widen, because of the opposite flow of electrons in the direction of the control electrode.

Alignment and Calibration

Correct alignment is extremely important in connection with all wave radios. The receivers are all properly aligned at the factory with precision instruments and readjustment 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 at 456, 1730, 1500, 600, 500, 1800, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I.F. Adjustment

Set the signal generator for a signal of 456 KC. Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector. Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band). Turn the selectivity control to the sharp position and keep it in this position for all adjustments. Turn the volume control to the maximum position. Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC. Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC. Turn the rotor of the tuning condenser to the full open position. Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator. For control and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C18) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Readjust the set screw. Adjust the oscillator Range B trimmer (C14) and antenna Range B trimmer (C4) to maximum. Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC. Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 600 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

5800 KC Adjustment

Set the signal generator for 5800 KC. Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator. Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band). Adjust the oscillator Range C trimmer (C17) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the oscillator Range C trimmer (C9) and antenna Range C trimmer (C3) to maximum. Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC. Turn the tuning condenser rotor until maximum output is obtained.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC. Keep the band selector of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position. Turn the band selector to the Range D position (2nd short wave band).

Adjust the oscillator Range D trimmer (C12) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C8) and antenna Range D trimmer (C2) to maximum. When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained. Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC. Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the defective trimmer and connect the lead to the trimmer in the strip. This connection is then made to the single trimmer. Connect the other end of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Voltage Chart

The voltage readings are taken with a voltmeter having a resistance of 1000 ohms per volt. The standard metal tube socket terminal numbering system (bottom of socket) is shown in Fig. 5. On the schematic circuit diagram, Fig. 2 is a list giving the complete names of the tube elements and the corresponding symbols as used on the sockets on the schematic.

WESTERN AUTO SUPPLY CO.

MODELS D701, D721
S721 (1936)
Voltage, Socket, Trimmers
Coils, Phono. Connections

loose and a new one will be required. In the sets with the flat belt type of drive, there is an idler pulley which can be positioned, and by means of which the belt tension should be increased. In this type, therefore, the belt tension should be increased before attempting to put on a new one.

The replacement parts list shows the parts used in each type of drive and the parts common to both types.

Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 2. In contact locations not used, the number applying to that particular location is not employed.

Phonograph Connections

connected to the switch terminals nearest the chassis base. Before connecting the cable leads to the phono switch, it will be necessary to slip a piece of varnished tubing over the portion of the cable that passes near the 6K7 1st I.F. tube socket.

Now ground the shielding by soldering it to the lugs on the chassis base. One of these lugs is located just below the planetary drive; the other is near the rear mounting foot of the gang condenser.

Complete the other connections as illustrated in Fig. 7. The lead between the tone control and the .01 mf. tubular condenser C36 mounted on the back of the chassis base, should be covered with a piece of varnished tubing.

The tin plate shield is soldered to the tone control mounting bracket in such a way that when it is bent down toward the bottom and back of the chassis it will shield the lower leads of the phono switch and the lead between the tone control and tubular condenser C36.

After making the phono connections, the I.F. stages should be realigned.

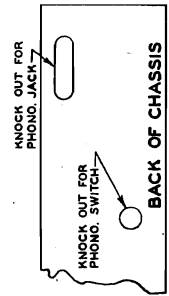


Fig. 8—Location of Phono Knockouts

cord belt. This is a bronze cable with a black fabric covering. It is about 3/16 inch in diameter.

The belt type also has an idler pulley which the cord type does not have.

The planetary assembly is the unit that is integral with the tuning shaft. It is at the bottom of the belt. If the nut of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect. If the nut is too loose, the drive will slip in slow speed. The remedy in this case is, of course, to tighten up the nut.

Should the drive belt slip when the planetary pulley is turning, first inspect the drive drum assembly. This is the assembly which is mounted on the tuning condenser shaft. If this assembly and the tuning condenser rotor turn satisfactorily, the belt is probably too

loose. This is a bronze cable with a black fabric covering. It is about 3/16 inch in diameter.

The belt type also has an idler pulley which the cord type does not have.

The planetary assembly is the unit that is integral with the tuning shaft. It is at the bottom of the belt. If the nut of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect. If the nut is too loose, the drive will slip in slow speed. The remedy in this case is, of course, to tighten up the nut.

Should the drive belt slip when the planetary pulley is turning, first inspect the drive drum assembly. This is the assembly which is mounted on the tuning condenser shaft. If this assembly and the tuning condenser rotor turn satisfactorily, the belt is probably too

Phonograph connections can be made as shown in Fig. 7. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch—See Fig. 8.

The phono switch must be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. Unsolder the .01 mf. condenser C27 from the volume control.

Strip about 3/4 inches of the shielding from each end of the cable furnished with the phono attachment parts. Connect one lead of the cable to the terminal on the volume control from which condenser C27 was removed. The other end of this lead is connected to the phono switch as shown in Fig. 7. The second cable lead is connected to the open end of condenser C27. Then connect the other end of this lead to the phono switch as shown in Fig. 7. Both of the shielded cable leads connected to the phono switch are con-

necting the phono switch must be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. Unsolder the .01 mf. condenser C27 from the volume control.

Strip about 3/4 inches of the shielding from each end of the cable furnished with the phono attachment parts. Connect one lead of the cable to the terminal on the volume control from which condenser C27 was removed. The other end of this lead is connected to the phono switch as shown in Fig. 7. The second cable lead is connected to the open end of condenser C27. Then connect the other end of this lead to the phono switch as shown in Fig. 7. Both of the shielded cable leads connected to the phono switch are con-

necting the phono switch must be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. Unsolder the .01 mf. condenser C27 from the volume control.

Strip about 3/4 inches of the shielding from each end of the cable furnished with the phono attachment parts. Connect one lead of the cable to the terminal on the volume control from which condenser C27 was removed. The other end of this lead is connected to the phono switch as shown in Fig. 7. The second cable lead is connected to the open end of condenser C27. Then connect the other end of this lead to the phono switch as shown in Fig. 7. Both of the shielded cable leads connected to the phono switch are con-

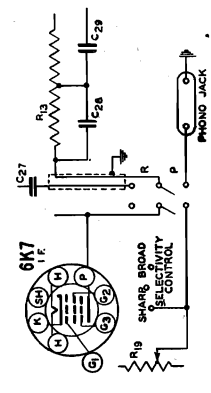


Fig. 7—Phonograph Connections

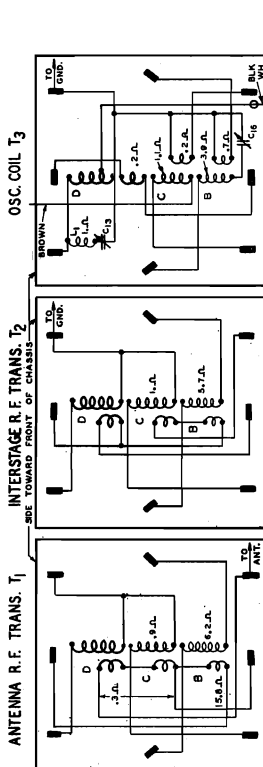


Fig. 4—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

This model uses a two-speed planetary drive. All of the early sets are equipped with a flat belt and may be identified by the 1/4 inch wide belt. The later sets use the same type of drive, but have a black

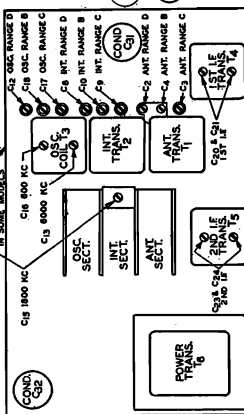


Fig. 3—Location of Trimmers

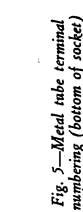


Fig. 5—Lead tube terminal numbering (bottom of socket)

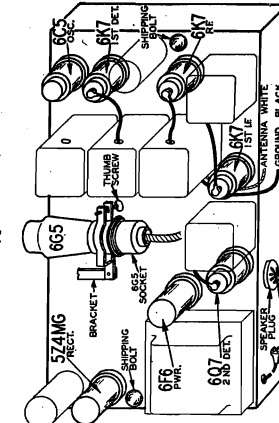


Fig. 6—Location of Tubes

Line Voltage: 115		Position of Band Switch: Standard Wave		Antenna Shorted to Ground		Voltage as read across heater terminals 2 and 7.		Voltage as read across heater terminals 4 and 6.	
TUBE	FUNCTION	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7	RF	0	6.1(1)	240	100	4.0	0	6.1(1)	4.0
6K7	1st Det.	0	6.1(1)	240	118	0	0	6.1(1)	9.0
6G5	Oct.	0	6.1(1)	120	0	0	0	6.1(1)	0
6K7	I.F.	0	6.1(1)	240	138	4.0	0	6.1(1)	4.0
6Q7	1st A.F.—2nd Det.	0	6.1(1)	105	0	0	0	6.1(1)	1.4
6F6	Power Amp.	0	6.1(1)	238	240	18	0	6.1(1)	0
5Z4MG	Rect.	0	4.9(2)	0	580(3)	0	580(3)	0	4.9(2)
6B5	Tuning Indicator	Plate to Ground 30(5)	Target to Ground 270	Cathode to Ground 0	Across Heater 6.1 A.C.				

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) A.C. voltage as read across heater terminals 4 and 6.
(3) A.C. voltage as read across terminals 4 and 6.
(4) As read with 500,000 ohm meter.

MODEL D705

Issues 1 to 6

WESTERN AUTO SUPPLY CO.

Drive Cord Data
Switch Data, Phono.

Drive Cord Replacement

LATE MODELS—Tie a knot with a small loop at one end of the new drive cord. Slide a 1¼ inch length of fabric tubing on the cord. The free end of the drive cord should be tied to the tension spring in such a manner that there is a distance of 56⅞ inches between the knots.

Turn the gang condenser to full open position.

Place the looped end of the drive cord over the hook on condenser drive drum A—See Fig. 2. Bring the cord up through the slot in the drum rim and pass to the right (from back of chassis) and around pulley B. Then bring the cord to the left and over pulley C. See that the fabric tubing is now between pulleys B and C. Continue cord down to control shaft D and wind 3½ turns counter-clockwise (from back of chassis) on shaft D. Bring cord up to and over pulley E. Bring cord down to top of drive drum A and wind one turn clockwise around the drum rim.

Pass the remaining drive cord and tension spring through the slot in the drum. Place free end of spring over the hook on the condenser drive drum.

EARLY MODELS—The procedure is the same as for the late models with the following exceptions:

The distance between the knots on the drive cord should be 49¼ inches.

Leaving shaft D (Fig. 3), the drive cord is brought directly to the top of drive drum A and then continued as in late models.

Permeability Tuning and Band Switch Assemblies—Differences in Early Models

A few of the first models used a station button plunger 6⅞ inches long. These models may be identified by a red paint mark on the front bracket of the tuning unit at the upper right corner. On later models, this length was changed to 6⅞ inches. These models have an orange paint mark in place of the red mark. It is important, therefore, that the length be noted when ordering this part and the correct part number, as shown in the parts list, be specified.

ALL SWITCHES HAVE ONLY TWO POSITIONS.

SCHEMATIC SHOWS ALL SWITCHES IN NORMAL POSITION (BUTTON OUT) & ON-OFF BUTTON PUSHED IN.

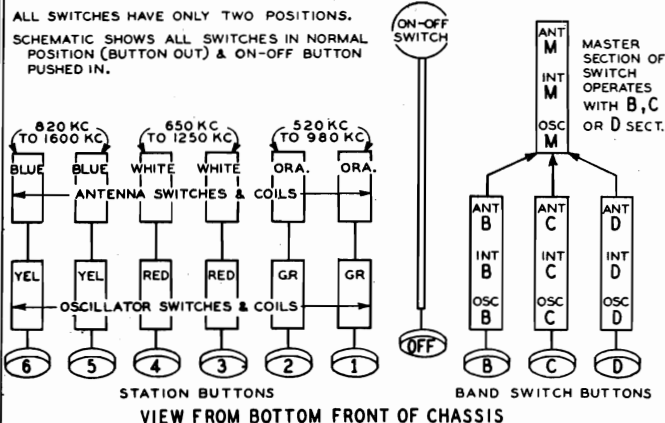


Fig. 5—Permeability Tuning Unit and Band Switch Arrangement.

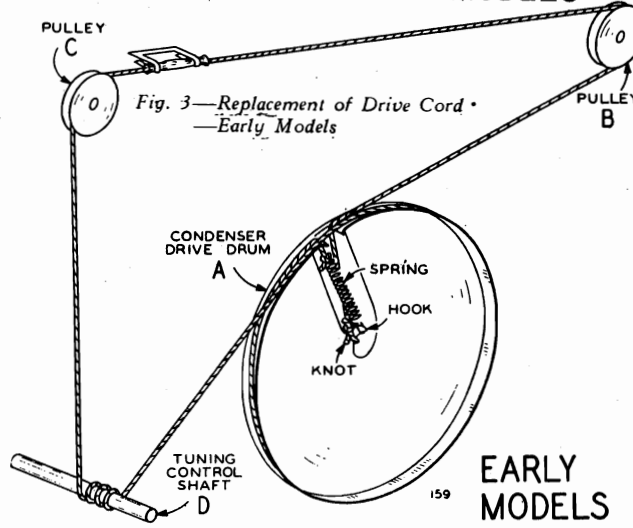
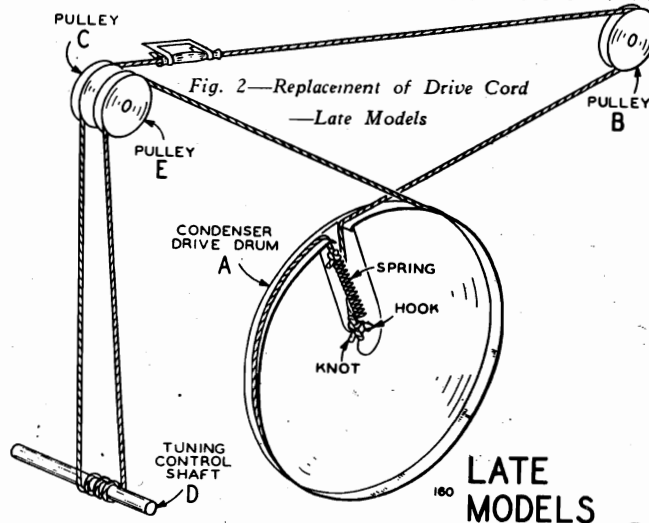
The plungers are replaceable only on the permeability (6 button) tuning unit. In the case of the band switch unit, if any parts require replacing, the entire assembly must be ordered. Two of these assemblies are listed, one using the early short shaft and the other using the later long shaft. The short shaft (early unit) has no paint mark on it. The long shaft (late unit) has an orange paint mark on it.

A change was also made on the tuning rod assembly (Rod on which 2 iron cores are mounted). The rod used on early models was 3¼ inches long and the back end of the rod rested in a small cup in the end of the compression spring. The rod used on late models is 4¼ inches long, extends through the compression spring and projects beyond the rear bracket of the tuning assembly. Only the later type rod complete with the compression spring and a small washer is being furnished for replacement. This complete assembly is interchangeable with the early type.

ATTACHING DIAL POINTER—Tune in a 1500 KC signal. Move the pointer to the 1500 KC mark on the dial and clamp it tightly over the fabric tubing on the cord.

Phonograph Connections

early models a 1¼ inch hole must be drilled in the back panel. A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug 1¼ inches in diameter. An octal on the other end is a phono-base socket is then mounted in this graph-radio switch and double tip knockout opening. In the case of the jack.



MODEL D705
Issues 1 to 6 incl.
Distortion Notes

WESTERN AUTO SUPPLY CO.

MODEL D705
Issues 2 to 6 incl.
Schematic, Voltage, Coils
Trimmers, Changes

ISSUE NUMBER CHANGES

The last digit of the number on the chassis number label identifies the radio as to the issue number.

ISSUE NO. 1

The information on the Replacement Parts List and Schematic Circuit Diagram, except for minor changes to all chassis issues, 1 through 6, the Replacement Parts List and Schematic Circuit Diagram, however, apply only to No. 1 issue chassis.

ISSUE NOS. 2 and 3

MECHANICAL CHANGES -- The station button plunger has a length of 7-5/16 inches.

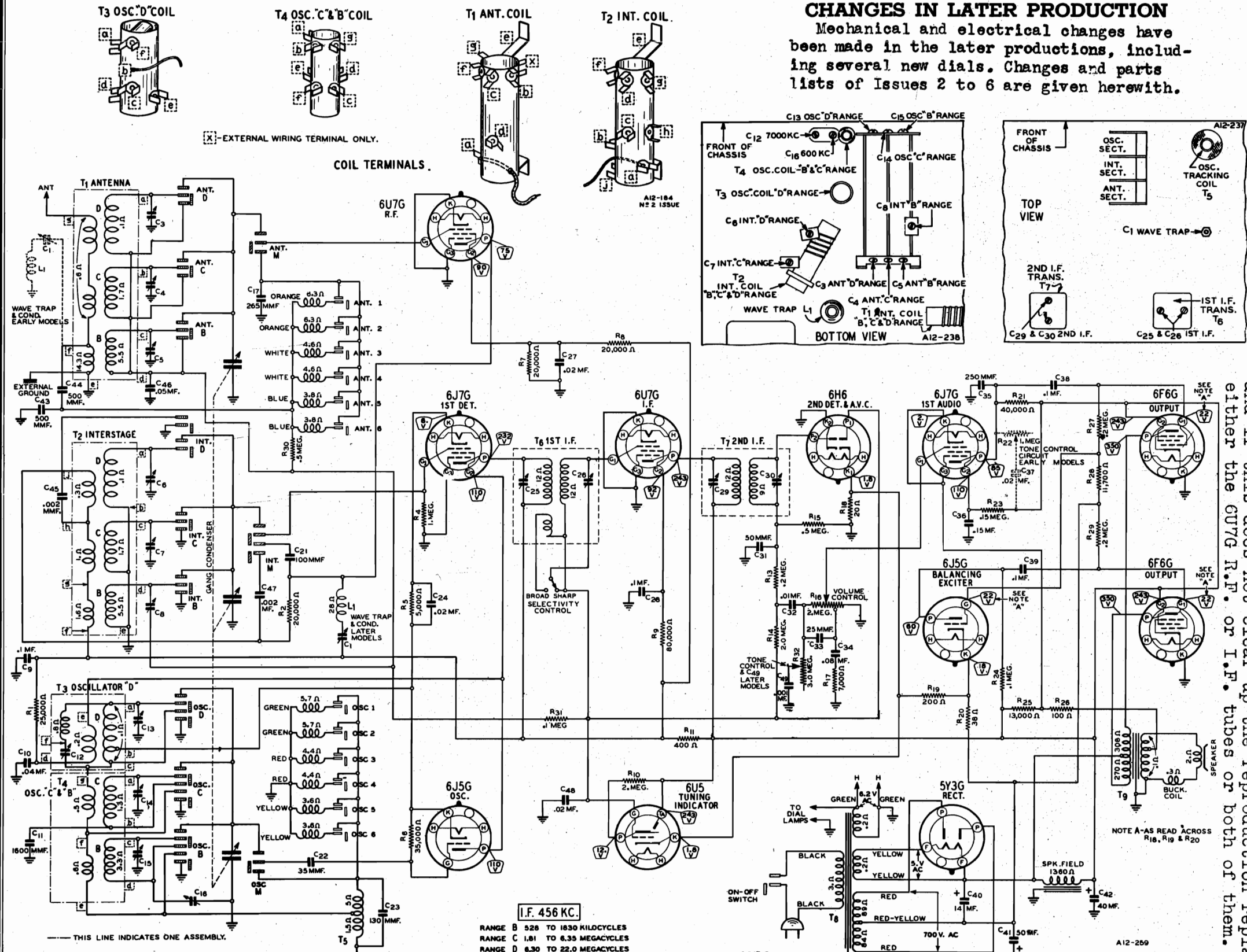
The locking plate for the station button plungers has been redesigned and now employs the side arms mounted in rubber cushioned hinge blocks and which are attached to the rear bracket of the tuner assembly by two screws.

FOR THE FOLLOWING ELECTRICAL CHANGES REFER TO SCHEMATIC ON THIS PAGE.

ELECTRICAL CHANGES -- The AVC voltage is fed to the grid of the R.F. tube through the manual and automatic tuning coils. Formerly, it was applied directly to the grid of the R.F. tube through a 1 megohm resistor.

The operating voltages of several of the tubes have been changed. Correct values are shown on the schematic in this supplement.

CHANGES IN LATER PRODUCTION
Mechanical and electrical changes have been made in the later productions, including several new dials. Changes and parts lists of Issues 2 to 6 are given herewith.



SCHEMATIC CIRCUIT DIAGRAM FOR ISSUE NOS. 2 THROUGH 6 .

JULY, 1938

SOCKET LAYOUT: SEE ISSUE NO.1 SOCKET LAYOUT.

Change the 4 megohm resistor R14 to a 2 megohm resistor and if this does not clear up the reproduction replace either the 6U7G R.F. or I.F. tubes or both of them.

DISFORMATION (ALL ISSUES NOS. 1 THROUGH 6)
If mushy reproduction is encountered on a medium or strong signal after the radio has been turned on for about ten minutes, it probably is due to grid current in the 6U7G R.F. and I.F. tubes.

ISSUE NOS. 4 and 5
MECHANICAL CHANGES -- The antenna coil (T1) and Wave Trap coil (T2) have been moved from the top of the chassis base to a position just in back of the band switch underneath the chassis base.

ISSUE NOS. 4 and 5

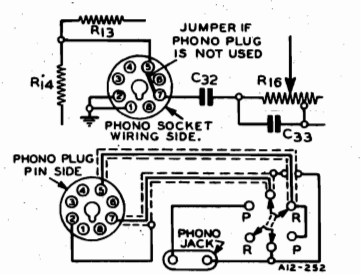
The Wave Trap Trimmer (C1) has been moved from its former position near the 1st I.F. Transformer (T6) to a position near the 6U7G R.F. tube.

ELECTRICAL CHANGES -- The Wave Trap coil (T2) and Trimmer Condenser (C1) have been removed from the antenna circuit and are now connected in the interstage circuit.

ISSUE NO. 6
ELECTRICAL CHANGES -- The Tone Control, formerly in the 1st audio plate has been put in the diode circuit.

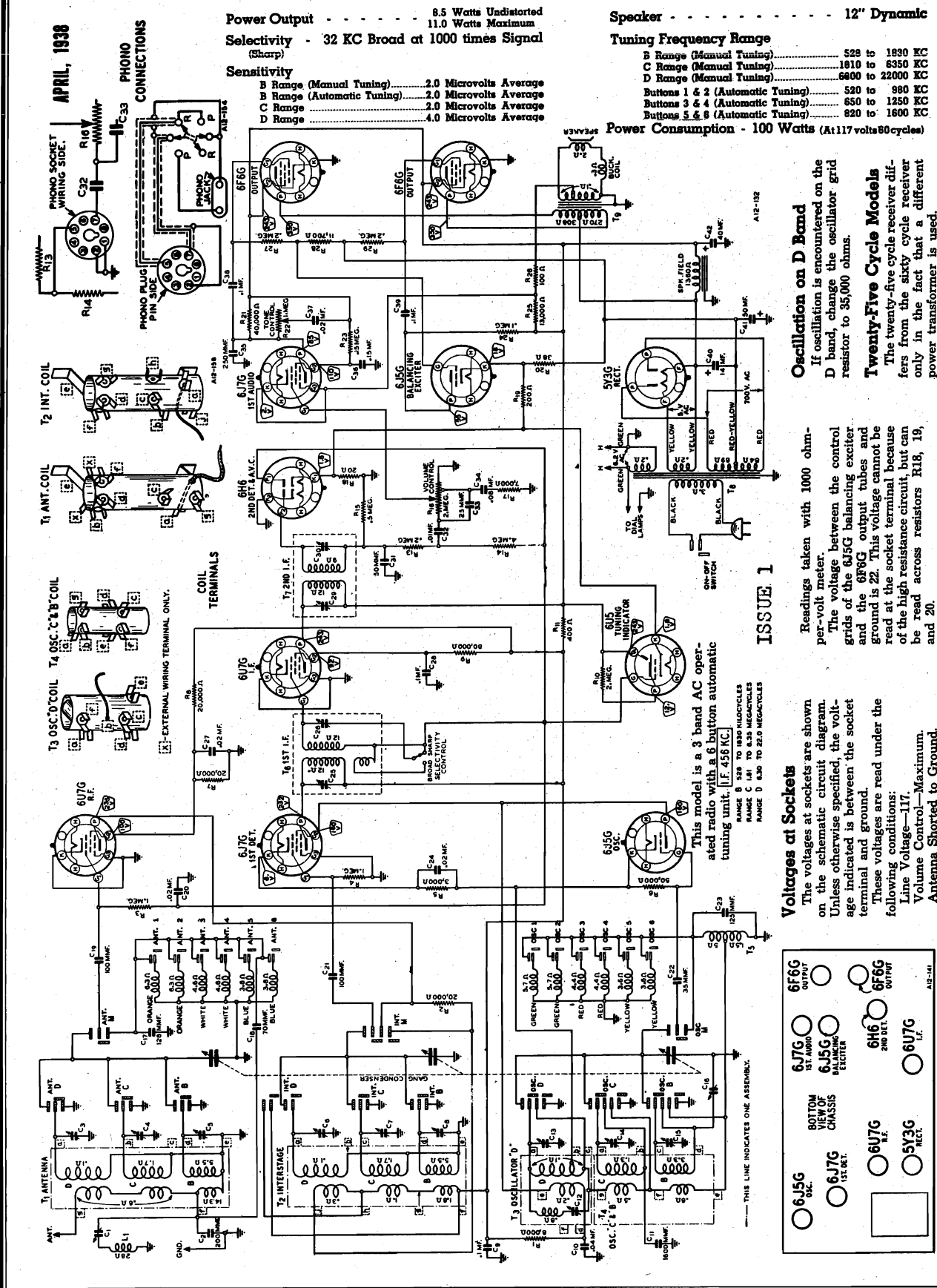
A 1 megohm Tone Control (R22) and a .02 mf. (C37) condenser were used in the audio plate.

A 3 megohm Tone Control (R22) and a .001 mf. (C49) condenser are used in the diode circuit.



MODEL D705, Issues 1 to 6
Socket, Specifications
Notes

MODEL D705, Issue 1
Schematic, Voltage



MODEL D705, Issues 1 to 6
Alignment, Trimmers
WESTERN AUTO SUPPLY CO.

Circuit

Ten buttons are provided on the front panel. Three buttons actuate linear band switches for a broadcast and 2 short wave, manual tuning ranges. Six buttons actuate switches which connect fixed tuned circuits for automatic tuning. Depressing any of the 9 band and automatic tuning buttons also turns on the radio. Depressing the 10th button will turn the radio to the off position.

The band switch has 4 arms as shown in Fig. 5, one each for the B, C, and D bands (broadcast, 1st and 2nd short wave, respectively) and one called the "Master" arm. The master arm switches from manual to automatic tuning and vice versa. This arm is actually over the other 3 arms rather than in back of them, as shown in the illustration. Depressing any of the B, C, or D band buttons actuates the arm for that band and also the master arm. The latter is in only when one of the 3 band switch buttons is depressed.

In manual tuning, an R. F. antenna transformer with tuned secondary is used before the 6J7G R. F. tube. The output of this tube is fed through another R. F. transformer with tuned secondary into the 6J7G 1st detector tube. A 6J5G tube functions as a separate oscillator. The antenna, interstage, and oscillator circuits are tuned by sections of the gang condensers.

In automatic tuning, the gang condenser is not used. A single tuned circuit is used before the R. F. tube while a stage of resistance coupling is employed between this tube and the 1st detector. The other automatic tuned circuit is the oscillator grid circuit. Tuning of the R. F. and oscillator fixed tuned circuits to the desired frequency is accomplished by varying the inductance of tuning coils by changing the permeability of the magnetic circuit. This is done by moving an iron core in and out of the coil.

The iron cores within the automatic tuning antenna and oscillator coil forms are secured to a brass rod. This rod is moved back and forth by a screw at the front of the radio.

Alignment between the oscillator and antenna automatic tuning coils is obtained by changing the antenna (rear) coil position while the iron core is held in place on the shaft.

In the schematic, the band switch and the automatic tuning switch are broken into sections each of which is given a name that is, to some extent, descriptive of its location in the circuit. Ant. D, for example, completes the antenna coil D band connections when the D range button is depressed. The location of the Ant. D connections on the band switch is shown in Fig. 5. All of the switches have only 2 positions. In the schematic, they are in the normal or button out position.

Now, to describe the connections for one manual tuning range: Let us assume that the B band button is depressed. The antenna transformer B band secondary is connected to the R. F. tube grid circuit through the Ant. B and Ant. M sections of the B band and master switch arms. The antenna transformer C and D band secondaries are short circuited.

The interstage transformer B band secondary is connected to the 1st detector tube grid circuit through the Int. B and Int. M sections of the switch arms mentioned above. The interstage transformer C band secondary is short circuited and the D band secondary is open circuited.

The oscillator B band grid coil is

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position 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., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BUTTON DEPRESSED	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)
I. F.					
456 KC	Grid of I. F. Tube	.1 mf.	B Range	Turn Rotor to Full Open	1st I. F. (C29) & (C30)
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	2nd I. F. (C25) & (C26)
RANGE B					
1830 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C15)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Ant. Range B (C8) Int. Range B (C8)
400 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	400 KC (C16) Rock Rotor—See Note B
WAVE TRAP					
456 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to 400 KC Adjust Sig. Gen.—See Note C	Wave Trap (C1) Adjust for MINIMUM Output
RANGE C					
6350 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C14)
6000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Antenna Range C (C4) Int. Range C (C7)
RANGE D					
22,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C13)
20,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C6) Int. Range D (C6) Rock Rotor—See Note B
7000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	7000 KC (C12) Rock Rotor—See Note B
PERMEABILITY TUNING UNIT					
700 KC	Antenna Lead	200 mmf.	No. 1	Setting Screw No. 1	Antenna Coil No. 1
700 KC	Antenna Lead	200 mmf.	No. 2	Setting Screw No. 2	Antenna Coil No. 2
850 KC	Antenna Lead	200 mmf.	No. 3	Setting Screw No. 3	Antenna Coil No. 3
850 KC	Antenna Lead	200 mmf.	No. 4	Setting Screw No. 4	Antenna Coil No. 4
1100 KC	Antenna Lead	200 mmf.	No. 5	Setting Screw No. 5	Antenna Coil No. 5
1100 KC	Antenna Lead	200 mmf.	No. 6	Setting Screw No. 6	Antenna Coil No. 6

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 pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Leave condenser rotor at the 400 KC setting and adjust the signal generator until maximum output is obtained at or near 456 KC.

NOTE D—At the bottom of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

connected to the grid circuit of the oscillator tube through the Osc. B and Osc. M sections of the same switch arms as mentioned above. The oscillator B band cathode coil is connected to ground through the Osc. B section. The oscillator C and D band grid coils are short circuited.

The permeability tuning coils are open circuited.

In like manner, to describe the connections for one automatic tuning circuit, assume that button number 1 is depressed.

The antenna circuit is connected to the R. F. tube grid circuit through the Ant. M section of the master switch arm. The antenna circuit is also connected to the antenna No. 1 permeability coil through Ant. 1 switch. The antenna No. 1 coil is shunted by fixed condenser C17. The connections from the antenna and interstage transformer secondaries are open circuited.

The plate of the R. F. tube is connected in series with resistor R2 to the B+ line. It is also connected through coupling condenser C21 to the grid of the 1st detector. The latter is connected through grid leak R4 to ground.

The oscillator cathode circuit is

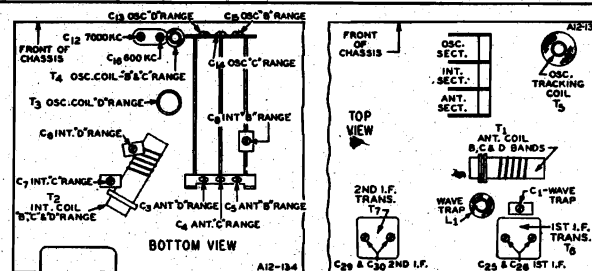


Fig. 1—Location of Trimmers

CAUTION—When aligning the short wave bands be sure NOT to adjust at 912 KC. or 4088 KC. on the dial. It may be necessary to increase the input signal to hear the image.

Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard

resistance coupling into the 6F6G output tube immediately to the right of it in the schematic.

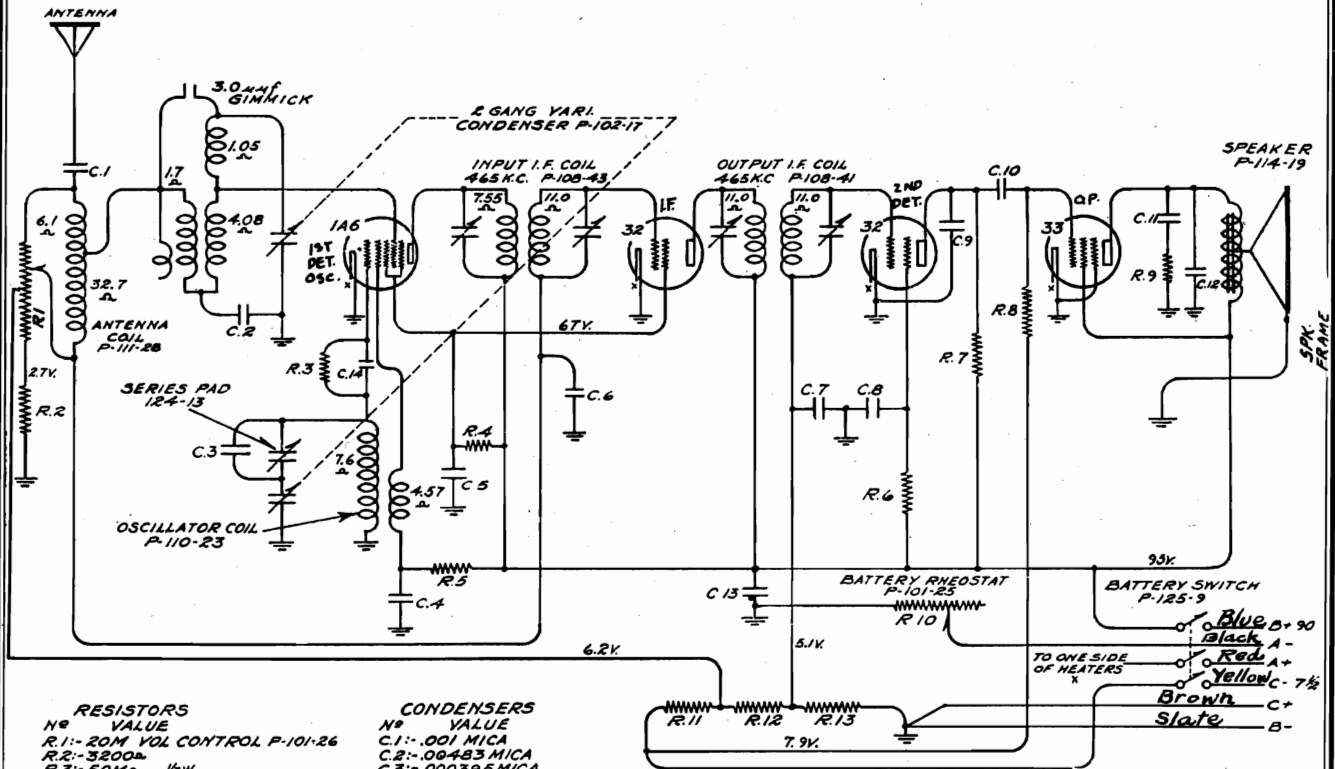
A portion of the voltage developed across the output tube grid resistor is applied to the control grid of the 6J5G balancing exciter tube. This tube functions as a phase inverter and applies the audio voltage of proper phase and amplitude to the other 6F6G output tube. The two output tubes operate as a stage of Class A push-pull amplification. The balancing exciter tube thus replaces a push-pull input transformer. A dynamic reproducer is employed.

Degeneration or negative feedback is used in the audio amplifier. A portion of the voltage developed across the secondary of the output transformer is fed back into the cathode circuit of the 1st audio tube. The voltage fed back is of the proper phase to reduce the amplitude of certain frequencies. This results in a reduction in distortion.

The power unit uses a 5Y3G full wave rectifier. A 6U5 tuning indicator tube is employed.

WESTERN AUTO SUPPLY CO.

MODEL D709 (1933)
Schematic, Socket
Trimmers

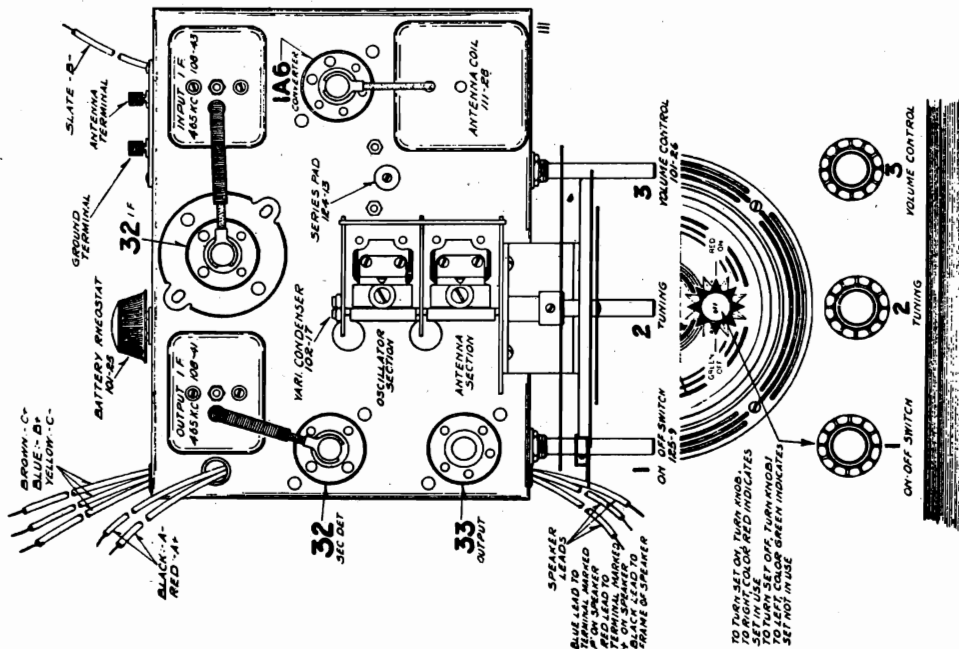


RESISTORS
No. VALUE
R.1:- 20M VOL CONTROL P-101-26
R.2:- 3200Ω
R.3:- 50MΩ 1/2W
R.4:- 11MΩ 1/2W
R.5:- 10MΩ 1/2W
R.6:- 3MEGΩ 1/2W
R.7:- 750MΩ 1/2W
R.8:- 500MΩ 1/2W
R.9:- 35MΩ 1/2W
R.10:- 4Ω BAT. RHEOSTAT P-101-25
R.11:- 1300Ω
R.12:- 1920Ω
R.13:- 9800Ω 1/2W

CONDENSERS
No. VALUE
C.1:- .001 MICA
C.2:- .00483 MICA
C.3:- .000395 MICA
C.4:- .01 X 200V
C.5:- .05 X 200V
C.6:- .25 X 200V
C.7:- .05 X 200V
C.8:- .01 X 200V
C.9:- .00025 MICA
C.10:- .01 X 400V
C.11:- .01 X 400V
C.12:- .0005 MICA
C.13:- .25 X 200V
C.14:- .00025 MICA

- NOTE -
R.2, R.11, R.12 ARE IN ONE UNIT, P-106-21 IF PEAK 465 KC
C.4, C.5 ARE IN ONE UNIT P-118-11
C.6, C.13 " " " P-118-5
C.7, C.8 " " " P-118-11
NUMBERS PREFIXED BY LETTER P ARE PART Nos
ALL VOLTAGES INDICATED ARE WITH NEW BATTERIES,
VOLUME CONTROL ON FULL

Serial No. 5D115200A and up



BATTERIES NEEDED

- The following batteries are needed.
- 2.....45 volt "B" Batteries.
 - 1.....7 1/2 Volt "C" Battery.
 - 1.....3 Volt Dry "A" Battery or 2 Volt Storage Battery.

MODEL D709 (1935) S709

Voltage Alignment
Drive Cord Data
Battery Data

WESTERN AUTO SUPPLY CO.

VOLTAGES AT SOCKETS					
Volume Control at Maximum—Antenna Shorted to Ground. B+125 Volts					
Type	Function	Agc	Plate	Screen	Normal
Tube		Grid	Grid	Grid	Grid
32	1st Det. & Osc.	2.0	135	67.5	7.5 (0) 2.5
34	1 F.	2.0	135	67.5	25 (0) 2.8
34	2nd Det.	2.0	50	40 (0) 0	1.8
30	1st Audio	2.0	135	9 (0) 9 (0)	3.0
19	Output	2.0	135	4.5	3.2
Total					
3.2					

(1) With 25,000 ohm meter.
(2) Subject to variation.
(3) With 25,000 ohm meter.
(4) Read at 100° battery.

Replacing Drive Cord

Remove chassis from cabinet.

Take off the pointer by removing the screw at the center of the dial.

Remove the dial by taking out the six rivets from the dial assembly.

Remove the on-off indicator dial by pulling it forward.

With the condenser plates in a completely open position, slip the new drive cord thru hole "A" (from the front) in the drive drum. See Fig. 9.

Pull the cord thru this hole far enough to tie a knot near the end. Make this knot large enough so that it will not pull back thru the hole.

Slip the opposite end of the drive cord thru hole "B" of the drive drum.

Now dip the piece of fine tubing (about 3/4" long) over the drive cord and insert about half of this tubing into hole "B" as shown in the illustration. This is important to prevent the cord from being cut.

Bring the drive cord down to the drive shaft and wrap the cord in a clockwise direction about two and one-half times around this shaft, progressing toward the front.

Bring the cord up from the drive shaft and wrap it around the drive drum approximately one and one-half times in a clockwise direction, progressing toward the front until the cord is up to the turned-in portion of the flange "C". See Fig. 9.

Pull the cord tight and tie the end of the cord to the tension spring as shown in the illustration. The knot should be at the bend in the flange so that the spring will be under sufficient tension to prevent the drive cord from slipping.

Now, by applying a little tension on the spring, hook the other end of the spring into hole "D" on the opposite side of the drum. Hook the spring from the inside (in later models hole "D" is replaced by a hook on the inside of the drive drum).

Turn the drive shaft back and forth several times to take out the slack and see if the drive is operating properly. If the cord slips on the drive shaft, remove the spring from the drive drum and add an additional knot in the cord at the spring in order to put greater tension on the spring.

Replace the on-off indicator dial, care being taken that the indicator is so placed that it will properly show the on and off positions.

Re-assemble the pointer and dial to the drive assembly. If the rivets are broken use No. 2 by 1/4" long round head machine screws and nuts.

Testing Batteries

If the receiver does not operate satisfactorily test the batteries under load. A high resistance meter is required for the "B" and "C" voltages. If any of the batteries are considerably below their rated voltage, new ones should be used. When the "B" batteries are replaced the "C" batteries should also be replaced. The reason for this is that the "C" drain is such that the "C" batteries are run down in about the same time as the "B" batteries.

"A" Battery and Regulator

This receiver is designed to operate with a 2 volt storage cell, but may be operated with a 3 volt dry "A" battery if used with a voltage regulator. The receiver may also be used with an air cell "A" battery provided a series resistor is used.

3 Volt "A" Battery—The voltage regulator required with this type of battery as illustrated in Fig. 4 is not supplied with the receiver unless specified. This device consists of a rheostat which controls the voltage, a voltmeter for measuring its value as supplied to the receiver and a small push button switch for cutting the voltmeter in and out of the circuit. It has two prongs at the bottom which plug into the socket in the platform at the rear left corner of the chassis. The circuit diagram of the regulator is shown in Fig. 5.

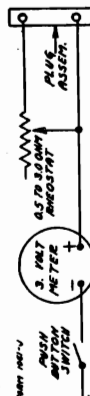


Fig. 5—Schematic Diagram of Voltage Regulator

The receiver is shipped from the factory with a jumper between the two socket connections and a fiber strip over the socket. This strip must be removed and the jumper taken out as illustrated in Figs. 6 and 7 before the regulator can be inserted as shown in Fig. 4. The jumper is in the "A-1" line.

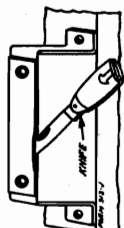


Fig. 6—Prising off Fiber Cover

When a new 3 volt "A" battery is inserted, the adjusting knob must be turned to the left hand position and then turned up until the voltmeter indicated 1.9 to 2 volts. The push button must be held in until the adjustment is completed. Caution the user never to operate the receiver with the adjustment beyond 2 volts.

Air Cell "A" Battery—If an air cell "A" battery is used, a series resistor will be required to reduce the voltage to the proper level of 2 volts for the tube filaments. Although the voltage regulator mentioned above can be used, the series resistor is cheaper and is satisfactory as the voltage of one of these batteries drops very little during the useful life of the battery.

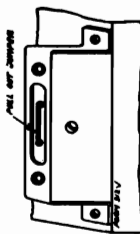


Fig. 7—Removing Jumper Wire

Alignment Procedure and Dial Calibration

Misalignment or misrouting of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the standard wave band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide accurately calibrated signals over the standard wave band and at the intermediate frequency and an output meter are required for indicating the effect of adjustments.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 175 KC. Connect the antenna lead of the signal generator thru a .1 MF. condenser to the coil end of the grid leak resistor R1. There is a lead which runs from the center tuning condenser stator to a lug at the bottom of the R. F. coil assembly. This connection can be made at the lug on the coil to which this lead is connected.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the volume control to the maximum position. Then adjust the three I. F. trimmers until maximum output is obtained. The adjusting screws for these

condensers are reached from the top of the chassis, and the location is shown in Fig. 8.

As stated above, use a non-metallic screwdriver to make the adjustment.

1750 KC Adjustment

Set the signal generator for 1750 KC. Turn the rotor of the tuning condenser to the full open position.

Connect the antenna lead of the receiver thru a 250 mmf. condenser to the output of the signal generator. Keep the volume control at the maximum position. Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained. The location of this trimmer is shown in Fig. 8.

1500 KC Adjustment

Set the signal generator for 1500 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained. Adjust the 1st detector and antenna trimmers for maximum output. Do not change the setting of the oscillator trimmer.

Dial Calibration

To obtain dial scale calibration tune in an 800 KC signal and set the dial pointer at that mark on the dial scale. When calibrated in this manner, the setting will be approximately correct at both ends of the scale.

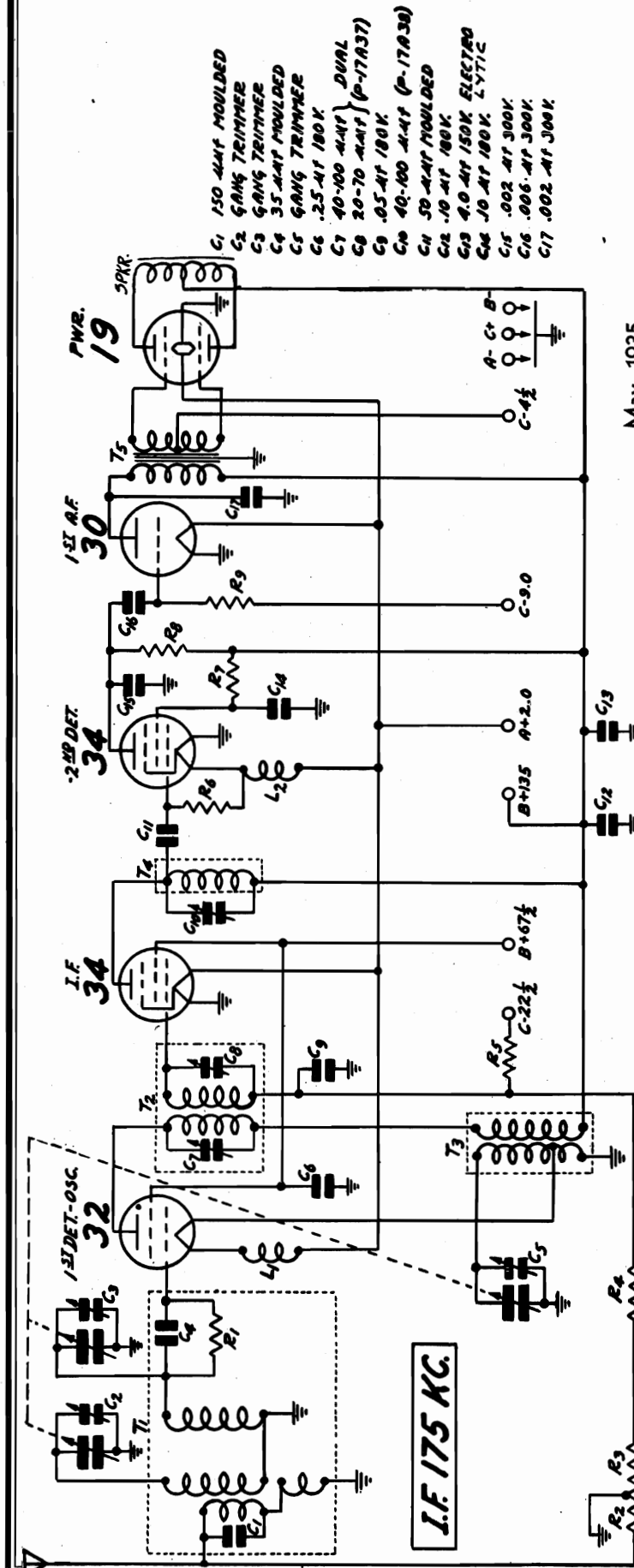
SPECIFICATIONS

Sensitivity	15 Microvolts Absolute
Tuning Range	530 to 1750 KC
Intermediate Frequency	175 KC
Speaker	6" Magnetic

Input Voltages	2 Volts (1.5 Amperes)
"A" Battery	.67 1/2 and 135 Volts
"B" Batteries	4 1/2, 9 and 23 1/2 Volts
"C" Batteries	1 Watt (Undistorted)
Power Output	1 Watt (Undistorted)

WESTERN AUTO SUPPLY CO

MODEL D709 (1935) S709
Schematic, Socket
Trimmers



May, 1935

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

Following are the D. C. resistances of the various windings in the chassis.

Part No.	Code	D. C. Resistance in Ohms
9A381	T1	17.
	T1	3.5
	T1	3.5
	T2	80.
	T3	105.
	T4	2.
	T5	50.
	L1	Small
	L2	Small
	T5	950.
	T5	600.
	T5	550.
	T5	200.
	T5	250.

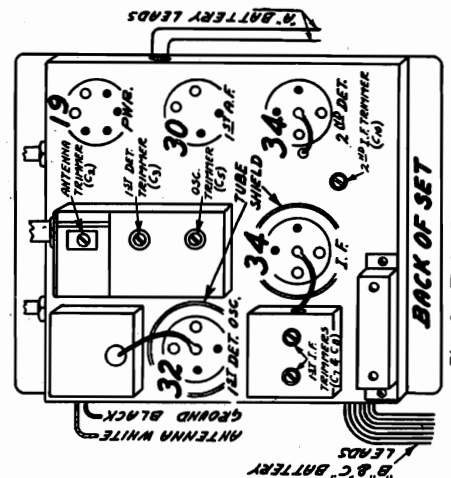


Fig. 8—Tube Arrangement

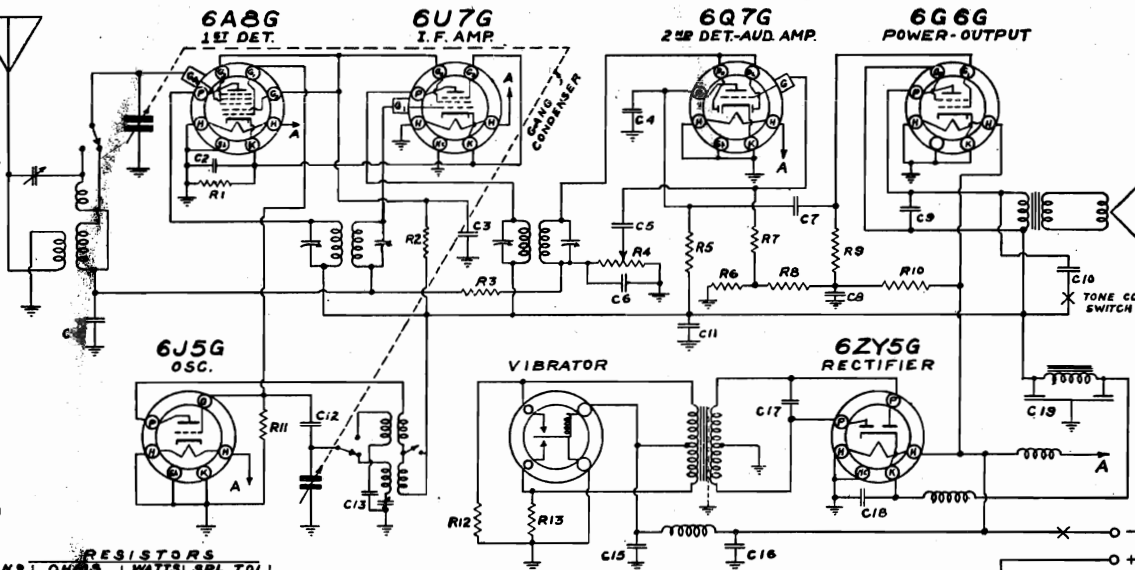
MODEL D709 (1938)

WESTERN AUTO SUPPLY CO.

Schematic, Socket
Trimmers, Alignment

Six Tube 6 Volt Battery Dual Wave Superheterodyne

This receiver is designed to operate over two tuning ranges: from 535 to 1730 Kilocycles (KC) (173.4 to 561 meters), and from 5650 to 18,100 Kilocycles (KC) (16.5 to 53 Meters).

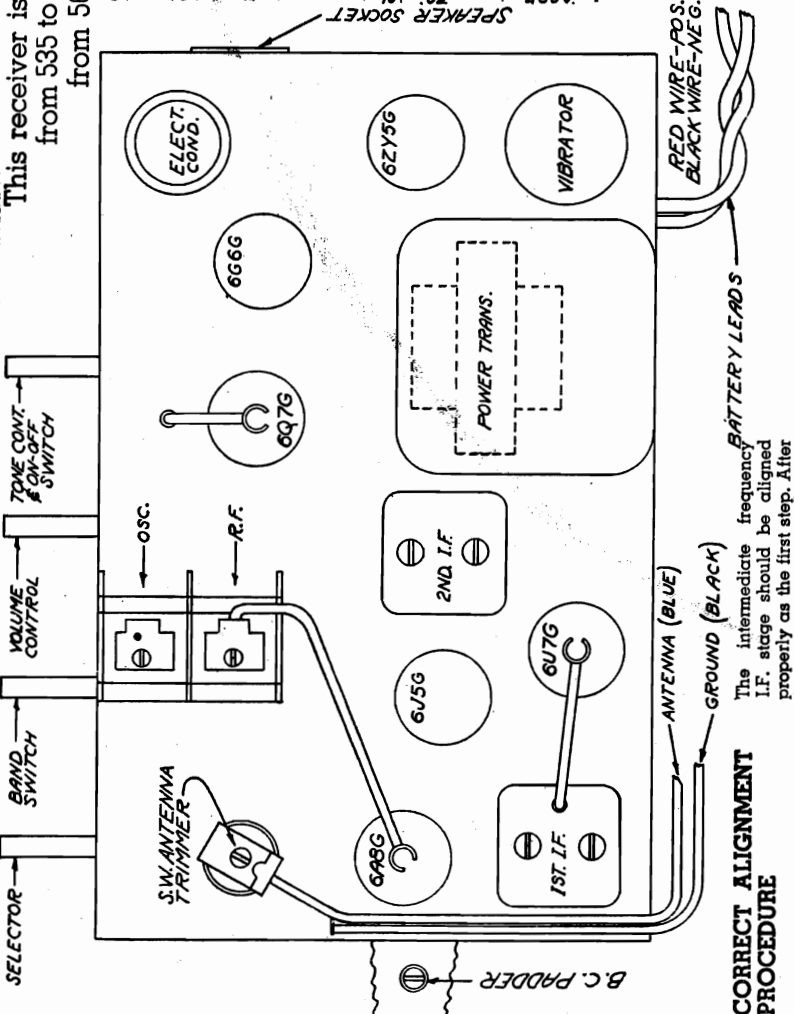


RESISTORS	WATTS	SPL. TOL.
15,000	1/4	± 10%
10,000	1/4	± 10%
500,000	1/4	± 10%
150,000	1/4	± 10%
100,000	1/4	± 10%
50,000	1/4	± 10%
10,000	1/4	± 10%
5,000	1/4	± 10%
1,000	1/4	± 10%
500	1/4	± 10%
100	1/4	± 10%
50	1/4	± 10%
10	1/4	± 10%
5	1/4	± 10%
1	1/4	± 10%
1/2	1/4	± 10%
1/4	1/4	± 10%
1/10	1/4	± 10%

CONDENSERS	CAP. MFD.	TYP.
11	.05	200V.
12	.00005	MICA
13	.004 (±5%)	MICA
14	.05	500K
15	.05	500K
16	.05	500K
17	.05	500K
18	.05	500K
19	.05	500K
20	.05	500K
21	.05	500K
22	.05	500K
23	.05	500K
24	.05	500K
25	.05	500K
26	.05	500K
27	.05	500K
28	.05	500K
29	.05	500K
30	.05	500K

Note: Approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal broadcast band and the gang with the receiver until the maximum reading is obtained on the condenser set at minimum output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the antenna. Return oscillator or signal generator to the grid of the first detector tube to 1400 KC and again go over the adjustments of this frequency (6A8G) through a .05 or .1 mfd. condenser. The ground on the test to be certain that they were not put slightly out of alignment when the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

The short wave band is adjusted by setting the generator to 16,000 KC and tuning in the signal. Adjust the "short wave antenna" to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.



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 should always be the next procedure; after which, the Short Wave Band may be aligned.

I.F. ALIGNMENT

With the wave switch in the broadcast band and the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output of test oscillator or signal generator to the grid of the first detector tube to 1400 KC and again go over the adjustments of this frequency (6A8G) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four 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 lead (blue) through a .0002 mfd. mica condenser. Set the Broadcast "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 KC on the dial. Adjust the Broadcast "antenna" trimmer to a maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver.

SHORT WAVE BAND ALIGNMENT

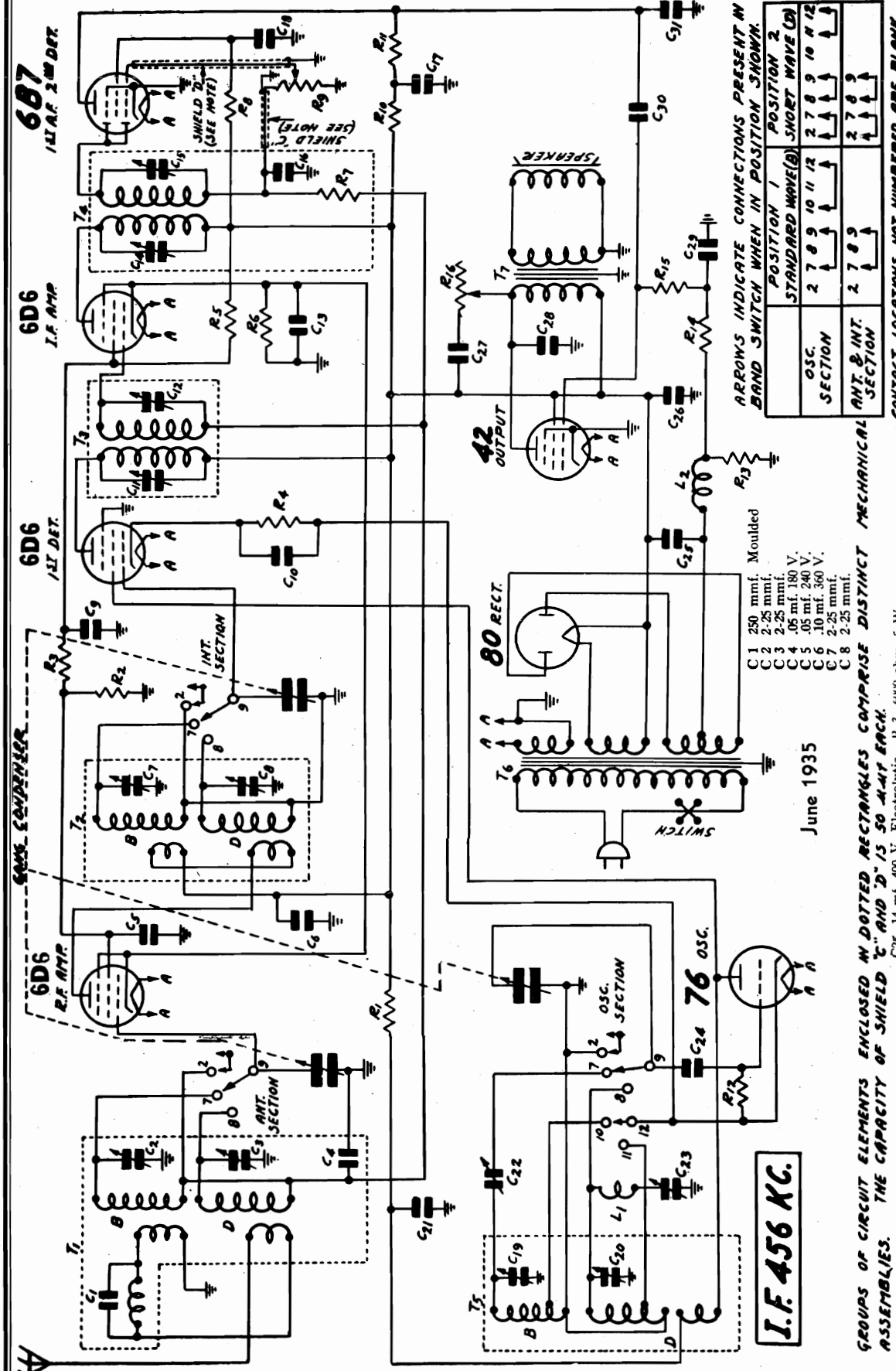
The short wave band is adjusted by setting the generator to 16,000 KC and tuning in the signal. Adjust the "short wave antenna" to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

This receiver requires a good ground.
SWITCHES IN BROADCAST POSITION I.F. 456 K.C.

WESTERN AUTO SUPPLY CO.

MODELS D710, D711 (1935)
S710, S711

Schematic



ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1	POSITION 2
OSC.	2 7 8 9 10 11 12	2 7 8 9 10 11 12
ANT. & INT. SECTION	2 7 8 9	2 7 8 9

CONTACT LOCATIONS NOT NUMBERED ARE BLANK.

R13 235 ohm Armored Wire Wound
R14 10000 ohm .2 W.
R15 50000 ohm .2 W.
R16 15000 ohm Tone Control
T1 Antenna R. F. Trans.
T2 Interstage R. F. Trans.
T3 1st I. F. Trans.
T4 2nd I. F. Trans.
T5 Osc. Inductors
T6 Power Trans.
T7 Output Trans.
L1 Osc. Tracking Coil
L2 Speaker Field (1050 ohms)

C1 250 mmf. Moulded
C2 2-25 mmf.
C3 2-25 mmf.
C4 .05 mf. 180 V.
C5 .05 mf. 240 V.
C6 .10 mf. 360 V.
C7 2-25 mmf.
C8 2-25 mmf.

C9 25 mf. 240 V.
C10 .05 mf. 180 V.
C11 70-150 mmf. One Assembly
C12 70-150 mmf. One Assembly
C13 .25 mf. 180 V.
C14 70-150 mmf. One Assembly
C15 150-250 mmf. One Assembly
C16 50 mmf. Moulded

C17 25 mf. 360 V.
C18 .25 mf. 360 V.
C19 2-25 mmf.
C20 2-25 mmf.
C21 10 mf. 360 V.
C22 300-600 mmf. One Assembly
C23 40-100 mmf. One Assembly
C24 35 mmf. Moulded

C25 14 mf. 400 V. Electrolytic
C26 18 mf. 300 V. Electrolytic
C27 .05 mf. 600 V.
C28 .002 mf. 600 V.
C29 .03 mf. 180 V.
C30 .01 mf. 480 V.
C31 .002 mf. 600 V.

R1 25000 ohm 1.0 W.
R2 30000 ohm .5 W.
R3 6000 ohm .5 W.
R4 2500 ohm .2 W.
R5 16000 ohm .2 W.
R6 150 ohm .2 W.
R7 2.0 Megohm .2 W.
R8 30000 ohm .5 W.
R9 50000 ohm Volume Control
R10 20000 ohm .2 W.
R11 60000 ohm .5 W.
R12 80000 ohm .2 W.

June 1935

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES. THE CAPACITY OF SHIELD "C" AND "D" IS 50 MMF EACH.

MODELS D710, D711 (1935)
S710, S711

WESTERN AUTO SUPPLY CO.

Alignment, Trimmers
Voltage, Socket, Coils
Resistances, Changes

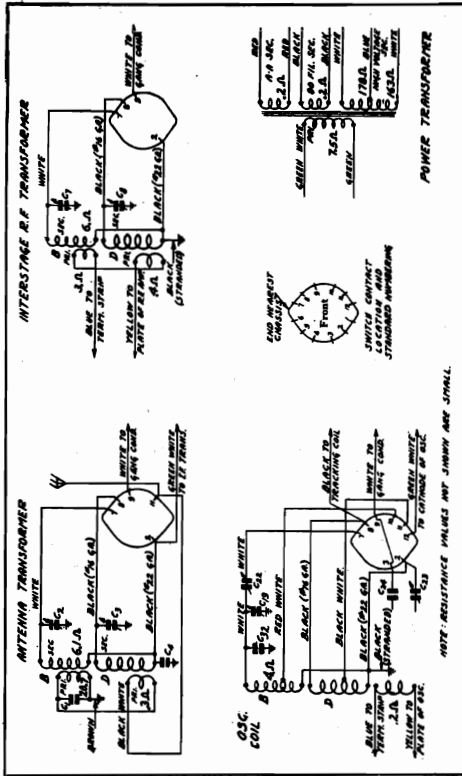


Fig. 3—Color Coding of Coil Wires and D. C. Resistance of Windings

Part No.	Item	Code	D. C. Resistance in Ohms
9A388	Antenna Transformer		
	1st Primary Winding	T1	11
	2nd Primary Winding	T1	11
	1st Secondary Winding	T2	11
	2nd Secondary Winding	T2	11
9A389	Intermediate P.F. Transformer		
	1st Primary Winding	T3	11
	2nd Primary Winding	T3	11
	1st Secondary Winding	T4	11
	2nd Secondary Winding	T4	11
9A390	Power Transformer		
	1st Primary Winding	T5	11
	2nd Primary Winding	T5	11
	1st Secondary Winding	T6	11
	2nd Secondary Winding	T6	11

Changes in Early Models
In the early models of this receiver the oscillator standard wave trimmer C19 was in the oscillator coil can—see Fig. 4.
In the early models the antenna transformer had two B primary windings as shown in Fig. 5. In later models only one winding was used as shown in Fig. 3.

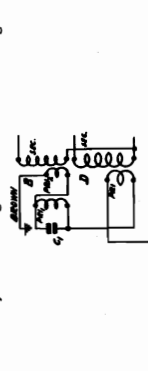


Fig. 5—Antenna Transformer on Early Models

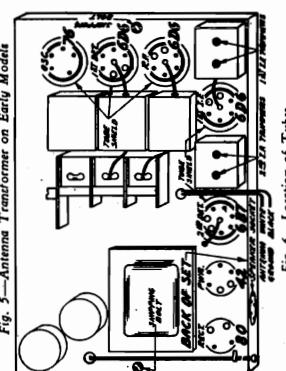


Fig. 6—Location of Tubes

VOLTAGES AT SOCKETS
Line Voltage - 112
Antenna Shorted to Ground

Type of Tube	Function	Heater Volts	Plate Screen Cathode Ground-Ground	Plate M. A.
6D6	R. F.	6.1	240 95 3	7
6D6	1st Det.	6.1	240 100 9	3.5
76	Osc.	6.1	100	5
6D6	I. F.	6.1	240 120 3	7.5
6B7	2nd Det.	6.1	55 40 0	2.3
42	Power	6.1	225 240 17 (1)	38.0
80	Rectifier	4.6		per plate

Loosen the pointer set screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.
Adjust the interstage standard wave trimmer (C7) and antenna standard wave trimmer (C2) until maximum output is obtained.
Do not change the setting of the oscillator standard wave trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.
Turn the tuning condenser rotor until maximum output is obtained.
Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 4 for location of this trimmer.
Be sure to use a non-metallic screw driver for this adjustment.

18,300 KC Adjustment

Set the signal generator for 18,300 KC.
Turn the rotor of the tuning condenser to the full open position.
Turn the band switch to the short wave position.
As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.
Adjust the oscillator short wave trimmer (C20) until maximum output is obtained. See Fig. 4 for location of this trimmer.
If a maximum output peak cannot be reached, it may be due to the fact that the antenna and interstage short wave trimmers are screwed down too far. Back off these two trimmer screws two or three turns and then adjust the oscillator short wave trimmer for maximum output.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.
Turn the rotor of the tuning condenser carefully until maximum output is obtained.
Adjust the interstage short wave trimmer (C8) and antenna short wave trimmer (C3) until maximum output is obtained.
When adjusting the interstage short wave trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.
Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator short wave trimmer, the 15,000 KC adjustment must be repeated.
Do not make any further change in the setting of the oscillator short wave trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.
Turn the tuning condenser rotor until maximum output is obtained.
Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 4 for location of this trimmer.
Use a non-metallic screw driver for this adjustment.

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.
A signal generator that will provide an accurately calibrated signal 450, 1730, 1500, 600, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.
Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 450 KC.
Connect the antenna lead of the signal generator thru a .1 MF condenser to the grid of the 1st detector.
Connect the ground lead of the signal generator to the chassis ground.
Turn the band switch to the standard wave position.
Turn the volume control to the maximum position.
Attenuate the signal from the signal generator to prevent the leveling-off action of the A.V.C.
Then adjust the four I. F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 6.

1730 KC Adjustment

Set the signal generator for 1730 KC.
Turn the rotor of the tuning condenser to the full open position.
Keep the band switch in the standard wave position.
Connect the antenna lead of the receiver through a 250 mmf. condenser to the output of the signal generator.
For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.
Adjust the oscillator standard wave trimmer (C19) until maximum output is obtained. The location of this trimmer is shown in Fig. 4.

1500 KC Adjustment

Set the signal generator for 1500 KC.
Turn the rotor of the tuning condenser carefully until maximum output is obtained.

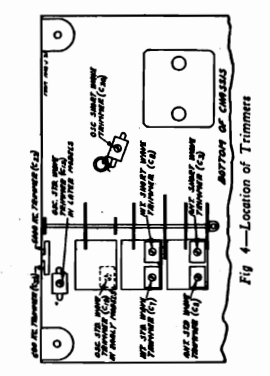


Fig. 4—Location of Trimmers

MODELS D714M, S712 (1935)
Phono. Connections
Resistances, Phono. Parts

WESTERN AUTO SUPPLY CO.

MODELS D710, D711 (1935)
S710, S711
Phono. Connections

MODELS D-714-M, S-712 (1935)

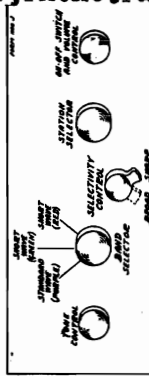


Fig. 1—Arrangement of Controls

PHONO ATTACHMENT PARTS

Description	List Price
Phono Switch (Double Pole Double Throw)	1.00
Switch Knob	.10
120 mfd. .25 Volt Dry Electrolytic	.20
900 Ohm .2 Watt Resistor	.75
12 inches of No. 22G Shielded Hookup Wire	.15
Terminal Strip	.10

ground lug away from this terminal. Be sure to solder back to this ground lug any leads that were connected to it (not including cathode connection of socket).

Connect one side of the 12 mfd. 25 volt electrolytic condenser to ground and the other side of the condenser to the cathode terminal of the 6B7 2nd detector and the phono switch as shown in Fig. 7. To this same terminal on the phono switch connect the 900 ohm .2 watt resistor. The other side of this resistor goes to ground. Complete the other connections as illustrated.

A high impedance pick-up should be used. If a low impedance pick-up is used a step-up transformer will be required for sufficient volume. The volume control and tone control of the set will regulate the phono volume and tone.

Servicing R. F. Coil Assemblies

The R. F. coil assemblies in this receiver are sold complete with can. This is due to the fact that the trimmers are soldered to the can, and cannot be easily disassembled.

The lead colors and resistances of the various windings in each assembly are shown in Fig. 3.

If it is ever necessary to remove one of coil assemblies from the can, proceed as follows: First remove the nuts from the screws at the top of the can. The outside lug on the trimmer condenser is inserted in a slot in the coil can, and this lug is soldered into position.

Apply a soldering iron to the can at the point of the soldered connection. Then with a screw driver lift up on the outside edge of the trimmer (edge soldered to can) until the trimmer is clear of the can. After the trimmers are all unsoldered, the coil can be taken out.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle chassis can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Phonograph connections can be made as shown in Fig. 7. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch—see Fig. 8.

For mounting the 12 mfd. 25 volt dry electrolytic condenser, two No. 27 drill holes should be drilled in the side of the chassis base directly below the wet electrolytic condensers. These holes are 1/4" from

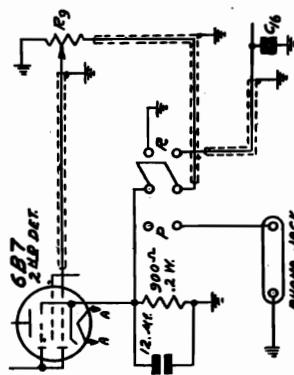


Fig. 7—Phonograph Connections

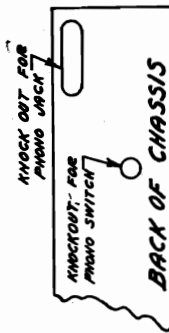


Fig. 8—Location of Phono Knockouts

the bottom, 7/8" and 3 3/4" from the front of the chassis.

The ground lug which extends out from the side of the chassis should be bent back into the chassis wall. The connections are made by opening the diode return circuit at the volume control. Unsolder the shielded lead which runs from the I. F. transformer to the volume control at the lug on the I. F. transformer. Cut this lead to length and connect it to the switch as shown in Fig. 7. The extra length of shielded lead which is provided, is connected from the volume control R9 to the phono switch as illustrated.

Remove the ground from the cathode terminal of the 6B7 2nd detector tube by bending the chassis

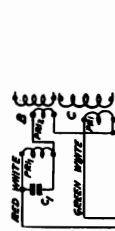


Fig. 8—Antenna Transformer in Early Models

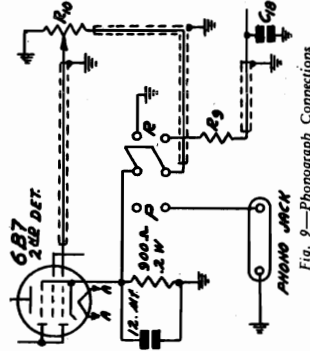


Fig. 9—Phonograph Connections

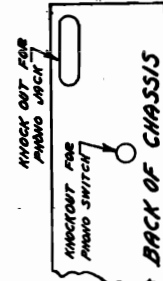


Fig. 10—Location of Phono Knockouts

General Service Data

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Col.	D. C. Resistance in Ohms
9A37	Antenna Transformer	T1	21.2
	Range A Primary Winding		0.2
	Range B Primary Winding		0.2
	Range C Primary Winding		0.2
	Range D Primary Winding		0.2
	Range A Secondary Winding		6.1
	Range B Secondary Winding		1.8
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
9A37	R. F. Interstage Transformer	T2	2.4
	Range A Primary Winding		1.4
	Range B Primary Winding		1.4
	Range C Primary Winding		6.0
	Range D Primary Winding		1.9
	Range A Secondary Winding		Small
	Range B Secondary Winding		Small
9A37	Oscillator Coils	T3	3.8
	Range A Grid Coil to White		0.9
	Range B Grid Coil to Green		0.9
	Range C Grid Coil to Green		1.3
	Range D Grid Coil to Green		0.6
	Range E Grid Coil to Black		0.6
	Range F Grid Coil to Black		0.6
	Range G Grid Coil to Black		0.6
	Range H Grid Coil to Black		0.6
	Range I Grid Coil to Black		0.6
	Range J Grid Coil to Black		0.6
	Range K Grid Coil to Black		0.6
	Range L Grid Coil to Black		0.6
	Range M Grid Coil to Black		0.6
	Range N Grid Coil to Black		0.6
	Range O Grid Coil to Black		0.6
	Range P Grid Coil to Black		0.6
	Range Q Grid Coil to Black		0.6
	Range R Grid Coil to Black		0.6
	Range S Grid Coil to Black		0.6
	Range T Grid Coil to Black		0.6
	Range U Grid Coil to Black		0.6
	Range V Grid Coil to Black		0.6
	Range W Grid Coil to Black		0.6
	Range X Grid Coil to Black		0.6
	Range Y Grid Coil to Black		0.6
	Range Z Grid Coil to Black		0.6
9A37	1st I. F. Transformer	T4	11.6
	Primary Winding		11.4
	Secondary Winding		0.5
	Short Section		0.5
9A38	2nd I. F. Transformer	T5	14.2
	Primary Winding		14.0
	Secondary Winding		0.5
	Short Section		0.5
12A223	Dynamic Speaker (8")	L1	50.0
	Output Transformer Primary Winding	T6	103.0
	Output Transformer Sec. Winding	T7	103.0
	Speaker Voice Coil		4.1
	Speaker Bucking Coil		0.2
5X51	115 Volt 60 Cycle Power Transformer	T8	7.5
	Tube Filament Winding (A-A)		0.2
	80 Filament Secondary Winding		0.2
	High Voltage Secondary Winding		163
	Center Tap to Outside		178
9A381	High Frequency Oscillator Tracking Coil	L2	1.1

*Speakers with other part numbers may have slightly different values of D. C. resistance.

MODEL D712M (1935)

Voltage, Socket, Trimmers WESTERN AUTO SUPPLY CO.
Coils, Phono, Connections

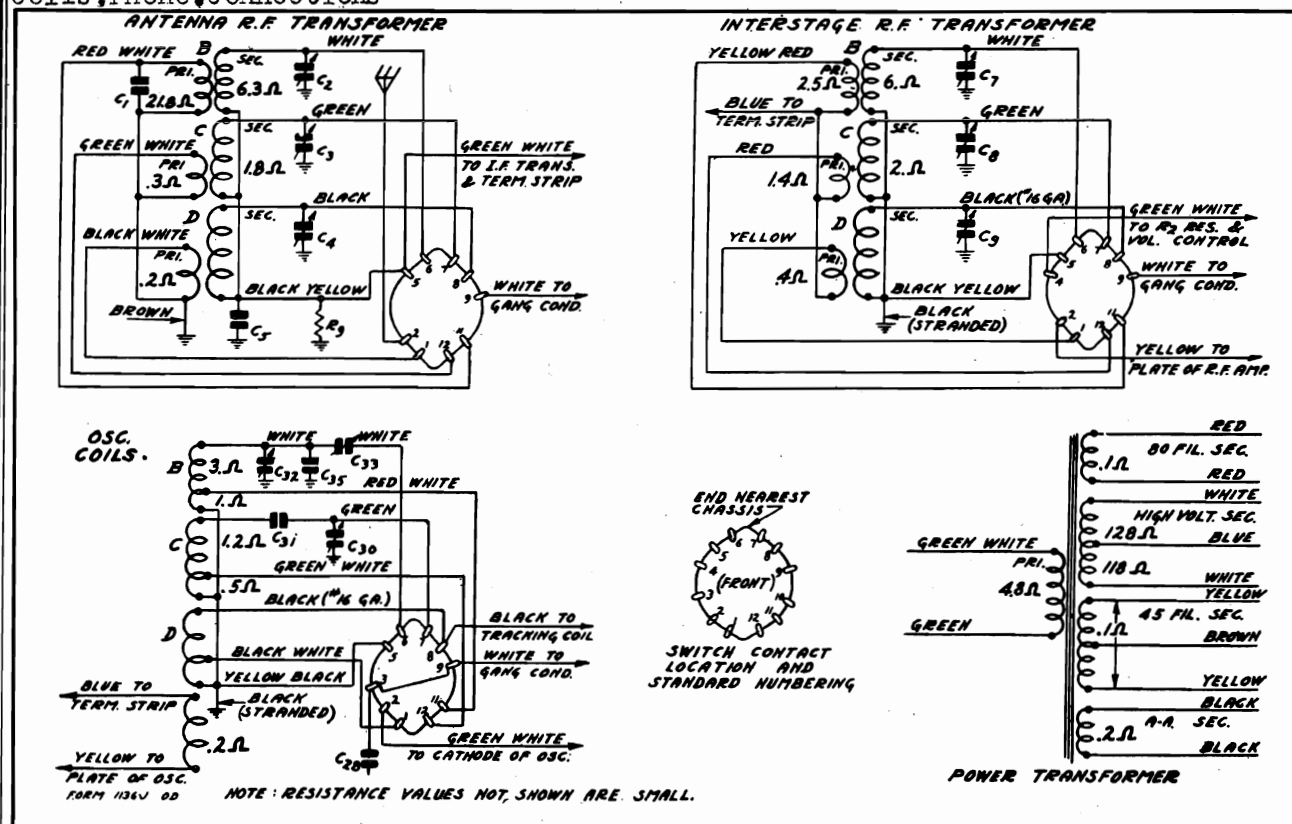


Fig. 4—Color Coding of Coil Wires and D. C. Resistance of Windings
(Also see complete D. C. Resistance List in this Manual)

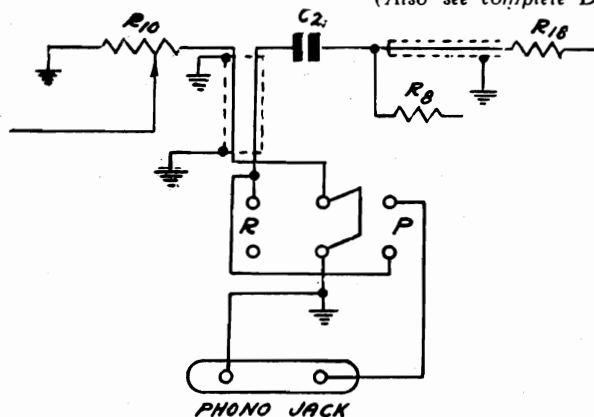


Fig. 7—Phonograph Connections

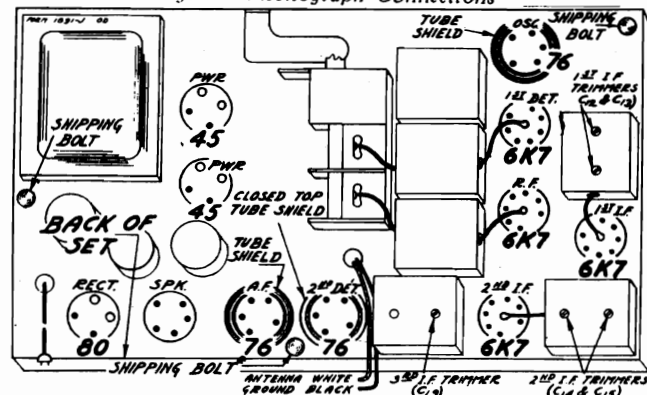


Fig. 5—Location of Tubes

VOLTAGES AT SOCKETS						
Line Voltage, 115 - Volume Control at Maximum Antenna Shorted to Ground						
Type of Tube	Function	Heater or Filament	Plate to Ground	Screen to Ground	Cathode to Ground	Cathode M. A.
6K7 (6D6)	R. F.	6.1	265	120	3.7	9.0
6K7 (6D6)	1st Det.	6.1	265	110	9.5	3.8
76	Osc.	6.1	110			5.8
6K7 (6D6)	1st I. F.	6.1	265	120	3.7	9.0
6K7 (6D6)	2nd I. F.	6.1	265	120	3.7	9.0
76	2nd Det.	6.1				
76	1st A. F.	6.1	265		14.	5.0
45	Power	2.5	265		50. (1)	22.
80	Rectifier	4.9				90. (total)

(1) As read with 500 Volt Scale. Grid to Ground.

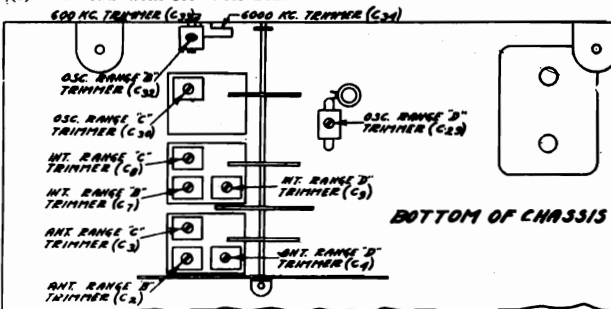


Fig. 3—Location of Trimmers

WESTERN AUTO SUPPLY CO.

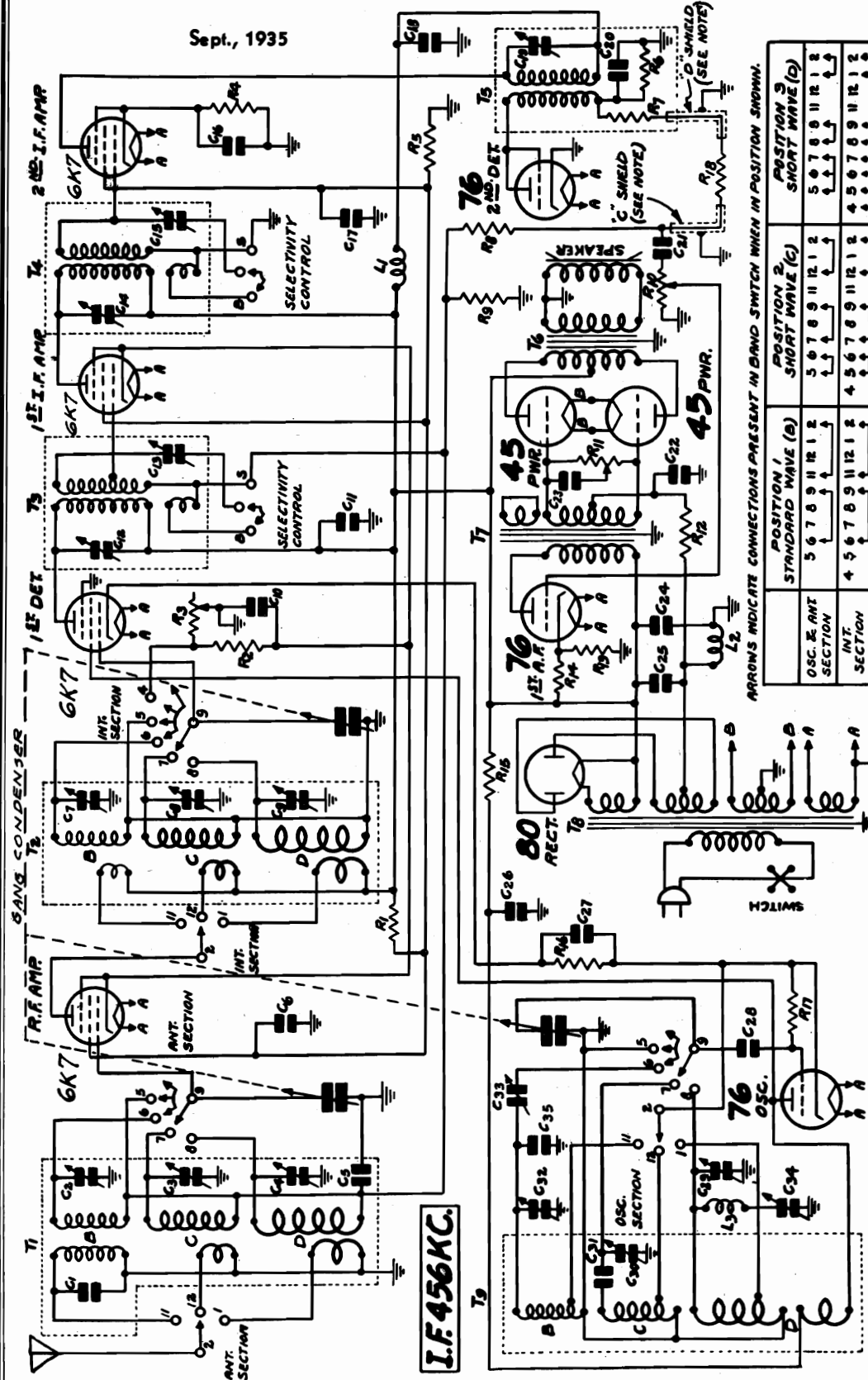
MODEL D712M (1935)
Schematic

Power Consumption - 90 Watts (At 115 volts 60 cycles)
Power Output - - - - - 5 Watts Undistorted
Selectivity - 22 KC Broad at 1000 times Signal (Sharp)

Tuning Frequency Range

B Range - - - - - 535 to 1730 KC.
C Range - - - - - 1715 to 5800 KC.
D Range - - - - - 5750 to 18300 KC.

Sept., 1935



ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1	POSITION 2	POSITION 3
OSC. & ANT. SECTION	5 6 7 8 9 11 12 1	5 6 7 8 9 11 12 1	5 6 7 8 9 11 12 1
INT. SECTION	4 5 6 7 8 9 11 12 1	4 5 6 7 8 9 11 12 1	4 5 6 7 8 9 11 12 1

CONTACT LOCATIONS 3, 4 AND 10 IN OSC. AND ANT. SECTIONS, AND 3 AND 10 IN INT. SECTION ARE BLANK.

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPOSE DISTINCT MECHANICAL ASSEMBLIES. "B" AND "D" ON SELECTIVITY CONTROL DENOTES "BROAD" AND "SHARP" RESPECTIVELY. THE CAPACITY OF THE "C" SHIELD IS 55 p.p.f. THE CAPACITY OF THE "D" SHIELD IS 20 p.p.f.

- T 1 Ant. R.F. Trans.
- T 2 Interstage R.F. Trans.
- T 3 1st I.F. Trans.
- T 4 2nd I.F. Trans.
- T 5 Diode Input Trans.
- T 6 Audio Output Trans.
- T 7 Audio Input Trans.
- T 8 Power Trans.
- T 9 Osc. Inductors
- L 1 Isolating Reactor
- L 2 Specter Field (570 Ohm)
- L 3 Osc. Tracking Coil
- R 5 30,000 ohm 1.0 W.
- R 6 300,000 ohm 2.0 W.
- R 7 100,000 ohm 2.0 W.
- R 8 2.0 megohm 2.0 W.
- R 9 1.0 megohm 2.0 W.
- R 10 3.0 megohm 2.0 W.
- R 11 10,000 ohm 2.0 W.
- R 12 10,000 ohm 2.0 W.
- R 13 25,000 ohm 1.0 W.
- R 14 25,000 ohm 1.0 W.
- R 15 25,000 ohm 1.0 W.
- R 16 2,500 ohm 2.0 W.
- R 17 80,000 ohm 2.0 W.
- C 1 250 mmf.
- C 2 2.25 mmf.
- C 3 2.25 mmf.
- C 4 2.25 mmf.
- C 5 .05 mf. 180 V.
- C 6 .25 mf. 240 V.
- C 7 .25 mf. 240 V.
- C 8 2.25 mmf.
- C 9 2.25 mmf.
- C 10 .25 mf. 180 V.
- C 11 25 mf. 360 V.
- C 12 150-250 mmf. 1 UNIT
- C 13 150-250 mmf. 1 UNIT
- C 14 150-250 mmf. 1 UNIT
- C 15 150-250 mmf. 1 UNIT
- C 16 .05 mf. 180 V.
- C 17 4.0 mf. 150 V.
- C 18 .10 mf. 360 V.
- C 19 70-150 mmf.
- C 20 50 mmf.
- C 21 50 mf. 360 V.
- C 22 50 mf. 360 V.
- C 23 104 mf. 200 V.
- C 24 18.0 mf. 400 V.
- C 25 14.0 mf. 400 V.
- C 26 .05 mf. 180 V.
- C 27 .05 mf. 180 V.
- C 28 35 mmf.
- C 29 2.25 mmf.
- C 30 2.25 mmf.
- C 31 1400 mmf.
- C 32 2.25 mmf.
- C 33 200-400 mmf. 1 UNIT
- C 34 40-100 mmf. 1 UNIT
- R 1 16,000 ohm 2.0 W.
- R 2 150 ohm 2.0 W.
- R 3 2,500 ohm 2.0 W.
- R 4 400 ohm 2.0 W.

MODEL D712M (1935) Alignment, Changes Resistances

WESTERN AUTO SUPPLY CO.

Twenty-five Cycle Receivers.

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Changes in Early Models

In the early models of this receiver the tone control resistor (R11) was connected as a series variable resistor connecting in series through the condenser C23 between the grids of the 45 tubes in the audio output stage. In the later models it is employed as a potentiometer in the manner shown in Fig. 2.

The 100,000 ohm resistor (R18) was not used in the early models. Condenser C21 was connected directly to the resistor R7.

The type 6K7 metal tubes replace the type 6D6 glass tubes which were used in the early models.

Condenser C35 was added to the oscillator coil standard wave section in later models. It is not, however, used in all cases but only when this capacity is required in this circuit.

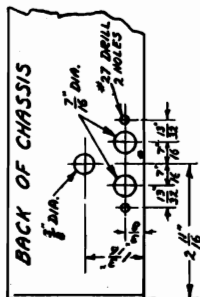


Fig. 8—Details of Panel Drilling for Phono Assembly

Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required to make this installation are shown in the parts list.

To mount the phono switch and phono jack, drill holes of a size and in the position shown in Fig. 8 at the left hand side (from back) of the rear panel of the chassis.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC. Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

D. C. Resistance of Windings

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Winding	Code	D. C. Resistance in Ohms
F-9A405	Antenna P. Transformer	T1	21.8
	Range A Primary Winding		0.3
	Range A Secondary Winding		0.2
	Range B Primary Winding		0.3
	Range B Secondary Winding		0.2
F-9A405	Int. Transformer	T2	2.5
	Range C Primary Winding		0.4
	Range C Secondary Winding		0.3
	Range D Primary Winding		0.4
	Range D Secondary Winding		0.3
F-9A405	Oscillator Coil	T3	Small
	Range E Primary Winding		3.0
	Range E Secondary Winding		1.0
	Range F Primary Winding		1.2
	Range F Secondary Winding		0.3
F-9A407	1st P. Transformer	T4	Small
	Range G Primary Winding		4.6
	Range G Secondary Winding		3.4
F-9A408	2nd P. Transformer	T5	1.7
	Range H Primary Winding		0.2
	Range H Secondary Winding		0.2
F-9A409	3rd P. Transformer	T6	9.4
	Range I Primary Winding		0.5
	Range I Secondary Winding		0.5
F-9A410	Audio Input Transformer	T7	28.4
	Range J Primary Winding		238
	Range J Secondary Winding		200
F-9A411	Audio Output Transformer	T8	296
	Range K Primary Winding		188
	Range K Secondary Winding		222
F-9A412	Dynamic Speaker (8"		0.4
F-9A413	Speaker Field		1.6
F-9A414	Volt 60 Cycle Power Trans.		592
F-9A415	Tube Filament Secondary (A-A)		4.8
	Tube Filament Secondary (B-B) (45)		0.2
	High Voltage Secondary Winding		0.1
	Center Tap to Inside		118
	Center Tap to Outside		36
F-9A416	2nd 1. K. Plate Solenoid Reactor		1.1
F-9A417	High Frequency Oscillator Tracking Coil		1.3

Alignment and Calibration

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used. If a station is tuned in with the selectivity control in the broad position and this control is then turned to the sharp position, the station may disappear. This is not an indication that the receiver is out of alignment.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC. Connect the output of the signal generator through a 0.1 mf. condenser to the grid of the 1st detector. Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position. Attenuate the signal from the signal generator to prevent the leveling-off action of the A.V.C. Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 1.

Range B Alignment

1730 KC Adjustment
Set the signal generator for 1730 KC. Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position. Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C32) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C7) and antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC. Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

5800 KC Adjustment

Set the signal generator for 5800 KC. Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

Adjust the oscillator Range C trimmer (C10) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C8) and antenna Range C trimmer (C3) to maximum. Do not change the setting of the oscillator Range C trimmer.

Range D Alignment

18,300 KC Adjustment
Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

Adjust the oscillator Range D trimmer (C29) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

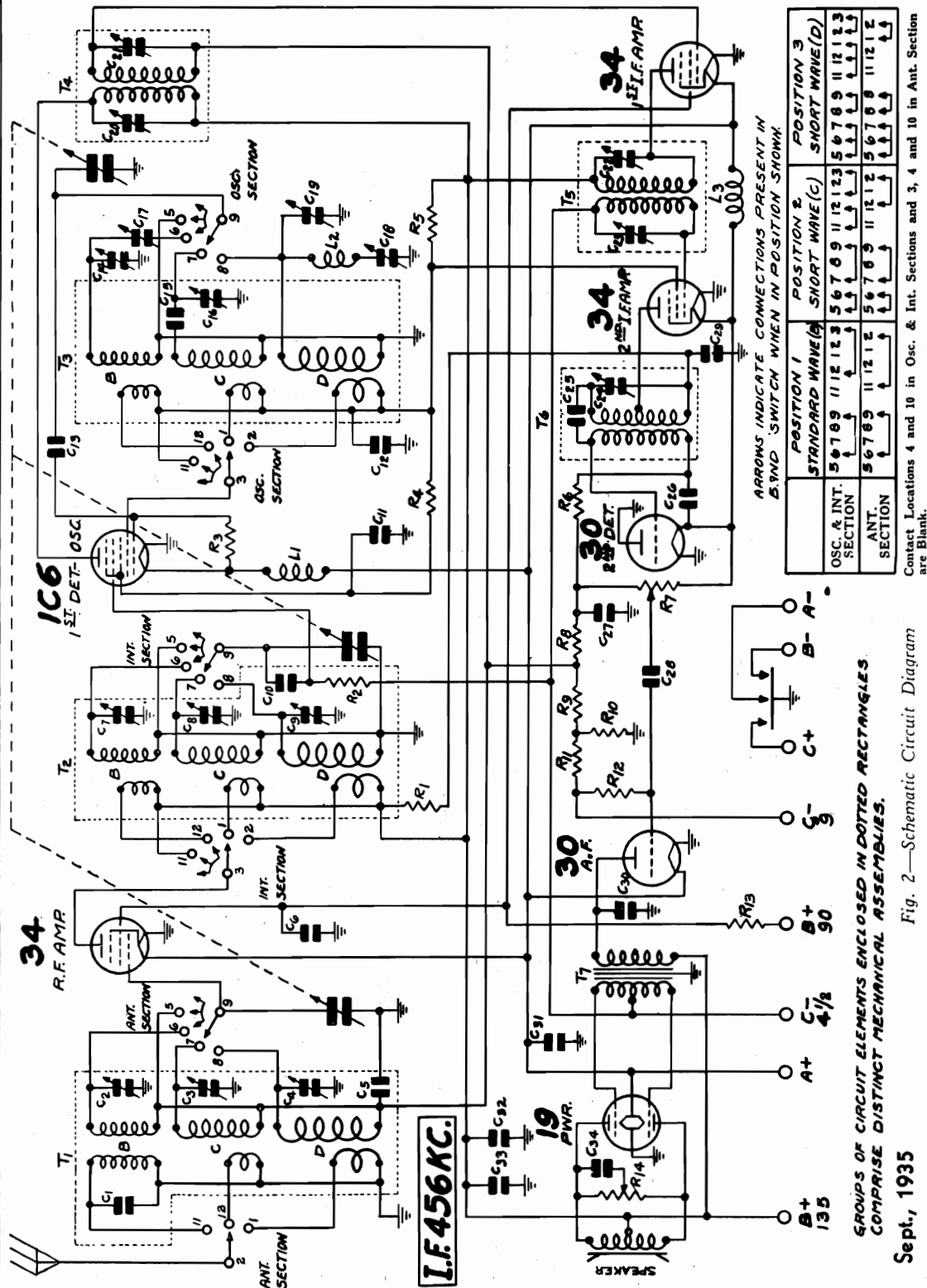
Set the signal generator for 15,000 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C4) to maximum.

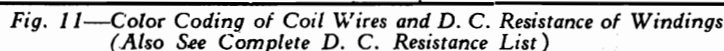
When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

WESTERN AUTO SUPPLY CO.

MODEL D713 (1935)
Schematic



WESTERN AUTO SUPPLY CO.



Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Control Grid to Ground	Normal Plate M. A.
34	R. F. Amp.	2.0	135	45		1.8
1C6	1st Detector	2.0	135 75(1)	65		2.6 1.8(1)
34	1st I. F. Amp.	2.0	135	45		1.8
34	2nd I. F. Amp.	2.0	133	75	4.5	2.25
30	2nd Detector	2.0				
30	A. F. Amp.	2.0	135			3.0
19	Power Amp.	2.0	135		4.5	1.0 (Per Plate)

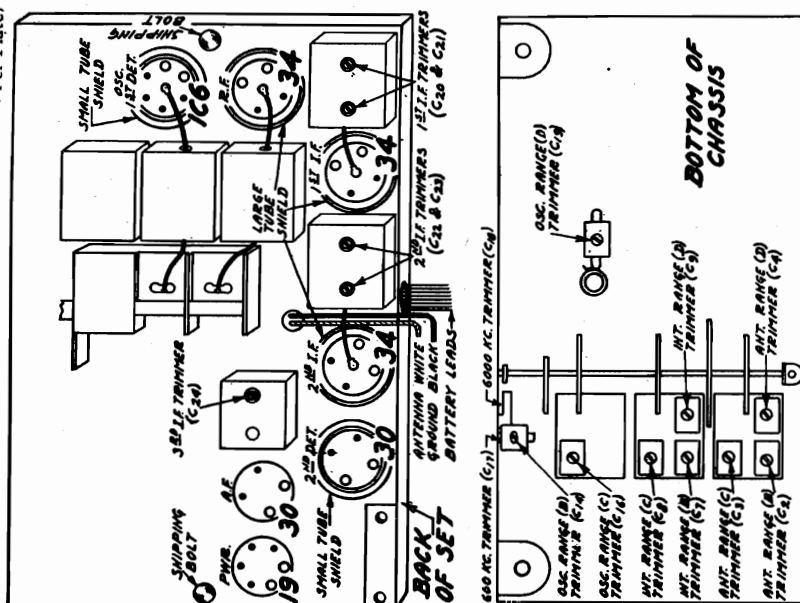


Fig. 9—Arrangement of Trimmers

WESTERN AUTO SUPPLY CO.

MODEL D713 (1935)
Alignment, Changes

SPECIFICATIONS

Input Voltages		Tuning Frequency Range	
"A" Battery	2 Volts (0.68 Amperes)	B Range	535 to 1730 KC.
"B" Batteries	90 and 135 Volts	C Range	1680 to 4800 KC.
"C" Batteries	4½ and 9 Volts	D Range	5650 to 16000 KC.
Power Output		Sensitivity	
1 Watt Undistorted		B Range Average	2.0 Microvolts Absolute
Selectivity		C Range Average	4.0 Microvolts Absolute
24 KC Broad at 1000 times Signal		D Range Average	6.0 Microvolts Absolute
Intermediate Frequency			
456 KC.			
Speaker			
8" Magnetic			

Alignment and Calibration

Correct alignment is extremely important in connection with all wave receivers. 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 at 456, 1730, 1500, 600, 4800, 4200, 16,000, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC. Connect the output of the signal generator through a 0.1 mf. condenser to the switch end of condenser C-10—see Fig. 2. There is a lead which goes to the lug on the top of the center stator section of the tuning condenser—see Fig. 10. The connection can be made at this lug.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the volume control to the maximum position. Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 10.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC. Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C14) until maximum output is obtained. The location of this trimmer is shown in Fig. 9.

1500 KC Adjustment

Set the signal generator for 1500 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C7) and antenna Range B trimmer (C2) to maximum.

600 KC Adjustment

Set the signal generator for 600 KC. Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 9 for location of this trimmer.

Be sure to use a non-metallic screwdriver for this adjustment.

Range C Alignment

4800 KC Adjustment

Set the signal generator for 4800 KC. Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range C trimmer (C16) until maximum output is obtained. See Fig. 9 for location of this trimmer.

4200 KC Adjustment

Set the signal generator for 4200 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C8) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range D Alignment

16,000 KC Adjustment

Set the signal generator for 16,000 KC. Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

Adjust the oscillator Range D trimmer (C19) until maximum output is obtained. See Fig. 9 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C4) to maximum.

When adjusting the interstage Range D trimmer it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 16,000 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC. Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer (C18) until the peak of greatest intensity is obtained. See Fig. 9 for location of this trimmer.

Use a non-metallic screwdriver for this adjustment.

Voltages

Check the voltages at the sockets to see if correct values are being delivered to the tubes. The antenna and ground should be disconnected and the antenna and ground leads from the set connected together. The volume control should be turned to the right or maximum position.

The voltage chart gives the voltages with all tubes in, the speaker connected and the set in operating condition. These voltages are typical of the sets but will vary slightly with variations in individual receivers, tubes, test equipment used and battery voltages.

Changes in Early Models

Condenser C35 7 mmf. (not shown in Fig. 2) was added to the oscillator coil assembly in parallel with oscillator Range B trimmer condenser C14. It is not, however, used in all cases but only when this capacity is required in this circuit.

MODEL D713 (1935)

Drive Cord Data

Resistances

WESTERN AUTO SUPPLY CO.

Replacing Drive Cord

Take off the station pointer by removing the screw at the center of the dial.

Loosen the two set screws in the collar on the band selector shaft.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis and one screw at the top which secures this assembly to the bracket.

Pull the dial assembly forward until the collar is free of the band selector shaft; and lay the assembly face downward in front of the chassis.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 12.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 12. Insert one end of the new drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord, which has been inserted through the hole, to one end of the tension spring.

Wrap the cord in a counter clockwise direction (facing front of chassis) around the drive drum approximately one and one half turns, progressing toward the front.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one half times around this shaft as shown in Fig. 12, progressing toward the back of chassis.

Wrap the cord on directly under the drive drum above.

Then bring this cord up to the drive drum until it is up to the hole in the drive drum as shown in the illustration.

Now insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension

Following are the D. C. resistances of the various coil windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Winding	Code	D. C. Resistance in Ohms
P-9A416	Antenna R. F. Transformer	T1	
	Range B Primary Winding		20.0
	Range C Primary Winding		0.3
	Range D Primary Winding		0.2
	Range B Secondary Winding		6.2
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
P 9A392	Interstage R. F. Transformer	T2	
	Range B Primary Winding		4.0
	Range C Primary Winding		2.5
	Range D Primary Winding		0.5
	Range B Secondary Winding		6.0
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
P-9A393	Oscillator Coils	T3	
	Range B Plate Coil		1.2
	Range C Plate Coil		1.0
	Range D Plate Coil		0.4
	Range B Grid Coil		4.0
	Range C Grid Coil		0.9
	Range D Grid Coil		Small

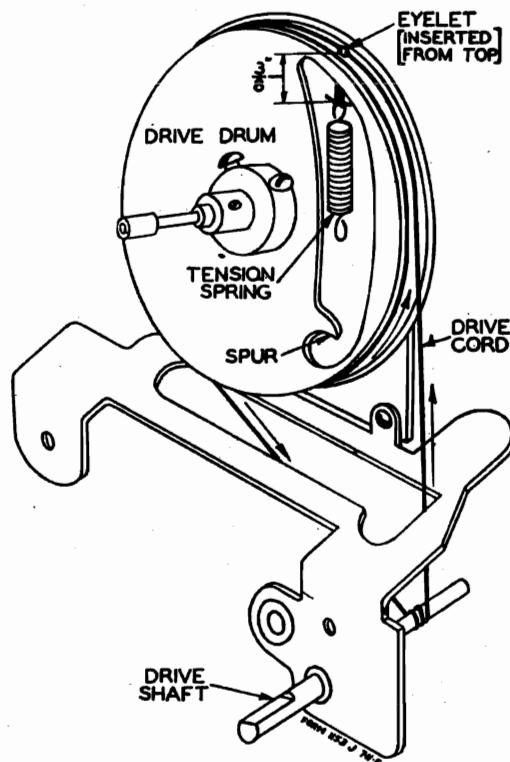


Fig. 12—Drive Cord Replacement

spring. The end of the spring when hanging free should be approximately $\frac{3}{8}$ " from the flange of the drum as shown in Fig. 12. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Turn the drive shaft back and forth several times.

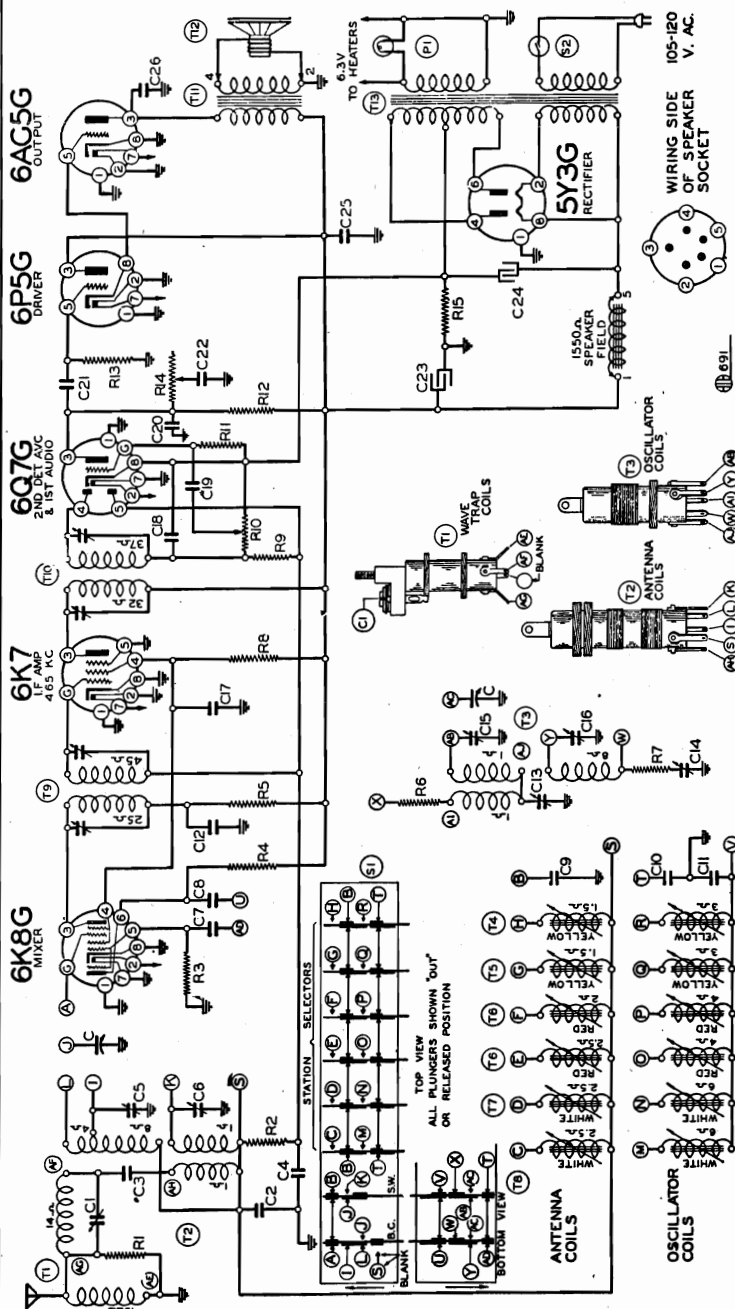
Replace the drive assembly and pointer.

Replace the chassis in the cabinet.

Part No.	Winding	Code	D. C. Resistance in Ohms
P-9A394	1st I. F. Transformer	T4	
	Primary Winding		11.4
	Secondary Winding		11.4
P-9A395	2nd I. F. Transformer	T5	
	Primary Winding		11.4
	Secondary Winding		11.4
P-9A396	3rd I. F. Transformer	T6	
	Primary Winding		
	Tap to B+		8.0
	Tap to Variable Trimmer		8.2
	Secondary Winding		126.0
P-50X11	Audio Input Transformer	T7	
	Primary Winding		1005.0
	Secondary Winding		
	Center Tap to Inside		580.0
	Center Tap to Outside		630.0
*P-12A218	Magnetic Speaker		
	Speaker Coil		
	Center Tap to Inside		275.0
	Center Tap to Outside		300.0
P-9A281	Single Filament Reactor	L1	1.2
P-9A391	High Frequency Oscillator Tracking Coil	L2	0.7
P-9A281	Single Filament Reactor	L3	1.2

WESTERN AUTO SUPPLY CO.

MODEL D714 (1939)
Schematic, Voltage
Socket, Trimmers



RESISTORS

R1	13017	10M ohm— $\frac{1}{2}$ w.
R2	13011	250M ohm— $\frac{1}{2}$ w.
R3	13094	50M ohm— $\frac{1}{2}$ w.
R4	13048	15M ohm— $\frac{1}{2}$ w.
R5	13023	2M ohm— $\frac{1}{2}$ w.
R6	13023	30 ohm— $\frac{1}{2}$ w.
R7	13023	20 ohm— $\frac{1}{2}$ w.
R8	13023	30 ohm— $\frac{1}{2}$ w.
R9	13023	20 ohm— $\frac{1}{2}$ w.
R10	13023	30 ohm— $\frac{1}{2}$ w.
R11	13023	20 ohm— $\frac{1}{2}$ w.
R12	13023	30 ohm— $\frac{1}{2}$ w.
R13	13023	20 ohm— $\frac{1}{2}$ w.
R14	13023	30 ohm— $\frac{1}{2}$ w.
R15	13023	20 ohm— $\frac{1}{2}$ w.

PARTS

T1	10812A	Wave Trap
T2	11111	B. C. S. W. Oscillator coil
T3	11097	High Frequency tuner coil
T4	11081C	Middle Frequency tuner coil
T5	11082	Low Frequency tuner coil
T6	11083	Low Frequency tuner coil
T7	11083R	Input I. F.—465 kc.
T8	10812B	Output Transformer
T9	11111R	Speaker—dynamic (150 ohm Field)
T10	11111R	Push Button switch
T11	10812C	Off-on switch on volume control
T12	12567	Pilot light

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40, 110, 130, and 230 volts.

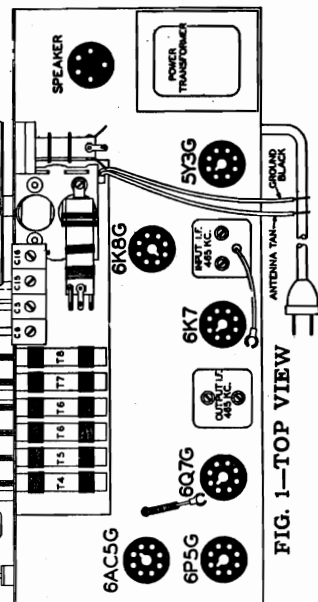
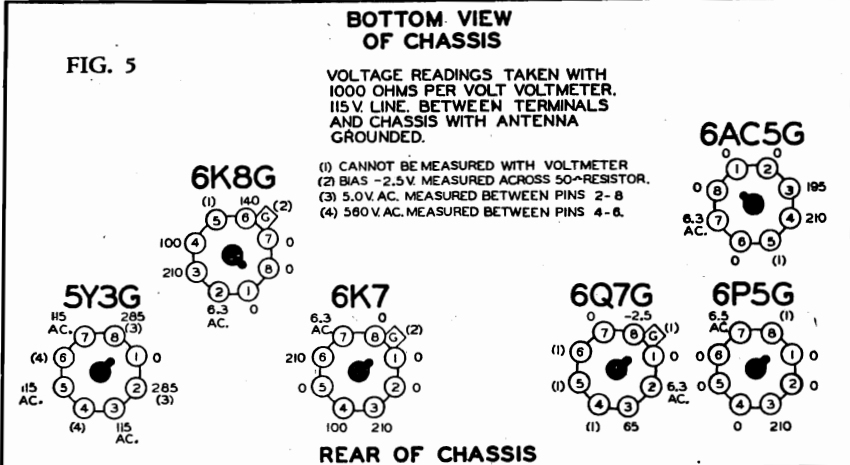
Power Consumption _____ 50 Watts (At 115 volts 50-60 cycles)
Power Output _____ 1.6 Watts Undistorted, 3 Watts Maximum
Intermediate Frequency _____ 465 KC.

FREQUENCY RANGE

5.65 to 18.3 MC.
540 to 1750 KC.

CONDENSERS

C1	10091	2 gang condenser
C2	10091	Adjustable Trimmer (Wave trap)
C3	12919	.0001 mica
C4	12919	.01 x 200 v.
C5	10091	.05 x 200 v.
C6	12439C	S. W. Antenna trimmer
C7	12439C	.000025 mica
C8	12919	.002 x 600 v.
C9	12919	.000484 mica—(0— Temperature Coefficient)
C10	12919	.000329 mica—(0— Temperature Coefficient)
C11	12919	.008 mica—(0— Temperature Coefficient)
C12	10086	.02 x 400 v.



MODEL D714 (1939)
Alignment, Tuner

WESTERN AUTO SUPPLY CO.

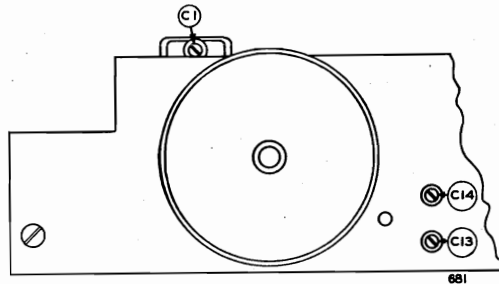


FIG. 4

DIAL CALIBRATION:

To correct dial calibration, rotate the tuning knob to the right until the dial pointer reaches the other extreme end of the dial scale. Then rotate the tuning knob to the left until the pointer reaches the other extreme end of the dial scale.

Stop clamps on the pointer slider bar make the pointer self aligning thereby correcting dial calibration.

To remove the chassis from the cabinet, remove the four bolts which are used to fasten the chassis to the cabinet bottom; pull the knobs off their shafts and detach the pointer from the drive string (see Fig. 1, top view).

NOTE:—On the front of the string dial drum a calibrated scale is provided for aligning this chassis to the frequencies listed in the alignment procedure. Attach a pointer so that it will indicate proper dial setting in respect to the position of the variable condenser.

ALIGNMENT PROCEDURE

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequency.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antenna—1 mf., 200 mmf. and 400 ohms.

BAND	Frequency Setting	Connection to Radio	Pushbutton Indicated Below Pushbutton	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1750 Kc.	200 mmf.	Broadcast	Rotor full open (Plates out of mesh)	Trimmer (C16) (See Fig. 1)	Broadcast oscillator	Adjust to maximum output
	1400 Kc.	200 mmf.	Broadcast	Set Dial at 1400 Kc.	Trimmer (C5) (See Fig. 1)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	Broadcast	Set Dial at 600 Kc.	Trimmer (C14) (See Fig. 1)	Broadcast oscillator	Adjust to maximum output
	465 Kc.	200 mmf.	Broadcast	Set Dial at 465 Kc. at 600 Kc. (See Fig. 4)	Trimmer (C13) (See Fig. 4)	Broadcast oscillator	Adjust to minimum output
SHORT WAVE BAND	17 Mc.	400 ohms	Short Wave	Set Dial at 17 MC	Trimmer (C15) (See Fig. 1)	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 ohms	Short Wave	Set Dial at 17 MC	Trimmer (C9) (See Fig. 1)	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 ohms	Short Wave	Set Dial at 6 MC	Trimmer (C13) (See Fig. 4)	Short Wave oscillator	Adjust to minimum output

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are as shown. 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 the voltage chart are measured with 115 volts A. C. on the primary of the power transformer. 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.

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

PROCEDURE FOR SETTING THE AUTOMATIC STATION PUSHBUTTONS:

Important: Allow the radio to "warm up" for about 15 minutes before setting the station adjustment screws for the pushbuttons.

After you have made up your list of stations, press button marked "Broadcast" and tune set manually until station selected having the highest frequency is tuned in and the program noted. Press button covering frequency range in which station is located (See Fig. 3). Adjust screw through station

NOTE "A": Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

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. tab opening above button pressed until the same station is heard clearly and is correctly tuned.

Press pushbutton marked "Broadcast" and tune in next station selected. Press button covering frequency range in which station is located. Adjust screw through station tab opening above button pressed until the same station is heard clearly and with maximum volume.

Follow this procedure for each button until you have selected all of your stations. The automatic buttons are now set up for quick tuning and no further adjustment is necessary.

NOTE: In setting up the pushbuttons, station identification may require switching back and forth to button marked "Broadcast" until the same program is heard for both. If the same program is heard on more than one station, find the station on dial tuning and select the proper one on the pushbutton by comparing the order or sequence of programs with that on dial tuning.

Pinch out the station call letter tabs of the stations you have set on for the automatic buttons. The set of letters supplied and insert them into the rectangular space in the escutcheon. One of the small, clear celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

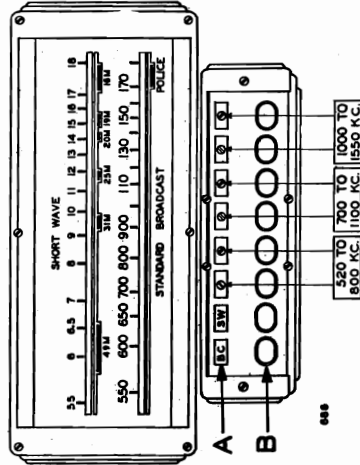


FIG. 3—Showing Station Adjustment Screws.

[illegible]

Fig. 4—Oscillator Trimmer Location

MODELS S712,D714M(1935)

Voltage, Socket, Coils
Changes, Phono. Data

WESTERN AUTO SUPPLY CO.

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 5. In contact locations not used, the number applying to that particular location is not employed.

Changes in Early Models

In the early models of this receiver, the antenna transformer (T1) had two Range B Primary windings as shown in Fig. 8.

The oscillator Range B and C trimmer locations varied in the early and intermediate models of this receiver as shown in Figs. 3 and 4.

Referring to Fig. 2, in the early models of this receiver, contact No. 4 in the interstage section of the band selector was not used. The purpose of this contact arrangement is to short out variable resistor R2 in the second short wave position. In these models the relative positions of resistors R1 and R2 were reversed. The common connection from the suppressor grid and cathodes of the R. F. and I. F. amplifier tubes was connected to the control arm of variable resistor R2. The latter was connected to resistor R1 which was grounded at the other end. The by-pass condenser C6 remains connected as before, to the cathode and suppressor grid connection.

The type 6K7 and 6F6 metal tubes replace the types 6D6 and 42 glass tubes respectively which were used in the early models.

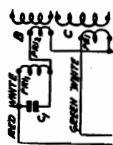


Fig. 8—Antenna Transformer in Early Models

Phonograph Connections

Replace the single lug insulated terminal strip (located on the rear panel, directly in back of the band selector switch) with (P-4A39) double lug insulated terminal strip with ground lug. Be sure to solder back to this new terminal strip any leads that were connected to the other terminal strip.

The connections are made by opening the diode return circuit at the volume control. Unsolder the 50,000 ohm resistor R9 (covered with saturated sleeving in early models) from the lug at the volume control and from the shielded lead which runs from the I. F. transformer. Cut this shielded lead to length and connect to the open lug on the new terminal strip. Connect one side of the 50,000 ohm resistor R9 to the same lug and the other side to the phono switch—see Fig. 9. Ground the shield to the ground lug of the terminal strip.

The extra shielded lead which is provided should be inserted into a piece of saturated sleeving.

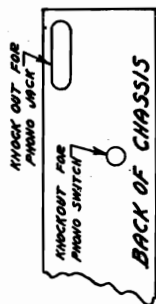


Fig. 9—Phonograph Connections

Servicing R. F. Coil Assemblies

The R. F. transformers and oscillator coil assemblies in this receiver are sold complete with can. This is due to the fact that the trimmers are soldered to the can, and cannot be easily disassembled.

The lead colors and resistances of the various windings in each assembly are shown in Fig. 5.

If it is ever necessary to remove one of coil assemblies from the can, proceed as follows: First remove the nuts from the screws at the top of the can. The outside lug on the trimmer condenser is inserted in a slot in the coil can, and this lug is soldered into position.

Apply a soldering iron to the can at the point of the soldered connection. Then with a screw driver lift up on the outside edge of the trimmer (edge soldered to can) until the trimmer is clear of the can. After the trimmers are all unsoldered, the coil can be taken out.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Phonograph connections can be made as shown in Fig. 9. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch—See Fig. 10.

For mounting the 12 mfd. 25 volt dry electrolytic condenser, two No. 27 drill holes should be drilled in the side of the chassis directly below the wet electrolytic condensers. These holes are 1 1/4" from the bottom, 7/8" and 3/4" from the front of chassis. The ground lug which extends out from the side of the chassis should be bent back into the chassis wall.

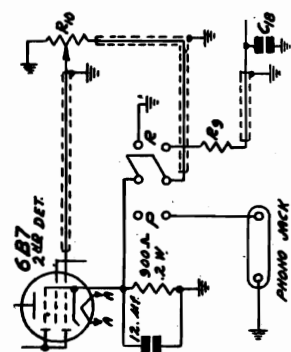


Fig. 10—Location of Phono Knockouts

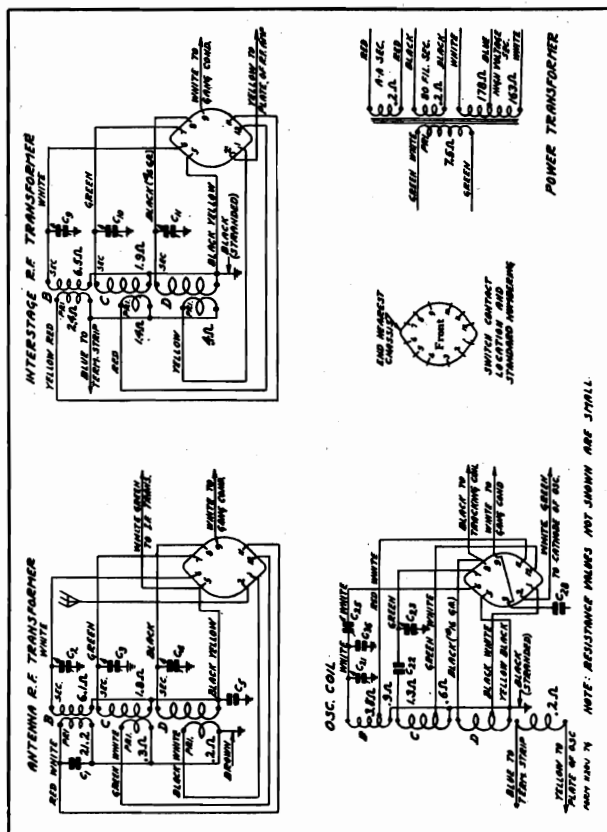


Fig. 5—Color Coding of Coil Wires and D.C. Resistance of Windings (Also see complete D.C. Resistance List in this Manual)

VOLTAGES AT SOCKETS					
Line Voltage, 115 - Volume Control at Maximum					
Type	Function	Heater	Plate to Ground	Cathode to Ground	Plate to Cathode
6K7 (6D6)	R. F.	6.1	230	95	3.0
6K7 (6D6)	1st Det.	6.1	230	100	9.0
76	Osc.	6.1	100		
6K7 (6D6)	I. F.	6.1	230	120	3.0
6B7 (6D6)	2nd Det.	6.1	55(1)	40	9.0
6B6 (6D6)	Power	6.1	215	230	17(2)
80	Rectifier	4.7			

(1) As read with 500,000 ohm meter.
(2) As read across R16

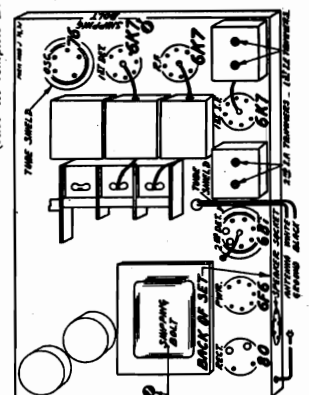


Fig. 6—Location of Tubes

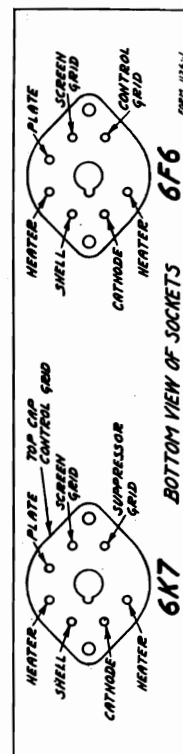


Fig. 7—Metal Tubes—Bottom View of Sockets

WESTERN AUTO SUPPLY CO. Circuit Data, Alignment

MODELS S712, D714M(1935)

Circuit

This model is a three band receiver with a tuning range in each band as shown in the specifications above. Three band coverage is accomplished by means of three sets of R. F. and oscillator coils and a three section triple throw switch.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R. F. transformer assemblies and T3 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively. The three sections of the band switch are designated in the schematic as the antenna, interstage and oscillator sections.

The band switch completes connections to the coils in use. It also short circuits the R. F. transformer secondary and oscillator coil of lower frequency not in use.

The antenna transformer with tuned secondary feeds into a type 6K7 R. F. amplifier tube. The output of this tube is fed through the interstage R. F. transformer with tuned secondary into another 6K7 tube which functions as the 1st detector.

A separate type 76 tube is employed in the oscillator circuit. Referring to the oscillator assembly T3, Fig. 2, B, C and D refer to the standard wave, 1st short wave and 2nd short wave oscillator coils respectively. The oscillating circuit is always resonant at 476 KC above the frequency to which the R. F. amplifier is tuned.

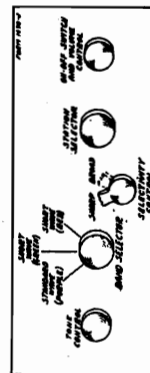


Fig. 1—Arrangement of Controls

The oscillator potential is fed into the cathode circuit of the 6K7 first detector tube. This results in the intermediate or beat frequency of 476 KC being present in the plate circuit of this tube.

One stage of I. F. amplification is employed using a 6K7 tube. The primaries and secondaries of the first and second I. F. transformers are tuned by small trimmer condensers.

Selectivity Control—Referring to the 1st I. F. transformer T3 in Fig. 2, it will be noted that there is a coupling winding shown in the illustration below the primary. Refer also to the by-pass arrangement in the pentode plate circuit of the 6B7.

When the selectivity control is in the sharp position, the coupling winding is open circuited and the loose coupling which exists between the primary and secondary of this transformer results in high selectivity. High audio frequencies are by-passed to ground through condenser C35.

When the selectivity control is in the broad position,

the coupling winding which is wound under the primary is connected in series with the secondary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

In order to allow passage of the higher audio frequencies in the broad position, the capacity of the by-pass condenser to ground is greatly reduced (C35 and the capacity of shield E in series).

Dual Volume Control—A dual manual volume control is employed. In one section the audio voltage applied to the 1st audio section of the 6B7 tube is varied (R10). In the other section the R. F. and I. F. bias is varied (R2). The purpose of the latter section is to reduce the sensitivity of the receiver at low volume settings in order to cut down noise pick-up between stations. The variable section R2 is shorted out through contact No. 4 of the interstage section of the band selector when in the 2nd short wave position.

A type 6B7 duo diode pentode tube functions as the second detector and a one stage audio amplifier. The two diode plates are connected together. AVC voltage is applied through isolating resistors to the control grid circuits of the R. F. and I. F. tubes. The audio voltage developed across volume control resistor R10 is applied through the movable arm to the control grid of the 6B7 tube. Resistance coupling is used between the first audio stage and the output stage which employs a type 6F6 output pentode tube. A type 80 full wave rectifier tube is used in the power unit.

Alignment and Calibration

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 476 KC. Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector. Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color). Turn the selectivity switch to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position. Attenuate the signal from the signal generator to prevent the levelling-off action of the A. V. C.

Then adjust the four I. F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 6.

Range B Adjustment

1730 KC Adjustment
Set the signal generator for 1730 KC. Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position. Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal

generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A. V. C. action.

Adjust the oscillator Range B trimmer (C21) until maximum output is obtained. The location of this trimmer is shown in Figs. 3 and 4.

1500 KC Adjustment

Set the signal generator for 1500 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

There is a lever arm in front of the large gear on the tuning condenser shaft by means of which the position of the station pointer may be adjusted. Set the station pointer at the 1500 KC mark on the dial scale by adjusting this lever arm.

Adjust the interstage Range B trimmer (C9) and antenna Range B trimmer (C2) to maximum.

600 KC Adjustment

Set the signal generator for 600 KC. Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

5800 KC Adjustment

Set the signal generator for 5800 KC. Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

Adjust the oscillator Range C trimmer (C23) until maximum output is obtained. See Figs. 3 and 4 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C10) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range D Adjustment

18,300 KC Adjustment

Set the signal generator for 18,300 KC. Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

Adjust the oscillator Range D trimmer (C24) until

maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C11) and antenna Range D trimmer (C4) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC. Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Tuning Frequency Range

B Range - - - - - 535 to 1730 KC
C Range - - - - - 1715 to 5800 KC
D Range - - - - - 5750 to 18300 KC

Sensitivity

B Range Average - - - - - 0.5 Microvolts Absolute
C Range Average - - - - - 1.0 Microvolts Absolute
D Range Average - - - - - 2.0 Microvolts Absolute

Power Consumption - 68 Watts (At 115 volts 60 cycles)

Power Output - - - - - 3 Watts Unfiltered

Selectivity - 98 KC Broad at 1000 times Signal (Sharp)

Intermediate Frequency - - - - - 456 KC

Speaker - - - - - 6" and 8" Dynamic

MODEL D716 (1935)

Alignment, Resistances

WESTERN AUTO SUPPLY CO.

Alignment and Calibration

1500 KC Adjustment

Set the signal generator for 1500 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large band scale. Retighten the set screw.

Adjust the 1st and 2nd interstage Range B trimmers (C3 and C13) and antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Be sure to use a non-metallic screwdriver for this adjustment.

Range C Alignment

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range C trimmer (C40) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range C trimmers (C9 and C12) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range D trimmer (C41) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range D trimmers (C10 and C11) and antenna Range D trimmer (C4) to maximum.

When adjusting the 2nd interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Use a non-metallic screwdriver for this adjustment.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Part No.	Winding	Resistance	Notes
P-9A418	Antenna R. F. Transformer	21.4	
	Range A Primary Winding	0.2	
	Range C Primary Winding	0.2	
	Range D Primary Winding	0.2	
	Range B Secondary Winding	6.1	
	Range C Secondary Winding	6.1	
	Range D Secondary Winding	6.1	
P-9A417	1st Interstage R. F. Transformer	7.3	
	Range B Primary Winding	3.6	
	Range C Primary Winding	3.6	
	Range D Primary Winding	3.6	
	Range B Secondary Winding	5.8	
	Range C Secondary Winding	5.8	
	Range D Secondary Winding	5.8	
P-90X23	Audio Input Transformer	17	
	Center Tap to Inside	415.0	
	Center Tap to Outside	211.7	
P-31X26	Audio Output Transformer	70	
	Primary Winding	135.5	
	Center Tap to Inside	155.3	
	Center Tap to Outside	155.3	
	Secondary Winding	0.16	
	Tap to Ground Side	0.12	
P-53X28	Power Transformer (115 Volt-60 Cycle)	79	
	Primary Winding	17	
	Range A Secondary (A-A)	Small	
	Range B Secondary (B-B)	Small	
	High Voltage Secondary Winding	87.9	
	Center Tap to Inside	106.4	
	Center Tap to Outside	106.4	
P-9A427	Oscillator Coils	110	
	Range B Grid Coil	2.1	
	Red White Tap to White	0.7	
	Red White Tap to Ground	0.7	
	Range C Grid Coil	1.7	
	Green White Tap to Green	0.5	
	Range D Grid Coil	0.5	
	Black White Tap to Black	0.2	
	Black White Tap to Ground	0.2	
	Oscillator Plate Coil	34.7	
P-9A430	2nd I. F. Plate Isolating Reactor	1.1	
P-12A204	12" Dynamic Speaker (No. 1—See Fig. 2)	600	
	Speaker Field	24	
P-12A203	12" Dynamic Speaker (No. 2—See Fig. 2)	100	
	Speaker Field	1.1	
P-12A206	12" Speaker (No. 3—See Fig. 2)	100	
	Speaker Field	1.1	
P-53X29	Reactor Assembly	1.5	
P-9A301	High Frequency Oscillator Tracking Coil	14.6	
P-9A402	Antenna R. F. Coils	1.0	
	Range A Section	5.9	
	Long Portion	0.2	
	Range C Section	1.8	
	Short Portion	0.2	
P-9A413	1st I. F. Transformer	74	
	Primary Winding	4.4	
	Coupling Winding	0.3	
	Secondary Winding	2.3	
	Tap to Condenser Side	2.3	
	Tap to Switch Side	2.3	
P-9A414	2nd I. F. Transformer	73	
	Primary Winding	4.3	
	Coupling Winding	0.3	
	Secondary Winding	2.3	
	Tap to Condenser Side	2.3	
	Tap to Switch Side	2.3	
P-9A415	3rd I. F. Transformer	76	
	Primary Winding	9.8	
	Secondary Winding	30.0	

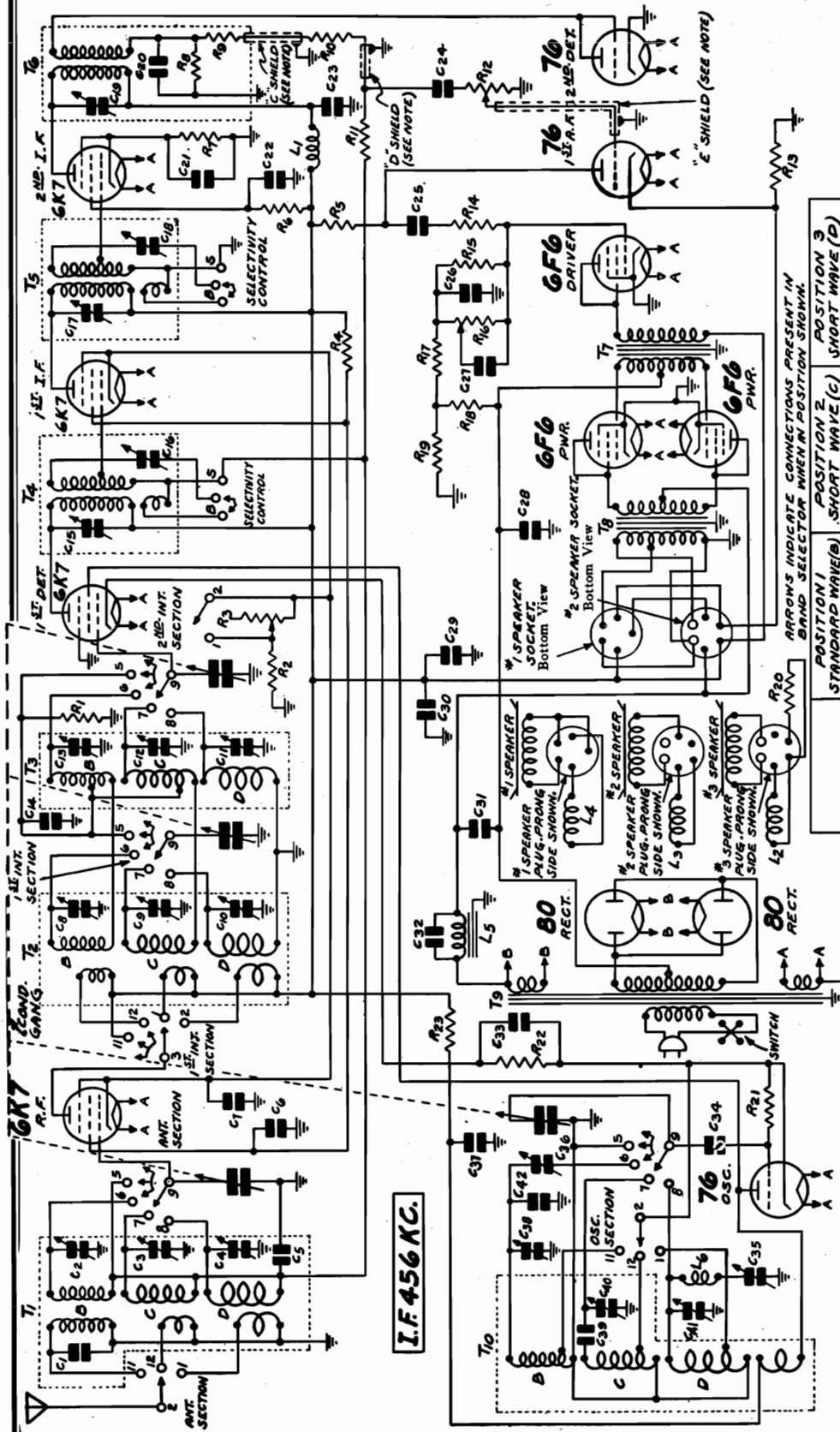
WESTERN AUTO SUPPLY CO.

MODEL D716 (1935)
Schematic

Power Consumption - 140 Watts (At 115 volts 60 cycles)
Power Output 15 Watts Undistorted

Tuning Frequency Range
B Range 535 to 1730 KC.
C Range 1715 to 5800 KC.
D Range 5750 to 18300 KC.

October, 1935



ARROWS INDICATE CONNECTIONS PRESENT IN BAND SELECTOR WHEN IN POSITION SHOWN.

	POSITION 1	POSITION 2	POSITION 3
STANDARD WAVE (S)	11 12 1 2 3 5 6 7 8 9	11 12 1 2 3 5 6 7 8 9	11 12 1 2 3 5 6 7 8 9
OSC. AND ANT. SECTION	1 2 3 5 6 7 8 9	1 2 3 5 6 7 8 9	1 2 3 5 6 7 8 9
I.F. INT. SECTION	11 12 1 2 3 5 6 7 8 9	11 12 1 2 3 5 6 7 8 9	11 12 1 2 3 5 6 7 8 9

- CONTRACT LOCATIONS 3, 4 AND 10 IN OSC. AND ANT. SECTIONS, 3, 4, 10, 11 AND 12 IN I.F. INT. SECTION AND 4 AND 10 IN I.F. INT. SECTION ARE BLANK.
- T 6 3rd I.F. Trans.
 - T 7 Push-Pull Input Trans.
 - T 8 Push-Pull Output Trans.
 - T 9 Power Trans.
 - T 10 Osc. Inductors
 - L 1 and I.F. Plate Isolating Reactor
 - L 2 No. 3 Speaker Field (1000 ohm)
 - L 3 No. 1 Speaker Field (600 ohm)
 - L 4 No. 2 Speaker Field (600 ohm)
 - L 5 Choke Coil (600 ohm)
 - L 6 Osc. Transformer Coil
 - R 5 60,000 ohm 0.5 watt
 - R 6 100,000 ohm 0.5 watt
 - R 7 500 ohm 0.2 watt
 - R 8 200,000 ohm 0.5 watt
 - R 9 100,000 ohm 0.2 watt
 - R 10 100,000 ohm 0.2 watt
 - R 11 20 megohm 0.2 watt
 - R 12 200 ohm 0.5 watt
 - R 13 250,000 ohm 0.2 watt
 - R 14 250,000 ohm 0.2 watt
 - R 15 250,000 ohm 0.2 watt
 - R 16 3.0 megohm 0.2 watt
 - R 17 100,000 ohm 0.2 watt
 - R 18 128 ohm 2.5 watt
 - R 19 145 ohm 3.0 watt
 - R 20 780 ohm 12.0 watt
 - R 21 80,000 ohm 0.2 watt
 - R 22 2,500 ohm 0.2 watt
 - R 23 27,000 ohm 1.0 watt
 - T 1 Ant. R.F. Trans.
 - T 2 1st Interstage R.F. Trans.
 - T 3 2nd Interstage R.F. Trans.
 - T 4 1st I.F. Trans.
 - T 5 2nd I.F. Trans.
 - C 37 .25 mf. 350 V.
 - C 38 2.25 mf.
 - C 39 1400 mf.
 - C 40 2.25 mf.
 - C 41 2.25 mf.
 - C 42 10 mf.
 - R 1 25,000 ohm 0.2 watt
 - R 2 150 ohm 0.2 watt
 - R 3 250 ohm
 - R 12 2.0 megohm
 - R 4 30,000 ohm 1.0 watt
 - C 25 .05 mf. 350 V.
 - C 26 .25 mf. 180 V.
 - C 27 .004 mf. 600 V.
 - C 28 125.0 mf. .45 V. Electrolytic
 - C 29 18.0 mf. 250 V. Electrolytic
 - C 30 .25 mf. 350 V.
 - C 31 30.0 mf. 450 V.
 - C 32 .15 mf. 280 V. A. C.
 - C 33 .05 mf. 180 V.
 - C 34 .35 mf.
 - C 35 40-100 mf. } One
 - C 36 300-500 mf. } Unit
 - C 13 2.25 mf.
 - C 14 .05 mf. 180 V.
 - C 15 150-250 mf. } One
 - C 16 150-250 mf. } Unit
 - C 17 150-250 mf. } One
 - C 18 150-250 mf. } Unit
 - C 19 70-150 mf.
 - C 20 50 mf.
 - C 21 .05 mf. 180 V.
 - C 22 .05 mf. 350 V.
 - C 23 10 mf. 350 V.
 - C 24 .01 mf. 480 V.

MODEL D716 (1935)
Voltage, Socket, Coils
Trimmers

WESTERN AUTO SUPPLY CO.

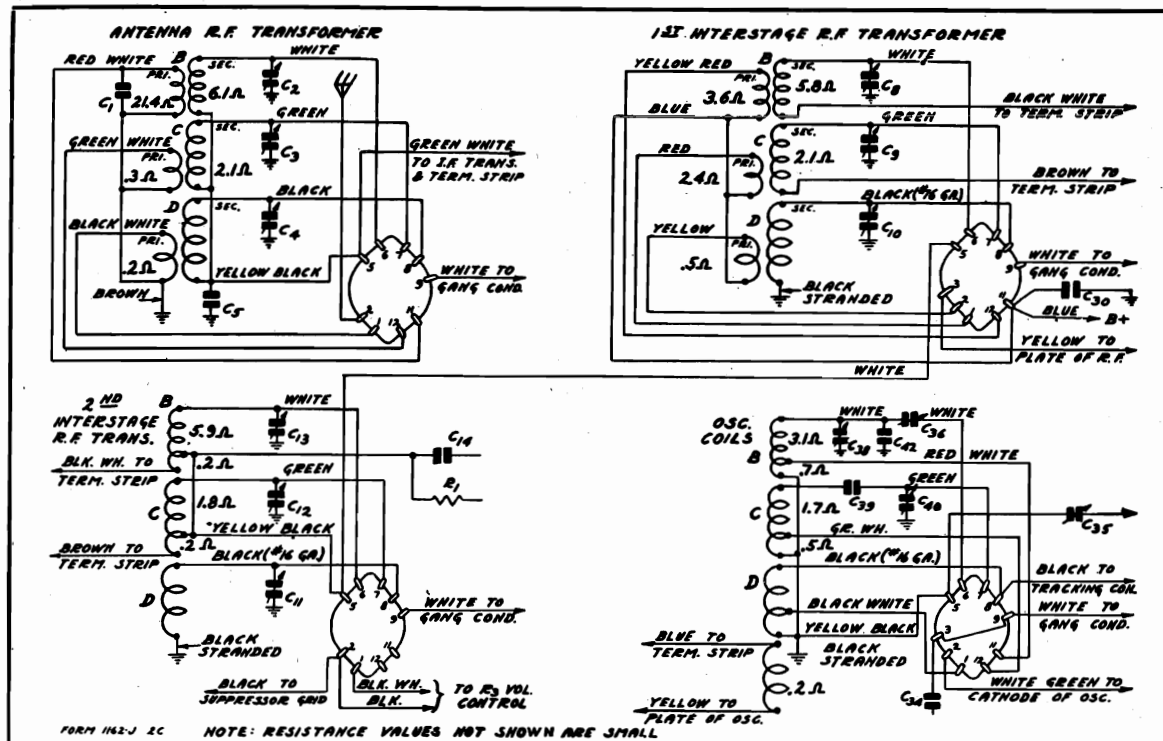


Fig. 4—Color Coding of Coil Wires and D. C. Resistance of Windings. (Also see complete D. C. Resistance List)

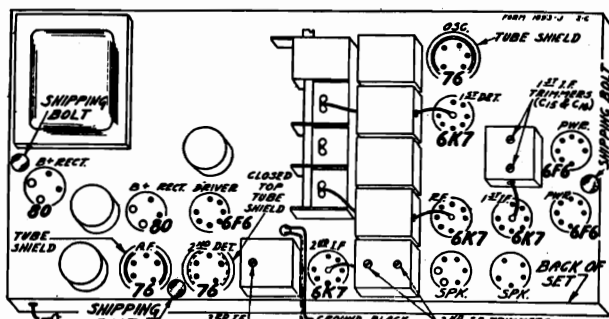


Fig. 5—Location of Tubes

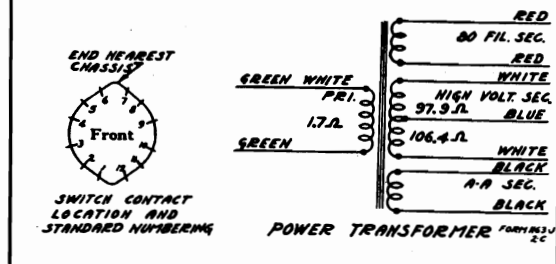


Fig. 7—Phonograph Connections

VOLTAGES AT SOCKETS						
Line Voltage 115 - Antenna Shorted to Ground						
Volume Control at Maximum						
Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cath. to Ground	Cath. M A
6K7	R. F.	6.2	245	80	2.8	7.6
6K7	1st Det.	6.2	245	90	6.5	2.6
76	Osc.	6.2	90			5.3
6K7	1st I. F.	6.2	245	80	2.8	7.6
6K7	2nd I. F.	6.2	245	74	3.9	7.0
76	2nd Det.	6.2				
76	1st A. F.	6.2	110		5.6	2.1
6F6	Driver	6.2	235	230	20.0(1)	27.0
6F6	Power	6.2	345	345	38.0(2)	22.5
80	Rectifier	5.1	500(3)			140.0(4)

(1) As read across R19

(3) Plate to Center Tap

(2) Grid to Ground

(4) Two tubes in parallel

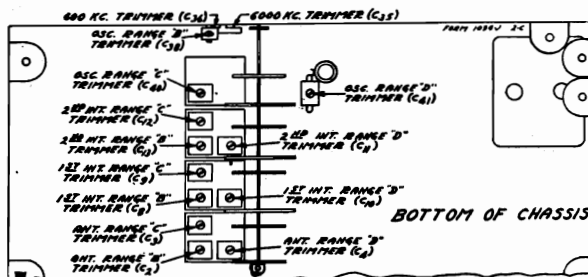


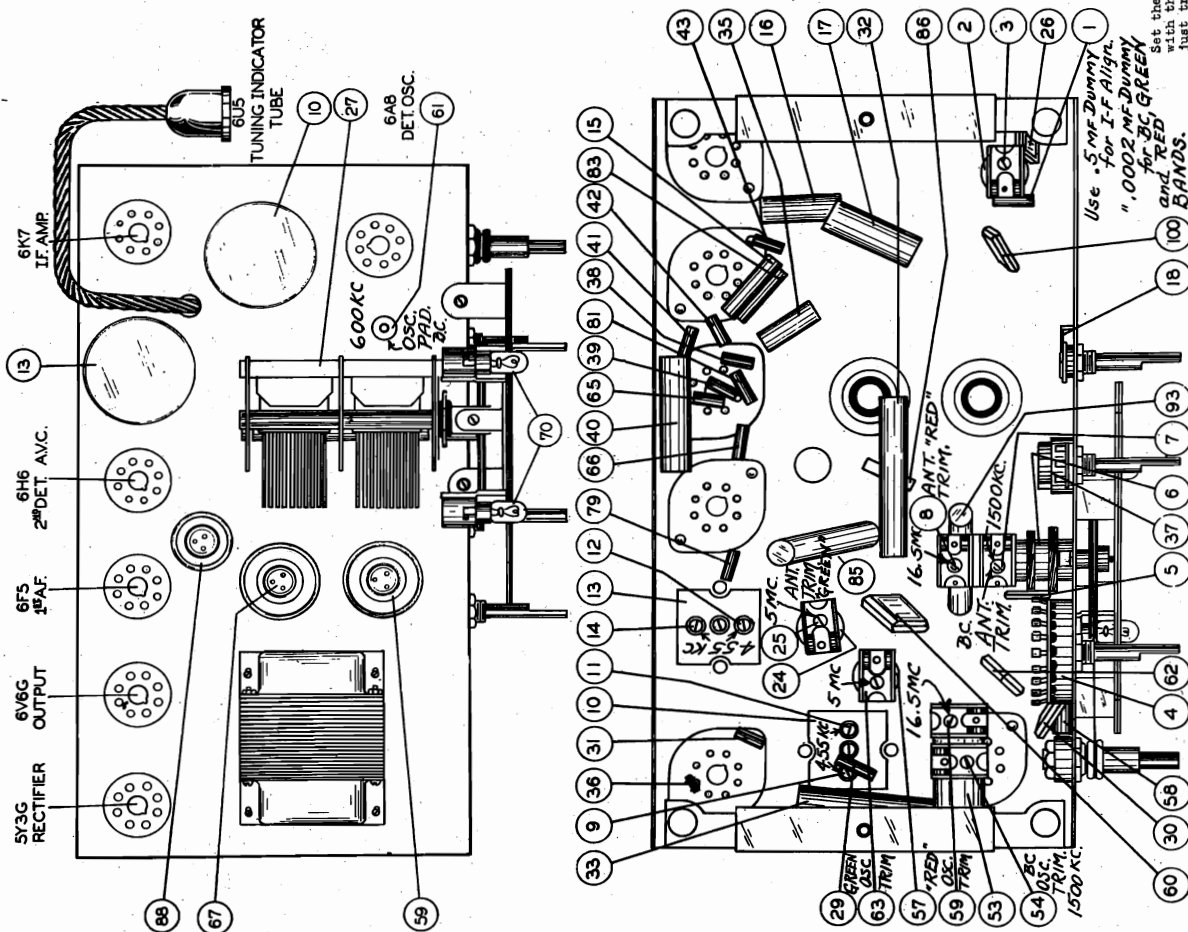
Fig. 3—Location of Trimmers



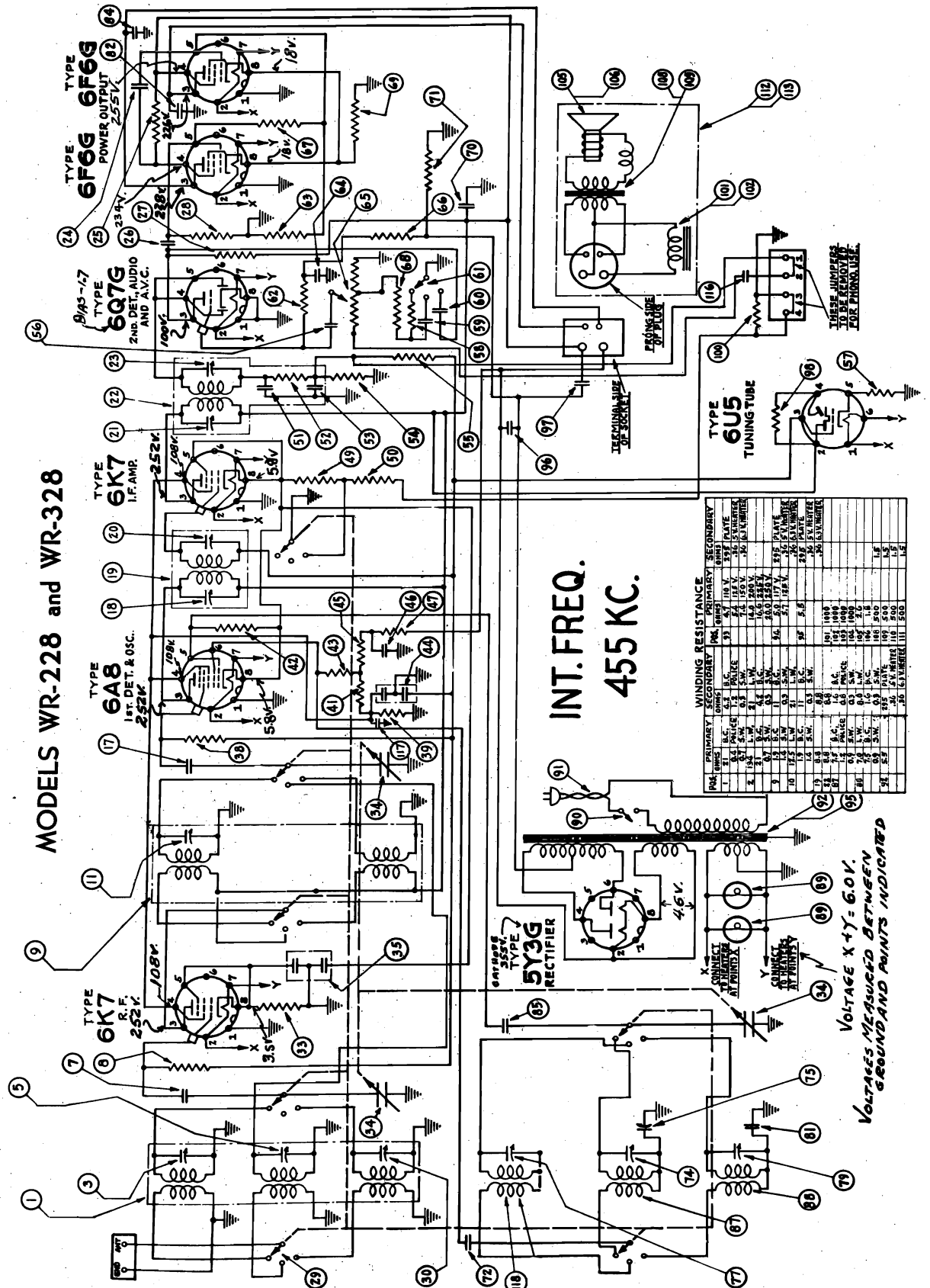
SERVICE PARTS LIST

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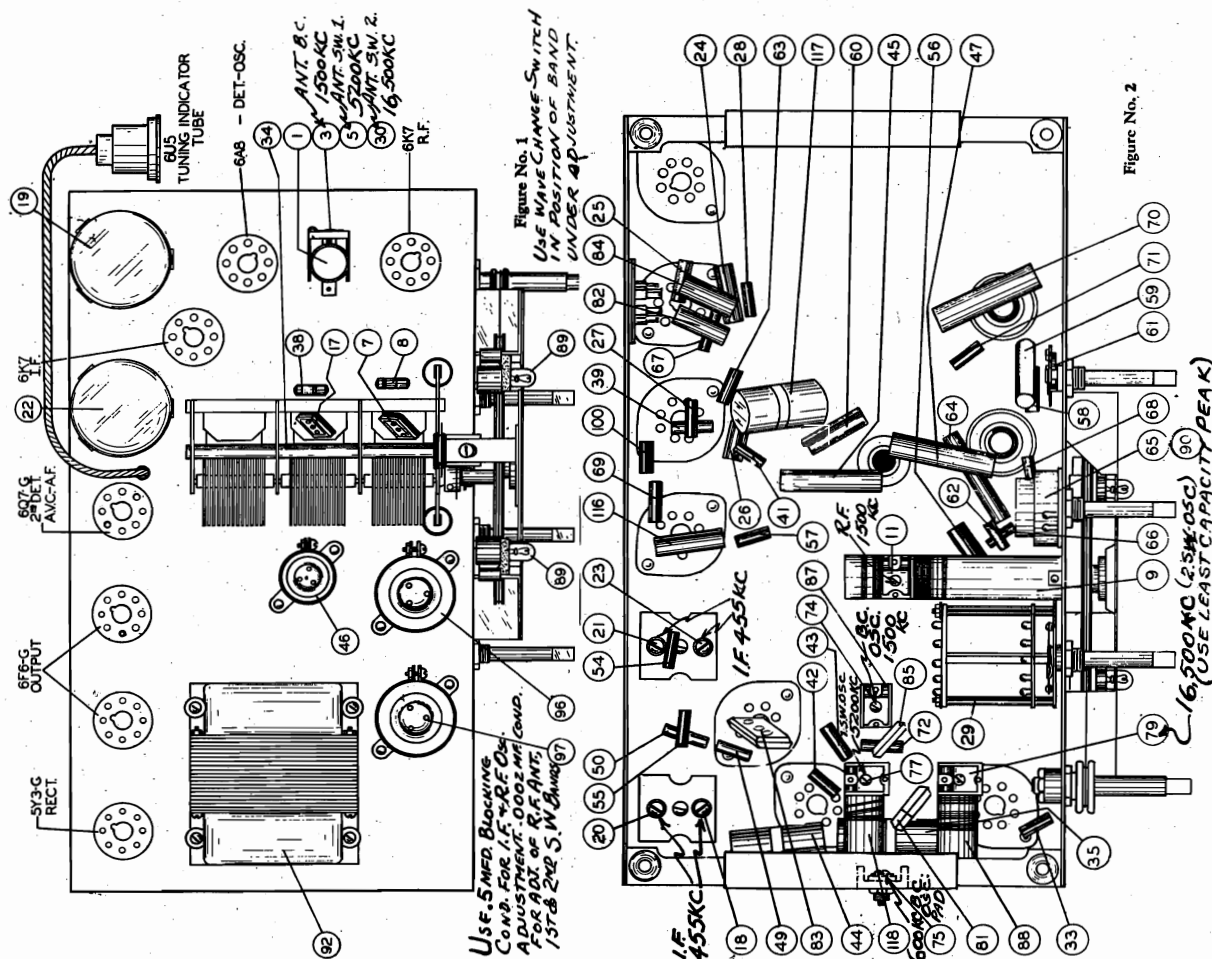
WAVE TRAP ADJUSTMENT



WESTINGHOUSE ELEC. SUPPLY CO. MODELS WR228, WR328
Schematic, Voltage Resistances



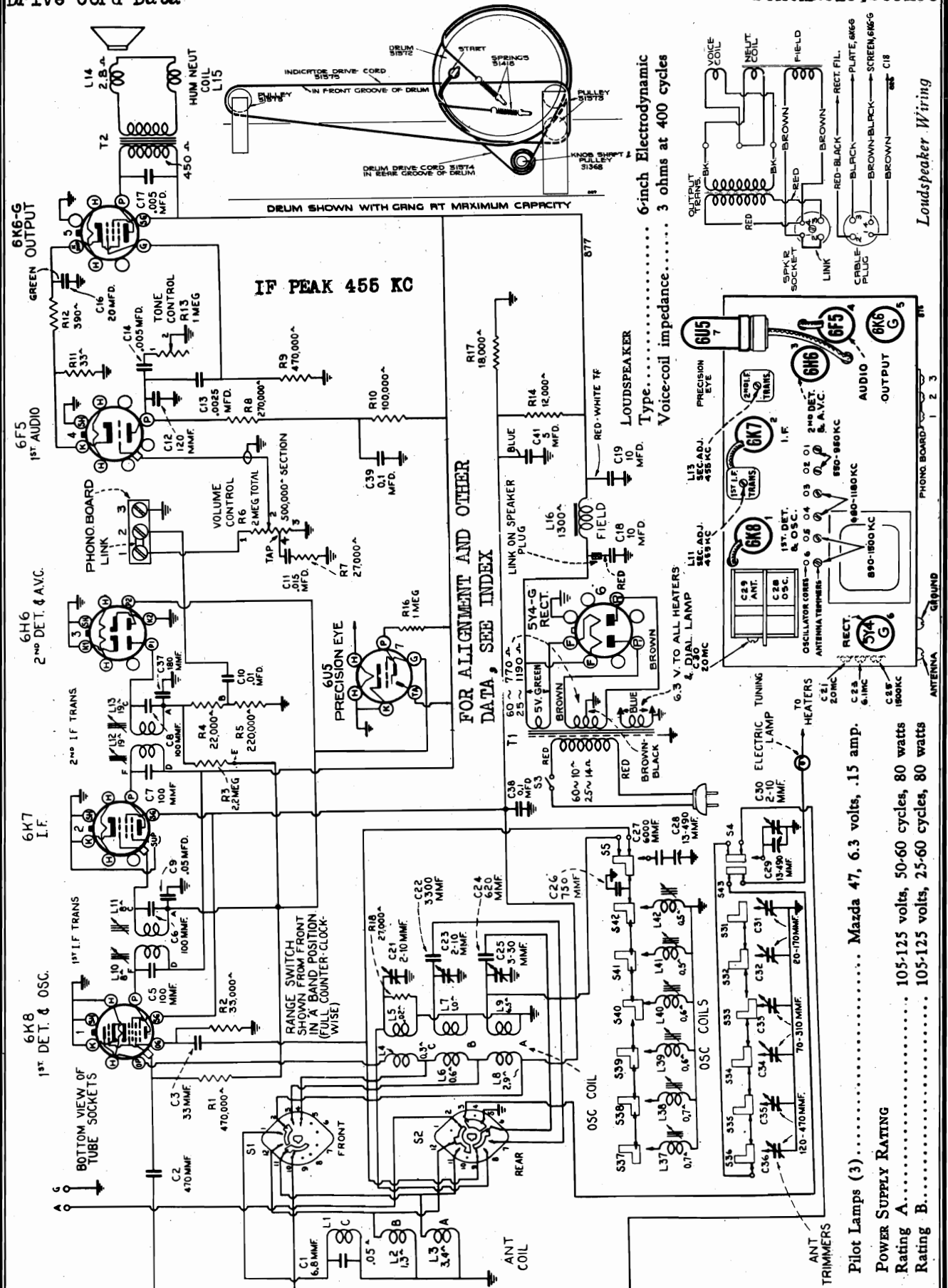
Socket, Trimmers Alignment, Parts

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Trimmers, Speaker
Drive Cord Data

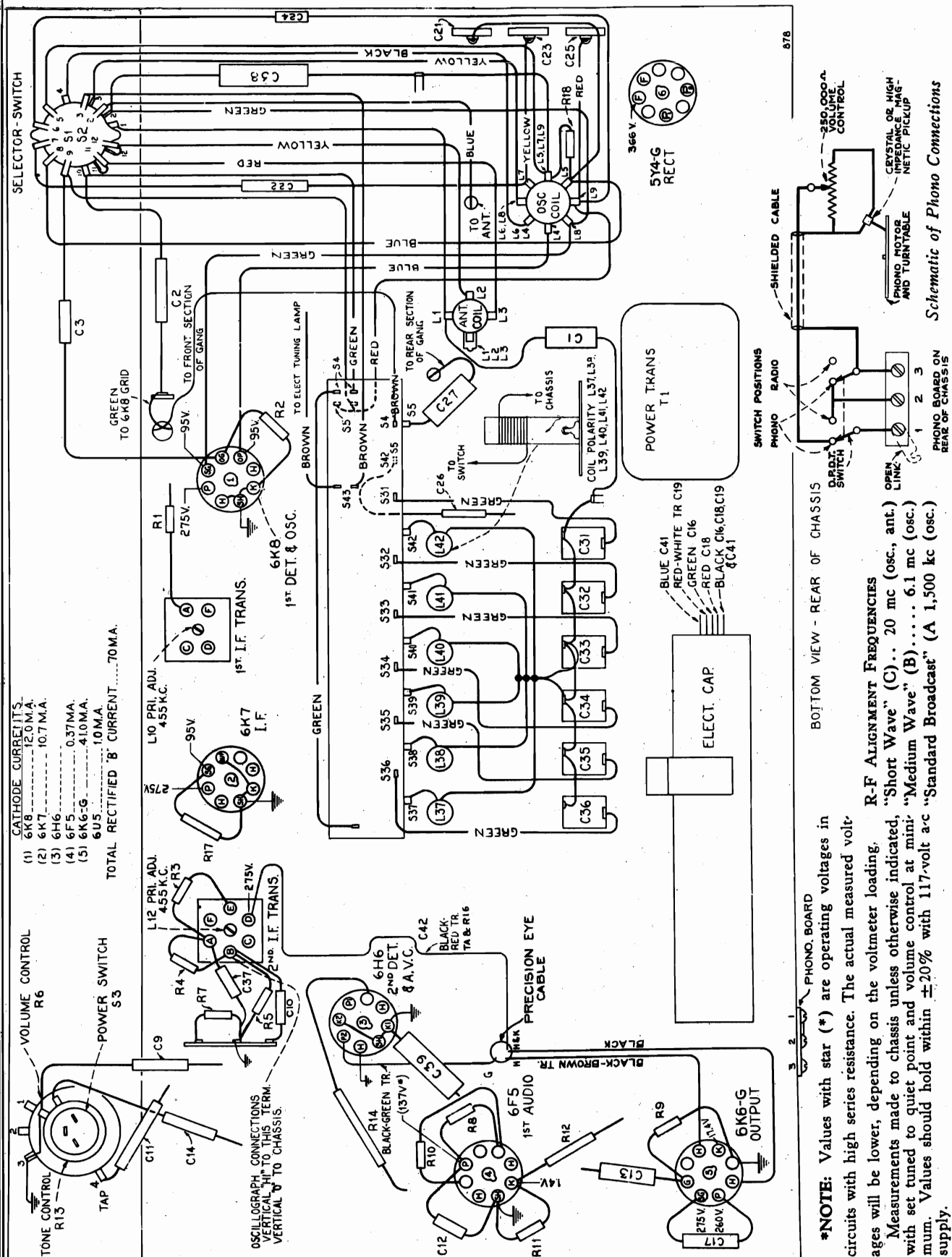
WESTINGHOUSE ELEC. SUPPLY CO.

MODEL WR264
Schematic, Socket

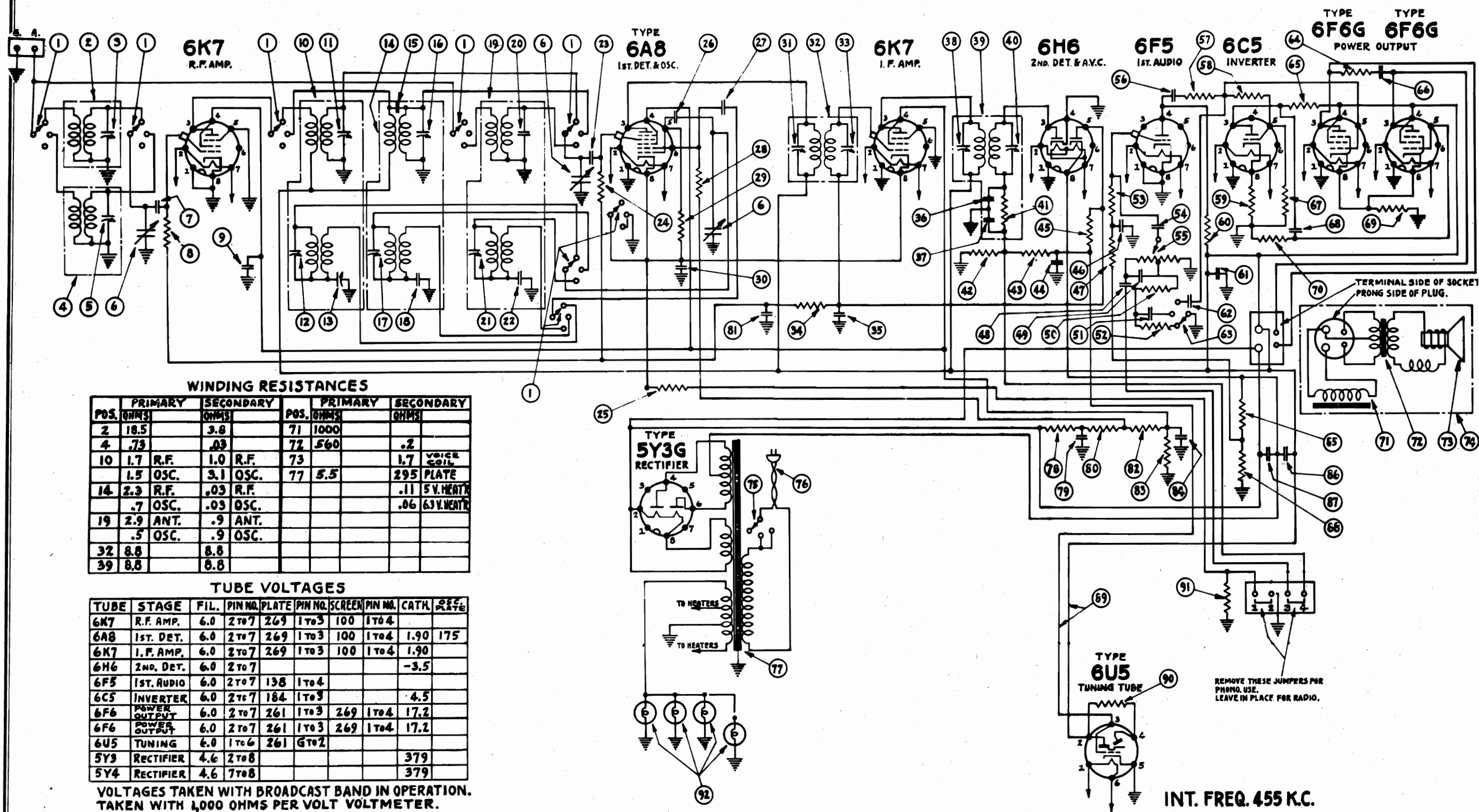


MODEL WR264
Chassis Wiring
Voltage

WESTINGHOUSE ELEC. SUPPLY CO.



WESTINGHOUSE ELEC. SUPPLY CO.

MODEL WR330
Schematic, Voltage
Resistances



IC 9511A	1st I.F. transformer	65
IC 9511A	100 mfd. 400 V. resistor	66
IC 9511A	.05 mfd. 400 V. resistor	67
IC 9511A	100 mfd. mica condenser - part of IC 95121	68
IC 9511A	800-200 mmf. trimmers - part of IC 95121	69
IC 9511A	2nd I.F. transformer	70
IC 9511A	470,000 ohm, 1/2 W. resistor	71
IC 9511A	1 meg. 1/2 W. resistor	72
IC 9511A	1 mfd., 400 V. condenser	73
IC 9511A	1 meg., 1/2 W. resistor	74
IC 9511A	1 mfd., 400 V. condenser	75
IC 9511A	100,000 ohm, 1/2 W. resistor	76
IC 9511A	.05 mfd. 400 V. resistor	77
IC 9511A	75 mmf. mica condenser	78
IC 9511A	100,000 ohm, 1/2 W. resistor	79
IC 9511A	.002 mfd., 800 V. condenser	80
IC 9511A	100,000 ohm, 1/2 W. resistor	81
IC 9511A	200,000 ohm, 1/2 W. resistor	82
IC 9511A	.02 mfd., 400 V. condenser	83
IC 9511A	.02 mfd., 400 V. condenser	84
IC 9511A	.02 mfd., 400 V. condenser	85
IC 9511A	470,000 ohm, 1/2 W. resistor	86
IC 9511A	500,000 ohm, 1/2 W. resistor	87
IC 9511A	220,000 ohm, 1/2 W. resistor	88
IC 9511A	1 mfd., 400 V. condenser	89
IC 9511A	.01 mfd., 400 V. condenser	90
IC 9511A	Tone control switch	91
IC 9511A	500,000 ohm, 1/2 W. resistor	92
IC 9511A	500,000 ohm, 1/2 W. resistor	93
IC 9511A	500,000 ohm, 1/2 W. resistor	94
IC 9511A	500,000 ohm, 1/2 W. resistor	95
IC 9511A	500,000 ohm, 1/2 W. resistor	96
IC 9511A	500,000 ohm, 1/2 W. resistor	97
IC 9511A	500,000 ohm, 1/2 W. resistor	98
IC 9511A	500,000 ohm, 1/2 W. resistor	99
IC 9511A	500,000 ohm, 1/2 W. resistor	100

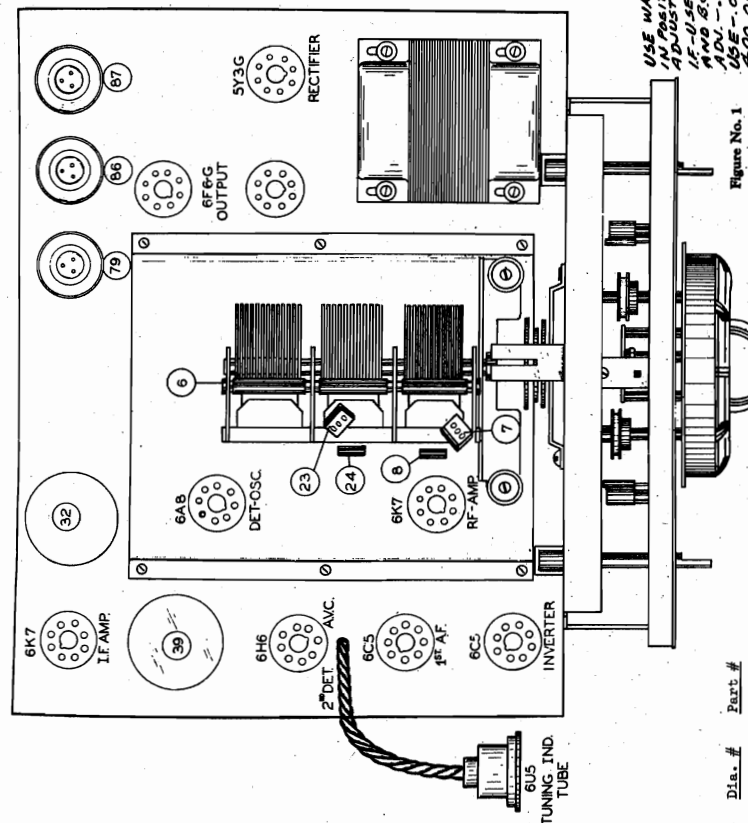
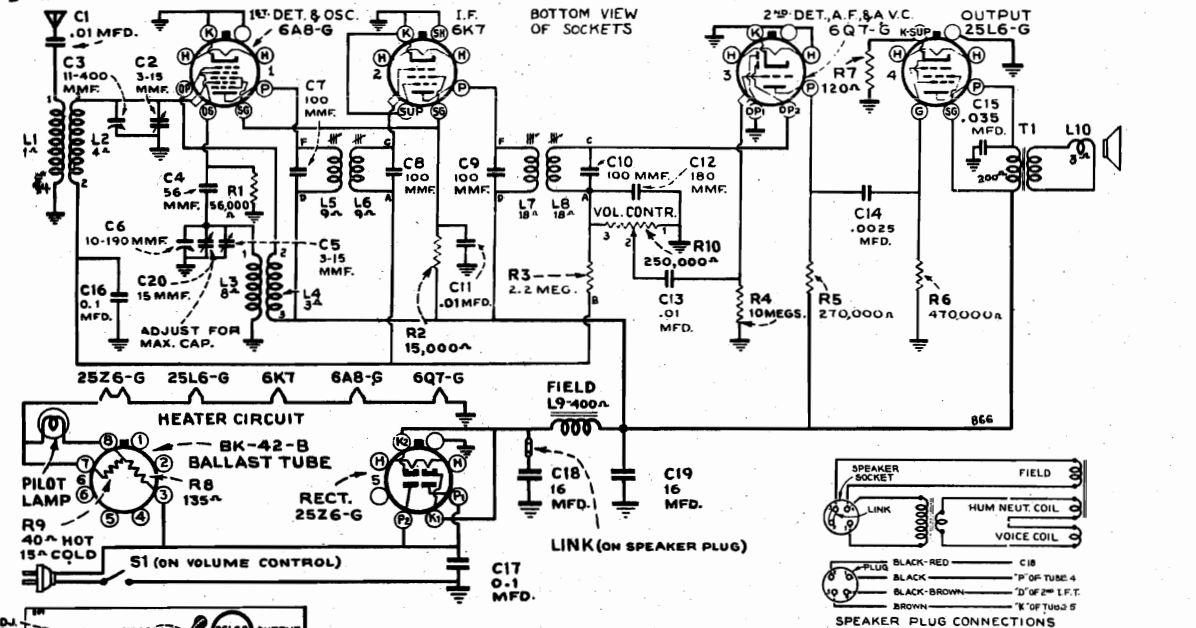


Figure No. 1

USE WAVE CHANGE SW.
IN POSITION OF BAND UNDER
TREATMENT.

Part #	Diagram	Description
SW 9586	1	Wave change switch assembly
RC 95311	2	B.C. antenna coil
	3	4-35 mfd. trimmer - part of RC 95311
	4	S.W. antenna coil assembly
	5	4-35 mfd. trimmer - part of RC 95312
CG 9566	6	Variable condenser gang
RE 1519	7	1000 mfd. mica condenser
RE 1519	8	1000 mfd. mica condenser
CG 4-10	9	1 mfd. 400 V. W. resistor
RC 95317	10	B.C. composite coil assembly
	11	4-35 mfd. trimmer - part of RC 95317
	12	5-25 mfd. trimmer - part of RC 95317
	13	500-600 mfd. trimmer - part of RC 95317
	14	10 W. composite coil assembly
	15	4-35 mfd. trimmers - part of RC 95315
	16-17	3400 mfd. mica condenser - part of RC 95315
	18	Police composite coil assembly
RC 95314	19	10 mfd. mica condenser - part of RC 95314
	20	4-35 mfd. trimmer - part of RC 95314
	21	1000 mfd. mica condenser - part of RC 95314
	22	1000 mfd. mica condenser - part of RC 95314
CM 9519	23	100,000 ohm 1/2 W. resistor
RE 1043	24	150 ohm, 1/2 W. resistor
RE 1513	25	.0001 mfd. mica condenser
CM 9513	26	.01 mfd., 400 V. condenser
GW 4-01	27	1000 ohm, 1/2 W. resistor
RE 475312	28	1000 ohm, 1/2 W. resistor
RE 475312	29	405 mfd. 200 V. condenser
GW 2-05	30	80-200 mfd. trimmers - part of RC 95319
	31	



Frequency Range..... 540 to 1,720 kc
R-F Alignment Frequency.. 1,500 kc (osc., ant.)
Intermediate Frequency..... 455 kc

TUBE COMPLEMENT

- | | | |
|-----|-----------------|--------------------------|
| (1) | RCA-6A8-G..... | First-Det., Osc. |
| (2) | RCA-6K7..... | Intermediate Amp. |
| (3) | RCA-6Q7-G..... | Second-Det., A-F, A.V.C. |
| (4) | RCA-25L6-G..... | Power Output |
| (5) | RCA-25Z6-G..... | Rectifier |
| (6) | BK-42-B..... | Ballast |

Dial lamp.... Mazda No. 47, 6.3 volts, 0.15 amp.

POWER OUTPUT (125-volt, 60-cycle supply)

Undistorted.....	1.0 watt
Maximum.....	1.5 watts

LOUDSPEAKER

Type..... 5-inch Electrodynamic
Voice-coil Impedance..... 8.4 ohms at 100 cycles

Voice-coil Impedance 3.4 ohms at 400 cycles

POWER SUPPLY RATINGS
A-C Rating, 105-125 volts, 50-60 cycles, 50 watts

Precautionary Lead Dress

1. Keep power cord close to chassis base and away from volume control.
2. Keep speaker leads close to chassis and away from volume control and 25L6-G socket.
3. Keep black wire from 2nd i-f transformer to volume control close to front apron and away from other parts.
4. Keep pilot lamp leads close to chassis base.
5. Keep 6QY-G grid lead away from dial lamp.

Alignment Procedure

CAUTION: The chassis is connected to one side of the power supply. Avoid contact of chassis or parts to external ground when servicing.

Output meter alignment.—Connect the meter across the speaker voice-coil, and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis through a 0.1 mfd. capacitor.

Re-sealing i-f adjusting screws.—After completion of alignment, seal the i-f adjusting screws with a few drops of household cement.

Note 1.—Reel up the antenna wire and connect the high side of test oscillator through an 80-mmfd. capacitor to terminal "X" on antenna coil (see top view).

25-cycle operation.—For operation with 25-cycle power supply, connect a 16-mfd., 150-volt dry electrolytic capacitor (Part No. 31323) in parallel with C18.

Figure 2—Tube Socket Voltages and Location of Parts

* Note: Values with star (*) are operating voltages.
Values not starred are actual measured voltages.

Measurements made to chassis unless otherwise indicated.
Measurements made with set tuned to quiet point, volume control at minimum, using 1,000-ohm-per-volt meter, having ranges of 10, 50, 250, and 500 volts. (Use nearest range above the specified measured voltage).

Values should hold within approximately $\pm 20\%$ for 117-volt 60-cycle supply. On d-c, voltages are approximately 10% lower except heaters which remain the same.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
No. 1	6K7 I-F grid cap, in series with .01 mfd.	455 kc	Quiet point between 550-750 kc	L7 and L8 (2nd I-F Transformer)
No. 2	6A8-G 1st-det. grid cap, in series with .01 mfd.	455 kc		L5 and L6 (1st I-F Transformer)
No. 3	See Note 1	1,500 kc	1,500 kc	C5* (oscillator) C2 (antenna)

* Trimmer C20 on gang condenser should be screwed clockwise for maximum capacity before adjusting C5.

Transformer Data
Pick-up, Motor Coils

WESTINGHOUSE ELEC. SUPPLY CO.

MODEL WR472
Schematic, Voltage
Socket, Trimmers

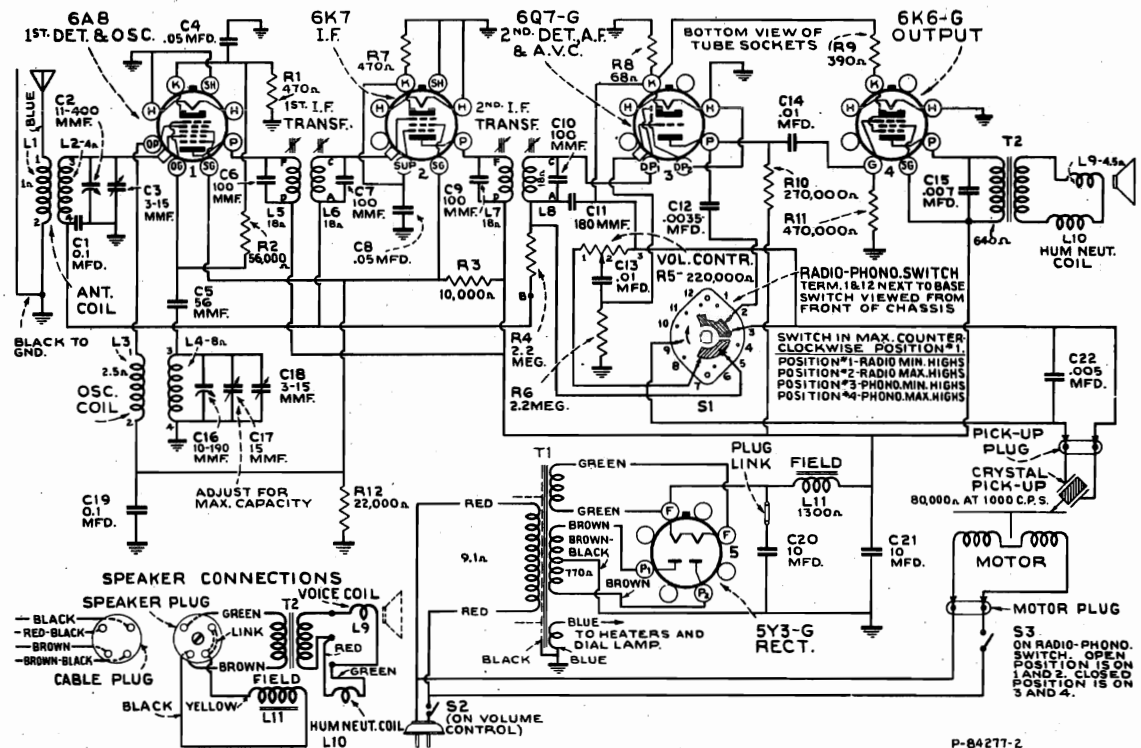


Figure 4—Schematic Circuit Diagram

P-84271-2

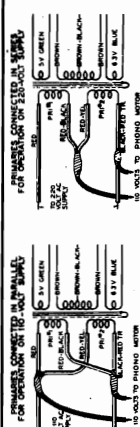
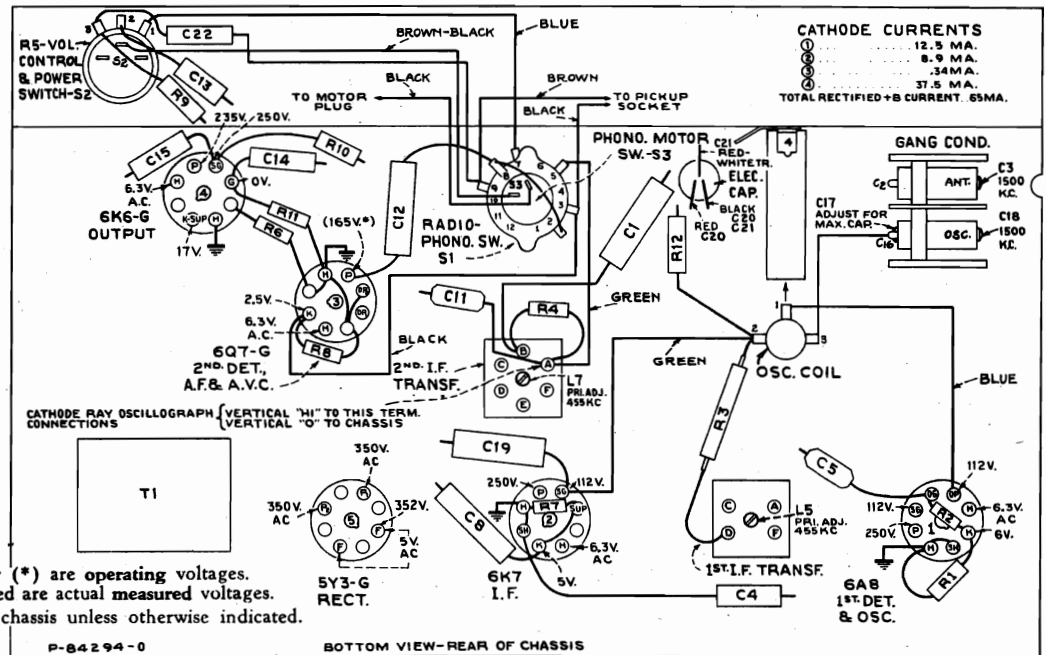


Figure 2—Connections for No. 30888 Replacement Transformer

* Note: Values with star (*) are operating voltages.
Values not starred are actual measured voltages.
Measurements made to chassis unless otherwise indicated.



P-84294-0

BOTTOM VIEW-REAR OF CHASSIS

Figure 3—Tube Socket Voltages

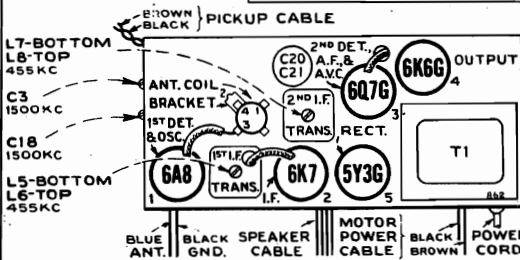


Figure 2—Tube and Trimmer Locations

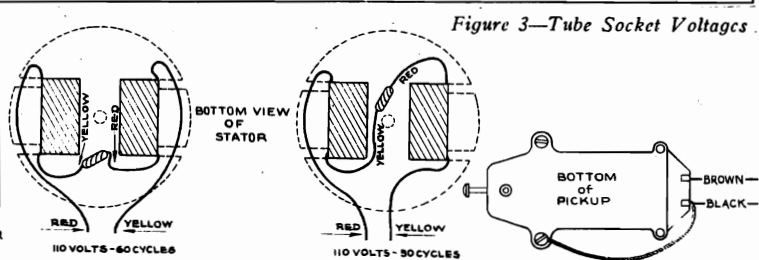


Figure 5—Motor Coil Connections

D-C resistance of each coil (for 110 volts, 50 and 60 cycles) is approximately 82 ohms.

Figure 6—Pickup Connections

MODEL WR264
Alignment, Tuner
Phono. Data
Lead Dress

WESTINGHOUSE ELEC. SUPPLY CO.

MODEL WR472
Alignment
Phono. Data

MODEL WR-264

Phonograph Terminal Board—A 3-terminal board is

located on the rear of the chassis for connecting a phonograph pickup, or Record Player, into the audio amplifier of the receiver. The above schematic shows connections for a high-impedance pickup with a switch for changing from a radio to record. For low-impedance pickups, a suitable step-up transformer should be used to provide proper impedance matching, and should be connected between the pickup and radio-phonograph switch. The volume control is optional.

Loudspeaker.—The loudspeaker voice-coil may be centered in the normal manner by using three narrow feelers to obtain equal spacing of the air-gap. The dust cover must be removed before centering, and may be done by gently cutting it free from the cone, being careful not to cut or damage the cone while doing so.

Precautionary Lead Dress—

1. Disconnect switch leads against left apron to prevent hum pickup.
2. Dress R1 away from front of chassis.
3. Electric-tuning lamp leads must be dressed in front of range switch.
4. Leads from L5 to range switch away from other leads.
5. Dress leads away from antenna coil.
6. Dress other parts and leads away from R14, as it becomes heated.
7. Leads across back of chassis should be dressed under electrolytic to prevent approaching phono board.
8. Keep leads of C27 as short as possible.

Frequency Ranges:

"Standard Broadcast" (A).....	540-1,720 kc
"Medium Wave" (B).....	2.3-7 mc
"Short Wave" (C).....	7-21 mc

Calibration Scale on Indicator—Drive—Coat Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is provided on the indicator. The scale is graduated in degrees from shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang condenser, for each alignment frequency, is given in the alignment table. The position of the drum is determined by the position of the indicator, which is vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the drum to the shaft is measured by means of the indicator. The distance from the shaft to the drum is measured by means of two set screws, which must be tightened accurately when the drum is in the correct position.

Pointer for Calibration Scale.—Improve a pointer for the indicator. The pointer should be made of brass, and fastened to the condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with the indicator at the 5 o'clock position. The indicator has a spring clip for attachment to the cable.

After completion of alignment, seal the if core-adjusting screws with household cement. The dial tuning (right hand) push button must be pushed in for steps 1 to 5 inclusive.

Steps	Connect the high side of test-osc. to—	Turn test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	6K7 I-F grid cap. in series with .01 mfd.	455 kc	"A" band, Quiet Point	1,500 kc (2nd I-F Tuning)
2	6K8 det. grid cap. in series with .01 mfd.	455 kc	between 550-750 kc	L5 and L11 (1st I-F Tuning)
3	Antenna Terminal, in series with 400 ohms	30 mc	30 mc (85° "C" band)	C36 (osc.) * C30 (ant.) **
4	Antenna Terminal, in series with 400 ohms	6.1 mc	6.1 mc (31° "B" band)	C38 (osc.) †
5	Antenna Terminal, in series with 200 mfd.	1,500 kc	1,500 kc (284° "A" band)	C35 (osc.)
6	Follow "Adjustments for Electric Tuning"			

* Use minimum capacity peak if two peaks can be obtained.

† Rock gang slightly and use maximum capacity peak if two peaks can be obtained. Check to determine that C23 has been adjusted to the correct peak by tuning to approximately 49° (5.19 mc), at which point a weaker signal should be received.

‡ Use minimum capacity peak if two peaks can be obtained. Check to determine that C23 has been adjusted to the correct peak by tuning to approximately 49° (5.19 mc), at which point a weaker signal should be received.

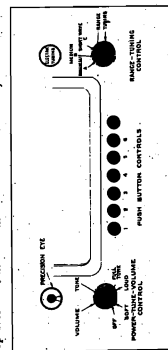
NOTE: Oscillator tracks 455 kc above signal on all bands.

ADJUSTMENTS FOR ELECTRIC TUNING

This receiver has seven push buttons. The right-hand button connects the gang condenser for manual tuning. The other buttons connect the oscillator coil to the antenna terminal in the standard-broadcast range. The station buttons connect to separate permeability tuned oscillator coils and separate antenna trimmers which must be adjusted for the desired stations.

Use an insulated screwdriver or alignment tool for making adjustments. The following steps should be followed in making adjustments. The procedure is as follows:

1. Make a list of the desired six stations, arranged in order from low to high frequencies. See "Tune and Frequency" view for frequency coverage of each button.
2. Push in the dial-tuning button, and manually tune in the first station on the list.
3. Push in station button No. 1 (left) and adjust No. 1 oscillator trimmer (C37) to the station frequency. Then un-core all the way in, to lowest frequency, and then unscrew slowly until station is received.
4. Adjust No. 1 antenna trimmer (C36) for maximum signal.
5. Check the adjustment of coils and trimmers tune the circuits to lower frequencies.
6. Repeat steps 3 and 4 for the remaining five stations in the same manner. Careful adjustment of the oscillator coils and antenna trimmers. Use the Precision Eye to ensure sharp peaking.



Location of Controls.
The right-hand push-button is for dial tuning

MODEL WR-472 PHONOGRAPH MOTOR SERVICE DATA

3. Motor not properly supported from motor board.
4. Burrs on poles of rotor or stator. Remove with fine emery cloth.

Removing Rotor.—The rotor and turntable assembly simply rest on the ball bearing at bottom of vertical bearing. Remove by lifting up.

Rotor Adjustment.—Loosen the three screws that hold the rotor to the turntable. Adjust the rotor so that the distances around the gap between the rotor and stator, and then carefully tighten the three screws. The top of rotor must be flush with top of stator; add additional seal washers beneath the stator if necessary.

Lubrication.—Oiling points are indicated in figure 1.

TURNABLE HELD ON SHAFT BY RETAINING RING & WASHER

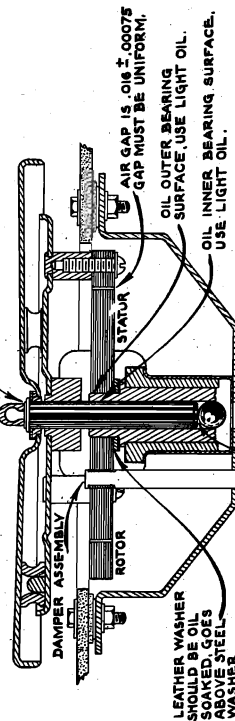


Figure 1—Motor Assembly

Alignment Procedure

Presenting dial.—With gang condenser in full mesh move dial pointer to coincide with horizontal lines. This is a friction adjustment.

Re-setting I-F. Adjustment screws.—After completion of alignment, seal the I-F core adjustment screws with a few drops of household cement.

Steps	Connect the high side of test-oscillator to—	Turn test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
No. 1	6K7 I-F grid cap. in series with .01 mfd.	455 kc	Quiet point between 550-750 kc	L7 and L8 (2nd I-F Tuning)
No. 2	6A8 1st-det. grid cap. in series with .01 mfd.	455 kc		L5 and L6 (1st I-F Tuning)
No. 3	Antenna lead, in series with 200 mfd.	1,500 kc	1,500 kc	C18* (osc.) C3 (antenna)

* Trimmer C17 on gang condenser should be screwed clockwise for maximum capacity before adjusting C18

LOUSEBARK

Type..... 5 inch electrodynamic
V-C impedance..... 5 ohms at 400 cycles

Power Supply Ratings

Rating A-6..... 105-125 volts, 60 cycles, 80 watts

Rating A-5..... 105-125 volts, 50 cycles, 80 watts

Phonograph..... Synchronous (manual starting)

Records..... 10-inch and 12-inch, 78 r.p.m.

Pickup..... Crystal, 40,000 ohms at 1,000 cps.

Average Output of Pickup..... 1 1/2-volts, at 1,000 cps.

Unidistorted..... 2.0 watts

Maximum..... 3.5 watts

The synchronous motor used in this instrument is designed to operate at 60 cycles. Among its many features are: long life, ease of starting, rubber damper, ease of repair, and low maintenance. The motor is started by turning "on" shown in figure 1. The motor is started by turning "on" with the hand. Smooth starting and running will be insured by keeping the bearings well cleaned and oiled.

Hum and Vibration.—A small amount of hum when starting, decreasing to a negligible amount when running, is normal. Excessive vibration occurs if it may be due to: 1. binding, or any failure that will cause the leather washer not oiled. (Check to make certain that the leather washer is above the seal washer.)

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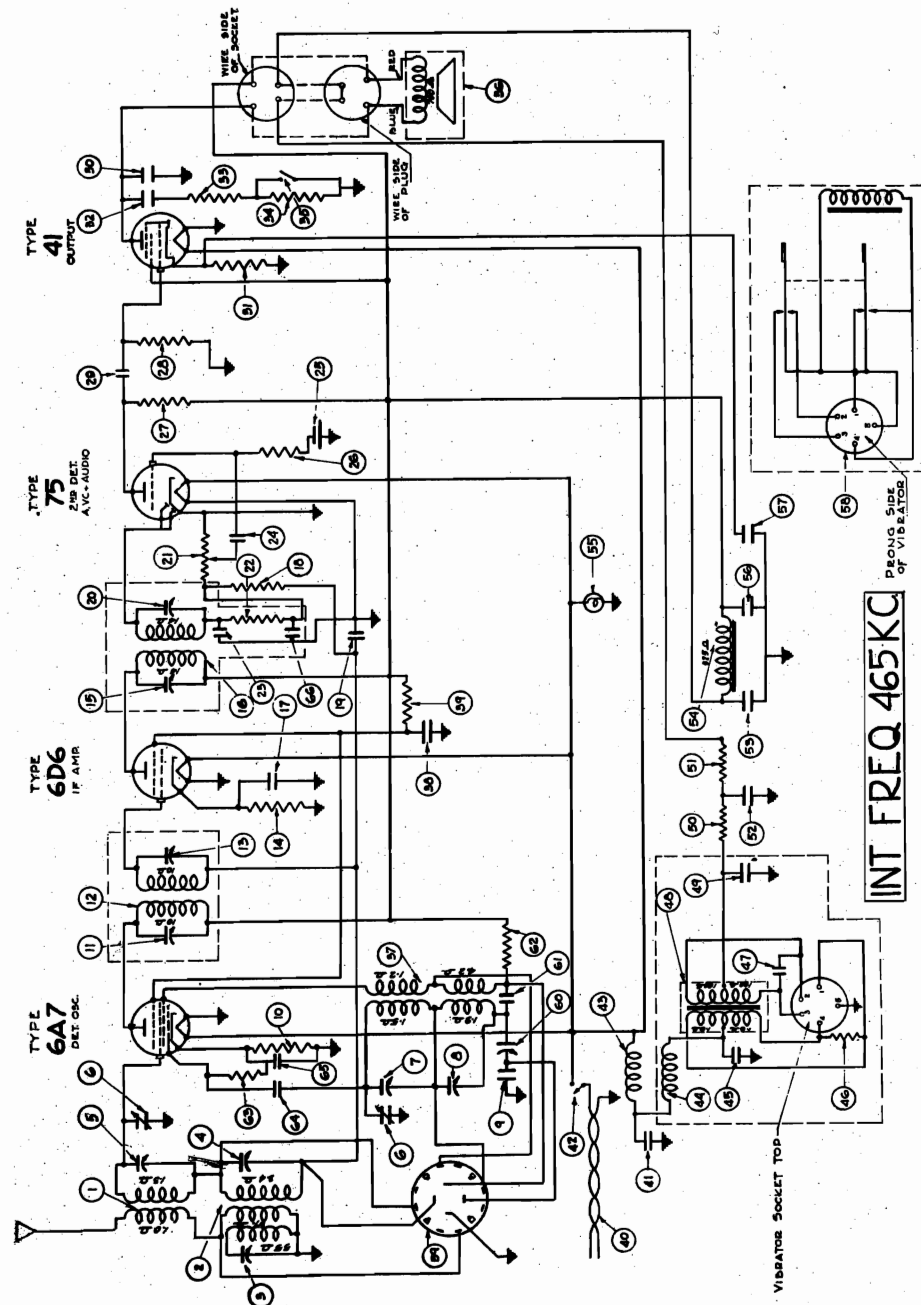
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WESTINGHOUSE ELEC. SUPPLY CO. Schematic

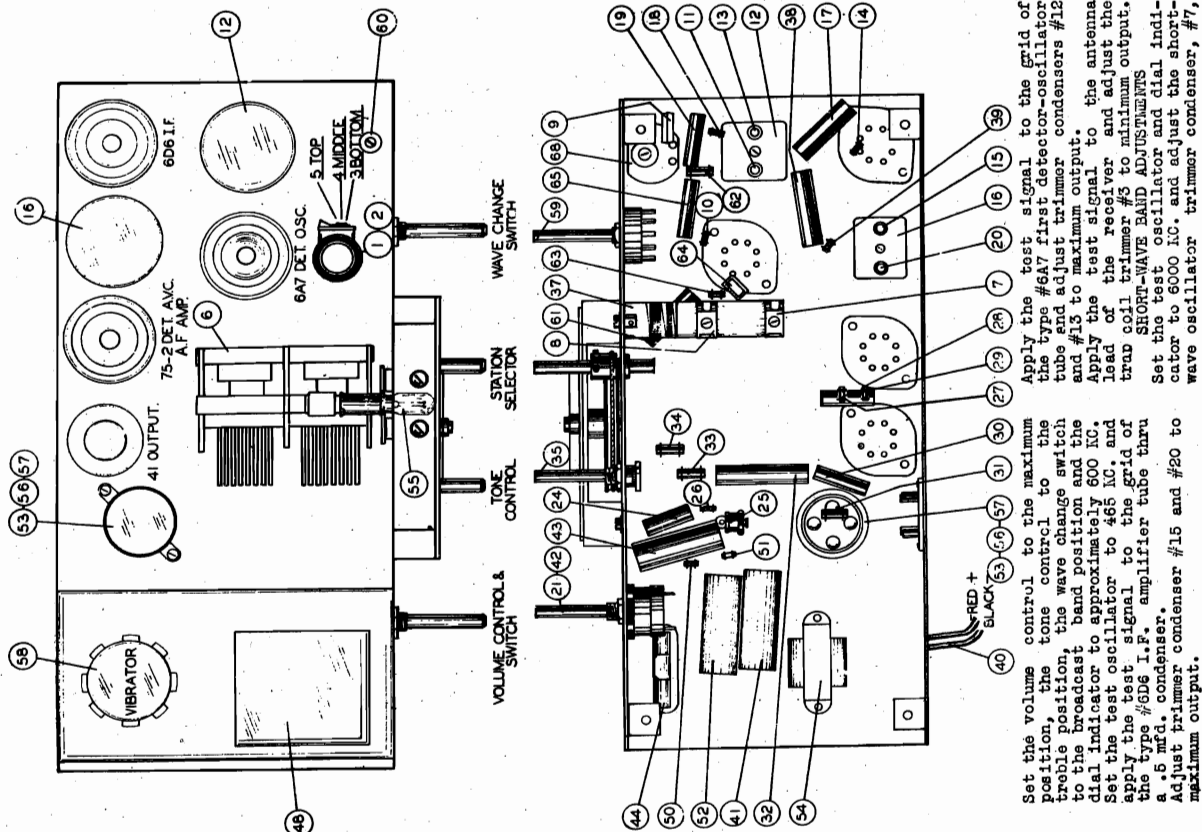
MODELS WR603, WR606



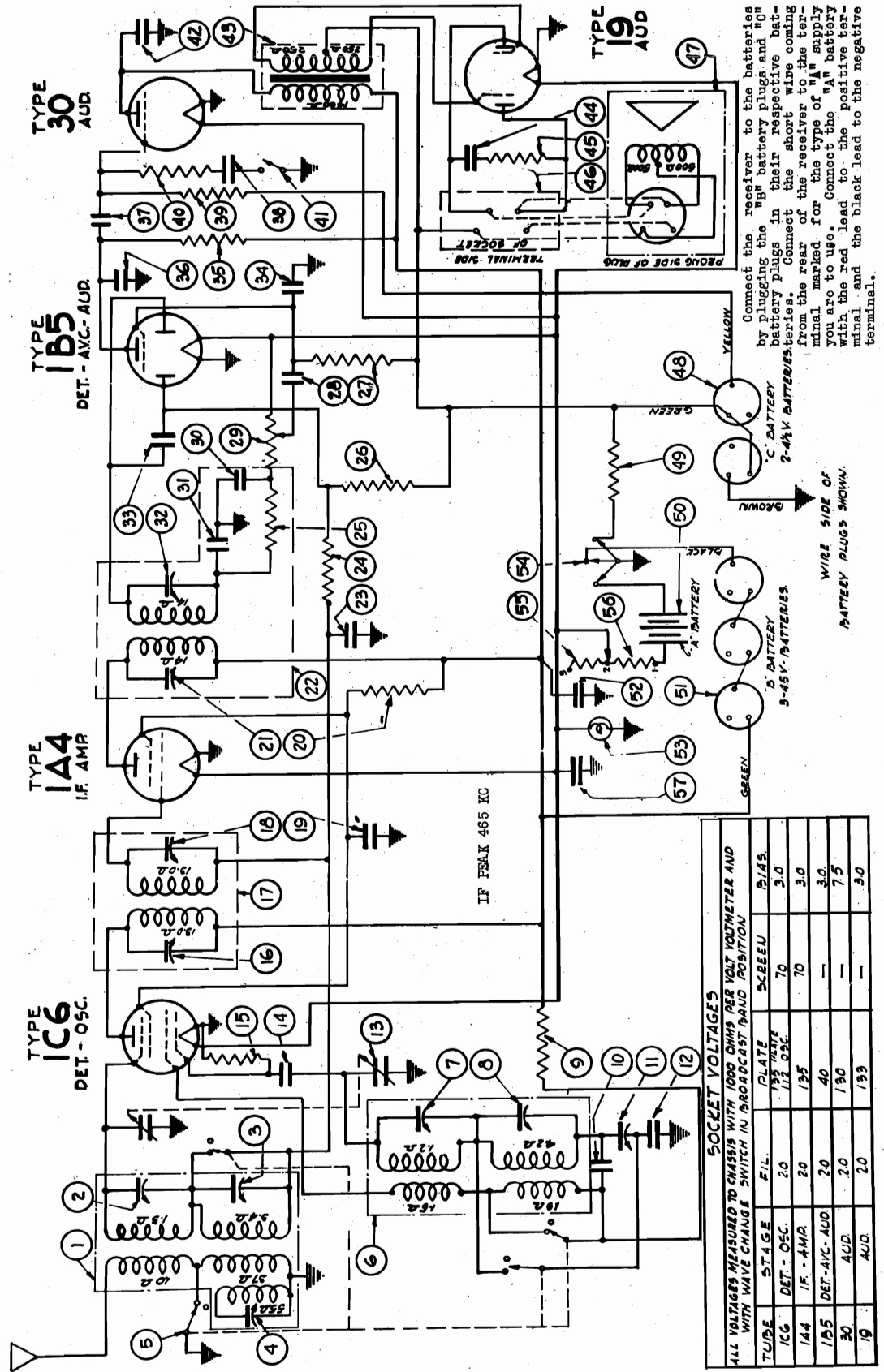
MODELS WR603,WR606
Chassis,Socket,
Trimmers,Alignment
Parts

WESTINGHOUSE ELEC. SUPPLY CO.

Dis. #	Part #	Description of Parts
1	RC 95237	Antenna coil assembly.....
2		Trap coil - part of RC 95237
3		Trimmer condenser, 30-80 mmf. - part of RC 95237
4		Trimmer condenser, 1-5-10 mmf. - part of RC 95237
5		Trimmer condenser, 4-25 mmf. - part of RC 95237
6	OG 9552	Variable condenser - 2 gang
7		Trimmer condenser, 6-30 mmf. - part of RC 95238
8		Trimmer condenser, 4-25 mmf. - part of RC 95238
9		.0012 mfd. oscillator series condenser
10	CM 9526	500 ohm, 1/4 W. resistor
11	SA 105264	Trimmer condenser 45-135 mmf. - part of IC 9569
12	IC 9569	1st I.F. coil (465 KC.).....
13		Trimmer condenser, 45-135 mmf. - part of IC 9569
14	RE 95117	500 ohm, 1/4 W. resistor
15		Trimmer condenser 30-100 mmf. - part of IC 9574
16	IC 9574	2nd I.F. coil (465 KC.).....
17	CW 2-05	.05 mfd., 200 V. condenser
18	RE 9574	1 meg., 1/4 W. resistor
19	CW 4-02	.02 mfd., 400 V. condenser
20		Trimmer condenser, 30-100 mmf. - part of IC 9574
21	VR 9523	.5 meg. volume control.....
22	RE 9524	50,000 ohm, 1/8 W. resistor
23		.0001 mfd. mica condenser - part of IC 9574
24	CW 4-02	.02 mfd., 400 V. condenser
25	EY 952	Grid bias cell.....
26	RE 9574	1 meg., 1/4 W. resistor
27	RE 9585	1/4 meg., 1/4 W. resistor
28	RE 9572	1/2 meg., 1/4 W. resistor
29	CW 4-02	.02 mfd., 400 V. condenser
30	CW 4-005	.005 mfd., 400 V. condenser
31	SA 105265	750 ohm, 1/4 W. resistor
32	CW 4-05	.05 mfd., 400 V. condenser
33	SA 105249	5000 ohm, 1/4 W. resistor
34	SA 105274	20,000 ohm, 1/4 W. resistor
35	SW 9558	Tone control switch.....
36	SK 9539	Speaker.....
37	RC 95238	Oscillator coil.....
38	CW 2-05	.05 mfd., 200 V. condenser
39	SA 105254	15,000 ohm, 1/4 W. resistor
40	CB 9556	Power supply cable.....
41	CW 2-50	.5 mfd., 200 V. condenser
42		On/Off switch - part of VR 9523
43	SA 105452	1/4 W. choke.....
44	SA 105452	1/4 W. choke.....
45	CW 957	.5 mfd., 120 V. condenser
46	SA 105258	200 ohm, 1/4 W. resistor
47	RC 9521	.008 mfd., 400 V. condenser
48	TR 9569	Power transformer.....
49	CR 9513	.05 mfd., 200 V. condenser
50	RE 9537	.50 ohm, 1/4 W. resistor
51	RE 9516	.50 ohm, 1/4 W. resistor
52	CW 2-50	.5 mfd., 200 V. condenser
53		.8 mfd., 200 V. electrolytic cond. - part of CE 9541
54	TR 9534	"B" choke.....
55	LP 9516	Dial lamp (6. volt).....
56		8 mfd., 280 V. electrolytic condenser - part of CE 9541
57		10 mfd., 25 V. electrolytic condenser - part of CE 9541
58	VI 957	Vibrator.....
59	SV 9559	Wave change switch.....
60	CS 9560	Broadcast oscillator series condenser
61	CW 4-02	.02 mfd., 400 V. condenser
62	SA 105275	25,000 ohm, 1/4 W. resistor
63	RE 9575	50,000 ohm, 1/4 W. resistor
64	CM 9513	.0001 mfd., mica condenser
65	CW 2-05	.05 mfd., 200 V. condenser
66		.0001 mfd. mica condenser - part of IC 9574
67	DM 9519	Speaker diaphragm.....
68		to maximum output.
69		Adjust the short wave
70		#5 to maximum output.



WESTINGHOUSE ELEC. SUPPLY CO. Schematic, Voltage



TUBE	STAGE	FILE	PLATE	SCREEN	BIAS
1G6	DET. - OSC.	20	135 RATE 112 25K	70	3.0
1A4	IF. - AMP.	20	135	70	3.0
1B5	DET.-AFC.-AUD.	20	40	—	3.0
30	AUD.	20	130	—	7.5
19	AUD.	20	133	—	3.0

MODELS WR604, WR607

Alignment, Trimmers

WESTINGHOUSE ELEC. SUPPLY CO.

Socket, Chassis, Parts

Dia. #	Part #	Description of Parts	List Price
1	RC 95237	Antenna coil assembly	\$ 2.25
2		4-25 mfd. trimmer condenser - part of RC 95237	
3		1.5-10 mfd. trimmer condenser - part of RC 95237	
4		30-60 mfd. trimmer condenser - part of RC 95237	
5	SW 9559	Wave change switch	.65
6	RC 95238	Oscillator coil assembly	1.60
7		12-35 mfd. trimmer condenser - part of RC 95238	
8		4-25 mfd. trimmer condenser - part of RC 95238	
9	SA 105249	5,000 ohm, 1/4 W. resistor	.15
10	CW 4-02	.02 mfd., 400 V. condenser	.15
11	CS 9560	350-700 mfd. oscillator series condenser	.45
12	CG 9526	.0012 mfd. mica condenser	.30
13	CG 9552	Variable condenser (2 gang)	2.75
14	CG 9513	.100 mfd. mica condenser	.10
15	RE 9575	50,000 ohm, 1/4 W. resistor	.15
16	IC 9579	30-100 mfd. trimmer condenser - part of IC 9579	2.00
17		First I.F. coil (465 KC.)	
18		30-100 mfd. trimmer condenser - part of IC 9579	
19	CW 2-05	.25 mfd., 200 V. condenser	.15
20	SA 105254	15,000 ohm, 1/4 W. resistor	.15
21	IC 9574	30-100 mfd. trimmer condenser - part of IC 9574	1.75
22		Second I.F. coil (465 KC.)	
23	CW 2-05	.25 mfd., 200 V. condenser	.15
24	RE 9550	50,000 ohm, 1/4 W. resistor	.10
25	RE 9550	50,000 ohm, 1/4 W. resistor	.10
26	RE 9550	50,000 ohm, 1/4 W. resistor	.10
27	RE 9574	1 meg., 1/4 W. resistor	.15
28	CW 4-02	.02 mfd., 400 V. condenser	.15
29	VR 9538	.5 meg. volume control	.95
30		5 meg. volume control	
31		100 mfd. mica condenser - part of IC 9574	
32		30-100 mfd. trimmer condenser - part of IC 9574	
33	CM 9513	100 mfd. mica condenser	.10
34	RE 9585	250,000 ohm, 1/4 W. resistor	.15
35	CM 9513	100 mfd. mica condenser	.10
36	CM 9513	100 mfd. mica condenser	.10
37	CW 4-02	.02 mfd., 400 V. condenser	.15
38	CW 4-005	.005 mfd., 400 V. condenser	.15
39	RE 9572	500,000 ohm, 1/4 W. resistor	.15
40	SA 105272	10,000 ohm, 1/4 W. resistor	.15
41	SW 9558	Tone control switch	.40
42	CW 6-005	.005 mfd., 600 V. condenser	.15
43	TR 9570	Audio transformer	2.00
44	SW 4-0274	.01 mfd., 400 V. condenser	.15
45	SA 105274	50,000 ohm, 1/4 W. resistor	.15
46	SK 95427	Speaker socket	.10
47	SK 95427	Speaker socket	.10
48	PG 9514	8" battery plug	6.00
49	SA 105267	1000 ohm, 1/4 W. resistor	.10
50	DM 9519	Speaker diaphragm	1.25
51	PG 9588	8 mfd., 200 V. electrolytic condenser	1.25
52	CE 9542	Dial lamp, 2 V., .06 amp.	.30
53	LP 9518	On-off switch - part of VR 9538	.15
54		0.94 ohm resistor	.15
55	RE 9591	0.94 ohm resistor	.15
56	RE 9592	0.42 ohm resistor	.15
57	CW 2-50	.5 mfd., 200 V. condenser	.25

ment of trimmer condensers #6 and #7 for accuracy.

nal to the antenna of the receiver through a .0002 mfd. condenser.

2. Adjust the broadcast oscillator trimmer condenser #6 to maximum output.

3. Adjust the Broadcast prescaler trimmer #3 to maximum output.

4. Set the test oscillator and dial indicator to 600 KC. and adjust the oscillator series condenser #11 to maximum output at the same time rocking the variable condenser.

5. Return the test oscillator and dial indicator to 1600 KC. and check the adjust-

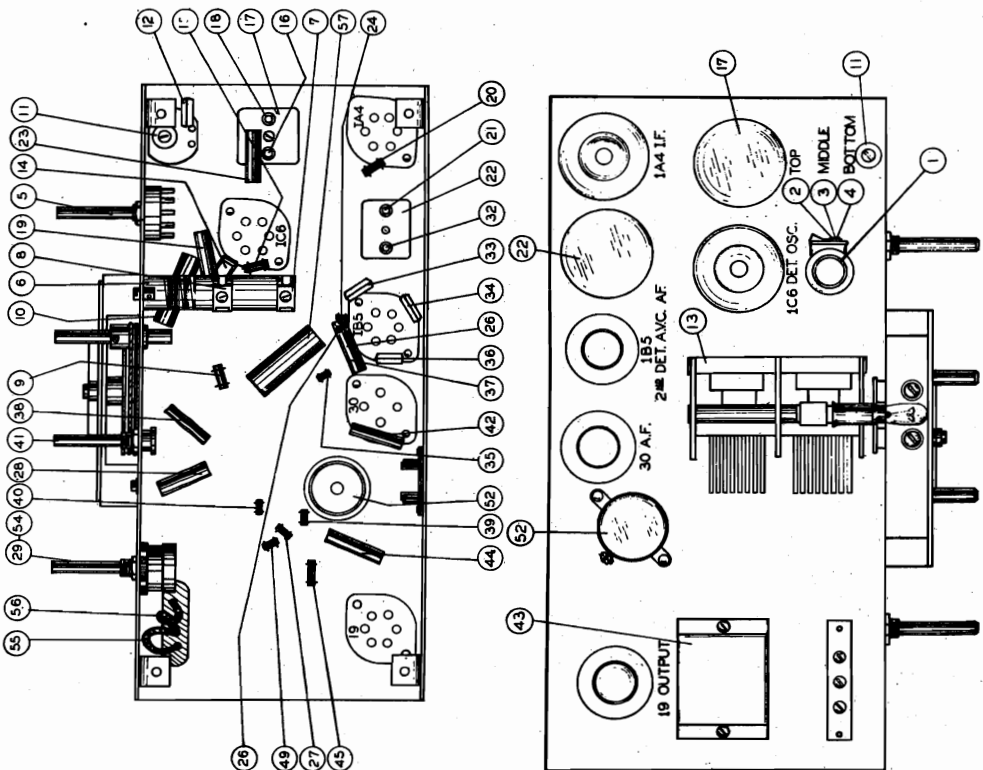
ment of trimmer condensers #6 and #7 for accuracy.

1. Set the wave change switch to the short-wave band position.

2. Set the test oscillator and dial indicator to 8000 KC. and adjust the short-wave trimmer condenser #7 to maximum output.

3. Adjust the short-wave prescaler trimmer condenser #2 to maximum output.

4. Check the receiver over the short-wave band for sensitivity and calibration.



Apply the test signal to the grid of the type 106 first detector-oscillator tube and adjust the I.F. trimmer condensers #16 and #18 to maximum output.

Lead of the test signal to the antenna trap trimmer condenser #4 to minimum output.

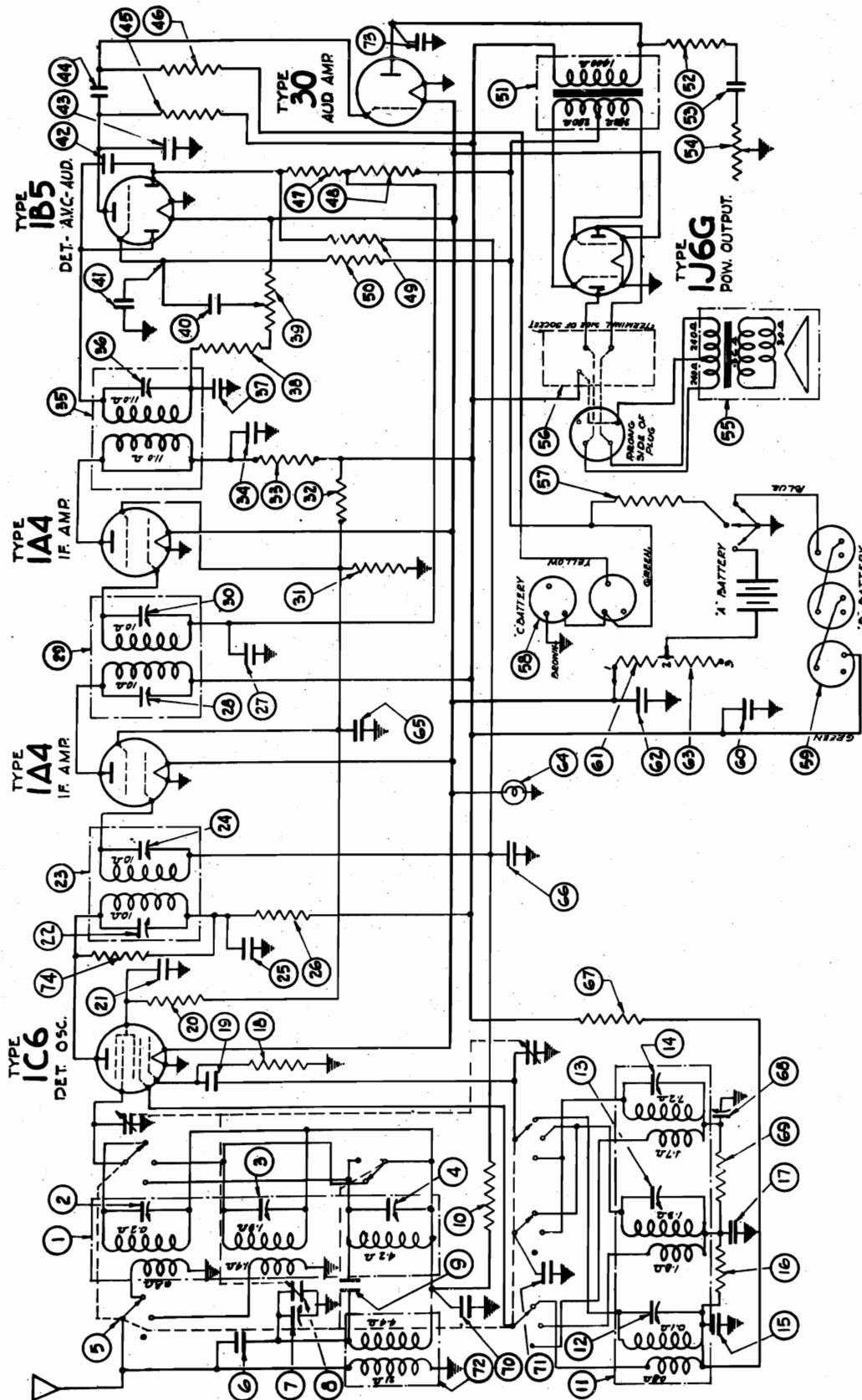
BROADCAST BAND ADJUSTMENTS

1. Set the test oscillator and dial indicator to 1600 KC. and apply the test signal to the grid of the type 106 first detector-oscillator tube and adjust the I.F. trimmer condensers #16 and #18 to maximum output.

Set the volume control to the maximum position, the wave change switch on the broadcast band and the dial indicator to approximately 600 KC.

Set the test oscillator to 465 KC. and apply the test signal to the grid of the type 106 first detector-oscillator tube, through a 0.5 mfd. blocking condenser, and adjust the I.F. trimmer condensers #21 and #22 to maximum output.

WESTINGHOUSE ELEC. SUPPLY CO. MODELS WR605, WR608
Schematic, Voltage



INT FREQ 465KC

SOCKET VOLTAGES

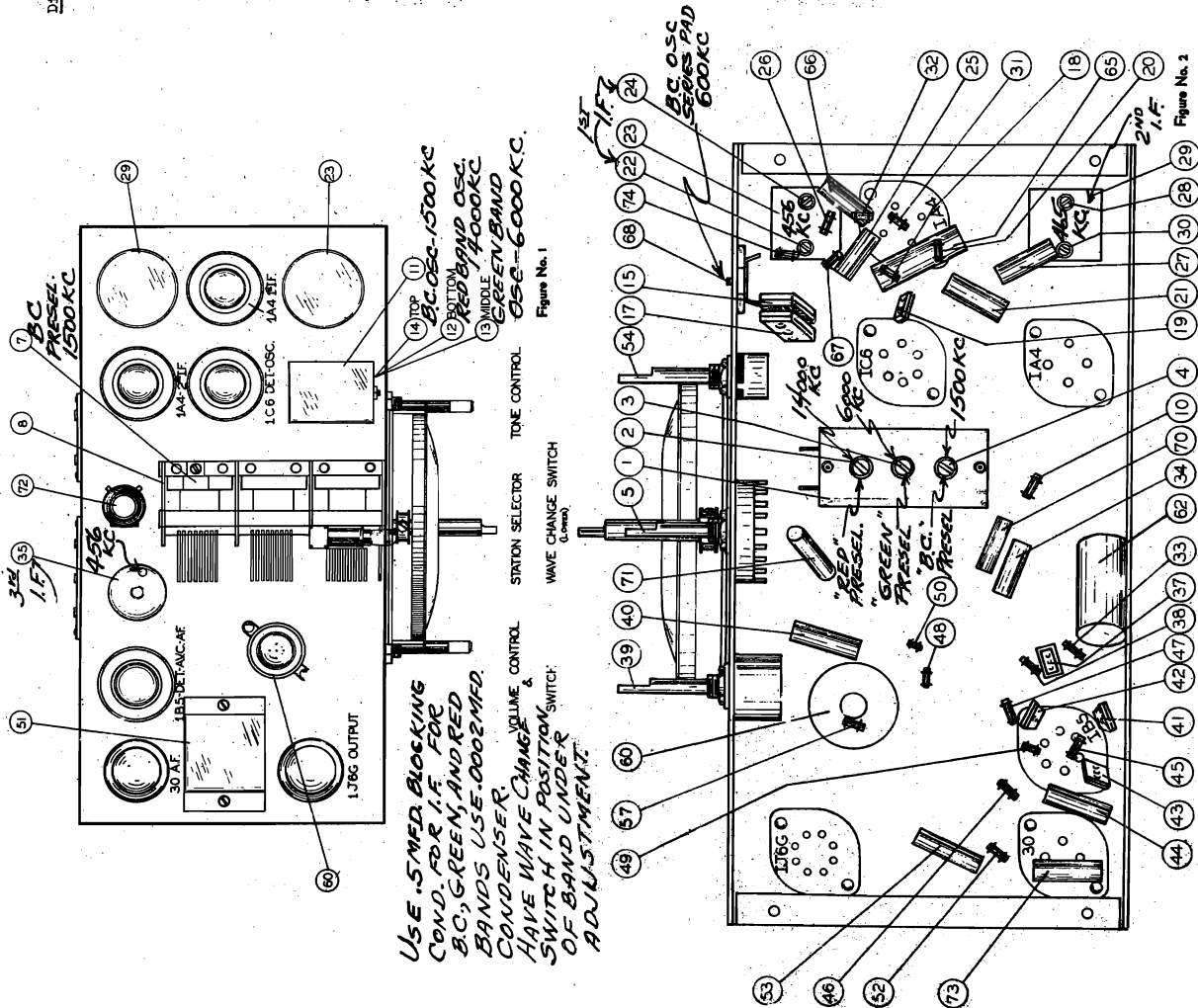
ALL VOLTAGES MEASURED TO CHASSIS WITH 100 OHMS PER VOLT VOLTMETER AND WITH WAVE CHARGE SWITCH IN DECADE FIRST BAND POSITION

TUBE	STAGE	FILE	PLATE	SCREEN	B1A5
IC6	DET.-OSC.	2.0	175-200V	70	3.0
IA4	IF AMP.	2.0	175	70	3.0
IA4	IF AMP.	2.0	175	70	3.0
IB5	DET.-AVC-AUD.	2.0	175	70	3.0
I30	AUD. AMP.	2.0	175	70	3.0
IJ6G	POW. OUTPUT	2.0	175	70	3.0

MODELS WR605, WR608
Alignment, Socket
Trimmers, Chassis, Parts

WESTINGHOUSE ELEC. SUPPLY CO.

Dis. #	Part #	Description of Parts
1	RC 95257	Preslector coil
2		30-60 mfd. trimmer condenser - part of RC 95257
3		4-30 mfd. trimmer condenser - part of RC 95257
4		4-30 mfd. trimmer condenser - part of RC 95257
5	SW 9548	Wave change switch
6		10 mfd. mica condenser - part of RC 95258
7		10 mfd. mica condenser - part of RC 95258
8	CG 9554	Variable condenser - 5 gang
9		100,000 ohm, 1/4 W. resistor
10	RE 9584	Oscillator coil
11	RC 95259	1.5 to 10 mfd. trimmer condenser - part of RC 95259
12		4-30 mfd. trimmer condenser - part of RC 95259
13		4-30 mfd. trimmer condenser - part of RC 95259
14		2500 ohm, 1/8 W. resistor
15	CK 9510	.0025 mfd. mica condenser
16	RE 95128	5000 ohm, 1/4 W. resistor
17	CM 95276	5000 ohm, 1/4 W. resistor
18	CM 9513	5000 ohm, 1/4 W. resistor
19	SA 105287	1000 ohm, 1/4 W. resistor
20	SA 105287	1000 ohm, 1/4 W. resistor
21	SA 105287	1000 ohm, 1/4 W. resistor
22	SA 105287	1000 ohm, 1/4 W. resistor
23	IC 9572	45 to 135 mfd. trimmer condenser - part of IC 9572
24		1st I.F. coil (465 KC.)
25		45 to 135 mfd. trimmer condenser - part of IC 9572
26	SA 105270	.05 mfd., 200 V. condenser
27	SA 105270	.05 mfd., 200 V. condenser
28	SA 105270	.05 mfd., 200 V. condenser
29	IC 9569	45 to 135 mfd. trimmer condenser - part of IC 9569
30		45 to 135 mfd. trimmer condenser - part of IC 9569
31	SA 105276	50,000 ohm, 1/4 W. resistor
32	SA 105276	50,000 ohm, 1/4 W. resistor
33	SA 105276	50,000 ohm, 1/4 W. resistor
34	SA 105276	50,000 ohm, 1/4 W. resistor
35	IC 9568	30-60 mfd. trimmer condenser - part of IC 9568
36		30-60 mfd. trimmer condenser - part of IC 9568
37	SA 105276	50,000 ohm, 1/4 W. resistor
38	SA 105276	50,000 ohm, 1/4 W. resistor
39	SA 105276	50,000 ohm, 1/4 W. resistor
40	SA 105276	50,000 ohm, 1/4 W. resistor
41	CM 9513	5000 ohm, 1/4 W. resistor
42	CM 9513	5000 ohm, 1/4 W. resistor
43	CM 9513	5000 ohm, 1/4 W. resistor
44	CM 9513	5000 ohm, 1/4 W. resistor
45	CM 9513	5000 ohm, 1/4 W. resistor
46	CM 9513	5000 ohm, 1/4 W. resistor
47	CM 9513	5000 ohm, 1/4 W. resistor
48	CM 9513	5000 ohm, 1/4 W. resistor
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55	CM 9513	5000 ohm, 1/4 W. resistor
56	CM 9513	5000 ohm, 1/4 W. resistor
57	CM 9513	5000 ohm, 1/4 W. resistor
58	CM 9513	5000 ohm, 1/4 W. resistor
59	CM 9513	5000 ohm, 1/4 W. resistor
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66	CM 9513	5000 ohm, 1/4 W. resistor
67	CM 9513	5000 ohm, 1/4 W. resistor
68	CM 9513	5000 ohm, 1/4 W. resistor
69	CM 9513	5000 ohm, 1/4 W. resistor
70	CM 9513	5000 ohm, 1/4 W. resistor
71	CM 9513	5000 ohm, 1/4 W. resistor
72	CM 9513	5000 ohm, 1/4 W. resistor
73	CM 9513	5000 ohm, 1/4 W. resistor
74	CM 9513	5000 ohm, 1/4 W. resistor
75	CM 9513	5000 ohm, 1/4 W. resistor
76	CM 9513	5000 ohm, 1/4 W. resistor





MODELS WRT700
WRT701
MODELS WRT702
WRT703

WESTINGHOUSE ELEC. SUPPLY CO.

Data, Parts

EXCEPT for the following data:-

Model WRT-700 is the same as RCA Model TRK-5
Model WRT-701 is the same as RCA Model TRK-5

SUPPLEMENTARY

REPLACEMENT PARTS LIST FOR
WESTINGHOUSE TELEVISION RECEIVERS

Model WRT-700 (5" Television Attachment)
Model WRT-701 (5" Console)

When ordering replacement parts refer to this supplementary sheet first and if the part appears here it should be ordered by the stock number and receiver model indicated. For parts not listed in this sheet, refer to the main parts list.

Parts should be ordered from your Westinghouse Parts Distributor giving the stock number of part and model number of receiver.

TELEVISION CHASSIS ASSEMBLIES

Stock Number	Unit	List Price
33835	Adjuster - Magnetite core and stud in tube for high frequency oscillator circuit adjustment (used with L13).....	\$.60
33120	Choke - Filter choke (L39).....	3.25
30752	Bracket - "Precision Eye" bracket.....	.25
30766	Cap - Rubber cap for "Precision Eye".....	.15
13871	Socket - "Precision Eye" socket.....	.45

1-BAND RADIO RECEIVER
RC-429-A Used with Model WRT-701

Stock Number	Unit	List Price
30716	Clip - Precision eye mounting clip with wing screw.....	\$.25
32634	Cord - Variable condenser drive cord.....	.10
33712	Plate - Finished drive plate with drive pulley and bracket.....	1.95
33713	Pointer - Dial pointer and carriage.....	.40
13871	Socket - "Precision Eye" socket.....	.45

3-BAND RADIO RECEIVER CHASSIS

RC-427-B in WRT-703
RC-427-C in WRT-702

Parts should be ordered from your Westinghouse Parts Distributor giving the stock number of the part and the model number of the receiver.

MISCELLANEOUS ASSEMBLIES

Model WRT-700

33827	Cap - Pilot lamp "bulls eye" (Model WRT-701 only).....	.65
33716	Escutcheon- Dial escutcheon less scale and buttons (Model WRT-701 only).....	14.00
31210	Button - Station selector push button (Model WRT-701 only).....	.10
33715	Dial - 3 Band glass dial scale (Model WRT-701 only).....	1.70
31095	Disc - Package of 8 protective cover discs for push buttons (Model WRT-701 only).....	.10
33754	Glass - Safety protective glass for Kinescope.....	2.90
31355	Knob - Band switch knob (Model WRT-701 only).....	.12
33181	Knob - "Volume" knob.....	.25
31391	Knob - Television "Brightness", "Hor. Hold", or Radio "Volume Control" knob.....	.15
33178	Knob - Radio "Tone Control" knob.....	.20
33179	Knob - Radio tuning knob (Model WRT-700 only).....	.25
33176	Knob - Television "Station Selector" control knob (white dot).....	.12
31355	Knob - Television "Volume Control" knob (Model WRT-700 only).....	.40
30991	Markers - Complete set of call letter markers (Model WRT-701).....	.05
14270	Spring - Knob spring for Stock No. 31355, 33176, 33178 and 33181 knobs.....	.03
30330	Spring - Knob spring for Stock No. 31391 knob.....	.05
4982	Spring - Knob spring for Stock No. 33179 knob.....	.05

Prices subject to change without notice.

MISCELLANEOUS ASSEMBLIES

WRT-702 and WRT-703

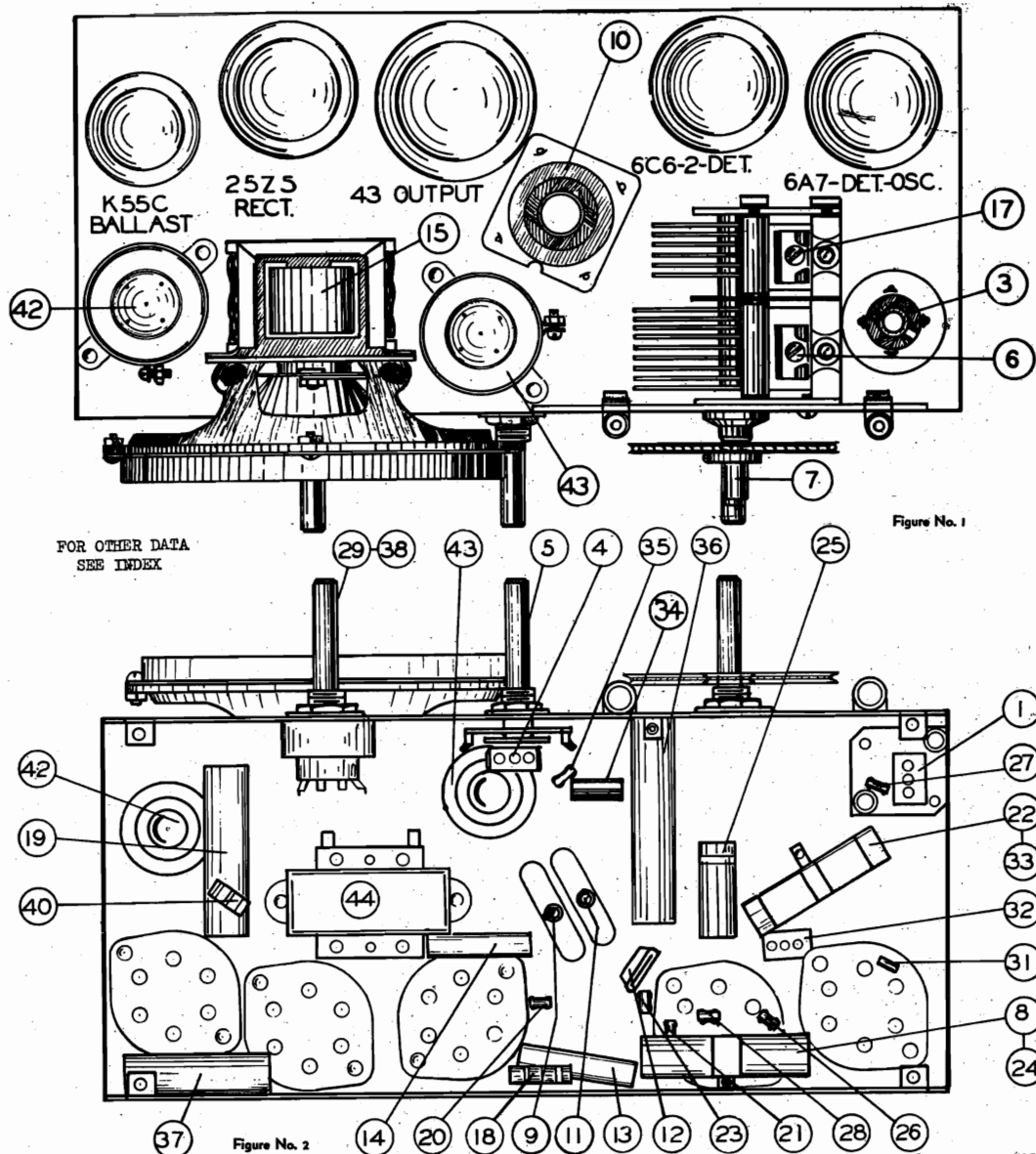
32425	Button - Station selector push button.....	.20
33827	Cap - Orange pilot lamp "Bulls Eye".....	.65
33752	Cushion - Kinescope masking cushion (Model WRT-703 only).....	2.30
33753	Cushion - Kinescope masking cushion (Model WRT-702 only).....	2.00
33710	Dial - Three band glass dial scale.....	2.30
33711	Escutcheon-Dial escutcheon less buttons, button shaft, and dial scale.....	4.75
31355	Knob - Radio tuning, volume, or range selector knob.....	.12
31391	Knob - Television "Contrast", "Hor. Hold", or "Fine Tuning" knob.....	.15
33181	Knob - Television "Brightness" or "Vert. Hold" knob.....	.25
33178	Knob - Television "Station Selector" knob.....	.30
33179	Knob - "Victrola" Radio, Television - Fidelity selection knob.....	.20
32067	Marker - Complete set of call letter markers.....	.35
31460	Marker - "Dial Tuning" push button marker.....	.04
30330	Spring - Knob spring for stock No. 31391 knob.....	.03
14270	Spring - Knob spring for stock No. 31355, 33181, 33176, and 33178 knobs.....	.05

Prices subject to change without notice.

Trimmers
Chassis

WESTINGHOUSE ELEC. INTERNATIONAL CO.

MODEL WR102
Alignment
Socket



FOR OTHER DATA
SEE INDEX

Figure No. 1

Type and Number of Tubes 1 #6A7, 1 #6C6, 1 #43, 1 #25Z5, 1 #K55C (Ballast) - Total 5
Power Supply Characteristics.. 105-125 volts D.C. or 105-125 volts, 50-60 cycle A.C.
Power Consumption 44 Watts
Total Power Output 1.10 Watts
Undistorted Power Output 0.75 Watts
Tuning Ranges (Broadcast Band 535 to 1525 K.C.
Shortwave Band 1500 to 3000 K.C.
Line-Up Frequencies I.F. 465 K.C.; 1400 K.C.

LINE-UP CAPACITOR ADJUSTMENTS

To properly align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied and reduced sufficiently to prevent overload as the individual circuits of the receiver are brought into alignment. A conventional output meter should be connected across the terminals of the speaker voice coil to indicate when the individual circuits are correctly aligned. The sensitivity of this meter must be sufficient to give satisfactory readings with low input signals.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, location of the various tubes and alignment condensers. Top and bottom views of the chassis are shown in Figures #1 and #2 and should be carefully studied before actual work is started.

ALIGNMENT OF I.F. (465 K.C.)

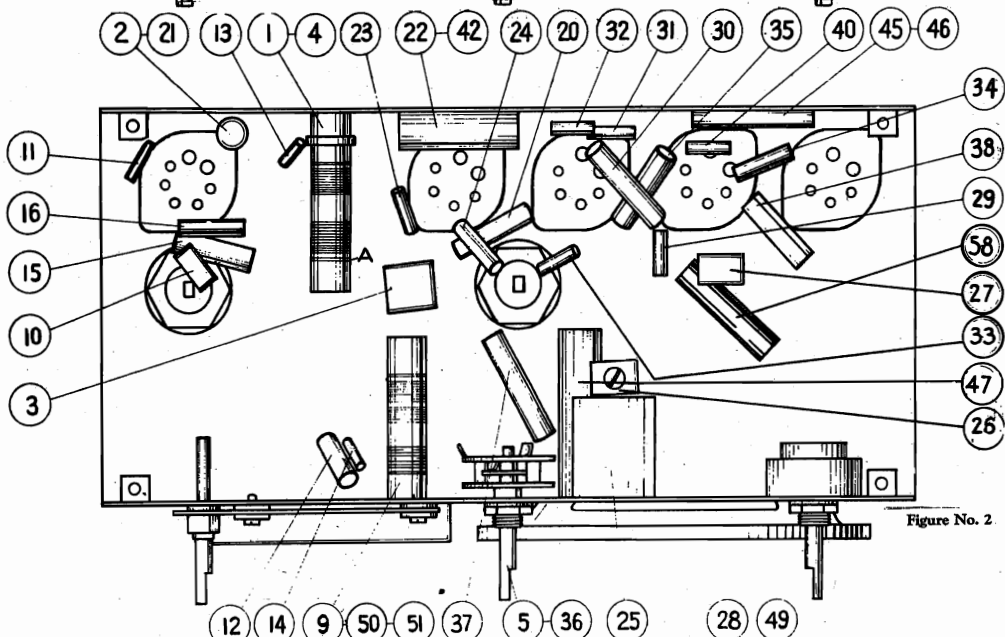
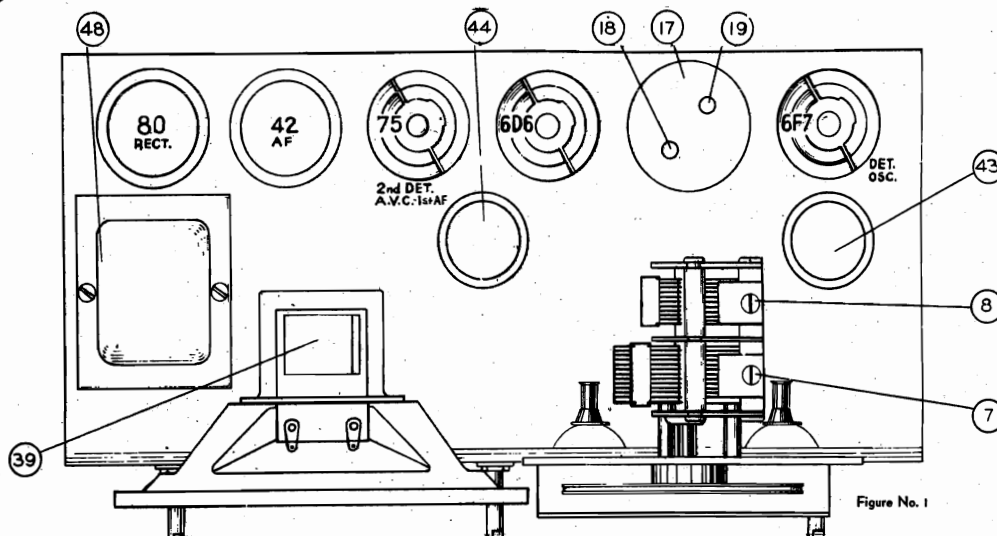
1. Set the volume control to maximum position and wave change switch to standard broadcast band.
2. Connect the output meter across the voice coil terminals of the speaker.

3. Set the test oscillator to 465 K.C. and adjust its output to produce a measurable reading on the output meter when the test signal is applied to the grid of the type 6A7 first detector-oscillator tube through a 0.5 mfd. blocking condenser.
4. Adjust trimmers #9 and #11 to maximum output.

ALIGNMENT OF OSCILLATOR AND R. F.

1. Check the pointer setting to be sure that it is exactly horizontal when the tuning condenser is completely closed.
2. Set the test oscillator and dial indicator to 1400 K.C. and adjust the oscillator trimmer condenser #17 to maximum output.
3. Apply the test signal to the antenna of the receiver through a .0001 mfd. blocking condenser and adjust trimmer condenser #6 to maximum output.
4. Check sensitivity over the band.
5. Turn wave change switch to the shortwave band and check the sensitivity over scale.

MODEL WR209 WESTINGHOUSE ELEC. INTERNATIONAL CO.
Alignment, Socket
Trimmers, Chassis



Type and Number of Tubes	1 #6F7, 1 #6D6, 1 #75, 1 #42, 1 #80 - Total 5
Power Supply	105 to 125 volts, 50 to 60 cycles A.C.
Power Consumption	46 Watts
Tuning Ranges	540 to 1500 K.C. and 1500 to 3200 K.C.
Maximum Undistorted Output	1.5 Watts
Maximum Output	2.8 Watts
Line-Up Frequencies	I.F. 465 K.C., 1400 K.C.

This model is a five-tube, A.C., two-band superheterodyne receiver whose circuit comprises a combined first detector-oscillator, an intermediate frequency amplifier, a combined second detector, A.V.C. and first audio amplifier, a power pentode output stage and a rectifier with its associated filter circuit and power transformer.

This model is designed to work over two bands, the broadcast band extending from 540 to 1500 K.C. and a police band which extends from 1400 to 3200 K.C.

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver are brought into alignment.

A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Fig. #1 and #2 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (465 K.C.)

1. Set volume control on full, turn tone control knob to the right hand position. Set wave-change switch on the broadcast position and the dial indicator at approximately 600 K.C.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 K.C. and adjust its output to produce a measurable reading on output meter when test signal is applied to the grid of the 6D6 I.F. tube thru a .5 mfd. blocking condenser.
4. Adjust #26 (see Fig. #2) to maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 6F7 first detector-oscillator tube and adjust #18 and #19 (Fig. #1) to maximum output.

6. With test signal still on the grid of 6F7 tube, repeat the above adjustments for greatest sensitivity.

ADJUSTMENT OF BROADCAST BAND

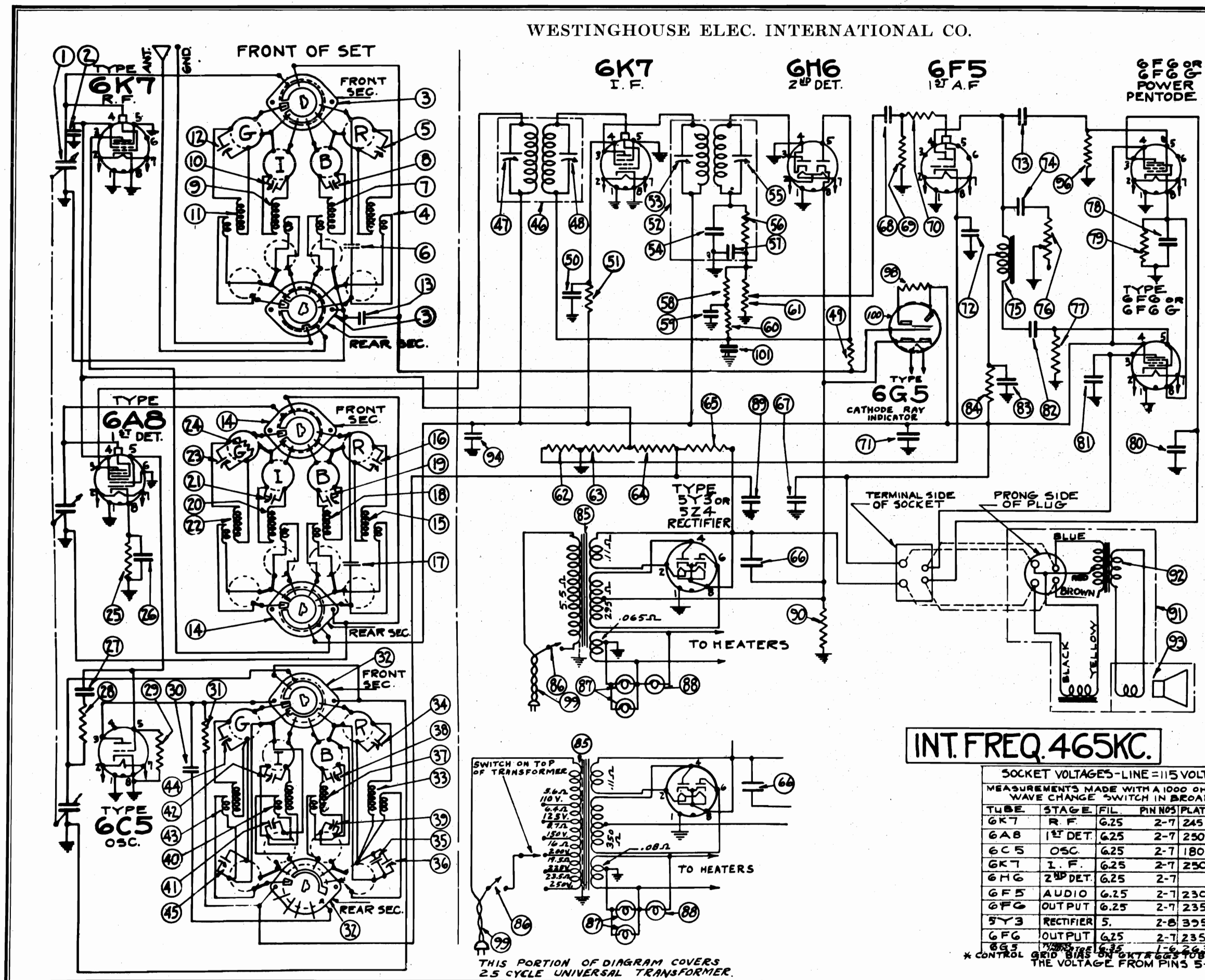
1. Leave test signal on grid of 6F7 tube and set the test oscillator to 1400 K.C.
2. Turn the gang condenser to its maximum position. Adjust dial indicator until either end is directly over the long horizontal lines on the dial scale. Then set dial indicator to 1400 K.C.
3. Adjust trimmer #8 to maximum output.
4. Apply test signal to antenna of set thru a .0002 mfd. condenser and adjust trimmer #7 to maximum output.

ADJUSTMENT OF POLICE BAND

When adjustments as outlined under the broadcast band are completed, the police band requires no adjustment unless the coil had been changed. In this event, set test oscillator and station indicator to 1700 K.C. and apply test signal to antenna lead. The police band winding is indicated by "A" in Fig. #2. Adjust the position of this winding by sliding it back and forth on the core until maximum output is indicated on the output meter. This winding should then be secured in place by applying a thin coat of coil cement.

WESTINGHOUSE ELEC. INTERNATIONAL CO.

MODELS WR214X, WR314X
Schematic, Voltage
Resistances



D.C. RESISTANCE				
MEASURED WITH WAVE CHANGE SWITCH IN CORRESPONDING BAND POSITION				
COIL	DIA. NO.	PRIM.	SEC.	
G-ANT.	11	120	20	
G-R.F.	22	11	20	
G-OSC.	43	6	8	
I-ANT.	9	18.5	3.8	
I-R.F.	20	0.8	10.7	
I-OSC.	40	1.4	3.3	
B-ANT.	7	2.1	1.0	
B-R.F.	18	1.8	1.0	
B-OSC.	37	0.5	0.9	
R-ANT.	4	0.7	0.03	
R-R.F.	15	2.0	0.03	
R-OSC.	35	0.5	0.03	
12 I.F.	46	8.6	8.6	
2nd I.F.	52	8.6	8.6	
INTERSTAGE TRANS.	75	4200	9000	
OUT PUT TRANS.	92	372	.63	
SPKR FIELD		1800		
VOICE COIL	93	3.2		

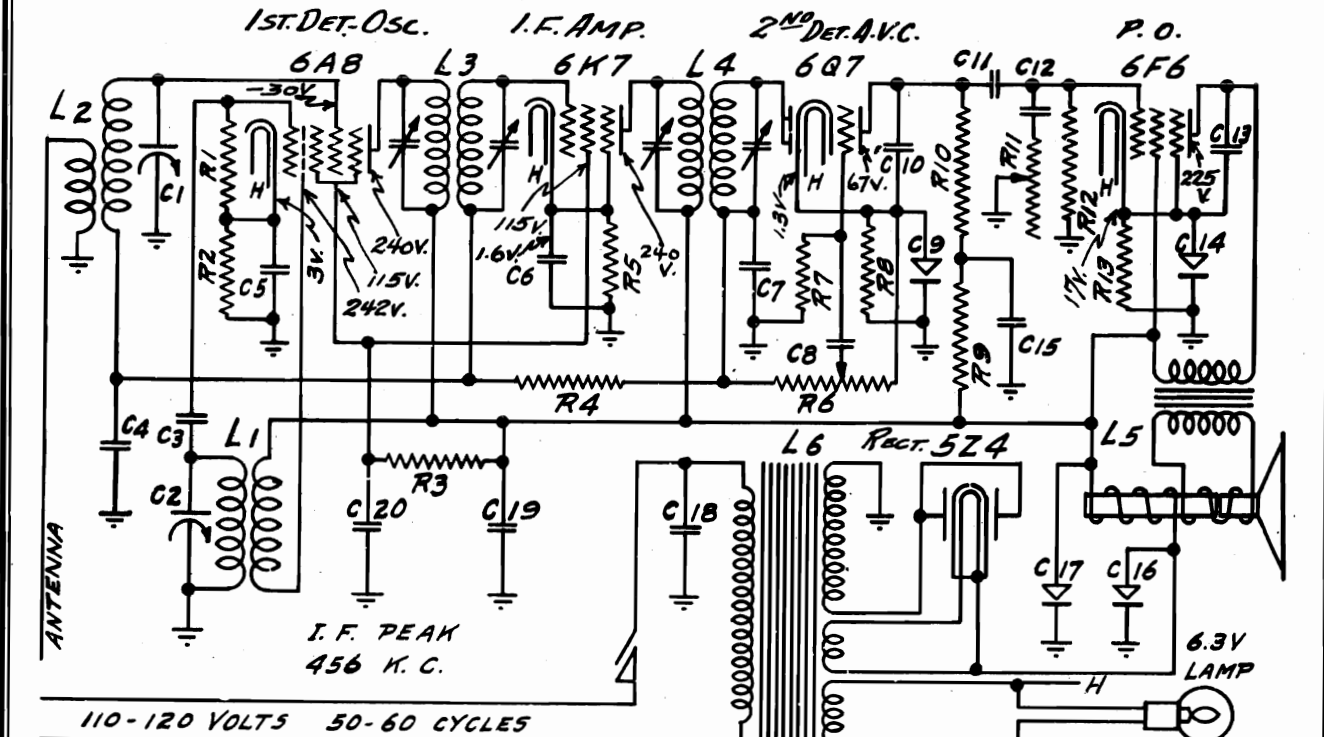
INT. FREQ. 465KC.

SOCKET VOLTAGES—LINE = 115 VOLTS TAKEN FROM BOTTOM OF SOCKETS							
MEASUREMENTS MADE WITH A 1000 OHMS PER VOLT VOLTMETER & WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION							
TUBE	STAGE	FIL.	PIN NOS.	PLATE	PIN NOS.	SCREEN	PIN NOS.
6K7	R.F.	6.25	2-7	245	3-1	100	4-1
6A8	1st DET.	6.25	2-7	250	3-1	100	4-1
6C5	OSC.	6.25	2-7	180	3-1		
6K7	I.F.	6.25	2-7	250	3-1	105	4-1
6HG	2nd DET.	6.25	2-7				
6F5	AUDIO	6.25	2-7	230	4-1		
6FG	OUTPUT	6.25	2-7	235	3-1	250	4-1
5Y3	RECTIFIER	5.	2-8	395	8-1		
6G5	OUTPUT	6.25	2-7	235	3-1	250	4-1
6G5	GRID BIAS	6.25	1-6	263	2-5		

* CONTROL GRID BIAS ON 6K7 & 6HG TUBES IS EQUAL TO APPROX. 50% TENTHS THE VOLTAGE FROM PINS 5-1 ON THE 6HG TUBE SOCKET.

WILCOX-GAY CORP.

MODEL 7E5
Schematic, Voltage
Alignment, Socket
Trimmers



CONDENSERS SOCKET VOLTAGES TAKEN FROM
SOCKET PRONGS TO GND. B+242V.
SPEAKER FIELD 78. METER 1000 OHMS/VOLT.

C1	77-2007	Preselector Section of Variable Condenser
C2	77-2007	Oscillator Section of Variable Condenser
C3	76-2002	.00005 Mfd. Mica Condenser
C4	75-2005	.1 Mfd. 200 V. Paper Condenser
C5	75-2005	.1 Mfd. 200 V. Paper Condenser
C6	75-2005	.1 Mfd. 200 V. Paper Condenser
C7	76-268	.00025 Mfd. Mica Condenser
C8	75-2005	.1 Mfd. 200 V. Paper Condenser
C9	18-928	25 Mfd. 25 V. Dry Electrolytic Cond.
C10	76-662	.002 Mfd. Mica Condenser
C11	75-2005	.1 Mfd. 200 V. Paper Condenser
C12	75-2003	.01 Mfd. 400 V. Paper Condenser
C13	75-2002	.004 Mfd. 600 V. Paper Condenser
C14	18-928	25 Mfd. 25 V. Dry Electrolytic Cond.
C15	75-2005	.1 Mfd. 200 V. Paper Condenser
C16	18-2008	6 Mfd. 350 V. Dry Electrolytic
C17	18-2008	6 Mfd. 250 V. Dry Electrolytic
C18	75-2003	.01 Mfd. 400 V. Paper Condenser
C19	75-2011	.5 Mfd. 200 V. Paper Condenser
C20	75-2005	.1 Mfd. 200 V. Paper Condenser

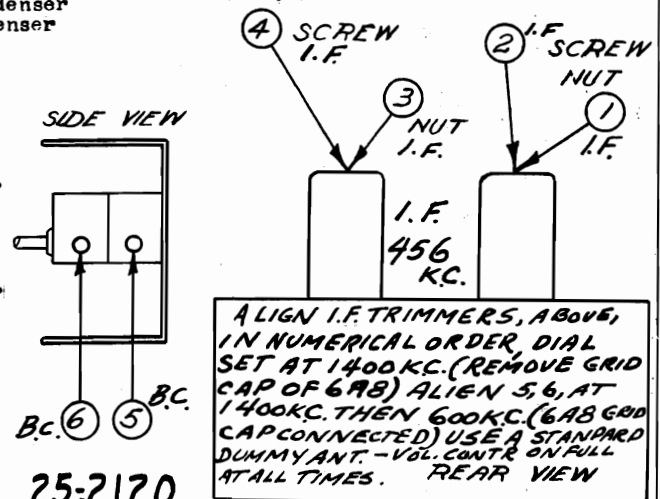
INDUCTANCES

L1	17-2135	Oscillator Coil Assembly
L2	17-2138	Preselector Coil Assembly
L3	68-2040	First I.F. Transformer Assembly
L4	68-2041	Second I.F. Transformer Assembly
L5	64-2045	5" Speaker, 1500 Ohm Field, 6F6 Output Trans.
L6	80-2009	Power Transformer for 110-120 V. 60 Cycle

CODE PART NO.

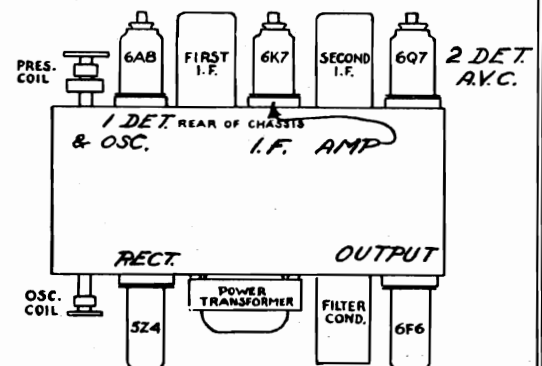
RESISTORS

R1	53-898	50,000 Ohm Type M Resistor
R2	53-1062	250 Ohm Wirewound Resistor
R3	53-1042	25,000 Ohm Type M Resistor
R4	53-926	1 Meg Ohm Type M Resistor
R5	53-1062	250 Ohm Wirewound Resistor
R6	19-1291	500,000 Ohm Volume Control & Line Switch
R7	53-925	500,000 Ohm Type M Resistor
R8	53-919	5,000 Ohm Type M Resistor
R9	53-923	100,000 Ohm Type M Resistor
R10	53-924	250,000 Ohm Type M Resistor
R11	19-1317	250,000 Ohm Tone Control
R12	53-925	500,000 Ohm Type M Resistor
R13	53-1063	500 Ohm Wirewound Resistor



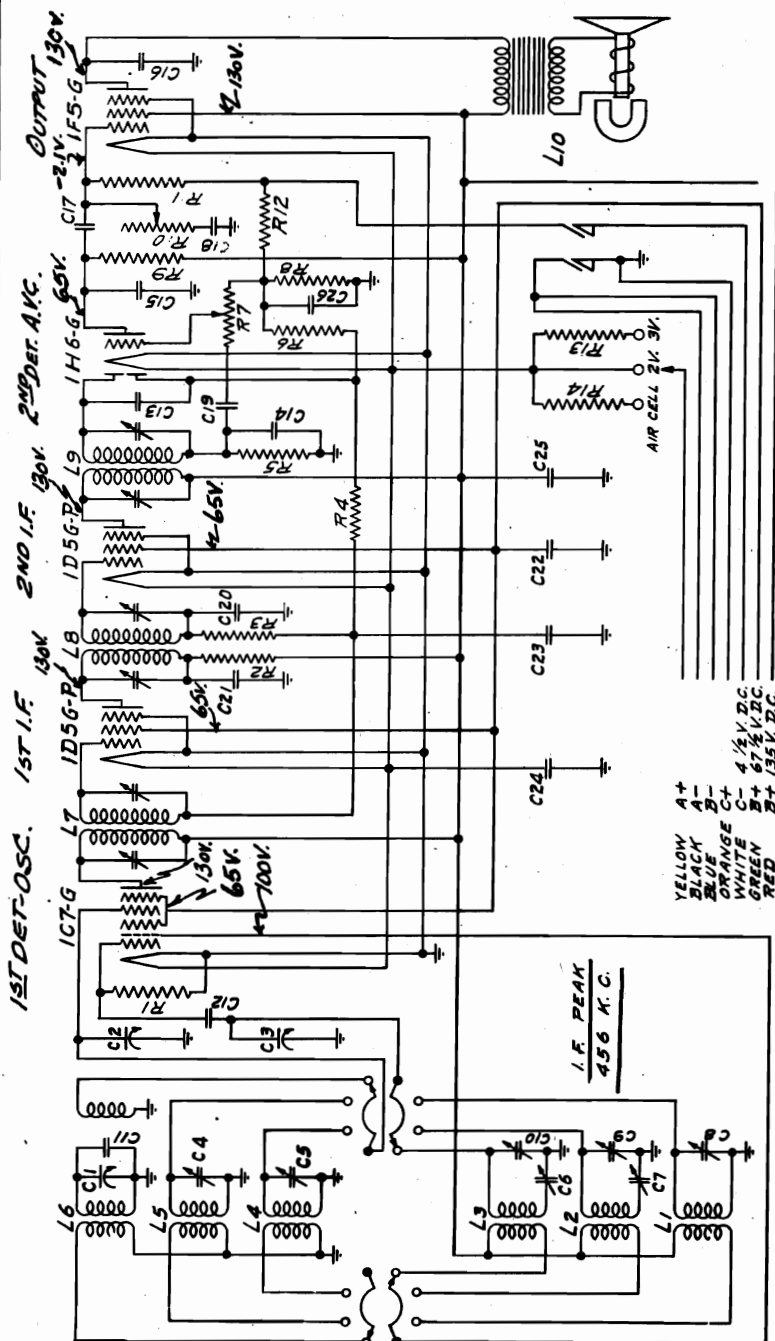
25-2120

ALIGNMENT: - CONNECT OUTPUT METER
BETWEEN PLATE 6F6 AND GROUND.



MODELS A41,A42
Chassis 7R5
Schematic,Voltage
Socket,Alignment

WILCOX-GAY CORP.



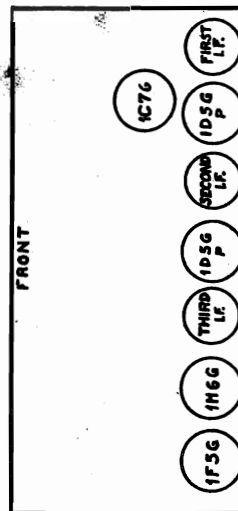
VOLTAGES MEASURED FROM SOCKET PRONGS TO GROUND WITH A 1000 OHM PER VOLT METER. FILAMENT VOLTAGE 1.5.

25-2133

CONVENTIONAL ALIGNMENT

SEE SPECIAL SECTION VOL. VIII

LOCATION OF TUBES

CONDENSERS (Cont'd.)

CODES PART NO.

CODE	PART NO.	RESISTORS
1	1000	1000
2	1000	1000
3	1000	1000
4	1000	1000
5	1000	1000
6	1000	1000
7	1000	1000
8	1000	1000
9	1000	1000
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98	1000	1000
99	1000	1000
100	1000	1000

CODE PART NO.

CONVENTIONAL ALIGNMENT

5

001 Mfd. mica Condenser
004 Mfd. 600 V. Paper Condenser
01 Mfd. 400 V. Paper Condenser
01 Mfd. 400 V. Paper Condenser
01 Mfd. 400 V. Paper Condenser
01 Mfd. 400 V. Paper Condenser
01 Mfd. 400 V. Paper Condenser
01 Mfd. 400 V. Paper Condenser
1 Mfd. 200 V. Paper Condenser
1 Mfd. 200 V. Paper Condenser
5 Mfd. 200 V. Paper Condenser
5 Mfd. 200 V. Paper Condenser
5 Mfd. 200 V. Paper Condenser

C15	76-265
C16	75-2008
C17	75-2003
C18	75-2003
C19	75-2003
C20	75-2003
C21	75-2003
C22	75-2005
C23	75-2006
C24	75-2011
C25	75-2011
C26	75-2011

[illegible]

R1	53-898
R2	53-919
R3	53-923
R4	53-926
R5	53-925
R6	53-925
R7	19-8008
R8	53-923
R9	53-924
R10	19-8010
R11	53-925
R12	53-898
R13	53-8016
R14	53-8015

SPECIAL SECTION VOL. V
LOCATION OF TUBES

FRONT

SEE

INDUCTANCES

ATMOSPHERIC WIND 010 0700-00 4-11

0420-0000

C

Foreign Band Oscillator Coil Assembly
Police Band Oscillator Coil Assembly
Tactical Band Oscillator Coil Assembly
Tactical Band Oscillator Coil Assembly
Police Band Prescaler Coil Assembly
Police Band Prescaler Coil Assembly
First I. F. Transformer Assembly
Second I. F. Transformer Assembly
Third I. F. Transformer Assembly
4-10 Permanent Magnet Field for Model A-41
4-11 Permanent Magnet Field for Model A-42
4-12 Permanent Magnet Field for Model A-43
4-13 Speaker Permanent Magnet Field for Model A-42
4-14 Speaker Permanent Magnet Field for Model A-42
Output Trans. for Model A-42

L1	17-2183
L2	17-2170
L3	17-2150
L4	17-2182
L5	17-2168
L6	17-2151
L7	68-2047
L8	68-2047
L9	68-2048
L10	64-2052
L10	64-2053

[illegible]

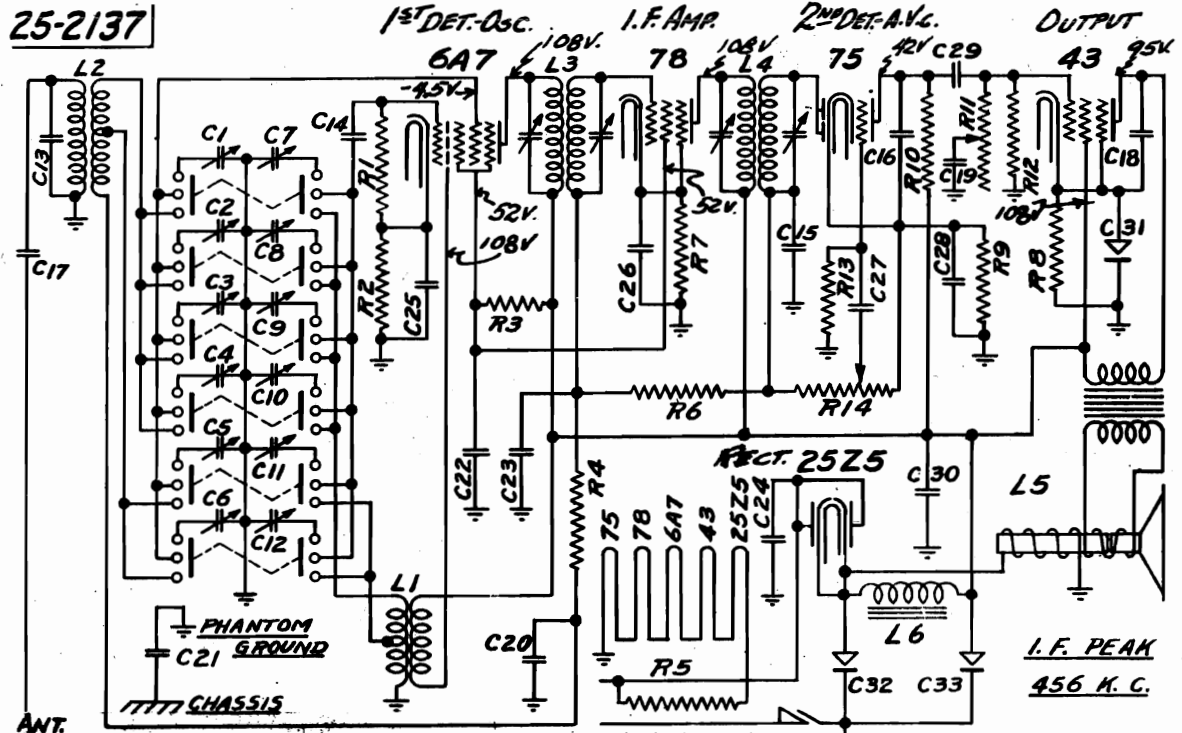
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78-92	78-92
78-93	78-93
78-94	78-94
78-95	78-95
78-96	78-96
78-97	78-97
78-98	78-98
78-99	78-99
79-00	79-00

116 G THIRD I.F. 1D5 G P SECOND I.F. 1D5 G P 1C76

1F5G

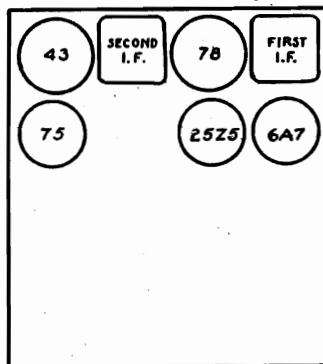
WILCOX-GAY CORP.

MODEL A48
Chassis 7S5
Schematic, Voltage
Socket, Alignment



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

LOCATION OF TUBES



SOCKET VOLTAGES, Measured from socket prongs to ground with a 1000 ohm per volt meter. B+ 180V., Speaker field 125 V., Line voltage was 120 at 60 cycles.

CODE	PART NO.	RESISTORS
R1	53-898	50,000 Ohm 1/4 Watt Resistor
R2	53-1062	250 Ohm Wirewound Resistor
R3	53-1042	25,000 Ohm 1/4 Watt Resistor
R4	53-923	100,000 Ohm 1/4 Watt Resistor
R5	20-2009	173 Ohm Resistor in Power Line Cord
R6	53-926	1 Megohm 1/4 Watt Resistor
R7	53-1063	500 Ohm Wirewound Resistor
R8	53-1063	500 Ohm Wirewound Resistor
R9	53-919	5,000 Ohm 1/4 Watt Resistor
R10	53-924	250,000 Ohm 1/4 Watt Resistor
R11	19-2009	250,000 Ohm Tone Control
R12	53-925	500,000 Ohm 1/4 Watt Resistor
R13	53-925	500,000 Ohm 1/4 Watt Resistor
R14	19-2007	500,000 Ohm Volume Control & Off-On Switch

C1, C2	78-2033	40-240 Mfd. Two Gang Trimmer Condenser
C3, C4	78-2033	40-240 Mfd. Two Gang Trimmer Condenser
C5, C6	78-2033	40-240 Mfd. Two Gang Trimmer Condenser
C7, C8	78-2033	40-240 Mfd. Two Gang Trimmer Condenser
C9, C10	78-2033	40-240 Mfd. Two Gang Trimmer Condenser
C11, C12	78-2033	40-240 Mfd. Two Gang Trimmer Condenser
C13	76-2002	.00005 Mfd. Mica Condenser
C14	76-2002	.00005 Mfd. Mica Condenser
C15	76-307	.0005 Mfd. Mica Condenser
C16	76-265	.001 Mfd. Mica Condenser
C17	76-265	.001 Mfd. Mica Condenser
C18	75-2002	.004 Mfd. 600 V. Paper Condenser
C19	75-2003	.01 Mfd. 400 V. Paper Condenser
C20	75-2003	.01 Mfd. 400 V. Paper Condenser
C21	75-2005	.1 Mfd. 200 V. Paper Condenser
C22	75-2005	.1 Mfd. 200 V. Paper Condenser
C23	75-2005	.1 Mfd. 200 V. Paper Condenser
C24	75-2005	.1 Mfd. 200 V. Paper Condenser
C25	75-2005	.1 Mfd. 200 V. Paper Condenser
C26	75-2005	.1 Mfd. 200 V. Paper Condenser
C27	75-2005	.1 Mfd. 200 V. Paper Condenser
C28	75-2005	.1 Mfd. 200 V. Paper Condenser
C29	75-2005	.1 Mfd. 200 V. Paper Condenser
C30	75-2011	.5 Mfd. 200 V. Paper Condenser
C31	18-928	25 Mfd. 25 V. Dry Electrolytic Cond.
C32, C33	18-2009	20 Mfd. & 10 Mfd. 150 W.V. Dry Elect. Cond.

INDUCTANCES

L1	17-2198	Oscillator Coil Assembly
L2	17-2200	Presselector Coil Assembly
L3	68-2051	First I. F. Transformer Assembly
L4	68-2052	Second I. F. Transformer Assembly
L5	64-2055	4" Speaker, 2100 Ohm, 43 Tube Output Trans.
L6	14-2002	20 Henry Filter Choke

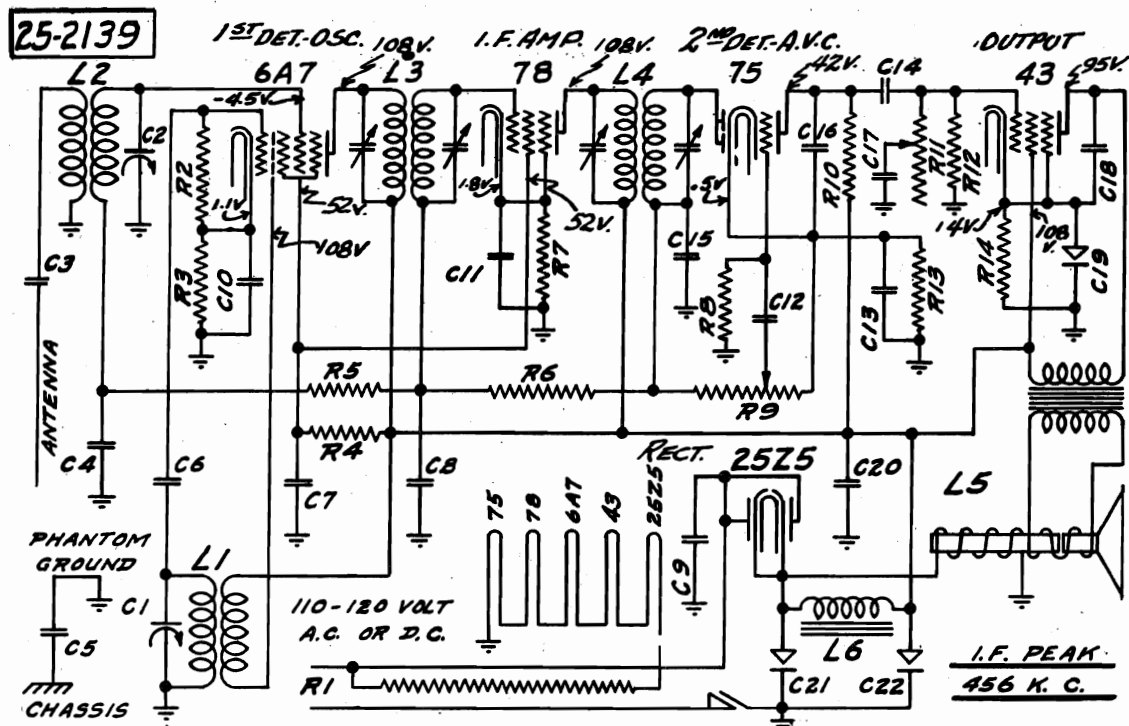
MODEL A49

Chassis 7T5

Schematic, Voltage

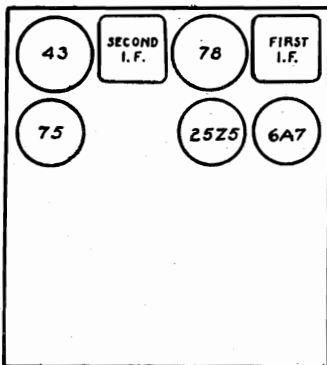
Alignment, Socket

WILCOX-GAY CORP.



SOCKET VOLTAGES, Measured from socket prongs to ground with a 1000 ohm per volt meter. B+ 180V., Speaker field 125 V., Line voltage was 120 at 60 cycles.

LOCATION OF TUBES



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL.VIII

CODE	PART NO.	RESISTORS
R1	20-2009	175 Ohm Resistor in Power Line Cord
R2	53-898	50,000 Ohm 1/4 Watt Resistor
R3	53-1062	250 Ohm Wirewound Resistor
R4	53-1042	25,000 Ohm 1/4 Watt Resistor
R5	53-923	100,000 Ohm 1/4 Watt Resistor
R6	53-926	1 Megohm 1/4 Watt Resistor
R7	53-1063	500 Ohm Wirewound Resistor
R8	53-1063	500 Ohm Wirewound Resistor
R9	19-2007	500,000 Ohm Volume Control & Off-On Switch
R10	53-924	250,000 Ohm 1/4 Watt Resistor
R11	19-2009	250,000 Ohm Tone Control
R12	53-926	500,000 Ohm 1/4 Watt Resistor
R13	53-919	5,000 Ohm 1/4 Watt Resistor
R14	53-1063	500 Ohm Wirewound Resistor

CONDENSERS

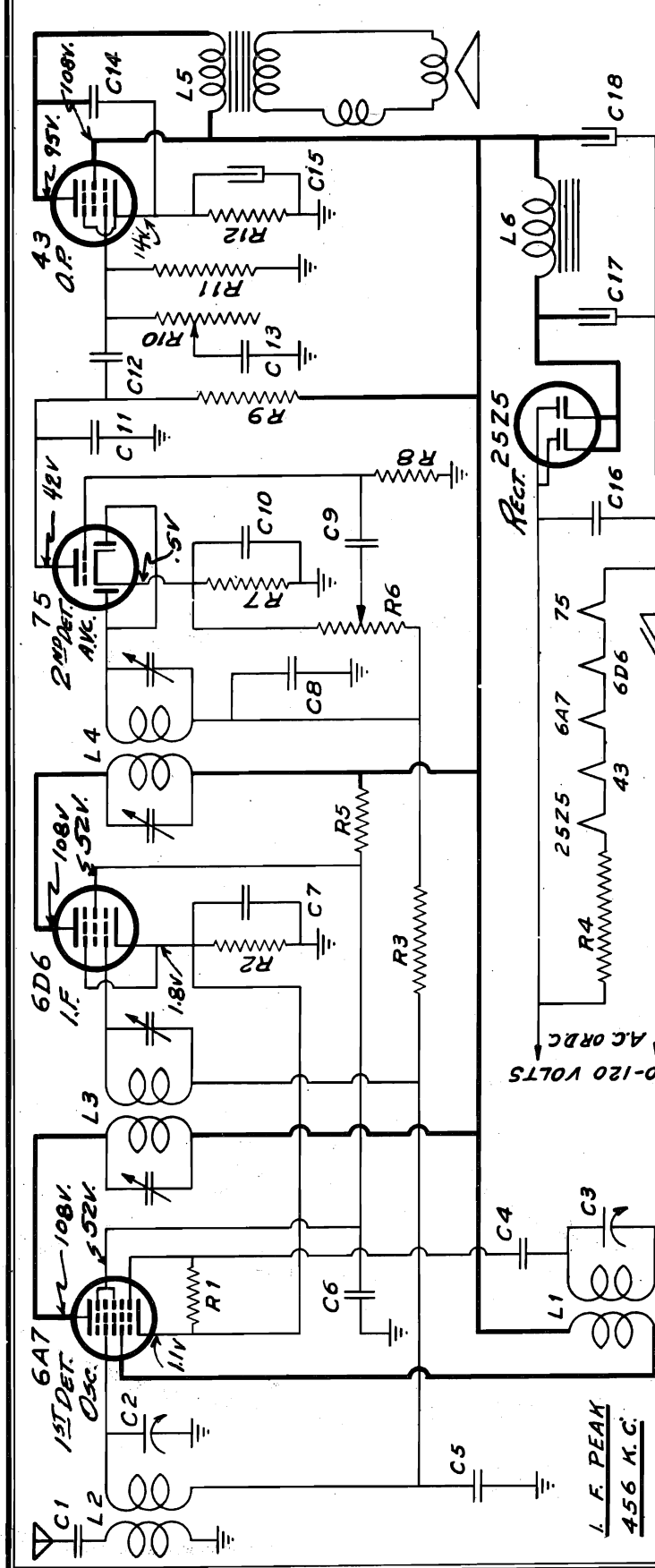
C1, C2	77-2007	2 Gang Variable Condenser
C3	76-265	.001 Mfd. Mica Condenser
C4	76-2003	.01 Mfd. 200 V. Paper Condenser
C5	75-2005	.1 Mfd. 200 V. Paper Condenser
C6	76-2002	.00005 Mfd. Mica Condenser
C7	75-2005	.1 Mfd. 200 V. Paper Condenser
C8	75-2005	.1 Mfd. 200 V. Paper Condenser
C9	75-2005	.1 Mfd. 200 V. Paper Condenser
C10	75-2005	.1 Mfd. 200 V. Paper Condenser
C11	75-2005	.1 Mfd. 200 V. Paper Condenser
C12	75-2005	.1 Mfd. 200 V. Paper Condenser
C13	75-2005	.1 Mfd. 200 V. Paper Condenser
C14	75-2005	.1 Mfd. 200 V. Paper Condenser
C15	76-307	.0005 Mfd. Mica Condenser
C16	76-265	.001 Mfd. Mica Condenser
C17	75-2002	.004 Mfd. 600 V. Paper Condenser
C18	75-2002	.004 Mfd. 600 V. Paper Condenser
C19	18-928	25 Mfd. 25 V. Dry Electrolytic Cond.
C20	75-2011	.5 Mfd. 200 V. Paper Condenser
C21, C22	18-2009	25 Mfd. & 10 Mfd. W.V. Dry Elect. Cond.

INDUCTANCES

L1	17-2204	Oscillator Coil Assembly
L2	17-2202	Preselctor Coil Assembly
L3	68-2051	First I.F. Transformer Assembly
L4	68-2052	Second I.F. Transformer Assembly
L5	64-2055	4" Speaker, 2100 Ohm, 43 Tube Output Trans
L6	14-2002	20 Henry Filter Choke

WILCOX-GAY CORP.

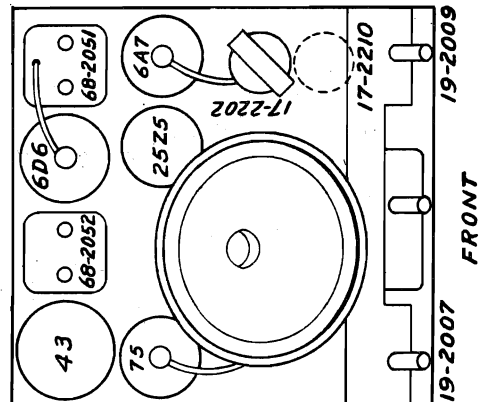
MODEL A50
Chassis 8D5
Schematic, Voltage
Alignment, Socket



ohm per volt meter. B+ 180V., Speaker field 125V., Line voltage was 120 at 60 cycles.

SOCKET VOLTAGES, Measured from socket prongs to ground with a 1000

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII



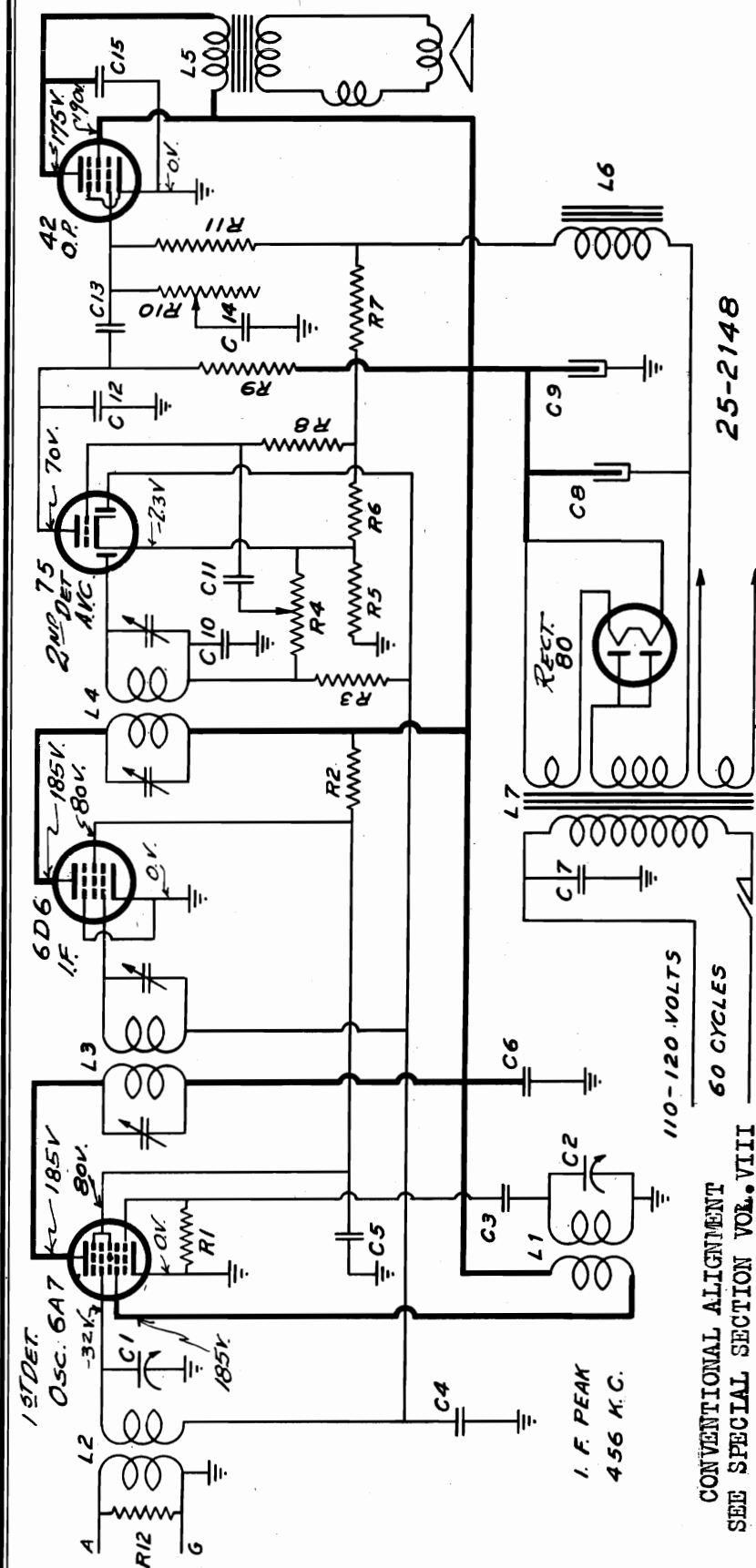
RESISTORS	CONDENSERS
R1 50,000 Ohm 1/4 Watt Resistor	C1 .002 Mfd. 600 V. Paper Cond.
R2 250 Ohm 1/2 Watt Resistor	C2 .002 Mfd. 600 V. Paper Cond.
R3 500 Ohm 1/4 Watt Resistor	C3 .0005 Mfd. Mica Condenser
R4 1 Meg Ohm 1/4 Watt Resistor	C4 .0005 Mfd. Mica Condenser
R5 173 Ohm Res. in Power Cord	C5 .1 Mfd. 200 V. Paper Cond.
R6 25,000 Ohm 1/4 Watt Resistor	C6 .1 Mfd. 200 V. Paper Cond.
R7 500,000 Ohm Volume Cont. & Switch	C7 .001 Mfd. 600 V. Paper Cond.
R8 5,000 Ohm 1/4 Watt Resistor	C8 .0005 Mfd. Mica Condenser
R9 500,000 Ohm 1/4 Watt Resistor	C9 .1 Mfd. 200 V. Paper Cond.
R10 250,000 Ohm 1/4 Watt Resistor	C10 .1 Mfd. 200 V. Paper Cond.
R11 500,000 Ohm 1/4 Watt Resistor	C11 .001 Mfd. 600 V. Paper Cond.
R12 500,000 Ohm 1/4 Watt Resistor	C12 .001 Mfd. 600 V. Paper Cond.

INDUCTANCES	CONDENSERS (Cont.)
L1 17-2210	C13 .01 Mfd. 200 V. Paper Cond.
L2 17-2202	C14 .01 Mfd. 200 V. Paper Cond.
L3 68-2051	C15 .01 Mfd. 200 V. Paper Cond.
L4 68-2052	C16 .01 Mfd. 200 V. Paper Cond.
L5 81-2003	C17 .01 Mfd. 200 V. Paper Cond.
L6 64-2056	C18 .01 Mfd. 200 V. Paper Cond.

Oscillator Coil Assembly
Prescaler Coil Assembly
First I.F. Trans. Assembly
Second I.F. Trans. Assembly
Output Transformer for # 43 Tube
4" Speaker, 450 Ohm Field

25-2144

25-2148



Voltages taken from socket prongs to ground with a 1000 ohm upper volt. meter. B- 185 v., Speaker field 65v., Line 120v, 60v.

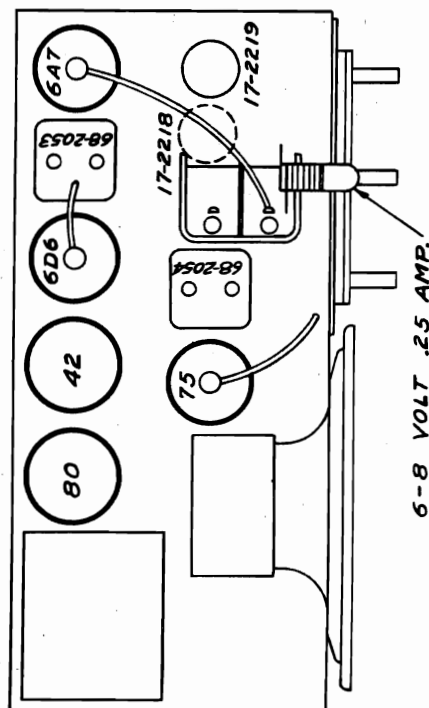
R1	55-898	50,000 Ohm	1/4 Watt Resistor	C7	75-2003	.01 Mfd. 400 V. Paper Cond.
R2	55-941	20,000 Ohm	1/4 Watt Resistor	C8	18-2014	8 Mfd. 300 W.V. Elect. Cond.
R3	55-926	500,000 Ohm	1/4 Watt Resistor	C9	18-2013	4 Mfd. 300 W.V. Elect. Cond.
R4	19-2007	1 Meg Ohm	1/4 Watt Resistor	C10	76-307	.0005 Mfd. Mica Condenser
R5		500,000 Ohm	Vol. Cont. & Switch	C11	76-307	.01 Mfd. 400 V. Paper Cond.
R6		60 Ohm		C12	75-2003	.01 Mfd. 400 V. Paper Cond.
R7	55-2019	20 Ohm	Candohm Resistor	C13	75-2014	.001 Mfd. 600 V. Paper Cond.
R8		240 Ohm		C14	75-2013	.01 Mfd. 400 V. Paper Cond.
R9	55-925	500,000 Ohm	1/4 Watt Resistor	C15	75-2002	.01 Mfd. 400 V. Paper Cond.
R10	55-924	250,000 Ohm	1/4 Watt Resistor	C16	75-2002	.004 Mfd. 600 V. Paper Cond.

INDUCTANCES

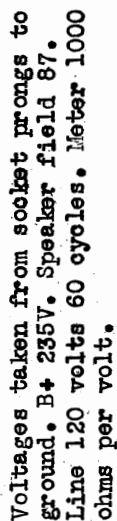
L1	17-2218	Oscillator Coil Assembly
L2	17-2219	Preslector Coil Assembly
L3	68-2053	First I.F. Trans. Assembly
L4	68-2054	Second I.F. Trans. Assembly
L5	64-2057	6 $\frac{1}{2}$ " Speaker, Output Trans. for #42 Tube
L6	64-2057	1500 Ohm Speaker Field
L7	80-2009	Power Transformer

CONDENSERS

C1,C2	77-2014	Two Gang Variable Condenser
C3	76-2002	50 Mmfd. Mica Condenser
C4	75-2005	.1 Mfd. 200 V. Paper Condenser
C5	75-2005	.1 Mfd. 200 V. Paper Condenser
C6	75-2005	.1 Mfd. 200 V. Paper Condenser



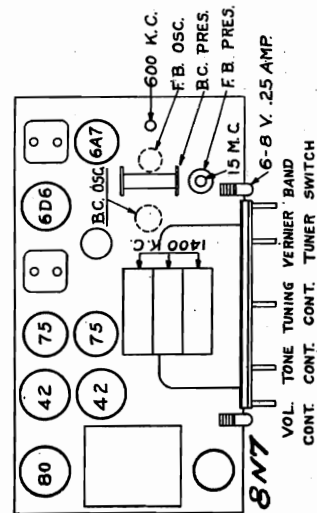
WILCOX-GAY CORP.



45	68-2051	First I.P. Transformer Assembly
46	68-2051	Second I.P. Transformer Assembly
49	80-2032	Power Transformer

MODEL A55

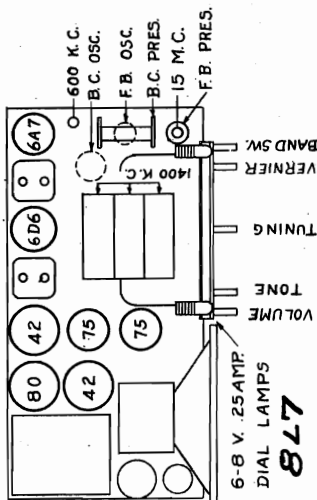
64-2059 12" Speaker - #42 Push Pull Output Trans.
64-2059 12" Speaker - 1000 Ohm Field



L1	19-0009	360,000 Ohm Freq Control
L2	55-0201	500,000 Ohm 1/2 Watt Resistor
L3	55-0201	500,000 Ohm 1/2 Watt Resistor
L4	55-0211	250,000 Ohm 1/2 Watt Resistor
L5	55-0211	20,000 Ohm 1/4 Watt Resistor
L6	55-0225	500,000 Ohm 1/4 Watt Resistor
L7	55-0225	500,000 Ohm 1/4 Watt Resistor
L8	55-0225	500,000 Ohm 1/4 Watt Resistor
L9	55-0219	5,000 Ohm 1/4 Watt Resistor
L10	55-0219	5,000 Ohm 1/4 Watt Resistor
L11	17-2149	Foreign Band Osc. Coil Assembly
L12	17-2227	Broadcast Oscillator Coil Assembly
L13	17-2228	Foreign Band Pres. Coil Assembly
L14	17-2228	Broadcast Presetor Coil Assembly
L15	17-2228	Broadcast Presetor Coil Assembly

MODEL A54

L7 64-2058	6 1/2" Speaker - #42 Push Pull Output Trans.
L8 64-2058	6 1/2" Speaker - .1000 Ohm Field



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

- [illegible]

For MODELS 6S306, 9S307
15S308

ZENITH RADIO CORP.

MODEL 169-31 Automatic
Record Changer

Installation, Operation

INSTALLATION, OPERATION AND SERVICE AUTOMATIC RECORD CHANGER

used in
Models 6-S-306, 9-S-307, 15-S-308

This Record Changer will automatically play a series of eight 10- or seven 12-inch records of the 78 revolutions-per-minute type or, if you so desire, you may change records, of any size up to 12 inches, manually. Records of the last few years with the standard eccentric or spiral stopping groove

will operate the automatic mechanism and change your records for you.

INSTALLATION

The Automatic Record Changer as supplied consists of two units.

1. The **Motorboard Unit** which includes the automatic record changer mechanism, the turntable, and the pickup.

2. The **Motor Unit** which includes the support plate assembly.

The units are supplied ready for mounting on a cabinet rail. This rail must be drilled in accordance with the information and dimensions shown on page 4. Wooden support blocks as shown, must be provided by the customer. All other necessary parts are included in your purchase. It is essential for proper operation that the rail and support blocks provide for the mounting of the motor support plate exactly $2\frac{3}{4}$ inches below the top surface of the motorboard. The support blocks should be attached to the rail with heavy wood screws. Details of this mounting, with all necessary dimensions, are given on page 4.

1. Install the Motor Unit with support plate loosely in position as shown on page 4. Do not tighten the mounting screws.
2. Loosen the two set screws in the collar of the flexible coupling on the Motorboard Unit, a detail of which is shown on page 3.
3. Place the Motorboard Unit in position on the cabinet rail with the upper mounting springs in place as shown on page 4. Make sure that the guide pins extending from the motor support plate enter the rubber grommets in the Motorboard Unit without binding.
4. Secure Motorboard in position using the screws and lower mounting springs as shown on page 4. Tighten up the four motorboard mounting screws to compress all eight mounting springs to the dimensions shown. *Make sure that the Motorboard Assembly is level in the cabinet.*
5. Tighten up the mounting screws on the Motor Unit support plate assembly so that they are firmly down against the spacers.
6. Check the installation to be sure that there is no binding between the collar of the flexible coupling and the collar of the motor spindle. See page 3.

7. Tighten the two set screws of the flexible coupling down on the spindle of the Motor Unit.

Needle Box

The needle box is in a separate package. Place the box in the hole in the motorboard with the needle ejector tab toward the front. To do this tilt the box upwards at front and lower into hole with the lug on back of box in the slot in the motorboard. Slide the lug under the motorboard and the box drops in place.

Speed Regulation and Lubrication

There are three holes in the top of the turntable which give access to oil holes and a speed regulating screw in the motor mechanism beneath. Revolve the turntable slowly until you can see the holes and screw through the turntable. A few drops of good quality light machine oil should be applied in the oil holes at regular intervals, about once every six months.

Speed Regulation.—After the phonograph is in operation the speed should be checked while playing a record.

1. Place a piece of white paper under edge of record so that it is plainly visible.
2. Count the number of revolutions per minute with the aid of a watch.
3. If not 78, stop the turntable, lift off the record and set the turntable to give access to the speed regulator screw through one of the holes.
4. Insert a screwdriver through the hole in the turntable into the groove in the speed regulator screw and turn to right (clockwise) to decrease speed, or to the left (counterclockwise) to increase speed.
5. Replace and replay record, recount and adjust until speed is checked at 78 r. p. m.

Shipping

Shipping blocks as shown on page 4 should be used in all cases of reshipment.

OPERATION

Before operating the phonograph, either automatically or manually, be sure that the pickup is down and can be moved by hand. If not, a "cycle" must be completed to bring it down. To do this, throw Turntable Switch "on." The turntable will start to revolve and the cycle of motion on the pickup arm will be resumed. When the pickup arm comes down, turn off the Turntable Switch.

Cautions

1. Never use force to start or stop the motor or any part of the record-changing mechanism or pickup arm.
2. The use of records which have become warped or damaged through improper care may cause the mechanism to jam and damage the instrument. In addition, records which have become warped will slide on one another when playing, resulting in unsatisfactory reproduction.
3. This instrument is not recommended for playing 10-inch and 12-inch records in mixed sequence. If the user desires this service he must be positive that all records are perfectly flat and free from warp. The Index and Record Reject Lever must be set at "10" and after playing the last selection the pickup will come down in position for a 10-inch record and repeat the playing of the record on a 10-inch diameter unless the Turntable Switch is turned off. Any jamming of the mechanism under these conditions indicates that the records used are not perfectly flat or that their edges are not sufficiently smooth to permit normal operation of the separators in dropping each record in sequence onto the turntable.

4. Do not leave records on the record holder posts, as they are liable to warp, particularly so in warmer climates. Keep your records in a record file (album or cabinet) when not in use. If any records should become warped, place them on a flat surface with a flat heavy article, such as a large book, on top and leave them in this position for a few days.

Controls and Moving Mechanism

Index and Record Reject Lever.—This lever is located near the right front corner of the motorboard with its index plate marked for four positions—"MANUAL," "12," "10," and "REJECT." When you desire to change record selections manually, this lever should be set in the "MANUAL" position. With the lever in the "12" position, the mechanism is set to play a series of 12-inch records automatically. To play either a series of 10-inch records, or 10- and 12-inch records mixed, the lever should be set at the "10" position.

To reject a record being played, or to start the record-changing cycle in case the record just played does not have the standard eccentric or spiral stopping groove, simply push the lever to the "REJECT" position and let go. The pickup will raise up and swing outwards and the next record will drop down. Upon releasing the lever, it will automatically return to the "10" position. If you are playing a series of 12-inch records, the lever should be returned to the "12" position after rejecting a record. Keep the lever in its "MANUAL" position when not actually playing records automatically.

1.

MODEL 169-31 Automatic
Record ChangerZENITH RADIO CORP.
Automatic Record Changer

Adjustments, Notes

GENERAL INFORMATION

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc. are in good order and are correctly assembled.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

The turntable, spindle, and pinion gear are assembled by means of a 3/32 inch straight pin. This pin may be removed by gently driving with a standard pin punch.

If the record changer or cabinet is not perfectly level, normal operation is likely to be affected.

The 10 and 12 inch records must be absolutely flat for smooth operation when using a mixture of the two sizes.

A shorting switch, located in the pickup head, operates due to pressure when the pickup is placed on the pickup rest.

ADJUSTMENTS

A. Main Lever.—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. One adjustment is provided for the main lever. Rotate the turntable until the changer is out-of-cycle; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate by 1/16 inch.

B. Friction Clutch.—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip lever "7" through a friction clutch "5." If the motion of the pickup is abruptly accelerated or becomes irregular due to swinging in the eccentric groove, the trip finger "7" moves the trip pawl "22" into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw "B." If adjustment is too tight, the needle will repeat grooves; if too loose, tripping will not occur at the end of the record.

C. Pickup Lift Cable Screw.—During the record change cycle, lever "16" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pickup lift cable. To adjust pickup for proper elevation, stop the changer "in-cycle" at the point where pickup is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknuts "C" to obtain 1 inch spacing between needle point and turntable top surface.

D. & E. Needle Landing on Record.—The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10 inch record. Position of eccentric stud "E" governs the landing of the needle on a 12 inch record; this, however, is dependent on the proper 10 inch adjustment.

To adjust for needle landing, place 10 inch record on turntable; push index lever to reject position and return to the 10 inch position; see that pickup locating lever "17" is tilted fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "V" on lever "14" is in contact with "Step T" on lever "17." The correct point of landing is 4-11/16 inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17." Leave approximately 1/32 inch end play between hub of lever "20" and pickup base bearing, and tighten the blunt nose screw "D"; run mechanism through several cycles as a check, then tighten cone pointed screw "D".

After adjusting for needle landing on a 10 inch record, place 12 inch record on turntable; push index lever to reject and return to 12 inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5-11/16 inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end adjusts lever "14" to give correct needle landing. The eccentric end of the stud must always be toward the rear of the motor board, otherwise incorrect landing may occur with 10 inch records.

F. & G. Record Separating Knife.—The upper plate (knife) "25" on each of the record posts serves to separate the lower record from the stack and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "27" be accurately maintained. The spacing for the 10 inch record is nominally .055 inch, and for the 12 inch record is .075 inch.

To adjust, rotate the knife to the point of minimum

vertical separation from the record shelf and turn screw and locknut "F" to give .052—.058 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "F", adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072—.078 inch.

H. Record Support Shelf.—The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both posts are rotated simultaneously by a gear and rack coupled to the main lever "15," and it is necessary that adjustments be such that the record is released from both shelves at the same instant. To adjust, place a 12 inch record on the turntable, rotate mechanism into cycle to the point where tone arm is at maximum distance outward from turntable; lift record upward until it is in contact with both separating knives, then loosen screws "H" and shift record shelves so that the curved inner edges of the shelves are uniformly spaced at least 1/16 inch from record edge. Tighten the blunt nose screw "H," run mechanism through cycle several times to check action, then tighten cone pointed screw "H".

If record shelves or knives are bent, or not perfectly horizontal, improper operation and jamming of mechanism will occur.

J. Tone Arm Rest Support (not shown).—When the changer is out-of-cycle, the front lower edge of the pickup head should be 5/16 inch above surface of motor board. This may be adjusted by bending the tone arm support bracket, which is associated with the tone arm mounting base, in the required direction.

K. Trip Pawl Stop Pin.—The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the point at which the roller enters the cam. By bending the pin support either toward or away from trip pawl bearing stud, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

Lubrication.—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board.

The felt washer between the turntable and spindle bearing should be soaked in light engine oil whenever the turntable is removed, or as required for proper operation.

Do not allow oil or grease to come in contact with, rubber mounting of tone arm base, rubber bumper, or flexible coupling of drive motor.

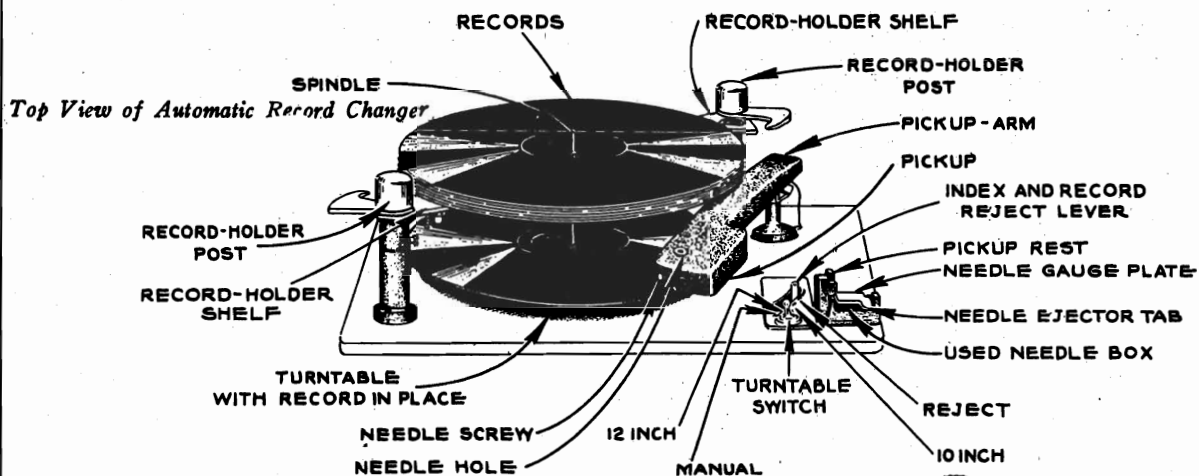
MISCELLANEOUS SERVICE HINTS

Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual mis-adjustments will enable ready adjustment in most cases.

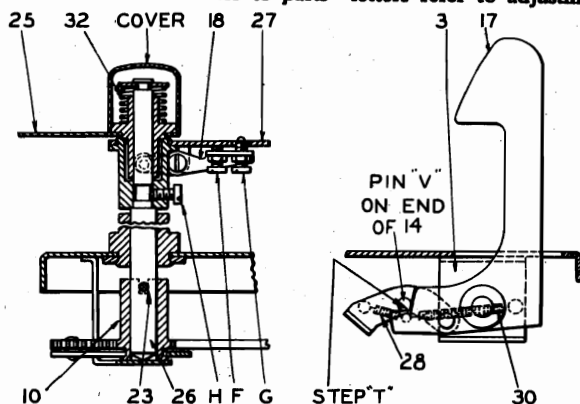
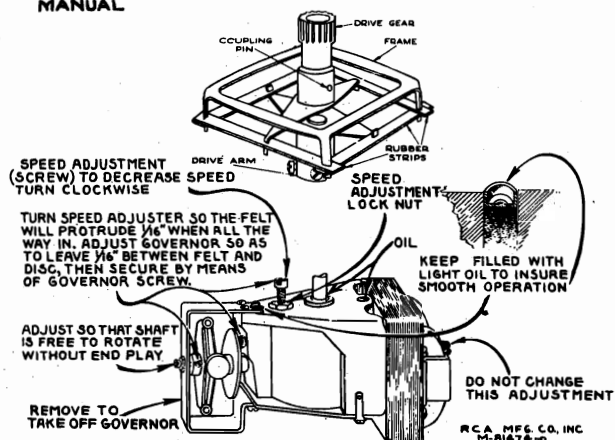
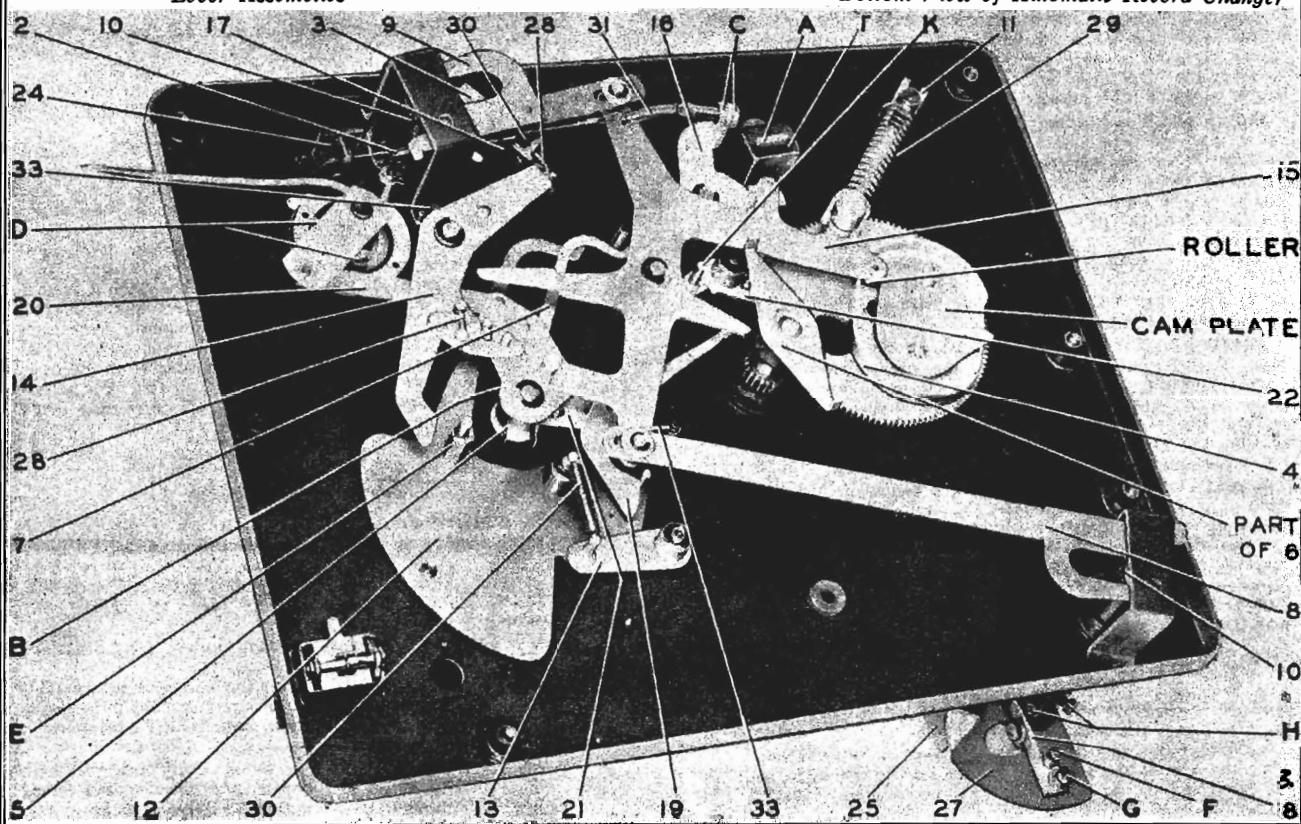
1. For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A".
2. Needle does not land properly on both 10 and 12 inch records—Make complete adjustments "D" and "E".
3. Needle does not land properly on 12 inch record but correct on 10 inch—Effect adjustment "E".
4. Failure to trip at end of record—Increase clutch "5" friction by means of screw "B". Also, see that levers "7" and "12" are free to move without touching each other.
5. Pickup strikes lower record of stack or drags across top record on turntable—Adjust lift cable per adjustment "C".
6. Needle does not track after landing—Friction clutch "5" adjustment "B" may be too tight; bind in tone arm vertical bearing; levers "7" and "12" fouled; or pickup output cable twisted.
7. Cycle commences before record is complete—Record is defective, or adjustment "B" of friction clutch "5" is too tight.
8. Wow in record reproduction—Record is defective; flexible coupling between motor and changer mechanism not correctly assembled; or instrument is not being operated at normal room temperature (65° F).
9. Record knives strike edge of records—Records warped; record edges are rough; or knife adjustments "F" and "G" are incorrect.
10. Record not released properly—Adjust record shelf assemblies in respect to shaft by means of adjustment "H".
11. Needle lands in 10 inch position on 12 inch record or misses record when playing both types mixed—Increase tension of pickup locating lever spring "30".

Chassis, Details

ZENITH RADIO CORP.

MODEL 169-31 Automatic
Record Changer

NOTE: Numbers refer to parts—letters refer to adjustments.

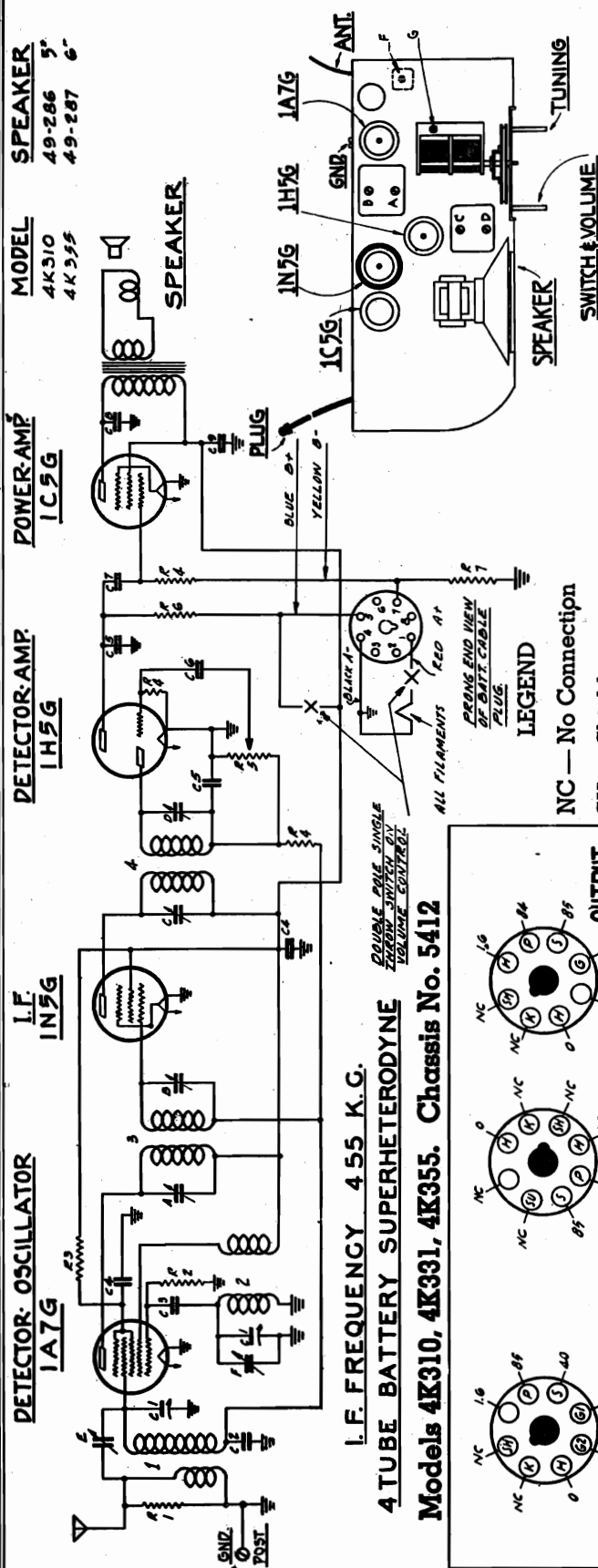
*Details of Record Shelf Posts, and Locating
Lever Assemblies**Motor Data and Coupling**Bottom View of Automatic Record Changer*

Details, Notes

Automatic Operation

- ## Manual Operation

Schematic, Voltage
Alignment, Socket
Trimmers



129-181

Location of tubes and trimmers

DWG. NO.	Part No.	DESCRIPTION
1	5-6704	ANTENNA COIL ASSEMBLY
2	5-6361	OSCILLATOR COIL ASSEMBLY
3	5-6713	1ST I.F. TRANSFORMER
4	5-6714	2ND I.F. TRANSFORMER
5	50-580	SPEAKER TRANS. (ON 5-6713)
1ST I.F. TRANS. PRIMARY		
A		1ST I.F. TRANS. SECONDARY
B		END. 1ST TRANS. PRIMARY
C		END. 1ST TRANS. SECONDARY
D		ANTENNA THINNER
E	22-305	BROADCAST OSC. (ON 6-606)
2 G. GANG VARIABLE		
100Y		.05 MFD
400Y		.0005 MFD
600Y		.0001 MFD
800Y		.01 MFD
400Y		.01 MFD
200Y		.005 MFD
100Y		.005 MFD
B MFD CR. Y. ELAS.		
10W		4700 OHM
10W		100 M OHM
10W		80 M OHM
10W		2.2 MEG OHM
10W		600 M OHM
10W		1 MEG OHM
10W		1000 OHM

NC — No Connection

SH — Shield

H — Heater

P — Plate

S — Screen

G — Grid

SU — Suppressor

D — Diode

K — Cathode

F—Filament

ALIGNMENT PROCEDURE

**All voltages measured using
Zenith No. Z28 battery pack.**

Operation	Connect Test Oscillator to	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	455	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" "	200 Mmfd.	1500	"	1500	G	Align'ment of Ant.

All voltages measured from point indicated to chassis using a 1000 ohm per volt meter.

Antenna disconnected — volume control at minimum and condenser plates in full mesh.

BOTTOM VIEW OF CHASSIS

FRONT OF CHASSIS

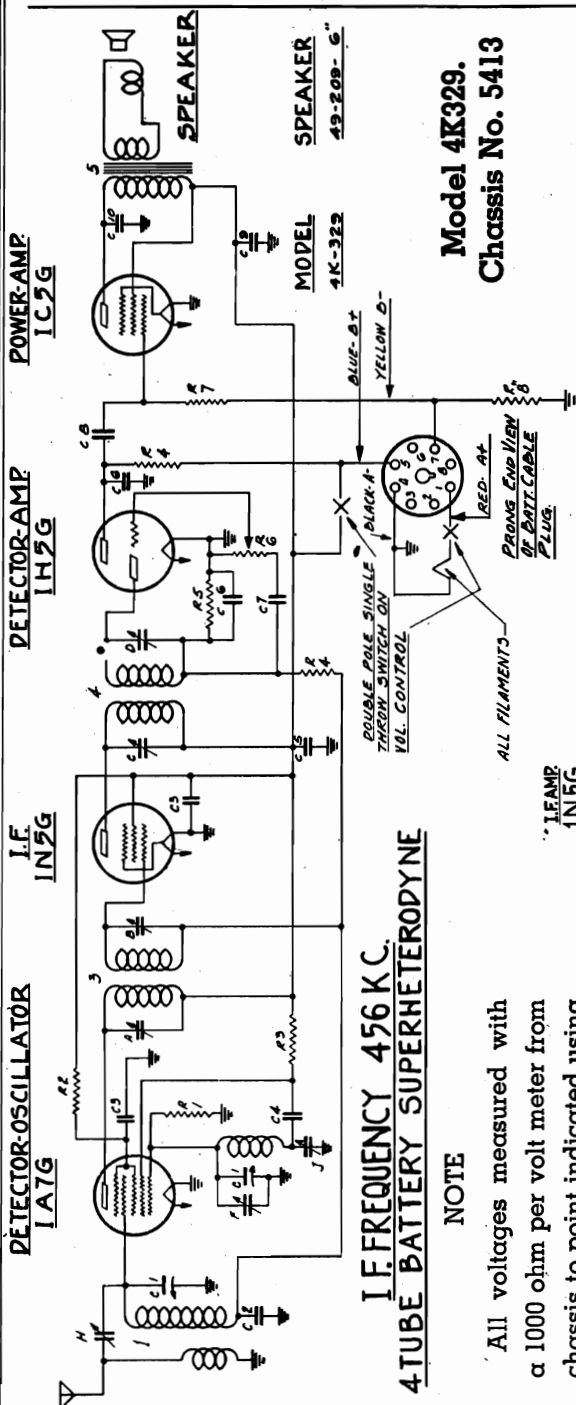
NOTE

MODEL 4K329, Chas. 5413
Schematic, Voltage
Alignment, Socket
Trimmers

ZENITH RADIO CORP.

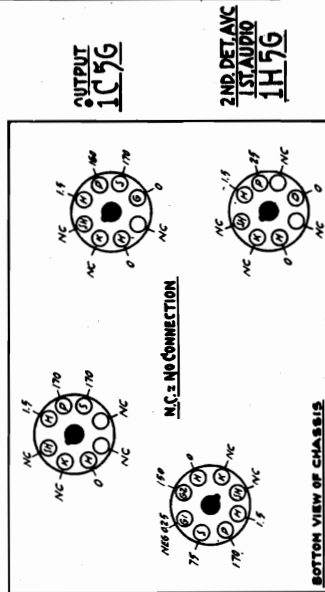
ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	½ Mfd.	456	Br'dc't	600	ABCD	I. F. Algm't.
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Algm't of Ant.
4	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output
5	" " "	200 Mmfd.	1500	"	1500	FG	Rpt. 3 & 4



Model 4K329.
Chassis No. 5413

PART NO.	DESCRIPTION
C-1	22-650 TWO GANG VARIABLE
C-2	22-250 .05 MFD
C-3	22-199 .5 MFD
C-4	22-398 .002 MFD
C-5	22-212 .05 MFD
C-6	22-162 .0001 MFD
C-7	22-327 .02 MFD
C-8	22-160 .02 MFD
C-9	22-404 8 MFD ELECTROLYTIC
C-10	22-492 .002 MFD
R-1	63-325 150 M OHM
R-2	63-594 60 M OHM
R-3	63-530 5000 OHM
R-4	63-271 1 MEG OHM
R-5	63-698 990 M OHM
R-6	63-548 1 MEG OHM VOL CONTROL
R-7	63-600 2.2 MEG OHM
R-8	63-338 1000 OHM
1	51088 ANTENNA COIL ASSEMBLY
2	51100 ANT. COIL & SHIELD ASSEM.
3	51462 OSCILLATOR COIL ASSEM.
4	51479 1ST. I.F. TRANSFORMER
5	51420 2ND I.F. TRANSFORMER
	SPEAKER TRNG. (ON SPEAKER.)
A	11T. I.F. TRANS. PRI.
B	11T. I.F. TRANS. SEC.
C	2ND I.F. TRANS. PRI.
D	2ND I.F. TRANS. SEC.
F	BROADCAST OSCILLATOR
H	ANTENNA BROADCAST
J	OSCILLATOR PRODER.



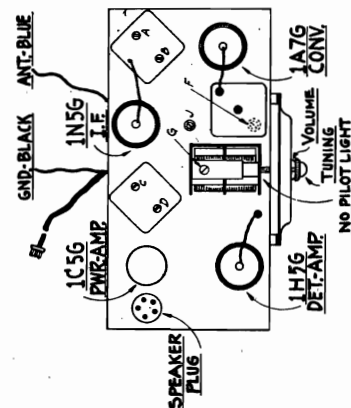
LEGEND
NC — No Connection
SH — Shield
H — Heater
P — Plate
S — Screen
G — Grid
SU — Suppressor
D — Diode
K — Cathode
F — Filament

NOTE

All voltages measured with
a 1000 ohm per volt meter from
chassis to point indicated using
a Z28 battery pack.

Antenna disconnected — vol.
control at minimum and con-
denser plates in full mesh.

DET.-OSC.
1A7G

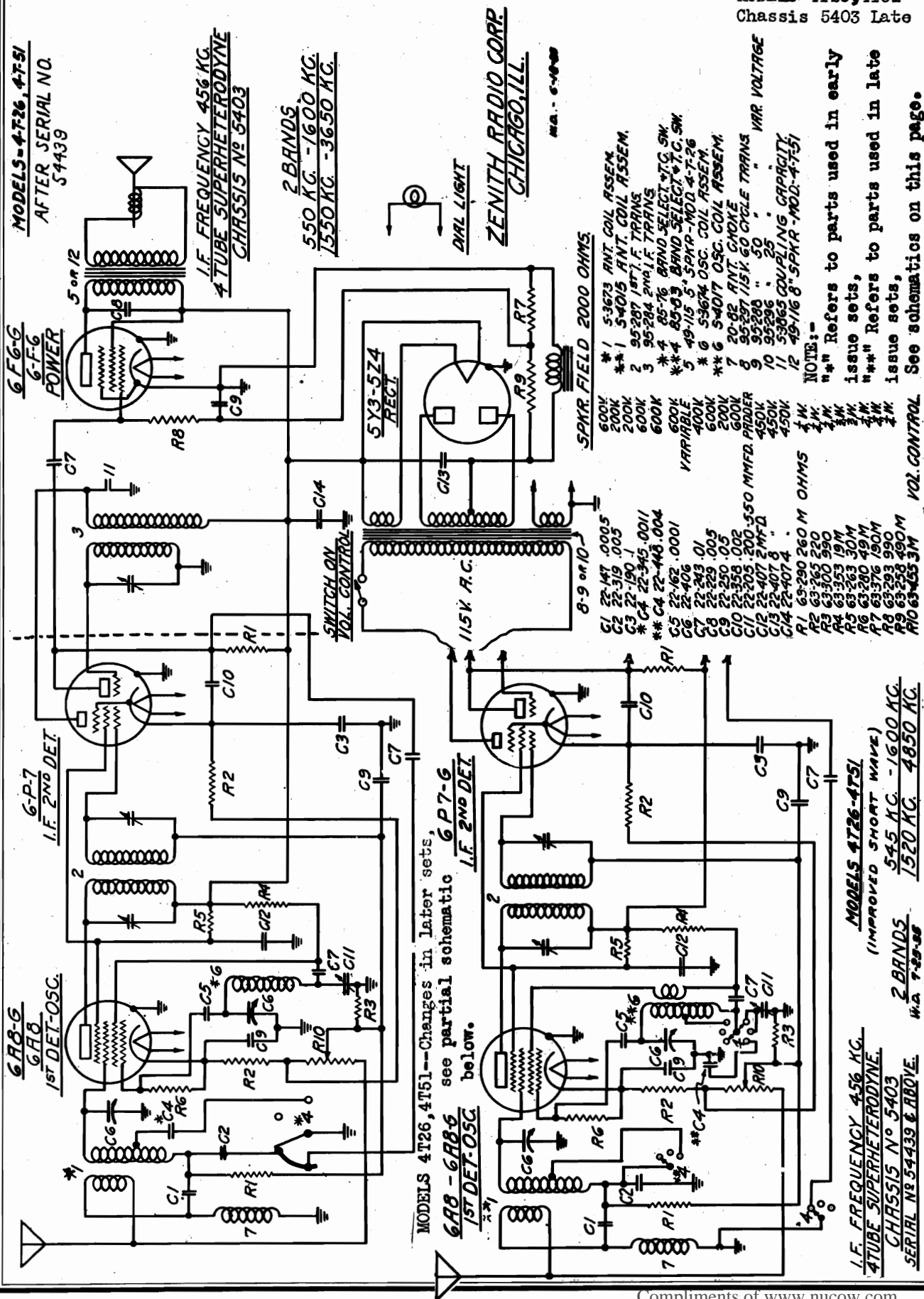


Location of tubes and trimmers

With Improved Short Wave
Schematics, Changes

ZENITH RADIO CORP.

MODELS 4T26,4T51
Chassis 5403 Early
MODELS 4T26,4T51
Chassis 5403 Late



MODELS 4T26, 4T51
Chassis 5403
Early, Late
Alignment, Voltage
Socket, Trimmers

ZENITH RADIO CORP.

Socket Voltages

TUBE	POSITION	1	2	3	4	5	6	7	8	9
6A8	1st Det.		6					6		
	Osc.	0	AC	220	90	6	125	AC	14	0
6P7	I.F.		6							
	2nd Det.	0	AC	0	220	100	100	0	13	0
6F6	PWR	0	0	200	220	-1	-	6	AC	0
					230		230			-
5Y3	Rect.	0	220	-	AC	-	AC	-	220	-

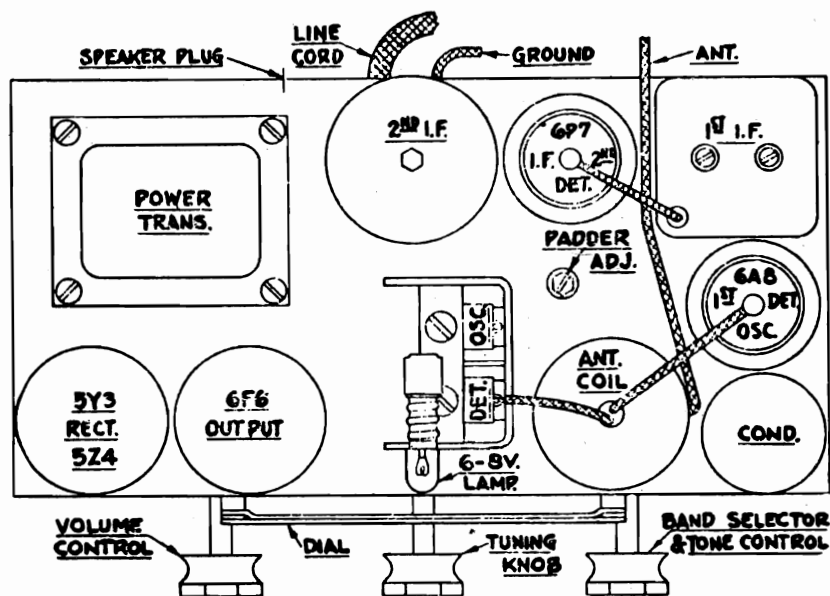
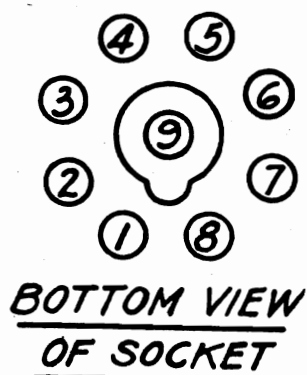
Line Voltage 110

Antenna and Ground
Disconnected.

All voltages measured from point indicated to ground, using a 1000 ohm per volt D.C. meter (unless marked otherwise.)

Alignment

- (1) Balance I.F. transformer at 456 K.C.
- (2) Place switch in left or broadcast position. Set dial pointer at 1500 K.C., and align trimmers on gang to resonance. Align broadcast padder at 540 K.C. slowly rocking pointer past 540 on dial to position giving strongest signal. There are no adjustments for the short wave band.

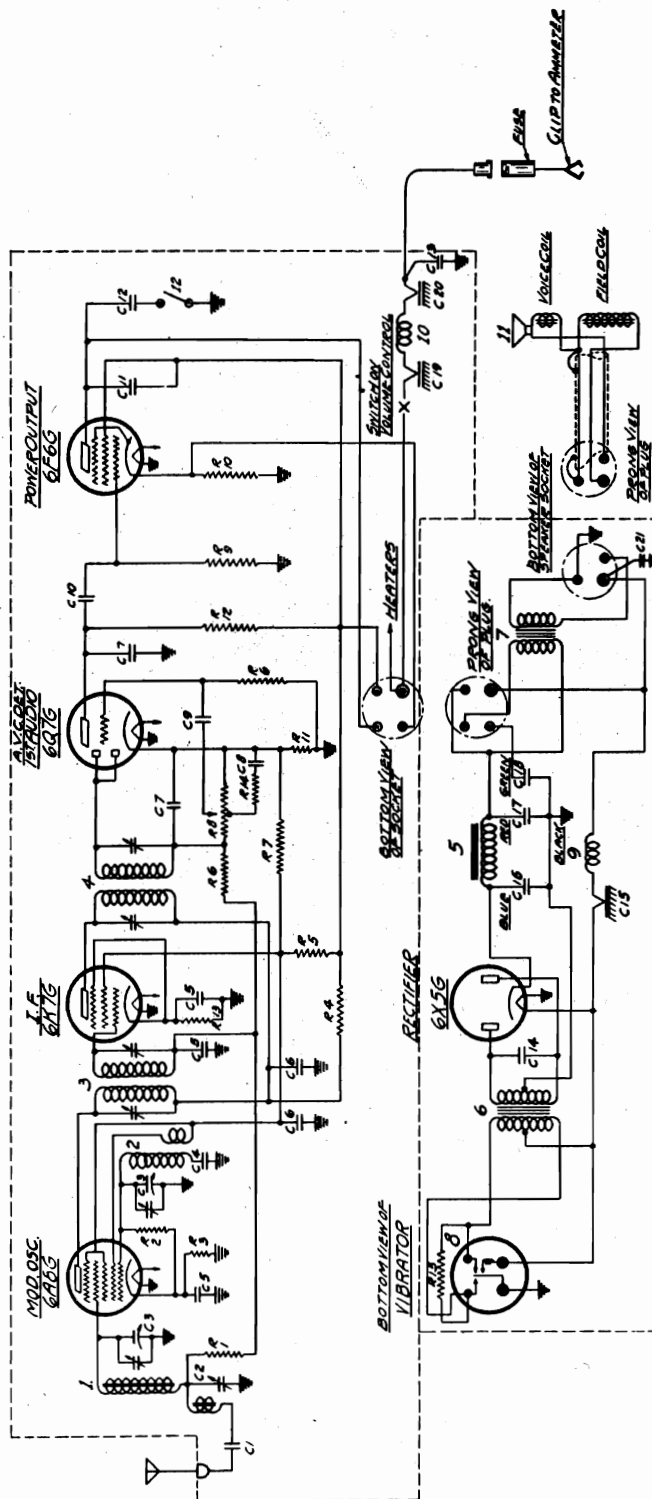


ZENITH RADIO CORP.

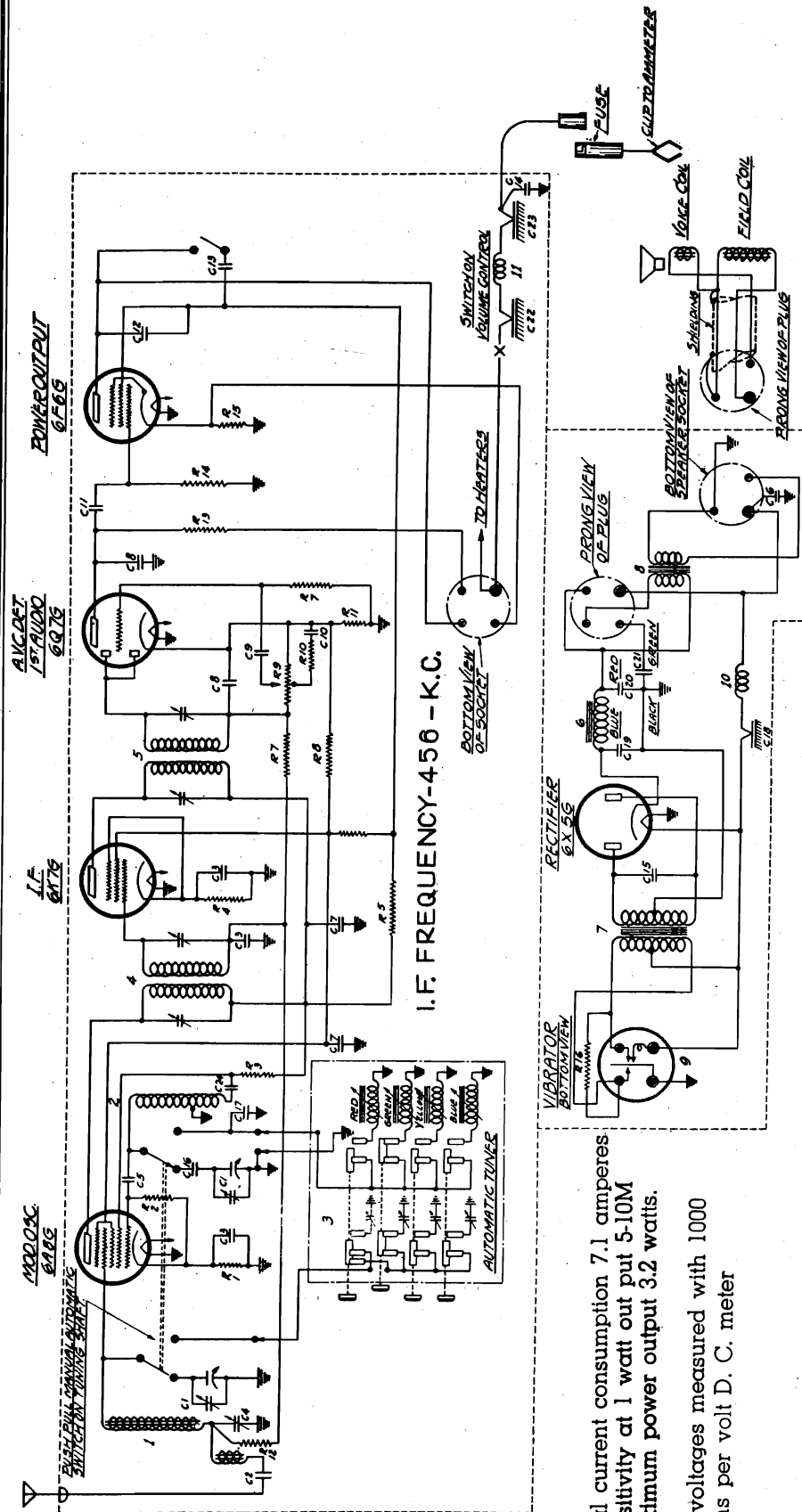
MODEL 5M291, Chas. 5527
Schematic

I.F. FREQUENCY-455-K.C.

MODEL-5-M-291 CHASSIS-5527

ZENITH RADIO CORPORATION
CHICAGO, ILL.

PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
C 1	22-219	R 12	61-725
C 2	22-245	R 13	61-725
C 3	22-245	R 14	61-725
C 4	22-245	R 15	61-725
C 5	22-245	R 16	61-725
C 6	22-245	R 17	61-725
C 7	22-245	R 18	61-725
C 8	22-245	R 19	61-725
C 9	22-245	R 20	61-725
C 10	22-245	R 21	61-725
C 11	22-245	R 22	61-725
C 12	22-245	R 23	61-725
C 13	22-245	R 24	61-725
C 14	22-245	R 25	61-725
C 15	22-245	R 26	61-725
C 16	22-245	R 27	61-725
C 17	22-245	R 28	61-725
C 18	22-245	R 29	61-725
C 19	22-245	R 30	61-725
C 20	22-245	R 31	61-725
C 21	22-245	R 32	61-725
C 22	22-245	R 33	61-725
C 23	22-245	R 34	61-725
C 24	22-245	R 35	61-725
C 25	22-245	R 36	61-725
C 26	22-245	R 37	61-725
C 27	22-245	R 38	61-725
C 28	22-245	R 39	61-725
C 29	22-245	R 40	61-725
C 30	22-245	R 41	61-725
C 31	22-245	R 42	61-725
C 32	22-245	R 43	61-725
C 33	22-245	R 44	61-725
C 34	22-245	R 45	61-725
C 35	22-245	R 46	61-725
C 36	22-245	R 47	61-725
C 37	22-245	R 48	61-725
C 38	22-245	R 49	61-725
C 39	22-245	R 50	61-725
C 40	22-245	R 51	61-725
C 41	22-245	R 52	61-725
C 42	22-245	R 53	61-725
C 43	22-245	R 54	61-725
C 44	22-245	R 55	61-725
C 45	22-245	R 56	61-725
C 46	22-245	R 57	61-725
C 47	22-245	R 58	61-725
C 48	22-245	R 59	61-725
C 49	22-245	R 60	61-725
C 50	22-245	R 61	61-725
C 51	22-245	R 62	61-725
C 52	22-245	R 63	61-725
C 53	22-245	R 64	61-725
C 54	22-245	R 65	61-725
C 55	22-245	R 66	61-725
C 56	22-245	R 67	61-725
C 57	22-245	R 68	61-725
C 58	22-245	R 69	61-725
C 59	22-245	R 70	61-725
C 60	22-245	R 71	61-725
C 61	22-245	R 72	61-725
C 62	22-245	R 73	61-725
C 63	22-245	R 74	61-725
C 64	22-245	R 75	61-725
C 65	22-245	R 76	61-725
C 66	22-245	R 77	61-725
C 67	22-245	R 78	61-725
C 68	22-245	R 79	61-725
C 69	22-245	R 80	61-725
C 70	22-245	R 81	61-725
C 71	22-245	R 82	61-725
C 72	22-245	R 83	61-725
C 73	22-245	R 84	61-725
C 74	22-245	R 85	61-725
C 75	22-245	R 86	61-725
C 76	22-245	R 87	61-725
C 77	22-245	R 88	61-725
C 78	22-245	R 89	61-725
C 79	22-245	R 90	61-725
C 80	22-245	R 91	61-725
C 81	22-245	R 92	61-725
C 82	22-245	R 93	61-725
C 83	22-245	R 94	61-725
C 84	22-245	R 95	61-725
C 85	22-245	R 96	61-725
C 86	22-245	R 97	61-725
C 87	22-245	R 98	61-725
C 88	22-245	R 99	61-725
C 89	22-245	R 100	61-725



Total current consumption 7.1 amperes
Sensitivity at 1 watt out put 5-10M
Maximum power output 3.2 watts.

All voltages measured with 1000 ohms per volt D. C. meter

[illegible]

MODELS 5A318, 5A325
Chassis 5532A
Voltage, Tuner Data
Socket

ZENITH RADIO CORP.

MODEL 5S313B
Chassis 5535BT
Socket, Voltage

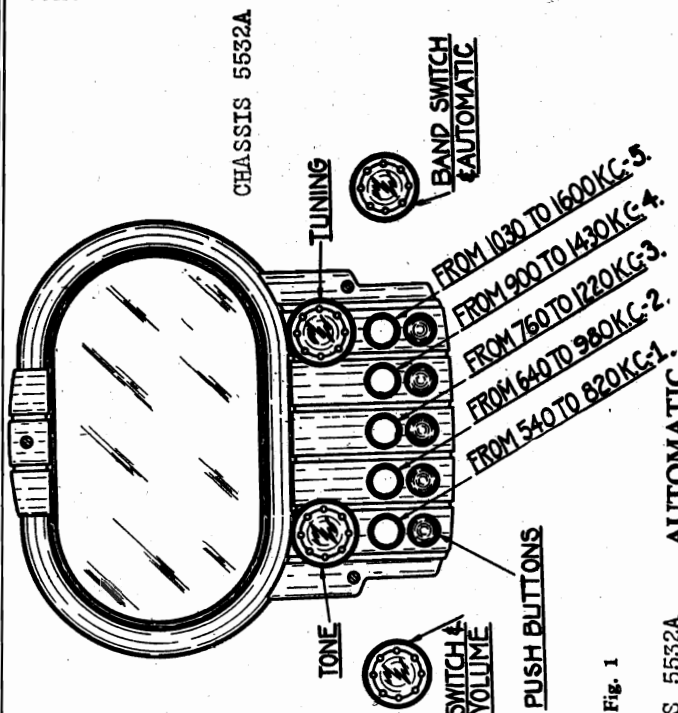


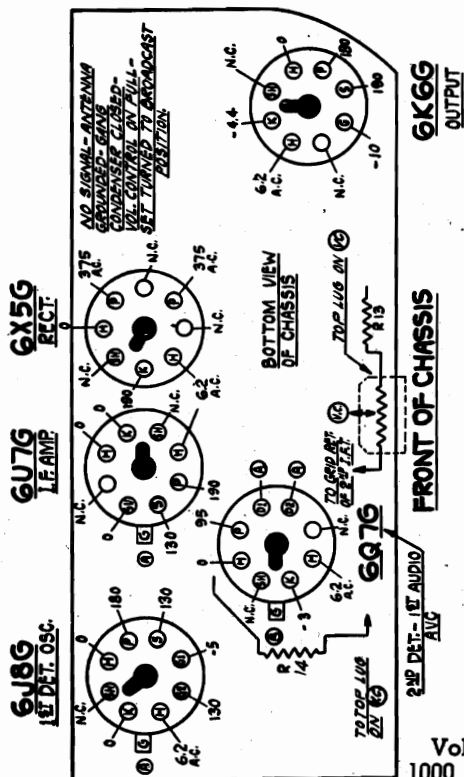
Fig. 1

CHASSIS 5532A AUTOMATIC

Set the buttons for automatic operation proceed as follows:

1. Select a station in the tuning range of the No. 1 button.
2. Place the band switch on BROADCAST and tune this station manually in the conventional manner.
3. Set the band switch to the AUTOMATIC position and press No. 1 button.
4. Remove the cap above the button by inserting a pin or your finger nail under the edge and pulling out.
5. Turn the exposed screw in either direction until the previously selected station is heard. (Recheck by switching back to BROADCAST.) Adjust the screw very carefully for best tone, greatest freedom from noise, and maximum volume.
6. Replace cap and cut the call letters of the station from the call sheet furnished with the receiver. Wet the rear surface of the tab, and place it in the space provided on the cap.
7. Follow the above operations in setting the remaining four buttons.
8. The call letter sheets should be preserved for use in the event it is desired to change any of the buttons to some other station.

CHASSIS 5535BT SOCKET VOLTAGES



(A) Bias for 6J8G—6U7G and diodes of 6Q7G measured across resistor R14.

(B) Bias for triode section of 6Q7G and 6K6G measured across R13 and R14.

Voltages measured with a 1000 ohm per volt meter from chassis to socket contacts. Antenna disconnected — volume control on full.

Line voltage 115 v.

LEGEND: N.C.—No Connections; S.H.—Shield; H.—Heater; P.—Plate; S.—Screen; S.U.—Suppressor Grid; G.—Grid; D.I. Diode; K.—Cathode.

AVC. DET. AMP. 6Q7G
I.F. 6U7G
POWER-AMP. 6K6G
OUTPUT

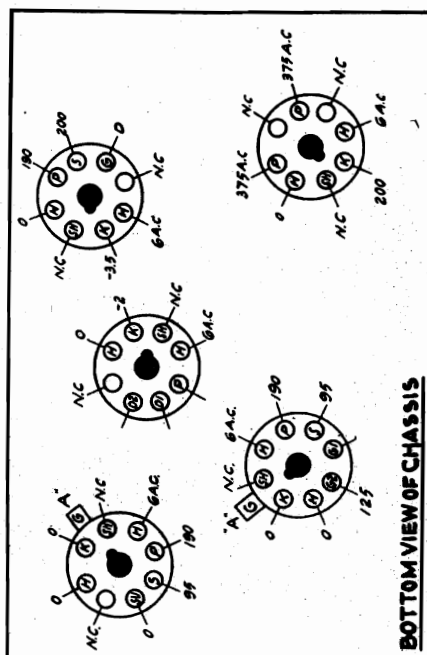


Fig. 3 CHASSIS 5532A

REC. 6X5G
FRONT OF CHASSIS

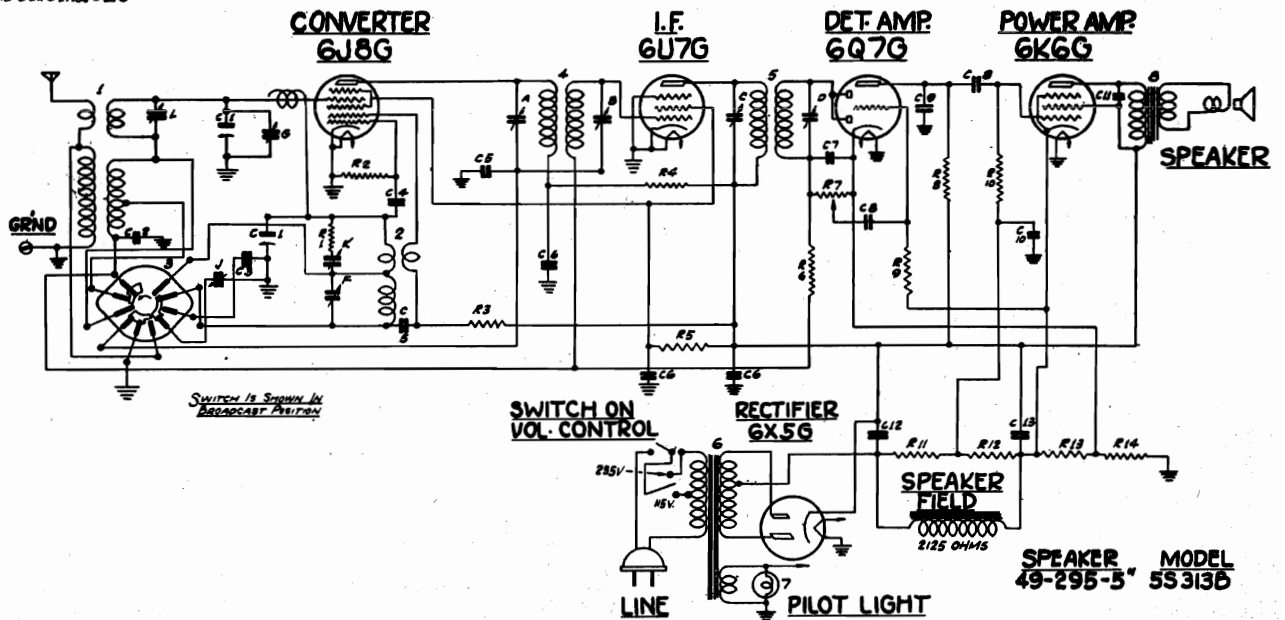
All Voltage is taken with a 1000 ohm per volt meter from point indicated to ground. Line Volts 115 A.C. Vol. at minimum, no ant. Band sw on manual Broadcast position. NOTE "A" Grid Bias for 6U7G and 6V8G is—2 V. measured at "K" of 6Q7G.

CONV. 6J8G

MODEL 55313B
Chassis 5535BT
Schematic

ZENITH RADIO CORP.

MODELS 5A318, 5A325
Chassis 5532A
Schematic



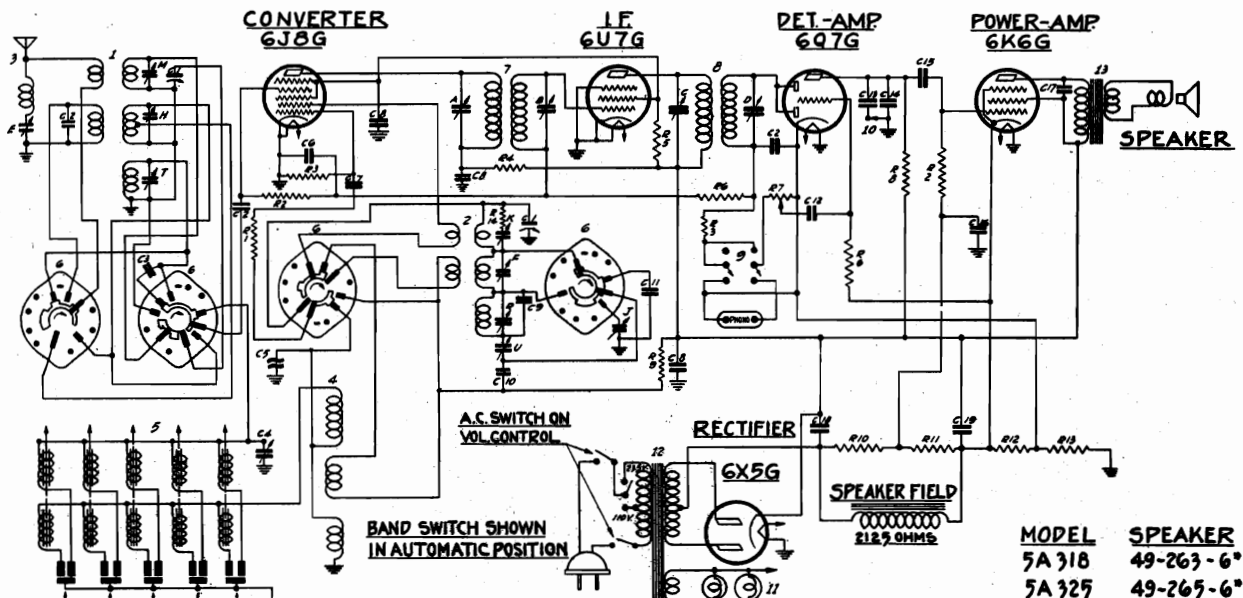
DWG. NO.	PART NO.	DESCRIPTION	DWG. NO.	PART NO.	DESCRIPTION	DWG. NO.	PART NO.	DESCRIPTION
C-1	22-832	2ND GANG VAR.	R-2	63-593	47M OHMS	3	65-182	BAND SWITCH
C-2	22-818	25MFD	R-3	63-1014	15M OHMS	4	95-393	1ST I.F. TRANSFORMER
C-3	22-889	50 MFD	R-4	63-605	1000 OHMS	5	95-396	2ND I.F. TRANSFORMER
C-4	22-859	100MFD	R-5	63-608	12M OHMS	6	95-570	POWER TRANSFORMER
C-5	22-819	100MFD	R-6	63-600	2.2 MEGOHMS	7	100-36	PILOT LIGHT 250-0.3V
C-6	22-819	100MFD	R-7	63-1027	VOLUME CONTROL	8		SPEAKER TRANS.
C-7	22-182	100MFD	R-8	63-296	220M OHMS	9		1ST I.F. TRANS. PRI.
C-8	22-811	5MFD	R-9	63-271	1MEG OHM	10		1ST I.F. TRANS. SEC.
C-9	22-147	100MFD	R-10	63-597	470M OHMS	11		2ND I.F. TRANS. PRI.
C-10	22-824	5MFD	R-11	63-658	900M OHMS	12		2ND I.F. TRANS. SEC.
C-11	22-812	100MFD	R-12	63-260	100M OHMS	13		BROADCAST OSC. (SEE NOTE)
C-12	22-775	BMFD ELECTROLYTIC	R-13	63-563	80 OHMS WIREWOUND	14		ANTENNA BRD. (ON GANG)
C-13	22-776	BMFD ELECTROLYTIC	R-14	63-606	150 OHMS WIRE WOUND	15		BROADCAST PADDERS
						16		SHORT WAVE OSC. (SEE NOTE)
						17		SHORT WAVE DETECTOR
A-1	63-625	82 OHMS	1	5-4874	ANTENNA COIL ASSY.	K		
			2	5-4875	OSCILLATOR COIL ASSY.	L		

NOTE: TRIMMERS #1-K MOUNTED ON BAKELITE STRIP #22-754

L.F. FREQUENCY 455 KC.
5 TUBE SUPERHETERODYNE
CHASSIS No 5535 BT
ZENITH RADIO CORPORATION
CHICAGO, ILL.

Total power consumption 45 watts.

Power output 3.5 watts.



DWG. NO.	PART NO.	DESCRIPTION	DWG. NO.	PART NO.	DESCRIPTION	DWG. NO.	PART NO.	DESCRIPTION
C-1	22-183	2ND GANG ADJUSTABLE	R-1	63-625	80 OHMS	10	20-798	CONVERSION COIL
C-2	22-182	100MFD	R-2	63-187	470 OHMS	11	91-174	1ST I.F. TRANS. SEC.
C-3	22-183	100MFD	R-3	63-193	47 OHMS	12	91-175	2ND I.F. TRANS. SEC.
C-4	22-519	TRIMMER CONDENSER	R-4	63-593	1000 OHMS	13	95-574	1ST I.F. TRANS. PRI.
C-5	22-761	COMPENSATING COND.	R-5	63-593	1000 OHMS	14	95-575	2ND I.F. TRANS. PRI.
C-6	22-127	25 MFD	R-6	63-271	1MEG OHM	15	95-576	2ND I.F. TRANS. SEC.
C-7	22-171	10 MFD	R-7	63-271	1MEG OHM	16	95-577	BROADCAST OSC. (SEE NOTE)
C-8	22-782	100MFD	R-8	63-271	1MEG OHM	17	95-578	ANTENNA BRD. (ON GANG)
C-9	22-559	100MFD	R-9	63-271	1MEG OHM	18	95-579	BROADCAST PADDERS
C-10	22-183	100MFD	R-10	63-121	15 OHMS	19	95-580	SHORT WAVE OSC. (SEE NOTE)
C-11	22-183	100MFD	R-11	63-121	15 OHMS	20	95-581	SHORT WAVE DETECTOR
C-12	22-183	100MFD	R-12	63-121	15 OHMS	21	95-582	SHORT WAVE DETECTOR
C-13	22-183	100MFD	R-13	63-121	15 OHMS	22	95-583	SHORT WAVE DETECTOR
C-14	22-183	100MFD	R-14	63-121	15 OHMS	23	95-584	SHORT WAVE DETECTOR
C-15	22-183	100MFD	R-15	63-121	15 OHMS	24	95-585	SHORT WAVE DETECTOR
C-16	22-183	100MFD	R-16	63-121	15 OHMS	25	95-586	SHORT WAVE DETECTOR
C-17	22-183	100MFD	R-17	63-121	15 OHMS	26	95-587	SHORT WAVE DETECTOR
C-18	22-183	100MFD	R-18	63-121	15 OHMS	27	95-588	SHORT WAVE DETECTOR
C-19	22-183	100MFD	R-19	63-121	15 OHMS	28	95-589	SHORT WAVE DETECTOR

Total power consumption 45 watts.

Power output 3.0 watts.

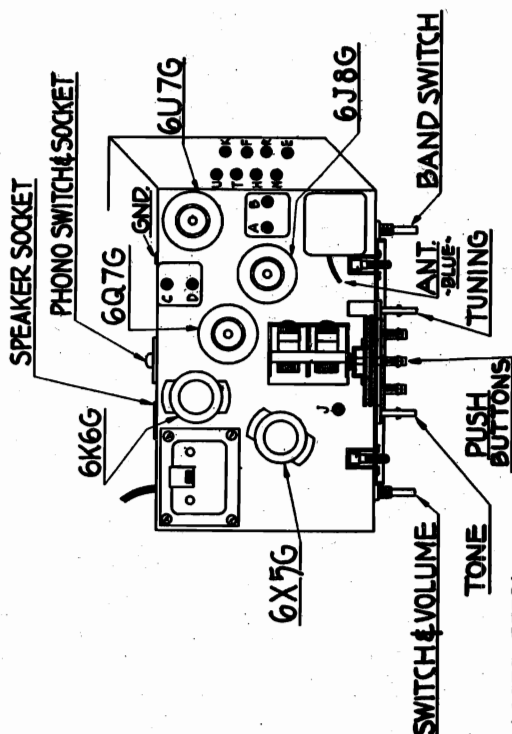
L.F. FREQUENCY 455 KC.
5 TUBE SUPERHETERODYNE
CHASSIS No 5532-A
ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS

MODELS 5A318, 5A325
Chassis 5532A
MODEL 5S313B
Chassis 5535BT
Alignment, Socket
Trimmers

ZENITH RADIO CORP.

UNDER NO CIRCUMSTANCES SHOULD THIS RECEIVER BE CONNECTED TO DIRECT CURRENT (D.C.).

Chassis 5532A only is designed to operate on 25 to 100 cycle alternating current (A.C.) and may be adjusted for use on either 110 or 235 Volt power lines by means of the switch on top of the power transformer. The proper position of the switch for either voltage is marked on the transformer case.



CHASSIS 5532A

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to— (Meters)	Wave Band	Set Dial to— (Meters)	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	660	Med.	500	ABCD	I.F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	660	Med.	500	E	See Note
3	Rec. Ant. Lead	200 Mmfd.	200	Med.	200	F	Set Osc. to Scale
4	Rec. Ant. Lead	200 Mmfd.	200	Med.	200	H	Align. of Antenna
5	Rec. Ant. Lead	200 Mmfd.	500	Med.	500	J	Rock gang & adj. for max. output
6	Rec. Ant. Lead	200 Mmfd.		Med.		FH	Repeat 3 & 4
7	Rec. Ant. Lead	200 Mmfd.	800	Long	800	R	Set Osc. to Scale
8	Rec. Ant. Lead	200 Mmfd.	800	Long	800	T	Align. of Antenna
9	Rec. Ant. Lead	200 Mmfd.	1900	Long	1900	U	Rock gang & adj. for max. output
10	Rec. Ant. Lead	200 Mmfd.		Long		RT	Repeat 7 & 8
11	Rec. Ant. Lead	400 Ohms	17	Short	17	K	Set Osc. to Scale
12	Rec. Ant. Lead	400 Ohms	17	Short	17	M	Align. of Antenna

NOTE: If receiver is used in location subject to code interference adjust wave trap (E) for minimum interference with antenna, connected and receiver operating in Medium Wave position.

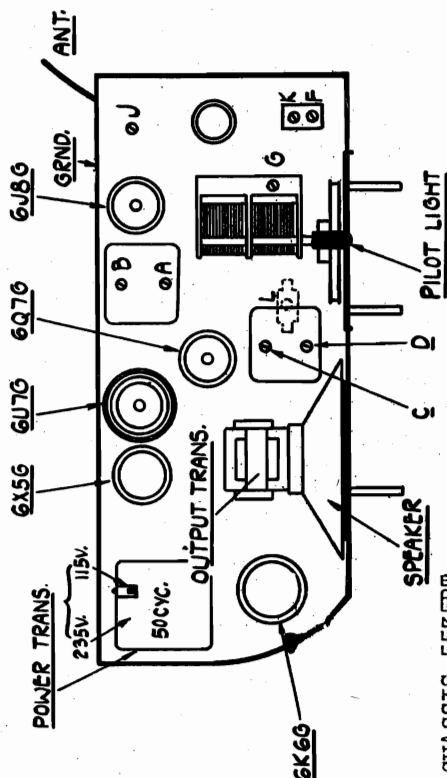
5 Tube A.C. receiver—Chassis No. 5535BT

GENERAL

This receiver is a modern five tube superheterodyne with a dual tuning range covering frequencies between 18.2 to 5.4 megacycles and 540 to 1750 kilocycles. The tuning is explained under "Operation."

UNDER NO CIRCUMSTANCES SHOULD THIS RECEIVER BE CONNECTED TO DIRECT CURRENT (D.C.).

This receiver is designed to operate on 50 to 100 cycle alternating current (A.C.) and may be adjusted for use on either 110 or 235 Volt power lines by means of the switch on top of the power transformer. The proper position of the switch for either voltage is marked on the transformer case.



CHASSIS 5535BT

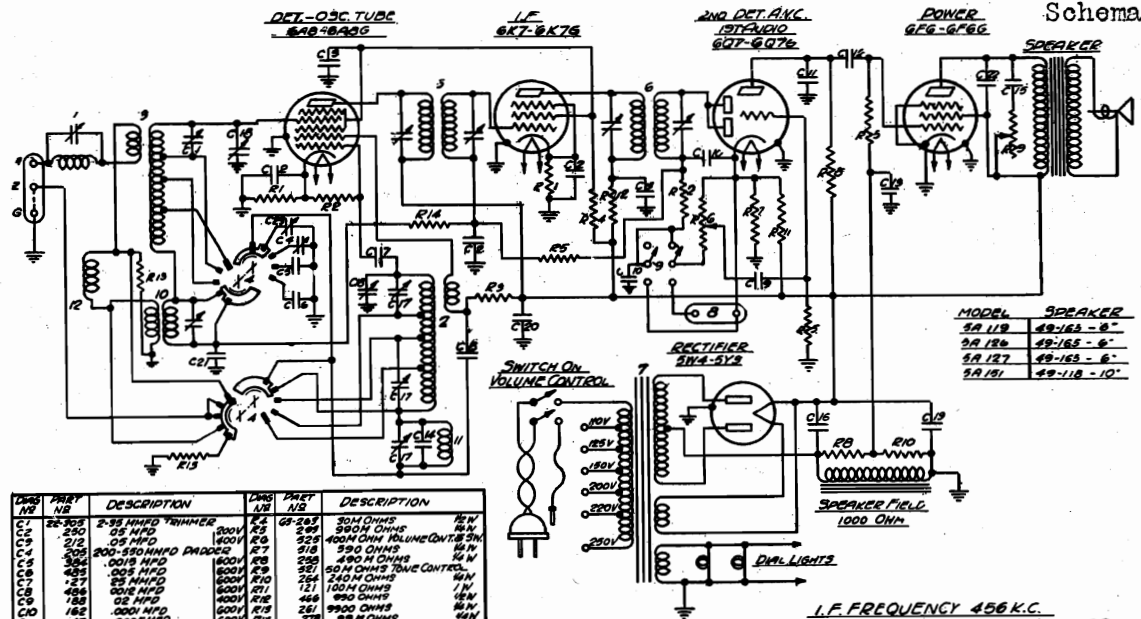
ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to—	Dummy Antenna	Set Test Osc. to—	Band	Set Dial at Trimmers	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	455	Br'dc't	500	ABCD	I.F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	1500	Br'dc't	1500	F	Set Osc. to Scale
3	Rec. Ant. Lead	200 Mmfd.	1500	Br'dc't	1500	G	Align. of Ant.
4	Rec. Ant. Lead	200 Mmfd.	600	Br'dc't	600	J	Rock gang & adj. for max. output
5	Rec. Ant. Lead	200 Mmfd.	1500	Br'dc't	1500	F & G	Repeat 2 & 3
6	Rec. Ant. Lead	400 ohms	18000	S. W.	18000	K	Set Osc. to Scale
7	Rec. Ant. Lead	400 ohms	18000	S. W.	18000	L	Rock gang & adj. for max. output

ZENITH RADIO CORP.

MODELS 5A119, 5A126
5A127, 5A151, Ch. 5517A
MODELS 5L228, 5L237
Chassis 5525A

Schematics



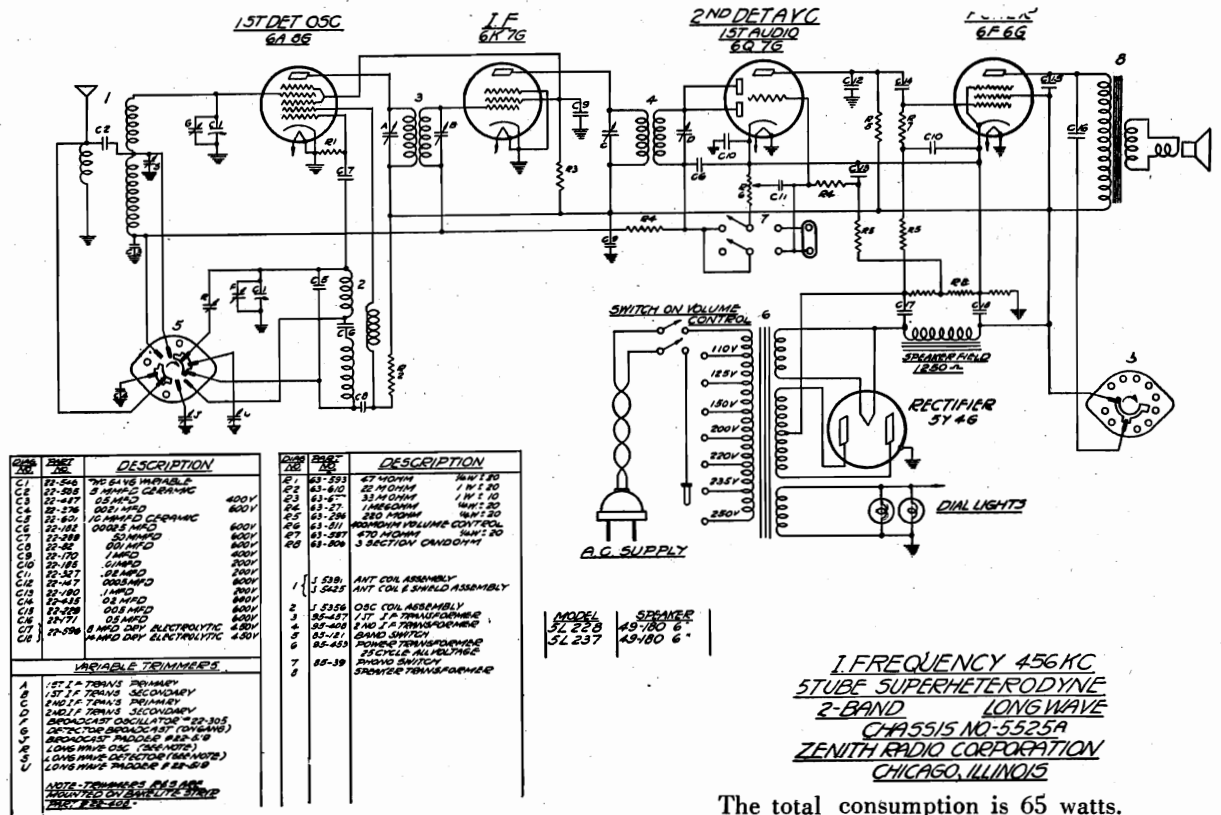
MODEL	SPEAKER
5A 119	49-162 - 6"
5A 126	49-165 - 6"
5A 127	49-165 - 6"
5A 151	49-118 - 10"

L.F. FREQUENCY 456 K.C.
5 TUBE SUPERHETERODYNE - 4 BANDS
CHASSIS NO 5517A

BAND	COLOR	KILOCYCLES
A	Green	492-1640
B	Yellow	1750-6040
C	Red	5520-19000
D	Blue	148-400

The total consumption is 55 watts. Power output 3 watts.

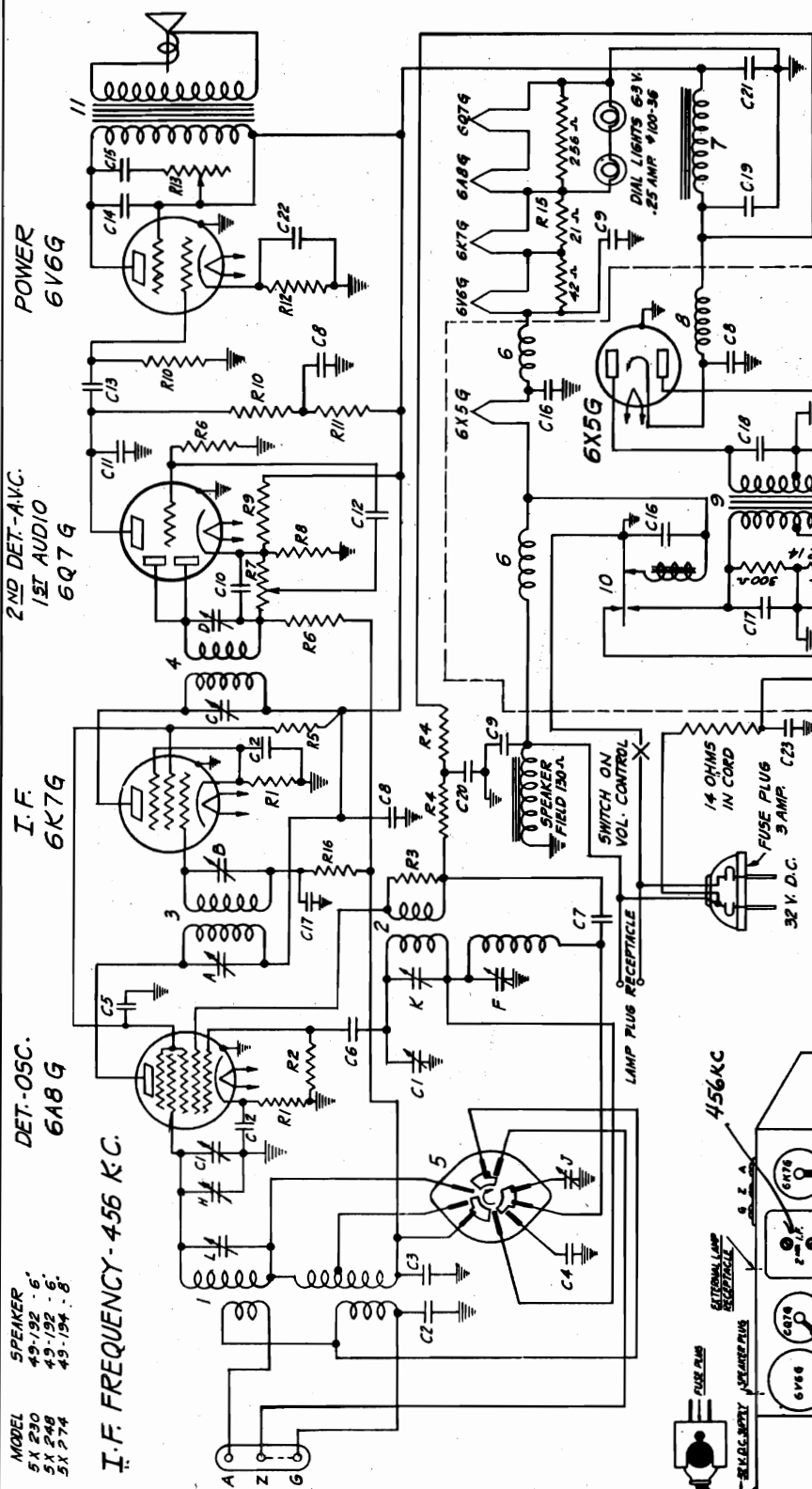
FOR OTHER DATA, SEE INDEX



The total consumption is 65 watts.
Power output 4.5 watts.

MODELS 5X230, 5X248
5X274, Chas. 5523
Schematic, Alignment
Socket, Trimmers

ZENITH RADIO CORP.



MODEL
5X 230
5X 248
5X 274

SPEAKER
49-132 - 6"
49-132 - 6"
49-134 - 8"

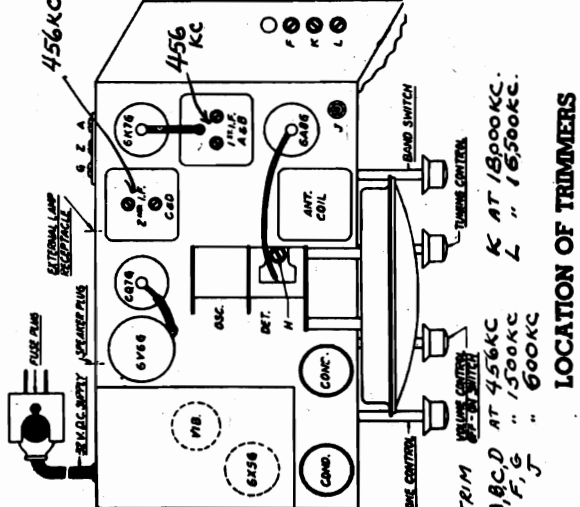
DET.-OSC.
6A8G

I.F.
6K7G

2ND DET.-AVC.
1ST AUDIO
6Q7G

POWER
6V6G

I.F. FREQUENCY-456 KC.



LOCATION OF TRIMMERS

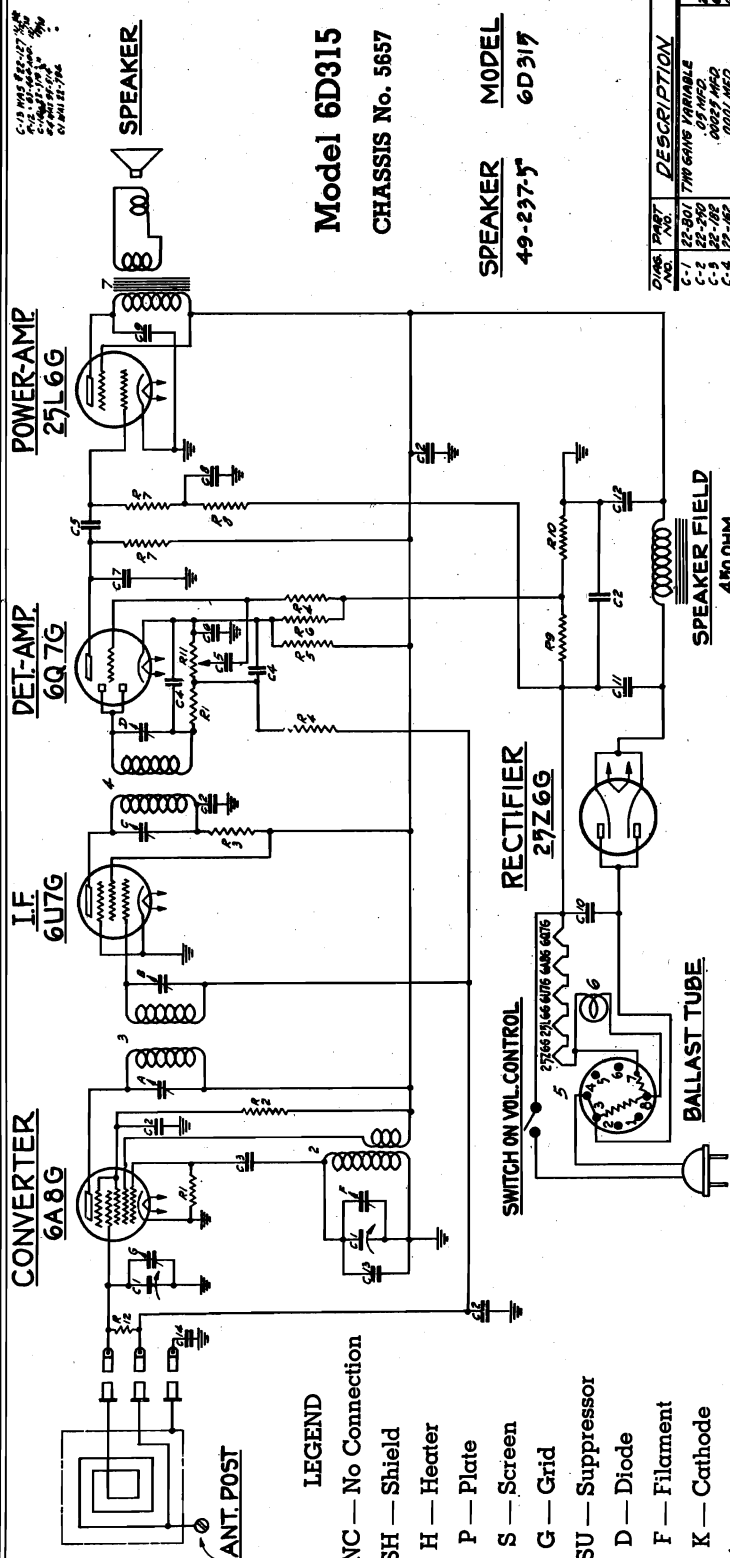
FOR VOLTAGE
SEE INDEX

CONVENTIONAL
ALIGNMENT,
SEE SPECIAL
SECTION
VOL. VII

COMPONENT	VALUE	NOTE
185-112	5-2043	5-2043
6	5-2043	5-2043
7	5-2043	5-2043
8	5-2043	5-2043
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97	5-2043	5-2043
98	5-2043	5-2043
99	5-2043	5-2043
100	5-2043	5-2043

ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	455	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Lead	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
3	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.



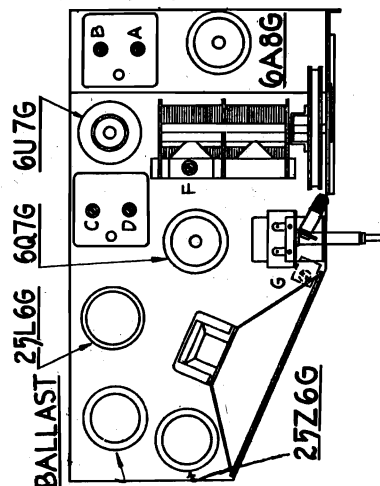
I.F. FREQUENCY-455 K.C.
6-TUBE SUPERHETERODYNE
CHASSIS N°5657-A.C.DC.

NOTE

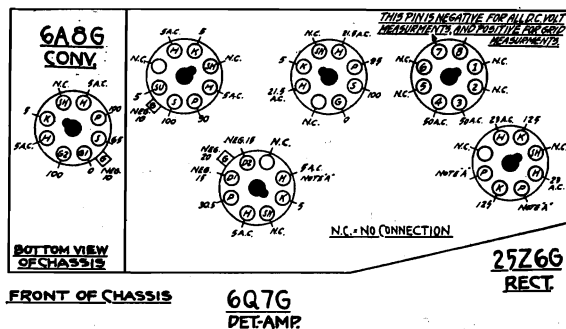
Voltages measured from No. 7 pin on ballast tube to point indicated using a 1000 ohm per volt meter. Vol. control at minimum. Antenna disconnected.

All filament voltages measured across each respective tube, using a 0-30 A.C. voltmeter.

(A) Plate voltage of 25Z6 shows 110 v. A.C. measured from plate of 25Z6 to No. 7 pin of 6Q7 socket.



Location of tubes and trimmers

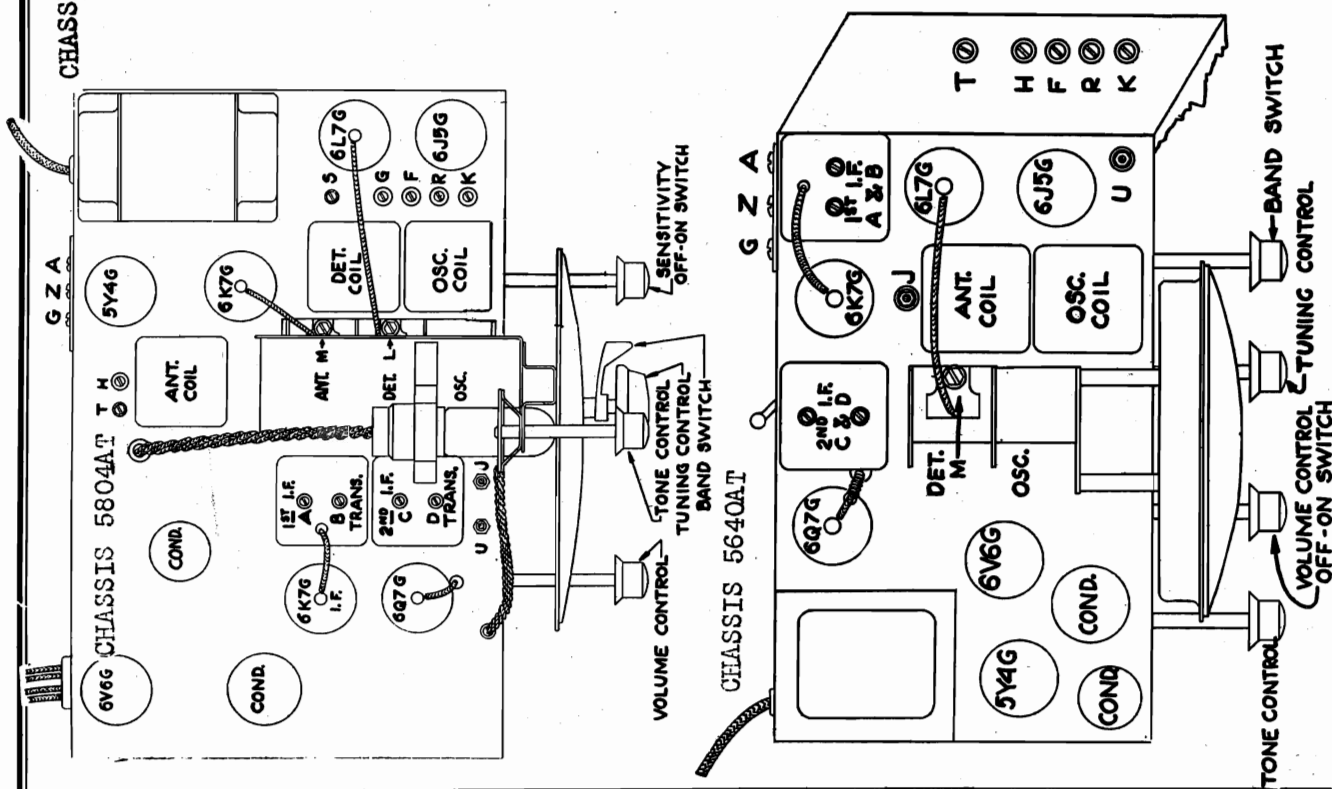


Alignment Procedure

CHASSIS 5640AT AND 5804AT

Operation	Sig. Gen. Connected to	Dummy	Gen. Freq.	Band Switch	Receiver Dial	Trimmer	Remarks:
1	1st Det. Grid	$\frac{1}{2}$ mfd	456	Med. Wave	550KC	ABCD	I F Alignment
2	Rec. Ant. Post	400 Ohms	18000	S. W.	18000	K	Set. Osc. To Scale
3	Rec. Ant. Post	400 Ohms	18000	S. W.	18000	L-M	Rock Gang While Adj. for Max. Output
4	Rec. Ant. Post	200 mfd.	1500	Med. Wave	1500	F	Set. Osc. to Scale
5	" " "	200 "	1500	" "	1500	G-H	Adjust for Max. Output
6	" " "	200 "	550	" "	550	J	Rock Gang while Adjusting for Maximum Output
7	" " "	200 "	1500	" "	1500	F-G-H	Repeat 4 & 5
8	" " "	200 "	400	L. W.	400	R	Set. Osc. to Scale
9	" " "	200 "	400	L. W.	400	S-T	Adjust for Max. Output
10	" " "	200 "	166.7	L. W.	166.7	U	Rock Gang While Adjusting for max. Output
11	" " "	200 "	400	L. W.	400	R-S-T	Repeat 8 & 9

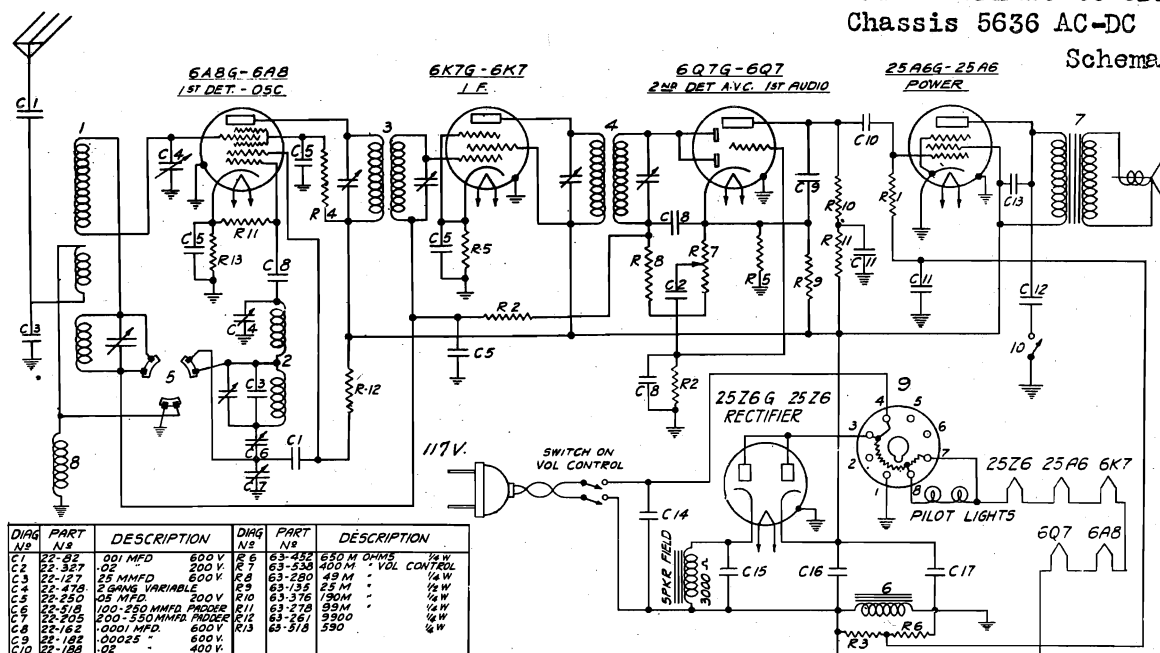
MODEL CHASSIS 5804A ONLY



ZENITH RADIO CORP.

MODELS 6A203, 6A223, 6A229
6A239, 6A241, Ch. 564QAT
MODELS 6DL120 to 6DL122
Chassis 5636 AC-DC

Schematics



DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C1	22-32	.001 MFD 600V	R6	63-352	350 OHMS 1/4W
C2	22-327	.02 MFD 200V	R7	63-353	400 OHMS VOL CONTROL
C3	22-127	25 MMFD 600V	R8	63-280	49 M 1/4W
C4	22-478	2 BAND VARIABLE	R9	63-132	25 M 1/4W
C5	22-250	.05 MFD 200V	R10	63-376	150M 1/4W
C6	22-518	100-250 MMFD PRODER	R11	63-278	95M 1/4W
C7	22-205	200-550 MMFD PRODER	R12	63-261	3500 1/4W
C8	22-162	1000 MFD 600V	R13	63-518	550 1/4W
C9	22-182	.00025 600V			
C10	22-158	.02 400V			
C11	22-150	.1 200V			
C12	22-212	.05 400V			
C13	22-212	.05 600V			
C14	22-453	.01 1200V			
C15	22-517	.1 250V			
C16	22-517	.1 250V			
C17	22-516	.8 250V			
R1	63-290	260M OHMS 1/4W	1	20-144	ANT COIL ASSEMBLY
R2	63-293	350M 1/4W	2	20-145	OSC COIL ASSEMBLY
R3	63-481	400M 1/4W	3	35-378	1ST I.F. TRANS
R4	63-288	1/2M 1/4W	4	35-347	2ND I.F. TRANS
R5	63-362	400 1/4W	5	85-101	BAND SELECT SWITCH
			6	25-345	POWER CHOKES
			7	25-141	SPEAKER
			8	20-88	ANTENNA CHOKES
			9	100-37	BALLAST TUBE (117V)
			10	85-102	TOUCH CONTROL SWITCH

MODEL	SPEAKER
6DL120	49-141 5
6DL121	49-141 5
6DL122	49-141 5

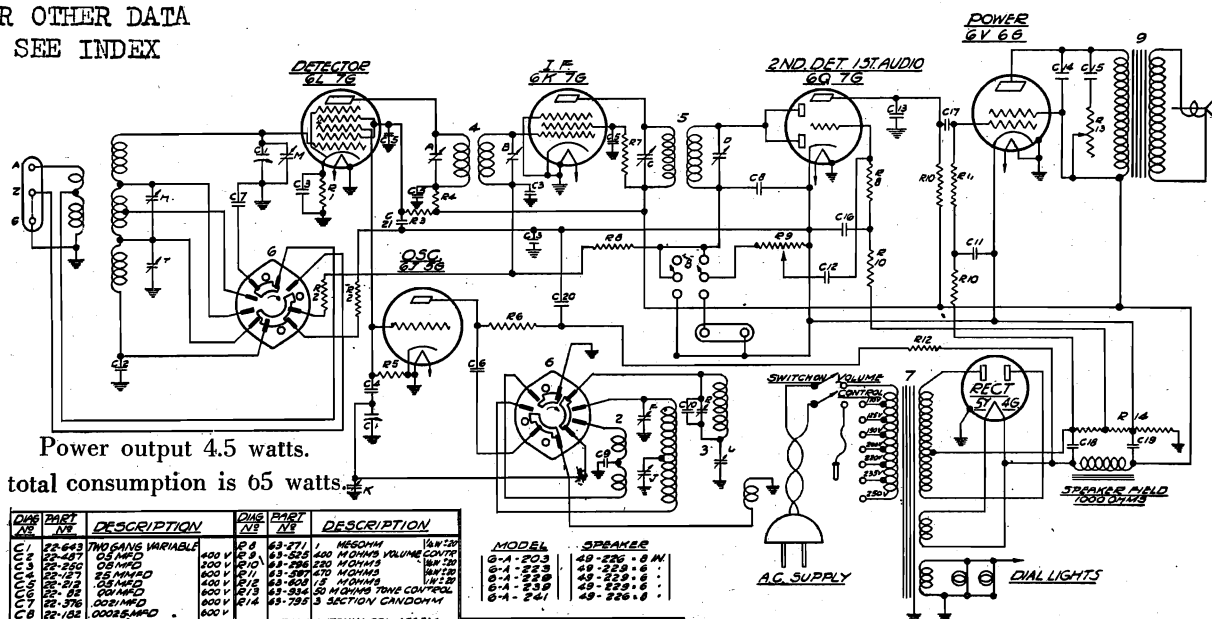
I.F. FREQUENCY 456 KC
6 TUBE SUPERHETERODYNE
CHASSIS NO 5636 AC-DC

ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS

Power Output 15 watts.

Current Consumption 44 watts

FOR OTHER DATA
SEE INDEX



Power output 4.5 watts.

The total consumption is 65 watts.

DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
C1	22-443	2 BAND VARIABLE	R1	63-271	1 MEG OHM 1/4W
C2	22-407	.02 MFD 400V	R2	63-525	400 OHMS VOLUME CONTR
C3	22-250	.05 MFD 200V	R3	63-296	250 OHMS 1/4W
C4	22-518	100-250 MMFD PRODER	R4	63-376	150M 1/4W
C5	22-205	200-550 MMFD PRODER	R5	63-278	95M 1/4W
C6	22-162	1000 MFD 600V	R6	63-261	3500 1/4W
C7	22-182	.00025 MFD 600V			
C8	22-158	.02 400V			
C9	22-150	.1 200V			
C10	22-212	.05 400V			
C11	22-212	.05 600V			
C12	22-453	.01 1200V			
C13	22-517	.1 250V			
C14	22-517	.1 250V			
C15	22-516	.8 250V			
R1	63-290	260M OHMS 1/4W	1	20-144	ANT COIL ASSEMBLY
R2	63-293	350M 1/4W	2	20-145	OSC COIL ASSEMBLY
R3	63-481	400M 1/4W	3	35-378	1ST I.F. TRANS
R4	63-288	1/2M 1/4W	4	35-347	2ND I.F. TRANS
R5	63-362	400 1/4W	5	85-101	BAND SELECT SWITCH
			6	25-345	POWER CHOKES
			7	25-141	SPEAKER
			8	20-88	ANTENNA CHOKES
			9	100-37	BALLAST TUBE (117V)
			10	85-102	TOUCH CONTROL SWITCH

MODEL	SPEAKER
6A-203	49-226 8 W
6A-223	49-226 8 W
6A-229	49-226 8 W
6A-239	49-226 8 W
6A-241	49-226 8 W

VARIABLE TRIMMERS	
A	1ST I.F. TRANS. PRIMARY
B	1ST I.F. TRANS. SECONDARY
C	2ND I.F. TRANS. PRIMARY
D	2ND I.F. TRANS. SECONDARY
E	BROADCAST OSC. (SEE NOTE)
F	ANT. BROADCAST (SEE NOTE)
G	25-518 BROADCAST PRODER
H	25-518 BROADCAST PRODER
I	25-518 BROADCAST PRODER
J	25-518 BROADCAST PRODER
K	25-518 BROADCAST PRODER
L	25-518 BROADCAST PRODER

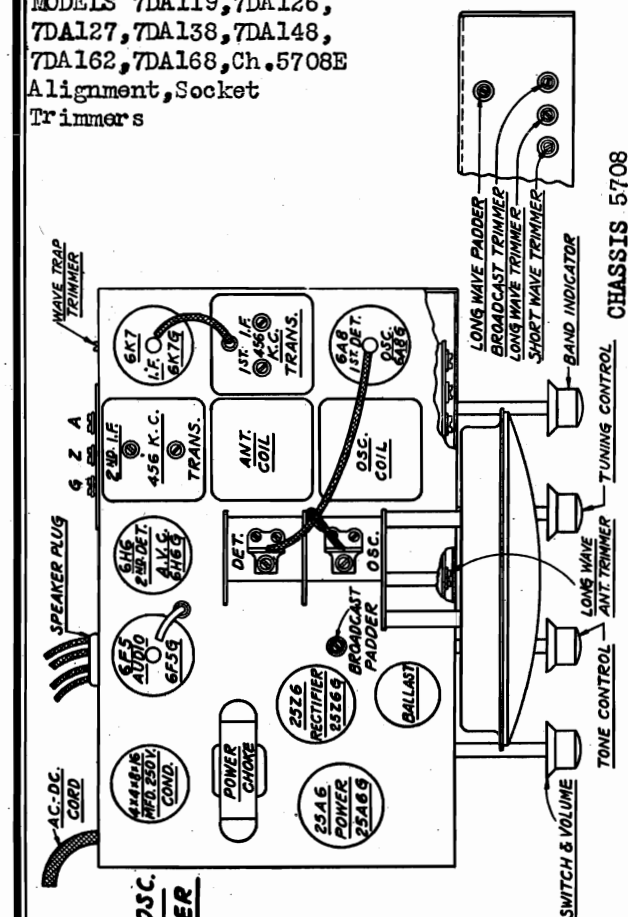
NOTE:
TRIMMERS F-H & J
ARE EQUIPPED ON
SPECIAL ORDER
REF-66

I.F. FREQUENCY 456 KC
6 TUBE SUPERHETERODYNE
CHASSIS NO 5640 AT
3 BAND LONG WAVE

ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS

BAND	KILOCYCLES
A	411 — 150
B	1538 — 432
C	23077 — 5660

CHASSIS 5708



ALIGNMENT PROCEDURE

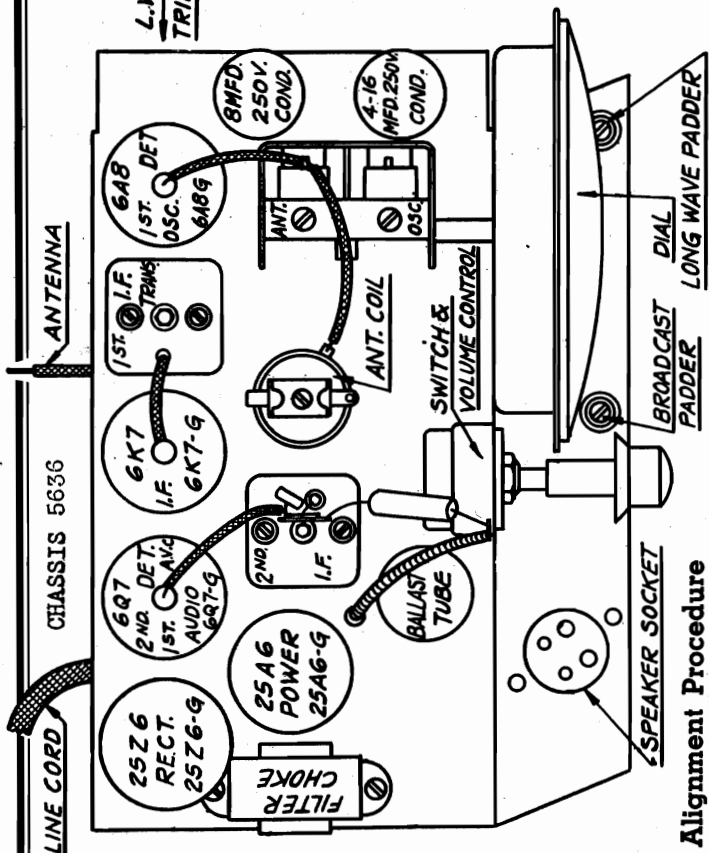
- (11) Connect the output leads of the signal generator to the grid of the first detector and receiver chassis. Also connect an output meter across the speaker transformer leads.
- (12) Set the signal generator at 456 K.C. and carefully adjust the four I.F. trimmers to the point giving the highest reading of the output meter. These adjustments should be repeated several times to secure the greatest accuracy.

All adjustments should be made using as weak an output from the signal generator as possible in order to prevent the A.V.C. action from affecting the output readings.

- (3) Change the signal generator leads to the antenna and chassis of the receiver.
- (4) Adjust the wave trap (located on rear of chassis) for minimum output reading.
- (5) Set signal generator at 6 Mc.C. Switch receiver to band B and adjust osc. trimmer on gang for correct dial reading at 50 meters.
- (6) Set signal generator at 1400 K.C. Switch receiver to band A and adjust broadcast trimmer (see diagram) for correct dial reading at 215 meters. Also adjust det. trimmer on gang for greatest output reading.
- (7) Set signal generator to 600 K.C. and rock pointer past 500 meters on dial while adjusting the broadcast paddler (adjacent to gang) to combination giving the greatest output reading.
- (8) Repeat operation No. 6.

(8) Repeat operation No. 6.

- (9) Set the signal generator at 17 M.C. Switch the receiver to band C and adjust the short wave trimmer while rocking pointer past 17.5 meters on dial to combination giving the greatest output.
- (10) Set the signal generator at 375 K.C. Switch receiver to Band D and adjust the long wave trimmer for correct dial reading at 800 meters. Also adjust the long wave trimmer to resonance.
- (11) Set the signal generator at 167 K.C. Rock the pointer past 1800 meters on dial and adjust the long wave paddor to point giving the highest output.
- (12) Repeat operation No. 10.



Alignment Procedure

- (1) Connect the output leads of the signal generator to the grid of the first detector and receiver ground. Also connect an output meter across the speaker transformer leads.

- (2) Set the signal generator at 456 K. C. and carefully adjust the four I. F. trimmers to the point giving the highest reading of the output meter. These adjustments should be repeated several times to secure the greatest accuracy.

All adjustments should be made using as weak an output from the signal generator as possible in order to prevent the A.V.C. action from affecting the output readings.

- (3) Change the signal generator leads to the antenna and ground terminals of the receiver.

- (4) Set signal generator at 1500 K. C., switch receiver to broadcast band and adjust oscillator trimmer on gang for correct dial reading at 200 meters. Also adjust antenna trimmer on gang to resonance.

- 5) Set signal generator to 600 K. C. and rock pointer past 500 meters on dial while adjusting the broadcast podder (adjacent to gang) to combination giving the greatest output reading.

- (6) Repeat operation No. 4:

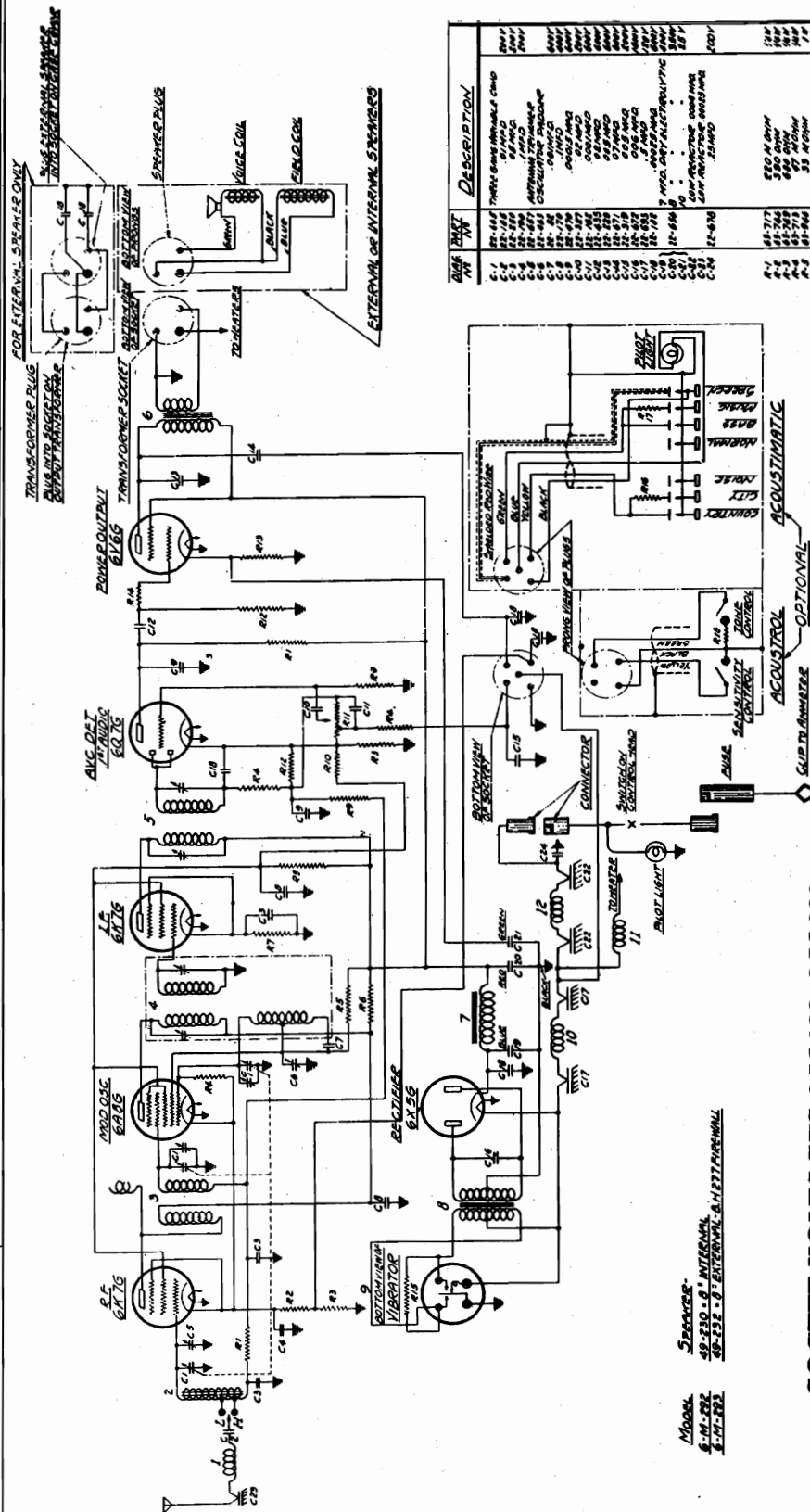
- 7) Set signal generator at 375 K. C. Switch receiver to long wave band and adjust long wave oscillator trimmer (located on oscillator coil underneath chassis) for correct dial reading at 800 meters. Also adjust trimmer on top of coil adjacent to gang for greatest output reading.

- 8) Set the signal generator at 167 K. C. Rock the pointer past 1800 meters on dial and adjust the long wave paddler to point giving the highest output.

- 9) Repeat operation No: 7.

ZENITH RADIO CORP.

MODELS 6M292, 6M293
Chassis 5645
Schematic, Voltage



SOCKET	DESCRIPTION
1	6X7G
2	6A8G
3	6K7G
4	6Q7G
5	6V6G
6	6X5G
7	6X7G
8	6A8G
9	6K7G
10	6Q7G
11	6V6G
12	6X5G
13	6X7G
14	6A8G
15	6K7G
16	6Q7G
17	6V6G
18	6X5G
19	6X7G
20	6A8G
21	6K7G
22	6Q7G
23	6V6G
24	6X5G
25	6X7G
26	6A8G
27	6K7G
28	6Q7G
29	6V6G
30	6X5G
31	6X7G
32	6A8G
33	6K7G
34	6Q7G
35	6V6G
36	6X5G
37	6X7G
38	6A8G
39	6K7G
40	6Q7G
41	6V6G
42	6X5G
43	6X7G
44	6A8G
45	6K7G
46	6Q7G
47	6V6G
48	6X5G
49	6X7G
50	6A8G
51	6K7G
52	6Q7G
53	6V6G
54	6X5G
55	6X7G
56	6A8G
57	6K7G
58	6Q7G
59	6V6G
60	6X5G
61	6X7G
62	6A8G
63	6K7G
64	6Q7G
65	6V6G
66	6X5G
67	6X7G
68	6A8G
69	6K7G
70	6Q7G
71	6V6G
72	6X5G
73	6X7G
74	6A8G
75	6K7G
76	6Q7G
77	6V6G
78	6X5G
79	6X7G
80	6A8G
81	6K7G
82	6Q7G
83	6V6G
84	6X5G
85	6X7G
86	6A8G
87	6K7G
88	6Q7G
89	6V6G
90	6X5G
91	6X7G
92	6A8G
93	6K7G
94	6Q7G
95	6V6G
96	6X5G
97	6X7G
98	6A8G
99	6K7G
100	6Q7G
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102	6X5G
103	6X7G
104	6A8G
105	6K7G
106	6Q7G
107	6V6G
108	6X5G
109	6X7G
110	6A8G
111	6K7G
112	6Q7G
113	6V6G
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117	6K7G
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119	6V6G
120	6X5G
121	6X7G
122	6A8G
123	6K7G
124	6Q7G
125	6V6G
126	6X5G
127	6X7G
128	6A8G
129	6K7G
130	6Q7G
131	6V6G
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133	6X7G
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150	6X5G
151	6X7G
152	6A8G
153	6K7G
154	6Q7G
155	6V6G
156	6X5G
157	6X7G
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159	6K7G
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161	6V6G
162	6X5G
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184	6Q7G
185	6V6G
186	6X5G
187	6X7G
188	6A8G
189	6K7G
190	6Q7G
191	6V6G
192	6X5G
193	6X7G
194	6A8G
195	6K7G
196	6Q7G
197	6V6G
198	6X5G
199	6X7G
200	6A8G

I.F. FREQUENCY

252 ± K.C.

Voltage at Battery 6.3
Voltage at Receiver 6.0
Antenna disconnected

All Voltages measured with 1000 ohm per volt meter
Total current consumption 7.4 amperes
Sensitivity at 1 watt output - 1 microvolt
Maximum power output 6 watts.

SOCKET VOLTAGES 6M-292, 6M-293

Tube	1	2	3	4	5	6	7	8	9
6K7G	0	6.0	250	78	*	—	0	*	
6A8G	0	6.0	250	78	**	132	0	*	
6K7G	0	0	250	78	-3.8	—	6.0	3.5	
6Q7G	0	0	95	0	—	—	6.0	1.6	
6V6G	0	6.0	240	250	—	—	0	11.5	
6X5G	—	0	—	—	—	—	6.0	255	

*Sensitivity position { —4.96 country
—8.0 city
—9.5 noise
**Sensitivity position { —18.5 country
—17.5 city
—15.0 noise

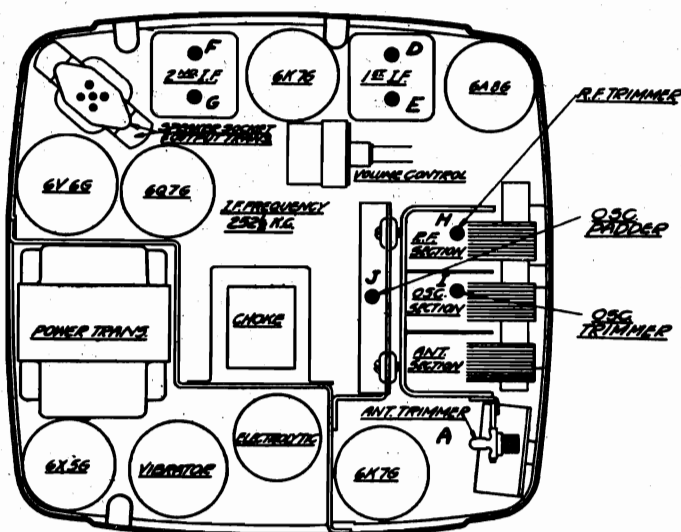
MODELS 6M292, 6M293
 Chassis 5645
 Alignment, Socket
 Trimmers
 MODEL 6M295, Ch. 5650
 Alignment

ZENITH RADIO CORP.

MODELS 6-M-292, 6-M-293, 6-M-295

Operation	Connect Test Oscillator To	Dummy Antenna	Set Test Osc. To	Manual or Automatic Position	Set Gang Cond.	Adjust Trimmers	Purpose
1	1st Det. Grid	½ Mfd.	252.5	Manual	Max. Cap.	DEFG	I. F. Alignment
2	Rec. Ant. Lead	50 Mmfd.	1600	Manual	Min. Cap.	I	Trim Oscillator
3	Rec. Ant. Lead	50 Mmfd.	1400	Manual	1400	AH	Trim Ant. & R. F. Stage
4	Rec. Ant. Lead	50 Mmfd.	600	Manual	600	J	Rock Gang & Adjust Osc. Padder for Max. Output
5	Rec. Ant. Lead	50 Mmfd.	—	Manual	Tune To A Station Around 900 K. C. and Set Dial for Calibration		
6	Rec. Ant. Lead	50 Mmfd.	1000	Automatic	Range #2	Trim Ant. & R.F. of Automatic Unit — Trimmers "B" - "C"	
7	Connect Car Antenna to Set — Tune to Weak Station Around 1400 K. C. — Trim Antenna Trimmer "A" for Maximum Peak Output.						
8	Trim Automatic Antenna Trimmer "B" to Car Antenna on a Weak Station around 1000 K. C. on Range #2.						

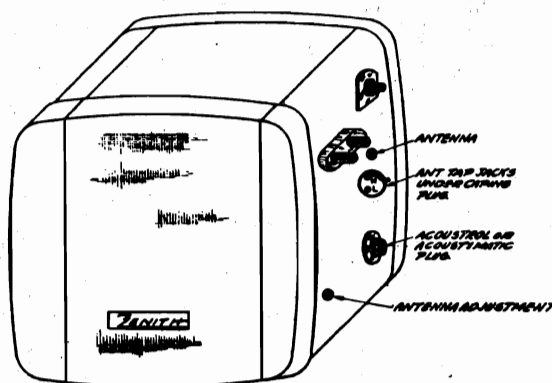
See tube layouts for location of aligning trimmers



6-M-292, 6-M-293

Fig. 7

Tube Position



6-M-292, 6-M-293

Fig. 8

6-M-292, 6-M-293 ANTENNA ALIGNMENT

"L" position, depending on the capacity of the antenna being used. The "H" position must be used for antennas with a capacity in the range of from 100 to 500 mmfd. The "L" connection must be used for low capacity antennas of from 0 to 125 mmfd. Compare this listing with that given under the various antennas, and the proper position will easily be recognized. After selecting the position desired, place the capping plug back over the hole to prevent motor noise from entering into the antenna circuit of the receiver. Connect the antenna proper by means of the Delco-Remy connector shown in Fig. 8.

Fig. 8 shows the location of the antenna tap jacks on the side of the receiver case. Remove the capping plug from over this jack assembly, and insert the antenna pin lead in the "H" or

MODEL 6M295
Chassis 5650
Socket, Trimmers
Antenna Data, Tuner

ZENITH RADIO CORP.

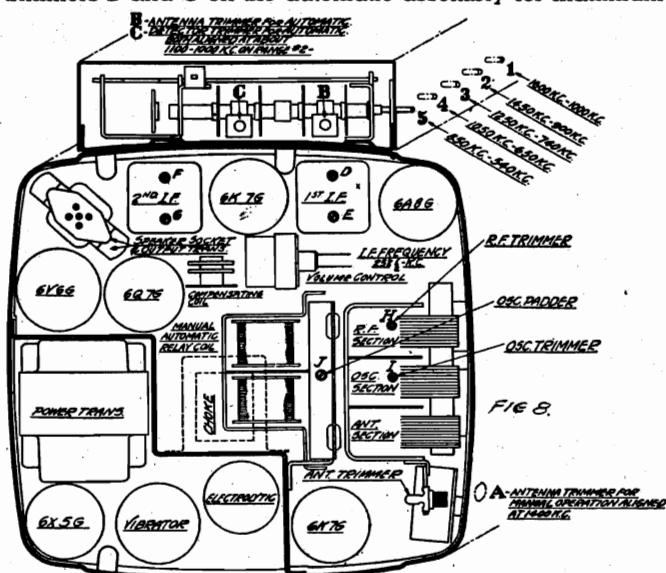
ANTENNA ALIGNMENT

Manual Tuning: Press the MANUAL button on the automatic key board.

This disconnects the automatic system and allows operation of the receiver from the standard tuning mechanism. After adjusting the dial calibration accurately, turn the volume control up full and tune to a weak station near 1400 K.C. Adjust the antenna trimmer A (Fig. 8) to the point of greatest volume. This completes antenna alignment for manual operation. The trimmer does not have to be adjusted at any other point on the dial.

Automatic Tuning: Press automatic button 2 (Fig. 8) This will disconnect the manual tuning mechanism and place the automatic buttons into service. After button 2 has been pressed, turn adjusting screw 2 in either direction until a weak station between 1100 to 1000 K.C. is heard. Now adjust trimmers B and C on the automatic assembly for maximum signal strength of the weak station tuned

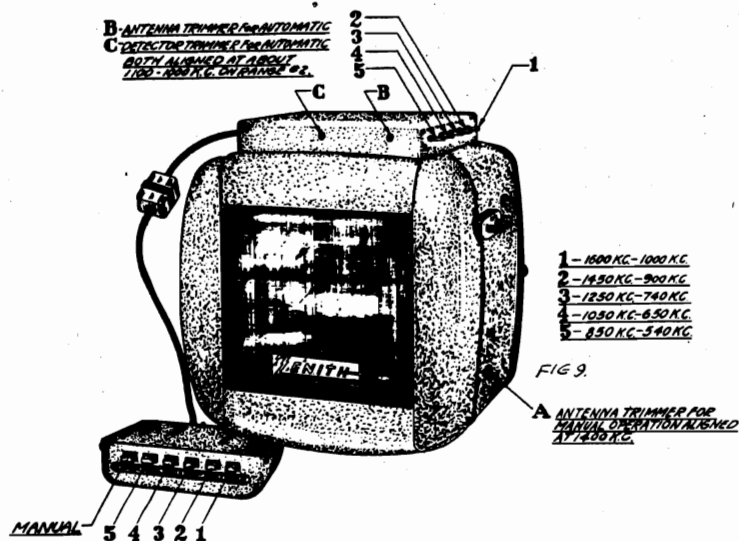
in by the number 2 adjusting screw. The automatic is in complete resonance with the antenna over the entire automatic button range and need not be resonated at any other button setting. Adjusting screw 2 may now be tuned to a local station as outlined under "AUTOMATIC" with no further attention to adjustments B or C.



AUTOMATIC

Study Fig. 8 carefully. Although simple in adjustment, best results will only be obtained if made accurately and by the following procedure.

1. Press button 1. (This button will be on the left if automatic unit is mounted on edge of instrument panel.)
2. Adjust automatic trimmer screw (until a desired local station between 1600 and 1000 K.C. is heard. Turn the screw slowly back and forth over the station as if tuning the dial of a receiver, for clearest reception and best tone quality and allow the screw setting to remain at that point.
3. Press button 2 and tune for a station between 1450 and 900 K.C. on automatic adjusting screw 2.
4. Follow above procedure for buttons 3, 4 and 5 using the ranges shown on Fig. 8.



5. Remove the chrome bezel over the parts adjacent to the automatic buttons and insert the station call letters cut from the sheet supplied. After placing the proper station calls in correct order over the port holes, fasten the escutcheon back in place.

6. Repeat careful adjustment of each automatic trimmer pressing the corresponding button in order from 1 to 5 to obtain best tone, loudest signal and greatest freedom from noise.

A AND A1	540 - 970 KC.
B AND B1	610 - 1100 KC.
C AND C1	675 - 1230 KC.
D AND D1	830 - 1500 KC.
E AND E1	900 - 1600 KC.

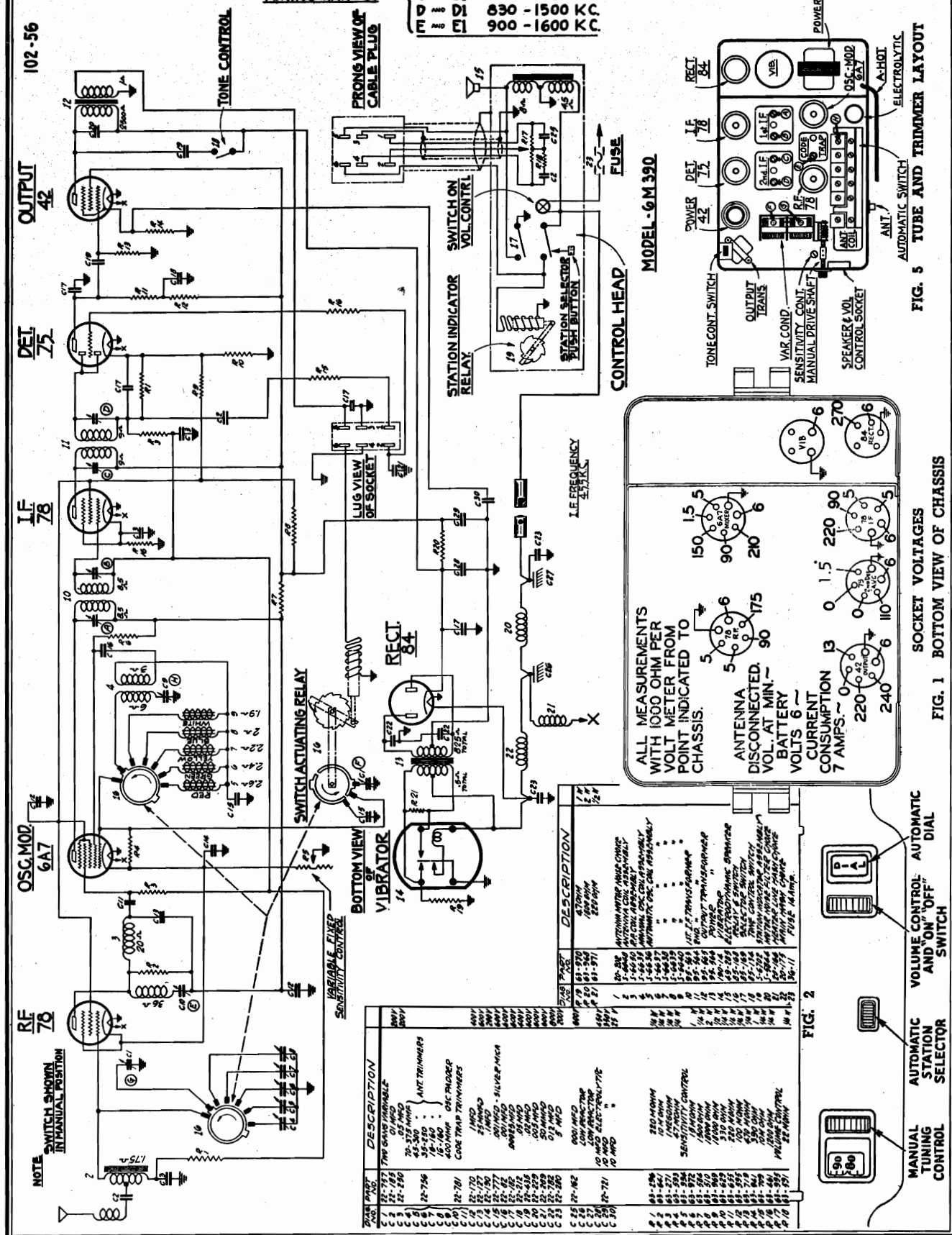


FIG. 5 TUBE AND TRIMMER LAYOUT

SOCKET VOLTAGES

FIG. 2

MODEL 6M390

Alignment, Trimmers

Tuner Data

ZENITH RADIO CORP.

NOTE: This receiver is equipped with a fixed-variable sensitivity control located on the chassis base below the tuning control shaft of the variable condenser. (See Fig. 5.) The control can be adjusted with a screw driver either from above or below the chassis, and is set at the factory to a position which gives a sensitivity of 10 microvolts at 1 watt output. In practice it is found advisable to hold the receiver to this level as any higher sensitivity might result in increased motor noise or excessive background noise. Unless laboratory equipment capable of accurately measuring the input and output of the receiver is available, it is not advisable to alter this setting.

MANUAL DIAL ADJUSTMENT: The manual control dial must be aligned with the receiver for correct calibration. To do this, turn the manual tuning knob in one direction as far as it will go. Now do the same in the opposite direction. Then tune in a station of known frequency, and note if the dial reading corresponds. If the frequency reading is not correct, hold the tuning knob firmly and move the dial drum with your fingers through the bezel to the correct frequency reading of the station being received.

AUTOMATIC DIAL SYNCHRONIZATION: Before setting the station adjusting screws for automatic tuning, it may be necessary to synchronize the automatic dial to the receiver which is done as follows: Turn on the receiver, and try to tune in a station with the manual tuning control. If no station can be picked up, push the automatic station selector button until a position is found where stations can be tuned in manually. Remove the automatic dial assembly by pulling out from the rear and turn the station indicator drum downward until the word "Dial" appears in the opening. The adjusting screws in the receiver can now be resonated for the stations shown around the automatic dial as the automatic button is operated. It is very important that these adjusting screws be set on a weak signal from the station so that the circuit may be sharply tuned. A very short piece of wire used as an antenna will hold down the signal strength. Always be sure the antenna characteristics are similar to actual car conditions. A 38 mmfd. condenser from antenna to ground will provide the necessary input capacity.

AUTOMATIC TUNING ADJUSTMENTS: 1. Turn the receiver on and allow it to operate until thoroughly heated. Loosen the screws holding the cover plate over the automatic adjustments, and slide it upward exposing the adjusting screws and recording strip. This plate is on the front of the receiver. (See Fig. 4.)

2. Push the automatic station selector button until the word "Dial" is at the automatic dial window. Tune in manually the station whose call letters are in the No. 1 position on the dial (the lowest frequency station—see Fig. 3) and note the program so that it can be identified. Push the automatic station selector button once, and this station's call letters will appear at the automatic window.

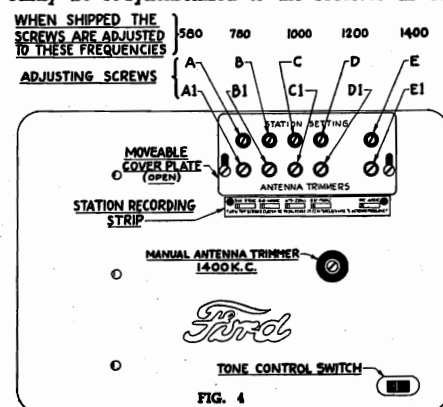
3. With a small screw driver, turn the station setting screw A (see Fig. 4) in the upper row to the right or left until that station is tuned in accurately. Now adjust the corresponding screw A1 in the lower row until maximum volume is obtained. Make these adjustments very carefully as it is quite easy to pass the resonant point due to the unusual selectivity of the receiver.

4. Press the automatic station selector button until "Dial" again is at the automatic window and tune in manually the station whose call letters are in the No. 2 position (the next higher frequency) on the automatic dial. Press the automatic station selector button twice to bring the No. 2 station's call letters in view, and adjust B and B1 screws to this station. Repeat this procedure until each of the five pairs of adjusting screws have been carefully set to their respective stations. It is necessary that the

IMPORTANT: Unless certain dummy antenna capacities are employed with either the signal generator or in making adjustments on stations, the receiver will not respond properly. The values provided in the Zenith dummy antenna unit shown in Fig. 6 are identical with the conditions in the Ford car, and if adjusted accordingly the instrument will operate properly when reinstalled in the automobile. The Zenith dummy antenna S6740 is especially priced at 25c net to service stations, and should be purchased for use in servicing Zenith built Ford receivers.

setting of the adjusting screws be repeated in the order given to be sure that they are properly set for maximum performance.

If the station setup on the automatic tuning dial should appear in the wrong position, the dial can easily be re-synchronized to the receiver as ex-



plained under "Dial Synchronization." If it is necessary to examine the automatic dial mechanism or change call letters it may easily be removed from the speaker housing by pressing the spring catch directly beneath the assembly and pulling out from the rear.

If difficulty is experienced in setting the adjusting screws for the desired station, first turn the antenna trimmer screw down tight, and then adjust the station setting screw (oscillator) to the station, and follow with a readjustment of the antenna trimmer screw for resonance.

ALIGNMENT: I. F. Connect signal generator set at 455 K. C. through .1 mfd. condenser direct to 6A7 grid cap. Adjust I. F. trimmers A, B, C, D, (Fig. 5) to resonance. This should be done with the volume control of the receiver on full, and the generator signal reduced to a weak level.

Wave Trap: Remove signal generator lead from 6A7 grid, and attach to 78 R. F. tube grid. Using the same signal frequency of 455 K. C. carefully adjust the wave trap trimmer E for minimum response with a strong generator signal.

R. F. Press the automatic button to where the "Dial" position shows, or until the set can be tuned manually. Now rotate the manual tuning control until the condenser plates are completely out of mesh. Remove the generator lead from the 78 R. F. tube and connect it direct through a Zenith dummy antenna unit (Zenith part No. S6740) to the antenna socket on the receiver. Set the signal generator to 1580 K. C., and adjust the oscillator trimmer F on the gang condenser to resonance. Reset the signal generator to 1400 K. C. turn the dial until the signal is heard and adjust the gang condenser trimmer G to maximum response. Reset the signal generator to 600 K. C., and again turn the manual dial until the signal is heard. Rock the condenser gang slightly while adjusting padder H to maximum response at this point.

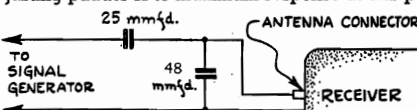


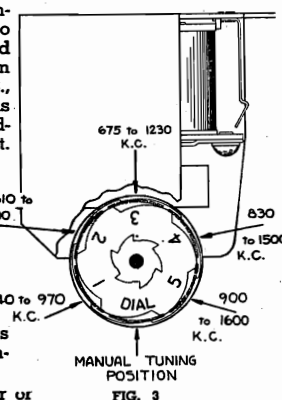
Figure 6 shows the dummy antenna requirements necessary where the special Zenith dummy connector S6740 is not available.

Unless certain dummy antenna capacities are employed with either the signal generator or in making adjustments on stations, the receiver will not respond properly. The values provided in the Zenith dummy antenna unit shown in Fig. 6 are identical with the conditions in the Ford car, and if adjusted accordingly the instrument will operate properly when reinstalled in the automobile. The Zenith dummy antenna S6740 is especially priced at 25c net to service stations, and should be purchased for use in servicing Zenith built Ford receivers.

ELECTRICAL SPECS: Rotomatic Tuning—Provides a means of selecting either manual or any one of five pre-selected stations using a single push-button. The automatically controlled circuits consist essentially of permeability tuned inductances in the oscillator circuit and mica type trimmers in the detector stage. Switching is accomplished electrically by coincidental solenoid operation of band-switch type segments.

Sensitivity:—10 microvolts at 1 watt output. Tuning range 540—1580 K.C. Power output—3 watts measured at voice coil. Speaker—8" dynamic. I.F.—455 K.C. Automatic—Five positions and "Dial."

Tube complement:—78 R.F., 6A7 mixer, 78 I.F., 75 2nd det. and audio, 42 output, 84 rectifier. Current Consumption—7 amp. at 6 volts.

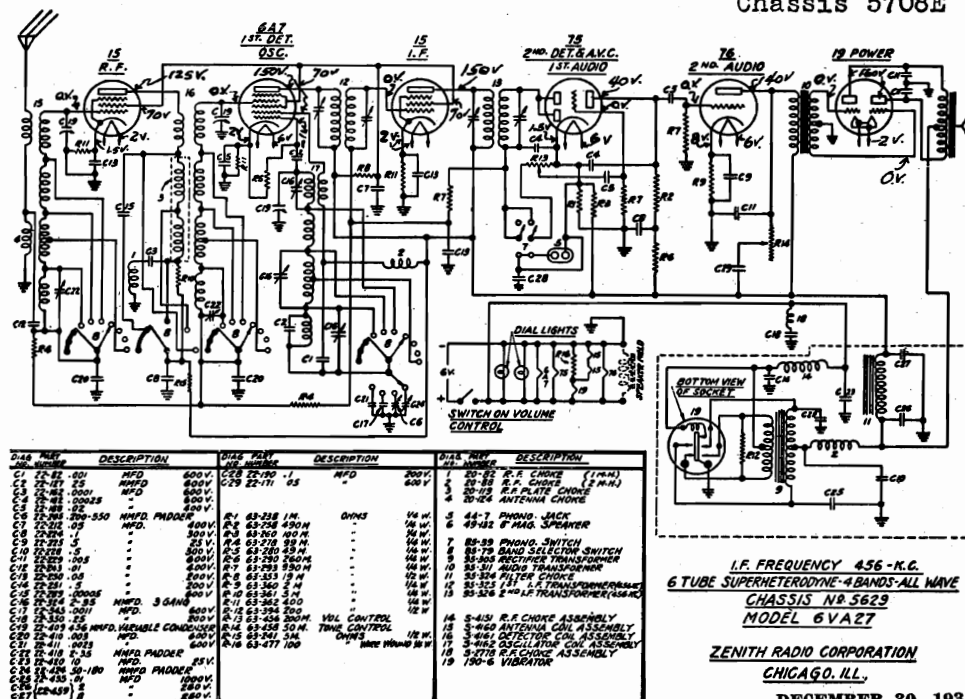


Schematics, Voltage

ZENITH RADIO CORP.

MODELS 6VA27, 6VA62
Chassis 5629
MODELS 7DA119, 7DA126
7DA127, 7DA138, 7DA148
7DA162, 7DA168
Chassis 5708E

Band	Color	Kilocycles	Megacycles	Meters
A	Green	550-1,740	55-1.74	545-172
B	Yellow	2,000-7,000	2-7	150-42.8
C	Orange	150-370	.15-.37	2,000-800
D	Red	7,000-22,500	7-22.5	42.8-13.3

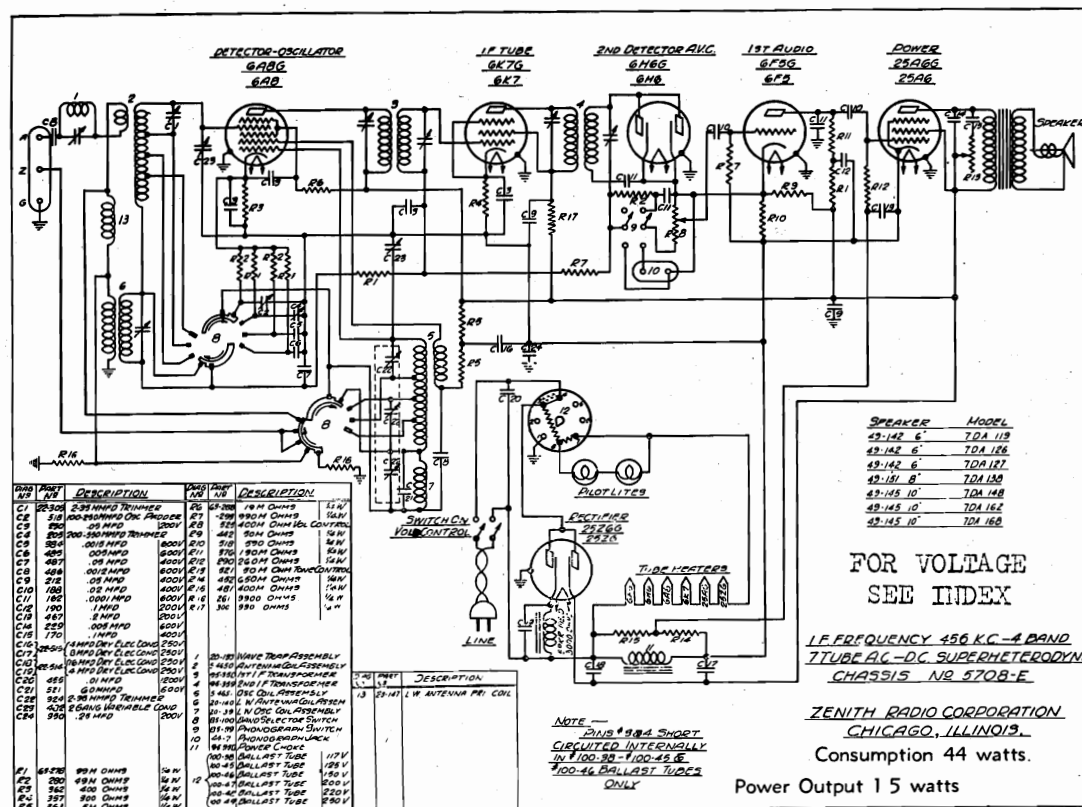


VOLTAGE AT SOCKET TERMINALS: - ANTENNA AND GROUND DISCONNECTED
MEASURED FROM SOCKET TERMINALS TO GROUND WITH 1000 OHM PER VOLT D.C. METEC.

FOR OTHER DATA
SEE INDEX

The tuning is divided into four bands represented by the four scales A B C and D on the dial. These letters correspond to the letters above the band indicator knob and show the range and scale in use.

BAND	COLOR	KILOCYCLES	MEGACYCLES	METERS
A	Green	492-1640	.492-1.640	610-183
B	Yellow	1750-6040	1.75-6.04	171-49.6
C	Red	5520-19000	5.52-19	2025-750
D	Blue	148-400	1.48-4.00	2025-750



MODELS 5A119, 5A126, 5A127
5A151, Chassis 5517A
MODELS 6VA27, 6VA62
Chassis 5629

ZENITH RADIO CORP.

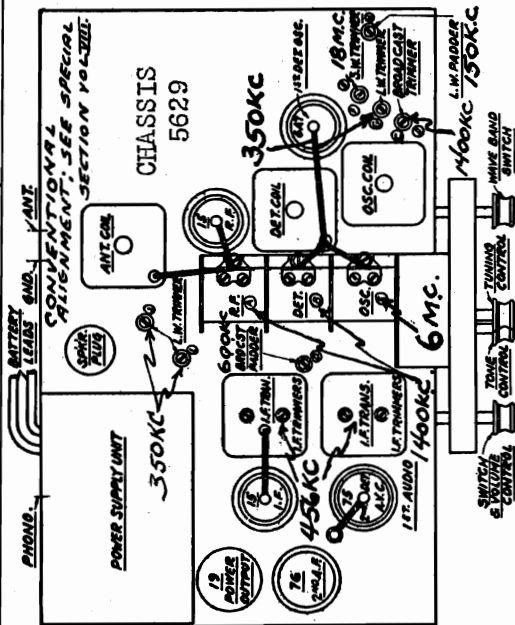
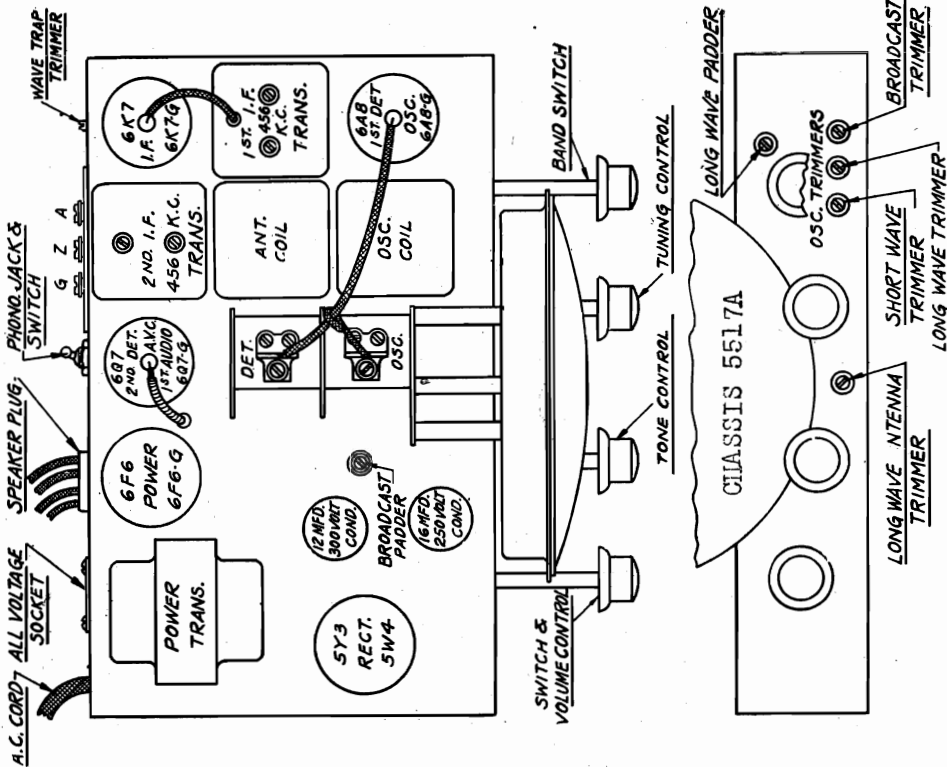
Alignment, Socket
Trimmers

CHASSIS 5517A

IMPORTANT!



Connect ordinary single wire antenna to A. Jumper wire placed between Z and G (shipped from factory in this manner.)
When using a ZENITH DOUBLET ANTENNA, remove jumper wire between Z and G and attach doublet lead-in to A and Z.



CHASSIS 5517A ALIGNMENT PROCEDURE

- (1) Connect the output leads of the signal generator to the grid of the first detector and receiver ground. Also connect an output meter across the speaker transformer leads.
- (2) Set the signal generator at 456 K.C. and carefully adjust the four I.F. trimmers to the point giving the highest reading of the output meter. These adjustments should be repeated several times to secure the greatest accuracy.
- (3) All adjustments should be made using as weak an output from the signal generator as possible in order to prevent the A.V.C. action from affecting the output readings.
- (4) Change the signal generator leads to the antenna and ground terminals of the receiver.
- (5) Adjust the wave trap (located on rear of chassis) for minimum output reading.
- (6) Set signal generator at 6 M.C. Switch receiver to band B and adjust osc. trimmer on gang for correct dial reading at 50 meters.
- (7) Set signal generator at 1400 K.C. Switch receiver to band A and adjust broadcast trimmer (see diagram) for correct dial reading at 215 meters. Also adjust det. trimmer on gang for greatest output reading.
- (8) Set signal generator to 600 K.C. and rock pointer past 500 meters on dial while adjusting the broadcast padder (adjacent to gang) to combination giving the greatest output reading.
- (9) Repeat operation No. 6.
- (10) Set the signal generator at 17 M.C. Switch the receiver to band C and adjust short wave trimmer while rocking pointer past 17.5 meters on dial to combination giving the greatest output.
- (11) Set the signal generator at 375 K.C. Switch receiver to Band D and adjust the long wave trimmer for correct dial reading at 800 meters. Also adjust the long wave ant. trimmer to resonance.
- (12) Set the signal generator at 167 K.C. Rock the pointer past 1800 meters on dial and adjust the long wave padder to point giving the highest output.
- (13) Repeat operation No. 10.

MODELS 8A232, 8A242, 8A244
8A262, Chassis 5804AT
Schematics

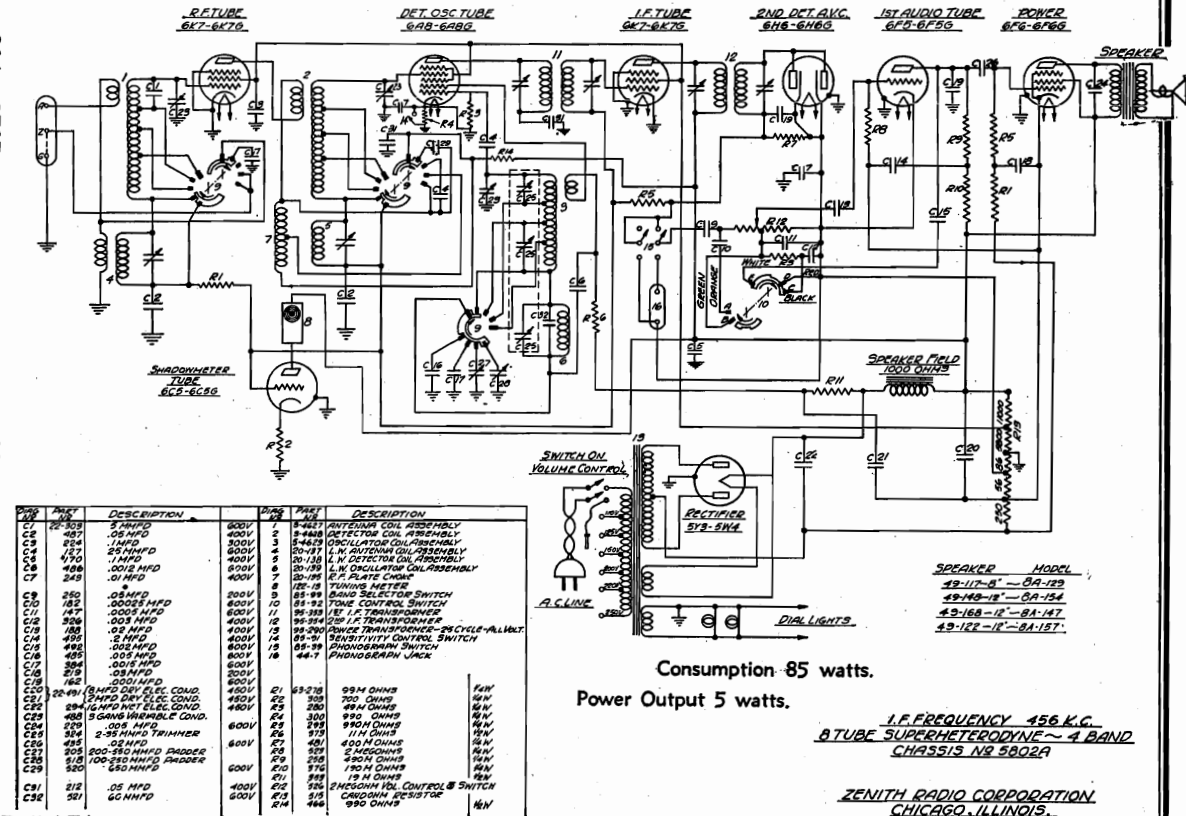
ZENITH RADIO CORP.

MODELS 8A129, 8A154, 8A147
8A157, Chassis 5802A

BAND	KILOCYCLES	MEGACYCLES	METERS
A	23-56	13-53	13-53
B	56-60	195-601	195-601
C	60-65	729-1987	729-1987
D	65-70		

FOR OTHER DATA
SEE INDEX

BAND	KILOCYCLES	MEGACYCLES	METERS
Short Wave	23,076 — 5660	23 — 5.6	13 — 53
Standard Broadcast	1538 — 499	1.5 — .49	195 — 601
Long Wave	411 — 150	.41 — .15	729 — 1987

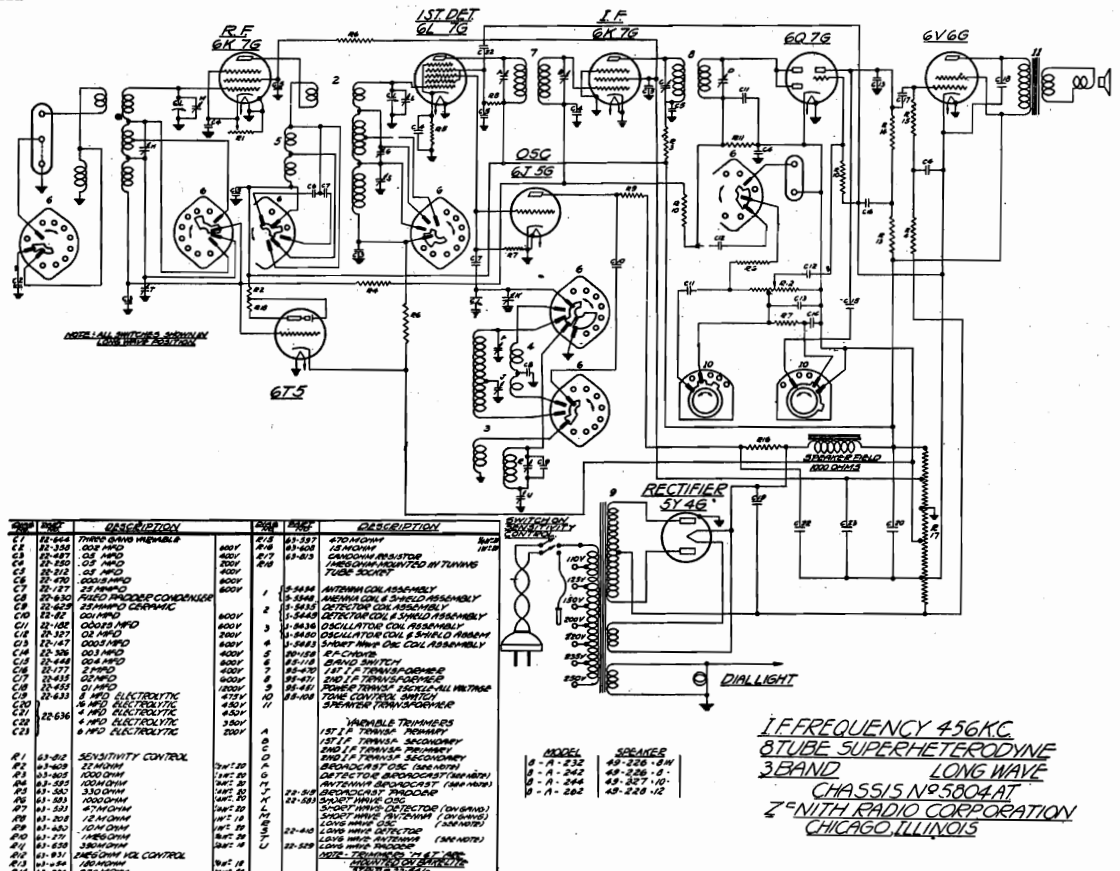


Consumption 85 watts.
Power Output 5 watts.

I.F. FREQUENCY 456 K.C.
8TUBE SUPERHETERODYNE ~ 4 BAND
CHASSIS NO 5804A

ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS

The total consumption is 70 watts. Power output 4.5 watts.

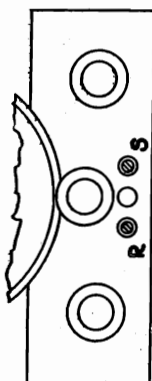


I.F. FREQUENCY 456 K.C.
8TUBE SUPERHETERODYNE
3 BAND LONG WAVE
CHASSIS NO 5804AT
ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS

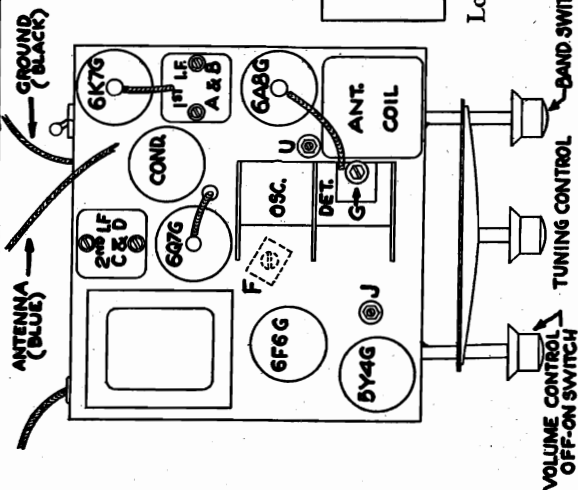
MODELS 5L228, 5L237
Chassis 5525
MODELS 8A129, 8A147
8A154, 8A157
Chassis 5802A
Alignment, Socket
Trimmers

ZENITH RADIO CORP.

CHASSIS 5525



Location of Tubes and Trimmers



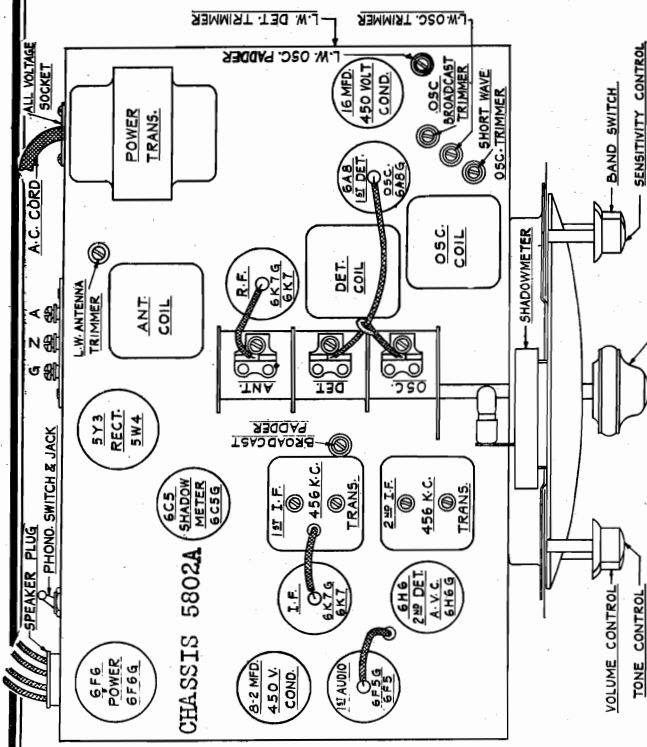
ALIGNMENT PROCEDURE

Chassis 5802-A

- (1) Connect the output leads of the signal generator to the grid of the first detector and receiver chassis. Also connect an output meter across the speaker transformer leads.
- (2) Set the signal generator at 456 K. C. and carefully adjust the four I. F. trimmers to the point giving the highest reading on the output meter. The output transformers are of a very high gain, selective type, and these adjustments should be repeated several times in order to secure maximum accuracy. All adjustments should be made using as weak an output from the signal generator as possible in order to prevent the A. V. C. action from affecting the output readings.
- (3) Change the signal generator leads to the antenna and ground terminals of the receiver.
- (4) Set signal generator at 6 M. C.—Switch receiver to Band B and adjust osc. trimmer on gang for correct dial reading at 50 meters.
- (5) Set signal generator at 1500 K. C.—Switch receiver to band A and adjust broadcast trimmer for correct dial reading at 200 meters. Also adjust ant. and det. trimmer on gang to resonance.
- (6) Set signal generator at 17.5 M. C.—Switch receiver to band C and adjust the short wave trimmer while rocking the pointer past 17 meters on the dial to the combination giving the greatest output.
- (7) Set signal generator at 600 K. C.—Switch receiver to band A, and rock pointer past 500 meters on dial while adjusting the broadcast padder (located adjacent to gang condenser) to combination giving the greatest output reading.
- (8) Repeat operation No. 5.
- (9) Set signal generator at 375 K. C. Switch receiver to Band D and adjust long wave osc. trimmer for correct dial reading at 800 meters. Also adjust long wave det. and ant. trimmers (located on side and rear of chassis), for maximum output reading.
- (10) Set signal generator at 150 K. C. and rock pointer past 2000 meters on dial while adjusting the long wave osc. padder to combination giving the highest output reading.
- (11) Repeat operation No. 9.

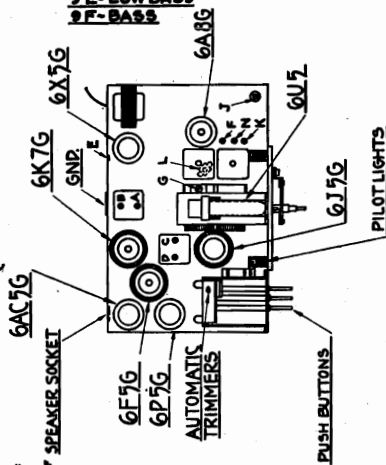
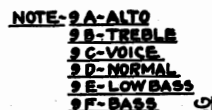
CHASSIS 5525 Alignment Procedure

Operation	Sig. Gen. Connected to	Dummy	Gen. Freq.	Band Switch	Receiver Dial	Trimmer	Remarks
1	1st Det. Grid	$\frac{1}{2}$ mfd.	456 KC	Med. Wave	550	ABCD	I F Alignment
2	Rec. Ant. Lead	200 mmfd	1500	Med. Wave	1500	F	Set Osc to scale
3	Rec. Ant. Lead	200 mmfd	1500	Med. Wave	1500	G	Adj. for Max. Output
4	" " "	" "	550	"	550	J	Rock gang and adjust for max. Output
5	" " "	" "	1500	"	1500	F-G	Repeat two and three
6	" " "	" "	400	L. W.	400	R	Ser. Osc. to Scale
7	" " "	" "	400	L. W.	400	S	Adjust for Max. Output
8	" " "	" "	166.7	L. W.	166.7	U	Rock Gang while adjusting for Max. Output
9	" " "	" "	400	L. W.	400	R-S	Repeat six and seven



SPEAKER
49-249-12"

MODEL
8-5-359



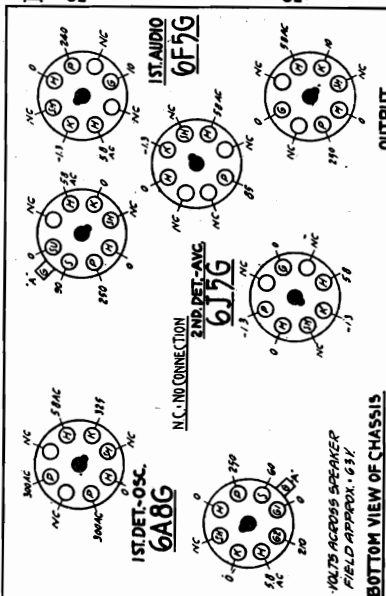
Location of tubes and trimmers

I.F. FREQUENCY 455 KC.
8-TUBE SUPERHETERODYNE
CHASSIS NO. 7807-A.C. 3-BAND
LEGEND

IC — No Connection

H — Shield	All voltages measured from
H — Heater	chassis to point indicated using
P — Plate	a 1000 ohm per volt meter. An-
S — Screen	tenna disconnected. Volume
G — Grid	control at minimum. Band switch
U — Suppressor	on manual B.C. position.
	Line voltage 114 v.

D — Diode
F — Filament
K — Cathode



FRONT OF CHASSIS

MODEL 8S359, Ch. 5807

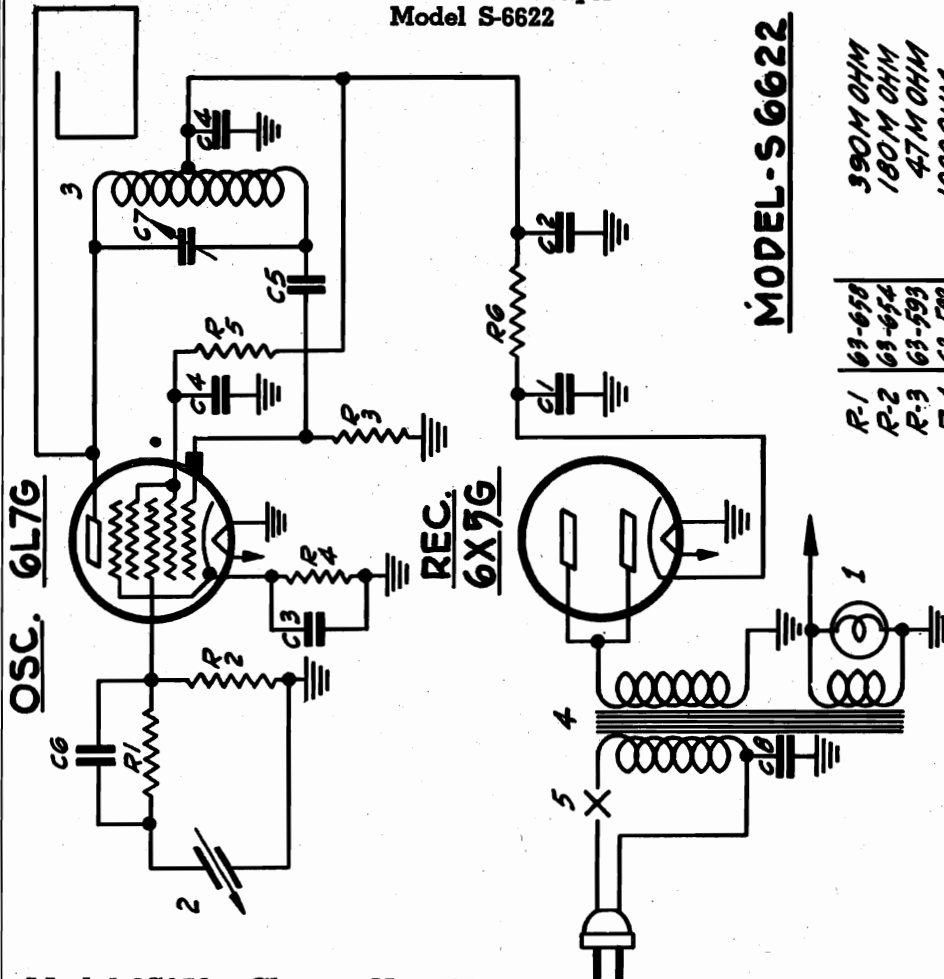
Alignment

MODEL S-6622

Wireless Record Player

Schematic

ZENITH RADIO CORP.

PHONOGRAPH OSCILLATORWireless Record Player
Model S-6622

MODEL-S 6622

DIAG. No.	PART No.	DESCRIPTION	VOLTS
C-1	22-768	16 MFD ELECTROLYTIC	200V
C-2	22-250	40 MFD "	150V
C-3	22-196	.05 MFD	200V
C-4	22-182	.01 MFD	600V
C-5	22-147	.00025 MFD	600V
C-6	22-463	.0005 MFD	600V
C-7	22-463	TRIMMER	600V
C-8	22-525	.005 MFD	1000V
R-1	63-658	390M OHM	
R-2	63-454	180M OHM	
R-3	63-593	47M OHM	
R-4	63-593	1000 OHM	
R-5	63-587	4700 OHM	
R-6	63-964	4700 OHM	
1	100-36	PILOT LIGHT-6.3V.25A.	
2	142-14	PICK-UP ARM-COMPLETE	
3	142-16	CRYSTAL UNIT ONLY	
4	S-6625	OSC. COIL ASSEM.	
5	95-567	POWER TRANS.	
	95-170	SWITCH	

Model 8S359. Chassis No. 5807

ALIGNMENT PROCEDURE

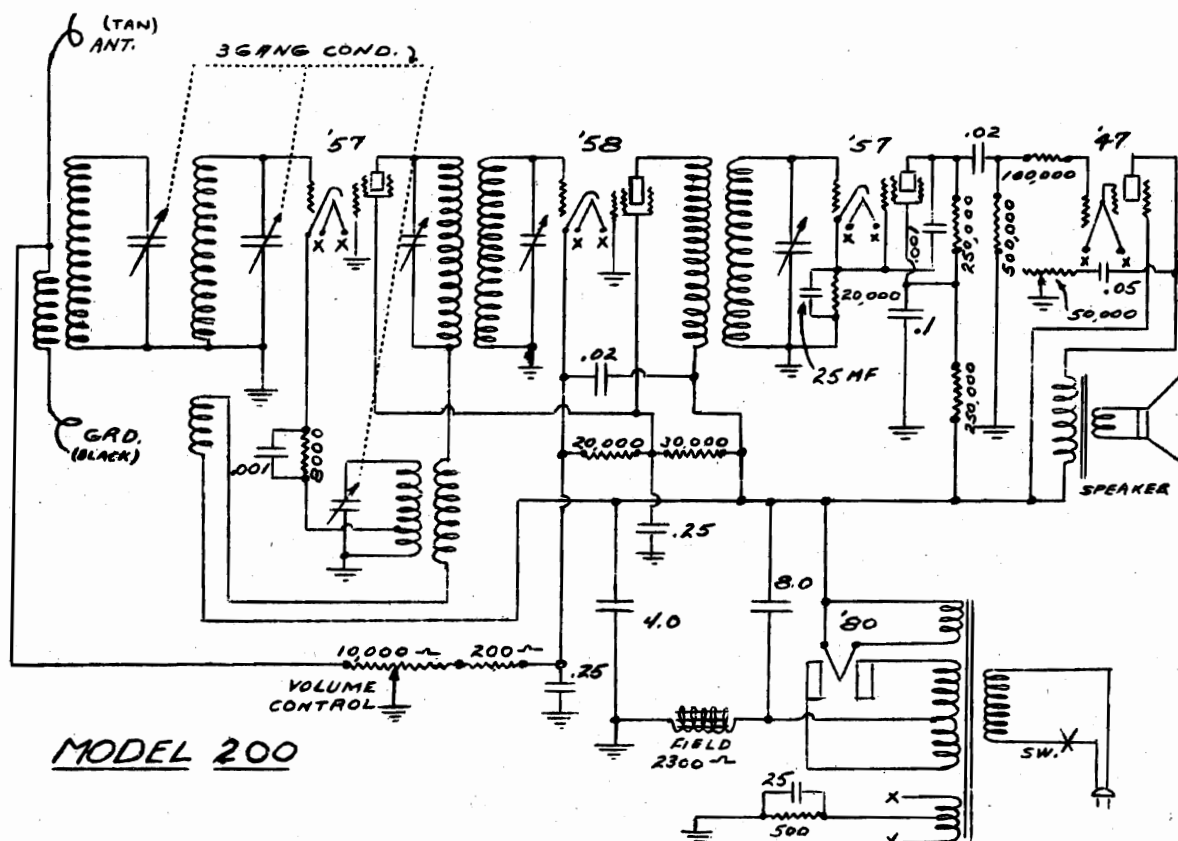
Operation	Connect Test Oscillator to	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	455	Br'dc't	600	ABCD	I. F. Alignment
2	Rec. Ant. Post	200 Mmfd.	455	"	600	E	See Note
3	" " "	200 Mmfd.	1500	"	1500	F	Set Osc. to Scale
4	" " "	200 Mmfd.	1500	"	1500	G	Al'gment of Ant.
5	" " "	200 Mmfd.	600	"	600	J	Rock gang & adj. for max. output.
6	" " "	200 Mmfd.		"		FG	Repea 3 & 4
7	" " "	400 Ohms	18000	S.W.	18000	K	Set Osc. to Scale
8	" " "	400 Ohms	18000	S.W.	18000	L	Rock Gang & adj. for max. output.
9	" " "	400 Ohms	6000	Police	6000	N	Rock Gang & adj. for max. output.

NOTE: If receiver is used in location subject to code interference adjust wave trap (E) for minimum interference with antenna connected and receiver operating in broadcast band.

MODELS 834, 1102, 1106
Chassis 1002
Alignment, Notes

ZENITH RADIO CORP.

MODEL 200
Schematic



MODELS 1102, 1106, and 834. CHASSIS 1002

All components used in these models are the same as those used in Zenith Chassis 1001 - 1001A excepting the following changes.

Parts added

26-75 Complete Dial and Drive Assem.

26-73 Dial scale only

22-305 (2) 35 mfd. Condensers

22-245 Padder

S-3317 Long wave ant coil Assem.

S-3318 Long wave osc. coil ..

S-3321 Long Wave Detector Coil Assem.

The long wave band has two trimmers on each stage. The oscillator stage has a trimmer and padder assembly of the nut and screw type. The nut is the trimmer and the screw is the padder.

The detector and R.F. stages each have two trimmers whose actions are dependent. The arrangement consists of a coupling condenser and a coil trimmer.

The coil trimmer can be distinguished in that one side is grounded. Maximum gain with this system is obtained by having the coupling condenser with as much capacity as possible and still be able to obtain a peak on the coil trimmer.

BALANCING PROCEDURE FOR LONG WAVE

Connect service oscillator to antenna post and set at 375 KC. Set dial at 375 KC. Adjust nut on oscillator trimmer assembly to bring in signal. Open R.F. and detector coil trimmers as far as possible and still leave enough capacity for peaking (about 2 or 3 turns). Open coupling condensers until what appears to be resonance is obtained. Then repeak coil trimmers to resonance. Remember the resonance obtained by means of the coupling condensers is not true resonance and the coil trimmers must be re-adjusted for true resonance.

Move I.F. selector switch to 160 KC. and set dial at this point. Adjust padder screw in oscillator coil assembly for maximum gain, rocking condenser to reach this point, wherever it happens to fall. Repeak 375 KC. as it will be thrown off by the movements of the padder.

Parts Deducted

(26-66 Dial and Drive)

(26-67 Dial Scale only)

(22-289 Condenser)

(22-225 Condenser)

(20-84 7 Meter coil)

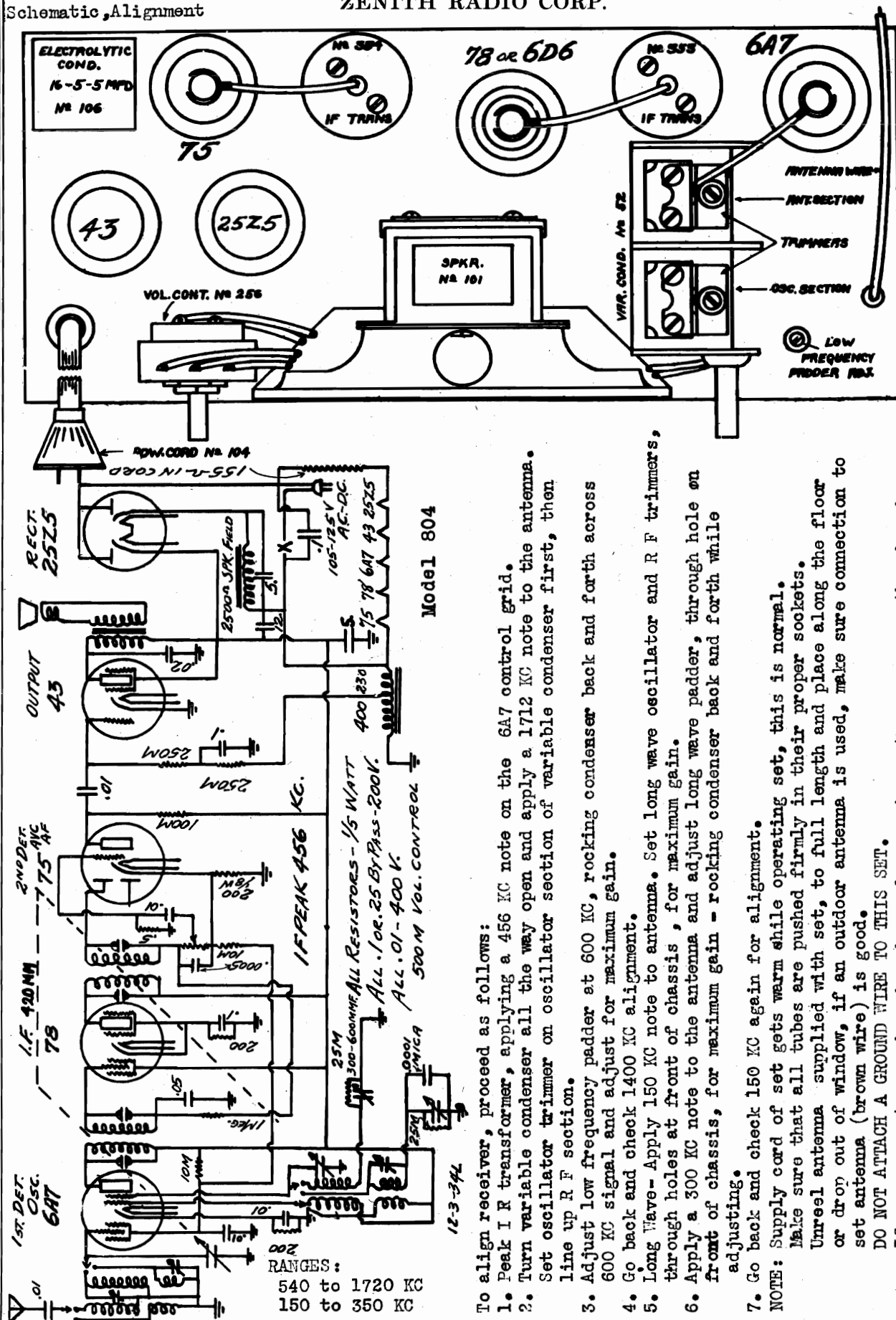
(S-3115 7 Meter coil)

MODEL 804

Schematic Alignment

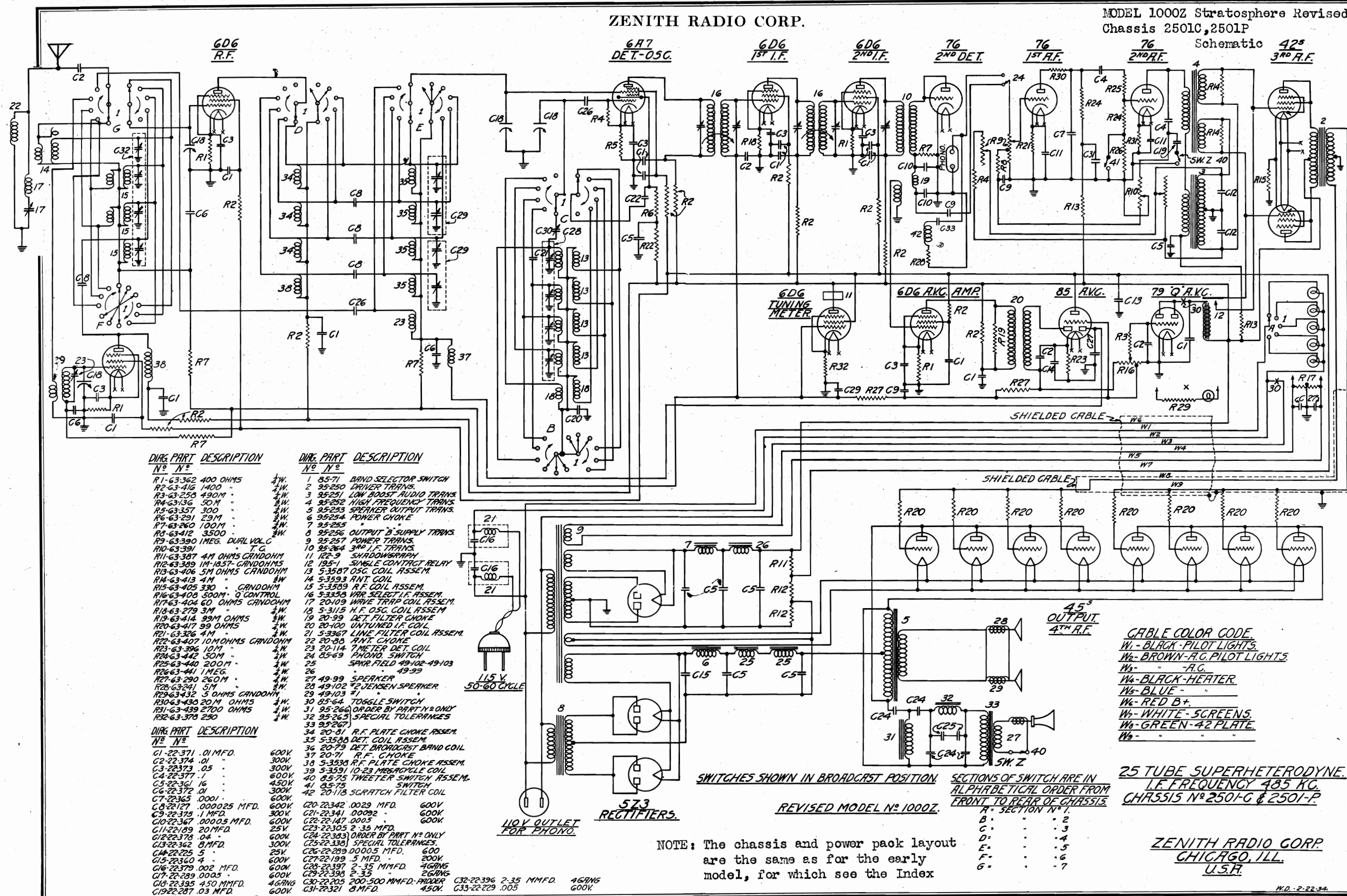
ZENITH RADIO CORP.

Socket, Trimmers



To align receiver, proceed as follows:

1. Peak I F transformer, applying a 456 KC note on the 6A7 control grid.
 2. Turn variable condenser all the way open and apply a 1712 KC note to the antenna. Set oscillator trimmer on oscillator section of variable condenser first, then line up R F section.
 3. Adjust low frequency padder at 600 KC, rocking condenser back and forth across 600 KC signal and adjust for maximum gain.
 4. Go back and check 1400 KC alignment.
 5. Long Wave- Apply 150 KC note to antenna. Set long wave oscillator and R F trimmers, through holes at front of chassis , for maximum gain.
 6. Apply a 300 KC note to the antenna and adjust long wave padder, through hole on front of chassis, for maximum gain - rocking condenser back and forth while adjusting.
 7. Go back and check 150 KC again for alignment.
- NOTE: Supply cord of set gets warm while operating set, this is normal. Make sure that all tubes are pushed firmly in their proper sockets. Unreel antenna supplied with set, to full length and place along the floor or drop out of window, if an outdoor antenna is used, make sure connection to set antenna (brown wire) is good.
- DO NOT ATTACH A GROUND WIRE TO THIS SET.
- If necessary to service chassis, under no circumstances remove the chassis without first removing plug from receptacle.



NOTE: The chassis and power pack layout are the same as for the early model, for which see the Index

ZENITH RADIO CORP.
CHICAGO, ILL.
U.S.A.

W.D. - 2-22-34

Socket Voltages

TUBE	POSITION	Ef	Ek	Eg1	Eg2	Eg3	Bp
6D6	1st R. F.	6.3	3	0	100	3	300
6D6	2nd R. F.	6.3	3	0	100	3	300
6A7	1st Det.	6.3	3	0	100	-	300
	Osc.	6.3	3	3	-	-	130
6D6	1st I. F.	6.3	7	0	100	7	300
6D6	2nd I. F.	6.3	3	0	100	3	300
76	2nd Det.	6.3	0	0	-	-	0
76	1st A. F.	6.3	8	0	-	-	140
76	2nd A. F.	6.3	14	0	-	-	270
42	Driver	6.3	22	0	300	-	300
45	Power A. F.	2.5	53	0	-	-	330
79	Q.A.V.C.	6.3	0	0	-	-	250 Q on 0 Q off
6D6	Shadowmeter Amplifier	6.3	3	0	100	3	300
6D6	A.V.C. Amplf.	6.3	3	0	100	3	300
85	A.V.C.	6.3	0	0	-	-	100
503	Rect. Power Amplifier	5	-	-	-	-	-
503	Rect. for Upper Chassis	5	-	-	-	-	-

Line Voltage 112.
f - filament; k - cathode; g1 - control grid; g2 - screen grid; g3 - suppressor grid; p - plate.
Antenna and Ground shorted.

Balance Procedures: Caution - Test set thoroughly for defective tubes, antenna and ground, check line voltage and chassis voltages before any attempt is made to rebalance. All balancing should be done with a calibrated oscillator capable of a steady signal and minimum attenuation of signal input strength. The screw driver used should be of non metallic type and output meter usually connected across plates of 45 tubes at point where the two green speaker wires come out of power pack.

Warning: Do not rebalance this chassis unless absolutely necessary as all chassis are balanced on an accurate signal generator before shipment. Set volume control in full on position, tone control on treble, high fidelity control in selective position. Band switch set on broadcast position, gang 580 K.C., approximately. Connect 485 K.C. service oscillator to grid of 6A7 and chassis ground. Adjust I.F. transformers, to maximum output with minimum input signal. Rotate selectivity control to broad position, I.F. output should remain constant 6 K.C. plus and minus 485 K. C. Next, connect the same 485 K.C. signal directly across aerial and ground binding post. Balance wave trap to minimum signal. Gang set at 550.

Note: Refer to drawing of trimmer assembly to identify trimmers. Set service oscillator at 600 K.C. Adjust broadcast padder "A" meanwhile rocking pointer past 600 K.C. on dial to combination giving greatest output. Set chassis dial to exactly 1400 K.C., and service oscillator to 1400 K.C. Balance "I" oscillator trimmer to scale. Reset oscillator to 600 K.C., rotate gang to 600 and re-check 600 padder for maximum output. Next, return oscillator trimmer at 1400 K.C. Adjust detector trimmer "H" and R.F. trimmer "W" to maximum output.

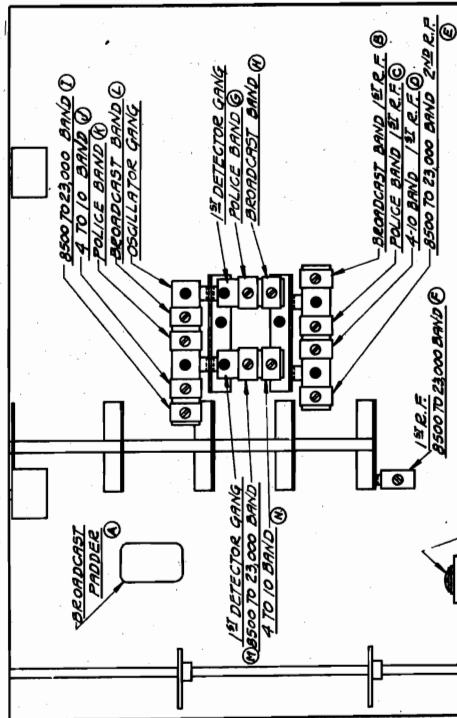
Police or Orange band. Rotate chassis band switch to police band, gang should be rotated to 3 megacycles, oscillator to 3 megacycles also. Adjust oscillator

ZENITH RADIO CORP.

ZENITH PAGE 10-37

MODEL 1000Z Revised
Chassis 250LC, 250LP
Alignment, Trimmers
Voltage, Resistances

trimmer "W" to scale, peak "Q" detector and "Q" R.F. trimmers to maximum peak. Yellow band. Set dial and oscillator to 9 megacycles, peak oscillator trimmer "W" for scale, "W" detector and "W" R.F. trimmers for maximum peak. Red band. Set dial and oscillator at 21 megacycles, peak "I" oscillator for scale, "I" detector and "I" R.F., and trimmer "W" located at back of band switch for maximum peak. There are no adjustments on the Blue band. On all short wave adjustments be careful not to balance the oscillator circuit to the image frequency of the signal. This is equal to signal frequency minus twice the I.F. frequency.



ADJUST AT EXTREME LOW FREQUENCY END OF BROADCAST BAND.

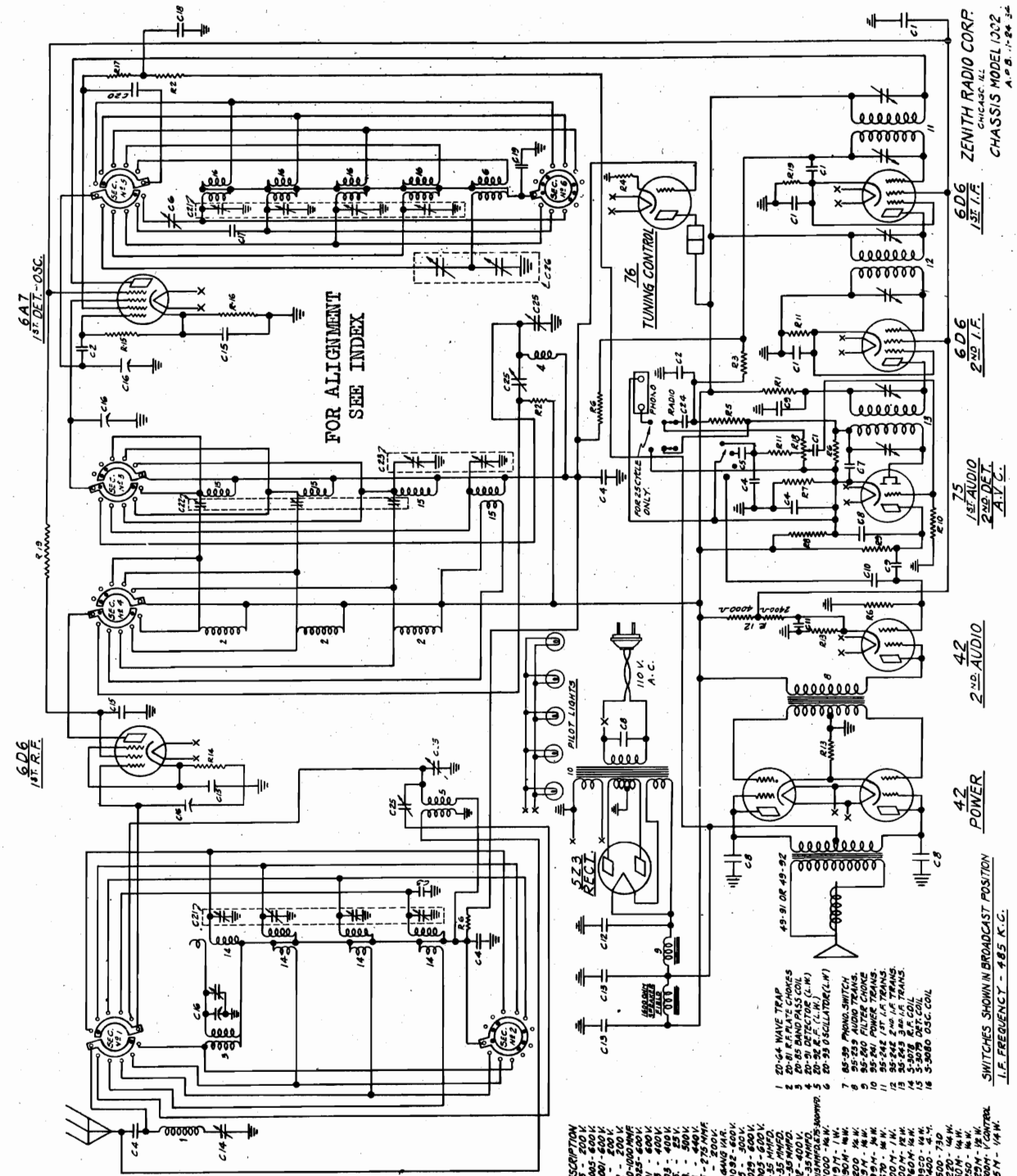
TUBE	POSITION	HEATER	CATHODE	GRID	SCREEN	SUPPRESSOR	PLATE
6D6	1st. R. F.	20	350	600 M.	5 Meg.	350	1 Meg.
6D6	2nd. R. F.	20	350	600 M.	5 Meg.	350	1 Meg.
6A7	1st. Det.	20	275	50 M.	-	-	1 Meg.
	Osc.	20	350	2	5 Meg.	350	1 Meg.
6D6	1st. I. F.	20	3000	500 M.	5 Meg.	3000	1 Meg.
6D6	2nd. I. F.	20	0	100 M.	-	-	100 M.
76	1st. Aud.	20	4000	8000	-	-	1 Meg.
76	2nd. Aud.	20	3000	1 Meg.	-	-	1 Meg.
42	Driver	20	325	3000	-	-	1 Meg.
79	Q.A.V.C.	20	0	1 Meg.	-	-	1 Meg.
6D6	Shadowmeter Amplifier	20	250	500 M.	5 Meg.	250	1 Meg.
6D6	A.V.C. Amplf.	20	250	2	5 Meg.	250	1 Meg.
85	A.V.C.	20	10M	250 M.	400 M.	500 M.	15 Meg.

All Measurements Made With Lower Chassis Disconnected.

PAGE 10-38 ZENITH

MODELS 834, 1102, 1106
Chassis 1002
Schematic

ZENITH RADIO CORP.



SWITCHES SHOWN IN BROADCAST POSITION
I.F. FREQUENCY - 485 K.C.

ZENITH RADIO CORP.
CHICAGO, ILL.
CHASSIS MODEL 1002
A. F. 1-24-34

ZENITH RADIO CORP.

CHASSIS 5517A SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	1st Det. Osc.	0	0	240	85	-1	166	6ac	4	0
6K7	I. F.	0	0	240	85	3	—	6ac	3	0
6Q7	2nd Det. A.V.C.	0	0	75	1	1	—	6ac	15	0
6F6	Power	0	0	230	240	-5	—	6ac	0	—
5Y3 5W4	Rectifier	0	240	—	AC	—	AC	—	240	—

CHASSIS 5517A
CHASSIS 5525A
CHASSIS 5636
CHASSIS 5640AT
CHASSIS 5708E
CHASSIS 5802A
CHASSIS 5804AT
Voltage

BOTTOM VIEW
OF SOCKET

CHASSIS 5640AT Socket Voltages

Tube	Position	1	2	3	4	5	6	7	8	9
6L7	1st Det	0	0	231	141	-10	—	6.3	2.5	0
6J5	Osc	0	6.3	129	—	-17	—	0	0	—
6K7	IF	0	6.3	234	65	0	—	0	0	0
6Q7	2nd Det Audio	0	0	88	-5	-5	—	6.3	-1	-2
6V6	Power	0	0	210	234	-2	—	6.3	-1.5	—
5Y4	Rect.	0	—	AC	—	AC	188?	288	288	—

CHASSIS 5802A SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6K7	R. F.	0	6AC	250	68	0	—	0	0	0
6A8	1st Det. Osc.	0	6AC	250	68	-4	150	0	0	0
6K7	I. F.	0	6AC	250	68	0	—	0	Local 5	0
6H6	2nd Det. A.V.C.	0	6AC	-3	-3	-3	—	0	-3	—
6F5	1st Audio	0	6AC	—	70	0	0	0	-3	-3
6F6	Power	0	6AC	235	250	-4	—	0	-4	—
6C5	Target Tuning Amp.	0	6AC	250	—	-5	—	0	4	—
5Y3 5W4	Rectifier	0	310	—	AC	—	AC	—	310	—

All voltages measured from point indicated to ground, using a 1000 ohm per volt meter. Antenna and ground disconnected. Line Voltage 112V.

CHASSIS 5804AT Socket Voltages

Tube	Position	1	2	3	4	5	6	7	8	9
6K7	RF	0	0	216	90	0	—	6.2	0	0
6L7	1st Det	0	0	216	130	-3	—	6.2	2	0
6J5	Osc	0	6.2	116	—	-3	—	0	0	—
6K7	IF	0	6.2	212	90	0	—	0	0	0
6Q7	2nd Det Audio	0	0	70	-2	-2	—	6.2	-2	-2
6V6	Power	0	0	210	216	-3	—	6.2	-4	—
5Y4	Rect	0	—	AC	—	AC	—	276	276	—
6T5	Eye	—	0	10	-2	216	-2	6.2	6.2	—

CHASSIS 5636 SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	1st Det Osc.	0	AC	100	50	-5	100	AC	1	-1
6K7	I. F.	0	AC	100	100	5	—	AC	5	0
6Q7	2nd Det. A.V.C.	0	AC	50	0	0	—	AC	1	0
25A6	Power	0	AC	90	100	1	—	AC	0	—
25Z6	Rectifier	0	AC	AC	AC	100	—	AC	125	—
100-37	115 Volt Ballast	—	—	—	—	—	—	—	—	—

All voltages measured from point indicated to ground, using a 1000 ohm per volt meter. Antenna and ground disconnected. Line Voltage 112V (A.C.)

CHASSIS 5525A Socket Voltages

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	Converter Osc.	0	6.3	244	97	-9	149	0	0	-5
6K7	I. F.	0	6.3	246	97	0	—	0	0	-5
6Q7	2nd Det. AVC 1st Audio	0	0	71	-2.5	-2.5	—	6.3	-2.5	-2.5
6F6	Power	0	0	231	246	-3.5	—	6.3	-2.5	—
5Y4	Rect.	0	—	AC	—	AC	—	316	316	—

All voltages measured from point indicated to ground using a 1000 ohm per volt meter, antenna and ground disconnected. Line voltage 117 v.

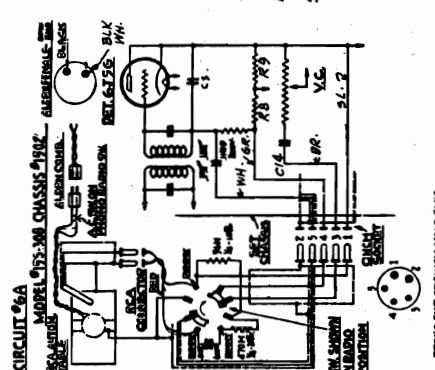
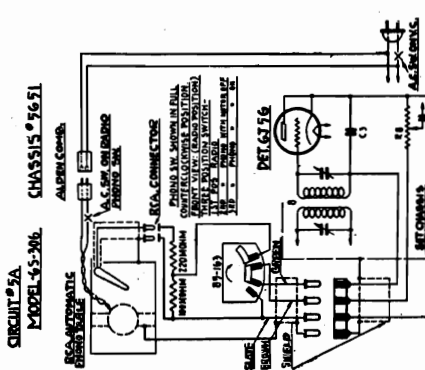
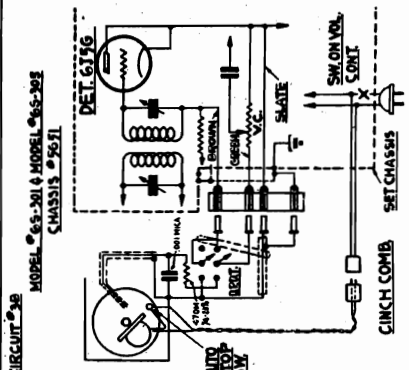
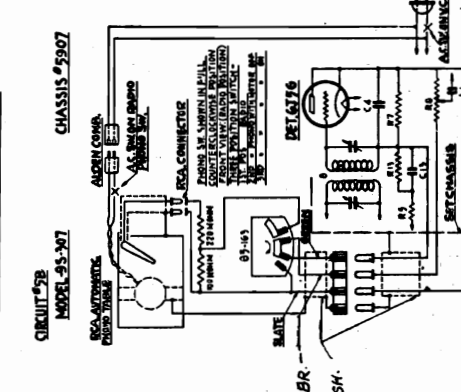
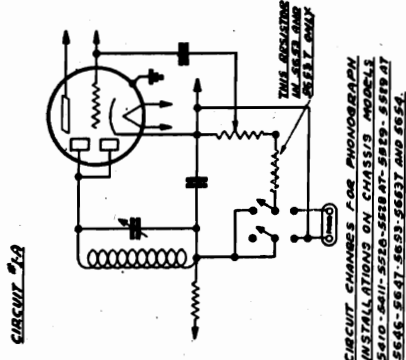
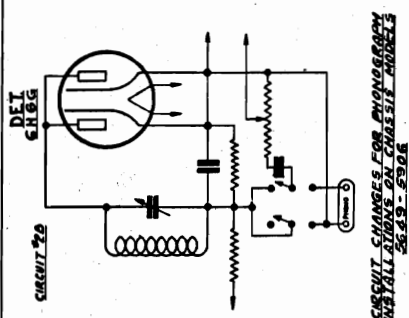
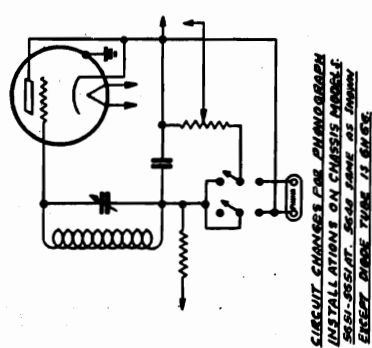
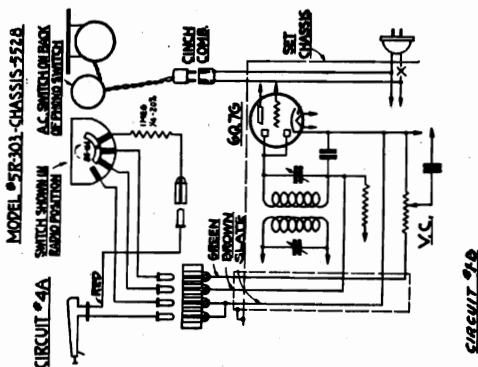
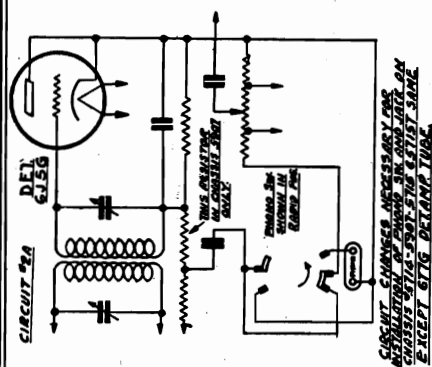
CHASSIS 5708E SOCKET VOLTAGES

Tube	Position	1	2	3	4	5	6	7	8	9
6A8	1st Det Osc.	0	AC	125	80	20	100	AC	25	15
6K7	I. F.	0	AC	125	125	25	—	AC	25	10
6H6	2nd Det A.V.C.	0	AC	10	25	10	—	AC	25	—
6F5	1st Audio	0	AC	—	60	—	—	AC	25	5
25A6	Power	0	AC	110	125	1	—	AC	25	—
25Z6	Rectifier	0	0	AC	AC	105	—	AC	125	—
	Ballast	—	—	—	—	—	—	—	—	—

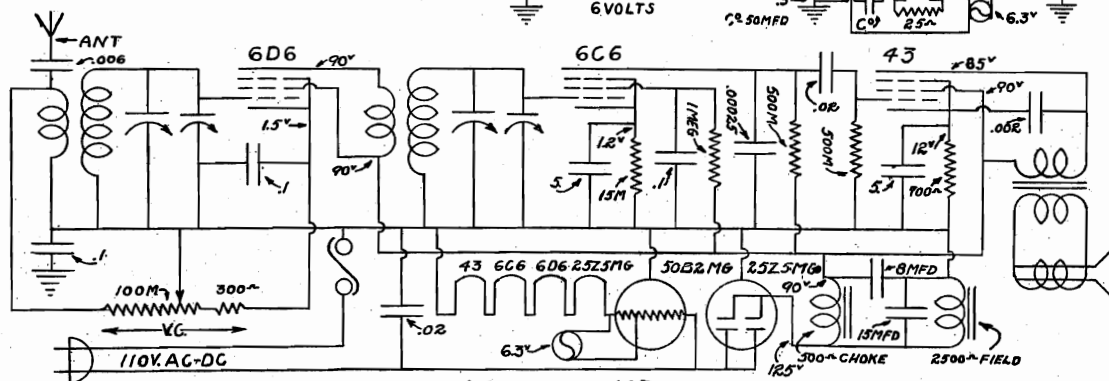
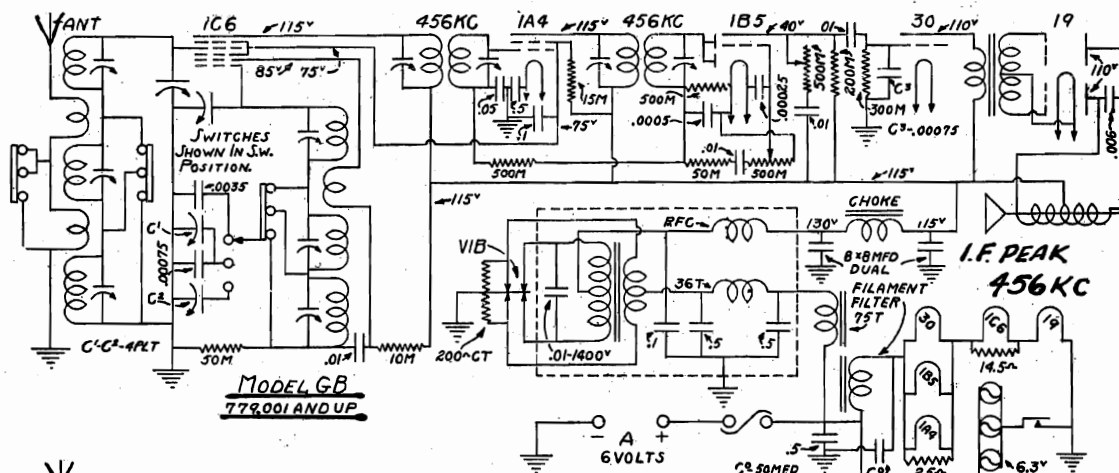
Measured from point indicated to junction of meter choke and speaker field using a 1000 ohm per volt meter. Line Voltage 112 (A.C.)

ZENITH RADIO CORP.

WIRING CHANGES NECESSARY FOR PHONO PICKUP



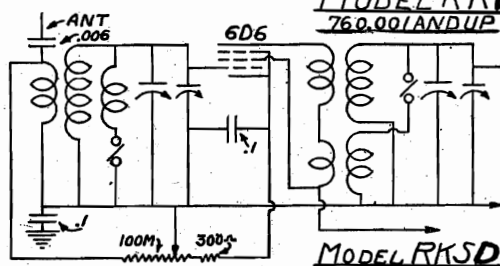
MODEL GB,Above Ser.779001
MODELS DB,DF,Above 775,001
MODEL RKD,Above Ser.760,001
MODEL RKSD



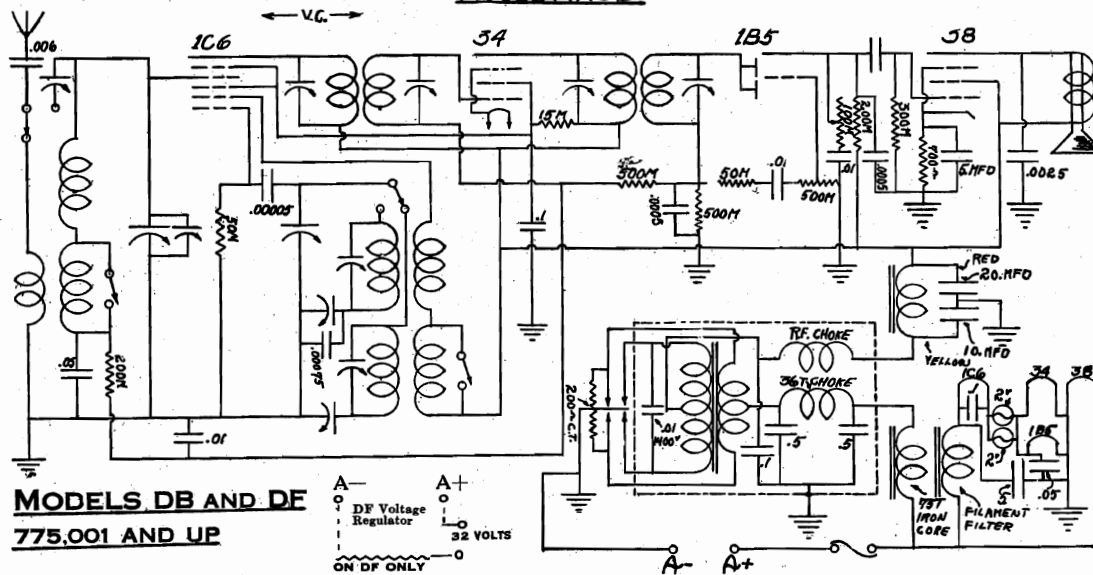
MODEL RKD
760.00/ANDUP

ALL OTHER
→ CONSTANTS ON
MODEL PK'S SAME
AS MODEL PK.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII



MODEL RKSD



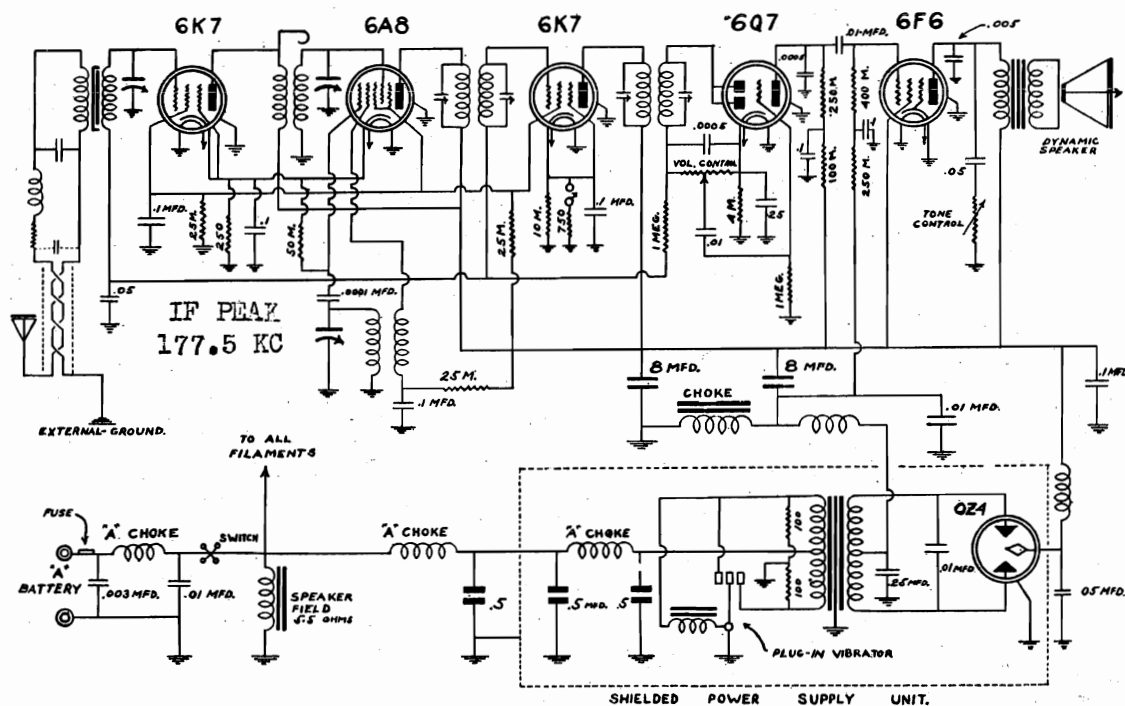
MODELS DB AND DE
775,001 AND UP

A- DF Voltage Regulator A+ 32 VOLTS
 ON DF ONLY

MODELS 2M7,B102
Schematic

ZEPHYR RADIO CO.

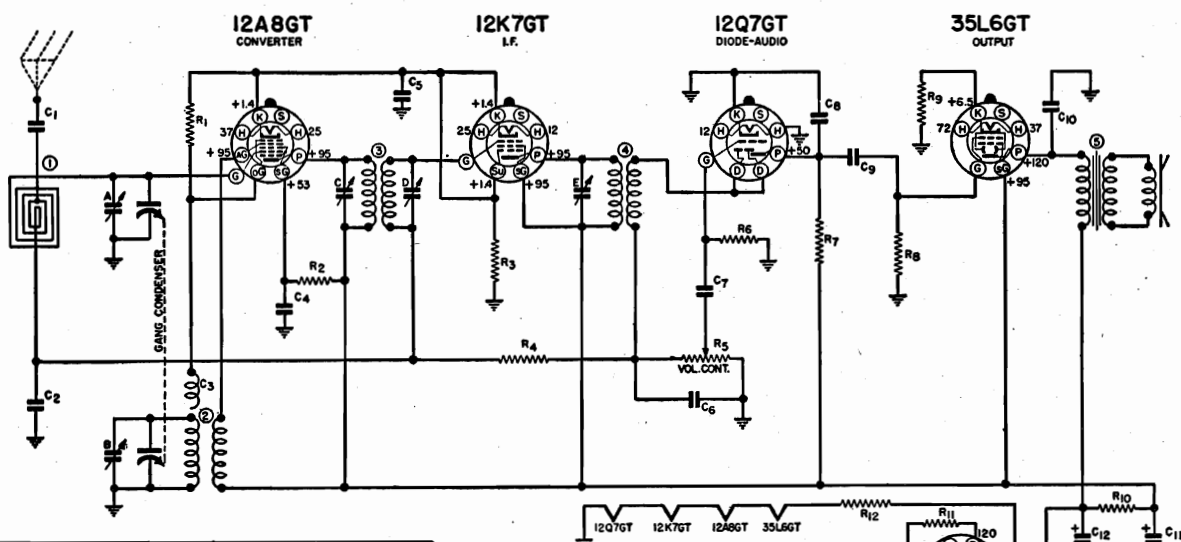
MODEL TSA105
Schematic, Socket
Trimmers, Alignment



Models B102 & 2M7

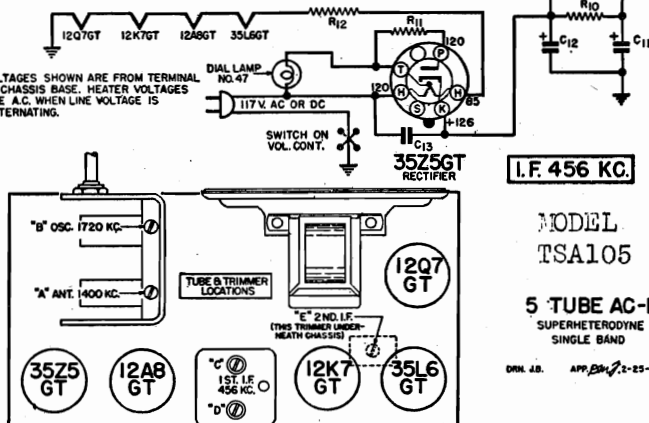
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.

App. by <i>LWG</i>	dc. by <i>MT</i>	1936
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DWG. NO.	PART NO.	DESCRIPTION	DWG. NO.	PART NO.	DESCRIPTION
R ₁	N-1260	50,000 OHM .5W. 20%	C ₇	N-1344	.01 MFD. 400V.
R ₂	N-1460	30,000 OHM .5W. 20%	C ₈	N-1447	.0005 MFD. 400V.
R ₃	N-1615	100 OHM .5W. 10%	C ₉	N-1344	.01 MFD. 400V.
R ₄	N-1262	1 MEGOHM .5W. 20%	C ₁₀	N-1376	.02 MFD. 400V.
R ₅	N-1595	.05 MEGOHM VOL. CONT.	C ₁₁	N-1366	25 MFD. 150V. } ELECTRO.
R ₆	N-1263	10 MEGOHM .5W. 20%	C ₁₂	N-1366	25 MFD. 150V. }
R ₇	N-1377	200,000 OHM .5W. 20%	C ₁₃	N-1346	.05 MFD. 400V.
R ₈	N-1264	500,000 OHM .5W. 20%			
R ₉	N-1616	250 OHM .5W. 10%			
R ₁₀	N-1617	2500 OHM .5W. 20%	I ₁	N-1594	ANTENNA COIL LOOP
R ₁₁	N-1614	50 OHM .5W. 20%	I ₂	N-1452	OSCILLATOR COIL
R ₁₂	N-1618	80 OHM 2W. 10%	3	N-1598	1ST. LF. TRANSFORMER
			4	N-1596	2ND. LF. TRANSFORMER
			5	N-1505	4" P.M. SPEAKER & TRANS.
			E	N-1597	2ND. LF. TRIMMING COND.
C ₁	N-1344	.01 MFD. 400V.			
C ₂	N-1345	.05 MFD. 200V.			
C ₃		CAPACITY INCLUDED IN OSCILLATOR COIL			
C ₄	N-1345	.05 MFD. 200V.	N-4131		GANG CONDENSER
C ₅	N-1351	.1 MFD. 200V.			
C ₆	N-1374	100 MMFD.			

NOTE: VOLTAGES SHOWN ARE FROM TERMINA
TO CHASSIS BASE. HEATER VOLTAGES
ARE A.C. WHEN LINE VOLTAGE IS
ALTERNATING.



I.F. 456 KC.

MODEL
TSA105

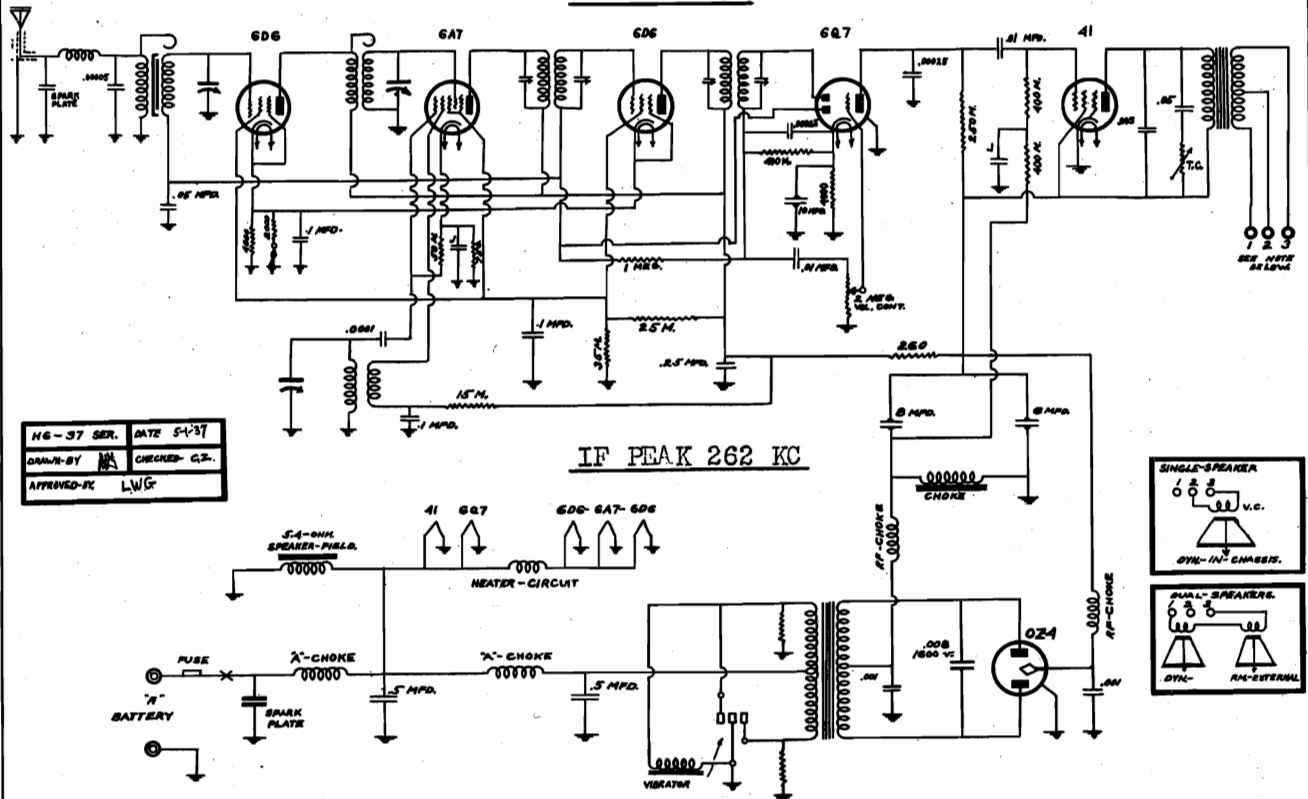
5 TUBE AC-DC
SUPERHETERODYNE
SINGLE BAND

DRM. J.B. APP. *DS-7* 2-25-39

ZEPHYR RADIO CO.

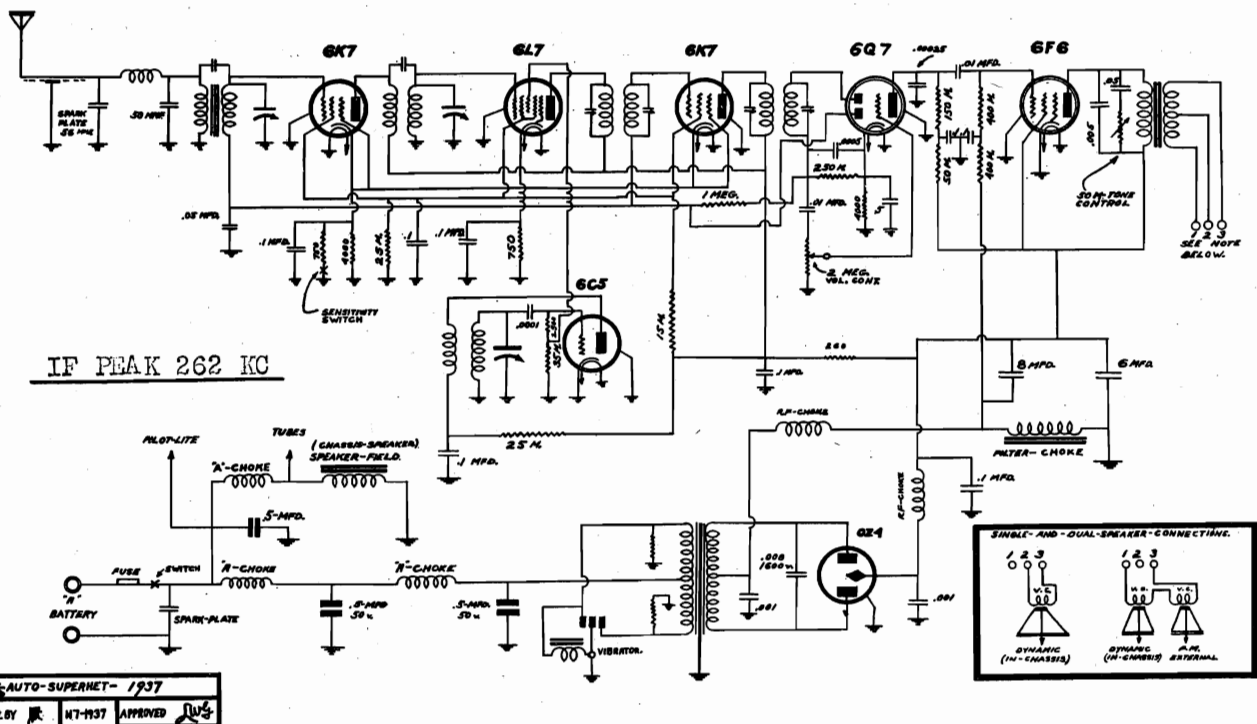
MODEL 3M7
MODEL 3M8
Schematics

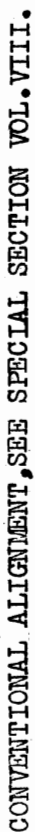
Model 3M7



CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII.

Model 3M8

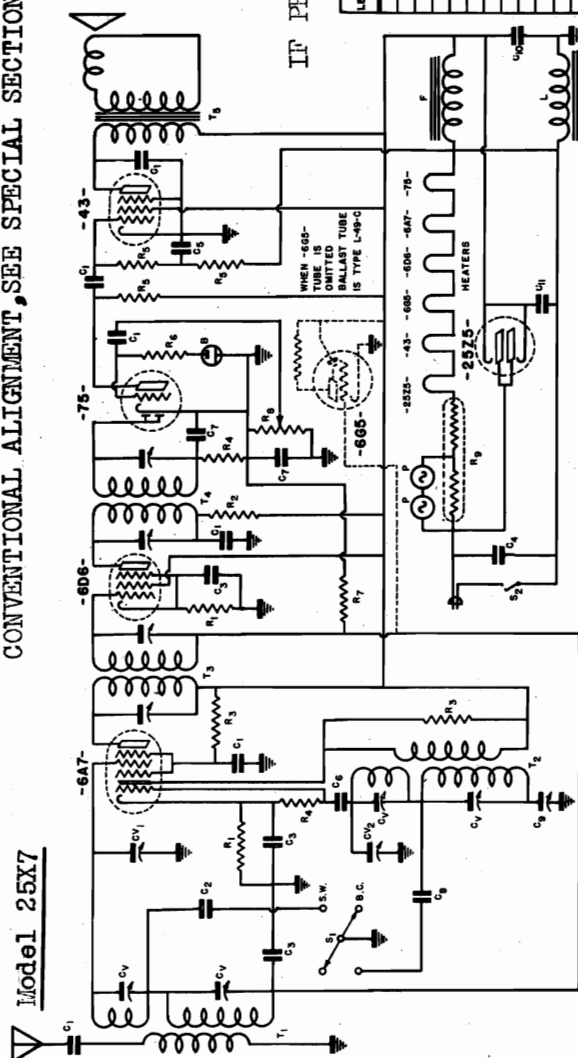




Model 25X7 Parts List

IT PEAK 456 KC

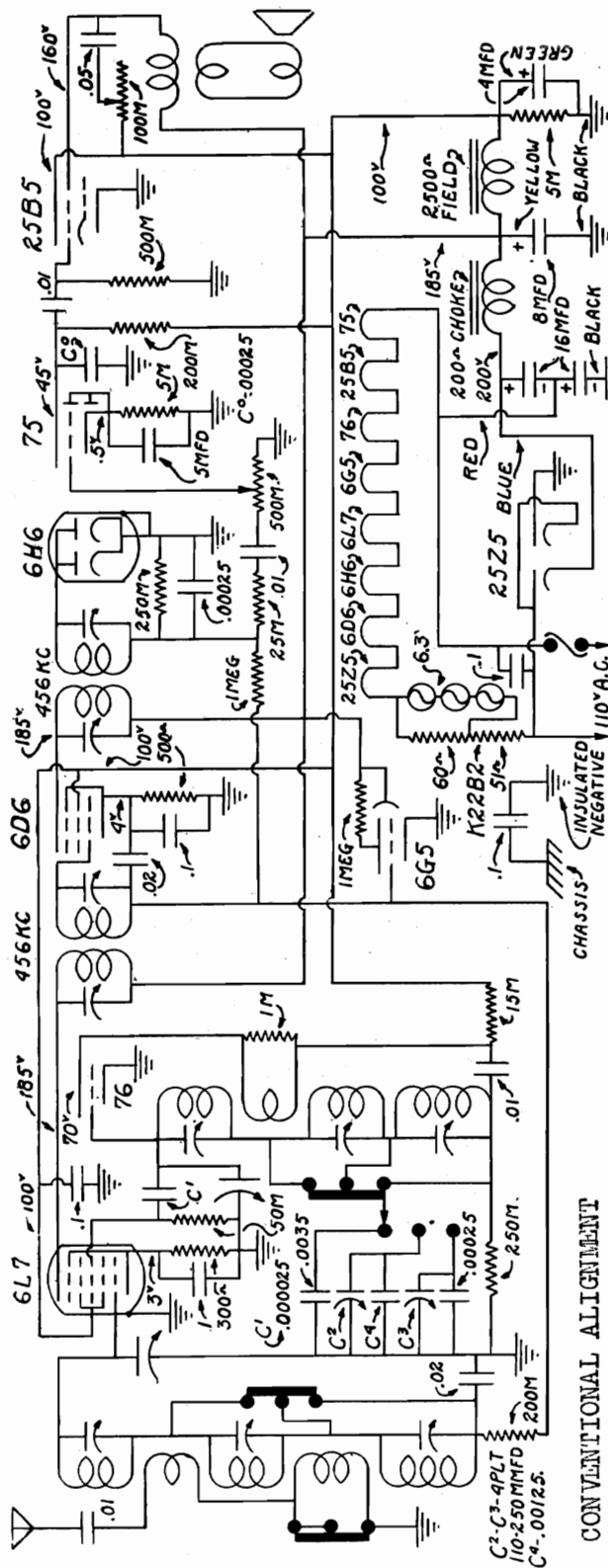
OUR LEGEND	DESCRIPTION
C1	01 MFD 400V. TUBULAR CONDENSER
C2	05 MFD 500V. TUBULAR CONDENSER
C3	203 .1 MFD 200V. TUBULAR CONDENSER
C4	210 .1 MFD 400V. TUBULAR CONDENSER
C5	38 MFD 500V. TUBULAR CONDENSER
C6	4001 MFD. MICA CONDENSER
C7	401 .0025 MICA CONDENSER
C8	411 .0018 MICA CONDENSER
C9	5 PLATE PADDING CONDENSER
C10	10 MFD 500 WAT ELECTROLYTIC COND.
C11	20 MFD 100 WAT ELECTROLYTIC COND.



MODEL 33B6
Schematics, Socket

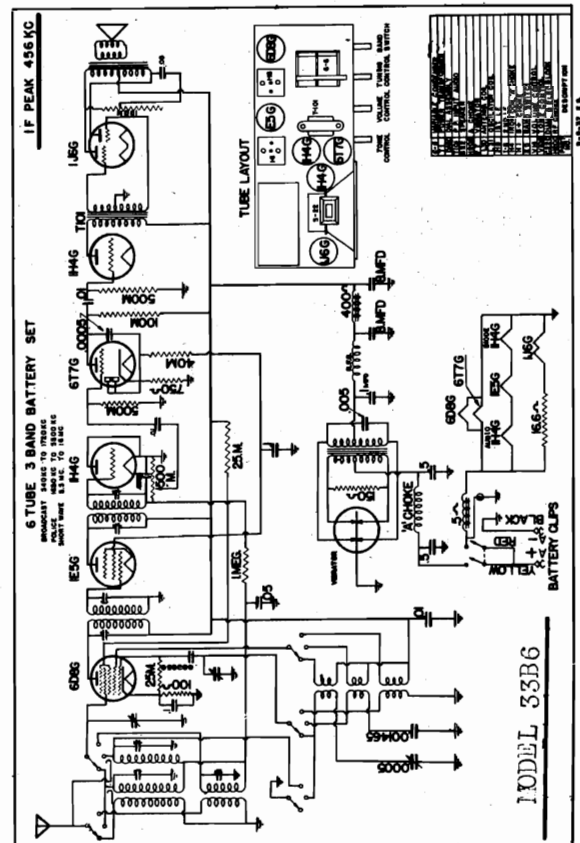
ZEPHYR RADIO CO.

MODEL 30X5
MODEL 30Y9
Above Ser. 707001



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

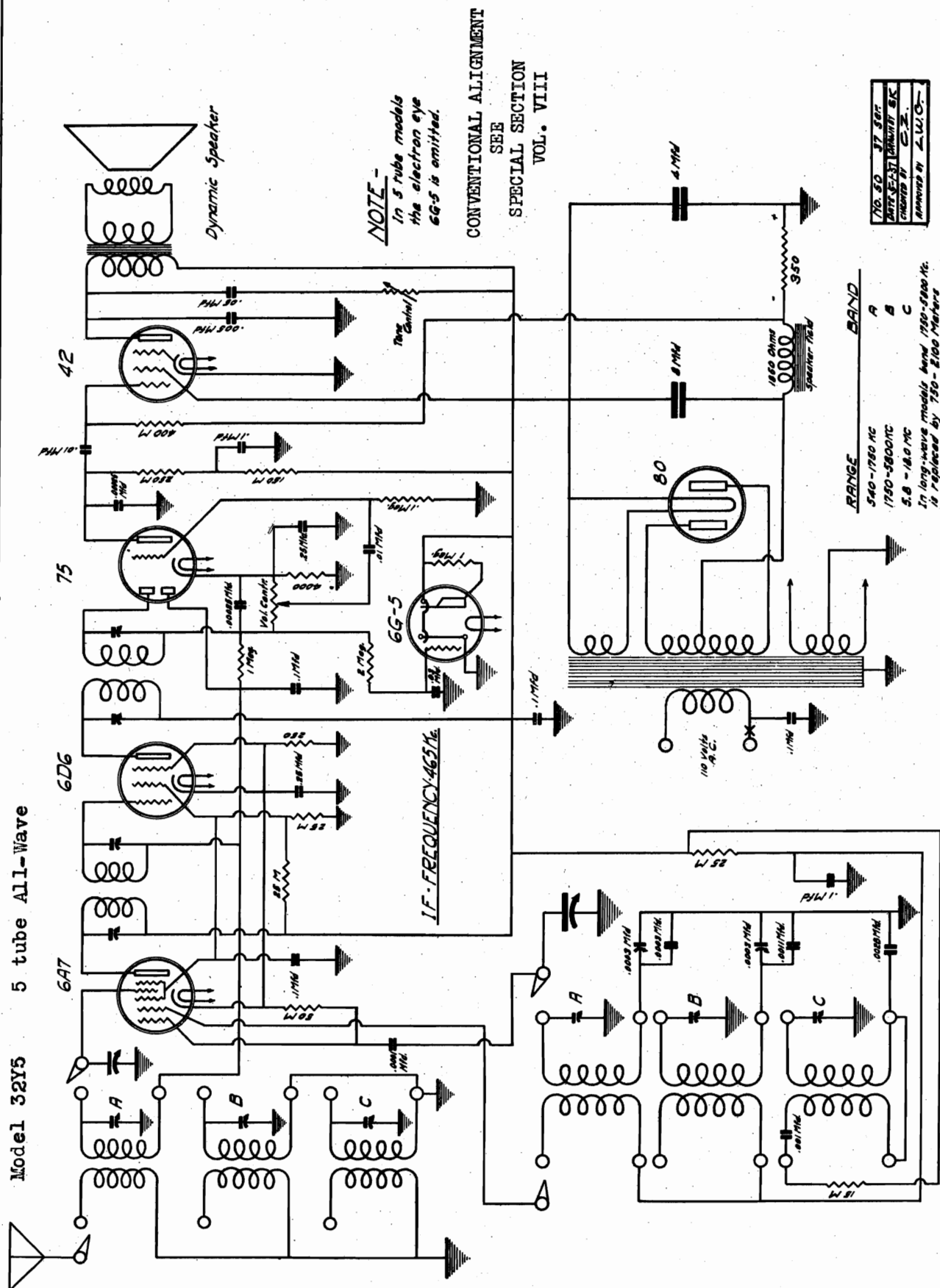
MODEL 30Y9
707001 AND UP. *Blum*
Zephyr Radio Co. Detroit, Mich.
IF Freq. 456 KC



MODEL 33B6

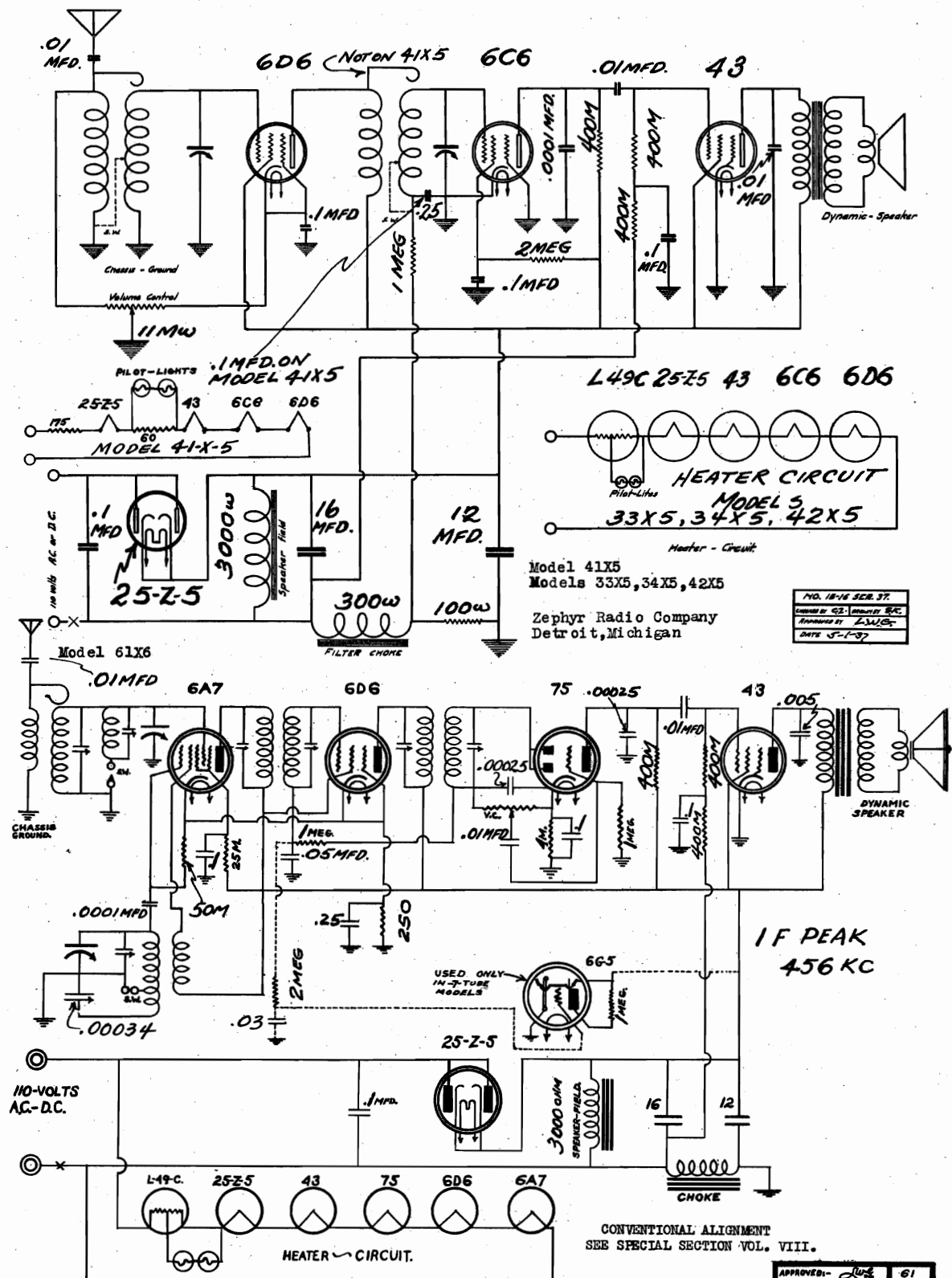
MODEL 32Y5
Schematic

ZEPHYR RADIO CO.



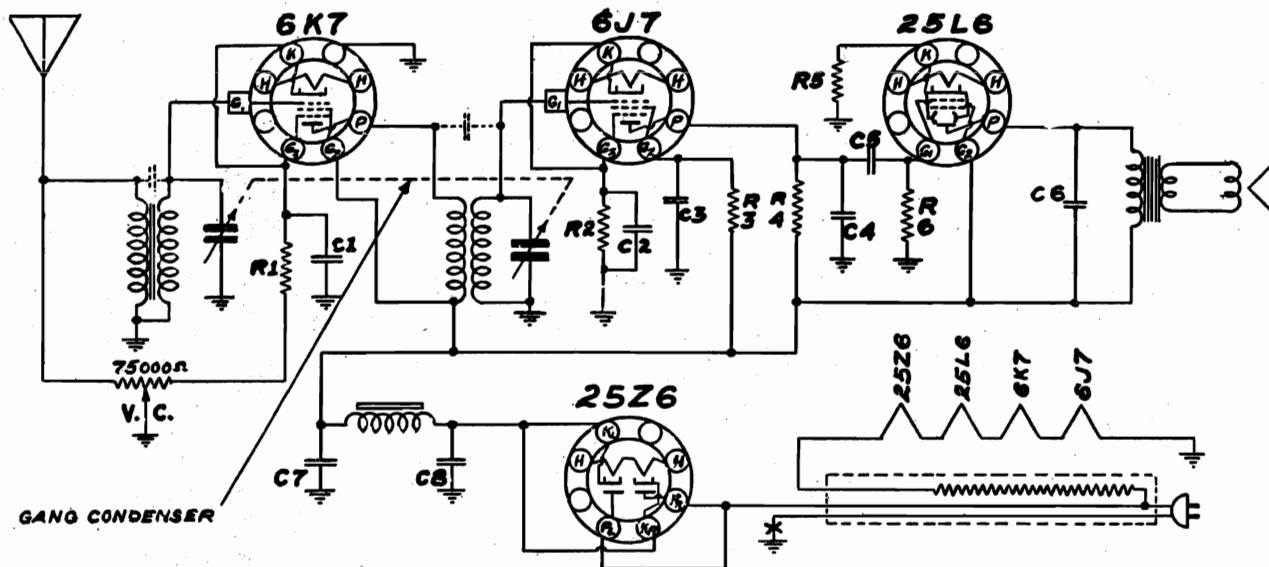
ZEPHYR RADIO CO.

MODELS 33X5, 34X5, 42X5
 MODEL 41X5
 MODEL 61X6
 Schematics



MODEL 39X4
MODEL 39Y6
Schematics

ZEPHYR RADIO CO.



CAPACITORS

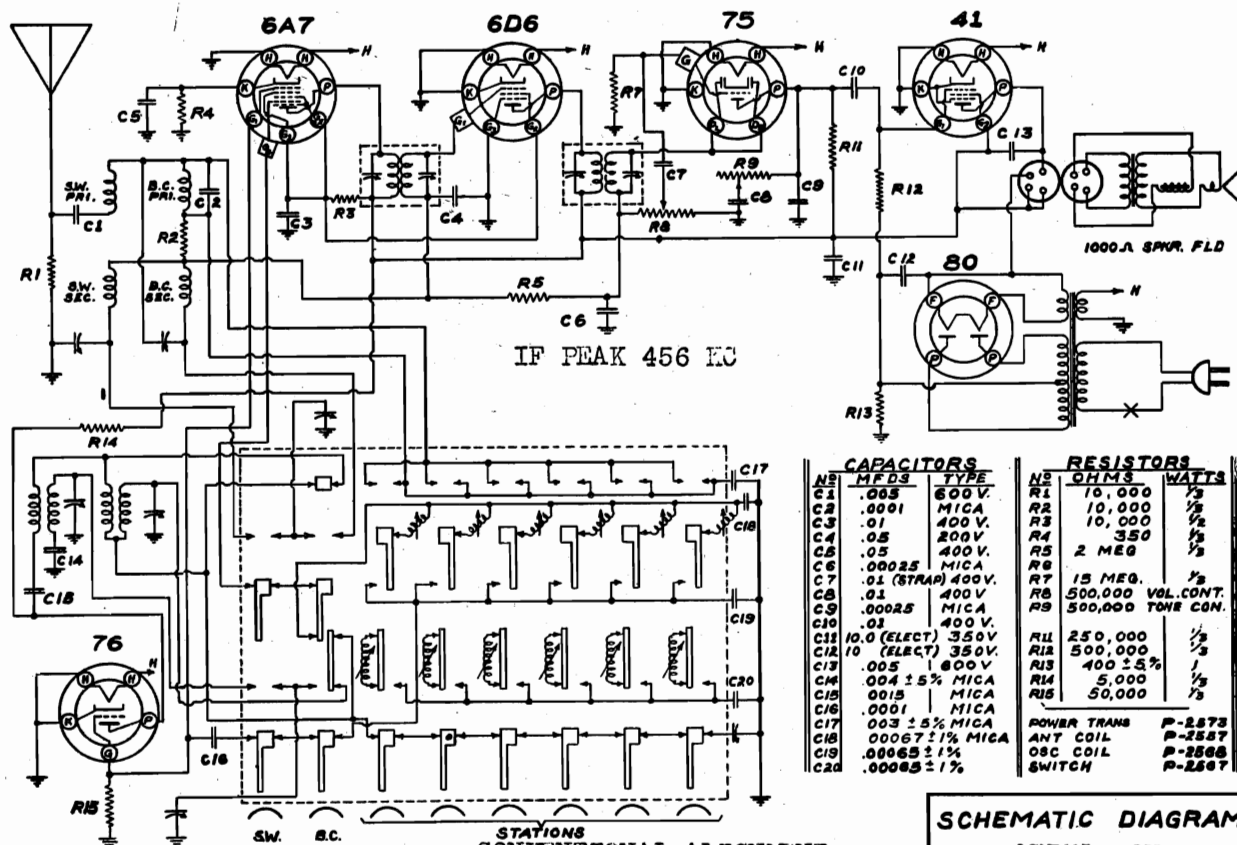
N ^o	MFD.	TYPE	N ^o	MFD.	TYPE
C1	.1	200V.	C5	.01	400V.
C2	.25	200V.	C6	.02	400V.
C3	.1	200V.	C7	10.0	ELECT.
C4	.00025	MICA	C8	30.0	ELECT.

RESISTORS

N ^o	OHMS	WATTS	N ^o	OHMS	WATTS
R1	250	1/4	R4	500,000	1/4
R2	25,000	1/4	R5	110	1/2
R3	2,000,000	1/4	R6	500,000	1/4

RESISTANCE OF LINE CORD 173 OHMS

SCHEMATIC DIAGRAM
MODEL 39X4



IF PEAK 456 KC

CAPACITORS

N ^o	MFD.	TYPE
C1	.005	600V.
C2	.0001	MICA
C3	.01	400V.
C4	.05	200V.
C5	.05	400V.
C6	.00025	MICA
C7	.01 (STRAP)	400V.
C8	.01	400V.
C9	.00025	MICA
C10	.01	400V.
C11	10.0 (ELECT)	350V.
C12	10 (ELECT)	350V.
C13	.005	600V.
C14	.004 ± 5%	MICA
C15	.0015	MICA
C16	.0001	MICA
C17	.003 ± 5%	MICA
C18	.00067 ± 1%	MICA
C19	.00065 ± 1%	MICA
C20	.00065 ± 1%	MICA

RESISTORS

N ^o	OHMS	WATTS
R1	10,000	1/2
R2	10,000	1/2
R3	10,000	1/2
R4	350	1/2
R5	2 MEG.	1/2
R6	15 MEG.	1/2
R7	500,000 VOL. CONT.	1/2
R8	500,000 TONE CON.	1/2
R9	250,000	1/2
R10	500,000	1/2
R11	400 ± 5%	1/2
R12	50,000	1/2
R13	50,000	1/2
R14	50,000	1/2
R15	50,000	1/2

POWER TRANS. P-2573
ANT. COIL P-2557
OSC. COIL P-2568
SWITCH P-2567

SCHEMATIC DIAGRAM
MODEL 39Y6

STATIONS
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.

MODEL 39Y6
Tuner
MODELS 40Y8, 40Y8C
Alignment, Tuner
Socket, Trimmers

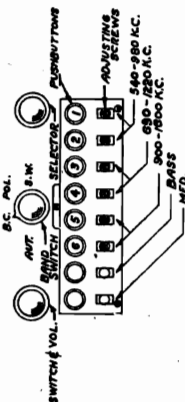
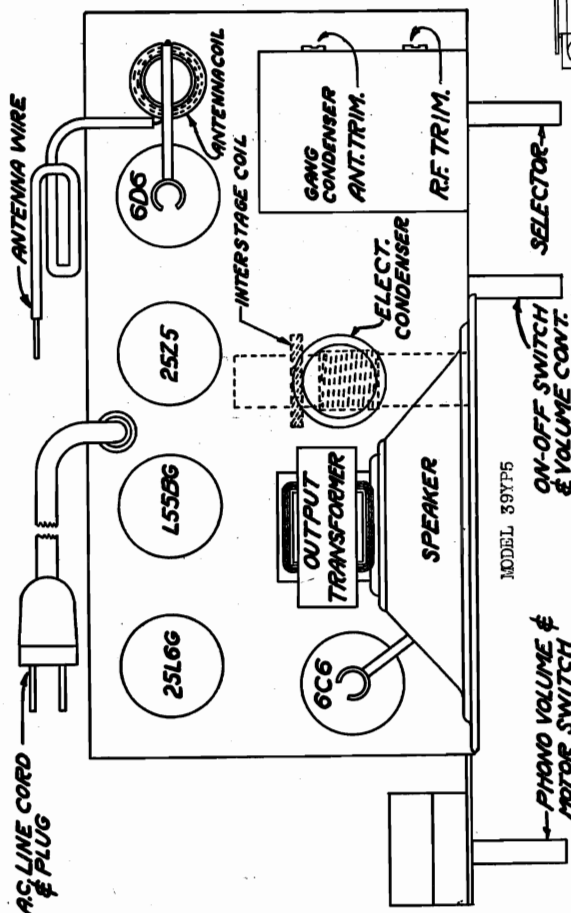
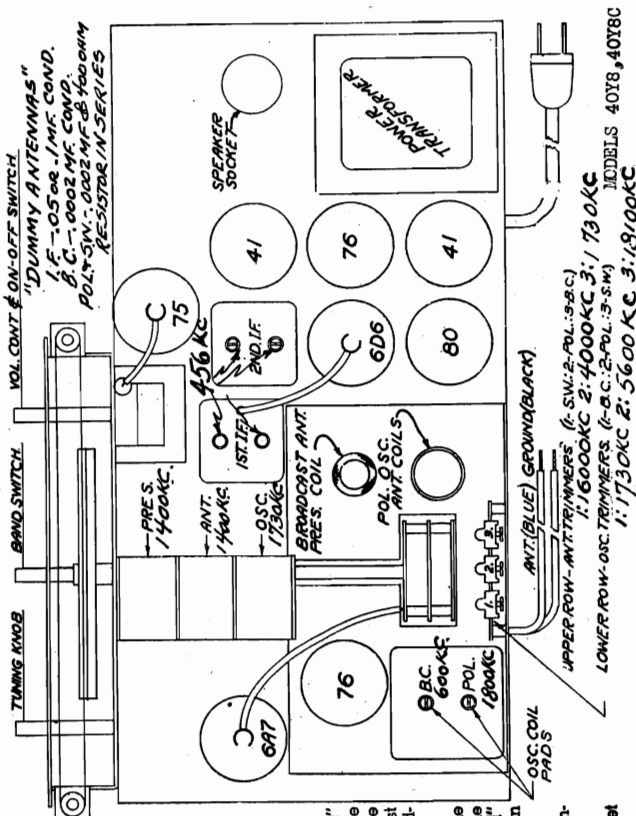
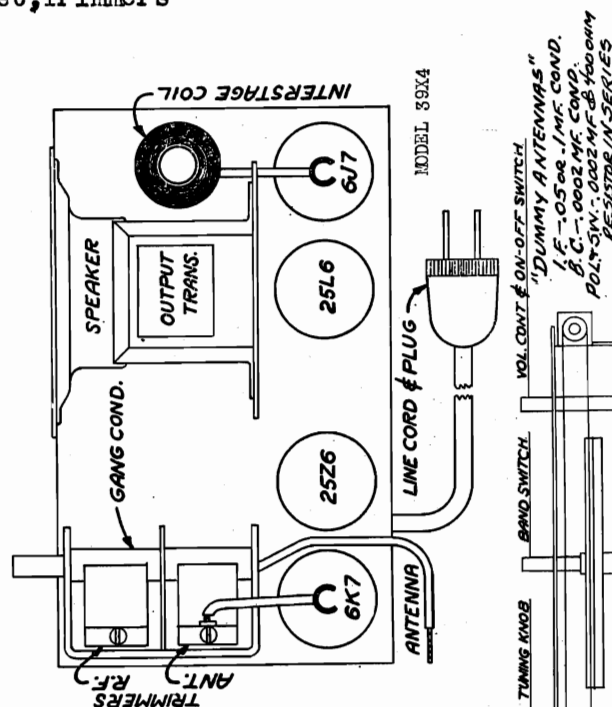


Fig. 1

PROCEDURE FOR SETTING UP AUTOMATIC PUSH BUTTONS

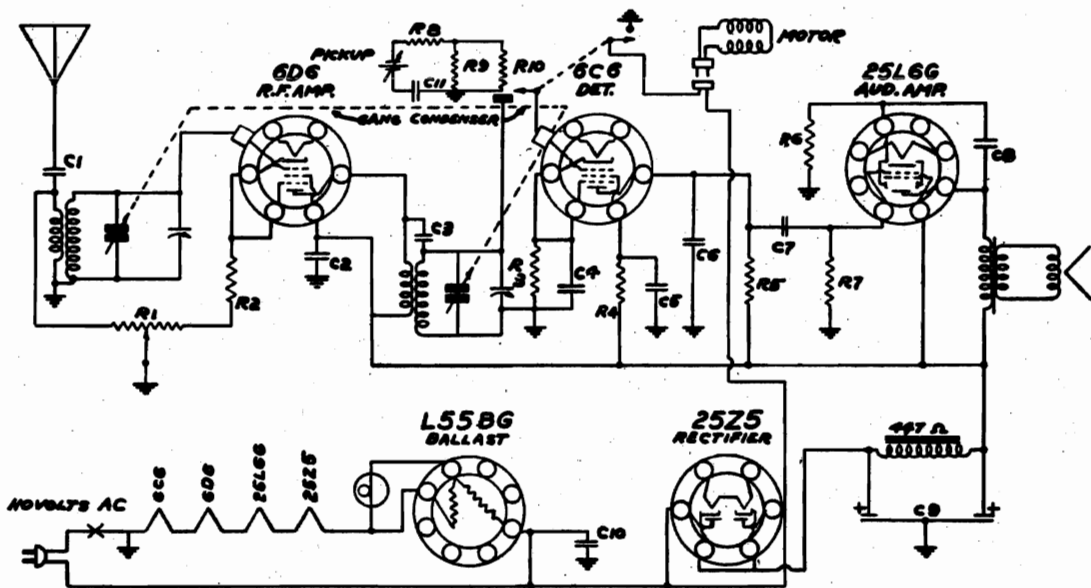
A glance at Fig. 1 will show that there are eight (8) push buttons, six (6) of which are for automatic use; the adjusting screws are located directly below these.

Fig. 1 also shows the tuning range or frequencies covered by each button.

The remaining two (2) push buttons, located at the extreme left hand end of the push button plate are for tone control.

1. Choose a station having a frequency within the range of button No. 1 (540 K.C. to 930 K.C.)
2. With the middle knob in the "broadcast" position, tune this station conventionally by using the selector knob.
3. Repeat the above procedure for the remaining five (5) stations.

ZEPHYR RADIO CO.

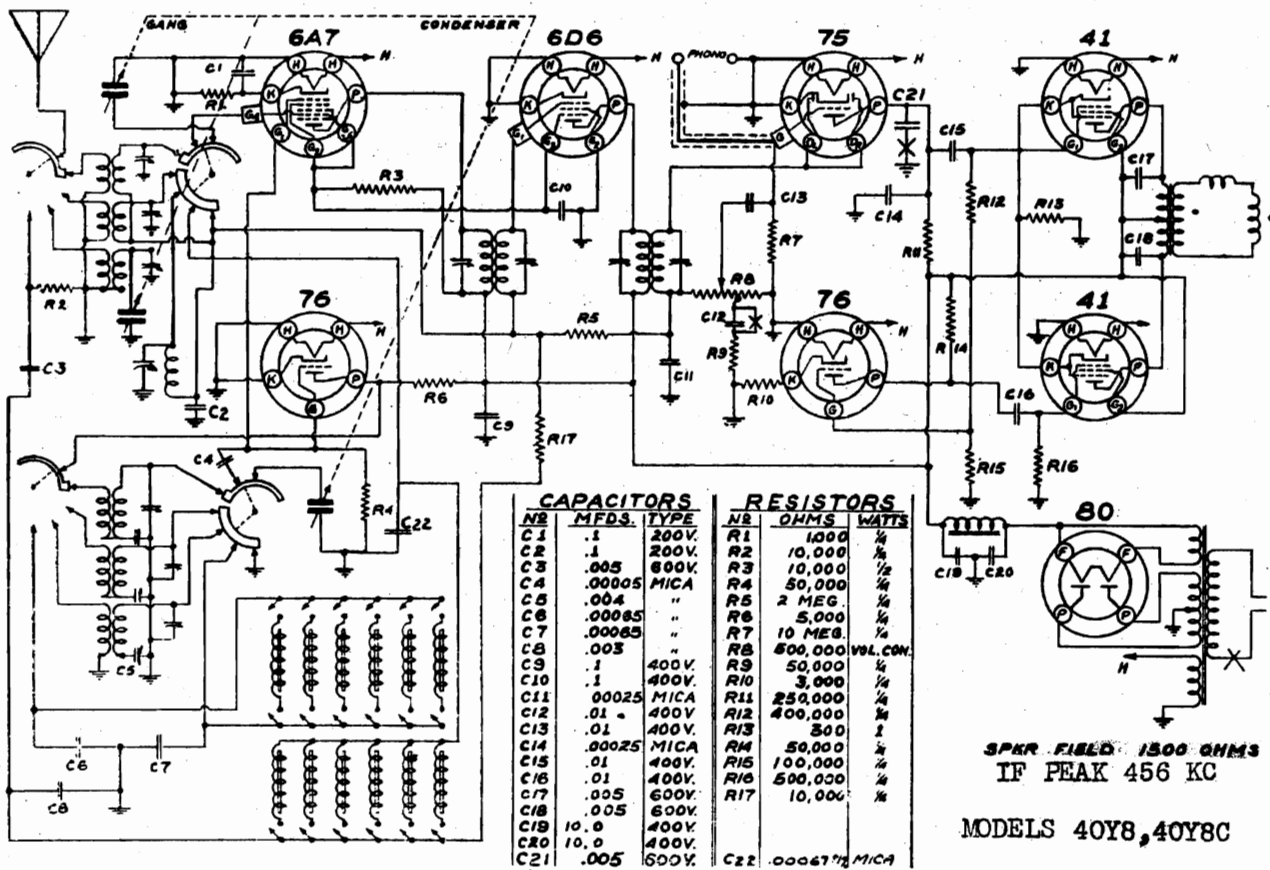


CONDENSERS		
NO.	CAPACITY.	TYPE
C1	.002 MFD	400V.
C2	.1 "	200V.
C3	1.5 u.f.	GIMMIK
C4	.25 MFD	200V.
C5	.1 "	200V.
C6	.0002 "	500V.
C7	.01 "	400V.
C8	.02 "	400V.
C9	16-16 "	150V. ELECT.
C10	.1 "	400 V.
C11	.005 "	500 V.

RESISTORS			
NR.	OHMS	WATTS	
R1	15,000		VOL. CONT.
R2	250	1/2	
R3	25,000	1/2	
R4	2,000,000	1/2	
R5	500,000	1/2	WIRE WOUND
R6	110	1/2	
R7	500,000	1/2	
R8	4,000,000	1/4	
R9	250,000	1/4	
R10	500,000		PHONO VO.

PHONO COMBINATION

MODEL 39YP5



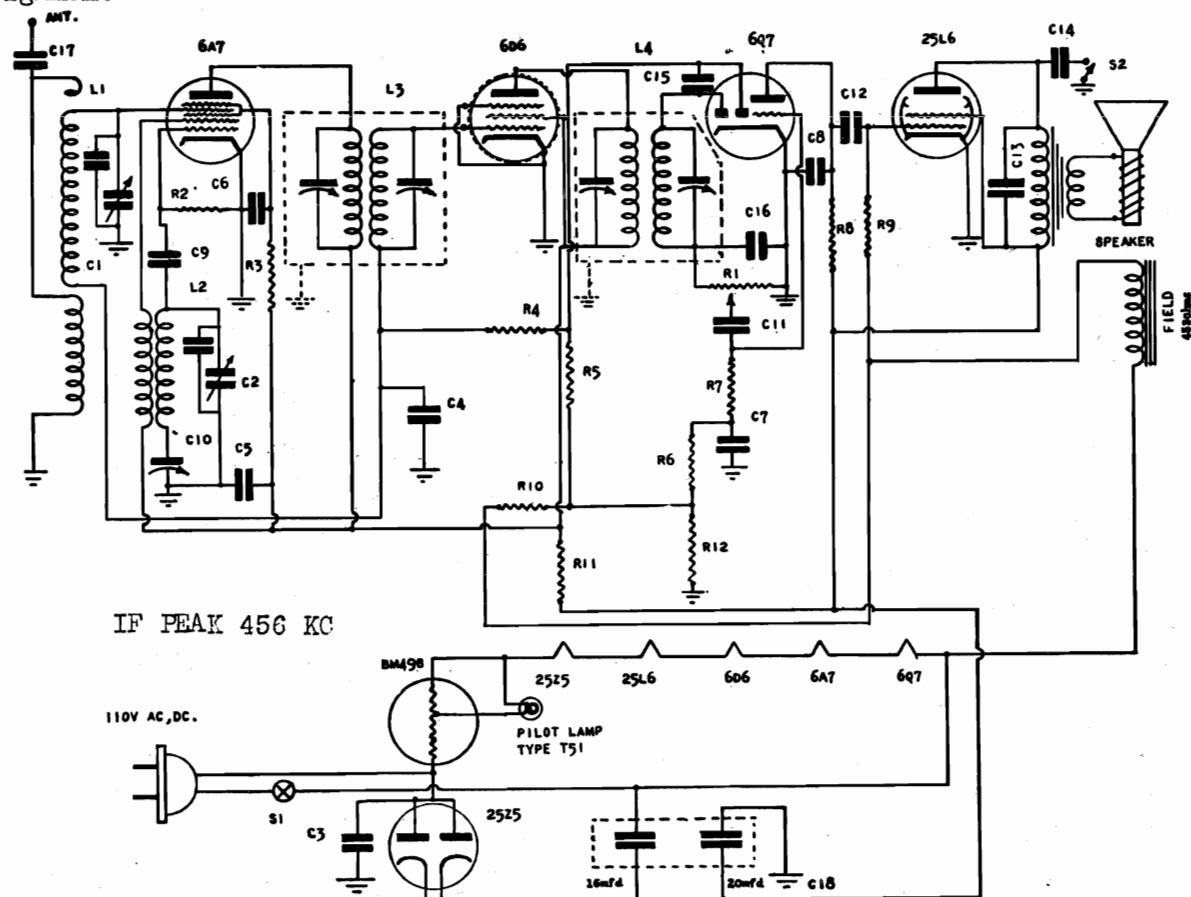
SPKR FIELD 1500 OHMS
IF PEAK 456 KC

MODELS 40Y8, 40Y8C

MODEL 41X6

Schematic
Alignment

ZEPHYR RADIO CO.



IF PEAK 456 KC

ALIGNMENT PROCEDURE

I. F. Alignment. Connect a signal generator set at 456kc to the 6A7 input and connect an output meter to the speaker output. Using a weak signal tune the two I. F. condensers on the first I. F. coil and the two I. F. condensers on the output I. F. coil for maximum response.

R. F. Alignment. Connect the signal generator set at 1400kc to the antenna lead using a dummy antenna of 200mmf. Tune the set by means of the dial to 1400kc position. Adjust oscillator trimmer for this frequency. Pad at 600kc. Recheck 1400kc and trim antenna stage for maximum response. Repeating the alignment may result in improved sensitivity.

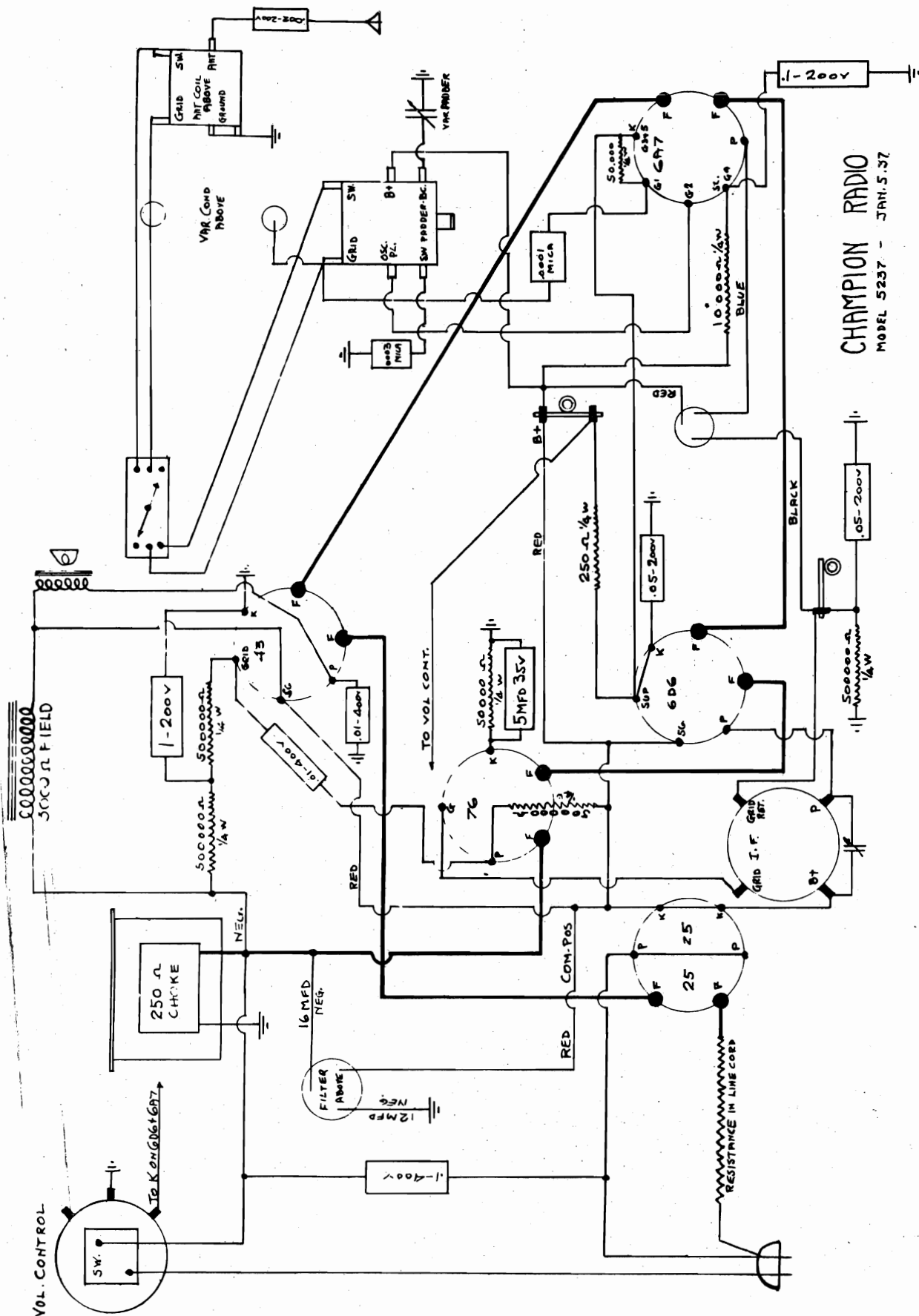
SCHEMATIC LOCATION	DESCRIPTION	PART NO.	LIST PRICE
L1	Antenna Coil	BA110	\$0.50
L2	Oscillator Coil	BO110	.40
L3	1st I.F. Coil	LC110	.80
L4	2nd I.F. Coil	LC112	.80
	Speaker	SD23	3.50
C1, C2	Tuning Condenser	CV25	1.80
C3, C4, C5, C6, C7	Fixed " .1mfd—200v		.20
C8, C9, C16	Mica " 200mmfd		.20
C15	Mica " 100mmfd		.20
C10	Variable Padder 550mmfd		.40
C11, C12, C13	Fixed Condenser .01mfd—200v		.20
C14	Fixed " .02mfd—600v		.20
C17	Fixed " .002mfd—600v		.25
C18	Electrolytic Condenser Block	CE20	1.40
S1	Line Switch (On Vol. Control)		
S2	Tone Control Switch	S12	.40
R1	Volume Control 1/4 megohm	RV18	.80
R2	Resistors 50,000 ohms—1/4 Watt		.15
R3	" 25,000 ohms—1/4 Watt		.20
R4, R5	" 2 megohms—1/4 Watt		.15
R6, R7	" 1 megohm—1/4 Watt		.15
R8, R9	" 1/4 megohm—1/4 Watt		.15
R10	" 1/2 megohm—1/4 Watt		.15
R11	" 100 ohms—1/2 Watt		.20
R12	" 30 ohms—1/4 Watt		.20
	" 25 ohms—1/4 Watt		.20

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

[illegible]

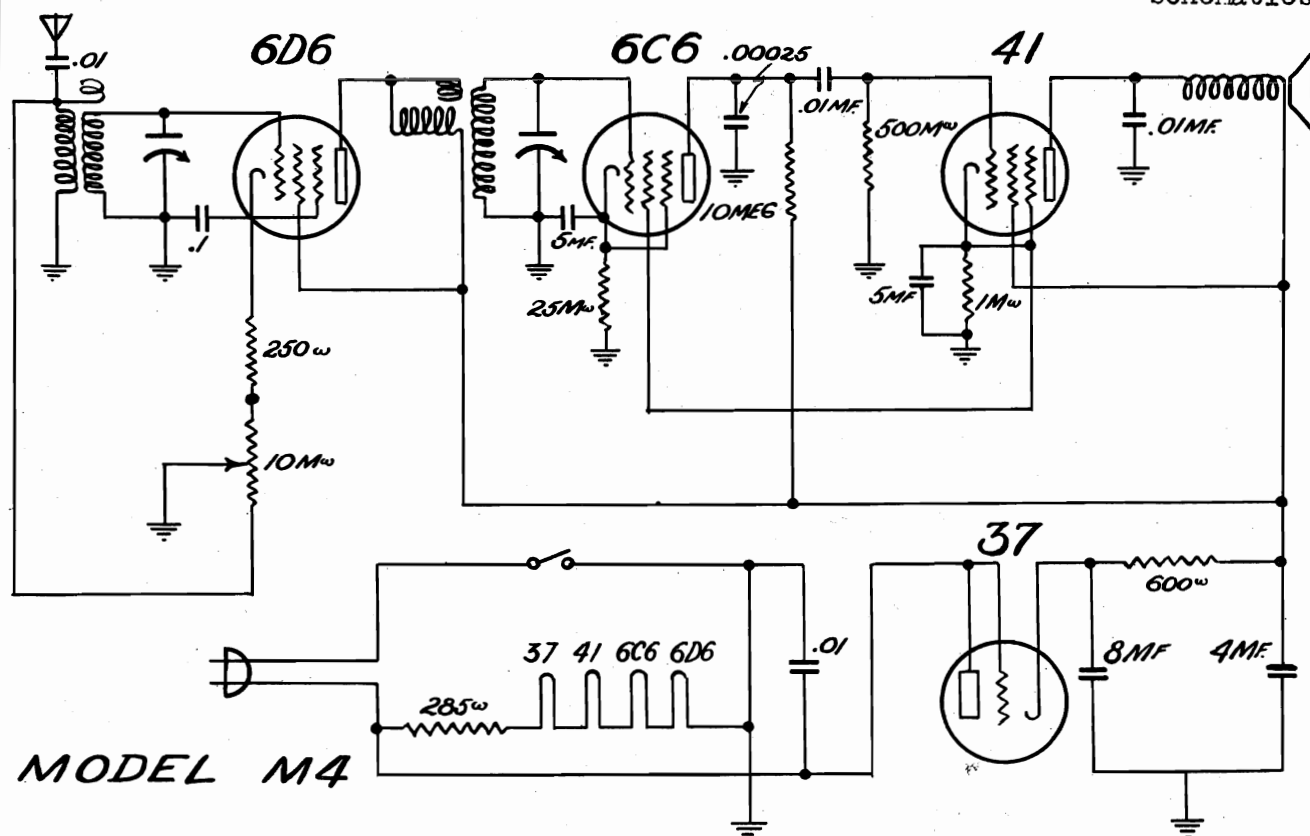
MODEL 5237
Schematic

CHAMPION RADIO



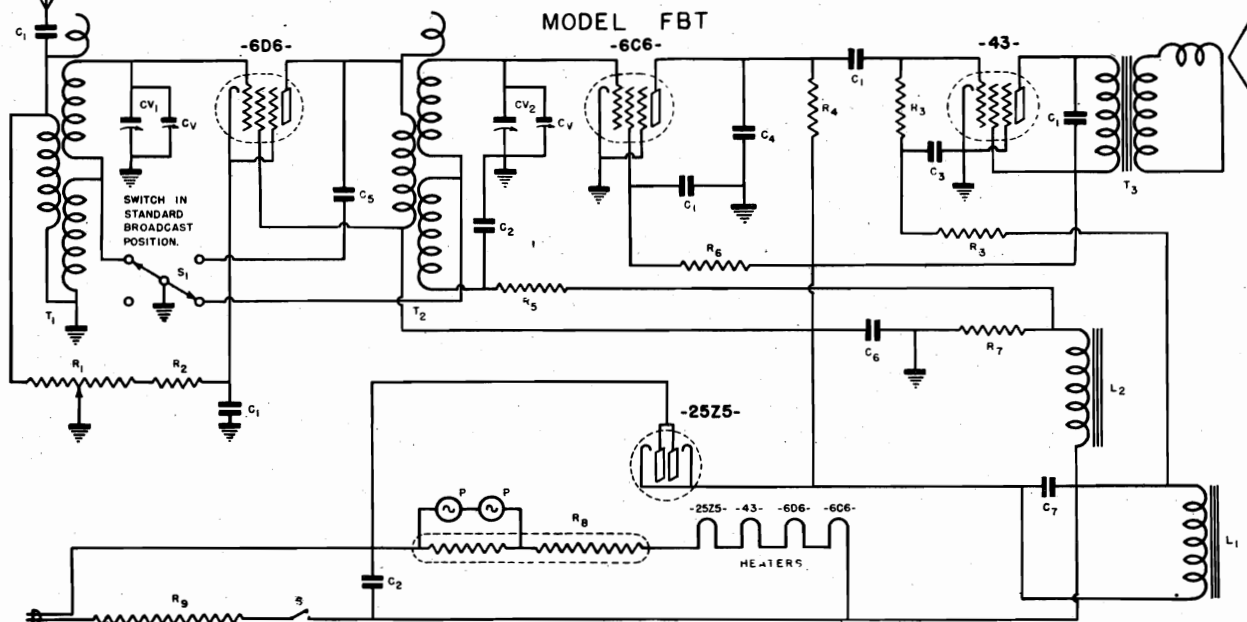
CLIMAX RADIO & TELEVISION CO., INC.

MODEL FBT
MODEL M4
late
Schematics



5 TUBE LONGWAVE 2 BAND TRF RECEIVER = AC-DC TYPE

MODEL FBT



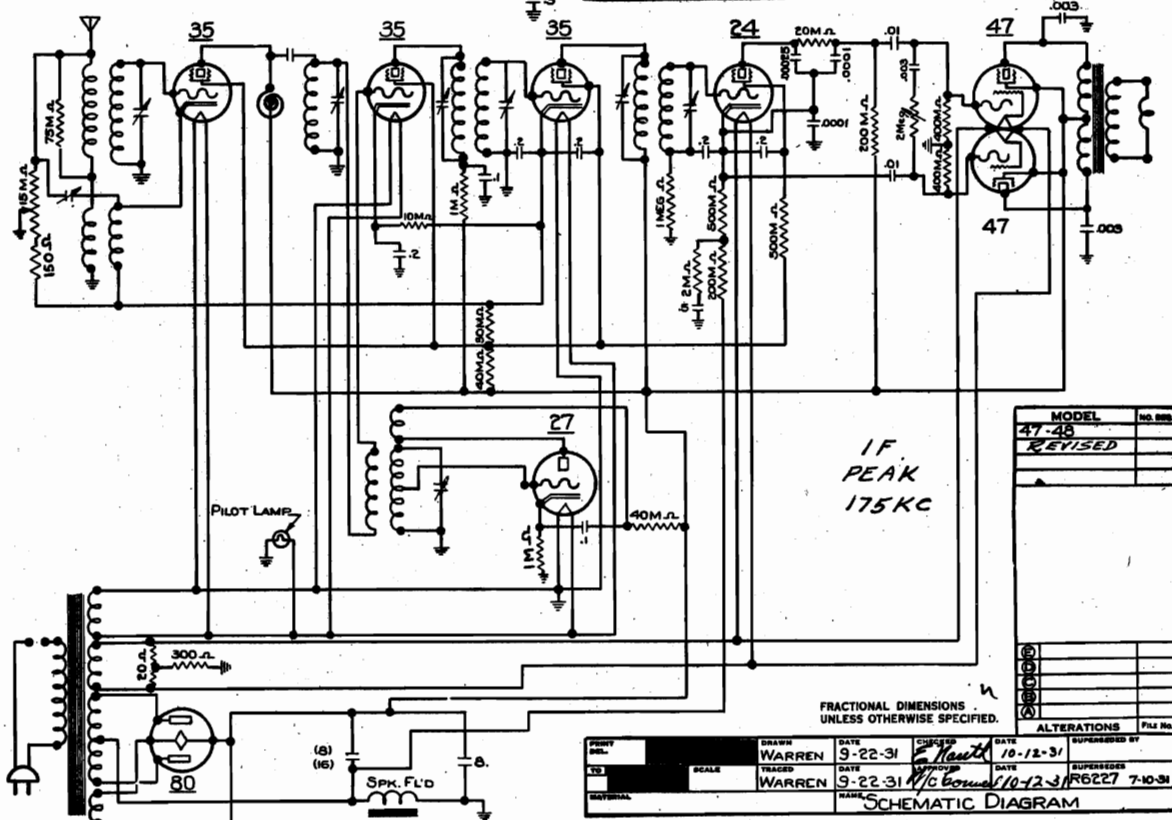
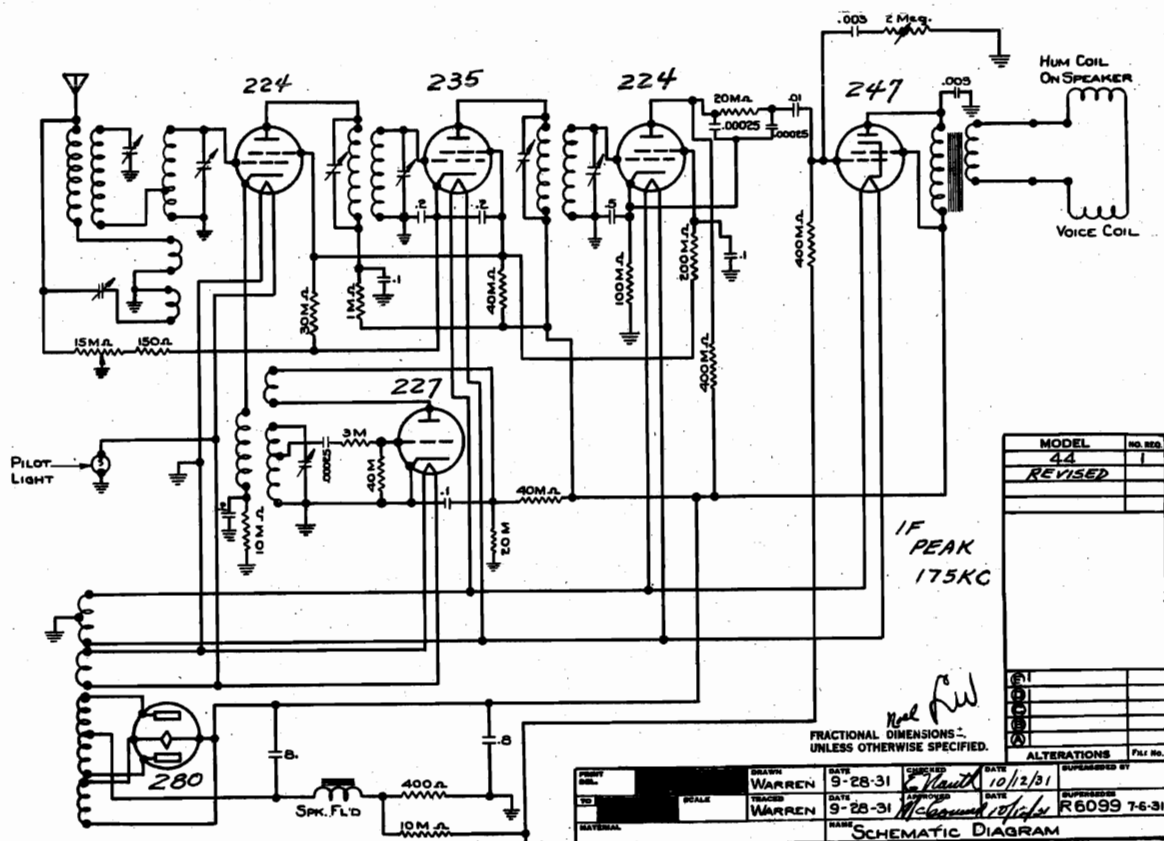
LEGEND	OUR PART NO.	DESCRIPTION
C ₁	211	.01 MFD-400V. TUBULAR CONDENSER
C ₂	210	.1 MFD-400V. TUBULAR CONDENSER
C ₃	204	.25 MFD-400V. TUBULAR CONDENSER
C ₄	401	.00025 MICA CONDENSER
C ₅	405	.0004 MICA CONDENSER
C ₆	314	10 MFD 150 W.V. ELECTROLYTIC COND.
C ₇	311	20 MFD 150 W.V. ELECTROLYTIC COND.
C ₈	815	2 GANG VARIABLE CONDENSER
C ₉	815	2 GANG VARIABLE CONDENSER
C ₁₀	815	2 GANG VARIABLE CONDENSER
C ₁₁	815	2 GANG VARIABLE CONDENSER
C ₁₂	815	2 GANG VARIABLE CONDENSER
C ₁₃	815	2 GANG VARIABLE CONDENSER
C ₁₄	815	2 GANG VARIABLE CONDENSER
C ₁₅	815	2 GANG VARIABLE CONDENSER
C ₁₆	815	2 GANG VARIABLE CONDENSER
C ₁₇	815	2 GANG VARIABLE CONDENSER
C ₁₈	815	2 GANG VARIABLE CONDENSER
C ₁₉	815	2 GANG VARIABLE CONDENSER
C ₂₀	815	2 GANG VARIABLE CONDENSER
C ₂₁	815	2 GANG VARIABLE CONDENSER
C ₂₂	815	2 GANG VARIABLE CONDENSER
C ₂₃	815	2 GANG VARIABLE CONDENSER
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C ₂₆	815	2 GANG VARIABLE CONDENSER
C ₂₇	815	2 GANG VARIABLE CONDENSER
C ₂₈	815	2 GANG VARIABLE CONDENSER
C ₂₉	815	2 GANG VARIABLE CONDENSER
C ₃₀	815	2 GANG VARIABLE CONDENSER
C ₃₁	815	2 GANG VARIABLE CONDENSER
C ₃₂	815	2 GANG VARIABLE CONDENSER
C ₃₃	815	2 GANG VARIABLE CONDENSER
C ₃₄	815	2 GANG VARIABLE CONDENSER
C ₃₅	815	2 GANG VARIABLE CONDENSER
C ₃₆	815	2 GANG VARIABLE CONDENSER
C ₃₇	815	2 GANG VARIABLE CONDENSER
C ₃₈	815	2 GANG VARIABLE CONDENSER
C ₃₉	815	2 GANG VARIABLE CONDENSER
C ₄₀	815	2 GANG VARIABLE CONDENSER
C ₄₁	815	2 GANG VARIABLE CONDENSER
C ₄₂	815	2 GANG VARIABLE CONDENSER
C ₄₃	815	2 GANG VARIABLE CONDENSER
C ₄₄	815	2 GANG VARIABLE CONDENSER
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C ₄₆	815	2 GANG VARIABLE CONDENSER
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C ₇₀	815	2 GANG VARIABLE CONDENSER
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C ₇₉	815	2 GANG VARIABLE CONDENSER
C ₈₀	815	2 GANG VARIABLE CONDENSER
C ₈₁	815	2 GANG VARIABLE CONDENSER
C ₈₂	815	2 GANG VARIABLE CONDENSER
C ₈₃	815	2 GANG VARIABLE CONDENSER
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C ₈₅	815	2 GANG VARIABLE CONDENSER
C ₈₆	815	2 GANG VARIABLE CONDENSER
C ₈₇	815	2 GANG VARIABLE CONDENSER
C ₈₈	815	2 GANG VARIABLE CONDENSER
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C ₉₀	815	2 GANG VARIABLE CONDENSER
C ₉₁	815	2 GANG VARIABLE CONDENSER
C ₉₂	815	2 GANG VARIABLE CONDENSER
C ₉₃	815	2 GANG VARIABLE CONDENSER
C ₉₄	815	2 GANG VARIABLE CONDENSER
C ₉₅	815	2 GANG VARIABLE CONDENSER
C ₉₆	815	2 GANG VARIABLE CONDENSER
C ₉₇	815	2 GANG VARIABLE CONDENSER
C ₉₈	815	2 GANG VARIABLE CONDENSER
C ₉₉	815	2 GANG VARIABLE CONDENSER
C ₁₀₀	815	2 GANG VARIABLE CONDENSER

LEGEND	OUR PART NO.	DESCRIPTION
R ₁	2006	10,000 OHM VOLUME CONTROL
R ₂	—	250 OHM (Minimum on Volume Control)
R ₃	116	250,000 OHM 1/2 WATT CARBON RESISTOR
R ₄	117	500,000 OHM 1/2 WATT CARBON RESISTOR
R ₅	119	1 MEGOHM 1/2 WATT CARBON RESISTOR
R ₆	120	3 MEGOHM 1/2 WATT CARBON RESISTOR
R ₇	139	65 OHM 1/2 WATT CARBON RESISTOR
R ₈	2904	L-55-C BALLAST TUBE

LEGEND	OUR PART NO.	DESCRIPTION
R ₉	18 J1	285 OHM RESISTOR CORD
T ₁	1208	LONG WAVE ANTENNA COIL
T ₂	1307	LONG WAVE R.F. COIL
T ₃	1307	IN 800 SPEAKER TRANSFORMER
L ₁	1100	FILTER CHOKE
L ₂	1100	IN 800 SPEAKER FIELD (2500 OHMS)
S ₁	1914	BAND SELECTOR SWITCH
S	—	SWITCH ON VOLUME CONTROL
P	2902	MAZDA #46 PILOT LIGHT

MODEL 44 Revised
MODELS 47,48 Revised
Schematics

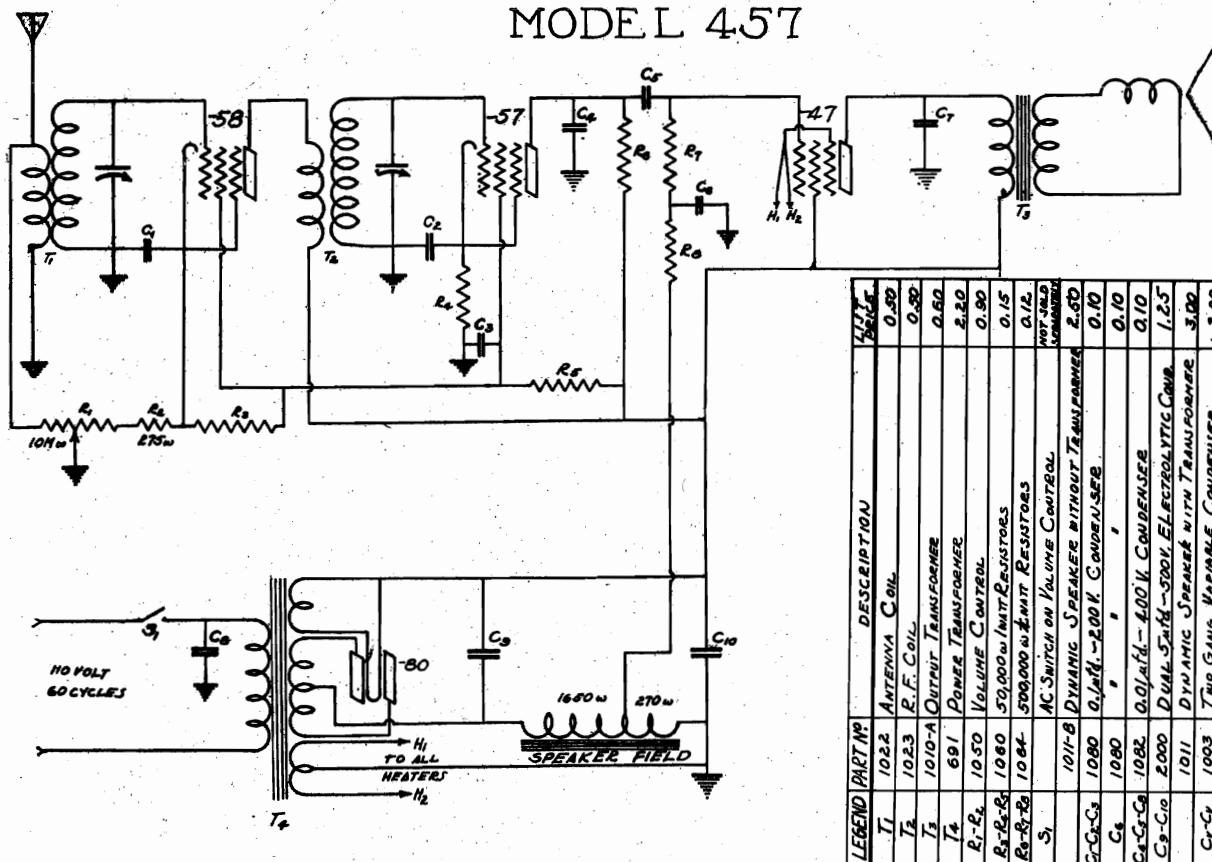
COLONIAL RADIO CORP.



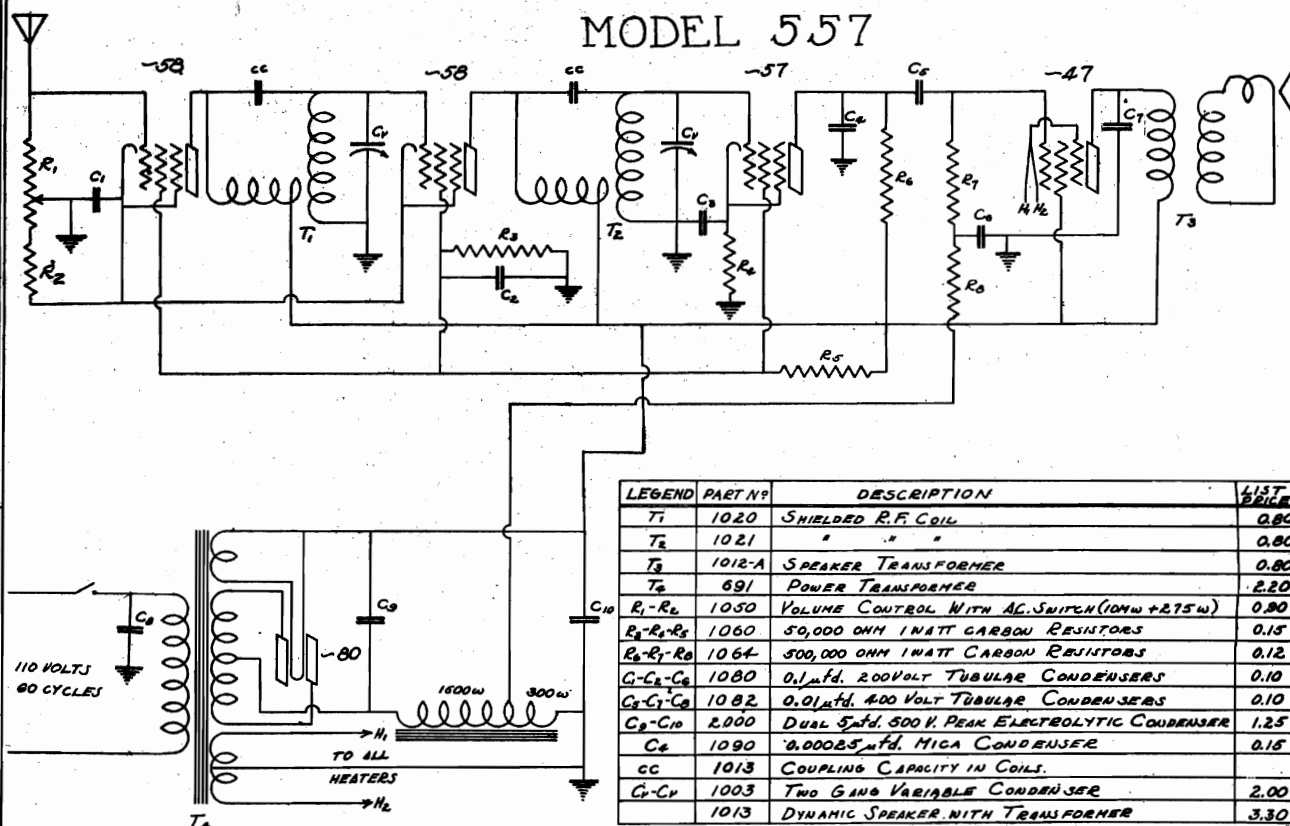
GENERAL TELEVISION, INC.

MODEL 457
MODEL 557
Schematics

MODEL 457



MODEL 557



[illegible]

Location on Circuit	Part No.	Description	Selling Price
1	2403	Antenna Tank	\$.15
2	2404	Antenna	2.40
3	2388	Antenna Coil	.40
4	2389	Oscillator Coil	.51
5	2390	1st I.F. Coil	.80
6	2390	2nd I.F. Coil	.80
7	2400	Variable Condenser	1.65
8	1431-1	Padder 600 KU	.37
9	2361	Electrolytic 16-16 MF- 150V	.64
10	1345-S	Volume Control & Switch	.76
11	2387	Dial Scale	.85
12	2388	Pinpoint 45.5V	.15
13	2359	Resistor 1/4 W 150V	.16
14	2387	Speaker (dial)	.16
15	2366-A	Pointer 5" dynamic	2.00
16	2388	Output Transformer	.57
17	2388	Dial Assembly	

ALIGN IF AT 456 KC
ALIGN RE. AT 1500 KC THEN PAD AT 600 KC
BY KOKING CONDENSER TO THE HIGHEST
PEAK THEN REALIGN AT 1500 KC

CHASSIS LAYOUT MODEL A55

Five Tube Superheterodyne, Broadcast And Police Receiver.

110 to 120 Volts, AC or DC, Alternating or Direct Current.

Broadcast Band - 545 Kilocycles (540 Meters) to 1550 Kilocycles (195 Meters).

Police Band - State and Municipal Police - 1600 Kilocycles
(190 Meters) to 1750 Kilocycles (170 Meters)
(120 meters).

Five tubes as follows:
6XBGT, 6K7GT, 6Q7GT, 25L6GT, 25Z6GT.

ANTENNA

The antenna built into this set will perform with best results in most localities. However in localities more than 100 miles from a broadcasting station an outdoor antenna of 50 to 75 feet attached to the end of the built-in antenna will be sufficient to give the best performance. THIS RECEIVER WAS DESIGNED TO OPERATE WITHOUT A GROUND. UNDER NO CIRCUMSTANCES SHOULD A GROUND WIRE BE PERMITTED TO COME IN CONTACT WITH ANY METAL PART OF THIS RECEIVER.

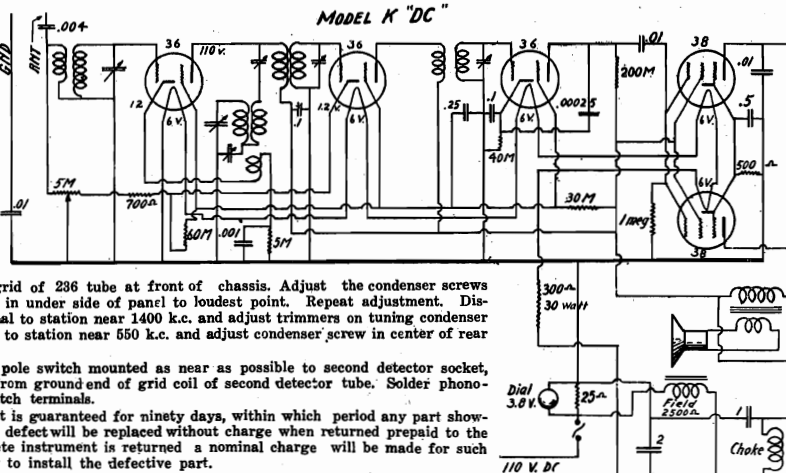
LINE VOLTAGE

TUNING RANGES

STUDYERS

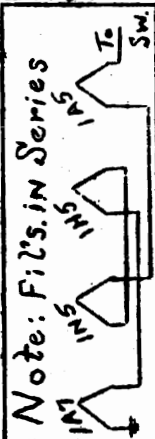


GUARANTEE: This instrument is guaranteed for ninety days, within which period any part showing electrical or mechanical defect will be replaced without charge when returned prepaid to the factory, but if the complete instrument is returned a nominal charge will be made for such labor as may be necessary to install the defective part.



MODEL 55 Portable
Schematic, Socket
Trimmers

SETCHELL CARLSON, INC.



BATTERIES

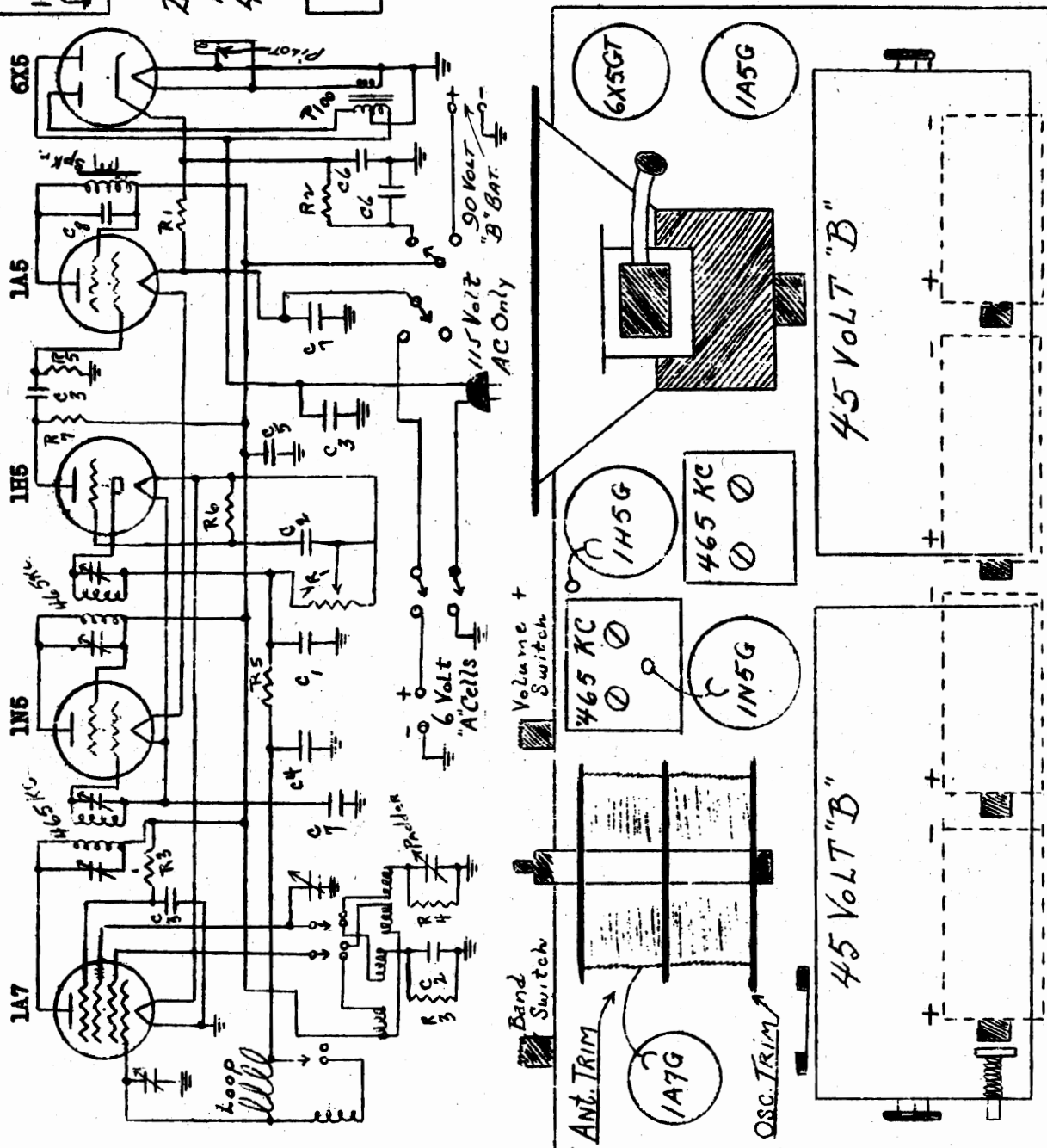
2-45V- $\frac{1}{2}$ " (Portable Size)
AVG. LIFE - 6 MONTHS
4-REGULAR FLASH LIGHT
CELLS - AVG LIFE-100 Hrs
115 Volts - AC only
60 cycles - 12 Watts

Resistors	
R ₁ - 2500 ohms	10 watt
R ₂ - 3000 ohms	1/2 watt
R ₃ - 50M ohms	..
R ₄ - 100M ohms	..
R ₅ - 1 megohm	..
R ₆ - 15 megohms	..
R ₇ - 200M ohms	..
VR ₁ - 500M ohms	V.C.-Sw.
Condensers	
C ₁ - .0001	600 Volt.
C ₂ - .002	600 ..
C ₃ - .01	400 ..
C ₄ - .1	200 ..
C ₅ - .25	400 ..
C ₆ - 20	200 ..
C ₇ - 75	20 ..
C ₈ - .001	600 ;;

CAUTION

DO NOT CHANGE TUBES
WHEN SET IS TURNED ON.

Setchell-Carlson - - - - - PORTABLE "55"



Arvin 618, 618A, etc.

In order to eliminate the hum in the chassis used in these and other six-tube models, follow this procedure:

Remove the chassis from the cabinet. Locate the ground lug on the 6Q7G tube socket (see chassis layout on page 8-16 of *Rider's Volume VIII*). This lug is fastened to the chassis by a rivet which attaches the 6Q7G socket to the chassis. Bend this lug over and solder it to the chassis and then recheck for hum. If this is soldered correctly, the hum level should be brought to a minimum.

Pilot X114, X115

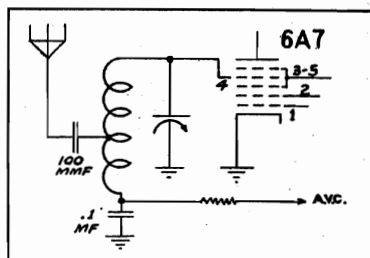
Changes have been made in the chassis used in these models, which have a similar schematic to the one shown on page 6-15 in *Rider's Volume VI*. The condensers C32 and C33 in the plate circuit of the second detector have been removed from the circuit, so that now the switch S3 is used to short out only the one condenser, C34, which now has a value of 250 mmf.

The value of the 10,000-ohm resistor No. 26 has been changed to 6,000 ohms. This is in the primary circuit of the pushpull input transformer.

A line condenser (1000-volt, paper) has been added across the primary of the power transformer. This is a dual condenser, grounded between the 0.01-0.01 mf sections.

Automatic 960A

The accompanying partial schematic shows a change which was incorporated in the 960 series, the schematic of which is shown on page 9-2 in *Rider's Volume IX*. Note also that the receivers in which this change has been made have an i-f peak of 480 kc, instead of 456 kc and that they are identified by the letter "A" after the model number.



New antenna circuit of the Automatic 960 A Series.

Arvin 818, 828, etc.

In order to reduce the hum level of the models in which the 8-tube chassis is used, follow this procedure:

Remove the chassis from the cabinet. Unsolder the 250,000-ohm plate resistor of the 6F5G tube from the B+ terminal, which is the lug on the 16-mf—300 volt electrolytic condenser. See chassis layout on page 8-20 of *Rider's Volume VIII*. Connect this resistor to the first tap down from B+ on the voltage divider resistor R87. This voltage tap supplies the potential for the 6A8G anode grid. Recheck for hum, which now should be reduced to a satisfactory level.

Oldsmobile 982043

In some of the early receivers (under serial A-20,000) of this model, several differences exist which should be noted on page 9-1 in *Rider's Volume IX*.

Resistor No. 46 is 100,000-ohms instead of 20,000.

Resistor No. 54 is 125,000 instead of 100,000-ohms and No. 55 is 75,000 instead of 100,000-ohms.

Resistor No. 44 and condenser No. 26 have been transposed, i.e. the resistor is connected to the grounded end of resistor No. 53 instead of the condenser.

The value of condenser No. 82 is indicated as 0.000063-mf and its connections are as follows: one terminal is connected to the junction of condenser No. 26 and the tap from resistor No. 58 and the other terminal is connected to the junction of condenser No. 18 and the left end of resistor No. 58.

Emerson Chassis AF

Receivers using this chassis and bearing serial numbers above 1,244,716 differ from the schematic shown on page 8-45 in *Rider's Volume VIII*. The condenser C-17 is omitted and the negative side of the filament circuit is grounded to the chassis.

Fairbanks-Morse 9A

Refer to the schematic shown on page 8-9 of *Rider's Volume VIII*. During production, the 47,000-ohm resistor (8) and the filter condenser (7) were removed and the r-f secondary was grounded directly, thus removing AVC from the 6L7G mixer tube. The bottom of the antenna coil secondary was then connected directly to the 1-meg-ohm resistor (9). A 1000-ohm variable resistor was added in the cathode circuit of the 6J7G AFC control tube (at 37) to make possible compensation for variation in calibration due to variation in tube characteristics. This control was found unnecessary and was removed in later runs.

Fairbanks-Morse 8A

Refer to schematic shown on page 8-7 of *Rider's Volume VIII*. During production, the 47,000-ohm resistor (16) and the 0.05-mf condenser (7) were removed and the r-f secondary was grounded directly, thus removing AVC from the 6L7G mixer tube. The bottom of the antenna coil secondary was then connected directly to the 470,000-ohm resistor (17).

G.E. G-57

This model is identical to model G-55, except for the cabinet and the loud speaker, which has a part number RS-095. The 12-inch cone of this unit has a part number RC-943.

The servicing data for model G-55, found on pages 9-3, 9-4, and 9-5 of *Rider's Volume IX*, apply to the G-57. This additional model number should be added to the listing in your Index.

Stromberg-Carlson Push-Button Tuners

The push buttons on all the new receivers, such as those whose servicing data are found in *Rider's Volume IX*, which employ padding condensers for tuning purposes are set up from the front of the chassis. It is unnecessary to get into the back of the receiver to set up the desired stations, except to adjust the electric tuning switch on the rear of the chassis.

To set up the stations, it is only necessary to remove the escutcheon over the push buttons and the adjusting screws become readily accessible. These escutcheons are held in place by several Phillips type screws, which can be removed with any small pointed instrument, such as a small nailfile or an old knife blade. However, the use of a special tool is recommended, as this will not mar the surface of the screw head.

DeWald 1106

This model is identical with the Models 1104 and 1105, shown on pages 9-1 and 9-10 of *Rider's Volume IX*, except that the new model has an additional short-wave band for the 14-40 mc range, giving it a total of five bands.

RCA 8M3, 8M4

On 8M3 and 8M4 receivers, it is often advantageous to connect the 22-mmf condenser (C1, on page 9-37 of *Rider's Volume IX*) from the output end of coil L1 to ground, instead of from the antenna end. Later runs of sets include this change. Note also that good electrical contact is required between vibrator-transformer and chassis to minimize internal noise.

Majestic 11356

This model is found on pages 9-8, 9-11 and 9-12 of *Rider's Volume IX*. A new electric tuning system has been incorporated in later runs of this receiver and is illustrated in Fig. 1. The procedure for indexing this tuning system for desired stations is as follows:

- (1) Set receiver to Standard Broadcast band.
 - (2) Place "Manual-Electric" lever in "Manual" position, which is extreme counter-clockwise. Be sure the tone control is in the "Normal" position as shown by the indicator.
 - (3) Pull out Indexing Rod located at center bottom half of the escutcheon. This rod has numbers on it which correspond to the push buttons (counting from left to right.)
 - (4) Set Indexing Rod so that the number on the rod corresponding to the push button you wish to index is in line with the escutcheon plate.
 - (5) Turn tuning knob until the pointer has covered the entire dial. This is essential to engage the tuning disc.
 - (6) Tune in the desired station accurately, using the tuning eye.
 - (7) Push Indexing Rod all the way in, and that particular station will always be tuned in automatically when that particular button is depressed while the "Manual-Electric" lever is in the "Electric" position.
- To index more than one station, go through steps (3) to (6) for each station desired and when finished, push the Indexing Rod back as far as it will go.

Caution: When using electric tuning, do not depress more than one button at a time. Depressing two buttons will cause the motor to run continuously or until the automatic thermal switch operates to prevent the motor from burning out. If this happens, it may take fifteen minutes for the motor to become cool enough for the electric tuning to become operative again.

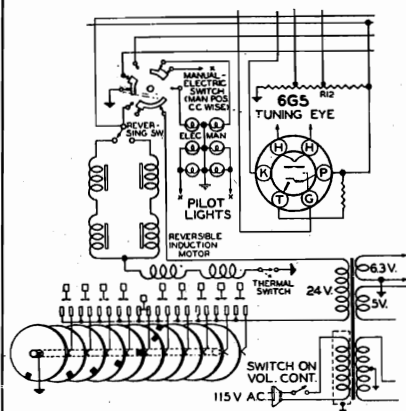


Fig. 1. How the new electric tuning unit is connected in the Majestic Model 11356. Philco 38-10 (121, 124)

Run No. 5. Resistor No. 11, 70,000-ohms changed to 40,000-ohms, Part No. 33-340339 in order to improve the oscillator circuit performance. See page 8-67 in *Rider's Volume VIII*

Spiegel Chassis X1

This chassis is used in the following models: 1900, 1920, 1931, 1970, 4502, 9922, and 9925. It is quite similar to the chassis used in the Spiegel Model 100 found on page 9-1 of *Rider's Volume IX*, the difference being as follows:

The 250,000-ohm resistor in the plate circuit of the 75 second detector is connected directly to +B. This means that the 100,000-ohm resistor and the 0.1-mf by-pass condenser are not used in this chassis. An 0.05-mf condenser is used across the 110-volt a-c leads to the power transformer primary instead of one with a value of 0.02 mf.

No wave trap is used in the X1 chassis, such as is shown in the broadcast-band antenna coil. Also no condenser is shunted across the short-wave oscillator coil. The value of the fixed condenser connected between the Police-band oscillator coil and ground is 0.005 mf instead of 0.012 mf.

RCA 10K11, 10T11

The chassis and speakers of these two models are identical to models 10K and 10T, which will be found in *Rider's Volume VII* on page 7-132. The service data starting on that page applies to these new model numbers with the exception of some minor replacement parts for the new cabinets in which these chassis are housed.

Majestic 11056, 11057, 11058

Models 11056 and 11058 are found on pages 9-8 to 9-10 of *Rider's Volume IX*. The data given there also apply to Model 11057. Alignment instructions for these three models are given in the table below.

Signal Generator Connection	Signal Generator Frequency	Band Switch Position	Dial Position	Trimmer Designation	Output Signal
6A8G Mixer	455 kc (1)	BC	(2)	Trim 455 kc	Max.
Control Grid	18 mc	SW	18 mc	Osc— 18 mc	(4)
Antenna (3)	11 mc	SW	To Gen.	R-F— 18 mc	Max.
	6 mc	SW	To Gen.	Ant— 18 mc	Max.
	19 mc	SW	18 mc		(5)
	6 mc	POL	6 mc	Osc— 6 mc	(6)
Antenna (3)	7 mc	POL	6 mc	R-F— 6 mc	Max.
Antenna (7)	1500 kc	BC	1500 kc	Ant— 6 mc	Max.
Antenna (7)	600 kc	BC	600 kc	Osc—1500 kc	(4)
Antenna (7)	1500 kc	BC	1500 kc	R-F—1500 kc	Max.
				Ant—1500 kc	Max.
				Pad— 600 kc	Max. (8)
Antenna (7)	600 kc	BC	600 kc	Osc—1500 kc	(4)
				R-F—1500 kc	Max.
				Ant—1500 kc	Max.
				Pad— 600 kc	Max. (8)

- Note (1)—Apply through 0.1-mf condenser; use smallest possible signal from generator to prevent AVC action from affecting output readings.
 Note (2)—Gang condenser about 50% engaged; if a squeal is heard, rotate gang until squeal is removed.
 Note (3)—Apply through 400-ohm dummy antenna.
 Note (4)—Unscrew trimmer to minimum, then slowly turn screw to increase capacity until the signal is heard.
 Note (5)—Check sensitivity.
 Note (6)—Image check: If alignment is correct, about 10 times as much signal-generator input will be required to give image same output reading as did the desired signal.
 Note (7)—Apply through 200-mmfd mica condenser as dummy antenna.
 Note (8)—While rocking gang condenser.

DeWald 1004

This model is identical with the Models 1002 and 1003, shown on page 9-6 of *Rider's Volume IX*, except that the new model has an additional short-wave band for the 14-40 mc range, giving it a total of five bands.

Fairbanks-Morse 5A

During production runs, a 10-mf, 25-volt condenser was added across the cathode resistor of the type-41 output tube to increase sensitivity. In the schematic shown on page 9-5 of *Rider's Volume IX*, the cathode resistor mentioned bears the number, 21.

Fairbanks-Morse 6C

Referring to the schematic shown on page 8-5 of *Rider's Volume VIII*, the 10,000-ohm resistor (15), in the screen circuit of the 6D8G and 15 tubes, was changed during production to 22,000 ohms. Both resistors are of 2-watts rating.

Silvertone 4600, 4601

A receiver is occasionally encountered in which the volume goes to a low value as the volume control is turned down, but then increases again as the control is turned still lower. This can usually be corrected as follows: Remove the chassis from its case and remove the connections to the two outside terminals of the volume control. Then connect a 22.5-volt "B" battery between the center terminal and the case of the control. Rotate the control a couple of times throughout its range. This should repair the control and the connections should be soldered back on to the outside terminals.

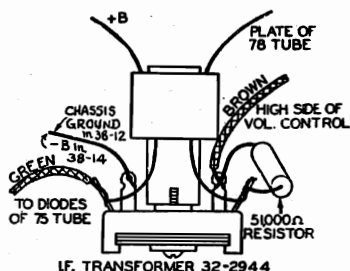
Philco 38-12

Run No. 3. It is important that the following leads be dressed in order to eliminate hum:

Dress the green wire connecting the diodes of the 75 tube to the 2nd i-f transformer as far as possible from the filament prongs of the 75.

The brown wire connecting the 51,000-ohm resistor to the high side of the volume control should be dressed under the coil of the 2nd i-f transformer.

The grid lead of the 75 tube should be dressed toward the back of the receiver and between the tube and shield.



New i-f transformer for Philco models 38-12 and 38-14.

The second i-f transformer, No. 12 in the schematic on page 8-69 of *Rider's Volume VIII*, has been changed from Part No. 32-2674 to No. 32-2944. Note that condenser 12B and 12C are part of the padder in these transformers. The wiring of this new transformer is shown in the accompanying illustration.

Philco 38-14

In the list of parts on page 8-72 in *Rider's Volume VIII*, the parts numbers of the following are incorrect:

Schematic No.	Incorrect No.	Correct No.
12—Compensator	31-6209	31-6100
20—Volume Control	33-5236	33-5230

A condenser, 5 mmf, was connected across the secondary of the short-wave transformer, No. 2. This condenser is connected to lugs Nos. 3 and 4 of the transformer shown on the schematic. See page 8-71 of *Rider's Volume VIII*.

Run No. 2. The second i-f transformer, No. 17, was changed from Part No. 32-2674 to No. 32-2944. The wiring lugs on the new transformer are slightly changed. The drawing of this transformer is shown in the preceding change notice covering Philco 38-12. Note that in the case of Model 38-12, the middle left-hand lead in the sketch goes to chassis ground, but in the Model 38-14, this same lead goes to -B.

Philco 38-4

Run No. 5. The two condensers, Part No. 30-1097, which were connected in parallel with the new air padder, No. 16 in Run No. 3 receivers (see *SUCCESSFUL SERVICING*, July 1938, page 2) have been removed, starting with Run No. 5. For schematic see page 8-61 in *Rider's Volume VIII*. In place of these condensers, a thermal compensator, Part No. 31-6227 is connected in parallel with the air padder. The air padder, No. 16, Part No. 31-6206, has also been relocated and is now mounted between the 6U7G r-f tube and the 6F6G output tube. (See page 8-63 for chassis layout). The thermal compensator, Part No. 31-6227, is also mounted in the same position with the thermostatic plate facing the power transformer.

The oscillator transformer, No. 15, was changed from Part No. 32-2631 to 32-2894. Connection No. 1 of the new transformer has been increased in length for soldering to the air padder in the new location.

Philco 38-14 (121, 124)

Run No. 4, Code 121. In order to eliminate hum modulation, the electrolytic condenser, No. 32, was changed from 16-mf to 40-mf, Part No. 30-2237. The electrolytic condenser in Code 124 receivers was also changed from 16- to 40-mf, Part No. 30-2256. The oscillator blocking condenser No. 8, 250-mmf was changed to 50-mmf, Part No. 30-1029.

See page 8-71 in *Rider's Volume VIII* for schematic of both codes.

Philco 38-33 (121)

Run No. 3. Resistor No. 20, 8000-ohms, was changed to 20,000-ohms, Part No. 33-320339. It was removed from the 90-volt wire (see schematic on page 9-3 of *Rider's Volume IX*) and reconnected to the 135-volt wire of the battery cable. The battery cable assembly was also changed to Part No. 41-3402.

Signal Generator Connection	Signal Generator Frequency	Dial Position
Det.-Osc.	456 kc ¹	—
Control Grid	456 kc	—
Antenna	6 mc	6 mc
Antenna	1400 kc	1400 kc
Antenna	18 mc	18 mc
Antenna	600 kc	600 kc
Antenna	1400 kc	1400 kc

Note 1—Use smallest possible signal from generator to prevent AVC action from affecting output readings.

Note 2—Adjust for correct dial reading.

Note 3—While rocking.

Belmont 665,765

It will be noticed that another model number, 765, has been added to 665, which appears in the Index to *Rider's Volume IX*. This new series starts with serial 9A532400 for which the model numbers are 665 Series A, Issue B and 765 Series A. The servicing data on both these models are the same as the information published in *Rider's Volume IX* with the following changes:

A 6U5 tuning indicator tube has been added in the model 765. The grid of the 6U5 is connected to the junction of No. 5 terminal of the 6Q7G and R8; the target to +B; and the cathode to the junction of R10 and R12. See schematic on page 9-21 in *Rider's Volume IX*.

The short pieces of wire on the antenna coil, which are designated as CA and CB in the schematic, have been removed.

A resistor, R17, 2000 ohms, has been shunted across the P and H terminals of the oscillator coil.

A 0.008-mf, 800-volt condenser, C21, has been added between the plate of the output tube, 6AC5G, and ground.

The short-wave oscillator padder, C12, was not shown on the bottom view of the chassis. This is located on the layout just above and between the trimmers C8 and C11. Note that this padder C12 is adjusted at the factory and needs no other adjustment.

Zenith Chassis 5516, 5634, 5707

The alignment instructions for the three chassis mentioned above are identical and will be found below. The model numbers of the receivers in which these chassis are used will be found on the pages of *Rider's Volume VII*. The schematics and trimmer locations for the respective chassis will be found on these pages: Chassis 5516, schematic page 7-7, trimmers page 7-2; Chassis 5634, schematic page 7-17, trimmers page 7-9; Chassis 5707, schematic page 7-18, trimmers page 7-11.

Wave-Band Switch Position	Trimmer Number	Output Signal
—	4 I-F Trimmers	Max.
—	Wave-Trap Trim. (Rear of chassis)	Min.
Band B	Osc. Trim. ²	—
Band A	Broadcast Trim. ²	—
—	Antenna Trim.	Max.
Band C	Short-Wave Trim.	Max. ³
Band A	Broadcast Pad.	Max. ³
Band A	Broadcast Trim. ²	—
—	Antenna Trim.	Max.

RCA U-112, Late U-111 and U-112

The U-112 is a 5-tube superheterodyne-Victrola combination similar to U-111 except that the cabinet has been enlarged to permit the playing of 12-inch records. The service data for the U-111 found on *pages 9-169 and 9-170 of Rider's Volume IX* apply to these later models, with the following exceptions:

In the U-112, the rectifier has been changed to a 5W4.

A 12,000-ohm resistor, R18, has been added in series with the 0.005-mf condenser across the pickup in U-112.

Model U-112 is made in three power supply ratings, all 105-125 volts with 80 watts consumption:

Rating	Frequency
A-6	60 cycles
A-5	50 "
B-2	25 "

The 25-cycle power transformer for U-112 has a d-c resistance of 13.7 ohms in its primary and 1190 ohms in the secondary. The speaker in this model, 84265-4, has the following d-c resistances: Field coil—1300 ohms; Primary of output transformer—420 ohms; Voice coil—2 ohms.

Later production of both the U-111 and U-112 models have the following changes:

The antenna coil has been changed from stock number 30894 (1-ohm primary) to 32338 (35-ohm primary). This last coil may be used to replace the former.

A 270-mmf condenser, C23, is connected from the triode plate of the 6Q7G to the chassis.

The following additional alignment data apply to both models: On r-f alignment, turn the gang condenser all the way out of mesh and with the test oscillator tuned to 1720 kc, align the oscillator trimmer C18. Set the test oscillator to 1500 kc, tune the receiver to the 1500-kc signal and align the antenna trimmer C3 for maximum output.

Note that the connections for the motor coil assembly, shown on *page 9-170*, has been revised. The connections shown in the left-hand view of the stator are used for both 25-cycle and 60-cycle operation on 110 volts and are unchanged. For 110-volt, 50-cycle operation, the red and yellow designations in the right-hand sketch should be reversed; in other words, the yellow of the left-hand coil is connected to the red of the right coil, making the leads at the bottom, red from the left coil and yellow from the right. Note also that the d-c resistance of each coil for 25-cycles in 250 ohms, those for 50- and 60-cycles remaining 82 ohms. These notes apply to both U-111 and U-112.

RCA 5T

Two different speakers are used on Model 5T, and are identified by the numbers stamped on them as follows: (1) RL-63C1 and (2) 72203-5. Replacement parts for No. RL-63C1 are listed in the service data for Model 5T, shown on *page 7-14 of Rider's Volume VII*, and the replacement parts for No. 72203-5 are listed below:

Stock No.	Description
9579	Coil—Field coil
9533	Cone—Reproducer cone mounted and centered in housing
5118	Connector—3-contact male connector for reproducer
9578	Reproducer complete
4818	Transformer—Output transformer

RCA 5X

Late-production Model 5X receivers include the following minor changes from the original Model 5X which is found on *pages 7-18 to 7-20 of Rider's Volume VII*: (1) a fixed-tuned wave-trap is used in place of the adjustable wave-trap and (2) a few changes in component parts which are listed below. For late-production Model 5X, under "Alignment Procedure," omit the wave-trap adjustment. Early- and late-production receivers can be distinguished readily by inspection of the wave-trap. Component part changes for late-production models are as follows:

Stock No.	Description
11414	Capacitor—0.1 mf (C19)
13837	Capacitor pack—Comprising one 10-mf and two 16-mf sections (C23, C24, C26)
12695	Resistor—15,000 ohms, insulated, ¼ watt (R2)
12679	Resistor—2.2 megohms, insulated, ¼ watt (R3, R7)
13836	Switch—Range switch (S2, S3, S4, S5)
13838	Trap—Wave trap (L1, C1)
13149	Coil—Reproducer field coil (L13, L15)

Stock Nos. 12537, 4835, 12398, 12410, 12411, 12399, 3404, 12402, 12395, 12497, 12499, 12731, 12498, 9684, 12500, 13150, 13071, 12936 and 12937 are not used in Model 5X with fixed-wave-trap.

RCA 8T2

Four different speakers are used with Model 8T2 receiver, and are identified by the numbers stamped on them as follows: (1) RL-63-4, (2) 76365-1, (3) 76365-3 and (4) RL-63E2. Replacement parts for Nos. RL-63-4 and 76365-1 are listed on *page 8-40 of Rider's Volume VIII*, and No. 76365-3 is listed on the schematic on *page 8-41*. The replacement parts for No. RL-63E2 are listed below:

Stock No.	Description
12641	Board—Reproducer terminal board
12640	Bracket—Output transformer mounting bracket
11254	Coil—Field coil
11233	Coil—Hum neutralizing coil

12642	Cone—Reproducer cone and dust cap
5118	Connector—3-contact male connector for reproducer
9773	Reproducer complete
11253	Transformer—Output transformer

RCA 8U

Two different phonograph turntable motors are used on Model 8U, and are distinguished by the numbers stamped on the motor name plate as follows: (1) 72444-1 and (2) 56992-1. No. 72444-1 is an induction motor with a governor-type speed regulator; No. 56992-1 is a synchronous motor. Replacement parts for No. 72444-1 are listed on *page 8-51 of Rider's Volume VIII*; replacement parts for No. 56992-1 are listed below:

Stock No.	Description
8989	Motor complete, 105-125 volts, 60 cycles
8993	Rotor and shaft for Stock No. 8989
3398	Spring—Motor mounting spring assembly
3817	Stud—Motor mounting stud

RCA 87K1, 87K2, 87T2

The service data and replacement parts for the Model 87K1 are shown on *pages 9-83 to 9-86 of Rider's Volume IX*. Three replacement parts have been added as follows:

Stock No.	Description
30846	Core—Inductance adjustment for instantaneous tuning coils
12007	Spring—Retaining spring for core Stock No. 30846
30695	Card—Station call-letter card for push buttons

All service data and replacement parts for Model 87K1 apply directly to Model 87K2, including the three additional replacement parts listed above for Model 87K1.

All service data and replacement parts for Model 87K2 apply directly to Model 87T2, except that the Reproducer Replacement Parts listed below should be used instead of those listed for Model 87K1.

Stock No.	Description
14614	Cone—Reproducer cone and dust cap (L17) (for speaker marked 84091-1 or 84001-3)
14934	Cone—Reproducer cone and dust cap (L17) (for speaker marked 84091-2 or 84001-6)
5118	Plug—3-contact male plug for reproducer
14613	Reproducer complete (marked 84001-3 or 84001-6 but interchangeable with speaker marked 84091-1 or 84091-2 respectively)
14615	Transformer—Output transformer (T2) (for speaker marked 84091-1 or 84001-3)
14935	Transformer—Output transformer (T2) (for speaker marked 84091-2 or 84001-6)

Stock Nos. 13866, 14354, 11469, 12667, 14395, 14358, 14355 and 14357 for Model 87K1 Reproducer Assemblies are not used in Model 87T2.

Silvertone 7127, 7133

The schematic for the chassis used in these models will be found on *Sears page 7-63 in Rider's Volume VII*. The alignment has just been obtained and will be found below.

Apply a 456-kc signal at the control grid of the 2A7 and adjust the i-f trimmers.

Apply a 1712-kc signal at the antenna. Turn condenser all the way open. First adjust oscillator trimmer on the oscillator coil, then the r-f trimmer on the condenser.

Adjust the low-frequency padder at 600 kc while rocking the condenser.

Check at 1400 kc for alignment.

Short-wave Adjustment: adjust the small trimmer found under the chassis on short-wave antenna coil for maximum output. If short wave does not track with dial, adjust trimmer on oscillator section of variable condenser until correct. Make all adjustments for short wave with the variable condenser turned to center of 25-meter location on scale.

Silvertone 4600

A .1-mf condenser should be added to eliminate bad chassis pickup as shown in Fig. 1, the partial schematic. This type of pickup is heard as noise when the car engine is running and the antenna is disconnected from the receiver.

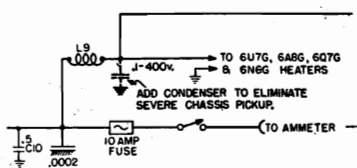


Fig. 1. Partial schematic of Silvertone model 4600 in which is shown where the .1-mf condenser is connected to eliminate chassis pickup.

This instruction applies to sets having identification number 101.458 on the label inside the receiver case cover; the condenser has been added at the factory when the number reads 101.458B or a subsequent letter. See location in Fig. 2. Note that the schematic is shown on *Sears page 9-35 of Rider's Volume IX*.

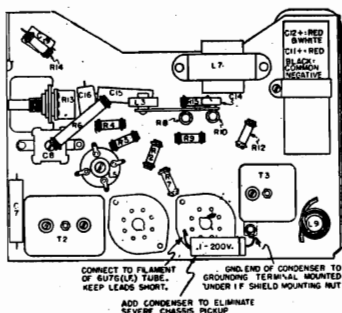


Fig. 2. Bottom of chassis showing location of the added condenser.

Silvertone 4601

A .1-mf condenser should be added to eliminate bad chassis pickup, as shown in the partial schematic of Fig. 1. This type of pickup is heard as

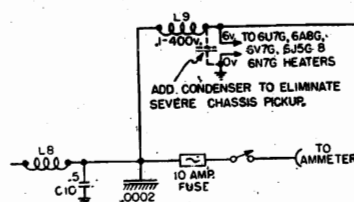


Fig. 1. Where the .1-mf condenser is added in Silvertone 4601 to eliminate chassis pickup.

noise when the car engine is running and the antenna is disconnected from the receiver. This instruction applies to sets having identification number 101.463 on the label inside the receiver case cover; the condenser has been added at the factory when the number reads 101.463B or a subsequent letter.

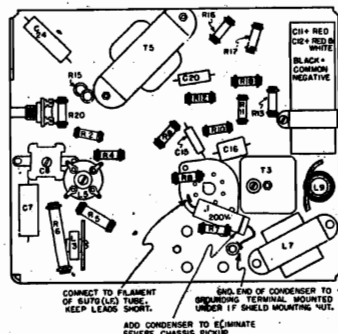


Fig. 2. Location of added condenser.

The location of this condenser is shown in Fig. 2, the bottom view of the chassis. Note that the Silvertone 4601, shown on *Sears page 8-75 of Rider's Volume VIII*, does not show this condenser; it may be assumed, therefore, that this is Chassis 101.463.

Silvertone 4414, 4415, etc.

The original production of this chassis (No. 101,393) used part number 1012814032, r-f coil and detector coil (iron core). Later production, which can be identified by the letter "C" or a subsequent letter rubber-stamped on the chassis, used part number 1012818509 detector coil and number 1012818510, r-f coil (air core). When the new air-core type coils are used, the 350-ohm resistor, R2, in series with the volume control, is changed to 150 ohms.

Later production used part number 1012418344 as volume control, instead of the one used originally. The new control incorporates the 150-ohm resistor, R2, mentioned above, as a tap on the resistance element, eliminating R2 as an external resistor. The new control can be used to replace the old

one in those sets using a 350-ohm R2 by substituting a 200-ohm resistor, as the 150 ohms are incorporated in the control itself. It can be used to replace the original control in those sets that use a 150-ohm external resistor for R2 by removing R2 and connecting to the tap on the volume control.

Please notice that three more model numbers have been added to this chassis and these should be added to the listing in the Index, which should now read: 4414, 4415, 4500, 4505, 4506, 4509, 4510, 4511, Chassis 101.393. The schematic for this chassis will be found on *page 8-15 in Rider's Volume VIII*.

Silvertone 4502, 4504, etc.

The same changes relating to Chassis 101.393 also apply to these models, with the exception that the later production is identified by the letter "A" or a subsequent letter rubber-stamped on the chassis.

New model numbers have also been added to this chassis and they should be incorporated in your Index, which should read: 4502, 4502A, 4504, 4508, 4512, 4513, 4514, Chassis 101.427. The schematic of this chassis will be found on *page 8-58 in Rider's Volume VIII*.

Silvertone 4487, 4587, 4587A

If one of these models has been out of service for several months, the 25-mf electrolytic condenser may lose its formation, causing the 5Y3G rectifier tube plates to become redhot or the tube to burn out. While this condition seldom occurs, the electrolytic can be reformed and the condition remedied as follows:

Using a 5Y3 plug and a 5X4 socket, make an adapter by connecting together the prongs indicated below. Then put a 5X4G rectifier tube in the adapter socket and push the adapter plug into the rectifier socket of the receiver. (It is advisable to remove the output tubes from their sockets during the reforming period.) The receiver should be turned on for about five minutes, the 5X4G tube being used to reform the electrolytic. After this period, the 5Y3G tube can be replaced in its socket and the receiver will perform normally.

This same remedy can be applied to other chassis, although it is very unlikely that this condition will be often encountered.

5X4G Plug	connects to	5Y3G Socket
3	"	2
5	"	4
7	"	6
8	"	8

Stewart-Warner-Firestone R-1332

The filter system and rectifier tube are protected against breakdown during the warming up period by the Globar resistor (No. 15 in the schematic on page 6-16 in *Rider's Volume VI*), which functions as follows: The resistance of this unit drops rapidly as the voltage across it rises, so that it acts as a load on the power transformer during the warm-up period and keeps the voltage under the danger point until the tubes are heated and take their normal current. Because of its unique voltage characteristics, this resistor can not be checked with an ordinary ohmmeter as it will show a resistance of several megohms.

I-F Alignment:

This is conventional, the i-f peak being 456-kc. The trimmers are located on the top of the i-f transformers and may be reached by removing the top cover. The signal generator is connected between the control grid of the 6A7 and ground.

Dial Calibration:

Tune in a station of known frequency between 800 and 1000-kc. Insert a screwdriver in the slotted end of the dial shaft projecting through the back of the control head. Hold the tuning control knob so that the station remains tuned in properly and adjust the dial pointer with the screwdriver so that the exact station frequency is indicated.

If the set is badly out of calibration, such that it calibrates correctly at one part of the dial but not at another, it is necessary to adjust the oscillator shunt trimmer. In order to reach this trimmer the chassis must be removed from the case as follows:

Remove the flexible shafts and dismount the receiver.

Remove the four terminals of the speaker cable from the speaker.

Remove the black antenna lead from the coil and unsolder the coil shield grounding braid.

Remove the blue dial-light lead from the socket terminal.

Remove the yellow tone-control lead from the tone control switch.

Remove the six slotted chassis fastening screws and slide the chassis from the case.

Reconnect the red and yellow leads of the speaker cable to the speaker.

Insert the tuning shaft in the gang condenser fitting and reconnect the battery lead.

Set the chassis on a flat metal plate and adjust as follows:

Connect a 0.00025-mf condenser in series with the output of the signal gen-

erator and the antenna lead plug on the antenna coil and the ground lead of the signal generator to the chassis of the set. Set signal generator to 600-kc and tune the receiver to maximum volume and set the dial to read exactly 6.0 (600-kc). Set the signal generator to 1400-kc and turn the tuning knob until the dial pointer reaches 14.0 (1400-kc). Adjust the oscillator shunt trimmer (on the gang condenser second from the control end) until the meter indicates maximum output. Then adjust the other gang trimmer as directed below.

R-F Alignment:

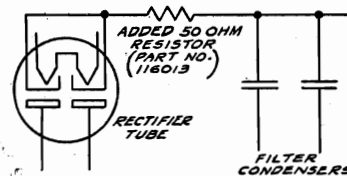
With the signal generator tuned to 1400 kc, tune the receiver carefully for maximum output. Adjust the output of the signal generator to minimum value which will give sufficient output meter deflection. Adjust the trimmer nearest to the shaft end of the gang condenser for maximum output.

Stewart-Warner AC-DC Receivers

There is a tendency for filter condensers and rectifier tubes in AC-DC receivers to fail prematurely. The Stewart-Warner Engineering Department has developed a simple remedy which will be incorporated in all future production of Stewart-Warner AC-DC receivers, and which can be applied easily by the serviceman to existing receivers.

With certain power-line impedances, extremely high surge voltages are developed across the filter condenser. These voltages may be as high as 300 volts, and occur only if the set is turned off on a particular part of the a-c cycle of the power-line current. Such a surge often punctures the filter condenser, and this causes the rectifier tube to fail. Since this difficulty is caused by a power-line condition, if it happens once in a certain customer's home, it is very likely to happen again.

The remedy for this trouble is to connect an inexpensive 50-ohm 1-watt resistor in series with the connection from the rectifier-tube cathodes to the electrolytic filter condensers. The proper connection of the resistor is shown in the accompanying diagram. The Stewart-Warner part number for this resistor is 116013.



The 50-ohm resistor added in the rectifier circuit for line surge protection.

Firestone-Stewart-Warner R-1322

The alignment instructions for this receiver are practically the same as those which will be found on page 8-16 in *Rider's Volume VIII*. As this set is used with a steering column control head, the portion of the instructions pertaining to the dash control head can be disregarded. Also the trimmers on the gang condenser are reached by removing the back cover instead of the bottom cover.

A note is contained in the circuit description which should be observed. The correct position of the vibrator in its socket depends upon which car battery terminal is grounded. If the negative terminal is grounded, the vibrator should be inserted so that the arrow points away from the adjacent transformer cover. If the positive side of the battery is grounded, this arrow should point towards the transformer cover. The schematic for this receiver will be found on Stewart-Warner page 6-15 in *Rider's Volume VI*.

Stewart Warner R-160 Chassis

The circuit description and alignment notes found on page 8-16 in *Rider's Volume VIII*, are practically the same as those which apply to models 1601 to 1609 inclusive, the major difference occurring in the section devoted to dial calibration. In the instructions for calibrating a dial for receivers having a dash control head, only the 1400-kc adjustment is used, the 600-kc setting being neglected. The schematic for the R-160 chassis will be found on page 7-8 in *Rider's Volume VII*.

RCA 262,263

The a-f driver transformer, T3 has a revised coil design, the d-c resistance of the primary now being 1350 ohms and that of the secondary being 2000 ohms. An extra connection has also been provided on this unit for equalizing the primary and core potentials so that electrolysis between these parts will be reduced. This additional lead is colored red-green and it should be connected to plug "B" of the primary circuit. See schematic diagrams of the early models on pages 5-102 and 5-103 of *Rider's Volume V* and the late models on pages 6-51 and 6-53 of *Rider's Volume VI*.

Bosch 376BT, 376F, 376S

Please make a note in the table of socket voltages on page 6-2 in *Rider's Volume VI* that the filament voltages should be 2.0 instead of 6.2 volts.