VOLUME XVIII

PERPETUAL TROUBLE SHOOTER'S MANUAL

REG. U.S. PAT. OFF.

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GENERAL DESCRIPTION

1. GENERAL

These instructions cover the installation, operation and servicing of the Scott Export Radio Receiver.

THEY SHOULD BE READ AND STUDIED WITH GREAT CARE BEFORE THE INSTALLATION OR OPERATION OF THE RECEIVER IS ATTEMPTED IN ORDER THAT OPTIMUM PERFORMANCE MAY BE OBTAINED.

The receiver employs twelve tubes and covers the frequency range of 0.54 to 1.6 megacycles and 3.2 to 23.5 megacycles in four frequency bands.

The Scott Export Radio Receiver is designed for operation from a 115 volt DC source of 115 volt 60 cycle single phase AC source. Power consumption is 78 watts.

All operating controls are mounted on the front panel of the receiver. Power, antenna, ground, audio output, record player input and fuses are located at the rear of the receiver.

2. DESCRIPTION

2.1 General

The Scott Export Radio Receiver is a superheterodyne type receiver. The electrical circuits employed for signal reception on all frequency ranges comprise one stage of R.F. amplification, first detector or mixer, a separate high frequency oscillator, two stages of intermediate frequency amplification operating at 455 kilocycles, a diode type second detector, two stages of resistance coupled audio amplification, and a push pull audio frequency power output stage. The second detector utilizes one set of elements of a dual diode, the other set of elements is utilized to supply AVC voltage to the RF and IF amplifiers. One half of a twin triode tube is utilized as the 1st audio amplifier, the other half of the twin triode is utilized in an efficient peak noise limiter circuit. A self contained power supply provides the necessary DC voltages for operation of the receiver from either an AC or DC power source. Inverse feedback is incorporated in the output audio amplifier to reduce hum and provide better audio response.

2.2 Frequency Range

The receiver covers the frequency range of 0.54 to 23.5 megacycles in four bands as follows:

Band	Frequency Range
1	0.54 - 1.6 megacycles
2	3.2 - 8.4 megacycles
3	8.2 - 14.4 megacycles
4	14.2 - 23.5 megacycles

2.3 Audio Output Connections

The audio output transformer is mounted on the receiver chassis. The secondary of this transformer is connected to a two terminal strip marked "SPEAKER" mounted on the rear of the chassis. The loudspeaker is connected to this terminal strip by means of the two conductor cable fastened on the speaker. The voice coil impedance of the loudspeaker is 8 ohms. The maximum undistorted audio output is 2.16 watts measured across an 8 ohm load.

2.4 Antenna Connections

The antenna terminal strip is mounted at the rear of the receiver for antenna and ground connections.

The input circuit of the receiver is primarily designed for operation with a separate antenna not used for other equipment. A conventional single wire antenna will suffice. It should be well insulated and erected as high as possible. The recommended minimum overall length of antenna and lead-in is fifty feet. The antenna proper should be erected out in the open as much as possible.

In an installation having a simple antenna-ground combination, connect the antenna lead-in to the outer antenna terminal and the ground lead to the terminal marked "GND". Then connect a jumper wire between the center antenna terminal and the ground terminal.

When a doublet type antenna, such as the Scott Super Double Doublet, is used the two lead-in conductors should be connected to the two terminals marked "ANT" and the ground wire to the terminal marked "GND".

CAUTION: When connecting the ground wire between the receiver and the water pipe or other ground point remove the power plug from the wall receptacle as a slight shock may be felt if the plug is left in with the polarity reversed.

2.5 Power Requirements

The radio receiving equipment is designed to operate from either 115 volts DC or 115 volts 60 cycle single phase AC. Line current at 115 volts is .62 amperes. The nominal power consumption at 115 volts AC or DC is 78 watts.

Connection to the power source should be made through the plug and cord attached to the receiver. When the receiver is used on a DC power source the correct polarity must be observed or the receiver will not operate. After the receiver has been connected and turned on if it fails to operate after warming up, reverse the power plug to obtain the correct polarity.

When the receiver is used on an AC power source the polarity is not important. It may be desirable, however, to reverse the power plug in some installations to reduce hum.

The fuse in the power supply line is mounted adjacent to the power input at the rear of the receiver. The fuse mounting is of such design that the fuse, which is of the cartridge type, is replaceable without the use of tools, and without the necessity for the removal of the receiver chassis from its cabinet.

2.6 Record Player Connections

Provision is made at the rear of the chassis for connection of a record player pickup of the high-impedance type. A low impedance pickup may be used with the proper matching transformer.

2.7 Tube Complement

The vacuum tubes employed in the Scott Export Radio Receiver are as follows:

Symbol	Tube Type	Function
V-101	6K7	R. F. Amplifier
V-102	12J5GT	H. F. Oscillator
V-103	12SA7	First detector mixer
V-104	12SK7	First IF Amplifier
V-105	12SK7	Second IF Amplifier
V-106	12H6	Second Detector, AVC
V-107	12SN7GT	First Audio, Noise Limiter
V-108	12SN7GT	Second Audio, Phase Inverter
V-109	25L6GT	Output Audio Amplifier
V-110	25L6GT	Output Audio Amplifier
V-111	1629	Tuning Indicator
V-112	25Z6GT	Rectifier

3. CONSTRUCTION

The Scott Export Radio Receiver is furnished with a complete set of escutcheons and hardware for mounting the receiver in the cabinet. If it is desired to house the receiver in a custom installation or any cabinet built to the customers specifications Figure 3 shows the cut-out dimensions for the front panel and loudspeaker baffle board. The following table gives the dimensional outlines of the receiver chassis and loudspeaker and lists the weight of each unit.

Width	Depth	Height	Weight
Receiver Chassis			
16 5/8"	16 7/8"	10 1/2"	35 lbs.
Loudspeaker			
12 1/4" dia.	5 1/4"	-	6 lbs.

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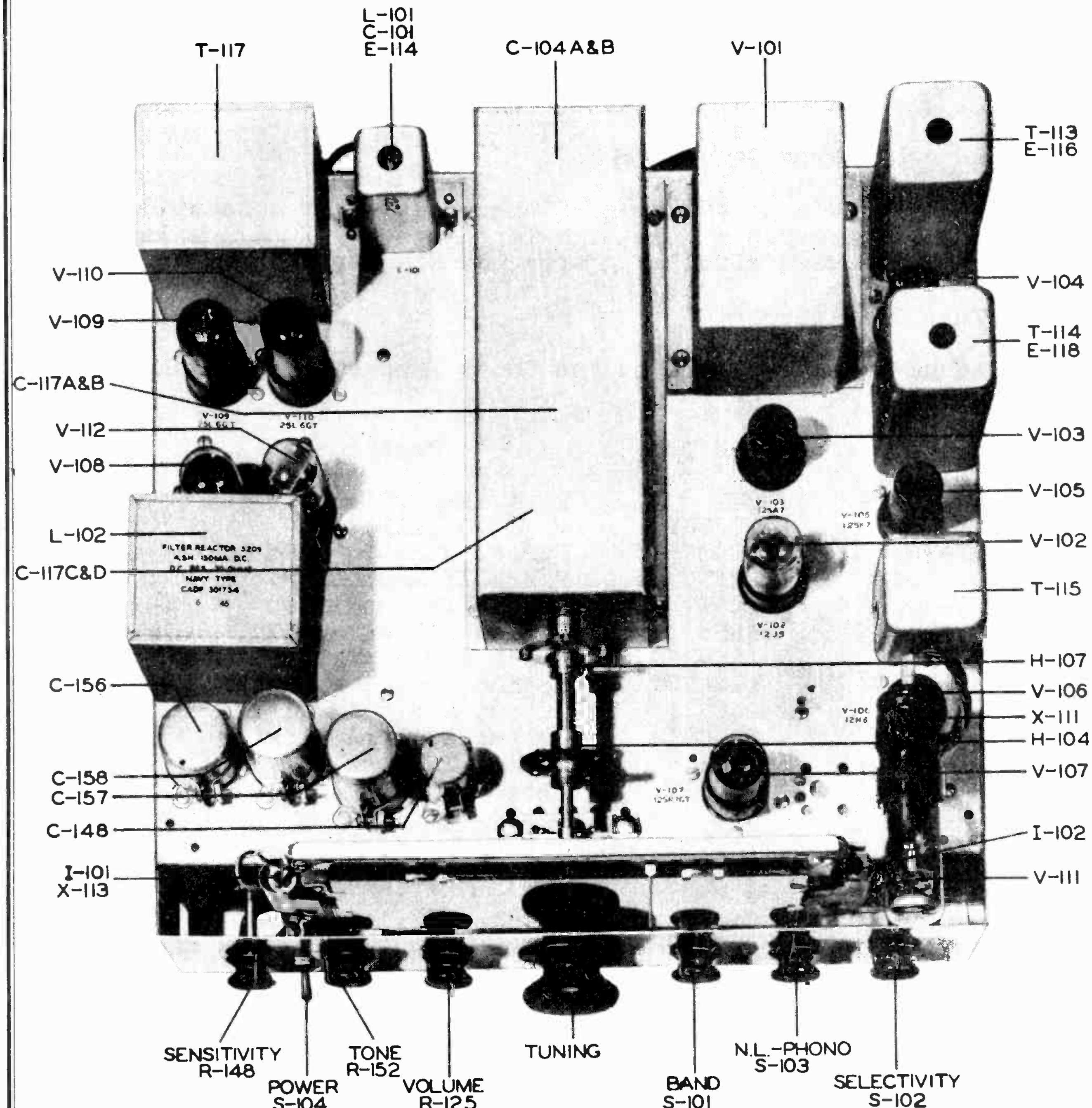

Figure 1 Top View Export Radio Receiver Chassis

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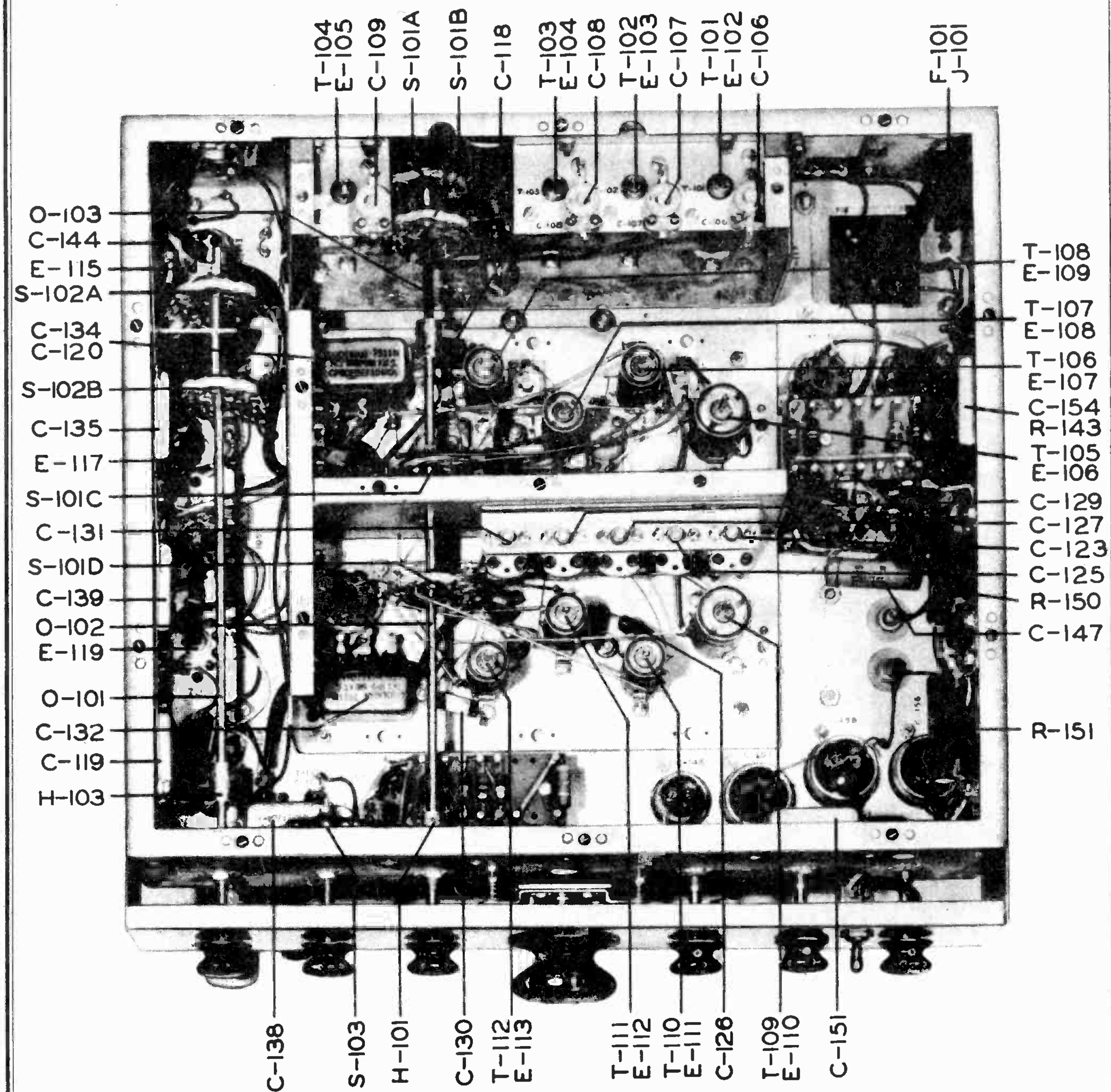

Figure 2 Bottom View Export Radio Receiver Chassis

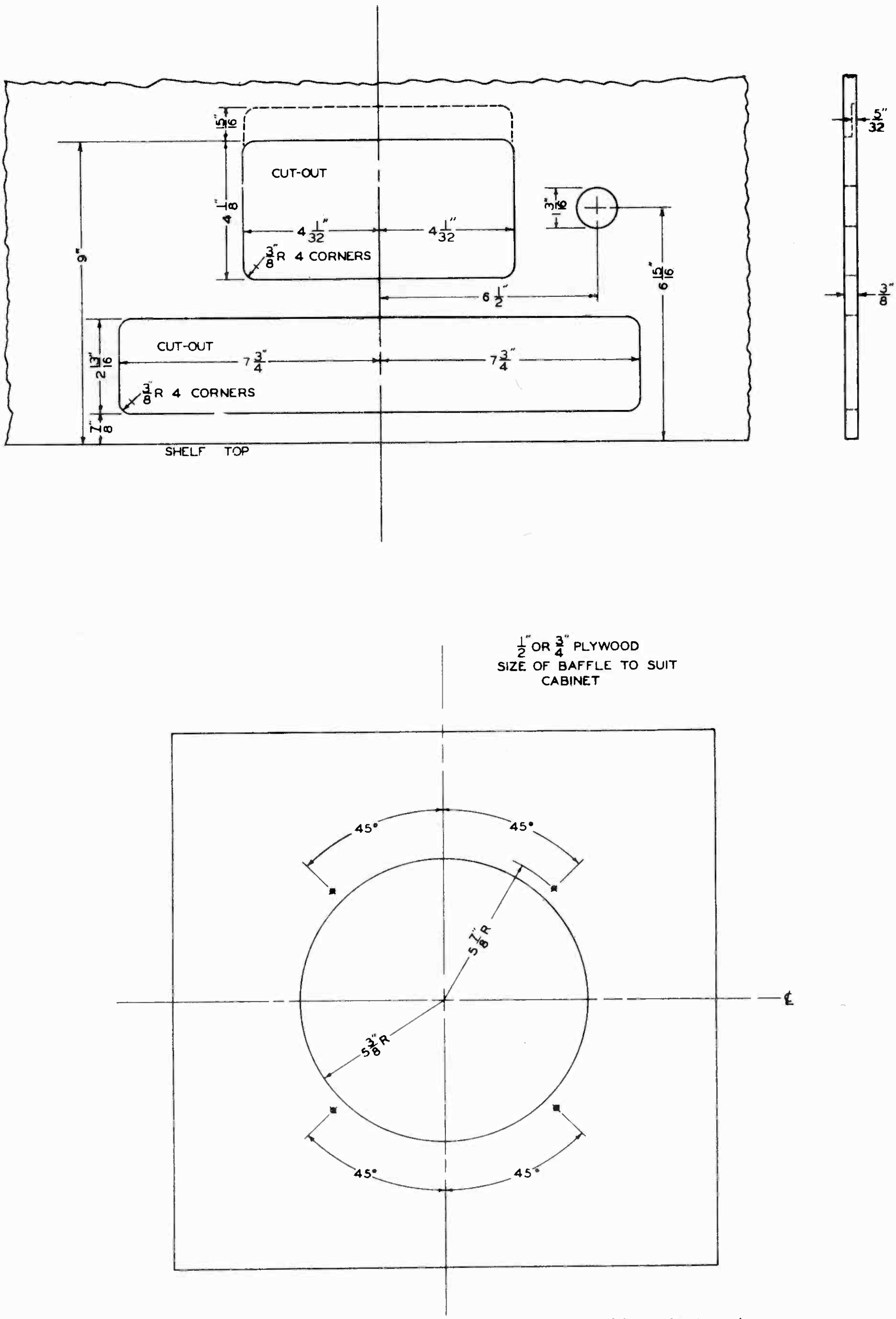

Figure 3 Panel and Speaker Baffle Cutouts

CIRCUIT DESCRIPTION

4. GENERAL

The actual schematic diagram of the Scott Export Radio Receiver is shown in Figure 7. For purposes of illustration, it will be assumed that the circuits are set up as for signal reception on Band 1 (.54 - 1.6 MC) as shown in the diagram. The following description will refer therefore, to the symbol numbers of the circuit elements of this band. It shall be assumed that unless otherwise noted, the description will be equally applicable to Bands 2 - 3 - 4.

5. SIGNAL FREQUENCY CIRCUITS

Signal input to the receiver through antenna terminal E-120 is connected to the primary winding of antenna input transformer T-101 by switch S-101A. Wave trap inductor L-101 is provided to attenuate signals at IF frequency (455 KC). This circuit is tuned by series connected capacity C-101 and tuned to 455 KC by adjustable iron core E-114. An electrostatic shield, at ground potential, separates the secondary winding from the primary winding. The secondary winding together with variable air dielectric capacitor C-104 (A and B) constitutes the first tuned circuit. Transfer of r-f signal, at the resonant frequency of this tuned circuit, from the antenna to the control grid of R.F. amplifier tube V-101, is accomplished by inductive coupling through antenna input transformer T-101. Variable capacitor C-104 is a two section capacitor, both sections being connected in parallel on Bands 1 and 2 by means of switch S-101B. On Bands 3 and 4 capacitor section C-104A is switched out of the circuit and C-104B alone used. Variable capacitor C-104 is ganged with variable capacitor C-117 to provide uni-controlled tuning of the receiver. The secondary winding of transformer T-101 is provided with an adjustable iron core for inductance trimming and a shunt connected variable trimmer capacitor C-106. These trimmer elements permit the accurate alignment of the tuned circuit at both ends of the frequency band and are accessible for adjustment as shown in Figure 2. The high potential end of the tuned circuit is connected to the control grid of R.F. amplifier tube V-101 by switch S-101B and through coupling capacitor C-103. The low potential end of the tuned circuit is returned to ground bus. The d-c bias return from the control grid of R.F. amplifier tube V-101 to the A.V.C. line is closed through resistor R-101.

Plate potential from the high voltage d-c line is applied to the plate of R.F. amplifier tube V-101 through decoupling resistor R-109, bypassed to ground by capacitor C-134C and through R.F. transformer T-105 primary. Screen potential is applied through resistor R-103 bypassed by capacitor C-111B. The suppressor is connected to the cathode. Initial grid bias is obtained by means of cathode resistor R-102 bypassed by capacitor C-111A. One side of the heater of V-101 connects to the heater of V-108, the other side connects to the heater of V-107.

The amplified signal from the plate of R.F. amplifier tube V-101 is transferred to the signal grid of mixer tube V-103, through R. F. transformer T-105. The primary of T-105 is untuned, the secondary winding together with variable capacitor C-117 (A and B) constitute the second and final tuned circuit operating at signal frequency. The high potential end of the tuned circuit is connected to the signal grid of mixer tube V-103 by switch S-101C through coupling capacitor C-116. The low potential end of the tuned circuit connects to ground bus. Adjustable iron core E-106 and parallel connected trimmer capacitor C-112 are provided for purposes of circuit alignment. The DC bias return from the control grid of mixer tube V-103 to the AVC line is closed through resistor R-104 bypassed to ground bus by capacitor C-159.

Screen potential from the high voltage DC line is applied to the screen of mixer tube V-103 through resistor R-108 bypassed to ground by capacitor C-134A. The suppressor is internally connected to the shell of the tube. Initial bias is obtained by means of cathode resistor R-106 bypassed to ground by capacitor C-120B.

6. HIGH FREQUENCY OSCILLATOR CIRCUITS

The high frequency oscillator circuit is of the "electron-coupled" type. The tuned circuit consists of tapped inductor T-109, shunted with variable trimmer capacitor C-125 and is tuned by variable capacitor C-117 (C and D). Inductor T-109 is provided with an adjustable iron core for inductance adjustment. Fixed capacitor C-124 shunted by variable trimmer capacitor C-123 is provided to modify the tuning of the H.F. oscillator so that it will maintain a fixed frequency difference of 455 kilocycles with respect to the signal frequency when tuning capacitors C-104, C-117AB and C-117CD are varied from minimum to maximum capacity. The oscillator circuits are aligned on the high side of the signal circuits on Bands 1 and 2 and on the low side of the signal circuits on Bands 3 and 4 as outlined in Paragraph 21.

The high potential end of the tuned circuit is connected to the control grid of H.F. oscillator tube V-102, through switch S-101D and fixed capacitor C-122. This grid is returned to the ground bus through resistor R-110. The low potential end of the tuned circuit is also returned to the ground bus. The cathode of the H.F. oscillator tube V-102 is connected to the tap of inductor T-109 through switch S-101D and through coupling capacitor C-121 to the oscillator injector grid of mixer tube V-103. This grid is returned to ground bus through resistor R-107. The plate of the H.F. oscillator tube V-102 is connected to the high voltage DC line through resistor R-111 and bypassed to ground by capacitor C-132A. One side of the heater circuit of the H.F. oscillator tube V-102 connects to the heater of V-105 bypassed to ground bus by capacitor C-132C. The other side of the heater connects to the heater of V-104.

7. I.F. AMPLIFIER CIRCUITS

The signal frequency arriving at the control grid of mixer tube V-103 and the H. F. oscillator frequency arriving at the injector grid of this tube are mixed (or heterodyned) and the resultant difference frequency (455 kilocycles) is fed to the input of the I.F. amplifier.

Transfer of IF signal from the plate of the mixer tube V-103 to second detector tube V-106 is accomplished by inductive coupling through IF transformers T-113, T-114, T-115 and amplified by tubes V-104 and V-105. First IF transformer T-113 consists of two tuned circuits, primary and secondary with the secondary tuned circuit operating in conjunction with switch S-102A and a tapped tertiary winding, to provide five degrees of selectivity by changing the coefficient of coupling with the primary circuit. The primary and secondary windings are each tuned to 455 kilocycles by fixed capacitors C-136 and C-137 and adjustable iron cores E-115 and E-116. These cores are accessible for adjustment through the top of the shield can for E-116 and at the bottom of the receiver for E-115. The high potential end of the primary tuned circuit connects to the plate of mixer tube V-103 through a shielded conductor while the low potential end connects to the high voltage DC line through resistor R-112, bypassed to ground by capacitor C-135C. The high potential end of the secondary tuned circuit is connected to the grid of first IF amplifier tube V-104 while the low potential end is connected to the AVC line through resistor R-113, bypassed to ground bus by capacitor C-144A. DC potential from the high voltage DC line is applied to the screen of first IF amplifier tube V-104 through resistor R-115, bypassed to ground by capacitor C-144B. Plate potential is applied through resistor R-116 bypassed by capacitor C-139C. Initial cathode bias is obtained through resistor R-114, bypassed to ground by capacitor C-135A. The suppressor is connected to the cathode. One side of the heater of the first IF amplifier tube V-104 is connected to the heater of V-102. The other side of the heater connects to the heater of mixer tube V-103.

Second IF transformer T-114 is identical to first IF transformer with respect to design, construction, and operating characteristics, accordingly, except for differences in symbol designations. The circuit description of first IF transformer T-113 is applicable to this transformer.

The circuit arrangement of second IF amplifier tube V-105 is the same, except for symbol designations as for first IF amplifier tube V-104 except that the grid is returned to ground bus instead of AVC. One side of the heater of second IF amplifier tube V-106 connects to the heater of V-102. The other side of the heater connects to the heater of V-111.

Third IF transformer T-115 consists of a tuned primary circuit and an untuned secondary. The primary circuit consists of the primary winding shunted by a fixed capacitor C-142 and permeability tuned by iron core E-119 which is accessible for adjustment at the bottom of the chassis. Plate potential is applied to the plate and screen of second IF amplifier tube V-105 through resistor R-118, bypassed to ground by capacitor C-139B. The high potential end of the secondary winding feeds the second detector diode while its low potential end connects to ground bus through diode load resistor R-119 and filter resistors R-120 and R-121.

8. SECOND DETECTOR CIRCUITS

Tube V-106 is a dual diode tube, one section V-106A, is used as a second detector, the plate of which is connected to the high potential end of the secondary winding of the third IF transformer T-115. The cathode is connected to ground bus, thus the tube acts as a half wave rectifier.

The second section, V-106B of twin diode V-106, is utilized as an AVC diode. Signal is fed from the primary of IF transformer T-115 to the plate of V-106B through capacitor C-150. This plate is returned to ground bus through load resistor R-129. Bias is applied to the cathode of V-106B to delay AVC action so that on weak signals the AVC is inoperative and the full sensitivity of the receiver may be utilized. The voltage developed across load resistor R-129 as a result of the demodulating action of AVC diode V-106B, is filtered by resistor R-127 and capacitor C-119A and the resultant DC voltage is used to control the gain of amplifier tubes V-101, V-103, V-104. The degree of control being dependent on the strength of the incoming signal.

DC potential from the AVC diode is further filtered by resistor and capacitor C-119B and applied to the control grid of electron-ray indicator V-111. This DC voltage regulates the shadow angle of the electron-ray tube to indicate when the receiver is tuned to resonance with the received signal.

9. NOISE LIMITER CIRCUIT

One section of twin triode V-107 is utilized as a peak noise limiter. When the noise limiter switch SW3 is set at "ON" position voltage from the second detector diode is applied to the grid of V-107A through a filter consisting of R-122 and C-119C, the time constant of this filter is long enough so that normal variations in modulation will not affect the input voltage yet short enough so that variations on voltage due to signal fading will be followed, thus providing automatic adjustment of the noise limiter circuit for different carrier levels.

Under normal conditions the cathode of V-107A is negative with respect to the ground bus by the voltage drop across R-119, R-120 and the grid is held more negative by the voltage drop across R-120 while the plate is positive by the voltage drop across R-123 in the cathode of the AVC diode V-106B.

Under these conditions the plate to cathode resistance is very high and very little conduction takes place until the modulation reaches approximately 85%. When the current through the diode load is suddenly greatly increased by a pulse of "Noise voltage" the cathode of V-107A will go more negative and the plate more positive but the grid will remain at the original potential due to the time constant of the filter R-122, C-119C. The cathode now becomes more negative than the grid, and the plate to cathode resistance becomes very low and bleeds off the peak voltage developed by the noise pulse.

10. A. F. AMPLIFIER CIRCUITS

The A.F. voltage developed across the diode load resistor R-119 as a result of the demodulating action of second detector diode V-106A, is applied to the control grid of first A.F. amplifier tube V-107B, through capacitor C-145 and A.F. gain potentiometer R-125.

Switch S-103 operates to transfer the audio input to volume control R-125 and hence the input circuit of the first A.F. amplifier tube V-107B, from the second detector circuit to "PHONO" terminals E-121 to permit the operation of the audio amplifier system of the receiver with a high impedance record player pick-up. Low impedance pick-ups may also be employed provided that their connection to terminals E-121 are made through suitable matching transformers.

Amplification of the A.F. signals from the second detector is accomplished by resistance-capacity coupling between first A.F. amplifier tube V-107B and output power amplifier tubes V-109 and V-110. Transfer of audio frequency energy from the plate of output amplifier tubes V-109 and V-110, to loud speaker terminal E-122 is accomplished through output transformer T-117 which matches the plate impedance of the tube with the 8 ohm output load with which the receiver is designed to work.

DC potential is applied to the plate of first A.F. amplifier tube V-107B through plate load resistor R-130 and filter resistor R-131, bypassed to ground bus by electrolytic capacitor C-148. Bias is applied to the cathode through resistor R-126 which returns to ground bus. One side of the heater of V-107 connects to the heater of V-101, the other side connects to one side of the power line.

A.F. signal from the plate of first audio tube V-107B, is transferred to the grid of second audio tube V-108 through capacitor C-147 and series resistor R-132. The grid of V-108B is returned to ground bus through resistor R-133.

The grid of V-108A is returned to ground bus through resistor R-135. DC potential is applied to the plate of V-108A through resistor R-137 and to the plate of V-108B through resistor R-136. Bias is provided for V-108B through resistor R-134 and for V-108A through resistor R-135 bypassed by C-149.

A.F. signal is transferred from the plate of V-108B to the grid of V-109 through capacitor C-152 and from the plate of V-108A to the grid of V-110 through capacitor C-153. The grid of V-109 is returned to ground bus through load resistors R-139, R-140 and filter resistor R-142. The grid of V-110 is returned to ground bus through load resistor R-140 and filter R-142. Resistors R-139 and R-140 in series are utilized as a voltage divider to supply the proper amount of audio signal to the grid of V-108A so that the signal output from the plates of V-108A and V-108B will be equal and 180 degrees out of phase thus providing push-pull signal input to the grids of the output tubes V-109, V-110.

DC potential is applied to the plates of output amplifier tubes V-109 and V-110 through output transformer T-117 primary which is center-tapped. The cathodes of V-109 and V-110 are returned to ground bus, through resistor R-143 bypassed by capacitor C-154. One side of the heater of V-109 connects to the heater of V-108, the other side connects to the heater of V-110, the other side of the heater of V-110 connects to the heater of V-112.

AF signal from the plate of V-109 is fed back to the cathode of V-108B through resistor R-138 and capacitor C-155 in series. This feedback arrangement is provided to supply more constant voltage output at the loudspeaker terminals thus providing more uniform frequency response from the loudspeaker.

Variable potentiometer R-152 and series connected capacitor C-151 constitute the control for regulating the fidelity of the audio amplifier system of the receiver. The series combination is connected from the plate of 1st audio tube V-108B to ground bus.

Output transformer T-117 is provided to transfer the A.F. signal from the audio amplifier of the receiver to the loudspeaker connections.

11. RECTIFIER POWER CIRCUITS

The Scott Export Radio Receiver is designed for AC-DC operation, therefore, no power transformer is used. The heaters of all tubes are connected in series in two circuits. In one circuit V-101, V-107, V-108, V-110, V-109 and V-112 are connected in series with resistor R-105. The other heater circuit consists of V-102, V-106, V-105, V-103, V-104 and V-111 in series with resistor R-151.

Rectifier tube V-112 is utilized to supply DC potential for operation of the receiver when used with an AC power source. The pulsating DC potential from the cathodes of V-112 is filtered by iron core inductor L-102 and electrolytic capacitors C-156, C-157 and C-158.

The two lamps used for lighting the dial scale are connected in series across resistor R-150. If one of these lamps burns out, both lamps will go out until the defective lamp is replaced.

NOTE: WHEN REPLACING THESE LAMPS MAKE CERTAIN THE REPLACEMENT LAMP IS RATED AT 6-8 VOLTS .25 AMP OR BLUE BEAD TYPE.

INSTALLATION AND INITIAL ADJUSTMENTS

12. UNPACKING THE EQUIPMENT

After unpacking the equipment, it should be inspected for any possible damage that might have resulted from careless handling in transit. Make certain that all vacuum tubes are firmly seated in their sockets.

13. INSTALLATION

The necessary hardware for installing the receiver and loudspeaker in the cabinet is included in the chassis carton.

The loudspeaker should be installed first, and is accomplished by placing the speaker on the four bolts which are already fastened into the speaker baffle. The speaker is then fastened down using the four nuts and washers furnished. NOTE: DO NOT draw the speaker down too tight against the baffle as the frame may be distorted and misalign the voice coil.

The escutcheons for the dial and tuning indicator should be mounted next, centering the escutcheons in the panel cutout provided and fastening them down with the small wood screws provided.

The receiver can now be mounted in the cabinet, pushing it forward until the knob escutcheon plate hits the back of the panel. Then center the dial calibration scale in the escutcheon opening and fasten the receiver in place using the right and left hand brackets and wood screws furnished. These brackets are mounted at the rear corners of the chassis. Connect the two speaker leads to the terminals marked speaker, the power connection and antenna connections are made as outlined below.

14. CONNECTIONS TO RECEIVER

14.1 Power Connections

The receiver may be operated from a 115 volt DC supply or 115 volts 60 cycle single phase power source. Connection to the power source should be made by means of the plug and cord furnished with the receiver. CAUTION: When a DC power source is used, if the power plug is inserted in the wall receptacle with the wrong polarity the set will not operate. Therefore when operating the receiver on DC power if the receiver fails to work after being turned on, reverse the power plug. On an AC power source the receiver will operate with the plug inserted either way, although in some instances the hum level may be lower if the plug is inserted one way.

14.2

Antenna and ground connections are made to the receiver through the terminal strip furnished on the receiver. Connections should be made as outlined in Paragraph 2.4.

14.3 Loudspeaker Connections

Terminals are provided at the rear of the receiver for connection of the loudspeaker which has an input impedance of 8 ohms. It is not necessary to observe polarity when connecting the loudspeaker.

14.4 Record Player Connections

A record player pickup may be connected to the terminals marked "PHONO" located at the rear of the chassis. If the pickup is high impedance such as a crystal, direct connection may be made. If the pickup is low impedance, a matching transformer must be used.

14.5 Installation Inspection

Before turning the receiver on, inspect all connections to ascertain that they have been properly made. Then set the panel controls as follows:

1. Sensitivity control set at zero.
2. Tone control set at maximum.
3. Volume control set at zero.
4. Band selector control set to frequency band in which signals are desired.
5. N.L. control to center "OFF" position.
6. Selectivity control to No. 1 position.

The equipment is now ready for operation and is turned on by means of switch S-104 when set at "Power" position.

Section IV OPERATION

15. OPERATION OF CONTROLS

All switches and controls (with the exception of the main tuning control) of the radio receiver are identified by panel engraving.

For reception of broadcast signals the following procedure should be followed:

1. Set Power switch to "Power" position.
2. Set Band Selector control to frequency band in which the desired signal is located.
3. Set Selectivity control at No. 1 position.
4. Set N.L. control to "OFF" position.
5. Set Sensitivity control to maximum position.
6. Advance Volume control to suitable noise level.

7. Tune the receiver to the approximate station frequency by means of the main tuning control. Slowly rotate the tuning knob back and forth until the signal is properly tuned in as indicated by tuning indicator tube.

8. Adjust the Volume control to the proper output level.

9. Adjust the Tone control to the desired position to eliminate background noise.

When the Sensitivity control is turned counterclockwise the sensitivity of the receiver is decreased. By turning this control back the inter-station noise level can be cut down or eliminated when it is desired to receive the more powerful local stations.

If conditions of reception are such that peak noise levels interfere with received signals, the N.L. control should be set to the N.L. "ON" position. Under these conditions the peak noises will be chopped off and signals may be received through heavy interference.

In order to widen the IF selectivity and pass a wider band of frequencies for better fidelity, the Selectivity control should be set at No. 2, 3, 4 or 5 position to suit conditions.

CORRECTIVE MAINTENANCE

16. When servicing the Export Radio Receiver the first step should be a complete check of all tubes. This can be accomplished easily by replacing one at a time with tubes of known good quality. All tubes which are not defective should be reinserted in the socket from which they were taken. Failure of a vacuum tube in the receiver may reduce the sensitivity, cause intermittent operation or cause the receiver to be completely inoperative. Since the heaters of the vacuum tubes in the receiver are connected in series, in two strings, if one tube in a string burns out all the tubes in that string will be inoperative until the defective tube is replaced.

17. FAILURE OF THE RADIO RECEIVER

In case of failure or breakdown of the receiver the fault must first be localized in one portion of the circuit. This can be accomplished by observation of some peculiar action of one of the controls or by checking the receiver against test data tabulated in Tables 1 and 2. It must be remembered that resistance or voltage checks will not positively locate certain faults. For instance, an open circuited by-pass capacitor will not appear in point to point resistance tests and may introduce regeneration or oscillation in certain circuits which effect the stage gain of other circuits. Similarily, a short circuit occuring in a low resistance inductor will not appear in a point to point resistance test and if the short appears in an R.F. coil, a false indication of the necessity for realignment may result.

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Table 1 Tube Socket Voltages

Symbol	Type	1	2	3	4	5	6	7	8
V-101	6K7	0.0	17 AC	98	98	2.5	0.0	11AC	2.5
V-102	12J5	0.0	34 AC	100	0.0	-10.5	0.0	45 AC	0.0
V-103	12SA7	0.0	22 AC	100	86	-2.4	2.4	10.5 AC	.05
V-104	12SK7	0.0	34 AC	2	-2	2	88	22 AC	96
V-105	12SK7	0.0	56 AC	4.2	0.0	4.2	98	45 AC	98
V-106	12H6	0.0	0.0	-.3	0.0	0.0	0.0	10.5 AC	1.05
V-107	12SN7GT	-.6	1.05	0.6	0.0	42	1.65	11 AC	0.0
V-108	12SN7GT	0.0	48	1.7	0.0	40	1.4	17 AC	29.5 AC
V-109	25L6GT	0.0	29.5 AC	100	100	0.0	0.0	56 AC	8
V-110	25L6GT	0.0	80.5 AC	100	100	0.0	0.0	56 AC	8
V-111	1629	0.0	68 AC	100	100	0.6	100	56 AC	0.0
V-112	25Z6GT	0.0	80.5 AC	0.0	106	0.0	0.0	109 AC	106 AC

All readings are measured from socket contacts to common ground bus with voltohmyst meter.

Adjust controls as follows:

Sensitivity	Max.
Volume	Min.
Tone	Max.
Band	Band 1
N.L.Control	Off
Selectivity	Sharp

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EXPORT RECEIVER

Table 2 Tube Socket Terminal Resistance Table

Symbol	Type	1	2	3	4	5	6	7	8
V-101	6K7	0.0	-	10260	12100	330	0.0	-	330
V-102	12J5	0.0	-	9920	-	47000	-	-	50
V-103	12SA7	0.0	-	10380	12100	20000	270	-	3.67 Meg
V-104	12SK7	0.0	-	220	3.67 Meg	220	15300	-	10380
V-105	12SK7	0.0	-	680	4.7	680	10380	-	10380
V-106	12H6	0.0	-	.118 Meg	0.0	2.2 Meg	0.0	-	10000
V-107	12SN7GT	1.12 Meg	10000	-	0.0	76700	1800	-	-
V-108	12SN7GT	.125 Meg	56700	1000	75000	56700	1500	-	-
V-109	25L6GT	0.0	-	9800	9700	.145 Meg	-	-	125
V-110	25L6GT	0.0	-	9800	9700	.24 Meg	-	-	125
V-111	1629	-	-	2.2 Meg	9700	4.2 Meg	9700	-	0.0
V-112	25Z6GT	-	-	55	9770	55	-	-	9770

All readings are measured from socket terminal to the common ground bus.

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Table 3 TROUBLE LOCATION CHART

Symptom	Cause	Remedy
Weak or dead on all bands	Blown fuse	Replace from spares
	Defective tube	Replace from spares or stock
	Dial lamp burned out	Replace from spares
	Socket voltages wrong	Check associated bypass capacitors
		Check continuity of wiring and components
		Check resistors and switch contacts
	No signal	Check receiver stage by stage
		Check for disconnected or broken antenna connections
Weak or dead one band only	No signal	Check all coils on specific band
		Check switch contacts
Noisy Reception	Defective tube	Tap all tubes lightly and replace any that are noisy
	Defective antenna	Check antenna installation and connection
	Defective component	Tap all components lightly with insulated rod, check carefully suspected parts
Oscillation	Defective tube	Replace tubes one at a time
	Open bypass capacitor	Connect good capacitor across suspected unit, temporarily. Replace defective unit
Hum	Defective tube	Replace tubes one at a time
	Defective filter capacitor	Replace defective unit
	Defective bypass capacitor	
	Improper power source connection	Reverse power input connection

Bypass or filter capacitors, which develop poor internal connections or which become open-circuited, will cause decreased sensitivity and/or poor stability. An open unit can be located by temporarily connecting a good capacitor in parallel with the unit under suspicion. Failures of any bypass or filter capacitor may seriously overload resistors of associated circuits. Overloads of sufficient magnitude to permanently damage a resistor will cause the painted surface of the resistor to be scorched, making the defective unit easy to locate by visual inspection.

Loose connections, causing intermittent or noisy operation, and which cannot be found by point to point resistance tests, can usually be located by individually testing each circuit element, or by tapping or shaking the component under suspicion, when the receiver is adjusted for normal operation.

18. VOLTAGE AND RESISTANCE TESTS

Table 1 lists the tube socket voltages for various settings of the controls. All voltages are measured between the GROUND BUS and socket terminals. Voltage measurements listed are made with an electronic voltmeter such as the voltohmyst using the scale that can be most easily read. The receiver should be connected for normal operation and the controls adjusted as listed in Table 1. Line voltage should be 115 volts AC or DC. Resistance measurements are listed in Table 2. All resistance measurements are made between ground bus and terminal. The most suitable scale for the measurement being taken, should be used. The receiver should be disconnected from the power source with controls adjusted as listed in Table 1.

19. ALIGNMENT DATA

Should realignment of the Scott Export Radio Receiver become necessary, the following alignment data should be carefully studied before making any circuit adjustments. It is important that the operator understand the functions of each circuit element so that correct alignment may be made quickly and accurately.

All alignment and measurements may be made with a signal generator capable of producing both a 30% 400 cycle modulated signal or an unmodulated signal between 400 kilocycles and 25 megacycles and a General Radio Type 583A or equivalent output meter. For RF alignment and measurements at the antenna input a Standard RMA dummy antenna as shown in Figure 4 should be used.

Before proceeding with the alignment of any circuit of the receiver, the chassis must be removed from the cabinet, and the bottom cover plate of the chassis removed. For IF alignment the bottom cover shield of the oscillator-converter compartment must be removed.

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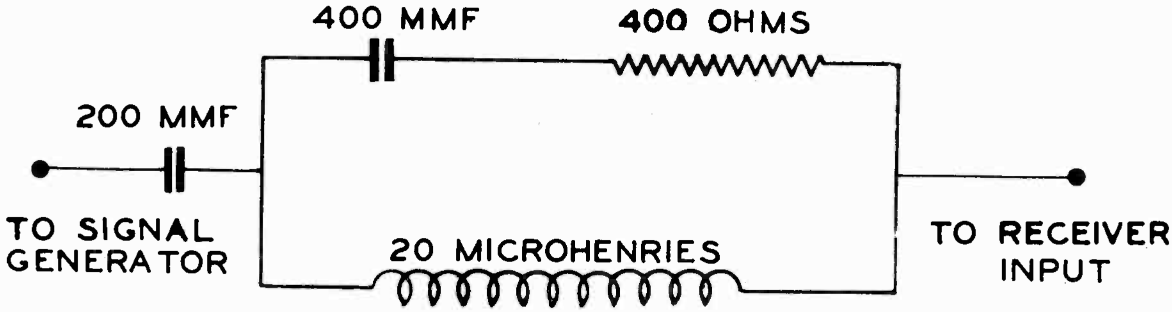

Figure 4 Schematic Diagram RMA Standard Dummy Antenna

The receiver must be connected to a 115 volt AC or DC power source and the controls set as follows unless otherwise noted.

Control	Position	Control	Position
Power Switch	Power	Tone	Maximum
Sensitivity	Maximum	Band Selector	As Noted
Volume	As Noted	N.L. Control	Off
		Selectivity	Sharp (1)

The complete alignment of the radio receiver may be divided into three steps.

1. I.F. Amplifier Alignment
2. High Frequency Oscillator Alignment
3. Radio Frequency Amplifier Alignment

NOTE: THE CIRCUITS MUST BE CHECKED IN THE ABOVE ORDER WHEN COMPLETE ALIGNMENT IS NECESSARY.

20. I.F. AMPLIFIER ALIGNMENT

The intermediate frequency of the radio receiver is 455 kilocycles.

Tuning adjustments are provided in each I.F. transformer. These adjustments consist of adjustable iron cores and are designated by symbol numbers E-115 to E-119 inclusive as indicated on Schematic Diagram, Figure 7.

The high potential lead of the signal generator should be connected to the control grid (terminal No. 8) of the mixer tube V-103 through a .01 mfd. capacitor and the ground lead to any metal part of the chassis.

The frequency of the signal generator should be carefully adjusted to 455 kilocycles modulated 30% at 400 cycles and the signal input to mixer tube V-103, adjusted to provide a reading on the output meter. Starting with the Third I.F. transformer the trimmers should be adjusted in the following order: E-119, E-118, E-117, E-116 and E-115.

NOTE: IT IS ESSENTIAL THAT THE INPUT SIGNAL FROM THE SIGNAL GENERATOR, BE KEPT BELOW THE THRESHOLD OF OPERATION OF THE AUTOMATIC VOLUME CONTROL. EXCESSIVE SIGNAL INPUTS WHICH WILL CAUSE OVERLOAD OF EITHER THE SECOND DETECTOR OR AUDIO CIRCUITS SHOULD ALSO BE AVOIDED.

The performance of the I.F. amplifier can be checked against the following data. For an audio output of .5 watt across an 8 ohm load (2 volts) the following input values should not be exceeded, if the I.F. amplifier is in proper operating condition.

V-103 grid	50	Microvolts
V-104 grid	1000	Microvolts
V-105 grid	50000	Microvolts

21. R. F. AND H. F. OSCILLATOR ALIGNMENT

CAUTION: READJUSTMENT OF THE H.F. OSCILLATOR CIRCUIT TRIMMERS SHOULD NOT BE ATTEMPTED UNTIL AFTER THE NEED FOR SUCH READJUSTMENT HAS BEEN POSITIVELY ESTABLISHED.

Table 3 gives the alignment frequency, trimmer adjustment and nominal sensitivity for each of the four frequency bands.

The signal generator should be connected through a Standard RMA dummy antenna to the antenna-ground input terminals. A 400 cycle, 30% modulated signal should be used. The receiver controls should be adjusted as listed in Paragraph 19 with the band selector control set to the desired frequency band.

It is important that the H.F. oscillator circuits operate at a higher frequency than that of the RF amplifier circuit on Bands 1 and 2 and at a lower frequency than the RF amplifier circuits on Bands 3 and 4. The correct operating point can be checked by leaving the signal generator set at the alignment frequency and on Bands 1 and 2 the image signal should appear 910 KC lower in frequency on the dial if the oscillator is correctly aligned. On Bands 3 and 4 the image should appear 910 KC higher in frequency on the dial. It may be necessary to increase the signal output of the generator in order to pickup the image signal.

The following general procedure should be employed in the alignment of the H.F. oscillator and R.F. amplifier circuits. Set signal generator to high frequency alignment point of desired band. Set radio dial to high frequency alignment point and adjust corresponding trimmer adjustments for maximum output. Repeat this procedure for the low frequency alignment point.

The alignment of the R.F. and oscillator circuits may be considered satisfactory if the signal input necessary to produce a 500 milliwatt output, measured across an 8 ohm load at the speaker terminals, does not exceed the values given in Table 3.

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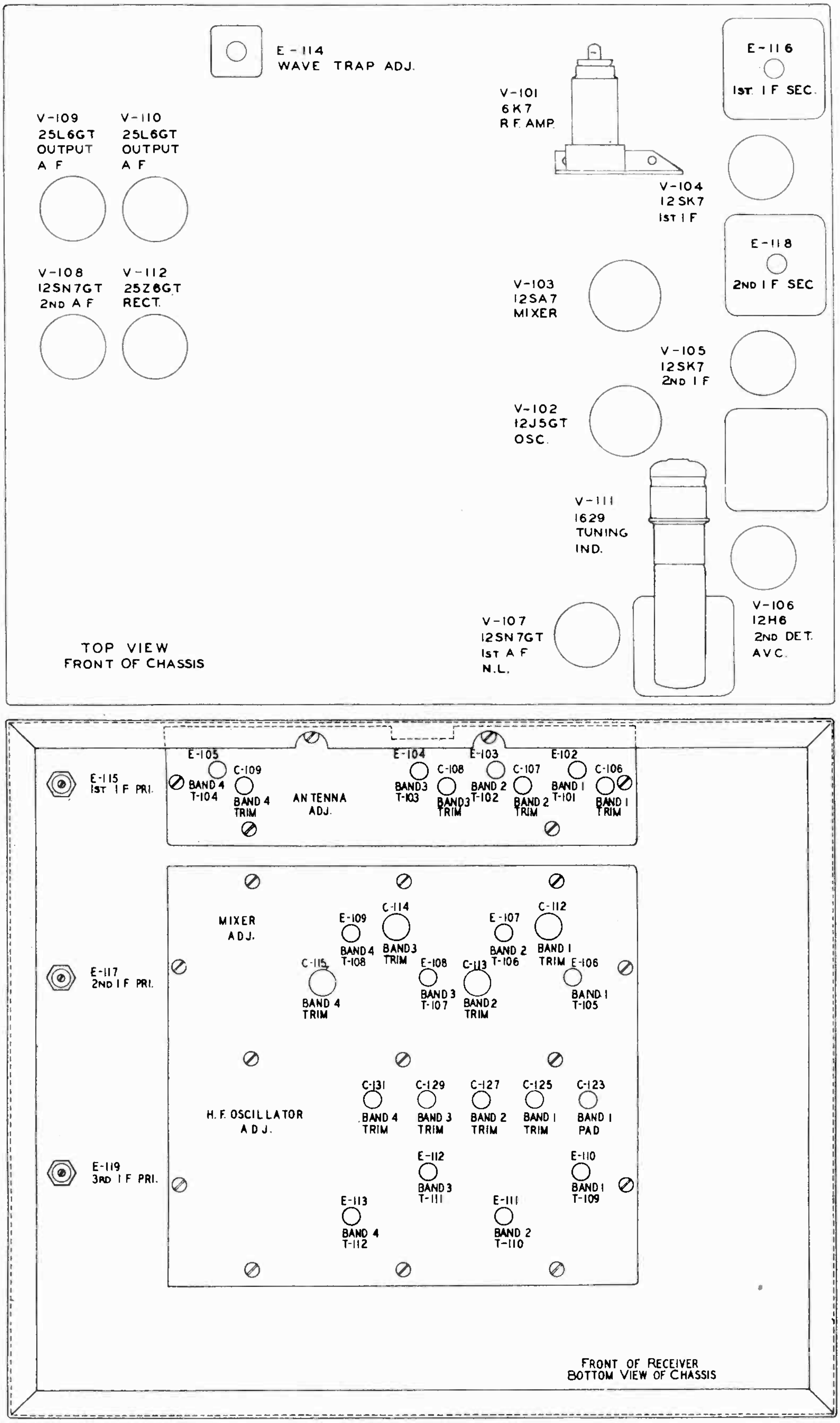

Figure 5 Trimmer Positions and Tube Location

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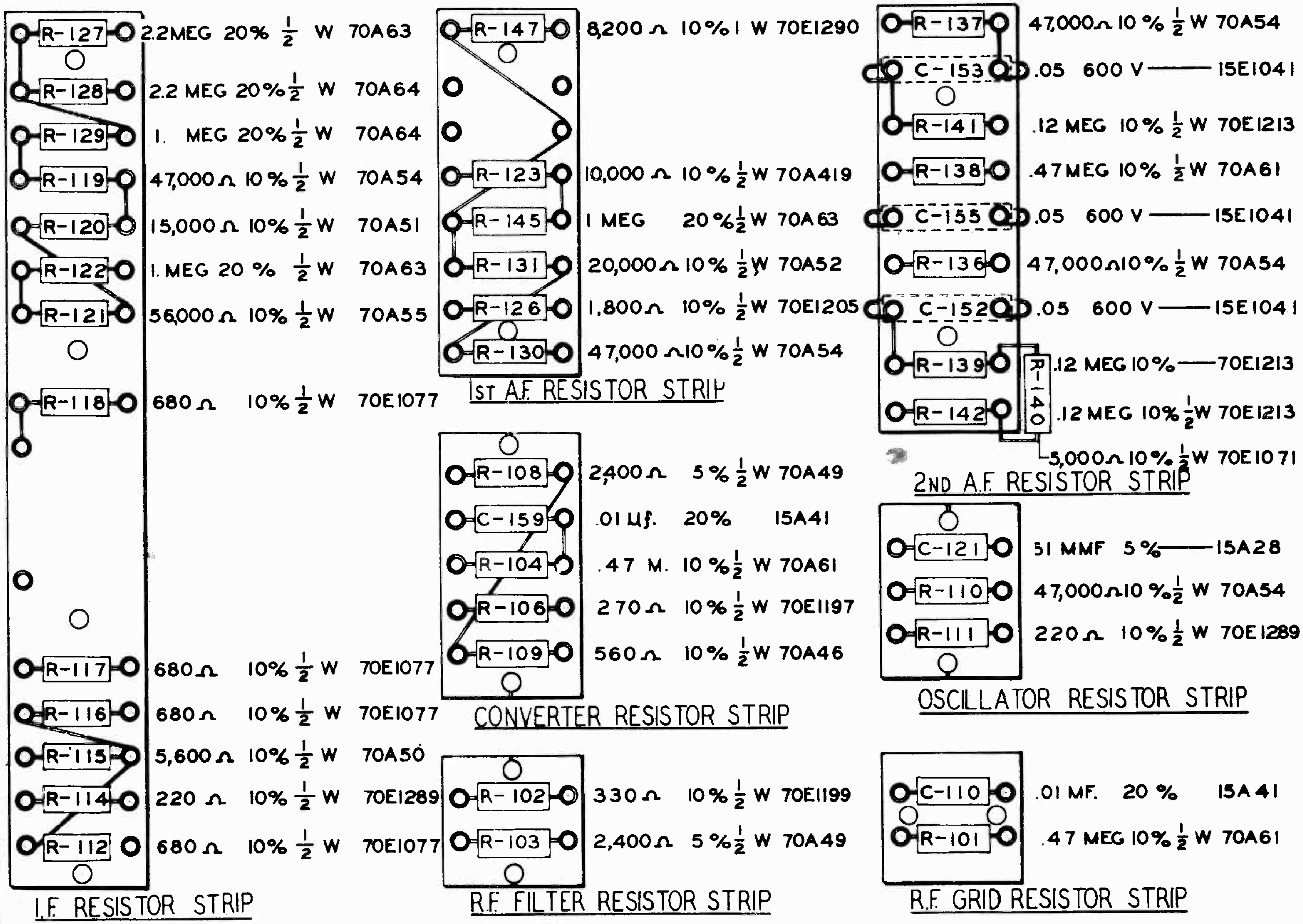

Figure 6 Resistor Strip Layout

Sensitivity measurements are made at a 10 to 1 signal to noise ratio as follows:

With the signal generator and receiver set to the same frequency, turn off the signal generator modulation; adjust the signal generator output to 10 microvolts; adjust the A.F. gain control on the receiver to give an output reading of 50 milliwatts, .63 volts across an 8 ohm load. Turn the signal generator modulation on and adjust the signal generator output control to give an output reading from the receiver of .5 watt (2 volts). Repeat this procedure as a check. Then the output reading of the signal generator will be the sensitivity of the receiver at a 10 to 1 signal to noise ratio.

NOTE: The sensitivity control should be set at maximum position when making the above measurements.

TABLE 4

Alignment Data

Band	Freq.	Adjustment			Nominal Sensitivity
		Osc.	Mixer	Ant.	
1	1400 KC 1000 KC 600 KC	C-125 E-110 C-123	C-112 E-106	C-106 E-102	10 uv
2	7.5 MC 3.5 MC	C-127 E-111	C-113 E-107	C-107 E-103	10 uv
3	13.5 MC 9.0 MC	C-129 E-112	C-114 E-108	C-108 E-104	10 uv
4	22.6 MC 15 MC	C-131 E-113	C-115 E-109	C-109 E-105	10 uv

SCOTT RADIO LABS., INC. EXPORT RECEIVER

Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
		CAPACITORS	
C-101	L-101 tuning	Capacitor, silver mica, 200 MMF 5%, 500 V DC wkg., bakelite case	15E1257
C-102	Antenna series	Capacitor, mica, .01 MF 20% 300 V DC wkg.,bakelite case	15A427
C-103	V-101 grid coupling	Capacitor, mica, 240 MMF 10%, 500 V DC wkg.,bakelite case	15A31
C-104 C-104A C-104B	Antenna tuning	Capacitor, variable air, single unit, split stator Section"A" 17 plates, min. cap 12 MMF, max. cap 262 MMF. Section "B" 9 plates, min.cap. 9 MMF max.cap.134 MMF. Air gap .015", shaft: 3/8" dia. x 1 3/32 long	15E1280
C-105	C-104B shunt on Bands 2, 3,4	Capacitor, silver ceramic, 10 MMF 10%, 500 V DC wkg., insulated, pigtail leads	15A22
C-106	T-101 secondary trimmer	Capacitor, ceramic trimmer, min.cap. 1.5 MMF, max.cap. 10 MMF, 500 V DC test	15E1284
C-107	T-102 secondary trimmer	Capacitor, ceramic trimmer, min.cap. 4.5 MMF, max.cap. 25 MMF, 500 V DC test	15A21
C-108	T-103 secondary trimmer	Same as C-107	
C-109	T-104 secondary trimmer	Same as C-107	
C-110	V-101 grid return bypass	Capacitor, mica, .01 MF 20% 300 V DC wkg., CM35 case	15A41
C-111 C-111A C-111B	Section "A", V-101 cathode bypass Section "B", V-101 screen bypass	Capacitor, paper, 0.1/0.1 MFD 10%, 600 V DC wkg., bathtub container 1 13/16" long x 1" wide x 7/8" high, mtg centers 2 1/8",hermetically sealed	15B796
C-112	T-105 secondary trimmer	Same as C-106	
C-113	T-106 secondary trimmer	Same as C-107	
C-114	T-107 secondary trimmer	Same as C-107	
C-115	T-108 secondary trimmer	Same as C-107	
C-116	V-103 grid coupling	Same as C-103	
C-117 C-117A C-117B C-117C C-117D	Sections "A" and "B" mixer tuning Sections "C" and"D" H.F. oscillator tuning	Capacitor, variable air, 2 unit, split stator, Section "A" both units 17 plates, min.cap. 12 MMF, max.cap. 262 MMF. Section "B" both units, 9 plates, min.cap. 9 MMF, max.cap. 134 MMF,air gap.015",shaft at both ends 3/8"dia., 1 3/32" long at rear, 2 3/4"long at front	15E1281

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SCOTT RADIO LABS., INC.

Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
	CAPACITORS (Continued)		
C-118	Ground bus to chassis ground at V-103 socket	Same as C-110	
C-119 C-119A C-119B C-119C	Section "A" V-107 #1 grid Section "B" V-111 grid filter Section "C" N.L. grid filter	Capacitor, paper, 2 x .05 MFD 10%, 600 V DC wkg., bathtub container, 1 13/16" long x 1" wide x 7/8" high, hermetically sealed	15A11
C-120 C-120A C-120B	Section "A" V-103 heater bypass Section"B" V-103 cathode bypass	Same as C-111	
C-121	V-102 cathode to V-103 osc. grid coupling	Capacitor, silver mica, 51 MMF 5%, 500 V DC wkg., bakelite case,pigtail leads	15A28
C-122	V-102 grid coupling	Same as C-121	
C-123	T-109 variable pad	Capacitor, variable air trimmer, min.cap. 6.5 MMF, max.cap. 100 MMF, 28 plates ¼" hex adj. shaft with screwdriver slot	15B862
C-124	T-109 fixed pad	Capacitor, silver mica, 560 MMF 5%, 500 V DC wkg.,bakelite case, pigtail leads	15E1283
C-125	T-109 trimmer	Capacitor, variable air trimmer, min.cap. 3 MMF, Max.cap. 25 MMF, 7 plates, ¼" hex adj. shaft with screwdriver slot	15A18
C-126	T-110 fixed pad	Capacitor,silver mica, 3000 MMF 5%, 500 V DC wkg.,bakelite case, pigtail leads	15A38
C-127	T-110 trimmer	Same as C-125	
C-128	Bypass from case of C-139 to ground bus.	.005 MF mica 300 V DC wkg.	15E1263
C-129	T-111 trimmer	Same as C-125	
C-130	Ground bus to chassis bypass at V-102	Same as C-110	
C-131	T-112 trimmer	Same as C-125	
C-132 C-132A C-132B C-132C	Section "A", V-102 plate bypass Section "B", V-102 plate filter Section "C", heater bypass at V-102 socket	Same as C-119	
C-133	T-104 secondary shunt	Capacitor, silver ceramic, 20 MMF 10%, 500 V DC wkg., N.P.O.	15B864

SCOTT RADIO LABS., INC. EXPORT RECEIVER

Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
	CAPACITORS (Continued)		
C-134 C-134A C-134B C-134C	Section "A",V-103 screen bypass Section "B", +B bus bypass Section "C", V-101 plate return bypass	Same as C-119	
C-135 C-135A C-135B C-135C	Section "A", V-104 cathode bypass Section "B", sensitivity control bypass Section "C", V-103 plate bypass	Same as C-119	
C-136	T-113 primary tuning	Same as C-101	
C-137	T-113 secondary tuning	Capacitor, silver mica, 240 MMF 5%,500 V DC wkg., bakelite case, pigtail leads	15B602
C-138 C-138A C-138B	Section "A", ground bus to chassis bypass at V-106 Section "B", ground bus to chassis bypass at Pin 8 of V-107	Capacitor, paper, 0.1/0.1 MFD 600 V DC wkg., bathtub container, 1 13/16" long x 1" wide x 7/8" high,mounting centers 2 1/8"	15E2573
C-139 C-139A C-139B C-139C	Section "A", V-105 cathode bypass Section "B", V-105 screen and plate filter Section "C", V-104 plate filter	Same as C-119	
C-140	T-114 primary tuning	Same as C-137	
C-141	T-114 secondary tuning	Same as C-137	
C-142	T-115 primary tuning	Capacitor, silver mica, 100 MMF 5%, 500 V DC wkg.,bakelite case, pigtail leads	15A428
C-143	V-106A diode filter	Capacitor, mica 100 MMF 10% 500 V DC wkg., bakelite case, pigtail leads	15A29
C-144 C-144A C-144B	Section "A", V-104 grid return bypass Section "B", V-104 screen filter	Capacitor,paper, .05/.05 MF 10%, 600 V DC wkg, bathtub container, hermetically sealed	15A11
C-145	S-103 to volume control R-125 coupling	Same as C-102	
C-146	AVC diode cathode bypass	Same as C-143	
C-147	V-107B plate to V-108B grid coupling	Capacitor, paper,.05 MF 10% 600 V DC wkg.,tubular paper case, pigtail leads	15E1041

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SCOTT RADIO LABS., INC.

Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
	CAPACITORS	(Continued)	
C-148	V-107B plate filter bypass	Capacitor, electrolytic, 20 MF, 200 V DC wkg., 2 terminal type in 1" dia. x 2 1/4" long round can, hermetically sealed	15E1278
C-149	V-108A cathode bypass	Capacitor, electrolytic, 25 MF, 25 V DC wkg., bathtub container 1 13/16" long x 1" wide x 7/8" high, hermetically sealed	15A15
C-150	V-105 plate to V-106B plate coupling	10 MMF silver ceramic NPO.	15A22
C-151	Tone control series	Capacitor, paper, .02 MFD 10%, 600 V DC wkg., bathtub case, hermetically sealed	15A12
C-152	V-108B plate to V-109 grid coupling	Same as C-147	
C-153	V-108A plate to V-110 grid coupling	Same as C-147	
C-154	V-109, V-110 cathode bypass	Same as C-149	
C-155	V-109 plate feedback	Same as C-147	
C-156	Power supply filter, input side	Capacitor, electrolytic, 60 MF, 250 V DC wkg., 2 terminal type in 1 3/8" dia. x 2¼" long round can, hermetically sealed	15E1277
C-157 C-157A C-157B	Power supply output filter 2 sections in parallel	Capacitor, electrolytic, 60/60 MF, 200 V DC wkg., 3 terminal type in 1 3/8" dia. x 3 1/4" long round can, hermetically sealed	15E1276
C-158 C-158A C-158B	Power supply input filter 2 sections in parallel	Same as C-157	
C-159	V-103 grid return filter	Same as C-110	
C-160	T-110 secondary compensating	Capacitor, silver ceramic, 18 MMF 5%, 500 V DC wkg., N-750 temp. coeff.	15E1259
C-161	T-111 secondary compensating	Capacitor, silver ceramic, 10 MMF 5%, 500 V DC wkg., N-750 temp. coeff.	15A23
C-162	T-112 secondary compensating	Capacitor, silver ceramic, 25 MMF 5%, 500 V DC wkg., N-750 temp. coeff.	15E1254
C-163	Phono input ground series.	.25 MF paper tubular 400 V DC wkg	15E1136
C-164	Power line bypass	.05 MF paper tubular 600 V DC wkg	15E1041

SCOTT RADIO LABS., INC. EXPORT RECEIVER

Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
	MISCELLANEOUS ELECTRICAL PARTS		
E-101	V-101 grid cap	1/4"grid cap for octal tube	14E1089
E-102	T-101 inductance trimmer	Compressed powdered iron core, coil inductance trimmer	24A99
E-103	T-102 inductance trimmer	Same as E-102	
E-104	T-103 inductance trimmer	Same as E-102	
E-105	T-104 inductance trimmer	Same as E-102	
E-106	T-105 inductance trimmer	Same as E-102	
E-107	T-106 inductance trimmer	Same as E-102	
E-108	T-107 inductance trimmer	Same as E-102	
E-109	T-108 inductance trimmer	Same as E-102	
E-110	T-109 inductance trimmer	Same as E-102	
E-111	T-110 inductance trimmer	Same as E-102	
E-112	T-111 inductance trimmer	Same as E-102	
E-113	T-112 inductance trimmer	Same as E-102	
E-114	L-101 inductance trimmer	Compressed powdered iron core, coil inductance trimmer	24A98
E-115	T-113 primary inductance trimmer	Same as E-114	
E-116	T-113 secondary inductance trimmer	Same as E-114	
E-117	T-114 primary inductance trimmer	Same as E-114	
E-118	T-114 secondary inductance trimmer	Same as E-114	
E-119	T-115 primary inductance trimmer	Same as E-114	
E-120	Antenna terminal strip	Three terminal connector strip marked Ant-Gnd	87E411
E-121	Phono input terminal board	Two terminal connector strip marked "Phono-Gnd" 6-32 captive screws	87A220
E-122	Speaker terminal board	Two terminal connector strip marked Speaker	87E2423
	FUSES		
F-101	Power input fuse	Fuse, 1 amp, 250 volt,cartridge type 1 1/4" long, ferrules 1/4" dia.	37B655
	HARDWARE		
H-101	Band change switch shaft coupling	Coupling, solid, for 1/4" dia.shaft,3/4" long x 1/2" dia.	25A367

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Parts List By Symbol Designation.

Symbol Desig.	Function	Description	Part Number
	HARDWARE (Continued)		
H-102	Band change switch shaft coupling	Same as H-101	
H-103	Selectivity switch shaft coupling	Same as H-101	
H-104	Dial to main tuning capacitor coupling	Coupling, insulated, for 3/8" dia. and 1/4" dia. shaft, 1 1/8" long, 1 25/32" dia., phenolic insulator ring	25E2580
H-105	Single and double unit main tuning capacitor coupling	Coupling, insulated, for 3/8" dia. shaft, 1" long x 1 25/32" dia., phenolic insulating ring	25A301
H-106	#8 set screw wrench	Wrench, 5/64" x 1 7/8" long for #8 hollow head set screws	94B810
H-107	Main tuning capacitor coupling	Coupling, flexible for 3/8" dia., shaft, 1" long x 1 25/32" dia.	25E2430
	INDICATING DEVICES		
I-101	Dial lamp	Lamp, 6-8 volt, 0.15 amp miniature bayonet base	49E899
I-102	Dial lamp	Same as I-101	
	JACKS AND RECEPTACLES		
J-101	Fuse holder for power input fuse	Receptacle, extractor type, fuse holder, mounts in 1/2" hole	67A192
	INDUCTORS RF AND AF		
L-101	455 KC wavetrap	RF inductor, 195 T 7/41 litz wire, universal wound, 0.51 MH at 1000 CPS DC resistance 5.87 ohms 10% includes C-101	20E2379
L-102	Power supply filter choke	Filter reactor, 4.5 H at 3 V 60 CPS with 150 MA DC., DC resistance 70 ohms, 2060 turns #28 E wire, hermetically sealed	17E1339
	LOUDSPEAKERS		
LS-101	Loudspeaker	Loudspeaker, 12 inch PM, 8 ohm voice coil, 3 ft wire leads with terminal lugs	85E2418A

Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
		MECHANICAL PARTS, SHAFTS	
O-101	Selectivity switch extension shaft	Shaft, 1/4" dia. x 10 1/4" long, flat on 2 sides, .187 thick, steel	79E1356
O-102	Band change switch shaft	Shaft, 1/4" dia. x 9 1/2" long, flat on 2 sides, .187 thick, steel	79E1357
O-103	Band change switch shaft for antenna section	Shaft, 1/4" dia. x 3 1/8" long, flat on 2 sides, .187 thick, PBG bakelite, wax impregnated	79E2425
		PLUGS	
P-101	Power input plug	Plug, 2 contact, male	65B679
		RESISTORS	
R-101	V-101 grid return	Resistor, composition, 0.47 meg 10%, ½ watt, pigtail terminals	70A61
R-102	V-101 cathode bias	Resistor, composition, 330 ohms 10%, ½ watt, pigtail terminals	70E1199
R-103	V-101 screen filter	Resistor, composition, 2400 ohms 5%, ½ watt, pigtail terminals	70A49
R-104	V-103 grid return	Same as R-101	
R-105	Not used		
R-106	V-103 cathode bias	Resistor, composition, 270 ohms 10%, ½ watt, pigtail terminals	70E1197
R-107	V-103 oscillator grid return	Resistor, composition, 20000 ohms 5%, ½ watt, pigtail terminals	70A52
R-108	V-103 screen filter	Same as R-103	
R-109	V-101 plate filter	Resistor, composition, 560 ohms 10%, ½ watt, pigtail terminals	70A46
R-110	V-102 grid return	Resistor, composition, 47000 ohms 10% ½ watt, pigtail terminals	70A54
R-111	V-103 plate load	Resistor, composition, 220 ohms 10%, ½ watt, pigtail terminals	70E1289
R-112	V-103 plate filter	Resistor, composition, 680 ohms 10%, ½ watt, pigtail terminals	70E1077

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Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
	RESISTORS	(Continued)	
R-113	V-104 grid return	Same as R-101	
R-114	V-104 cathode bias	Same as R-111	
R-115	V-104 screen filter	Resistor, composition, 5600 ohms 10%, ½ watt, pigtail terminals	70A50
R-116	V-104 plate filter	Same as R-112	
R-117	V-105 cathode bias	Same as R-112	
R-118	V-105 plate filter	Same as R-112	
R-119	V-106 diode load	Same as R-110	
R-120	V-106 diode filter	Resistor, composition, 15,000 ohms 10%, ½ watt, pigtail terminals	70A51
R-121	V-106 diode filter	Resistor, composition, 56,000 ohms 10% ½ watt, pigtail terminals	70A55
R-122	Noise limiter filter	Resistor, composition, 1 meg 20%, ½ watt, pigtail terminals	70A63
R-123	Diode bias V-106 AVC	Resistor, composition, 10,000 meg 10%, ½ watt, pigtail terminals	70A419
R-124	Phono input shunt	Resistor, composition, 0.1 meg 10%, ½ watt, pigtail terminals	70A58
R-125	Volume control	Potentiometer, composition, 0.25 meg 20%, 0.4 watt, clockwise logarithmic taper, cover insulated from mtg bushing and connected to left hand terminal, shaft 2" long	70E1285
R-126	V-107B cathode bias	Resistor, composition, 1800 ohms 10%, ½ watt, pigtail terminals	70E1205
R-127	AVC filter	Same as R-128	
R-128	V-111 grid filter	Resistor, composition, 2.2 meg 20%, ½ watt, pigtail terminals	70A64
R-129	AVC diode filter	Same as R-122	
R-130	V-107B plate load	Same as R-110	
R-131	V-107B plate filter	Same as R-107	
R-132	V-108B grid series	Resistor, composition, .12 meg 10%, ½ watt, pigtail terminals	70E1213
R-133	V-108B grid return	Resistor, composition, 75,000 ohms 10%, ½ watt, pigtail terminals	70A56

SCOTT RADIO LABS., INC.

Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
	RESISTORS	(Continued)	
R-134	V-108B cathode bias	Resistor, composition, 1500 ohms 10%, ½ watt, pigtail terminals	70A48
R-135	V-108A cathode bias	Resistor, composition, 1000 ohms 10%, ½ watt, pigtail terminals	70A47
R-136	V-108B plate load	Same as R-110	
R-137	V-108A plate load	Same as R-110	
R-138	V-109 plate feedback	Same as R-101	
R-139	V-109 grid return	Same as R-132	
R-140	V-109 grid return	Resistor, composition, 5000 ohms 10%, ½ watt, pigtail terminals	70E1071
R-141	V-110 grid return	Same as R-132	
R-142	V-109 and V-110 grid return	Same as R-132	
R-143	V-109 and V-110 cathode bias	Resistor,wirewound,125 ohms 5%,5 watt,pigtail terminals	70E2447
R-144	Dial lamp series	Resistor,composition, 10 ohms 10%, ½ watt, pigtail terminals	70A42
R-145	AVC diode bleeder	Same as R-122	
R-146	V-111 triode plate series	Same as R-129	
R-147	Sensitivity control bleeder	Resistor, composition, 8200 ohms 10%, 1 watt, pigtail terminals	70E1290
R-148	Sensitivity control	Potentiometer,wirewound, 1500 ohms 10%, 4 watts, linear taper, shaft 1/4" dia. x 2" long	70E1287
R-149	Not used		
R-150	Vacuum tube heater series	Resistor,wirewound,50 ohms 5%, 15 watts, pigtail terminals	70E2449
R-151	Vacuum tube heater series	Resistor, wirewound, 310 ohms 5%, 20 watts, pigtail terminals	70E2448
R-152	Tone control	Potentiometer,composition, 0.25 meg 20%, 0.4 watt, clockwise logarithmic taper, shaft 1/4" dia. x 2" long	70E1286

EXPORT RECEIVER

SCOTT RADIO LABS., INC.

Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
		SWITCHES	
S-101A	Antenna primary circuit switch	Switch section, 2 pole, 4 position, rotary type, ceramic wafer, silver contacts	89E1299-1
S-101B	Antenna secondary circuit switch	Switch section, 2 pole, 4 position, rotary type, ceramic wafer, silver contacts	89E1299-1A
S-101C	Mixer circuit switch	Switch section, 2 pole, 4 position, rotary type, ceramic wafer, silver contacts	89E1299-2A
S-101D	Oscillator circuit switch	Same as S-101B	
S-102A	First IF amp.selectivity switch	Switch section, 2 pole, 5 position, rotary type, ceramic wafer, silver contacts	89E1292-1
S-102B	Second IF amp. selectivity switch	Same as S-102A	
S-103	Noise limiter and phono-radio switch	Switch section, 3 pole, 3 position, rotary type, bakelite wafer, silver contacts	89E1600-1
S-104	Power switch	Toggle switch, D.P.S.T., 3 A, 125 V DC, silver plated contacts	89E1329
		TRANSFORMERS RF, AF AND POWER	
T-101	Band 1 antenna transformer	RF Transformer Pri.-175 T #34 SCE wire on 1" dia.form, DC resistance 14 ohms, universal wound Sec. 97½ T #34 SCE wire progressive universal wound on 1" dia. form DC resistance 7.0 ohms, wax impregnated	Pri. 20E2360 Sec. 20E2361
T-102	Band 2 antenna transformer	RF Transformer Pri. 32 T #34 SCE wire universal wound on 3/4" form,DC resistance 1.9 ohms Sec.16½ T #24 E wire closewound on 3/4" form, DC resistance 0.1 ohms, wax impregnated	Pri. 20E2362 Sec. 20E2363

SCOTT RADIO LABS., INC.

EXPORT RECEIVER

Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
	TRANSFORMERS RF, AF AND POWER (Continued)		
T-103	Band 3 antenna transformer	RF Transformer Pri.23½ T #32 wire universal wound on 3/4" form, DC resistance .8 ohms Sec. 9 3/4 T #24 E wire closewound on 3/4"form, DC resistance .07 ohms, wax impregnated	Pri. 20E2364 Sec. 20E2365
T-104	Band 4 antenna transformer	RF transformer Pri.23½ T #32 E wire closewound on 3/4" form, DC resistance 0.8 ohms Sec. 4 3/4 T #24 E wire spacewound on 3/4"form, DC resistance .04 ohms, wax impregnated	Pri. 20E2366 Sec. 20E2367
T-105	Band 1 mixer transformer	RF Transformer Pri. 60 T #34 SCE wire, universal wound, DC resistance 5.0 ohms Sec. 96¼ T #34 SCE wire, progressive universal wound, DC resistance 7.0 ohms, 1" dia. form, wax impregnated	20E2368
T-106	Band 2 mixer transformer	RF Transformer Pri. 9½ T #28 DSC wire, universal wound, DC resistance .16 ohms Sec. 15½ T #24 E wire, closewound, DC resistance .11 ohms, 3/4" dia. form, wax impregnated	20E2369
T-107	Band 3 mixer transformer	RF Transformer Pri.9 3/4 T #28 DCC wire closewound, DC resistance 0.143 ohms Sec.8½ T #24 E wire,closewound, DC resistance .07 ohms, 3/4" dia. form, wax impregnated	20E2370
T-108	Band 4 mixer transformer	RF Transformer Pri.4¼ T #28 DCC wire interwound, DC resistance .11 ohms Sec. 4 3/8 T #24 E wire, spacewound, DC resistance .04 ohms, 3/4" form, wax impregnated	20E2371

EXPORT RECEIVER

SCOTT RADIO LABS., INC.

Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
	TRANSFORMERS RF, AF AND POWER (Continued)		
T-109	Band 1 oscillator transformer	RF Transformer Pri. 12 T #32 E wire, closewound, DC resistance 0.55 ohms Sec. 49 1/4 T #32 E wire, closewound, DC resistance 2.2 ohms,1" dia. form, wax impregnated	20E2372
T-110	Band 2 oscillator transformer	RF Transformer Pri. 5 1/2 T #24 E wire, closewound, DC resistance .03 ohms Sec. 13 T #24 E wire, closewound, DC resistance 0.1 ohms, 3/4" dia. form, wax impregnated	20E2373
T-111	Band 3 oscillator transformer	RF Transformer Pri. 2 1/2 T #24 E wire, spacewound, DC resistance .01 ohms Sec. 8 T #24 E wire, spacewound, DC resistance .04 ohms, 3/4" dia. form, wax impregnated	20E2374
T-112	Band 4 oscillator transformer	RF Transformer Pri. 1 1/8 T #24 E wire, spacewound, DC resistance .005 ohms Sec. 3 1/2 T #24 E wire, spacewound, DC resistance .03 ohms, 3/4" dia. form, wax impregnated	20E2375
T-113	#1 IF transformer V-103 to V-104 coupling	IF Transformer, 455 KC Pri. 162 T, 7/41 litz wire, universal wound, DC resistance 4.72 ohms Sec. 162 T, 7/41 litz wire, universal wound, DC resistance 4.93 ohms Tertiary: 6 T, 7/41 litz wire, tapped at 3 T and wound under primary. 7/16" dia. form, iron core tuned, wax impregnated	20E2376

SCOTT RADIO LABS., INC. EXPORT RECEIVER

Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
	TRANSFORMERS RF, AF AND POWER (Continued)		
T-114	#2 IF transformer V-104 to V-105 coupling	IF transformer, 455 KC Pri. 162 T, 7/41 litz wire, universal wound, DC resistance 4.93 ohms Sec. 162 T, 7/41 litx wire, universal wound, DC resistance 4.73 ohms Tertiary: 6 T, 7/41 litz wire tapped at 3 T and wound under primary. 7/16" dia. form, iron core tuned, wax impregnated	20E2377
T-115	#3 IF transformer V-105 to V-106 coupling	IF Transformer, 455 KC Pri. 210 T, #34 SCE wire universal wound, DC resistance 12.3 ohms Sec. 2 pi winding 160 each pi, #34 SCE wire, DC resistance total 16.7 ohms, wax impregnated	20E2378
T-116	Not used		
T-117	V-109 and V-110 to speaker terminals coupling	Output transformer Pri. 4000 ohms at 1000 CPS 80 MA DC Sec. 8 ohms	91E2355
	VACUUM TUBES		
V-101	RF amplifier, 6K7	Vacuum tube (receiving-metal) triple grid super control amplifier. Base: small wafer octal 7 pin, miniature cap. Heater: current 0.3 amp at 6.3 volts AC or DC Type 6K7	92E1057
V-102	HF oscillator, 12J5	Vacuum tube (receiving-glass) detector amplifier triode, Base:intermediate shell octal 6 pin.Heater: current 0.15 amp at 12.6 volts AC or DC Type 12J5	92E1298
V-103	First detector and mixer, 12SA7	Vacuum tube (receiving-metal) pentagrid converter Base: small wafer octal 8 pin. Heater: current 0.15 amp at 12.6 volts AC or DC Type 12SA7	92E1417

EXPORT RECEIVER

SCOTT RADIO LABS., INC.

Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
	VACUUM TUBES (Continued)		
V-104	First IF amplifier,12SK7	Vacuum tube (receiving-metal) triple grid super control amplifier. Base: small wafer octal 8 pin. Heater: current 0.15 amp at 12.6 volts AC or DC Type 12SK7	92E1294
V-105	Second IF amplifier, 12SK7	Same as V-104	
V-106	Second detector AVC, 12H6	Vacuum tube (receiving-metal) twin diode. Base: small wafer octal 7 pin. Heater: current 0.15 amp at 12.6 volts AC or DC Type 12H6	92E1295
V-107	First AF amplifier, noise limiter, 12SN7GT	Vacuum tube (receiving-glass) twin triode. Base: intermediate shell octal 8 pin. Hater:current 0.3 amp at 12.6 volts AC or DC Type 12SN7GT	92E1297
V-108	Second AF amplifier, Phase inverter, 12SN7GT	Same as V-107	
V-109	Output audio amplifier 25L6GT	Vacuum tube (receiving-glass) beam power amplifier. Base: intermediate shell octal 7 pin. Heater: current 0.3 amp at 25 volts AC or DC Type 25L6GT	92E1418
V-110	Output audio amplifier, 25L6GT	Same as V-109	
V-111	Tuning indicator, 1629	Vacuum tube (receiving-glass) electron ray indicator. Base: small shell octal 7 pin. Heater:current 0.15 amp at 12.6 volts AC or DC Type 1629	92E1296
V-112	Rectifier, 25Z6GT	Vacuum tube (receiving-glass) high vacuum rectifier. Base: intermediate shell octal 7 pin.Heater: current 0.3 amp at 25 volts AC or DC Type 25Z6GT	92E1419

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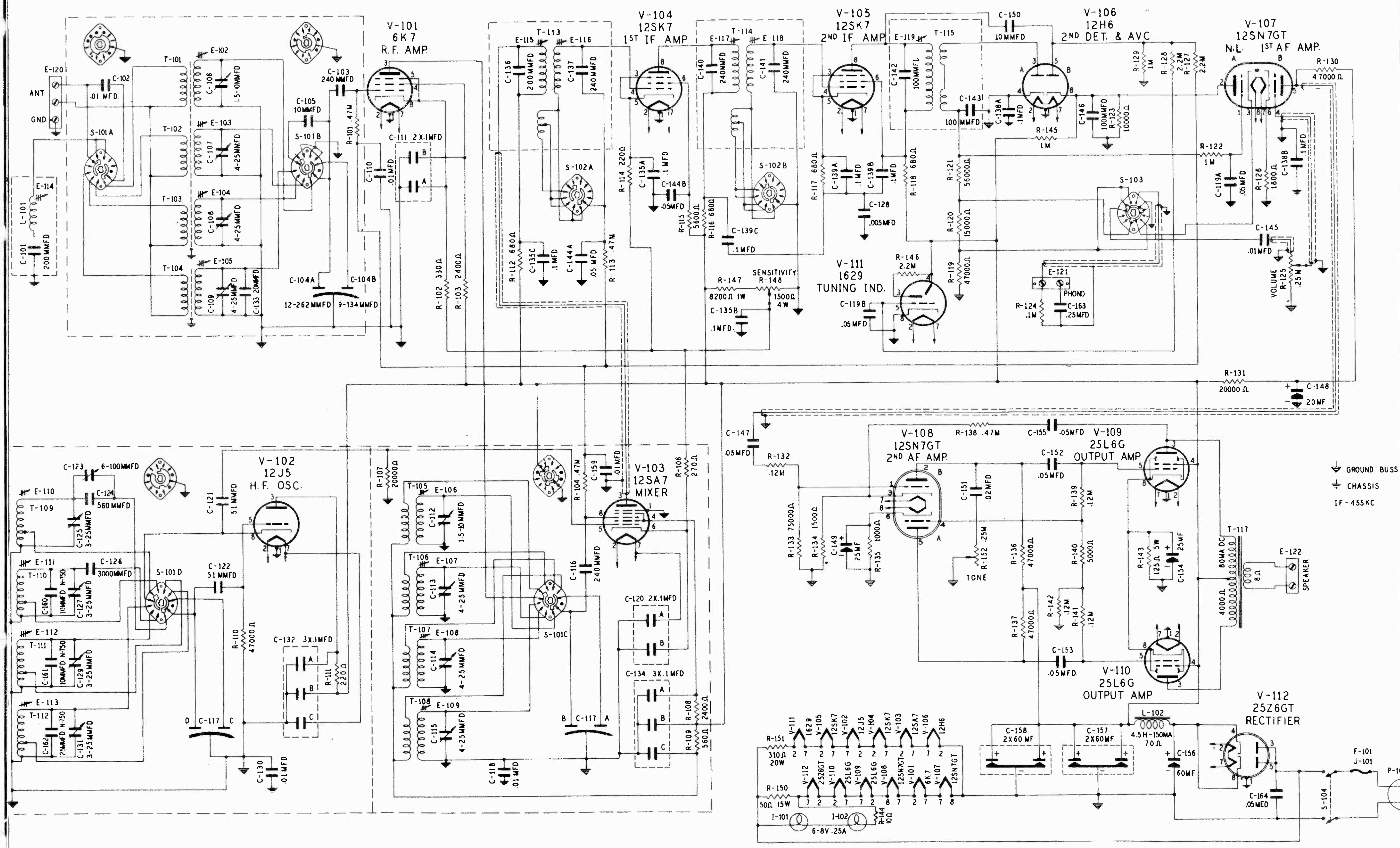

Figure 7 Schematic Circuit Diagram of Scott Export Receiver

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Parts List By Symbol Designation

Symbol Desig.	Function	Description	Part Number
		SOCKET	
X-101	Socket for V-101	Vacuum tube socket, 8 prong octal, mica filled bakelite with mounting plate and retainer ring	82E1322
X-102	Socket for V-102	Same as X-101	
X-103	Socket for V-103	Same as X-101	
X-104	Socket for V-104	Same as X-101	
X-105	Socket for V-105	Same as X-101	
X-106	Socket for V-106	Same as X-101	
X-107	Socket for V-107	Same as X-101	
X-108	Socket for V-108	Same as X-101	
X-109	Socket for V-109	Same as X-101	
X-110	Socket for V-110	Same as X-101	
X-111	Socket for V-111 tuning indicator	Vacuum tube socket, 8 prong octal, bakelite with metal shield cap, 5 wire leads, contains R-146	82E1371A
X-112	Socket for V-112	Same as X-101	
X-113	Dial lamp socket for I-101, I-102	Socket Assembly, miniature bayonet lamp, 2 sockets with wire leads	82E2417

SCOTT RADIO LABS., INC.

1. INTRODUCTION

1.1 These instructions cover the installation, operation, and servicing of the Model SLR-12-A Radio Receiving Equipment. THEY SHOULD BE READ AND STUDIED WITH GREAT CARE BEFORE THE INSTALLATION OR OPERATION OF THE EQUIPMENT IS ATTEMPTED IN ORDER THAT OPTIMUM PERFORMANCE MAY BE OBTAINED.

2. GENERAL DESCRIPTION

2.1 The Model SLR-12-A Radio Receiving Equipment is suitable and is primarily intended for use aboard marine vessels of all types. It is equally suitable for use at Radio shore stations.

2.2 The receiving equipment covers the frequency ranges of 0.53 to 1.60 and 5.55 to 15.60 megacycles in three frequency bands. It is specifically designed to provide optimum performance and high quality reception of voice or tone modulated radio frequency signals, on all frequency bands, by head telephone or loud speaker methods. For this reason, no beat frequency oscillator for the reception of radio telegraph signals is provided.

2.3 Special circuits and features are incorporated in the Model SLR-12-A Radio Receiving Equipment to preclude its oscillator feeding voltages into the antenna circuit and radiating interferences which could be detected by sensitive radio receiving or radio direction finding equipments in the same, or close vicinity.

2.4 The receiving equipment is designed for a-c operation, being equipped with a self-contained rectifier type power supply for supplying all operating voltages required from an a-c source of 110/125 volts, 58/62 cycles, single phase, such as the Model 262 Inverter.

2.5 The audio frequency output circuits of the receiving equipment are designed to permit the use of one pair of standard head telephones separately or in conjunction with a suitable local loud speaker, of the permanent magnet type, coupled to the equipment by means of either a 600 ohm or 5000 ohm matching transformer.

2.6 The Model SLR-12-A Radio Receiving equipment consists of three major units, the Radio receiver mounted in a metal cabinet, a 115 volt D.C. to 115 volt A.C., 250 Watt inverter, and a loudspeaker of the permanent magnet type.

2.7 The equipment is supplied with one set of vacuum tubes contained within the Radio Receiver. Two instruction books and one set of spare tubes are also supplied with each equipment.

2.8 The net weights and overall dimensions of the major unit of the complete equipment are listed in Par. 8.16.

3. DESCRIPTION OF MAJOR UNIT

3.1 The Model SLR-12-A Radio Receiver is a 12 tube superheterodyne covering the frequency ranges of 0.53 to 1.60 and 5.55 to 15.60 megacycles in three frequency bands, as follows:

BROADCAST BAND
0.53 to 1.60 MEGACYCLES
SHORT WAVE BAND-1
5.55 to 9.55 MEGACYCLES
SHORT WAVE BAND-2
9.20 to 15.60 MEGACYCLES

3.2 This major unit employs the cabinet type of construction, with the cabinet suitably shock mounted and designed for top of table or bench mounting. The chassis design and construction are such that the chassis may be mounted in a standard, cabinet type, relay rack. However, this type of mounting is not recommended for installations where the equipment will be subjected to severe shock or vibration, owing to the fact, that it can be accomplished only with the sacrifice of the shock mounting feature.

3.3 The major unit contains, on a single chassis, all apparatus, (including power supply) necessary for taking energy from an antenna, amplifying and converting such energy into intermediate frequency energy, amplifying the intermediate frequency energy and then demodulating such energy into audio frequency energy for delivery, through an audio frequency amplifier to a phone jack on the front operating panel and/or one of three sets of loud speaker terminals at the rear of the chassis.

3.4 The electrical circuits of the Model SLR-12-A Radio Receiver employed for signal reception on all frequency ranges, comprises one stage of radio frequency amplification, first detector (or mixer), high frequency oscillator, two stages of intermediate frequency amplification operating at 455 kilocycles, a diode type second detector two stages of resistance coupled audio frequency amplification and an audio frequency power output stage. The second detector utilizes one set of elements of a dual diode; the other set of elements is utilized for an efficient noise limiter circuit. Inverse feedback is incorporated, within the audio output circuits, to maintain a relatively constant voltage across the primary of the output transformer, when the output load is varied upon connection of one or more amplifier type loud speakers across the secondary winding of the output transformer which also feeds the front panel mounted phone jack.

3.5 The power supply section of the Model SLR-12-A Radio Receiver, which is employed for supplying the necessary operating voltages for the receiver circuits, is designed for operation from a 110/125 volt, 58/62 cycle, single phase source of a-c power. The power supply includes a power transformer with r-f input filter and primary fuse, two vacuum tube rectifiers, and a two-section a-f filter.

3.6 Four audio output circuits are provided:

(1) A phone jack is mounted on the front panel and is supplied from one of three output windings on the audio output transformer. This winding is directly connected to one pair of speaker terminals at the rear of the chassis and to the phone jack through an attenuation network which limits the maximum available power at the phone jack to approximately 30 milliwatts. The phone jack is provided for monitoring purposes, by head telephone methods, since the equipment is primarily intended for loud speaker signal reproduction.

(2) The pair of speaker terminals, referred to in (1), above, is provided for the connection of the audio output of the Radio Receiver to a system of remotely installed, parallel connected Speaker Amplifiers. The output winding on the audio output transformer supplying these terminals, as well as the phone jack, is capable of supplying, by virtue of the inverse feedback associated with the audio output stage of the receiver, substantially constant voltage at the speaker terminals for any variation in load impedance from 60 to 600 ohms.

(3) A second pair of speaker terminals at the rear of the receiver chassis is supplied from a separate output winding on the audio output transformer. These terminals are provided for the connection of a high quality, permanent magnet type, locally installed loud speaker having a self-contained input transformer designed to match the 600 ohm impedance of the audio output transformer winding supplying the speaker terminals. The maximum undistorted audio power available at these terminals is nominally 2 watts.

(4) A third pair of speaker terminals, also supplied from a separate output winding on the audio output transformer, provides for the connection, at the rear of the receiver chassis, of a high quality, permanent magnet type, locally installed loud speaker having a self-contained input transformer designed to match the 5000 ohm impedance of the winding supplying the terminals. The maximum undistorted audio power available at these terminals is nominally 2 watts.

(5) FOR ANY INSTALLATION, ONLY ONE OF THE THREE SETS OF SPEAKER TERMINALS MAY BE EMPLOYED AT ANY ONE TIME FOR SUPPLYING AUDIO POWER TO LOUD SPEAKER CIRCUITS. This does not preclude the use of a head telephone set for monitoring while the required loud speaker system is in operation.

3.7 A concentric jack, Type 49120, is mounted at the rear of the chassis of the Radio Receiver for antenna and ground connection. A hole in the rear of the cabinet provides access to the jack. A concentric plug, Type 49121A, which mates with the concentric jack is furnished as part of the complete Model SLR-12-A Equipment, but with no antenna or ground leads attached.

3.8 A power receptacle and mating plug are also provided at the rear of the chassis for a-c power input connection. No power input cable is furnished.

3.9 The fuse, in the primary circuit of the power supply, is mounted adjacent to the power input receptacle at the rear of the receiver chassis. The fuse mounting is of such design that the fuse, which is of the miniature cartridge type, is replaceable without the use of tools, and without the necessity for the removal of the receiver chassis from its cabinet.

3.10 Facilities are also provided, in the form of separate auxiliary terminals at the rear of the receiver chassis and a suitable switching arrangement, for connecting a phonograph pickup to the input circuits of the audio frequency amplifier. With the necessary switching completed, the radio frequency circuits are rendered ineffective during operation of the audio frequency circuits in conjunction with a phonograph pickup.

4. TUBE COMPLEMENT

4.1 The vacuum tubes employed in the Model SLR-12-A Radio Receiver are as follows:

Symbol	*Commercial Type*	*Function*
V-101	6K7	R.F. Amplifier
V-102	6J5	H.F. Oscillator
V-103	6SA7	First Detector and MIXER
V-104	6SK7	First I.F. Amplifier
V-105	6SK7	Second I.F. Amplifier
V-106	6H6	Second Detector, A.V.C.
V-107	6J5	First A.F. Amplifier
V-108	6SJ7	Second A.F. Amplifier
V-109	6K6GT	A.F. Power Output
V-110	6E5	Tuning Indicator
V-111	6X5GT	Rectifier (Full Wave)
V-112	6X5GT	Rectifier (Full Wave)

5. POWER REQUIREMENTS

5.1 The Model SLR-12-A Radio Receiving Equipment is designed for operation from a 110/125 volt, 58/62 cycle, single phase power source. The line current at 115 volts is .74 amperes. The nominal power consumption at 115 volts is 85 watts.

6. ANTENNA REQUIREMENTS

6.1 The input circuit of the Model SLR-12-A Radio Receiver is primarily designed for operation with a separate antenna not used for other equipment. A conventional single wire antenna will suffice since the antenna requirements are not critical. Such a single wire antenna should be spaced at least six feet away from any parallel stay, mast, or stack. It should be well insulated and should be erected as high as possible. The recommended minimum overall length of antenna and lead-in is fifty feet. The antenna proper (not including lead-in) should be at least fifty feet in the clear. A one-half megohm static-drain resistor should be permanently installed between the antenna and ground.

6.2 In an installation having a simple antenna-ground combination, solder the antenna lead-in to the retaining nut for the jack socket of the Type 49121A concentric plug. Connect the ground lead to the terminal provided for this purpose and mounted adjacent to the Type 49120 concentric jack at the rear of the receiver chassis.

7. INSTALLATION

7.1 The Model SLR-12-A Equipment, with its Radio Receiver equipped with one full complement of vacuum tubes, one Type 49121A concentric antenna-ground connecting plug, and one female power input plug, is shipped in a single wooden packing box. Two instruction books, one Model 262 Inverter, one loudspeaker, and one set of spare vacuum tubes, are also contained in the same packing box.

7.2 After unpacking the equipment it should be inspected for any possible damage that might have resulted from careless handling in transit. Make certain that all vacuum tubes in the Radio Receiver are firmly seated in their respective sockets. Inspection of the chassis and vacuum tubes may be readily effected upon the removal of the chassis from its cabinet. This is accomplished by removing two screws in the rear of cabinet, then loosening the four thumb screws and removing their respective retaining plates at either side of the front operating panel. The chassis may then be drawn out of the cabinet by pulling on the two handles on the front panel.

7.3 The mounting base, to which the shock mounts for the Radio Receiver are attached, should be drilled with four mounting holes. The location and size of the mounting holes should be such as permit the use of sufficiently large screws or bolts to provide a secure mounting for the Radio Receiver when the mounting base is fastened on the top of an operating table or bench. Such security should predicate freedom from loosening or "tearing away" of the mounting screws or bolts when the equipment is subjected to strains resulting from vessel rolling in heavy seas.

7.4 In planning an installation, care should be exercised to provide adequate clearance from the back of the Radio Receiver to the bulkhead or nearest obstruction in order to provide access to the power input plug, the antenna-ground concentric plug, speaker output or phonograph input terminals, fuse, or the movement of feeder cables when withdrawing the chassis from the cabinet for servicing, vacuum tube replacement, or inspection.

7.5 Make connection to the proper 110/125 volt, 58/62 cycle, single phase, a-c power source by means of a suitable, two conductor, cable for connecting the power source with plug P-102 which is then inserted in receptacle E-106 at the rear of the receiver chassis.

7.6 Make antenna connections in accordance with Section 6, Antenna Requirements. The antenna lead, or shielded patch cable, should be soldered to plug P-101 in accordance with previously described methods.

7.7 A loudspeaker of the permanent magnet type is supplied with the equipment, this speaker should be connected to the 600 ohm terminals E-104 by means of the two conductor cable supplied with the speaker. Where two or more loud speakers are to be connected to the receiver, terminals E-105 should be used, the load applied to these terminals may be varied from 60 ohms to 600 ohms with only a 2 D.B. change in output. Where speakers are installed more than twenty five feet from the receiver the connecting cable should be shielded.

7.8 The loudspeaker should be mounted to the bulkhead or some flat surface by means of the attached brackets, the speaker can then be rotated to the desired position and fastened by tightening the screws holding the brackets to the side of the speaker case.

7.9 The model 262 inverter supplied with the equipment is used to supply 115 volts A.C. from a 115 volt D.C. source. It will supply 250 watts which is sufficient for both the SLR-12-A Radio Receiver and a record player when used. The Power cable from the SLR-12-A receiver should be plugged into receptacle E-201 on the Inverter, Plug P-201 attached to the Inverter should then be plugged into a 115 volt D.C. source, the Inverter is then ready to operate and may be turned on and off with the power switch on the front panel of the Inverter. The Inverter is protected against Overload by fuse F-201 rated at 10 amperes, 25 volts, the Vibrator Unit of the Inverter is of the Plug-in type and is easily replaced after removing the case from the unit.

7.10 A phonograph pick-up may be connected, through a suitable matching transformer, to terminals E-102 at the rear of the chassis. These terminals are marked PHONO and GND for convenience in making the desired connections.

7.11 The equipment is now ready for operation and is turned on by means of toggle switch S-201 on the front panel of the Inverter, switch S-103 on the front panel of the Receiver should be left on.

7.12 The Radio Receiver may be mounted with other units of the same type in a common cabinet type relay rack in such installations as, for example, at Radio shore stations where the problem of vibration is relatively unimportant. This is accomplished by removing the receiver chassis from its cabinet and securing the chassis on the relay rack by its front panel, using the same holes in the edges of the panel for the securing screws as for the original securing thumb screws. It is essential that a cabinet type relay rack be employed in order to preclude the accumulation of dust on the chassis mounted components, and in the tuning drive mechanism. This method of installing the Model SLR-12-A Equipment does not abrogate the contents of Paragraphs 7.5 to 7.12, inclusive, except as they might be qualified with respect to certain minor details.

8. CONSTRUCTION

8.1 The Model SLR-12-A Radio Receiver is primarily designed for top of table or bench mounting. It is furnished with its chassis housed in a metal cabinet supported from its mounting base with rubber shock-mounts at the four bottom corners of the cabinet. The front panel, to which the chassis is secured, forms the enclosure for one side of the cabinet. The general appearance and type of construction employed are shown in Figures 1 and 2.

8.2 The cabinet is of fabricated construction with ventilating louvers in its two sides and clearance apertures in the rear for access to the antenna and power input receptacles, fuse, and speaker and phonograph feeder connection terminals.

8.3 The chassis assembly is rigidly secured to the front panel. All component items, exclusive of those mounted on the front panel, entering into the construction of the Radio Receiver, are mounted either on top or underneath the chassis structure. The chassis and front panel form a basic assembly capable of being inserted or withdrawn from the cabinet, as a unit.

8.4 When the chassis assembly is housed in the cabinet, it is secured to the cabinet by the front panel through the use of eight knurled, captivated type, thumb screws which pass through four slots in opposite edges of the panel and engage with suitable inserts in the flanged sides of the front opening of the cabinet. The captivated type thumb screws are retained, when loosened, in groups of four in removable angles which also serve as "trim," for the front side corners of the cabinet, by concealing the mounting screw slots in the front panel. Two handles are conveniently arranged on the front panel to permit the insertion or removal of the chassis assembly without subjecting any of the operating controls to strain.

8.5 The construction of the chassis assembly and the arrangement and mounting of the component parts are clearly depicted in Figures 3 to 6, inclusive. All vacuum tubes are accessible from the top side of the chassis upon removal of the chassis from the cabinet. The design and construction of the chassis assembly, and the arrangement of the component items mounted thereon, provides a high degree of accessibility to all items for inspection, servicing, or replacement. A bottom cover plate, not shown in Figures 5 & 6, completely encloses the bottom of the chassis proper. It is provided as an added shielding feature, and for the protection of the under side chassis mounted components against damage due to careless handling. It is secured to the chassis with machine screws so that it is readily removable, as and when necessary to make repairs or to effect replacement of chassis mounted components.

8.6 The receiver panel layout is shown in Figure 1, and the location and functions of the various controls are described in Section 10, Operating Instructions.

8.7 The Model SLR-12-A Radio Receiver is especially designed to minimize radiation from the high frequency oscillator. This is accomplished by isolating the antenna input circuits from the first detector (or mixer) and the high frequency oscillator circuits, through the use of extensive shielding and filtering, and by the employment of a type of construction which reduces, to practical limits, undesirable circuit coupling by virtue of circulating currents in common shields.

8.8 A separate shielded compartment, designed as a complete sub-assembly and easily detachable, as such, from the chassis for inspection and servicing of the component parts which it houses, contains all the circuit elements between the antenna input and the signal grid of the R.F. amplifier tube. This sub-assembly, as pictured in Figures 3 to 6, inclusive, is mounted at the rear center of the chassis, and is centrally disposed, above and below the chassis, through an aperture in the chassis. The compartment is grounded at only one point on the chassis and since the mounting flanges are insulated from the chassis this ground constitutes the only grounding for the compartment. Details of the construction of the shielded compartment and the arrangement and mounting of the component parts, which it contains, are shown in Figure 8. The figure depicts an oblique rear view of the shielded compartment with the sides removed or opened to display the internal components. The compartment, as pictured, is inverted with respect to its normal position in the receiver.

8.9 A second shielded compartment, constructed and mounted in the same manner as for that containing the antenna circuit elements, but larger in overall dimensions, contains all of the circuit elements from the R. F. amplifier tube to the 1st I. F. amplifier input transformer, and includes also, all circuit elements associated with the high frequency oscillator. This compartment, as pictured in Figures 3 to 6, inclusive, is mounted on the chassis between the front panel and the compartment containing the antenna input circuit elements. The arrangement and mounting of the circuit components are depicted in Figure 7 which portrays an oblique view of the sub-assembly with the bottom cover plate removed to show the disposition of the internal circuit components. This view depicts the sub-assembly in an inverted position with respect to its normal position in the receiver. Circuit components, associated with the compartment sub-assembly, and not visible in Figure 7, are shown in Figure 4 which shows the two compartment sub-assemblies, described above, mounted in their normal positions, but with their top shield cover plates removed.

8.10 Insulated mechanical couplings are employed for joining together the shafts of the tuning capacitors and band selector switches in the two shielded compartments. These couplings are shown in Figures 3 to 6 inclusive. The R.F. amplifier tube is mounted in a horizontal position in a socket which is provided with a clamp for securing the tube in place. The socket is mounted on one side wall of the large compartment and all wiring thereto is contained within the shielded compartment. The vacuum tube then projects into the side of the compartment containing the antenna circuit components, and connection to the signal grid cap is made within the confines, of this compartment. The internal shields in the vacuum tube isolates the signal grid circuit from the plate circuit, and, in effect, completes the shielding of the antenna circuit compartment so that these circuits are electrically isolated from the plate circuit of the R.F. amplifier tube, insofar as stray coupling from the high frequency oscillator is concerned.

8.11 Removable cover plates, secured with thumb screws, are provided on the two shielded compartments for access to the vacuum tubes contained within. Similar cover plates on the bottoms of the shielded compartments are secured with conventional machine screws. Either the top or bottom cover plate, as described above, must be removed for access to the circuit trimmers of the R.F. amplifier, 1st detector and high frequency oscillator, since it was not possible to provide access holes in the plates, themselves, without compromising the shielding integrity of the receiver.

8.12 The secondary windings of the antenna coupling transformers feeding the grid of the R.F. amplifier tube are provided with individual adjustable iron cores for inductance trimming, and adjustable mica dielectric trimmer capacitors for capacity trimming during circuit alignment. Adjustment of the trimmer capacitors is afforded through access holes in the rear of the shielded compartment housing these transformers. Corresponding holes in the rear of the chassis and cabinet permits the adjustment of the trimmer capacitors, as a final adjustment, in the installation of the equipment for optimum performance with the specific antenna employed, without the necessity for the removal of the receiver chassis from its cabinet. Access to the adjustable iron cores is provided upon the removal of the top cover plate of the shielded compartment containing the antenna coupling transformers.

8.13 The r-f transformers, coupling the plate of the R.F. amplifier tube with the signal grid of the first detector, are each provided with both inductance trimmers, in the form of adjustable iron cores, and capacity trimmers in the form of adjustable mica dielectric trimmer capacitors, for purposes of alignment, of these circuits with the high frequency oscillator circuits. Access to all trimmers, either capacitive or inductive, is afforded upon the removal of the bottom cover plate from the shielded compartment containing these transformers.

8.14 The inductors employed in the high frequency oscillator circuits are similarly provided with adjustable powdered iron cores, and adjustable, air-dielectric trimmer capacitors for inductance and capacity trimming. These adjustable trimmers, together with "padder" capacitors, permit the "tracking" of the high frequency oscillator circuits with the R.F. amplifier circuits. The "padder" capacitors are, except for the BROADCAST BAND, of the fixed, molded phenolic, mica dielectric type. In the excepted case, an adjustable, air-dielectric capacitor is employed in parallel with the fixed capacitor. All adjustable trimmer and "padder" capacitors are accessible for adjustment upon the removal of the bottom cover plate of the compartment containing these circuit elements.

8.15 The cabinet, front panel and mounting base of the Radio Receiver have a standard black wrinkle finish. All metallic parts which enter into the construction of the chassis are finished with a suitable plating or paint to provide; first, a high degree of protection to these parts against the deleterious effects of corrosion; and second, a chassis assembly presenting a pleasing appearance.

8.16 The dimensions and weights of the Radio Receiver are as follows:

(1) *Dimensions:*

	Chassis in Cabinet	*Chassis Only*
Length	20.50 inches	19.00 inches
Depth	18.50 inches	18.50 inches
Height	13.75 inches	10.50 inches

(2) *Weights:*

Chassis in Cabinet — 103 pounds
Chassis Only — 79 pounds

9. CIRCUIT DESCRIPTION

9.1 General

9.11 The actual schematic diagram of the Model SLR-12-A Radio Receiver is shown in Figure 9. For purposes of illustration, it will be assumed that the circuits are set up as for signal reception on SHORT-WAVE BAND-2, as depicted in the diagram. The following description will refer, therefore, to the symbol numbers of the circuit elements of the band as, or when, pertinent to the description. It shall be assumed that, unless otherwise specifically noted, the description will be equally applicable to SHORT-WAVE BAND-1 and the BROADCAST BAND.

9.2 Signal Frequency Circuits

9.21 Signal input to the receiver through concentric jack J-103 is connected to the primary winding of antenna input transformer T-103 by switch S-102E. An electrostatic shield, at ground potential, separates the secondary winding from the primary winding. The secondary winding together with variable, air dielectric capacitor C-156 and series capacitor C-134, constitutes the first tuned circuit. Transfer of r-f signal, at the resonant frequency of this tuned circuit, from the antenna to the control grid of R.F. amplifier tube V-101, is accomplished by inductive coupling through antenna input transformer T-103. Variable capacitor C-156 is ganged with variable capacitors C-144A and C-144B to provide uni-controlled tuning of the receiver. Capacitor C-134 is shorted out for the BROADCAST BAND and its selection and proper connection is controlled by switch S-102D. The secondary winding of transformer T-103 is provided with adjustable iron core E-123, for inductance trimming, and a shunt connected, variable, mica dielectric capacitor C-151 for capacity trimming. These trimmer elements permit the accurate alignment of the tuned circuit with the succeeding tuned circuit, at both ends of the frequency band, and are accessible for adjustment, as described under Section 8. The high potential end of the tuned circuit is connected to the control grid of R.F. amplifier tube V-101 by switch S-102D and through coupling capacitor C-123. The low potential end of the tuned circuit is returned to ground. The d-c bias return from the control grid of R.F. amplifier tube V-101 to the A.V.C. bus is closed through grid resistor R-135.

9.22 Plate potential from the high voltage d-c bus is applied to the plate of R.F. amplifier tube V-101 through decoupling filter resistor R-112, by-passed to ground by capacitor C-109B, and r-f inductor L-101. Screen potential, also obtained from the high voltage d-c bus, is applied to the screen through a decoupling filter consisting of filter resistor R-126 and by-pass capacitor C-109C. The suppressor is connected to the side of the heater circuit which is operated at ground potential. Initial grid bias is obtained by means of cathode resistor R-109, by-passed by capacitor C-109A.

9.23 The amplified signal voltage from the plate of R.F. amplifier tube V-101 is applied to the primary winding of R.F. transformer T-106, through coupling capacitor C-124, by switch S-102C. The low potential end of the primary winding is returned to ground. The secondary winding of transformer T-106, together with variable, air dielectric tuning capacitor C-144A and series connected capacitor C-135 (the latter employed for the same purpose and in the same manner as capacitor C-134), constitute the second and final tuned circuit operating at the signal frequency. Transfer of signal energy from the plate circuit of R.F. amplifier tube V-101 to the control grid of first detector tube V-103 is accomplished by inductive coupling through R.F. transformer T-106 and by the connection of the high potential end of the tuned circuit to the control grid of first detector tube V-103 by switch S-102C, through coupling capacitor C-125. The low potential end of the tuned circuit connects to ground. Adjustable iron core E-126 and parallel connected (variable) mica dielectric trimmer capacitor are associated with the tuned circuit for purposes of circuit alignment and are accessible for adjustment as described in Section 8. The d-c bias return from the control grid of first detector tube V-103 to the A.V.C. bus is closed through grid resistor R-136.

9.24 Screen potential from the high voltage d-c bus is applied to the screen of first detector tube V-103 through r-f inductor L-102, by-passed to ground by capacitor C-129, and thence through decoupling filter resistor R-144, by-passed to ground by capacitor C-107B. The suppressor is internally connected to the shell of the tube. Initial bias is obtained by means of cathode resistor R-105, by-passed to ground by capacitor C-107A.

9.3 High Frequency Oscillator Circuits

9.31 The H. F. oscillator circuit is of the so called "electron coupled" type. The tuned circuit consists of tapped inductor element T-109, shunted with variable, air dielectric trimmer capacitor C-147 and tuned with variable, air dielectric tuning capacitor C-144B, series connected capacitor C-136 and padder capacitor C-143. Capacitor C-136 is shorted out by the switch S-102B for the BROADCAST BAND. The inductor element is also provided with adjustable iron core E-129 for inductance trimming. Padder capacitor C-143 is used to modify the tuning of the H. F. oscillator so that it will maintain a fixed frequency difference of 455 kilocycles with respect to the signal frequency when tuning capacitors C-156, C-144A and C-144B are simultaneously varied from minimum to maximum capacity. The high potential end of the oscillator tuned circuit is connected, by switch S-102B, through coupling capacitor C-132 to the control grid of the H. F. oscillator tube V-102. This grid is returned to ground through grid resistor R-122 for d-c bias return. The low potential end of the tuned circuit is also returned to ground. The cathode of H. F. oscillator tube V-102 is connected, by switch S-102B, to the tap on inductor element T-109, and through coupling capacitor C-131 to the oscillator injector grid of first detector tube V-103. This grid has a d-c return to ground through grid resistor R-118.

9.32 The plate of H. F. oscillator tube V-102 is connected to the high voltage d-c bus through decoupling filter resistor R-143, by-passed to ground by capacitor C-106B, and r-f filter inductor L-103, by-passed to ground by capacitor C-130. One side of the heater circuit operates at ground potential while the other side is filtered by capacitors C-106A and C-128 and r-f filter inductor L-104.

9.4 I. F. Amplifier Circuits

9.41 The signal frequency arriving at the control grid of first detector tube V-103 and the H. F. oscillator frequency arriving at the injector grid of this tube are mixed (or hetrodyned) and the resultant difference frequency (455 kilocycles) is fed to the input of the intermediate frequency amplifier.

9.42 Transfer of intermediate frequency energy, from the first detector tube V-103 to second detector tube V-106 is accomplished by inductive coupling through I. F. transformer T-110, T-111, and T-112 and amplified through I. F. amplifier tubes V-104 and V-105. First I. F. transformer T-110 consists of two tuned circuits, primary and secondary, with the secondary tuned circuit operating in conjunction with switch S-101B, resistors R-103 and R-104 and a tertiary winding to provide three degrees of selectivity by changing the electrical constants of the secondary tuned circuit and its coefficient of coupling with the primary tuned circuit. The primary and secondary windings are each tuned to the intermediate frequency by fixed, mica dielectric capacitors C-137 and C-138, augmented by adjustable iron cores E-130 and E-131, provided for inductance trimming, and accessible through the top and bottom of the transformer shield can. The high potential end of the primary tuned circuit connects to the plate of first detector V-103 through a shielded conductor, while the low potential end connects to the high voltage d-c bus through decoupling filter resistor R-113, by-passed to ground by capacitor C-112A. The high potential end of the secondary tuned circuit is connected to the grid of first I. F. amplifier tube V-104 while the low potential end is connected to the A.V.C. bus through A.V.C. filter R-134 and C-112B.

9.43 Screen potential from the high voltage d-c bus is applied to the screen of first I. F. amplifier tube V-104 through decoupling filter resistor R-127, by-passed to ground by capacitor C-113B. Initial cathode bias is applied through bias resistor R-110, by-passed by capacitor C-113A.

9.44 Second I. F. transformer T-111 is identical to first I. F. transformer T-110, with respect to its design, construction, and operating characteristics. Accordingly, except for differences in circuit symbol designations, which becomes obvious upon examination of Fig. 9, the circuit description of paragraph 9.42 is applicable to this transformer, in all details, except that the low potential end of the secondary tuned circuit is returned to ground instead of to the A.V.C. bus.

9.45 The circuit arrangement of second amplifier tube V-105 is the same, except for symbol designations, as described for the first I. F. amplifier tube V-104, in paragraph 9.43 above. No automatic control of control grid bias is provided for this tube, however.

9.46 Third I. F. transformer T-112 contains a tuned primary circuit and an untuned secondary circuit. The primary tuned circuit consists of the primary winding shunted by fixed, mica dielectric capacitor C-133, and permeability tuned by adjustable iron core E-134 which is accessible, for adjustment, through the top of the transformer shield can. Plate potential to the plate of third I. F. amplifier tube V-105 is applied from the high voltage d-c bus through the primary winding and decoupling filter resistor R-115, by-passed to ground by capacitor C-116B. The high potential end of the secondary winding feeds the second detector diode while its low potential end connects to the A.V.C. bus.

9.5 Second Detector Circuits

9.51 Tube V-106 is a dual diode tube, one section is used as a second detector the plate of which is connected to the high potential end of the secondary winding of third I. F. transformer T-112. The cathode is grounded thus the tube acts as a half-wave rectifier. The voltage appearing across diode load resistor R-130, R-131 is filtered by resistor R-139 and condenser C-114A and the resulting direct current A.V.C. voltage is used to control the gain of amplifier tubes V-101, V-103, V-104, the degree of control being dependent on the strength of the incoming signal. The other half of dual diode V-106 is used in a very efficient noise limiter circuit which reduces peak noise levels so that weak signals may be received in locations where the noise level is high.

9.6 A. F. AMPLIFIER CIRCUITS

9.61 The a-f voltage developed across the diode load resistor R-130, R-131 as the result of the demodulating action of the second detector tube V-106, is applied to the control grid of first A. F. amplifier tube V-107, through coupling capacitor C-117, by switch S-101A and VOLUME control potentiometer R-146.

9.62 Switch S-101A is ganged with switch S-101B and S-101C. It operates to transfer the input to VOLUME control potentiometer R-146, and hence, the input circuits of first A. F. amplifier tube V-107 from the second detector circuit to PHONO terminals E-102 to permit the operation of the audio amplifier system of the Receiver with a high impedance phonograph pick-up. Low impedance pick-ups may also be employed provided that their connection to E-102 are made through suitable matching transformers.

9.63 Amplification of the a-f signals from the second detector is accomplished by resistance-capacity coupling between first and second A.F. amplifier tubes V-107 and V-108, respectively, and the output amplifier tube V-109. Transfer of audio frequency energy, from the plate of output amplifier tube V-109 to head telephone PHONE(S) jack J-101 and loud speaker terminals E-103, E-104, and E-105, is accomplished through output transformer T-113, E-104 and E-105, which matches the plate impedance of the tube with the separate loads with which the Receiver is designed to operate. A resistance net work, consisting of resistors R-106, R-107, and R-108 is connected between head telephone jack J-101 and the secondary winding of output transformer T-113 to reduce the maximum audio power below that available at speaker terminal E-105.

9.64 Inverse feed back is provided for the second A. F. and output amplifier stages to maintain approximately constant voltage across the primary winding of output transformer T-113 for relatively wide changes in output load, as specified elsewhere in these instructions.

9.65 A separate high voltage d-c bus supplies d-c voltage to the plates and screens of A. F. amplifier tubes V-107, V-108 and V-109. Direct current potential is applied to the plate of first A. F. amplifier tube V-107 through load resistor R-123 and decoupling filter R-124 and C-155; to the screen of second amplifier tube V-108 through decoupling filter R-138 and C-108B, to the plate of this tube through load resistor R-132, and decoupling filter R-125 and C-108A; and finally, to the screen and plate of output amplifier tube V-109, directly, with respect to the screen, and through the primary of output transformer T-113.

9.66 Variable potentiometer R-147 and series connected capacitor C-118 constitutes the control for regulating the fidelity of the audio amplifier system of the Receiver. The series combination is connected between the plate of first A. F. amplifier tube V-107 and ground.

9.7 RECTIFIER POWER CIRCUITS

9.71 The proper a-c heater potential for all vacuum tubes except the rectifiers is obtained from a common secondary winding of power transformer T-114. One side of the secondary is operated at ground potential. High voltage a-c plate potential from a second secondary winding of the transformer is applied to the parallel connected plates of rectifier tubes V-111 and V-112. The rectified pulsating potentials are derived from each cathode and fed through separate filters to two separate high voltage d-c feeder circuits to the Receiver vacuum tubes. The cathode of rectifier tube V-111 supplies d-c power to one feeder line through filter L-105, C-103, C-104 and C-110, while the cathode of rectifier tube V-112 supplies d-c power to the second feeder line through filter L-106, C-101, C-102 and C-120.

9.72 The a-c power input line to the primary winding of power transformer T-114 is filtered by capacitors C-111A and C-111B to prevent stray r-f potentials from being applied across the primary winding. Power is applied through switch S-103 in one side of the line circuit, which also is fused by F-101.

10. OPERATING INSTRUCTIONS

10.1 All switches and controls (with the exception of the main tuning control) of the Model SLR-12-A Radio Receiver are identified by panel engraving.

10.2 The main tuning control knob E-118 is centrally located near the bottom of the front panel and is secured to a shaft which drives the ganged, main tuning capacitors through a friction operated mechanical drive. The mechanical drive, also controls the movement of dial pointer N-106, through a system of pulleys and a flexible bronze cable, across the face of main tuning dial, N-107. Dial disc N-104, which carries a linear dial scale and operates in conjunction with fixed index plate N-105, is rotated by the tuning drive mechanism in such a manner that one rotation is completed with a complete traverse of dial pointer N-106 across the face of main tuning dial N-107. Main tuning dial N-107 is of Lucite with white scale markings and characters on a black background. This dial carries a frequency scale for each band. The Lucite dial is framed with escutcheon plate H-110, fitted with a transparent shatter-proof lens. Indirect dial illumination is afforded by edge lighting of the Lucite dial plate, from suitably placed dial lamps mounted behind the panel and at the two sides of the dial plate.

10.3 The VOLUME control is located at the left of the main tuning control and is operated by control knob E-117. The control is a potentiometer which operates to adjust the signal input level that is applied to the grid of the first A.F. amplifier tube, and hence, the signal level at the output terminals of the receiver, since the A.F. amplifier is operated at constant gain. Clockwise rotation of control knob E-117 increases the audio output signal level.

10.4 The FIDELITY control, located at the left of the VOLUME control, is operated by control knob E-116. It is a rheostat which operates, in conjunction with a series connected fixed capacitor, in the plate circuit of the first A.F. amplifier tube to limit the high frequency response of the receiver. Full clockwise to full counter-clockwise rotation of this control affords a continuous reduction of the high frequency audio response. The control should be adjusted to an extreme clockwise setting for high fidelity reception. For such reception, the SELECTIVITY control, described in Paragraph 10.8 should be set at BROAD.

10.5 Immediately above the FIDELITY control is mounted PHONE(S) jack J-101 which is provided to permit monitoring of the received signals by head telephone methods, as described in previous portions of these instructions.

10.6 The power on-off toggle switch, located at the upper left-hand corner of the operating panel of the receiver, is connected in the power line input circuit and is provided to apply or remove line power to or from the complete equipment.

10.7 A BAND SELECTOR switch, operating by control knob E-119, is located at the right of the main tuning control knob E-118. This control operates to select the R.F. and high frequency oscillator circuits for the three frequency ranges covered by the Model SLR-12-A Radio Receiver. The settings of this switch for the three frequency bands covered by the Receiver are marked SW2, SW1 and BC, in left to right sequence.

10.8 The SELECTIVITY control is located adjacent to the BAND SELECTOR control. It operates the ganged, rotary type, four-position switches, operating in conjunction with the second I. F. transformers, to vary the selective characteristics of the I. F. amplifier. Selectivity control is afforded by three positions of the ganged selector switches to provide for three degrees of selectivity, namely SHARP, MEDIUM and BROAD; while the fourth position of the ganged switches connects the "PHONO" input terminals, at the rear of the Receiver chassis, to the input of the audio amplifier through the VOLUME control. The panel markings for the four-positions of the SELECTIVITY control are marked in left to right sequence, SHARP, MED, BRD and PHONO.

10.9 There is located at the upper right hand corner of the Receiver panel an electron ray indicator which indicates when the Receiver is tuned to resonance with the frequency of the received signals. Resonance is indicated by the shadow angle of the electron ray indicator, which should be adjusted, by manipulation of the main tuning control, until the two halves of the shadow approximately meet. The shadow of the electron ray indicator can be adjusted on a strong signal, so that the two halves of the shadow just meet, by turning the eye-adjusting control R-148 with a screwdriver. CAUTION: WHEN TUNING THE RECEIVER ALWAYS TURN THE SELECTIVITY CONTROL TO THE *SHARP* POSITION AND TUNE FOR MAXIMUM SIGNAL AS INDICATED BY THE ELECTRON RAY INDICATOR. Should the receiver be tuned while the SELECTIVITY control is at MEDIUM or BROAD, the electron ray indicator may indicate maximum signal on either side of resonance owing to the fact that the selectivity characteristic of the I. F. amplifier has somewhat of a flat-top characteristic in each of these two positions of the selectivity control. After the Receiver has been properly tuned to resonance, as described above, the SELECTIVITY control may then be adjusted to the BROAD and MEDIUM positions as desired. Hand grips H-111 and H-112, are mounted on either side of the panel for convenience in the removal of the chassis from its cabinet without subjecting any of the operating controls to undue strain.

11. PERFORMANCE DATA

11.1 The SENSITIVITY vs. FREQUENCY curves are plotted in Plate 1 and are representative of the overall sensitivity of the Model SLR-12-A Radio Receiving Equipment over the three frequency bands covered by the Radio Receiver. These curves, together with the OVERALL SELECTIVITY curves shown in Plate 2, provide data for definitely checking the Radio Receiver to determine if repairs or re-alignment are necessary since the majority of circuit element failures or any misalignment will reduce the sensitivity of the equipment. The data referred to above will, therefore, also serve to show the efficacy of repairs or realignment.

11.2 The selectivity of a radio receiving equipment is that characteristic which determines the extent to which it is capable of differentiating between the desired signal and disturbances of other frequencies. The OVERALL SELECTIVITY curves of Plate 2, are representative of the overall selectivity characteristics of the equipment for the three degrees of selectivity, that is made possible by suitable adjustment of the SELECTIVITY control of the Radio Receiver. Over the frequency ranges covered by the Model SLR-12-A Radio Receiving Equipment, the OVERALL SELECTIVITY, for any adjustment of the SELECTIVITY control, will be essentially the SELECTIVITY characteristics of the intermediate frequency amplifier. For signal frequencies below 1000 kilocycles, the OVERALL SELECTIVITY characteristics for the BROAD and MEDIUM adjustments of the SELECTIVITY control will be somewhat sharper than shown by the corresponding curves in Plate 2, due to "side band cutting" by the tuned circuits of the r-f amplifier preceding the first detector.

11.3 The image attenuation is the degree to which a superheterodyne type of radio receiving equipment is capable of rejecting signals off resonance which, in combination with the fundamental or any harmonic of the conversion oscillator, produce intermediate frequencies which are amplified by the intermediate frequency amplifier and result in spurious responses The IMAGE ATTENUATION vs. DESIRED SIGNAL FREQUENCY curves of Plate 3, show the extent to which the Model SLR-12-A Radio Receiving Equipment is capable of rejecting image responses. The curves of Plate 3, are representative of the extent to which primary image frequencies are attenuated by the preselector tuned circuits of the Radio Receiver. The primary image frequency is equal to the desired signal frequency plus two times the intermediate frequency. The attenuation of the primary image, corresponding to any desired signal frequency, as derived from the curves of Plate 3, is predicated on the ratio between the r-f inputs, at the desired signal and primary image frequencies, to produce a constant output as measured with the receiver tuned for resonance with the desired signal frequency.

11.4 The intermediate frequency rejection offered by the Model SLR-12-A Radio Receiver is better than 75.0 decibels. This expression is the ability of the Model SLR-12-A Radio Receiving Equipment to reject signals at the frequency to which the intermediate frequency amplifier is resonated.

11.5 The A.V.C., OVERALL FIDELITY, and A.F. AMPLIFIER FIDELITY characteristics shown on Plates 4, 5, and 6 are necessary when particular performance checks are desired, but are of secondary importance in most cases in the determination of the necessity for repairs or realignment.

11.6 The maximum undistorted power output, as measured at 400 cycles across a load impedance of 60 ohms connected to terminals E-105, is approximately 2 watts. Due to the inverse feed-back feature associated with the audio amplifier system of the Radio Receiver, the voltage appearing across terminals E-105 remains constant, within a total tolerance of 2 decibels, as the load impedance is varied from 60 to 600 ohms. A maximum undistorted power output of approximately 2 watts may also be obtained across terminals E-104 and E-103 when connected to load impedances of 600 and 5000 ohms, respectively, providing that at no time more than one set of output terminals E-103, E-104, or E-105 are used.

11.7 The high frequency oscillator radiation, as measured at the r-f input terminals of the Radio Receiver, is less than 400 micro-microwatts at any frequency covered by the Model SLR-12-A Radio Receiving Equipment. This characteristic will permit "safe" operation of the equipment on Marine vessels.

SCOTT RADIO LABS., INC.

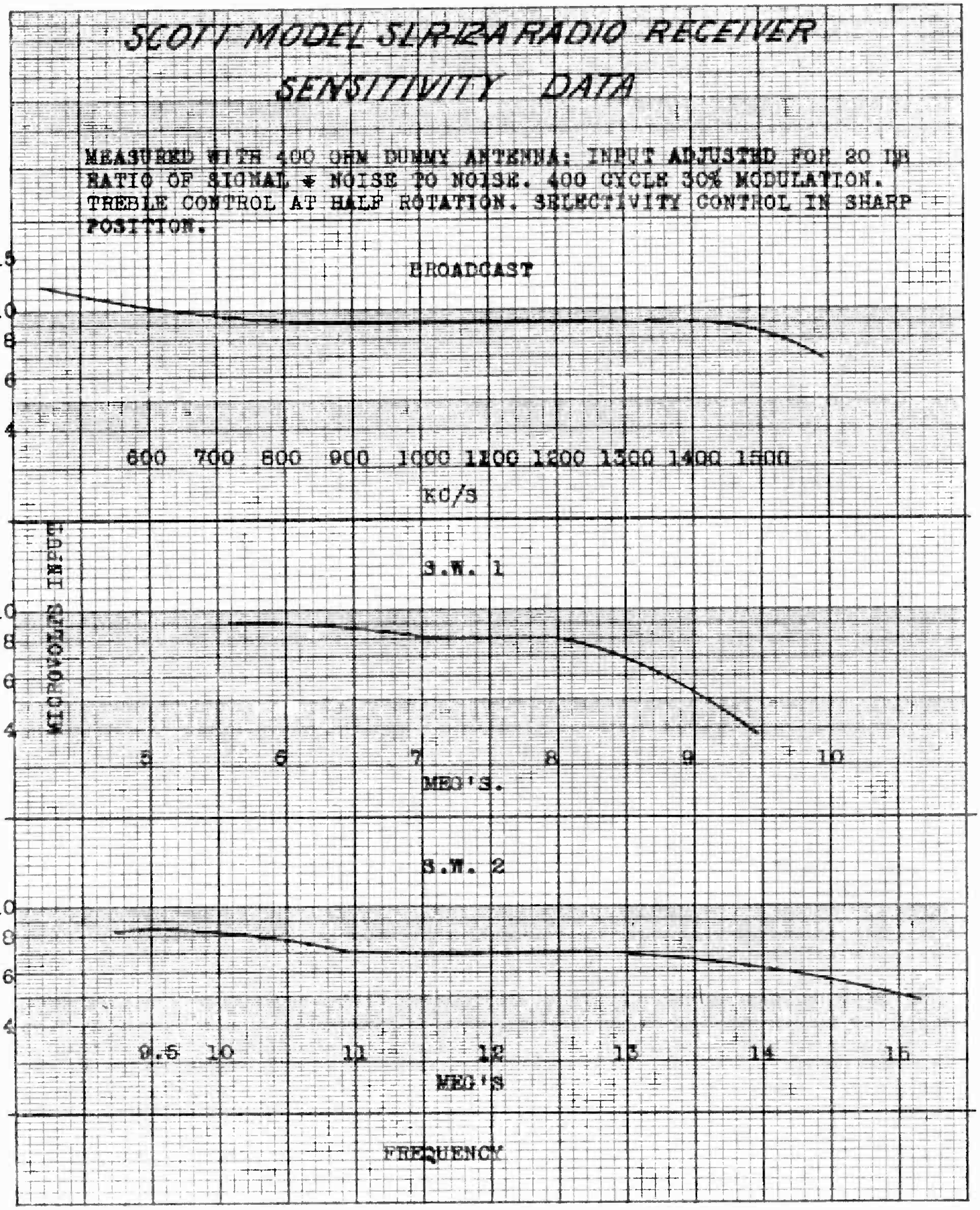

PLATE 1

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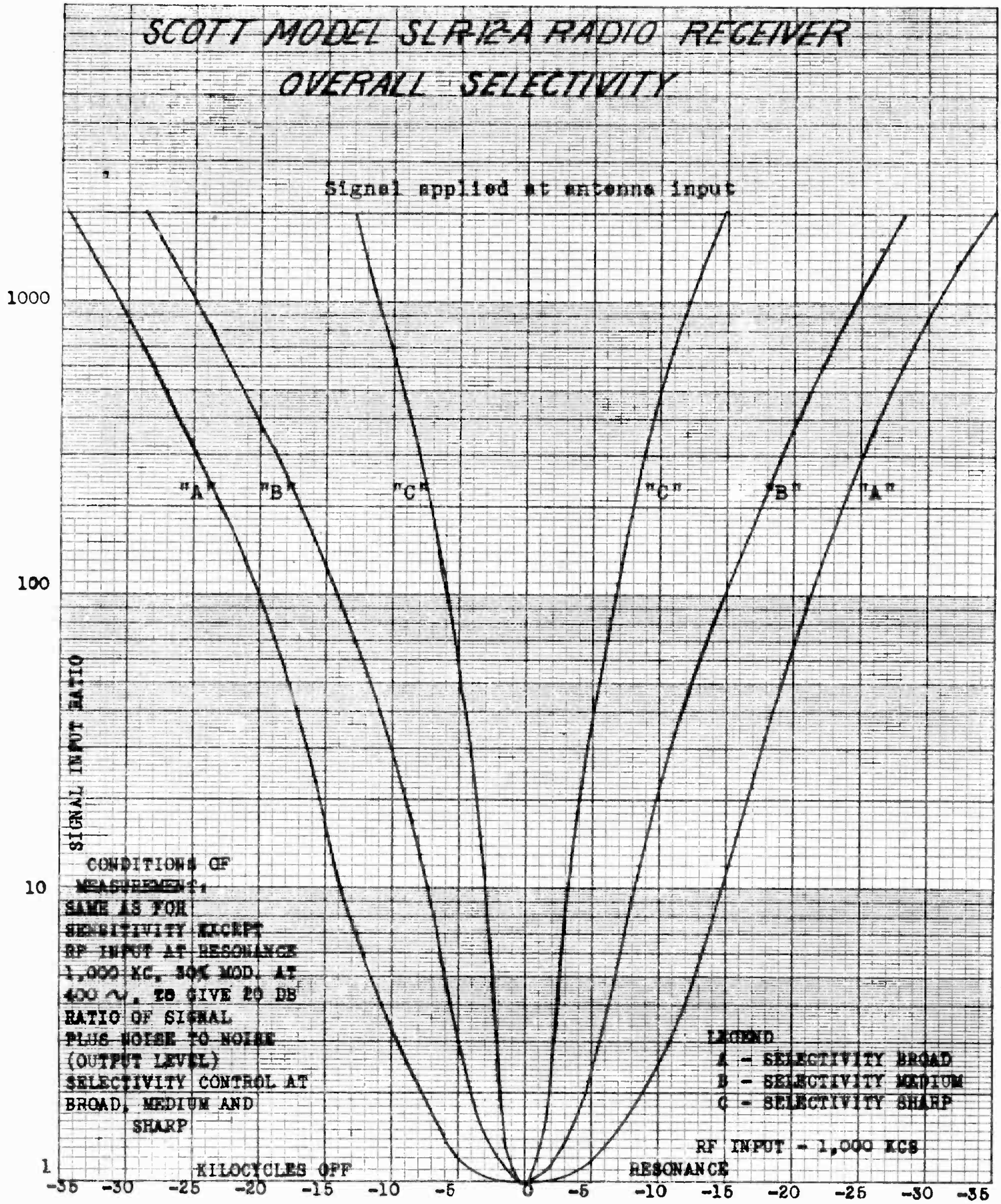

PLATE 2

SCOTT RADIO LABS., INC.

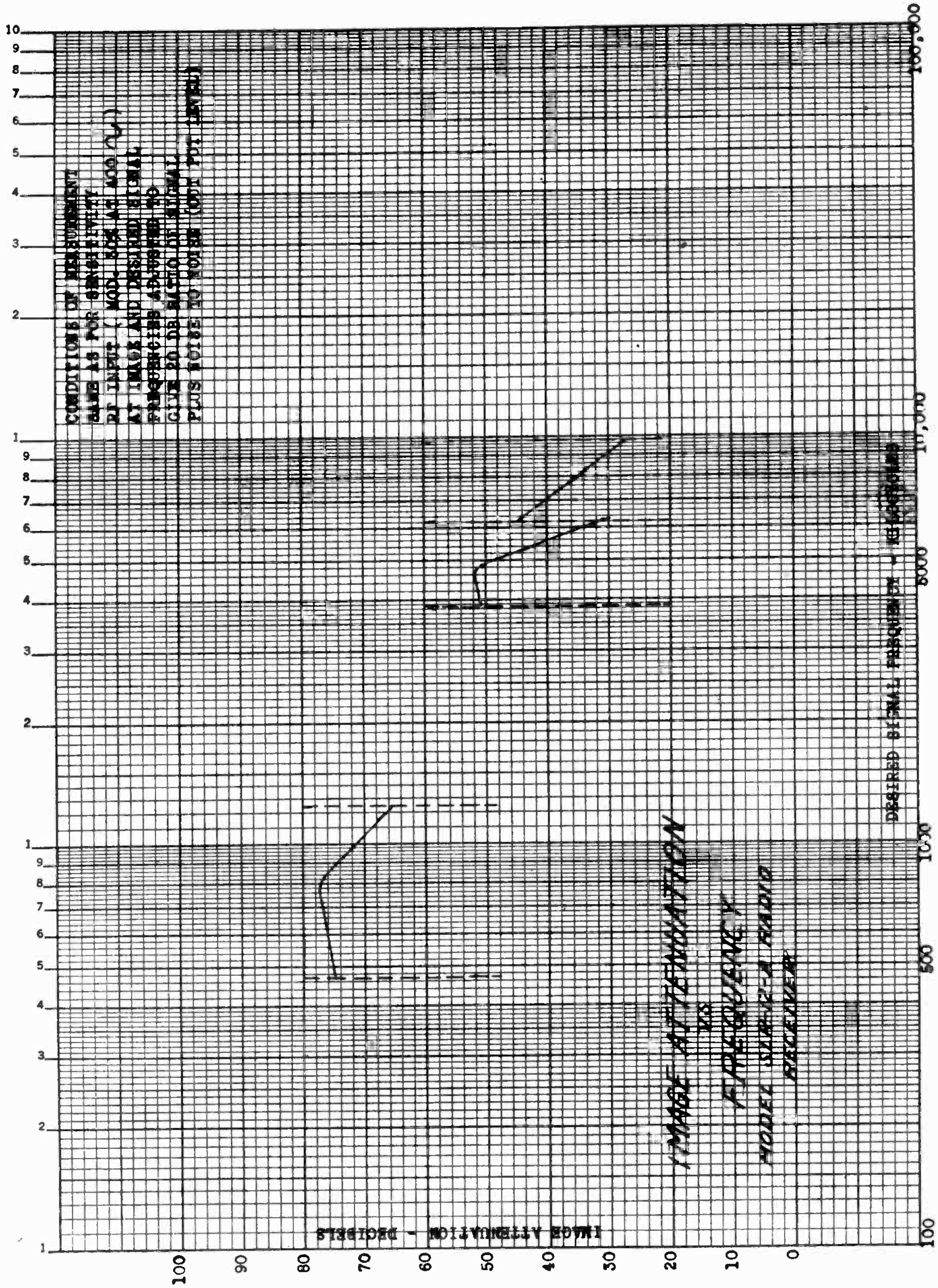

PLATE 3

MODEL SLR-12-A

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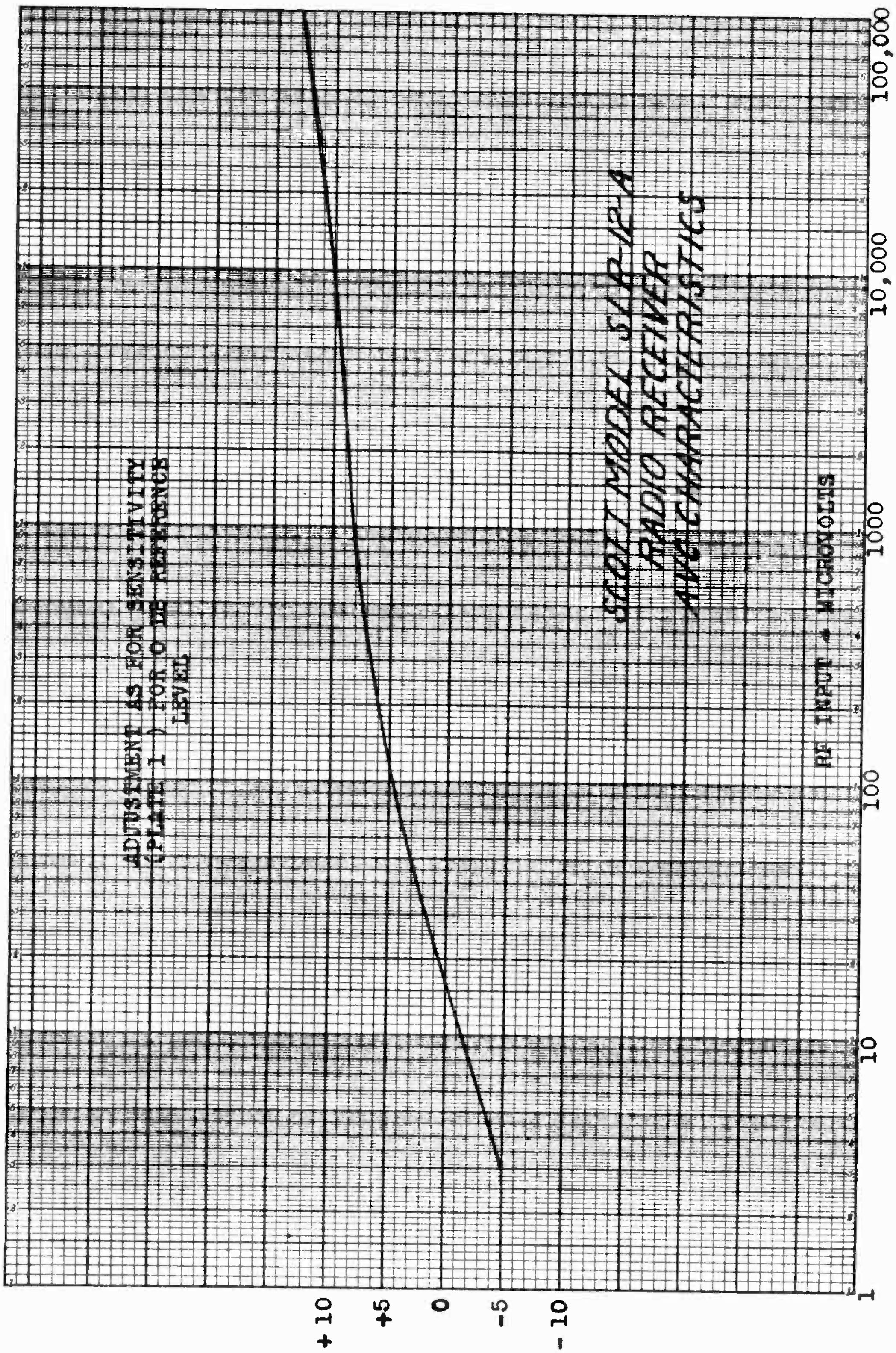

PLATE 4

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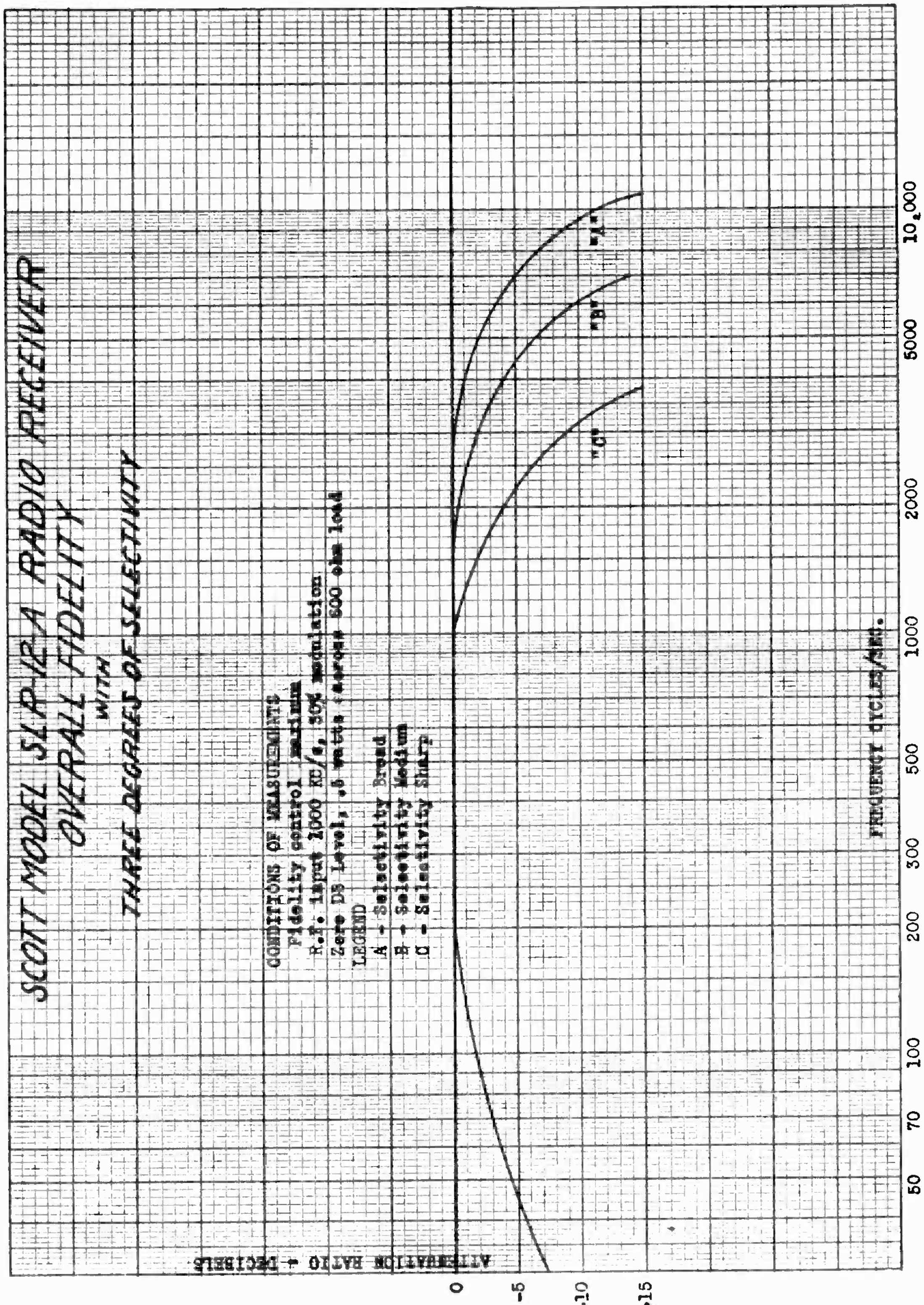

PLATE 5

MODEL SLR-12-A

SCOTT RADIO LABS., INC.

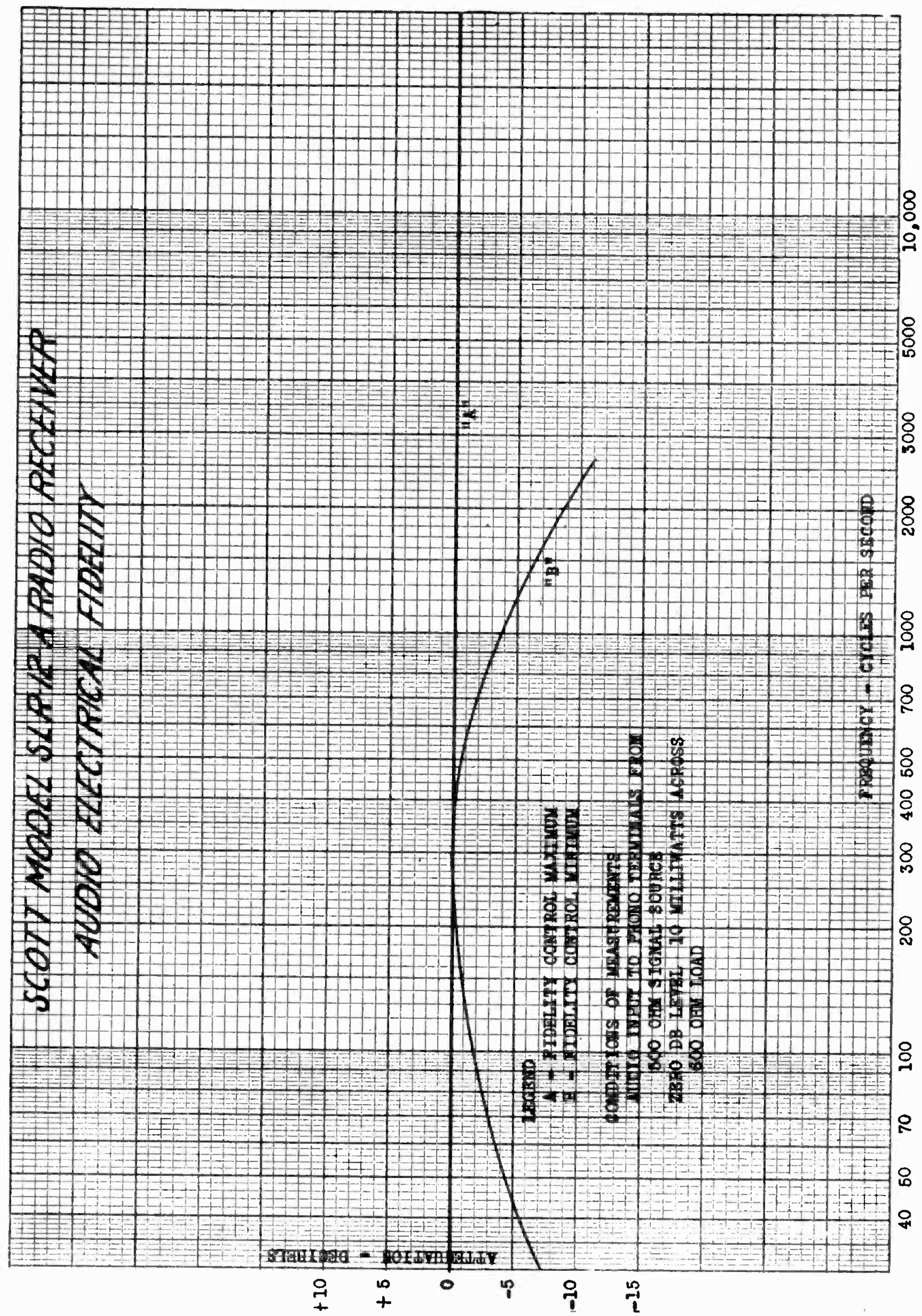

PLATE 6

12. MAINTENANCE-FAILURES AND REMEDIES

12.1 GENERAL

12.11 Adequate test equipment for maintenance of Model SLR-12-A Radio Receiving Equipment should include the following items:

(1) A Radio Frequency Standard Signal Generator.

(2) An audio output meter, General Radio Company Type 583A, or equivalent.

(3) A Model OE Analyzer, or equivalent, for resistance measurements, testing vacuum tubes and measuring a-c and d-c potentials and currents in the circuits with which the tube under test is associated. The Performance and Test Data of Sections 11 and 13 may be determined with equipment as listed above.

12.12 In making any tests or adjustments, it is essential that the operator consider the influence that any one circuit element may have upon other associated circuits. The Test Data of Section 13 will be particularly helpful in determining extent of such influences and the necessity for making further replacement after a fault in one particular circuit element has been located and repaired.

12.13 Any repairs in the Model SLR-12-A Radio Receiving Equipment which necessitate resoldering of joints should be made with care. The new joint should be such that the pieces to be soldered are firmly connected mechanically before solder is applied.

12.2 TUBE REPLACEMENT

12.21 ALL TUBES SUPPLIED WITH THE EQUIPMENT OR AS SPARES ON THE EQUIPMENT CONTRACT SHALL BE USED IN THE EQUIPMENT PRIOR TO EMPLOYMENT OF TUBES FROM GENERAL STOCK.

12.22 Failure of a vacuum tube in the Receiver may reduce the sensitivity of the equipment to radio signals, produce intermittent operation or cause the equipment to be completely inoperative. In such cases all tubes should be checked either in an analyzer, or similar tube testing equipment, or by replacement with tubes of proven quality. When any tube is tested it should be tapped or jarred to make sure it has no internal loose connections or intermittent short-circuits.

12.23 When tube replacements become necessary, substitution of new tubes may alter alignment of r-f or i-f amplifier circuits inasmuch as the replacement tubes may not be identical with those originally employed. The necessity for realignment as well as alignment procedure are discussed in Section 14.

12.3 FAILURE OF THE RADIO RECEIVER

12.31 In case of breakdown or failure of the Model SLR-12-A Radio Receiver, the fault must first be localized in one portion of the circuit. This can be accomplished by observation of some peculiar action of one of the controls or by checking the Receiver against Test Data tabulated in Section 13. Reference to Figures 1 to 9, inclusive, will show the location of any component part of the Receiver. Functions and ratings of component parts are given in Parts List, Section 15.

12.32 It must be remembered that the Test Data of Section 13 will not positively locate certain faults. For instance, an open-circuited by-pass capacitor will not appear in point to point resistance tests and may introduce regeneration or oscillation in certain circuits which effect the stage gain of other circuits. Similarly, a short circuit occurring in a low resistance inductor will not appear in point to point resistance tests and if the short appears in an R.F. coil, a false indication of the necessity for realignment may result.

12.33 By-pass or filter capacitors, which develop poor internal connections or which become open-circuited, will cause decreased sensitivity and/or poor stability. The defective unit can generally be located by temporarily connecting a good capacitor in parallel with each capacitor that is under suspicion.

12.34 Failures of any by-pass or filter capacitor may seriously overload resistors of associated circuits. Overloads of sufficient magnitude to permanently damage a resistor will cause the painted surface of the resistor to be scorched, making the defective unit easy to locate by visual inspection.

12,35 Open, — or short-circuited resistors can be definitely located by testing the resistance of each individual resistor. The Schematic diagram, Figure 9, should be consulted to make sure that any particular resistor under test is not connected in parallel with some other circuit element which might produce misleading measurements.

12.36 Loose connections, causing intermittent or noisy operation, and which cannot be found by point to point resistance tests, can usually be located by individually testing each circuit element, or by tapping or shaking the component, under suspicion, when the Receiver is adjusted for normal operation.

12.37 The primary fuse F-101 will "blow" when the primary circuit, of transformer T-114, is subjected to a sustained primary current in excess of approximately two amperes.

13. TEST DATA

13.1 The TUBE SOCKET VOLTAGES AND CATHODE CURRENTS, Table 1 must not be considered as a list of the actual operational voltages and currents in the circuits of the Model SLR-12-A Radio Receiver. The resistance of the measuring instruments, together with capacitive and resistive loading effects, will disturb many of the circuits to such an extent that they become inoperative, thus altering normal voltage and current distribution.

13.2 The only currents listed in Table 1 are those in the various cathode circuits. This listing is a desirable simplification, inasmuch as measurements of cathode current constitutes a definite check on all circuits directly associated with the vacuum tube in question.

13.3 The POINT TO POINT RESISTANCE Table 2 shows average resistance values in the Model SLR-12-A Radio Receiver with speakers disconnected from terminal panels E-103, E-104, E-105 and headphones removed from PHONES (S) jack J-101. The vacuum tubes need not be removed from their sockets. In using Table 2, the statements of Par. 12.32 must be given consideration.

13.4 All measurements in Table 1 are made with the Receiver connected for normal operation a 115 volt, 60 cycle, single phase a-c power source. The *VOLUME* control should be adjusted for full clockwise rotation and the FIDELITY control for approximately mid rotation.

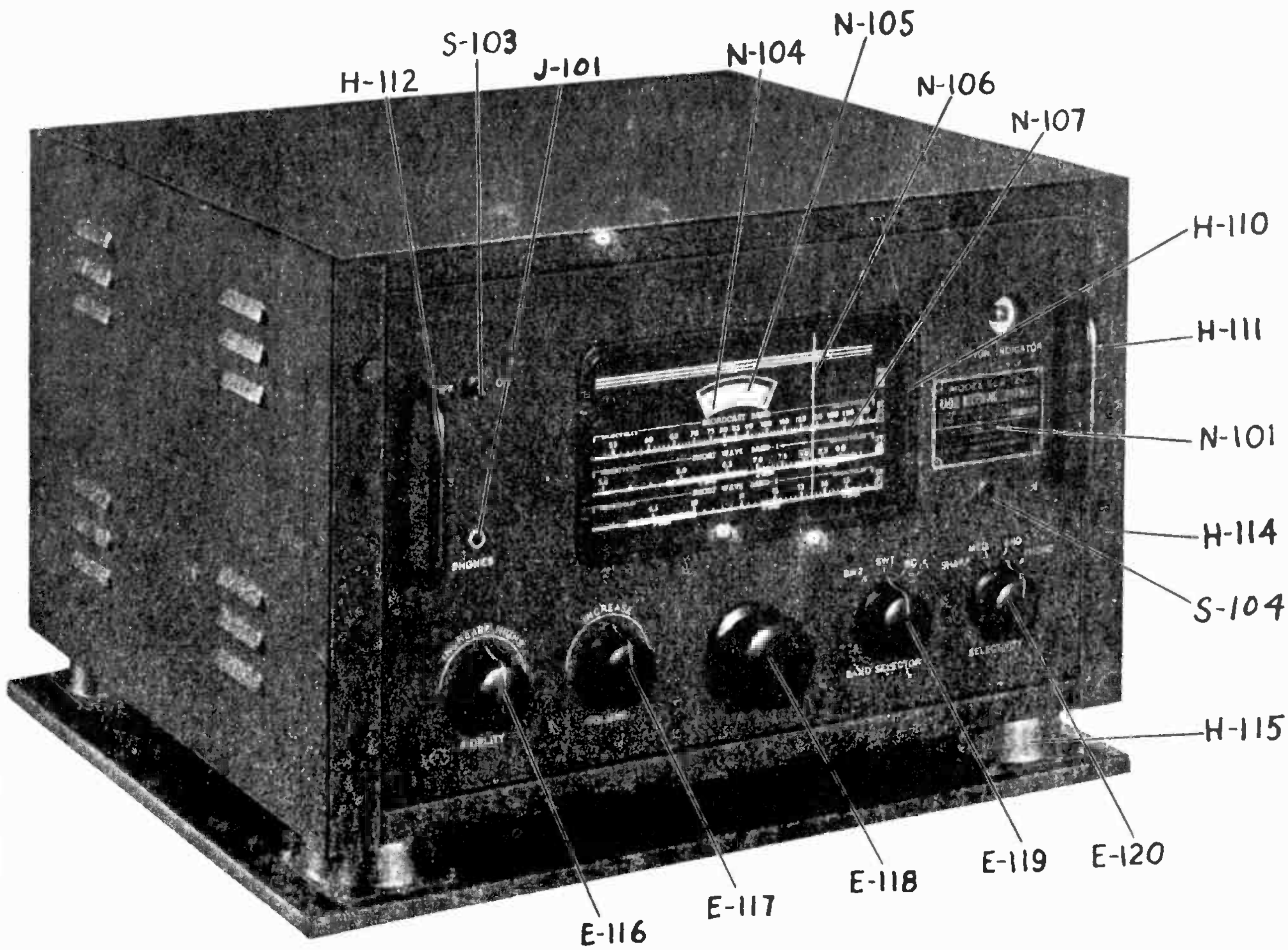

FIG. 1. LEFT FRONT OBLIQUE VIEW, RADIO RECEIVER.

Table 1: TUBE SOCKET VOLTAGES AND CATHODE CURRENTS

Terminal		Voltages D.C. Volts	Currents D.C. M.A.
V-101	Grid	0	
	Cathode	5	6.5
	Screen	110	
	Suppressor	0	
	Plate	270	
V-102	Grid	0	
	Cathode	0	8.0
	Plate	150	
V-103	Grid ♯1	0	
	Cathode	3.2	11.5
	Grid ♯3	0	
	Grid ♯5	0	
	Grids ♯2 & 4	110	
	Plate	270	
V-104	Grid	0	
	Cathode	4.8	6.7
	Screen	100	
	Suppressor	0	
	Plate	270	
V-105	Grid	0	
	Cathode	5.0	7.0
	Screen	100	
	Suppressor	0	
	Plate	270	
V-106	Cathode	0	
	Plate ♯1	0	
	Plate ♯2	0	
V-107	Grid	0	
	Cathode	3.0	1.6
	Plate	100	
V-108	Grid	0	
	Cathode	2.6	1.8
	Screen	65	
	Suppressor	0	
	Plate	70	
V-109	Grid	0	
	Cathode	20	29
	Screen	270	
	Plate	260	
V-110	Grid	0	
	Cathode	0	1.4
	Target	270	
	Plate	100	
V-111	Cathode	290	31
	Plate ♯1	255 A.C.	
	Plate ♯2	255 A.C.	
V-112	Cathode	290	42
	Plate ♯1	255 A.C.	
	Plate ♯2	255 A.C.	

♯ Measured on 500 Volt Scale

Voltage measurements made with a D.C. Voltmeter, 20,000 ohms per volt. All voltage measurements made between socket terminals and Receiver chassis.

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Table 2: POINT TO POINT RESISTANCES
(*Terminal to Chassis*)

Terminal		*Variable* *Symbol*	*Variable* *Setting*	*Resistance (Ohms) Plus or Minus 10%*
V-101	Grid	NONE		1.91 Meg.
	Cathode	NONE		680
	Screen	NONE		Infinite
	Suppressor	NONE		0
	Plate	NONE		Infinite
V-102	Grid	NONE		.047 Meg.
	Cathode	S-102	BC	.72
	Cathode	S-102	SW-1	.17
	Cathode	S-102	SW-2	.167
	Plate	NONE		Infinite
V-103	Grid #1	NONE		20,000
	Cathode	NONE		270
	Grid #3	NONE		1.91 Meg.
	Grid #5	NONE		0
	Grids #2 & 4	NONE		Infinite
	Plate	NONE		Infinite
V-104	Grid	S-101	SHARP	1.1 Meg.
	Grid	S-101	MED	1.1 Meg.
	Grid	S-101	BRD	1.1 Meg.
	Grid	S-101	PHONO	1.1 Meg.
	Cathode	NONE		680
	Screen	NONE		Infinite
	Suppressor	NONE		0
	Plate	NONE		Infinite
V-105	Grid	S-101	SHARP	5
	Grid	S-101	MED	15
	Grid	S-101	BRD	52
	Grid	S-101	PHONO	52
	Cathode	NONE		680
	Screen	NONE		Infinite
	Suppressor	NONE		0
	Plate	NONE		Infinite
V-106	Cathode #1	NONE		0
	Cathode #2	NONE		1.3 Meg.
	Plate #1	NONE		.3 Meg.
	Plate #2	NONE		.3 Meg.
V-107	Grid	R-146	MIN	0
	Grid	R-146 S-101	MAX SHARP	.5 Meg.
	Grid	R-146 S-101	MAX MED	.5 Meg.
	Grid	R-146 S-101	MAX BRD	.5 Meg.
	Grid	R-146	MAX	.5 Meg.
	Grid	S-101	PHONO	.5 Meg.
V-107	Cathode	NONE		2,400
	Plate	NONE		Infinite
V-108	Grid	NONE		.47 Meg.
	Cathode	NONE		1,500
	Screen	NONE		Infinite
	Suppressor	NONE		0
	Plate	NONE		Infinite

Table 2: POINT TO POINT RESISTANCES (*Continued*) (*Terminal to Chassis*)				
Terminal		*Variable*		*Resistance (Ohms) Plus or Minus 10%*
		Symbol	*Setting*	
V-109	Grid	NONE		1 Meg.
	Cathode	NONE		680
	Screen	NONE		Infinite
	Plate	NONE		Infinite
V-110	Grid	R-148	MAX	.84 Meg.
	Grid	R-148	MIN	.2 Meg.
	Cathode	NONE		0
	Target	NONE		Infinite
	Plate	NONE		Infinite
V-111	Cathode	NONE		Infinite
	Plate #1	NONE		85
	Plate #2	NONE		85
V-112	Cathode	NONE		Infinite
	Plate #1	NONE		85
	Plate #2	NONE		85

13.5 Stage Gain Measurements

13.51 The sensitivity measurements, listed below, are made under the following conditions:

(1) The Model SLR-12-A Radio Receiving Equipment is set up in accordance with Par. 14.13. The Standard Signal Generator is connected in accordance with Par. 14.23, except that the high potential output lead is connected to the control grid of the tubes specified in Table 3.

(2) Adjust the standard Signal Generator for a test signal frequency of 455 kilocycles, modulated 30% at 400 cycles.

(3) The VOLUME control of the Receiver is fully advanced, the FIDELITY control set approximately mid position and the SELECTIVITY control on SHARP position.

(4) Table 3 as a tabulation of the minimum allowable I.F. sensitivity (maximum signal input) for 10 milliwatts as measured at the PHONE(S) jack with the General Radio Type 583A output meter.

Table 3

Terminal		*I.F. Sensitivity Microvolts*
V-103	Grid	120 uv ± 20 uv
V-104	Grid	1500 uv ± 300 uv
V-105	Grid	60000 uv ± 5000 uv

14. ALIGNMENT DATA

14.1 General

14.11 Should realignment of the Model SLR-12-A Radio Receiver become necessary, the following alignment data should be carefully studied before making any circuit adjustments. It is important that the operator understand the functions of each circuit element so that correct alignment may be obtained quickly and accurately. The alignment data of this section is, therefore, supplemented by Section 8, Construction, and Section 9, Circuit Description.

14.12 Performance Data and Test Data, presented in Sections 11 and 13, will be particularly helpful in determining the necessity for making any specific adjustments. The operator is cautioned against making any adjustments indiscriminately and he should not realign any circuit unless tests definitely indicate realignment is necessary.

14.13 All alignment and calibration tests, measurements, etc., may be made with the Standard Signal Generator, or similar equipment, and an output meter, General

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Radio Type 583A, or equivalent. All tests are made with the Standard Signal Generator adjusted to provide a test signal having 400 cycle 30% modulation, unless otherwise specified.

14.14 Before proceeding with the alignment of any circuit of the Model SLR-12-A Radio Receiver, other than adjustment of trimmer capacitors associated with the secondary windings of the antenna coupling transformers, then the Receiver chassis must be taken out of its cabinet; the bottom cover plate of the chassis; top cover plate of the shielded compartment (Fig. 8), containing the antenna coupling transformers; and the bottom cover plate of the shielded compartment containing the H.F. oscillator and R.F. transformers, (Fig. 7) must be removed. Removal of the latter cover plates provide access to the capacitive and inductive trimming components.

14.15 The Model SLR-12-A Radio Receiver must be connected to 115 volt, 60 cycle, single phase, A.C. power source; the power switch S-103 to ON; SELECTIVITY control knob, E-120, to SHARP; FIDELITY control knob E-116 to approximate mid position, and, VOLUME control knob E-117 to full clockwise rotation. An output meter, General Radio Type 583A, or equivalent, should be connected either to the PHONE(S) output jack J-101, or to speaker terminals E-105, and adjusted for 600 ohm impedance.

14.16 The complete alignment of the Radio Receiver may be divided into four steps:

(1) Intermediate frequency amplifier alignment.

(2) High frequency oscillator alignment.

(3) Radio frequency amplifier alignment.

(4) Trimming of antenna input circuit.

NOTE: THE CIRCUITS MUST BE CHECKED IN THE ABOVE ORDER WHEN COMPLETE ALIGNMENT IS NECESSARY.

14.2 I. F. AMPLIFIER ALIGNMENT

14.21 The intermediate frequency of the Radio Receiver is 455 kilocycles, plus or minus one kilocycle.

14.22 Tuning adjustments are provided in each I.F. transformer. These adjustments consist of adjustable iron cores and are designated by symbol numbers E-130 to E-134, inclusive, as indicated on schematic diagram, Figure 9.

14.23 The high potential lead of the Standard Signal Generator should be connected to the control grid (terminal No. 5) of the first detector tube V-103 and the ground potential lead to any metal part making direct connection to the chassis.

14.24 The frequency of the Standard Signal Generator should be carefully adjusted to 455 kilocycles and the signal input to first detector tube V-103 adjusted to provide a reading on the output meter. The I.F. tuning adjustments, listed in Paragraph 14.22, should be carefully adjusted to give a maximum reading on the output meter. The order in which the adjustments are made is unimportant.

NOTE: IT IS ESSENTIAL THAT THE INPUT SIGNAL, FROM THE STANDARD SIGNAL GENERATOR, BE KEPT BELOW THE THRESHOLD OF OPERATION OF THE AUTOMATIC VOLUME CONTROL. EXCESSIVE SIGNAL INPUTS WHICH WILL CAUSE OVERLOAD OF EITHER THE SECOND DETECTOR OR AUDIO CIRCUITS SHOULD ALSO BE AVOIDED.

14.25 The performance of the Model SLR-12-A Radio Receiver, from the control grid of the first detector to the output load, can be checked against the stage gain data in Table 3, Section 13, after alignment has been completed. Similarly, the selectivity may be checked against the curves of Plate 2, Section 11.

14.3 HIGH FREQUENCY OSCILLATOR ALIGNMENT

14.31 Realignment of the H.F. oscillator circuits for any frequency band is usually necessary if the resonant frequency of the Receiver, as indicated by the tuning dial reading, is in error with respect to the actual resonant frequency by more than ± 1.0 percent.

WARNING: READJUSTMENT OF THE H.F. OSCILLATOR CIRCUIT TRIMMERS SHOULD NOT BE ATTEMPTED UNTIL AFTER THE NEED FOR SUCH READJUSTMENTS HAS BEEN POSITIVELY ESTABLISHED BY TESTS COVERED IN SECTION 13.

14.32 To check the operation of the R.F. amplifier and H.F. oscillator circuits, the Standard Signal Generator, or equivalent, should be connected to the antenna input jack J-103, using a 400 ohm non-inductive resistor as a dummy antenna. The VOLUME control may be retarded somewhat if desired, as background noise may be excessive when the control is fully advanced.

14.33 If error in calibration is found, check the dial pointer to make certain that it has not been pushed out of position. This may be checked by turning the main tuning control knob E-118 until pointer N-106 is at the extreme left position of its travel. At this point the pointer should line up with the vertical lines on the end of the dial scales.

14.34 The following general procedure should be employed in the alignment of H.F. oscillator circuits of any frequency band.

(1) General.
If, when the Receiver is resonated, at the high frequency end of the band, with a test signal frequency, the dial pointer appears above the dial scale marking for this test freqency, then adjustment is made by tuning the oscillator trimmer capacitor, associated with that band, in a clockwise direction to increase its capacity; conversely, if the Receiver resonants at a lower frequency, as indicated by the markings on the dial, correction is made by turning trimmer counterclockwise.

(2) Broadcast-B.C. position of BAND SELECTOR switch.

(A) Set Signal Generator to 1500 kilocycles.

(B) Set Receiver dial pointer to 1500.

(C) Adjust trimmer C-145 until maximum output is obtained.

(D) Set Signal Generator to 600 kilocycles.

(E) Set Receiver dial pointer to 600.

(F) Adjust padder C-148 for maximum output.

(G) Set Signal Generator to 900 kilocycles.

(H) Set Receiver dial pointer to 900.

(I) Adjust iron core E-127 for maximum output.

(J) Repeat operations A to I, inclusive, until the pointer lines up with the dial markings at all three points on this band.

(3) Shortwave Band I-SW 1 position of BAND SELECTOR switch.

(A) Set Signal Generator to 9.0 megacycles.

(B) Set Receiver dial pointer to 9.0.

(C) Adjust trimmer capacitor C-146 for maximum output.

(D) Set Signal Generator to 5.8 megacycles.

(E) Set Receiver Dial pointer to 5.8.

(F) Adjust iron core E-128 for maximum output.

(G) Repeat A to F, inclusive, until the dial markings correspond to these two frequencies without further adjustment.

(4) Shortwave Band II-SW 2 position on BAND SELECTOR switch.

(A) Set Signal Generator to 15 megacycles.

(B) Set Receiver Dial pointer to 15.

(C) Adjust C-147 until maximum output is obtained.

(D) Set Signal Generator to 9.3 megacycles.

(E) Set Receiver dial pointer to 9.3.

(F) Adjust E-129 for maximum output.

(G) Repeat A to F, inclusive, until these two frequencies are resonated at the dial markings for these frequencies.

14.4 R. F. AMPLIFIER ALIGNMENT

14.41 The following general procedure should be employed in the Alignment of R.F. and antenna stages.

(1) General.
Standard Signal Generator is adjusted to provide a 30%, 400 cycle modulated carrier, specified in (2), (3) and (4); connection made to the Receiver through J-103 using a 400 ohm, non-inductive resistance as a dummy antenna.

(2) Broadcast Band (BC).

(A) Set Signal Generator to 1500 kilocycles.

(B) Set Receiver dial pointer to 1500.

(C) Adjust C-149 and C-152 for maximum output.

(D) Set Signal Generator to 600 kilocycles.

(E) Set Receiver dial pointer to 600.

(F) Adjust E-121 and E-124 for maximum output.

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(G) Repeat A to C, inclusive, for final adjustment.

(3) Shortwave Band 1 (SW1).

(A) Set Signal Generator to 9.0 megacycles.

(B) Set Receiver dial pointer to 9.0.

(C) Adjust C-150 and C-153 for maximum output.

(D) Set Signal Generator to 5.8 megacycles.

(E) Set Receiver dial pointer to 5.8.

(F) Adjust E-122 and E-125 for maximum output.

(G) Repeat A to C, inclusive, for final adjustment.

(4) Shortwave Band II (SW2).

(A) Set Signal Generator to 15 megacycles.

(B) Set Receiver dial pointer to 15.

(C) Adjust C-151 and C-154 for maximum output.

(D) Set Signal Generator to 9.3 megacycles.

(E) Set Receiver dial pointer to 9.3.

(F) Adjust E-123 and E-126 for maximum output.

(G) Repeat A to C, inclusive, for final adjustment.

14.5 Antenna Alignment

Final antenna alignment should be made after installation, by adjusting trimmers C-149, C-150 and C-151, for the B.C., SW-1 and SW-2 bands respectively, for optimum performance with the specific antenna employed.

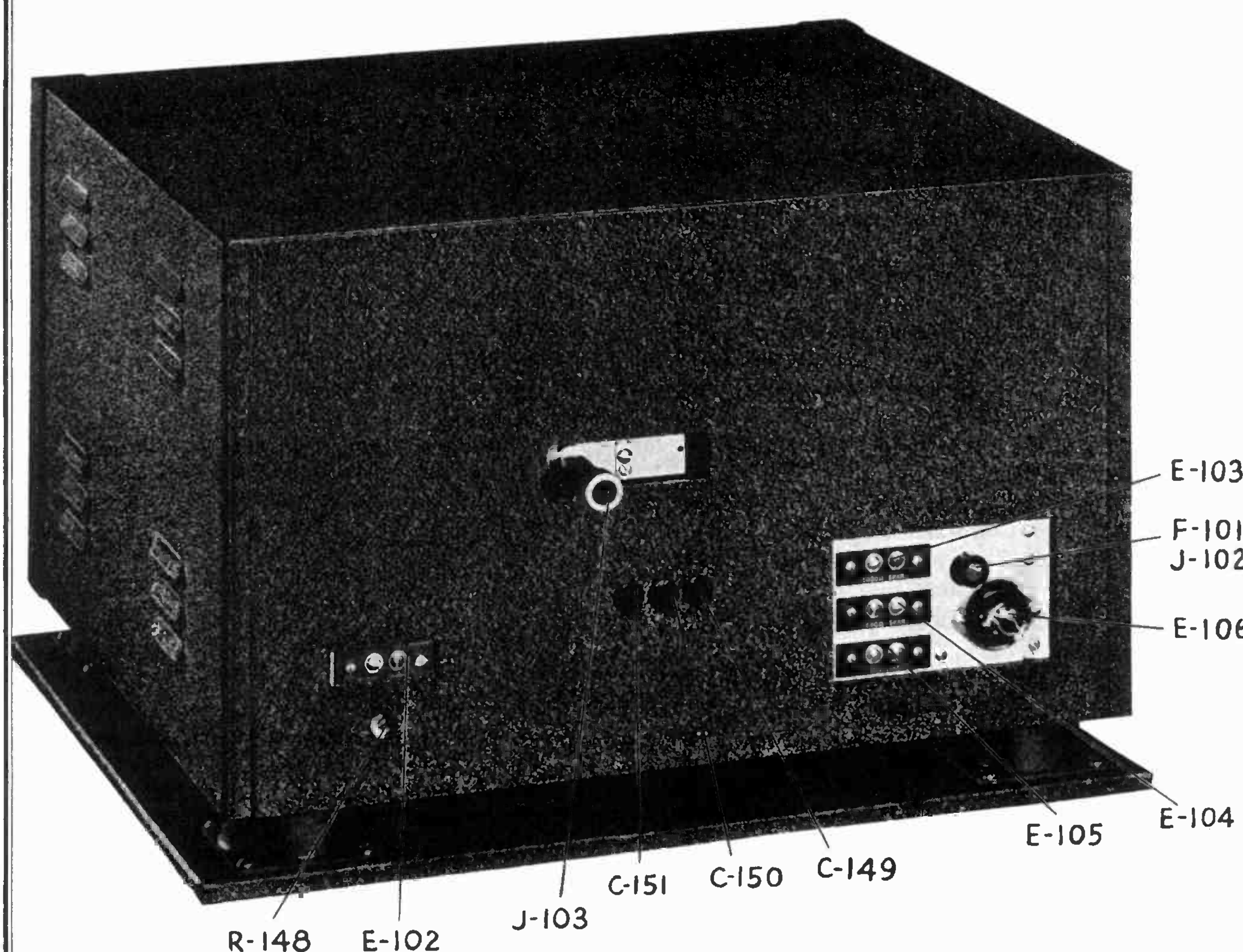

FIG. 2. Left Rear Oblique View, Radio Receiver.

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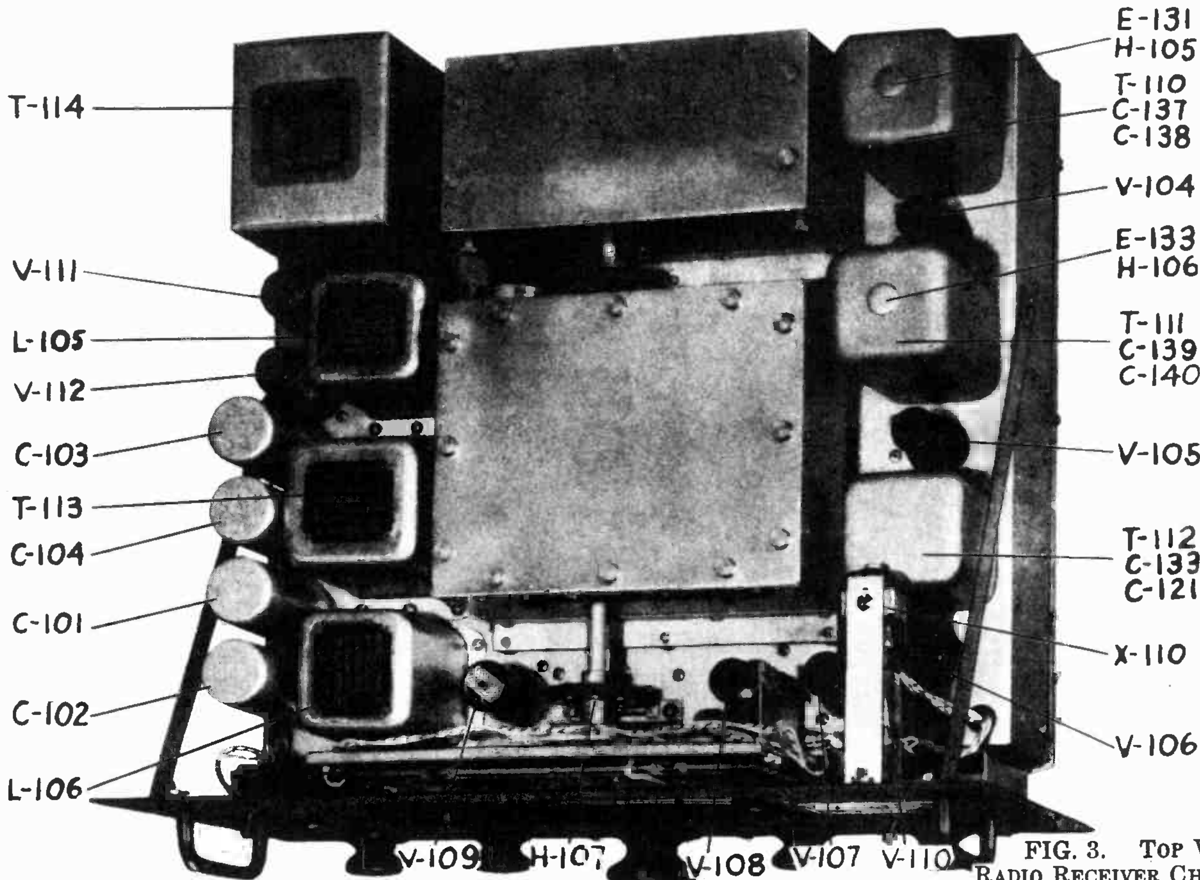

FIG. 3. Top View, Radio Receiver Chassis.

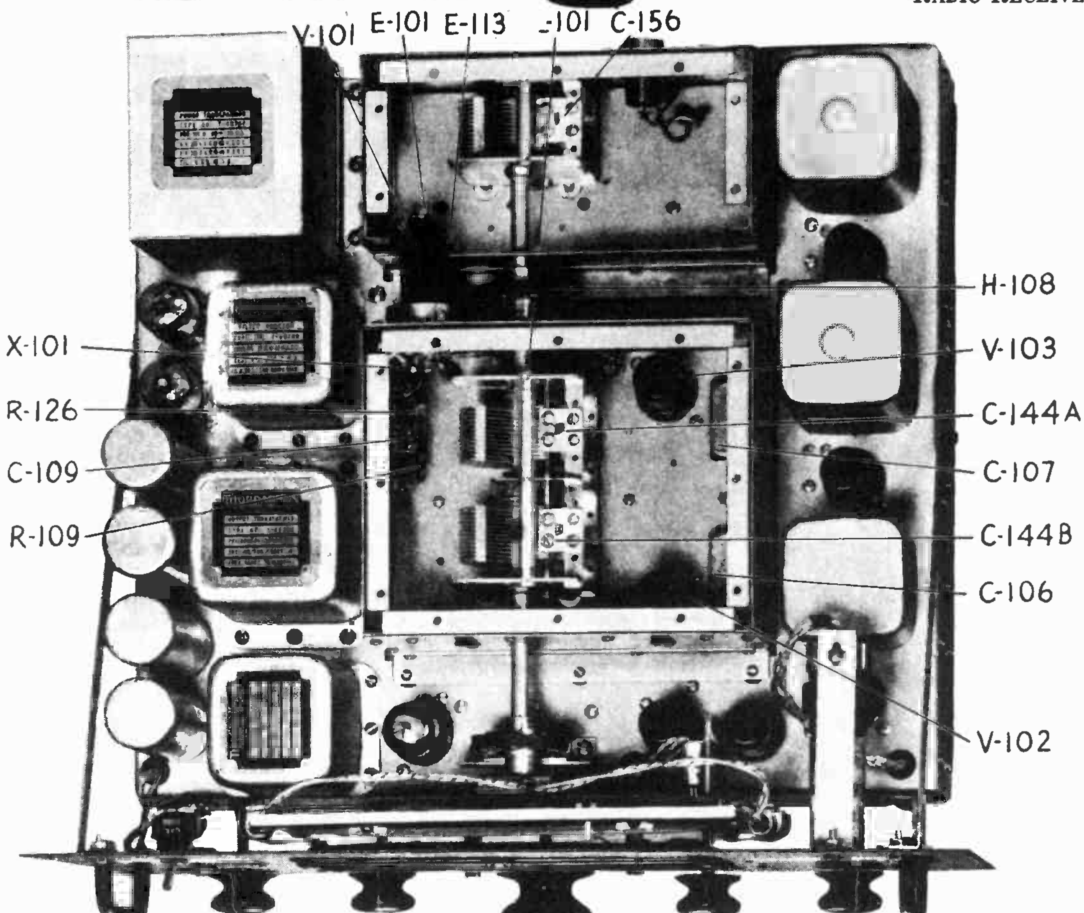

FIG. 4. Top View, Radio Receiver Chassis. Compartment Shield Covers Removed.

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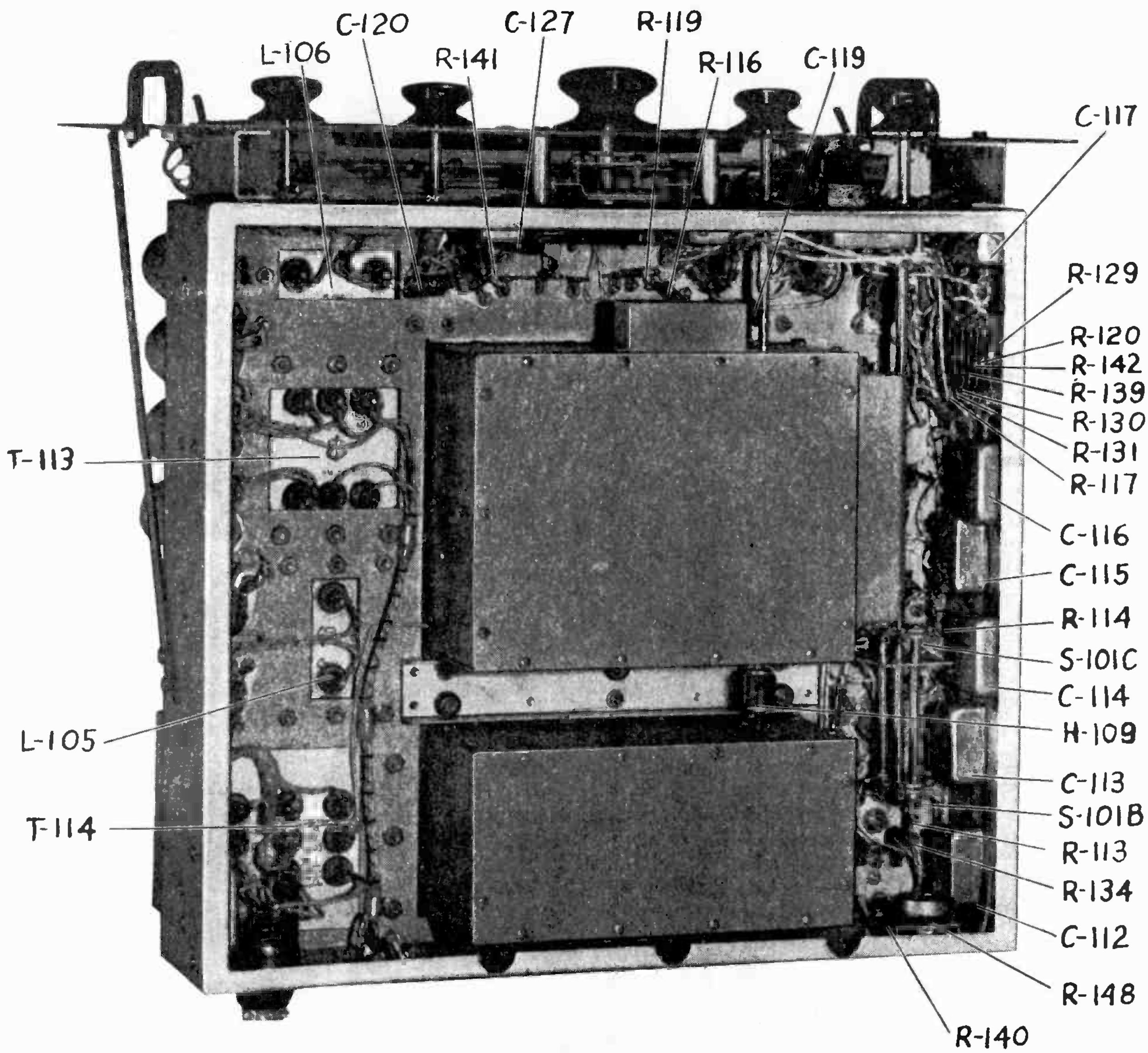

FIG. 5. LEFT BOTTOM OBLIQUE VIEW, RADIO RECEIVER CHASSIS. BOTTOM COVER PLATE REMOVED.

15.2 TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS FOR MODEL SLR-12-A RADIO RECEIVING EQUIPMENT
SECTION 1—MODEL SLR-12-A RECEIVER

Symbol Desig.	Function	Description	Drawing and Part Number
		CAPACITORS	
C-101	Input Filter	Capacitor, paper, 4 mfd, 600 volts DC working.	5070
C-102	Output Filter	Same as C-101	
C-103	Input Filter	Same as C-101	
C-104	Output Filter	Same as C-101	
C-105	V-107 Cathode Bypass	Capacitor, electrolytic, 25 Mfd. +50%, —10%, 25 Volts DC working.	5088
C-106			
C-106A	V-102 Heater Bypass	Capacitor, paper, 0.1/0.1 Mfd. each section 600 Volts DC working. Hermetically sealed.	5069
C-106B	V-102 Plate Bypass		
C-107		Same as C-106	
C-107A	V-103 Cathode Bypass		
C-107B	V-103 Screen Bypass		
C-108		Capacitor, paper, 0.1/0.1 Mfd. each section 600 Volts DC working. Hermetically sealed.	5089
C-108A	V-108 Plate Bypass		
C-108B	V-108 Screen Bypass		
C-109		Capacitor, paper, 0.1/0.1/0.1 Mfd. each section 600 Volts DC working. Hermetically sealed.	5065
C-109A	V-101 Cathode Bypass		
C-109B	V-101 Plate Bypass		
C-109C	V-101 Screen Bypass		
C-110	Filter Tuning	Capacitor, paper, 0.05 Mfd. 600 Volts DC working. Hermetically sealed.	7002
C-111		Capacitor, paper, 0.05/0.05 Mfd. each section 600 Volts DC working. Hermetically sealed.	5067
C-111A	Line Bypass		
C-111B	Line Bypass		
C-112		Same as C-111	
C-112A	V-103 Plate Filter		
C-112B	V-104 Grid Filter		
C-113		Same as C-111	
C-113A	V-104 Cathode Bypass		
C-113B	V-104 Screen Bypass		
C-114		Same as C-111	
C-114A	A.V.C. Line Bypass		
C-114B	V-104 Plate Filter		
C-115		Same as C-109	
C-115A	V-105 Plate Bypass		
C-115B	V-105 Cathode Bypass		
C-115C	V-105 Screen Bypass		
C-116		Same as C-111	
C-116A	V-110 Grid bypass		
C-116B	Limiter bypass		
C-117	V-106 to V-107 Coupling	Capacitor, paper, 0.02 Mfd. 600 Volts DC working. Hermetically sealed.	5066
C-118	Fidelity Control Condenser	Same as C-117	
C-119	V-107 to V-108 Coupling	Capacitor, mica, 5000 MMF, ±10% 300 Volts DC working.	5079
C-120	+ B bypass	Same as C-119	
C-121	Diode filter bypass	Capacitor, mica, 50 MMF, ±10%, 500 Volts DC working. Low loss case.	5076
C-122	Not used		
C-123	Ant to V-101 Coupling	Capacitor, mica, 250 MMF, ±10% 500 Volts DC working. Low loss case.	5077
C-124	V-101 Plate coupling	Same as C-123	
C-125	V-103 Grid coupling	Same as C-123	
C-126	Not used		
C-127	V-108 to V-109 Coupling	Same as C-119	
C-128	V-102 Heater bypass	Same as C-119	

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15.2 TABLE II (*Continued*)
PARTS LIST BY SYMBOL DESIGNATIONS FOR MODEL SLR-12-A RADIO RECEIVING EQUIPMENT
SECTION 1 — MODEL SLR-12-A RECEIVER

Symbol Desig.	Function	Description	Drawing and Part Number
		CAPACITORS (*Continued*)	
C-129	V-103 B + bypass	Same as C-119	
C-130	V-102 B + bypass	Same as C-119	
C-131	Oscillator coupling	Capacitor, Silver mica, 50 MMF ±2.5%, 500 Volts DC working.	5080
C-132	Oscillator grid Coupling	Same as C-131	
C-133	T-112 Primary tuning	Capacitor, Silver mica, 100 MMF ±2.5%, 500 Volts DC working.	5081
C-134	Antenna tuning padder	Capacitor, Silver mica, 175 MMF ±2.5%, 500 Volts DC working.	5082
C-135	R.F. tuning padder	Same as C-134	
C-136	Oscillator tuning padder	Same as C-134	
C-137	T-110 Primary tuning	Capacitor, Silver mica, 225 MMF ±2.5%, 500 Volts DC working.	5083
C-138	T-110 Secondary tuning	Capacitor, Silver mica, 250 MMF ±2.5%, 500 Volts DC working.	5084
C-139	T-111 Primary tuning	Same as C-138	
C-140	T-111 Secondary tuning	Same as C-138	
C-141	T-107 Padder fixed	Capacitor, Silver mica, 350 MMF ±2.5%, 500 Volts DC working.	5085
C-142	T-108 Padder	Capacitor, Silver mica, 3000 MMF ±2.5%, 500 Volts DC working.	5086
C-143	T-109 Padder	Capacitor, Silver mica, 4000 MMF ±2.5%, 300 Volts DC working.	5087
C-144		Capacitor, variable air, 2 gang. Minimum capacity 14 MMF, Max. capacity 390 MMF. 25 plates each section curve "C", 0.015 inches min. spacing.	5101
C-144A	R.F. tuning		
C-144B	Oscillator tuning		
C-145	T-107 trimmer	Capacitor, variable air. Minimum capacity 3 MMF, Max. capacity 25 MMF.	5072
C-146	T-108 trimmer	Capacitor, variable air. Minimum capacity 4 MMF, Max. capacity 50 MMF.	5073
C-147	T-109 trimmer	Same as C-146	
C-148	T-107 variable padder	Capacitor, variable air. Minimum capacity 6 MMF, Max. capacity 75 MMF.	5074
C-149	T-101 trimmer	Capacitor, Var. mica, Min. capacity 1 MMF, Max. capacity 12 MMF. Compression type.	6093
C-150	T-102 trimmer	Capacitor, variable mica, Minimum capacity 4 MMF, Max. capacity 60 MMF. Compression type.	5071
C-151	T-103 trimmer	Same as C-150	
C-152	T-104 trimmer	Same as C-149	
C-153	T-105 trimmer	Same as C-150	
C-154	T-106 trimmer	Same as C-150	
C-155	V-107 Plate filter	Same as C-109	
C-156	Antenna tuning	Capacitor, variable air. Min. capacity 14 MMF, Max. capacity 390 MMF 25 plates, curve "C", 0.015 min. spacing.	5100
		MISCELLANEOUS ELECTRICAL PARTS	
E-101	V-101 Grid cap	¼" Grid cap for octal tubes	5045
E-102	Phono input terminals	Phono input two terminal strip marked PHONO and GND, Terminals have captive screws.	6001
E-103	Speaker output term. 5000 ohm	Speaker output two terminal strip marked 5000 ohm SPKR. Terminals have captive screws.	6003

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15.2 TABLE II (*Continued*)
PARTS LIST BY SYMBOL DESIGNATIONS FOR MODEL SLR-12-A RADIO RECEIVING EQUIPMENT
SECTION 1 — MODEL SLR-12-A RECEIVER

Symbol Desig.	Function	Description	Drawing and Part Number
	MISCELLANEOUS ELECTRICAL PARTS (*Continued*)		
E-104	Speaker output term. 600 ohm	Speaker output two terminal strip marked 600 ohm SPKR. Terminals have captive screws.	6004
E-105	Line term. 60 ohm	Output two terminal strip marked 60 ohm LINE. Terminals have captive screws.	6005
E-106	AC power receptacle	Two pole plug set in drawn steel shell for below surface mounting.	7006
E-107	SW II lamp socket	Bayonet type socket	5174
E-108	SW I lamp socket	Bayonet type socket	5173
E-109	BC lamp socket	Bayonet type socket	5172
E-110	Phono lamp socket	Bayonet type socket	5171
E-111	Dial lamp socket	Bayonet type socket	5041
E-112	Dial lamp socket	Same as E-111	
E-113	V-101 grid lead insul.	Porcelain lead through bushing	5036
E-114	L-101 support insul.	Same as E-113	
E-115	L-101 support insul.	Same as E-113	
E-116	Treble control knob	1½" Black bakelite knob.	5119
E-117	Volume control knob	Same as E-116	
E-118	Main tuning knob	2⅛" Black bakelite knob.	5120
E-119	Wave Change knob	Same as E-116	
E-120	Selectivity knob	Same as E-116	
E-121	T-101 Sec. Inductance Trimmer	Compressed powdered-iron core coil inductance trimmer.	5103
E-122	T-102 Sec. Inductance Trimmer	Compressed powdered-iron core coil inductance trimmer.	5102
E-123	T-103 Sec. Inductance Trimmer	Same as E-122	
E-124	T-104 Sec. Inductance Trimmer	Same as E-121	
E-125	T-105 Sec. Inductance Trimmer	Same as E-122	
E-126	T-106 Sec. Inductance Trimmer	Same as E-122	
E-127	T-107 Sec. Inductance Trimmer	Same as E-121	
E-128	T-108 Sec. Inductance Trimmer	Same as E-122	
E-129	T-109 Sec. Inductance Trimmer	Same as E-122	
E-130	T-110 Pri. Inductance Trimmer	Same as E-121	
E-131	T-110 Sec. Inductance Trimmer	Same as E-121	
E-132	T-111 Pri. Inductance Trimmer	Same as E-121	
E-133	T-111 Sec. Inductance Trimmer	Same as E-121	
E-134	T-112 Pri. Inductance Trimmer	Same as E-121	
	FUSES		
F-101	AC line fuse	Fuse, 2 Amps, up to 250 V., cartridge type, 1¼" long, ferrules ¼" diameter.	5111
	HARDWARE		
H-101	Plug button for T-101 Trimmer	½" Plug button	5038
H-102	Plug button for T-102 Trimmer	Same as H-101	
H-103	Plug button for T-103 Trimmer	Same as H-101	
H-104	Not used		
H-105	Plug button for T-110 Shield	½" Plug button	5037
H-106	Plug button for T-111 Shield	Same as H-105	
H-107	N-106 to C-144 coupling	Insulated coupling for ⅜" shaft	7157
H-108	C-144 to C-156 coupling	Insulated coupling for ⅜" shaft	6081A
H-109	O-101 to O-102 coupling	Insulated coupling for ¼" shaft	5106
H-110	Dial escutcheon	Transparent Escutcheon	5109
H-111	Pull Handle	Right Pull Handle	5115
H-112	Pull Handle	Left Pull Handle	5115

15.2 TABLE II (*Continued*)
PARTS LIST BY SYMBOL DESIGNATIONS FOR MODEL SLR-12-A RADIO RECEIVING EQUIPMENT
SECTION 1 — MODEL SLR-12-A RECEIVER

Symbol Desig.	Function	Description	Drawing and Part Number
		HARDWARE (*Continued*)	
H-113	Captive thumb screws	8/32 Captive thumb screws	5166
H-114	Panel thumb screws	10/32 thumb screws	5167
H-115	Shock Mounting	Rubber Shock Mounting	5170
		INDICATING DEVICES	
I-101	SW II Indicator lamp	Type 44—6.3V, .25A lamp	5110
I-102	SW I Indicator lamp	Same as I-101	
I-103	B.C. Indicator lamp	Same as I-101	
I-104	Phono Indicator lamp	Same as I-101	
I-105	Dial lighting lamp	Same as I-101	
I-106	Dial lighting lamp	Same as I-101	
		JACK AND RECEPTACLES	
J-101	Phone Jack	Jack, single, open circuit, short, for 2 conductor plugs, with tip and sleeve only.	5118
J-102	Fuse Holder	Extractor type fuse holder	5112
J-103	Concentric Antenna	Concentric line jack for RF connections	7010
		INDUCTORS R.F. & A.F.	
L-101	V-101 Plate choke	Radio Frequency choke, 2.5 M H., 125 MA.DC, distributed capacity 1MMF 50 ohms DC resistance. Pigtail terminals.	5047
L-102	V-103 + B choke	Same as L-101	
L-103	V-102 + B choke	Same as L-101	
L-104	V-102 heater filter	RF choke, 32 turns of #20 wire	5046
L-105	Audio + B filter choke	32 H, 40MA choke ±10% Test voltage 1500 RMS 3900 T #34E, 450 OHMS.	5048
L-106	RF + B filter choke	Same as L-105	
		NAMEPLATES, DIALS, CHARTS	
N-101	Model nameplate	Etched model plate	8001
N-104	Linear dial	Etched linear scale	5107A
N-105	Dial Index plate	Etched indicator index plate	5107B
N-106	Dial main tuning	Friction Drive dial pointer	7100
N-107	Frequency dial	Dial plate with lucite calibration	5108
		PLUGS	
P-101	Antenna and ground plug	Concentric plug single circuit for RF connection	7009
P-102	Power input receptacle & plug	Receptacle, 2 pole	7006
		MECHANICAL PARTS, SHAFTS	
O-101	Band switch shaft	Switch shaft & detent plate	5195-A
O-102	Band switch shaft extension	Shaft extension	7018
O-103	Selectivity switch shaft	Switch shaft & detent plate	5196-A
		RESISTORS	
R-101	T-111 secondary series	Resistor, wire wound, 10 ohms, ±10%, ½ watt, phenolic insulated. Pigtail type terminals.	5131
R-102	T-111 secondary series	Resistor, wire wound, 47 ohms, ±10%, ½ watt. phenolic insulated. Pigtail type terminals.	5132

SCOTT RADIO LABS., INC.

15.2 TABLE II (*Continued*)
PARTS LIST BY SYMBOL DESIGNATIONS FOR MODEL SLR-12-A RADIO RECEIVING EQUIPMENT
SECTION 1 — MODEL SLR-12-A RECEIVER

Symbol Desig.	Function	Description	Drawing and Part Number
		RESISTORS (*Continued*)	
R-103	T-110 secondary series	Same as R-102	
R-104	T-110 secondary series	Same as R-102	
R-105	V-103 Cathode bias	Resistor, composition, 270 ohms, ±10%, ½ watt, pigtail terminals	7145
R-106	Phone pad resistor	Same as R-105	
R-107	Phone pad resistor	Same as R-105	
R-108	Phone pad resistor	Resistor, composition, 560 ohms, ±10%, ½ watt, pigtail terminals	7220
R-109	V-101 Cathode bias	Resistor, composition, 680 ohms, ±10%, ½ watt, pigtail terminals	7146
R-110	V-104 Cathode bias	Same as R-109	
R-111	V-105 Cathode bias	Same as R-109	
R-112	V-101 Plate filter	Resistor, composition, 1000 ohms, ±10%, ½ watt, pigtail terminals	5136
R-113	V-103 Plate filter	Same as R-112	
R-114	V-104 Plate Filter	Same as R-112	
R-115	V-105 Plate Filter	Same as R-112	
R-116	V-108 Cathode bias	Resistor, composition, 1500 ohms, ±10%, ½ watt, pigtail terminals	5137
R-117	V-107 Cathode bias	Resistor, composition, 2400 ohms, ±10%, ½ watt, pigtail terminals	7148
R-118	V-103 Grid #1 resistor	Resistor, composition, 20,000 ohms, ±10%, ½ watt, pigtail terminals	7150
R-119	T-113 to V-108 Feedback	Resistor, composition, 10,000 ohms, ±10%, ½ watt, pigtail terminals	7008
R-120	V-106 noise limiter	Resistor, composition, 1.0 meg. ohms, ±10%, ½ watt, pigtail terminals	5146
R-121	Not used		
R-122	V-102 Grid leak	Resistor, composition, 47,000 ohms, ±10%, ½ watt, pigtail terminals	5141
R-123	V-107 plate load	Same as R-122	
R-124	V-107 plate filter	Same as R-122	
R-125	V-108 plate filter	Same as R-122	
R-126	V-101 screen filter	Resistor, composition, 100,000 ohms, ±10%, ½ watt, pigtail terminals	5142
R-127	V-104 screen filter	Same as R-126	
R-128	V-105 screen filter	Same as R-126	
R-129	V-106 Limiter Cathode resistor	Resistor, composition, .82 meg., ±10%, ½ watt, pigtail terminals.	7090
R-130	Diode filter	Resistor, composition, .22 Meg. ±10%, ½ watt, pigtail terminals.	5144
R-131	Diode load	Same as R-130	
R-132	V-108 plate load	Resistor, composition, .47 Meg. ± 10%, ½ watt, pigtail terminals.	5145
R-133	V-109 to V-108 feedback·	Same as R-130	
R-134	V-104 grid filter	Same as R-130	
R-135	V-101 grid filter	Same as R-132	
R-136	V-103 grid filter	Same as R-132	
R-137	V-108 grid leak	Resistor, composition, .47 Meg. ±10%, ½ watt, pigtail terminals.	5145
R-138	V-108 screen filter	Same as R-132	
R-139	A.V.C. filter	Resistor, composition, 1.0 Meg. ±10%, ½ watt, pigtail terminals.	5146
R-140	Eye control limiting	Same as R-130	

15.2 TABLE II (*Continued*)
PARTS LIST BY SYMBOL DESIGNATIONS
FOR MODEL SLR-12-A RADIO RECEIVING EQUIPMENT
SECTION 1 — MODEL SLR-12-A RECEIVER

Symbol Desig.	Function	Description	Drawing and Part Number
		RESISTORS (*Continued*)	
R-141	V-109 grid leak	Same as R-139	
R-142	V-110 indicator filter	Resistor, composition, 2.2 Meg. ±10%, ½ watt, pigtail terminals.	5147
R-143	V-102 plate filter	Resistor, composition, 15,000 ohms, ±10%, 2 watt, pigtail terminals.	7230
R-144	V-103 screen filter	Resistor, composition, 18,000 ohms, ±10%, 2 watt, pigtail terminals.	7231
R-145	V-109 cathode bias	Resistor, wire wound, 680 ohms, ±10%, 2 watts, phenolic insulated, pigtail type terminals.	7239
R-146	Volume control	Potentiometer, .5 meg ±20% Composition, semi-logarithmic Clockwise taper, shaft .250x2.187	5129
R-147	Treble control	Potentiometer, .25 meg ±20% Composition, semi-logarithmic Clockwise taper, shaft .250x2.187	5130
R-148	Tuning indicator control	Potentiometer 1 meg ±20% Composition, linear taper Shaft .250x.500, screwdriver slot	5128
		SWITCHES	
S-101A	Phono Radio section	Selectivity gang switch, rotary type, 3 wafer sections	5196-B
B	#1 IF selectivity section		
C	#2 IF selectivity section		
S-102		Band switch, rotary type, 5 wafer sections	5195-B
A	Indicator lamp section		
B	Oscillator section		
C	R.F. section		
D	Antenna secondary section		
E	Antenna primary section		
S-103	A.C. - off - on switch	Toggle switch S.P.S.T., silver plated contacts rated 3A, 250 volts DC	5197
S-104	Noise limiter - off - on switch	Toggle switch S.P.D.T., silver plated contacts rated 3A, 250 volts D.C.	7091
		TRANSFORMERS R.F., A.F. AND POWER	
T-101	J-103 to V-101 coupling B.C. band	R.F.Transformer assembly antenna section Pri.D.C. resistance 0.58 ohms ±10% Sec.D.C. resistance 4.73 ohms ±10%	Pri-5050 Sec-5051
T-102	J-103 to V-101 coupling S.W.I. band	R.F.Transformer assembly antenna section Pri.D.C. resistance 0.2 ohms ±10% Sec.D.C. resistance 0.11 ohms ±10%	Pri-5054 Sec-5055
T-103	J-103 to V-101 coupling S.W. II band	R.F.Transformer assembly antenna section Pri.D.C. resistance 0.16 ohms ±10% Sec.D.C. resistance 0.06 ohms ±10%	Pri-5058 Sec-5059
T-104	V-101 to V-103 coupling B.C. band	R.F.Transformer assembly R.F. section Pri.D.C. resistance 0.3 ohms ±10% Sec.DC. resistance 4.82 ohms ±10%	5052
T-105	V-101 to V-103 coupling S.W.I. band	R.F.Transformer assembly R.F. section Pri.D.C. resistance 0.14 ohms ±10% Sec.D.C. resistance 0.11 ohms ±10%	5056
T-106	V-101 to V-103 coupling S.W. II band	R.F.Transformer assembly R.F. section Pri. D.C. resistance 0.094 ohms ±10% Sec.D.C. resistance 0.062 ohms ±10%	5060

SCOTT RADIO LABS., INC.

15.2 TABLE II (*Continued*)
PARTS LIST BY SYMBOL DESIGNATIONS FOR MODEL SLR-12-A RADIO RECEIVING EQUIPMENT
SECTION 1 — MODEL SLR-12-A RECEIVER

Symbol Desig.	Function	Description	Drawing and Part Number
		TRANSFORMERS R.F., A.F. AND POWER (*Continued*)	
T-107	B.C. Band oscillator	R.F.Transformer assembly oscillator section Tap D.C. resistance 0.564 ohms ±10% Total coil D.C. resistance 3.1 ohms ±10%	5053
T-108	S.W.I. Band oscillator	R.F.Transformer assembly oscillator section Tap, D.C. resistance 0.03 ohms ±10% Total coil, D.C. resistance 0.1 ohms ±10%	5057
T-109	S.W.II Band oscillator	R.F.Transformer assembly oscillator section Tap, D.C. resistance 0.023 ohms ±10% Total coil, D.C. resistance 0.06 ohms ±10%	5061
T-110	V-103 to V-104 coupling	1st I.F. Transformer 455 K.C. Pri.D.C. resistance 4.65 ohms ±10% Sec.D.C. resistance 4.78 ohms ±10%	5062
T-111	V-104 to V-105 coupling	2nd I.F. Transformer 455 K.C. Pri.D.C. resistance 4.89 ohms ±10% Sec.D.C. resistance 4.78 ohms ±10%	5063
T-112	V-105 to V-106 coupling	3rd I.F. Transformer 455 K.C. Pri.D.C. resistance 13 ohms ±10% Sec.D.C. resistance 17.4 ohms ±10%	5064
T-113	V-109 to Speaker terminals	Output Transformer Pri. 2500 turns #37E, D.C. resistance 649 ohms ± 10%, impedance 8000 ohms Sec. #1, 236 turns #26E, D.C. resistance, 5.088 ohms ± 10%, impedance 60 ohms Sec. #2, 753 turns #31E, D.C. resistance, 55.8 ohms ±10%, impedance 600 ohms Sec. #3, 2250 turns #36E, D.C. resistance 489 ohms ±10%, impedance 5000 ohms	6008
T-114	Power Transformer	Pri. 308 turns #22E, D.C. resistance 3.1 ohms ±10%, 70 Va. 115 V., 0.61A, ± 10%. Sec. #1, 1416 turns centertapped #32E, D.C. resistance 166.2 ohms ±10%, 255 V. A.C., 40 Ma. 255 V. A.C., 40 Ma., ±10% Sec. #2, 18 turns #17E, D.C. resistance 0.072 ohms ±10%, 6.3 V. A.C., 3.8A ±10% Sec. #3, 18 turns #20E, D.C. resistance 0.15 ohms, 6.3 V. A.C., 1.2A ±10%	6007
		VACUUM TUBES	
V-101	R.F. amplifier 6K7	Vacuum tube (Receiving—Metal). Triple grid super-control amplifier. Base: Small wafer octal 7 pin. Miniature cap. Heater: Current 0.30 amp at 6.3 volts AC or DC	6017
V-102	H.F. oscillator 6J5	Vacuum tube (Receiving—Metal). Detector amplifier triode. Base: Small wafer octal 6 pin, phenolic. Heater: Current 0.30 amp at 6.3 volts AC or DC	6015
V-103	1st detector and mixer 6SA7 or 6SA7-GT	Vacuum tube (Receiving—Metal). Pentagrid converter. Base: Small wafer octal 8 pin, phenolic. Heater: current 0.3 amp at 6.3 volts AC or DC	6014

MODEL SLR-12-A

SCOTT RADIO LABS., INC.

VACUUM TUBES (*Continued*)

V-104	1st I.F. amplifier 6SK7 or 6SK7-GT	Vacuum tube (Receiving—Metal). Triple grid super-control amplifier. Base: Small wafer octal 8 pin, phenolic. Heater: Current 0.30 amp at 6.3 volts AC or DC	6016
V-105	2nd I.F. amplifier 6SK7 or 6SK7-GT	Same as V-104	
V-106	Second detector and A.V.C. 6H6 or 6H6-GT	Vacuum tube (Receiving tube—Metal). Twin diode. Base: Small wafer octal 7 pin. Heater: Current 0.30 amp at 6.3 volts AC or DC	6010
V-107	1st Audio amplifier 6J5 or 6J5-GT	Same as V-102	
V-108	2nd Audio amplifier 6SJ7 or 6SJ7-GT	Vacuum tube (Receiving — Pentode metal). Triple Grid Detector Amplifier. Base: Small wafer octal 8 pin, phenolic. Heater: current 0.3 amp at 6.3 volts AC or DC	6009
V-109	Output amplifier 6K6-GT	Vacuum Tube (Receiving — Pentode glass). Power amplifier Pentode. Base: Medium Shell Octal 7 pin, phenolic. Heater: current 0.4 amp at 6.3 volts AC or DC	6011
V-110	Tuning indicator 6E5	Vacuum Tube (Receiving—Glass). Electron-Ray tube (Indicator). Base: Small 6 pin, phenolic. Heater: Current 0.30 amp at 6.3 volts AC or DC	6012
V-111	Rectifier 6X5-GT	Vacuum Tube (Receiving—Glass). Full wave high vacuum rectifier. Base: intermediate shell octal 6 pin, phenolic. Heater: Current 0.6 amp at 6.3 volts AC or DC	5096
V-112	Rectifier 6X5-GT	Same as V-111	

SOCKETS

X-101	Socket for V-101	Vacuum tube socket eight contact (octal) plug-in type, with retaining ring and spacer washer. Molded bakelite base. Circular.	7035
X-102	Socket for V-102	Same as X-101	
X-103	Socket for V-103	Same as X-101	
X-104	Socket for V-104	Same as X-101	
X-105	Socket for V-105	Same as X-101	
X-106	Socket for V-106	Same as X-101	
X-107	Socket for V-107	Same as X-101	
X-108	Socket for V-108	Same as X-101	
X-109	Socket for V-109	Same as X-101	
X-110	Socket for V-110	Vacuum tube socket, 6 prong, phenolic.	5040
X-111	Socket for V-111	Same as X-101	
X-112	Socket for V-112	Same as X-101	

SECTION 2—MODEL 262 INVERTER

Symbol Desig.	Function	Description	Drawing and Part Number
	MISCELLANEOUS ELECTRICAL PARTS		
E-201	AC Power receptacle	2 Pole receptacle flush mounting	
E-202	Vibrator unit	Plug-in type vibrator unit	7571
	FUSES		
F-201	D-C Line fuse	Fuse—10 amps. 25 volts	7248
	PLUGS		
P-201	D-C Line plug	2 Pole plug and 5 foot 2 conductor cord	7227
	SWITCHES		
S-201	D-C Power switch	S.P.S.T. Toggle switch	5197

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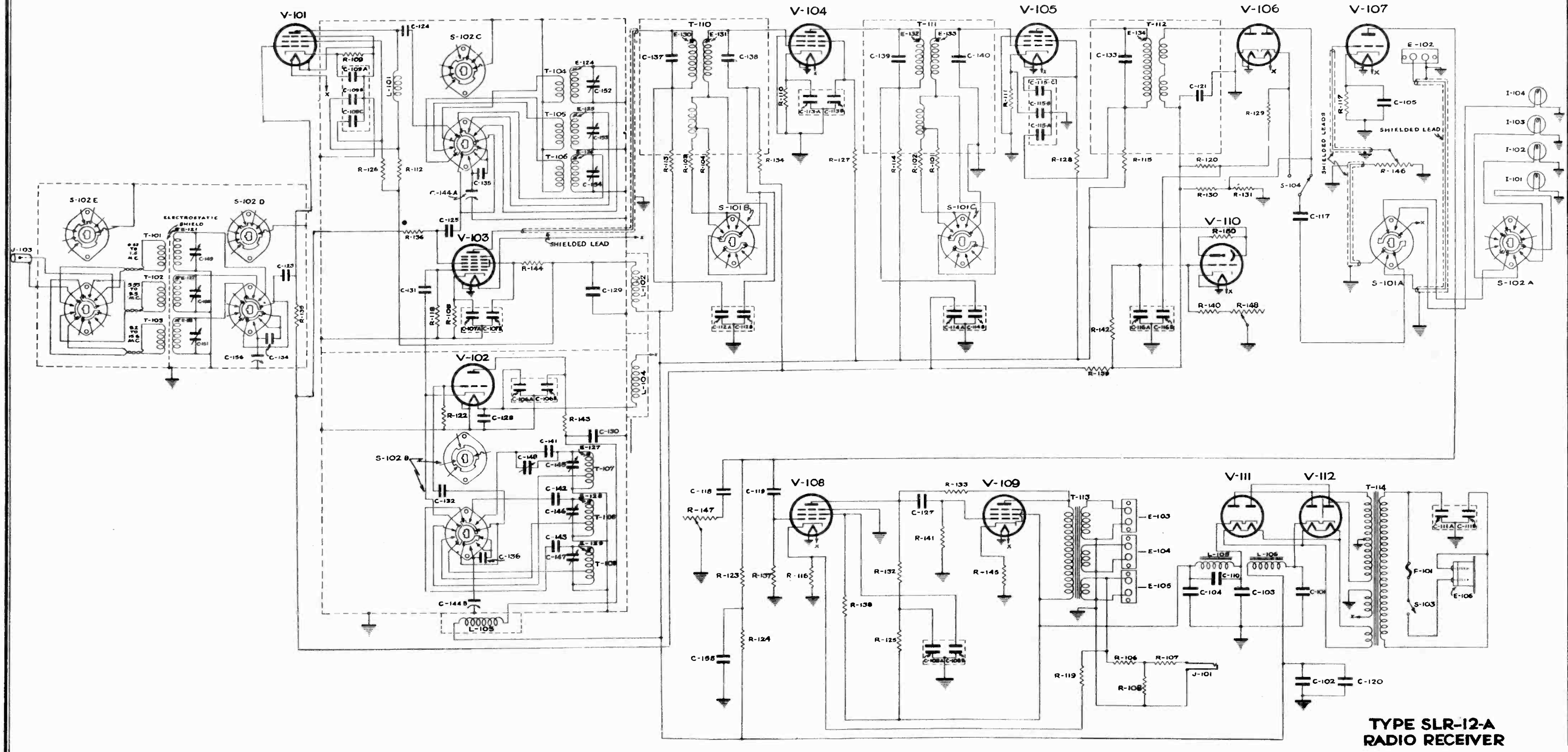

FIG. 9. ACTUAL SCHEMATIC DIAGRAM. MODEL SLR-12-A RADIO RECEIVER.

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15.2 TABLE II (*Continued*)
PARTS LIST BY SYMBOL DESIGNATIONS
FOR MODEL SLR-12-A RADIO RECEIVING EQUIPMENT
SECTION 3—MODEL SPM-8 SPEAKER

Symbol Desig.	Function	Description	Drawing and Part Number
		TRANSFORMERS	
T-301	Output transformer	Output coupling transformer Pri. impedance—600 ohms Sec. impedance—4.4 ohms	8010
		LOUD SPEAKERS	
LS-301	Loud speaker	8 inch permanent magnet loud speaker. Voice coil impedance 4.4 ohms	8002
		INTERCONNECTING CABLES	
W-301	Speaker cable	2 wire rubber covered connector cable	8004A

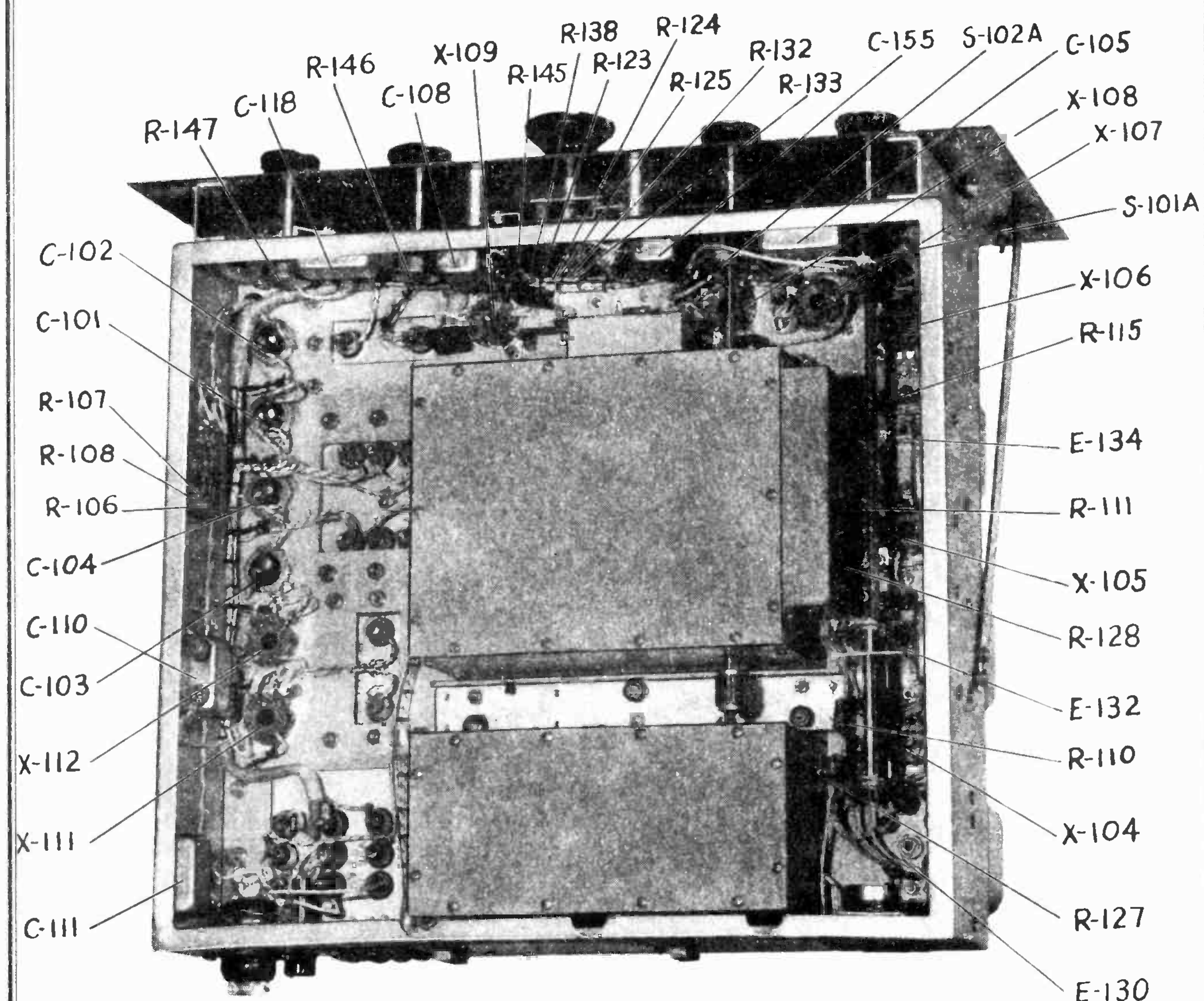

FIG. 6. RIGHT BOTTOM OBLIQUE VIEW, RADIO RECEIVER CHASSIS. BOTTOM COVER PLATE REMOVED.

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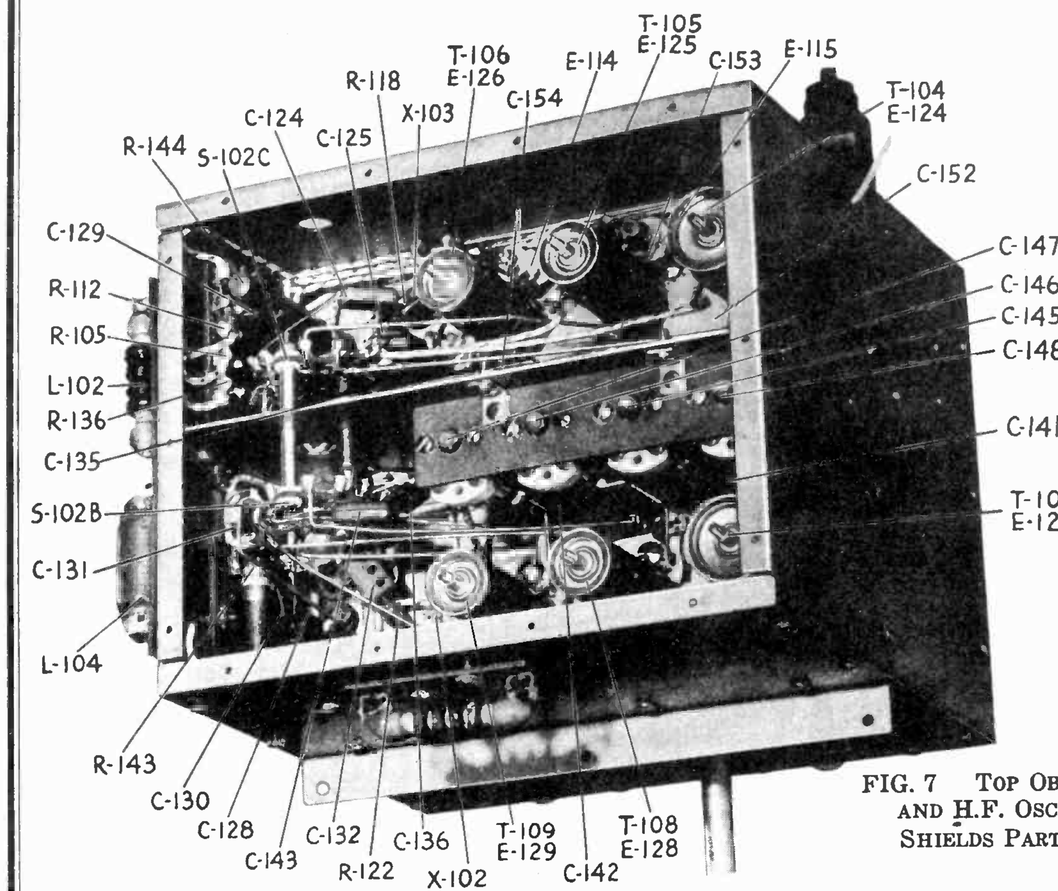

FIG. 7 TOP OBLIQUE VIEW, R.F. AND H.F. OSC. COMPARTMENT. SHIELDS PARTIALLY REMOVED.

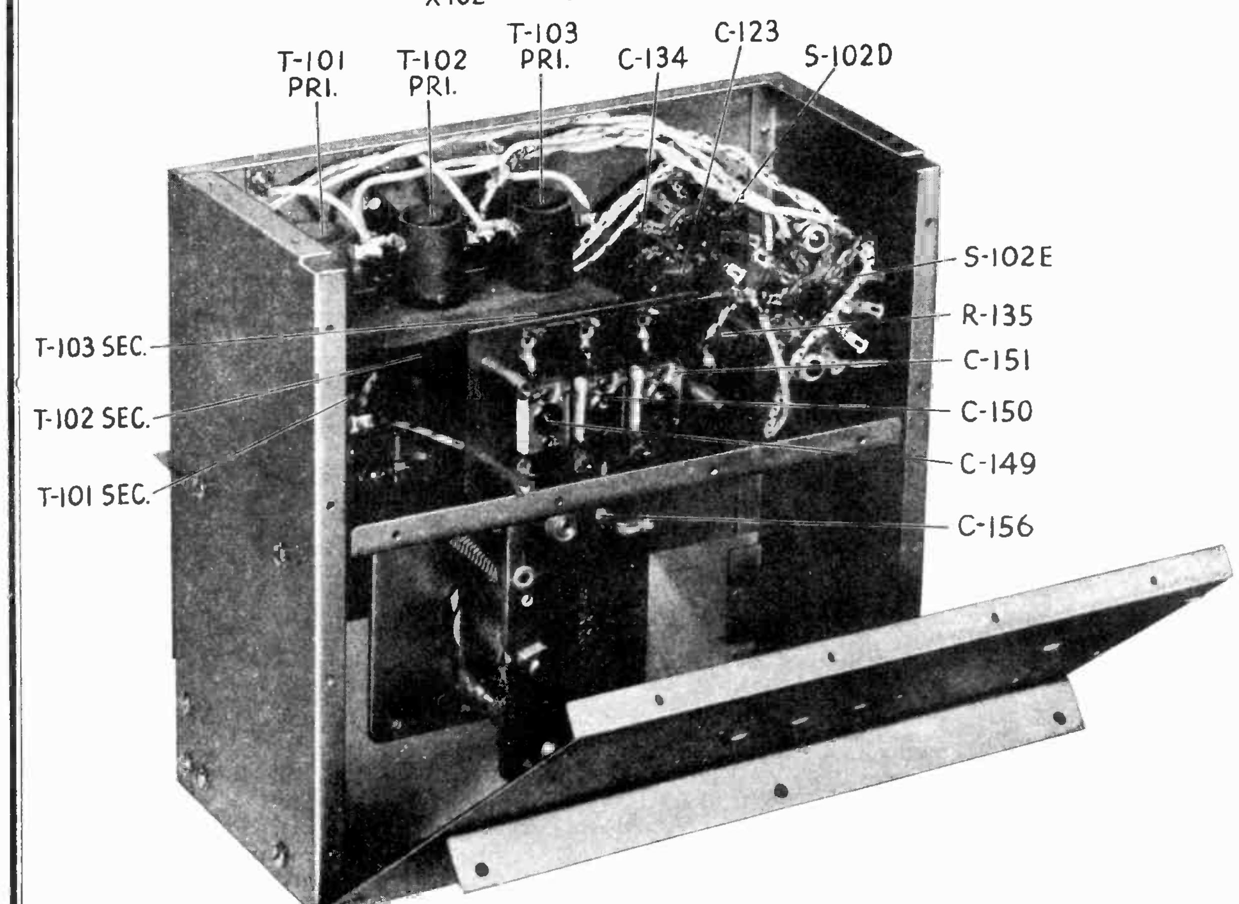

FIG. 8. LEFT OBLIQUE, INVERTED VIEW, ANTENNA COMPARTMENT. SHIELDS PARTIALLY REMOVED.

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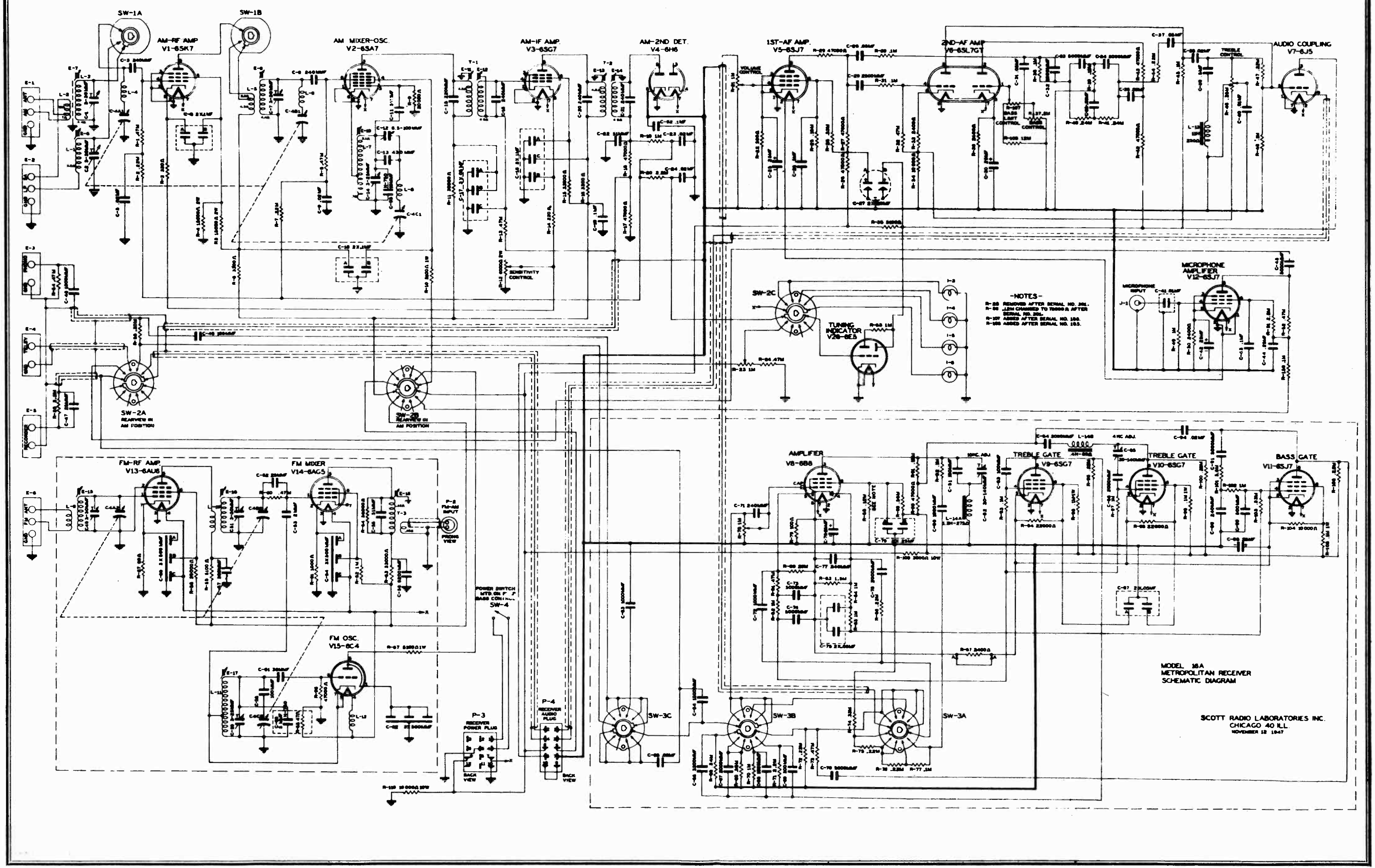

MODEL 16A
(Metropolitan)

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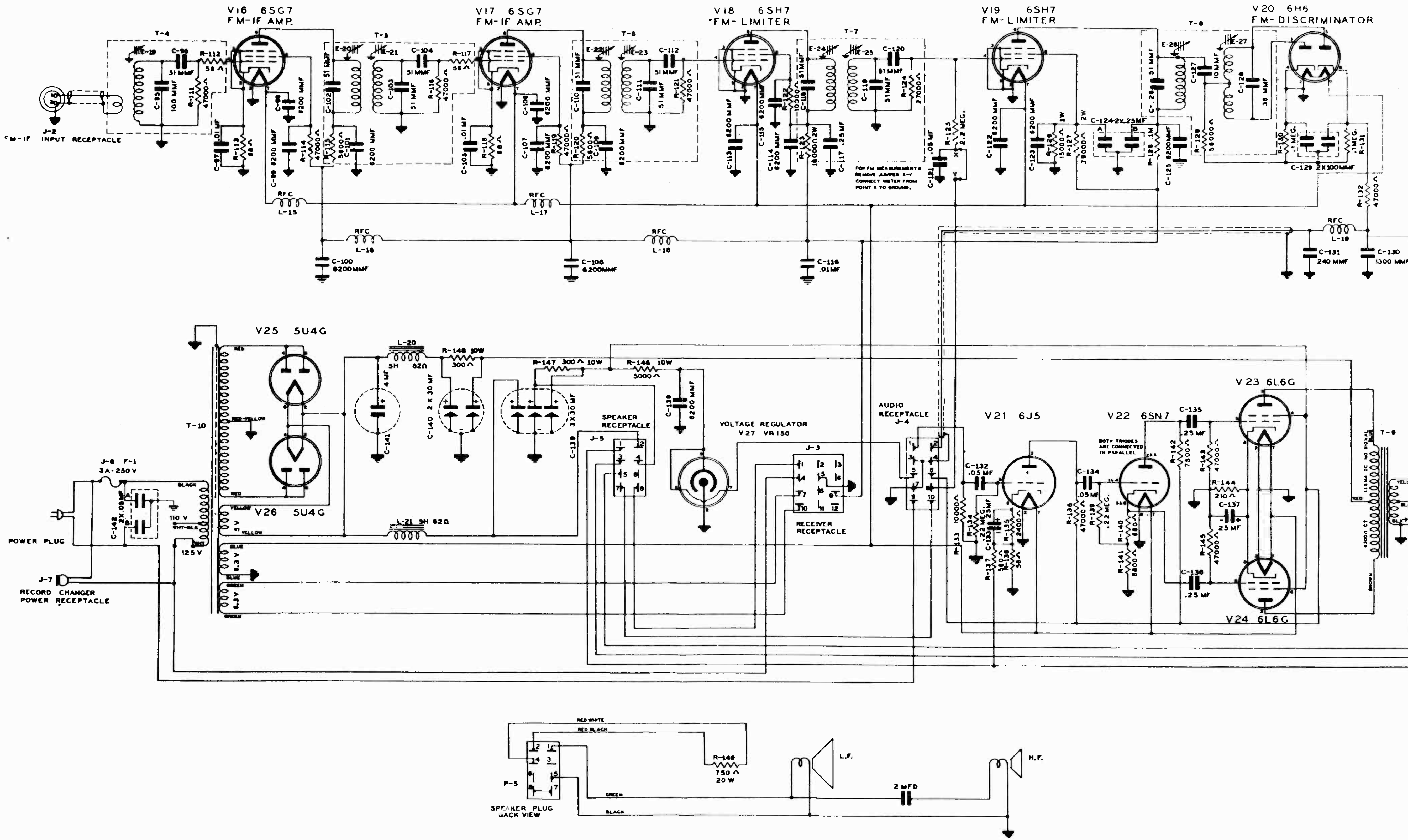
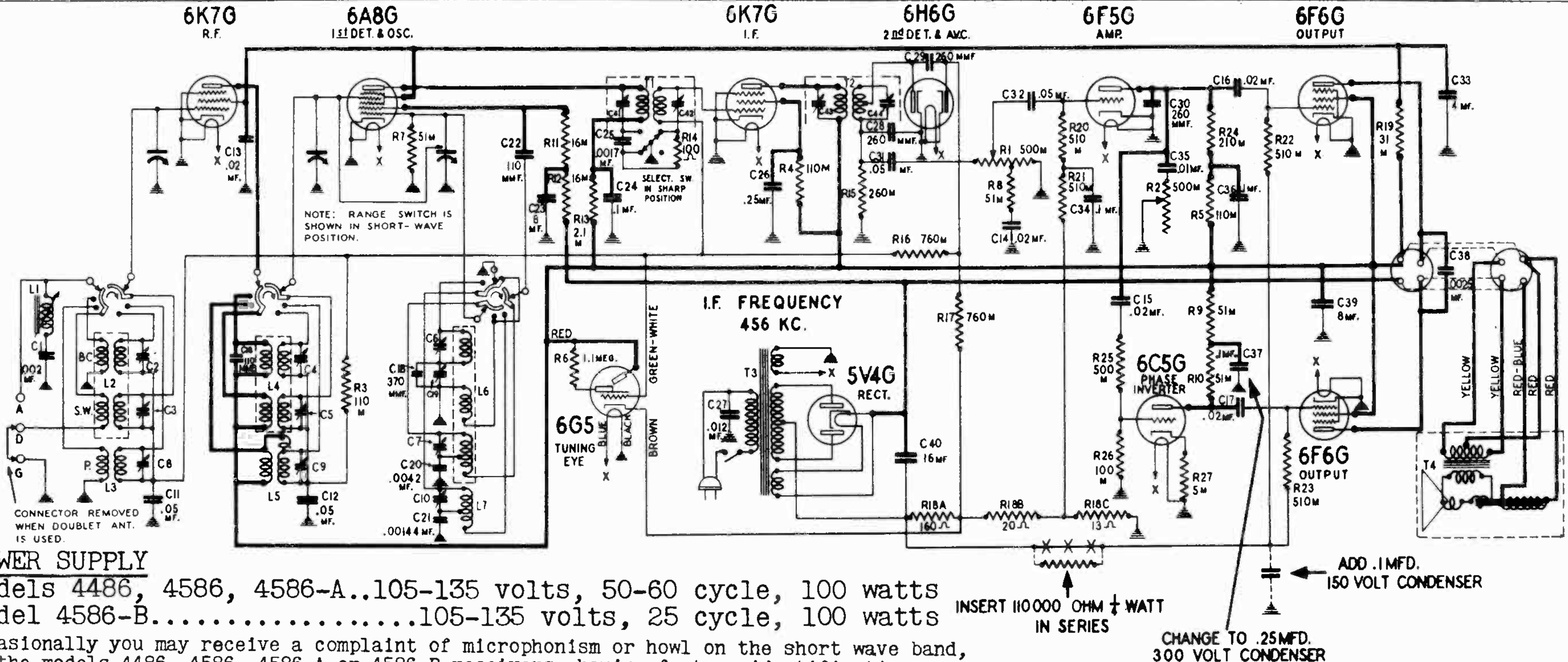


SEARS, ROEBUCK & CO.

MODELS 4486 1586, 4586-A, 4586-B CHASSIS 100, 156



POWER SUPPLY

Models 4486, 4586, 4586-A..105-135 volts, 50-60 cycle, 100 watts
Model 4586-B..................105-135 volts, 25 cycle, 100 watts

Occasionally you may receive a complaint of microphonism or howl on the short wave band, in the models 4486, 4586, 4586-A or 4586-B receivers, having factory identification number 100156. In such cases, first make a careful test of all tubes, eliminating those which are microphonic, and other parts which might cause howl if defective. A good ground must be used. It is also advisable to see that the control knobs are not jammed too tightly against the cabinet front. If microphonics or howl is not caused by defective parts or any of the above items, it can usually be eliminated or greatly reduced by making the following circuit changes:

1. Disconnect and remove the 110,000 ohm, 1/4 watt carbon resistor which is connected from the junction of the two 510,000 ohm grid resistors in the grid circuits of the output stage, to the center tap of the power transformer. This resistor will be found only in receivers carrying changes shown in supplement No. 1 of bulletin 57 RL 26. In receivers where this resistor is not present the lead between the junction of the two grid resistors and the center tap should be removed. The junction point referred to should then be connected to ground.

2. Short out the R-18A section of the candohm bias resistor strip.

3. (a) Open the cathode connections to ground on both of the 6F6 output tubes.

   (b) Connect the two cathode terminals, of the 6F6 output tubes, together.

   (c) From the cathode terminal, of either of the 6F6 output tubes, connect a 270 ohm 2 watt resistor to ground. The value given for this resistor is quite critical.

INTERMEDIATE FREQUENCY........456 KC.

FREQUENCY RANGES	ALIGNMENT FREQUENCIES
Band A.....526 to 1750 KC.	1500 KC.; 600 KC.
Band P....1730 to 5600 KC.	5000 KC.
Band F..5500 to 18,000 KC.	16,000 KC.

POWER OUTPUT
Type......................Class A
Undistorted.............3.0 Watts
Maximum.................3.5 Watts

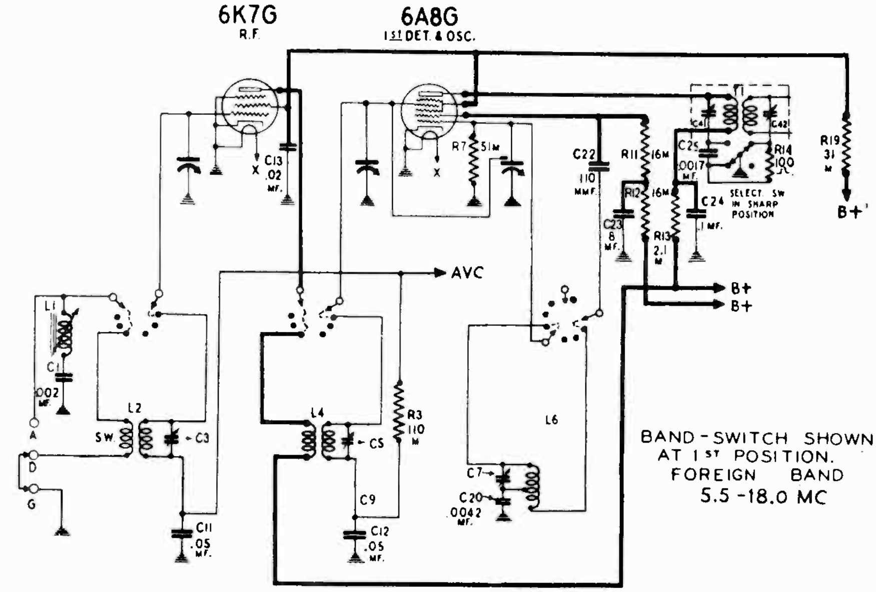
CHASSIS FEATURES
Number of R.F. Stages..........One
Number of I.F. Stages..........One
Number of Cond. in Gang......Three
Antenna....Conventional or Doublet
456 KC. Wave Trap

CLARI-SKEMATIX

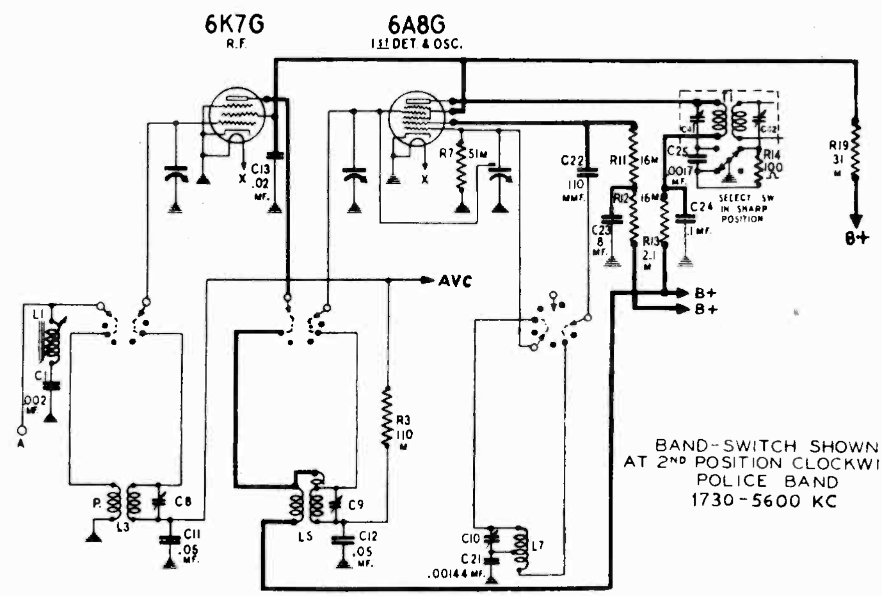
Registered Trademark

MODELS 4486, 4586, 4586-A, 4586-B CHASSIS 100,156

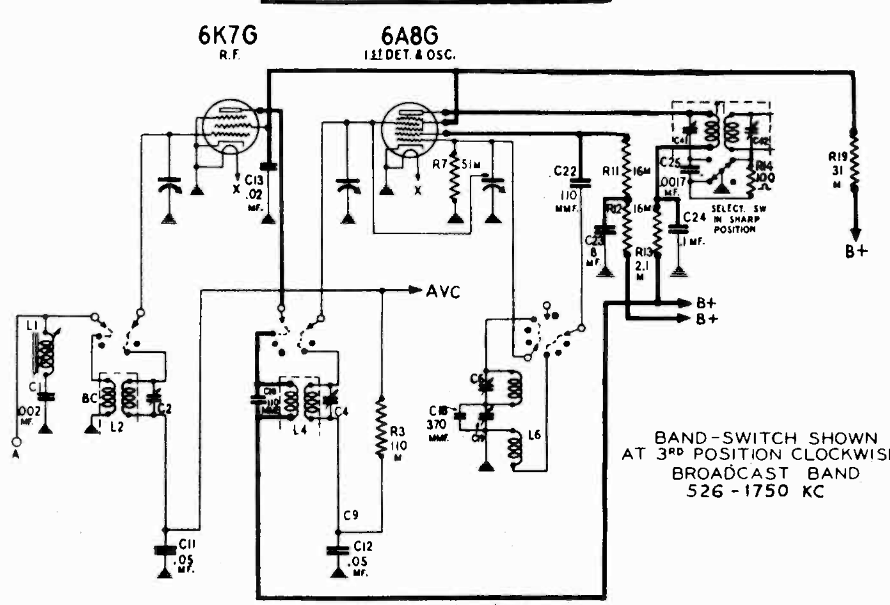
SEARS, ROEBUCK & CO.



BAND-SWITCH SHOWN AT 1ST POSITION. FOREIGN BAND 5.5-18.0 MC



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE. POLICE BAND 1730-5600 KC



BAND-SWITCH SHOWN AT 3RD POSITION CLOCKWISE BROADCAST BAND 526-1750 KC

SEARS, ROEBUCK & CO.

MODELS 4486,4586,4586-A, 4586-B CHASSIS 100,156

ALIGNMENT PROCEDURE

PRELIMINARY

Output meter connections..........................Across voice coil leads

Output meter reading to indicate 1 watt output......... 10" spkr. 1.4 volts / 12" spkr. 2.0 volts

Average sensitivity in microvolts for 1 watt output........See chart below

Generator ground connection..............................Receiver Chassis
Dummy antenna 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 selectivity control.................Sharp position (clockwise)
Position of volume control............................Maximum clockwise
Position of tone control..............................Maximum clockwise

BAND SWITCH	POSITION OF * DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (In order shown)	MICRO-VOLTS (Sharp Pos.)
Band A I.F.	1000 KC.	456 KC.	.1 Mfd.	6A8-G Grid	C41, C42, C43, C44	150
I.F. Trap	600 KC.	456 KC.	.00025 Mfd.	Ant. Lead	L1 for Min.Output	
	1500 KC.	1500 KC.	.00025 Mfd.	Ant. Lead	C6,C4,C2	15
	600 KC. ** (Rock Dial)	600 KC.	.00025 Mfd.	Ant. Lead	C19	15
Band P	5000 KC.	5000 KC.	400 Ohm.	Ant. Lead	*** C10, C9, ** C8	30
Band F	16000 KC.	16000 KC.	400 Ohm.	Ant. Lead	*** C7, C5, ** C3	30

.IMPORTANT ALIGNMENT NOTES

* Before attempting to align the receiver check to see that the dial pointer coincides with the last scale division at the low frequency end of the dial scale when the gang condenser is in full mesh.

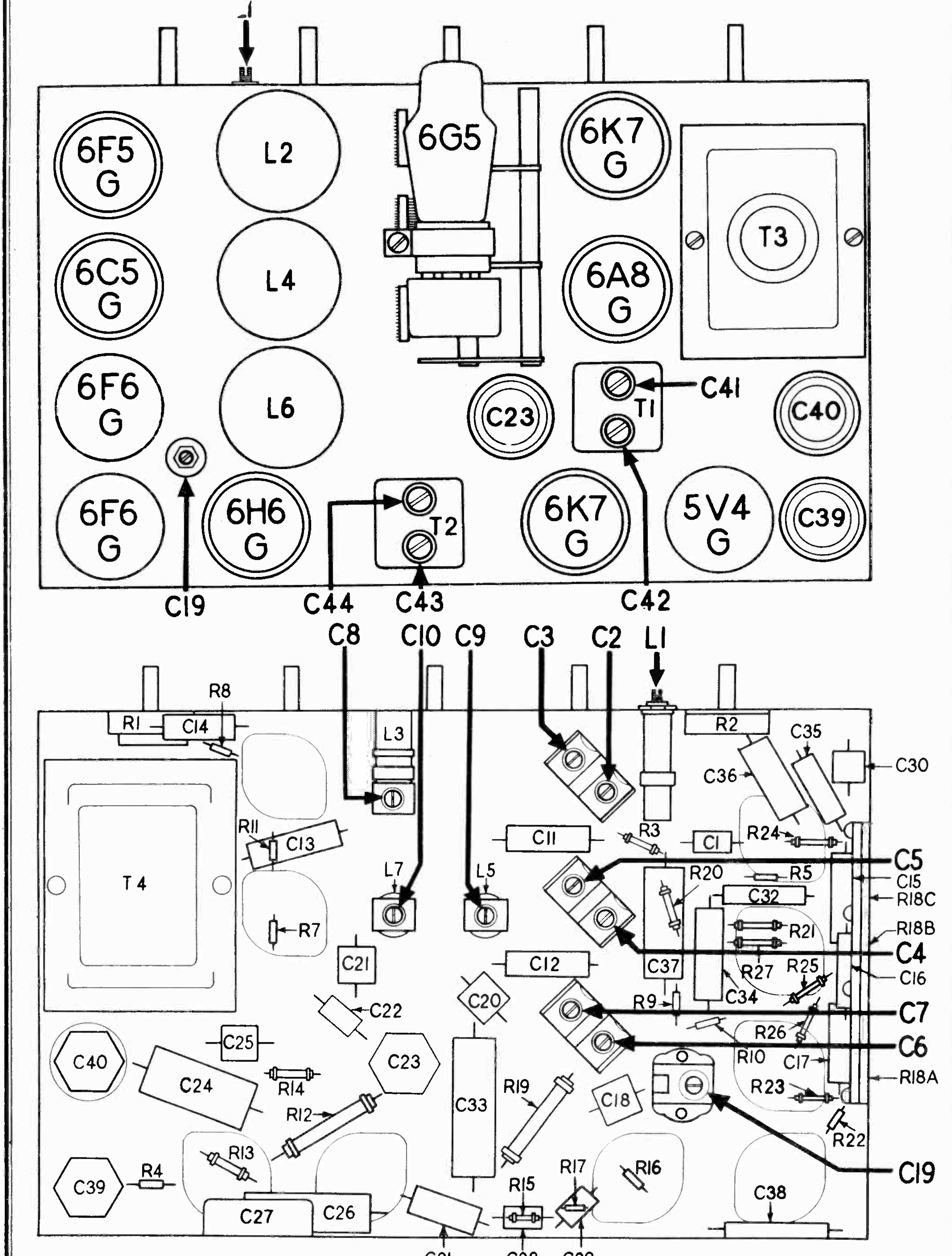
After adjusting the I.F. trimmers C41, C42, C43 and C44, go back and repeat the adjustment, since the setting of each trimmer will have some effect on others. When adjusting L1, antenna trap trimmer, increase generator output to obtain clearly defined trimmer setting for a minimum.

** When aligning the broadcast band padder C19 at 600 KC. and the short wave detector trimmers, it is necessary to adjust the trimmers while slowly rocking the gang condenser through a small distance. Rocking the gang is essential if maximum sensitivity is to be obtained.

*** When aligning the short wave bands, care should be taken in adjusting trimmers C7 and C10, since two possible adjustments of these trimmers will result in signal peaks. The proper peak is that which occurs with the trimmer screw farthest out.

MODELS 4486, 4586, 4586-A, 4586-B CHASSIS 100, 156

SEARS, ROEBUCK & CO.



SEARS, ROEBUCK & CO.   MODELS 4486,4586,4586-A, 4586-B CHASSIS 100,156

GENERAL INFORMATION

The R-100156 three band radio receiver has a frequency range extending from 526 KC. to 18,000 KC. The intermediate frequency is 456 KC. A three deck band selector switch is used for selecting the proper combination of coils to be used for each wave band. Special contacts on one deck of the switch are used for shorting out unused oscillator coils to prevent dead spots due to absorption.

The coils for the antenna, R.F., and oscillator circuits covering the broadcast and short wave bands, are shielded and located on top of the chassis. They are designated by L2, L4 and L6 respectively in the circuit diagram. The antenna, R.F. and oscillator coils covering the police band are located on the underside of the chassis and are designated by L3, L5 and L7 respectively in the circuit diagram.

The receiver is designed for use with a conventional or doublet antenna. A 456 KC. wave trap is connected across the antenna input to prevent code interference from stations operating on frequencies in the vicinity of 456 KC.

The control grid circuit of the 6K7-G, radio frequency amplifier, is tuned by the secondary of the antenna coil and one section of the variable condenser. Similarly, the control grid circuit of the 6A8-G first detector and oscillator, is tuned by the secondary of the R.F. coil and one section of the variable condenser. After amplification in the 6K7-G R.F. amplifier, the signal is impressed on the control grid of the 6A8-G, 1st detector and oscillator, where frequency conversion to 456 KC. takes place. The 456 KC. output voltage of the 6A8-G tube is amplified by the 6K7-G intermediate frequency amplifier and impressed on the diode plates of the 6H6-G second detector and A.V.C. tube.

By means of the selectivity control, two degrees of selectivity are obtainable in the intermediate frequency amplifier. This is accomplished by altering the resonance characteristics of the 1st I.F. transformer. When the selectivity control is in the sharp position (clockwise) the 1st I.F. transformer functions as a typical transformer with tuned primary and secondary circuits. When it is in the broad position (counter-clockwise) the resonant frequency of the primary circuit is decreased and that of the secondary circuit increased. At the same time the selectivity curve of the secondary is broadened.

One section of the 6H6-G twin diode tube is used as a linear detector. The 260,000 ohm resistor R15 serves as a load resistor for the detector section of the twin diode. The potentiometer type of volume control R1, is capacity coupled to the diode load resistor R15, and acts as a continuous voltage divider of the audio frequency voltage developed. Hence any portion of the audio frequency voltage developed may be applied to the control grid of the 6F5-G resistance coupled audio frequency amplifier. The second section of the twin diode, fed through the condenser C29 is used for delayed A.V.C. With sufficient signal intensity, A.V.C. voltage is developed across resistance R17 and applied to the control grids of the 6K7-G and 6A8-G tubes through a resistance capacity filter.

The output of the 6F5-G audio amplifier is fed into a resistance coupled push-pull output stage. In this circuit, the 6C5-G tube operating as a phase inverter, takes the place of a push-pull input transformer.

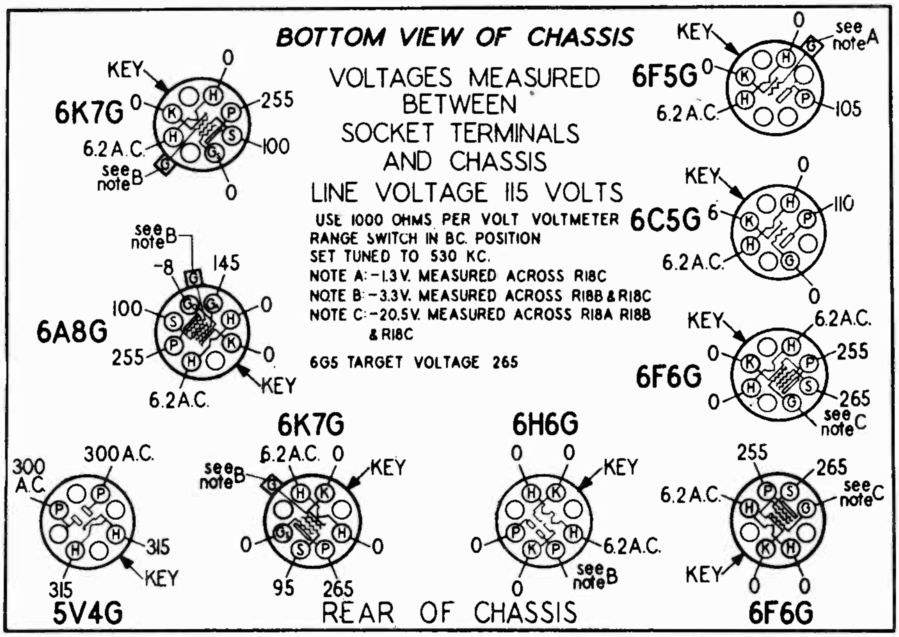
The control grid bias of the 6F5-G is obtained from the negative end of resistance R18-C. Similarly, the control grid bias of the 6K7-G tubes, the 6A8-G tube, and the delay voltage for the A.V.C. section of the 6H6-G is obtained from the negative end of resistances R18-B and R18-C. Also the bias for the 6F6-G output tubes is obtained from the negative end of resistors R18-A, R18-B and R18-C. Resistances R18-A, R18-B and R18-C are located in the negative lead of the high voltage D.C. supply.

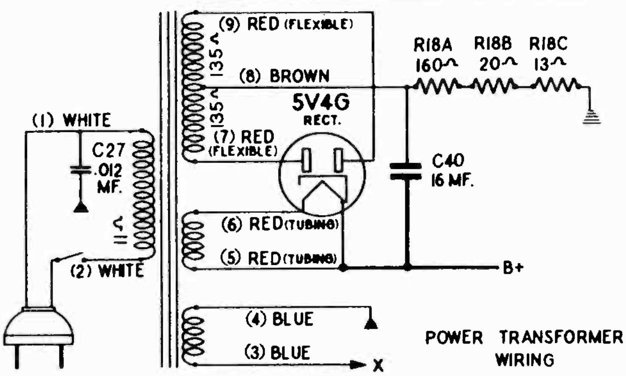
WEAK OR INOPERATIVE SETS DUE TO SHORT-CIRCUITED POLICE BAND R.F. COILS

Occasionally you may find a set which is weak or completely inoperative on all three bands due to a short between the coupling turn and the secondary of the police band R.F. coil (L5). The short circuit may first cause crackling and sputtering and then later the set will stop playing. To test for this short, disconnect the red and yellow wires from the coil (L5) and test for continuity from either end of the trimmer condenser on the coil to the lug to which the coil coupling turn is connected. This should show an open circuit. Even the slightest leakage between these two points with the red and yellow wires disconnected, calls for the replacement of the coil which is part number 1002888604. Such shorted coils do not occur very often, therefore, we recommend that tubes and voltages be checked first to make sure that no other trouble exists.

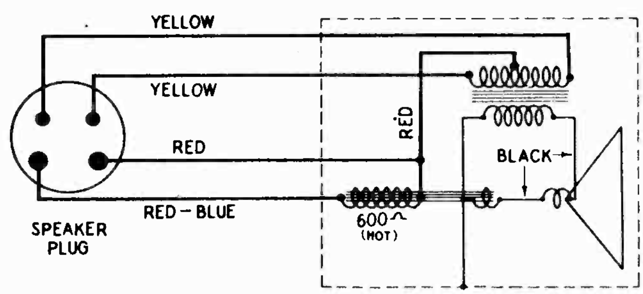
MODELS 4486,4586,4586-A, 4586-B CHASSIS 100,156

SEARS, ROEBUCK & CO.

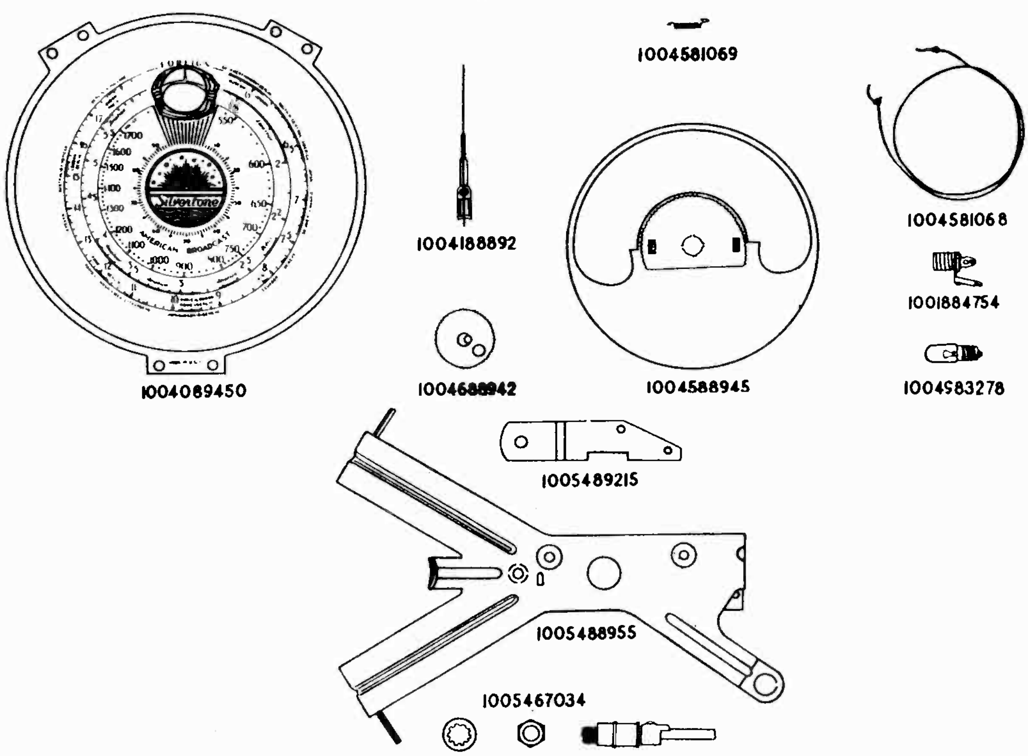




POWER TRANSFORMER WIRING



SPEAKER WIRING



SEARS, ROEBUCK & CO. MODELS 4486,4586,4586-A, 4586-B CHASSIS 100,156

DEFECT	GENERALLY CAUSED BY	REMEDY
Dead Receiver On All Bands	No power at A.C. outlet............	Check or repair A.C. power source.
	Shorted by-pass condenser. Burned out power transformer. Defective tubes. Open coupling condenser. Shorted filter condenser. Open plate resistor.	Determine defective parts by means of continuity and voltage tests, and replace.
	High resistance short between coupling turn (primary circuit) and secondary of Police band R.F. Coil (L5) ...	Replace coil.
Low Volume, Insensitive. Tuning Eye Does Not Close Sufficiently	Inadequate antenna.................	Replace antenna system.
	Defective tubes. Leaky filter condenser. Leaky by-pass condenser.	Replace defective parts.
	High resistance short between coupling turn (primary circuit) and secondary of Police band R.F. Coil (L5) ...	Replace coil.
Poor Tone	Defective tubes. Leaky by-pass condenser. Open filter condenser.	Replace defective parts.
	Speaker cone off center............	Recenter speaker cone.
	Receiver out of alignment..........	Realign receiver.
Oscillating Receiver	Defective tubes. Open by-pass condenser. Poor contact of tube shield.	Repair or replace defective parts.
	Receiver out of alignment..........	Realign receiver.
	Poor chassis grounds...............	Check ground connections in chassis.
Fading Receiver	Defective tubes....................	Replace defective tubes.
	Defective audio coupling condenser..	Replace defective condenser.
	Loose connections..................	Resolder loose connections.
	Defective antenna system	Check and repair antenna.
Hum	Open filter condenser. Defective by-pass condenser. Shorted heater type tube.	Replace defective parts.
Off Calibration	Dial pointer shifted...............	Set dial pointer.
	Receiver out of alignment..........	Realign receiver.
Audio Howl	Shipping blocks not removed.........	Remove wood shipping blocks.
	Knob shafts in contact with cabinet.	Readjust chassis in cabinet.
	Microphonic tubes..................	Replace microphonic tubes.

MODELS 4486,4586,4586-A, 4586-B CHASSIS 100,156

SEARS, ROEBUCK & CO.

Part No.	Schematic Location	Description
1002089186	C33	Condenser - 4 mfd. 150 V. electrolytic
	C34	Condenser - .1 mfd. 150 V.
	C35	Condenser - .01 mfd. 400 V.
	C36 C37	Condenser - .1 mfd. 300 V.
1001989543	C38	Condenser - .0025 mfd. 750 V.
1002089542	C39	Condenser - 8 mfd. 400 V. electrolytic
1002088679	C40	Condenser - 16 mfd. 450 V. electrolytic
1001688850		Condenser - variable gang
1005585321		Connector - ground
1002489524	R1	Control - volume (250 M. with switch)
1002588677	R2	Control - tone (500 M.)
1004581068		Dial drive cord per ft.
1004089450		Dial scale
1004589509		Dial gear
1005789193		Diaphragm and voice coil assembly 10" sp.
1005789880		Diaphragm and voice coil assembly 12" sp.
1004589514		Drum and bushing assembly
1004488916		Escutcheon - dial
1004489819		Escutcheon - dial see note
1005789196		Gasket 3/16" for 10" speaker
1005467034		Hex. nut 3/8" - planetary
1003988804		Knob - range switch
1003988802		Knob - selectivity control specify if knobs
1003988807		Knob - tone control are lettered in gold
1003988801		Knob - tuning control
1003988806		Knob - volume control
1004983278		Lamp - pilot 6 volt
1005417615		Lockwasher - 3/8" planetary per 100
1005436437		Pin - escutcheon
1004588953		Planetary - dial drive
1001888631		Plug - speaker
1001888632		Plug Cap - speaker
1004189521		Pointer and stud assembly
1004189523		Pointer - band spread
	R3 R4 R5	Resistor - 110,000 ohm 1/4 watt
	R6	Resistor - 1.1 megohm 1/4 watt
	R7 R8 R9 R10	Resistor - 51,000 ohm 1/4 watt
	R11	Resistor - 16,000 ohm 1/2 watt
	R12	Resistor - 16,000 ohm 1 watt
	R13	Resistor - 2,100 ohm 1/4 watt
	R14	Resistor - 100 ohm 1/4 watt
	R15	Resistor - 260,000 ohm 1/4 watt
	R16 R17	Resistor - 760,000 ohm 1/4 watt
	R18A	Resistor - 160 ohm sect. 3 watt
2189603	R18B	Resistor - 20 ohm sect. 2 watt
	R18C	Resistor - 13 ohm sect. 2 watt
	R19	Resistor - 31,000 ohm 1 watt
	R20 R21 R22 R23	Resistor - 510,000 ohm 1/4 watt
	R24	Resistor - 210,000 ohm 1/4 watt
	R25	Resistor - 500,000 ohm 1/4 watt
	R26	Resistor - 100,000 ohm 1/4 watt
	R27	Resistor - 5,000 ohm 1/4 watt

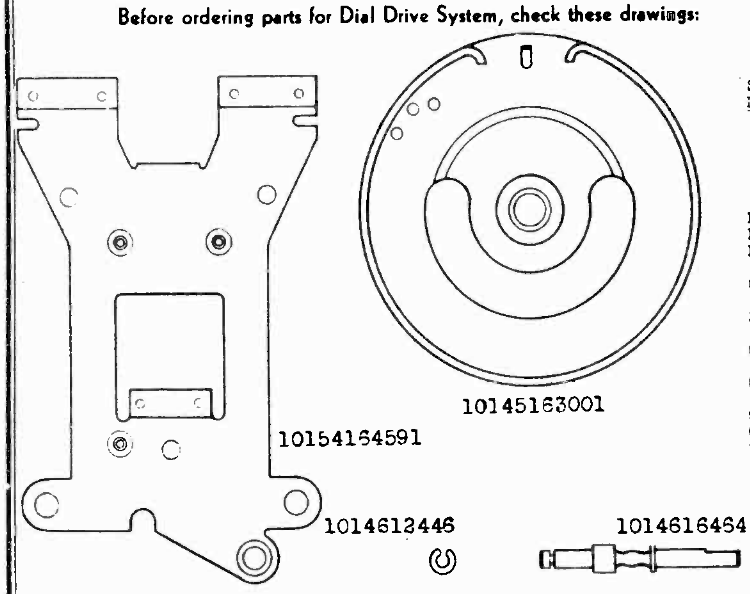
Part No.	Schematic Location	Description
1004689511		Shaft and gear - pointer
1005384982		Shield - tube, section (slotted end)
1005384981		Shield - tube, section
1005388708		Shield - tube, section
1001884758		Socket - pilot light
1001888675		Socket - speaker
10058264		Speaker - 10"
10058268		Speaker - 12"
1005489837		Speed nut used on 1004489819 (each)
1005384983		Spring ring - tube shield
1004581069		Spring - dial cord
1004388918		Spring - dial glass retainer
1004388919		Spring - escutcheon mounting used on 1004488916
1003788877		Switch - range
1002688874		Switch - selectivity
1005585066		Terminal strip G.D.A.
1003388882	T1	Transformer - 1st I.F.
1003588885	T2	Transformer - 2nd I.F.
1001089582	T3	Transformer - Power, 115 V. 60 cycles
1001089822	T3	Transformer - Power, 115 V. 25 cycles
1001389508	T4	Transformer - Output 10" sp.
1001389881	T4	Transformer - Output 12" sp.
1005488955		Bracket - dial mounting
1005488875		Bracket - selectivity switch
1005489215		Bracket - planetary support
1005588969		Cable and Plug - tuning indicator
1005481145		Clip - pointer shaft retaining spring
1003189560	L1	Coil - antenna trap
1002888592	L2	Coil - antenna (B.C. & S.W. with shd. & trimmer)
1002888881	L3	Coil - antenna (Police)
1002888597	L4	Coil - R.F. (B.C. & S.W. with shd. & trimmer)
1002888604	L5	Coil - R.F. (Police)
1002888599	L6	Coil - osc. (B.C. & S.W. with shd. & trimmer)
1002888605	L7	Coil - osc. (Police)
1001988686	C1	Condenser - .002 mfd. (mica)
1001788596	C2 C3 C4 C5 C6 C7	Condenser - dual trimmer
1001788477	C8 C9 C10	Condenser - single trimmer
	C11 C12	Condenser - .05 mfd. 150 V.
	C13 C14 C15 C16 C17	Condenser - .02 mfd. 400 V.
1001989525	C18	Condenser - .00037 mfd. (mica)
1001785285	C19	Condenser - padding trimmer
1001988587	C20	Condenser - .0042 mfd. (mica)
1001985562	C21	Condenser - .00144 mfd. (mica)
	C22	Condenser - .00011 mfd. (mica)
1002089614	C23	Condenser - 8 mfd. 300 V. electrolytic
	C24	Condenser - .1 mfd. 400 V.
1001988887	C25	Condenser - .0017 mfd. (mica)
	C26	Condenser - .25 mfd. 200 V.
1001983976	C27	Condenser - .012 mfd. 1,000 V.
	C28 C29 C30	Condenser - .00026 mfd. (mica)
	C31 C32	Condenser - .05 mfd. 200 V.

Note: This escutcheon is mounted on cabinet with three escutcheon pins No. 1005436437 and three speed nuts No. 1005489837.

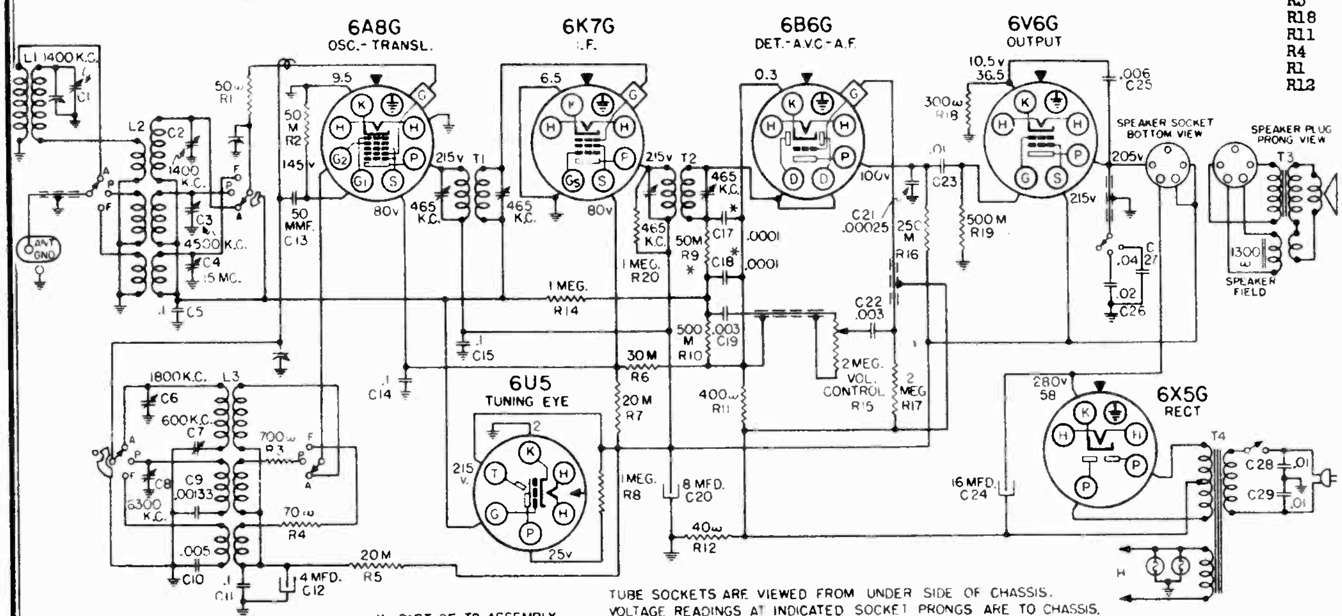
SEARS, ROEBUCK & CO.

MODELS 4663,4763
CHASSIS 101.471

Before ordering parts for Dial Drive System, check these drawings:



SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	10155147031	Board - Antenna terminal
	10154164591	Bracket - Dial mounting
	1015413407	Bushing - Rubber, chassis mtg.
	1015515484	Cable - Tuning Eye, with socket
	1015413808	Clip - Grid
L1	1013814821	Coil - Antenna, broadcast
L3	1012815457	Coil - Oscillator
L2	1012815466	Coil - Translator
	1011613455	Condenser - Variable
C24	1012014573	Condenser - 16 mfd. 350 volts, electrolytic
C12,C20	1012016570	Condenser - Electrolytic, dry, dual
C2,C3,C4	1011716448	Condenser - Trimmer, triple, antenna
C6,C8	1011713909	Condenser - Trimmer, dual, oscillator
C7	1011714433	Condenser - Padder
C5,C14		Condenser - .1 mfd. 200 volts
C11,C15		Condenser - .1 mfd. 400 volts
C37		Condenser - .04 mfd. 600 volts
C36		Condenser - .02 mfd. 600 volts
C23		Condenser - .01 mfd. 400 volts
C28,C39		Condenser - .01 mfd. 600 volts
C25		Condenser - .005 mfd. 600 volts
C10	1011916656	Condenser - .005 mfd. mica
C19,C22		Condenser - .003 mfd. 300 volts
C9	1011916531	Condenser - .00133 mfd. mica
C21		Condenser - .00025 mfd. mica
C13		Condenser - .00005 mfd. mica
C16		Condenser - .000025 mfd. mica
R15	1012416453	Control - Volume with switch
	1015516706	Cord - Power
	10145139740	Cord - Condenser drive
	1014016475	Dial - Station selector
	10145163001	Drum - Condenser drive
	1014416461	Escutcheon -
	1015410980	Grommet - Rubber, condenser mtg.
	1013916504	Knob - Tone
	1013916550	Knob - Tuning
	1013916613	Knob - Volume
	1013916548	Knob - Wave switch
	1014914914	Lamp - Dial light
	1015916561	Leaflet - Instruction
	1015915947	Log - Station
	1014313427	Nut - Escutcheon mounting
	1014116304	Pointer - Dial
R17		Resistor - 2 megohms, 1/3 watt
R8,R13, R14,R30		Resistor - 1 megohm, 1/3 watt
R10,R19		Resistor - 500M ohms, 1/3 watt
R16		Resistor - 250M ohms, 1/3 watt
R2		Resistor - 50M ohms, 1/3 watt
R6		Resistor - 30M ohms, 1/2 watt
R7		Resistor - 20M ohms, 2 watts
R5		Resistor - 20M ohms, 1/3 watt
R3		Resistor - 700 ohms, 1/3 watt
R18		Resistor - 300 ohms, 1/2 watt
R11		Resistor - 400 ohms, 1/3 watt
R4		Resistor - 70 ohms, 1/3 watt
R1		Resistor - 50 ohms, 1/3 watt
R12		Resistor - 40 ohms, 1/3 watt
	1014616464	Shaft - Pointer drive
	1015315548	Shield - Tube
	1015315550	Shield - Tube, base
	101188253	Socket - 5 prong, Speaker
	1011812809	Socket - 6 prong, Octal
	1011813173	Socket - 8 prong, Octal
	1011817096	Socket - Dial light, Left Hand
	1011817117	Socket - Dial light, Right Hand
	1015816563	Speaker - Dynamic, 6"
	1015716563	Cone and voice coil
	1011516564	Field coil
	1011316565	Transformer
	1014513948	Spring - Condenser drive cord tension
	1013716480	Switch - Wave
	1013816454	Switch - Tone control
	10133164461	Transformer - IF Input
	1013513447	Transformer - IF Output
	1011015482	Transformer - Power, 60 cycle
	1011115483	Transformer - Power, 25 cycle
	1014612446	Washer - Retaining, pointer drive shaft



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 TRIMMER CONDENSERS. VOLTAGES MUST BE MEASURED WITH NO SIGNAL. WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.471

CLARI-SKEMATIX

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MODELS 4663, 4763
CHASSIS 101.471

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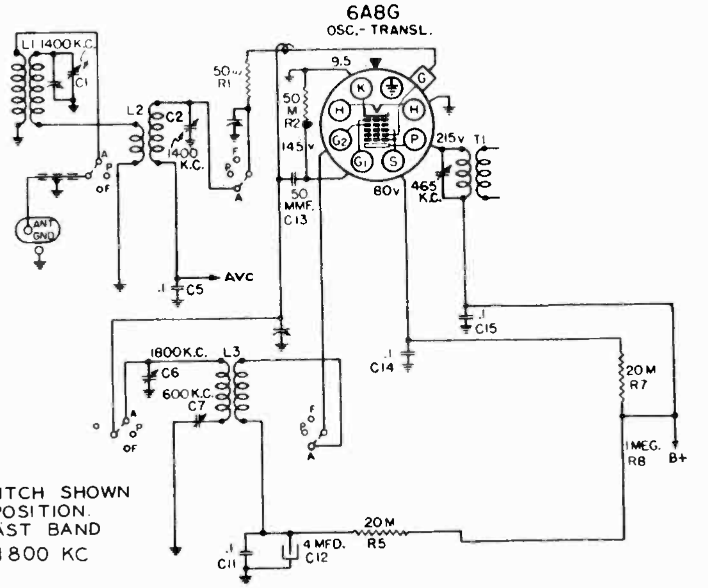
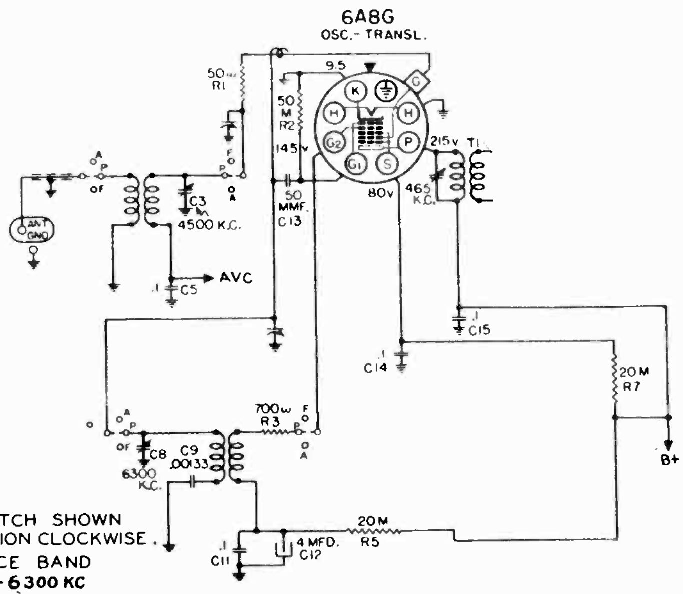
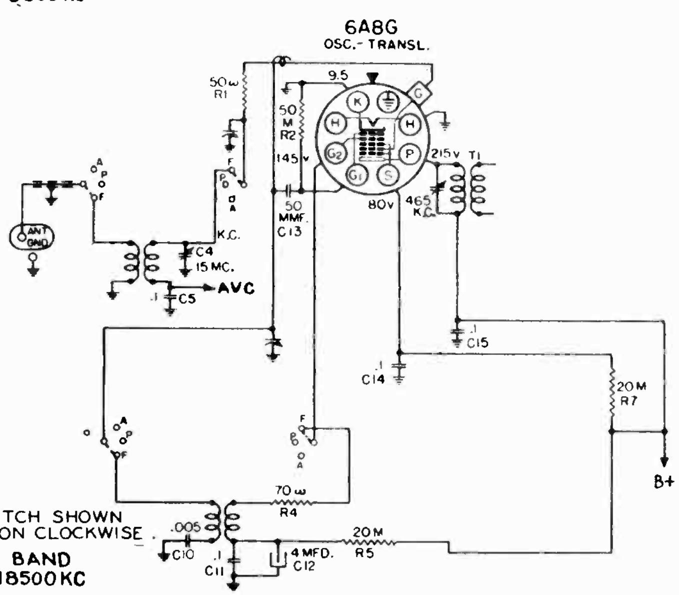


BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
540-1800 KC



BAND-SWITCH SHOWN
AT 2ND POSITION CLOCKWISE.
POLICE BAND
1760-6300 KC



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
FOREIGN BAND
5950 - 18500 KC

SEARS, ROEBUCK & CO.

MODELS 4663,4763
CHASSIS 101.471

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections . . . . Across voice coil leads

Output meter reading to indicate .5 watts output . . . . 1.04 volts

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 Dial Pointer . . . . To be horizontal when variable is fully meshed.

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"A"	550 kc	435 kc	.1 mfd.	6A8G Grid	T2,T1	IF Output IF Input	60
"A"	1800 kc	1800 kc	.0002 mfd.	Ant. Term.	C6	Oscillator	200
"A"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C1,C2	Antenna Oscillator	35
"A"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C7	Padder	35
"P"	Fully open	6.3 mc	400 ohms	Ant. Term.	C8	Oscillator	35
"P"	4.5 mc (rock)	4.5 mc	400 ohms	Ant. Term.	C3	Translator	25
"F"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C4	Translator	30
"F"	6 mc	6 mc	400 ohms	Ant. Term.	-	-	110

IMPORTANT ALIGNMENT NOTES

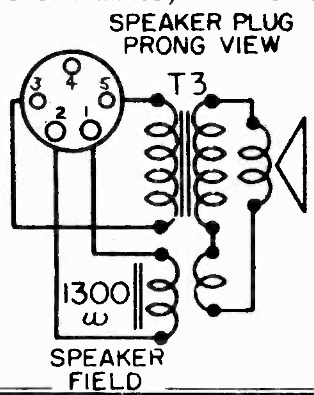
Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

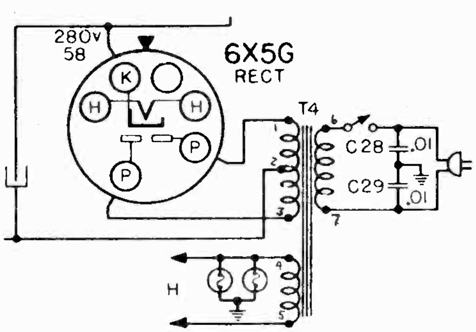
It it advisable to repeat the entire alignment procedure band by band and in the original order to insure greater accuracy.

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.

After the alignment procedure has been completed, tune in a broadcast signal at about 1000 kc. If necessary, shift the dial pointer so that it indicates this frequency.
Values shown under, "Microvolts", are only approximate.

1. BLACK
2. YELLOW
3. BROWN
4. BLANK
5. GREEN





T4 COLOR CODE

1. RED
2. GREEN
3. RED
4. BLACK
5. BLACK
6. BLUE
7. BLUE

MODELS 4663,4763
CHASSIS 101.471

SEARS, ROEBUCK & CO.

ELECTRICAL SPECIFICATIONS

POWER SUPPLY:
All models available . . . . 105-125 volts, 50-60 cycle, 45 watts
All models available . . . . 105-125 volts, 25 cycle, 55 watts

FREQUENCY RANGES:
Band "A" . . . . 540-1800 kc
Band "P" . . . . 1760-6300 kc
Band "F" . . . . 5950-18500 kc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant.-Transl. Trimmer	Padder
Band "A"	1800 kc	1400 kc	600 kc
Band "P"	6300 kc	4500 kc	Fixed
Band "F"	-	15 mc	Fixed

INTERMEDIATE FREQUENCY . . . . 465 kc

POWER OUTPUT:
Type . . . . Beam tube
Undistorted . . . . 2 watts
Maximum . . . . 3.3 watts

OPERATING FEATURE
Fidelity Range . . . 50 - 5000 cycles

LOUD SPEAKER:
Type . . . . Dynamic
Size . . . . 6 inch
App. field coil resistance. .1300 ohms
App. field coil voltage drop . . . 75 volts

GENERAL INFORMATION

THE AVC CIRCUIT:

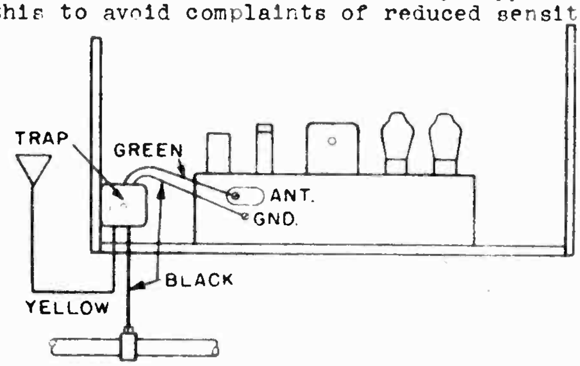
The diode current of the 6B6G tube, flowing through the 500M ohm resistor, R10, creates a voltage drop across it. This voltage is applied to the control grids of the 6A8G and 6K7G tube to provide AVC.

WAVE-TRAP TO ELIMINATE INTERFERENCE FROM SHIP OR AIRPORT TRANSMITTERS:

In locations near ship transmitters or airports or air beacon stations, code interference may be experienced. Part #1013114256 wave-trap is designed to eliminate such interference. It may be ordered directly from the Colonial Radio Corporation, 254 Rano Street, Buffalo, N. Y., using Purchase Order blank, form F5284.

Mount the trap, by means of two wood screws, at any convenient place on the chassis shelf or cabinet where it will be near the antenna terminal of the receiver. Connect the yellow lead of the wave-trap to the antenna downlead. Connect the green lead of the wave-trap to the antenna terminal of the receiver. Cut off any excess length of green wire from the trap so that the green lead from the wave-trap to the chassis is as short as possible. The yellow lead from the wave-trap should be run so that it is as far as possible from the green lead. Connect one of the black leads from the wave-trap to the ground terminal of the receiver. Connect the other wave-trap black lead to the ground used for the installation.

The trap is pre-tuned to the IF frequency so that normally no further adjustment is necessary. However, should interference still be experienced, tune the receiver between approximately 550 and 300 kc. Then adjust the wave-trap, by means of the trimmer screw at the bottom of the container, until the interference is eliminated. Addition of the trap will reduce the sensitivity of the receiver around 600 kc by approximately 50%. The customer should be forewarned of this to avoid complaints of reduced sensitivity.



INSTALLATION OF A PHONOGRAPH PICK-UP JACK OR AN EARPHONE JACK:

A kit, part #1016117189, can be ordered from Colonial Radio Corporation, 254 Rano Street, Buffalo, N. Y. 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. In addition, changes must be made in the wiring to the speaker socket and the electrolytic condenser. As the Schematic Section shows, these wiring changes and the connections to the jack are as follows:

SEARS, ROEBUCK & CO.

MODELS 4663,4763
CHASSIS 101-471

Disconnect the jumper between prongs 1 and 5 of the speaker socket.

Disconnect the jumper between prong #2 of the speaker socket and the anode (center terminal) of the wet electrolytic.

There is a lead running from the 40 ohm resistor, mounted on the terminal board near the power transformer, to the cathode (can terminal) of the wet electrolytic. Disconnect this lead from the electrolytic and connect it to terminal #2 of the speaker socket.

Run a lead from terminal #1 of the speaker socket to the cathode (can terminal) of the electrolytic.

Run a lead from terminal #1 of the jack to the cathode prong of 6B6G tube.

Connect the .05 condenser from terminal #2 of the jack to the junction of R10 and C19. This junction is at the end lug of the terminal board mounted under the IF output transformer.

Connect the 500M ohm resistor from terminal #3 of the jack to the end of R14 that is connected to the blank prong of the 6B6G socket.

Connect prong #4 of the jack to 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.

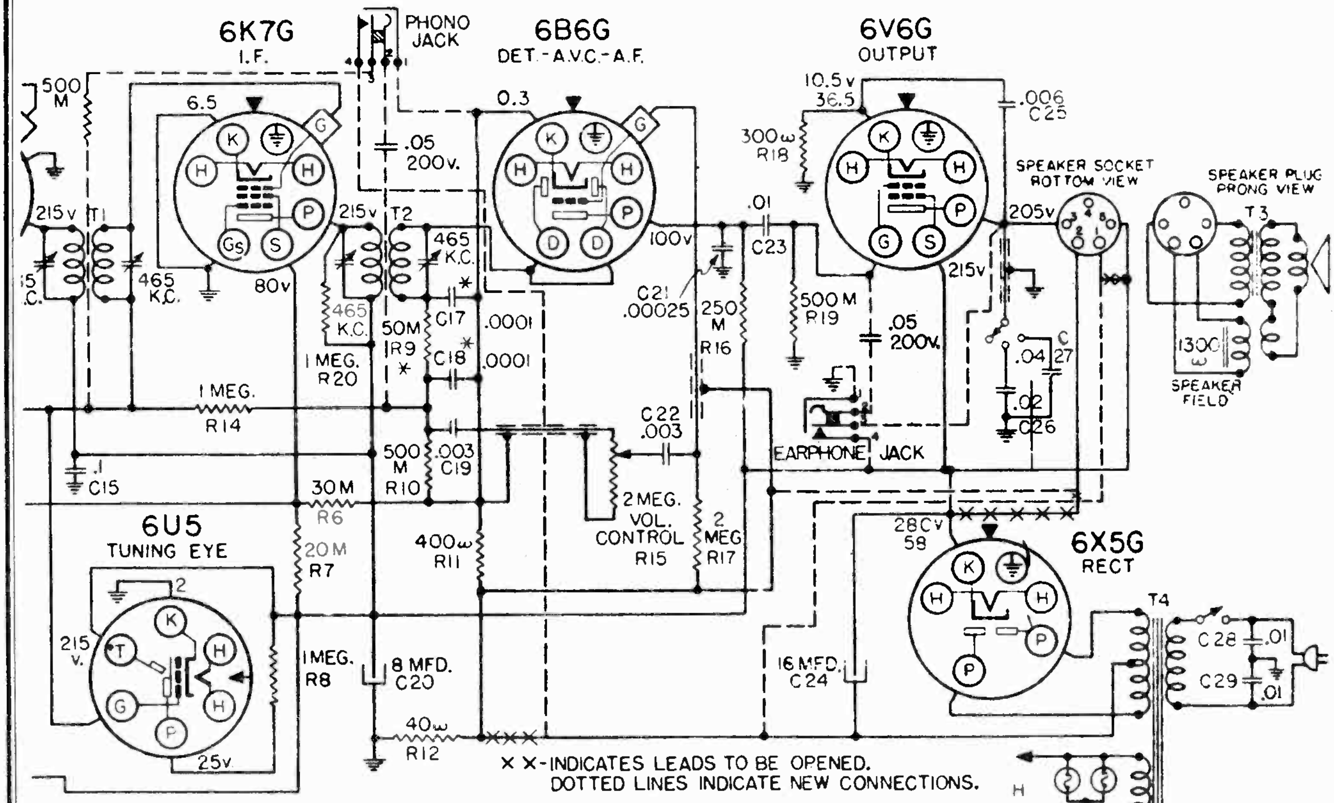
Connect the .05 condenser from terminal #2 of the jack to the grid prong of the 6V6G output tube.

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.

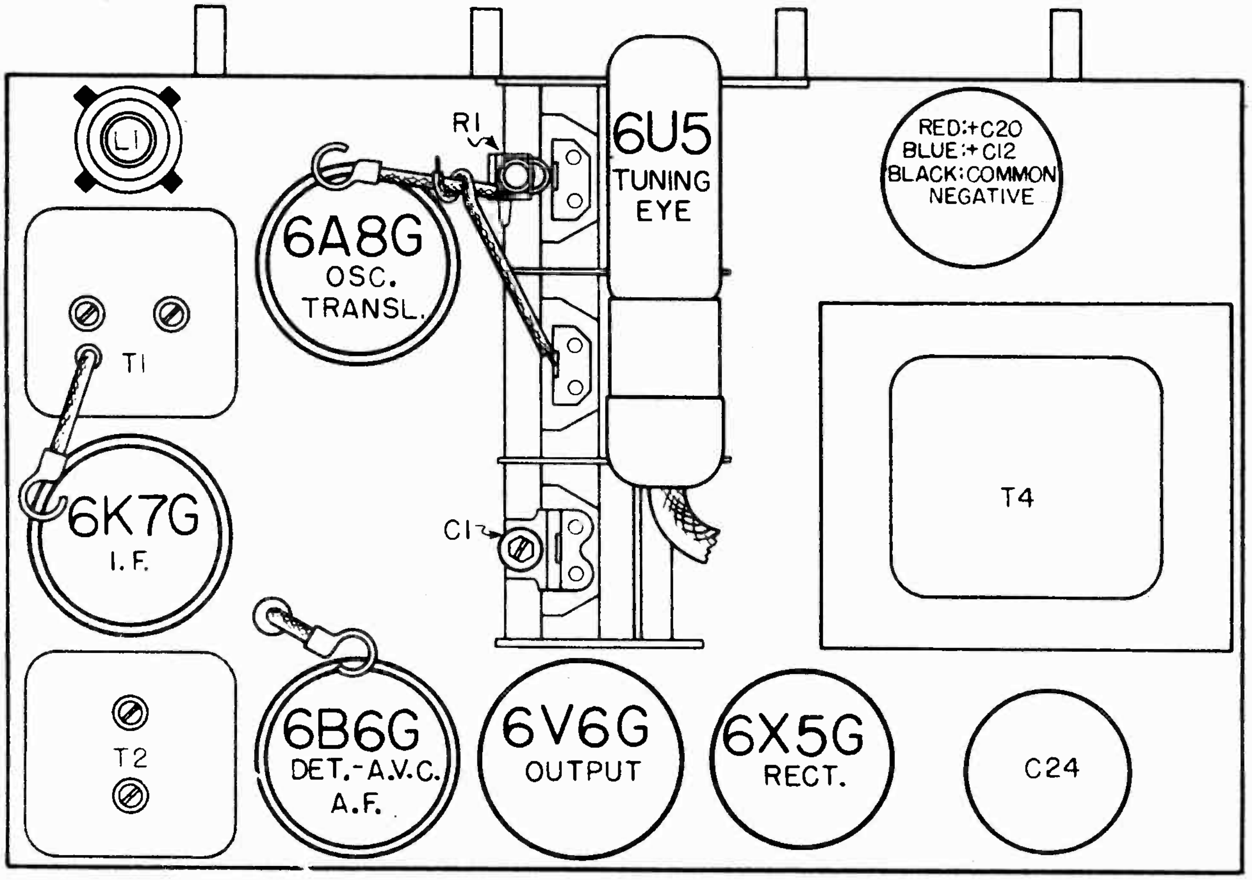
This is the only wiring necessary. The wiring changes mentioned above for connection of the phonograph pick-up jack are not to be done if only an earphone jack is used.

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.

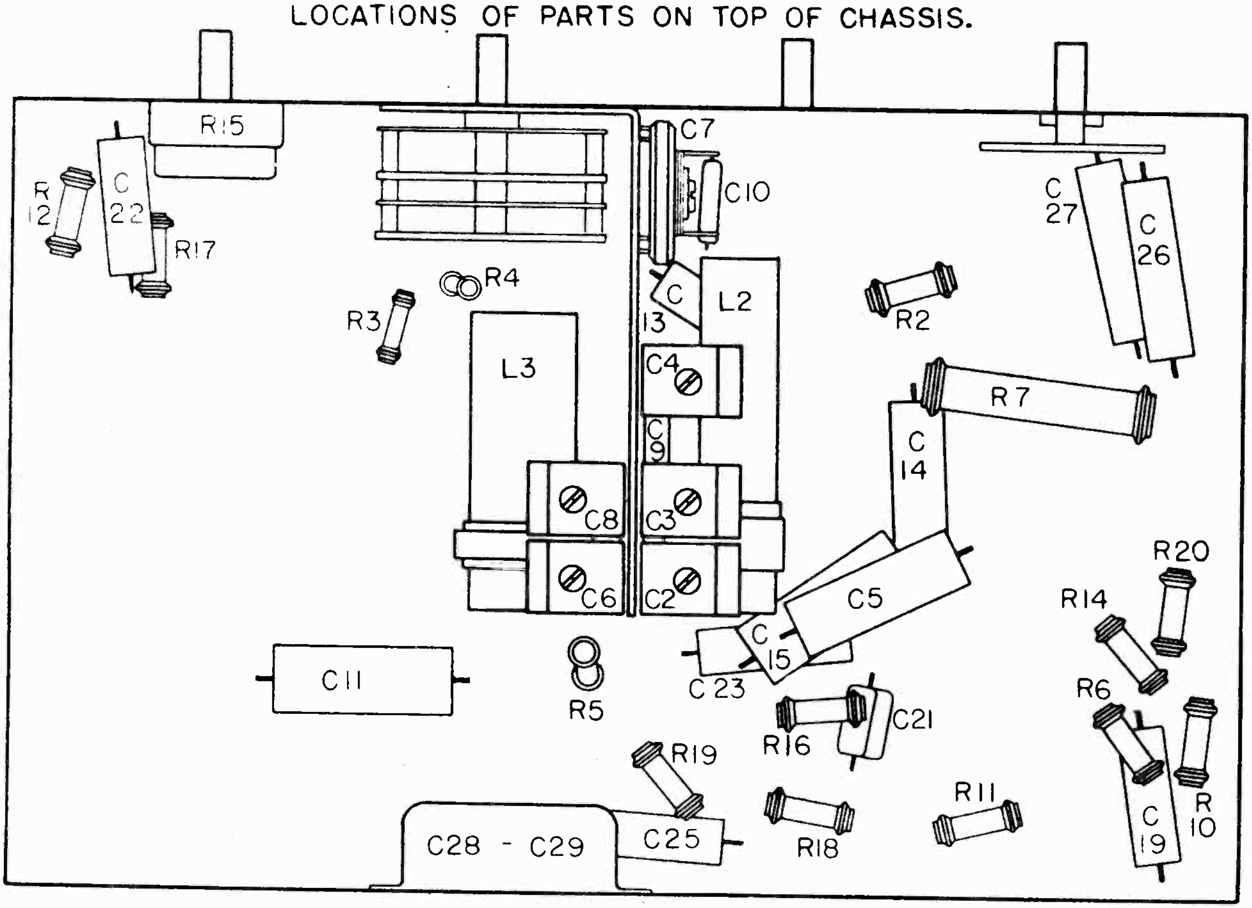


MODELS 4663,4763
CHASSIS 101.471

SEARS, ROEBUCK & CO.



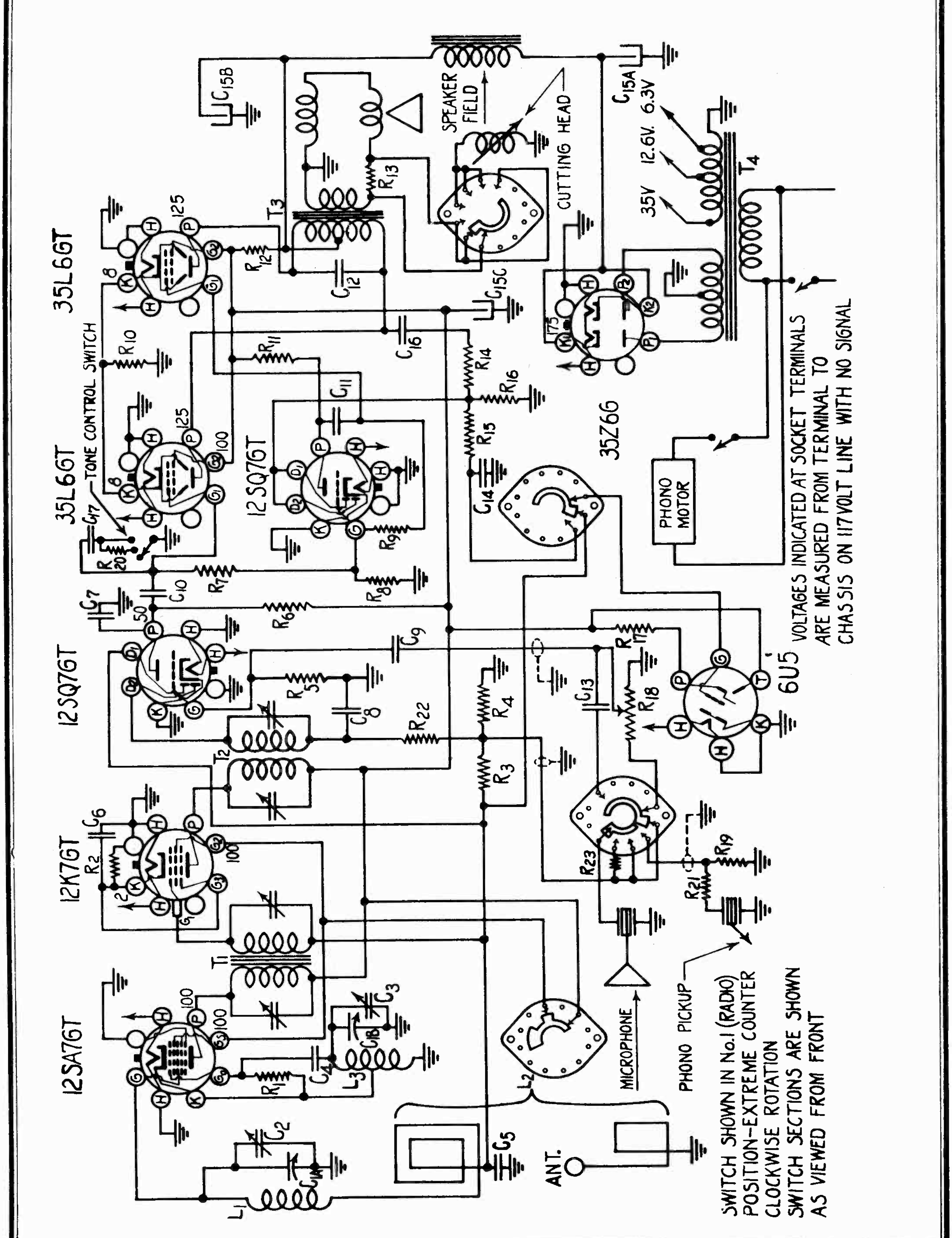
LOCATIONS OF PARTS ON TOP OF CHASSIS.



LOCATIONS OF PARTS UNDER CHASSIS

SEARS, ROEBUCK & CO.

MODELS 5372, 5372-B
CHASSIS 109.371, 109.371-1



RECORD CHANGER: International Detrola Model 550, RCD.CH. 15-1

MODELS 5372, 5372-B

CHASSIS 109.371, 109.371-1

SEARS, ROEBUCK & CO.

CIRCUIT CHANGE IN 109.371 RADIO RECEIVER

The 109.371-1 receiver is identical with 109.371 with the following changes:

The value of C-13 is changed to .02 Mfd. 400V.
The value of C-9 is changed to .001 Mfd. 600V.

The connection from condenser C-13 is changed from the volume control side of condenser C-9 to the 12SQ7GT grid side of C-9.

ELECTRICAL SPECIFICATIONS
CHASSIS 109.371

TUBES AND FUNCTIONS

12SA7GT .... Oscillator Translator
12K7GT .... IF Amplifier
12SQ7GT .... Detector-AVC-Audio
12SQ7GT .... Phase Inverter
2 - 35L6GT .... Power Output
35Z6G .... Rectifier
6U5 .... Tuning/Volume Indicator

POWER SUPPLY .... 105-125 Volts AC
50 and 60 cycle models available.

POWER OUTPUT
Type .... Push Pull Beam Tubes
Undistorted .... 2 Watts
Maximum .... 3.5 Watts

SPEAKER
Type .... Dynamic
Size .... 6½ Inch
Field Resistance .... 500 Ohms

THE MASTER CONTROL SWITCH

This switch has six positions. The recording positions are described in detail on the next page.

Position No. 1 .... Radio
Position No. 2 .... Phono
Position No. 3 .... Record Radio Programs
Position No. 4 .... Record Radio Program & with Microphone at the same time
Position No. 5 .... Record with Microphone Only
Position No. 6 .... Public Address

THE TUNING EYE

When the Master Control Switch is in the "Radio" position the eye acts in the normal manner as a tuning indicator.

When the Master Control Switch is in any position except No. 1 the eye is connected to the output of the receiver so that it indicates volume. For recording, the volume control should be adjusted so that the eye just closes. In recording a radio program it is very hard to predict just how loud the loudest part of the program will be, therefore, it is best to set the volume control so that the eye is slightly open.

THE LOOP ANTENNA

The loop antenna is somewhat directional in its reception characteristics, therefore turning the receiver to a particular position will often improve reception or reduce interference.

ANTENNA AND GROUND CONNECTIONS

If the receiver is used in a building which has metal lath or a large amount of steel in its construction, or in a location where reception conditions are poor, an outdoor antenna and a ground connection may be necessary.

Two terminals are provided on the back of the cabinet for connection of antenna and ground.

DIAL LAMPS

The two dial lamps are connected in series, therefore if one burns out the other will not light. Mazda #47 dial lamps are used.

PHONO OPERATION

Turning the Master Control Switch to the No. 2 or Phono position connects the phono pickup to the audio amplifier of the receiver and disconnects the radio. The Volume control acts for phono the same as for radio.

RECORDING

The recording mechanism will cut records up to 10 inches in diameter. Recordings of excellent quality can be made if the instructions in the following paragraphs are very carefully followed.

INSERTING THE RECORDING NEEDLE IN THE HEAD OF THE RECORDER ARM

Notice that the shank of the recording needle is ground flat on one side. Loosen the screw in the end of the Recorder Arm. Insert the needle into the hole in the under side so that the flat side is towards the front of the cabinet. Tighten the retaining screw so that the needle is held firmly. Check to make sure that the recording needle is tight each time a recording is made.

TO RECORD A RADIO PROGRAM

Place a blank record on the turntable making sure that the small pin on the turntable projects through the hole provided for it in the record. This is necessary to prevent the record from slipping and ruining the recording.

SEARS, ROEBUCK & CO. MODELS 5372, 5372-B
CHASSIS 109.371, 109.371-1

Turn the Master Control Switch to the No. 1 (Radio) position. Tune in the program you desire to record. Observe the tuning eye carefully and be sure that the station is tuned in perfectly.
Turn the Master Control Switch to the "Record Radio" (No. 3) position. Notice that the shadow on the tuning eye screen now varies in width with the volume of sound.
Adjust the Volume Control so that the eye just closes.
Turn the phono motor ON.
Raise the Recorder Arm and move it so that the needle is just inside the edge of the record. Lower the arm carefully on the record.
When the recording arm is lowered on the record an arm on the under side of the recorder unit engages the lead screw which moves the arm across the record. The arm must be raised about three inches to disengage the lead screw so that the arm can be moved.
As the recording is being made, a small shaving is cut out of the record by the recording needle. This piles up in the center of the record.
After the record has been cut, raise the recorder arm, swing it outwardly and place it on the rest. Stop the turntable and remove the shaving which has been cut out of the record.
The record may now be played in the normal manner.

TO RECORD WITH THE MICROPHONE

Plug the Microphone into the socket provided on the rear of the cabinet.
Turn the Master Control Switch to the No. 5 position.
Speak into the microphone and adjust the volume control until the eye just closes. Whatever sound is picked up by the microphone will be recorded on the record. Keep the microphone some distance away from the receiver, preferably to one side so that it does not pick up the sound from the speaker. Keep the microphone at least six inches from your mouth and try to keep the same voice level as used initially in setting the volume.
Place the recording arm on the record as described above.

TO RECORD WITH MICROPHONE AND RADIO AT THE SAME TIME

Tune in the program you desire to record exactly as described under "Recording Radio Programs".
Turn the Master Control Switch to the No. 4 position.
Speak into the microphone and adjust the volume control so that the combined volume of the radio and the microphone just closes the eye as described previously. To make the voice predominate, retard the volume setting slightly to reduce the radio volume, and speak a little closer to the microphone.
Place the recorder arm on the record and proceed with the recording.

PUBLIC ADDRESS

The No. 6 position of the Master Control Switch connects the circuits so that the microphone, and the audio amplifier and speaker of the receiver may be used as a small public address system. Keep the microphone as far as possible from the speaker so that the sound from the speaker will not reach the microphone, causing a "Howl" or whistle.

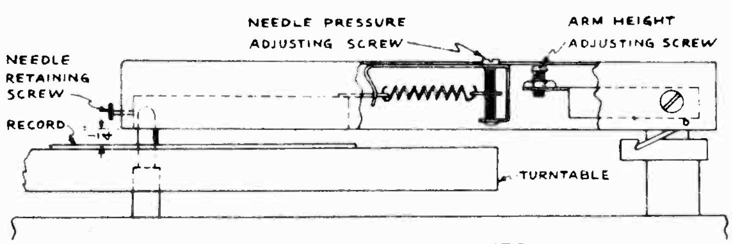
GENERAL INFORMATION

In the recording positions (Positions 3, 4 and 5 of the Master Control Switch) the volume from the speaker is reduced. This is done automatically by the switch for three reasons, some of the power from the output tune is needed for operating the recording head, the volume level necessary for recording is too high for the average size room, and to prevent the sound from the speaker from reaching the microphone.

If the recording needle is not very sharp, the quality of the recording will be poor. A needle which has become dull through use or which has been otherwise damaged should be replaced.
The Master Control Switch should always be turned to the No. 1 (Radio) position when listening to radio programs.

RECORDING ARM ADJUSTMENTS

The bottom of the recording arm should be exactly 1/4 inch from the surface of the record. This should be measured beside the needle retaining screw on the end of the arm. The screw for making this adjustment can be found when the arm is raised, on a small platform near the hinge. Turning the adjusting screw to the left raises the arm, turning to the right lowers it. In making an adjustment turn the screw only a small fraction of a turn at a time.
Make a cut of at least ten or fifteen turns to see whether or not the needle is exerting the correct pressure on the record. This is correct when the groove cut by the needle is of approximately the same width as the space between grooves. On top of the cutting arms is a flat head screw. Turning this screw to the right increases the depth of cut, to the left decreases it. This adjustment is quite critical and the screw should be turned not more than 1/4 turn at a time.



RECORDING ARM ADJUSTMENTS

MODELS 5372, 5372-B
CHASSIS 109.371, 109.371-1

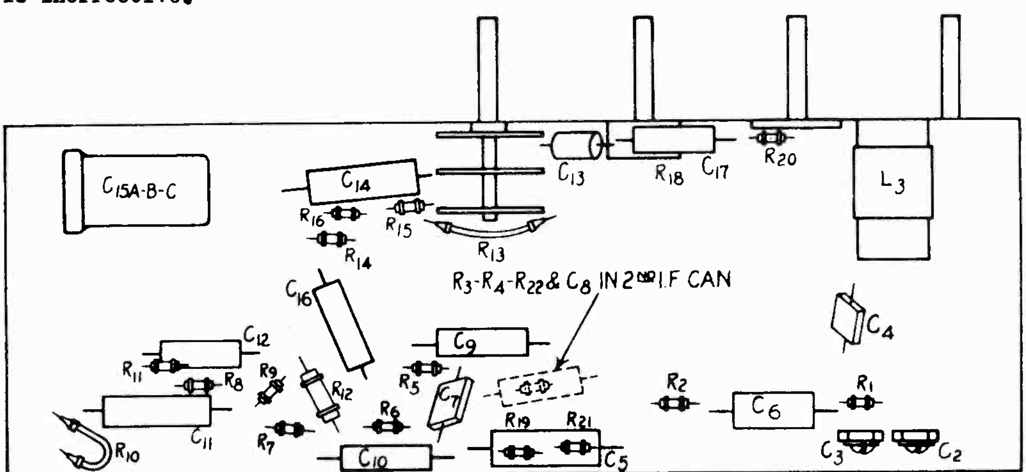
SEARS, ROEBUCK & CO.

ALIGNMENT PROCEDURE

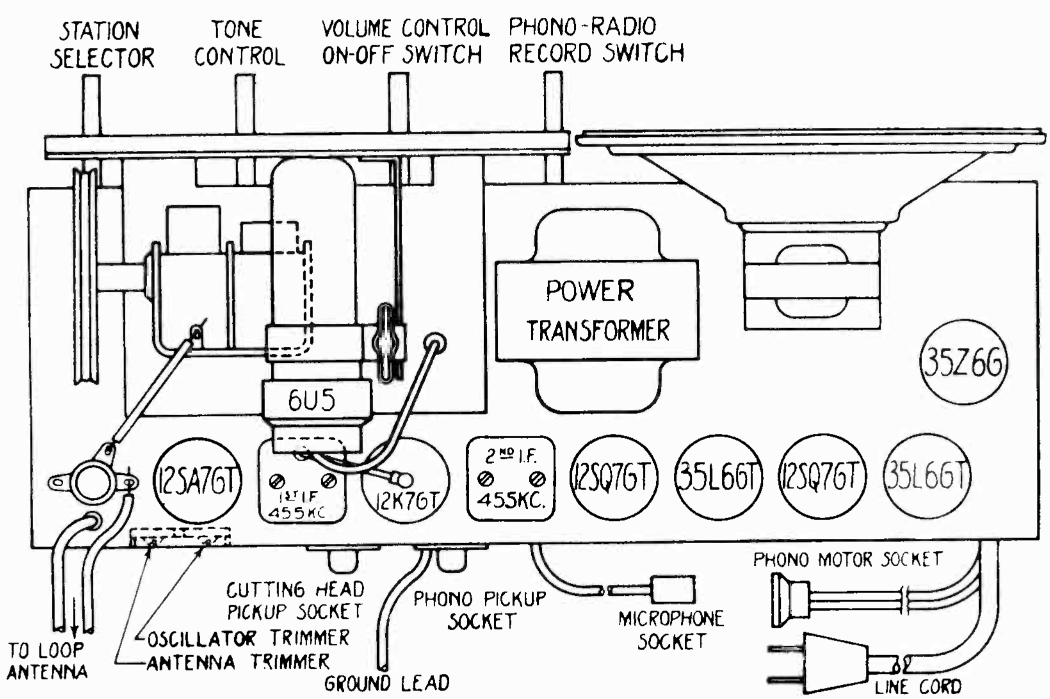
Output Meter connection .... Across speaker voice coil
Connection of generator lead .... See chart below
Connection of generator ground lead .... Tomchassis
Dummy antenna value .... See chart below
Position of volume control .... Fully clockwise
Position of Master Control Switch .... "Radio" (Position No.1)

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (In order shown)
Open (Minimum capacity	455 Kc.	.1 mfd.	Antenna section of variable	T2, T1.
Minimum capacity	1720 Kc.	50 mmf.	Antenna terminal	Oscillator trimmer
Tune in Sig. from generator	1400 Kc.	50 mmf.	Antenna terminal	Antenna trimmer.

The alignment procedure should be repeated stage by stage in the original order for greatest accuracy. Always keep the output from the generator at the lowest possible level so that the AVC action of the receiver is ineffective.



LOCATION OF PARTS UNDER
CHASSIS 109.371



SEARS, ROEBUCK & CO.

MODELS 5372, 5372-B
CHASSIS 109.371, 109.371-1

PARTS LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION CHASSIS PARTS
	109544417	Button, snap (Dial Mounting)
	109548931	Cable, Tuning Tube
	109542163	Cable, Drive
	109543227	Cap, Grid
R18	109248910	Control, Volume & Switch (1 meg.)
	109551732	Cord, Line
	109546424	Clamp, Linecord
	109544314	Clamp, Tapped) For Tuning Tube
	109544315	Clamp, Plain)
L3	109288422	Coil, Oscillator
L1	109288423	Coil, Tracking
C1A & B	109168911	Condenser, Variable (with pulley)
C2 & 3	109178504	Condenser, Dual Trimmer
C15A, B & C	109208425	Condenser, Electrolytic (20 - 250)-(20 - 150)(20 150)
C4		Condenser, 100 Mmf, Mica
C5, 14		Condenser, .1 Mfd. 200 v.
C6		Condenser, .05 Mfd. 200 v.
C7		Condenser, 250 Mmf, Mica
C8		Condenser, 100 Mmf. Mica
C9		Condenser, .002 Mfd. 600 v.
C10, 16		Condenser, .01 Mfd. 400 v.
C11		Condenser, .05 Mfd. 400 v.
C12, 13		Condenser, .001 - 600 v.
C17		Condenser, .005 Mfd. 600 v.
	109547209	Grommet, Tuner Assembly MTG
	109408913	Dial Chart
	109548941	Microphone Socket Assembly
	109456244	Pulley, Idler
	109415026	Pointer
	6158	Pilot Lite
	109541207	Retainer, "C" Washer (Holds Tuning Shaft)
R1		Resistor, 20M, 1/3 Watt
R2		Resistor, 200 Ohm, 1/3 Watt
R3, 4, 14, 16		Resistor, 1 Meg, 1/3 Watt
R5		Resistor, 10 Meg, 1/3 Watt
R6, 7, 8, 9, 11		Resistor, 200M, 1/3 Watt
R10		Resistor, 120 Ohm 1/2 Watt
R12		Resistor, 1000 Ohm, 1 Watt
R13		Resistor, 35 Ohm, 1/2 Watt
R15		Resistor, 2 Meg, 1/3 Watt
R17		Resistor, 1 Meg (in tuning tube socket)
R19, 20, 21, 22		Resistor, 50M, 1/3 Watt
R23		Resistor, 4 Meg, 1/3 Watt
	109188440	Socket, Dual Dial Lamp
	109548648	Spring, Drive Cable
	109548427	Shaft, Drive
	109388428	Switch, Tone Control
	109388932	Switch, Master Control
	109588919	Speaker, 6-1/2" Dynamic
T4	109108918	Transformer, Power, 60 cycle
T4	109108933	Transformer, Power, 50 cycle
T3	1091389191	Transformer, Output
T1	109338434	Transformer, 1st IF
T2	109358435	Transformer, 2nd IF

CABINET ASSEMBLY PARTS

109608920	Back for Cabinet
109598921	Book, Instruction
109548462	Bushing, rubber (recorder unit MTG)
109628922	Carton, shipping
109608923	Cabinet (Price on application)
109448924	Escutcheon
109392750	Knob, Motor Switch
109398487	Knob, Tuning
109398488	Knob, Tone
109398489	Knob, Volume
109398925	Knob, Master Control Switch
109288491	Loop Antenna Assembly
109448928	Plate, instruction
109448477	Plate, Motor-on-off
109548287	Plug, 1 Prong (for cutter leads)
109548288	Plug, 1 Prong (for phono pickup leads)
109548493	Plug, 2 Prong (for Motor leads)
109388454	Switch, Motor
109542997	Washer, Rubber (for recorder MTG)

RECORDER UNIT PARTS

1095486943	Hex nut for pivot post
1095486947	Motor mounting screw
1095486948	Adjusting screw (Follower Arm)
10954869413	Turntable shaft locking screw
10954869417	Recorder Arm Rest
10954869418	Follower arm complete
10963869424	Pickup Cartridge
10963869426	Pickup Arm complete
10954869428	Cutter head tension spring
10964869484	Magnetic Cutter Head with leads
10963869434	Recorder arm complete
10954869438	Pivot post return spring
10964869450	10" one piece turn table
10964869456	Turntable drive disc stud clip
10964869458	Lead screw and pinion assembly
10964869463	Turntable drive disc tension spring
10964869464	Turntable shaft
10964869466	Turntable drive disc
10964869467	Turntable drive disc mounting bracket assembly
109547799	Connector - Microphone
109541297	Plug - Microphone
109548668	Bracket - Mic. Connector
109546909	Spring - Mic. Connector
109546908	Washer - Mic. Connector

The following parts are for models with ONE PIECE TURNTABLE ONLY

10964869469	Retractable pin spring
10964869470	Retractable pin
10964869472	Rotor shaft pulley
10964869474	Rotor shaft pulley set screw
10964869481	Motor 60 cycle
10964869482	Motor 50 cycle

MODELS 6015, 6016
CHASSIS 132.820

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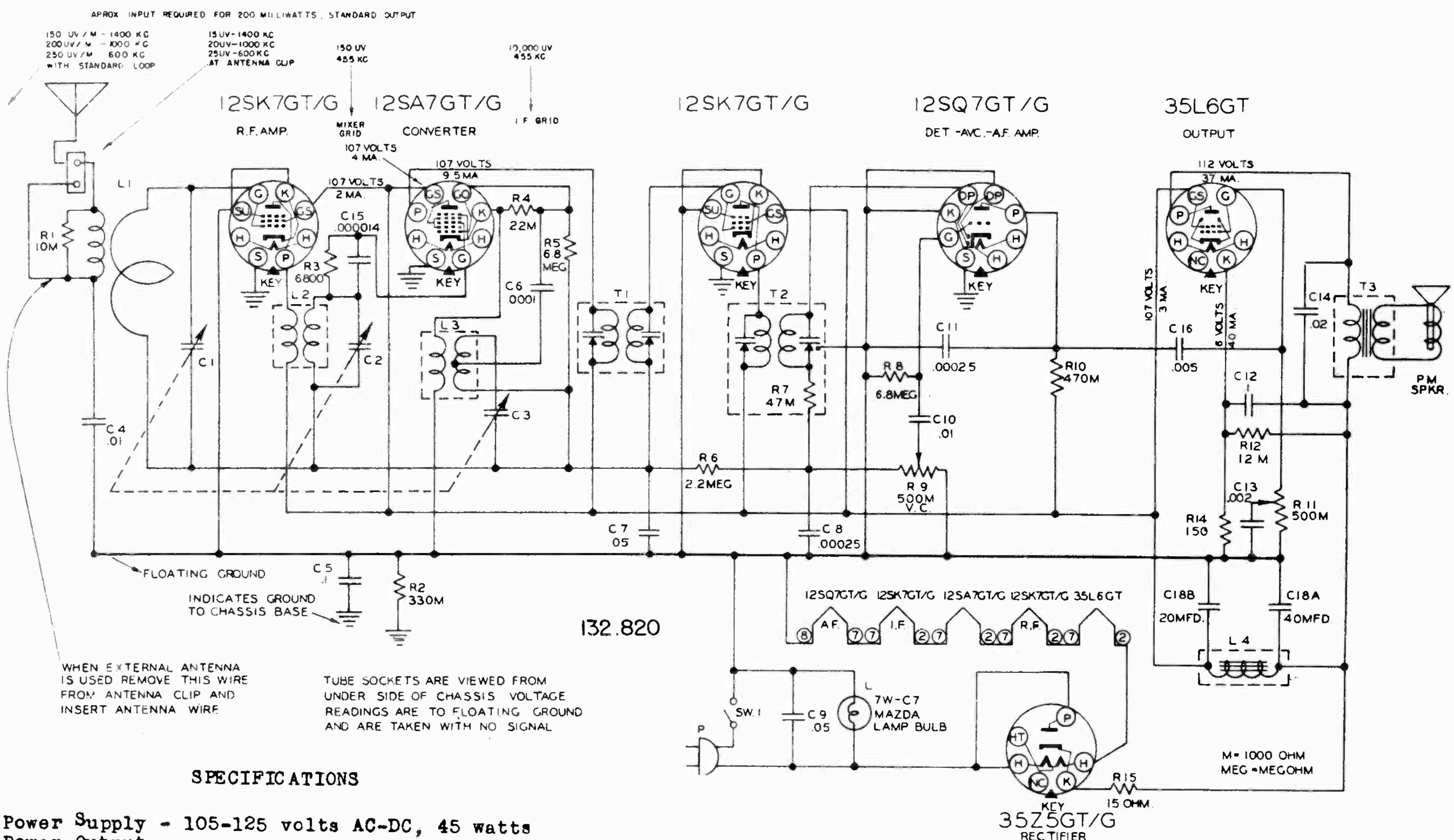


SPECIFICATIONS

Power Supply - 105-125 volts AC-DC, 45 watts
Power Output
  Undistorted .8 watts, maximum - 2.5 watts

Tuning Range Broadcast Band 540-1600 Kc
Speaker
  Voice Coil Impedance 3.2 Ohms

Difference between 6015 and 6016:

Model 6015 has a walnut cabinet. Model 6016 has an ivory cabinet.

SEARS ROEBUCK & CO.

MODELS 6015, 6016
CHASSIS 132.820

ALIGNMENT PROCEDURE

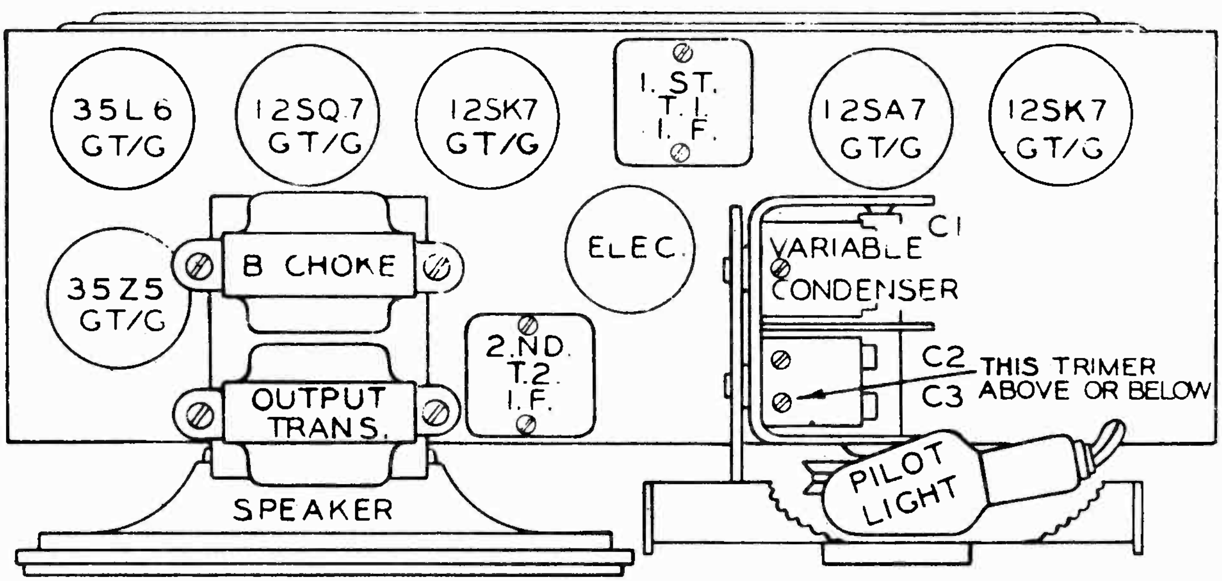
PRELIMINARY:

Output meter connection .... Across Speaker Voice Coil
Output meter reading to indicate 200 mw (Standard Output).................. .8 Volts
Dummy antenna value used in series with generator output .... See Chart Below
Connection of generator output lead .... See Chart Below
Connection of generator ground lead .... Floating Ground
Generator modulation .... 30% 400 Cycles
Position of volume control .... Fully Clockwise
Position of tone control .... Treble
Position of dial pointer with variable fully closed .... Horizontal

POSITION OF VARIABLE	FREQUENCY OF GENERATOR	DUMMY ANTENNA	GENERATOR OUTPUT CONNECTION	TRIMMERS ADJUSTED IN ORDER SHOWN FOR MAX. OUTPUT	FUNCTION OF TRIMMER
Open	455	.05 mfd.	12SA7 Grid (or Stator of C-2)	Top of 2nd & 1st IF Trans.	IF
1400	1400	.0002 mfd.	Antenna Clip (with black wire removed)	C-3; C-2; C-1 Trimmers located on Variable Condenser	Oscillator Mixer RF

IMPORTANT ALIGNMENT NOTES:

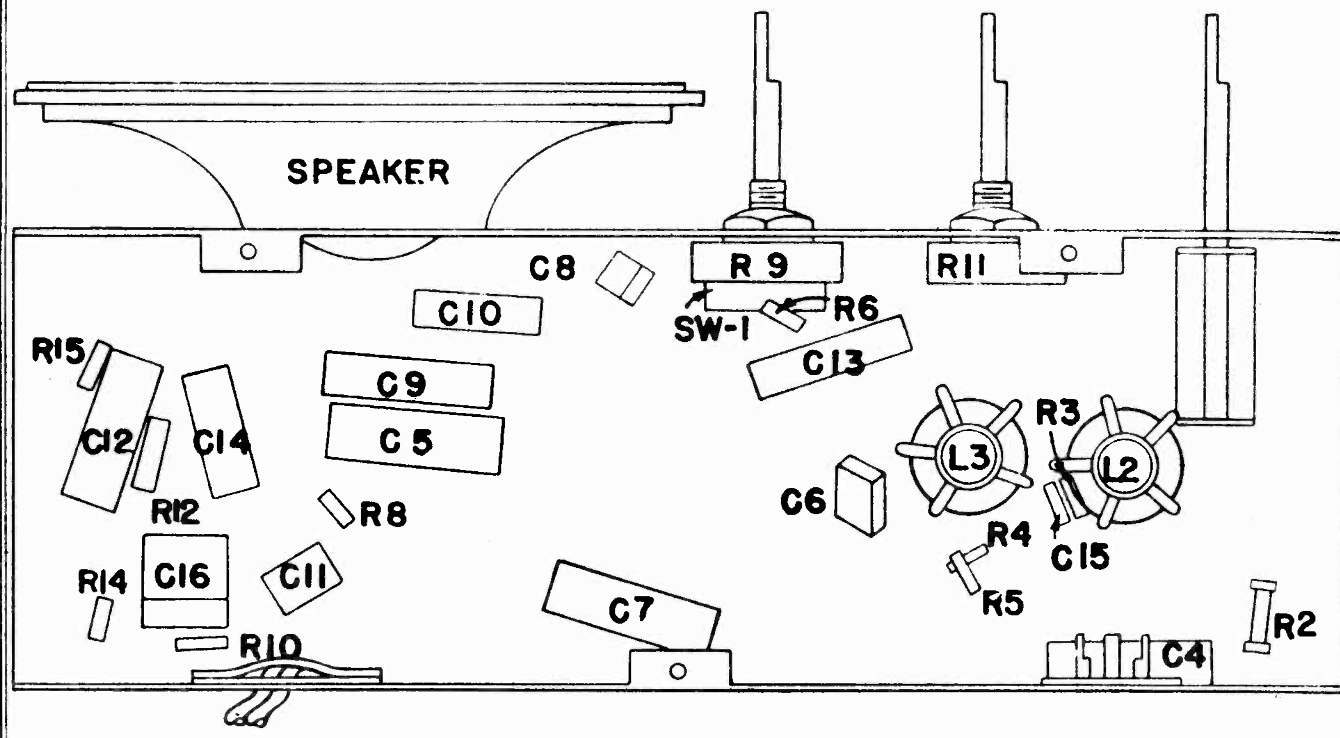
1. Place set loop in the same position and at the same distance with respect to the back of the chassis as it would be when the set is mounted in the cabinet, during alignment of the RF stage.
2. If a standard test loop is used with the Signal Generator for alignment of the receiver, the black wire will be left in the antenna clip.
3. The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the A. V. C. action of the receiver ineffective.



LOCATION OF PARTS ON TOP OF CHASSIS

MODELS 6015, 6016
CHASSIS 132.820

SEARS, ROEBUCK & CO.



LOCATION OF PARTS UNDER CHASSIS

SERVICE NOTE:

The AC hum can often be greatly reduced on this chassis by replacing C12 with an .03 mfd. 400V condenser. Sometimes the hum can be further reduced by replacing R12 with a 15,000 ohm 1 watt resistor.

PARTS LIST

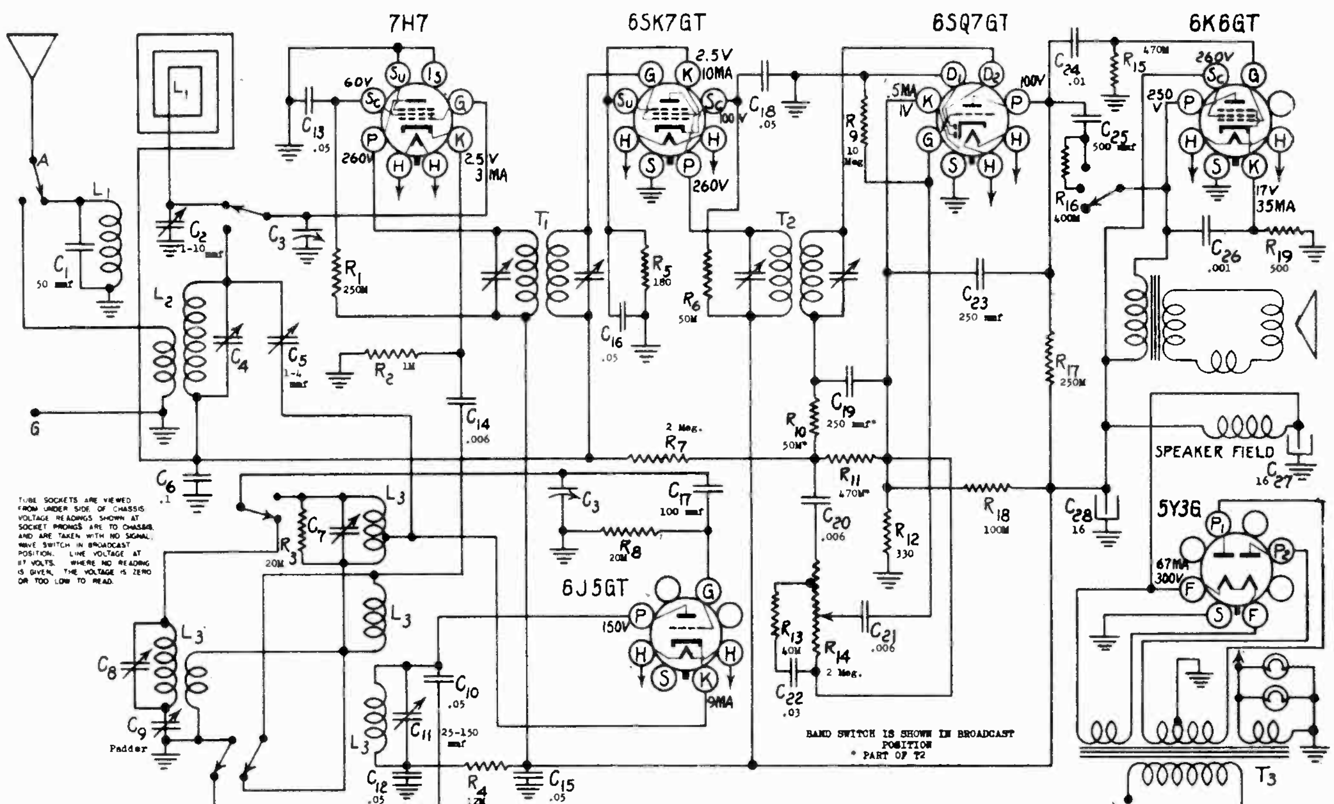
Schematic Location	Part No.	Description
R1		Resistor, 10,000 ohm, 1/4 watt
R2		Resistor, 330,000 ohm, 1/4 watt
R3		Resistor, 6800 ohm, 1/4 watt
R4		Resistor, 22,000 ohm, 1/4 watt
R5-R8		Resistor, 6.8 megohm, 1/4 watt
R6		Resistor, 2.2 megohm, 1/4 watt
R7		Resistor, 47,000 ohm, 1/4 watt
R9	N19448	Resistor, 500,000 ohm, Volume Control & Sw
R10		Resistor, 470,000 ohm, 1/4 watt
R11	N19966	Resistor, 500,000 ohm Tone Control
R12		Resistor, 12,000 ohm, 1 watt
R14		Resistor, 150 ohm, 1/4 watt
R15		Resistor, 15 ohm, 1/4 watt
C1, 2, 3	N18564	Condenser, Variable
C4, C10		Condenser, .01 mfd. 400 volt
C5, C12		Condenser, .1 mfd. 400 volt
C6		Condenser, .0001 mfd. 500 volt Mica
C7, C9		Condenser, .05 mfd. 400 volt
C8, C11		Condenser, .00025 mfd. 500 volt Mica
C13		Condenser, .002 mfd. 600 volt
C14		Condenser, .02 mfd. 400 volt
C15		Condenser, .000014 mfd. 500 volt Mica
C16		Condenser, .005 mfd. 600 volt
C18A-18B	N19239	Condenser, Electrolytic, 20-40 mfd. 150 v
L1	N19666	Antenna Loop Assembly
L2	N19860	Coil, R. F.
L3	N18580	Coil, Oscillator
L4	N18583	Choke, Iron Core "B"

Schematic Location	Part No.	Description
T1	N21009	Transformer, First I. F.
T2	N18578	Transformer, 2nd I. F.
T3	N18582	Transformer, Output
Spkr.	N18550	Speaker, 5-1/4" P.M.
P	N20064	Line Cord with Plug
L		Dial Light, Mazda 7W, C7-117 volt
	N21137	Cabinet Assembly, Walnut (Cat. #6015)
	N21138	Cabinet Assembly, Ivory (Cat. #6016)
	N19518	Handle Assembly, Walnut (Cat. #6015)
	N19519	Handle Assembly, Ivory (Cat. #6016)
	N19463	Knob, Volume, Walnut (Cat. #6015)
	N19466	Knob, Tone, Walnut (Cat. #6015)
	N19469	Knob, Tuning, Walnut (Cat. #6015)
	N19462	Knob, Volume, Ivory (Cat. #6016)
	N19465	Knob, Tone, Ivory (Cat. #6016)
	N19468	Knob, Tuning, Ivory (Cat. #6016)
	N19225	Scale, Dial
	N19226	Pointer, Dial
	N18272	Crystal, Dial
	N19436	Shaft, Tuning
	N19132	Cord, Dial Drive
	N19234	Socket, Antenna
	N19134	Socket Assembly, Dial Light with Leads
	N19295	Spring, Dial Cord
	N19410	Retainer, Antenna Loop
	N17311	Baffle Board, Speaker
	N19768	Baffle, Rear Cabinet
	N19454	Instruction Sheet

SEARS, ROEBUCK & CO.

MODEL 7046
CHASSIS 141.416

WIRING DIAGRAM



TUBES AND FUNCTIONS:

6J5GT	Oscillator
7H7	Translator
6SK7GT	IF
6SQ7GT	Detector-AVC-Audio
6K6GT	Output
5Y3G	Rectifier

ALIGNMENT FREQUENCIES:

Oscillator Trimmer	Antenna-Transl. Trimmer	Padder
1610 kc	1400 kc	600 kc
18.2 mc	15 mc	6 mc

POWER SUPPLY:
All models available . . . 105-125 volts, 50-60 cycles; 70 watts
All models available . . . 105-125 volts, 25-60 cycles; 75 watts

INTERMEDIATE FREQUENCY . . . 455 kc

POWER OUTPUT:
Type . . . Single Pentode
Undistorted . . . 2.5 watts
Maximum . . . 4.0 watts

FREQUENCY RANGES:
Band "A" . . . 540-1600 kc
Band "B" . . . 6.0-18.0 mc

LOUD SPEAKER:
Type . . . Dynamic
Size . . . 7.5 inch
Approx. field coil res. . . . 750 ohms
Approx. field coil voltage drop . . 40 V.

MODEL 7046
CHASSIS 141.416

SEARS, ROEBUCK & CO.

GENERAL INFORMATION & SERVICE HINTS

The RADIONET Antenna System equipped with the receiver is in use for Broadcast band operation only. An external antenna must be used for short-wave operation.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . .Across loudspeaker voice coil
Output meter reading to indicate 500 milliwatts . . . . 1.1 volts
Generator ground lead connection . . . . .To 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 . . . . .HI
Position of Dial Pointer with variable fully closed. . . . . At mark to left of 550 kc calibration mark.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	ANT. COUPLED APPROXIMATE MICROVOLTS
"BC"	Closed	455 kc	.1 mfd.	7H7 Grid	T2, T1	IF	100
"BC"	Open	1610 kc	.00005 mfd.	Ant. Term.	C8	Oscillator	--
"BC"	1400 kc	1400 kc	.00005 mfd.	Ant. Term.	C2	Translator	80**
"BC"	600 kc(rock)	600 kc	.00005 mfd.	Ant. Term.	C9	Padder	70***
"SW"	Open	18.2 mc	400 ohms	Ant. Term.	C7*	Oscillator	--
"SW"	15 mc(rock)	15 mc	400 ohms	Ant. Term.	C4	Translator	70
"SW"	6 mc(rock)	6 mc	400 ohms	Ant. Term.	C11	Padder	100

IMPORTANT ALIGNMENT NOTES

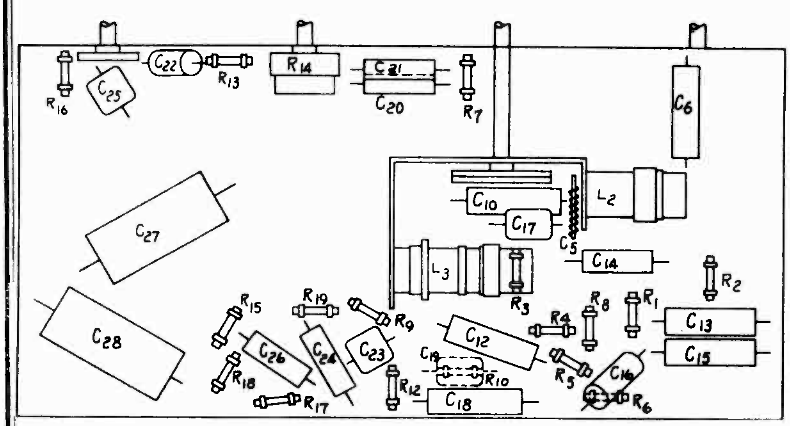
* If two peaks can be had, the correct one is with the trimmer screw further out. The other peak is the image.

** 160 microvolts per meter using standard Hazeltine alignment loop 24 inches from receiver loop.

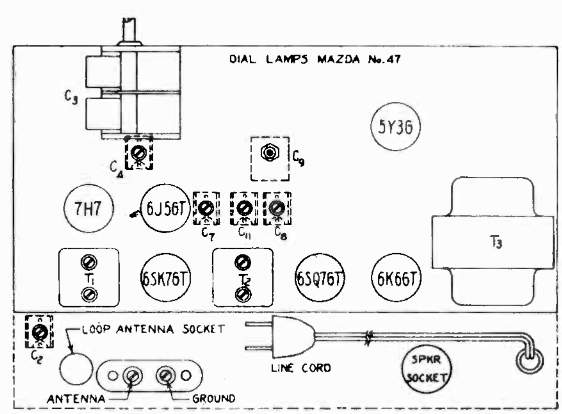
*** 140 microvolts per meter using standard Hazeltine alignment loop 24 inches from receiver loop.

Where indicated by the work, "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.



LOCATIONS OF PARTS UNDER CHASSIS



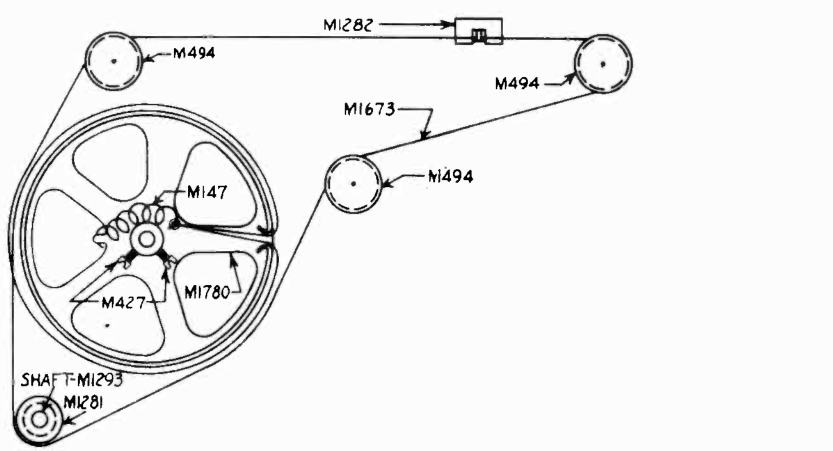
LOCATIONS OF PARTS ON TOP OF CHASSIS

SEARS, ROEBUCK & CO.

PARTS LIST

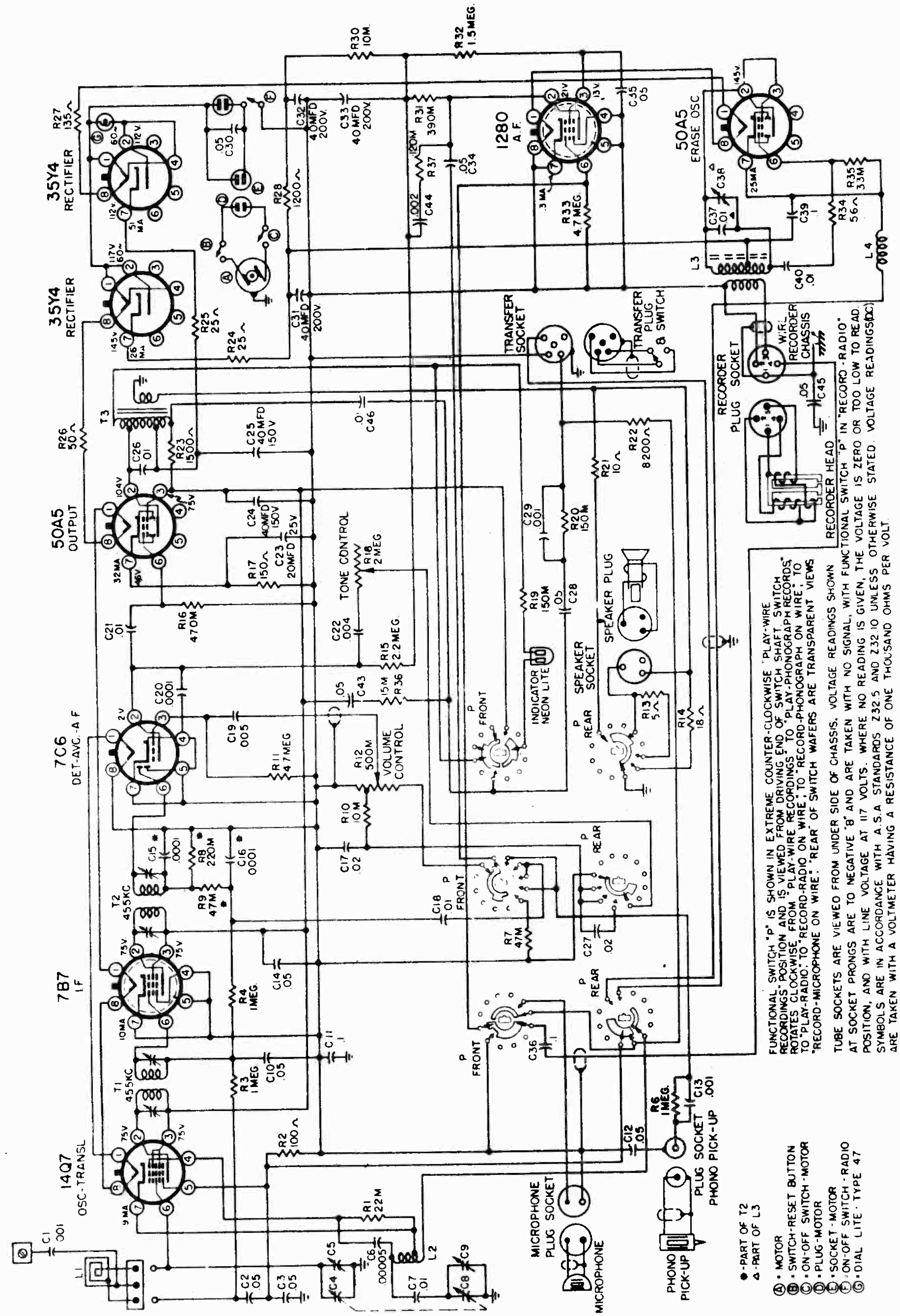
SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	M1297	Book - Instruction
	M1188	Bracket - Drive Support
	M306	Button - Snap
	M712	Cabinet
	M1673	Cable - Drive
	M1298	Carton - Shipping
	M119	Clamp - Line Cord
L2	M1305	Coil - Short Wave Antenna
L3	M1306	Coil - Oscillator
C6		Condenser - .1 mfd. 200 V.
C10,12,13, 15,18		Condenser - .05 mfd. 400 V.
C14,20,21		Condenser - .006 mfd. 400 V.
C16		Condenser - .05 mfd. 200 V.
C22		Condenser - .03 mfd. 200 V.
C24		Condenser - .01 mfd. 400 V.
C26		Condenser - .001 mfd. 400 V.
C27	M482	Condenser - Elec. 16 mfd. 400 V.
C28	M550	Condenser - Elec. 16 mfd. 400 V.
C1	M517	Condenser - Mica 50 mmf.
C2	M1161	Condenser - Trimmer 1-10 mmf.
C5	M1307	Condenser - 1-4 mmf.
C11	M1274	Condenser - Trimmer 25-150 mmf.
C17		Condenser - Mica 100 mmf.
C23		Condenser - Mica 250 mmf.
C25		Condenser - Mica 500 mmf.
C7,8	M766	Condenser - Trimmer
C4	M766	Condenser - Trimmer
C9	M228	Condenser - Padder
C3	M1086	Condenser - Variable
R14	M1193	Control - Volume & Switch 2 Meg.
	M412	Cord - Line
	M1060	Envelope - Instruction Book
	M1196	Escutcheon with Crystal
	M652	Grommet - Rubber
	M653	Grommet - Rubber
	M1279	Indicator
	M1139	Knob - Volume & Switch
	M1138	Knob - Tuning
	M1141	Knob - Tone Control
	M1299	Knob - Band Switch
	M136	Lamp - Dial Mazda #47
L1	M1300	Loop - Assembly
	M1311	Plug - 4 Prong Loop Connecting
	M1282	Pointer
	M1780	Pulley - Drive with Hub
	M494	Pulley - Idler
	M645	Pulley - Rubber
R5		Resistor - 180 ohms 1/3 W.
R12		Resistor - 330 ohms 1/3 W.
R19		Resistor - 500 ohms 1 W.
R2		Resistor - 1M 1/3 W.
R4		Resistor - 12M 2 W.
R3,8		Resistor - 20M 1/3 W.
R13		Resistor - 40M 1/3 W.
R6		Resistor - 50M 1/3 W.
R18		Resistor - 100M 1W.
R1,17		Resistor - 250M 1/3 W.
R16		Resistor - 400M 1/3 W.
R15		Resistor - 470M 1/3 W.
R7		Resistor - 2 Megohms 1/3 W.
R9		Resistor - 10 Megohms 1/3 W.
	M1293	Shaft - Drive
	M661	Socket - 4 Prong
	M1254	Socket - 5 Prong
	M1290	Socket - Dual Dial Lamp
	M1169	Socket - Loctal
	M363	Socket - Octal
	M1172	Speaker - Complete
	M147	Spring - Drive Cable
	M1273	Switch - Band
	M1291	Switch - Tone Control
	M1690	Transformer - Output
T1	M1295	Transformer - 1st I.F.
T2 with R10, R11,C19	M1296	Transformer - 2nd I.F.
T3	M1194	Transformer - Power 50-60 cycle
T3	M1691	Transformer - Power 25 cycle
	M436	Washer - Cup
	M168	Washer - Drive Shaft Retaining

Before ordering parts for Dial Drive System, check these drawings:



MODELS 7085,7102,8085
CHASSIS 101.814,
101.814-1A,101.814-4C

SEARS, ROEBUCK & CO.



SCHEMATIC DIAGRAM FOR 101.814 & 101.814-1A

Frequency Range:
Broadcast.................540-1600 KC

SEARS, ROEBUCK & CO.

MODELS 7085,7102,8085
CHASSIS 101.814,
101.814-1A,101.814-4C

CHASSIS 101.814-4C

is Similar to chassis 101.814 except 14A7 I. F. Tube is used in place of 7B7. Elliptical Speaker is used in place of 5 1/4" Speaker. The styling of this model with respect to Escutcheon, Knobs, Dial Background and Pointer are similar to the 101.814-2B.

SPECIFICATIONS

CHASSIS 101.814 AND 101.814-1A

Model Differences:
Both models are similar, however, 101.814-1A is a console with a larger speaker. The 101.814 is a table model.

Power Supply:
All models available............................117 Volts AC 60 Cycles 90 Watts

PRELIMINARY:

ALIGNMENT PROCEDURE

Output Meter Connection................................Across loud speaker voice coil
Output Meter Reading to Indicate 50 Milliwatts (Standard Output)............ 0.4 Volt
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 Tone Control..Treble (clockwise)
Position of Pointer with Tuner Fully Closed......Last line below 540 calibration mark

POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER) SHOWN	TRIMMER FUNCTION
Closed	455 KC	.1 mfd.	Trans. Grid	T2,T1	IF
1500 KC	1500 KC	.0002 mfd.	Antenna	C9	Oscillator
1500 KC	1500 KC	.0002 mfd.	Antenna	C5	Transl.

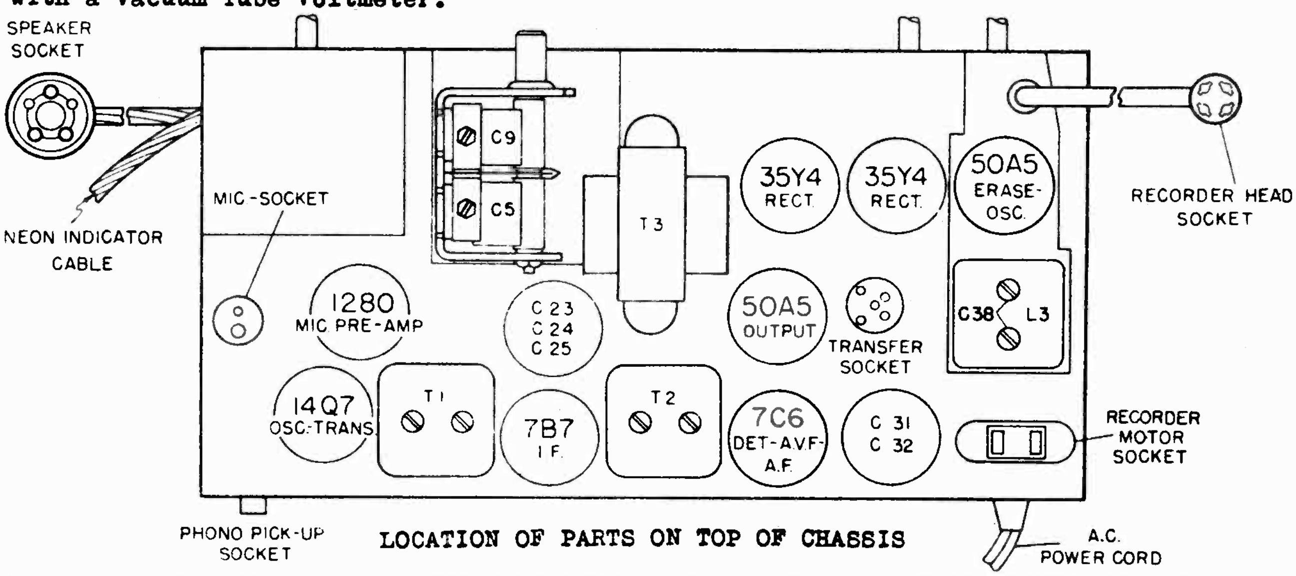
IMPORTANT ALIGNMENT NOTES

The Alignment must be done in the order given.
The entire Alignment Procedure should be repeated step by step in the original order for greatest 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.

The Erase Oscillator Coil has been set at 39.5 Kc. at the factory. If necessary, it can be adjusted with the use of a Beat Frequency Oscillator.

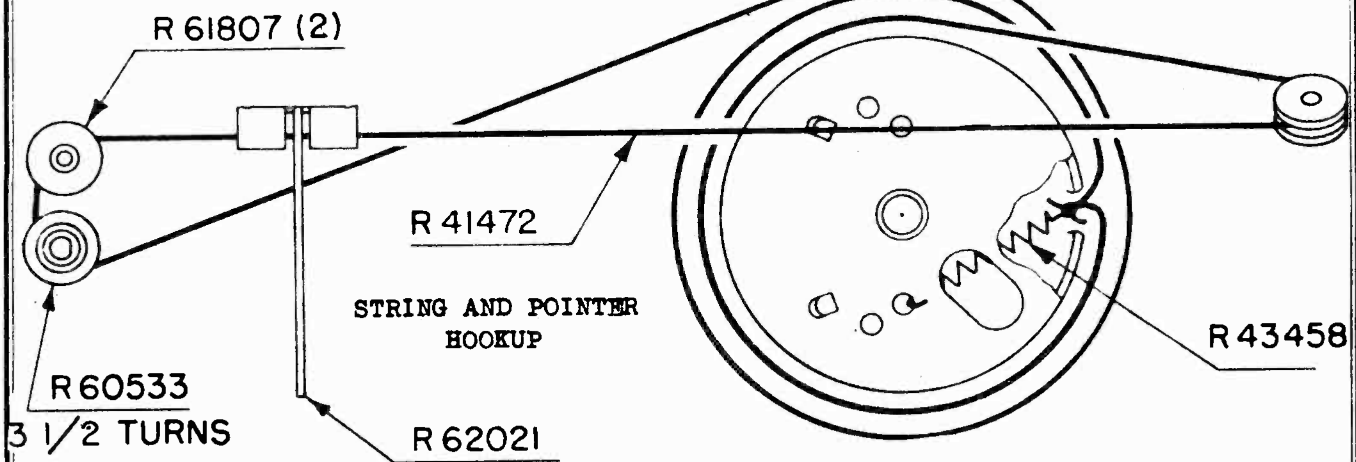
The Erase voltage on the Recording Head should be approximately 3.3 volts as measured with a Vacuum Tube Voltmeter.



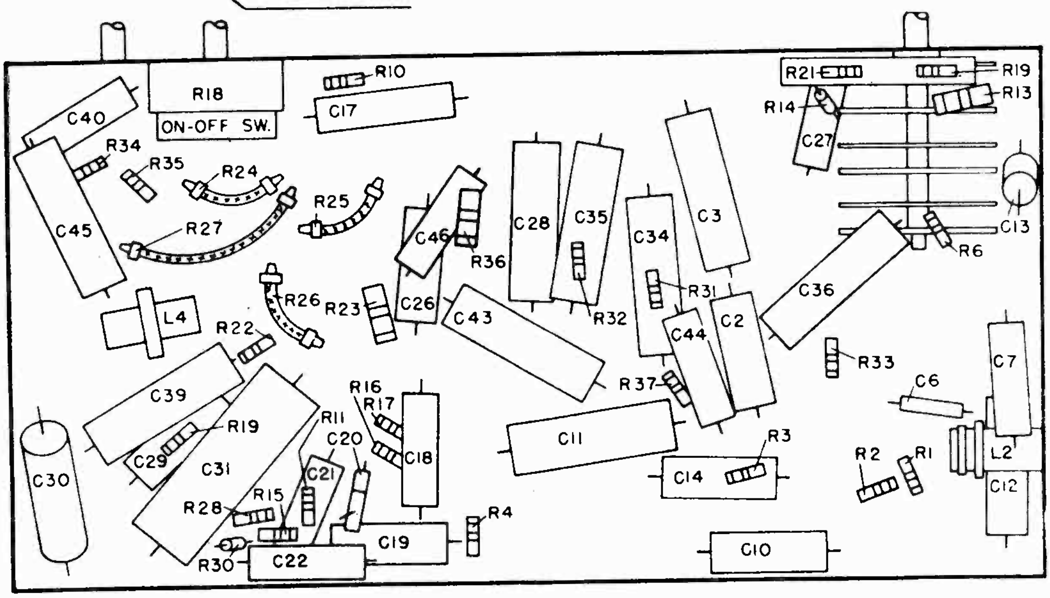
LOCATION OF PARTS ON TOP OF CHASSIS

MODELS 7085, 7102, 8085
CHASSIS 101.814,
101.814-1A, 101.814-4C

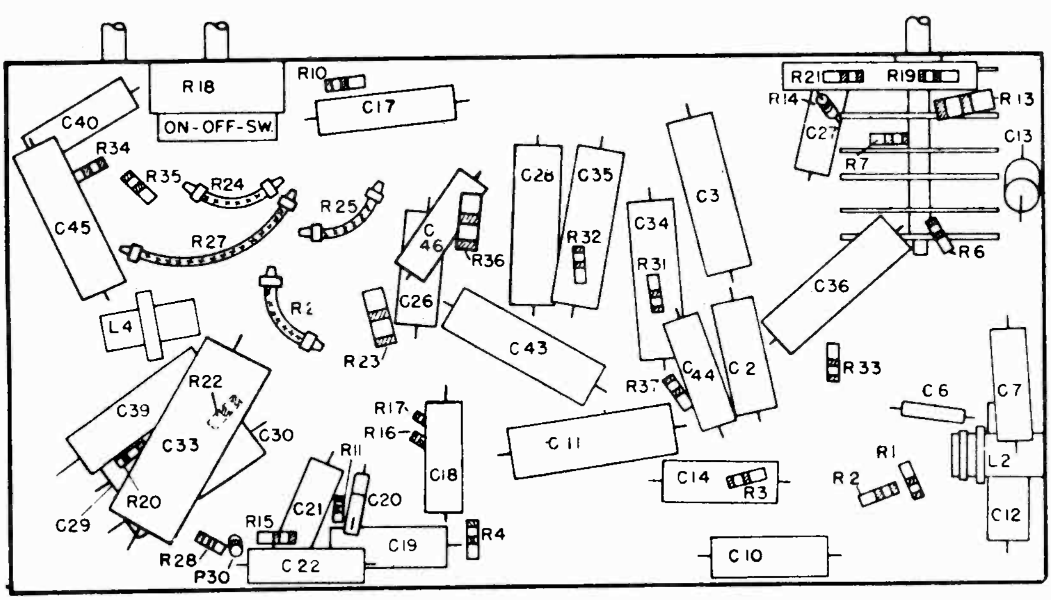
SEARS, ROEBUCK & CO.



STRING AND POINTER HOOKUP



LOCATION OF PARTS UNDER CHASSIS - 101.814



LOCATION OF PARTS UNDER CHASSIS - 101.814-1A

SEARS, ROEBUCK & CO MODEL 7085 CHASSIS 101.814
MODEL 7102 CHASSIS 101.814-1A
MODEL 8085 CHASSIS 101.814-4C
MODELS 8102,8102B CHASSIS 101.814-2B
MODEL 8102A CHASSIS 101.814-3B
MODEL 8086 CHASSIS 101.814-5C
MODELS 8086A,8086B CHASSIS 101.814-6C

PARTS LIST

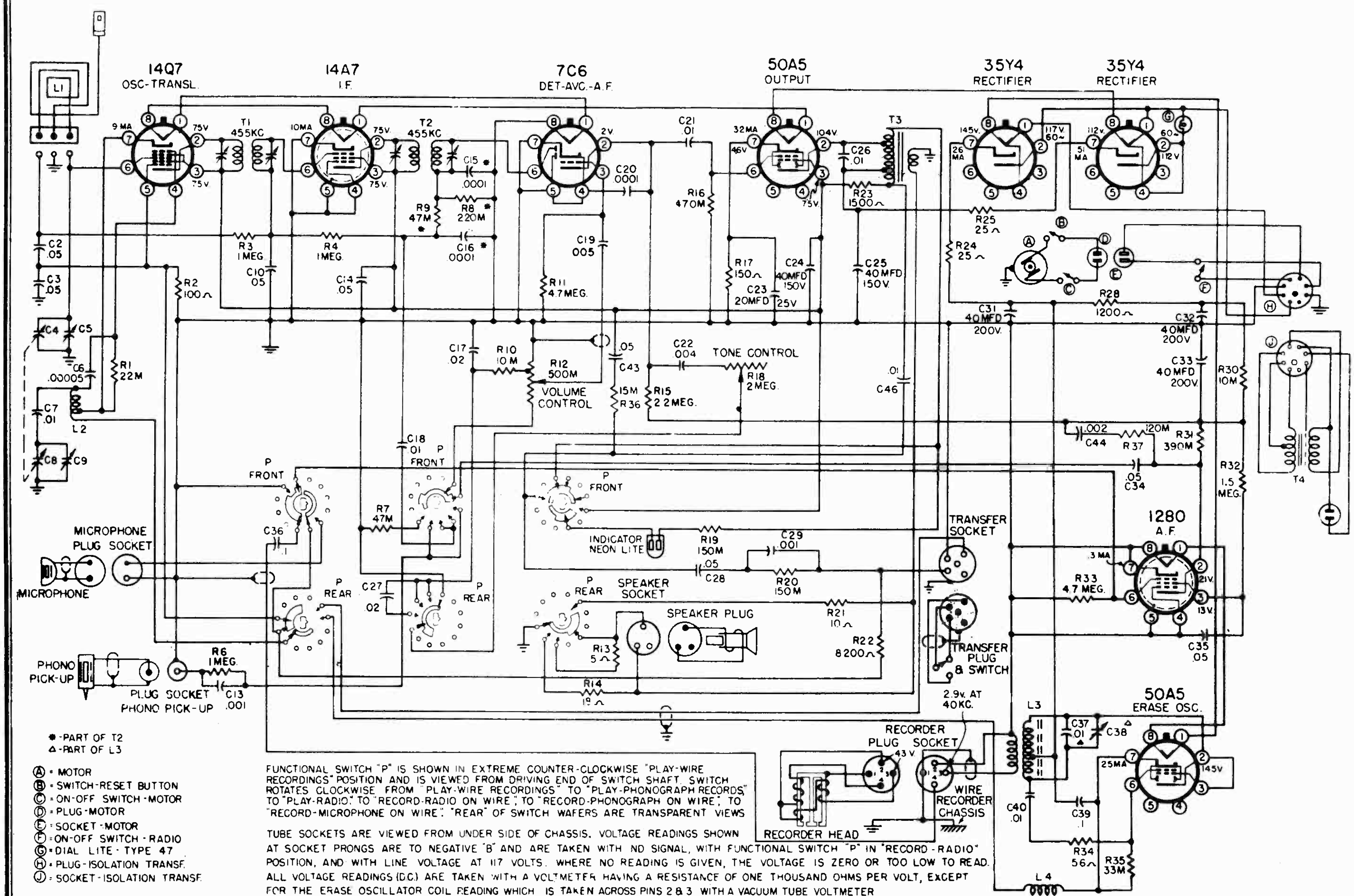
SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R62075	Background - Dial
	R61846	Button - Snap - Dial Background Mounting
	R63290	Cable & Socket Assembly (101.814,-1A,-2B)
	R64699	Cable & Socket Assembly (101.814-3B,-5C,-6C)
C11,C36,C39		Capacitor - .1 Mfd. 600 Volt (101.814,-1A)
C36,C39		Capacitor - .1 Mfd. 600 Volt (101.814-2B)
C11,C34		Capacitor - .1 Mfd. 600 Volt (101.814-3B,-5C,-6C)
C7,C18,C21, C26,C40,C46		Capacitor - .01 Mfd. 600 Volt (101.814,-1A,-2B)
C6,C14,C21, C27,C29,C32		Capacitor - .01 Mfd. 600 Volt (101.814-3B,-5C,-6C)
C17,C27		Capacitor - .02 Mfd. 600 Volt (101.814,-1A,-2B)
C13,C17		Capacitor - .02 Mfd. 600 Volt (101.814-3B,-5C,-6C)
C2,C3,C10,C12, C14,C28,C30,C34, C35,C43,C45		Capacitor - .05 Mfd. 600 Volt (101.814,-1A)
C2,C3,C10, C14,C28,C34 C35,C43		Capacitor - .05 Mfd. 600 Volt (101.814-2B)
C1,C2,C10,C12, C20,C23,C36, C40		Capacitor - .05 Mfd. 600 Volt (101.814-3B,-5C,-6C)
C9		Capacitor - .001 Mfd. 600 Volt (101.814-6C)
C1,C13,C29		Capacitor - .001 Mfd. 600 Volt (101.814,-1A)
C13,C29		Capacitor - .001 Mfd. 600 Volt (101.814-2B)
C26		Capacitor - .001 Mfd. 600 Volt (101.814-3B,-5C,-6C)
C44		Capacitor - .002 Mfd. 600 Volt (101.814,-1A,-2B)
C35		Capacitor - .002 Mfd. 600 Volt (101.814-3B,-5C,-6C)
C42		Capacitor - .003 Mfd. 600 Volt
C22		Capacitor - .004 Mfd. 600 Volt (101.814,-1A,-2B)
C22,C31		Capacitor - .004 Mfd. 600 Volt (101.814-3B,-5C,-6C)
C19		Capacitor - .005 Mfd. 600 Volt (101.814,-1A,-2B)
C18		Capacitor - .005 Mfd. 600 Volt (101.814-3B,-5C,-6C)
C6		Capacitor - Mica - 50 Mmfd. (101.814,-1A,-2B)
C5		Capacitor - Mica - 50 Mmfd. (101.814-3B,-5C,-6C)
C20		Capacitor - Mica - 100 Mmfd. (101.814,-1A,-2B)
C19		Capacitor - Mica - 100 Mmfd. (101.814-3B,-5C,-6C)
C4,C8	R61100	Capacitor - Variable Tuning (101.814,-1A,-2B)
C3,C7	R61100	Capacitor - Variable Tuning (101.814-3B,-5C,-6C)
C33	R61517	Capacitor - 40 Mfd. 200 Volt (101.814,-1A,-2B)
C40	R61517	Capacitor - 40 Mfd. 200 Volt (101.814-3B,-5C,-6C)
C31,C32	R61507	Capacitor - 40 Mfd. 200 Volt, 40 Mfd. 200 Volt (101.814,-1A,-2B)
C30,C39	R61507	Capacitor - 40 Mfd. 200 Volt, 40 Mfd. 200 Volt (101.814-3B,-5C,-6C)
C23,C24,C25	R60416	Capacitor - Electrolytic - 40 Mfd. 150 Volt, 40 Mfd. 150 Volt, 20 Mfd. 25 Volt (101.814,-1A,-2B)
C24,C25,C28	R60416	Capacitor - Electrolytic - 40 Mfd. 150 Volt, 40 Mfd. 150 Volt, 20 Mfd. 25 Volt (101.814-3B,-5C,-6C)
L3	R64696	Coil - Erase Oscillator (101.814-3B,-5C,-6C)
L4	R43050	Coil - Choke
L3	R61519	Coil - Erase Oscillator (101.814,-1A,-2B)
L2	R61107	Coil - Oscillator - B.C.
	R62045	Clip - Lens Retaining
	R61191	Clip - Neon Lamp Retaining
	R60639	Connector - Loop Terminal
R12	R61128	Control - Volume (101.814,-1A,-2B)
R18	R61864	Control - On-Off & Tone
R11	R61128	Control - Volume (101.814-3B,-5C,-6C)
	R41748	Cord - Line
	R41472	Cord - Dial Drive (44")
	R60506	Dial - Station (101.814,-1A)
	R60520	Escutcheon - Dial (101.814,-1A)
	R62080	Escutcheon & Dial Assembly (101.814-2B,-3B,-5C,-6C)
	R62531	Knob - Volume (101.814-2B,-3B,-5C,-6C)
	R60484	Knob - Volume (101.814,-1A)
	R61408	Knob - On-Off & Tone (101.814,-1A)
	R62538	Knob - Master Control (101.814-2B,-3B,-5C,-6C)
	R61566	Knob - Master Control (101.814,-1A)
	R60480	Knob - Tuning (101.814,-1A)
	R62712	Knob - Tuning (101.814-2B,-3B,-5C,-6C)
		Lamp - Mazda Type #47
	R45981	Lamp - Neon
	R54425	Leaflet - Instruction (101.814)
	R54451	Leaflet - Instruction (101.814-1A)
	R64075	Leaflet - Instruction (101.814-2B)
	R64295	Leaflet - Instruction (101.814-3B)
	R61473	Leaflet - Instruction (101.814-5C)
	R66520	Leaflet - Instruction (101.814-6C)
	R61137	Lens - Recorder Indicating Lamp
	R61196	Loop & Board Assembly (101.814)
	R61557	Loop & Board Assembly (101.814-1A)
	R64589	Loop & Board Assembly (101.814-2B,-3B)
	R65216	Loop & Board Assembly (101.814-5C,-6C)
	R61168	Microphone (101.814,-1A)
	R49264	Cartridge - Crystal Microphone
	R56115	Ring - Mounting
	R56449	Cover Assembly - Terminal Shield
	R64674	Microphone (101.814-2B,-3B,-5C,-6C)
	R56076	Cartridge - Crystal Microphone
	R56115	Ring - Mounting
	R56449	Cover Assembly - Terminal Shield
	R61527	Plate - Instruction (101.814)
	R61594	Plate - Instruction (101.814-1A)
	R64567	Plug - 9 Prong
	R62077	Pointer Assembly (101.814-2B,-3B,-5C,-6C)
	R62021	Pointer - Dial (101.814,-1A)
	R62013	Pointer - Plastic - Master Control Knob (101.814,-1A)
	R61807	Pulley - Metal
R21		Resistor - 10 Ohm - 1/2 Watt
R14		Resistor - 18 Ohm - 1/2 Watt
R34		Resistor - 56 Ohm - 1/2 Watt (101.814,-1A,-2B)
R29		Resistor - 56 Ohm - 1/2 Watt (101.814-3B,-5C,-6C)
R2		Resistor - 100 Ohm - 1/2 Watt
R17		Resistor - 150 Ohm - 1/2 Watt
R28		Resistor - 1200 Ohm - 1/2 Watt (101.814,-1A,-2B)
R26		Resistor - 1200 Ohm - 1/2 Watt (101.814-3B,-5C,-6C)
R22		Resistor - 8200 Ohm - 1/2 Watt
R10,R30		Resistor - 10,000 Ohm - 1/2 Watt (101.814,-1A,-2B)
R9,R33		Resistor - 10,000 Ohm - 1/2 Watt (101.814-3B,-5C,-6C)
R1		Resistor - 22,000 Ohm - 1/2 Watt
R35		Resistor - 33,000 Ohm - 1/2 Watt (101.814,-1A,-2B)
R30		Resistor - 33,000 Ohm - 1/2 Watt (101.814-3B,-5C,-6C)
R7		Resistor - 47,000 Ohm - 1/2 Watt (101.814,-1A,-2B)
R6		Resistor - 47,000 Ohm - 1/2 Watt (101.814-3B,-5C,-6C)
R37		Resistor - 120,000 Ohm - 1/2 Watt (101.814,-1A,-2B)
R27		Resistor - 120,000 Ohm - 1/2 Watt (101.814-3B,-5C,-6C)
R19,R20		Resistor - 150,000 Ohm - 1/2 Watt
R31		Resistor - 390,000 Ohm - 1/2 Watt
R16		Resistor - 470,000 Ohm - 1/2 Watt
R4		Resistor - 1 Megohm - 1/2 Watt (101.814-6C)
R3,R4,R6,		Resistor - 1 Megohm - 1/2 Watt (101.814,-1A,-2B)
R3,R5		Resistor - 1 Megohm - 1/2 Watt (101.814-3B,-5C,-6C)
R32		Resistor - 1.5 Megohm - 1/2 Watt
R15		Resistor - 2.2 Megohm - 1/2 Watt
R11,R33		Resistor - 4.7 Megohm - 1/2 Watt (101.814,-1A,-2B)
R10,R28		Resistor - 4.7 Megohm - 1/2 Watt (101.814-3B,-5C,-6C)
R23		Resistor - 1500 Ohm - 1 Watt
R36		Resistor - 15,000 Ohm - 1 Watt (101.814,-1A,-2B)
R12		Resistor - 15,000 Ohm - 1 Watt (101.814-3B,-5C,-6C)
R24,R25	R40232	Resistor - Glasohm - 25 Ohm - 1 Watt
R26	R62030	Resistor - Glasohm - 50 Ohm - 3 Watts (101.814,-1A)
R27	R61505	Resistor - Glasohm - 136 Ohm - 5 Watts (101.814,-1A)
R13		Resistor - 5 Ohm - 1 Watt
	R60533	Shaft Assembly - Tuning
	R62641	Screw - Escutcheon & Dial Mounting
	R63141	Screw - Wire Recorder Mounting
	R64566	Shell - (for R64567 Plug)
	R62014	Shield - Switch
	R44145	Socket - 2 Prong - AC to Wire Recorder
	R62049	Socket Assembly - 1280 Tube only
	R44897	Socket - 1 Prong - Phono Connector
	R57049	Socket - Tube - 8 Prong Lock-In
	R60515	Socket - Pilot Lamp
	R60597	Socket - 5 Prong - Transfer Cable
	R60693	Socket - Speaker Cable
	R61291	Socket - 2 Prong - Microphone Connector
	R64569	Socket - 9 Contact (101.814-2B,-3B)
		WHEN ORDERING SPEAKER PARTS ALWAYS GIVE THE PART NUMBER ON THE SPEAKER
	R61117	Speaker - 5 1/4" P.M. (101.814)
	R60780	Cone & Voice Coil
	R49743	Plug
	R64668	Speaker - 6" x 9" P.M. (101.814-5C,-6C)
	R62659	Cone & Voice Coil
	R49743	Plug
	R61558	Speaker - 8" P.M. (101.814-1A)
	R59799	Cone & Voice Coil
	R49743	Plug
	R63021	Speaker - 10" P.M. (101.814-2B,-3B)
	R63056	Cone & Voice Coil
	R49743	Plug
	R43458	Spring - Tension - Dial Drive
	R67035	Switch - Master Control (101.814,-1A)
	R62695	Switch - Master Control (101.814-2B,-3B,-5C,-6C)
T1	R61111	Transformer - I. F. #1
T2	R61142	Transformer - I. F. #2
T3	R61506	Transformer - Output
T4	R64563	Transformer - Isolation - 60 Cycle (101.814-2B,-3B,-5C,-6C)
	R61570	Tray - Spool Storage (101.814-1A,-2B,-3B)
	R61523	Tray - Spool Storage (101.814,-5C,-6C)
	R60450	Wafer - Electrolytic Capacitor Mounting
	R18897	Washer - Flat - Dial Plate Mounting
	R46042	Washer - Phono Socket Insulating
	R61815	Washer - Metal Pulley Retaining

For CHASSIS 101.814-4C

PART NUMBER	DESCRIPTION
R64931	Loop & Board Assembly
R64310	Leaflet - Instruction
R64668	Speaker - 6" x 9" P. M.
R62659	Cone & Voice Coil
R49743	Plug

MODELS 8102, 8102B
CHASSIS 101.814-2B

SEARS, ROEBUCK & CO.



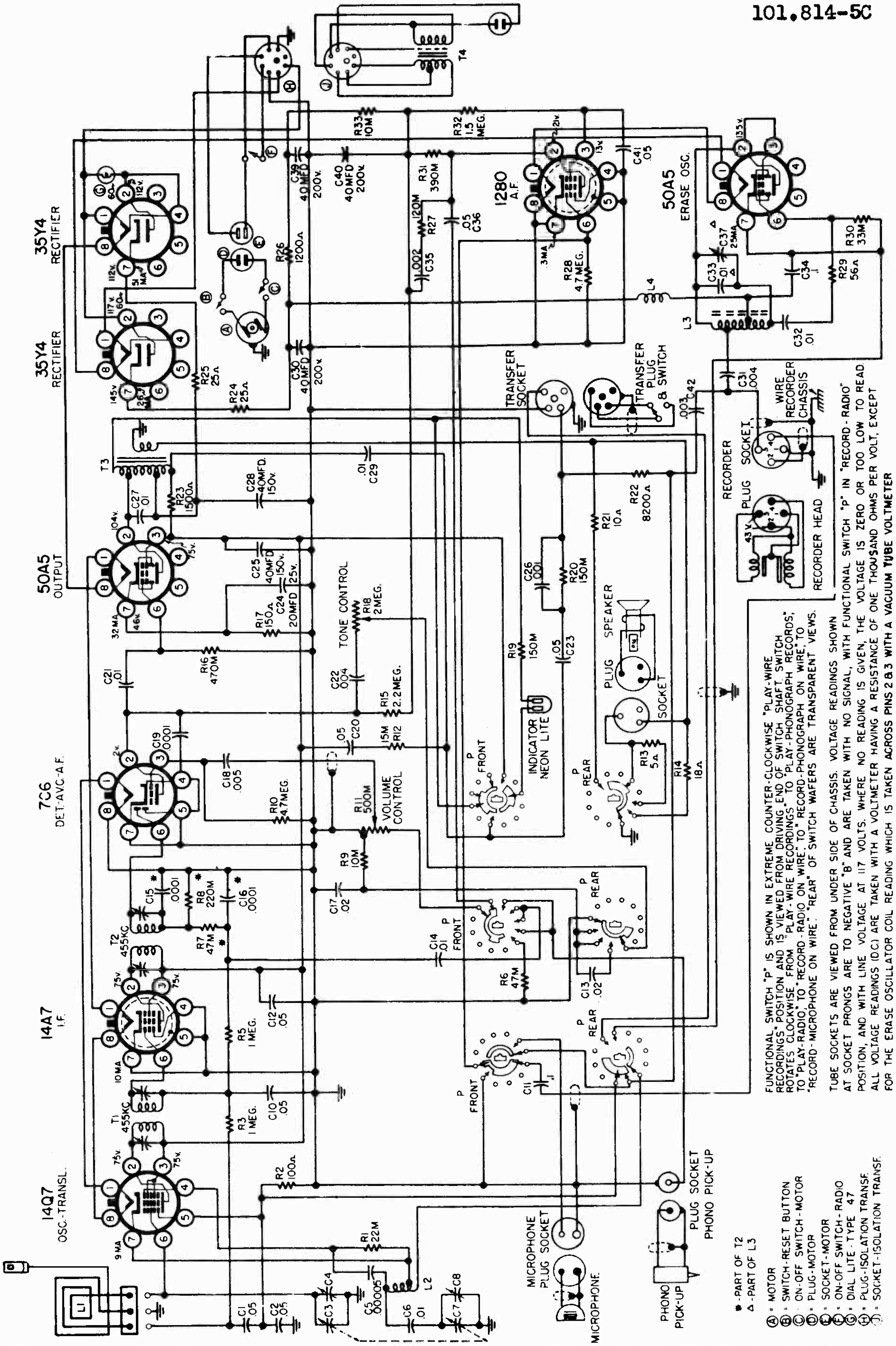
FUNCTIONAL SWITCH "P" IS SHOWN IN EXTREME COUNTER-CLOCKWISE "PLAY-WIRE RECORDINGS" POSITION AND IS VIEWED FROM DRIVING END OF SWITCH SHAFT. SWITCH ROTATES CLOCKWISE FROM "PLAY-WIRE RECORDINGS" TO "PLAY-PHONOGRAPH RECORDS", TO "PLAY-RADIO", TO "RECORD-RADIO ON WIRE", TO "RECORD-PHONOGRAPH ON WIRE", TO "RECORD-MICROPHONE ON WIRE". "REAR" OF SWITCH WAFERS ARE TRANSPARENT VIEWS

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO NEGATIVE "B" AND ARE TAKEN WITH NO SIGNAL, WITH FUNCTIONAL SWITCH "P" IN "RECORD-RADIO" POSITION, AND WITH LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. ALL VOLTAGE READINGS (D.C.) ARE TAKEN WITH A VOLTMETER HAVING A RESISTANCE OF ONE THOUSAND OHMS PER VOLT, EXCEPT FOR THE ERASE OSCILLATOR COIL READING WHICH IS TAKEN ACROSS PINS 2 & 3 WITH A VACUUM TUBE VOLTMETER

SCHEMATIC DIAGRAM FOR 101.814-2B

SEARS, ROEBUCK & CO.

MODELS 8102A, 8086
CHASSIS 101.814-3B, 101.814-5C



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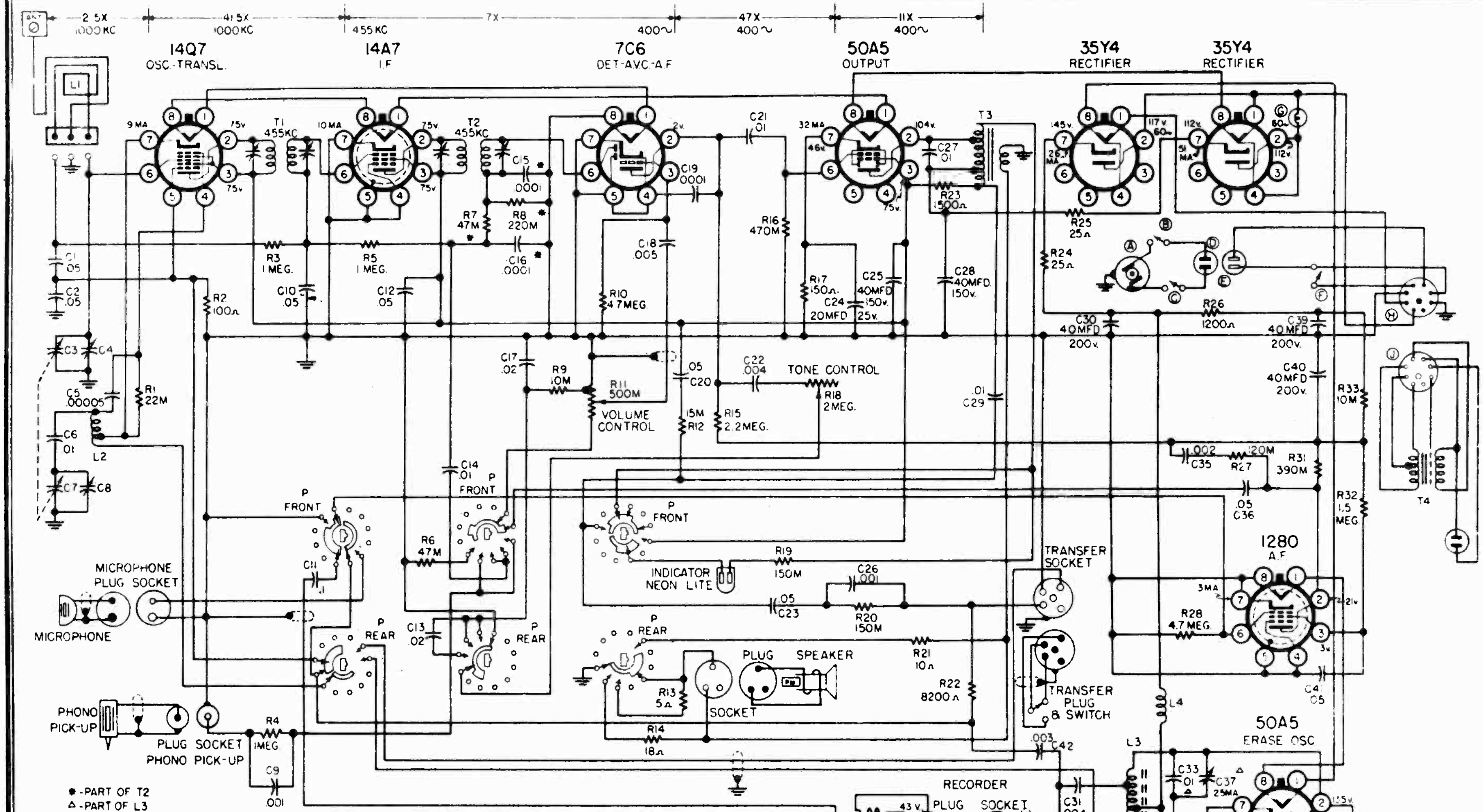
* - PART OF T2
Δ - PART OF L3
Ⓐ - MOTOR
Ⓑ - SWITCH-RESET BUTTON
Ⓒ - ON-OFF SWITCH-MOTOR
Ⓓ - PLUG-MOTOR
Ⓔ - SOCKET-MOTOR
Ⓕ - ON-OFF SWITCH-RADIO
Ⓖ - DIAL LITE-TYPE 47
Ⓗ - PLUG-ISOLATION TRANSF.
Ⓙ - SOCKET-ISOLATION TRANSF.

SCHEMATIC DIAGRAM FOR 101.814-3B,-5C

MODELS 8086A, 8086B
CHASSIS 101.814-6C

SEARS, ROEBUCK & CO.



FUNCTIONAL SWITCH "P" IS SHOWN IN EXTREME COUNTER-CLOCKWISE "PLAY-WIRE RECORDINGS" POSITION AND IS VIEWED FROM DRIVING END OF SWITCH SHAFT. SWITCH ROTATES CLOCKWISE FROM "PLAY-WIRE RECORDINGS" TO "PLAY-PHONOGRAPH RECORDS", TO "PLAY-RADIO," TO "RECORD-RADIO ON WIRE," TO "RECORD-PHONOGRAPH ON WIRE," TO "RECORD-MICROPHONE ON WIRE". "REAR" OF SWITCH WAFERS ARE TRANSPARENT VIEWS.

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO NEGATIVE "B" AND ARE TAKEN WITH NO SIGNAL, WITH FUNCTIONAL SWITCH "P" IN "RECORD-RADIO" POSITION, AND WITH LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. ALL VOLTAGE READINGS (D.C.) ARE TAKEN WITH A VOLTMETER HAVING A RESISTANCE OF ONE THOUSAND OHMS PER VOLT, Φ EXCEPT FOR THE RECORDER HEAD READING WHICH IS TAKEN ACROSS PINS 2 & 3 WITH A VACUUM TUBE VOLTMETER.

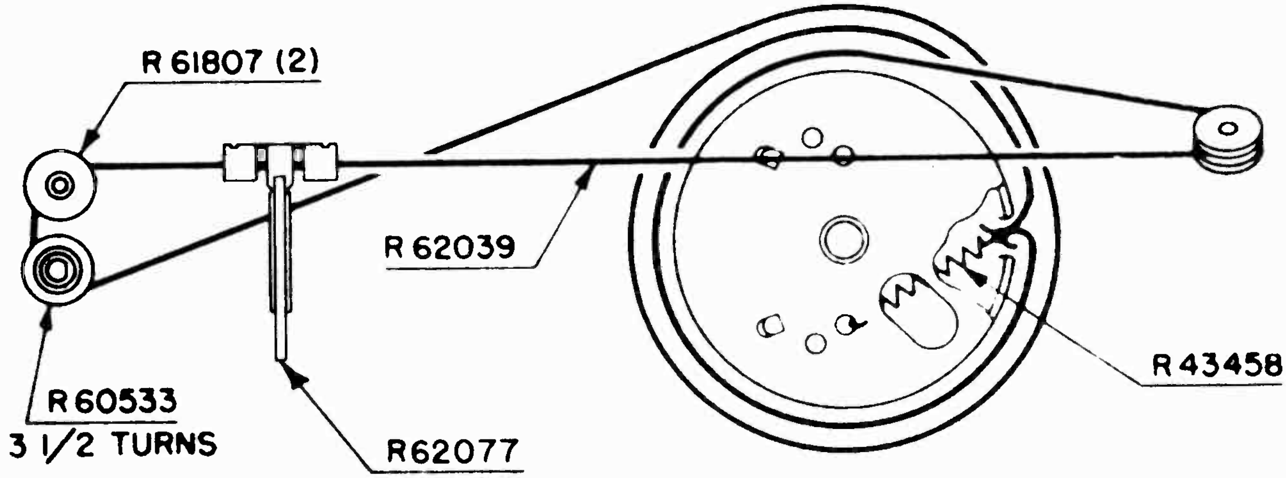
THE GAIN PER STAGE VALUES AS NOTED ABOVE ARE APPROXIMATE VALUES FOR AN AVERAGE STAGE, RATHER THAN AN ABSOLUTE VALUE. A 0.1 MFD DUMMY IS USED FOR ALL MEASUREMENTS EXCEPT FOR THE ANTENNA WHERE A 200 MMFD. DUMMY IS USED. INPUT SHALL BE KEPT AT THE LOWEST LEVEL NECESSARY TO MAINTAIN A STANDARD OUTPUT OF 50 MILLIWATTS WITH THE VOLUME CONTROL FULLY ON. NOTE: THE TYPE OF EQUIPMENT USED, THE HANDLING OF THE PROBES, THE ACCURACY OF ALIGNMENT, ETC. CAN AFFECT THE MEASUREMENTS.

SCHEMATIC DIAGRAM FOR 101.814-6C

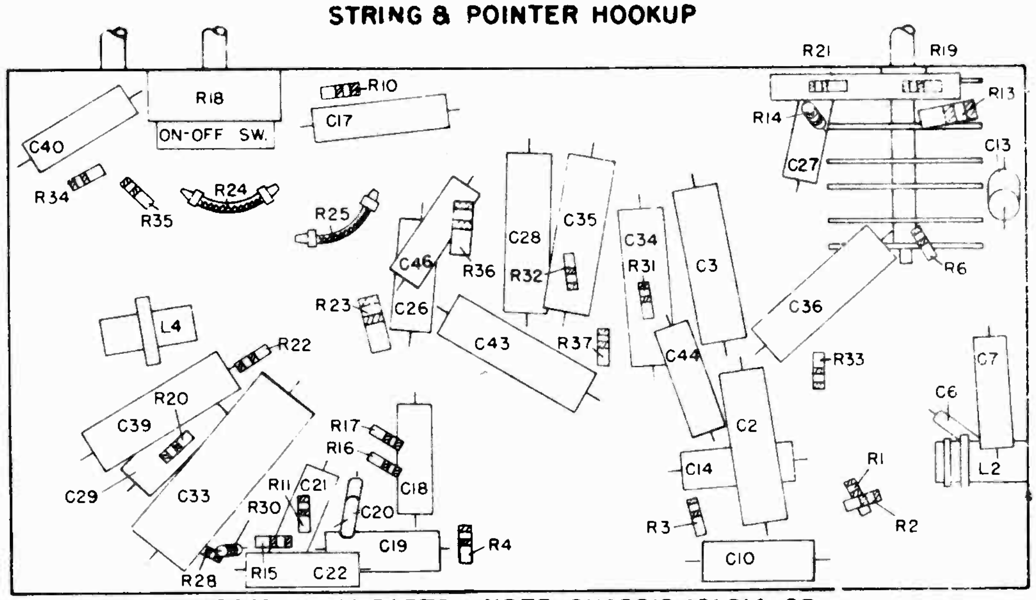
CHASSIS 101.814-2B
CHASSIS 101.814-3B
CHASSIS 101.814-5C
CHASSIS 101.814-6C

SEARS, ROEBUCK & CO.

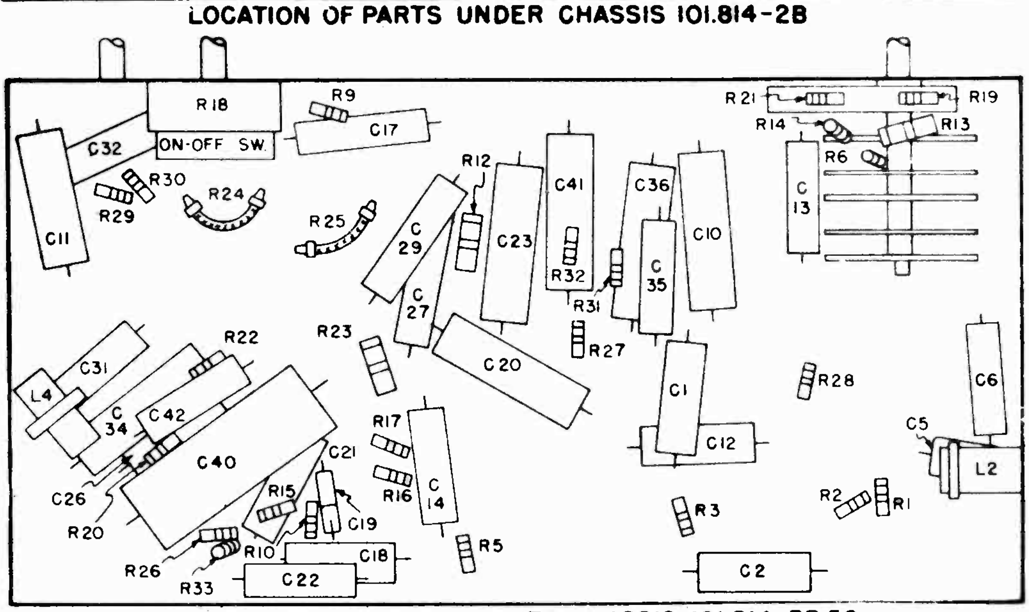
MODELS 8102,8102B
MODEL 8102A
MODEL 8086
MODELS 8086A,8086B



STRING & POINTER HOOKUP



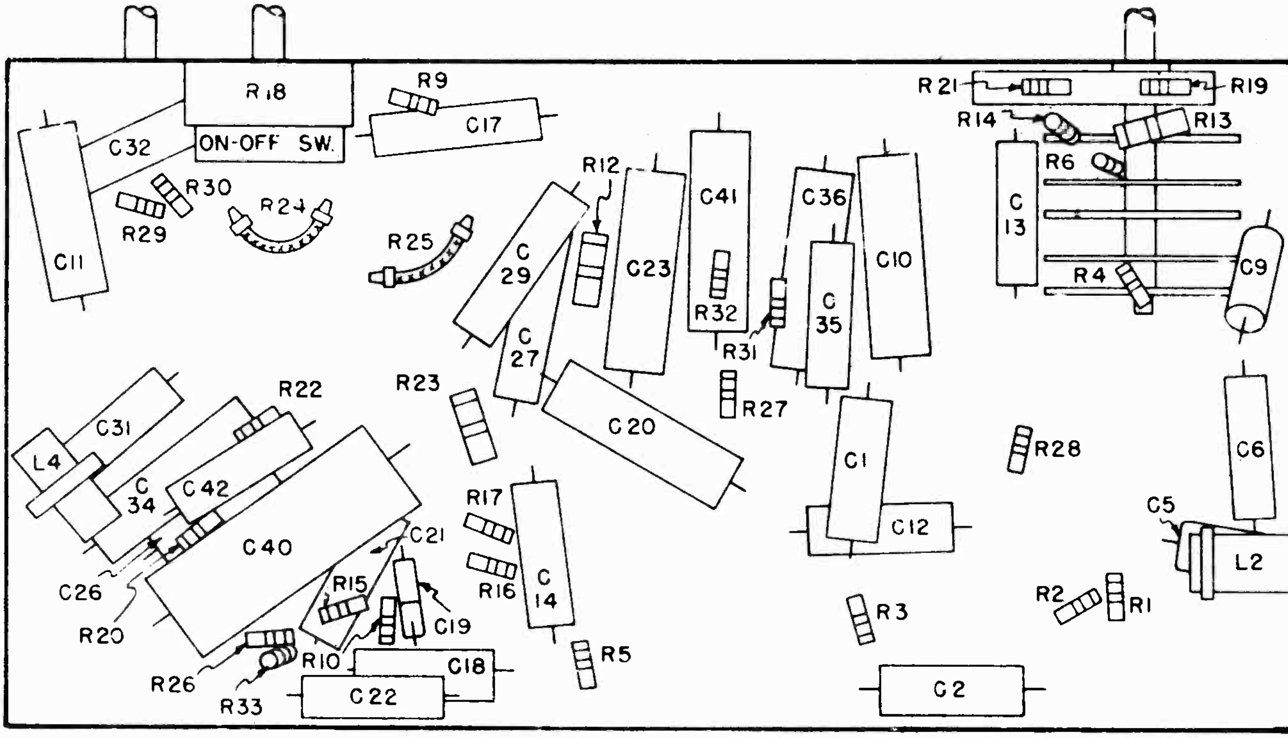
LOCATION OF PARTS UNDER CHASSIS 101.814-2B



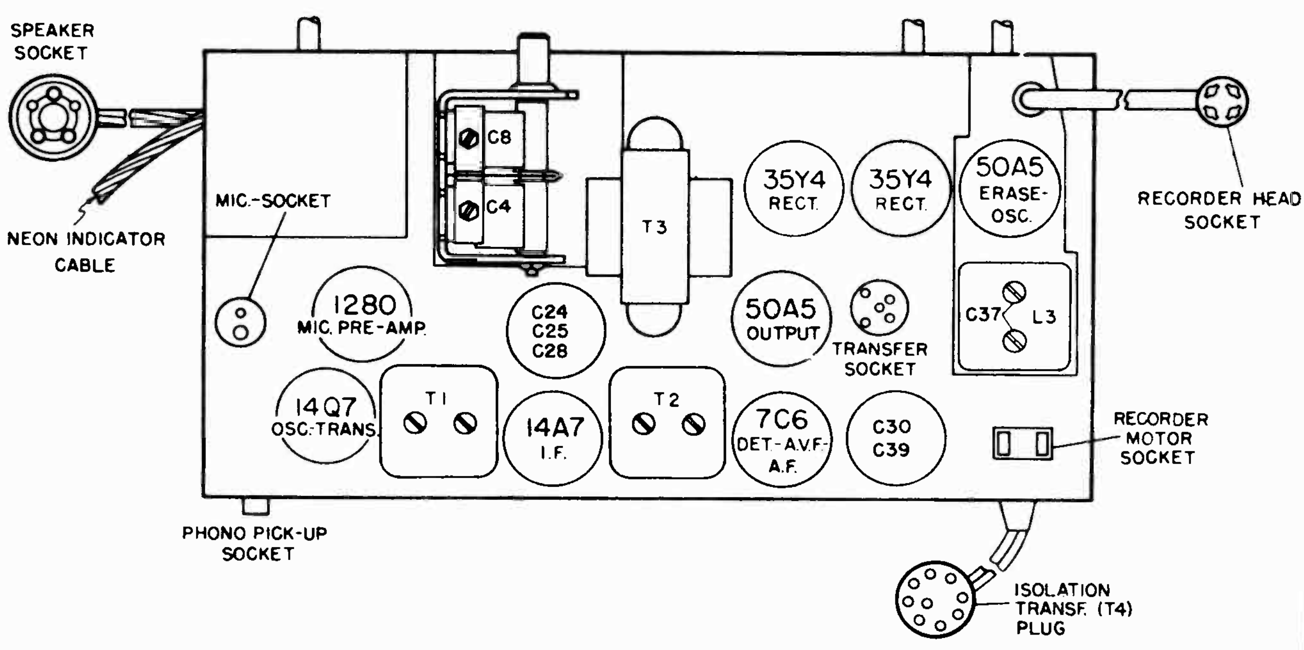
LOCATION OF PARTS UNDER CHASSIS 101.814-3B,5C

MODELS 8102, 8102B
CHASSIS 101.814-2B
MODELS 8086A, 8086B
CHASSIS 101.814-6C

SEARS, ROEBUCK & CO.



LOCATION OF PARTS UNDER CHASSIS 101.814-6C



LOCATION OF PARTS ON TOP OF CHASSIS 101.814-2B

SEARS, ROEBUCK & CO. MODEL 8102A CHASSIS 101.814-3B
MODEL 8086 CHASSIS 101.814-5C
MODELS 8086A, 8086B
CHASSIS 101.814-6C

ALIGNMENT PROCEDURE FOR 101.814-3B,5C,6C ONLY

PRELIMINARY:

Output meter reading to indicate 0.05 watt across voice coil................0.4 volt
Generator ground lead connection..................................Receiver chassis
Generator modulation..30%, 400 cycles
Position of volume control..Fully on
Position of tone control..HI
Position of pointer with tuner fully closed.......Last line below 540 Kc. calibration mark on the Dial or at the "Start" of calibration point on the dial background plate.

POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION
Closed	455 Kc.	0.1 mfd.	Transl.-Grid	T2 & T1	I.F.
See note below	1400 Kc.	200 mmfd.	Ant.	C8	Osc.
See note below	1400 Kc.	200 mmfd.	Ant.	C4	Transl.

IMPORTANT ALIGNMENT NOTES:

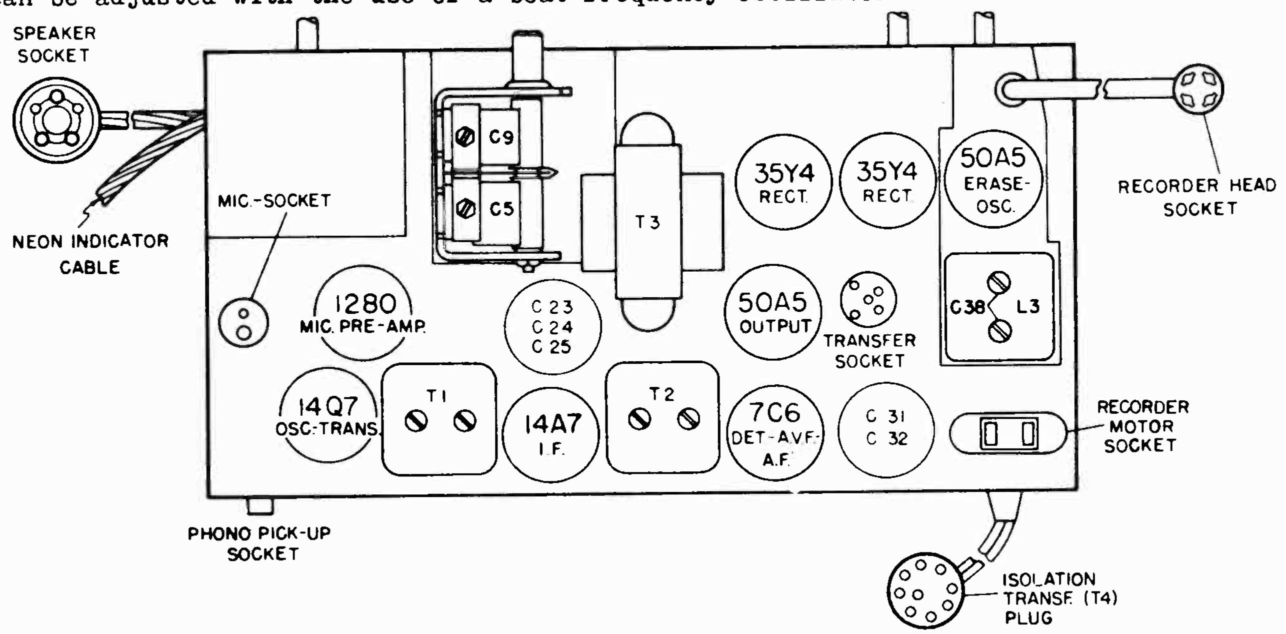
NOTE: With the dial background removed, the tuner should be positioned at the 1400 Kc. mark on the dial background plate.

The alignment must be done in the order given.

The alignment procedure should be repeated step by step in the original order for greatest accuracy.

Always keep the output voltage from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurage alignment.

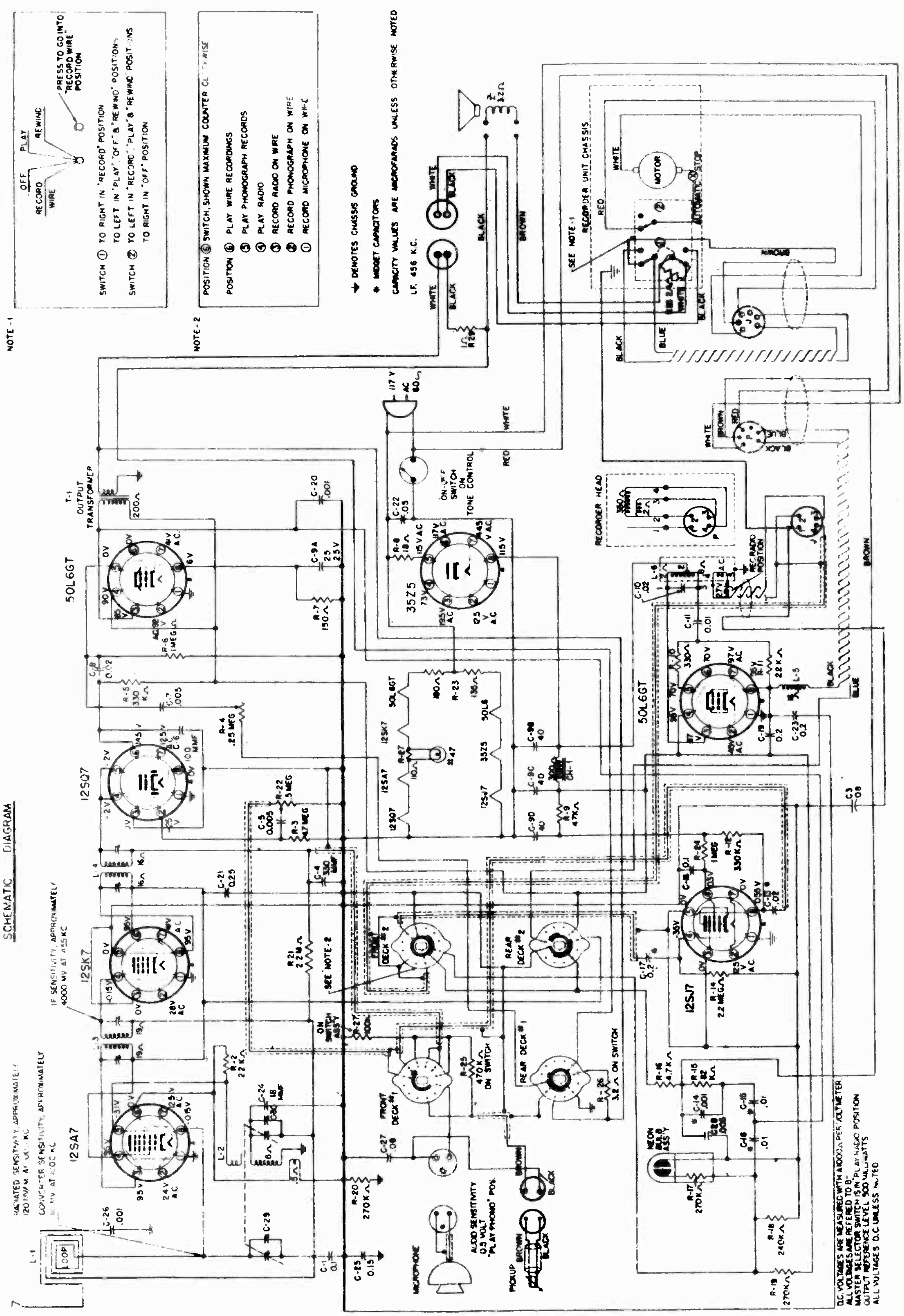
The erase oscillator coil has been set at 33.7 Kc. at the factory. If necessary it can be adjusted with the use of a beat frequency oscillator.



LOCATION OF PARTS ON TOP OF CHASSIS 101.814-3B,-5C,-6C

MODELS 7086, 7103
CHASSIS 110.466,
110.466-1

SEARS, ROEBUCK & CO.



SCHEMATIC DIAGRAM 110.465 and 110.466-1

SEARS, ROEBUCK & CO.

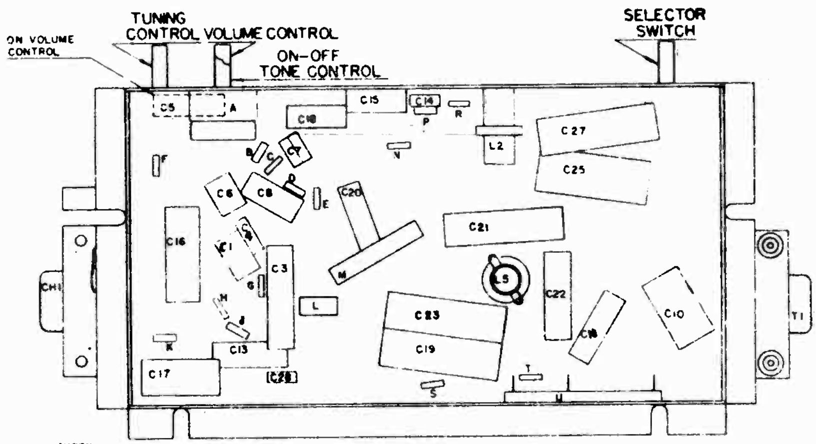
MODELS 7086,7103
CHASSIS 110.466,
110.466-1

SPECIFICATIONS

Power Supply:

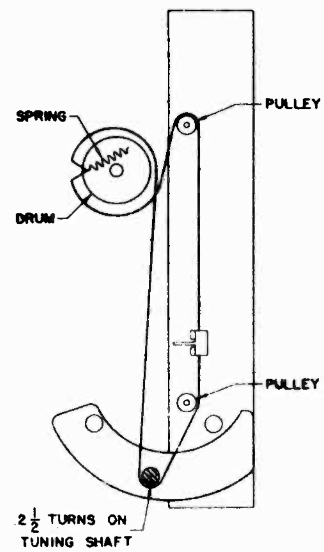
All models available. . . . . .117V 60 cycle AC 90 watts

Frequency Ranges:. 540-1580KC



INDEX			
A	R4	K	R13
B	R16	L	R8
C	R5	M	R27
D	R7	N	R2
E	R6	P	R15
F	R3	R	R16
G	R21	S	R9
H	R24	T	R10
J	R12	U	R23

LOCATIONS OF PARTS UNDER CHASSIS



DIAL STRINGING DIAGRAM

ALIGNMENT PROCEDURE

PRELIMINARY:

OUTPUT METER CONNECTION. . . . . ACROSS LOUD SPEAKER VOICE COIL
OUTPUT METER READING TO INDICATE 500 MILLIWATTS. . . . . .1.25 VOLTS
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. . . . . .B— BUS
GENERATOR MODULATION. . . . . 30% AT 400 CYCLES
POSITION OF VOLUME CONTROL. . . . . FULLY CLOCKWISE
POSITION OF TONE CONTROL . . . . .COUNTER CLOCKWISE (HI)
POSITION OF DIAL POINTER WITH VARIABLE FULLY CLOSED . . . . ON MARK BELOW 540 KC. CALIBRATION MARK
POSITION OF MASTER CONTROL SWITCH . . . . "PLAY RADIO"

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	ADJUSTMENTS (In order shown)	FUNCTION
Any	455	.2 mfd.	Grid. 12SA7GT	L3, L4	I.F.
1500 Kc	1500 Kc	***	*** See Below	C30, C29	Osc. R. F.
600 Kc	600 Kc	***	*** See Note Below	(Check-Point)	(Check Point)

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

IMPORTANT ALIGNMENT NOTES

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.

POWER OUTPUT UNDISTORTED. . . . .95 WATTS MAXIMUM. . . . 2.0 WATTS

SPECIAL SERVICE NOTES

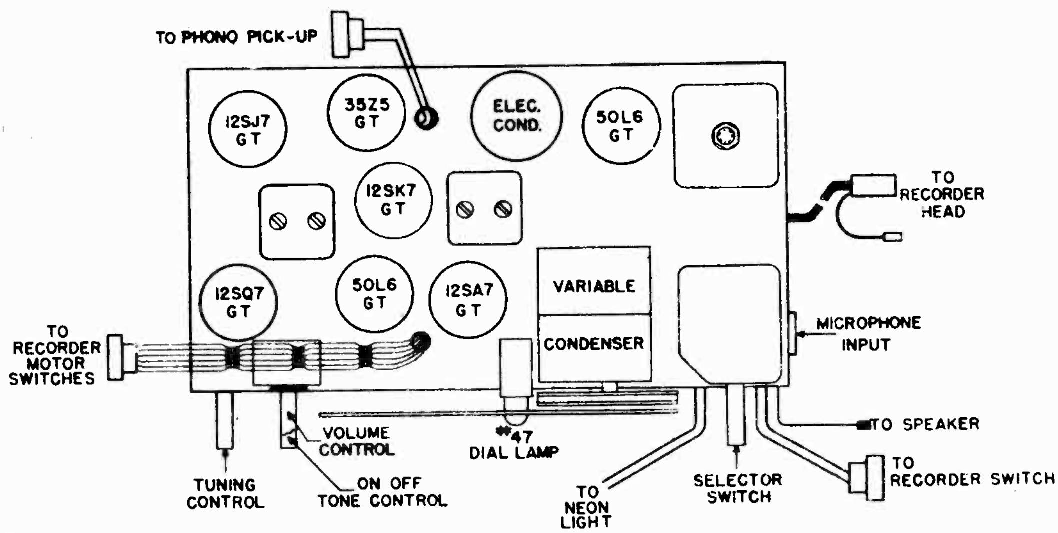
To check the erasing voltage of the Recorder Head, turn set on. Set Master Selector Switch to Position #3 *(Record Radio)*. Set the Recorder Control Lever to "Record Wire" and measure the voltage between Pin #2 and 3 of the Recorder Head. This should be done with Recorder Head attached to the plug of the Recorder Cable. The voltage at this point should be 2.7 Volts, minimum, as measured with the Vacuum Tube Voltmeter.

The erasing voltage may also be checked using a #57 Pilot Light. This is done by setting the Master Selector Switch to Position #3 *(Record Radio)* and the Recorder Control Lever to "Record Wire". The voltage appearing across Pin #2 and 3 of the "J" Connector *(see schematic)* will light the lamp to a pale orange color which outlines the filament. *(without recorder head attached)*.

MODELS 7086,7103
CHASSIS 110.466,
110.466-1

SEARS, ROEBUCK & CO.

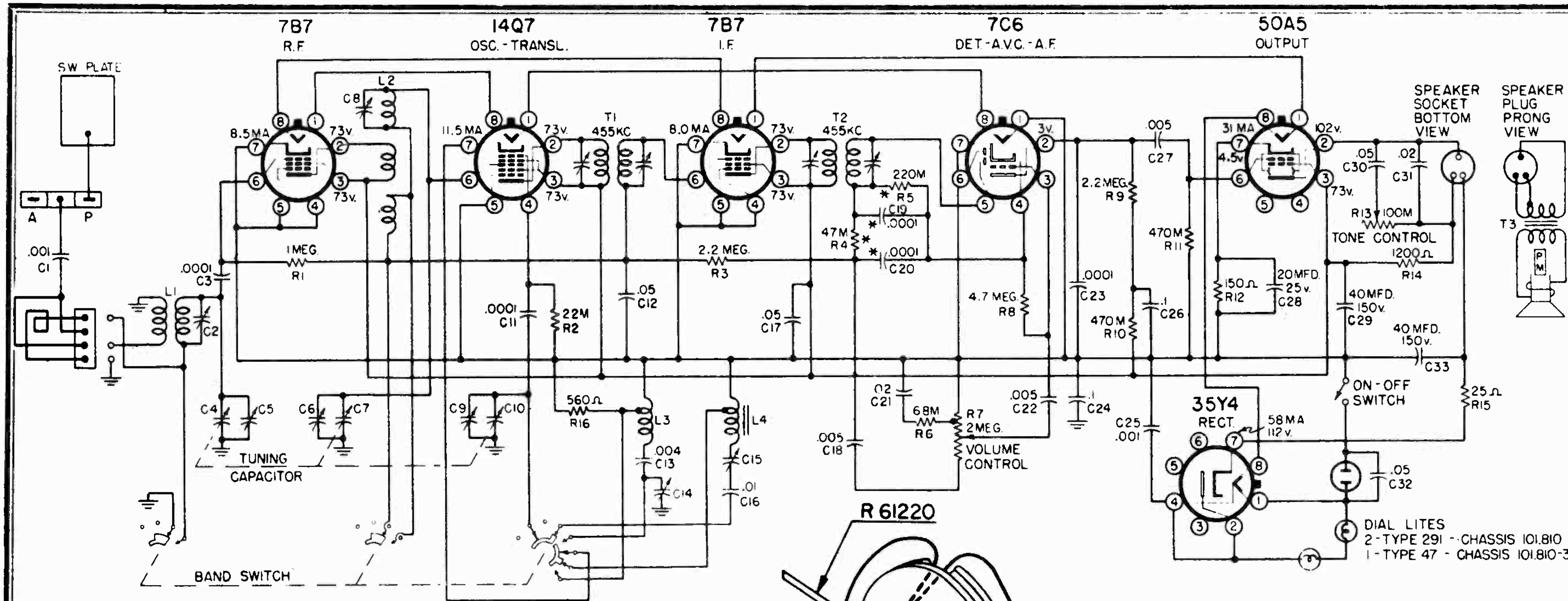
TUBE LOCATION



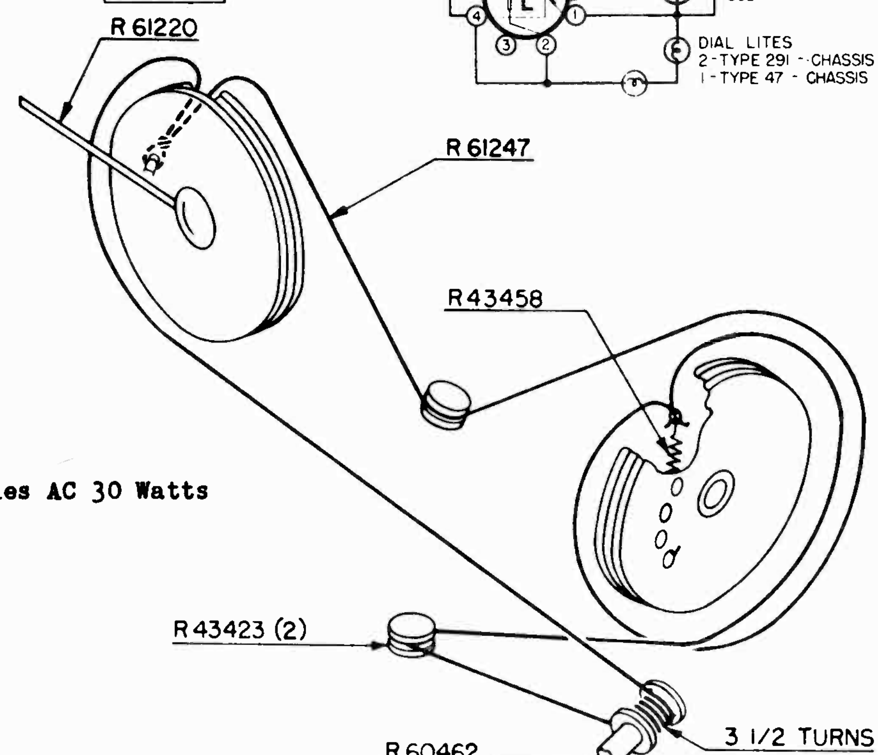
PARTS LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
C21		Condenser- .25 mfd. paper, 400 volts
C22		Condenser- .05 mfd. paper, 400 volts
C24		Condenser- 18 mmfd. mica or ceramic
C25		Condenser- .5 mfd. paper, 400 volts
C26		Condenser- .001 mfd. paper, 200 volts
C28		Condenser- .002 mfd. paper, 150 volts
	A-1691	Condenser- variable
R4	A-2474	Control, Tone, with Switch
R22	A-2475	Control, Volume
	A-54367	Cord, Dial Drive (Per Yard)
	A-5589	Cord, Line 8 ft.
	A-4447	Escutcheon (Dial Crystal)
	A-4445	Escutcheon (Meter Control)
	A-39166	Knob Selector
	A-39167	Knob-Tone Control, On - Off
	A-39165	Knob-Tuning
	A-39168	Knob-Volume Control
		Lamp, Pilot Light No.47
	A-59309	Leaflet - Instruction
	A-28174	Loop Antenna Ass'y.
	A-18127	Plug Phono - 2 Wire
L5	A-3010	Choke 1 mh R.F. 15 ohms
CH1	A-1400	Choke Filter
L2	A-28173	Coil-Oscillator B. C.
C1	A-1979	Condenser- .1 mfd. paper, 150 volts
C3,C27		Condenser- .05 mfd. paper, 400 volts
C4		Condenser- 330mmfd mica
C5		Condenser- .005 mfd. paper
C6		Condenser- 470 mmfd mica, 400 volts
C7	A-1978	Condenser- .005 mfd. paper, 150 volts
C8		Condenser- .02 mfd. paper, 400 volts
C9	A-2074	Condenser- Electrolytic 40 40-40 x 150 volts - 25 x 25 volts
C10		Condenser- .02 mfd. oil, 600 volts
C11		Condenser- .01 mfd. 400 volts
C12	A-2077	Condenser- Electrolytic 25 mfd. 10 volts
C13	A-1982	Condenser- .02 mfd. 400 volts
C14	A-1980	Condenser- .001 mfd. 150 volts
C15,C18	A-1981	Condenser- .01 mfd. 400 volts
C16		Condenser- .1 mfd. paper, 400 volts
C17	A-1983	Condenser- .2 mfd. paper, 200 volts
C19,C23		Condenser- .2 mfd. paper, 400 volts
C20		Condenser- .001 mfd. paper, 400 volts
	A-5586	Plug (Recorder Motor AC)
	A-4142	Pointer-Dial
R2		Resistor- 22,000 ohms, 1/4 watt
R3		Resistor- 4.7 meg ohms, 1/4 watt
R5		Resistor- 330,000 ohms, 1/4 watt
R6,R14,R25		Resistor- 470,000 ohms, 1/4 watt
R7		Resistor- 150 ohms, 1/4 watt
R8		Resistor- 18 ohms, 2 watt
R9		Resistor- 47,000 ohms, 1/4 watt
R10		Resistor- 330 ohms, 1/4 watt
R11		Resistor- 22,000 ohms, 1/4 watt
R12		Resistor- 240,000 ohms, 1/4 watt
R13		Resistor- 2200 ohms, 1/4 watt
R15		Resistor- 82,000 ohms, 1/4 watt
R16		Resistor- 4700 ohms, 1/4 watt
R18		Resistor- 220,000 ohms, 1/4 watt
R19,R20		Resistor- 270,000 ohms, 1/4 watt
R21		Resistor- 2.2 meg ohms, 1/4 watt
R23	A-2176	Resistor- Fil. Dropping 135-180 ohms
R24		Resistor- 1 meg ohms, 1/4 watt
R26		Resistor- 3.2 ohms, 1/2 watt
R27		Resistor- 110 ohms, 2 watt
	A-40116	Scale Dial
	A-4677	Shaft, Dial Drive
	A-18133	Socket Ass'y. Neon Bulb
	A-18123	Socket, Dial Light
	A-18134	Socket, Female for Recorder Head
	A-18101	Socket, Microphone
	A-18126	Socket, Phono
	A-5586	Socket, Recorder Motor AC
	A-5874	Speaker - 6" (PM) used on 466 only
	A-5875	Speaker - 8" (PM) used on 466-1 only
	A-53335	Spring Dial Cord
	A-3786	Switch, wafer 6 position
	A-3360	Transformer - 1st I.F.
	A-3530	Transformer - 2nd I.F.
	A-28178	Transformer - Bias Oscillator
	A-1336	Transformer - Output
	A-6610	Microphone

SEARS, ROEBUCK & CO.



SCHEMATIC DIAGRAM 101.810 & 101.810-3



STRING AND POINTER HOOKUP

* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. BAND SWITCH SECTIONS ARE VIEWED FROM DRIVING END AND WITH ROTORS IN EXTREME COUNTER-CLOCKWISE (BC) POSITION. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO NEG "B" AND ARE TAKEN WITH NO SIGNAL, WITH BAND SWITCH IN BC POSITION, AND WITH LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ. SYMBOLS ARE IN ACCORDANCE WITH A.S.A. STANDARDS Z32.5 AND Z32.10 UNLESS OTHERWISE STATED.

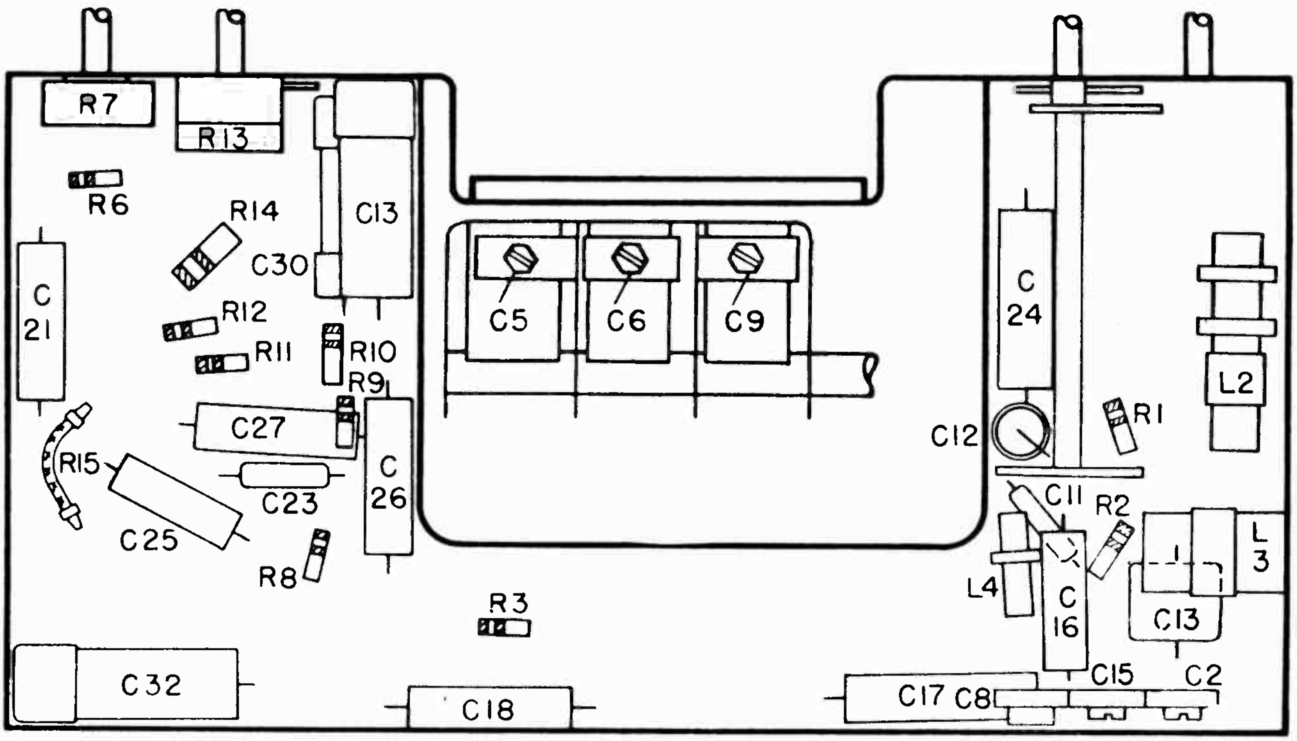
SPECIFICATIONS

Power Supply:
All models available...........117 Volts DC 25-60 Cycles AC 30 Watts
Frequency Range:
Broadcast................540-1600 KC

Shortwave....................6-16 MC

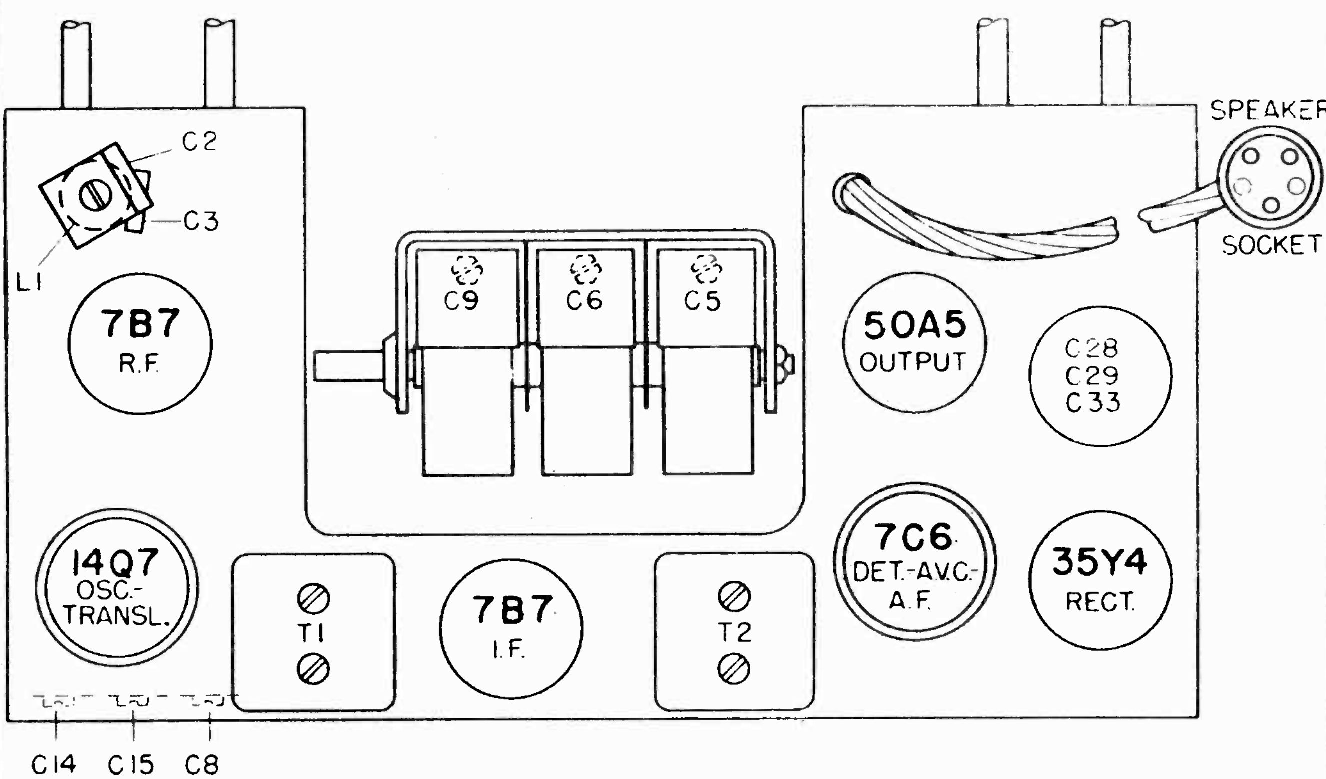
MODEL 7090
CHASSIS 101.810,
101.810-3

SEARS, ROEBUCK & CO.



LOCATION OF PARTS UNDER CHASSIS

Model Differences:
Two Type 291 Dial Lamps Used On 101.810
One Type 47 Dial Lamp Used On 101.810-3



LOCATION OF PARTS ON TOP OF CHASSIS

SEARS, ROEBUCK & CO. MODEL 7090 CHASSIS 101.810, 101.810-2, 101.810-3
MODEL 8092 CHASSIS 101.810-1A

Preliminary:

ALIGNMENT PROCEDURE

Output Meter Connection..............................Across Loud Speaker Voice Coil
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 Tone Control..............................Treble
Position of Pointer with Tuner Fully Closed......Last Line Below 540 Calibration Mark

BAND SWITCH POSITION	POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS	TRIMMER FUNCTION
BC	Closed	455 KC	0.1	Trans. Grid	T2-T1	I. F.
BC	1500 KC	1500 KC	200 Mmfd.	Ant.	C9	Oscillator
BC	1500 KC	1500 KC	200 Mmfd.	Ant.	C6	Translator
BC	1500 KC	1500 KC	200 Mmfd.	Ant.	C4	Antenna
BC	600 KC (Rock)	600 KC	200 Mmfd.	Ant.	C15	Padder
SW	Open	16.5 MC	400 Ohms	Ant,	C14	Oscillator
SW	15 MC (Rock)	15 MC	400 Ohms	Ant.	C8	Translator
SW	15 MC (Rock)	15 MC	400 Ohms	Ant.	C2	Antenna

IMPORTANT ALIGNMENT NOTES

The Alignment must be done in the order given.
The Alignment Procedure should be repeated step by step in the original order for greatest 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.
During alignment of the BC Band Padder and the SW Band Translator and Antenna Trimmers, the Tuner should be rocked through resonance to assure alignment.

Power Output Undistorted 1.1 Watts Maximum 2 Watts

THE FOLLOWING PARTS LIST COVERS CHASSIS 101.810, 101.810-1A, 101.810-3 AND 101.810-2

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R62842	Antenna Assembly - S. W. (101.810-1A)
	R61412	Antenna Assembly - S. W. (101.810,-3)
	R62643	Background - Dial (101.810-1A,-2)
	R62652	Button - Push (101.810-1A)
	R60486	Button - Push (101.810,-3)
	R13961	Button - Snap
C4,C7,C10	R61200	Capacitor - Variable
C24,C26		Capacitor - .1 Mfd. 600 Volt
C31,C21		Capacitor - .02 Mfd. 600 Volt
C12,C17,C30,C32		Capacitor - .05 Mfd. 600 Volt
C16		Capacitor - .01 Mfd. 600 Volt
C1,C25		Capacitor - .001 Mfd. 600 Volt (101.810,-1A,-3)
C1,C25,C30		Capacitor - .001 Mfd. 600 Volt (101.810-2)
C18,C22,C27		Capacitor - .005 Mfd. 600 Volt
C3,C11,C23		Capacitor - .0001 Mfd. Mica
C13		Capacitor - .004 Mfd. Mica
C8,C14,C15	R61231	Capacitor - Trimmer Assembly
C28,C29,C33	R60416	Capacitor - Electrolytic - 40x40 Mfd. 150 Volt 20 Mfd. 25 Volt
L3	R63166	Coil - Oscillator - SW (101.810-1A,-2)
L2	R61236	Coil - BC & SW R. F.
L4	R61237	Coil - BC Oscillator
L1	R61238	Coil - SW Antenna
L3	R61239	Coil - SW Oscillator (101.810,-3)
R7	R60430	Control - Volume (101.810,-3)
R13	R61232	Control - On-Off & Tone (101.810,-3)
R9	R62052	Control - Volume (101.810-1A)
R11	R62529	Control - On-Off & Tone (101.810-1A)
R13	R62340	Control - On-Off & Tone (101.810-2)
	R41472	Cord - Dial Drive (42")
	R16706	Cord - Line
	R60540	Cover - Tab (101.810,-2,-3)
	R62653	Cover - Tab (101.810-1A)
	R61215	Dial - Station (101.810,-2,-3)
	R60461	Drum & Pinion Assembly (Used on R61200)
	R62373	Escutcheon & Dial Assembly (101.810-1A)
	R61214	Escutcheon - Dial (101.810,-2,-3)
	R61218	Escutcheon - Push Button
	R60724	Gear & Hub Assembly (Tuner Assembly) (101.810-1A,-2)
	R60459	Gear & Hub Assembly (Tuner Assembly) (101.810,-3)
	R62315	Key - Plunger - Tuner Assembly (101.810-1A,-2)
	R62531	Knob - Volume (101.810-1A)
	R62534	Knob - On-Off & Tone (101.810-1A)
	R62537	Knob - BC, SW & Phono (101.810-1A)
	R62712	Knob - Tuning (101.810-1A)
	R61221	Knob - Tuning (101.810,-2,-3)
	R61222	Knob - Volume (101.810,-2,-3)
	R61223	Knob - Tone & On-Off (101.810,-2,-3)
	R61224	Knob - Wave Switch (101.810,-2,-3)
		Lamp - Mazda Type #291 (101.810)
		Lamp - Mazda Type #47 (101.810-1A,-2,-3)
	R64064	Leaflet - Instruction (101.810-2)

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R64060	Leaflet - Instruction (101.810-1A)
	R54657	Leaflet - Instruction (101.810)
	R64125	Leaflet - Instruction (101.810-3)
	R64080	Log - Station
	R61235	Loop and Board Assembly
	R62307	Plunger & Yoke Assembly (101.810-1A)
	R60464	Plunger & Yoke Assembly (101.810-2)
	R62549	Pointer Assembly (101.810-1A)
	R61220	Pointer - Dial (101.810,-2,-3)
	R61216	Pointer Drive Drum Assembly
	R61807	Pulley - Metal (101.810-1A)
	R43423	Pulley - Wood (101.810,-2,-3)
R12		Resistor - 150 Ohm - 1/2 Watt
R2		Resistor - 22,000 Ohm - 1/2 Watt
R10,R11		Resistor - 470,000 Ohm - 1/2 Watt
R1		Resistor - 1 Megohm - 1/2 Watt
R3,R9		Resistor - 2.2 Megohm - 1/2 Watt
R8		Resistor - 4.7 Megohm - 1/2 Watt
R14		Resistor - 1200 Ohm - 1 Watt
R6		Resistor - 68,000 Ohm - 1/2 Watt
R14		Resistor - 560 Ohm - 1/2 Watt
R15	R40232	Resistor - Glasohm - 25 Ohm - 1 Watt
	R62640	Screw - Escutcheon Mounting (101.810-2)
	R62641	Screw - Escutcheon & Dial Mounting (101.810-1A)
	R44897	Socket - 1 Prong - Phono Connector (101.810-1A)
	R60515	Socket - Pilot Lamp (101.810-1A)
	R60693	Socket - Speaker Cable
	R62173	Socket - Pilot Lamp (101.810-2,-3)
	R57049	Socket - 8 Prong - Lock-In
	R61234	Socket - Dial Lamp (101.810)
	R57193	Shield - Tube
		WHEN ORDERING SPEAKER PARTS ALWAYS GIVE THE PART NUMBER ON THE SPEAKER
	R61032	Speaker - 8" P. M.
	R61037	Cone & Voice Coil
	R61038	Transformer - Output
	R43458	Spring - Tension - Dial Drive (101.810,-2,-3)
	R60677	Spring - Tension - Dial Drive (101.810-1A)
	R60427	Spring - Extension (Tuner Assembly)
	R60437	Spring - Compression (Tuner Assembly)
	R62050	Switch - Wave (101.810-1A)
	R61228	Switch - Wave (101.810,-2,-3)
	R62838	Tabs - Station (101.810-1A)
	R60474	Tabs - Station (101.810,-2,-3)
	R62527	Tuning Shaft Assembly (101.810-1A)
T1	R60417	Transformer - 1st I. F.
T2	R60418	Transformer - 2nd I. F.
	R60462	Tuning Shaft Assembly (101.810,-2,-3)
	R60450	Wafer - Electrolytic Capacitor Mtg.
	R60472	Washer - Felt
	R46042	Washer - Phono Socket Insulating (101.810-1A)
	R60439	Washer - Spring - Tuner Assembly
	R61815	Washer - Metal Pulley Retaining (101.810-1A)

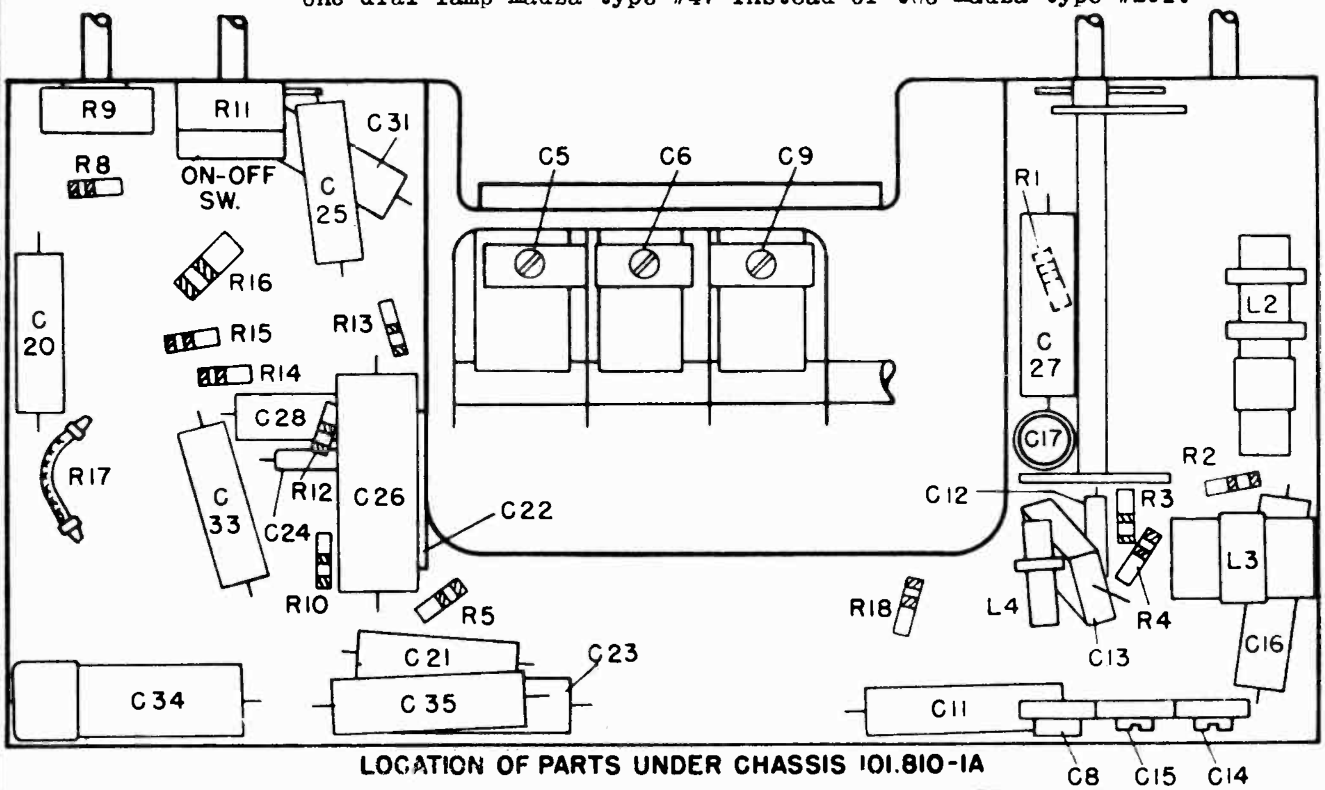
MODELS 7090,8092
CHASSIS 101.810-2,
101.810-1A

SEARS, ROEBUCK & CO.

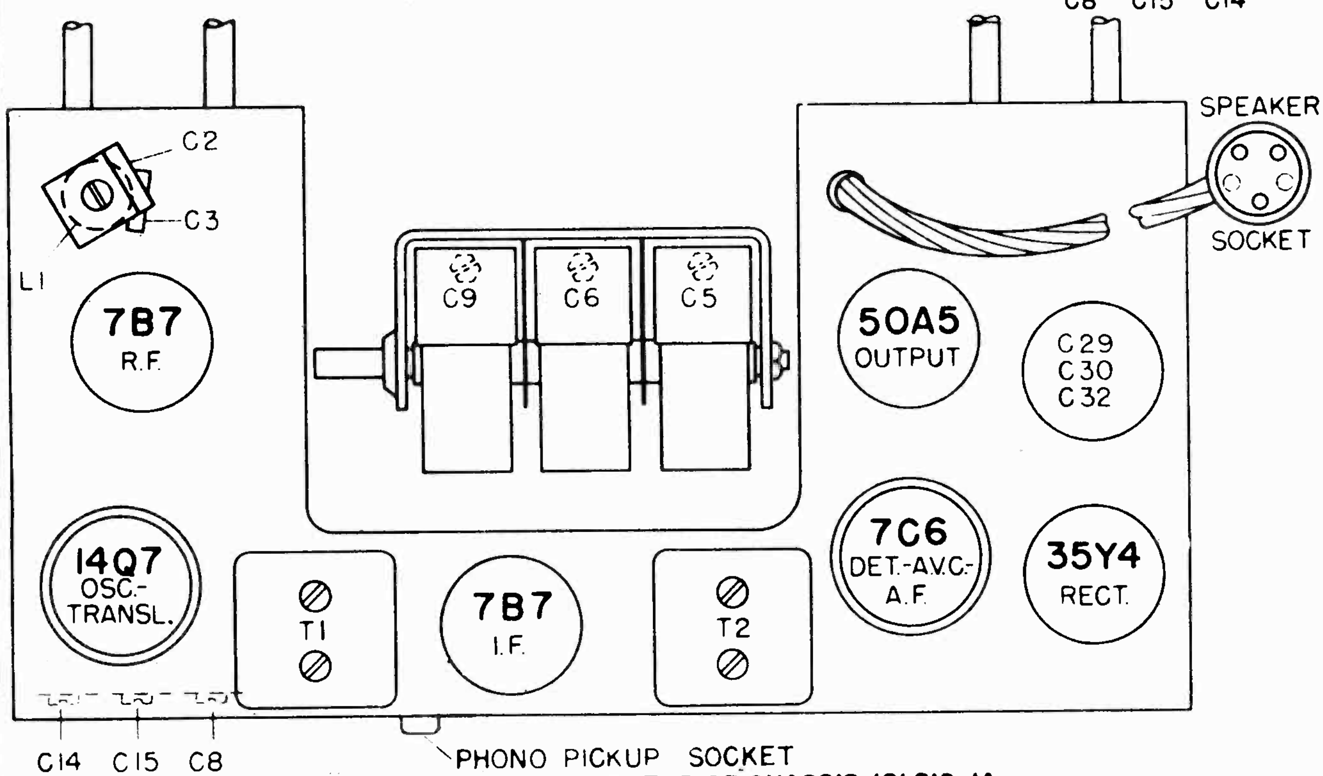
Chassis Differences:

101.810-1A - Chassis similar to 101.810-3 except linear dial.

101.810-2 - Chassis same as 101.810 except new type tone control and uses one dial lamp Madza type #47 instead of two Madza type #291.



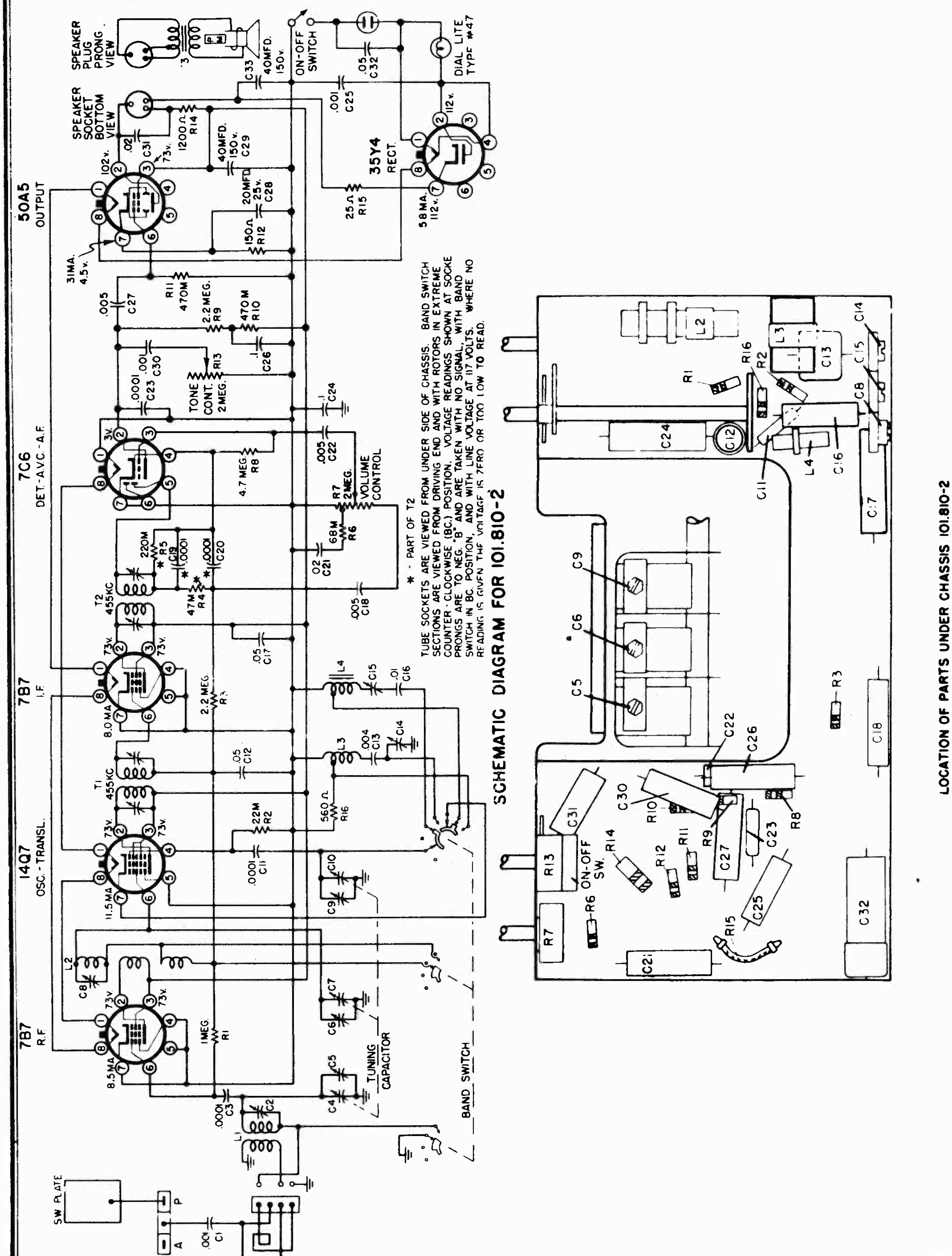
LOCATION OF PARTS UNDER CHASSIS 101.810-1A



LOCATION OF PARTS ON TOP OF CHASSIS 101.810-1A

SEARS, ROEBUCK & CO.

MODEL 7090
CHASSIS 101.810-2



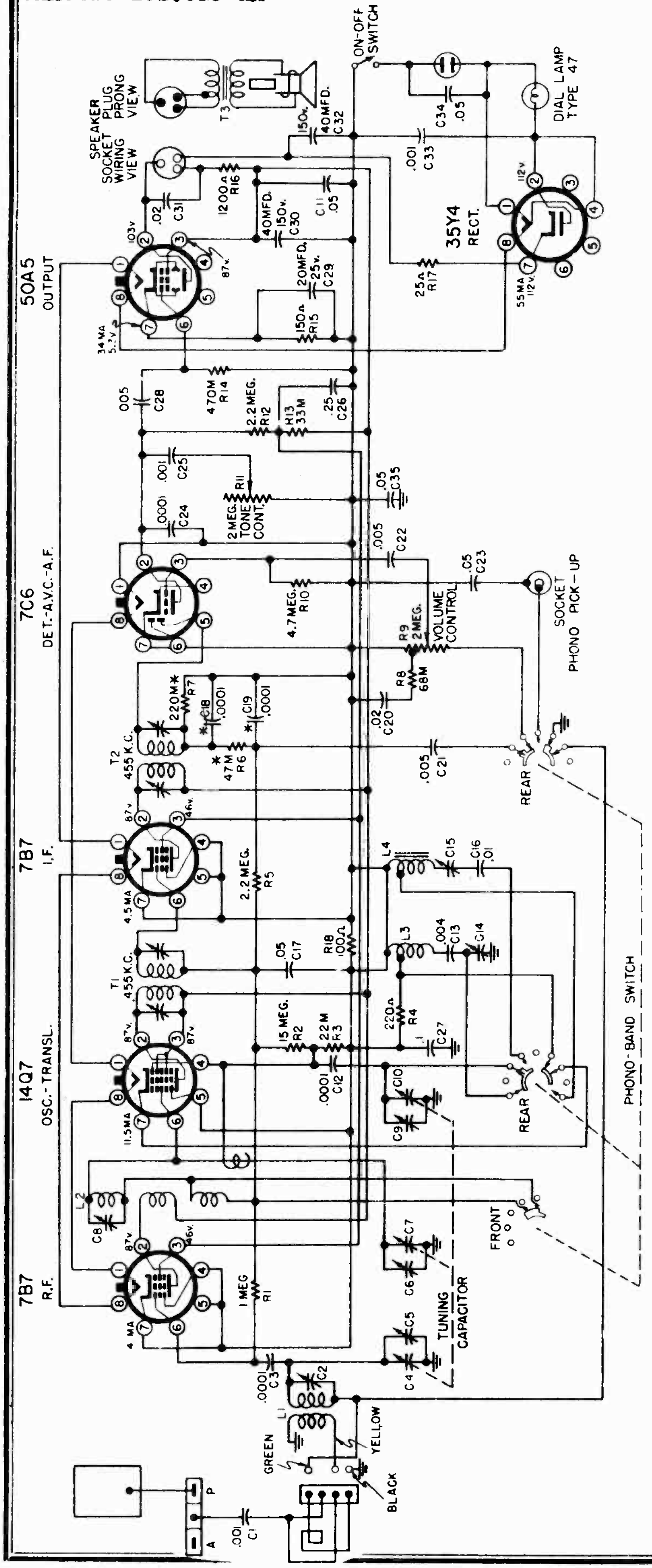
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. BAND SWITCH SECTIONS ARE VIEWED FROM DRIVING END AND WITH ROTORS IN EXTREME COUNTER-CLOCKWISE (BC.) POSITION. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO NEG. "B" AND ARE TAKEN WITH NO SIGNAL, WITH BAND SWITCH IN BC. POSITION, AND WITH LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.

SCHEMATIC DIAGRAM FOR 101.810-2

LOCATION OF PARTS UNDER CHASSIS 101.810-2

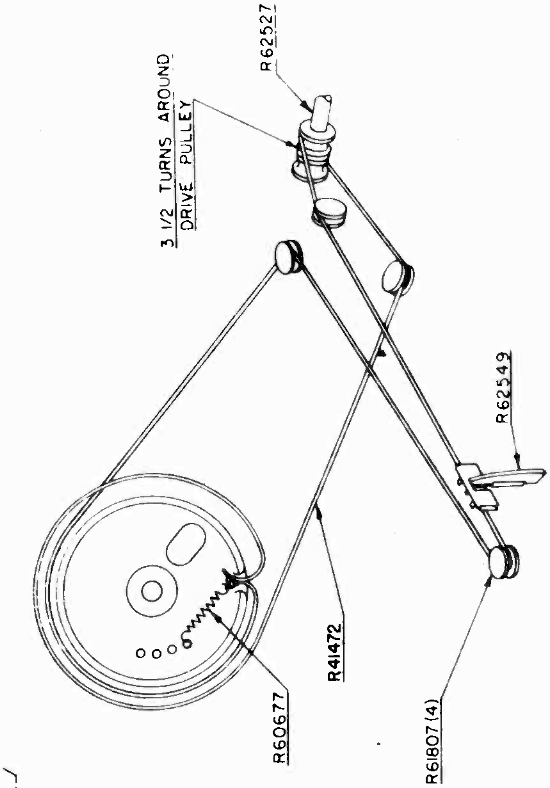
MODEL 8092
CHASSIS 101.810-1A

SEARS, ROEBUCK & CO.



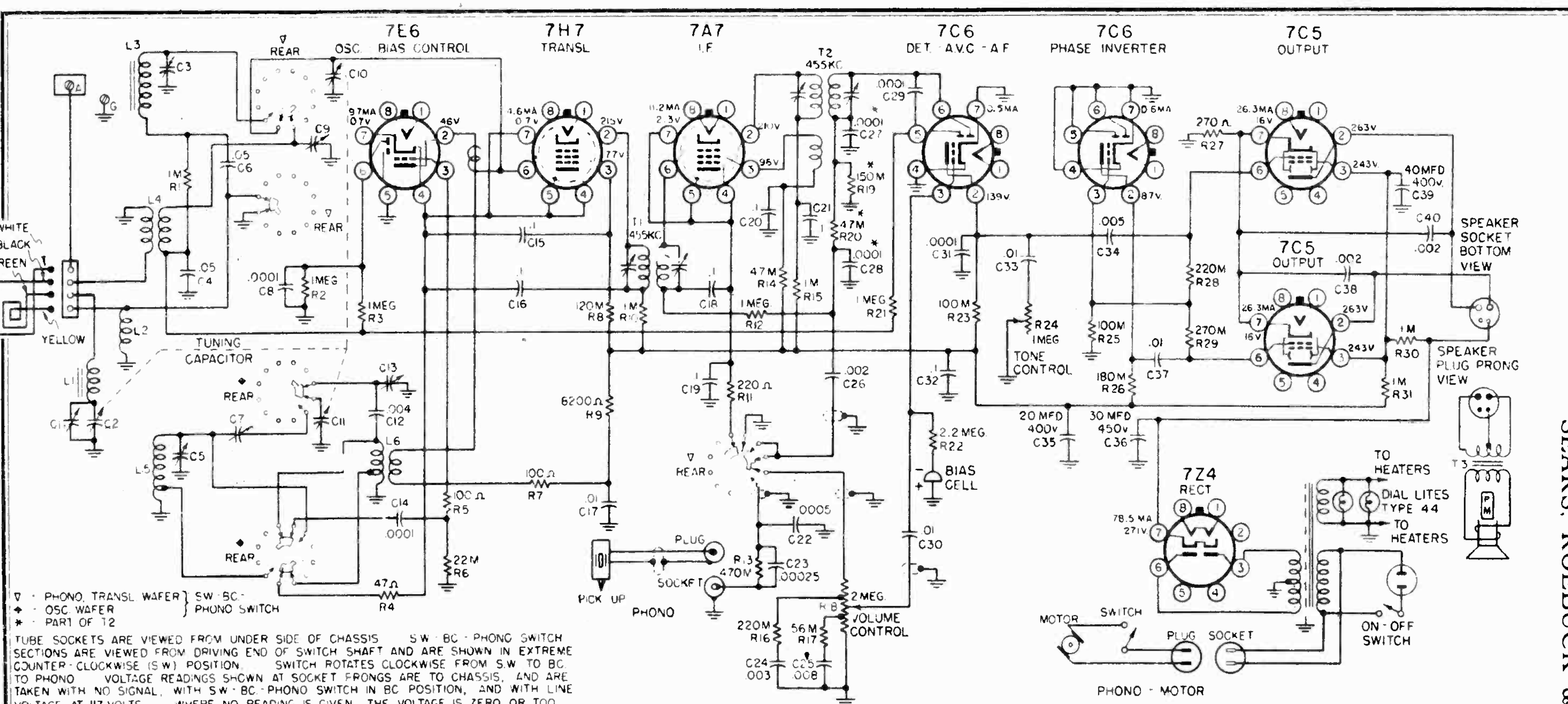
*-PART OF T2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO NEGATIVE "B" AND ARE TAKEN WITH NO SIGNAL, WITH PHONO-BAND SWITCH IN BC. POSITION, AND WITH LINE VOLTAGE AT 117 VOLTS. VOLTAGES SHOWN ARE TAKEN WITH A VOLTMETER HAVING A RESISTANCE OF ONE THOUSAND OHMS PER VOLT. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.
PHONO-BAND SWITCH IS SHOWN IN EXTREME COUNTER-CLOCKWISE (S.W.) POSITION (VIEWED FROM SHAFT END) AND ROTATES CLOCKWISE FROM S.W. TO BC. TO PHONO. SECTIONS MARKED "REAR" ARE TRANSPARENT VIEWS.

SCHEMATIC DIAGRAM FOR 101.810-1A



STRING & POINTER HOOKUP FOR 101.810-1A

SEARS, ROEBUCK & CO. MODELS 7105,7106
CHASSIS 101.828,101.828-1A



▽ - PHONO, TRANSL. WAFER
◆ - OSC. WAFER } SW - BC - PHONO SWITCH
* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. SW - BC - PHONO SWITCH SECTIONS ARE VIEWED FROM DRIVING END OF SWITCH SHAFT AND ARE SHOWN IN EXTREME COUNTER - CLOCKWISE (SW) POSITION. SWITCH ROTATES CLOCKWISE FROM SW TO BC TO PHONO. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL, WITH SW - BC - PHONO SWITCH IN BC POSITION, AND WITH LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R61034	Background - Dial
	R60493	Ball - .125 Dia. Tuner Unit Assembly
	R60982	Ball - .093 Dia. Tuner Unit Assembly
	R60713	Bar - Plunger
	R17998	Board - Antenna
	R61094	Bracket & Trimmer Assembly (101.828-1A)
	R13961	Button - Snap
	R60739	Button - Push
C18,C19		Capacitor - .1 Mfd. 200 V.
C15,C16,C20, C21,C32		Capacitor - .1 Mfd. 400 V.
C17,C33		Capacitor - .01 Mfd. 400 V.
C30,C37		Capacitor - .01 Mfd. 600 V.
C4,C6		Capacitor - .05 Mfd. 200 V.
C26,C38,C40		Capacitor - .002 Mfd. 600 V.
C24		Capacitor - .003 Mfd. 400 V.
C34		Capacitor - .005 Mfd. 400 V.
C25		Capacitor - .008 Mfd. 400 V.
C12		Capacitor - .004 Mfd. Mica
C8,C14,C29, C31		Capacitor - 100 Mmfd. Mica
C23		Capacitor - 250 Mmfd. Mica
C22		Capacitor - 500 Mmfd. Mica
C35,C36,C39	R61455	Capacitor - Electrolytic, 20 Mfd. 400 V. 30 Mfd. 450 V., 40 Mfd. 400 V.
C2,C10,C11	R61436	Capacitor - Variable
C3,C9	R61462	Capacitor - Trimmer - 2 Gang
C1,C5,C7,C13	R61441	Capacitor - Trimmer - 4 Gang
	R17915	Cell - Bias
	R57293	Clip - Open Link
L5,L6	R61410	Coil - Oscillator - BC. & S.W.
L1	R61466	Coil - Antenna Loop Loading
L4	R61460	Coil - S. W. Antenna
L3	R61498	Coil - BC. Translator
L2	R62300	Coil - Preselector Coupling
R18	R47240	Control - Volume
R24	R60738	Control - On-Off & Tone
	R60983	Cord - Dial Drive
	R60993	Cord - Line
	R61033	Covers - Tab - Celluloid
	R61192	Diffuser - Pilot Lamp
	R61472	Escutcheon Assembly (With Dial Glass)
	R60741	Escutcheon (Without Dial Glass)
	R61470	Dial - Station - Glass
	R61080	Friction Arm Assembly (101.828-1A)
	R60747	Knob - On-Off & Tone
	R60749	Knob - Tuning
	R60750	Knob - Volume
	R61480	Knob - Wave Switch & Phono
		Lamp - Mazda Type #44
	R54685	Leaflet - Instruction (101.828)
	R54698	Leaflet - Instruction (101.828-1A)
	R61478	Loop Assembly (101.828)
	R61496	Loop Assembly (101.828-1A)
	R57272	Plug - 1 Prong - Phono Input
	R60898	Plunger & Yoke Assembly
	R61007	Pointer - Dial
	R42943	Pulley - Wood
	R43416	Pulley - Wood
	R61571	Pulley - Wood
	R60442	Pulley - Tuning Shaft Assembly
R4		Resistor - 47 Ohm - 1/3 Watt
R5,R7		Resistor - 100 Ohm - 1/3 Watt
R11		Resistor - 220 Ohm - 1/3 Watt
R1,R10,R15		Resistor - 1000 Ohm - 1/3 Watt
R6		Resistor - 22,000 Ohm - 1/3 Watt
R14		Resistor - 47,000 Ohm - 1/3 Watt
R17		Resistor - 56,000 Ohm - 1/3 Watt
R23,R25		Resistor - 100,000 Ohm - 1/3 Watt
R8		Resistor - 120,000 Ohm - 1/3 Watt
R26		Resistor - 180,000 Ohm - 1/3 Watt
R16,R28		Resistor - 220,000 Ohm - 1/3 Watt
R29		Resistor - 270,000 Ohm - 1/3 Watt
R13		Resistor - 470,000 Ohm - 1/3 Watt
R2,R3,R12, R21		Resistor - 1 Megohm - 1/3 Watt
R22		Resistor - 2.2 Megohm - 1/3 Watt
R30,R31		Resistor - 1000 Ohm - 1 Watt
R9		Resistor - 8200 Ohm - 1 Watt
R27		Resistor - 270 Ohm - 2 Watt
	R60754	Shaft - Tuning Assembly
	R17981	Socket - 4 Prong Reg. - Speaker
	R44897	Socket - 1 Prong - Phono Input
	R44145	Socket - 2 Prong A.C. - (Rec. Chgr.)
	R57049	Socket - Tube - 8 Prong Lock-in Wafer
	R61014	Socket - Pilot Lamp
	R61013	Socket - Tube - 8 Prong Lock-in Molded
		WHEN ORDERING SPEAKER PARTS ALWAYS GIVE THE PART NUMBER ON THE SPEAKER
	R61437	Speaker - 10" P. M.
	R61036	Cone & Voice Coil
T3	R61439	Output Transformer
	R60677	Spring - Extension - Dial Drive
	R60427	Spring - Extension - Tuner Unit
	R60437	Spring - Compression - Tuner Unit
	R61092	Spring - Counterbalance (101.828-1A)
	R61458	Switch - 3 Pos. - Tuner Unit
	R61454	Switch - Wave - 3 Pos. - Under Chassis
	R60752	Tabs - Call Letter
T1	R61431	Transformer - I. F. #1
T2	R61432	Transformer - I. F. #2
T4	R61433	Transformer - Power
	R61434	Tuner & R. F. Assembly

Power Supply:
All models available

117 Volts 60 Cycle AC 100 Watts

Frequency Range:

Standard Broadcast.......540-1600 KC
Shortwave...................6-16 MC

Model Differences:

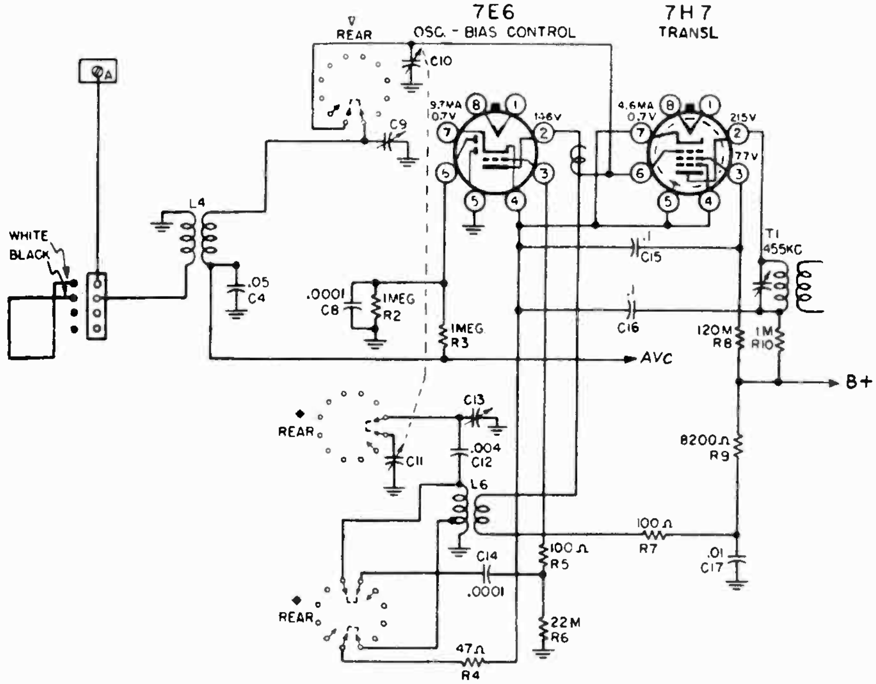
101.828 Cabinet is a Vertical Console
101.828-1A Cabinet is a Walnut Loboy

RECORD CHANGER: Sears Model 101.206-2, RCD.CH. 18-6

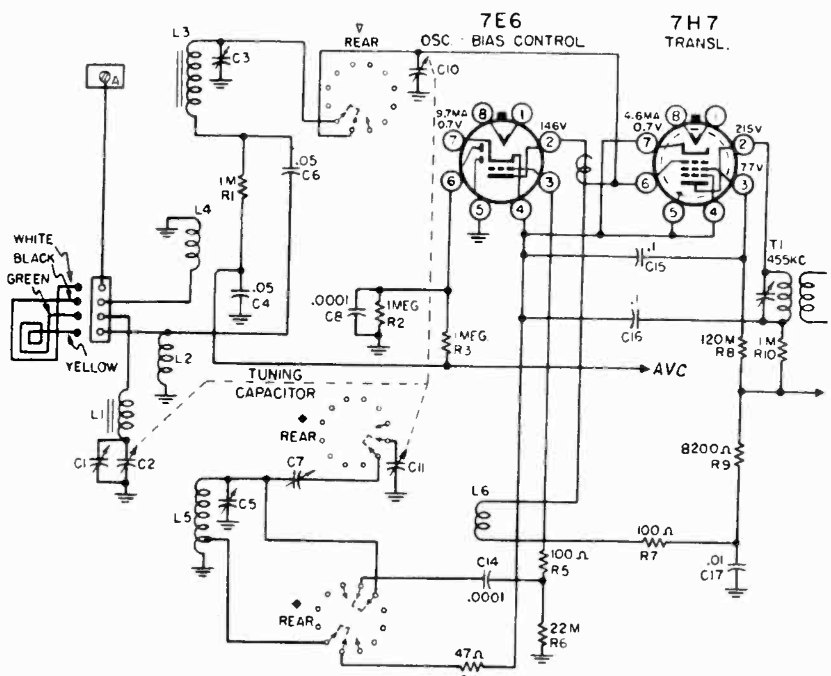
CLARI-SKEMATIX
Registered Trademark

MODELS 7105,7106
CHASSIS 101.828,101.828-1A

SEARS, ROEBUCK & CO.



BAND-SWITCH SHOWN
AT 1ST POSITION.
SHORT WAVE BAND
6-16 MC



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

SEARS, ROEBUCK & CO. MODELS 7105,7106
CHASSIS 101.828,101.828-1A

IMPORTANT ALIGNMENT NOTES

The Alignment must be done in the order given.

The Alignment Procedure should be repeated step by step in the original order for greatest 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.

During alignment of the BC Band Padder and the SW Band Translator Trimmers, the Tuner should be rocked through resonance to assure alignment.

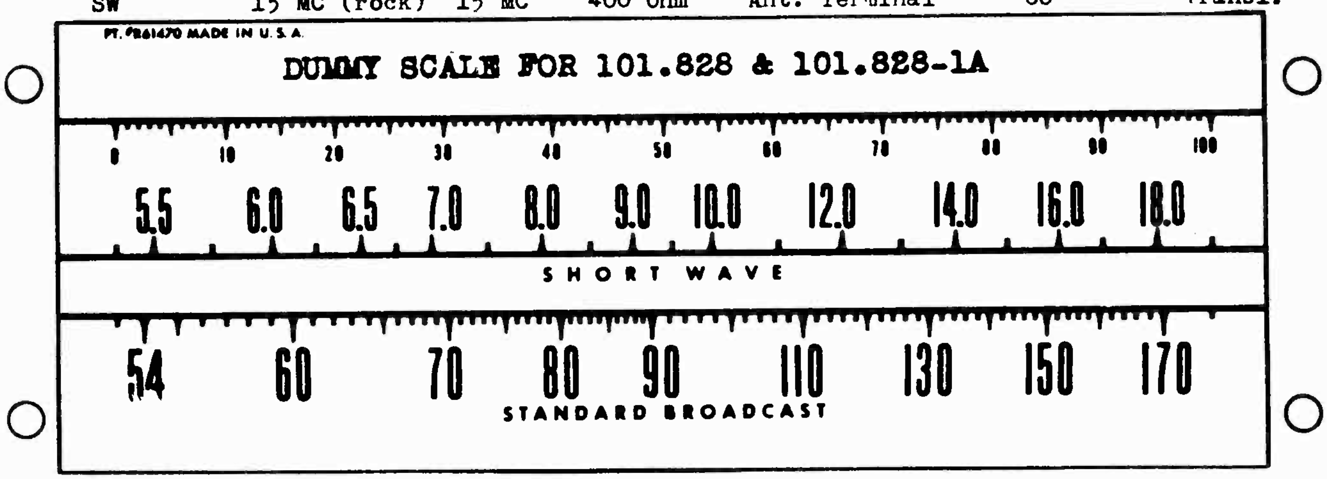
Power Output — Undistorted 3.6 Watts — Maximum 6.5 Watts

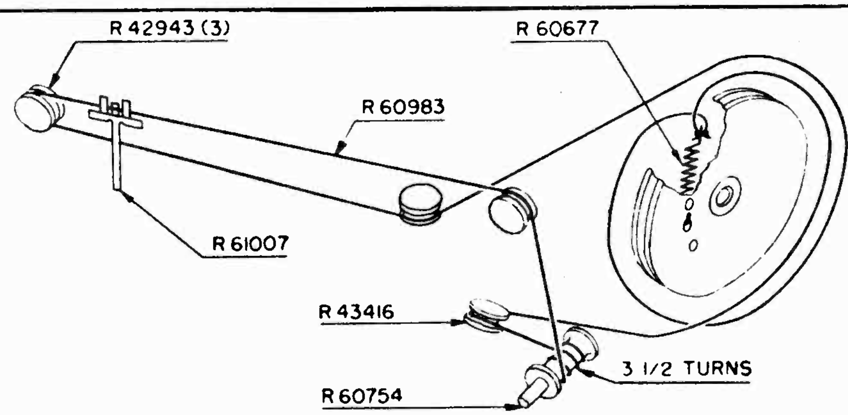
ALIGNMENT PROCEDURE

Preliminary:

Output Meter Reading to Indicate .5 Watts Across Voice Coil..................1.2 Volts
Generator Ground Lead Connection..................................Receiver Chassis
Generator Modulation..30%, 400 Cycles
Position of Volume Control...Fully on
Position of Tone Control...Treble
Position of Pointer with Tuner Fully Closed......Last Line Below 540 Calibration Mark

WAVE BAND SWITCH POSITION	POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION
BC	Closed	455 KC	0.1 Mfd.	7H7 Transl. Grid	T2, T1	I. F.
BC	1410 KC	1410 KC	.0002 Mfd.	Ant. Terminal	C1	Oscillator
BC	1410 KC	1410 KC	.0002 Mfd.	Ant. Terminal	C2	Transl.
BC	1410 KC	1410 KC	.0002 Mfd.	Ant. Terminal	C3	Antenna
BC	600 KC (rock)	600 KC	.0002 Mfd.	Ant. Terminal	C4	Padder
SW	15 MC	15 MC	400 Ohm	Ant. Terminal	C5	Oscillator
SW	15 MC (rock)	15 MC	400 Ohm	Ant. Terminal	C6	Transl.

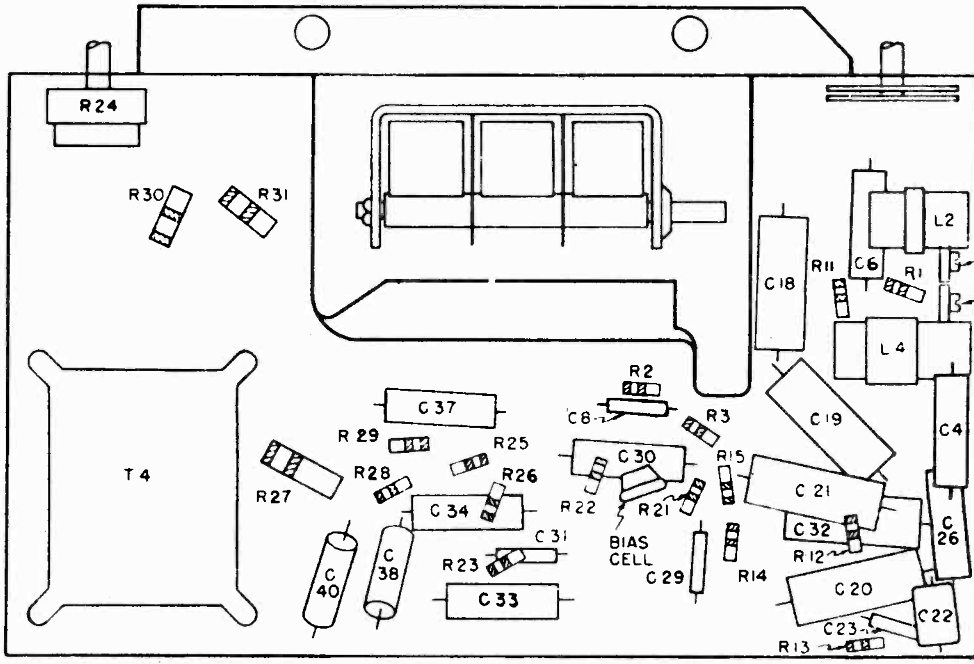




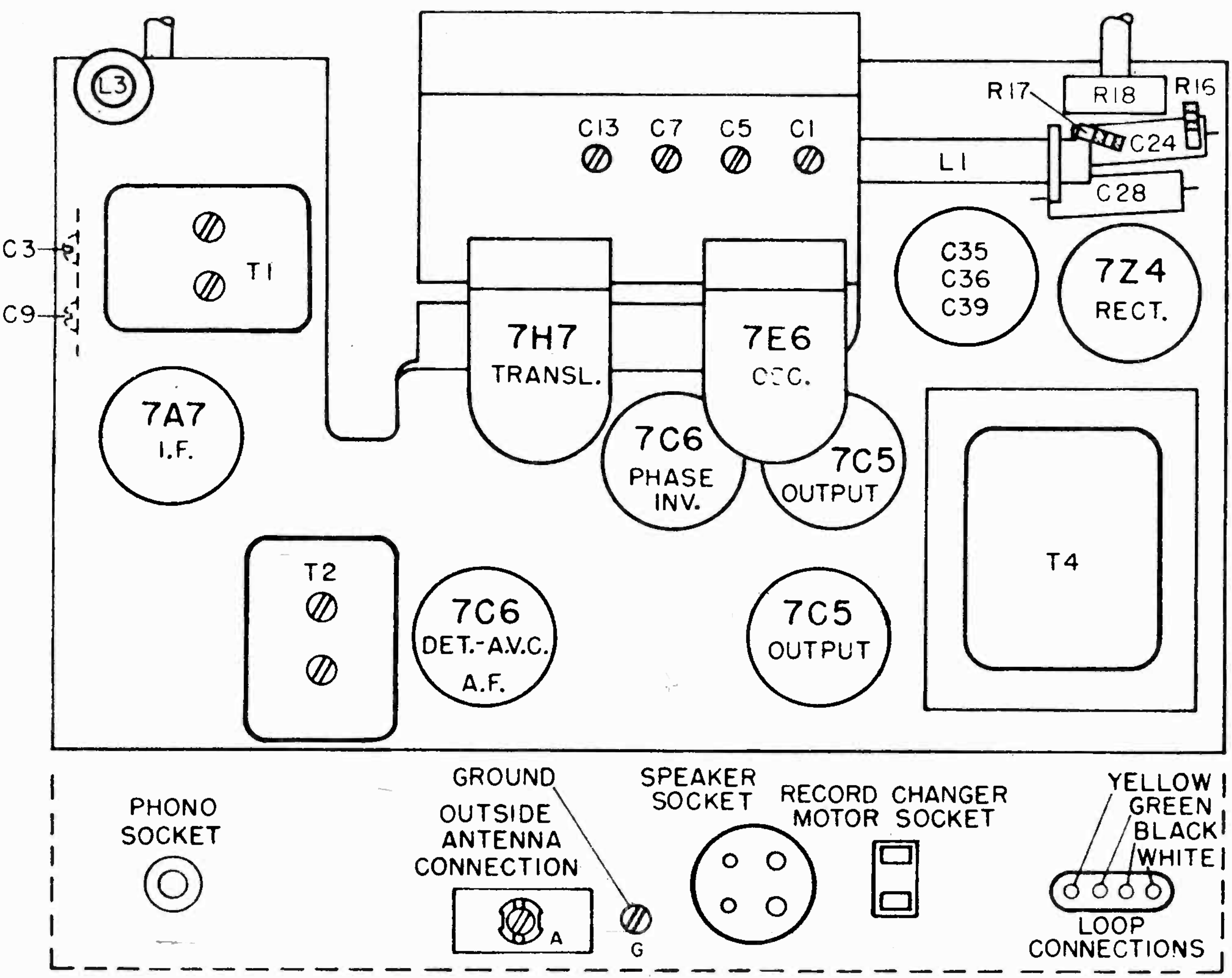
STRING AND POINTER HOOKUP

MODELS 7105, 7106
CHASSIS 101.828, 101.828-1A

SEARS, ROEBUCK & CO.



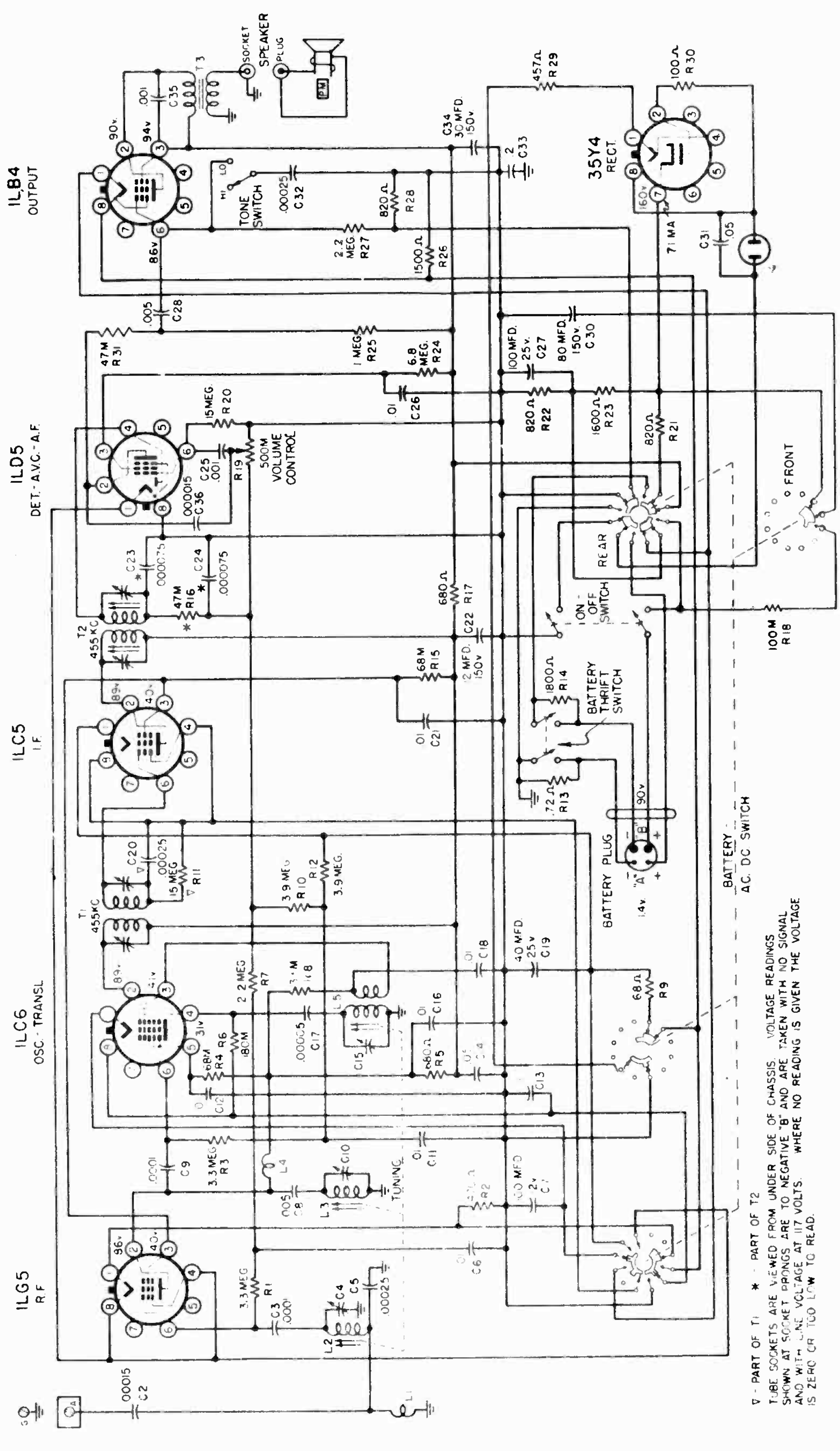
LOCATION OF PARTS ON BOTTOM OF CHASSIS



LOCATION OF PARTS ON TOP OF CHASSIS

SEARS, ROEBUCK & CO.

MODEL 7226
CHASSIS 101.819A



SCHEMATIC DIAGRAM FOR 101.819A

MODEL 7226
CHASSIS 101.819A

SEARS, ROEBUCK & CO.

PRELIMINARY:

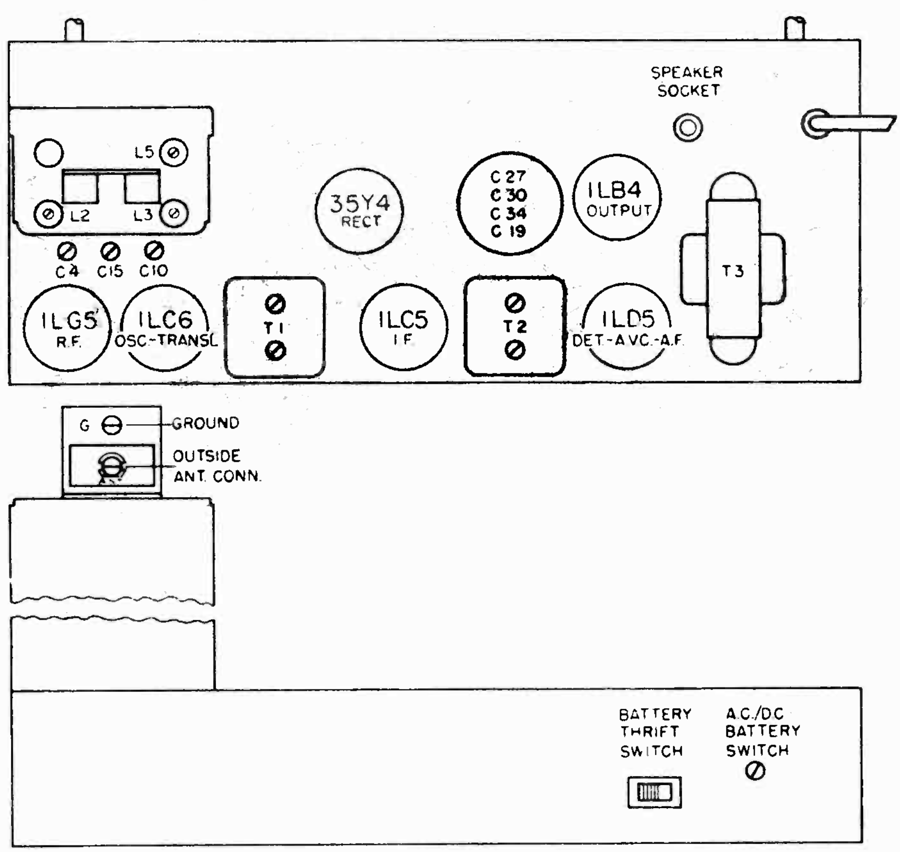
Output meter connections..............................Across loud speaker voice coil
Output meter reading to indicate 50 milliwatts (Standard output)..............0.4 Volt
Generator ground lead connection...................................Receiver chassis
Dummy antenna value to be in series with generator 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 Tone Control...HI
Position of pointer with tuner fully closed....To the left of 540 Kc calibration mark

POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	ADJUSTMENTS (IN ORDER SHOWN)	FUNCTION
Closed	455 Kc.	.1 mfd.	1LC6 Transl. Grid	T2,T1	I.F.
1725	1725 Kc.	.000075 mfd.	Ant. Terminal	C15	Oscillator
1725	1725 Kc	.000075 mfd.	Ant. Terminal	C4,C10	Ant., Transl.
1500	1500 Kc	.000075 mfd.	Ant. Terminal	L5	Oscillator Core
1500	1500 Kc	.000075 mfd.	Ant. Terminal	L2,L3	Ant., Transl. Cores
1725	1725 Kc	.000075 mfd.	Ant. Terminal	C4,C10,C15	Oscillator, Ant., & Transl. Recheck

The alignment must be done in the order given.

The Alignment Procedure snould be repeated step by step in the original order for greatest accuracy.

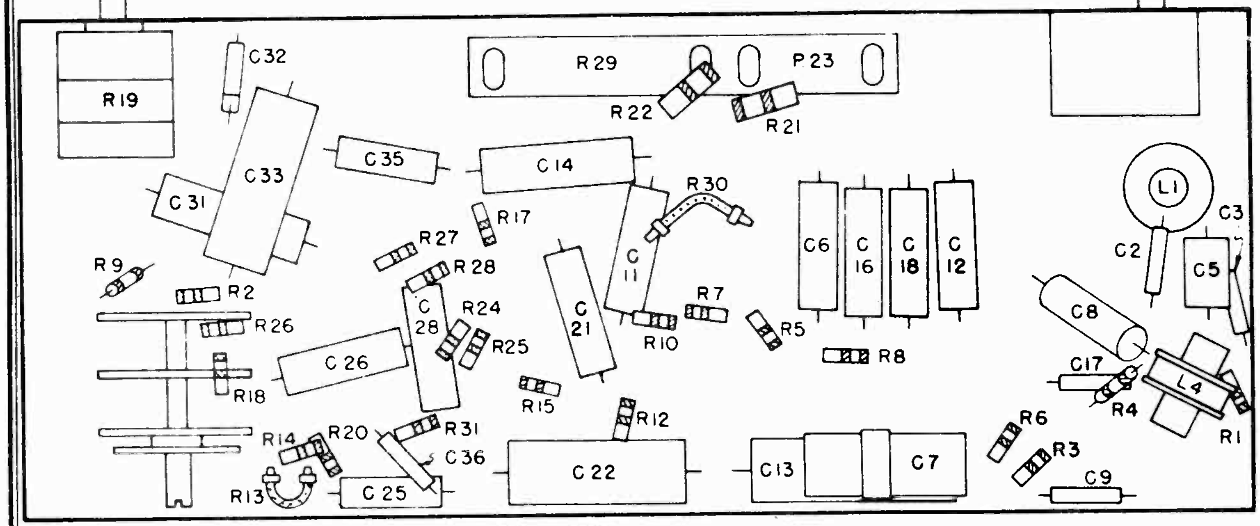
Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

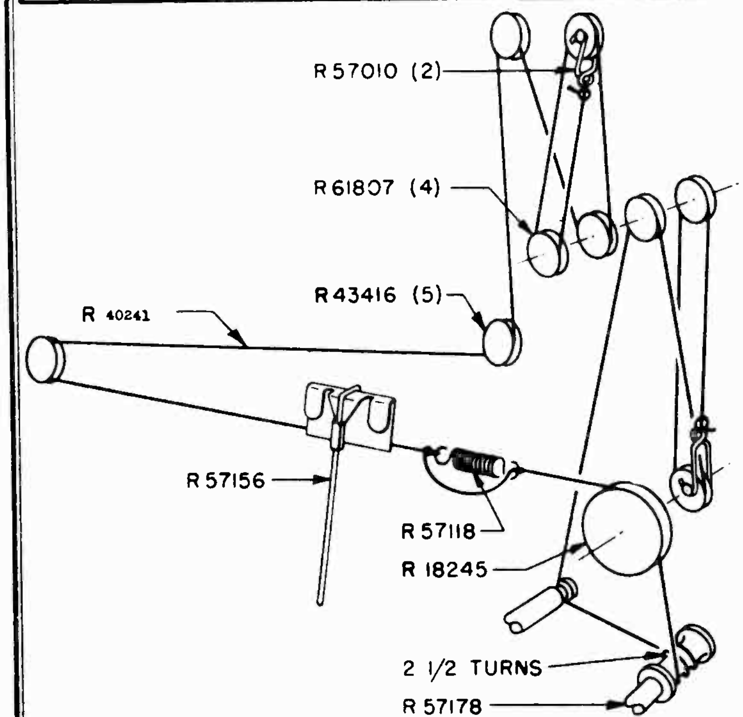


LOCATION OF PARTS ON TOP AND BACK OF CHASSIS

SEARS, ROEBUCK & CO.

MODEL 7226
CHASSIS 101.819A





STRING AND POINTER HOOKUP

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R57145	Antenna Package
	R57174	Bushing - Drive Shaft
	R13961	Button Snap - Dial Mtg.
C13		Capacitor - .1 Mfd. 200 V.
C33		Capacitor - .2 Mfd. 200 V.
C6,C11,C12, C16,C18,C21, C26		Capacitor - .01 Mfd. 200 V.
C14		Capacitor - .05 Mfd. 200 V.
C31		Capacitor - .05 Mfd. 400 V.
C25,C35		Capacitor - .001 Mfd. 600 V.
C8,C28		Capacitor - .005 Mfd. 400 V.
C36		Capacitor - Mica - 15 Mmfd.
C17		Capacitor - Mica - 50 Mmfd.
C3,C9		Capacitor - Mica - 100 Mmfd.
C2		Capacitor - Mica - 150 Mmfd.
C32		Capacitor - Mica - 250 Mmfd.
C5	R46799	Capacitor - Silver Mica - 280 Mmfd. 500 V.
C19,C27,C30	R60803	Capacitor - Elect. 30 Mfd. 150 V., 40 Mfd. 25 V., 100 Mfd. 25 V., 80 Mfd. 150 V.
C22	R61840	Capacitor - Dry Elect. - 12 Mfd. 150 V.
C7	R62274	Capacitor - Dry Elect. - 100 Mfd. 12 V.
C4,C10,C15	R57081	Capacitor - Trimmer - 3 Gang
L1,L4	R45255	Coil - Choke - Antenna
R19	R57071	Control - On-Off - Volume & Tone
	R40241	Cord - Dial Drive
	R17166	Cord - Line
	R61816	Cover - Dial
	R45067	Cover - Perm. Coil Unit
	R61801	Dial - Station
	R57150	Knob - On-Off & Volume
	R57151	Knob - Tuning
	R57153	Knob - Tone Control
	R64166	Leaflet - Instruction
	R40457	Plug - Battery - 4 Prong
	R63019	Pointer - Dial
	R18245	Pulley - Wood
	R43416	Pulley - Wood
	R57017	Pulley - Drive Shaft
	R61807	Pulley - Metal

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
R9		Resistor - 68 Ohm - 1/3 Watt
R2		Resistor - 470 Ohm - 1/3 Watt
R5,R17		Resistor - 680 Ohm - 1/3 Watt
R28		Resistor - 820 Ohm - 1/3 Watt
R26		Resistor - 1500 Ohm - 1/3 Watt
R14		Resistor - 1800 Ohm - 1/3 Watt
R8		Resistor - 33,000 Ohm - 1/3 Watt
R31		Resistor - 47,000 Ohm - 1/3 Watt
R4,R15		Resistor - 68,000 Ohm - 1/3 Watt
R18		Resistor - 100,000 Ohm - 1/3 Watt
R6		Resistor - 180,000 Ohm - 1/3 Watt
R25		Resistor - 1 Megohm - 1/3 Watt
R7,R27		Resistor - 2.2 Megohm - 1/3 Watt
R1,R3		Resistor - 3.3 Megohm - 1/3 Watt
R10,R12		Resistor - 3.9 Megohm - 1/3 Watt
R24		Resistor - 6.8 Megohm - 1/3 Watt
R20		Resistor - 15 Megohm - 1/3 Watt
R21,R22		Resistor - 820 Ohm - 1 Watt
R13	R45254	Resistor - Flexohm .72 Ohm - 1/2 Watt
R30	R61219	Resistor - Glassohm 100 Ohm - 2 Watt
R23,R29	R61838	Resistor - Wire Wound 2 Section Candohm 475 Ohm - 1800 Ohm
	R57178	Shaft - Drive Assembly - Dial
	R44497	Socket - 1 Prong - Speaker Connector
	R57049	Socket - Tube - 8 Prong Lock-In
		WHEN ORDERING SPEAKER PARTS ALWAYS GIVE THE PART NUMBER OF THE SPEAKER
	R57061	Speaker - 5½" P.M.
	R57118	Spring - Extension - Dial
	R57038	Switch - Thrift
	R61828	Switch - A.C. - Battery Changeover
T1	R57120	Transformer - I. F. #1
T2	R62571	Transformer - I. F. #2
T3	R62213	Transformer - Output
	R61814	Tuner Permeability Unit
	R61824	Coil - Antenna
	R61676	Coil - Oscillator
	R61679	Coil - R. F.
	R61819	Core Slide Bracket Assembly
	R61830	Wafer - Elect. Capacitor Mtg.
	R45169	Washer - ...

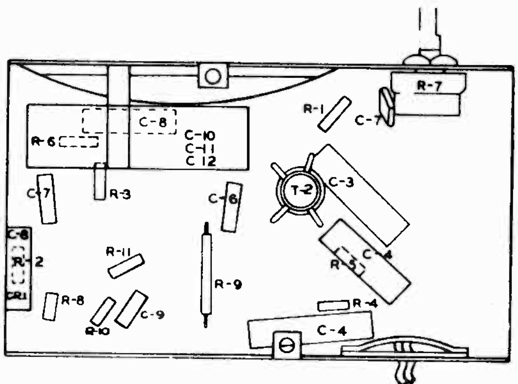
MODEL 8003
CHASSIS 132.818-1

SEARS, ROEBUCK & CO.

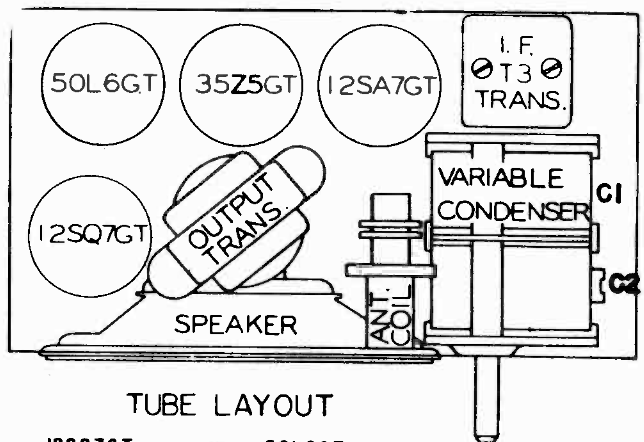
SPECIFICATIONS

Power Supply -- 105-125 Volts AC-DC, 30 Watts
Power Output
Undistorted .8 Watts, Maximum - 2.5 Watts

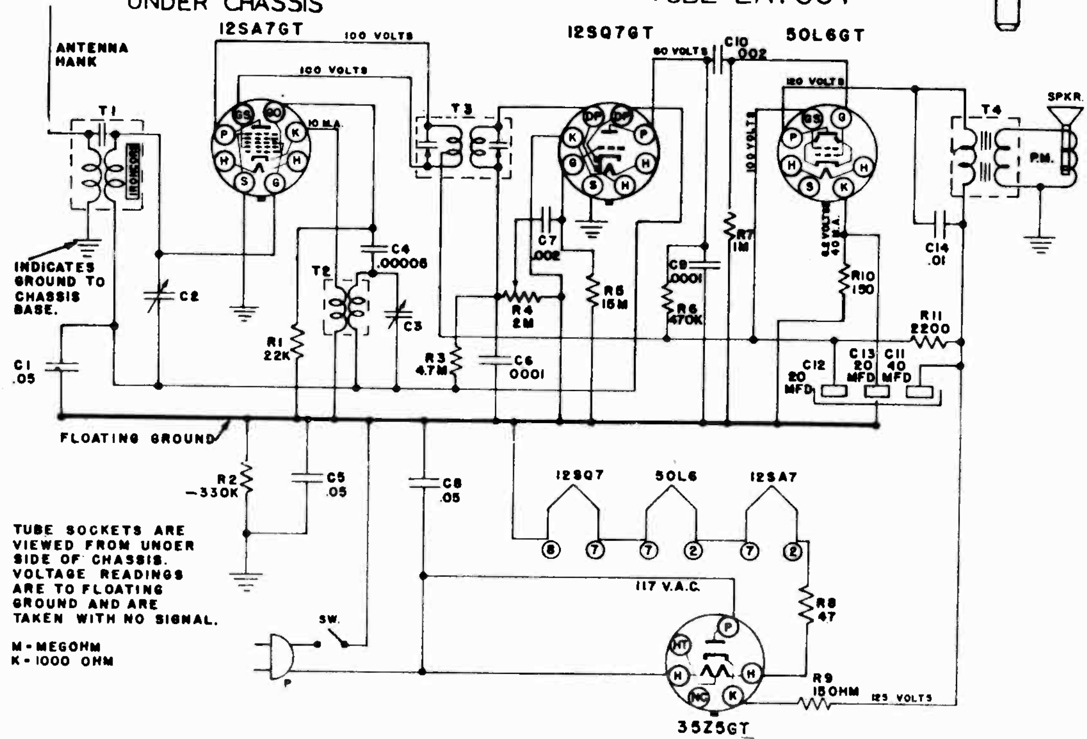
Tuning Range Broadcast Band 540-1600 Kc
Speaker
Voice Coil Impedance 3.2 Ohms



LOCATION OF PARTS UNDER CHASSIS



TUBE LAYOUT



SCH. LOC.	PART NO.	DESCRIPTION
	N19936-2	Cabinet, gray-green
T1	N18255	Coil, antenna
T2	N18256	Coil, oscillator
C1		Condenser, .05 mfd., 200 v
C2,C3	N17115	Condenser, variable, 2-gang
C4		Condenser, .00005 mfd., 500 v,mica
C5,C8		Condenser, .05 mfd., 400 v
C6,C9		Condenser, .0001 mfd., 500 v
C7,C10		Condenser, .002 mfd., 600 v
C11)	N19176	Condenser, 40 mfd., 150 v
C12)		Condenser, 20 mfd., 150 v
C13)		Condenser, 20 mfd., 25 v
C14		Condenser, .01 mfd., 400 v
	N20237	Cord, Power
	N21923	Emblem, Dial Scale
	N19120-1	Knob, tuning
	N18673	Knob, volume
	N21925	Leaflet, instruction

M.U. CODE	SCH. LOC.	PART NO.	DESCRIPTION
	R1		Resistor, 22,000 Ohms, 1/4 w
	R2		Resistor, 330,000 ohms 1/4 w
	R3		Resistor, 4.7 megohms, 1/4 w
	R4	N18587	Resistor, 2 meg.,vol control & sw
AAO	R5		Resistor, 15 meg., 1/4 w
	R6		Resistor, 470,000 ohms, 1/4 w
	R7		Resistor, 1 meg., 1/4 w
	R8	N19177	Resistor, 470 ohms, 1 w
	R9		Resistor, 15 ohms, 1/4 w
	R10		Resistor, 150 ohms, 1/4 w
	R11		Resistor, 2200 ohms, 1 watt
	Spk.	N19937-1	Speaker & Output transformer assy.
		N21626-1	Speaker, 4" P. M.
	T4	N18258	Transformer, output
	T3	N19649	Transformer, I.F.
		N20040	Washer, white felt
		N18136	Wire, antenna

SEARS, ROEBUCK & CO.

MODEL 8003
CHASSIS 132.818-1
MODEL 8090
CHASSIS 101.821

MODEL 8003 CHASSIS 132.818-1
ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection .... Across speaker voice coil
Output meter reading to indicate 200 milliwatts .... .8 volt
Connection of generator ground lead .... Floating ground
Generator modulation .... 30%, 400 cycles
Position of volume control .... Fully clockwise
Position of dial pointer with variable fully closed .... 54 on dial

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION (high)	TRIMMERS ADJUSTED (in order shown)	TRIMMER FUNCTION
Open	455 kc	.05 mfd.	12SA7GT grid	Top of T3	I. F.
1400 kc	1400 kc	.00005 mfd.	**Antenna	*C2	Oscillator
600 kc	600 kc	.00005 mfd.	**Antenna	Check point	- - - - -

IMPORTANT ALIGNMENT NOTES

*Since the antenna stator section of the variable has no trimmer, the rotor is rocked back and forth while adjusting oscillator trimmer, to obtain maximum output.

Check the sensitivity at 600 kc; if weak, adjust antenna section plates for maximum output at 600 kc; tracking is accomplished by adjusting plates of rotor.

**Unsolder 20' antenna lead from lug on antenna coil, and connect signal generator lead to lug through .00005 mfd. Dummy Antenna.

Approximate stage by stage sensitivities are: Mixer - 455 kc - 2600 uv; Mixer 1000 kc - 2600 uv; Antenna - 1000 kc - 180 uv.

ALIGNMENT PROCEDURE
MODEL 8090 CHASSIS 101.821

PRELIMINARY:

Output meter reading to indicate 0.05 Watt across voice coil.................0.4 Volt

Generator ground lead connection.....................I.F. alignment-negative "B" lead
.....................Ant. alignment-Receiver chassis

Generator modulation..30%, 400 cycles

Position of volume control...Fully on

Position of pointer with tuner fully closed..Last line to left of 540 calibration mark on escutcheon or the second light brown mark from the left-hand end on the upper edge of the dial background.

POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION
Closed	455 Kc.	0.1 mfd.	Transl.-Grid	T2 & T1	I. F.
Fully open	1650 Kc.	.0002 mfd.	Antenna	C7	Oscillator
See note below	1410 Kc.	.0002 mfd.	Antenna	C3	Antenna

IMPORTANT ALIGNMENT NOTES:

NOTE: The 1410 Kc. calibration point is the first light brown mark from the right-hand edge of the dial background.

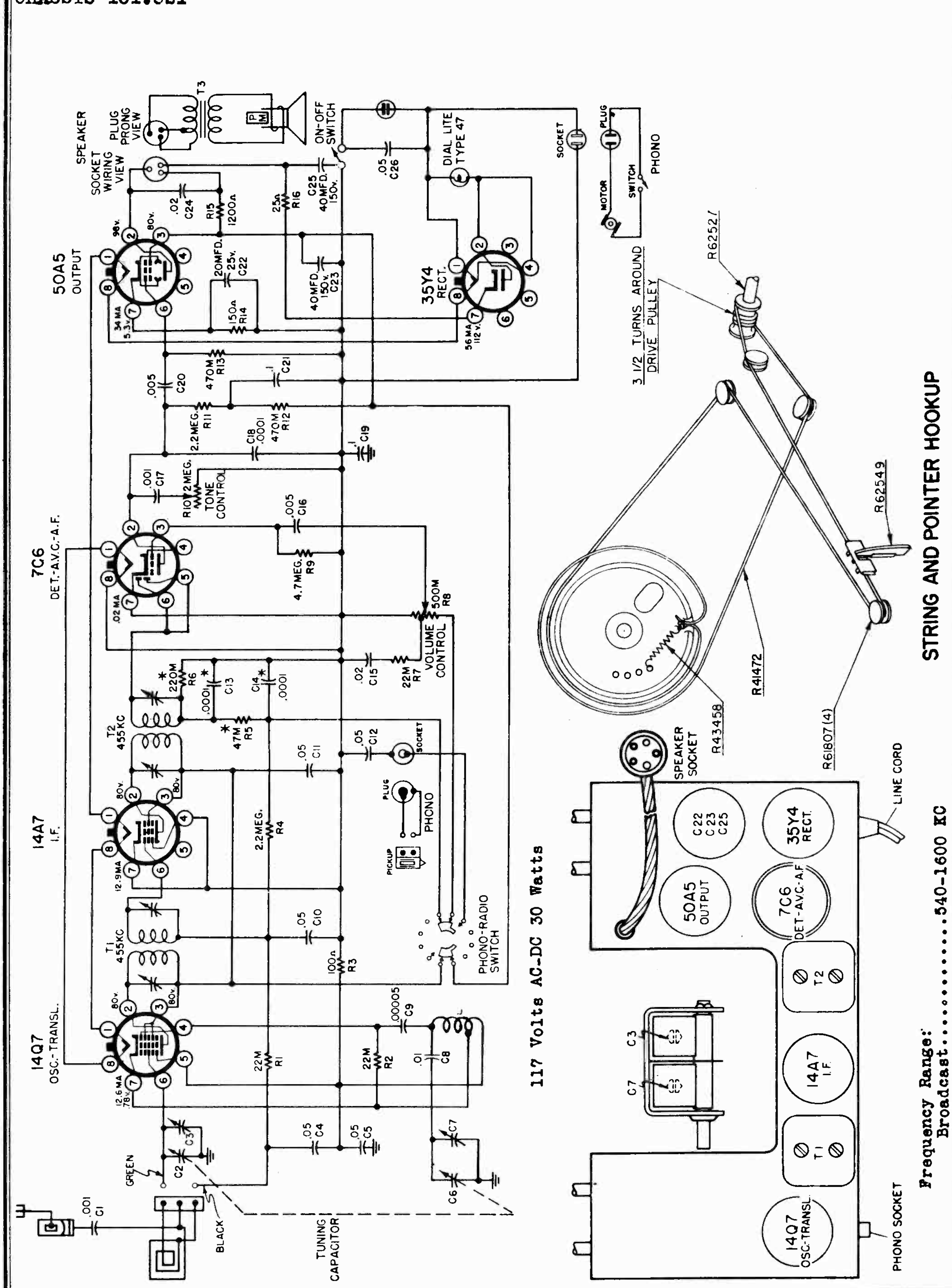
The alignment must be done in the order given.

The entire Alignment Procedure should be repeated step by step in the original order for greatest accuracy.

Always keep the output from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

MODEL 8090
CHASSIS 101.821

SEARS, ROEBUCK & CO.

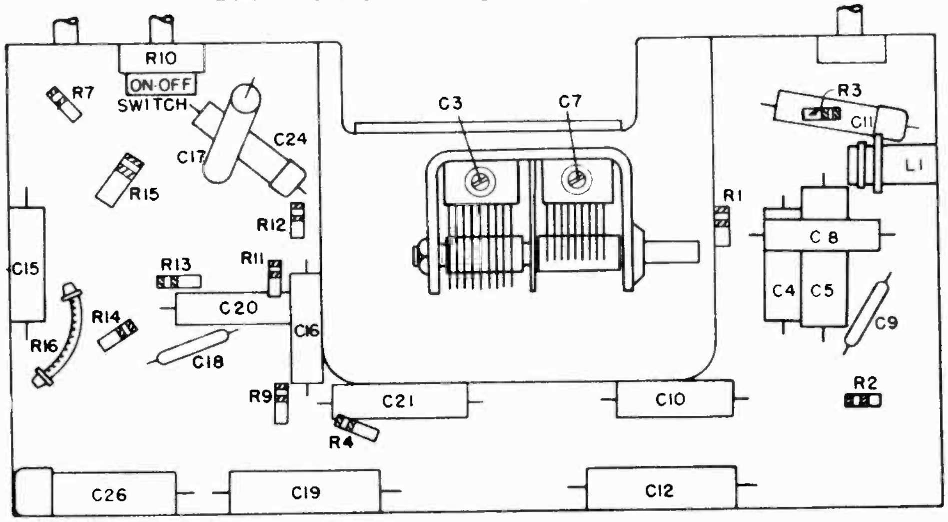


SEARS, ROEBUCK & CO.

MODEL 8090
CHASSIS 101.821

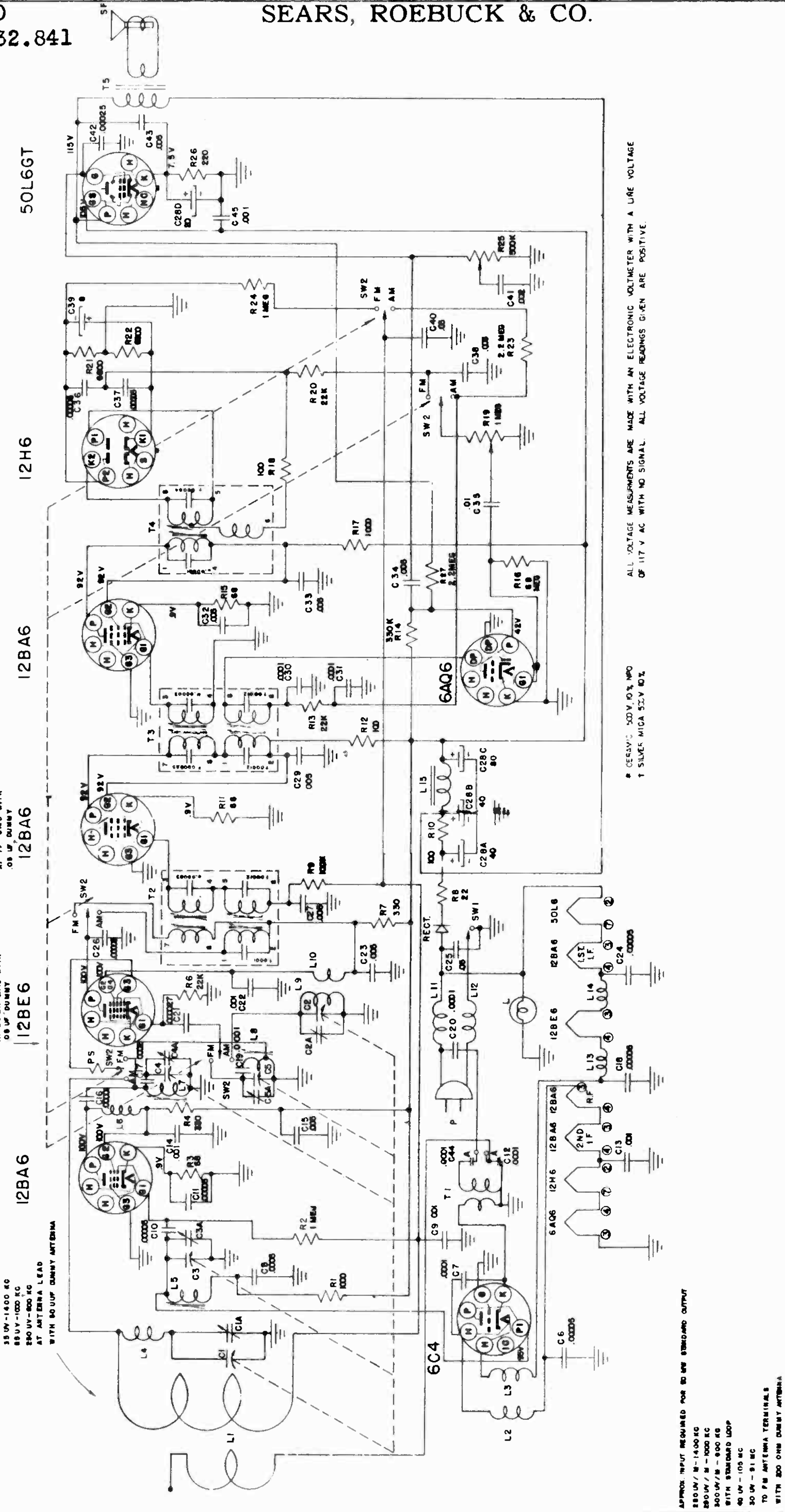
SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	R62643	Background - Dial
	R61846	Button - Snap
C16,C20		Capacitor - .005 Mfd. 600 Volt
C1,C17		Capacitor - .001 Mfd. 600 Volt
C4,C5,C10, C11,C12,C26		Capacitor - .05 Mfd. 600 Volt
C15,C24		Capacitor - .02 Mfd. 600 Volt
C8		Capacitor - .01 Mfd. 600 Volt
C19,C21		Capacitor - 0.1 Mfd. 400 Volt
C9		Capacitor - Mica - 50 Mmfd.
C18		Capacitor - Mica - 100 Mmfd.
C22,C23,C25	R60416	Capacitor - Electrolytic - 20 Mfd. 25 Volt 40 Mfd. 150 Volt, 40 Mfd. 150 Volt
C2,C6	R61100	Capacitor - Variable - With Drum
L1	R61107	Coil - Oscillator
R8	R62371	Control - On-Off & Volume
R10	R62393	Control - Tone
	R41472	Cord - Dial Drive - 42"
	R16706	Cord - Line
	R62397	Escutcheon & Dial Assembly
	R62713	Knob - On-Off & Volume
	R62535	Knob - Phono - Radio
	R62532	Knob - Tone
	R62712	Knob - Tuning
		Lamp - Dial #47
	R64007	Leaflet - Instruction
	R63189	Loop Antenna Assembly
	R62549	Pointer & Slide Assembly
	R61807	Pulley - Metal
R12,R13		Resistor - 470,000 Ohm - 1/3 Watt
R1,R2,R7		Resistor - 22,000 Ohm - 1/3 Watt
R14		Resistor - 150 Ohm - 1/3 Watt
R3		Resistor - 100 Ohm - 1/3 Watt
R9		Resistor - 4.7 Megohm - 1/3 Watt
R4,R11		Resistor - 2.2 Megohm - 1/3 Watt
R15		Resistor - 1200 Ohm - 1 Watt
R16	R40232	Resistor - Glasohm - 25 Ohm - 1 Watt
	R62527	Tuning Shaft Assembly
	R62322	Shield - On-Off Switch Cover
	R44897	Socket - Phono Input
	R60515	Socket - Pilot Lamp
	R57049	Socket - Tube - 8 Prong Lock-In
		WHEN ORDERING SPEAKER PARTS ALWAYS GIVE THE PART NUMBER ON THE SPEAKER
	R62600	Speaker - 6" P. M.
	R62601	Cone & Voice Coil
T3	R62602	Output Transformer
	R49743	Plug (Speaker)
	R60693	Socket (Speaker Cable)
	R43458	Spring - Tension
	R62394	Switch - Phono - Radio
T1	R62513	Transformer - I. F. #1
T2	R60418	Transformer - I. F. #2
	R60450	Wafer - Electrolytic Mounting

LOCATION OF PARTS UNDER CHASSIS



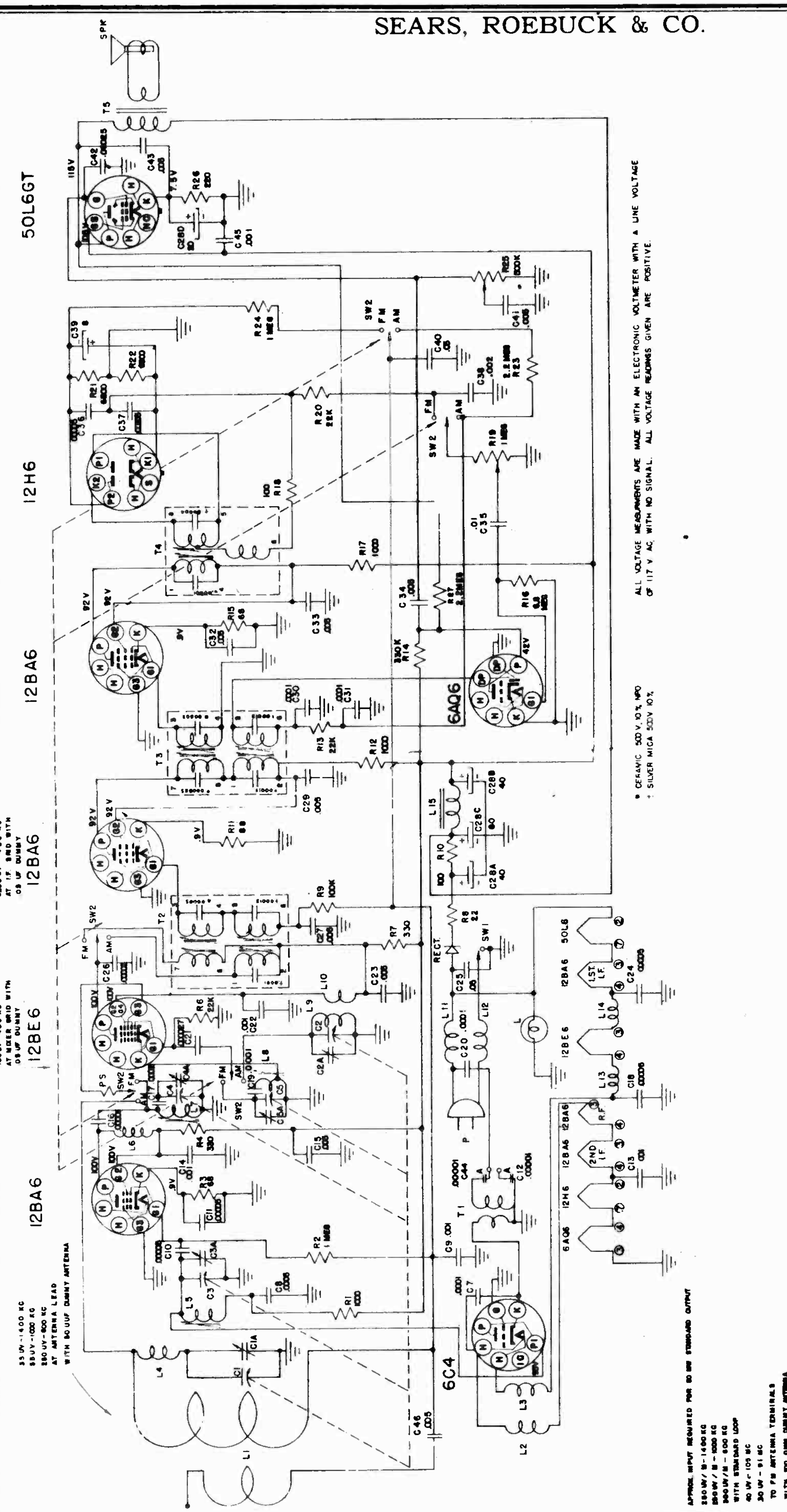
MODEL 8020
CHASSIS 132.841

SEARS, ROEBUCK & CO.



SEARS, ROEBUCK & CO.

MODEL 8020 REVISED
CHASSIS 132.841



SPECIFICATIONS

Power Supply
105-125 Volts AC-DC 45 Watts

Frequency Range
Broadcast .... 540-1600 Kc
FM .... 88- 108 Mc

Power Output
Undistorted .... 1.0 Watt
Maximum .... 2.0 Watt

Speaker Voice Coil Impedance ... 3.2 Ohms

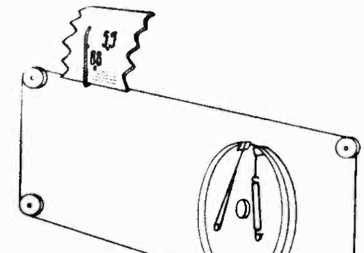
MODEL 8020
CHASSIS 132,841

SEARS, ROEBUCK & CO.

CIRCUIT CHANGES

Before start of Production on this model, certain circuit improvements were made, which do not appear on the printed stickers and instruction sheets which accompany each receiver. These differences are as follows:

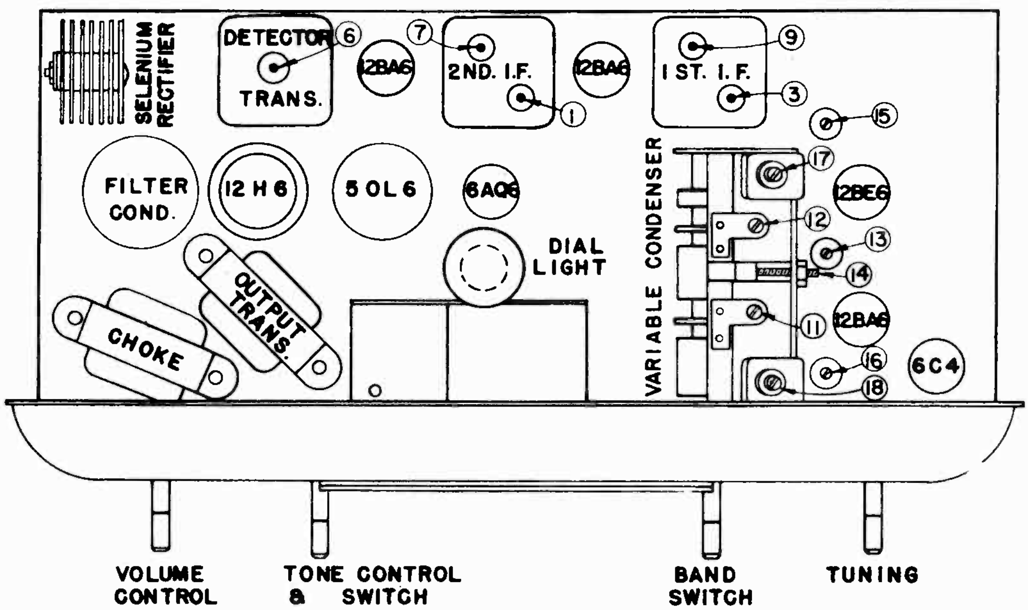
1. A pickup coil was added to the AM loop antenna.
2. C44 added to FM antenna circuit and C12 relocated in FM antenna circuit.
3. R27 added from plate of 50L6 to plate of 6AQ6.
4. C34 -- .005 Mfd. was .05 Mfd.
5. C38 -- .005 Mfd. was .002 Mfd.
6. C41 -- .002 Mfd. was .005 Mfd.
7. L4 -- is relocated on the Schematic Diagram.
8. R5 -- deleted from FM antenna circuit.



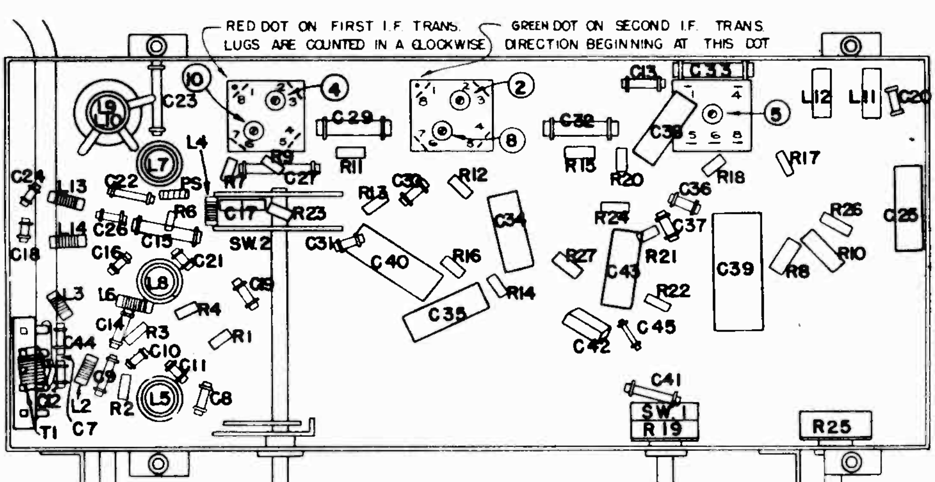
DIAL STRING ARRANGEMENT

The following changes were made after some sets had been produced, to improve the sensitivity and tone.

1. C45 Condenser added from 50L6 screen grid to chassis .001 uf.
2. C12 Condenser changed from .001 uf. to .00001 uf.
3. C44 Condenser changed from .001 uf. to .00001 uf.
4. C34 Condenser changed from 400 Volt to 600 Volt.



LOCATION OF TUBES AND TRIMMERS ON TOP OF CHASSIS



LOCATION OF PARTS AND TRIMMERS UNDER CHASSIS

SEARS, ROEBUCK & CO.

MODEL 8020
CHASSIS 132.841

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection .... Across speaker voice coil
Output meter reading to indicate 50 MW (Standard Output) .... .4 volt
Generator modulation .... 30 % 400 cycles
Position of volume control .... Fully clockwise
Set dial pointer .... To last mark on left end of dial with variable condenser closed
Set band switch .... To left for AM alignment and to right for FM alignment

AM ALIGNMENT

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION HIGH SIDE	GENERATOR CONNECTION GROUND LEAD	ADJUST TRIMMERS IN ORDER SHOWN FOR MAX. OUTPUT	TRIMMER FUNCTION
Open	455 Kc	.05 Mfd.	Mixer grid	Chassis	1-2-3-4	IF
1400 Kc	1400 Kc		*Test loop	Test loop	11	Oscillator
1400 Kc	1400 Kc		*Test loop	Test loop	12	Antenna
**600 Kc	600 Kc		*Test loop	Test loop	Check point	Antenna

*Connect generator lead to a Standard Hazeltine Test Loop, Model 1150, placed two feet from the set loop, or three turns of wire about six inches in diameter, placed about one foot from the set loop. Or the generator can be connected with the high side lead to the green lead on the set loop and the ground lead to the chassis.

**With a generator signal of 600 Kc, tune the set to the point where maximum output is obtained, which should be approximately 600 Kc on the dial. Adjust antenna section plates of variable for maximum output.

The alignment procedure should be repeated in the original order for greatest accuracy.

Always keep the output from the signal generator at its lowest possible value to make the A.V.C. action of the receiver ineffective.

FM ALIGNMENT

Discriminator

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION HIGH SIDE	GENERATOR CONNECTION GROUND LEAD	ADJUST TRIMMERS IN ORDER SHOWN	TRIMMER FUNCTION
Open	10.7 Mc	.05 Mfd.	2d IF grid	Chassis	*5, 6	Discriminator

*5 is adjusted for maximum A.V.C. voltage.
*6 is adjusted for zero reading of a vacuum tube voltmeter connected across the volume control. Rock this adjustment through the zero point to see that the voltage is positive on one side of the zero point and negative on the other.

IF

Open	10.7 Mc	.05 Mfd.	Mixer grid	Chassis	7, 8, 9, 10	IF

Adjust trimmers for maximum A. V. C. voltage.

Repeat "Discriminator" and "IF Alignment" with generator connected to mixer grid, being careful not to shift the generator frequency during this operation.

NOTE: If a 10.7 Mc FM generator is not available for alignment of discriminator and IF, an unmodulated signal of 10.7 Mc from an accurately calibrated conventional AM type generator can be used.

RF

108 Mc	108 Mc	200 Ohm Resistor	Ant. Terminal on Rear Cover	Ant. Terminal on Rear Cover	14	Oscillator
88 Mc	88 Mc	200 Ohm Resistor	Ant. Terminal on Rear Cover	Ant. Terminal on Rear Cover	13	Oscillator

Repeat the above oscillator adjustments until proper coverage is obtained.

105 Mc	105 Mc	200 Ohm Resistor	Ant. Terminal on Rear Cover	Ant. Terminal on Rear Cover	17, 18	Mixer & Antenna
91 Mc	91 Mc	200 Ohm Resistor	Ant. Terminal on Rear Cover	Ant. Terminal on Rear Cover	15, 16	Mixer & Antenna

All RF trimmers are adjusted for maximum output.

Repeat "Mixer & Antenna" adjustments until proper tracking is obtained.

MODEL 8020
CHASSIS 132.841

SEARS, ROEBUCK & CO.

PARTS LIST

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	N21535	Cabinet (Less metal grille & dial cover)
L15	N21394-2	Choke, B+ Filter
L2,L3,L4 L6,L13,L14	N21445-1	Choke, R. F.
L11, L12	N21444-1	Choke, R. F.
L5	N21399-1	Coil, F. M., First R. F.
L7	N21400-1	Coil, F. M., Second R. F.
L9,L10	N21396-1	Coil, A. M. Oscillator
L8	N21397-1	Coil, F. M. Oscillator
C1,C2,C3 C4,C5	N21401-2	Condenser, Variable
C6		Condenser, .00005 Mfd., 500 Volts
C7		Condenser, .0001 Mfd., 500 Volts
C8		Condenser, .0005 Mfd., 350 Volts
C9		Condenser, .001 Mfd., 350 Volts
C10		Condenser, .00005 Mfd., 350 Volts
C11		Condenser, .00005 Mfd., 500 Volts
C12, C44		Condenser, .00001 Mfd., 350 Volts
C13		Condenser, .001 Mfd., 350 Volts
C14		Condenser, .001 Mfd., 350 Volts
C15		Condenser, .005 Mfd., 350 Volts
C16		Condenser, .00001 Mfd., 500 Volts
C17		Condenser, .0002 Mfd., 500 Volts
C18		Condenser, .00005 Mfd., 500 Volts
C19		Condenser, .0001 Mfd., 500 Volts
C20		Condenser, .0001 Mfd., 500 Volts
C21		Condenser, .000027 Mfd., 500 Volts
C22		Condenser, .001 Mfd., 350 Volts
C23		Condenser, .005 Mfd., 350 Volts
C24		Condenser, .00005 Mfd., 500 Volts
C25		Condenser, .05 Mfd., 400 Volts
C26		Condenser, .00002 Mfd., 500 Volts
C27		Condenser, .005 Mfd., 350 Volts
C28A,C28B, C28C, C28D	N21402	Condenser, Electrolytic 40-40-80 Mfd., 150 Volt, 20 Mfd., 25 Volts
C29		Condenser, .005 Mfd., 350 Volts
C30		Condenser, .0001 Mfd., 500 Volts
C31		Condenser, .0001 Mfd., 500 Volts
C32		Condenser, .005 Mfd., 350 Volts
C33		Condenser, .005 Mfd., 350 Volts
C34		Condenser, .005 Mfd., 600 Volts
C35		Condenser, .01 Mfd., 400 Volts
C36		Condenser, .00005 Mfd., 500 Volts
C37		Condenser, .00005 Mfd., 500 Volts
C38		Condenser, .005 Mfd., 350 Volts
C39	N21403	Condenser, Electrolytic, 8 Mfd., 50 Volts
C40		Condenser, .05 Mfd., 200 Volts
C41		Condenser, .002 Mfd., 200 Volts
C42		Condenser, .00025 Mfd., 500 Volts
C43		Condenser, .005 Mfd., 600 Volts
C45		Condenser, .001 Mfd., 350 Volts
R19	N21661	Control, Volume, 1 Megohm

MU. CODE	SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
B5	Sw-1, R25	N21663	Control, AC Switch & Tone, ½ Megohm
		N19132	Cord, Dial Drive
		N21585	Cover, Dial
		N21584	Grille, Metal
			Lamp, Dial, Mazda, No. C7
	N	N21592	Leaflet, Instruction
	L1	N21605-1	Loop Antenna Assembly, A. M.
		N20054-5	Power Cord and Plug
		N21604	Pointer, Dial
B5	R1		Resistor, 1000 Ohms, 1/4 Watt
	R2		Resistor, 1 Megohm, 1/4 Watt
	R3		Resistor, 68 Ohm, 1/4 Watt
	R4		Resistor, 330 Ohm, 1/4 Watt
	R5		Resistor, 220 Ohm, 1/4 Watt
	R6		Resistor, 22,000 Ohm, 1/4 Watt
	R7		Resistor, 330 Ohm, 1/4 Watt
	R8		Resistor, 22 Ohm, 1/4 Watt
	R9		Resistor, 100,000 Ohm, 1/4 Watt
	R10		Resistor, 100 Ohm, 1/4 Watt
	R11		Resistor, 68 Ohms, 1/4 Watt
	R12		Resistor, 1000 Ohm, 1/4 Watt
	R13		Resistor, 22,000 Ohm, 1/4 Watt
	R14		Resistor, 330,000 Ohm, 1/4 Watt
	R15		Resistor, 68 Ohm, 1/4 Watt
	R16		Resistor, 6.8 Megohm, 1/4 Watt
	R17		Resistor, 1,000 Ohm, 1/4 Watt
	R18		Resistor, 100 Ohm, 1/4 Watt
	R20		Resistor, 22,000 Ohm, 1/4 Watt
	R21		Resistor, 6800 Ohms, 1/4 Watt
	R22		Resistor, 6800 Ohms, 1/4 Watt
	R23		Resistor, 2.2 Megohm, 1/4 Watt
	R24		Resistor, 1 Megohm, 1/4 Watt
	R26		Resistor, 220 Ohm, 1/4 Watt
	R27		Resistor, 2.2 Megohm, 1/4 Watt
		N21601	Scale, Dial
		N21603	Shaft, Tuning
		N19134-4	Socket, Dial Light with Leads
		N21709-1	Suppressor, Parasitic
	Sw-2	N21662	Switch, Wave
		N21658	Speaker, 5-1/4" P.M.
		N19295	Spring, Dial Cord
	T2	N21390-2	Transformer, First I. F.
	T3	N21391-2	Transformer, Second I. F.
	T1	N21398-1	Transformer, Antenna Coupling
	T4	N21392-2	Transformer, F. M. Detector
	T5	N21393-2	Transformer, Output
		N20207-3	Rectifier, Selenium
		N21587	Knob, Tuning
		N21588	Knob, Volume
		N21589	Knob, Tone (Off-On)
		N21590	Knob, AM-FM

Subject: General Service Suggestions and Circuit Changes.

This supplement is issued for the purpose of distributing information which should be helpful in servicing this radio. The following points are covered.

1. REDUCTION OF HUM LEVEL:

On some earlier production sets, excessive hum may be reduced to an acceptable level by reversing the intermediate and output sections of the electrolytic condenser, part no. N21402. The intermediate section, indicated as C28C on the Schematic Diagram printed herewith, should be 80 Mfd., and the output section 40 Mfd. Should these be connected oppositely, reversing them as indicated in the diagram below, will result in a lower hum level.

2. MICROPHONISM:

Examination of the metal chassis will disclose that the R. F. unit (variable condenser, three miniature tubes and related parts underneath) is rubber mounted on a separate panel. Any direct contact between this panel and the main chassis base may result in a tendency toward microphonics, particularly at high volume level. Slightly loosening the three mounting screws which protrude through the rubber grommets, so as to free the "floating" action of the panel, will, in some cases, eliminate the microphonic tendency. It may be necessary also to pry up the front edge of the panel in order to clear contact with the head of the rivet in the front of the panel. On later production sets, the location of this rivet was changed, so as to avoid any contact with the main chassis base.

3. DISTORTION AT LOW VOLUME LEVEL:

A complaint of low volume distortion or "hum modulation" may be satisfied by the addition of a .001 mfd. condenser from the 50L6GT screen grid to chassis ground. This addition was incorporated in early production; however, some sets were shipped without it

4. NEW CIRCUITS:

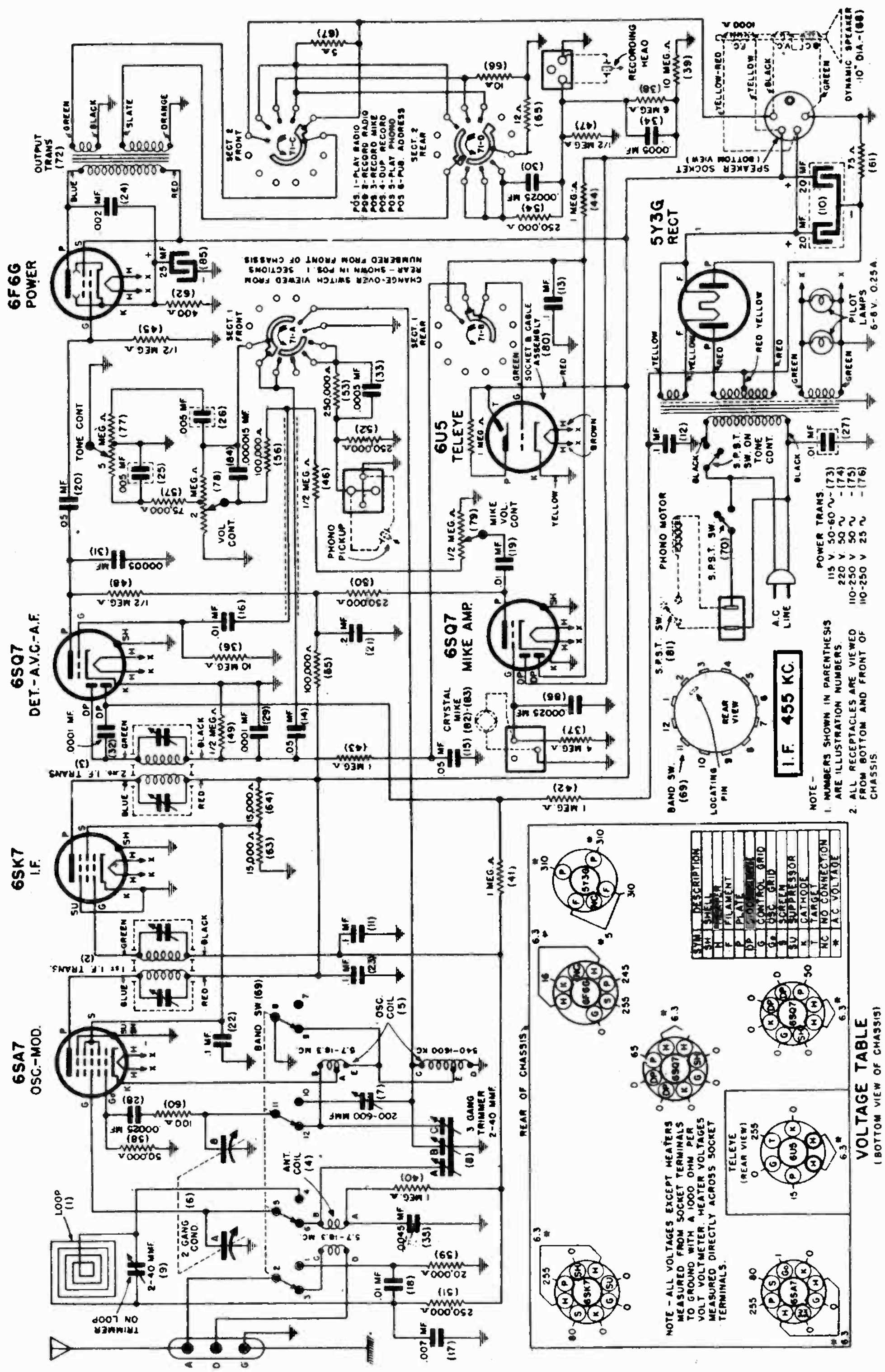
(4) additional circuit changes have been made in current production. These are indicated on the revised schematic diagram printed here, and are as follows:

1. Condenser C6 - .00005 mfd., deleted.
2. Condenser C46 - .005 mfd., added across antenna loop sections and connection to antenna screw terminals removed.
3. Condenser C41 - changed from .002 mfd. to .005 mfd.
4. Condenser C38 - changed from .005 mfd. to .002 mfd.

Any set not wired in accordance with the above #2 change should be changed over, only if it is to be used in conjunction with an external antenna. Otherwise, these changes are not necessary.

Changes #3 and #4 make the tone control more effective.

SENTINEL RADIO CORP.



MODEL 216J

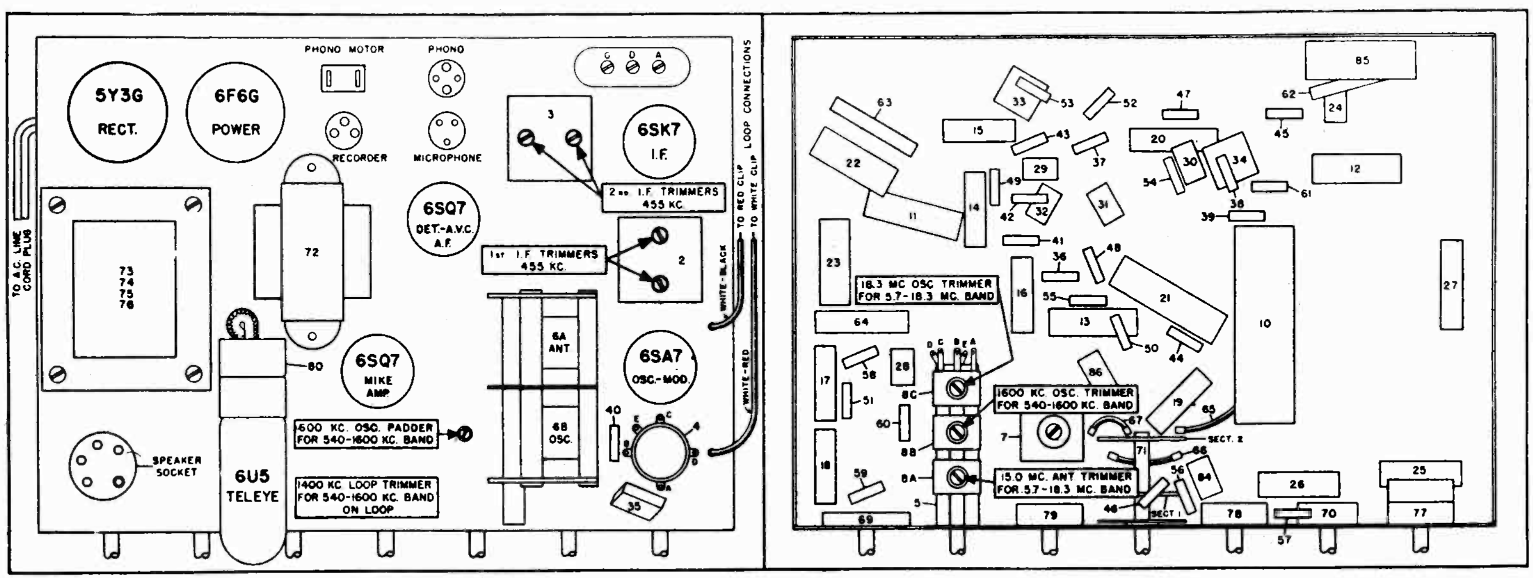
SENTINEL RADIO CORP.

ALIGNMENT PROCEDURE

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. IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET, AND HAVE CHANGE OVER SWITCH KNOB IN "PLAY RADIO" POSITION.

When adjusting 1600 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect oscillator to loop. Couple test oscillator to receiver loop by: (a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator. (b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

Place band switch for operation on:		Set Receiver dial to:	TEST OSCILLATOR: Adjust test oscillator frequency to:	TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of:	TEST OSCILLATOR: Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
I. F. alignment use any band position.		Any point where no interfering signal is received	Exactly 455 K.C.	0.2 Mfd. condenser	High side to grid of 6SA7 tube.	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.
1600 to 540 K.C. Band	1	Exactly 1600 K.C.	Exactly 1600 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	Adjust 1600 K. C. oscillator trimmer for maximum output.
	2	Approx. 1400 K.C.	Approx. 1400 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	While rocking gang condenser adjust 1400 K. C. loop trimmer for maximum output.
	3	Approx. 600 K.C.	Approx. 600 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	While rocking gang condenser adjust 600 K. C. oscillator padder for maximum output.
5.7 to 18.3 M.C. Band	1	Exactly 18.3 M.C.	Exactly 18.3 M.C.	400 Ohm carbon resistor	High side to "A" Post, Low side to chassis.	Adjust 18.3 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	Approx. 15 M.C.	Approx. 15 M.C.	400 Ohm	High side to "A" Post, Low side to chassis.	While rocking gang condenser adjust 15 M. C. antenna trimmer for maximum output.



VOLTAGE RATING

WHILE THE RADIO MAY BE OPERATED ON EITHER 50 OR 60 CYCLE 100-120 VOLT ALTERNATING CURRENT (A.C.), THE PHONOGRAPH MOTOR MUST BE USED ON THE FREQUENCY DESIGNATED ON THE PAPER LICENSE TAG, which will be found attached to the cabinet.

Check receiver and recorder motor voltage and frequency rating before attempting to operate this unit. Be sure that the voltage and frequency rating given on the license tag is the same as the house current supply.

IF THE LICENSE NOTICE IS MARKED 115 VOLTS 60 CYCLE, THE PHONOGRAPH MOTOR IS DESIGNED FOR OPERATION ON 110-120 VOLTS 60 CYCLE CURRENT ONLY.

IF LICENSE NOTICE IS MARKED 115 VOLTS 50 CYCLE, THE PHONOGRAPH MOTOR IS DESIGNED FOR OPERATION ON 110-120 VOLT 50 CYCLE CURRENT ONLY

AERIAL

THE LOOP AERIAL SUPPLIED with the radio should provide ample 540-1600 kilocycle band reception in average locations.

OUTSIDE AERIAL

LOOP AERIALS ARE NOT SATISFACTORY FOR SHORT WAVE RECEPTION, AND BECAUSE OF THIS AN EXTERNAL AERIAL MUST BE ATTACHED TO THE RADIO WHEN TUNING FOR SHORT WAVE STATIONS. Also, if the radio is used in shielded areas or when located a great distance from broadcast stations, the volume of the stations operating in the 560-1600 kilocycle band may not be ample, in which case it would be necessary to attach a 35 to 50 foot outdoor aerial to the receiver to obtain satisfactory results.

A DOUBLET TYPE ANTENNA can be used and will be of aid in eliminating man made static noises in locations where this interference is excessive, if the flat top of the aerial can be located outside of the field of disturbance. Satisfactory doublet type aerials containing necessary material and complete installation instructions are available in kit form from most radio dealers.

THERE ARE THREE POSTS marked "A," "D," and "G" on the rear of the chassis. When the receiver is shipped from the factory a flexible wire is connected to post "D" and "G." When a straight aerial is used this wire should be left in this position and the aerial lead-in connected to the post marked "A."

When a doublet type antenna is used, remove the small piece of wire connecting "G" and "D" posts together and attach one of the doublet antenna lead-ins to "A" post and the other to "D" post.

GROUND

A GOOD GROUND such as a cold water pipe, steam radiator, or an iron rod driven into the ground three or four feet in a place where it is moist should be attached to the post marked "G" regardless of the type of antenna used.

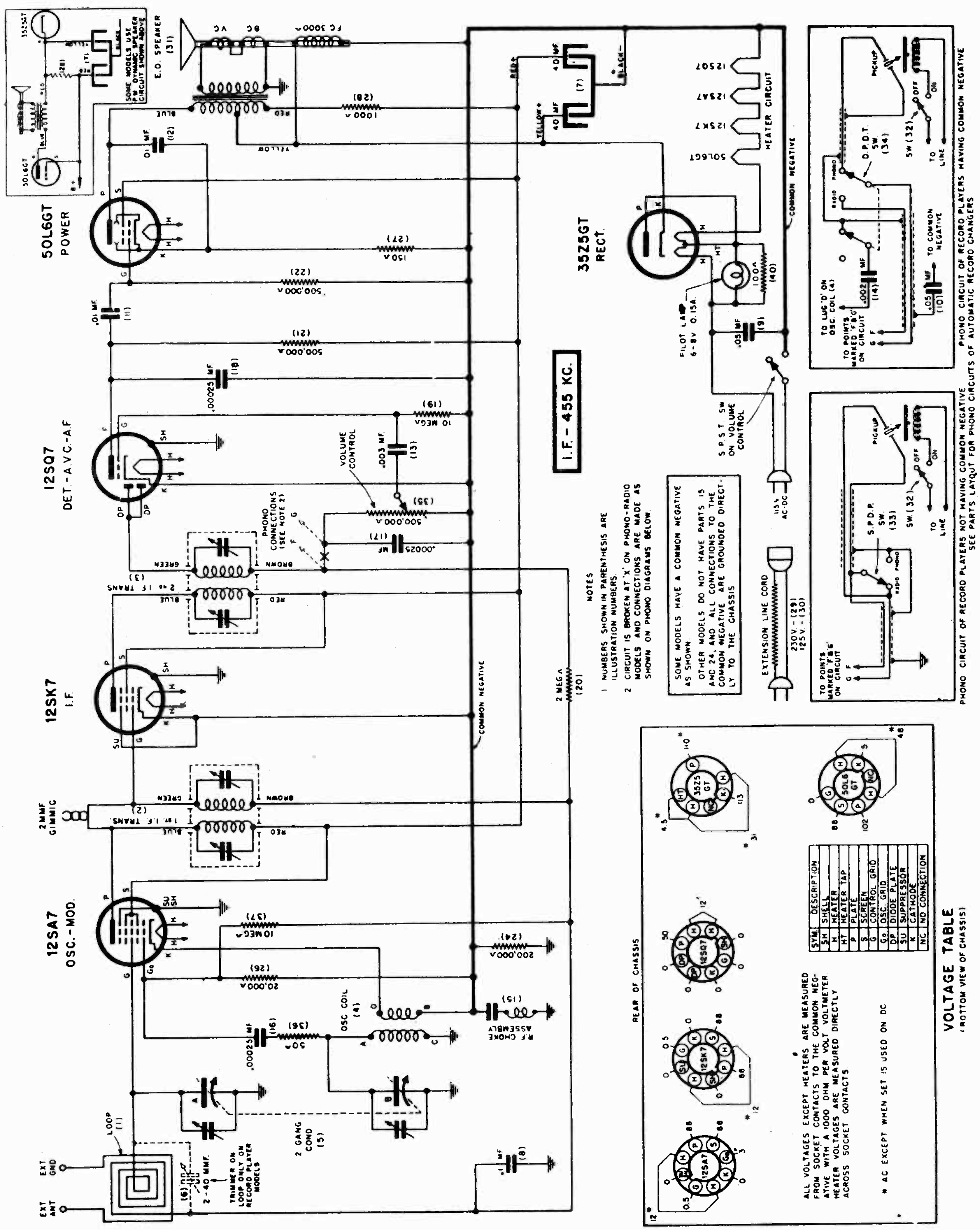
PARTS LIST

Illus. No.	Part No.	Part Name	Description
1	12150	Coil	Loop Antenna
2	4404	Coil	1st I.F. Transformer
3	4404	Coil	2nd I.F. Transformer
4	12118	Coil	Antenna
5	12119	Coil	Oscillator
6	12121	Condenser	Tuning Two Gang—With Pulley
7	3596	Condenser	Padder 340-460 Mmf.
8	3762	Condenser	Trimmer Three Gang Strip
9	1597	Condenser	Trimmer 3-35 Mmf.
10	12139	Condenser	Tubular Dry Elec. 20-20 Mfd. 450 V. D.C. Wkg.
11	1151	Condenser	Tubular .1 Mfd. 200 Volt
12	1151	Condenser	Tubular .1 Mfd. 200 Volt
13	1151	Condenser	Tubular .1 Mfd. 200 Volt
14	1147	Condenser	Tubular .05 Mfd. 200 Volt
15	1147	Condenser	Tubular .05 Mfd. 200 Volt
16	1149	Condenser	Tubular .01 Mfd. 200 Volt
17	10078	Condenser	Tubular .007 Mfd. 200 Volt 1 or 10%
18	9468	Condenser	Tubular .01 Mfd. 400 Volt
19	9468	Condenser	Tubular .01 Mfd. 400 Volt
20	9457	Condenser	Tubular .05 Mfd. 400 Volt
21	1219	Condenser	.2 Mfd. 400 Volt
22	9203	Condenser	.1 Mfd. 400 Volt
23	9203	Condenser	.1 Mfd. 400 Volt
24	1551	Condenser	.002 Mfd. 600 Volt
25	11856	Condenser	.005 Mfd. 200 Volt Shielded
26	11856	Condenser	.005 Mfd. 200 Volt Shielded
27	4305	Condenser	.01 Mfd. 200 Volt Shielded
28	9458	Condenser	Mica .00025 Mfd.
29	7934	Condenser	Mica .0001 Mfd.
30	9458	Condenser	Mica .00025 Mfd.
31	1544	Condenser	Mica .00005 Mfd.
32	7934	Condenser	Mica .0001 Mfd.
33	9459	Condenser	Mica .0005 Mfd.
34	9159	Condenser	Mica .0005 Mfd.
35	1628	Condenser	Mica .0045 Mfd.
36	4804	Resistor	Carbon 10 Megohm 1/3 Watt
37	1694	Resistor	Carbon 4 Megohm 1/3 Watt
38	2333	Resistor	Carbon 6 Megohm 1/3 Watt
39	4804	Resistor	Carbon 10 Megohm 1/3 Watt
40	7998	Resistor	Carbon 1 Megohm 1/3 Watt
41	7998	Resistor	Carbon 1 Megohm 1/3 Watt
42	7998	Resistor	Carbon 1 Megohm 1/3 Watt
43	7998	Resistor	Carbon 1 Megohm 1/3 Watt
44	7998	Resistor	Carbon 1 Megohm 1/3 Watt
45	6984	Resistor	Carbon 500,000 Ohm 1/3 Watt
46	6984	Resistor	Carbon 500,000 Ohm 1/3 Watt
47	6984	Resistor	Carbon 500,000 Ohm 1/3 Watt
48	6984	Resistor	Carbon 500,000 Ohm 1/3 Watt
49	6984	Resistor	Carbon 500,000 Ohm 1/3 Watt
50	8906	Resistor	Carbon 250,000 Ohm 1/3 Watt
51	8906	Resistor	Carbon 250,000 Ohm 1/3 Watt
52	8906	Resistor	Carbon 250,000 Ohm 1/3 Watt
53	8906	Resistor	Carbon 250,000 Ohm 1/3 Watt
54	8906	Resistor	Carbon 250,000 Ohm 1/3 Watt
55	8000	Resistor	Carbon 100,000 Ohm 1/3 Watt
56	8000	Resistor	Carbon 100,000 Ohm 1/3 Watt
57	3534	Resistor	Carbon 75,000 Ohm 1/3 Watt
58	6879	Resistor	Carbon 50,000 Ohm 1/3 Watt
59	1784	Resistor	Carbon 20,000 Ohm 1/3 Watt
60	2431	Resistor	Carbon 100 Ohm 1/3 Watt
61	12728	Resistor	Carbon 75 Ohm ' Watt
62	3549	Resistor	Carbon 400 Ohm 1 Watt
63	1385	Resistor	Carbon 15,000 Ohm 1 Watt
64	12727	Resistor	Carbon 15,000 Ohm ' Watt
65	12141	Resistor	Flexible Wire Wound 12 Ohm 2 Watt
66	12142	Resistor	Flexible Wire Wound 10 Ohm 2 Watt
67	12143	Resistor	Flexible Wire Wound 5 Ohm 1 Watt
68	12148	Speaker	Electro-Dynamic 10"
69	12134	Switch	Band
70	10014	Switch	Phono Motor
71	12133	Switch	Selector
72	12120	Transformer	Output
73	12135	Transformer	Power 115 Volt 50-60 Cycle
74	12136	Transformer	Power 220 Volt 50 Cycle
75	12137	Transformer	Power 110-250 Volt 50 Cycle
76	12138	Transformer	Power 110-250 Volt 25 Cycle
77	12131	Tone Control	With S.P.S.T. Switch
78	10227	Volume Control	
79	12132	Volume Control	(Microphone)
80	10108	Cable	6U5 Tuning Eye Socket and Cable Assembly
	12177	Recording Unit	With Motor for 115 Volt 50 Cycle Operation
	12162	Recording Unit	With Motor for 115 Volt 60 Cycle Operation
	12163	Recording Unit	With Motor for 220 Volt 50 Cycle Operation
	12164	Recording Unit	With Motor for 110-250 Volt 50 Cycle Operation
	12165	Recording Unit	With Motor for 110-250 Volt 25 Cycle
81	12169	Switch	S.P.D.T. (On-Off)
82	12167	Microphone	With 10 Ft. Cable
84	10258	Condenser	Mica .000015 Mfd.
85	9196	Condenser	Tubular Dry Elec. 25 Mfd. 25 Volt
86	9458	Condenser	Mica .00025 Mfd.

MISCELLANEOUS PARTS

Part No.	Part Name	Description
10292	Bulb	6-8 Volt .250 Ampere Dial Light
8184	Dial Cord	30" of 18 Lb. Drive Cord
11693	Dial Spring	Cord Tension Spring
12122	Dial Shaft	Drive Shaft
12126	Dial Scale	Calibrated Glass Scale
12128	Dial Pointer	Large for Tuning Scale
12129	Dial Pointer	Small Indicator
11449	Escutcheon	For Dial with Crystal
12154	Knob	Marked "Tuning"
12155	Knob	Marked "Volume"
12156	Knob	Marked "Mike Volume"
12157	Knob	Marked "Off-On-Tone"
12158	Knob	Marked "Band Switch"
12159	Knob	Marked "Motor Switch"
12160	Knob	Marked "Change Over Switch"
	Needle	Cutting
	Needle	Play Back
12172	Plug	For Recorder
12173	Plug	For Microphone
12174	Plug	For Phonograph
12114	Socket	For Recorder
12115	Socket	For Microphone
12116	Socket	For Phonograph
12226	Socket	For Phonograph Motor
11698	Strip	Three Post—Antenna and Ground Terminal

MODELS 248, 1U-248 SENTINEL RADIO CORP.



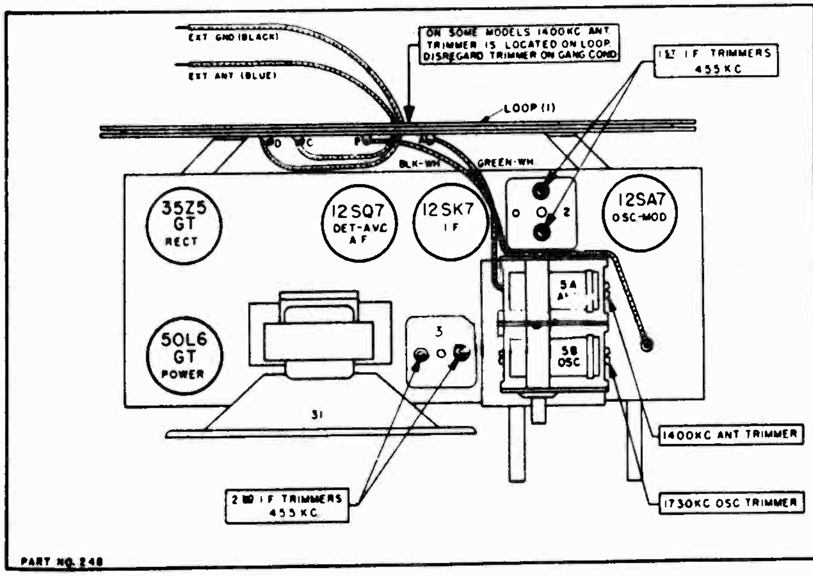
New Products Model 300, ARCR-312; R.C.A. Model 9865, ARCR-963; R.C.A. Model 9932, ARCR 507, 515

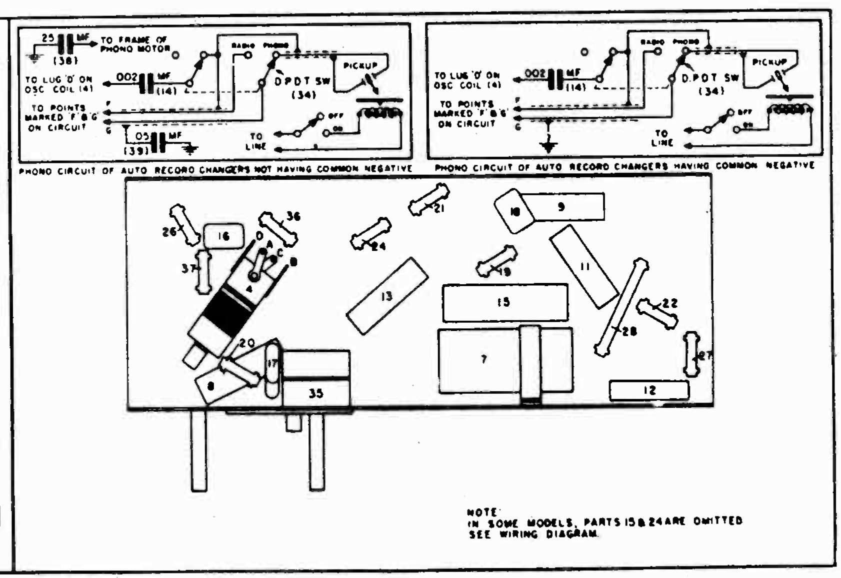
ALIGNMENT PROCEDURE

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. IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

When adjusting 1730 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to loop. Couple test oscillator to receiver loop by: (a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator. (b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

	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:
	Any point where no interfering signal is received	Exactly 455 K.C.	0.2 Mfd. condenser	High side to grid of 12SA7 tube. Low side to frame of gang condenser through .01 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.
1	Exactly 1730 K.C.	Exactly 1730 K.C.	None	Use Small Loop to couple test oscillator to receiver loop. Low side to frame of gang condenser through .01 Mfd. condenser.	Adjust 1730 K. C. oscillator trimmer for maximum output.
2	Approx. 1400 K.C.	Approx. 1400 K.C.	None	Use Small Loop to couple test oscillator to receiver loop. Low side to frame of gang condenser through .01 Mfd. condenser.	While rocking gang condenser adjust 1400 K. C. loop trimmer for maximum output.





VOLTAGE RATING

BE SURE THAT THE VOLTAGE RATING MARKED ON THE WHITE PAPER LICENSE NOTICE ATTACHED EITHER TO THE BOTTOM OR THE INSIDE OF THE CABINET IS EXACTLY THE SAME AS YOUR HOUSE LIGHT CURRENT SUPPLY—IF IN DOUBT CONSULT YOUR LOCAL ELECTRIC LIGHT COMPANY OR RADIO DEALER.

VOLTAGE RATING OF ALL MODELS NOT EQUIPPED WITH PHONO PLAYER OR AUTOMATIC RECORD-CHANGER

IF THE RECEIVER IS NOT EQUIPPED WITH PHONO PLAYER OR AUTOMATIC RECORD-CHANGER it may be used on either 110-120 volt 50/60 cycle alternating current (AC) or 110-120 volt direct current (DC).

If the radio does not operate on DC current after approximately one minute remove the plug on the end of radio line cord from the house current receptacle turn it half way around (180°) and re-insert it into power receptacle.

VOLTAGE RATING OF PHONO PLAYER AND AUTOMATIC RECORD-CHANGER MODELS

MODELS EQUIPPED WITH PHONO PLAYER OR AN AUTOMATIC RECORD-CHANGER ARE DESIGNED FOR USE ON ALTERNATING CURRENT ONLY. While the radio may be operated on either 50 or 60 cycle 110-120 volt alternating current (AC) the phonograph motor must only be used on the correct frequency.

If license notice is marked 115 volt 60 cycle the phonograph motor is designed for operation on 110-120 volt 60 cycle current only.

If license notice is marked 115 volt 50 cycle the phonograph motor is designed for operation on 110-120 volt 50 cycle current only.

DO NOT ATTEMPT TO OPERATE PHONO PLAYER OR RECORD CHANGER MODELS ON DIRECT CURRENT. TO DO SO WILL DAMAGE THE MOTOR.

THE LOOP AERIAL SUPPLIED with the radio should provide ample reception in average locations.

Loop aerials are directional — for maximum volume and range when using the loop carefully tune in the desired station, next lift the complete radio and slowly turn it until the station is heard with greatest volume, then set the radio down in this position.

OUTSIDE AERIAL

When the radio is used in shielded areas or when located a great distance from broadcast stations, the volume of some or all stations may not be ample in which case it would be necessary to ATTACH A 25-50 ft. OUTDOOR AERIAL TO THE BLUE LEAD COMING OUT THE REAR OF THIS CHASSIS to obtain satisfactory results.

GROUND

When a regular aerial is used, best result will be obtained with a ground attached to the black lead.

WARNING—Do not attach a ground direct to the radio chassis—ANY EXTERNAL GROUND CONNECTION TO ANY METAL PART OF THE CHASSIS WILL CAUSE A SHORT AND POSSIBLE DAMAGE.

PARTS LIST

Illus. No.	Part No.	Part Name	Description
1	13222	Coil	Loop Antenna (A & B)
1	13259	Coil	Loop Antenna (C & D)
1	13254	Coil	Loop Antenna (E & F)
2	13213	Coil	First I.F. Transformer
3	11988	Coil	Second I.F. Transformer
4	13221	Coil	Oscillator
5	13215	Condenser	Tuning (2 Gang) with Pulley
6	1597	Condenser	Trimmer 3-35 Mmf (A & C)
7	13701	Condenser	Tubular Dry Elec. 40-40 Mfd 150 V (B, D & F)
7	13545	Condenser	Tubular Dry Elec. 40-40 Mfd 150V (A, C, & E)
8	1151	Condenser	Tubular .1 Mfd. 200 Volt
9	9457	Condenser	Tubular .05 Mfd. 400 Volt
10	9457	Condenser	Tubular .05 Mfd. 400 Volt (C)
11	9468	Condenser	Tubular .01 Mfd. 400 Volt
12	9468	Condenser	Tubular .01 Mfd. 400 Volt
13	1368	Condenser	Tubular .003 Mfd. 400 Volt
14	10762	Condenser	Tubular .002 Mfd. 400 Volt (C, E & F)
15	13474	Condenser	R.F. Choke Wound on a Tubular .2 Mfd. 400 Volt (A, C & E)
16	9458	Condenser	Mica .00025 Mfd. + or — 20%
17	9458	Condenser	Mica .00025 Mfd. + or — 20%
18	9458	Condenser	Mica .00025 Mfd. + or — 20%
19	4804	Resistor	Carbon 10 Meg Ohm 1/3 Watt
20	2705	Resistor	Carbon 2 Meg Ohm 1/3 Watt
21	6984	Resistor	Carbon 500,000 Ohm 1/3 Watt
22	6984	Resistor	Carbon 500,000 Ohm 1/3 Watt
24	2155	Resistor	Carbon 200,000 Ohm 1/3 Watt (A, C, & E)
26	1784	Resistor	Carbon 20,000 Ohm 1/3 Watt
27	9018	Resistor	Carbon 150 Ohm 1/3 Watt
28	4998	Resistor	Carbon 1,000 Ohm 1 Watt
29	11860	Resistor	230 Volt Line Cord (B)
30	11861	Resistor	125 Volt Line Cord (B)
31	13288	Speaker	Permanic 5" (B & D)
	11364	Speaker	P.M. 5" (A & C)
	13250	Speaker	P.M. 5" (F)
	13255	Speaker	P.M. 5" (E)
	13565	Speaker	E.D. 5" (B & D)
	13566	Speaker	E.D. 5" (A & E)
	13567	Speaker	E.D. 5" (F)
	13568	Speaker	E.D. 5" (E)
32	12281	Switch	S.P.D.T. Motor On-Off Switch (C & D)
33	12281	Switch	S.P.D.T. Radio-Phone Switch (D)
34	12909	Switch	D.P.D.T. Radio-Phone Switch (C, E & F)
35	11359	Vol. Control	With S.P.S.T. Switch
36	3706	Resistor	Carbon 50 Ohm 1/3 Watt
37	4804	Resistor	Carbon 10 Meg Ohm 1/3 Watt
38	9032	Condenser	Tubular .25 Mfd. 200 Volt (F)
39	1147	Condenser	Tubular .05 Mfd. 200 Volt (F)
40	10540	Resistor	Carbon 100 Ohm ½ Watt

(A)—Used only in models having common ground and not equipped with phono player or automatic record changer.

(B)—Used only in models not having common ground and not equipped with phono player or automatic record-changer.

(C)—Used only in phono player model and having common ground.

(D)—Used only in phono player model not having common ground.

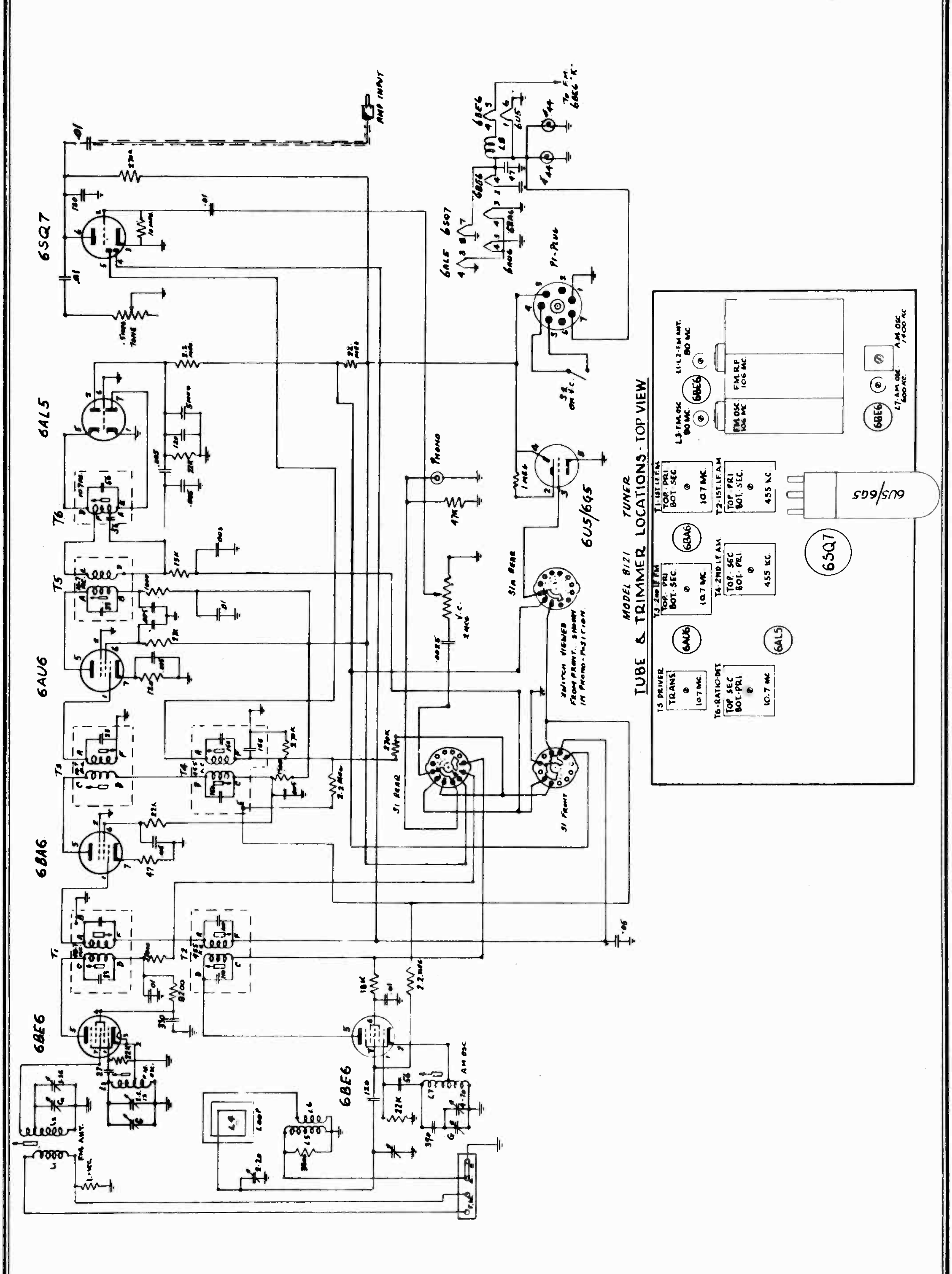
(E)—Used only in models having record-changer and having common ground.

(F)—Used only in models having record-changer and not having common ground.

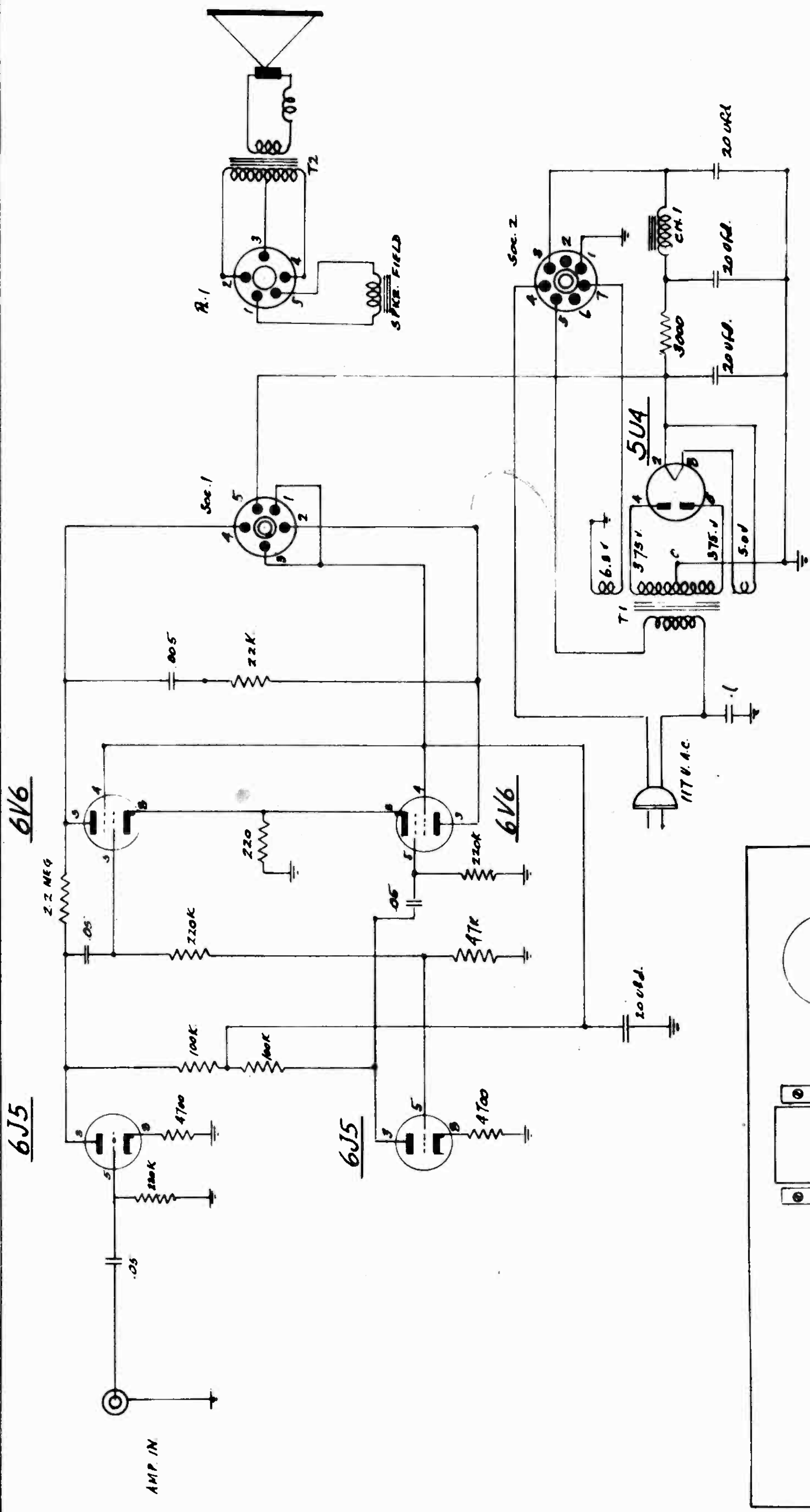
MISCELLANEOUS PARTS

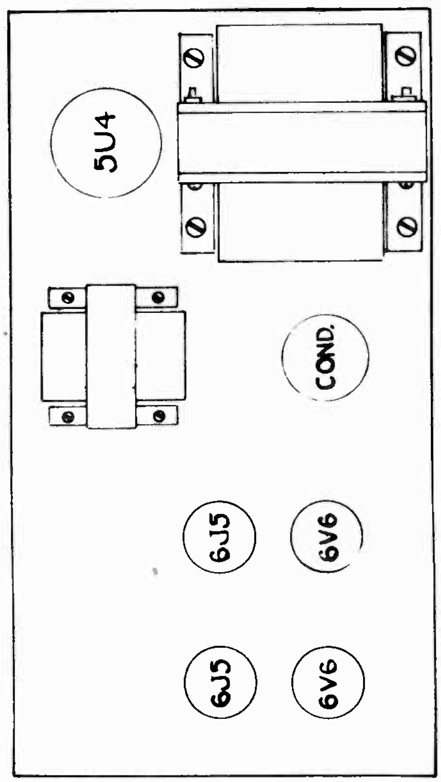
Part No.	Part Name	Description
12022	Back	For Plastic Cabinets
12280	Back	For Phono Player Cabinet
11304	Bulb	6-8 Volt .150 Amp. No. 47 Bayonet Base Dial Light
276	Cabinet	Ivory Plastic
278	Cabinet	Walnut Plastic
13217	Dial Scale	Calibrated Scale
11992	Dial Shaft	Drive Shaft
8184	Dial Cord	17" of 18 Lb. Drive Cord
11357	Dial Crystal	Acetate Crystal for Dial
13248	Dial Pointer	Dial Indicator
12105	Knob	Used with Walnut Plastic Cabinet
12106	Knob	Used with Ivory Plastic Cabinet
12096	Knob	Used with Phono Player and Automatic Record-Changer Model only
12916	Pickup	Crystal Pickup and Arm Used Only with Phono-Player

HAROLD SHEVERS, INC. MODEL 8121, (Gotham)



MODEL 8121, (Gotham) HAROLD SHEVERS, INC.





AMPLIFIER TUBE LAYOUT

ALIGNMENT PROCEDURE

Alignment Indicators:

A high resistance volt meter is necessary for measuring D.C. voltage during F.M. alignment. An output meter is also necessary to indicate minimum audio output during F.M. ratio detector alignment. The output meter may be connected across the speaker voice coil.

For A.M. alignment, the high resistance volt meter can be used as an indicator by measuring developed A.V.C. voltage.

F.M. RATIO DETECTOR ALIGNMENT

1. Connect a 680 ohm resistor between pins 5 and 7 of the ratio detector tube 6AL5. Connect the D.C. probe of the indicating meter to the negative lead of the 5 mfd. electrolytic condenser. The common lead is connected to ground.

2. Set the generator at 10.7 m.c., modulated 30% at 400 cycles (AM). Turn the volume control to maximum volume and connect the generator to the driver grid, pin 1, of the 6AU6 in series with a .01 mfd. condenser.

3. Adjust driver transformer, T5, for maximum D.C. across the 5 mfd. electrolytic condenser.

4. Remove the meter leads and disconnect the 680 ohm resistor. Connect two 100,000 ohms (±1%) resistors in series, across the 22,000 ohms ratio detector load resistor. Connect the common lead of the indicating meter to the center point of the 100,000 ohm resistors and the D.C. probe to terminal "A" of the ratio detector transformer, T6,

5. Repeat connections as in step 2 above and adjust T6, bottom core for zero D.C. balance. This point is approached rapidly and continued adjustment causes the indicated polarity to reverse. A slow approach to zero is an indication of severe detuning.

Adjust T6 top core for minimum audio output. Alternate the adjustments of the top and bottom core of T6 until minimum audio output and zero D.C. balance occur at the same point.

6. Disconnect the two 100,000 ohm resistors and repeat steps two and three, eliminating the 680 ohm resistor.

7. Repeat steps 5 and 6 until further adjustment does not improve the calibration.

A.M. ALIGNMENT

1. Connect the signal generator to pin 1, converter grid, 6BE6 in series with .01 condenser. Tune the generator to 455 kc.
2. Turn the radio dial to a quiet point at the low frequency end of the variable condenser.
3. Adjust the A.M. I.F. transformers for peak output.
4. Connect the signal generator to the antenna lead in series with 200 mmf. Tune the generator to 1400 kc.
5. Turn the radio dial to 1400 kc, and adjust the oscillator trimmer and the loop trimmer for peak output.
6. Set the generator and set at 600 kc. and "rock in" L7, oscillator coil.

NOTE:
Correct alignment of 455 kc. I.F. requires that the 10.7 mc. F.M. I.F. be aligned previously.

F.M. I.F.-R.F. ALIGNMENT

1. Connect the D.C. probe of the high resistance meter to the negative lead of the 5 mfd. electrolytic condenser and the common lead of the meter to ground.
2. Set the generator at 10.7 m.c., modulated 30% at 400 cycles (AM). Set the radio dial at the low frequency end of the variable condenser and connect the signal generator in series with a .01 condenser to pin 7 of the 6BE6.
3. Adjust the I.F. transformers for peak output on the meter.
4. Set the generator at 106 m.c. and connect the high side in series with 120 ohm resistor and the low side in series with 120 ohm resistor to the F.M. antenna terminals. Set the radio dial at 106 mc.
5. Adjust the F.M. osc. ceramic trimmer and the F.M. antenna trimmer maximum output.
6. Set the generator and radio dial for 90 mc. and adjust L3 and L2 oscillator and antenna coil for peak output.

MODEL 8121 TUNER MEASUREMENTS, VOLTAGE AND RESISTANCE

Tube	Pin	Voltage	Resistance
FM osc. 6BE6	1	-.3	18 K
	2	0	0
	3	Gnd.	0
	4	AC	0
	5	175	over 500 K
	6	80	over 500 K
	7	0	0
IF amp. 6AB6	1	-.5	2.5 meg
	2	Gnd.	Gnd.
	3	Gnd.	Gnd.
	4	AC	0
	5	170	over 500 K
	6	120	over 500 K
	7	.5	47 ohm
Ratio Detector 6AL5	1	Gnd.	Gnd.
	2	-.5	18 K
	3	AC	0
	4	Gnd.	Gnd.
	5	-.25	
	6	Gnd.	Gnd.
	7	-.25	
Magic Eye 6U5/6G5	1	AC	0
	2	50	over 500 K
	3	0	2 meg.
	4	200	over 500 K
	5	Gnd.	Gnd.
	6	Gnd.	Gnd.
AM osc. 6BE6	1	-6.8	20 K
	2	0	0
	3	Gnd.	Gnd.
	4	AC	0
	5	190	over 500 K
	6	80	over 500 K
	7	0	4.5 meg.
FM driver 6AU6	1	0	0
	2	Gnd.	Gnd.
	3	Gnd.	Gnd.
	4	AC	0
	5	185	over 500 K
	6	155	over 500 K
	7	1 V.	100 ohm
Detector 6SQ7	1	Gnd.	Gnd.
	2	0	10 meg.
	3	Gnd.	Gnd.
	4	-.5	2 meg.
	5	-.3	220 K
	6	100	over 500 K
	7	AC	0
	8	Gnd.	Gnd.

MODEL 8121 AMPLIFIER MEASUREMENTS, VOLTAGE AND RESISTANCE

Tube	Pin	Voltage Gnd.	Resistance Gnd.
Input 6J5	1	Gnd.	Gnd.
	2	AC	0
	3	105	over 500 K
	4	N.C.	N.C.
	5	0	240 K
	6	N.C.	N.C.
	7	AC	0
	8	4.6	470 ohm
1st 6V6	11	Gnd.	Gnd.
	2	AC	0
	3	185	over 500 K
	4	200	over 500 K
	5	0	∞
	6	N.C.	N.C.
	7	AC	0
	8	15V	220 Ohm
Rectifier 5U4	1	N.C.	N.C.
	2	360	over 1 meg.
	3	N.C.	N.C.
	4	380 AC	70 ohm
	5	0	∞
	6	380 AC	70 ohm
	7	0	0
	8	0	∞
Inverter 6J5	1	Gnd.	Gnd.
	2	AC	0
	3	105	over 500 K
	4	N.C.	N.C.
	5	0	50 K
	6	N.C.	N.C.
	7	AC	0
	8	4.6	470 ohm
2nd 6V6	1	Gnd.	Gnd.
	2	AC	0
	3	185	over 500 K
	4	200	over 500 K
	5	0	300 K
	6	N.C.	N.C.
	7	AC	AC
	8	15V	200 ohm

All voltage taken with a 20,000 ohm per volt meter and taken with respect to chassis ground.

NOTE: 5 volts AC measured from pins 2 and 8 of 5U4 tube.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

FREQUENCY RANGE

Broadcast (AM Band)....................540-1600 kc.
Frequency Modulation (FM Band).........88-108. mc.

INTERMEDIATE FREQUENCY

Broadcast.................................455 kc.
Frequency Modulation......................10.7 mc.

TUBE COMPLEMENT (Tuner)

1. 6BE6.......................1st Det. & Osc. FM.
2. 6BE6.......................1st Det. & Osc. AM.
3. 6BA6..............................I.F. Amp.
4. 6AU6..............................FM. Driver
5. 6AL5..........................Ratio Detector
6. 6SQ7.........2nd Det., A.V.C. & A.F. Amplifier
7. 6U5/6G5............AM-FM. Tuning Eye Indicator

TUBE COMPLEMENT (Amplifier-Power Supply)

8. 6J5.........................2nd A. F.Amplifier
9. 6J5...............................Phase Inverter
10. 6V6.......................A.F. Power Amplifier
11. 6V6.......................A.F. Power Amplifier
12. 5U4G.................................Rectifier

FRONT PANEL CONTROLS

1. Tuning
2. Range Switch.........3 position; Phono, AM, FM
3. Tone............................Treble - Bass
4. Volume

POWER SUPPLY RATING

105-125 volts-60 cycles.............105 watts

PILOT LAMPS.......(2) No. 44, 6-8 volts, 0.25 amp.

LOUDSPEAKER

Type...................Rola G12, Auditorium Model
Size...........................12" Electrodynamic
Voice coil impedance.........6.8 ohms at 400 cycles

POWER OUTPUT

Undistorted..............................10 watts
Maximum..................................14 watts

CIRCUIT DESCRIPTION

This receiver is a twelve tube combination FM-AM superheterodyne radio with provision for phono operation. Three separate sections are employed for the entire receiver; a tuner, amplifier-power supply and a metal encased auditorium speaker.

The tuner incorporates two separate convertors, one for FM and the other for the broadcast band. A range switch is provided with a third position allowing phonograph operation through the sound channel. A 6U5/6G5 tuning eye tube facilitates visual indication of proper tuning for both AM and FM operation.

The set utilizes a ratio detector eliminating the necessity of a limiting stage preceeding the detector and having an inherent insensitivity to amplitude modulated signals.

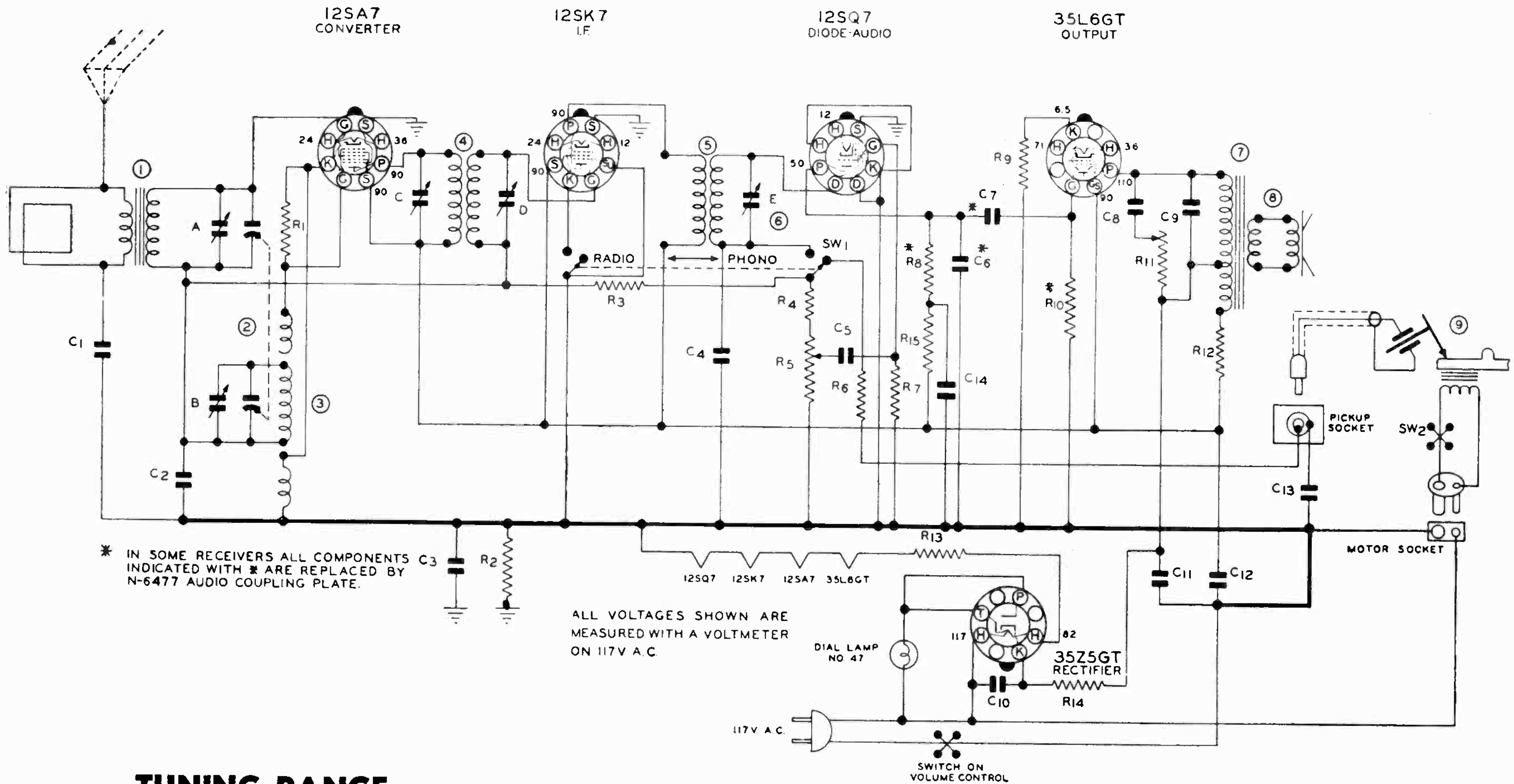
A loop antenna is included for the broadcast band.

The amplifier section employs two 6J5 tubes as phase inverter and amplifier driving a pair of 6V6 in push-pull operation which deliver ten watts of undistorted output from a Rola G12 auditorium speaker.

A 5U4 rectifier is used in the power supply with separately filtered sections for both the tuner and amplifier.

SONORA RADIO & TELEV. CORP.

MODEL WBRU-239



I.F. 455 KC.

5 TUBE A.C.-D.C.
SUPERHETERODYNE
SINGLE BAND
PHONO-CHANGER COMBINATION
DRAWN BY APP'D.

MARCH 1947

TUNING RANGE

The receiver is designed to operate over the standard broadcast band which extends from 535 to 1620 Kilocycles (KC) (185 to 560 Meters).

DIAL CALIBRATION. The scale is calibrated from 55 to 160 (Standard Broadcast). This band covers all Standard Broadcast frequencies of the United States, Canada, Mexico, Cuba and many Central and South American Countries. Add a zero to figures on the scale to obtain kilocycles.

SERVICE DATA

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

NOTE: IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED. OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM:

ALIGNMENT PROCEDURE

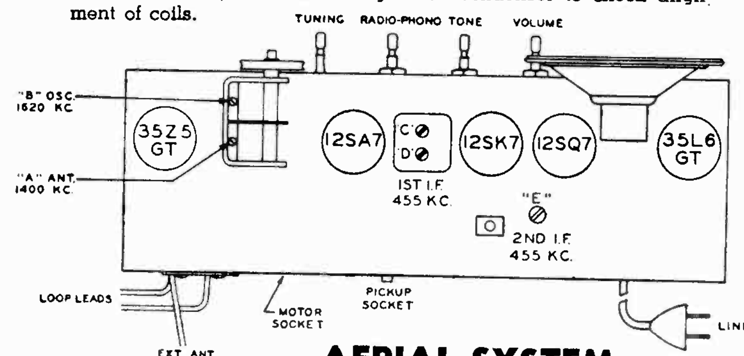
GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 600, 1400 and 1620 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I. F. ALIGNMENT. Remove chassis from the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all three I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the test oscillator to the antenna of the set through a 100 mmfd. (.0001) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1620 KC, and adjust the oscillator (or 1620 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

DIA NO.	PART NO.	DESCRIPTION	DIA NO.	PART NO.	DESCRIPTION
R1	N-4025	22,000 OHM .5W 20%	C6	N-8135	250 MMFD 500V 20%
R2	N-4026	220,000 OHM .5W 20%	C7	N-1344	.01 MFD 400V 20%
R3	N-1262	1. MEGOHM .5W 20%	C8	N-1623	.1 MFD. 400V -10+20%
R4	N-4063	47,000 OHM .5W 20%	C9	N-1376	.02 MFD 400V 20%
R5	N-4843 / N-5757	.5 MEGOHM VOL. CONT.	C10	N-1346	.05 MFD 400V 20%
			C11 / C12	N-5051	40 MFD 150V / 40 MFD 150V ELECTROLYTIC
R6	N-1262	1. MEGOHM .5W 20%	C13	N-4957	.09 MFD 200V 20%
R7	N-4028	6.8 MEGOHM .5W 20%	C14	N-1345	.05 MFD 200V 20%
R8	N-4026	220,000 OHM .5W 20%			
R9	N-4087	180 OHM .5W 10%			
R10	N-4027	470,000 OHM .5W 20%	1	N-6149	ANT. COIL
R11	N-6157	25,000 OHM TONE CONT.	2	N-6154	2 GANG CONDENSER
R12	N-5358	1000 OHM 1.W 10%	3	N-4810	OSCILLATOR COIL
R13	N-4023	82 OHM 2.W 10%	4	N-4813	1ST I.F. TRANSFORMER
R14	N-4022	33 OHM .5W 20%	5	N-4846	2ND IF TRANSFORMER
R15	N-4064	33,000 OHM .5W 20%	6	N-4985	TRIMMER
			7	N-4875	OUTPUT TRANSFORMER
			8	N-6148	5" P.M. SPEAKER
C1	N-6015	100 MMFD 500V 20%	9	N-6151	RECORD CHANGER
C2	N-1345	.05 MFD 200V 20%			
C3	N-1345	.05 MFD 200V 20%	S1	N-6145 / N-6156	RADIO-PHONO SWITCH
C4	N-6015	100 MMFD 500V 20%			
C5	N-4894	.005 MFD 600V -15+40%	S2		MOTOR SWITCH ON CHANGER



AERIAL SYSTEM

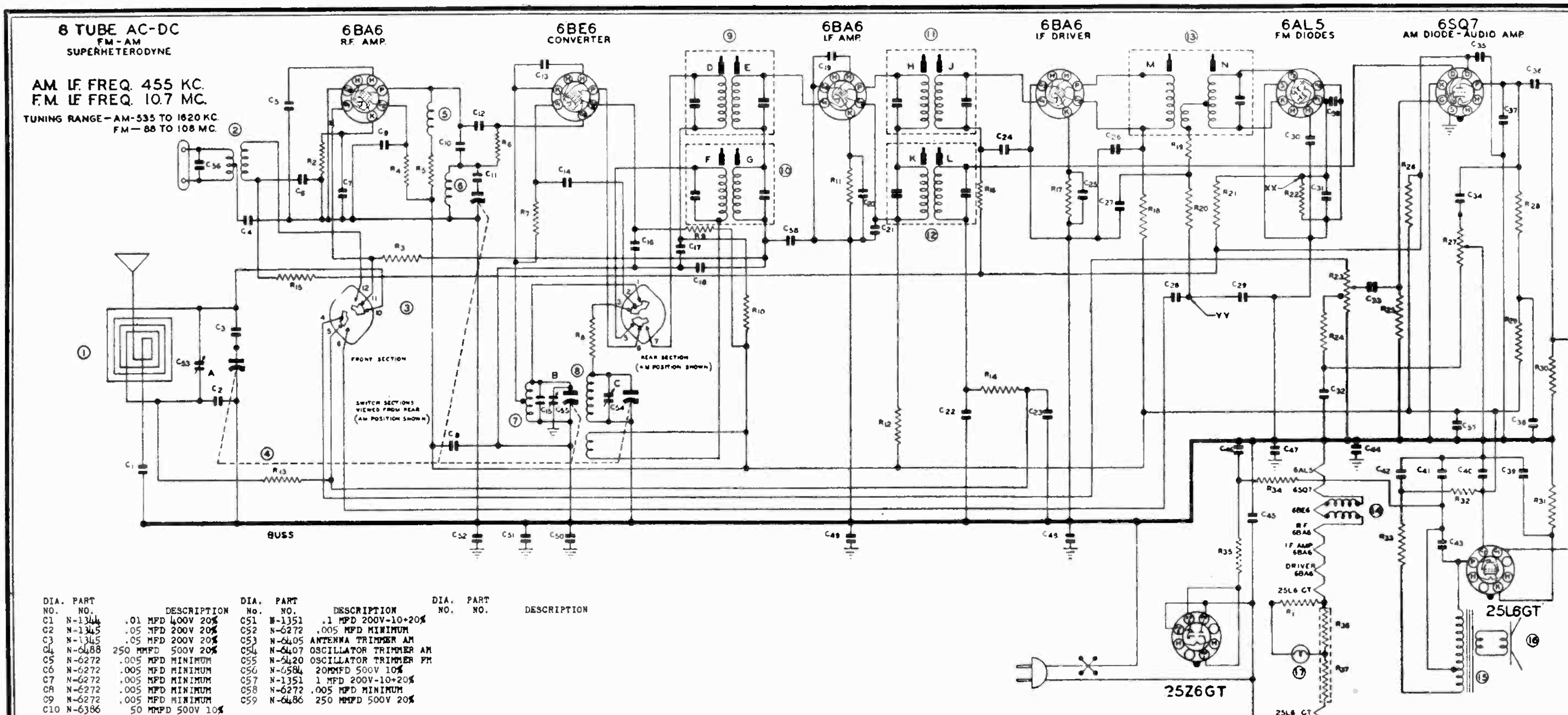
The receiver has a built-in "loop" aerial. Its excellent design is such as to increase pick-up from stations having wide variations in signal strength. The efficiency and selectivity of the loop provide outstanding reception without the use of an external aerial. The "loop" aerial used on this receiver is somewhat directional so reception from weak stations can be improved by turning the set in the proper direction. In or near metal buildings, iron ore deposits or steel structures or in localities remote from broadcasting stations, reception can be improved by using an outside aerial 50 feet to 100 feet in length including lead-in. Connect the outside aerial to the aerial lead. When using the outside aerial it may be necessary to reverse the power cord plug in wall socket to eliminate hum or distortion.

SONORA RADIO & TELEV. CORP.

MODELS WEU-240, WEU-262

8 TUBE AC-DC
FM-AM
SUPERHETERODYNE

AM IF FREQ. 455 KC.
FM IF FREQ. 10.7 MC.
TUNING RANGE — AM-535 TO 1620 KC. FM — 88 TO 108 MC.

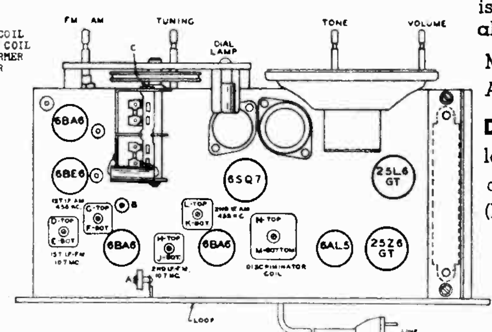


DIA. NO.	PART NO.	DESCRIPTION
C1	N-1344	.01 MFD 400V 20%
C2	N-1345	.05 MFD 200V 20%
C3	N-1345	.05 MFD 200V 20%
C4	N-6488	250 MMFD 500V 20%
C5	N-6272	.005 MFD MINIMUM
C6	N-6272	.005 MFD MINIMUM
C7	N-6272	.005 MFD MINIMUM
C8	N-6272	.005 MFD MINIMUM
C9	N-6272	.005 MFD MINIMUM
C10	N-6386	50 MMFD 500V 10%
C11	N-6484	75 MMFD 500V 5%
C12	N-6015	100 MMFD 500V 20%
C13	N-6488	250 MMFD 500V 20%
C14	N-6365	50 MMFD 500V 10%
C15	N-8483	4.5 MMFD 500V 20%
C16	N-6272	.005 MFD MINIMUM
C17	N-6272	.005 MFD MINIMUM
C18	N-1345	.05 MFD 200V 20%
C19	N-6272	.005 MFD MINIMUM
C20	N-6272	.005 MFD MINIMUM
C21	N-6272	.005 MFD MINIMUM
C22	N-6375	50 MFD 500V 20%
C23	N-6375	50 MFD 500V 20%
C24	N-6272	.005 MFD MINIMUM
C25	N-6272	.005 MFD MINIMUM
C26	N-6272	.005 MFD MINIMUM
C27	N-6487	130 MMFD 500V 5%
C28	N-1376	.02 MFD 400V 20%
C29	N-6377	.002 MFD 600V-15+40%
C30	N-6272	.005 MFD MINIMUM
C31	N-6374	4 MFD 50V ELECTROLYTIC
C32	N-1344	.01 MFD 400V 20%
C33	N-4894	.005 MFD 600V-15+40%
C34	N-4894	.005 MFD 600V-15+40%
C35	N-6438	250 MMFD 600V 20%
C36	N-1344	.01 MFD 400V 20%
C37	N-6488	.250 MFD 500V 20%
C38	N-1361	.1 MFD 200V-10+20%
C39		20 MFD 25V ELECTROLYTIC
C40		50 MFD 150V ELECTROLYTIC
C41	N-6913	50 MFD 150V ELECTROLYTIC
C42		50 MFD 150V ELECTROLYTIC
C43	N-1344	.01 MFD 400V 20%
C44	N-6486	250 MMFD 500V 20%
C45	N-1340	.05 MFD 400V 20%
C46	N-6312	80 MFD 150V ELEC.
C47	N-6462	.01 MFD MINIMUM
C48	N-6272	.005 MFD MINIMUM
C49	N-6482	.01 MFD MINIMUM
C50	N-6272	.005 MFD MINIMUM
C51	N-1351	.1 MFD 200V-10+20%
C52	N-6272	.005 MFD MINIMUM
C53	N-6405	ANTENNA TRIMMER AM
C54	N-6407	OSCILLATOR TRIMMER AM
C55	N-5420	OSCILLATOR TRIMMER FM
C56	N-6584	20MMFD 500V 10%
C57	N-1351	1 MFD 200V-10+20%
C58	N-6272	.005 MFD MINIMUM
C59	N-6486	250 MMFD 500V 20%

DIA. NO.	PART NO.	DESCRIPTION
R1	N-6311	REGULATING RES.
R2	N-6485	68 OHM .5W 10%
R3	N-4277	2.2 MEGOHM .5W 20%
R4	N-4898	2,200 OHM .5W 10%
R5	N-4279	820 OHM .5W 10%
R6	N-4895	10,000 OHM .5W 20%
R7	N-4025	22,000 OHM .5W 20%
R8	N-5053	12 OHM .5W 10%
R9	NN-1694	1,000 OHM .5W 10%
R10	N-1694	1,000 OHM .5W 20%
R11	N-6485	68 OHM .5W 10%
R12	N-6011	470 OHM .5W 20%
R13	N-1262	1.0 MEGOHM .5W 20%
R14	N-4063	47000 OHM .5W 20%
R15	N-4026	220,000 OHM .5W 20%
R16	N-4026	220,000 OHM .5W 20%
R17	N-6485	68 OHM .5W 10%
R18	N-6011	470 OHM .5W 20%
R19	N-6485	68 OHM .5W 10%
R20	N-4064	33,000 OHM .5W 20%
R21	N-2973	100,000 OHM .5W 10%
R22	N-6378	33,000 OHM .5W 5%
R23	N-6274	.5 MEGOHM VOLUME CONT.
R24	N-4451	27,000 OHM .5W 10%
R25	N-4028	68 MEGOHM .5W 20%
R26	N-6486	1.8 MEGOHM .5W 10%
R27	N-6273	.5 MEGOHM TONE CONTROL
R28	N-4026	220,000 OHM .5W 20%
R29	N-5683	68,000 OHM .5W 10%
R30	N-4027	470,000 OHM .5W 20%
R31	N-3663	150 OHM .5W 10%
R32	N-1613	100 OHM .5W 10%
R33	N-3663	150 OHM .5W 10%
R34	N-6379	68 OHM 1.0W 10%
R35	N-5053	12 OHM .5W 10%
R36	N-6362	100 OHM 7.7W
R37	N-6362	60 OHM 6.0W 10%

DIA. NO.	PART NO.	DESCRIPTION
1	N-6343	ANTENNA LOOP COIL
2	N-6371	ANTENNA COIL FM
3	N-6351	AM-FM SWITCH
4	N-6276	2 GANG CAPACITOR
5	N-6373	R.F. CHOKE COIL
6	N-6372	R.F. COIL FM
7	N-6349	OSC. COIL FM
8	N-6348	OSC. COIL FM
9	N-6346	1st IF COIL FM
10	N-6344	1st IF COIL AM
11	N-6346	2nd IF COIL FM
12	N-6345	2nd IF COIL AM
13	N-6341	DISCRIMINATOR COIL
14	N-6339	FILAMENT CHOKE COIL
15	N-6369	OUTPUT TRANSFORMER
16	N-6286	5" P.M. SPEAKER
17	N-1147	DIAL LAMP

CHASSIS LAYOUT AND TUBE POSITIONS



This receiver is designed to operate over two tuning ranges; the broadcast band which extends from 535 to 1620 Kilocycles (KC) (185 to 560 Meters), and the Frequency Modulation (FM) Band which extends from 87 to 109 Megacycles (MC).

DIAL CALIBRATION. **(Standard Broadcast Band.)** The upper scale is calibrated from 55 to 160 (Standard Broadcast). This band covers all Standard Broadcast frequencies of the United States, Canada, Mexico, Cuba, and many Central and South American Countries. Add a zero to figures on the scale to obtain kilocycles.

DIAL CALIBRATION. **(Frequency Modulation Band.)** The entire lower scale is calibrated from 88 to 108 Megacycles (201 to 300 FM channels) which covers the entire popular Frequency Modulation (FM) Band.

MODELS WEU-240, WEU-262

SONORA RADIO & TELEV. CORP.

SERVICE DATA

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes, such as weak or defective tubes or speaker, open or grounded resistors, or bypass condensers. Never attempt to realign the set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause. It will be necessary to follow the procedure outlined below and to use recommended equipment for satisfactory results.

BROADCAST ALIGNMENT PROCEDURE

EQUIPMENT REQUIRED: Modulated Test Oscillator that will cover the frequencies of 455, 600, 1400 and 1620 KC, also an Output Meter to connect across the primary or secondary of the output transformer.

I. F. ALIGNMENT: Put switch in the broadcast position and connect the test oscillator to the converter grid through a .05 condenser. The ground lead of the test oscillator should be connected to the buss of the receiver. Adjust the four I. F. trimmers (F,G,L and K) for maximum reading on the output meter. Always use the peak on the slug which is obtained when screw is out of the can the greatest distance.

R. F. ALIGNMENT: Connect the test oscillator to the antenna lead on the loop through a 100 mmf. condenser. Set the gang condenser to the maximum high frequency position and the test oscillator to 1620 KC. Adjust Trimmer "C" to the maximum output. Set test oscillator to 1400 KC and tune in signal with the gang condenser and adjust Trimmer "A" to maximum response. Set test oscillator to 600 KC and tune in signal with gang condenser. Check for damage to gang condenser or coils.

F. M. ALIGNMENT PROCEDURE

EQUIPMENT REQUIRED: F. M. Generator with frequencies of 90, 98, 106, and 109 megacycles, and generator without any modulation which covers 10.7 megacycles, also a zero center microammeter, and a DC Vacuum Tube Voltmeter (An oscilloscope and variable frequency audio oscillator can be used for better results. This method of alignment is described in the last paragraph).

DISCRIMINATOR ALIGNMENT: Connect DC Vacuum Tube Voltmeter between the buss and point "XX" on circuit diagram. Point "XX" is negative potential on the vacuum tube voltmeter. Isolate point "XX" and buss connections to vacuum tube voltmeter with chokes made by wrapping approximately 20 turns of hookup wire around a pencil. This is illustrated in Figure 1. Connect two 100,000 ohm resistors in series. (These resistors must match to 5%.) Connect them from point "XX" to buss. Between junction of 100,000 ohm resistors and the point "YY" connect Zero Center Meter, which is also isolated by the choke described above. These connections are illustrated in Figure 1. Connect test oscillator which is adjusted to 10.7 magacycles to grid of IF Driver through a 250 mmf condenser. Adjust slug "M" to maximum on the vacuum tube voltmeter. Reduce test oscillator to keep vacuum tube voltmeter to around 5 volts. Adjust slug "N" to bring zero center meter to zero point. Slug "N" should never be touched after this alignment.

PRELIMINARY IF ALIGNMENT: Connect test oscillator to the converter grid through a 250 mmf. mica condenser. Adjust slugs D, E, H and J to maximum output on the vacuum tube voltmeter. In making these adjustments reduce the generator input to keep the vacuum tube voltmeter at approximately 5 volts when making this adjustment. Always use the peak on the slug which is obtained when the screw is out of the can the greatest distance.

FINAL I. F. ALIGNMENT: Set the test oscillator to 109 MC without frequency moldulation and connect it to converter grid. Adjust trimmer "B" for approximate maximum output on the vacuum tube voltmeter and zero center for exact centering. Adjust test oscillator to approximately 25 KC deviation, carefully adjust trimmers D, E, H, J and M for maximum on vacuum tube voltmeter. It may be necessary to shift the frequency of the oscillator slightly to hold the zero center meter on center. In making this adjustment turn up volume control slightly to obtain an audio signal out of the speaker. If this signal is free of distortion, increase the deviation to approximately 75 KC and repeat the above alignment. If this is done carefully there will be no distortion in the speaker with this deviation. If distortion is obtained in the speaker with this deviation, it will be necessary to carefully repeat the I.F. alignment.

R. F. ALIGNMENT: Move the signal generator to the FM antenna terminals, using 150 ohm resistors between the generator terminals and each of the FM antenna terminals. Set the test oscillator to 106 megacycles and tune in signal with gang condenser to obtain approximate maximum on the vacuum tube voltmeter and zero center on the meter. Slightly bend the RF section in the gang condenser for maximum output with vacuum tube voltmeter. Set the signal generator to 98 megacycles, tune in signal with the gang condenser. Repeat the above procedure at this frequency and also at 90 megacycles. Recheck alignment at 106 megacycles.

FINAL ALIGNMENT OF FM IF WITH OSCILLOSCOPE AND VARIABLE AUDIO OSCILLATOR: The oscilloscope and variable audio oscillator should be connected as shown in Figure 2. Adjust the deviation to approximately 25 KC and align trimmers D, E, H, J and M to maximum on the vacuum tube voltmeter while watching the oscilloscope for a straight line. It may be necessary to vary the frequency of the variable audio oscillator in order to make the line straight on the scope. Next increase deviation to approximately 75 KC and repeat procedure, adjusting for maximum or as close to maximum as it is possible to obtain without losing the straight line on the oscilloscope. After all the trimmers have been properly adjusted to a maximum and a straight line on the scope, increase the deviation from approximately 125 to 150 KC. The curves illustrated in Figure 3 should be obtained. In making the above adjustments it may be necessary to make slight variations in the RF frequency in order to hold the zero center meter at the zero point.

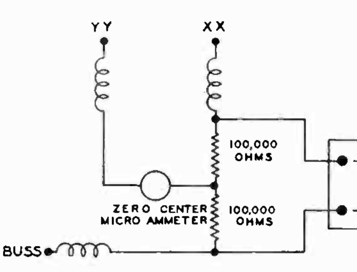


FIG. 1

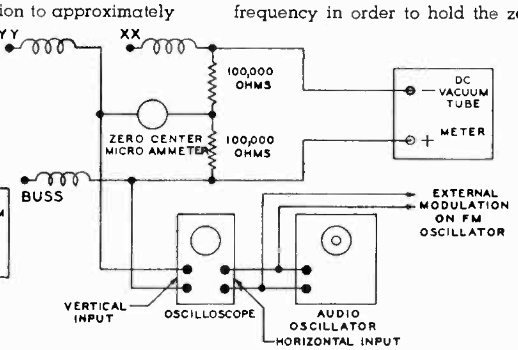
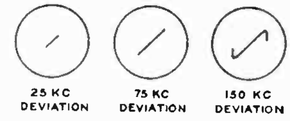


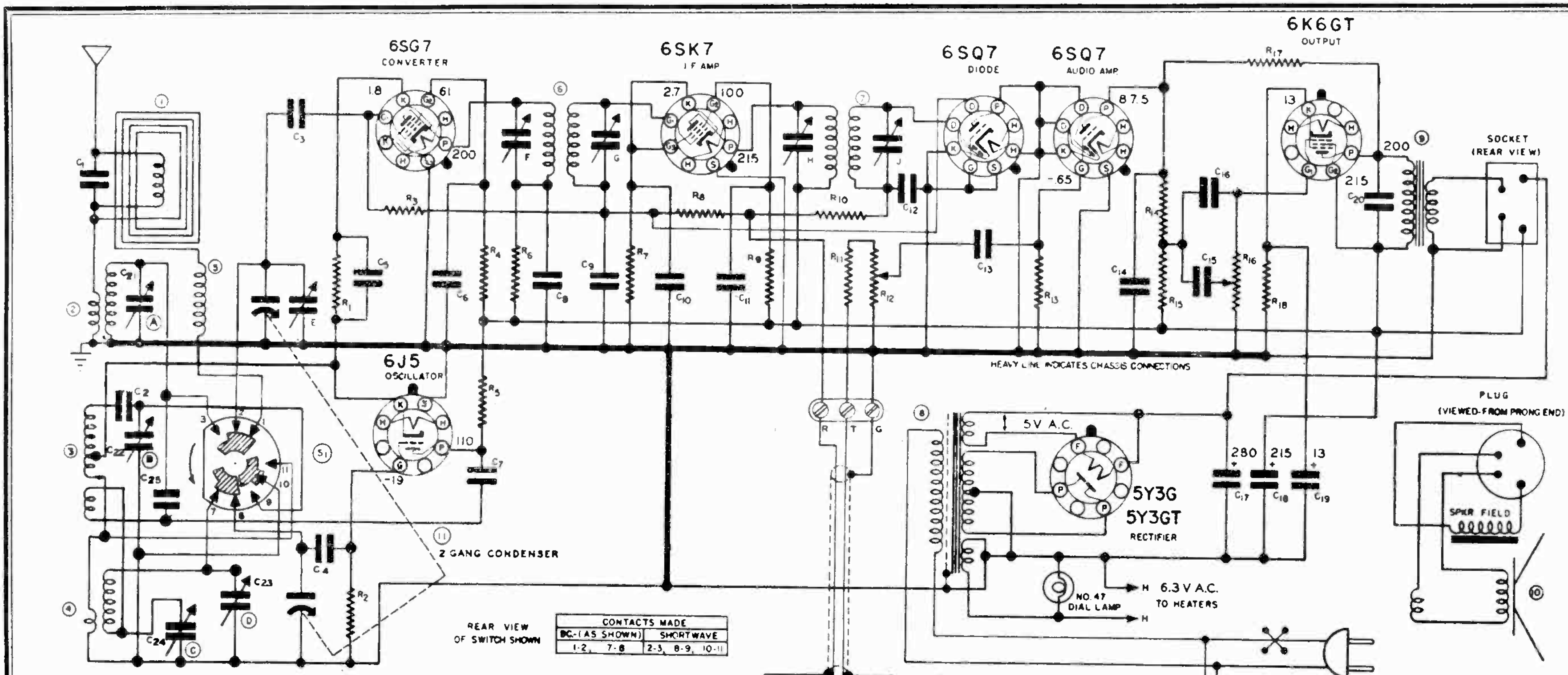
FIG. 2



OSCILLOSCOPE PATTERNS

FIG. 3

SONORA RADIO & TELEV. CORP. MODEL WTRU-254A



ALL VOLTAGES SHOWN ARE MEASURED WITH A VOLTMETER ON 117 V. A.C.

DIA NO.	PART NO.	DESCRIPTION		
R1	N-3341	1000 OHM	.5W.	10%
R2	N-4063	47,000 OHM	.5W.	20%
R3	N-4062	3.3 MEGOHM	.5W.	20%
R4	N-4423	330,000 OHM	.5W.	20%
R5	N-4451	27,000 OHM	.5W.	10%
R6	N-1258	10,000 OHM	.5W.	20%
R7	N-4121	270 OHM	.5W.	10%
R8	N-1262	1.0 MEGOHM	.5W.	20%
R9	N-4063	47,000 OHM	.5W.	20%
R10		47,000 OHM IN 2ND I.F. COIL	.5W.	20%
R11	N-4063	47,000 OHM	.5W.	20%
R12	N-4014	0.5 MEGOHM	VOL. CONT.	
R13	N-1263	10.0 MEGOHM	.5W.	20%
R14	N-4064	33,000 OHM	.5W.	20%
R15	N-4423	330,000 OHM	.5W.	20%
R16	N-5161	0.5 MEGOHM	TONE CONT.	
R17	N-4424	2.2 MEGOHM	.5W.	10%
R18	N-4421	470 OHM	.1 W.	10%
R19	N-5405	470,000 OHM	.5W.	20%
C1	N-1343	.00025 MFD.	MICA	20%
C2	N-1690	.004 MFD.	MICA	5%
C3	N-1343	.00025 MFD.	MICA	20%
C4	N-1342	.00005 MFD.	MICA	20%
C5	N-1345	.05 MFD.	200V.	20%
C6	N-1376	.02 MFD.	400V.	20%
C7	N-1344	.01 MFD.	400V.	20%
C8	N-1623	.1 MFD.	400V.	20%
C9	N-1345	.05 MFD.	200V.	20%

DIA NO.	PART NO.	DESCRIPTION
C10	N-1351	.1 MFD. 200V. 20%
C11	N-1623	.1 MFD. 400V. 20%
C12		.0001 MFD. MICA 20% IN 2ND I.F. COIL
C13	N-1344	.01 MFD. 400V. 20%
C14	N-1374	.0001 MFD. MICA 20%
C15	N-4894	.005 MFD. 600V. 20%
C16	N-1344	.01 MFD. 400V. 20%
C17, C18, C19	N-4411	12 MFD. 400WV. / 10 MFD. 400WV. ELECTROLYTIC / 20 MFD. 25WV.
C20	N-4894	.005 MFD. 600V. 20%
C21, C22, C23	N-2158	3 SECTION TRIMMER
C24	N-1254	PADDER
C25	N-5920	4.0 MMFD COPOLENE
S1	N-4400	BANDSWITCH
S2	N-5560	RADIO PHONO SWITCH
1	N-4401	LOOP ANTENNA
2	N-5921	SW ANTENNA COIL
3	N-4404	SW OSCILLATOR COIL
4	N-4403	BC OSCILLATOR COIL
5	N-4407	LOOP SERIES COIL
6	N-4405	1ST I.F. TRANSFORMER
7	N-4406	2ND I.F. TRANSFORMER
8	N-4396	POWER TRANSFORMER
9	N-4395	OUTPUT TRANSFORMER
10	N-6435	8" DYNAMIC SPEAKER
11	N-4397	2 GANG CONDENSER
12	N-6151	RECORD CHANGER

TUNING RANGE

This receiver is designed to operate over two tuning ranges; the broadcast band which extends from 535 to 1720 Kilocycles (KC) (174 to 560 Meters), and the International Short Wave Band which extends from 5.65 to 18.3 Megacycles (MC) (16.4 to 53 Meters.)

DIAL CALIBRATION. (STANDARD BROADCAST BAND.) The outside scale is calibrated from 55 to 170 (Standard Broadcast.) This band covers all Standard Broadcast frequencies of the United States, Canada, Mexico, Cuba, and many Central and South American Countries. Add a zero to figures on the scale to obtain kilocycles.

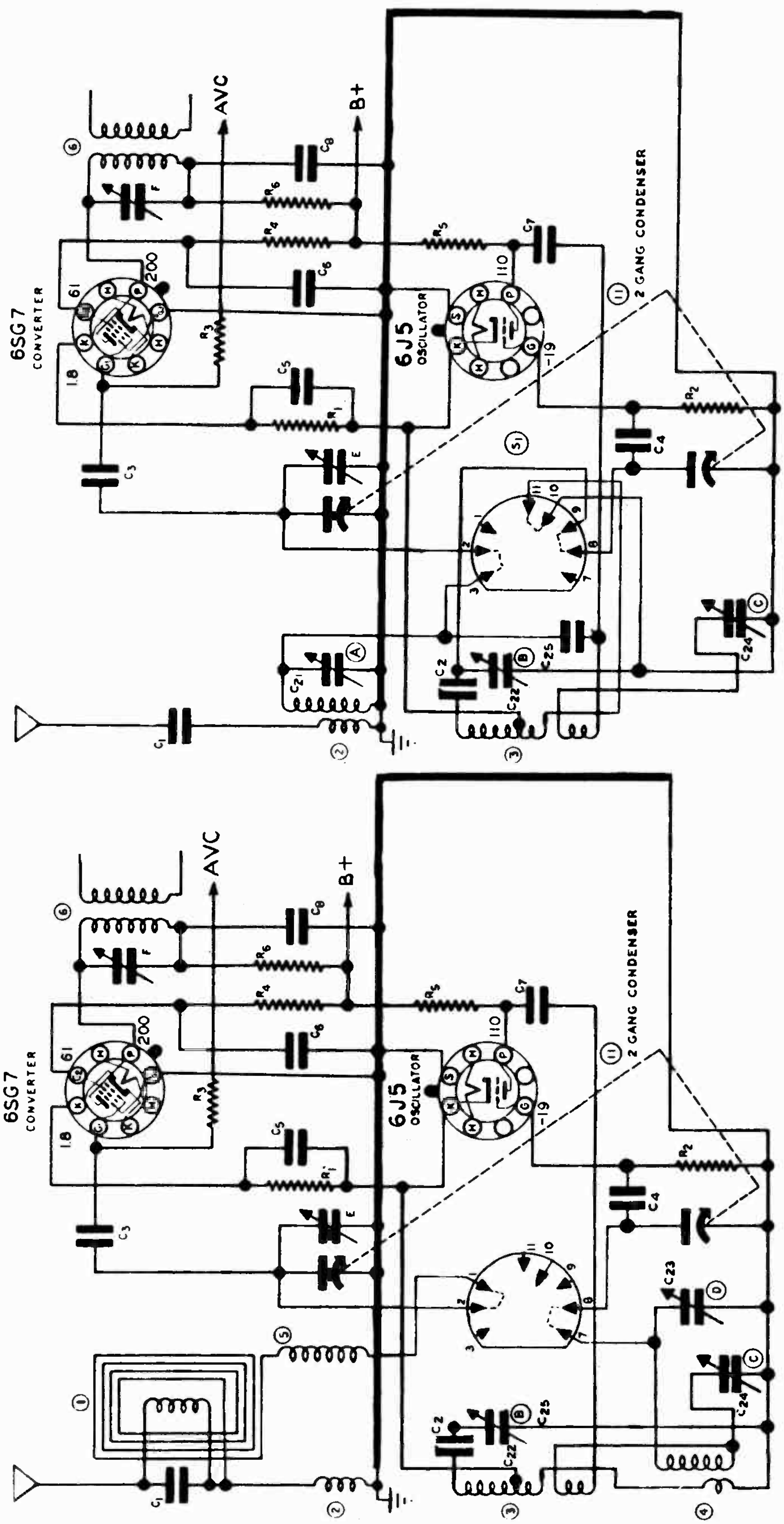
DIAL CALIBRATION. (SHORT WAVE BAND.) The entire inside scale is devoted to short wave American and foreign broadcasts. This scale is calibrated from 6 to 18 megacycles (MC). Consult the Sonora Short-Wave Station list for the proper frequency and time for best short wave reception.

CLARI-SKEMATIX

Registered Trademark

MODEL WTRU-254A

SONORA RADIO & TELEV. CORP.



BAND-SWITCH SHOWN
AT 2ND POSITION COUNTERCLOCKWISE.
SHORT WAVE BAND
5.65 - 18.3 MC

BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
535 - 1720 KC

ALIGNMENT PROCEDURE

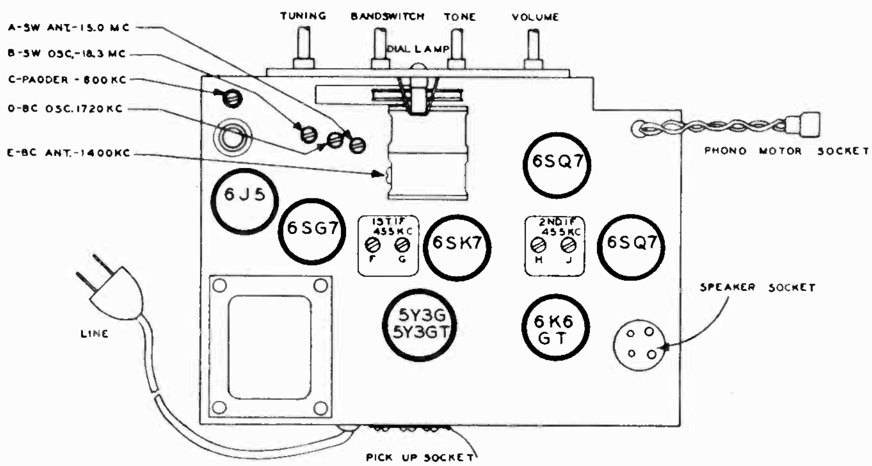
GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 600, 1400, 1720, 6000, 15000, and 18300 KC, and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast and Short Wave bands should be adjusted.

I.F. ALIGNMENT. Remove the chassis and loop antenna from the cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the Band Switch set to the Broadcast Band and with the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube 6SG7 through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the receiver ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

SHORT WAVE BAND ALIGNMENT. With the band switch turned to the S.W. position, connect the test oscillator to the antenna with a 400 ohm dummy and the ground on the test oscillator to the ground connection on the receiver. Adjust the S.W. oscillator to give a maximum output with the dial at 18300 KC (extreme end.) Set the test oscillator at 15000 KC and tune in the signal with the dial. Adjust the antenna trimmer for maximum output. With a strong signal input turn the dial to approximately 1 M.C. lower in frequency and pick up the image frequency. If the image is not received, it will be necessary to return the dial to 18300 KC to reduce the capacity in the oscillator trimmer until a second signal is received. Proceed as before with the alignment of the antenna and recheck for image frequency. Check the sensitivity at 6000 KC to determine if the coils and mica pad are not defective.

BROADCAST BAND ALIGNMENT. With the Band Switch turned to the Broadcast Position, connect the test oscillator to the antenna of the set through a 100 mmfd. (.0001) condenser, and the ground on the test oscillator to the receiver ground. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer). For the antenna adjustment set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in the signal on the condenser. Adjust the 600 KC Pad while rocking the gang to obtain maximum output.



SERVICE DATA

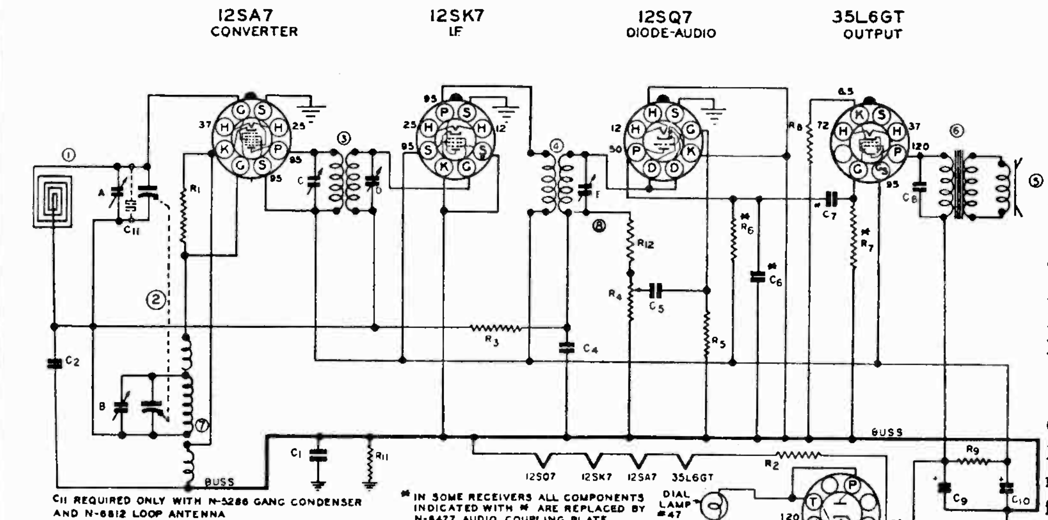
Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

NOTE: IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED. OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

AERIAL SYSTEM

The receiver has a built-in "loop" aerial. Its excellent design is such as to increase pick-up from stations having wide variations in signal strength. The efficiency and selectivity of the loop provide outstanding reception without the use of an external aerial. The "loop" aerial used on this receiver is somewhat directional so reception from weak stations can be improved by turning the set in the proper direction. In or near metal buildings, iron ore deposits or steel structures or in localities remote from broadcasting stations, reception can be improved by using an outside aerial 50 feet to 100 feet in length including lead-in. Connect the outside aerial to the aerial lead. When using an outside aerial, use a good ground connection. Water pipes and steam or hot water radiators make a desirable ground connection. The ground wire should be connected to the black wire on the receiver. Although broadcast reception is satisfactory, the short wave band may require an additional aerial.

MODELS 100I, 100M — SONORA RADIO & TELEV. CORP.

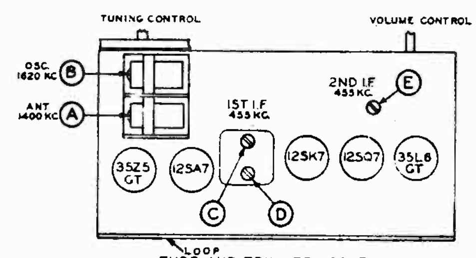


C11 REQUIRED ONLY WITH N-5286 GANG CONDENSER AND N-6812 LOOP ANTENNA

* IN SOME RECEIVERS ALL COMPONENTS INDICATED WITH * ARE REPLACED BY N-6477 AUDIO COUPLING PLATE.

ALL VOLTAGES SHOWN ARE MEASURED WITH SET OPERATING ON 117 AC.

DIA NO	PART NO	DESCRIPTION	DIA NO	PART NO	DESCRIPTION
R1	N-4025	22,000 OHM .5W 20%	C8	N-1376	.02 MFD 400V
R2	N-4023	82 OHM 2.W 10%	C9	N-6631	35 MFD 150V ELECT.
R3	N-1282	1. MEGOHM .5W 20%	C10		30 MFD 150V
R4	N-4999	.5 MEG. VOL. CONT.	C11	N-1681	10 MMFD MICA
R5	N-4028	6.8 MEGOHM .5W 20%			
R6	N-4026	220,000 OHM .5W 20%			
R7	N-4027	470,000 OHM .5W 20%			
R8	N-4024	220 OHM .5W 10%			
R9	N-5358	1000 OHM 1.0W 10%			
R10	N-4022	33 OHM .5W 20%			
R11	N-4026	220,000 OHM .5W 20%			
R12	N-4063	47,000 OHM .5W 20%	1	N-6629	ANTENNA LOOP COIL
			2	N-5936	2 GANG CONDENSER
				OR	
			1	N-6812	ANTENNA LOOP COIL
			2	N-5286	2 GANG CONDENSER
C1	N-1345	.05 MFD 200V	3	N-4813	1ST I.F. TRANSFORMER
C2	N-1345	.05 MFD 200V	4	N-4846	2ND I.F. TRANSFORMER
C3	N-1346	.05 MFD 400V	5	N-4316	4" P M SPEAKER
C4	N-1374	100 MMFD MICA	6	N-3899	OUTPUT TRANSF.
C5	N-4894	.005 MFD 600V	7	N-4810	OSCILLATOR COIL
C6	N-4890	.0005 MFD 600V	8	N-4048	TRIMMER
C7	N-1344	.01 MFD 400V		#47	DIAL LAMP



TUBE AND TRIMMER LOCATIONS

TUNING RANGE

This receiver is designed to operate over the standard broadcast band which extends from 535 to 1620 Kilocycles (KC) (185 to 560 Meters).

DIAL CALIBRATION. The scale is calibrated from 55 to 160 (Standard Broadcast). This band covers all Standard Broadcast frequencies of the United States, Canada, Mexico, Cuba and many Central and South American Countries. Add a zero to figures on the scale to obtain kilocycles.

POWER SUPPLY. This receiver is designed to operate on any alternating current supply (AC) ranging from 110 to 120 volts, 50 to 60 cycles; or on any direct current supply (DC) ranging from 110 to 120 volts.

5 TUBE AC-DC

SUPERHETERODYNE SINGLE BAND

NOVEMBER, 1947

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

⑤ **NOTE:** IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 600, 1400 and 1620 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

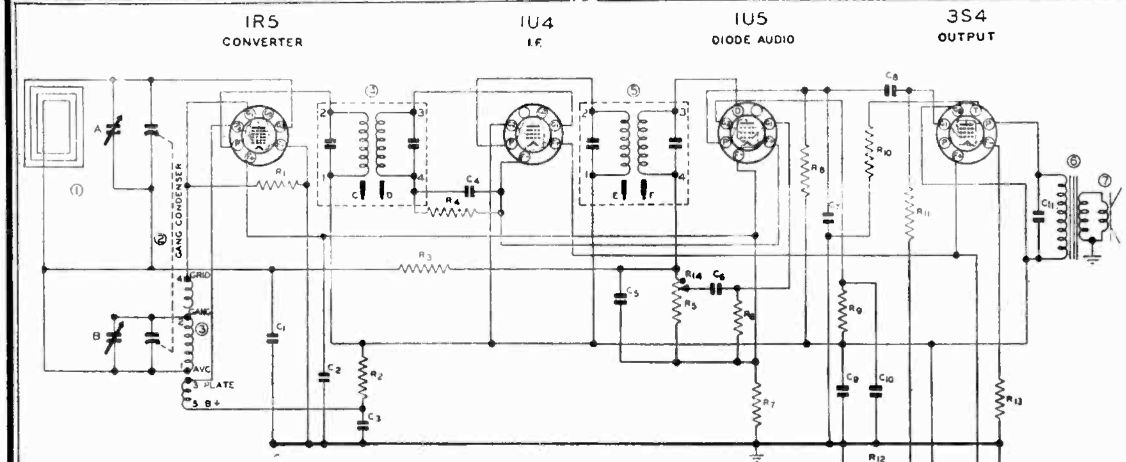
CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformer has been properly adjusted and peaked, the broadcast band should be adjusted.

I.F. ALIGNMENT. Remove the chassis and loop antenna from the cabinet and set them up on the bench so that they occupy exactly the same respective position on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated on the circuit diagram. Align all three I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the test oscillator to a dummy loop which can be made by coiling 2 turns of hookup wire about 6" in diameter. Place this dummy loop about a foot from the loop on the receiver and in the same plane as the receiver loop. With the gang condenser set at minimum capacity, set the test oscillator at 1620 KC, and adjust the oscillator (or 1620 KC trimmer) on the gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

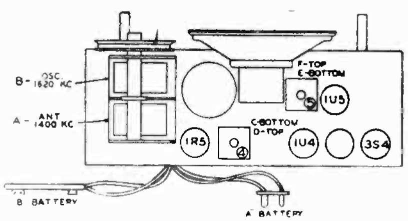
I.F. 455KC.

SONORA RADIO & TELEV. CORP. MODELS 101B, 101B-B



I.F. 455 KC.

Diagram No.	Part No.	Description
C1	N-1345	.05 MFD 200 V. 20%
C2	N-1351	.1 MFD 200 V. —10% + 20%
C3	N-1345	.05 MFD 200 V. 20%
C4	N-1344	.01 MFD 400 V. 20%
C5	N-6015	100 MMFD 500 V. 20%
C6	N-4894	.005 MFD 600 V. —15% + 40%
C7	N-6015	100 MMFD 500 V. 20%
C8	N-4894	.005 MFD 600 V. —15% + 40%
C9	N-1367	6 MFD 150 V. Electrolytic
C10	N-1344	.01 MFD 400 V. 20%
C11	N-6377	.002 MFD 600 V. —15% + 40%
R1	N-2973	100,000 Ohm .5 W. 10%
R2	N-5690	12,000 Ohm .5 W. 10%
R3	N-4061	4.7 Megohm .5 W. 20%
R4	N-4028	6.8 Megohm .5 W. 20%
R5	N-6779	1.0 Megohm Volume Control
R6	N-4028	6.8 Megohm .5 W. 20%
R7	N-4279	820 Ohm .5 W. 10%
R8	N-1262	1.0 Megohm .5 W. 20%
R9	N-5473	3.9 Megohm .5 W. 10%
R10	N-6793	1,200 Ohm .5 W. 10%
R11	N-4277	2.2 Megohm .5 W. 20%
R12	N-4228	680 Ohm .5 W. 10%
R13	N-6792	27 Ohm .5 W. 10%
R14		47,000 Ohm (In Volume Control)
1	N-6781	Antenna Loop Coil
2	N-5936	2 Gang Capacitor
3	N-6003	Oscillator Coil
4	N-6865	Coil, 1st I.F.
5	N-6866	Coil, 2nd I.F.
6	N-6791	Output Transformer
7	N-6881	4" PM Speaker



BATTERY
SUPERHETERODYNE
RANGE 535 KC - 1620 KC

BATTERY: To install new batteries or replace an old one, the following sequence should be followed. Attach the connector with the snap-on fasteners to the "B" battery (67½ V.) and insert battery into left side of battery compartment as viewed from rear of cabinet so that the connector faces the rear of cabinet. Secondly, insert the prongs of the other battery connector into the socket of the "A" battery (4½ V.) and insert battery into cabinet so that the socket of the "A" battery faces the "B" battery.

This receiver will accommodate any of the batteries listed below:

Manufacturer	Manufacturer's "A" Battery	Type Number "B" Battery
National Carbon	**746**	**467**
General Dry Battery	**3H3**	**W45A**
Ray-O-Vac	**P83A**	**4367**
Burgess Battery	**G3**	**XX45**

CAUTION: *Do not place receiver on hot objects such as stoves, radiators, etc. Heat will damage the internal components of the receiver and reduce the battery life.*

TUNING RANGE

This receiver is designed to operate over the standard broadcast band which extends from 535 to 1620 Kilocycles (KC) (185 to 560 Meters).

DIAL CALIBRATION. The scale is calibrated from 55 to 160 (Standard Broadcast). This band covers all Standard Broadcast frequencies of the United States, Canada, Mexico, Cuba and many Central and South American Countries. Add a zero to figures on the scale to obtain kilocycles.

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

NOTE: IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED. OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 600, 1400 and 1620 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformer has been properly adjusted and peaked, the broadcast band should be adjusted.

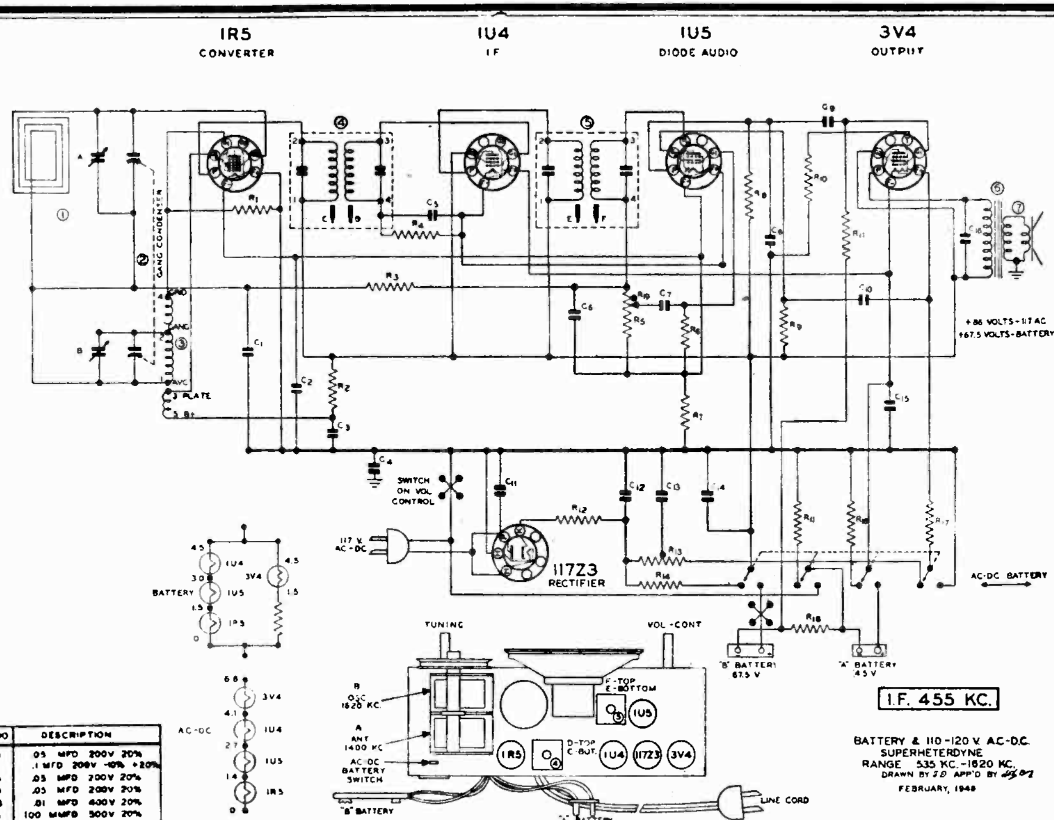
I.F. ALIGNMENT: Remove the chassis and batteries from the cabinet and remove the bottom enclosure plate from the chassis. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (1R5) through a .05 or .1 MFD condenser. The ground of the test oscillator should be connected to the chassis. Align all four I.F. slugs to peak or maximum reading on the output meter. Each I.F. has an adjustment at the top and bottom of the can. The peaks on the slugs must be the ones farthest out of the coils.

R.F. ALIGNMENT: Place the cabinet on its face and open cabinet back to a 90° angle. Lay a board across the body of cabinet ahead of the loop. Replace the bottom chassis enclosure and set the chassis and batteries on the board so that they occupy the same relative position to the loop as they do in the cabinet. Care should be taken to have no iron or other metal near the loop.

Connect the test oscillator to a dummy loop which can be made by coiling 2 turns of hookup wire about 6" in diameter. Place this dummy loop about a foot from the loop on the receiver and in the same plane as the receiver loop. With the gang condenser set at minimum capacity, set the test oscillator at 1620 KC, and adjust the oscillator (or 1620 KC trimmer) on the gang condenser. Next set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

MODELS 102B, 102G

SONORA RADIO & TELEV. CORP.



DIA NO	PART NO	DESCRIPTION
C1	N-1345	.05 MFD 200V 20%
C2	N-1351	.1 MFD 200V -10% +20%
C3	N-1345	.05 MFD 200V 20%
C4	N-1345	.05 MFD 200V 20%
C5	N-1344	.01 MFD 400V 20%
C6	N-8015	100 MMFD 500V 20%
C7	N-4094	.005 MFD 600V -15% +40%
C8	N-8015	100 MMFD 500V 20%
C9	N-4094	.005 MFD 600V -15% +40%
C10	N-1344	.01 MFD 400V 20%
C11	N-1346	.05 MFD 400V 20%
C12	N-8061	50 MFD 150V ELECTROLYTIC
C13		30 MFD 150V
C14		30 MFD 150V
C15		100 MFD 25V
C16	N-8377	.002 MFD [illegible] -15% +40%
R1	N-2973	100,000 OHM .5 W 10%
R2	N-5000	12,000 OHM .5 W 10%
R3	N-4061	4.7 MEGOHM .5 W 20%
R4	N-4028	8.4 MEGOHM .5 W 20%
R5	N-8770	1.0 MEGOHM VOL CONT
R6	N-4028	6.8 MEGOHM .5 W 20%
R7	N-4066	470 OHM .5 W 10%
R8	N-2976	1.0 MEGOHM .5 W 10%
R9	N-5473	3.9 MEGOHM .5 W 10%
R10	N-8703	1200 OHM .5 W 10%
R11	N-4277	2.2 MEGOHM .5 W 20%
R12	N-8113	68 OHM 1.5 W 10%
R13	N-8842	1820 OHM 5.0 W
R14	N-8703	1200 OHM .5 W 10%
R15	N-4026	220,000 OHM .5 W 20%
R16	N-8703	1200 OHM .5 W 10%
R17	N-8792	27 OHM .5 W 10%
R18	N-4121	270 OHM .5 W 10%
R19		47,000 OHM IN VOL CONT
1	N-8701	ANTENNA LOOP COIL
2	N-3936	2 GANG CAPACITOR
3	N-8003	OSCILLATOR COIL
4	N-8002	1ST IF COIL
5	N-8000	2ND IF COIL
6	N-8701	OUTPUT TRANSFORMER
7	N-8861	4" RM SPEAKER

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

NOTE: IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455, 600, 1400 and 1620 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I.F. ALIGNMENT: Remove the chassis and batteries from the cabinet and remove the bottom enclosure plate from the chassis. With the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (1R5) through a .05 or .1 MFD condenser. The ground of the test oscillator should be connected to the buss. Align all four I.F. slugs to peak or maximum reading on the output meter. Each I.F. has an adjustment at the top and bottom of the can. The peaks on the slugs must be the ones farthest out of the coils.

R.F. ALIGNMENT: Place the cabinet on its face and open cabinet back to a 90° angle. Lay a board across the body of cabinet ahead of the loop. Replace the bottom chassis enclosure and set the chassis and batteries on the board so that they occupy the same relative position to the loop as they do in the cabinet. Care should be taken to have no iron or other metal near the loop.

Connect the test oscillator to a dummy loop which can be made by coiling 2 turns of hookup wire about 6" in diameter. Place this dummy loop about a foot from the loop on the receiver and in the same plane as the receiver loop. With the gang condenser set at minimum capacity, set the test oscillator at 1620 KC, and adjust the oscillator (or 1620 KC trimmer) on the gang condenser. Next set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

BATTERY. To operate this receiver on battery, it will first be necessary to insert one prong of power cord plug into the switch through the slot located at the lower left hand corner of the top of the Chassis Base.

Before installing new batteries or replacing old ones, turn the volume control to the extreme left or "OFF" position, then the following sequence should be followed. Attach the connector with the snap-on fasteners to the "B" battery (67½ V.) and insert battery into left side of battery compartment as viewed from rear of cabinet so that the connector faces the rear of cabinet. Insert the prongs of the other battery connector into the socket of the "A" battery (4½ V.) and place battery into cabinet so that the socket of the "A" battery faces the "B" battery.

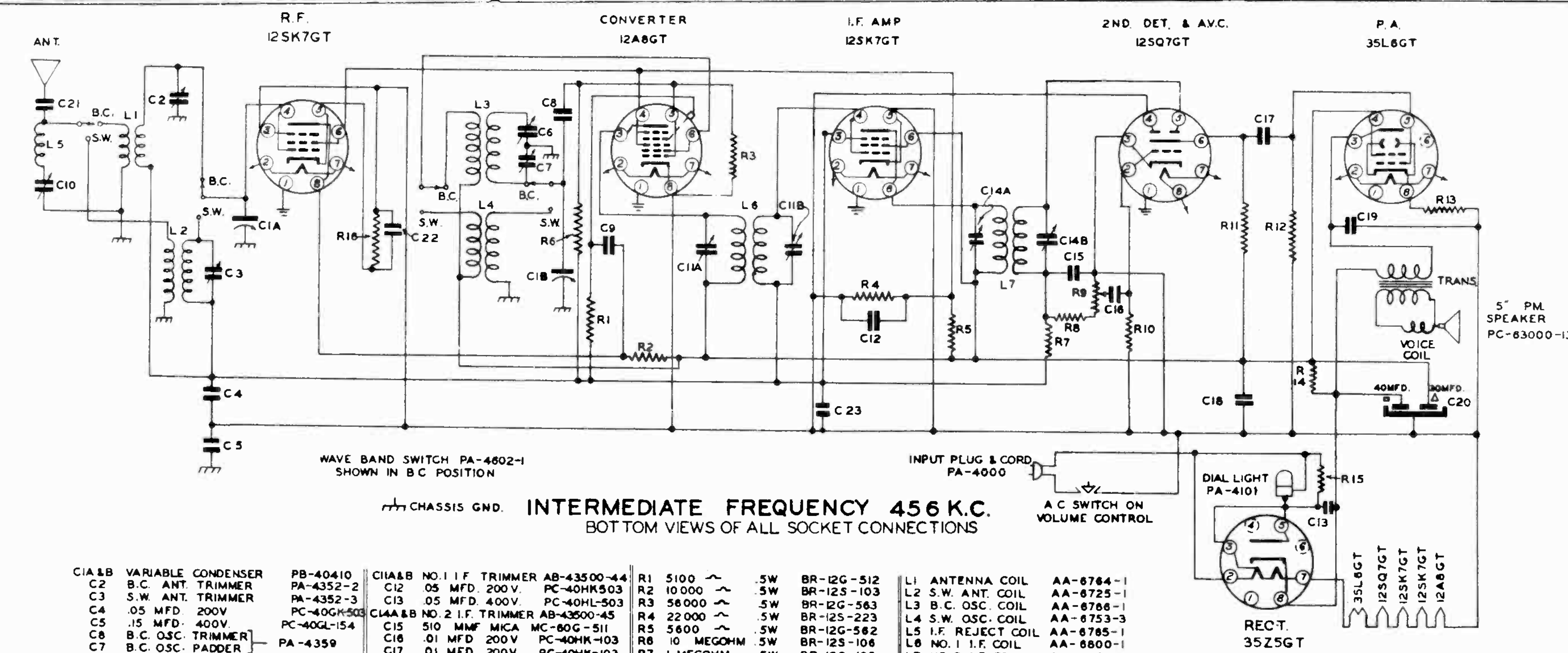
This receiver will accommodate any of the batteries listed below:

Manufacturer	Manufacturer's Type Number "A" Battery	"B" Battery
National Carbon	**746**	**467**
General Dry Battery	**3H3**	**W45A**
Ray-O-Vac	**P83A**	**4367**
Burgess Battery	**G3**	**XX45**

CAUTION: *Do not place receiver on hot objects such as stoves, radiators, etc., or store in closed car during summer months, as the excessive heat will damage the internal components of the receiver and cabinet, and reduce the battery life.*

POWER SUPPLY. This receiver is designed to operate on self-contained batteries or on either an AC or DC power supply when such a supply is available. (For battery information, see section on batteries.) The receiver will operate on either AC (50 to 60 cycles) with a voltage of 110 to 120 or DC with a voltage from 110 to 120.

THE SPARKS-WITHINGTON CO.



INTERMEDIATE FREQUENCY 456 K.C.

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS

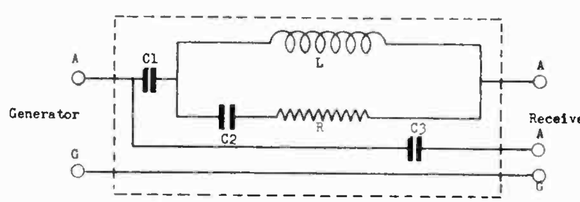
C1A&B	VARIABLE CONDENSER	PB-40410
C2	B.C. ANT. TRIMMER	PA-4352-2
C3	S.W. ANT. TRIMMER	PA-4352-3
C4	.05 MFD 200V	PC-40GK-503
C5	.15 MFD 400V.	PC-40GL-154
C6	B.C. OSC. TRIMMER	PA-4359
C7	B.C. OSC. PADDER	PA-4359
C8	51 MMF. MICA	MC-60F-510
C9	100 MMF. MICA	MC-60F-101
C10	I.F. REJECT TRIMMER	PA-4352-4

C11A&B	NO. 1 I.F. TRIMMER		AB-43500-44
C12	.05 MFD.	200 V.	PC-40HK503
C13	.05 MFD.	400 V.	PC-40HL-503
C14A&B	NO. 2 I.F. TRIMMER		AB-43500-45
C15	510 MMF	MICA	MC-60G-511
C16	.01 MFD	200 V	PC-40HK-103
C17	.01 MFD.	200 V	PC-40HK-103
C18	.05 MFD.	200 V	PC-40HK-503
C19	.03 MFD.	400 V	PC-40GL-303
C20	40-30 MFD	ELECT.	PA-4304-1
C21	.001 MFD.	400V	PC-40GL-102
C22	.01 MFD	200V	PC-40HK-103
C23	.05 MFD	200V.	PC-40HK-503

R1	5100 ~	.5W	BR-12G-512
R2	10 000 ~	.5W	BR-12S-103
R3	56000 ~	.5W	BR-12G-563
R4	22 000 ~	.5W	BR-12S-223
R5	5600 ~	.5W	BR-12G-562
R6	10 MEGOHM	.5W	BR-12S-106
R7	1 MEGOHM	.5W	BR-12S-105
R8	56 000 ~	.5W	BR-12G-563
R9	VOL. CONT. & SW.	.5MEG.	PA-4400-4
R10	10 MEGOHM	.5W	BR-12S-106
R11	270 000 ~	.5W	BR-12S-274
R12	680 000 ~	.5W	BR-12S-684
R13	180 ~	.5W	BR-12S-181
R14	1200 ~	.1W	CR-12S-122
R15	82 ~	.5W	BR-12S-820
R16	470 ~	.5W	BR-12G-471

L1	ANTENNA COIL	AA-6764-1
L2	S.W. ANT. COIL	AA-6725-1
L3	B.C. OSC. COIL	AA-6766-1
L4	S.W. OSC. COIL	AA-6753-3
L5	I.F. REJECT COIL	AA-6765-1
L6	NO. 1 I.F. COIL	AA-6800-1
L7	NO. 2 I.F. COIL	AA-6800-4

DUMMY ANTENNA



Note: When using this dummy antenna the generator output impedance should be 10 Ohms or lower.

C1 - 200 mmf. Condenser 400 V.D.C.
C2 - 400 mmf. Condenser 400 V.D.C.
C3 - .02 mmf. Condenser 400 V.D.C.
R - 100 Ohms Resistor 1/4 Watt
L - 20 Microhenryies Choke

----Case Shield
Choke Coil Specifications
Tubing-3/8" Diameter bakelite
Wire-No. 38 Enameled
Turns-59 closely wound (Impregnated)

VOLTAGE CHART

Line Voltage: 117 Volts AC

Position of volume control: Full with set tunned to quiet channel
Position of Band Switch: Broadcast

TUBE	FUNCTION	Voltage of Socket Prongs to Ground See Prong Nos. on schematic								
		No.1	No.2	No.3	No.4	No.5	No.6	No.7	No.8	Grid Cap
12SK7GT	R. F. Amp.	0	38 *	0	-.2	.35	50.3	23. *	58.	—
12A8GT	Converter	0	12 *	82.	52	-.24	81	0	0	-.26
12SK7GT	I. F. Amp.	0	23.3*	0	-.28	0	82	12 *	82	—
12SQ7GT	2nd. Det., AVC, 1st. AF	0	-.6	0	**	-.42	54	39 *	48.5*	—
35L6GT	Power Amp.	0	85. *	112	82	0	0	48 *	5.3	—
35Z5GT	Rectifier	0	117 *	112 *	0	112	0	87 *	117	—

Notes: All voltages are measured between tube pins and B- on Filter Condenser. (Chassis Base not ground pontential). Voltage readings are for Schematic Diagram in this bulletin. Allow 15% / or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All D.C. measurements made with 20,000 ohms per volt voltmeter. All D.C. voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are / D.C. voltages.

* A.C. Volts
** Cannot be measured with 20,000 ohms per volt voltmeter.

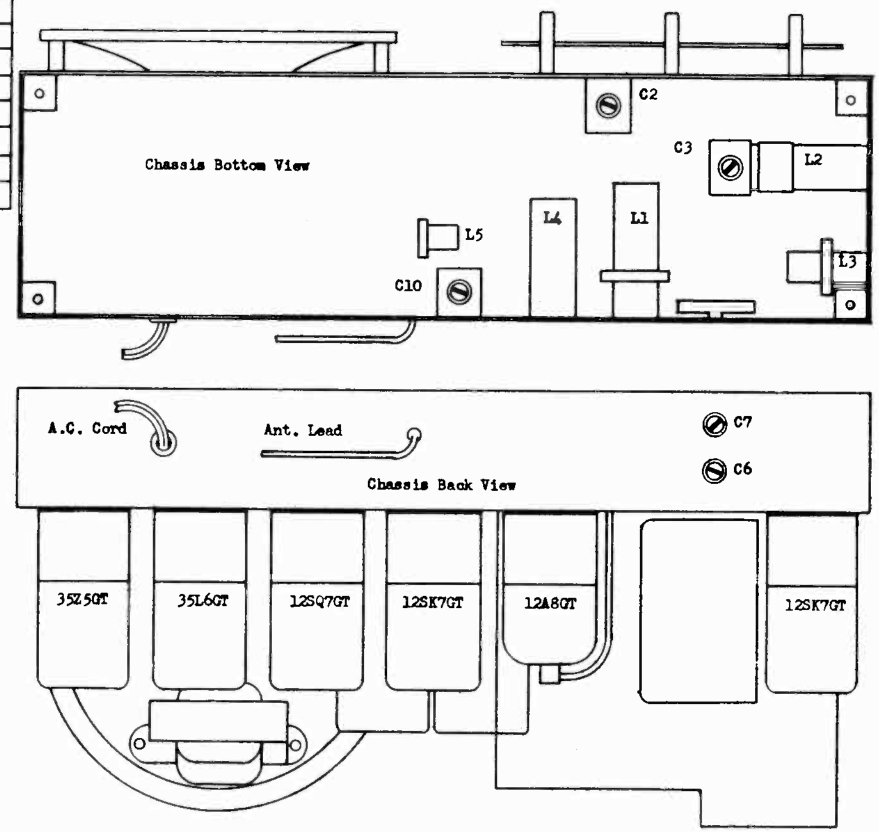
THE SPARKS-WITHINGTON CO.

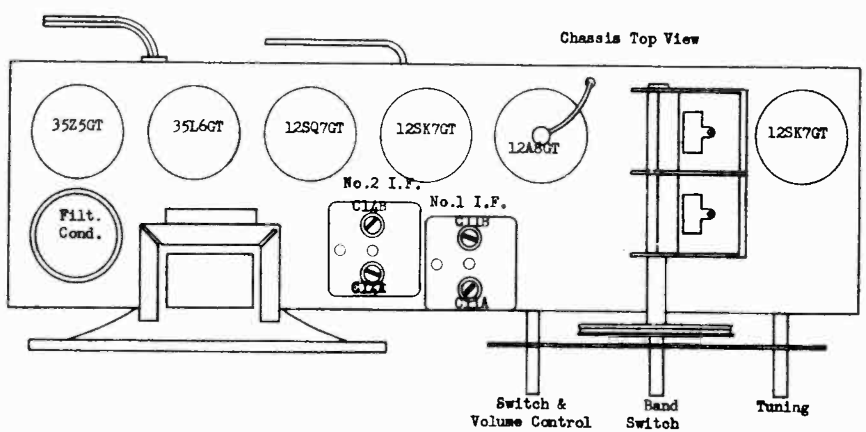
ALIGNMENT DATA

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	BAND SWITCH SETTING	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	REMARKS
1	Set Dial Pointer to end of scale with condenser gang closed							
2	I.F.	*	.02 MFD. Cond.	BC.	456Kc.	OPEN	C14A & C14B	Peak Accurately
3							C11A & C11B	" "
4	Rejector	Ant.	* *	BC.	456Kc.	CLOSED	C10 Trim.	Adjust to Minimum
5	Broadcast Band	Ant.	* *	BC.	1500Kc	1500Kc.	C6 Osc.Trim.	Peak Accurately
							C2 Ant.Trim.	" "
6					600Kc.	600Kc.	C7 Osc.Pad.	***
7	Repeat operations 5 & 6							
8	Check calibration at 600Kc., 1000Kc. and 1500Kc.							
9	S.W.Band	Ant.	* *	S.W.Band	18.Mc.	18.Mc.	C3 Ant.Trim.	***
10	Check calibration at 18.Mc., 9.Mc. and 6.Mc.							
11	Check operations 1 to 8 inclusive.							

Notes: * Connect Generator to grid cap on 12A8GT Tube.
** Use dummy antenna as shown below.
*** Rock dial while adjusting for maximum output.

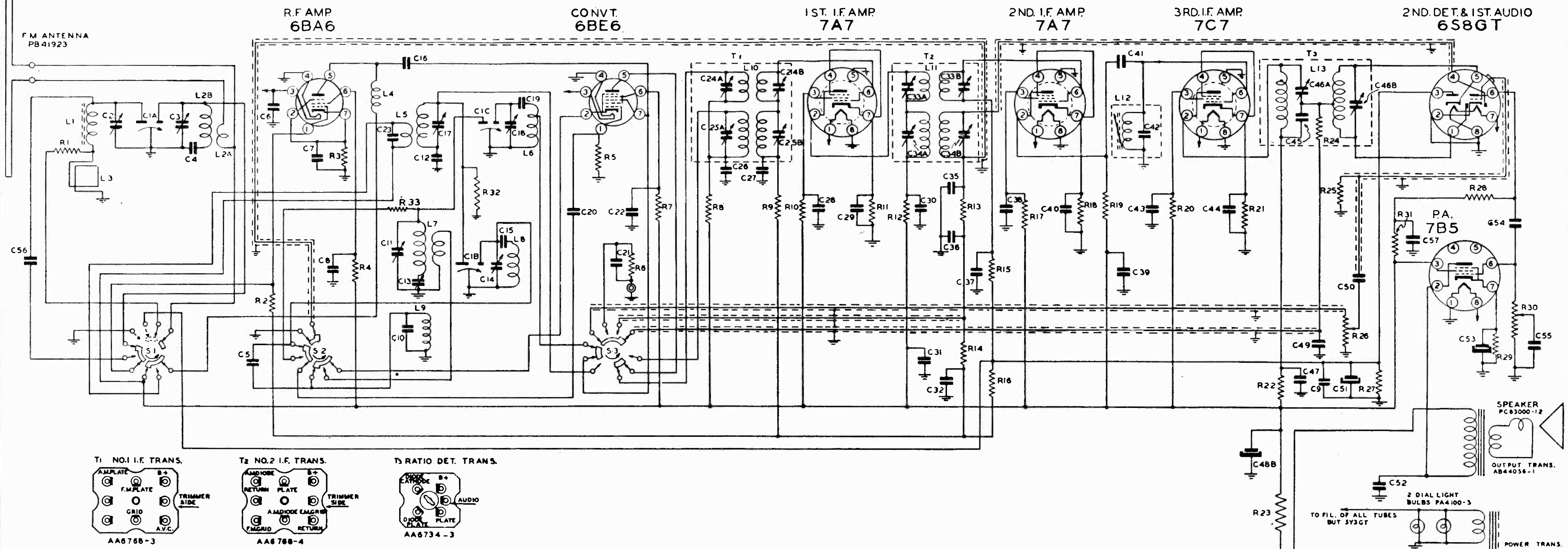
CHASSIS DIAGRAM

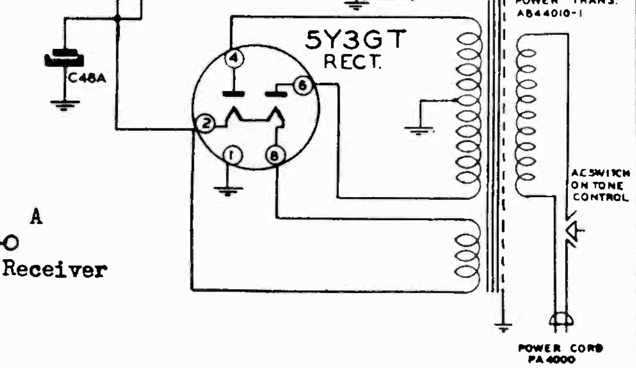




THE SPARKS-WITHINGTON CO.

A.M. INTERMEDIATE FREQUENCY 456 KC.
F.M. INTERMEDIATE FREQUENCY 10.7 MC.
BOTTOM VIEWS OF ALL SOCKET CONNECTIONS





TERMINAL HOOKUP FOR L10, L11 AND L13
BOTTOM VIEW

* SPECIAL SERVICE NOTE: THESE TRANSFORMERS SUPPLIED AS ASSEMBLIES COMPLETE ONLY.

C1 A,B,C, 3 GANG CONDENSER	PB40405
C2 AM ANT TRIMMER	PA4352-1
C3 F.M. ANT TRIMMER	PA4352-1
C4 F.M. ANT. PADDER 46MMF.	PA4328-2
C5 10MMF. CERAMIC	CC31H100K
C6 1000 MMF MOLDED PAPER	PA4325-2
C7 10,000 MMF. MOLDED PAPER	PA4325-1
C8 1000 MMF. MOLDED 200 V	PA4325-2
C9 1000 MMF MOLDED 400 V.	PA4325-3
C10 15 MMF. CERAMIC	CC31H150K
C11 A.M. OSC. TRIMMER	PA4352-3
C12 .05 MFD 200 V TUBULAR	PC40GK 503
C13 B.C. OSC. PADDER	PA4352-8
C14 F.M. OSC. TRIMMER	PA4379-1
C15 F.M. OSC PADDER 85MMF.	PA4328-6
C16 5 MMF. CERAMIC	PA4328-5
C17 B.C. R.F. TRIMMER	PA4352-1
C18 F.M. R.F. TRIMMER	PA4352-1
C19 F.M. R.F. PADDER 46MMF	PA4328-2
C20 51 MMF MOLDED MICA	MC60G-510
C21 100 MMF. " "	MC60G-101
C22 1000 MMF. " PAPER	PA4325-2
C23 51 MMF. CERAMIC	CC31H510K
C24 A,B NO.1 I.F. TRIMMER F.M. *	PA4359-1
C25 A,B NO.1 I.F. " A.M. *	PA4359-3
C26 .01 MFD. 400V. TUBULAR	PC40GL-103
C27 .01 MFD 200V. "	PC40GK-103
C28 1000 MMF MOLDED PAPER	PA4325-2
C29 .05 MFD. 200 V.	PC40GK-503
C30 .01 MFD. 400 V.	PC40GL-103
C31 .05 MFD. 400 V.	PC40GL-503
C32 .02 MFD. 200 V.	PC40GK-203
C33 NO.2 I.F. TRIMMER F.M. *	PA4359-1
C34 NO.2 I.F. TRIMMER A.M. *	PA4359-3
C35 100 MMF. MOLDED MICA	MC60G-101
C36 100 MMF. " "	MC60G-101
C37 .001 MFD. 200V. MOLDED PAPER	PA4325-2
C38 1000 MMF. MOLDED PAPER	PA4325-2
C39 .01 MFD. 400V. TUBULAR	PC40GL-103
C40 .05 MFD. 200V. "	PC40GK-503
C41 100 MMF. MICA MOLDED	MC60G-101

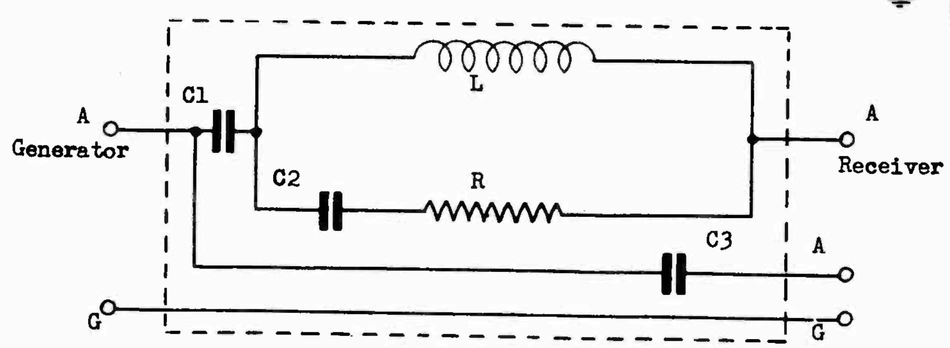
C42 20 MMF. MICA MOLDED	MC65F-200
C43 .05 MFD. 400 V. PAPER	PC40GL-503
C44 .01 " 200 V.	PC40GK-103
C45 51 MMF. MOLDED MICA	MC60F-510
C46 A,B RATIO DET. TRIMMER *	PA4359-1
C47 .05 MFD. 400V. TUBULAR	PC40GL-503
C48 A,B 40-40 MFD. ELECT.	PA4302
C49 100 MMF. MOLDED MICA	MC60G-101
C50 .02 MFD. 200V. TUBULAR	PC40GK-203
C51 8 MFD. 150 V. ELECT.	PA4303-6
C52 .006 MFD. 1000V. TUBULAR	PC40GN-602
C53 20 " 25V. ELECT.	PA4303-2
C54 .02 " 400 V. TUBULAR	PC40GL-203
C55 .004 " 200 V.	PC40GK-402
C56 51 MMF. MICA	MC60G-510
C57 .05 400 V. "	PC40GL-503

L1 A.M. ANT. LOADING COIL	AA6780-2
L2A F.M. ANT. COIL PRI.	AA6786-1
L2B F.M. ANT. COIL SEC.	AA6767-6
L3 A.M. ANT. LOOP	AC67008-1
L4 F.M. R.F. CHOKE	AA6769-2
L5 B.C. R.F. COIL	AA6756-4
L6 F.M. R.F. COIL	AA6767-5
L7 B.C. OSC. COIL	AA6759-2
L8 F.M. OSC. COIL	AA6767-4
L9 F.M. CATHODE CHOKE	AA6798-1
L10 NO.1 I.F. COIL *	AA6803-2
L11 NO.2 I.F. COIL *	AA6803-2
L12 F.M. CHOKE	AA6785-2
L13 RATIO DETECTOR *	AA6805-2

R1	2200	OHMS	½ WATT	BR12S-222
R2	1 MEG.	"	" "	BR12S-105
R3	68	"	" "	BR12S-680
R4	33,000	"	" "	BR12S-333
R5	22,000	"	" "	BR12S-223
R6	1 MEG.	"	" "	BR12S-105
R7	22,000	"	2 "	DR12S-223
R8	1000	"	½ "	BR12S-102
R9	100,000	"	" "	BR12S-104
R10	82,000	"	" "	BR12S-823
R11	270	"	" "	BR12S-271
R12	1000	"	" "	BR12S-102
R13	56,000	"	" "	BR12S-563
R14	100,000	"	" "	BR12S-104
R15	1 MEG.	"	" "	BR12S-105
R16	330,000	"	" "	BR12S-334
R17	82,000	"	" "	BR12S-823
R18	270	"	" "	BR12S-271
R19	10,000	"	1 "	CR12S-103
R20	220,000	"	½ "	BR12S-224
R21	820	"	" "	BR12S-821
R22	1000	"	" "	BR12S-102
R23	650	"	10 "	PA4200-4
R24	10,000	"	½ "	BR12S-103
R25	10 MEG.	"	" "	BR12S-106
R26	½ MEG.	VOLUME CONTROL		PA4407-1
R27	51,000	"	½	BR12S-513
R28	220,000	"	"	BR12S-224
R29	470	"	2	DR12S-471
R30	½ MEG.	TONE CONTROL & SWITCH		PA4400-7
R31	56,000	OHMS	½ WATT	BR12S-563
R32	1 MEGOHM		½ WATT	BR12S-105
R33	47 OHM		1 WATT	CR12S-470

T1 NO.1 I.F. TRANS. ASSEM. *	AA6768-3
T2 NO.2 I.F. TRANS. ASSEM. *	AA6768-4
T3 RATIO DET. TRANS. ASSEM. *	AA6734-3

DUMMY ANTENNA



C1-200 mmf. Condenser 400 V.D.C.
C2-400 mmf. Condenser 400 V.D.C.
C3-.02 mmf. Condenser 400 V.D.C.
R-100 ohms Resistor 1/4 Watt
L-Choke Coil

----Case Shield
Choke Coil Specification
Tubing - 3/8" Diameter Bakelite
Wire - No. 38 Enameled
Turns - 59 closely wound (Impregnated)

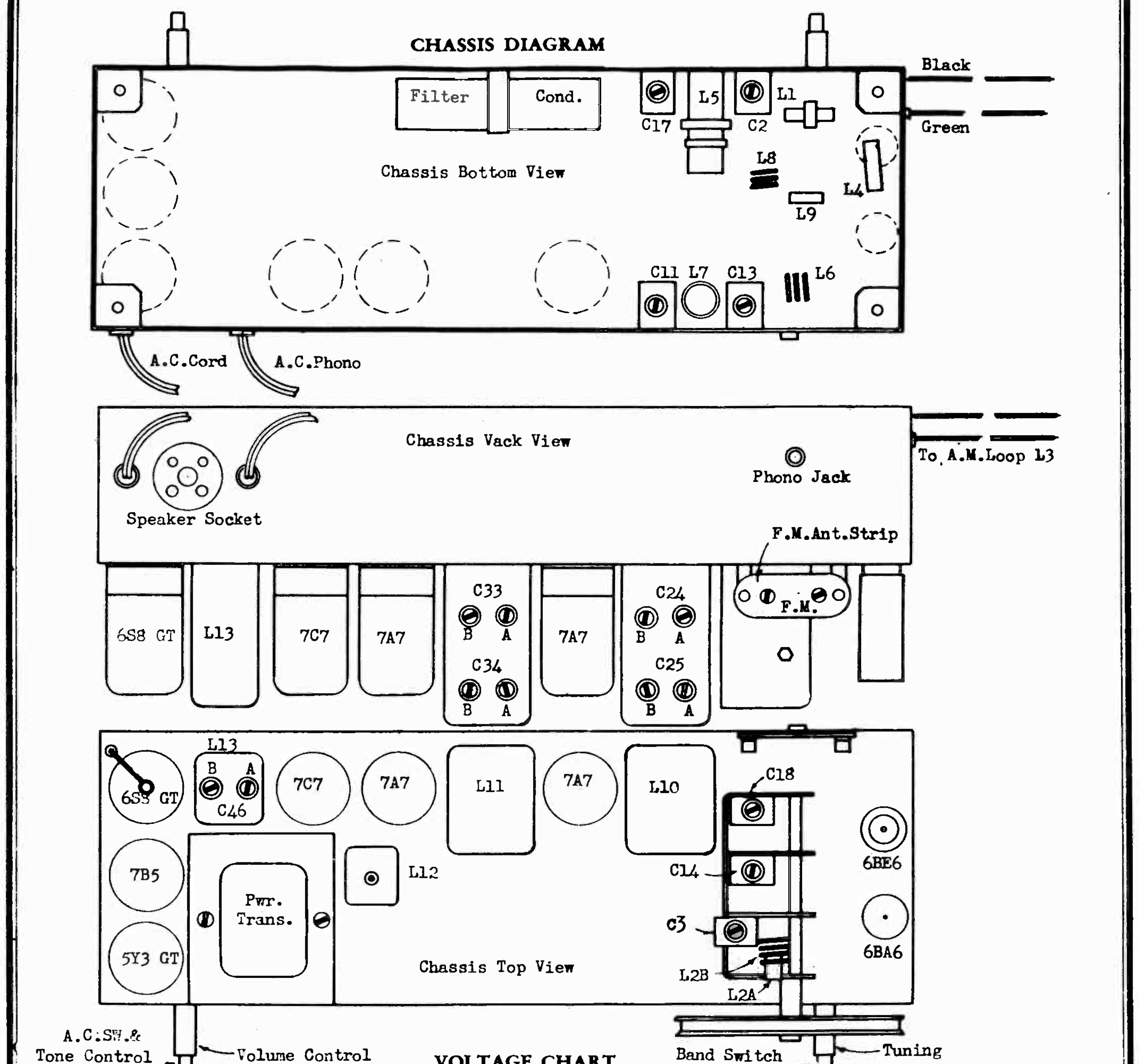
NOTE: When using this dummy antenna the generator output impedance should be 10 ohms or lower.

ALIGNMENT CHART

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANT.	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNNING COND. SETTING	TRIMMER	REMARKS
1	Set dial pointer even with left-hand stop line with condenser gang closed.							
2	A.M.-I.F.	Pin #7 of 6BE6 Convt. Tube	.02 MFD. Cond.	456 KC.	BC.	Open	C34A & B	Peak Accurately
							C25A & B	" "
3	A.M.-R.F.	BC. Ant.	*	1500 KC.	BC.	1500 KC.	C11 Osc. Tr.	" "
							C17 R.F. Tr.	" "
							C2 Ant. Tr.	" "
4				600 KC.		600 KC.	C13 Osc. Pad.	**
5	Repeat operations 2, 3, and 4.							
6	Check calibrations at 600, 1000, and 1500 KC.							
7	SPECIAL NOTE: For complete F.M.-I.F. visual alignment instructions please refer to pages 5, 6, 7, 8, 9, and 10 of this bulletin.							
8	F.M.-I.F. alignment using A.M. generator and output meter.							
9	T3 F.M. Ratio Det.	Pin #6 on 2nd 7A7 I.F. Amp.	.05 MFD. Cond.	10.8 MC.	F.M.	Open 108 MC.	C46B Sec.	Peak Accurately
							L12 Slug	Max. Reading
							C46A Pri.	Peak Accurately
10	NOTE: Operation #9 must be made with generator output as low as possible with maximum reading on output meter.							
11	Connect a 15,000 ohm resistor (to prevent overcoupling) between pin #6 (grid) on 2nd 7A7 tube to ground. After operation #12 is completed leave resistor connected for operations to follow.							
12	T2 F.M.-I.F.	Pin #6 on 1st 7A7 I.F. Amp.	.05 MFD. Cond.	10.7 MC.	F.M.	Open 108 MC.	C33B Sec.	Peak Accurately
							C33A Pri.	" "
13	NOTE: Operation #12 must be made with generator output as low as possible with maximum reading on output meter.							
14	Connect another 15,000 ohm resistor between pin #6 (grid) on 1st 7A7 tube to ground.							
15	T1 F.M.-I.F.	Pin #7 on 6BE6 Tube or C.T. on L6 Coil	.05 MFD Cond.	10.7 MC.	F.M.	Open 108 MC.	C24B Sec.	Peak Accurately
							C24A Pri.	" "
16	NOTE: Operation #15 must be made with generator output as low as possible with maximum reading on output meter.							
17	Repeat operations 9, 12, and 15.							
18	Remove the two 15,000 ohm resistor dummies from pin #6 on the 7A7 tubes but leave generator coupled through .05 MFD. Cond. to pin #7 on 6BE6 tube (C.T. on L6 coil).							
19	Adjust C46B secondary trimmer on T3 ratio detector transformer to minimum deflection or dip on output meter. Under certain conditions it is possible to adjust C46B secondary trimmer to minimum noise with the receiver tuned to a weak station. This operation is very sharp and the receiver must be tuned to the center response only.							
20	Repeat operation #19.							
21	F.M.-R.F. alignment using an A.M. generator with frequency of 88 to 108 MC. and vacuum tube voltmeter, or D.C. voltmeter (20,000 ohms per volt).							
OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANT.	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
22	Place meter across C51 Elect. Condenser. (Meter reading approx. 1 volt).							
23	F.M.-R.F.	F.M. Ant.	Match to 300 Ohms	108 MC.	F.M.	108 MC.	C14 Osc. Tr.	Max. A.V.C. V.
							C18 R.F. Tr.	Peak Accurately
							C3 Ant. Tr.	" "
24	Repeat operation #23.							
25	Check calibration at 88 MC.							

* Use dummy antenna
** Rock dial while adjusting for maximum output.

CHASSIS DIAGRAM



VOLTAGE CHART

Line Voltage: 117 Volts AC

Position of volume control: Full with set tunned to quiet channel.
Position of Band Switch: Broadcast

TUBE	FUNCTION	Voltage of Socket Prongs to Ground. See Prong Nos. on schematic. No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
6BA6	R. F. Amp.	* *	6	6.2*	0	238	115	.9		
6BE6	Convt.	.-15	0	6.2*	0	236	90	0		
7A7	1st I. F. Amp.	6.2*	230	87	2.38	0	* *	2.38	0	
7A7	2nd I. F. Amp.	6.2*	168	93	2.30	0	* *	2.30	0	
7C7	3rd I. F. Amp.	6.2*	235	110	2.45	0	* *	2.50	0	
6S8GT	2nd Det. 1st Audio	* *	0	0	0	.-15	111	6.2*	0	-.25
7B5	P.A.	0	260	237	0	0	* *	15	6.2*	
5&3GT	Rect.	0	260	0	245*	0	245*	0	260	

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 20,000 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 with 20,000 ohms per volt voltmeter.

VISUAL I. F.-F. M. ALIGNMENT DATA

1. Description of circuit used:

The I. F. channel in this model consists of 1 stage of amplification at 456 Kc. plus a diode detector used for AM reception on the BC band and a 10.7 Mc. amplifier consisting of two stages of amplification, one ratio detector and 1 ratio detector driver.

The tube complement is as follows, two 7A7 IF amplifiers only one of which is used for AM reception, one 7C7 ratio detector driver used on FM only and one 6S8GT detector and 1st audio amplifier. The 6S8GT tube contains three diodes and a triode and is there used as the diode detector and 1st audio amplifier on AM and as a ratio detector and 1st audio amplifier on FM. The various circuits are connected to the wave band switch where necessary to switch from AM to FM.

The IF transformers used are of the composite type wherein the 456 KC. circuits and the 10.7 circuits are constructed in the same shield can and is generally wired in series to obviate the need for switching. Only the converter plate connection on the model is switched when changing from FM to AM or vice versa. The ratio detector driver is tuned by an iron core, peaking coil tuned to 10.7 Mc. in the grid circuit of the 7C7 tube.

The ratio detector transformer is a special design made for this purpose and generally peculiar to the receiver in which it is used. Most of the noise rejecting characteristics and to a large extent the audio fidelity of the receiver hinges on the proper design and adjustment of this circuit. This adjustment together with the proper alignment of the other IF transformers determines the gain of the IF system and thus the overall sensitivity of the complete receiver. Thus the importance of properly making these adjustments is of the utmost importance.

2. Theory of Visual Alignment:

One of the characteristics of a tuned circuit is the fact that when it is excited or driven by a generator such as a vacuum tube or another tuned circuit, the voltage developed across it will vary with slight changes in frequency. This voltage will be greatest when the frequency is equal to the resonant frequency of the circuit and will be less if the frequency is higher or lower than the resonant frequency. Thus if we were to shift the frequency from high to low or low to high across the resonant frequency and make a record of the voltage across the tuned circuit, we could plot the voltage against frequency and obtain a curve which might look like Fig. 1.

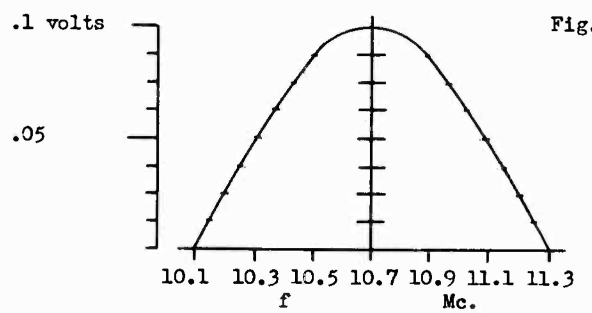
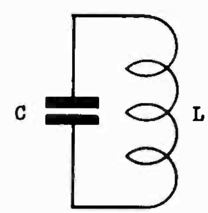


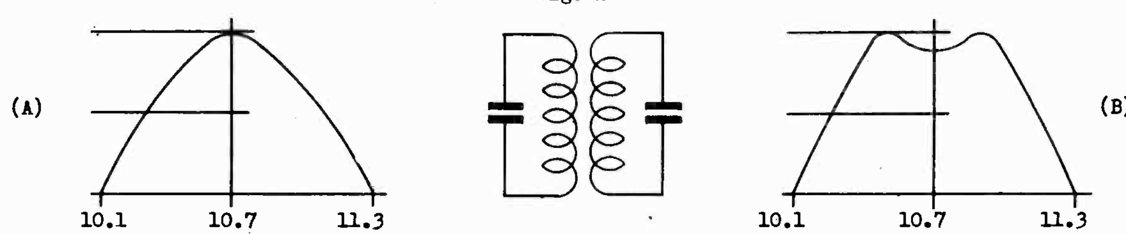
Fig. 1



This is the selectivity curve or response curve for the circuit under discussion.

This type of circuit may be aligned or adjusted to resonance by simply changing either L or C until maximum voltage is obtained at the resonant frequency. Now if another circuit tuned to the same resonant frequency is coupled to the simple case above, a number of things can happen. First, current flowing in one circuit will induce current in the second circuit, the magnitude of this current depending on the degree or amount of coupling between the two circuits. This coupling may be in the form of mutual inductance, mutual capacitance or any impedance common to the two circuits and its magnitude may be either controlable or uncontrolable or as is often the case only partly controlable in a production item. Most IF transformers in present day use are circuits of this type where the coupling is in the form of mutual inductance which may be controled in fabrication. However with the advent of 10.7 Mc. IF channels the effect of the stray capacity coupling always present becomes important and is usually difficult to control. Now if we repeat the procedure outlined for obtaining the response curve of a single tuned circuit using the voltage developed across the secondary of the coupled circuit while driving the primary, we may get either of two types of curves depending on the magnitude of the coupling, (a) in Fig. 2 is a typical curve for two circuits coupled below critical coupling and (b) is a representation of the curve for an overcoupled circuit.

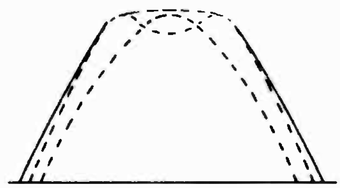
Fig. 2



VISUAL I. F.-F. M. ALIGNMENT DATA

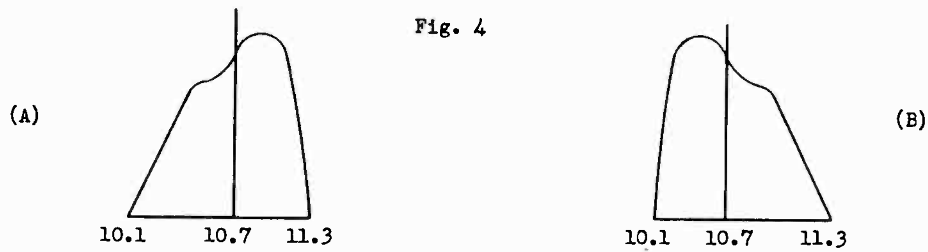
Overcoupled circuits producing a response curve like (b) Fig. 2 are often employed where it is important that the response curve remain approximately flat over a narrow band of frequencies near the resonant frequency. They are also frequently combined with single peaked circuits to produce a response curve like Fig. 3.

Fig. 3



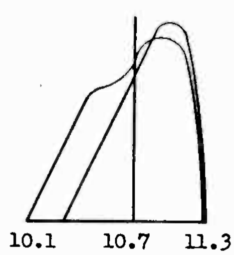
The dotted lines indicate the curves of the individual circuits and the solid curve shows the overall response of two or more pairs of coupled circuits. Circuits like the above or approaching them in form are desirable in a FM receiver where the pass band should be of the order of 200 Kc. Now from the above it is evident that simply peaking both sides of a circuit coupled below critical for maximum voltage will provide optimum alignment but if this procedure is followed with an overcoupled circuit it is almost a certainty that the two circuits will not be tuned to the resonant frequency but will instead be aligned so that either one or the other peak is accentuated. The response curve will then look like Fig. 4 (a) or (b).

Fig. 4



Now if this overcoupled circuit is combined with a single peaked circuit (where the coupling is below critical) the misalignment becomes worse, something like Fig. 5.

Fig. 5



From the above it appears that to properly align a receiver using overcoupled IF transformers it will be necessary to take a response curve of each stage and align the circuit so that the two peaks are symmetrical, that is, approximately equal in amplitude and displaced equally from the center frequency. To do this with a CW or AM signal would be laborious and time consuming whereas the use of visual equipment makes it nearly as simple as adjusting a simple single peaked amplifier.

Visual alignment test equipment performs the operation of plotting the response curve almost exactly as described above except that instead of manually changing the generator frequency, recording the voltage and then plotting the results, these operations are performed automatically and simultaneously by a combination of electronic circuits. The operation is briefly as follows.

In the signal generator a low AC voltage is applied to a reactance tube modulator which shifts the oscillator frequency from low to high or from high to low at a rate determined by the frequency of the AC voltage and by an amount determined by the AC voltage. The frequency at any instant is then dependant on the AC voltage present at that instant of time. An oscilloscope is provided which may be considered a voltmeter used to read the voltage across the tuned circuit, provided a detector is used to convert the RF to a low audio frequency. This voltage is then applied to the vertical plates and results in a vertical displacement of the spot on the screen. Some of the voltage used to shift the oscillator frequency is also applied to the horizontal plates of the oscilloscope providing a means of displacing the spot horizontally. It is now evident that since that for any given

VISUAL I. F.-F. M. ALIGNMENT DATA

AC voltage only one frequency may be obtained and since that AC voltage will result in an exact amount of spot deflection on the scope we can read the voltage across the circuit under examination by noticing the position of the spot at this exact instant.

Now if we consider the frequency as shifting from low to high 60 times per second and remember that the spot is moving across the screen of the scope 60 times per second at exact synchronization with the change in frequency it is only necessary to apply the voltage from our circuit to the vertical plates to obtain a replica of the response curve on the face of the cathode ray tube. This curve will be repeated 60 times per second if our sweep frequency is 60 cycles. Adjustments to the circuit may now be made and the effect on the response curve noted instantaneously.

EQUIPMENT REQUIRED

To align the IF stages in this receiver the following equipment will be necessary.

(a) A sweep signal generator with a center frequency of 10.7 Mc. and a total sweep width of at least 400 Kc. This generator should be equipped with filters to remove all spurious oscillator frequencies and limiters should be provided to remove all amplitude modulation. There should also be a crystal oscillator to provide a marker frequency at 10.7 Mc. for accurate determination of the center frequency.

(b) An amplitude modulated signal generator tuned to 456 Kc. This generator should be either crystal controlled or means should be provided for accurate frequency calibration.

(c) An oscilloscope with either a 3" or 5" tube equipped with both vertical and horizontal amplifiers.

(d) A power output meter with an internal impedance to match 3.2 ohms for use in 456 Kc. alignment.

(e) A diode detector for use in connection with the oscilloscope while aligning the FM IF channel. This diode detector may be either a IN34 crystal or a two element vacuum tube such as the 6H6. A diode load resistor, coupling condenser, etc. will also be necessary. A connection for this detector is supplied on the speaker socket.

(f) Connecting cables, from the generator to receiver, receiver to scope, etc.

Alignment of the 456 Kc. IF.

This alignment adjustment should be made before attempting to align the 10.7 IF circuit because of possible effects on the operation of the FM IF.

Connect the output meter, scope and speaker to the receiver by pluging the detector into the speaker socket. All output connections will be made automatically when this is done. Connect the signal generator output lead to the converter (6BE6) grid. Turn the wave band switch to BC and the generator to 456 Kc. Using the output meter as an indicator peak the AM IF trimmers for maximum output.

Alignment of the 10.7 IF.

Turn the wave band switch to FM and the generator switch to 10.7 Mc. Move the signal generator lead to the plate of the second 7A7 tube and turn the function switch on the scope to Det. Now proceed to align the ratio detector transformer for maximum linearity and minimum noise. This operation can be facilitated by applying a small amount of amplitude modulation along with the FM and then adjusting the secondary trimmer for minimum noise. Please note that the adjustment of the secondary circuit, controls to a large extent, the linearity of the pattern and adjustment of the primary is responsible for the gain in the circuit. Fig. 6 will represent a linear detector curve and Fig. 7, a detector curve with noise or AM present.

Fig. 6

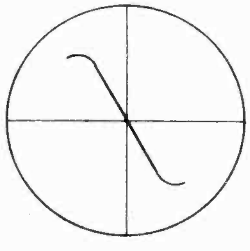
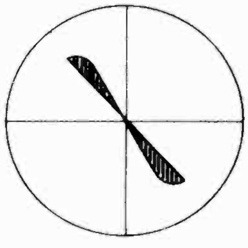


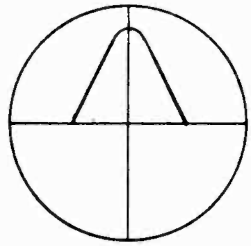
Fig. 7



With the generator output lead still connected to the grid of the second 7A7 tube, turn the function switch to IF. Align the core adjustment in the tuned choke for maximum output. Note that since this is a single tuned circuit, the response curve is single peaked. See Fig. 8.

VISUAL I. F.-F. M. ALIGNMENT DATA

Fig. 8

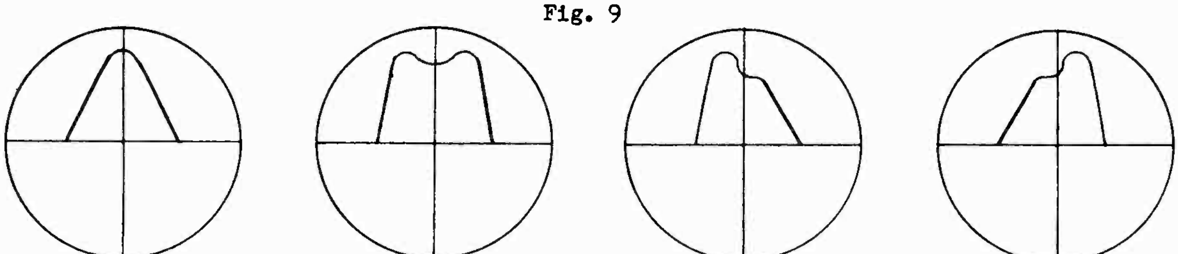


Move the generator lead to the grid of the first 7A7 tube and align the second IF transformer. Adjust both trimmer screws for maximum gain, meanwhile maintaining symmetry in the curve. Observe that by alternatly adjusting the primary and secondary trimmer, the vertical amplitude can be increased without allowing the response curve to become greatly distorted. This transformer is not supposed to be overcoupled and so should not present a double peaked curve, however, production variations in coupling may be large enough for the transformer to become overcoupled in which case final alignment should be so made that the two peaks are equally spaced about the center frequency and approximately equal in amplitude.

Move the generator lead to the grid of the 6BE6 tube and align No. 1 IF transformer following the same procedure as for #2 above.

Fig. 9, (a) (b) (c) (d) below represent response curves typical of those for #1 and #2 IF stages.

Fig. 9



(A) Not Overcoupled Properly Aligned (Right)

(B) Overcoupled Properly Aligned (Right)

(C) Overcoupled Improperly Aligned (Wrong)

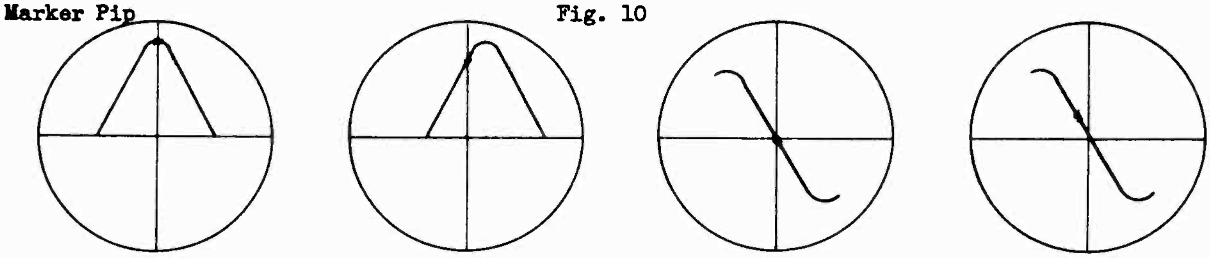
(D) Overcoupled Improperly Aligned (Wrong)

With the generator lead still connected to the 6BE6 grid, turn the function switch on the scope to Det. and check the detector curve for linearity and noise. Should this appear unsatisfactory, a very slight readjustment of the detector secondary alignment may be made at this time. If however the adjustment required is very great the entire alignment procedure should be repeated in that the need for adjustment is indication of incorrect alignment in one of the other stages.

Use of Marker Frequencies.

A crystal controlled marker frequency is provided at 10.7 Mc. This frequency may be turned on or off by means of the marker control and should be used only when necessary to check the calibration of the sweep oscillator. This is accomplished by simply turning on the marker and observing the position of the pip. When the frequency of the sweep oscillator is correct the pip will appear in the exact center of the sweep and so in the center of the resonance curve. See Fig. 10.

Fig. 10



Right

Wrong Resonance Curve Off Frequency

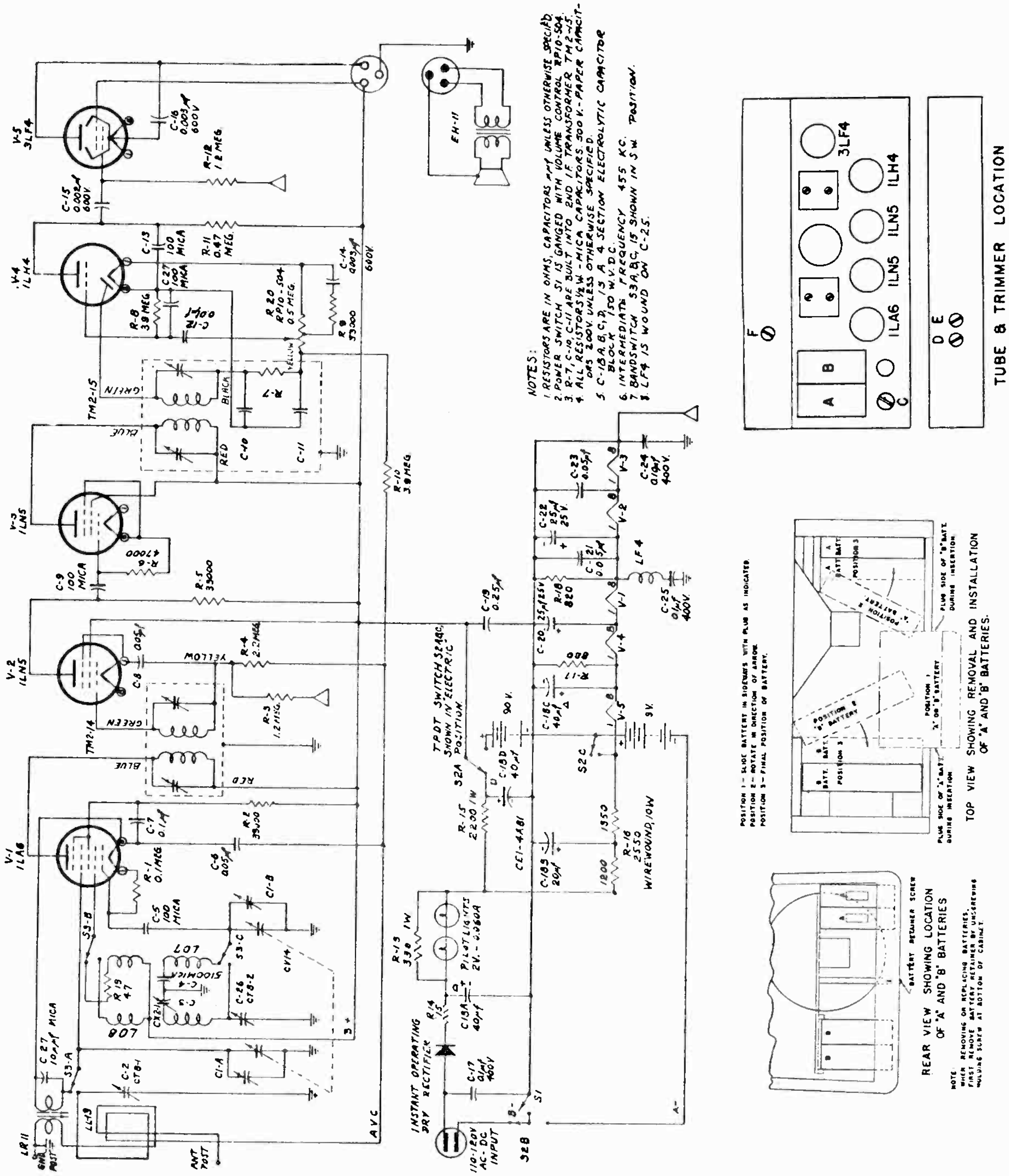
Right

Wrong Sweep Oscillator Off Frequency

Note that either the sweep oscillator or the circuit alignment may be off frequency.

SPIEGEL

MODEL G-521



Model G-521 has 5 tubes plus an instant operating dry disc rectifier. It is a three way portable superheterodyne receiver using the latest types of low drain electronic tubes.

Operation: The set operates on 105 to 120 volts 50 or 60 cycles A.C., 105 to 120 volts D.C., or from self contained batteries. Power drain is approximately 13 watts on electric operation. Because Model G-521 uses an instant operating dry disc rectifier, no warm up period is necessary on either A.C., D.C., or battery operation. The set will play immediately after the power switch is turned on. When operated on direct current (D.C.) if no reception is obtained, reverse the line plug in the power outlet.

Ranges: Model G-521 has both a broadcast and a short wave range. It covers the broadcast band from 535 to 1620 kilocycles. Since the broadcast dial scale is calibrated from 55 to 160 the actual frequency of the station may be obtained by adding a zero to the dial calibration. The range of the short wave band covered in Model G-521 is from 5.6 to 18.5 megacycles. The short wave dial scale is calibrated directly in megacycles.

Antenna: For normal reception on the broadcast band, no outside aerial is required, as more than adequate pickup is obtained by the self contained loop antenna. At installations remote from stations desired to be heard, improved results may be obtained by rotating the receiver for maximum response, as the loop antenna has a marked directional effect on weak signals.

For short wave or weak broadcast reception the whip antenna should be extended to its full length. This will provide sufficient signal for satisfactory reception in most locations.

Reception can be improved especially in poor receiving locations by attaching an external antenna and ground to the antenna and ground connections provided in the rear of the cabinet. The blue wire is the external antenna connection, the black wire is the external ground connection.

Batteries: The batteries comprise: Two 4½ volt "A" units, Eveready type 746 or equivalent, and two 45 volt "B" units, Eveready type 482 or equivalent.

They should be mounted in the compartment provided in the bottom of the cabinet as shown in the sketch. Batteries should be removed when they are dead or if the set is not to be used on battery operation for several months.

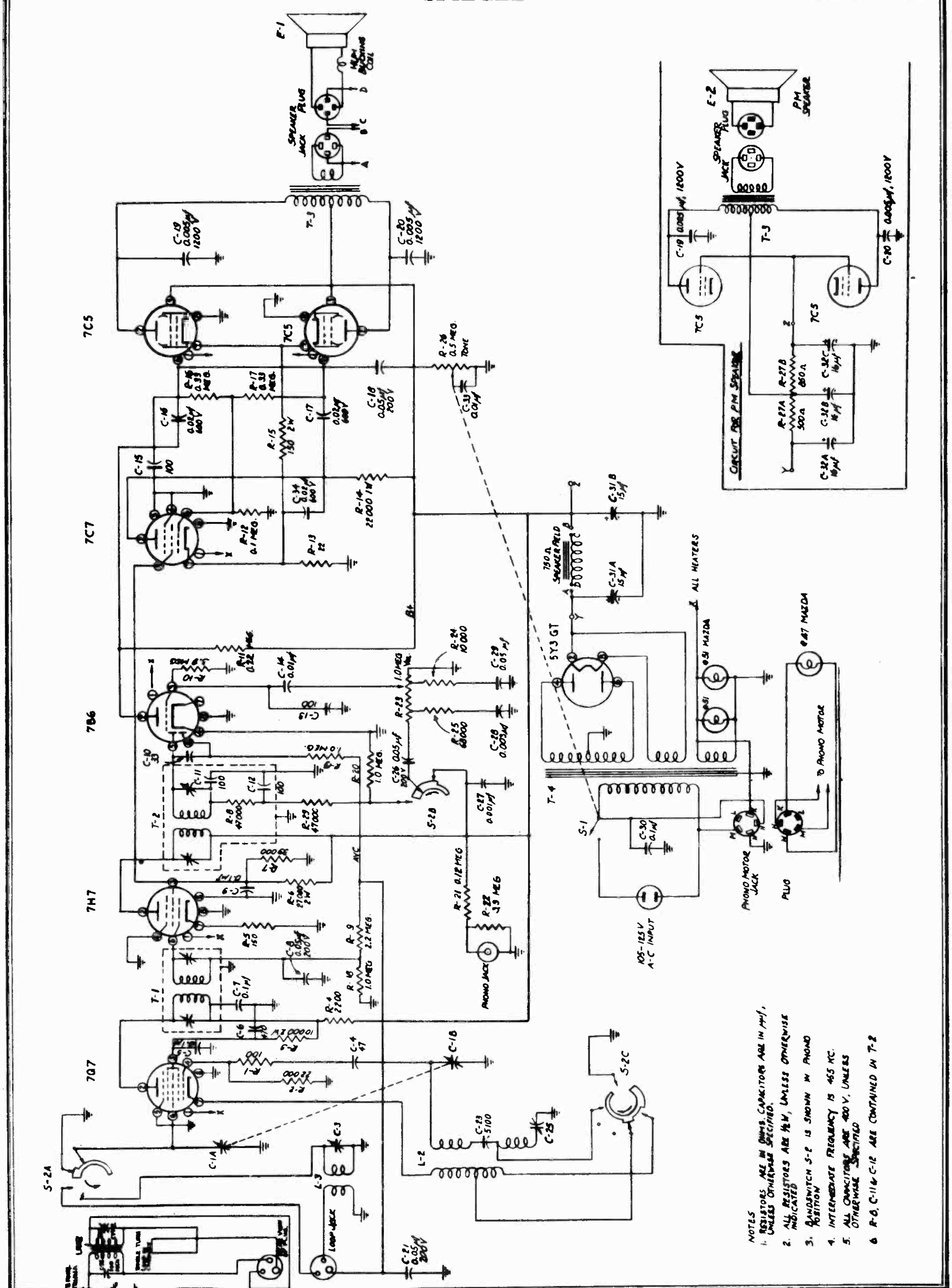
Alignment: No attempt should be made to realign this receiver until it has determined that a poor tube, or some local condition is not responsible for faulty reception. The Signal Generator may be connected through a 0.01 mf capacitor (used as a dummy antenna) to the lug on the R. F. section (B) of the tuning capacitor. Connect ground clip of generator to the common negative of the electrolytic capacitor. An output meter may be clipped across the voice coil lugs. Align the I. F. trimmers to 455 K.C. using the least possible input from the Signal Generator to avoid developing A.V.C. voltage which would make the tuning adjustments very broad.

The short wave band trimmers must be aligned before attempting to align the broadcast band. To align the short wave band turn the bandswitch to the short wave position and connect the Signal Generator through a 0.01 mf capacitor and a 400 ohm resistor in series (used as a dummy antenna) to the antenna connection at the back of the cabinet. With the tuning capacitor plates completely out of mesh and the pointer at the extreme right end of travel, adjust the short wave oscillator trimmer (A) to 18.5 megacycles. With both tuning capacitor and Signal Generator adjusted to 6 megacycles, adjust the short wave antenna coil slug (C) for maximum response. Readjust both the Signal Generator and the tuning capacitor to 18 megacycles and tune the short wave R. F. trimmer (B) for maximum response.

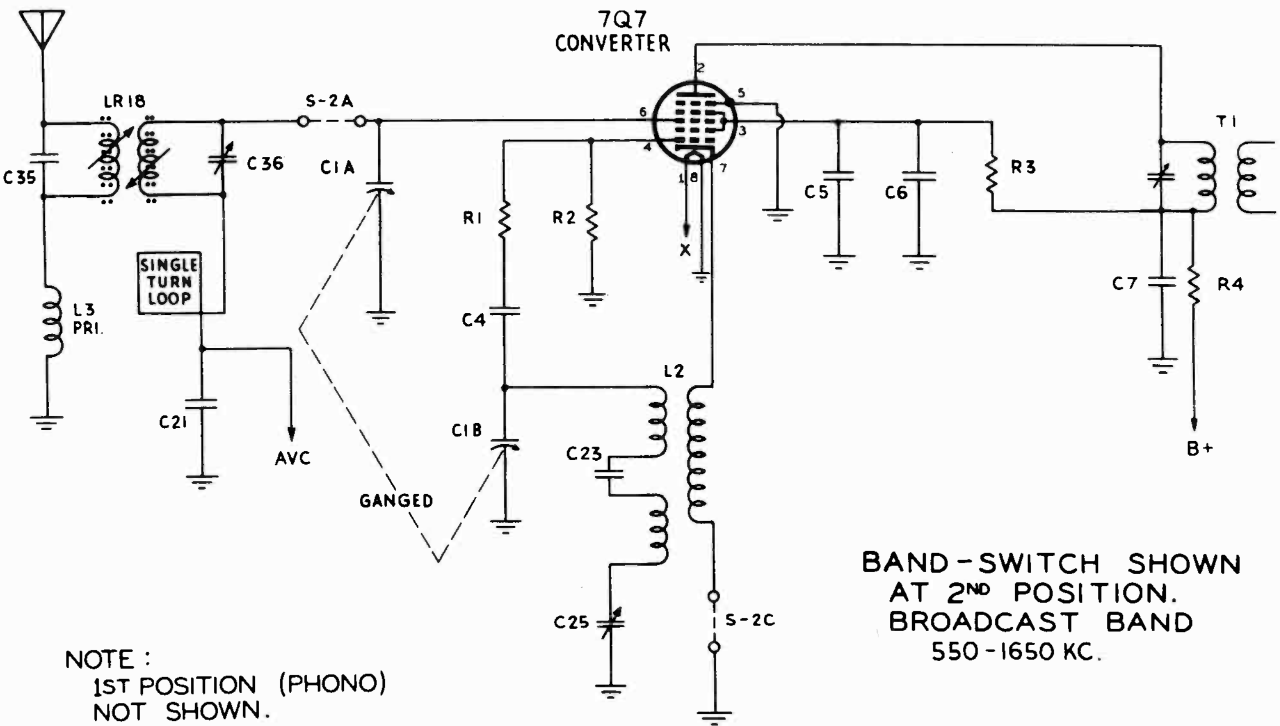
With the short wave band aligned, the broadcast band trimmers may now be aligned. To align the broadcast band turn the bandswitch to the broadcast position. Remove the 0.01 mf capacitor and the 400 ohm resistor and connect the Signal Generator to two or three turns of heavy wire, forming a self supporting loop of about 7 or 8 inches diameter placed about a foot away from the receiver's loop antenna. Again use the least possible input from the Signal Generator. With the tuning capacitor completely out of mesh and the pointer at the extreme right end of travel, adjust the broadcast oscillator trimmer (E) to 1620 kilocycles. With the dial pointer set to 600 KC adjust the padder (F) while rocking the signal generator dial for maximum audio output. Readjust both Signal Generator and dial pointer to 1550 kilocycles and adjust the R. F. trimmer (D) for maximum response.

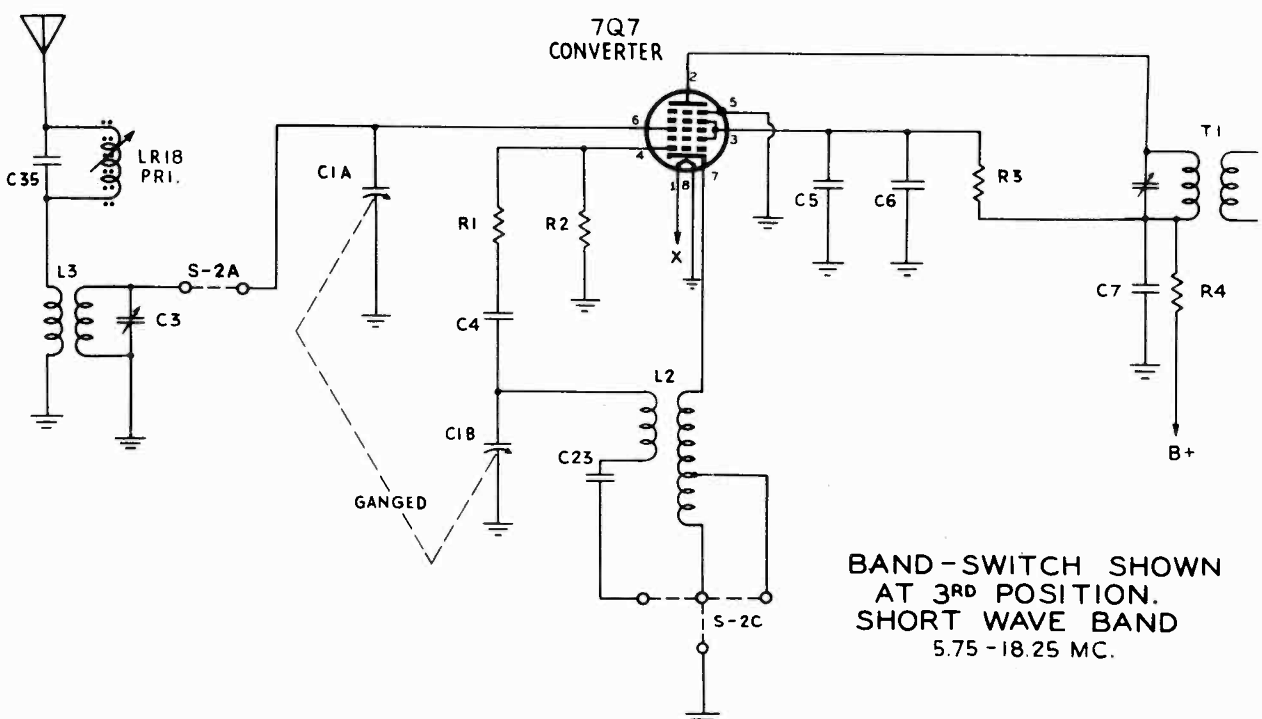
SPIEGEL

MODEL G-722



SPIEGEL


7Q7
CONVERTER
LR18
S-2A
C35
C36
C1A
SINGLE TURN LOOP
L3 PRI.
C21
AVC
R1
R2
C4
X
L2
C1B
C23
GANGED
C25
S-2C
C5
C6
R3
T1
C7
R4
B+
NOTE:
1ST POSITION (PHONO) NOT SHOWN.
BAND-SWITCH SHOWN AT 2ND POSITION. BROADCAST BAND 550-1650 KC.

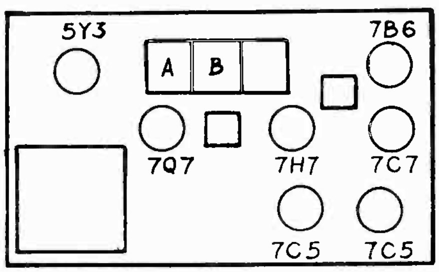

7Q7
CONVERTER
C35
LR18 PRI.
C1A
L3
S-2A
C3
R1
R2
C4
X
L2
C1B
C23
GANGED
S-2C
C5
C6
R3
T1
C7
R4
B+
BAND-SWITCH SHOWN AT 3RD POSITION. SHORT WAVE BAND 5.75-18.25 MC.

Alignment: No attempt should be made to realign this receiver until it has been determined that a poor tube, or some local condition is not responsible for faulty reception. The Signal Generator may be connected through a 0.01 mf capacitor (used as a dummy antenna) to the lug on R. F. section (A) of tuning capacitor. Connect ground clip of generator directly to chassis. Align the I. F. trimmers to 455 K.C., using least possible input from the Signal Generator to avoid developing A.V.C. voltage which would make the tuning adjustments very broad. An output meter may be clipped across the voice coil lugs.

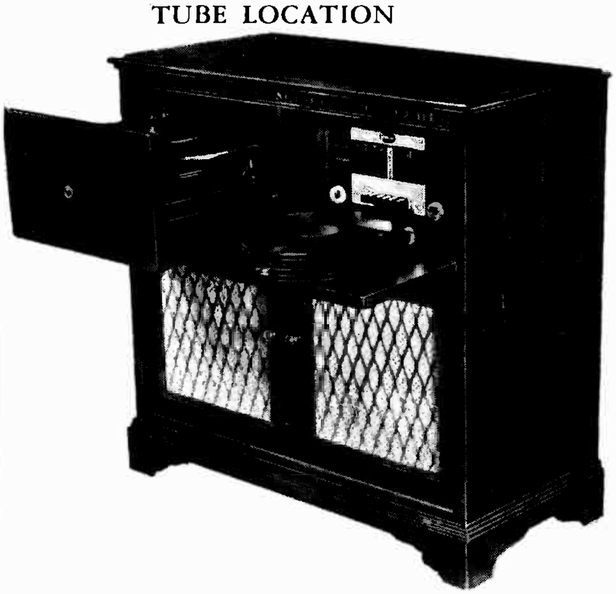
To align broadcast R. F. trimmers, remove the 0.01 mf capacitor and connect the Signal Generator leads to two or three turns of heavy wire, forming a self-supporting loop of about 7 or 8 inches diameter placed about a foot away from the receiver's loop antenna. Again, use the least possible input from the Signal Generator. With the tuning plates completely out of mesh and the pointer at the extreme right end of travel, adjust the broadcast oscillator trimmer, on the under side of the chassis, to 1650 K.C. With tuning capacitor fully meshed adjust the padder on the chassis deck to 535 K.C. Readjust both Signal Generator and tuning capacitor to 1550 K.C. and adjust the R. F. trimmer on the loop for maximum response.

To align the short wave band connect the Signal Generator through a 0.01 mf capacitor and a 400 ohm resistor in series (used as a dummy antenna) to the antenna connection on the loop antenna. With the tuning capacitor plates completely out of mesh, and pointer at the extreme right end of travel, adjust the short wave oscillator trimmer (on the under side of the chassis) to 18.25 magacycles. Readjust both Signal Generator and tuning capacitor to 16 megacycles and adjust short wave antenna coil trimmer for maximum response. With tuning capacitor fully meshed, the receiver should tune to 5.75 megacycles, however, no adjustment is required at this point.

For checking purposes five marks are engraved on the front of the dial plate. These represent, in order, the pointer position with the capacitor plates fully meshed and the pointer settings for 600 kc, 8 mc, 16 mc, and 1550 kc.



TUBE LOCATION



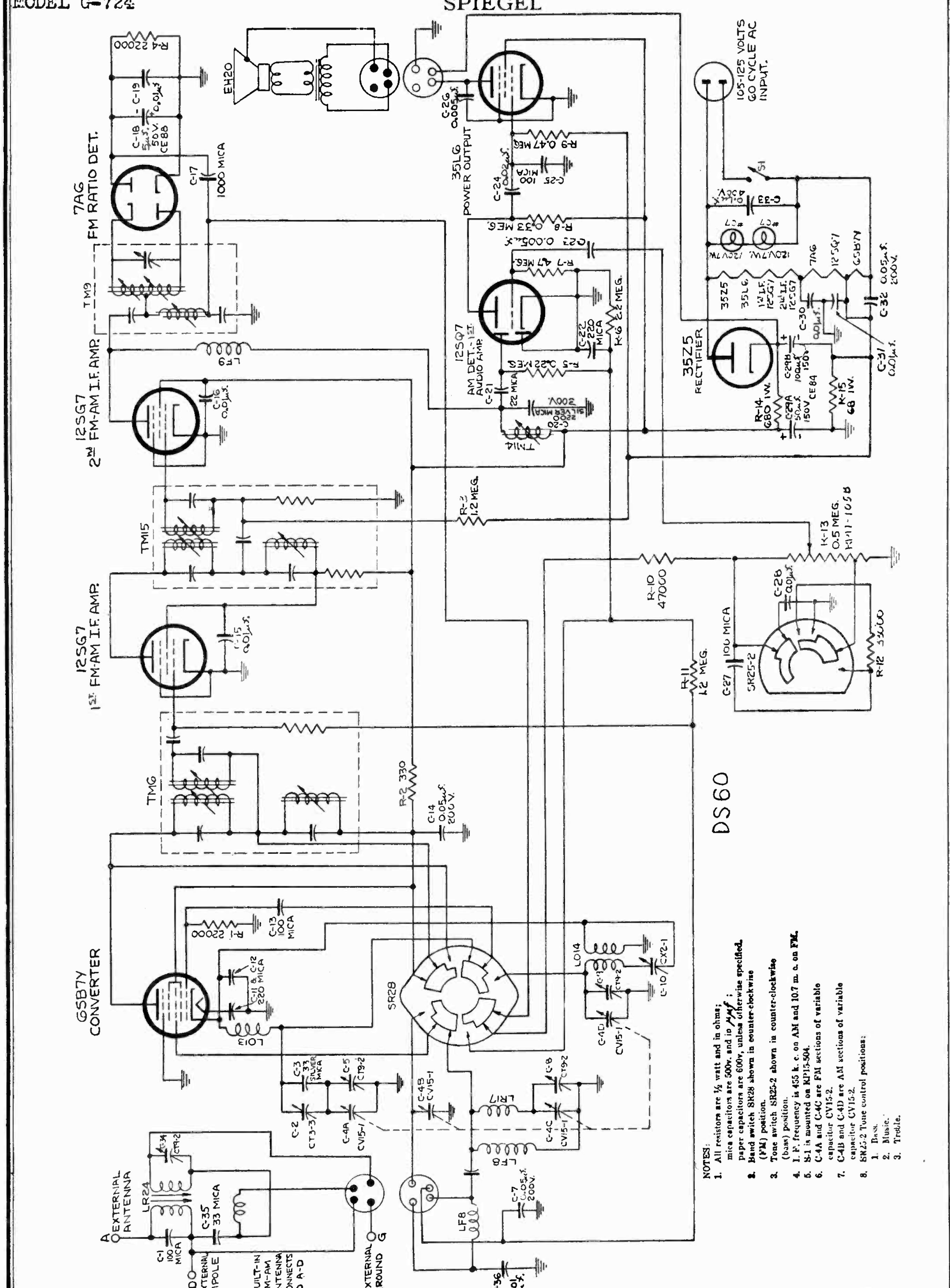
REPLACEMENT PARTS LIST

Circuit Symbol	Part Number	Item	Description
C-1 A & B	CV-9	Capacitor	Variable 2-gang, Push-button
C-2	CT1-1	Capacitor	Trimmer 1.5—15 MMF
C-3	CT1-2	Capacitor	Trimmer 2.2—40 MMF
C-22	CT1-2	Capacitor	Trimmer 2.2—40 MMF
C-23	CT1-2	Capacitor	Trimmer 2.2—40 MMF
C-25	CX2-1	Capacitor	Padder
E-1	EH-9	Speaker	10" Electrodynamic
E-2	EH-14	Speaker	10" P.M.
L-1	LL-9	Loop Antenna	
L-2	LO-4	Oscillator Coil Assembly	Broadcast & S.W. Osc. Coils
L-3	LR-4	S.W. Antenna Coil	
R-23	RP8-105	Potentiometer	1 Meg. with 2 taps, Volume Control
R-26	RP5-2	Potentiometer	0.5 Meg. with switch, Tone Control
R-27 A & B	RW3-1	Resistor	Wirewound 1350 Ohms 17 watt tapped at 500 Ohms
S-2 A, B & C	SR-9	Bandswitch	
T-1	TM2-4	Transformer	I. F. Input
T-2	TM2-5	Transformer	I. F. Output
T-3	TA-8	Transformer	Push-pull speaker output
T-4	TP-9	Transformer	Power

Operation: The set operates on 105 to 125 volts, 60 cycles A. C. only. Power drain is approximately 70 watts for the radio and about 20 watts additional for the record changer.

MODEL G-724

SPIEGEL



NOTES:

1. All resistors are ½ watt and in ohms; mica capacitors are 500v. and in $\mu\mu f$; paper capacitors are 600v, unless otherwise specified.
2. Band switch SR28 shown in counter-clockwise (FM) position.
3. Tone switch SR25-2 shown in counter-clockwise (bass) position.
4. I. F. frequency is 455 k. c. on AM and 10.7 m. c. on FM.
5. S-1 is mounted on KP15-504.
6. C-4A and C-4C are FM sections of variable capacitor CV15-2.
7. C-4B and C-4D are AM sections of variable capacitor CV15-2.
8. SR25-2 Tone control positions:
   1. Bass.
   2. Music.
   3. Treble.

ALIGNMENT PROCEDURE:

Dummy Antenna	Signal Generator Connection	Signal Generator Frequency	Band Switch Position	Radio Dial Setting	Adjust	Remarks
0.01 MFD	Terminal T	455 KC AM	Broadcast	1625 KC	E G-1 F-1	Adjust for maximum output Repeat for fine adjustment
0.01 MFD	Pin 4 of 12SG7 2nd FM-AM IF with FM Signal Gen.	10.7 MC FM	FM	108 MC	H-2	Adjust for maximum output (Broad adjustment)
0.01 MFD	"	10.7 MC FM	FM	108 MC	H-4	Adjust for maximum output
0.01 MFD	"	10.7 MC AM	FM	108 MC	H-1 or H-3	Adjust whichever is required for minimum output
						Repeat last two steps for fine adjustment until settings for maximum FM output coincide with settings for minimum AM output.
0.01 MFD	Pin 8 of 6SB7Y Converter	10.7 MC FM	FM	108 MC	G-3 — G-2	Adjust for maximum output
0.01 MFD		"	FM	108 MC	F-3 — F-2	Adjust for maximum output
						Repeat last two steps for fine adjustment
			Broadcast	535 KC	Pointer	Adjust pointer to reference mark
100 MMFD	"A" Post on Cabinet	600 KC AM	"	600 KC	J and Core on Ant. Coil in Cab.	Adjust for maximum output
"	"	1550 KC AM	"	1550 KC	B and trimmer on Ant. Coil	Adjust for maximum output
300 OHM Resistor	"	92 MC FM	FM	92 MC	D	Adjust for maximum output
"	"	106 MC FM	FM	106 MC	A and C	Adjust for maximum output

Model G-724 Radio is a 7-tube including rectifier superheterodyne Frequency Modulation and Amplitude Modulation receiver using the latest type of low drain tubes.

Operation: The set is designed for operation on 105 to 125 volts, 60 cycles A. C. It will also operate on 120 D. C. Power drain is approximately 36 watts for the radio.

Ranges: Model G-724 has both a broadcast and FM range. It covers the broadcast band from 535 to 1625 kilocycles. Since the broadcast dial scale is calibrated from 53.5 to 160, the actual frequency of the station may be obtained by multiplying the dial calibration by ten. The range of the FM band covered in Model G-724 is from 87.6 to 108.4 megacycles. The FM dial scale is calibrated directly in megacycles.

Antenna: This radio will operate without an external antenna. For normal reception more than adequate pickup is obtained by the self contained antenna. At installations remote from station desired to be heard on the broadcast band, improved results may be obtained by attaching twenty or thirty feet of insulated wire to the antenna connection provided in the rear of the cabinet. The wire may be concealed under the rug or laid on the floor along one side of the room.

For normal reception on FM, no outside aerial is required as sufficient signal pickup is secured from the built-in FM antenna. However, in poor receiving locations provision is made for improved results, which may be obtained by the addition of an outside antenna of correct design, properly installed. (Your dealer can supply and install a suitable FM antenna for your FM Radio).

Alignment: No attempt should be made to realign this receiver until it has been determined that a poor tube or some local condition is not responsible for faulty reception. The following is a list of the minimum equipment necessary to realign this receiver.

1—AM signal generator covering 455 KC, 600 KC, 1550 KC and 10.7 MC

2—FM signal generator covering 10.7 MC, 92 MC and 106 MC

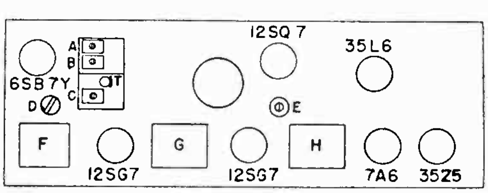
3—Output meter, rectifier type, approximately 0 to 2 volts RMS

4—Dummy antennas

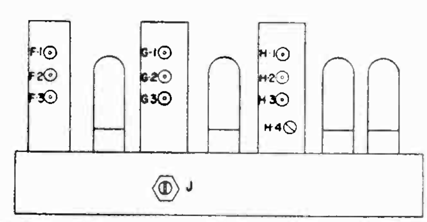
0.01 MFD Capacitor 100MMFD Mica Capacitor 300 Ohm Risistor

In the following alignment procedure the high side of the signal generator is connected to the terminal indicated in the "Signal Generator Coupling" column below. The ground side of the signal generator is connected directly to the chassis. The output meter should be connected across the voice coil of the speaker for all measurements.

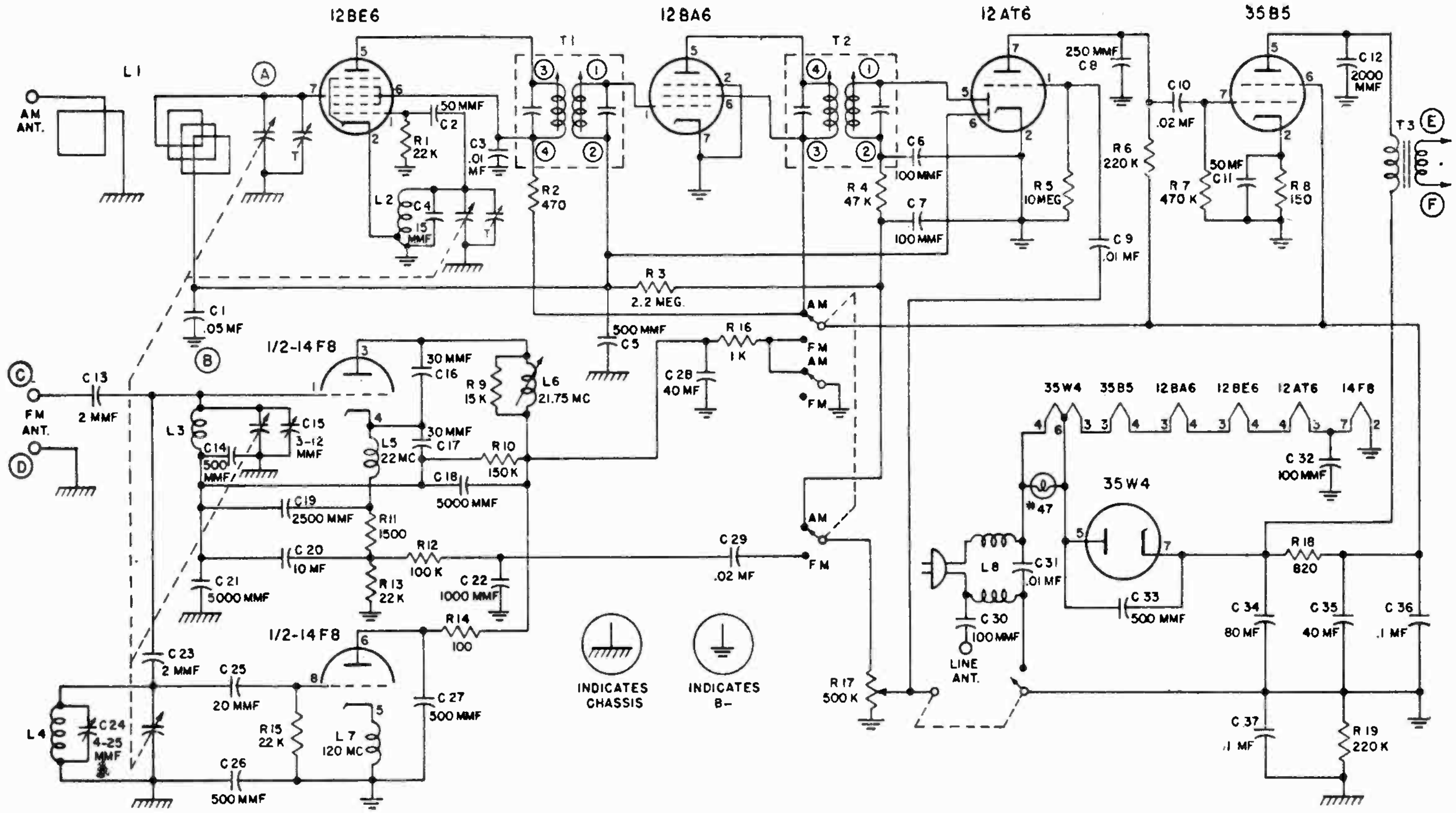
In adjusting the radio frequency trimmers and padders it is advisable to "rock" the variable capacitor gang slightly across the signal being delivered by the signal generator until that particular signal has been accurately peaked.



TUBE AND TRIMMER LOCATION



SPIEGEL



INSTALLATION:

1. Antenna Connection.

AM—A self contained loop antenna is provided, which will give satisfactory reception on the standard broadcast band without requiring any additional external antenna. However, if stronger signals are desired from weak or distant stations an external antenna may be connected to the wire extending from the loop.

FM—A self contained line antenna system is provided for reception of stations appearing in the FM band. To use this line antenna a short wire jumper should be connected between the two outside screw terminals of the FM antenna panel, which is mounted on the broadcast loop antenna form. Should poor reception conditions make it necessary, an FM dipole antenna may be connected to the left hand and center screw terminals of the FM antenna panel. In such a case, the line antenna link should be disconnected.

POWER SOURCE:

This receiver may be operated from either an AC or DC line, between 105 and 125 volts. On AC lines the frequency must be 50 to 60 cycles.

TUBE COMPLEMENT:

1 12BE6 — AM converter.
1 12BA6 — AM intermediate frequency amplifier.
1 12AT6 — AM demodulator and AVC; AM-FM 1st audio amplifier.
1 14F8 — FM oscillator-mixer-Super Regenerative I.F. amp.
1 35B5 — Audio output amplifier.
1 35W4 — Power rectifier.

2. Ground.

This set has been designed to operate without an external ground, and the use of any ground connection is not recommended.

3. Power Connection.

After making certain that the power circuit is rated between 105 and 125 volts extend the line cord to its full length and insert the plug into the nearest convenient outlet. If the supply is DC, and the set fails to operate, it may be necessary to reverse the plug connection to secure operation of the set.

OPERATION:

The left hand knob controls the ON-OFF power switch and volume level. To turn receiver on, rotate this knob in a clockwise direction. Within a few degrees of rotation an audible click will be heard, and the dial will become luminous. After a half minute of warm up the receiver will be in an operating condition. Further advance of this control in a clockwise direction will provide an increase in volume level.

The center knob controls the selection of AM or FM stations. When rotated to the counterclockwise position, operation in the AM (standard broadcast) band is provided. When this control is rotated to the clockwise position, FM stations may be tuned in.

The right hand or tuning knob enables the selection of any desired station as indicated on the calibrated dial. The upper row of numbers is calibrated directly in megacycles and covers the FM band. The lower scale is used to tune in stations in the standard broadcast band. Add one zero to the numbers on this scale to obtain the station frequency in kilocycles.

SERVICE ADJUSTMENTS:

Alignment or adjustment of the various circuits of this receiver can only be made by a skilled radio technician with the proper equipment.

NOTE: Points A, B, C, D, E, and F are noted on the circuit diagram.

AM Equipment:

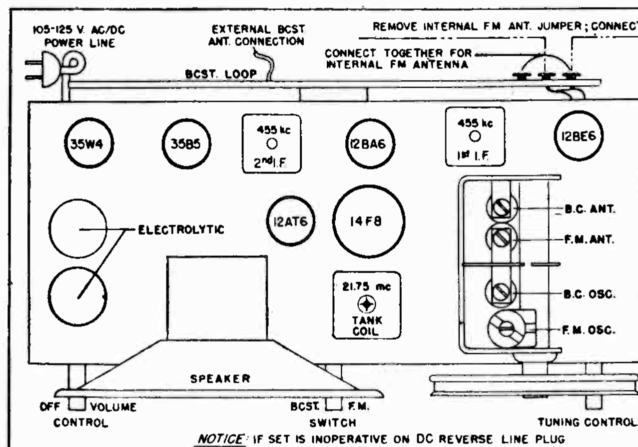
Equipment Required:
- a) Broadcast Band Signal Generator.
- b) Output Meter.

1. Set band switch at AM. Advance volume control to full volume setting.
2. Connect output meter across voice control at points "E" and "F".
3. Connect the "high" side of the Signal Generator to point "A" through a .01 mfd condenser. Connect the "ground" side to point "B". Adjust the Signal Generator to 455 kc and with the receiver switched on, adjust the first and second I.F. transformers for peak output as shown on the output meter. The signal injected into the receiver should be as small in magnitude as possible, consistent with a useful deflection on the output meter.
4. Connect the "high" side of the Generator to the antenna terminal with a 200 mmf condenser inserted in series. Connect the "ground" side of the Generator to point "B".
5. Tune receiver to 150 on the dial. Adjust Signal Generator to 1500 kc. Adjust BC oscillator and BC antenna trimmers for maximum output. Use a weak signal for final adjustment.

FM Equipment:

Equipment Required:
- a) 21.75 kc oscillator.
- b) FM Signal Generator for 88 to 108 megacycle range.
- c) Output meter.

1. Connect output meter across points "E" and "F".
2. With set switched on and volume control at maximum, feed modulated 21.75 mc signal into terminals "C" and "D".
3. Adjust tank coil for maximum response on output meter.
4. Disconnect 21.75 kc oscillator and connect FM signal generator to points "C" and "D".
5. Set receiver dial to 88 megacycles and adjust Signal Generator for same frequency. Adjust spacing of FM oscillator coil for maximum signal response.
6. Tune receiver to 108 megacycles and adjust Signal Generator to same frequency. Adjust FM oscillator trimmer for maximum signal response.
7. Repeat operation 5 and 6.
8. Tune receiver to 90 megacycles and adjust Signal Generator for same frequency. Adjust spacing of the FM antenna coil for maximum signal response with minimum background noise. Slowly rock tuning control while performing this adjustment.
10. Repeat operations 8 and 9.



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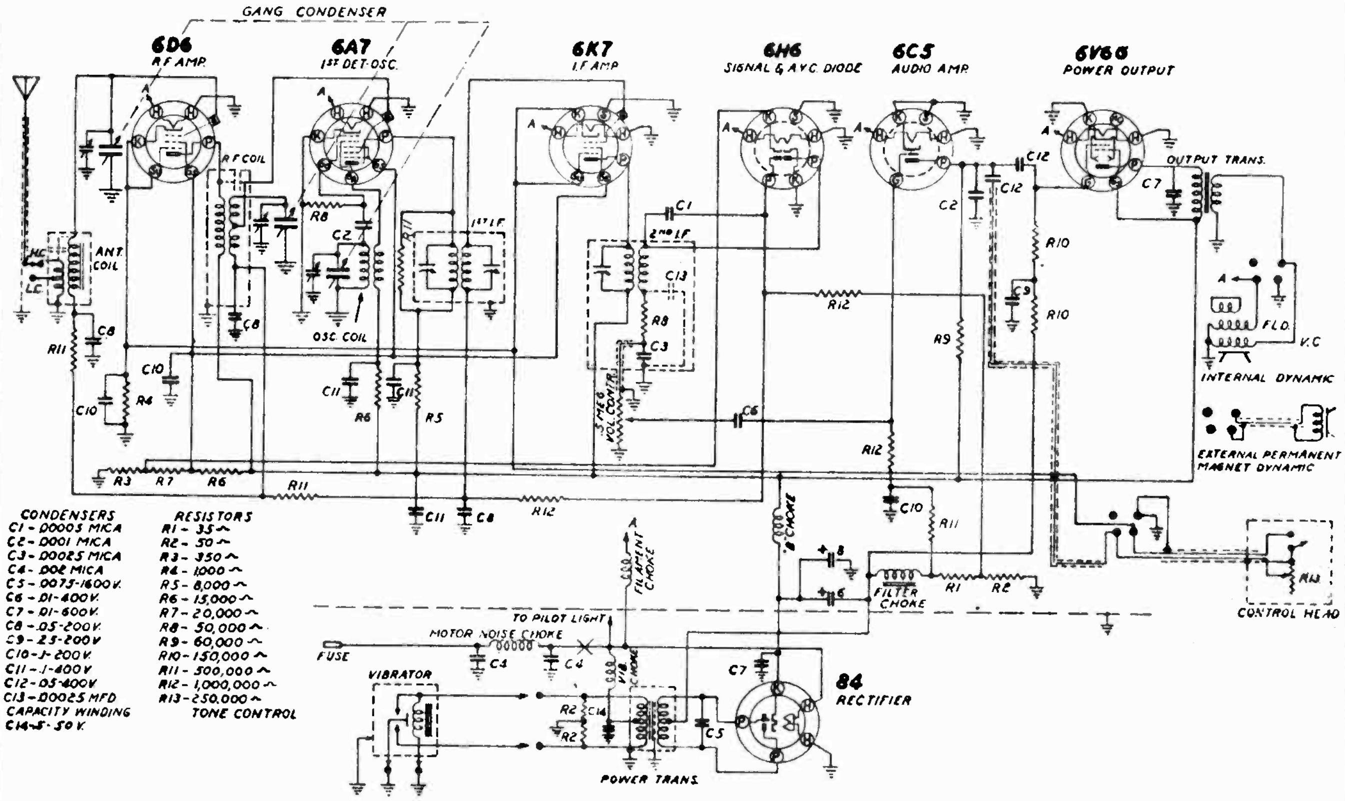
RMA CODE 174

PART NO. GB-498

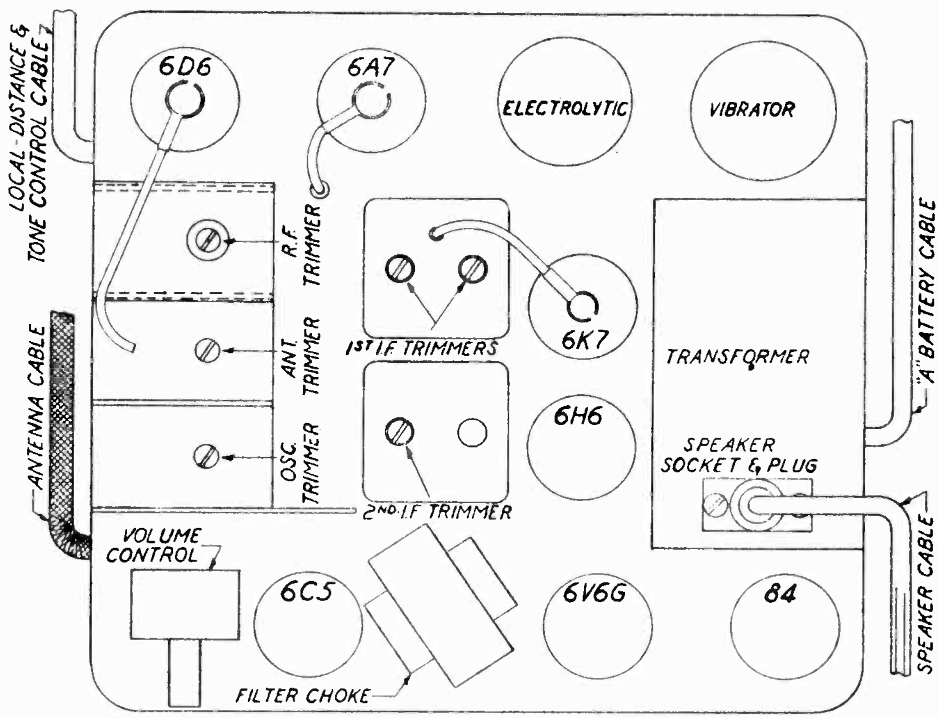
SPIEGEL

MODELS 77, 770



CONDENSERS
- C1 - .00005 MICA
- C2 - .0001 MICA
- C3 - .00025 MICA
- C4 - .002 MICA
- C5 - .0075-1600V.
- C6 - .01-400V.
- C7 - .01-600V.
- C8 - .05-200V.
- C9 - .25-200V.
- C10 - .1-200V.
- C11 - .1-400V.
- C12 - .05-400V.
- C13 - .00025 MFD CAPACITY WINDING
- C14-5 - 50V.

RESISTORS
- R1 - 35 Ω
- R2 - 50 Ω
- R3 - 350 Ω
- R4 - 1000 Ω
- R5 - 8,000 Ω
- R6 - 15,000 Ω
- R7 - 20,000 Ω
- R8 - 50,000 Ω
- R9 - 60,000 Ω
- R10 - 150,000 Ω
- R11 - 500,000 Ω
- R12 - 1,000,000 Ω
- R13 - 250,000 Ω TONE CONTROL



1. CONTROLS. Two knobs appear on the control head. The one that moves the dial pointer is for tuning; the other controls volume and turns the receiver "On" and "Off".

2. TURNING THE RECEIVER "ON". Turn the volume control knob to the right. A click will be heard, and the pilot lamp will light. Wait thirty seconds for the tubes to heat up.

3. TUNING IN STATIONS. Put the volume on full by turning the volume control knob to the right as far as it will go. Next turn the station selector knob slowly until a station is heard. Reduce the volume by means of the volume control knob to below the desired intensity. Now turn the station selector knob very slowly back and forth until the signal is clearest and strongest. If the signal is not carefully tuned in, reception will be noisy and distorted. Then adjust the volume control until the desired intensity is obtained. Always reduce the volume by means of the volume control knob and never by turning the station selector knob. To get the kilocycle reading, multiply the scale reading by ten.

4. TONE CONTROL. The tone control is located on the control plate and is operated by means of a wing type knob directly behind volume control knob as shown in Figure 8. When the knob is turned to the right, a brilliant tone is obtained, and when it is turned to the left, a deep bass tone is produced.

5. LOCAL AND DISTANCE SWITCH. The local and distance switch is located directly behind the station selector and is operated by means of a wing knob. When tuning local stations, turn the wing knob to the extreme left to enjoy brilliant performance without the usual in-between station noises, and noise and static caused by high voltage lines. When tuning distant stations, turn wing knob to extreme right, and a click will be heard, and the set becomes very sensitive, bringing in far-away stations with surprising sharpness and clarity.

6. TURNING THE RECEIVER "OFF". Turn the volume control knob to the left as far as it will go. A click will be heard, and the pilot light will go out, indicating that the set is turned off.

CARE AND MAINTENANCE

1. ADVANCING GENERATOR CHARGING RATE. The installation of any automobile radio imposes an additional drain on the car storage battery. This can be compensated for by advancing the charging rate of the car generator. Check the state of charge of the storage battery about a week after the installation of the automobile radio is made and have the charging rate adjusted accordingly.

2. TUBES. The type of tubes used and location of these tubes in the chassis are shown in Fig. 8. These tubes are of a sturdy, rugged construction designed especially for an auto receiver. Most of them, under normal use, will last for many months and in some cases, years. Some of them, however, may become faulty after a few months of operation. For that reason it is advisable to secure a new set of tested tubes at intervals of three to six months and to have them inserted in the receiver one at a time, noting any difference in performance.

3. VIBRATOR. The vibrator unit is plugged in exactly the same as a tube. This unit may, in case of failure, be readily replaced in the same manner as replacing a tube.

4. PILOT LAMP. To replace the pilot lamp first turn the receiver off. Then pull out the pilot lamp assembly and replace the lamp. A 6-8 volt automobile type lamp is used (Bulb No. 51).

5. FUSE. A 20 ampere automobile fuse is used in the battery cable. This fuse is placed in an insulating shield and is in the receptacle provided for it at the chassis end of the battery cable.

CAUTION—Be sure the fuse insulator is on the fuse before the latter is inserted in the receptacle. If a fuse blows, do not replace it without first investigating the cause.

ALIGNMENT DATA AND SERVICING

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 175, 600 and 1400 K.C., and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignment should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) transformers should be alligned properly as the first step.

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.

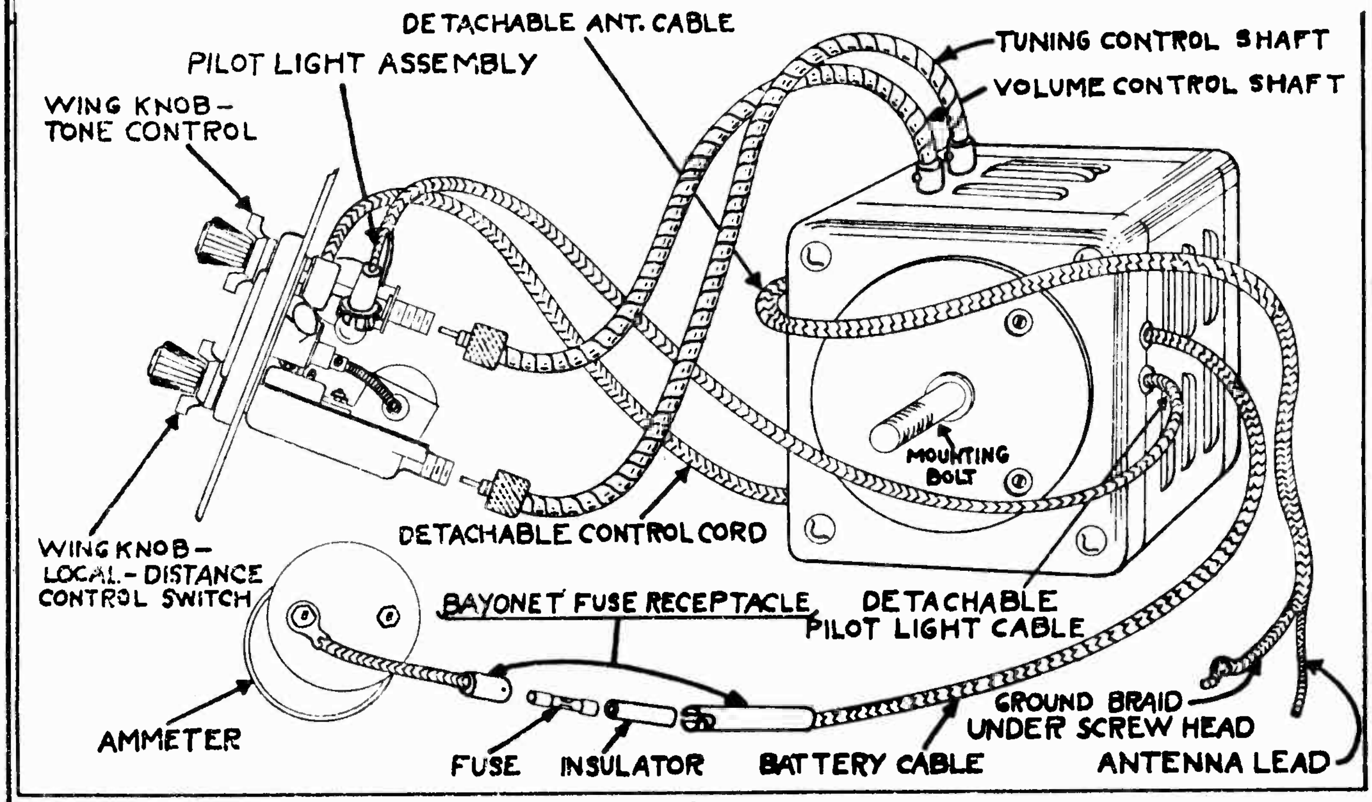


FIG. 8

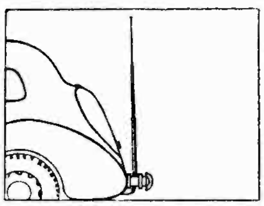


FIG. 9

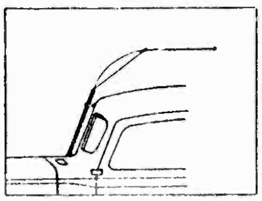


FIG. 10

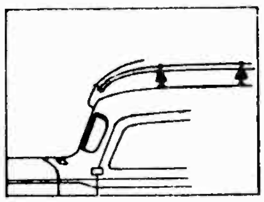


FIG. 11

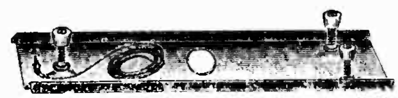


FIG. 12

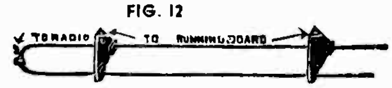


FIG. 14

FIG. 13

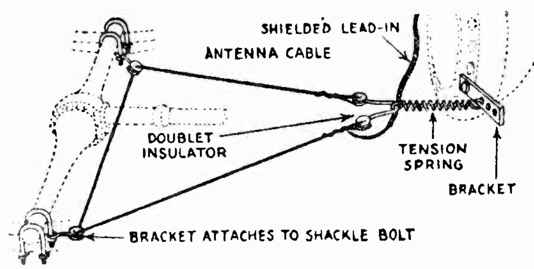


FIG. 15

Buick and Oldsmobile have what is known as insulated running board type antenna which is about 500 mmfd. These types of high capacity antennas can efficiently be coupled to the receiver by means of a special provision which provides proper matching.

COMPLETING THE WIRING CONNECTIONS

Now, with the receiver and control units mounted, and with flexible shafts attached, the next step is to complete the wiring connections. Supplied with the receiver: (1) a shielded antenna lead-in with two prong plug attached; (2) a shield pilot light lead with slip-on pilot light head at one end and tip jack connector at the other end; (3) a battery lead with built-in replaceable fuse (4) detachable control cord with a two prong plug at one end for chassis connection. (See Fig. 8).

1. ANTENNA CONNECTION. The shielded antenna lead should be soldered to the antenna lead-in as shown in Figure 16. The position in which the plug is inserted into the receiver depends upon the type of antenna used in the installation. The antenna lead plug has two tips, one soldered and one blank. If a low capacity antenna is used, the soldered tip of the plug is inserted in the hole specified in Figure 17. If a high capacity antenna is used, the soldered tip of the plug should be inserted in the hole indicated for high capacity antenna.

Keep the antenna cable as far away from car wiring as possible, and ground the pig tail of the antenna cable shield as close to the antenna end as possible. If a roof antenna is used the cable supplied will prove sufficiently long in practically all uses to reach the corner post or column at which the antenna lead comes down. The shielded cable should be pushed up into the column as far as possible to prevent ignition interference that may be picked up by any unshielded portion of the antenna cable.

Three connections are necessary. First, the antenna must be hooked up to the receiver unit; second the pilot light must be in the control head; third, the battery cable must be connected to the ammeter. (See Fig. 8).

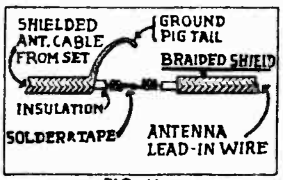


FIG. 16

If an under car or running board antenna is used, the shielding must be extended to the antenna in all cases. The pigtail on the end of the antenna cable shield must be well grounded at the extreme antenna end. If it is necessary to extend the antenna cable shielding as described below, be sure that a pigtail is put on the end of the shielded extension and that it is well grounded at the extreme antenna end. (See Fig. 16).

To extend the antenna cable shielding, the antenna lead wire should be covered with heavy insulation such as loom, to properly separate the shielding from the wire. Then connect the two wires together and connect the two shields together, care being taken that no strand of the shield touches the antenna wire.

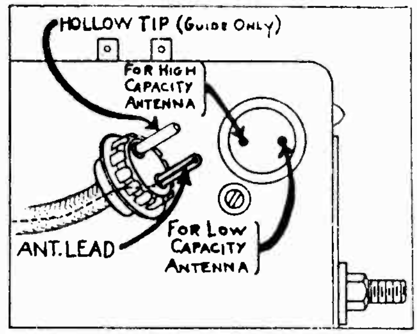


FIG. 17

2. PILOT LAMP CONNECTION. Connect the pilot lamp cable at the chassis by inserting the pin tip connector into the receptacle on the side of the chassis case indicated in Figure 8. Push the fitting all the way down. Then insert the pilot lamp assembly into the receptacle at the back of the control unit as indicated in Figure 8. In some cases the cable supplied will not be long enough and an extra length cable may be fitted.

3. BATTERY CABLE CONNECTION. The battery connection is made at the ammeter. The end of the battery cable should be soldered to a lug and secured to one of the posts at the back of the ammeter in the instrument panel. The other end of the battery cable has a fuse receptacle with bayonet fitting. Insert the fuse shield and fuse into the receptacle and connect it to the bayonet pin connector in the end of the battery lead coming from the chassis case as shown in Figure 8.

4. THE CONTROL CORD. Connect the control cord at the chassis by inserting the 3 prong plug into the receptacle on the side of the chassis case as indicated in figure 8. Push the fitting all the way down.

ADJUSTING THE DIAL POINTER FOR CORRECT CALIBRATION

After the control unit has been installed the dial pointer must be adjusted to provide a correct calibration of the receiver in operation. Tune in a station of known frequency around 700 K.C. Now reach back behind the control unit and loosen the knurled nut. This now makes it possible to rotate the flexible shaft by hand until the dial is set at the exact frequency of the station tuned in. Now tighten the knurled nut with fingers. (Do not use pliers or other tools). If this procedure is carefully followed the dial pointer will indicate 700 K.C. when a 700 K.C. station is being received. Once you adjust the dial pointer for correct calibration at any one frequency, all other points or calibrations on the dial scale will be found to be in agreement with frequencies tuned.

HOW TO SUPPRESS IGNITION AND GENERATOR NOISE

This radio incorporates all of the latest circuit developments for the elimination of motor noises.

Due to the use of special filter circuit, the set is inherently quiet, and only a few precautionary procedures are required. Cars of recent manufacture will not require the use of spark plug suppressors.

Even in older cars, suppressors should not be required providing the ignition system wiring has not developed high tension "leaks" due to aged, cracked or otherwise defective insulation.

There are a few units in every car that will require a little attention to provide absolute "noiseless motor" operation. The following automobile components are often not grounded or poorly grounded from a radio standpoint and should be investigated as suggested. It is advisable to pay particular attention to the first four causes listed below. In a majority of cases, if these are treated, no further noise suppression will be required. If the noise persists, the remaining seven points should be checked in the order recommended.

1. Distributor
2. Generator
3. Dome Light
4. Ammeter
5. Bonding of Cables
6. Coil Position
7. High and Low Tension Wires
8. Steering Columns, etc.
9. Grounding Engine and Other Parts
10. Loose Parts in Car
11. Weak Pick-up

HOW TO INSTALL THE RECEIVER AND CONNECT THE CONTROL UNIT

THE RECEIVER. After the receiver and control head positions have been selected, the installation of these two units should be completed. A single hole made by using a 1/2 inch or 9/16 inch drill is all that is necessary for mounting the receiver unit proper. The short threaded end of the stud bolt should be screwed into the rear mounting plate of the receiver, with the long threaded section of the bolt fitted through the hole in the car bulkhead. (See Fig. 7).

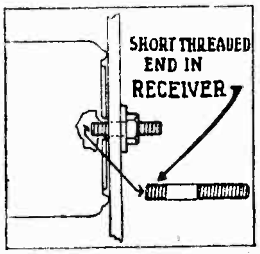


FIG. 7

IMPORTANT: Never screw the long threaded end of the stud bolt into the receiver as it is long enough to penetrate the interior of the chassis and cause serious damage to the wiring and components within. THE SHORT THREADED END ONLY should be screwed into the receiver mounting plate.

THE CONTROL UNIT. The control unit supplied with this receiver is custom built for your car, employing either aeroplane or porthole type dial assembly, as engineered by the car manufacturer. The mounting of the control head is easily accomplished. Remove the ash receiver or the ornamental plate designed to accommodate the radio control unit. In few 1937 cars it will be necessary to remove the ash receiver and the plate. There is no sawing, drilling or filing necessary in preparing for installation. Now assemble the control unit as per instruction sheet enclosed in each control unit package and proceed to clamp to the dash. Once the receiver unit and control unit have been mounted into position, the flexible shafts should be connected in the manner clearly indicated in figure 8. Figure No. 8 also shows the proper battery, control cord, pilot light and antenna connections.

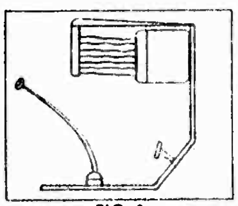


FIG. 3

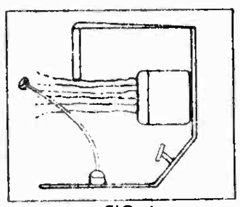


FIG. 4

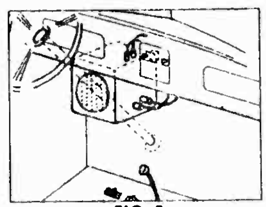


FIG. 5

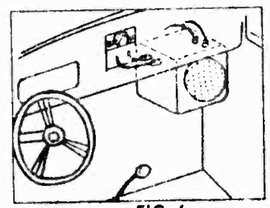


FIG. 6

REPLACEMENT PARTS LIST

Model 77-770

Part No.	Description	Part No.	Description	Part No.	Description
P536.	6D6 Socket.	P1375.	Transformer.	P137A.	500,000 ohm 1/4 watt Insulated.
P506.	6A7 Socket.	P1289.	4 Prong Speaker Socket.	P1380.	8,000 ohm 1/4 watt Insulated.
P824.	Vib. Socket.	P1414.	Vibrator Unit.	P417A.	50,000 ohm 1/4 watt Insulated.
P489.	6K7 Socket.	P1293.	Electrolytic Condenser.	P1381.	1,000 ohm 1/4 watt Insulated.
P490.	6H6 Socket.	P1376.	2nd I.F. Transformer.	P417.	50,000 ohm 1/4 watt Insulated.
P522.	6C5 Socket.	P1291.	R.F. Interstage Coil.	P1379.	20,000 ohm 1 watt Insulated.
P1374.	6V6G Socket.	P836.	Oscillator Coil.	P1309.	15,000 ohm 1/2 watt Insulated.
P815.	No. 84 Socket.	P1377.	Candohm Resistor.	P1310.	15,000 ohm 1 1/2 watt Insulated
P852.	Pilot Light Socket.	G5207.	6 in. Dynamic Speaker.	P1324.	50 ohm 1/2 watt Insulated.
P805.	Antenna Socket.	P831.	Fuse.	P817.	.00025 mica.
P1368.	Speaker Socket.	P870.	Antenna Cable.	P480.	.0001 mica.
P1278.	Gang Condenser.	P806.	Generator Condenser.	P1382.	.00005 mica.
P1279.	Motor Noise Choke.	P1300.	Ammeter Condenser.	P335.	.01—600V Condenser.
P1370.	B Filter Choke.	P1388.	Control Head.	P1383.	.10-200—.05-400 Condenser.
P1280.	1st I.F. Transformer.	P851.	Drive Cable.	P1315.	.25-200—.10-400 Condenser.
P1281.	Filament Choke.	P1445.	External Speaker.	P1384.	.05-400—.05-200 Condenser.
P854.	R.F. B Choke.	P1402.	External Speaker Cable.	P1314.	.10-400—.05-200 Condenser.
P1319.	Hash Choke Coil.	P1378.	60,000 ohm 1/4 watt Insulated.	P1317.	.10-400—.05-200 Condenser.
P1292.	Antenna Coil.	P418A.	150,000 ohm 1/4 watt Insulated.	P1385.	.10-200—.10-400 Condenser.
P1371.	Volume Control.	P1308.	350 ohm 1/4 watt Insulated.	G867.	.0075-1600V Condenser.
P1286.	Out Put Audio Transformer.	P162A.	1 Meg. ohm 1/4 watt Insulated.	P813.	.50-50V Condenser.
				P818.	.002 mica Condenser.

1. **DISTRIBUTOR ROTOR.** Distributor rotors develop an unshielded spark and in practically all installations it will be necessary to install a distributor suppressor to squelch this interference. The intensity of this spark interference can be greatly reduced by "peening" the rotor blade. This operation reduces the gap between the rotor blade and the distributor head contact. Normally there is a gap of about twenty thousandths of an inch and the spark jumping this gap produces the most objectionable interference. Hammering the rotor blade which is made of copper will lengthen it and reduce the clearance to a few thousandths of an inch and consequently reduce proportionately the spark and interference. A more desirable and easier way of "peening" the rotor is to increase its length by building it up with solder. Sufficient solder, which is soft, can be added to completely close this space and a trial turn over the engine will scrape off any surplus so that the gap will be almost spaceless.

2. **GENERATOR.** Generators on new cars usually do not cause much interference, but as the car becomes older the brushes wear and spark, producing objectionable noise. The ½ microfarad condenser furnished with the receiver should be installed on the generator cut-out relay to prevent this source from causing interference. In some of the new cars, the generator relay is mounted on the front of the bulkhead or in some other location. It will be most convenient and advisable for best results to mount the generator condenser at the relay.

3. **DOMELIGHT.** To determine the amount of noise caused by the dome light, try a ¼ or ½ mfd. condenser from the end of the dome wire to ground.

The end of the dome light wire will usually be found at the ammeter or at a special connection terminal block. In cases where the condenser does not cure the noise it may be necessary to shield the dome light wire to the point where it enters the corner post running to the roof, and to ground the shield. If the noise still persists, disconnect this lead and remove it from the front cornerpost, at which point it is generally run down, and use one of the side posts in back of the door, connecting it directly to the storage battery. If done in this manner, this lead should be fused.

4. **AMMETER.** By-passing the ammeter with a ½ mfd. condenser should be tried in looking for the source of interference and permanently applied if a reduction in noise results.

5. **BONDING OF CABLES.** Try grounding to the dash all cables and tubing which pass through it, such as oil lines, gas lines, hand throttle, choke wire, etc. By means of a file, contact can be established between any of the lines and the dash, in order to determine whether such a ground will reduce the noise. To bond the cables to the dash, clean the point of contact, wrap a length of braided shielding around the cable and solder the connection.

Then solder the ends of the shielding to the dash or ground it under a screw head if one is convenient. Sufficient play should be left in the bonding shielding so that movement of the cables or tubing will not loosen this shielding from the dash.

6. **COIL POSITION.** If the receiver chassis and ignition coil are both in back of the dash (under the cowl) take off the coil and mount it on the front of the dash (in the engine compartment). Should the coil be moved, mount it as close to the distributor as possible. If the coil cannot be moved place a copper can over it and ground the can at the coil mounting. Shield the high tension lead from the coil to the dash, grounding this shield both to the metal can of the coil and to the dash. Considerable care must be exercised in shielding this lead to prevent short circuiting the high tension system. It should first be covered with loom or heavy insulation before the braided shielding is put on.

7. **HIGH AND LOW TENSION LEADS.** In some cases, the high and low tension leads between the coil and distributor are run close together. In some cars they are in the same conduit. If this is the case, remove the low tension lead from this conduit. In any event, keep the high and low tension leads as far apart from each other as possible. Shield and ground the shield of the low tension lead, if separating the two leads is not sufficient.

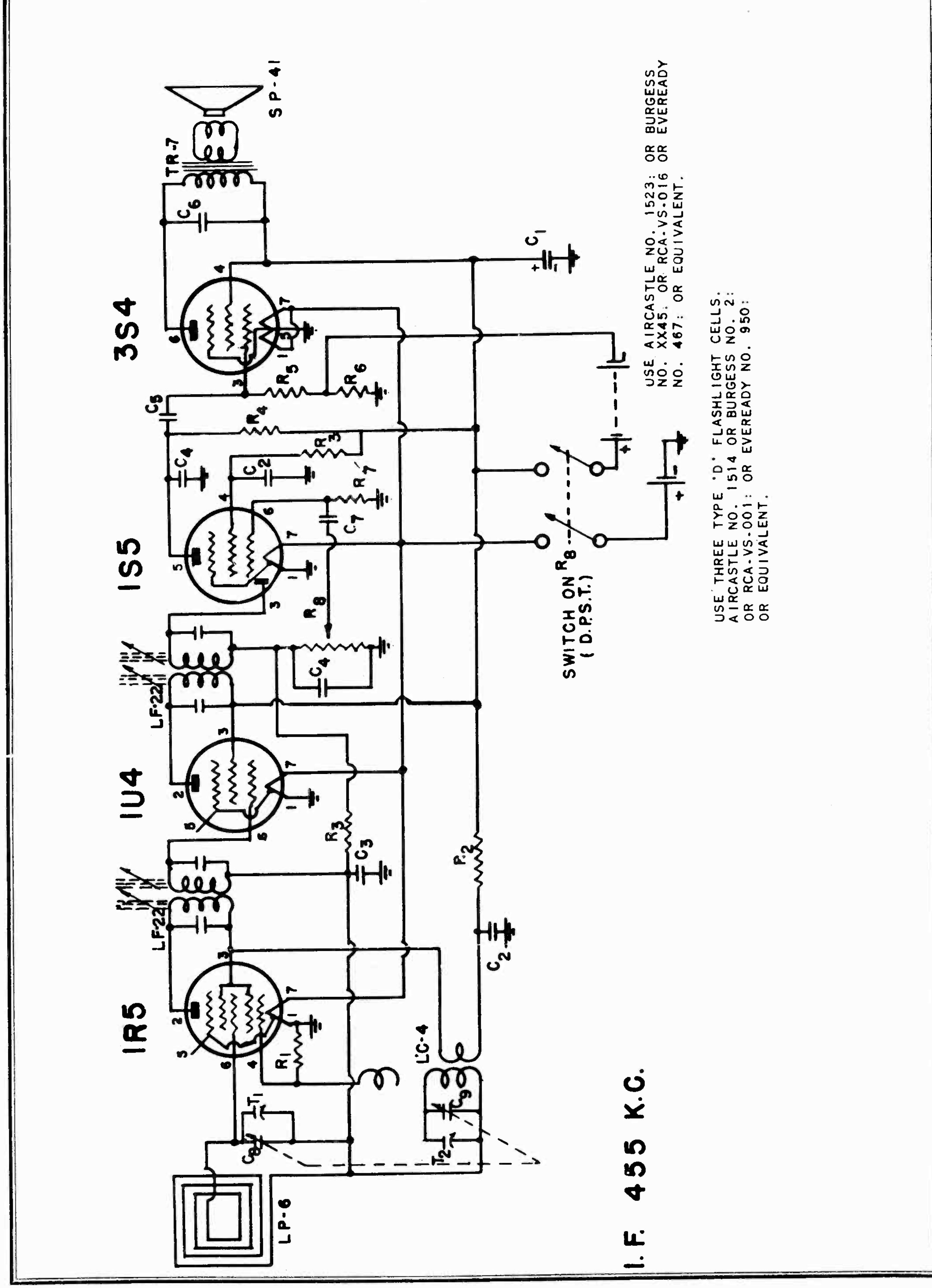
8. **STEERING COLUMN, ETC.** It is possible for the steering column, foot pedals and brake lever to carry interference to the back of the dash at which point it may affect the radio receiver. See if each of these are well grounded to the frame of the car. By means of a file or a braided shielding jumper, contact can be established between these points and the frame in order to determine whether such a ground will reduce the noise. A piece of one inch braided shielding should be used if a ground is necessary and this shielding may be grounded under a screw head, or nut, or may be soldered in position.

9. **GROUNDING ENGINE AND OTHER PARTS.** The engine must, in every case, be well grounded to the frame of the car. If it is not, use a very heavy braided lead for this purpose, similar to a storage battery ground lead. In like manner it may be necessary to check the grounding of the metal dash, instrument panel, radiator and hood to the frame of the automobile.

10. **WEAK PICKUP.** Noise, on occasion, may be caused by the automobile being in a shielded location or by a faulty antenna system. Automatic volume control, when counteracting weak pickup, causes the set to operate at its maximum sensitivity, thereby increasing the noise level. If the antenna instructions, previously outlined are carefully followed, weak pickup should not be experienced.

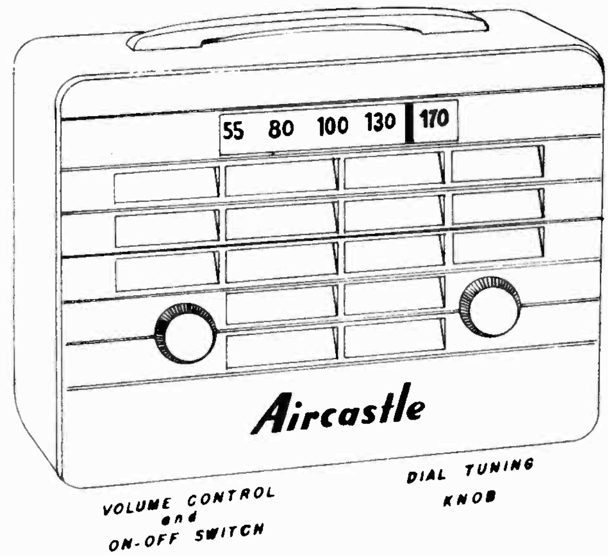
11. **LOOSE PARTS IN CAR.** Noisy operation is also caused in some instances by loose parts in the car body or frame. These loose parts rubbing together affect the grounding and cause noises. Tightening up the frame and body at all points and in some cases, using a copper jumper will eliminate noise of this nature.

SPIEGEL


1R5
1U4
1S5
3S4
LF-22
LF-22
LC-4
LP-6
TR-7
SP-41
SWITCH ON R8
(D.P.S.T.)
USE AIRCASTLE NO. 1523: OR BURGESS NO. XX45: OR RCA-VS-016 OR EVEREADY NO. 467: OR EQUIVALENT.
USE THREE TYPE 'D' FLASHLIGHT CELLS. AIRCASTLE NO. 1514 OR BURGESS NO. 2: OR RCA-VS-001: OR EVEREADY NO. 950: OR EQUIVALENT.
I.F. 455 K.C.

MODEL 179

SPIEGEL



ALIGNMENT PROCEDURE

- Output meter across 3.5 ohm output load.
- Volume control at maximum for all adjustments.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.

SIGNAL GENERATOR				*SETTING TUNER*	*ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)*
Frequency	*Coupling Factor*	*Connection to Receiver*	*Ground Connection*		
455 kc	.1 mfd	1R5 Grid	B—	Rotor full open (Plates out of mesh)	Input and output trimmers on IF cans
1700 kc	.1 mfd	1R5 Grid	B—	Rotor full open (Plates out of mesh)	Oscillator trimmer T2
1500 kc		Radiating Loop		1500 kc*	Antenna trimmer T1

* Five markings on the dial bracket represent respectively 530 kc., 600 kc., 1000 kc., 1500 kc., and 1700 kc., reading from left to right. These points are to be used for the alignment of the receiver.

ELECTRICAL SPECIFICATIONS

Batteries .... A—$1\frac{1}{2}$ volts. 250 ma.
B—$67\frac{1}{2}$ volts. 8 ma. average.

Frequency Range .... 530 to 1700 kc.

Intermediate Freq. .... 455 kc.

Tuning .... Two-gang capacitor

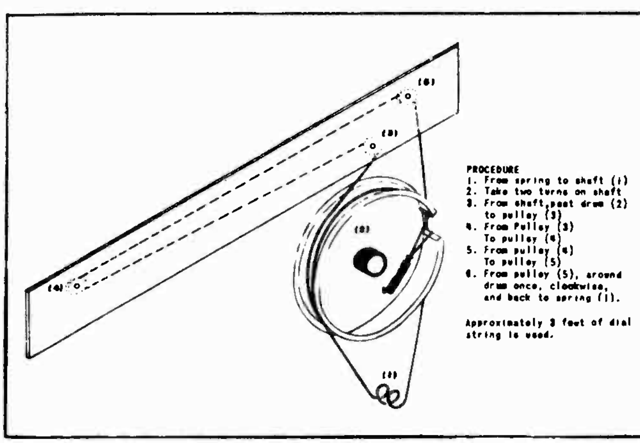
Antenna .... Built-in loop

Speaker .... 4 inch PM; voice coil Impedance 3.5 ohms.

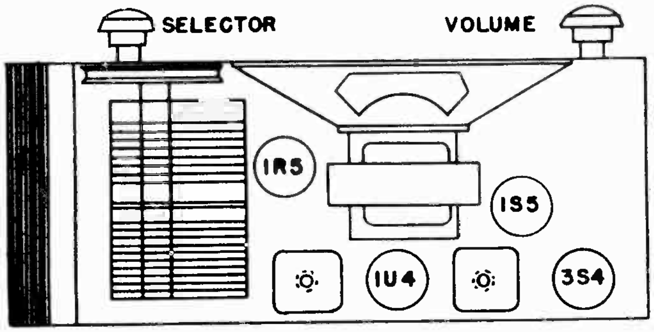
Power Output .... 80 milliwatts undistorted
140 milliwatts maximum

Sensitivity .... 800 microvolts per meter for 50 milliwatt output

Selectivity .... 55 kc broad at 1000 times signal at 1000 kc.



Replacement of Drive Cord



REPLACEMENT PARTS LIST

CAPACITORS

Ref. No.	*Part No.*	*Description*
C1	CE-14	16 mfd, 100 volt, Electrolytic
C2	CP-103-3	.01 mfd, 200 volt, paper
C3	CP-503-4	.05 mfd, 200 volt, paper
C4	CM-101-2	100 mmf, 500 volt, mica
C5	CP-202-2	.002 mfd, 200 volt, paper
C6	CP-502-1	.005 mfd, 400 volt, paper
C7	CP-102-3	.001 mfd, 200 volt, paper
C8, C9	CV-10	Variable condenser, two gang

RESISTORS

Ref. No.	*Part No.*	*Description*		
R1	RC-104-1	100,000 ohms	1/2 watt	20%
R2	RC-153-1	15,000 ohms	1/2 watt	20%
R3	RC-335-1	3.3 megohms	1/2 watt	20%
R4	RC-105-1	1 megohm	1/2 watt	20%
R5	RC-225-1	2.2 megohms	1/2 watt	20%
R6	RC-821-2	820 ohms	1/2 watt	10%
R7	RC-106-1	10 megohms	1/2 watt	20%
R8	VC-6	1 meg. Vol. control with switch		

COILS AND TRANSFORMERS

Part No.	*Description*
LC-4	Oscillator Coil
LF-22	I.F. Transformer
LP-6	Loop Antenna
TR-7	Output Transformer

MISCELLANEOUS

Part No.	*Description*
SP-41	4 inch P.M. Speaker
PN-6	Pointer (Specify Color)
CR-2	Drive Cord
SG-1	Spring for Drive Cord
KN-20-4	Knob
BK-20 BK-22	Cabinet Back with Hardware (Specify Color)
CB-104A CB-103	Assembled Cabinet without Back and Handle (Specify Color)
HA-2	Handle for Cabinet with Springs and Pins (Specify Color)
AS-3	Battery Holder

POWER SUPPLY

The battery supply to be used with this receiver is as follows:

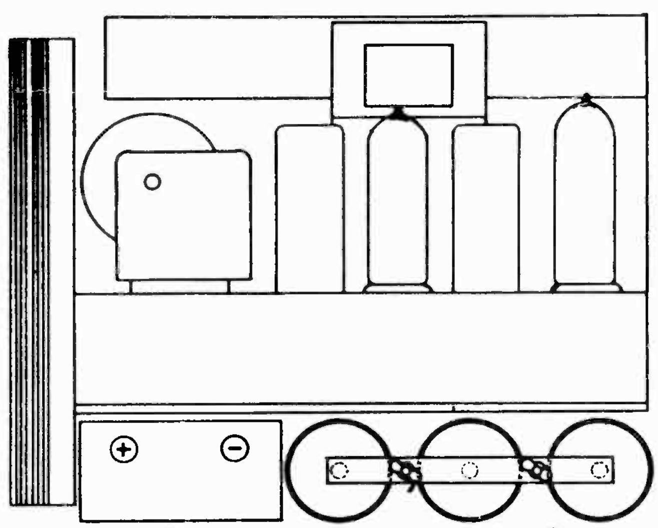
"A" supply .... 1½ volts.
Use three type "D" flashlight cells; Aircastle No. 1514, or Burgess No. 2, or RCA-VS-001, or Eveready No. 950 or equivalent.

Use Aircastle No. 1523 or Burgess No. XX45 or RCA-VS-016 or Eveready No. 467 or equivalent.

ANTENNA SYSTEM

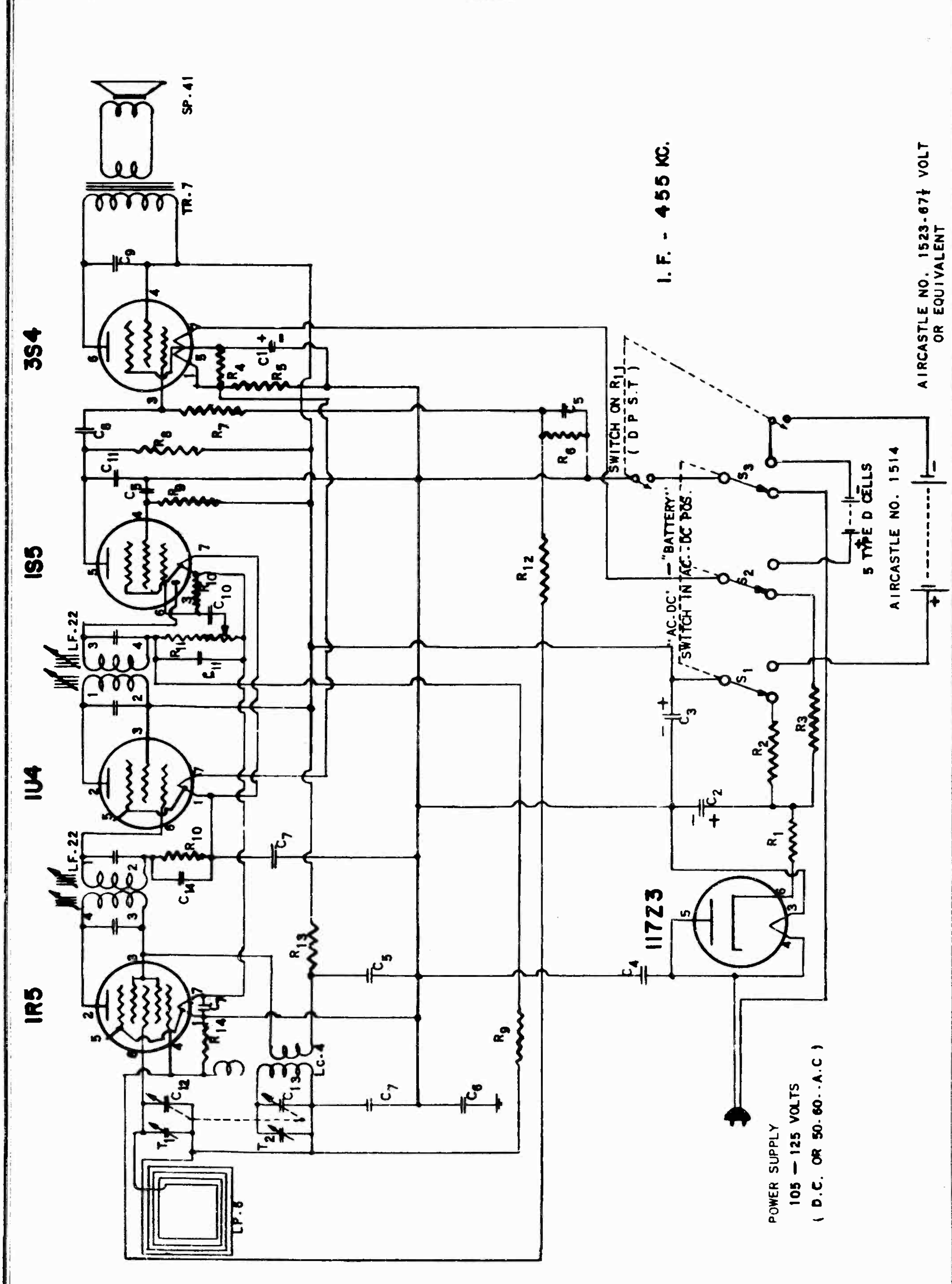
This receiver is equipped with a built in Antenna System, which obviates the necessity of using an antenna connection for receiving most local and some distant stations.

When tuning Broadcast Stations, it may be found advisable to rotate the radio about its position of rest until the most distant station regularly enjoyed is heard the clearest. In some vicinities where there is a localized noise interference prevalent, it is best to rotate the radio cabinet to a position which gives a minimum of noise.



MODEL 180

SPIEGEL



ALIGNMENT PROCEDURE

- Output meter ac oss 3 5 ohm output load
- Volume control at maximum for all adjustments.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.

SIGNAL GENERATOR				SETTING TUNER	ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)
Frequency	Coupling Factor	Connection to Receiver	Ground Connection		
455 kc	.1 mfd	1R5 Grid	B—	Rotor full open (Plates out of mesh)	Input and output trimmers on IF cans
1700 kc	.1 mfd	1R5 Grid	B—	Rotor full open (Plates out of mesh)	Oscillator trimmer T2
1500 kc		Radiating Loop		1500 kc*	Antenna trimmer T1

* Five markings on the dial bracket represent respectively 530 kc., 600 kc., 1000 kc., 1500 kc., and 1700 kc., reading from left to right. These points are to be used for the alignment of the receiver.

REPLACEMENT PARTS LIST

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

CAPACITORS

Ref. No.	Part No.	Description
C1, C2, C3,	CE-12	{125 mfd, 10 volt} {25 mfd, 150 volt} Electrolytic condenser
C4	CP-503-5	.05 mfd, 400 volt, paper
C5	CP-103-2	.01 mfd, 150 volt, paper
C6	CP-104-2	.1 mfd, 200 volt, paper
C7	CP-503-2	.05 mfd, 150 volt, paper
C8	CP-202-3	.002 mfd, 200 volt, paper
C9	CP-502-2	.005 mfd, 400 volt, paper
C10	CP-102-3	.001 mfd, 200 volt, paper
C11	CM-101-1	.0001 mfd, 300 volt, mica
C12, C13	CV-10	Variable condenser, 2 gang
C14	CP-103-4	.01 mfd, 100 volt, paper

RESISTORS

Ref. No.	Part No.	Description
R1	RC-180-1	18 ohms, ½ watt 20%
R2	RC-682-5	6800 ohms, 1 watt 10%
R3	RP-3	2650 ohms, 10 watt 5%
R4	RC-471-1	470 ohms, ½ watt 20%
R5	RC-821-2	820 ohms, ½ watt 10%
R6	RC-274-2	270,000 ohms, ½ watt 10%
R7	RC-225-1	2.2 megohms, ½ watt 20%
R8	RC-105-1	1 megohm, ½ watt 20%
R9	RC-335-1	3.3 megohms, ½ watt 20%
R10	RC-106-1	10 megohms, ½ watt 20%
R11	VC-6	1 meg. vol. control with switch
R12	RC-105-2	1 megohm, ½ watt 10%
R13	RC-153-1	15,000 ohms, ½ watt 20%
R14	RC-104-2	100,000 ohms, ½ watt 10%

POWER SUPPLY

This receiver is designed to operate on either an A.C. or D.C power supply. The following operation ratings should be observed:

Voltages .... 105 - 125 Volts, A.C. or D.C.

COILS AND TRANSFORMERS

Ref. No.	Part No.	Description
	LC-4	Oscillator coil
	LF-22	IF transformer
	LP-6	Loop antenna
	TR-7	Output transformer

MISCELLANEOUS

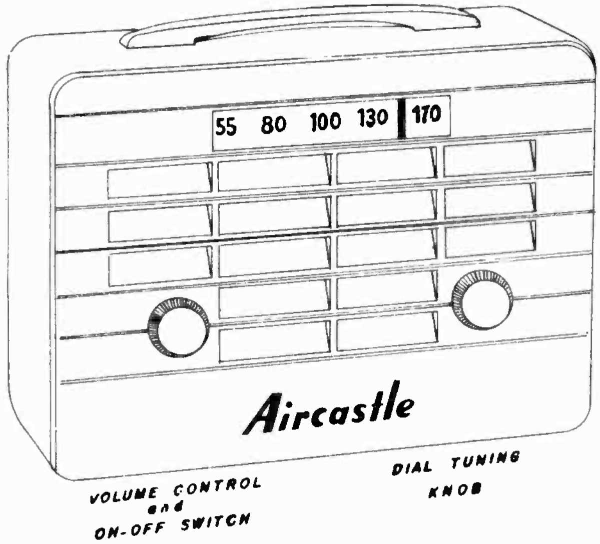
Ref. No.	Part No.	Description
S1, S2, S3	SW-10	Three Pole Single Throw Switch
	SP-41	4 inch P.M. speaker
	PN-6	Pointer
	CR-2	Drive cord
	SG-1	Spring for drive cord
	KN-20-4	Knob
	BK-20	Cabinet back (with hardware)
	CB-104A	Assembled cabinet (without back and handle)
	HA-2	Handle for cabinet (with springs and pins)
	AS-1	Assembled battery box

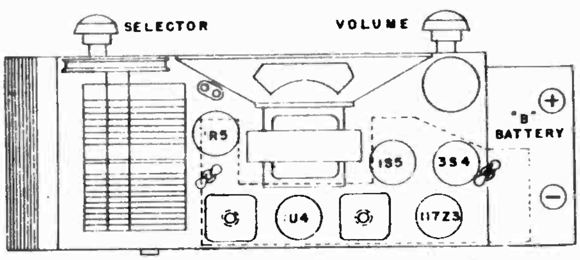
The battery supply to be used with this receiver is as follows:

"A" supply .... 7½ volts
Use five type "D" flashlight cells; Aircastle No. 1514, or RCA-VS-001, or Burgess No. 2 or Eveready No. 950 or equivalent.

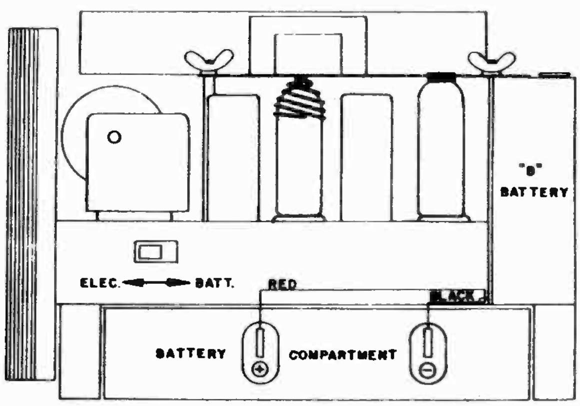
"B" supply .... 67½ volts.
Use Aircastle No. 1523 or Burgess No. XX45 or Eveready No. 467 or RCA-VS-016 or equivalent.

MODEL 180 SPIEGEL



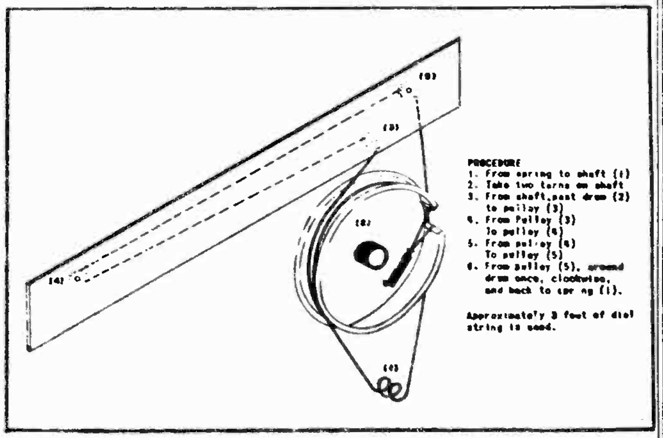


TO REPLACE TUBES, UNSCREW WING NUTS, AND REMOVE TUBE SPRING PLATE



ELECTRICAL SPECIFICATIONS

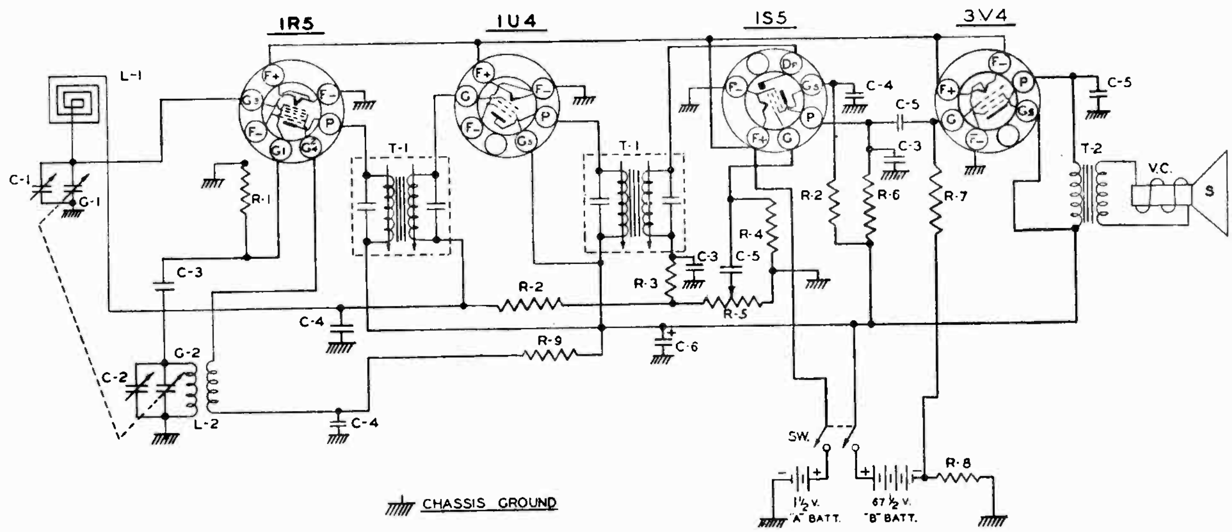
Power Supply	105-125 volts DC or 50-60 cycles AC 15 watts
Batteries	A—7½ volts. 50 ma. B—67½ volts. 8 ma. average.
Frequency Range	530 to 1700 kc.
Intermediate Freq.	455 kc.
Tuning	Two-gang capacitor
Antenna	Built-in loop
Speaker	4 inch PM; voice coil Impedance 3.5 ohms.
Power Output	80 milliwatts undistorted 140 milliwatts maximum
Sensitivity	500 microvolts per meter for 50 milliwatt output
Selectivity	55 kc broad at 1000 times signal at 1000 kc.



Replacement of Drive Cord

SPIEGEL

MODEL 5029



PART NO.		DESCRIPTION	PART NO.		DESCRIPTION
1R-20	R-1	220M Ω RESISTOR 1/2W. 20 %	GC-4	G-1 G-2	GANG CONDENSER
1R-23	R-2	3.3MEG. RESISTOR 1/2W. 20 %	LL-13	L-1	LOOP ANTENNA
1R-31	R-3	82M Ω RESISTOR 1/2 W. 10 %	LO-12	L-2	OSC. COIL
1R-3	R-4	10MEG. RESISTOR 1/2 W 20 %	L1-5	T-1	I.F TRANSFORMER
VC-8	R-5	1MEG. VOLUME CONTROL		SW	D.P.S.T SWITCH ON VOLUME CONTROL
1R-12	R-6	1MEG. RESISTOR 1/2W. 20 %	SPK-8	T-2	SPEAKER TRANSFORMER
1R-13	R-7	2.2MEG. RESISTOR 1/2W. 20 %		V.C	VOICE COIL
1R-39	R-8	620 Ω RESISTOR 1/2W. 5 %		S	P.M. SPEAKER
1R-37	R-9	10M Ω RESISTOR 1/2W. 20 %	TU-30		1R5 - 1U4 - 1S5 - 3V4
TC-7	C-1	ANT. TRIMMER			
	C-2	OSC. TRIMMER ON GANG			
MC-2	C-3	100MMFD. MICA. CONDENSER			
PC-7	C-4	.01 MFD. 400 V. CONDENSER			
PC-6	C-5	.005MFD. 600 V. CONDENSER			
EC-7	C-6	20MFD 80WV ELECTROLYTIC			

DRAWN BY: R.G.S.
APPROVED:
DATE: 3-28-47

ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment. A signal generator is required having the following frequencies: 455 KC and 1400 KC. An output meter should be connected across the speaker.

FIRST STEP· Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD. condenser. The ground lead from the generator may be connected to any spot on the metal chassis. Turn the gang condenser to complete minimum capacity. Set the generator to 455 KC. Adjust the movable iron cores in the IF cans. These IF adjustments are made in the top and in the bottom of the can under the chassis. Adjust the cores until a maximum reading is noted on the output meter.

The volume control of the receiver should be turned to maximum during the IF and all subsequent alignment and the generator output as low as possible to prevent the AVC from working and giving false readings.

SECOND STEP: With the leads from the generator still connected as in IF alignment, adjust the generator to 1400 KC. Set the dial pointer to 1400 KC on the dial scale. Adjust the oscillator trimmer until the signal is tuned in.

THIRD STEP: Remove the generator leads from the gang condenser.

Replace the chassis in the cabinet. Loosely couple the generator to the receiver loop by making a complete turn over the outside of the cabinet. With the receiver and the generator still set at 1400 KC increase the generator output. Adjust the Antenna trimmer through the back of the chassis until a maximum signal is noted on the output meter.

No further adjustment should be necessary as the coils and gang condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

NOTE: When the antenna trimmer is adjusted at 1400 KC., the chassis as well as the "A" and "B" batteries must be in normal position in the cabinet to reflect the proper loop impedance.

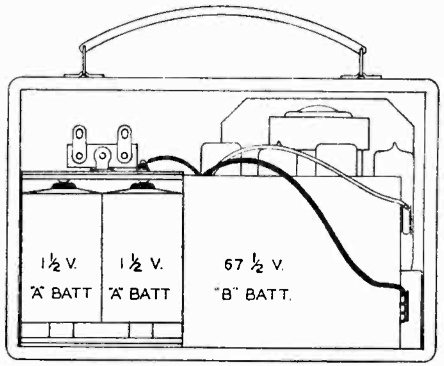
SPIEGEL

For proper operation this receiver requires two "A" batteries and one "B" battery.

The "A" batteries are size "D" flashlight cells and are made by all battery manufacturers.

The "B" battery is a 67½ volt battery and is made by the following manufacturers:

Eveready	67½ vlt.	#467
Burgess	67½ vlt.	#XX45
General	67½ vlt.	#W45A
Ray-O-Vac	67½ vlt.	#4367



BATTERY LOCATION
FIGURE - 1

BATTERY SERVICING

(See Fig. No. 1)

To replace the batteries in this receiver:

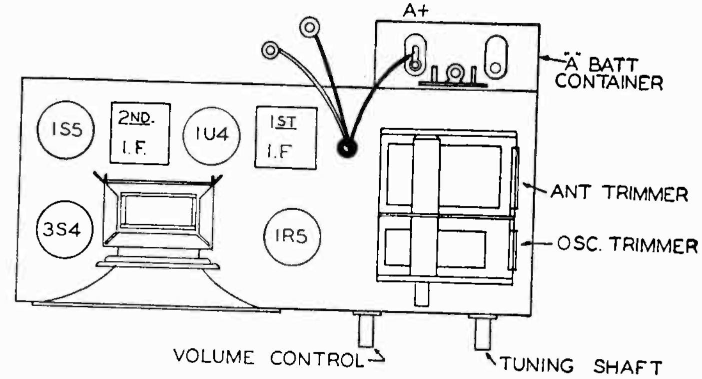
Remove the back.

To the left, looking into the rear of the cabinet is the "A" or flashlight battery container. To the right is the "B" or 67½ volt battery.

To replace the "A" batteries, pull the old batteries out of the container. Replace with fresh batteries, making sure the batteries are inserted according to the diagram on the inside of the container.

To replace the "B" battery, disconnect the snap fastener connectors. Replace with a fresh battery and snap the connectors into place. Replace the battery in the cabinet as shown in Fig. No. 1, making sure that the connector end faces the right side of the cabinet.

After the batteries have been installed, replace the back, making sure that the two washers in the bottom of the back fit into the slot near the bottom edge of the cabinet.



MODEL 5029
TUBE AND TRIMMER LOCATION

TL-61

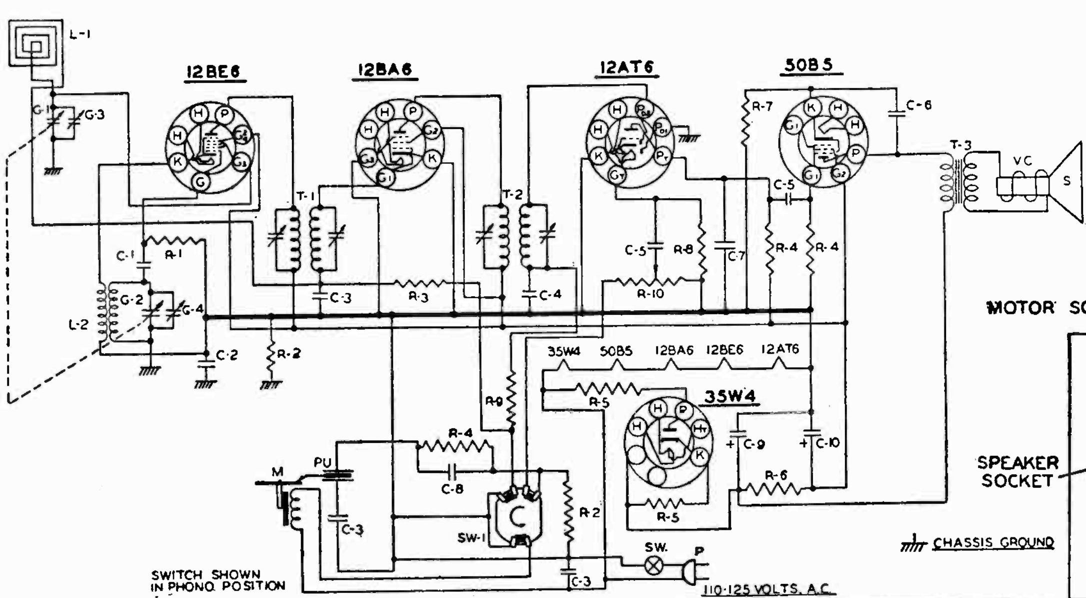
STATION SELECTOR: The right hand knob is the station selector or tuning control. Rotate this knob to the right or left to select your desired station. By mentally adding a zero to the figures on the dial the result will be read directly in kilocycles i.e., 140 plus 0 equals 1400 KC or 60 plus 0 equals 600 KC.

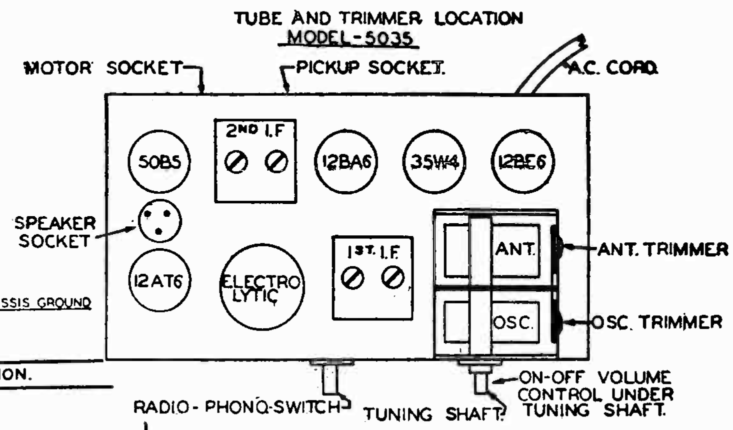
Rotate the tuning knob until the proper station has been selected, then adjust the volume control to the desired level.

ANTENNA: This receiver is equipped with a sensitive loop antenna and requires no external antenna wire. However, due to the directional qualities of the loop some stations may appear to be weak in reception. This condition may be remedied by rotating or changing the position of the receiver.

CAUTION: If the batteries in the receiver wear out from use and the receiver refuses to operate make sure that the volume control is turned all the way to the left in "OFF" position, until the batteries can be replaced. If the switch is left in the "ON" position this will cause the battery cells to burst and they will leak into the receiver which may ruin the component parts.

SPIEGEL.





PART NO.		DESCRIPTION	PART NO.		DESCRIPTION	PART NO.		DESCRIPTION.
IR-9	R-1	22M-Ω-RESISTOR 1/2W. 20%	PC-5	C-3	.05MFD. CONDENSER 400 V		G-3	ANT TRIMMER
IR-20	R-2	220M-Ω-RESISTOR 1/2W. 20%	MC-2	C-4	100MMFD. MICA		G-4	OSC. TRIMMER
IR-23	R-3	3.3MEG-Ω-RESISTOR 1/2 W. 20%	PC-6	C-5	.005MFD. CONDENSER 600 V.	PU-5	PU	L75AS CRYSTAL CARTRIDGE
IR-11	R-4	470M-Ω- RESISTOR 1/2 W. 20%	PC-7	C-6	.01 MFD. CONDENSER 400 V		SW	S.P.S.T. SWITCH ON VOLUME CONTROL
IR-17	R-5	33-Ω- RESISTOR 1/2 W. 20%	MC-3	C-7	.00022 MFD. MICA		T-3	OUTPUT TRANSFORMER
IR-25	R-6	2200-Ω- RESISTOR .1W. 10%	MC-5	C-8	500 MMFD. MICA	SPK-11	VC	VOICE COIL
IR-14	R-7	150-Ω-RESISTOR 1/2W. 20%	EC-12	C-9	40MFD. 150 V ELECTROLYTIC		S	P.M. SPEAKER
IR-13	R-8	2.2 MEG-Ω-RESISTOR 1/2W. 20%		C-10	20MFD	CO-2	P	LINE CORD.
IR-19	R-9	100M-Ω-RESISTOR 1/2W 20%	LL-11	L-1	LOOP ANT.	M-1	M	110-125 V. 60~ A.C. PHONO MOTOR
VC-9	R-10	1 MEG. VOLUME CONTROL	LO-13	L-2	OSC. COIL	SW-7	SW-1	PHONO RADIO SWITCH
MC-4	C-1	.000050 MFD. MICA	GC-7 X	G-1 G-2	GANG CONDENSER	TU-18		12BE6 12BA6 12AT6 50B5 35W4
PC-8	C-2	.1 MFD. CONDENSER 400 V.						

ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment.

A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1650 KC. An output meter should be connected across the speaker.

The volume control of the receiver should be turned to maximum during the I. F. and all subsequent alignment and the generator output as low as possible to prevent the A. V. C. from working and giving false readings.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser through the .1 MFD. condenser. The ground lead from the generator must be connected to "B" minus under the chassis. Turn the gang condenser to complete minimum capacity. Set the generator to 455 KC. Adjust the trimmers of the first and second I. F. transformers until a maximum reading is noted on the output meter.

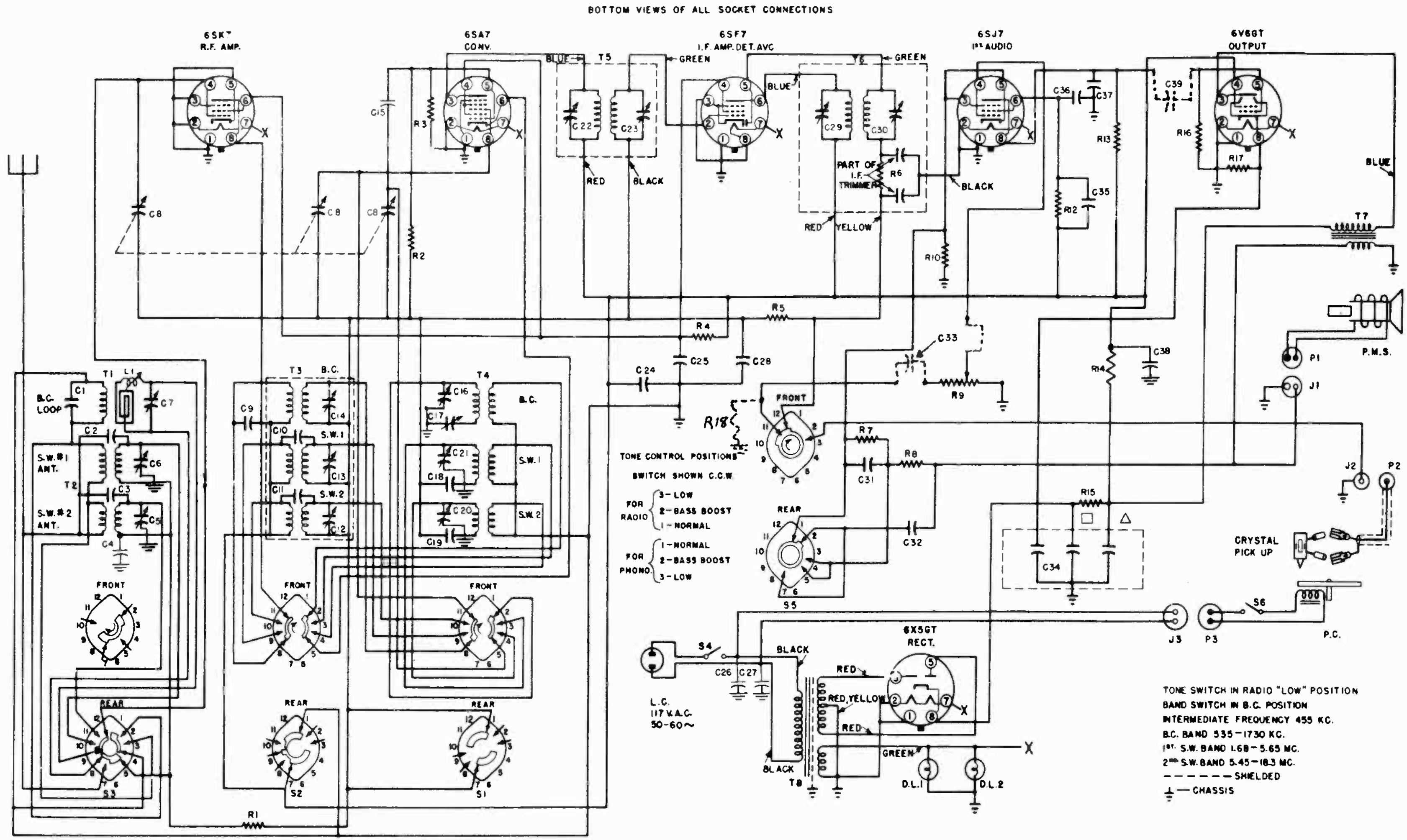
SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1650 KC. Adjust the OSC. trimmer until the 1650 KC signal is tuned in. The gang condenser must be at complete minimum capacity for this adjustment.

THIRD STEP: Remove the generator leads from the gang condenser. Loosely couple the generator to the receiver loop by using a complete turn of wire. With the receiver and generator set at 1400 KC, increase the generator output. Adjust the ANT. trimmer until a maximum signal is noted on the output meter. No further adjustment should be made as the coils and gang condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

MODEL 6612

SPIEGEL

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS



TONE SWITCH IN RADIO "LOW" POSITION
BAND SWITCH IN B.C. POSITION
INTERMEDIATE FREQUENCY 455 KC.
B.C. BAND 535–1730 KC.
1ST S.W. BAND 1.68–5.65 MC.
2ND S.W. BAND 5.45–18.3 MC.
– – – – – – SHIELDED
⏚ — CHASSIS

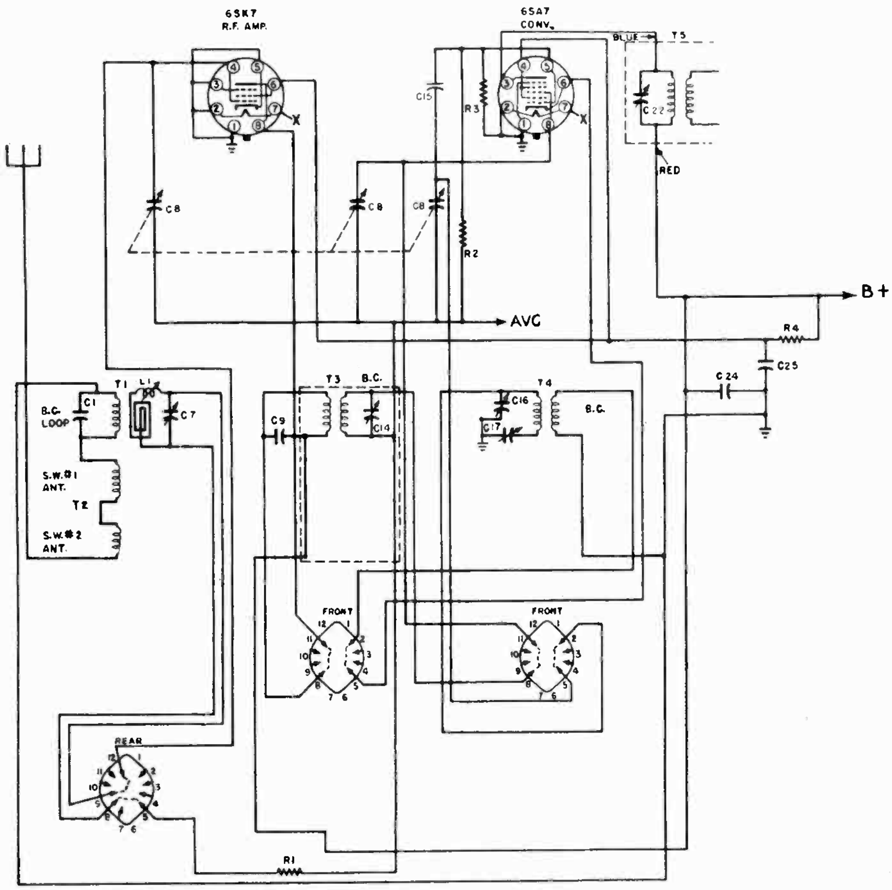
DWG. SYM.	PART NO.	DESCRIPTION
T1	B82651	B.C. LOOP ASSEMBLY
T2	B65025	S.W. BAND 1 & 2 ANT. COIL ASSEMBLY
T3	B65026	B.C.–S.W. 1 & S.W. 2 R.F. " "
T4	B65022	" " " " " OSC. " "
T5	B53350	NO. 1 I.F. TRANSFORMER "
T6	B53341	" 2 " " "
T7	△ B53941	OUTPUT "
T8	B53942	POWER " "
C1	B56053	22 MMFD. MICA CAPACITOR
C2	A52655	3 MMFD FIXED "
C3	A52655	3 MMFD " "
C4	C56596	.02 MFD 200V PAPER CAPACITOR
C5	A52664	S.W. 2 ANT. TRIMMER ASSEMBLY
C6	A52664	" 1 " " "
C7	A52686	BC ANT. TRIMMER ASSEMBLY
C8	B52642	3 GANG VARIABLE CAPACITOR & PULLEY
C9	B56057	100 MMF MICA CAPACITOR
C10	A52674	3 MMFD. FIXED "
C11	A52674	3 " " "

DWG. SYM.	PART NO.	DESCRIPTION
C12	A52644	S.W. 2 R.F. TRIMMER ASSEMBLY
C13	A52644	" 1 " " "
C14	A52644	BC R.F. TRIMMER ASSEMBLY
C15	B56057	100 MMF MICA CAPACITOR
C16	A52665	B.C. OSC. TRIMMER ASSEMBLY
C17	A52665	" " PADDER "
C18	A50235	1250 MMFD MICA CAPACITOR TOL. ±5%
C19	A51931	3900 " " " " "
C20	A52664	S.W. 2 OSC. TRIMMER ASSEMBLY
C21	A52664	" 1 " " "
C22, C23		NO. 1 I.F. TRIMMER (PART OF ASS'Y)
C24	C56631	.01 MFD 400V PAPER CAPACITOR
C25	A54146	10 " 350V ELECTROLYTIC
C26	C56628	.05 MFD 400V PAPER CAPACITOR
C27	C56628	.05 " " " "
C28	C56596	.02 " 200V " "
C29, C30		NO. 2 I.F. TRIMMER (PART OF ASS'Y)
C31	C56600	.05 MFD. 200V PAPER CAPACITOR
C32	C56594	.01 " " " "

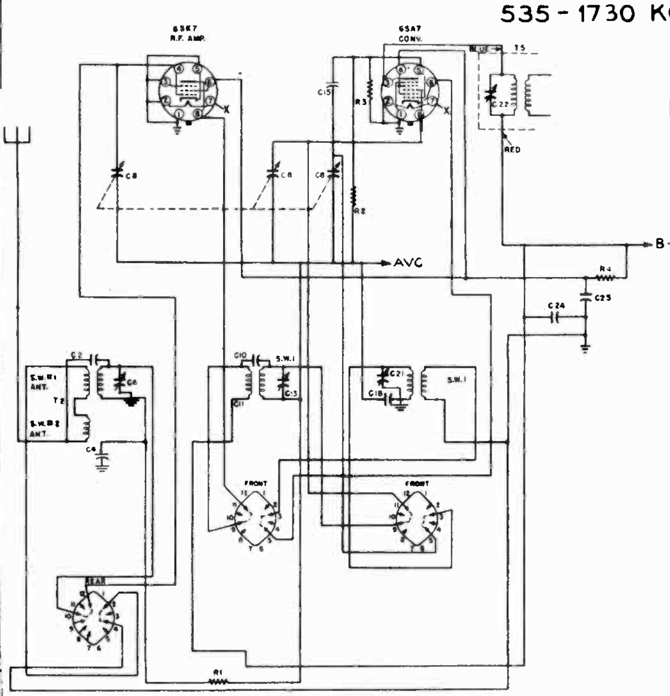
DWG. SYM.	PART NO.	DESCRIPTION
C33	C56596	.02 MFD 200V. PAPER CAPACITOR
C34	B53939	20 " 25 V. ELECTROLYTIC 10△ " 350V " 20□ " " "
C35	C56622	.01 " 400V PAPER CAPACITOR
C36	C56628	.05 " " " "
C37	C56613	.001 " " " "
C38	A54146	10 350V ELECTROLYTIC
C39	C56624	.02 MFD 400V PAPER CAPACITOR
R1	B55485	220,000 OHM 1/2W CARBON RESISTOR
R2	B55496	15 MEG " " "
R3	B55479	22,000 OHM " " "
R4	B55952	12,000 " 2W " "
R5	B55491	2.2 MEG 1/2W " "
R6	B55481	47,000 " " (PART OF I.F. ASS'Y)
R7	B55481	47,000 " " " "
R8	B55478	15,000 " " " "
R9, S4	D56340	500,000 OHM VOL. CONTROL & SWITCH
R10	B55472	1500 OHM 1/2W CARBON RESISTOR

DWG. SYM.	PART NO.	DESCRIPTION
R11	B55491	2.2 MEG 1/2W CARBON RESISTOR
R12	B55491	" " " " "
R13	B55487	470,000 OHM " "
R14	B55940	1200 OHM 2W. " "
R15	B55999	200 " 2W " "
R16	B55487	470,000 " 1/2W " "
R17	B55733	220 " 1W " "
D.L. 1, 2	A70535	DIAL LIGHT TYPE 47
L1	B61752	LOADING COIL
L.C.	B54175	LINE CORD
P.M.S.	B53933	10" PERMANENT MAGNET SPEAKER
S1, S2, S3	B52646	BAND SWITCH ASS'Y
S5	A53940	RADIO-PHONO TONE CONTROL
S6	30834-03	PHONO SWITCH (PART OF CHANGER
P.C.	PC-206	RECORD CHANGER ASS'Y
P1		SPEAKER CONNECTOR (MALE)
J1		" " (FEMALE)
P2		PHONO PICK UP CONNECTOR (MALE)
J2		" " " " (FEMALE)
P3		" POWER " (MALE)
J3		" " " (FEMALE)

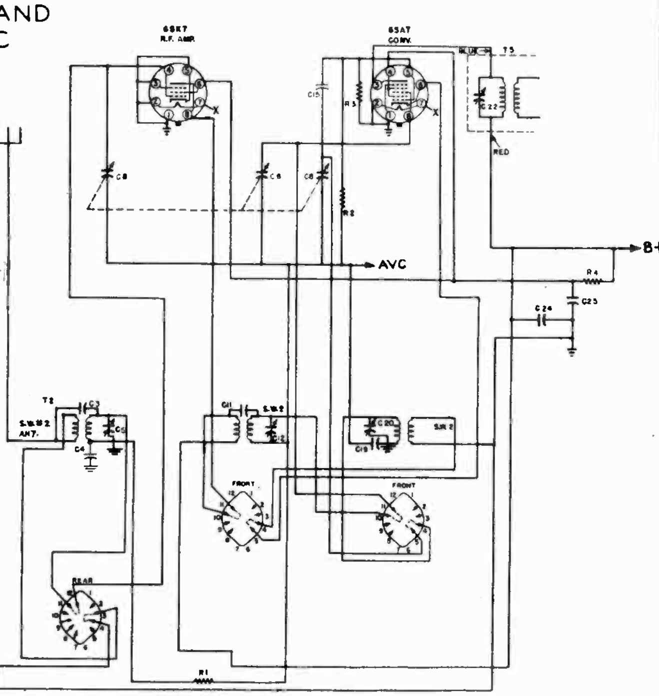
SPIEGEL MODEL 6612



BAND-SWITCH SHOWN
AT 1ST POSITION.
BROADCAST BAND
535 - 1730 KC



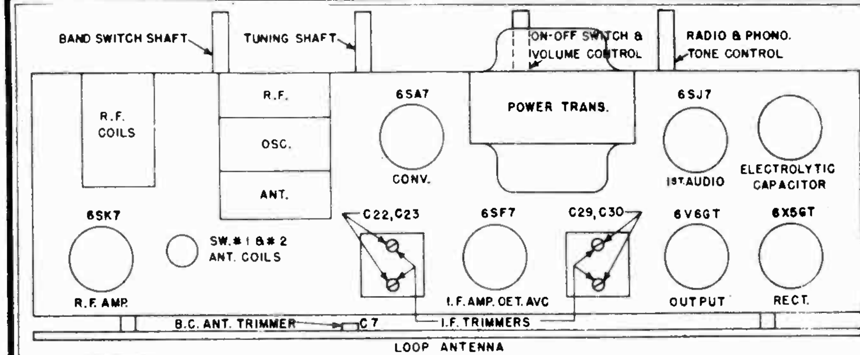
BAND-SWITCH SHOWN
AT 2ND POSITION.
SHORT WAVE 1 BAND
1.68 - 5.65 MC

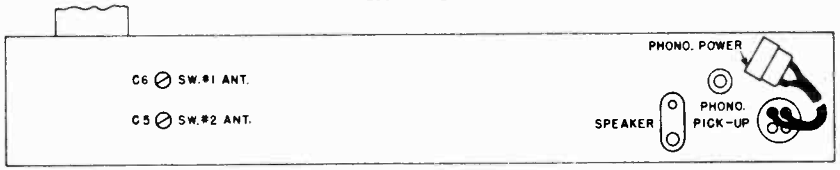


BAND-SWITCH SHOWN
AT 3RD POSITION.
SHORT WAVE 2 BAND
5.45 - 18.3 MC

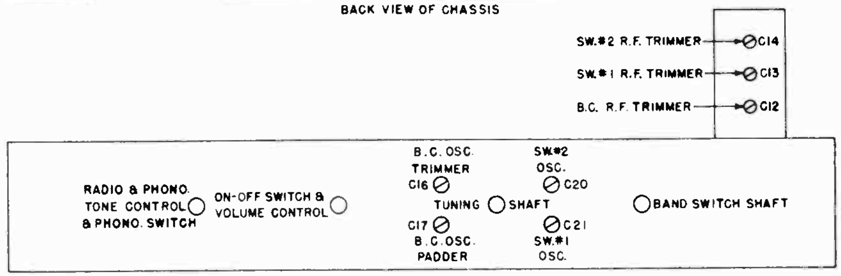
MODEL 6612

SPIEGEL



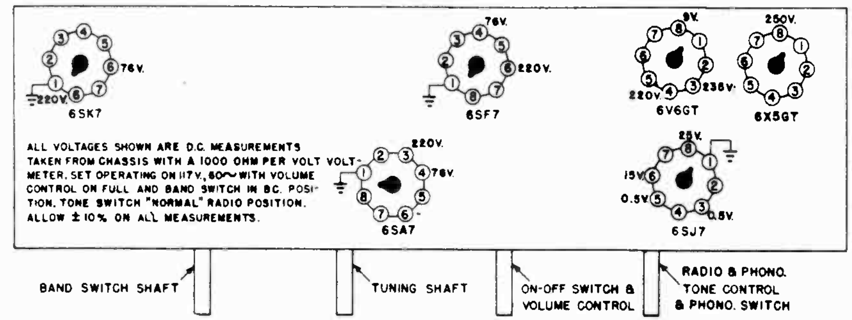


BACK VIEW OF CHASSIS



FRONT VIEW OF CHASSIS

CHASSIS VOLTAGE CHART



BOTTOM VIEW OF CHASSIS

ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	DIAL AND CONDENSER SETTING	TRIMMER	REMARKS
1	Set dial pointer to last mark at Low frequency end of dial with gang condenser closed.							
2	2nd. I.F.	6SA7 Grid	.05 Mf.	455 KC	BC	Open	C29 & C30	Max. Output
3	1st. I.F.	and Gnd.					C22 & C23	Max. Output
4		Antenna		1500 KC		1500 KC	C16, C12, C7	Max. Output
5	BC	Lead &	200 mmf.	600 KC	BC	600 KC	C17	(osc. padder)
6		Gnd.		Repeat operations 4 and 5 until alignment frequencies fall on correct calibration points				
7				600	BC	600	L1	Max. Output
8				Recheck C7 at 1500 KC and L1 at 600 KC				Max. Output
9		Antenna	400 ohms	5 MC	1	5 MC	C21, C13, C6	Max. Output
10	SW1	Lead &Gnd.	(res)	1800 KC		1800 KC	* *	* *
11	SW 2	Antenna	400 ohms	16 MC	2	16 MC	C20* C14, C5	Max. Output
12		Lead &Gnd.	(res)	6 MC		6 MC	**	**

NOTES: * Rock dial while trimming C20 at 16 MC. ** Check sensitivity and dial calibration
C7 and L1 are located on Loop Antenna.

VOLTAGE CHART

Line Voltage: 117 volts, 60 cycles AC
Position of Band Switch: Broadcast Band
Position of Volume Control: Full (with no signal)
Position of Tone Switch: Radio - "Normal"

TUBE	FUNCTION	Voltage of each socket prong to Ground (Chassis) No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
6SK7	R-F Amplifier	0	0	0	0	0	76.B	6.1*	220.A
6SA7	Oscillator-Converter	0	0	220.A	76.B	0	0	6.1*	0
6SF7	I-F Amp. -Detector-AVC	0	0	0	76.B	0	220.A	6.1*	0
6SJ7	1st Audio Amplifier	0	0	.5D	0	.5D	15.A	6.1*	25.A
6V6GT	Beam Power Amplifier	0	0	235.A	220.A	0	—	6.1*	9.C
6X5GT	Rectifier	0	0	250. *	—	250.*	—	6.1*	250.A

* AC Volts A-250 Volt Scale B-100 Volt Scale C-25 Volt Scale D-5 Volt Scale

Voltage readings are for schematic diagram in this bulletin. Allow 10% ± on all measurements

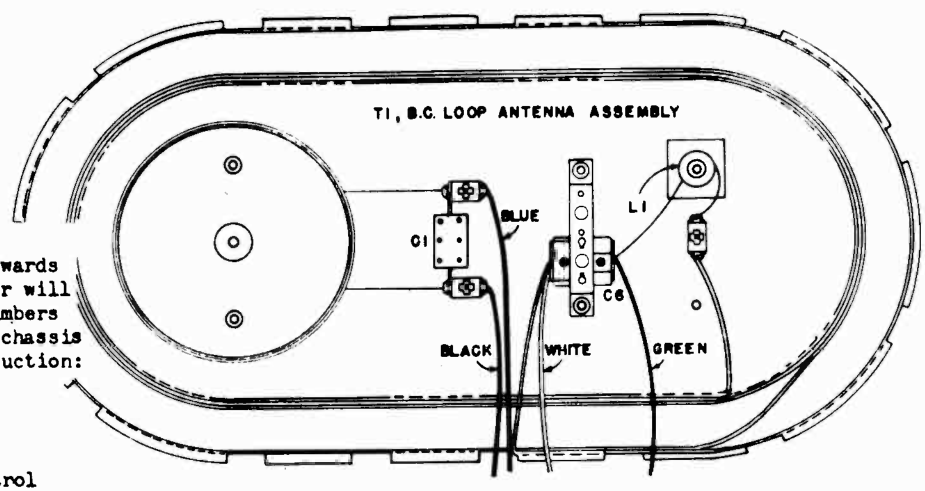
All DC voltages made with 1000 ohms per volt voltmeter

Voltages are DC unless otherwise specified.

SPIEGEL

MODEL 6612

LOOP WIRING DIAGRAM



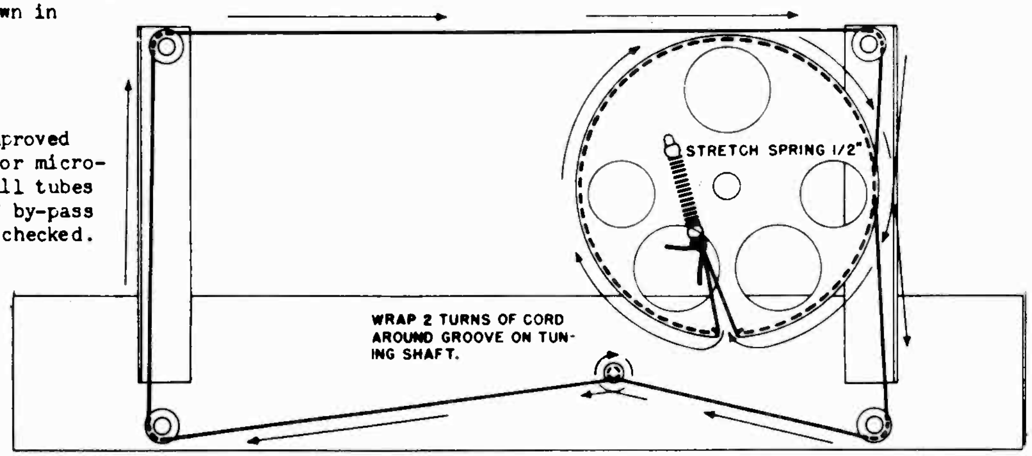
These changes are incorporated in chassis bearing serial numbers upwards of No. 24000. A limited number of chassis beyond this serial number will not have these changes, and similarly, a few chassis with serial numbers somewhat under 24000 will have had the changes. Inspection of the chassis will readily determine whether these changes have been made in production: *These changes are shown in dotted lines on the schematic*

1. The volume control circuit has been altered to:

   a) Delete resistor R-11.
   b) Remove capacitor C-33 (.02 mfd. 200 volts) from volume control grid lead and substitute with .02 mfd. 400 volt or 600 volt capacitor to be connected in switch lead of volume control. Connect ground (outside foil) to switch as shown.
   c) Add resistor R-18 (470,000 ohms, 1/2 watt) as in diagram.

2. Substitute capacitor C-39 which couples the plate of 1st audio 6SJ7 tube to the grid of output 6V6GT tube with capacitor having 600 volt rating (no change in the capacity of .02 mfd.) and change polarity so that outside foil connects to plate, as shown in diagram.

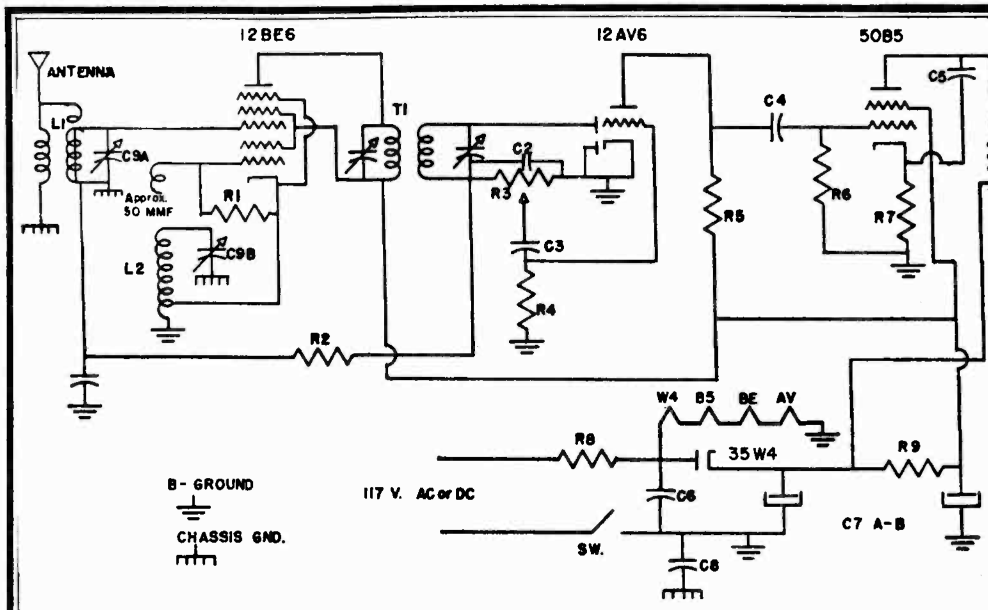
DIAL DRIVE DIAGRAM



FRONT VIEW

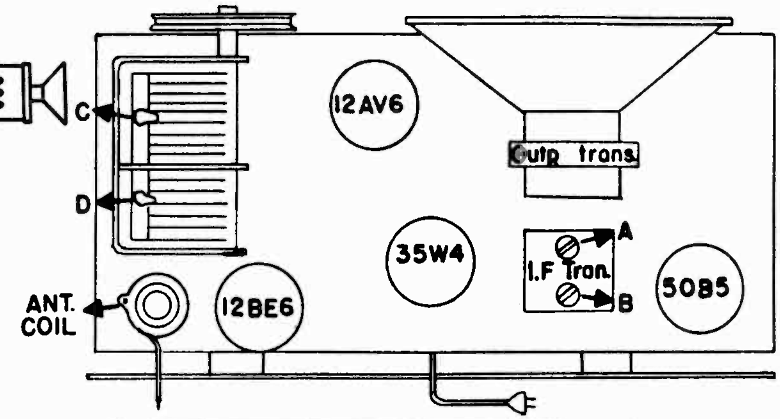
NOTE:

These changes have been found to result in generally improved performance characteristics. In case of excessive hum or microphonism, it is recommended that: 1) the condition of all tubes be checked by substitution, 2) the correct polarity of by-pass capacitors be ascertained, 3) the filter capacitor be checked.



CHASSIS MODEL 10001

TUBE LOCATION CHART



CIR. SYM.	PART NO.	DESCRIPTION
R1	RC-21002	RESISTOR CARBON 10,000 Ohm 1/3 W
R2	RC-22204	" " 2.2 MEG Ohm 1/3 W
R3	VC-12106-C	VOLUME CONTROL 1 MEG WITH SWITCH
R4	RC-21005	RESISTOR CARBON 10 MEG Ohm 1/3 W
R5, 6	RC-24703	" " 470,000 Ohm 1/3 W
R7	RC-21500	" " 150 Ohm 1/3 W
R8	RC-40220	" " 22 Ohm 1 W
R9	RC-21001	" " 1000 Ohm 1/3 W
T1	TS-10017A	TRANSFORMER I.F.
T2	TO-10000	TRANSFORMER OUTPUT
C1	CP-12203	CONDENSER PAPER .02 MFD 200 V.
C2	CM-25251	" MICA 250 MMF
C3,4	CP-12502	" PAPER .005 MFD 200 V.
C5	CP-14103	" PAPER .01 MFD 400 V.
C6,8	CP-12503	" PAPER .05 MFD 200 V.
C7	CL-10017	" ELECT. 30/20 MFD 150 V.
C9 A-B	CV-10010	" VARIABLE
L1	TRF-10012	ANTENNA COIL
L2	TRC-10011-A	OSCILLATOR COIL

OPERATION

Insert the power cord plug into the power receptacle. To turn the receiver on, turn the lower knob to the right until a click is heard. In about 30 seconds the set will be in operating condition.

The tuning range of this receiver is 540 to 1600 kilocycles, the standard broadcast band. The dial has the last 0 omitted so that 54 is 540 Kc. and 160 is 1600 Kc.

Rotate the tuning knob (upper knob) until the desired station has the deepest tone, and the background noise is at a minimum. Adjust the volume control (lower knob) for the desired volume. Do not reduce the volume by tuning the receiver off the station.

To turn the receiver off, turn the lower knob to the left until a click is heard and the receiver is switched off.

ANTENNA

A 20 foot antenna hank is attached to the receiver. In metropolitan areas it may be necessary to uncoil only a portion of the antenna to obtain satisfactory reception. For maximum pickup uncoil the antenna hank the full length. Do not attach it to a water pipe, radiator, or other grounded object. If you are located some distance from a broadcasting station, or if local noise from electrical equipment is high, reception will be greatly improved by the addition of an outside antenna which may be connected to the end of the hank.

This receiver is designed to operate without a ground connection and no attempt should be made to use one.

ALIGNMENT PROCEDURE

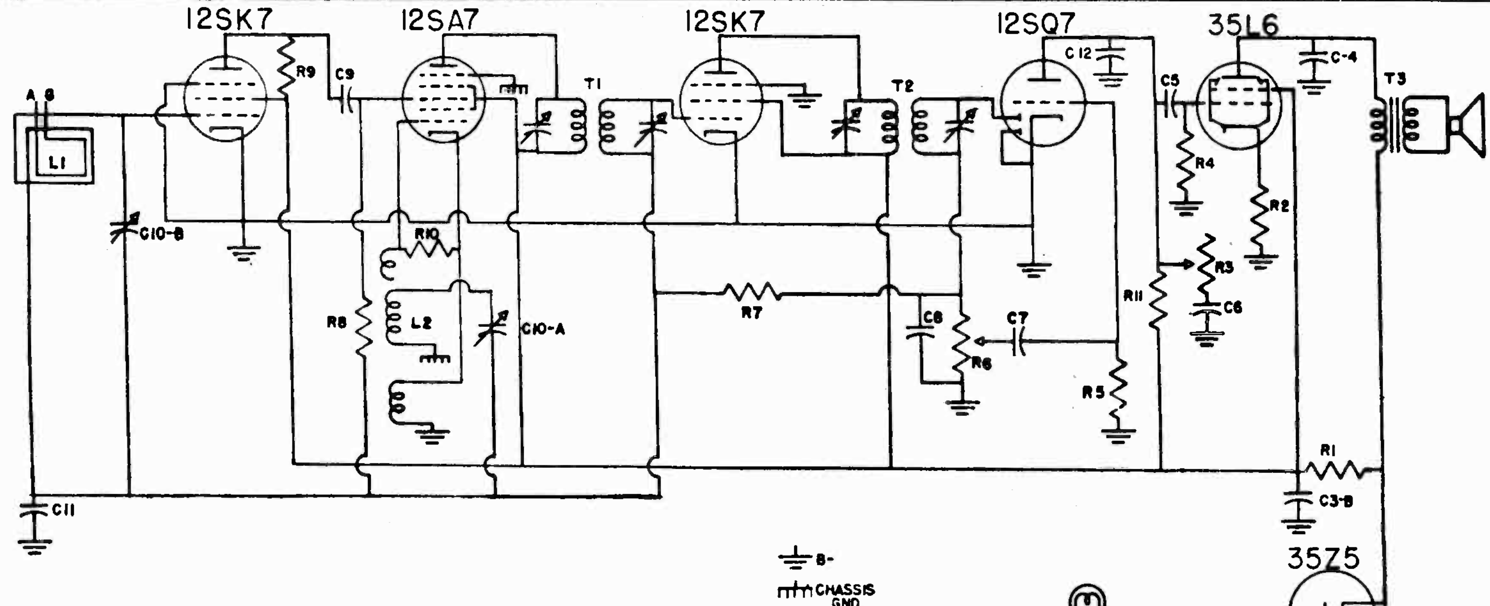
I. F. Alignment

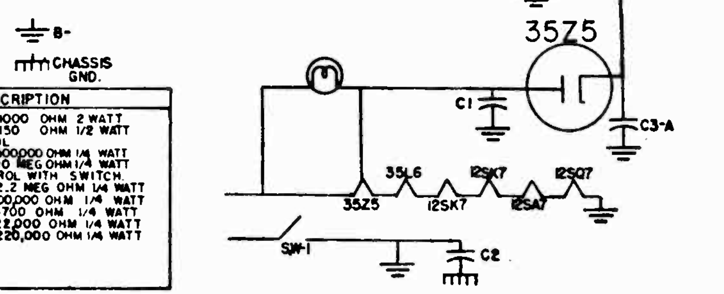
1. Set variable condenser to high frequency end of dial.
2. Connect suitable output meter to voice coil of speaker.
3. Connect signal generator to grid of BE6 through .05 condenser. Connect ground side of generator to B-.
4. Adjust trimmers A and B for maximum output at 455 Kc.
5. Repeat trimmer adjustment for peak sensitivity.

R. F. Alignment

1. Set variable condenser to extreme high frequency end of dial.
2. Connect signal generator to antenna input terminal on antenna coil through 50 mmf. condenser.
3. Set generator to 1720 Kc.
4. Set trimmer C to 1720 Kc.
5. Set generator to 1400 Kc. and tune receiver dial to maximum response.
6. Adjust trimmer D for maximum output at 1400 Kc.
7. Check tracking and make necessary compensations.

SPIEGEL





Cir. Symbol	Part No.	DESCRIPTION
C1	CP-14503	CONDENSER PAPER .05 mfd 400 V.
C2	CP-14154	" " .15 mfd 400 V.
C3	CL-10021	" ELECTR. A-30 mfd B-30 mfd 150 V.
C4	CP-14203	" PAPER .02 mfd 400 V.
C5	CP-12502	" " .005 mfd 200 V.
C6	CP-12302	" " .003 mfd 200 V.
C7	CP-12202	" " .002 mfd 200 V.
C8, C12	CM-15221	" MICA 220 mmf 500 V.
C9	CM-15101	" " 100 mmf 500 V.
C10 A-B	CV-10009	" VARIABLE
C11	CP-12104	" PAPER .1 mfd 200 V.
L1	AL-10021	ANTENNA LOOP
L2	TRC-1003	OSCILLATOR COIL

Cir. Symbol	Part No.	DESCRIPTION
R1	RC-51001	RESISTOR CARBON 1000 OHM 2 WATT
R2	RC-31500	" " 150 OHM 1/2 WATT
R3	VC-13105	1 MEG TONE CONTROL
R4	RC-15003	RESISTOR CARBON 500000 OHM 1/4 WATT
R5	RC-11005	" " 10 MEG OHM 1/4 WATT
R6	VC-11105	1 MEG VOLUME CONTROL WITH SWITCH.
R7	RC-12204	RESISTOR CARBON 2.2 MEG OHM 1/4 WATT
R8	RC-11003	" " 100,000 OHM 1/4 WATT
R9	RC-14701	" " 4700 OHM 1/4 WATT
R10	RC-12202	" " 22,000 OHM 1/4 WATT
R11	RC-12203	" " 220,000 OHM 1/4 WATT

The tuning range of this receiver is 550 to 1600 kilocycles. The dial has the last 0 omitted so that 55 is 550 Kc. and 160 is 1600 Kc.

ALIGNMENT PROCEDURE

Connect a suitable signal generator to the R.F. section of the tuning condenser. Connect the ground side of the generator to the frame of the condenser. Use a .05 condenser to isolate the generator from the R.F. section.

Connect a suitable output meter to the voice coil leads of the speaker.

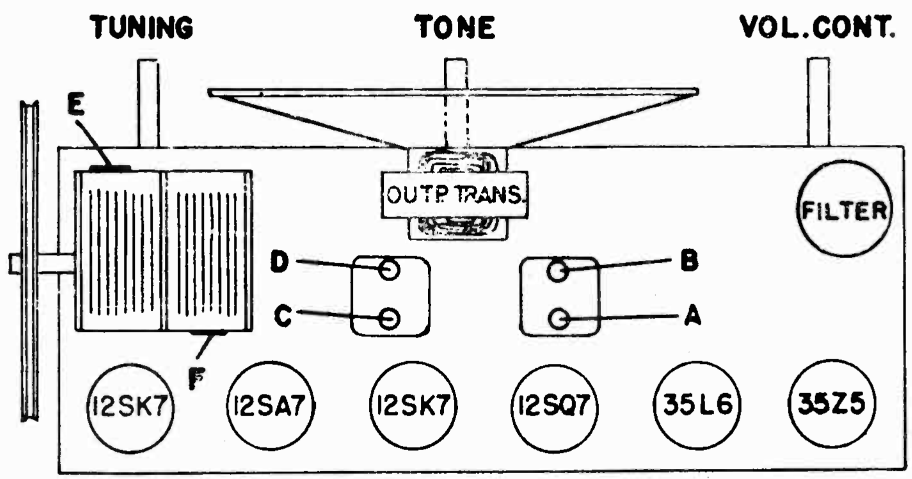
With the variable condenser open, apply a 455 Kc. signal. Use the lowest level consistent with good output indication.

Adjust trimmers A, B, C, and D for maximum response, reducing the input signal as required to keep the output meter on scale.

Connect the generator to terminals A & G through a 400 ohm dummy antenna. Apply a 1720 Kc. signal and adjust trimmer E to maximum.

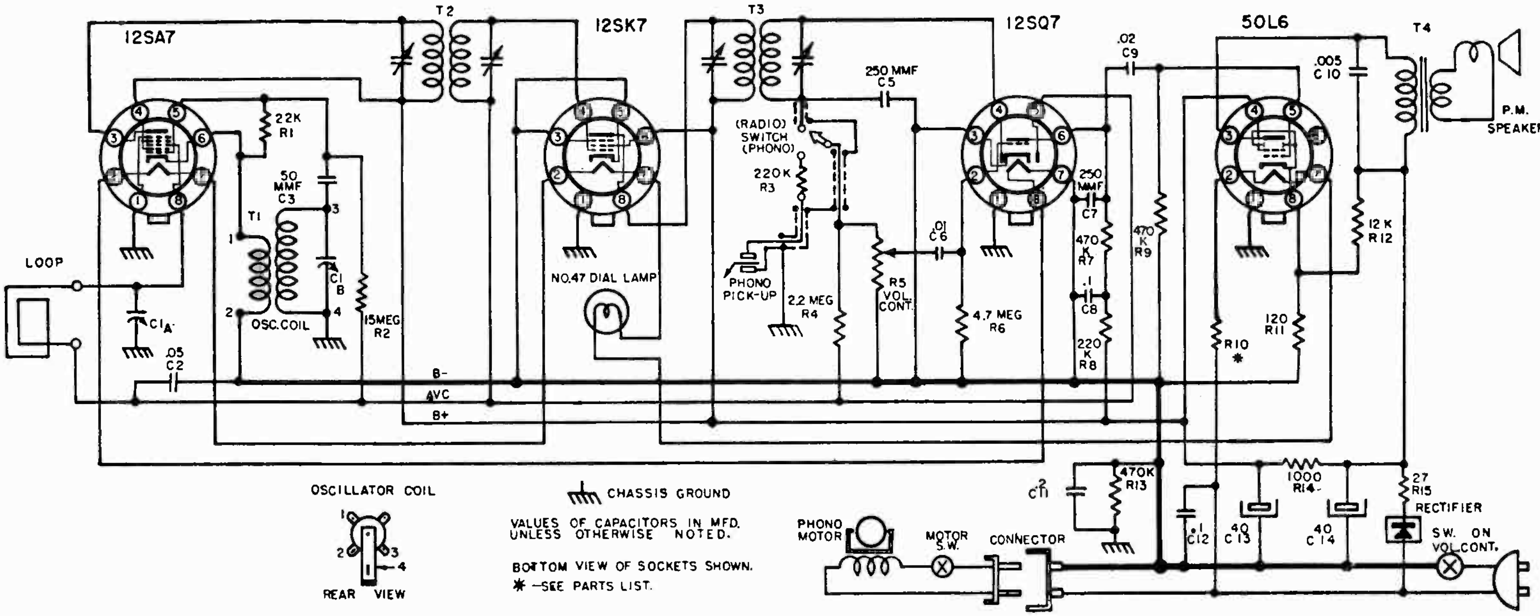
Set the signal generator to 1400 Kc. Tune the receiver dial to maximum response, then adjust trimmer F to maximum response. This completes the alignment.

TUBE LOCATION CHART



MODEL 11305

SPIEGEL



✱ COMPENSATION CIRCUIT — PAT. APPLIED FOR

PARTS LIST

Code	Part No.	DESCRIPTION	Code	Part No.	DESCRIPTION	Code	Part No.	DESCRIPTION
C1A, C1B	B19-189	Variable Condenser	R5	A24-164	500K Ohm Volume Control with Switch		A69-172	Switch, Phono-Radio
C2	A16-152	.05 MFD. 200 volt Condenser	R6	A60-669	4.7 Megohm ½ watt 20% Resistor		A39-279	Drum for Variable Condenser
C3	A15-175	50 MMFD. Mica Condenser	R7, R9, R13	A60-662	470K Ohm ½ watt 20% Resistor		B79-352	5" P. M. Speaker
C9	A16-150	.02 MFD. 400 volt Condenser	R10	A60-719	Special Compensating Resistor, order only from the manufacturer		A71-22	Cover for Volume Control
C5, C7	A15-176	250 MMFD. Mica Condenser	R11	A60-702	120 Ohm ½ watt 10% Resistor		A83-391	Selenium Rectifier
C6	A16-156	.01 MFD. 400 volt Condenser	R12	A60-720	12K Ohm 2 watt 10% Resistor		A75-52	Tuning Shaft
C8	A16-157	.1 MFD. 200 volt Condenser	R14	A60-699	1000 Ohm 2 watt 10% Resistor		A83-308	Connector
C10	A16-153	.005 MFD. 600 volt Condenser	R15	A60-721	27 Ohm 1 watt 10% Resistor		D42-407	Cabinet, Wood
C11	A16-154	.2 MFD. 400 volt Condenser	T1	B10-411	Oscillator Coil		C71-27	Cover for Dial Plate
C12	A16-160	.1 MFD. 400 volt Condenser	T2	A10-468	1st I. F. Transformer		B67-499	Dial Scale
C13, C14	A18-280	40 MFD. 150 volt Electrolytic Condenser	T3	B10-454	2nd I. F. Transformer		A58-53	Dial Pointer
R1	A60-659	22K Ohm ½ watt 20% Resistor	T4	B80-230	Output Transformer		B83-408	Dial Scale Retainer
R2	A60-664	15 Megohm ½ watt 20% Resistor		A52-199	Knob, Volume		C83-410	Cabinet Back
R3, R8	A60-667	220K Ohm ½ watt 20% Resistor		A52-200	Knob, Tuning		C82-43	Loop Antenna
R4	A60-964	2.2 Megohm ½ watt 20% Resistor		A52-201	Knob, Phono-Radio		A83-273	Dial Diffusing Plate

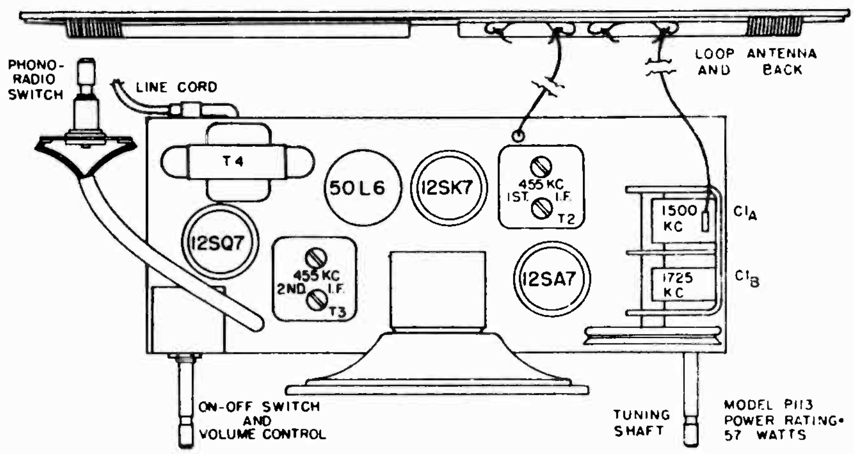
117 volt 60 cycle A.C. power supply.

The tubes used are:—

12SA7—Mixer, Oscillator
12SK7—I. F. Amplifier
12SQ7—Det., AVC, Audio
50L6—Power Output

No rectifier tube is required as a Selenium rectifier is used in its place.

This receiver covers the frequency range from 535 kilocycles to 1725 kilocycles (K.C.).



ALIGNMENT PROCEDURE

The following alignment procedure is for use only by competent servicemen having the proper equipment.

The alignment should be made with volume control fully on, and the output from the signal generator as low as possible, to prevent A.V.C. action from interfering with correct alignment.

With the output meter connected across the voice coil of the speaker, the output meter reading for 50 milliwatts is .4 volts using a signal which is modulated 400 c.p.s.

Adjust all trimmers for maximum output. Repeat alignment procedure given below as a final check.

CAUTION: This is an A.C.-D.C. receiver and when aligning the set it is necessary to isolate the Signal Generator or the Receiver from the line by use of a transformer, or place a .2 MFD. condenser in both test leads of the Signal Generator.

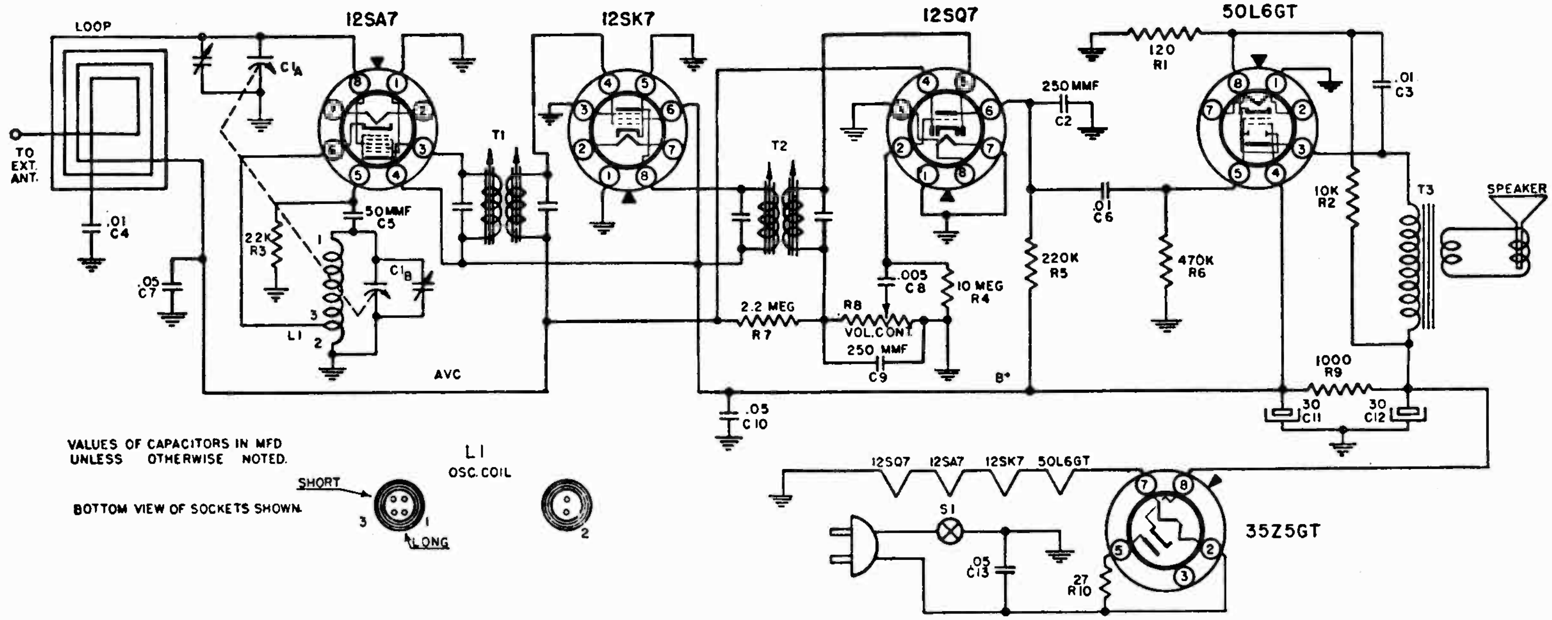
Position of Variable	**Generator Frequency**	**Dummy Ant. Mfd.**	**Generator Connections**	**Trimmer Adjustment**	**Trimmer Function**
Fully open	455 KC	.1	* 12SA7 Grid (Stator of C1A)	T2	Input I.F.
Fully open	455 KC	.1	* 12SA7 Grid (Stator of C1A)	T3	Output I.F.
Fully open	1725 KC	.00025	* 12SA7 Grid (Stator of C1A)	C1B	Oscillator
Tune in signal from generator	1500 KC	.00025	**Loosely Coupled to Loop	C1A	Antenna

*Connect ground lead of signal generator to Common "B."

**Do not connect ground lead of signal generator.

MODEL 11802

SPIEGEL



PARTS LIST

CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION
C1A, C1B	19-173	Variable Condenser	R9	A60-732	1000 Ohm 1 watt Resistor
C2, C9	A15-176	250 MMFD. Mica Condenser	R10	A60-690	27 Ohm ½ watt Resistor
C3, C4, C6	A16-156	.01 MFD. 400 volt Condenser	T1	A10-475	1st I. F. Transformer
C5	A15-175	50 MMFD. Mica Condenser	T2	A10-479	2nd I. F. Transformer
C7, C10	A16-152	.05 MFD. 200 volt Condenser	T3	A80-233	Output Transformer
C8	A16-153	.005 MFD. 600 volt Condenser	L1	B10-480	Oscillator Coil
C11, C12	B18-283	30 x 30 MFD. 150 volt Dual Electrolytic Condenser		79-318	4" P.M. Speaker
C13	A16-158	.05 MFD. 400 volt Condenser		67-462	Dial Scale
R1	A60-702	120 Ohm ½ watt Resistor		48-34	Dial Crystal
R2	A60-698	10K Ohm 1 watt Resistor		58-37	Dial Pointer
R3	A60-659	22K Ohm ½ watt Resistor		B82-48	Loop Antenna
R4	A60-663	10 Megohm ½ watt Resistor		A42-432	Cabinet, Ivory
R5	A60-667	220K Ohm ½ watt Resistor		C42-430	Cabinet, Walnut
R6	A60-662	470K Ohm ½ watt Resistor		A52-222	Knob, Ivory
R7	A60-684	2.2 Megohm ½ watt Resistor		A52-244	Knob, Maroon
R8	24-157	Volume Control, 1 Megohm		C83-500	Cabinet Back
				A36-123	Grille, Ivory
				C36-122	Grille, Maroon

117 volts 60 cycle AC or 117 volts DC power supply.

The tubes used are:—

1—12SA7	Oscillator Converter	1—12SQ7	AVC Detector and 1st Audio
1—12SK7	I.F. Amplifier	1—50L6GT	Power Output
1—35Z5GT	Power Rectifier		

This receiver covers the frequency range from 540 kilocycles to 1630 kilocycles (KC).

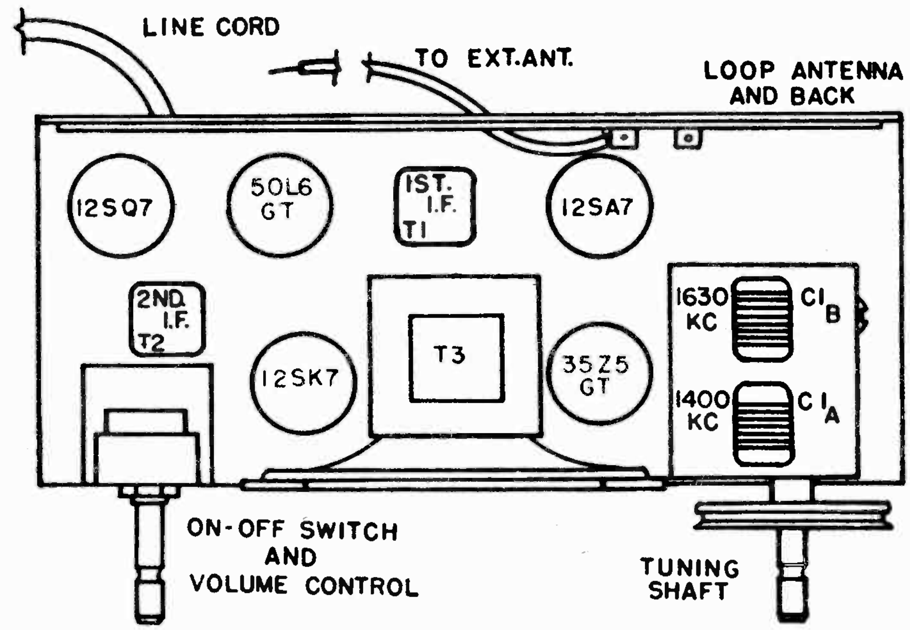
ALIGNMENT PROCEDURE

The following alignment procedure is for use only by competent servicemen having the proper equipment.

The alignment should be made with volume control fully on, and the output from the signal generator as low as possible, to prevent A.V.C. action from interfering with correct alignment.

With the output meter connected across the voice coil of the speaker, the output meter reading for 50 milli-watts is .4 volts using a signal which is modulated 400 c.p.s.

Adjust all trimmers for maximum output. Repeat alignment procedure given below as a final check.



ALIGNMENT PROCEDURE
(Continued)

CAUTION: This is an A.C.-D.C. receiver and when aligning the set it is necessary to isolate the Signal Generator or the Receiver from the line by use of a transformer, or place a .2 MFD. condenser in both test leads of the Signal Generator.

Position of Variable	Generator Frequency	Dummy Ant. Mfd.	Generator Connections	Trimmer Adjustment	Trimmer Function
Fully open	455 KC	.1	*12SA7 Grid (Stator of C1A)	T1	Input I.F.
Fully open	455 KC	.1	*12SA7 Grid (Stator of C1A)	T2	Output I.F.
Fully open	1630 KC	.00025	*12SA7 Grid (Stator of C1A)	C1B	Oscillator
Tune in signal from generator	1400 KC	.00025	*Ant. lead from loop	C1A	Antenna

*Connect ground lead of signal generator to chassis.

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SOCKET VOLTAGES

All voltages are measured with a 1000 ohm per volt meter on the 150 volt scale, with no signal. To obtain an accurate voltage check the A.C. line voltage must be 117 volts. Where no voltage is shown the voltage is O or cannot be read with this type of volt-meter.

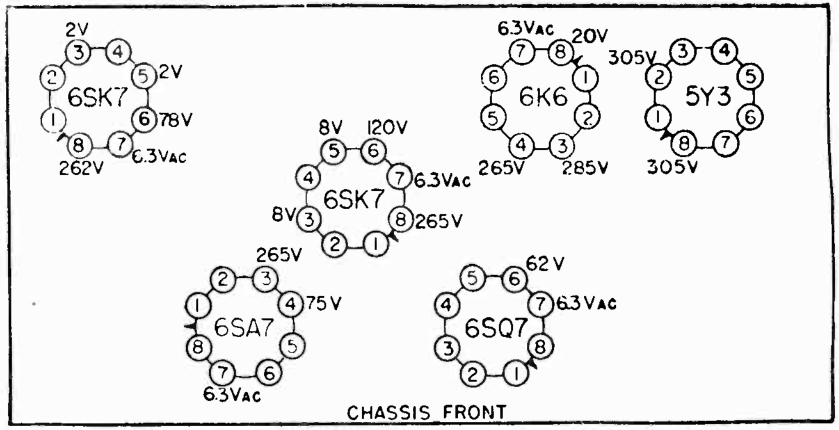


Fig. 2 Chassis, Bottom View

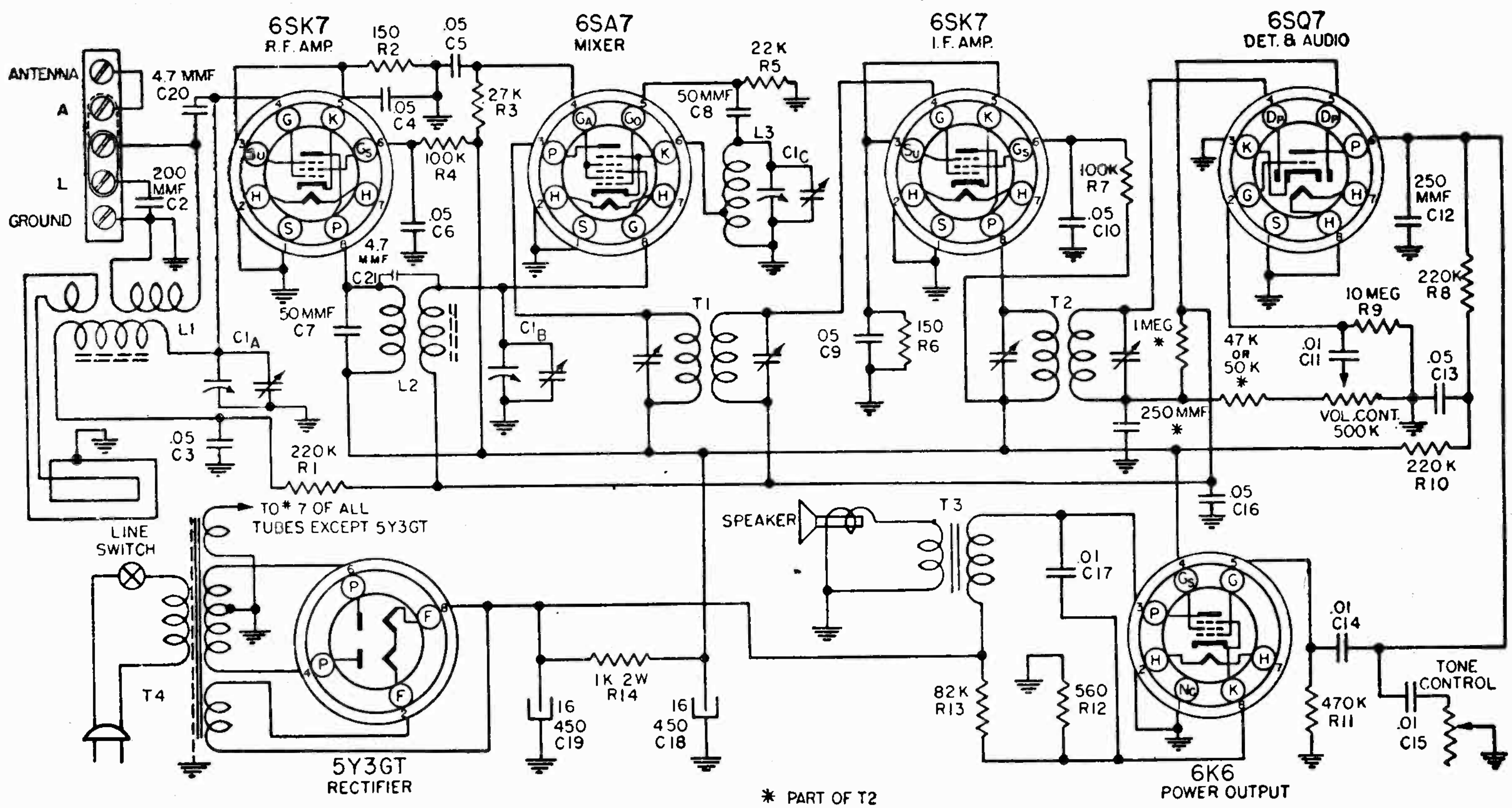


Fig. 3 Schematic Diagram

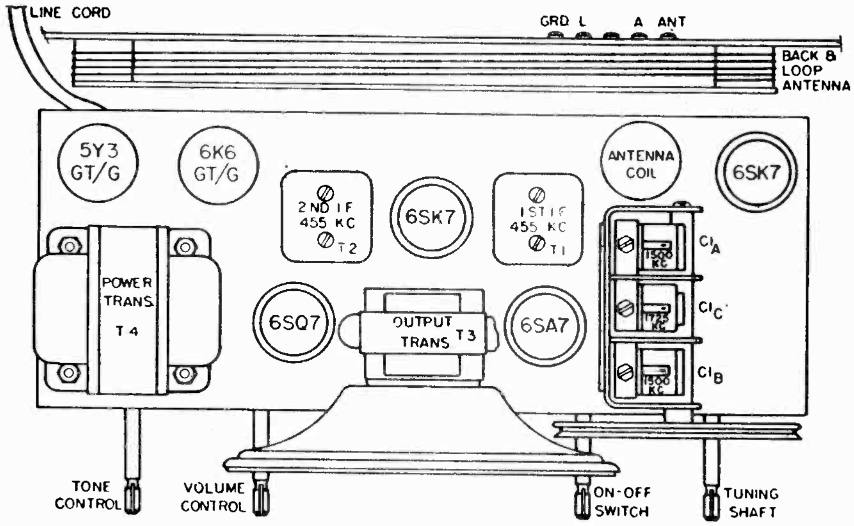


Fig. 1 Chassis, Top View

TUBE COMPLEMENT

The tube complement of this receiver consists of the following:

1—6SK7—R.F. Amplifier
1—6SA7—Mixer—OSC.
1—6SK7—I.F. Amplifier
1—6SQ7—Det. AVC—Audio
1—6K6—Power Output
1—5Y3—Rectifier

ALIGNMENT PROCEDURE

Volume control—Maximum: all adjustments.

Tone Control—Treble: Full Clockwise Rotation.

Connect ground lead of signal generator to radio chassis.

Connect dummy antenna in series with output lead of signal generator.

Connect output meter across voice coil of speaker.

The following equipment is necessary for proper alignment:

Signal generator that will provide the test frequencies as listed.

Output meter.

Non-metallic screwdriver.

Dummy antennas—.1 mfd., 00025 mfd.

Position of Variable	Generator Frequency	Dummy Ant. mfd.	Generator Connections	Trimmer Adjustment	Trimmer Function
Minimum Capacity (Fully Opened)	455 K.C.	.1	6SA7 Grid (Stator of CIB	TI T2	I. F.
Minimum Capacity (Fully Opened)	1725 K.C.	.00025	*Ant. Terminal on Loop	CIC	Osc.
Tune in signal From Generator	1500 K.C.	.00025	*Ant. Terminal on Loop	CIB	R. F.
Tune in signal From Generator	1500 K.C.	.00025	*Ant. Terminal on Loop	CIA	Ant.

*Be sure coupling link is in correct position for external antenna operation. See illustration below (Fig. 4).

Repeat the above alignment procedure as a final check.

With an output meter connected across the voice coil of the speaker, the output meter reading for ½ watt is 1.25 volts using a signal which is modulated 400 c.p.s.

ANTENNA and GROUND CONNECTIONS

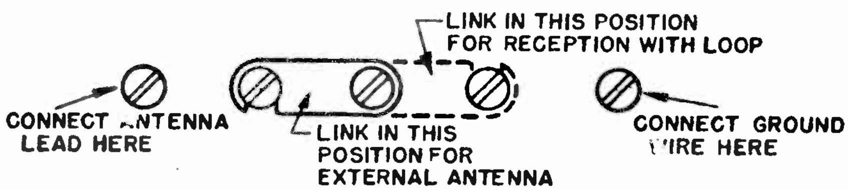


Fig. 4

POWER SUPPLY

This receiver is designed to operate from a power source of 117 volts A.C. 60 cycle current. If in doubt about the power rating in your location consult your local power company for this information. Never attempt to operate this radio on any current other than that specified.

MODELS 108014, 108504
MODEL 127084

CODE	PART NO.	DESCRIPTION
C1A, C1B	B19-193	Variable condenser
C2	A16-152	.05 MFD 200 volt condenser
C3	A15-175	50 MMFD mica condenser
C9	A16-150	.02 MFD 400 volt condenser
C5, C7	A15-176	250 MMFD mica condenser
C6	A16-156	.01 MFD 400 volt condenser
C8	A16-157	.1 MFD 200 volt condenser
C10	A16-153	.005 MFD 600 volt condenser
C11	A16-154	.2 MFD 400 volt condenser
C12	A16-160	.1 MFD 400 volt condenser
C13, C14	A18-280	40 MFD 150 volt electrolytic condenser
C15	A16-155	.002 MFD 600 volt condenser
R1	A60-659	22K Ohm ½ watt resistor
R2	A60-664	15 Megohm ½ watt resistor
R3, R8	A60-667	220K Ohm ½ watt resistor
R4	A60-684	2.2 Megohm ½ watt resistor
R5	A24-169	500K Ohm volume control
R6	A60-669	4.7 Megohm ½ watt resistor
R7, R9, R13	A60-662	470K Ohm ½ watt resistor
R10	A60-719	Special compensating resistor, order only from Spiegel.
R11	A60-702	120 Ohm ½ watt resistor
R12	A60-720	12K Ohm 2 watt resistor
R14	A60-699	1000 Ohm 2 watt resistor
R15	A60-721	27 Ohm 1 watt resistor
R16	A26-123	Tone control, 2 megohm
T1	B10-411	Oscillator coil
T2	B10-453	1st I.F. transformer
T3	B10-454	2nd I.F. transformer
T4	B80-230	Output transformer
T5	A10-503	Antenna loading coil
	A52-211	Knob, Phono-Radio
	A52-263	Knob, tuning
	A52-265	Knob, volume
	A52-266	Knob, on-off
	A52-264	Knob, tone
	A69-172	Switch, Phono-Radio
	A39-277	Drum for variable condenser
	B79-351	6" P.M. speaker
	A83-391	Selenium rectifier
	A84-41	Tuning shaft and pulley
	A83-308	Connector
	A71-30	Cover, dial plate assembly
	C67-528	Dial scale
	A58-54	Dial pointer
	A83-429	Retainer, dial scale
	B83-290	Dial diffusing plate
	A69-169	On-off switch
	10700	Record Changer

117 volt 60 cycle A.C. power supply.

The tubes used are:—
12SA7—Mixer, Oscillator
12SK7—I. F. Amplifier
12SQ7—Det., AVC, Audio
50L6—Power Output
A83-391—Selenium Rectifier

This receiver covers the frequency range from 535 kilocycles to 1725 kilocycles (K.C.).

SPIEGEL

PARTS LIST

Code No.	Part No.	Description
C1A, C1B, C1C	B19-186	Variable condenser
C2		200 MMF mica condenser (on Loop)
C3, C4, C9, C16	A16-152	.05 MFD. 200 volt tubular condenser
C5, C6, C10, C13	A16-158	.05 MFD. 400 volt tubular condenser
C7, C8	A16-175	50 MMF mica condenser
C11, C14, C15	A16-156	.01 MFD. 400 volt tubular condenser
C12	A15-176	250 MMF mica condenser
C17	A16-168	.01 MFD 1000 volt tubular condenser
C18	A18-279	16 MFD. 450 volt electrolytic condenser
C19	A18-274	16 MFD. 450 volt electrolytic condenser
C20, C21	A83-355	4.7 MMF condenser
R1, R8, R10	A60-667	220K ohm 1/3 watt resistor
R2, R6	A60-686	150 ohm 1/3 watt resistor
R3	A60-692	27K ohm 1 watt resistor
R4, R7	A60-671	100K ohm ½ watt resistor
R5	A60-659	22K ohm 1/3 watt resistor
R9	A60-663	10 megohm 1/3 watt resistor
R11	A60-662	470K ohm 1/3 watt resistor
R12	A60-701	560 ohm 1 watt resistor
R13	A60-700	82K ohm 1 watt resistor
R14	A60-699	1000 ohm 2 watt resistor
L1	B10-459	Antenna coil
L2	B10-452	R.F. coil
L3	A10-446	Oscillator coil
T1	B10-412	1st I.F. transformer
T2	B10-414	2nd I.F. transformer
T3	A80-222	Output transformer
T4	C80-223	Power transformer
	S84-252	Loop antenna assembly, for Model 108504
	S84-251	Loop antenna assembly, for Model 108014
	B83-325	Baffle, cardboard
	D42-379	Cabinet, bakelite, walnut, for Model 108504
	A42-401	Cabinet, bakelite, ivory, for Model 108014
	C67-535	Dial scale
	A98-4	Grille cloth
	A52-279	Knob, walnut, for Model 108504
	A52-280	Knob, ivory, for Model 108014
	A58-65	Dial Pointer
	A83-292	Dial scale retainer, right
	A83-293	Dial scale retainer, left
	B79-341	6" P.M. speaker

SPIEGEL

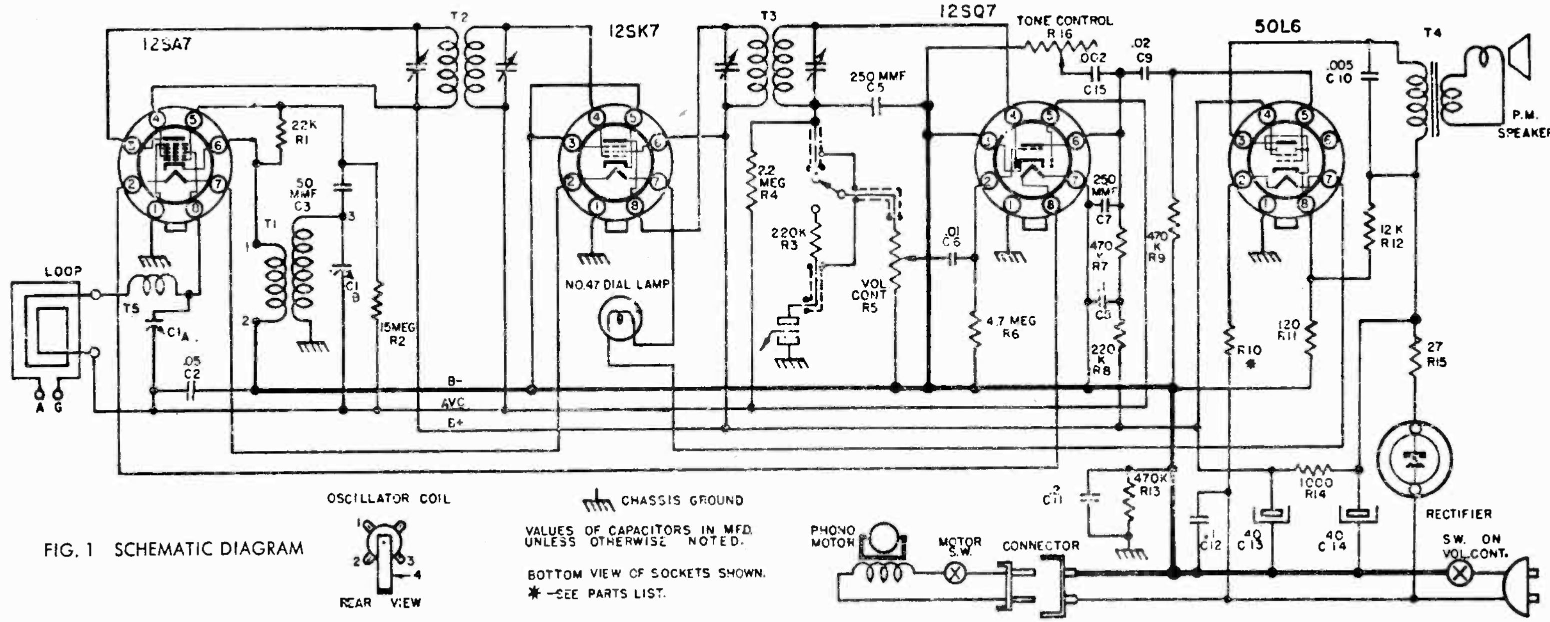


FIG. 1 SCHEMATIC DIAGRAM

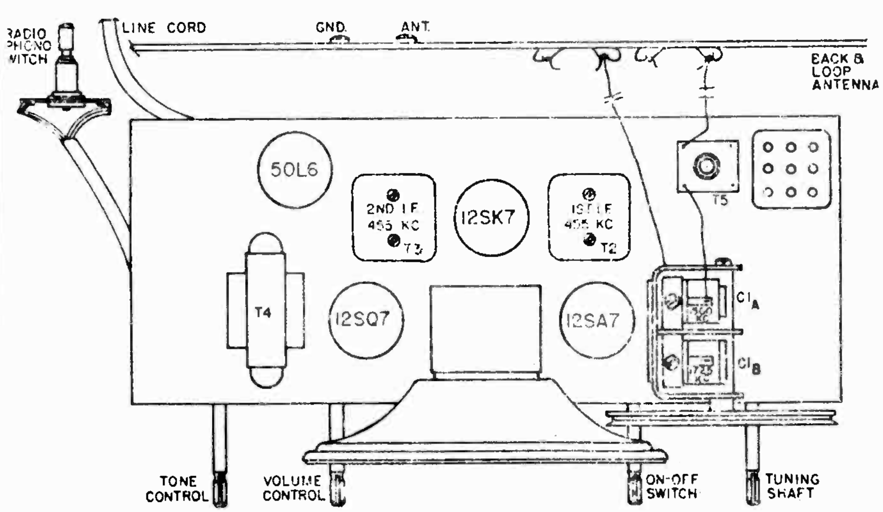


FIG. 2 PICTORIAL DIAGRAM

ALIGNMENT PROCEDURE

The following alignment procedure is for use only by competent servicemen having the proper equipment

The alignment should be made with volume control fully on, and the output from the signal generator as low as possible, to prevent A.V.C. action from interfering with correct alignment.

With the output meter connected across the voice coil of the speaker, the output meter reading for 50 milliwatts is .4 volts using a signal which is modulated 400 c.p.s.

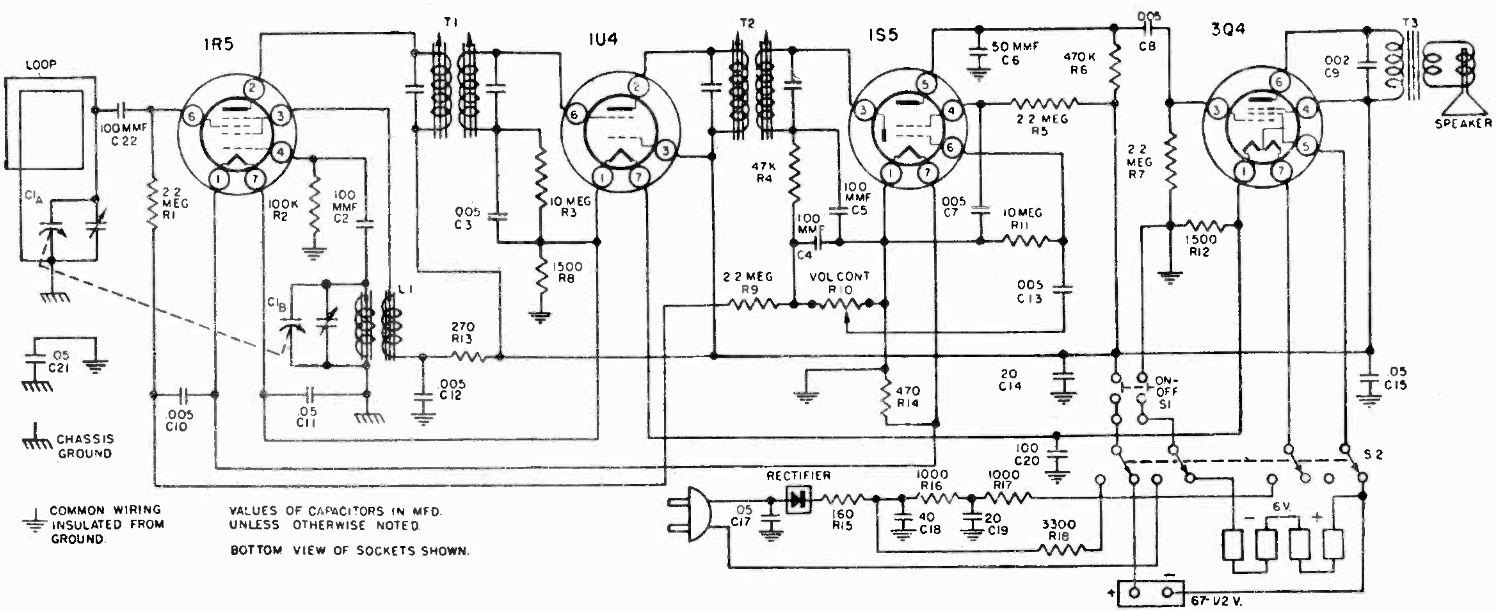
Adjust all trimmers for maximum output. Repeat alignment procedure given below as a final check.

Position of Variable	Generator Frequency	Dummy Ant. Mfd.	Generator Connections	Trimmer Adjustment	Trimmer Function
Fully open	455 KC	.1	* 12SA7 Grid (Stator of C1A)	T2	Input I.F.
Fully open	455 KC	.1	* 12SA7 Grid (Stator of C1A)	T3	Output I.F.
Fully open	1725 KC	.00025	* 12SA7 Grid (Stator of C1A)	C1B	Oscillator
Tune in Signal from generator	1500 KC	.00025	**Loosely Coupled to Loop	C1A	Antenna

*Connect ground lead of signal generator to Common "B."

**Do not connect ground lead of signal generator.

SPIEGEL



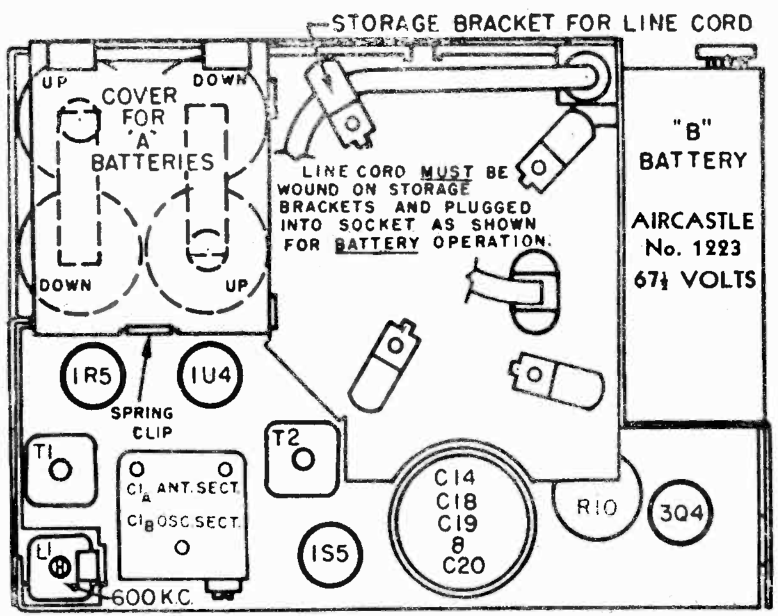


FIG. 2 PICTORIAL DIAGRAM

VOLTAGE CHART

All voltages are measured from minus "B" with a 20,000 ohm per volt meter, volume control at maximum, no signal applied, and the radio operating from a 117 volt AC power supply.

NOTE: Normal tolerance on component values may cause a plus or minus of 10% in voltage readings.

TUBE	Pin Numbers						
	1	2	3	4	5	6	7
1R5	1.6	65	67	—8	1.5	0	2.8
1U4	2.8	65	65	0	2.8	0	4.2
1S5	0	0	0	18	20	0	1.5
3Q4	4.2	64	0	65	5.9	64	6.8

ALIGNMENT PROCEDURE

Volume control—Maximum: all adjustments.

Connect ground lead of signal generator to common "B."

Connect dummy antenna in series with output lead of signal generator.

Connect output meter across voice coil of speaker.

The following equipment is necessary for proper alignment:

- Signal generator that will provide the test frequencies as listed, 30% modulated, 400 c.p.s.
- Output meter.
- Non-metallic screwdriver.
- Dummy antennas— .1 mfd., .00025 mfd.

For alignment points refer to Figure No. 2.

CAUTION: This is an A.C.-D.C. receiver and if alignment is made with the receiver connected to 117 volts A.C. or D.C., it is necessary to isolate the signal generator or the receiver from the line by use of a transformer, or place a .2 M.F.D. condenser in both test leads of the Signal Generator.

Position of Variable	Generator Frequency	Dummy Ant. Mfd.	Generator Connections	Trimmer Adjustment	Trimmer Function
Fully open	455 KC	.1	*1R5 Grid (Stator of C1A)	T2	Output I.F.
Fully open	455 KC	.1	*1R5 Grid (Stator of C1A)	T1	Input I.F.
Fully open	1600 KC	.00025	*1R5 Grid (Stator of C1A)	C1B	Oscillator
Tune in signal from generator	1400 KC	—	Loosely coupled to loop	C1A	Antenna
**Tune in signal from generator	600 KC	—	Loosely coupled to loop	L1	600 KC Padder

*Connect ground lead of signal generator to chassis.

**When making this adjustment the variable should be rocked back and forth.

SPIEGEL

POWER SUPPLY

This receiver is designed to operate from self contained batteries, or from 105-125 volt AC or DC power supply. One $67\frac{1}{2}$ volt "B" battery Aircastle No. 1223, and four (4) $1\frac{1}{2}$ volt "A" batteries, Aircastle No. 1514, are used for battery operation.

PARTS LIST

Circuit Diagram Reference	Part No.	Description
C2, C4, C5, C22	A15-190	100 MMF Mica condenser
C1A, C1B	B19-190	Variable condenser
C3, C7, C8	A16-181	.005 MFD 150 volt condenser
C10, C12, C13		
C6	A15-191	50 MMF mica condenser
C11, C17, C21	A16-172	.05 MFD 400 volt condenser
C14, C19		20 MFD 150 volt Electrolytic condenser
C18	A18-282	40 MFD 150 volt Electrolytic condenser
C20		100 MFD 25 volt Electrolytic condenser
C15	A16-171	.05 MFD 200 volt condenser
C9	A16-182	.002 MFD 200 volt condenser
R1, R5, R7, R9	A60-726	2.2 Megohm ½ watt resistor
R2	A60-727	100K ohm ½ watt resistor
R3, R11	A60-728	10 Megohm ½ watt resistor
R4	A60-730	47K ohm ½ watt resistor
R6	A60-731	470K ohm ½ watt resistor
R8, R12	A60-729	1500 ohm ½ watt resistor
R10	A24-172	Volume control, 1 megohm
R13	A60-723	270 ohm ½ watt resistor
R14	A60-722	470 ohm ½ watt resistor
R15	A60-725	160 ohm 3 watt resistor
R16, R17	A60-713	2000 ohm 10 watt resistor (1000 ohms each section)
R18	A60-724	3300 ohm 1 watt resistor
T1, T2	C10-475	1st and 2nd I.F. Transformer
T3	A80-231	Output transformer
L1	B10-477	Oscillator coil
	S84-112	Cover assembly for "A" batteries
	S84-225	Front cover assembly for case, with loop
	S84-128	Rear cover assembly for case
	S84-111	Hub and Pointer assembly
	B52-218	Knob, On-Off switch
	C52-216	Knob, tuning
	B52-217	Knob, volume control
	A83-561	Selenium Rectifier
	B79-353	Speaker, P.M.
	A69-174	Switch, AC-DC—Battery
	A69-175	Switch, On-Off
	A76-34	Terminal for "B" battery
	B23-156	Line cord
	D21-108	End Cap, for handle
	B83-442	Handle

SPIEGEL

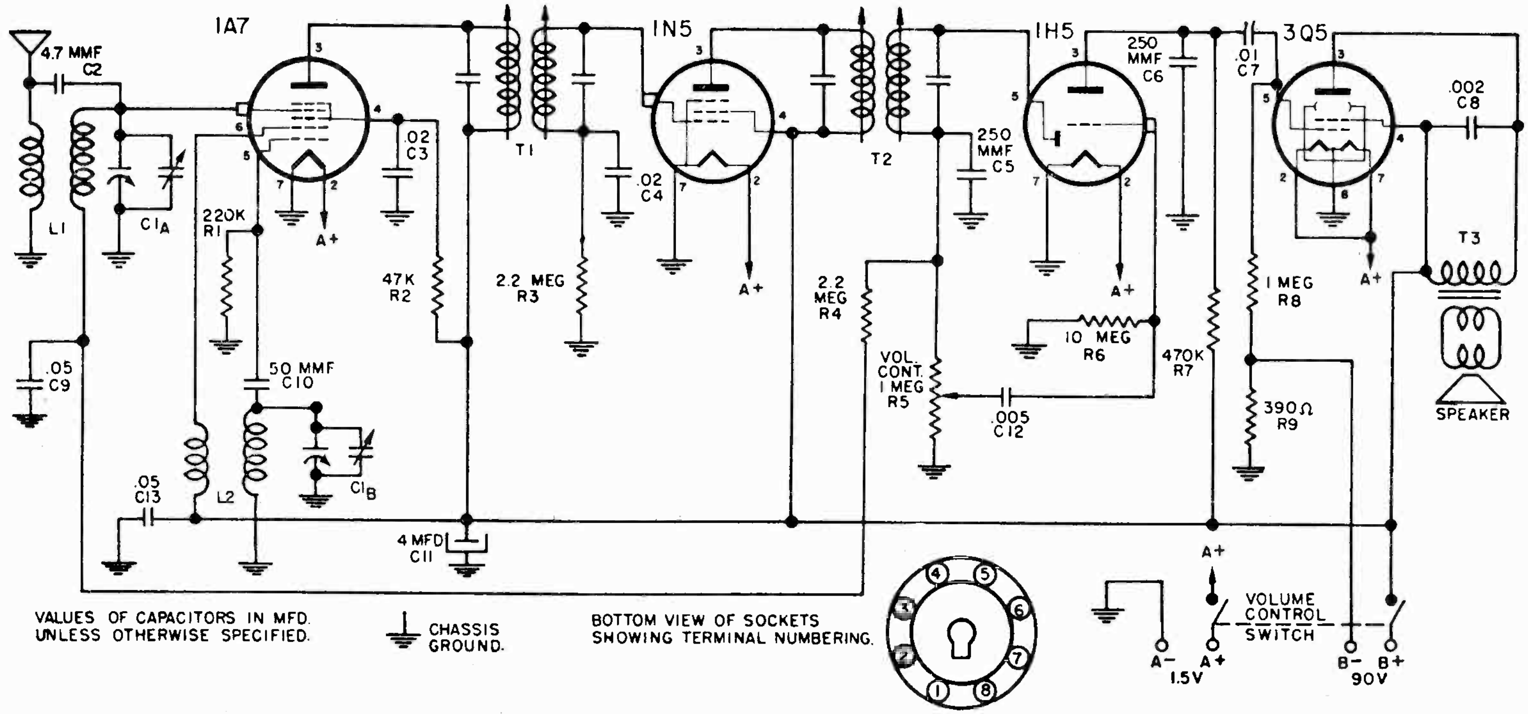


FIG. 1 SCHEMATIC DIAGRAM

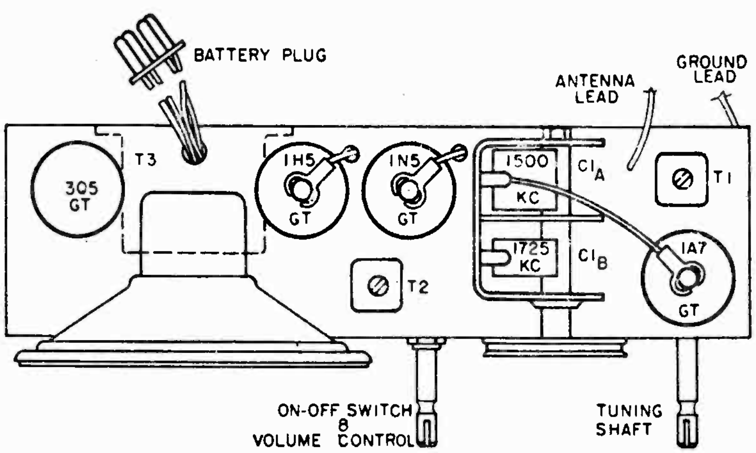


FIG. 2 TUBE AND TRIMMER LOCATIONS

VOLTAGE CHART

All voltages measured with a 1000 ohm per volt meter on the 150 volt scale. For the following voltages the "B" battery section of the power pack should read 90 volts under load, the "A" section 1½ volts.

TUBE	PIN NUMBERS 1	2	3	4	5	6	7	8
1A7	0	1.5	85	37	0	85	0	0
1N5	0	1.5	85	85	0	0	0	0
1H5	0	1.5	17	0	0	0	0	0
3Q5	0	1.5	83	85	0	5	1.5	

SPIEGEL

DESCRIPTION

Your New Aircastle Radio is a 4-Tube Superhetrodyne receiver designed to cover a frequency range of from 540 kilocycles to 1725 kilocycles (K.C.). The tubes used are—

1A7 GT—Osc. Converter	1H5 GT—AVC Det. Audio Amplifier
1N5 GT—I. F. Amplifier	3Q5 GT—Power Output

ALIGNMENT PROCEDURE

Volume control—Maximum: all adjustments.

Connect ground lead of signal generator to chassis.

Connect dummy antenna in series with output lead of signal generator.

Connect output meter across voice coil of speaker.

The following equipment is necessary for proper alignment:
- Signal generator that will provide the test frequencies as listed, 30% modulated, 400 c.p.s.
- Output meter.
- Non-metallic screwdriver.
- Dummy antennas— .1 mfd., .00025 mfd.

Position of Variable	Generator Frequency	Dummy Ant. Mfd.	Generator Connections	Trimmer Adjustment	Trimmer Function
Fully open	455 KC	.1	1A7 Grid (Stator of C1A)	T2	Output I.F.
Fully open	455 KC	.1	1A7 Grid (Stator of C1A)	T1	Input I.F.
Fully open	1725 KC	.00025	Antenna Lead	C1B	Oscillator
Tune in signal from generator	1400 KC	.00025	Antenna Lead	C1A	Antenna

INSTALLATION

This receiver has been designed to operate on a self-contained battery containing both the "B" battery (90 Volts) and the "A" battery (1½ Volts) Aircastle No. 1491.

After inserting the battery plug of the receiver into the socket on the battery, the battery may be placed inside the cabinet in the space provided.

Anyone of the following batteries may also be used with this receiver: Eveready No. 748, General No. 60DL-11 L, Burgess No. 17G-D60, Ray-O-Vac No. AB 82.

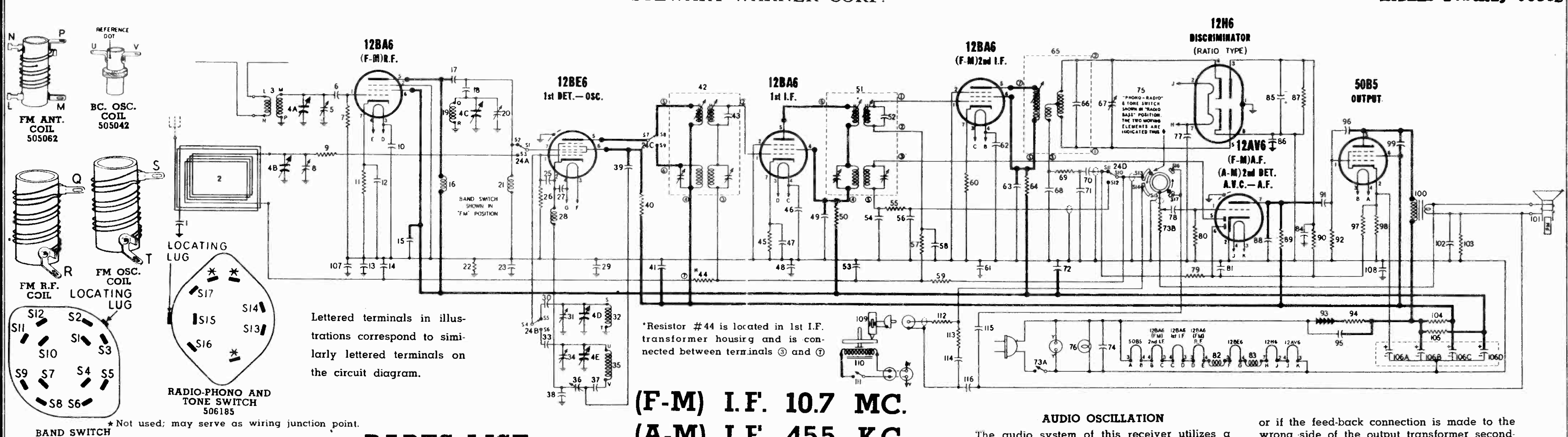
For best results an outside antenna about 75-100 feet long, including the lead-in, should be used. It should be erected as high as possible and as far away from surrounding objects as practical. When the receiver is used close to powerful broadcasting stations it may be desirable to use a shorter antenna. (For most ordinary instalations use Aircastle House Mast Arial No. 1396.)

To obtain the best possible performance a good ground should be used. This can be a water pipe, or a galvanized pipe driven into the ground. It should be connected to the ground lead (black) of the receiver. Connect the antenna wire to the other lead coming from the receiver.

PARTS LIST

Circuit Diagram Reference	Part No.	Description
C1A,C1B	B19-188	Variable Condenser
C2	A83-355	4.7 MMFD Condenser
C3,C4	A16-150	.02 MFD 400 volt condenser
C5,C6	A15-176	250 MMFD mica condenser
C7	A16-156	.01 MFD 400 volt condenser
C8	A16-155	.002 MFD 600 volt condenser
C9,C13	A16-152	.05 MFD mica condenser
C10	A15-175	50 MMFD mica condenser
C11	A18-273	4 MFD 150 volt electrolytic condenser
C12	A16-153	.005 MFD 600 volt condenser
R1	A60-667	220K ohm ½ watt resistor
R2	A60-685	47K ohm ½ watt resistor
R3,R4	A60-684	2.2 megohm ½ watt resistor
R5	A24-170	Volume control, 1 megohm
R6	A60-663	10 megohn, ½ watt resistor
R7	A60-662	470K ohm ½ watt resistor
R8	A60-668	1 megohm ½ watt resistor
R9	A60-665	390 ohm ½ watt resistor
L1	A10-485	Antenna coil
L2	A10-505	Oscillator coil
T1,T2	A10-506	1st and 2nd I.F. transformer
T3	B80-232	Output transformer
	B79-352	Speaker, 5" P.M.
	A75-60	Tuning Shaft
	A45-118	Battery plug
	B67-515	Dial scale
	58-31	Dial pointer
	48-21	Dial crystal
	D42-437	Cabinet, walnut, wood
	A52-245	Knob, walnut

STEWART-WARNER CORP.



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

*Resistor #44 is located in 1st I.F. transformer housing and is connected between terminals ③ and ⑦

*Not used; may serve as wiring junction point.

(F-M) I.F. 10.7 MC.
(A-M) I.F. 455 KC.

PARTS LIST

WARNING: Some parts listed below have special characteristics. Do not use substitutes for replacement purposes.

DIAGRAM NO.	PART NO.	DESCRIPTION
		CONDENSERS
1	504725	Condenser—.02 Mfd. 200 volt
4-A to E	504955	Condenser—variable gang and drum
5	504954	Condenser—trimmer; 3 to 12 Mmfd.
6	504974	Condenser—ceramic 47 Mmfd. 500 volt
8	504069	Condenser—trimmer; 3 to 35 Mmfd.
10	504976	Condenser—ceramic 1500 Mmfd. 150 volt
12	505025	Condenser—ceramic 100 Mmfd. 350 volt
13	505052	Condenser—.002 Mfd. 400 volt
14	505073	Condenser—.05 Mfd. 400 volt
15	504975	Condenser—ceramic 470 Mmfd. 350 volt
17	502295	Condenser—ceramic 10 Mmfd. 500 volt
18	505053	Condenser—ceramic 15 Mmfd. 500 volt
20	504954	Condenser—trimmer; 3 to 12 Mmfd.
23	505073	Condenser—.05 Mfd. 400 volt
25	504730	Condenser—ceramic 3 Mmfd. 500 volt
27	504973	Condenser—ceramic 22 Mmfd. 500 volt
29	505454	Condenser—.05 Mfd. 400 volt (low impedance at 455 Kc.—do not substitute ordinary capacitor)
30	505072	Condenser—ceramic 33 Mmfd. 350 volt
31	504954	Condenser—trimmer; 3 to 12 Mmfd.
33	504974	Condenser—ceramic 47 Mmfd. 500 volt
34	119491	Condenser—trimmer; 10 to 90 Mmfd.
36	505051	Condenser—trimmer; 440 to 660 Mmfd.
37	504979	Condenser—ceramic .01 Mfd. 150 volt
38	504975	Condenser—ceramic 470 Mmfd. 350 volt
39	504979	Condenser—ceramic .01 Mfd. 150 volt
41	504979	Condenser—ceramic .01 Mfd. 150 volt
43	505068	Condenser—ceramic 91 Mmfd. 350 volt ± 5%
46	504976	Condenser—ceramic 1500 Mmfd. 150 volt
47	505028	Condenser—.05 Mfd. 150 volt
48	504979	Condenser—ceramic .01 Mfd. 150 volt
49	505211	Condenser—.08 Mfd. 400 volt
52	505068	Condenser—ceramic 91 Mmfd. 350 volt ± 5%
53	505028	Condenser—.05 Mfd. 150 volt
54	505026	Condenser—ceramic 150 Mmfd. 350 volt
56	505026	Condenser—ceramic 150 Mmfd. 350 volt
58	504978	Condenser—ceramic .005 Mfd. 150 volt
61	504979	Condenser—ceramic .01 Mfd. 150 volt
62	504976	Condenser—ceramic 1500 Mmfd. 150 volt
63	504978	Condenser—ceramic .005 Mfd. 150 volt
66	505074	Condenser—ceramic 43 Mmfd. 350 volt ± 5%
67	504954	Condenser—trimmer; 3 to 12 Mmfd.
68	505025	Condenser—ceramic 100 Mmfd. 350 volt
70	505028	Condenser—.05 Mfd. 150 volt
71	504976	Condenser—ceramic 1500 Mmfd. 150 volt
72	504979	Condenser—ceramic .01 Mfd. 150 volt
74	505083	Condenser—.02 Mfd. 400 volt
77	504976	Condenser—ceramic 1500 Mmfd. 150 volt
78	504977	Condenser—ceramic .002 Mfd. 150 volt
81	505082	Condenser—.02 Mfd. 150 volt
84	505027	Condenser—.01 Mfd. 400 volt
85	504937	Condenser—electrolytic 5 Mfd. 50 volt
86	504979	Condenser—ceramic .01 Mfd. 150 volt
88	505025	Condenser—ceramic 100 Mmfd. 350 volt
91	505028	Condenser—.05 Mfd. 150 volt
95	505073	Condenser—.05 Mfd. 400 volt
96	504973	Condenser—ceramic 22 Mmfd. 500 volt
99	505027	Condenser—.01 Mfd. 400 volt
102	505071	Condenser—.2 Mfd. 400 volt
106-A, B, C, D	504980	Condenser—electrolytic A—20 Mfd. 25 volt; B—60 Mfd. 150 volt; C—40 Mfd. 150 volt; D—40 Mfd. 150 volt
107	504975	Condenser—ceramic 470 Mmfd. 350 volt
108	504979	Condenser—ceramic .01 Mfd. 150 volt
114	504450	Condenser—.01 Mfd. 150 volt
115	504978	Condenser—ceramic .005 Mfd. 150 volt
116	505071	Condenser—.2 Mfd. 400 volt
		RESISTORS
7	502134	Resistor—carbon 470,000 Ohms ¼ watt
9	504969	Resistor—carbon 33 Ohms ¼ watt
11	502794	Resistor—carbon 68 Ohms ¼ watt
22	502133	Resistor—carbon 220,000 Ohms ¼ watt
26	502130	Resistor—carbon 22,000 Ohms ¼ watt
40	502406	Resistor—carbon 1,500 Ohms ¼ watt
44	502134	Resistor—carbon 470,000 Ohms ¼ watt
45	502794	Resistor—carbon 68 Ohms ¼ watt
50	502287	Resistor—carbon 680 Ohms ¼ watt
55	504710	Resistor—carbon 33,000 Ohms ¼ watt
57	502134	Resistor—carbon 470,000 Ohms ¼ watt
59	502268	Resistor—carbon 1 Meg. ¼ watt
60	504968	Resistor—carbon 10 Ohms ¼ watt
64	502287	Resistor—carbon 680 Ohms ¼ watt
69	504710	Resistor—carbon 33,000 Ohms ¼ watt
73-A, B	504967	Resistor—Volume control 1 Meg (with Switch)
79	502134	Resistor—carbon 470,000 Ohms ¼ watt
80	502136	Resistor—carbon 10 Meg. ¼ watt
87	502408	Resistor—carbon 68,000 Ohms ¼ watt
89, 90	502134	Resistor—carbon 470,000 Ohms ¼ watt
92	502134	Resistor—carbon 470,000 Ohms ¼ watt
94	505023	Resistor—carbon 33 Ohms 1 watt
97	502135	Resistor—carbon 2.2 Meg. ¼ watt
98	504437	Resistor—carbon 150 Ohms ½ watt ± 10%
103	502132	Resistor—carbon 100,000 Ohms ¼ watt
104	504971	Resistor—carbon 2,200 Ohms ½ watt
105	504970	Resistor—carbon 470 Ohms, 2 watt
112	510073	Resistor—carbon 100,000 Ohms ¼ watt
113	502408	Resistor—carbon 68,000 Ohms ¼ watt
		COILS AND TRANSFORMERS
2	505054	Loop Antenna
3	505062	Coil—F.M. antenna
16	505075	Coil—R.F. choke (FM)
19	505060	Coil—FM R.F.
21	505076	Coil—R.F. choke (FM)
28	505076	Coil—R.F. choke (FM)
32	505060	Coil—FM oscillator
35	505042	Coil—BC oscillator
42	505066	Transformer—1st I.F.
51	505067	Transformer—2nd I.F.
65	505391	Transformer—discriminator
82, 83	505392	Coil—R.F. choke (FM)
100	506184	Transformer—output
		OTHER ELECTRICAL PARTS
24-A, B, C, D	504938	Switch—band
75	506185	Switch—radio, phono and tone
76	506183	Lamp—dial, 115 volt 10 watt
93	504972	Rectifier—selenium
101	505342	Speaker—P.M. dynamic (8 inch)
109	505100	Crystal cartridge
110	505750	Motor—phono; 115 volt 50 cycle
	505758	Motor—phono; 115 volt 60 cycle
111	505759	Switch—phono; "On-Off"
		MISCELLANEOUS
	506240	Back for cabinet
	504598	Base for tube shield with internal spring
	504981	Base for mounting electrolytic condenser
	505368	Base for tube shield without internal spring
	114955	Clip—retainer on end of dial cord
	112764	Clip—retains light shield
	117057	Cord—dial drive (6 ft. required) per ft.
	506191	Dial scale
	506235	Drawer—record changer compartment (less hardware)
	506233	Handle for drawer
	505344	Knob—tuning
	505345	Knob—"VOLUME"
	505346	Knob—"RADIO-PHONO"
	506192	Knob—"FM-AM"
	506278	Light diffusing strip
	502690	Pointer
	506234	Rail for drawer (supplied in sets)
	81145	Retaining ring for tuning shaft
	119087	Ring for dial cord
	113463	Rubber stop for drawer
	114914	Screw—No. 2 x ⅜"; for mtg. dial scale
	83047	Screw—No. 3 x ⅞"; chassis mtg.
	501777	Screw—No. 4 x ½"; for mtg. back
	505045	Shaft—tuning
	504599	Shield—tube; has internal spring
	505367	Shield—tube; has no internal spring
	506181	Shield—light
	116690	Socket—octal base
	501182	Socket—phono motor cable
	504597	Socket—miniature
	505654	Socket—phono pickup cable
	506182	Socket—dial light
	161384	Spring—dial cord tension
	506277	Trim strip for dial

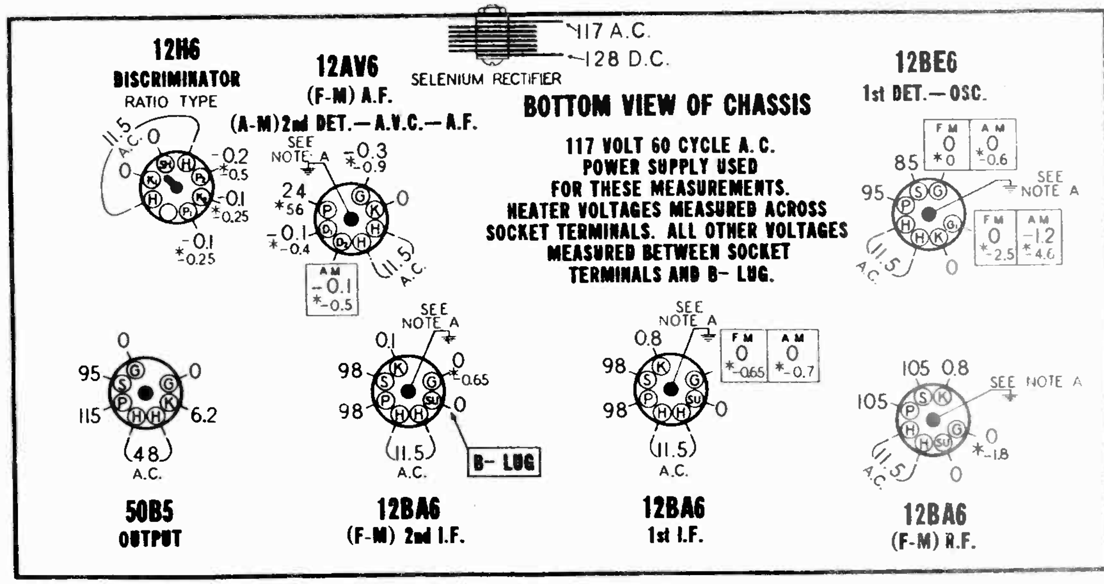
AUDIO OSCILLATION

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

SOCKET VOLTAGES

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*). The (*) symbol designates a vacuum tube voltmeter measurement.

ALL MEASUREMENTS MADE WITH BAND SWITCH IN "FM" POSITION UNLESS OTHERWISE INDICATED
DIAL TUNED TO 108MC. FOR "FM" MEASUREMENTS
DIAL TUNED TO 540KC. FOR "AM" MEASUREMENTS
VOLUME CONTROL SET TO MINIMUM WITH NO SIGNAL
"PHONO-RADIO" AND TONE SWITCH SET "RADIO-BASS" POSITION



REAR OF CHASSIS

NOTE A: Grounding of center stud on tube socket is necessary to reduce capacity coupling between other pins. Oscillation may result if this ground is omitted.

MODELS B72CR1, 9038B

STEWART-WARNER CORP.

FREQUENCY MODULATION — "FM" — ALIGNMENT PROCEDURE

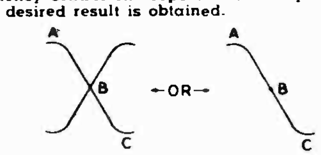
INSTRUMENTS: Alignment of the FM circuits in this receiver may be accomplished with either a conventional AM type signal generator or an FM signal generator. The output indicator should be an oscilloscope or a vacuum tube voltmeter.

Although it is preferable to use an FM generator and an oscilloscope, reasonably accurate alignment is obtainable when using a conventional AM generator and a vacuum tube voltmeter providing proper care is exercised in adjusting the discriminator circuit trimmer condenser.

IMPORTANT: If an AM signal generator is used, it should be capable of producing fundamental frequencies of 10.7 and 88 to 108 MC. Avoid using an AM generator which produces signals in the 88 to 108 MC range by using harmonics higher than the second. Generators which are dependent upon third, fourth or fifth harmonics for frequencies of 88 to 108 MC will generally produce undesireable spurious beat signals with the local oscillator in the receiver and alignment will be exceedingly difficult.

The following procedure is adaptable for use with either an AM or FM generator and oscilloscope or vacuum tube voltmeter merely follow the instructions that are applicable to the instruments that are used.

1. If alignment of both AM and FM channels is required it is necessary to align the AM channel first, then align the FM channel as instructed in the following chart (AM alignment procedure is given on page 7).
2. During alignment of this receiver, it will be necessary to set the dial pointer to 98 MC. In order to avoid replacing the chassis in the cabinet, it will be found convenient to mark this frequency point on the dial background before starting the alignment.
3. Do not attempt to reposition pointer by releasing it from clip on dial cord as this is done only during AM alignment.
4. Disconnect leads from built-in FM antenna (do not disturb connections to built-in AM loop antenna); also disconnect phono-plugs and speaker.
5. Remove chassis and AM loop antenna from cabinet. Reconnect speaker.
6. Set "PHONO-RADIO" and Tone switch to "Radio-Bass" position (extreme counter-clockwise).
7. Set the receiver volume control to the maximum volume position.
8. Dress FM circuit leads as short and straight as possible, particularly those in the oscillator circuit. I.F. plate and grid leads should also be kept short and straight.
9. Alignment of receiver circuits may now be accomplished by using the procedure in the chart below.

SIGNAL GENERATOR CONNECTIONS			V-T VOLTMETER OR OSCILLOSCOPE CONNECTIONS		RECEIVER				TYPE OF ADJUSTMENT AND OUTPUT INDICATION	
CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	CONNECT GROUND LEAD OF SIGNAL GENERATOR TO	FREQUENCY & TYPE OF MODULATION	IF A V-T VOLTMETER IS USED, CONNECT IT AS FOLLOWS:	IF AN OSCILLOSCOPE IS USED, CONNECT IT AS FOLLOWS:	BAND SWITCH POSITION	DIAL SETTING	TRIMMER OR SLUG NUMBER	TRIMMER DESCRIPTION	ADJUSTMENT AND OUTPUT INDICATION WHEN USING A V-T VOLTMETER	ADJUSTMENT AND OUTPUT INDICATION WHEN USING AN OSCILLOSCOPE
Pin #7 of 12BE6 tube: use a .01 MFD. condenser in series with generator lead.	B in vicinity of 12BE6 tube. **CAUTION:** If your signal generator is designed with an AC-DC type power supply, connect ground lead of signal generator to B lug through a .25 Mfd. condenser.	**10.7 MC** AM signal must be 400 cycle modulated or FM signal should preferably be modulated ±300 KC.	Connect common (or ground) terminal of meter to B . D.C. probe lead of meter is then connected to pin #3 of the 12H6 tube.	Connect vertical amplifier "high" lead in series with an 0.1 MFD. condenser to junction of resistor #69 (33,000 ohms) and condenser #70 (.05 MFD.) which are in the discriminator output circuit. Connect scope ground lead to B .	**FM** Maximum clockwise position	Any position where it does not affect the signal.	8	Discriminator Primary	Set meter to a low D.C. voltage range and adjust trimmer #8 for maximum meter reading. (This voltage will be negative.)	Set vertical amplifier of scope for maximum amplification. Where FM signal generator provides an output voltage for synchronization, connect this voltage to "sync" terminals of the scope. Then adjust setting of trimmer #9, before attempting to adjust trimmer #8, until a pattern similar to the following appears on the screen. Should the pattern fail to appear on screen or be of insufficient amplitude, adjust trimmers #10, 11, 12 and 13 for maximum sound output from speaker. Then readjust trimmer #9 for approximately correct pattern and trimmer #8 for maximum amplitude and steepness of that portion of the curve between "A" and "C". If pattern does not remain stationary operate sweep frequency control on scope and also "sync" control until desired result is obtained.  This double "S" curve pattern results when 'scope uses properly phased "Sawtooth" horizontal deflection voltage whose frequency is twice the modulation frequency of signal generator. This single "S" curve pattern results when 'scope uses properly phased "sine wave" horizontal deflection voltage.
Same as above	Same as above	Same as above	Before connecting V-T voltmeter, it is necessary to connect two 68,000 ohm resistors (**resistance of both units must compare within 1%**) in series from pin #3 of the 12H6 tube to B . Then connect common (or ground) terminal of V-T voltmeter to the junction of these two resistors. D.C. probe lead of meter is now connected to junction of resistor #69 (33,000 ohms) and condenser #70 (.05 MFD.) which are in the discriminator output circuit.	Same as above	Same as above	Same as above	9	Discriminator Secondary **Use an insulated phasing tool to adjust this trimmer.**	Set meter for operation on its lowest D.C. voltage range. Note that as trimmer #9 is rotated a point will be found where voltmeter will swing rather sharply from a positive to a negative reading or vice versa. Correct setting of trimmer #9 is obtained when meter reads zero as trimmer is moved through this point. The adjustment is somewhat critical and **considerable care must be exercised to set the trimmer for a zero meter indication.**	With the 'scope set up as described above, adjust trimmer #9 until the cross-over point "B" is centrally located in both the horizontal and vertical directions; in addition, the portion of the curve between "A" and "C" should be as linear (straight) as possible.
Recheck the two preceding adjustments to be sure that both trimmers are set as accurately as possible to obain the specified output indication on vacuum tube voltmeter or oscilloscope. Then disconnect and remove the two 68,000 ohm resistors that were used for the vacuum tube voltmeter connection in the 2nd step.										
Same as above	Same as above	Same as above	Connect common (or ground) terminal of meter to B . D.C. probe lead of meter is then connected to Pin #3 of the 12H6 tube.	Same as above	Same as above	Same as above	**10 and 11**	2nd I.F.	Adjust trimmers #10 and #11 for maximum meter reading.	With 'scope set up as described above, adjust trimmers #10 and #11 for maximum amplitude and steepness of that portion of the pattern between "A" and "C".
Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	Same as above	**12 and 13**	1st I.F.	Adjust trimmers #12 and #13 for maximum meter reading.	Adjust trimmers #12 and #13 for maximum amplitude and steepness of pattern as described above. If the enlarged pattern now indicates a lack of symmetry, readjust trimmer #9 for correct cross-over point.
Generator output leads must be connected to the two "External FM Antenna" terminals at back of loop antenna frame. Insert a 120 Ohm resistor in series with each of the generator leads before connecting to receiver antenna terminals.		**98 MC** AM signal may be 400 cycle modulated or FM signal should preferably be modulated ±300 KC	Same as above	Same as above	Same as above	**98 MC**	**14**	Oscillator Trimmer	Set trimmer #14 to receive 98 MC. signal as indicated by maximum meter reading.	Adjust trimmer #14 to obtain the symmetrical pattern shown above. Correct setting of trimmer #14 is obtained when cross-over point in pattern is centrally located.
Same as above		Same as above	Same as above	Same as above	Same as above	**98 MC**	**15**	R.F. Trimmer	Adjust trimmer #15 for maximum meter reading.	Adjust trimmer #15 for maximum amplitude of pattern.
							12 and 13	1st I.F.	Recheck adjustment of these trimmers for maximum meter reading.	Recheck adjustment of these trimmers for maximum amplitude and symmetry of pattern.
Same as above		Same as above	Same as above	Same as above	Same as above	**98 MC**	**16**	Antenna Trimmer	Adjust trimmer #16 for maximum meter reading.	Adjust trimmer #16 for maximum amplitude of pattern.
Check calibration and tracking of receiver with input signals of 88 and 108 MC. If necessary, adjust spacing of gang condenser plates.										

STEWART-WARNER CORP. **MODELS B72CR1, 9038B**

FREQUENCY RANGES
- **Broadcast** .... 540-1600 KC
- **FM** .... 88-108 MC

POWER OUTPUT
- **Undistorted** .... 1 watt
- **Maximum** .... 2.5 watts

SPEAKER .... 8" PM Dynamic

INTERMEDIATE FREQUENCY .... FM—10.7 MC / AM—455 KC

CIRCUIT DESCRIPTION

This receiver operates on 60 cycle Alternating Current (A.C.) at 105 to 125 volts. Rectified B+ voltage is obtained by using a miniature selenium type rectifier which is noted for reliability and long life.

The built-in antenna used for AM reception is a high impedance loop that is mounted at the rear of the chassis. Two 18" lengths of wire, arranged to form a dipole, serve as the built-in FM antenna.

Tuning of the radio frequency circuits of the receiver is accomplished by a 5 section gang condenser. Two sections are used to tune the AM antenna and oscillator circuits, and three sections are used to tune the FM antenna, R.F., and oscillator circuits.

An R.F. amplifier stage is utilized to give maximum sensitivity and selectivity as well as high image rejection on FM reception. Although this stage is switched out of the circuit on AM reception, overall receiver sensitivity is adequate for highly satisfactory reception where station signals are of moderate strength.

Both transformer coupled I.F. stages are used for FM and one stage is used for AM. The first and second I.F. transformers have two sets of windings; one set is tuned to 455 KC for AM operation and the other is tuned to 10.7 MC for FM operation. Switching of the windings, to alleviate undesired beat frequencies, is necessary only in the first I.F. transformer.

Detection of amplitude modulated 455 KC signals is accomplished by the 12AV6 diode rectification circuit.

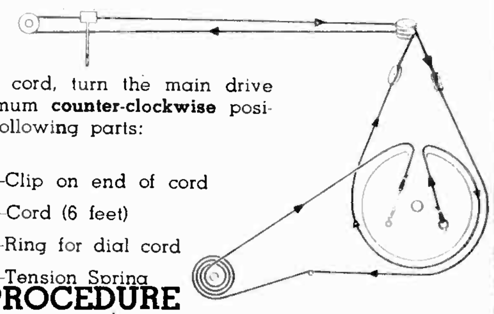
Frequency modulation detection is accomplished by an entirely new circuit that is known as the "RATIO DISCRIMINATOR." This FM detector circuit has the unusual ability to reject noise or other brief variations in amplitude of the signal. The relative insensitivity of the Ratio Discriminator to signal amplitude variation makes it possible to eliminate the use of a "limiter" stage that usually precedes the discriminator in other types of FM detector systems. It will therefore be noted that this receiver utilizes a normal I.F. amplifier stage instead of a low gain limiter stage preceding the FM discriminator.

Audio frequency output from both AM and FM detectors is amplified through the triode section of the 12AV6. The audio power amplifier stage incorporates a 50B5 tube which is coupled to a permanent magnet dynamic speaker. A special inverse feedback arrangement is used which reduces distortion and contributes to exceptionally good tone quality.

DIAL AND POINTER DRIVE CORD ARRANGEMENT

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

114955—Clip on end of cord
117057—Cord (6 feet)
119087—Ring for dial cord
161384—Tension Spring

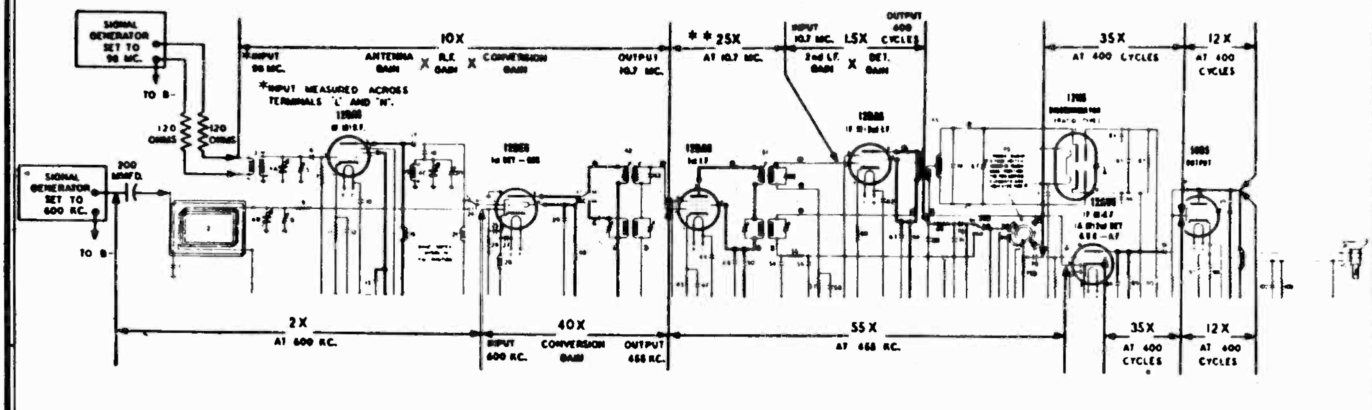


STAGE GAIN MEASUREMENT PROCEDURE

REQUIRED INSTRUMENTS: The amount of amplification or "gain" of each of the stages of this receiver should be measured with an A. C. Vacuum Tube Voltmeter of the high frequency type (uniform response up to 100 MC). A conventional "AM" type signal generator may be used but it must be capable of producing **fundamental frequencies of 600 KC. and 98 MC—avoid using a generator that produces the 98 MC. signal by means of harmonics.**

PROCEDURE: It is exceedingly important to adhere to the procedure outlined below since the accuracy of these measurements will be affected to a considerable extent by the failure to establish proper operating conditions.

1. Be sure that R.F., I.F. and Discriminator stages are carefully and accurately aligned by utilizing the alignment procedure given in this manual.
2. Connect Signal Generator as shown below. Note that generator connections differ for "AM" and "FM" measurements.
3. For "AM" measurements, set signal generator to 600 KC. and then carefully tune radio receiver to this signal by using an output meter to indicate peak output. If a local station interferes, set generator to a nearby frequency and re-tune the receiver.
4. For "FM" measurements, set signal generator to 98 MC. and then carefully tune radio receiver to this signal by using a D. C. Vacuum Tube Voltmeter as an output indicator—meter must be connected between pin #3 of 12H6 tube and B—. If a local station interferes, set generator to a nearby frequency and re-tune the receiver.
5. The values of stage gain which are given here were measured with a fixed bias of 1.5 volts on the control grids of all R.F. and I.F. tubes which are connected to the A.V.C. circuit. Therefore, these values are not intended to indicate the full capability of a stage but they will serve as a convenient basis for determining proper operation. In order to duplicate the fixed bias voltage, connect the negative terminal of a 1.5 volt battery to A.V.C. at terminal 7 of the 1st I.F. transformer and connect the positive battery lead to B—.
6. R.F. and I.F. circuits are slightly de-tuned when contact is made with an instrument probe and this action, which is indicated by a change in the output meter reading, may seriously affect the gain measurement. Therefore, it is important to adjust the associated circuit trimmer for a maximum output meter reading and to set the input signal level to a convenient reference point on the gain measuring instrument while the probe is making contact. After removing the probe it is again necessary to adjust the trimmer so as to obtain the same output meter reading and thereby assure that the signal voltage at the specified point has not changed as a result of circuit de-tuning.



** When measuring the gain of this stage with a vacuum tube voltmeter the input signal level for minimum meter indication may cause overloading. Under those conditions the measured gain will be found to be approximately 14X.

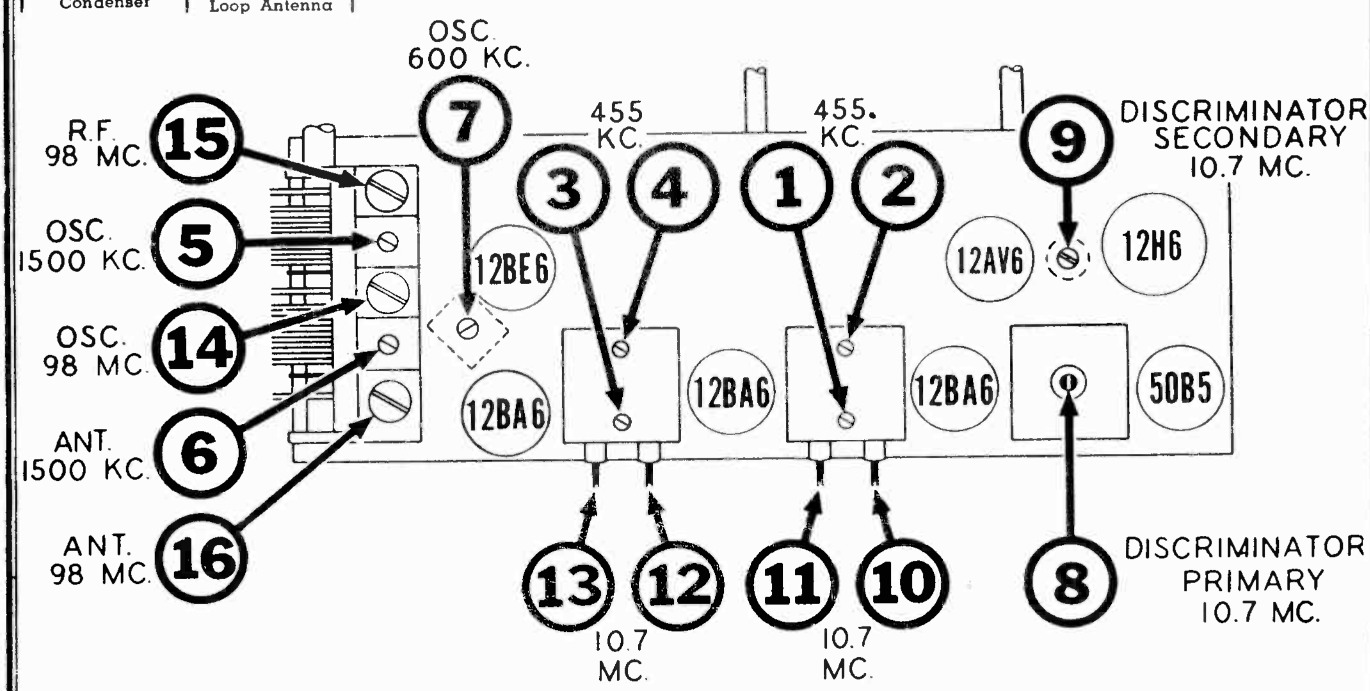
DIFFERENCES in tube characteristics, tolerance of parts, adjustment of tuned circuits and variations in line voltage will influence stage gain. These factors should be given due attention in event the gain of a stage varies extensively from the values shown above.

MODELS B72CR1, 9038B STEWART-WARNER CORP.

BROADCAST BAND — "AM" — ALIGNMENT PROCEDURE

1. With the gang fully meshed, the dial pointer should be in the position indicated by the last mark below 55 on the dial. If it is set incorrectly, release the pointer clip on the dial cord and reposition pointer.
2. During the alignment of this receiver, it will be necessary to set the dial pointer to the following frequencies: 1500 Kc., and 600 Kc. In order to avoid replacing the chassis in the cabinet each time a dial setting is required, it will be found more convenient to mark the required frequency points on the dial background before starting the alignment.
3. Disconnect leads from built-in FM antenna (do not disturb connections to built-in AM loop antenna); also disconnect phono plugs and speaker.
4. Remove chassis and AM loop antenna from cabinet. Place loop antenna in same position with respect to the chassis as is maintained when both units are mounted in the cabinet. Reconnect speaker.
5. Connect an output meter across speaker voice coil or from plate of the 50B5 tube to B through a 0.1 Mfd. condenser (see voltage chart for convenient B — connection).
6. Connect ground lead of signal generator to B – lug.
   CAUTION: If your signal generator is designed with an AC-DC type power supply, connect ground lead of signal generator to B — lug through a .25 Mfd. condenser.
7. Set "PHONO-RADIO" and Tone switch to "Radio-Bass" position (extreme counter-clockwise).
8. Set volume control to the maximum volume position and use a weak signal from the signal generator.
9. If alignment of both AM and FM channels is required, it is necessary to align the AM channel first; then align the FM channel as instructed in the preceding section.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF SIGNAL GENERATOR TO	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
200 MMFD. Mica Condenser	Pin #7 of 12BE6 tube.	455 KC	Broadcast (counter-clockwise)	Any point where it does not affect the signal.	1-2 3-4	2nd I.F. 1st I.F.	Adjust for maximum output. Then repeat adjustment.
200 MMFD. Mica Condenser	External Antenna Terminal (AM) on Loop Antenna	1500 KC	Broadcast (counter-clockwise)	1500 KC	5	Broadcast Oscillator	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Terminal (AM) on Loop Antenna	1500 KC	Broadcast (counter-clockwise)	Tune to 1500 KC Generator Signal	6	Broadcast Antenna	Adjust for maximum output.
200 MMFD. Mica Condenser	External Antenna Terminal (AM) on Loop Antenna	600 KC	Broadcast (counter-clockwise)	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.
200 MMFD. Mica Condenser	External Antenna Terminal (AM) on Loop Antenna	Repeat adjustment of trimmers 5 and 6 at 1500 Kc. Then re-check adjustment of trimmer 7 at 600 Kc.					

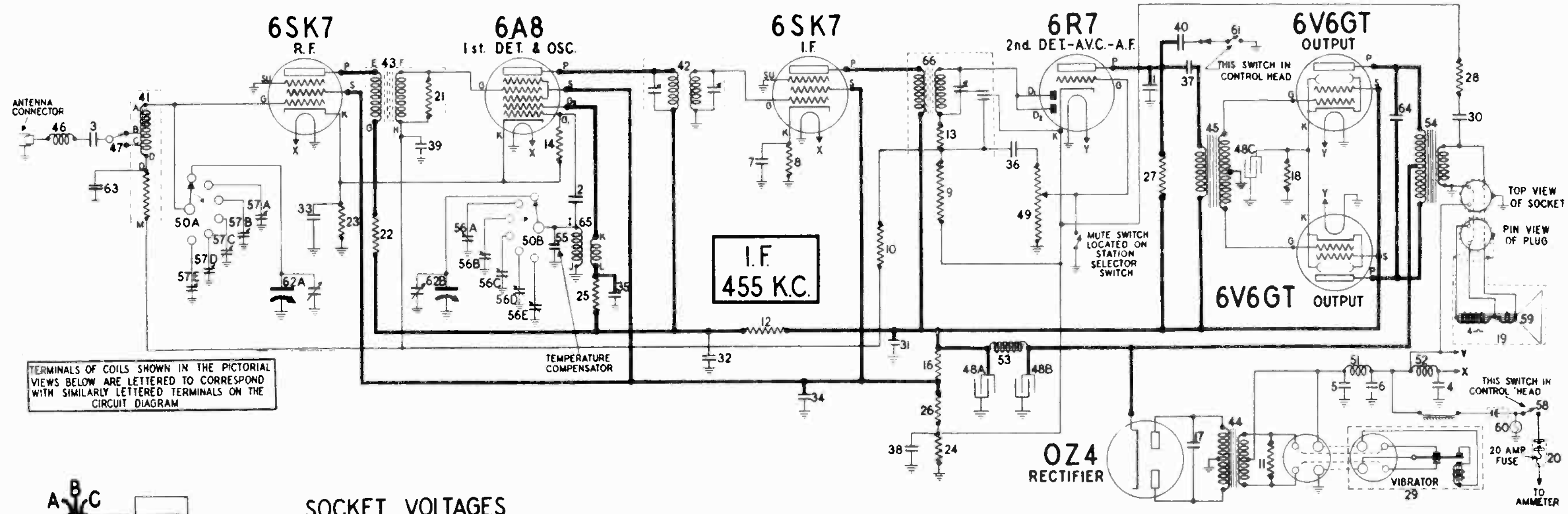


TRIMMER LOCATION CHART

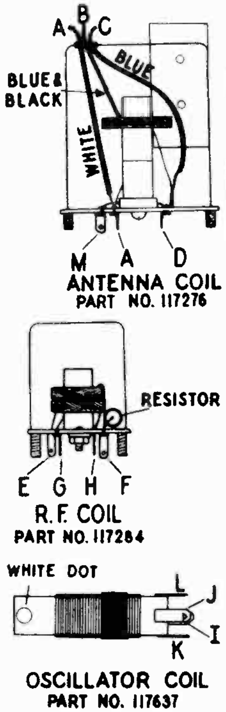
PACKARD MODELS PA-351099, PA-351100

STEWART-WARNER CORP.

MODELS R-3271, R-3271C



TERMINALS OF COILS SHOWN IN THE PICTORIAL VIEWS BELOW ARE LETTERED TO CORRESPOND WITH SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM



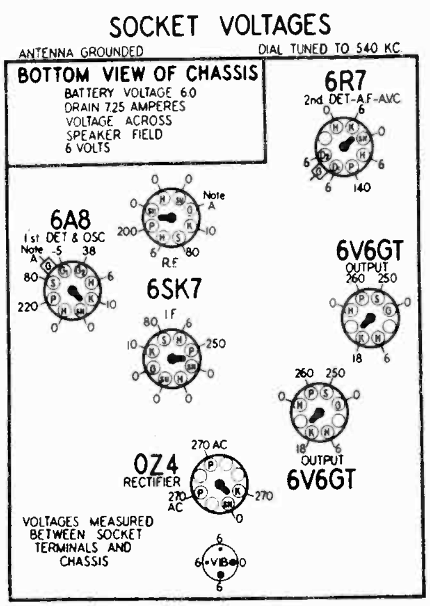
ANTENNA COIL PART NO. 117276

R.F. COIL PART NO. 117284

OSCILLATOR COIL PART NO. 117637

SOCKET VOLTAGES

ANTENNA GROUNDED — DIAL TUNED TO 540 KC



Use a voltmeter of at least 1000 ohms per volt.

NOTE A: Due to the high resistance of the A.V.C. circuit, accurate voltage measurements cannot be made at these points.

ELECTRICAL PARTS LIST

Diagram No.	Stewart Warner Part No.	Description
1-2	83539	Condenser—mica 260 mmfd.
3	88205	Condenser—mica 2100 mmfd.
4	88298	Condenser—.25 mfd. 150 volt
5-6-7	113561	Condenser—paper .5 mfd. 150 volt
8	112963	Resistor—insulated 330 ohms ¼ watt
9	112970	Resistor—insulated 330,000 ohms ¼ watt
10	112973	Resistor—insulated 1.5 meg. ¼ watt
11	112976	Resistor—wire wound 220 ohms ½ watt
12	112980	Resistor—insulated 1000 ohms ¼ watt
13	112982	Resistor—insulated 27,000 ohms ¼ watt
14	112987	Resistor—insulated 220,000 ohms ¼ watt
15	112993	Resistor—carbon 470,000 ohms 1/10 watt
16	112998	Resistor—insulated 22,000 ohms 2 watts
17	114277	Condenser—oil filled .01 mfd. 2000 volts
18	114335	Resistor—wire wound 430 ohms 2 watts
19	M-115065	Speaker—dynamic
20	116049	Fuse—20 amp. 25 volt
21	116052	Resistor—carbon 33,000 ohms 1/10 watt
22	116063	Resistor—10,000 ohms ¼ watt
23-24	116072	Resistor—1,000 ohms ¼ watt
25-26	116074	Resistor—22,000 ohms 1 watt
27	116075	Resistor—27,000 ohms 1 watt
28	116082	Resistor—1,500 ohms ¼ watt
29	116202	Vibrator
30-31-32-33-34	116625	Condenser—.1 mfd. 600 volt
35-36	116640	Condenser—.01 mfd. 600 volt
37-38	116706	Condenser—.2 mfd. 600 volt
39	116819	Condenser—.05 mfd. 600 volt
40	116893	Condenser—.02 mfd. 600 volt
41	117276	Coil—antenna (in shield)
42	117281	Transformer—1st I. F.
43	117284	Coil—R. F.
44	117297	Transformer—power
45	117306	Transformer—input
46	117308	Antenna Motor Noise choke coil
47	117313	Switch—antenna
48A to 48C	117314	Condenser—multiple electrolytic: Section A—10 mfd. 450 volt; Section B—10 mfd. 450 volt; Section C—10 mfd. 35 volt
49	117321	Volume control—1 meg. without switch.
50A-50B	117331	Switch for station selector
51-52	117332	Choke coil in "A" line
53	117334	Choke—filter
54	117339	Transformer—output
55	117341	Condenser (temperature compensating)
56A to 56E	117345	Push button trimmer 5 sec. for oscillator
57A to 57E	117346	Push button trimmer 5 sec. for antenna
58	117402	Switch—"on"—"off"
59	M-117487	Cone and voice coil assembly for M-115065 speaker
60	117499	Dial lamp—6 to 8 volt mazda 55
61	117501	Switch for tone control
62A-62B	117547	Condenser—variable gang
63-64	117571	Condenser—.008 mfd. 600 volt
65	117637	Coil—oscillator
66	117638	Transformer—2nd I. F.

ALIGNMENT PROCEDURE

1. Remove the top cover and connect output meter. If the meter has a 2 volt scale or less, connect from chassis to the lug with the white wire on the back of the speaker socket. If a less sensitive meter is used, it should be connected in series with a .1 mfd. condenser across the plates of the 6V6GT output tubes.

2. The volume control should be turned to maximum and the bottom of the receiver must be in place during alignment.

3. DIAL CALIBRATION: Before connecting the tuning cable, close the gang condenser (fully meshed). Turn the tuning knob on the control head clockwise until you reach appreciable resistance, then turn the knob counter-clockwise one whole turn. Now connect the tuning control cable as well as all other cables to the chassis and place the control head in a position where it will not be necessary to move it until the alignment procedure is completed. Turn the tuning knob clockwise as far as possible. At this time the last dial division below 55 should be in line with the center of the tuning shaft. If it is not, the dial may easily be moved to the correct position. IMPORTANT. Do not move the control head or radio again until the alignment is complete as this has a tendency to shift the dial position with respect to the tuning condenser position and the setting of the dial will no longer be correct.

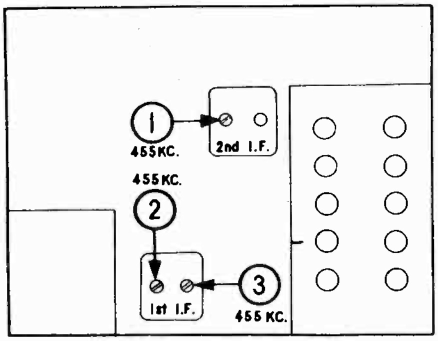
4. The station selector push button should be pushed until a position is reached where the set can be tuned manually with the tuning knob.

5. Remove the small chrome button on side of receiver case and turn the antenna switch so that the slot points toward the WHITE dot on the receiver case. This is the position for the cowl type antenna.

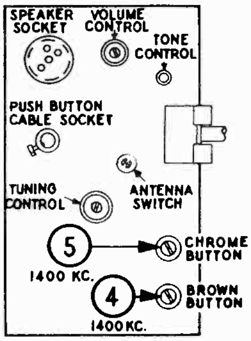
Dummy Ant. in Series With Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. CONDENSER	Control Grid of 6A8 Tube (do not remove grid cap)	455 KC	Any Point Where It Does Not Affect Signal	1	2nd I.F.	Adjust for maximum output, then repeat.
				2-3	1st I.F.	
*60 MMFD. MICA CONDENSER	Clip to Lug on Back of Antenna Socket	1400 KC	Exactly 1400 KC	4	Oscillator Shunt	Adjust for maximum output.
				5	Antenna Shunt	

After the set has been installed, the antenna switch under the small chrome button should be turned so that the slot points toward the red dot if an under car antenna is used, or to the white dot for a cowl antenna. Then tune in a weak signal at about 1360 to 1450 KC. and adjust the antenna shunt condenser, No. 5 (under the large chrome button) until maximum volume is obtained.

*If you do not have a 60 mmfd. mica condenser available, use a 250 mmfd. and turn antenna switch described in No. 5 to the red dot.



TOP VIEW



END VIEW

PARTS LIST

Stewart-Warner Part Number — *Description*

IGNITION NOISE SUPPRESSION PARTS

117251—Distributor Suppressor (screw type) 5000 ohms
117301—Condenser—1 mfd. 200 volt (generator)
117302—Condenser—.5 mfd. 200 volt (ignition)

CONTROL HEAD PARTS

117462—"A" cable & socket (from control head to set; 16 inch)
117494—Ammeter cable with bayonet tip
117496—Ammeter cable with fuse housing
117493—Cable for tone control
111658—Clip—for dial drum retainer
114851—Clip—hairpin type; on control shafts
117451—Clutch spring—for tuning dial drum
116948—Cord—dial drive (supplied in 6 ft. lengths)
117466—Dial drive drum (less scale)
117499—Dial lamp 6 to 8 volt (Mazda 55)
117503—Dial scale & disc assembly (less drive drum)
117468—Flexible drive shaft & housing (tuning)
117473—Flexible drive shaft & housing (volume)
83319—Fuse insulator tube
117256—Gland nut
117257—Gland nut cover
117255—Knob—metal for tuning or volume
117453—Light shield—felt pad on push button shaft
117465—Pawl assembly for station indicator dial drum
117492—Pilot light socket assembly
117480—Push button control cable housing
117482—Push button control cable with tip

PARTS LIST (Continued)

Stewart-Warner Part Number — *Description*

117397—Push button (station selector)
117416—Push button (tone)
85827—Set screw—8-32 square head
117258—Spacer—on control shaft
113177—Spring—dial cord tension
117497—Spring—tension
117498—Spring—tension
117464—Station indicator dial assembly
117402—Switch—"on"-"off"
117417—Trip—for "on"-"off" switch
111456—Washer—spring washer

CASE SECTIONS AND SPEAKER SHELL

110236—Anti Rattle Clips for case
117320—Bottom cover for case
117330—Case for speaker (less back cover)
117342—Cover for back of speaker
117344—Grill cloth for speaker
117329—Grill screen for speaker shell
117435—Plug button (brown finish)
110413—Plug button—chrome plate
117436—Plug button (nickel plated)
117439—Receiver case—wrap around section only
117443—Top cover & monogram

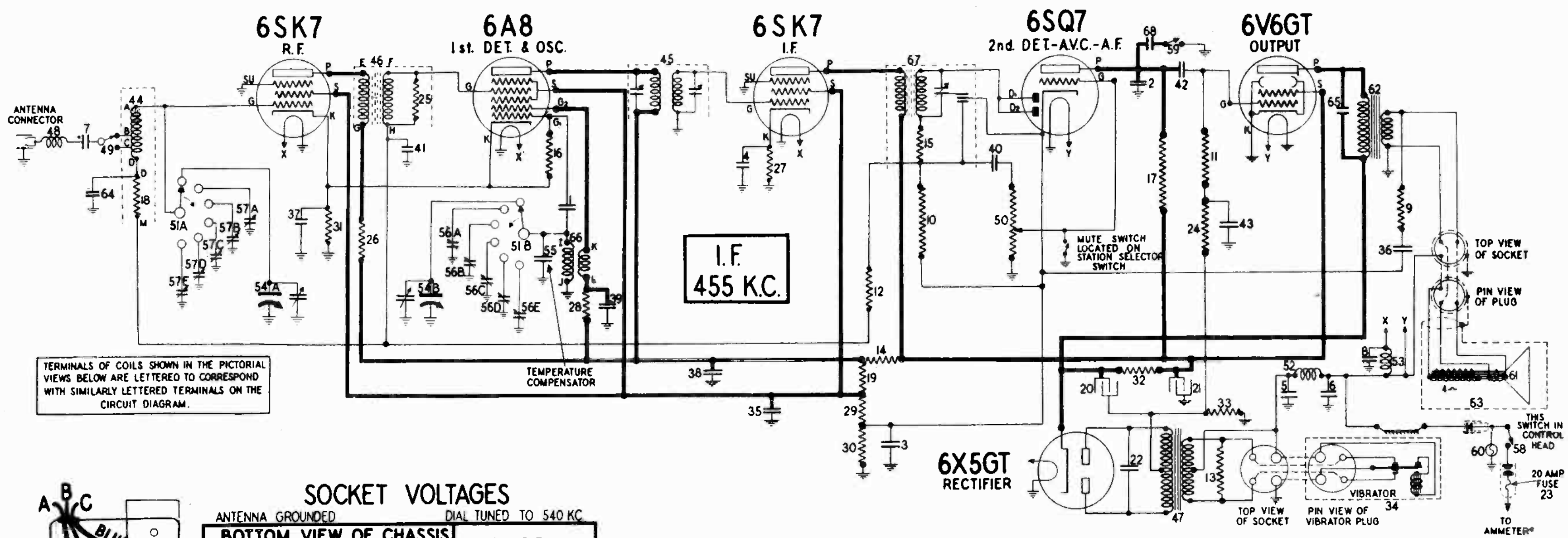
MISCELLANEOUS PARTS

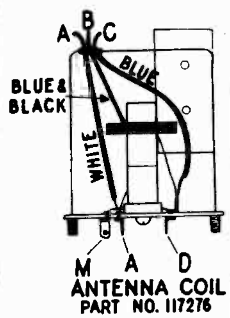
117377—"A" cable (bayonet tip)
117434—Antenna lead & socket
117548—Brass & fibre gear assembly—condenser drive
117328—Cable for speaker
117254—Call letter tabs
114253—Clamp—for vibrator
112745—Clip—coil mounting
110189—Coupling for drive shaft
79106—Lockwasher for mounting set to bulkhead
79105—Lockwasher for mounting speaker
12387—Nut—5/16 Hex. for mtg. speaker
79107—Nut for mounting set to bulkhead
64459—Nut for retaining "A" cable to ammeter terminal
85040—Screw—No. 6 Hex. Hd.
117347—Socket—for speaker plug
116690—Socket (octal base) (small)
117253—Stud—for speaker mounting
117252—"T" bolt—for mounting case
110237—Tube shield cap (for metal tube)
88262—Vibrator socket (4 prong)
45233—Washer for mounting speaker
77477—Washer for mounting set to bulkhead
117549—Worm gear with set screw—condenser drive

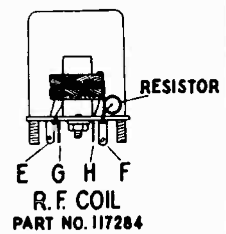
PACKARD MODELS PA-351099, PA-351100

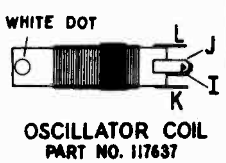
STEWART-WARNER CORP.

MODELS R-3291, R-3291C



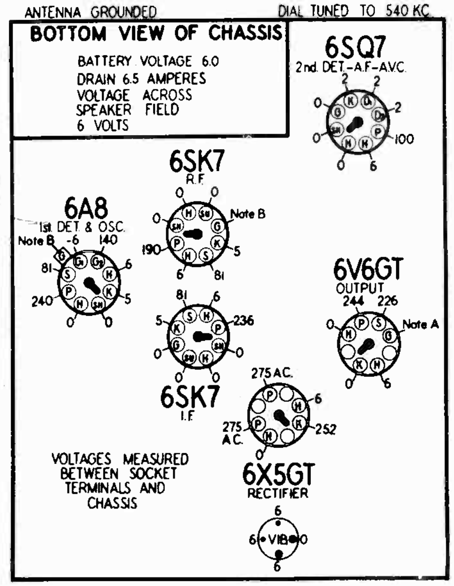






SOCKET VOLTAGES

ANTENNA GROUNDED DIAL TUNED TO 540 KC



Use a voltmeter of at least 1000 ohms per volt.

NOTE A—The voltage appearing at this point is measured across resistor number 33 and is -14.5 volts.

NOTE B—Due to the high resistance of the A.V.C. circuit, accurate voltage measurements cannot be made at these points.

ELECTRICAL PARTS LIST

Diagram No.	Stewart Warner Part No.	Description
1-2	83539	Condenser—mica 260 mmfd.
3	83784	Condenser—mica, 110 mmf.
4-5-6	113561	Condenser—paper .5 mfd. 150 volt
7	88205	Condenser—mica 2100 mmfd.
8	88298	Condenser—.25 mfd. 150 volt (low loss)
9	112964	Resistor—insulated 1500 ohm ¼ watt
10	112970	Resistor—insulated 330,000 ohms ¼ watt
11	112971	Resistor—insulated 470,000 ohms ¼ watt
12	112973	Resistor—insulated 1.5 megohm ¼ watt
13	112976	Resistor—wire wound 220 ohms ½ watt
14	112980	Resistor—insulated 1,000 ohm ¼ watt
15	112982	Resistor—insulated 27,000 ¼ watt
16-17	112987	Resistor—insulated 220,000 ohms ¼ watt
18	112993	Resistor—carbon 470,000 ohms 1/10 watt
19	112998	Resistor—insulated 22,000 ohms 2 watt
20-21	114258	Condenser—electrolytic 8 mfd. 450 volts
22	114277	Condenser—oil filled .01 mfd. 2000 volts
23	116049	Fuse—20 amp. 25 volt
24	116051	Resistor—insulated 33,000 ohms ¼ watt
25	116052	Resistor—carbon 33,000 ohms 1/10 watt
26	116063	Resistor—insulated 10,000 ohms ¼ watt
27	116072	Resistor—insulated 1000 ohms ¼ watt 10%
28	116074	Resistor—22,000 ohms 1 watt
29	116075	Resistor—insulated 27,000 ohms 1 watt
30	116078	Resistor—560 ohms ¼ watt
31	116080	Resistor—insulated 680 ohms ¼ watt
32	116081	Resistor—insulated 1,500 ohms 2 watts
33	116083	Resistor—insulated 300 ohms 2 watts wire wound

Diagram No.	Stewart Warner Part No.	Description
34	116202	Vibrator
35-36-37-38	116625	Condenser—.1 mfd. 600 volt
39-40	116640	Condenser—.01 mfd. 600 volt
41	116819	Condenser—.05 mfd. 600 volt
42-43	116893	Condenser—.02 mfd. 600 volt
44	117276	Coil—antenna (in shield)
45	117281	Transformer—1st I.F.
46	117284	Transformer—R.F.
47	117297	Transformer—power
48	117308	Antenna motor noise choke coil
49	117313	Switch—antenna
50	117321	Volume control—1 meg. without switch
51A-51B	117331	Switch for station selector
52-53	117332	Choke coil in "A" line
54A-54B	117338	Condenser—variable gang
55	117341	Condenser—temperature compensating
56A to 56E	117345	Push button trimmer gang oscillator section
57A to 57E	117346	Push button trimmer gang antenna section.
58	117402	Switch—"ON-OFF"
59	117491	Tone switch & cover assembly
60	117499	Dial lamp 6-8 volt (Mazda 55)
61	U-117509	Cone & voice coil assembly for U-115067 speaker
62	117565	Output transformer
63	U-115067	Speaker—dynamic 6 inch
64-65	117571	Condenser—.008 mfd. 600 volt
66	117637	Coil—oscillator
67	117723	Transformer—2nd I.F.
68	117725	Condenser—.015 mfd. 600 volt

MODELS R-3291,R-3291C STEWART-WARNER CORP.

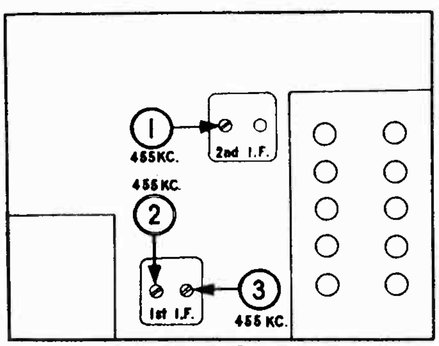
ALIGNMENT PROCEDURE

1. Remove the top cover and connect output meter. If the meter has a 2 volt scale or less, connect from chassis to the lug with the white wire on the back of the speaker socket. If a less sensitive meter is used, it should be connected in series with a .1 mfd. condenser from the 6V6GT plate to chassis.
2. The volume control should be turned to maximum and the bottom of the receiver must be in place during alignment.
3. DIAL CALIBRATION: Before connecting the tuning cable, close the gang condenser (fully meshed). Turn the tuning knob on the control head clockwise until you reach appreciable resistance, then turn the knob counter-clockwise one whole turn. Now connect the tuning control cable as well as all other cables to the chassis and place the control head in a position where it will not be necessary to move it until the alignment procedure is completed. Turn the tuning knob clockwise as far as possible. At this time the last dial division below 55 should be in line with the center of the tuning shaft. If it is not, the dial may easily be moved to the correct position. IMPORTANT. Do not move the control head or radio again until the alignment is complete as this has a tendency to shift the dial position with respect to the tuning condenser position and the setting of the dial will no longer be correct.
4. The station selector push button should be pushed until a position is reached where the set can be tuned manually with the tuning knob.
5. Remove the small chrome button on side of receiver case and turn the antenna switch so that the slot points toward the WHITE dot on the receiver case. This is the position for the cowl type antenna.

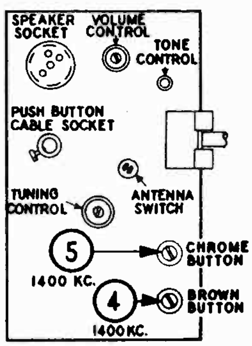
Dummy Ant. in Series With Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. CONDENSER	Control grid of 6A8 tube (do not remove grid cap)	455 KC	Any point where it does not affect signal	1	2nd I.F.	Adjust for maximum output, then repeat.
				2-3	1st I.F.	
*60 MMFD. MICA CONDENSER	Clip to lug on back of antenna socket	1400 KC	Exactly 1400 KC	4	Oscillator Shunt	Adjust for maximum output.
				5	Antenna Shunt *	

After the set has been installed, the antenna switch under the small chrome button should be turned so that the slot points toward the red dot if an under car antenna is used or to the white dot for a cowl antenna. Then tune in a weak signal at about 1360 to 1450 KC. and adjust the antenna shunt condenser, No. 5 (under the large chrome button) until maximum volume is obtained.

*If you do not have a 60 mmfd. mica condenser available, use a 250 mmfd. and turn antenna switch described in No. 5 to the red dot.



TOP VIEW



END VIEW

PARTS LIST

Stewart-Warner Part Number — Description

IGNITION NOISE SUPPRESSION PARTS

117251—Distributor Suppressor (screw type) 5000 ohms
117301—Condenser—1 mfd. 200 volt (generator)
117302—Condenser—.5 mfd. 200 volt (ignition)

CONTROL HEAD PARTS

117462—"A" cable & socket (from control head to set; 16 inch)
117494—Ammeter cable with bayonet tip
117496—Ammeter cable with fuse housing
111658—Clip—for dial drum retainer
114851—Clip—hairpin type; on control shafts
117451—Clutch spring—for tuning dial drum
116948—Cord—dial drive (supplied in 6 ft. lengths)
117466—Dial drive drum (less scale)
117499—Dial lamp 6 to 8 volt (Mazda 55)
117503—Dial scale & disc assembly (less drive drum)
117468—Flexible drive shaft & housing (tuning)
117473—Flexible drive shaft & housing (volume)
83319—Fuse insulator tube
117256—Gland nut
117257—Gland nut cover
117255—Knob—metal for tuning or volume
117512—Light shield—felt pad on push button shaft
117465—Pawl assembly for station indicator dial drum
117492—Pilot light socket assembly
117480—Push button control cable housing
117482—Push button control cable with tip
117397—Push button (station selector)

PARTS LIST (Continued)

Stewart-Warner Part Number — Description

85827—Set Screw—8-32 square head
117258—Spacer—on control shaft
113177—Spring—dial cord tension
117497—Spring—tension
117498—Spring—tension
117464—Station indicator dial assembly
117402—Switch "on"-"off"
117417—Trip—for "on"-"off" switch
111456—Washer—spring washer

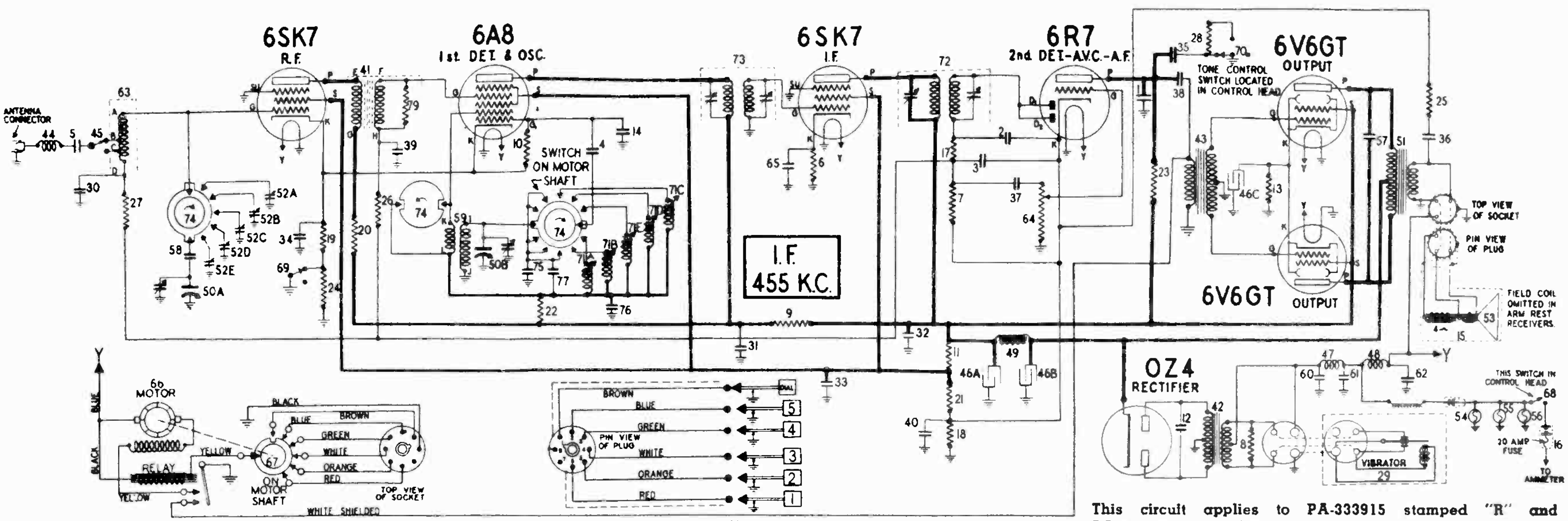
CASE SECTIONS AND SPEAKER SHELL

110236—Anti Rattle Clips for case
117542—Back cover for speaker (with dust seal)
117320—Bottom cover for case
117545—Case for speaker (less back cover)
117540—Grill cloth for speaker
117541—Grill screen for speaker shell
117435—Plug button (brown finish)
110413—Plug button—chrome plate
117436—Plug button (nickel plated)
117515—Receiver case—wrap around section only
117444—Top cover & monogram

MISCELLANEOUS PARTS

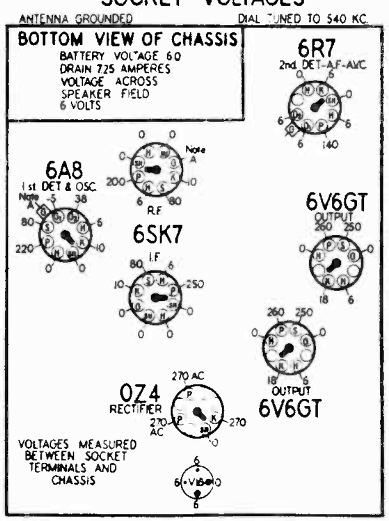
117377—"A" cable (bayonet tip)
117434—Antenna lead & socket
117548—Brass & fibre gear assembly—condenser drive
117636—Cable for speaker
117254—Call letter tabs
114253—Clamp—for vibrator
112745—Clip—coil mounting
110189—Coupling for drive shaft
79106—Lockwasher for mounting set to bulkhead
79105—Lockwasher for mounting speaker
12387—Nut—5/16 Hex. for mtg. speaker
79107—Nut for mounting set to bulkhead
64459—Nut for retaining "A" cable to ammeter terminal
85040—Screw—No. 6 Hex. Hd.
117347—Socket—for speaker plug
116690—Socket (octal base) (small)
117538—Stud—for speaker mounting
117252—"T" bolt—for mounting case
110237—Tube shield cap (for metal tube)
88262—Vibrator socket (4 prong)
77477—Washer for mtg. set to bulkhead
117549—Worm Gear with set screw—condenser drive

PACKARD MODELS PA-333915(Late chassis marked R),PA-353832 — STEWART-WARNER CORP. — MODELS 3341,3341-R(Late), 3371



This circuit applies to PA-333915 stamped "R" and PA-353832 with no letter.

SOCKET VOLTAGES



Use a voltmeter of at least 1000 ohms per volt. **NOTE A:** Due to the high resistance of the A.V.C. circuit, accurate voltage measurements cannot be made at these points. This chart applies to both circuit diagrams.

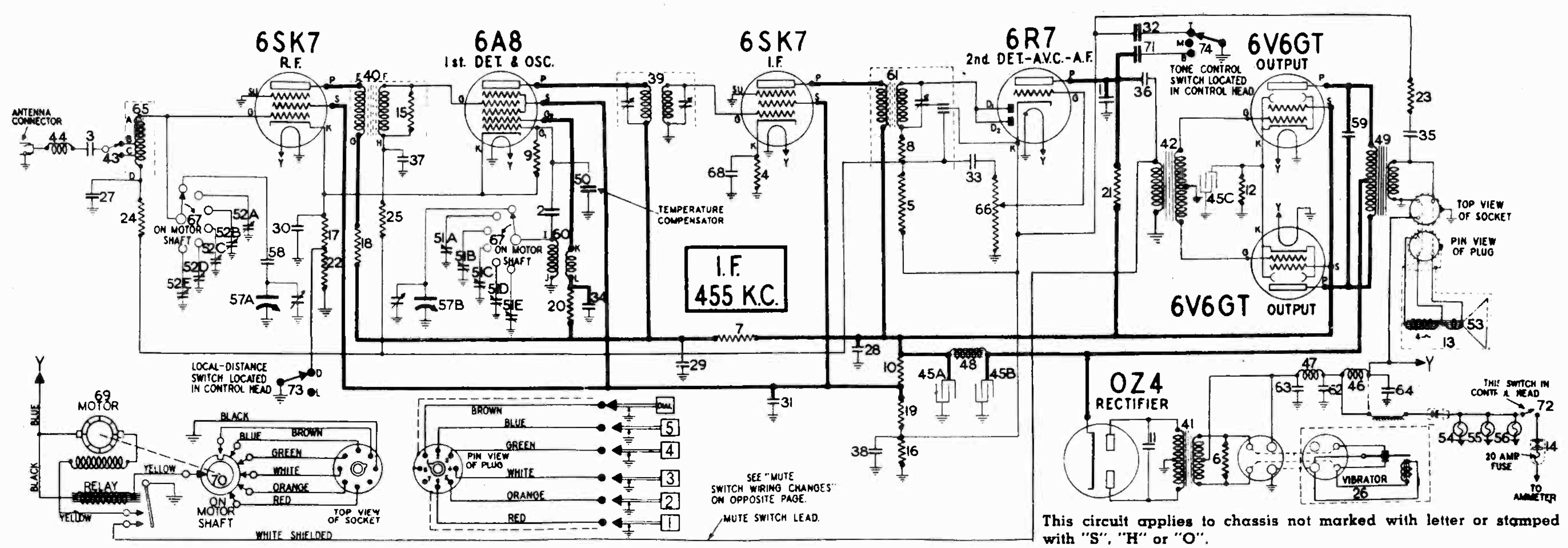
ELECTRICAL PARTS LIST

Diagram Number	Stewart-Warner Part Number	Description
1	83539	Condenser—mica 260 mmfd.
2-3	83783	Condenser—mica 110 mmfd.
4	85061	Condenser—mica 51 mmfd.
5	88205	Condenser—mica 2,100 mmfd.
6	112963	Resistor—insulated—330 ohms ¼ watt
7	112970	Resistor—insulated—330,000 ohms ¼ watt
8	112976	Resistor—wire wound—220 ohms ½ watt
9	112980	Resistor—insulated—1,000 ohms ¼ watt
10	112987	Resistor—insulated—220,000 ohms ¼ watt
11	112998	Resistor—insulated—22,000 ohms 2 watts
12	114277	Condenser—oil filled, .01 mfd. 2,000 volts
13	114335	Resistor—wire wound 430 ohms 2 watts
14	114499	Condenser—temperature compensating for oscillator
15	M-115065	Speaker—dynamic 8" (Custom Models Only)
	P-115079	Speaker—dynamic 6" (Arm Rest Models Only)
16	116049	Fuse—20 amp. 25 volt
17	116059	Resistor—insulated 22,000 ohms ¼ watt
18-19	116072	Resistor—1,000 ohms ¼ watt
20	116073	Resistor—insulated—10,000 ohms ½ watt
21-22	116074	Resistor—insulated—22,000 ohms 1 watt
23	116075	Resistor—27,000 ohms 1 watt
24	116080	Resistor—insulated—680 ohms ¼ watt (Resistor No. 24 omitted in Arm Rest Model)
25	116082	Resistor—insulated—1,500 ohms ¼ watt
26-27	116090	Resistor—insulated—3.3 megohms ¼ watt
28	116099	Resistor—insulated—4,700 ohms ¼ watt
29	116202	Vibrator—6 volt
30 to 35	116625	Condenser—.1 mfd. 600 volt
36	116625	Condenser—.1 mfd. 600 volt (Custom Models Only)
	116819	Condenser—.05 mfd. 600 v. (Arm Rest Models Only)
37	116640	Condenser—.01 mfd. 600 volt
38	116706	Condenser—.2 mfd. 600 volt
39	116819	Condenser—.05 mfd. 600 volt
40	116893	Condenser—.02 mfd. 600 volt
41	117284	Transformer—R.F.
42	117297	Transformer—power
43	117306	Transformer—input
44	117308	Antenna Motor Noise Choke Coil
45	117313	Switch—antenna
46A to 46C	117314	Condenser—multiple electrolytic: Section A—10 mfd. 450 volt; Section B—10 mfd. 450 volt; Section C—10 mfd. 35 volt
47-48	117332	Choke coil in "A" line
49	117334	Choke—filter
50A-50B	117338	Condenser—variable gang
51	117339	Transformer—output
52A to 52E	117346	Push button trimmer gang—antenna section
53	117487	Cone & Voice coil assembly for M-115065 speaker
54-55	117499	Dial lamp—6 to 8 volt Mazda 55 (Custom Models Only)
	85296	Dial lamp—6 to 8 volt Mazda 51 (Arm Rest Models Only)
56	117499	Dial lamp—6 to 8 volt Mazda 55 (Custom Models Only)
57-58	117571	Condenser—.008 mfd. 600 volt
59	117637	Coil—oscillator
60-61	118225	Condenser—.5 mfd. 150 volt
62	118231	Condenser—.25 mfd. 150 volt
63	118256	Antenna Coil—with shield
64	118270	Volume Control—1 megohm
65	118290	Condenser—.5 mfd. 150 volt
66	118299	Motor and switch assembly
67	118330	Motor control switch on motor
68	118550	Switch—"On"-"Off" (Custom Models Only)
	118790	Switch—"On"-"Off" (Arm Rest Models Only)
69	118551	Switch—Local Distance (Switch No. 69 omitted in Arm Rest Models)
70	118552	Switch—Tone Control (Custom Models Only)
	118894	Switch—Tone Control (Arm Rest Models Only)
71A to 71E	118756	Permeability Tuned Oscillator coil assembly
71A-71B	118888	Oscillator Coil—coil only (550-950 KC)
71C	118889	Oscillator Coil—coil only (700-1250 KC)
71D-71E	118890	Oscillator Coil—coil only (950-1580 KC)
	118891	Coil Plunger assembly (used on 118756 coil assembly)
72	118762	Transformer—2nd I.F.
73	118765	Transformer—1st I.F.
74	118770	Switch—station selector
75	118771	Condenser—silver mica—.0003 mfd.
76	118772	Condenser—silver mica—.00039 mfd.
77	118787	Condenser—temperature compensator
78	118793	Control Head Station Selector Switch (Arm Rest Models Only)
79	116052	Resistor—carbon—33,000 ohms 1/10 watt

INTERACTION BETWEEN TUNING COILS

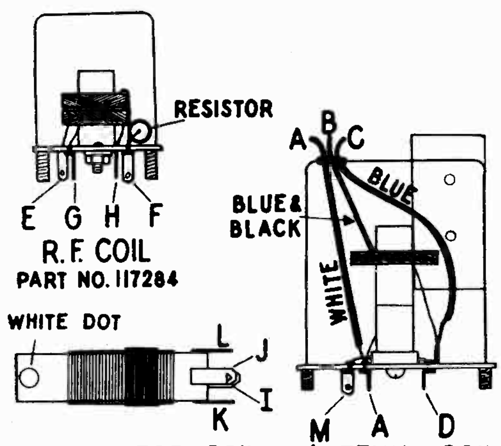
When setting up stations on either the inductance-tuned Custom or Arm Rest receivers, the adjustment of an adjacent coil plunger may affect the tuning of a station previously set up. Therefore, after all five stations have been set up, it is advisable to check the setting of all coils. Repeat this adjustment until no further change in tuning is experienced.

MODELS 3341, 3341-R (Late), 3371 — STEWART-WARNER CORP. PACKARD MODELS PA-333915 Early, PA-333915 Late, PA-353832



This circuit applies to chassis not marked with letter or stamped with "S", "H" or "O".

Terminal letters in illustrations correspond to letters on circuit diagrams.



R.F. COIL PART NO. 117284

OSCILLATOR COIL PART NO. 117637

ANTENNA COIL PART NO. 117256

ELECTRICAL PARTS LIST

Diagram Number	Stewart-Warner Part Number	Description
1	83539	Condenser—mica 260 mmfd.
2	85061	Condenser—mica 51 mfd.
3	88205	Condenser—mica 2100 mmfd.
4	112963	Resistor—insulated 330 ohms 1/4 watt
5	112970	Resistor—insulated 330,000 ohms 1/4 watt
6	112976	Resistor—wire wound 220 ohms 1/2 watt
7	112980	Resistor—insulated 1,000 ohms 1/4 watt
8	112982	Resistor—insulated 27,000 ohms 1/4 watt
9	112987	Resistor—insulated 220,000 ohms 1/4 watt
10	112998	Resistor—insulated 22,000 ohms 2 watts
11	114277	Condenser—oil filled .01 mfd. 2,000 volts
12	114335	Resistor—wire wound 430 ohms 2 watts
13	M-115065	Speaker—dynamic 8"
14	116049	Fuse—20 amp. 25 volt
15	116052	Resistor—carbon 33,000 ohms 1/10 watt
16-17	116072	Resistor—1,000 ohms 1/4 watt
18	116073	Resistor—insulated 10,000 ohms 1/2 watt
19-20	116074	Resistor—insulated 22,000 ohms 1 watt
21	116075	Resistor—27,000 ohms 1 watt
22	116080	Resistor—insulated 680 ohms 1/4 watt
23	116082	Resistor—insulated 1,500 ohms 1/4 watt
24-25	116090	Resistor—insulated 3.3 meg. 1/4 watt
26	116202	Vibrator—6 volt
27-28-29 30-31-32	116625	Condenser—.1 mfd. 600 volt
33-34	116640	Condenser—.01 mfd. 600 volt
35-36	116706	Condenser—.2 mfd. 600 volt
37	116819	Condenser—.05 mfd. 600 volt
38	116893	Condenser—.02 mfd. 600 volt
39	117281	Transformer—1st I.F.
40	117284	Transformer—R.F.
41	117297	Transformer—power
42	117306	Transformer—input
43	117308	Antenna motor noise choke coil
44	117313	Switch—antenna
45A to 45C	117314	Condenser—multiple electrolytic: Section A—10 mfd. 450 volt; Section B—10 mfd. 450 volt; Section C—10 mfd. 35 volt
46-47	117332	Choke coil in "A" line
48	117334	Choke—filter
49	117339	Transformer—output
50	117341	Condenser—temperature compensating
51A to 51E	117345	Push button trimmer gang oscillator section
52A to 52E	117346	Push button trimmer gang antenna section
53	M-117487	Cone and Voice coil assembly for M-115065 speaker
54-55-56	117499	Dial Lamp—6 to 8 volt Mazda 55
57	117547	Condenser—variable gang
58-59	117571	Condenser—.008 mfd. 600 volt
60	117637	Coil—oscillator
61	117638	Transformer—2nd I.F.
62-63	118225	Condenser—.5 mfd. 150 volt
64	118231	Condenser—.25 mfd. 150 volt
65	118256	Antenna coil—with shield
66	118270	Volume control—1 megohm
67A to 67B	118284	Switch—station selector
68	118290	Condenser—.5 mfd. 150 volt
69	118299	Motor and Switch assembly
70	118330	Motor control switch—on motor
71	118487	Condenser—.07 mfd. 600 volt
72	118550	Switch—"on"—"off"
73	118551	Switch—Local distance
74	118552	Switch—Tone control

MUTE SWITCH WIRING CHANGE

In chassis not marked with a change letter on the power transformer housing, the mute switch connects to the center terminal of the volume control and the red wire of the push-pull input transformer connects to B plus.

PACKARD MODELS PA-333915 Early, PA-333915 Late, PA-353832 STEWART-WARNER CORP. MODELS 3341, 3341-R (Late), 3371

ALIGNMENT PROCEDURE

1. Remove the top cover and connect output meter. If the meter has a 2 volt scale or less, connect from chassis to the lug with the white wire on the back of the speaker socket. If a less sensitive meter is used, it should be connected in series with a .1 mfd. condenser across the plates of the 6V6GT output tubes.

2. The volume control should be turned to maximum and the bottom of the receiver must be in place during alignment.

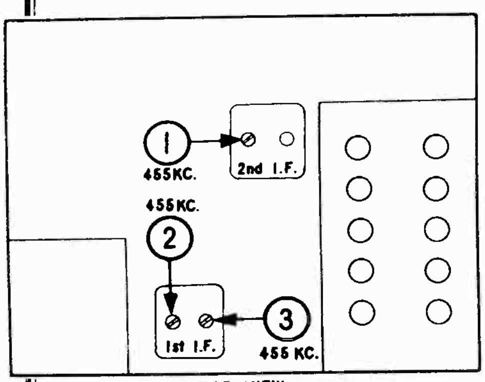
3. DIAL CALIBRATION: In Custom Models with 6-button control head, hold down "DIAL" button until tuning motor stops running. Now tune in a station whose frequency in kilocycles is known. Hold the tuning control knob and with the eraser on the end of a lead pencil, move the dial until the correct frequency is indicated. In Arm Rest Models push the Automatic Station Selector Button until the word "DIAL" appears in the window of the control head escutcheon. Now tune in a station whose frequency is known. Pull off the tuning knob and loosen the set-screw underneath this knob. Now turn the tuning control until the dial indicates the frequency of the station you have tuned in, then retighten set-screw, and replace knob. IMPORTANT: Do not move the control head again until the alignment is complete as this has a tendency to shift the dial position with respect to the tuning condenser position and the setting of the dial will no longer be correct.

4. Remove the small chrome button on side of receiver case and turn the antenna switch so that the slot points toward the WHITE dot on the receiver case. This is the position for the cowl type antenna.

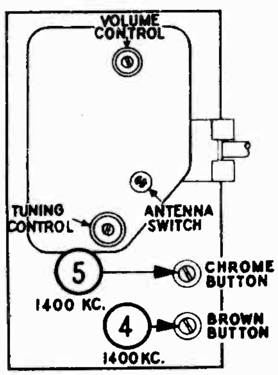
Dummy Ant. in Series With Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. CONDENSER	Control Grid of 6A8 Tube (do not remove grid cap)	455 KC	Any Point Where It Does Not Affect Signal	1-6	2nd I.F.	Adjust for maximum output, then repeat. **NOTE: Trimmer No. 6 is used on late radios only. It is adjacent to No. 1 on 2nd I.F. Transformer.**
				2-3	1st I.F.	
*60 MMFD. MICA CONDENSER	Clip to Lug on Back of Antenna Socket	1400 KC	Exactly 1400 KC	4	Oscillator Shunt	Adjust for maximum output.
				5	Antenna Shunt	

After the set has been installed, the antenna switch under the small chrome button should be turned so that the slot points toward the red dot if an under car antenna is used, or to the white dot for a cowl antenna. Then tune in a weak signal at about 1360 to 1450 KC. and adjust the antenna shunt condenser, No. 5 (under the large chrome button) until maximum volume is obtained.

*If you do not have a 60 mmfd. mica condenser available, use a 250 mmfd. and turn antenna switch described in No. 4 to the red dot.



TOP VIEW



END VIEW

MOTOR SHAFT BINDING

If the shafts of the tuning motor and the station selector switch are not in perfect alignment, binding of the shafts will result. Such binding may cause the motor to stall or else to run continuously, without changing stations.

If such binding occurs, it will be necessary to realign the motor and station selector switch shafts. Loosen the four screws holding the motor to the case. Then set the radio receiver on end so that the motor housing is on top. Remove the top cover and observe the shaft alignment between the end of the case and the R. F. housing while the motor is running. Now shift the position of the motor until the shafts line up and turn freely, then retighten the motor mounting screws.

If the shafts cannot be brought into alignment by shifting only the motor, it will be necessary to shift the position of the receiver chassis with respect to the case. Loosen the four screws mounting the chassis to the case and shift the chassis until the shafts can be brought into alignment.

CHIPS IN TUNING MOTOR

If metal chips or filings are present in the motor housing, they will eventually work their way into the drive gears, into the relay or into the air gap between the armature and field poles thus causing the motor to stall or operate erratically. These chips can best be removed by blowing them out with a blast of compressed air, although they can be removed using a small brush or similar device.

TONE CONTROL CIRCUIT CHANGES

The tone control circuit of the early and late Custom receiver differs. The latter circuit reduces high note response somewhat, thus reducing hiss and background noises. If a reduction in high note response is desired in the early sets, merely change condenser No. 35 to .05 mfd. This condenser is the one on the top of the output transformer.

MODELS 3341, 3341-R(Late), 3371 STEWART-WARNER CORP. PACKARD MODELS PA-333915 Early, PA-333915 Late, PA-353832

MISCELLANEOUS PARTS LIST

IGNITION NOISE SUPPRESSION PARTS

Stewart-Warner Part Number	Description	List Price
117251	Distributor Suppressor (screw type) 5000 ohms	$0.30
117301	Condenser—1 mfd. 200 volt (generator)	.70
117302	Condenser—.5 mfd. 200 volt (ignition)	.56

CONTROL HEAD PARTS FOR CUSTOM MODELS (6 button type)

118576	"A" lead with fuse housing
118572	Automatic tuning cable—with plug
118580	Bezel—chrome
118562	Bracket for mounting dial drum
118559	Bushing—dial drum shaft (brass eyelet)
118582	Casting for tuning mechanism
118575	Clamp—cable retaining
118433	Clamp—control mounting
118432	Clip—cable mounting
111658	Clip—for small gear
111160	Collar—drive cable retaining
118553	Control head assembly, complete with gland nuts and knobs
118581	Cover for tuning mechanism
118557	Dial drum
118558	Dial drum shaft—with gear
118571	Dial lamp socket—with lead
118404	Flexible drive shaft and housing (tuning)
118403	Flexible drive shaft and housing (volume)
118449	Gasket—push button .... Per C
118563	Gear—on dial support brackets
118566	Gear—on tuning shaft
118451	Gland nut
117257	Gland nut cover
117430	Knob—metal—for tuning or volume
118588	Light shield—metal bracket
118589	Metal grounding clips
118554	Push button body
118555	Push button cap—(chrome)
118577	Push button retainer bar
118578	Push button switch (3 section)
118579	Push button switch housing
118561	Retaining clip—for dial drum
118583	Retaining clip (small) in front of gear on tuning shaft
118567	Retaining clip—on tuning and volume shafts (1/2" O.D.)
79138	Screw—for mounting control head (No. 8-32 x 5/16 R.H.M.S.) .... Per C
85827	Set Screw—for trip; also control cable retaining
117258	Spacer washers
118560	Spring—on dial drum shaft
118584	Spring—(rectangular) in front of gear on tuning shaft
118568	Spring washer—on tuning shaft (1/2" O.D.)
118551	Switch—"Local Distance"
118550	Switch—"ON-OFF"
118552	Switch—tone control
118585	Toggle button for tone or local distance switch
118573	Tone control cable—with plug
118569	Trip—for on-off switch—with set screw
118565	Washer—on dial drum shaft (1 inch O.D.)
79146	Washer—under gland nut

CONTROL HEAD PARTS FOR ARM REST MODELS

118895	Cable—Station Selector
118796	Clamp—Cable
118856	Cover—Push Button Switch
118852	Dial Scale
118885	Escutcheon—for control head
118868	Flexible Shaft—tuning
118867	Flexible Shaft—volume
118786	Gear—(1" Diam.)—on station selector switch
118789	Idler gear and bracket assembly
118799	Knob—Push Button

CONTROL HEAD PARTS FOR ARM REST MODELS —(Continued)

Stewart-Warner Part Number	Description
118892	Knob—Tone Control
118798	Knob—Tuning or Volume
118797	Light Shield
118851	Rear Plate and Bushings for Control Head
118859	Screw—Chrome head—for mounting escutcheon
118861	Screw (No. 4-40 x 3/16) Retains 1" gear to station selector switch
118876	Screw No. 6 x 1/4" Self-Tapping
88360	Set Screw—No. 8-32 x 1/8"
118853	Shaft and Trip Arm Assembly
118778	Shaft—Tuning
118878	Socket—Dial Lamp
118855	Station Indicator Dial and Gear
118793	Switch—Control Head Station Selector
118790	Switch—"On"-"Off"
118894	Switch—Tone Control

CASE SECTIONS AND SPEAKER PARTS

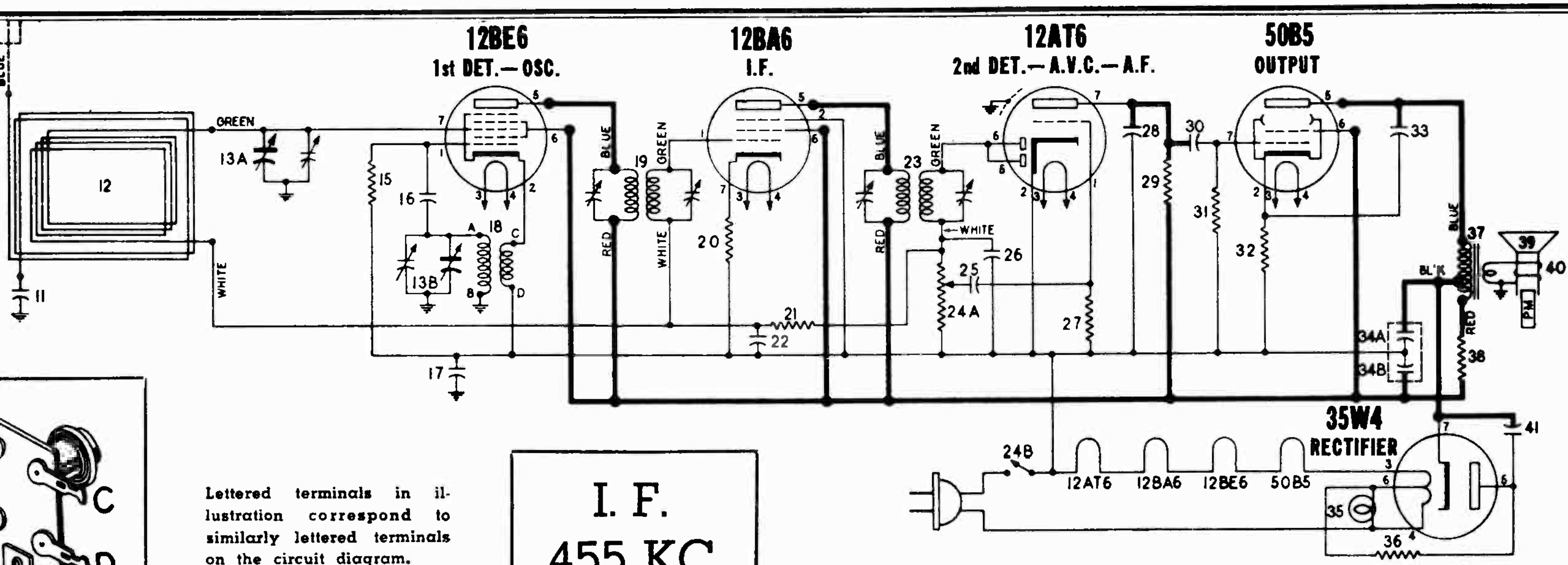
110236	Anti rattle clips for case
117320	Bottom cover for case
118276	Case cover for motor assembly
117330	Case for speaker (custom)
117342	Back cover for speaker case (custom)
117344	Grille Cloth for speaker (custom)
118884	Grille Ring—Speaker (arm rest)
119091	Grille Screen and Cloth (arm rest)
117329	Grille Screen for Speaker Shell (custom)
117435	Plug button (brown finish)
110413	Plug button—chrome plate
117436	Plug button—nickel plated
118265	Receiver case and motor case assembly less covers
118269	Top cover and monogram

MISCELLANEOUS PARTS

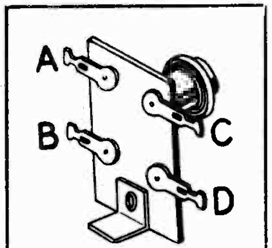
117377	"A" cable (bayonet tip) (custom)
118880	"A" Cable and Fuse Retainer (arm rest)
117434	Antenna lead and socket
118877	Antenna Lead Extension (arm rest)
117548	Brass and Fiber gear assembly—condenser drive
118590	Brush, carbon—for motor
117328	Cable for speaker (24") (custom)
118875	Cable—for speaker (arm rest)
118879	Cable—tone control (arm rest)
118441	Call letter tabs (custom)
118858	Tabs—station call letters (arm rest)
114253	Clamp—for vibrator
118432	Clip—Control Cable Mounting (arm rest)
112745	Clip—coil mounting
110189	Coupling for drive shaft
118470	"Dial" tab (custom)
83721	Grommet—for lead-in (arm rest)
79106	Lockwasher for mounting set to bulkhead
79105	Lockwasher for mounting speaker (custom)
12387	Nut—5/16 Hex. for mounting speaker (custom)
79107	Nut for mounting set to bulkhead
64459	Nut for retaining "A" cable to ammeter terminals
85040	Screw—No. 6 Hex. Hd. .... Per C
118886	Screw—No. 8 x 1" Self Tapping (for mtg. speaker) (arm rest)
116690	Socket—octal (small)
117347	Socket—for speaker plug
118297	Socket—for tone control plug
118331	Spacer—for mounting motor switch
117253	Studs—for mounting speaker (custom)
117252	"T" bolt—for mounting case (custom)
118899	"T" bolt—for mounting receiver case (arm rest)
110237	Tube shield cap (for metal tube)
77477	Washer for mounting set
118469	Window—for push button (custom)
117549	Worm gear with set screw—condenser drive
88262	Vibrator socket (4 prong)

STEWART-WARNER CORP.

MODELS 51T126, 51T136, 51T146, 51T176, 9018-B, 9018-C, 9018-F, 9018-H



I. F.
455 KC.



OSC. COIL
502934

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

SOCKET VOLTAGES

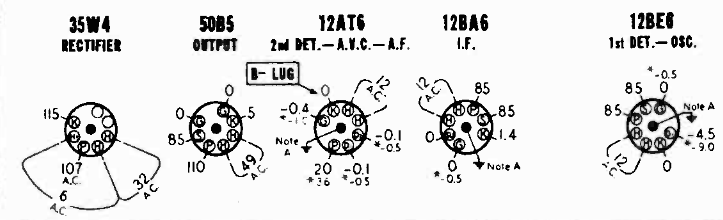
Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (*). The (*) symbol designates a vacuum tube voltmeter measurement.

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

BOTTOM VIEW OF CHASSIS

HEATER VOLTAGES MEASURED ACROSS SOCKET TERMINALS. ALL OTHER VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND B- LUG.

117 VOLT 60 CYCLE A.C. POWER SUPPLY USED FOR THESE MEASUREMENTS.



REAR OF CHASSIS

NOTE A: Grounding of center stud on tube socket is necessary to reduce capacity coupling between other pins. Oscillation may result if this ground is omitted.

PARTS LIST

CONDENSERS

11	502151	Condenser .01 Mfd. 400 volt
13-A, B	502925	Condenser—variable gang (with drum)
16	502929	Condenser—mica 47 Mmfd. 500 volt
17	502158	Condenser—.2 Mfd. 400 volt
22	502153	Condenser—.05 Mfd. 200 volt
25	502156	Condenser—.004 Mfd. 400 volt
26	502882	Condenser—220 Mmfd. 500 volt
28	502470	Condenser—.0008 Mfd. 400 volt
30	502156	Condenser—.004 Mfd. 400 volt
33	502152	Condenser—.02 Mfd. 400 volt
34-A, B	500256	Condenser—electrolytic A-40 Mfd. 150 volt, B-20 Mfd. 150 volt
41	502157	Condenser—.05 Mfd. 400 volt

RESISTORS

15	502130	Resistor—carbon 22,000 ohms 1/4 watt
20	502456	Resistor—carbon 220 ohms 1/4 watt
21	502135	Resistor—carbon 2.2 Meg. 1/4 watt
24-A, B	502928	Volume control—with switch; 1 Meg.
27	502136	Resistor—carbon 10 Meg. 1/4 watt
29	502134	Resistor—carbon 470,000 ohms 1/4 watt
31	502134	Resistor—carbon 470,000 ohms 1/4 watt
32	502932	Resistor—carbon 150 ohms 1 watt
36	502574	Resistor—carbon 33 ohms 1/2 watt
38	502933	Resistor—carbon 1500 ohms 1 watt

COILS AND TRANSFORMERS

12	502937	Loop antenna
18	502934	Coil—oscillator
19	502926	Transformer—1st I.F.
23	502927	Transformer—2nd I.F.
37	502817	Transformer—output for C-502816 spkr.
	504583	Transformer—output for W-502816 spkr

OTHER ELECTRICAL PARTS

35	118921	Lamp—dial (Mazda 47) 6-8V. 150 Ma.
39	504584	Cone & voice coil for W-502816 speaker
	502818	Cone & voice coil for C-502816 speaker
40	502816	Speaker—P.M. dynamic (4 inch)

MISCELLANEOUS PARTS

504556	Back for cabinet—(Models 51T126, 51T136, 51T146)
502940	Back for cabinet (Model 51T176)
116467	Base for mtg. electrolytic condenser
504598	Base—tube shield
500383	Cabinet—ivory (Model 51T176)
500261	Clamp—dial scale m't'g. (Model 51T176)
114955	Clip—retainer on end of dial cord
500497	Clip—retainer for cabinet back
117057	Cord—dial drive (4½ ft. required) per ft.
500324	Cover—cardboard for elect. condenser
504774	Dial scale glass (Models 51T126, 51T136, 51T146)
504912	Dial scale—glass (Model 51T176)
502564	Knob—ivory (Models 51T126, 51T146, 51T176)
502563	Knob—mahogany (Model 51T136)
502367	Pointer
81145	Retaining ring for tuning shaft
119087	Ring for dial cord
17064	Screw No. 4 x 3/32; for mtg. dial scale
83047	Screw No. 8 x 7/8; chassis mtg.
114628	Screw No. 8 x 1/2; chassis mtg.
501777	Screw No. 4 x 1/2; for mtg. back
502173	Shaft—tuning control
504599	Shield—tube
500499	Socket—dial lamp (with leads)
504397	Socket—miniature (black bakelite)
504597	Socket—miniature (wafer type)
161384	Spring—dial cord tension

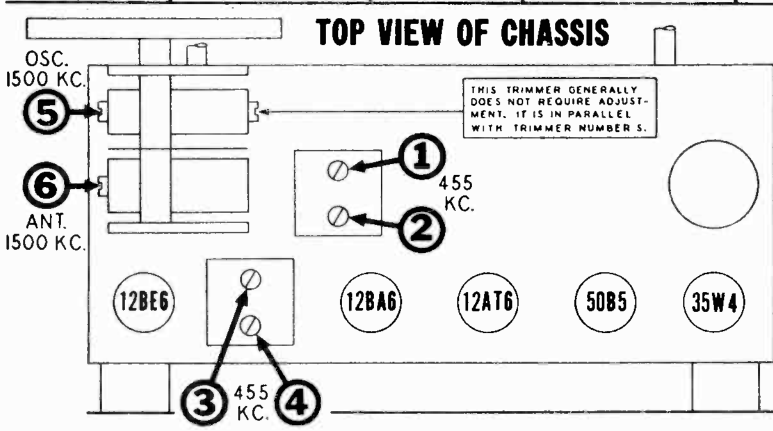
MODELS 51T126, 51T136, 51T146, 51T176, 9018-B, 9018-C, 9018-F, 9018-H

STEWART-WARNER CORP.

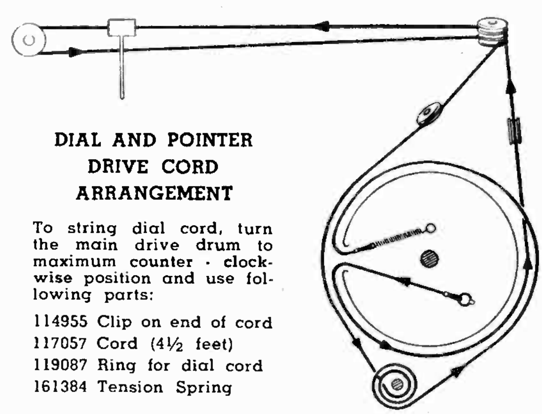
ALIGNMENT PROCEDURE

1. With the gang condenser fully meshed, the dial pointer should be in the position indicated by the last mark below 55 on the dial. If it is set incorrectly, release the pointer clip on the dial cord and reposition pointer.
2. Remove chassis from cabinet by taking out two screws which hold chassis to bottom of cabinet. Solder approximately 8" of insulated wire to any B— connection (see voltage chart on opposits side for convenient B— location).
3. Connect ground lead to signal generator to B— through a 0.25 Mfd. condenser.
4. Connect output meter across speaker voice coil (terminals at back of speaker) or from plate of 50B5 tube to B— through a 0.1 Mfd. condenser.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.

DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR	CONNECT HIGH SIDE OF GENERATOR TO	SIGNAL GENERATOR FREQUENCY	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
200 MMFD. Mica Condenser	Trimmer on rear section of gang.	455 KC	Any point where it does not affect the signal.	1-2	2nd I.F.	Adjust for maximum output. Then repeat adjustment.
				3-4	1st I.F.	
200 MMFD. Mica Condenser	External antenna lead on loop.	1500 KC	1500 KC	5	Broadcast Oscillator	Adjust for maximum output.
200 MMFD. Mica Condenser	External antenna lead on loop.	1500 KC	Tune to 1500 KC generator signal.	6	Broadcast Antenna	Adjust for maximum output.



TRIMMER LOCATIONS



DIAL AND POINTER DRIVE CORD ARRANGEMENT

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

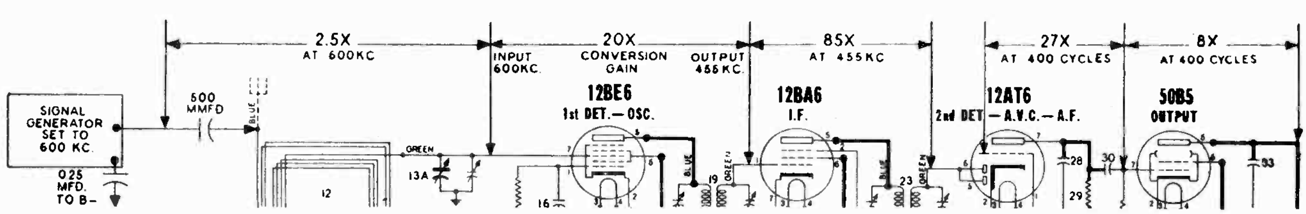
114955 Clip on end of cord
117057 Cord (4½ feet)
119087 Ring for dial cord
161384 Tension Spring

APPROXIMATE STAGE GAIN DATA

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

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

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

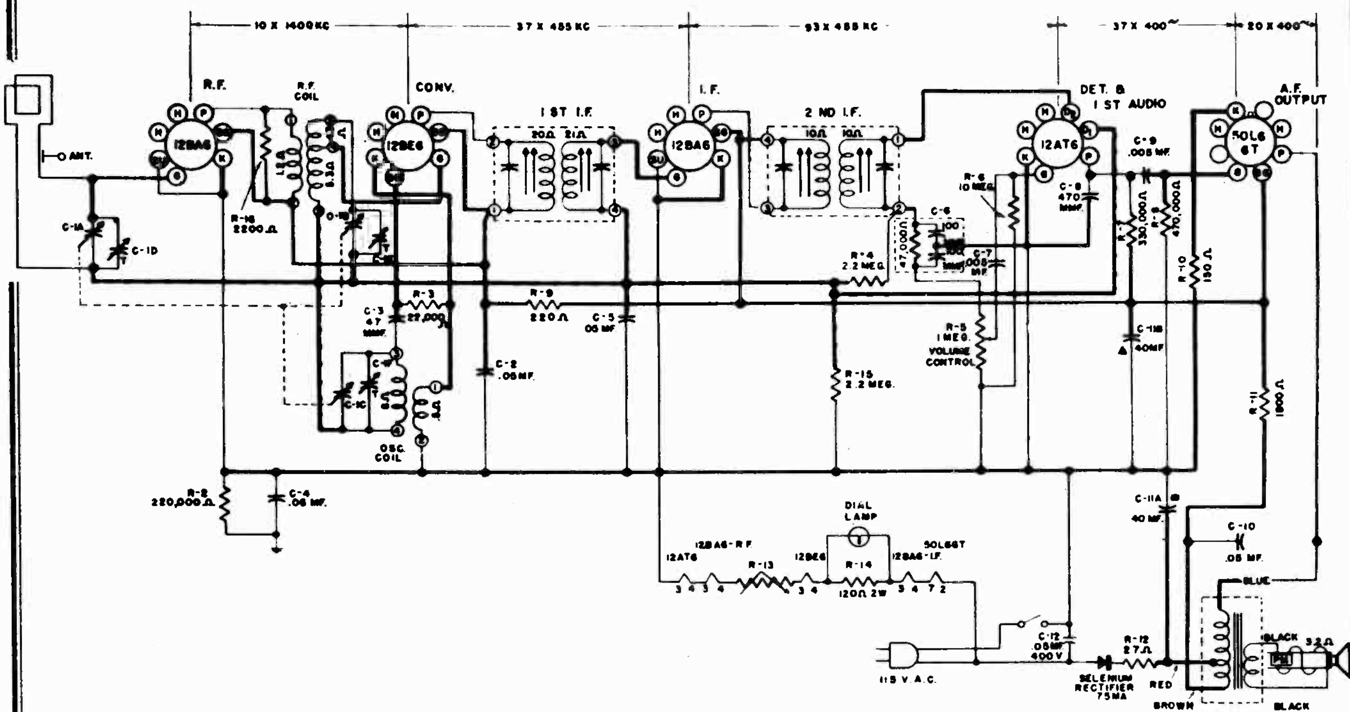


Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create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

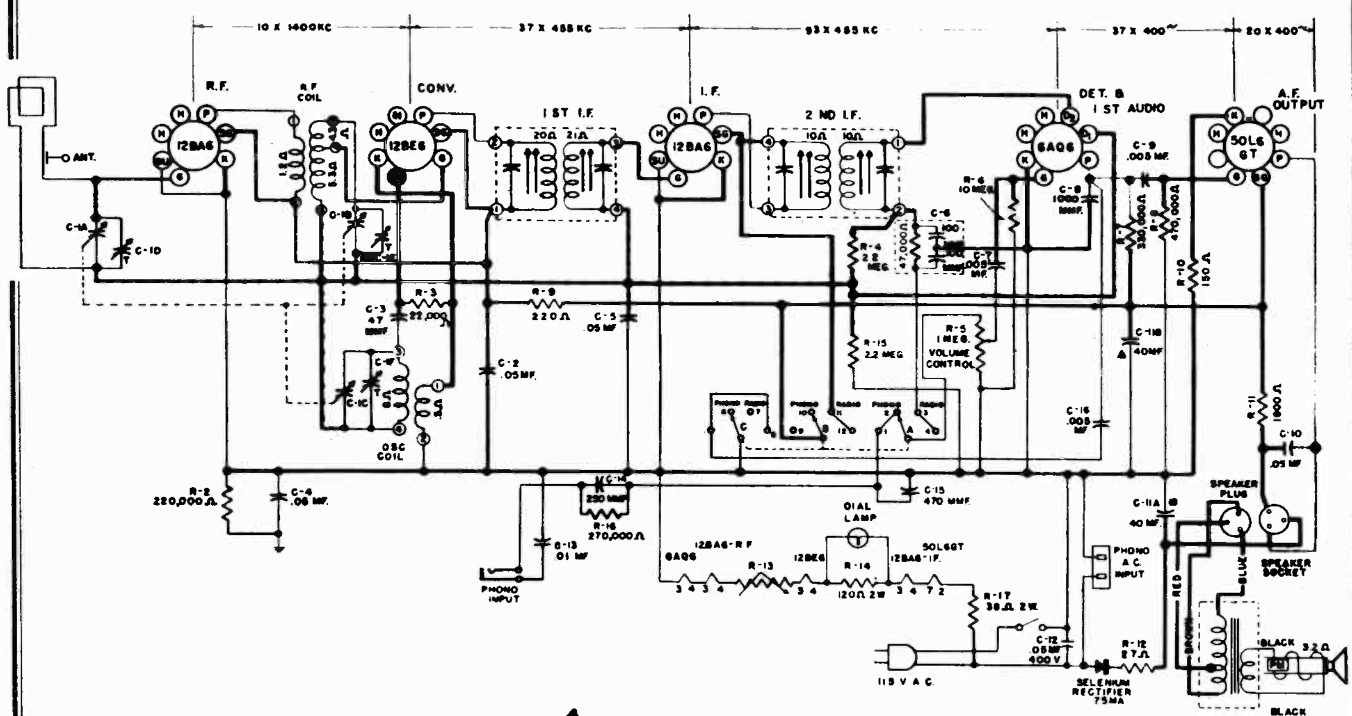
STROMBERG-CARLSON CO.

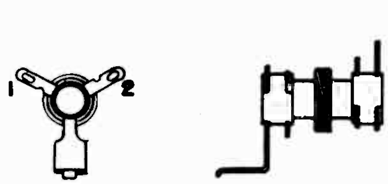
MODEL 1200
MODEL 1202

SCHEMATIC DIAGRAM, RADIO RECEIVER, MODEL 1200

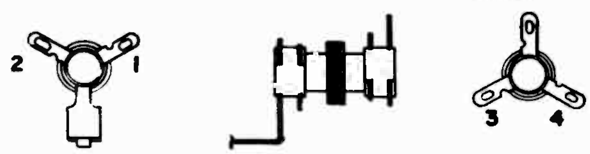


SCHEMATIC DIAGRAM, RADIO RECEIVER, MODEL 1202





R. F. COIL



OSC. COIL

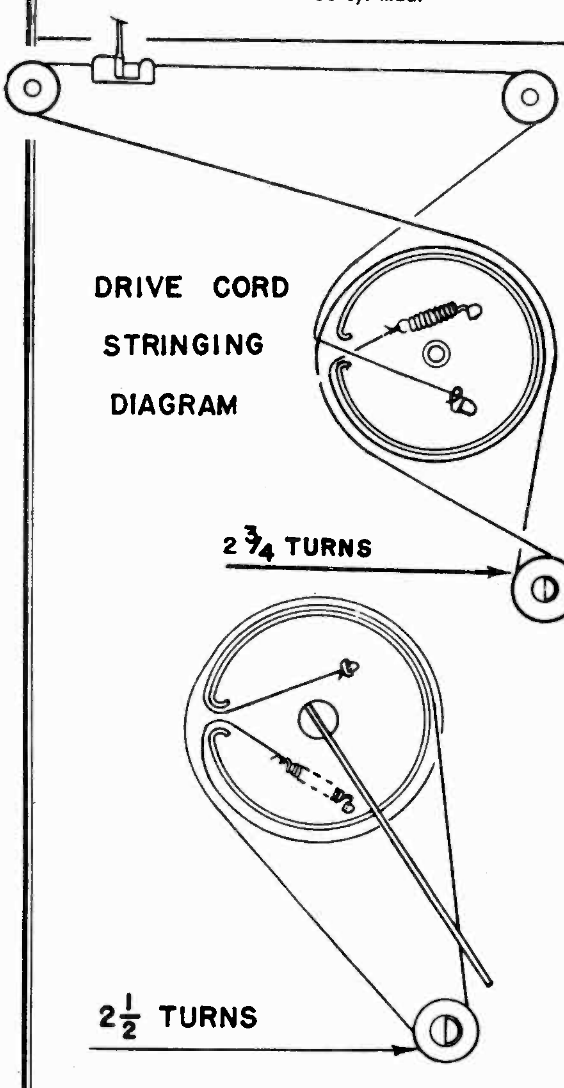
RECORD CHANGER for MODEL 1202: V-M Model 400, RCD.CH. 15-1

MODELS 1200, 1202 STROMBERG-CARLSON CO.

ALIGNMENT PROCEDURE

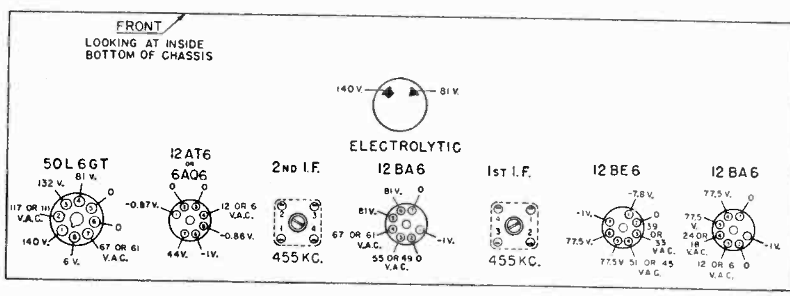
CAUTION: As this is a transformless Receiver, observe all usual precautions. The Black-White (B-) lead is common to one side of the 117 Volt Power Line Cord.

	Pointer Setting	*Generator Setting*	*Input and Dummy*	*VTVM and Scope Connection and Scale*	*Adj. and Notes*
			I. F. ADJUSTMENT		
(1)	Low frequency end of dial	455 kc. 400 cy. mod.	Pin #7, 12BE6 tube 0.01 mfd. dummy	-3V DC Scale Green-White (AVC) lead and Black-White (B-) lead.	Adj. top and bottom cores of each I. F. transformer with non-metallic screwdriver for maximum voltage.
(2)	"	455 kc. Swept 15 kc.	"	Scope to Junction C-6 and Volume Control	Adj. same cores as above for best over-lapping curve on scope.
			R. F. ADJUSTMENT		
(1)	1650 kc. Condenser plates all way out	1650 kc. 400 cy. mod.	Ant. terminal 0.01 mfd dummy	"	Adj. Osc. (front) trimmer on variable condenser for maximum voltage.
(2)	1400 kc.	1400 kc. 400 cy. mod.	"	"	Adj. R. F. and Loop trimmers on variable condenser for maximum voltage.



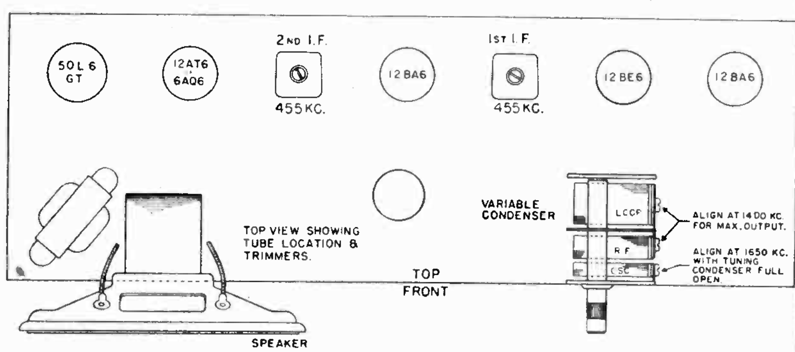
DIAL STRINGING DIAGRAM

Voltage and Tube Location Chart



*Where two tube types or voltage values are shown, the first is for the 1200 chassis, the second is for the 1202 chassis.

Measurements are made at 117V line, using electronic Voltmeter. Except where otherwise indicated, voltages are D.C. and are positive with respect to the reference point which is the common Black-White lead.



STROMBERG-CARLSON CO. **MODELS 1200, 1202**

SPECIFICATIONS

Voltage Rating — Radio	117 Volts AC-DC
Voltage Rating — Phono Motor	117 Volts AC Only
Type of Circuit	Superheterodyne
Tuning Range	540-1640 Kc
Input Power Rating	30 Watts
Intermediate Frequency	455 Kc
Speaker Voice Coil Impedence	3 Ohm
Power Output	1.5 Watts at 10% Distortion

TUBE COMPLEMENT

2 12BA6 Miniature RF and IF Amplifier

1 12BE6 Miniature Converter

1 12AT6 Miniature (1200 only) Detector, AVC and Audio Driver

1 6AQ6 Miniature (1202 only) Detector, AVC and Audio Driver

1 50L6GT Power Output

REPLACEMENT PARTS

Resistors

	1200 Model	1202	
28162	R-16		2200 Ohm
28184		R-16	0.27 Meg.
145032	R-5	R-5	Volume Cont. 1.0 Meg.
149030		R-17	39 Ohm 2 W
149035	R-14	R-14	120 Ohm 2 W
149047	R-11	R-11	1800 Ohm 2 W
149097	R-9	R-9	220 Ohm
149109	R-3	R-3	22000 Ohm
149115	R-2	R-2	0.22 Meg.
149116	R-7	R-7	0.33 Meg.
149117	R-8	R-8	0.47 Meg.
149121	R-4, 15	R-4, 15	2.2 Meg.
149125	R-6	R-6	10.0 Meg.
149168	R-10	R-10	150 Ohm
149243	R-13	R-13	Special N-T-C
149244	R-12	R-12	27 Ohm 2 W

Capacitors

	1200 Model	1202	
25376		C-14	250 mmf. mica
27760	C-9	C-9	.005 mf. 600 V
40632	C-2, 4, 5, 10, 12	C-2,4,5,10,12	.05 mf. 400 V
110026	C-1	C-1	Variable
110209		C-15	470 mmf. mica
110419	C-7	C-7,16	.005 mf. 500 V
110420		C-13	.01 mf. 500 V
110425		C-8	.001 mf. Ceramic
110458	C-3	C-3	47 mmf. Ceramic
110464	C-8		470 mmf. Ceramic
110478	C-6	C-6	Diode Filter
111032	C-11 A, B	C-11 A, B	2, 40 mf. 200 V Electrolytic

Coils—Transformers—Speakers

	1200 Model	1202	
114046	X	X	RF Coil Assem.
114047	X	X	Osc. Coil Assem.
114336	X	X	1st. I. F. Transf.
114337	X	X	2nd. I. F. Transf.
139020	X		Loop Assembly
139022		X	Loop Assembly
155013	X		Speaker Assem.
155029		X	Speaker Only
155052		X	Speaker Assem.
161413	X	X	Output Transformer

Miscellaneous

	1200 Model	1202	
33218	X	X	Power Cord
34421		X	Phono Socket
122022	X		Dial
122025		X	Dial
124014	X		Dial Drive Cord
124016		X	Dial Drive Cord
143012		X	Speaker Plug
144013	X		Pointer
144015		X	Pointer
150034	X	X	Tuning Shaft Assembly
152001	X		Pilot Socket
152038		X	Phono Motor Power Socket*
152040	X	X	Miniature Socket
152041	X	X	Octal Socket
152044		X	Speaker Socket Assem.
152045		X	Pilot Socket
156032	X	X	Tube Hold Down Spring
158015		X	Radio-Phono Switch
162034	X	X	Rectifier

*The Phono Motor is for use on AC only.

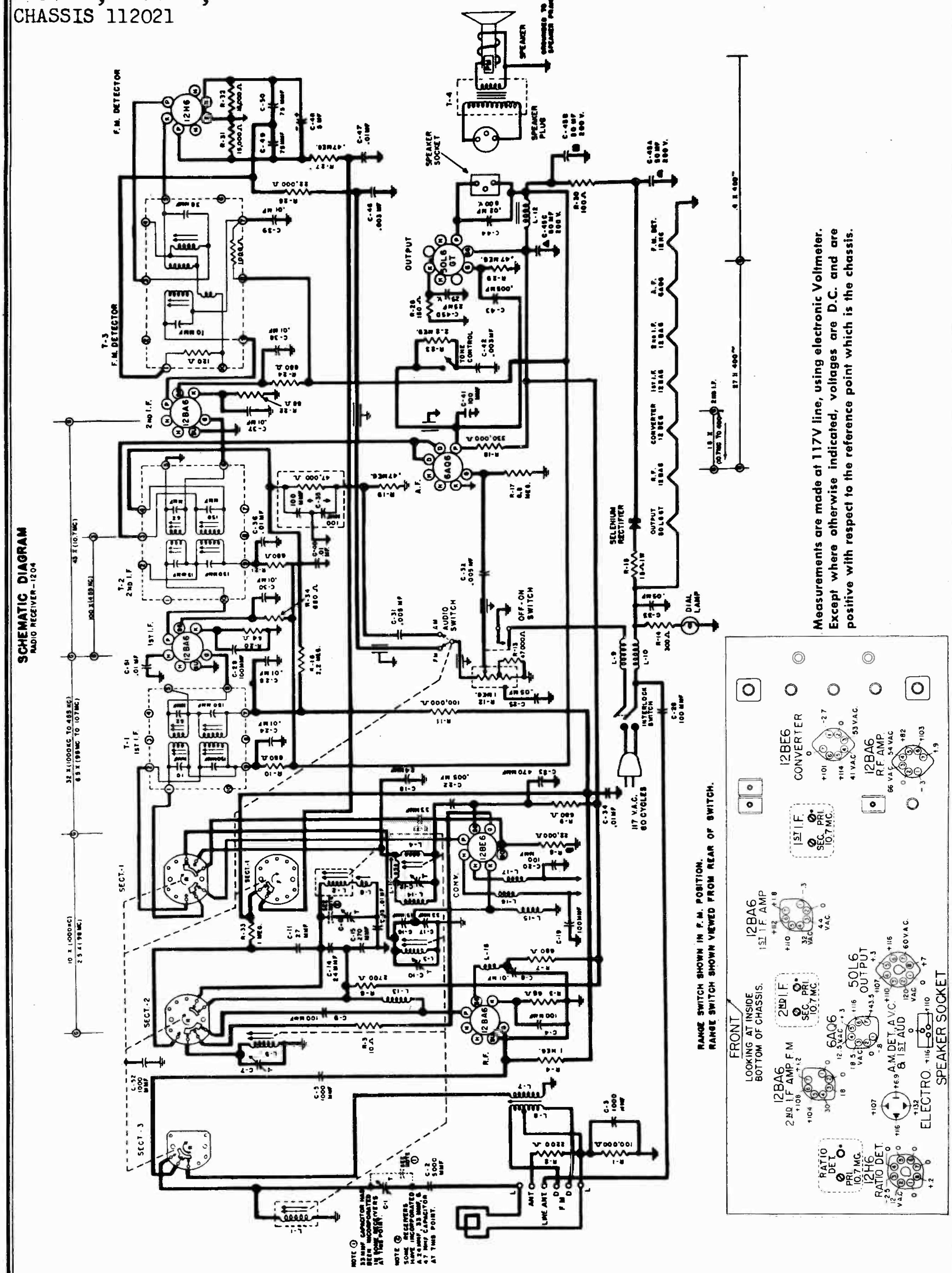
Cabinets and Parts

	1200 Model	1202	
108065	X		Brown Cabinet
108066	X		Ivory Cabinet
108078		X	Cabinet
125013		X	Escutcheon and Grille
134004	X		Brown Knob
134005	X		Ivory Knob
134029		X	Volume and Stotion Knob
134056		X	Radio-Phono Knob
138008	X		Dial Lens
163062	X		Chassis hold down screw
200624		X	Chassis hold down screw

NOTE—When ordering replacement parts always specify series number as well as model and part number. Series number is stamped on back of chassis.

MODELS 1204HB, 1204HI, 1204HME, 1204HMG, CHASSIS 112021

STROMBERG-CARLSON CO.



STROMBERG-CARLSON CO.
ALIGNMENT PROCEDURE 1204

MODELS 1204HB, 1204HI, 1204HME, 1204HMG, CHASSIS 112021

	Band and Pointer Setting	Generator Setting	Input and Dummy	VTVM Connection and Scale	Trimmer Adj. and Notes
			A.M. I.F. ALIGNMENT		
(1)	AM-Pointer near middle of dial	455 kc. 400 cy. mod.	Junction C-13, 6 and L-8 200 mmf. dummy	Junction C-31, 35 3VDC scale	Adj. Pri. and Sec. cores two AM IF transformers top of chassis. Highest voltage
			F.M. I.F. ALIGNMENT		
(1)	FM-Pointer near middle of dial	10.7 mc 400 cy mod.	Junction C-10, 16 and L-3	AVC buss (Green and White Wire) —3VDC scale	Detune Sec. Ratio Det. Transformer adjust four FM IF cores, bottom of chassis, in following order counting from band switch—One, Four, Two Three for highest voltage. DO NOT REPEAT
(2)	"	"	"	"	Adjust Pri. Ratio Det. Transformer for highest voltage.
(3)	"	"	"	Center terminal audio switch —3 VDC scale	Adjust Sec. Ratio Det. Transformer for ZERO voltage.
(4)	Repeat (2) and (3)				
			A.M. R.F. ALIGNMENT		
(1)	AM-600 kc	600 kc 400 cy. mod.	Loop and link connected 200 mmf dummy to Ant. terminal	Junction C-31, 35 —3 VDC scale	Adjust C-12, 6 and 1 for highest voltage.
(2)	AM-1600 kc Repeat (1) and (2)	1600 kc	"	"	Align L-8, 11 for highest voltage.
			F.M. R.F. ALIGNMENT		
	FM Pointer at 98 to 100 mc.	98 to 100 mc. 400 cy mod.	"	AVC buss (Green and White Wire) —3 VDC scale	Adjust C-7, 10 and core L-6 and 7 for highest voltage.

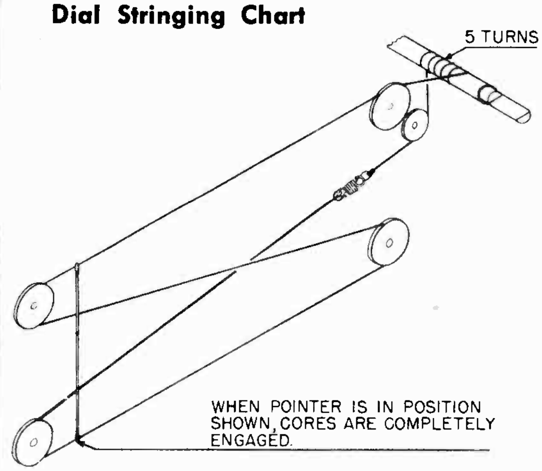
SPECIFICATIONS

Voltage Rating.......................... 105-125 Volts AC-DC
Type of Circuit.............................. Superheterodyne
Tuning Range....................... A.M.—540 KC.—1600 KC.
F.M.—88 MC.—108 MC.
Number & Type of Tubes—7
3—12BA6.............. R.F. Amp. and two I.F. Amp.
1—12BE6............................ Convertor
1—6AQ6......... 1st Audio Amp.—A.M. Det. & AVC
1—12H6.............................. F.M. Det.
1—50L6GT........................ Power Output
Input Power Rating................................ 40 Watts
Intermediate Frequency.............. A.M. 455 KC. F.M. 10.7 MC.
Speaker Voice Coil Impedance (PM)...................... 3 Ohms
Power Output.............. 1.25 Watts at less than 10% distortion

Cabinet Parts

	HB	HI	HME	HMG	
108044	X				Cabinet
108056		X			Cabinet
108062				X	Cabinet
108063			X		Cabinet
122015	X	X			Dial
122021			X	X	Dial
125019			X	X	Escutcheon
130029	X				Grille Cloth Assem.
130037		X			Grille Metal
138014	X	X			Lens
138015			X	X	Lens
139013	X	X			Loop and Back Assem.
139019	X	X	X	X	Loop and Back Assem.
154030	X	X	X	X	Fibre Knob Spacer
508051	X	X	X	X	Screw, Chassis to cabinet

Dial Stringing Chart



IDENTIFICATION TABLE

MODEL	CHASSIS	CABINET	SPEAKER
HI	112021	108056	155030
HB	112021	108044	155030
HME	112021	108063	155030
HMG	112021	108062	155030

MODELS 1204HB, 1204HI, 1204HME, 1204HMG, CHASSIS 112021

STROMBERG-CARLSON CO.

REPLACEMENT PARTS

Resistors

28144	R-5, 20, 22	68 Ohms
28156	R-7, 9, 10, 21, 24, 34	680 Ohms
28162	R-2	2200 Ohms
28163	R-6	2700 Ohms
149089	R-3	10 Ohms
149109	R-8, 26	22000 Ohms
149111	R-13	47000 Ohms
149113	R-1, 11	0.1 Meg.
149116	R-18	0.33 Meg.
149117	R-19, 27, 29	0.47 Meg.
149119	R-4, 33	1.0 Meg.
149121	R-16, 23	2.2 Meg.
149124	R-17	6.8 Meg.
149167	R-30	100 Ohms 1W
149168	R-28	150 Ohms 1W
149219	R-15	15 Ohms 1W (Glusohm)
149229	R-14	300 Ohms 1W
149250	R-31,32	15000 Ohms 5%

NOTE—When ordering replacement parts always specify series number as well as model and part number. Series number is stamped on back of chassis.

Capacitors

25484	C-44	.02-600V
29891	C-25,33	.05-600V
110017	C-6, 12.	Trimmer
110024	C-1	Trimmer
110025	C-7, 10	Trimmer
110208	C-15	270 mmf
110403	C-14, 18	24 mmf
110407	C-17	33 mmf
110419	C-22, 31, 32, 43	.005-500V
110420	C-8, 13, 24, 28, 30, 34, 36, 37, 38, 39, 40, 47, 51	.01-500V
110425	C-3, 5, 52	1000 mmf
110451	C-4, 9, 19, 20, 26, 29, 41	100 mmf
110455	C-23	470 mmf
110468	C-16	15 mmf
110478	C-35	Diode filter, Includes 47000 Ohms resistor
110483	C-49, 50	75 mmf.
110485	C-11	27 mmf.
110486	C-21	33 mmf.
110488	C-42, 46	.003-500V
110491	C-2	5000 mmf.
111027	C-45a, b, c, d	3-50 MF 200V, 1-25 MF 25V
111030	C-48	5 MF

Transformers—Coils

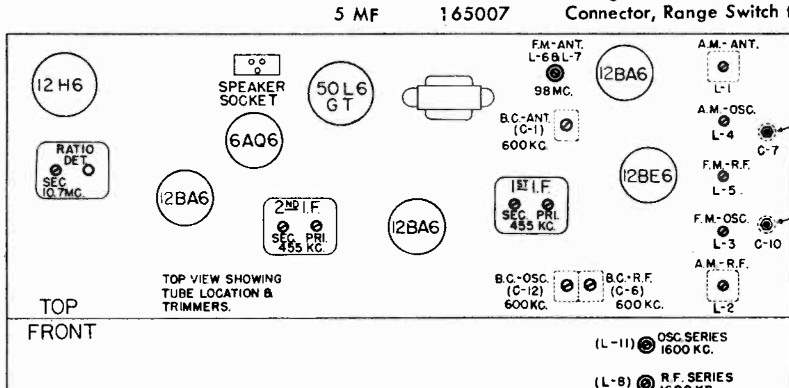
114029	L-5	RF Tuning Coil F.M.
114036	L-6 and 7	Ant. Coil F.M.
114041	L-1, 2, 4	Ant., RF, Osc Tuning Coils A.M.
114042	L-3	Osc. Tuning Coil F.M.
114043	L-11	Osc. Coil, A.M. Aligning
114044	L-8	RF Coil, A.M. Aligning
114045	L-14	Osc. Coil, A.M. Shunt
114311	T-1	1st I.F. transformer
114323	T-2	2nd I.F. transformer
114616	L-9 and 10	Ant. choke coil
114620	L-13, 15	R.F. choke
114621	L-16, 17	Heater choke
114622	L-18	R.F. choke
161004	L-12	Filter choke
161228	T-3	Ratio Detector Transformer
161410	T-4	Output Transformer

Controls—Switches—Knobs

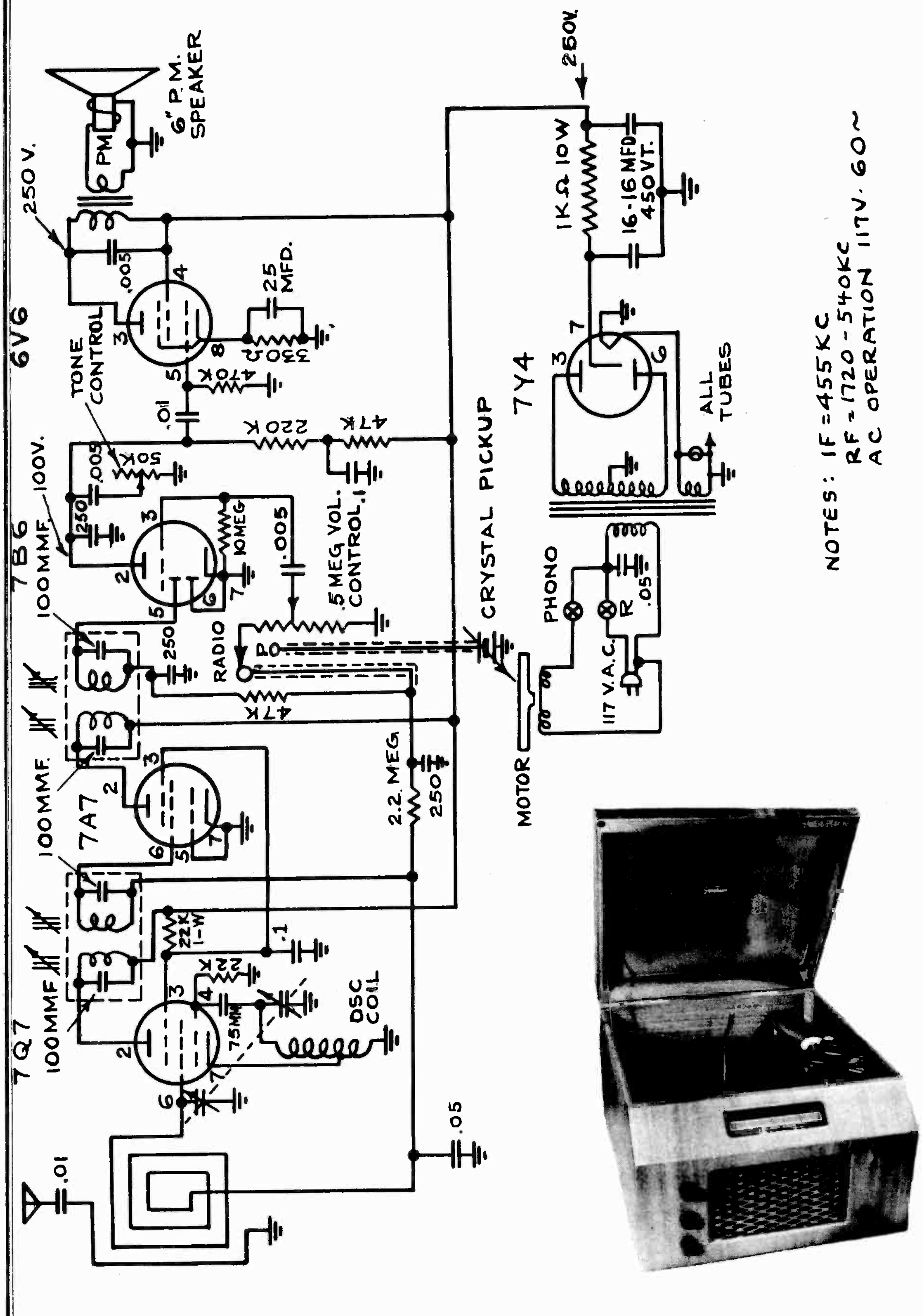
134031	Knob Assem. (dot)	HB
134032	Knob Assem (no dot)	HB
134046	Knob Assem. (dot)	HI
134047	Knob Assem. (no dot)	HI
134050	Knob Assem.	HMG
134051	Knob Assem.	HME
145031	R-12	1 Meg. Volume Control and Switch
158016		Range Switch
158017		Tone Control Switch
158018		Interlock Smitch
158028		Audio Switch (A.M.-F.M.)

Miscellaneous

31969	Dial Pointer
32046	Speaker Socket
32164	Speaker Plug
33218	A.C. Cord
124012	Dial Drive Cord Assem.
142026	Dial Plate Assem.
147016	Range Switch Hub
151021	Miniature Socket
151036	Converter Tube Shield
152014	Octal Socket
152037	Miniature Socket, Converter Tube
155006	Speaker Cone
155029	Speaker—Less Transformer
155030	Speaker, Complete
156032	Tube Hold-down Spring
162058	Selenium Rectifier
164004	Tuning Unit (Mechanical Assem.)
165007	Connector, Range Switch to Audio Switch

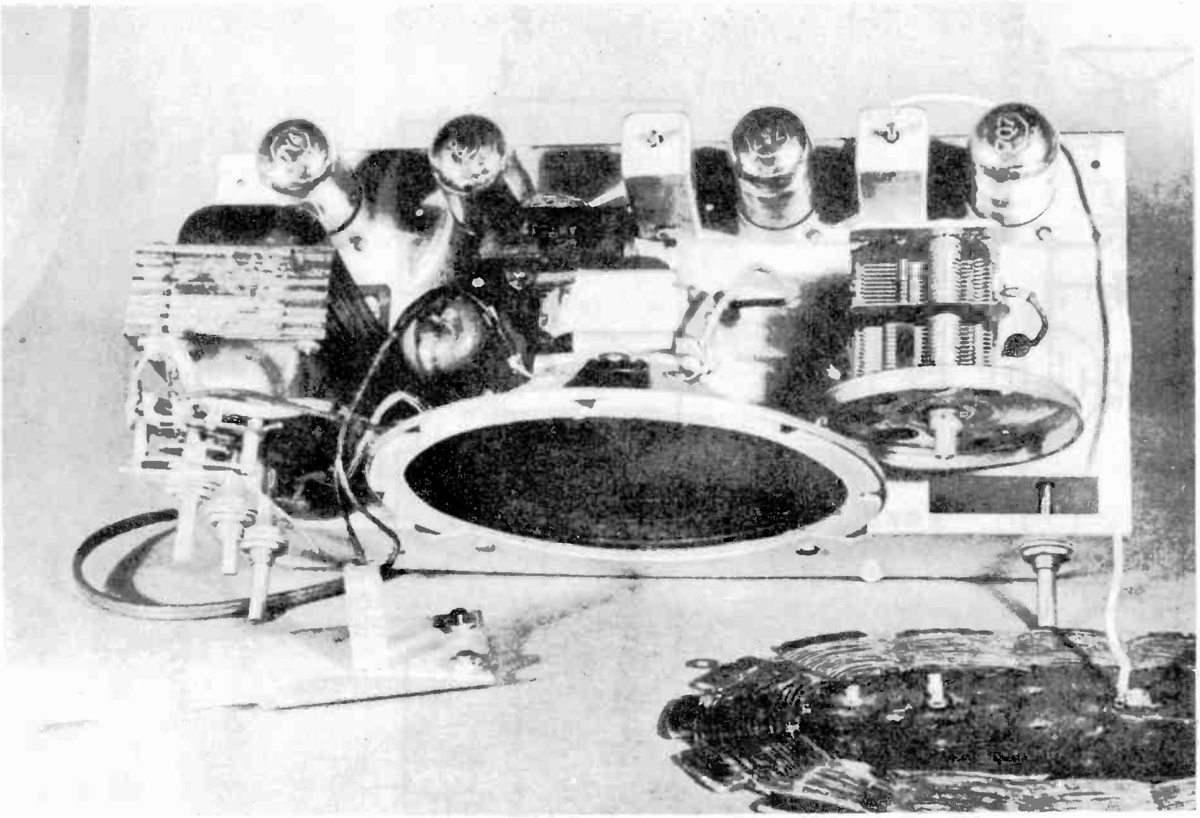


SYMPHONY RADIO & TELEV. CORP. MODEL "BILTMORE"

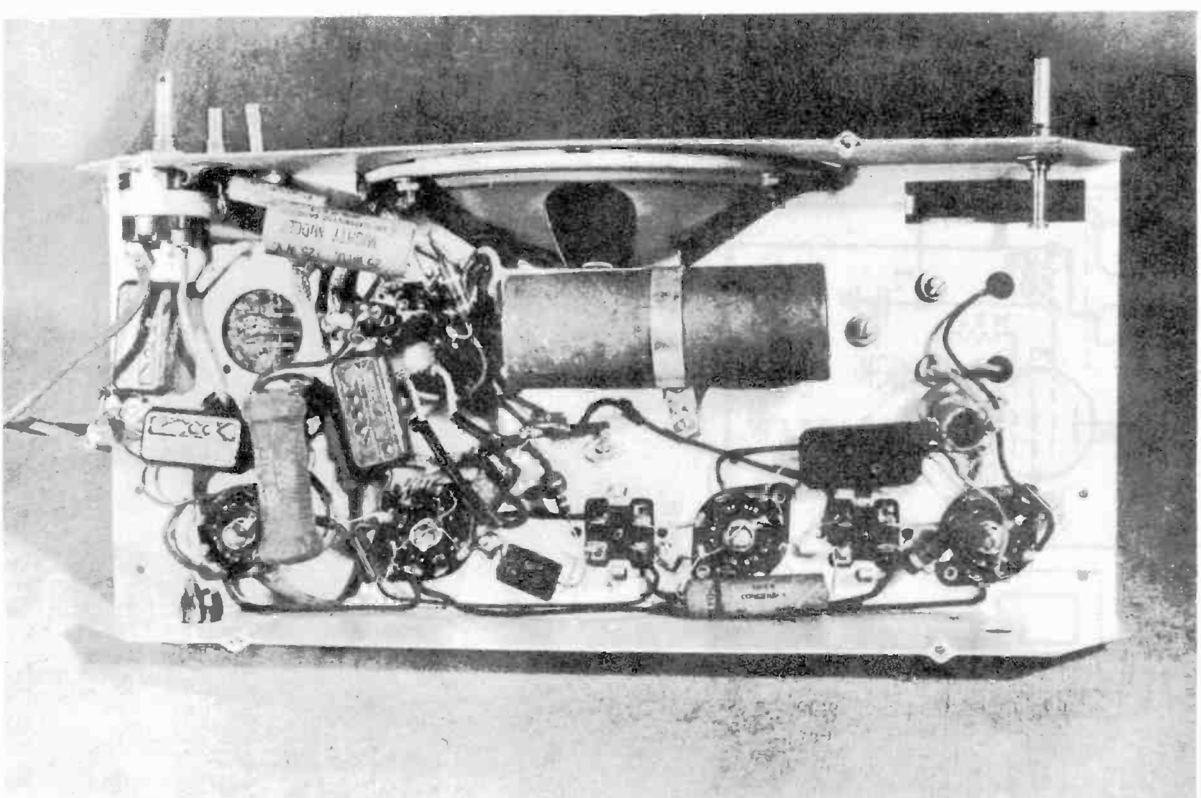


RECORD CHANGER: Aero Model 46-A, RCD.CH. 16-1

MODEL "BILTMORE" SYMPHONY RADIO & TELEV. CORP.

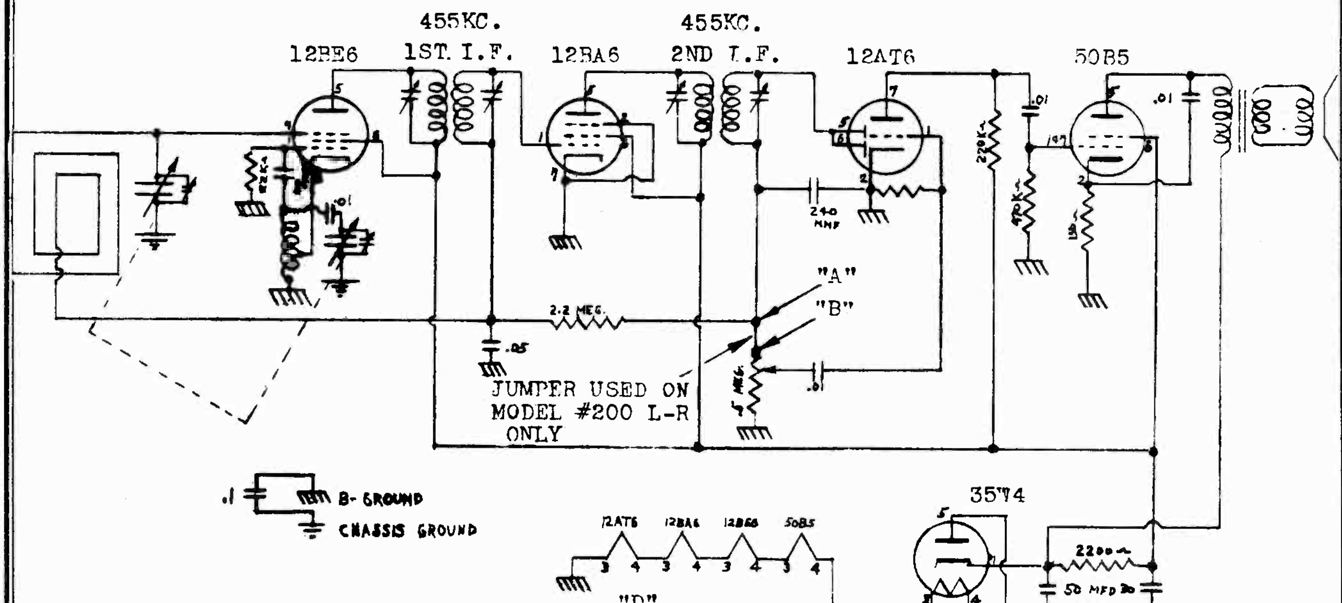


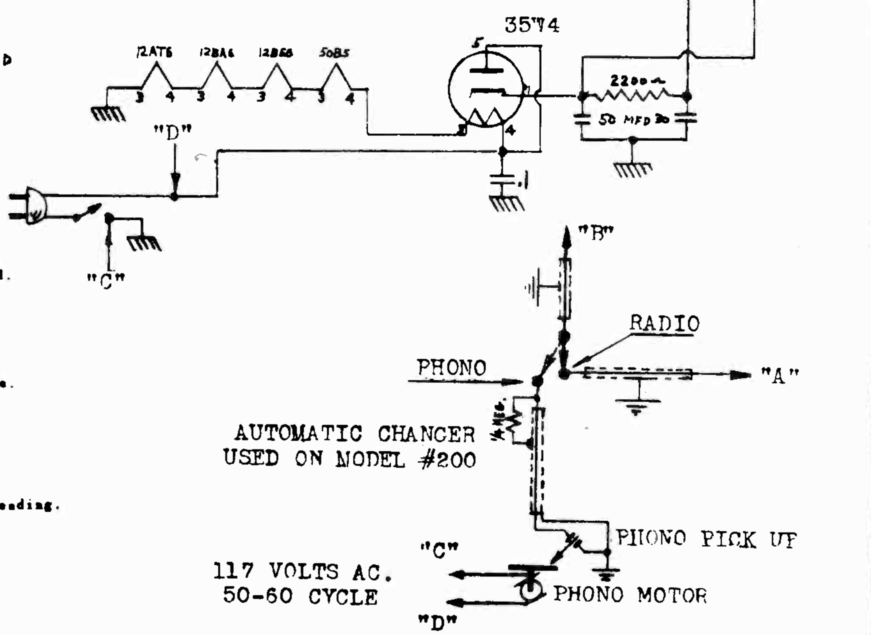
TOP CHASSIS VIEW



BOTTOM CHASSIS VIEW

SYMPHONY RADIO & TELEV. CORP. MODELS 200, 200L-R





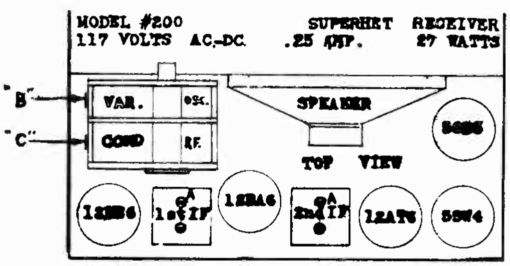
ALIGNMENT INSTRUCTIONS

Keep the gain of the signal generator as low as possible on all alignment work.
IMPORTANT. The volume control must be set at max. gain on all alignment work.

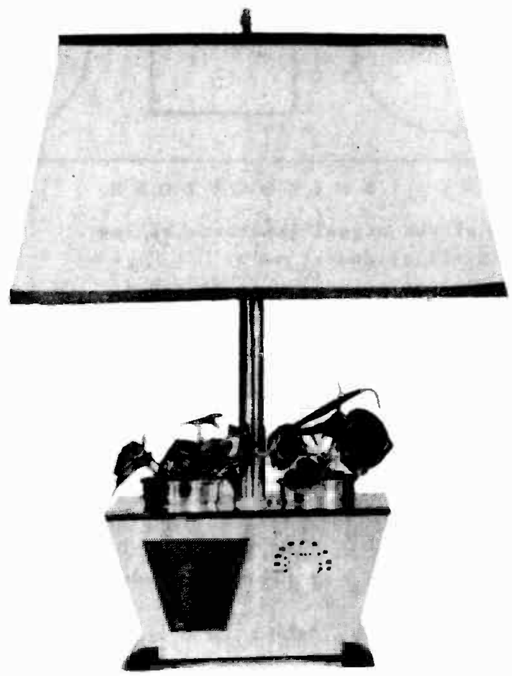
1. Turn variable condenser fully closed.
2. Connect signal generator through A.1-MFD.Cond. and connect to the grid of the 12BE6 tube.
3. Align IF's to 455 K.C. max. reading. (A)

RF CALIBRATION

1. Turn variable condenser fully open.
2. Place signal generator leads near loop antenna.
3. Set signal generator to 1720 K.C.
4. Align osc. section (B) of variable condenser for max. reading.
5. Set signal generator to 1500 K.C.
6. Turn variable condenser to 150 on dial and align RF (C) section of var. cond. for max. reading.

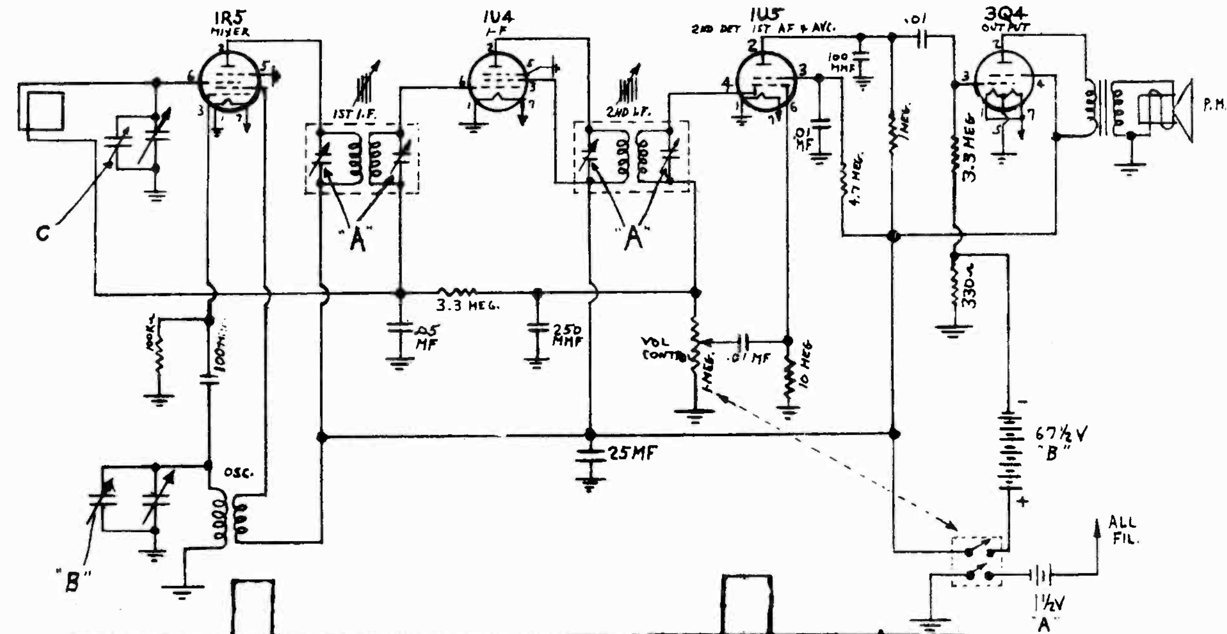


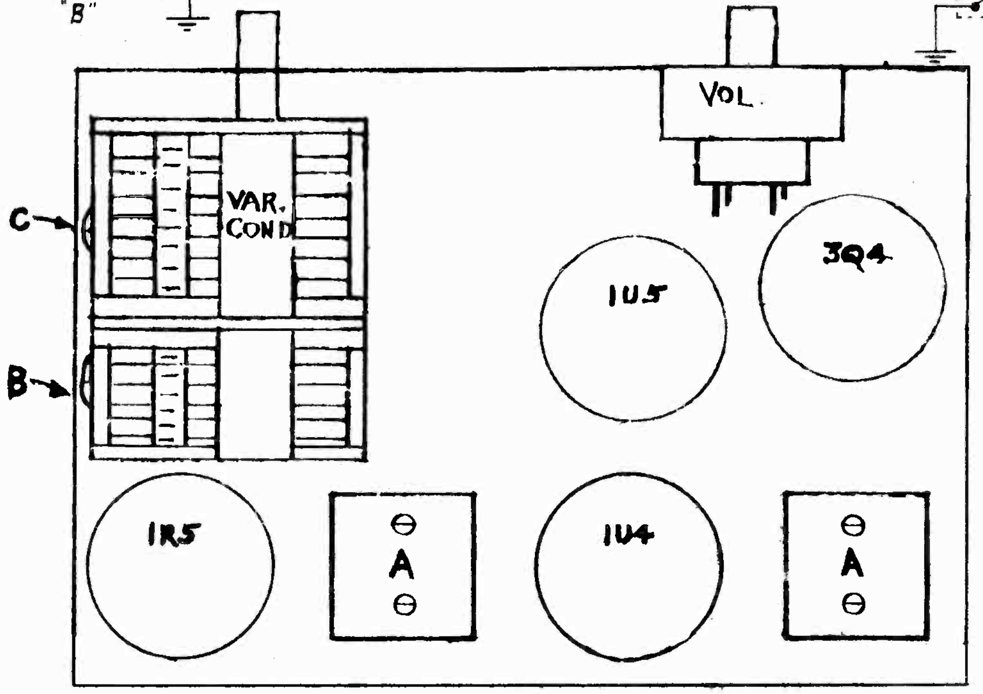
NOTE
FOR MODEL #200 ONLY
117 VOLTS AC. 60-50 CYCLES
FOR MODEL #200 L-R
117 VOLTS AC-DC



MODEL 200L-R

MODEL 260 SYMPHONY RADIO & TELEV. CORP.





ALIGNMENT INSTRUCTIONS

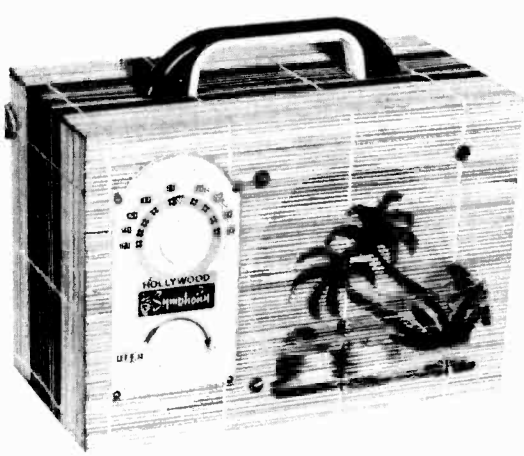
Keep the gain of the signal generator as low as possible on all alignment work.

IMPORTANT. The volume control must be set at max. gain on all alignment work.

1. Turn variable condenser fully closed.
2. Connect signal generator through A.1-MFD.Cond. and connect to the grid of the 1R5 tube.
3. Align IF's to 455 K.C. max. reading. A

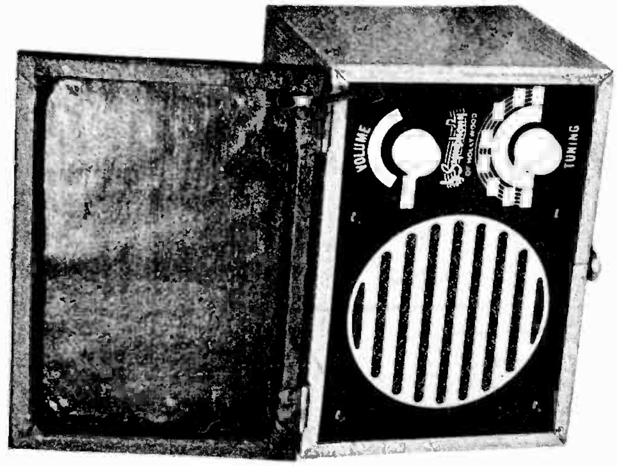
RF CALIBRATION

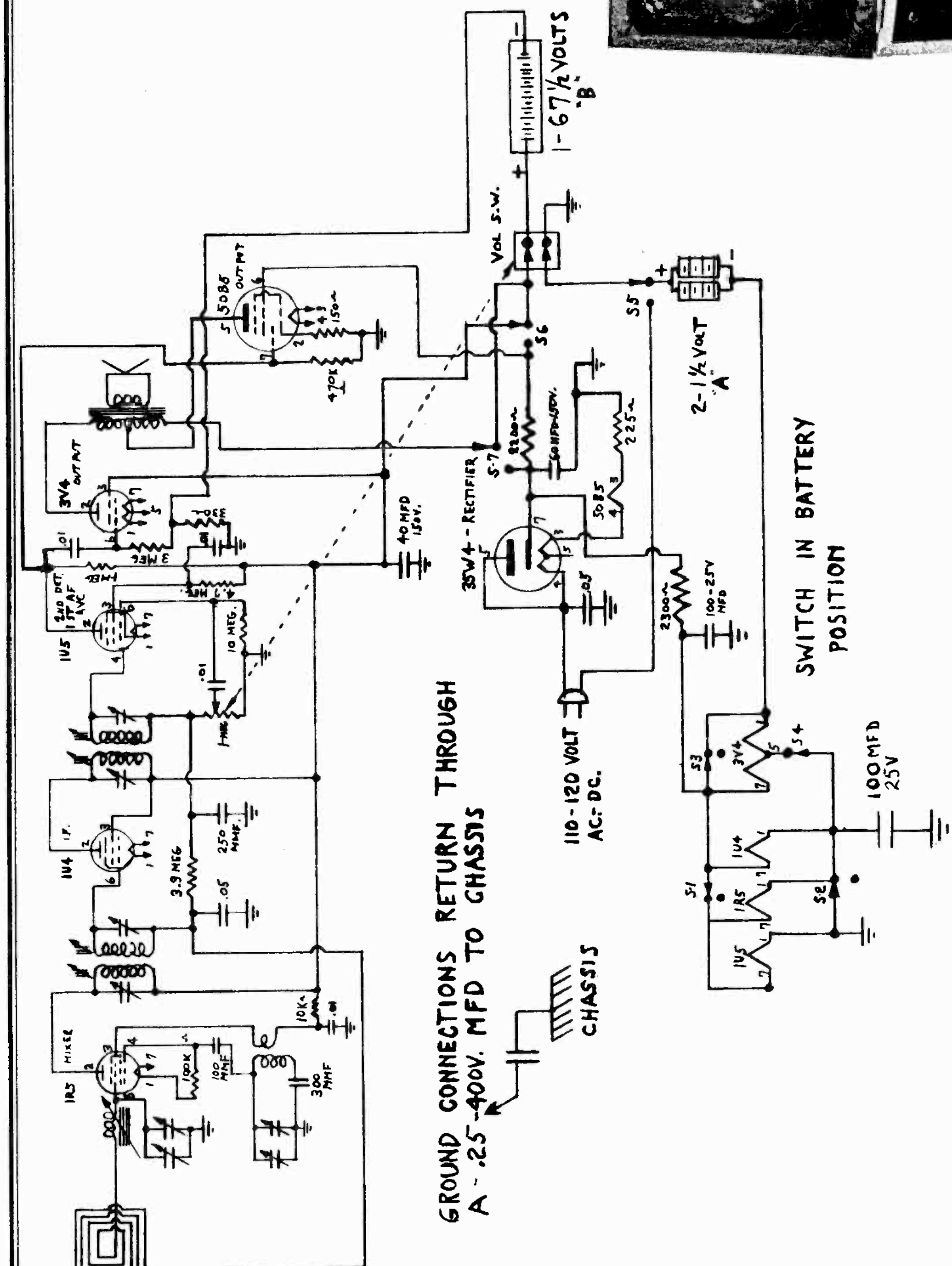
1. Turn variable condenser fully open.
2. Place signal generator leads near loop antenna.
3. Set signal generator to 1600 K.C.
4. Align osc. section B of variable condenser for max. reading.
5. Set signal generator to 1400 K.C.
6. Turn variable condenser to 140 on dial and align RF C section of var. cond. for max. reading.



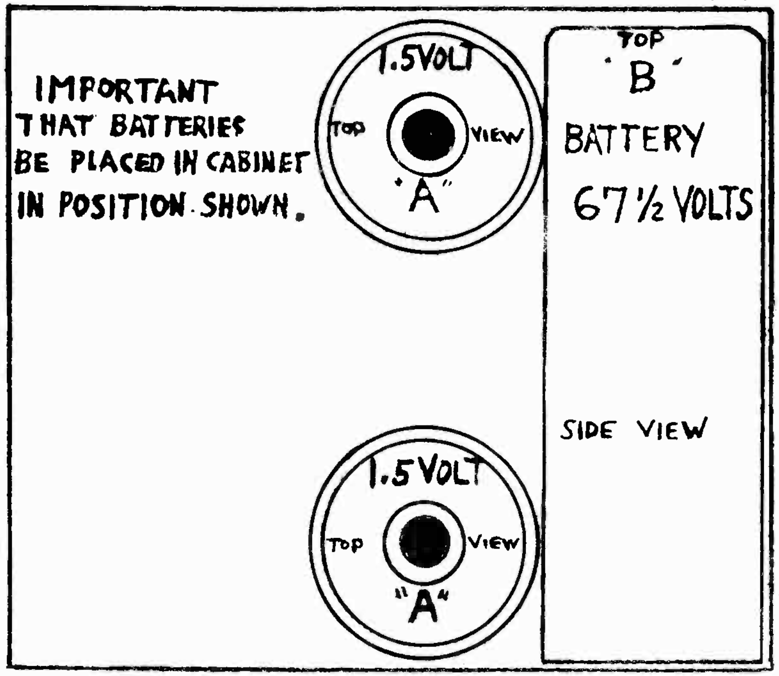
SYMPHONY RADIO & TELEV. CORP.

MODEL 348

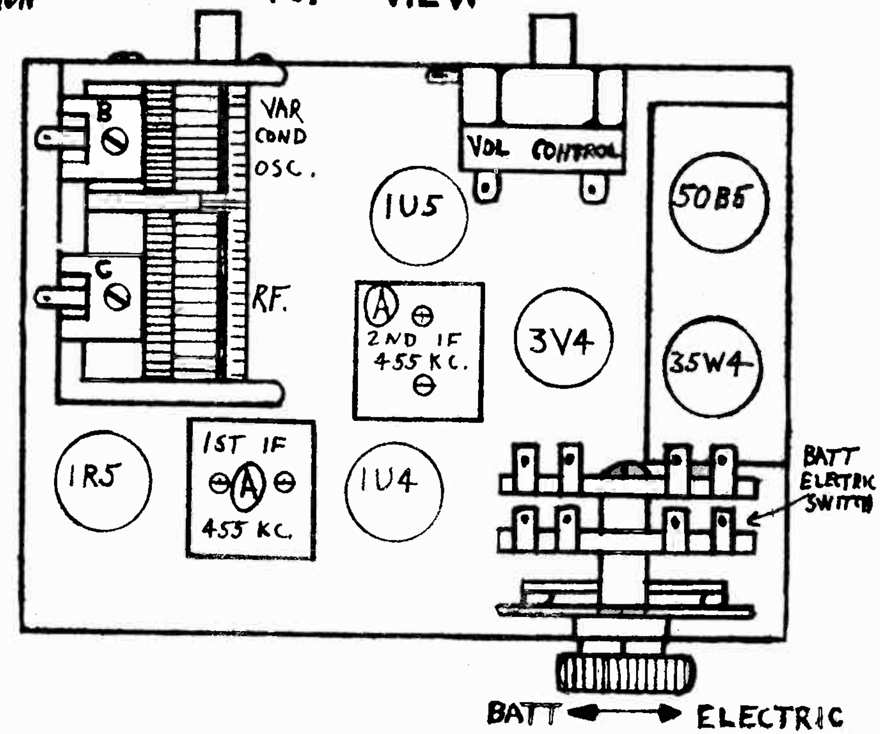




INSIDE VIEW FOR "A" AND "B" BATTERY POSITION



TOP VIEW



A L I G N M E N T   I N S T R U C T I O N S

Keep the gain of the signal generator as low as possible on all alignment work.
IMPORTANT. The volume control must be set at max. gain on all alignment work.

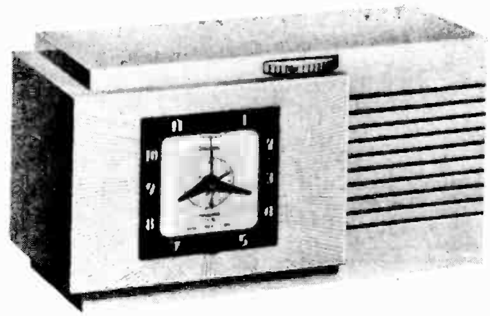
1. Turn variable condenser fully closed.
2. Connect signal generator through A.1-MFD.Cond. and connect to the grid of the 1R5 tube.
3. Align IF's to 455 K.C. max. reading. (A)

R F   C A L I B R A T I O N

1. Turn variable condenser fully open.
2. Place signal generator leads near loop antenna.
3. Set signal generator to 1600 K.C.
4. Align osc. section (B) of variable condenser for max. reading.
5. Set signal generator to 1400 K.C.
6. Turn variable condenser to 140 on dial and align RF (C) section of var. cond. for max. reading.
7. Set signal generator to 600 K.C.
   Turn var. cond. to 60 on dial and adjust the iron core loop loading coil screw for max. reading.

TELECHRON INC.

MODEL 8H67
MUSALARM



SPECIFICATIONS

CABINET:

Model	8H67
Color	Fawn
Height	$6\frac{3}{8}$ inches
Width	$11\frac{1}{4}$ inches
Depth	6 inches

ELECTRICAL RATING (INPUT):

Voltage	105-125 volts, a-c
Frequency	60 cycles
Wattage	35 watts

OPERATING FREQUENCIES:

Intermediate Frequency	455 kc
Broadcast Band	540-1600 kc

POWER OUTPUT:

Undistorted	1.0 watt
Maximum	1.7 watts

LOUDSPEAKER:

Type	Alnico PM
Outside Cone Diameter	4-inch
Voice Coil Impedance (400 cycles)	3.5 ohms

TUBE COMPLEMENT:

Oscillator-Converter	Type 12SA7
I-F Amplifier	Type 12SK7
Detector and 1st Audio	Type 12SQ7
Power Output	Type 50L6GT
Rectifier	Type 35Z5GT

CAUTION — One side of the power line is connected to B–. Avoid any ground connections direct to B–. Use an isolating transformer when making service adjustments with the chassis removed from the cabinet, or be certain that the cord plug is connected to the power line so that B– is on the ground side of the power line.

RADIO CIRCUIT ALIGNMENT

ALIGNMENT FREQUENCIES:

R-F	1620 kc and 1500 kc
I-F	455 kc

EQUIPMENT REQUIRED:

1. Signal generator, 450 kc to 1620 kc, with 400 cycle tone modulation.
2. A-C voltmeter, 3 volts full scale at 1000. ohms/volt, or vacuum tube voltmeter.
3. 0.05 mfd. paper capacitor.
4. 200 mmfd. mica capacitor.
5. Insulated screwdriver.

ALIGNMENT PROCEDURE—GENERAL:

1. With the tuning scale control wheel turned so that the gang condenser plates are fully meshed, the index should read approximately $\frac{3}{16}$-inch to the right of the 550 kc scale calibration mark. If it does not, remove the control wheel from the gang condenser shaft and replace it for correct position. CAUTION—Do not attempt to correct the position by rotating the wheel on the shaft as this will cause the knob to slip.
2. For i-f alignment, it is necessary to remove the chassis from the cabinet.
3. Connect the output voltmeter across the loudspeaker voice coil terminals.
4. Keep radio volume control at maximum and attenuate the signal generator output so that the output voltmeter reading never exceeds 1.0 volt.
5. Connect the capacitor as listed in column 2 between the output "High Side" of the test oscillator and the point of input specified.
6. Figure 3 shows the locations of all trimmers listed in the alignment chart.

ALIGNMENT CHART

Step	Connect Test Oscillator to—	Test Osc. Setting	Dial Drum Setting	Adjust Trimmers for Maximum Output
1	12SK7 grid (4) in series with 0.05 mfd. cap.	455 kc	1600 kc	2nd i-f trans. trimmers, C14 and C15
2	12SA7 grid (8) in series with 0.05 mfd. cap.	455 kc	1600 kc	1st i-f trans. trimmers, C8 and C9
3	Antenna Post in series with 200 mmfd. cap.	1620 kc	(Full Open)	C4 (oscillator)
4	Antenna Post in series with 200 mmfd. cap.	1500 kc	1500 kc	C3 (antenna)

STAGE GAIN AND VOLTAGE CHECKS

Stage gain measurements by vacuum tube voltmeter or similar measuring devices may be used to check circuit performance and isolate trouble. The gain values listed may have tolerances of 20%. Readings should be taken with low signal input so that AVC is not effective.

(1) R-F and I-F Stage Gains

Antenna Post to 12SA7 Grid	2 at 1000 kc
12SA7 Grid to 12SK7 Grid	50 at 455 kc
12SK7 Grid to 12SQ7 Diode Plate	70 at 455 kc

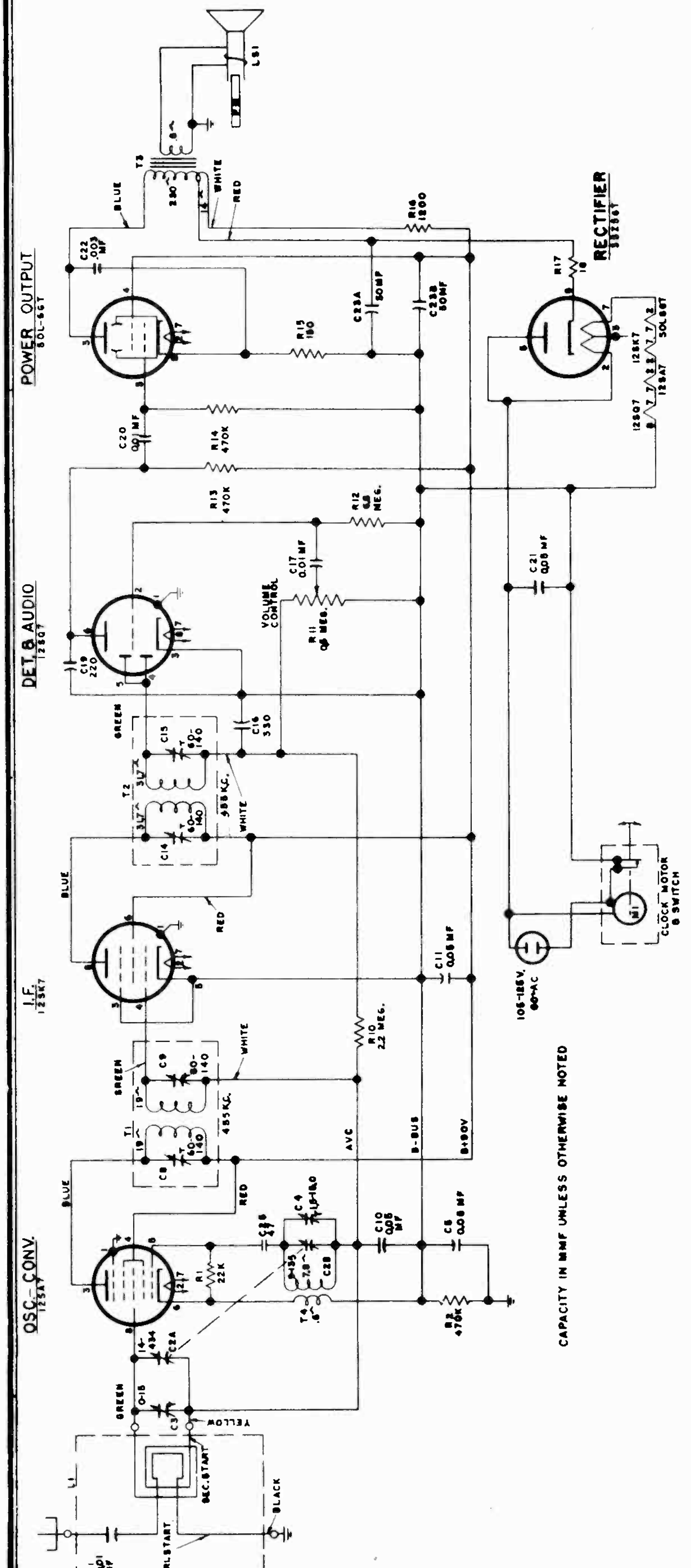
(2) Audio Gain
.15 volts at 400 cycles across the volume control (R11) with control set at maximum will give approximately ½-watt output across the loudspeaker, LS1, voice coil.

(3) Oscillator Grid Bias
D-C voltage developed across the oscillator grid leak (R1) averages 7.0 volts at 1000 kc.

(4) Socket Pin Voltages
Figure 2 shows voltages from all tube pins to B–. Voltage readings much higher or lower than those specified may help localize defective components or tubes.

MODEL 8H67
MUSALARM

TELECHRON INC.



CAPACITY IN MMF UNLESS OTHERWISE NOTED

FIG. 1 - SCHEMATIC DIAGRAM MODEL 8H67

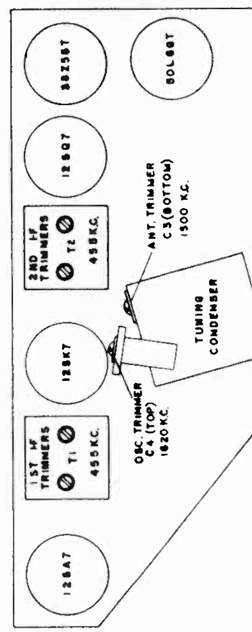


FIG. 3 - TUBE & TRIMMER LOCATION (TOP VIEW)

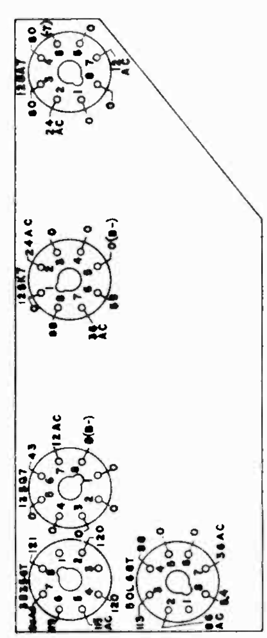
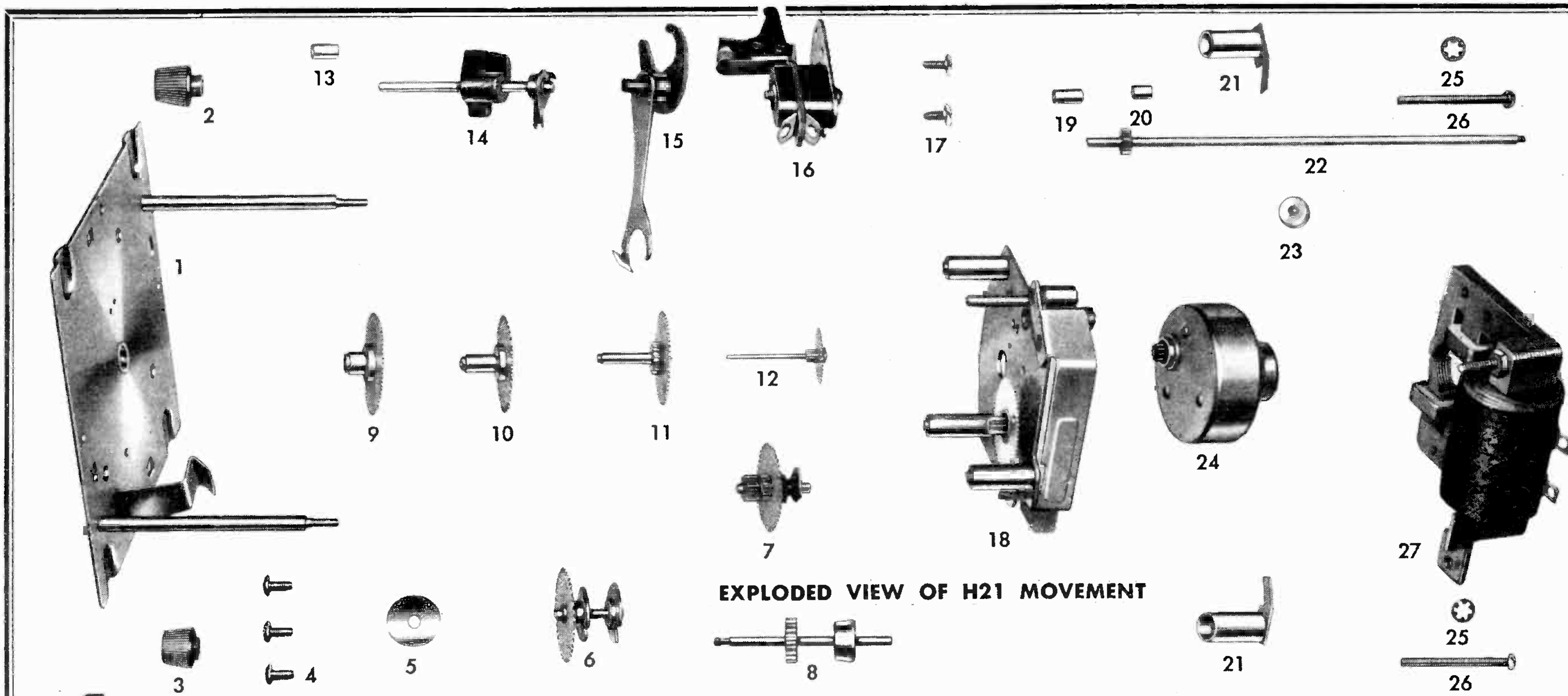


FIG. 2 — SOCKET VOLTAGES (BOTTOM VIEW) TO B-BUS
DC MEASURED WITH 20,000 OHM/VOLT METER
AC MEASURED WITH VACUUM TUBE METER

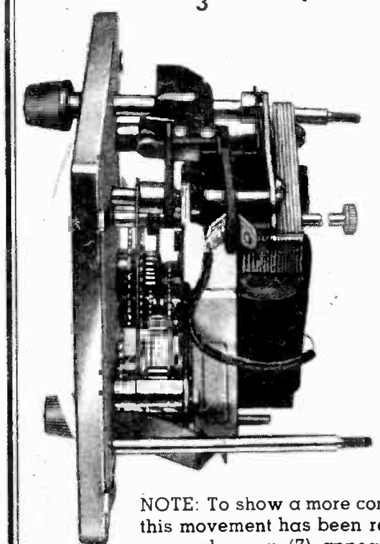
TELECHRON INC.

MODEL 8H67
MUSALARM



EXPLODED VIEW OF H21 MOVEMENT

1. Front Plate Assembly
2. Switch Knob
3. Alarm Set Knob
4. Front Plate Screws
5. Cam Shaft Washer
6. Cam Shaft Assembly
7. Intermediate Gear Assembly
8. Alarm Set Shaft Assembly
9. Alarm Hand Sleeve Assembly
10. Hour Hand Sleeve Assembly
11. Minute Hand Sleeve Assembly
12. Sweep Second Shaft Assembly
13. Switch Shaft Spacer
14. Switch Shaft Assembly
15. Switch Lever Assembly
16. Switch Assembly
17. Switch Bracket Screws
18. **Base Plate Assembly**
19. Time Set Shaft Spacer (long)
20. Time Set Shaft Spacer (short)
21. Spreader Posts
22. Time Set Shaft Assembly
23. Time Set Knob
24. Rotor Unit M1630
25. #1204 Lockwashers
26. Field Screws
27. Field & Coil Assembly



NOTE: To show a more complete and detailed view this movement has been reversed so that the bezel numeral seven (7) appears in the normal twelve (12) o'clock position.

"Vistac" has been applied to the following parts of the clock movement:

1. Time set shaft before assembling, and time set shaft spacers where they touch front plate and base plate.
2. Base plate stud where the switch lever touches it.
3. Both ends of the shaft for the intermediate gear and shaft assembly.
4. Switch lever assembly where it touches the front plate.

If it is necessary to replace any of the above parts, a very small amount of "Vistac" should be applied.

MODEL 8H67
MUSALARM

TELECHRON INC.

UNIVERSAL RADIO REPLACEMENT PARTS

CAT. NO.	SYMBOL	DESCRIPTION
UCC-623	C22	CAPACITOR—.003 mfd., 600 v., paper
UCC-630	C1, 17, 20	CAPACITOR—.01 mfd., 600 v., paper
UCC-635	C5, 10, 11, 21	CAPACITOR—.05 mfd., 600 v., paper
UCU-036	C19	CAPACITOR—220 mmfd., mica
UCU-040	C16	CAPACITOR—330 mmfd., mica
UCW-020	C25	CAPACITOR—47 mmfd., ceramic
UOP-418	LS1	SPEAKER—4-inch PM speaker
URD-029	R15	RESISTOR—150 ohms, ½ w., carbon
URD-081	R1	RESISTOR—22,000 ohms, ¼ w., carbon
URD-113	R2, 13, 14	RESISTOR—470,000 ohms, ½ w., carbon
URD-129	R10	RESISTOR—2.2 meg., ½ w., carbon
URD-141	R12	RESISTOR—6.8 meg., ½ w., carbon
URF-051	R16	RESISTOR—1200 ohms, 2 w., carbon

NOTE: See page 1 for tube complement

SPECIALIZED RADIO REPLACEMENT PARTS

CAT. NO.	SYMBOL	DESCRIPTION
RAB-056	L1	BACK—Cabinet back cover (includes loop antenna)
RAU-022		CABINET—Plastic cabinet (Model 61)
RCE-050	C23A, B	CAPACITOR—50 mfd., 150 v.; 50 mfd., 150 v.; dry electrolytic
RCT-021	C2A, B	CONDENSER—Tuning condenser oscillator, and r-f section
RDK-093		KNOB—Volume control knob
RDK-094		KNOB—Tuning dial wheel
RDS-046		SCALE—Dial scale
RJS-003		SOCKET—Octal tube socket (Type 12SA7)
RJS-006		SOCKET—Octal tube socket
RLC-051	T4	COIL—Oscillator coil
RRC-053	R11	POTENTIOMETER—0.5 megohm, volume control
RRW-008	R17	RESISTOR—18 ohms, 1 watt, wire wound
RTL-050	T1	TRANSFORMER—1st I-F transformer
RTL-051	T2	TRANSFORMER—2nd I-F transformer
RTO-036	T3	TRANSFORMER—Output transformer
RWL-009		CORD—Power cord, brown

CLOCK REPLACEMENT PARTS LIST—MODEL No. 8H67

CAT. NO.	SYMBOL	DESCRIPTION
		CASE PARTS
C53X97		Bezel—Venus Bronze
C59X233		Bezel Color Ring—White
C58X15		Crystal
C61X825		Dial
C4X16	3	Knob—Alarm Set
C59X714	2	Knob—Switch
C3X49	23	Knob—Time Set
C59X707		Wire Lead 2 [illegible]" long
		HANDS
C55X10		Alarm Disc
C32X159		Hour and Minute
C31X48		Sweep Second
		MOVEMENT PARTS
C15X3	9	Alarm Hand Sleeve
C11X11	8	Alarm Set Shaft
C35X39	18	Base Plate Assembly
C17X10	6	Cam Shaft Assembly
C40X252	5	Cam Shaft Washer
C46X12		Coil Only
C45X73	27	Field and Coil
C34X134	1	Front Plate Assembly
C13X11	10	Hour Hand Sleeve
C40X87	7	Intermediate Gear Assembly
C14X17	11	Minute Hand Sleeve
		MOVEMENT PARTS (Cont'd)
C44X38	24	Rotor Unit—M1630
C64X1	4	Screw—Front Plate (3)
C40X201	21	Spreader Post (2)
C16X14	12	Sweep Second Hand Shaft
C40X76	16	Switch Assembly
C40X88	15	Switch Lever Assembly
C59X699	14	Switch Shaft Assembly
C40X265	13	Switch Shaft Spacer
C10X129	22	Time Set Shaft Assembly
C40X220	19	Time Set Shaft Spacer (Long)
C40X219	20	Time Set Shaft Spacer (Short)

PARTS OF SWITCH ASSEMBLY

CAT. NO.	SYMBOL	DESCRIPTION
C40X83		Switch Bracket
C40X26		Lower Contact Block
C40X99		Lower Contact Spring
C40X85		Contact Spring Insulator
C40X138		Upper Contact Spring
C40X84		Upper Contact Block
C1X43		No. 4-40 Hex Nut
C1X68		No. 4-40 x $\frac{11}{16}$" Rd. Hd. M/S

CLOCK INSTRUCTIONS

1. CONTACT ADJUSTMENT

A. Set switch to "Alarm" position so that cam follower rests on timing cam. Contacts shall be adjusted to .017" min. gap.

B. With switch in "Off" position, contacts shall remain open as in "A" and there shall be clearance between cam follower and cam.

C. With switch in "On" position, contacts shall be closed.

D. Set switch to "Alarm" position, turn alarm set knob until cam follower drops into slot of timing cam. The contacts shall be closed.

E. Check for proper contact pressure by depressing lower contact strip, using a small pointed tool. If upper contact strip follows the lower a noticeable amount before the contacts separate, the pressure is sufficient.

F. To insure that contacts close, connect a small lamp in series with the switch assembly when testing.

2. TIMING

A. Set minute and hour hands to 12 o'clock.

B. Set timer dial so that the 12 o'clock mark lines up with small line on the dial. In this position the indicator on the hour hand should also line up with the line on the dial.

C. Adjust timer for contact closure at 6:55 o'clock when dial is set for alarm to operate at 7:00 o'clock. On repeat tests the contacts shall close at 6:55, plus or minus 3 minutes. At all other settings, the contacts shall close within 12 minutes ahead or 2 minutes after the time for which the dial is set.

3. VIBRATOR ADJUSTMENT

A. Vibrator shall start buzzing 10 minutes plus or minus 5 minutes after contact closure occurs.

B. When vibrator is in "Shut-off" position the shut-off spring shall lift the vibrator sufficiently above the cam, so that the cam will not contact vibrator in any position.

C. Adjust vibrator for maximum sound.

D. Vibrator shall be shut off before completion of buzzing period.

4. NOISE PREVENTION

Vistac has been applied to such parts as are specified in notes under exploded view of movement. When the parts specified are replaced, a very small amount of Vistac should be applied.

5. GENERAL

A. Alarm set knob to be sufficiently tight on shaft to permit setting of "Alarm" disc in clockwise or counter-clockwise direction, but shall loosen when cam is turned against vibrator.

B. Switch knob shall turn freely.

C. Alarm disc shall not rub against the dial in any position. Prongs must be fully seated in alarm set groove.

6. CAUTION

A. This radio alarm clock will operate satisfactorily only on a circuit supplied with regulated alternating current of the voltage and frequency stamped on name plate.

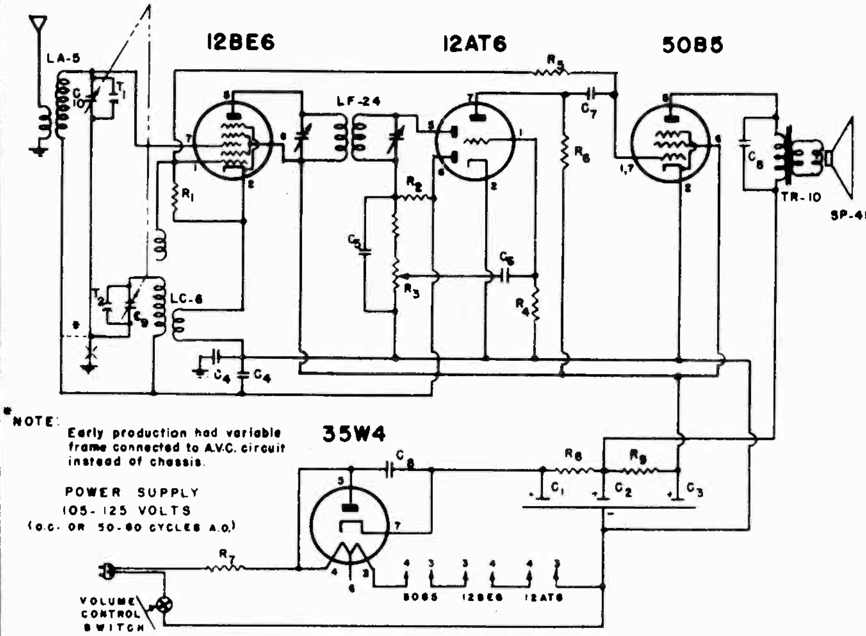
B. If clock loses time, or hour and minute hands fail to rotate, check clearance of time setting shaft from case back or any obstruction behind the Musalarm. This shaft must be allowed to rotate while clock is in operation.

C. It is common practice for people to disconnect their radios during a thunder storm, or to use the outlet for a vacuum cleaner, or when moving furniture in housecleaning. The clock will, of course, stop when disconnected and start immediately when plugged in again. However, it will be necessary to reset the clock to the proper time if disconnected for any reason.

TELE-TONE RADIO CORP.

MODEL 165 Early, CHASSIS AD
MODEL 148, CHASSIS S

MODEL 165 Early

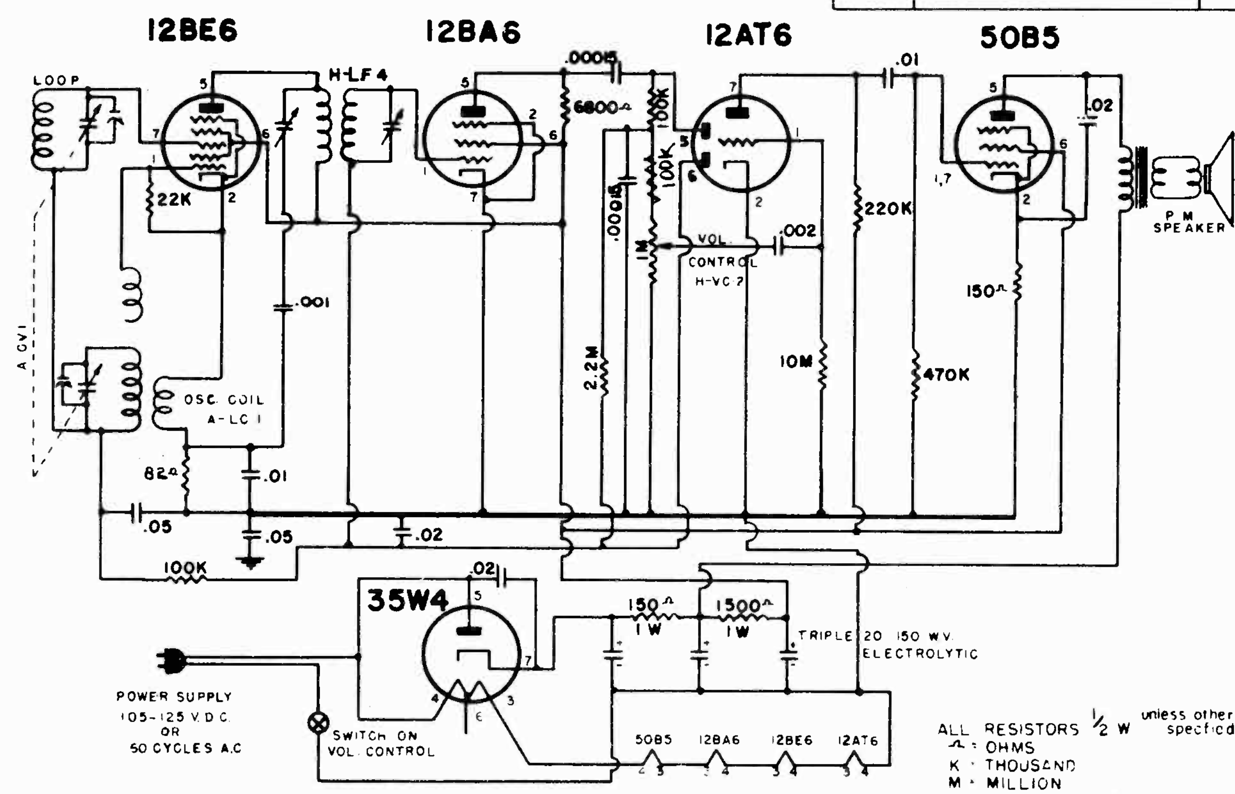


I.F 455 K.C.
FREQ RANGE - 1620 KC.-532.5 KC.
ALIGN T_2 - 1620 KC.
T_1 - 1400 KC.
TRACK - 600 KC.

ITEM	DESCRIPTION	PT. NO.
C_1 C_2 C_3	3X20 MFD 150 VOLT ELECTROLYTIC	CE-11
C_4	.05 MFD. 200 VOLT PAPER COND.	CP-503-4
C_5	.00015 MFD. 500 VOLT MICA COND.	CM-151-1
C_6	.002 MFD 400 VOLT PAPER COND.	CP-202-2
C_7	.005 MFD. 200 VOLT PAPER COND.	CP-502-3
C_8	.02 MFD. 400 VOLT PAPER COND.	CP-203-1
LA-5	ANTENNA COIL	LA-5
LC-6	OSCILLATOR COIL	LC-6
LF-24	I.F. TRANSFORMER	LF-24
R_1	22,000 OHMS 1/2 W. RESISTOR	RC-223-2
R_2	4.7 MEG OHMS 1/2 W. RESISTOR	RC-475-1
R_3	2 MEG. VOL. CONTROL - 100K STOP	VC-11
R_4	10 MEG. OHMS 1/2 W. RESISTOR	RC-106-1
R_5	330,000 OHMS 1/2 W. RESISTOR	RC-334-1
R_6	220,000 OHMS 1/2 W. RESISTOR	RC-224-1
R_7	33 OHMS 2 W. wire wound RES.	RW-330-8
R_8	120 OHMS 1/2 W RESISTOR	RC-121-2
R_9	1500 OHMS 1/2 W. RESISTOR	RC-152-1
SP-45	SPEAKER	SP-45
TR-10	OUTPUT TRANSFORMER	TR-10
C_9 C_{10}	VARIABLE CONDENSER	CV-14
T_1 T_2	TRIMMERS	

CHASSIS SERIES "AD"

MODEL 148



ALL RESISTORS 1/2 W unless otherwise specified
Ω = OHMS
K = THOUSAND
M = MILLION
ALL CONDENSERS IN MICRO-FARAD

CHASSIS SERIES "S"

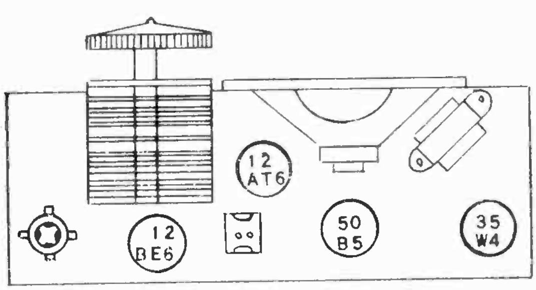
I.F. 455 KC
FREQ RANGE - 530-1700 KC
ALIGN AT - 1500 KC
TRACK AT - 600 KC

MODEL 165 Early
CHASSIS AD

TELE-TONE RADIO CORP.

ELECTRICAL SPECIFICATIONS

Power Supply	105-125 Volts D.C. or 50-60 Cycles A.C. 30 Watts
Frequency Range	532.5 to 1620 kc.
Intermediate Freq.	455 kc.
Tuning	Two gang capacitor
Speaker	4 inch PM 3.5 ohm voice coil impedance
Power Output	1 watt undistorted 1.5 watt maximum
Sensitivity	800 Microvolts at 50 milli-watts Output
Selectivity	120 kc broad at 1000 times signal at 1000 kc.



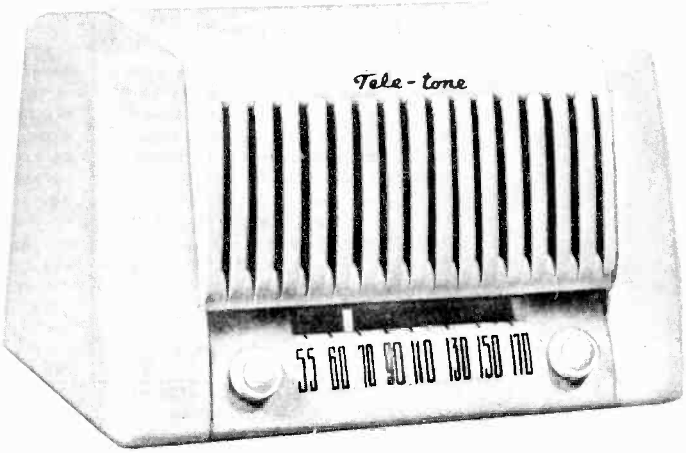
Remove back to replace tubes

ALIGNMENT PROCEDURE

- Output meter across 3.5 ohm output load.
- Volume control at maximum for all adjustments.
- Align for maximum output. Reduce input as needed to keep output near 0.4 volts.

SIGNAL GENERATOR				SETTING TUNER	ADJUST TRIMMERS TO MAXIMUM OUTPUT (in order shown)
Frequency	*Coupling Factor*	*Connection to Receiver*	*Ground Connection*		
455 kc	.1 mfd	12BE6 Grid	B—	Rotor full open (Plates out of mesh)	Input and output trimmers on IF cans
1620 kc	.1 mfd	12BE6 Grid	B—	Rotor full open (Plates out of mesh)	Oscillator trimmer T2
1400 kc	75 mmf	Hank	B—	1400 kc	Antenna trimmer T1

TELE-TONE RADIO CORP. MODELS 159 Early, 159 Late
CHASSIS AA, AB



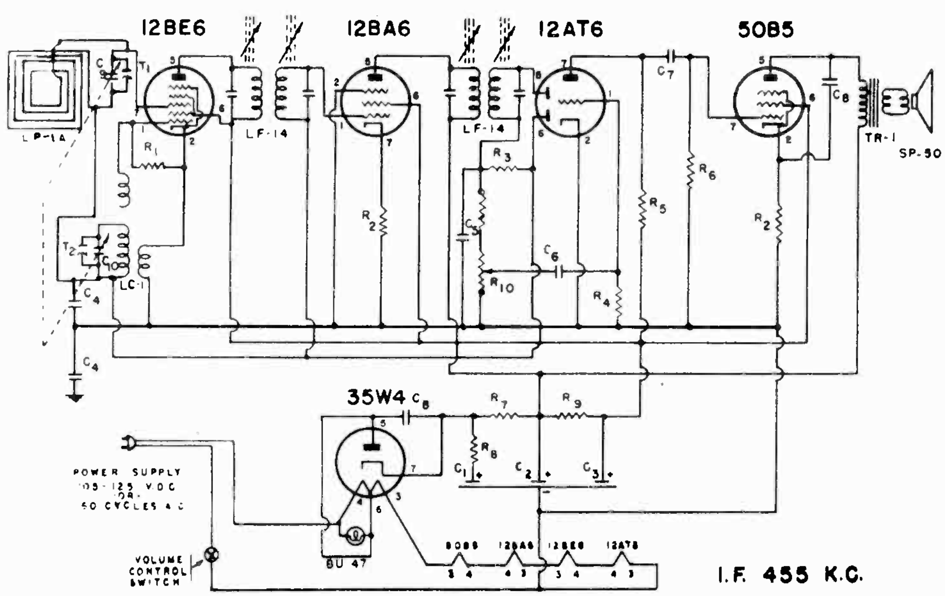
MODEL 159 EARLY

ITEM	DESCRIPTION	PART NO.
C_1 C_2 C_3	3 X 20 MFD-150 VOLT ELECTROLYTIC	CE-11
C_4	.05 MFD-400 VOLT PAPER COND.	CP-503-1
C_5	.00015 MFD-500 VOLT MICA COND.	CM-151-1
C_6	.002 MFD-200 VOLT PAPER COND.	CP-202-4
C_7	.01 MFD-400 VOLT PAPER COND.	CP-103-1
C_8	.02 MFD-400 VOLT PAPER COND.	CP-203-1
C9, C10	VARIABLE CONDENSER	CV-10
LF-14	I.F. TRANSFORMER	LF-14
LP-1A	LOOP	LP-1A
R_1	22,000 OHMS 1/2 W. RESISTOR	RC-223-1
R_2	150 OHMS 1/2 W. RESISTOR	RC-151-1
R_3	2.2 MEG. 1/2 W. RESISTOR	RC-225-1
R_4	10 MEG. 1/2 W. RESISTOR	RC-106-1
R_5	220,000 OHMS 1/2 W. RESISTOR	RC-224-1
R_6	470,000 OHMS 1/2 W. RESISTOR	RC-474-1
R_7	150 OHMS 1 W. RESISTOR	RC-151-4
R_8	18 OHMS 1/2 W. RESISTOR	RC-180-2
R_9	1500 OHMS 1/2 W. RESISTOR	RC-152-1
R_{10}	1 MEG. VOL. CONTROL with 100 K STOP	VC-9
SP-50	SPEAKER	SP-50
TR-1	OUTPUT TRANSFORMER	TR-1
LC-1	OSCILLATOR COIL	LC-1
T1, T2	TRIMMERS ON VARIABLE	
BU-47	#47 PILOT LIGHT	BU-47

FREQ. RANGE—530-1700 KC.
ALIGN T_2 - 1700 K.C.
T_1 - 1500 K.C.
TRACK AT - 600 K.C.

Late series have component changes as follows:

ITEM	DESCRIPTION	PART NO
LP-8	LOOP	LP-8
R_{10}	1 MEG. VOL CONTROL with 100 K STOP	VC-10
SP-43	SPEAKER	SP-43



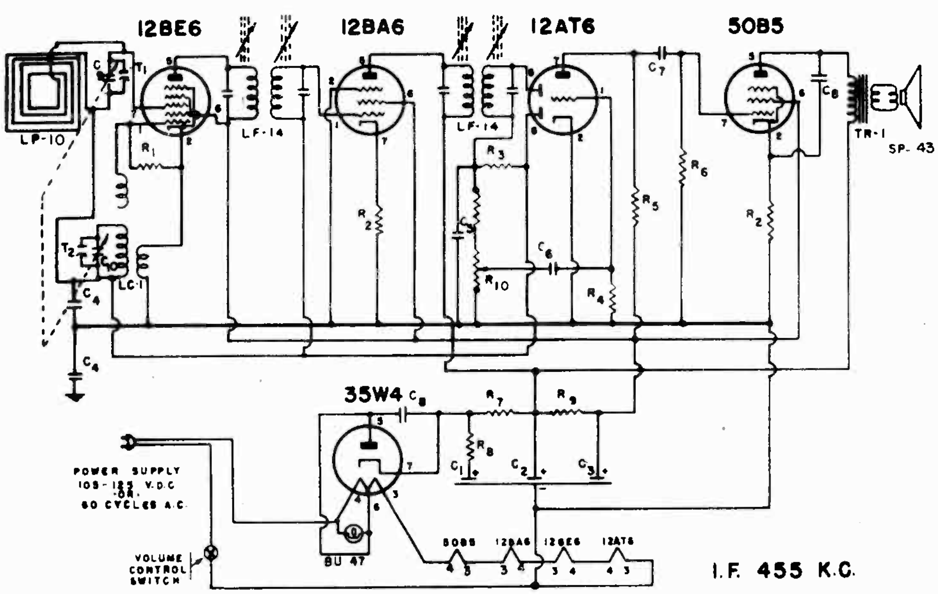
CHASSIS SERIES "AA"

MODEL 160
CHASSIS Y

TELE-TONE RADIO CORP.

ITEM	DESCRIPTION	PART NO
C_1 C_2 C_3	3 X20 MFD-150 VOLT ELECTROLYTIC	CE-11
C_4	.05 MFD-400 VOLT PAPER COND	CP-503-1
C_5	.00015 MFD-500 VOLT MICA COND.	CM-151-1
C_6	.002 MFD 200 VOLT PAPER COND.	CP-202-4
C_7	.01 MFD-400 VOLT PAPER COND	CP-103-1
C_8	.02 MFD 400 VOLT PAPER COND.	CP-203-1
C9, C10	VARIABLE CONDENSER	CV-10
LF-14	I.F. TRANSFORMER	LF-14
LP-10	LOOP	LP-10
R_1	22,000 OHMS ½ W. RESISTOR	RC-223-1
R_2	150 OHMS ½ W RESISTOR	RC-151-1
R_3	2.2 MEG ½ W. RESISTOR	RC-225-1
R_4	10 MEG ½ W. RESISTOR	RC-106-1
R_5	220,000 OHMS ½ W. RESISTOR	RC-224-1
R_6	470,000 OHMS ½ W RESISTOR	RC-474-1
R_7	150 OHMS 1 W. RESISTOR	RC-151-4
R_8	18 OHMS ½ W. RESISTOR	RC-180-2
R_9	1500 OHMS ½ W. RESISTOR	RC-152-1
R_{10}	1 MEG. VOL. CONTROL with 100K STOP	VC-8
SP-43	SPEAKER	SP-43
TR-1	OUTPUT TRANSFORMER	TR-1
LC-1	OSCILLATOR COIL	LC-1
T1 T2	TRIMMERS ON VARIABLE	
BU-47	#47 PILOT LIGHT	BU-47

FREQ. RANGE – 530 - 1700 KC
ALIGN T_2 - 1700 KC
T_1 - 1500 K.C.
TRACK AT - 600 K.C.

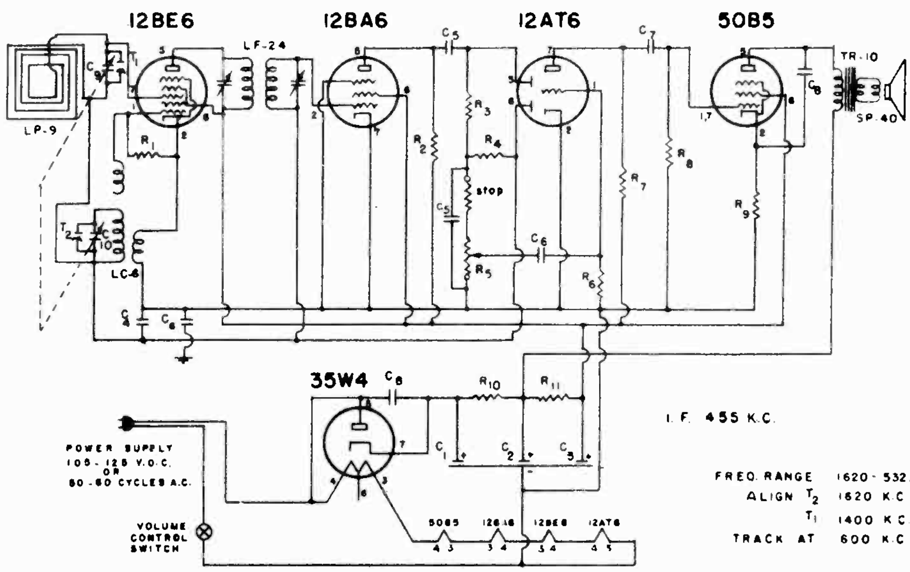


CHASSIS SERIES "Y"

TELE-TONE RADIO CORP.

MODEL 166 Early
CHASSIS AE

ITEM	DESCRIPTION	PART NO.
C_1 C_2 C_3	3×20 MFD. 150 VOLT ELECTROLTIC	CE-11
C_4	.05 MFD. 200 VOLT PAPER COND.	CP-503-4
C_5	.00015 MFD. 500 VOLT MICA COND.	CM-151-1
C_6	.002 MFD. 400 VOLT PAPER COND.	CP-202-2
C_7	.01 MFD. 150 VOLT MOLDED COND.	CP-103-5
C_8	.02 MFD. 400 VOLT PAPER COND.	CP-203-1
C_9 C_{10}	VARIABLE CONDENSER	CV-10
LC-6	OSCILLATOR COIL	LC-6
LF-24	I.F. TRANSFORMER	LF-24
LP-9	LOOP	LP-9
R_1	22,000 OHMS ½ W. RESISTOR 10%	RC-223-2
R_2	6800 OHMS ½ W. RESISTOR	RC-682-1
R_3	100,000 OHMS ½ W. RESISTOR	RC-104-1
R_4	4.7 MEG. OHMS ½ W. RESISTOR	RC-475-1
R_5	2 MEG. VOL. CONTROL with 100K stop	VC-12
R_6	10 MEG. OHMS ½ W. RESISTOR	RC-106-1
R_7	220,000 OHMS ½ W. RESISTOR	RC-224-1
R_8	470,000 OHMS ½ W. RESISTOR	RC-474-1
R_9	150 OHMS ½ W. RESISTOR	RC-151-1
R_{10}	150 OHMS 1 W. RESISTOR	RC-151-4
R_{11}	1500 OHMS 1 W. RESISTOR	RC-152-4
SP-40	SPEAKER	SP-40
TR-10	OUTPUT TRANSFORMER	TR-10
T_1 T_2	TRIMMERS ON VARIABLE	



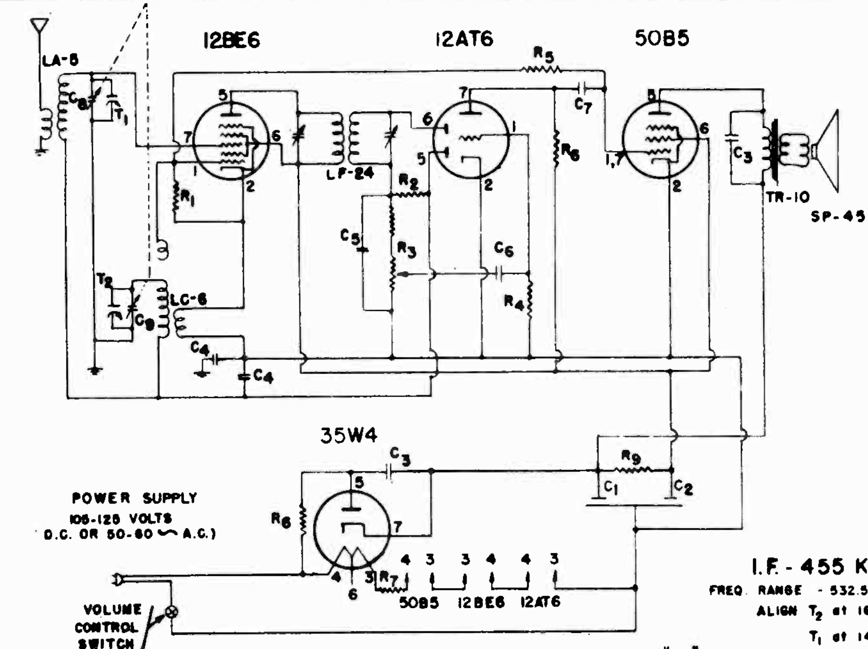
I.F. 455 K.C.

FREQ. RANGE 1620 - 532.5 KC
ALIGN T_2 1620 K.C.
T_1 1400 K.C.
TRACK AT 600 K.C.

CHASSIS SERIES "AE"

MODEL 166 Late
CHASSIS AN

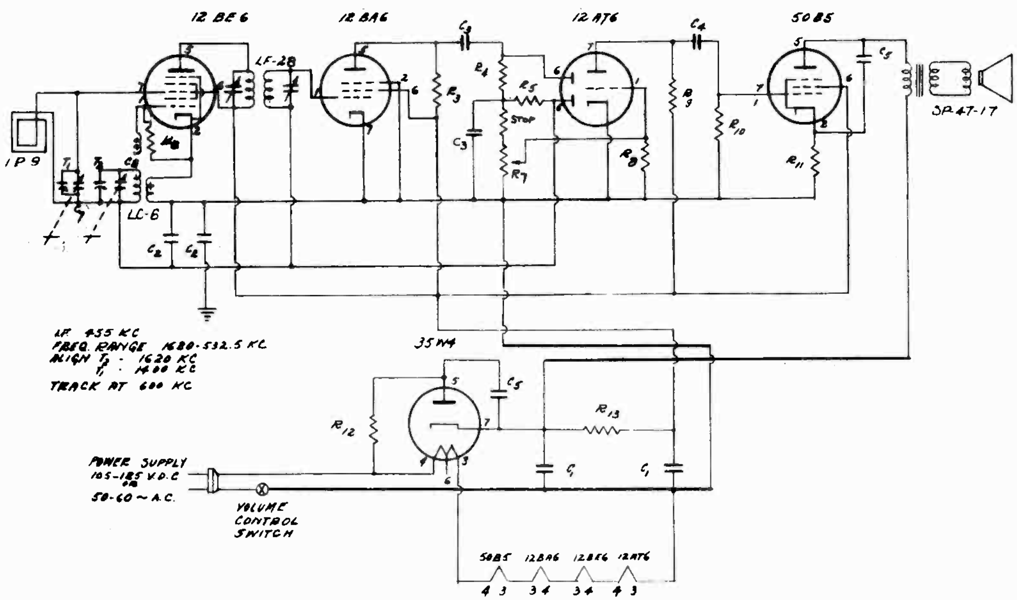
TELE-TONE RADIO CORP.



CHASSIS SERIES "AG"

I.F. - 455 K.C.
FREQ. RANGE - 532.5 to 1620 K.C.
ALIGN T_2 at 1620 K.C.
T_1 at 1400 K.C.
TRACK at 600 K.C.

ITEM	DESCRIPTION	PART NO.
C_1, C_2	2 X 40 MFD. 150 VOLT ELECT.	CE-15
C_3	.02 MFD. 400 V. PAPER COND.	CP-203-1
C_4	.05 MFD. 200 V. PAPER COND.	CP-503-4
C_5	.00015 MFD. 500 V. MICA COND.	CM-151-1
C_6	.002 MFD. 400 V. PAPER COND.	CP-202-2
C_7	.005 MFD. 200 V. PAPER COND.	CP-502-3
C_8, C_9	VARIABLE CONDENSER	CV-14
LC-6	OSCILLATOR COIL	LC-6
LA-5	ANTENNA COIL	LA-5
LF-24	I. F. TRANSFORMER	LF-24
R_1	18,000 OHMS ½ W. 10%	RC-183-2
R_2	4.7 MEGOHMS ½ W. RESISTOR	RC-475-1
R_3	2 MEG. VOL. CONTROL, 100K STOP	VC-11
R_4	10 MEGOHMS ½ W. RESISTOR	RC-106-1
R_5	330,000 OHMS ½ WATT	RC-334-1
R_6	220,000 OHMS ½ WATT	RC-224-1
R_7	39 OHMS 1 WATT RESISTOR	RC-390-4
R_8	18 OHMS ½ W. RESISTOR	RC-180-1
R_9	2200 OHMS 1 W. RESISTOR	RC-222-4
T_1, T_2	TRIMMERS	
SP-45	SPEAKER	SP-45
TR-10	OUTPUT TRANSFORMER	TR-10



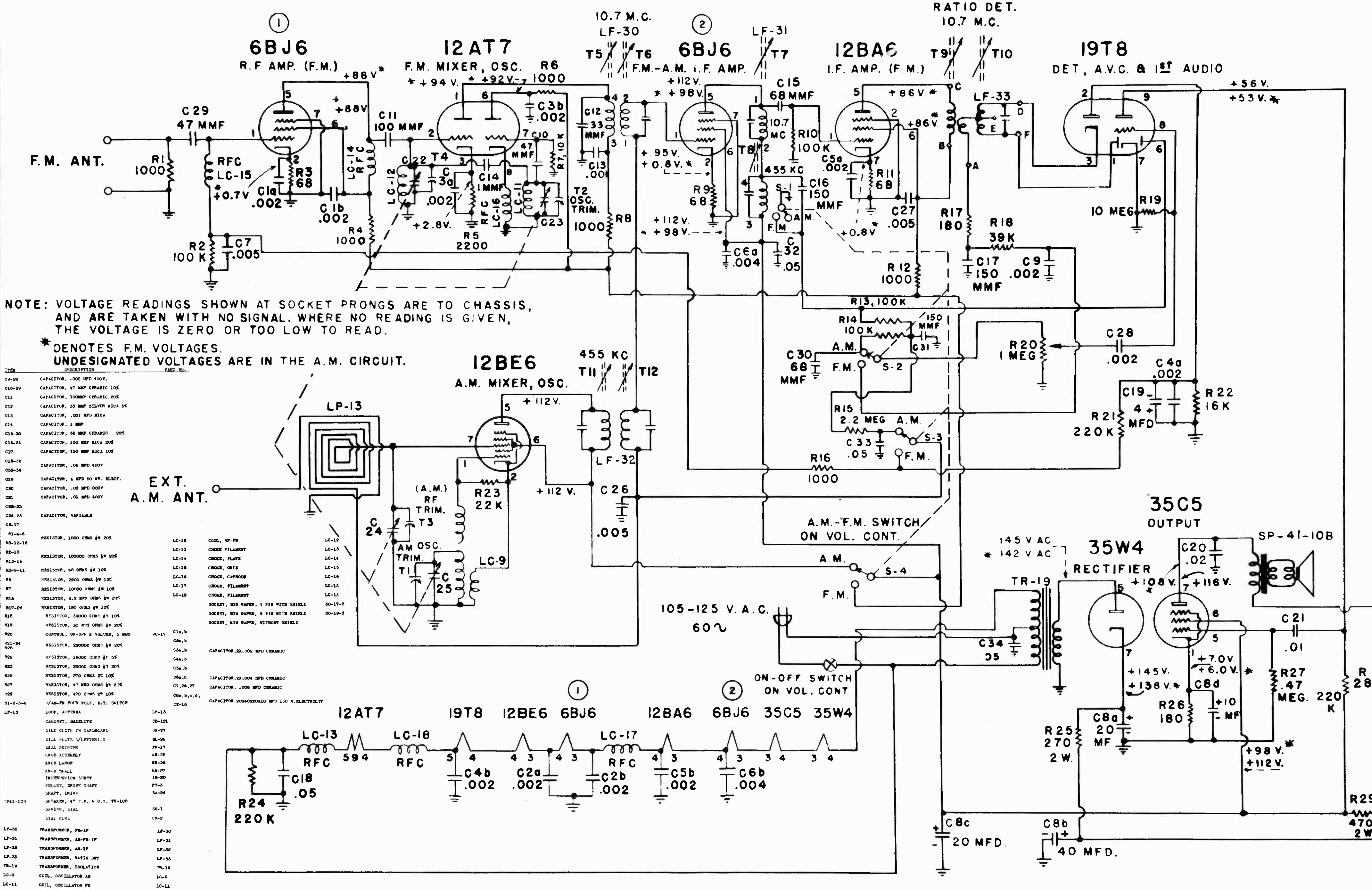
I.F. 455 KC
FREQ. RANGE 1620-532.5 KC
ALIGN T_2 : 1620 KC
T_1 : 1400 KC
TRACK AT 600 KC

CHASSIS SERIES "AN"

ITEM	DESCRIPTION	PART NO.
C-1	40 MF 150 V. ELECT. COND.	CE-15
C-2	.05 MF 200 V. PAPER ±20%	CP-503-4
C-3	150 MMF MICA COND	CM-151-1
C-4	.005 MF 200 V. PAPER ±20%	CP-502-3
C-5	.02 MF 400 V. PAPER ±20%	CP-203-1
C-6	.002 MF 400 V. PAPER +40% -15%	CP-202-2
C-7, C-8	VARIABLE CONDENSER	CV-10
T-1, T-2	TRIMMERS ON VARIABLES	
R-2	22,000Ω ½ W. ±10%	RC-223-2
R-3	6800Ω ½ W. ±20%	RC-682-1
R-4	100000Ω ½ W ±20%	RC-104-1
R-5	4.7 MEG ½ W. ±20%	RC-475-1
R-7	2 MEG. V.C. WITH 100,000Ω STOP	VC-12
R-8	10 MEG ½ W. ±20%	RC-106-1
R-9	220000Ω ½ W. ±20%	RC-224-1
R-10	470,000Ω ½ W ±20%	RC-474-1
R-11	150Ω ½ W. ±20%	RC-151-1
R-12	18Ω ½ W. ±20%	RC-180-1
R-13	2200Ω 1 W ±20%	RC-222-4
LP-9	ANTENNA LOOP	LP-9
LC-6	OSCILLATOR COIL	LC-6
SP-47-17	4" SPEAKER WITH .48 oz MAG.	SP-47-17
LF-24	I.F. TRANSFORMER	LF-24

TELE-TONE RADIO CORP.

MODELS 158, 198
CHASSIS AT



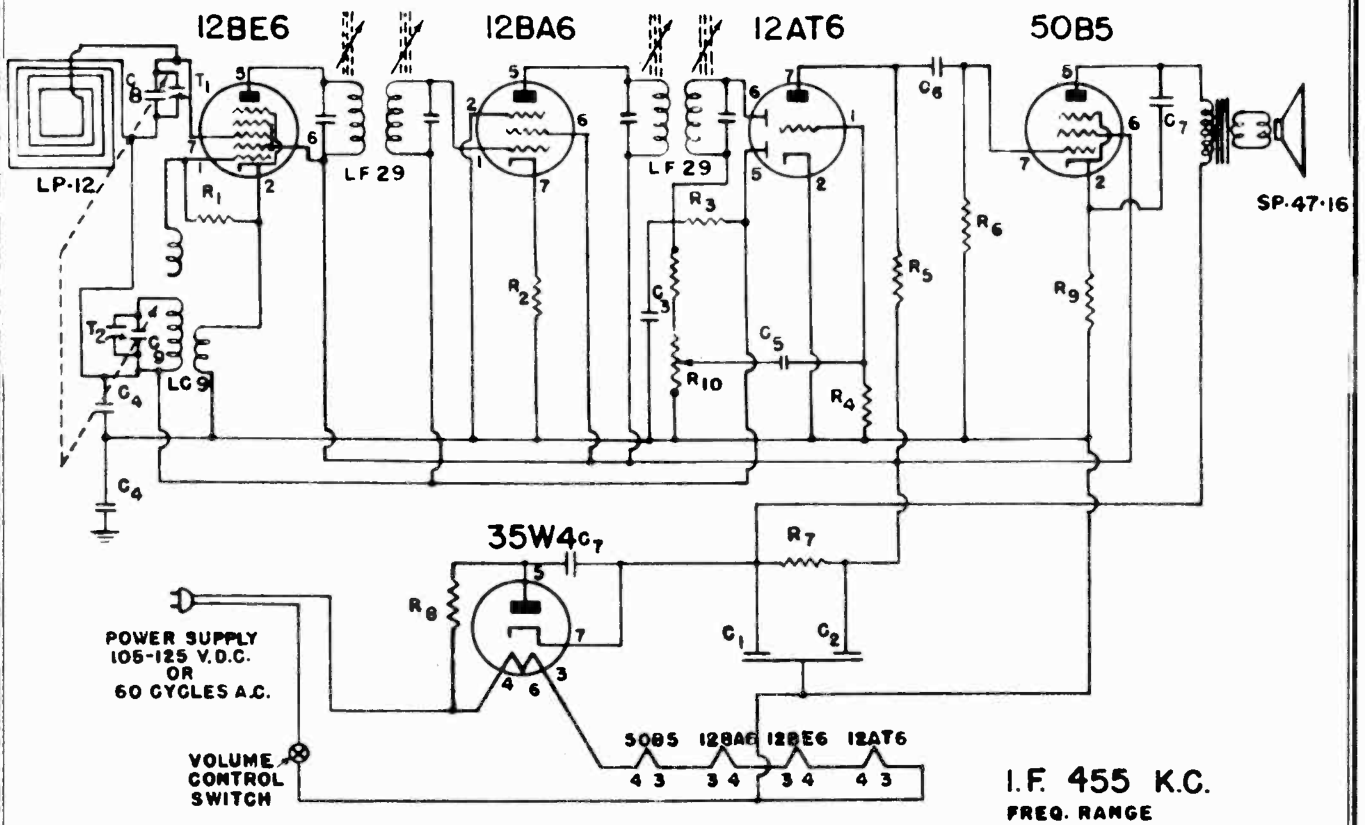
NOTE: VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

* DENOTES F.M. VOLTAGES.
UNDESIGNATED VOLTAGES ARE IN THE A.M. CIRCUIT.

ITEM	DESCRIPTION	PART NO.
C9-28	CAPACITOR, .002 MFD 400V.	
C10-29	CAPACITOR, 47 MMF CERAMIC 10%	
C11	CAPACITOR, 100MMF CERAMIC 20%	
C12	CAPACITOR, 33 MMF SILVER MICA 5%	
C13	CAPACITOR, .001 MFD MICA	
C14	CAPACITOR, 1 MMF	
C15-30	CAPACITOR, 68 MMF CERAMIC 20%	
C16-31	CAPACITOR, 150 MMF MICA 20%	
C17	CAPACITOR, 150 MMF MICA 10%	
C18-32 C33-34	CAPACITOR, .05 MFD 400V	
C19	CAPACITOR, 4 MFD 50 WV. ELECT.	
C20	CAPACITOR, .02 MFD 800V	
C21	CAPACITOR, .01 MFD 400V	
C22-23 C24-25 CV-17	CAPACITOR, VARIABLE	
R1-4-6 R8-12-16	RESISTOR, 1000 OHMS ½W 20%	
R2-10 R13-14	RESISTOR, 100000 OHMS ½W 20%	
R3-9-11	RESISTOR, 68 OHMS ½W 10%	
R5	RESISTOR, 2200 OHMS ½W 10%	
R7	RESISTOR, 10000 OHMS ½W 10%	
R15	RESISTOR, 2.2 MEG OHMS ½W 20%	
R17-26	RESISTOR, 180 OHMS ½W 10%	
R18	RESISTOR, 39000 OHMS ½W 10%	
R19	RESISTOR, 10 MEG OHMS ½W 20%	
R20	CONTROL, ON-OFF & VOLUME, 1 MEG	VC-17
R21-24 R28	RESISTOR, 220000 OHMS ½W 20%	
R22	RESISTOR, 16000 OHMS ½W 5%	
R23	RESISTOR, 22000 OHMS ½W 20%	
R25	RESISTOR, 270 OHMS 2W 10%	
R27	RESISTOR, 47 MEG OHMS ½W 20%	
R29	RESISTOR, 470 OHMS 2W 10%	
S1-2-3-4	W/AM-FM FOUR POLE, D.T. SWITCH	
LP-13	LOOP, ANTENNA	LP-13
	CABINET, BAKELITE	CB-120
	SILK CLOTH ON CARDBOARD	OR-27
	DIAL PLATE W/LETTERING	DL-26
	DIAL POINTER	PN-17
	KNOB ASSEMBLY	KN-28
	KNOB LARGE	KN-26
	KNOB SMALL	KN-27
	INSTRUCTION SHEET	IS-20
	PULLEY, DRIVE SHAFT	PY-3
	SHAFT, DRIVE	SA-24
SP41-10B	SPEAKER, 4" P.M. & O.T. TR-10B	
	SPRING, DIAL	SO-1
	DIAL CORD	CR-2
LF-30	TRANSFORMER, FM-IF	LF-30
LF-31	TRANSFORMER, AM-FM-IF	LF-31
LF-32	TRANSFORMER, AM-IF	LF-32
LF-33	TRANSFORMER, RATIO DET	LF-33
TR-19	TRANSFORMER, ISOLATION	TR-19
LC-9	COIL, OSCILLATOR AM	LC-9
LC-11	COIL, OSCILLATOR FM	LC-11
LC-12	COIL, RF-FM	LC-12
LC-13	CHOKE FILAMENT	LC-13
LC-14	CHOKE, PLATE	LC-14
LC-15	CHOKE, GRID	LC-15
LC-16	CHOKE, CATHODE	LC-16
LC-17	CHOKE, FILAMENT	LC-13
LC-18	CHOKE, FILAMENT	LC-13
	SOCKET, MIN WAFER, 7 PIN WITH SHIELD	SO-17-S
	SOCKET, MIN WAFER, 9 PIN WITH SHIELD	SO-19-3
	SOCKET, MIN WAFER, WITHOUT SHIELD	
C1a,b C2a,b C3a,b C4a,b C5a,b	CAPACITOR, 2X.002 MFD CERAMIC	
C6a,b	CAPACITOR, 2X.004 MFD CERAMIC	
C7,26,27	CAPACITOR, .005 MFD CERAMIC	
C8a,b,c,d, CE-18	CAPACITOR 20x40x20x10 MFD 150 V. ELECTROLYT	

TELE-TONE RADIO CORP.

MODEL 184
CHASSIS AM



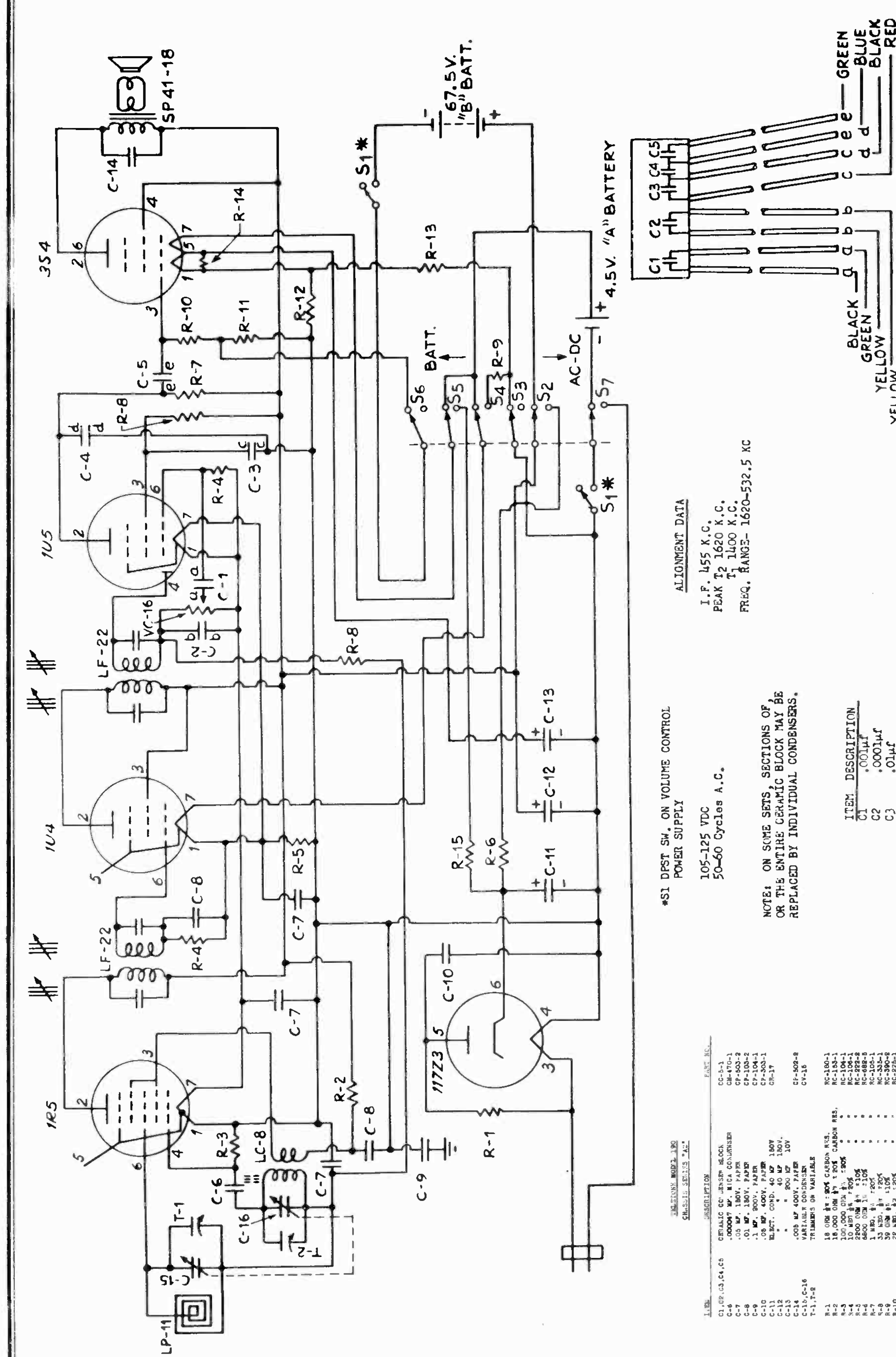
I.F. 455 K.C.

FREQ. RANGE
532.5-1620 KC
ALIGN T_2 1620 KC
T_1 1400 KC
TRACK AT 600 KC

ITEM	DESCRIPTION	PART NO
C_1 C_2	40-40-150 V. ELECTROLYTIC CONDENS.	CE-15
C_3	150 MMF MICA CONDENSER	CM-151-1
C_4	.05 MFD 400 V. PAPER CONDENSER	CP-503-1
C_5	.002 MFD 200 V. PAPER CONDENSER	CP-202-4
C_6	.005 MFD 200 V. PAPER CONDENSER	CP-502-3
C_7	.02 MFD 400 V. PAPER CONDENSER	CP-203-1
C_8 C_9	VARIABLE CONDENSER	CV-15
R_1	22,000 OHMS ½W RESISTOR	RC-223-1
R_2	180 OHMS ½W RESISTOR	RC-181-2
R_3	2.2 MEG ½W RESISTOR	RC-225-1
R_4	10 MEG ½W RESISTOR	RC-106-1
R_5	220,000 OHMS ½W RESISTOR	RC-224-1
R_6	470,000 OHMS ½W RESISTOR	RC-474-1
R_7	2200 OHMS 1 W RESISTOR	RC-222-4
R_8	18 OHMS ½W ±10% RESISTOR	RC-180-2
R_9	150 OHMS ½W RESISTOR	RC-151-1
R_{10}	VOLUME CONTROL	VC-8
LC-9	OSCILLATOR COIL	LC-9
LF-29	I.F. TRANSFORMER	LF-29
LP-12	LOOP	LP-12
SP-47-16	SPEAKER WITH OUTPUT TRANSF. MTD.	SP-47-16
T_1 T_2	TRIMMERS ON VARIABLE	T_1 T_2

MODEL 190
CHASSIS AZ

TELE-TONE RADIO CORP.



ALIGNMENT DATA

I.F. 455 K.C.
PEAK T_2 1620 K.C.
T_1 1400 K.C.
FREQ. RANGE- 1620-532.5 KC

*S1 DPST SW. ON VOLUME CONTROL

POWER SUPPLY

105-125 VDC
50-60 Cycles A.C.

NOTE: ON SOME SETS, SECTIONS OF, OR THE ENTIRE CERAMIC BLOCK MAY BE REPLACED BY INDIVIDUAL CONDENSERS.

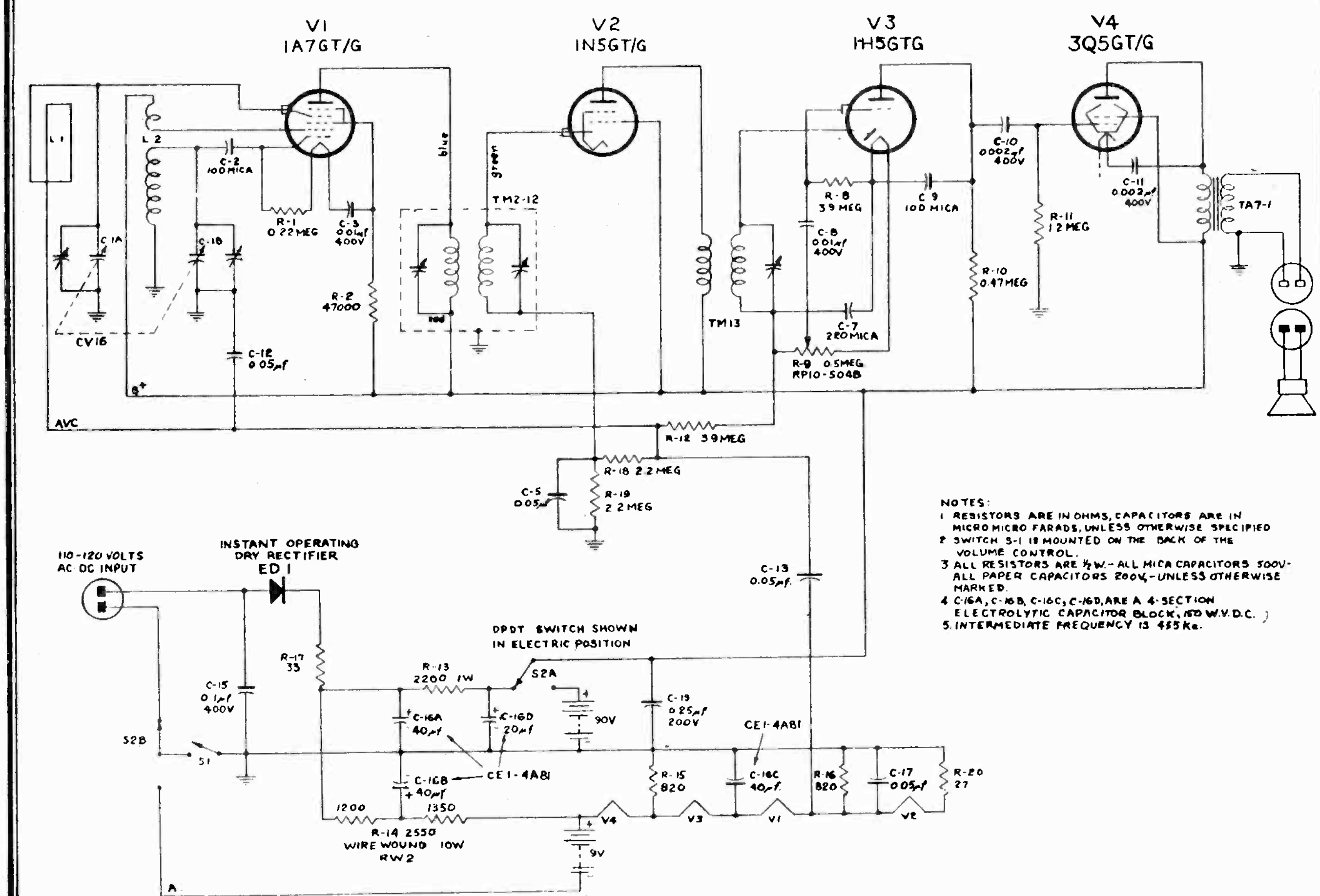
ITEM	DESCRIPTION
C1	.001µf
C2	.0001µf
C3	.01µf
C4	.0001µf
C5	.002µf

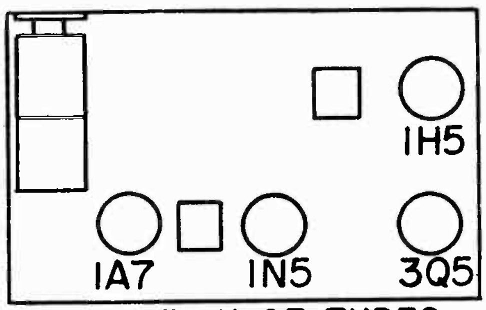
TELETONE MODEL 190
CHASSIS SERIES "AZ"

ITEM	DESCRIPTION	PART NO.
C1,C2,C3,C4,C5	CERAMIC CONDENSER BLOCK	CC-5-1
C-6	.000047 MF. MICA CONDENSER	CM-470-1
C-7	.05 MF. 180V. PAPER	CP-503-2
C-8	.01 MF. 180V. PAPER	CP-103-2
C-9	.1 MF. 200V. PAPER	CP-104-1
C-10	.05 MF. 400V. PAPER	CP-503-1
C-11	ELECT. COND. 40 MF 150V	CE-17
C-12	" " 40 MF 150V.	
C-13	" " 200 MF 10V	
C-14	.005 MF 400V. PAPER	CP-502-8
C-15,C-16	VARIABLE CONDENSER	CV-16
T-1,T-2	TRIMMERS ON VARIABLE	
R-1	18 OHM ½W ±20% CARBON RES.	RC-180-1
R-2	15,000 OHM ½W ±20% CARBON RES.	RC-153-1
R-3	100,000 OHM ½W ±20%	RC-104-1
R-4	10 MEG ½W ±20%	RC-106-1
R-5	2200 OHM 1W ±10%	RC-222-2
R-6	6800 OHM 1W ±10%	RC-682-5
R-7	1 MEG. ½W ±20%	RC-105-1
R-8	33 MEG. ½W ±20%	RC-336-1
R-9	39 OHM ½W ±10%	RC-390-2
R-10	22 MEG. ½W ±20%	RC-226-1
R-11	680 OHM ½W ±10%	RC-681-2
R-12	1800 OHM ½W ±10%	RC-182-2
R-13	27 OHM ½W ±5%	RC-270-3
R-14	390 OHM ½W ±10%	RC-391-2
R-15	CARBON RES. 2550 OHM ±5%	RP-5
VC-1	VOL. CONTROL 1 MEG. WITH DPST SWITCH	VC-16
SP-41	4" SPKR. [illegible] MAGNET WITH O.T.	SP-41-18
LF-22	I.F. TRANSFORMER	LF-22
LP-11	ANTENNA LOOP	LP-16
LC-8	OSC. COIL	LC-8
S-2,3,4,5,6,7	BATTERY SWITCH 6 POLE DT	S-11

TEMPLETONE RADIO MFG. CORP.

MODEL G-410





LOCATION OF TUBES

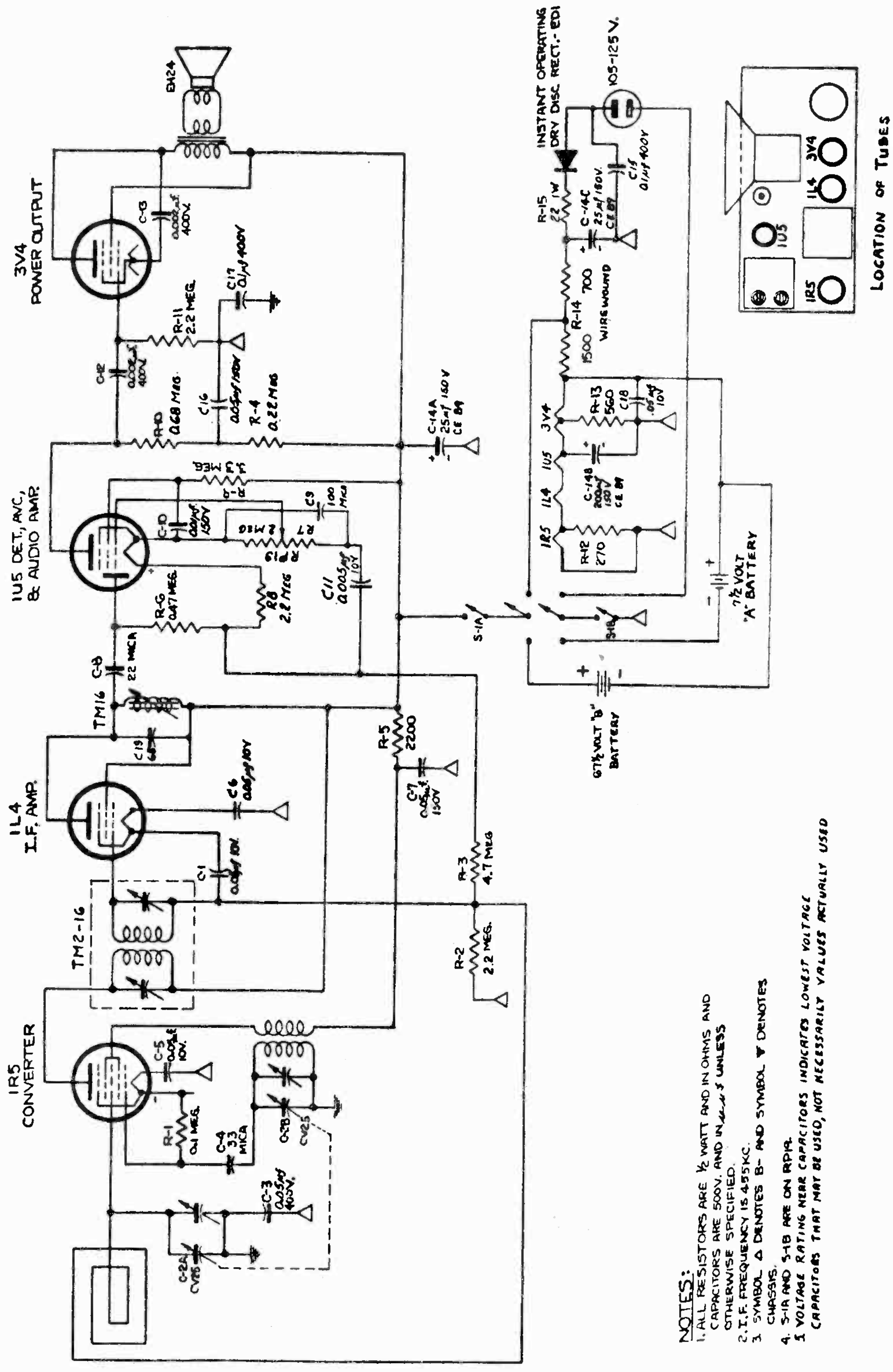
Battery: The battery is an Eveready type 753 battery pack or equivalent. It should be mounted in the compartment provided in the bottom of the cabinet, with plug facing front of cabinet. Battery should be removed when it is dead or if the set is not to be used on battery operation for several months.

Alignment: No attempt should be made to realign this receiver until it has been determined that a poor tube, or some local condition is not responsible for faulty reception.

The Signal Generator may be connected through a 0.01 mf capacitor (used as dummy antenna) to the lug on RF section (A) of tuning capacitor. Connect ground clip of generator to the chassis. An output meter may be clipped directly across the voice coil lugs. Align the I.F. trimmers to 455 kc, using least possible input from Signal Generator to avoid developing A.V.C. voltage which would make the tuning adjustments very broad.

To align RF trimmers, remove the 0.01 mf capacitor and connect the Signal Generator leads to two or three turns of heavy wire, forming a self-supporting loop of about 7 or 8 inches diameter, placed about a foot away from the receiver's loop antenna. Again, use the least possible input from the Signal Generator. With the tuning capacitor plates completely out of mesh, and pointer at extreme right end of travel, adjust the oscillator trimmer (B) (on front section of tuning capacitor) to 1700 kc. Readjust both Signal Generator and tuning capacitor to 1550 kc and adjust the RF trimmer (A) (on rear section) for maximum response.

MODELS G-415, H-415 TEMPLETONE RADIO MFG. CORP.



NOTES:
1. ALL RESISTORS ARE ½ WATT AND IN OHMS AND CAPACITORS ARE 500V. AND IN μμf UNLESS OTHERWISE SPECIFIED.
2. I.F. FREQUENCY IS 455KC.
3. SYMBOL △ DENOTES B- AND SYMBOL ▼ DENOTES CHASSIS.
4. S-1A AND S-1B ARE ON RP-14.
5. VOLTAGE RATING NEAR CAPACITORS INDICATES LOWEST VOLTAGE CAPACITORS THAT MAY BE USED, NOT NECESSARILY VALUES ACTUALLY USED

This Radio has 4 tubes plus an instant operating dry disc rectifier. It is a 3-way portable superheterodyne receiver using the latest octal type of low-drain electronic miniature tubes.

Operation: The set operates from 105 to 120 volts, A.C. or D.C. power supply or from self-contained batteries. Power drain is approximately 18 watts on electric operation. Because it uses an instant operating dry disc rectifier, no warm up time is necessary on either A.C., D.C., or battery operation. The set will play immediately after the power switch is turned on. When operated on direct current (D.C.), if no reception is obtained, reverse the line plug in the power outlet.

Range: This Radio covers the broadcast band from 540 to 1625 kilocycles. Since the scale is calibrated 55 to 160, the actual frequency of the station received is obtained by adding a zero to the dial calibration.

Controls: Three controls are provided. The left-hand control puts the set into operation and increases the volume with clockwise rotation. The right-hand control tunes the dial to the desired station. The slide switch selects electric operation in the upper position, and battery operation in the lower position.

Antenna: No outside aerial is required as adequate pickup is obtained by the self-contained loop antenna. In areas of poor reception or for weak or distant stations the loop antenna has a directional effect. The set or loop antenna may be turned to the direction of maximum reception.

Battery: The batteries comprise: one 7½ volt "A" unit Temple #GB1 or equivalent and one 67½ volt "B" unit Eveready type 467, Burgess #XX45, Ray-O-Vac #4367, Winchester #1710 or equivalent. They should be mounted in the spaces provided in the cabinet. Batteries should be removed when they are dead or if the set is not to be used on battery operation for several months.

This receiver uses a new "A" battery with the latest type construction, the Temple GB1, that eliminates the need for using five (5) flashlight cells and the attendant difficulties with the ten (10) contacts required for the flashlight batteries. Since it may not at once be readily available all over, it is suggested that a spare GB1 be kept on hand.

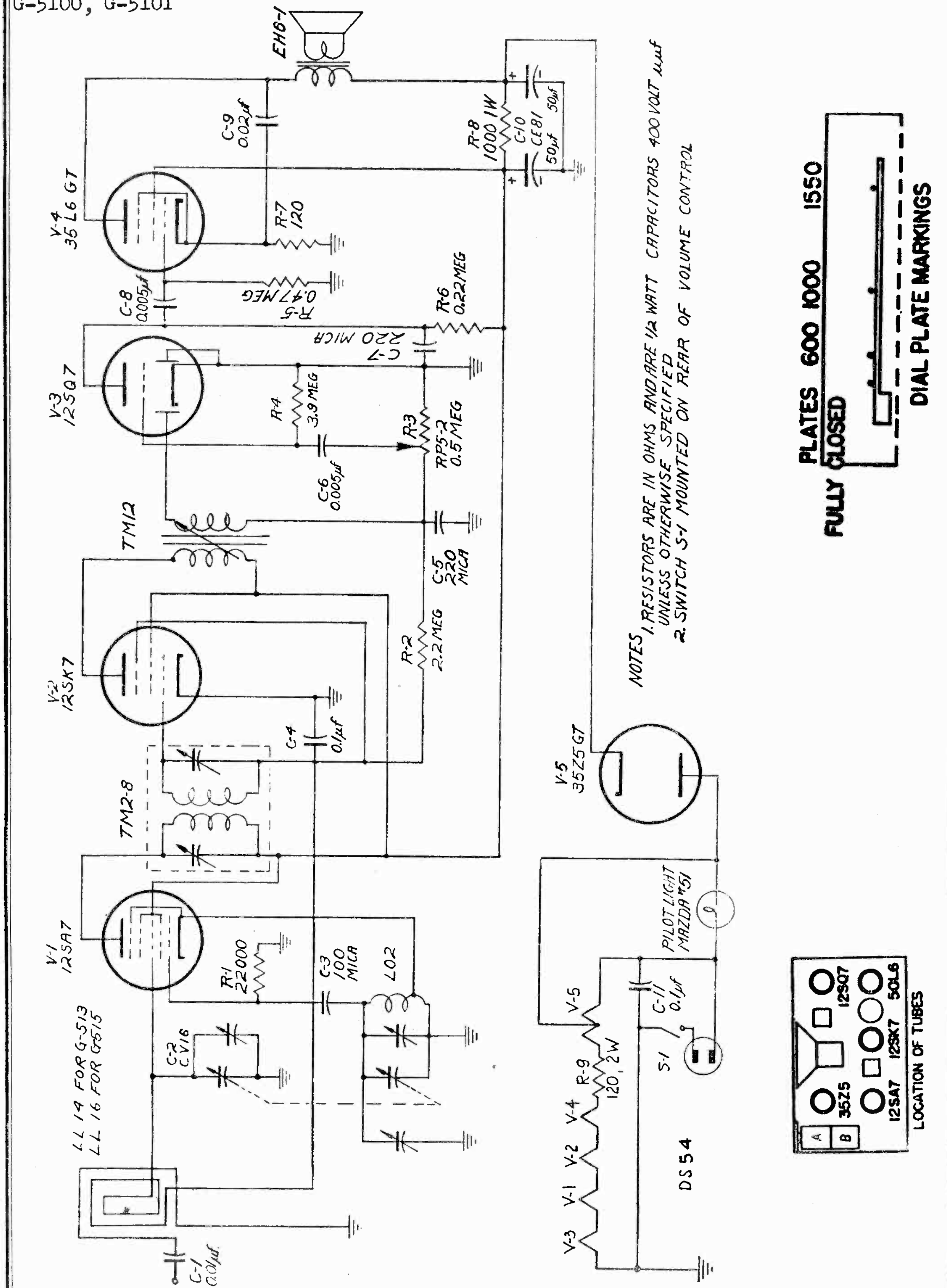
Alignment: No attempt should be made to realign this receiver until it has been determined that a poor tube, or some local condition is not responsible for faulty reception.

The Signal Generator may be connected throught a 0.01 mf capacitor (used as dummy antenna) to the lug on RF section of the tuning capacitor. Connect ground clip of generator to the B— terminal. An output meter may be clipped directly across the voice coil lugs. Align the I.F. trimmers and iron core to 455 kc, using least possible input from Signal Generator to avoid developing A.V.C. voltage which would make the tuning adjustments broad.

Provisions are made to align the R.F. trimmers with the receiver in the metal cabinet. Remove the two plug buttons on the right side of the cabinet and connect the Signal Generator leads to two or three turns of heavy wire, forming a self-supporting loop of about 7 or 8 inches diameter, placed about a foot away from the receiver's loop antenna. Again, use the least possible input from the Signal Generator. With the tuning capacitor plates completely out of mesh, and the pointer at the extreme right end of its travel, adjust the oscillator trimmer (on front section of tuning capacitor) to 1625 kc. Readjust both Signal Generator and tuning capacitor to 1550 kc and adjust the RF trimmer (on rear section) for maximum response.

MODELS G-513, G-515,
G-5100, G-5101

TEMPLETONE RADIO MFG. CORP.



radio is a 5-tube super-heterodyne receiver using the latest type of low-drain electronic tubes.

Operation: The set operates on 110 to 120 volts, 50 or 60 cycles A. C. and 110 to 120 volts D. C. Power drain is approximately 25 watts.

When operated on direct current (D.C.), if no reception is obtained after approximately one minute of warm-up time, reverse the line plug in the power outlet.

Range: covers the broadcast band from 540 to 1620 kilocycles. Since the scale is calibrated 54 to 160, the actual frequency of the station received is obtained by adding a zero to the dial calibration.

Controls: Only two controls are required for operation. The left-hand control puts set into operation, increases the volume with clockwise rotation, and includes the power switch. The right-hand control tunes the dial to the desired station.

Antenna: For normal reception, no outside aerial is required, as more than adequate pickup is obtained by the self-contained loop antenna.

At installations remote from the stations desired to be heard, improved results may be obtained by rotating the receiver for maximum response, as the loop antenna has a marked directional effect on weak signals. Reception can also be improved, and the directional effect reduced, by attaching a length of insulated wire approximately 15 to 25 feet long, to the antenna connection provided at the back of the cabinet. This wire may be laid on the floor along one side of the room, or concealed under the rug. **Under no circumstances** should a ground be attached to the chassis—such ground is automatically provided through the power lines.

Alignment: No attempt should be made to realign this receiver until it has been determined that a poor tube, or some local condition is not responsible for faulty reception. An output meter may be clipped directly across the voice coil lugs.

The Signal Generator may be connected through a 0.01 mf capacitor (used as dummy antenna) to the lug on RF section (B) of tuning capacitor. Connect ground clip of generator directly to chassis. Align the I. F. trimmers to 455 kc, using least possible input from Signal Generator to avoid developing A.V.C. voltage which would make the tuning adjustments very broad.

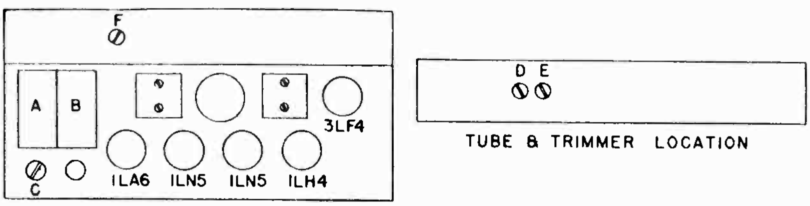
To align RF trimmers remove the 0.01 mf capacitor and connect the Signal Generator leads or two or three turns of heavy wire, forming a self-supporting loop of about 7 or 8 inches diameter, placed about a foot away from the receiver's loop antenna. Again, use the least possible input from the Signal Generator. With the tuning capacitor plates completely out of mesh, and pointer at extreme right end of travel, adjust the oscillator trimmer (A) (on front section of tuning capacitor) to 1700 kc. Readjust both Signal Generator and tuning capacitor to 1550 kc and adjust the RF trimmer (B) (on rear section) for maximum response.. With tuning capacitor plates fully meshed, the receiver should tune to 532 kc; however, no adjustment is required at this point. For checking purposes, four fine marks are engraved on the dial plate. These represent, in order, the pointer position with capacitor plates fully meshed, and the pointer settings for 600, 1000 and 1550 kc.

MODEL G-521 TEMPLETONE RADIO MFG. CORP.

Alignment: No attempt should be made to realign this receiver until it has determined that a poor tube, or some local condition is not responsible for faulty reception. The Signal Generator may be connected through a 0.01 mf capacitor (used as a dummy antenna) to the lug on the R. F. section (B) of the tuning capacitor. Connect ground clip of generator to the common negative of the electrolytic capacitor. An output meter may be clipped across the voice coil lugs. Align the I. F. trimmers to 455 K.C. using the least possible input from the Signal Generator to avoid developing A.V.C. voltage which would make the tuning adjustments very broad.

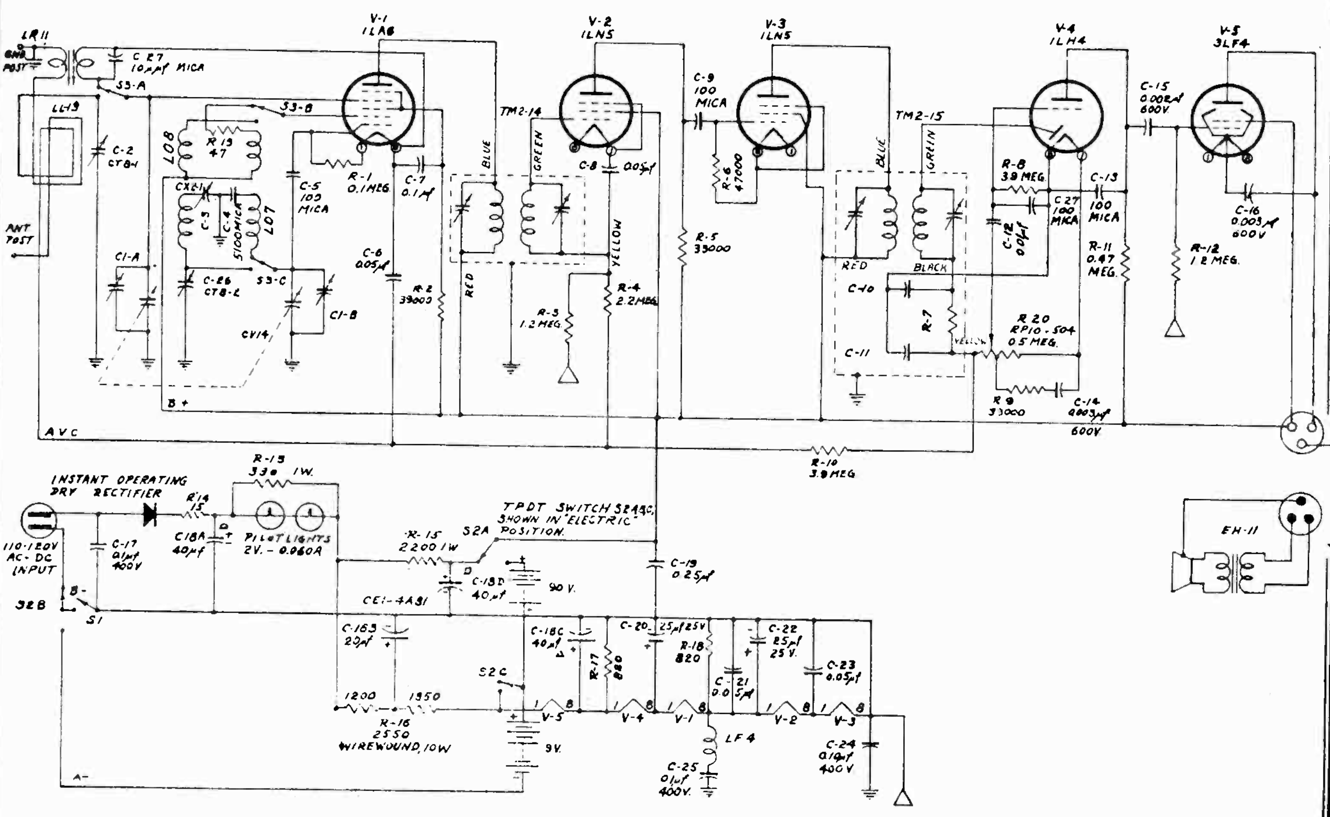
The short wave band trimmers must be aligned before attempting to align the broadcast band. To align the short wave band turn the bandswitch to the short wave position and connect the Signal Generator through a 0.01 mf capacitor and a 400 ohm resistor in series (used as a dummy antenna) to the antenna connection at the back of the cabinet. With the tuning capacitor plates completely out of mesh and the pointer at the extreme right end of travel, adjust the short wave oscillator trimmer (A) to 18.5 megacycles. With both tuning capacitor and Signal Generator adjusted to 6 megacycles, adjust the short wave antenna coil slug (C) for maximum response. Readjust both the Signal Generator and the tuning capacitor to 18 megacycles and tune the short wave R. F. trimmer (B) for maximum response.

With the short wave band aligned, the broadcast band trimmers may now be aligned. To align the broadcast band turn the bandswitch to the broadcast position. Remove the 0.01 mf capacitor and the 400 ohm resistor and connect the Signal Generator to two or three turns of heavy wire, forming a self supporting loop of about 7 or 8 inches diameter placed about a foot away from the receiver's loop antenna. Again use the least possible input from the Signal Generator. With the tuning capacitor completely out of mesh and the pointer at the extreme right end of travel, adjust the broadcast oscillator trimmer (E) to 1620 kilocycles. With the dial pointer set to 600 KC adjust the padder (F) while rocking the signal generator dial for maximum audio output. Readjust both Signal Generator and dial pointer to 1550 kilocycles and adjust the R. F. trimmer (D) for maximum response.



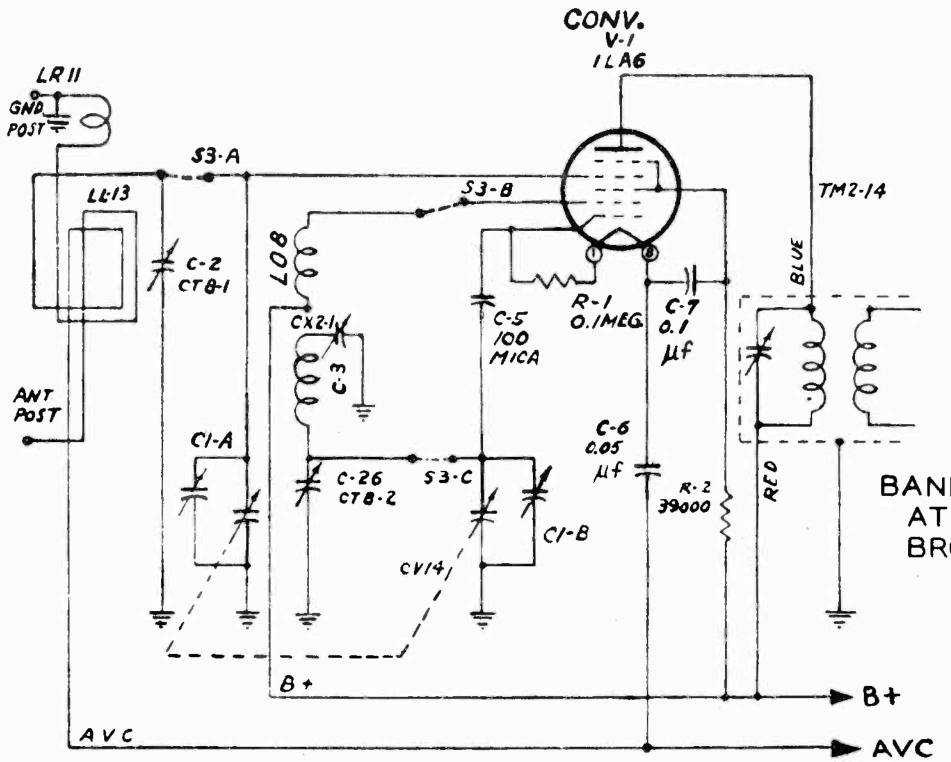
TUBE & TRIMMER LOCATION

NOTES:
1 RESISTORS ARE IN OHMS. CAPACITORS μμf UNLESS OTHERWISE SPECIFD.
2. POWER SWITCH S1 IS GANGED WITH VOLUME CONTROL RP10-504.
3 R-7, C-10, C-11 ARE BUILT INTO 2ND IF TRANSFORMER TM2-15
4. ALL RESISTORS ½W - MICA CAPACITORS 500 V. - PAPER CAPACITORS 200V UNLESS OTHERWISE SPECIFIED.
5. C-13A, B, C, D, IS A 4 SECTION ELECTROLYTIC CAPACITOR BLOCK 150 W.V.D.C.
6. INTERMEDIATE FREQUENCY 455 KC.
7 BANDSWITCH S3A, B, C, IS SHOWN IN S.W. POSITION.
8 LF4 IS WOUND ON C-25.

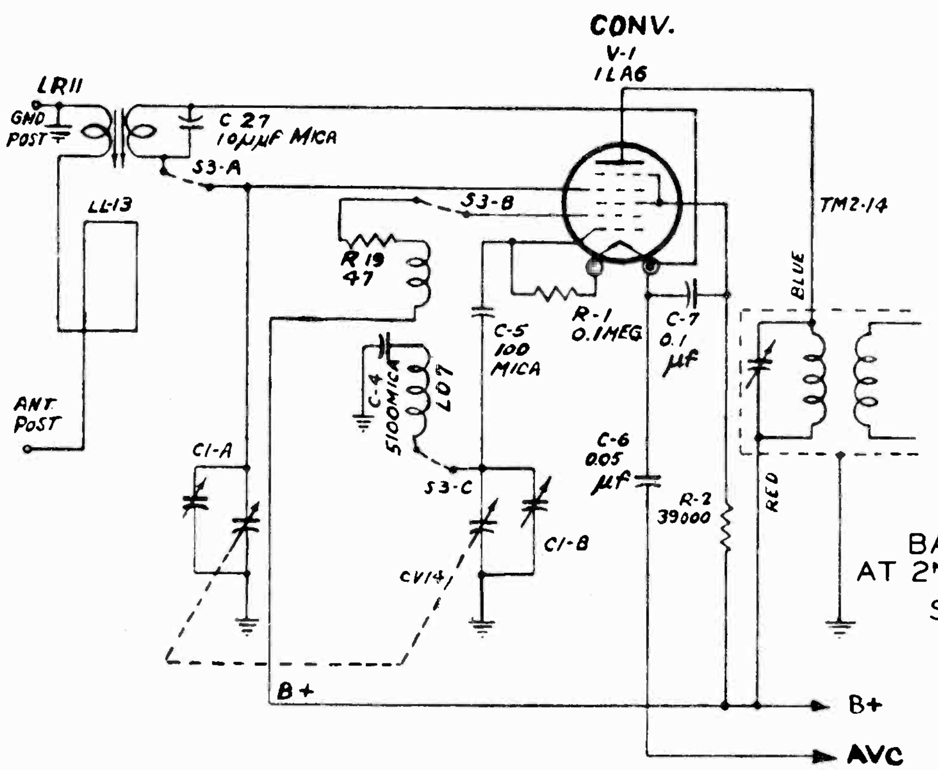


TEMPLETONE RADIO MFG. CORP.

MODEL G-521



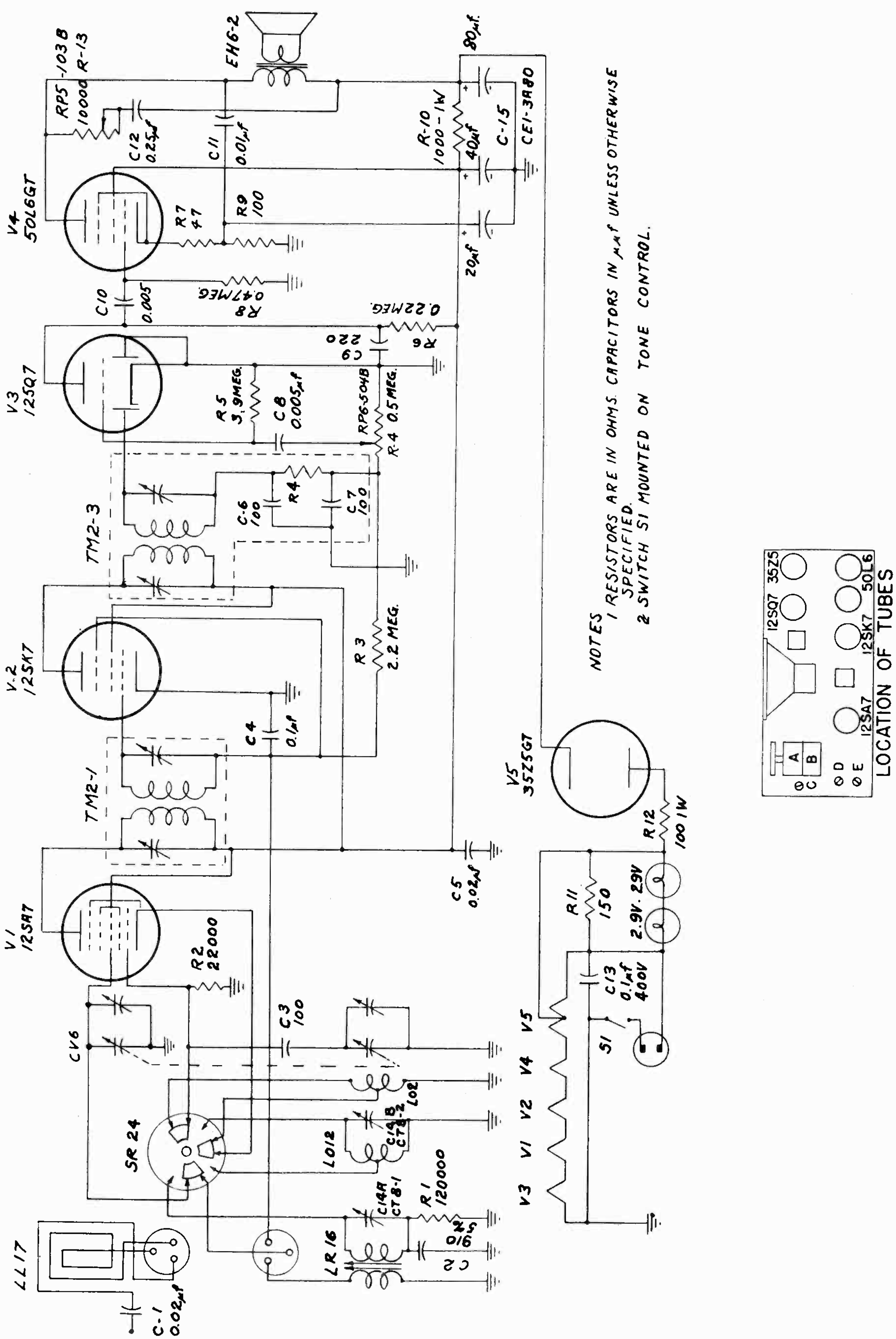
BAND-SWITCH SHOWN AT 1ST POSITION.
BROADCAST BAND
535-1620 KC



BAND-SWITCH SHOWN AT 2ND POSITION CLOCKWISE
SHORT WAVE BAND
5.6-18.5 MC.

MODEL G-522

TEMPLETONE RADIO MFG. CORP.



OPERATING INSTRUCTIONS and SERVICE NOTES.

Model G-522 is a 5-tube, two band superheterodyne receiver using the latest types of low drain electronic tubes.

Operation: The set operates on 105 to 120 volts 50 or 60 cycles A. C. and 105 to 120 volts D. C. Power drain is approximately 30 watts.

When operated on direct current (D. C.) if no reception is obtained after approximately one minute of warm up time, reverse the line plug in the power outlet.

Ranges: Model G-522 has both a broadcast and a short wave range. It covers the broadcast band from 532 to 1700 kilocycles. Since the broadcast dial scale is calibrated from 55 to 160 the actual frequency of the station may be obtained by adding zero to the dial calibration. The range of the short wave band covered in Model G-522 is from 5.6 to 12.5 megacycles. The short wave dial scale is calibrated directly in megacycles.

Controls: Four controls are provided for the operation of the radio set. The control at the extreme left includes the power switch and the tone control; this turns the set on with clockwise rotation and provides a continuous variation in tone from full base at the counter-clockwise end to full treble in the extreme clockwise position. The second control is the volume control; this increases the volume with clockwise rotation. The third control is the bandswitch. In its counter-clockwise position it selects broadcast band operation. In its clockwise position it switches to operation on the short-wave band. The last control is the tuning control which permits accurate tuning of the slide rule dial through a smooth vernier action.

Antenna: For normal reception, no outside aerial is required, as more than adequate pickup is obtained by the self contained loop antenna. On the broadcast band, at installations remote from stations desired to be heard, improved results may be obtained by rotating the receiver for maximum response, as the loop antenna has a marked directional effect on weak signals. Reception can also be improved, especially on the short wave band, by attaching a length of insulated wire approximately 15 to 25 feet long, to the antenna connection provided at the back of the cabinet. This wire may be laid on the floor along one side of the room, or concealed under the rug. **Under no circumstances** should a ground be attached to the chassis — such ground is automatically provided through the power lines.

Alignment: No attempt should be made to re-align this receiver until it has been determined that a poor tube, or some local condition is not responsible for faulty reception. The Signal Generator may be connected through a 0.01 mf capacitor (used as a dummy antenna) to the lug on the R. F. section (B) of the tuning capacitor. Connect ground clip of generator directly to chassis. An output meter may be clipped across the voice coil lugs. Align the I. F. trimmers to 455 kc using the least possible input from the Signal Generator to avoid developing A. V. C. voltage which would make the tuning adjustments very broad.

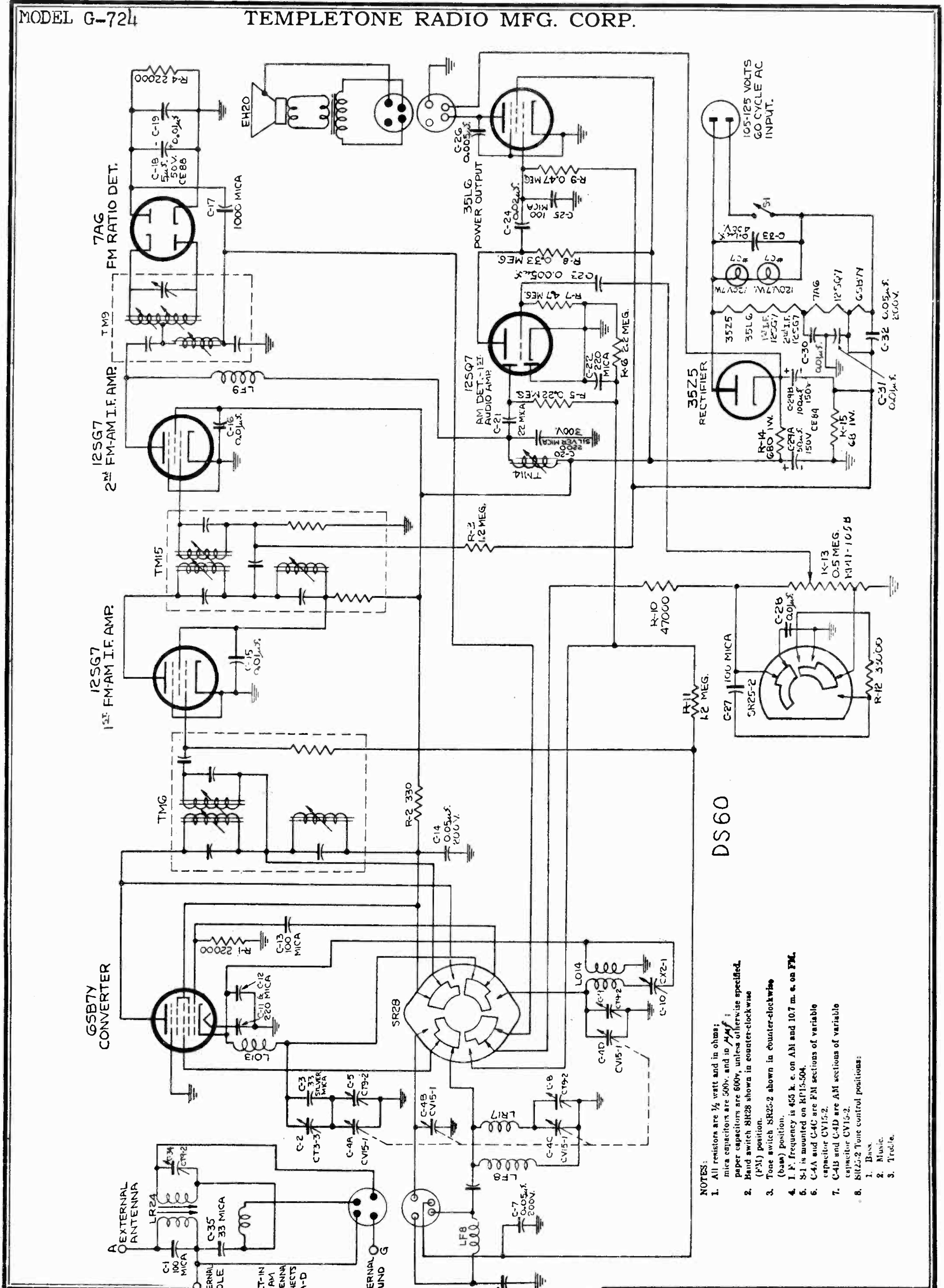
To align broadcast R. F. trimmers, remove the 0.01 mf capacitor and connect the Signal Generator to two or three turns of heavy wire, forming a self-supporting loop of about 7 or 8 inches diameter placed about a foot away from the receiver's loop antenna. Again use the least possible input from the Signal Generator. Turn the bandswitch to the broadcast position. With the tuning capacitor plates completely out of mesh and the pointer at the extreme right end of travel, adjust the broadcast oscillator trimmer (A) to 1700 kc. Re-adjust both Signal Generator and tuning capacitor to 1550 kc and adjust R. F. trimmer (B) for maximum response. With tuning capacitor plates fully meshed, the receiver should tune to 532 kc, however, no adjustment is required at this point.

To align the short wave band, turn the bandswitch to the short wave position and connect the Signal Generator through a 0.01 capacitor and a 400 ohm resistor in series (used as a dummy antenna) to the antenna connection at the back of the cabinet. With the tuning capacitor plates completely out of mesh and the pointer at the extreme right end of travel, adjust the short wave oscillator trimmer (E) to 12.5 megacycles. With both tuning capacitor and Signal Generator adjusted to 6 megacycles adjust the short wave antenna coil slug (C) for maximum response. Re-adjust both the Signal Generator and the tuning capacitor to 10.5 megacycles and tune the short wave antenna trimmer (D) for maximum response. With tuning capacitor fully meshed, the receiver should tune to 5.6 megacycles, however, no adjustment is required at this point.

For checking purposes five marks are engraved on the front of the dial plate. These represent in order, the pointer position with the capacitor plates fully meshed and the pointer settings for 600 kc or 6 mc, 1000 kc 10.5 mc, and 1550 kc.

MODEL G-724

TEMPLETONE RADIO MFG. CORP.



TEMPLETONE RADIO MFG. CORP.

ALIGNMENT PROCEDURE:

Dummy Antenna	Signal Generator Connection	Signal Generator Frequency	Band Switch Position	Radio Dial Setting	Adjust	Remarks
0.01 MFD	Terminal T	455 KC AM	Broadcast	1625 KC	E G-1 F-1	Adjust for maximum output Repeat for fine adjustment
0.01 MFD	Pin 4 of 12SG7 2nd FM-AM IF with FM Signal Gen.	10.7 MC FM	FM	108 MC	H-2	Adjust for maximum output (Broad adjustment)
0.01 MFD	"	10.7 MC FM	FM	108 MC	H-4	Adjust for maximum output
0.01 MFD	"	10.7 MC AM	FM	108 MC	H-1 or H-3	Adjust whichever is required for minimum output
						Repeat last two steps for fine adjustment until settings for maximum FM output coincide with settings for minimum AM output.
0.01 MFD	Pin 8 of 6SB7Y Converter	10.7 MC FM	FM	108 MC	G-3 — G-2	Adjust for maximum output
0.01 MFD		"	FM	108 MC	F-3 — F-2	Adjust for maximum output
						Repeat last two steps for fine adjustment
			Broadcast	535 KC	Pointer	Adjust pointer to reference mark
100 MMFD	"A" Post on Cabinet	600 KC AM	"	600 KC	J and Core on Ant. Coil in Cab.	Adjust for maximum output
"	"	1550 KC AM	"	1550 KC	B and trimmer on Ant. Coil	Adjust for maximum output
300 OHM Resistor	"	92 MC FM	FM	92 MC	D	Adjust for maximum output
"	"	106 MC FM	FM	106 MC	A and C	Adjust for maximum output

Operation: The set is designed for operation on 105 to 125 volts, 60 cycles A. C. It will also operate on 120 D. C. Power drain is approximately 36 watts for the radio.

Ranges: Model G-724 has both a broadcast and FM range. It covers the broadcast band from 535 to 1625 kilocycles. Since the broadcast dial scale is calibrated from 53.5 to 160, the actual frequency of the station may be obtained by multiplying the dial calibration by ten. The range of the FM band covered in Model G-724 is from 87.6 to 108.4 megacycles. The FM dial scale is calibrated directly in megacycles.

Antenna: This radio will operate without an external antenna. For normal reception more than adequate pickup is obtained by the self contained antenna. .At installations remote from station desired to be heard on the broadcast band, improved results may be obtained by attaching twenty or thirty feet of insulated wire to the antenna connection provided in the rear of the cabinet. The wire may be concealed under the rug or laid on the floor along one side of the room.

For normal reception on FM, no outside aerial is required as sufficient signal pickup is secured from the built-in FM antenna. However, in poor receiving locations provision is made for improved results, which may be obtained by the addition of an outside antenna of correct design, properly installed. (Your dealer can supply and install a suitable FM antenna for your FM Radio).

Alignment: No attempt should be made to realign this receiver until it has been determined that a poor tube or some local condition is not responsible for faulty reception. The following is a list of the minimum equipment necessary to realign this receiver.

1—AM signal generator covering 455 KC, 600 KC, 1550 KC and 10.7 MC

2—FM signal generator covering 10.7 MC, 92 MC and 106 MC

3—Output meter, rectifier type, approximately 0 to 2 volts RMS

4—Dummy antennas

0.01 MFD Capacitor

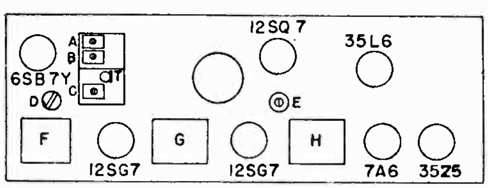
300 Ohm Risistor

100MMFD Mica Capacitor

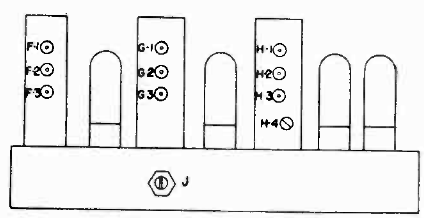
In the following alignment procedure the high side of the signal generator is connected to the terminal indicated in the "Signal Generator Coupling" column below. The ground side of the signal generator is connected directly to the chassis. The output meter should be connected across the voice coil of the speaker for all measurements.

In adjusting the radio frequency trimmers and padders it is advisable to "rock" the variable capacitor gang slightly across the signal being delivered by the signal generator until that particular signal has been accurately peaked.

The location of the trimmers, padders and slugs referred to in the alignment procedure chart on page three are shown in the tube and trimmer location diagram below.

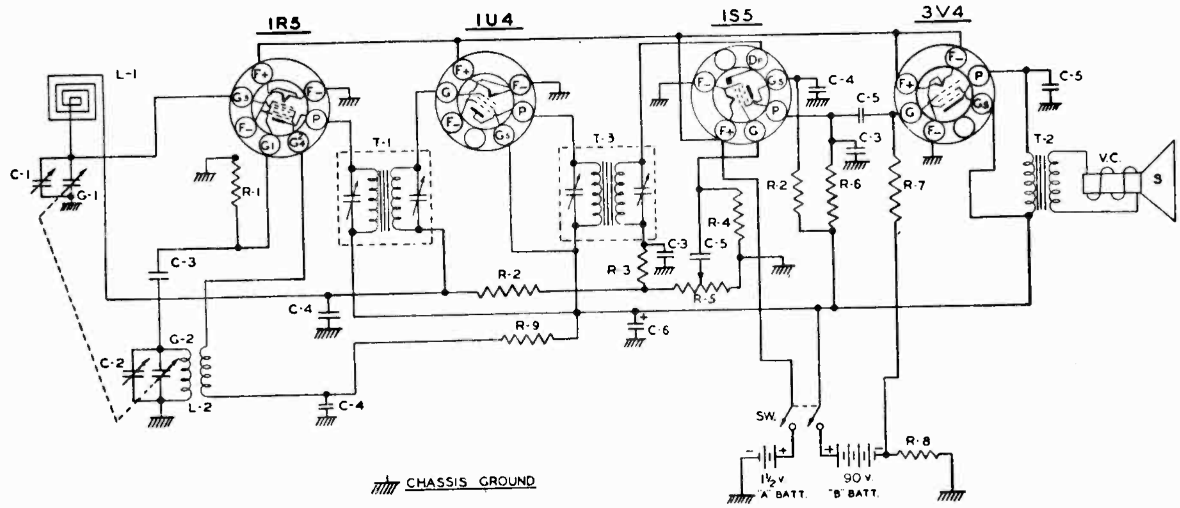


TUBE AND TRIMMER LOCATION



TRAV-LER RADIO CORP.

MODEL 5021



ALIGNMENT AND SERVICE DATA

PART NO.		DESCRIPTION
1R-20	R-1	220MΩ RESISTOR 1/2W. 20 %
1R-23	R-2	3.3MEG. RESISTOR 1/2W 20 %
1R-31	R-3	82MΩ RESISTOR 1/2W. 10 %
1R-3	R-4	10MEG RESISTOR 1/2W. 20 %
VC-8	R-5	1MEG. VOLUME CONTROL
1R-12	R-6	1MEG. RESISTOR 1/2W 20 %
1R-13	R-7	2.2MEG RESISTOR 1/2W. 20 %
1R-39	R-8	620 Ω RESISTOR 1/2W 5 %
1R-37	R-9	10M Ω RESISTOR 1/2W 20 %
TC-7	C-1	ANT. TRIMMER
	C-2	OSC TRIMMER ON GANG
MC-2	C-3	100 MMFD. MICA. CONDENSER
PC-7	C-4	.01 MFD. 400 V. CONDENSER.
PC-6	C-5	.005 MFD. 600 V. CONDENSER
EC-7	C-6	20MFD 80WV ELECTROLYTIC
GC-5	G-1 G-2	GANG CONDENSER
LL-5	L-1	LOOP ANTENNA
LO-12	L-2	OSC. COIL
L1-3	T-1	I.F. TRANSFORMER INPUT
	SW	D.P.S.T. SWITCH ON VOLUME CONTROL
SPK-5	T-2	SPEAKER TRANSFORMER
	V.C.	VOICE COIL
	S	PM SPEAKER
L1-4	T-3	IF TRANSFORMER OUTPUT
TU-30		1R5 - 1U4 - 1S5 - 3V4

Remove chassis from cabinet for alignment. A signal generator is required having the following frequencies: 455 KC and 1400 KC. An output meter should be connected across the speaker.

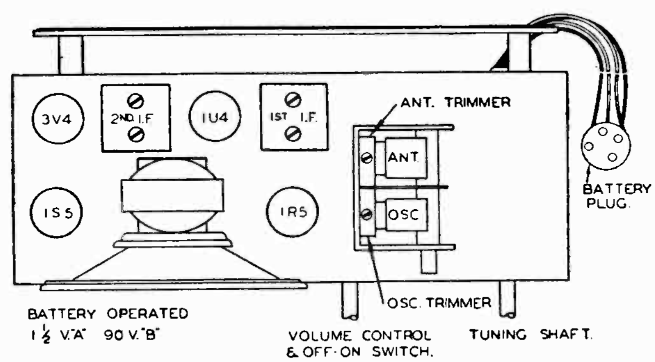
FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD. condenser. The ground lead from the generator may be connected to any spot on the metal chassis. Turn the gang condenser to complete minimum capacity. Set the generator to 455 KC. Adjust the movable trimmers in the IF cans, until a maximum reading is noted on the output meter.

The volume control of the receiver should be turned to maximum during the IF and all subsequent alignment and the generator output as low as possible to prevent the AVC from working and giving false readings.

SECOND STEP: With the leads from the generator still connected as in IF alignment, adjust the generator to 400 KC. Set the dial pointer to 1400 KC on the dial scale. Adjust the oscillator trimmer until the signal is tuned in.

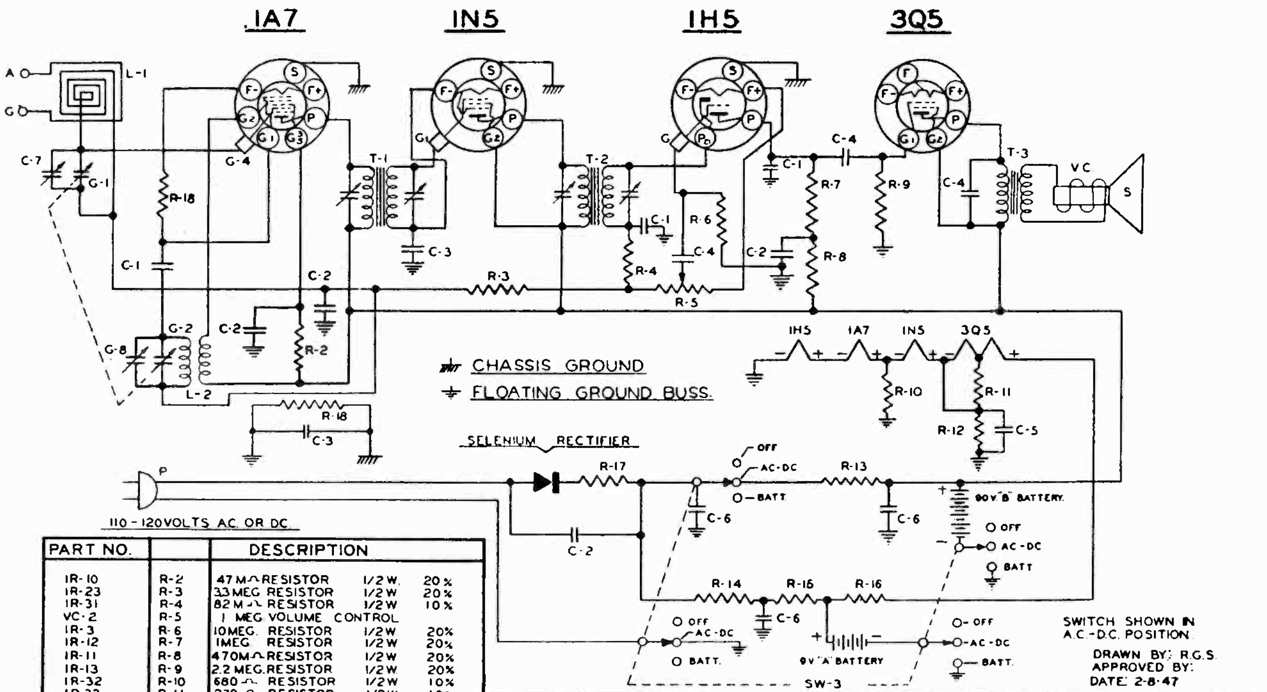
THIRD STEP: Remove the generator leads from the condenser. Connect the hot lead from the generator through a 200 MMFD. condenser to one of the leads which project from the back of the loop antenna. Connect the ground lead of the generator to the remaining lead. With the generator and the receiver still tuned to 1400 KC, adjust the antenna trimmer until a maximum reading is noted on the output meter.

TUBE AND TRIMMER LOCATION



MODEL 5025

TRAV-LER RADIO CORP.



PART NO.		DESCRIPTION
IR-10	R-2	47 MΩ RESISTOR 1/2 W. 20%
IR-23	R-3	33 MEG RESISTOR 1/2 W 20%
IR-31	R-4	82 MΩ RESISTOR 1/2 W 10%
VC-2	R-5	1 MEG VOLUME CONTROL
IR-3	R-6	10 MEG. RESISTOR 1/2 W 20%
IR-12	R-7	1 MEG RESISTOR 1/2 W 20%
IR-11	R-8	470 MΩ RESISTOR 1/2 W 20%
IR-13	R-9	2.2 MEG. RESISTOR 1/2 W. 20%
IR-32	R-10	680 Ω RESISTOR 1/2 W 10%
IR-33	R-11	270 Ω RESISTOR 1/2 W 10%
IR-21	R-12	330 Ω RESISTOR 1/2 W 10%
IR-34	R-13	1200 Ω RESISTOR 1/2 W. 10%
WR-3	R-14	1050 Ω CANDOHM RESISTOR
	R-15	1050 Ω
	R-16	40 Ω
IR-35	R-17	82 Ω WIREWOUND RESISTOR 2W 10%
IR-20	R-18	220 MΩ RESISTOR 1/2 W. 20%
MC-2	C-1	100 MMFD. CONDENSER. [MICA]
PC-5	C-2	.05 MFD. CONDENSER. 400 V.
PC-8	C-3	.1 MFD. CONDENSER 400 V.
PC-6	C-4	.005 MFD. CONDENSER 600 V.

PART NO.		DESCRIPTION
EC-6	C-5	70 MFD. 10 V. ELECTROLYTIC
EC-4	C-6	40-40-40-150 V ELECTROLYTIC
TC-7	C-7	ANTENNA TRIMMER
TC-6	G-8	OSC TRIMMER
GC-2	G-1, G-2	GANG CONDENSER
LL-5	L-1	LOOP ANNTENNA
LO-8	L-2	OSC. COIL
LI-3	T-1	INPUT I.F. TRANSFORMER
LI-4	T-2	OUTPUT I.F. TRANSFORMER
CO-1	P	LINE CORD

PART NO		DESCRIPTION
SPK-5	T-3	OUTPUT SPEAKER TRANSFORMER
	VC	VOICE COIL
	S	P.M. SPEAKER.
SW-5	SW-3	4 POLE 3 POSITION
SR-1	—	SELENIUM RECTIFIER
TU-11	—	1A7- 1N5 - 1H5 - 3Q5
"A" BATTERY		9 VOLTS
"B" BATTERY		90 VOLTS.

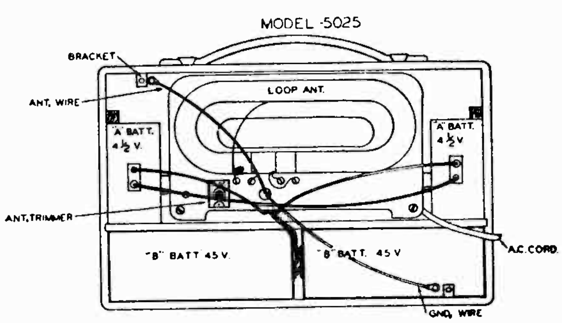
The following is a table of manufacturers and their battery type number.

"B" BATTERIES
(2 Required)

Mfgr.	Volts	Type No.
Burgess	45 "B"	M30
General	45 "B"	W30B
Bright Star	45 "B"	3033
Usalite	45 "B"	640
Rayovac	45 "B"	P7830
Eveready	45 "B"	482

"A" BATTERIES
(2 Required)

Burgess	4½ "A"	G3
General	4½ "A"	3H3
Bright Star	4½ "A"	361
Usalite	4½ "A"	683
Rayovac	4½ "A"	P83A
Eveready	4½ "A"	746



BATTERY LOCATION.

BATTERY SERVICING

(See Figure No. 1)

To replace batteries, loosen and remove the two screws at the left and right hand corners of the cabinet back. Remove the back and pull out the plug from each battery. Never pull on the wires connected to the plugs as they may break. Always grasp the plug form between the fingers, or use a flat blade to pry out the plug. Observe with care the position of the batteries and plugs when replacing. Be sure that batteries and plugs are replaced as shown in the "Battery Location" diagram. (Figure No. 1)

After the batteries have been installed, replace the back. Make sure that the two wires from the loop antenna are held in place between the brackets of the cabinet and the back by the two fastening screws.

TUNING RANGE — 540 KC to 1720 KC

Read aud follow instructions carefully before attempting operation of this receiver.

POWER SOURCES: This receiver is designed for operation on either an external power source or on the enclosed batteries.

AC OR DC OPERATION: This receiver may be operated on 50 to 60 cycle, 110 to 125 volt AC current or 110 to 125 DC current.

CAUTION: Never plug this receiver into a 220 volt line as this will seriously damage the component parts which hae been designed for 110 to 125 volt operation only.

To operate on AC or DC open the small door at the lower right hand corner in the back of the cabinet. Pull out the power cord and plug into a convenient outlet of the proper voltage and current. Follow instructions under "Controls."

To operate on the enclosed batteries, follow instructions under "Control."

CONTROLS: This receiver has three control knobs which are located on the front panel of the cabinet.

STATION SELECTOR KNOB: The right hand knob is the station selector. Rotate this knob to the right or left to select your desired station. The dial scale is calibrated in kilocycles. By mentally adding a zero to the numbers on the scale, the result will be read directly in (KC) kilocycles. (i.e., 60 plus 0 equals 600 KC or 140 plus 0 equals 1400 KC).

POWER SELECTOR SWITCH: The center knob is the power selector. It has three positions which are indicated on the front panel. The extreme left hand position is the "OFF" position. The small dot on this knob must point to "OFF" when the receiver is not in use. The center position is "AC-DC" and is used when it is desired to operate the receiver from a power line source. The extreme right hand position is "BATT" and is used when it is desired to operate on the enclosed batteries.

AC OPERATION: When an AC power source is used, set the power selector knob to "AC-DC" after the power cord has been plugged into a convenient outlet. The receiver is now ready for operation.

DC OPERATION: If the receiver does not operate after a few seconds, reverse the power cord plug in the outlet and it will operate properly.

ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment.

A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

The receiver volume control should be turned to maximum during the I.F. and all subsequent alignments to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the floating ground buss under the chassis. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the front of the chassis. Adjust this trimmer until the 1720 KC signal is tuned in.

THIRD STEP: Remove the hot lead of the generator from the ANT section of the gang condenser. Connect this lead to the primary of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT trimmer is located on the top of the ANT. section of the gang condenser. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

TUBE AND TRIMMER LOCATION
MODEL-5025

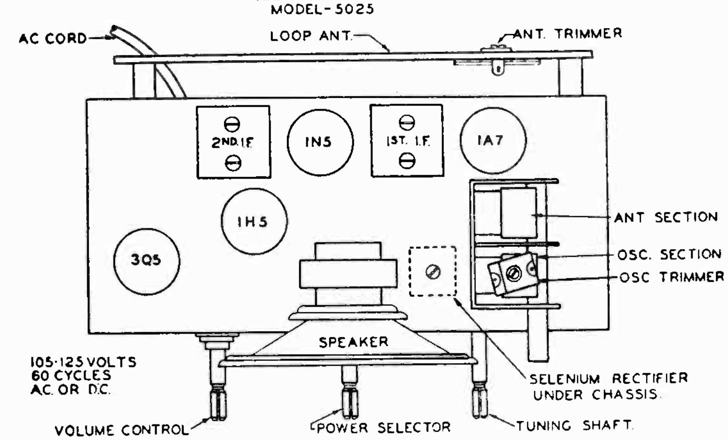
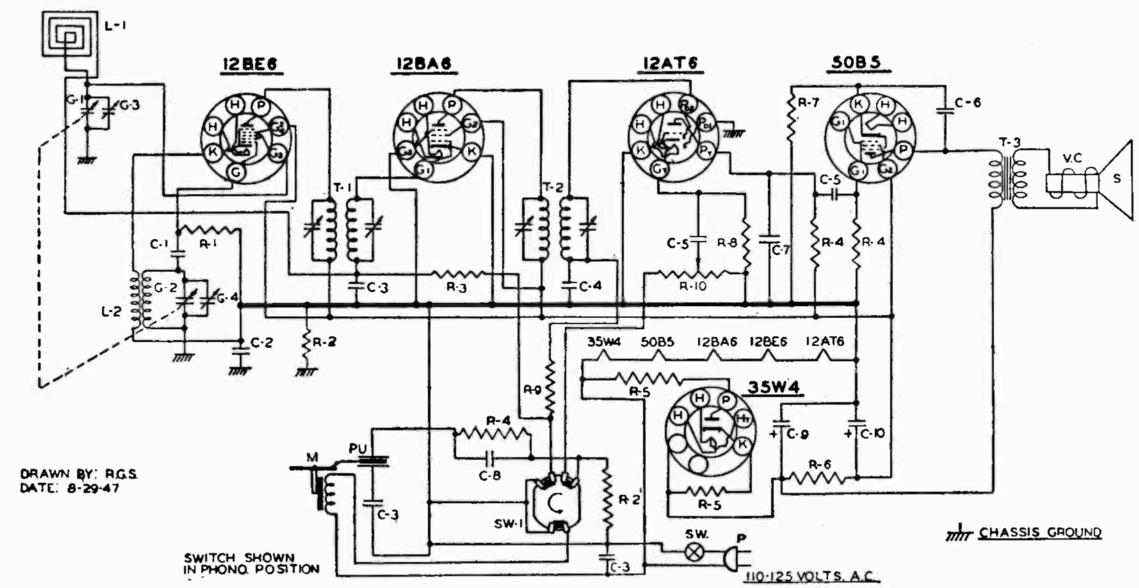


FIGURE-1

MODEL 5035,
CHASSIS SD54

TRAV-LER RADIO CORP.



ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment.

A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1650 KC. An output meter should be connected across the speaker.

The volume control of the receiver should be turned to maximum during the I. F. and all subsequent alignment and the generator output as low as possible to prevent the A. V. C. from working and giving false readings.

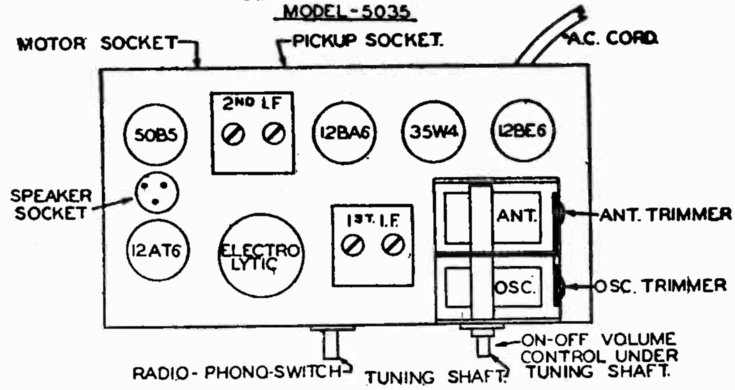
FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser through the .1 MFD. condenser. The ground lead from the generator must be connected to "B" minus under the chassis. Turn the gang condenser to complete minimum capacity. Set the generator to 455 KC. Adjust the trimmers of the first and second I. F. transformers until a maximum reading is noted on the output meter.

SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1650 KC. Adjust the OSC. trimmer until the 1650 KC signal is tuned in. The gang condenser must be at complete minimum capacity for this adjustment.

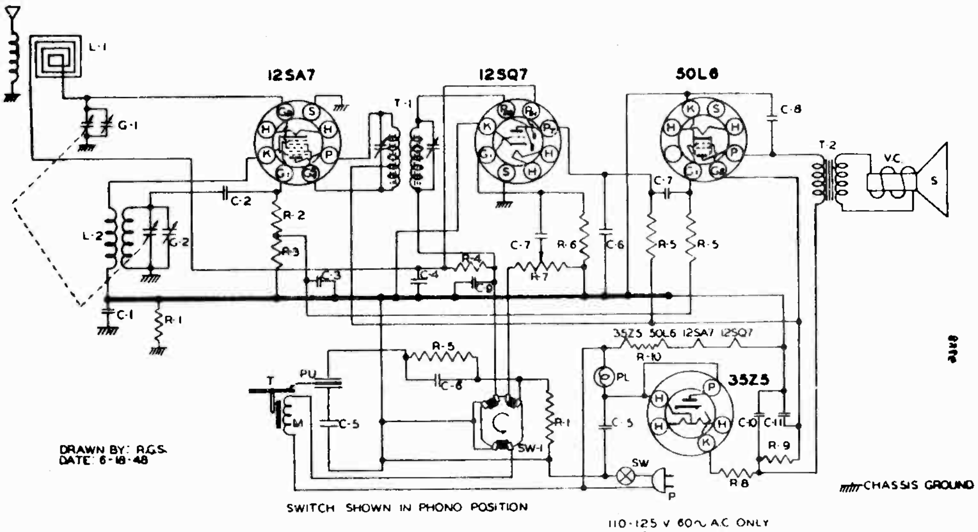
THIRD STEP: Remove the generator leads from the gang condenser. Loosely couple the generator to the receiver loop by using a complete turn of wire. With the receiver and generator set at 1400 KC, increase the generator output. Adjust the ANT. trimmer until a maximum signal is noted on the output meter. No further adjustment should be made as the coils and gang condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

PART NO.		DESCRIPTION
IR-9	R-1	22M-Ω- RESISTOR 1/2W. 20%
IR-20	R-2	220M-Ω-RESISTOR 1/2W. 20%
IR-23	R-3	3.3MEG-Ω-RESISTOR 1/2 W. 20%
IR-11	R-4	470M -Ω- RESISTOR 1/2 W. 20%
IR-17	R-5	33-Ω- RESISTOR 1/2 W. 20%
IR-25	R-6	2200 -Ω- RESISTOR .1W. 10%
IR-14	R-7	150-Ω-RESISTOR 1/2W. 20%
IR-13	R-8	2.2 MEG.-Ω-RESISTOR 1/2W. 20%
IR-19	R-9	100M-Ω-RESISTOR 1/2W 20%
VC-9	R-10	1MEG. VOLUME CONTROL
MC-4	C-1	.000050 MFD. MICA
PC-8	C-2	.1 MFD. CONDENSER 400 V.
PC-5	C-3	.05MFD. CONDENSER 400 V
MC-2	C-4	100 MMFD. MICA.
PC-6	C-5	.005MFD. CONDENSER 600 V.
PC-7	C-6	.01 MFD CONDENSER 400 V
MC-3	C-7	.00022 MFD. MICA.
MC-5	C-8	500 MMFD. MICA.
EC-12	C-9 C-10	40 MFD. 20 MFD. 150 V ELECTROLYTIC
LL-11	L-1	LOOP ANT.
LO-13	L-2	OSC. COIL
GC-7 X	G-1 G-2	GANG CONDENSER
	G-3	ANT TRIMMER
	G-4	OSC. TRIMMER
PU-5	PU	L75AS CRYSTAL CARTRIDGE
	SW	S.P.S.T. SWITCH ON VOLUME CONTROL
SPK-11	T-3	OUTPUT TRANSFORMER
	VC	VOICE COIL
	S	P.M. SPEAKER
CO-2	P	LINE CORD.
M-1	M	110-125 V. 60~ A.C. PHONO. MOTOR
SW-7	SW-1	PHONO. RADIO SWITCH
TU-18		12BE6 12BA6 12AT6 50B5 35W4

TUBE AND TRIMMER LOCATION
MODEL-5035



TRAV-LER RADIO CORP. MODEL 5036



ALIGNMENT AND SERVICE DATA

Remove chassis from cabinet for alignment.

A Signal Generator is required having the following frequencies: 455 KC, 1400 KC, 1720 KC. An output meter should be connected across the speaker.

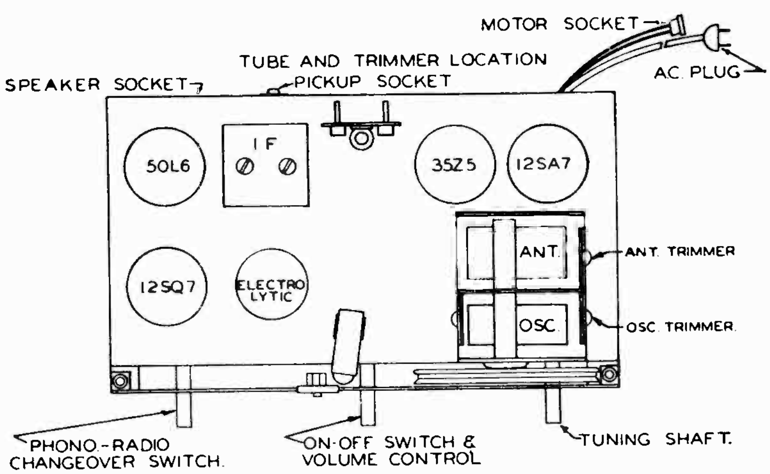
The receiver volume control should be turned to maximum during the I.F. and all subsequent alignments to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD condenser. The ground lead from the generator must be connected to the floating ground buss under the chassis. Turn the gang condenser to complete minimum capacity. Adjust the generator to 455KC and adjust the trimmers of the 1st and 2nd I.F. transformers until a maximum reading is noted on the output meter.

SECOND STEP: With the leads from the generator still connected in the same manner, adjust the Signal Generator to 1720 KC. The OSC. trimmer is located on the front of the chassis. Adjust this trimmer until the 1720 KC signal is tuned in.

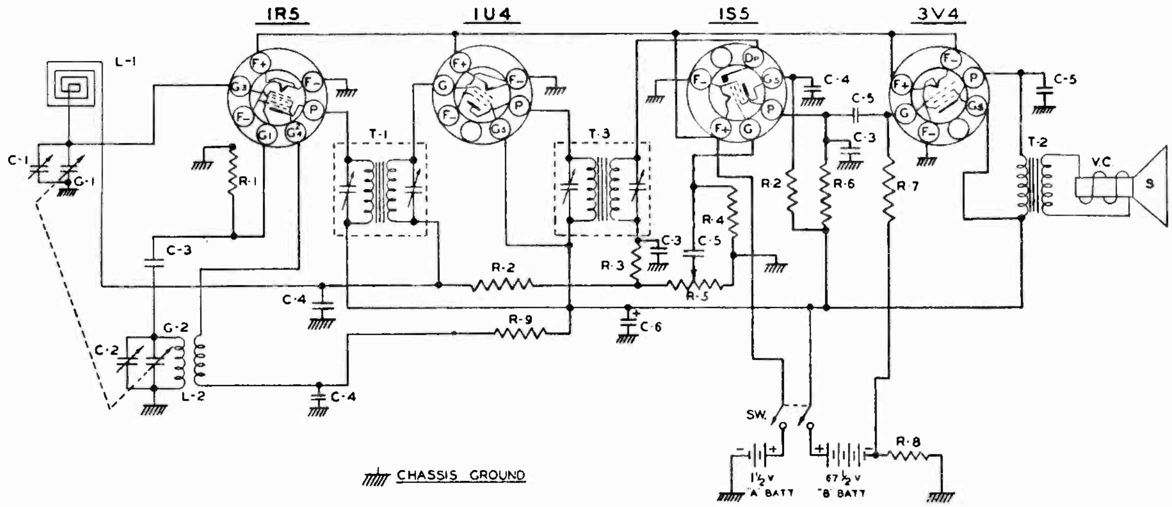
THIRD STEP: Remove the hot lead of the generator from the ANT section of the gang condenser. Connect this lead to the primary of the loop antenna through a 200 MMFD condenser. Adjust the Signal Generator to 1400 KC. Rotate the tuning control until this signal is tuned in. The ANT trimmer is located on the top of the ANT. section of the gang condenser. Adjust this trimmer until a maximum reading is noted on the output meter. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

PART NO.		DESCRIPTION
IR-20	R-1	220MΩ RESISTOR 1/2W 20%
IR-9	R-2	22MΩ RESISTOR 1/2W 20%
IR-10	R-3	47MΩ RESISTOR 1/2W 20%
IR-23	R-4	3.3MEGΩ RESISTOR 1/2W 20%
IR-11	R-5	470MΩ RESISTOR 1/2W 20%
IR-3	R-6	10MEGΩ RESISTOR 1/2W 20%
VC-4	R-7	1MEG. VOLUME CONTROL
IR-17	R-8	33Ω RESISTOR 1/2W 20%
IR-25	R-9	2200Ω RESISTOR 1W 10%
IR-41	R-10	47Ω RESISTOR 1W 10%
PC-8	C-1	.1MFD. CONDENSER 400V.
MC-4	C-2	50MMFD. MICA
PC-4	C-3	.25MFD. CONDENSER 200V.
PC-2	C-4	.05MFD CONDENSER 200V.
PC-5	C-5	.05MFD. CONDENSER 400V
MC-6	C-6	500MMFD. MICA
PC-10	C-7	.005MFD CONDENSER 400V
PC-7	C-8	.01MFD. CONDENSER 400V
MC-2	C-9	100MMFD. MICA
EC-12	C-10	40MFD. ELECTROLYTIC
	C-11	20MFD ELECTROLYTIC
	SW	SWITCH ON VOLUME CONTROL
SW-1	SW-1	RADIO-PHONO SWITCH
LI-8	T-1	IF TRANSFORMER
SPK-10	T-2	OUTPUT TRANSFORMER
	VC	VOICE COIL
	S	4" PM SPEAKER
LL-19	L-1	LOOP ANT
LO-14	L-2	OSC COIL
M-2	M-2	110V 60 CYCLES MOTOR
PU-5	PU	TONE ARM WITH L-75 CARTRIDGE
PB-1	PL	#47 PILOT BULB
CO-1A	P	LINE CORD
TT-2	T	8" TURNTABLE
GC-6	G-1	GANG CONDENSER
	G-2	GANG CONDENSER



MODEL 5049

TRAV-LER RADIO CORP.



ALIGNMENT AND SERVICE DATA

PART NO.		DESCRIPTION
1R-20	R-1	220MΩ RESISTOR 1/2W 20 %
1R-23	R-2	3.3MEG. RESISTOR 1/2W. 20 %
1R-31	R-3	82MΩ RESISTOR 1/2W. 10 %
1R-3	R-4	10MEG RESISTOR 1/2W 20 %
VC-8	R-5	1MEG. VOLUME CONTROL
1R-12	R-6	1MEG. RESISTOR 1/2W 20 %
1R-13	R-7	2.2MEG. RESISTOR 1/2W. 20 %
1R-39	R-8	620 Ω RESISTOR 1/2W 5 %
1R-37	R-9	10M Ω RESISTOR 1/2W 20 %
TC-7	C-1	ANT. TRIMMER
	C-2	OSC. TRIMMER ON GANG
MC-2	C-3	100MMFD. MICA CONDENSER
PC-7	C-4	.01 MFD. 400 V. CONDENSER
PC-6	C-5	.005MFD. 600 V. CONDENSER
EC-7	C-6	20MFD. 80WV. ELECTROLYTIC
GC-4	G-1, G-2	GANG CONDENSER
LL-18	L-1	LOOP ANTENNA
LO-16	L-2	OSC. COIL
L1-3	T-1	I.F. TRANSFORMER INPUT
	SW	D.P.S.T. SWITCH ON VOLUME CONTROL
SPK-8	T-2	SPEAKER TRANSFORMER
	VC	VOICE COIL
	S	PM SPEAKER
L1-4	T-3	IF TRANSFORMER OUTPUT
TU-30		1R5 - 1U4 - 1S5 - 3V4

Remove chassis from cabinet for alignment. A signal generator is required having the following frequencies: 455 KC and 1400 KC. An output meter should be connected across the speaker.

FIRST STEP: Connect the hot lead from the generator to the ANT. section of the gang condenser, through a .1 MFD. condenser. The ground lead from the generator may be connected to any spot on the metal chassis. Turn the gang condenser to complete minimum capacity. Set the generator to 455 KC. Adjust the movable iron cores in the IF cans. These IF adjustments are made in the top and in the bottom of the can under the chassis. Adjust the cores until a maximum reading is noted on the output meter.

The volume control of the receiver should be turned to maximum during the IF and all subsequent alignment and the generator output as low as possible to prevent the AVC from working and giving false readings.

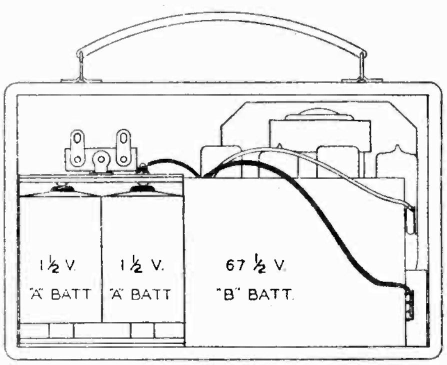
SECOND STEP: With the leads from the generator still connected as in IF alignment, adjust the generator to 1400 KC. Set the dial pointer to 1400 KC on the dial scale. Adjust the oscillator trimmer until the signal is tuned in.

THIRD STEP: Remove the generator leads from the gang condenser.

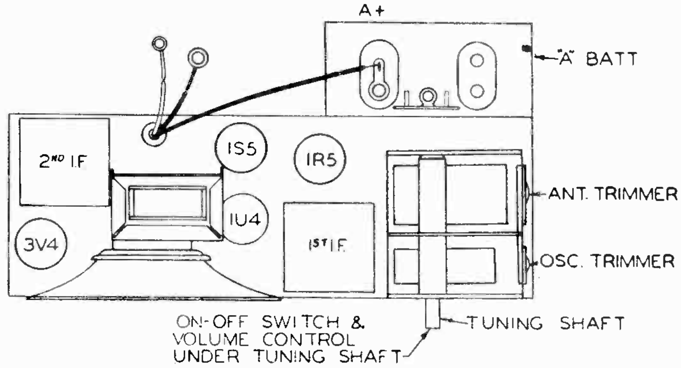
Replace the chassis in the cabinet. Loosely couple the generator to the receiver loop by making a complete turn over the outside of the cabinet. With the receiver and the generator still set at 1400 KC increase the generator output. Adjust the Antenna trimmer through the back of the chassis until a maximum signal is noted on the output meter.

No further adjustment should be necessary as the coils and gang condenser in this receiver have been specially handled at the factory to insure proper alignment at the lower frequencies.

NOTE: When the antenna trimmer is adjusted at 1400 KC., the chassis as well as the "A" and "B" batteries must be in normal position in the cabinet to reflect the proper loop impedance.



BATTERY LOCATION



TUBE AND TRIMMER LOCATION

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THEORY OF OPERATION

(The switch numbers in this discussion refer to Fig. 1)

The Delco model R-705 is an auto radio receiver using a conventional superheterodyne circuit, but which introduces an entirely new method of automatic station selection. Depressing a single push button will automatically select and tune in any broadcast station of satisfactory signal strength without requiring a previous push button set-up. This automatic tuning is accomplished by electronically controlling a motor driven permeability tuned tuner. Rectified voltage from the received broadcast signal actuates a 6SN7 tube which in turn instantaneously operates a relay and a solenoid switch disconnecting the motor and stopping the tuner on the frequency of the station.

The Electro-Tuner of this radio sweeps the broadcast band first in one direction and then in the other. In order to do this the tuner driving motor is reversed at each end of the broadcast band. The tuner sliding mechanism trips the reversing switch (5) each time the tuner reaches the end of its movement. This switch (5) alternately grounds opposite ends of the motor's center tapped field coil.

The nature of the Electro-Tuner's circuit is such that unless prevented the tuner would hunt for a broadcast signal after the radio is turned on until the receiver is warmed up and stations can be received. This would cause additional wear on the motor and would cause a change in stations when a change might not be desired. A mechanical interlock switch (6) prevents this hunting when the radio is turned on. It accomplishes this by keeping the motor circuit open when the radio is turned on until the tuning control is operated. When the tuning control is operated for the first time after the radio is turned on the interlock switch (6) is closed. It remains closed until the radio is turned off which causes the switch to open. The interlock switch will then remain open until the radio is turned on and the tuning control button is depressed.

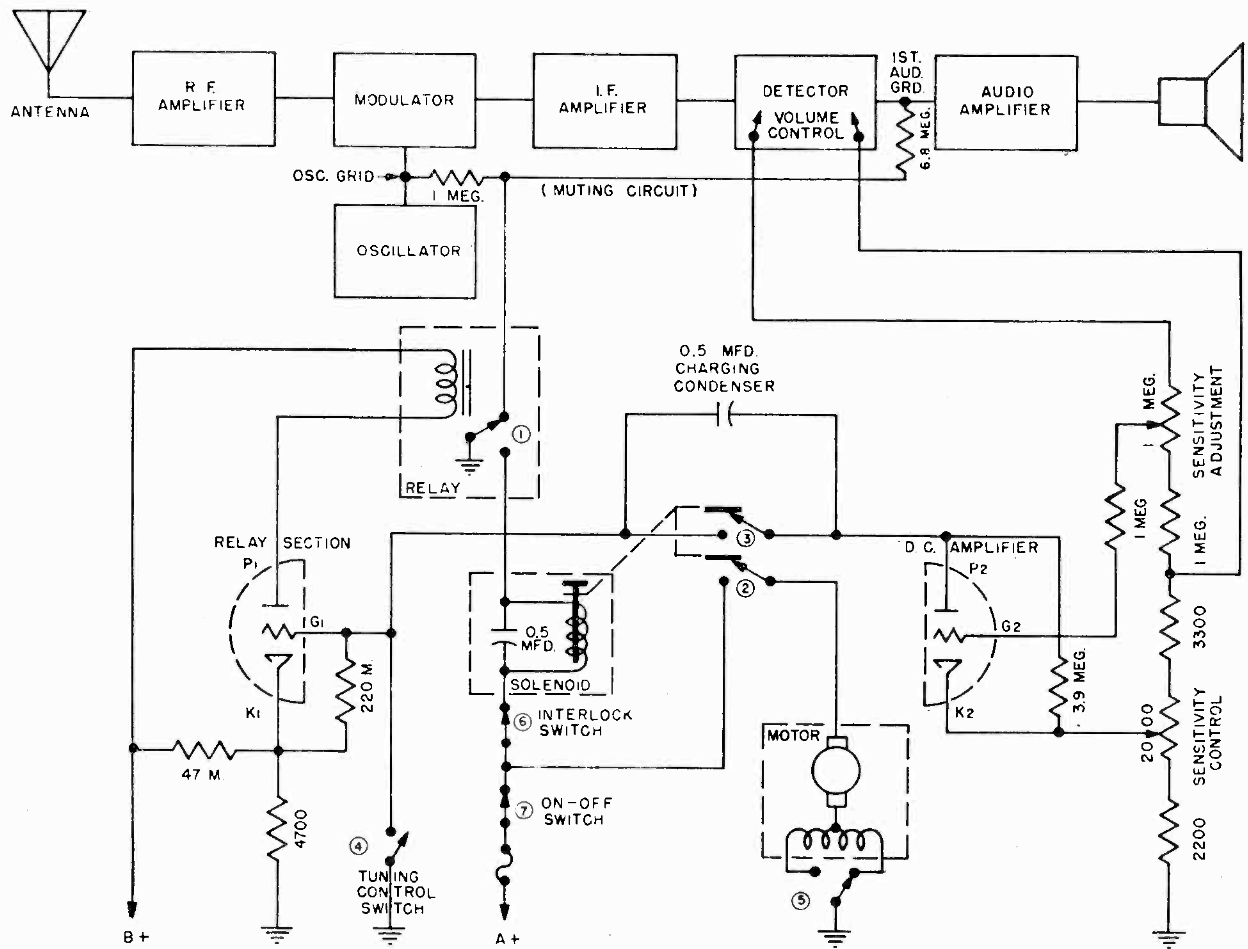

Fig. 1

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Circuit Operation

The heart of the electrotuner is the 6SN7 twin triode tube and to more readily understand this explanation of the operation, assume the radio is warmed up, the tuner has been operated, and a station is being received. The wiring diagram, Fig. 1, is arranged to show these conditions.

A. With a signal being received, plate current flows in the relay section of the 6SN7 tube and through the coil of the relay switch, holding the relay switch contact (1) in the position shown.

1. The muting voltage is grounded and audio reaches the speaker.

2. The solenoid coil circuit is open and —

a. The motor is not engaged.

b. The motor circuit contacts (2) of the solenoid switch are open.

c. The 6SN7 D. C. amplifier plate circuit contacts (3) of the solenoid switch are open.

B. The electrotuner is actuated by momentarily depressing the tuning knob, thereby setting off a chain of events which happen almost simultaneously.

1. The tuning control switch (4), ganged to the tuning knob, is closed when the tuning knob is depressed, thereby grounding the grid G_1 of the relay section of the 6SN7 tube which stops the plate current flow in the relay section.

a. With no current flowing through the coil of the relay switch (1) the spring loaded contact arm of this switch opens which permits approximately —10 volts to be applied to the grid of the first audio tube, silencing the radio.

b. With the solenoid coil circuit grounded at the relay switch contact (1) the solenoid coil is energized and pulls the plunger into the coil which:

(1) Mechanically engages the motor clutch.

(2) Closes the motor circuit contacts (2) of the solenoid switch which starts the motor driving the tuner.

(3) Closes the D. C. amplifier plate circuit contacts (3) of the solenoid, connecting the plate (P_2) of the D. C. amplifier section to the grid (G_1) in the relay section of the 6SN7 tube.

c. As the motor drives the tuner away from the received signal, the rectified voltage supplied from the detector stage to the grid (G_2) of the D. C. amplifier section of the 6SN7 tube disappears. This rectified voltage is negative in polarity with respect to the cathode voltage and is picked up from the detected signal at the input of the volume control in the detector stage through a potentiometer (sensitivity adjuster). The removal of this negative voltage from the grid (G_2) of the D. C. amplifier section of the 6SN7 tube drives it well above the cutoff voltage.

2. The tuning control switch (4) is opened when the tuning knob is released. This removes the ground from the grid (G_1) of the relay section of the 6SN7 tube and allows voltage to reach the plate (P_2) of the D. C. amplifier section.

a. Plate current flows in the D. C. amplifier section since the grid (G_2) of the D. C. amplifier is well above the cutoff voltage.

b. The plate current flows through the 220M ohm resistor and the resultant voltage drop keeps the grid (G_1) of the relay section of the 6SN7 tube biased below cutoff and current does not flow in the relay section.

c. The motor continues driving the tuning mechanism across the broadcast frequencies and control of the motor and clutch is transferred from the tuning control switch to the D. C. amplifier section of the 6SN7 tube so that the tuner will stop on the first station with sufficient signal strength.

C. The Electro-Tuner is stopped by and on the first station of sufficient signal strength with another chain of events that are almost simultaneous.

1. As the tuning mechanism sweeps into a receivable signal the rectified signal appears across the sensitivity adjuster.

a. A portion of this rectified voltage is applied to the grid G_2 of the D. C. amplifier. Since this voltage is negative with respect to the cathode the D. C. amplifier is biased near cutoff, which reduces the plate current flow in this section. This low current reduces the voltage drop across the 220M ohm resistor allowing the grid G_1 of the relay section to rise above cutoff. The relay section of the 6SN7 tube starts conducting.

2. As the relay section of the 6SN7 tube starts conducting, it actuates the relay switch coil and pulls the contact arm (1) back to the position shown in the diagram.

a. The muting voltage is removed from the audio circuit by grounding it through the contact arm of the relay switch.

b. The solenoid circuit opens thus de-energizing the solenoid.

(1.) The motor is mechanically declutched stopping the tuning mechanism on the received signal.

(2.) The motor circuit contacts (2) of the solenoid switch are opened stopping the motor.

(3.) The 6SN7 D. C. amplifier plate contacts (3) are opened removing the D. C. amplifier from the control circuit.

The Electro-Tuner has now tuned the radio to a station and when another station is desired, it is only necessary to depress tuning control momentarily.

Sensitivity Control

The sensitivity control is a continuously variable potentiometer located on the steering column control unit.

Electrically the sensitivity control is located in the cathode circuit of the 6SQ7 detector tube. When the potentiometer arm is in the position nearest ground the cathode of the D. C. amplifier section of the 6SN7 tube has the lowest possible applied cathode voltage. This means that the relative potential between the cathode and the grid of the D. C. amplifier is a minimum resulting in maximum plate current flow in this section.

Assume that the plate current in the D. C. amplifier section becomes low enough to stop the tuner when the grid (G_2) is two volts below the cathode. When the tuner is sweeping between stations and no signal is being received the grid (G_2) of the D. C. amplifier is approximately + 12 volts and the cathode is approximately + 7 volts when the sensitivity control is adjusted to the maximum voltage position. Our voltage differential from cathode to grid is now + 5 volts. To stop the tuner we need a rectified signal voltage of -7 volts which drives the grid two volts below the cathode.

If the sensitivity control is at the minimum voltage position with no signal the grid (G_2) is again + 12 volts and the cathode is approximately + 4 volts, making the differential from cathode to grid + 8 volts. Now, to stop the tuner we need a rectified signal voltage of -10 volts.

The local signal strength of the received station is proportional to the value of the rectified signal; the stronger the station the more negative the rectified signal voltage. Therefore, when the sensitivity control feeds maximum voltage to the cathode (K_2) it is in the position of maximum tuner sensitivity and the tuner will stop on relatively weak signals. When the sensitivity control is feeding the minimum voltage to the cathode (K_2) the tuner will stop only on relatively strong stations.

Sensitivity Adjuster

Local reception conditions vary so greatly over the U. S. A. that an additional adjustment is necessary so the tuner can be made to select only the locally strong stations at minimum position of the steering column sensitivity control. This adjustment has negligible effect on tuner operation when the sensitivity control is set so the tuner will stop on a maximum number of stations.

Electrically the sensitivity adjuster is a potentiometer which governs the amount of rectified signal voltage impressed on the grid (G_2) of the D. C. amplifier. Therefore it establishes the maximum signal strength necessary to stop the tuner when the sensitivity control is positioned to stop the tuner only on very strong stations.

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Charging Condenser

No matter where the sensitivity controls are set, there will always be a few weak stations which will produce enough signal to stop the tuner but will not be strong enough to insure those stations being tuned in accurately. In order to prevent the tuner from stopping on such borderline signal strength stations, a charging condenser has been placed across the switch (3) coupling the plate (P_2) of the D. C. amplifier and the Grid (G_1) of the relay section of 6SN7 tube. Whenever the tuner stops on a station the rectified signal voltage must be maintained during the charging time of this condenser or the condenser will pass sufficient current to bias the grid (G_1) of the relay section beyond cut off causing the relay to open and the tuner to move on to the next station. This action will make the relay appear to chatter on some stations. This condition is normal and merely indicates that the received signal is not quite strong enough to stop the tuner accurately.

TROUBLE SHOOTING THE ELECTRO-TUNER

NOTE: This radio will appear to have many operating troubles if the correct "A" voltage is not used. This radio should be operated with "A" voltage between 5.5 and 7.5 volts measured at the fuse on the power supply. It is recommended that bench power supply leads be no smaller than #14 wire.

I. THE TUNER WILL NOT STOP ON ANY STATIONS.

A. When the sensitivity control (illustration #94) is at minimum sensitivity. NOTE: Proper operation should receive at least one strong local station.

1. The tuner sensitivity needs adjusting (see page #1).

B. When the sensitivity control is at maximum sensitivity.

1. Insufficient rectified signal voltage reaches the tuner from the detector stage of the receiver. Sufficient rectified signal voltage will give a VTVM reading of 5 or more DC volts negative from grid to cathode of the DC amplifier section of 6SN7 tube.

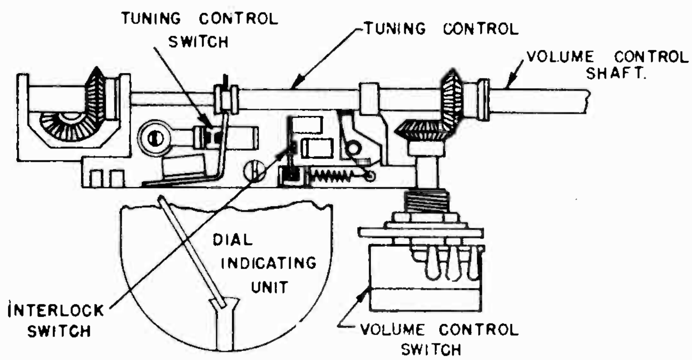

Fig. 2

a. Stations cannot be tuned in manually.

(1) Receiver is not operating. Service the radio and antenna in the conventional manner.

b. Stations can be received manually.

(1) The tuner sensitivity needs adjusting (See Page 1).

(2) The radio sensitivity needs adjusting.

(3) The antenna trimmer needs peaking. If trimmer will not peak use antenna adapter #4278.

(4) Open circuit between receiver and tuner.

(5) Antenna is faulty.

2. Sufficient rectified voltage reaches the tuner.

a. The 6SN7 tube is faulty.

b. The relay is not operating. The relay should operate with 7MA current.

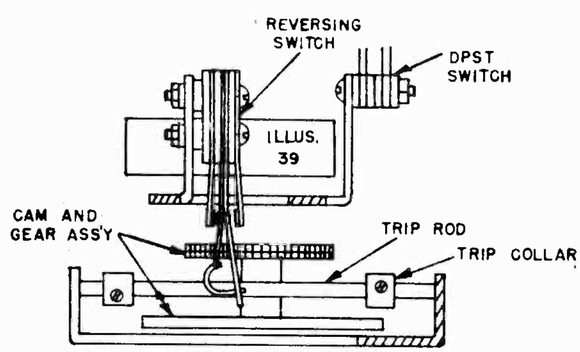

Fig. 3

II. THE TUNER WILL NOT START.

A. The tuner is completely inoperative.

1. The tuning control switch does not close when the tuning control is operated. (See Fig. 2)
2. The interlock switch does not close when the tuning control is operated. (See Fig. 2)
3. The reversing switch is open. (See Fig. 3)
4. The relay tension spring is disconnected. (See Fig. 4)
5. The 6SN7 tube is faulty.
6. The motor switch (Illus. No. 113B) does not close properly. This switch should close before the clutch fingers engage the slotted disc on the motor drive gear. (See Fig. 5). It should open before the clutch fingers engage the manual drive slotted disc. This may appear as intermittent trouble.

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MODEL R-705,
Electro-Tuner

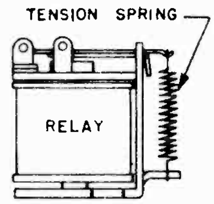

Fig. 4

B. The motor runs without driving the tuning mechanism.
1. The motor clutch does not engage.
   a. The motor drive gear slotted disc or the clutch fingers are worn.
   b. The clutch engaging yoke does not have enough travel. Adjust the solenoid core "hat" so that the clutch fingers extend into the slotted disc but not through it when the solenoid plunger is all the way in. Check the screw under the solenoid that holds the two pieces that make up the clutch yoke. If this screw is loose tighten it with the linkage in its extended position and solder these securely in place. (See Fig. 5)
2. One of the gears has failed.
   a. The motor drive gear friction safety clutch has failed. (See Fig. 5)
   b. The gear teeth are worn. (See Fig. 5)
   c. The gears are out of alignment or mesh. The three mounting screws that mount the gear housing to the motor control the position of these gears. (See Fig. 5)
3. The reversing switch has failed. The switch will not reverse or continually reverses.
   a. The switch is fouled on the trip rod. (See Fig. 3)
   b. The trip collars are improperly positioned. They should reverse the motor just before the cam follower reaches the point of the cam. (See Figs. 3 and 6)
4. There is backlash in the tuner slide mechanism.
   a. The tuner slide anti-backlash spring is disconnected. (See Fig. 6)
   b. The tuner sliding mechanism is binding. (See Fig. 6)

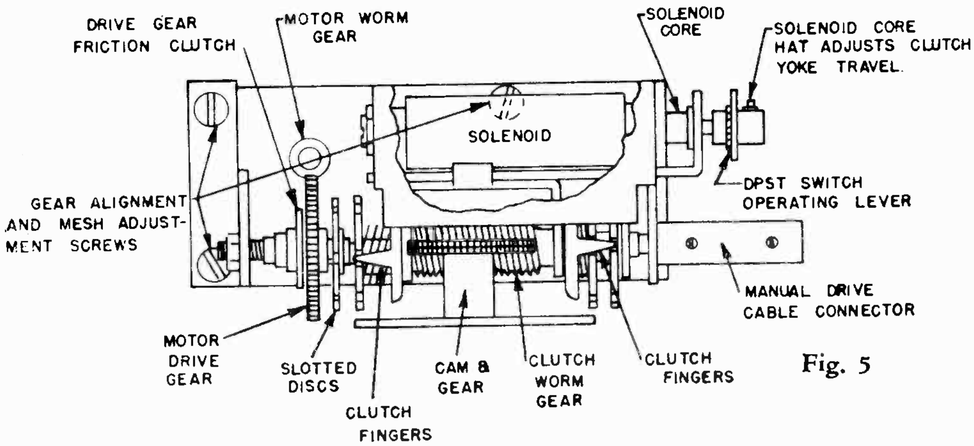

Fig. 5

III. MISCELLANEOUS TUNER FAILURES.

A. The tuner operates when the radio is turned on and before the tuning control is operated.
1. The interlock is continuously closed. (See Fig. 2)

B. The tuner reverses before reaching the end of the broadcast band.
1. The reversing switch is fouled on the trip rod. (See Fig. 3)
2. The trip collars are improperly positioned. (See paragraph II, Part B, 3, b.)

C. The tuner will not tune stations accurately.
1. There is mechanical loosening or binding if no stations are tuned in accurately.
2. The 0.5 mfd. charging condenser is open if only weak stations are tuned in inaccurately.

D. The motor runs after stations have been tuned in and tuner has stopped.
1. The motor switch (Illustration #113B) is continuously closed or shorted.
2. The motor switch (Illus. #113B) does not open before the clutch fingers engage the manual drive slotted disc.

E. The tuner changes stations when the signal is decreased (viaducts, power lines, large buildings, etc.)
1. The 0.5 mfd. charging condenser is shorted.

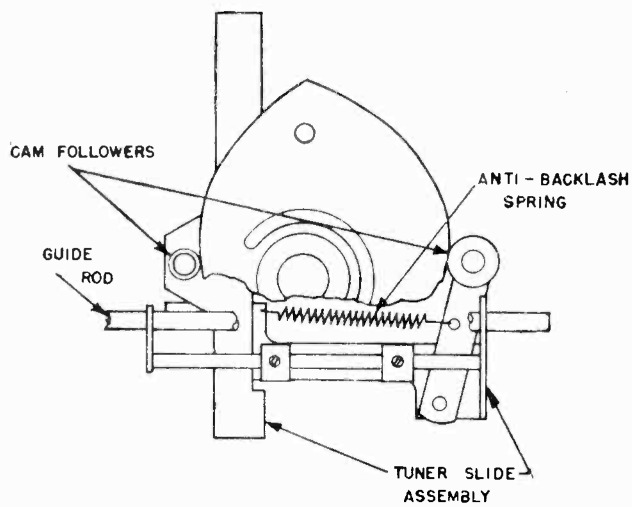

Fig. 6

MODEL R-1226

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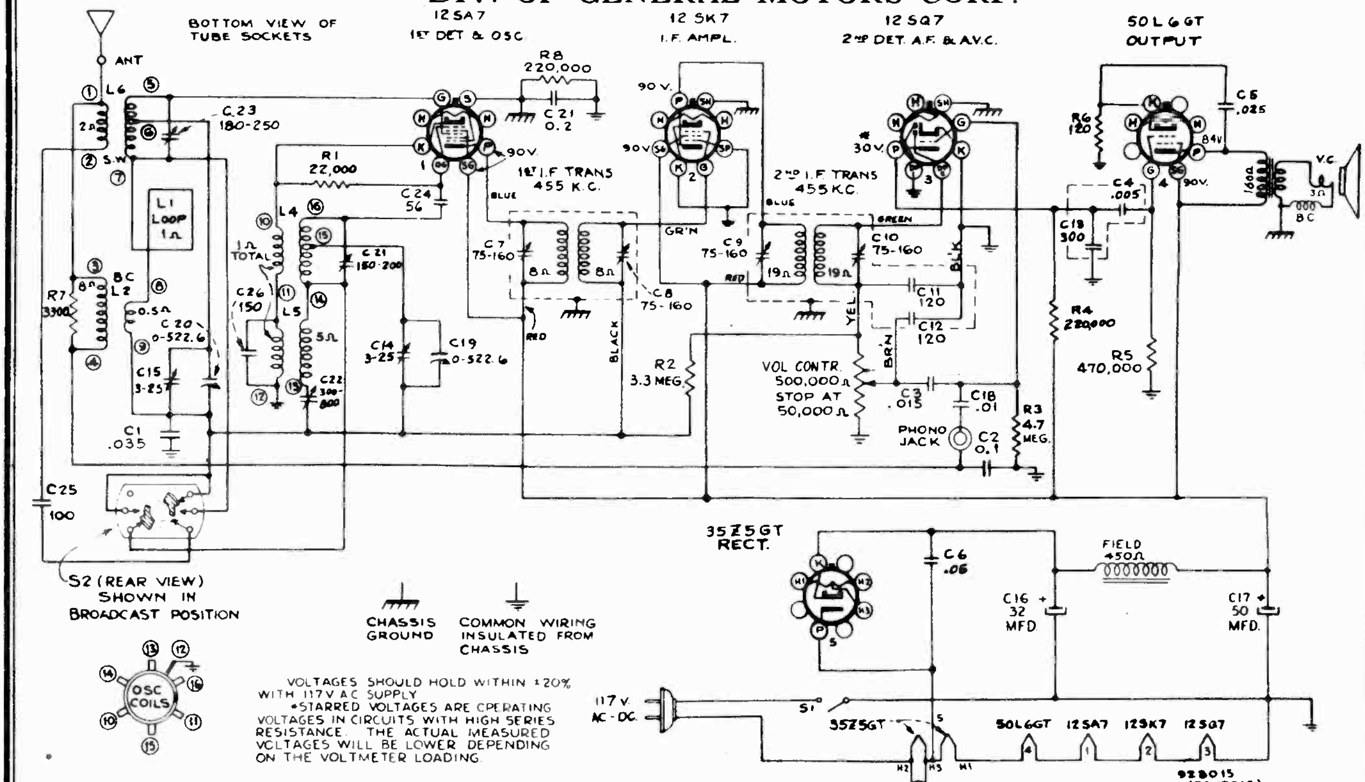


Illus. No.	Service Part No.	Part Name	Description
C1	E403	Condenser	.035 mfd., 400 V., tubular
C3	E203	Condenser	.02 mfd., 600 V., tubular
C4		Condenser	.005 mfd., 300 mmfd., dual
C13		Condenser	.0003 mfd., 300 mmfd., dual
C5	E203	Condenser	.02 mfd., 600 V., tubular
C6	E503	Condenser	.05 mfd., 600 V., tubular
C14		Condenser	Trimmer
C15		Condenser	Trimmer
C19		Condenser	Tuning
C20		Condenser	Tuning
C16		Condenser	Electrolytic, 30 mfd., 150 V.
C17		Condenser	Electrolytic, 20 mfd., 150 V.
C18	E103	Condenser	.01 mfd., 600 V., tubular
C21	E104	Condenser	0.1 mfd., 400 V., tubular
C21A		Condenser	Trimmer
C22		Condenser	Trimmer
C23		Condenser	Trimmer
C24	G470	Condenser	.00005 mfd., moulded
C25	G101	Condenser	.0001 mfd., 600 V., moulded
L1		Loop	Antenna loop
L2-R7		Coil	Loop coupling
L4	1216399	Coil	Oscillator coil
L5		Coil	Oscillator coil
L6		Coil	Antenna coil
R1	A183	Resistor	20,000 ohms, ¼ watt
R2	A275	Resistor	3 megohm, ¼ watt
R3	A475	Resistor	4.7 megohm, ¼ watt
R4	A184	Resistor	200,000 ohms, ¼ watt
R5	A474	Resistor	500,000 ohms, ¼ watt

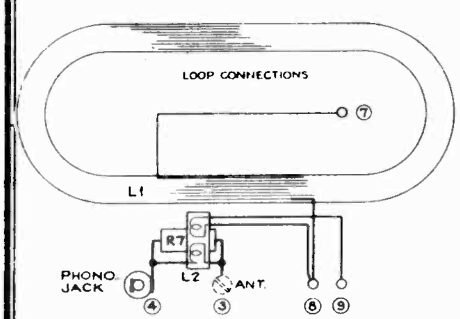
Illus. No.	Service Part No.	Part Name	Description
R6	A101	Resistor	100 ohms, ¼ watt
R8	A184	Resistor	200,000 ohms, ¼ watt
S2		Switch	Range switch
T1		Transformer	First I.F. transformer
T2		Transformer	Second I.F. transformer
T3		Transformer	Output transformer
V1	8070	Control	Volume control
	8200	Switch	Power switch on vol. control
	1216366	Speaker	5 inch E. M. (stamped RL86-B1 or RL86-B4)

Tubes

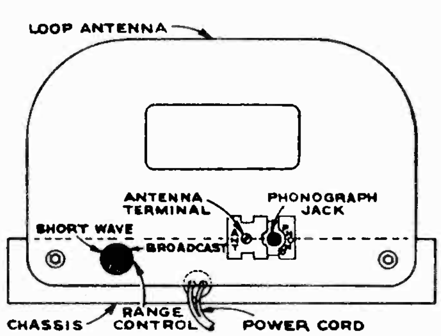
Service Part No.	Part Name	Description
5341	12SA7	First Detector--Oscillator
5348	12SK7	I.F.
5350	12SQ7	Second Detector--A.E.&A.V.C.
5451	50L6GT	Output
5408	35Z5GT	Rectifier

Chassis Miscellaneous Parts

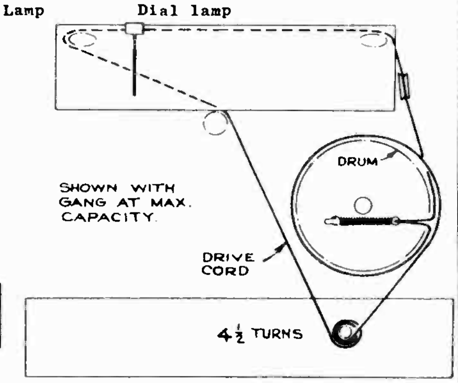
Service Part No.	Part Name	Description
1212233	Cord	Drive cord (approx. 33 inch. overall lgth.)
1216403	Dial	Glass dial scale
1215740	Knob	Volume control or tuning
51.....	Lamp	Dial lamp



Loop Antenna Connections



Rear View



Dial Cord Layout

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

GENERAL

Tubes .... Five
Speaker........................ 5-inch Electrodynamic
Antenna.................. Built-in Loop or External
Tuning .... Manual
Tuning Range................. 540-1,720 kc, 9-12 mc
Power Supply. 105-125-AC, 50/60 cycles or DC—30 watts

ALIGNMENT PROCEDURE

Volume Control maximum, Signal Generator output minimum for satisfactory output indication.

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	12SK7 grid in series with 0.1 mfd.	455 kc	Quiet point at 1,600 kc end of dial	C10, C9 2nd I-F Transformer
2	12SA7 grid in series with 0.1 mfd.			C8, C7 1st I-F Transformer
3	Antenna term. in series with 47 mmf.	10 mc*	10 mc	C21 (osc.)** C23 (ant.)
4	Antenna term. in series with 200 mmfd.	1,600 kc	1,600 kc	C14 (osc.)
5	Radiation loop consisting of two turns of wire 18 inches in diameter located 4 to 6 feet from receiver	1,300 kc	Resonance on signal	C15 (ant.)
6		600 kc	600 kc	C22 (osc.) Rock in

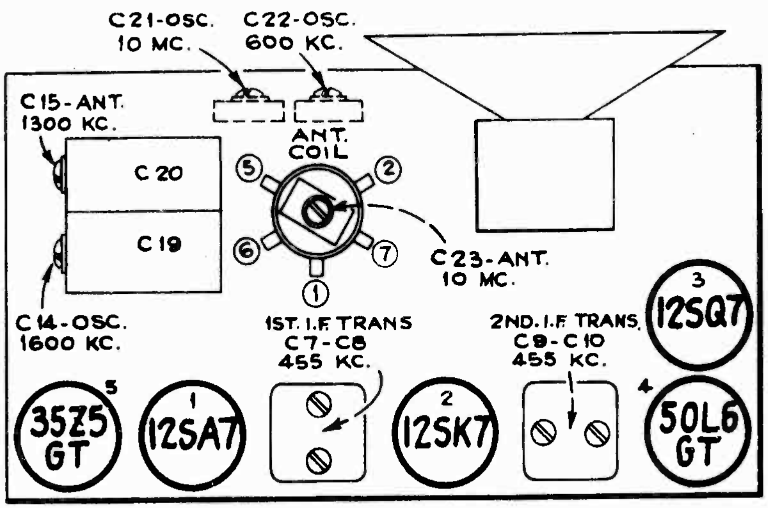
* It is recommended that this step be repeated using a received station of known frequency.
** Use minimum capacity if two peaks can be obtained.

POWER-SUPPLY POLARITY

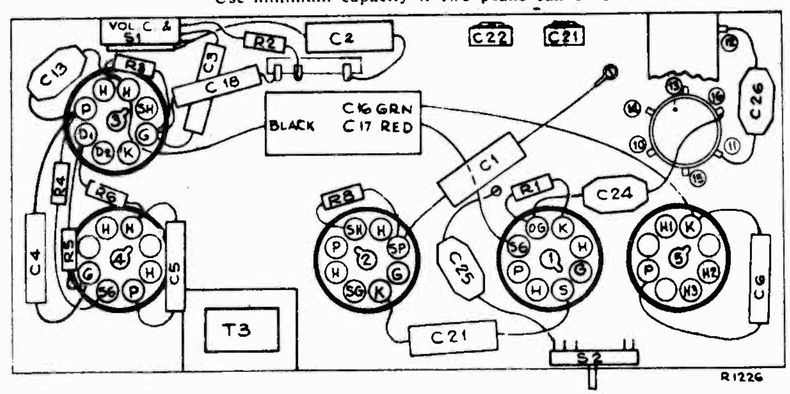
For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

CALIBRATION SCALE

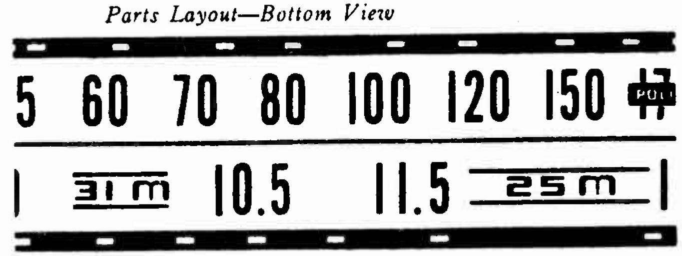
The glass tuning dial may be easily removed from the cabinet and temporarily attached to the dial backing plate for quick reference during alignment.



Parts Layout—Top View



Parts Layout—Bottom View



The dial scale drawing shown is a full size reproduction. It can be used as a direct substitute for regular dial scale in alignment procedure.

MODEL R-1233

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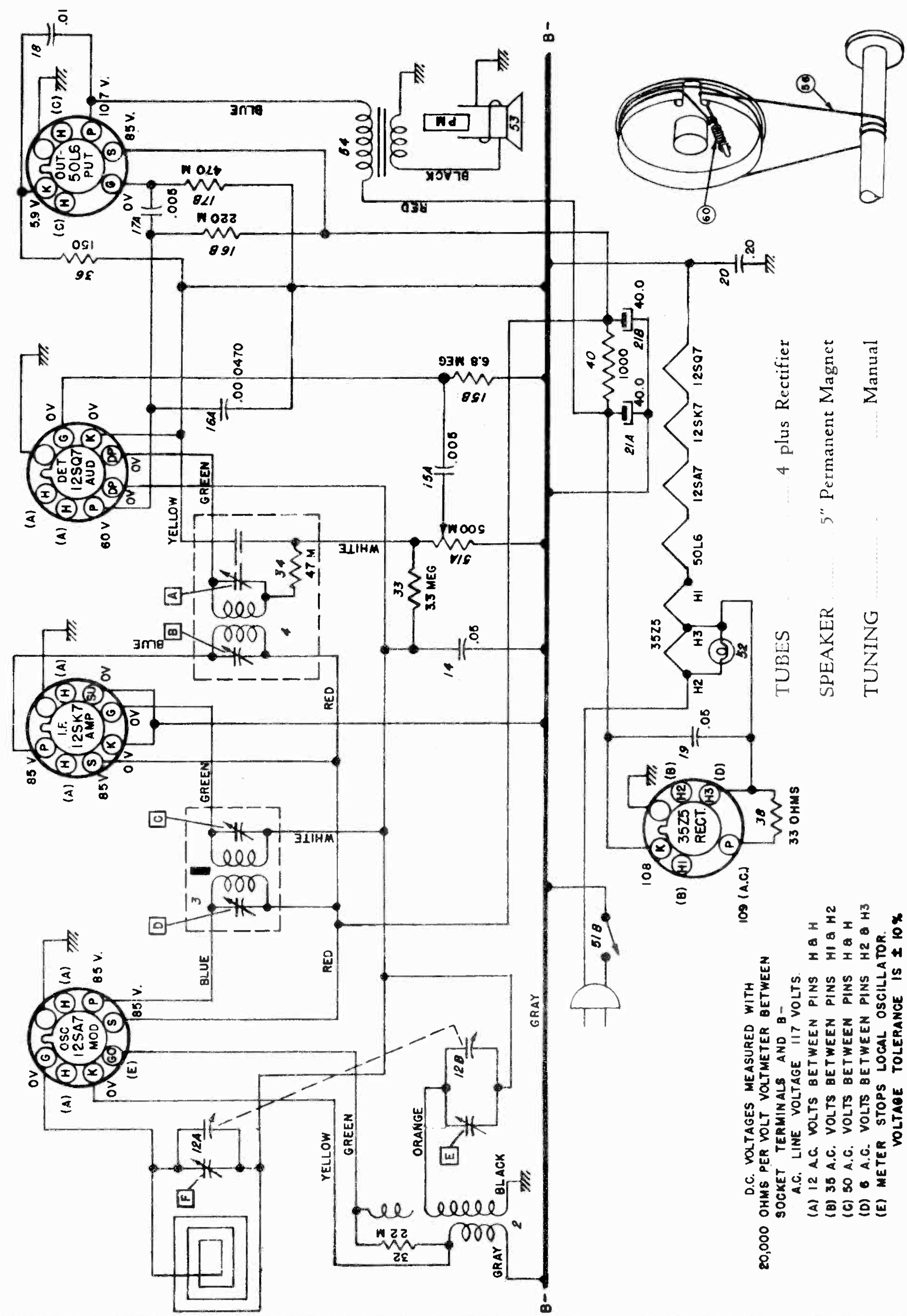

DIAL CORD DRAWING

TUBES .... 4 plus Rectifier

SPEAKER .... 5" Permanent Magnet

TUNING .... Manual

TUNING RANGE .... 540 to 1720 KC

D.C. VOLTAGES MEASURED WITH 20,000 OHMS PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B-
A.C. LINE VOLTAGE 117 VOLTS.

(A) 12 A.C. VOLTS BETWEEN PINS H & H
(B) 35 A.C. VOLTS BETWEEN PINS H1 & H2
(C) 50 A.C. VOLTS BETWEEN PINS H & H
(D) 6 A.C. VOLTS BETWEEN PINS H2 & H3
(E) METER STOPS LOCAL OSCILLATOR.

VOLTAGE TOLERANCE IS ± 10%

POWER CONSUMPTION .... 35 WATTS

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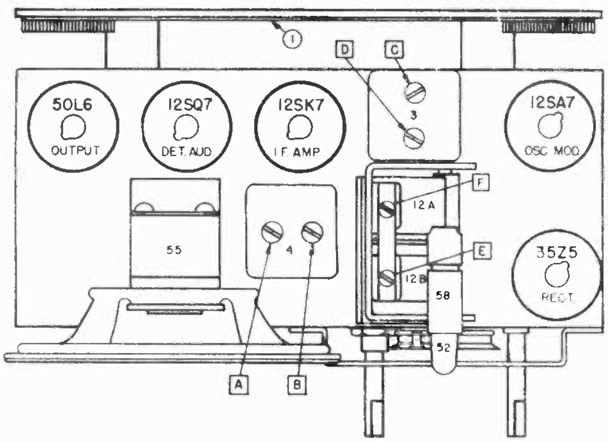
ALIGNMENT PROCEDURE:

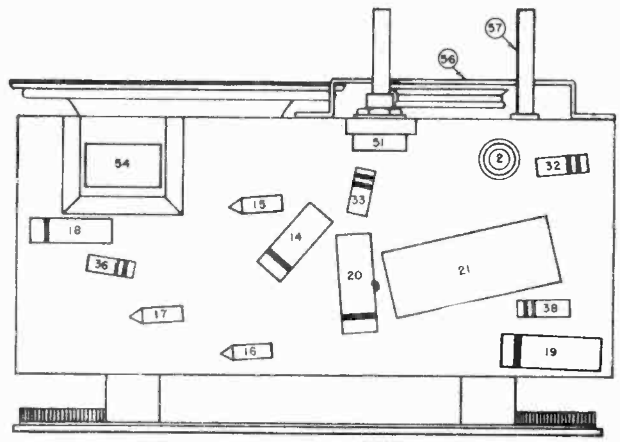
Output Meter Connections .... Across Voice Coil
Generator Return .... To Chassis Through 0.1 Mfd.
Dummy Antenna .... In Series With Generator
Volume Control Position .... Maximum Volume
Generator Output .... Minimum for Readable Indication

Steps	Series Condenser or Dummy Antenna	Connect Signal Generator To	Signal Generator Frequency	Tune Receiver To	Adjust In Sequence For Max. Output
1	0.000220 Mfd.	12SA7 Grid (Pin #8)	456 KC	High Frequency Stop	A, B, C, D
2	0.000220 Mfd.	*12SA7 Grid (Pin #8)	1720 KC	Signal Generator Signal	E
3	0.000220 Mfd.	*Clip to Loop Mtg Board	1400 KC	Signal Generator Signal	F

*The signal generator may be coupled to the receiver by placing a loop electrically across the output of the signal generator and physically near the receiver loop. This loop may be a loop from another radio, a home made loop of 10 or 15 turns, etc.

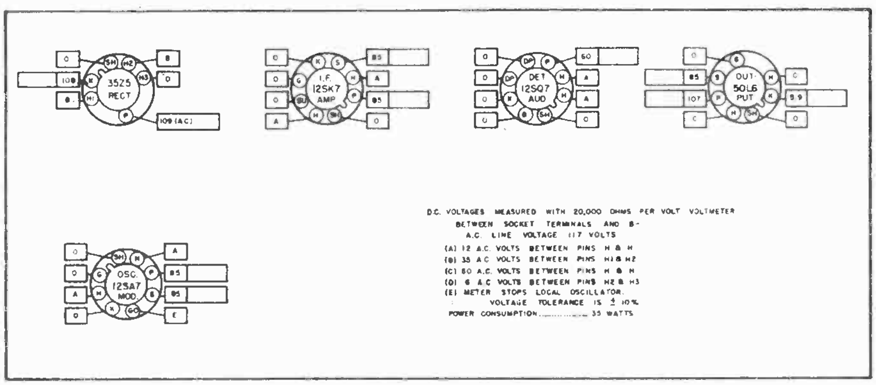


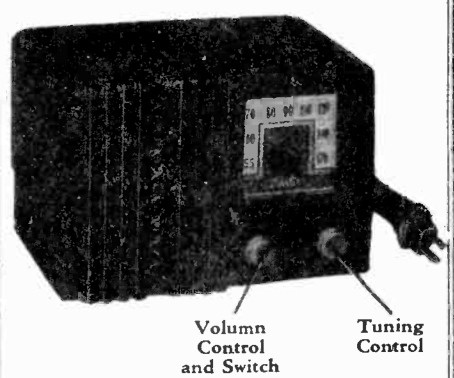
PARTS LAYOUT - TUBE VIEW



PARTS LAYOUT - CHASSIS VIEW

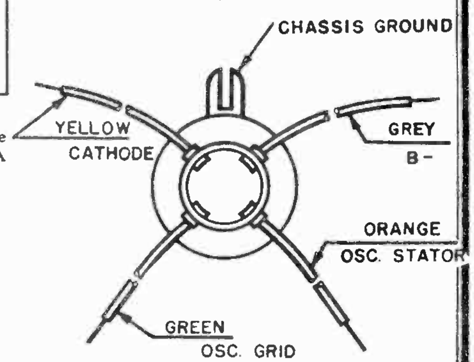
TUBE SOCKET VOLTAGE CHART





The tube socket voltages as measured at the factory are shown above. The blank spaces are provided so the service man may fill in actual readings as taken with his own equiqment. A normal operating radio should be used for these measurements.

Voltmeter Resistance is .... Ohms Per Volt
Reading Taken with .... AC Volts Line Voltage
Tolerance on Readings is ± 10%
Tubes are viewed from the Terminal Side of the Socket



OSCILLATOR COIL CONNECTIONS

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
			ELECTRICAL PARTS
			COILS
1	1218286	1218286	Loop and Rear Cover Assy.
2	1216518	1216518	Oscillator
3	1218248	1217972	1st I. F. Assy.
4	1218250	1217973	2nd I. F. Assy.
			CONDENSERS
12	1217391	1217391	Variable Condenser Package
			Variable Condenser
12A			R. F. Section
12B			Osc. Section
	1218252	1218252	Pulley
			Grommet -3 Spacer Sleeve -3 Screw -3
14	7236842	E 503	0.05 Mfd. 200V Tubular
15	1218258		Capristor — 0.005 Mfd; 6.8 Megohms
15A		E 502	0.005 Mfd. 600V Tubular
15B		A 685	6.8 Megohms ½W Insulated
16	1218260		Capristor — 0.000470 Mfd; 220,000 Ohms
16A		G 471	0.000470 Mfd. Molded
16B		A 224	220,000 Ohms ½W Insulated
17	1218259		Capristor — 0.0005 Mfd; 470,000 Ohms
17A		E 502	0.005 Mfd. 600V Tubular
17B		A 474	470,000 Ohms ½W Insulated
18	1216513	E 103	0.01 Mfd. 600V Tubular
19	7230592	E 503	0.05 Mfd. 600V Tubular
20	7238787	E 204	0.2 Mfd. 400V Tubular
21	1217027	J 908	Electrolytic
21A			40 Mfd. 150V
21B			40 Mfd. 150V
			RESISTORS
15	1218258		Capristor — 0.005 Mfd. 6.8 Megohm
15A		E 502	0.005 Mfd. 600V Tubular
15B		A 685	6.8 Megohms ½W Insulated
16	1218260		Capristor — 0.000470 Mfd. 220,000 Ohms
16A		G 471	0.000470 Mfd. Molded
16B		A 224	220,000 Ohms ½W Insulated
17	1218259		Capristor — 0.005 Mfd. 470,000 Ohms
17A		E 502	0.005 Mfd. 600V Tubular
17B		A 474	470,000 Ohms ½W Insulated
32	1214550	A 223	22,000 Ohms ½W Insulated
33	1214564	A 335	3.3 Megohm ½W Insulated
34	1214553	A 473	47,000 Ohms ½W Insulated
			(In 2nd I. F. Coil Assy.)
36	1213220	A 151	150 Ohms ½W Insulated
38	1214538	A 330	33 Ohms ½W Insulated
40	1211037	B 102	1000 Ohms 1W Insulated
			MISCELLANEOUS ELECTRICAL PARTS
51	1216477		Control — Volume and Switch
51A		8071	Volume Control
51B		8201	Switch
52	435433	47	Lamp, Dial Light
53	1217405	1216563	Speaker — 5" Permanent Magnet
54	1216571	1216571	Transformer — Output
			TUBES
	1214889	5342	12SA7GT
	1214890	5349	12SK7GT
	1214891	5351	12SQ7GT
	1214366	5451	50L6GT
	1213848	5408	35L5GT — Rectifier
			MECHANICAL PARTS
			CHASSIS
	1216512	1216512	Cord — Power
55		6040	Cord — Pointer Drive (120 Ft. Spool)
56	1217421	1217421	Dial and Plate Assy.
	1218253	1218253	Pointer
57	1216479	1216479	Shaft — Tuning
58	1217839	1217839	Socket — Dial Light
	7236279	7236279	Socket — Octal Tube
59	1217323	1217323	Spring — Cord Tension

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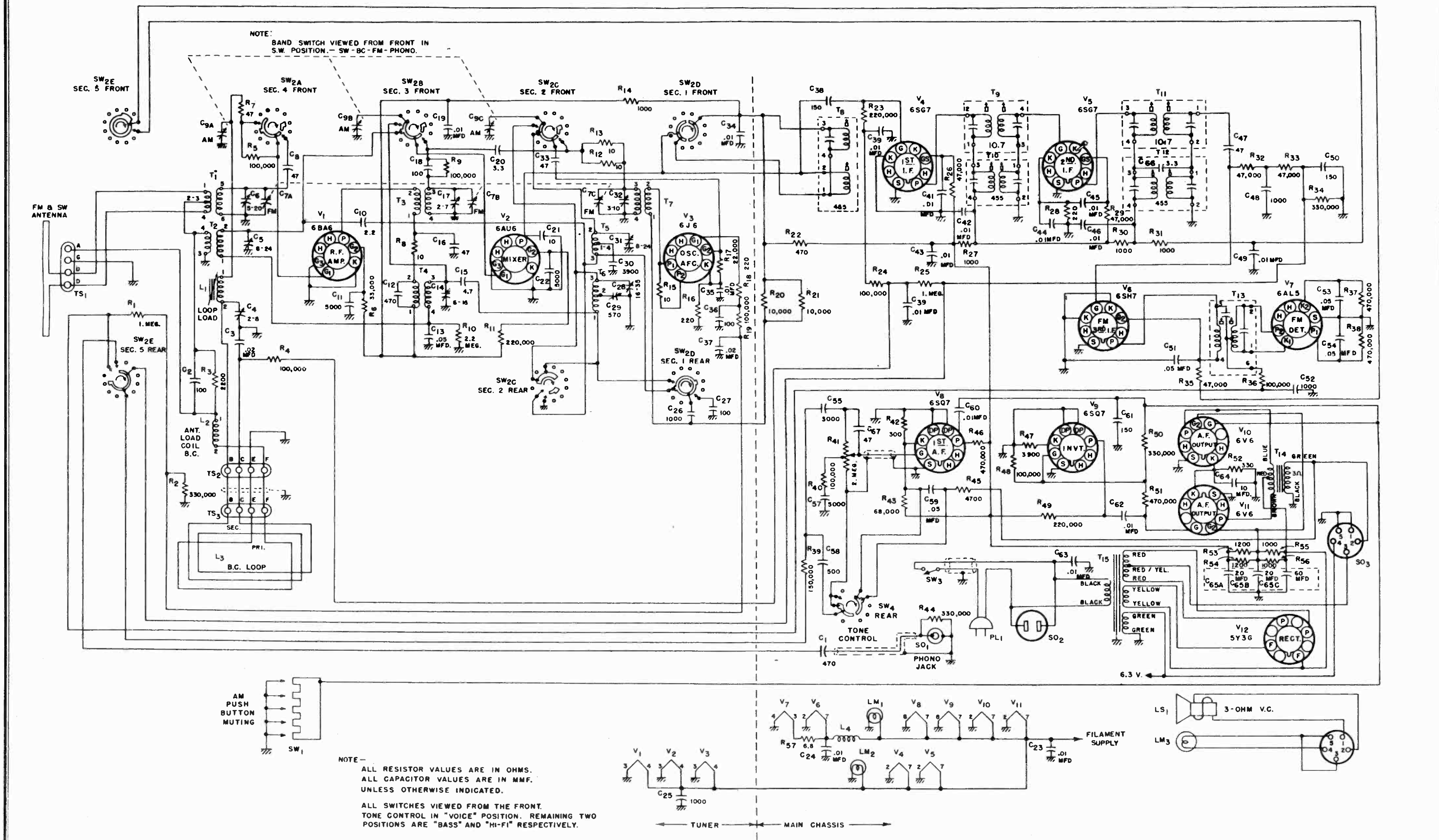

Circuit Diagram

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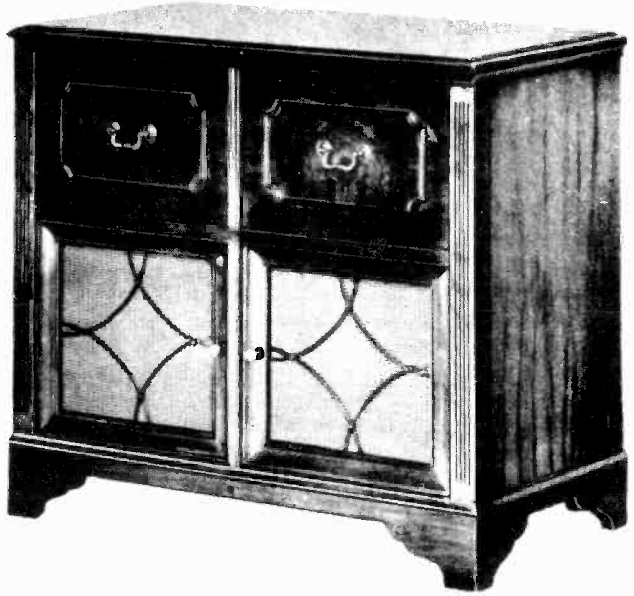
MODELS R-1253, R-1254

GENERAL

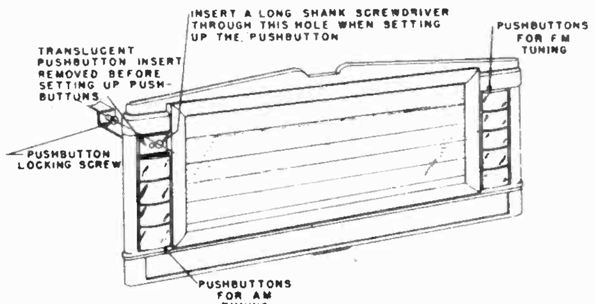
TUBES	Eleven plus rectifier
SPEAKER	12 inch P.M.
TUNING	Manual and mechanical push-buttons; five P.B. for "AM", five P.B. for "FM"
TUNING RANGE	(BC) 550 KC - 1700 KC (SW) 5.8 MC - 18 MC (FM) 88 MC - 108 MC
ANTENNA	Built-in loop, (BC); built-in dipole, (FM) and (SW); Provisions for external antennas
POWER SUPPLY	105-125 V. AC, 60 Cycles
POWER CONSUMPTION	120 Watts (140 watts with changer)



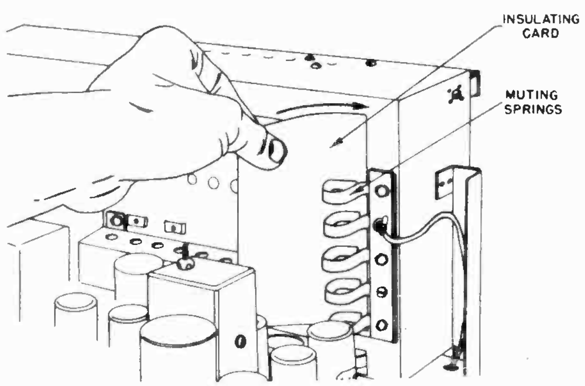
BUTTON SETTING

Insulate the muting switch contacts with the instruction card or a similar 4 x 6 inch paper card as shown before setting the left hand group of "AM" push buttons. The right hand group of "FM" push buttons do not require this treatment.

1. Select any one push button.
2. Pull translucent insert straight out.
3. Insert screw driver blade through large hole of push button into slot of locking screw.
4. Loosen locking screw about one-half turn. (Not more than one full turn.)
5. With push button depressed, carefully tune in desired station with the manual control and tighten the locking screw.
6. Replace the translucent insert with the proper station call letters inserted as follows.



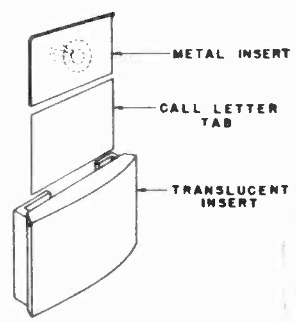
Setting the Push Buttons



Insulating the Muting Switch Contacts

INSERTING CALL LETTERS

1. Slide out metal insert from translucent insert assembly.
2. Insert desired call letter tab.
3. Replace metal insert behind call letter tab.
4. Replace translucent insert assembly into push button mechanism.



Call Letter Installation

MODELS R-1253, R-1254

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

DIAL AND PILOT LAMP REPLACEMENT

The two dial lamps are made accessible by removing the dial escutcheon at the front of the cabinet. The pilot lamp at the base of the cabinet is removed from the front of the cabinet by reaching under the cabinet directly behind the jewel. Slip the socket assembly straight back a short distance, releasing it from its mounting tongue. The socket and defective lamp may now be brought out in the open for replacement. Replace all lamps with 6-8 volt Mazda No. 44 or equivalent.

ALIGNMENT PROCEDURE

Removal of the receiver chassis from the cabinet requires the use of other calibration means than the dial glass. Calibration strips mounted on the pointer rails are provided for alignment purposes.

To use these calibration strips, it is necessary to remove the dial plate (brown metal cover) in the following manner:

1. Remove dial pointers. Pull them straight out of their spring clips.
2. Remove the two dial lamp sockets.
3. Remove dial plate fastened to the chassis with seven sheet metal schews.

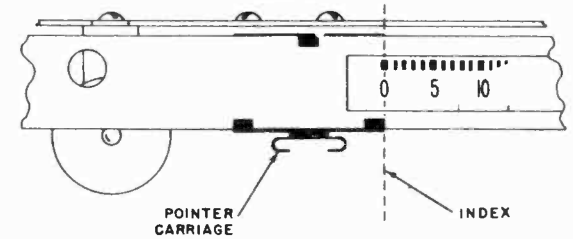
With the variable condensers fully meshed, the right hand side of the pointer carriage will be indexed to zero on the calibration strips.

The receiver is equipped with AUTOMATIC FREQUENCY CONTROL on the "FM" band to compensate for mechanical variations in the push button mechanism. The correction factor is approximately 5 times: AFC takes hold 100 kc before the station frequency is reached and releases before tuning 450 kc beyond the station frequency when receiving a 0.1 volt signal.

The standard RMA dummy specified in the alignment chart consists of a 200 mmf condenser in series with a 20 uh r-f choke which is shunted by a 400 mmf condenser in series with a 400 ohm carbon resistor.

NOTE —

Output Meter Connections	Across Voice Coil
Generator Ground	To Chassis
Dummy Antenna	In Series with Generator
Volume Control Position	Maximum
Tone Control Position	"VOICE"



Calibration Strip Detail

ALIGNMENT CHART

Step	Dummy Antenna	Signal Generator Connection	Signal Generator Frequency	Band Switch Pos.	Radio Dial Setting	Cal. No.	Adjust	Remarks
1	0.01 mfd. cap.	To stator plates of center section of "AM" tuning cond.	455 kc	"BC"	1000 kc	55	S1, S2, S3, S4, S5	Adjust for max. output.
2	0.01 mfd. cap.	To stator plates of center section of "FM" tuning cond.	10.7 mc (No modulation)	"FM"	Mid-scale	55	S6, S7, S8, S9 S10, S11	Adjust for max. AVC voltage as measured between pin No. 7 of 6AL5 and ground with a 20,000-ohm per volt meter.
3	0.01 mfd. cap.	To stator plates of center section of "FM" tuning cond.	10.7 mc (No modulation)	"FM"	Mid-scale	55	S12	Adjust for zero voltage as measured between the junction of C55 and C58 and ground with a 20,000-ohm per volt meter.
4	Std. RMA dummy	To terminals "A" and "G" on ant. term. strip.	1500 kc 600 kc	"BC" "BC"	1500 kc 600 kc	82 15.5	A*, B and C D* and S13	Adjust for max. output.
5	Std. RMA dummy	To terminals "A" and "G" on ant. term. strip.	16 mc	"SW"	16 mc	84	E* and F	Adjust for max. output.
6	Two 150 ohm carbon resistors	To terminals "D" and D" on ant. term. strip; one 150 ohm resistor in each lead.	108 mc	"FM"	108 mc	83.5	G*, H and I	Adjust for max. limiter grid voltage as measured between the junction of R33 and R34 and ground with a 20,000-ohm per volt meter.

* Note—Calibration Adjustments.

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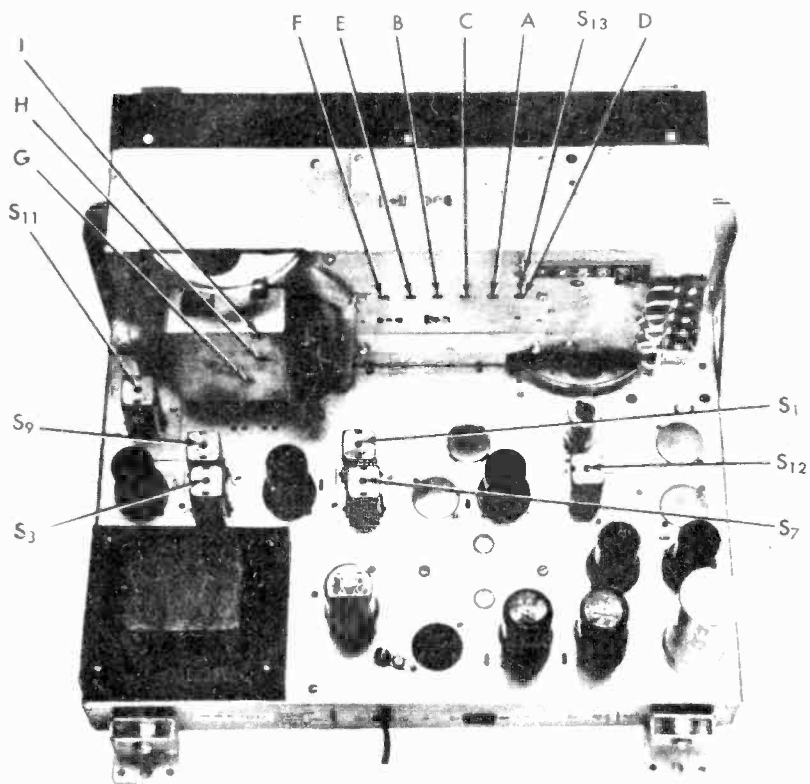
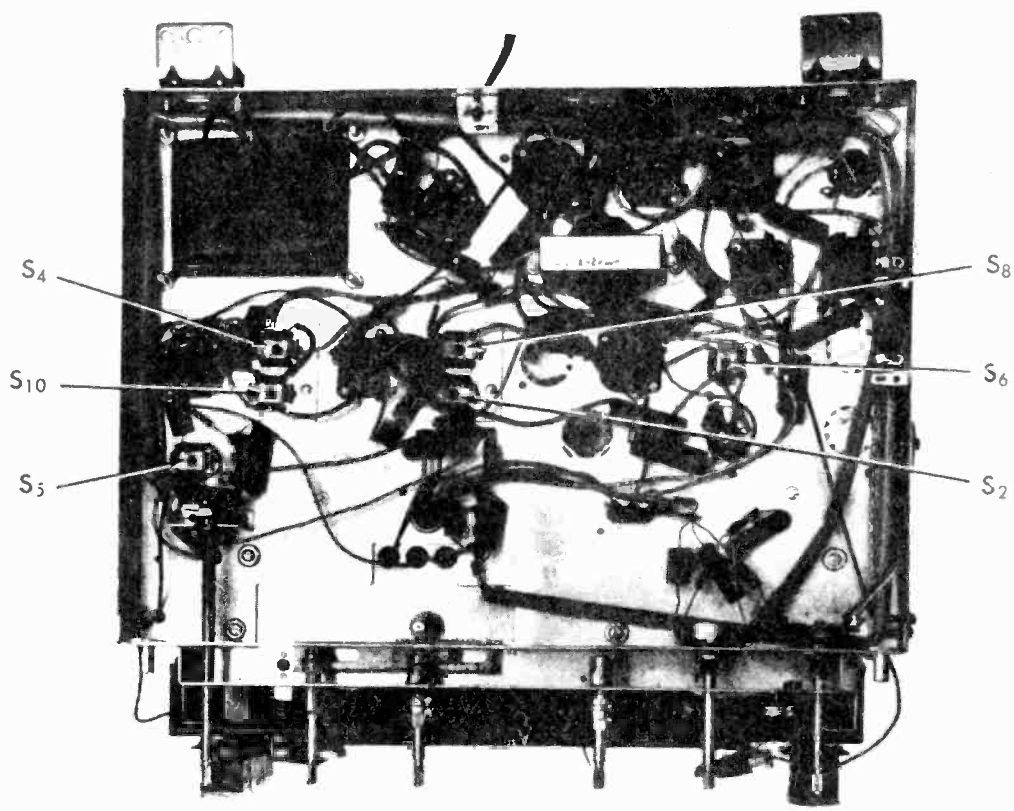


Alignment Adjustments—*Top View*



Alignment Adjustments—*Bottom View*

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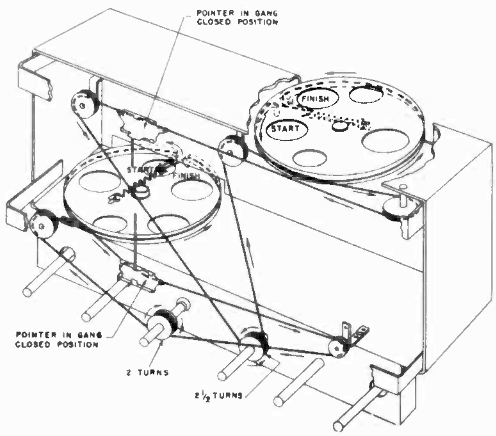
DIV. OF GENERAL MOTORS CORP.

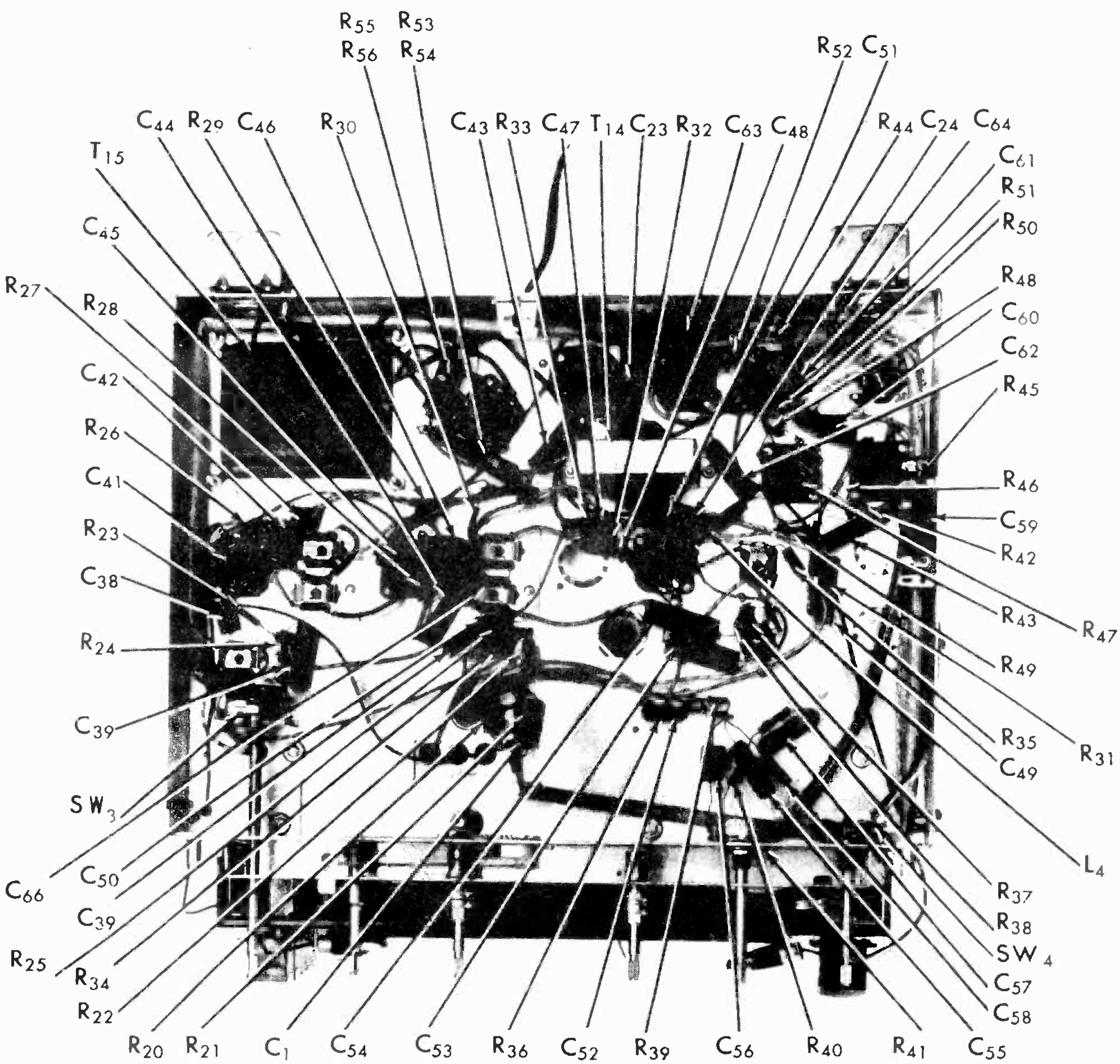


Dial Cord Layout

RESTRINGING DIAL CORD

To restring either the "FM" or "AM" dial drive system, cut a five foot length of 9 lb. test dial cord and follow the stringing procedure as illustrated. Note that the start and finish of both drives are located at the tension spring on the large driven pulley.

Index the pointer by closing the gang and attaching the pointer carriage so that the right hand side of the pointer carriage falls at the zero mark on the calibration strip. Refer to the calibration strip detail shown in the alignment procedure.



Parts Layout—Bottom View

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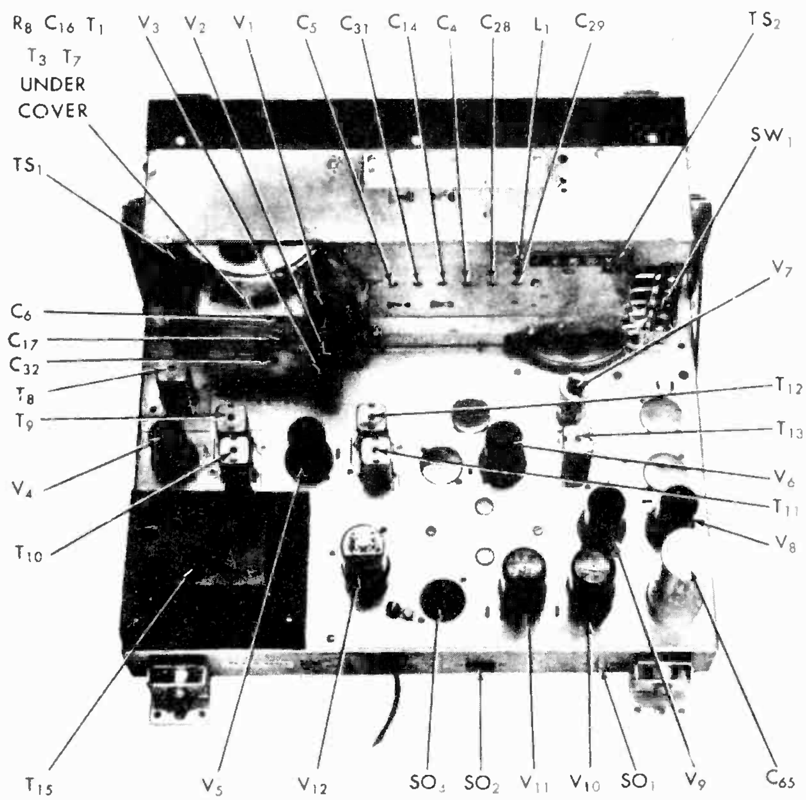
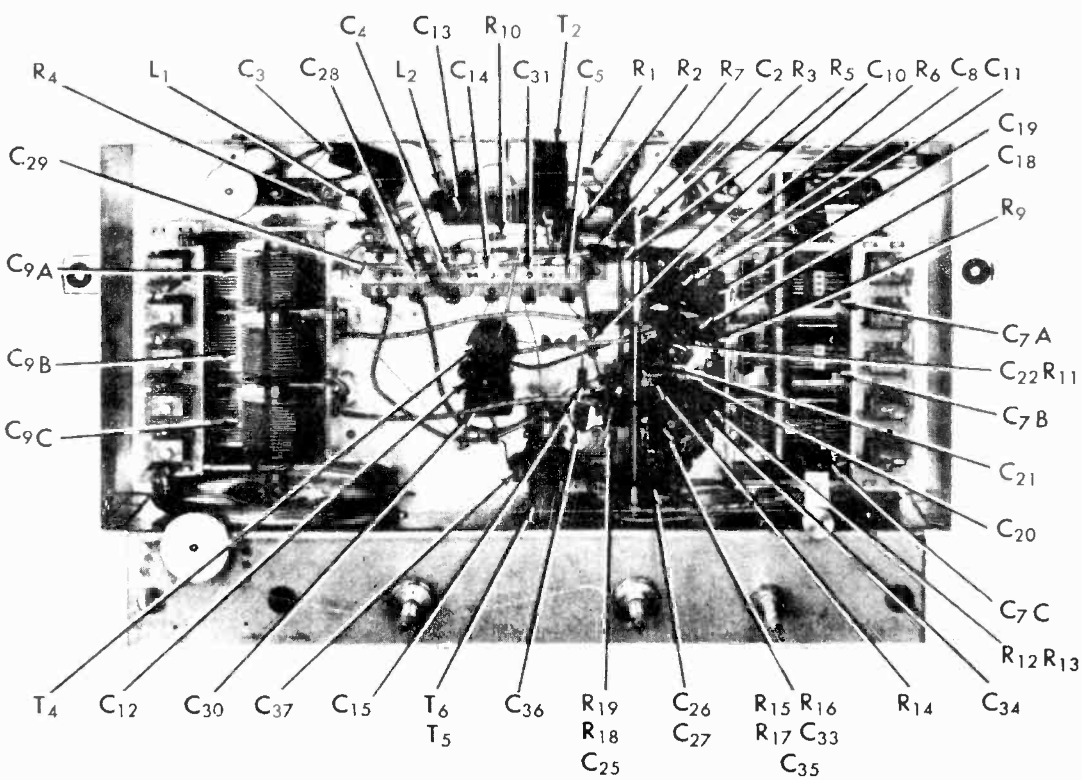
MODELS R-1253, R-1254



Parts Layout—*Top View*



Parts Layout—*Front View*

MODELS R-1253,
R-1254

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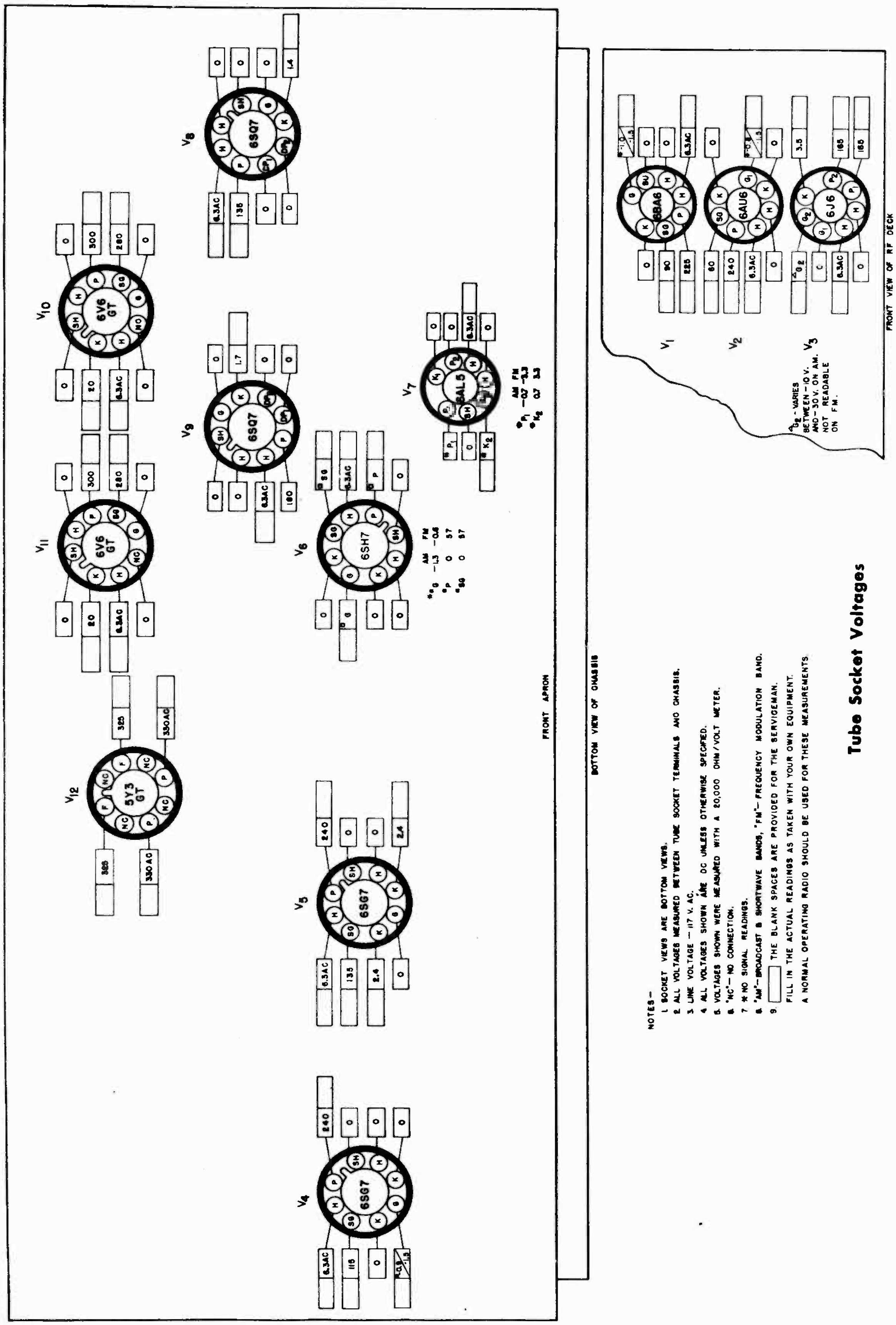

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

MODELS R-1253, R-1254

SERVICE PARTS LIST

ELECTRICAL PARTS
COILS AND TRANSFORMERS

Illustration No.	Production Part No.	Service Part No.	Description
L-1	51B907	1217643	Coil, loop loading
L-2	51A994	1218351	Coil, antenna loading
L-4	53B009	1218362	Coil, R.F. choke
T-1	51B916	1217649	Transformer, FM, antenna stage
T-2	51B993	1218355	Transformer, SW, antenna stage
T-3	51B915	1217718	Transformer, FM, mixer stage
T-4	51B910	1217646	Transformer, BC, mixer stage
T-5	51B908	1217644	Transformer, SW, osc. stage
T-6	51B911	1217647	Transformer, BC, osc. stage
T-7	51B914	1217648	Transformer, FM, osc. stage
T-8	50C298	1218413	Transformer, 1st I.F.
T-9, 11	50C237	1218414	Transformer, FM, interstage I.F.
T-10	50C236	1216416	Transformer, AM, interstage I.F.
T-12	50C235	1218415	Transformer, AM, detector stage I.F.
T-13	50C263	1218265	Transformer, FM, detector stage I.F.
T-14	55B105	1218418	Transformer, audio output
T-15	52C153	1218417	Transformer, power

CONDENSERS

Illustration No.	Production Part No.	Service Part No.	Description
C-1, 12	CM20A471K	G471	470 mmf. 500 V., mica
C-2, 36	CM20A101M	G101	100 mmf. 500 V., mica
C-3, 37	46AY203F	E203	.02 mfd. 600 V., tubular paper
C-4, 5, 14, 28, 29, 31	44B348	1218365	Trimmer assembly
C-6	44A194	1217707	Trimmer, FM, ant. stage
C-7	48C175	1217716	Tuning condenser, FM
C-8, 33	47A150	1217715	47 mmf. 500 V., ceramic
C-9	48C176	1217717	Tuning condenser, AM
C-10	47A160-4	1218407	2.2 mmf., ceramic
C-11, 22	47A168	1218298	5000 mmf. 500 V., ceramic
C-13, 51, 53, 54	46AY503F	E503	.05 mfd. 600 V., tubular paper
C-15	47A160-6	1218408	4.7 mmf., ceramic
C-16, 47	CM20A470M	G470	47 mmf. 500 V., mica
C-17	44A192	1217705	Trimmer, FM, mixer stage
C-18, 27	47A045	1218411	100 mmf. 500 V., ceramic
C-19, 23, 24, 34, 39, 40, 41, 42, 43, 44, 45, 46, 49, 60, 62	46AZ103F	E103	.01 mfd. 600 V., tubular paper
C-20	47A160-5	1218409	3.3 mmf., ceramic
C-21	47A149	1217714	10 mmf. 500 V., ceramic
C-25, 26, 48, 52	47A148	1217713	1000 mmf. 500 V., ceramic
C-30	CM35A392J	G392	3900 mmf. 500 V., mica
C-32	44A218	1218352	Trimmer, FM, osc. stage
C-35	47B32103N1	1218329	.01 mfd. 150 V., ceramic
C-38, 50, 56, 61	CM20A151M	G151	150 mmf. 500 V., mica
C-55	46AZ302J	E302	.003 mfd. 600 V., tubular paper
C-57	46AZ502J	E502	.005 mfd. 600 V., tubular paper
C-58	47A147	1217712	500 mmf. 350 V., ceramic
C-59	46AU503J	E503	.05 mfd. 200 V., tubular paper
C-63	46AG103J	1217227	.01 mfd. 600 V., molded paper
C-64	45A121	J100	10 mfd. 25 V., electrolytic
C-65	45B113	1217457	60-20 mfd., 450 V.; 20 mfd., 400 V., electrolytic
C-66	47A160-5	1218409	3.3 mmf., ceramic
R-1, 25	RC20AE105M	A105	1 megohm 1/2 watt, carbon
R-2, 34, 44, 50	RC20AE334K	A334	330,000 ohms 1/2 watt, carbon
R-3	RC20AE222M	A222	2200 ohms 1/2 watt, carbon
R-4, 5, 9, 19, 24, 36, 40, 48	RC20AE104K	A104	100,000 ohms 1/2 watt, carbon
R-6	RC30AE333M	B333	33,000 ohms 1 watt, carbon
R-7	RC20AE470M	A470	47 ohms 1/2 watt, carbon
R-8, 12, 13, 15	RC20AE100M	A100	10 ohms 1/2 watt, carbon
R-10	RC20AE225M	A225	2.2 megohms 1/2 watt, carbon
R-11, 23, 49	RC20AE224M	A224	220,000 ohms 1/2 watt, carbon
R-14, 27, 30, 31	RC20AE102M	A102	1000 ohms 1/2 watt, carbon
R-16, 18, 28	RC20AE221M	A221	220 ohms 1/2 watt, carbon
R-17	RC20AE223M	A223	22,000 ohms 1/2 watt, carbon
R-20, 21	RC30AE103M	C103	10,000 ohms 2 watts, carbon
R-22	RC30AE471M	B471	470 ohms 1 watt, carbon
R-26, 29, 35	RC30AE473M	R473	47,000 ohms 1 watt, carbon
R-32, 33	RC20AE473M	A473	47,000 ohms 1/2 watt, carbon
R-37, 38, 51, 46	RC20AE474K	A474	470,000 ohms 1/2 watt, carbon
R-39	RC20AE154M	A154	150,000 ohms 1/2 watt, carbon
R-41	25B622	1218361	Resistor, variable, 2 megohms (tapped)
R-42	RC20AE301J	A301	300 ohms 1/2 watt, carbon
R-43	RC40AE683K	C683	68,000 ohms 2 watts, carbon
R-45	RC20AE472K	A472	4700 ohms 1/2 watt, carbon
R-47	RC20AE392K	A392	3900 ohms 1/2 watt, carbon

SERVICE PARTS LIST (Continued)

CONDENSERS (Continued)

Illustration No.	Production Part No.	Service Part No.	Description
R-52	RC20AE331M	C331	330 ohms 2 watts, carbon
R-53, 54	24BV122E	C122	1200 ohms 2 watts, WW
R-55, 56	24BV102E	C102	1000 ohms 2 watts, WW

TUBE COMPLEMENT

Illustration No.	Production Part No.	Service Part No.	Description
V-1	90X6BA6	5252	Type 6BA6, antenna
V-2	90X6AU6	5260	Type 6AU6, mixer
V-3	90X6J6	5254	Type 6J6, osc.
V-4, 5	90X6SG7	5226	Type 6SG7, 1st & 2nd I.F.
V-6	90X6SH7	5255	Type 6SH7, FM limiter, AM detector
V-7	90X6AL5	5251	Type 6AL5, FM detector
V-8, 9	90X6SQ7	5231	Type 6SQ7, audio amp.
V-10, 11	90X6V6GT/G	5241	Type 6V6GT/G, power amp.
V-12	90X5Y3GT	5123	Type 5Y3GT, rectifier

MISCELLANEOUS ELECTRICAL PARTS

Illustration No.	Production Part No.	Service Part No.	Description
L-3	57C114	1217986	Loop antenna
SW-1	18A092	1217977	Switch, muting
SW-2	60C308	1218369	Band switch assembly
SW-3	60B309	1218358	Switch, power
SW-4	60B310	1218359	Switch, tone control
PL-1	87B1625	1218366	Line cord and plug
LM-1, 2, 3	39A003	187189	Lamp, dial light—Mazda No. 44
	87A1615-1	1217680	Transmission line, loop
	57C108-1	1217983	FM folded doublet antenna
LS-1	85C069	1218367	Speaker assembly

MECHANICAL PARTS
CHASSIS PARTS

Illustration No.	Production Part No.	Service Part No.	Description
SO-1	36A034	1217634	Receptacle, phono pickup
SO-2	10A015	1217633	Receptacle, phono motor
SO-3	6A277	1217682	Socket, speaker (5 pin)
	6A190	1217684	Socket, octal (tube)
	6B296	1218360	Socket, octal (6V6GT tubes)
	6A276	1217683	Socket, miniature (tube)
	86B046	1217629	Socket & bracket, dial light, L.H.
	86B047	1217628	Socket & bracket, dial light, R.H.
	69A169	1217688	Shield, tube base (miniature tube)
	69A104	1217685	Shield, tube (miniature tube)
	75A076	1217623	Spring, tube retainer
	86A037	1218353	Shield, dial light
	69C172	1218368	Shield, FM coil section
	67B645	1217653	Carriage, pointer
	82B145	1218357	Pointer, FM
	82B146	1218363	Pointer, AM
	75A132	1218354	Spring, pointer
	75A006	1217624	Spring, dial drive
	38A017	....	Cord, dial drive
	83D300	1217719	Plate, dial drive cover
TS-1	88A277	1217652	Terminal strip, antenna
TS-2	88A278	1217651	Terminal strip, loop
	76A356	1217616	Clamp, speaker

CABINET PARTS

Illustration No.	Production Part No.	Service Part No.	Description
	86B050-2	1218364	Socket, cabinet pilot light
	69A197	1217938	Shield, pilot light
	69B209	1218356	Shield assembly, cabinet
	17B028	1217666	Push-button (brown)
	17A027	1217631	Insert, push-button, lucite
	17A029	1217936	Insert, push-button, metal
	17A025	1217632	Call letters
	7D039	1217830	Escutcheon
	22D195	1217985	Dial glass, upper
	22B194	1217982	Dial glass, lower
	69A212	1218349	Shield, escutcheon
	76A331	1217980	Clips, dial glass
	15B096	1217627	Knob, power switch & tone control
	15B093	1217626	Knob, tuning & volume controls
	15A129	1217935	Knob & pin assembly bandswitch
	86A057	1217981	Jewel, pilot lamp
	67A765	1217937	Bracket, pilot lamp
			Record changer (see Bulletin 15D505)
	14A161	1217933	Pad, push-button (felt)
	66D409	1217987	Cabinet, console (walnut)
	66D409-1	1217988	Cabinet, console (mahogany)

MODELS 980797, 980798, BUICK

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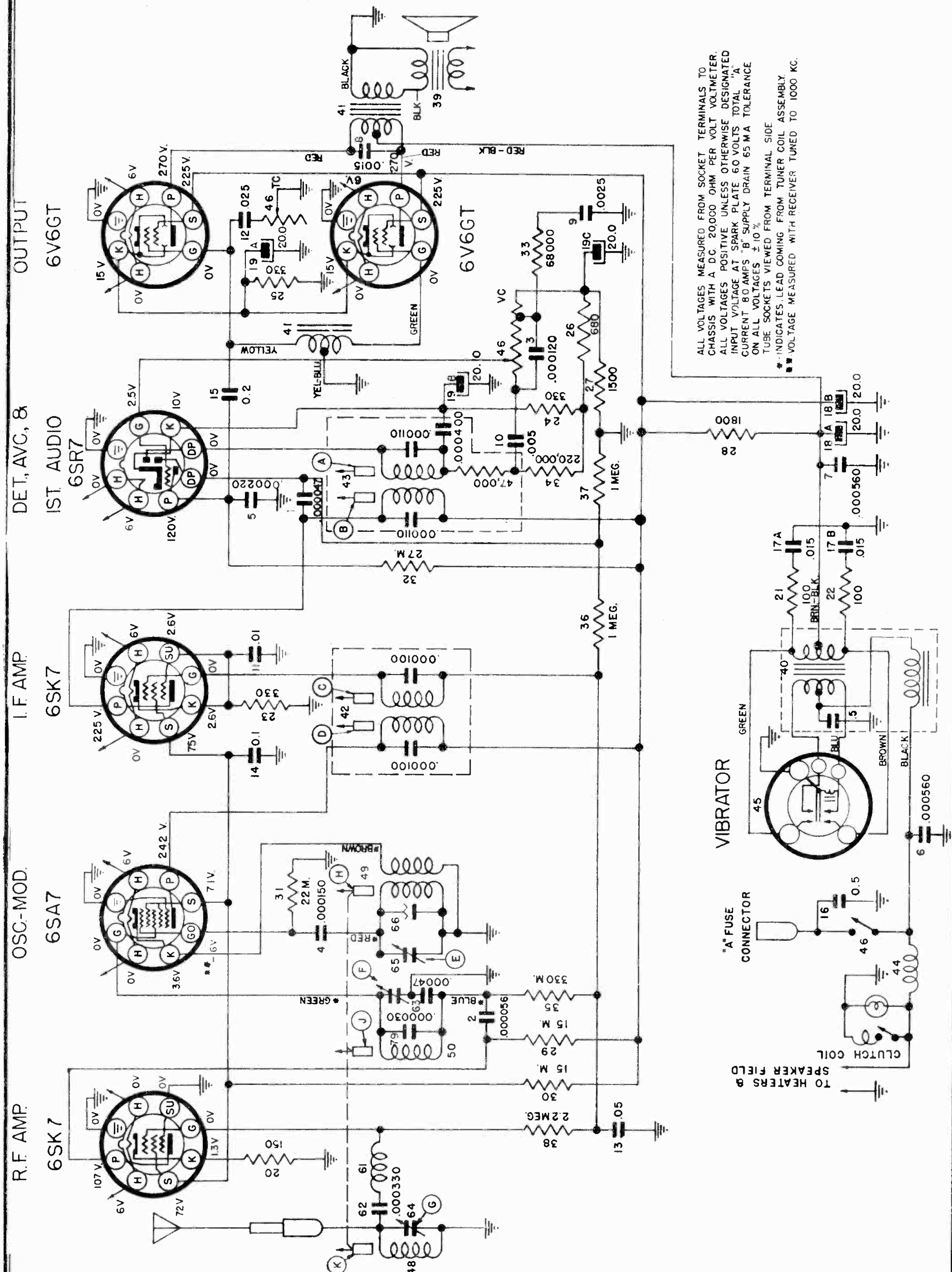

For additional information on Model 980797 see 980744; Buick 15-1
For additional information on Model 980798 see 980745; Buick 15-1

UNITED MOTORS SERVICE
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MODELS 980797, 980798, BUICK

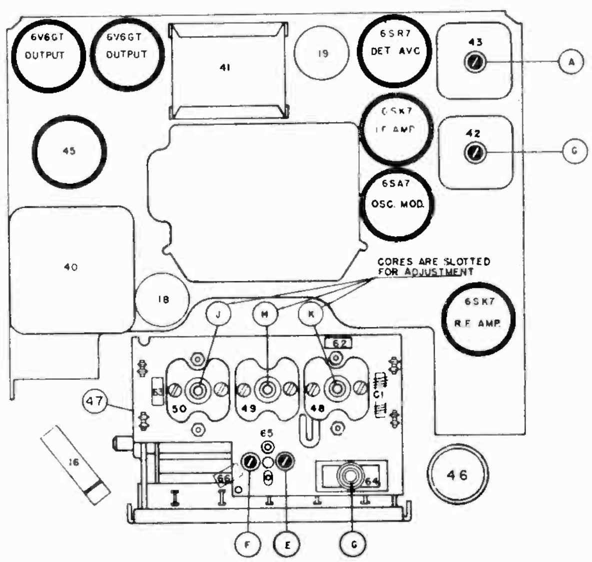
GENERAL:

Mounting—Model 980797 on all 1948 series 40-60-90 Buick cars.
Model 980798 on all 1948 series 50-70

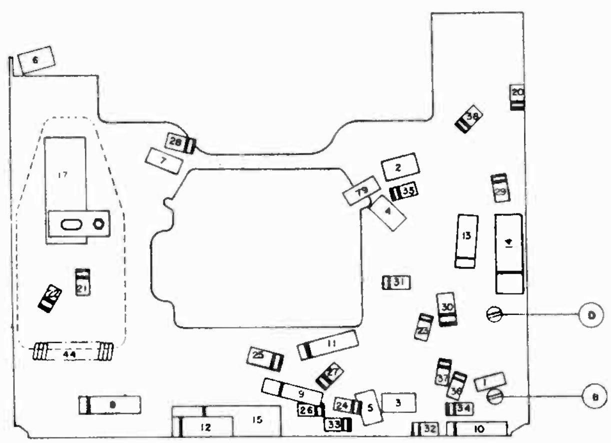
The model 980797 is similar to model 980744 and model 980798 is similar to model 980745. With the exception of parts and illustrations shown in this bulletin, all other information in Bulletin 6D-923 is applicable to models 980797 and 980798.

SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description	
20	1213220	A151	150 Ohms ½ W. Insulated Resistor	
39	7255895	7255895	Speaker—8" Permanent Magnet	
40	7256939	7256939	Power Transformer	
	1217841	1217841	Dial Light Socket (Less Lamp)	
47	7257817	7257817	Tuner Assembly Complete—980797	
47A	7257797	7257797	Tuner Assembly Complete—980798	
		6040	Pointer Cord Pkg. (100' length)	
	7238860	7238860	Spring-Pointer Cord Tension	
69	7257811	7257811	Escutcheon	Parts included in Tuner Assy. 7257817
70	7257765	7257765	Dial	
71	7257766	7257766	Dial Shield	
72	7257803	7257803	Backplate Assembly	
74	7257779	7257779	"B" Pushbutton	
75	7257780	7257780	"U" Pushbutton	
76	7257781	7257781	"I" Pushbutton	
77	7257782	7257782	"C" Pushbutton	
78	7257783	7257783	"K" Pushbutton	
69A	7257818	7257818	Escutcheon	Parts included in Tuner Assy. 7257797
70A	7257755	7257755	Dial	
71A	7257756	7257756	Dial Shield	
72A	7257796	7257796	Backplate Assembly	
74A	7257786	7257786	"B" Pushbutton	
75A	7257787	7257787	"U" Pushbutton	
76A	7257788	7257788	"I" Pushbutton	
77A	7257789	7257789	"C" Pushbutton	
78A	7257790	7257790	"K" Pushbutton	
	1334393	1334393	Tuning Knob	
	1320577	1320577	Dummy Knob	
	1320576	1320576	Tone Control Knob	
	1336763	6015	Generator Condenser	
	120375	120375	Hex Nut	
79	1217735	G330	0.000033 Mfd. Molded Condenser	



PARTS LAYOUT — CHASSIS VIEW



PARTS LAYOUT — TUBE VIEW

MODEL 982400
OLDSMOBILE

UNITED MOTORS SERVICE
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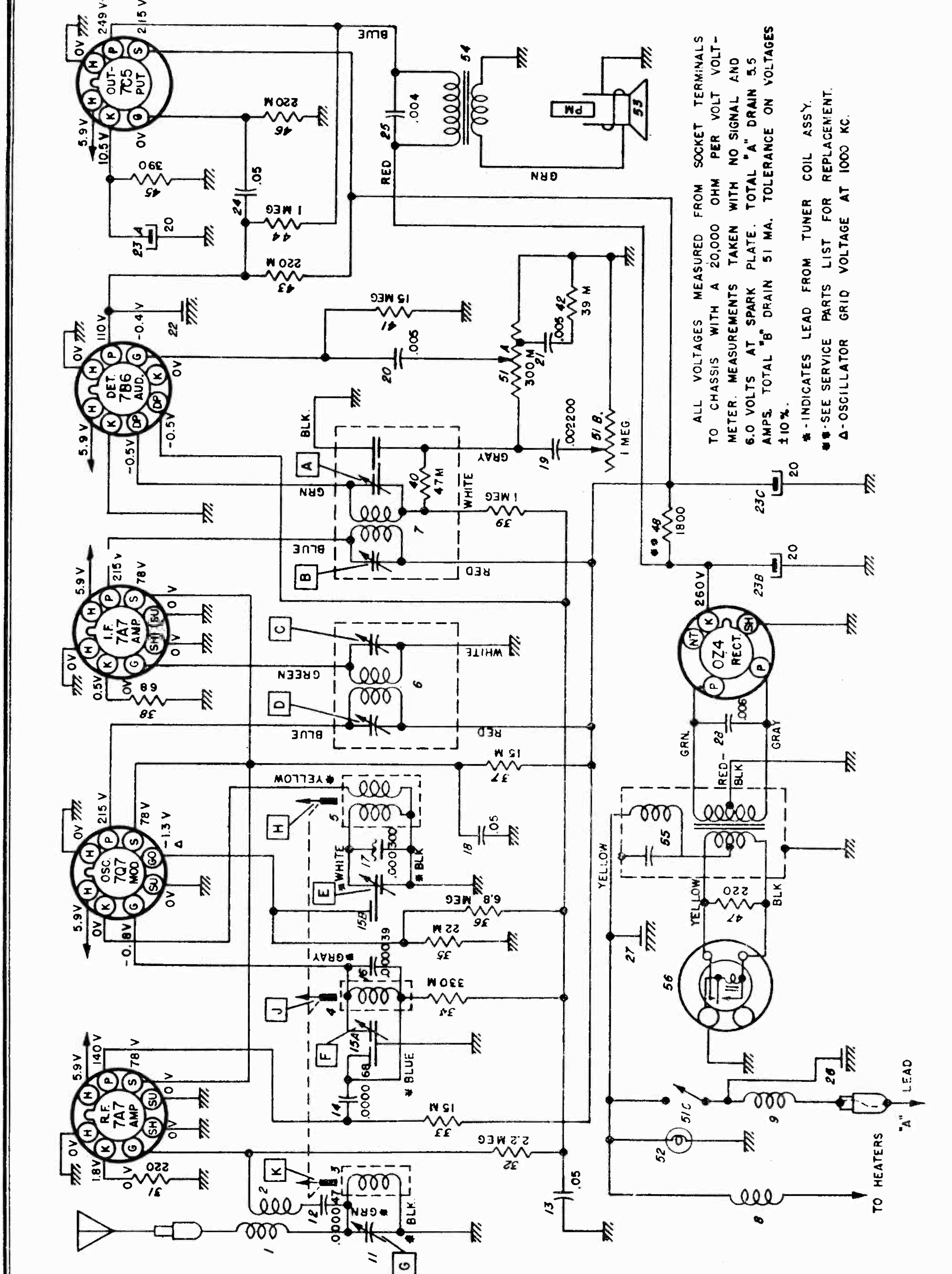


ALL VOLTAGES MEASURED FROM SOCKET TERMINALS TO CHASSIS WITH A 20,000 OHM PER VOLT VOLT-METER. MEASUREMENTS TAKEN WITH NO SIGNAL AND 6.0 VOLTS AT SPARK PLATE. TOTAL "A" DRAIN 5.5 AMPS. TOTAL "B" DRAIN 51 MA. TOLERANCE ON VOLTAGES ±10%.

*-INDICATES LEAD FROM TUNER COIL ASS'Y.

**-SEE SERVICE PARTS LIST FOR REPLACEMENT.

Δ-OSCILLATOR GRID VOLTAGE AT 1000 KC.

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

MODEL 982400
OLDSMOBILE

GENERAL

MOUNTING — All 1949 Oldsmobile Cars.

TUBES—Five, plus rectifier.

SPEAKER—6"x 9" Elliptical, Permanent Magnet.

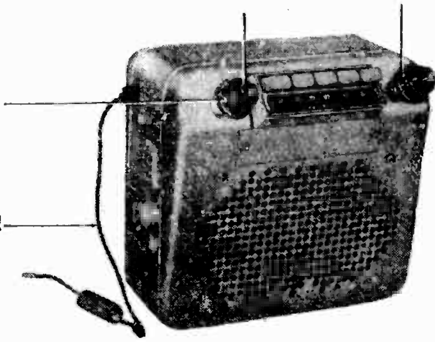
TUNING—Manual and 5 P. B. Mechanical.

ANTENNA TRIMMER COMPENSATION—For Antennas Between 0.000050 - 0.000070 Mfd.

TUNING RANGE—550-1600 KC.

PUSH BUTTON SETUP PROCEDURE

Pull Push Button to the left and out. Tune in desired station manually. Push button all the way in.



MODEL 982400

ALIGNMENT PROCEDURE

Output Meter Connections .... Across Voice Coil
Generator Return .... To Receiver Chassis
Dummy Antenna .... In Series With Generator
Volume Control Position .... Maximum Volume
Tone Control Position .... Treble
Generator Output .... Minimum for Readable Indication

Steps	Series Condenser or Dummy Antenna	Connect Signal Generator to	Signal Generator Frequency	Tune Receiver to	Adjust in Sequence For Max. Output
1	0.1 Mfd.	7Q7 Grid (Pin #6)	260 KC	High Frequency Stop	A, B, C, D
2	0.000068 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	*E, F, G
3	0.000068 Mfd.	Antenna Connector	1400 KC	Signal Generator Signal	J, K
4	0.000068 Mfd.	Antenna Connector	1615 KC	High Frequency Stop	F, G
5	0.000068 Mfd.	Antenna Connector	1000 KC	Signal Generator Signal	L**

*Before making this adjustment check mechanical setting of oscillator core "H." The rear of the core should be 1 25/32" from the mounting end of the coil form. (This measurement is readily made by inserting a suitable plug in the mounting end of the coil form.) Core adjustments should be made with an insulated screw driver, and core studs should be cemented in place with glyptal or household cement after alignment.

**L is the pointer adjustment screw which is on the connecting link, Illus. #88, between the pointer assembly and the parallel guide bar. It should be adjusted so that the dial pointer corresponds with the 1000 KC mark on the dial. (On the 1st "0")

With the radio installed and the car antenna plugged in adjust the antenna trimmer "G" for maximum volume with the radio tuned to a weak station near 1400 KC (see sticker on case).

MODEL 982400
OLDSMOBILE

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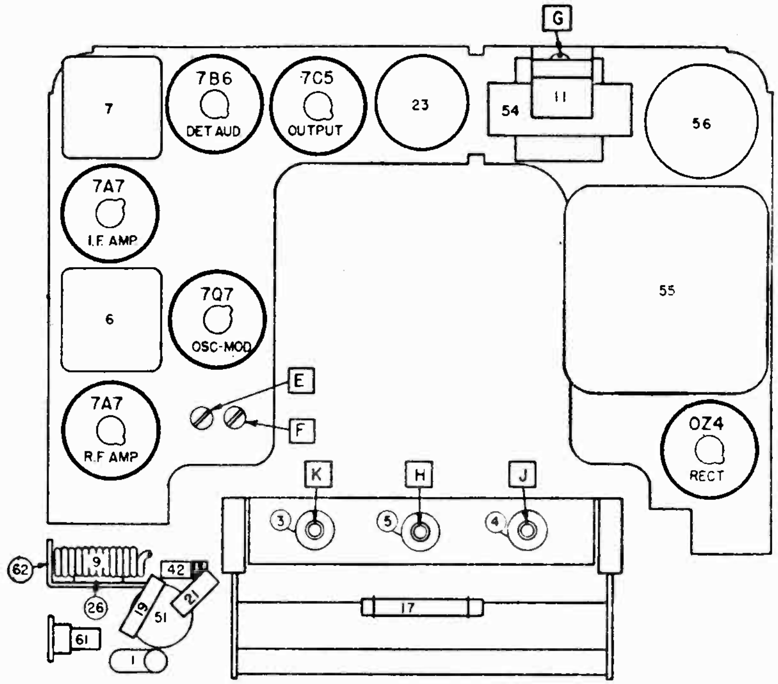
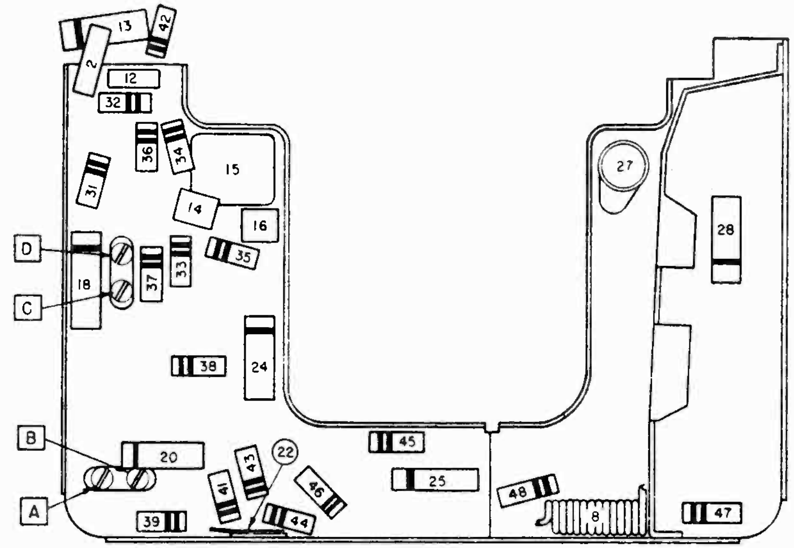
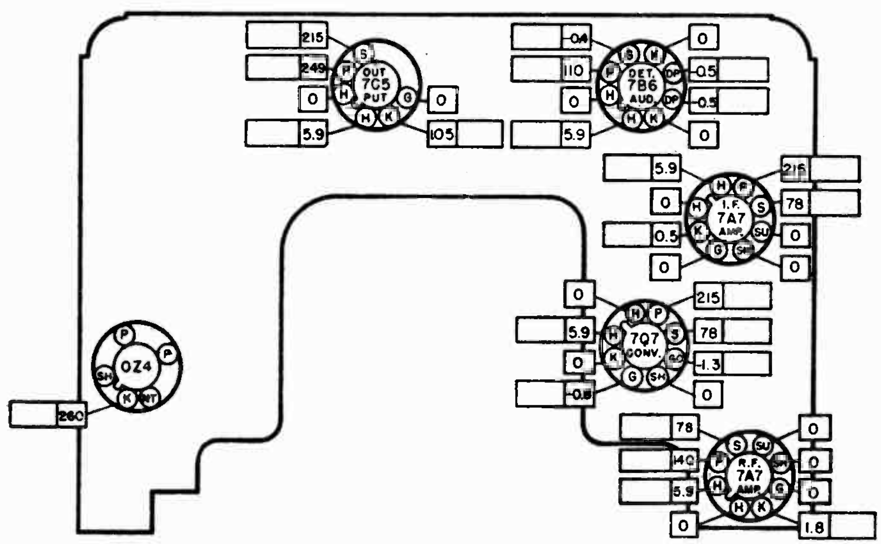


PARTS LAYOUT — TUBE VIEW



PARTS LAYOUT — CHASSIS VIEW

TUBE SOCKET VOLTAGE CHART



The tube socket voltages, as measured at the factory and under the conditions shown on the schematic diagram on Page 3 are shown.

The blank spaces are provided so the service man may fill in the actual voltage readings as taken with his own equipment. A normal operating radio should be used for these measurements.

VOLT METER RESISTANCE .... OHMS PER VOLT. READINGS TAKEN WITH .... VOLTS AT SPARK PLATE. VOLTAGES MEASURED FROM SOCKET TERMINALS TO CHASSIS AND ARE POSITIVE UNLESS MARKED OTHERWISE.

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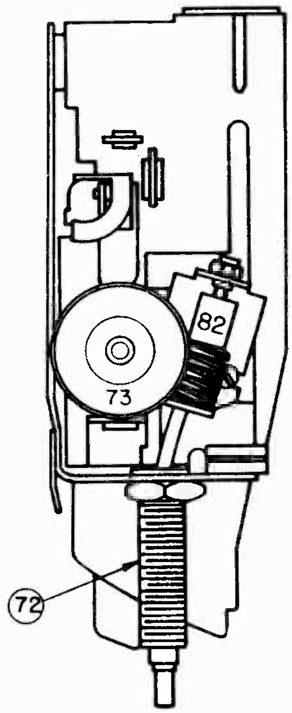
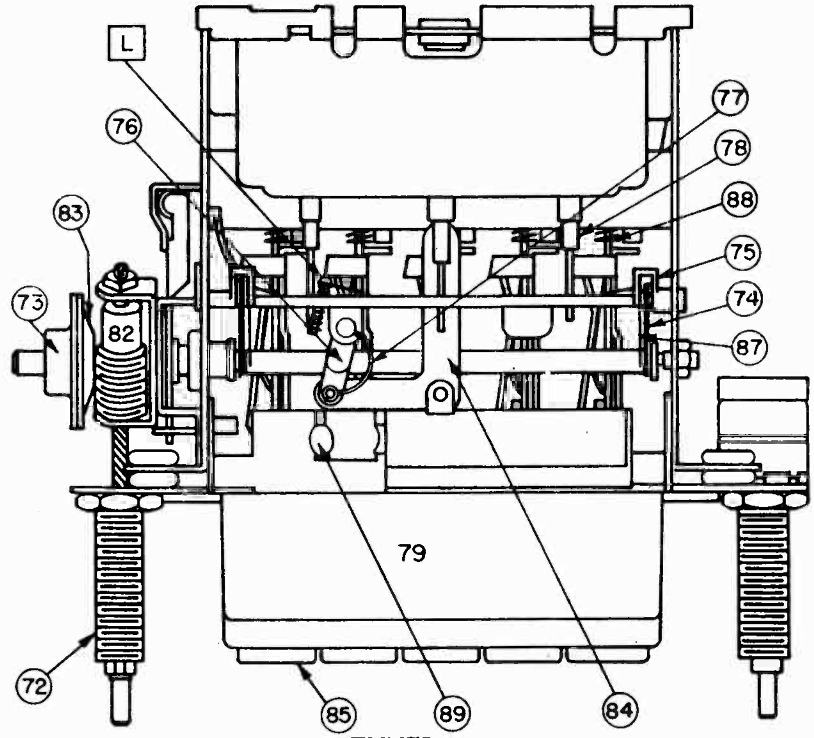
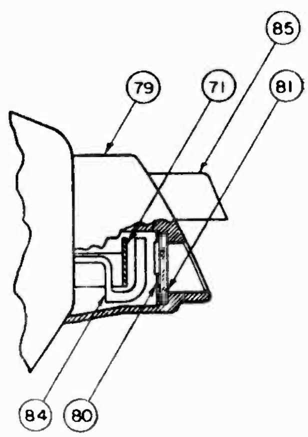


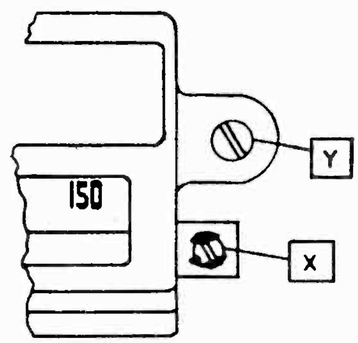
ESCUTCHEON MOUNTING



TUNER



ESCUTCHEON CROSS SECTION



ESCUTCHEON MOUNTING

SPECIAL INSTRUCTIONS

Unless special precautions are taken in removing the dial escutcheon, there is a possibility that the dial pointer tip will be broken. Therefore in removal of the escutcheon the following procedure is recommended.

1. Loosen but do not remove the two screws holding the pointer back plate ("X" in Escutcheon Mounting Drawing Above) and loosen the shellac so that the back plate is free to move.
2. Remove the escutcheon mounting screws "Y" (see Escutcheon Mounting).
3. Carefully lift off the escutcheon (DO NOT FORCE). If the dial backplate is free to move slightly downward the escutcheon will come off easily.

The same caution should be exercised when replacing the escutcheon.

MODEL 982400
OLDSMOBILE

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP:

SERVICE PARTS LIST

Illus. No	Production Part No.	Service Part No.	Description
			ELECTRICAL PARTS
			Coils
1	7255738	7255738	Antenna series choke
2	7240251	7240251	Antenna spark choke
3	7257979	7257979	Antenna
4	7257979	7257979	R. F.
5	7257977	7257977	Oscillator
6	7257832	7257832	1st I. F. Assy.
7	7258139	7258139	2nd I. F. Assy.
8	1217846	1217846	Hash choke
9	7258434	7258434	"A" spark choke, fuse connector female, and "A" spark condenser
			Condensers
11	7258161	7258161	Antenna trimmer
12	1218505	G 470	0.000047 mfd. ceramic
13	7236842	E 503	0.05 mfd. 200 V tubular
14	7236109	G 680	0.000068 mfd. molded
15	7242454	7242454	Dual trimmer
15A			R. F. section
15B			Oscillator section
16	7258221	G 390	0.000039 mfd. ceramic
17	7258162	7258162	0.000300 mfd. compensating
18	7230892	E 503	0.05 mfd. 400 V tubular
19	1217436	G 222	0.002200 mfd. molded
20	7232956	E 502	0.005 mfd. 400 V tubular
21	7232956	E 502	0.005 mfd. 400 V tubular
22	1217848	1217848	Chassis plate condenser
23	7241198	7241198	Electrolytic
23A			20 mfd. 25 V
23B			20 mfd. 400 V
23C			20 mfd. 400 V
24	7230892	E 503	0.05 mfd. 400 V tubular
25	7233243	H 402	0.004 mfd. 800 V tubular
26	1212278	1212278	"A" spark condenser
27	1217848	1217848	Chassis plate condenser.
28	7240906	H 602	0.006 mfd. 1600 V buffer
			Resistors
31	7237835	A 221	220 ohms ½ W insulated
32	1214563	A 225	2.2 megohms ½ W insulated
33	7237595	B 153	15,000 ohms 1 W insulated
34	1214557	A 334	330,000 ohms ½ W insulated
35	1214550	A 223	22,000 ohms ½ W insulated
36	1215563	A 685	6.8 megohms ½ W insulated
37	7233653	C 153	15,000 ohms 2 W insulated
38	1214563	A 680	68 ohms ½ W insulated
39	1213282	A 105	1 megohm ½ W insulated
40	1214553	A 473	47,000 ohms ½ W insulated
41	1213289	A 156	15 megohms ½ W insulated
42	1213480	A 393	39,000 ohms ½ W insulated
43	1214555	A 224	220,000 ohms ½ W insulated
44	1213282	A 105	1 megohm ½ W insulated
45	1216149	B 391	390 ohms 1 W insulated
46	1214555	A 224	220,000 ohms ½ W insulated
47	7237994	B 221	220 ohms 1 W insulated
48	1214573	C 272 B 562	1800 ohms Replace with 2700 ohm 2 W and 5600 ohm 1 W in parallel
			Tubes
	1211924	5003	OZ4—Rectifier
	1213565	5292	7B6
	1213568	5295	7C5
	1213562	5290	7A7
	1213981	5301	7Q7

UNITED MOTORS SERVICE
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MODEL 982400
OLDSMOBILE

SERVICE PARTS LIST (Cont.)

Illus. No	Production Part No.	Service Part No.	Description
			Miscellaneous Electrical
51	7256697	7256697	Control—Volume, tone, and switch
51A			Volume control
51B			Tone control
51C			Switch
52	.187189	44	Lamp, Mazda #44
53	7257645	7257645	Speaker, 6 x 9 elliptical, PM
54	7256664	7256664	Transformer, output
55	7255881	7255881	Transformer, power
56	7239124	8542	Vibrator, non-synchronous
			MECHANICAL PARTS
			Chassis
61	7256742	7256742	Connector—Antenna
62	7258434	7258434	Connector—Fuse female, "A" spark choke, and spark condenser
	7241356	7241356	Socket—Loctal tube
	7236279	7236279	Socket—Octal tube
	7239125	7239125	Socket—Vibrator
			Tuner
71	7256688	7256688	Backplate, Pointer
72	7258492	7258492	Bushing and manual drive shaft
73	7258072	7258072	Clutch disc—Driven
74	7258203	7258203	Connecting link—Core bar
75	7258211	7258211	Core guide bar—Parallel
76	7256271	7256271	Pointer connecting link
77	7255992	7255992	Spring—Pointer connecting link
78	7258468	7258468	Core—Powdered iron
79	7256722	7256722	Escutcheon assy.
80	7258423	7258423	Dial backplate
81	7258152	7258152	Dial
82	7256705	7256705	Gear and Bracket—Worm
83	7256495	7256495	Gear and Bushing—Clutch
84	7256707	7256707	Pointer assy.
	1219174	1219174	Pointer tip package
85	1219175	1219175	Pushbutton and slide assy.
	7256488	7256488	Spring—Clutch
87	7257415	7257415	Spring—Core bar connecting link
88	7255984	7255984	Spring—Slide return
89	1217820	1217820	Socket—Dial light
			INSTALLATION PARTS
	554691	554691	"A" Lead, condenser, and fuse connector male
	7258476	6016	Condenser, "A" Lead
	1911095	6015	Condenser, generator
	1912757	6015	Condenser, ignition coil
	120151	120151	Fuse, 15 amperes
	555348	555348	Hood ground clip
	7256702	7256702	Knob—Control
	554515	554515	Knob—Tone and dummy
	7240138	6013	Static collector
	7257239	7257239	Suppressor—Distributor
	414237	414237	Suppressor insulator
	554339	554339	Trim plate—Instrument panel
	1912900	1912900	Condenser—Regulator

MODEL 984247
PONTIAC

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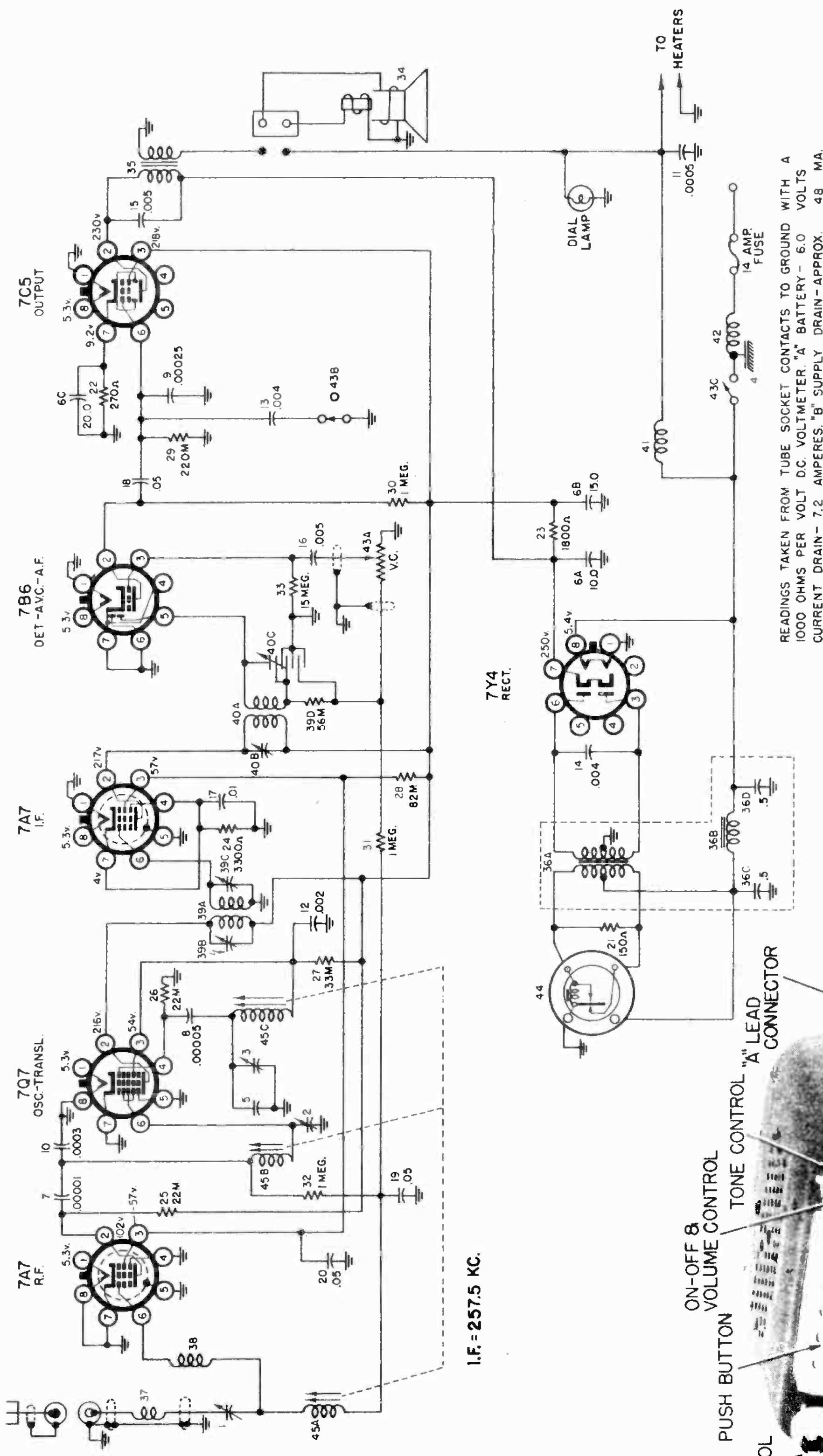
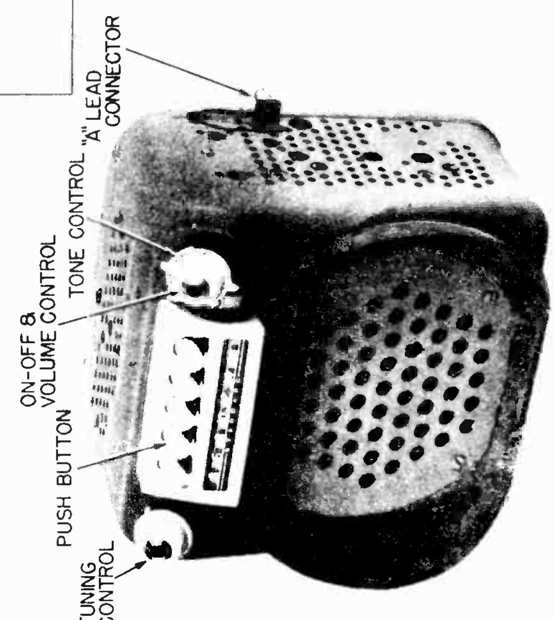


SPEAKER —— 6" Electro-Dynamic

TUNING —— Manual and 5 P. B.

TUNING RANGE —— 535 KC —— 1610 KC

CAR ANTENNA CAPACITY —— 70 mmfd.



UNITED MOTORS SERVICE
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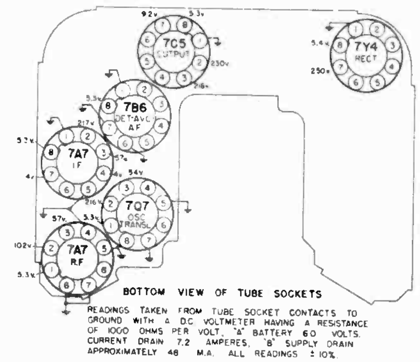
ALIGNMENT PROCEDURE

Volume Control maximum.
Tone Control on high position.
Signal Generator Output minimum for satisfactory output indication.

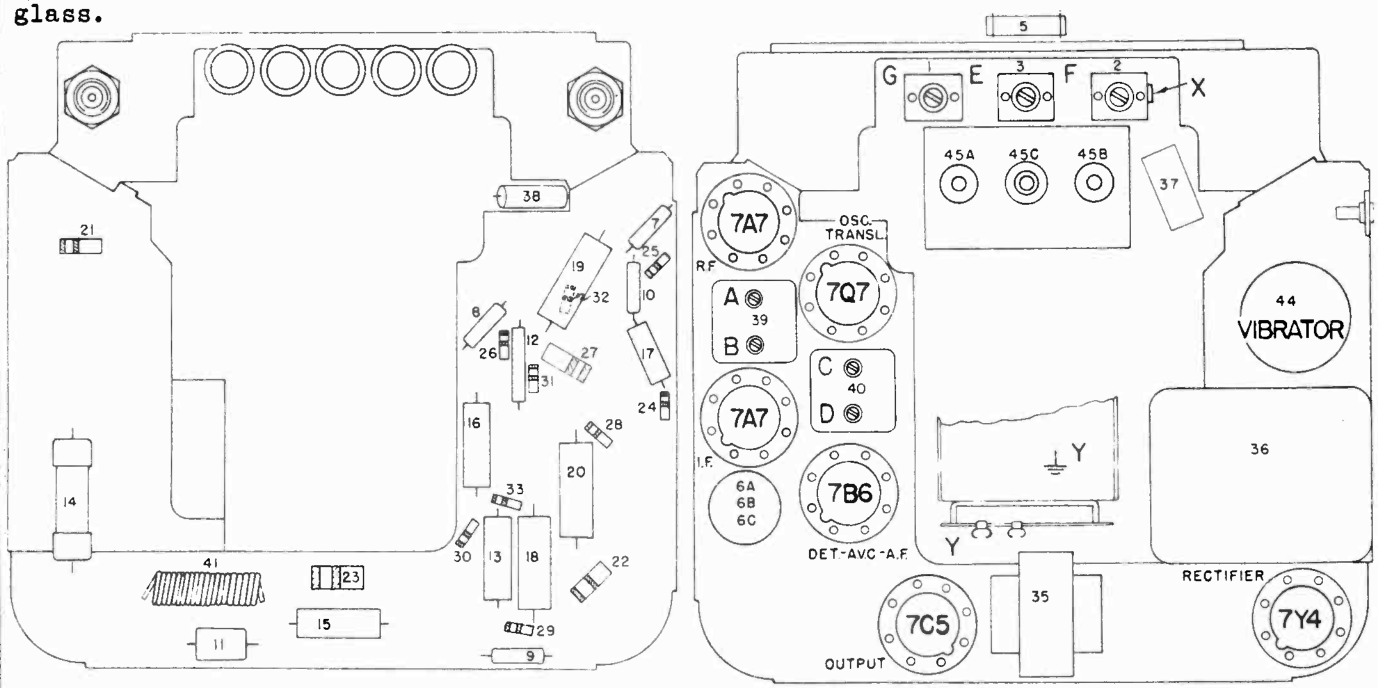
Series Capacitor Or Dummy Antenna	Connect To	Signal Generator Frequency	Adjust Screws In Order
0.1 mfd.	Terminal X (See Parts Layout)	257.5 KC	A, B, C, D
.000070 mfd.	Antenna Terminal	1610 KC †	E, F, G

Low frequency alignment not required.
Adjust Trimmer F to match car antenna (1400 KC †) when radio is installed.

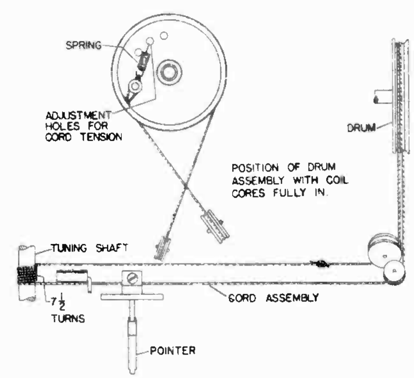
† Calibration marks for given frequencies are found on upper side of dial glass.



SOCKET VOLTAGES



PARTS LAYOUT



DIAL CORD HOOKUP

UNITED MOTORS SERVICE
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PUSH BUTTON SET-UP

Turn counter clockwise - tune in manually - depress loosened button - turn button clockwise to tighten.

CAPACITORS

Illus. No.	Service * Part No.	Production Part No.	Description
1		1216671	Antenna Trimmer
2		1216672	R. F. Coil Trimmer
3		1215925	Oscillator Trimmer
4		1218017	Spark Plate
5		1218049	270 Mfd. Compensating Capacitor
6		1213868	Electrolytic
6A			10 Mfd. 350 Volt
6B			15 Mfd. 300 Volt
6C			20 Mfd. 25 Volt
7	G100	7234242	.00001 Mfd. Moulded
8	G470	1207625	.00005 Mfd. Moulded
9	G221	1209055	.00025 Mfd. Moulded
10	G271	1215553	.0003 Mfd. Moulded
11	G471	7238879	.0005 Mfd. Moulded
12		1218112	.002 Mfd. Silver Mica
13	H402	1212098	.004 Mfd. 600 Volt
14	H402	1217875	.004 Mfd. 1500 Volt
15	E502	7230912	.005 Mfd. 600 Volt
16	E502	7230912	.005 Mfd. 600 Volt
17	E103	1208600	.01 Mfd. 600 Volt
18	E503	7230592	.05 Mfd. 600 Volt
19	E503	7230592	.05 Mfd. 600 Volt
20	E503	7230592	.05 Mfd. 600 Volt

RESISTORS

Illus. No.	Service * Part No.	Production Part No.	Description
21	B151	1211005	150 Ohm - 1 Watt
22	B271	1213846	270 Ohm - 1 Watt
23	C182	1214573	1800 Ohm - 2 Watt
24	A332	1213481	3300 Ohm - 1/2 Watt
25	A223	1214550	22,000 Ohm - 1/2 Watt
26	A223	1214550	22,000 Ohm - 1/2 Watt
27	A333	7242447	33,000 Ohm - 1 Watt
28	A823	1214554	82,000 Ohm - 1/2 Watt
29	A224	1214555	220,000 Ohm - 1/2 Watt
30	A105	1213282	1 Megohm - 1/2 Watt
31	A105	1213282	1 Megohm - 1/2 Watt
32	A105	1213282	1 Megohm - 1/2 Watt
33	A156	1213289	15 Megohm - 1/2 Watt

MISCELLANEOUS ELECTRICAL PARTS

Illus. No.	Service * Part No.	Production Part No.	Description
34		1214389	Speaker - 6" Electro-Dynamic
34		1217417	Speaker - 6" P.M. (Alternate)
35		1218021	Transformer - Audio Output
36		1218022	Power Transformer & Filter Assembly
36A			Transformer - Power
36B			Hash Choke Coil Assembly
36C			Capacitor - .5 Mfd. 100 Volt
36D			Capacitor - .5 Mfd. 100 Volt
37		1218405	Antenna Spark Choke
38		1214382	Antenna Spark Choke
39		1218034	1st I. F. Transformer Assembly
39A			I. F. Coil Assembly
39B			Primary Trimmer
39C			Secondary Trimmer
40		1218032	2nd I. F. Transformer Assembly
40A			I. F. Coil Assembly
40B			Primary Trimmer
40C			Secondary Trimmer
40D			Resistor - 56,000 Ohm 1/2 Watt
41		1218026	Filament Choke
42		1218048	Spark Choke
43		1218020	Control - Volume - Tone - On-Off Switch
43A			Volume Control
43B			Tone Switch
43C			Off-On Switch
44	8542	1218006	Vibrator

TUNER UNIT AND PARTS

Illus. No.	Service * Part No.	Production Part No.	Description
45		1218024	Unit - Perm. Tuning Coils
45A			Antenna Coil
45B			R. F. Coil
45C			Oscillator Coil
		1215926	Bushing - Station Selector Shaft
		1218041	Connector Assembly - Antenna
		1218014	Connector Assembly - "A" Lead
		1218023	Cover Assembly - Case Back
		1217919	Dial Pointer & Slide Assembly
		1218003	Dial & Escutcheon Assembly
		1216041	Socket - Vibrator
		7242463	Nut - 1/2"-28 Hex. Mtg. Spacer
		1863407	Pin Connector - Speaker
		1218019	Shaft Assembly - Rear Drive
		1213685	Screw - Cover Retaining
		1215932	Shaft Assembly - Front
		1218031	Clip - Pilot Lamp
		1218013	Socket - 8 Prong Lock-In
		1214399	Speaker Gasket - Rubber
		1216036	Spring - Core Driving
		1214386	Spring & String Assembly - Pointer
		1218016	Spring - Actuating Arm
		1216538	Tuner Unit Assembly - Push Buttons Included
		1218012	Spring - Rocker Bar Tension
		1216587	Push Button Assembly
		1218018	Drum Assembly - Drive
		187189	Lamp - Pilot (Mazda #44)

TUBES

Illus. No.	Service * Part No.	Production Part No.	Description
	5290	1213583	7A7 - R. F. Amplifier
	5301	1213853	7Q7 - Oscillator - Translator
	5290	1213583	7A7 - I. F. Amplifier
	5292	1213762	7B6 - Detector AVC - 1st Audio
	5295	1213586	7C5 - Audio Output
	5302	1213570	7Y4 - Rectifier

INSTALLATION AND MOUNTING PARTS

Illus. No.	Service * Part No.	Production Part No.	Description
		507505	Knob - Tuning & Volume Control
		507510	Knob - Dummy
		507511	Knob - Tone Control
	6015	1911095	Capacitor - Generator
	6016	1885292	Capacitor - Ammeter
		1869573	Clamp - Condenser Ammeter
		511057	"A" Lead Assembly
		7235968	Nut 1/2"-28 Hex. Radio Mtg. (Front)
		505630	Washer - Tone Control - Felt
		7238755	Washer - Dummy Knob - Spring
		505629	Bolt - 1/4"-20 x 5/8 Hex. Hd.
		1299232	Washer - 1/4" Flat
		121753	Washer - 1/4" Ext. Tooth Shakeproof
		443882	Screw - #8-15 x 3/8" (Self Tapping)
		147685	Tube - Fuse Insulating
	6000	1207821	Suppressor - Distributor
	6008	1853686	Adaptor - Distributor Suppressor
		509129	Insulator - Distributor Suppressor
		508583	Plate - Control Finish

* Order parts, using service part number where shown, otherwise use production part number for service.

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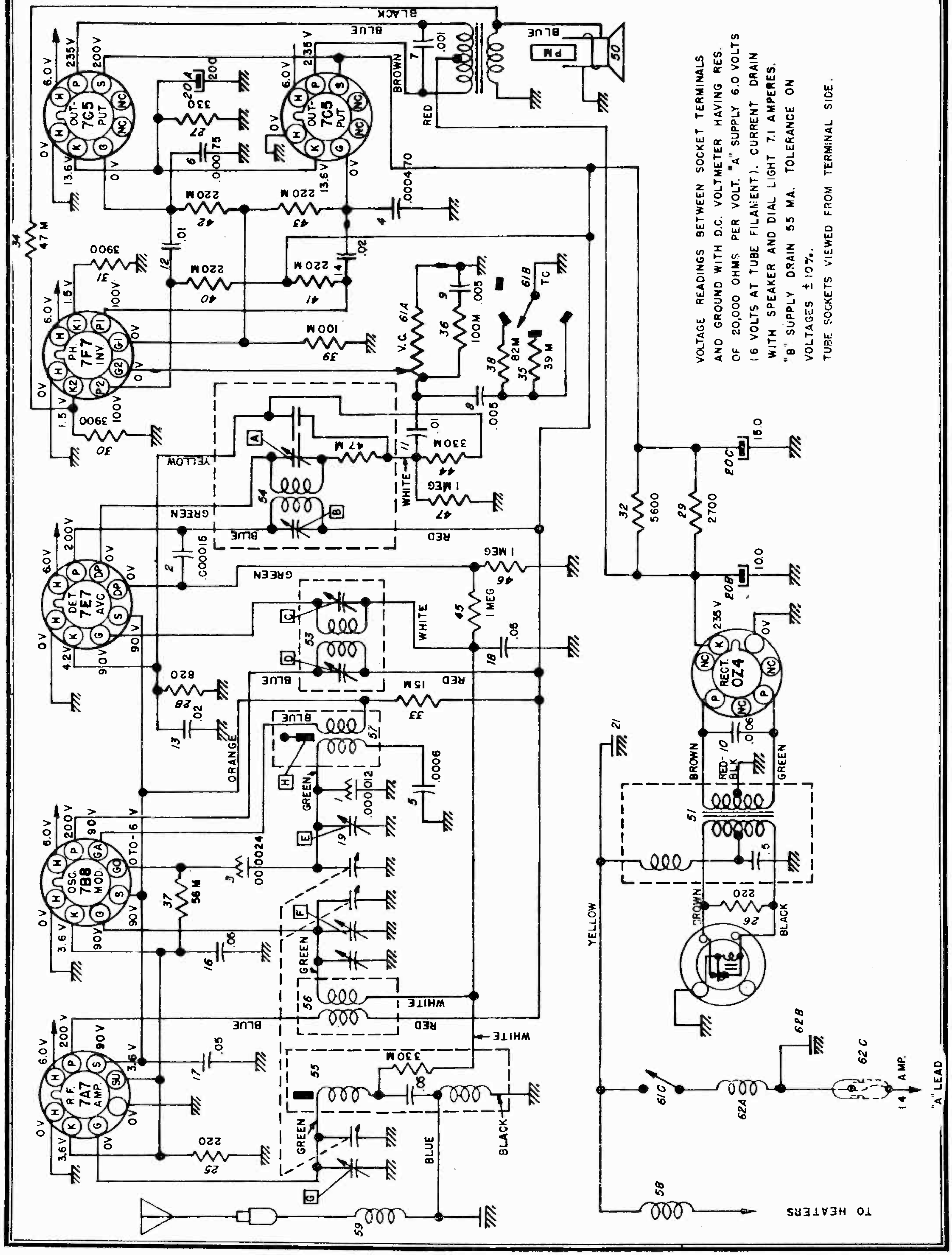
MODEL 984248,
PONTIAC



VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RES. OF 20,000 OHMS PER VOLT. "A" SUPPLY 6.0 VOLTS (6 VOLTS AT TUBE FILAMENT). CURRENT DRAIN WITH SPEAKER AND DIAL LIGHT 7.1 AMPERES. "B" SUPPLY DRAIN 55 MA. TOLERANCE ON VOLTAGES ± 10%.

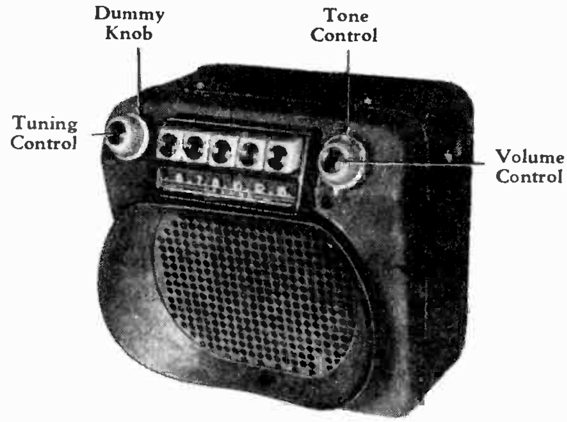
TUBE SOCKETS VIEWED FROM TERMINAL SIDE.

MODEL 984248,
PONTIAC

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

GENERAL

MOUNTING .... All 1948 Pontiac Cars
TUBES .... Six, Plus Rectifier
SPEAKER .... 8" Round Permanent Magnet
TUNING .... Manual and 5 P. B. Mechanical
ANTENNA TRIMMER COMPENSATION
For Antennas Between 0.000055 - 0.000075 Mfd.
TUNING RANGE .... 550-1600 KC.



MODEL 984248

PUSHBUTTON SET-UP PROCEDURE

Move spring on bottom of button to the left and pull button off. Turn reset screw one turn counterclockwise and push all the way in. Hold the reset screw in and tune in the desired station manually. Carefully release and tighten the reset screw. Replace button. Repeat procedure to set up other buttons.

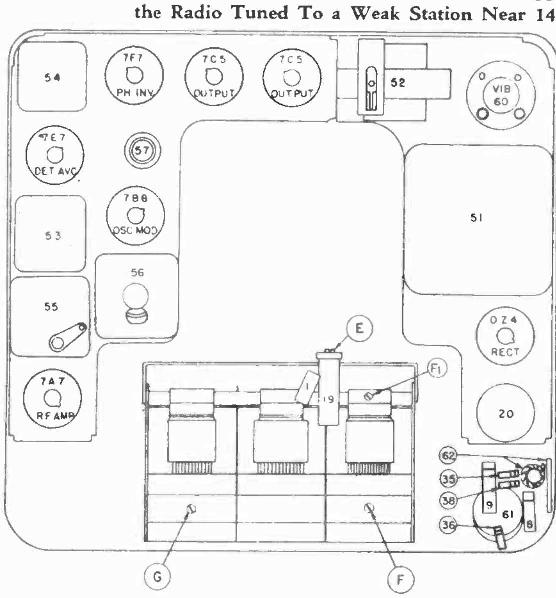
ALIGNMENT PROCEDURE

Output Meter Connections .... Across Voice Coil
Generator Return .... Receiver Chassis
Dummy Antenna .... In Series With Generator
Volume Control Position .... Maximum Volume
Tone Control Position .... Treble
Generator Output .... Minimum for Readable Indication

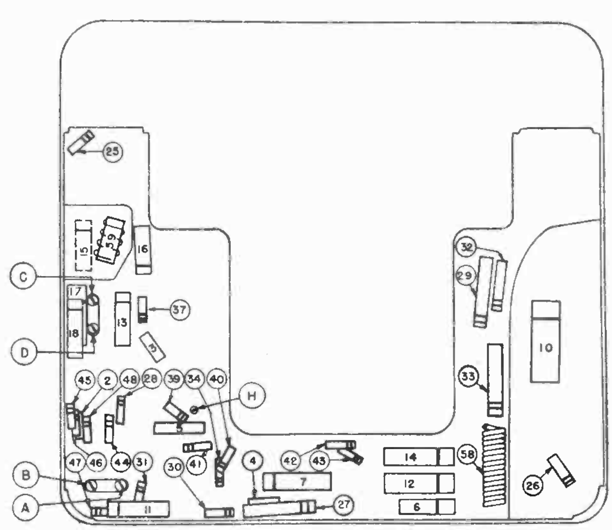
Steps	Series Condenser or Dummy Antenna	Connect To	Signal Generator Frequency	Tune Receiver To	Adjust In Sequence For Max. Output
1	0.1 Mfd.	Grid Side R. F. Trimmer "F_1" (See Parts Layout)	260 KC.	High Frequency Stop	A, B, C, D
2	0.000068 Mfd.	Antenna Connector	1615 KC.	High Frequency Stop	E
3	0.000068 Mfd.	Antenna Connector	1430 KC.	Signal Generator Signal	F, G
4	0.000068 Mfd.	Antenna Connector	600 KC.	Signal Generator Signal	*H
5	0.000068 Mfd.	Antenna Connector	1615 KC.	High Frequency Stop	E
6	0.000068 Mfd.	Antenna Connector	1430 KC.	Signal Generator Signal	F, G

*Rock Gang Condenser Back and Forth Through Signal During This Adjustment.

With the Radio Installed and the Car Antenna Plugged In Adjust the Antenna Trimmer "G" for Maximum Volume With the Radio Tuned To a Weak Station Near 1400 KC. (See Sticker On Case).



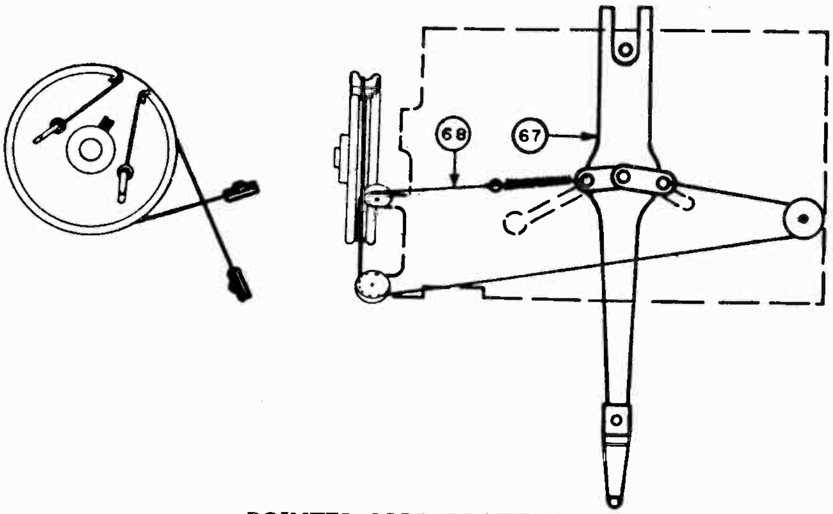
PARTS LAYOUT — TUBE VIEW



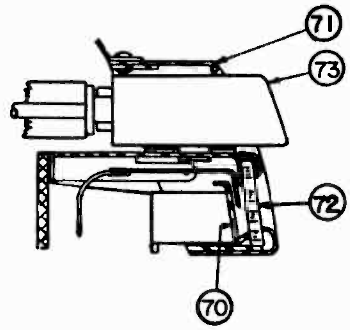
PARTS LAYOUT — CHASSIS VIEW

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

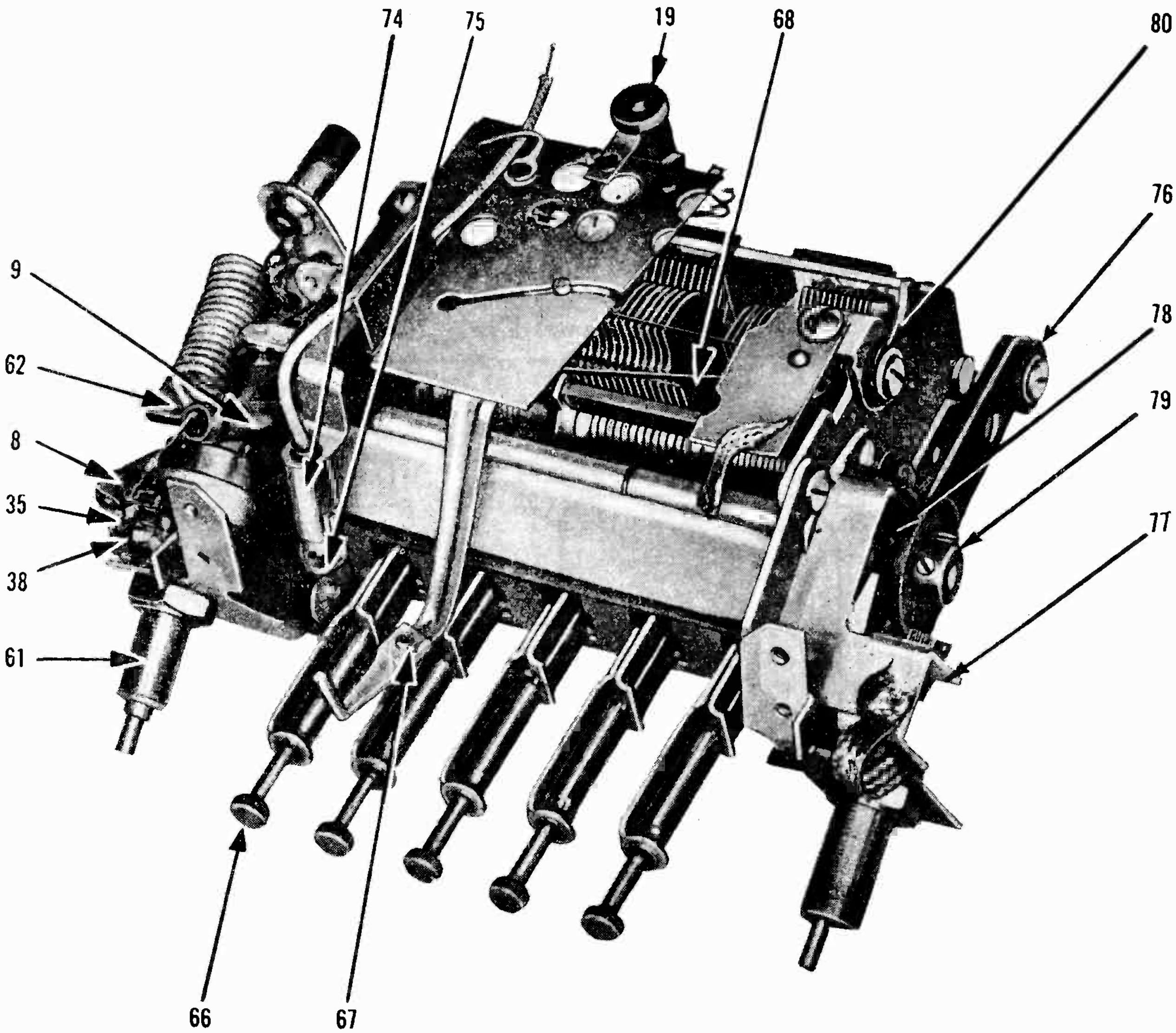
MODEL 984248,
PONTIAC



POINTER CORD DRAWING



ESCUTCHEON CROSS SECTION



TUNER

MODEL 984248,
PONTIAC

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

TUNER UNIT AND ESCUTCHEON PARTS

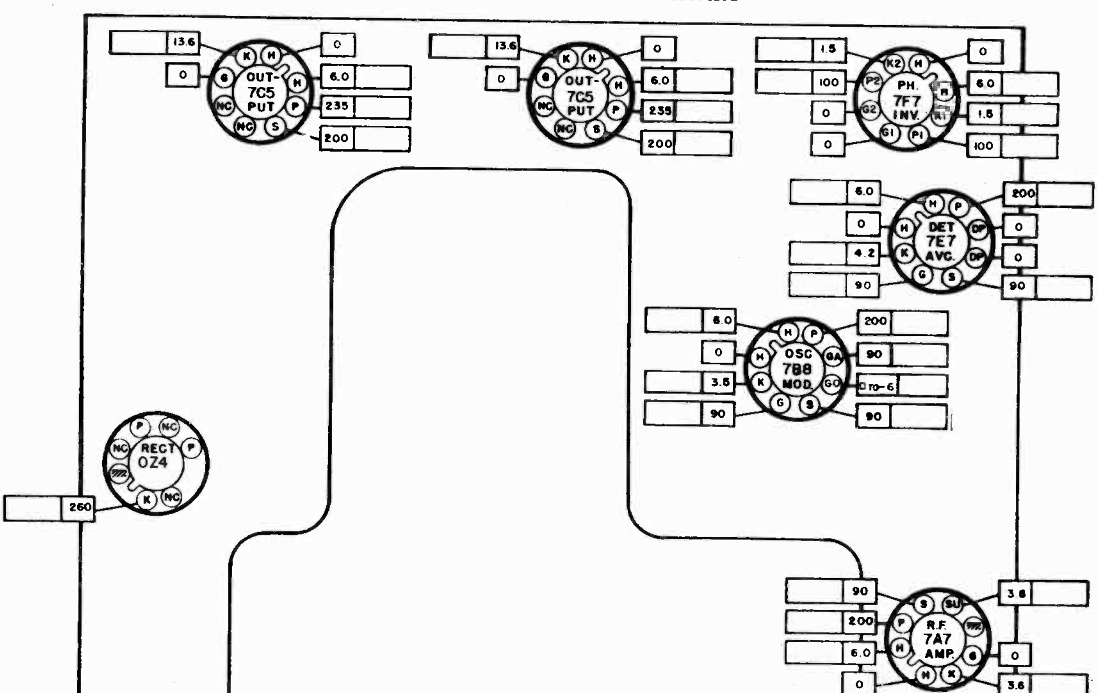
Illus. No.	Production Part No.	Service Part No.	Description
	7257485	7257485	Tuner Unit Complete (Includes Illus. Nos. 1, 3, 9, 19, 35, 36, 38, 61)
	7242020	7242020	Variable Condenser Assy.
66	7240368	7240368	Reset Screw
	7242354	7242354	Rubber Bumper
	1217323	1217323	Spring — Slide Return
67	7244084	7244084	Pointer Assy.
	7238860	7238860	Spring — Cord Tension
68	1212233	1212233	Cord — 48 Inches
70	7257473	7257473	Dial Backplate
71	7257648	7257648	Escutcheon Assy. (Die Cast)
72	7257472	7257472	Dial
71A	7257484	7257484	Escutcheon Assy. (Sheet Metal)
72A	7257752	7257752	Dial
73	7242136	7242136	Pushbutton
74	1217842	1217842	Socket — Dial light
75	115273	51	Lamp — Dial (Mazda #51)
76	7237172	7237172	Grommet — Tuner Mtg.
77	7242076	7242076	Manual Drive Assy.
78	7241207	7241207	Brake and Spring Assy.
79	7241590	7241590	Crown Gear
80	7241627	7241627	Grommet — Pointer Plate Mtg.
81	7240795	7240795	Pulley — Pointer Drive

INSTALLATION PARTS

Production Part No.	Service Part No.	Description
1911095	6015	Condenser — Generator
1885292	6015	Condenser — "A" Lead
507505	507505	Knob — Control
507511	507511	Knob — Tone Control
507510	507510	Knob — Dummy
508583	508583	Trim Plate
147685	147685	Fuse — 14 Amperes
5273906	5273906	"A" Lead and Fuse Connector
*1207821	6000	Distributor Suppressor
*1853686	6008	Suppressor Adaptor
*509129	509129	Suppressor Insulator

*Cars having a distributor with the center tower of the distributor cap 1⅛" high instead of ⅞" high have a built-in distributor suppressor and should not have an external suppressor installed. These distributors are marked "Radio" on the lower flange.

TUBE SOCKET VOLTAGE CHART



Voltmeter Resistance Is .... Ohms Per Volt

Readings Taken With .... Volts At Spark Plate

The voltages are measured from tube socket terminals to chassis.

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

MODEL 984248, PONTIAC

SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
		CONDENSERS	
3	7236178	7242450	.000012 Mfd. Compensating
1	7242450	G150	.000015 Mfd. Molded
2	7238891	7236178	.000024 Mfd. Compensating
4	7238879	G471	.000470 Mfd. Molded
5	7236156	7236156	.000600 Mfd. Silver Mica
6	7240738	7240738	.00075 Mfd. 400 V Tubular
7	7240905	H102	.001 Mfd. 1600 V Tubular
8	7232956	E502	.005 Mfd. 600 V Tubular
9	7232956	E502	.005 Mfd. 600 V Tubular
10	7240906	H602	.006 Mfd. 1600 V Tubular
11	1209309	E103	.01 Mfd. 400 V Tubular
12	1209309	E103	.01 Mfd. 400 V Tubular
13	7236845	E203	.02 Mfd. 200 V Tubular
14	7231542	E203	.02 Mfd. 400 V Tubular
16	7236842	E503	.05 Mfd. 200 V Tubular
17	7236841	E503	.05 Mfd. 400 V Tubular
18	7236842	E503	.05 Mfd. 200 V Tubular
19	7242317	7242317	Air Trimmer
20	7238830	M908	3 Section Electrolytic
20A			20 Mfd. 25 V
20B			10 Mfd. 400 V
20C			15 Mfd. 400 V
21	1217848	1217848	Chassis Plate Condenser
		RESISTORS	
25	7237835	A221	220 Ohms ½ W Insulated
26	7237994	B221	220 Ohms 1 W Insulated
27	7233773	B331	330 Ohms 1 W Insulated
28	1214544	A821	820 Ohms ½ W Insulated
29	7242844	C272	2700 Ohms 2 W Insulated
30	1214546	A392	3900 Ohms ½ W Insulated
31	1214546	A392	3900 Ohms ½ W Insulated
32	7240918	B562	5600 Ohms 1 W Insulated
33	7233653	C153	15,000 Ohms 2 W Insulated
34	1214553	A473	47,000 Ohms ½ W Insulated
35	1213480	A393	39,000 Ohms ½ W Insulated
36	1213270	A104	100,000 Ohms ½ W Insulated
37	1213267	A563	56,000 Ohms ½ W Insulated
38	1214554	A823	82,000 Ohms ½ W Insulated
39	1213270	A104	100,000 Ohms ½ W Insulated
40	1214555	A224	220,000 Ohms ½ W Insulated
41	1214555	A224	220,000 Ohms ½ W Insulated
42	1214555	A224	220,000 Ohms ½ W Insulated
43	1214555	A224	220,000 Ohms ½ W Insulated
44	1214557	A334	330,000 Ohms ½ W Insulated
45	1213282	A105	1 Megohm ½ W Insulated
46	1213282	A105	1 Megohm ½ W Insulated
47	1213282	A105	1 Megohm ½ W Insulated
		MISCELLANEOUS ELECTRICAL PARTS	
50	7241120	7241120	Speaker — 8" Round Permanent Magnet
51	7255881	7255881	Transformer — Power
52	7240453	7240453	Transformer — Output
53	7242079	7242079	Coil — 1st I. F.
54	7242533	7242533	Coil — 2nd I. F.
55	7242504	7242504	Coil — Antenna
56	7242506	7242506	Coil — R. F.
57	7242527	7242527	Coil — Oscillator (Includes Illus. #3 and 5)
58	7241708	7241708	Coil — Hash Choke
59	7255738	7255738	Coil — Antenna Choke
60	7239124	8542	Vibrator
61	7242017	7242017	Control — Volume, Tone and Switch
61A			Volume Control
61B			Tone Control
61C			Switch
62	7240797	7240797	Spark Plate, "A" Choke and "A" Connector
62A	7241701	7241701	"A" Choke
62B			Spark Plate
62C			"A" Connector
	7236279	7236279	Socket — Octal Tube
	7241356	7241356	Socket — Loctal Tube
	7239125	7239125	Socket — Vibrator
	7239475	7239475	Socket — Antenna

MODEL GMC-2233029

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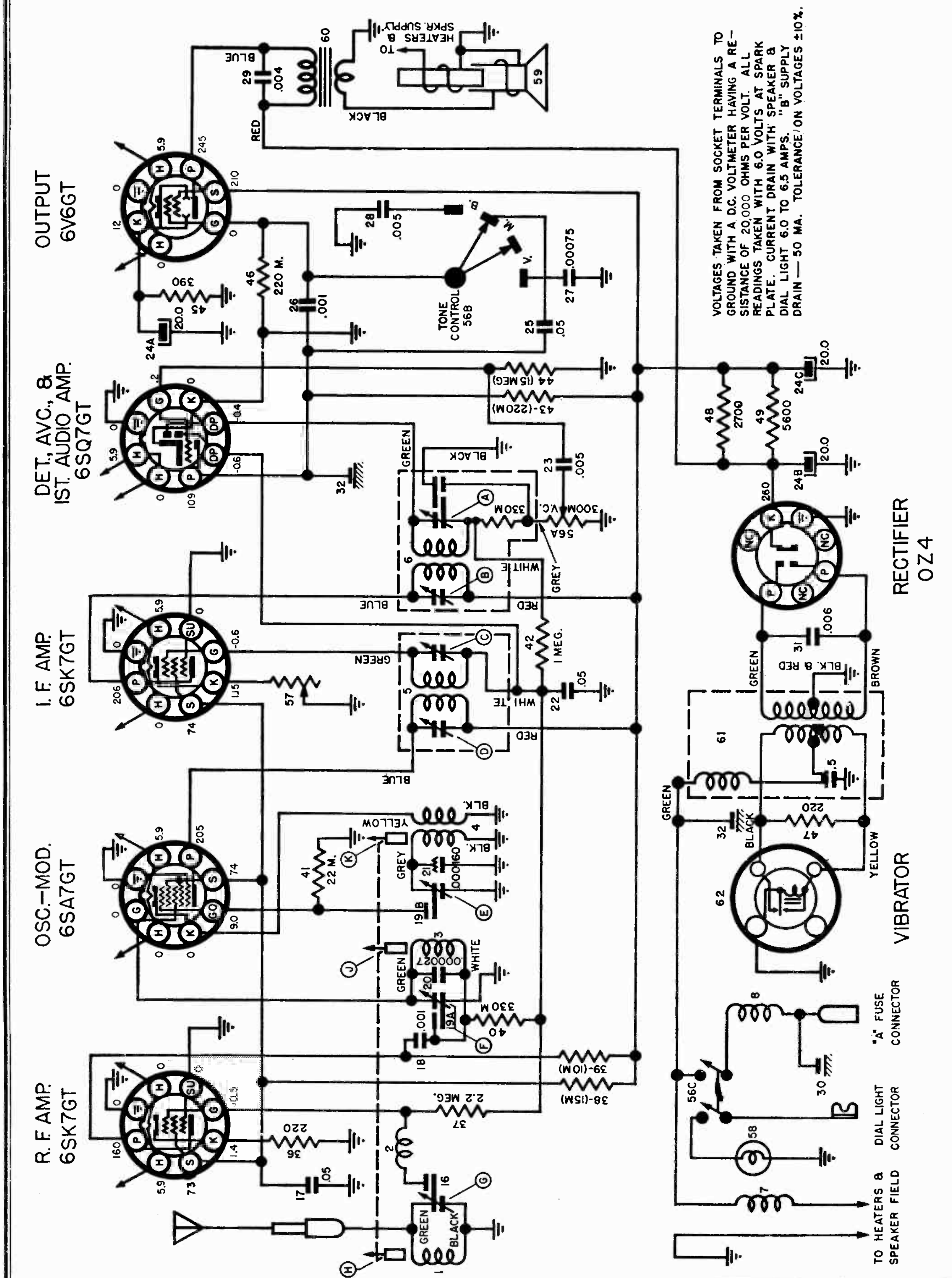


UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

MODEL GMC-2233029

GENERAL

MOUNTING—All 1947 GMC F. C. Trucks.

TUBES—Five, Plus Rectifier.

SPEAKER—6″ x 9″ Elliptical Electrodynamic.

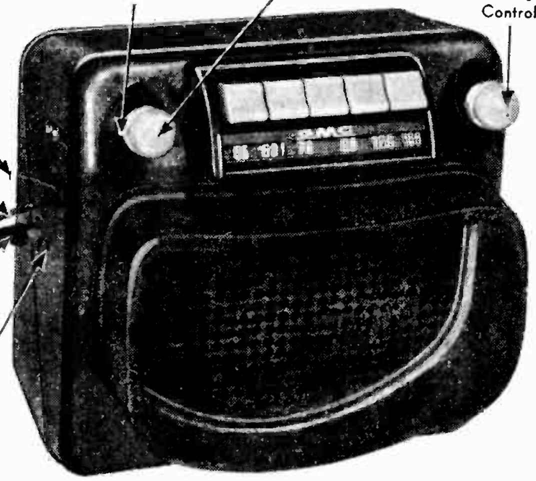
TUNING—Manual and 5 P. B. Mechanical.

ANTENNA TRIMMER COMPENSATION—.000058-.000090 Mfd.

TUNING RANGE—550-1600 KC.

PUSHBUTTON SET-UP

Press pushbutton to the left and pull out. Tune in desired station manually. Push button all the way in.



MODEL 2233029

ALIGNMENT PROCEDURE

Volume Control Maximum.

Signal generator output set to minimum.

Series Condenser Or Dummy Antenna	Connect To	Signal Generator Frequency	Tune Receiver To	Adjust Screws In Order
0.1 Mfd.	6SA7 Pin #8	262 KC	No broadcast Signal	A B C D
.000070 Mfd.	Antenna Connector	1615 KC	Extreme H. F. end of dial	*E F G
.000070 Mfd.	Antenna Connector	1400 KC	Signal generator	J H
.000070 Mfd.	Antenna Connector	1615 KC	Extreme H. F. end of dial	F G
.000070 Mfd.	Antenna Connector	1400 KC	Signal generator	J H

* Before making this adjustment check setting of oscillator core "K" with pointer against high frequency stop. The rear of the iron core should be 1¾″ from the mounting end of the coil form. (This measurement is readily made by inserting a suitable plug in the mounting end of the coil form.) Core adjustments are made by a bakelite screwdriver in slot in rear end of core. Reseal core studs to guide bar with glyptal.

Pointer calibration is made by tuning signal generator to 800 KC and the receiver to the signal. Adjust pointer to 800 KC with screw on pointer connecting link assembly.

When radio is installed, adjust trimmer "G" to match car antenna at approximately 1400 KC.

MODEL GMC- 2233029

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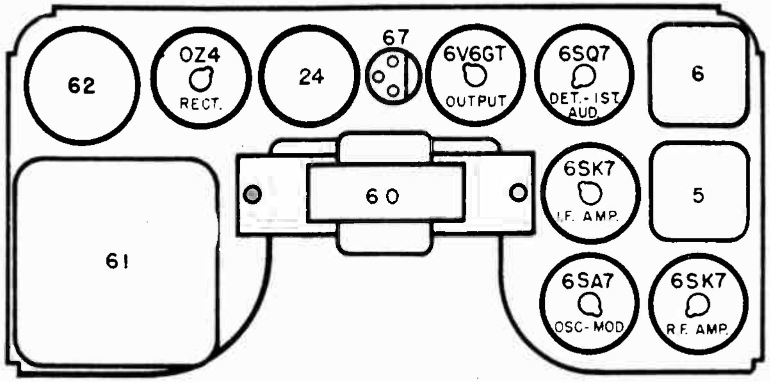
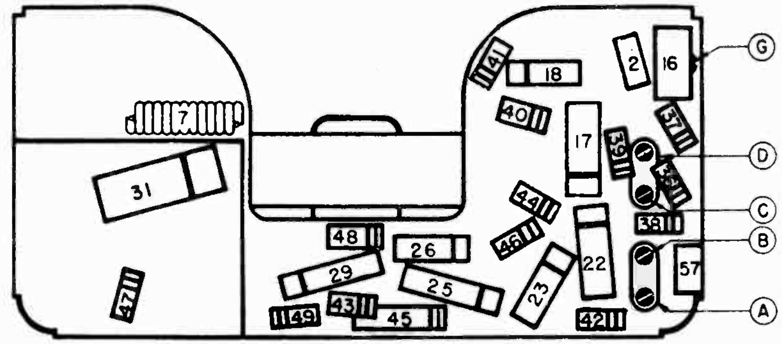


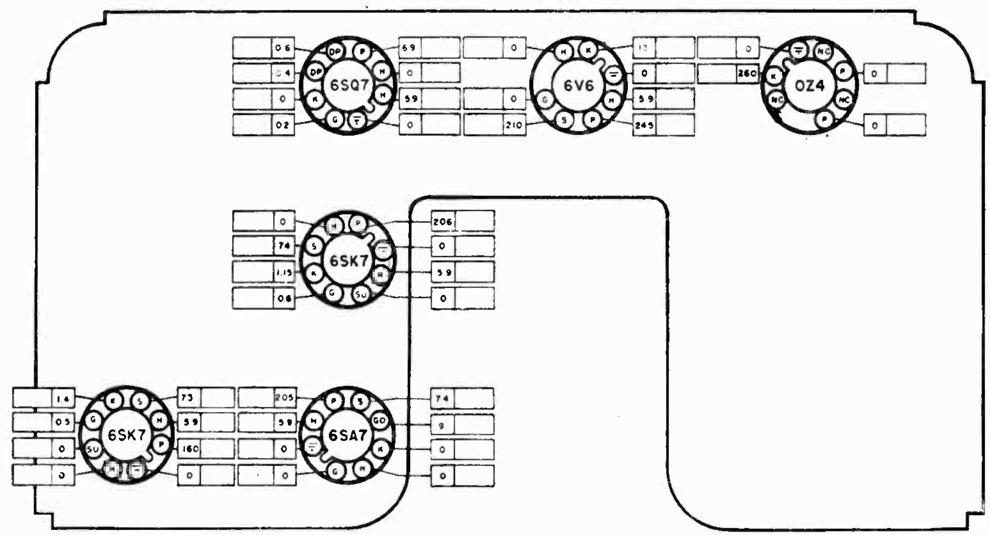
PARTS LAYOUT — TUBE VIEW



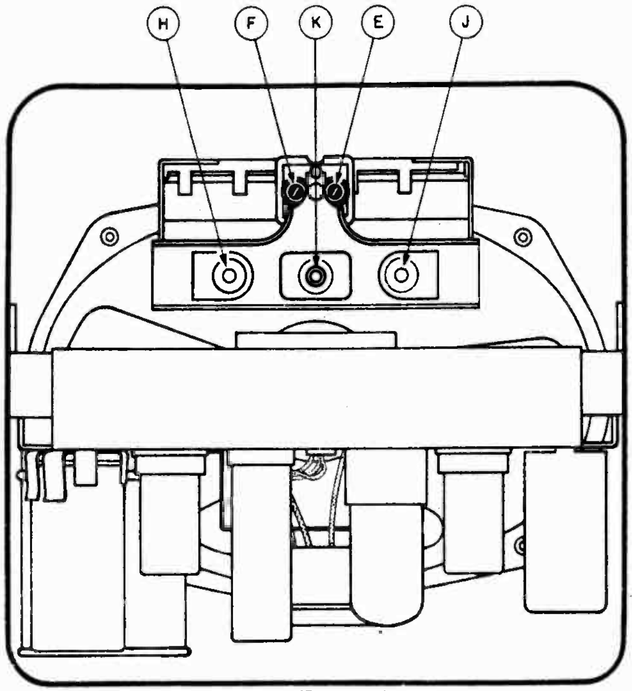
PARTS LAYOUT — CHASSIS VIEW

TUBE SOCKET VOLTAGE CHART

The tube socket voltages, as measured at the factory and under the conditions shown on the schematic diagram on page 3 are shown below. The blank spaces are provided so the serviceman may fill in actual voltage readings as taken with his own equipment. A normal operating radio should be used for these measurements.



Voltages measured from socket terminals to ground. Voltmeter resistance .... ohms per volt. All readings taken with .... volts at spark plate. "A" current drain 6 to 6.5 amps with 6.0 volts at spark plate. "B" current drain 50 MA. with 6 volts at spark plate, voltage tolerance ±10%.



TRIMMER CHART

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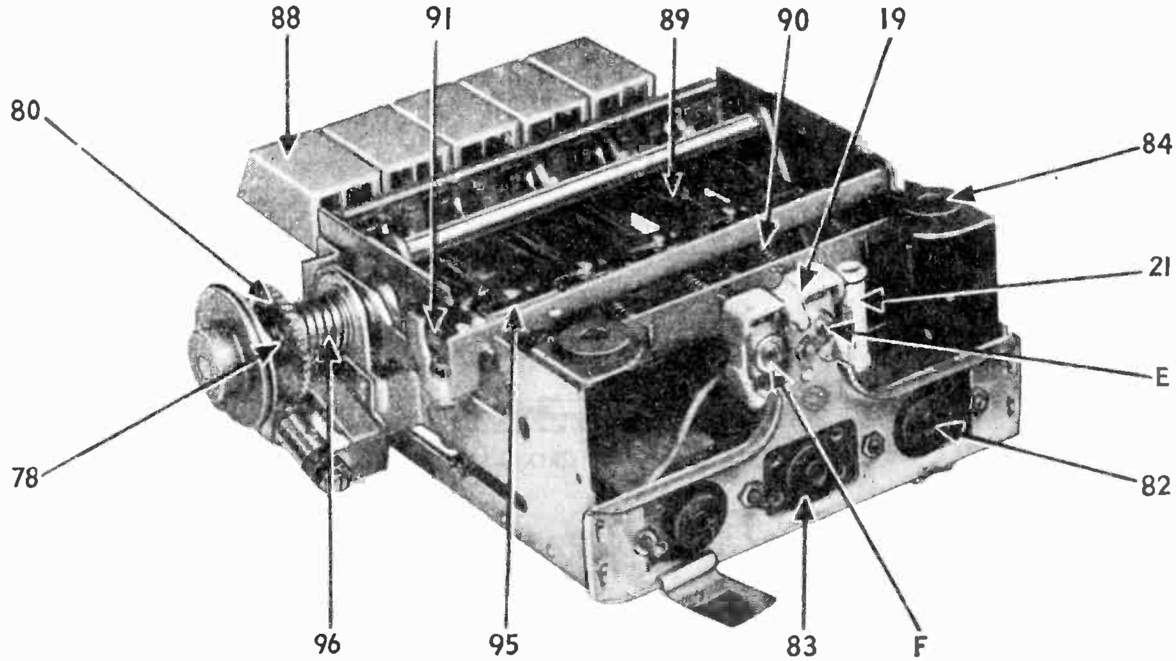
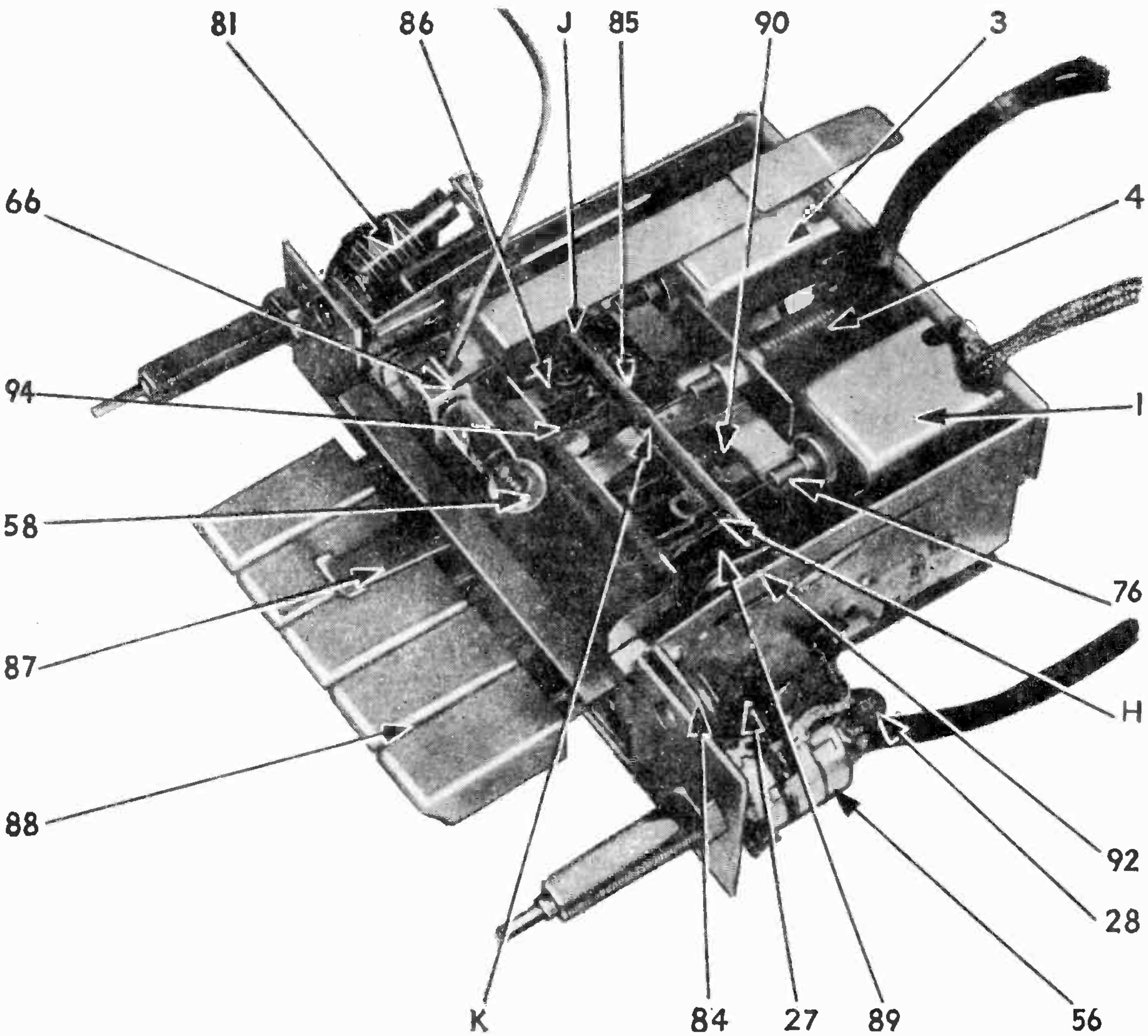


TUNER PICTURE — TOP VIEW



TUNER PICTURE — BOTTOM VIEW

MODEL GMC-2233029

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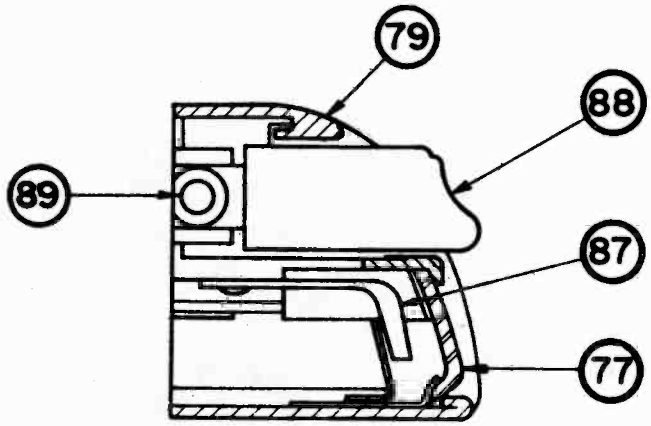

ESCUTCHEON CROSS SECTION

SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
			ELECTRICAL PARTS
			COILS
1	7256233	7256233	Antenna
2	7240251	7240251	Antenna Choke
3	7256233	7256233	R. F.
4	7256235	7256235	Oscillator
5	7256011	7256011	1st I. F.
6	7256012	7256012	2nd I. F.
7	7241708	7241708	Hash Choke
8	1217846	1217846	"A" Choke
			CONDENSERS
16	7255907	7255907	Antenna Trimmer, fixed capacity .000200 Mfd.
17	7236841	E503	.05 Mfd. 400V Tubular
18	7242942	E102	.001 Mfd. 600V Tubular
19	7242454	7242454	Dual Trimmer
19A			R. F. Section, fixed capacity .000300 Mfd.
19B			Oscillator Section, fixed capacity .000100 Mfd.
20	7256348	G270	.0000270 Mfd. Molded
21	7256276	7256276	.000160 Mfd. Compensating
22	7236842	E503	.05 Mfd. 400V Tubular
23	7230767	E502	.005 Mfd. 600V Tubular
24	7240724	M908	3 Section Electrolytic
24A			20 Mfd. 25V
24B			20 Mfd. 400V
24C			20 Mfd. 400V
25	7230892	E503	.05 Mfd. 400V Tubular
26	7239188	E102	.001 Mfd. 600V Tubular
27	7240738	7240738	.0075 Mfd. 400V Tubular
28	7232956	E502	.005 Mfd. 600V Tubular
29	7233243	H402	.004 Mfd. 800V Tubular
30	7241259	7241259	Spark Plate
31	7240906	H602	.006 Mfd. 1600V Tubular
32	1217848	1217848	Chassis Plate Condenser
			RESISTORS
36	7237835	A221	220 Ohms ½W Insulated
37	1214563	A225	2.2 Megohms ½W Insulated
38	7233653	C153	15,000 Ohms 2W Insulated
39	1211085	B103	10,000 Ohms 1W Insulated
40	1214557	A334	330,000 Ohms ½W Insulated
41	1214550	A223	22,000 Ohms ½W Insulated
42	1213282	A105	1 Megohm ½W Insulated
43	1214555	A224	220,000 Ohms ½W Insulated
44	1213289	A156	15 Megohms ½W Insulated
45	1216149	B391	390 Ohms 1W Insulated
46	1214555	A224	220,000 Ohms ½W Insulated
47	7237994	B221	220 Ohms 1W Insulated
48	7242844	C272	2700 Ohms 2W Insulated
49	7240918	B562	5600 Ohms 1W Insulated

MODEL GMC-2233029

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

SERVICE PARTS LIST

(Continued)

Illus. No.	Production Part No.	Service Part No.	Description
			TUBE COMPLEMENT
	1213764	5230	6SK7GT
	1213763	5223	6SA7GT
	1213765	5232	6SQ7GT
	1213637	5241	6V6GT
	7237180	5003	OZ4—Rectifier
			MISCELLANEOUS ELECTRICAL PARTS
56	7256188	7256188	Control—Volume, tone and switch
56A			Volume control
56B			Tone control
56C			Switch
57	7242204	7242204	Sensitivity Control
58	125588	125588	Lamp—Mazda #55
59	7241312	7241312	Speaker—6" x 9" Elliptical
60	7256009	7256009	Transformer—Output
61	7255881	7255881	Transformer—Power
62	7239124	8542	Vibrator
			MECHANICAL PARTS
			CHASSIS
	7255920	7255920	Cable and Plug—Speaker
	7239475	7239475	Socket—Antenna
66	1217838	1217838	Socket—Dial light
	7236279	7236279	Socket—Octal tube
67	1216962	1216962	Socket—Speaker
	7239125	7239125	Socket—Vibrator
			TUNER
76	7256112	7256112	Core—Iron
77	7256730	7256730	Dial (included in Escutcheon)
78	7256105	7256105	Disc—Clutch Driven
79	7256729	7256729	Escutcheon Assy.
80	7256102	7256102	Gear and Bushing
81	7256100	7256100	Gear and Bracket—Worm
82	7244021	7244021	Grommet—Antenna and R. F. Coil
83	7244020	7244020	Grommet—Oscillator Coil
84	7237172	7237172	Grommet—Tuner Mounting
85	7256179	7256179	Guide Bar—Core
86	7256271	7256271	Link—Pointer Connecting Assy.
87	7256175	7256175	Pointer Assy.
88	7255985	7255985	Pushbutton
	7256099	7256099	Shaft—Manual Drive
89	1217837	1217837	Slide and Pushbutton Assy.
90	7255984	7255984	Spring—Slide Return
*91	7255989	7255989	Spring—Cam Return
*91A	7257434	7257434	Pin and Spring Assy.—Cam Return
†92	7255990	7255990	Spring—Treadle Bar Connecting Link (coil type)
†92A	7257415	7257415	Spring—Treadle Bar Connecting Link (wire type)
94	7255992	7255992	Spring—Pointer Connecting Link
95	7255987	7255987	Spring—Declutch Lever
96	7255991	7255991	Spring—Clutch
			INSTALLATION PARTS
	494786	6009	Collector—Static
	1849161	6016	Condenser—Ammeter
	1908848	1908848	Condenser—Generator
	1910147	1910147	Condenser—Ignition Coil
	147685	147685	Fuse—14 Amperes
	1217950	1217950	Fuse Holder
	7255936	7255936	Knob—Wing
	7255935	7255935	Knob—Dummy
	7256148	7256148	Knob—Control
	1888204	1888204	Nipple—Rubber
	1887829	6003	Suppressor—Distributor

†*NOTE: Both of these parts have been used in production. The type part to be replaced is the part that should be ordered.

MODEL 986241

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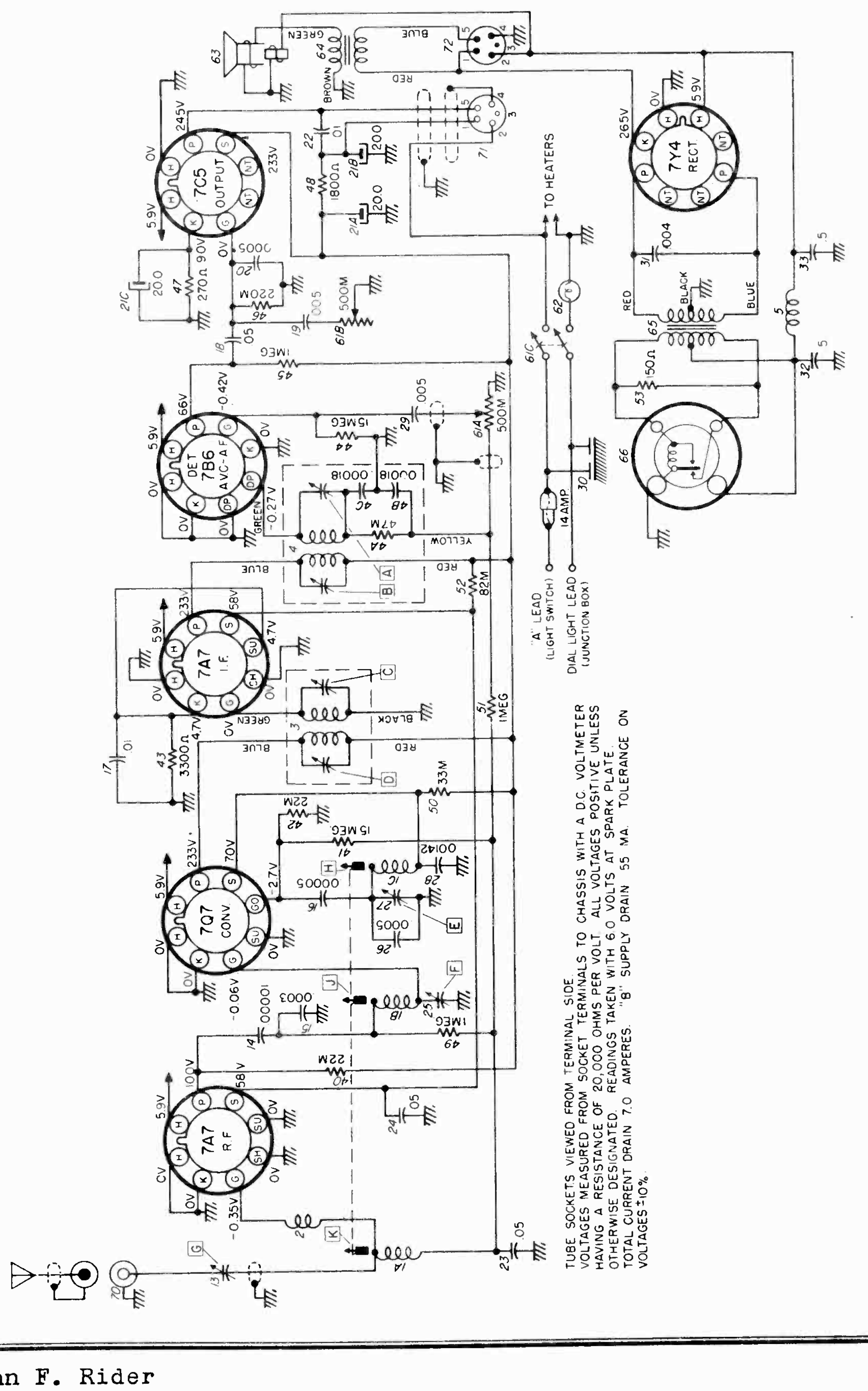

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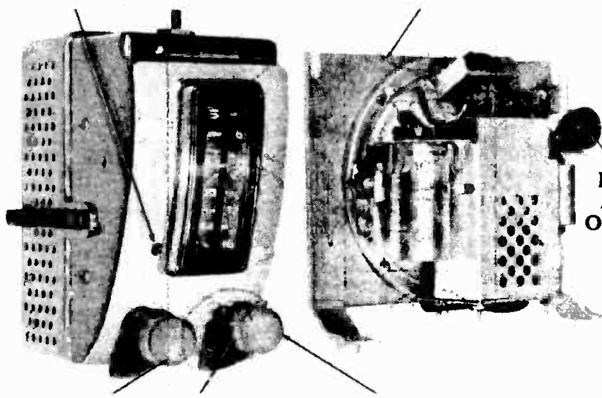
MODEL 986241



ALIGNMENT PROCEDURE:

Output Meter Connection .... Across Voice Coil

Generator Return .... To Receiver Chassis

Dummy Antenna .... In Series With Generator

Volume Control Position .... Maximum Volume

Tone Control Position .... Treble

Generator Output .... Minimum for Readable Indication

Steps	Series Condenser or Dummy Antenna	Connect To	Signal Generator Frequency	Tune Receiver To	Adjust In Sequence For Max. Output
1	0.02 Mfd.	7Q7 Grid (Pin #6)	257.5 KC.	High Frequency Stop	A, B, C, D
2	0.000065 Mfd.	Antenna Connector	1610 KC	High Frequency Stop	E, F, G
3	0.000065 Mfd.	Antenna Connector	1400 KC	Signal Generator Signal	H, J, K
4	0.000065 Mfd.	Antenna Connector	1610 KC	High Frequency Stop	F, G
5	0.000065 Mfd.	Antenna Connector	1400 KC	Signal Generator Signal	*Pointer Adjust. Screw

*Refer to the Pointer String Hookup drawing This should be adjusted so the pointer reads 1400 KC.

With the radio installed and the car antenna plugged in adjust the antenna trimmer "G" for maximum volume with the radio tuned to a weak station near 1400 KC.

MODEL 986241

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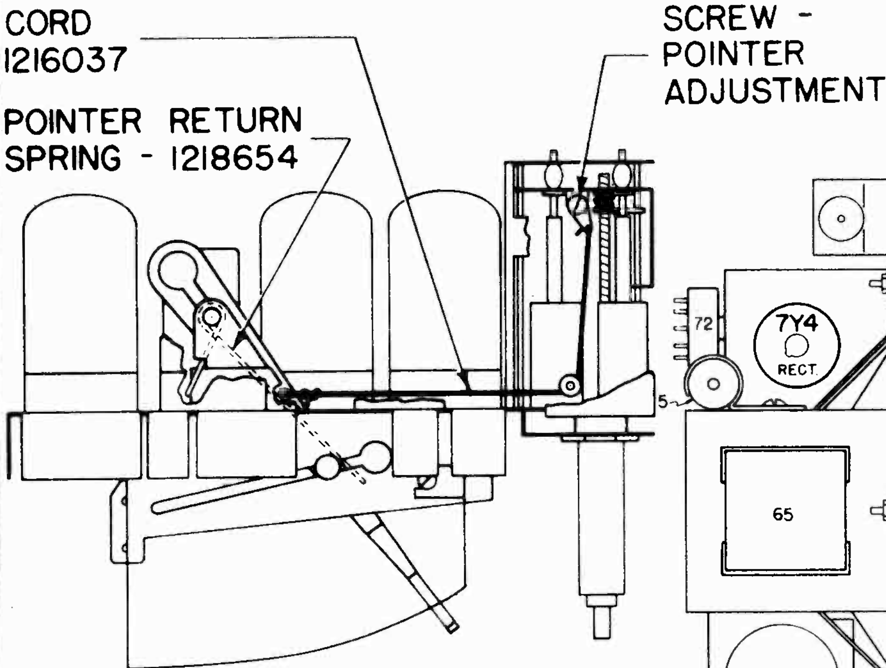
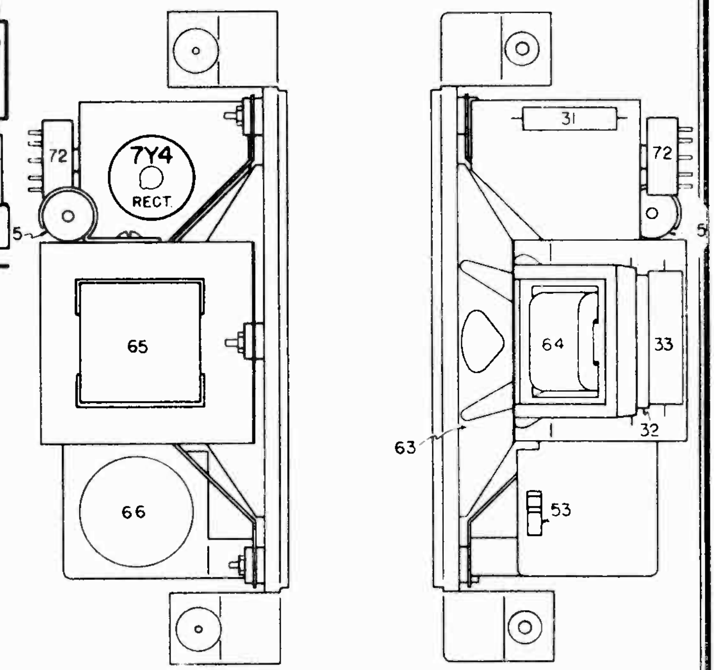
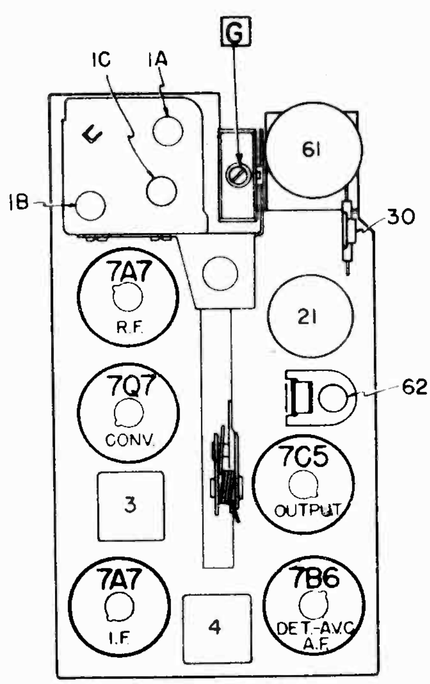


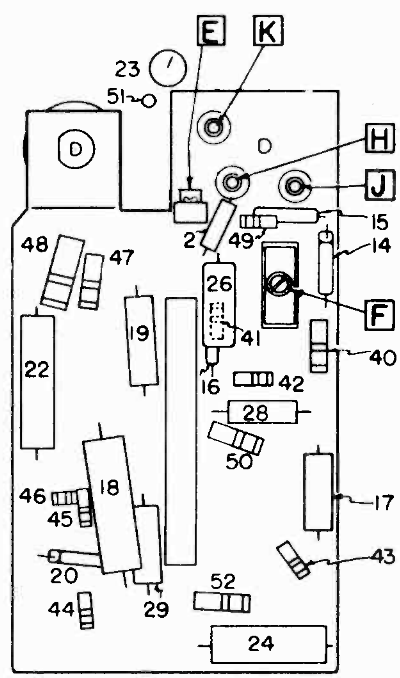
POINTER STRING HOOKUP



PARTS LAYOUT—POWER UNIT



PARTS LAYOUT—TUBE VIEW



PARTS LAYOUT—CHASSIS VIEW

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

MODEL 986241

SERVICE PARTS LIST

ELECTRICAL PARTS

COILS

Illus. No.	Service Part No.	Production Part No.	Description
1		1218664	Coils-Permeability Tuning
1A			Antenna Coil
1B			R. F. Coil
1C			Oscillator Coil
2		1218639	Antenna Spark Choke
3		1218660	1st I. F. Assembly
4		1218661	2nd I. F. Assembly
4A			47,000 Ohm ½ Watt
4B			.00018 Mfd. Molded Condenser
4C			.00018 Mfd. Molded Condenser
5		1218643	Hash Choke

CONDENSERS

Illus. No.	Service Part No.	Production Part No.	Description
13		1218634	Antenna Trimmer
14	G100	7234242	.00001 Mfd. Molded
15	G271	1215553	.0003 Mfd. Molded
16	G470	7236141	.00005 Mfd. Molded
17		7233608	.01 Mfd. 100 V. Tubular
18		7230592	.05 Mfd. 200 V. Tubular
19		7230767	.005 Mfd. 100 V. Tubular
20	G471	1216881	.0005 Mfd. Molded
21		1218633	Electrolytic Condenser
21A			20 Mfd. 350 V.
21B			20 Mfd. 350 V.
21C			20 Mfd. 25 V.
22	E103	7233608	.01 Mfd. 600 V. Tubular
23		7230592	.05 Mfd. 200 V. Tubular
24		7230592	.05 Mfd. 200 V. Tubular
25		1218636	R.F. Trimmer
26		1218632	.0005 Mfd.—Temperature Compensating
27		1218635	Oscillator Trimmer
28		1218631	.00142 Mfd. Silver Mica
29		7230767	.005 Mfd. 100 V. Tubular
30		1218629	Spark Plate
31	H402	1218630	.004 Mfd. 1600 V. Tubular
32		7240248	.5 Mfd. 100 V. Tubular
33		7240248	.5 Mfd. 100 V. Tubular

RESISTORS

Illus. No.	Service Part No.	Production Part No.	Description
40	B223	1216156	22,000 Ohm 1 W. Insulated
41	A156		15 Megohm ⅓ W. Insulated
42	A223	1214550	22,000 Ohm ½ W. Insulated
43	A332		3,300 Ohm ½ W. Insulated
44	A156		15 Megohm ⅓ W. Insulated
45	A105	1213282	1 Megohm ½ W. Insulated
46	A224		220,000 Ohm ⅓ W. Insulated
47	B271	1213846	270 Ohm 1 W. Insulated
48	C182	1214573	1,800 Ohm 2 W. Insulated
49	A105		1 Megohm ⅓ W. Insulated
50	B333	7242447	33,000 Ohm 1 W. Insulated
51	A105		1 Megohm ⅓ W. Insulated
52	A823	1214554	82,000 Ohm ½ W. Insulated
53	B151	1211005	150 Ohm 1 W. Insulated

TUBES

Illus. No.	Service Part No.	Production Part No.	Description
	5290	1213562	7A7—R. F. Amplifier
	5301	1213981	7Q7—Oscillator—Translator
	5290	1213562	7A7—I. F. Amplifier
	5292	1213565	7B6—Detector AVC—1st Audio
	5295	1213568	7C5—Audio Output
	5302	1213570	7Y4—Rectifier

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UNITED MOTORS SERVICE
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MISCELLANEOUS ELECTRICAL PARTS

Illus. No.	Service Part No.	Production Part No.	Description
61		1218641	Control-Volume, Tone and Switch
61A			Volume Control
61B			Tone Control
61C			On-Off Switch
62		125588	Lamp, Dial (Mazda 55)
63		1218657	Speaker—6″ Electro-Magnetic
64		1218662	Transformer—Output
65		1218663	Transformer—Power
66		1218006	Vibrator

MECHANICAL PARTS

CHASSIS

Illus. No.	Service Part No.	Production Part No.	Description
70		1218651	Socket—Antenna Connector
		1218013	Socket—Loctal Tube
		1218653	Socket—Rectifier
		1218652	Socket—Vibrator
		1218638	Cover—Rectifier Socket
		1218640	Clip—Pilot Lamp
71		1218642	Cable & Socket—Power
		1218645	Lead Assy.—Dimmer
		1218649	Plug & Leads Assy.—Power Supply & Speaker
72		1218650	Plug—Plug & Leads Assy.
		1218655	Spring—Case Assembly Cover
		1218622	"A" Connector Assembly
		1218628	Case—Front

TUNER PARTS

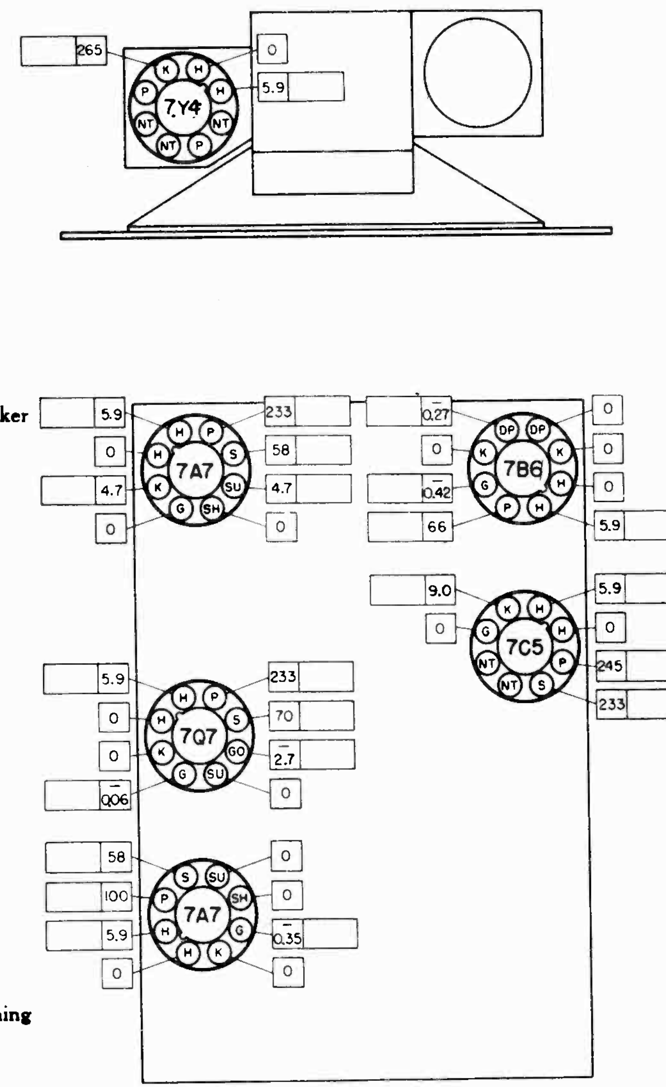
Illus. No.	Service Part No.	Production Part No.	Description
		1218621	Pointer Arm
		1218623	Pointer Arm Assembly
		1218624	Background—Dial
		1218625	Background—Pointer
		1218644	Dial
		1218646	Link & Stud Assy.—Pointer
		1218647	Nut—Speed—Dial & Background Mtg.
		1218648	Pointer—Dial
		1218654	Spring—Pointer Return
		1218659	Stud—Top Mounting

INSTALLATION PARTS

Illus. No.	Service Part No.	Production Part No.	Description
		3690332	Bracket—Receiver Mounting-Top
		7257984	Block—Serrated—Radio Mtg.
		7257922	Bushing—Control
		3690333	Trim Plate
		147685	Fuse—14 Amp.—25 Volt
		7257930	Knob—Tone
		7257929	Knob—Dummy
		7257928	Knob (Includes Set Screw)—Volume & Tuning
	6015	1911095	Condenser—Generator
		7257919	Condenser—Ammeter
		1910147	Condenser—Ignition Coil
		1912900	Condenser—Voltage Regulator
		7257917	Stud—Power Supply Mtg.
		1887829	Suppressor—Distributor
		1888204	Nipple—Suppressor
		494786	Static Collector Assembly

TUBE SOCKETS VIEWED FROM BOTTOM OF CHASSIS.

READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 20,000 OHMS PER VOLT.
"A" SUPPLY AT SPARK PLATE 6.0 VOLTS
"B" SUPPLY DRAIN APPROXIMATELY 55 MA.



TUBE SOCKET VOLTAGE CHART

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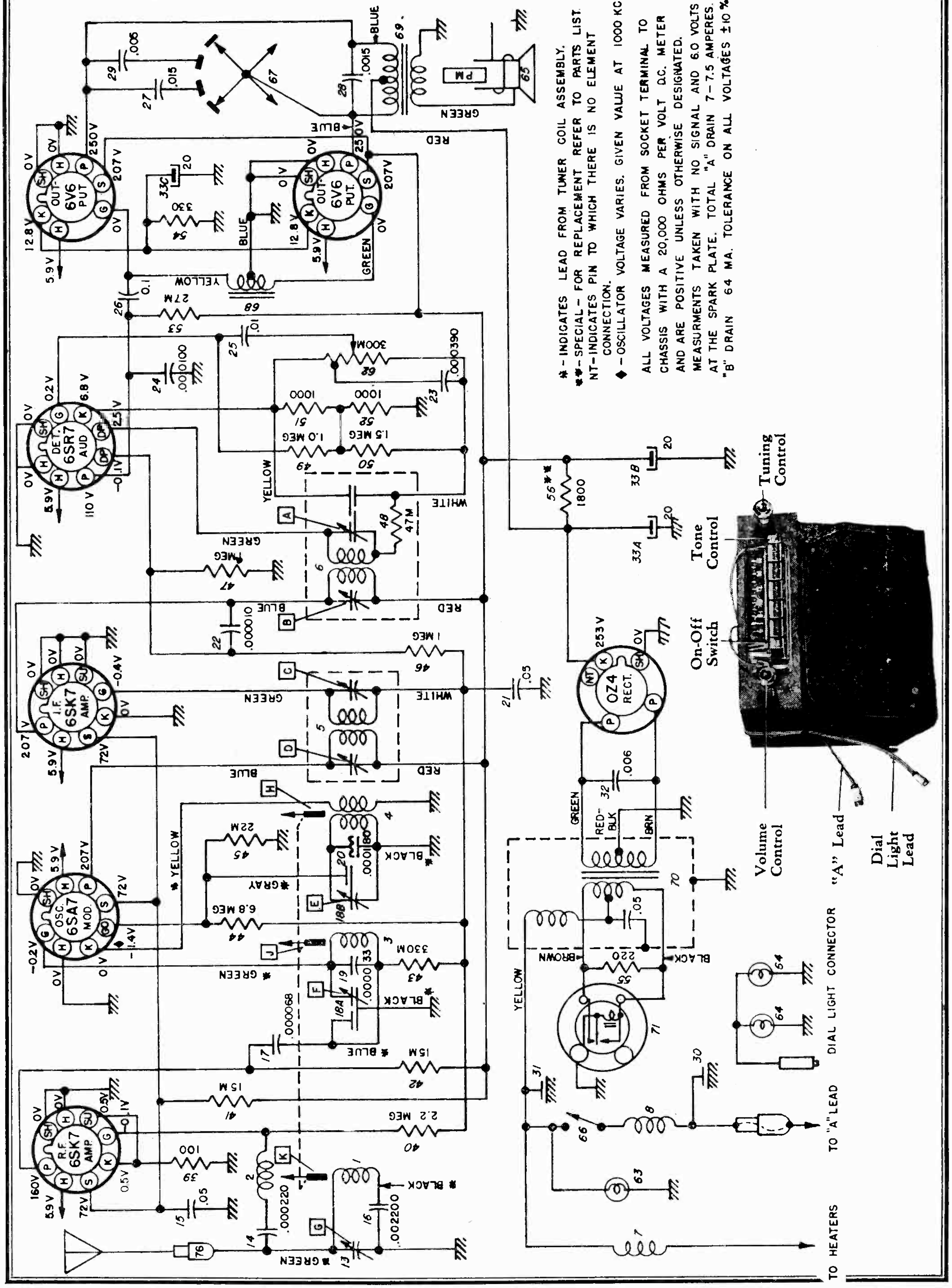
MODEL 7256609, CADILLAC



✱ - INDICATES LEAD FROM TUNER COIL ASSEMBLY.
✱✱ - SPECIAL - FOR REPLACEMENT REFER TO PARTS LIST.
NT - INDICATES PIN TO WHICH THERE IS NO ELEMENT CONNECTION.
◆ - OSCILLATOR VOLTAGE VARIES. GIVEN VALUE AT 1000 KC

ALL VOLTAGES MEASURED FROM SOCKET TERMINAL TO CHASSIS WITH A 20,000 OHMS PER VOLT D.C. METER AND ARE POSITIVE UNLESS OTHERWISE DESIGNATED. MEASUREMENTS TAKEN WITH NO SIGNAL AND 6.0 VOLTS AT THE SPARK PLATE. TOTAL "A" DRAIN 7 - 7.5 AMPERES. "B" DRAIN 64 MA. TOLERANCE ON ALL VOLTAGES ±10%

MODEL 7256609,
CADILLAC

UNITED MOTORS SERVICE
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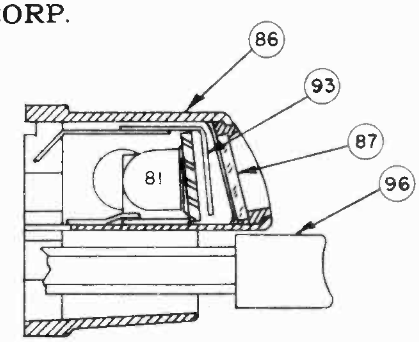
ALIGNMENT PROCEDURE:

Output Meter Connection .... Across Voice Coil
Signal Generator Return .... To Chassis
Dummy Antenna .... In Series with Generator
Volume Control .... Maximum Volune
Tone Control .... Treble
Generator Output .... Minimum for Readable Indication



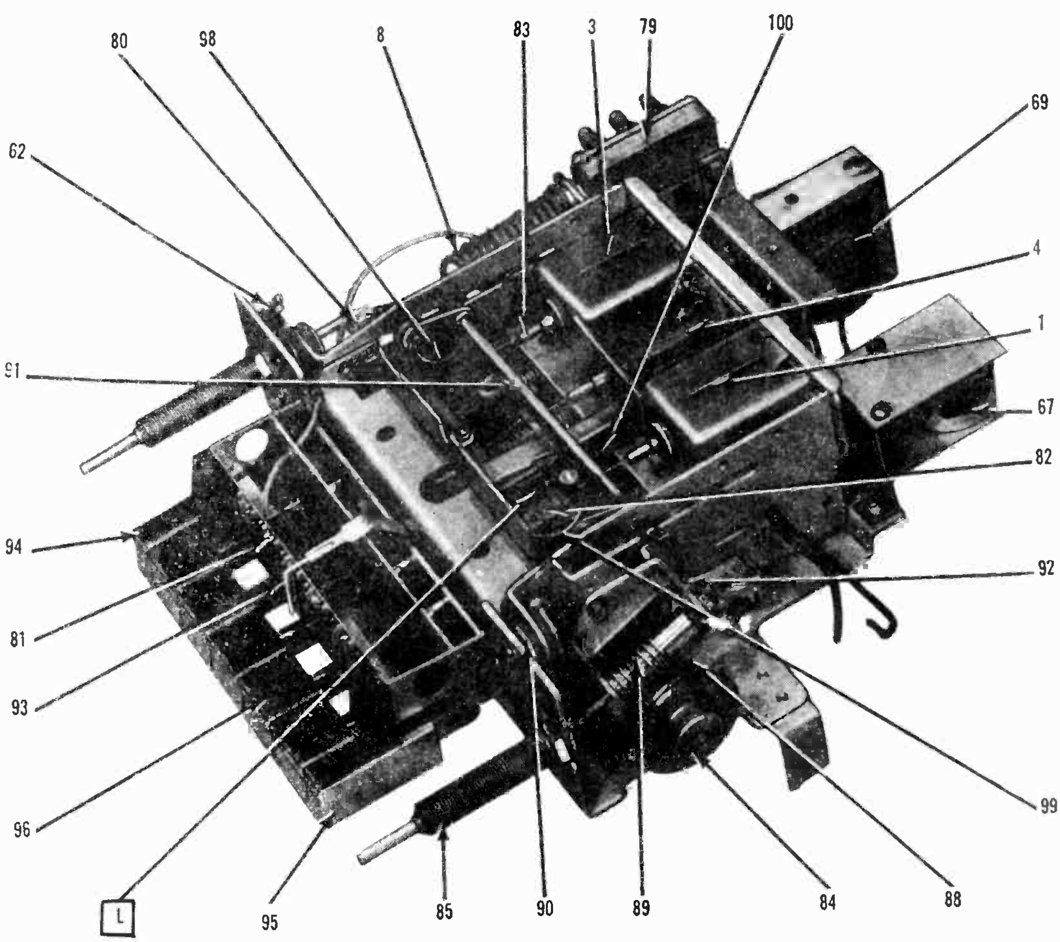
ESCUTCHEON CROSS SECTION

Steps	Series Condenser or Dummy Antenna	Connect To	Signal Generator Frequency	Tune Receiver To	Adjust In Sequence for Max. Output
1	0.1 Mfd.	6SA7 Grid (Pin #8)	260 KC	High Freq. Stop	A, B, C, D
2	0.000068 Mfd.	Antenna Connector	1615 KC	High Freq. Stop	*E, F, G
3	0.000068 Mfd.	Antenna Connector	600 KC	Signal Gen. Signal	J, K
4	0.000068 Mfd.	Antenna Connector	1615 KC	High Freq. Stop	F, G
5	0.000068 Mfd.	Antenna Connector	1430 KC	Signal Gen. Signal	L**

*Before making this adjustment check the mechanical setting of the oscillator core "H." The slotted end of the core should be 1¾" from the mounting end of the coil form. (This measurement is readily made by inserting a suitable plug in the mounting end of the coil form). Core adjustments are made from the mounting end of the coil form with an insulated screwdriver, and core studs should be sealed with glyptal or household cement after alignment.

**"L" is the pointer adjustment screw on the pointer connecting link (See tuner picture). Adjust so pointer reads 1430 KC.

With the radio installed and the car antenna plugged in adjust antenna trimmer "G" (See sticker on case) for maximum volume with the radio tuned to a weak station near 1400 KC.



TUNER

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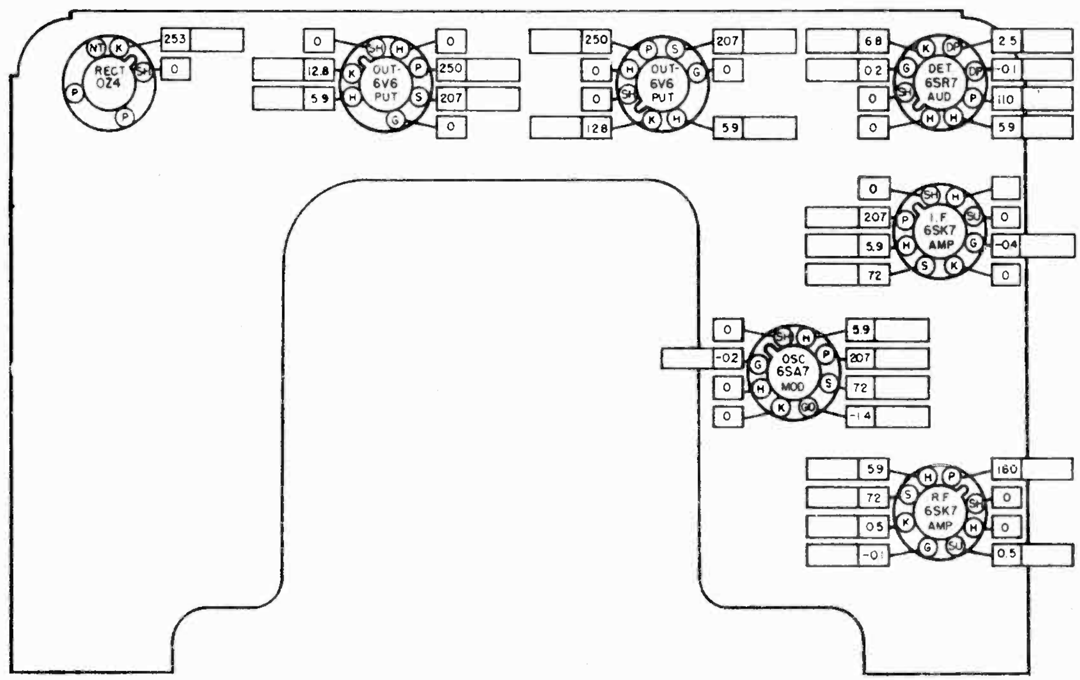
MODEL 7256609, CADILLAC

TUBE SOCKET VOLTAGE CHART

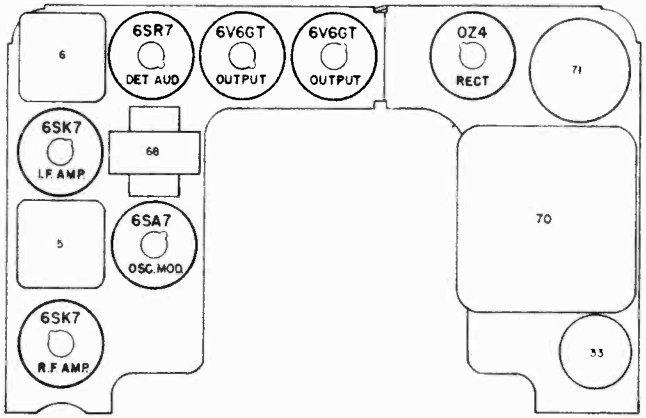


The tube socket voltages, as measured at the factory and under the conditions shown on the schematic diagram, are shown above. The blank spaces are provided so that the serviceman may fill in actual voltage readings as taken with his own equipment. A normal operating radio should be used for these measurements.

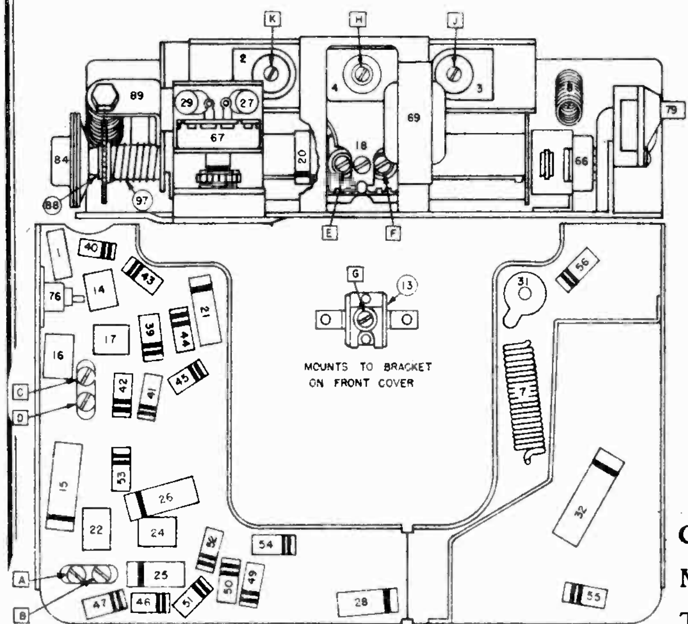
Voltmeter resistance .... Ohms Per Volt.

Readings taken with .... Volts At Spark Plate.

All voltages measured from socket terminals to chassis.



PARTS LAYOUT — TUBE VIEW



PARTS LAYOUT — CHASSIS VIEW

GENERAL

MOUNTING—All 1948 Cadillac Cars.

TUBES—Six, Plus Rectifier.

SPEAKER — 6″ x 9″ Elliptical, Permanent Magnet.

TUNING—Manual and 5 P. B. Mechanical.

ANTENNA TRIMMER COMPENSATION — 0.000060 - 0.000085 Mfd.

TUNING RANGE—550-1600 KC.

PUSHBUTTON SET-UP

Pull pushbutton to the right and out. Tune in desired station manually. Push button all the way in.

MODEL 7256609,
CADILLAC

UNITED MOTORS SERVICE
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SERVICE PARTS LIST

Illus. No.	Production Part No.	Service Part No.	Description
		ELECTRICAL PARTS	
		COILS	
1	7257391	7257391	Antenna Coil
2	7240251	7240251	Antenna Choke
3	7257391	7257391	R. F. Coil
4	7256750	7256750	Oscillator Coil
5	7257832	7257832	1st I. F. Assy.
6	7256932	7256932	2nd I. F. Assy.
7	7241708	7241708	Hash Choke
8	1217846	1217846	Spark Noise Choke
		CONDENSERS	
13	7256949	7256949	Antenna Trimmer and Bracket
14	7236105	7236105	0.000220 Mfd. Molded
15	7230892	7230592	0.05 Mfd. 400 V. Tubular
16	1217744	1217744	0.002200 Mfd. Ceramic
17	1212359	1212359	0.000068 Mfd. Molded
18	7242454	7242454	Dual Trimmer
18A			R. F. Trimmer, Fixed Capacity 0.000300 Mfd.
18B			Osc. Trimmer, Fixed Capacity 0.000100 Mfd.
19	1217735	1217735	0.000033 Mfd. Molded (Included in R. F. Coil Shield Can)
20	7257424	7257424	0.000180 Mfd. — Temperature Compensating
21	7236842	7230592	0.05 Mfd. 200 V. Tubular
22	1215189	1215189	0.000010 Mfd. Molded
23	1217740	1217740	0.000390 Mfd. Molded (On Volume Control)
24	1210275	1210275	0.000100 Mfd. Molded
25	7237870	1208600	0.01 Mfd. 400 V. Tubular
26	7238788	7231536	0.1 Mfd. 400 V. Tubular
27	7237719	7237719	0.015 Mfd. 600 V. Tubular
28	7236134	7236134	0.0015 Mfd. 800 V. Tubular
29	7233769	7233769	0.005 Mfd. 1000 V. Tubular
30	7241259	7241259	Spark Plate (On case at entrance of "A" Lead)
31	1217848	1217848	Chassis Plate Condenser
32	7240906	7240906	0.006 Mfd. 1600 V. Buffer
33	7240724	7240724	Electrolytic Condenser
33A			20 Mfd. 400 V.
33B			20 Mfd. 400 V.
33C			20 Mfd. 25 V.
		RESISTORS	
39	1213217	1213217	100 Ohms ½ W. Insulated
40	1214563	1214563	2.2 Megohms ½ W. Insulated
41	7233653	7233653	15,000 Ohms 2 W. Insulated
42	7237595	7237595	15,000 Ohms 1 W. Insulated
43	1214557	1214557	330,000 Ohms ½ W. Insulated
44	1215563	1215563	6.8 Megohms ½ W. Insulated
45	1214550	1214550	22,000 Ohms ½ W. Insulated
46	1213282	1213282	1 Megohm ½ W. Insulated
47	1213282	1213282	1 Megohm ½ W. Insulated
48	1214553	1214553	47,000 Ohms ½ W. Insulated (In Illus. 6)
49	1213282	1213282	1 Megohm ½ W. Insulated
50	1213285	1213285	1.5 Megohms ½ W. Insulated
51	1213235	1213235	1000 Ohms ½ W. Insulated
52	1213235	1213235	1000 Ohms ½ W. Insulated
53	1213342	1213342	27,000 Ohms 1 W. Insulated
54	7233773	7233773	330 Ohms 1 W. Insulated
55	7237994	7237994	220 Ohms 1 W. Insulated
56	1214573	7240918 7242844	5600 Ohms 1 W. 2700 Ohms 2 W. — Replace in Parallel
		MISCELLANEOUS ELECTRICAL PARTS	
62	7257791	7257791	Control, Volume
63	115273	115273	Lamp, Dial Light
64	187189	187189	Lamp, Dial Light
65	7257248	7257248	Speaker 6" x 9" Elliptical, Permanent Magnet
66	7256915	7256915	Switch and Bracket, On-off
67	1218056	1218056	Switch, Tone Control
68	7256432	7256432	Transformer, Input
69	7256907	7256907	Transformer, Output
70	7255881	7255881	Transformer Assy., Power
71	7239124	7239124	Vibrator, Non-synchronous

UNITED MOTORS SERVICE
DIV. OF GENERAL MOTORS CORP.

MODEL 7256609, CADILLAC

Illus. No.	Production Part No.	Service Part No.	Description
		MECHANICAL PARTS	
		CHASSIS	
76	7256944	7256944	Connector, Antenna
	1860926	1860926	Ferrule, Dial Light Connector
	1836869	1836869	Shell, Dial Light Connector
77	1218055	1218055	Socket, Dial Light with Lead
	7236279	7236279	Socket, Octal Tube
	7239125	7239125	Socket, Vibrator
78	7257280	7257280	Spring, Vacuum Valve Yoke
79	7256773	7256773	Valve, Vacuum
80	7257279	7257279	Yoke, Drive, Vacuum Valve
		TUNER	
81	1218054	1218054	Backplate, Dial and Socket Assy.
82	7256271	7256271	Connecting Link, Pointer
83	7257353	7257353	Core, Powered Iron Tuning
84	7256105	7256105	Disc, Clutch Driven
85	1218343	1218343	Driveshaft and Bushing, Manual Tuning
86	7256806	7256806	Escutcheon Assy.
87	7256783	7256783	Glass, Dial
88	7256760	7256760	Gear and Bushing
89	7256758	7256758	Gear, Worm and Bracket
90	7237172	7237172	Grommet, Tuner Mounting
91	7256504	7256504	Guide Bar, Parallel
92	7257434	7257434	Pin and Spring Assy.
93	7256787	7256787	Pointer, Dial and Bracket
94	1218053	1218053	Push Button and Plunger (On-off)
95	1218052	1218052	Push Button and Plunger (Tone Control)
96	1218051	1218051	Push Button and Slide Assy. (Tuning)
97	7256761	7256761	Spring, Clutch
98	7257415	7257415	Spring, Guide Bar Connecting Link
99	7255992	7255992	Spring, Pointer Connecting Link
100	7255984	7255984	Spring, Slide Return
	7257361	7257361	Spring, On-off Switch — Return
	7257361	7257361	Spring, On-off Switch — Anti-Rattle
	7244115	7244115	Spring, Tone Control Switch — Return
	7241042	7241042	Spring, Tone Control Switch — Anti-Rattle
		INSTALLATION PARTS	
	7256637	7256637	Bracket, Support
	7242478	7242478	Cap, "A" Lead
	1911095	1911095	Condenser, Generator
	1910147	1910147	Condenser, Ignition Coil
	1872486	1872486	Connector
	7240808	7240808	Ferrule, Suppressor Insulating
	147685	147685	Fuse
	7242024	7242024	Fuseholder, Complete
	7257502	7257502	Gasket, Anti-Squeak
	7256784	7256784	Knob, Control
	7257501	7257501	Nut, Mounting
	443370	443370	Screw, Mounting, Condenser to Coil
	415204	415204	Screw, Engine to Dash Ground Strap
	7257406	7257406	Spring, Ground, Hood to Cowl
	7240138	7240138	Static Collector
	5274049	5274049	Strap, Ground, Engine to Dash
	1435482	1435482	Suppressor, Distributor
	7255849	7255849	Suppressor, Spark Plug
	7256636	7256636	Trim Plate
	120388	120388	Washer, Plain, Ground Strap to Outer Cushion Screw
	120395	120395	Washer, Plain, Ground Strap to Outer Cushion Screw
		TUBES	
	7237751	7237751	6SK7
	7237752	7237752	6SA7
	1218149	1218149	6SR7
	1213793	1213793	6V6
	1211924	1211924	0Z4