

MODELS A-54 & A-58

Five-Tube, Two-Band, A-C Receivers

ELECTRICAL SPECIFICATIONS

Voltage Rating.	105-125 Volts
Frequency Rating.	25-60 and 50-60 Cycles
Power Consumption (All frequencies).	85 Watts
Number and Types of Radiotrons 1 Type 6A7, 1 Type 6K7, 1 Type 6B7, 1 Type 6F6, 1 Type 80 Total - 5.	
Undistorted Output	.1.9 Watts
Maximum Output	.3.5 Watts
Tuning Frequency Ranges.	.540 K.C. - 1720 K.C.- 5500 K.C. to 18000 K.C.
Line-up Frequencies.	.460 K.C. - 600 K.C.- 1720 K.C. and 18000 K.C.

PHYSICAL SPECIFICATIONS

	<u>Model A-54</u>	<u>Model A-58</u>
Height	18"	39"
Width.	14-5/8"	24"
Depth.	9-7/8"	11-13/16"

This receiver is a five tube, two band A.C. operated superheterodyne having tuning ranges that cover both the standard and the short wave broadcasting bands. Features include automatic volume control, metal tubes, diode detection, two point tone control, illuminated full vision dial scale, resistance coupled audio system, electrodynamic loudspeaker, six to one tuning ratio, antenna wave trap and other important points of improvement.

Service convenience has been an especial requirement in the layout and construction of this receiver. A plug-connector attachment is used in

the chassis to speaker cable which will allow ready removal of either unit without disturbing the other. Trimmer adjustments are located at accessible points, their number is reduced to the least that is consistent with efficient operation.

These models have been manufactured using both glass and metal tubes. Those models using glass tubes, the tube complement is as follows:-- 1 Type 6A7, 1 Type 6D6, 1 Type 6B7, 1 Type 41, 1 Type 80. In those models employing metal tubes, a 6K7 was replaced by a 6K7G, these two tubes are interchangeable and 6K7G can be substituted by 6K7.

DESCRIPTION OF ELECTRICAL CIRCUIT

The circuit is of the superheterodyne type and consists of a combined oscillator and first detector, an I.F. stage, a combined second detector and automatic volume control and a Pentode output stage. A type 80 is used as a rectifier for providing grid and plate power to all other tubes.

The signal enters the receiver through the antenna system and is applied through a tuned circuit to the grid of the first detector. Combined with the signal is the local oscillator signal, which is at a constant frequency difference (460 K.C. higher) throughout the tuning range. The combined signals after passing through the first detector produce the I.F. signal, which is 460 K.C. The Type 6A7 is the combined detector and oscillator.

The I.F. amplifier consists of a single Type

6K7 and two transformers, having a total of four tuned circuits. The high I.F. frequency (460 K.C.) is used to reduce image frequency response and to improve the short-wave performance.

The output of the I.F. amplifier is then applied to the diode sections of the Type-6B7, which is a combined second detector, automatic volume control and A.F. amplifier. The direct current component of the rectified signal produces a voltage drop across resistor R-9. The full voltage drop constitutes the automatic bias voltage for the first detector while a tap is provided for the I.F. voltage. These automatic bias voltages for the detector and I.F. give the automatic volume control action of the receiver. The volume control selects the amount of audio voltage that is applied to the grid of the Type-6B7 and thereby regulates the audio output of the entire receiver.

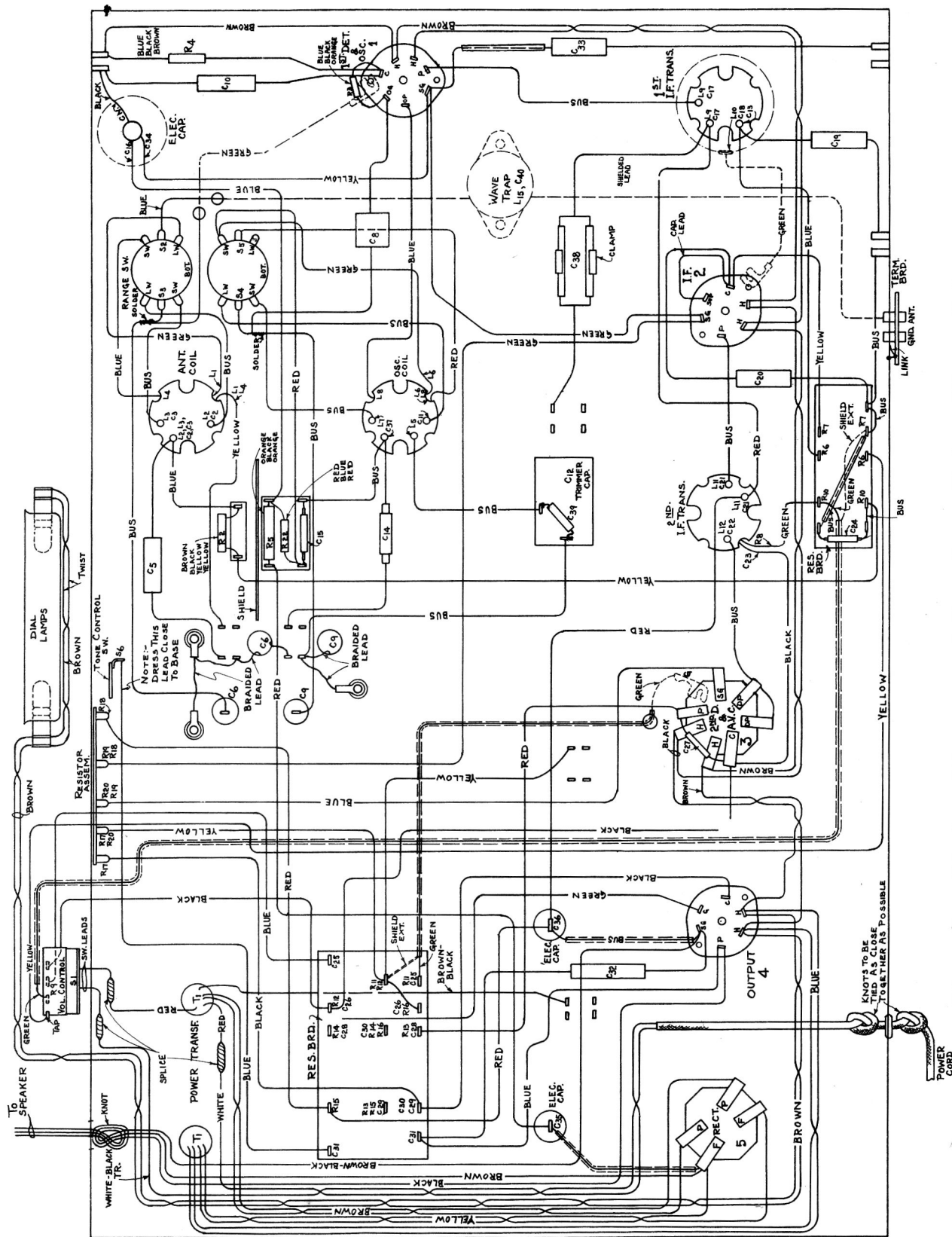


Fig. 2 - Wiring Diagram of Receiver Using Glass Tubes.

The output of the Type-6B7 is resistance coupled to the grid of the Type-6F6 tube, which is the power output amplifier. This tube is operated as a Pentode and provides high audio gain and satisfactory output power. The plate circuit of the output stage is matched to the cone coil of the reproducer by means of a step-down transformer.

The tone control consists of a 0.017 mfd. capacitor connected from the plate of the output

tube to ground through a single pole switch. Closing the switch reduces the high-frequency output of the receiver.

Plate and grid voltages for all tubes are supplied from the output of the rectifier filter system. A Type-80 is used as a rectifier and a suitable network of capacitors and resistors gives the necessary filtering and voltages. The loudspeaker field is used as a filter reactor.

SERVICE DATA

(1) LINE-UP CAPACITOR ADJUSTMENTS.

To properly align this receiver, it is essential that a modulated R.F. oscillator, such as Stock No.9050, an output indicator and an alignment tool (Stock No.4160) be available. Figure 5 shows the location of the various line-up capacitors.

until a maximum deflection is obtained. Keep the oscillator output at a low value so that only a slight deflection is obtained on the output meter at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the I.F. adjustments.

I.F. TUNING ADJUSTMENTS.

Two transformers comprising four tuned circuits are used in the intermediate amplifier. These are tuned to 460 K.C. and the adjustment screws are accessible as shown in Figure 5. Proceeds as follows:

- (a) Short-circuit the antenna and ground terminals and tune the receiver so that no signal is heard. Set the volume control at maximum and connect a ground to the ground terminal.
- (b) Connect the test oscillator output between the first detector control grid and chassis ground. Connect the output meter across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight deflection is obtained in the output meter.
- (c) Adjust the secondary and primary of the first and then the second I.F. transformers

R.F. AND OSCILLATOR ADJUSTMENTS.

The R.F. line-up capacitors are located at the bottom of the coil assemblies instead of their usual position on the gang capacitor. They are all accessible from the bottom of the chassis except the 600 K.C. series capacitor, which is accessible from the top of the chassis. Proceeds as follows:

- (a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the indicator pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 540. Then set the Test Oscillator at 1720 K.C., the dial indicator at 1720 and the oscillator output so that a slight deflection will be obtained in the output meter when the volume control is at its maximum position.

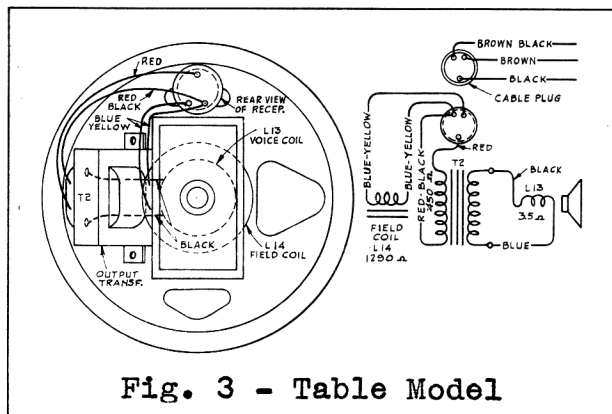


Fig. 3 - Table Model

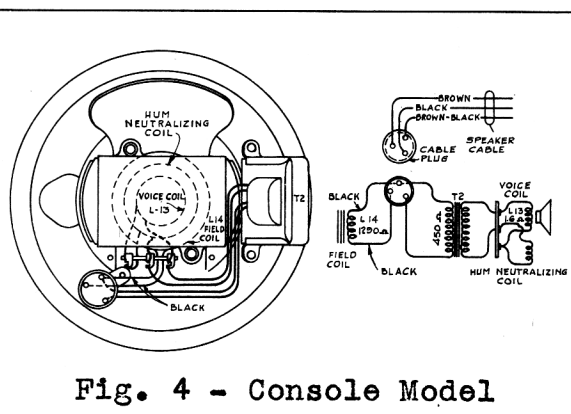


Fig. 4 - Console Model

- (b) With the Range Switch at the "in" position adjust the two trimmers under the two R.F. coils, designated as BC in Figure 5, until a maximum deflection is obtained in the output meter. Then shift the Test Oscillator frequency to 600 K.C. The trimmer capacitor, accessible from the top of the chassis, should now be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Then repeat the 1720 K.C. adjustment.
- (c) Now place the Range Switch at the "out" position, shift the Test Oscillator to 18,000 K.C. and set the dial at 18M. Adjust the two trimmer capacitors designated as SW in Figure 5 for maximum output, beginning with the oscillator trimmer. It will be noted that the oscillator and first detector trimmers will have two positions at which the signal will give maximum output. The position which uses the lower trimmer capacitance, obtained by turning the screw counter-clockwise, is the proper adjustment for the oscillator, while the position that uses a higher capacitance is correct for the detector. The detector trimmer MUST be adjusted for maximum output while rocking the main tuning capacitor back and forth through the signal. Both of these adjustments must be made as indicated irrespective of output.

The important points to remember are the need for using the minimum oscillator output to

obtain a deflection in the output meter with the volume control at its maximum position and the manner of obtaining the proper high frequency oscillator and detector adjustments.

(2) WAVE TRAP ADJUSTMENT:

To eliminate code interference in localities near high powered radio telegraph stations operating at frequencies in the vicinity of 460 K.C., a wave trap consisting of a parallel resonant circuit is incorporated in these receivers.

With receiver in operation using its normal antenna tune, the station selector to the point at which the intermediate-wave interference is most intense. Then adjust the wave-trap trimmer to the point which cause maximum suppression of the interference.

(3) RADIOTRON SOCKET VOLTAGES:

The following voltages are those at the various tube sockets while the receiver is in operating condition. No allowance has been made for currents drawn by the meter, and if lower resistance meters are used, such allowances must be made:

RADIOTRON SOCKET VOLTAGES

115-Volt, A. C. Line—Maximum Volume Control—No Signal

RADIOTRON NO.		Cathode to Ground Volts D.C.	Screen Grid to Ground Volts, D.C.	Plate to Ground Volts, D.C.	Plate Current M.A.	Heater Volts, A.C.
Type-6A7	Detector	6.0	105	265	3.5	6.3
	Oscillator			220	4.5	
Type-6K7 I.F.		6.0	105	265	9.0	6.3
Type-6B7 2nd Det. AVC		3.0	50*	90*	0.7	6.3
Type-6F6 Power		16.5	265	245	30.0	6.3
Type-80 Rectifier		--	--	690 (Plate to Plate)	64.0	5.0

* Voltage calculated from $265 V + B$.

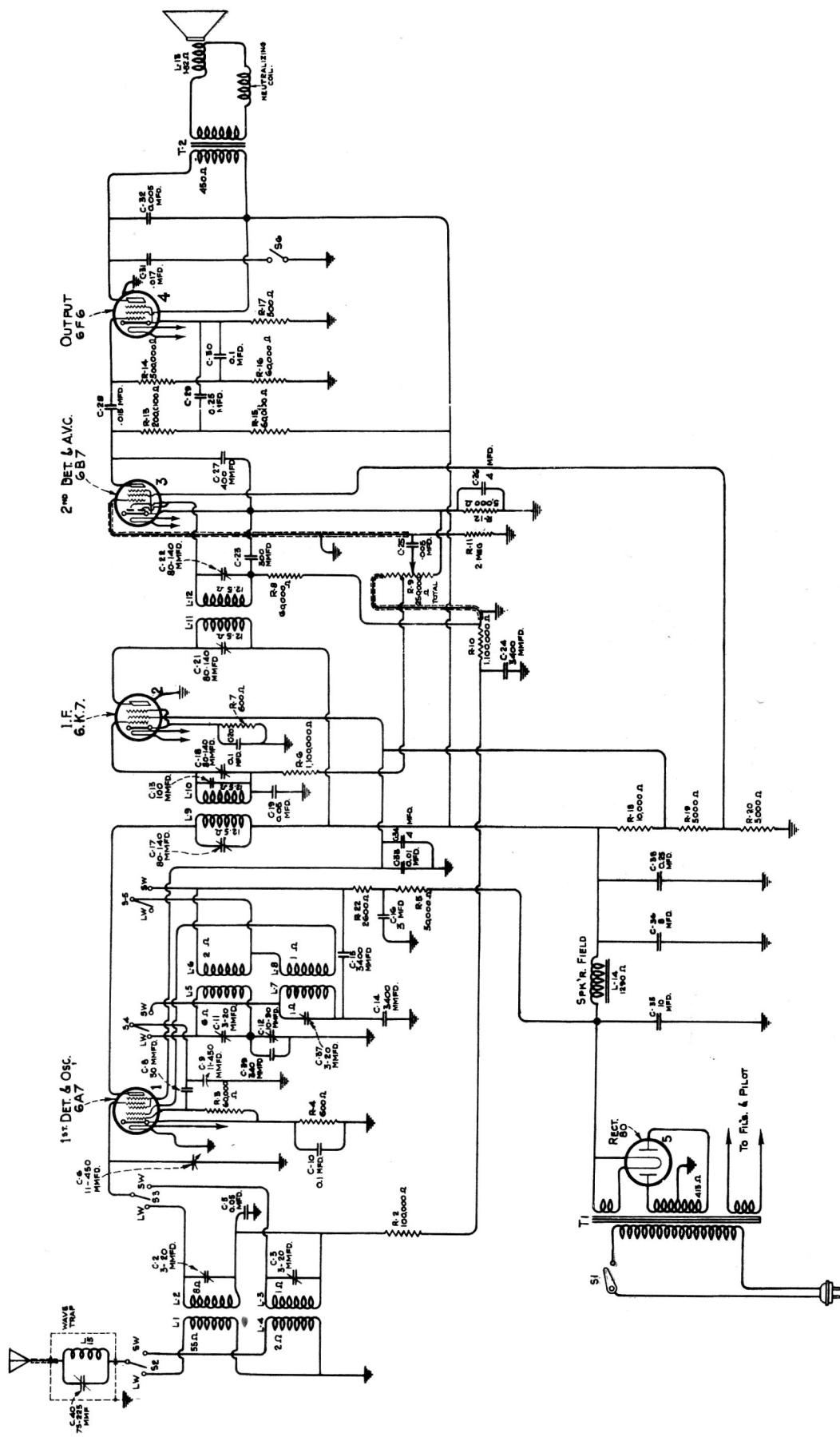


Fig. 6 - Schematic Circuit Diagram of Receiver Using Metal Tubes.

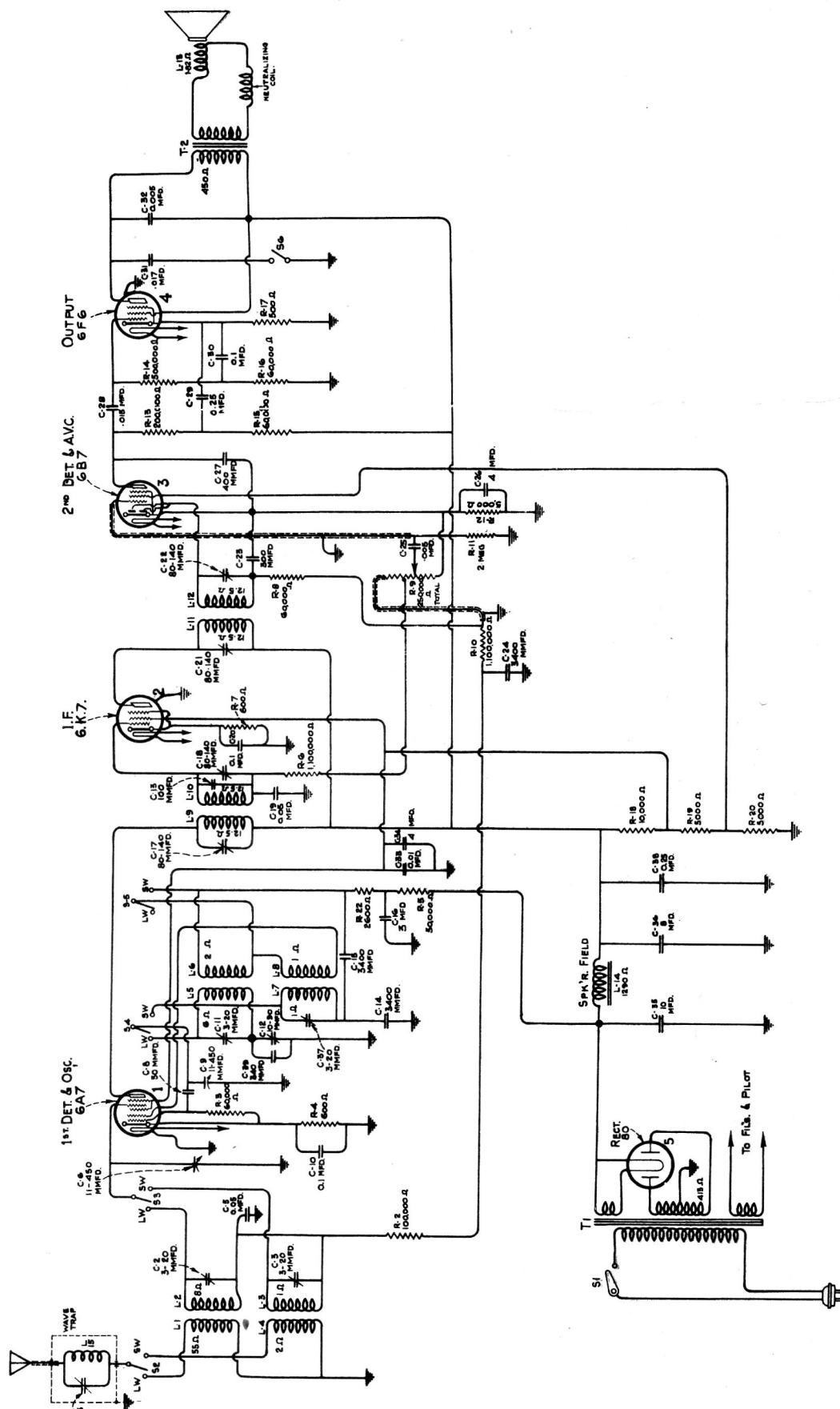


Fig. 6 - Schematic Circuit Diagram of Receiver Using Metal Tubes.

REPLACEMENT PARTS A-54 & A-58

STOCK NO.	DESCRIPTION	STOCK NO.	DESCRIPTION
RECEIVER ASSEMBLIES			
S-1067	Resistor - 500,000 ohms - Carbon Type - 1/4 Watt (R-14)	4438	Shield - 2nd Det. Radiotron Shield
2240	Resistor - 30,000 ohms - Carbon Type - 1 Watt (R-5)	3942	Shield - 1st Det. & Osc. Radiotron Shield
3116	Resistor - 200,000 ohms - Carbon Type - 1/4 Watt (R-13)	7800	Shield - Ant. Osc. or IF Trans. Coil Shield.
3118	Resistor - 100,000 ohms - Carbon Type - 1/4 Watt (R-2)	5052	Switch - Tone Control (S-6)
3218	Resistor - 600 ohms - Carbon Type - 1/4 Watt (R-4, R-7)	S-1561	Switch Assembly (S.W.-B.C.) (S-2, S-3, S-4, S-5)
3602	Resistor - 60,000 ohms - Carbon Type - 1/4 Watt (R-3, R-15, R-16)	9511	Transformer - Pwr. 105-125 Volt, 50-60 Cyc. (T-1)
4721	Resistor - Tapped one 10,000 ohms, two 5,000, one 500 Section (R-17, R-18, R-19, R-20)	9512	Transformer - Pwr. 105-125 Volt, 25-40 Cyc. (T-1)
4790	Volume Control (R-9)	4422	Clutch - Drive Assy.
4783	Resistor - 1,100,000 ohm - Carbon Type - 1/4 Watt (R-10)	REPRODUCER (Console)	
6242	Resistor - 2 Meg. Carbon Type - 1/4 Watt (R-11)	S-1563	Reproducer Complete.
4436	Resistor - 5,000 ohms Carbon Type - 1/4 Watt (R-12)	11253	Transformer - Output transformer (T-2)
4812	Resistor - 26,000 ohms Carbon Type - 1/4 Watt (R-22)	11258	Cone.
S-1360	Capacitor - Adjustable Trimmer Capacitor (C-12)	5085	Cable - 3 Conductor reproducer cable-complete - with female connectors
S-1547	Capacitor - 400 mmfd. (C-27)	5118	Connector - 3 contact male connector for reproducer cable
3597	Capacitor - .25 mfd. (C-29, C-38)	5119	Connector - 3 contact female connector for reproducer cable
3796	Capacitor - 4 mfd. ELECTROLYTIC (C-26)	S-1564	Field Coil and Cone Support
4442	Capacitor - 50 mmfd. (C-8)	REPRODUCER (Table)	
4428	Capacitor - 8 mfd. (C-36)	S-1565	Reproducer Complete.
4439	Capacitor - 3,400 mmfd. (C-15)	S-1473	Transformer - Output transformer (T-2)
4791	Capacitor - 0.1 mfd. (C-10, C-20, C-30)	11235	Cone.
4792	Capacitor - 0.015 mfd. (C-28)	S-1566	Field Coil and Cone Support
4793	Capacitor - 0.005 mfd. (C-32)	5085	Cable - 3 conductor reproducer cable complete with female connector.
4868	Capacitor - 0.005 mfd. (C-25)	5119	Connector - 3 contact female connector for reproducer cable
4883	Capacitor - .01 mfd. (C-33)	5118	Connector - 3 contact male connector for reproducer cable
4836	Capacitor - .05 mfd. (C-19, C-5)	MISCELLANEOUS PARTS	
4811	Capacitor - 340 mmfd. (C-39)	S-1559	Knob - Band Switch Knob.
4881	Capacitor - 3,400 mmfd. (C-15, C-14)	4256	Lamp - Pilot Lamp-Package of 2.
7790	Capacitor - 10 mfd. ELECTROLYTIC (C-35)	3529	Socket - Pilot Lamp socket.
5101	Capacitor - Dry ELECTROLYTIC one 8 mfd. & two 4 mfd. (C-16, C-34, C-36)	S-1555	Dial - Station selector dial Table model.
4504	Variable Capacitor - 2 Gang Tuning (C-6, C-9)	S-1556	Dial - Station selector dial Console model.
4906	Capacitor - 0.017 mfd. (C-31)	4449	Knob - Package of two
4430	Coil - Antenna Coil (L-1, L-2, L-3, L-4, C-2, C-3)	4613	Screw - 8-32 7/16" Headless set screw for knob - Package of 10.
4432	Coil - Oscillator Coil (L-5, L-6, L-7, L-8, C-11, C-37)	4944	Bezel - Station Selector Dial Bezel and Glass - Console Model.
S-1562	Transformer - First I.F. Transformer (L-9, L-10, C-17, C-18)	4476	Indicator Assy. Dial Pointer (Table)
4433	Transformer - Second I.F. Transformer (L-11, L-12, R-8, C-21, C-22 and C-23)	4363	Indicator Assy. Dial Pointer (Console)
S-1560	Wave Trap (L-15, C-40)	6672	Screen - Translucent screen for dial lamps Package of 3.
6300	Tube Socket - 4 contact.	S-1557	Bezel - Station Selector Dial Bezel and Glass - Table Model.
3572	Tube Socket - 7 contact.		
11198	Tube Socket - For Metal tubes.		
S-1151	Tube Socket - 4 Contact (Glass tube)		
11416	Shield - 6K7G Tube Shield less cap.		
11425	Cap - 6K7G Tube Shield cap		