

SUPPLEMENT TO
RCA VICTOR MODEL 5X

Late production Model 5X instruments incorporate a few minor changes from the original Model 5X. These changes are: (1) a fixed tuned wave-trap used in place of the adjustable wave-trap; and (2) a few component part changes as listed below. All Specifications and Service Data for Model 5X are directly applicable to these instruments except, under "Alignment procedure", omit the wave-trap adjustment. Visual inspection of the wave-trap will readily identify these instruments.

REPLACEMENT PARTS

<u>Stock No.</u>	<u>Description</u>
11414	Capacitor--0.1 Mfd. (C19)
13837	Capacitor pack--Comprising one 10Mfd. and two 16 Mfd. sections (C23, C24, C26)
12695	Resistor--15,000 ohms, insulated, 1/4 watt (R2)
12679	Resistor--2.2 megohms, insulated, 1/4 watt (R3, R7)
13836	Switch--Range switch (S2, S3, S4, S5)
13838	Trap--Wave trap (L1, C1)
13149	Coil--Reproducer field coil (L13, L15)

Stock Nos. 12537, 4835, 12398, 12410, 12411, 12399, 3404, 12402, 12395, 12497, 12499, 12731, 12498, 9684, 12500, 13150, 13071, 12936, and 12937 are not used in Model 5X with fixed wave-trap.

RCA VICTOR MODELS 5X, 5X3, and 5X4

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

TECHNICAL INFORMATION

Electrical Specifications

FREQUENCY RANGES		ALIGNMENT FREQUENCIES	
"Standard Broadcast" (A).....	540-1,800 kc.	"Standard Broadcast" (A)	600 kc. (osc.); 1,700 kc. (osc. and ant.)
"Short Wave" (B).....	1,800-6,500 kc.	"Short Wave" (B).....	None required
Intermediate Frequency.....			460 kc.
RADIOTRON COMPLEMENT		(3) RCA-75..... Second Detector, A-F, and A.V.C.	
(1) RCA-6A7.....	First Detector-Oscillator	(4) RCA-43.....	Power Output
(2) RCA-78.....	Intermediate Amplifier	(5) RCA-25Z5.....	Rectifier
Power Supply Rating (105-125 volts).....			50-60 cycles—60 watts, D-C—50 watts
POWER OUTPUT		LOUDSPEAKER	
Undistorted.....	0.4 watts AC, 0.3 watts DC	Type.....	Electrodynamic
Maximum.....	0.9 watts AC, 0.8 watts DC	Impedance (v.c.)	{M80864-1, 4.5 ohms } {M80864-2, 3.0 ohms } at 400 cycles
Pilot Lamps (2).....			Mazda No. 40, 6.3 volts, 0.15 amperes

Mechanical Specifications

CABINET DIMENSIONS	MODEL 5X	MODEL 5X3	MODEL 5X4
Height.....	9 $\frac{3}{8}$ inches.....	9 $\frac{5}{8}$ inches.....	7 $\frac{5}{8}$ inches
Width.....	12 $\frac{3}{16}$ inches.....	10 $\frac{3}{8}$ inches.....	10 $\frac{5}{8}$ inches
Depth.....	6 inches.....	6 inches.....	6 inches
WEIGHTS			
Net.....	11 pounds.....	10 $\frac{1}{2}$ pounds.....	9 $\frac{3}{4}$ pounds
Shipping.....	13 $\frac{1}{2}$ pounds.....	13 $\frac{1}{2}$ pounds.....	12 $\frac{3}{4}$ pounds
Chassis Base Dimensions.....	9 $\frac{1}{8}$ inches x 4 $\frac{3}{4}$ inches x 1 $\frac{7}{8}$ inches		
Over-all Height of Chassis.....	6 $\frac{1}{8}$ inches		
Tuning Drive Ratio.....	5 to 1		
Operating Controls.....	(1) Power Switch-Volume, (2) Tuning, (3) Range Selector		

General Features

Each model contains a five-tube chassis mounted in a table-type cabinet. The superheterodyne type of circuit is used, with such features of design as: automatic volume control, diode detection, magnetite core adjusted i-f transformers, improved core adjusted antenna wave-trap, band-selective illumination of full vision dial scales, five to one tuning ratio, resistance coupled audio system and an electrodynamic loudspeaker. The tuning range is continuous through the "Standard broadcast" and "Short wave" bands (in-

cluding 49 meters). The short-wave portion of this extensive range also includes channels assigned for police, amateur and aviation communication. Trimmer adjustments are located at accessible points. Their number is reduced to the least that is consistent with efficient operation. A mechanical interlock switch, in the power supply circuit, is provided on some models to prevent accidental shocks and damage to equipment from operating the receiver with the rear cover removed.

Circuit Arrangement

The conventional superheterodyne type of circuit, consisting of a combined first-detector-oscillator stage, a single i-f stage, a diode-detector-automatic-volume-control stage, an audio voltage amplifier stage, an audio power output stage, and a half-wave rectifier power supply stage, is used.

Tuned Circuits

The antenna coil system consists of two series-connected primary and two series-connected secondary windings to provide the two ranges of tuning. The oscillator coil is similarly wound on a single form.

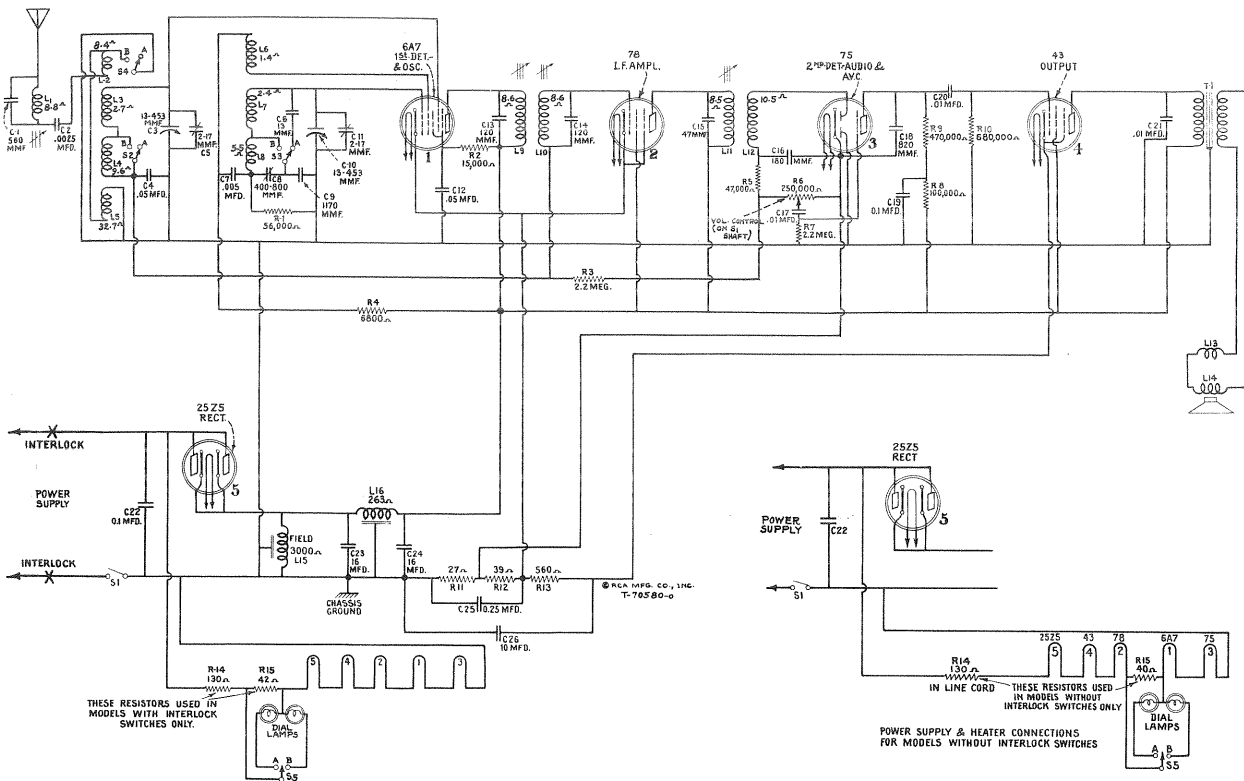


Figure 1—Schematic Circuit Diagram

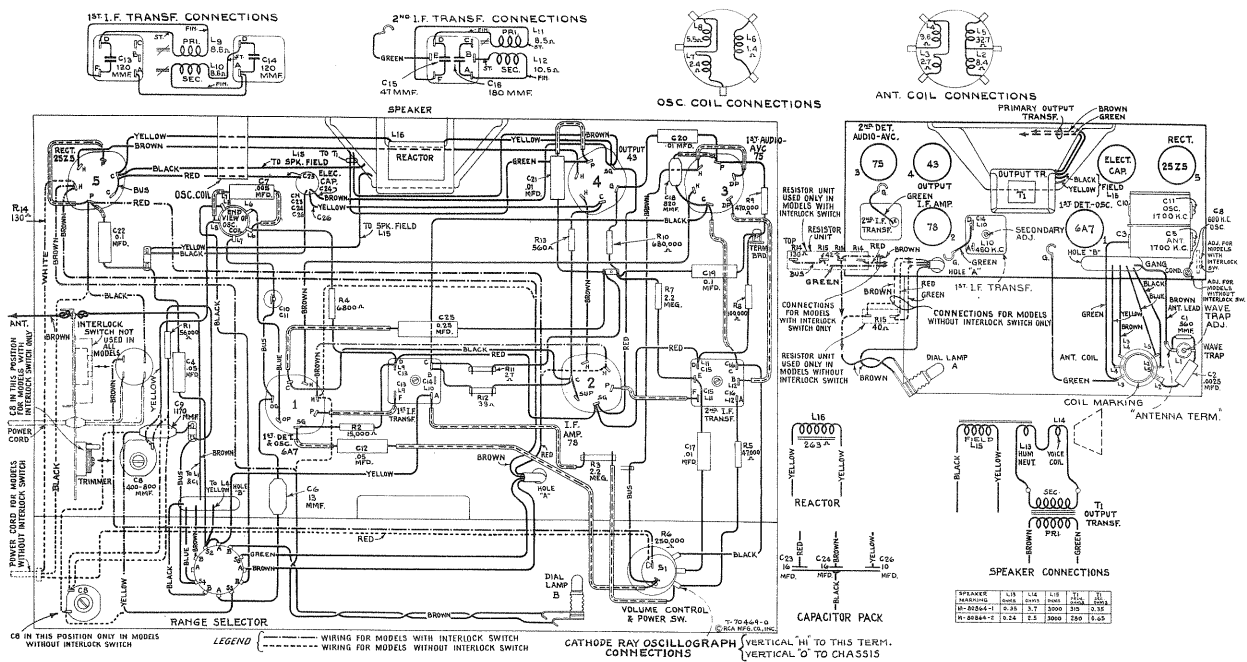


Figure 2—Chassis Wiring Diagram, Radiotron, Coil, and Trimmer Locations

A range selector switch, consisting of S2, S3, S4, and S5, is used to connect the various sections of these coil systems and to illuminate the proper dial scale for the band in operation. The coils are tuned by a variable two-section gang condenser having trimming capacitors in shunt with each section. A series trimming capacitor is also associated with the "Standard broadcast" oscillator coil.

The intermediate frequency amplifier system consists of an RCA-78 in a transformer coupled circuit. This stage operates at a basic frequency of 460 kc. Adjustable magnetite cores are provided for adjusting inductance of the input i-f transformer (primary and secondary) and the output transformer (primary) windings.

Detector and A. V. C.

The modulated signal, as obtained from the output of the i-f stage is detected by one of the diodes in the RCA-75 tube. The audio frequency component, secured by this process, is transferred from the movable arm of the volume control R6 through coupling capacitor C17 to the control grid of the RCA-75 for voltage amplification. The d-c voltage which results from detection of the signal is used for automatic volume control. This voltage which develops across resistor R6 is applied as automatic control grid bias to the first-detector and i-f tube through a suitable resistance filter circuit.

Audio System

The audio frequency component, mentioned under "Detection and a.v.c.," transferred to the control grid of the RCA-75, is amplified in the tube and then coupled to the control grid of the power output tube RCA-43 through capacitor C20. The output of the

power amplifier is transformer coupled into the dynamic loudspeaker.

Rectifier

The plate, grid, cathode and the loudspeaker field voltages required for the operation of this receiver are supplied by the RCA-25Z5 tube operating as a half-wave rectifier.

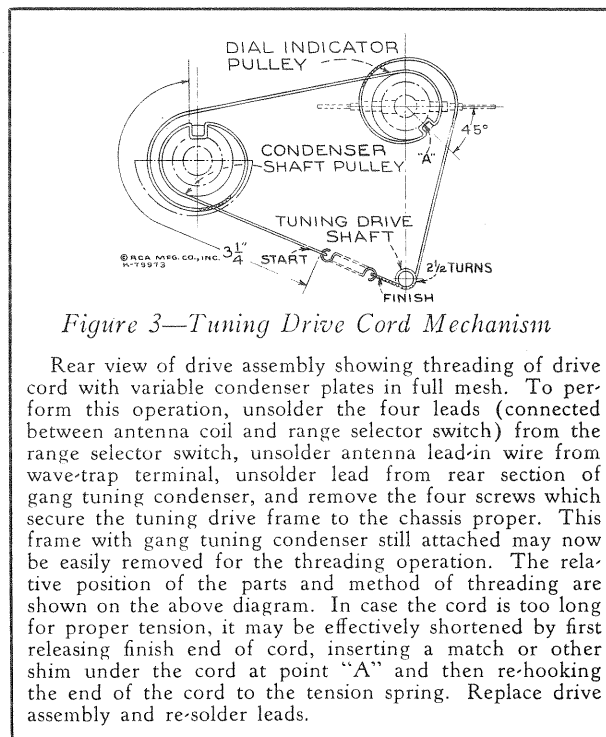


Figure 3—Tuning Drive Cord Mechanism

Rear view of drive assembly showing threading of drive cord with variable condenser plates in full mesh. To perform this operation, unsolder the four leads (connected between antenna coil and range selector switch) from the range selector switch, unsolder antenna lead-in wire from wave-trap terminal, unsolder lead from rear section of gang tuning condenser, and remove the four screws which secure the tuning drive frame to the chassis proper. This frame with gang tuning condenser still attached may now be easily removed for the threading operation. The relative position of the parts and method of threading are shown on the above diagram. In case the cord is too long for proper tension, it may be effectively shortened by first releasing finish end of cord, inserting a match or other shim under the cord at point "A" and then re-hooking the end of the cord to the tension spring. Replace drive assembly and re-solder leads.

SERVICE DATA

Caution: Certain tests (e. g. alignment and voltage measurement) require operation of receiver with the chassis removed from the cabinet. To permit such operation on models using interlock switch, it will be necessary to hold the interlock switch (see figure 5) closed either by inserting a screwdriver, rod, or pencil through the small interlock hole at rear of chassis, or by temporarily unhooking the interlock tension spring and pushing the interlock bar towards the front of the chassis. **Avoid external grounding of receiver or associated equipment** since the power supply is connected to the receiver chassis. Carelessness may cause serious damage to equipment. **Replace interlock tension spring upon completion of test.**

Alignment Procedure

There are three alignment trimmers provided in the antenna coil and oscillator coil tuned circuits. The i-f transformer adjustments are made by means of three screws attached to molded magnetite cores. Re-adjustment may occasionally occur from continued extremes of climate, tampering, purported alteration for services, or after repairs have been made to the r-f or i-f tuned circuits. Improper alignment usually causes the impairment of sensitivity, selectivity, and tone quality. Such conditions will usually exist simultaneously.

In re-adjusting the tuned circuits, it is important to apply a definite procedure and to use adequate and reliable test equipment. A standard test oscillator, such as the RCA Stock No. 9595 will be required as the source of the signal at the specified alignment frequencies. Visual indication of the receiver output during alignment is also necessary to accurately show when the correct point of adjustment is reached. The RCA Stock No. 4317 Neon Output Indicator is especially suitable for this use.

The procedure outlined below should be followed in adjusting the various trimming capacitors and molded magnetite cores:

I-F Core Adjustments

The three adjustment screws (one on top and one on bottom of first i-f transformer and one on bottom of second i-f transformer) are located as shown by figures 2 and 5. Each circuit must be aligned to a basic frequency of 460 kc. To do this attach the output indicator across the loudspeaker voice coil or across the output transformer primary. Connect the output of the test oscillator through a .05 mfd. capacitor to the RCA-6A7 control grid, the ground of the test oscillator being connected to the receiver chassis through a .05 mfd. capacitor. Set the test oscillator to 460 kc. Set the range selector to "Short-

wave" position. Advance the receiver volume control to its full-on position and adjust the receiver tuning control to a point within its range where no interference is encountered either from local broadcast stations or heterodyne oscillator. Increase the output of the test oscillator until a slight indication is apparent on the output indicator.

Adjust the bottom core screw of the second i-f transformer to produce maximum (peak) indicated receiver output. Then adjust the two core screws of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device.

During these adjustments regulate the test oscillator output so the indication is always as low as possible. By doing so, broadness of tuning due to a.v.c. action will be avoided. It is advisable to repeat the adjustment of all i-f core screws to assure that the inter-

action between them has not disturbed the original adjustment.

Wave-Trap Adjustment

Attach the output of the test oscillator to the "Antenna Terminal" (see wave-trap, top view chassis, figure 2) through an 80 mmfd. capacitor, the ground connection of the test oscillator and receiver chassis being connected through capacitor as before. Receiver "Antenna Wire" should be reeled up for this and the following r-f adjustments.

Leave the test oscillator adjusted to 460 kc. and range selector in "Short wave" position as before. Then adjust the wave-trap trimmer to the point which causes maximum suppression of the 460 kc. signal.

R-F Trimmer Adjustments

Roughly calibrate the tuning dial by setting the pointer to the bottom horizontal line at the low fre-

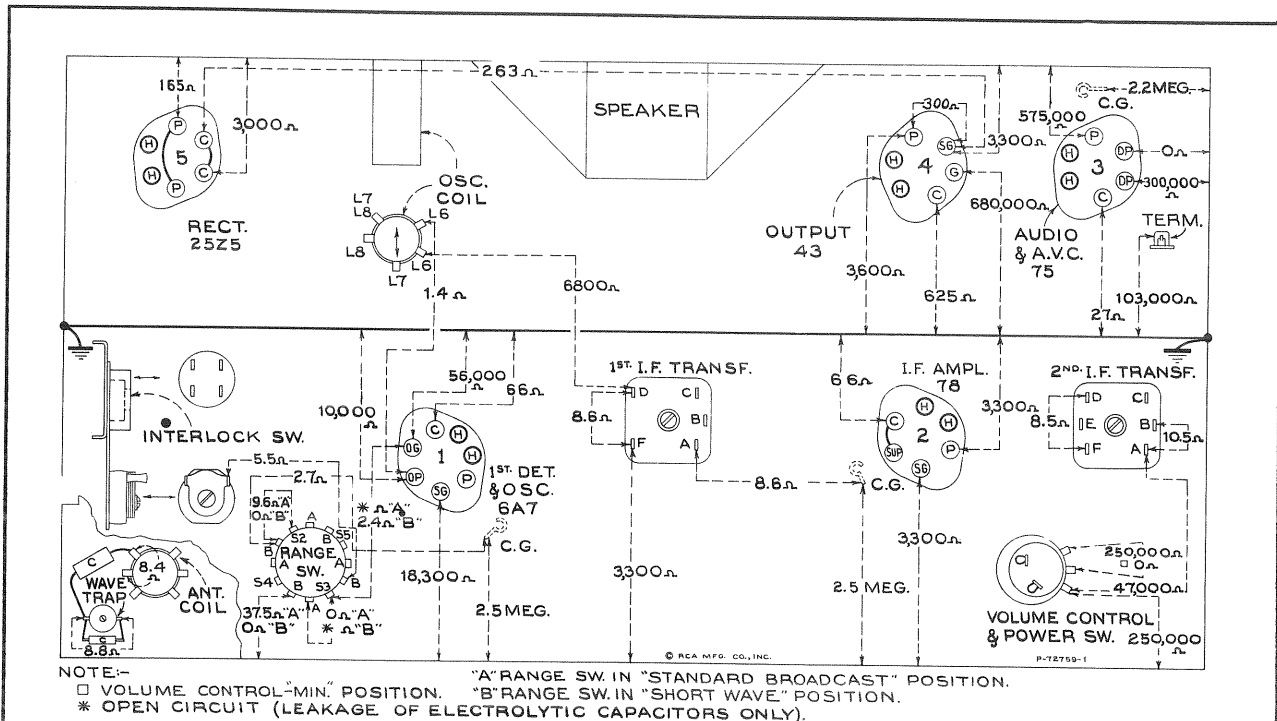


Figure 4—Resistance Diagram

Power supply disconnected—Radiotrons in sockets—Tuning condenser in full mesh
Range selector "Standard broadcast"—Volume control maximum

Resistance Measurements

The resistance values shown between Radiotron socket contacts, grid caps, resistors, terminals, and receiver chassis ground, on figure 4 have been carefully selected so as to facilitate a rapid check of the circuit for defective parts, bad joints, etc. The use of this diagram in conjunction with the Schematic Circuit Diagram, figure 1, and the Chassis Wiring Diagram, figure 2, will permit the location of certain troubles which would otherwise be difficult to ascertain. Each value as specified should hold within $\pm 20\%$. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. Resistance values

were measured with the Radiotrons in sockets, power supply disconnected, tuning condenser in full mesh, and volume control set at maximum except where otherwise noted. In all cases of measuring the resistance between points of the circuit and ground, it will be necessary to connect the negative (-) terminal of the resistance meter to the chassis ground. If the polarity of the resistance meter is not known, it may be readily ascertained by connecting a d-c voltmeter of indicated polarity across the terminals of the device.

quency end of the broadcast scale with the two-gang tuning condenser at its maximum capacity. The output indicator should be left connected to the output system. The connections for the test oscillator remain the same as for "Wave-trap" adjustment. Volume control should be in maximum position. Make sure range selector is set to "Standard broadcast."

Set oscillator and antenna trimming capacitors C11 and C5, respectively, to a position near minimum capacitance (plates near out). Adjust the test oscillator to 1,700 kc.

Tune the receiver to pick up this signal (near 1,700 kc. on dial) for maximum response disregarding dial reading. Always keep test oscillator output as low as is possible and still obtain visual indication. Adjust trimming capacitors C11 and C5 so that each produces maximum (peak) receiver output, re-adjusting receiver tuning slightly if necessary, but using the minimum trimming capacitance possible to obtain peaks. Adjust the dial pointer (without disturbing gang tuning condenser) to a dial reading of 1,700 kc.

Shift the test oscillator to 600 kc. Tune the receiver to receive the signal disregarding the dial reading at which it is best received. Then adjust the oscillator series capacitor, C8, simultaneously rocking the tuning control backward and forward through the signal until maximum receiver output results from these combined operations. The adjustment at 1,700 kc. should then be repeated to correct for any change which may have been caused by the oscillator series trimming capacitor adjustment.

Loudspeaker

Centering of the loudspeaker voice coil is made in the usual manner with three narrow paper feelers after first removing the front paper dust cover. This may be removed either permanently by cutting it away with a sharp knife, or by softening its cement with a very light application of acetone using care not to allow the acetone to flow down into the air gap. The dust cover may be cemented back in place with ambroid upon completion of adjustment.

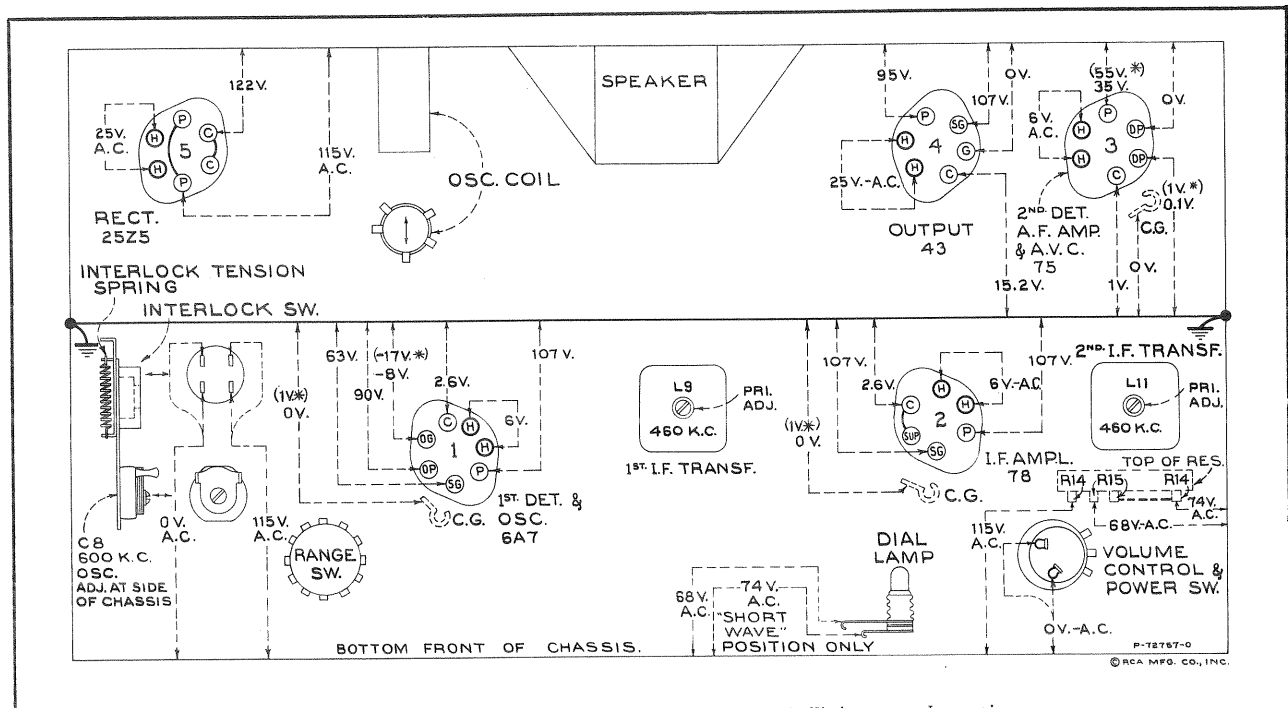


Figure 5—Radiotron Socket Voltages and Trimmer Locations

Measured at 115 volts, 60-cycle supply—For 115-volt d-c supply approximately 10% lower
Tuned to approximately 1,000 kc. ("Standard broadcast" range)—No signal being received—
Volume control setting optional

Radiotron Socket Voltages

The voltage values indicated from the Radiotron socket contacts, grid caps, resistors and terminals to receiver chassis ground on figure 5 will assist in locating cause for faulty operation. Each value as specified should hold within $\pm 20\%$ when the receiver is normally operative at its rated line voltage. Variations in excess of this limit will usually be indicative of trouble in the basic circuits. These voltages were measured with set tuned to approxi-

mately 1,000 kc. ("Standard broadcast" range); no signal being received and volume control setting optional. To duplicate the conditions under which the voltages were measured requires a 1,000-ohm-per-volt d-c meter, having ranges of 10, 50 and 250 volts. Use nearest range above voltage to be measured. A-C voltages were measured with a corresponding a-c meter.

REPLACEMENT PARTS

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

Stock No.	DESCRIPTION	LIST PRICE	Stock No.	DESCRIPTION	LIST PRICE
11409	Band—Tube shield rubber band—Package of 5.....	\$0.10	12408	Shield—Second I.F. transformer shield...	.28
12118	Cap—Grid contact cap—Package of 5....	.15	12396	Shield—75 or 78 Radiotron shield.....	.25
11465	Capacitor—Adjustable capacitor (C8)....	.48	3404	Spring—Power switch spring—Package of 10.....	.50
12535	Capacitor—13 Mmfd. (C6).....	.18	12007	Spring—Retaining spring for core Stock No. 12006—Package of 10.....	.36
12405	Capacitor—47 Mmfd. (C15).....	.26	12402	Switch—Interlocking switch and cover...	1.74
12404	Capacitor—120 Mmfd. (C13, C14).....	.26	12395	Switch—Range switch (S2, S3, S4, S5)..	.68
12406	Capacitor—180 Mmfd. (C16).....	.26	12403	Transformer—First intermediate frequency transformer, complete with shield (L9, L10, C13, C14).....	1.62
12537	Capacitor—560 Mmfd. (C1).....	.20	12407	Transformer—Second intermediate frequency transformer, complete with shield (L11, L12, C15, C16).....	1.45
12536	Capacitor—820 Mmfd. (C18).....	.25	12497	Trap—Wave trap (L1).....	.70
12534	Capacitor—1,170 Mmfd. (C9).....	.28	12394	Volume Control—Volume control and power switch (R6, S1).....	1.06
5107	Capacitor—.0025 Mfd. (C2).....	.16	REPRODUCER ASSEMBLIES (M80864-1)		
4868	Capacitor—.005 Mfd. (C7).....	.20	12499	Coil—Reproducer field coil (L15).....	1.60
4858	Capacitor—.01 Mfd. (C17, C20, C21)...	.25	12731	Coil—Reproducer neutralizing coil (L13)..	.22
4836	Capacitor—.05 Mfd. (C4).....	.30	12498	Cone—Reproducer cone, complete (L14)..	1.20
4886	Capacitor—.05 Mfd. (C12).....	.20	9684	Reproducer—Speaker, complete.....	5.16
4839	Capacitor—.1 Mfd. (C22).....	.28	12500	Transformer—Output transformer (T1)..	1.60
4835	Capacitor—.1 Mfd. (C19).....	.28	REPRODUCER ASSEMBLIES (M80864-2)		
4840	Capacitor—.25 Mfd. (C25).....	.30	13149	Coil—Reproducer field coil (L13, L15)..	1.60
12398	Capacitor Pack—Comprising two 16 Mfd. and one 10 Mfd. section (C23, C24, C26)	2.72	13148	Cone—Reproducer cone, complete (L14)..	1.25
4358	Clamp—Mounting clamp for capacitor Stock No. 12398.....	.15	9750	Reproducer—Speaker, complete.....	5.50
12495	Coil—Antenna coil (L2, L3, L4, L5)....	1.30	13151	Transformer—Output transformer (T1) ..	1.60
12496	Coil—Oscillator coil (L6, L7, L8).....	.80	DRIVE ASSEMBLIES		
13128	Cord—Power cord (130 ohm resistor R14) (Models without interlock switch only)	1.00	12401	Condenser—2-gang variable tuning condenser (C3, C5, C10, C11).....	2.35
12006	Core—Adjustable core for Stock Nos. 12403, 12407 and 12497.....	.22	12420	Cord—Variable tuning condenser drive cord—Package of 5.....	.20
4340	Lamp—Dial lamp—Package of 5.....	.60	12608	Dial—Dial scale—Used on Models 5X and 5X3 only.....	.45
12409	Lead—Antenna lead, approximately 20 feet long.....	.35	13071	Dial—Dial scale—Used on Model 5X4 only45
12397	Reactor—Filter reactor (L16).....	1.14	12419	Indicator—Station selector indicator pointer15
12453	Resistor—27 ohm—insulated, 1/4 watt (R11)—Package of 5.....	1.00	12416	Pulley—Indicator pointer drive pulley and shaft24
12415	Resistor—39 ohm—insulated, 1/4 watt (R12)—Package of 5.....	1.00	12417	Pulley—Variable tuning condenser shaft pulley, with set screws.....	.24
12414	Resistor—560 ohm—insulated, 1/4 watt (R13)—Package of 5.....	1.00	12418	Screw—8-32x3/16 in. milled head, cupped point set screw for condenser drive pulley Stock No. 12417—Package of 10..	.18
12265	Resistor—6,800 ohm—insulated, 1/4 watt (R4)—Package of 5.....	1.00	12422	Shaft—Variable tuning condenser drive (knob) shaft.....	.26
12410	Resistor—15,000 ohm—insulated, 1/4 watt (R2)—Package of 5.....	1.00	12421	Spring—Variable tuning condenser drive cord tension spring—Package of 10....	.60
12412	Resistor—47,000 ohm—insulated, 1/4 watt (R5)—Package of 5.....	1.00	MISCELLANEOUS ASSEMBLIES		
12286	Resistor—56,000 ohm—insulated, 1/4 watt (R1)—Package of 5.....	1.00	12548	Crystal—Station selector crystal and bezel—Used on Models 5X and 5X3 only..	1.06
12263	Resistor—100,000 ohm—insulated, 1/4 watt (R8)—Package of 5.....	1.00	12936	Crystal—Station selector crystal and bezel—Used on Model 5X4 only.....	.90
12285	Resistor—470,000 ohm—insulated, 1/4 watt (R9)—Package of 5.....	1.00	12673	Knob—Station selector, volume control or range switch knob—Package of 5—Used on Models 5X and 5X3 only....	.58
12413	Resistor—680,000 ohm—insulated, 1/4 watt (R10)—Package of 5.....	1.00	12937	Knob—Station selector, volume control or range switch knob—Package of 5—Used on Model 5X4 only.....	.65
12411	Resistor—2.2 megohm—insulated, 1/4 watt (R3, R7)—Package of 5.....	1.00	4119	Screw—Set screw for knob Stock No. 12673 and 12937—Package of 20.....	.38
12399	Resistor—Comprising one 130 ohm and one 42 ohm sections (R14, R15) (Models with interlock switch only)...	1.40			
12845	Resistor—40 ohm—wire wound (R15) (Models without interlock switch only).	.40			
4786	Socket—6-contact 78, 75, 43 or 25Z5 Radiotron socket.....	.15			
4787	Socket—7-contact 6A7 Radiotron socket.	.15			
12400	Socket—Dial lamp socket.....	.22			
12008	Shield—First I.F. transformer shield.....	.28			
12607	Shield—First I.F. transformer shield top.	.30			

The prices quoted above are subject to change without notice.