RCA VICTOR MODELS 8T2, 8T11, and 8K11

Eight-Tube, Three-Band, A-C, Superheterodyne Receivers TECHNICAL INFORMATION

Electrical Specifications

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Frequency Ranges	Alignment Frequencies
"Long Wave" (X) 155-33	20 kc "Long Wave" (X)
"Medium Wave" (A) 530-1,50	175 kc (osc.), 300 kc (osc., det., ant.)
"Short Wave" (C) 5,400-18,00	00 kc "Short Wave" (C) 15,000 kc (osc., det., ant.)
Intermediate Frequency	460 kc
RADIOTRON COMPLEMENT	
(1) RCA-6K7 Radio-Frequency Amp (2) RCA-6A8 First Detector—Osci (3) RCA-6K7 Intermediate Amp (4) RCA-6H6 Second Detector—A	illator (6) RCA-6F6 Audio Power Amplifier
Power Supply Ratings	
Rating B	
POWER OUTPUT RATING	Loudspeaker
Undistorted 2½ Maximum 5	$\begin{array}{llllllllllllllllllllllllllllllllllll$
Mechan	nical Specifications
CABINET DIMENSIONS Mod	lel 8T2 Model 8T11 Model 8K11
Width 153/4	inches
WEIGHTS	
Net 35 pc Shipping 41 pc	ounds
Over-all Height of Chassis	

General Features

These receivers employ the same type chassis and have many distinctive features. Models 8T2 and 8T11 employ an 8-inch dynamic loudspeaker and Model 8K11 employs a 12-inch dynamic loudspeaker. The superheterodyne circuit is used with such features of design as all-metal tubes, a radio-frequency amplifier stage, "Magic Eye" tuning indicator, improved antenna wave-trap, aural compensated volume control, 3-position tone control with music-voice

switch, automatic volume control, resistance coupled audio system, phonograph terminal board, band selective illumination of dial scales, and a dust-proof loudspeaker. Trimming adjustments are located at accessible points. Their number is reduced to the least that is consistent with efficient operation. The tuning dial ratio of 10 to 1 with a 50 to 1 vernier permits ease of tuning, especially in the "Short wave" band.

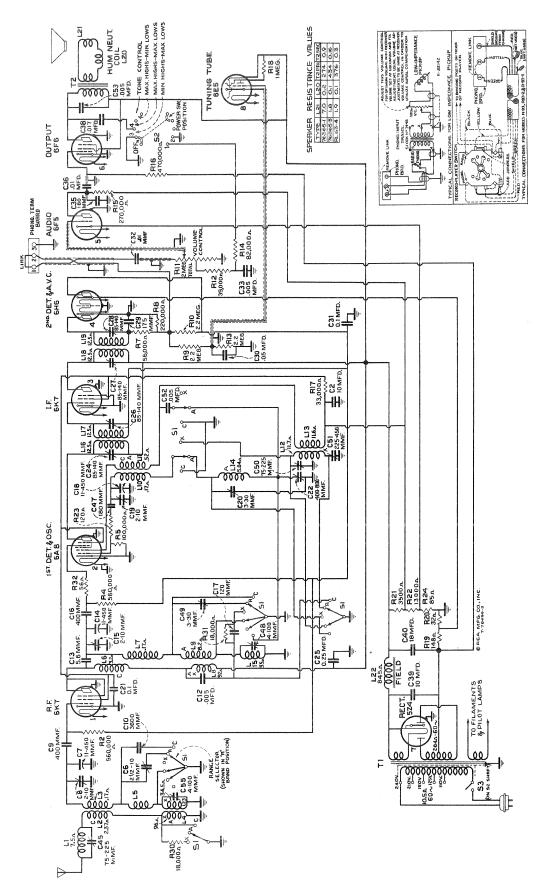
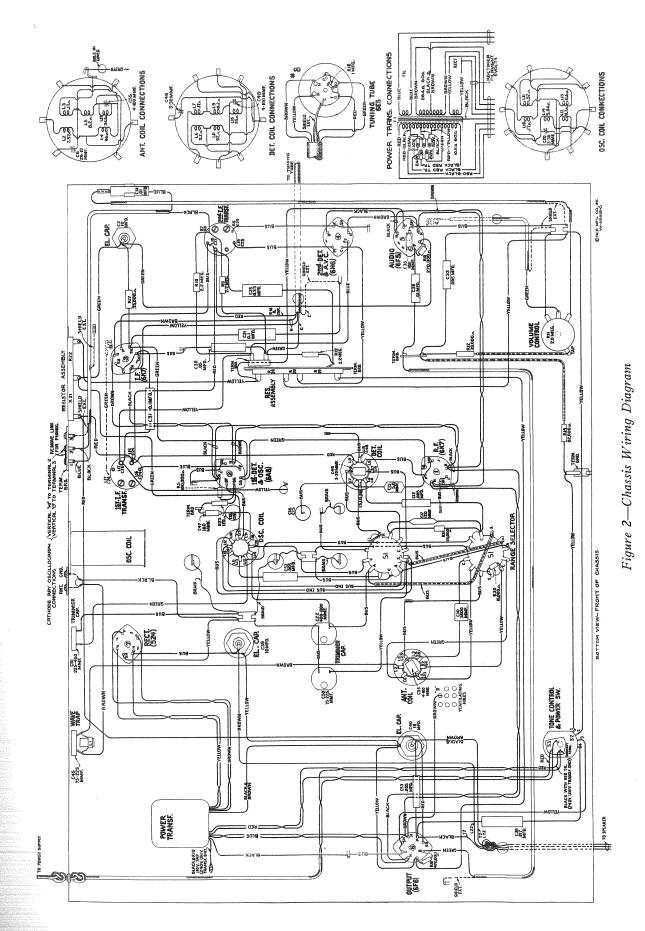


Figure 1—Schematic Circuit Diagram



Circuit Arrangement

The conventional Superheterodyne type of circuit, consisting of an r-f stage, 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 high-voltage rectifier power-supply stage is used.

Tuned Circuits

The antenna coil system and the detector coil system each consist of two series-connected primary and three series-connected secondary windings to provide the three ranges of tuning. The oscillator coil system is wound on a single form. A range selector switch (S1) is used for connecting the various sections of these three coil systems into the circuit to provide operation on the band desired. The coils are tuned by a variable three-section gang condenser having trimmer capacitors in shunt with each section. There are additional trimmer capacitors across the section of each coil used for the "Medium wave" (A) band as well as the "Long wave" (X) band. A series trimmer is also associated with the "Medium wave" (A) and "Long wave" (X) band oscillator coils.

The intermediate-frequency amplifier system consists of an RCA-6K7 in a transformer-coupled circuit. This stage operates at a basic frequency of 460 kc. Each winding of both i-f transformers (input and output) is tuned by an adjustable trimmer.

Detector and A.V.C.

The modulated signal as obtained from the output of the i-f stage is detected by an RCA-6H6 twindiode tube (No. 1 diode). The audio frequency secured by this process is transferred to the a-f system for amplification and final reproduction. The d-c voltage which results from detection of the signal is used for automatic volume control. This voltage, which develops across resistor R8, is applied as automatic control-grid bias to the r-f, first-detector, and i-f tubes through a suitable resistance filter circuit. The No. 2 diode of the RCA-6H6 is used to supply residual bias for the controlled tubes under conditions of little or no signal. This diode, under such conditions, draws current which flows through resistors R10 and R8, thereby maintaining the desired mini-

mum operating bias on such tubes. On application of signal energy above a certain level, however, the auxiliary bias-diode ceases to draw current and the a.v.c diode takes over the biasing function.

Audio System

The manual volume control consists of an acoustically tapered potentiometer in the audio circuit between the output of the detector diode and the input grid of the audio-voltage-amplifier tube. This control has a tone compensating filter connected to it so that the correct aural balance will be obtained at different volume settings.

Resistance-capacitance coupling is used between the first-audio stage and the power-output stage. The output of the power amplifier is transformer-coupled into the dynamic loudspeaker. High-frequency tone control is effected by a capacitor across the plate circuit of the output tube. Speech-music control is effected by a resistor connected to the compensated volume control circuit. Control of tone is obtained by means of the switch (S2).

"Magic Eye"

An RCA-6E5 cathode-ray tuning tube is used as a means of visually indicating when the receiver is accurately tuned to the incoming signal. This tube consists of an amplifier section and a cathode-ray section built in the same glass envelope. Correct tuning of the receiver to the incoming carrier is evidenced by the minimum width of the dark sector of the tuning tube.

Rectifier

The power required for operation of this receiver is supplied through transformer T1. This transformer has an efficient electrostatic shield between its primary and secondary windings. This shield prevents interference which is on the power-supply circuit from entering the receiver and conversely reduces the tendency of the receiver to re-radiate into the power circuit. An RCA-5Z4 furnishes the d-c voltages necessary for plate, screen, cathode, and grid potentials. The field winding of the loudspeaker is used as a reactor in the filter circuit from which it simultaneously receives its magnetizing current.

SERVICE DATA

The various diagrams of this booklet contain such information as will be needed to locate causes for defective operation if such develops. Values of the resistors, capacitors, coils, etc., are indicated adjacent to the symbols signifying these parts on the diagrams. Identification titles, such as R30, L1, C45, etc., are provided for reference between the diagrams and the replacement parts list. Locating of the parts in the schematic circuit is facilitated by the fact that the numerical titles increase from left to right on the diagram. The coils, reactors, and transformer windings are rated in terms of their dc resistances only. Resistance values of less than one ohm are generally omitted.

Alignment Procedure

Precise alignment is vital to the proper functioning of this receiver. There are four trimming adjustments provided in the i-f system, five in the oscillator coil system, three in the detector coil system, and three in the antenna coil system. Each of these trimmers has been accurately adjusted during manufacture and should remain properly aligned unless affected by abnormal conditions of climate or have been altered for service purposes. Incorrect alignment is usually evidenced by loss of sensitivity, improper tone quality, and poor selectivity. These indications will generally be present together.

The correct performance of these receivers can only be obtained when the alignment is performed with adequate and reliable test apparatus and in the sequence given. The manufacturer of these instruments has a complete assortment of such service equipment available for sale through its dealers and distributors.

A test oscillator (signal generator) is required as a source of the specified alignment frequencies. Visual indication of the receiver output during the adjustments is necessary to enable the serviceman to obtain an accuracy of alignment which is not possible by listening to the signal. The RCA Stock No. 9595 Full-Range Test Oscillator and the RCA Stock No. 4317 Neon Output Indicator are especially suitable and fulfill the above requirements.

The following procedure should be adhered to in adjusting the various trimmer capacitors.

I-F Trimmer Adjustments

The four trimmers of the two i-f transformers are located as shown by figure 6. Each must be aligned to a basic frequency of 460 kc. To do this, attach the output indicator across the voice-coil circuit. Attach the receiver chassis to a good external ground. Connect the output of the test oscillator between the control-grid of the RCA-6A8 first-detector tube and chassis ground through a .001 mfd. capacitor. Tune the test oscillator to 460 kc. Advance the receiver volume control to its full-on position and adjust the receiver tuning control to a point where no interference is encountered from broadcast stations, or short stator of oscillator tuning capacitor C18 to chassis eliminating local oscillator signals. Increase the output of the test oscillator until a slight indication is apparent on the output indicator. Adjust the two trimmers, C28 and C27 of the second i-f transformer to produce maximum (peak) indicated receiver output. Then, adjust the two trimmers, C26 and C24, of the first i-f transformer for maximum (peak) receiver output as shown by the indicating device. During these adjustments, regulate the testoscillator output so that the receiver output 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 trimmers a second time to assure that the inter-action between them has not disturbed the original adjustment.

R-F Trimmer Adjustments

The eleven trimmers associated with the r-f, first detector, and oscillator tuned circuits have their locations shown by figures 3 and 6. The three trimmers which are at all times directly in shunt with the variable tuning condensers necessitate that the "Short wave" (C) band be aligned first. The range selector switch should, therefore, be turned to its "Short wave" position for the first adjustments. Leave the output indicator connected to the output system.

Calibrate the dial by rotating the tuning control until the variable condenser plates are in their fullmesh (maximum capacity) position and adjust the dial pointer so that its end points to the horizontal graduation (520 kc) at the low-frequency end of the "Medium wave" (A) dial scale.

Wave-Trap Adjustment

Connect the test oscillator to the antenna and ground terminals of the receiver, leaving it tuned to 460 kc. Adjust the wave-trap trimmer C45 for maximum suppression of the 460 kc signal. An increase in test-oscillator output may be necessary before the point of minimum output (maximum suppression of signal) is obtained.

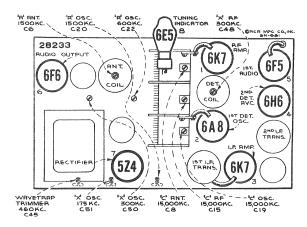


Figure 3—Radiotron and R-F Trimmer Locations

"Short Wave" Band

- (a) Adjust the test oscillator to 15,000 kc and set the receiver tuning control to a dial reading of 15,000 kc.
- (b) Adjust trimmer C19 on the oscillator section of the variable condenser to the point at which it produces maximum indicated receiver output. Two points may be found, each of which produces such a maximum. The one of maximum trimmer capacitance is correct and should be used. The local (heterodyne) oscillator will be 460 kc below the signal frequency at this adjustment point.
- (c) Adjust trimmer C15 of the detector section of the variable condenser, simultaneously rocking the receiver tuning control backward and forward through the 15,000 kc input signal, until maximum receiver output results from these combined operations.
- (d) With the receiver tuning control set to 15,000 kc adjust trimmer C8 on the antenna section of the variable condenser to the point which produces maximum (peak) indicated receiver output.

"Medium Wave" Band

- (e) Change the receiver range selector to its "Medium wave" (A) band position and set the receiver tuning control to a dial reading of 1,500 kc. Tune the test oscillator to 1,500 kc and regulate its output to produce a slight indication on the receiver output indicating device.
- (f) Adjust the high-frequency trimmers of the oscillator, detector, and antenna coils, C20, C49 and C6 respectively, to the points at which each produces maximum indicated receiver output.
- (g) Shift the test-oscillator frequency to 600 kc and tune the receiver to pick up this signal, disregarding the dial reading at which it is best received.
- (h) Adjust the low-frequency trimmer C22 of the oscillator coil, simultaneously rocking the tuning control of the receiver backward and forward through the signal, until maximum indicated receiver output results from these combined operations. The adjustment of C19, C15 and C8 should be corrected at 15,000 kc

as in (b), (c), and (d); also C20, C49 and C6 should be corrected at 1,500 kc, as in (f) to compensate for any changes caused by the adjustment of the low-frequency oscillator coil trimmer C22.

"Long Wave" Band

- (i) Change receiver band selector to "Long wave" (X) band and set receiver tuning control to a dial reading of 300 kc. Tune test oscillator to 300 kc and adjust oscillator, detector, and antenna trimmers C50, C48 and C55, respectively, for maximum indicated receiver output.
- (j) Set receiver to 175 kc and tune test oscillator to 175 kc. Adjust trimmer C51 for maximum indicated output, simultaneously rocking tuning control of the receiver backward and forward through the signal.
- (k) The adjustment of C50, C48 and C55 should now be repeated at 300 kc as described in (i) to compensate for any changes caused by the adjustment of the low-frequency trimmer C51.

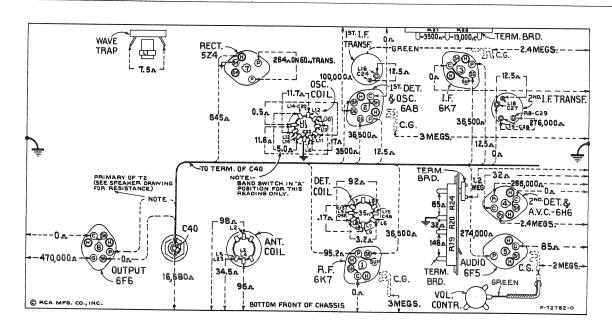


Figure 4—Resistance Diagram

Power supply disconnected—Radiotrons in sockets—Tuning condenser in full-mesh—Range selector in "Long wave" position—Volume control maximum—Power switch—Tone in "OFF" position

Resistance Measurements

The resistance values shown between Radiotron socket contacts, grid caps, resistors, and terminals to receiver chassis ground or other pertinent point on figure 4, permit a rapid continuity check of the circuits. The use of this diagram in conjunction with the Schematic Circuit Diagram, figure 1, and Wiring Diagram, figure 2, will permit the location of certain troubles which might otherwise be difficult to ascertain. Each value as specified should hold within

± 20%. Variations in excess of this limit will usually be indicative of trouble in circuit under test. When measuring the resistance between points of the circuit and ground, it will be necessary to connect the negative terminal of the resistance meter to 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.

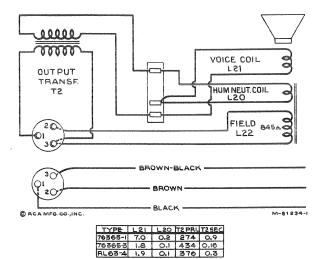


Figure 5—Loudspeaker Wiring
Coil resistances type RL70-1, same as RL63-4

Phonograph Terminal Board

A terminal board is provided for connecting a phonograph into the audio amplifying circuit

Radiotron Cathode Current Readings
Measured with Milliammeter Connected at Tube
Socket Cathode Terminals under Conditions
Similar to Those of Voltage Measurements
(1) RCA-6K7—R-F 12.5 ma.
(2) RCA-6A8—DetOsc 13.8 ma.
(3) RCA-6K7—I.F 9.0 ma.
(4) RCA-6H6—2nd DetA.V.C. —
(5) RCA-6F5—Audio 0.25 ma.
(6) RCA-6F6—Power 40.0 ma.
(7) RCA-5Z4—Rect 90.0 ma.*
(8) RCA-6E5—Eye 3.0 ma.
(* Cannot be measured at socket.)

Typical methods of connecting a low-impedance pickup, or the RCA Victor Models R-93, R-93-2, and R-93-S Record Players are shown on the Schematic Diagram (figure 1).

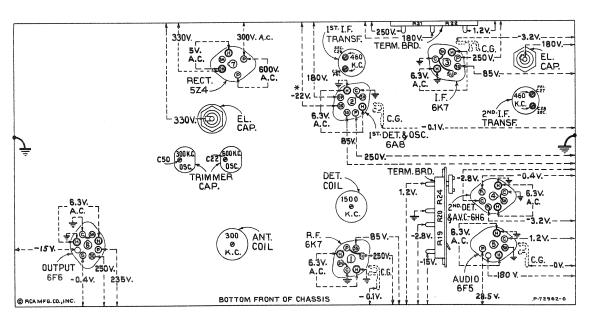


Figure 6—Radiotron Socket Voltages, Coil, and Trimmer Locations

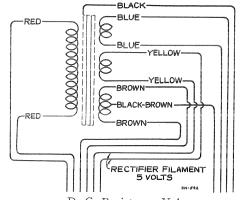
Measured at 115 volts, 60-cycle supply—Tuned to approximately 1,000 kc—No signal being received—

Volume control minimum—Power switch—Tone full clockwise

Radiotron Socket Voltages

Note: The asterisk (*) value may vary appreciably. The voltage values indicated from the Radiotron socket contacts, grid caps, resistors, and terminals to receiver chassis ground on figure 6 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. 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, 250, 500, and 1,000 volts. Use the nearest range above the specified measured voltage. A-c voltages were measured with a corresponding a-c meter.



D. C. Resistance Values

110 volts, 50-60 cycles Primary, 5.34 ohms Secondary, 330 ohms 110 volts, 25 cycles Primary, 7.37 ohms Secondary, 430 ohms SERVICE HINT

Excessive heating of the 6E5 tube may be due to high cathode current—in excess of 7 ma. The tube should be replaced and the condition of the 5Z4 rectifier checked.

Figure 7—Standard Transformer

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
	RECEIVER ASSEMBLIES		13094	Dial—Station selector dial scale	\$1.05
12706	Arm—Arm and hub assembly for op-		11394	Foot—Chassis foot assembly—Package	
13098	erating shutter Board—Antenna and ground terminal	\$0.22	12712	of 2	.70
12717	board	.25 .22	5226	pointer Lamp—Dial lamp—Package of 5	.22
5237	Bushing—Variable tuning condenser	. Eu &a	12718	Mask—Dial Light Diffuser with colored	
	mounting bushing assembly—Package	40	11000	screen	.40
11625	of 3	.43	11393	Resistor—Voltage divider resistor—com prising one 3,500 ohm and one 13.000	
	plete with socket	1.26		ohm sections—(R21, R22)	.74
12511	Cap—Contact cap—Package of 5	.15	11329	Resistor—Voltage divider resistor— com-	
4955 11256	Capacitor—Adjustable trimmer (C45) Capacitor—Adjustable trimmer (C50)	.48 .48		prising one 148 ohm, one 32 ohm and	
11465	Capacitor—Adjustable trimmer (C30)	.48	10077	one 85 ohm sections— (R19, R20, R24)	.52
12065	Capacitor—Adjustable trimmer (C51).	.65	12075	Resistor—56 ohms—Flexible type complete with contact cap—(R32)	.28
12814 12974	Capacitor—5.6 Mmfd.—(C13)	.20	12071	Resistor—120 ohms—Carbon type— ¹ / ₄	.20
13003	Capacitor—120 Mmfd.—(C17) Capacitor—180 Mmfd.—(C35, C47)	.20 .20		watt-(R23)-Package of 5	1.00
5116	Capacitor—175 Mmfd.—(C35, C47)	.18	12070	Resistor—18,000 ohms—Carbon type—	
11290	Capacitor—400 Mmfd.—(C9, C16)	.25	5033	1/10 watt—(R30, R31)—Package of 5 Resistor—33,000 ohms—Carbon type—	.75
11621	Capacitor—3,600 Mmfd.—(C10)	.38	3033	1 watt—(R17)—Package of 5	1.10
4868	Capacitor—.005 Mfd.—(C12, C33, C52, C53)	.20	11322	Resistor —39,000 ohms—Carbon type—1/4	1.20
11451	Capacitor—.017 Mfd.—(C38)	.18	11000	watt—(R12)—Package of 5	1.00
11395	Capacitor—.01 Mfd.—(C32)	.18	11365	Resistor—82,000 ohms—Carbon type—1/4 watt—(R14)—Package of 5	1.00
4858	Capacitor—.01 Mfd.—(C36)	.25	3118	Resistor—100,000 ohms—Carbon type—	1.00
4839 4841	Capacitor—0.1 Mfd.—(C21) Capacitor—0.1 Mfd.—(C31)	.28 .22	3110	watt—(R5)—Package of 5	1.00
5170	Capacitor—0.25 Mfd.—(C25)	.25	11453	Resistor—270,000 ohms—Carbon type—	1.00
4836	Capacitor—.05 Mfd.—(C30)	.30		1/10 watt—(R15)—Package of 5	.75
11240	Capacitor—10 Mfd.—(C39)	1.08	11452	Resistor—470,000 ohms—Carbon type—	
11387 5212	Capacitor—10 Mfd.—(C2)	.86	11397	1/10 watt—(R16)—Package of 5 Resistor 560,000 ohms—Carbon type—	.75
12061	Capacitor—18 Mfd.—(C40) Coil—Antenna coil—Less shield—(L2,	1.16	1200,	1/10 watt—(R2, R4)—Package of 5	.75
	L3, L4, L5, L23, C6, C55)	1.90	12013	Resistor—1 megohm—Carbon type—1/10	
12062	Coil—Detector coil—Less shield—(L6,		11606	watt—(R18)—Package of 5	.75
12063	L7, L8, L9, L15, C48, C49)	1.94	11626	Resistor—2.2 megohms—Carbon type— 1/4 watt—(R9, R10, R13)—Package of	
12003	L11, L12, L13, L14, C20)	2.62		5	1.00
12965	Condenser—Three-gang variable tuning	2.02	4669	Screw-No. 8-32 set screw for arm stk	
	condsenser—(C7, C8, C14, C15, C18,		10011	No. 12706—Package of 10	.25
	C19)	6.15	12064	Shield—Antenna or detector coil shield	.28

The prices quoted above are subject to change without notice.

REPLACEMENT PARTS (Continued)

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
11604 11390	Shield—Oscillator coil shield Shield—Intermediate frequency transformer shield	\$0.24 .25	9634 11837	Reproducer—Complete Transformer—Output transformer (Field and hum coils are not removable)	\$6.40 1.56
12735 12971	Shield—Dial lamp shield—Package of 5 Shutter—Dial scale holder and shutter	.25		Speaker No. 76365-3	
11222	assembly Socket—Dial lamp socket	.85 .18	11844 11842	Coil—Field coil Coil—Hum neutralizing coil	2.00 .30
11195	Socket—5-contact rectifier Radiotron socket	.15	11838 5118	Cone—Reproducer Cone Connector—3 contact male connector for	2.00
11198	Socket—7-contact 6K7—6F5—or 6H6 Radiotron socket	.15	9635	reproducer Reproducer—Complete	.25 6.40
11196	Socket—8 contact 6A8 or 6F6 Radiotron socket	.15 1.75	11839	Spring — Reproducer center support clamping spring—Package of 2	.30
12966 11392	Switch—Range switch—(S1) Switch—Tone control and power switch assembly—(S2, S3)	1.14	11843	Transformer—Output transformer	1.56
11388	Transformer—First intermediate frequency transformer—(L16, L17, C24,		11996	MISCELLANEOUS ASSEMBLIES Bracket—Tuning tube mounting bracket	
11389	C26)	1.90	12666	and clamp Cover—Reproducer cover—(Model	.22
11004	quency transformer—(L18, L19, C27, C28, C29, R7, R8)	3.02	12698	8K11) Crystal—Station selector escutcheon and	.65
11804	Transformer—Power transformer—105- 125 volts—25-50 cycles (T1) Transformer—Power transformer—105-	6.02	13303	crystal—(Model 8T2) Crystal—Station selector escutcheon and crystal—(Model 8T11 or 8K11)	1.02
11005	130, 140-160, 195-250 volts—40-60 cycles (T1)	7.95	11276	Escutcheon—Tuning tube escutcheon— (Model 8T2)	.40
11667 13144	Trap—Wave trap—(L1, C45)	1.22 1.00	13275	Escutcheon—Tuning tube escutcheon (Model 8T11 or 8K11)	.25
	REPRODUCER ASSEMBLIES Speaker No. RL63-4 or RL70-1		11347	Knob—Range switch, tone control or volume control knob—Package of 5 (Model 8T2)	.75
11232	Board—Terminal board with two lead wire clips	.18	11610	Knob—Station selector knob—includes one large and one small knob—Package	.,,
8060	Bolt—Yoke and core assembly bolt and nut	.16	13304	of 5—(Model 8T2)	1.00
11257	bracket	.14	13395	Model 8T11 only—Package of 5 Knob—Large station selector knob—	.75
	ing nut and screw assembly—Package of 5	.25	13305	Model 8K11 only—Package of 5 Knob—Small (Vernier) Station selector	.80
11254 11233	Coil—Field coil—(L22) Coil—Neutralizing coil (L20)	2.00	13396	knob—Mcdel 8T11 only—Package of 5 Knob—Small (Vernier) Station selector	.80
11235	Cone—Reproducer cone—(L21)— (Speaker No. RL63-4)—Models 8T2	1.00	13306	knob—Model 8K11 only—Package of 5 Knob—Tone control, volume control or	.75
11258	or 8T11 Cone—Reproducer cone—(L21)— (Speaker No. RL70-1)—Model 8K11	1.00	12070	range switch knob—Model 8T11 only—Package of 5	.80
5119	Connector—3-contact female connector for reproducer cable	.25	13278	range switch knob—Model 8K11 only—Package of 5	.80
5118	Connector—3 contact male connector for reproducer	.25	11210	Screw—Chassis mounting screw as- embly for console model only—Package	
9618	Reproducer—Complete (Speaker No. RL63-4)—Models 8T2 or 8T11 Reproducer—Complete (Speaker No.	6.40	11377	of 4	.28
11253	RL70-1)—Model 8K11 Transformer—Output transformer—(T2)	6.05 1.56		sembly for table model only—Package of 4	.12
11886	Washer—Spring washer used to hold field coil securely—Package of 5	.20	4982	Spring—Retaining spring for large knob in Stk. No. 11610, 13304 and 13395—Package of 10	.50
11836 5118	Speaker No. 76365-1 Cone—Reproducer cone Connector—3-contact male connector for	1.75	11349	Spring—Retaining spring for knob Stk. No. 11347, 13278, 13305, 13306, 13396 and small knob in Stk. No. 11610—	
0210	reproducer	.25		Package of 5	.25

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