RCA VICTOR MODELS BT 7-8 AND BC 7-9

Seven-Tube, Two-Band, Superheterodyne, Battery Receivers

SERVICE NOTES

ELECTRICAL SPECIFICATIONS

Type and Number of Radiotrons.....1 RCA-1C6, 2 RCA-34, 2 RCA-30, 1 RCA-32, 1 RCA-19—Total, 7

Total "A" Battery Current.....0.68 Ampere

Maximum "B" Battery Current.....21 M. A.

Tuning Ranges.....540-1720 kc. and 5400-18000 kc.

Maximum Undistorted Output.....1.2 Watts

Maximum Output.....2.2 Watts

Line-up Frequencies.....460 kc., 600 kc., 1720 kc., and 18000 kc.

PHYSICAL SPECIFICATIONS

	Model BT 7-8	Model BC 7-9
Height	18½ Inches	39 Inches
Width	14½ Inches	25½ Inches
Depth	11 Inches	14½ Inches

These seven-tube, battery-operated, Superheterodyne receivers provide excellent reception of standard-wave and short-wave broadcasting stations. High sensitivity, excellent selectivity and good fidelity characterize their performance. Outstanding features include a permanent magnet dynamic type loudspeaker, two-point tone control, Class "B" output stage, vernier drive and excellent mechanical construction. The chassis is unusually accessible for repair or replacement of parts. Fuses in the "B" battery leads provide protection for the Radiotrons in event of short circuits. Battery connections are by means of plugs. Figure 1 shows the schematic diagram, while Figure 2 shows the chassis wiring.

DESCRIPTION OF ELECTRICAL CIRCUIT

The circuit is of the superheterodyne type and consists of a combined oscillator-detector stage, two i-f amplifying stages, a combined, second detector and automatic volume control, a two-stage audio amplifier and a Class "B" output stage. A two-pole operating switch opens the "+A" and "+B" battery leads when the switch is turned to the "off" position.

The signal enters the receiver through a shielded antenna lead and is applied through the antenna transformer to the grid circuit of the first detector which also serves as the local oscillator for producing a signal, 460 kc. higher in frequency than the incoming signal. The combined signals after passing through the first detector produce the i-f signal.

The i-f amplifier uses two RCA-34 Radiotrons in conjunction with three transformers. Two of the transformers are tuned very accurately to the i-f frequency (460 kc.) by means of suitable trimmer capacitors. The third transformer is untuned and couples the output of the second stage to the input of the second detector, an RCA-30, the plate of which is grounded.

Automatic volume control action is obtained from the voltage drop of a portion of the rectified signal across resistor R-9. The voltage drop constitutes the automatic bias voltage for the first detector and i-f stages and thereby gives the automatic volume control action of the receiver.

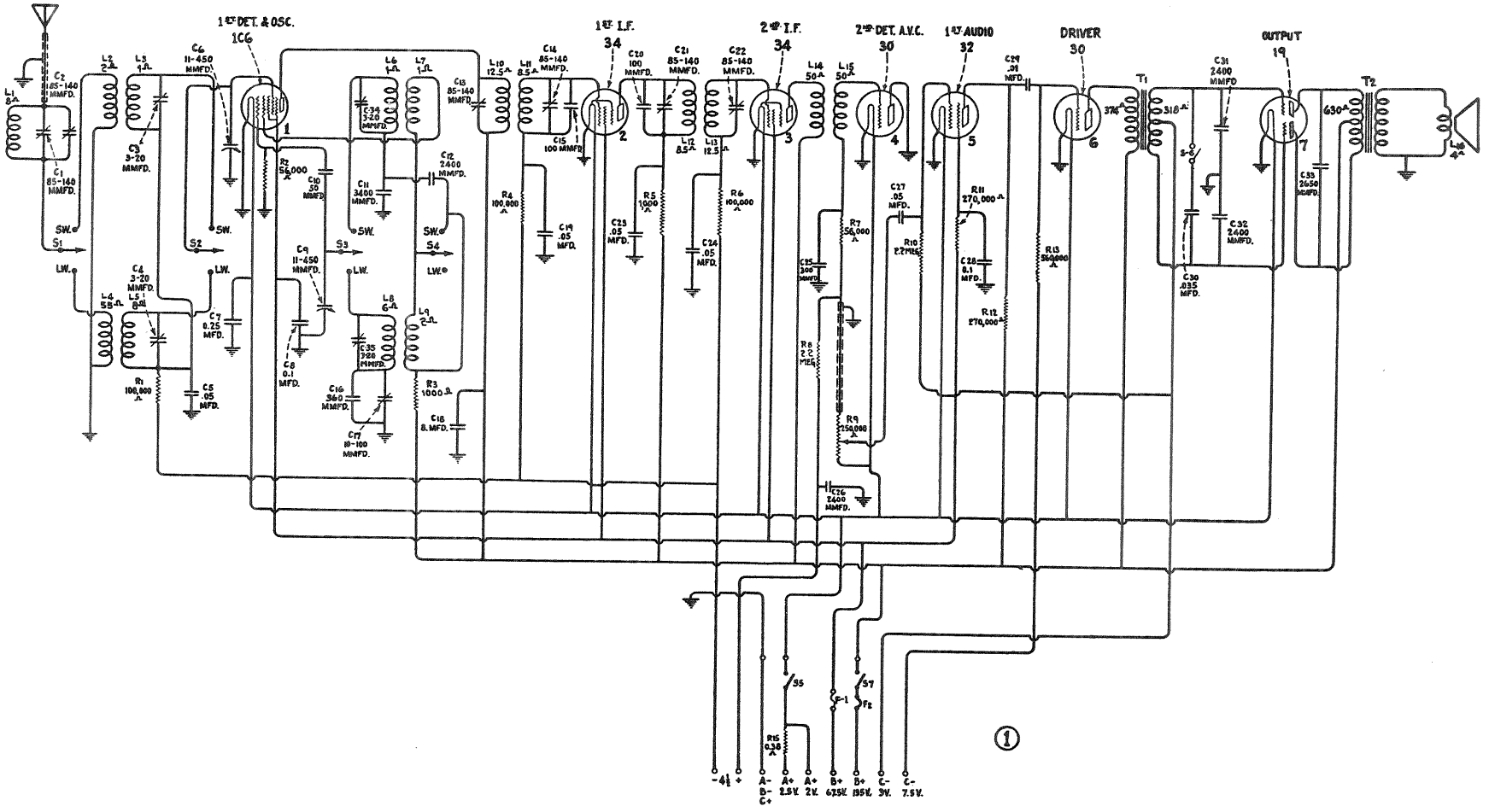

Figure 1—Schematic Circuit Diagram

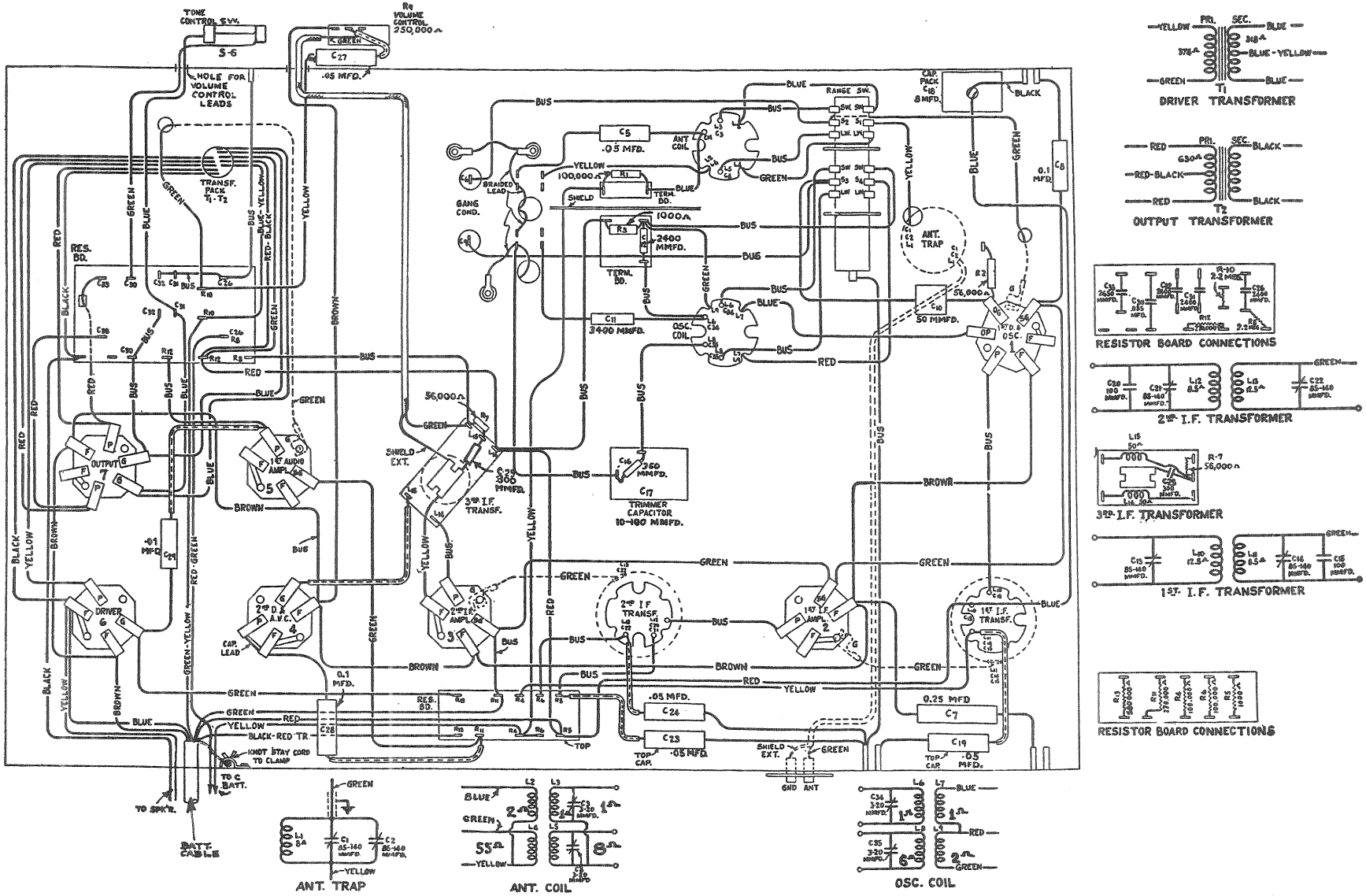

Figure 2—Chassis Wiring Diagram

The volume control selects the desired amount of audio signal from the drop across R-9 and applies it to the grid circuit of the first audio stage, RCA-32.

The output of the first audio stage is resistance coupled to the grid circuit of the RCA-30 driver stage, which is transformer coupled to the Class "B" output stage. The output stage utilizes the twin amplifier Radiotron RCA-19, which has two separate sets of elements and eliminates the necessity of having two separate tubes for a Class "B" output stage. The plate circuit of this tube is transformer coupled to the cone coil of the permanent magnet, dynamic loudspeaker.

Plate, grid and filament voltages are supplied by individual batteries. Two +A leads are provided, one permitting operation on a 2-volt storage cell and the other used for operation on a 2.5-volt "Eveready Air Cell."

SERVICE DATA

ALIGNMENT PROCEDURE

To properly align this receiver, it is essential that a modulated R. F. oscillator of suitable frequency range such as Stock No. 9595, an output indicator, Stock No. 4317, and an alignment tool, Stock No. 4160, be available. Figure 4 shows the location of the various line-up capacitors.

I-F Tuning Adjustments

The i-f amplifier comprises two stages including three transformers. The third transformer is untuned so that only a total of four circuits are to be adjusted. Refer to Figure 4 and proceed 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 indicator across the voice coil of the loudspeaker and adjust the oscillator output so that, with the receiver volume control at maximum, a slight glow is obtained in the output indicator.

(c) Adjust the secondary and primary of the second and then the first i-f transformers until a maximum deflection is obtained. The third transformer is untuned and does not require adjusting. Keep the oscillator output at a low value so that only a slight glow is obtained in the output indicator at all times. Go over these adjustments a second time, as there is a slight interlocking of adjustments. This completes the i-f alignment.

(d) Connect Test Oscillator to antenna-ground terminals. Adjust wave trap trimmer, C-1, to give minimum receiver output.

R-F and Oscillator Adjustments

The important points to remember are the need for using the minimum oscillator output to obtain an indication in the output device with the volume control at its maximum position and the manner of obtaining the proper high-frequency oscillator and detector 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 kc. series capacitor, which is accessible from the top of the chassis. Proceed as follows:

(a) Connect the output of the oscillator to the antenna and ground terminals of the receiver. Check the position of the dial pointer when the tuning capacitor plates are fully meshed. It should be coincident with the radial line adjacent to the dial reading of 540.

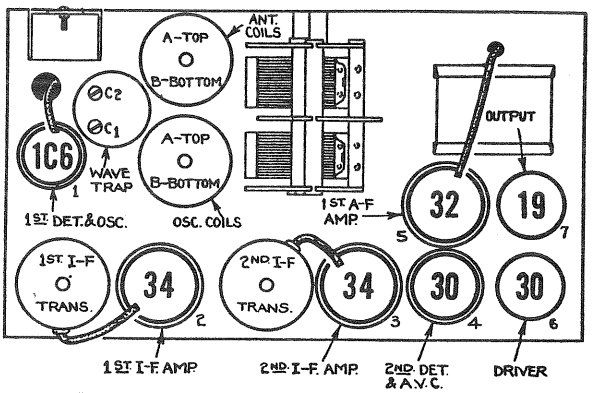

Figure 3—Radiotron and Coil Locations

(b) Then set the receiver band switch to its broadcast position, the Test Oscillator at 1720 kc., and the dial pointer at 1720. Adjust the oscillator output so that a slight glow will be obtained in the output indicator when the volume control is at its maximum position. Adjust the two trimmers, C-35 and C-4, under the two r-f coils, see Figure 4, until a maximum output is obtained. Then shift the Test Oscillator frequency to 600 kc. The trimmer capacitor, C-17, 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 kc. adjustment.

(c) Change the receiver range switch to its high frequency (short wave) position and tune the Station Selector to a dial reading of 18,000 kc. Adjust the Test Oscillator to this same frequency and regulate its output to give a slight indication on the output meter. Then adjust trimmer C-34 to the point giving maximum receiver output. Two points may be found on the trimmer, C-34, which give this maximum. The one of least capacitance is correct and should be used. To assure that this point has been used, tune the receiver to a dial setting of 17,080 kc. and increase the output of the Test

Oscillator. The "image" of the 18,000 kc. signal will be received, if the adjustment of C-34 has been properly made. *No adjustments are to be made during the "image" check.*

Return the receiver tuning to 18,000 kc., readjust C-34 if necessary, and then tune the antenna trimmer, C-3, simultaneously rocking the tuning control backward and forward through the signal, until maximum output is obtained. Two positions of the trimmer may be found which give this condition—the one of maximum capacitance is correct.

Radiotron Socket Voltages

Voltage and current values indicated at the Radiotron socket contacts on Figure 4 form a reference basis for test of the receiver. It is to be noted that all voltages are given with respect to chassis-ground, excepting those appearing across the filaments (F-F). The values shown are obtainable when the receiver is in normal operating condition. They do not take into account inaccuracies caused by current consumed in the voltmeter used for the tests; the lower the voltmeter resistance, the lower the degree of accuracy. Allowances must therefore be made, dependent upon the type of test instrument used, for the loading effect of the voltmeter on the circuit.

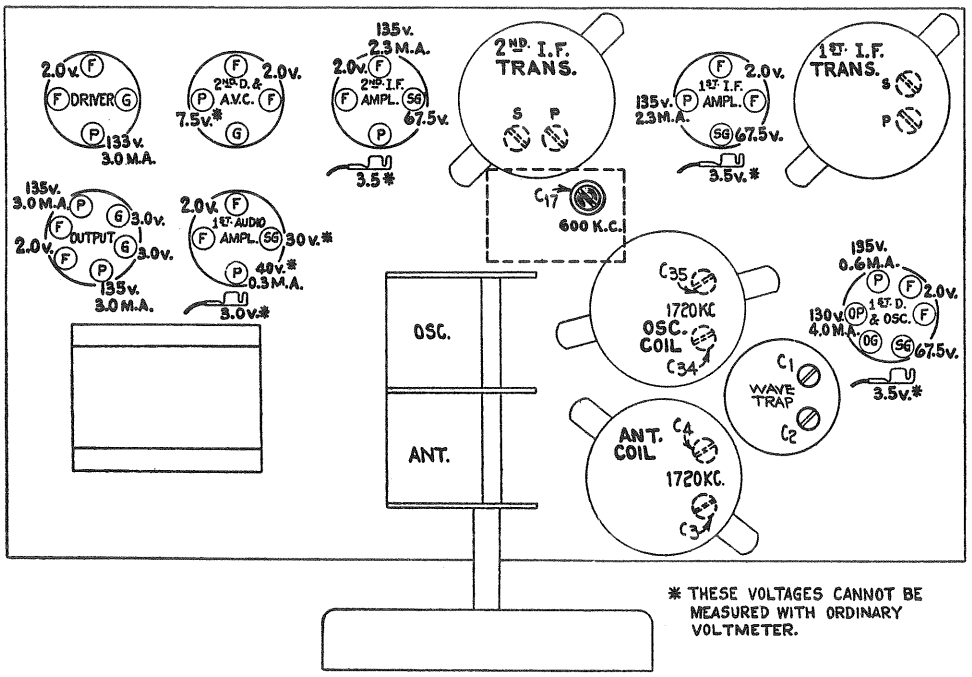

Figure 4—Line-Up Capacitor Locations and Voltage Values at Socket Contacts

Volume Control at Maximum—No Signal—135 Volt "B" Battery—
4.5 and 7.5-Volt Bias Batteries

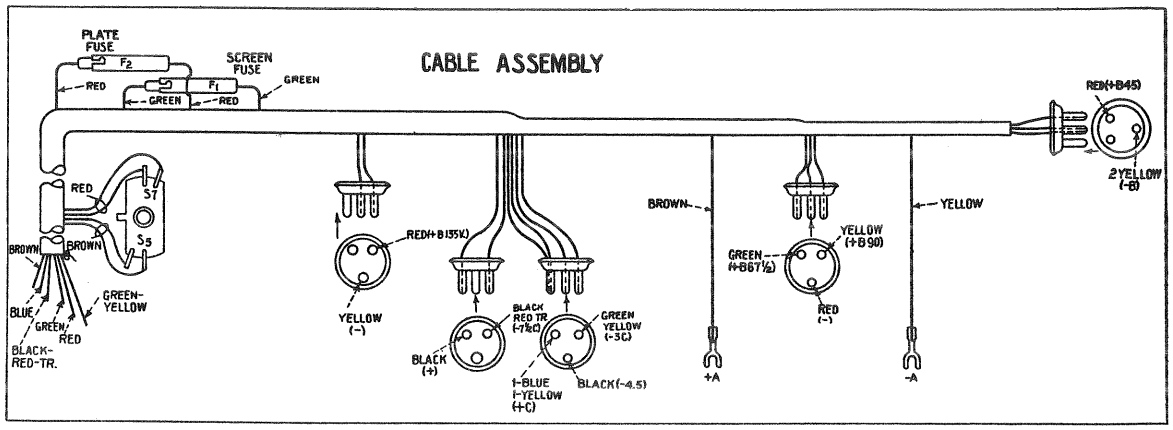

Figure 5—Battery Cable Connections

BT 7-8 and BC 7-9
REPLACEMENT PARTS

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

Stock No.	Description	List Price
	RECEIVER ASSEMBLIES	
4427	Bracket—Volume control or tone control mounting bracket	$0.18
4244	Cap—Grid contact cap—Package of 5	.20
3861	Capacitor—Adjustable capacitor (C17)	.78
11289	Capacitor—50 MMfd. (C10)	.26
3794	Capacitor—100 MMfd. (C15, C20)	.30
3981	Capacitor—300 MMfd. (C25)	.30
11413	Capacitor—360 MMfd. (C16)	.22
4801	Capacitor—2400 MMfd. (C12, C31, C32)	.50
2749	Capacitor—2400 MMfd. (C26)	.35
4529	Capacitor—2650 MMfd. (C33)	.32
4439	Capacitor—3400 MMfd. (C11)	.35
5196	Capacitor—0.035 Mfd. (C30)	.18
4883	Capacitor—0.01 Mfd. (C29)	.20
4518	Capacitor—0.05 Mfd. (C27)	.52
4836	Capacitor—0.05 Mfd. (C5, C19, C23, C24)	.30
4841	Capacitor—0.1 Mfd. (C8, C28)	.22
4840	Capacitor—0.25 Mfd. (C7)	.30
11344	Capacitor—8 Mfd. (C18)	0.00
4430	Coil—Antenna coil (L2, L3, L4, L5, C3, C4)	1.92
4432	Coil—Oscillator coil (L6, L7, L8, L9, C34, C35)	1.65
4539	Coil and shield assembly—Antenna trap circuit	2.05
4504	Condenser—Two-gang variable tuning condenser (C6, C9)	2.78
11338	Volume control—(R9)	1.00
5112	Resistor—1000 Ohms—Carbon type—¼ Watt—(R5)—Package of 5	1.00
5029	Resistor—56,000 Ohms—Carbon type—¼ Watt—(R2, R7)—Package of 5	1.00
3118	Resistor—100,000 Ohms—Carbon type—¼ Watt—(R1, R4, R6)—Package of 5	1.00
11323	Resistor—270,000 Ohms—Carbon type—¼ Watt—(R11, R12)—Package of 5	1.00
5035	Resistor—560,000 Ohms—Carbon type—¼ Watt—(R13)—Package of 5	1.00
11151	Resistor—2.2 Megohms—Carbon type—¼ Watt—(R8, R10)—Package of 5	1.00
4521	Shield—Antenna, oscillator, or intermediate frequency coil shield	.42
3942	Shield—First detector, oscillator Radiotron shield	.18
7487	Shield—Second detector Radiotron shield	.25
3056	Shield—First or second intermediate frequency, or first audio Radiotron shield—Package of 2	.40
4532	Socket—4-contact first audio Radiotron socket	.28
6980	Socket—4-contact intermediate frequency, second detector or driver Radiotron socket	.20
4232	Socket—6-contact first detector, oscillator Radiotron socket	.35
4531	Socket—6-contact output Radiotron socket	.30
5053	Switch—Tone control switch (S6)	.50
11339	Switch—Operating switch—less knob (stock #3088) and escutcheon (stock #6176)—(S5, S7)	.80
4437	Switch—Range switch (S1, S2, S3, S4)	2.35
4533	Transformer—Audio transformer pack comprising driver and output transformer (T1, T2)	3.98
4431	Transformer—First intermediate frequency transformer—(L10, L11, C13, C14, C15)	2.28
7840	Transformer—Second intermediate frequency transformer (L12, L13, C20, C21, C22)	$2.35
4538	Transformer—Third intermediate frequency transformer (L14, L15, R7, C45)	2.15
	DRIVE ASSEMBLIES	
10194	Ball—Steel ball—Package of 20	.50
4422	Clutch—Tuning condenser drive clutch assembly—comprising shaft, balls, ring, spring and washers—assembled	1.00
11342	Dial—Station selector dial	.72
4586	Drive—Variable tuning condenser drive assembly—complete	2.42
4520	Indicator—Station selector indicator pointer	.18
4669	Screw—No. 8-32 5/32" set screw for variable condenser drive assembly—Package of 10	.25
	REPRODUCER ASSEMBLIES (TABLE MODEL—BT 7-8)	
9539	Cone—Reproducer cone—Package of 5—(L16)	4.30
9540	Magnet assembly—Comprising cone bracket, core, and magnet	5.72
9538	Reproducer—Complete—(L16)	7.65
	REPRODUCER ASSEMBLIES (CONSOLE MODEL—BC 7-9)	
9432	Cone—Reproducer cone—complete with voice coil (L16)	1.88
7820	Magnet—Cone housing and magnet assembly	8.98
7819	Reproducer—Complete—(L16)	12.18
	MISCELLANEOUS ASSEMBLIES	
11343	Cable—Main battery cable complete with three stock #11340 connectors, two stock #11341, connectors, two stock #6516 fuse connectors, two stock #3748 fuses—except, less one stock #11339 switch	3.55
6516	Connector—Fuse connector	.16
11340	Connector—3-contact male connector with three small prongs—for "B" battery connections	.24
11341	Connector—3-contact male connector with two small and one large prong for "C" battery connections	.24
11337	Escutcheon—Station selector escutcheon	.70
6176	Escutcheon—Off-on operating switch escutcheon—Package of 5	.50
3748	Fuse—½ ampere F1—Package of 5	.40
6614	Glass—Station selector dial glass	.30
3088	Knob—Operating switch knob and screw—Package of 5	.50
4449	Knob—Station selector, volume control, tone or range switch knob—Package of 5	.60
4644	Resistor—.38 Ohms—Flexible type—Filament series resistor—(R15)—Package of 5	.80
4678	Ring—Dial glass retaining ring—Package of 5	.34
3238	Screw—No. 6-40 17/32" Knurled head screw for knob, stock 3088—Package of 10	.25
4945	Screw—Chassis mounting screw assembly—Console Model	.50
4446	Screw—Chassis mounting screw assembly—Table Model	.28
4613	Screw—No. 8-32 7/16" headless set screw for station selector volume control, tone control switch, or range switch knob—Package of 10	.25

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