RCA VICTOR MODELS BT 6-3, BC 6-4 AND BT 6-10

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

SERVICE NOTES

Electrical Specifications

FREQUENCY RANGES

Broadcast ..... 540-1850 kc.
Shortwave ..... 1850-6900 kc.
Intermediate Frequency ..... **460 kc.**

ALIGNMENT FREQUENCIES

Broadcast ..... 600 kc. (osc.), 1720 kc. (osc., ant.)
Shortwave ..... None required

RADIOTRON COMPLEMENT

(1) RCA 1C6 ..... First Detector and Oscillator
(2) RCA 34 ..... Intermediate Amplifier
(3) RCA 1B5 ..... Detector, A.F. and A.V.C.
(4) RCA 30 ..... Audio Driver Amplifier
(5) RCA 49 ..... Power Output Amplifier
(6) RCA 49 ..... Power Output Amplifier

BATTERIES REQUIRED

"A" Supply ..... Eveready Aircell or 2 volt storage cell
"B" Supply ..... 3—45 volt, heavy or medium duty, plug-in type
"C" Supply ..... 3—4½ volt (with 3 volt tap), plug-in type

CURRENT DRAIN

"A" ..... 0.52 Amperes
"B" ..... 16 Milliamperes
Screen ..... 3 Milliamperes

FUSE RATING ..... ½ Ampere

POWER OUTPUT

Undistorted ..... 1.2 Watts
Maximum ..... 2.2 Watts

LOUDSPEAKER

Table Models ..... 8 inch, Permanent Magnet
Console Model ..... 10 inch, Permanent Magnet

Mechanical Specifications

	BT 6-3	BC 6-4	BT 6-10
Height	17½ inches	37¼ inches	21⅝ inches
Width	14½ inches	23⅛ inches	15¾ inches
Depth	10 inches	12 inches	13¼ inches

Chassis Base ..... 12" W x 7" D x 2½" H

General Description

These receivers are related in that they have identical chassis assemblies. An 8 inch loudspeaker is used in each table model and a 10 inch is used in the console (BC 6-4). Model BT 6-10 differs from the others by having a cabinet which is adapted to house the battery equipment.

The range of tuning afforded by these instruments includes the standard 540-1600 kc. broadcast band which extends to cover the 1700 kc. police channels, and a shortwave band, covering reception on frequencies from 1850-6900 kc.

Vernier tuning of 6 to 1 ratio is provided. Automatic volume control is incorporated in the Superheterodyne circuit. Two-point, high-frequency tone control is another feature. Batteries required are the "plug-in" type, which permit ready installation and prevent improper connection. Space and mounting holes are provided on the chassis base for installation of a 460 kc. wave trap when needed in locations where code interference is encountered.

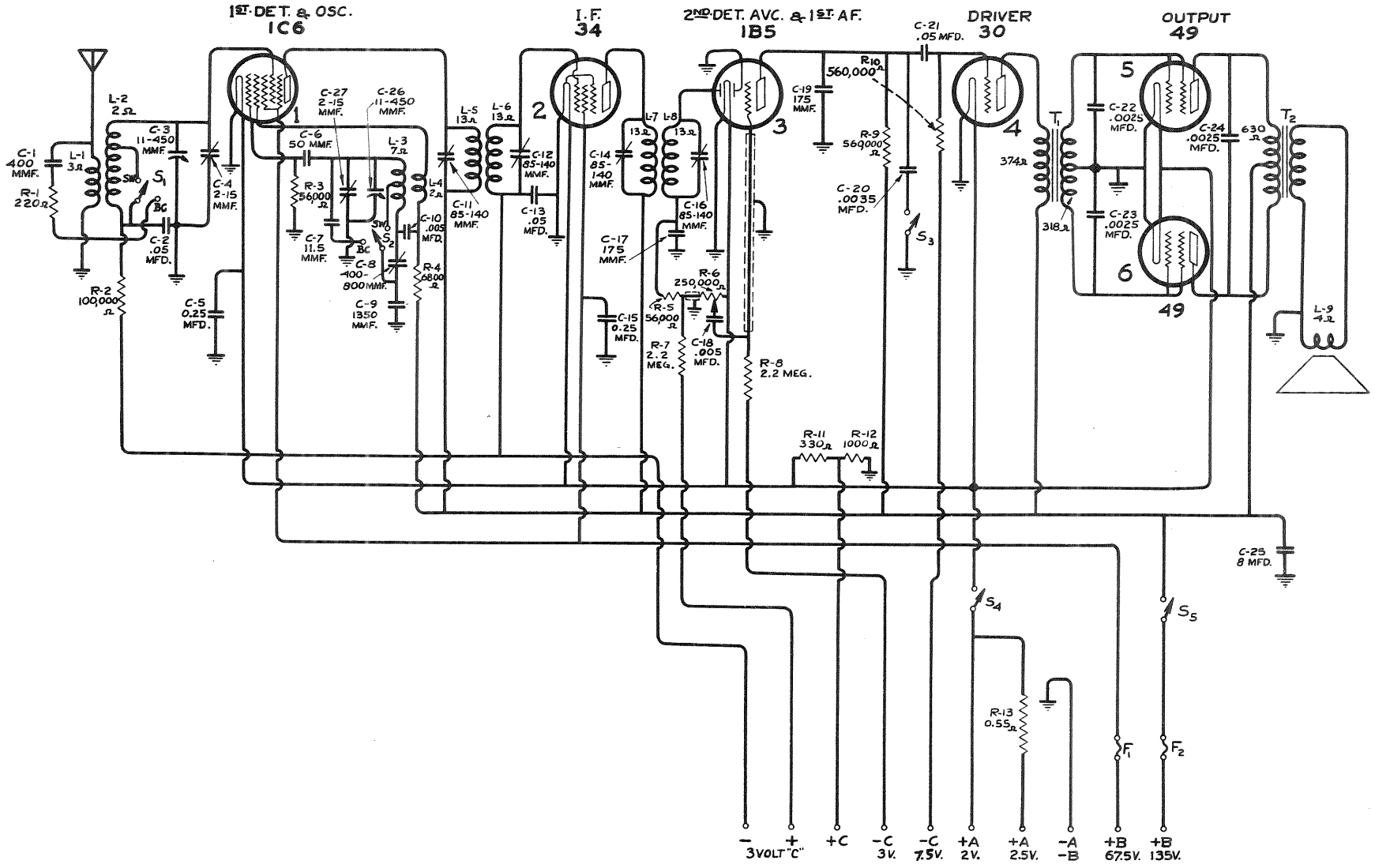

Figure 1—Schematic Circuit Diagram

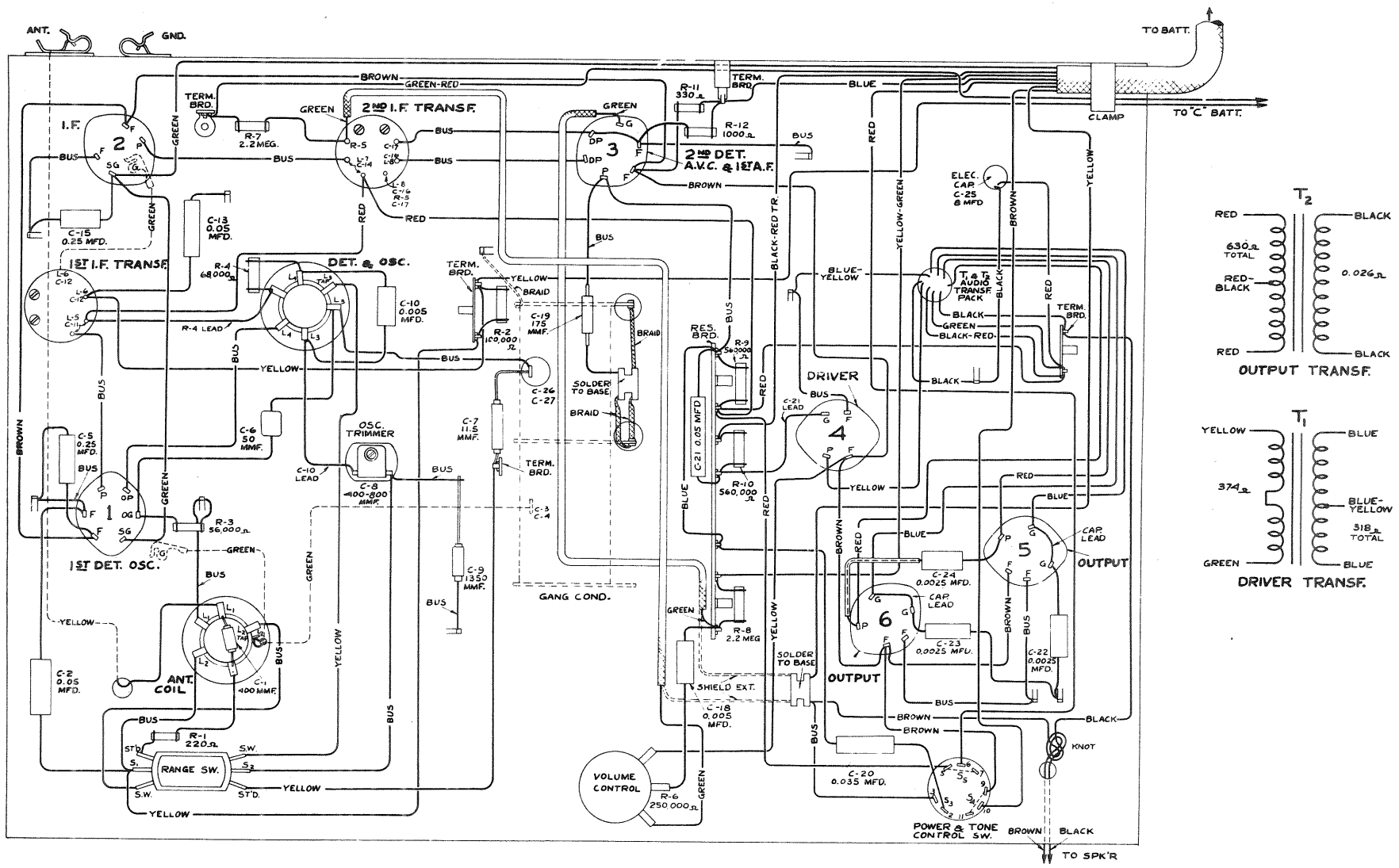

Figure 2—Chassis Wiring Diagram

Circuit Arrangement

The conventional Superheterodyne circuit is used. The first stage combines the local oscillator and first detector functions in one tube, an RCA-1C6. Coils of the detector input and oscillator are tuned by a two-section variable condenser and are aligned by a total of three adjustable trimmers. Each coil is tapped so that a portion of it may be shorted by the band switch in order to extend the tuning range to the higher frequencies. The oscillator operates at a fundamental frequency which is at all times above the incoming signal by 460 kc.

An RCA-34 is employed as i-f amplifier. Its input and output are coupled by transformers to the first detector and second detector, respectively. Each transformer has both its secondary and primary windings tuned to 460 kc. by adjustable trimmer capacitors.

The modulated signal as obtained from the output of the i-f system is detected by a diode of the RCA-1B5. Audio developed by such detection in the diode load resistor, R-6, is selected by the variable arm of the volume control (R-6) and passed on to the a-f system for amplification and final reproduction. The d.c. which occurs in resistor R-6, due to signal detection, is used for automatic volume control by varying the control grid bias on the first detector and i-f tubes.

Resistance-capacitance coupling is used between the RCA-1B5 and the RCA-30 driver tube. A high-frequency tone control, consisting of a switch in series with a condenser, is shunted across the plate circuit of the RCA-1B5. In the closed position of the switch, the high a-f frequencies are reduced.

The power output stage is arranged for Class "B" operation. The high level of power afforded, is fed to the permanent magnet, dynamic speaker through a step-down transformer.

Battery "On-off" control is by means of a double pole switch, one side of which is in the +A lead; the other side being in the 135 volt, +B lead. Two +A leads are provided in order to permit operation from either a standard 2 volt storage cell or an "Eveready 2.5 volt Aircell". A resistor (R-13) is in series with the +A, 2.5 volt lead to drop the voltage to the proper value. Fuse protection is incorporated in the screen and plate supply leads from the "B" batteries.

SERVICE DATA

Alignment Procedure

There are a total of seven trimmer adjustments provided. Four of these are located in the i-f system and the remainder are associated with the antenna and oscillator coils. They are precisely adjusted at the factory to give the correct performance. Their settings should remain intact indefinitely when the receiver is used under ordinary conditions, however, necessity for readjustment may occasionally occur from continued extremes of climate, tampering, purported alteration for service purposes, or after repairs have been made to the r-f or i-f tuned circuits. Improper alignment usually causes the receiver to be insensitive, non-selective, and sub-normal in respect to tone quality. Such indications will usually exist simultaneously.

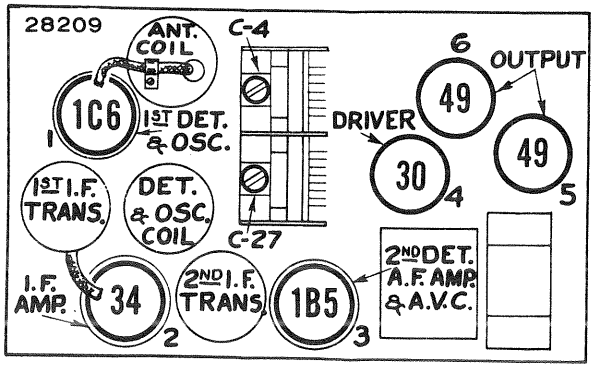

Figure 3—Radiotron and Coil Locations

In re-adjusting the trimmers to their normal settings, it is quite 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 a source of signal at the specified alignment frequencies. Means for indication of the receiver output during alignment is also necessary to accurately show when the correct point of adjustment is reached. This indication should be by means of an instrument such as the RCA Stock No. 4317 Neon Glow Indicator. Proceed with the alignment as follows:

Place the receiver in operation where it will be easily accessible. Attach the Output Indicator across the loudspeaker voice coil circuit, or across the output transformer primary. Advance the receiver volume control to its maximum position, letting it remain in such position for *all* adjustments. For each trimming operation, regulate the test oscillator output control so that the signal level is as low as possible and still observable at the receiver output. Use of such a small signal will obviate broadness of tuning which would otherwise result from A. V. C. action on a stronger one.

I-F Adjustments

(a) Connect the output of the test oscillator between the control grid cap of the i-f tube (RCA-34) and chassis-ground. Adjust the frequency of the oscillator to **460 kc.** Tune the receiver to a point where no interference is received from the heterodyne oscillator or local station.

(b) Adjust the trimmers, C-16 and C-14, of the second i-f transformer so that each produces maximum (peak) receiver output as shown by the indicating device.

(c) Remove the oscillator from the i-f tube input

and connect it between the control grid cap of the first detector tube (RCA-1C6) and chassis-ground. Allow its tuning to remain at **460 kc.** Tune the receiver to avoid interference as in (a).

(d) Adjust the trimmers, C-12 and C-11, of the first i-f transformer for maximum (peak) receiver output. This completes the i-f transformer adjustments.

R-F Adjustments

(a) Check the calibration of the dial scale by rotating the tuning control until the variable condenser plates are in full mesh. (Maximum capacity). This will carry the dial pointer to its minimum frequency position. Then adjust the dial pointer until it points to the horizontal line at the low frequency end of the broadcast band scale.

(b) Connect the output of test oscillator to the antenna-ground terminals of the receiver. Adjust the receiver range switch to its "Broadcast" position. Tune the oscillator to **1720 kc.** Allow the output indicator to remain attached to the receiver output.

(c) Tune the receiver so that the dial reading is **1720 kc.** Then adjust the oscillator and antenna coil trimmers. C-27 and C-4 respectively, tuning each to the point producing maximum indicated receiver output.

(d) Shift the oscillator frequency to **600 kc.** and tune the receiver to pick up this signal, disregarding the dial reading at which it is best received. The oscillator series trimmer, C-8, should then be adjusted, simultaneously rocking the receiver tuning backward and forward through the signal until maximum receiver output results from the combined operations. The adjustment of C-27 should be repeated as in (c) to correct for any change in its alignment due to the adjustment of C-8.

Radiotron Socket Voltages

Voltage 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 in respect to chassis-ground excepting those appearing across the heaters (H-H). 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 meter resistance, the lower will be 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.

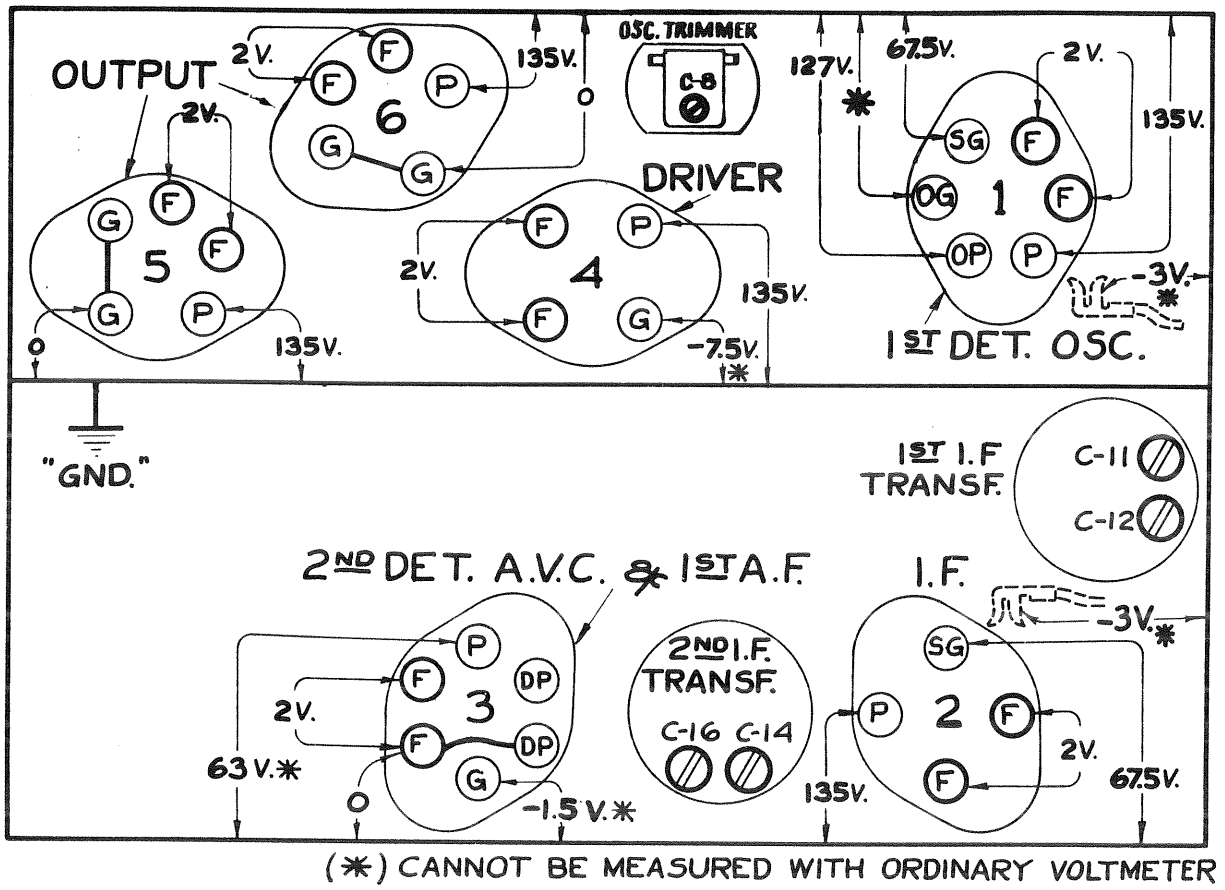

Figure 4—Radiotron Socket Voltages and Trimmer Locations
Measured at Normal Battery Voltages—No Signal Being Received

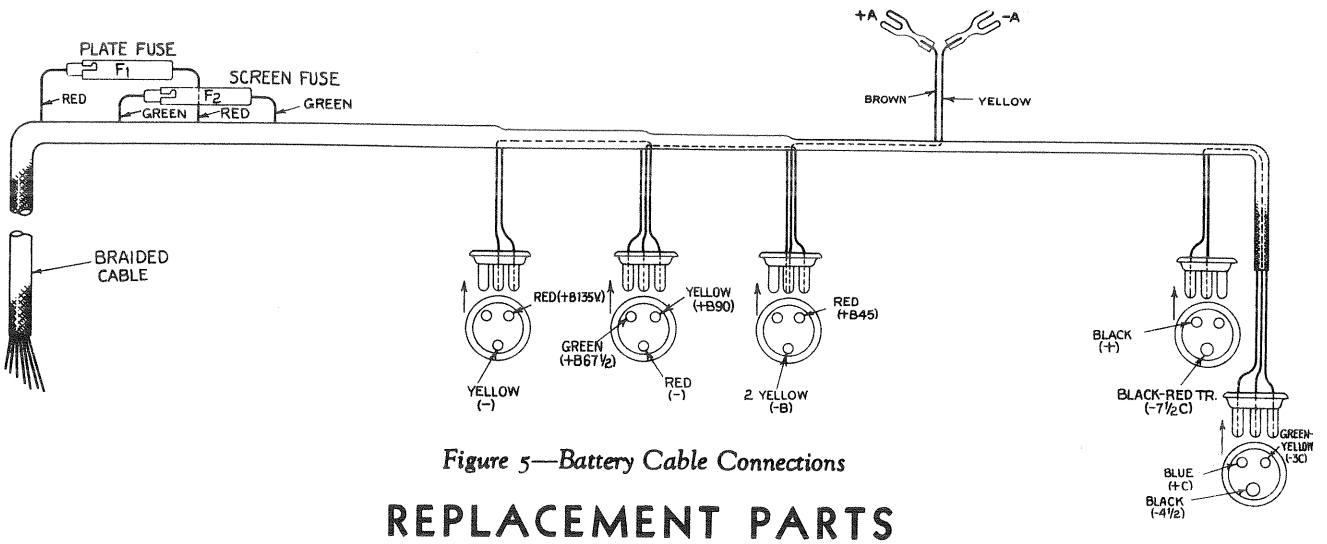

Figure 5—Battery Cable Connections

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	
11465	Capacitor—Adjustable capacitor—(C-8)	$0.48
11450	Capacitor—11.5 MMfd.—(C7)	.14
11289	Capacitor—50 MMfd.—(C6)	.26
5116	Capacitor—175 MMfd.—(C19)	.18
11171	Capacitor—400 MMfd.—(C1)	.22
11597	Capacitor—1350 MMfd.—(C9)	.22
5107	Capacitor—.0025 Mfd.—(C22, C23, C24)	.16
5005	Capacitor—.0035 Mfd.—(C20)	.16
4868	Capacitor—.005 Mfd.—(C10, C18)	.20
4836	Capacitor—.05 Mfd.—(C2, C13, C21)	.30
4840	Capacitor—0.25 Mfd.—(C5, C15)	.30
11595	Capacitor—8 Mfd.—(C25)	1.04
11590	Coil—Antenna coil—(L1, L2)	1.70
11463	Coil—Oscillator coil—(L3, L4)	1.65
11457	Condenser—Two gang variable tuning condenser—(C3, C4, C26, C27)	3.46
11467	Indicator—Station selector indicator pointer	.10
11174	Resistor—220 Ohms—Carbon type—¼ watt—(R1)—Package of 5	1.00
11296	Resistor—330 Ohms—Carbon type—¼ watt—(R11)—Package of 5	1.00
5112	Resistor—1000 Ohms—Carbon type—¼ watt—(R12)—Package of 5	1.00
11454	Resistor—6800 Ohms—Carbon type—¼ watt—(R4)—Package of 5	1.00
5029	Resistor—56,000 Ohms—Carbon type—¼ watt—(R3)—Package of 5	1.00
3118	Resistor—100,000 Ohms—Carbon type—¼ watt—(R2)—Package of 5	1.00
5035	Resistor—560,000 Ohms—Carbon type—¼ watt—(R9, R10)—Package of 5	1.00
11626	Resistor—2.2 Megohms—Carbon type—¼ watt—(R7, R8)—Package of 5	1.00
11464	Shield—Antenna or oscillator coil shield	.25
3682	Shield—First or Second detector Radiotron shield	.22
3056	Shield—Intermediate frequency Radiotron shield—Package of 2	.40
11390	Shield—Intermediate frequency transformer shield	.25
11461	Switch—Range switch—(S1, S2)	.56
11588	Switch—Tone control and power switch—(S3, S4, S5)	.90
5238	Terminal—Antenna terminal board with clip, insulation strip and rivets	.14
11594	Transformer—Audio driver and output transformer pack—(T1, T2)	4.10
11592	Transformer—First intermediate frequency transformer—(L5, L6, C11, C12)	2.55
11593	Transformer—Second intermediate frequency transformer—(L7, L8, C14, C16, C17, R5)	2.75
11589	Volume Control—(R6)	.85
	MISCELLANEOUS ASSEMBLIES	
4289	Body—Fuse connector body—Package of 10	.35
4288	Cap—Fuse connector cap—Package of 10	.36
6516	Connector—Fuse connector—complete	.16
11340	Connector—Three contact male connector with three small prongs—for "B" battery connections	.24
11341	Connector—Three contact male connector with two small and one large prong—for "C" battery connection	.24
11627	Dial—Station selector dial	.32
4286	Ferrule—Fuse connector—ferrule and bushing—Package of 10	.38
3748	Fuse—½ Ampere fuse—(F1, F2)—Package of 5	.40
4290	Insulator—Fuse connector insulator—Package of 10	.35
11587	Resistor—0.55 Ohms—Flexible type, complete with terminal (R13)	.24
4284	Spring—Fuse connector spring—Package of 10	.30
4285	Washer—Fuse connector insulating washer—Package of 10	.22
	REPRODUCER ASSEMBLIES (Table Models BT 6-3, BT 6-10)	
9539	Cone—Reproducer cone—(L9)—Package of 5	4.30
9540	Magnet Assembly—Comprising cone bracket, core, and magnet	5.72
9538	Reproducer—Complete	7.65
	REPRODUCER ASSEMBLIES (Console Model BC 6-4)	
9432	Cone—Reproducer cone—complete with voice coil—(L9)	1.88
7820	Magnet—Cone housing and magnet assembly	8.98
7819	Reproducer—Complete	12.18