

# RCA VICTOR MODELS BT 6-5 AND BC 6-6

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

## SERVICE NOTES

### Electrical Specifications

FREQUENCY RANGES		ALIGNMENT FREQUENCIES	
Band A.....	540-1,720 kc.	Band A.....	600 kc. (osc.); 1,720 kc. (osc., ant.)
Band C.....	5,600-18,000 kc.	Band C.....	18,000 kc. (osc., ant.)
<b>Intermediate Frequency</b> .....			<b>460 kc.</b>
RADIOTRON COMPLEMENT			
(1) RCA-1C6.....	First Detector and Oscillator	(4) RCA-30.....	Audio Driver Amplifier
(2) RCA-34.....	Intermediate Amplifier	(5) RCA-49.....	Power Output Amplifier
(3) RCA-75.....	Second Det., A.F., and A.V.C.	(6) RCA-49.....	Power Output Amplifier
BATTERIES REQUIRED			
"A" Supply.....			Storage Battery (6-volt)
"B" Supply.....			None
"C" Supply.....			None
CURRENT DRAIN			
"A" Battery.....			1.5 Amperes
FUSE RATING .....			15 Amperes
POWER OUTPUT			
Undistorted.....	0.8 Watt	Maximum.....	1.2 Watts
LOUDSPEAKER			
Table Model.....	8 inch Permanent Magnet	Console Model.....	10 inch Permanent Magnet

### Mechanical Specifications

	BT 6-5	BC 6-6
Height.....	20 $\frac{3}{16}$ inches.....	38 inches
Width.....	14 $\frac{7}{16}$ inches.....	24 inches
Depth.....	9 $\frac{3}{4}$ inches.....	12 inches
Chassis Base.....		13 inches x 7 $\frac{1}{2}$ inches x 2 $\frac{1}{2}$ inches
Weight (Net).....	33 $\frac{1}{2}$ pounds.....	40 pounds
Weight (Shipping).....	59 pounds.....	74 pounds

### General Description

These instruments each employ a synchronous type vibrator and require only one 6-volt storage battery for power supply.

The receiver chassis of both models are identical. An 8-inch loudspeaker is used in the table model (BT 6-5) and a 10-inch loudspeaker is used in the console model (BC 6-6).

The tuning range afforded by these instruments includes (1) the standard 540-1,600 kc. broadcast

band which extends to cover the 1,700 kc. police channels, and (2) a shortwave band from 5,600-18,000 kc. which covers the principal shortwave broadcast stations on the 49, 31, 25, 19, and 16 meter bands.

Outstanding features include automatic volume control, two-point tone control, antenna wave trap, airplane type dial, dual ratio tuning drive, class "B" output stage, and vibrator power unit (V.P.U.)

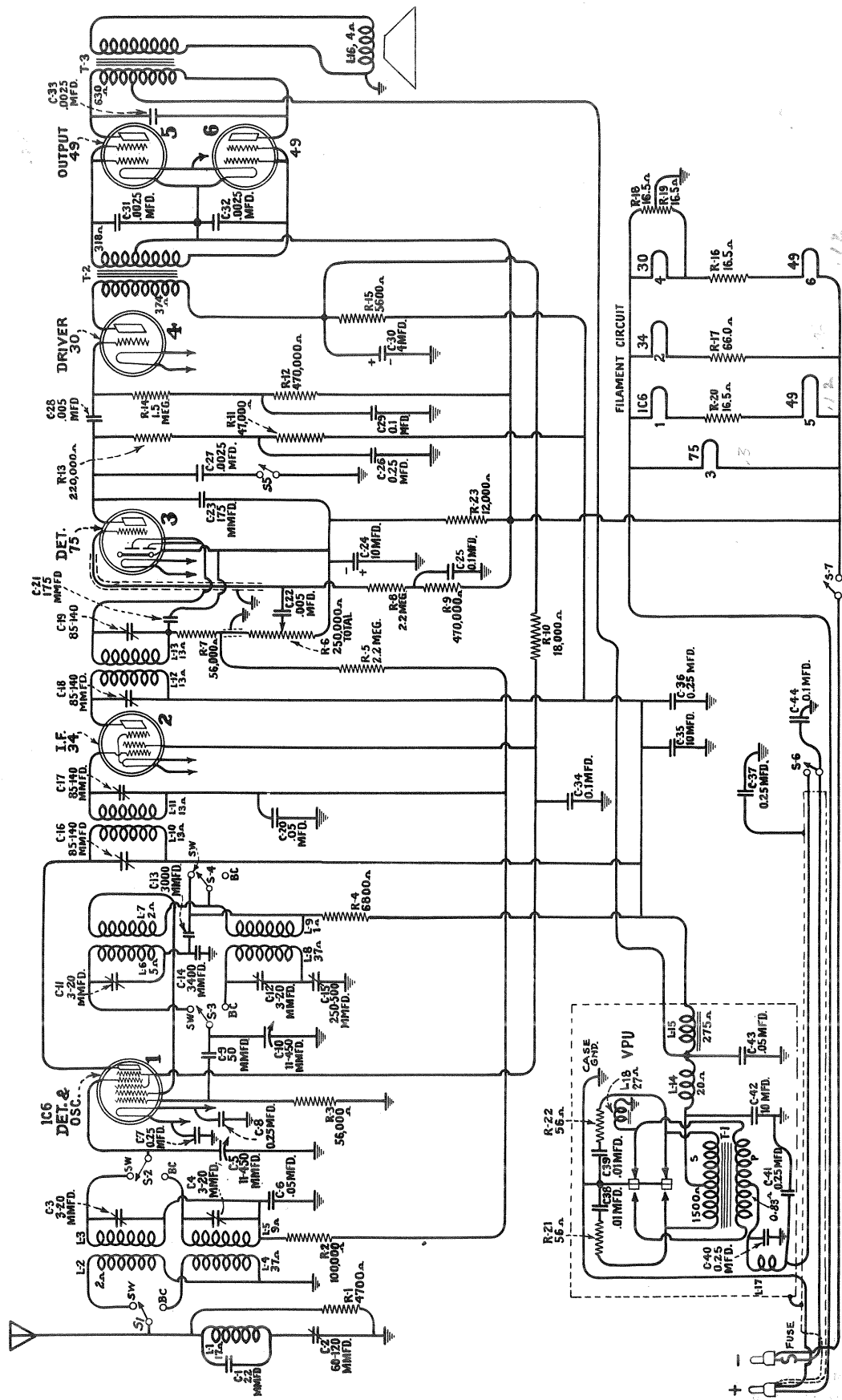


Figure 1—Schematic Circuit Diagram

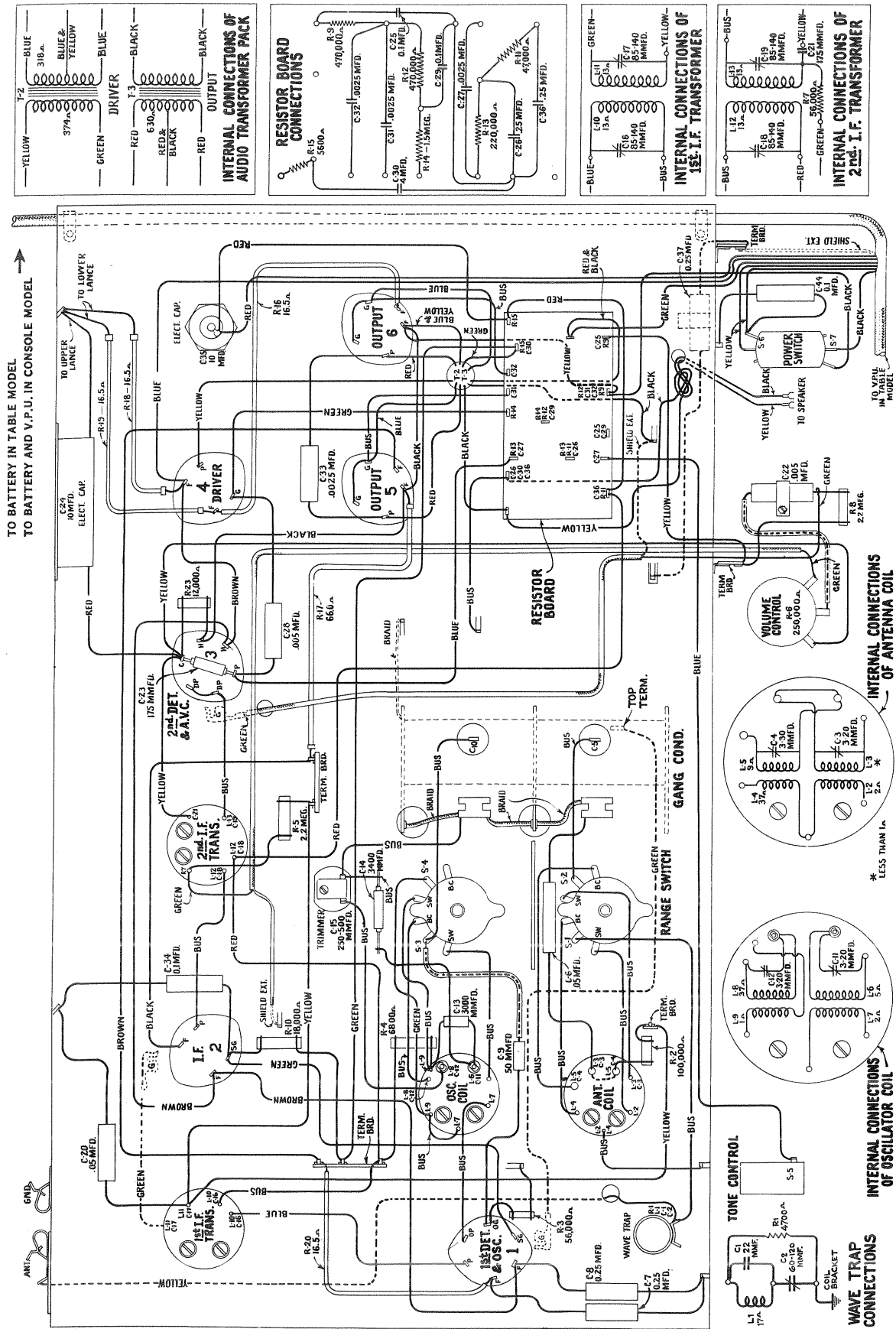


Figure 2—Chassis Wiring Diagram

## 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 five adjustable trimmers. Selection of the individually wound coil systems is made by the range selector. 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 an *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 the diode section of the RCA-75. The *a-f* voltage appearing across 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-75 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-75. When this switch is closed, 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 an output transformer.

Battery "On-Off" control is by means of a double pole switch, one side of which controls the filament and bias circuits, while the other side controls the vibrator power unit circuit. A fuse is provided in the V. P. U. circuit.

## SERVICE DATA

### Alignment Procedure

Four adjusting trimmers are provided for the *i-f* coils and five for the antenna and oscillator coils. They are precisely adjusted during manufacture to give correct performance. Their settings should remain intact indefinitely when the receiver is used under ordinary conditions. 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.

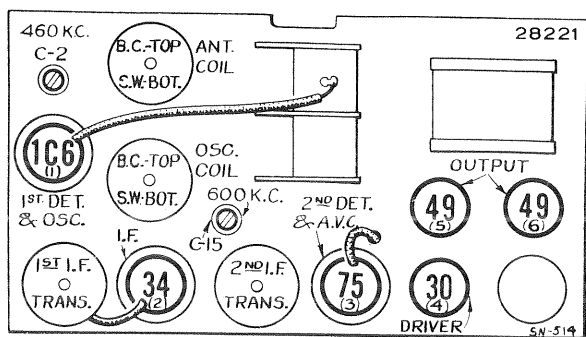


Figure 3—Radiotron and Coil Locations

In readjusting 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 source of the specified alignment frequencies is required. It is recommended that such a source consist of an RCA Stock No. 9595 Full-Range Test Oscillator. 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 obtained by means of such

an instrument 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 avoid broadness of tuning which would otherwise result from A.V.C. action on a stronger one.

### I-F Adjustments

- Connect the output of the test oscillator between the control-grid cap of the first detector tube (RCA-1C6) 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.
- Adjust the trimmers, C-19 and C-18, of the second *i-f* transformer, and C-17 and C-16 of the first *i-f* transformer, so that each produces maximum (peak) receiver output as shown by the indicating device. This completes the *i-f* trimmer adjustments.

### R-F Adjustments

- Check the calibration of the dial scale by rotating the tuning control until the variable condenser plates are in full mesh. (Maximum capacity.) 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 Band A (broadcast) position. Tune the oscillator to 1,720 kc. Allow the output indicator to remain attached to the receiver output.
- (c) Tune the receiver so that the dial reading is 1,720 kc. Then adjust the oscillator and antenna coil trimmers, C-12 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-15, should then be adjusted, simultaneously rocking the receiver tuning control backward and forward through the signal until maximum receiver output results from the combined operations. The adjustment of C-12 should be repeated as in (c) to correct for any changes in its alignment due to the adjustment of C-15.
- (e) Shift the oscillator frequency to 18,000 kc. Adjust the receiver range switch to its Band C (shortwave) position, and set the receiver dial to a reading of 18,000 kc. The oscillator and antenna trimmers, C-11 and C-3, should then be adjusted for maximum indicated receiver output.

Retune receiver to 17,080 kc. and check for image signal. If C-11 has been correctly

aligned, the 18,000 kc. signal will be received. It may be necessary to increase the oscillator output for this indication of the "image." *No adjustments should be made during this check.*

## Vibrator Power Unit

The Vibrator Power Unit supplies the necessary plate, screen, and cathode voltage for proper operation of the receiver. It contains a plug-in type vibrator, step-up transformer, and an efficient filter system. Rectification of the high voltage is by means of the synchronous vibrator. The complete unit is acoustically shielded to prevent noise. *The radio chassis is 1 volt negative with respect to the vibrator chassis and, therefore, it is necessary to insulate the vibrator power unit from the chassis when they are removed for service purposes.* The vibrator unit has been carefully adjusted by means of special equipment to insure quiet operation over an extensive period of life. No adjustments should be attempted on a vibrator suspected of being in a defective condition, but a renewal installed. A convenient plug-in base is provided for effecting a quick replacement.

## Radiotron Socket Voltages

Voltage values indicated at the Radiotron socket contacts on Figure 4 form a reference basis for test of the receiver. All voltages are given in respect to

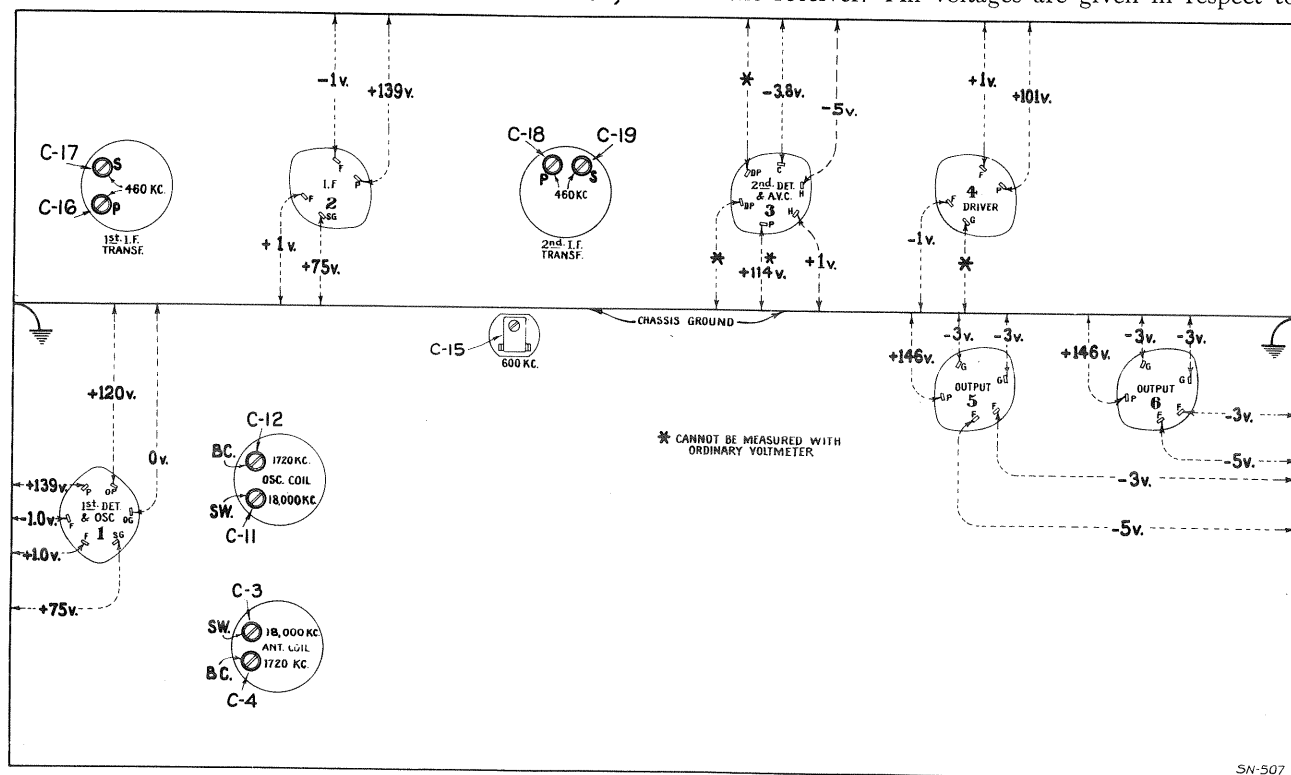


Figure 4—Radiotron Socket Voltages and Trimmer Locations  
Measured at Normal Battery Voltage—No Signal Being Received

chassis-ground. 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.

## Wave-Trap Adjustment

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

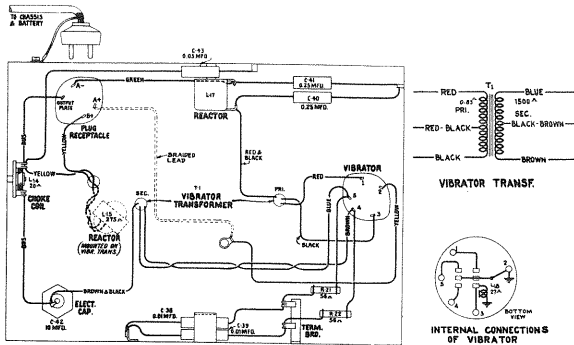


Figure 5—Vibrator Power Unit Wiring

## Operation on 32-Volt Farm Plants

The recommended method for operating these receivers from a 32-volt Farm Lighting System is to connect the 6-volt battery leads across a medium-duty 6-volt storage battery which is connected in series with a 100-watt 32-volt lamp and switch across the 32-volt system. This method will permit the battery to be charged at a rate of about 3 amperes. The 6-volt battery should be charged from the 32-volt system about two-thirds the number of hours the re-

ceiver is in operation to prevent the battery from becoming overcharged. It is recommended that a frequent check be made with a hydrometer as to the state of charge of the battery. The wiring should be made permanent so that no mistake could be made as to the proper battery polarity.

In some cases, these receivers may be operated from a 6-volt tap (ground side) on the 32-volt battery system provided the interference radiated from the battery leads does not seriously affect reception. It will be necessary to extend the 4-conductor battery leads of the receiver to the 32-volt battery system and properly shield them to reduce radiation of interference into the antenna. The extension of only a single pair of leads will cause excessive vibrator interference in the filament circuits of the receiver. If the receiver is located some distance from the 32-volt battery system, the radiation of interference and the resistance in the battery leads will result in unsatisfactory operation of the receiver. This method of operation places an uneven load on the 32-volt battery system with a greater discharge occurring in three of the battery cells which may affect their life.

If these receivers are operated directly from the 32-volt system by means of a series dropping resistance without the floating battery, excessive hum and interference will result. It is also impossible to recommend a value for the dropping resistance which will insure that the receiver will not be damaged under certain operating conditions of the lighting plant.

A small capacitor (.05 mfd.) should be placed in series with the ground lead of the receiver to prevent shorting the 32-volt system.

## 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
<b>RECEIVER ASSEMBLIES</b>					
5237	Bushing—Variable tuning condenser mounting bushing assembly—Package of 3.....	\$0.43	4836	Capacitor—.05 Mfd.—(C6, C20).....	.30
11223	Capacitor—Adjustable capacitor—(C15)..	.46	4841	Capacitor—0.1 Mfd.—(C25, C29, C34, C44).....	.22
11292	Capacitor—22 MMfd.—(C1).....	.24	4840	Capacitor—0.25 Mfd.—(C7, C8, C26, C36, C37).....	.30
11289	Capacitor—50 MMfd.—(C9).....	.26	6832	Capacitor—4 Mfd.—(C30).....	.85
5116	Capacitor—175 MMfd.—(C23).....	.18	11387	Capacitor—10 Mfd.—(C35).....	.86
11622	Capacitor—3000 MMfd.—(C13).....	.36	11645	Capacitor—10 Mfd.—(C24).....	1.08
4439	Capacitor—3400 MMfd.—(C14).....	.35	11639	Coil—Antenna coil—(L2, L3, L4, L5, C3, C4).....	2.40
5107	Capacitor—.0025 Mfd.—(C27, C31, C32, C33).....	.16	11640	Coil—Oscillator coil—(L6, L7, L8, L9, C11, C12).....	2.46
4868	Capacitor—.005 Mfd.—(C28).....	.20	11638	Condenser—Two-gang variable tuning condenser (C5, C10).....	3.05
5242	Capacitor—.005 Mfd.—(C22).....	.52			

## REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION	LIST PRICE	STOCK No.	DESCRIPTION	LIST PRICE
11648	Foot—Chassis foot and bracket assembly—Package of 2.....	.64	4840	Capacitor—.25 Mfd.—(C40, C41).....	.30
11134	Resistor—16.5 ohms—Flexible type—(R16, R20)—Package of 5.....	.68	11387	Capacitor—10 Mfd.—(C42).....	.86
11611	Resistor—16.5 ohms—Flexible type—(R18, R19)—Package of 5.....	.68	11655	Coil—Choke coil—(L14).....	.38
11473	Resistor—66 ohms—Flexible type—(R17)—Package of 5.....	.68	11657	Reactor—Filter reactor—(L15).....	.96
11650	Resistor—4700 ohms—Carbon type—1/10 watt—(R1)—Package of 5.....	.75	11652	Reactor—(L17).....	1.28
11647	Resistor—5600 ohms—Carbon type—1/4 watt—(R15)—Package of 5.....	1.00	5034	Resistor—56 ohms—Carbon type—1/2 watt—(R21, R22)—Package of 5.....	1.00
11726	Resistor—6800 ohms—Carbon type—1/4 watt—(R4)—Package of 5.....	1.00	4794	Socket—4-contact socket for cable plug connector.....	.15
5109	Resistor—12,000 ohms—Carbon type—1/4 watt—(R23)—Package of 5.....	1.00	4814	Socket—5-contact vibrator socket.....	.15
11175	Resistor—18,000 ohms—Carbon type—1/4 watt—(R10)—Package of 5.....	1.00	11653	Transformer—Vibrator transformer—(T1).....	6.50
11646	Resistor—47,000 ohms—Carbon type—1/4 watt—(R11)—Package of 5.....	1.00	11656	Vibrator.....	5.92
5029	Resistor—56,000 ohms—Carbon type—1/4 watt—(R3)—Package of 5.....	1.00	MISCELLANEOUS ASSEMBLIES		
11281	Resistor—100,000 ohms—Carbon type—1/10 watt—(R2)—Package of 5.....	.75	4289	Body—Fuse connector body—Package of 10.....	.35
5158	Resistor—220,000 ohms—Carbon type—1/4 watt—(R13)—Package of 5.....	1.00	11635	Cable—Battery cable complete with four-contact male connector, fuse connector and two-contact pins—for table model.....	2.30
11172	Resistor—470,000 ohms—Carbon type—1/4 watt—(R9, R12)—Package of 5.....	1.00	11636	Cable—Battery cable complete with four-contact male connector, fuse connector, and two-contact pins—for console model.....	2.60
4241	Resistor—1.5 megohms—Carbon type—1/4 watt—(R14)—Package of 5.....	1.00	4288	Cap—Fuse connector cap—Package of 10.....	.36
11626	Resistor—2.2 megohms—Carbon type—1/4 watt—(R5, R8)—Package of 5.....	1.00	11634	Connector—Clip and strap connector assembly for storage battery—Package of 2.....	.26
11641	Shield—Antenna or oscillator coil shield.....	.34	6516	Connector—Fuse connector—complete... ..	.16
11390	Shield—Intermediate frequency transformer shield.....	.25	11570	Connector—Four-contact male connector for battery cable.....	.32
3682	Shield—Radiotron (1C6 or 75) shield... ..	.22	11337	Escutcheon—Station selector escutcheon.....	.70
3056	Shield—Radiotron (34) shield—Package of 2.....	.40	4286	Ferrule—Fuse connector ferrule and bushing—Package of 10.....	.38
4794	Socket—4-contact Radiotron (30 or 34) socket.....	.15	5023	Fuse—15 Ampere fuse—Package of 5....	.40
4814	Socket—5-contact Radiotron (49) socket.....	.15	6614	Glass—Station selector dial glass.....	.30
4786	Socket—6-contact Radiotron (1C6 or 75) socket.....	.15	4290	Insulator—Fuse connector insulator—Package of 10.....	.35
11643	Switch—Power switch—(S6, S7).....	.60	11346	Knob—Station selector knob—Package of 5.....	.75
11642	Switch—Range switch—(S1, S2, S3, S4).....	1.52	11455	Knob—Volume control, tone control, range switch or power switch knob—Package of 5.....	.48
11644	Switch—Tone control switch—(S5)....	.30	11637	Pin—Contact pin—for battery cable—colored black—Package of 5.....	.10
5238	Terminal—Antenna terminal board with clip, insulating strip and rivets.....	.14	11658	Pin—Contact pin—for battery cable—colored red—Package of 5.....	.10
11594	Transformer—Audio driver and output transformer pack—(T2, T3).....	4.10	4678	Ring—Station selector dial glass retaining ring—Package of 5.....	.34
11592	Transformer—First intermediate frequency transformer—(L10, L11, C16, C17)....	2.55	5210	Screw—Chassis mounting screw assembly—Package of 4.....	.16
11593	Transformer—Second intermediate frequency transformer—(L12, L13, C18, C19, C21, R7).....	2.75	11348	Screw—No. 8-32x7/16-in. headless cupped point set screw—for knob, stock No. 11346—Package of 10.....	.32
11649	Trap—Wave trap—(L1, C1, C2, R1)....	1.15	4284	Spring—Fuse connector spring—Package of 10.....	.30
11589	Volume control—(R6).....	.85	11349	Spring—Retaining spring for knob, stock No. 11455—Package of 5.....	.15
DRIVE ASSEMBLIES			4285	Washer—Fuse connector insulating washer—Package of 10.....	.22
10194	Ball—Steel ball for drive assembly—Package of 20.....	.25	REPRODUCER ASSEMBLIES		
4422	Clutch—Tuning condenser drive clutch assembly—comprising drive shaft, balls, ring, spring and washers assembled... ..	1.00	Table Model		
11674	Dial—Station selector dial.....	.30	9539	Cone—Reproducer cone (L9)—Package of 5.....	4.30
11651	Drive—Variable tuning condenser drive assembly.....	1.84	9540	Magnet Assembly—Comprising cone bracket, core and magnet.....	5.72
4520	Indicator—Station selector indicator pointer.....	.18	9538	Reproducer—Complete.....	7.65
4669	Screw—No. 8-32x5/32-in. set screw for condenser assembly—Package of 10....	.25	REPRODUCER ASSEMBLIES		
POWER UNIT ASSEMBLIES			Console Model		
11654	Capacitor—.01 Mfd.—(C38, C39).....	.16	9432	Cone—Reproducer cone—complete with voice coil—(L9).....	1.88
4836	Capacitor—.05 Mfd.—(C43).....	.30	7820	Magnet—Cone housing and magnet assembly.....	8.98
			7819	Reproducer—Complete.....	12.18