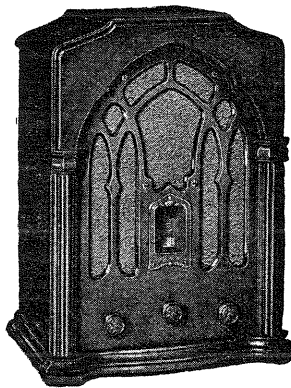


# **RCA Victor**

## **Short Wave Converter SW-3**

### **SERVICE NOTES**



*RCA Victor R-24 with SW-3 Converter*

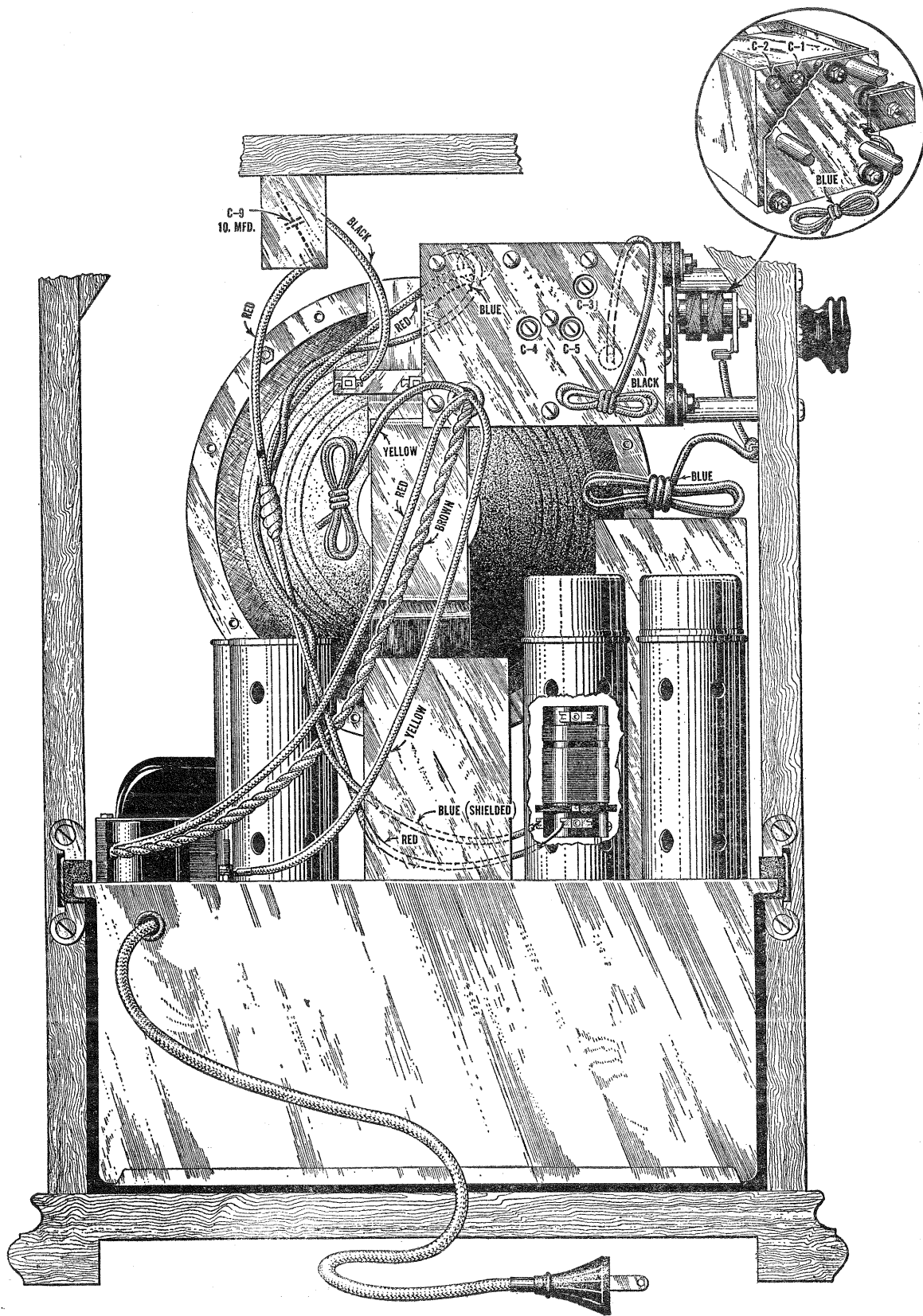
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**SERVICE DIVISION**

**RCA Victor Company, Inc.**  
**Camden, N. J., U. S. A.**

**A RADIO CORPORATION OF AMERICA SUBSIDIARY**

**REPRESENTATIVES IN PRINCIPAL CITIES**



(Some Models have Converter Unit on the opposite side from that shown)

*Figure 1—Assembly Wiring of Model R-24*

# RCA Victor

## Short Wave Converter SW-3

### SERVICE NOTES

#### SPECIFICATIONS

- Type of Circuit.....Super-Heterodyne Converter for use with standard broadcast receiver
- Type and Number of Radiotrons—A. C.....1 RCA-58, 1 RCA-56—Total, 2
- Type and Number of Radiotrons—Battery.....1 RCA-230, 1 RCA-232—Total, 2
- Type of Tuning....All tuning is done by means of the I. F. Amplifier, which is the broadcast receiver
- Broadcasting Ranges.....
- |   |                                      |
|---|--------------------------------------|
| { | 6000 K. C. to 6150 K. C.—49 Meters   |
|   | 9500 K. C. to 9600 K. C.—31 Meters   |
|   | 11700 K. C. to 11900 K. C.—25 Meters |
|   | 15100 K. C. to 15350 K. C.—19 Meters |
- Requirements of Receiver for use with Converter.....High impedance antenna transformer primary insulated from the chassis or other circuits; a source of 2.5 volt current capable of supplying 2 amperes additional and a source of 180-260 volt plate current supplying an additional 5 M. A. The cabinet must also be acoustically correct, as the tendency to howl is increased by the addition of the converter.

The RCA Victor Short Wave Converter SW-3 is a two-tube Super-Heterodyne Converter that may be used with standard broadcast band receivers. By means of the Converter, short wave broadcasting stations may be received merely by tuning with the broadcast receiver. A selector switch allows choice of the short wave band that it is desired to receive.

A number of RCA Victor receivers include this Converter. The assembly wiring diagrams, together with any schematic changes for the models, are contained in this booklet. The regular Service Notes should be consulted for service information pertinent to the broadcast receivers.

### SERVICE DATA

A three-section, five-position switch, located on the side or front of the cabinet, provides for readily changing the detector fixed tuning inductance and the oscillator fixed tuning capacitance (both in the short wave converter) for operation in any desired short wave broadcasting band. Such changes are effected by shifting the tap switch contact arm through its first four positions, the fifth, or remaining position, being employed for standard (long wave) broadcast reception. In the latter case, the short wave circuits are isolated and grounded and the incoming signals are transferred to the input of the standard broadcast receiver.

The following tabulation shows the frequency range of the instrument for each position of the switch and, in addition, the width of the important short wave bands included in those ranges:

Switch Position	Range (K. C.)	Broadcast Band Included (Meters)	Band Width (K. C.)
1	15600-14650	19	15340-15100
2	12350-11400	25	11900-11700
3	9950- 9000	31	9600-9500
4	6700- 5750	49	6150-6000
5	1500- 550	Standard	1500-550

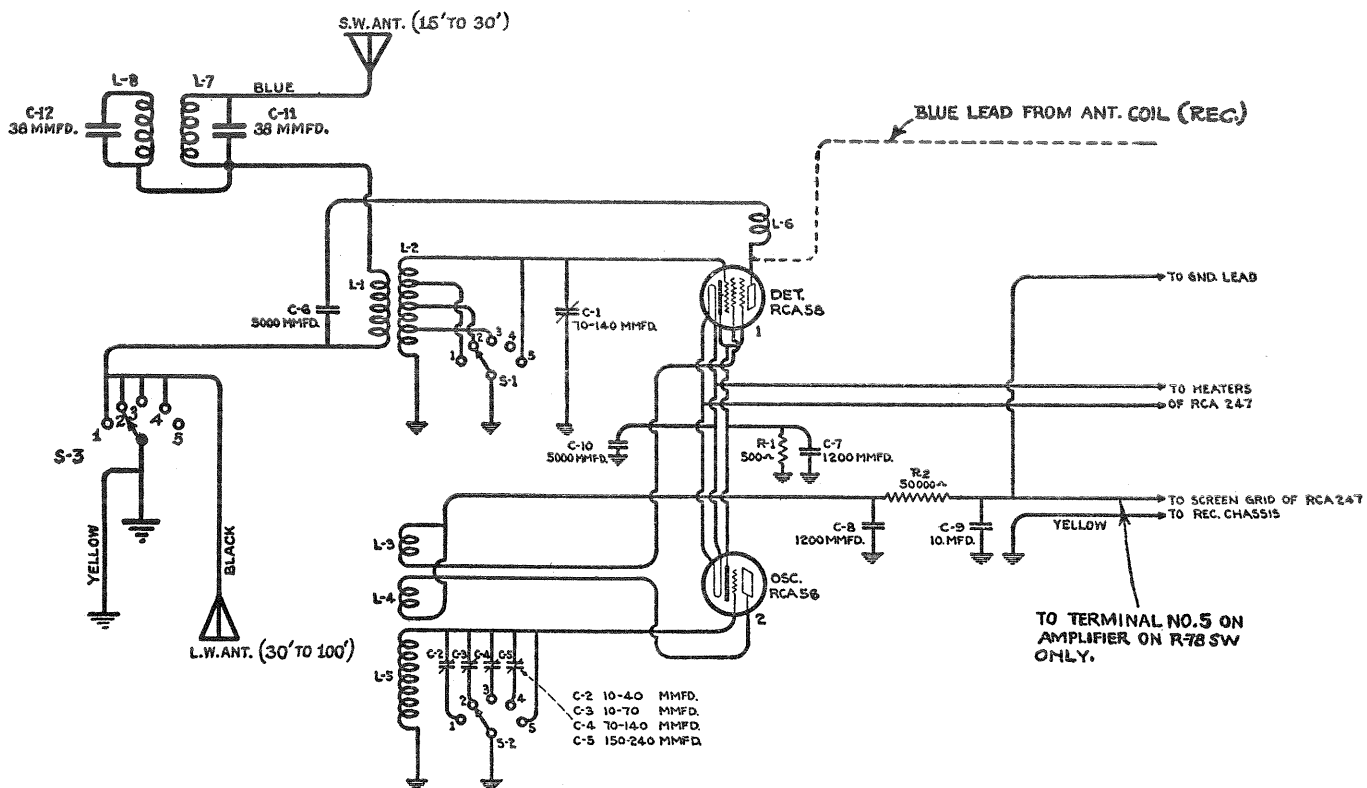


Figure 2—Schematic Diagram of A. C. SW-3

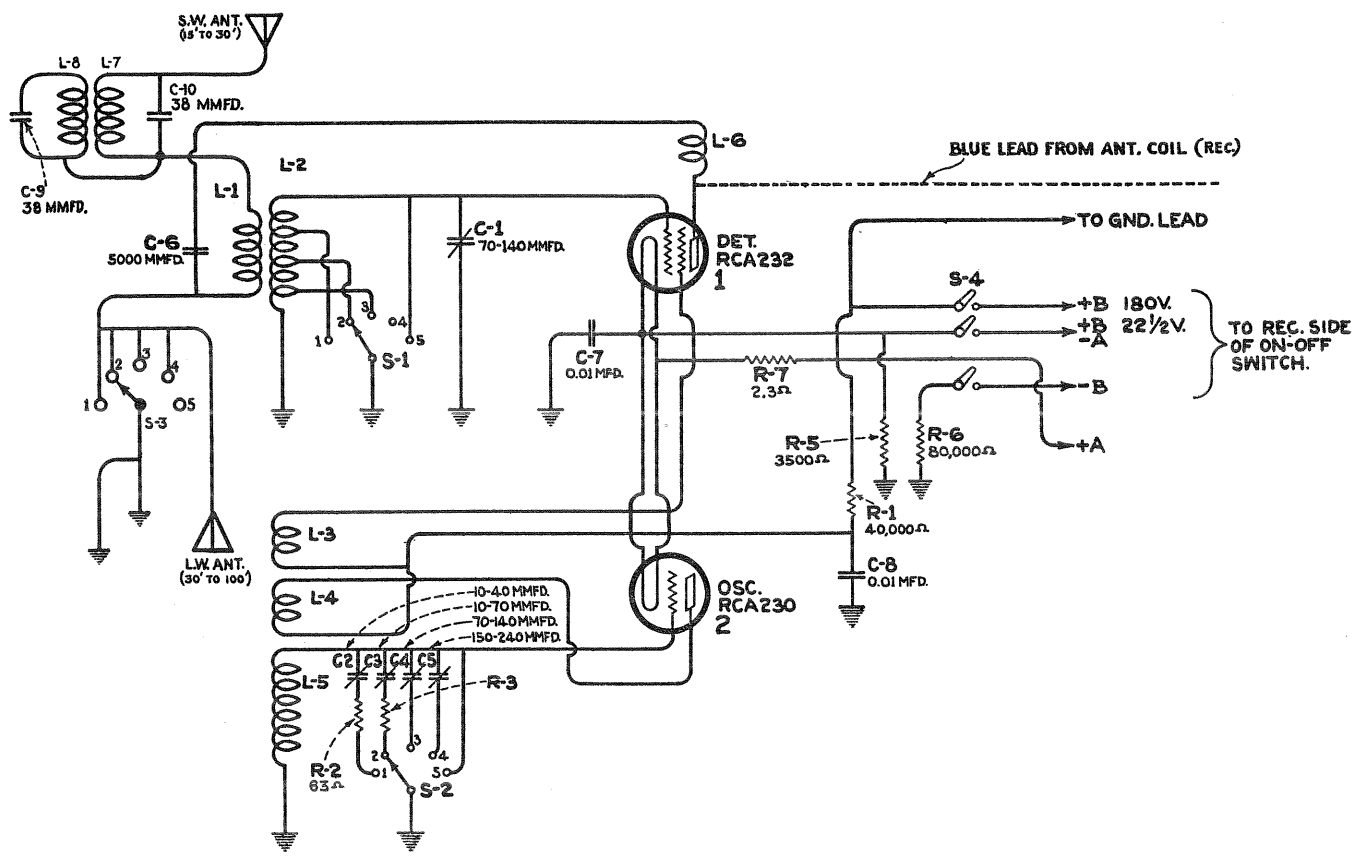


Figure 3—Schematic Diagram of Battery SW-3

By examination of the above table, it will be seen that considerable latitude is provided on either side of the actual extremities of each standardized short wave band. This provision further increases the usefulness of the receiver since several stations are now operating on frequencies slightly outside of the actual band range limits.

Since all tuning adjustments are effected from the single dial, it will be appreciated that considerable interference with short wave reception may be caused by nearby, powerful, long wave (200 to 546 meter) broadcasting stations. Since when correctly adjusted, all short wave broadcasting bands fall within 950-1300 K. C., the possibility of interference is limited to that caused by local stations operating within these frequencies. Such interference may be eliminated in each range by a slight shift of the oscillator frequency. This result is accomplished by adjustment of one of the four spring-plate, tuning capacitors on the short wave converter chassis, one of which is effective for each position of the tap switch. Any adjustment of these capacitors, of course, will change the dial positions of all stations in that particular range an equal number of dial divisions (10 K. C. per dial division) to an extent corresponding to the frequency shift from the original position at which interference was encountered. If local stations are present within 950-1300 K. C. range, adjust the oscillator tuning capacitors so that no short wave signals are received at the same dial setting.

## (1) OSCILLATOR ADJUSTMENTS

The oscillator frequencies should be the following values for the taps indicated:

<i>Band</i>	<i>Oscillator Frequency</i>	<i>Trimming Capacitor</i>
19 Meter	14100 K. C.	C-2
25 Meter	12900 K. C.	C-3
31 Meter	8450 K. C.	C-4
49 Meter	7250 K. C.	C-5

If a frequency meter or a calibrated receiver is available, either will be suitable for checking or adjusting these capacitors. If such equipment is not available then the following method may be used:

The frequency of the oscillator may be checked by adding or subtracting the dial reading in kilocycles from the operating frequency of the station being received. The instruction book lists a number of stations with their correct operating frequency. The dial reading should be added or subtracted as follows:

19 Meter Tap.....	Subtract dial reading.
25 Meter Tap.....	Add dial reading.
31 Meter Tap.....	Subtract dial reading.
49 Meter Tap.....	Add dial reading.

It will be noted that when the oscillator trimmer capacitors are properly adjusted, all stations operating in the assigned bands will fall between 950 and 1300 K. C. on the receiver dial. The purpose of the oscillator capacitors is to adjust this range and is *not* a sensitivity adjustment.

In the event that they are so badly out of adjustment that one or more of the bands fall entirely out of the receiver tuning range and no short wave broadcasting stations are heard, the following procedure may be used for realigning them:

1. By means of a set using the SW-3 Converter and working properly, determine that a station can be heard on the band to be adjusted.

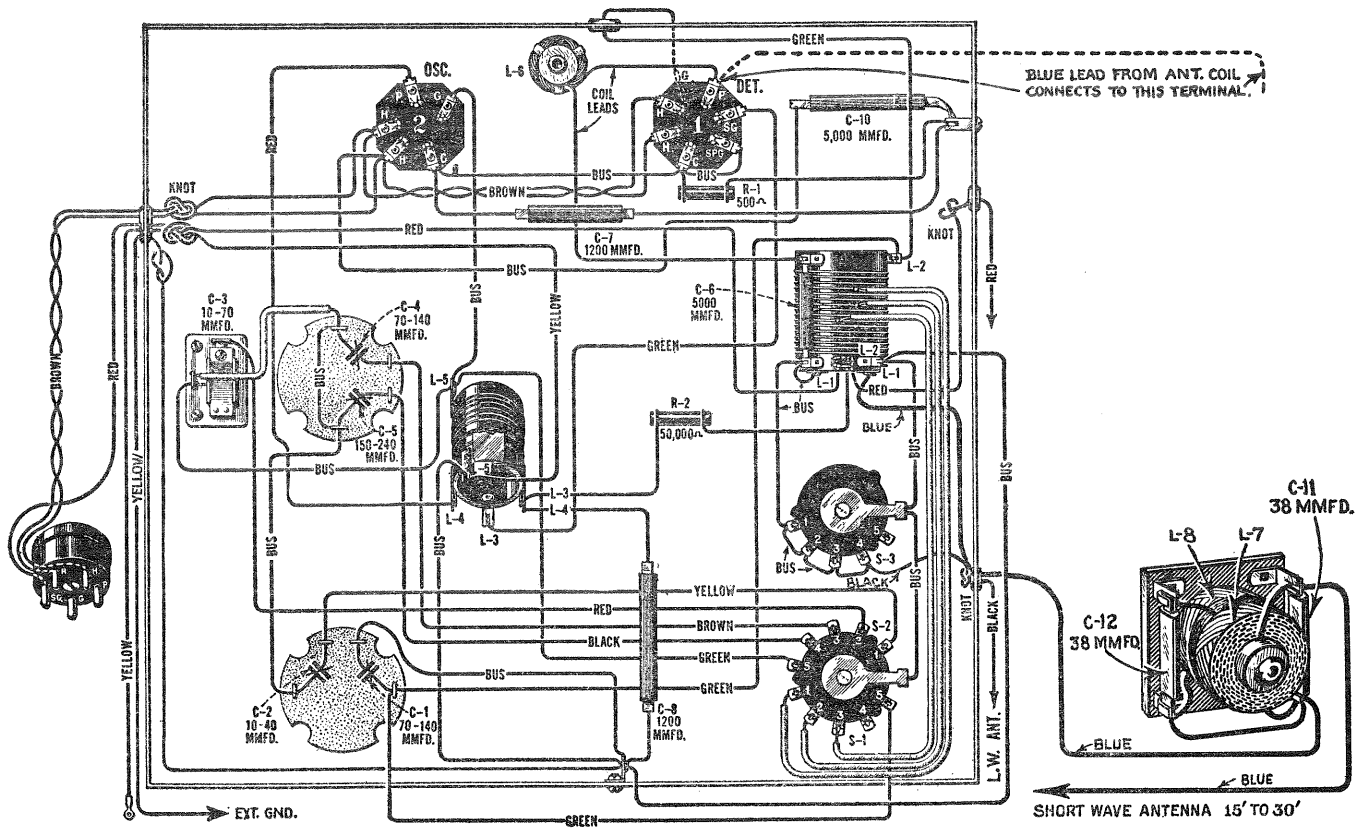


Figure 4—Wiring Diagram of A. C. SW-3

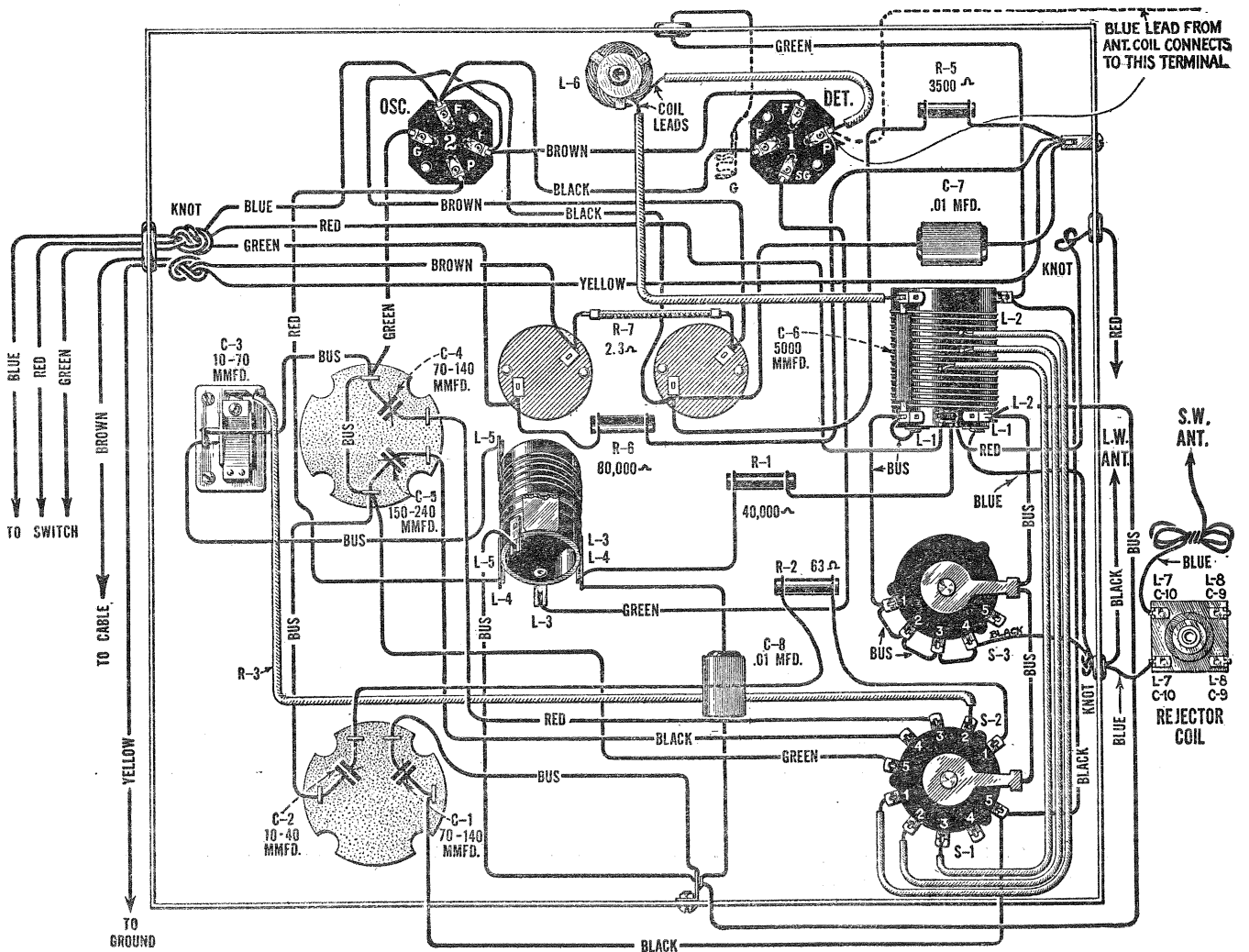


Figure 5—Wiring Diagram of Battery SW-3

2. Tune in a signal, on the receiver working properly, in the band it is desired to adjust the defective receiver. Then set the band switch and dial at the same position on the defective receiver as that of the receiver tuned to the signal.
3. For the 49 and 25 meter bands, turn C-3 or C-5, as the case may be, Figure 1, to the extreme minimum capacity position, counter-clockwise. Then turn slowly clockwise until the station being received on the first receiver is heard. For the 19 and 31 meter positions, the capacitors C-2 and C-4, as the case may be, should be first tuned to their maximum capacity position clockwise and then turned counter-clockwise until the signal is heard. This order should be carefully followed. The first point, after starting from the maximum or minimum position at which the signal is heard, is the correct adjustment. On some settings, two positions may be found but any one other than the first will result in improper tuning.

## (2) DETECTOR ADJUSTMENT

The detector trimmer capacitor, if not properly adjusted, will cause insensitivity or excessive background noise on all bands.

This adjustment can only be made at the time of day when 49 meter stations can be received unless equipment for generating an artificial high-frequency (6075 K. C.) test signal of accurate frequency is available.

The adjustment should be made as follows:

1. Remove screws holding converter in cabinet and place converter at the rear of the chassis on a wooden box or other rest made of non-conductive material, leaving all connections intact so that proper operation is maintained. In models not having a hole in mounting plate to enable adjustment of C-1, the mounting plate must also be removed and so placed that it is not in the field of the coils of the converter.
2. Then tune in a station operating near the center of the 49 meter band (6075 K. C.) and adjust detector trimmer (C-1) for maximum volume. Rock the main tuning capacitor back and forth while making this adjustment.

If no station operating close to 6075 K. C. can be heard, adjust for maximum volume on two stations successively, one on either side of 6075 K. C., noting position of trimmer and then placing the trimmer at the mean of the two positions.

3. Use of Station Finding Chart.

By thorough understanding and use of the Station Finder, the customer can obtain much greater satisfaction by enabling the rapid identification and dial setting of short wave stations.

In effect the Station Finder provides a calibration of the receiver tuning dial, converting the long wave markings 540 to 1500 K. C. to higher frequency calibrations, depending on the position of the range switch.

This is made possible by the fact that no matter what frequency is being received one dial division always represents 10 K. C.

The following example explains the operation:

With Range Switch in 49 meter position, assume that W8XK is tuned in at 1080 dial position. By reference to the Station Finder, it will be seen that in the section bracketed 49 M., W8XK is marked opposite 6140 K. C. the operating frequency of W8XK. This then means that 1080 corresponds to 6140 K. C. Rotate the inner circle so that 1080 is exactly opposite 6140, the point at which

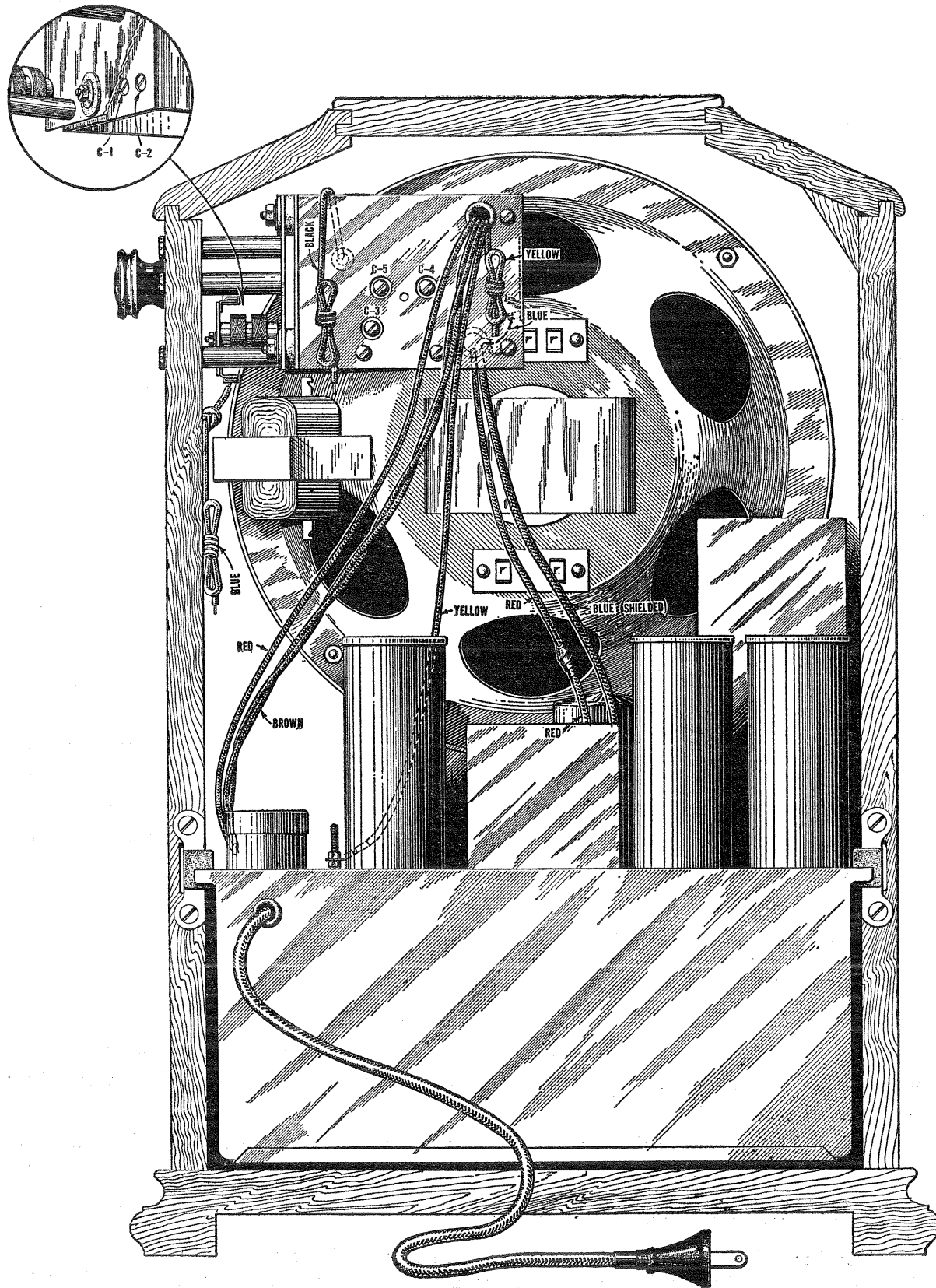


Figure 6—R-24-A Assembly Wiring



W8XK is marked. Then by reference to chart it will be seen that with the receiver tuned to 1180 it will be tuned to 6040 K. C. or the operating frequency of W4XB. Now, by outlining the index hole we can record, permanently, the point to set the Station Finder in order to find the dial setting for any 49 meter station. By looking on the Short Wave Broadcast Station List and Program Schedule we find that W3XAL operates on 6100 K. C.; then for the example given above we can immediately find that W3XAL will be received at 1120 K. C. and when received, the call letters may be marked in the margin opposite 6100 K. C.

Thus it is only necessary to log one station in a band to obtain the dial position for all stations in that band. The same procedure should be repeated for all bands.

In case it is found that any stations operating within the bands fall outside of the region from 950-1300 K. C., the oscillator trimmer condenser for that band should be readjusted so as to bring all stations within the region of 950-1300 K. C. in order to obtain maximum efficiency.

It is recommended that each receiver be checked and the Station Finder be logged for the particular set, marking the serial number on the Station Finder before sending to customer's house. Then when installed the operation of the Station Finder should be demonstrated, stressing the ease of tuning and separation of stations obtained.

### (3) GENERAL NOTES

The following general notes will help in the performance of service work in conjunction with receivers using the SW-3.

1. Keep the antenna lead of the converter as far as possible from the broadcast receiver chassis.
2. If modulation hum is encountered, connect a 5000 mmfd. capacitor from either heater lead to ground. Later production instruments include this capacitor.
3. The shielding on the grid of the R. F. tube should be kept as loose as possible. If it is drawn tight it will affect the adjustment of the R. F. Trimmer Capacitor on the broadcast receiver.
4. Keep all other shielding tight, especially the shield over the lead from the converter to the shielded antenna coil, pushing it tight against the coil shield and thus covering the wire entirely.
5. If it is desired to use only one antenna, connect the antenna permanently to the blue lead from the Converter. If sufficient signal strength is not obtained on long wave reception, provide a single pole, single throw switch for connecting the black lead to the blue when long wave reception is desired. A clip on the black lead can be used if a switch is not available.
6. In buildings of metal framework or even with a metal roof, an indoor antenna or an outdoor antenna that does not extend beyond the shielding effect of the building will not be satisfactory. For such installations, an outdoor antenna must be used and the lead-in placed away from any metal parts of the building.

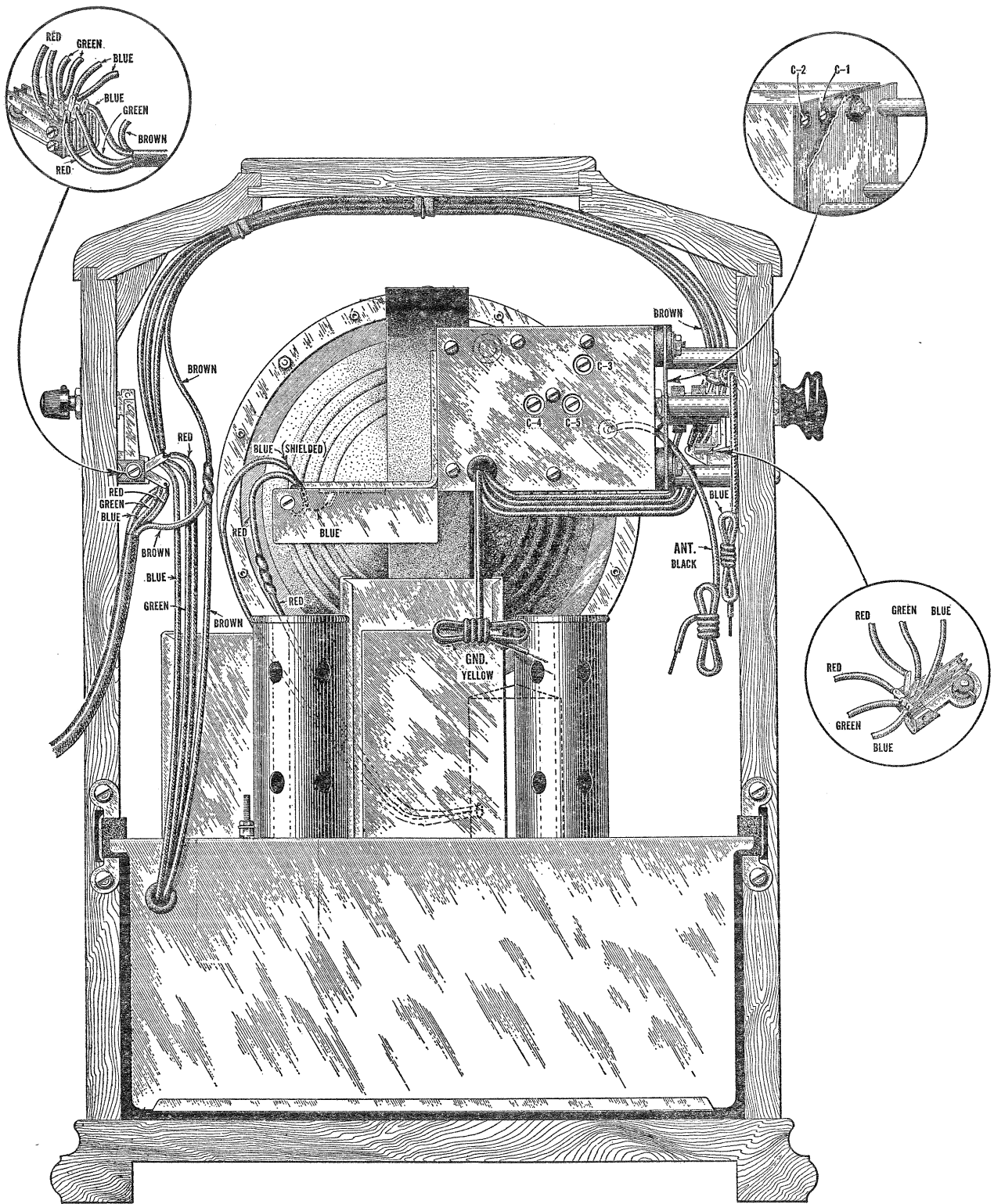


Figure 7—R-24-B Assembly Wiring

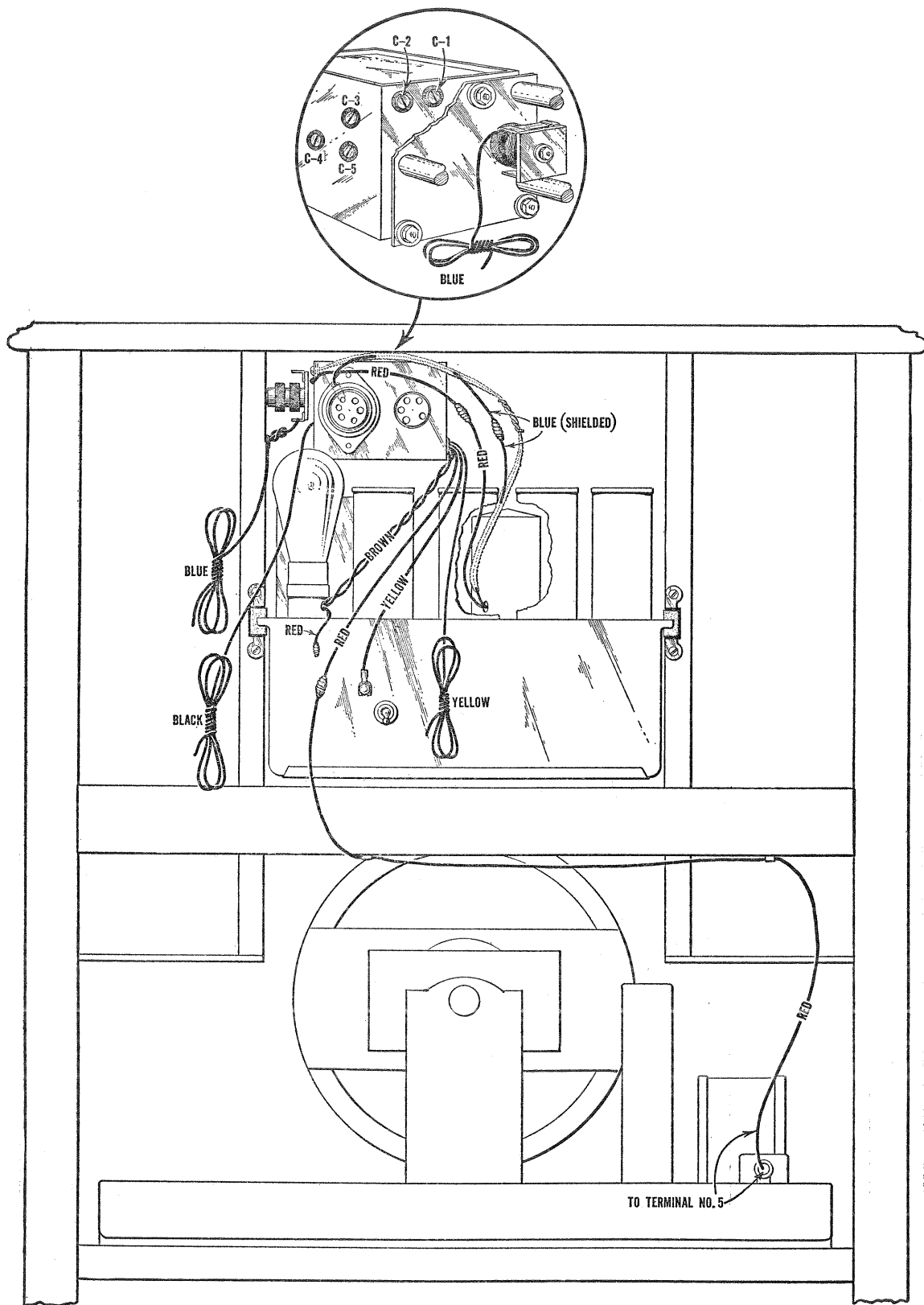


Figure 8—R-78-S. W. Assembly Wiring

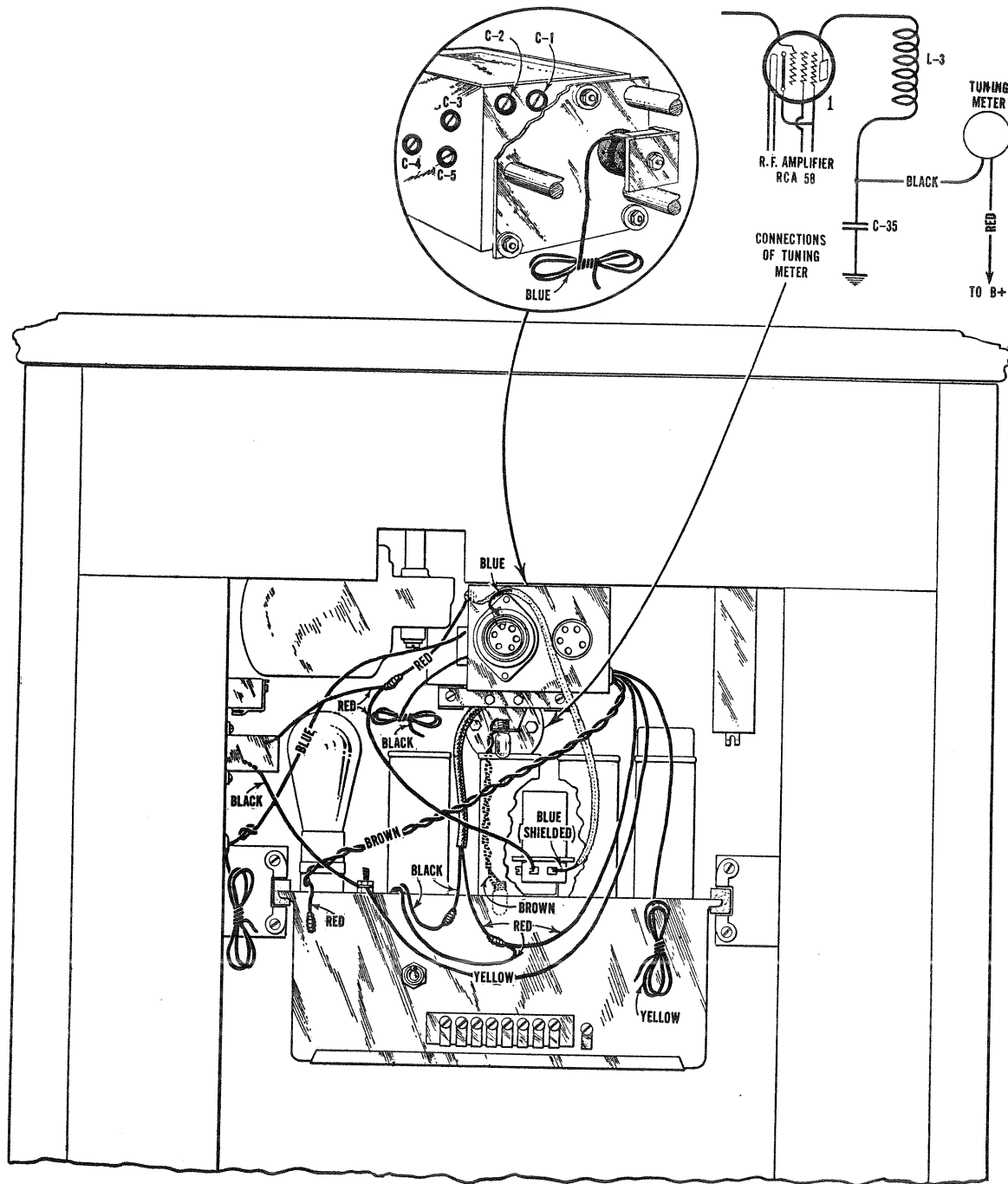


Figure 9—RAE-84-S. W. Assembly Wiring

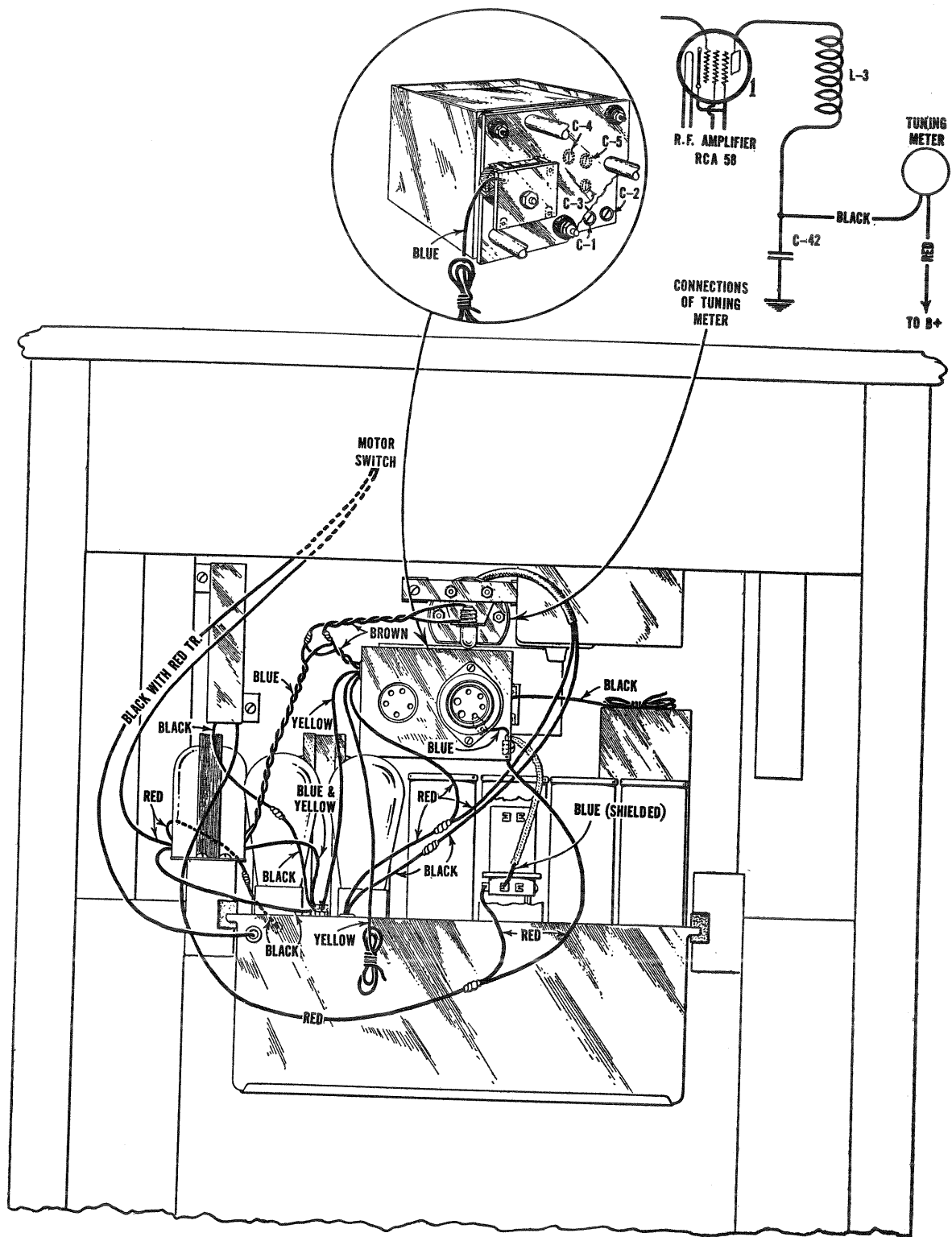


Figure 10—RE-81-S. W. Assembly Wiring

# 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>SW-3 A. C.</b>				
2012	Capacitor—1200 mmfd.....	\$0.55	3501	Capacitor — 38 mmfd. — Located on rejector coil.....	\$0.44
2747	Contact cap—Package of 5.....	.50	3504	Shield—Detector shield.....	.34
2969	Resistor—50,000 ohms—Carbon type—1 watt—Package of 5.....	2.50	3576	Resistor—2.3 ohms—Flexible type—Package of 5.....	1.20
2932	Capacitor—5000 mmfd.....	1.00	3577	Resistor—3,500 ohms— $\frac{1}{2}$ watt—Carbon type—Package of 5.....	1.00
3383	Resistor—500 ohms—Carbon type— $\frac{1}{2}$ watt—Package of 5.....	2.50	3578	Capacitor—0.01 mfd.....	.38
3420	Switch—Range selector switch.....	2.00	3579	Resistor—63 ohms— $\frac{1}{2}$ watt—Carbon type—Package of 5.....	1.00
3421	Coil—Oscillator coil.....	1.10	6100	Coil—Choke coil.....	.75
3422	Capacitor — Adjustable capacitor — 10 mmfd. to 40 mmfd. and 70 mmfd. to 140 mmfd.....	1.10	6109	Knob—Range switch selector knob—Package of 5.....	1.75
3423	Capacitor — Adjustable capacitor — 70 mmfd. to 140 mmfd. and 150 mmfd. to 240 mmfd.....	1.10	6300	Socket—4 contact Radiotron socket....	.55
3424	Coil—Detector coil.....	1.60	6379	Coil—Detector coil.....	1.52
3425	Capacitor — Adjustable capacitor — 10 mmfd. to 70 mmfd.....	.75	6380	Coil—Oscillator coil.....	1.08
3426	Escutcheon — Range selector switch escutcheon.....	.50	7488	Shield—Detector tube shield top.....	.50
3427	Capacitor—10 mfd. capacitor.....	2.15		<b>SPECIAL PARTS FOR R-24-A, R-24-B, RE-81 and RAE-84 RECEIVER ASSEMBLIES</b>	
3428	Plate—Converter mounting plate assembly.....	.85	3502	Base and mounting bracket for R. F. coil.....	.32
3429	Screw—Converter mounting screw—Package of 3.....	.50	3503	Shield—R. F. coil shield.....	.36
3500	Coil—Rejector coil—Located on mounting plate.....	1.46	6411	Coil—R. F. coil complete with mounting bracket.....	1.54
3501	Capacitor — 38 mmfd. — Located on resistor board.....	.44		<b>SPECIAL PARTS FOR R-24-A RECEIVER ASSEMBLIES</b>	
3504	Shield—Detector shield.....	.34	3522	Resistor—17,000 ohms—Carbon type— $\frac{1}{2}$ watt—Package of 5.....	1.00
6100	Coil—Choke coil.....	.75		<b>REPRODUCER ASSEMBLIES</b>	
6109	Knob—Range selector switch knob—Package of 5.....	1.75	6390	Transformer—Output transformer.....	2.12
6350	Adaptor—Five prong adaptor plug complete with leads.....	1.25	8976	Coil assembly—Comprising field coil magnet and cone support.....	4.30
7484	Socket—UY type Radiotron socket.....	.65		<b>SPECIAL PARTS FOR R-24-B RECEIVER ASSEMBLIES</b>	
7485	Socket—Radiotron 6 contact socket.....	.70	3048	Resistor—500,000 ohms—Carbon type— $\frac{1}{2}$ watt—Package of 5.....	2.50
	<b>SW-3 (Battery)</b>		3079	Resistor—40,000 ohms—Carbon type— $\frac{1}{2}$ watt—Package of 5.....	2.50
2747	Contact cap—Package of 5.....	.50	6312	Capacitor—650 mmfd.—Package of 5...	2.50
2932	Capacitor—5000 mmfd.....	1.00		<b>SPECIAL PARTS FOR RE-81</b>	
3045	Resistor—40,000 ohms—1 watt—Carbon type—Package of 5.....	2.50	7587	Transformer—Filament transformer....	4.25
3297	Resistor—80,000 ohms— $\frac{1}{2}$ watt—Carbon type—Package of 5.....	2.50		<b>SPECIAL PARTS FOR RAE-84</b>	
3420	Switch—Range selector switch.....	2.00	3048	Resistor—500,000 ohms—Carbon type— $\frac{1}{2}$ watt—Package of 5.....	2.50
3422	Capacitor — Adjustable capacitor — 10 mmfd. to 40 mmfd. and 70 mmfd. to 140 mmfd.....	1.10	3505	Capacitor—0.1 mfd.....	.36
3423	Capacitor — Adjustable capacitor — 70 mmfd. to 140 mmfd. and 150 mmfd. to 240 mmfd.....	1.10	3506	Knob—Range switch selector knob.....	.50
3425	Capacitor — Adjustable capacitor — 10 mmfd. to 70 mmfd.....	.75	3523	Capacitor pack—Comprising two 0.05 mfd. capacitors in metal container....	.72
3426	Escutcheon — Range selector switch escutcheon.....	.50		<b>SPECIAL PARTS FOR RE-81 and RAE-84</b>	
3428	Plate—Converter mounting plate assembly.....	.85	6412	Capacitor—10 mfd.....	1.62
3429	Screw—Converter mounting screw—Package of 3.....	.50	6413	Meter—Tuning meter.....	2.38
3500	Coil—Rejector coil.....	1.46			