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**communications**

**OPERATING and SERVICE  
INSTRUCTIONS**



**S-80**  
RUN 1

**the hallicrafters co.**  
MANUFACTURERS OF RADIO AND ELECTRONIC EQUIPMENT, CHICAGO 24, U. S. A.

## DESCRIPTION

Your Hallicrafters Model S-80, the "Defender", is a super-sensitive, four tube battery operated radio specially designed for use in rural and remote areas where commercial power is not available. It covers both the standard broadcast band and the 6 to 18 megacycle shortwave range thus assuring 24 hour reception even in weak signal areas where the broadcast band "blacks-out" in daytime.

The receiver is designed to operate from any standard  $1\frac{1}{2}$  volt "A" - 90 volt "B" heavy duty battery pack such as listed below under BATTERY INSTALLATION. These batteries will provide over 1,000 hours or approximately one year of service and will fit inside the rear of the cabinet. A special feature is the battery saver switch, a slide switch located on the chassis which will provide approximately 50 hours of additional battery operation at the normal end life of the battery.

Operation of the receiver in metropolitan areas from commercial power is easily possible by the use of a moderate cost power converter such as Perma Power Model A or Sears "Power Shifter". Such a unit equips the receiver for 110-120 volt, 50 or 60 cycle AC operation.

The tuning dial is of the slide rule type with separate dial scales for both the standard broadcast and shortwave bands. Major foreign cities are clearly indicated on the shortwave portion of the dial to facilitate tuning. Shortwave services covered by this receiver include the following international shortwave bands: 5.9 to 6.2 MC, 9.5 to 9.7 MC, 11.7 to 11.9 MC, 15.1 to 15.45 MC and 17.7 to 17.9 MC.

To get the utmost enjoyment from your Hallicrafters receiver, carefully follow the instructions contained in this book.



92X1542

Model S-80 Defender

## OPERATING INSTRUCTIONS

### BATTERY INSTALLATION

1. The receiver is designed to operate from any one of the following combination 90 and  $1\frac{1}{2}$  volt farm battery packs: Sears 06308, Wards 51, Burgess 17GD60, RCA VSO 99, General 60DL-11L, Eveready 748, Ray-O-Vac AB-82, Bond 0528 or Ensign AB48.
2. Place the battery pack into the compartment provided in the rear of the cabinet and insert the BATTERY CABLE PLUG (see Fig. 3) into the receptacle located on the battery.
3. Set the BATTERY SAVER SWITCH on the top right of the chassis to the NEW POSITION. (See Fig. 3.) This switch should be set at NEW whenever a new battery pack is installed.

**NOTE:** Maximum battery life will be obtained if the receiver is operated intermittently, i.e., for short periods of time, instead of continuously for prolonged periods.

4. When the volume of stations decreases noticeably due to the battery approaching the end of its normal operating life, set the BATTERY SAVER SWITCH at USED.
5. When reception becomes weak even with the BATTERY SAVER SWITCH at USED, replace the battery pack.

## ANTENNA INSTALLATION

Two leads have been provided at the top left of the chassis for antenna and ground connections. A satisfactory antenna in most cases is 30 to 60 feet of wire connected to the green lead and run about the room in any convenient manner. A good ground connection is required when this type of antenna is employed. For best results, an outside antenna should be used.

### SINGLE WIRE ANTENNA

1. Construct the antenna as shown in Fig. 1 and connect it to the green lead located on the top left of the chassis. (See Fig. 3.)
2. Erect the antenna as high as possible and free from surrounding objects.
3. Use an Underwriters approved lightning arrester designed for single lead-in at the point where the lead-in enters the house.
4. Connect the black lead located at the top left of the chassis to a cold water pipe or other good ground such as a six foot ground rod driven into moist soil.

For shortwave reception, a doublet antenna with a 300 ohm ribbon type transmission line is recommended. The doublet antenna, when properly constructed and installed, will provide excellent world-wide shortwave reception as well as standard broadcast reception.

### DOUBLET ANTENNA

1. Construct the antenna as shown in Fig. 2. Note that the antenna is  $19\frac{1}{2}$  feet long each side of center, the two sections being insulated from one another.
2. Use a length of 300 ohm ribbon type transmission line, commonly called twin-lead, as the lead-in from the antenna to the receiver. Connect one end of the transmission line to the two  $19\frac{1}{2}$  foot antenna sections and the other end to the black and green leads located at the top left of the chassis.
3. Use an Underwriters approved lightning arrester designed for twin-lead at the point where the lead-in enters the house.
4. No ground connection is required with the doublet antenna.

### TUNING DIAL

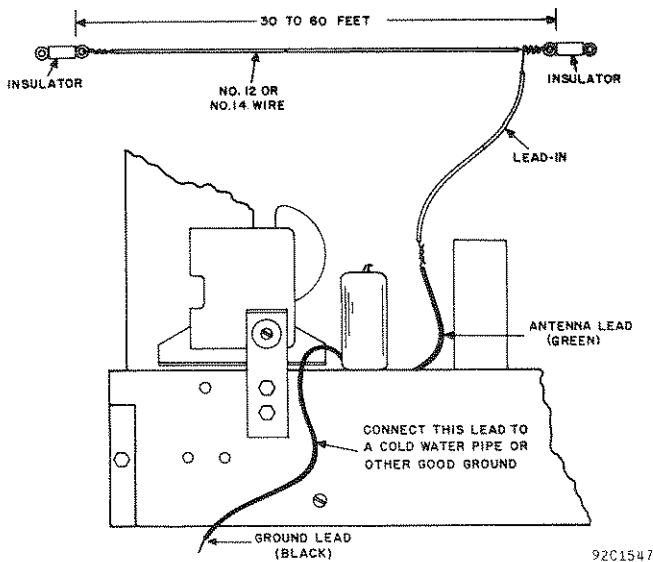
1. The standard broadcast band is calibrated in kilocycles with a zero deleted for convenience. To convert the dial reading to the station frequency in kilocycles, add one zero.
2. The shortwave band is calibrated directly in megacycles.

### STANDARD BROADCAST AND SHORT WAVE RECEPTION

1. Set the SHORTWAVE-BROADCAST control knob to BROADCAST for standard broadcast reception or to SHORTWAVE for shortwave reception.
2. Turn the receiver ON by rotating the VOLUME control knob clockwise. Turn this control to a well advanced position and reset it for the desired volume after a station has been tuned in.
3. Tune in the desired station by turning the TUNING CONTROL knob slowly until the dial pointer indicates the station frequency.
4. Readjust the VOLUME control for the desired volume.
5. To turn the receiver OFF, turn the VOLUME control knob counterclockwise until a click is heard.

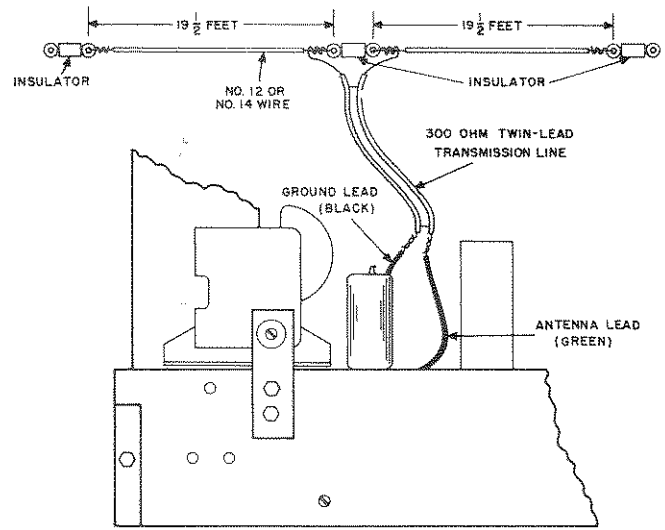
BEST SHORTWAVE RECEPTION TABLE

BAND	MOST FAVORABLE TIME	MOST FAVORABLE DISTANCE	
6-7 MC	Night - Winter	Day - 400 Miles	Night - Over 1500 Miles
9-10 MC	Day - Late Afternoon and Night - Winter	Over 500 Miles	
11-12 MC	Evenings or Late Summer Afternoons	Day - Under 1500 Miles	Night - Over 1500 Miles
15-18 MC	Early Mornings and Summer Evenings	Over 1500 Miles	



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Fig. 1. Single Wire Antenna Installation



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Fig. 2. Doublet Antenna Installation

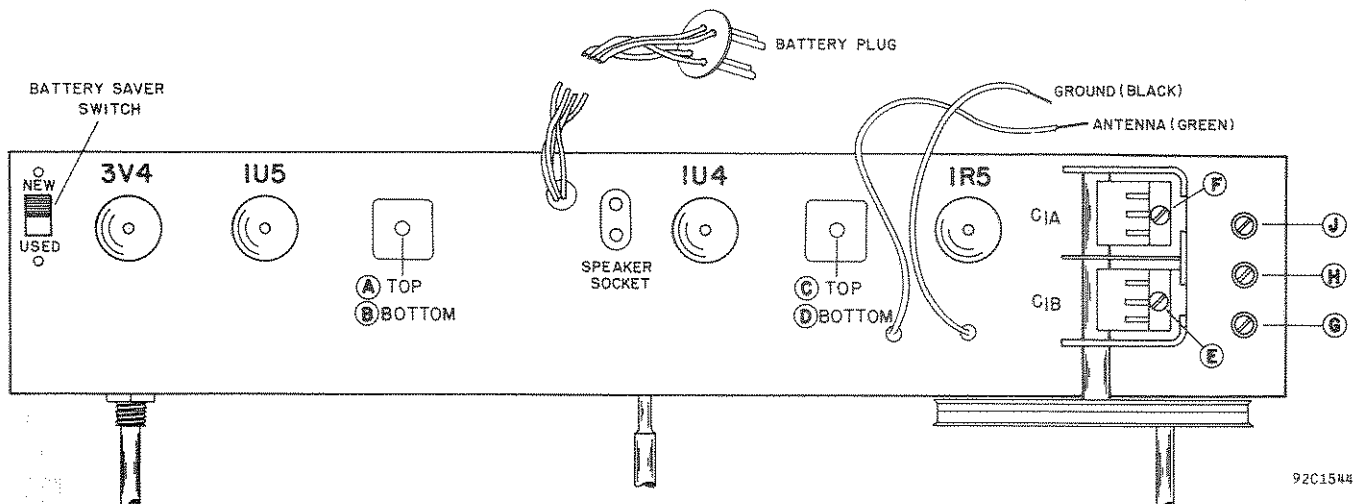
## SERVICE INSTRUCTIONS

### SPECIFICATIONS

Tubes . . . . .	Four
Speaker . . . . .	5 inch PM
Speaker Voice Coil Impedance . . . . .	3.2 ohms
Intermediate Frequency . . . . .	455 KC
Antenna . . . . .	Provision for external single wire or doublet antenna.
Power Supply. . . . .	.90 volt "B" - 1 1/2 volt "A" battery pack
Frequency Coverage. . . . .	.540 - 1620 KC and 6 - 18 MC

**TUBE REPLACEMENT** - The tube types and their relative location in the receiver are shown in Fig. 3. To gain access to all tubes, slide the battery pack out of the cabinet. When installing a replacement tube, line up the seven pins on the tube with the socket holes and push down on the tube until the base of the tube rests firmly on the socket. Handle all tubes with care as they are fragile and will not withstand mechanical abuse.

**REPLACEMENT BATTERY PACKS** - Sears 06308, Wards 51, Burgess 17GD60, RCA VSO 99, General 60DL-11L, Eveready 748, Ray-O-Vac AB-82, Bond 0528 and Ensign AB48.

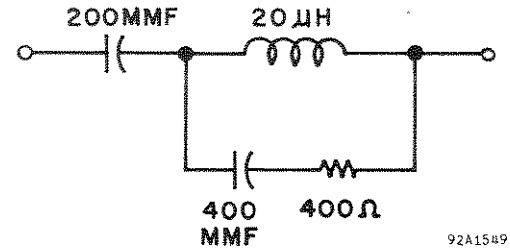


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Fig. 3. Top View of Chassis Showing Location of Alignment Adjustments and Tubes

## ALIGNMENT PROCEDURE

- Connect output meter across speaker voice coil.
- Set volume control at maximum.
- Use a non-metallic alignment tool.
- Signal generator must have a modulated output and cover 455 KC, 600 KC, 1300 KC and 14 MC.
- Keep the generator output as low as possible to avoid AVC action.
- Refer to Fig. 3 for location of alignment adjustments.



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Fig. 4. RTMA Dummy Antenna

STEP	SIGNAL GENERATOR CONNECTIONS	SIGNAL GENERATOR FREQUENCY	BAND SWITCH SETTING	RECEIVER DIAL SETTING	ADJUST FOR MAXIMUM OUTPUT
1	High side to stator plates of rear section of tuning capacitor through a .01 mfd. capacitor. Low side to chassis.	455 KC	BROADCAST	1000 KC	A, B, C, D
2	High side to green antenna lead (Fig. 3) through a standard RTMA dummy antenna (Fig. 4). Low side to chassis.	14 MC	SHORTWAVE	14 MC	E, F
3	Same as STEP 2.	1300 KC	BROADCAST	1300 KC	G, H.
4	Same as STEP 2.	600 KC	BROADCAST	600 KC	J

### DIAL CORD RESTRINGING

1. Set the tuning capacitor in a fully meshed position.
2. Tie one end of a 60 inch length of 30 lb. test dial cord to the tension spring at position 1. See Fig. 5.
3. Follow the stringing procedure 1 through 10. At position 10, stretch the spring and tie the cord securely to the spring.
4. With the tuning capacitor fully meshed, attach the dial pointer to the cord and align it with the left hand index marks on the dial. Cement the pointer to the cord with a drop of quick drying cement.

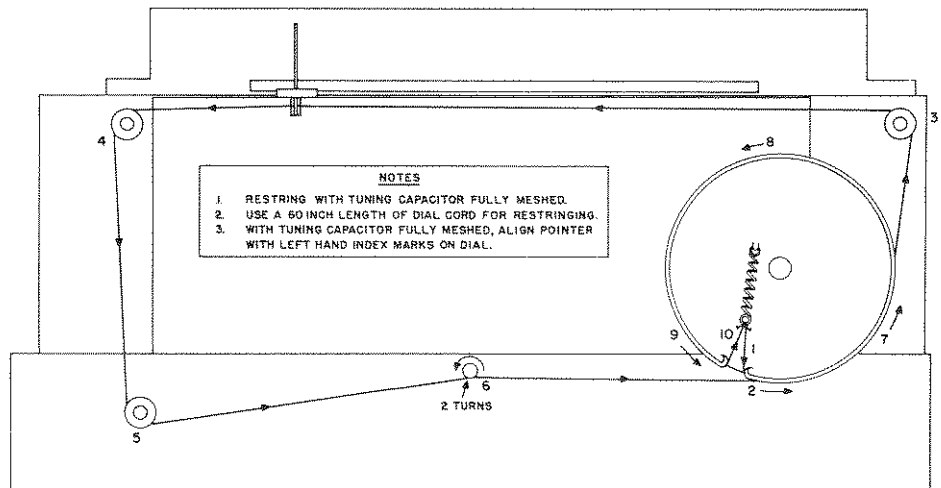


Fig. 5. Dial Cord Stringing Procedure

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**SERVICE OR OPERATING QUESTIONS** - For additional information regarding operation or servicing of your receiver, contact the store from which you purchased your set. Make no service shipments to the factory as Hallicrafters will not accept the responsibility for unauthorized shipments. Factory type service is available at any **HALLICRAFTERS AUTHORIZED SERVICE CENTER** which displays the sign shown at the right. For the location of the **SERVICE CENTER** nearest you, consult your dealer or telephone directory.

The Hallicrafters Company reserves the privilege of making revisions in current production of receivers and assumes no obligation to incorporate these revisions in earlier models.



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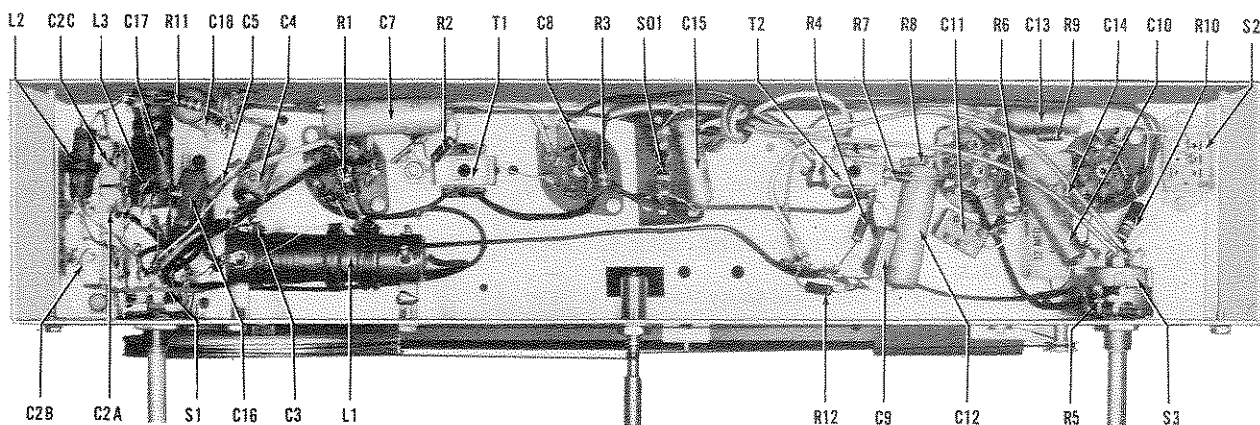


Fig. 6. Bottom View of Chassis Showing Component Location

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## SERVICE PARTS LIST

Schematic Symbol	Description	Hallicrafters Part Number	Schematic Symbol	Description	Hallicrafters Part Number
<b>CAPACITORS</b>					
C-1A,B	Tuning capacitor, 2 section	48C274	T-2	Transformer, IF; output	50C516
C-2A,B,C	Trimmer assembly; includes mtg. bracket and 3 trimmers	44C406	T-3	Transformer, audio output; part of speaker LS-1	-----
C-3	10 mmf. 500 V., ceramic	47B20A100K5	<b>PLUGS AND SOCKETS</b>		
C-4	.05 mfd. 200 V., tubular	46A091	PL-1	Plug, speaker; part of speaker LS-1	-----
C-5,17	100 mmf. 500 V., ceramic	47B20A101K5	PL-2	Plug, battery cable; includes leads	87B1555-1
C-6	2.2 mmf. 500 V., ceramic	47A160-4	SO-1	Socket, speaker	6A275
C-7,12	.02 mfd. 600 V., tubular	46AY203J		Socket, tube; miniature 7 pin	6A314
C-8	1000 mmf. 500 V., ceramic	47B20A102K5	<b>SWITCHES</b>		
C-9,11	220 mmf. 500 V., mica	47X20B221M	S-1A,B,C,D	Switch, rotary wafer; SHORT WAVE-BROADCAST	60B461
C-10,13	.005 mfd. 600 V., tubular	46AZ502J	S-2	Switch, slide (spst); NEW-USED BATTERY	60A244
C-14	12 mfd. 150 V., electrolytic	45B194	S-3	Switch, ON-OFF; part of VOLUME control R-5	-----
C-15	.002 mfd. 600 V., tubular	46AZ202J	<b>MISCELLANEOUS PARTS</b>		
C-16	4700 mmf. 500 V., mica	47X35B472K		Cabinet	66A754
C-18	.01 mfd. 600 V., tubular	46AY103J		Clip, mtg.; for dial glass	76A412
<b>RESISTORS</b>					
R-1	47,000 ohms 10%, 1/2 watt; carbon	23X20X473K		Clip, mtg.; for coil L-3	76A326
R-2	2200 ohms 10%, 1/2 watt; carbon	23X20X222K		Clip, mtg.; for transformers T-1 and T-2	76A385
R-3,6	4.7 megohms 10%, 1/2 watt; carbon	23X20X475K		Clip, speed; for mounting front panel	76A413
R-4,9	2.2 megohms 10%, 1/2 watt; carbon	23X20X225K		Dial cord, 57 inches	38A001
R-5	VOLUME control, 1 megohm, includes ON-OFF switch	S-3		Dial scale, glass	22C342
R-7	1 megohm 10%, 1/2 watt, carbon	23X20X105K		Grille assembly	7C318
R-8	5.6 megohms 20%, 1/2 watt, carbon	23X20X565M		Grommet, rubber	16A125
R-10	.75 ohms 10%, 1/2 watt; carbon	23A062		Knob, VOLUME and SHORT WAVE - BROADCAST	15B322
R-11	22,000 ohms 10%, 1/2 watt; carbon	23X20X223K		Knob, TUNING CONTROL	15B323
R-12	330 ohms 10%, 1/2 watt; carbon	23X20X331K		Pointer, dial	82A205
<b>COILS AND TRANSFORMERS</b>					
L-1	Coil, antenna; BC and SW	51B1459	LS-1	Retaining ring; for tuning shaft	76A649
L-2	Coil, oscillator; BC	51B1460		Shaft, tuning	74A500
L-3	Coil, oscillator; SW	51B1461		Speaker, 5" PM; includes output transformer T-3 and plug PL-1	85C085
T-1	Transformer, IF; input	50C233		Spring, dial cord	75A012

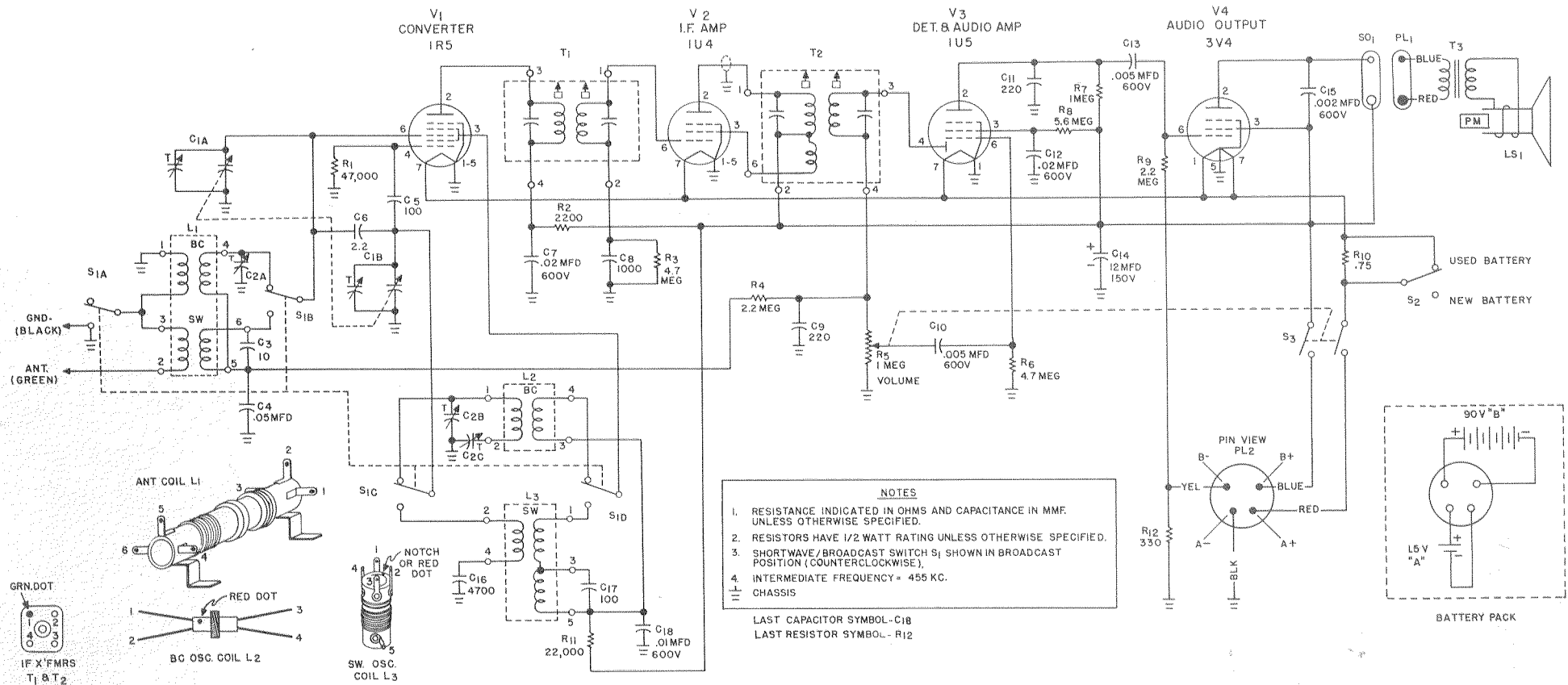


Fig. 7. Schematic Diagram

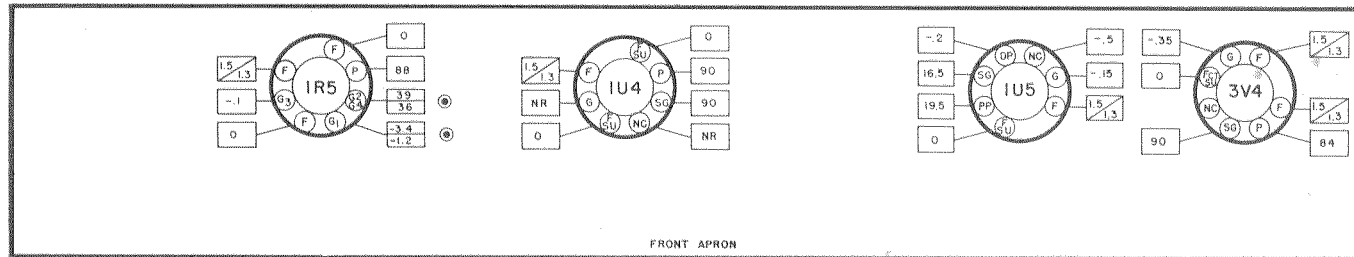


Fig. 8. Tube Socket Voltage Chart

- NOTES**
1. SOCKET VIEWS ARE BOTTOM VIEWS.
  2. ALL VOLTAGES ARE MEASURED BETWEEN TUBE SOCKET TERMINALS & CHASSIS WITH ZERO SIGNAL INPUT USING A VACUUM TUBE VOLTMETER.
  3. VOLTAGE MEASURED WITH NEW BATTERY, VOLUME AT MAXIMUM, TUNING GANG FULLY MESHED AND SPEAKER CONNECTED.
  4. ALL VOLTAGES SHOWN ARE DC AND POSITIVE UNLESS OTHERWISE SPECIFIED.
  5. FILAMENT VOLTAGES SHOWN WITH THE BATTERY SAVER AT USED/NEW.
  6. NC—NO CONNECTION. VOLTAGE SHOW ONLY WHEN TERMINAL IS USED AS A TIE LUG.
  7. NR—NOT READABLE.
- ⊙ BROADCAST — VOLTAGE SHOWN WITH BAND SWITCH IN BOTH BROADCAST AND SHORT WAVE POSITION.

## Warranty

"The Hallicrafter's Company warrants each new radio product manufactured by it to be free from defective material and workmanship and agrees to remedy any such defect or to furnish a new part in exchange for any part of any unit of its manufacture which under normal installation, use and service discloses such defect, provided the unit is delivered by the owner to our authorized radio dealer, wholesaler, from whom purchased, or, authorized service center, intact, for examination, with all transportation charges prepaid within ninety days from the date of sale to original purchaser and provided that such examination discloses in our judgment that it is thus defective.

This warranty does not extend to any of our radio products which have been subjected to misuse, neglect, accident, incorrect wiring not our own, improper installation, or to use in violation of instructions furnished by us, nor extend to units which have been repaired or altered outside of our factory or authorized service center, nor to cases where the serial number thereof has been removed, defaced or changed, nor to accessories used therewith not of our own manufacture.

Any part of a unit approved for remedy or exchange hereunder will be remedied or exchanged by the authorized radio dealer or wholesaler without charge to the owner.

This warranty is in lieu of all other warranties expressed or implied and no representative or person is authorized to assume for us any other liability in connection with the sale of our radio products."

Form No. 94X622

*the Hallicrafters co.*