



communications

**OPERATING and SERVICE
INSTRUCTIONS**



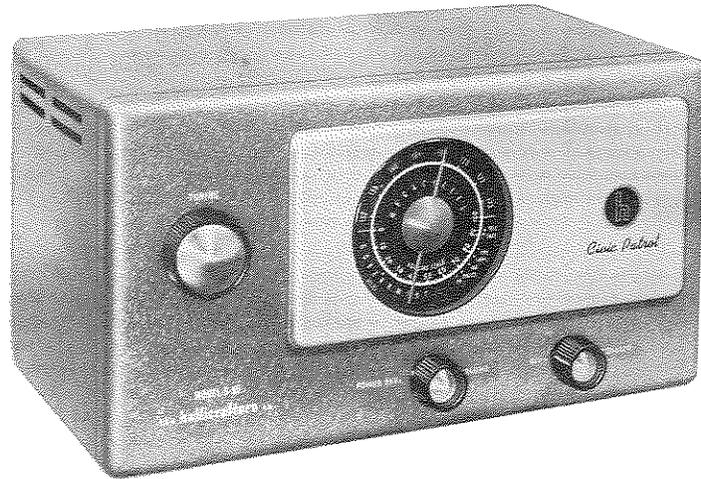
the hallicrafters co.

MANUFACTURERS OF RADIO, TELEVISION AND ELECTRONIC EQUIPMENT, CHICAGO 24, U. S. A.

GENERAL DESCRIPTION

Your new Hallicrafters Model S-95 is an FM receiver which covers the police, fire, taxicab, bus, railroad, private telephone, forestry and other industrial services operating in the 152 to 173 megacycle communication band. It employs 8 tubes and a selenium rectifier in the latest type superheterodyne circuit and is designed to operate on 105 to 125 volt AC or DC current. Mobile operation is also possible by using a 6-volt DC to 110-volt AC power converter. (See "Power Source" below.) Quick and easy operation is afforded by the modern easy-to-read dial and a minimum of controls. A special logging scale on the dial assures ease and accuracy in logging or relocating stations of special interest. During periods when no signal is being received, the receiver may be completely silenced by the built-in adjustable relay-type squelch system. Satisfactory reception is usually possible without an outside antenna or ground and, in most localities, fine performance can be obtained with just the 2-foot antenna wire included with your receiver.

Services similar to those covered by the S-95 Receiver also operate in the 30 to 50 megacycle communication band. A companion receiver, the Model S-94, covers this frequency range and is available from your Hallicrafters dealer.



92X2333

Fig. 1. Model S-95

INSTALLATION

UNPACKING - After unpacking the receiver, examine it closely for damage which may have occurred in transit. Should any sign of damage be apparent, file a claim immediately with the carrier stating the extent of damage. Carefully check all shipping labels and tags for instructions before removing or destroying them.

LOCATION- The receiver is equipped with rubber feet for table or shelf mounting. When locating the receiver, avoid excessively warm locations such as those near radiators and heating vents. Allow at least an inch of clearance between the back of the receiver and the wall for proper ventilation.

POWER SOURCE - The receiver is designed to operate on 105 to 125 volt AC or DC current. If in doubt about your power source, contact your local power company before plugging in the receiver. The power consumption of the receiver is 40 watts.

Mobile operation is possible by the use of a 6-volt DC to 110-volt AC power converter such as Cornell Dubilier Model 6R10, American Television and Radio Model 6-RSD, or Terado Model 6-51160. Such units equip the receiver for operation from 6-volt battery sources normally found in automobiles, trucks, etc.

HEADPHONES - Two tip jacks, marked "Phones", are provided at the rear of the receiver for connecting headphones. The headphone output impedance is not critical and any commercial headphones may be used. For maximum headphone output, the use of low-impedance headphones is recommended. For headphone operation, the Speaker-Phones selector switch at the rear of the receiver should be set at "Phones".

ANTENNAS - The r-f input of the receiver is designed to operate from either a whip or vertical doublet antenna. Antenna connections are made to a two-terminal strip at the rear of the receiver marked "A" and "G".

Whip Antenna (Supplied with Receiver)

Where signal strength is not a problem, the 2-foot antenna wire included with your receiver will provide satisfactory results. It is simply necessary to uncoil this wire, connect one end of it to terminal "A", and then erect it vertically by fastening it to the back of the cabinet with a piece of tape. In some locations, reception may be improved by connecting a ground wire (ordinary copper wire) from terminal "G" to a cold water pipe or outside ground rod.

Vertical Doublet Antenna

For top performance, especially when receiving weak distant signals, the use of a vertical doublet antenna is recommended. Such an antenna may be readily constructed from standard 300-ohm twin-lead TV transmission line as shown in Fig. 2 and may be mounted either indoors or outdoors. For optimum performance, the doublet antenna should be cut to the proper length for the most used frequency or band of frequencies and erected as high as possible. The overall length of the doublet antenna is determined by the following formula:

$$\text{Length in inches} = \frac{5620}{\text{Frequency in megacycles}}$$

IMPORTANT: All transmissions in the frequency range of the receiver are vertically polarized and for maximum signal pickup, the receiving antenna should also be similarly polarized. This is accomplished by erecting the antenna so that its length is vertical as shown in Fig. 2.

OPERATION

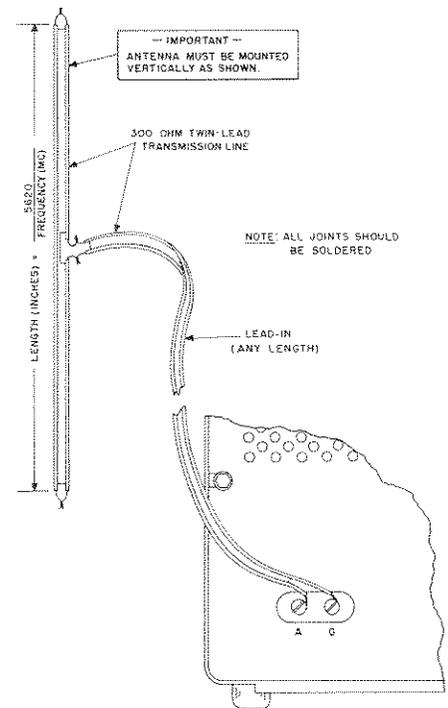
1. Connect the power cord to a 105 to 125 volt, AC or DC power source.
2. Connect a suitable antenna to the antenna terminals at the rear of the receiver. See page 2 for antenna installation instructions.
3. Set the Speaker-Phones selector switch at the rear of the receiver at "Speaker".
4. Turn the receiver on by rotating the Volume control clockwise. Allow about one minute for the tubes to warm up. If the receiver fails to operate on DC, reverse the power plug to obtain proper polarity. On DC, the receiver will operate only with the plug in one position.
5. Set the Squelch control at "Off", set the Volume control at a well advanced position, and carefully tune in a desired signal with the Tuning control. After the signal has been accurately tuned in, reset the Volume control as desired.

IMPORTANT: Always set the Squelch control at "Off" when tuning the receiver.

6. Turn the squelch circuit "on" by rotating the Squelch control clockwise just beyond the point where the switch "click" is heard. With the signal tuned in, slowly advance the Squelch control until the signal just disappears ... then turn in the opposite direction until the signal is heard again. This is the proper setting of the Squelch control. Setting the Squelch control farther clockwise than necessary will increase the minimum signal level necessary to "unsquelch" or activate the receiver. The Squelch control should be readjusted each time a signal is tuned in.

NOTE: If the signal disappears when the Squelch control is turned "on", it is an indication that the signal is not strong enough to properly operate the squelch circuit. When this occurs, simply operate the receiver with the squelch circuit disabled (Squelch control set at "Off").

7. To turn the receiver off, rotate the Volume control fully counterclockwise, until a click is heard.



92C1565-1-A

Fig. 2. Vertical Doublet Antenna

***FREQUENCY ASSIGNMENTS OF SERVICES COVERED BY MODEL S-95**

| | | | |
|---|---|--|--|
| <u>Telephone - Base</u> 152.51 - 152.81 152.03 - 152.2 | <u>Special Emergency</u> 157.47 159.51 - 161.99 | <u>Forest Products Service</u> 153.05 - 153.35 158.31 - 158.43 | <u>Power</u> 153.41 - 153.71 158.13 - 158.25 |
| <u>Telephone - Mobile</u> 157.77 - 158.07 158.49 - 158.67 | <u>Police</u> 154.65 - 156.7 158.73 - 161.7 | <u>Petroleum</u> 153.05 - 153.35 158.31 - 158.43 | <u>Forestry</u> 156.87 - 156.93 159.27 - 159.51 161.79 170.425 - 170.575 |
| <u>Taxicabs - Base & Mobile</u> 152.27 - 152.45 | <u>Fire</u> 153.77 - 154.43 159.51 - 161.79 166.25 170.15 | <u>Highway Maintenance</u> 156.99 - 157.41 159.51 - 161.79 | 171.425 - 171.575 172.225 - 172.375 |
| <u>Taxicabs - Mobile Only</u> 157.53 - 157.71 | | <u>Motion Picture</u> 152.87 - 152.99 | <u>Railroad</u> 159.51 - 161.91 |

* All frequencies in megacycles.

SERVICE INSTRUCTIONS

SPECIFICATIONS

| | |
|--------------------------------------|--|
| Tubes and Rectifiers | 8 tubes and 1 selenium rectifier |
| Speaker | 5 inch PM |
| Voice Coil Impedance | 3.2 ohms |
| Headphone Output Impedance | 100 ohms |
| Antenna Input Impedance | 300 ohms |
| Antenna | Vertically polarized whip or doublet (See Page 2) |
| Intermediate Frequency. | 10.7 MC |
| Power Supply | 105-125 volts DC or 50-60 cycle AC |
| Frequency Coverage | 152 to 173 MC |

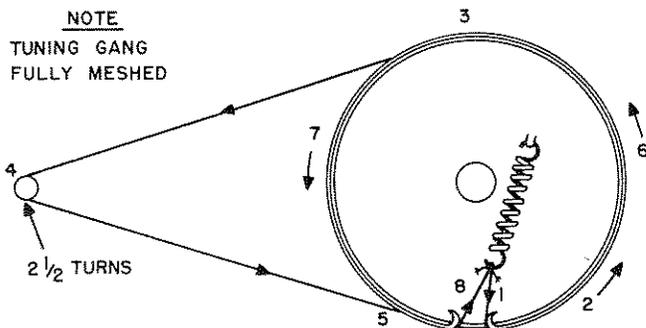
SQUELCH RANGE CONTROL ADJUSTMENT

The Squelch Range control (Fig. 4) adjusts the operating point of the output section of the 12AU7 squelch tube (V-8). This control has been carefully adjusted at the factory for proper operation and will normally not require readjustment unless the squelch tube, relay, or components in the squelch circuit have been replaced. If adjustment is necessary, proceed as follows:

1. Connect a DC milliammeter (0-15 ma) in series with the squelch relay, RY-1, in the plate circuit of the squelch tube, V-8.
2. Set the Volume control at maximum, the Squelch Range control fully clockwise (minimum resistance) and the Squelch control on the front panel fully counterclockwise (maximum resistance) but not at "Off".
3. Tune the receiver to noisy part of the band where no signal is present.
4. With no signal tuned in, slowly rotate the Squelch Range control counterclockwise until the noise is just squelched (disappears). At this point the relay contacts are closed and the grid of the audio output tube is shorted to ground. Note the plate current reading of the squelch tube (should be anywhere from 6.5 to 10.25 ma), and then continue to advance the Squelch Range control until the plate current drops 2 ma from that obtained at the point of squelch. This is the proper setting of the Squelch Range control.

If a milliammeter is not available, the Squelch Range control can be "roughly" set by adjusting the Squelch Range control to the point of squelch as outlined above and then advancing the control 65° farther counterclockwise.

NOTE
TUNING GANG FULLY MESHED



92C1558-A

Fig. 3. Dial Cord Stringing Diagram.

IF ALIGNMENT

- Use a 10.7 MC signal generator, either amplitude modulated or unmodulated.
 - Connect high side of generator through a .01 mfd. capacitor to pin 7 of V-2; connect low side to chassis.
 - Adjust generator output to maintain a one volt reading on VTVM.
 - Set Volume control at maximum and Squelch control at "Off".
 - See Fig. 4 for location of alignment adjustments.
1. Connect DC probe of VTVM to pin 2 of V-5; common lead to chassis. Adjust B, C, D, E, and F for maximum output.
 2. Connect two 470,000 ohm resistors in series between pin 2 of V-5 and the chassis. Connect DC probe of VTVM to junction of R-10 and C-16; common lead to center tap of the two 470,000 ohm resistors. Adjust A for zero reading between a positive and negative peak. The two peaks should have approximately the same amplitude. If not, readjust B slightly and then touch up A.

RF ALIGNMENT

- Use a signal generator either amplitude modulated or unmodulated which covers 156 MC and 170 MC.
 - Connect high side of generator through a 270 ohm resistor to terminal "A" on antenna terminal strip on rear of chassis; low side to terminal "G".
 - Use a non-metallic alignment tool.
 - Connect DC probe of VTVM to pin 2 of V-5; common lead to chassis.
 - Adjust generator output to maintain a one volt reading on VTVM.
 - Set Volume control at maximum and Squelch control at "Off".
 - See Fig. 4 for location of alignment adjustments.
1. Set generator and receiver dial to 170 MC and adjust G and then H for maximum output. When adjusting H, "rock" tuning capacitor slightly.
 2. Check calibration at low end of receiver by setting generator and receiver dial to 156 MC. A calibration adjustment is usually not necessary and should not be made unless the oscillator coil on the top front of the tuning gang has been damaged or bent. If adjustment is required, the frequency can be increased by compressing the coil or decreased by expanding the coil.

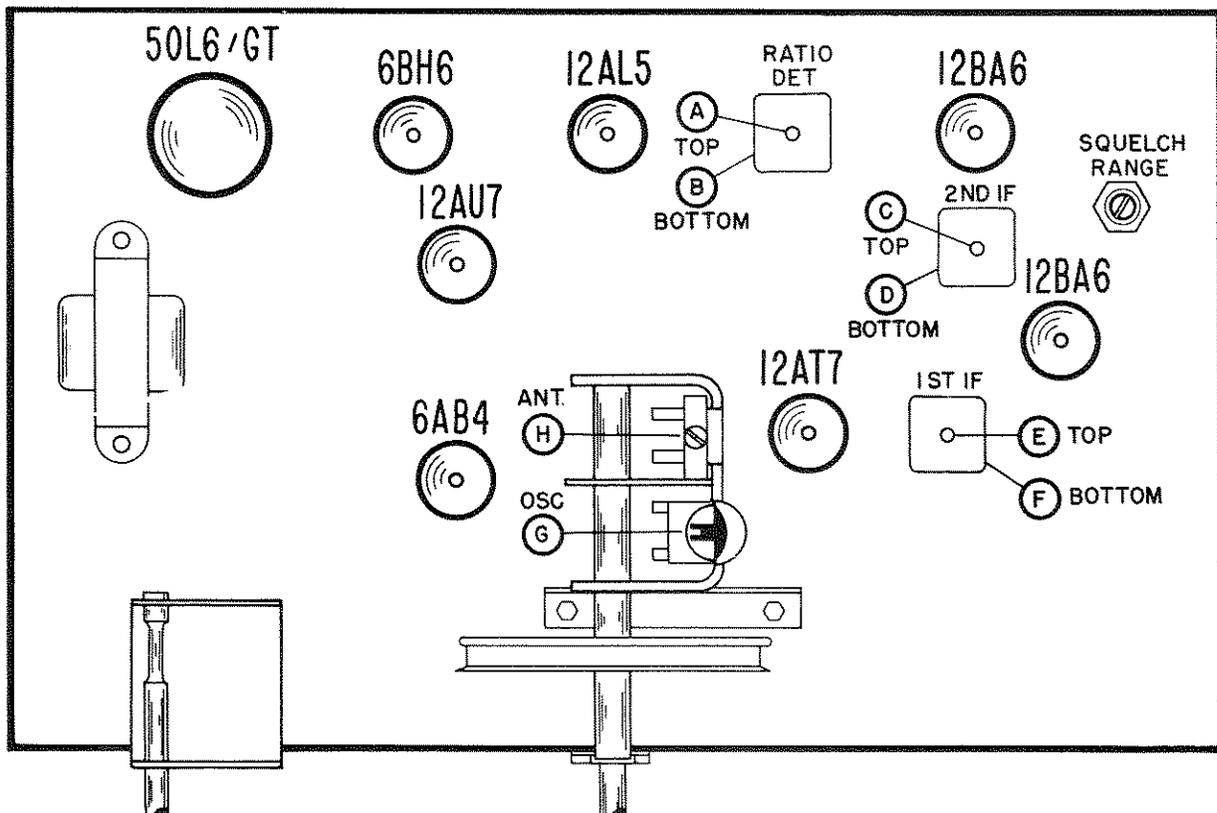


Fig. 4. Tube Location and Alignment Adjustments

SERVICE OR OPERATING QUESTIONS - For any further information regarding operation or servicing of your receiver, contact your Hallicrafters dealer. The Hallicrafters Co. maintains an extensive system of authorized service centers where any required service will be performed promptly and efficiently at a nominal charge. All Hallicrafters Authorized Service Centers display the sign shown at the right. For the location of the one nearest you, consult your dealer or telephone directory.

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



92X1401-C

SERVICE PARTS LIST

| Schematic Symbol | Description | Hallicrafters Part Number |
|---|---|---------------------------|
| CAPACITORS | | |
| C-1,2,3,4,19, 37 | 330 mmfd. 10%, 500 V.; ceramic | 47CA25331K5 |
| C-5 | Tuning capacitor, 2 section | 48C278 |
| C-6,38 | 0.68 mmfd. 20%, 500 V.; ceramic | 47B403-1 |
| C-7 | 33 mmfd. 5%, 500 V.; ceramic | 47X25CJ330J |
| C-8,17,20 | 0.01 mfd. +80-20%, 450 V.; ceramic disc | 47A224 |
| C-9,10,11,12, 22,25,27,29, 30,33,34,35,36 | 0.005 mfd. GMV, 500 V.; ceramic disc | 47A168 |
| C-13 | 2 mfd. 50 V., electrolytic | 45B192 |
| C-14,15 | 100 mmfd. 10%, 500 V.; ceramic | 47X25UK101K |
| C-16,31,32 | 0.001 mfd. GMV, 500 V.; ceramic disc | 47B230 |
| C-18 | 0.02 mfd. +80-20%, 500 V.; ceramic disc | 47A242 |
| C-21 | 60-40-40 mfd. @ 150 V., 20 mfd. @ 25 V.; electrolytic | 45B091 |
| C-23 | 4-20 mmfd., ceramic trimmer | 44A115 |
| C-24 | 47 mmfd. 10%, 500 V.; ceramic | 47X20UK470K |
| C-26 | 10 mfd. 150 V., electrolytic | 45C097 |
| C-28 | 0.047 mfd. 600 V., molded tubular paper | 46BR473L6 |

GMV - Guaranteed Minimum Value

| Schematic Symbol | Description | Hallicrafters Part Number |
|------------------|---|---------------------------|
| RESISTORS | | |
| R-1,2,18 | 10,000 ohms 10%, 1/2 watt; carbon | 23X20X103K |
| R-3,4,5,7,9 | 1000 ohms 10%, 1/2 watt; carbon | 23X20X102K |
| R-6,8,16,17 | 100 ohms 10%, 1/2 watt; carbon | 23X20X101K |
| R-10 | 47,000 ohms 10%, 1/2 watt; carbon | 23X20X473K |
| R-11 | 2 megohms, variable; Volume control (includes power on-off switch) | 25B1115 |
| R-12 | 2.2 megohms 10%; 1/2 watt; carbon | 23X20X225K |
| R-13 | 1 megohm 10%, 1/2 watt; carbon | 23X20X105K |
| R-14,21 | 270,000 ohms 10%, 1/2 watt; carbon | 23X20X274K |
| R-15 | 470,000 ohms 10%, 1/2 watt; carbon | 23X20X474K |
| R-19 | 50,000 ohms, variable; Squelch control (includes squelch on-off switch) | 25B1114 |
| R-20 | 1200 ohms 10%, 1/2 watt; carbon | 23X20X122K |
| R-22 | 470 ohms 10%, 1/2 watt; carbon | 23X20X471K |
| R-23 | 650 ohms 1 watt, wirewound variable; Squelch Range control | 25A1113 |
| R-24 | 10,000 ohms 10%, 2 watt; carbon | 23X40X103K |
| R-25 | 15 ohms 10%, 1/2 watt; carbon | 20X150K |
| R-26 | 220 ohms 10%, 2 watt; carbon | 23X40X221K |
| R-27 | 470 ohms 10%, 1 watt; carbon | 23X30X471K |
| R-28 | 270 ohms 10%, 1 watt; wirewound | 23X30X271K |

| Schematic Symbol | Description | Hallicrafters Part Number |
|-------------------------------|---------------------------------------|---------------------------|
| COILS AND TRANSFORMERS | | |
| L-1 | Coil, antenna | 51A1894 |
| L-2 | Coil, RF | 51A1472 |
| L-3 | Choke, RF; wound on 4700 ohm resistor | 53A239 |
| L-4 | Coil, oscillator | 51A1471 |
| L-5 | Choke, RF; 2.2 uh. | 53A238 |

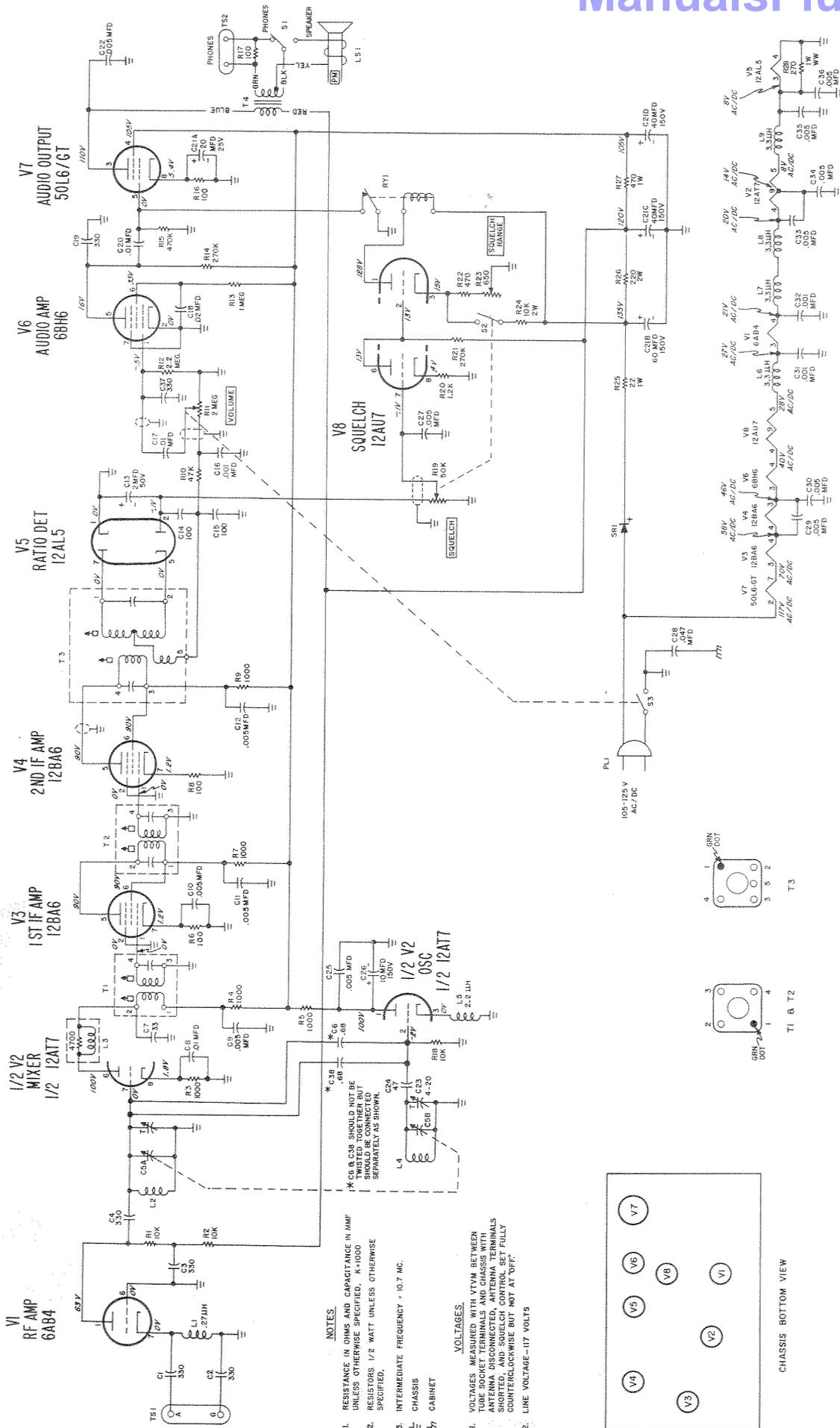
| Schematic Symbol | Description | Hallicrafters Part Number |
|---------------------------------------|-----------------------------|---------------------------|
| COILS AND TRANSFORMERS (Cont.) | | |
| L-6,7,8,9 | Choke, RF; 3.3 uh | 53A240 |
| T-1 | Transformer, 1st IF | 50C519 |
| T-2 | Transformer, 2nd IF | 50C517 |
| T-3 | Transformer, ratio detector | 50C518 |
| T-4 | Transformer, audio output | 55A127 |

| Schematic Symbol | Description | Hallicrafters Part Number |
|------------------|--|---------------------------|
| SWITCHES | | |
| S-1 | Switch, spst; Speaker-Phones | 60A243 |
| S-2 | Switch, squelch on-off; part of Squelch control R-19 | ----- |
| S-3 | Switch, power on-off; part of Volume control R-11 | ----- |

| Schematic Symbol | Description | Hallicrafters Part Number |
|-----------------------------|----------------------------------|---------------------------|
| TUBES AND RECTIFIERS | | |
| V-1 | 6AB4: RF amplifier | 90X6AB4 |
| V-2 | 12AT7: oscillator/mixer | 90X12AT7 |
| V-3,4 | 12BA6: 1st and 2nd IF amplifiers | 90X12BA6 |
| V-5 | 12AL5: ratio detector | 90X12AL5 |
| V-6 | 6BH6: audio amplifier | 90X6BH6 |
| V-7 | 50L6GT: audio output | 90X50L6GT |
| V-8 | 12AU7: squelch | 90X12AU7 |
| SR-1 | Selenium rectifier, 150 ma. | 27-158 |

| Schematic Symbol | Description | Hallicrafters Part Number |
|----------------------|---|---------------------------|
| MISCELLANEOUS | | |
| | Cabinet | 40C173 |
| | Cabinet back | 32C680 |
| | Clip, mtg.; for transformers | |
| | T-1, 2 and 3 | 76A385 |
| | Clip, push-on; for mounting dial window | 76A853 |
| | Cover, cabinet bottom | 8C1617 |
| | Dial | 83C404 |
| | Dial cord (specify length) | 38A026 |
| | Foot, mounting; rubber | 16A007 |
| | Grommet, rubber; chassis-cabinet insulating | 16A201 |
| | "h" medallion | 7A021 |
| | Insulator, nylon; fits in chassis-cabinet insulating grommet | 4A647 |
| | Knob, Tuning control | 15B802 |
| | Knob, Volume and Squelch controls | 15B816 |
| PL-1 | Line cord and plug | 87A078 |
| | Lock, line cord | |
| | male section | 76A397-1 |
| | female section | 76A397-2 |
| | Pointer, dial | 82A277 |
| | Relay, DC; spst normally closed; 1000 ohms DC, 8-11 ma pull-in. | 21B193 |
| | Ring, retaining; "E" type | 76A1052 |
| | Socket, tube | |
| | 7-pin miniature | 6B402 |
| | 9-pin miniature | 6A401 |
| | octal | 6A250 |
| | Speed nut (for mounting "h" medallion) | 2A1011 |
| LS-1 | Speaker, 5 inch PM; 3.2 ohm voice coil | 85C120 |
| | Spring, dial cord tension | 75A012 |
| TS-1 | Terminal strip, antenna | 88A809 |
| TS-2 | Twin jack, Phones | 88A071 |
| | Washer, extruded; chassis-cabinet insulating | 4A646 |
| | Window, dial | 22B345 |

MODEL S-95 RUN 1



VALUES AND TOLERANCES SHOWN ARE NOMINAL AND VARIATIONS MAY BE FOUND. IT IS RECOMMENDED THAT THE VALUE OF ANY REPLACEMENT CORRESPOND TO THE NOMINAL VALUE OF THE PART BEING REPLACED.

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.