GENERAL DESCRIPTION

Your new Hallicrafters Receiver Model S-120 tunes from 540 kilocycles to 31 megacycles to bring you the finest in world-wide radio reception. You'll hear foreign and domestic shortwave broadcasts, amateurs, police, aircraft, ships, and countless other exciting, distant stations...as well as all your favorite programs on standard broadcast. The receiver employs the latest type superheterodyne circuit and provides for reception of AM (voice) and CW (code) signals over its entire tuning range. Special features in your receiver include: a high sensitivity built-in ferrite antenna for broadcast band reception...a 45 inch collapsible whip antenna for shortwave reception...an electrical bandspread dial for fine tuning of the amateur and shortwave bands...a BFO control (beat frequency oscillator) for CW reception...a powerful built-in Alnico V permanent magnet speaker...provisions for headphone operation...a RECEIVE-STANDBY switch on the front panel that permits you to silence the receiver without turning it off.

POWER SOURCE

The receiver is designed to operate on 105 to 125 volt 50/60 cycle, AC or DC current. It may also be operated on 210 to 250 volt AC or DC current using Line Cord Adapter 087-201566, available as an accessory from your Hallicrafters dealer. Power consumption is 30 watts.

HEADPHONES

A phone jack is provided on the front panel for connecting headphones. Any commercial headphones ranging from 50 to 10,000 ohms may be used. Insertion of the headphone plug into the PHONES jack automatically disconnects the internal speaker.
ANTENNAS

In most localities, satisfactory results throughout the entire tuning range can be obtained with the internal ferrite loop antenna and shortwave whip antenna supplied with the receiver.

The internal ferrite loop antenna is effective on the broadcast band only (Band 1) and does not require that the shortwave whip be in place. In some localities, it may be found that a slight orientation of the receiver will improve broadcast band reception. Further improvement in the reception of distant signals on the broadcast band may be obtained by the use of the whip antenna or a length of wire connected to the antenna terminal.

For short wave reception the whip antenna should be installed as shown in figure 1 and extended to its full length. In steel constructed buildings or where receiving conditions are exceptionally poor, an outside antenna 50 to 100 feet long may be necessary.

For top performance on the shortwave and amateur bands, the use of a half-wave doublet or other type of tuned antenna is recommended (see figure 2). The doublet antenna should be cut to the proper length for the most used frequency or band of frequencies. The overall length in feet of a doublet antenna is determined by the following formula:

\[
\text{Length in feet} = \frac{468}{\text{frequency in megacycles}}
\]

For maximum signal pick-up, the doublet antenna should be erected with its length at right angles to the desired station.

When using outside antennas we strongly recommend, as a protection against lightning, that the receiver be protected by the use of a lightning arrester in the antenna lead-in.

IMPORTANT: When using outside antennas a safety ground wire (ordinary copper wire) is required between a cold water pipe (or other approved ground) and the GND terminal of the receiver.

TUNING DIAL

The top dial scale (Band 1) is the standard broadcast band. To convert the readings on this band to kilocycles simply add one zero. For example: 70 on the dial is 700 kilocycles. The shortwave bands are marked 2, 3, and 4. The reading on these bands are in megacycles. The standard broadcast band is marked with a "CD" emblem and a dot at 640 and 1240 kilocycles to indicate the two official civil defense frequencies. In a civil defense emergency, tune to either of these two frequencies for official civil defense news, instructions, and information.
RECEIVE-STANDBY SWITCH

This switch is normally set at RECEIVE. When set at STANDBY, the receiver is silenced but the tubes remain at operating temperature for instant use. To resume reception at any time, simply return the switch to RECEIVE position.

BAND SELECTOR CONTROL

Set this control for the band you wish to tune. The four positions of this control correspond to the band numbers at the left side of the dial.

OFF-VOLUME CONTROL

Turn this control clockwise to turn the receiver ON and to increase volume. Allow about one minute for the tubes to warm up. When operating on DC (direct current) reverse the power plug in the wall outlet if the receiver does not operate after the one minute warm up, as the receiver will operate ONLY with the plug in one position. When operating on AC (alternating current), try reversing the power plug for minimum hum after the receiver is in operation. To turn the receiver off, simply rotate the OFF-VOLUME control fully counter-clockwise, until a click is heard.

TUNING AND BANDSPREAD CONTROLS

Wide tuning is performed with the TUNING control and fine tuning with the BANDSPREAD control. To tune the receiver, set the Bandspread dial pointer at 100 and then slowly turn the TUNING control to the desired station. When trying to locate weak, distant stations, it is suggested that the OFF-VOLUME control be initially set near maximum and then readjusted for the desired level after the station has been tuned in. For CW (code) reception, adjust the TUNING control for the desired pitch when tuning in the station. The dial readings will correspond to the station frequencies only if the Bandspread dial pointer is set at 100.

The Bandspread control is an electrical fine tuning adjustment which permits you to accurately tune in stations on crowded bands by spreading them out. It may be used in two different ways. The first method of tuning is used when it is desired to tune in a single signal with precision accuracy. The Bandspread dial pointer is set at about 95 then the signal is located with the TUNING control, and finally the signal is accurately tuned in by rocking the BANDSPREAD control (turning it a few degrees to the left and right) until the signal is loudest and clearest. The second method of tuning is used when one wishes to tune through a range of frequencies, such as the amateur bands. Set the bandspread dial pointer at 100, set the TUNING control for the high end of the selected band or range of frequencies, and then tune through the range with the Bandspread control. Turning the BANDSPREAD control from 0 to 100 tunes the receiver progressively higher in frequency.

BFO CONTROL

This control is primarily used to provide the necessary beat frequency tone when receiving CW (code) signals. In addition to this function, however, the Model S-120 circuit is designed so that this control also acts as a sensitivity adjustment making reception of extremely weak signals possible.

Operation of the control is as follows:

To receive normal AM broadcasts: The control should be set in the OFF position (maximum counter-clockwise).

To increase sensitivity for weak signal reception: Turn the control ON and advance slowly in a clockwise direction to the point where maximum weak signal sensitivity is obtained.

To receive CW (code) signals: The control should be advanced fully clockwise and slowly turned counter-clockwise to the point that produces the clearest tone. The frequency of the tone may be adjusted with either the main tuning or bandspread control.
It will be found during the course of using this control that a point exists between the setting required for weak signal reception, and that required for CW reception where receiver noise will increase considerably. This is a normal condition. It is undesirable to operate the receiver with the control set at or very near this point as tuning will become extremely critical.

SERVICE OR OPERATING QUESTIONS

For any further information regarding operation or servicing of your unit, 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.

Make no service shipments to the factory unless instructed to do so by letter. The Hallicrafters Co. will not accept the responsibility for unauthorized shipments.

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.

Warranty

"The Hallicrafters 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 develops such defect, provided the unit is delivered by the buyer 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 to us 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.

the Hallicrafters Co.

094-902428 C
161
SERVICE DATA MODEL S-120

CHASSIS REMOVAL

To remove the chassis from the cabinet, remove the four screws (within the plastic feet) that secure the chassis to the cabinet. Slide the chassis out of the rear of the cabinet.

CAUTION: Just before removing the chassis from the cabinet rotate the MAIN TUNING and BAND SPREAD controls fully counterclockwise to prevent damage of the tuning capacitors.

DIAL CORD RESTRINGING

Remove the chassis from the cabinet to restrin the dial cord (see CHASSIS REMOVAL).

To restrin the BAND SPREAD dial cord remove control knobs, phone jack retaining nut, escutcheon trim plate and clip on each end of plate (2 screws), insulation spacer, dial scale (two screws), and dial plate (four hex head screws). Care should be taken when removing the dial plate not to damage the pointers. Referring to figure 2, follow the arrows and letter sequence to string the dial cord. The dial cord spring should be expanded from 1/4" to 1/2". Place the BAND SPREAD pointer on the bottom of the dial rail and engage the dial cord with the pointer clips. Replace the dial plate, dial scale, escutcheon trim strip (replace clips on either end of plate), and control knobs. With BAND SPREAD control fully counterclockwise, align the pointer on "O" and apply a drop of cement to the dial cord and pointer clip. Replace chassis in the cabinet.

To restrin the MAIN TUNING dial cord with the chassis removed from the cabinet, refer to figure 2 and follow the arrows and letter sequence. The dial cord spring should be expanded 1/4" to 1/2". Place the MAIN TUNING pointer on the dial rail and engage the dial cord with the pointer clip. With the MAIN TUNING control fully counterclockwise, align the pointer with "O" on the BAND SPREAD scale and apply a drop of cement to the dial cord and pointer clip. Replace the chassis in the cabinet.

Figure 1. Hallicrafters Model S-120

TECHNICAL SPECIFICATIONS

TUBES................. Four, plus rectifier
SPEAKER............... 5 inch PM, 8 ohm voice coil
ANTENNA............. Broadcast - Self contained ferrite loopstick
        Short wave - 45" collapsible whip antenna and provision for single
wire or 50-600 ohm line
POWER SUPPLY........ 105-125 volts DC or AC (50-60 CPS )
POWER CONSUMPTION...... 30 watts
INTERMEDIATE FREQUENCY... 455 KC
FREQUENCY COVERAGE...... 540 KC to 31 MC
DIMENSIONS. 5-1/8" high, 13-1/2" wide, 8-3/4" deep
WEIGHT.................. 12 lbs. approximately

TUBE AND DIAL LAMP REPLACEMENT

For access to the tubes, remove the cabinet rear panel which is held in place by two screws. Care should be exercised so as not to damage the leads to the loopstick antenna mounted on the inside of the rear panel. For dial lamp replacement, remove the chassis from the cabinet (see CHASSIS REMOVAL).

Figure 2. Band Spread, Stringing Diagram - Front View

NOTE BANDSPREAD GANG
FULLY MESHED
ALIGNMENT PROCEDURE

1. Use an amplitude modulated generator covering 455 KC to 30 MC.
2. Connect the output meter across the speaker voice coil.
3. Use a standard EIA dummy antenna as shown in figure 3.
4. Set BFO control to OFF, VOLUME control maximum clockwise, RECEIVE/STANDBY control to RECEIVE, and the BANDSPREAD control to 100.
5. Refer to figures 4 and 5 for location of adjustments.

<table>
<thead>
<tr>
<th>Step</th>
<th>Signal Generator Connections</th>
<th>Generator Frequency</th>
<th>Band Selector Setting</th>
<th>Receiver Dial Setting</th>
<th>Adjust</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High side through a .01 uF mfd capacitor to</td>
<td>455 KC (30%, mod.)</td>
<td>1</td>
<td>1.0 MC</td>
<td>A, B, C and D for maximum output. Keep reducing the generator output to keep the output meter below 50 milliwatts.</td>
</tr>
<tr>
<td>2</td>
<td>High side through EIA antenna to terminal</td>
<td>1450 KC (30%, mod.)</td>
<td>1</td>
<td>1450 KC</td>
<td>C1 and C24 for maximum output as in step 1.</td>
</tr>
<tr>
<td>3</td>
<td>Same as step 2.</td>
<td>600 KC (30%, mod.)</td>
<td>1</td>
<td>600 KC</td>
<td>L1 for maximum output as in step 1.</td>
</tr>
<tr>
<td>4</td>
<td>Same as step 2.</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>Repeat steps 2 and 3 until an increase in output can be obtained on either adjustment.</td>
</tr>
<tr>
<td>5</td>
<td>Same as step 2.</td>
<td>4.5 MC (30%, mod.)</td>
<td>2</td>
<td>4.5 MC</td>
<td>C2 and C26 for maximum output as in step 1.</td>
</tr>
<tr>
<td>6</td>
<td>Same as step 2.</td>
<td>5.0 MC (30%, mod.)</td>
<td>3</td>
<td>5.0 MC</td>
<td>T3 and L3 for maximum output as in step 1.</td>
</tr>
<tr>
<td>7</td>
<td>Same as step 2.</td>
<td>-</td>
<td>3</td>
<td>-</td>
<td>Repeat steps 5 and 6 until no increase in output can be obtained.</td>
</tr>
<tr>
<td>8</td>
<td>Same as step 2.</td>
<td>11 MC (30%, mod.)</td>
<td>3</td>
<td>11 MC</td>
<td>C3 and C26 for maximum output as in step 1.</td>
</tr>
<tr>
<td>9</td>
<td>Same as step 2.</td>
<td>5 MC (30%, mod.)</td>
<td>3</td>
<td>5 MC</td>
<td>T3 and L3 for maximum output as in step 1.</td>
</tr>
<tr>
<td>10</td>
<td>Same as step 2.</td>
<td>-</td>
<td>3</td>
<td>-</td>
<td>Repeat steps 8 and 9 until no increase in output can be obtained.</td>
</tr>
<tr>
<td>11</td>
<td>Same as step 2.</td>
<td>20 MC (30%, mod.)</td>
<td>4</td>
<td>20 MC</td>
<td>C4 and C27 for maximum output as in step 1.</td>
</tr>
<tr>
<td>12</td>
<td>Same as step 2.</td>
<td>14 MC (30%, mod.)</td>
<td>4</td>
<td>14 MC</td>
<td>T4 and L4 for maximum output as in step 1.</td>
</tr>
<tr>
<td>13</td>
<td>Same as step 2.</td>
<td>-</td>
<td>4</td>
<td>-</td>
<td>Repeat steps 11 and 12 until no increase in output can be obtained.</td>
</tr>
</tbody>
</table>

*Before beginning 13 procedure, turn A.M/C.W. Tune control to its full counterclockwise position.*
Figure 6. Schematic Diagram.
SERVICE PARTS LIST

TUBES, LAMPS AND RECTIFIERS

- Rectifier, Selenium
- Lamp, Dial type #1
- 12 BEG, Converter
- 12, 120, 120V, amplifier
- 7 ALY, AYC and 1st Audiosl
- Amplifier

MISCELLANEOUS

- Antenna, Telescopig
- Bracket, Antenna
- Bracket, Dial Plate
- Casing (Inc. Trim Strip)
- Clip, "Y" mgt.
- Clip line (flexa mgt.)
- Complete Auto.
- Scale, Dial Calibrated
- Dial Cord
- Seals, trim plate
- Foo, Front
- Panel, Rear
- Ground, metal plate (lead and rear panel mgt.)
- Ground, rear plastic (lead last mgt.)
- Ground, speaker (capacitor and ground selection mgt.)
- Ground plate (stabilizer plate)
- Lamp, MAIN TUNING and
- BAND SPREAD
- Lamp, VOLUME and BFO
- Lamp, SELECTOR
- Lamp, Front
- Lamp, Rear
- Lamp, Loud Cord

SWITCHES

- Speaker, 6-ohm Voice Ch.
- Panel, Dial
- Panel, BAND SPREAD
- Panel, MAIN TUNING
- Lamp, Front
- Lamp, Rear
- Lamp, SELECTOR
- Lamp, Loud Cord

SOCKETS AND CONNECTORS

- Plug, "O" pin, "O" pin

NOTE: TUNING GANG FULLY NESTED

Figure 7. Main Tuning Stringing Diagram, Rear View.