

communications

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**OPERATING and SERVICE
INSTRUCTIONS**

SX-140

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the hallicrafters co.

MANUFACTURERS OF ELECTRONIC EQUIPMENT, CHICAGO 24, U. S. A.

www.shortwaveradio.ch



Figure 1. Hallicrafters Model SX-140

SECTION I

GENERAL INFORMATION

The new Hallicrafters Model SX-140 is a precision built, highly sensitive, communications receiver providing coverage within the frequency range of 3.5 megacycles to 54 megacycles. For ease and flexibility of operation, a single tuning control is provided which covers the easy-to-read slide-rule dial specifically calibrated for the 80, 40, 20, 15, 10 and 6 meter bands. Five tubes plus two silicon rectifiers are employed in the latest superheterodyne circuit and provision is made for the reception of amplitude modulation (AM), single-sideband (SSB), and continuous wave (CW) signals over the entire tuning range.

For control of selectivity, a regenerative intermediate-frequency stage is employed. This control of regeneration also provides a boost in sensitivity to bring in weak or distant stations that would ordinarily be lost in the background noise.

A carrier level meter provides an aid for accurate tuning and a means of determining the relative strength of received signals.

The alignment procedure for the receiver has been greatly simplified with the use of a built-in crystal oscillator circuit to generate the required signals for alignment. A 1650 KC crystal (not supplied) plugged into the crystal calibrator socket will permit the IF transformers to be aligned with the use of the Carrier Level meter as an output indicator.

Other special features include auxiliary

switching, controlling an antenna change over relay, turning on the transmitter or shorting the speaker voice coil during transmitting (with the FUNCTION control set to STANDBY). The SELECTIVITY-BFO control with its associated circuitry permits continuously variable selectivity on AM reception to the point where the BFO starts. Beyond this point, the circuitry permits reception of CW and upper or lower SSB signals. The pitch of a CW signal may be varied with this control. The crystal oscillator circuit utilizes a 3.5 MC crystal which permits the operator to set the low frequency ends of the 80, 40, 20, 15 and 10 meter bands and 52.5 MC on the 6 meter band.

NOTE

Careful attention should be directed to the INSTALLATION and OPERATION instructions. They have been provided to insure satisfactory operation from this Hallicrafters precision built product. The receiver has an unusually high degree of sensitivity necessary to receive weak and distant stations. Careless operation of a high sensitivity receiver may result in excessive noise or background "hiss". These undesirable effects can be held to a minimum by careful adjustment of the SELECTIVITY, TUNING, AUDIO GAIN and RF GAIN controls as well as the proper selection and arrangement of the antenna.

SECTION II

TECHNICAL DATA

TECHNICAL SPECIFICATIONS

TUBES Five, Plus two Silicon Rectifiers

HEADPHONE OUTPUT Low to medium impedance (see para. 3-6).

ANTENNA INPUT Single wire or any 50-75 ohms unbalanced.

POWER CONSUMPTION 47 watts

AUDIO OUTPUT IMPEDANCE 3.2 ohms

DIMENSIONS 13-3/8" wide, 8-1/4" deep, 7-3/16" high

NET WEIGHT 13.5 pounds

SHIPPING WEIGHT 14 pounds

RECEIVER FREQUENCY COVERAGE

BAND IN METERS	CALIBRATED FREQUENCY RANGE	INTERMEDIATE FREQUENCY	OSCILLATOR FREQUENCY RANGE	FCC BAND LIMITS
80	3.5-4.0 MC	1650 KC	5150-5650 KC	3.5-4.0 MC
40	7.0-7.3 MC	1650 KC	8650-8950 KC	7.0-7.3 MC
20	14.0-14.4 MC	1650 KC	15650-16050 KC	14.0-14.35 MC
15	21.0-21.5 MC	1650 KC	11325-11575 KC	21.0-21.45 MC
10	28.0-29.9 MC	1650 KC	14825-15775 KC	28.0-29.7 MC
6	50.0-54.0 MC	1650 KC	24175-26175 KC	50.0-54.0 MC

On some bands the calibrated frequency range of the receiver has been extended above the actual FCC band limits to include the reception of some of the special service frequencies.

The oscillator frequency on the 80, 40, and 20 meter bands is higher than the received signal by the IF frequency. On the 15 and 10 meter bands the oscillator second harmonic is used, which is higher than the received signal by the IF frequency. On the 6 meter band the oscillator second harmonic is used which is lower than the received signal by the IF frequency.

SECTION III

UNPACKING

3-1. 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.

3-2. LOCATION

The receiver is equipped with rubber mounting 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 one inch of clearance between the back of the receiver and the wall for proper ventilation.

3-3. POWER SOURCE

The SX-140 Receiver is designed to operate from a 105-125 volt, 60 cycle AC power source. Power consumption is 47 watts.

NOTE

If in doubt about your power source, contact your local power company prior to inserting the power cord into an AC power outlet. Connecting the receiver to the wrong power source may cause

extensive damage to the unit and costly repairs.

3-4. ANTENNAS

The RF input of the receiver is designed for operation from either a single-wire antenna, (fig. 2) a half-wave doublet or other tuned antenna with transmission line impedances from 50 to 75 ohms. (fig. 3 and 4.) Antenna connections are made to a two-terminal strip at the rear of the receiver marked A (antenna) and G (chassis ground).

The single wire antenna (fig. 2) may be used in an area where antenna space is limited. When using this antenna, a ground lead from terminal G to a water pipe or other earth ground will improve reception.

For the best performance, however, a coaxial-fed dipole, tuned to the center of the desired band is the recommended type of antenna to be used (fig. 3). The impedance of this antenna is approximately 75 ohms. When using this antenna, the center conductor of the coax is connected to terminal A and the outer conductor (braid shield) is connected to terminal G.

For further information regarding antennas, refer to the "A.R.R.L. Antenna Book", published by the American Radio Relay League, West Hartford, Conn., U.S.A.

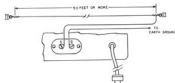


Figure 2. Single Wire Antenna.

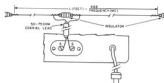


Figure 3. Dipole Antenna Using Coaxial Lead-in.

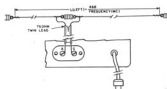


Figure 4. Dipole Antenna Using Twin Lead-in.

3-5. SPEAKER CONNECTION

The speaker terminal board is marked SPKR and GND. Internally, the hot lead from the output transformer is connected through the PHONES jack (J1) to the SPKR terminal; the other transformer lead is connected to chassis ground.

3-6. HEADPHONES

The headphone jack, marked "PHONES", is located on the front panel of the receiver (as seen in figure 5) and is wired to automatically disable the speaker when the headphones are plugged in. The headphone output impedance is not critical, and any commercial headphones may be used, including crystal types, as no direct current flows in the headphone circuit. For maximum headphone output, the use of low-impedance magnetic phones (50 to 1000 ohm) is recommended.

3-7. TYPICAL SYSTEM CONNECTION

A four terminal strip is provided at the rear of the chassis to connect the SX-140 Receiver into a station control system (see fig. 6 and 7). With the FUNCTION switch in the STANDBY position, terminals 1 and 2 are shorted together as are terminals 3 and 4, thus providing auxiliary switching functions. Figure 6 illustrates the SX-140 controlling the antenna change over relay and the station transmitter (HT-40 Transmitter). Figure 7 illustrates the SX-140 controlling the station speaker and available contacts for another auxiliary switching function.

SECTION IV

FUNCTION OF OPERATING CONTROLS

4-1. GENERAL

Each control of the receiver performs a definite function which contributes to its reception capabilities. Full appreciation of the receiver is to be expected only after becoming familiar with each of the controls and the effect each control has on the performance of the receiver.

A brief description of each control is contained in the following paragraphs (see figure 5).

4-2. FUNCTION CONTROL

The FUNCTION control, a four position rotary switch, is used to select the desired operating condition of the receiver. Auxiliary switching functions are also controlled by this switch, refer to paragraph 3-7. Operating conditions for each switch position are as follows:

1. In the OFF position no power is applied.
2. In the STANDBY position power is applied to the receiver; however, a high negative bias is applied to the RF tube (V1A) grid to prevent the reception of signals.

3. In the AM position, amplitude modulated signals may be received and the AVC circuit is activated.
4. In the CW-SSB position, continuous wave and single side-band signals may be received. The AVC is reduced for CW and SSB reception. The carrier level meter is disabled to prevent damage by a strong signal.

4-3. BAND SELECTOR CONTROL

The BAND SELECTOR control is a six-position rotary switch for permitting the receiver to receive signals on either the 80, 40, 20, 15, 10, or 6 meter band.

4-4. CAL-OFF CONTROL

The CAL-OFF control is a DPDT slide switch. In the CAL position, the 3.5 MC crystal marker circuit is actuated and provides beat signals at 3.5, to 7.0, 14.0, 21.0, 28.0, and 52.5 MC. With the switch in the OFF position, the crystal marker circuit is disabled and no beats will be heard.

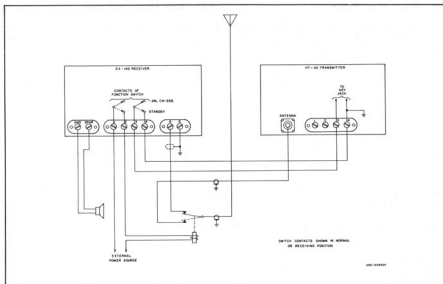


Figure 6. Station Control, Receiver Controlling Antenna Relay and Transmitter.

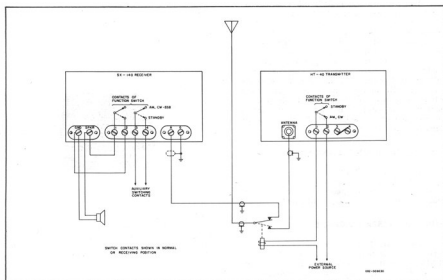


Figure 7. Station Control, Transmitter Controlling Antenna Relay.

4-5. ANL-OFF CONTROL

The ANL-OFF control is a SPDT slide switch. When the ANL-OFF switch is in the ANL position, the noise reducing circuit is actuated to improve reception of signals in the presence of high noise level, such as, ignition noise, atmospheric static, etc. When placed in the OFF position, the receiver resumes its normal reception of signals.

4-6. RF GAIN CONTROL

The RF GAIN control is a variable resistor in series with the cathode of the RF tube V1A. In the extreme counterclockwise position, maximum resistance is introduced into the cathode circuit thus developing maximum cathode bias to cut off the plate current. In the clockwise position, minimum cathode bias is developed, plate current increases and RF gain is maximum.

4-7. AUDIO GAIN CONTROL

The AUDIO GAIN control, a variable resistor, regulates the receiver volume. Clockwise rotation increases the volume; counterclockwise rotation decreases the volume.

4-8. SELECTIVITY-BFO CONTROL

The SELECTIVITY-BFO controls the effective resistance connected between the IF tube (V3) suppressor and chassis ground. This control varies the regeneration capabilities of the IF stage up to and beyond the point of oscillation. During the reception of AM signals, the selectivity of the IF stage can be varied from approximately 8 KC (control fully counterclockwise) to approximately 2 KC (control advanced to the point just below the point of oscillation). For the reception of CW and SSB signals, advance the control to the point of oscillation or beyond. By varying the control beyond the point of oscillation, the pitch of a CW signal may be varied as desired.

4-9. MAIN TUNING CONTROL

The MAIN TUNING control is a variable capacitor which determines the oscillator frequency. It engages and moves the pointer on the slide-rule dial when tuning in stations.

4-10. CAL RESET CONTROL

The CAL RESET control is a variable capacitor connected in parallel with the MAIN TUNING capacitor to permit recalibration of the dial pointer on each band. This may be considered as an electrical pointer reset. It is used primarily in connection with the CAL-OFF switch when setting the low frequency limits of each band and the 52.5 MC point on the 6 meter band.

4-11. ANT TRIM CONTROL

The ANT TRIM control is a variable capacitor which is connected across the secondary of the antenna coils as each coil is switched into the circuit. It maintains perfect tracking of signals on all frequencies of each band.

4-12. USE OF THE CARRIER LEVEL METER

The carrier level meter is useful only when the FUNCTION switch is set in the AM position and permits the operator to obtain a relative signal strength indication of the AM signals received. When the FUNCTION switch is set to the CW-SSB position, the carrier level meter is disabled to prevent the pointer from being abused.

In the AM position, the carrier level meter is very sensitive and will permit an excellent visual display of the relative strength of the incoming signals.

4-13. SERVICE OR OPERATIONS QUESTIONS

For any further information regarding operation or servicing of the receiver, contact The Hallicrafters dealer from which the receiver was purchased. The Hallicrafters Company 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 below. For the location of the one nearest you, consult the telephone directory.



Do not make any service shipments to the factory unless instructed to do so by letter. The Hallicrafters Company will not accept the responsibility for any 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.

SECTION V

RECEIVER OPERATION

5-1. STANDBY

Rotate the FUNCTION control to the STANDBY position. In this position power is applied to the receiver, as indicated by illumination of the tuning dial, thus allowing the receiver to warm up prior to calibration or normal operation (reception of AM, CW or SSB signals).

5-2. CALIBRATION

A special crystal oscillator circuit (with crystal) has been incorporated into the receiver to enable the operator to accurately calibrate each band. A 3.5 MC crystal inserted into the crystal socket (see fig. 8) provides a signal that will zero-beat with the local oscillator to provide a calibration marker at the low frequency edge of the 80, 40, 20, 15 and 10 meter bands and at 52.5 MC on the 6 meter band. For calibration of the receiver preset the controls as indicated:

ANT TRIM. Center of range

FUNCTION. CW-SSB

CAL-OFF. CAL

ANL-OFF OFF

RF GAIN Maximum counter-clockwise

AUDIO GAIN Maximum clockwise

BAND SELECTOR. 80

MAIN TUNING 3.5 MC

SELECTIVITY-BFO. Maximum clockwise

The band edge calibration points for the 80, 40, 20, 15 and 10 meter bands are 3.5, 7.0, 14.0, 21.0, and 28.0 MC respectively. These signals are

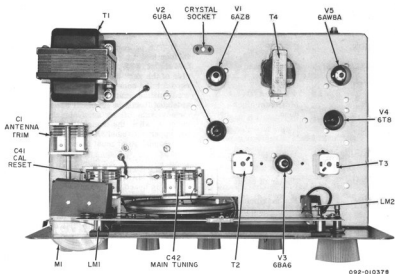


Figure 8. Top View Alignments.

available from the fundamental and even harmonics of the 3.5 MC crystal oscillator. Since no even harmonic of 3.5 MC will fall in the 6 meter band, an odd harmonic, 52.5 MC is used.

Beginning with the 80 meter band at 3.5 MC, rotate the CAL RESET control until a beat note is heard. It may be necessary to advance the RF GAIN control clockwise until the beat note is audible. Adjust the CAL RESET control to obtain a zero-beat which completes the calibration of the 80 meter band. As each band is calibrated from the 80 to the 6 meter band it will be found that the harmonics become weaker, thus necessitating further advance of the RF GAIN control.

If on any band, during the calibration procedure, no beat note is heard with any setting of the CAL RESET control, it is assumed that this band is out of alignment and the alignment procedure should be followed (see section VI).

NOTE

Since all bands are calibrated with the CAL RESET control, only the last band calibrated is in proper calibration. Each time the receiver is switched to a different band for reception, the band calibration should be checked.

5-3. CW RECEPTION

1. For CW reception set the receiver controls as follows:

FUNCTION.	CW-SSB
BAND SELECTOR. . .	Desired band
CAL-OFF	OFF
RF GAIN	Maximum clockwise
ANL-OFF	OFF
SELECTIVITY-BFO. .	Maximum clockwise
AUDIO GAIN.	Center of range
ANT TRIM.	For maximum background noise
CAL RESET.	Previously set (para. 5-2)

NOTE

For practice in tuning in a CW signal, the 40 meter band is recommended as there are usually an abundance of CW stations on the air at all times of the day or night.

2. Starting at the lower frequency end of the band, rotate the MAIN TUNING control until a CW signal is located. Reduce or increase the volume if necessary (see step 3). Continue tuning until the zero-beat of the signal is reached. Either side of the zero-beat point may be used for the reception of CW signals. Signal pitch may be varied to a comfortable listening level by tuning nearer to or further from the zero-beat.
3. Rotate the AUDIO GAIN control to maintain a comfortable listening level throughout the tuning procedure.
4. Rotate the SELECTIVITY-BFO control counterclockwise to the point just above the point where the circuit drops out of oscillation. At this point, the receiver will have maximum selectivity for separating stations operating on frequencies near the frequency of the desired station. Slight readjustment of the MAIN TUNING control may be required.
5. Rotate the RF GAIN control counterclockwise to reduce background noise commensurate with adequate listening level.
6. Rock the ANT TRIM control to obtain maximum signal level.

5-4. SSB RECEPTION

The procedure for tuning in an SSB signal is identical to the above procedure for tuning a CW signal, with one important difference. Only one side of the zero-beat or zero signal point may be used for the reception of the SSB signal. When the transmitting station is operating on the lower sideband it will be necessary to use the high frequency side of the zero signal point; and conversely, when the transmitter is transmitting on the upper sideband the low frequency side of the zero-signal point must be used.

As a typical example, with controls set the same as outlined for the reception of a CW signal, rotate the MAIN TUNING knob until unintelligible speech is heard. Rotate the knob further, through zero-beat if necessary, until the speech becomes intelligible. Some stations will be intelligible on the high side of the zero-signal while others will be intelligible on the low side of the zero-signal point.

NOTE

It will be found that, on the average, the SSB stations on 40 meters will be transmitting lower sideband signals while on the 20 and 80 meter bands the stations will be transmitting on the upper sideband.

5-5. AM RECEPTION

1. For AM reception set the receiver controls as follows:

FUNCTION	AM
BAND SELECTOR . . .	Desired band
CAL-OFF	OFF
RF GAIN	Maximum clockwise
ANL-OFF	OFF
SELECTIVITY-BFO . .	Maximum counterclockwise
AUDIO GAIN	Maximum clockwise
ANT TRIM	For maximum background noise
CAL RESET	Previously set (para. 5-2)

2. Rotate the MAIN TUNING control to

locate an AM signal. Reduce the volume as required (see step 3). Tune the MAIN TUNING control for maximum indication on the carrier level meter.

3. Rotate the AUDIO GAIN control to maintain the desired listening level throughout the tuning process.
4. The selectivity of the receiver may be increased by rotating the SELECTIVITY-BFO control clockwise. Maximum selectivity is attained at a point just below the point where the circuit begins to oscillate.
5. Rotate the RF GAIN control counterclockwise to reduce background noise to a minimum while maintaining an adequate listening level.
6. Rock the ANT TRIM control for maximum indication on the carrier level meter.
7. To reduce excessive noise, such as atmospheric static and ignition noise, set the ANL-OFF switch to the ANL position.

SECTION VI SERVICE DATA

6-1. TUBE AND DIAL LAMP REPLACEMENT

To gain access to the tubes and dial lamps, remove the chassis from the cabinet (see para. 6-2). The location of the tubes and dial lamps are shown in figure 8.

6-2. CHASSIS REMOVAL

The chassis may be removed from the cabinet by removing the four No. 6 Phillips Head, thread forming screws from the rear of the cabinet. When removing the chassis from the cabinet care should be taken not to damage any of the components.

6-3. CARRIER LEVEL METER ADJUSTMENT

To adjust the carrier level meter, disconnect antenna and short the antenna terminal to the ground terminal. Set the RF GAIN maximum clockwise, and the SELECTIVITY-BFO control maximum counterclockwise. Set the ANL-OFF switch to the OFF position and turn the receiver on by rotating the FUNCTION control to the AM position, allowing approximately five minutes to warm-up. Adjust the carrier level meter control

on the rear of the chassis (see figure 9) until the carrier level meter reads "0".

6-4. DIAL CORD RESTRINGING

Remove the chassis from the cabinet to restring the dial cord (see paragraph 6-2). Rotate the tuning drum fully clockwise (tuning capacitor plates open). Care should be taken not to damage the capacitor plates. Referring to figure 10 for the stringing procedure, tie the dial cord to the dial cord spring and follow the arrows and the number sequence to restring the dial cord. Keep just enough tension on the dial cord during stringing to prevent it from slipping off the tuning drum or idler pulleys. When the other end of the dial cord is tied to the dial cord spring, the spring should be expanded about 1/4 inch.

Place the pointer on the pointer rail and engage the dial cord, but do not crimp the clips. Rotate the MAIN TUNING control fully counterclockwise to close the tuning capacitor. Keeping the tuning capacitor closed, align the pointer with the mark approximately 5/16 inch to the left of the 50 MC mark on the 6 meter band. Crimp the clips to prevent slippage. Replace the chassis in the cabinet.

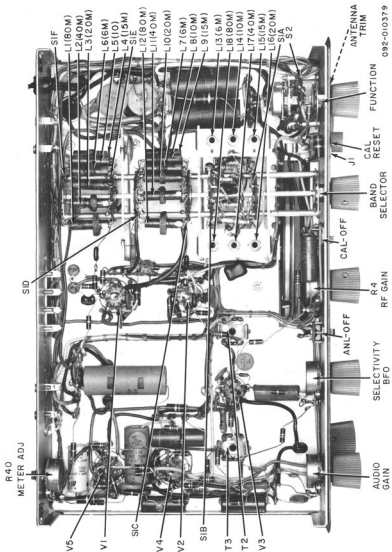


Figure 9. Bottom View Alignments.

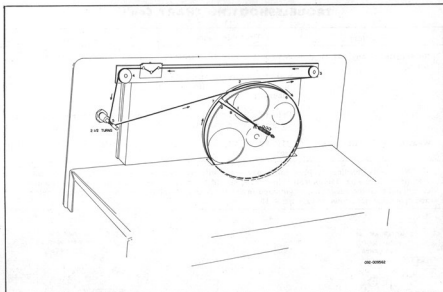


Figure 10. Dial Restringing.

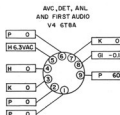
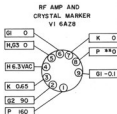
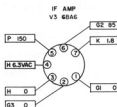
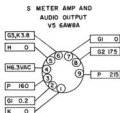
TROUBLESHOOTING CHART

Symptom	Probable Cause	Suggested Remedy
No reception of any signals on any band on speaker or phones but with tubes and pilot lights lighting	V1, V2, V3, V4, V5 defective CR2, CR3 defective Open Audio Transformer C52, C53, C54 shorted. Open Filter Resistor R46	Replace defective tube. Replace defective diode rectifier. Replace Audio output Transformer. Replace defective capacitor. Replace Resistor
	Any component associated with V1, V2, V3, V4, and/or V5 that open or short a signal circuit.	Replace defective component after determining cause by referring to the voltage chart (figure 11) and the schematic diagram (figure 12), measuring voltages at various significant points etc.
Reception of AM signals but no reception of intelligible CW or SSB signals	Triode oscillator section of V2 6U8A defective.	Replace 6U8A tube.
No signals on any one band	Antenna coils L1, L2, L3, L4, L5 and or L6 open or shorted. RF coils L7, L8, L9, L10, L11, and/or L12 shorted or open. Oscillator coils L13, L14, L15, L16, L17, and/or L18 open or shorted.	Replace defective coil. Replace defective coil. Replace defective coil.

TROUBLESHOOTING CHART Con't

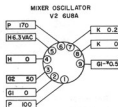
Symptom	Probable Cause	Suggested Remedy
No signals on any one band (cont.)	Also open or shorted capacitors associated in the circuit with the above Antenna, RF, or Oscillator coils (Refer to Schematic Diagram)	Replace defective capacitor.
Weak signals on all bands	Defective Bandswitch Contact on one or more wafers. V1, V2, V3, V4, and/or V5 defective.	Replace defective section. Replace defective tube.

Numerous obscure troubles which may occur with any well designed electrical equipment, may occur in the SX-140 as well. Therefore, should any trouble occur that may not be readily corrected with the suggestions contained in the above trouble-shooting chart, refer to service and operating questions, paragraph 4-13.



CONTROL	SETTING
FUNCTION	CW-SSB (AVC OFF)
BAND SELECTOR	IS METER
CAL-OFF	OFF
RF GAIN	MAXIMUM CLOCKWISE
ANL-OFF	OFF
SELECTIVITY SFO	MAXIMUM COUNTERCLOCKWISE
AUDIO GAIN	MAXIMUM CLOCKWISE

*READINGS VARY WITH BAND SELECTION.
**25 VOLTS WITH CAL-OFF SWITCH IN "CAL" POSITION.



NOTES:

- VOLTAGE READINGS TAKEN UNDER THE FOLLOWING CONDITIONS
- LINE VOLTAGE ; 117 VOLTS, 60 CPS, A.C.
- ALL VOLTAGES MEASURED BETWEEN TUBE SOCKET TERMINALS AND CHASSIS UNLESS OTHERWISE SPECIFIED.
- ALL VOLTAGES ARE D.C. AND POSITIVE UNLESS OTHERWISE INDICATED D.C. AND A.C. VOLTAGES MEASURED WITH A 20,000 OHMS-PER-VOLT METER.

092-00908

Figure 11. Voltage Chart.

SECTION VII ALIGNMENT

7-1. GENERAL

This receiver has been carefully aligned at the factory by specially trained personnel using precision equipment. Alignment of the receiver should not be required unless the receiver has been tampered with or component parts have been replaced in the IF or oscillator stages.

Two methods of aligning the IF and oscillator stages are described in the following paragraphs of this alignment procedure. Method one requires only a non-metallic alignment tool for adjusting the slugs in the IF transformers, and a 1650 KC crystal inserted into the crystal socket for IF alignment. A similar non-metallic alignment tool for adjusting the slugs in the oscillator coils and a 3.5 MC crystal inserted into the crystal socket provides an accurate method of oscillator alignment on all bands. Method II requires the same non-metallic alignment tools for adjusting the slugs in the IF transformers and oscillator coils, a signal generator, a 0.02 mfd capacitor, a 27 ohm resistor and an output meter (AC scale of a VTVM or a conventional output meter).

7-2. METHOD ONE-IF ALIGNMENT

EQUIPMENT REQUIRED

1. 1650 KC crystal
2. Non-metallic alignment tool for IF transformers

PROCEDURE

1. Disconnect antenna and remove the chassis from the cabinet (see para. 6-2).
2. Insert 1650 KC crystal in crystal socket (see fig. 8).

3. Set controls as follows:

ANT TRIM Center of range

CAL RESET Center of range

FUNCTION AM

BAND SELECTOR . . 10

MAIN TUNING 29.0 MC

CAL-OFF CAL

RF GAIN Center of range

ANL-OFF OFF

SELECTIVITY-BFO . . Maximum counter-clockwise

AUDIO GAIN Any position

4. Adjust RF GAIN control until carrier level meter reads approximately S9.
5. Adjust the slugs in the IF transformers, T3 and T2 (see figures 8 and 9), for maximum deflection on the carrier level meter; make adjustments in the following order.

NOTE: After each adjustment bring the meter reading back to S9.

T3 secondary (top of can)

T3 primary (bottom of can)

T2 secondary (top of can)

T2 primary (bottom of can)

6. Repeat step 5 for final peaking of IF transformers.
7. Set the CAL-OFF switch to the OFF position and remove the 1650 KC crystal.

7-3. METHOD ONE-OSCILLATOR ALIGNMENT

EQUIPMENT REQUIRED

1. 3.5 MC crystal
2. Non-metallic alignment tool for the oscillator coils.

PROCEDURE

1. Insert 3.5 MC crystal in crystal socket.
2. Set controls as follows:

ANT TRIM Center of range

CAL RESET Center of range

FUNCTION CW-SSB

BAND SELECTOR . . . As indicated in step 3

CAL-OFF CAL

RF GAIN Center of range

ANL-OFF OFF

SELECTIVITY-BFO . . Maximum clockwise

AUDIO GAIN Maximum clockwise

MAIN TUNING As indicated in step 3

- Set indicated controls and slowly adjust slug in each oscillator coil as indicated in the following table, readjusting the RF GAIN control, as necessary, to maintain the beat signal at a comfortable listening level. Refer to figure

9 for location of the oscillator coils.

- Set the CAL-OFF switch to OFF and remove the 3.5 MC crystal.
- Put chassis back in cabinet and connect antenna.

BAND SELECTOR	MAIN TUNING	ADJUSTMENT SLUG IN	ADJUST FOR
80	3.5 MC	L18	Zero-Beat
40	7.0 MC	L17	Same as above
20	14.0 MC	L16	Same as above
15	21.0 MC	L15	Same as above
10	28.0 MC	L14	Same as above
6	52.5 MC	L13	Same as above

7-4. METHOD TWO-IF ALIGNMENT

EQUIPMENT REQUIRED

- Signal generator
- Output meter
- 0.02 mfd capacitor
- A non-metallic alignment tool for IF transformer slugs.

PROCEDURE

- Disconnect the antenna and remove the chassis from the cabinet (see para. 6-2).
- Preset the controls as follows:
 ANT TRIM Center of range
 CAL RESET Center of range
 FUNCTION CW-SSB
 BAND SELECTOR . . . 10
 MAIN TUNING 29.0 MC
 CAL-OFF OFF
 RF GAIN Maximum clockwise
 ANL-OFF OFF
 SELECTIVITY-BFO . . Maximum counter-clockwise
 AUDIO GAIN Maximum clockwise

- Connect the high side of the signal generator through the 0.02 mfd capacitor to pin 2 of the oscillator mixer tube (V2A) and the ground side to the chassis (see figures 8 and 9).
- Set the signal generator frequency to 1650 KC (1.65 MC).
- Connect the output meter across the SPKR terminals with speaker connected and adjust the signal generator output (modulated 400 CPS) for adequate indication on the output meter, approximately 25 milliwatts.
- Adjust IF transformer (T3 and T2) slugs for maximum indication on the output meter in the order listed below; re-adjusting signal generator output, if necessary, to maintain an indication on the output meter, of approximately 25 milliwatts.
 T3 secondary (top of can)
 T3 primary (bottom of can)
 T2 secondary (top of can)
 T2 primary (bottom of can)
- Repeat step 6 for final peaking of IF transformers.
- Disconnect the signal generator and the 0.02 mfd. capacitor.

7-5. METHOD TWO-OSCILLATOR ALIGNMENT

EQUIPMENT REQUIRED

- Signal generator

2. Output meter
3. 27 ohm resistor
4. A non-metallic alignment tool for the oscillator coil slugs.

PROCEDURE

1. Preset the controls as follows:

ANT TRIM Center of range

CAL RESET Center of range

FUNCTION CW-SSB

BAND SELECTOR . . . 80

MAIN TUNING 3.5 MC

CAL-OFF OFF

RF GAIN Maximum clockwise

ANL-OFF OFF

SELECTIVITY-BFO . . Maximum counter-clockwise

AUDIO GAIN Maximum clockwise

3. Connect the high side of the signal generator through the 27 ohm resistor to the antenna terminal and the ground side to chassis.
4. The output meter should still be connected across the SPKR terminals.
5. Set the signal generator frequency to 3.5 MC.
6. Adjust the signal generator output (modulated 400 CPS) for adequate output indication on the output meter, approximately 25 milliwatts.
7. Rotate the slug in oscillator coil L13 counterclockwise to end of travel; rotate the slug clockwise until the 400 CPS audio signal is heard in the speaker. Rock slug slowly back and forth until maximum deflection is indicated on the output meter, and the speaker audio level is maximum.
8. Adjust the oscillator coils for the remaining bands by setting the controls and making adjustments as indicated in the following table. Readjust signal generator output, if necessary, to maintain a reading of approximately 25 milliwatts on the output meter.

BAND SELECTOR	MAIN TUNING	SIG. GEN. FREQUENCY	ADJUST	ADJUST FOR
80	3.5 MC	3.5 MC	L18	Maximum deflection on the output meter.
40	7.0 MC	7.0 MC	L17	Same as above
20	14.0 MC	14.0 MC	L16	Same as above
15	21.0 MC	21.0 MC	L15	Same as above
10	28.0 MC	28.0 MC	L14	Same as above
6	50.0 MC	50.0 MC	L13	Same as above
*If the signal generator to be used is not calibrated to 50 MC it may be set to 25 MC thus utilizing the second harmonic which is 50 MC.				

SERVICE PARTS LIST

Schematic Symbol	Description	Hallicrafters Part Number	Schematic Symbol	Description	Hallicrafters Part Number	Schematic Symbol	Description	Hallicrafters Part Number
CAPACITORS			*RESISTORS (cont.)			JACKS, PLUGS, AND SOCKETS		
C1	5.2-25.8 mfd., ANT TRIM	048-009492	R29	Resistor, Var., AUDIO GAIN	025-001942	J1	Jack, Phone	036-100002
C29, 43	47 mfd., 500V, 2%; Duramix	482-151470	R30	250K ohm	451-252224	PL1	Line Cord and Plug	087-100078
C3, 4, 7, 12, 14, 15, 17, 18, 19, 47, 56	0.01 mfd., 500V, 20%; Cer. Disc	047-109224	R31	10K ohm, 10%; 1W	451-252103		Socket, Tube; 7 pin min., (V2)	036-000946
C5, 8, 27, 46, 48	.005 mfd., 500V, 20%; Cer. Disc	047-109442	R32	2.2 Meg	451-252225		Socket, Tube; 9 pin min., (V1, 2, 4, 5)	036-000947
C6, 32, 34	1 mfd., 200V, 20%; Paper	499-011014	R33	1.8K ohm	451-252182		Socket, Crystal	036-000948
C16, 49	10 mfd., 50V	043-009724	R39	560 ohm, 10%; 1W	451-252561		Socket, Pilot light, left	086-000949
C10, 11, 44, 55	.02 mfd., 500V; Cer. Disc	047-109242	R40	Resistor, Var., (1/2" Meter)	025-001943		Socket, Pilot light, right	086-000942
C12	100 mfd., 500V, 10%; Cer. Disc	042-131100	R41	470K ohm	451-252474	TUBES AND LAMPS		
C26, 22	100 mfd., 500V, 10%; Cer. Disc	047-201182	R43	180 ohm	451-252181	V1	6AU6 RF Amplifier, Crystal Marker	090-901417
C28	8 mfd., 250V, Electrolytic	045-000721	R44	27 ohm, 10%; 1W	451-252270	V2	6XA Mixer, Oscillator	090-901285
C25, 26	.001 mfd., GMV, 500V; Cer. Disc	047-200230	R45	10 ohm	451-252190	V3	6BA6 IF Amplifier	090-901112
C28	1 mfd., 400V, 20%; Paper	499-024104	R46	820 ohm, 10%; 2W	451-252581	V4	6V6A AVC, Det. AML	090-901403
C29	68 mfd., 500V, 2%	482-161890	R47	100K ohm, 10%; 1W	451-252194	V5	6AW6 5 Meter Amplifier, Audio Output	090-901103
C30, 32	22 mfd., 50%; Cer. Tub.	491-105230-95				LMI, 2	Pilot Lamp #47	039-109019
C31	100 mfd., 500V, 2%	482-161101	TRANSFORMERS			MISCELLANEOUS PARTS		
C33	330 mfd., 500V, 2%	482-161331	T1	Transformer, Power	052-000853		Bracket, Cabinet	067-009046
C34	68 mfd., 50V	482-161890	T2, 3	Transformer, IF	050-000751		Cabinet Weld Assembly	150-000359
C35	250 mfd., 500V, 2%	482-161301	T4	Transformer, Audio Output	055-200424		Cable, Coax (300 ohm)	087-100133
C36	33 mfd., 50V	491-105330-92					Chassis, Receiver	070-000205
C37	180 mfd., 500V, 2%	493-121830-334					Dial Cord	063-000949
C38	56 mfd., 50V	491-105360-95					Dial Plate	063-000942
C39	68 mfd., 50V	491-125680-42					Dial Window (calibrated)	063-000945
C40	1200 mfd., 500V, 2%	482-261322					Hook, Mounting	016-200172
C41, 42	Capacitor, Var. MAIN TUNING; CAL RESET	048-000493					Front Panel Weld Assembly	150-000359
C45	27 mfd., 500V, 2%	493-151270					Knob, ANT TRIM, CAL	016-200164
C50, 51	.01 mfd., 1400V, GMV; Cer. Disc	047-100242					RESET	016-200168
C52, 53	40 mfd., 150V	045-000725					COIL, FUNCTION, BAND SELECTOR	015-201258
C54	40 mfd., 250V	045-000721					Knob, R.F. GAIN, AUDIO GAIN, SELECTIVITY-SFO	015-201259
*RESISTORS							MAIN TUNING ASSEMBLY	015-201274
R1, 8, 22, 32, 35, 38	1 megohm	451-252105					Lock, Line Cord	076-200397
R2	22 ohm	451-252220					Pointer, Main Tuning	082-000489
R29, 42	10 megohm	451-252106					Pointer, Track Assembly	150-000711
R3, 11	68 ohm	451-252580					Pulley, Idle	026-200919-09
R4	Resistor, Var., R.F. GAIN	025-001941					Rectifier, Silicon	027-000283
R5	10K ohm	451-252108					Ring, Retaining	076-100883
R6, 12	33K ohm	451-252333					"R" Meter	082-200402
R7, 13	15K ohm, 10%, 1W	451-252153					Shaft, Main Tuning	074-200451
R8, 14	1K ohm	451-252102					Shield, Pilot Lamp	084-100037
R10, 15, 34, 31, 34	47K ohm	451-252473					Spacer, Track	073-200395
R16	Resistor, Var., SELECTION	025-001944					Spring, Dial Card	073-200012
R17	2K ohm	451-252820					Screw, Cabinet	073-200699
R18	82 ohm	451-252104					Terminal Board, Antenna	084-200206
R19, 25	100K ohm	451-252223					Terminal Board (4 contact)	011-001077
R20, 32	22K ohm	451-252222					Terminal Board, Speaker	011-001076
R21	2.2K ohm	451-252274					Track, Pointer	063-000506
R26	270K ohm	451-252154					Washer, Spring	004-001408
R27	150K ohm	451-252154						

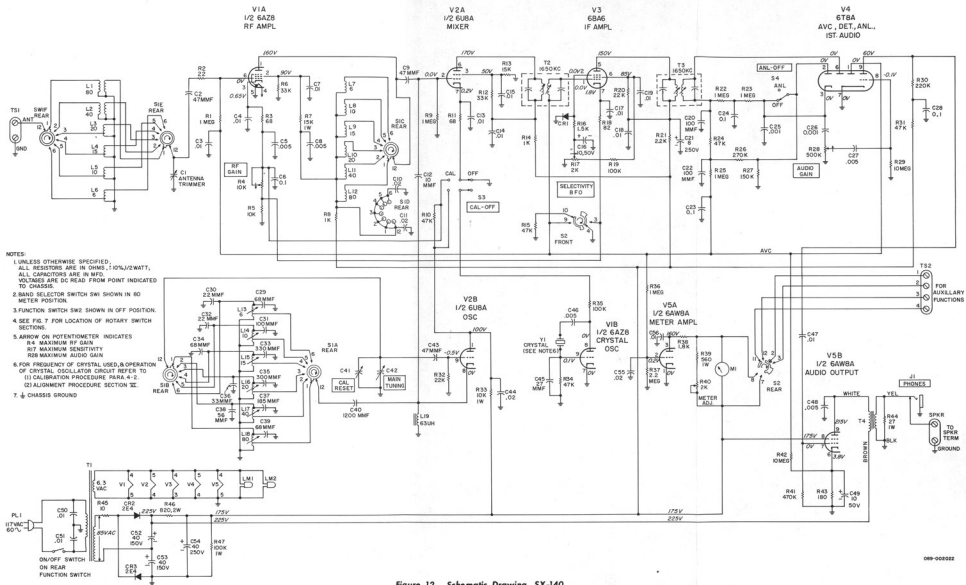


Figure 12. Schematic Drawing, SX-140.

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 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. 943622

the Hallicrafters co.

AMENDMENT I

MODEL SX-140 INSTRUCTION MANUAL

These instructions amend the Instruction Manual for the Model SX-140 Receiver.

It is suggested that the following changes, the Service Parts List and the Schematic Diagram be incorporated into the Instruction Manual.

In Section II delete the word calibrated from the phrase, calibrated frequency range each time it appears.

In the Troubleshooting Chart, under Probable Causes, change the second paragraph to read; Any component associated with V1, V2, V3, V4 and/or V5 may become defective and open or short the signal circuit.

Schematic Symbol	Description	Hallcrafters Part Number	Schematic Symbol	Description	Hallcrafters Part Number	Schematic Symbol	Description	Hallcrafters Part Number
CAPACITORS			*RESISTORS (cont.)			SWITCHES (cont.)		
C1	5.2-25.8 mfd., ANT TRIM	048-000492	R10, 15, 24, 31, 34	47K ohm	451-252473	S2	Switch, Rotary, FUNCTION	040-002207
C2, 9, 43	47 mfd., 500V, 2%; Dura-mica	402-151470	R12	15K ohm	451-252132	S3	Switch, DPDT, CAL-OFF	040-002250
C3, 4, 7, 13, 14, 15, 17, 18, 19, 47, 56	.01 mfd., 500V, 20%; Cer. Disc	047-100224	R16	1.5K ohm	451-252152	S4	Switch, SPDT, ANL-OFF	040-200967
C5, 8, 27, 48, 49	.005 mfd., 500V, 20%; Cer. Disc	047-100482	R17	Resistor, Var., SELECTIVITY; 2K ohm	025-001944			
C6, 23, 24	1 mfd., 200V, 20%; Molded Paper	499-014104	R18	82 ohm	451-252280		JACKS, PLUGS, AND SOCKETS	
C10, 11, 44, 55	.02 mfd., 500V, -80-20%; Cer. Disc	047-100242	R19, 25	100K ohm	451-252104	J1	Jack, Phone	039-100062
C12	10 mfd., 500V, 2%; Dura-mica	402-131100	R21	32K ohm	451-252223	PL1	Line Cord and Plug	007-100078
C16, 49	10 mfd., 50V; Electrolytic	045-000724	R20, 22	2.2K ohm	451-252222	XV3	Socket, Tube; 7 pin min.	006-000496
C20, 22	100 mfd., 500V, 10%; Cer. Disc	047-201182	R28	270K ohm	451-252274	XV1, 2, 4, 5	Socket, Tube; 9 pin min.	006-000497
C21	8 mfd., 250V; Electrolytic	045-000721	R28	Resistor, Var., AUDIO GAIN; 500K	025-001942	XV1	Socket, Crystal	006-100346
C25, 26	.001 mfd., 500V, GMV; Cer. Disc	047-200230	R29, 42	10 megohm	451-252106		Socket, Pilot light, left	048-000542
C28	1 mfd., 400V, 20%; Molded Paper	499-024104	R30	270K ohm	451-252224		Socket, Pilot light, right	048-000542
C30, 38	68 mfd., 500V, 2%; Dura-mica	402-161680	R33	10K ohm, 10%; 1W	451-252103			
C39, 40	22 mfd., 250V, 2%; Cer. Disc	491-105225-25	R37	2.2 Meg	451-252225			
C31	100 mfd., 500V, 2%; Dura-mica	402-161101	R38	1.5K ohm	451-252182			
C32	15 mfd., NT5, 5%; Cer. Disc	491-105150-95	R39	560 ohm, 10%; 1W	451-252561			
C33	330 mfd., 500V, 2%; Dura-mica	402-161331	R40	Resistor, Var., (Carrier Level Meter); 2K ohm	025-001943	V1	6AB6; RF Amplifier, Crystal	090-901417
C34	68 mfd., NT50, 5%; Cer. Disc	491-105580-95	R41	470K ohm	451-252474	V2	6UB6; Mixer, Oscillator	090-901285
C35	300 mfd., 500V, 2%; Dura-mica	402-161301	R43	180 ohm	451-252181	V3	6BA6; IF Amplifier	090-901112
C37	180 mfd., 500V, 2%; Dura-mica	402-121850-34	R44	27 ohm, 10%; 1W	451-252279	V4	6TBA; AVC, Det. ANL.	090-901403
C39	15 mfd., NT50, 5%; Cer. Disc	491-105580-95	R45	18 ohm	451-252180	V5	6AW6; Carrier Level Meter	090-901103
C41	Capacitor, Var.; CAL RE-SET	048-000519	R47	100K ohm, 10%; 1W	451-252104		Amplifier, Audio Output	
C42	Capacitor, Var.; MAIN TUNING	048-000494				LM1, 2	Pilot Lamp #47	039-100019
C45, 57	27 mfd., 500V, 2%; Dura-mica	402-151270						
C50, 51	.01 mfd., 1400V, GMV; Cer. Disc	047-200732						
C52, 53	40 mfd., 100V; Electrolytic	045-000725						
C54	40 mfd., 250V; Electrolytic	045-000722						
C58	56 mfd., NT55, 5%; Cer. Disc	491-105560-95						
*RESISTORS			TRANSFORMERS			MISCELLANEOUS PARTS		
R1, 22, 23, 25, 36	1 megohm	451-252109	T1	Transformer, Power	052-000853		Bracket, Cabinet	007-000916
R2	22 ohm	451-252220	T2, 3	Transformer, IF	008-000715		Cabinet Weld Assembly	150-000059
R3, 11	56 ohm	451-252550	T4	Transformer, Audio Output	005-000424		Cable, Coax (30 ohm)	007-105313
R4	Resistor, Var., R.F. GAIN, 10K ohm	025-001941				CR1	Classic, Receiver	070-002025
R5	10K ohm	451-252103				CR2, 3	Diode, Silicon	007-000283
R6, 12	33K ohm	451-252333					Diode Cord	008-000049
R7	15K ohm, 10%; 1W	451-252152					Dial Plate	008-000542
R8, 14	1K ohm	451-252102					Dial Window (calibrated)	008-000019
							Foot, Mounting	016-012762
							Front Panel Weld Assembly	150-000509
							Knob, ANT TRIM, CAL RESET	015-001564
							Knob, FUNCTION, BAND SELECTOR	015-231358
							Knob, R.F. GAIN, AUDIO GAIN, SELECTIVITY-BFO	015-301258
							Knob, MAIN TUNING	015-001574
							ASSEMBLY	
							Lock, Line Cord	076-200397
							Potentiometer, Main Tuning	042-000449
							Pointer, Track Assembly	150-000711
							Pushy, Idle	028-200919-39
							Ring, Retaining	075-200882
							Carrier Level Meter	042-000492
							Shall, Main Tuning	074-002451
							Shield, Pilot Lamp	048-100037
							Spacer, Track	073-003025
							Spring, Dial Cord	075-000012
							Strip, Cabinet	073-200889
							Terminal Board, Antenna	048-200206
							Terminal Board, 4 contact	011-001077
							Terminal Board, Speaker	011-001076
							Track, Pointer	043-000306
							Washer, Spring	004-000428
							Crystal, Quartz	019-002720

094-902658
Pack with
094-902430