HAMMARLUND HQ-140-X Communications Receiver Instruction Manual

HAMMARLUND

HQ-140-X Communications Receiver
Instruction Manual

ERRATA
For all HQ.140.X receivers No. 299 and below the following change should be made on the schematic diagram, Fig. 7.
The Line running up from R48 is connected to the top instead of the bottom of the S4 switch.
For all HQ.140·X receivers No. 849 and below make the following change:
Resistor R35 is 820K ohms (Hammarlund Part No. 19309-103) instead of 180K ohms on the schematic diagram, Fig. 7, and in the Parts List, page 19.
For all receivers 1099 and below C25 is 4 MMF.
For all receivers No. 1494 and below make the following change:
Item C68 is a ceramic trimmer, NPO, 1.5-7 MMF, and carries part number 23059.

Fig. 1—The HQ-140-X Receiver.

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INTRODUCTION

The Hammarlund HQ-140-X is a modern, general purpose, super heterodyne communications receiver designed to maintain high perform ance characteristics for many years without adjustment. The standard cabinet model has a self-contained stabilized power supply operating from a 50-60 cps, 105-125 volt AC source.

Frequency coverage is continuously tunable from 540 Kc to 31 Mc (555 to 9.7 meters) with adequate selectivity to separate crowded signals. Full use of the receiver's high sensitivity is available for reception of even the weakest stations because of the inherently high signal-to-noise ratio and the superior Hammarlund noise limiter_ The special patented Hammarlund crystal filter provides extreme selectivity for the high attenuation of closely adjacent interfering signals.

Band spread tuning is available on the four higher frequency ranges, with direct calibration for the 80, 40, 20, 15, and 10 meter amateur bands. Calibration charts for other ranges may be easily made for use with the arbitrary band-spread logging scale.

While this receiver was designed primarily for communications use, good fidelity of music and voice reproduction in both the standard and short wave broadcast bands is provided. Power hum is negligible. Either headphones or loudspeaker may be used. Automatic volume control aids in keeping music and voice reception at the desired level. When you are interested in receiving telegraph or code signals, you will find that the HQ-140-X incorporates an unusually stable beat fre frequency oscillator. A "5" Meter enables you to obtain accurate reports on received phone signals while the Send-Receive switch and relay connec tions permit associated transmitter operation without interference.

Large, comfortable, and carefully positioned controls make the HQ140-X a truly professional-type receiver, the ideal instrument for operating in today's crowded short-wave bands.

INSTALLATION AND OPERATION

Unpack the receiver carefully. Make sure that the fuse, tubes, asso coated tube shields, and pilot lamps are in place. Tubes V4, V5, V6, V8, V9, VIO, and Vll are not shielded.

Connect the permanent magnet dynamic speaker to the two terminals marked SPEAKER on the rear of the receiver chassis. For best perform ance do not place the speaker on top of the receiver cabinet. The antenna may then be connected as described under ANTENNA.

Basically, all that is necessary to operate a radio receiver are the tuning and volume controls. The additional knots and switches found on a professional-type receiver such as the HQ-140-X control functions greatly improve operating performance.

The receiver “ON-OFF” switch is on the AUDIO GAIN control. If you are unfamiliar with the type of power availahle, check with the local power company before plugging in the receiver. Turn on the receiver by advancing the AUDIO GAIN. Check to see that the pilot lamps light and tubes warm up.

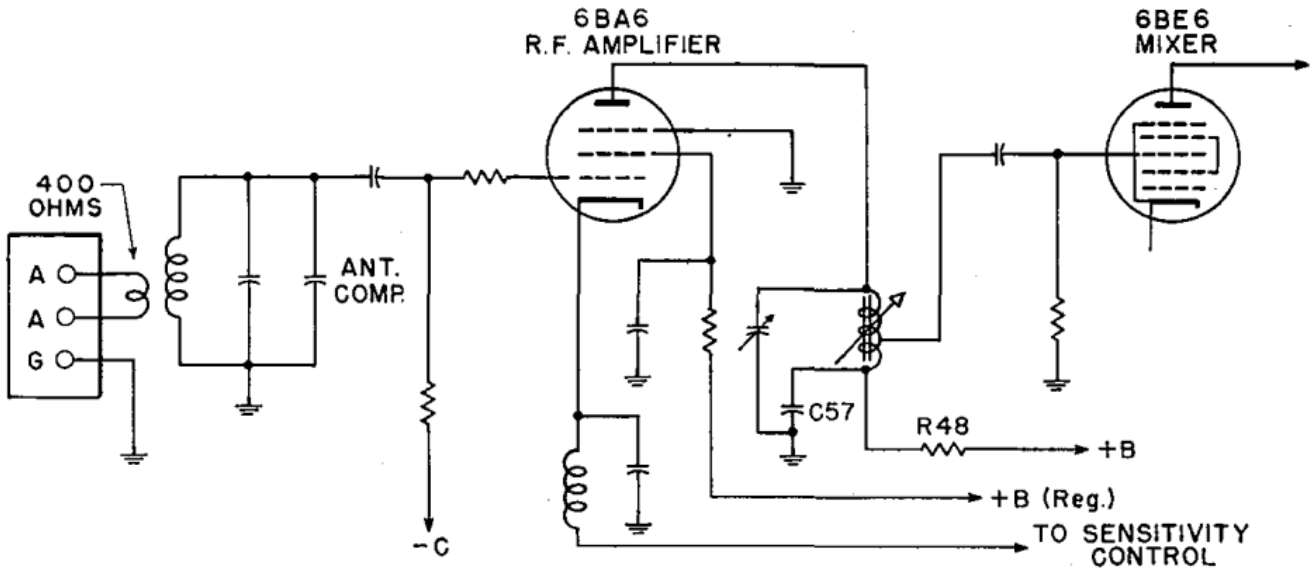


Fig. 2—Tuned RF Amplifier and Mixer.

While the tubes are heating, set the TUNING RANGE switch in the .54·1.32 position, MAN-AVC-BFO on A VC (automatic volume control), CRYSTAL SELECTIVITY on OFF, STAND BY RECEIVE on RECEIVE, and SENSITIVITY on “10”. Tune in to the broadcast stations by using the MAINTAINING dial and AUDIO GAIN control. For accurate tuning watch the “S” meter. Adjust the MAINTUNNING dial for a maximum meter reading for the station to which you are listening.

The ANTENNA compensator knob, the final adjustment, also should be set for the greatest meter deflection.

When the automatic volume control is not desired, the MAN-AVC-BFO switch can be set on MAN (Manual), the AUDIO GAIN control turned fully clockwise, and the SENSITIVITY control employed to provide the desired volume. When headphones are plugged into the jack in the lower right-hand corner of the panel, the speaker is disconnected. On the rear of the chassis are two pin jacks marked RELAY which can be connected to the send·receive relay of the transmitter for break·in operation. With the STANDBY-RECEIVE switch in STANDBY, the receiver is silent but ready for instant use.

The BFO (Beat Frequency Oscillator) control provides a wide choice of tones for CW code operation. Turning the MAN-AVC-BFO switch to BFO disconnects the automatic volume control, and the SENSITIVITY control must then be employed. It is often a great help to use the LIMITER in short wave reception.

The PHASING control normally is set at the arrow in the center of its scale but may be adjusted to cut out interference from stations on either side of the signal. With the CRYSTAL SELECTIVITY switch, the operator can choose the degree of selectivity that provides the greatest fidelity with minimum interference. The first three positions are for phone reception and the fifth and sixth are for single signal code reception in extremely crowded bands.

Set controls as follows for initial operation:

CONTROL	for PHONE	for CW or CODE
MAN·AVC·BFO	AVC	BFO
CR YSTAL SELECTIVITY	OFF	OFF
CRYSTAL PHASING	At Arrow	At Arrow
CW TONE	Inoperative	±2
STANDBY ·RECEIVE	RECEIVE	RECEIVE
LIMITER	As required	As required
ANTENNA	To Peak Signal	To Peak Signal
AUDIO GAIN	Adjust	10
SENSITIVITY	10	Adjust

TUNING RANGES

Band	Frequency	Meters Wave Length
1	.540-1.32 Mc	555 -227
2	1.32-3.2 Mc	227 -93.7
3	3.2 -5.7 Mc	93.7-52.6
4	5.7 -10 Mc	52.6-30.0
5	10 -18 Mc	30.0-16.7
6	18 -31 Mc	16.7-9.7

TUNING PROCEDURE

To tune in a standard broadcast station, it is merely necessary to tune the MAIN TUNING dial to the desired frequency. The BAND SPREAD dial is inoperative on the first two ranges.

For reception of short wave stations with the MAIN TUNING dial only, it is necessary to set the BAND SPREAD dial to 100 in order to attain a calibration accuracy of 1% or better.

The BAND SPREAD dial is calibrated directly for the 80, 40, 20, 15, and 10-meter amateur bands. To make use of this feature, set the MAIN TUNING dial at the high-frequency end of the desired amateur band.

The BAND SPREAD dial then may be tuned over the range selected. For a higher degree of accuracy, the BAND SPREAD dial may be set to the exact frequency of a known signal, and the MAIN TUNING dial care fully tuned for maximum signal. It is no longer necessary to touch the MAINTAINING dial, and the BAND SPREAD calibration will hold.

A 0-100 arbitrary logging scale is also provided for band-spread tuning of any desired ranges which are not directly calibrated. Again the MAIN TUNING dial is set at the high end of the selected range. Turning the BAND SPREAD dial from 100 to 0 tunes the receiver progressively lower in frequency.

The following table indicates the approximate frequency range covered by the BAND SPREAD dial at various settings of the MAIN TUNING dial, for each of the four higher frequency bands of the receiver.

Band	Low End	Middle	High End
3.2-5.7 Mc	0.4 Mc	0.7 Mc	1.25 Me
5.7-10 Me	0.2 Mc	0.5 Me	0.9 Me
10-18 Me	0.2 Me	0.5 Me	0.9 Me
18-31 Me	0.6 Me	1.2 Me	2.2 Me

DESIGN

Symbol	Type	Tube Complement	Function
V1	6C4	Triode	Oscillator
V2	6BA6	Remote Cutoff Pentode	RF Amplifier
V3	6BE6	Pentogrid Converter	Mixer
V4	6BA6	Remote Cutoff Pentode	1st IF Amplifier
V5	6BA6	Remote Cutoff Pentode	2nd IF Amplifier
V6	6BA6	Remote Cutoff Pentode	3rd IF Amplifier
V7	6AL5	Twin Diode	Detector, AVC; Noise Limiter
V8	12AU7	Twin Triode	1st AF Amplifier; BFO
V9	6V6GT/G	Beam Power	Audio Power Output
V10	OC3/VRI05	Voltage Regulator	Voltage Regulator
V11	5U4G	Full Wave Rectifier	Rectifier

PRE-SELECTION

The antenna input coupling and RF amplifier stage provide the necessary pre-selection and gain for high performance and rejection of unde sired signals. The high signal level at the mixer grid, V3, contributes to a favorable signal-to-noise ratio.

Bob grid and plate circuits of the RF stage are tuned; individual tuning coils are selected for each band.

The antenna compensating capacitor, adjustable from the front panel, permits the receiver to be resonated for optimum performance with the antenna in use.

CONVERTER STAGE

A high degree of oscillator stability is attained by the use of a separate mixer (6BE6), V3, and an independent oscillator (6C4), VI.

The output signal from the RF amplifier, V2, is heterodyned with the output of the local high-frequency oscillator, VI, and electronically combined within the mixer tube, V3. On the four lower frequency ranges the local oscillator is 455 Kc above the signal frequency. On the two highest ranges the oscillator is 4,55 Kc below the signal frequency. Low-loss tube sockets, ceramic band switches, temperature compen sating capacitors, zero temperature coefficient ceramic trimmers, and a bi-metallic compensating plate all contribute to oscillator stability. Additional frequency stability is attained by applying a regulated voltage to the oscillator plate and by the rugged construction

of the entire oscillator section assembly.

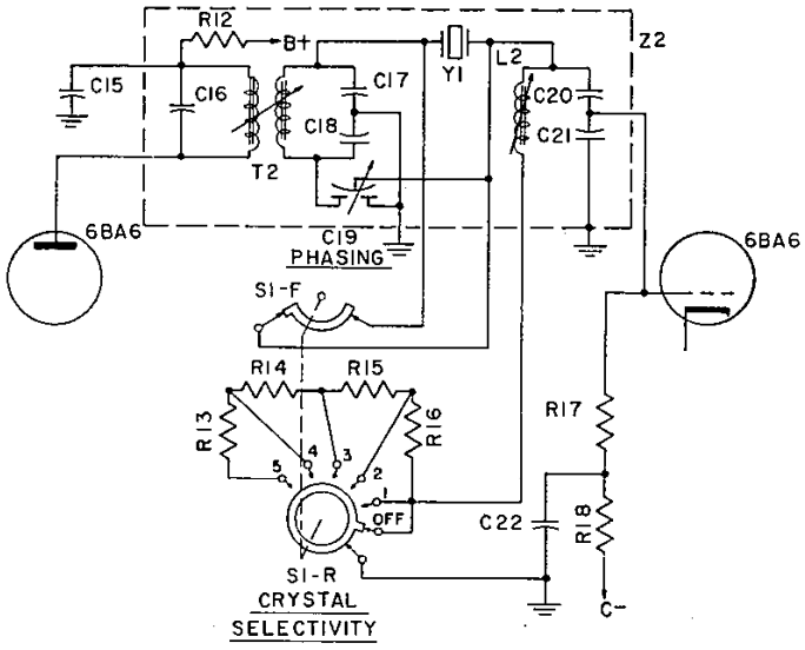


Fig. 3—Crystal Filter Circuit.

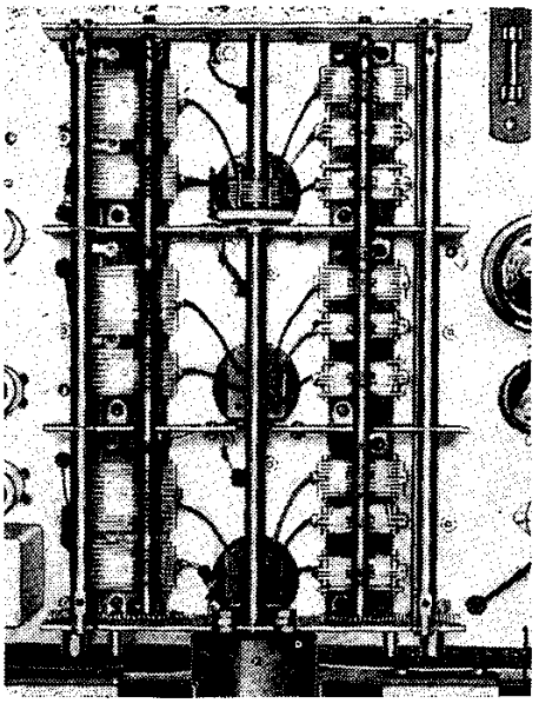


Fig. 4—H. F. Tuning Assembly.

CRYSTAL FILTER AND PHASING NETWORK

The patented Hammarlund 455 Kc crystal filter and phasing network is controlled from the HQ-140-X front panel. Its six-position SELECTIVITY switch includes an OFF position and five increasingly selective band widths.

Switch positions 1, 2, and 3 provide progressively sharper crystal selectivity for use in phone reception. Positions 4 and 5, the sharpest selectivity positions, are recommended for reliable CW or code reception.

The highest fidelity is obtained in the OFF position when the crystal filter is inoperative.

The phasing control may be set to highly attenuate interfering adjacent signals. With the experienced operating techniques, the crystal filter offers distinct advantages under severe interference conditions.

IF AMPLIFIER

Nine tuned circuits, in three stages of IF amplification (V 4, V5, and V6), contribute to sensitivity and selectivity. The gain per stage is purposely low in order to maintain stability. Iron core permeability-tuned transformers improve performance and add to the ease of adjustment.

The intermediate frequency is 455 Kc, the RTMA standard.

AVC SYSTEM

Automatic Volume Control minimizes fading and signal strength variations by controlling the gain of the RF stage V2 and the IF stages V 4 and V5. As a result, a comfortable and constant level of audio is main trained.

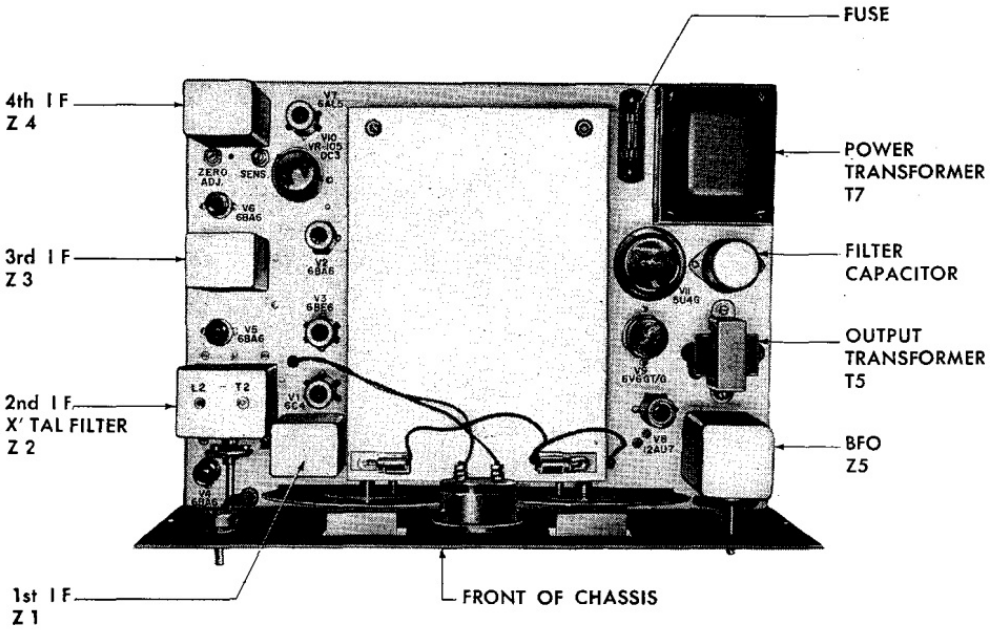


Fig. 5—Top view showing chassis layout.

The Automatic Volume Control is operative only when the MAN.
A VC-BFO switch is in the A VC position. With A VC, the greatest signal-to noise ratio will result with the SENSITIVITY control set at maximum.
It may be necessary to reduce sensitivity slightly for unusually strong signals.

"S" METER

The "S" or Tuning Meter is provided to assist in tuning and to give an indication of relative signal strength. Because the meter readings are proportional to A VC voltage, it is operative only when the MAN -A VC·
BFO switch is in the A VC position.
The meter, which is calibrated to 20 dB over S-9, is factory adjusted so that a signal input of approximately 50 microvolts gives a reading of S-9. Each "S" unit indicates a 6 dB increase, equivalent to doubling signal strength.
Should meter re-adjustment be necessary:

1. Set front panel SENSITIVITY control to "10" and CRYSTAL SELECTIVITY to "OFF".
2. With receiver off, mechanically zero pointers with a fine screw driver.

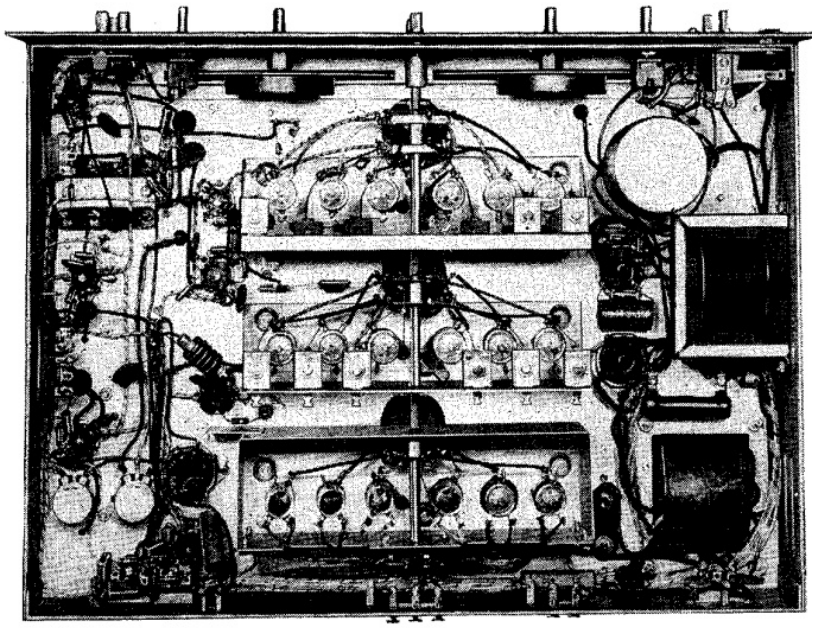


Fig. 6—Bottom view showing placement of parts.

3. With the A ve on and the 1st IF tube V 4 removed, zero pointers with ZERO ADJ potentiometer R-19.
4. With Ave on and V 4 replaced, adjust meter sensitivity with SENS potentiometer R-23.

SECOND DETECTOR AND NOISE LIMITER

One section of the 6AL5 tube V7 is used for the second detector and Avc system. This system produces a minimum of distortion.

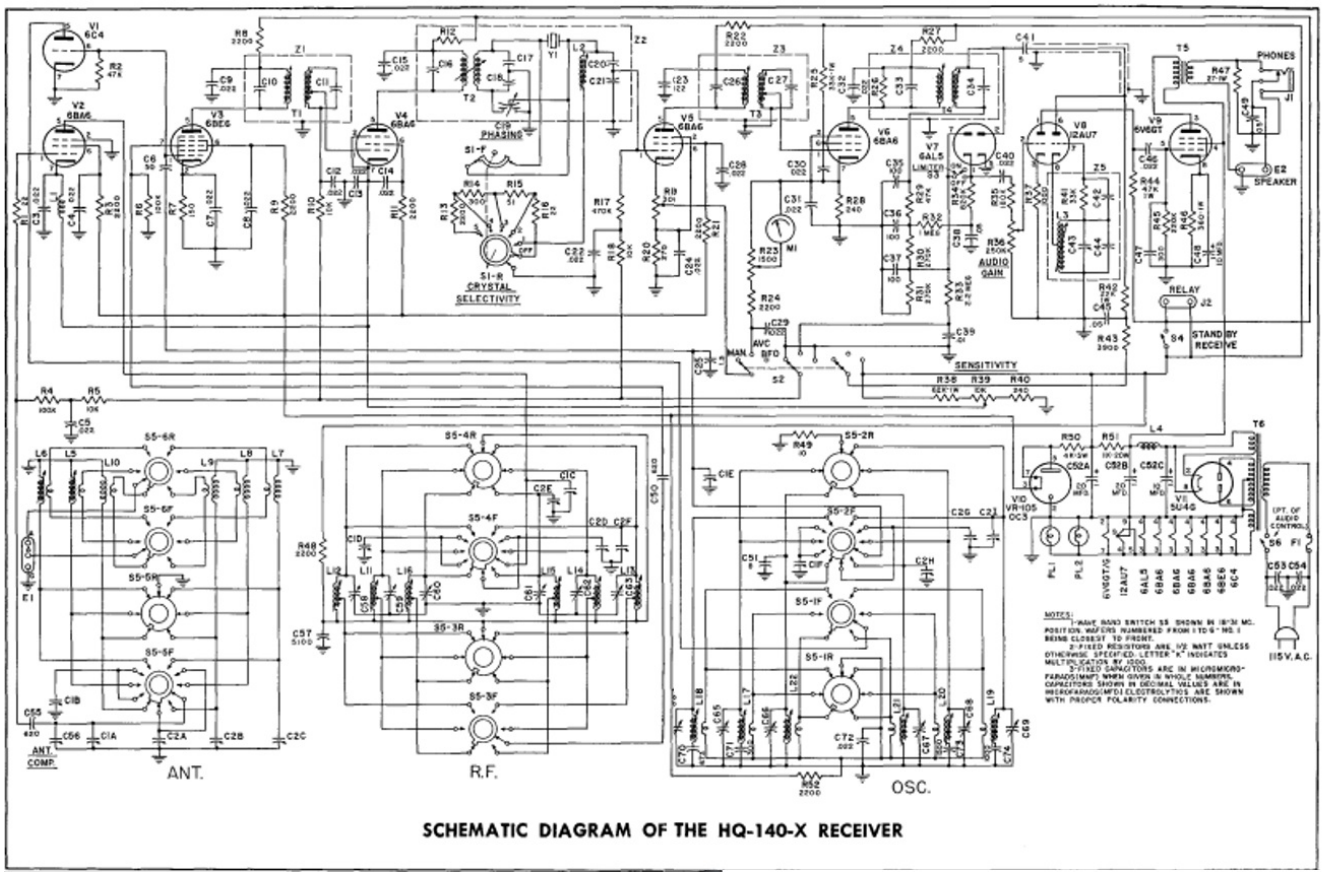
The other half of the V7 operates as a series, self-adjusting noise limiter.

It will reduce automobile ignition and other types of impulse noise to a minimum. Intelligibility is not affected by the noise limiter, although it may be switched off if desired.

BEAT FREQUENCY OSCILLATOR

The Beat Frequency Oscillator, which employs one section of the 12AU7 (V8), is designed to provide reception of new or unmodulated code signals. The new TONE control permits the selection of the desired audio tone. Each calibration division represents approximately 1000 cycles.

The BFO is only operative when the MAN -AVe-BFO switch is in the BFO position.



SCHEMATIC DIAGRAM OF THE HQ-140-X RECEIVER

AUDIO AMPLIFIER

The first audio stage is a resistance-coupled voltage amplifier using the other section of the I2AU7 (V8). In the audio output stage, a 6V6GT/G beam power amplifier (V9) provides an undistorted output of at least 2 watts.

The output transformer impedance is 6 ohms to match the voice coil of the Hammarlund or other suitable permanent magnet speaker. The phone jack is connected across the voice coil winding and silences the speaker when the phone plug is inserted.

POWER SUPPLY

The self-contained, stabilized power supply is designed with a large safety factor to ensure reliable, trouble-free operation. Humfrey perform ance is provided by a two-section filter. High voltage is supplied by the SU4G rectifier, VII. The OC3/VRIOS (VIO) furnishes regulated voltage to the variable frequency oscillator VI and the screen grid of V2, V3, V 4, and VS.

ANTENNA

The HQ-I40-X is designed for use with either a single wire or a balanced type of antenna. A good match to most antenna systems will be obtained because of the receiver's input impedance, nominally 400 ohms, and its high sensitivity.

For general coverage, an indoor wire of 20 to SO feet will give surprisingly good reception. A long single-wire outdoor antenna such as shown in Figure 8 will generally give entirely satisfactory performance. This wire may be SO to 7S feet long.

For best reception, the antenna should be isolated as much as possible from neighboring objects.

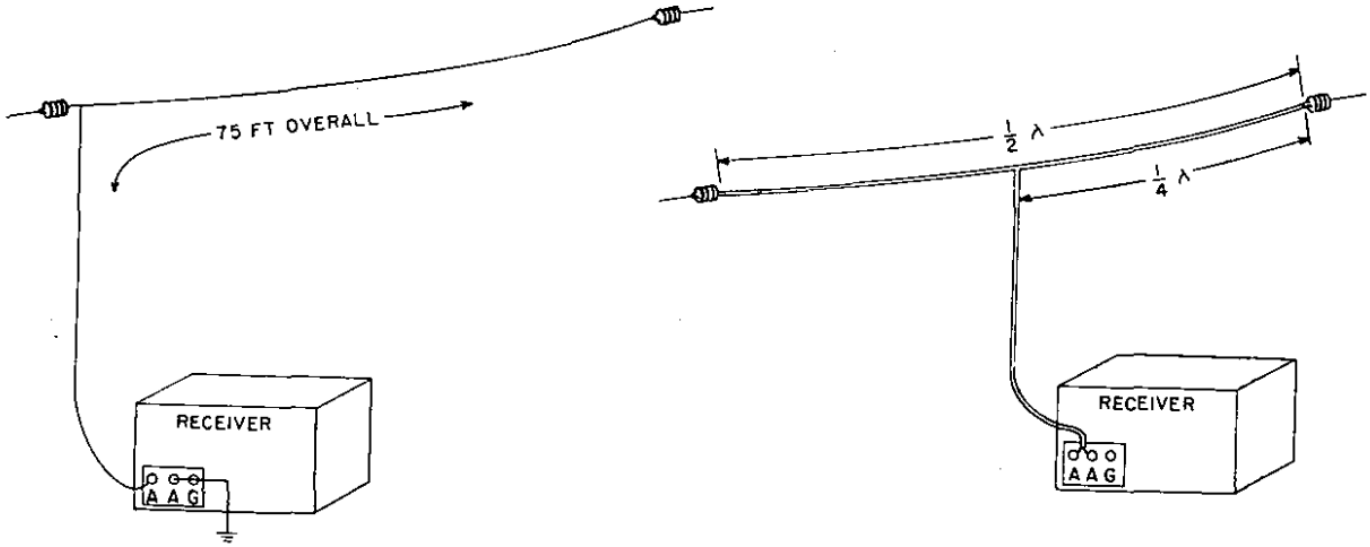


Fig. 8—Antenna suggestions.
(A) Single Wire. (B) 300 ohm folded di-pole.

Optimum performance on a particular amateur band or other narrow tuning range will be obtained by using a half-wave dipole or folded dipole fed with 300 ohm or suitable lead-in as shown in Figure 8E.
The length of the required di-pole may be calculated by the following formula:

$$\text{Length (feet)} = \frac{468}{\text{Freq. (Mc)}}$$

A good ground, although not absolutely necessary, will frequently aid in reception.

RE-ALIGNMENT PROCEDURE

A. Equipment necessary

1. Cathode-ray oscilloscope (externally synchronized by the signal generator.)
2. Frequency Modulated (swept) signal generator (fairly constant output.)
3. Output Meter.

B. IF Amplifier

The intermediate-frequency transformers are iron-core permeability-tuned and resonated with fixed silver-mica capacitors.
A high degree of stability results, which should make IF realignment unnecessary for a long time. Re-alignment should not be attempted without suitable equipment.

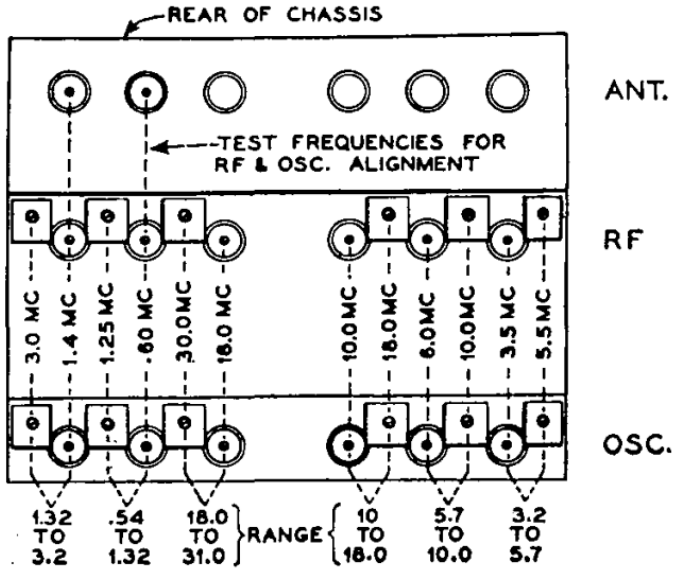


Fig. 9—Left: Diagram for tuning IF Amplifier, RF Stage and H. F. Oscillator.

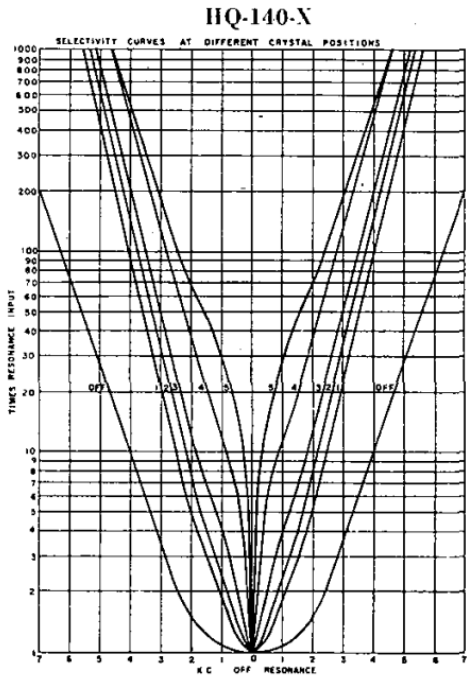


Fig. 10—Selectivity Curves.

The IF transformers must be tuned for symmetry and proper coincidence of the visible curves as well as for amplitude on the oscilloscope. This requires a stage-by-stage alignment, starting with the last IF transformer (Z4) and continuing back through the first IF transformer (ZI).

This is the procedure:

1. Set receiver as follows:

   MAIN TUNING DIAL. …….. 54 Mc

   Bandswitch (TUNING RANGE) ….. 54-1.32 Mc

   STANDBy-RECEIVE …….. RECEIVE

   LIMITER…….. OFF

   MAN -A VC-B.FO……..MAN

   CRYSTAL SELECTIVITy …….. OFF
2. With the generator set at 455 Kc apply a signal to the grid (pin No.1) of the 3rd IF tube (V6). Adjust the two indoctors of Z4 alternately to obtain maximum amplitude, symmetry, and pattern coincidence on the oscilloscope.
3. Apply the signal input lead to the grid (pin No.1) of the 2nd IF tube (V5). Turn the two adjustment screws on Z3 to obtain a symmetrical, coinciding curve with as much amplitude as possible without disturbing the pattern.
4. Switch the signal input lead to the grid (pin No.1) of the 1st IF tube (V4), and adjust the plate inductor (1’2) of the crystal filter (Z2) for maximum amplitude at center of the curve.
5. Apply the signal input to the grid (pin No.7) of the 6BE6 mixer tube (V3). Adjust screws of 1st IF transtransformer (ZI) as in (3). This should result in a tall selectivity curve with a slightly flattened peak.
6. Turn CRYSTAL SELECTIVITY switch to position No. 1, set the CRYSTALPHASING pointer on the arrow, and ad just the grid inductor (L2) of the crystal filter (Z2) for maximum amplitude and symmetry. Adjust signal input or receiver SENSITIVITY control as required to prevent L overloading.
7. Switch to CRYSTAL SELECTIVITY position No 2, and if necessary, move PHASING CONTROL slightly from an arrow to obtain identical images.

   Adjust signal generator frequency to obtain the coincidence of the images. If complete coincidence is not obtained, alternately make slight adjustments to the PHASING CONTROL and the signal generator frequency,

until images coincide.

After these last steps have determined the exact frequency of the Quartz crystal, the frequency setting of the signal generator should be left undisturbed.

8. Repeat carefully the complete IF alignment .procedure (steps 1 through 7) for the crystal frequency.

C. RF Amplifier

The RF and oscillator stages have been carefully aligned against standard crystals at the factory and are designed to hold their adjustments over a long period of time. Re-alignment should not be attempted unless it is positive that re-adjustment is necessary.

As shown in the chart, Figure 9, the front r~w of adjustments control the H. F. oscillator frequency and consequently dial calibration.

The middle row of adjustments controls RF alignment and the rear adjustments are for antenna alignment.

Here is the procedure:

1. Set controls as follows:

   Receiver

   STANDBY-RECEIVE ……. RECEIVE

   MAN -A VC-BFO ……. MAN

   CRYSTAL SELECTIVITy …….. OFF

   BAND SPREAD ……. 100

   Bandswitch (TUNING RANGE) ……. 54-1.32 Mc

   MAIN TUNING …….. 60 Mc

   Signal Generator

   Frequency. . . . . .. .60 Mc

   Modulation. . . . . .. Off

   Each band is adjusted for maximum response by changing the inductance at the low-frequency end and the capacitance at the high-frequency end. These adjustments mutually affect each other. If such change is made at one end of the band, the other end of the band must also be re-adjusted. This procedure is repeated until dial calibration coincides with frequency at both ends of the band.

   At 30 Mc there is some interaction between the RF and oscillator sections. It is, therefore, necessary to rock the MAINTAINING dial back and forth while adjusting the trimmer capacitor, in order to avoid a false setting.

2. With the signal generator connected to the receiver ANTENNA terminals and the output meter connected to the SPEAKER terminals, adjust L17 until maximum deflection is obtained on the meter.
3. Change signal generator frequency to 1.25 Mc as shown in Figure 9. Set MAINTUNING dial on 1.25 Mc to correspond. Adjust trimmer capacitor C73 to tune in signal, and C69 for maximum response.
4. Set the signal generator to 1.4 Mc, change to the 1.32-3.2 Mc Band, and set the MAINTAINING dial on 1.4 Mc. Adjust LI8 until signal appears and L12 and L6 for maximum response.
5. Change signal generator to 3 Mc, and set MAIN TUNING dial to 3 Mc to correspond. Adjust C64 to tune in signal and C58 for maximum response.

In like manner, this procedure is followed for each band and should be repeated until calibration and tracking are as desired.

MAINTENANCE

The HQ-140-X is designed to give years of trouble-free service with out the need for repairs. Tube failure is the most common source of trouble. The second most common cause of the difficulty is a component failure among

small resistors and fixed capacitors.

The following chart, Figure 11, gives voltages between tube socket terminals and chassis. Below each voltage, in parenthesis, is shown the meter scale required for checking with a voltmeter having a sensitivity of 1000 ohms per volt or better. Slight variations from voltages indicated may be disregarded.

With the aid of the chart and the schematic diagram, defective components can usually be located. The parts list in the back of this manual gives values and Hammarlund part numbers.

Standard items may be purchased locally. Non-standard components are available on order from the factory.

A delicate communications receiver should be entrusted only to a qualified technician. Should difficulty be experienced, please write the company for advice or to arrange for factory service.

LINE VOLTAGE 117 V.A.C.	SENSITIVITY AND AUDIO AT MAX., NO SIGNAL										MAN-AVC-BFO SWITCH POSITION	
	Limiter-off		Man. Position				Receive Position				AVC	BFO
	RF 6BA6	Mixer 6BE6	OSC 6C4	1st IF AMP 6BA6	2nd IF AMP 6BA6	3rd IF AMP 6BA6	Det. AVC Limiter 6AL5	Out-put 6V6GT	Recti-fier 5U4G	Volt. Reg. OC3/ VR105	1st Audio ½ 12AU7	BFO ½ 12AU7
Pin 1 to ground.....	...	...	92 (300)	...	...	...	−0.2 (12)	...	...	Tie Point 210 (300)	75 (300)	....
Pin 2 to ground.....	...	1.1 (3)	...	3.5 (6)	1.5 (3)	2.3 (3)	−0.4 (12)	...	298 (300)	...	....	....
Pin 3 to ground.....	6.2 A.C.	6.2 A.C.	6.2 A.C.	6.2 A.C.	6.2 A.C.	6.2 A.C.	6.2 A.C.	256 (300)	...	106 (300)	2.3 (3)	....
Pin 4 to ground.....	...	...	...	...	...	...	...	273 (300)	280 A.C.	...	6.2 A.C.	....
Pin 5 to ground.....	200 (300)	205 (300)	92 (300)	203 (300)	200 (300)	192 (300)	...	...	Tie Point 273 (300)	106 (300)	6.2 A.C.	....
Pin 6 to ground.....	100 (300)	92 (300)	...	100 (300)	100 (300)	110 (300)	...	Tie Point 210 (300)	280 A.C.	...	....	75 (300)
Pin 7 to ground.....	3.6 (6)	...	...	3.5 (6)	3.1 (6)	2.3 (3)	−0.2 (12)	6.2 A.C.	...	106 (300)	....	−13 (60)
Pin 8 to ground.....	...	...	...	...	...	...	...	14 (60)	298 (300)	...	....	....

PARTS LIST HQ.140.X

SCHEMATIC DESIGNATION	DESCRIPTION CAPACITORS	HAMMARLUND PAR T No_
Cl,A-F	Main Tuning, va~iable ……. (Part of 20840-Gl)	
C2, A-I	Band Spread, variable ……. (Part of 20840-G I)	
C3, 4, 5	Ceramic disc, _0221J.f W_V.D.C ……	23034·24
C6	Silver mica, 50 IJ.lJ.f 500 W.V.D.C …….	23071·5
C7, 8, 9	Ceramic disc, .022 IJ.f W.V.D.C ……	23034·24
CI0	Silver mica, 240 IJ.lJ.f 500 W.V.D.C. (Part of ZI, I.F. transformer assembly iii 26121)..	23071·56
CII	Silver mica, 260 IJ.lJ.f 500 W.V.D.C. (Part of ZI, I.F. transformer assembly iii 26121)…	23003·112
C12, 13, 14, 15	Ceramic disc, .022 IJ.f W.V.D.C …… .	23034·24
C16	Silver mica, 220 IJ.lJ.f 500 W.V.D.C. (Part of Z2, Crystal Filter Assembly iii 26125) ……	23071·55
C17, 18	Silver mica, 100 1J.[J.f 500 W.V.D.C. (Part of Z2, Crystal Filter Assembly iii 26125) ……	23003·94
C19	Crystal phasing variable, (part of Z2, Crystal Filter Assembly !il26125) ……	11776·Gl
C20	Silver mica, 270 1J.[J.f 500 W.V.D.C. (Part of Z2, Crystal Filter Assembly !il26125) ……	23003-104
C21	Silver mica, 100 1J.[J.f 500 W.V.D.C …… (Part of Z2, Crystal Filter Assembly !il26125) …..	23003·94
C22, 23,24	Ceramic disc, .022 [J.f W.V.D.C ……	23034-24
C25	Ceramic, NPO 1.5 IJ.lJ.f 500 W.V.D.C ……	23023·107 CK
C26	Silver mica, 240 ‘1J.[J.f 500 W.V.D.C. (Part of Z3, I.F. transformer assembly !il26123) …..	23071-56

SCHEMATIC DESIGNATION	DESCRIPTION CAPACITORS	HAMMARLUND PART No _
C27	Silver mica, 260 {J.{J.f SOO W.V.D.C. (Part of Z3, I.F. transformer assembly jji26123) …	23003-1]2
C28,29,30,31.32	Ceramic disc, .022 {J.{J.f W.V.D.C …….	23034-24

C33,34	Silver mica, 9S {J.{J.f SOO W.V.D.C. (Part of Z4, Final I.F. transformer assembly jji 26112)	23071-62
C3S, 36, 37	Mica, 100 {J.{J.f SOO W.V.D.C ……	23001-48
C38	Paper tubular, .OS {J.f 600 W.V.D.C ……..	23912-2
C39	Paper tubular, .01 {J.f 400 W.V.D.C ……	239]2-23
C40	Ceramic disc, .022 {J.f W.V.D.C ……	23034-24
C41	Silver mica, S {J.{J.f SOO W.V.D.C ……	23002-1
C42	Silver mica, 240 {J.{J.f SOO W.V.D.C. (Part of ZS, B.F.O. Assembly jji261OS) ……	2307] -S6
C43	B.F.O. variable, (Part of ZS, B.F.O. Assembly jji 2610S) ……..	1173S-G42
C44	Silver mica, 220 {J.{J.f SOO W.V.D.C. (Part of ZS, B.F.O. Assembly jji2610S) ……	23071-SS
C4S	Paper tubular, .OS {J.f 600 W.V.D.C ……..	23912-2
C46	Ceramic disc, .022 {J.f W.V.D.C ……	23034-24
C47	Mica, 300 {J.{J.f SOO W.V.D.C …….	23001-7S
C48	Electrolytic, 10 {J.f ISO W.V.D.C …….	23073-71
C49	Paper tubular, .OS {J.f 600 W.V.D.C ……	23912-2
CSO	Mica, 620 {J.{J.f SOO W.V.D.C. (Part of R.F. Unit Assembly jji 26131) …….	2300S-86
CSI	Ceramic, NPO 8 {J.{J.f SOO W.V.D.C. (Part of II.F. Oscillator Unit Assembly jji 26143) ….	23023-22 CH
CS2	Electrolytic, 10-S00V, 20-4S0V, 20-4S0V ……	ISS04-6]
CS3,S4	Ceramic disc, .022 [J.f ……..	23034-24
CSS	Mica, 620 [J.[J.f, SOO W.V.D.C ……..	2300S-86
CS6	Antenna Compensator, variable (Part of Main Tuning Unit jji20840-GI) ……..	SA-617
CS7	Mica, S100 [J.[J.f SOO W.V.D.C ……..	2301S-16B
CS8, S9, 60	Trimmer, mica 3-3S [J.{J.f. ……..	16089-2
C61	Trimmer, mica 1.S-9 [J.{J.£. …….	16089-1
C62	Trimmer, mica 3-3S [J.{J.f. ……	16089-2
C63	Trimmer, mica 1.S-9 {J.[J.£. …….	16089-1
C64,6S	Trimmer, mica 3-3S [J.IJ.f. ……..	16089-2

C66,67	Trimmer, ceramic NPO 1.S-7 [J.IJ.f. ……..	230S9-1
C68	Trimmer, ceramic NPO 3-12 [J.[J.f …….	230S9-2
C69	Trimmer, mica 1.S-9 [J.[J.f ……..	16089-1
C70	Silver mica 673 IJ.[J.f SOO W.V.D.C •……	23004-2
C71	Silver mica 300 IJ.IJ.f SOO W.V.D.C ……	23003-] OS
C72	Ceramic disc., .022 W.V.D.C …….	23034-24
C73	Mica, IS00 [J.{J.f SOO W.V.D.C ……	2301S-20
C74	Mica, 1000 [J.[J.f SOO W.V.D.C …….	2301S-40
FI	Fuse, 2-ampere type 3AG ……	IS928-7
JI	Phone jack ……..	6087
J2	Relay jack ……..	6142
EI	Antenna terminal strip ……	6088
E2	Speaker terminal strip. . . … ……	3843
LI	R.F. choke (CII-X) ……	609-GI
L2	COILS Crystal Filler grid coil, (Part of Z2, Crystal Filter Assembly jji2612S-GI) ..	31068-GI
L4	Filter choke …….	26111·1
LS	Antenna coil assembly .S4-1.32 mc range …….	260S1-GI
L6	Antenna Coil Assembly 1.32-3.2 mc range ……	260S1-G2
L7	Antenna Coil 3.2-S.7 mc range …….. :	6013
L8	Antenna Coil S.7-10 mc range ……..	6016

SCHEMATIC DESIGNATION	DESCRIPTION CAPACITORS	HAMMARLUND PART No_
L9	Antenna Co~l 10-18 me range ……	6019
L10	Antenna Cod 18-31 me range ……	6022
L11	R.F. Coil Assembly .54-1.32 me range ……..	26047-G2
LI2	R.F. Coil Assembly 1.32-3.2 me range ……..	26047-G1
LI3	R.F. Coil Assembly 3.2-5.7 me range ……	26047-G6
LI4	R.F. Co~l Assembly 5.7-10 me range ……	26047-G5

Ll5	R.F. Coll Assembly 10-18 me range ……. .	26047-G4
Ll6	R.F. Coil Assembly 18-31 me range …….	26047-G3
Ll7	H.F. Ose. Coil Assembly .54–1.32 me range ……	26030-G2
L18	H.F. Ose. Coil Assembly 1.32-3.2 me range …….. .	26030-Gl
Ll9	H.F. Ose. Coil Assembly 3.2-5.7 me range …… .	26030-G6
L20	H.F. Ose. Coil Assembly 5.7-10 me range ……. .	26030-G5
L21	H.F. Ose. Coil Assembly 10-18 me range ……. .	26030-G4
L22	H.F. Ose. Coil Assembly 18-31 me range ……..	26030-G3
Ml	Carrier Level (“S”) meter ……..	26149-Gl
PLl,2	Pilot Lamp No. 47, 6.3 V., .15 amp…	16004-1
RESISTORS		
Rl	22 Ohms 1/2 W ……	19309-9
R2	47,000 Ohms, 1/2 W ……..	19309-89
R3	2,200 Ohms, 1/2 W ……..	19309-57
R4	100,000 Ohms, 1/2 W ……	19309-97
R5	10,000 Ohms, 1/2 w …….	19309-73
R6	100,000 Ohms, 1/2 W ……	19309-97
R7	150 Ohms, 1/2 W ……	19309-259
R8,9	2,200 Ohms, 1/2 w …….	19309-57
RIO	10,000 Ohms, 1/2 w …….	19309·73
Rll	2,200 Ohms, 1/2 W ……..	19309-57
R12	2,200 Ohms, 1/2 W.	19309-57
R13	2,200 Ohms, 1/2 W.	19309-57
R14	300 Ohms, 1/2 w …….	19309-202
R15	51 Ohms, 1/2 w ……..,……..	19309-193
R16	22 Ohms, 1/2 w ……..	19309-9
R17	470,000 Ohms, 1/2 W …….	19309-113
R18	10,000 Ohms, 1/2 w ……..	19309-73
R19	Potentiometer, 300 Ohms ……. .	15368-1
R20	270 Ohms, 1/2 w …….	19309-262
R21,22	2,200 Ohms, 1/2 W ……..	19309-57
R23	Potentiometer, 1500 Ohms ……	15368-2

R24	2,200 Ohms, 1/2 w ……..	19309-57
R25	33,000 Ohms, 1/2 W ……..	19310-293
R26	47,000 Ohms, 1/2 W. (Part of Z4, LF. Transformer Assembly jji26113) …. .	19309-89
R27	2,200 Ohms, 1/2 W ……..	19309-57
R28	240 Ohms, 1/2 W ……	19309-201
R29	47,000 Ohms, 1/2 W ……	19309-89
R30, 31	270,000 Ohms, 1/2 W ……	19309-107
R32	1 Meg Ohms, 1/2 W …….	19309-121
R33	2.2 Meg Ohms, 1/2 W ……..	19309-129
R34	820,000 Ohms, 1/2 W ……	19309-119
R35	180,000 Ohms, 1/2 W ……..	19309-103
R36	Potentiometer 250,000 Ohms (switch attached) ……	6095
R37	1,000 Ohms, 1/2 W ……..	19309-49
R38	62,000 Ohms, 1/2 W ……..	19310-231
R39	Potentiometer, 10,000 Ohms ……..	15367-1
R40	240 Ohms, 1/2 W ……	19309-201
R41	33,000 Ohms, 1/2 W. (Part of Z5, B.F.O. Assembly jji26107) ……	19309·85

SCHEMATIC DESIGNATION	DESCRIPTION CAPACITORS	HAMMARLUND PART No_
R42	22,000 Ohms, 1 W ……..	19310-81
R43	3,900 Ohms, Yz W. (Part of B.F.O. Bracket Assembly 111 26029-G2) …..	19309-63
R44	47,000 Ohms, 1 W ……	19310-89
R45	220,000 Ohms, Yz W …….	19309-105
R46	360 Ohms, I W ……..	19310-211
R47	27 Ohms, 1 W ……	19310-11
R48	2,200 Ohms, Yz W. (Part of R.F. Unit Assembly 111 26137) …… .	19309-57
R49	10 Ohms, YzW. (Part of H.F. Osc. Assembly 11126143) …… .	19309-1
R50	4,000 Ohms, 5 W …… .	19380-47

R5I	1,000 Ohms, 20 W …….. .	19435-19
R52	2,200 Ohms, Yz W. (Part of H.F. Osc. Assembly 11126143) …… .	19309-57
SWITCHES		
SI, F, R,	Crystal Selectivity Assembly	
S2	MAN -A VC-BFO …….. .	26155-1
S3	Limiter …….. .	15864-2
S4	Standby-Receive …… .	15864-2
S5-IF, R	H.F.Osc.plate ……..	6331
S5-2F, R	H.F.Osc.grid ……..	6332
S5-3F, R	Detector grid tap …….. .	6064
S5-4F, R	R.F. plate …….. .	6063
S5-5F, R	R.F. grid …… .	6063
S5-6F, R	Antenna …….. .	6062
S6	Power …….. (Part of R36, Potentiometer 111 6095)	
TRANSFORMERS AND IMPEDANCE ASSEMBLIES		
T5	Audio Output Transformer …… .	26110-1
T6	Power Transformer …….. .	26109-1
Y	Crystal, 455 Kc …….. .	6338-1
ZI	1st I.F. Assembly, includes CIO, Cll, and Tl.. …… .	26121-Gl
Z2	Crystal Filter Assembly (2nd I.F.), includes C16, Cl7, C18, C19, C20, C21, L2, R12, T2, and Yl. .. .	26125-Gl
Z3	3rd I.F. Assembly, includes C26, C27, and T3 ……. .	26123-Gl
Z4	Final I.F. Assembly, includes C33, C34, R26, and T4 ..	26112-Gl
Z5	B.F.O. Assembly includes C42, C43, C44, L3, and R41.	26107-Gl

Documents / Resources

	HAMMARLUND HQ-140-X Communications Receiver [pdf] Instruction Manual HQ-140-X, Communications Receiver, HQ-140-X Communications Receiver, Receiver