

HX-50A
SSB-AM-CW TRANSMITTER
FOR AMATEUR USE 10 TO 80 METERS
(160 METER BAND OPTIONAL)

The HX-50A single sideband amateur band transmitter is an advanced version of the HX-50 unit. The HX-50A differs from the HX-50 as follows:

1. Hammarlund Exclusive and Unique "ZBZ" is built in as standard equipment rather than available as an option.
2. Adjustment of the calibrate signal level is provided as a front panel control.
3. The VOX circuitry has been improved providing better long term stability. In addition a CW hold-in control has been added to the rear of the chassis permitting more optimum CW-VOX as well as VOICE-VOX operation.
4. Circuitry of the final amplifier stage has been improved permitting PEP input up to 200 watts on SSB.

The following information together with the HX-50 Technical Description and Operating Instructions Manual comprises all the necessary information to operate and service the HX-50A Transmitter. Additions and/or changes are made to the manual and are referenced to page numbers and sub-paragraphs.

PAGE 12

Add Paragraph 3-16 to read as follows:

3-16 ZBZ SWITCH AND CALIBRATE LEVEL CONTROL

This control (S106/R144), another HAMMARLUND-UNIQUE feature, is located directly below the "BAND SELECTOR" switch. Operation of this control permits instantaneous, fool-proof, positive, zero-beating of the HX-50A Transmitter frequency with a received signal, without disturbing any operating controls other than the "FREQUENCY" knob.

The ZBZ SWITCH AND CALIBRATE LEVEL CONTROL is a potentiometer and a momentary push switch combined. Pushing in on the knob closes a switch which operates relay K103, placing the HX-50A in the following conditions:

1. One set of form C relay contacts (closed pair) opens the cathode return of the speech amplifier tube, thus disabling the speech and VOX amplifier circuits, thereby eliminating audio feedback.
2. The open contact on the above set shunts a capacitor from one side of the balanced modulator to ground, which reinserts carrier to become the calibrating signal. This signal is accurately set by the crystals selected for the

particular mode of operation. (i.e., upper sideband, lower sideband, AM or CW) and therefore assures that the calibrate signal will perfectly coincide with the transmitter signal regardless of mode selection.

3. A third pair of contacts decreases the cutoff bias to the RF driver stage to allow the RF level from it to leak through to the output as set by front panel control.
4. A fourth set of contacts opens the VOX trip relay coil circuit and prevents the accidental turning on of the transmitter during the period of the zero-beating operation.

NOTE: This feature may also be used when answering the telephone, talking to the XYL, etc.

LEVEL CONTROL (RED KNOB)

The level control adjusts the level of the calibrating signal and is accomplished by rotation of its respective knob. Maximum clockwise rotation is maximum level. It should be noted that the RF DRIVE control also will vary the calibrate signal level and it is therefore recommended that the transmitter be properly adjusted and ready for operation before attempting the on frequency calibration setting.

Select the received signal that you desire to adjust your transmitter to and push in on the (RED) ZBZ Switch and hold. Adjust the calibrate signal to the level that will give satisfactory beating against the incoming signal in your receiver. Rotate the frequency knob of your transmitter to zero beat. Release the switch and the transmitter is now ready to operate on the selected frequency you have just selected. It may be noted when the switch is released that momentary keying of the transmitter is made. This is a by-product of the ZBZ relay action and should cause relatively little interference because of its short duration.

NOTE: It is normal for the calibrate level control to vary the standby PA cathode current when ZBZ is actuated or when the OPERATIONS switch is set on CALIBRATE however the PA cathode current will always drop to the normal lower value when the ZBZ is de-activated or the OPERATIONS switch is set in the STANDBY or VOX positions. (When not transmitting.)

Further versatility in the HX-50A is brought about by the remote control capabilities of ZBZ. The ZBZ switch is internally connected to the terminal strip on the rear of the HX-50A so that a foot switch, knee switch or similar device may be utilized thereby leaving the operator with both hands free, normally one for the receiver and the other for the transmitter.

PAGE 14 CW TUNING

Change sub-paragraph 4-3-3 to read as follows:

Set METER switch to OUTPUT LEVEL and adjust the PA TUNING and PA LOAD

controls for maximum meter deflection. (As the final amplifier stage is tuned, it will be necessary to re-adjust the METER SENS. control to keep the pointer on scale.) Return the METER control to PA CATHODE and adjust the RF DRIVE for 225 MA PA CATHODE current, except 10 meter operation where it should read 150 MA.

Change sub-paragraph 4-3-4 to read as follows:

If necessary, re-adjust the RF DRIVE level and repeat the above tuning procedure until the PA TUNING and PA LOAD controls are set for maximum output (meter switched to OUTPUT LEVEL) while maintaining the PA cathode current at 225 MA.

In sub-paragraph 4-3-5, change RF output level at the 180 MA to read 225 MA.

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Add Paragraph 4-3-9 to read as follows:

A 1 Meg. potentiometer R153 has been installed (code 3) and is located on the rear chassis apron to facilitate accurate voltage adjustment to allow faster action of relay K101 and K102 in high speed CW operation.

Adjustment of R153 is accomplished by setting the operations switch to VOX and the function switch to CW (key open) or AM. Vary the potentiometer R153 from one end to the other or until you hear the relays close. Back off until the relay just opens. Key the transmitter and observe keying action. Minor re-adjustment of the potentiometer may still be required until proper operation is obtained.

PAGE 15 SSB TUNING

Change sub-paragraph 4-4-1 to read as follows:

Tune up the transmitter to a PA CATHODE CURRENT of 250 MA, (except on 10 meters where the limit is 200 MA), then set the METER SENS. control for 0 db reference on the OUTPUT LEVEL position.

Change sub-paragraph 4-4-3 to read as follows:

While monitoring the transmission on the OUTPUT LEVEL meter, adjust the AF LEVEL control for the required audio gain which does not produce peak flattening or overload distortion of the output signal. Note: The output meter damping factor prevents the output level meter from indicating 0 db reference on voice peaks. The meter will indicate approximately 1/2 to 3/4 full scale with voice excitation. A higher reading may cause distortion.

The transmitter should then be talked up to an indicated plate current of 150 MA. Since the meter movement indicates average current, the peak (or instantaneous) values will be approximately twice that value. As the high voltage applied to the

PA stage is in the vicinity of 700 volts, the peak envelope power input will be 200 watts.

For best performance, all single sideband transmitters should be adjusted and loaded with the aid of an oscilloscope or similar instantaneous reading instrument. When such an instrument is available, a single tone input should produce a meter reading of 150 MA, as the output tuning and loading controls are adjusted for linear performance (no flattopping).

PARTS LIST HX-50A

SCHEMATIC
DESIGNATIONHAMMARLUND
PART NO.

DESCRIPTION

CAPACITORS

C101, C130	1509-02-01023	Disc Ceramic, 100 PF $\pm 10\%$, 1000 V
C102	1515-02-05001	Electrolytic 8 MF, 350V
C103, C104, C115, C116, C129, C131, C132, C142, C144, C159, C178, C179, C180, C181, C204, C210, C214	1509-01-01024	Disc Ceramic .005 MF, $+80-20\%$, 500V
C105, C133, C170, C188, C212	1519-01-00015	Dur-Mica, DM-15 10PF, $\pm .5$ PF, 500V
C109, C110, C111, C112, C113, C114, C148, C163, C164, C165, C166, C167, C168, C169, C172, C173, C192, C203, C206, C215, C238	1509-01-01029	Disc Ceramic, .01 MF, $+80-20\%$, 500V
C117, C126	1519-01-00059	Dur-Mica, DM-15 20 PF, $\pm 5\%$, 500V
C118, C119	1519-02-00065	Dur-Mica, DM-15 56 PF, $\pm 2\%$, 500V
C120, C121	1519-02-00061	Dur-Mica, DM-15 120 PF, $\pm 2\%$, 500V
C122, C123	1519-02-03015	Dur-Mica, DM-19 400 PF, $\pm 2\%$, 500V
C124, C125	1519-02-03014	Dur-Mica, DM-19 420 PF, $\pm 2\%$, 500V
C127, C128	1509-01-01019	Disc Ceramic, .001 MFD, GMV, 500V
C134, C213, C225	1519-02-00057	Dur-Mica, DM-15 100 PF, $\pm 2\%$, 500V
C135	1519-02-00054	Dur-Mica, DM-15 240 PF, $\pm 1\%$, 500V
C136	9420-16-70002	Variable Oscillator Tuning Assembly
C137, C140, C143	1519-02-03013	Dur-Mica, DM-19 500 PF, $\pm 1\%$, 500V
C138	9434-60-20048	Variable 1.9-15.8 PF (Osc. Trim.)
C139, C221	1509-02-02003	Ceramic Dielectric Temp. Comp. 6 PF, $\pm .25$ PF N1400
C141	1519-01-00010	Dur-Mica, DM-15 20 PF, $\pm .5$ PF, 500V
C145	1528-02-02002	Mylar, .1 MF, $\pm 10\%$, 200V
C146	1509-01-01016	Disc Ceramic, .02 MF, $+80-20\%$, 500V
C147, C235, C239	1528-02-02001	Mylar, .22 MF, $\pm 10\%$, 400V
C150, C220	1519-01-00038	Dur-Mica, DM-15, 6 PF, $\pm .5$ PF, 500V
C155, C156, C157, C158	1521-01-00003	Mica Comp'r'n 1.5-20 PF
C160, C161, C185, C186, C187	1509-01-01015	Disc Ceramic, .01 MF, GMV, 1400V
C162	1517-02-00002	Electrolytic, 40-80-40
C162A	Included in C162	40 MF-450V
C162C	Included in C162	40 MF-350V
C171	1519-02-00025	Dur-Mica, DM-15, 4 PF, $\pm .5$ PF, 500V
C174, C175	1515-01-00003	Electrolytic, 90 MFD, 500V
C176, C177, C222	1515-02-05002	Electrolytic, 20 MF, 250V
C184, C211	1519-02-00062	Dur-Mica, DM-15, 320 PF, $\pm 2\%$, 500V

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CAPACITORS - CONT'D.

C189	9434-45-40001	Variable 2.3 - 15 PF
C193	1509-01-01006	Disc Ceramic, 500 PF
C199	1509-02-01027	Disc Ceramic, .005 MF, $\pm 20\%$, 1000V
C200, C202	1509-01-01028	Disc Ceramic, .005 MF, GMV, 3000V
C201	9404-11-20007	Variable (Plate Tuning)
C205	1515-02-06001	Electrolytic, 5 MF, 6V
C207	1519-02-04001	Dur-Mica, VDM-20 100 PF, $\pm 5\%$, 1000V
C208	1503-02-00001	Variable (RF Load)
C208A, C208B, C208C	Included in C208	40 - 1360 PF
C209	1519-02-04002	Dur-Mica, VDM-20, 750 PF, $\pm 5\%$, 1000V
C219	1509-01-01005	Disc Ceramic, .04 MFD, $\pm 80-20\%$, 600V
C224	1519-01-00024	Dur-Mica, DM-15, 2 PF, $\pm .5$ PF, 500V
C226	1523-02-02001	Metallized Paper, 2.0 MFD, 200V
C233	1519-01-00017	Dur-Mica, DM-15, 7 PF, $\pm .5$ PF, 500V
C234	1509-01-01025	Disc Ceramic, .002 MFD, GMV, 1000V
C236	1509-01-01031	Disc Ceramic, .0005 MFD, $\pm 20\%$, 1000V
C237	1515-01-01007	Electrolytic, 40 MFD, 350V
C241	1519-01-00006	Dur-Mica, DM-15, 10 MFD, $\pm 10\%$, 500V
ZC101	1541-02-00001	Voltage, Variable Capacitor

DIODES

CR101, CR102	4823-02-00002	Diode, Germanium (1N634)
CR104, CR105, CR109, CR110	4808-02-00001	Diode, Silicon
CR106	4805-02-00002	Diode, Silicon
CR107, CR108	4823-02-00003	Diode, Germanium (1N295)
CR111	4833-01-00004	Diode, Zener
CR112, CR113, CR114, CR115, CR116, CR117	4808-02-00001	Diode, CER73C

COILS

L101	1803-02-00109	Coil, Inductance Filter Output
L102	1802-02-00050	VFO Coil Assembly
L103	1802-02-00051	Choke, RF 2.5 MH
L104	1805-02-00058	Coil, 2nd Mixer 6.5 MC Trap
L105	1806-02-00007	Choke, RF (OSC Plate 10M)
L106	1805-02-00006	Choke, RF 2.2 UH (OSC Plate 80M)
L107	1805-02-00065	Choke, RF 2.0 UH (OSC Plate 40M)
L108	1805-02-00007	Choke, RF 1.0 UH (OSC Plate 20M)
L109	1806-02-00032	Choke, RF .56 UH (OSC Plate 15M)
L110, L111	1806-02-00014	Inductor (OSC Plate 10M)

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COILS - CONT'D.

L112	5626-02-00003	Choke, Filter
L113	1802-02-00051	Choke, RF 2.5 MH
L115	9004-03-00024	Parasitic Suppressor Assem. (Includes R181)
L116	1809-02-00009	Choke, (RF Plate)
L117	9004-03-00029	Coil, RF Tank Assem.
L119, L120	1805-02-00006	Choke, RF 2.2 UH
L121	1805-02-00059	Coil, Driver, 6.5 MC Trap
L122	1802-02-00051	Choke, RF 2.5 MH
L123	1803-01-00052	Choke, 430 UH

RESISTORS

R101	4703-01-00357	Fixed, 120K, $\pm 10\%$, 1/2W
R102, R109, R114, R121, R146, R147, R157	4703-01-00356	Fixed, 100K, $\pm 10\%$, 1/2W
R103, R110, R123, R136, R131, R161, R187, R199	4703-01-00332	Fixed, 1K, $\pm 10\%$, 1/2W
R104, R141	4703-01-00360	Fixed, 220K, $\pm 10\%$, 1/2W
R105	4703-01-00345	Fixed, 12K, $\pm 10\%$, 1/2W
R106	4735-02-01001	Variable, 1 Meg. (AF Level) 1/8W
R107	4703-01-00334	Fixed, 1.5K, $\pm 10\%$, 1/2W
R112	4735-02-01000	Variable, 10K (Carrier Bal.) 1/2W
R113, R126, R134, R162, R163	4703-01-00352	Fixed, 47K, $\pm 10\%$, 1/2W
R115	4735-02-01007	Variable, 3K, $\pm 30\%$, (RF Drive)
R116	4703-01-00331	Fixed, 820 Ω , $\pm 10\%$, 1/2W
R117, R120, R201	4703-01-00340	Fixed, 4.7K, $\pm 10\%$, 1/2W
R124, R217	4704-01-00632	Fixed, 1K, $\pm 10\%$, 1W
R125, R132, R191, R202	4703-01-00344	Fixed, 10K, $\pm 10\%$, 1/2W
R127	4713-02-00500	Fixed, 15K, $\pm 5\%$, 5W
R128	4704-01-00644	Fixed, 10K, $\pm 10\%$, 1W
R130	4703-02-00464	Fixed, 5.1K, $\pm 5\%$, 1/2W
R138	4735-02-01000	Variable, 10K (Osc. Adj.) 1/2W
R139	4735-02-01003	Variable, 1 Meg. (Vox. Sen.) 1/8W
R142	4705-01-00932	Fixed, 1K, $\pm 10\%$, 2W
R143	4735-02-01005	Variable, 10K (Bias. Adj.) 1W
R144	4735-02-01015	Variable, 10K, 1W (Part of S106)
R145, R148, R173	4703-01-00368	Fixed, 1 Meg., $\pm 10\%$, 1/2W
R149A	4735-02-18000	Variable, 5 Meg. (Vox Delay) 1/8W
R149B	Included in R149A	Variable, 10 Meg. (CW) 1/8W
R153	4735-02-01006	Variable, 1 Meg., $\pm 30\%$ (Relay Adj.), 1/4W
R155	4703-02-00523	Fixed, 1.5 Meg., $\pm 5\%$, 1/2W

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RESISTORS - CONT'D.

R158	4703-01-00339	Fixed, 3.9K, $\pm 10\%$, 1/2W
R159	4735-02-01003	Variable, 1 Meg. (Anti Trip Sen.) 1/8W
R160	4703-01-00342	Fixed, 6.8K, $\pm 10\%$, 1/2W
R164	4705-01-00913	Fixed, 27 Ω , $\pm 10\%$, 2W
R165	4714-02-01007	Fixed, 220 Ω , $\pm 10\%$, 10W
R166	4714-01-01001	Fixed, 3K, $\pm 10\%$, 10W
R168	4705-01-00930	Fixed, 680 Ω , $\pm 10\%$, 2W
R169	4704-01-00652	Fixed, 47K, $\pm 10\%$, 1W
R170, R171	4727-02-00001	Fixed, 40K, $\pm 10\%$, 5W
R172	4705-01-00942	Fixed, 6.8K, $\pm 10\%$, 2W
R174	4705-01-00928	Fixed, 470 Ω , $\pm 10\%$, 2W
R175	4705-01-00952	Fixed, 47K, $\pm 10\%$, 2W
R176	4705-01-00944	Fixed, 10K, $\pm 10\%$, 2W
R181	Included in L115	Fixed, 47 Ω , $\pm 10\%$, 1W
R182	4703-01-00320	Fixed, 100 Ω , $\pm 10\%$, 1/2W
R183	4705-02-00999	Fixed, 10 Ω , $\pm 5\%$, 2W
R184	4704-02-00900	Fixed, 4.8K, $\pm 1\%$, 1W
R185	4735-02-01004	Variable, 10K (Meter Sens.) 1/2W
R188	4704-01-00636	Fixed, 2.2K, $\pm 10\%$, 1W
R189, R216, R221	4704-01-00642	Fixed, 6.8K, $\pm 10\%$, 1W
R196, R209, R210, R211	4703-01-00364	Fixed, 470K, $\pm 10\%$, 1/2W
R200	4703-01-00355	Fixed, 82K, $\pm 10\%$, 1/2W
R205	4703-01-00347	Fixed, 18K, $\pm 10\%$, 1/2W
R206	4703-01-00328	Fixed, 470 Ω , $\pm 10\%$, 1/2W
R208	4703-01-00339	Fixed, 3.9K, $\pm 10\%$, 1/2W
R212	4703-01-00312	Fixed, 22 Ω , $\pm 10\%$, 1/2W
R213	4703-01-00331	Fixed, 820 Ω , $\pm 10\%$, 1/2W
R214	4713-01-00005	Fixed, 47K, $\pm 10\%$, 5W
R215	4703-01-00325	Fixed, 270 Ω , $\pm 10\%$, 1/2W
R218	4714-02-01013	Fixed, 12K, $\pm 10\%$, 10W
R219	4713-02-00004	Fixed, 7K, $\pm 10\%$, 5W
R220	4705-01-00944	Fixed, 10K, $\pm 10\%$, 2W
R222, R223, R224, R225, R226, R228	4703-01-00366	Fixed, 680K, $\pm 10\%$, 1/2W
R227	4714-01-01000	Fixed, 1K, $\pm 10\%$, 1W

SWITCHES

S101	5107-02-00001	Switch, Function
S102A	5105-02-00002	Switch, Wafer (1st Mixer Plate)
S102B	5105-02-00002	Switch, Wafer (2nd Mixer Grid)
S102C	5105-02-00003	Switch, Wafer (2nd Mixer Plate)
S102D	5105-02-00003	Switch, Wafer (Driver Grid)
S102E	5105-02-00002	Switch, Wafer (Crystal Osc. Grid)

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SCHEMATIC
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DESCRIPTION

SWITCHES - CONT'D.

S102F	5105-02-00001	Switch, Wafer (Crystal Osc. Grid)
S102G	5105-02-00001	Switch, Wafer (Band Ind.)
S102H	5105-02-00003	Switch, Wafer (Driver Plate)
S102J	5105-02-00003	Switch, Wafer (Final Grid)
S102L	5105-02-00006	Switch, Wafer (Final Tank)
S102M	5105-02-00004	Switch, Wafer (RF Loading)
S103	5106-02-00008	Switch, VFO Crystal
S104	5107-02-00006	Switch, (Operation)
S104A	Included in S104	Switch, (Operation)
S104B	Included in S104	Switch, (SP-ST) (On-Off)
S105	5106-02-00001	Switch, (Meter)
S106	Included in R144	Switch, (Part of R144)

TRANSFORMERS

T101	5620-02-00001	Transformer, Audio (Mod.)
T102	1814-02-00006	Transformer, Band Pass Input 3 MC
T103	1810-02-00005	Transformer, Band Pass Output 3 MC
T104	1812-02-00005	Coil, 1st Mixer 10M
T105	1812-02-00004	Coil, 1st Mixer 10M
T106	1812-02-00011	Coil, 1st Mixer 10M
T107	1812-02-00010	Coil, 1st Mixer 15M
T108	1812-02-00009	Coil, 1st Mixer 20M
T109	1812-02-00008	Coil, 1st Mixer 40M
T110	1812-02-00007	Coil, 1st Mixer 80M
T111	1812-02-00006	Coil, 2nd Mixer 10M
T112	1811-02-00009	Coil, 2nd Mixer 15M
T113	1811-02-00007	Coil, 2nd Mixer 20M
T114	1810-02-00009	Coil, 2nd Mixer 40M
T115	1810-02-00008	Coil, 2nd Mixer 80M
T116	5620-02-00002	Transformer, Audio (Ant. Trip)
T117	5603-02-00004	Transformer, Power
T118	1811-02-00005	Coil, Driver 10M
T119	1811-02-00006	Coil, Driver 15M
T120	1811-02-00008	Coil, Driver 20M
T121	1810-02-00007	Coil, Driver 40M
T122	1810-02-00006	Coil, Driver 80M
TB101	2887-02-02010	Terminal Board

TUBES

V101	5706-01-00001	Tube, Electron 6C10
V102	5720-02-00003	Tube, Electron 6EW6

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TUBES CONT'D.

V103	5710-01-00004	Tube, Electron 6AW8A
V104	5712-02-00002	Tube, Electron 6BA7
V105	5720-02-00001	Tube, Electron 6AU6
V106	5708-01-00002	Tube, Electron 6BV8
V107	5705-01-00001	Tube, Electron 12AT7
V109	5745-01-00001	Tube, Electron OA2
V110	5720-01-00004	Tube, Electron 12BY7A
V111	5722-02-00002	Tube, Electron 6DQ5

CRYSTALS

Y101	2304-02-00008	Crystal, 3038 KC, $\pm .005\%$
Y102	2304-02-00009	Crystal, 3035 KC, $\pm .005\%$
Y103	2305-02-00007	Crystal, 38.660 MC
Y104	2305-02-00006	Crystal, 38.110 MC
Y105	2305-02-00005	Crystal, 37.560 MC
Y106	2305-02-00004	Crystal, 30.535 MC
Y107	2305-02-00003	Crystal, 23.535 MC
Y108	2305-02-00002	Crystal, 16.535 MC
Y109	2305-02-00001	Crystal, 13.035 MC
ZF101	9004-03-00021	Crystal Filter Assembly

MISCELLANEOUS PARTS

F101	5134-02-00003	Fuse, SLO-BLO 3AG 3 AMP (For 50-60 cycle 115V Operation)
F101	5134-02-00001	Fuse, SLO-BLO 1 1/2 AGC (For 50-60 cycle 230V Operation)
I101	3913-02-00001	Lamp, Neon 1/25W
I102	3913-02-00002	Lamp, Neon 1/25W
I103	3913-02-00003	Lamp, Neon 1/25W
I104	3913-02-00004	Lamp, Neon 1/25W
I105	3913-02-00005	Lamp, Neon 1/25W
I106	3913-02-00006	Lamp, Neon 1/25W
I107, I108	3901-01-00001	Lamp, Incandescent No. 47
J101	2105-01-00001	Connector, Male (Mike)
J102	2106-01-00002	Connector, Female, 1 Contact
J103	2109-01-00011	Jack, Phone
J104	2106-01-00002	Connector, Female 1 Contact
J105	2111-01-00001	Connector, Receptacle
J106 thru J110	2120-02-00001	Jack, Push Fit (Test Point "A thru E")
K101, K102	4523-02-00001	Relay (2P-DT)
K103	4515-02-00001	Relay (4P-DT)
M101	2902-02-00004	Meter

PARTS LIST HX-50A

SCHEMATIC
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DESCRIPTION

MISCELLANEOUS - CONT'D.

2430-01-00082	Knob, (3/4" Dia.)
2430-01-00083	Knob, (1 1/8" Dia.)
2430-02-00084	Knob, (1 1/4" Dia.)
2430-02-00085	Knob, (1 1/2" Dia.)
2430-01-00050	Knob, Bar
2406-02-00001	Pointer
2430-02-00001	Knob, (Red) 3/4" (Qty. 2)
2430-02-00070	Knob, Modified 1/2" (Stamped 1, 2, 3, 4, 5)
9004-03-00012	Door Assembly (Left Side)
9004-03-00014	Door Assembly (Right Side)
2838-54-10120	Sems. Fastener No. 10/32X5/8" Lg.
2898-63-11005	Metal Washer 13/64 I.D.
9004-03-00003	Dial Pointer Cord Assembly
2537-01-00004	Spring, Dial Pointer
9004-03-00004	Dial Drive Cord Assembly
9004-03-00005	Cable, Band Switch Drive Assembly
2537-02-00005	Spring, Dial Drive
2537-02-00003	Spring, Band Switch

H A M M A R L U N D B U L L E T I N

In keeping with the policy of providing customers with the latest developments and improvements in design, and in order to get the latest information to you, the customer, we have prepared this bulletin.

The changes contained in this bulletin have been incorporated in your transmitter, but due to delayed delivery of material from our printers, we are not able at this time to provide you with a schematic diagram that includes these latest changes.

The changes are as follows:

1. R-213 is now 1K, $\frac{1}{2}W \pm 10\%$, Hammarlund part #4703-01-00332.
2. R-116 is now 220 Ohm, $\frac{1}{2}W \pm 10\%$, Hammarlund part #4703-01-00324.
3. R-132 has been deleted.
4. A 1.8K, $\frac{1}{2}W \pm 5\%$ Resistor has been installed between pins 1 and 7 of V105 (6AU6). Hammarlund part #4703-02-00453.
5. L-119 has been deleted.
6. C-211 has been deleted.
7. A 20K, 10W $\pm 10\%$ Resistor is in parallel with R-218. Hammarlund part #4714-02-01011.
8. CR-111 has been deleted and replaced by an OA2 tube. (Pin 7 of OA2 to ground, pins 1 and 5 to Lo B+ side of R-218.) Hammarlund part #5745-01-00001.
9. A trimmer capacitor (1.5-20 pf) has been installed from the junction of CR-101 and C-105 to ground. Hammarlund part #1521-01-00003.

FIXED FREQUENCY OPERATION

CRYSTAL FREQUENCIES

The following formula must be used for figuring the crystal frequency for the HX-50 and HX-50A Transmitters.

For operation in LSB, AM or CW:

FM - FO = FX

FM - First mixer output frequency.

FO - Desired output frequency.

FX - Crystal frequency.

For operation in USB:

FM - FO = FD, FD - FP = FX

FD - Difference frequency.

FP - Bandpass filter frequency difference. (Note: FP is obtained by subtracting the lower sideband frequency from the upper sideband frequency stamped on the bandpass filter assembly, ZF101.)

Example: In the case of operating USB on a MARS frequency:

FM	10,000 Kc/s
FO	<u>-4417.5 Kc/s</u>
FD	5582.5 Kc/s

FD	5582.5
FP	<u>- 3.086</u>
FX =	5579.414

Filter Assembly ZF101	
Where the USB is	3037.715
And the LSB is	<u>3034.629</u>
FP =	3.086

NOTE: Precise adjustment or netting the crystal frequency can be accomplished by adjusting the hetrodyne crystal trimmers for the respective band (C155 through C158).