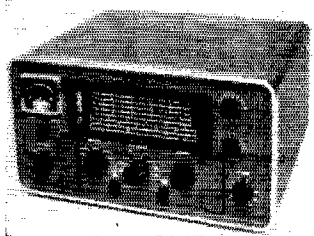


• Recent Equipment —

Hammarlund HX-50 Transmitter



THE Hammarlund HX-50 is an s.s.b., c.w., and a.m. transmitter/exciter which operates on the 80- through 10-meter amateur bands as supplied, but which can be adapted for operation on 160 meters. Coils and crystals are available from the manufacturer for operation on 160 meters.

Rated at 130-watt p.e.p. input and 90-watt d.c. input, the transmitter can be v.f.o. or crystal controlled. A five-position panel switch allows a choice of either the built-in v.f.o., an external v.f.o., or three crystal-controlled frequencies. Crystals must be supplied by the owner.

Through the use of bandpass couplers in the low-level r.f. stages, Hammarlund has limited the number of tune-up controls to a minimum. When changing frequency or bands, it is only necessary to touch up the final amplifier tuning and loading controls. Other controls are provided, of course, and seldom-used ones are hidden behind access doors on the front panel where they can be adjusted conveniently when necessary.

Weighing only 40 pounds, the equipment has its own built-in power supply. Although all of the operating features expected in an s.s.b./c.w. transmitter are included, the appearance of the HX-50 is pleasingly clean and uncluttered. The use of several multipurpose tubes, along with the filter system for generating s.s.b., probably is

responsible for this impression, at least in part.

The block diagram of the HX-50 is shown in Fig. 1. A triode section of a Compactron is used as a crystal-controlled carrier oscillator. Upper or lower sideband is selected by the use of either a 3.038- or a 3.035-Mc. crystal, which places the carrier frequency on the proper side of the sideband filter. Output from the carrier oscillator goes to the balanced modulator, which uses semiconductor diodes. The audio signal from the microphone is amplified in two triode stages, the remaining sections of the 6C10 Compactron.

On s.s.b. the balanced modulator feeds into the crystal sideband filter, where the desired sideband is passed through. Rated unwanted sideband suppression is 40 db. below the p.e.p. output.

For c.w. the modulator is automatically unbalanced and the carrier is shunted around the crystal filter. The same thing happens on a.m., except modulation is applied in the balanced modulator. This results in a double sideband with carrier signal.

In all types of transmission the signal is amplified in the 3-Mc. bandpass amplifier, V_2 , and then is heterodyned to a first i.f., which is changed for different output frequencies, in the first mixer, V_{3A} . Injection voltage is furnished by a crystal oscillator, V_{3B} . In the example shown in

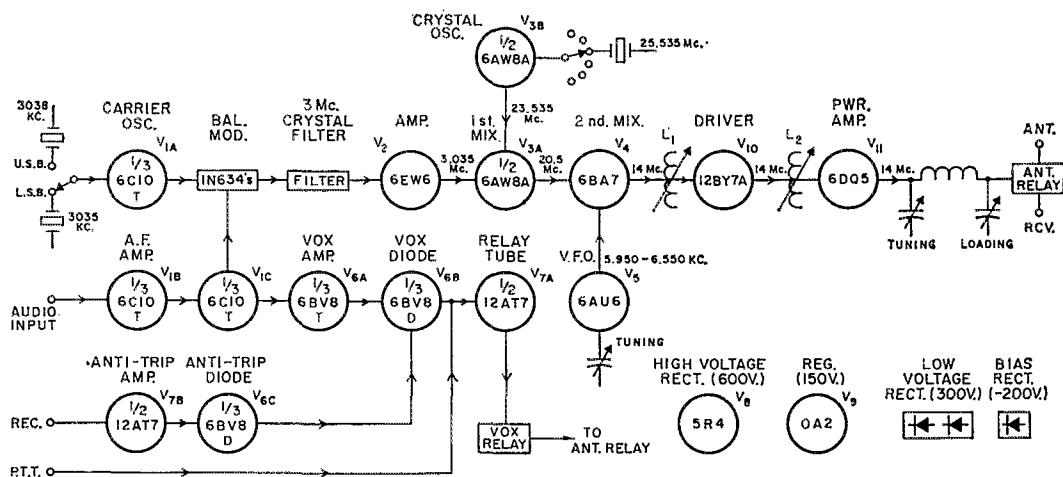


Fig. 1—Block diagram of the HX-50 transmitter. Frequencies beyond V_3 are shown for 14-Mc. output.

Fig. 1, the oscillator is operating at 23.535 Mc. to give a first-mixer output of 20.5 Mc. This signal goes immediately into the second mixer, V_4 , where it is heterodyned by the v.f.o. to the desired amateur frequency. The v.f.o. frequency range is 5.9 to 6.55 Mc. Our example in Fig. 1 puts the 20.5-Mc. signal into the 20-meter band. To maintain the proper relationship between upper and lower sideband and the dial calibrations, a small bias is applied to a capacitor diode across part of the v.f.o. tuned circuit when the FUNCTION switch is moved from LSB to USB. This automatically shifts the v.f.o. frequency the proper amount.

A jack at the rear of the HX-50 allows for connection of an external v.f.o. for transceiver use. The external v.f.o. should have a 6- to 6.5-Mc. range for amateur-band operation, and the injection voltage required is 3 volts across 50 ohms. The three crystal sockets for the crystal-controlled operation mentioned earlier are behind the right-hand panel door. Crystals must be the CR-18U type and in the 6- to 6.5-Mc. frequency range.

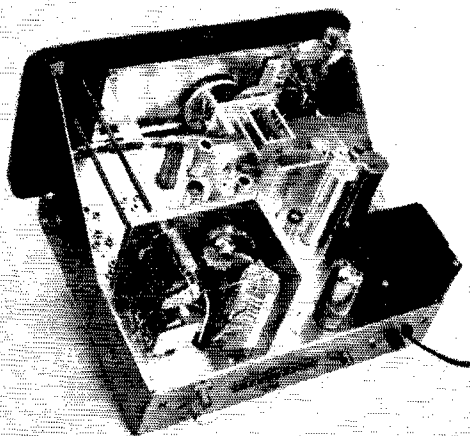
Mention should be made here of the tuning dial and band-indicator feature of the transmitter. The eight-position band switch (160, 80, 40, 20, 15, and three 10 positions) also controls five band-indicator lamps mounted beside the slide-rule dial. When the band switch is moved to a particular band, the appropriate band-indicator lamp lights up. One lamp is used for all three 10-meter-band segments. The transmitting frequency is read from the dial scale indicated by the light. Each scale is marked in 10-ke. divisions. The actual scale ranges are 1.8 to 2.3 Mc., 3.5 to 4.0 Mc., 7.0 to 7.5 Mc., 14.0 to 14.5 Mc., 21.0 to 21.5 Mc., 28.0 to 28.55 Mc., 28.55 to 29.1 Mc., and 29.1 to 29.65 Mc.

Output from the second mixer, V_4 , which is at the desired amateur-band frequency, is coupled through a broad-band circuit (L_1 in Fig. 1) to the 12BY7 driver tube, then through another broad-band coupler, L_2 , to the 6DQ5 r.f. amplifier. The bandpass couplers are overcoupled tuned circuits with resistive loading. Their use greatly simplifies tuning, since only the final-amplifier plate and loading controls need be adjusted after changing bands or frequency.

The final amplifier uses a 6DQ5 TV sweep tube with a pi-network output circuit designed for nonreactive loads of from 40 to 80 ohms. Power output is rated at 50 to 60 watts on s.s.b. and c.w. and 12 to 14 watts on a.m.

A front panel meter and meter selector switch allow monitoring either the 6DQ5 cathode current or relative power output. The meter scale is divided into two sections: 0 to 250 ma., and 50 to 0 db. The latter is for making an approximate carrier-suppression check, which is done by first tuning up on c.w. and setting the meter to full scale (with the METER SENSITIVITY control), then switching to s.s.b. With no audio input the meter will read carrier suppression in db.

The HX-50 has the usual VOX and anti-trip features, including a built-in antenna relay.

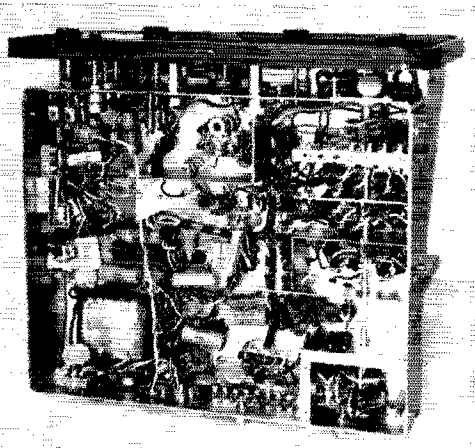


Top view of the HX-50 transmitter. The final-amplifier compartment is in the foreground and is shown with its cover cage removed. Rear apron connections are from left to right: antenna connector (SO-239) top, receiver connector (phono connector) bottom, terminal board (push-to-talk, speaker, receiver blocking bias, VOX relay contacts for external control of station functions), external v.f.o. connector below terminal board (phono connector), key jack, microphone connector, bias adjust control, fuse and line cord.

The VOX delay can be adjusted separately for c.w. work so the relays can be made to hold in between words. The first and second mixer driver and r.f. power amplifier are grid-block keyed when operating c.w. Receiver blocking bias, operated by the VOX circuits, is available at terminals at the rear of the transmitter.

In recent production models of the HX-50, the VOX circuitry has been modified in order to reduce the interaction between the audio level control and the VOX sensitivity. A VOX modification kit is available from the manufacturer for owners of earlier sets.

(Continued on page 140)



Bottom view of the HX-50 transmitter. Cover plates have been removed for the photograph.

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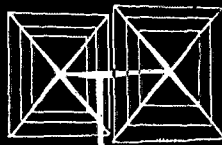
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at Chicoutimi, does well with low-power on 20-meter phone! Congratulations to Mr. & Mrs. VE2AUT on the arrival of a baby girl. VE2JC's bi-monthly magazine, *Appelle*, is a fine presentation by the French group. Traffic: VE2AGQ 116, VE2DR 82, VE2AUH 57, VE2BBB 55, VE2CP 38, VE2BAC 35, VE2AUU 29, VE2ALE 22, VE2BG 18, VE2BMS 11, VE2AQV 9, VE2AJD 4, VE2-AXK 4, VE2BMK 2.

ALBERTA—SCM, Harry Harrold, VE6TG—SEC: VE6FS, PAM: VE6PV, RM: VE6AEN, ECs: VE6-FK, VE6SS, VE6ABS, OPSs: VE6CA, VE6PV, VE6SS, VE6BA, VE6HM, OOs: VE6HM, VE6NX, VE6PL, OBS: VE6HM, ORS: VE6BR, OEBS: VE6DB, VE6HO. Our SEC reports that emergency groups are working very well with regular drills. Our RM reports that with poor band conditions PTN check-ins are low. VE6CW will report for VE8-Land. VE8JJ worked 40 zones with 108 countries. VE8-Land is doing well with emergency traffic in the far north. Yours truly had the pleasure of attending the Vulcan County Amateur Radio Clubs first big "do". Gene Moyer, club president, reported that it was a very successful evening with the SCM making the presentation of the charter. The SCM gave a very good talk on membership in the League and the benefits that can be derived, also how clubs can benefit and conducted a question period. VE6DW is now Asst. EC. Vulcan is looking for a big year in 1963. Traffic: VE6HM 218, VE6AEN 21, VE6TG 16, VE6FK 14, VE6CW 14, VE6FS 10, VE6SS 8, VE6PL 7, VE6J 7, VE6PK 6, VE6UH 5, VE6CA 4, VE6IB 4, VE6RG 4, VE6VE 3, VE6AA 3, VE6AAX 2, VE8JJ 2, VE4VX/VE8 2, VE6ABS 1, VE6CO 1.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB—The VARC reports two new amateurs, VE7BKU and VE7BKV; also VETANE and VE7BHM made Class A. VE7YG, who is a lover of fine things, paid a visit to VE7BCC and checked out his homemade single-seater aircraft and reports it is one swell job. Bill is waiting for DOT's approval to airborne it. The Nanaimo ARC is starting a club project on home-built u.h.f. equipment for fixed and mobile. New appointments for B.C. are VETSE of Kimberley, as EC, VE7BJV Hughes, as ORS. There is room for more appointees. Contact your SCM; he will be pleased to hear from you. A nice report was received from VE7BHH, Burnaby District EC. VE7OAI, our SEC, is spending time in the hospital which is the reason he is not heard. VE7ALE lost his tower in the wind and snow storm. What is happening in Prince Rupert? VE7AKG, where are you? It has been rumored that VE7AQW will be on again after four years to call south on the BCAREC Net. Also VETAUF is preparing to break the silence. The Burnaby ARC now meets at Bonsor Park in Burnaby each Friday night. Traffic: VE7BJV 210, VE7KZ 55, VE7AC 17, VE7-AAP 15, VE7AMW 4, VE7DH 3.

MANITOBA—SCM, M. S. Watson, VE4JY—The Brandon ARC publication *Sparks* has a circulation of over 150 members and associates because of the efforts of its editor, VE4KN, and president, VE4DQ. The Manitoba Phone Net has been plagued by strong c.w. signals from the U.S.A. smack on 3700 kc. during the duration of the net from 1900 to 1930 hours CST. The ARLM election of officers took place at the January meeting. VE4FO has been appointed the new EC for Manitoba. VE4IW reports making an emergency phone call for W4IAR/VE3 to Red Lake for a plane to pick up a staff girl at Poplar Hill suffering with appendix. Last reports indicate the patient is fine. VE4JW reports a visit from VE8AHO and that VE4QP has a new SX-100 receiver. VE4EG has a 50-ft. and a 30-ft. steel tower on his antenna farm. VE4AU is heard on his new Marauder. The new officers of the WARC for 1963 are WOKLP/VE4, pres.; VE4XD, vice-pres.; VE4BF, business mgr.; VE4-BU, treas.; VE4OK, secy. Traffic: VE4IW 22, VE4JY 21, VE4QD 10, VE4JW 8, VE4KL 8, VE4KN 6, VE4JA 5, VE4NW 5, VE4EG 2, VE4HF 2.

SASKATCHEWAN—SCM, Jack Robinson, VE5BL—Ex-VE5BT is now VE7BIT at Merrit. B.C. VE5FC has a new YL harmonic. VE5GX has a Ranger transmitter. VE5CB is back on the air after being absent for some time. VE5WW is now s.s.b. Traffic: VE5HP 162, VE5LM 44, VE5HQ 7, VE5IG 6, VE5HX 2.

Hammarlund HX-50 Transmitter

(Continued from page 51)

Vacuum tube and semiconductor rectifiers are used in the HX-50's power supply. Regulated voltage is applied to the oscillators to insure stability, which is rated at 500 cycles after a 15-minute warm-up.

(Continued on page 142)



it can't happen to me!

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AMERICAN CANCER SOCIETY

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1 — Packet grinding compound
2 — Plastic containers
2 — Wooden crystal blank holders
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- Kit # 2** 20 — Crystals in Misc. holders
12 — Assorted crystal blanks
Large package of Ammonium Bifluoride Flakes
Large packet of grinding compound
3 — Plastic containers
4 — Wooden crystal blank holders
Instructions **ONLY \$7.50 postpaid USA**
- Kit # 3** 35 — Crystals in Misc. holders
15 — Assorted crystal blanks
Extra large package of Ammonium Bifluoride Flakes
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2 — Plastic spoons
6 — Wooden crystal blank holders
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Crystal holders with all hardware (Any type).....	15c each
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Ammonium Bifluoride Flakes 1 lb.....	80c
Grinding Compound 1 lb.....	50c
Plastic containers.....	15c each
Crystal blank holder sticks.....	01c each

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QUAKER ELECTRONICS, MOUNTAIN TOP, PENNA.

Operating controls for the transmitter number about 15, but as mentioned earlier, after initial adjustment only a few are actually used in routine operating. A rundown of controls is as follows: The FUNCTION switch, used to select the mode of transmission, has four positions, USB, LSB, AM, and CW; the OPERATION switch with POWER OFF, STANDBY, MOX, CAL, and VOX; CRYSTAL-VFO switch (located behind the panel door); BAND SELECTOR; FREQUENCY (tuning control); METER SENSITIVITY; AUDIO LEVEL; RF DRIVE; FINAL TUNE; FINAL LOAD; VOX SENSITIVITY, VOX and CW DELAY, and ANTI-TRIP SENSITIVITY (behind panel door); and BLAS ADJUST (on rear chassis apron).

The HX-50 is housed in a dark gray perforated wrap-around cabinet which extends out slightly over the front panel. Knobs are finished in black with most of the panel control markings in white.

— E. L. C.

Hammarlund HX-50 Transmitter

Height 9 1/2 inches.
Width: 17 1/2 inches.
Depth: 9 1/2 inches.
Weight: 40 pounds.
Power requirements: 105-125 volts, 50-60 cycles, 250 watts.
Price class: \$150.
Manufacturer: Hammarlund Mfg. Co., Inc., 53 West 23rd St., New York 10, N. Y.

Checking Signal Quality

(Continued from page 38)

tape recorder makes such an excellent addition to the test gear. If you have to use other voices, try to avoid those having entirely different pitch and timbre. If a radio is the "actuator," scout around among the disk jockeys and compare the results.

Testing in this way doesn't strain finances, but when done intelligently it will give you all the information you need about your signal. If your pals on the frequency miss you for an evening, you'll be all the more welcome when you get back, provided you've cleaned up the things that may have been wrong. This, and the confidence that your transmissions will stand critical examination, should be more than ample payment for the small trouble and the time off the air.

QST

The Chartreuse Panels

(Continued from page 37)

oughta make these fellas stand right up there and solder up . . . er . . . hook up a receiver and transmitter before they let 'em take the exam even. Why, in a couple years there won't be nobody who can solder a thing . . . even wires . . . ahhh . . . coax fittings!

(Continued on page 144)