Reviewing the Heath HW-16 CW Transceiver

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If you're jaded with high power SSB operation and tired of short-range QSOs on the VHF bands, how can you put some life back into your hamming?

If you live in a tiny apartment and are putting most of your time into the intellectual pursuits on a university campus, what do you do to keep your operating hand in?

Revert to the womb, go back to the good old days, soak yourself in nostalgia and get your kicks—that's what you do.

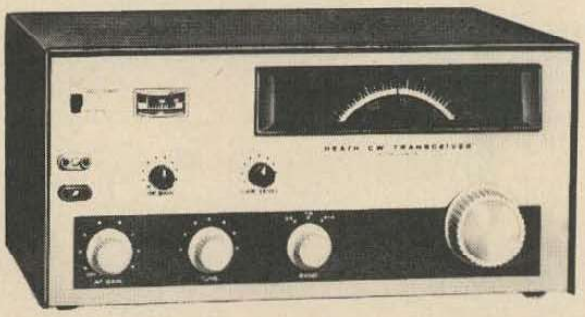
Fix yourself up with a lower power CW transmitter, a reasonably sensitive and selective receiver, an old J-38, and a handful of crystals for various spots around the CW bands. Hook it all up to a decent antenna and you can be back in the swing of it in no time at all.

There's hardly anything easier to build than a QRP CW rig. Crystals are cheap. A J-38, or similar key, is easy to come by. And modern technology permits small, inexpensive receivers with excellent sensitivity and selectivity.

So, you get all set to put together just such a rig. You reach for the parts catalog and the Heathkit wish-book falls off the shelf. By coincidence, it flips open to the pages showing equipment designed for Novice operation. You decide to take a look at some Heath circuits. Maybe you can pirate a good idea for the transmitter you hope to build.

What's this? A three-band CW transceiver? With a price tag that won't cut into next semester's tuition? You pick up the book and take a closer look at the Heathkit HW-16.

The piece turns out to be a complete, crystal-controlled transmitter and separate VFO-tuned receiver in a small, table-top package. The receiver tunes the first 250 kHz of 80, 40, and 15 meters. That means you can work 40 after classes in the afternoon; you can check into that 80 meter traffic net later in the evening; and you can start on a really challenging DXCC on 15 meters; what with the sunspots opening the band to all points on the globe.



Bandswitching is in one front-panel switch and transmitter tuning is simple. All you do is dip the final plate current reading on the front panel meter—or peak the power output reading on the meter, whichever you choose. There is a power level control on the front panel which lets you vary the screen voltage on the 6GE5 final, raising or lowering the input power of the transmitter. That way you can stay within Novice limits or boost the rig's input to over 100 watts.

There are separate af and rf gain controls on the front panel so you can operate the way you used to, running the af gain wide open and adjusting the rf gain for listening level.

To keep operation simple, the only other controls Heath has put on the front panel are the large (1¾ inch) main-tuning knob (which has that important smooth and hefty feel) and two sizes of crystal sockets.

Key jack, speaker output jack, earphones jack, antenna jack (phono type), ground connector, VFO input jack, and VFO power output socket are all on the rear chassis apron.

Inside, the rig is quite simple and straight forward.

The transmitter uses a 6CL6 as a modified Pierce crystal oscillator and buffer amplifier. The signal from that stage is amplified by the second 6CL6, the driver. The driver stage functions as a tripler to 21 MHz for 15 meter operation. The final is a 6GE5 getting 600 volts from a voltage-doubler power supply. Low-power transmitter and receiver sections receive 300 volts from the power supply. The primary of the power

transformer is protected by a circuit breaker and turned ON/OFF by a switch on the af gain control.

Grid-block keying controls the flow of cutoff bias to all three transmitter stages.

The front-panel meter measures a sample of rf output voltage at the antenna ("Rel Pwr") or final cathode current ("Plate").

Stray transmitter rf, which might tend to migrate toward the receiver sections, is kept out of the receiver's rf amplifier stage by bypassing to ground. A silicon diode, acting as an "antenna relay," is biased during transmit operation, permitting flow of current to ground only. During receive, the diode is unbiased and is effectively an open circuit at low received-signal voltages.

The pi network is used in both transmit and receive. Incoming signals follow a path through the receiver from the rf amplifier to a heterodyne mixer (with fixed-tuned heterodyne oscillator) to a VFO mixer (with manually-tuned VFO) to an *if* amplifier, an xtal-controlled product detector, and two audio amplifiers.

The manual rf gain control varies the amount of cathode bias on the rf amplifier tube (6EW6). It also controls the cathode bias to the 6EW6 *if* amplifier.

The heterodyne mixer is ½ of a 6EA8 and the heterodyne oscillator is the other half of that tube. The VFO and mixer share another 6EA8. The VFO tunes 1900 kHz to 2150 kHz. The *if* is at 3396 kHz. A 500 kHz crystal filter couples the VFO mixer output to the *if* amplifier grid(6EW6).

One-half of a 12AX7 is the bfo, crystal-controlled at 3396.4 kHz. The other half of that tube is the product detector which produces an audio signal equal to the difference in frequency between the bfo and *if* of the two input signals. The product detector output goes through the af gain control to two halves of an 6HF8, twin-stage audio amplifiers. The final audio is coupled through a transformer to either speaker or headphones (speaker connected at all times). When the 'phones are plugged in, their high impedance mutes the speaker. There is a 2N1274 bias switch for receiver muting.

So, you consider a compact, three-band, crystal-controlled, good-looking transceiver, with full break-in and built-in sidetones so you can hear your own fist in the speaker or 'phones. You send in your check and the twenty pounds of gear comes by return mail. You unlimber the trusty soldering iron and spend a few hours wiring the rig. You make typically Heathkit-simple alignments. And you hook up a 50 ohm, unbalanced antenna.

Having gone through the thick and thin of ham radio over 14 years, you need a vacation from building and testing wierd, special-purpose antennas. You have little room for anything fancy. So, you invest in a Hy-Gain 18AVQ and relax (after pounding in four eight-foot ground rods).

You dig through the recesses of your apartment-sized junkbox-in-a-suitcase. Crystals at 3625 kHz, 7007 kHz, 7025 kHz, and 7044 kHz turn up. They will hit the three bands just right. The old J-38 comes out of the junkbox. A cotton swab makes a good cleaner for the key contacts and your old Novice call where it is scratched into the wood-block base.

You hook everything together and warm up the transceiver. Firing it up on 40, you call a W8 in Toledo. He comes back with a FB signal report. You tell him he's your first with a new Heath HW-16 CW Xcvr. He says your signals are loud and clear despite strong QRM on the band. Later, you have a solid QSO with a W2 in New York and another with a W4 in Georgia, both on 80. The next morning you fire up for a quick check on 15 at mid-morning. It sounds as if the entire Communist bloc is on the air, so you plunge right in, working three countries toward that new DXCC.

One of your hang-ups is contest operating—nothing hot-shot, just leisurely. Not the little contests, but the SS, VE/W, DX, FD, and like that. You check the calendar. The VE/W contest is coming up in a couple of weeks so you make the necessary arrangements with the XYL for a free weekend.

The contest weekend arrives and you knock off about 7000 points with easy operating. You work all the Canadian geographical areas, save one. At three a.m. Sunday on 40 mtrs you connect with a 3C5/VE8 and you know the little rig is sweet.

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