

Testing the Heath GR 54

Here's an inexpensive general coverage receiver for the ham or SWL.

"Get a \$150 SWL Receiver for \$84.95," the ad read.

"Well, they'll have to show me," I thought as I sent off a check for the receiver. An ad can and often does say anything, but knowing Heath's reputation I figured I'd get more than \$85 worth anyway. After building the receiver, I've found that they're right.

The GR-54 covers 2 to 30 MHz in three bands, plus 180 to 420 kHz and the broadcast band. It contains a power transformer with a full-wave, silicon diode power supply. A tuned rf amplifier stage is used, with two *if* amplifier stages. A diode detector is used for AM detection and a separate product detector for SSB. Two diodes provide the ANL. One stage of audio amplification feeds the output stage. A built-in speaker is provided with an output connection of 8 ohms for external speaker if desired.

A number of multipurpose tubes are used, keeping the count down to six tubes. In addition, six diodes are used, plus the power supply silicon diodes. An "S" meter is used to indicate relative strength of signals. The *if* frequency is 1682 kHz.

Most unique in a receiver (not to mention one under 100 dollars), is the use of two crystals, one at 1680.1 kHz and the other at 1682.4 kHz, providing a half-lattice crystal filter! This crystal filter is placed in the secondary winding of the mixer to first *if* transformer, providing a narrow bandpass through the *if* amplifiers. By using these crystals, selectivity is 3.0 kHz at 6 dB and 7.5 kHz at 20 dB! This is quite remarkable for a low priced receiver.

Sensitivity is very good. Best sensitivity (on SSB), was on the 2.5 to 5 MHz band and was .4 μ V average, with lowest sensitivity of 4 μ V on the highest band. The relatively low sensitivity on the highest band is rather typical and expected.

I wondered how they could maintain such a high average sensitivity in a kit, with the receiver being built by quite a range of electronic talent. When I built the receiver, this became self-evident. The kit uses five separate, heavy printed circuit boards! As a matter of fact, no wiring is done on the steel chassis, except for inter-board wiring and the power supply.

Three boards are used for the front-end coils. The first one has all of the antenna coils, the second the rf amplifier plate coils and the third the oscillator coils. Even the coils are different on this receiver. They use a very strong coil form with four strong mountings. This prevents the inexperienced from finding it easy to break one of them, or burn them up with a soldering gun.

The rf, oscillator and mixer stages are located on another circuit board, with their associated parts. The last and largest board contains *if* stages, detector, product detector and audio stages. Coaxial cable is used for inter-board connections where required. Layout is good. A long shaft is used with the antenna trimmer capacitor, so that it can be located close to the rf amplifier stage. A rod antenna is used on the broadcast band, acting as antenna and also the antenna coil for that band. The antenna input impedance is a nominal 50 ohms.

Using printed circuit boards for the various coils and circuits, Heath has made alignment very easy. In addition, the coils are pre-tuned, and I do mean *pre-tuned!* I used a lab signal generator to align my kit, and not one of the coil slugs had to be turned more than half a turn. If the kit builder did not have equipment, but followed the directions given in the manual, he couldn't go wrong. (As a matter of fact, I aligned a student's GR-54 by this method and it came off fine.)

Check out of the receiver on the air came off without a hitch. Electrical bandspread is provided, and with the half-lattice filter, selectivity and tuning was very good. The low frequency band (180 to 420 kHz), was somewhat dead at this location, which is normal here. The sensitivity on this band is approximately 1.5 μ V, however. The receiver does not have a tendency to overload on strong signals and the antenna trimmer, unlike some receivers checked out here, really makes a difference.

VHF and UHF is of great interest to me, so the receiver was tried out with three different converters for 6, 2 and 1 $\frac{1}{4}$ meters, one of which was a tunable type. The receiver is excellent for shortwave listening, and generally ham work, but I think its greatest value to the Amateur is as a fixed or tunable *if* for converters. A receiver used for this purpose must have good stability, sensitivity, selectivity and what is so often lacking, a very stable BFO and product detector for SSB. The GR-54 can deliver this kind of operation, and for this purpose I found it to be great. At \$84.95, the GR-54 is a good receiver buy.

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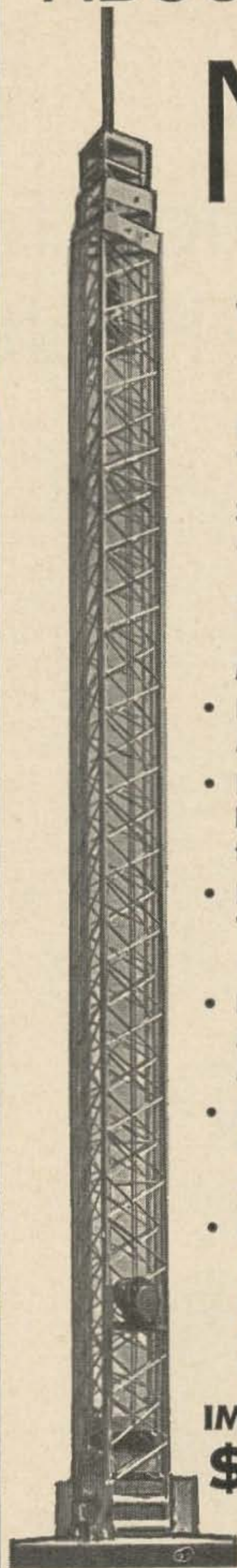
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