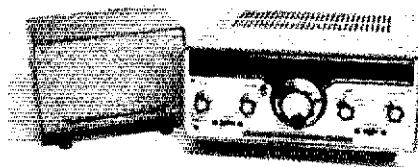


# Product Review

## The Heathkit HR-1680 Receiver

The Heath Company has a long history of supplying kits of parts for electronic equipment. One of the latest amateur products is the HR-1680, a solid-state, amateur-bands-only receiver. The attractive package somewhat resembles the Heath HW-104 transceiver in appearance, but the receiver is quite different from that in the '104. Instead of using broadband filters in the rf stage of the HR-1680, Heath engineers chose the more conventional scheme, where the tuned circuits in the receiver front end are resonated by means of a panel-mounted PRESELECTOR control. Peaking the rf stage at the exact frequency the receiver is tuned to, rather than having a wide-band filter, seems to help reduce the receiver susceptibility to interference from strong signals adjacent in frequency to the desired signal. The test unit, constructed by the reviewer and tested in the ARRL lab, performed quite well in this regard. The receiver selectivity for ssb reception is obtained in the 3.395-MHz second i-f stage, by use of a 4-pole crystal-lattice filter, rather than the packaged crystal filters used in other Heath equipment such as the SB-104, HW-104 and HW-101. Heath specifies the shape factor of the filter as approximately 2.5. Audio response is shaped for maximum speech intelligibility when the FUNCTION switch is in the WIDE position. With the FUNCTION switch placed in the NARROW position, an active filter reduces the audio bandwidth to 250 Hz, suitable for cw reception. There is no provision for a cw-bandwidth crystal filter in the second i-f stage.

The HR-1680 covers the 80- through 10-meter amateur bands in six selected ranges, each 500-kHz wide. Coverage of the 10-meter band is not complete: The receiver tunes only to 29 MHz. This could be a handicap for the amateur interested in hearing the OSCAR satellite 10-meter downlink signals in the



range of 29.4 to 29.55 MHz. Full 10-meter coverage, as well as coverage of the 160-meter band, would have been appreciated by many hams, but perhaps Heath's intended market will not miss these bands.

Even with inflation increasing at a slower rate, it must have been difficult for Heath to package this receiver for sale in the \$200 price range. Using diode switching for most functions, instead of expensive multiwafer rotary switches, incorporating a crystal filter having discrete crystals instead of a packaged filter, limiting coverage and having the builder construct the VFO, rather than including a prebuilt linear VFO, are some of the ways Heath cut the cost of the receiver. The VFO is worthy of special note, as its warm-up drift was under 75 Hz from a cold start to stabilization. This figure is impressive, since some of the more expensive receivers drift considerably more. Once stabilized, the VFO in the test unit drifted less than 20 Hz over the one-hour period during which its frequency was monitored. The VFO linearity is good.

In addition to a built-in 117- or 220-volt power supply, the receiver may be operated from a nominal 12-volt dc supply. During Hurricane Belle the reviewer was able to chart the course of the hurricane by listening to emergency nets on 75 meters while powering the receiver from an automobile battery in the shack. During periods when the reviewer's

area was without power, it was possible to continue listening. An HR-1680 owner may never appreciate this feature until it is needed, but it sure is nice to have. Those hams who enjoy going into the boondocks to operate, in areas without commercial power, need no further convincing on this point.

Overall, the reviewer has the impression that the HR-1680 packs a lot of performance inside its 12-3/4 x 6-3/4 x 12-inch volume. The noise floor of the receiver was measured at -137 dBm, blocking dynamic range was 108 dB, and IMD two-tone dynamic range was 82 dB, all measured in the ARRL lab.<sup>1</sup> When comparing these parameters with measurements made on the other receivers, one must keep in mind that previous measurements were made on receivers having either 400- or 500-Hz bandwidth i-f filters, whereas the HR-1680 has a minimum i-f selectivity of 2100 Hz. As previously stated, even with a wider i-f bandwidth the HR-1680 outperformed several more expensive receivers tested in the ARRL lab. Spurious responses were noted at several dial settings; the strongest one at 3.737 MHz was strong enough to register 30 dB over S9. Others, at 3.65 and 14.2 MHz, were barely audible when an antenna was connected to the receiver. The reviewer spent a week of evenings assembling the unit. Inexperienced builders may require more time for assembly. No problems were encountered that could be blamed on the receiver. The rf stage tended to oscillate when the receiver was operated on the 80-meter band, but when the leads connected to the PRESELECTOR capacitor were dressed according to the instructions, the problem was solved. — WAIWVK

<sup>1</sup> See Hayward, "Defining and Measuring Receiver Dynamic Range," *QST* for July 1975, for information on measuring techniques used.