

3-inch-high dial is now squished to 1 1/2 inches. It is a compromise between compactness and operating convenience.

A beginner should find the GR-78 wholly satisfactory as a basic station receiver. For a more experienced amateur it could be a good standby and general-coverage receiver to supplement the ham-band-only units most of us have these days, as well as having the convenience of completely portable operation when desired. In addition, it would be reassuring to know that in case of power outage for disaster or whatever reasons, you have an operating receiver that can go anywhere. -- W1LVQ.

### Heathkit GR-78 Receiver

Height: 4 3/4 inches for chassis, plus 1 1/2 more for antenna tip.  
Width: 11 1/2 inches.  
Depth: 9 inches.  
Weight: 10 pounds.  
Price Class: \$130.  
Manufacturer: Heath Company, Benton Harbor, MI 49022.

QST ————— QST ————— QST

## The Knight-Kit R-195 Receiver

**A**N EXAMPLE of straightforward solid-state circuit design is seen in the Knight R-195 kit receiver. This 13-transistor superheterodyne receiver employs a standard single-conversion lineup with a 455-kHz i-f. It provides coverage from 200 to 420 kHz on its lowest band, then permits continuous coverage from 550 kHz to 30 MHz on its four remaining bands.

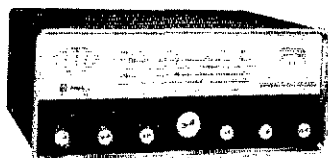
Ceramic filters are used to set the i-f bandwidth at 2.5 kHz at the 6-dB points on the i-f response curve. Though this bandwidth is suitable for ssb reception, it tends to restrict the fidelity when listening to the broadcast band. Cw reception is satisfactory at this bandwidth, and if additional cw selectivity is desired it should be a simple matter to add an outboard passive filter.<sup>1</sup>

The kit comes with complete assembly instructions, and there are no baffling procedures to follow when putting the unit together. This writer required approximately 15 hours to build the receiver. The alignment took one hour to complete.

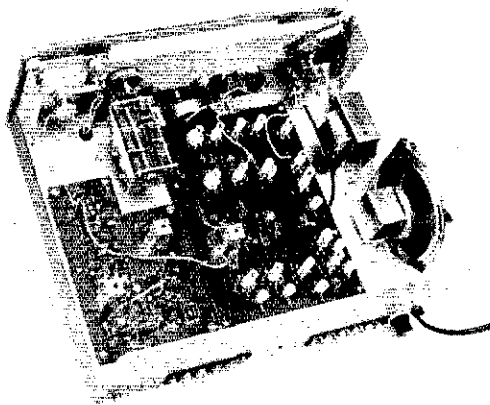
Modern circuit design is used in the front-end section of the equipment — JFETs being put to work in the rf amplifier, mixer, and local oscillator. A common-gate hookup is used in the rf stage. The source is tapped down on the input tuned circuit to assure an impedance match and reasonable selectivity. A second tuned circuit provides added selectivity. It is used in the drain of Q1, and the signal from it is coupled to the gate of the mixer, Q2, through a 0.005- $\mu$ F capacitor.

A Hartley oscillator is used at Q3. Its output is taken from the oscillator source tap and is fed to the source terminal of the mixer, across its 51,000-ohm source-bias resistor.

The ceramic i-f filters mentioned earlier are used as coupling elements between the three bipolar i-f stages. An i-f transformer couples the third i-f stage to a diode detector for a-m reception. The mode switch on the front panel selects audio output from a bipolar-transistor

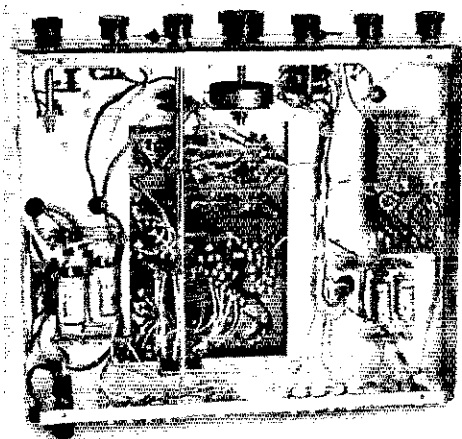


product detector during ssb or cw reception. In the ssb/cw position another section of the same switch applies operating voltage to the BFO and product detector to activate those two stages. Audio output from the detector in use is coupled to a four-stage audio amplifier which in turn operates the built-in speaker or an externally-connected pair of headphones.



This top-chassis view of the receiver shows the front-end circuit-board module extending across the center section of the chassis. The three-gang bandset capacitor is near the front panel at the left end of the chassis. Directly below it is the i-f/detector circuit board. The band-spread tuning capacitor is visible at the upper right of the photo, ahead of the power transformer.

<sup>1</sup> McCoy "A Solid-State Selectoroid," QST, May 1970.



Looking at the under side of the R-195 one can see the af circuit board at the far right (center). At the left center of the chassis are the power-supply filter capacitors and rectifier diodes. A flywheel is used on the bandset-tuning dial drive to provide speedy band scanning. It is visible at the upper center of the photo.

The internal power supply is used when operation from the 117-volt mains is desired. Alternatively, a 12-volt dc supply can be connected to the rear apron of the equipment to permit portable, mobile, or emergency use of the receiver.

Most of the small components are contained on three preassembled circuit boards. The builder installs the controls, several terminal strips, and some additional small components which are used to complete the circuits between the three modules. The remainder of the assembly work consists of soldering in the interconnecting wires and band-switch leads.

A slide-rule dial mechanism, string driven, is used for the bandset tuning. A circular dial plate, also string driven, reads out the bandspread settings. Separate tuning capacitors are employed for the two tuning functions.

#### *Tune-up and Performance*

No difficulty was experienced when aligning the receiver. The instructions were easy to follow and execute. In fact, very little peaking and aligning was necessary beyond the adjustment of the oscillator section of the receiver.

The performance specifications listed in the assembly manual are met, and the completed receiver is rugged and neat appearing. In this writer's opinion the designers might have done the operator a favor by reversing the dial functions. That is, it would be much more convenient to utilize the slide-rule dial for bandspread, thus providing an easier-to-read scale. Furthermore, in this model of the R-195 the bandspread dial is a bit spongy feeling when tuned, and introduces sufficient backlash to be somewhat annoying when tuning the three highest bands. However, good

results were had when operating the receiver on frequencies below 14 MHz.

A two-tone brown and buff finish gives the receiver a pleasing look. The cabinet is modern in appearance, and is fashioned from thick metal to assure ruggedness. — *WNILZQ*.

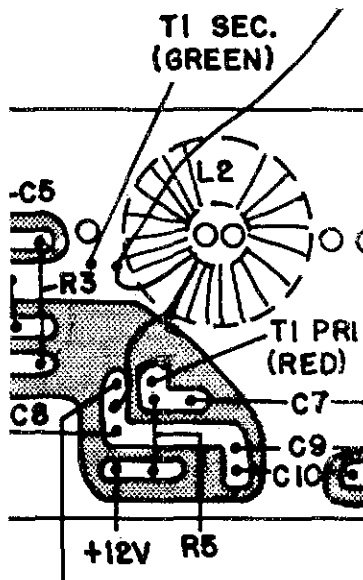
#### Knight-Kit R-195 Receiver

Height: 5 1/2 inches.  
 Width: 13 1/4 inches.  
 Depth: 11 inches.  
 Weight: 10 pounds.  
 Power: 117 volts ac or 12 volts dc.  
 Price Class: \$90.  
 Manufacturer: Allied Radio Corp., 100 N. Western Ave., Chicago, IL 60680.

## **Strays**

### Important Notice

Those who have ordered templates for the August 1970 *QST* QRP transceiver, "Once More With QRP," will find that a drafting error exists in the area of L2 and T1. L2 should not connect to the primary side of T1, but rather to the secondary winding. The corrected circuit-board pattern is shown here.



### Feedback

The schematic diagram, Fig. 1, page 48, of September 1970 *QST* incorrectly shows Q5, Q6 and Q7 as 40237s; they should be 40327s, as specified in the text.