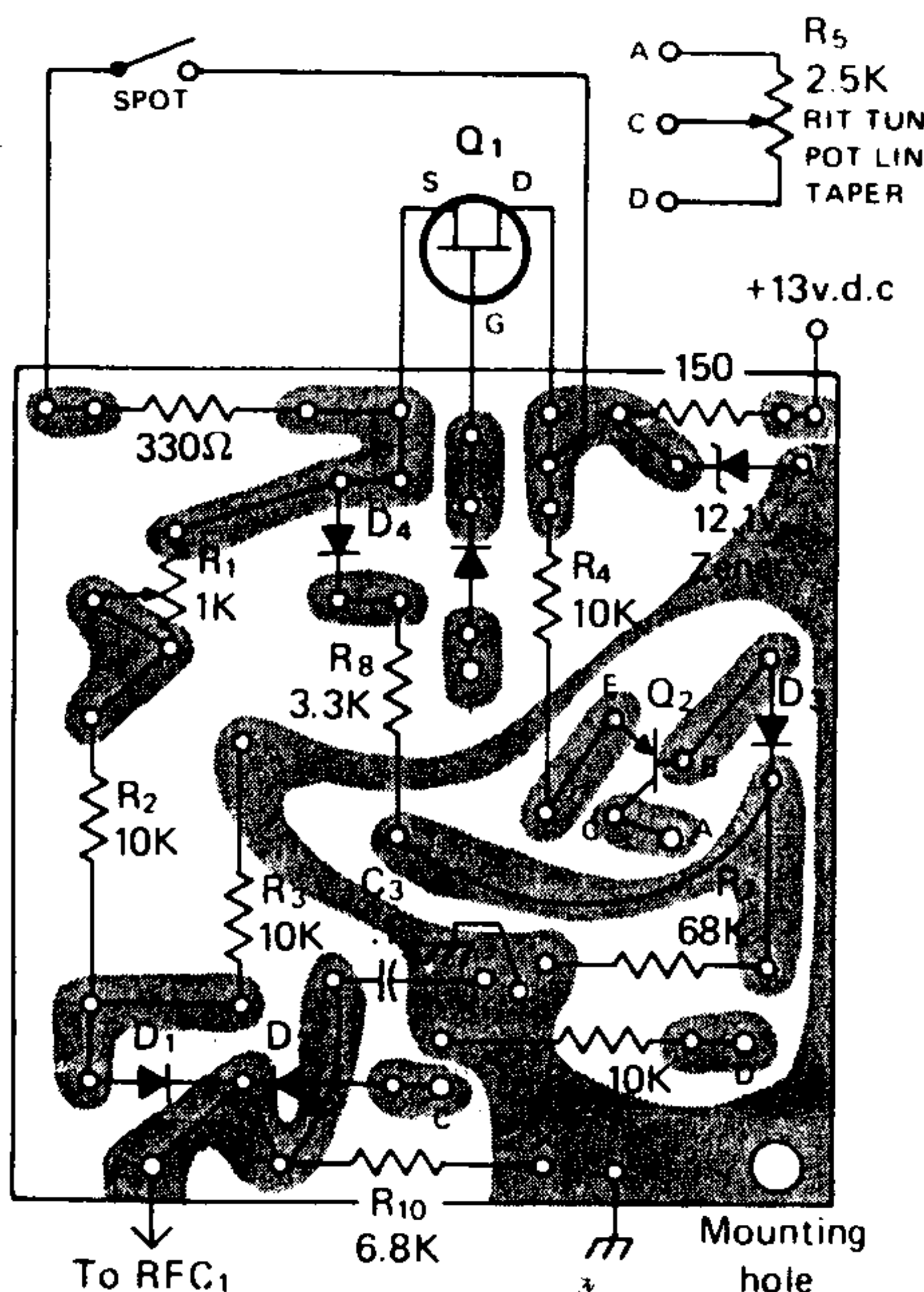


# QRP

## THE ART OF VERY LOW POWER OPERATING

### HW-8 R.I.T. P.C. Board Clarifications

The original p.c. board template published in the "Super Modified HW-8 Contest Machine" (August, October, 1977) showed only the foil connections for components, and omitted the groundfoil pattern. A corrected p.c. template appeared in May, 1978, CQ, p. 8. It is reproduced in this column, since demand for it has continued unabated since the original article appeared. Apparently hundreds of duplicates of the R.I.T. circuit have been incorporated into HW-8's with success. Since a few problems have cropped up, it might be worth mentioning them here. First off, several problems (2 instances) were traced to the use of unmarked "cheapie" transistors as Q1-Q2. Trouble-shooting indicated that the voltages given in the original article were not being achieved. This resulted from low gain (beta) of the "cheapie" devices. A standard rule here is: never use unmarked bargain-basement devices in a circuit and expect to reproduce the results achieved by quality devices. A second problem involved a board that produced the correct transmit-receive voltages and R.I.T. tuning spread control voltage, but when hooked to the tuning diode VR1, the control voltage dropped from the range of about 3.6 v.d.c. to 0.6 v.d.c. This indicated that current was being drawn somewhere in the off-board section of the circuit. Logical analysis suggested either a short somewhere in the off-board circuit, or VR1 inserted with the wrong polarity, and in effect, VR1 was functioning simply as a forward biased diode between the control voltage and ground. A third problem, although not really a problem, arose in a few cases because the original article failed to emphasize the fact that, when the R.I.T. circuit is connected into the existing HW-8 circuit, it *adds* capacitance to the v.f.o. tuning circuit, causing a +200-300 kHz frequency shift. Adding the circuit



has exactly the same effect as adding a 10 pf capacitor to the existing HW-8 tuning circuit. Since the heterodyne frequency generation system of the HW-8 is designed so that an inverse relationship exists between v.f.o. tuning values and heterodyne mixer output (i.e., more capacitance, more inductance, produces an *upward* movement of the heterodyne product frequency), the addition of the 10 pf equivalent capacitance moves the heterodyne mixer output frequency *upward* (7000-7270 kHz). Adjustment of the v.f.o. main tuning capacitor trimmer (C302) is required to bring the frequency back to dial calibration. The tuning capacitor trimmer should be adjusted for *less* capacitance (unscrewed) after insertion of the R.I.T. circuit. In most cases, lessening the trimmer capacitance will permit readjustment to proper dial calibration. However, in a few instances, it has been necessary to readjust the v.f.o. main inductance L9. L9 can be easily located at the board center, since it is mounted in a "can" shield enclosure. Here again, L9 should be *decreased* (unscrew the

slug) to produce a downward movement in frequency. Very little adjustment of L9 was necessary in cases requiring it.

Finally, as noted in the original review of the HW-8 in the May, 1977 issue of CQ, early production runs of the HW-8 used a seriously defective main tuning capacitor—in fact, several of these were so defective that they actually "fell apart" after a short period of use. There have been several reports of frequency instability and inability to achieve a proper dial calibration spread with early HW-8's. These flaws almost invariably trace to a defective main tuning capacitor (C302). If this capacitor is functioning appropriately, the HW-8 shows a very good dial calibration spread ( $\pm 3.5$  kHz), and excellent frequency stability. If you experience this problem, request a new C302 from Heath.

If you missed the original HW-8 series, they will be reprinted in the forthcoming *QRP Handbook*. I hesitate to offer to provide Xerox copies, although I've been known to do so on occasion for several bucks. Incidentally, if you desire a quick response from someone writing in a magazine with a circulation of 9,000 plus, always enclose an SASE with your inquiries.

The foregoing should clarify problems with respect to the Viking 3x5 and HW-8 modification.

#### The Viking 3x5

Someday we'll all get our act together and everything will be perfect the first time. This item which should have appeared last month between sections 2 and 3 on page 98 might be considered a lucidation on a clarification. It concerns the value of C2 in the schematic.

One further error has been discovered concerning the value of C2. In the schematic it is shown as 10 mf. The correct value is 10 pf.

73, Ade, K8EEG

\*83 Surburban Estates, Vermillion, SD 57069