which allows me to assign macros to the function keys. Defining one function key as Control-V Control-H (^V^H in *QMODEM* terminology) gives me a backspace key that works properly in PacTOR.—*Allan Schwartz, WA6EHA, San Jose, California*

CURING TRANSMIT AND RECEIVE DISTORTION IN THE HEATH HW-5400 TRANSCEIVER

◊ Ever since I built my HW-5400 in the spring of '86, it had shown high sensitivity to transmit distortion, and its receive audio seemed somewhat distorted when I listened to familiar voices. Only after several friends who know my voice well complained of the distortion did I decide to do something about it.

I investigated this problem by breadboarding the HW-5400's entire audio input circuit, up through the modulator and IF buffer (Q904), and investigating its performance with test equipment. The first stage, an op amp (U901A) behaved well, but both succeeding stages (Q902 and Q903) were prone to severe distortion and asymmetrical clipping. Changing feedback resistor R922 from 10 kΩ to 3.3 kΩ eliminated the problem while retaining adequate balanced-modulator drive.

The HW-5400's balanced modulator circuit uses a Motorola MC1496G (U902). According to Motorola data, the supply voltages at the IC's pins 6 and 9 are supposed to be equal, but are not in this application. I solved this by adding a 2.7-kΩ resistor between pin 6 of U902 and the supply rail.

Adjusting the BFO level according to the Heath manual set the modulator's SSB-mode carrier input well below the level recommended by Motorola. Increasing C921 to 0.1 µF brought the level up to approximately the value Motorola recommends for maximum carrier suppression.

The HW-5400's product detector also uses an MC1496G (U904), which also operated with unequal supply voltages in the unmodified Heath design. As in the balanced modulator, I equalized the voltages by adding a 2.7-kΩ resistor between pin 6 of U904 and the supply rail.

Testing now revealed that the HW-5400's transmit audio was acceptably distortion-free across the radio's transmit-audio passband, which measured 525 to 2650 Hz. Even audio inputs 25% greater than normal voice peaks produced no distortion. I made these tests at several power levels up to the HW-5400's maximum of 100 W. The radio's receive audio is now similarly free from distortion, and I enjoy listening to it.

Owners of HW-5400s with these distortion problems can easily correct them and be told, as I have been, "You sound great!"—*Ken Pierpont, KF4OW, Yorktown, Virginia*

HOW TO REMOVE CONNECTOR SEALANT FROM COAXIAL HARDWARE

◊ After several antenna experiments, I accumulated a pile of used coaxial hardware covered with connector sealant. The sticky black residue made reuse problematic, but I was reluctant to discard the connectors, especially since some were silver plated. Here's how I restore them to like-new condition.

First, use a pocketknife or similar tool to remove as much of the old sealant as you can. Then, place the connectors in a jar of turpentine and allow them to soak for about 10 minutes. This softens the sealant and allows you to remove the rest of it rather easily with a paper towel. (Take the appropriate handling precautions when working with turpentine.) If all of the material does not come off at once, repeat this process until satisfied. You can reclose the jar of used turpentine and keep it for future use. The dissolved sealant will settle out and fall to the bottom.

After the turpentine treatment, a quick bath in warm water and detergent should make your connectors sparkle like new if they were not badly weathered to begin with. You can then remove any cable remains with your soldering iron.—*Edgar Reihl, WA9ULU, Northbrook, Illinois*

MODIFIED GROUNDING CURES RF FEEDBACK IN A GM MOBILE

◊ In December 1991 and January 1992, *QST* carried a two-part article on mobile installations.[2] After sending for the GM bulletin mentioned in the article, I followed the instructions for a TS-440S in my 1989 Oldsmobile 98, using fuses in both positive and negative leads. I used RG-8 as the power cable[3] from the battery and routed it around the front of the vehicle on the driver's side and through the firewall. Contrary to the GM instructions, I found that passenger-compartment grounding in the passenger compartment was *necessary*. With my Hustler mobile antenna, the passenger's compartment was full of RF, and the TS-440S tended to oscillate, every time I spoke into the mike on 15 m. Grounding to the frame from the bolt and wing nut on the rear of the transceiver cured the problem.

I connected the power cable to the battery bolts using a small stainless-steel hose clamp rather than the Delco clamp GM recommends. It works fine.—*William A. Melanson, W1LID, Phoenix, Arizona*

LOWER MONITOR-MODE CURRENT DRAIN FOR THE CMOS SUPER KEYER II

◊ For me—I am a CW fan—the most important circuit in the 1992 *ARRL Handbook* was the CMOS Super Keyer II.[4] I have built a lot of "electronic bugs" since I was licensed in 1949 and, in my opinion, the Super Keyer II is not only up to date, it's the best development I can imagine. Its high current consumption (40 mA) in the Monitor mode disappointed me, however. Yes, I could switch off monitoring while transmitting and use my transmitter's sidetone instead, but the monitor is necessary when using the keyer's Function and Inquiry commands, and when changing memory contents in preparation for a new contest.

Speaker driver Q2 (2N2222) and the low-impedance speaker account for this high current drain. To reduce the current to only 9.8 mA (at 5 V), I use a 200-Ω telephone earpiece unit, which is small (47 mm) and cheap. I replaced the 2N2222 at Q2 with a BC517 Darlington transistor. (If you cannot find a BC517 in the States, you may use any other small-signal NPN Darlington transistor [an MPSA13 or MPSA14, for example].) The Darlington matches the 200-Ω speaker well, so the monitor volume is agreeable loud.

The modification reduces current drain in the Monitor mode to one-quarter of its original value, considerably extending the life of the keyer's batteries.

Last, but not least, my honest respect to KC0Q and N0II for their excellent CMOS Super Keyer II!—*Adolf Vogel, DL3SZ, Ansbach, Germany*

TIPS ON INSTALLING AND CONNECTING TO GROUND RODS

◊ Driving a ground rod 8 feet into the ground with a sledgehammer batters the rod end into an ugly flare. Some types of ground clamps can't open far enough to slip over the enlarged rod. Of course, you can file, grind or saw off the flared end, but doing all of these things at ground level can be difficult.

Alternatively, you could slip the clamp over the rod before driving it into the ground; or use a clamp that opens far enough to pass over the flare. In the case of ½-inch ground rods, however, clamps wide enough to pass the flare may not tighten adequately.

After considering these problems, I attached my shack ground wire to a ½-inch ground rod as follows. I drilled a tap-size hole, about ¾ inch deep, into the rod top. I tapped this hole for a ¼-inch, standard thread. Driving in a hex-head bolt permitted firm attachment of the wire to the rod end.

Although I did this by drilling only one hole, drilling a pilot hole—say, about ⅛ inch in diameter—*before* driving in the rod would assist. Doing so would allow you to put the rod in a vise for stability and accurate drilling. Your sledgehammer may obliterate this hole, but you should be able to relocate it by probing with a center punch.

In any such drilling and thread cutting, use a sharp drill and lubricate it and your tap often while cutting. One more tip: If you have a welder friend, consider having him or her weld a ¼-inch bolt to the ground-rod top—after you've driven it in—to provide a stud for connections.—*A. W. Edwards, K5CN, Corpus Christi, Texas*

[2] S. Ford, "Going Mobile," Part 1, *QST*, Dec 1991, pp 22-25; Part 2, Jan 1992, pp 53-55.

[3] Different "RG-8" cables vary considerably in center-conductor size—#9.5 to #16 in one listing I've seen. They therefore vary so widely in current-carrying capability that some "RG-8" cable may be unsuitable for powering a 12-V, 100-W transceiver without heating and/or significant voltage drop on power peaks. See cable catalogs and *The ARRL Handbook's* copper wire table for more information.—*Ed.*

[4] J. Russell and B. Southard, "The CMOS Super Keyer II," *QST*, Nov 1990, pp 18-21.