

Six jumpers plus  
60 minutes equals:

- eight additional memories
- 10-Hz readout
- scanning
- full transmit coverage

## modifying the Trio-Kenwood TS-930S

**Kenwood's TS-930S transceiver** includes a number of unadvertised capabilities. This article describes four of them that can be enabled by making just four simple modifications. These modifications require no additional parts except for one solder lug and about 3 feet (0.9 meter) of No. 18 (or smaller) insulated wire. They can be completed within an hour after removing the 930's covers.

I'll describe the modifications first, then explain how to install them.

### four simple mods

- **Mod 1: eight additional memories.** Adding one jumper results in each VFO (A and B) having 8 memories, creating a total of 16.
- **Mod 2: 10 Hz readout.** Ever notice the unused seven-segment LED on the left end of the frequency display? One jumper makes it usable by shifting the frequency display one digit to the left, resulting in 10 Hz resolution of the displayed frequency.
- **Mod 3: Scanning.** Add one jumper and the 930 will scan through the 8 frequencies stored in either of the VFO A or B memories.
- **Mod 4: Full coverage on transmit.** Add three jumpers and the 930 is ready to transmit on WARC, MARS, and the remainder of the *nonamateur* frequencies in the 1.5–30 MHz range.

### getting ready

As with all modification articles, please read this article several times before you heat up the soldering iron.

Doing so may well save you headaches later when you apply power to the set.

After disconnecting everything from your 930, remove the top and bottom covers (16 screws) and place the rig top side up, facing you, on a cushioned surface. Each of the modifications requires access to the digital-unit board, which is hidden under the speaker and VOX control assembly, which can be removed by removing the four screws that hold it to the main chassis of the 930. Lift the assembly upward slightly and disconnect the small 2-conductor plug (with the red and white wires) from the digital-unit board. Disconnect the speaker leads (remember their polarity) and the other two connectors that plug into the small board directly beneath the VOX controls. Set the assembly aside.

Two of the mods require access to the back of the front panel. This is easily accomplished thanks to the cabinet's sensible design. On each side of the 930 you'll find the front panel mounting brackets. There are two flathead screws and one roundhead screw in each bracket. Refer to **fig. 1** for their locations. Move the 930 toward the front of your work table so that a few inches of the rig hangs over the edge. The panel will tilt forward after (1) removal of the two flathead screws from each bracket and (2) careful loosening — *not removal* — of the roundhead screws. The panel may tilt on its own, so keep one hand on it while you

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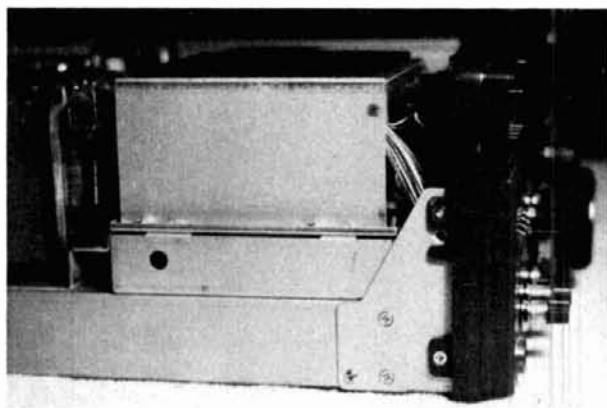


fig. 1. Front panel mounting bracket screws.

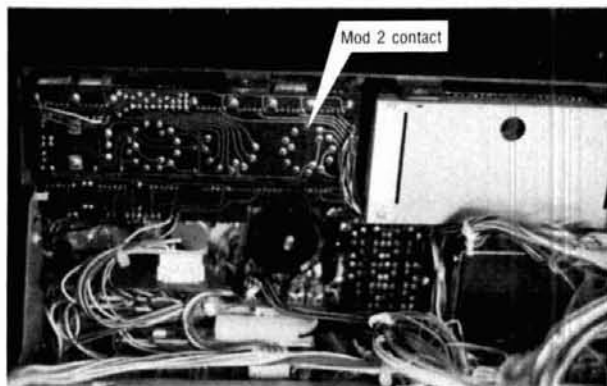


fig 2. Contact for mod 2 is at 12 o'clock position.

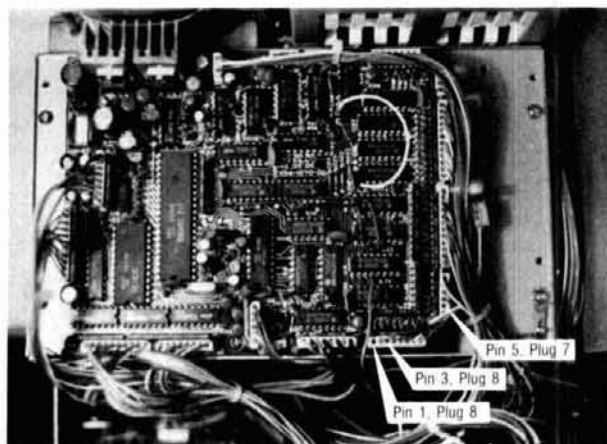


fig. 3. Connections for mods 1, 2, and 3 on digital unit board.

loosen the roundhead screws. Tilt the panel down about 60 degrees and retighten the roundheads. This will help to maintain the tilt of the panel and will prevent straining the multitude of wires connected to it.

## mod installations

**Mod 1 (8 additional memories)** requires a jum-

per from pin 5, plug 7 on the digital-unit board to ground through a switch. The function switch (VFO A, VFO B, etc.) has an empty contact to ground when it is placed in the VFO B position. **Figure 2** shows the location of the switch contact on the back of the switch's circuit board. Check continuity to ground through this contact to verify that you have the right one. Remember to place the switch in the VFO B position for this check. Solder one end of the jumper to this contact. The other end of the jumper needs to be bent into a small hairpin loop and fitted into the empty hole for pin 5, plug 7. (See **fig. 3** for the location of plug 7.) My 930 is seldom moved, so I don't worry about the jumper possibly pulling out of the hole. You'll need to experiment a bit with the size and shape of the hairpin to achieve a snug fit.

When finished, power up the 930 and program a few frequencies into the VFO A memories as you normally would. Then select VFO B and program a few more frequencies. Recall the memories, switching between VFO A and B. You'll notice that you now have the capability of 16 memories. If not, go back and check your jumper.

**Mod 2 (10-Hz readout)** requires installation of a jumper from pin 1, plug 8 on the digital-unit board to ground. (See **fig. 3** for the location of plug 8.) I used the hairpin trick again to connect the plug end of the jumper. A solder lug is connected to the other end, which can then be connected to any convenient screw in the chassis. I used one of the speaker/VOX assembly holddown screws. Test the mod by powering up the rig.

**Mod 3 (scanning)** requires a jumper from pin 3, plug 8 on the digital-unit board to ground through a switch. Use the hairpin method to connect the jumper to the plug. The other end of the jumper connects to the panel light DIM switch, which has an extra contact to ground when it's in the DIM position. (**Figure 4A** shows the location of this contact, with **Figure 4B** showing this in greater detail. Again, check continuity to ground with the switch in the DIM position to verify that you have the correct contact. When you've finished this modification, power up again, load up the memories, select VFO A and depress the DIM switch. Notice that the scanning starts with memory channel 1, scans to 8, and repeats, stopping on each channel for about 2 seconds. To scan VFO B memory channels, you must first initiate scanning in VFO A and then select VFO B. Scanning will not initiate in VFO B. In addition, only 8 channels can be scanned (that is, either VFO A or VFO B).

**Mod 4 (full coverage transmit)** requires three jumpers on the digital-unit board. The first one provides transmit coverage for the WARC bands. The other two provide the remaining coverage. If the WARC jumper is not installed, the 930 will still trans-

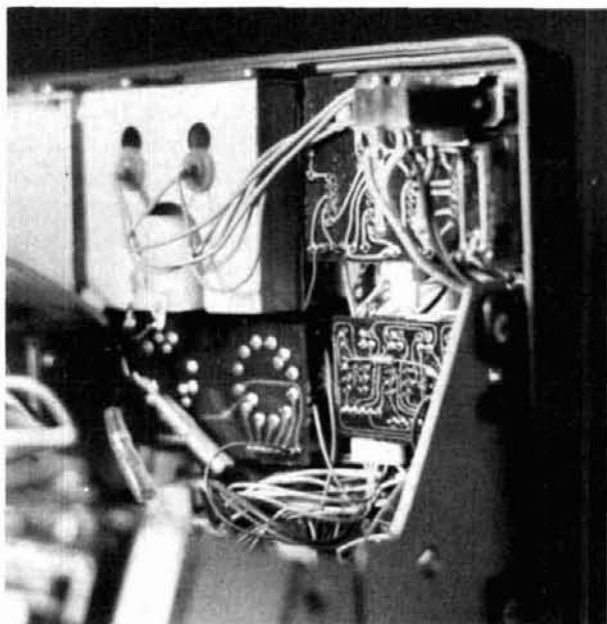


fig. 4A. Dim switch circuit board.

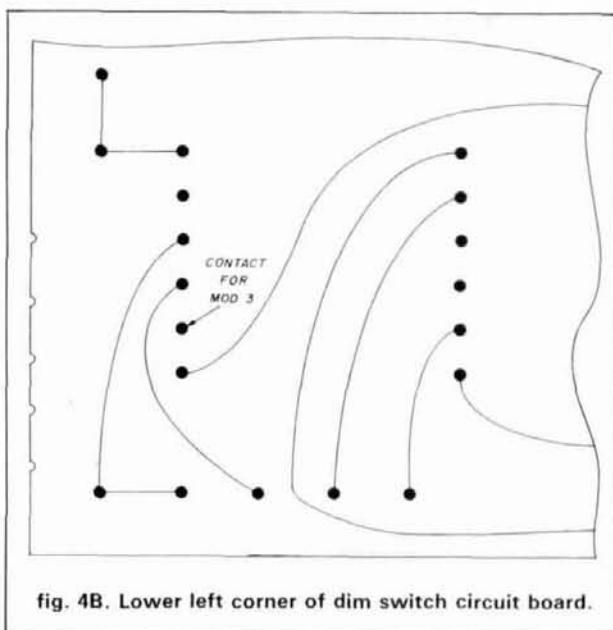


fig. 4B. Lower left corner of dim switch circuit board.

mit over the entire 1.5 to 30-MHz range with the exception of the 0.5-MHz segments, that contain the WARC bands. If you want only the WARC coverage, install only the first jumper, which goes from pin 12, U23 to ground. (Note: on two of the three 930s I've modified, the WARC jumper had already been installed at the factory). The second jumper goes from pin 9, U11 to pin 12, U21. The third jumper goes from pin 9, U12 to pin 12, U22. A close inspection of **fig. 5** will show that each of the connections to the above ICs can be made on unused solder pads on the digital-unit board. I melted a small amount of solder on each of the pads before installing the jumpers. The grounded end of the WARC jumper can be attached to the same solder lug that was used for the 10-Hz mod. You'll find that the optional tuner (AT-930) covers the WARC bands, but not the general-coverage bands.

### final steps

Reinstall the speaker/VOX assembly, remembering to reconnect the four cable assemblies that were disconnected earlier. Reattach the front panel, taking care not to pinch any wires. Replace the covers, and enjoy!

### conclusion

What's my assessment of the mods? Well, I hardly ever used the eight memories that came with the 930, so I really didn't need eight more, although I do use some of them now for scanning. I use the scanning feature to locate the family net at 14.177 MHz ( $\pm$ ) by programming from 14.175.5 to 14.179.0 in 50-Hz steps and scanning through them while attending to other tasks in the station. I also use it for checking band

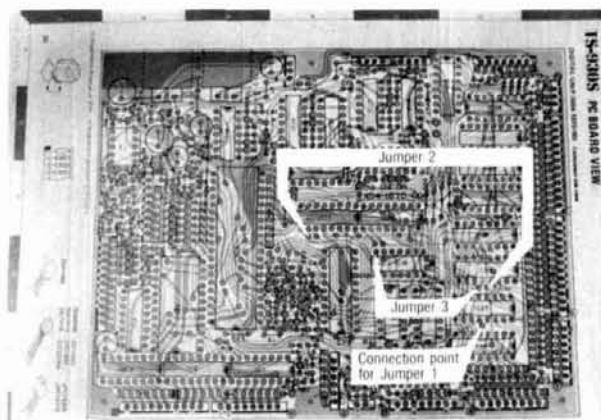


fig. 5. Location of connection points for mod 4.

openings by programming frequencies in different bands. One caution: the 930 will scan as long as the DIM switch is depressed. This includes the transmit mode, so be sure to disable the scanning before transmitting! The 10-Hz resolution isn't needed except to program scanning frequencies, so it's really just a novelty. The full transmit coverage is necessary if you want to use the 930 on some of the MARS frequencies, as I do.

Thanks go to DL3AM and KW9G (ex-WA9GMK), who assisted in installing these modifications. Thanks also to Trio-Kenwood for its courteous approval of my request to reproduce portions of the 930 Technical Service manual for this article. Copies are available from TRIO-KENWOOD, 1111 West Walnut Street, Compton, California 90220.

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