

Award, for his pioneering work in developing the Amateur Radio microwave bands above 30 GHz.

## Another Record?

Dick Beerman, W5AK, reports the following, which might be a record for digital meteor-scatter propagation on 6 meters:

I want to let you know about my JT6M QSO with Dennis, K7BV/1, on December 11, 2005. We have been running schedules for a year or two on 6 meters WSJT. Finally, on December 10 we made it with quite a bit of ease at my end. I had multiple callsigns and multiple grid squares (we are running in the NAMS Group Rally).

The contact was completed at 0325 UTC. It took less than 30 minutes. The distance is 1,537 miles according to K1JT's program. It's my longest MS QSO by far on 6 or 2 meters and Dennis said that it was his longest as well. Dennis's station can be seen at his website: <<http://www.qth.com/k7bv/>>. Mine is only a TS-2000X at 100 watts and an old M<sup>2</sup> 5-element Yagi at 40 feet that I have been running for over 10 years. As a result of this QSO I learned that like EME, a large and efficient station at one end of the circuit can overcome low power and small antenna at the other end of the circuit.

## Modifying the IC-7000

Last month in my product announcement of the ICOM IC-7000 I commented on the television reception capability that was promoted in early brochures. It seems that feature was nixed at the last minute as the radio was going through the FCC type-acceptance procedure. Several ideas have been suggested as to why this might have happened, with the safety and legality issue of having television reception available to a driver of a vehicle while in motion being the most likely winner of that speculation.

One of the early purchasers of the radio is Steve Hicks, N5AC, who also was curious about the television reception. Being *really* curious, he pulled the cover off and discovered how to make a modification to enable the reception. Here is his report with the following caveat: *Making modifications to your new radio may void the warranty.* Therefore, proceed accordingly.

The ICOM IC-7000 just released in December 2005 promised to have the capability to receive TV broadcasts off air and display these on the IC-7000's 2 1/2" TFT display. The feature was disabled at the last minute due to liability concerns, which is understandable given the many disparate state laws on TV displays in vehicles. Re-enabling the TV functionality is simple and can be performed by anyone who feels comfortable with a soldering iron and a pair of tweezers. In addition, the out-of-band transmit modification can also be done at the same time.



Photo A— The ICOM IC-7000 HF/VHF/UHF transceiver.  
(All photos courtesy of N5AC)

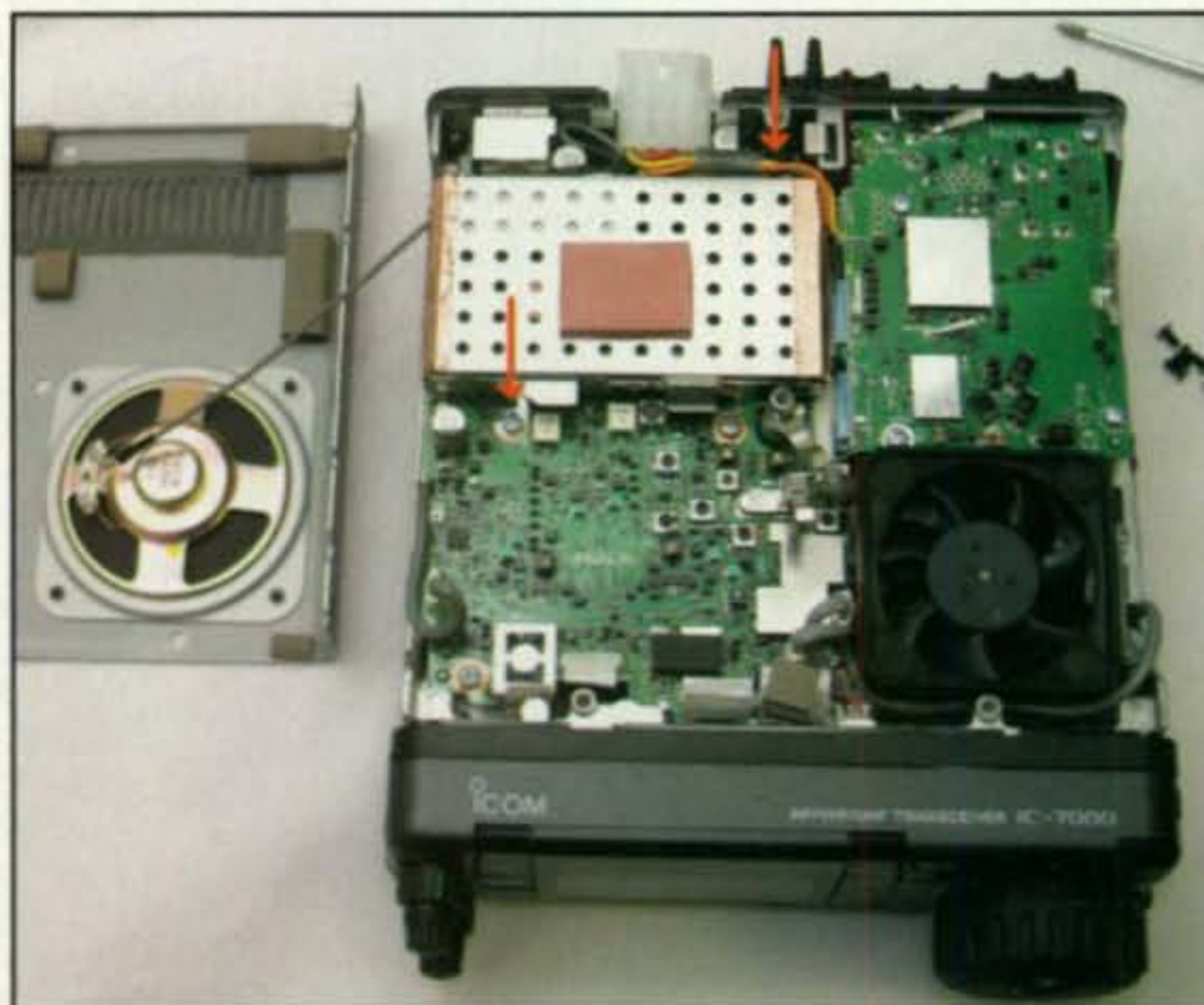


Photo B— Arrows point to the two screws holding the CPU/DSP module in place. Step 3 requires their removal. Step 4 requires the removal of the module.

Since you will be inside a microprocessor-controlled unit and you will be removing the processor unit itself, it is best to have all tools ready and in one place before beginning. Static discharge can harm or destroy parts of the radio and static buildup is always greater in the dry winter months. Be sure to touch the outer chassis of the radio and discharge any static buildup if you do find yourself walking around the room during this procedure:

1. Remove the top cover of the radio using a Philips-head screwdriver by removing two black screws on each side of the radio holding the top (total of four) and four screws on the top of the radio not immediately adjacent to the speaker (see photo A).

2. The cover of the radio should lift up easily. The speaker cable snakes under the CPU/DSP unit (business-card-size metal enclosure) and can be moved out from under this module. It is not necessary to unplug the speaker. The cover can be just set to the side or if you are more comfortable you may unplug the speaker.

3. Remove two silver screws holding the CPU/DSP module in place (see photo B).

4. Pull up on the CPU/DSP module and remove it from the radio. The unit can be set to the side.

5. Directly under the DSP unit are a number of integrated circuits (photos C1 and C2). Between the two white connectors that the CPU/DSP unit plugs into are four identical integrated circuits, three in a line and one next to the left-most one in the line. These are CMOS 4094 shift registers that are used by the processor to read the diodes on the board that control radio options. All four chips on my radio have the Texas Instruments logo and the part number "HJ4094."

6. Toward the front of the radio are rows of surface-mount (SMT) diodes. The diodes have silver paint on top and the letter "A" clearly marked. Using photo D, locate either or both diodes required for the modification. You may remove one diode for TV reception enable and another diode for MARS out-of-band transmit. The diodes may be removed in any number of ways. For most with limited equipment, a good pencil iron and a pair of tweezers can be used. I generally alternate heating up either side of the diode (there are two pads that barely stick out to each side of the diode on the short sides) with the iron and applying *gentle* pressure to the diode until it moves. Once it moves, it will have moved off both solder pads because it is so small. I then wrestle it into place with just one pad touching and reheat the diode to get it to adhere to the board. This is so that I can go back and add the diode back later if need be. With just one lead soldered, the diode will not operate in the circuit and will be in the radio if you need it later. You may also remove it completely if you like.

7. To enable TV, remove diode number two on the left of the set of diodes in front of the *middle* 4094 (see photo D).



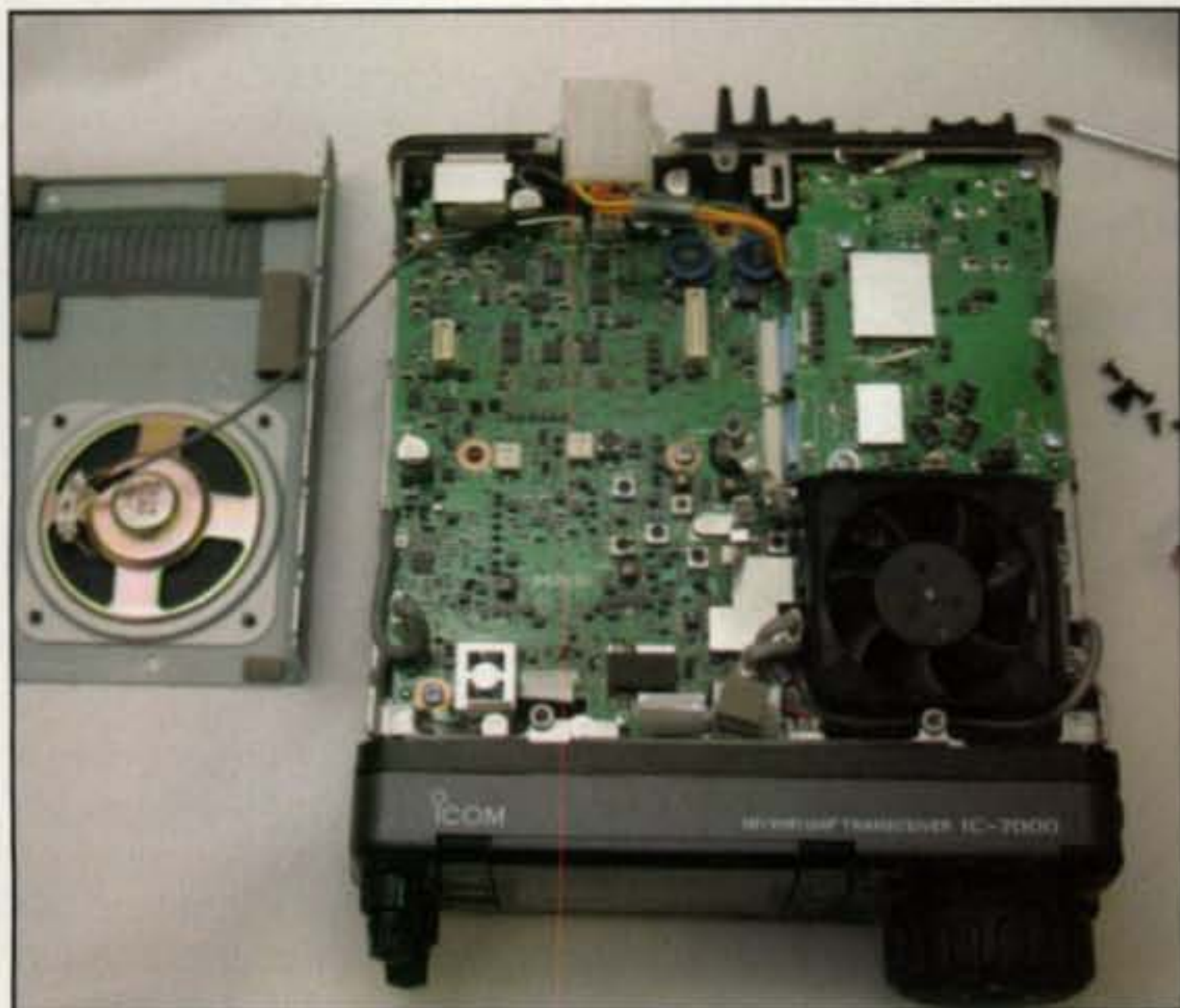


Photo C1— With the CPU/DSP module removed, the four 4094 shift registers are exposed. They can be identified by the Texas Instruments logo and part No. "HJ4094."

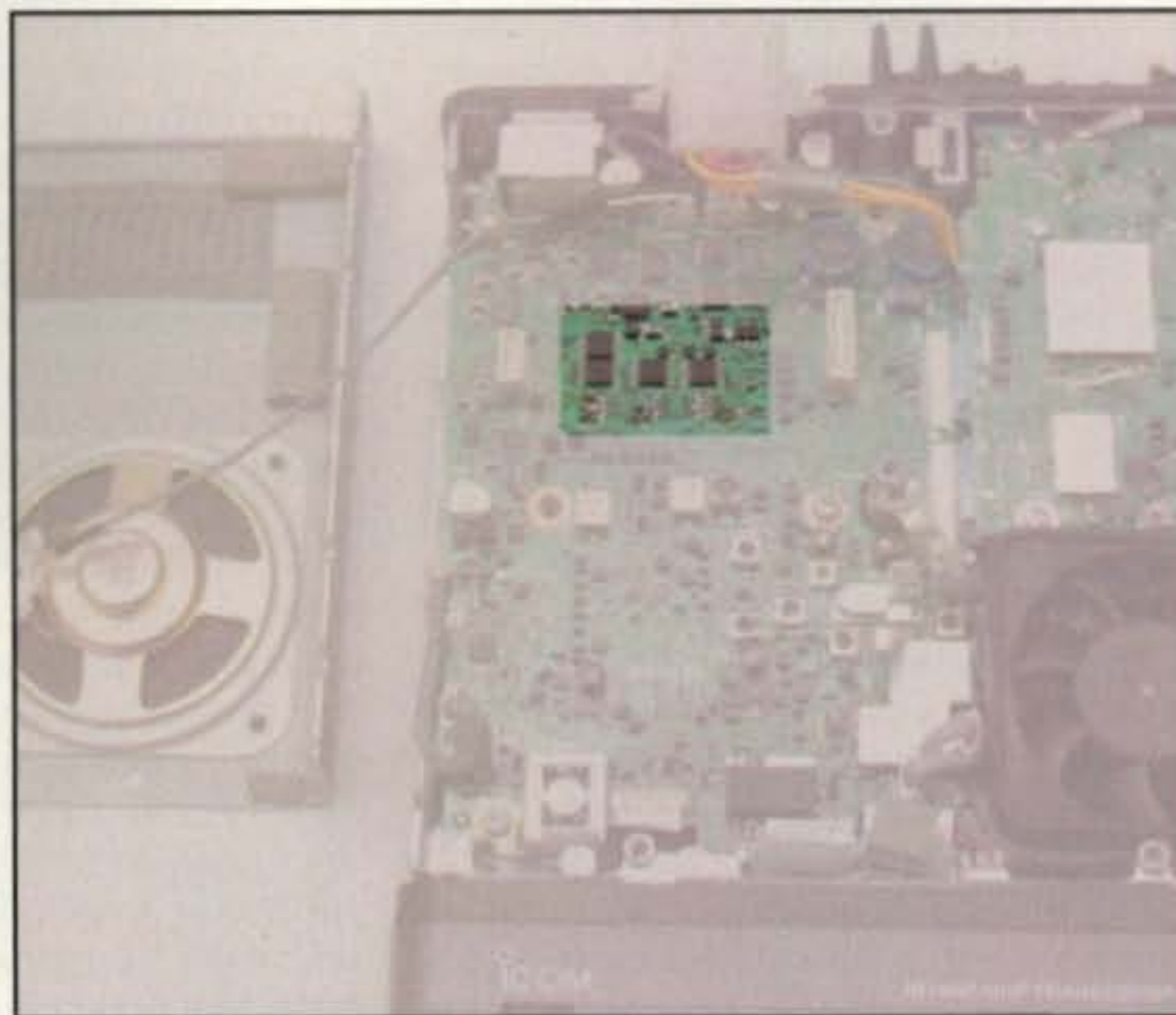


Photo C2— This photo highlights the four 4094 shift registers mentioned in step 5.

8. For MARS operation, remove diode number two on the left of the set of diodes in front of the *left two* 4094s (see photo D).

9. When you are done with the diodes, just reassemble the radio in reverse order. After putting the CPU/DSP unit back into the radio, be sure to slide the speaker cable gently under the upper left and lower left corners of the CPU/DSP module. If you do not do this, you will have trouble putting the top back on the radio.

To use the TV receive mode, press and hold the upper-left knob marked AF(SET) on the radio for one second. The normal radio screen will be replaced with a TV receiver screen. The receiver will tune US TV broadcast channels 2–13 by using either the band-up and band-down buttons or the [M-ch] inner knob on the lower left of the radio. TV channel 2 uses the HF antenna port on the back of the radio, while TV channels 3–13 use the VHF port on the radio. Specific channels can be tuned to a different frequency in the 49–218 MHz range and can be skipped from the channel-up and channel-down function by pressing in the AF (SET) button momentarily and following the prompts.

You can also put an ATV downconverter (such as the one from P.C. Electronics, <<http://www.hamtv.com>>) between the VHF antenna port and your antenna to receive ATV. Unlike your TV set, however, RF can come out of your VHF port, so you will want to be sure not to transmit through your ATV downconverter after you are through watching ATV.

Steve has also written an extended first-look review of the radio from the VHF+ perspective. It is scheduled for publication in the Winter 2006 issue of *CQ VHF* magazine. Here is an excerpt from that review:

For weak-signal contest work, the question of when and how we might use the spectrum or band scope arises. I wondered how strong of a signal is required in order for it to appear in the spectrum scope. I hooked up my HP 8640B signal generator and put it on 144.100 MHz. I was able to hear a signal at –145 dBm on the IC-7000. I put the band scope on in both fast and slow speeds and found that it required a signal of about –95 dBm before it showed up on the band scope. The question here is that if you are meeting someone on 2304 MHz and he is not exactly on channel, would you be able to jump over to the band scope and quickly find him? The received signal would need to be well above the noise for you to spot it on the scope, so conditions and the received signal level will dictate whether you will be able to use the band scope for this purpose. You can also use the band scope as a mini spectrum analyzer for work under 470 MHz.

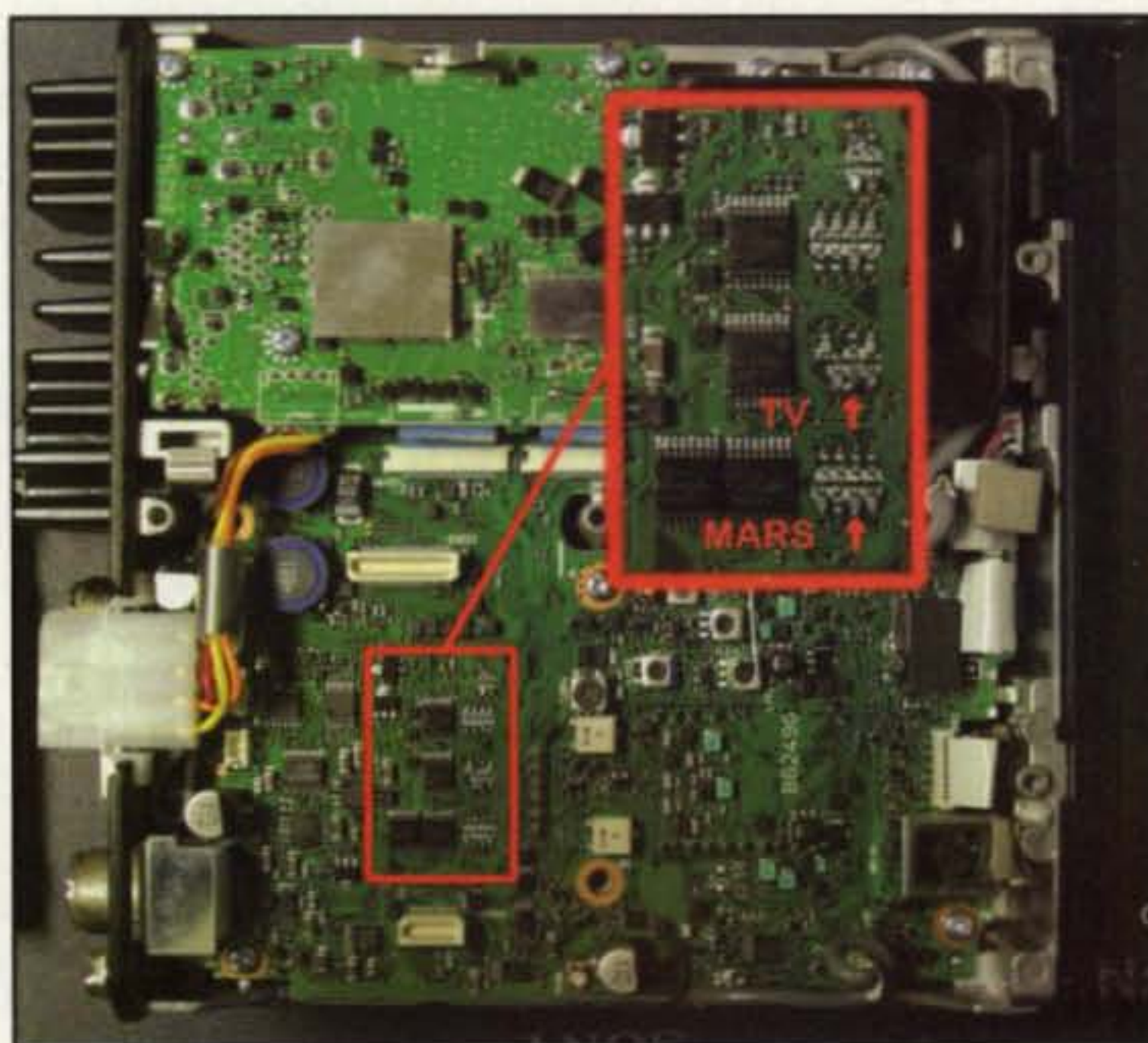


Photo D— Arrows point to the SMT diodes targeted for removal for the modifications. See steps 6 and 7 for instructions on how to remove them. Note that this photo is oriented 90 degrees counter-clockwise from photos B, C1, and C2.

More information on the radio can also be found on the Yahoo IC7000 users group site at <<http://groups.yahoo.com/group/ic7000>>.

In addition, Frank Floyd, AA7BQ, has written and published an extensive review on his QRZ.com website (<http://www.qrz.com/ib-bin/ikonboard.cgi?act=ST&f=3&t=108633>). It is followed by a growing list of comments.

### Calls for Papers

Calls for papers are issued in advance of forthcoming conferences either for presenters to be speakers, or for papers to be published in the conferences' *Proceedings*, or both. For more information, questions about format, media, hardcopy, e-mail,