

# PROGRESS REPORT – MOTOROLA MSF5000 REPEATER REPAIR

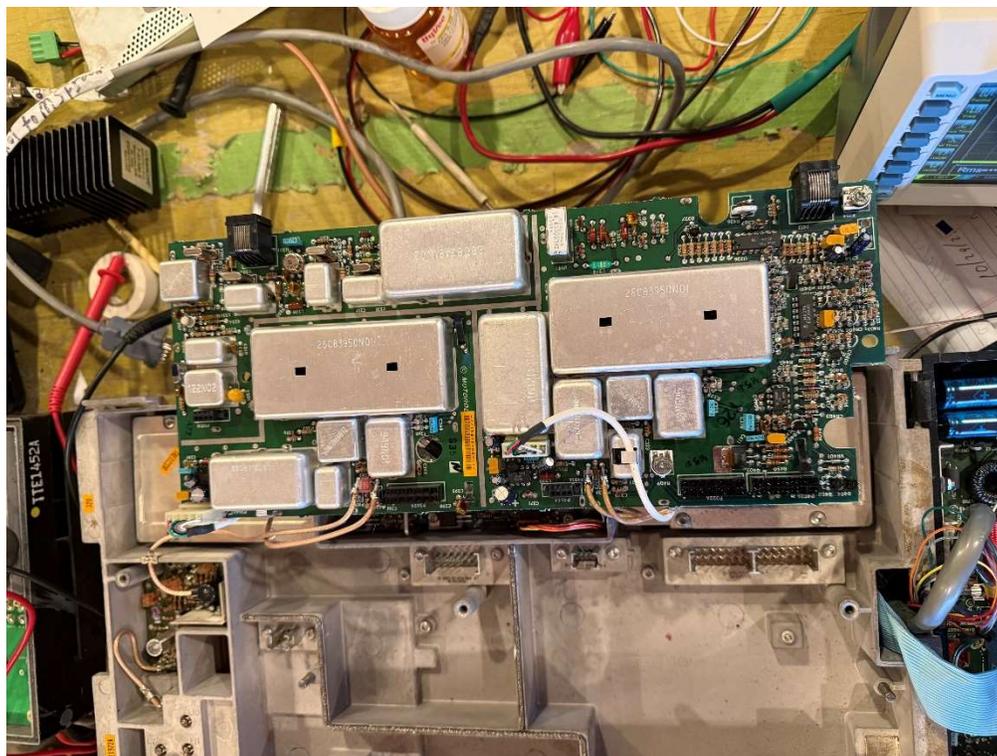
January 26, 2026

John KB0QKH and Paul WB0GXD met and started working on the intermittent transmit problem on the Minden 442.075 MSF5000 Motorola repeater.

After confirming that the problem still existed, they spent some time getting familiar with the transmit protection loop circuitry. We confirmed that the forward RF output power sensing voltage circuitry was operating properly. While monitoring this voltage we noticed that if the voltage was monitored at one point on the interconnect board it would intermittently fail. If monitored at a different point, one of the interconnect jacks, it would work ever time. Further testing revealed that applying different amounts of pressure would influence whether the transmitter failed or not.

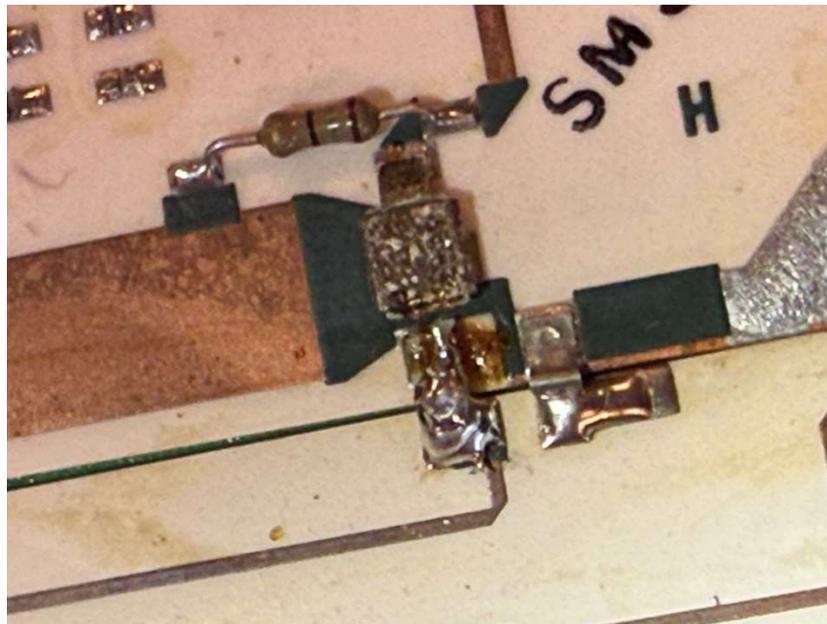
After confirming that there was good solid connectivity between the two points with an ohmmeter, including a visual inspection, we removed the interconnect board on the RF section and found the bug. See photo at right. After a proper funeral for the deceased bug and burying it in the wastebasket, they commenced cleaning operations on all of the associated plugs and jacks with DeOxit.

As long as it was removed and available we then performed a visual inspection of the entire board. No further problems were discovered during the visual inspection.



The board was then re-installed on the chassis. Power was applied to the radio and the transmitter tested. The transmitter keyed perfectly for about five minutes. Then the transmitter output dropped to zero. Dead. No power out.

Troubleshooting with an oscilloscope led us to a fault between the pre-driver and driver modules in the RF power amp. Continued troubleshooting using tapping and pressure at various point on the modules in question pointed to a problem or problems with the little straps used to connect signals between modules. Motorola calls these straps Omega straps, as they resemble the omega symbol  $\Omega$ . After probing the area to remove some excess old flux we also removed a small solder ball. The solder joints on this strap appeared to need some attention. We removed the strap, cleaned the solder pads, and re-installed the strap. We also touched up the solder connection on the 100 pF mica capacitor that couples the RF from the pre-driver module to the driver module.



Power was applied to the radio and the transmitter tested. The transmitter started keying perfectly. After several minutes of testing we re-assembled the transmitter, re-installed the covers for the RF power amp as well as the RF deck

Re-tested the transmitter for several minutes and it's been working fine. Every time I walk by I test it a few times. Still ok!

Next day – Yep, still working fine! Cranked output power from the transmitter to 100 watts.

Been testing for several days, 100 watts out on every PTT.

## **NEXT STEPS –**

Special thanks to Bob N0DYB for loaning us a temporary repeater! This allowed us to take our time to affect repairs and to design and implement and test modifications to the system. Repairs were slowed down during the holidays, and as the folks doing the repairs recovered from various illnesses.

The repeater committee has opted to replace the original filtering equipment that acted as a duplexer with a true 4 cavity Motorola duplexer. The “new” duplexer was purchased used via eBay, arrived in good condition, and has been re-tuned to our repeater frequencies.

As the CAT 250 has a hardware problem, it has also been decided to replace the original CAT 250 repeater controller with an RC-210 controller like the one we use on the 146.82 repeater. Paul WBOGXD has a spare one that he is loaning the Club.

The programming for the RC-210 controller will be a simplified version from the 146.82 machine. It will have a CW ID, and will also have the capability to announce AC power failures and when the AC power has been restored.

The UHF remote base has been re-programmed to allow linking with the 442.225 repeater at Memorial Park with a backup capability to link the WBOGXD 442.525 repeater if that should ever be needed. This switching capability can be done via remote control through the RC-210 controller.

All of this, plus a new interconnect panel with test points, will require planning on how to incorporate everything into the equipment rack, as well as maintain the current APRS radio system that is also hosted at the Minden site. Then building and installing everything, testing, and setting audio levels. In order to do this right, it will take time, so please be patient as we work to bring this system up to its full capabilities. In the meantime, enjoy using the temporary Minden equipment that Bob N0DYB has graciously loaned us!