

Kenwood TM-G707A
Add CTCSS decode
to
6 pin mini-din Data connector
Ralph Hogan W4XE

The Kenwood TM-G707 (and other models) have a front panel data packet connector which is normally used for packet radio. It is also handy for interfacing it as a remote base radio to controllers like the Arcom RC-210. The RC-210 allows it to be frequency agile by remote control. The problem is that the mini-din SQC pin 6 signal on the front panel goes active high on any on frequency carrier signal. In standard repeater terminology we would call this a Carrier Operated Switch or COS signal. If you have a memory channel with PL decode requirements, the SQC will still go active low on carriers without a proper PL tone. With the proliferation of CTCSS/PL on the ham bands it is very desirable to also have a PL Detect signal fed to the repeater controller. The following modification will allow the data packet front panel signal on pin 6 to also be used as CTCSS (PL) detect depending on how the memory channel is programmed for Carrier or PL decode. In Kenwood speak, the front panel LCD will indicate "CT" for carrier tone required. The original pin 6 signal was an active HIGH COS decode. After this modification it will give you a COS/PL active LOW.

A quick search of the web yielded the below easy modification:

Courtesy of Ken Arc AH6LE at Arcom, who says that Eric W2ZT first posted it:

The internal "SQ" line of the G707A presents an "active low" with an open squelch in carrier mode. When in "CT" mode, it's an active low only when the proper PL frequency is received. This behavior in other manufacturers is named "audio mute" - it's a signal that takes into account the carrier squelch/ctcss mode and the presence or absence of the CTCSS tone.

This "SQ" line can be found at CN4 pin 11 on the main TX-RX board or CN502 pin 11 on the Control board (behind the front panel). If you don't wish to perform this modification to the din socket (kind of intricate), you can simply attach a wire to one of these points, then route it out of the radio and connect it to an appropriate connector.

I modified my TM-G707A by routing the internal "SQ" line to pin 6 on the radio's mini din socket (replacing the current connection). My method of doing this required the cutting of a circuit trace on the Control board (current din connection) and routing a wire from pin 11 of CN502 to the din socket pin 6.

This mod will facilitate fully agile CTCSS decode &/or encode functionality using only the RC-210's A72xx1 or A72xx2 commands without the need for an external PL decoder. Additionally, the remote base controller port can be left in carrier mode. Don't forget to change the jumper plugs on the controller's remote base port from active high to active-low.

Many thanks to AH6LE and W2ZT for providing this information!

I thought it would be helpful to others if I documented my conversion.
First remove the top and bottom covers.
There are 9 screws total on the top and bottom covers.



Top View



Bottom View

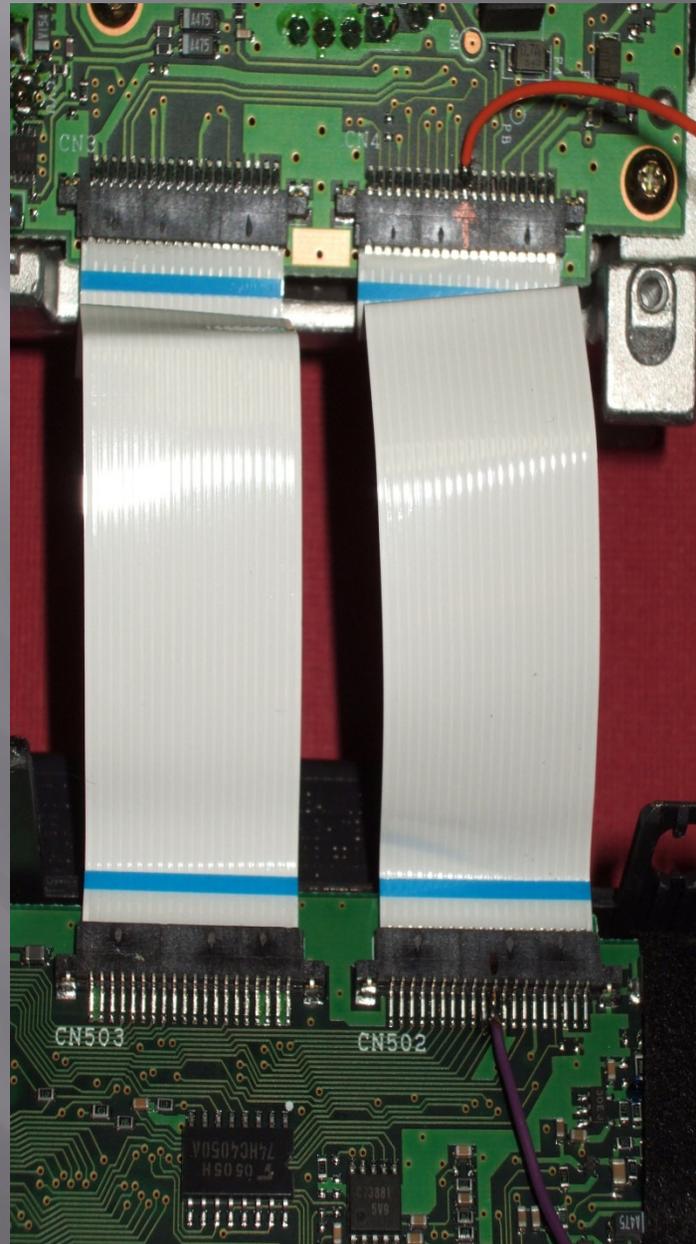
Note there are 3 plastic tabs on the top and bottom of the front Panel assembly. These hold the front panel onto the metal casting of the radio. You must pull up on these 6 tabs to separate the front panel from the radio. Be careful not to pry too hard or you will break them!

This shows the front Panel separated from the radio. I first added an orange wire to CN4 Pin 11 for testing. I then located CN502 pin 11 and tacked on the purple wire for testing. At first I wasn't sure which was pin 1 of the connector in order to locate pin 11. It turns out pin 1 is on the left side of the connectors in this photo. It is interesting to note that pin 12 is COS, which originally went to the mini-din pin 6.



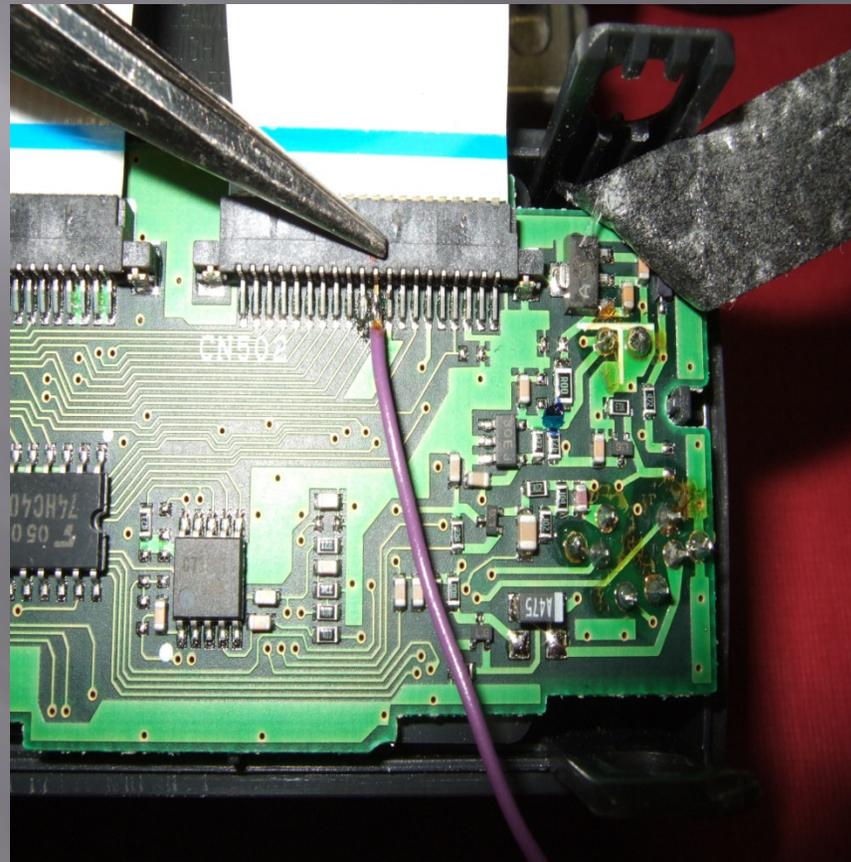
Be careful, the speaker and gasket will come off of the top side of the radio.

You can use either
Signal, but if you are
going to use the
Mini-din pin 6,
I would suggest CN502
For a shorter wire run.

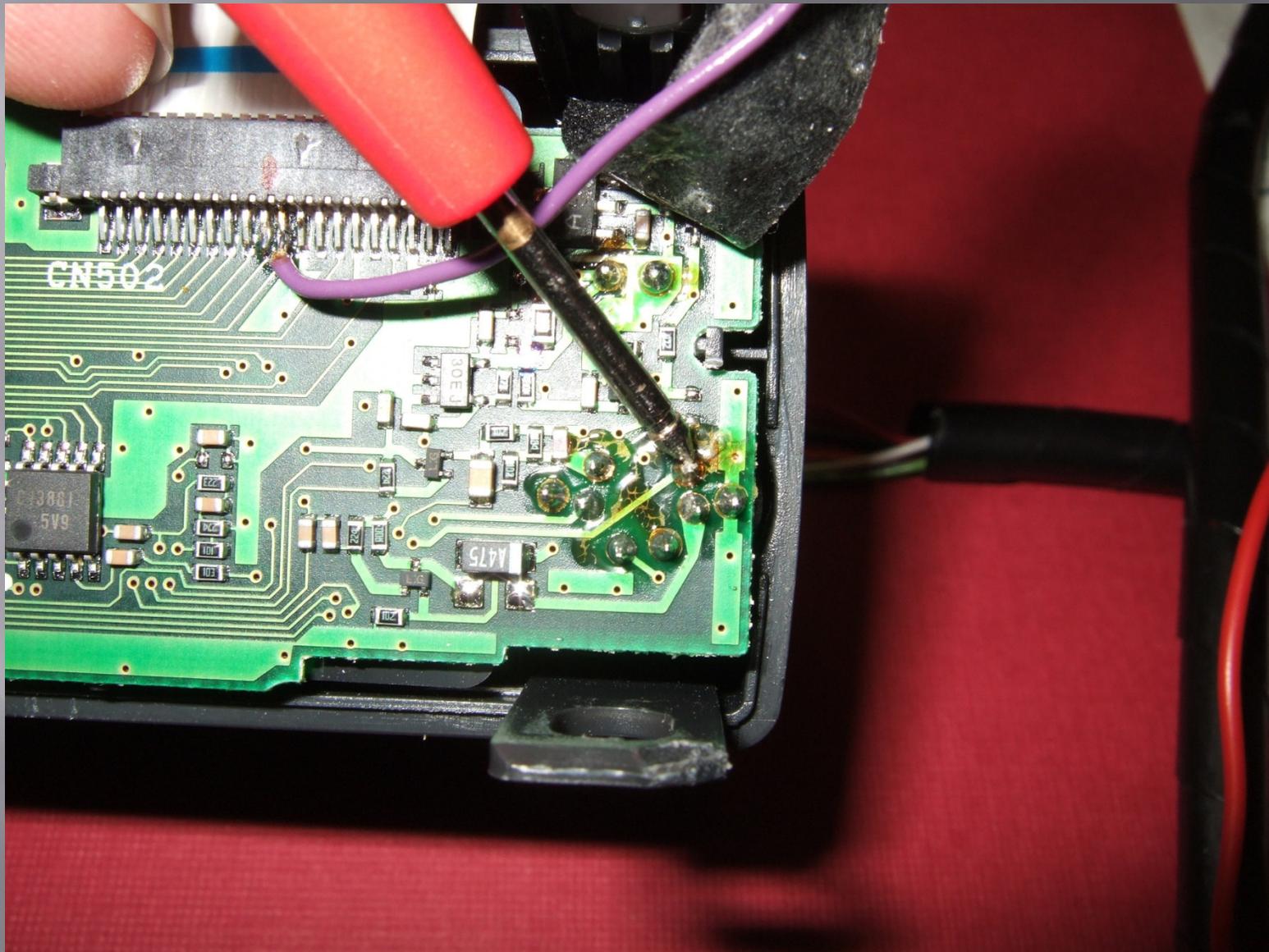


CN4

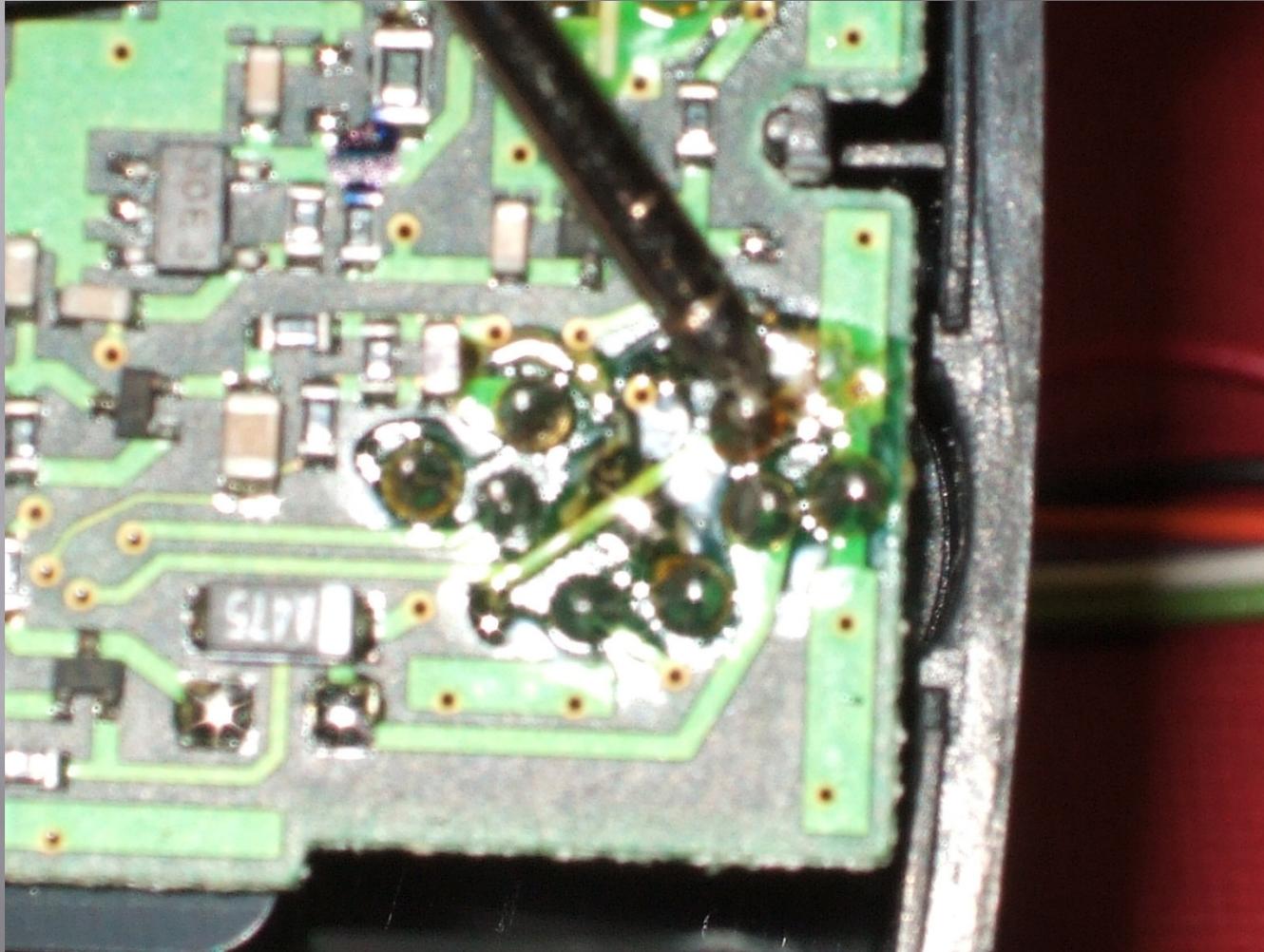
CN502



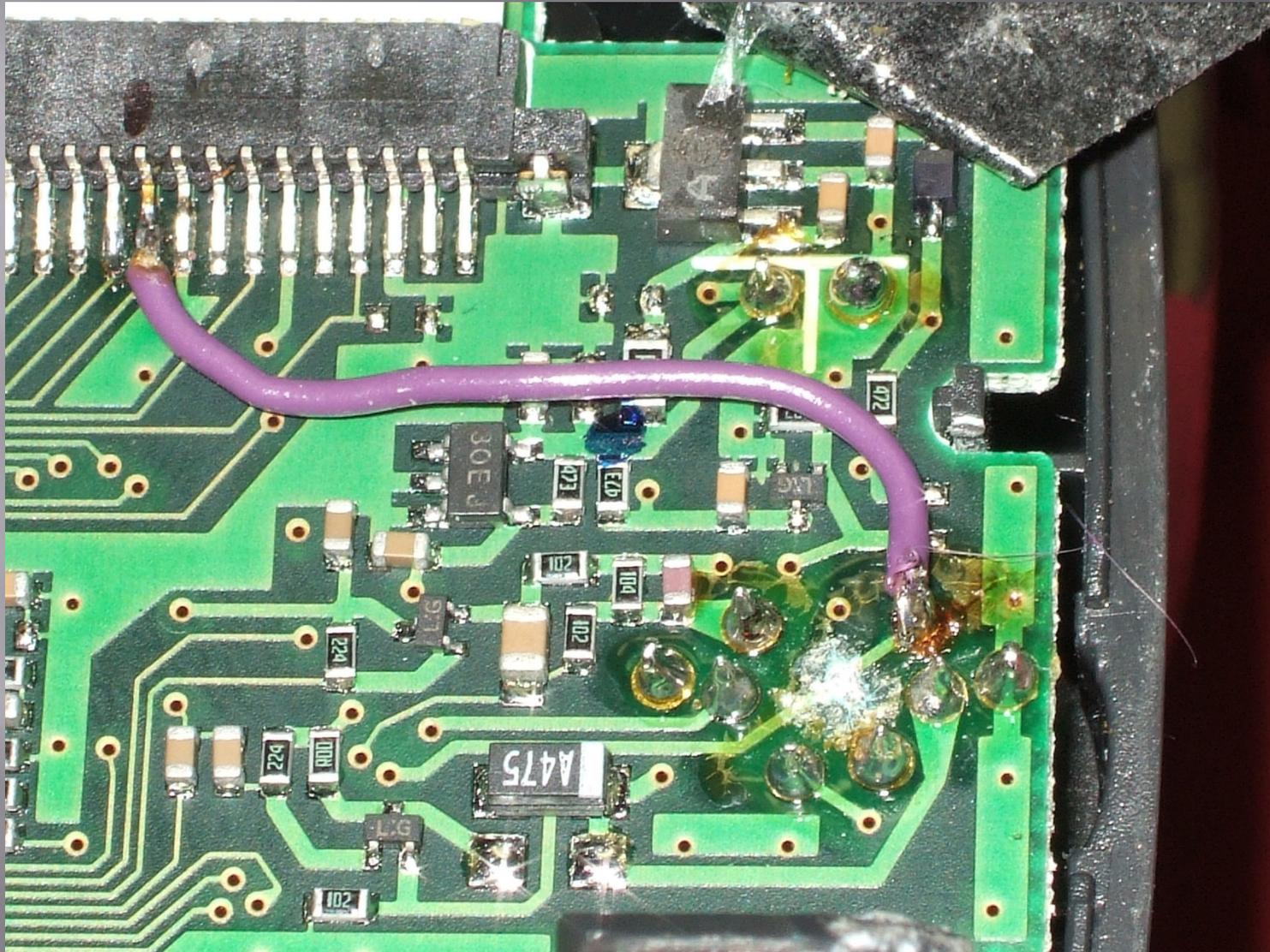
The forceps are pointing at CN502 pin 11.
The data packet mini-din connector back side is hiding under some insulation tape. Peel away one side of the tape to expose the mini-din.



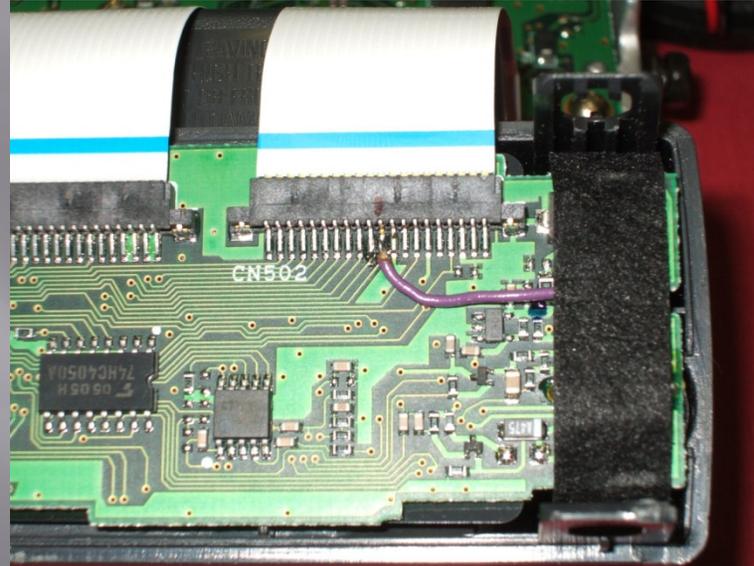
I'm probing on pin 6 for COS. It is about in the 1 o'clock position around the circular connector. Note the 45 degree diagonal pcb trace going from the pin 6 to the bottom left. You need to cut this trace with a xacto blade. This will free up pin 6 for the new COS+PL signal.



Not a great zoomed in macro shot, but a closer view of the connector. Again I'm probing on pin 6. Note all the solder flux around the mini-din. It was really built up and hard to cut through with the xacto blade.



Note the shiny white blotch on the 45 degree pcb trace below pin 6. This is where I cut the trace to free up pin 6. After you cut the trace MAKE SURE you have severed the path completely. If not you'll damage the radio when you tie two active signals together. The purple wire connection from CN502 pin 11 to the mini-din pin 6 is completed.



Don't forget to put the insulation tape back. At this point you may want to test your handy work before you put the radio back together. Just be careful with everything dangling around on the bench!

Pop the front Panel back onto the Radio with those 6 plastic tabs. Be careful with the two ribbon cables. Now put the top and bottom covers back on.

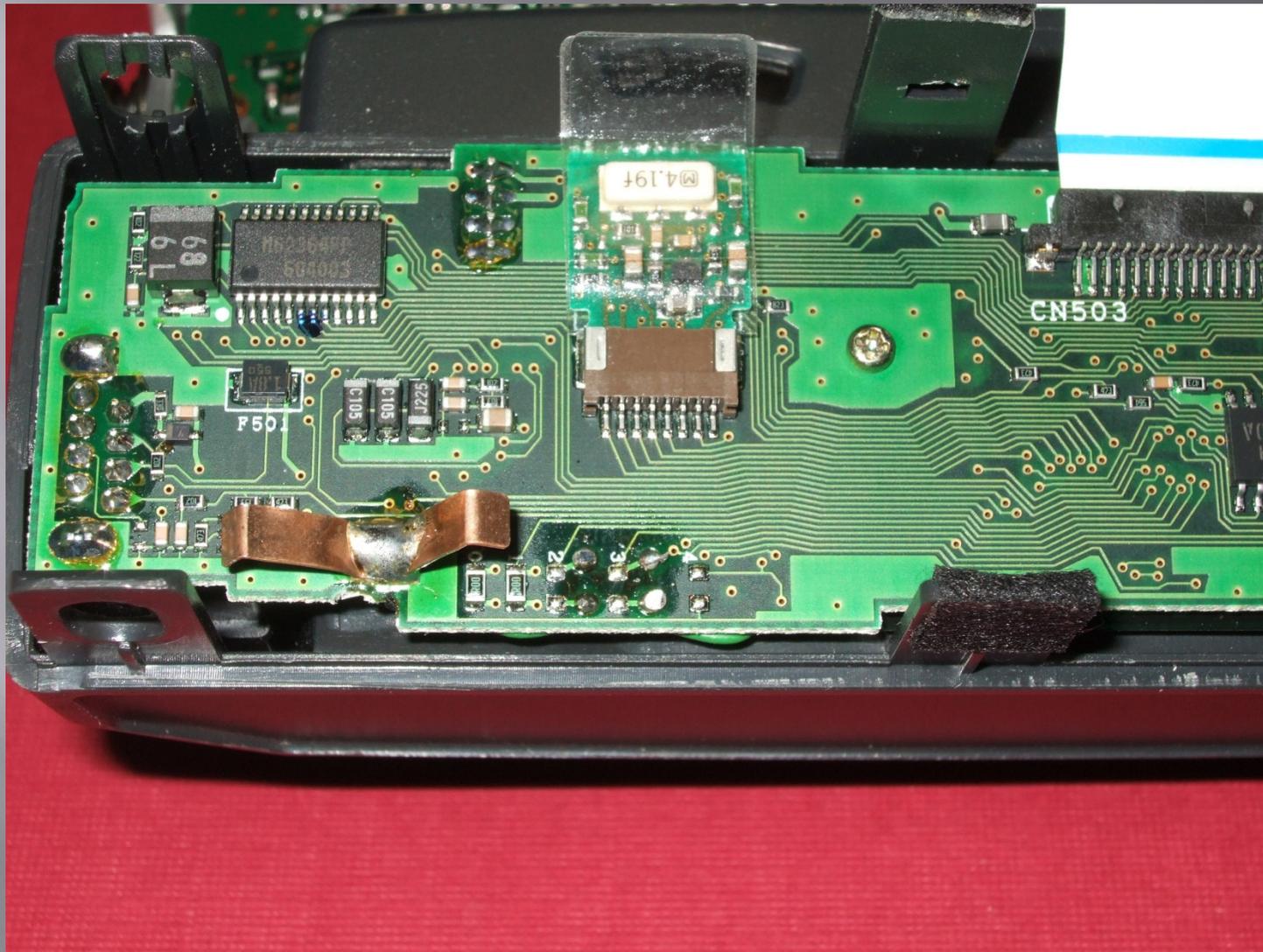
Time to test my handy work.



CT is enabled, a signal on 146.52 with no pl encode.
Pin 6 stays high @ 5.5 VDC in the non-active state.



CT is enabled, a signal on 146.52 with the proper pl encode tone.
Pin 6 goes active low (150.8 mV) state.



This is a bonus picture. It doesn't have anything to do with COS. For TM-G707 extended TX/RX for MARS use, the resistor positions labeled 0-4 next to the copper spring and the two loops of green wire just visible underneath them on the back side are mentioned in various internet conversion documents. For remote base use this would be a very dangerous modification. Leave the radio stock.