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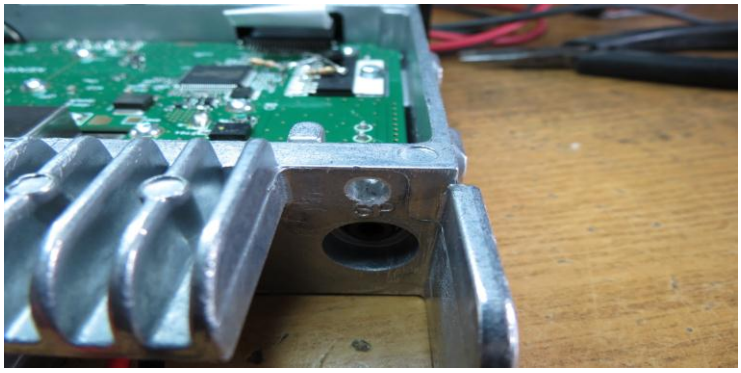
Interfacing the Kenwood TM-281a 2 meter transceiver for use with the RC210

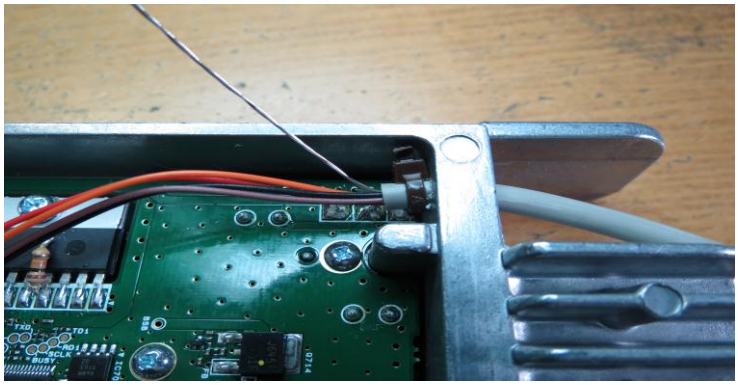
The TM-281a is the replacement for the TM-271a mobile that Kenwood discontinued in 2012. While the '271a was easy to interface to the RC210 as Kenwood had conveniently provided solder pads for various connections as PTT, COS and so on (presumably for easy connections for a packet TNC), the '281a contains no such convenient connection points. So we must tap off the signals we need from various points within the radio.

The first step is to remove the plastic top cover of the radio by removing one screw from each side and carefully lifting it off.

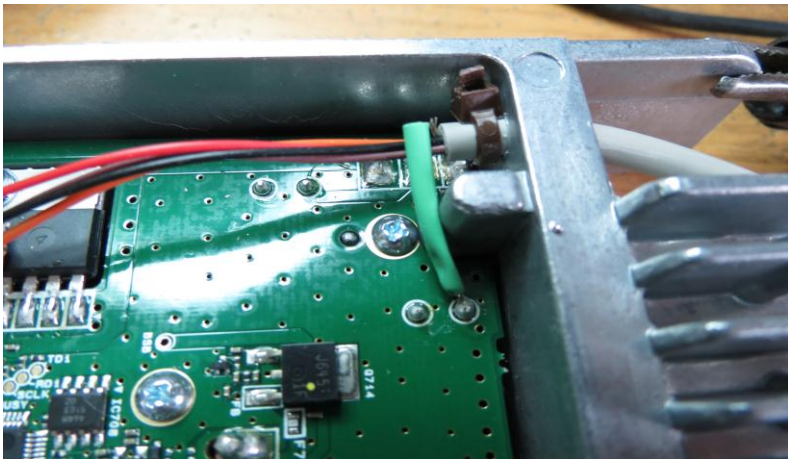
We need to drill a hole in the back panel in order to route the cable that will carry COS, PTT and the other required signals out to the RC210 Port Connector. All we need is 4 conductor plus a shield for these connections. The cable we used is slightly smaller in diameter than 3/16", so we drilled a 3/16" hole just above the external speaker connector:



We then took our cable and stripped 4" from one end, fed it through the hole and secured it with a tie wrap:

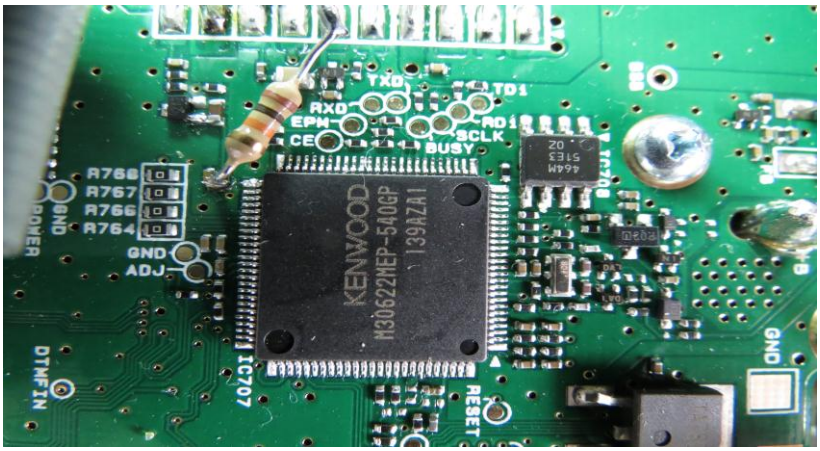


Cut the shield wire to about 2” and slide some heat shrink tubing over it and solder to the point shown.

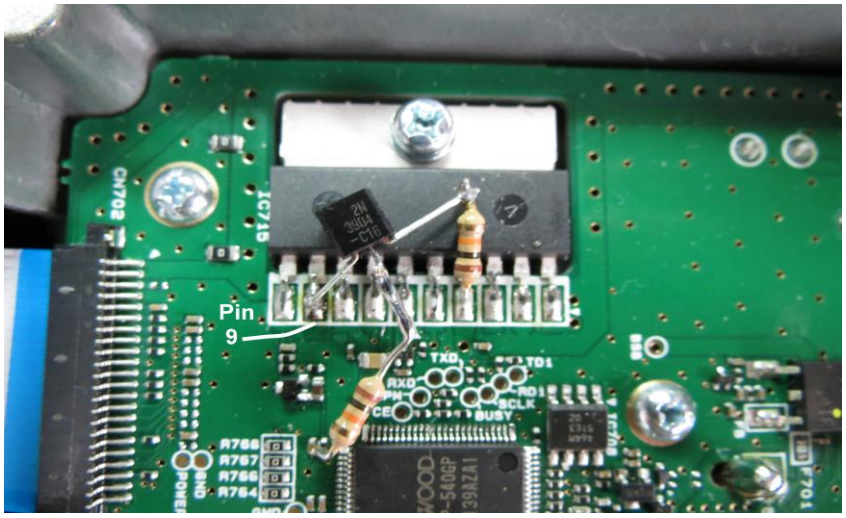


We need to install a transistor (any small signal NPN will work, such as a 2N2222 or 2N3904) and 2 resistors (both 10K) in order to provide us with a buffered COS signal. By the way, this COS output will actually respond according to the access mode selected in the radio. In other words, if we have carrier squelch selected, the COS will respond to carrier only. If CTCSS is selected, this signal will only respond when the proper tone is received. Fortunately for we RC210 users, we can easily make this selection from the RC210 when programming the TM-281a!

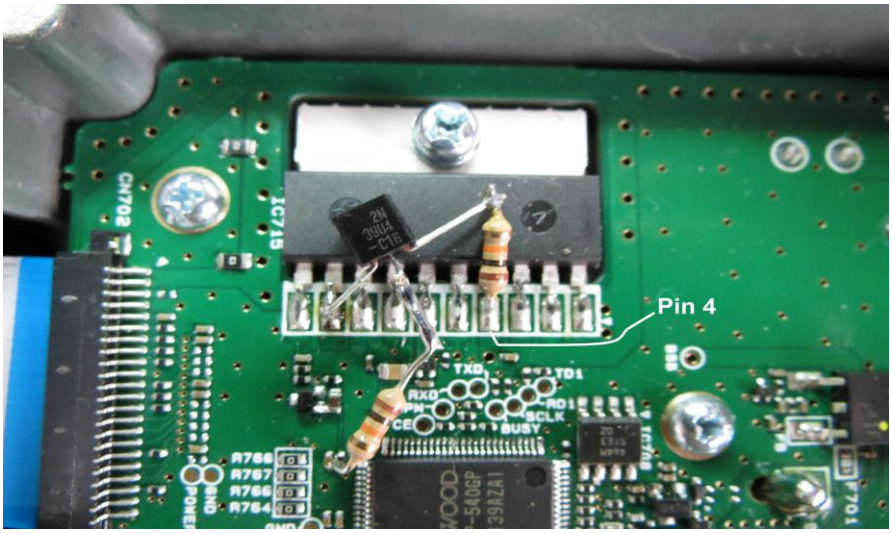
This COS signal is available from the radio’s microprocessor on pin 51. Fortunately, resistor R815 and capacitor C805 are both connected to this pin and this gives us a convenient point to which to solder our resistor. Solder one end of a 10K resistor to this junction and route it as shown:



Now take your NPN transistor, bend the leads as shown, lay over IC715 (the AF Amplifier IC) and solder the emitter lead to pin 9. Solder the other end of the 10K resistor you used in the previous step to the base of the NPN transitor.

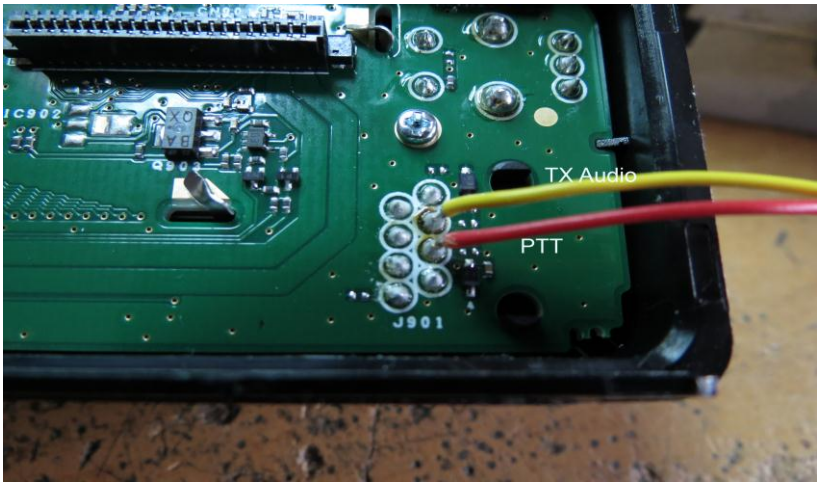


Solder one end of the other 10K resistor to pin 4 of IC715 and the other end to the collector of the NPN transistor. This junction will be your COS signal to the RC210.



You are now done with the hard part!. Turn the radio over and, using a flat blade screwdriver, insert into each slot and carefully push down in the handle, just enough to release the front panel's mounting tabs. Do this for each of the 2 slots and the front panel will come off. REMOVE THE PANEL CAREFULLY AS THERE IS A FLAT CABLE CONNECTED.

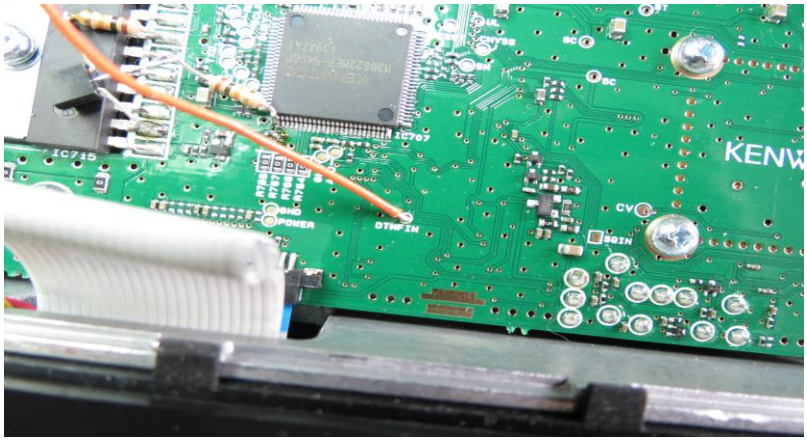
CAREFULLY remove the ribbon cable from the front panel connector and lay the panel down so you can access the pc board. We need to add 2 wires, one for PTT and one for TX audio. Use whatever color wires you have handy but make a note as to which is used for which signal (we used red for PTT and yellow for TX audio). Solder them to the back of the mic connector J901 as shown and cut them to about 6" in length:



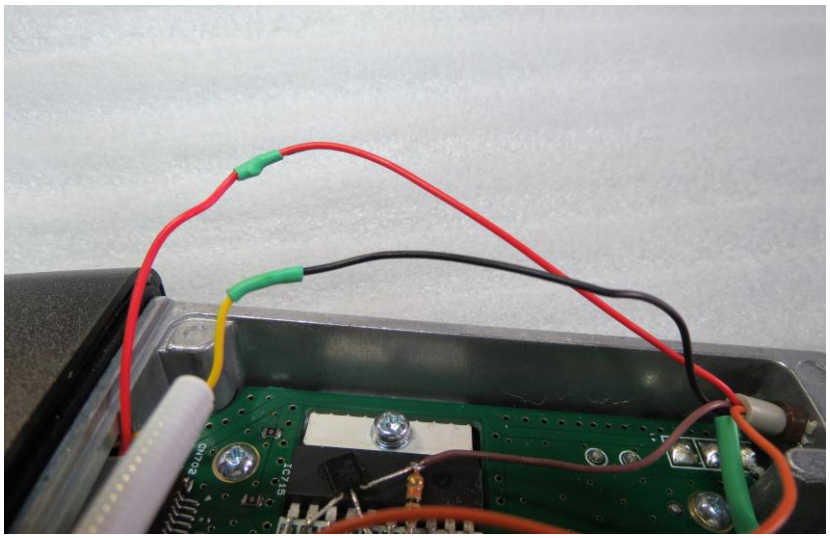
Carefully place the front panel near the chassis, reconnect the flat ribbon cable you removed in the previous step, route the 2 new wires through the opening and snap the front panel back onto the chassis of the radio.

In the next few steps, we show the 4 conductor shielded cable we used to connect to the RC210. The colors of your particular cable choice may vary so use our examples as a guide only.

In our case, we used the orange wire for RX audio. Kenwood was nice enough to give an easy point to obtain discriminator audio (our RX Audio), on a test point marked DTMF In:



Connect the two wires you soldered to the mic connector on the front panel, to your 4 conductor cable. In our case, PTT (red) goes to red on our cable while TX Audio (yellow) goes to black.



And finally, solder the remaining wire in your 4 conductor cable to the transistor/collector junction for your COS out signal. In our case, we used the brown wire.

Carefully tuck the wires out of the way, replace the top cover and screws, install the DB9 on the end of the cable and you're all set. Select Radio Type 8 (same as the TM-271a) in the RC210 programming.

High resolution pictures are also available at
http://www.arcomcontrollers.com//images/documents/rc210/tm281hires.zip