# FT-70D Soundcard / TNC Interface

Rick/WA7SB got me interested in using an FT-70D as part of a portable VARA FM station. I have found that it is convenient to have a second setup to assist in troubleshooting, practice and for demonstrations. TNC to Radio interfacing procedures have not changed much since the early days of Packet Radio.

I remember quite a few years ago connecting TNCs to Yaesu, ICOM and Kenwood HTs. By using this interface and a DRA series soundcard, you can operate VARA FM using the VARA FM software and Packet using UZ7HO Soundmodem. You can also use this interface with a TNC.

The FT-70D seemed like a good rig to use as a portable/test/demo station   Rick found a schematic in the FT-70DR/DE Advance Manual to interface with a TNC/soundcard, so no more excuses or delays.
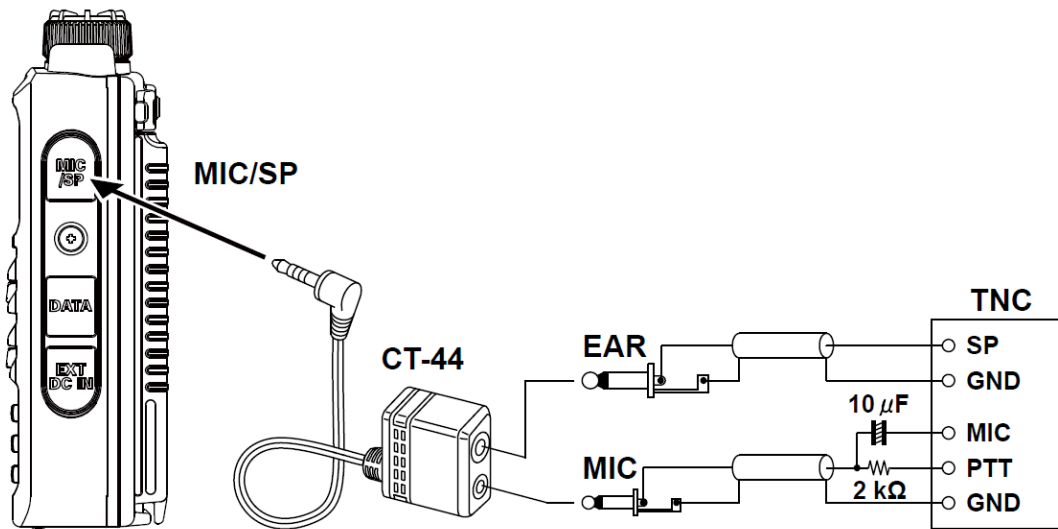
Besides a PC, the main players are (See Parts List at the end of this document for ordering information):

Yaesu FT-70D HT

Masters Communications DRA-36 Soundcard *

1/2 of a 6' mini-din6 M-M cable

Yaesu MH-34 Spkr/mic from eBay (by using the MH-34, the CT-44 shown above is not needed.)

Standard A > B USB cable

* Per Kevin @ Masters Communications, the DRA-30, 34 and 36 will work fine for systems that use the mic input. I have the DRA-36 and it works great driving my FT-70D using the spkr/mic jack and Kenwood TM-V71A using the rear 6 pin DATA jack.. If you are going to use one of his soundcards on other rigs that have a DATA jack on the rear of the radio, I would suggest that you contact Kevin @ kuggie@kuggie.com.

My first interface consisted of a small circuit board with the cap, resistor, mini-DIN 6 cable and TRRS cable connected. Although this was very small and was able to fit in the DRA-36 case, it did not provide any means to listen to the freq to see if it is clear. I did not want to remove the TRRS plug each time I wanted to make a packet/VARA FM connection, so it was time for Ver. 2.
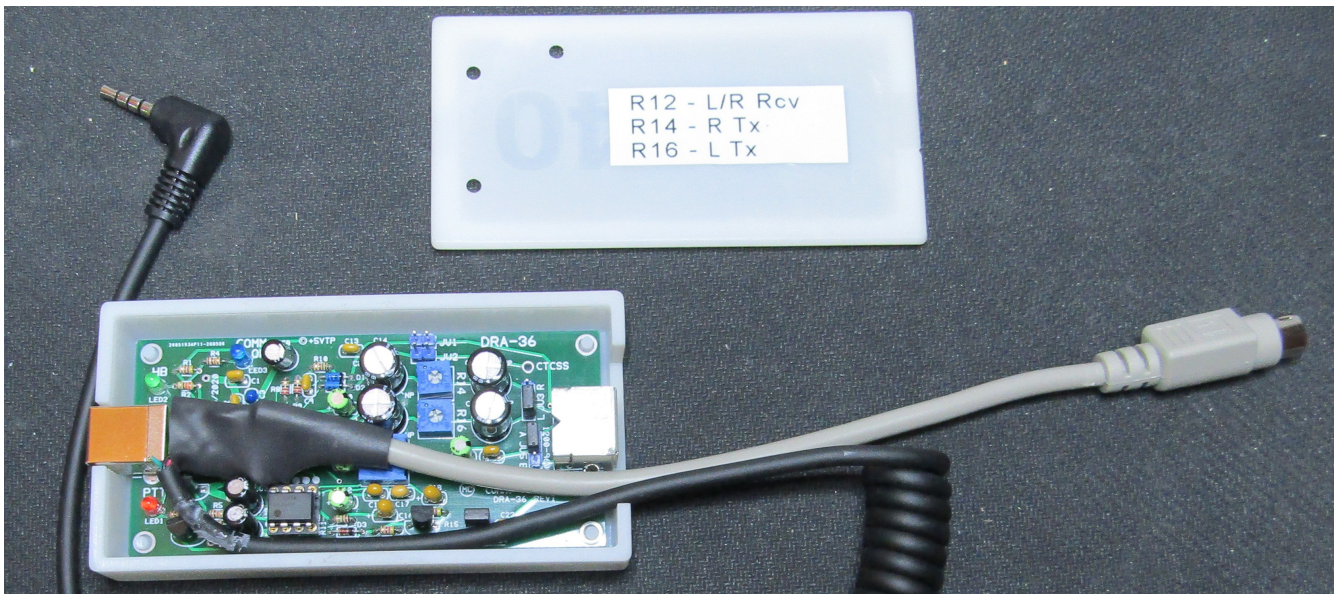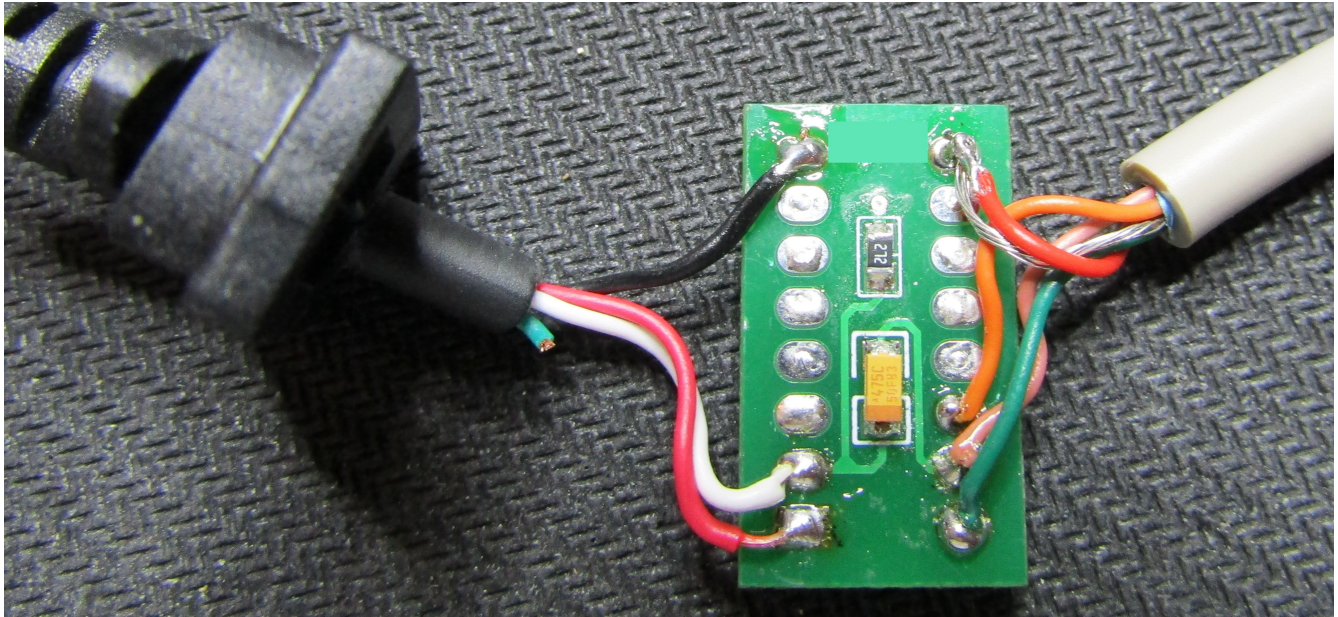
For Version 2, I purchased an inexpensive Yaesu MH-34 Spkr/Mic at eBay for $10, including shipping. By removing the spkr/mic cap, resistor and mic, cutting 2 traces, installing new SMD components and connecting wires, I now had an interface with "PUSH TO LISTEN."

Step One
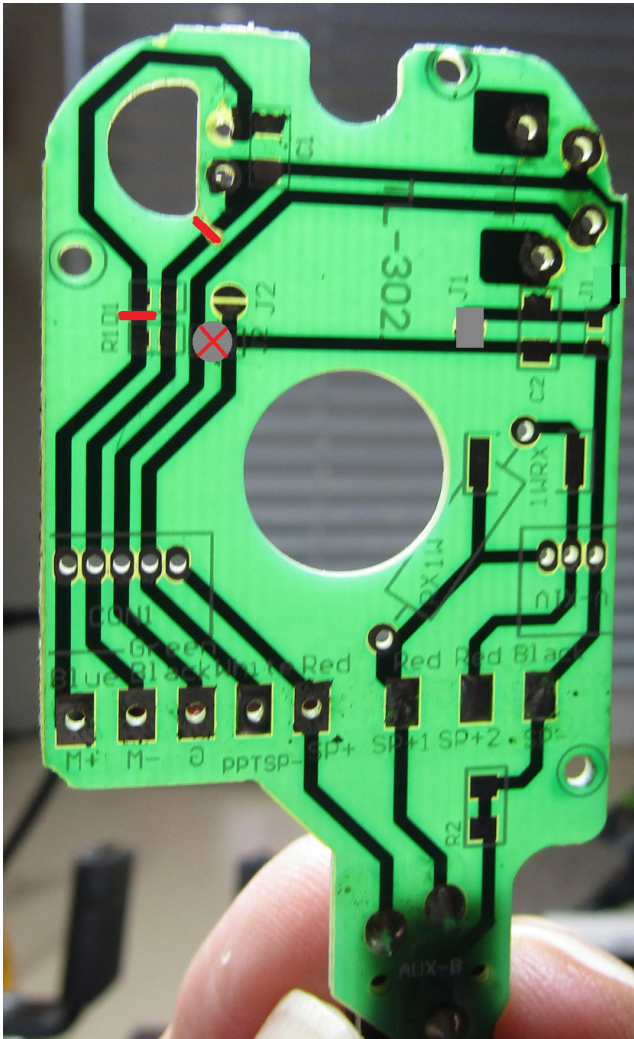
1. Disassemble spkr/mic clamshell cover by removing 3 black screws on the back of the clamshell.

2. Remove the circuit board by removing 2 silver screws.

3. Disconnect speaker wires from circuit board. They will be reconnected later.

4. Remove circuit board.

5. Remove microphone. Ensure the holes are clear as you will be connecting other wires here later.

6. Remove original C1 and R1 located next to the microphone.

7. Remove solder jumper/glob. ⊗

8. Add solder jumper here. ▇

9. Cut 2 traces where indicated with **RED** lines.

Note: Original PTT switch and TRRS wires removed to assist in R&D. There is no need to remove the switch nor the TRRS cable wires.

Cutting the two traces and installing C1 and R1 where indicated allows sharing of the TX audio and PTT signals on the single wire going to the HT (Ring2), and changes the PTT switch into a PTL (Push To Listen) switch.

Step Two:

I connected the wires from the soundcard/TNC first and then installed the SMDs (Step 3). But you can install the SMDs first if you prefer.
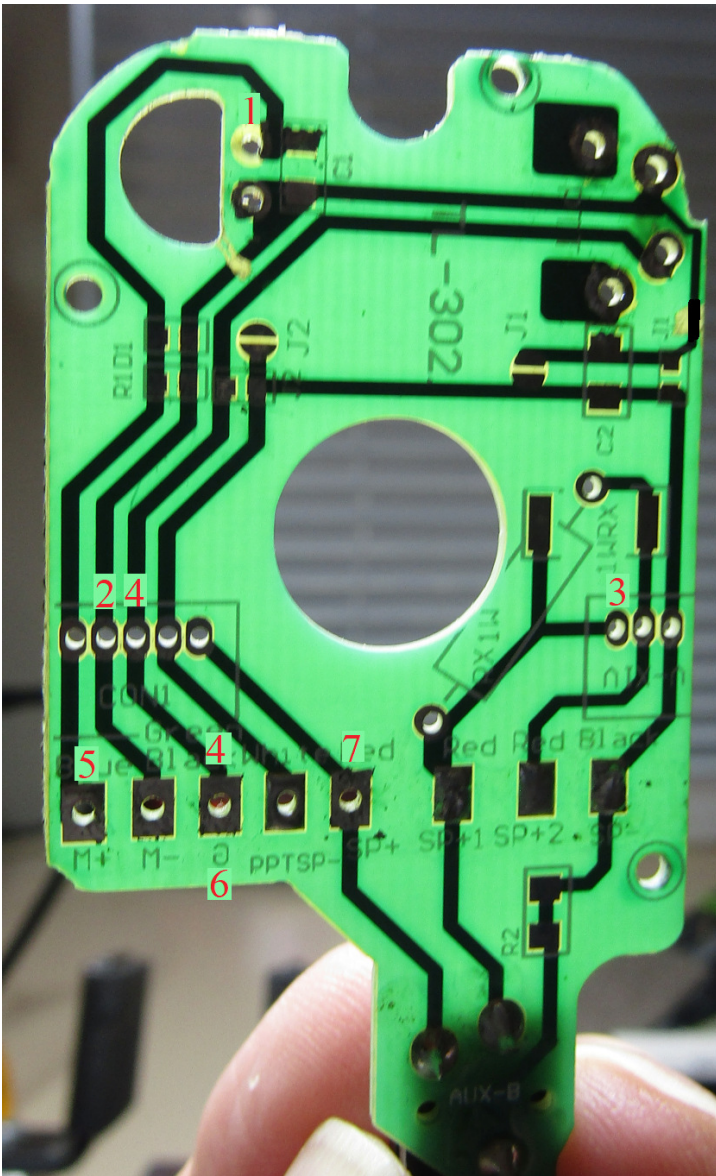
Attachment Points

1. Tx/Mic Audio from soundcard

2. PTT from soundcard

3. (+) Rcv audio from soundcard

4. Ground from soundcard. Either location works.

Wires from the TRRS cable should still be connected to attachment points 5, 6 and 7.

5. Ring2 on TRRS cable to HT. (Combined TX audio and PTT)

6. Sleeve on TRRS Cable to HT. (Ground)

7. Tip on TRRS cable to HT. (Receive audio)

I brought the mini-DIN6 cable wires through the bottom of the circuit board to aid in soldering and getting the cable to fit inside the case.
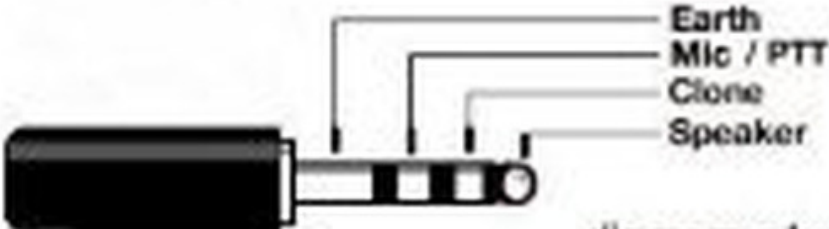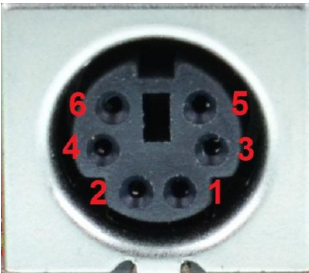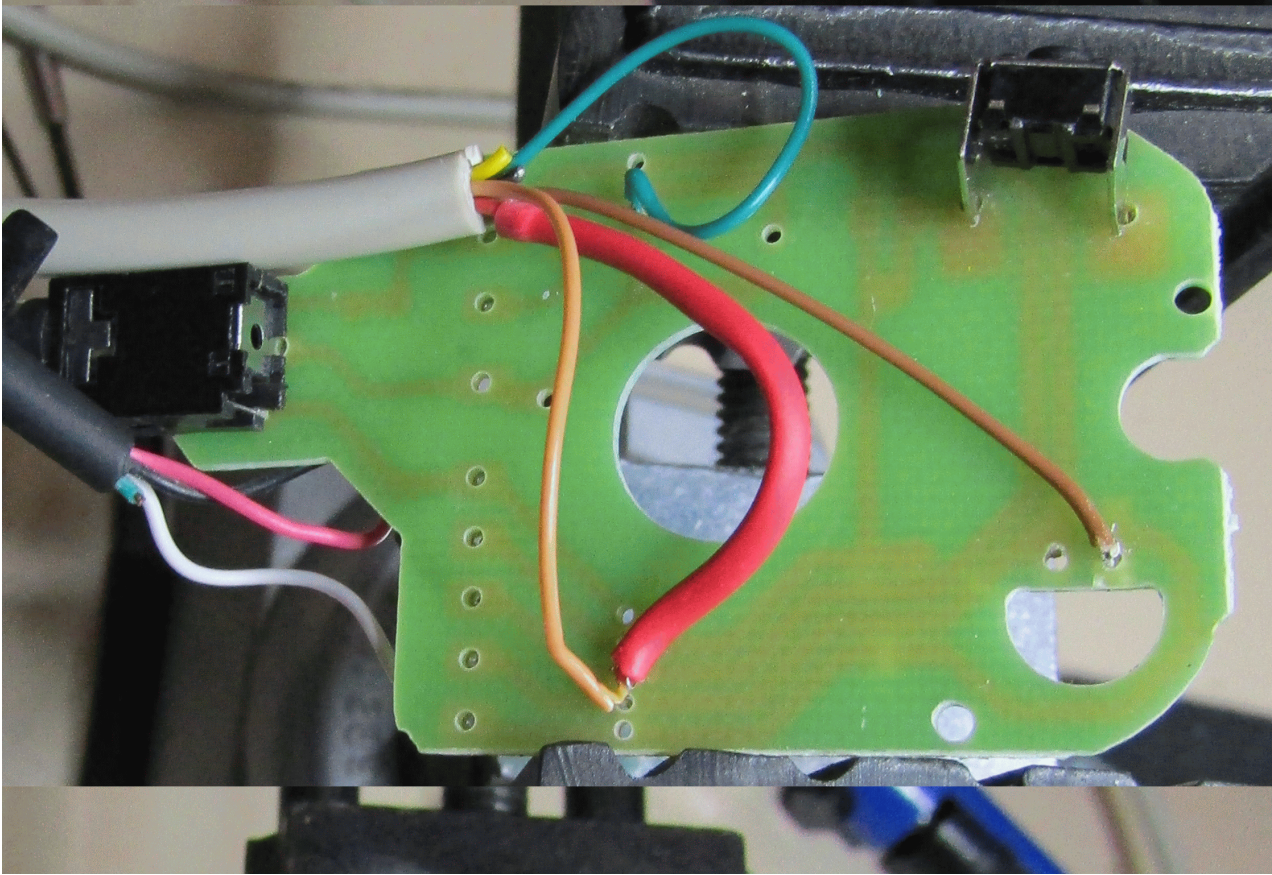
Step Three:
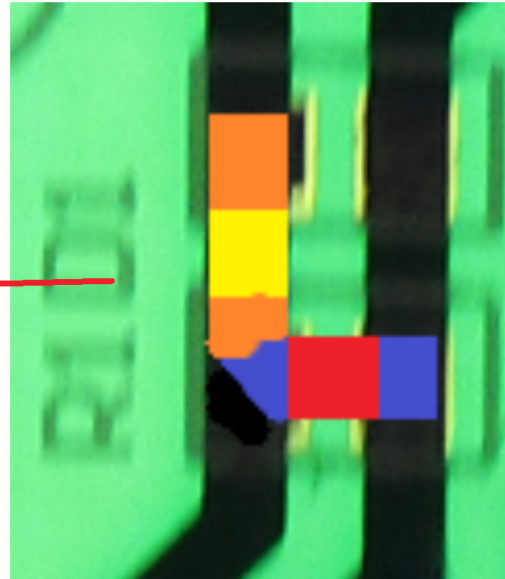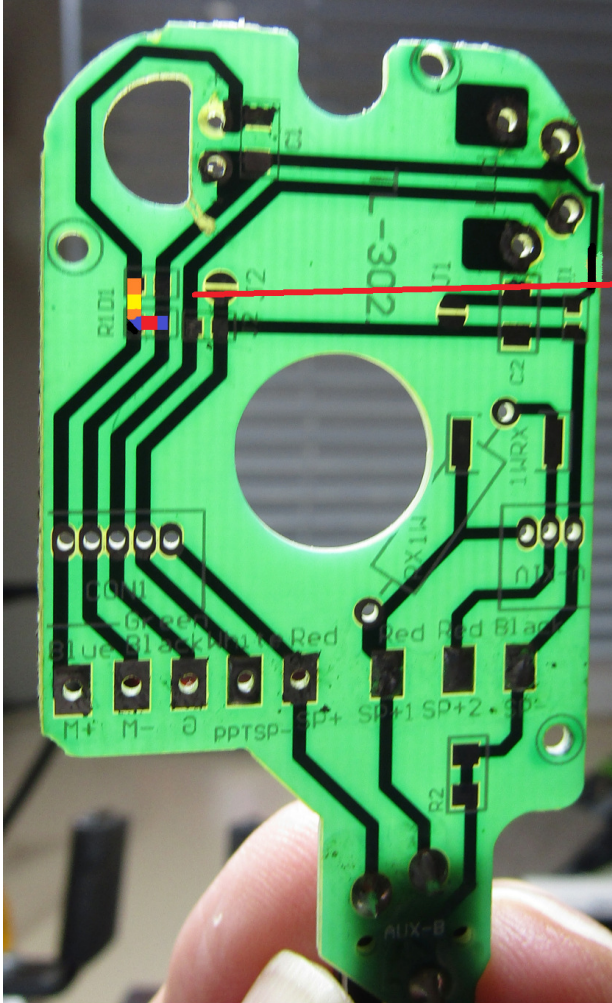
Install C1 10 uF cap using the solder pads on each side of the trace you previously cut at this location in step one.

Install R1 2.2K resistor between the bottom pad of C1 and the pad on the adjacent trace.
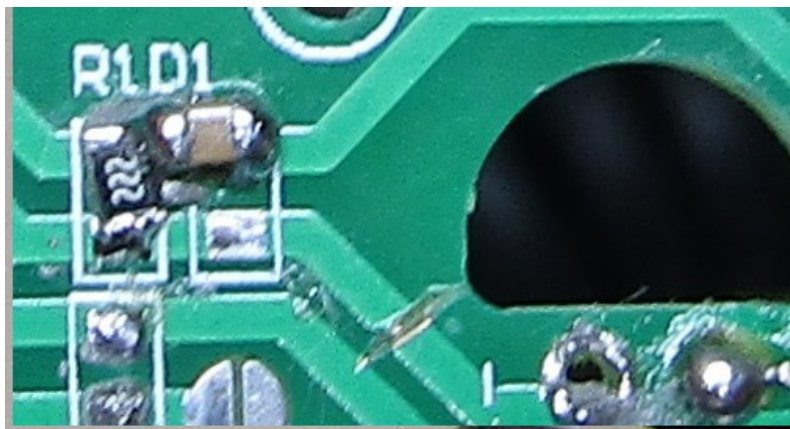
Step Four:

With the spkr/mic case clamped closed, drill a hole through the lower side of the case for the mini-DIN6 cable. I started with a very small bit and gradually increased until the cable fit with good tension/strain relief. Note: Drill the hole on the opposite side of the external headphone jack.
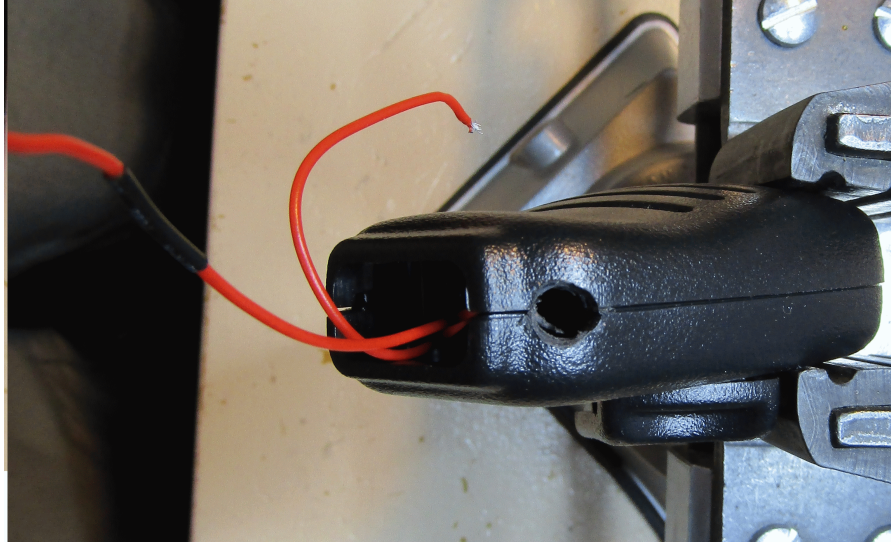
Step Five:

Reinstall the circuit board into the clam shell case, routing the speaker wires and DIN cable as shown below. Connect the speakers wires. The (+) wire goes back on the SP+1 pad. The (-) wire goes to where the microphone (-) was attached. Reassemble the clam shell case. **Note**: This modification still allows use of the external earphone jack in case of working in noisy environments. The PTL button will have no effect when there is an external speaker plugged into the interface.
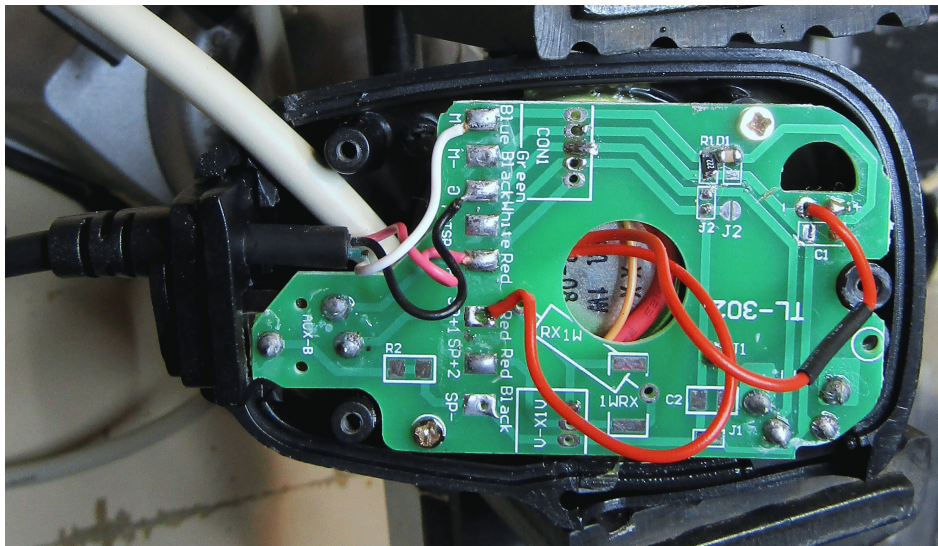
Now it's time to test the interface. Ensure the transceiver's squelch is open and the receive volume is adjusted so the VARA FM screen shows the VU meter at about the 1:00 o'clock position.

There are many youtube videos on how to set up VARA FM. If you prefer a document instead, try:

https://www.masterscommunications.com/products/radio-adapter/dra/vara-primer.html
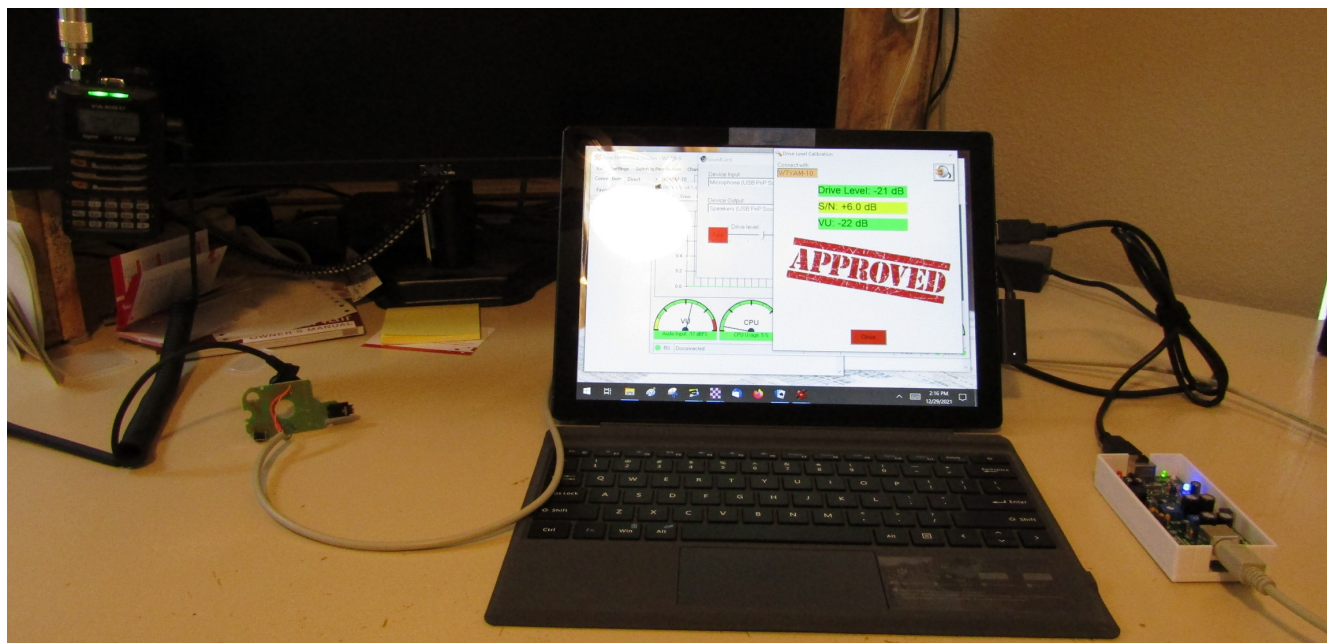
Here is the completed interface.

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Vara FM Winlink Session - WA7IB-5                    —   □   ×

Exit    Settings    Switch to Peer-to-Peer    Channel Selection    Start    Stop    Abort

Connection:  Direct      ▼  W7YAM-10    via  [          ]  ,  [          ]   Freq.:  144.960

Favorites:  [                                    ▼]  Select   Add to favorites

In: 19295/24184  Out: 0/0  BPM: 29463  Disconnected  Time to next Autoconnect = Disabled

*** Connected to Winlink RMS: W7YAM-10 @ 2021/12/29 22:25:37  Freq: 144.960
W7YAM-10 VHF VARA FM v4.1.8 RMS Gateway  Eola Hills, Oregon  Yamhill County ARES
[WL2K-5.0-B2FWIHJM$]
;PQ: 75804287
CMS via W7YAM >
  ;FW: WA7IB-5
  [RMS Express-1.5.43.0-B2FHM$]
  ;PR: 69886154
  ; W7YAM-10 DE WA7IB-5 (CN85JE)
  FF
;PM: WA7IB-5 KZKO6GHZKIMA 18522 WA7IB@winlink.org FW: Fwd: here it is
;PM: WA7IB-5 DHVVX4FKZ3JV 24184 WA7IB@winlink.org test file
FC EM KZKO6GHZKIMA 25047 18522 0
F> 84
  FS Y
*** Receiving KZKO6GHZKIMA
*** KZKO6GHZKIMA - 25062/18535 bytes received
*** Bytes: 18698,  Time: 00:35,  bytes/minute: 31469
  FF
FC EM DHVVX4FKZ3JV 30713 24184 0
F> 85
  FS Y
*** Receiving DHVVX4FKZ3JV
*** DHVVX4FKZ3JV - 30728/24194 bytes received
*** Bytes: 24394,  Time: 01:07,  bytes/minute: 21810
  FF
FQ
*** --- End of session at 2021/12/29 22:28:15 ---
*** Messages sent: 0.  Total bytes sent: 0,  Time: 02:37,  bytes/minute: 0
*** Messages Received: 2.  Total bytes received: 43092,  Total session time: 02:37,  bytes/minute: 16424
*** Disconnected from Winlink RMS: W7YAM-10 @ 2021/12/29 22:28:15
*** Session: 2.6 min;  Avg Throughput: 12467 Bytes/min;  1 Min Peak Throughput: 12467 Bytes/min
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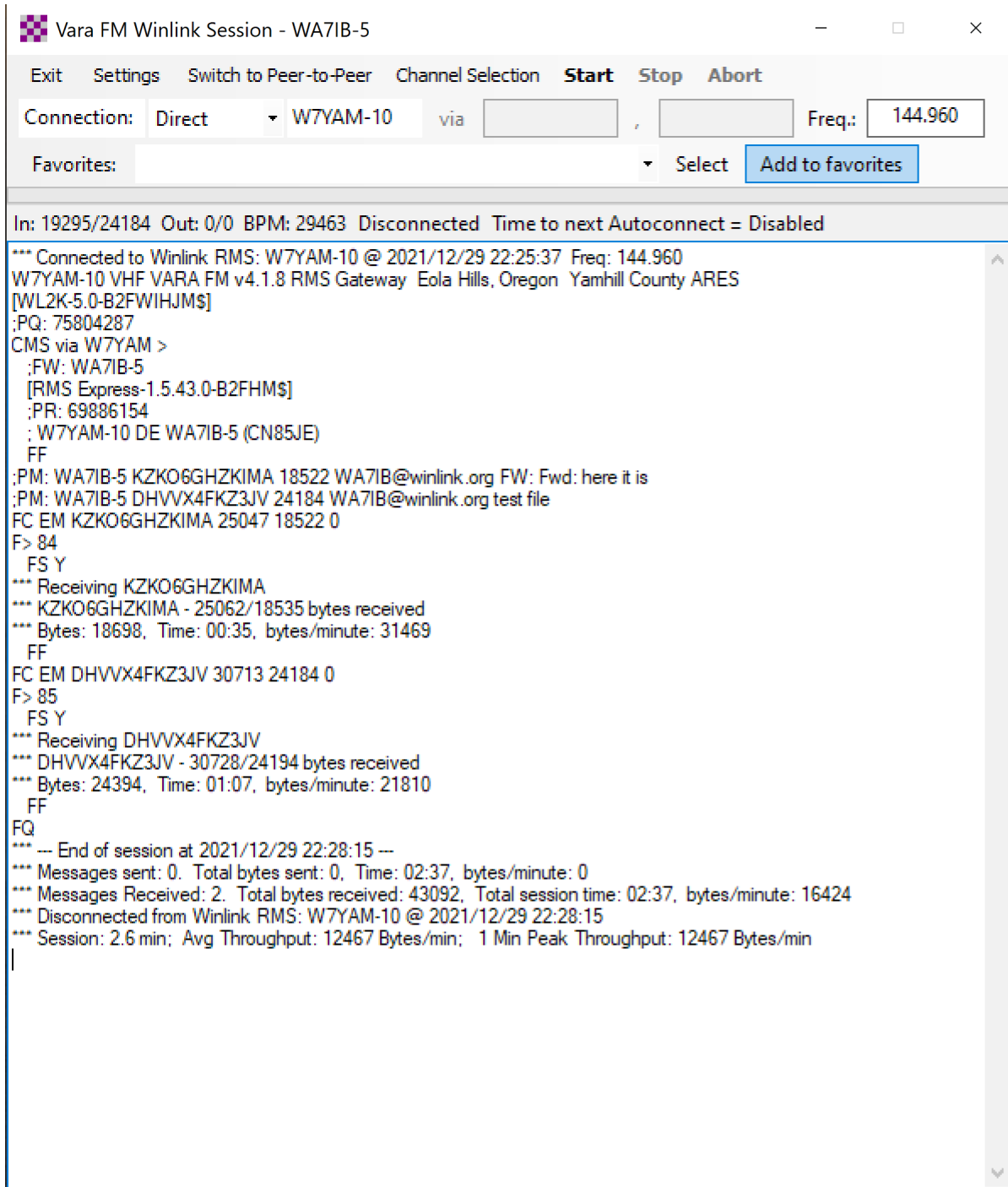
As you can see, it is FAST.

The ohiopacket.org website is an excellent source to find TNC wiring diagrams for MANY newer and older transceivers, including HTs.

https://ohiopacket.org/files/wiring_diagrams/web.archive.org/web/20000902104029/www.packetradio.org/tnc2rad.htm

Parts List

1. PS/2 MDIN-6 Male to Male Cable - 6 Feet:

https://www.amazon.com/gp/product/B001TKQOTG/ref=ppx_yo_dt_b_search_asin_title?
ie=UTF8&psc=1

2. MH-34 Speaker/Mic

https://www.ebay.com/itm/274645240603

3. DRA-36 Soundcard

https://www.masterscommunications.com/products/radio-adapter/dra/dra36.html

4. Tripp Lite USB 2.0 Hi-Speed A/B Cable

https://www.amazon.com/gp/product/B003MQ29B2/ref=ppx_yo_dt_b_search_asin_title?ie=UTF8&psc=1

5. SMD Resister Sample Pack:

https://www.amazon.com/dp/B07R5S5RFK?psc=1&ref=ppx_yo2_dt_b_product_details

6. SMD Capacitor Sample Pack:

https://www.amazon.com/dp/B06XD3K15S?psc=1&ref=ppx_yo2_dt_b_product_details

This would be an excellent project for a club or EMCOMM group to sponsor. There are 20 caps and resistors of each value in the SMD "sample" packs. Using the information found at the Ohio Packet site, you should be able to find schematics for almost any Amateur transceiver. The SMD sample packs should provide whatever component values needed.

73

de Hal / WA7IB