

# Adapt your FT-70DR HT for Digital Mode Desk-Top Operation

Don Dorward VA3DDN

The March 2018 QST Product Review of the Yaesu FT-70DR, prompted me to obtain one, albeit a few years later!

The Bottom Line description of the radio as being a good choice to get into System Fusion and hotspot use stuck in my mind. The article which follows describes my experience with it and how I adapted the radio for "Desk-Top use."

The FT-70DR can be used to access local C4FM repeaters in your area, but I wanted to use it also with a localized hotspot, so I could access the wires -X network and other digital modes like DMR.

However, I found it challenging to simultaneously hold the radio, read the small single line display, and then also push PTT and other appropriate buttons relative to the digital mode in use. Hence my decision to adapt the FT-70DR to desktop operation.



Figure 1

This project puts the hardware conveniently in front of you, freeing your hands for operating. Want portable operation again? Just pull out 2 plugs and unclip the FT-70DR from its stand. Note that this desk-top conversion could equally apply to most any other handheld radio which has connectors for an external microphone and speaker. As you can see from Figure 1, the transceiver, an external speaker and an external microphone are all mounted together on a small 7" x 7" plywood square.

There are only 2 connections required to the HT, a 4-connector 3.5 mm TRRS\* plug for microphone and audio, and a DC power plug. Note: "TRRS Plug" is an old telephone technology name for the 3.5mm audio plug often used today to connect ear-buds or other accessories to our cell phone or tablet. TRRS refers to the contact rings on the plug, ie: Tip, Ring1, Ring2 & Sleeve.

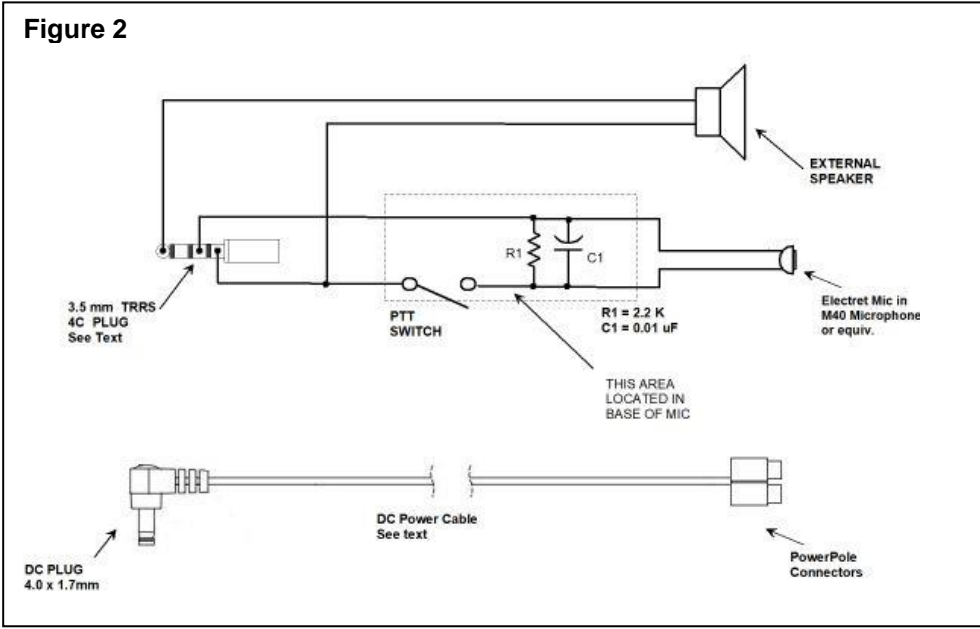
Jacks for both are located on the right side of the radio, behind those protective rubber plugs! (Note: external 12vdc allows continuous backlight operation without discharging the battery)

Someone is sure to point out that it would appear simpler to just use a regular speaker-microphone like the Yaesu MH-34B4B, instead of the separate speaker and microphone as proposed. Yes, you could, but then you end up with one hand fully occupied again to hold and key the mic. As well, the audio from most speaker/mics is not great.

Figure 2 shows the simple wiring involved, but you will need to gather together a few things:

- A wood panel scrap to mount everything on, mine was 7"x7" from some 1/2" plywood.
- 3.375" x 1.5" of 1/4" "hobby wood" or other, to provide the mounting bracket for the HT belt clip
- A small 3/4" x 3/4" metal 90° bracket and 2 suitable screws. Bend to ~ 70°
- A small speaker - I used a spare "Big Mouth" communication speaker

Figure 2



- An electret microphone - I used an old "Telex" brand computer microphone
- SPST switch for the PTT, pushbutton or toggle type, your choice
- TRRS 3.5mm 4C plug and cable
- 2200 ohm (2K2) ¼ watt 5% resistor
- 0.01 ufd ceramic capacitor
- DC power cable, Digikey CP-2198 (Tensility CA-2198)
- Suitable terminal strips to inter-connect all the wires together

**TRRS plug and Cable (Figure 3)**

The most likely source for a 4-wire cable with a TRRS plug is to find an unused cell phone audio cable or extension cable. Just cut one end off, leaving the 4-c plug end intact.

It is *most important to ensure that the plug end will fit all the way into the MIC/SP jack on the radio*. This means that the diameter of the rubber or metal stop on the 4-c plug cannot be more than about 6.4mm (0.25") in diameter.



Figure 3

**DC power Plug and Cable (Fig 2 above)**

Running with the backlight on continuously flattens the FT-70DR battery quickly. I like to have it on and so use the DC power cable shown in Fig. 1. The cable is an off-the shelf item from most distributors like Digikey, p/n CP-2198-ND, Tensility # CA-2198. I fitted the other end of my cable with Anderson Powerpole connectors for 12v use in my shack

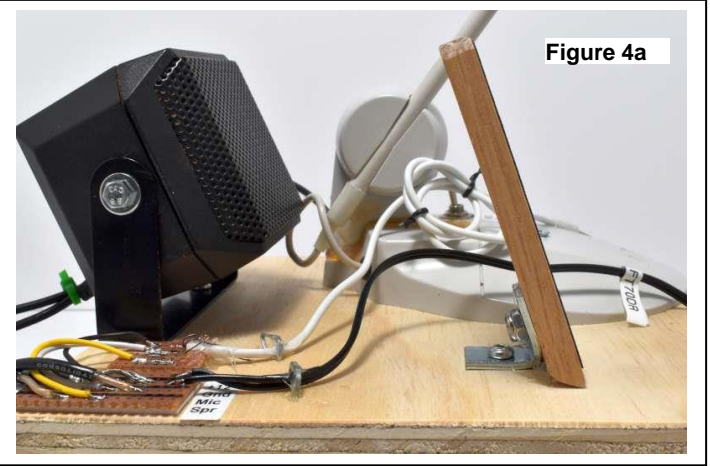


Figure 4a

**FT-70DR Mounting Bracket (Figure 4a, 4b)**

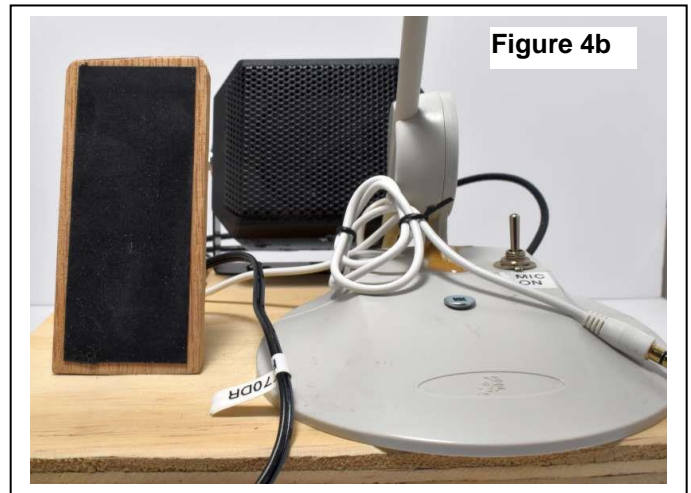
The mounting bracket was made from a small piece of ¼" x 1.5" w oak, it gives the FT-70DR belt clip something to attach to. It helps to glue a strip of rubber on the face of the bracket which helps keep the radio in place. Note that the metal fastening bracket is bent in a vise so the radio ends up sloped at about 70°.

## Speaker

The small speaker I used has had different manufacturers and part numbers over the years. It may be known as the Workman 717, SH2P4, Big Mouth, Astatic 302-vs4 etc. I like the small size and the clarity. Of course, there are many others available so use what works for you.

## Microphone Mods (Figure 5)

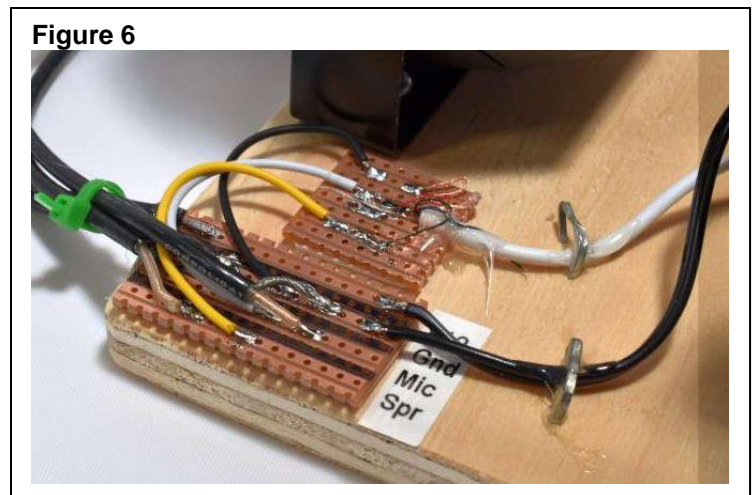
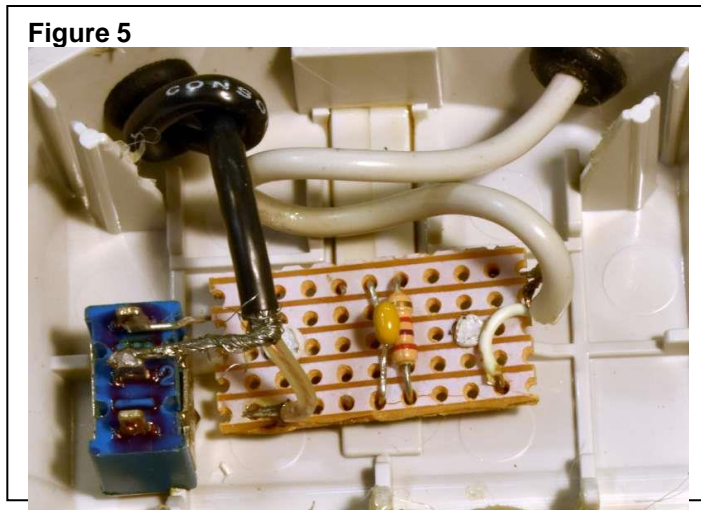
Most computer microphones are of the electret type and will work well with this radio. Mine was a vintage Telex “stick” mic, but there are many others including Califone AX-12, Labtec AM-242 etc. Just ensure what you use has an electret capsule in it. The nice thing about the old Telex is that it has room under its base for both the PTT toggle switch I used, and a tiny stripboard which has C1 and R1 on it.



## Connections (Figure 6)

The speaker and the mic have each 2 wires, and the **MIC/SP** plug cable has 4 wires, which need to be interconnected per Fig 2.

See photo which shows the 1” x 1.5” piece of stripboard I used as an ad hoc “terminal strip”. Beside it is a smaller piece of stripboard that I used to terminate the 4 very fine wires from the **MIC/SP** cable. Once all was soldered up and tested, I applied a coat of 5-minute epoxy to protect the wires. Marine “Goop” is a good alternate.



## Future Mods

So far in use the desk-top FT-70DR has exceeded expectations. I had to boost the FT-70DR set audio a bit by pressing the VOL button located below the PTT and then rotating the dial on top. I have also noticed that there is a wide range of audio levels received from the different networks as well as individual operators. An easier means of raising or lowering volume would be useful. I’m thinking that I might add externally a small LM386 audio amplifier with volume control, which would make listening more enjoyable.

73

VA3DDN, Don Dorward

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*(Note: This article was previously published with different formatting in Radcom Sept. 2022 and TCA Jan/Feb 2023.)*