# FT-817(ND) DIY Data Modes miniature USB interface version 2

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This is an updated version (v2) of the digital interface compatible with some Yaesu HF transceivers like:

- FT-817(ND)
- FT-897D
- FT-857D

The original documentation can be found here:

http://www.yo3ggx.ro/FT817_DIY_data_modes_interface.pdf

I will present here only the differences from the version 1 of the interface.

To summarize, the main differences are:

- another type of USB hub was used;
- the PTT now is based on RTS signal from the serial interface and not on a VOX circuit. PTT is now separated through an opto-coupler;
- two LEDs are used for power (RED) and PTT (green);
- a plastic case is used instead of a PCB based one.

The final product looks like in the following picture.
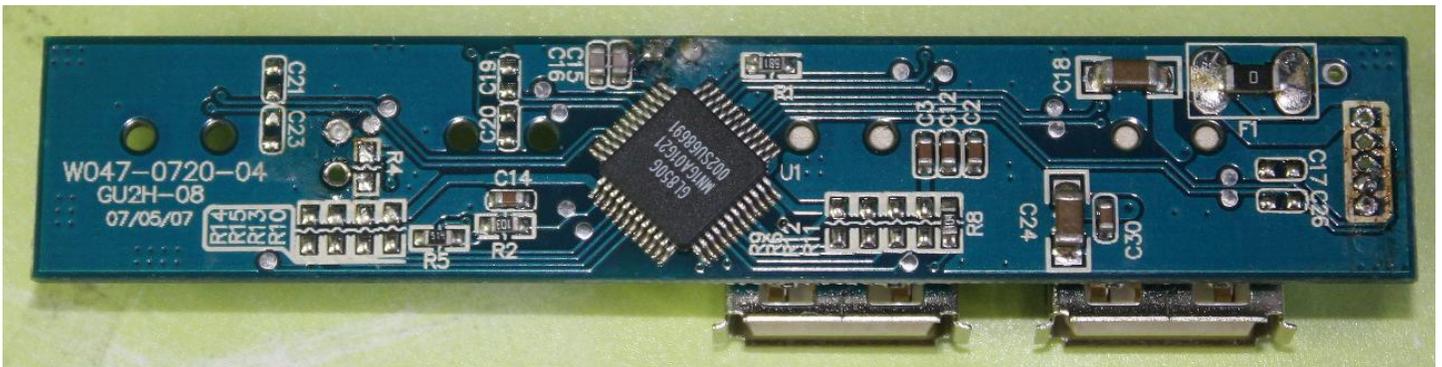
## The components

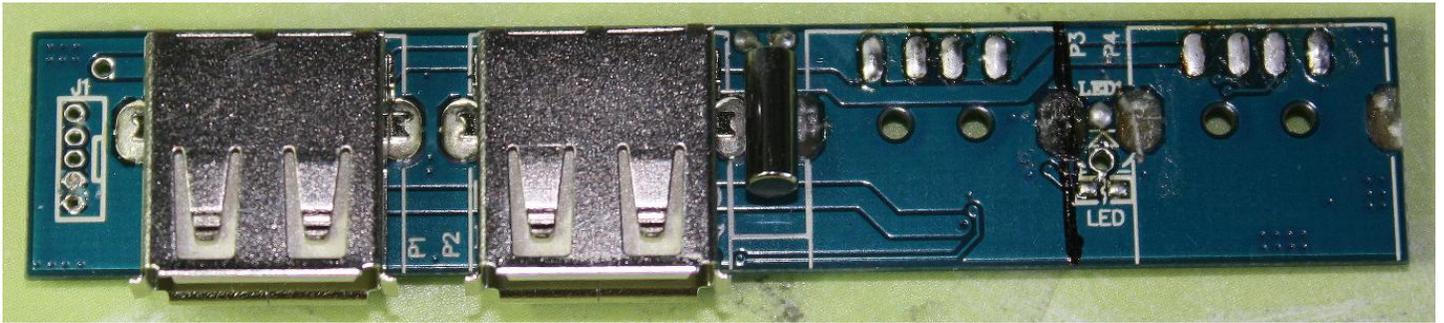First let's see where we can find the main components at the cheapest price.

1.  **HUB USB 2.0, 4 porturi, Digitus** (~ $8) at:
    http://www.conectica.ro/display/8-64-16858-Huburi_si_Distribuitoare/HUB_USB_2.0_4_porturi_Digitus.html.



When you take it out from the plastic case it looks like in the following picture (two of the USB connectors and the input cable already extracted):

2. **USB sound card** ( ~ $1.6) at:
   http://www.ebay.co.uk/itm/USB-2-0-3D-AUDIO-SOUND-CARD-ADAPTER-VIRTUAL-5-1-ch-/260513194910?pt=LH_DefaultDomain_0&hash=item3ca7cbe39e#ht_3520wt_1023



3. **USB to Serial (TTL) interface**:
   I'm an USB to Serial (TTL) interface from an old CDMA450 (Zapp Mobile) phone data cable.
   http://www.zapp.ro/personal/terminale/telefoane/accesorii/cabluri-accesorii-de-date/



There is no more available as a new product, but any kind of usb/serial (TTL) cable can be used.
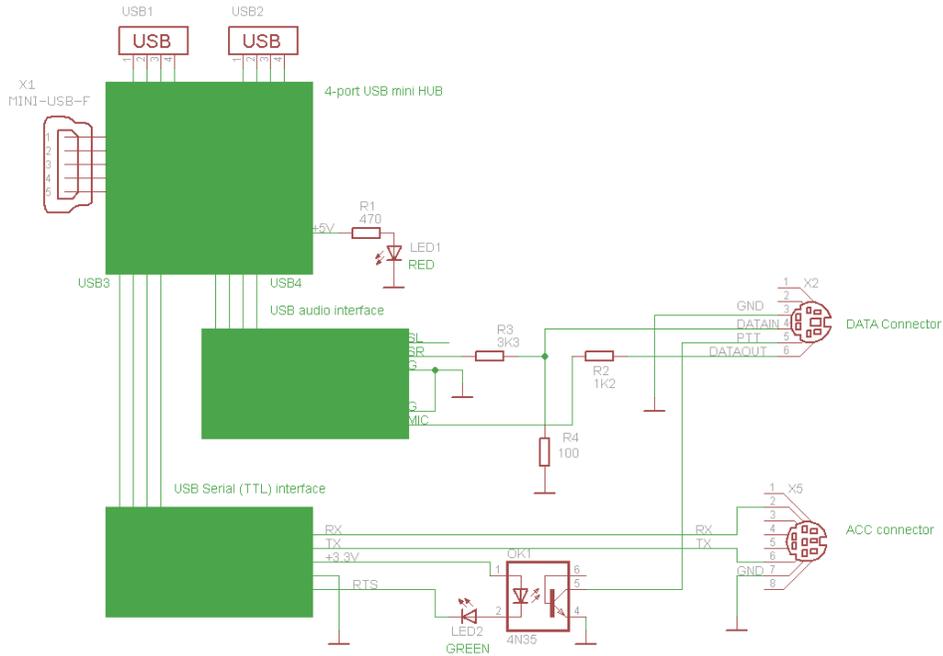
4. A microUSB connector extracted from an old card reader.
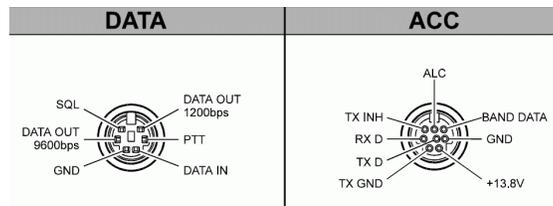5. Some small electronic components:
- R1 - 470ohm 1/8W
- R2 - 1K2 1/8W
- R3 - 3K3 1/8W
- R4 - 100ohm 1/8W
- LED1 – Red LED (3mm)
- LED2 – Green LED (3mm)
- OK1 – opto-coupler (4N35)
- X1 - mini DIN (8 pin) connector (male) – this comes with the USB CAT cable so you already have it

- X2 - mini DIN (6 pin) connector (male) – the same connector used for a PS2 mouse or keyboard. Unfortunately I was not able to find a mouse/keyboard with a cable using all pins, so I just use a new connector.

## The schematic



The pin-out for the two connectors can be found in the FT817(ND) user manual. A small extract below:
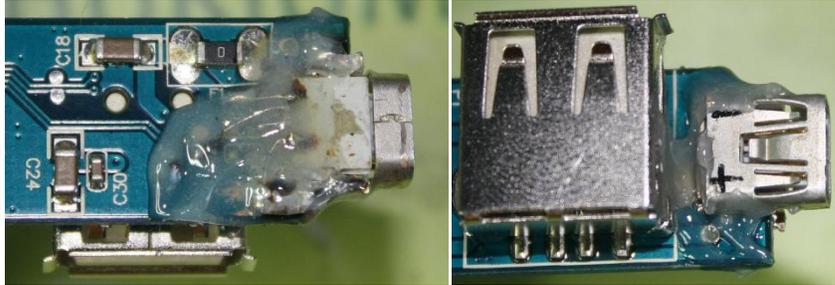


## How to build

I will try to explain by words all the steps. In order to reduce the size of the final product at minimum, some of the connectors from the original modules will need to be removed. You need basic soldering/de-soldering skills to do that.

1. Extract the USB hub PCB board from the plastic case ;
2. Desoldering two of the USB female connectors and the input USB cable (like in the picture blow);



3. Cut the PCB on the black line between the two de-soldered USB connector;
4. Extract the soundcard from the plastic case. You can easily do this as the plastic case is not very well attached.

5. Desoldering the two audio jack (Mic and Headphones);
6. Desoldering the USB connector (male);
7. Using short (~15mm) and very thin pieces of wire connect the microUSB female connector to the main PCB instead of the original USB cable, then fill all the space with POXIPOL ([www.poxipol.com](www.poxipol.com)) or similar epoxy, as in the following picture;



8. Extract the CAT USB/serial (TTL) interface from the plastic case and de-solder all the wires;
9. In the plastic case (external size 63mm x 34mm x 17mm) cut some holes for the two remaining USB connectors, for the microUSB connector, for the two LEDs and for the two cables to the transceiver;
10. Using thin isolated stranded wire make the connections between the 3 modules for the 2 USB ports (from HUB to audio and from HUB to the USB-Serial interface);
11. Fix the USB hub in the base of the case using POXIPOL ([www.poxipol.com](www.poxipol.com)) or similar adhesive;
12. Fix the two other modules on top (with adhesive), taking care that the TX/RX/GND pins for the CAT module and the audio pins from the soundcard to be accessible;
13. Using epoxy fix the opto-coupler somewhere on the plastic case;
14. Build the audio attenuators directly on the PCB of the sound interface;
15. Connect the two miniDIN connectors using two 4 wire chielded cable of around 20cm.;
16. After checking that everything works as expected, you can fill empty spaces with POXIPOL. You will not be able to make any repair in the future, but the device will be less exposed to mechanical shocks.
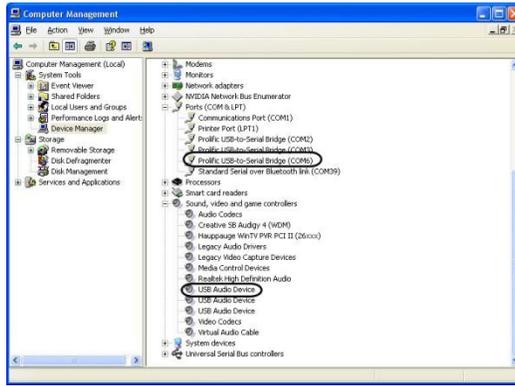
## Using the interface

You need to connect the interface to the PC/notebook using a standard USB(male)/miniUSB(male) cable.
**NOTE:** Use a quality USB 2.0 cable (shielded and with ferrite at the PC end) especially if you are working with high power.
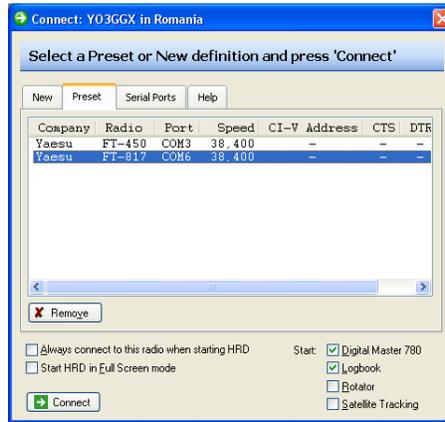 Wait for the drivers for the USB/serial module to be installed. If necessary, use the CD provided together with the CAT cable. Check in Computer Management / Device Manager / Ports (Windows XP) to see which port was allocated for the new interface. In the following example is port COM6.
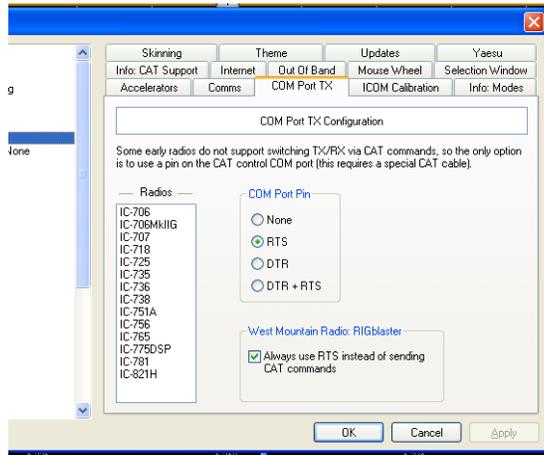Check that the USB sound interface driver is installed too.

Set in the program of choice for CAT the right COM port for CAT.

Example for Ham Radio Deluxe:



In HAM Radio Deluxe (Tools > Program Options > COM port TX) select as in the following picture.



Select in the program of choice for digital modes the right soundcard and the right PTT mode.

Example for Digital Master 780 (Tools > Program Options > PTT):

You are now ready to use your new interface even in portable mode with the little transceiver.

**FT817_DIY_data_modes_interface_v2.0.pdf      -  Bucharest, Dec 4th 2011 – © Dan Toma – YO3GGX – yo3ggx@gmail.com**