Useful modifications for the FT-817ND:

(1) DRM reception / SDR output (IF 12 kHz)

(2) Using the internal VOX for the data jack (digimodes)

(3) Connection of the mini speaker microfone ICOM HM-46

(1) DRM reception / SDR output (IF 12 kHz)

For receiving DRM transmissions (Digital Radio Mondiale) and for SDR experimentation (Software Defined Radio) with a PC soundcard the IF of 455 kHz has to be mixed down to a low IF of 12 kHz.

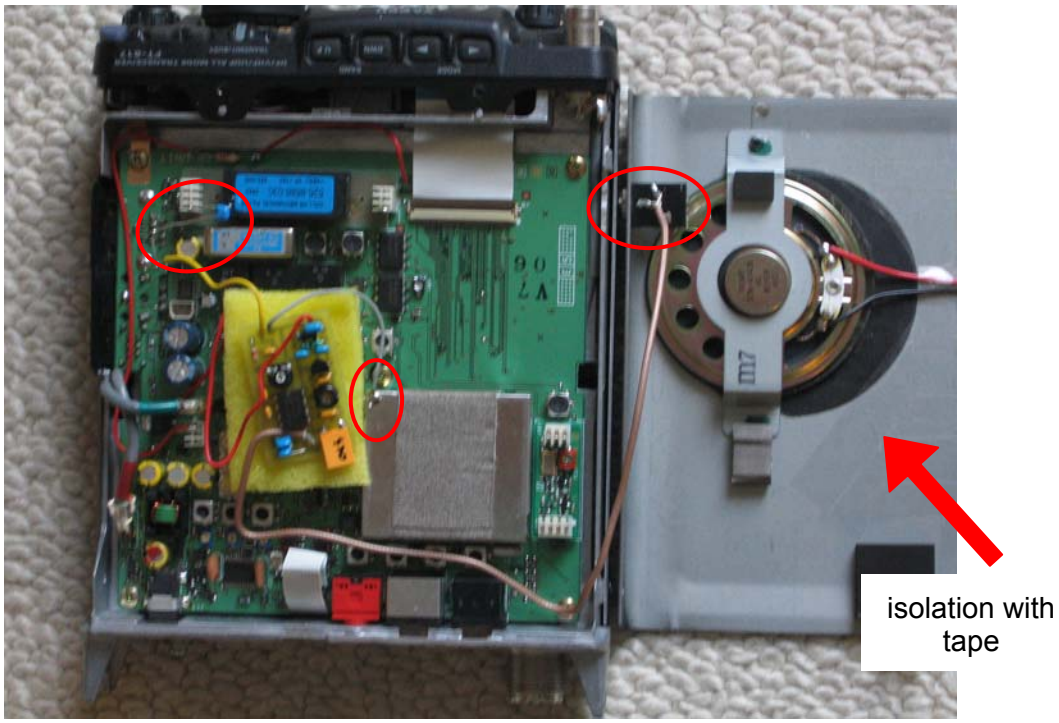
I use a „DRM-Converter“ of I5XWW with a SA612 mixer and a ceramic resonator which is tuned to 467 kHz by a variable capacitor (pic. 1). I'm sure the shown modification should work with similar units.

pic. 1

For receiving of the at least 10 kHz wide DRM broadcasting we have to catch the signal before the smaller IF filters.

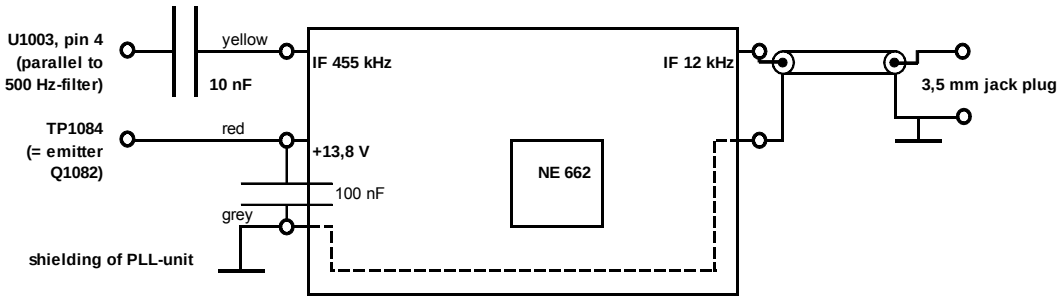
While having the optional 500 Hz filter (YF-122 C) built in, I couldn't use that space for mounting the mixer unit. So I did it my way:

1. „Chopping“ the mixer unit, that means desoldering all pins, horizantal mounting of the ceramic resonator, soldering voltage controller and capacitors very flat on the board, keeping wires at the rear side short
2. Instead of the pins I soldered wires: positive (here: red), ground (here: gray), IF input 455 kHz (here: yellow), output 12 kHz IF signal and ground (here: thin coax cable); preventive I added an additional 100 nF ceramic capacitor between positive and ground to avoid RF invasion into the voltage supply system of the FT-817.
3. Disconnect power supply and batteries (!) of the FT-817, then open upper cover (disconnect speaker cable!), then isolate the area beside the speaker broad with tape.
   For internal VOX modification (see below) now remove main PCB!
4. Lay a piece of soft isolating foam that is „unloaded“ about 0.7 – 1.0 cm thick and a bit larger than the mixer board onto the main PCB of the FT-817 (pic. 2) and place the mixer board on it:



pic. 2

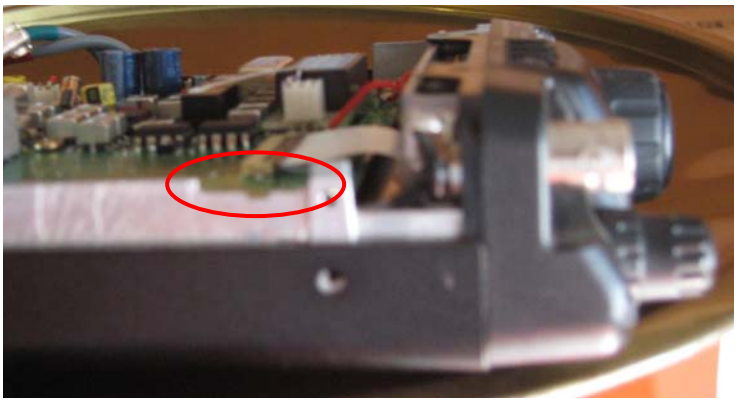
5. Connect cables of the mixer board like shown in pic. 3:



pic. 3

- All connecting points are on the upper side oft he main PCB and can be reached easily with the soldering iron.
- The 10 nF-capacitor is fixed on the case of the 500 Hz-filter with a drop of all-purpose adhesive and the yellow cable is soldered „self-supporting“.
- Because of the mixers sufficient highly resistive input there is no problem to keep it connected parallel permanently while using the 500 Hz-filter.
- The AGC of the FT-817 gets input from the signals that pass the 500 Hz-filter.
- The power supply of the mixer board is turned on and off with the TRX, so there is no burden for the batteries when turned off; the additional current drain when turned on is only a few mA.
- I noticed no couplings or phantom signals, only when the FT-817 is tuned to 467 kHz you can hear the oscillator, but without deflection of the S-meter at maximum RX sensitivity.

The 12 kHz-IF signal gets out by a thin coax cable and a 3,5 mm-jack plug (see above pic. 2); therefore I drilled through the upper cover and after covering the main PCB with plastic foil (cuttings!) I filed a little gap into the chassis of the FT-817 (pic. 4):



pic. 4

After mounting and connecting of the jack plug the re-assembling follows: On one hand the closing of the upper cover must be carried out without any pressure in spite of the additional components, on the other hand the mixer board should be fixed for portable use of the TRX because of slightly sinking into the foam (and the foam sinking into the parts under it); according to that the thickness and consistency of the foam has to be customized.

After re-assembling (don't forget the speaker cable!) we can see the following picture:

pic. 5

Now the FT-817 can be used as a „front-end" for a PC soundcard including the DRM reception with amazing sound quality even at DX: Connect the jack plug to the PC soundcard input, set the FT-817 to CW narrow, start your software; when the PC soundcard is overdriven (observe the display of the software) adjust the input gain some steps or the RF gain of the FT-817 continuously.

As a result of using the CW mode an indication error of the RX frequency in the amount of 700 Hz occurs (at standard settings for CW). To avoid this, choose the 500 Hz- filter for SSB in menu #38 (OP FILTER), then set the FT-817 to USB or LSB and the display shows the true RX frequency.

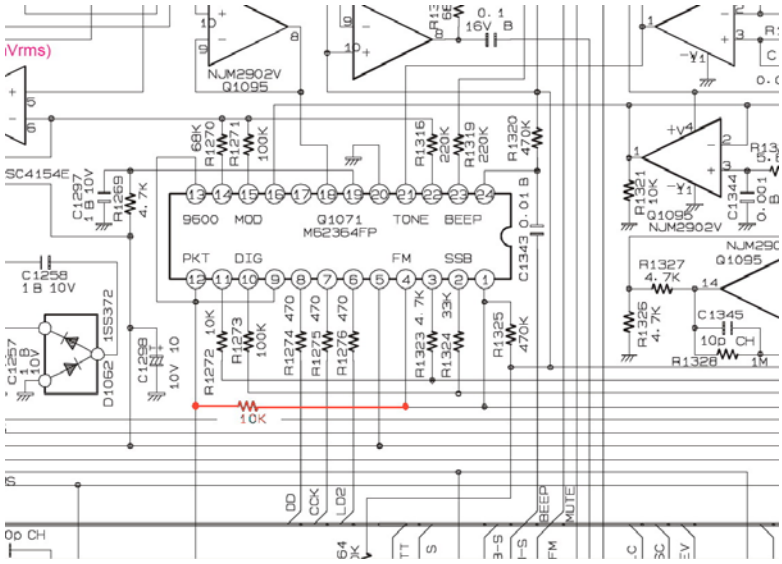
For DRM reception I'm using the „SoDiRa" freeware from Bernd Reiser (www.dsp4swls.de) with great success, which is more lean than the well-known DreAM software. SoDiRa supports amongst others synchronous AM reception, AM stereo and AMSS (amplitude modulation signalling system) decoding.

(2) Using the internal VOX for the data jack (digimodes)

As is generally known it's impossible to activate the internal VOX function for the data and packet modes at the FT-817.

With a simple modification you can nearly reach this feature that is badly missed for PC soundcard operation, especially if you don't have a RS-232 interface.

1. The RX signal is given out in all modes with a fixed level at the data jack, so you can receive without any disadvantages in USB/LSB or FM and therefore in these modes, that allow to activate the VOX function.
2. If there is a 500 Hz-filter, you can use it by the menu #38 (OP FILTER) in SSB (e.g. for PSK reception).
3. I found the quite simple solution for TX operation at the blog of OK1CDJ (in Czech language, I translated it awesome with a software and I was happy about the pictures): Insertion of a 10 kΩ-resistor between the circuit points 12 and 1 (or 4) of Q1071 on the B-side of the main PCB (pic. 6)

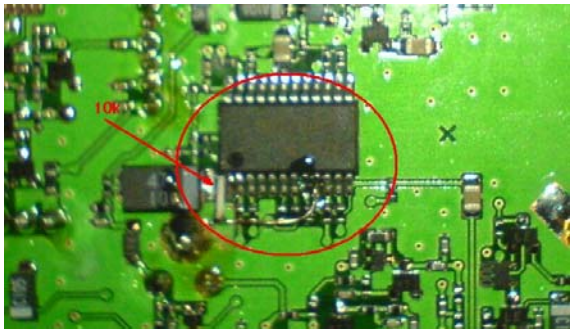


pic. 6

With this the AF signal from the data jack also is fed to the SSB- and FM-input of the TX.

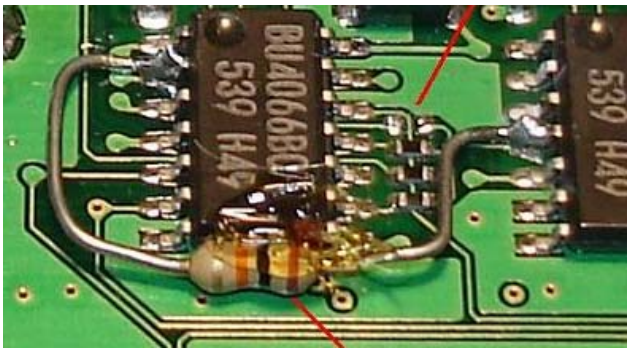
The sequence could be as follows:

1. Disconnect power supply and batteries (!) of the FT-817, then open upper cover (disconnect speaker cable!), loosen 5 screws of the main PCB, disconnect coax cable and both ribbon cables, lift PCB carefully and turn the B-side up.
2. Solder in a 10 kΩ-resistor; OK1CDJ did it that way (pic. 7):



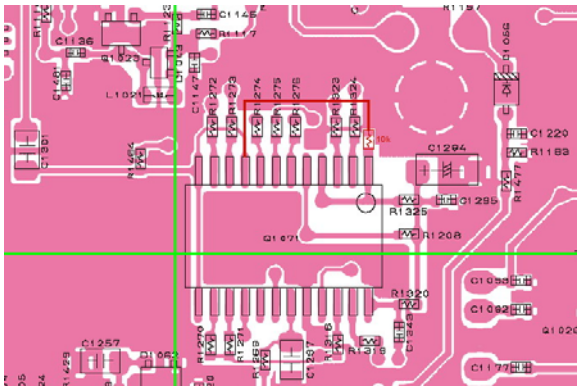
pic. 7

I‘ve chosen a mounting that I found at VE3MEO for another modification (pic. 8):



pic. 8

First fix a conventional 10 kΩ-resistor with all-purpose adhesive in the area of Q1071 on the PCB. After hardening of the adhesive the connecting wires of the resistor can be positioned and soldered easily to the side of the conectors of Q1071 (pic. 9).



pic. 9

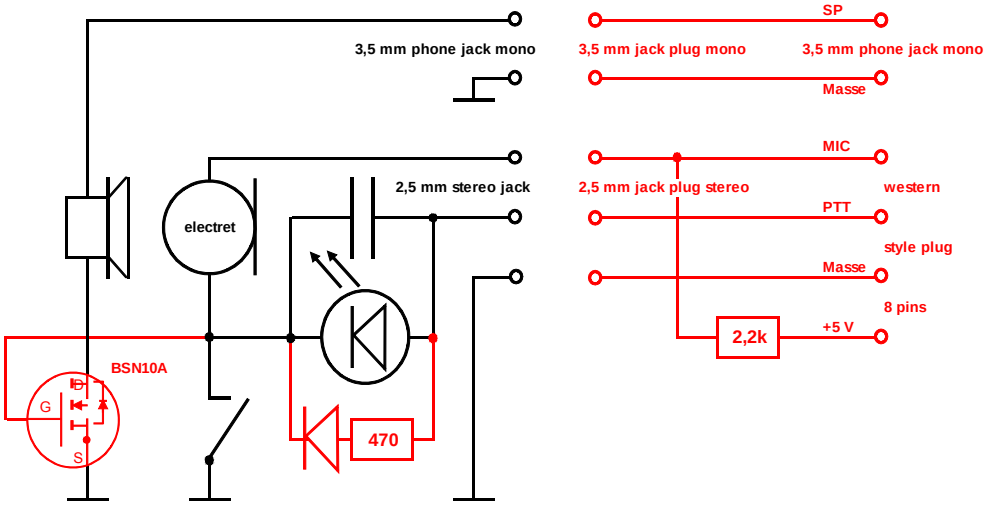
3. Re-assemble PCB and cover (don’t forget the speaker cable!).

The gain settings in SSB (menu #46) and FM (menu #29) is still be made with the demands of microfone operation. The right level for digi modes can be done at the volume level control of the PC soundcard. I set Menu #50 (VOX DELAY) to minimum (100 ms), while Menü #51 (VOX GAIN) can be set quite high, for example to 90.

To keep ambient noise off your signal and to prevent going on air unintentionally when using the VOX function at digimode operation you certainly have to use a microfone now that only puts out an AF signal when you‘re pushing PTT!

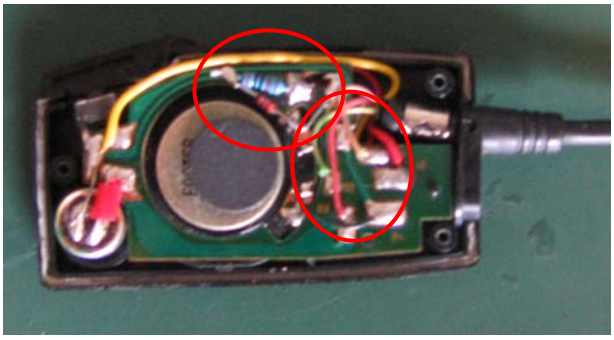
(3) Connection of the mini speaker microfone ICOM HM-46

In my opinion the nice original microfone MH-31 is too big in relation to the FT-817 (and by the way I like to use it with my FT-450). So I use the mini speaker microfone ICOM HM-46, which is still available today. In addition to the making of connections the following modifications are necessary (red in pic. 10)



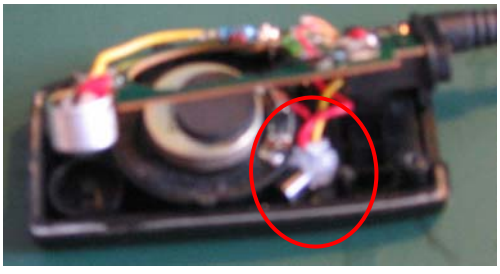
pic. 10

1. Increasing of PTT current
   A diode (type not critical) is soldered parallel to the LED with a serial resistor of 470 Ω (pic. 11)



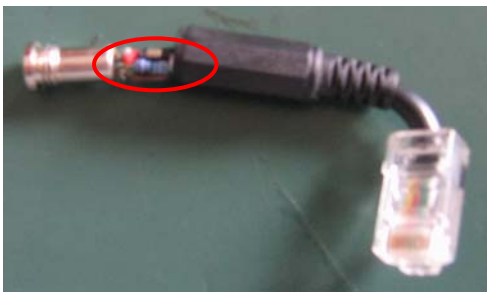
pic. 11

2. Muting the speaker during TX operation
   The AF amplifier of the FT-817 delivers permanently noise to the speaker output even during TX operation. Because of the tight acoustic coupling in the small microfone body the TX signal is affected without counteraction. Certainly you can just abstain to connect the mic's speaker, or you loop-in an adequate FET. The gate resistance of the BSN10A is high enough to keep the FT-817 reliably in RX operation if you don't push PTT; when pushing PTT the FET is muting the speaker. The FET is placed down left in the HM-46's body (beside the ducting of the helix cable) and is soldered self-supporting to the adequate extended cables; finally the FET wires are isolated by hot glue (pic. 12):



pic. 12

3. The 2,2 kΩ-resistor is mounted into the 2,5 mm-jack plug of the microfone adapter (pic. 13); without the resistor the AF signal would be quasi-bypassed to ground by C1434 in the FT-817 so that the signal level would be too low.



pic. 13

After modification the HM-46 can be used for other rigs like before by using the homebrewed adapter. The connectors of the western style plug are crimped without a special tool, but only using a simple screwdriver well-directed.

Because the electret unit of the HM-46 has very low sensitivity without pushing PTT (ground is missing!), the microfone can stay connected during operation in digimodes with the internal VOX modification that has been described before.

All information is given in all conscience, but I'm not liable for any damage that may occur!

Vy 73

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