

# Queensland Digital Group

## MFJ1270 TNC upgrade to X1J firmware

14 September 2005

### Introduction

The standard MFJ1270B TNC comes standard with a 27256 EPROM. For QDG purposes it will be necessary to upgrade the firmware (replace the eprom) with a 27512. This requires changes to the PCB.

Basic upgrade includes, PCB tracks to be cut, jumper's installed, fitting of the D8 socket and eprom replacement.

At a later date a small PCB will need to be made and fitted. This is the watch dog timer and is required for remote hill top installations.

### Parts required

You will need the following tools and equipment to complete this upgrade;

- (i) Sharp knife such as Scapple or Stanley knife.
- (ii) Jumper wires
- (iii) Soldering iron, fine tip & solder
- (iv) Din 8, locking ring style, socket
- (v) two only small philips head self tapping screws
- (vi) Drill, bit to suit screws
- (v) File, round
- (vi) SPST switch
- (vii) Glue gun and glue stick
- (viii) Multi meter (Continuity tester)

### Method

If you don't have a steady hand then stop right here. You will need to make two circuit board track cuts. You must not cut tracks either side of the wanted cut. A sharp knife is required. li use a new blade in the Stanley knife, but a scapple is better.

Remove the lithium battery and open JMP5.

For ease of construction I unplug the 2400 baud modem PCB. No need to remove any wires. Some require the removal of a screw located towards the front of the modem PCB.

Remove the eprom 27256, U23. It is the one closest to the front panel, on the left hand side looking from the front. The middle socket is not used

Remove the PCB from the case. Remove two screws on the front panel and four screws holding the PCB.

For the first piece of surgery you will need to gain access to a track which runs on the top of the PCB between pins 1 and 28 of U23 (eprom). I have found that by using a knife to cut the obstruction the IC socket is sometimes damaged. So I use a little heat.

Using a soldering iron melt the plastic strip of the IC socket (U23) being careful not to damage pins 1 nor pin 28. This is the plastic strip between pins 1 and 28, on the outside of the IC socket. Use your knife to make a clean cut after melting the plastic.

Identify the thicker track which runs between pins 1 and 28. Score this track with two parallel marks as close together as you can make them. Remove the small island and confirm with a multimeter that the track is now open circuit. do not cut the tracks either side fo the thicker track.

Identify the thick track (same one as above) which runs from pin 1 (U23) towards the front of the TNC. Confirm this is the inside track of the three heavier tracks which run at 45 degrees to the edge of the PCB. (About 15mm from IC U23, pin 1)

Score two parallel lines and remove the island as you did above. Confirm this track is open circuit. U23, pin 1 should now be open circuit to U23, pin 28 and to ground.

Using wire wrap wire, solder the following jumpers;

- Jumper 1      U23, pin 28 to U22 (Z80 CPU), pin 25. Confirm this is the heavier track, on the front panel side of the IC, 5th from the outside (eprom) side fo PCB.
  
- Jumper 2      U23, pin 1 to U21 (SIO), pin 16. This is NOT solder to the IC itself, follow the track from U21, pin 16 to a point where it come to four (4) via's or through holes in a row. It is the via (through hole) towards the front panel.
  
- Jumper 3      Fit a red jumper wire from J4, pin 16 (no tracks on this one) to plus 12 volts located at the junction of L1 and C12. Solder this to the underside of the PCB. Confirm the track is in a 'C' shaped track which is wider than those around it.

On the 2400 baud modem PCB you will have to cut a track. This is on the 20 pin header that plugs into J4. You need to isolate pin 16 as this is not required on the modem and can cause damage to the modem board if not cut. Identify a jumper to the inside of the modem PCB, from the header marked with 1, 2 and 3. Scribe two parallel track between pad marked 3 and 2. Remove the island and confirm it is open circuit.

That concludes the surgery on the PCB's. All that is remaining is to fit and wire the D8 and fit the SPST switch.

The SPST switch is necessary to switch the X1J firmware between protocol and non-

protocol modes.

Solder two wires to the SPST switch (top and middle posts) with rainbow ribbon cable about 100mm long. Tin the ends.

Using the hot glue gun fix the switch (vacant post to the bottom) to the PCB between the 5 pin Din socket and the DB25. Locate it as close as possible to the 5 pin Din socket, with the switch handle extending less than 4mm from the front of the 5 pin Din socket. Take care not to short the switch with JMP7. The body of the switch should be mounted against the PCB so it can switch in a vertical (ie up or down) manner.

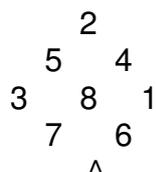
Identify C44 (+ve) (the thicker track) and solder one wire of the switch to this. Solder the other wire of the switch to R64, the end near to Q12. Route the wires away from the blue multi-turn pots.

Prior to wiring the D8 locking ring socket it will be necessary to fit it to the case. Identify the position where the VHF / HF switch was positioned. IT will be necessary to take the file and round out a section in the corner of the case for the D8 socket to be mounted. Do NOT file the bottom of the case as the PCB will short against the socket's pins.

You will need to test fit the D8 socket whilst filing the top of the hole in the case. I found it necessary to file out the white labelling 'VHF' in order for the socket to fit flush.

Using a suitable drill bit, profit the D8 socket and mark the centres of the holes. Drill them and fit the D8 socket. the screws should be fitted vertically so the nibble (locating hole) of the D8 socket is towards the inside. (ie pin 2 to the outside of the case, pin 1 to the top, and pin 3 down) Using the small screws fit the D8.

Solder the following wires to the D8 socket.



This view is from the back (solder side) of the socket. Remember that it is oriented on it's side with pin 1 up and pin 3 down.

Solder hook up wires about 250mm long as follows;

Green	6	(Rx Audio)
White	5	(PTT)
Yellow	3	(Tx Audio)
Black	7	(Ground)
Red	8	(+12v)

Fit the PCB to into the case. Fit the four silver screws into the PCB, fit the front panel

(2 black screws).

Check that pin 3 of the D8 socket does not short against the PCB. Bend it up a little if necessary.

Solder the wires as follows;

Black to SW1, towards rear, None of the two rows of three pins, solder to the pin on it's own where the large grounding mat is located.

Red To the point of SW1 where the jumper has been placed. Middle pins.

Cut the remaining three wires, yellow, green and white about 50mm shorter. Their length should be about 200mm.

White CR12, end near C31

Green C70, end near CR12

Yellow C34 (Not fitted), end towards JMP7.

Fit the 2400 baud modem, fit the eprom (as supplied with the TNC) and test same. It should operate as per normal.

With an X1Jv4 firmware eprom (27512) the STA led should be half lit. The switch needs to be labelled, up is Terminal, down is Protocol. Leave in up position and connect to terminal. Press ESC then type C enter. You should get a Connected response.

This confirms the TNC operation. If you don't have the X1J firmware then leave the switch in the up position (open circuit) and operate TNC as per normal.

Please advise me if you require further information;

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