Notes on building the BATC v2 Minitiouner

The board should be easy to build as it uses through hole parts. The components list and schematic can be found in annex A. There is no particular need to fit components in any specific order. I recommend fitting in order of component height. Do not fit the tuner module, the FTDI module or the J2 jumper at this stage.

The DC-DC converter module can be fitted on PCB headers or with wire offcuts. Use pliers to bend the regulator pins so that when fitted their mounting tabs align with the holes in the PCB. It's best to bolt down before soldering, this holds them in place and ensures alignment. The two socket headers for the FTDI module must be flat to the PCB. There is no need to fit J5 – J8 unless you intend to use them, they are for future expansion. If you would rather have the power LED on the front panel, fit a 2 pin header instead of the LED on the PCB. The result should look like figure 1.

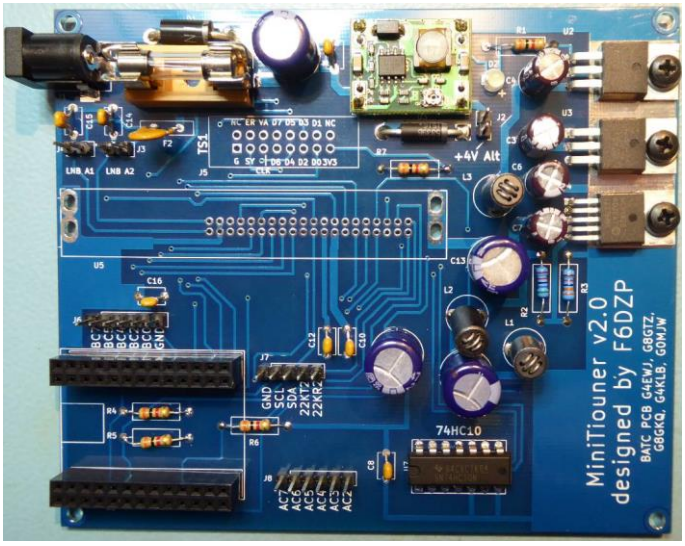


Figure 1 – BATC board ready for commissioning

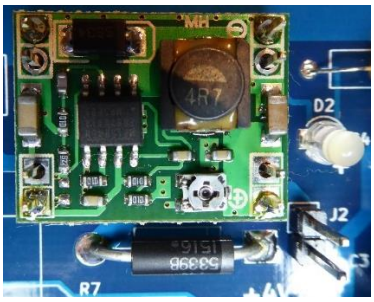


Figure 2 – DC-DC module

Commissioning

The DC-DC module needs to be set to 3.7-4 V output. You may want to do this before soldering it in, in case it doesn't work as expected. If you are not using the DC-DC you should feed 3.7-4 V into J2 as indicated on the PCB and then skip the next paragraph.

To set up the DC-DC, check again that the jumper on J2 is NOT fitted. Connect 6-18V supply – ideally via a regulated, current limited supply. Connect a voltmeter to the output of the DC-DC converter. Assuming no egress of smoke you will should find the output can be adjusted. Mine was originally set to 12V and the pot needed to be turned clockwise. Once you have checked and re-checked the DC-DC output really is in the 3.7-4.0 V range, fit a jumber on J2.

You should now measure the supply rails, there are three and the easiest place to measure is on the top of the ferrite RFCs, L1 = 3.3 V, L2 = 1.1 V, L3 = 3.3 V. If any of these are outside specification find out why and fix it. The tolerable range for the 1.1 V supply is 1.05-1.25 V. The actual value will depend on the tolerances of the regulator, R2 and R3. Expect about 1.1 V with the values suggested.

The Serit module can now be fitted. It should snap in reasonably easily but take care not to bend any pins. Making sure it is sitting properly on the PCB, solder the end tabs to hold it in position. Check again it is correctly aligned and then solder the 40 pins.

Fit the FTDI module checking it lines up and there are no bent pins. It can be a little reluctant to push down into the sockets. The result should look like Figure 3.

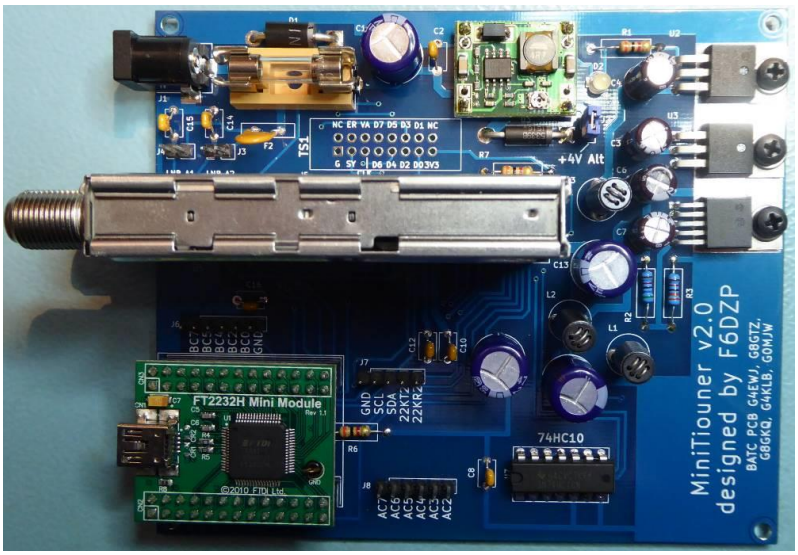


Figure 3 – Completed board

The Case

The board is designed to fit into a standard Hammond 1455N1201 Metal Enclosure. I went for BATC blue 1455N1201BU Digikey part no 1455N1201BU-ND, Farnell part no 2361595. Different colours or sizes will not affect performance. Figure 4 shows the rear panel and Figure 5 how it fits, note I have added the power LED to the panel. You may want to add other elements, e.g. LNB power switching. If you keep the bezels on this enclosure, you can trim the corners of the PCB to allow the board to mount flush to the panel. Use packing washers between the F-connectors and panel, the threads are 3/8-32 UNEF and are available from Digikey or can be salvaged from redundant satellite tuners.

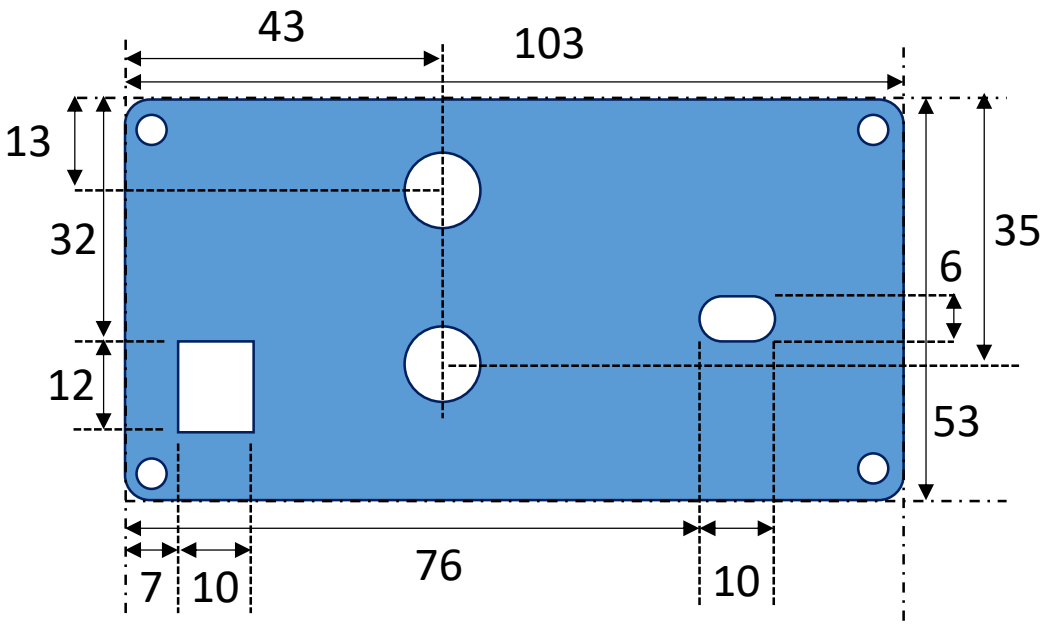
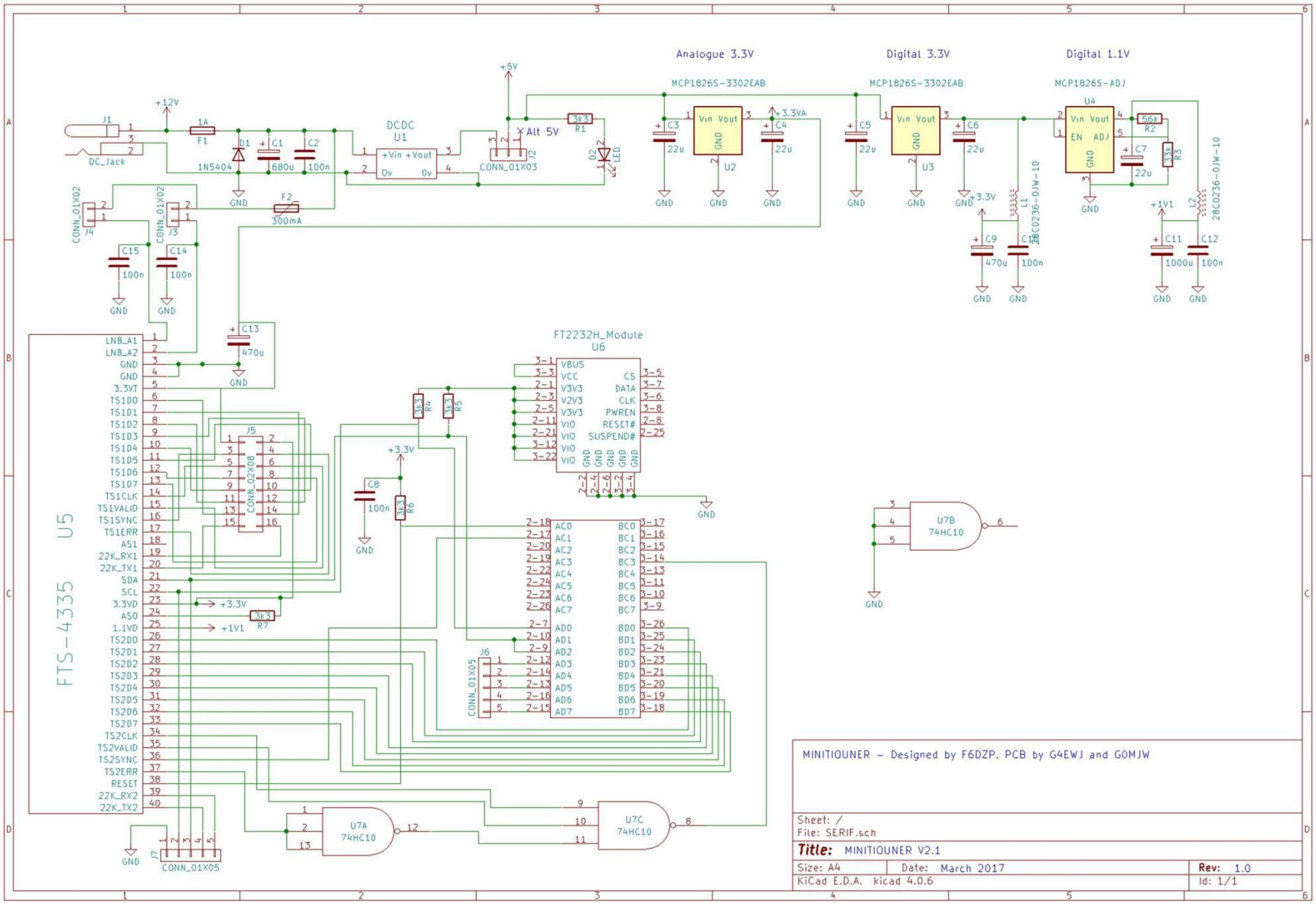


Figure 4 – Panel layout (Optional)

Figure 5 – Mounting in box

Annex A – Schematic and parts list



Designator	Qty	Value	Digikey	Notes
C1	1	680u	493-1829-ND	25V if you intend to feed with 18V
C11	1	1000u	493-1497-ND	>6V
C2,C8,C10,C12,C14,C15,C16	7	100n	BC2665CT-ND	5mm spacing
C3,C4,C6,C7	4	22u	493-11627-1-ND	>6V – must be low ESR < 1OHM
C9,C13	2	470u	493-15716-ND	>6V
D1	1	1N5404	1N5404DICT-ND	
D2	1	LED 3mm	1080-1113-ND	Any 3mm LED is fine, I used a white one.
D3	1	5.6V Zener	1N5339BTPMSCT-ND	Could also be 5.1V
F1	1	PCB Fuseholder	F6245-ND	
F2	1	500mA	MF-R050-ND	Choice here – 300mA to 1A.
J1	1	DC_Jack	EJ508A-ND	
J3,J4,J2	3	CONN_01X02	952-2262-ND	
J5	1	CONN_02X08	A33163-ND	Only needed for 2nd Tuner
J6,J8	2	CONN_01X06	A31116-ND	
J7	1	CONN_01X05	A31115-ND	
L1,L2,L3	3	28C0236-0JW-10	240-2493-ND	
R1,R4,R5,R6,R7	5	3k3	PPC3.3KBCT-ND	Anything will do
R2	1	56k	PPC56.2KXCT-ND	Use 1% or select on test
R3	1	33k	PPC33.2KXCT-ND	Use 1% or select on test
U1	1	DC-DC Converter		EBAY - Note – must be set to under 5V – ideally about 3.7V
U3,U2	2	MCP1826S-3302EAB	MCP1826S-3302E/AB-ND	
U4	1	MCP1826S-ADJ		BATC Shop
U5	1	FTS-4335		BATC Shop
U6	1	FT2232H_Module	768-1030-ND	BATC Shop – needs programming
U7	1	74HC10	296-12774-5-ND	
Headers for FTDI Module	2	CONN_02X13	S7116-ND	Not strictly necessary but advisable
Fuse 1A 5x20mm	1	1A Fuse	F2392-ND	Higher value if higher LNB current