Quartzmite V2.1 construction notes
PROVISIONAL

These are the construction notes for building a Quartzmite on the V2.1 boards.

Parts Identification

Many of the smaller parts have code numbers instead of their part number, the following table cross references part number to code number

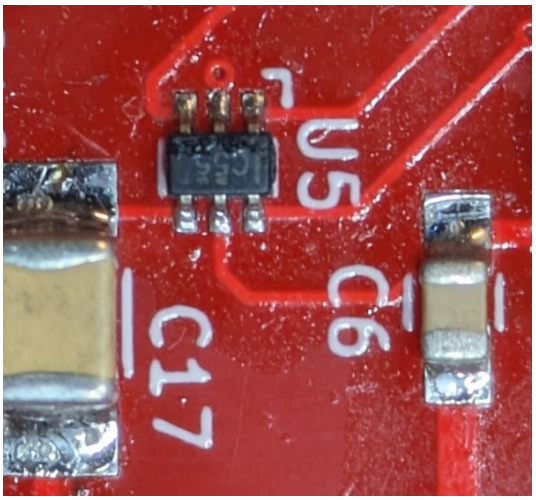
1N4148	5HS, T4 or A2J3
BB510	CA
MMBF170	6Z
MMBT4401	2X
78L05	8Cxxx
10k pot	14

Suggested construction and testing sequence

Fit the voltage regulator, U4 and its associated capacitors C6 & C29. Temporarily fit a power connector. Connect a 12v supply and check that there is 5v where expected (e.g. U3 pin 14).

Fit the PIC U3 and associated parts D3, R5, C1, C2, C3, C4 & C5. Temporarily fit a paddle connector. With a DMM or ‘scope check that the sidetone squarewave can be seen on U3 pin 16 when either the dot or dash paddle is closed.

Fit the op-amp U2, the analogue switch U5 (see photo for orientation) and R6, R7, R8, R9, R21, R22, C14, C15, C17, C18, C19, C28, RV1 & RV2. These parts form the audio amp and sidetone low pass filter. Temporarily connect a pair of headphones, when keying with the paddles the sidetone should now be heard.



Fit U6, U8, R3, R4, R10, R11, C20, C30 and C31 these form the voltage shirt logic that controls the varicap diode.

Fit Q1, R12, R13, R14, R15, C21, C22 & C23. Fit Y2 either directly to the board or in a socket. Add a ground wire from the metal can to the middle pin (see image right). These form the basic local oscillator. Fit the varicap diode D5 It should now be possible to see the output from the local oscillator at the emitter of Q1.

Listening for the local oscillator on a receiver tuned close to the crystal frequency it should be possible to detect the frequency shift up or down each time a paddle is pressed.

Fit U1, D1, D2, Y1, C7, C8, C9, C10, C11, C12, C13, C16, R1, R2, R20. These parts comprise the receiver, if an antenna is connected to point ‘RxA’ on the schematic then signals should be heard. The receiver audio should mute when keying with the paddles.

Fit Q4 since it is easier to fit before L1 is fitted in the next step.

Fit the capacitors in the low pass filter, C300/C301, C310/C311, C320/C321, C330/C331, C340/C341 these are in parallel pairs so that exact values can be obtained. Not all pairs have both fitted, it is band dependent. Then wind and fit L1 and L2. Connecting an antenna to the antenna connection should now enable signals to be heard in the receiver.

Fit C24, C32, Q2, Q3, R16, R17 & R18. When keying with the paddles a ‘scope should show driver output at the collector of Q2.

Fit C25, C26, C27, C33, D4 & R19. Wind transformer T1, note that the PCB pads for the primary winding are diagonally opposite each other as are the pads for the secondary winding. Choose the winding direction so that the ends come out in the correct places. With an antenna or dummy load connected there should now be RF output when keying.

The PA transistor Q4 can get quite hot, there is enough space on the mounting pad to add a small piece of copper as a heatsink if required. However be careful to keep it clear of the enclosure because the mounting pad is connected directly to the supply voltage.