

## Tait T500 control unit for the PLL

The transceiver modified was diode programmable for two channels. Some solutions available to implement multiple channels involve programming the channels and an additional channel selector installation on the front panel.

The objective for this solution was to provide tuning across the whole 2M band without further programming. An alternative front panel could be constructed to accommodate the extra controls needed but the solution chosen here meant there were little changes to the basic T500 and a very easy transition back to a two channel unit if required.

This unit is tuneable across the 2M band in 25 KHz steps. The PLL in this transceiver is capable to tune in 6.25 KHz steps and the design here can be implemented in those steps by making suitable changes to the Arduino code however 25 KHz seemed to be the best practical solution. It is understood that some models of the T500 come with a 5 KHz reference frequency which may be used to step across the band with appropriate changes to the Arduino code.



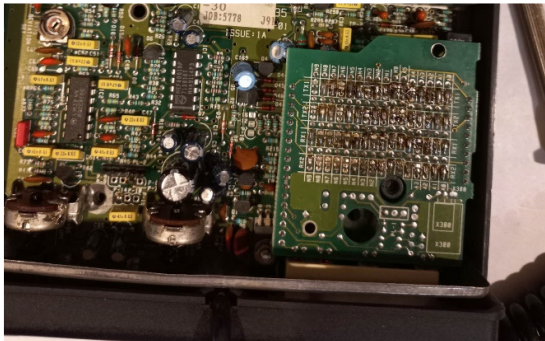
The layout selected here has the Arduino micro and controls in an enclosure attached to the top of the T500 case. Room has been left on the left of the panel so that another control can be added. By changing the Arduino code additional functions are possible.

Not yet labelled the switches in this layout from left to right are:

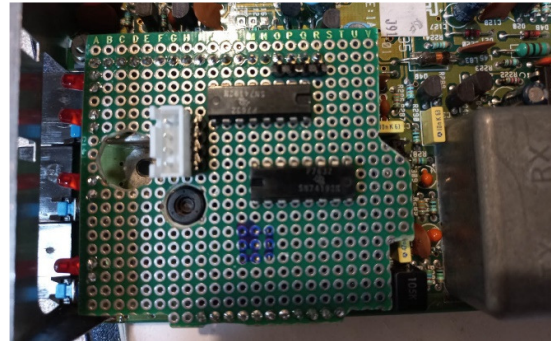
1. Scan on/off
2. Memory read/off/write
3. Repeater offset +600 KHz/0/-600 KHz
4. Display
5. Rotary encoder

PC boards used are 6x8cm through hole plated standard 2.54mm hole pitch. In the case of the board inside the T500 the hole spacings match the transceiver and make placement of components reasonably easy. Lining up the LEDs takes a bit of care – place them loosely, with the board in place, assemble the front panel, get them lined up and solder in position. The connections for the LED's can be determined from the original diode programming board and the T500 circuit.

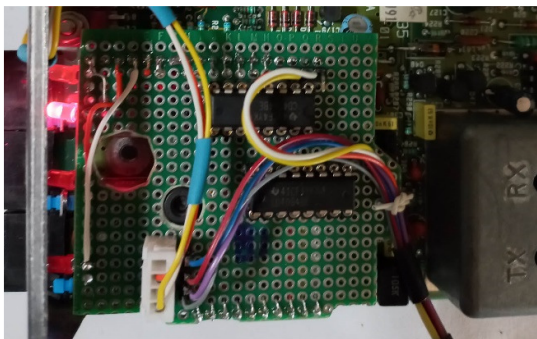
As shown in the photos below the board is shaped and holes cut to match the original board. The connecting plugs and sockets required need to match those on the original board and are readily available.



Original encoder board for two channels



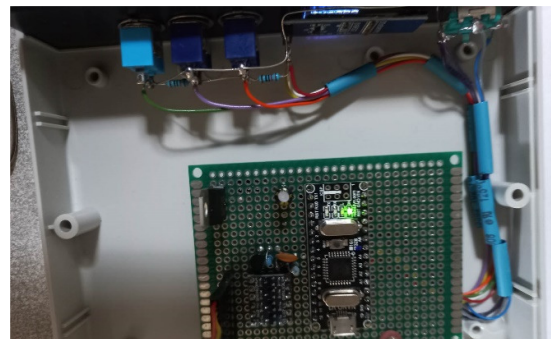
Component placement for replacement board.



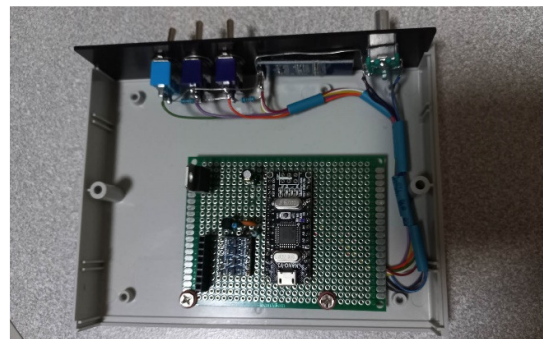
T500 board wired in. The CD4094 IC's are both socketed in this example. 3 connecting wires to the T500 are plugged into the board for easy board removal and are further connected to the Arduino unit.

1. Mic Tx switch – Tx Request
2. Tx Enable to T500
3. T500 9v supply

Where the Mic cable plugs into the board cut the track for connections 1 & 2. To reinstate the radio simply reconnect the cut track.



Internal layout of Arduino unit



Note this is the enclosure top – gets installed upside down.

From the Arduino unit to the T500 there should be seven connections

1. Clock
2. Data
3. Ground
4. +9v supply from the T500
5. Latch (or strobe)
6. Tx Enable
7. Tx Request

There are five additional files to describe the assembly of the unit. Note that the layout is not critical; the layout drawings are included to help with the connections and are not PCB design drawings. Some experimenting on the T500 layout may be necessary. You will note some blue marker pen markings on the PCB in an earlier photo in this document. This marked where a xtal that had been glued to the top of the PLL chip had departed the position and was near touching the replacement board under side – so it was left like that and the components placed to avoid contact.



In this case the interconnecting wires are soldered at the T500 end. A plug and socket were mounted on the Arduino board for the interconnecting wires. This enables the Arduino unit to be isolated for programming and any servicing. The Arduino unit was constructed and mounted on the top of the enclosure (i.e. upside down). By removing the top and disconnecting the interconnecting plug the entire Arduino unit can be separated.

The five additional files are:

1. T500 Arduino Circuit.pdf
2. T500 Arduino Layout.pdf
3. T500 Circuit.pdf
4. T500 Layout.pdf
5. Tait\_T500.ino This is the Arduino software file.