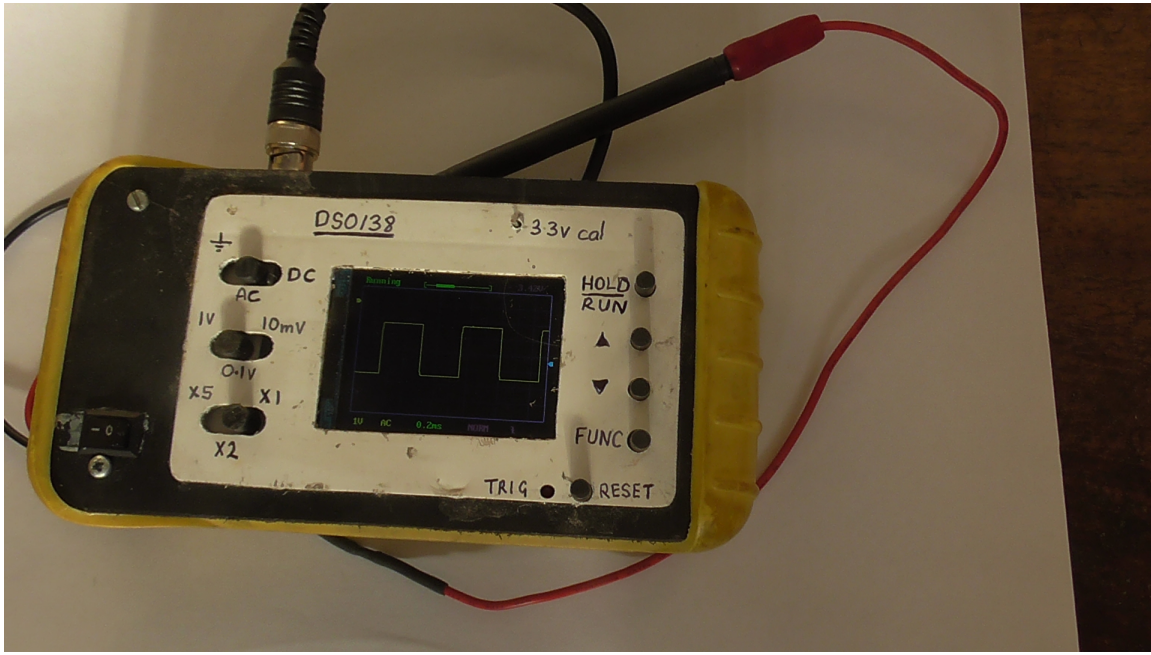




The JJE DSO 138 © calenterprises ltd

Already being the proud owner of two oscilloscopes I was loathed to accommodate another. However necessity dictates that I need a portable oscilloscope for field work. My son's thread-mill had gone pear-shape and although I had replaced some components on the board it still would not work. There was a micro driving a charge pump. I needed something to monitor that pulse under working conditions. I could hardly drag my 545B or HP1725A round to his house. I had looked at the DSO 138 before but discounted it as a mere plaything. Most control signals are less than hundreds of KHz so it is entirely suitable.

Comments on construction

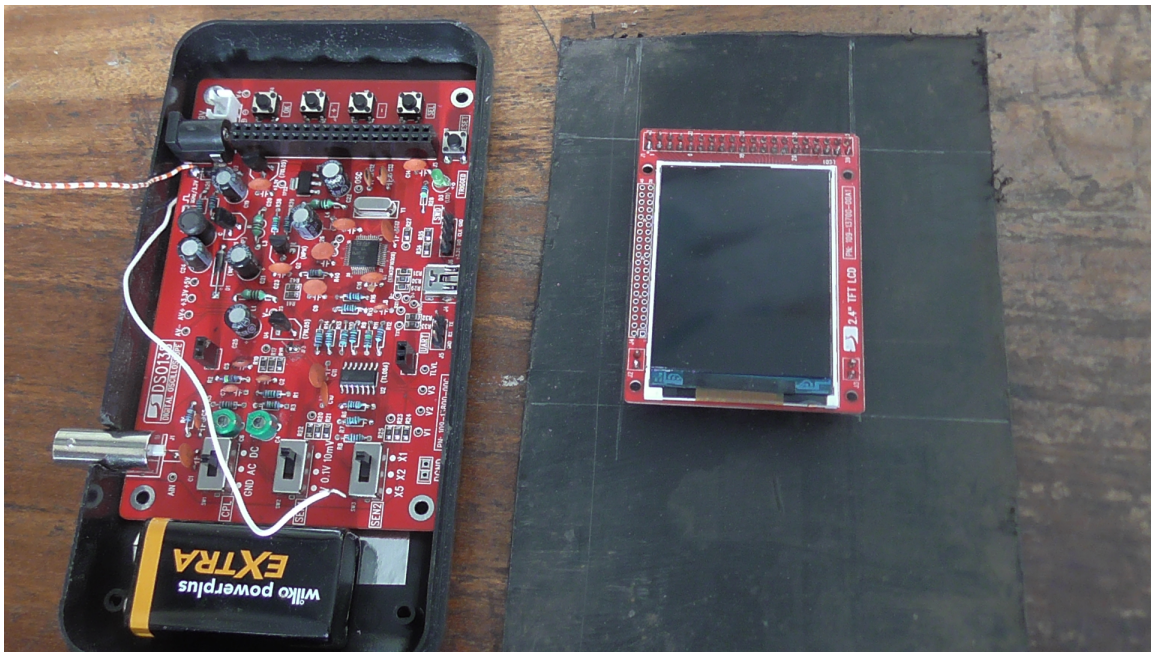
The instructions were very clear and helpful and advised the use of a multi-meter to make sure the right values of resistor were selected. I pushed the resistors through the holes first as instructed bending over the leads at the back of the board before soldering one lead for each component so that both leads can be cropped without the component dropping out. Finally the second lead can be soldered. There was a temptation to use too much solder to get a joint, but excess can be removed afterwards Joints should have the minimum size taking care to crop the leads close to the board (although this

makes it difficult to see an unsoldered joint). The grounded land seems to surround each joint so there is a chance of a short if the solder blob is too big. Continuing through the instructions the chokes are like fat resistors and measure zero ohms.

The LED can be installed with the leads “on tiptoe” as this needs to be visible at the front panel for triggering.

Commissioning.

Needless to say on switch-on the device did not work. I have to say I was not surprised, remember ages ago making up the ZX81 kit. The culprits were contacts on the display edge connector. Being so close together the joints can short with too much solder being applied. When this happens the microprocessor tests on switch-on and gives no display. The solution is to purge the joints with the board turned upside down. Phew finally it all works and gives a display. A 3.3v square wave can be displayed from the microprocessor out-put; this is protected from shorts by a 1k resistor.



If you are going to use the scope in the field you will need a suitable case. The available cases to buy look rubbish; I do not need to be able to see the works through a transparent case. Fortunately I had the back case from an old faulty multi-meter. From the picture you can see just enough room for the scope and a 9v battery. I decided to use the display as the reference for

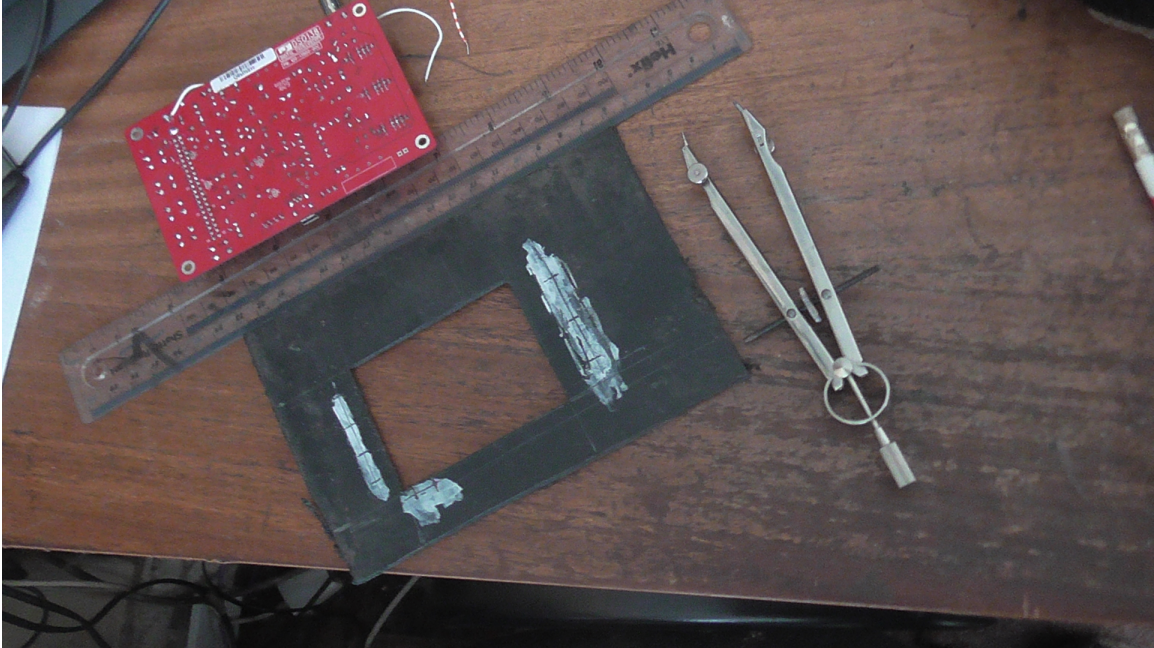
making the front panel out of some 1/8 plastic I had lying about. The piece shown is larger than needed but can be trimmed when finished. Marking out holes for the controls should be easy referenced to the display position.

The next picture shows a hole having been cut to exactly fit the outside of the display. .

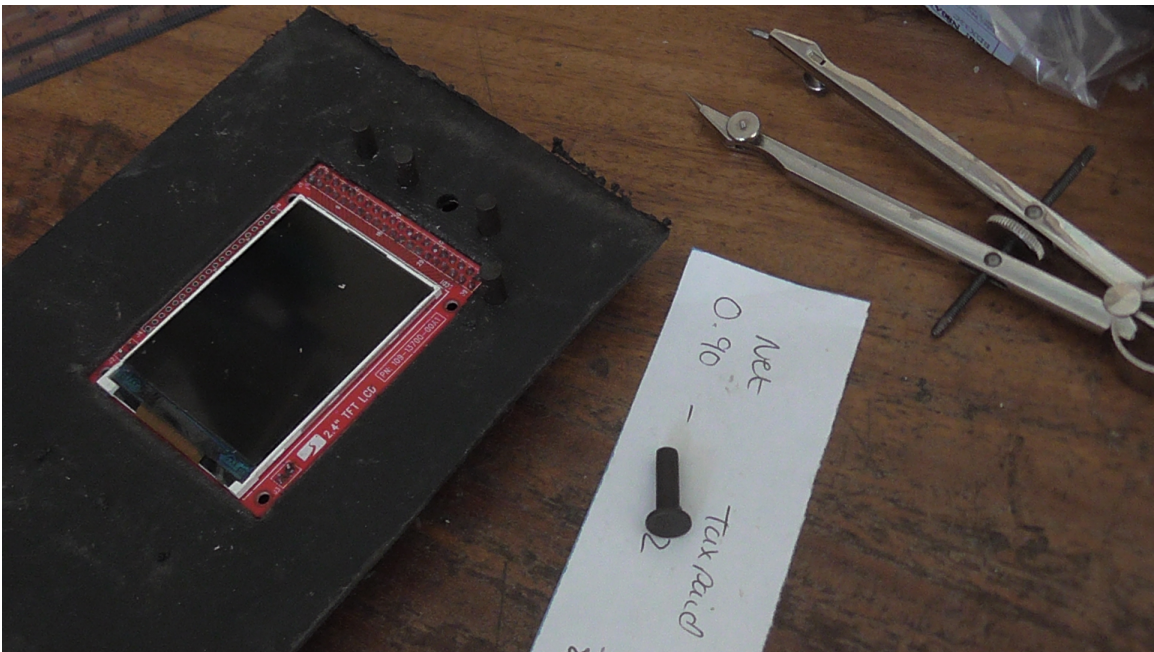


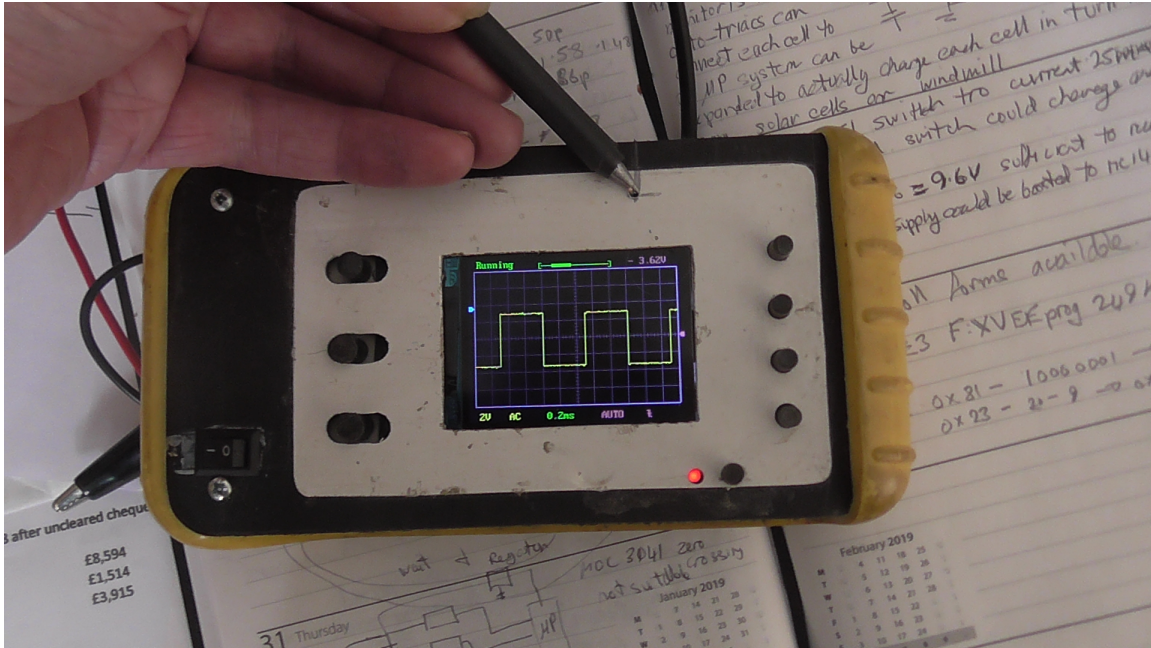
The controls are set back from the display and there needs to be some form of linkage to operate them. There are 5 click switches on the RHS set back from the display. In my junk I came across some 1/4 inch copper rivets which were ideal extensions to operate these switches. Held in by strategically placed holes in the 1/8 inch panel they fit the bill.

Marking out can begin once the square hole is cut to the exact size of the display. Here typing fluid helps to show markings.

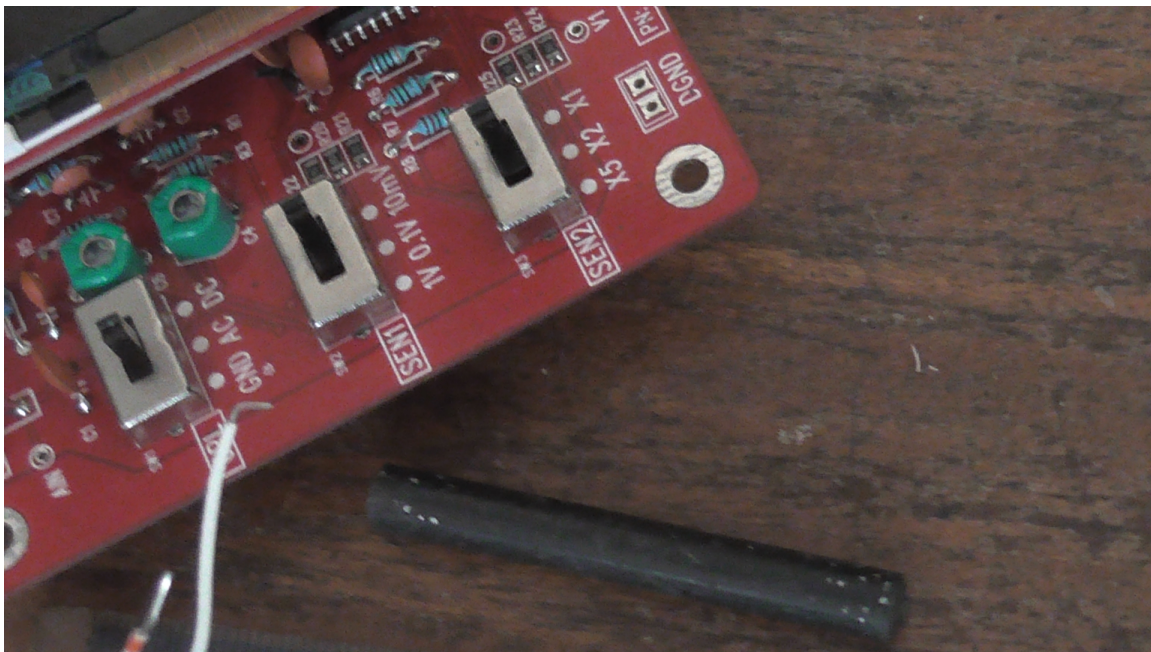


A pair of dividers is invaluable for marking out holes position in relation in relation to the display. I recommend drilling pilot holes with PCB drill, large drills can wander.

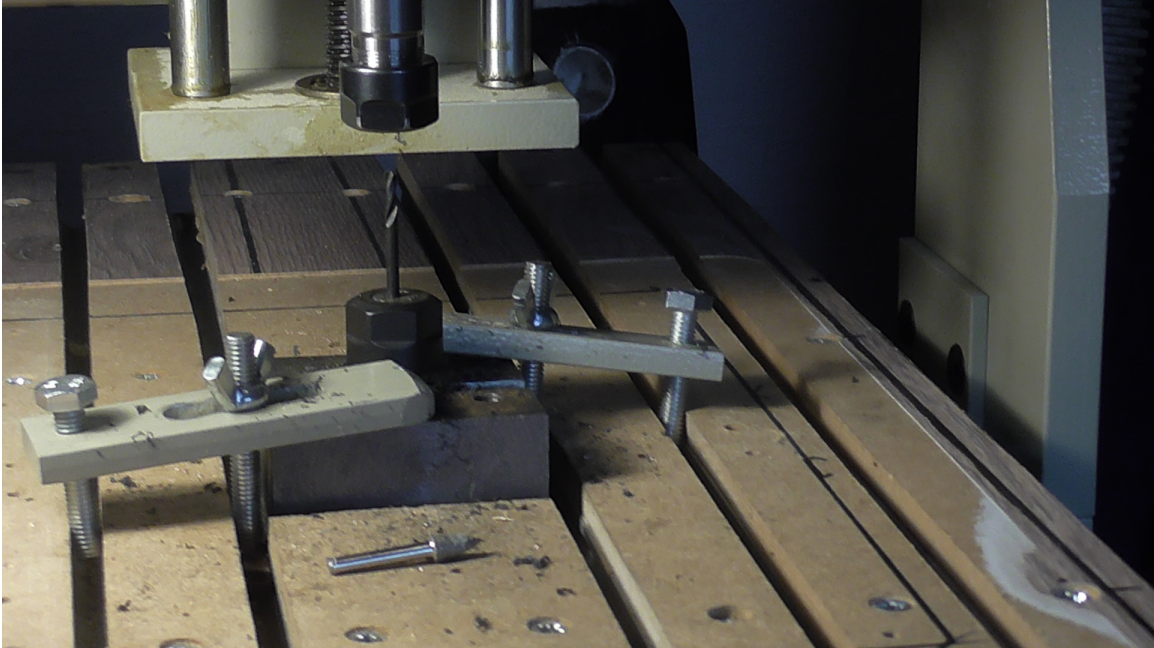




This later picture shows the thin white plastic panel stuck onto the black plastic which masks the sides of the display board and gives a better surface for the controls.



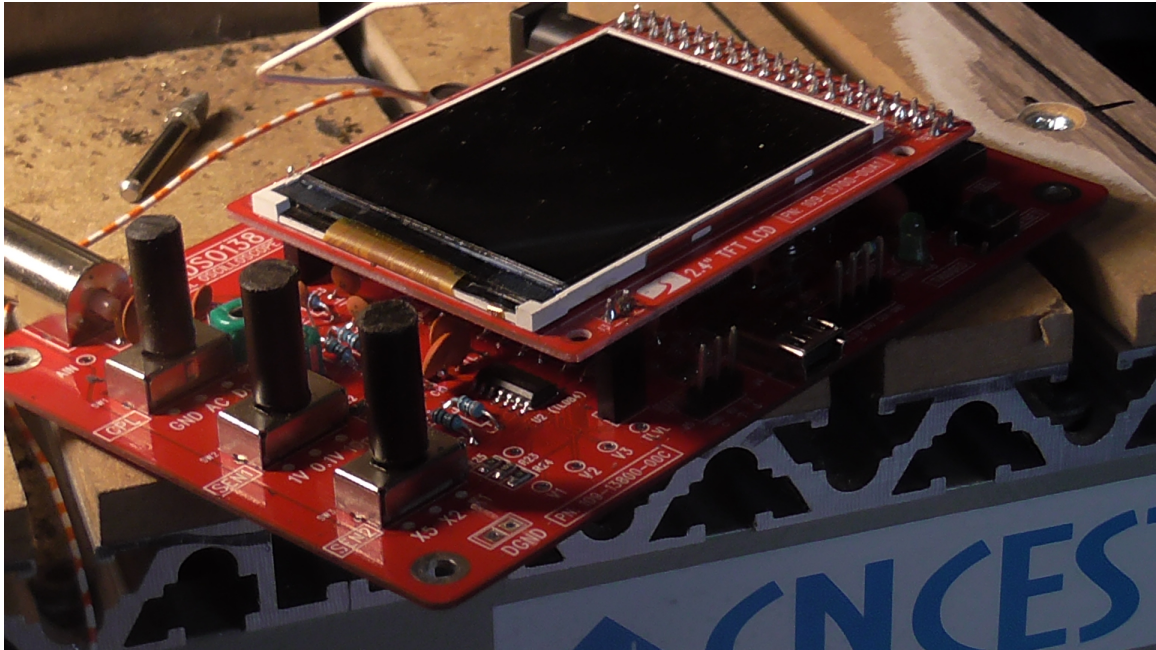
The tabs on the slide switches are not long enough to protrude through the front panel so some form of extension had to be contrived. Again the junk box came to the rescue. Most potentiometers (variable resistors) came with long 6mm plastic shafts. Shafts of this length are frequently shortened.



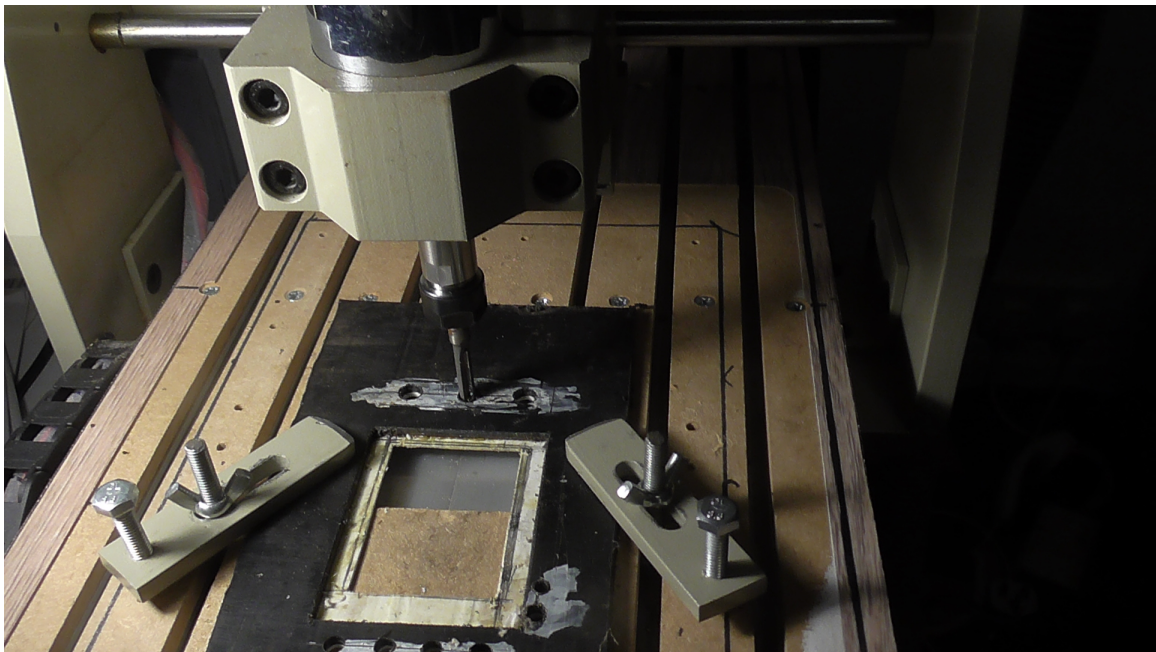
Fortunately I had modified this Chinese router table to have a drill mounted in another collet so that the work piece could be rotated in a manner similar to a small lathe. The same cast iron block in which the collet is mounted also has a side groove so that a 1/4 inch lathe tool can be mounted. It forms a very versatile tool which can machine very small bits. Using a CNC program on jog the bits can be lined up by eye and a small hole drilled in the end of the plastic rod. The forefront shows a burr which was used to drill a centre hole. Using the same router table

If a small hole could be drilled into the end of this plastic rod it could serve as an extension. How to drill such a small hole accurately in the centre of the rod requires some thought.

Small drills are quite flexible, so with a long length out of the collet this compensates for slight off centre.

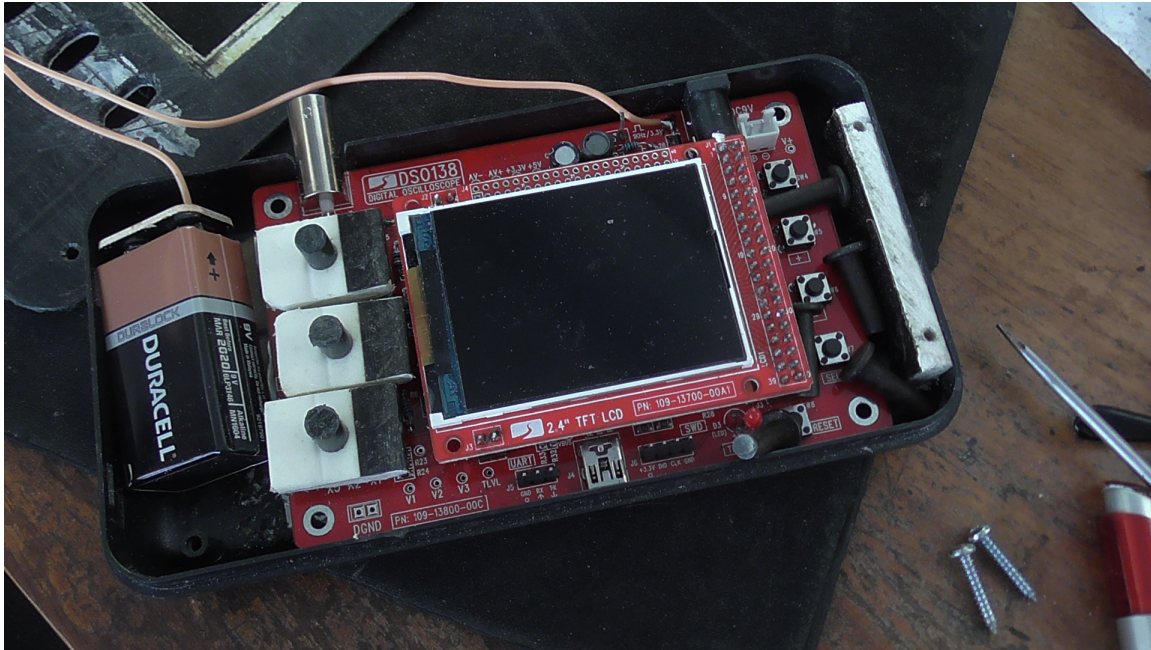


Picture shows the slide switches with extensions fitted.

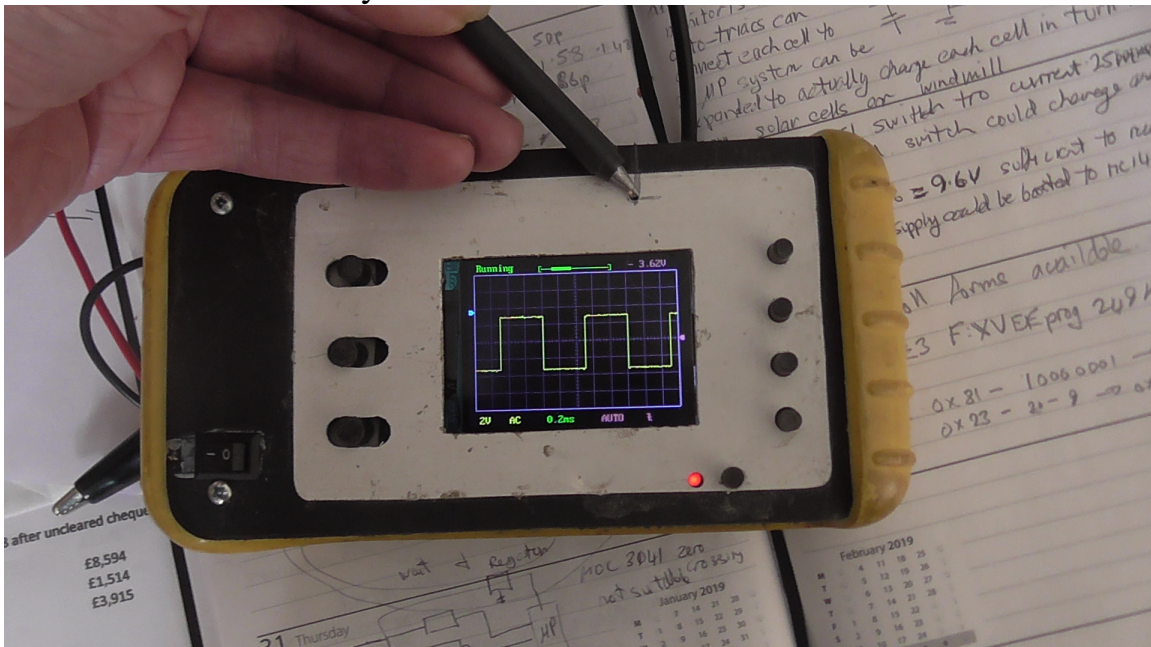


The same router table with a suitable bit was used to cut the slots for the Slide switches.

Unfortunately this was not quite the full answer to the slide switch problem. The switch tabs had a tendency to bend instead of moving the switches sideways. This could have been bad news if one of the tabs had broken off.



Fortunately the solution was to make small blocks to keep the extensions square when the slide switches were operated. This is $\frac{1}{4}$ inch plastic left over from double glazing. The picture also shows a plastic block glued to the inside of the case to facilitate panel fixing. A small slide switch is joined in series with the 9v battery as there is no OFF/ON switch on the board.

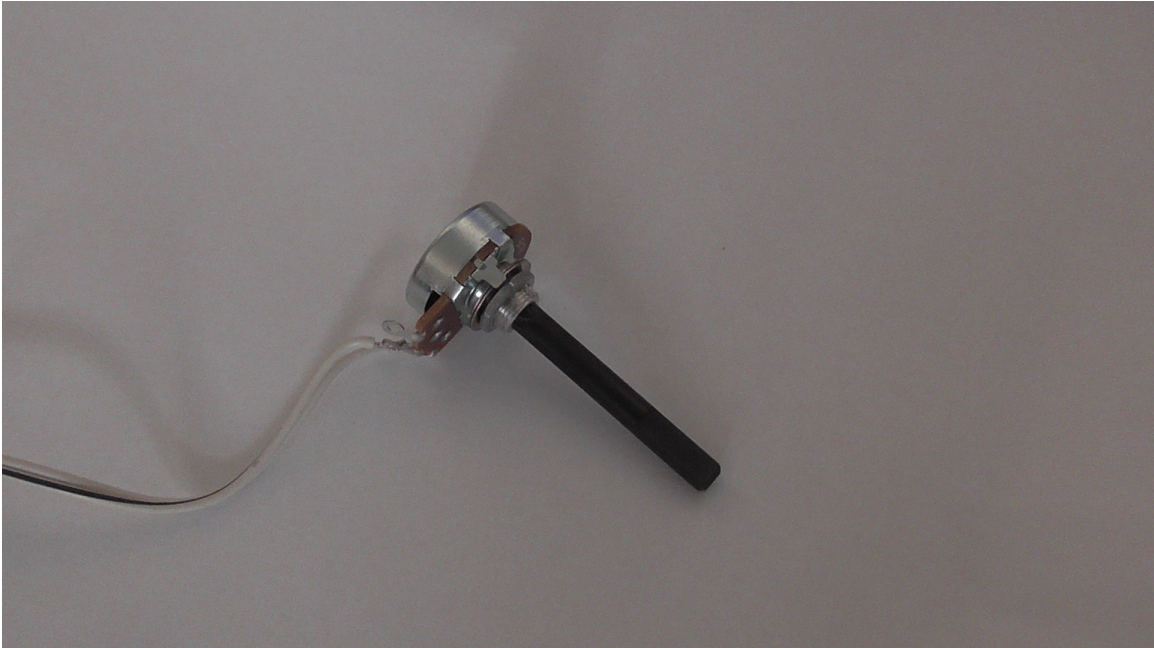


Although it looks OK it's not quite finished yet. The original leads were croc clips, not very convenient. So a separate lead was made from a brass tube with a sharp pointed probe on the positive lead. Crocodile clips being O.K. For earthy leads.



The scope board was in contact with the inside of the case which was not satisfactory. It tended to move inwards when a key was pressed. So some $\frac{1}{4}$ inch form was inserted into an inside out anti-static bag was placed behind the circuit board to act as a spacer.

Some notes on junk box items



Plastic extension rod taken from cut down potentiometer.



Double glazing plastic.