

REPAIRING VINTAGE THROUGH HOLE PCB's WITH MINIATURE EYELETS.

H. Holden (Jan, 2019).

Background:

Through hole pcb's are common in most vintage electronics. This article relates to some pcb repairs on an S-100 Computer Disk Controller card made by North Star Computers in the late 1970's, however it could apply to all through hole pcb's.

By the time fibreglass pcb's arrived in most commercial equipments, the adherence of the copper track and pads to the board surface was excellent and much better than previous generation phenolic pcb's. On top of this the plated through holes provided a lot of extra support for the component's wires and helped to prevent the pads lifting with physical forces on the body of the component.

However, if a pcb is subject to repairs by the inexperienced, damage can be done which causes the pads and tracks to lift. The typical errors here include a soldering iron tip that is too large and applies too much heat because it is not temperature controlled. Or applying force to the component while heating the pad at the same time the solder is not fully melted, or the poor use of de-soldering tools and poor technique. It comes down to a combination of excessive heat & force together, that causes the tracks and pads to separate from the pcb surface.

Most technicians have been confronted with the situation when a fault is being repaired that: "Oh no, somebody has been here before me and look at the pcb damage". It is not a nice feeling.

So this article is about a technique used to help repair a damaged pcb that had been worked on by a previous owner or repairer.

I do have a PCB plated through hole kit (supplied by RS Components) to replace plated through holes. While good for prototyping, the kit has limited utility in repairs because the pads & tracks are more prone to damage than the plated through holes.

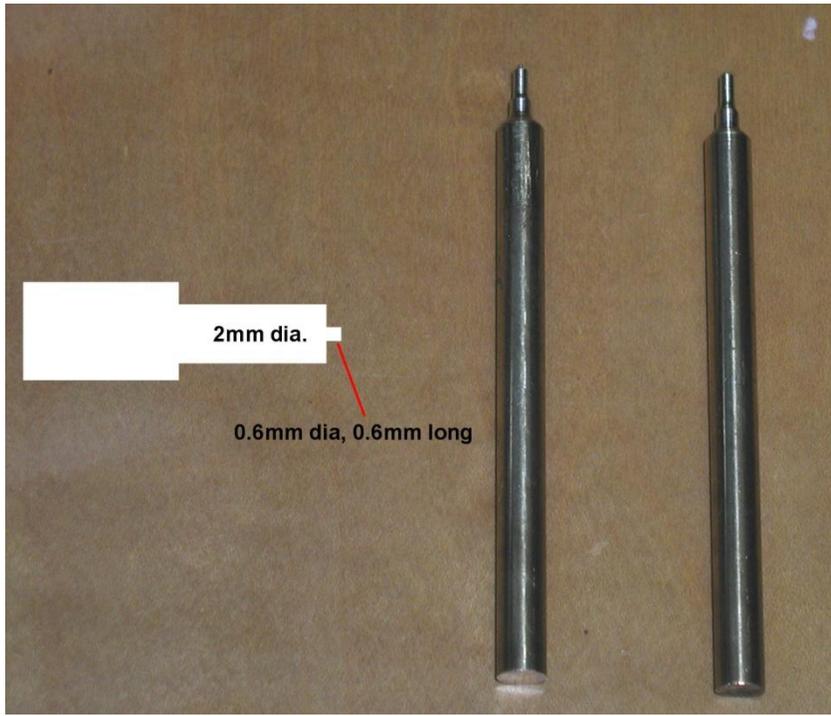
The pcb under consideration is shown below. Somebody in the past had attempted repairs and had replaced one of the IC sockets, creating track and pad damage. In addition the pads for some of the discrete components on the board had also been damaged.

end to end of the eyelet. I found that if I placed the 3mm eyelets temporarily in a 1mm diameter hole in a 2.5mm metal panel (as a length calibrator) and filed off the projecting length, it made an eyelet which was close to 2.7mm total length, which behaved perfectly for fitting to a 1.6mm thick pcb.



A photo of these eyelets is shown above. The tapered tool, seen in the photo above, is not used to press the eyelets in, but rather to very gently flare the mouth of it prior to the pressing. I had to machine two tools to press the eyelets, made out of some spare 6mm pot shaft extensions, shown below. The hole size to suit these eyelets is close to 1mm.

(It was easier to machine a tool with a flat rather than a concave face which is why the eyelet requires a small flare prior to pressing. A better tool would flare and press the eyelet at the same time)



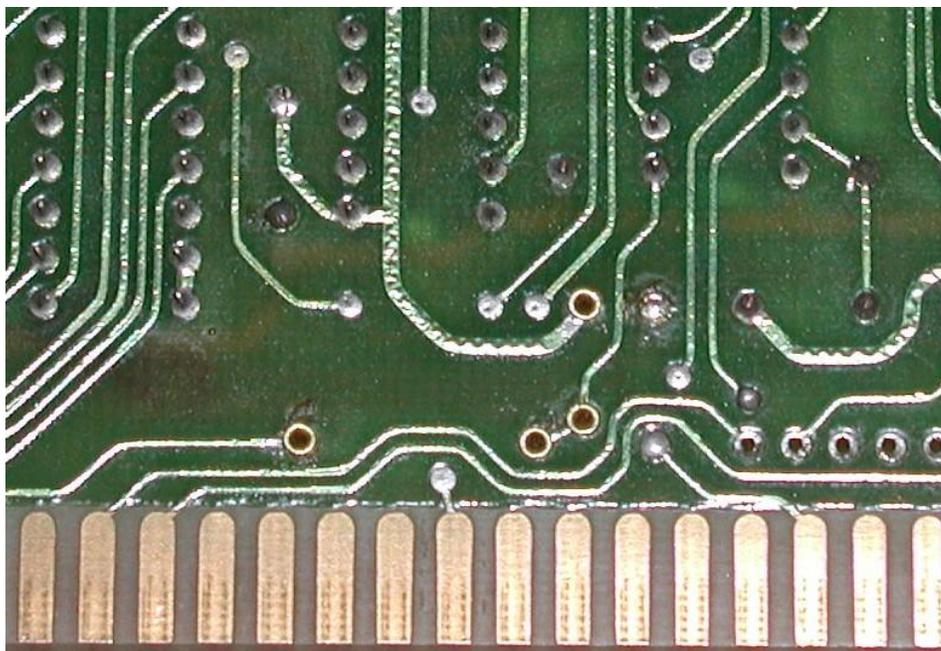
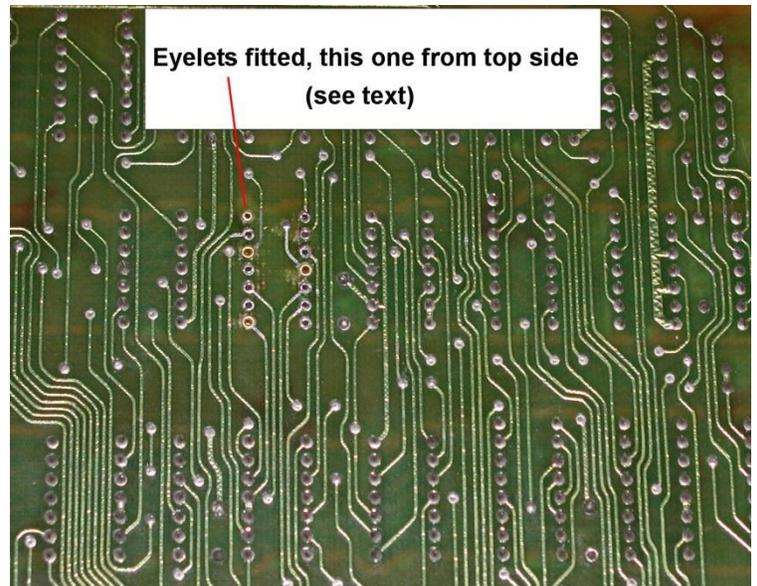
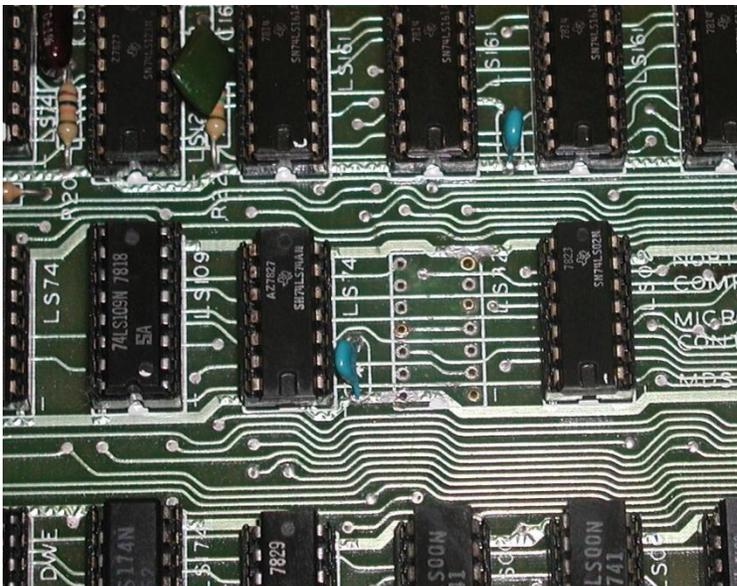
The easiest place to support these for use was in the drill press:



The head of the eyelet is close to 1.8mm diameter and on the other end, when pressed over, (with the simple tools shown above) is about 1.4 to 1.5mm diameter. So it raises the question which way the eyelet should be fitted. It depends if there is more track lifting and pad damage on one side or the other.

Once the eyelets are fitted they are soldered to the adjacent pads & tracks and de-soldered again with solder wick, or the sucker, ensure the brass eyelet is electrically connected to the pads and tracks on both sides.

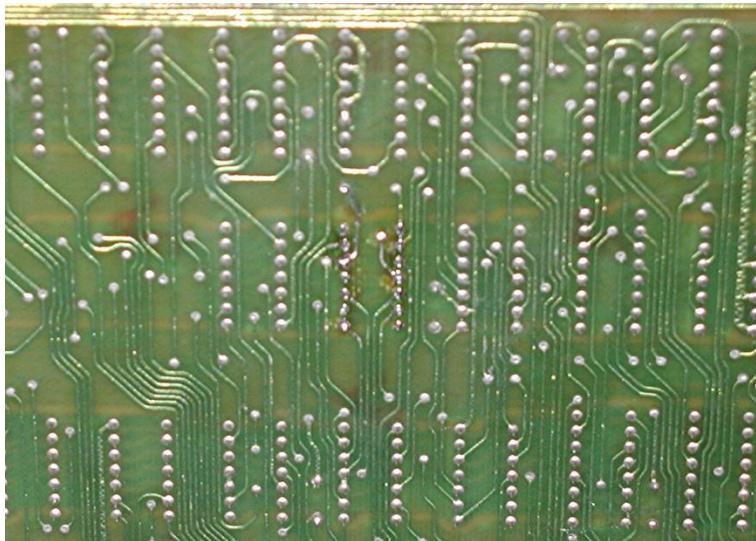
The photos below show the eyelets fitted to the damaged North Star pcb in the area of the IC sockets and in another area of previous damage:



The missing track was replaced with some thin tinned copper wire, taken from some wire wrap wire and to ameliorate the heat damage to the pcb surface in the area was painted over with some marine spar varnish.

(Of note, the Feast Watson marine spar varnish I use is water and UV resistant and has a rich red-ish colour which resembles vintage transformer varnish. I have tested it to 15kV and it is a very suitable varnish to repair & restore vintage television horizontal output transformers, to replace the old hard and dry pitch for example after the pitch has been dissolved away with mineral turpentine, which is also the solvent for this varnish).

The photo below shows the repaired pcb. It looks as though the flux has not been cleaned away, this is not the case, the darkened areas are due to previous pcb thermal damage from an inappropriately large soldering iron making contact with the board surfaces:



The Feast Watson Varnish:

