



Keyboard Replacement Kit

For Standard (non-Premium) series Microbees

It has been a common problem with older Microbee computers that keys on the keyboard become non-functional. With no supply of original switches, people have to resort to removing them, taking them apart & attempting repairs with varying levels of success.

Microbee Technology has designed a keyboard replacement kit that will allow you to refurbish your old standard non-Premium series Microbee and have a fully working keyboard once again.

Features of the keyboard replacement kit:

- Includes a new keyboard frame adapter plate to take the new, smaller form factor keys
- Also includes a keyboard matrix PCB to take the new switches
- 2 wiring looms are included to wire the new keyboard PCB to the original baseboard
- Includes 2 switch mode replacement regulators for the linear 7805 regulators that are normally mounted to the metal keyboard frame. These run much cooler and don't require heatsinking.

What you will need:

- Soldering Iron, Solder sucker, solder, pliers, star screw driver, wire cutters
- Around 3-4 hours for disassembly / construction / re-assembly
- Good soldering / de-soldering skills.

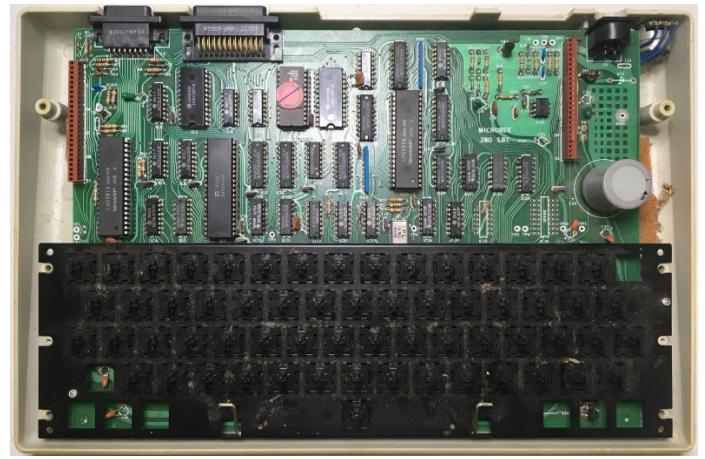
Getting Started

Start by opening the case of the Microbee. There are six case screws accessible underneath the machine. Once the top covers are off, unplug the core board from the baseboard and set it aside. Next there are screws to remove to allow the baseboard to be removed from the bottom of the case. One either side of the keyboard section, on the metal frame, and usually 2 or 4 screws around the parallel & serial ports. It is probably helpful to disconnect the speaker wiring from the baseboard as well at this point.

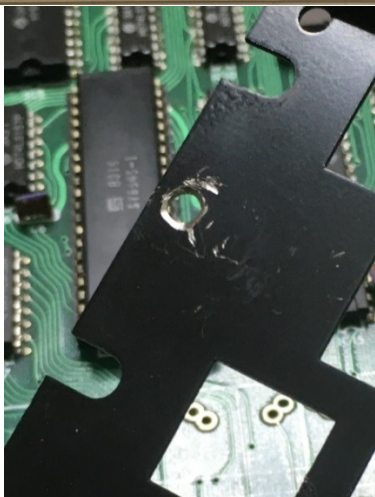
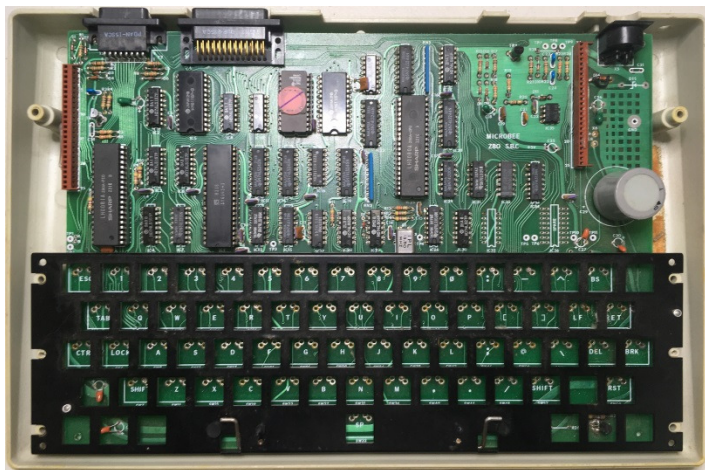
Remove the old key switches

There are 2 methods you can use to remove the key switches :

- a) If you have a soldering iron tip that is long enough to lay side on and heat both pins of the key switch, you can use a pair of pliers to pull the switch out of the frame while heating the soldered pins. Ensure that the solder on both pins is nicely liquid before pulling the switches out. Add more solder if you need to.
- b) If you cannot use the method above, de-soldering each pin with a solder sucker is the only recommended option. Do not use solder wick as this will end up applying too much heat to the PCB pads and will not be able to remove enough solder from the plated hole – risking damaging the PCB. Wiggling the de-soldered pins gently with a set of pliers will tell you if they are still attached at some point in the plated PCB hole or not. If they are solid in the hole, apply a little fresh solder and try de-soldering again. Sometimes they can be attached still by the smallest amount of solder and wiggling the pin will free it up, but do not do this if it requires anything more than a small amount of force. Once the pins are free, use the handle end of a screw driver (or some other flat surface that is easy to use) to push on both of the pins at once and the key should pop out of the keyboard frame.



Remove the regulators

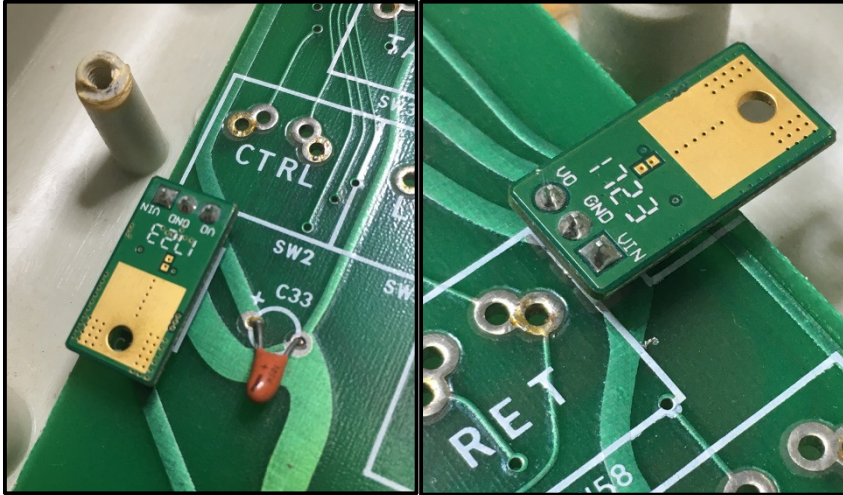


Once all of the key switches are out of the keyboard frame, it will be attached to the baseboard only by the two 7805 regulators. You can de-solder these now & completely disconnect the keyboard frame from the baseboard.

These are attached to the keyboard frame with a pop-rivet. You can either drill the head of the rivet out, or use wire cutters to chop the rear of it (the bit that protrudes through the TO-220 tab) and wiggle it free. Once you have removed the regulator (it doesn't matter if it gets damaged – they are being replaced anyway), chop the rest of the pop-rivet out of the keyboard frame.

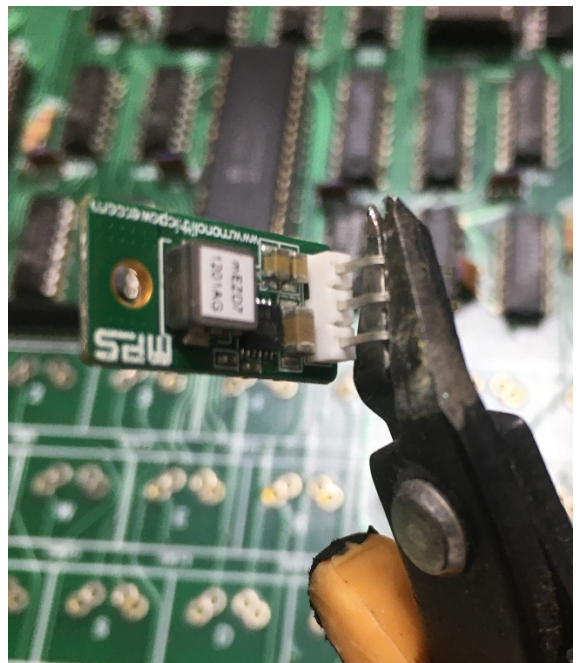
Fitting the new regulators to the Baseboard

2 switched-mode regulator replacements for the original 7805 linear regulators have been supplied with the kit. They have right angle pins that can either be bent straight or trimmed at the bend (as in the photo to the right). Next these can be soldered directly onto the baseboard as shown below.



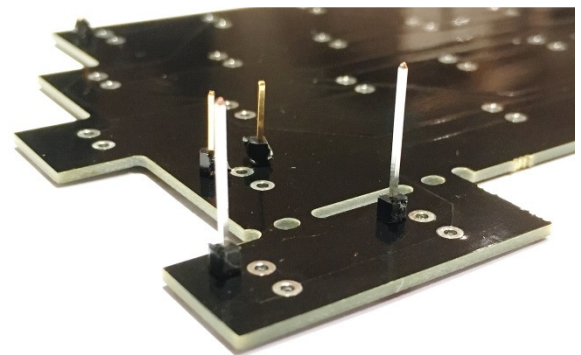
Baseboard - Left side & Right side

These regulators do not get connected to the keyboard frame, and do not require heat sinking.



Preparing the keyboard matrix PCB

The kit is supplied with a single row 0.1" pin strip. This should be cut up into individual pins. These mount on the under-side of the PCB (the side with the surface mount IC's on it). In total there are 9 pins to be mounted like this. You will see single pads (offset from the centre) at each of the following key switch locations: ESC, BackSpace, U & N. Additionally, the RESET key & Space bar key have 2 pins each.



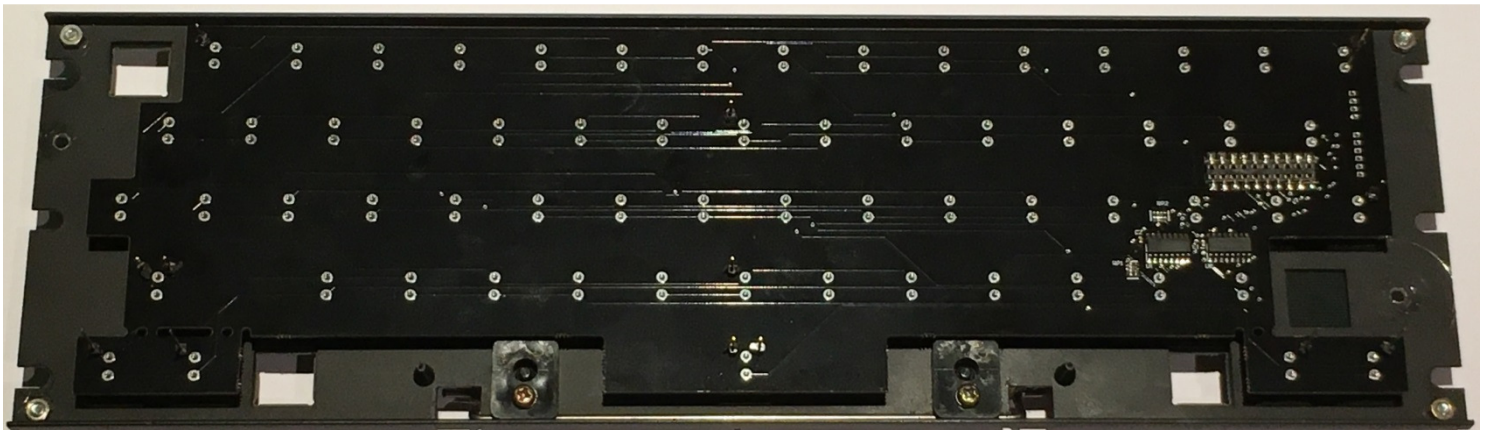
Solder these pins in from the top side of the board with minimal solder, and then trim them as close to the board as possible. Once done, the PCB should look like the photo above with the pins sticking out on the under-side of the board.

Mounting the key switch adapter plate to the metal key frame

There are 4 screws and nuts to mount the key switch adapter plate to the metal frame – 1 on each corner. Put this together now. Then, once that is secure, you can start installing the new key switches into the adapter plate. Not all the open holes in the keyboard plate get populated with switches – The right most on the top row (next to the Back Space key) doesn't need a switch and the position between the Right Shift key and RESET key doesn't need a switch either.



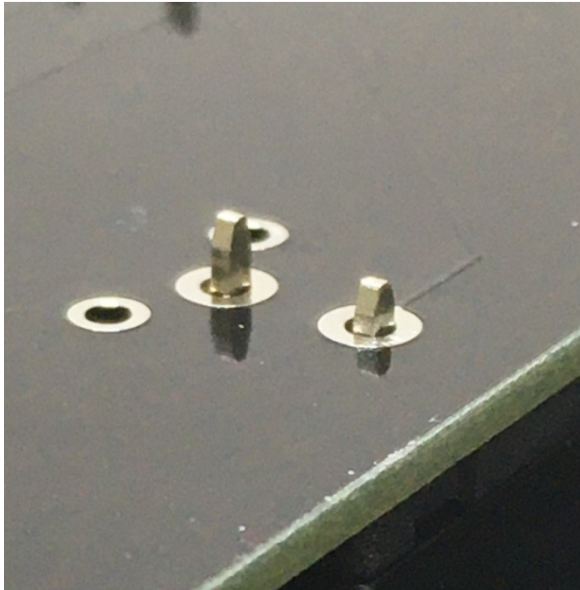
Once this is done, place the assembly face down (that is, with the tops of the key switch shafts on the working surface you are using) and then put the keyboard matrix PCB down onto the back of the key switches. It should drop right on, once aligned, with a little bit of friction from the key switch pins, but without too much trouble. It should then look like this:



(Note : Premium version shown above)

Soldering of the key switches

The key switches can now be soldered to the key matrix PCB. Before soldering each one, check that the pins of the key switch are o.k. It is possible to push the pins inside the housing of the switch somewhat, and this will stop the switch from working properly. EG:



Pin pushed into the body of the switch [X]

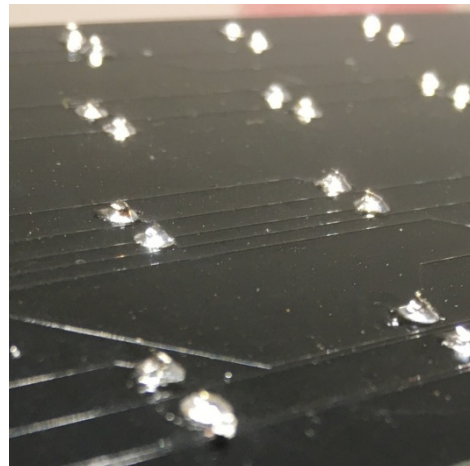


Both pins protruding equally [✓]

It is easy to correct a pin that it pushed in – just gently grip the pin with pliers or wire cutters and pull it out from the body.

Solder all of the key switches, starting with the outer most ones on the corners (ESC, BS, LShift, Reset), making sure the PCB is pressed down on the backs of the key switches before soldering.

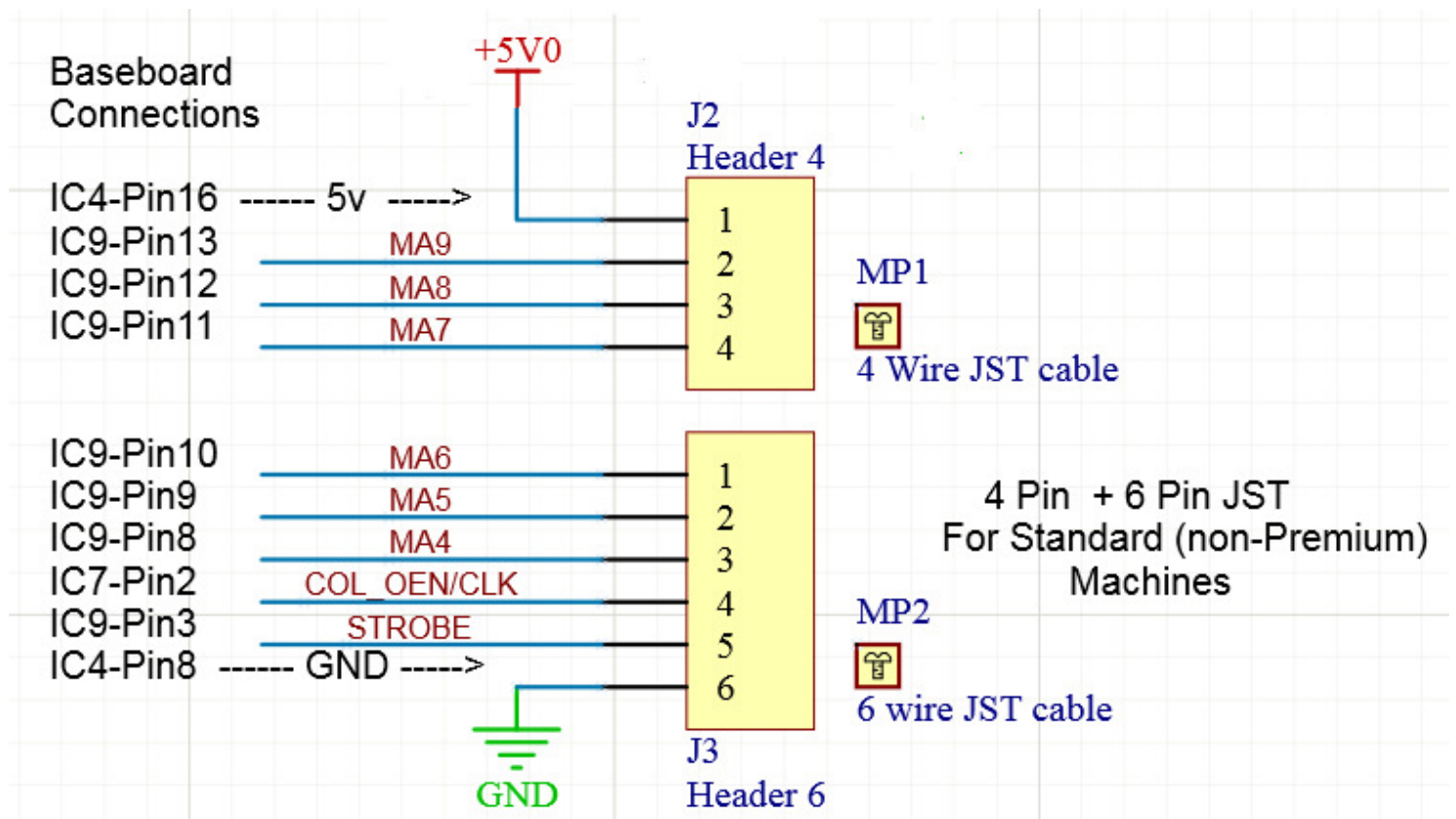
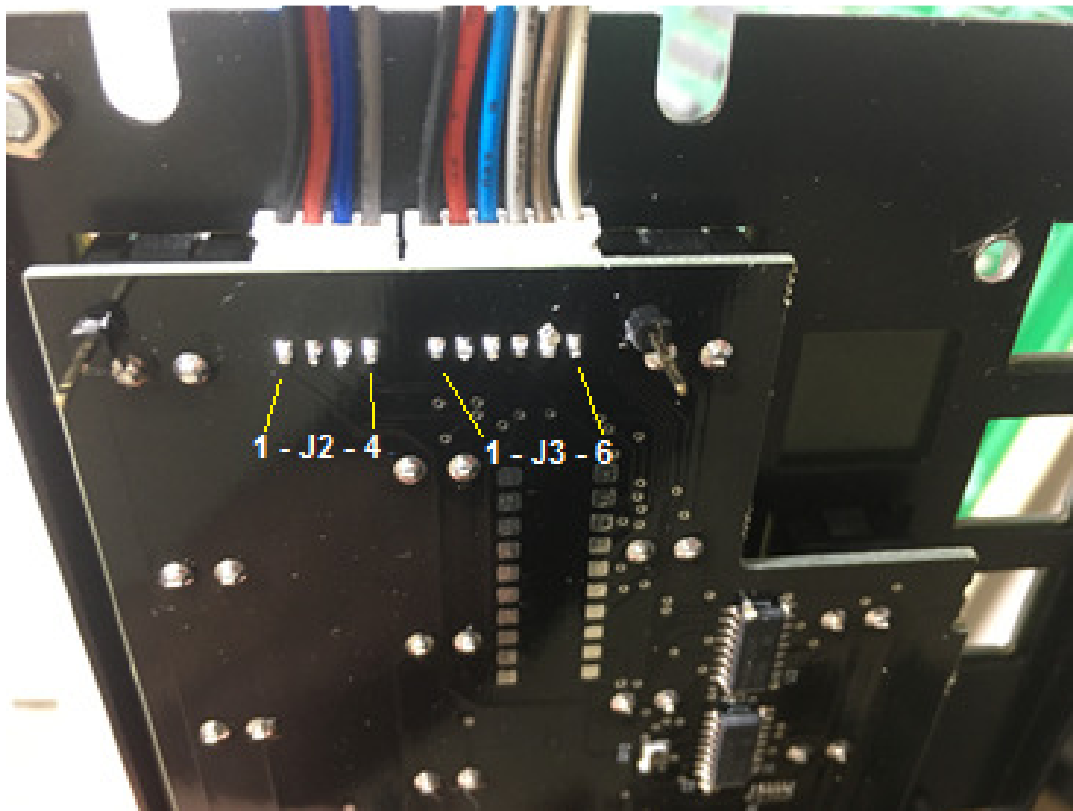
Trim the excess pin length from each of the key switches once soldering is done.



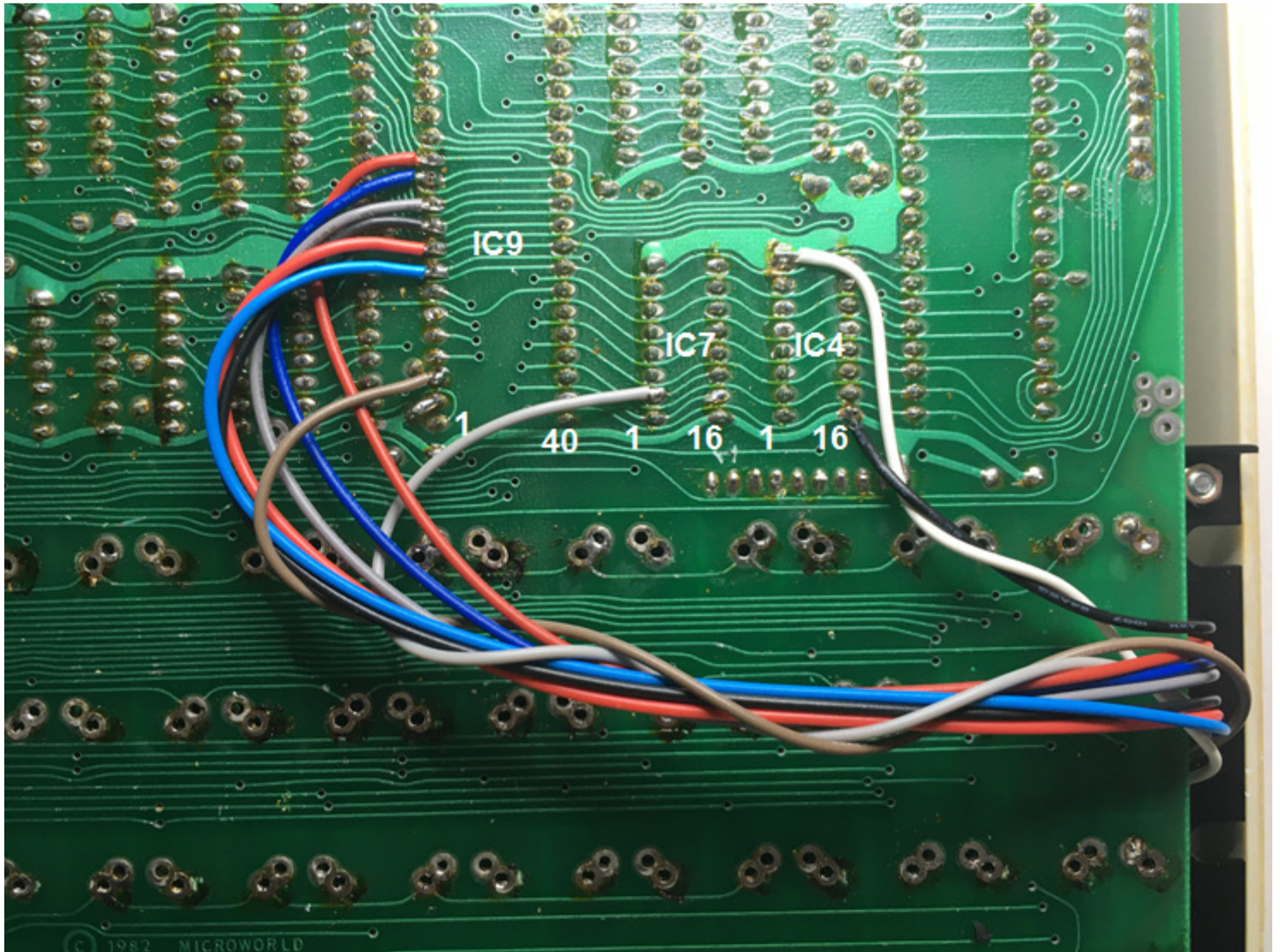
Next, take the newly assembled keyboard module and align all the mechanical support pins underneath it with the key switch pad hole in the baseboard and push the 2 together. The keyboard matrix PCB and the baseboard should be spaced apart by just the height of the black plastic on the pins and no more. Solder the pins in the outer corners of the keyboard module to the baseboard, and the 2 pins of the RESET key position for now – leave the rest of the support pins unsoldered until you have tested that the keyboard works.

Wiring the new keyboard matrix PCB to the Baseboard

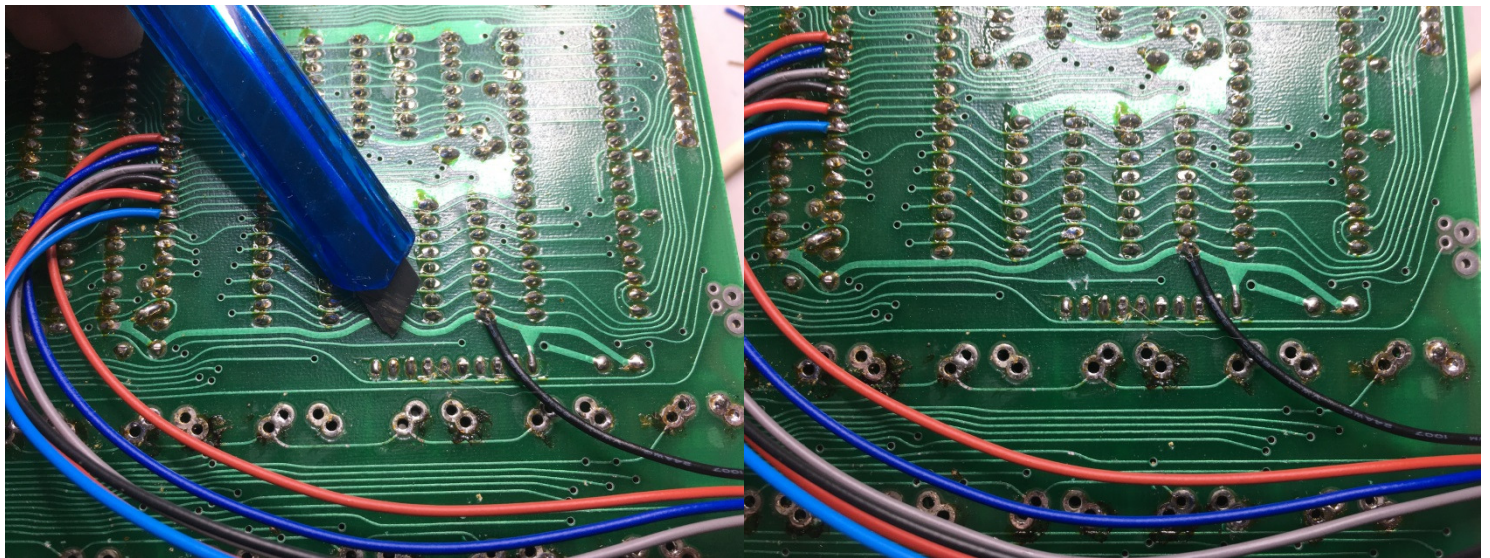
The kit is supplied with 2 cable looms – 1 x 4 way & 1 x 6 way. These plug in to the side of the keyboard matrix PCB and connect the required signals from the baseboard.



Wire these 10 connections to the baseboard as per the list of pin connections in the diagram above. It is good practice to trim the lead lengths to only just what is required rather than leaving them the full length as supplied. Refer to the following photo as an example.



There is one track cut to be done :



This is the Light PEN Strobe signal coming from the original keyboard scanning circuit on the baseboard to pin 3 of the CRT controller. We need to disconnect this so that there is no clash with the new scanning circuit output.

You can now test the keyboard & make sure all keys work. Once this is done you can solder the rest of the mechanical support pins (making sure that the 2 boards are evenly spaced) and trim the excess length.

All that is left to do now, is re-attach the speaker wires, screw the baseboard back into the case, put the core board back into its' 25way baseboard sockets, screw the top case sections on, and replace the key tops. Enjoy using your Microbee with its' brand new keyboard.

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Microbee Technology Pty Ltd
Shop 31, The Terrace Shopping Centre
66 – 74 Brice, Mooroolbark, Vic. 3138
Ph: (03) 9726 5001

www.microbeetechnology.com.au

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