OVERVIEW

For the most recent version of this document please visit https://thonk.co.uk/documents/prok/

This document has hi-res images. ZOOM IN for a closer look

All Thonk kits are sold under our standard Terms and Conditions - http://www.thonk.co.uk/faq/

DIY INSTRUCTIONS

This document gives detailed instructions that assume you have purchased a complete kit from www.thonk.co.uk. It also assumes no previous knowledge of electronics. To learn to solder try http://youtu.be/I_NU2ruzyc4 and the **Adafruit guide to excellent soldering** – http://bit.ly/1l77tF4

Watch and understand that whole YouTube video! If you're not achieving the results shown in the video then you need to buy new tools or seek advice.

You will not end up with a working module otherwise.

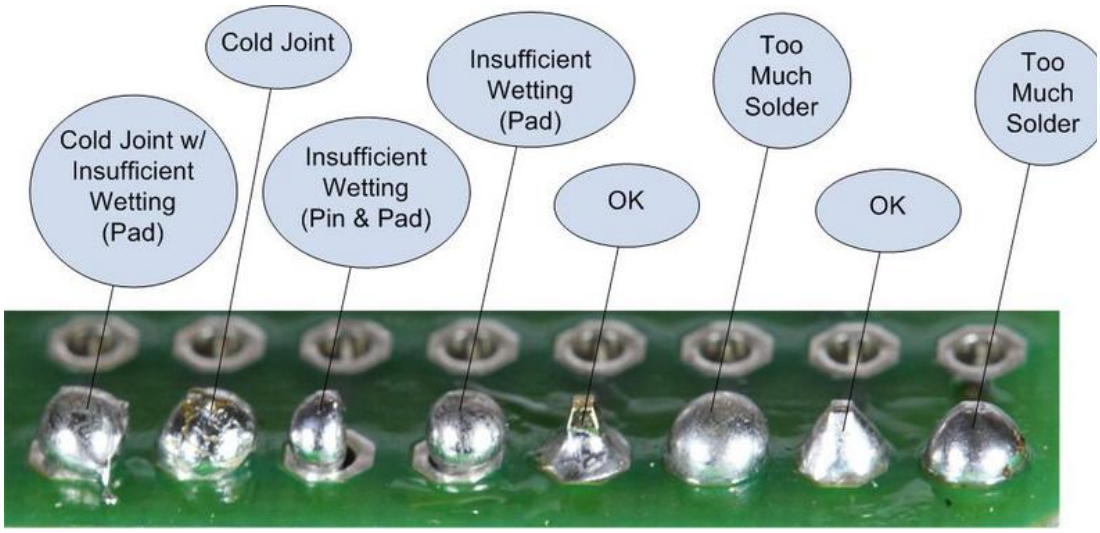
TOOLS REQUIRED

Soldering iron, snipe nose pliers or tweezers, masking tape, craft knife or scalpel and diagonal cutters AKA snips AKA side-cutters. A Digital Multimeter is always helpful for checking for bad solder joints and continuity. Thonk sell a range of inexpensive tools here - http://bit.ly/1jxqF3n

SOLDER JOINTS

Your solder joints should look like those shown as 'OK' below, they should have that neat conical shape on BOTH sides of the PCB. If they don't look the same on both sides then stop! Work out why from the soldering guides linked and don't continue until you are getting those results.

This isn't just OCD talking, you are very likely to end up with a destroyed, damaged or defective unit if you're not hitting that standard.

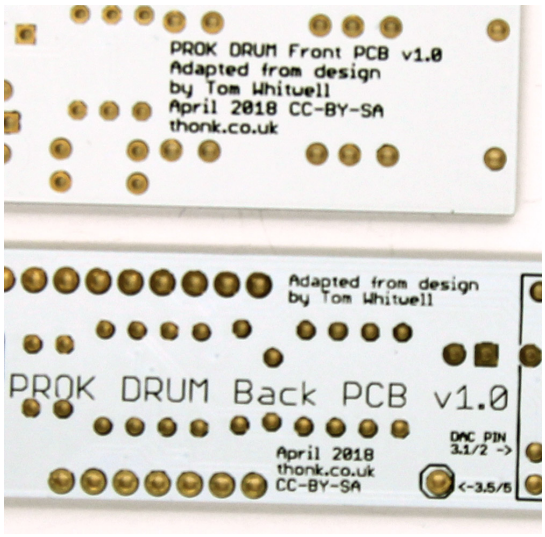


This photo is from the **Adafruit guide to excellent soldering** - http://bit.ly/1jxqF3n and is reproduced under an Attribution-Sharealike creative commons license - http://creativecommons.org/licenses/by-sa/3.0/

PROK DRUMS BUILD INSTRUCTIONS

1.

There are two PCBs used in this build - they are referred to as the front PCB and the back PCB. They can be identified by locating the text on each PCB as shown.



BACK BOARD

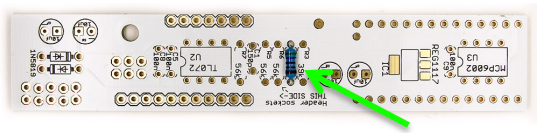
2.

We will start with the back PCB.

All the parts for this PCB are located in a labelled bag within the main kit bag. Empty this bag into a bowl or container – all other parts can be put to the side for the moment except for the Teensy.

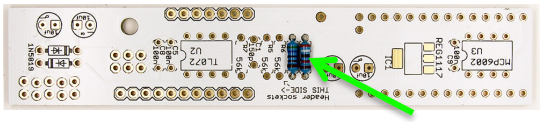
3.

Start by soldering the single 5.6K resistor into the position labelled R4 as shown.



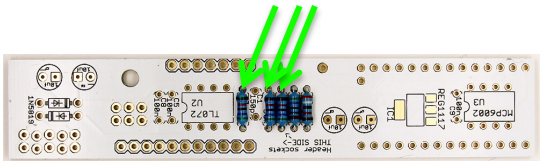
4.

Next solder the single 39K resistor into position R3.



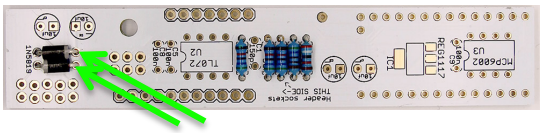
5.

Next solder the three 56K resistor into positions R5, R6 and R7.



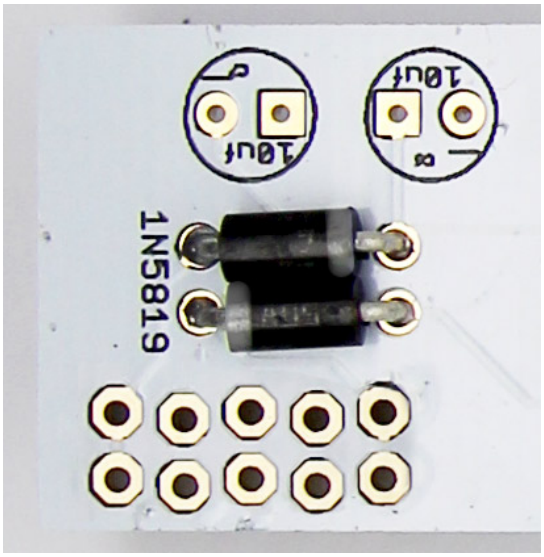
6.

Next solder the two 1N5819 diodes into position as shown.



NOTE: Take care with the orientation of the grey stripes on the diodes – these should match the black stripes on the PCB silkscreen.

NOTE: Do not heat the diodes excessively or you will damage them, you should be aiming to solder quickly and neatly.



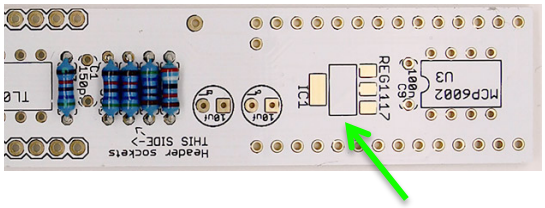
7.

Next locate the SMD voltage regulator which is packaged as shown.

Do not remove it from its packaging yet - complete the next step first.

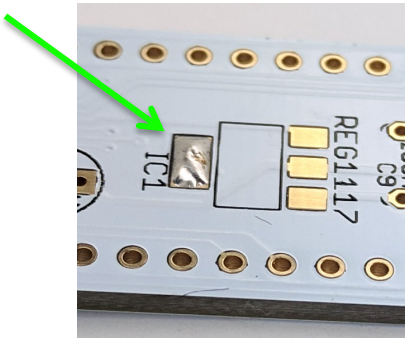
8.

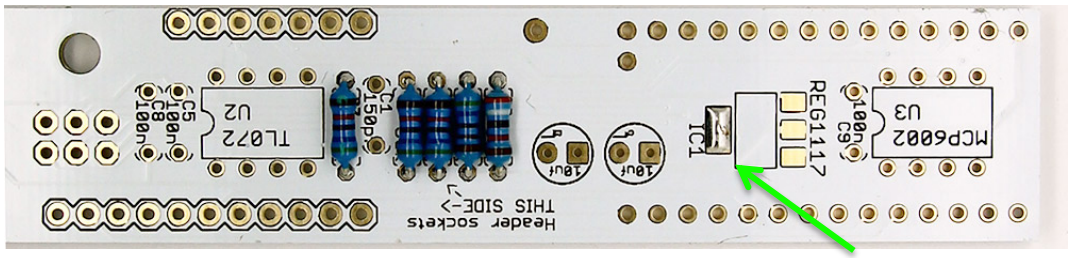
Next locate the position for the SMD regulator on the PCB as shown.



9.

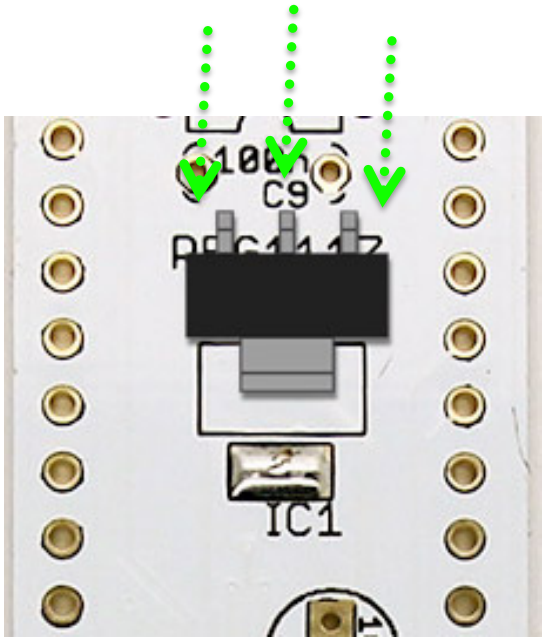
Now heat the single pad next to the text ‘IC1’ with your soldering iron, and once heated add a small blob of solder – just enough to cover the entire pad as shown.





10.

Now using tweezers or snipe nose pliers - take the voltage regulator and position it flat on the surface of the PCB as shown.



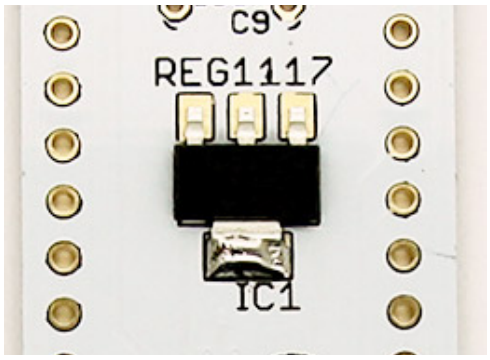
Then re-heat the pad that we already applied solder to, and when the solder is heated - slide the regulator into position so that the three pins line up with the other pads (see next image). If you don't manage this first time round you can re-flow the solder and reposition the regulator again.

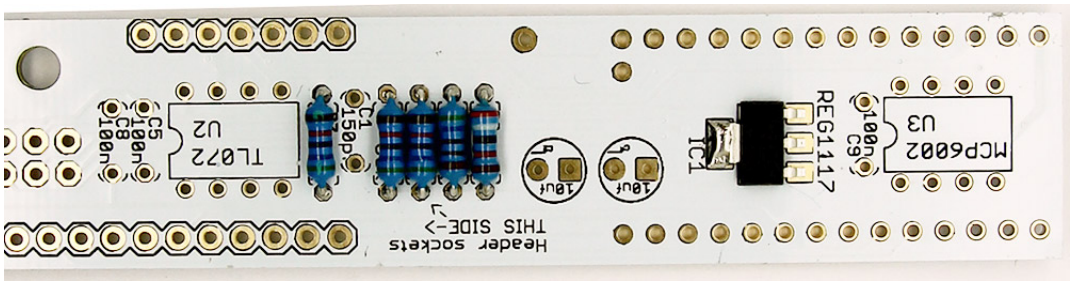
NOTE! Make sure the component is flush and perpendicular to the PCB surface as you slide it in place.

NOTE: Do not heat this part excessively or you will damage it, you should be aiming to solder quickly and neatly.

11.

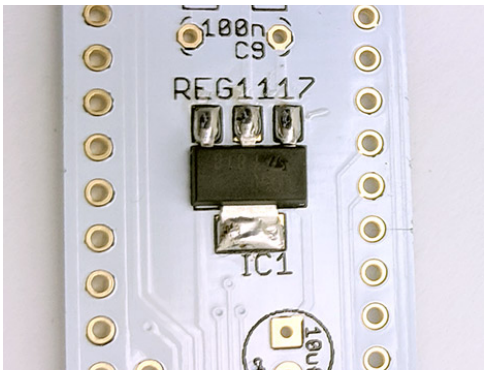
Once you have positioned the regulator it should look as shown.





12.

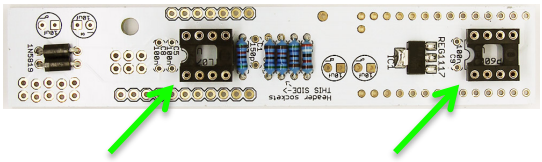
Now carefully solder the three remaining legs. If you need to add more solder to the first pad then you can – just be careful not to overheat the component.



13.

Next solder in the two IC sockets. The notch on each socket should match the PCB silkscreen as shown.

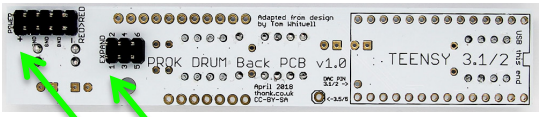
Make sure these sockets are soldered flush and perpendicular to the PCB surface

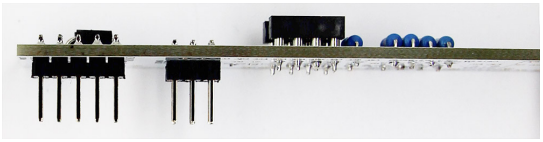


14.

Now take the 2x5 male header and the 2x3 male header. These should be soldered on the bottom of the back PCB as shown.

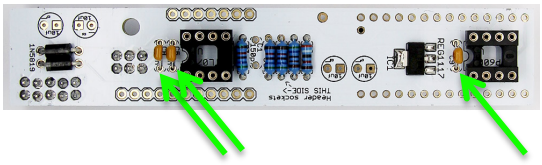
NOTE! These headers are soldered on the opposite side of all other components soldered so far.



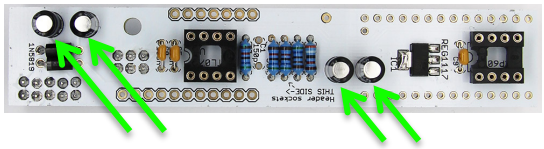


15.

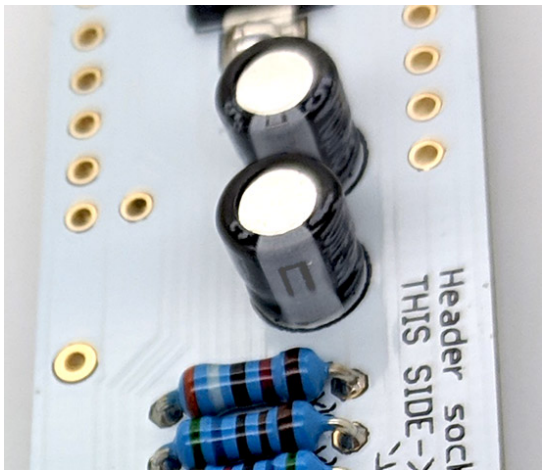
Next locate and solder the three 100n capacitors. These are soldered into C5, C8 and C9



16.

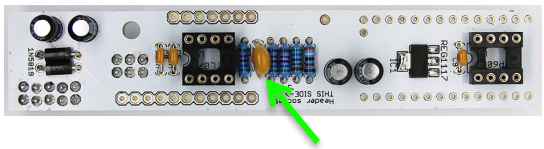


Next solder the four 10uF electrolytic capacitors as shown.



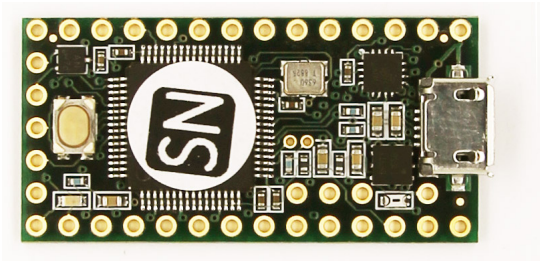
NOTE! Orientation is vital for this part. The grey stripe and shorter leg signify the negative side of the capacitor, the short lead of the component should go into the round hole marked minus on the PCB.

17.



Next solder in the single 150pF capacitor into C1.

18.

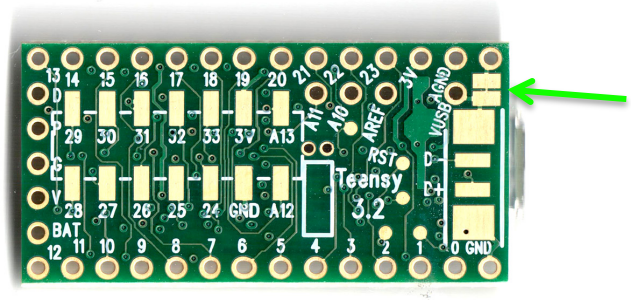


Now locate the Teensy – this build uses a Snare Drum but the procedure is the same for all Prok modules.

The Teensy included comes pre-programmed with the Prok Drums software.

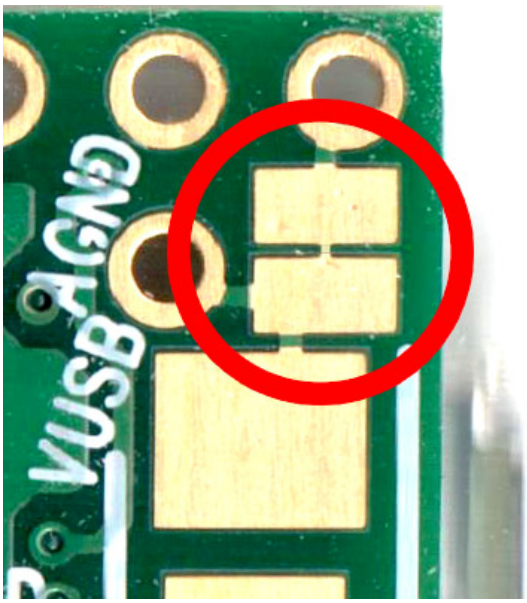
19.

Turn the teensy over so you're looking at bottom side, then locate the two SMD pads as marked in the picture.



If you look very closely or with a magnifying glass, you will see that there is a tiny trace between the two pads.

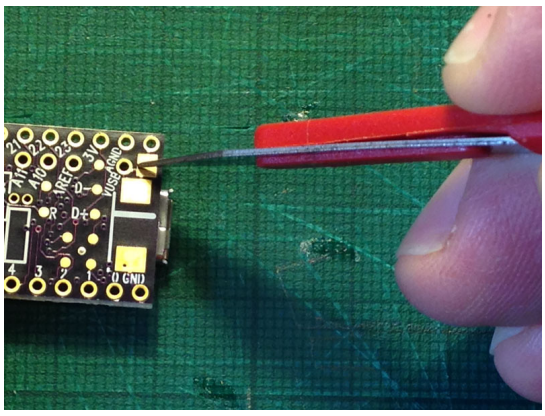
This is the USB power trace which we cut in the next step.



20.

Use a craft knife or scalpel to cut the USB power trace. One pass with the blade should be sufficient.

After cutting the trace use a multimeter or a magnifying glass to check there is no longer any connection between the pads.

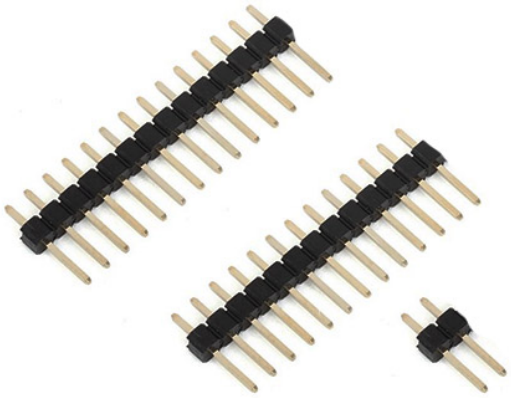


21.

Next take the long male pin header and break it into 3 different lengths:

1 x 14 pin length
1 x 13 pin length
1 x 2 pin length

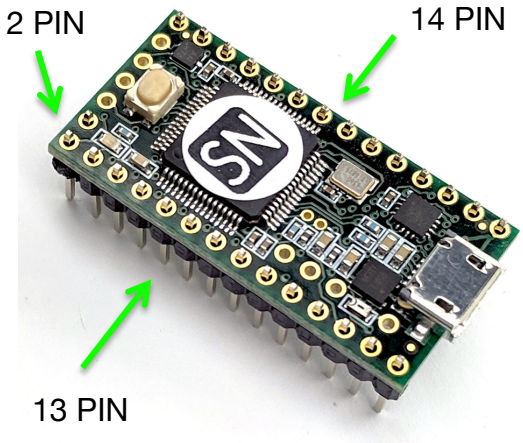
If you are using side cutters to do this be sure to wear safety goggles.



22.

Now place the male pins into the Teensy as shown, then carefully solder the pins.

Make sure the pins are soldered flush and perpendicular to the PCB surface.

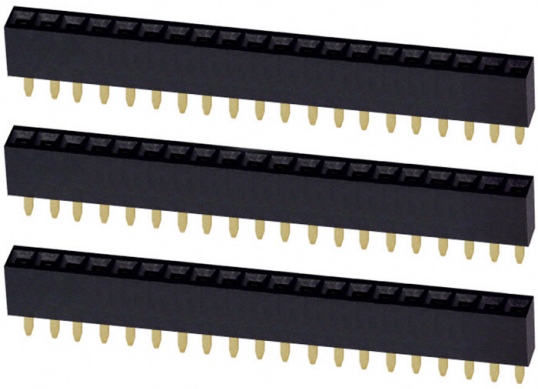


23.

Next take the three 20 pin female headers and cut them to the following lengths:

1 x 14 pin length
1 x 13 pin length
1 x 2 pin length
1 x 11 pin length
1 x 7 pin length

Be careful when cutting these down – it's better to cut too large and then trim down, rather than cut too small and be left with a useless length.

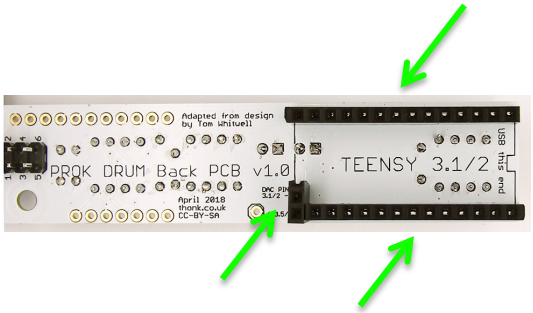


Be sure to wear safety goggles when cutting these headers.

24.

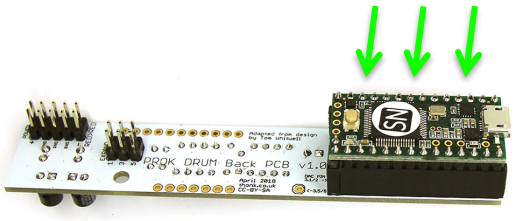
Now take the 14 pin, 13 pin and 2 pin female header lengths and place but DO NOT SOLDER them on the PCB as shown.

NOTE: These are placed on the bottom of the PCB on the same side as the power header



25.

Now place the male pins on the Teensy into the female pins. Once all 29 pins are snugly fitted together you can then flip the PCB over and solder the female pins in place.

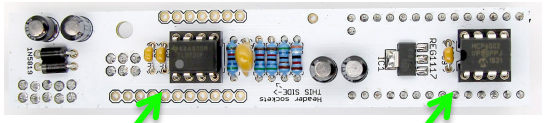


26.

Next take the TL072 and MCP6002 IC chips and place them as shown.

NOTE! Orientation is vital for all ICs.

For the TL072 make sure the black circle on the top face of the IC is facing the end with the notch in the IC socket. For the MCP6002 match the notch on the chip with the IC socket.



TL072 MCP6002

DOT NOTCH

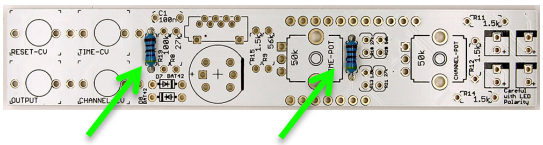
27.

Now put the remaining 1 x 11 and 1 x 7 female pin headers to one side, these will be soldered later on. Next we will move on to the Front PCB.

FRONT PCB

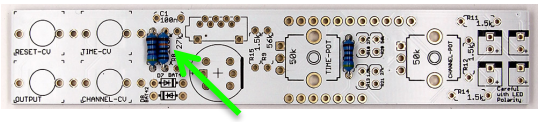
28.

On the front board start by soldering in the two 470R resistors into R17 and R18.



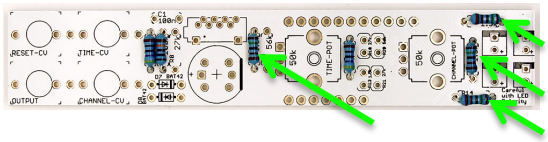
29.

Next solder the single 100K resistor into R19.



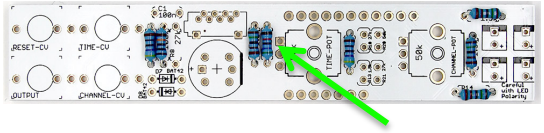
30.

Now solder four of the five 1.5K resistors into R11, R12, R14 and R15.



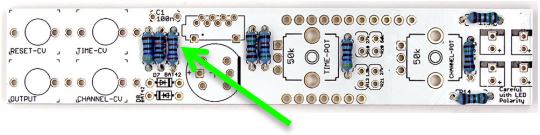
31.

Next solder one of the two 56K resistors into R9.



32.

Now solder one of the three 27K resistors into R8.

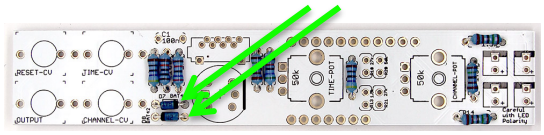


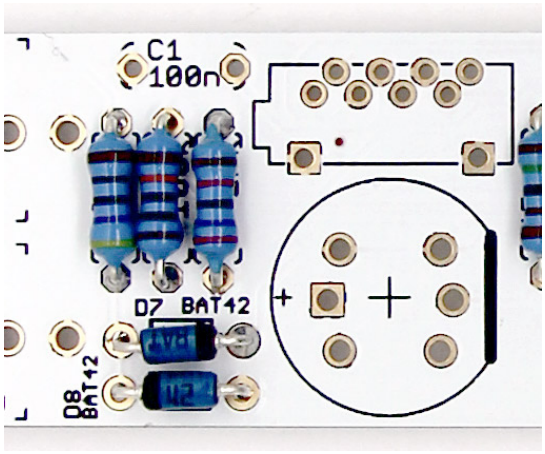
33.

Next solder in the two BAT42 diodes into D7 and D8 as shown.

NOTE: Take care with the orientation of the black stripes on the diodes – these should match the black stripes on the PCB silkscreen.

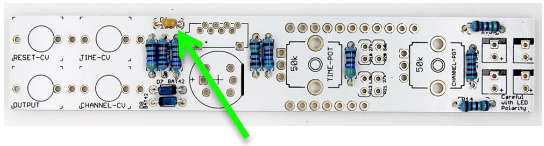
NOTE: Do not heat the diodes excessively or you will damage them, you should be aiming to solder quickly and neatly.





34.

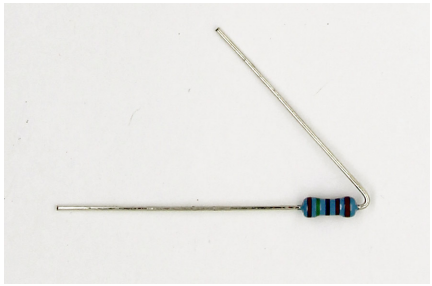
Next solder in the single 100n capacitor into C1.

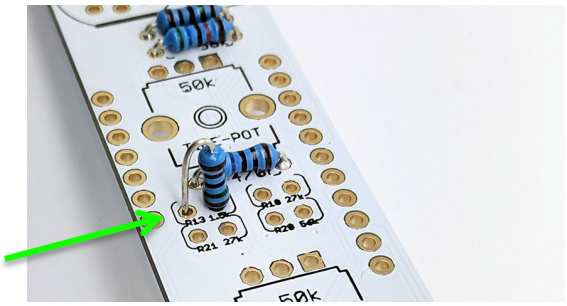


35.

Next we will solder the four standing resistors starting with single remaining 1.5K resistor.

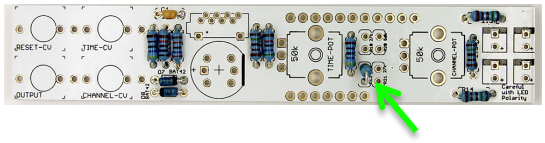
Bend the resistor lead as shown to prepare it to stand on the PCB, then place it into the PCB at R13 with the bent lead facing the PCB edge as shown.



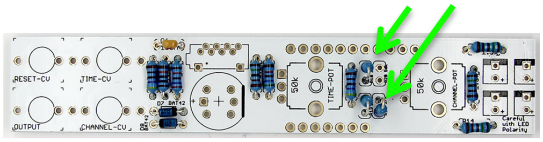


36.

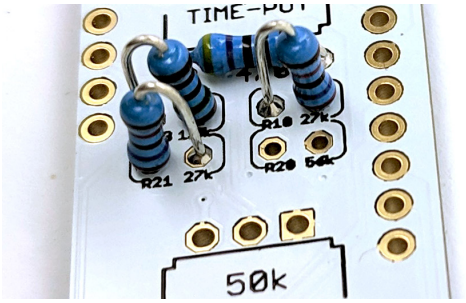
Now solder the standing 1.5K resistor into R13.



37.



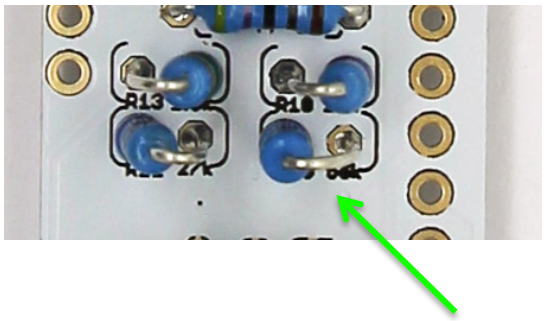
Next bend the leads for the two remaining 27K resistors and then place them standing into R10 and R21 as shown.



NOTE: Make sure you solder the resistor bodies as shown in the picture – with the bodies on opposite sides.

38.

Now take the remaining 56K resistor and solder it standing up into R20 as shown.

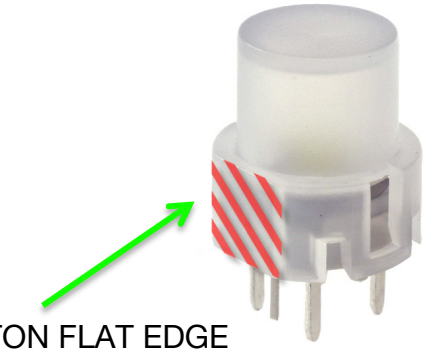


NOTE: Be sure to solder the resistor body as shown in the picture with the lead facing the PCB edge.

39.

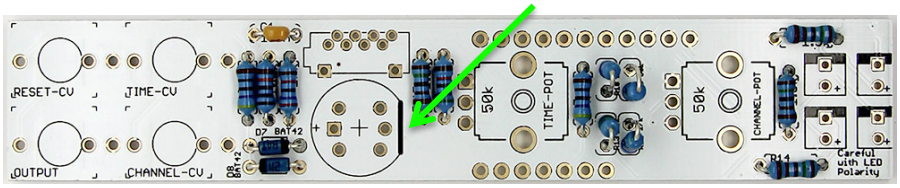
Next locate the round switch button. Note that one side is flattened. This needs to match the flat edge on the PCB silkscreen.

The real button does not have red stripes



BUTTON FLAT EDGE

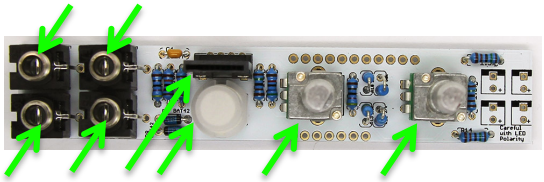
SILKSCREEN FLAT EDGE

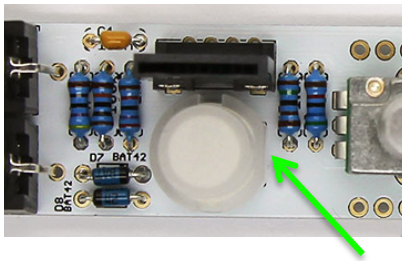


40.

Now place but DON'T SOLDER the button, four jacks, SD card holder, and two pots as shown. Thonk kits may include either D-Shaft or T18 shaft pots.

Remember! Orientation is vital for the switch button – make sure the flat edge matches the PCB silkscreen as shown.





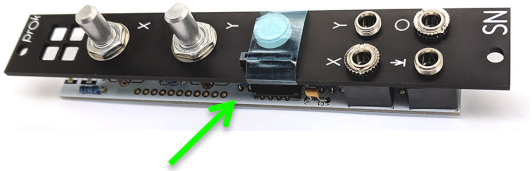
BUTTON FLAT EDGE

41.

Now carefully place on the front panel and screw the nuts and washers onto the pots and jacks to secure them in place.

Then use some masking tape to hold the switch and SD card holder in place – flat to the PCB surface.

Once everything is held securely you can then solder the parts to the PCB.



NOTE! Do not use regular tape as it will leave a sticky residue on the panel – only use masking or non-stick tape to hold the parts in place.

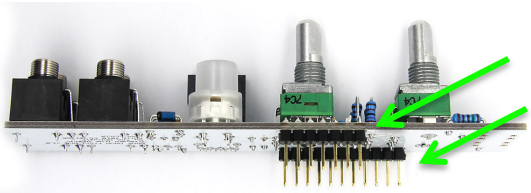
NOTE: The SD card holder has very fine pins - be slow and patient when placing and soldering this part in.

42.

Now remove the front panel and locate the long male pin header. Break the header into two lengths:

1 x 11 pin length
1 x 7 pin length

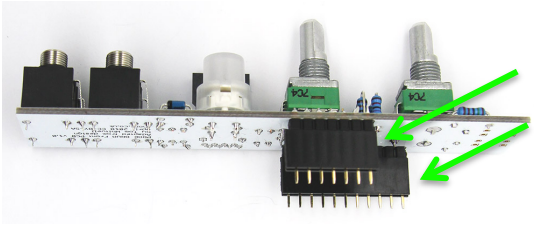
Place these on the opposite side of the PCB from the rest of the components as shown, then solder them in place.



NOTE: the pins should be soldered flush and perpendicular to the PCB surface.

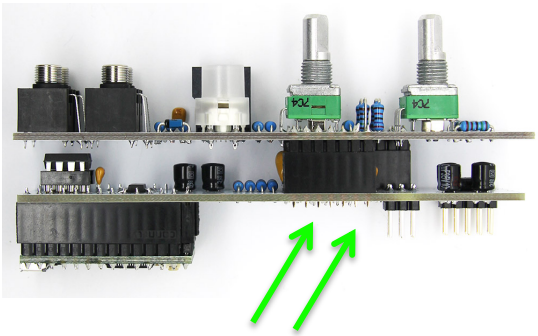
43.

Next take the female headers that were put aside earlier and place them onto the male headers as shown.



44.

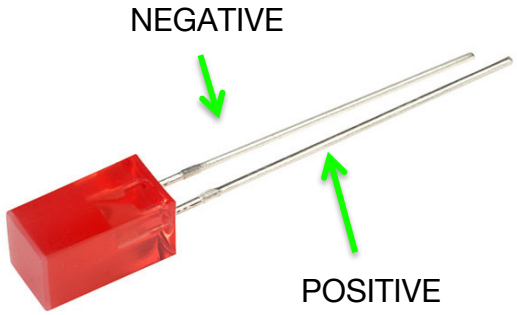
Now take the back PCB and fit the female header pins into the holes as shown. Then solder the female header pins onto the back board.



45.

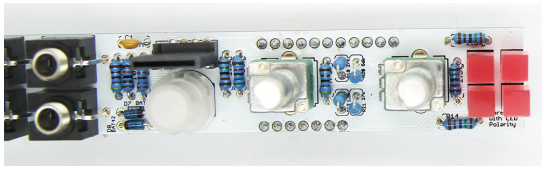
Now take the two PCBs apart again and locate the four square LEDS.

NOTE! One LED leg is longer than the other. Orientation is vital for this part: the long 'positive' leg must go to the round pad marked plus. The negative leg goes to the black stripe on the PCB.



46.

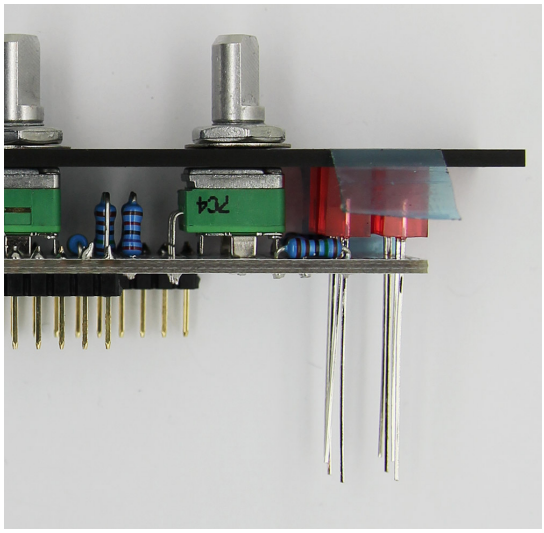
Now place the LEDs minding the correct orientation but DON'T SOLDER them yet.



47.

Next place on the front panel and secure it with all nuts and washers. Then take some masking tape and use it to hold the LEDs so they are flush with the front of the panel as shown.

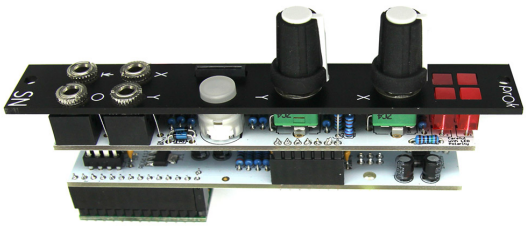
Once the LEDs are held nicely level with the front of the panel you can then solder them in place.



NOTE! Do not use regular tape as it will leave a sticky residue on the panel – only use masking or non-stick tape to hold the parts in place.

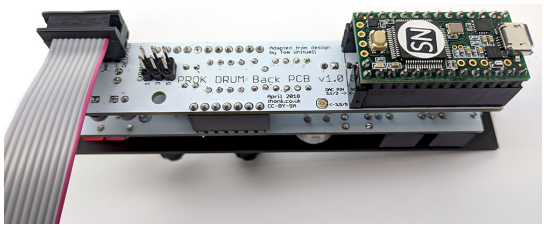
48.

Now join the both the PCBs together again and place the two knobs onto the pots.



49.

The module is now complete. Affix the power cable as shown with the red stripe facing the PCB text label ‘RED’



The Prok Drums user manual can be found here:

https://thonk.co.uk/documents/prok