



OVERVIEW

For the most recent version of this document please visit

<https://www.thonk.co.uk/documents/gbox>

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



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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/l_NU2ruzyc4 and the **Adafruit guide to excellent soldering** – <http://bit.ly/1177tF4>

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

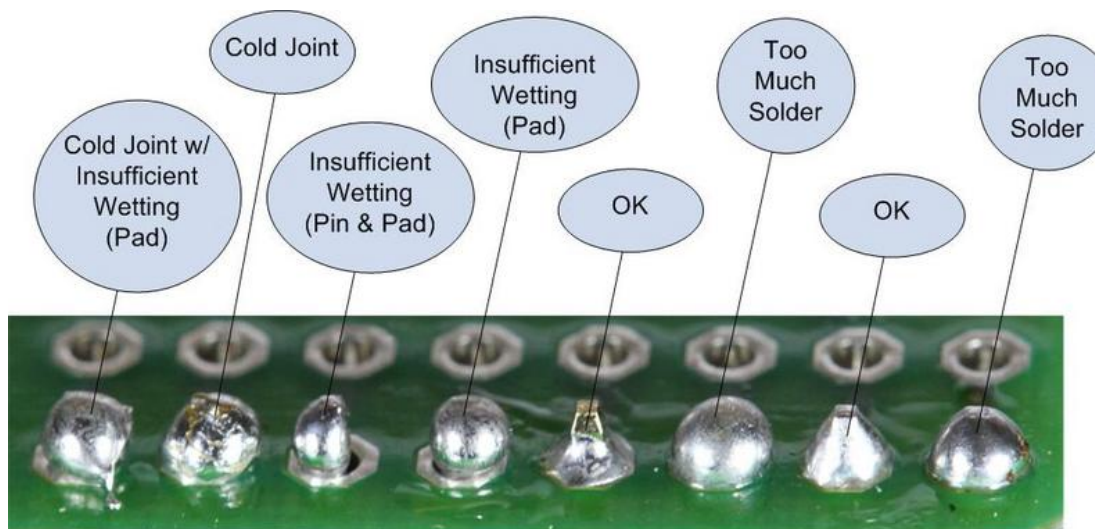
Soldering iron, snipe nose pliers, wire strippers, small flat head screwdriver and diagonal cutters AKA snips AKA side-cutters. A Digital Multimeter is always helpful for checking for bad solder joints and continuity. Thonk sell a range of inexpensive tools here - <http://bit.ly/1jxqF3n>



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.



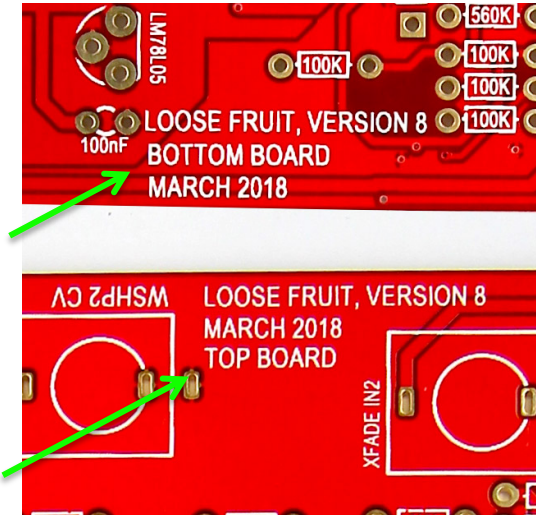
This photo is from the **Adafruit guide to excellent soldering** - <http://bit.ly/1jxqF3n> and is reproduced under an Attribution-Sharealike creative commons license - <http://creativecommons.org/licenses/by-sa/3.0/>



LOOSE FRUIT BUILD INSTRUCTIONS

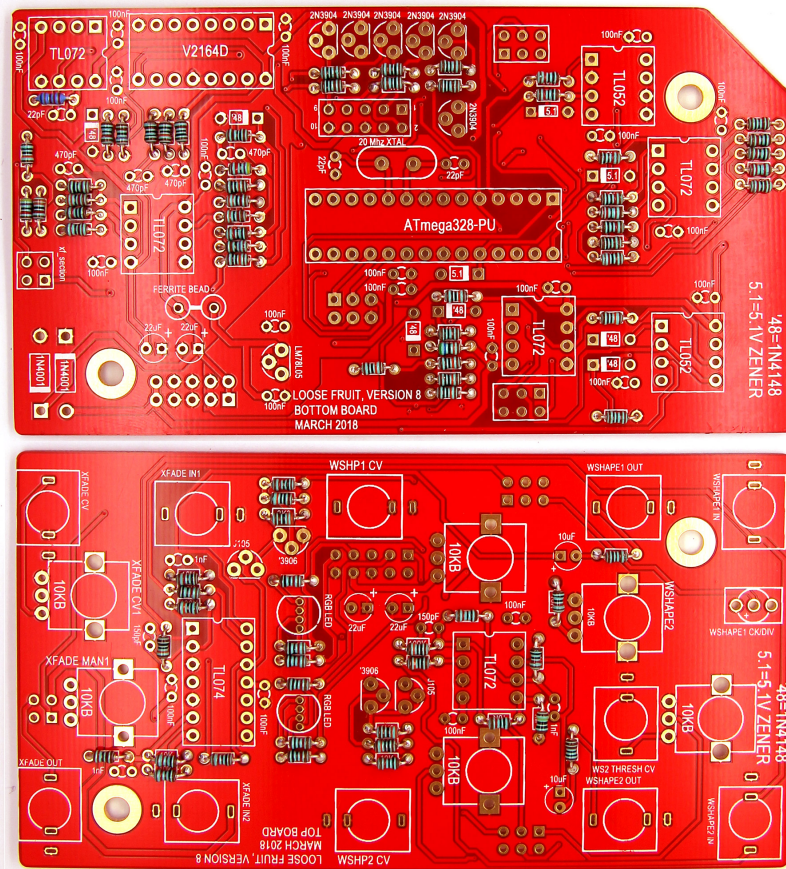
1.

There are two PCBs used in this build - they are referred to as the top board and the bottom board. They can be identified by locating the text on each PCB as shown. The bottom board has a diagonal corner cut off.



2.

Start off by soldering in all the resistors to both the top and bottom boards - it's recommended to do this gradually – one value at a time.





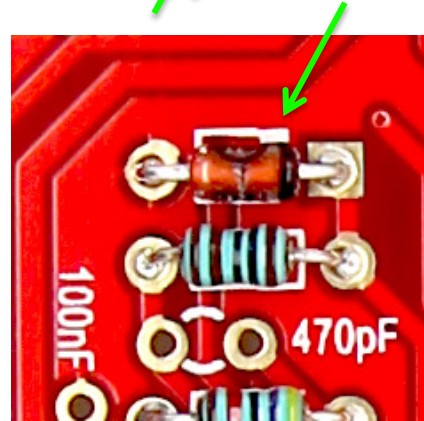
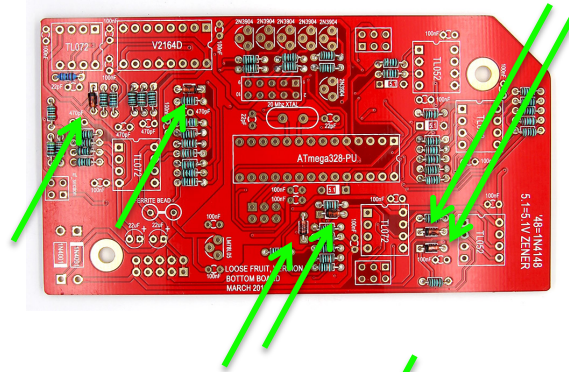
3.

Next solder in the six 1N4148 diodes. These are labelled on the PCB as: '48

Do not confuse these with the zener diodes which are also coloured orange and black.

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

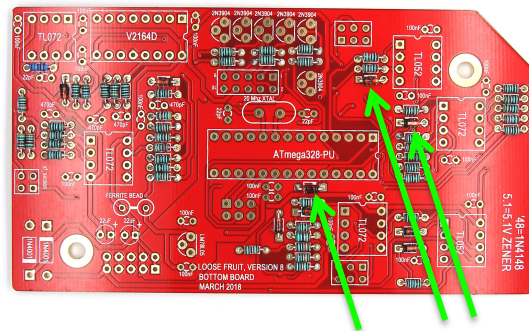
NOTE: Do not heat the diodes excessively or you will damage them, you should be aiming to solder quickly and neatly.



4.

Next solder in the three 5.1 Zener diodes. These are labelled on the PCB as 5.1

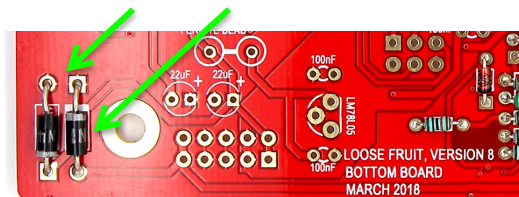
NOTE: Take care with the orientation of the black stripes on the diodes – these should match the thick white lines on the PCB silkscreen.



5.

Next solder in the two 1N4001 diodes. These are black with a silver stripe.

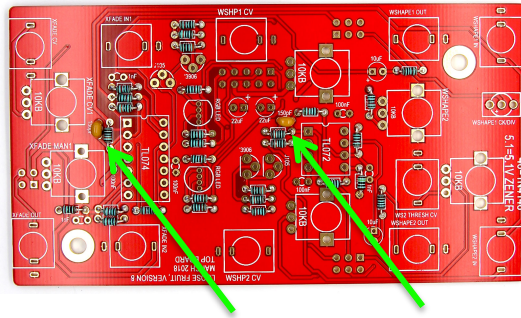
NOTE: Take care with the orientation of the silver stripes which should match the thick white lines on the PCB silkscreen.





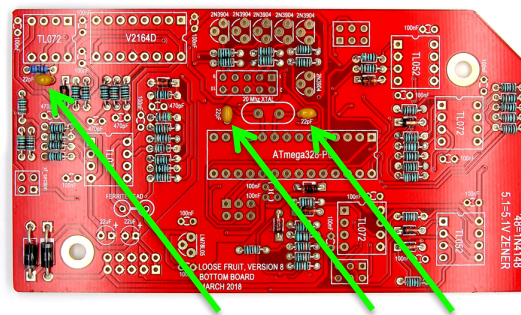
6.

Now take the top board and solder the two 150pF ceramic capacitors.



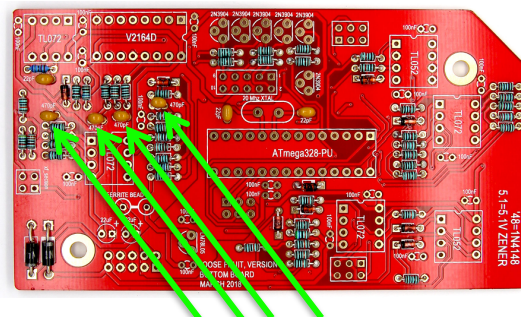
7.

Now move to the bottom board and solder the three 22pF ceramic capacitors.



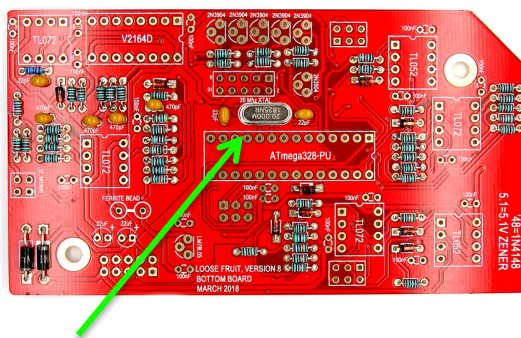
8.

Next solder the four 470pF ceramic capacitors.



9.

Now solder the crystal oscillator. Orientation does not matter for this part.

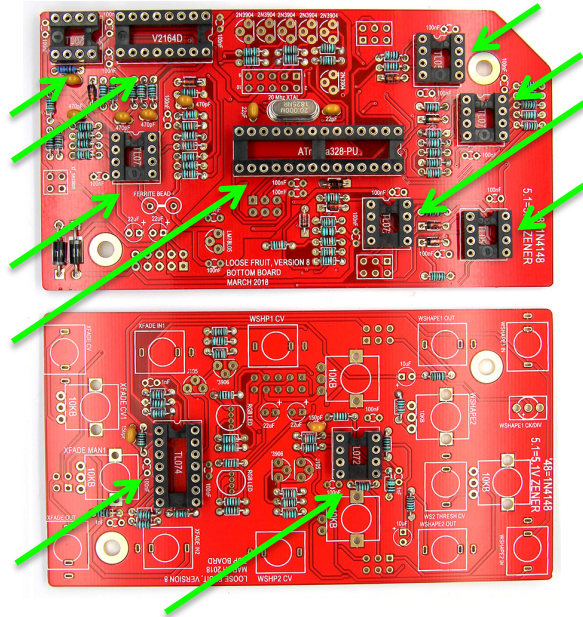




10.

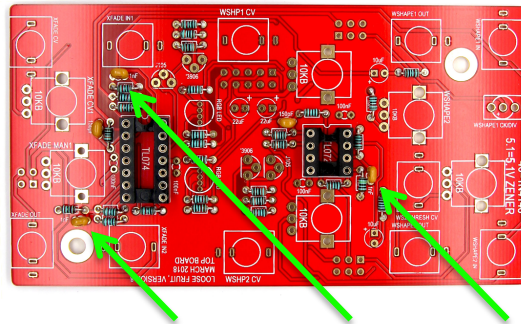
Next solder in the IC sockets on both PCBs. Make sure these sockets are soldered flush and perpendicular to the PCB surface.

The notch on each socket should match the PCB silkscreen as shown in the pictures.



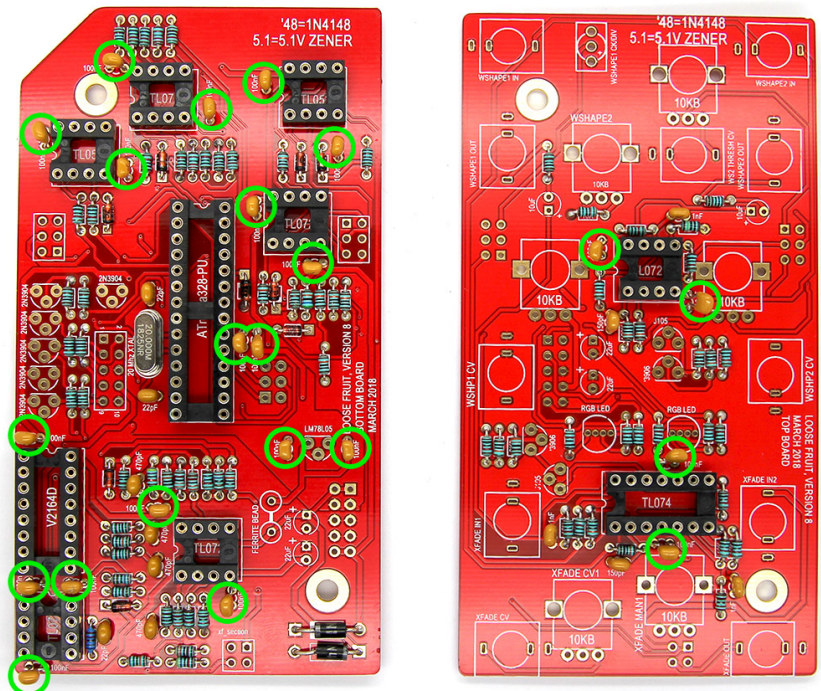
11.

Next solder the three 1n ceramic capacitors on the top board



12.

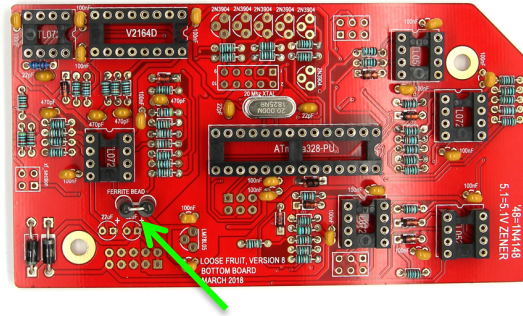
Now solder the twenty-two 100n ceramic capacitors.





13.

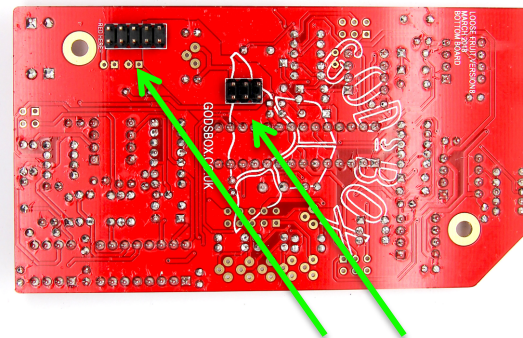
Next solder in the double standing ferrite bead. Orientation does not matter for this part.



14.

Bottom Board

Next take one of the 2x5 male headers and one of the 2x3 male headers. These should be soldered on the back of the bottom board as shown.

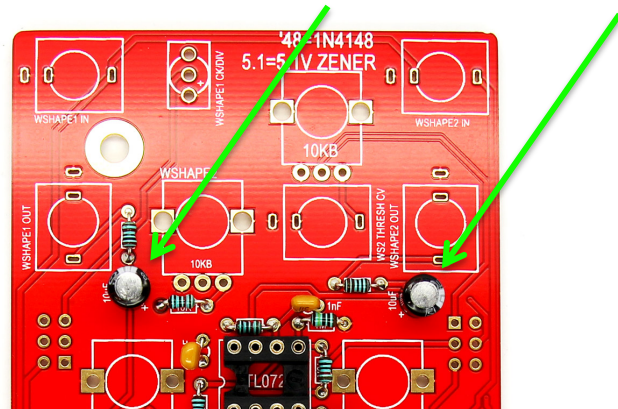


NOTE! Make sure these headers are soldered on the opposite side of all other components on the bottom board as shown in the picture.

15.

Now solder in the two 10uF Electrolytic Capacitors located on the top board.

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

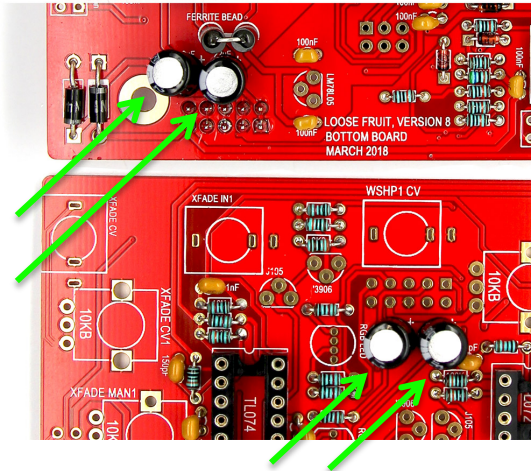




16.

Next solder the four 22uF Electrolytic Capacitors - there are two on each PCB.

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



17.

Next solder the single LM78L05 on the bottom board as shown.

NOTE! Orientation matters – be sure to match the curve of the body to the PCB silkscreen.

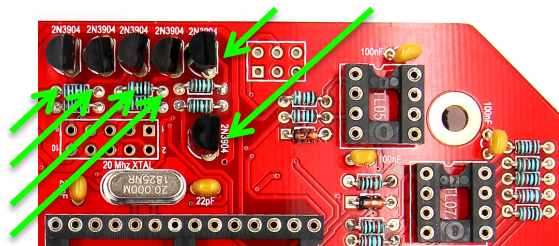


Do not heat these 3-legged parts excessively or you will damage them, you should be aiming to solder quickly and neatly.

18.

Now solder in the six 2N3904 transistors on the bottom board.

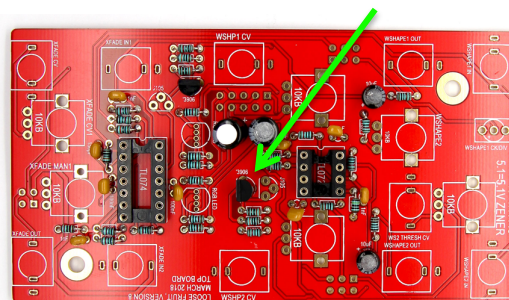
NOTE! Orientation matters – be sure to match the curve of the body to the PCB silkscreen.



19.

Now solder the two 2N3906 transistors on to the top board.

NOTE! Orientation matters – be sure to match the curve of the body to the PCB silkscreen.

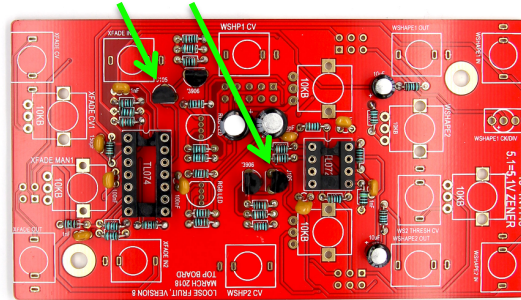




20.

Now solder the two J105 JFETs as shown.

NOTE! Orientation matters – be sure to match the curve of the body to the PCB silkscreen.

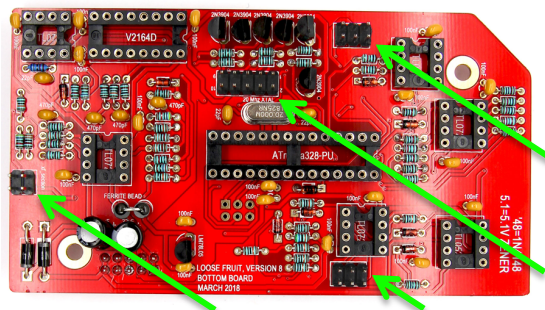


21.

Bottom Board

Next place and solder the remaining male headers on the bottom PCB - these are placed on the same side as the resistors and capacitors as shown.

These should be soldered flush and perpendicular to the PCB surface.



NOTE! Don't solder these headers to the other side of the board like the power header you already soldered!

22.

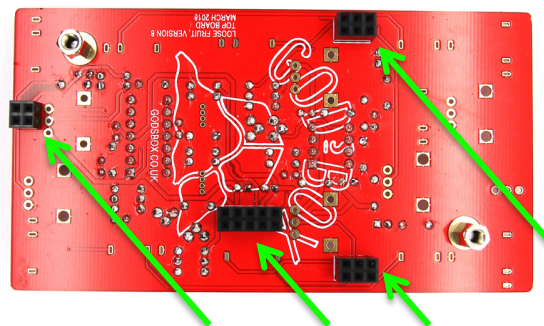
Now switch to the other PCB and place but **DO NOT SOLDER** the female headers on the top board. The female headers sit on the opposite side to all other components as shown.

Before soldering these headers – connect them to the male headers you just soldered on the other board. Once you have the PCBs connected nicely with the headers sitting flush you can then solder them in place.

Now is also a good time to screw the hex spacers onto the top PCB.

SWITCH TO OTHER PCB!

Top Board





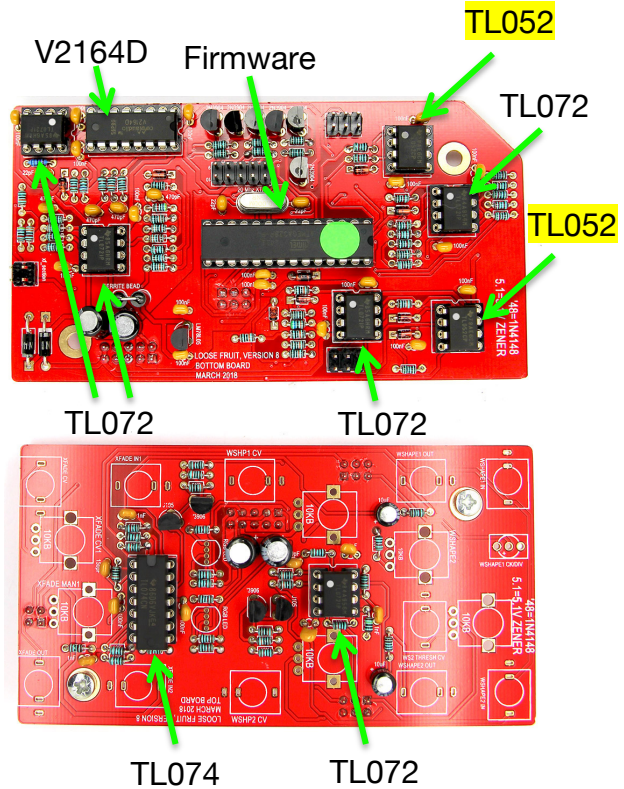
23.

Now disconnect the PCBs and fit all the ICs into their sockets as shown.

NOTE! Orientation is vital for all ICs

For the TL052 and TL072 ICs make sure the black circle on the top face of the IC is facing the end with the notch in the IC socket as pictured.

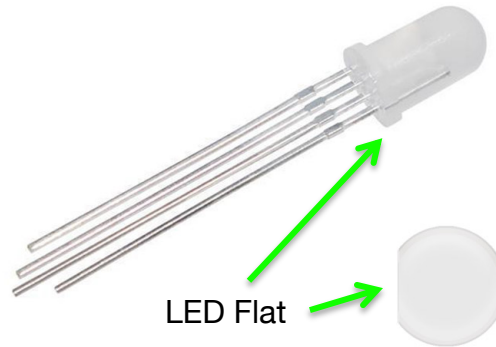
For all other chips make sure the notch in the chip is at the side with the notch in the IC socket.



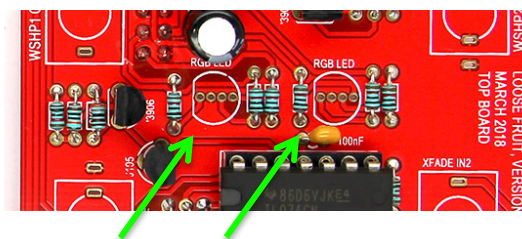
24.

Next locate the two LEDs.

When viewing the LED bulb from above or below, you should notice that one side of the bulb has a flattened edge.



The flat edge of the bulb must match the flat edge on the PCB silkscreen. Taking care of the orientation - you can place the LEDs - **DO NOT** solder them in yet!





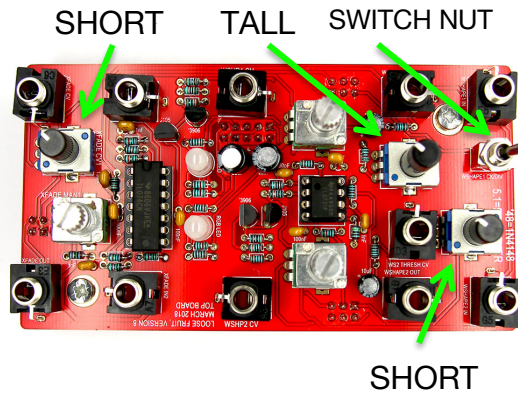
25.

Next place but **DO NOT SOLDER** the pots, jacks and switch.

Screw just one of the hex nuts onto the switch - do not use the switch washer.

Make sure the taller black trimmer is correctly placed in the position labelled WSHAPE2 as pictured.

NOTE: Before soldering the LEDs it's recommended to use masking tape to hold them to the front panel.



Place the tall black pot where the PCB is labelled WSHAPE2

26.

We recommend having the domed section of the LED just poking out from the panel for the best looking finish.

Now carefully place the front panel and secure some of the components with their nuts to hold the panel in place.

With the LEDs held in position with masking tape you can then solder in all the front panel components.



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 LEDs in place.

27.

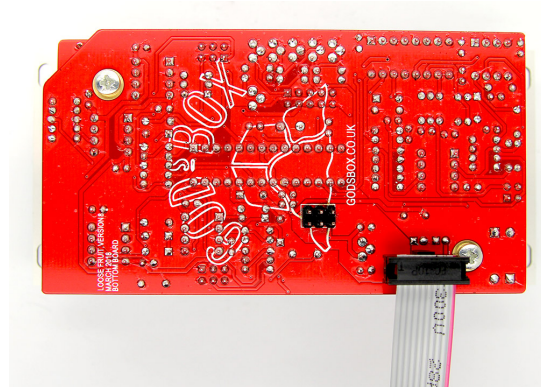
Now connect the two PCBs together - securing the two hex spacers with screws. Then you can screw on the rest of the nuts onto the front panel components and place the three knobs onto the pots.





28.

Affix the power cable as shown with the red stripe down. The red stripe should always be facing the PCB text label 'RED'



29.

The module is now complete. No calibration is required for the Loose Fruit

More info on God's Box modules can be found at <http://godsbox.co.uk>