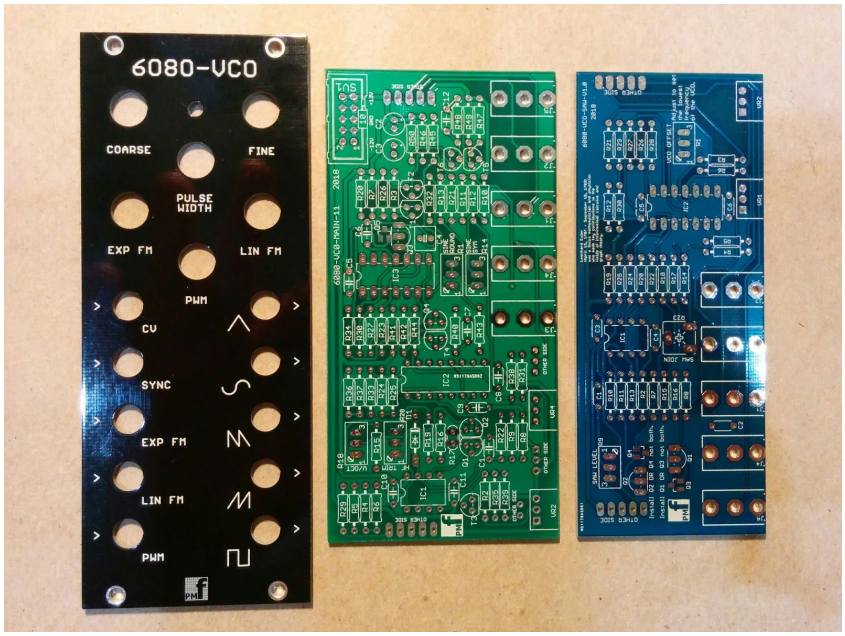
6080 VCO V1.2 – Assembly Guide

Thank you for purchasing this module! This is an average build with tightly packed components and some precision integrated circuits. Some of the pads are quite small and you will need a chisel tip or screwdriver tip soldering iron and the skill to solder these tiny joints.



The module is designed and sized for Eurorack systems. You will need a 16-10 pin eurorack power ribbon connector with –12/0/+12 which is connected to a synth power supply. Alternatively you can build to your own specification using the PCBs and solder wires from the switches, pots, LEDs and jack footprints to your desired front panels.

Follow the parts lists, these instructions and the PCB silkscreen text to build the module. The module consists of 2 PCB boards and a panel.

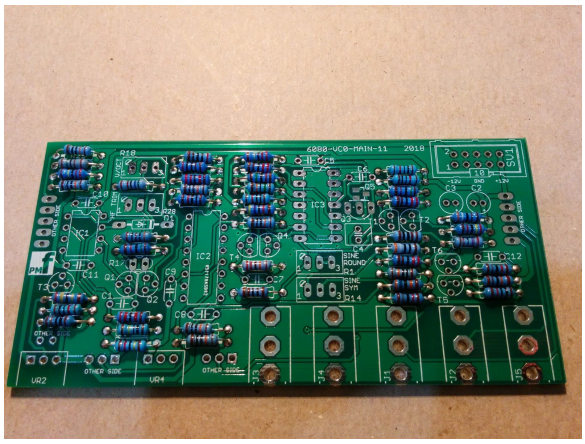
There are components installed on BOTH sides of the boards. Please ensure that you place the components on the correct side. When referring to the TOP of a board we mean the side with the pmF logo. The BOTTOM has no logo.

You must follow the order of assembly as described below since some components will be soldered underneath other components.

Constructing the Main board (labeled 6080-VCO-Main V1.x)

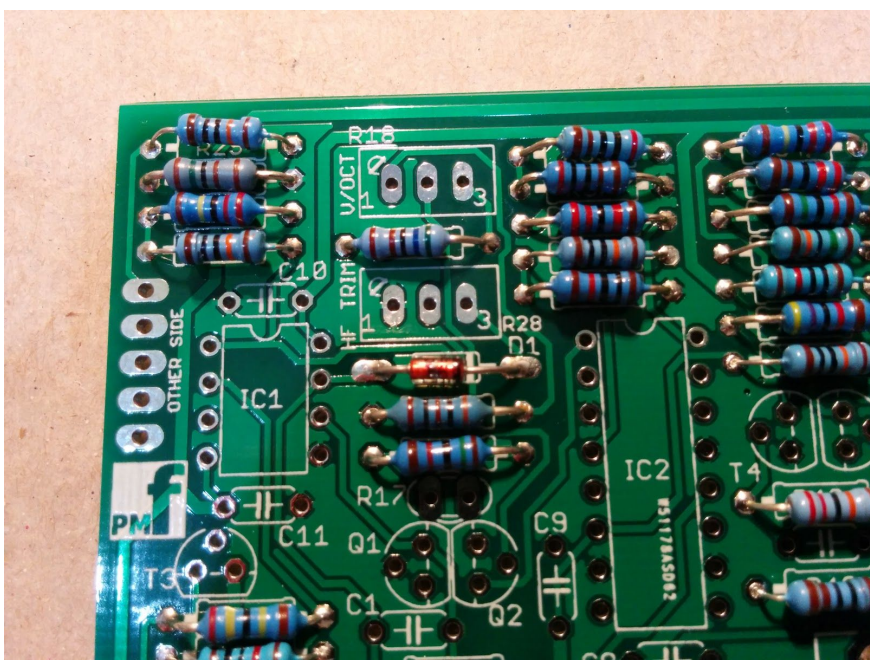
Resistors

Install the flat resistors on the TOP of the board. Solder and clip the leads.



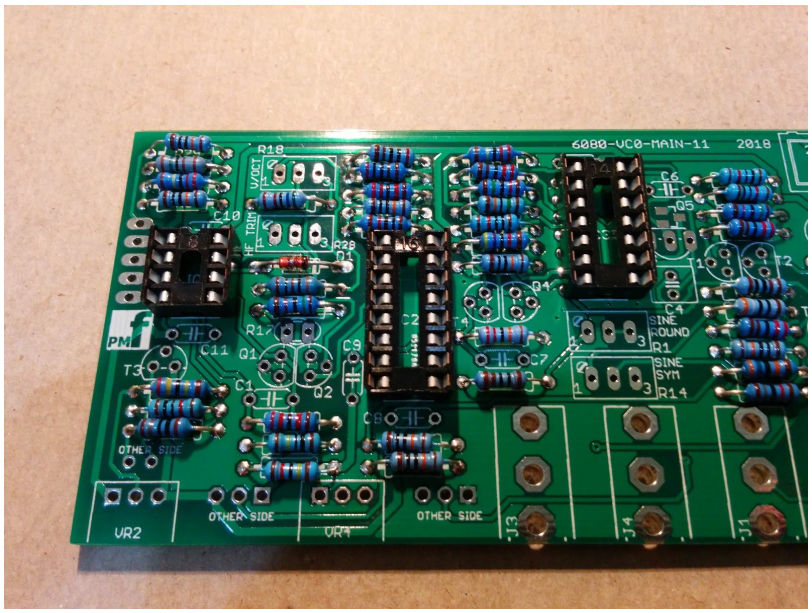
Diodes (but not LEDs)

Install the diodes on the TOP of the board. Align the stripe on each diode with the stripe marked on the board. Solder and clip the leads. Now go back and check the polarity against the silk screen for each diode.



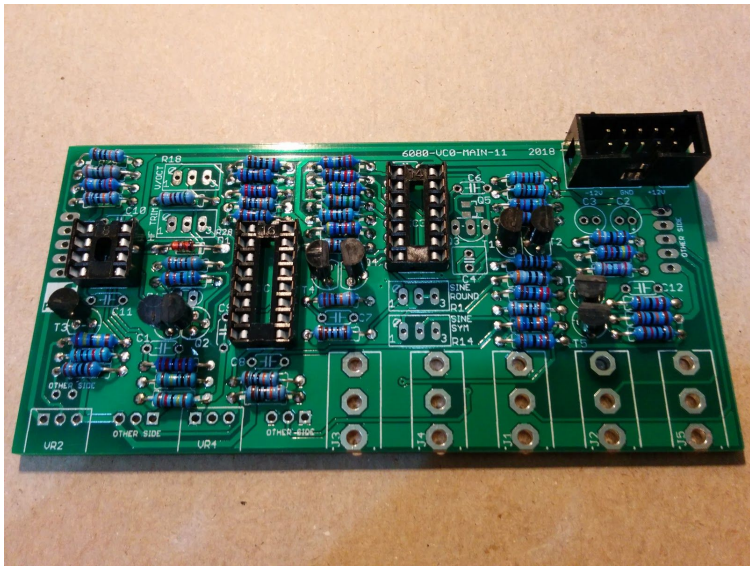
IC Sockets

Install the sockets on the TOP of the board. Observe the notch or mark on the socket and align with the notch or mark on the board. Solder.



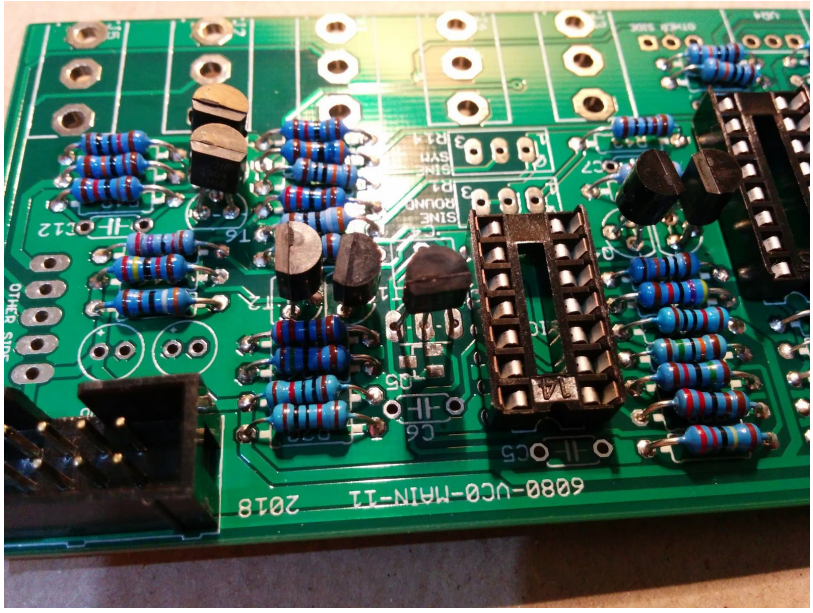
Power socket

Install the 10 pin power socket on the TOP of the board. This must be installed with the correct orientation or the module will be damaged when the power is connected.
The cut-out in the socket should face the jacks, aligning the cut-out with the "10" marking on the board as shown in the photo. Solder on the underside.



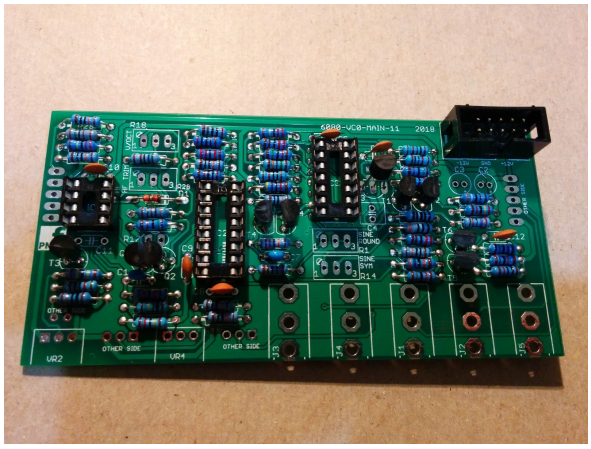
Bipolar Transistors

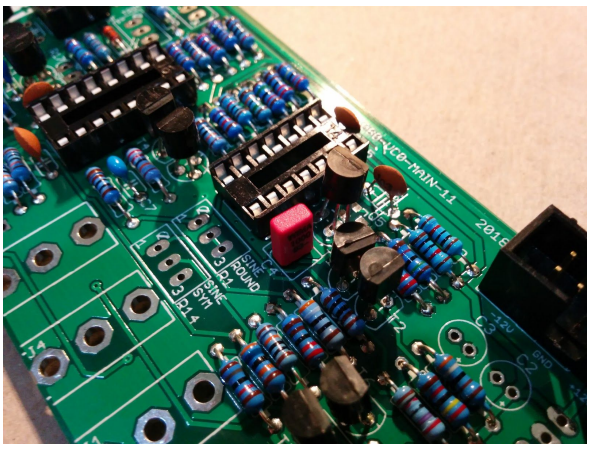
Install the transistors on the TOP of the board. Do not mix up the NPNs(marked T) with the PNPs(marked Q). These are polarized components. Align the outline with the outline on the board. They should be raised off the board surface slightly and at the same height. Solder and clip the leads.



Ceramic/film capacitors

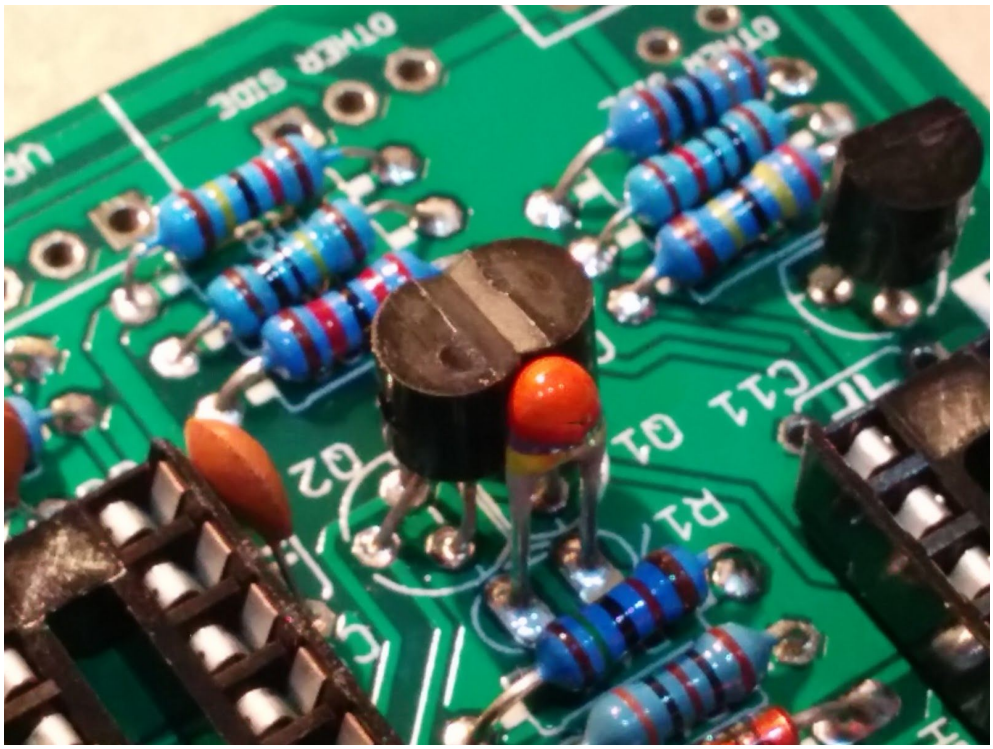
Install the ceramic/film capacitors on the TOP of the board. Solder and clip the leads.





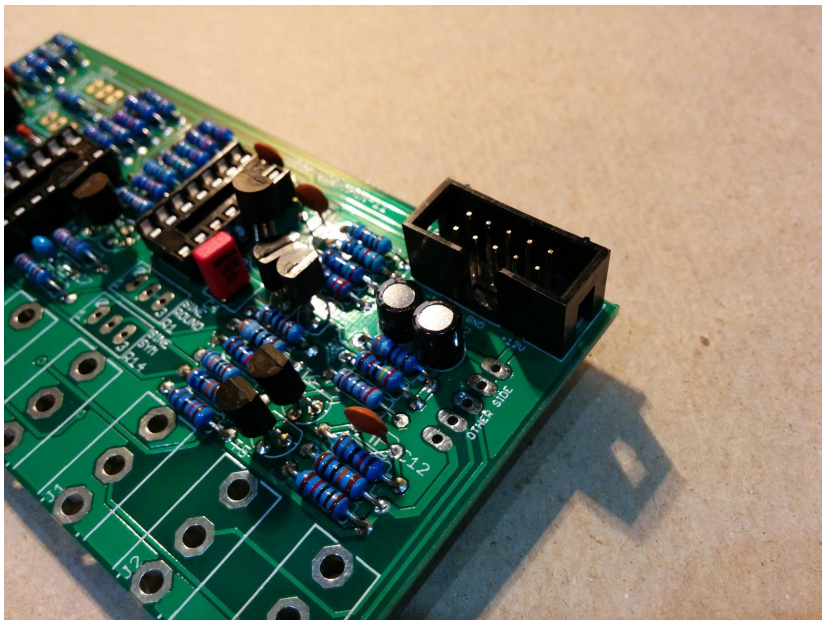
Thermistor

Install the thermistor on the TOP of the board. It should be raised off the board surface slightly and at the same height as the adjacent transistors. Try and move the two transistors and the thermistor close together and tie them together with a small zip tie or with epoxy. Solder and clip the leads.



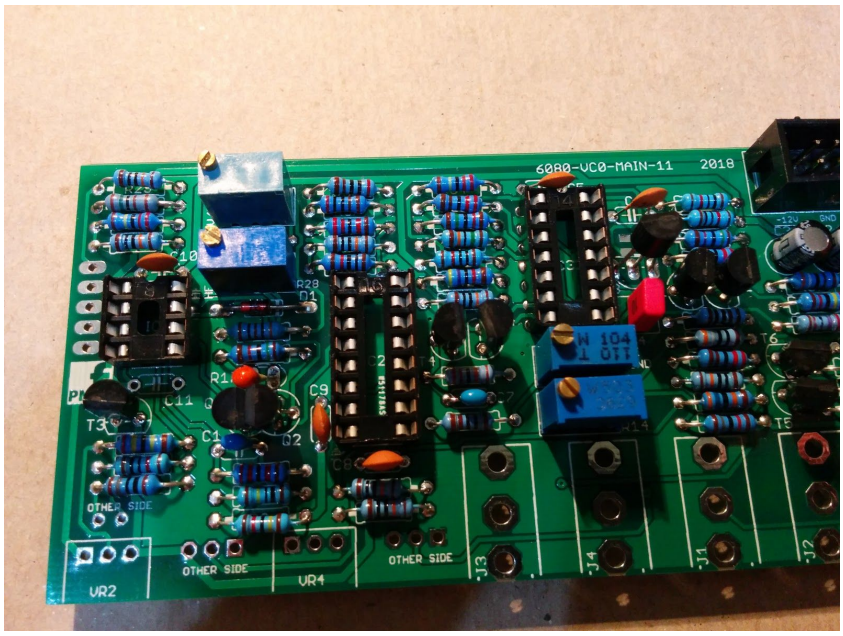
Electrolytic capacitors

Install these on the TOP. Make sure you orient these capacitors correctly. The longer lead and/or the lead marked with a + needs to be inserted into the hole that has the “+” marking near it. Leads marked with “-“ go in the board hole WITHOUT the “+”. Solder and clip the leads.



Trimmer resistors

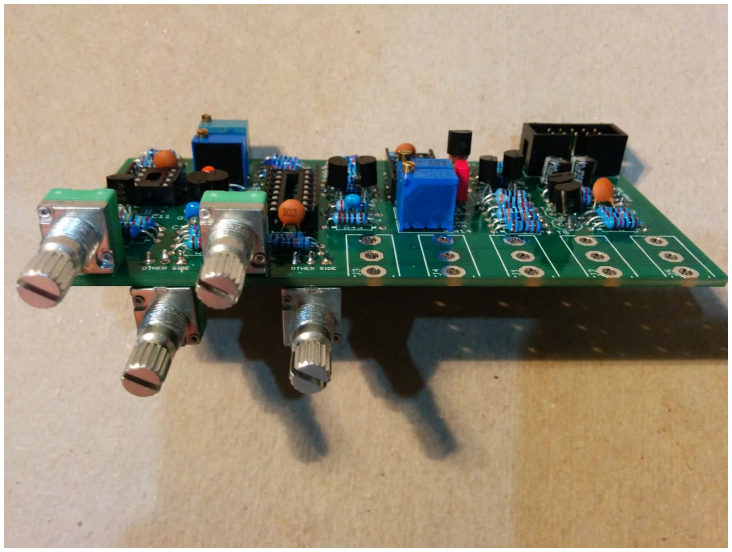
Populate the trimmer pots on the PCB. Make sure the multi turn trimmers are oriented so that the screw is above the circle on the silk screen.



Potentiometers

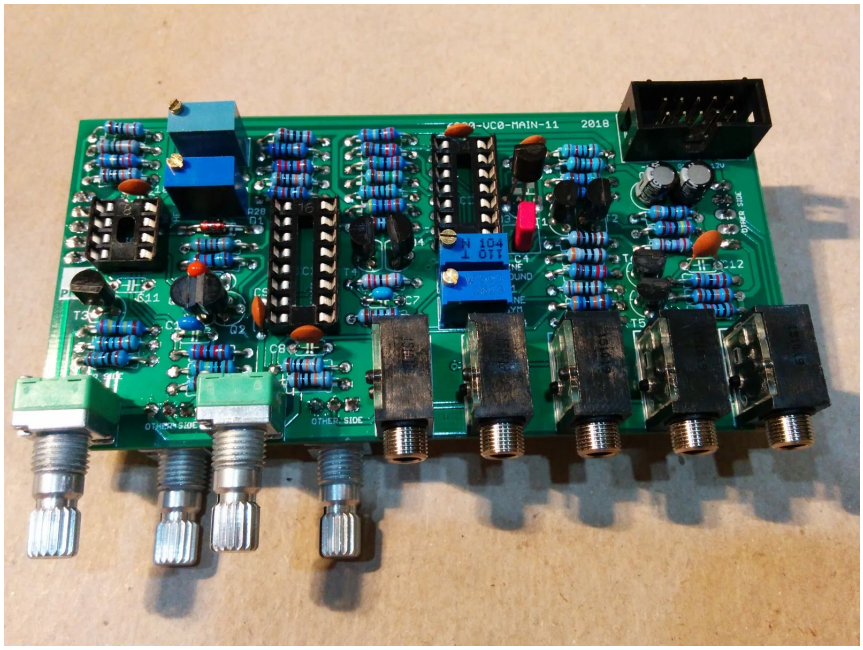
If the pots have positioning lugs on the front, cut these off with a sharp pair of flush cutting pliers. The front of the pot (where the shaft protrudes) needs to be flat.

Carefully align the pots so they are flush with the edge of the board and perfectly upright and tight to the board surface. They are on both sides. The easiest order for installation is 1,4,3,2. Please ensure they are on the CORRECT SIDE OF THE BOARD. See Photo.



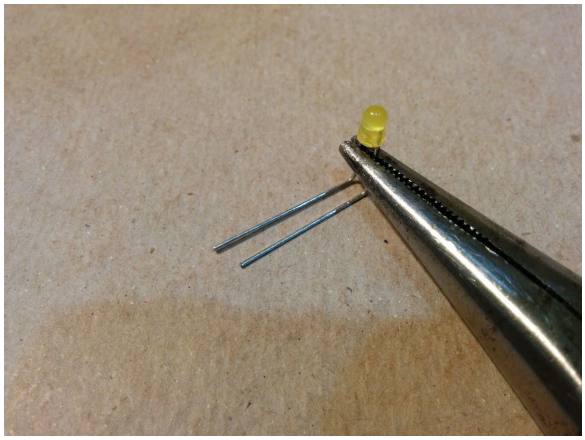
3.5mm Jack Sockets

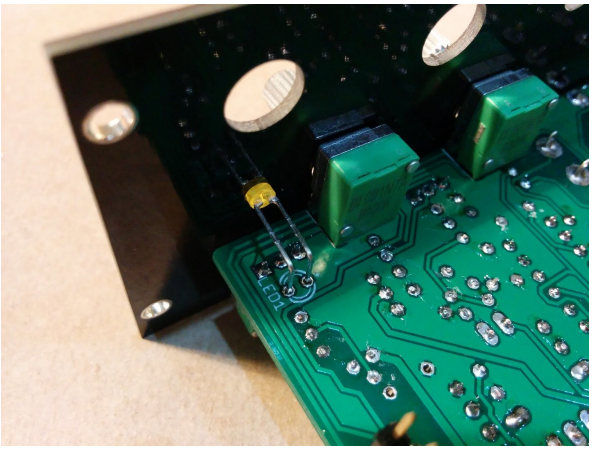
Install the jacks on the TOP and fully solder each one as you install it. Make sure they are perfectly aligned and tight to the board. Do not bridge the contacts to nearby components.



LED

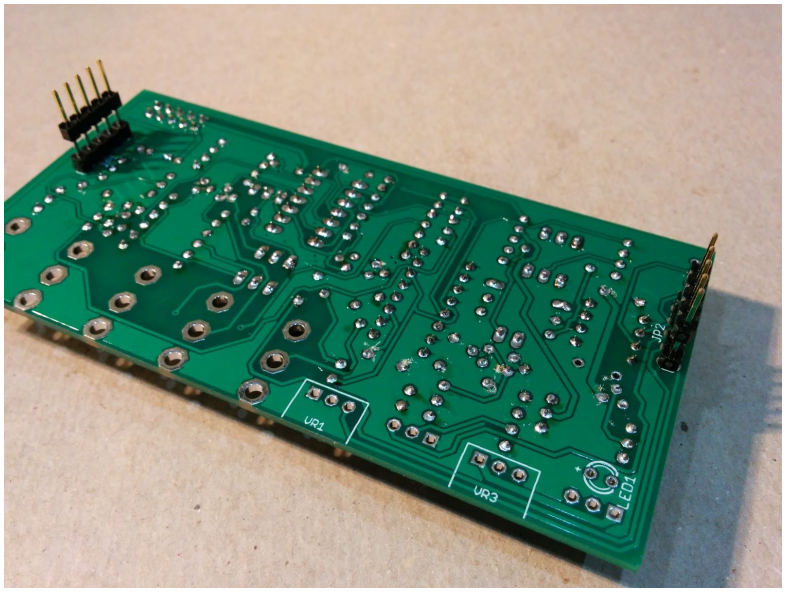
Bend the leads as shown in the photo. The bend id at ⅜” = 9mm from the base of the LED. Insert in the board with the long lead in the hole marked + and use the panel to align the LEDs. The correct location for the panel is with the pots emerging from the holes marked: Fine, LIN FM, PW, PWM and the jacks emerging from the output waveform markings. Solder the LED and clip the leads.





Headers

Install these on the BOTTOM of the board and solder on the TOP. They need to be perfectly perpendicular to the board and tight to the board surface. The short legs go into the board and the long legs stick out from the board. This is the lowest cost way of joining the boards but they are more difficult to separate than the alternative method described below.

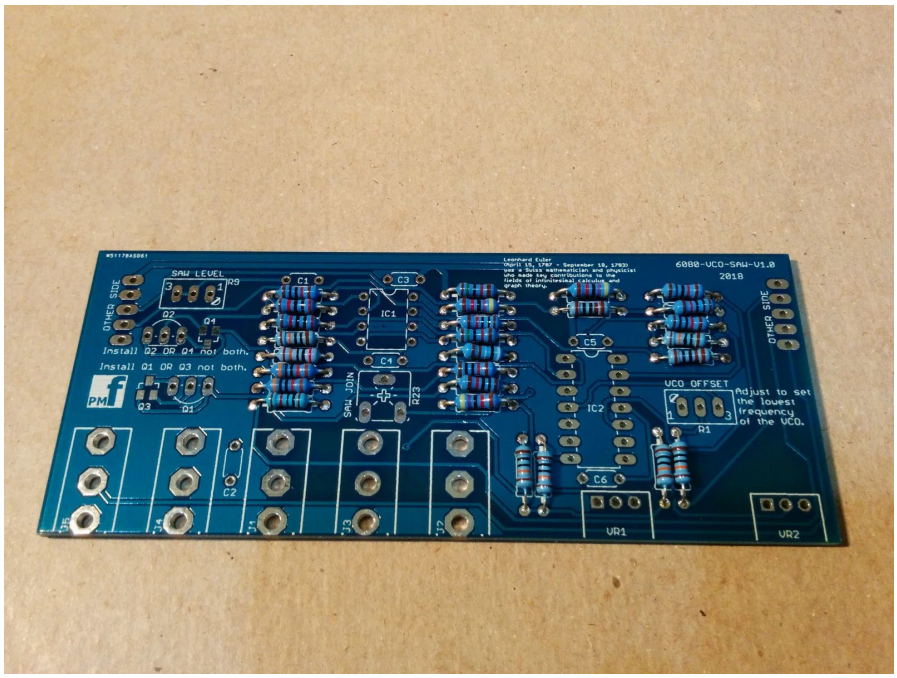


You can also use different headers. You can install 517-929974-01-05-RK or 517-929850-01-05-RA female headers on this board and 517-929834-02-05-RK on the Saw Shaper board. Solder the female headers first, then insert the male headers into the female headers, then,when you join the boards, you can solder the pins on the Saw board and then the two boards can be separated easily.

Constructing the Saw Shaper board (labeled 6080-Saw-1x)

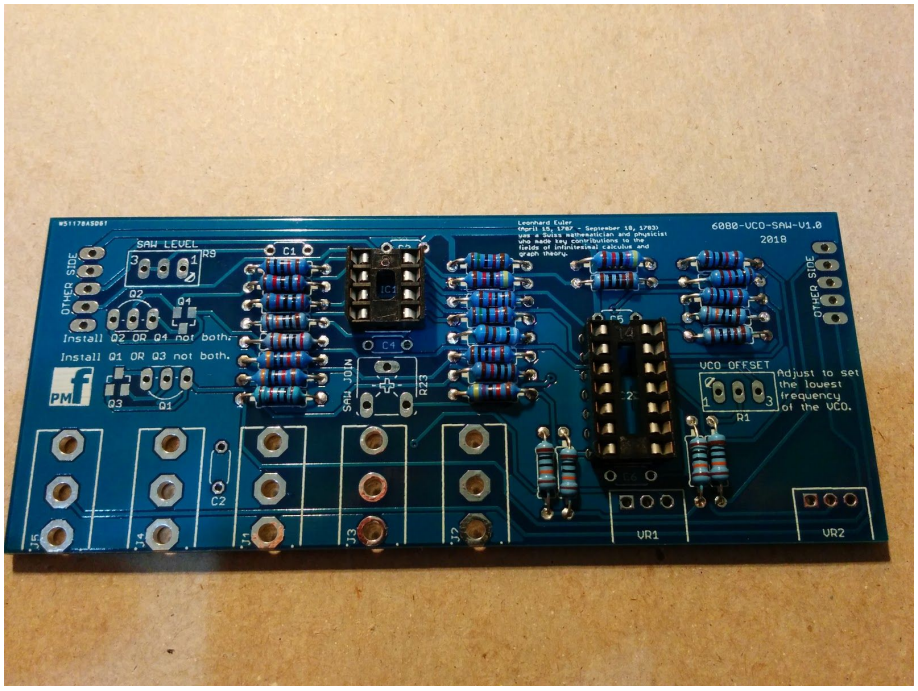
Flat Resistors

Install the flat resistors on the TOP of the board. Solder and clip the leads.



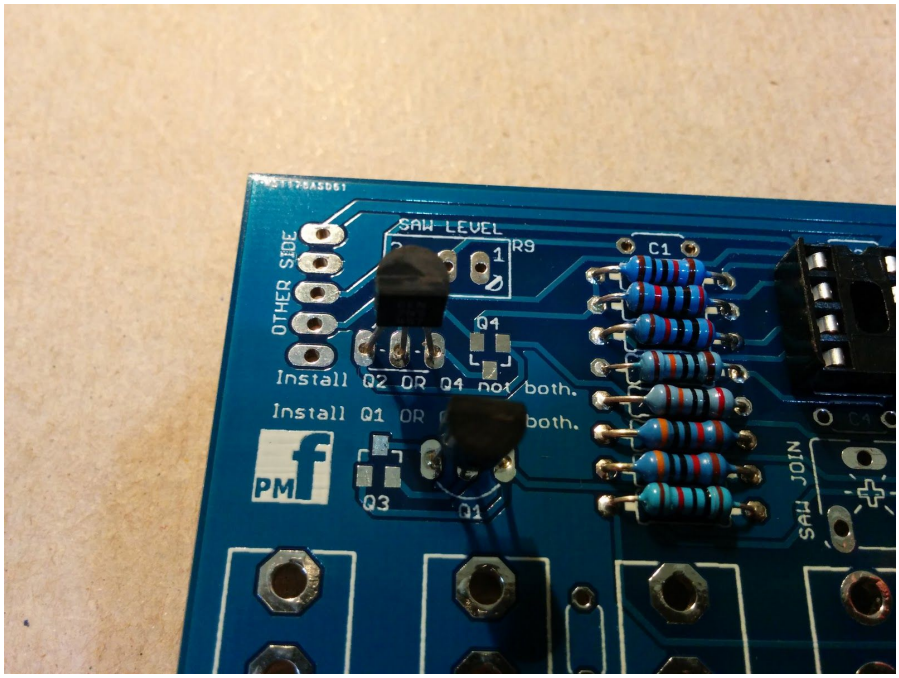
IC Sockets

Install the IC socket on the TOP of the board. Observe the notch or mark on the socket and align with the notch or mark on the board. Solder.



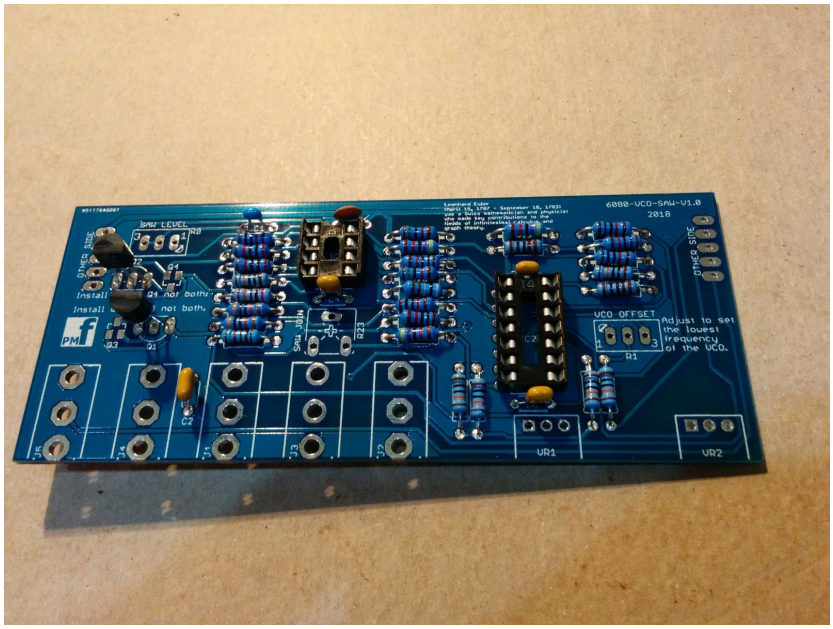
FETs

Select SMD OR through hole transistors. The board has footprints for both packages. DO NOT INSTALL both SMD transistors and through hole transistors.
Install the transistors on the TOP of the board. These are polarized components. Align the outline with the outline on the board. Solder (and clip the leads if using through hole components.



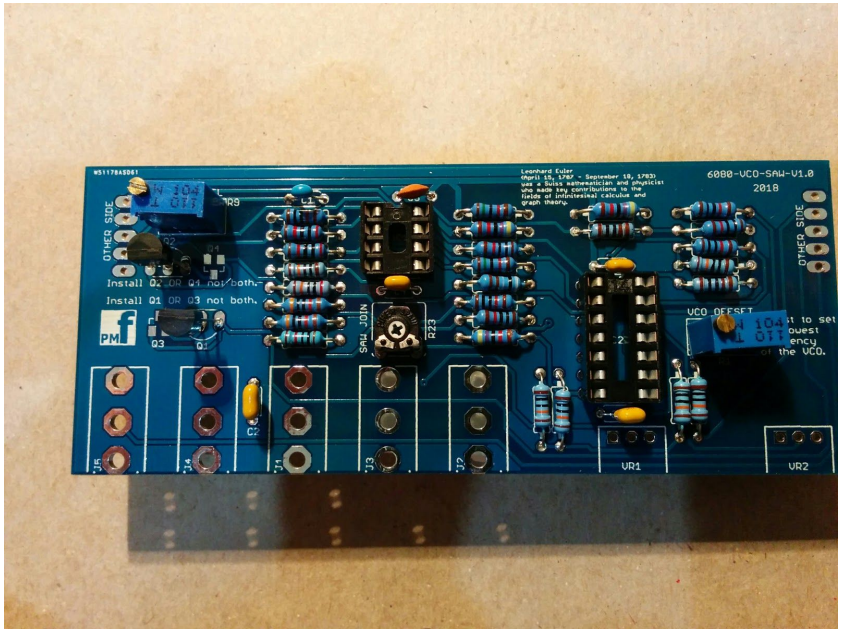
Ceramic/film capacitor

Install the ceramic/film capacitor on the TOP of the board. Solder and clip the leads.



Trimmer resistors

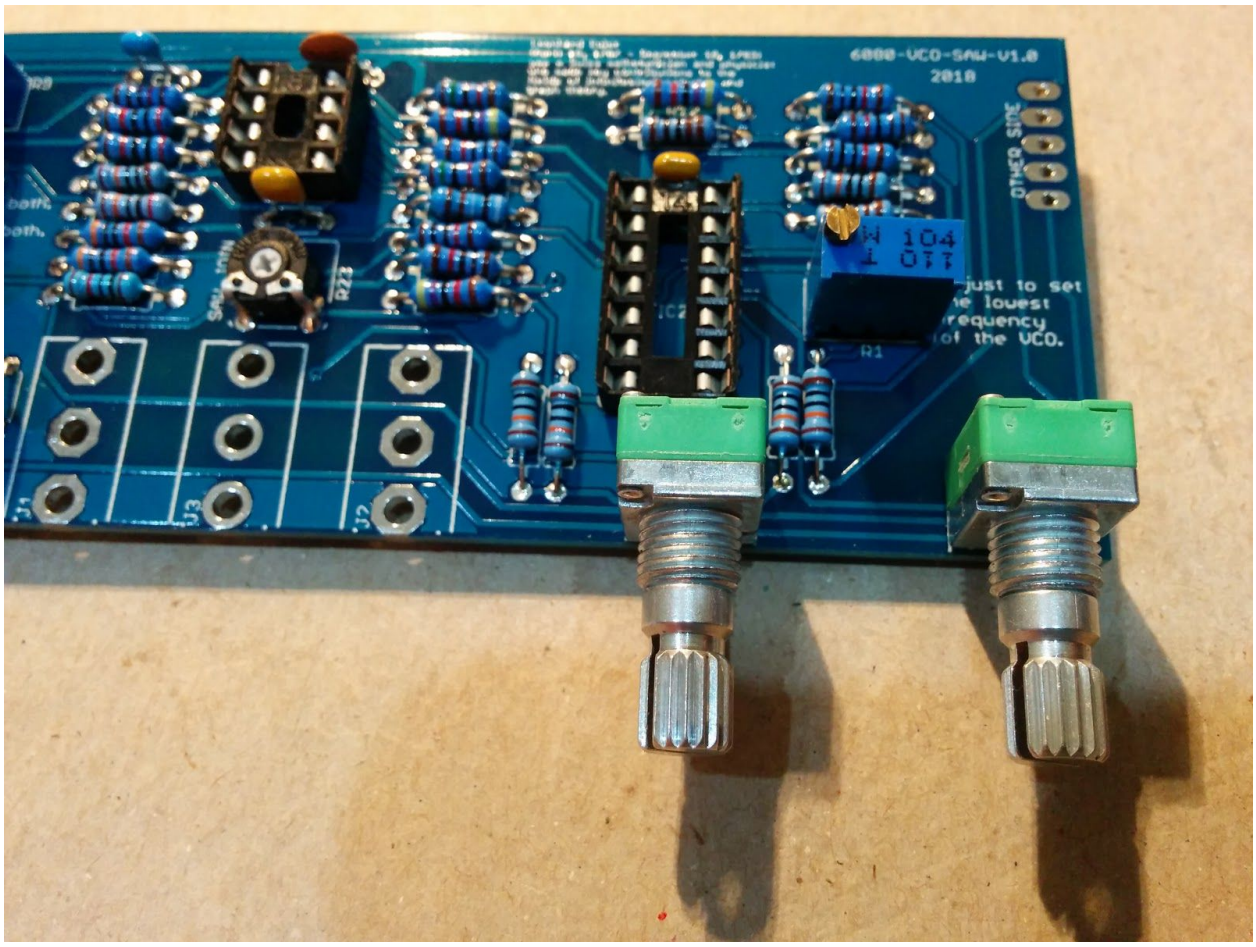
Populate the trimmer pots on the PCB. Do not mix up the 2K and the 100K trimmers. Make sure the multi turn trimmers are oriented so that the screw is above the circle on the silk screen.



Potentiometers

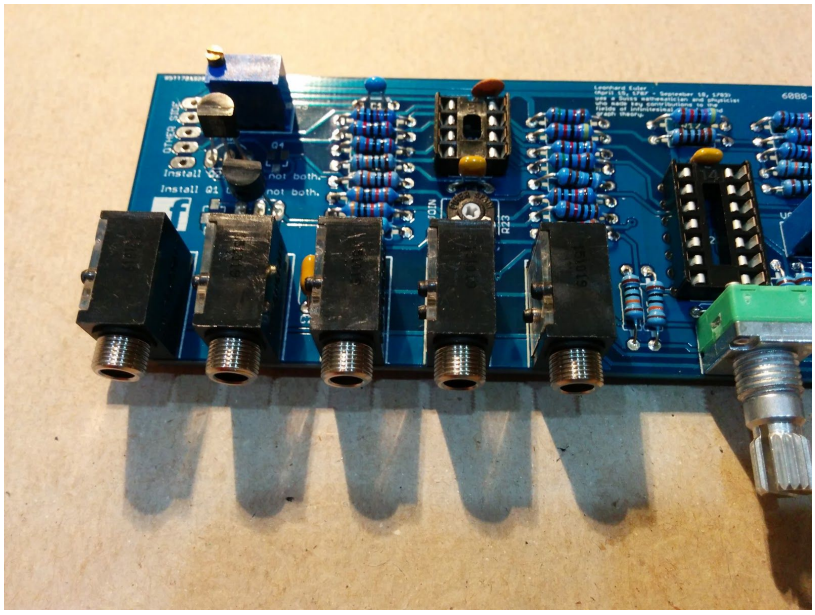
If the pots have positioning lugs on the front, cut these off with a sharp pair of flush cutting pliers. The front of the pot (where the shaft protrudes) needs to be flat.

Carefully align the pots so they are flush with the edge of the board and perfectly upright and tight to the board surface. Please ensure they are on the CORRECT SIDE OF THE BOARD. See Photo.



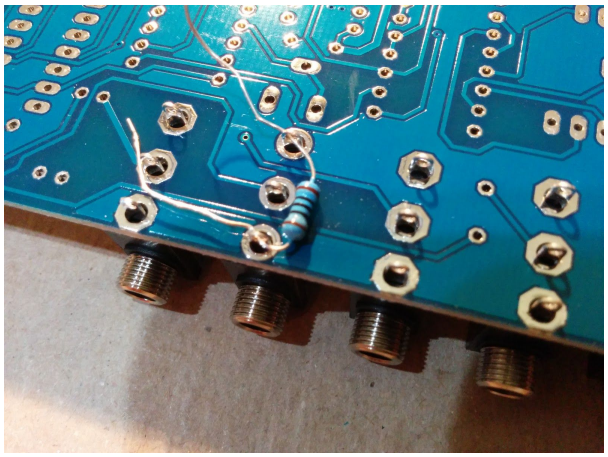
3.5mm Jack Sockets

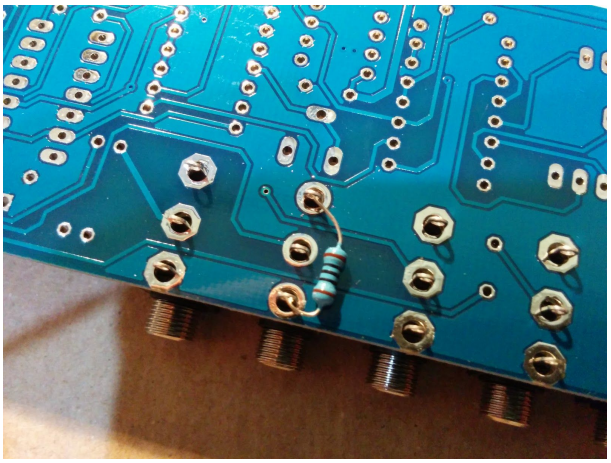
Install the jacks on the TOP and fully solder each one as you install it. Do not bridge the contacts to nearby components.



Sync Resistor

If your board is marked V1.0, install the sync resistor R31 across the sync jack (JP3) as shown.
ONLY FOR BOARDS MARKED V1.0 (IGNORE OTHERWISE)

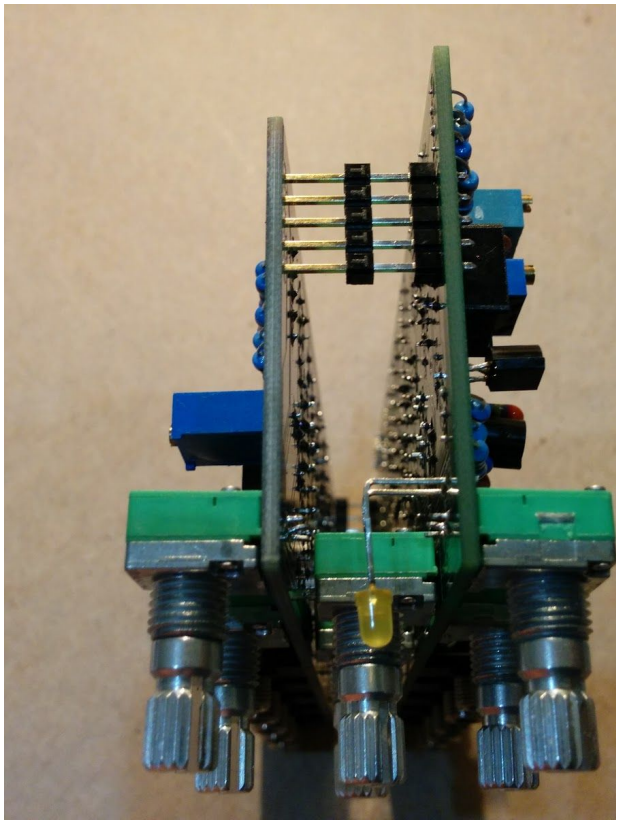




Join

Join the two PCBs by aligning the 5 pin headers on the “Main” board with the holes on the Saw Shaper board. Place the front panel over the boards so that the jacks, pot, and LED align with the holes in the panel. Put nuts on the jacks and pot.and attaching the front panel so that the two PCBs are parallel. You can then solder the headers onto the Saw Shaper board.

You can also use different headers. You can install 517-929974-01-05-RK or 517-929850-01-05-RA female headers on the main board and 517-929834-02-05-RK on this board. Solder the female headers first, then insert the male headers into the female headers, then,when you join the boards, you can solder the pins on the Saw board and then the two boards can be separated easily.



Voltage tests

You do not have to do these tests if you are completely happy with your soldering and are sure there are no bridges or incorrectly placed components. However, these tests will ensure that the correct power supplies are sent to the IC pins to ensure they will not be damaged on power up.

Connect the power of the Main board. Connect the –VE probe of a multimeter set to the 20V range to one of the ground pins on the input connector..

Check the voltage at the following points on the Main board:

IC1 pin 4 = -12
IC1 pin 8 = +12
IC1 pin 3 = 0
IC1 pin 5 = 0

IC2 pin 11 = +12
IC2 pin 6 = -12
IC2 pin 3 = 0
IC2 pin 16 = +12
IC2 pin 13 = 0
IC2 pin 14 = 0
IC2 pin 10 = 0
IC2 pin 7 = 0

IC3 pin 4 = +12V
IC3 pin 11 = -12
IC3 pin 3 = 0
IC3 pin 12 = 0

Check the voltage at the following points on the Saw Shaper board:

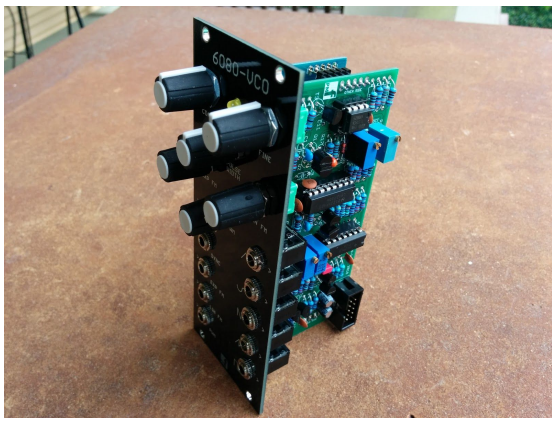
IC1 pin 4 = -12V
IC1 pin 8 = +12V
IC1 pin 6 = 0

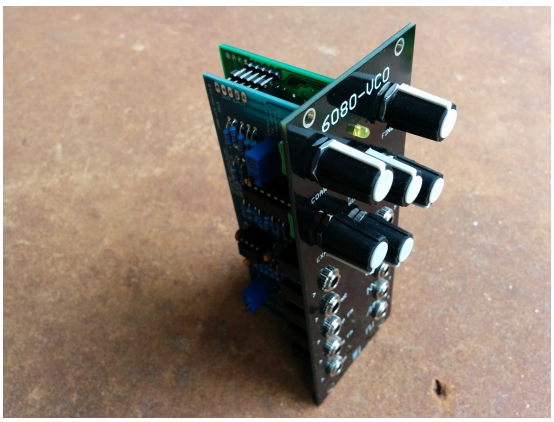
IC2 pin 4 = +12V
IC2 pin 11 = -12V
IC2 pin 3,5,12 = 0

If any of these tests fail to match the readings given, you should check the components and soldering before progressing.

Final Assembly

1. Place the ICs in place by aligning the notch with the notch graphic on the PCB Silk Screen and notch on the socket.
3. Place the front panel over the PCB so that the pots, jacks and LEDs align with the holes in the panel.
4. Put nuts on the pots and jacks and FULLY TIGHTEN all of them. Do not overtighten!
5. Install Knobs.





NOW READ THE USER GUIDE.