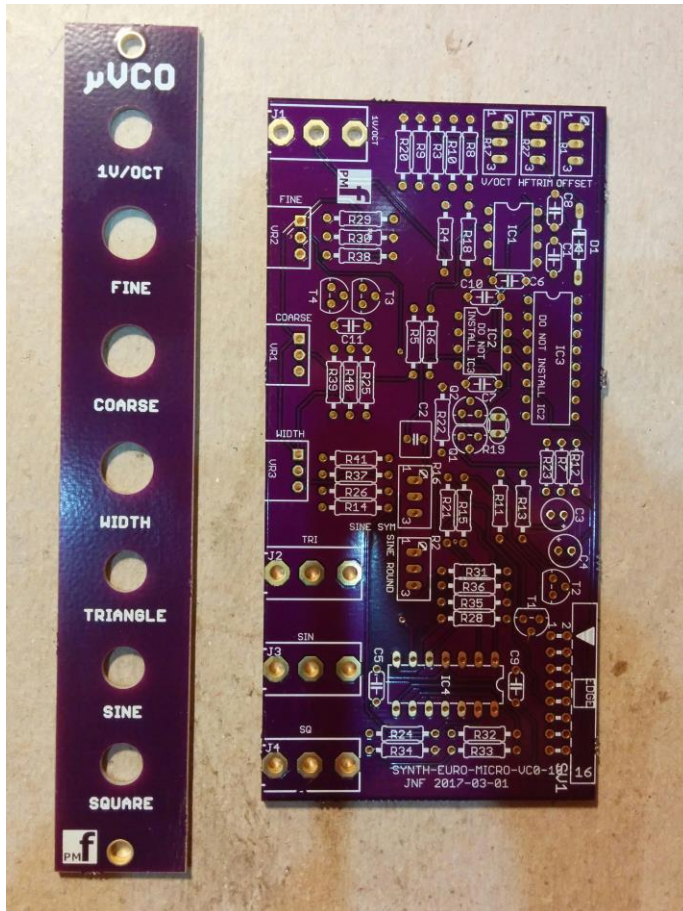


# Micro VCO v1.0 – Assembly Guide

---

Thank you for purchasing this module! This is a simple build with minimal packed components and precision integrated circuits.



The module is designed and sized for **Euro-rack** systems. You will need a 16 pin euro-rack power ribbon connector with  $-12/0/+12$  which is connected to a synth power supply.

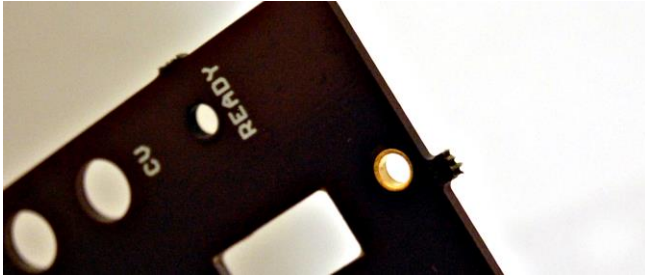
Follow the parts lists, these instructions and the PCB silkscreen text to build the module.

The module consists of 1 PCB board and a front panel.

You may need to clean up the board edges with wire cutters and/or a file to remove the remains of the tabs from the fabrication process. This is particularly important for the edges containing the jacks. These edges will need to mate flush with the front panel.

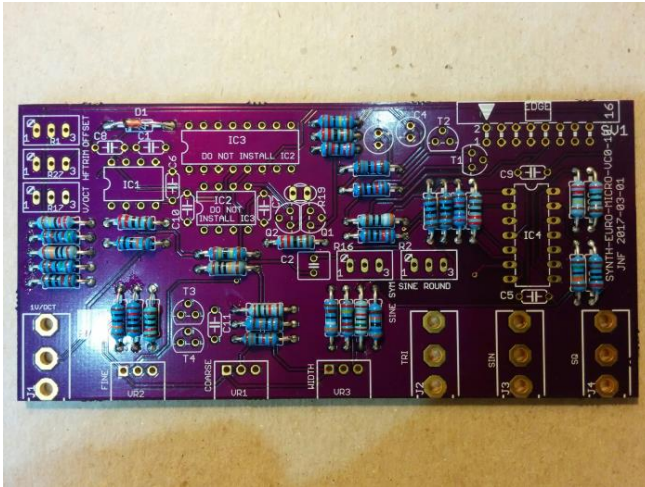
## Constructing the board

1. Clean board edges with wire cutters and/or file to remove the manufacturing tabs.



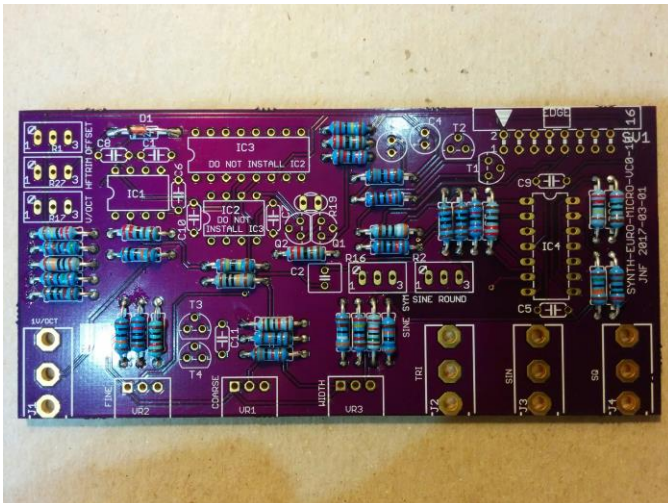
## 2. Resistors

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



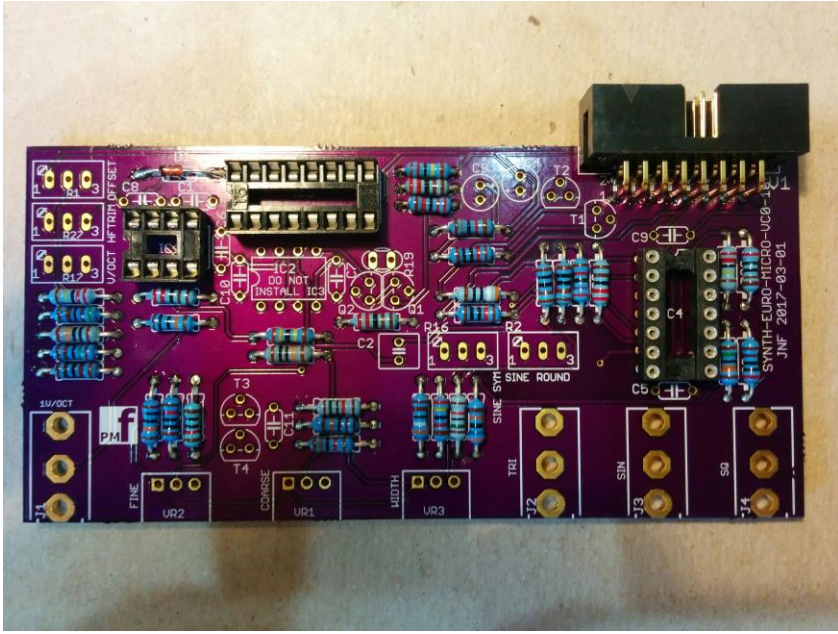
## 3. Diode

Install the diode on the TOP of the board. These are polarized components. Align the stripe on the diode with the stripe marked on the board. Solder and clip the leads.



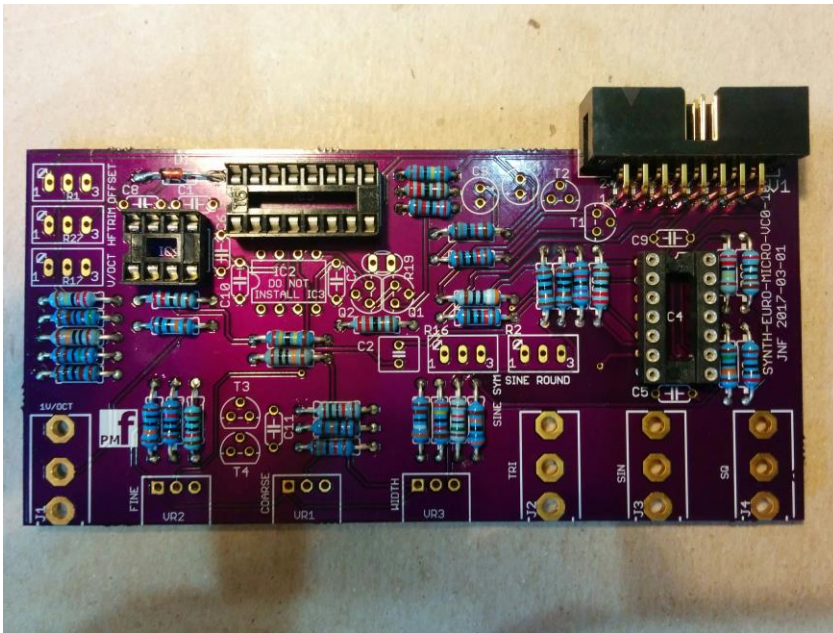
## 4. IC Sockets

Install the sockets on the TOP of the board. This module uses either a CA3080 (IC2) OR a LM13700 (IC3). If you will only use one or the other, you do not need to install the IC socket for the alternate part. Observe the notch or mark on the sockets and align with the notch or mark on the board. Solder these sockets in place now.



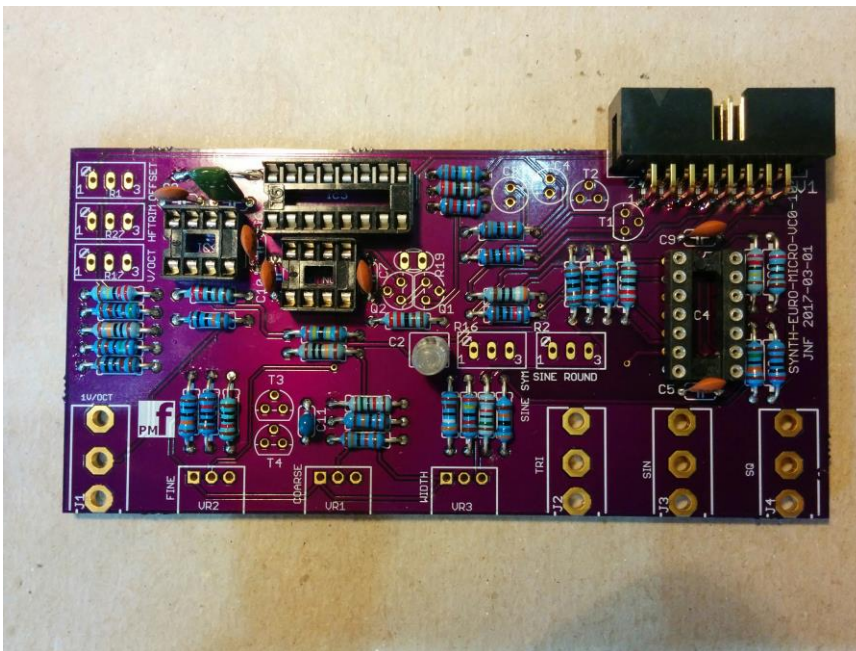
5. Power socket

Install the 16 pin power socket on the TOP of the board. The opening in the right angle socket should face OUT from the board as shown in the photo. Solder.



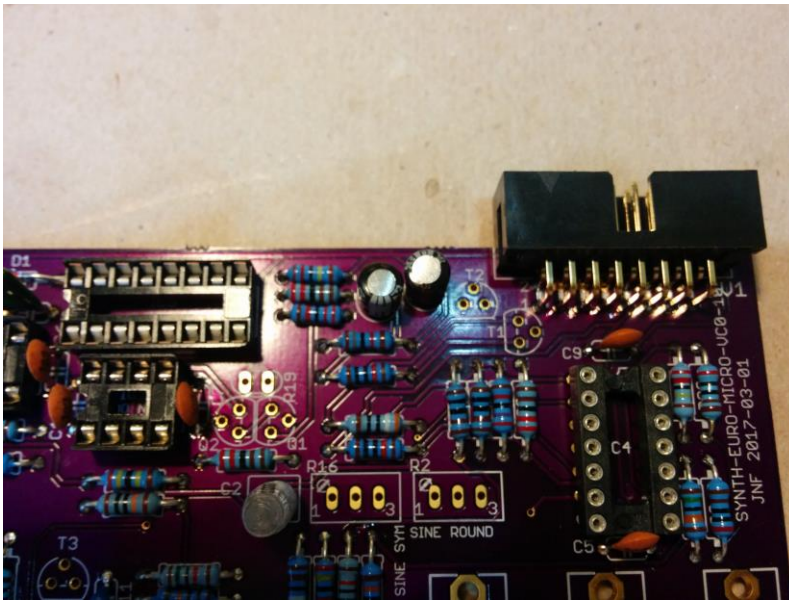
6. Ceramic/film/polystyrene capacitors

Install the ceramic/film capacitors on the TOP of the board. The 1000 pf polystyrene is C2. Solder and clip the leads.



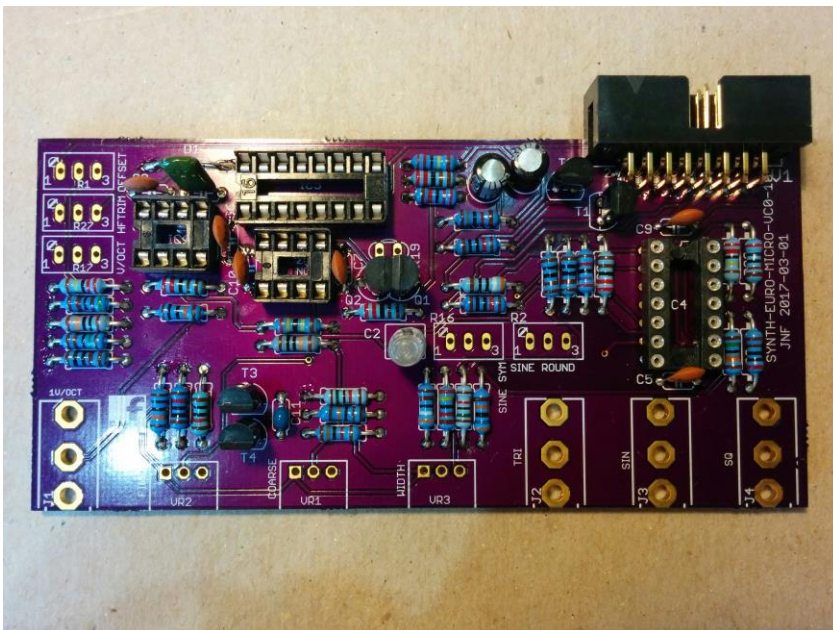
7. Electrolytic capacitors

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.



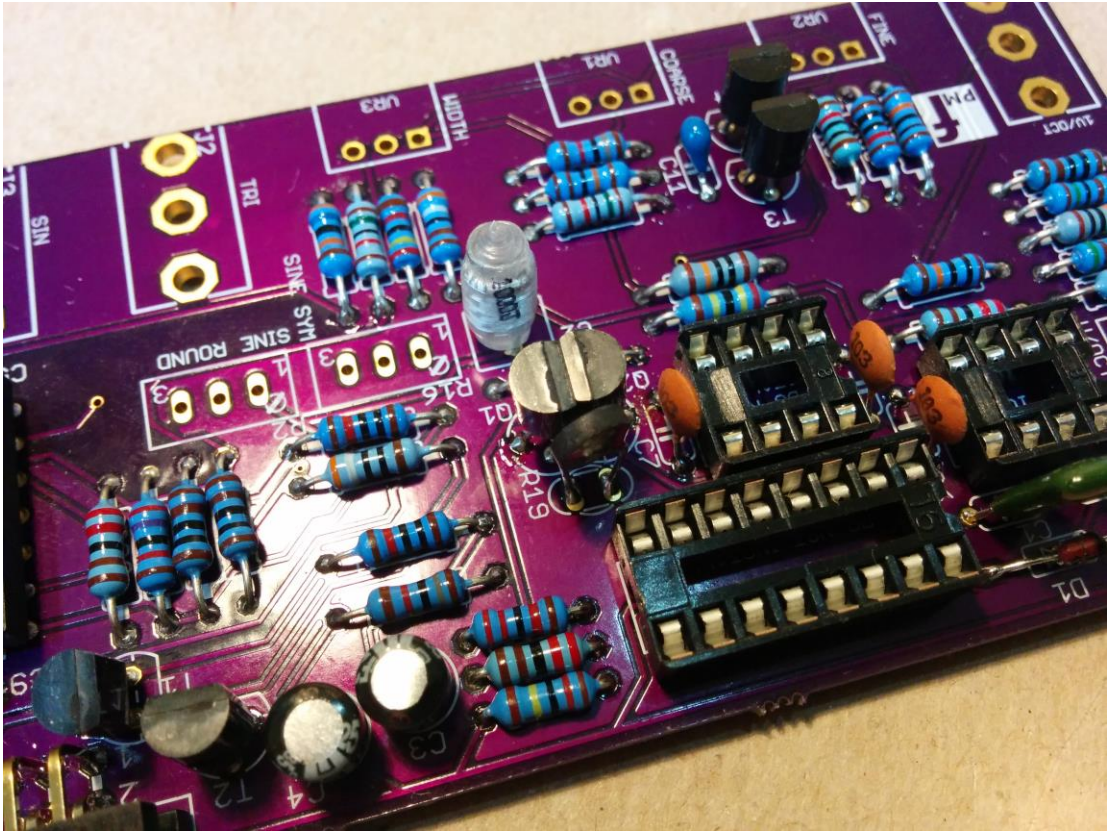
8. Transistors

Install the transistors on the TOP of the board. 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.



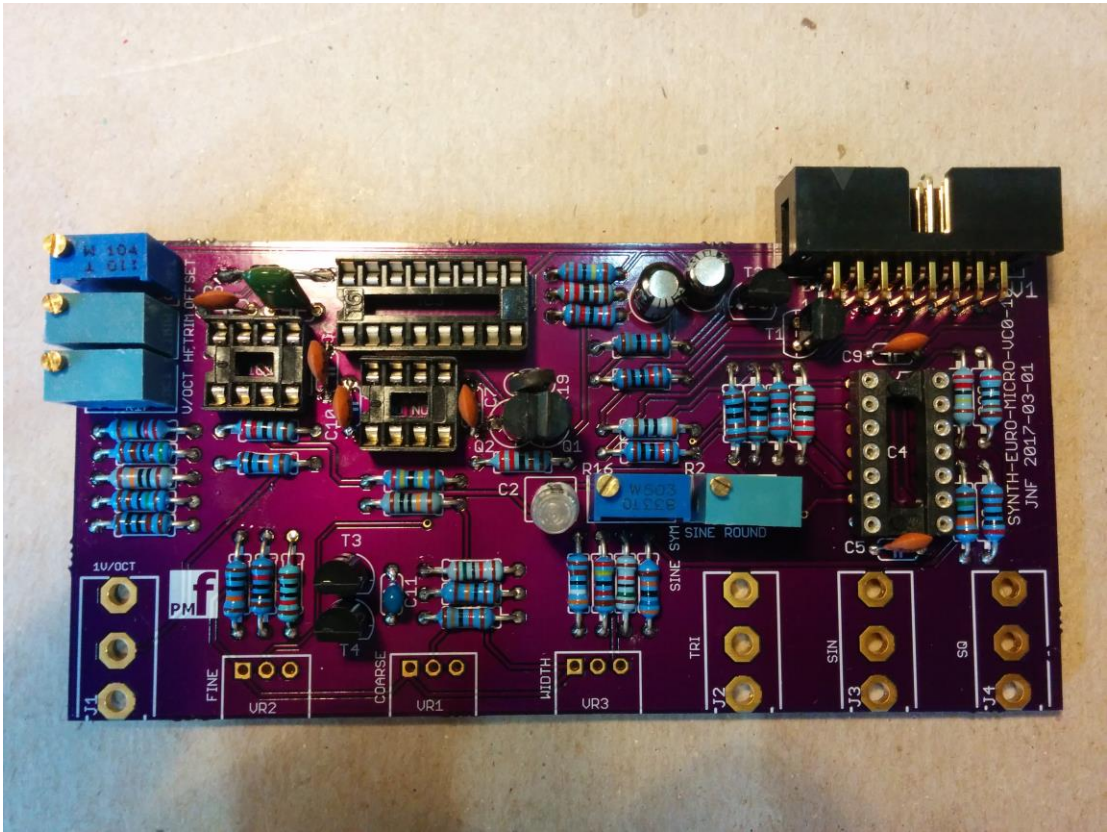
9. NTC thermistor

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.



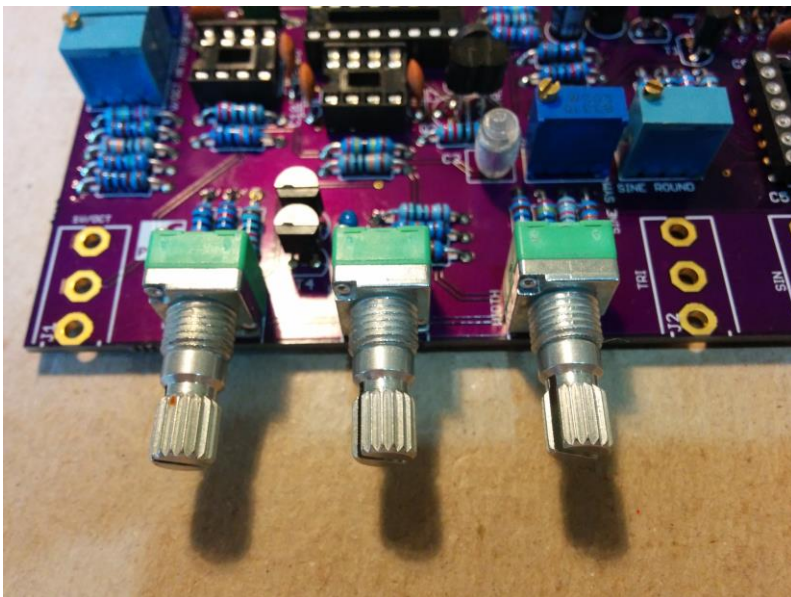
10. Trimmer resistors

Now populate the trimmer pots on the PCB. Make sure they are oriented so that the screw is above the circle on the silk screen.



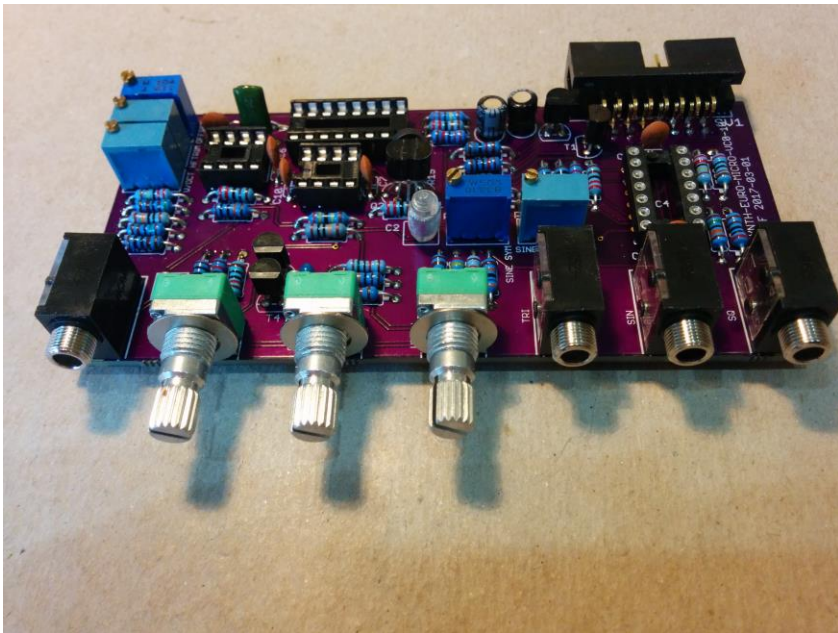
## 11. Potentiometers

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. Install pots on the top. Tack one pin only with solder. These will be finalized later. Please ensure they are on the **CORRECT SIDE OF THE BOARD**. See Photo.



## 12. 3.5mm Jack Sockets

Install jacks on the top. Tack one pin only with solder. These will be finalized later. Please ensure they are on the CORRECT SIDE OF THE BOARD. See Photo.

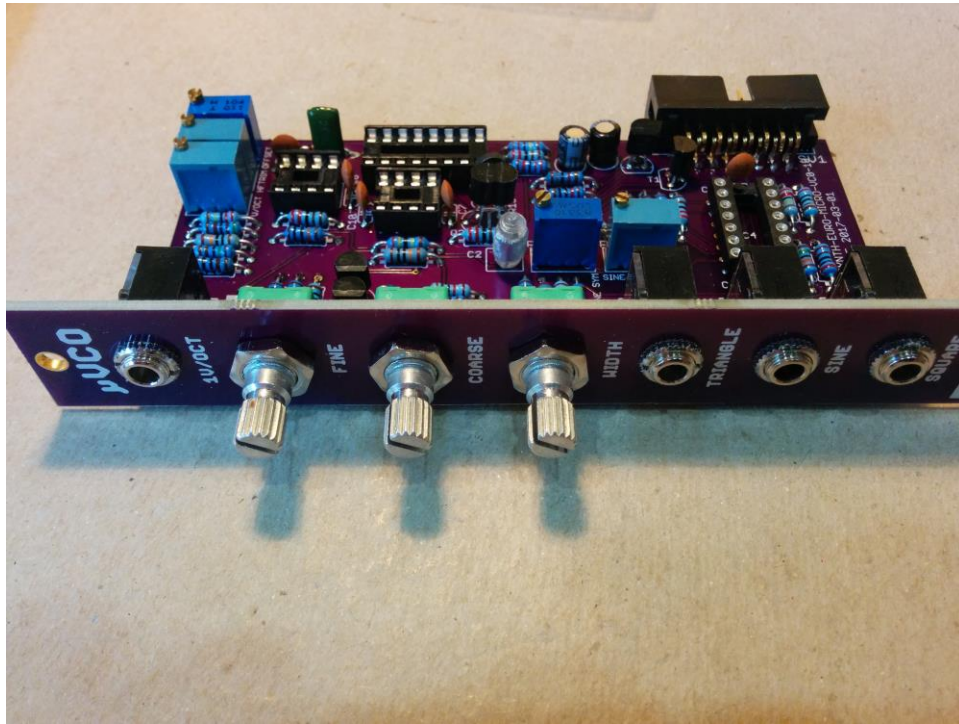


## 13. Alignment

1. Place a washer over each pot shaft.
2. Place the front panel over the board so that the pots and 3.5mm jacks align with the holes in the panel.
3. Put nuts on the jacks and pots and FULLY TIGHTEN all of them. Do not overtighten!



4. Now fully solder the remaining pins of each jack and pot.



14. Do not install the ICs until the voltage tests are complete.
15. If you do not trust all your soldering and connections, carry out the voltage tests below before installing the ICs

## Voltage tests

1. 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.
2. Plug in the power supply and connect the –VE probe of a multimeter (set to the 20V DC range) to one of the GROUND pins of the jacks. The GROUND pin is nearest to the edge of the board.
3. Check the voltage at the following points on the board:
  - a. At IC1 pin 8 approx = +12V
  - b. At IC1 pin 4 approx = -12V
  - c. At IC1 pin 3 = 0V
  - d. At IC1 pin 5 = 0V
  - e. At IC2 pin 7 approx = +12V
  - f. At IC2 pin 4 approx = -12V
  - g. At IC2 pin 3 = 0V
  - h. At IC3 pin 11 approx = +12V
  - i. At IC3 pin 6 approx = -12V
  - j. At IC3 pin 3 = 0V
  - k. At IC4 pin 4 approx = +12V
  - l. At IC4 pin 11 approx = -12V
  - m. At IC4 pin 3 = 0V
  - n. At IC4 pin 12 = 0V
4. If any of these tests fail to match the readings given, you should check the components and soldering before progressing

## Final Assembly

1. This module uses either a CA3080 (IC2) OR a LM13700 (IC3). These are ALTERNATIVE devices. If you are using IC2, DO NOT INSTALL IC3. If you are using IC3, DO NOT INSTALL IC2. Place the ICs in place by aligning the notch with the notch graphic on the PCB Silk Screen and notch on the sockets. DO NOT INSTALL BOTH IC2 AND IC3.
2. Place a washer over each pot shaft.
3. Place the front panel over the board so that the pots and 3.5mm jacks align with the holes in the panel.
4. Put nuts on the pots and jacks and fully tighten.

5. Install the knobs.



6. NOW READ THE USER GUIDE.