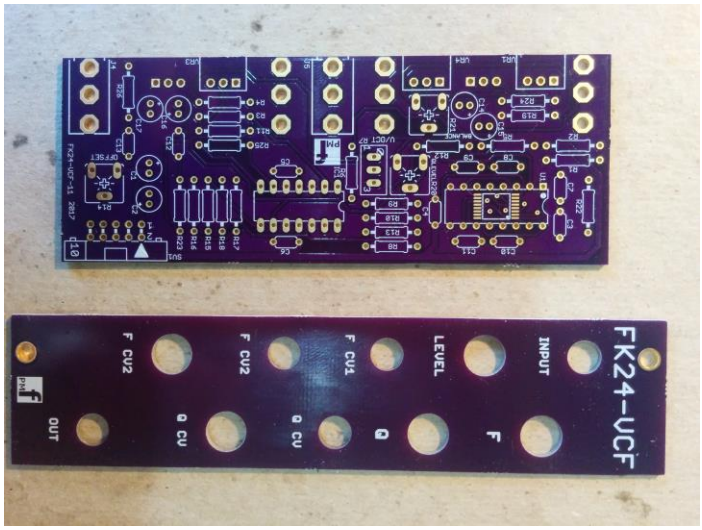
FK24-VCF v1.1 – Assembly Guide

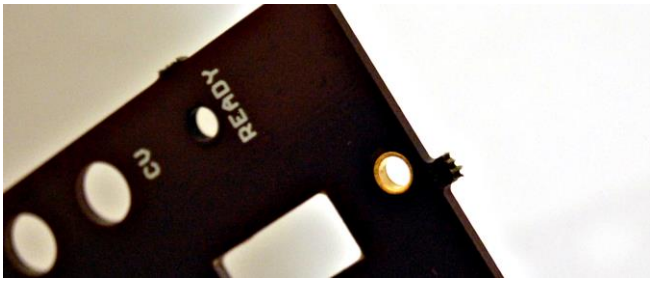
Thank you for purchasing this module! This is an average build with tightly packed components and some precision integrated circuits. Some of the pads are quite small and you will need a chisel tip or screwdriver tip soldering iron and the skill to solder these tiny joints.
There is also a surface mount part SSOP IC which MUST BE soldered to the board or to an adapter. If you have not soldered SMD before, we recommend watching some of the many YouTube guides. Our favorite: EEVBlog.



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

Constructing the board

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



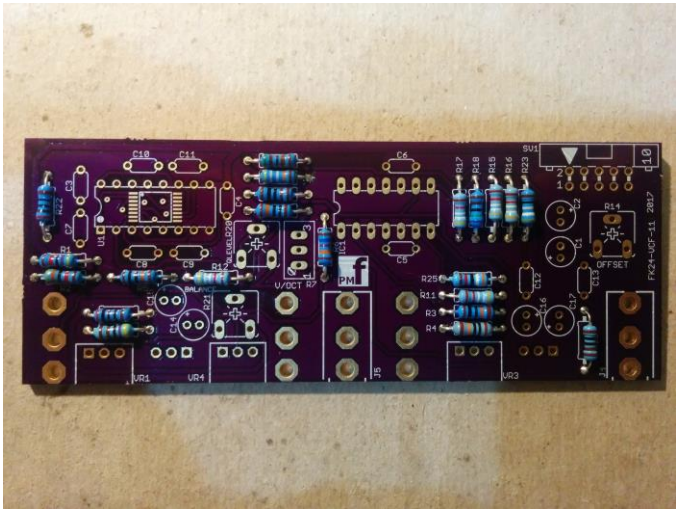
2. Resistors

   R1 and R2 are customizable between 0 (wire link) and 75k for the frequency range required. They set the upper and lower frequency range of the filter. Use wire links if you want the full range with a resonably coarse feel to the Frequency cutoff control. You can try other values (up to 75k) to compress the range but improve the accuracy of the cutoff control. We have also tried: R1 = 47k, R2 = 43k. Select the required values or use wire links.

   R8 is OPTIONAL and customizable for the response curve of the Q control panel pot. Do not install R8 for standard operation.

   R13 is part of the offfset trim circuit consisting of R13 and R14 trimmer. A frequency offset adjustment is necessary in polyphonic systems for consistent cutoff fequency across voices, or programmable systems where repeatable performance from a given control voltage is desired. If you do not need an offset trim function, you do not need to install R13.

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



3. IC Preparation and Sockets

   There are several options for U1:

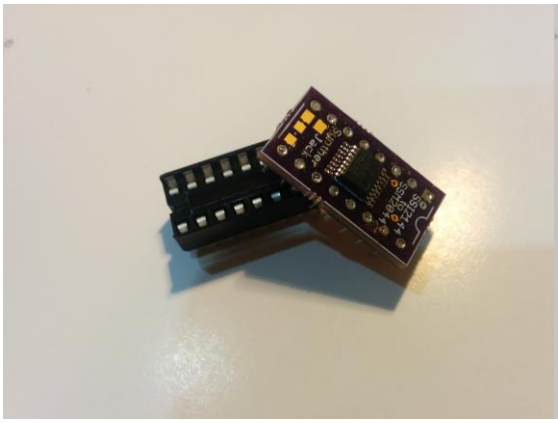
   a) You can solder the SSOP package of SSI2144 directly to the board;
   b) You can solder the SSOP package to an adapter that has pins compatible with the DIP 16 outline on the board;
   c) You can use an SSM2044 if available.

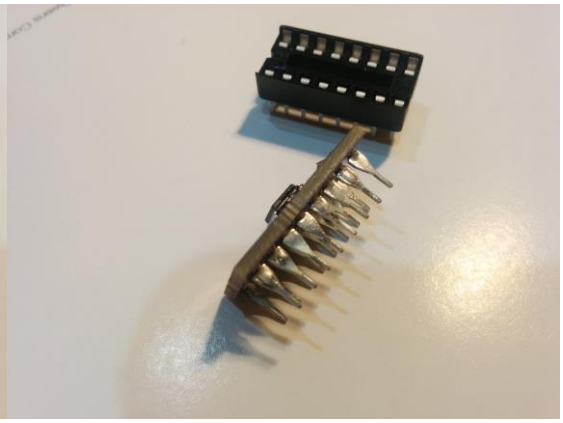
   For option a) you will wait until later to install the SSOP package.

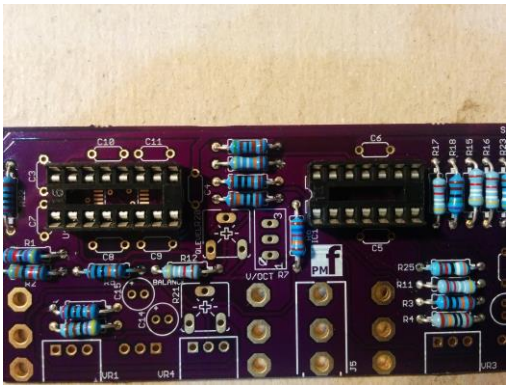
For option b) prepare the SSI2144 and it's adapter according to the instructions provided by the adapter supplier. Then solder a 16 pin IC socket to the board aligning the notch with the board outline.

For option c) solder a 16 pin IC socket to the board aligning the notch with the board outline.

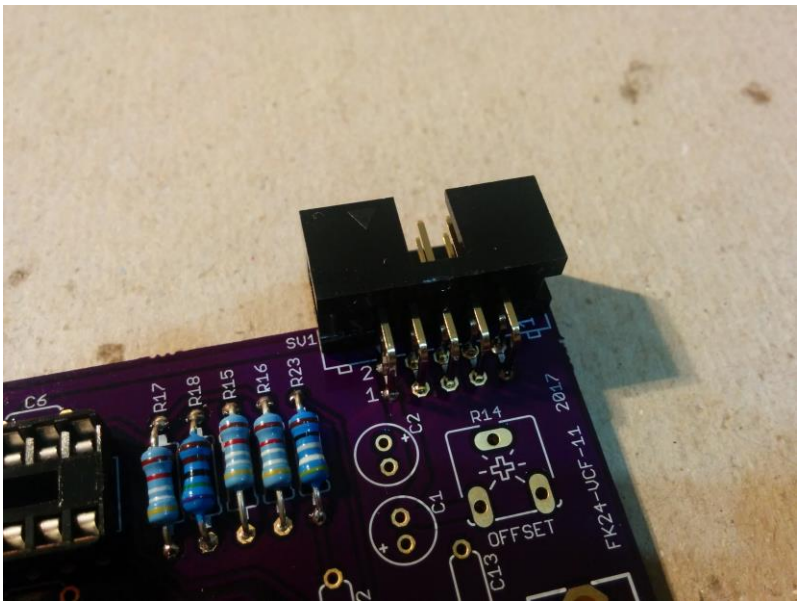
Now Install the socket for IC1 on the TOP of the board. Observe the notch or mark on the sockets and align with the notch or mark on the board. Solder.



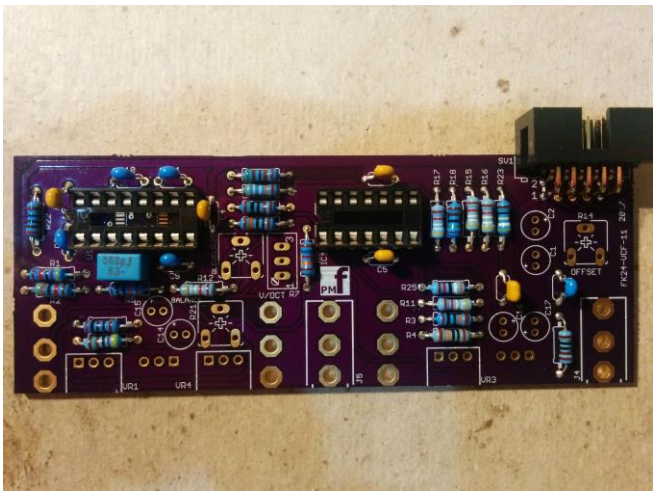




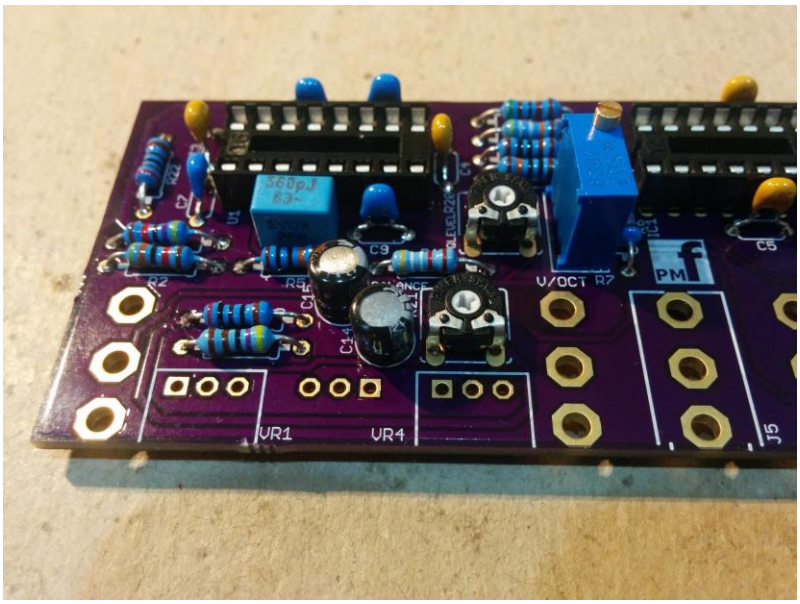
4. Power socket
   Install the 10 pin power socket on the TOP of the board. The opening in the right angle socket should face OUT from the board as shown in the photo. Solder.



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



6. 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.

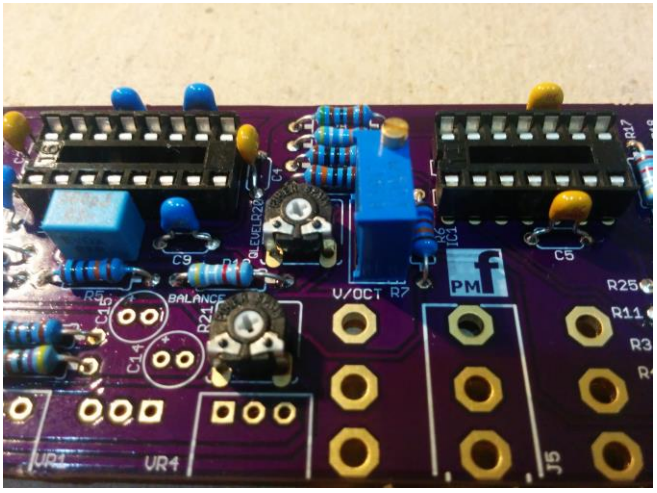


7. Trimmer resistors

   R14 is part of the offfset trim circuit consisting of (R13 and R14 trimmer). A frequency offset adjustment is necessary in polyphonic systems for consistent cutoff fequency across voices, or programmable systems where repeatable performance from a given control voltage is desired. If you do not need an offset trim function, you do not need to install R14.

   If you are using R14, install it here along with the other trimmers.

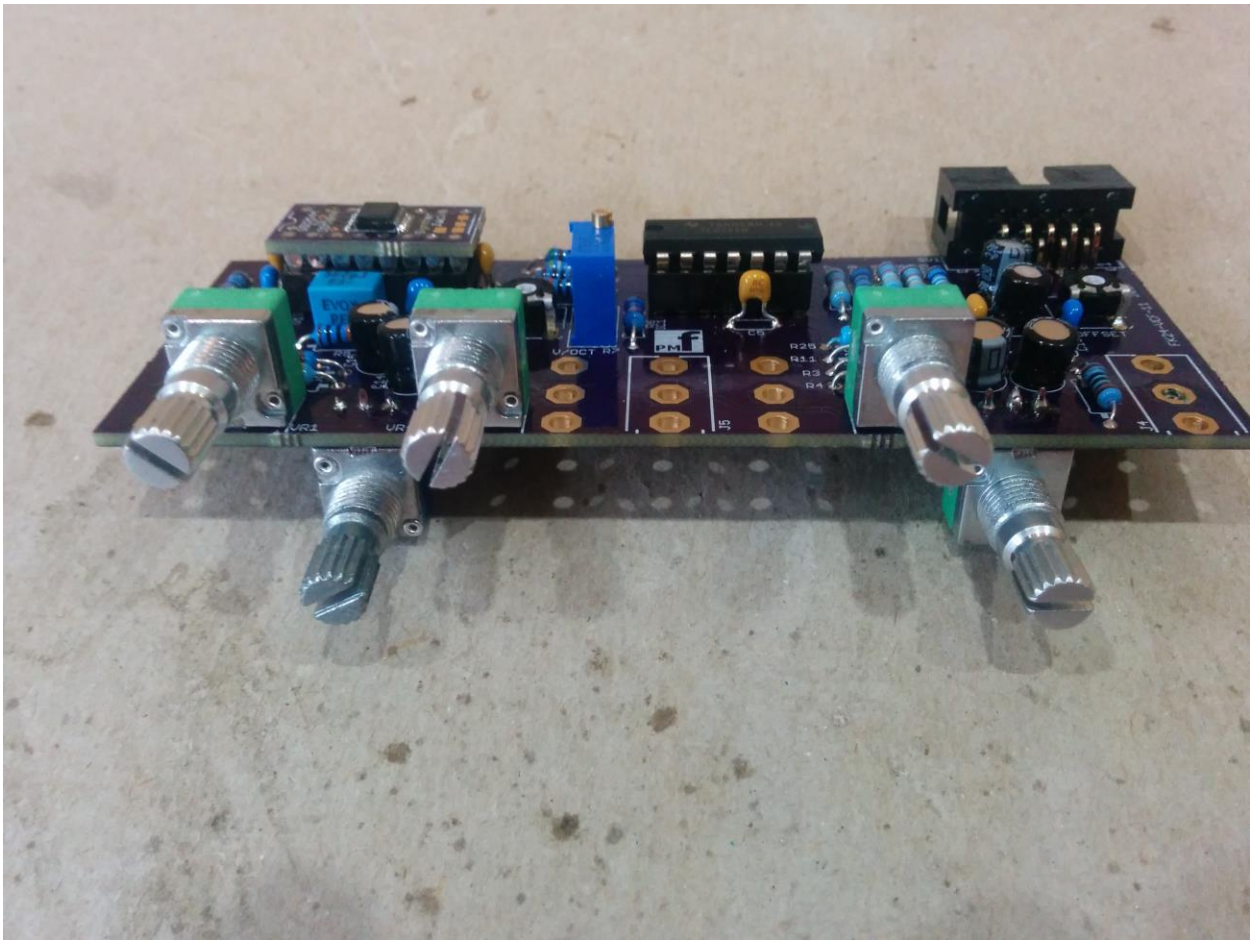
   Now populate the trimmer pots on the PCB. Make sure the multi turn trimmer is oriented so that the screw is above the circle on the silk screen.



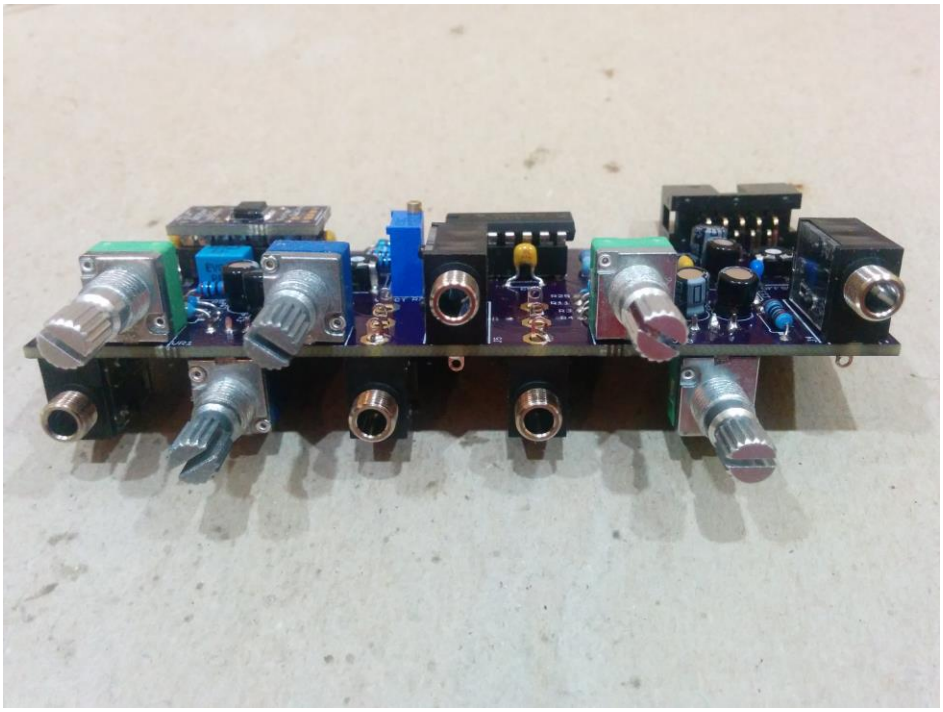
8. Potentiometers

   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 SOME pots on the top and SOME on the BOTTOM. Check the values since the pots are not all the same.
Tack one pin only with solder. These will be finalized later. Please ensure they are on the CORRECT SIDE OF THE BOARD. See Photo.



9. 3.5mm Jack Sockets
   Install SOME jacks on the top and SOME on the BOTTOM. Tack one pin only with solder. These will be finalized later. Please ensure they are on the CORRECT SIDE OF THE BOARD.



10. 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 TIGTEN all of them. Do not overtighten!
    4. Now fully solder as many pins as you can reach of each jack and pot.

    Remove the front panel and solder all the remaining pins on the jacks and pots.

11. If you do not trust all your soldering and connections, carry out the voltage tests below before installing the remaining ICs

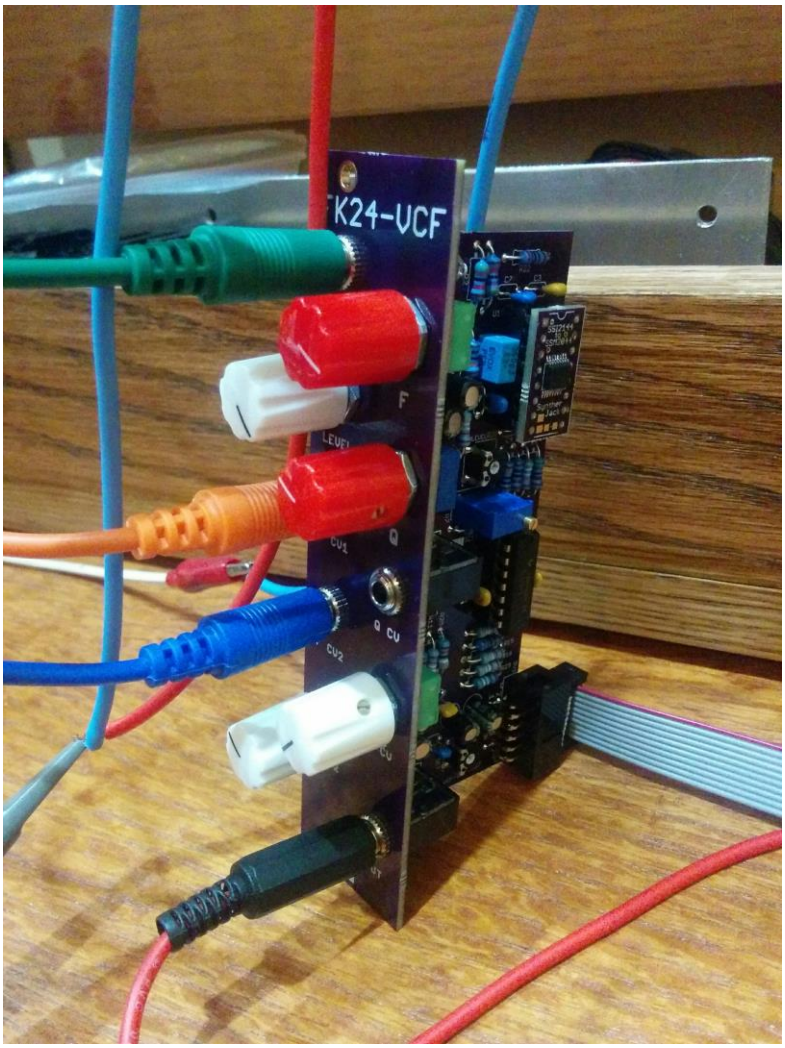
Voltage tests

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 4 approx = +12V
    b. At IC1 pin 11 approx = -12V
    c. At IC1 pin 3, 5, 10, 12 = 0V
    d. At IC1 pin 2 approx = -2V to +2V as F is swept
    e. At IC1 pin 8 approx = 0V to +6V as Q is swept
    f. At U1 (TEST AT DIP OUTLINE NOT SSOP) pin 8 = 0V
    g. At U1 (TEST AT DIP OUTLINE NOT SSOP) pin 9 = -12V
    h. At U1 (TEST AT DIP OUTLINE NOT SSOP) pin 16 = +12V
    i. All other pins should not show anything close to +12V or -12V
4. If any of these tests fail to match the readings given, you should check the components and soldering before progressing

Final Assembly

1. If you are using the SSOP package SSI2144 directly, solder U1 now ensuring that the white dot on the board outline aligns with pin 1 on the SSI2144.
2. Place the remaining ICs in place by aligning the notch with the notch graphic on the PCB Silk Screen and notch on the sockets.
3. Place a washer over each pot shaft.
4. Place the front panel over the board so that the pots and 3.5mm jacks align with the holes in the panel.
5. Put nuts on the pots and jacks and fully tighten.

6. Install the knobs.



7. **NOW READ THE USER GUIDE.**