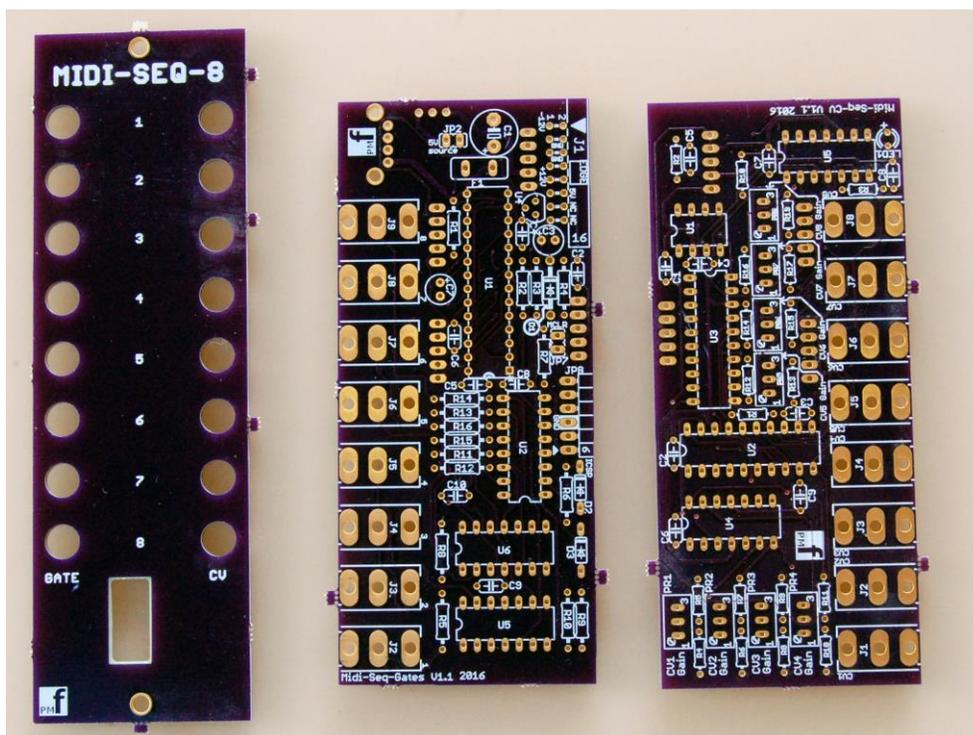


Midi-CV-8 v1.2 – Assembly Guide

Thank you for purchasing this module! This is a complicated build with tightly packed components and precision integrated circuits. It is not recommended for the beginner.



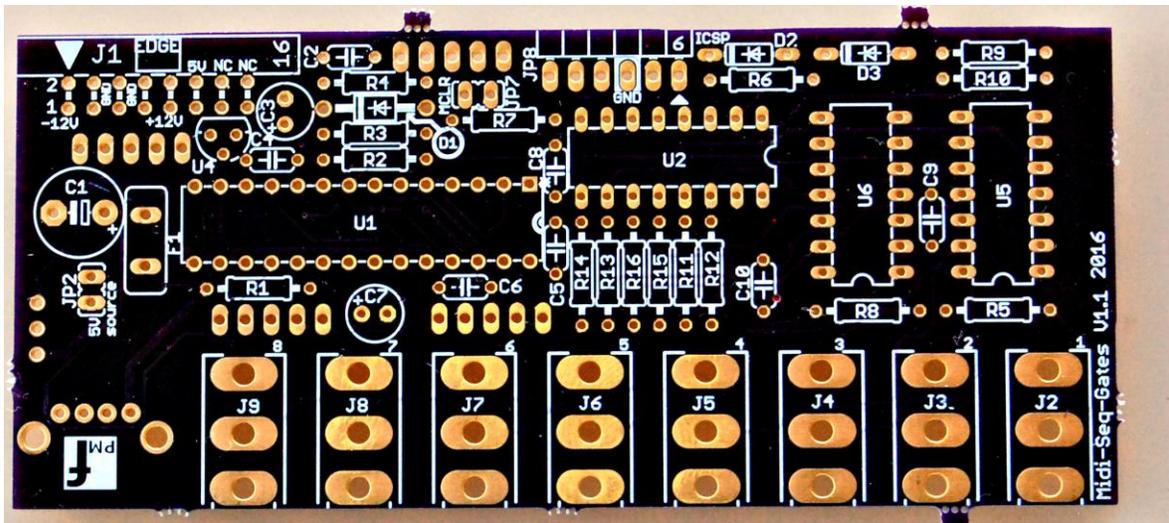
The module is designed and sized for **Euro rack** systems. You will need a 16 pin eurorack power ribbon connector with $-12/0/+12$ and $+5V$ which is connected to a synth power supply. Follow the parts lists, these instructions and the PCB silkscreen text to build the module. The Midi-CV-8 consists of 2 PCB boards 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 Gates board (labeled Midi-Seq-Gates)

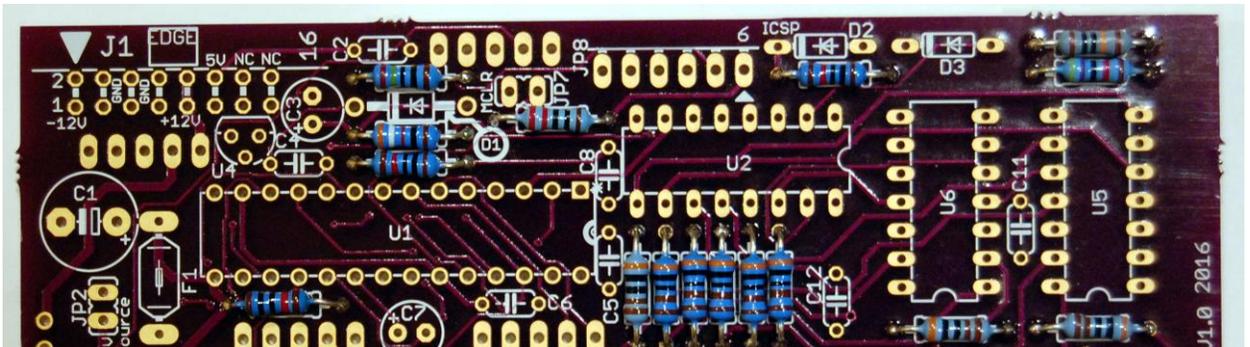


1. Clean board edges with wire cutters and/or file.



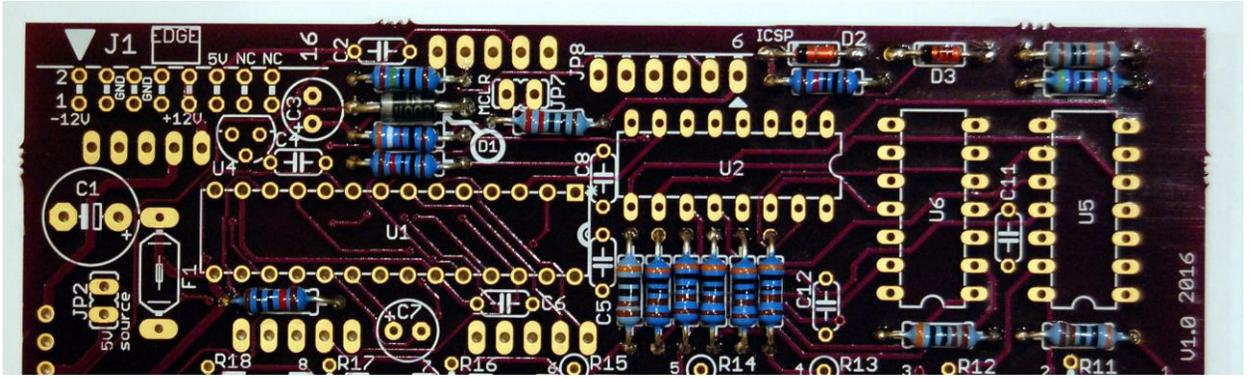
2. Resistors

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



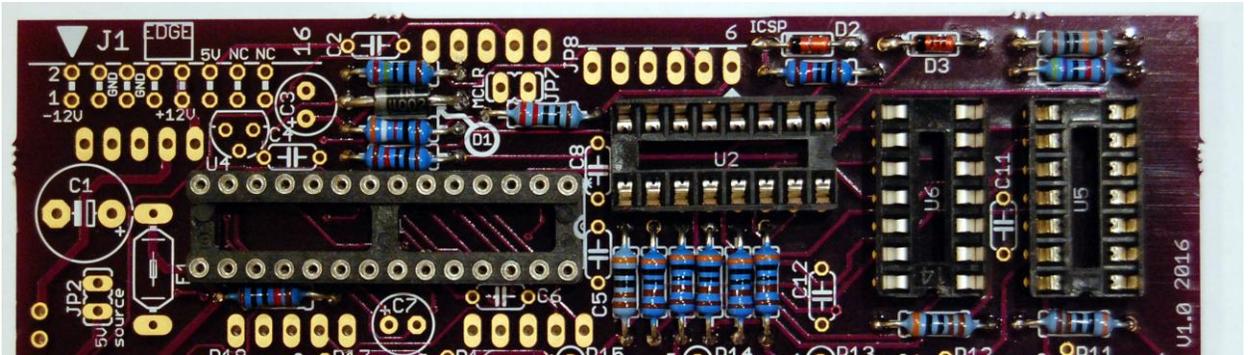
3. Diodes

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



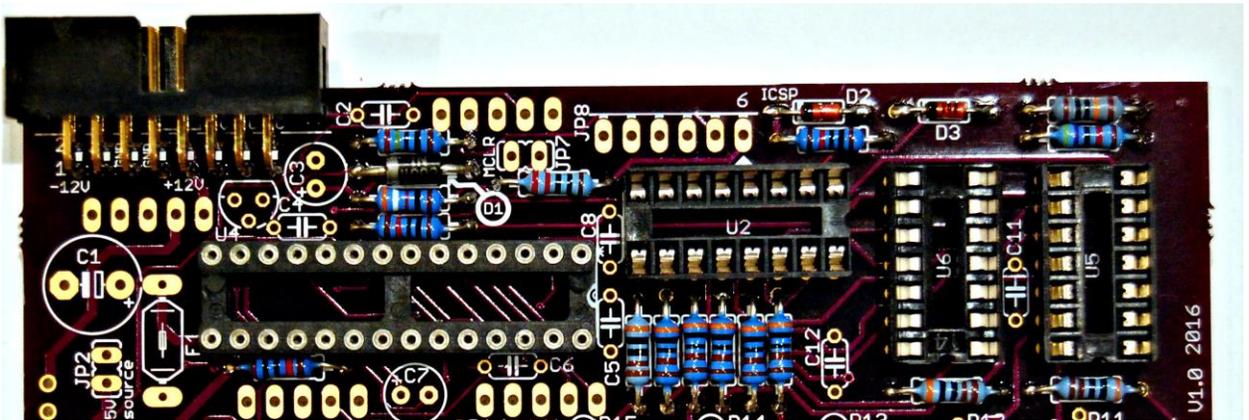
4. IC Sockets

Install the sockets for U1, U2, U5, U6 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.



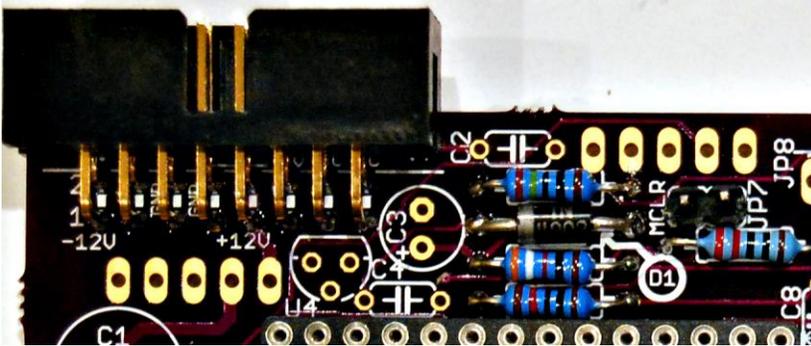
5. Power socket

Install the 16 pin power socket on the TOP of the board. The socket should face OUT from the board. Solder.



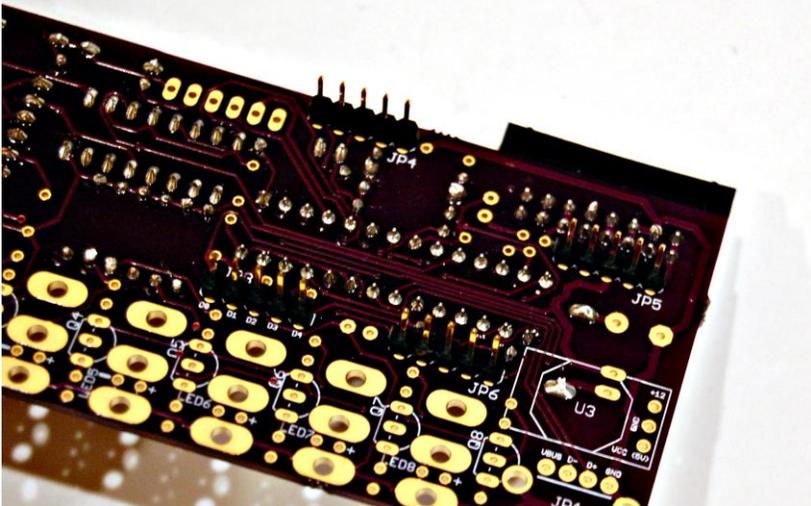
- 2 pin jumper (JP7 only at this time)

Install the 2 pin jumper JP7 marked MCLR on the TOP of the board. Solder.



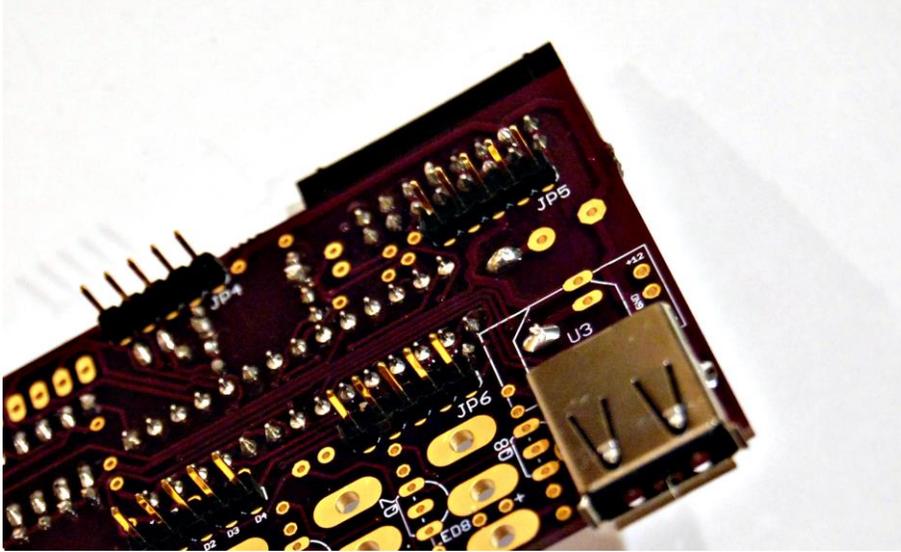
- 5 pin male headers

Cut the strip of 20 pins into 4 strips of 5 pins each. These should be installed on the BOTTOM of the board and soldered on the TOP. Solder these connectors at 90 DEGREES to the board as close as possible. The short part of each pin goes into the board and the longer part sticks out from the board. It is very important that these items are installed on the BOTTOM!



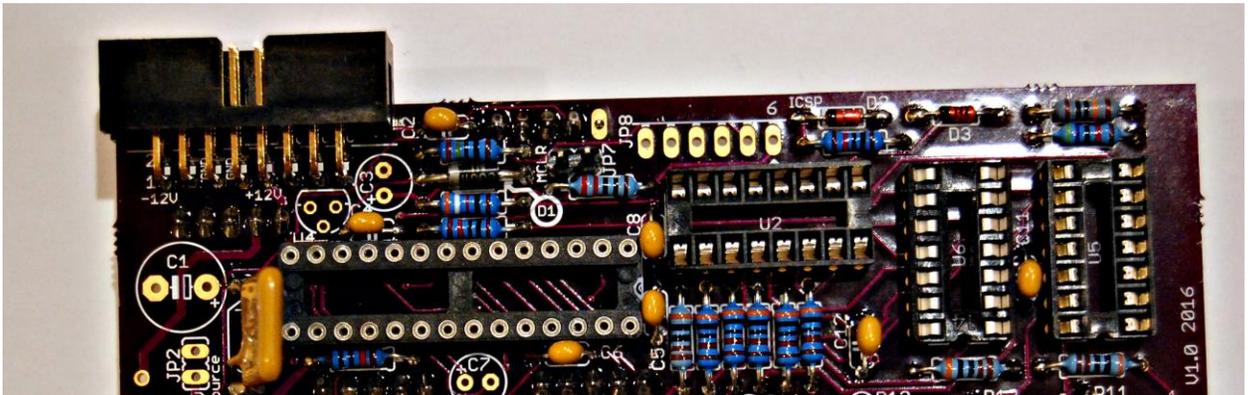
- USB socket

This is installed on the BOTTOM of the board. Squeeze the frame clips on each side together slightly so that it fits in the holes. Ensure that it is TIGHT and flush against the PCB before soldering. Solder the pins and the retaining clips.



9. Ceramic/film capacitors

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

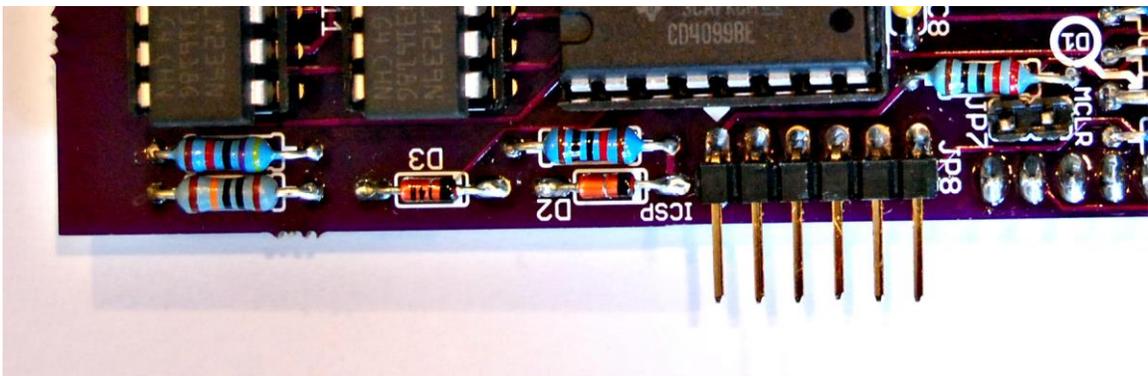


10. Wire links

Put a wire link in JP2 and solder. You can use a clipped lead from one of the earlier components. Put a wire link in F1 and solder. You can use a clipped lead from one of the earlier components. DO NOT PUT ANYTHING IN THE SPACE MARKED U3.

11. ICSP connector

Install the 6 pin ICSP connector on TOP. Orient so the black shroud faces out with the pins and the short, bent pins go into the board. See photos. Solder.



12. Electrolytic and tantalum 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.



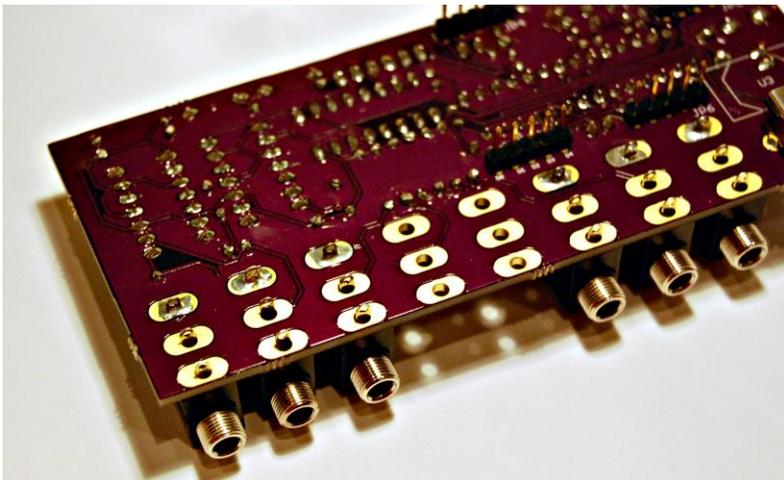
13. Voltage regulator

Install the Voltage regulator U4 on the TOP of the board. This is a polarized component. Align the outline with the outline on the board. Solder and clip the leads.

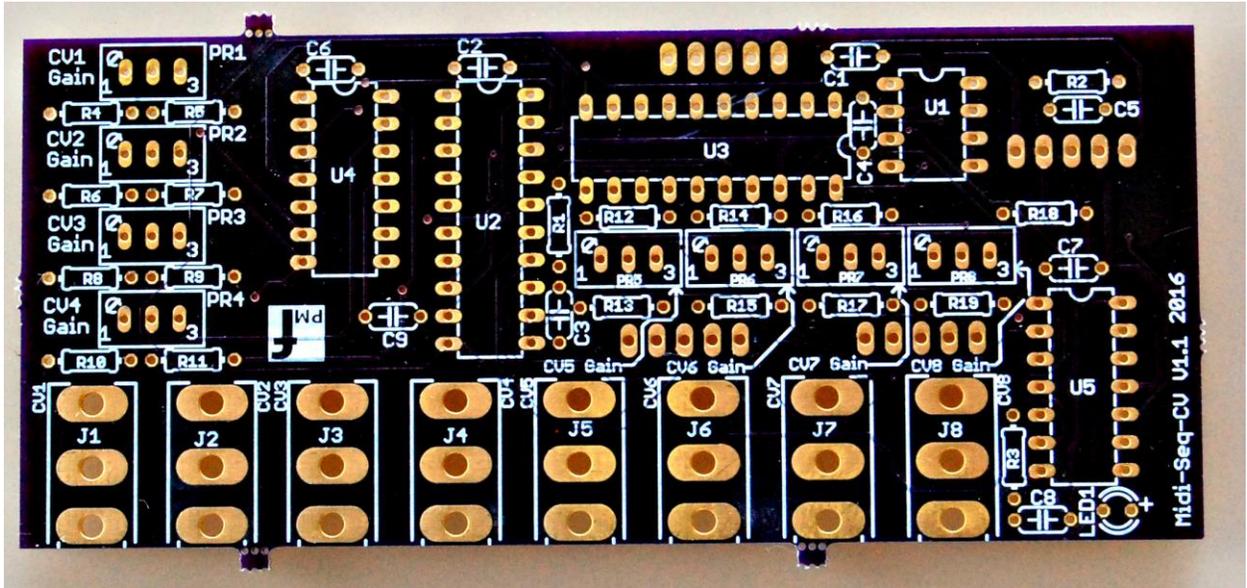


14. 3.5mm Jack Sockets

Install the jacks on the top and tack one pin only with solder. These will be finalized later.

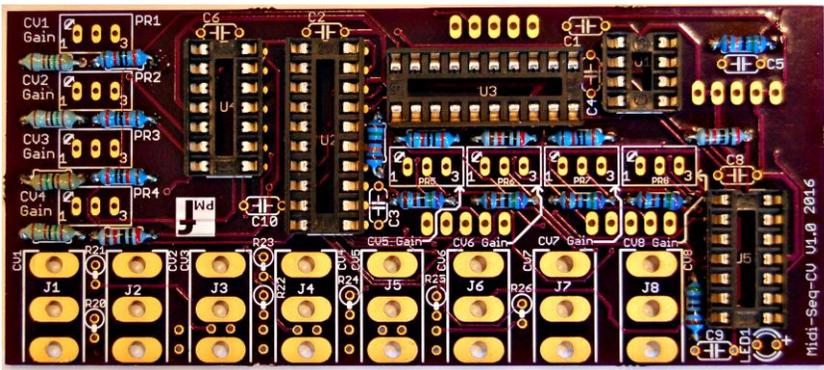


Constructing the CV board (labeled Midi-Seq-CV)



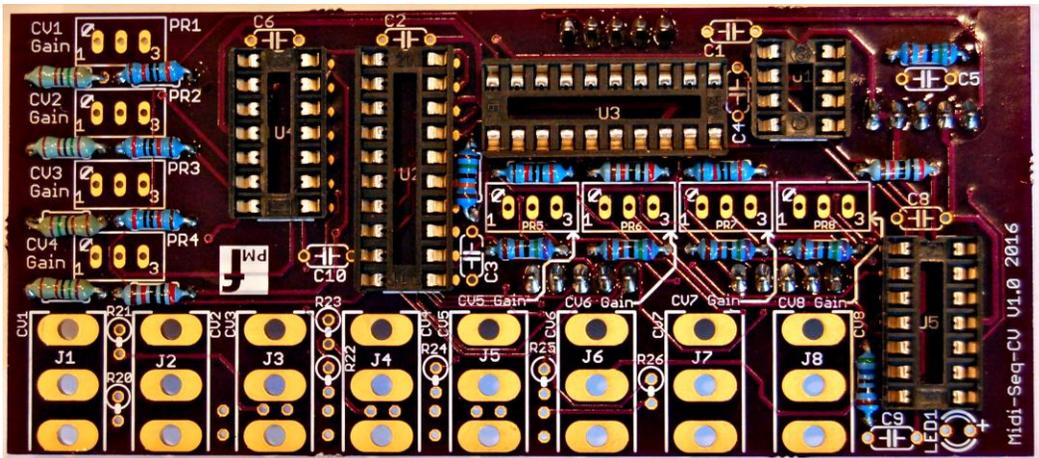
1. Clean board edges with wire cutters and/or file.
2. Resistors

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



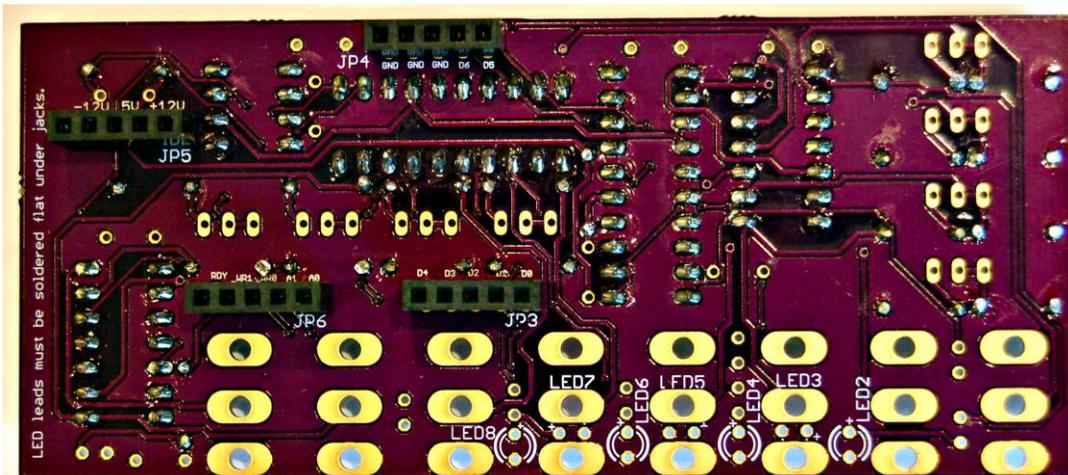
3. IC Sockets

Install the IC 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.



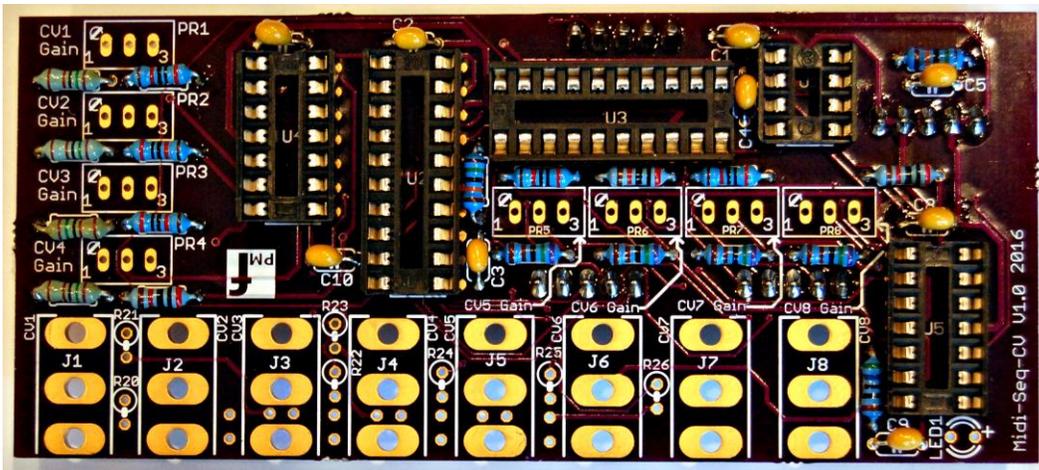
4. Female 5 pin connectors

These should be installed on the BOTTOM of the board and soldered on the TOP. Solder these connectors at 90 DEGREES to the board as close as possible. It is very important that these items are installed on the BOTTOM!



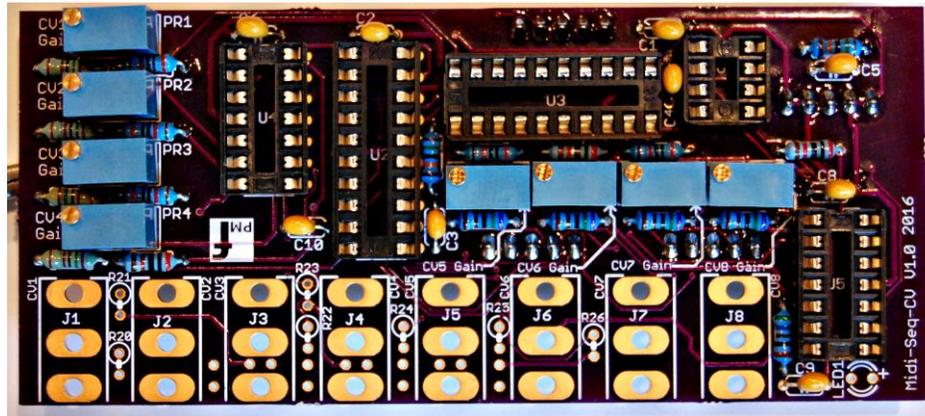
5. Ceramic/film capacitors

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



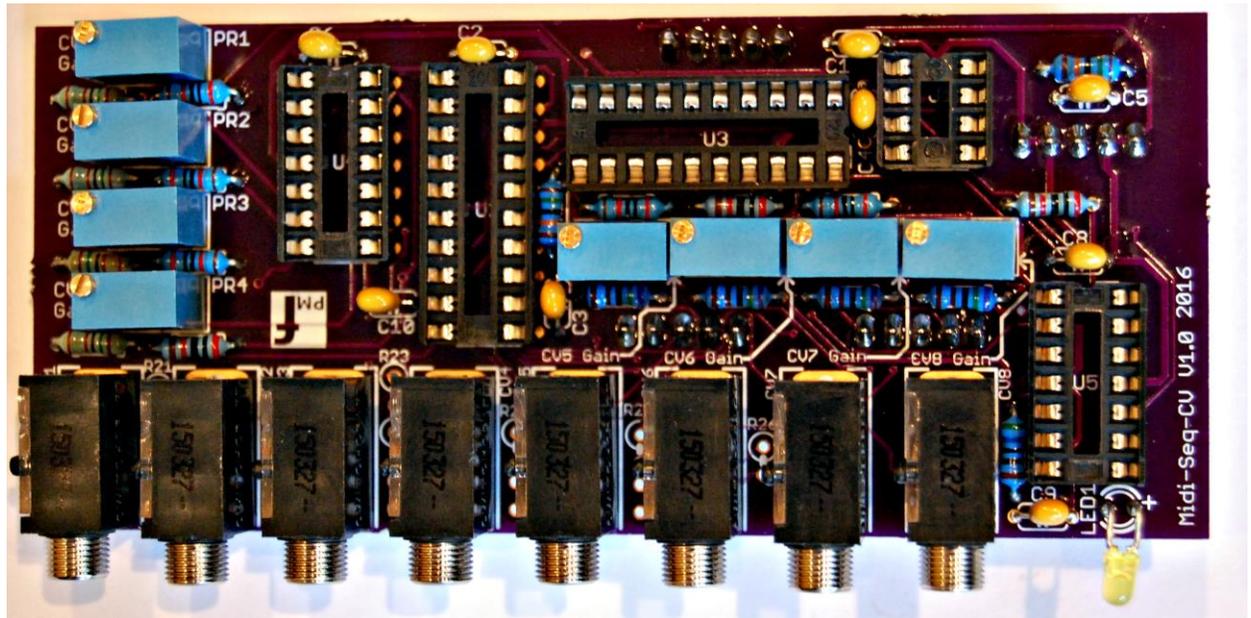
6. Trimmer resistors

- a. Use a multimeter to set these to approx 5k between pin 1 and 2. Use a trimmer adjustment tool.
- b. 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.



7. 3.5mm Jack Sockets

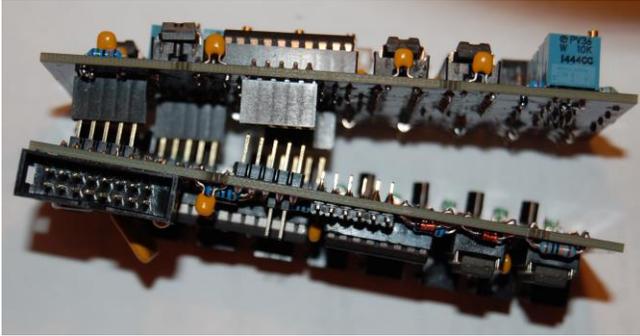
Install the jacks on the top and tack one pin only with solder. These will be finalized later.



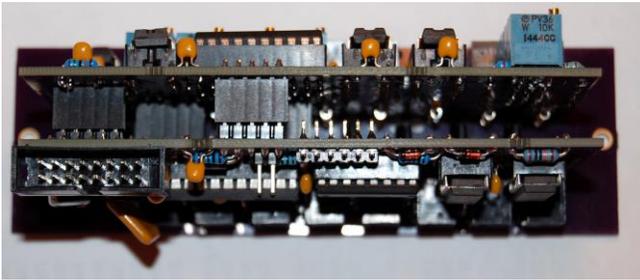
Alignment

1. Place the front panel over the "Gates" board so that the USB socket and 3.5mm jacks align with the holes in the panel.
2. Put nuts on the Gate jacks.
3. Now fully solder the one pin of each Gate jack which is furthest from the panel.

4. Remove the front panel and solder all the remaining pins on the **gate** jacks.
5. Place the panel over the "CV" board so that the 3.5mm jacks align with the holes in the panel.
6. Put nuts on the CV jacks.
7. Now fully solder the one pin of each CV jack which is furthest from the panel.
8. Remove the front panel and solder all the remaining pins on the **CV** jacks.
9. Join the two PCBs by aligning the 5 pin headers on the "Gates" board with the 5 pin female headers on the CV board and press together carefully.



10. Do not install the ICs until the voltage tests are complete.



11. If you do not trust all your soldering and connections, carry out the voltage tests below before connecting an Android device or installing the ICs

Voltage tests

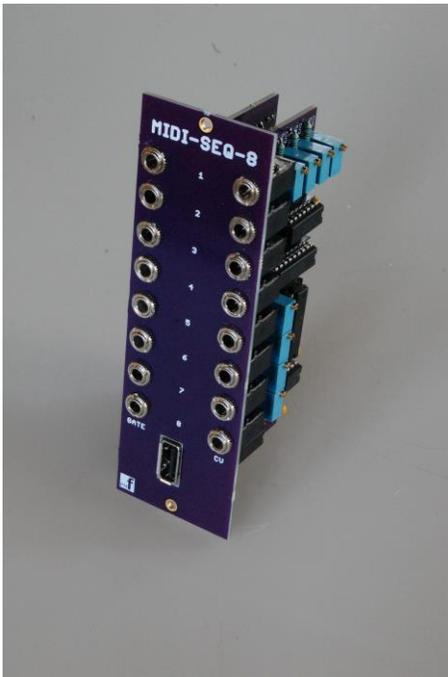
1. You do not have to do these tests if you are completely happy with your soldering and are sure there are no bridges or incorrectly placed components. However, these tests will ensure that the correct power supplies are sent to the IC pins to ensure they will not be damaged on power up.
2. Plug in the power supply and connect the $-VE$ probe of a multimeter set to the 20V range to the ICSP pin 4 marked GND with a rectangle around the pin.
3. Check the voltage at the following points on the GATES board:
 - a. At U5 and U6 pins 4,6,8,10 approx = 1.58V (if this is much higher, check that R9 and R10 are not swapped. The gates will not trigger if this voltage is larger than 1.8V).
 - b. At U5 and U6 pins 5,7,9,11 = 0V
 - c. At U5 and U6 pins 1,2,3,13,14 approx = +5 V

- d. At U5 and U6 pin 12 = 0V
 - e. At U2 pin 16 Approx = +3.3V
 - f. At U2 all other pins = 0V
 - g. At U1 pins 1,13,23,28 approx = 3.3V
 - h. At U1 pin 15 approx = +5V
 - i. At U1 pin 25 approx = 2.5V
 - j. At U1 pins 8,19,27 = 0V
4. Check the voltage at the following points on the CV board:
 - a. At U1 pin2 approx = +12V
 - b. At U1 all other pins = 0V
 - c. At U2 and U3 pin 18 approx = +12 V
 - d. At U2 and U3 pin 15 = Anywhere from 0 to +5 V, but NOT +12V or -12V
 - e. At U2 and U3 pins 1,2,3,5,6, 7-14, 16,17,19,20 = 0V
 - f. At U4 and U5 pin 4 approx = +12V
 - g. At U4 and U5 pin 11 approx = -12V
 5. If any of these tests fail to match the readings given, you should check the components and soldering before progressing
 6. TIP: If there are no shorts, missing components or unsolderd joints, the most likely cause for a voltage discrepancy is one or more resistors in the wrong place. You will need to check the value of each resistor against the BOM and the layouts shown in the photos of the unpopulated boards.

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 sockets.
2. With the PCBs joined with the 5 pin connectors, place the front panel over the GATES and CV boards so that the USB socket and 3.5mm jacks align with the holes in the panel.

3. Put nuts on the Gate and CV jacks.



4. NOW READ THE USER GUIDE.