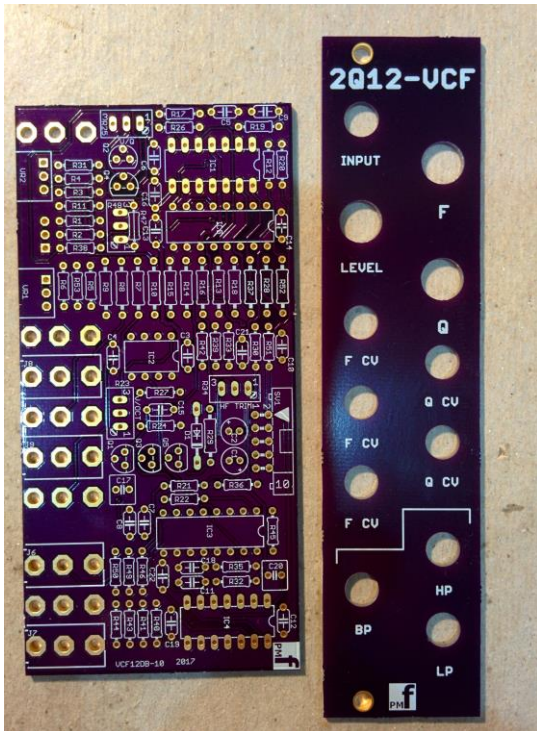


# 2Q12-VCF v1.1 – Assembly Guide

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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 **Euro rack** 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.

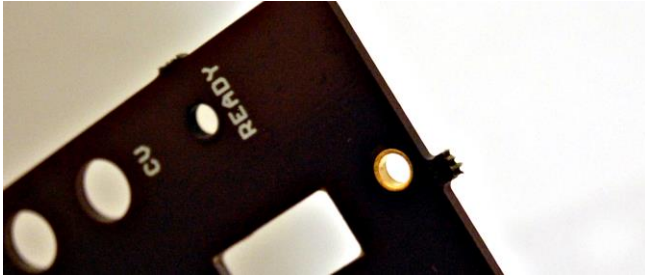
There are components installed on BOTH sides of the boards. Please ensure that you place the components on the correct side. When referring to the TOP of a board we mean the side with the **pmF** logo. The BOTTOM has no logo.

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.

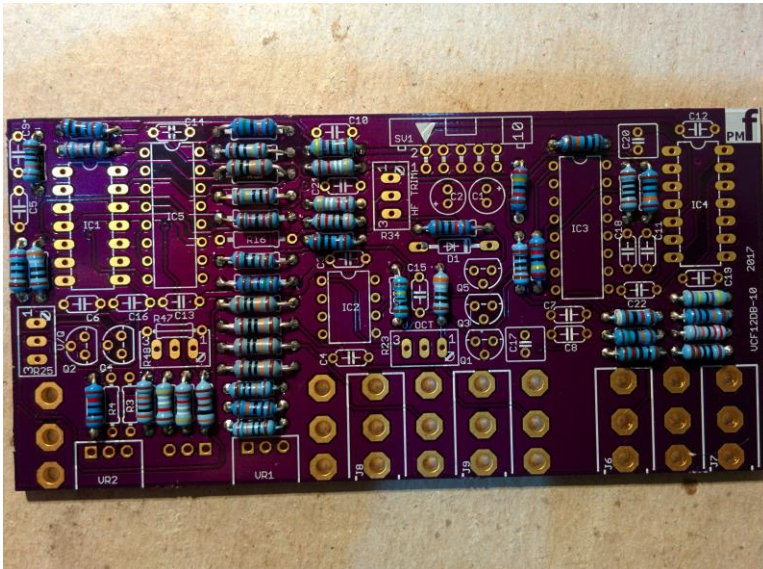


## 2. Resistors

R47 and R48 or OPTIONS for the resonance circuit. The fixed resistor R47 will fix the performance of the resonance circuit within the designed in tolerances. Alternatively, the trimmer R48 will allow the resonance circuit to be adjusted to individual preferences as explained in the user guide. Determine if you will use R47 (fixed) or R48 (trimmer). If you are using R47, install it here along with the other resistors.

R16 is part of the High Frequency trim circuit consisting of (R16, R34, D1). If you do not need a High Frequency trim function, you do not need to install R16.

R3 and R4 set the upper and lower frequency range of the filter. Use wire links for R3 and R4 if you want the full range with a reasonably 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. Install the flat resistors on the TOP of the board. Solder and clip the leads.

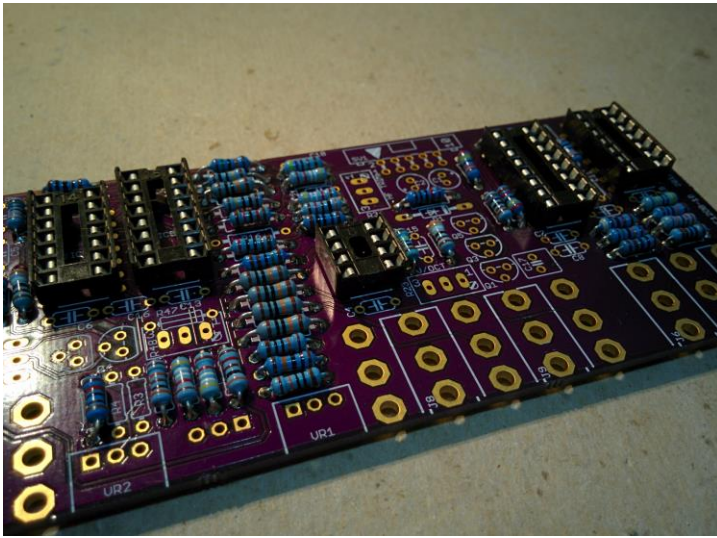


## 3. Diode

D1 is part of the High Frequency trim circuit consisting of (R16, R34, D1). If you do not need a High Frequency trim function, you DO NOT need to install D1. If you will be installing the 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.

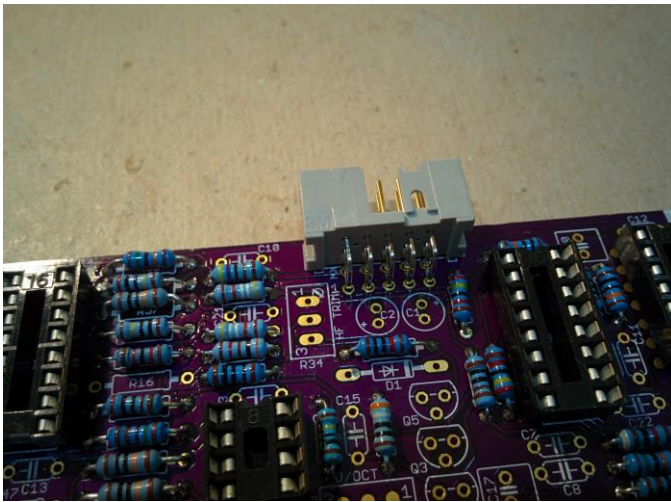
## 4. IC Sockets

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



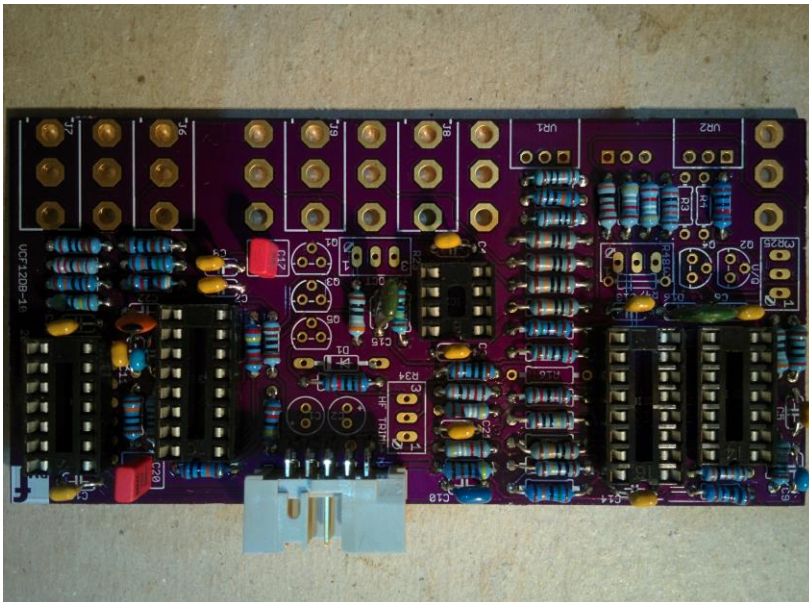
5. Power socket

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.



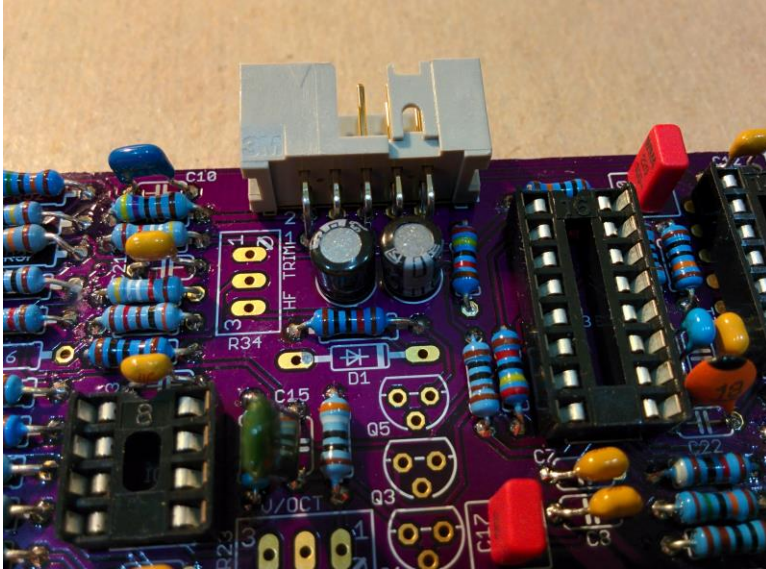
6. Ceramic/film/polypropylene capacitors

Install the ceramic/film capacitors on the TOP of the board. The 220 pf polypropylenes are recommended for C17 and C20. 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.

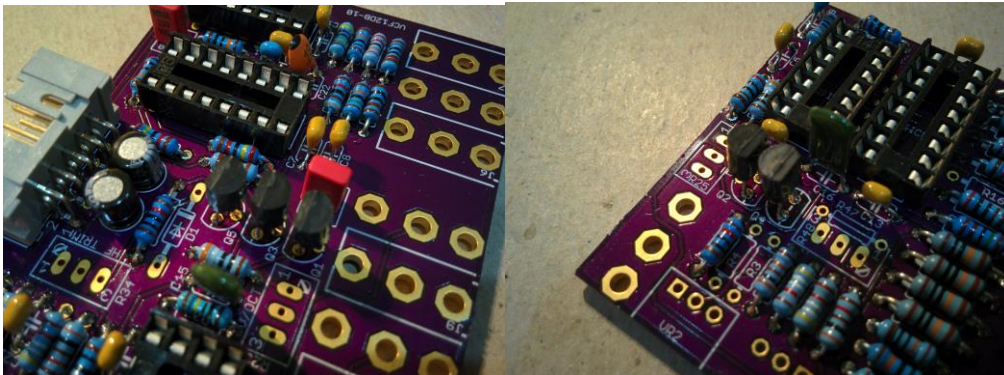


#### 8. Transistors

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.

Try and move the three transistors Q1,3,5 close together and tie them together with a small zip tie or with epoxy.

Try and move the three transistors Q2,4 close together and tie them together with a small zip tie or with epoxy.



## 9. Trimmer resistors

R47 and R48 or OPTIONS for the resonance circuit. The fixed resistor R47 will fix the performance of the resonance circuit within the designed in tolerances. Alternatively, the trimmer R48 will allow the resonance circuit to be adjusted to individual preferences as explained in the user guide. If you are using R48, install it here along with the other trimmers. R34 is part of the High Frequency trim circuit consisting of (R16, R34, D1). If you do not need a High Frequency trim function, you do not need to install R34.

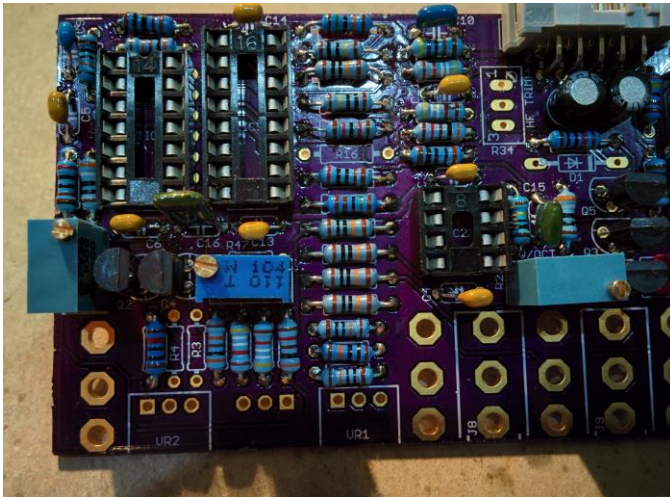
Use a voltmeter to preset the trimmers between Pin1 and Pin2 as follows:

R23 - 50R

R48 (if using) 50k

R34 (if using) turn fully CCW until click stop

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.



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



### 11. 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.



### 12. 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 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.

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

14. 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 4 approx = +12V
  - b. At IC1 pin 11 approx = -12V
  - c. At IC1 pin 3, 10, 12 = 0V
  - d. At IC2 pin 4 approx = -12V
  - e. At IC2 pin 8 = +12V
  - f. At IC2 pin 5 = 0V
  - g. At IC3 pin 6 approx = -12V
  - h. At IC3 pin 11 approx = +12V
  - i. At IC3 pin 3, 14 = 0V
  - j. At IC5 pin 6 approx = -12V
  - k. At IC5 pin 11 approx = +12V
  - l. At IC5 pin 3, 14 = 0V
  - m. At IC4 pin 3 = 0V
  - n. At IC4 pin 4 approx = +12V
  - o. At IC4 pin 11 approx = -12V
  - p. 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 and/or check with us for further analysis.

## 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. 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.