VU002 Quad Frequency Doubler User/Build Guide



VU002 is a quad frequency doubler or full-wave rectifier (in the same way as a linear power supply works, where AC is rectified and filtered to produce DC). Each of the 4 stage can :

- convert a ramp/saw to triangle
- multiply a triangle signal by a factor of 2
- multiply a sine signal by a factor of 2 (output sine is glitched)
- process a video signal for solarization effect

The 4 stages are chained together to multiply the signal at the input of the first stage by 16. Switching jacks allow to break the connection between each stage to use them individually.

Inputs: 0-1V, 100kohms Outputs: 0-1V, 499 ohms

- 4HP - 38mA +12V - 37mA -12V - 0mA +5V
- 50mm deep

Resistors



1k : R3, R4, R5, R6, R7, R13, R14, R15, R16, R17, R23, R24, R25, R26, R27, R33, R34, R35, R36, R37 2k : R8, R9, R18, R19, R28, R29, R38, R39

As you may have noticed, the resistors needs to be mounted vertically. Bend one of the lead along the body of the resistor, as close as possible (as another board will be mounted above this one).

A good practice is to mount two resistors that are next to each horizontally head to tail, to avoid a short between the leads.

Another good thing to do is to place a few resistor and solder them instead of placing all of them and solder, as there will be a lot of leads crossing each other.

Check the picture at the end of this section to see how the resistors are mounted.

Capacitors



100nF

 $100nF: {\tt C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12}$

Semiconductors



LM6172 : U1, U2, U3, U4, U5, U6 1N5711 : D1, D2, D3, D4, D5, D6, D7, D8

Diodes are polarized, make sure that the ring on the diode matches with the square pad on the circuit board. As for the resistors, the diodes needs to be mounted vertically by bending one of the lead along the body of the diode. Same as before, head to tail to avoid shorting.

LM6172 is polarized, make sure that then notch on the chip matches the notch on the circuit board.

Connectors



6 pin stackable connectors

XS1, XS2 : 6pin stackable connector

The box header (female plastic part) needs to be mounted on the component side, and the long pins on the solder side.



This is how the board should look once all the components are populated. Notice that the resistors and diodes are mounted head to tail. The connectors are soldered on the solder side of the board.

Controlboard build

Resistors





499R



499R : R2, R10, R12, R20, R22, R30, R32, R40 100k : R1, R11, R21, R31

Controlboard build

0 R10 0

0 R11 O

0 R22 0

0 R30 0

0 [] 0

Connectors



XS1, XS2 : 6pin female connector J1, J2, J3, J4, J5, J6, J7, J8 : PJ398SM

The 6pin connectors needs to be mounted with the box header on the solder side, pins are soldered on the component side.

The jacks are sharing a ground hold to save space, so it's better to insert J1 and J2 before soldering them, and so on.

Controlboard build





Now that the controlboard is done, let's move on to the power board. You can try fitting the controlboard to the mainboard now, but don't push the connectors all the way down yet, as it's a bit hard to disconnect afterwards.

Resistors









1k : R44, R45 4.99k : R41 10k : R43 24.9k : R42

Capacitors/Ferrites



10uF : C15, C16 100nF : C13, C14 Ferrites : FB1, FB2

Note that the 10uF capacitors are polarized, the longer lead needs to match the square pad/plus sign on the circuit board.

Semiconductors



1N4001 : D9, D10 TL072 : U8 TL431 : U7

Diodes are polarized, make sure that the ring on the diode matches with the line on the circuit board.

TL072 is polarized, make sure that then notch on the chip matches the notch on the circuit board.

TL431 is polarized, make the flat side of the component match the straight line on the circuit board

Connectors



XS1, XS2 : 6pin male connector

J9 : 10pin IDC connector

XS1 and XS2 long pins should be on the solder side of the board, and solder on the component side.

Make sure that the notch on the IDC connector matches the notch on the circuit board.





Now that all three boards are built, they can be connected together (again, don't push the control board and mainboard fully yet). You can fit the panel to test that the module is working properly. To do so, input a signal in the top jack (ramp or triangle) and check that the frequency is multiplied at each outputs, and you can also test each stage individually to check that all inputs are working correctly.