UniMatrix Oberheim TVS Installation
By Rob Rosen

Note: Most TVS include the digital keyboard, aka diode matrix keyboard which this modification is compatible with. Some early TVS have an analog keyboard like an ARP 2600, and that can be easily identified by a transposition rotary switch rather than a transposition slide switch. **If you have the earlier analog keyboard, this kit will not work at all.**

This install guide assumes you are familiar with electronics to a more than intermediate degree. It also assumes you don't need us to explain how to open the unit and access the underside of the left hand controller where the PCB lives.

Here is a photo of the finished installation. Note another diode matrix product was installed previously and the solder work isn't beautiful in this photo.

Mounting:
The holes on UniMatrix are not big enough for american hardware.
However, a 6/32 screw will fit with some encouragement. We removed 1 nut and replaced it with a ¼" standoff. We then affixed the unimatrix to this standoff with a nylon spacer between the PCB and the standoff. You may consider a 6/32 - M3 converting standoff.

Power:
+10V and ground can be had from most CMOS IC's on pin 14 and 7 respectively. Use a meter to confirm. The power wire in our kit came with 3 wires, the third unused, which we cut off.

Midi In:
We mounted the midi jack on the rear I/O plate and ran wires to the Unimatrix. Since we did not want to splice wires, we soldered the wires to the available pads on the bottom of the UniMatrix PCB for midi.
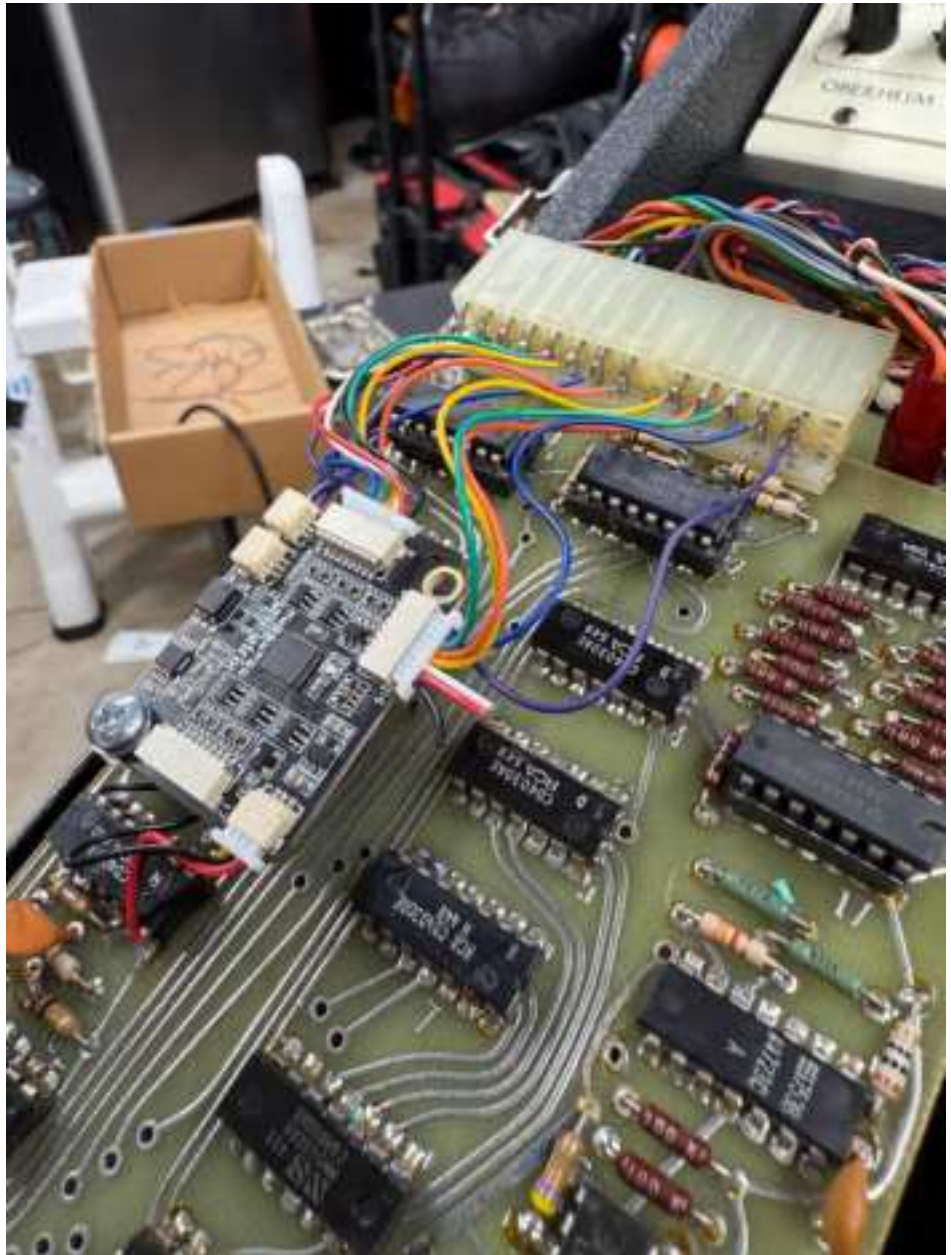
Wiring In Data Signals:
All needed signals are available on the large molex header that connects the keyboard to the logic PCB.
NOTE: The header is a 15 pin header with 2 keying positions. The 9th pin has a physical plug for keying but is still counted in the pin count. This is especially important for the stimulus pins. The 2nd keying position is pin 15, which is unused.

Starting from the left, here is how to connect the first set of wires for I/O 1-8 on UniMatrix:

UniMatrix	Wire Header
1 Purple	E4
2 Blue	E7
3 Green	E5
4 Orange	E8
5 Yellow	E6
6 White	E2
7 Red	E1
8 Black	E3

For the "Stimulus Pins", I/O 9-16 header, you only need 5 wires. The remaining 3 can be tied off or trimmed.

UniMatrix	Wire Header
1 Purple	E14
2 Blue	E13
3 Green	E12
4 Orange	E11
5 Yellow	E10
6 White	Unused
7 Red	Unused
8 Black	Unused

Once you have completed all wiring, it's time to configure the UniMatrix.

If available, download the TVS file we made for Tubbutec. It should be all you need. In case it's not, here is some specific bits of info for the configurator in the order they appear if they differ from the default values or values you can change to your liking (midi channel etc)

Midi Base Note: We recommend +12 or +24. No need to change this if you don't want to.
Stimulus/Input Count: 5
Number of notes to populate: 37
- Once you input this info, press the "rotated" button.
- Go to the OUT 8 tab and ensure the Note/CC Column descends in this order: 7, 15, 23, 31, 39,

Go to the top of page and export sysex or send directly from the webapp. This completes the UniMatrix install

Optional:
Tubbutec adds 2 midi-cv controller opportunities with UniMatrix.
We have only tried using this to control the SEM filter.
To add filter control by midi, do the following:

In the configurator, go to the bottom and change CV1 mapping to Controller. Under Note/CC, change to 74 which is the standard "brightness" control in midi land.

On either the bottom of UniMatrix or using the extra set of wires included, attach a wire to I/O pin 23. On the other end of the wire, you need to add a resistor and connect it to the filter summing node on the SEM. The filter summing node op amp is right above the filter molex header which is connector H.
Since the UniMatrix only supplies CV from 0-5 volt, we need to double the power of the summing node which is typically supplied with 100k summing resistors as the SEM filter needs 0-10V to fully sweep the filter.
Solder one leg of a 50K resistor to pin 2 of A19 (741 op amp). Solder the other end to the wire from UniMatrix.

To add control of both filters, simply run a second wire before it hits the resistor to go to SEM 2 with another 50K resistor in the same manner.

Tip: For true duophonic SEM fun with CC control, you can assign CV 2 to a different CC number and run pin 24 from UniMatrix just like above to the second SEM. Then you can control them individually! Or, you can use velocity instead to get more dynamics from your TVS via midi.
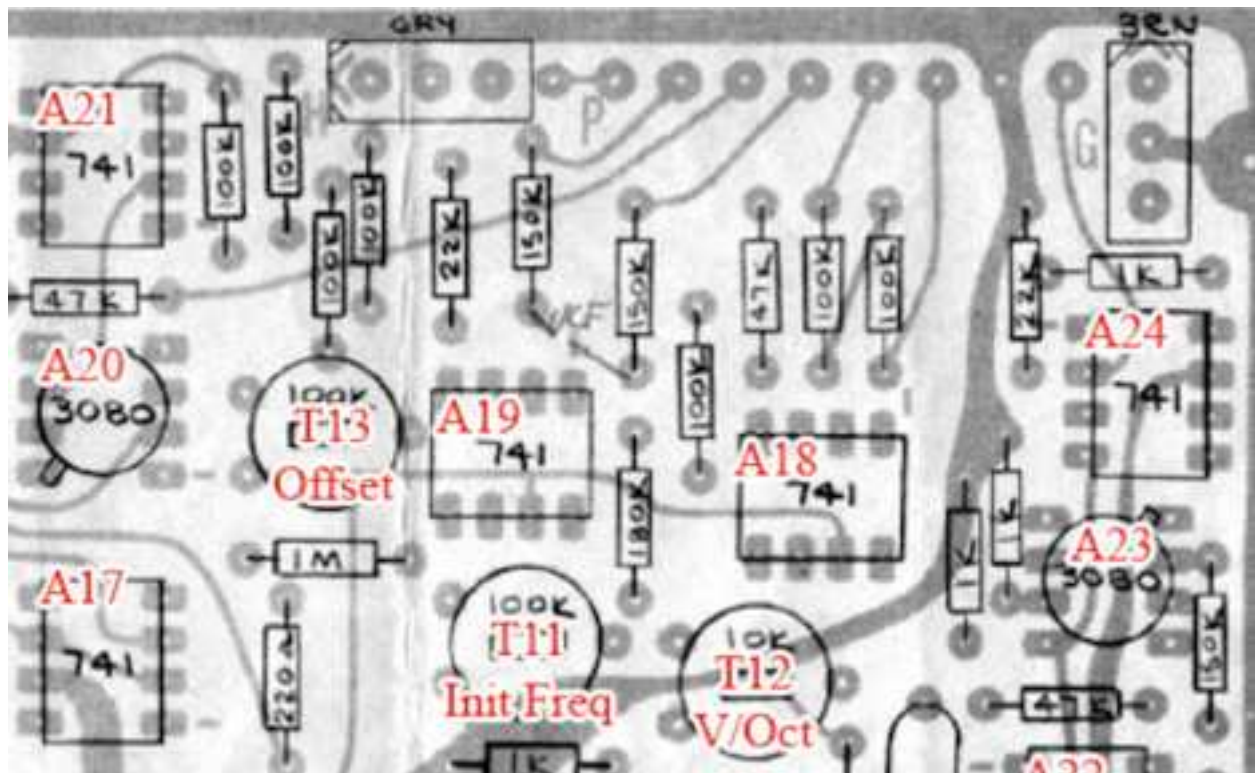
Another hint: UniMatrix includes a midi clock output. Connector H on the mini sequencer allows external clock, however the pulse must be above 12V, so you would need to convert the signal with transistor logic.