

SEISMIC INDUSTRIES

VIM

DIY Workshop - Voltage Injecting Mixer Module

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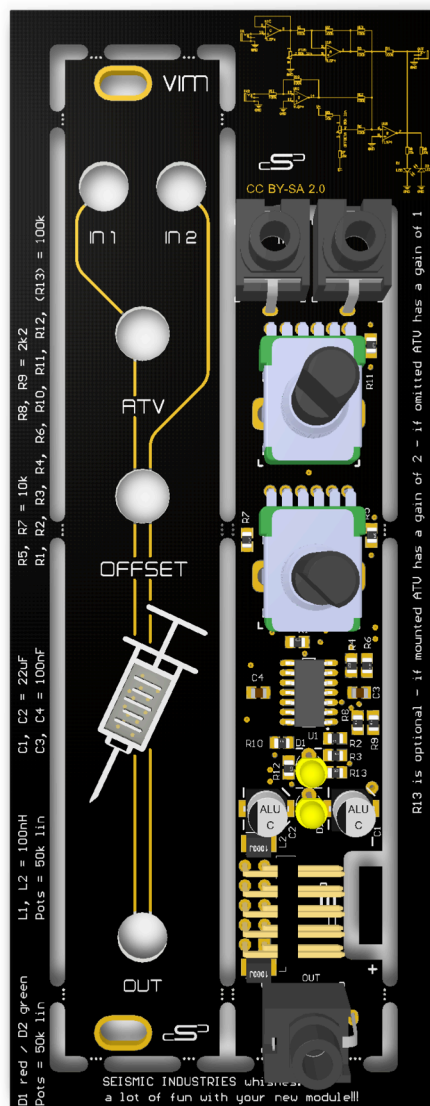


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1 Module Description

The voltage injecting mixer is a compact fully DC coupled two channel mixer module with the possibility to inject a +/- 8V offset on the incoming voltages.

Channel one has an attenuverter circuit, which allows inverting or attenuating the incoming signal. The attenuverters maximum gain can be set with a resistor on the board (Gain +/- 1 or +/- 2).

Channel two is fed right away into the summing circuit of the module.

The module also acts as an offset voltage generator. The offset voltage is mixed to the output anytime, even if no input signal is connected. Thus the module can also be used to pre-set/load a destination with its outgoing voltage.

The backlit syringe on the frontpanel displays the final output voltage. Red indicates positive voltages, green indicates negative voltages.



IN1 is the first signal input. It is fed to the ATV attenuverter circuit.

IN2 is the second signal input. It's fed straight to the internal summing amplifier

ATV is an attenuverter circuit to control the gain of IN2. It ranges either from -1 to +1 (R13 omitted), or -2 to +2 (R13 mounted)

OFFSET allows inserting a constant DC voltage value to the incoming signals.

The syringe displays the value of the output voltage. Positive voltages are displayed in red, negative voltages in green.

OUT is the summed output of IN1, IN2 and the OFFSET voltage.

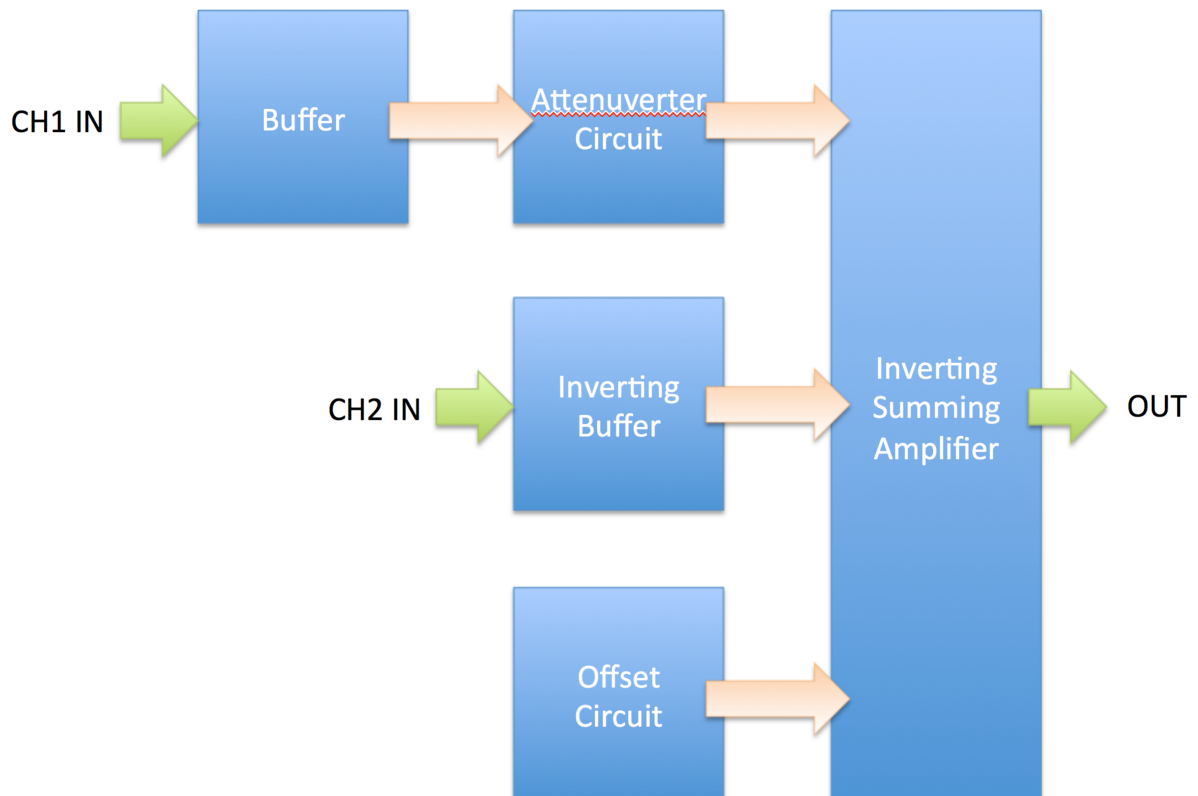
The module can be used for many purposes. For example:

- As a simple DC coupled 2 channel mixer
- As a standalone offset voltage generator
- As standalone Attenuverter
- As a display for voltages

2 Circuit Description

The circuit can be divided into 5 main function blocks:

- Buffer
- Attenuverter Circuit
- Inverting Buffer
- Inverting Summing Amplifier
- Offset voltage circuit



2.1 Buffer

The Buffer amplifier U1C ensures constant high input impedance for IN1. Which the following attenuverter circuit would not provide.

2.2 Attenuverter

The attenuverter is a versatile "one opamp" circuit to manually dial gains from a positive to negative amount. With the right resistor values a symmetrical configuration can be achieved. It's formed around U1A, R1 and R2.

2.3 Inverting Buffer

IN2 needs an inverting buffer, since the following summing amplifier is built in an inverting configuration. This is formed with U1D, R10 and R11.

2.4 Offset Circuit

The offset circuit is passive and is formed with the OFFSET potentiometer itself and two resistors, R5 and R7, to drop some of the powerrails voltage

2.5 Inverting summing amplifier

The inverting summing amplifier around U1D is a 3 input inverting summer.

R13 and R3 form the input resistor for IN1, by mounting both resistors on the PCB together the gain set to 2 (omit R13 for Gain=1).

R12 and R6 form the input resistors for IN2 and the OFFSET voltage.

The common feedback resistor is R4.

R8 and R9 are current limiting resistors for D1 and D2.

3 Build Instructions

3.1 Tools

Make shure you have the following tools ready:

- Soldering Iron
- Solder wire, solder wick
- Tweezers
- Side cutting plier (to cutout the PCB and frontpanel)
- Sanding Paper (for smoothing the cut edges of the PCB and frontpanel)

3.2 Build up sequence

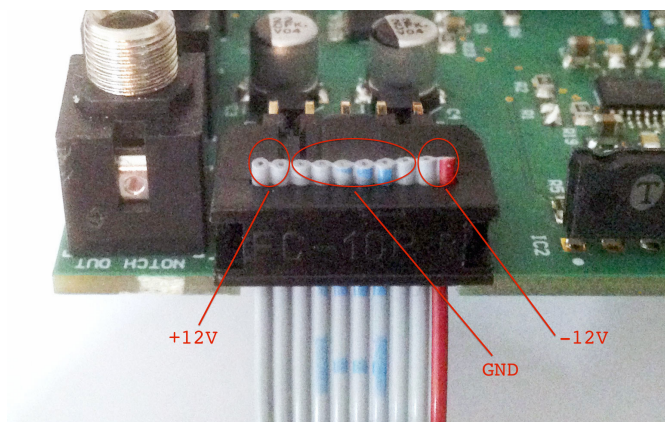
When building the kit you preferably start with the SMT components and then move on to the bigger THT ones. Also try mounting the SMT components from the inside out of the board.

A possible build up sequence is:

1. Semiconductors (like IC's, Transistors, ...)
2. Ceramic Capacitors
3. Resistors
4. Inductors
5. Electrolytic Capacitors
6. Power Connector
7. Jacks
8. LED's
 - a. Cutout the frontpanel and "premount" it with loosely tightened knurled nuts to define the length of the LED's legs
 - b. Solder and cut the legs
 - c. Then remove the frontpanel
9. Potentiometers
10. Mechanical
 - a. Mount the frontpanel
 - b. Tighten the knurled nuts of the jacks
 - c. Fasten the knobs of the potentiometers

3.3 Power Connection

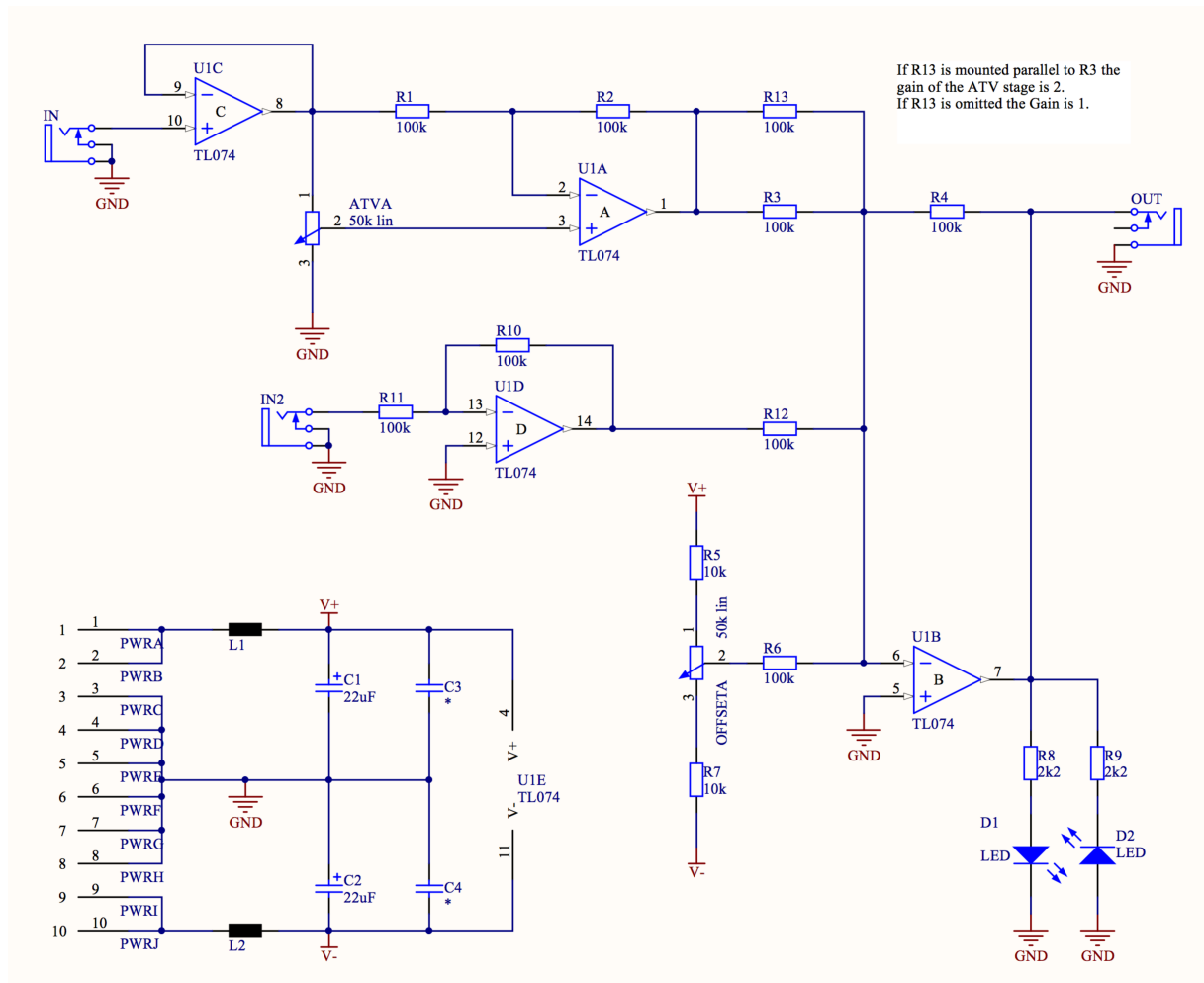
Connect the 10-pin ribbon cable like this:



IMPORTANT:

The red wire usually carries the -12V Signal in Eurorack synthesizers. Doublecheck your power rails before powering the module up. **Power inversion will destroy your module.**

4 Schematic



5 BOM

Comment	Designator	Quantity	Value
CAP PSU	C1, C2	2.00	22uF
Capacitor 0805	C3, C4	2.00	100nF
Inductor PSU 100nH	L1, L2	2.00	100nH
Phonejack	IN, IN2, OUT	3.00	-
LED	D1, D2	2.00	-
Pinhead 10Pole	PWR	1.00	-
Pot Stereo 50k lin	ATV, OFFSET	2.00	50k lin
TL074	U1	1.00	-
Resistor	R1, R2, R3, R4, R6, R10, R11, R12, R13	9.00	100k
Resistor	R5, R7	2.00	10k
Resistor	R8, R9	2.00	2k2

6 Pick & Place

