

BMC 074. Attenuate, Offset Invert Build Documentation.

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I. Using The Module.

This module provides basic functions for transforming and translating voltages and synthesizer signals. It's able to attenuate/amplify and add positive or negative offsets to voltages. The module has two identical channels and works with both +/-12V or +/-15V systems without modification. It can be used to turn a bipolar signals into a unipolar signals or vice-versa and I've found it especially useful in patches where a VCA's output is fed back into it's voltage control input.

Controls:

1. Attenuate Knob – This knob attenuates the input signal, fully counterclockwise the input signal is completely attenuated and clockwise it will have a gain of 2.
2. Offset Knob – This knob adds a DC voltage offset to the input signal, at fully counterclockwise it provides approximately -5V and clockwise it provides approximately +5V.

I/O:

1. Input
2. Positive output – a non-inverted output.
3. Negative output – An inverted output.

II. Schematic.

To the right is the schematic for this module. The two channels are identical, so only channel one's signal path will be described.

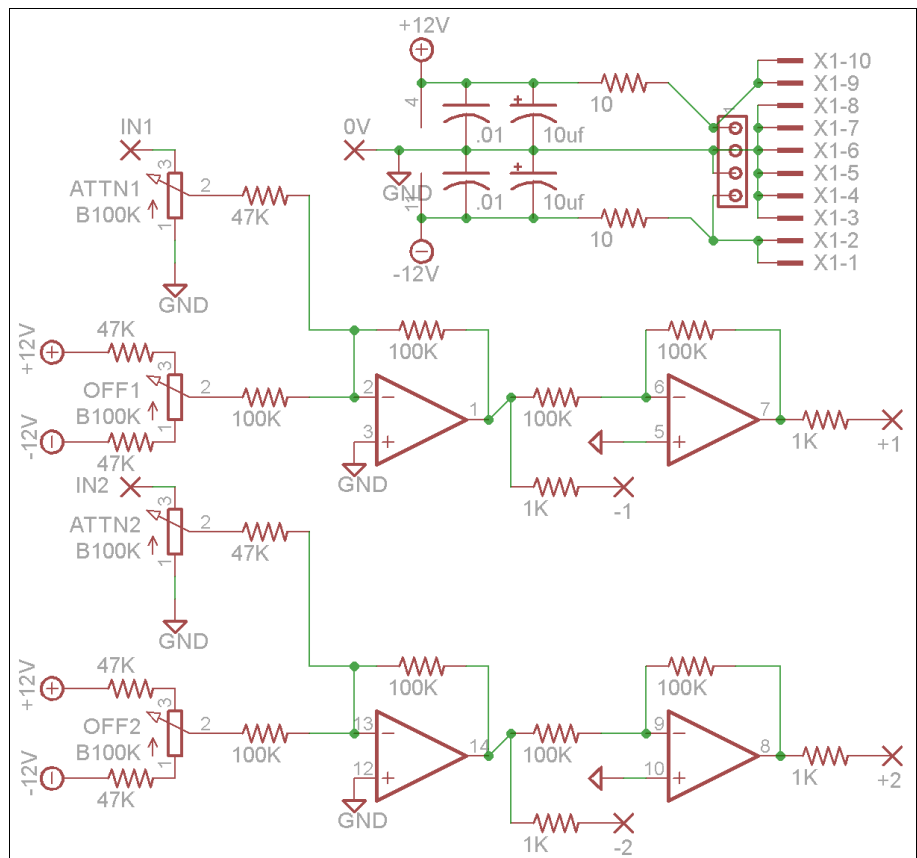
The input signal enters through the "IN1" wirepad and is attenuated by the "ATTN1" potentiometer. The wiper connects to a summing amplifier through a 47K resistor.

Below this we find the "OFF1" potentiometer connects to +12V/-12V through a pair of 47K resistors. These resistors limit the voltage at the wiper to +/-5V. The wiper of this pot connects to the summing amplifier through a 100K resistor.

The summing amplifier is an op-amp wired as an inverting amplifier with a 100K resistor in it's feedback path. Because the attenuate potentiometer connects to the amplifier with a 47k resistor, the signal from the attenuate knob will actually be amplified. A 1K resistor connects the output of this amplifier to the negative output wirepad "-1"

A second inverting amplifier with a gain of 1 connects to the output of the first inverting amplifier. The output of this amplifier connects to the positive output, "+1"

At the top of the schematic the power connections are shown. Footprints for MOTM and Eurorack style power connectors are available in parallel. The positive and negative power rails are filtered by a 10 ohm/ 10 uf low pass filter, additional filtering is done at the pins of the TL074 with .01uf capacitors.



III. Construction

A. Parts List

Semiconductors

Value	Quantity	Notes
TL074	1	14 pin DIP

Resistors

Value	Quantity	Notes
10 ohm	2	5mm lead spacing. Use 3.5mm body length or stand up
1Kohm	4	" "
47Kohm	6	
100 Kohm	8	" "
B100k PC mount Pot	4	16mm PCB Mount

Capacitors

Value	Quantity	Notes
.01uf	2	Small ceramic disc. Value not critical
10uf	2	Electrolytic

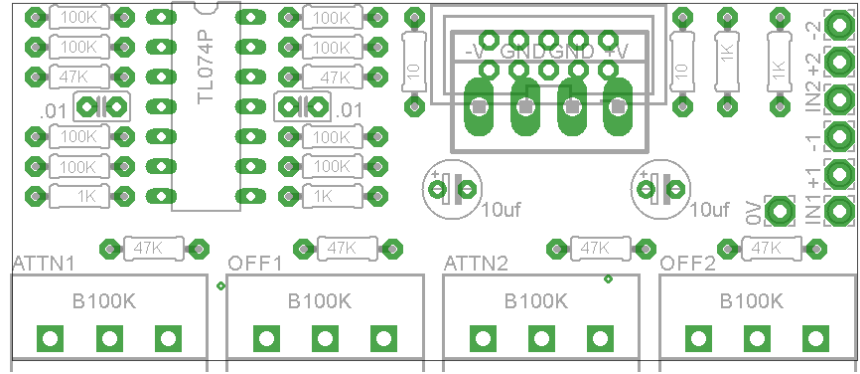
Other/Off Panel

Value	Quantity	Notes
Power connector	1	
Knobs	4	
Jacks	6	
14 pin DIP Socket	1	

B. PCB Layout

To the right are renderings of the PCB. The rendering showing the traces does not show the ground fill plane, so assume any missing connection is a ground fill.

The PCB measures 73mm x 31mm. The pots are spaced 18.4mm apart.



C. Wiring

The PCB's wirepads should be connected as follows:

0V → The sleeve of any jack if using a metal panel. If using a non-conductive panel, first wire all sleeves together.

IN1 → Tip of channel 1's input jack

+1 → Tip of channel 1's positive output jack

-1 → Tip of channel 1's negative output jack

IN2 → tip of channel 2's input jack

+2 → Tip of channel 2's positive output jack

-2 → Tip of channel 2's negative output jack.

To the right is a close up of jack wiring. Below is a photo of a complete module.

