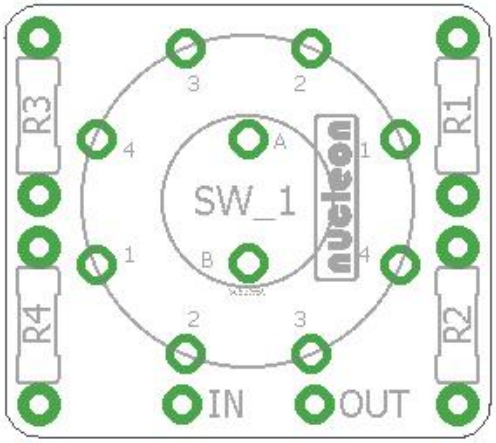
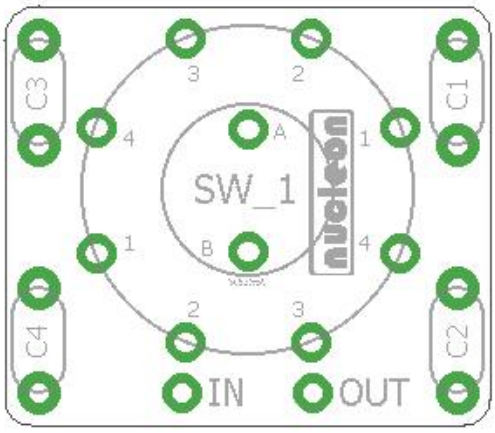
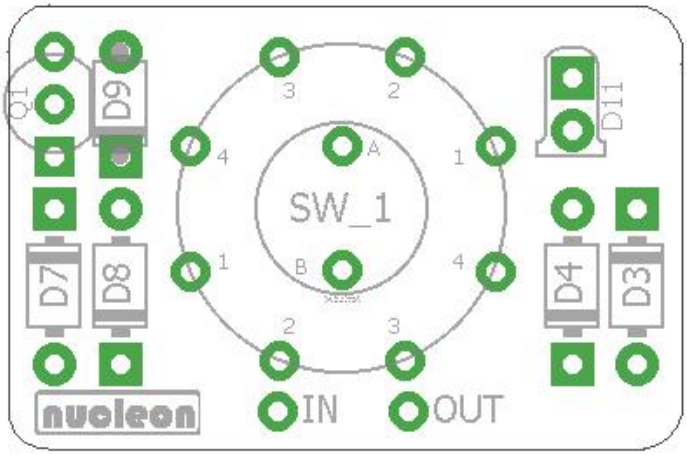
Mod Boards

Mod boards allow you to change any resistor, capacitor or diode in a circuit with four switchable ones. This allows you quickly change between gain, frequency response and clipping characteristics.





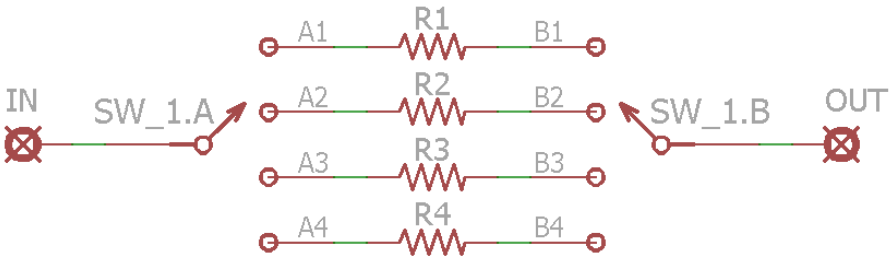


License information

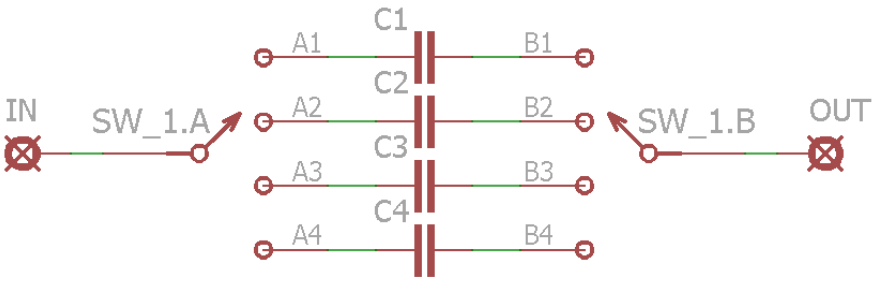
These boards may be used in commercial pedal builds. However, commercial (re)selling or distribution of the PCB, its design layout or this build document is prohibited. These materials are not to be sold as part of a kit. The PCB and its design can only be used in commercial pedals when purchased from Nucleon FX and provided that you do not 'goop'the PCB, remove the Nucleon logo or otherwise attempt to hide its origins. Construction and use of the PCB and project information is at your own risk. Nucleon FX can not be held accountable for any damages to equipment or yourself.

Schematic

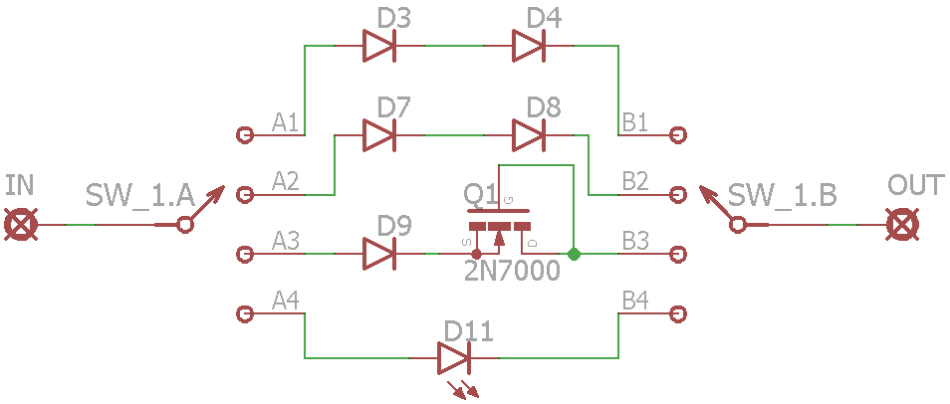
Resistor



Capacitor



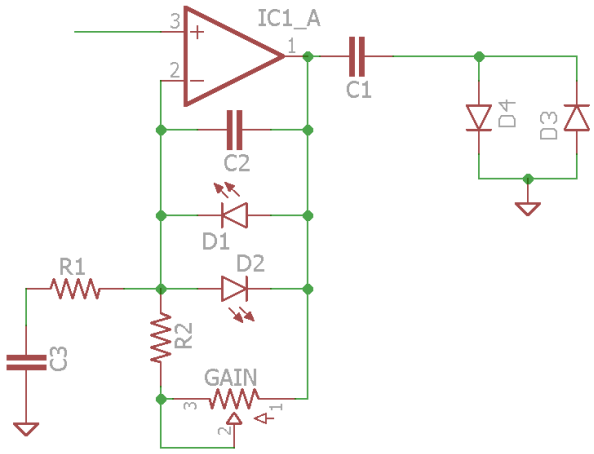
Diode



Note: I apologize for the weird numbering of the parts here. Diodes D4 and D8 may be replaced by jumpers is you want lower clipping threshold, for instance using a single germanium diode. Q1 is intended to be a 2N7000 mosfet. When using others like the BS170, beware of different pinouts. D9 should always be included.

Examples

Below is a little amplification circuit as you would find it in a typical overdrive/distortion pedal. It is not a complete circuit by itself but is used to give some pointers for possible mods.



Treble roll off

C2 is essentially a short circuit for high frequencies above a certain threshold. These frequencies won't be amplified as much as frequencies below the threshold, thus adjusting the treble content of the output. This Typical values are 50 pF to 470 pF. The Nucleon Atomic Blue project uses this idea with just a single switching option. With a mod board you can expand your options. The threshold frequency is determined by the value of C2 in parallel with R2 and the Gain pot:

$$f = \frac{1}{2\pi \cdot C2 \cdot R2 \cdot Gain}$$

Bass content

Similarly R1 and C3 set a threshold above which frequencies are amplified. That keeps the low end from becoming mush. In the classic tubescreamer both bass and treble roll off are set at 720 Hz. This results in the well known mid hump of the circuit. When using a mod board here, you can choose from a capacitor or resistor board. Either will work, but a capacitor board is recommended as that will not affect the overall gain. Higher values of R1 lower the gain of the opamp stage. Another equation similar for the threshold frequencie:

$$f = \frac{1}{2\pi \cdot C3 \cdot R1}$$

Clipping characteristics

The diodes D1 through D4 could all be replaced by a diode mod board to explore your soft (D1 and D2) or hard (D3 and D4) clipping options.

Switches

Switches are available through the Nucleon FX webshop in small quantities. Large quantities (10 and up) are more easily sourced through eBay. Here's a picture of what to look for.