

PROJECT NAME

UBE SCREAMER

BASED ON

Runoffgroove UBE Screamer

BUILD DIFFICULTY

■■■■■ Easy

EFFECT TYPE

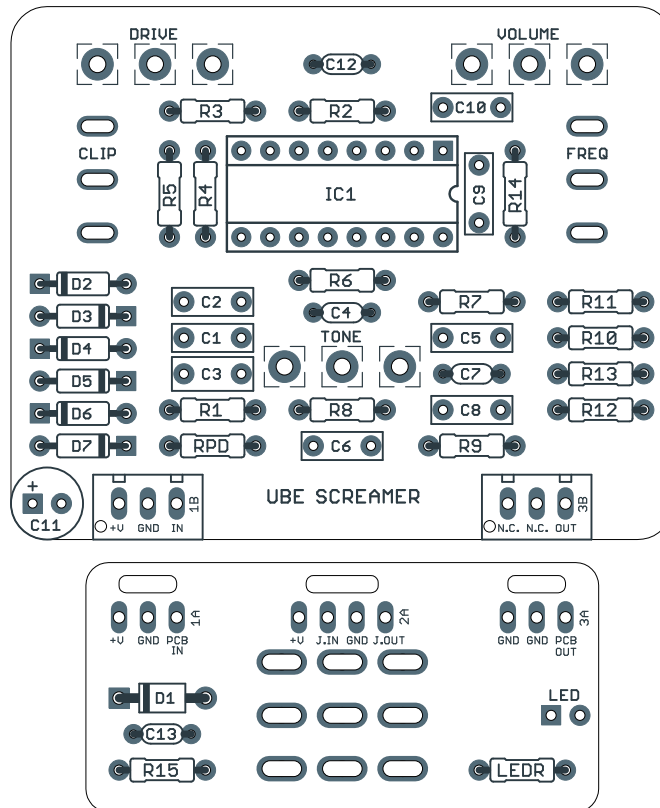
CMOS overdrive

DOCUMENT VERSION

1.0.0 (2022-04-08)

PROJECT SUMMARY

An original design from Runoffgroove with the goal of reproducing the sound of the Tube Screamer with CMOS gain stages.



Actual size is 2.3" x 1.86" (main board) and 1.78" x 0.87" (bypass board).

TABLE OF CONTENTS

1	Project Overview	7	Enclosure Layout
2	Introduction & Usage	8	Wiring Diagram
3-4	Parts List	9	Licensing
5	Schematic	9	Document Revisions
6	Drill Template		

INTRODUCTION

The [UBE Screamer](#) from Runoffgroove was originally developed as an experiment to see if something tonally similar to the [Ibanez Tube Screamer](#) could be created with a series of CMOS hex-inverter stages.

CMOS hex inverters function somewhat similar to op-amps, albeit with much lower open-loop gain and much different clipping characteristics. Craig Anderton's famous [Tube Sound Fuzz circuit](#) (which the Way Huge Red Llama is based on) also used hex inverters, as well as the [Electro-Harmonix Hot Tubes](#) from 1979 and many other derivatives since that time.

Circuit-wise, the UBE Screamer has little in common with the Tube Screamer it's named for, but it succeeds in occupying a similar space in the tonal spectrum and is well worth your time to build it.

The Aion FX implementation of the UBE adds two modifications: a clipping diode switch and a second switch to change out the global feedback resistor. The original Runoffgroove article recommends selecting this resistor for based on whether you'll be using single coil pickups or humbuckers, so we took the step of putting it on a switch so the pedal can be used in any scenario without heating up the soldering iron.

USAGE

The UBE Screamer has three knobs:

- **Drive** controls the amount of gain going into the feedback-clipping stage.
- **Tone** controls the treble response of the effect, cutting frequencies at 3dB/octave with a variable cutoff frequency of between 1kHz and 10kHz.
- **Volume** controls the overall output of the effect.

In addition, there are two switch modifications included for added flexibility:

- **Clipping** selects between 2 diodes or 4 diodes in the feedback clipping stage.
- **Frequency** sets the mixing ratio of the clean path, which impacts the EQ or fullness of the overall effect. Three options are available, with the down position being better suited for single-coil guitars and the middle position being better for humbuckers. The top position is somewhere in between.

PARTS LIST

This parts list is also available in a spreadsheet format which can be imported directly into Mouser for easy parts ordering. Mouser doesn't carry all the parts—notably potentiometers—so the second tab lists all the non-Mouser parts as well as sources for each.

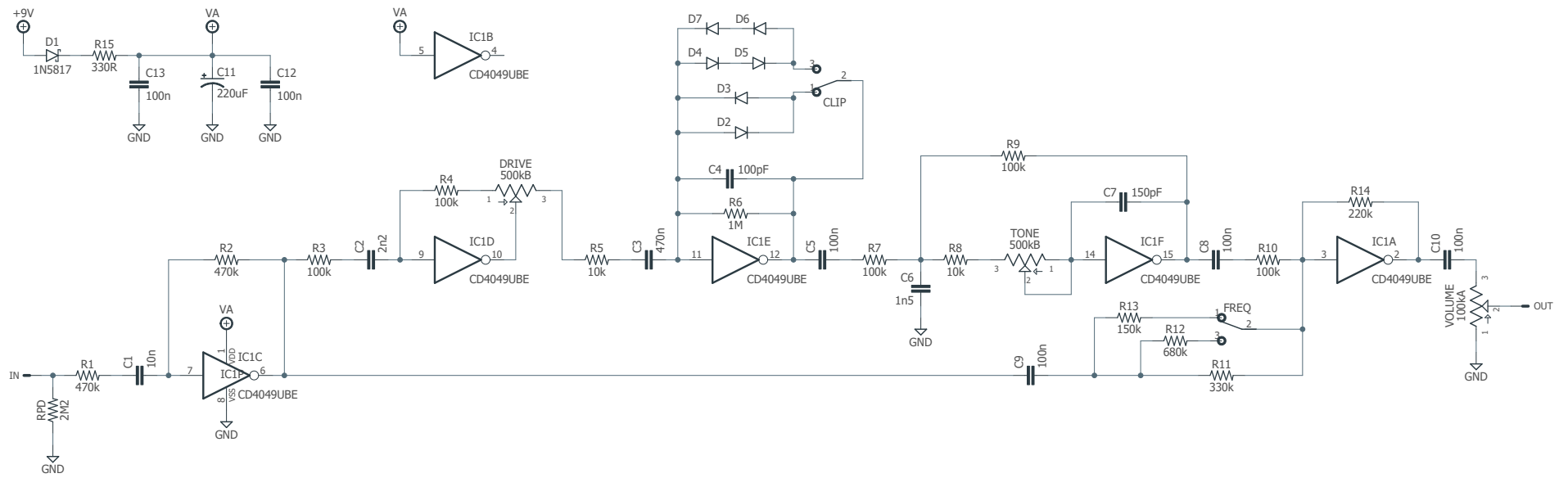
[View parts list spreadsheet](#) →

PART	VALUE	TYPE	NOTES
R1	470k	Metal film resistor, 1/4W	
R2	470k	Metal film resistor, 1/4W	
R3	100k	Metal film resistor, 1/4W	
R4	100k	Metal film resistor, 1/4W	
R5	10k	Metal film resistor, 1/4W	
R6	1M	Metal film resistor, 1/4W	
R7	100k	Metal film resistor, 1/4W	
R8	10k	Metal film resistor, 1/4W	
R9	100k	Metal film resistor, 1/4W	
R10	100k	Metal film resistor, 1/4W	
R11	330k	Metal film resistor, 1/4W	
R12	680k	Metal film resistor, 1/4W	
R13	150k	Metal film resistor, 1/4W	
R14	220k	Metal film resistor, 1/4W	
R15	330R	Metal film resistor, 1/4W	Power supply filter resistor.
RPD	2M2	Metal film resistor, 1/4W	Input pulldown resistor. Can be as low as 1M.
LEDR	4k7	Metal film resistor, 1/4W	LED current-limiting resistor. Adjust value to change LED brightness.
C1	10n	Film capacitor, 7.2 x 2.5mm	
C2	2n2	Film capacitor, 7.2 x 2.5mm	
C3	470n	Film capacitor, 7.2 x 3mm	
C4	OMIT	MLCC capacitor, NP0/C0G	Optional. Use 100pF if you experience feedback at high gain settings.
C5	100n	Film capacitor, 7.2 x 2.5mm	
C6	1n5	Film capacitor, 7.2 x 2.5mm	
C7	150pF	MLCC capacitor, NP0/C0G	
C8	100n	Film capacitor, 7.2 x 2.5mm	
C9	100n	Film capacitor, 7.2 x 2.5mm	
C10	100n	Film capacitor, 7.2 x 2.5mm	
C11	220uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C12	100n	MLCC capacitor, X7R	Power supply filter capacitor.
C13	100n	MLCC capacitor, X7R	Power supply filter capacitor.
D1	1N5817	Schottky diode, DO-41	
D2	1N914	Fast-switching diode, DO-35	

PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
D3	1N914	Switching diode, DO-35	
D4	1N914	Switching diode, DO-35	
D5	1N914	Switching diode, DO-35	
D6	1N914	Switching diode, DO-35	
D7	1N914	Switching diode, DO-35	
IC1	CD4049UBE	CMOS hex inverting buffer, DIP16	
IC1-S	DIP-16 socket	IC socket, DIP-16	
DRIVE	500k Ω	16mm right-angle PCB mount pot	
TONE	500k Ω	16mm right-angle PCB mount pot	
VOL.	100k Ω	16mm right-angle PCB mount pot	
CLIP	SPDT	Toggle switch, SPDT on-on	Can also use a center-off switch to add diode lift mode (untested)
FREQ	SPDT cntr. off	Toggle switch, SPDT on-off-on	
LED	5mm	LED, 5mm, red diffused	
IN	1/4" stereo	1/4" phone jack, closed frame	Switchcraft 112BX or equivalent.
OUT	1/4" mono	1/4" phone jack, closed frame	Switchcraft 111X or equivalent.
DC	2.1mm	DC jack, 2.1mm panel mount	Mouser 163-4302-E or equivalent.
FSW	3PDT	Stomp switch, 3PDT	
ENC	125B	Enclosure, die-cast aluminum	Can also use a Hammond 1590N1.

SCHEMATIC



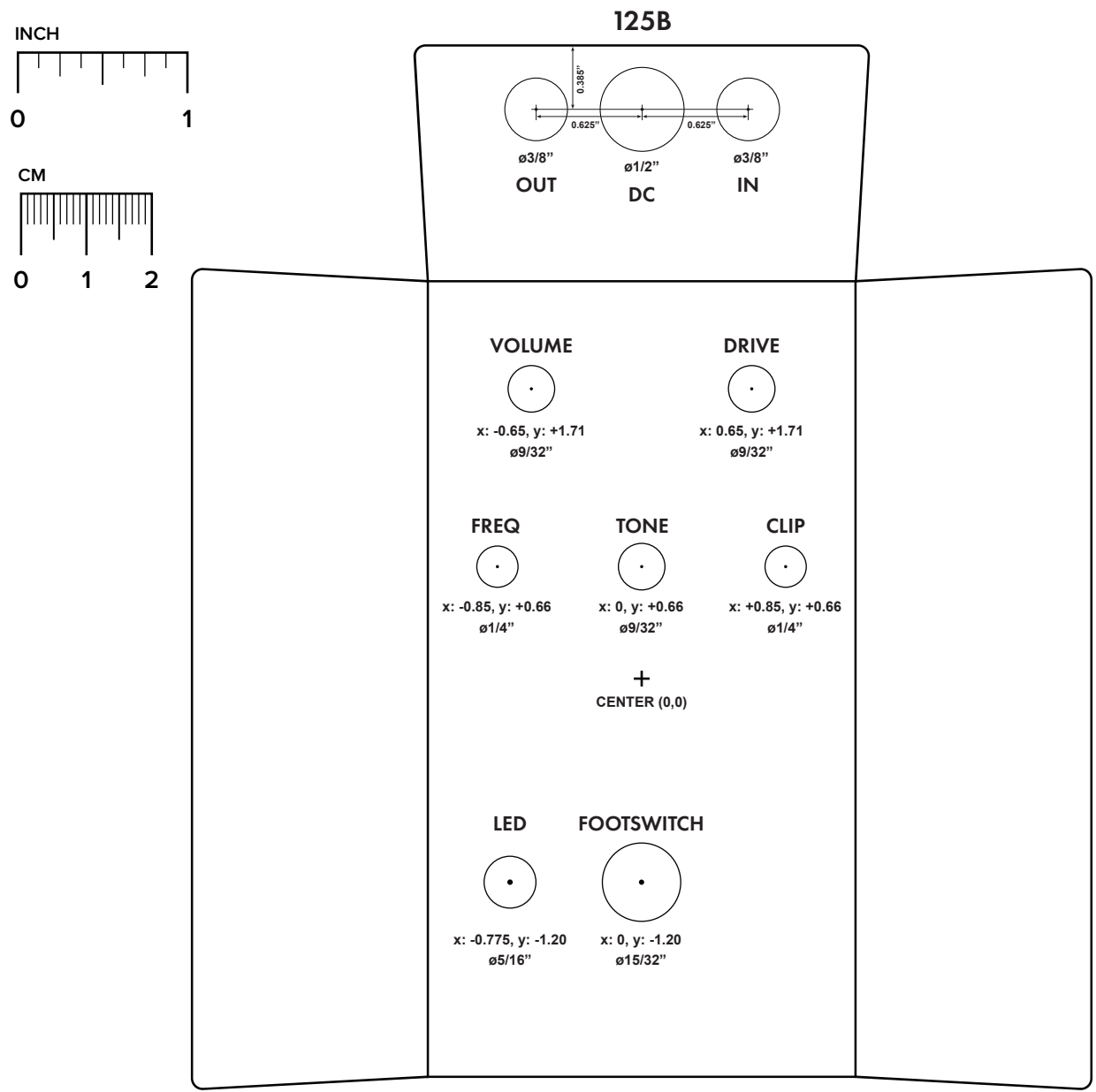
DRILL TEMPLATE

Cut out this drill template, fold the edges and tape it to the enclosure. Before drilling, it's recommended to first use a center punch for each of the holes to help guide the drill bit.

Ensure that this template is printed at 100% or "Actual Size". You can double-check this by measuring the scale on the printed page.

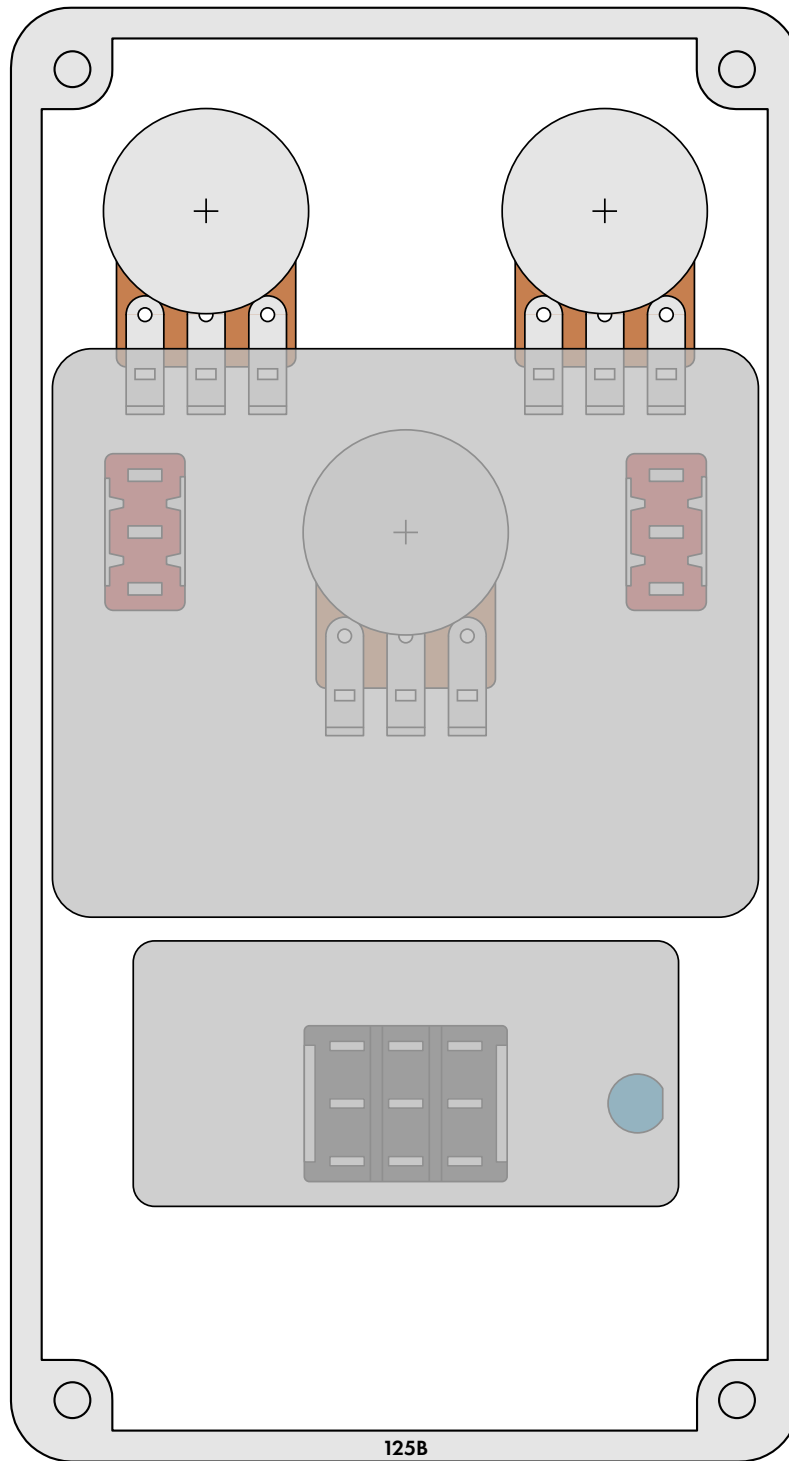
Top jack layout assumes the use of closed-frame jacks like the [Switchcraft 111X](#). If you'd rather use open-frame jacks, please refer to the Open-Frame Jack Drill Template for the top side.

LED hole drill size assumes the use of a [5mm LED bezel](#), available from several parts suppliers. Adjust size accordingly if using something different, such as a 3mm bezel, a plastic bezel, or just a plain LED.

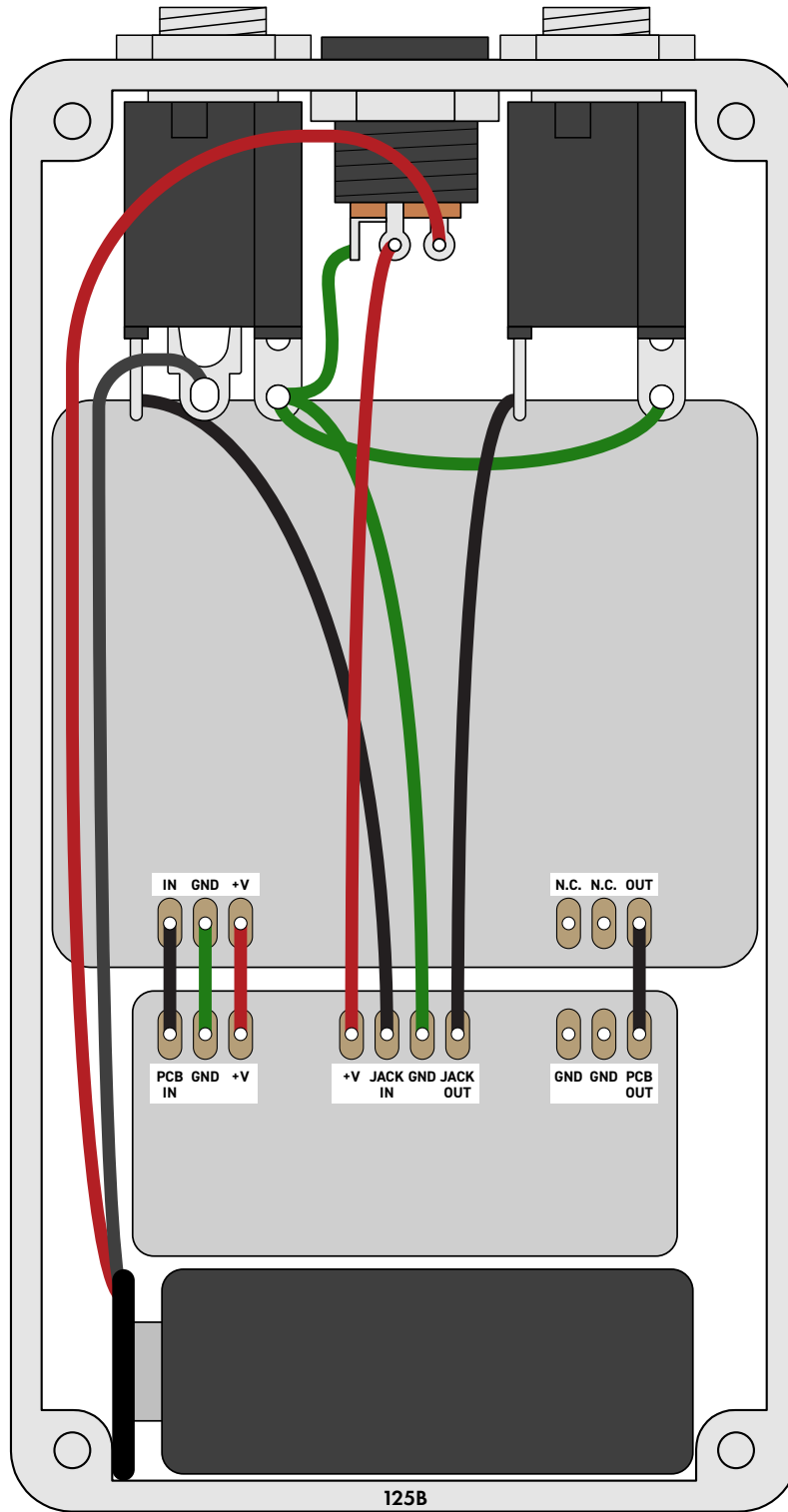


ENCLOSURE LAYOUT

Enclosure is shown without jacks. See next page for jack layout and wiring.



WIRING DIAGRAM



LICENSE & USAGE

No direct support is offered for these projects beyond the provided documentation. It's assumed that you have at least some experience building pedals before starting one of these. Replacements and refunds cannot be offered unless it can be shown that the circuit or documentation are in error.

All of these circuits have been tested in good faith in their base configurations. However, not all the modifications or variations have necessarily been tested. These are offered only as suggestions based on the experience and opinions of others.

Runoffgroove circuit licensing

Runoffgroove circuits have special licensing that is different from standard Aion FX projects. **These projects are for personal use only and may not be used for commercial endeavors** without approval from Runoffgroove. Here are the terms of use from their site:

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DOCUMENT REVISIONS

1.0.0 (2022-04-08)

Initial release.