

PROJECT NAME

APERTURE

BASED ON

Ampeg Scrambler

EFFECT TYPE

Octave-Up Fuzz

BUILD DIFFICULTY

■■■■■ Easy

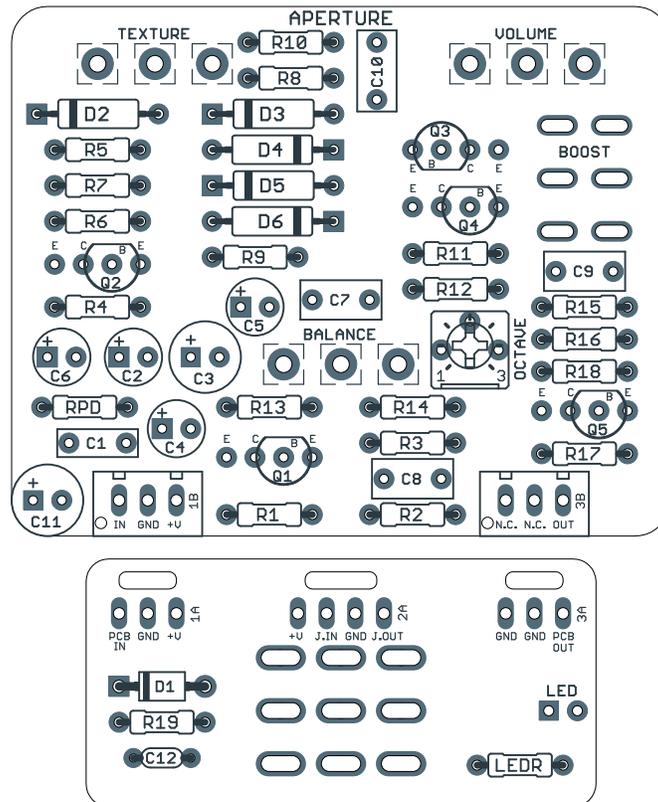
DOCUMENT VERSION

1.0.0 (2021-07-02)



PROJECT SUMMARY

A legendary octave-up fuzz effect with a blend control that makes it great for bass guitar.



Actual size is 2.3" x 1.86" (main board) and 1.78" x 0.86" (bypass board).

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INTRODUCTION

The Aperture Octave Fuzz is an adaptation of the Ampeg Scrambler, an exceptionally rare octave-up fuzz pedal originally released in 1969. It's said that fewer than 2,500 units were produced, and today the originals typically sell for over USD\$1,000 on the used market.

The Scrambler is an octave-up fuzz in the vein of the Superfuzz, fOXX Tone Machine and Octavia—although all four circuits use their own techniques to generate the octave, so they all sound different.

Due to its largely un-filtered bass content and clean blend control, the Scrambler is particularly good for bass guitar, as you would expect from a company that primarily makes bass equipment.

Ampeg reissued the Scrambler in 2005 in a vintage-style enclosure. According to Analogman, these reissues are very faithful to the originals, but not identical.

In 2017, the Scrambler was again reissued, this time in a modernized enclosure and including a treble control and output volume, and marketed as a “bass overdrive” with no mention of fuzz. It's not known how accurate these circuits are to the original, but they have received mixed reviews and are not regarded to sound like either the old ones or the 2005 reissues, so it is likely that the resemblance is in name only.

The Aperture project is faithful to the original 1969 Scrambler, with the addition of an optional volume boost stage as well as a master volume control at the end. The original unit suffers from excessively low volume, so the make-up gain stage from the Univox Superfuzz has been adapted for this circuit. With the gain boost disabled and the Volume knob at full, the circuit is 100% identical to a vintage Scrambler.

USAGE

The Aperture has the following controls:

- **Texture** is sort of a gain control, but not in the traditional sense of clipping or compression.
- **Blend** sets the ratio between clean and effect.
- **Volume** is the master output volume control. It is disabled unless boost mode is engaged.
- **Boost** (toggle) enables or disables an optional gain stage at the end of the circuit.

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 (most 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	1M	Metal film resistor, 1/4W	
R2	1M	Metal film resistor, 1/4W	
R3	4k7	Metal film resistor, 1/4W	
R4	2k2	Metal film resistor, 1/4W	
R5	470k	Metal film resistor, 1/4W	
R6	4k7	Metal film resistor, 1/4W	
R7	220R	Metal film resistor, 1/4W	
R8	8k2	Metal film resistor, 1/4W	
R9	220k	Metal film resistor, 1/4W	
R10	220k	Metal film resistor, 1/4W	
R11	1k	Metal film resistor, 1/4W	
R12	470R	Metal film resistor, 1/4W	
R13	47k	Metal film resistor, 1/4W	
R14	47k	Metal film resistor, 1/4W	
R15	100k	Metal film resistor, 1/4W	
R16	15k	Metal film resistor, 1/4W	
R17	1k	Metal film resistor, 1/4W	
R18	10k	Metal film resistor, 1/4W	
R19	100R	Metal film resistor, 1/4W	
RPD	2M2	Metal film resistor, 1/4W	Input pulldown resistor.
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	4.7uF	Electrolytic capacitor, 4mm	
C3	100uF	Electrolytic capacitor, 6.3mm	
C4	22uF	Electrolytic capacitor, 5mm	
C5	4.7uF	Electrolytic capacitor, 4mm	
C6	4.7uF	Electrolytic capacitor, 4mm	
C7	1uF	Film capacitor, 7.2 x 3.5mm	
C8	1uF	Film capacitor, 7.2 x 3.5mm	
C9	1uF	Film capacitor, 7.2 x 3.5mm	

PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
C10	1uF	Film capacitor, 7.2 x 3.5mm	
C11	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C12	100n	MLCC capacitor, X7R	Power supply filter capacitor.
D1	1N5817	Schottky diode, DO-41	
D2	OMIT		The factory schematic shows this diode as 1N456, but says it is not used.
D3	1N456	Rectifier diode, DO-35	
D4	1N456	Rectifier diode, DO-35	
D5	OMIT		The factory schematic shows this diode as 1N456, but says it is not used.
D6	OMIT		The factory schematic shows this diode as 1N456, but says it is not used.
Q1	MPSA14	Darlington transistor, NPN, TO-92	Substitute. Original uses 2N5306.
Q2	2N3904	BJT transistor, NPN, TO-92	Substitute. Original uses BC169B.
Q3	MPSA14	Darlington transistor, NPN, TO-92	Substitute. Original uses 2N5306.
Q4	MPSA14	Darlington transistor, NPN, TO-92	Substitute. Original uses 2N5306.
Q5	2N3904	BJT transistor, NPN, TO-92	
OCT.	10k trimmer	Trimmer, 10%, 1/4"	Set to about 40% rotation (11:00) for stock circuit.
TEXT.	10kB	16mm right-angle PCB mount pot	
BAL.	50kB	16mm right-angle PCB mount pot	
VOL.	50kB	16mm right-angle PCB mount pot	
BOOST	DPDT	Toggle switch, DPDT	
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.
BATT	Battery snap	9V battery snap	Optional. Use the soft plastic type—the hard-shell type will not fit.
FSW	3PDT	Stomp switch, 3PDT	
ENC	125B	Enclosure, die-cast aluminum	Can also use a Hammond 1590N1.

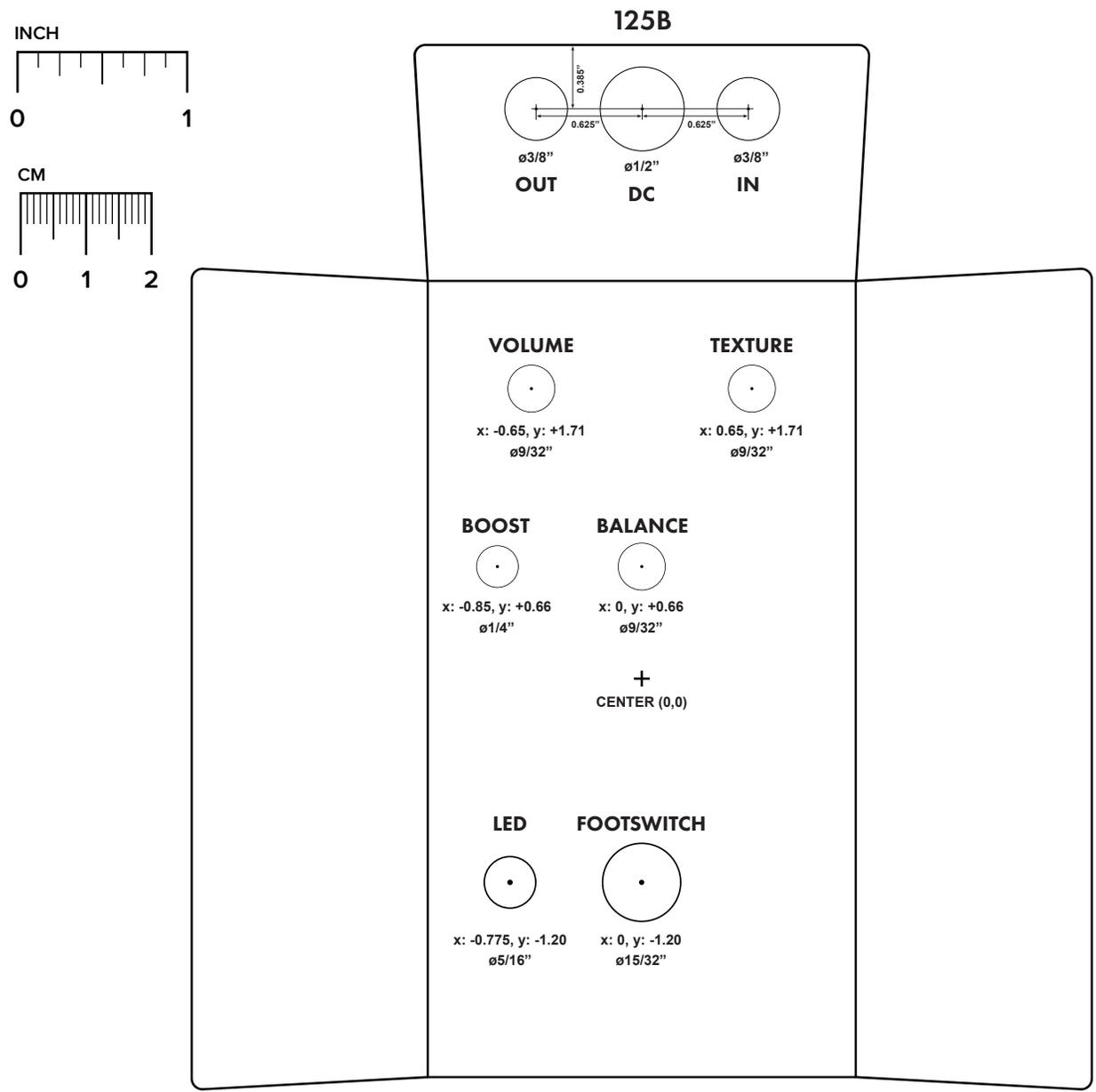
DRILL TEMPLATE

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.

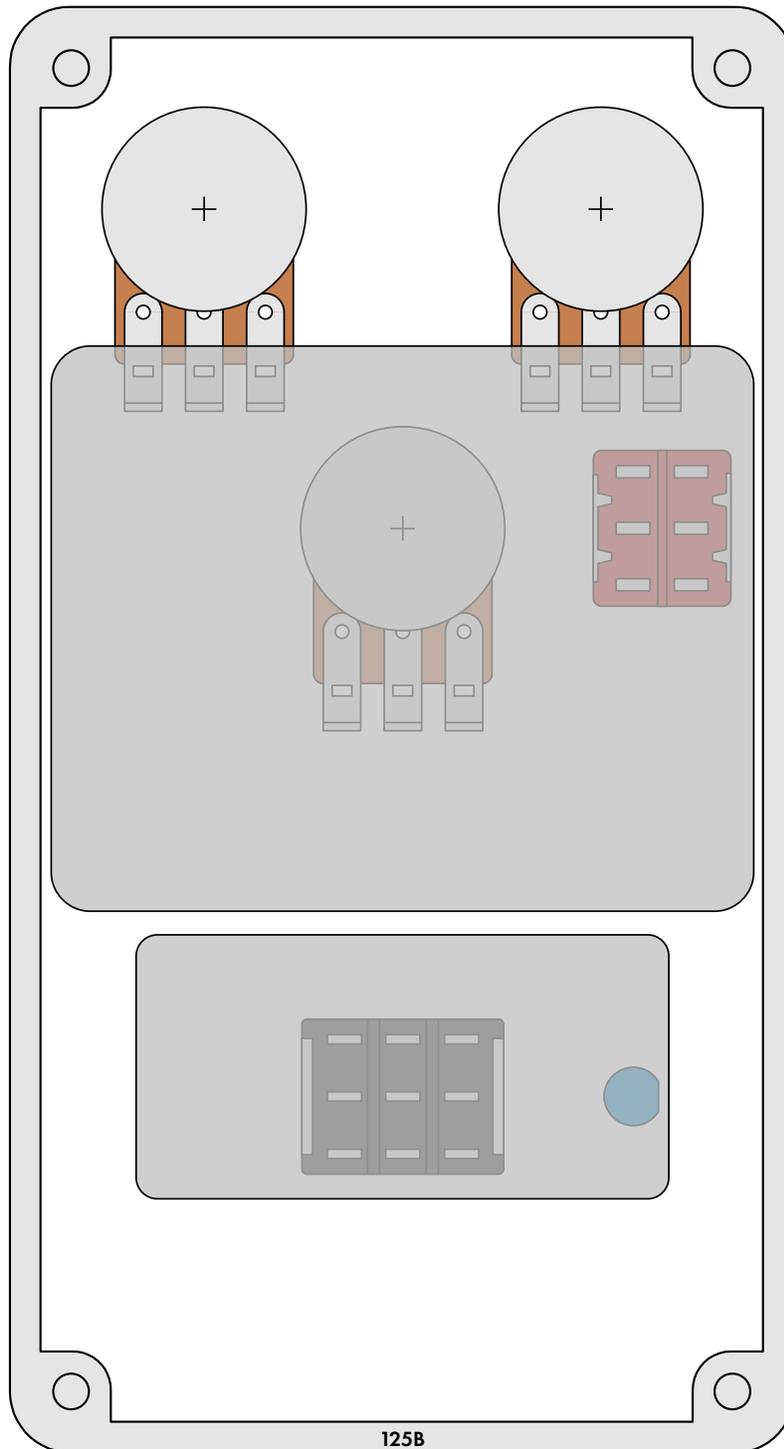
Top jack layout assumes the use of closed-frame jacks like the [Switchcraft 111X](#). If you'd rather use open-frame jacks, please refer to the [Open-Frame Jack Drill Template](#) for the top side.

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.

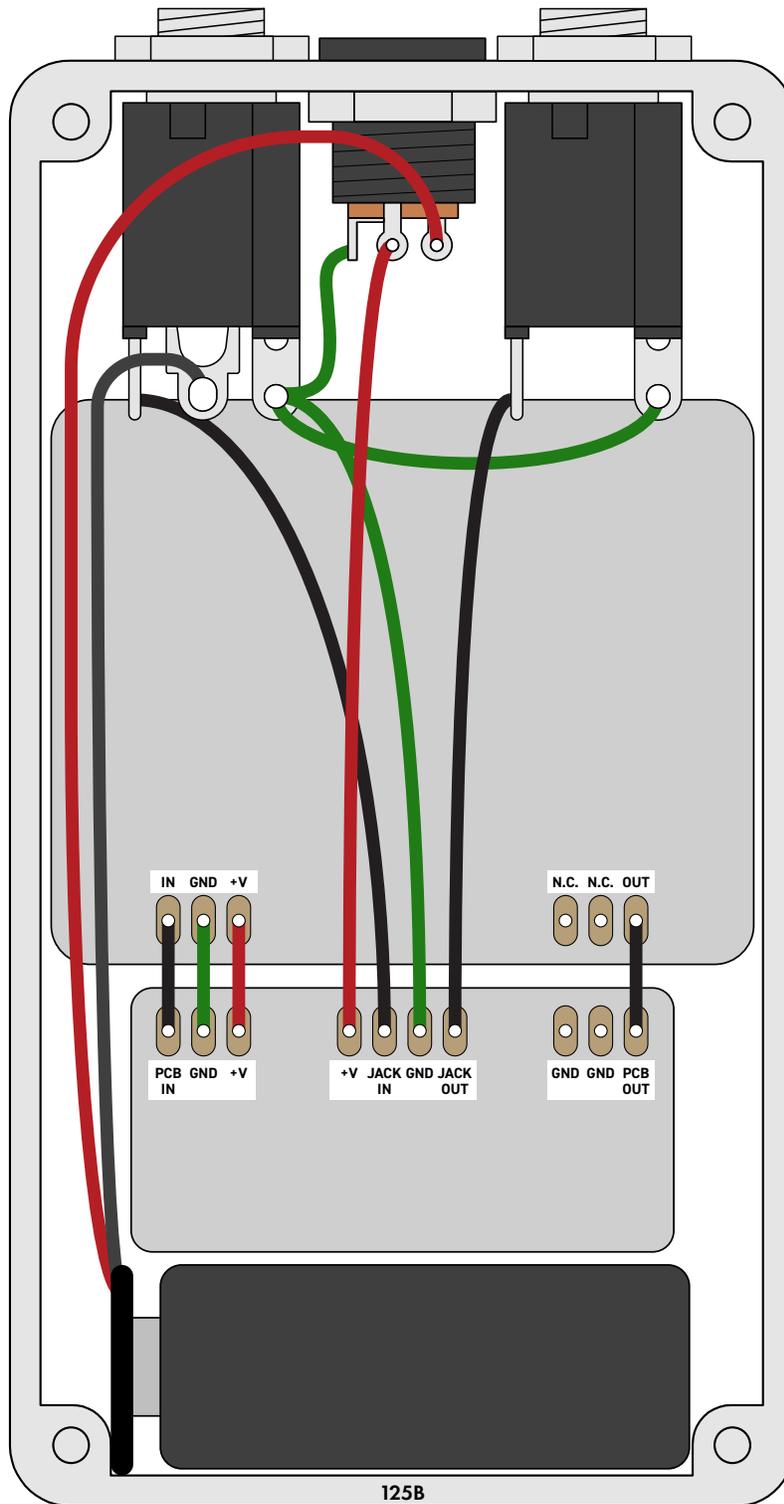


ENCLOSURE LAYOUT

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



WIRING DIAGRAM



*Shown with optional 9V battery. If battery is omitted, both jacks can be mono rather than one being stereo.
Leave the far-right lug of the DC jack unconnected.*

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.

Projects may be used for commercial endeavors in any quantity unless specifically noted. No attribution is necessary, though a link back is always greatly appreciated. The only usage restrictions are that **(1) you cannot resell the PCB as part of a kit without prior arrangement, and (2) you cannot “goop” the circuit, scratch off the screenprint, or otherwise obfuscate the circuit to disguise its source.** (In other words: you don't have to go out of your way to advertise the fact that you use these PCBs, but please don't go out of your way to hide it. The guitar effects industry needs more transparency, not less!)

DOCUMENT REVISIONS

1.0.0 (2021-07-02)

Initial release.