

PROJECT NAME
ZELUS

BASED ON
Blackout Effectors Musket Fuzz

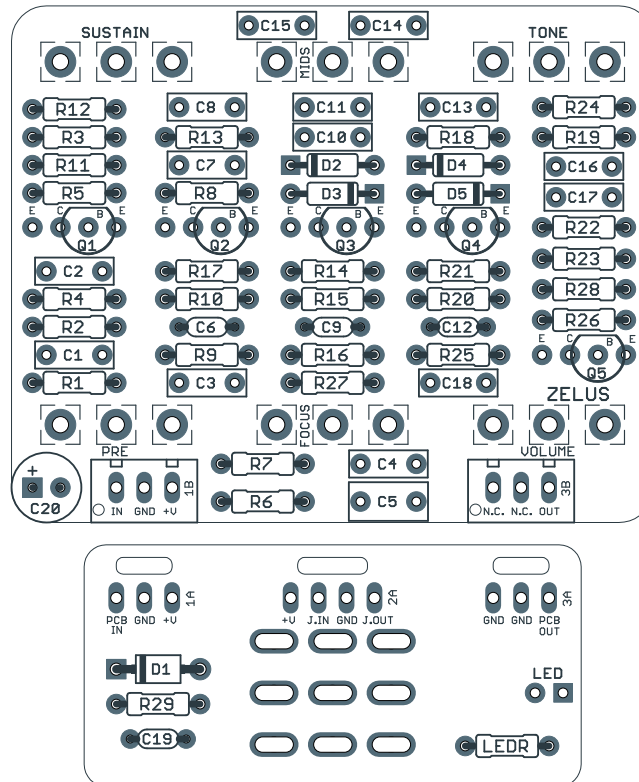
BUILD DIFFICULTY
■■■■■ Easy

EFFECT TYPE
Distortion / Sustainer, Fuzz

DOCUMENT VERSION
1.0.0 (2019-03-14)

PROJECT SUMMARY

Based on the classic Big Muff circuit, this pedal adds a boost to drive the input, a bass blend capacitor, and a midrange control inside the tone stack.



Actual size is 2.3" x 1.86" (main board) and 1.79" x 0.86" (bypass board).

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INTRODUCTION

The Zelus Distortion/Sustainer is adapted from the Blackout Effectors Musket Fuzz version 2, a Big Muff-based circuit with a few modifications.

First, an input boost has been added to the front of the circuit. This boost is adapted from the Electro-Harmonix LPB-1 and allows you to drive the input harder than the initial gain stage in a stock Big Muff.

Second, a “Focus” control has been added to blend in a higher capacitor value and allow more bass through before the clipping stages. With this feature, the Musket is great for bass guitar.

Third, a “Midrange” control has been added to the treble side of the rotation allowing another capacitor to be gradually blended in parallel with the stock tone capacitor, changing the frequency of that side. Note that if the tone control is turned all the way to the bass side (counter-clockwise), the Midrange control will have almost no effect.

With these enhancements, the Musket is a unique and modern take on the Big Muff while retaining the character of the vintage circuit.

USAGE

The Zelus has the following controls:

- **Pre** sets the gain of the input stage based on the LPB-1.
- **Focus** is an input capacitor blend control allowing the bass to be adjusted before the clipping. By cutting bass at the input, the “tightness” of the effect is improved and it has more clarity.
- **Sustain** controls the amount of drive or distortion, which also affects the amount of sustain.
- **Tone** is a the classic Big Muff balance control with a high-pass filter (treble emphasis) on one side and a low-pass filter (bass emphasis) on the other.
- **Mids** allows the midrange to be adjusted from scooped to boosted. It is most noticeable on the treble side of the tone control rotation.
- **Volume** is the overall output.

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	470k	Metal film resistor, 1/4W	
R3	47k	Metal film resistor, 1/4W	
R4	10k	Metal film resistor, 1/4W	
R5	390R	Metal film resistor, 1/4W	
R6	10k	Metal film resistor, 1/4W	
R7	10k	Metal film resistor, 1/4W	
R8	100k	Metal film resistor, 1/4W	
R9	470k	Metal film resistor, 1/4W	
R10	12k	Metal film resistor, 1/4W	
R11	100R	Metal film resistor, 1/4W	
R12	1k	Metal film resistor, 1/4W	
R13	10k	Metal film resistor, 1/4W	
R14	100k	Metal film resistor, 1/4W	
R15	470k	Metal film resistor, 1/4W	
R16	12k	Metal film resistor, 1/4W	
R17	390R	Metal film resistor, 1/4W	
R18	10k	Metal film resistor, 1/4W	
R19	100k	Metal film resistor, 1/4W	
R20	470k	Metal film resistor, 1/4W	
R21	12k	Metal film resistor, 1/4W	
R22	390R	Metal film resistor, 1/4W	
R23	10k	Metal film resistor, 1/4W	
R24	56k	Metal film resistor, 1/4W	
R25	470k	Metal film resistor, 1/4W	
R26	100k	Metal film resistor, 1/4W	
R27	10k	Metal film resistor, 1/4W	
R28	2k7	Metal film resistor, 1/4W	
R29	47R	Metal film resistor, 1/4W	
LED R	4k7	Metal film resistor, 1/4W	LED current-limiting resistor. Adjust value to change LED brightness.

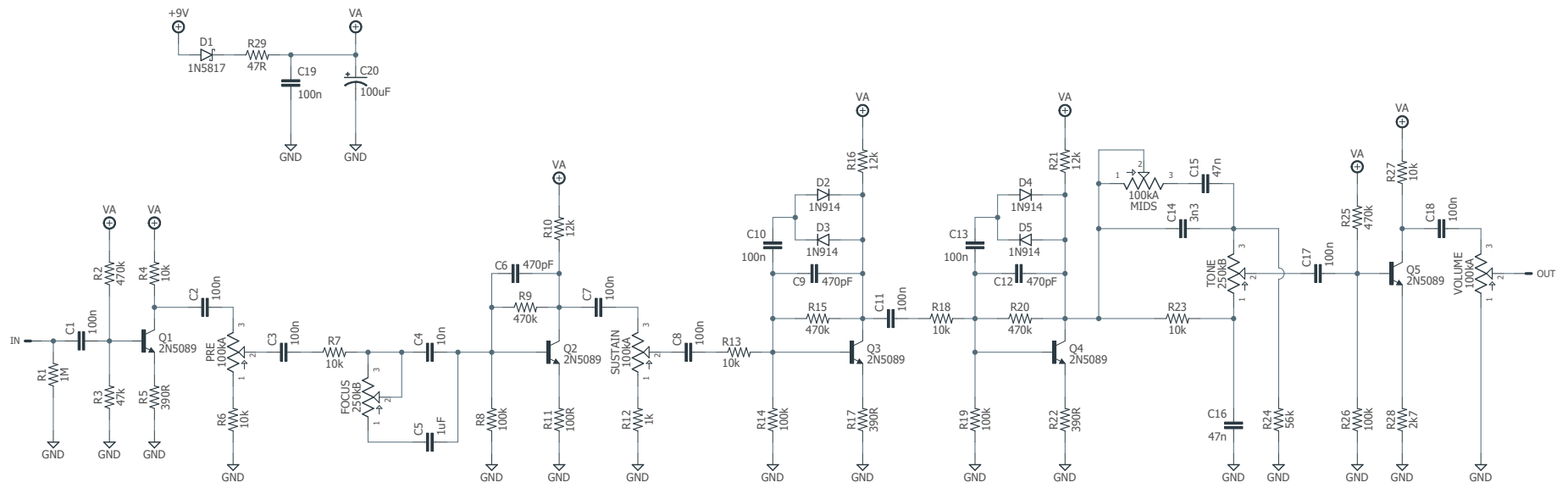
PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
C1	100n	Film capacitor, 7.2 x 2.5mm	
C2	100n	Film capacitor, 7.2 x 2.5mm	
C3	100n	Film capacitor, 7.2 x 2.5mm	
C4	10n	Film capacitor, 7.2 x 2.5mm	
C5	1uF	Film capacitor, 7.2 x 3.5mm	
C6	470pF	MLCC capacitor, NP0/COG	
C7	100n	Film capacitor, 7.2 x 2.5mm	
C8	100n	Film capacitor, 7.2 x 2.5mm	
C9	470pF	MLCC capacitor, NP0/COG	
C10	100n	Film capacitor, 7.2 x 2.5mm	
C11	100n	Film capacitor, 7.2 x 2.5mm	
C12	470pF	MLCC capacitor, NP0/COG	
C13	100n	Film capacitor, 7.2 x 2.5mm	
C14	3n3	Film capacitor, 7.2 x 2.5mm	
C15	47n	Film capacitor, 7.2 x 2.5mm	
C16	47n	Film capacitor, 7.2 x 2.5mm	
C17	100n	Film capacitor, 7.2 x 2.5mm	
C18	100n	Film capacitor, 7.2 x 2.5mm	
C19	100n	MLCC capacitor, X7R	Power supply filter capacitor.
C20	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
D1	1N5817	Schottky diode, DO-41	
D2	1N914	Fast-switching diode, DO-35	
D3	1N914	Fast-switching diode, DO-35	
D4	1N914	Fast-switching diode, DO-35	
D5	1N914	Fast-switching diode, DO-35	
Q1	2N5089	BJT transistor, NPN, TO-92	
Q2	2N5089	BJT transistor, NPN, TO-92	
Q3	2N5089	BJT transistor, NPN, TO-92	
Q4	2N5089	BJT transistor, NPN, TO-92	
Q5	2N5089	BJT transistor, NPN, TO-92	
PRE	100kA	16mm right-angle PCB mount pot	
FOCUS	250kB	16mm right-angle PCB mount pot	
SUS.	100kA	16mm right-angle PCB mount pot	
MIDS	100kA	16mm right-angle PCB mount pot	
TONE	250kB	16mm right-angle PCB mount pot	

PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
VOL.	100kA	16mm right-angle PCB mount pot	
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.

SCHEMATIC



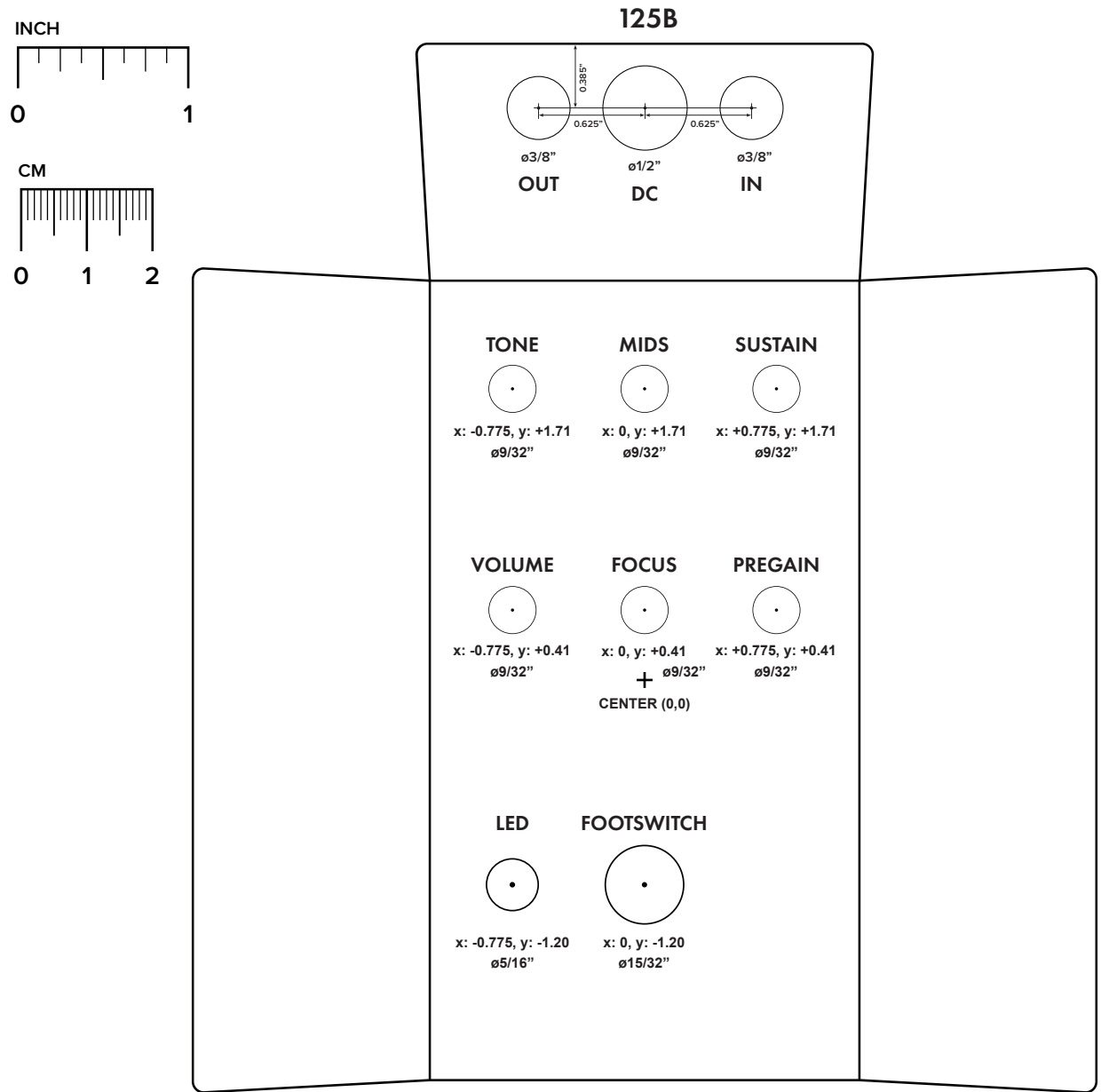
DRILL TEMPLATE

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.

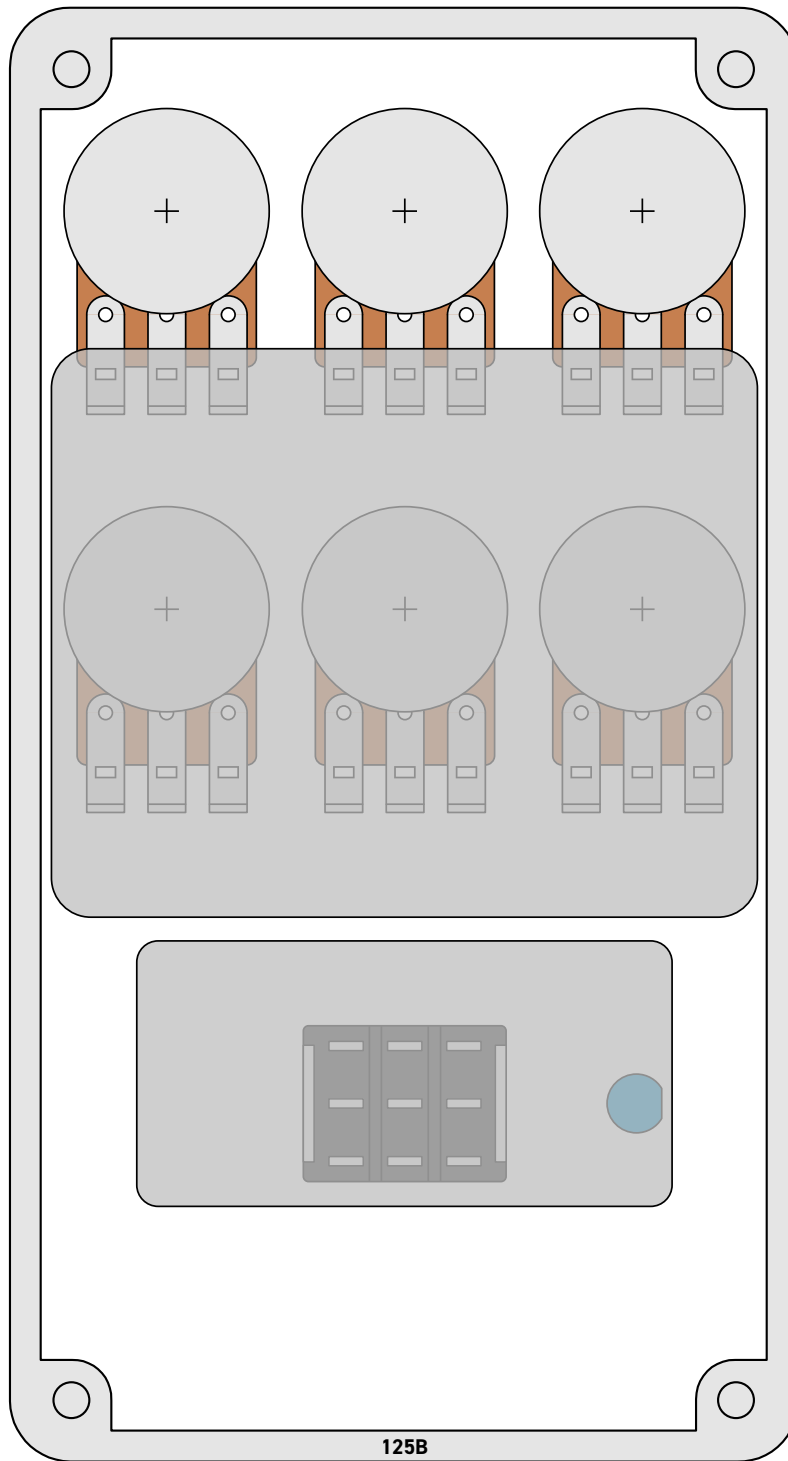
Top jack layout requires the use of closed-frame jacks like the [Switchcraft 111X](#). Open-frame jacks will not fit in layouts with 5 or more knobs due to the placement of the DC jack in the center.

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.

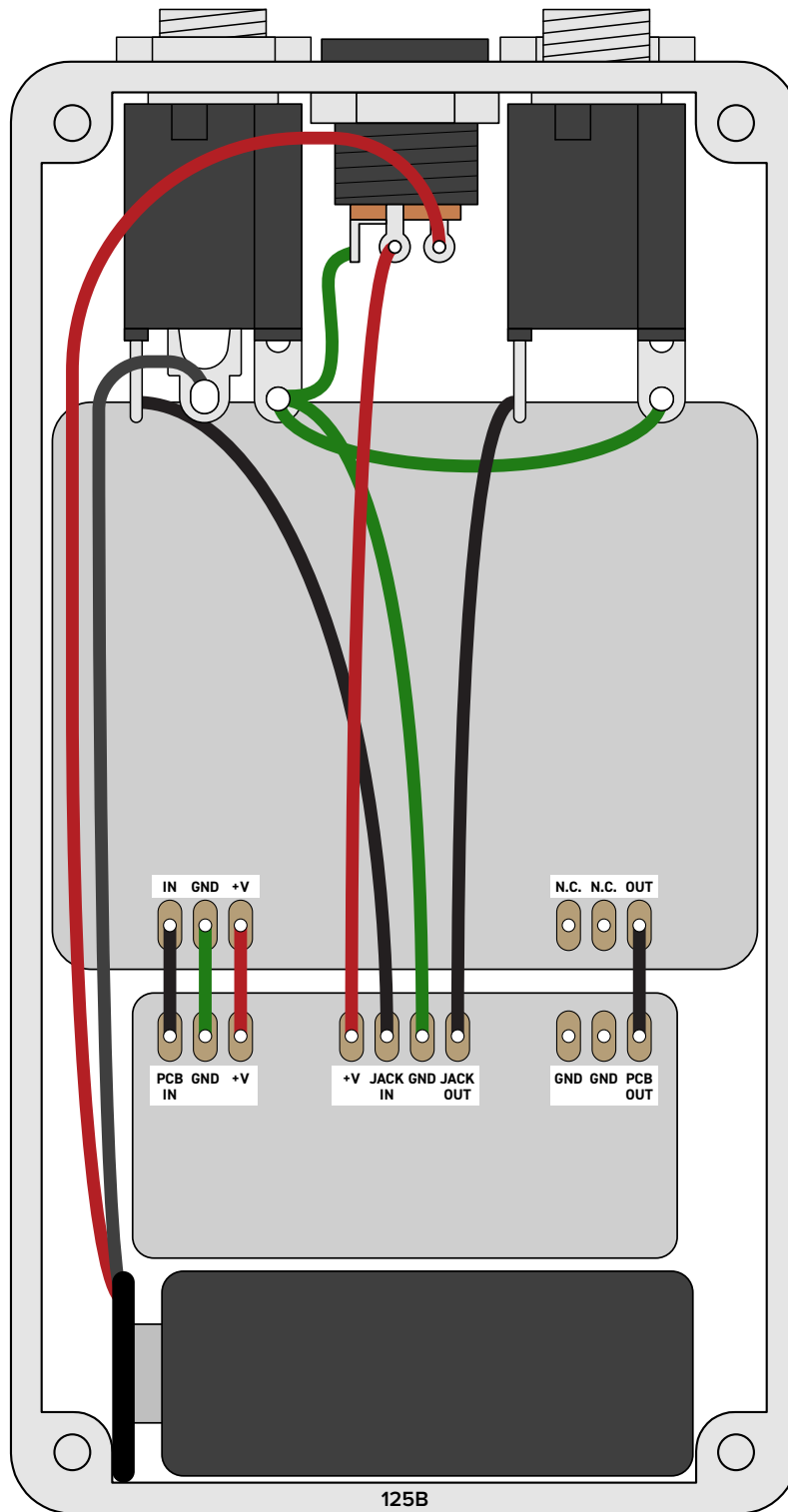


ENCLOSURE LAYOUT

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 (2019-03-14)

Initial release.