PROJECT NAME

OBERON

aion
DIY GUITAR EFFECTS

BASED ON
Jordan Bosstone

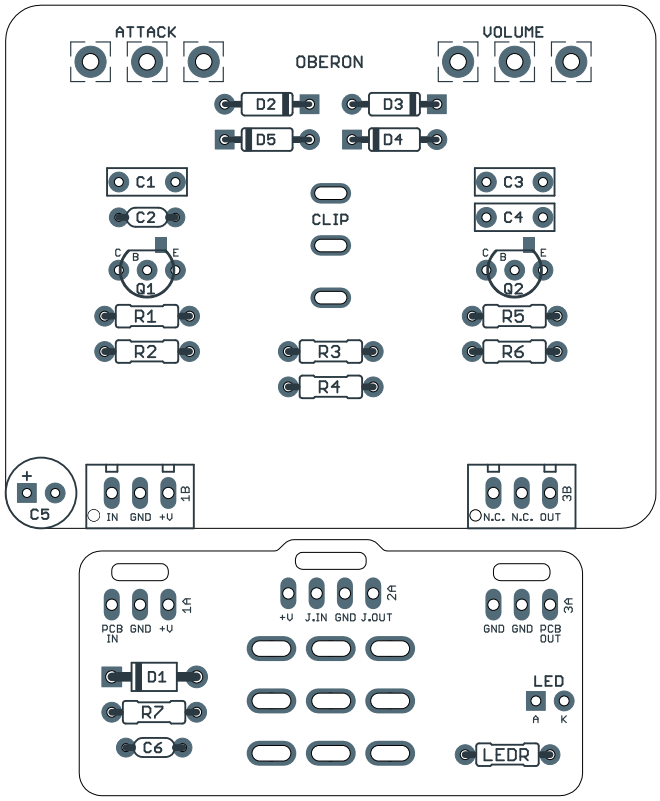
BUILD DIFFICULTY
▮▯▯▯▯ Beginner

EFFECT TYPE
Boost / distortion

DOCUMENT VERSION
1.0.0 (2024-07-04)

PROJECT SUMMARY

Originally a module that plugged directly into the guitar, this early distortion unit was one of the first effects to use diode clipping.



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

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INTRODUCTION

The Oberon Vintage Distortion is based on the original Jordan Boss Tone Model 1000, originally designed in 1966 by a company who was better known for making medical equipment and consumer Geiger counters for a post-WW2 atomic world.

The Boss Tone (also stylized as Bosstone) was one of the first fuzz or distortion units to use diode clipping. The Astrotone Fuzz predates it, but not by much. The Astrotone was released in 1966, and the Boss Tone was shown at the NAMM show in July 1966, but does not appear to have been commercially available until early 1967.

The two circuits are somewhat similar. The biggest difference is in form: the Jordan is meant to be plugged directly into the guitar, like the Vox Distortion Booster or Dan Armstrong effects, while the Astrotone is a floor pedal. These plug-in boxes were trendy for awhile in the late 1960s, but since they were incompatible with the Stratocaster and other recessed-jack guitars, this format of effect unit had largely disappeared by the early 1970s.

Inside the boxes, the Jordan has two cascaded transistor gain stages before the diode clipping while the Astrotone only has one. The Astrotone has a tone control, and the second transistor only serves as a buffer to isolate the clipping diodes from the tone control. Both circuits control gain the same way, with an input potentiometer that is functionally the same as a guitar volume knob.

The Boss Tone was released in five different versions. The first three use two NPN transistors and are called the “California” versions since Jordan Electronics was based in California. The last two use one NPN transistor and one PNP, and are called the “Nashville” versions since Jordan licensed production of the circuit to the Sho-Bud company in Nashville. Each of the five versions sounds different, but the California-Nashville transition between V3 and V4 was the most drastic change.

The Oberon is directly based on the original California versions of the Boss Tone, with the NPN-NPN version of the circuit. We have added a toggle switch that selects between two sets of clipping diodes or disables them altogether, but otherwise, it’s a faithful reproduction of the original circuit.

USAGE

The Oberon has two knobs and one toggle switch:

- **Attack** is the volume level at the input, similar to using the guitar’s volume knob.
- **Volume** is the output level at the end of the effect.
- **Clipping** (toggle switch) selects between three different diode combinations.

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	33k	Metal film resistor, 1/4W	
R2	6M8	Metal film resistor, 1/4W	
R3	100k	Metal film resistor, 1/4W	
R4	470R	Metal film resistor, 1/4W	
R5	560k	Metal film resistor, 1/4W	
R6	10k	Metal film resistor, 1/4W	
R7	100R	Metal film resistor, 1/4W	
LEDR	10k	Metal film resistor, 1/4W	LED current-limiting resistor.
C1	22n	Film capacitor, 7.2 x 2.5mm	
C2	220pF	MLCC capacitor, NP0/C0G	
C3	22n	Film capacitor, 7.2 x 2.5mm	
C4	22n	Film capacitor, 7.2 x 2.5mm	Power supply filter capacitor.
C5	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C6	100n	MLCC capacitor, X7R	
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	2N3903	BJT transistor, NPN, TO-92	
Q2	2N3903	BJT transistor, NPN, TO-92	
ATTACK	100kB	16mm right-angle PCB mount pot	Linear taper.
VOLUME	100kA	16mm right-angle PCB mount pot	Audio (log) taper.
CLIP	SPDT cntr off	Toggle switch, SPDT on-off-on	
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.

BUILD NOTES

Clipping switch

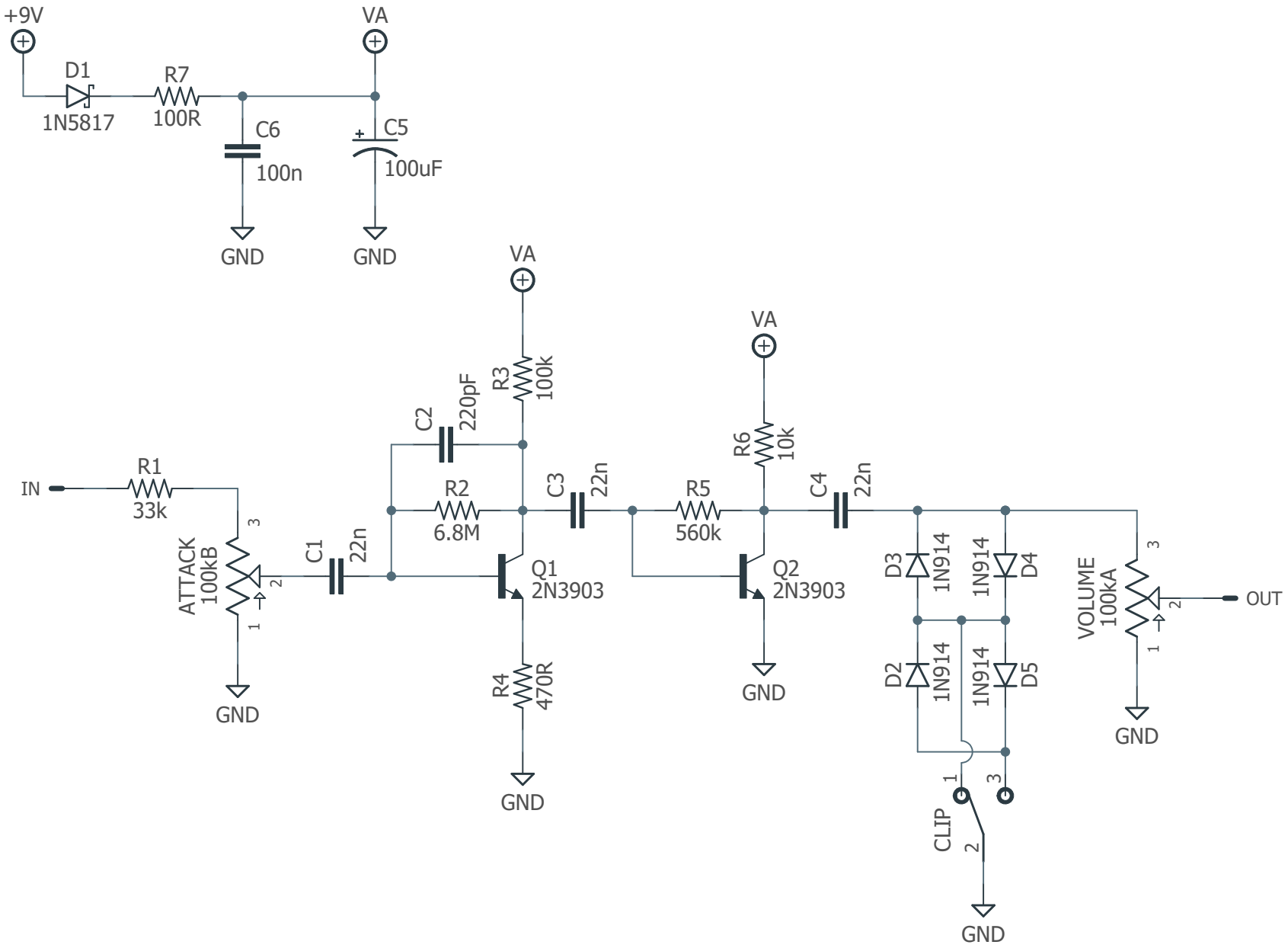
The original Bosstone had two clipping diodes. We've added a switch that lets you double them up for a little more transparency and more output volume, or disable them altogether for a transistor boost.

Transistor selection

The transistors used in the original Bosstone had a nominal h_{FE} of around 135. This is lower than the typical 2N3904, but right in the sweet spot for the 2N3903.

It may not matter at all since the majority of the clipping comes from the diodes and the transistors are limited to a fixed gain, so don't focus too much on it.

SCHEMATIC


+9V
D1
1N5817
R7
100R
C6
100n
GND
VA
C5
100uF
GND
VA
R3
100k
C2
220pF
R2
6.8M
C3
22n
VA
R6
10k
R5
560k
C4
22n
IN
R1
33k
ATTACK
100kB
C1
22n
Q1
2N3903
R4
470R
GND
Q2
2N3903
GND
D3
1N914
D4
1N914
D2
1N914
D5
1N914
CLIP
GND
VOLUME
100kA
OUT
GND

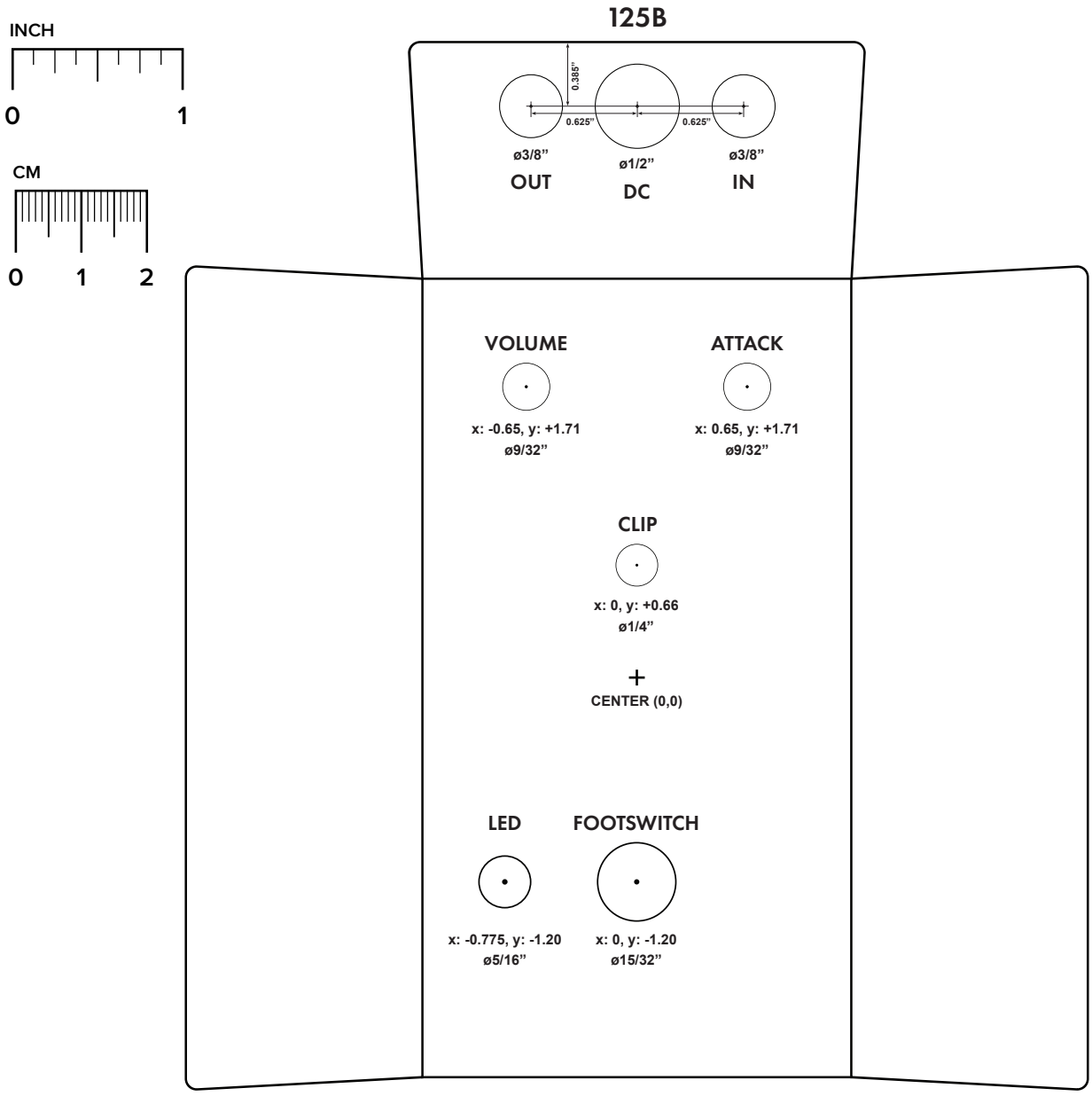
DRILL TEMPLATE

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.

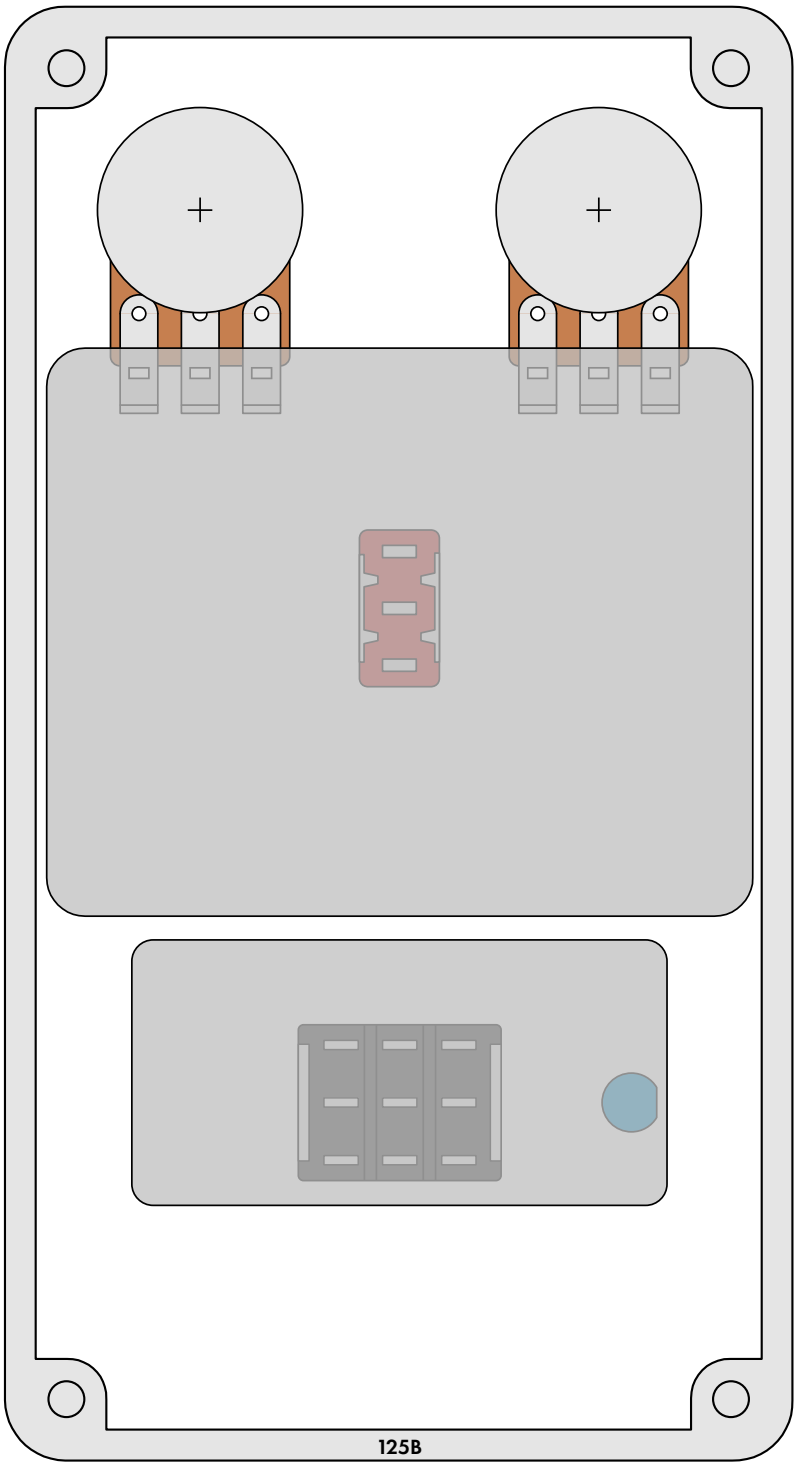
Top jack layout assumes the use of closed-frame jacks like the Switchcraft 111X. If you'd rather use open-frame jacks, please refer to the Open-Frame Jack Drill Template for the top side.

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.

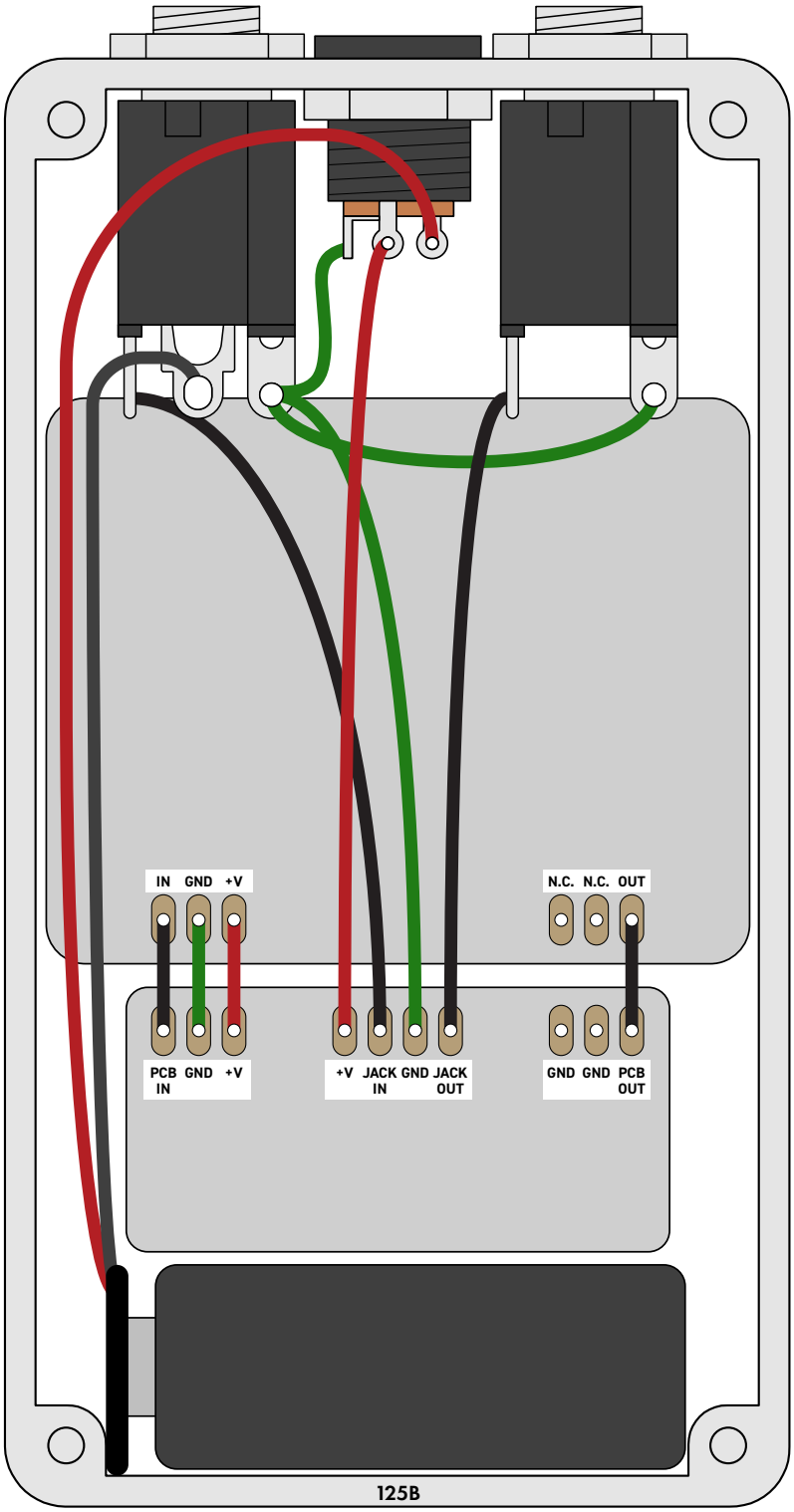


ENCLOSURE LAYOUT

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 cannotbe 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 (2024-07-04)

Initial release.