

PROJECT NAME

HORIZON



BASED ON

Catalinbread Dirty Little Secret Mk. I

BUILD DIFFICULTY

■■■■■ Easy

EFFECT TYPE

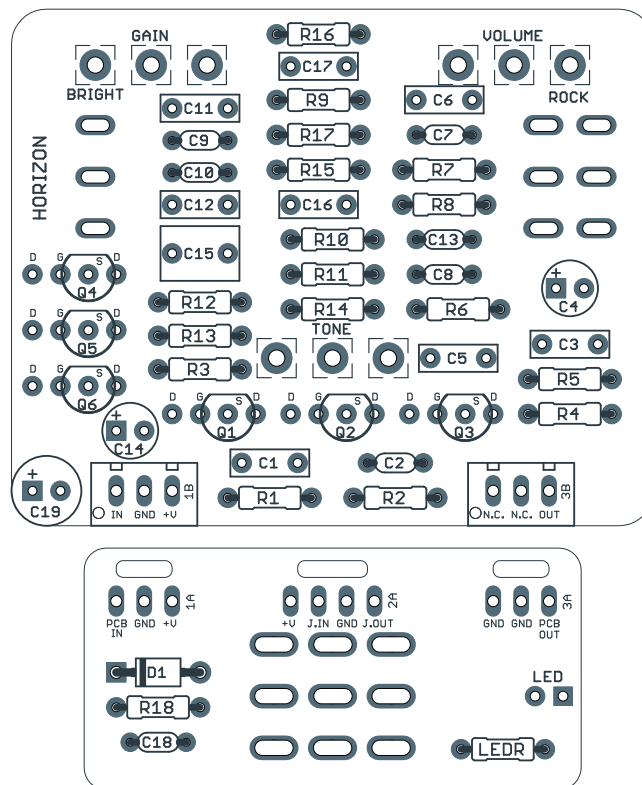
Overdrive

DOCUMENT VERSION

1.0.0 (2018-09-22)

PROJECT SUMMARY

An “amp in a box” drive pedal inspired by the sounds of 1970s Marshall amplifiers.



Actual size is 2.3" x 1.86" (main board) and 2.3" x 0.86" (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 Horizon Amp Overdrive is a recreation of the Catalinbread Dirty Little Secret Mk I, a unique drive pedal that resembles a Marshall amp stack in its response and tone.

The DLS Mk I was the first of three versions, and is often considered the best—or at least, different enough that subsequent versions should have been released as new pedals. They share some DNA in common, but they have very different tonestacks and tweakability.

The DLS circuit uses cascaded mu-amps as a foundation. There are no op-amps or clipping diodes. The clipping signal is generated entirely by the JFETs, giving it a different flavor than diode-clipping-based overdrives.

USAGE

The Horizon has three controls and two switches:

- **Gain** controls the signal level before the clipping stage.
- **Tone** is passive treble cut after the gain stage.
- **Level** sets the overall output of the effect.
- **Rock/Rawk** (toggle) changes the filtering in a couple places to give a different flavor to the tone.
- **Bright** (toggle) allows switching between a few different “treble bleed” capacitors on the gain control to allow better matching between different types of guitars. This is a modification to the DLS circuit, but it was recommended by the original designer.

Considered a “foundation” pedal, it’s recommended to use the Horizon as you would use an amplifier in your signal chain. Boost, compression, drive and wah effects should go before it, and modulation & delay should go after it.

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	1M	Metal film resistor, 1/4W	
R2	47k	Metal film resistor, 1/4W	
R3	10k	Metal film resistor, 1/4W	
R4	1M	Metal film resistor, 1/4W	
R5	1M	Metal film resistor, 1/4W	
R6	4k7	Metal film resistor, 1/4W	
R7	470k	Metal film resistor, 1/4W	
R8	200k	Metal film resistor, 1/4W	
R9	22k	Metal film resistor, 1/4W	
R10	470k	Metal film resistor, 1/4W	
R11	1M	Metal film resistor, 1/4W	
R12	1M	Metal film resistor, 1/4W	
R13	1M	Metal film resistor, 1/4W	
R14	4k7	Metal film resistor, 1/4W	
R15	22k	Metal film resistor, 1/4W	
R16	12k	Metal film resistor, 1/4W	
R17	200k	Metal film resistor, 1/4W	
R18	47R	Metal film resistor, 1/4W	
LEDR	4k7	Metal film resistor, 1/4W	LED current-limiting resistor. Adjust value to change LED brightness.
C1	47n	Film capacitor, 7.2 x 2.5mm	
C2	100pF	MLCC capacitor, NP0/COG	
C3	220n	Film capacitor, 7.2 x 2.5mm	
C4	4.7uF	Electrolytic capacitor, 4mm	
C5	22n	Film capacitor, 7.2 x 2.5mm	
C6	47n	Film capacitor, 7.2 x 2.5mm	
C7	470pF	MLCC capacitor, NP0/COG	
C8	200pF	MLCC capacitor, NP0/COG	
C9	47pF	MLCC capacitor, NP0/COG	
C10	220pF	MLCC capacitor, NP0/COG	

PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
C11	4n7	Film capacitor, 7.2 x 2.5mm	
C12	47n	Film capacitor, 7.2 x 2.5mm	
C13	47pF	MLCC capacitor, NP0/COG	
C14	10uF	Electrolytic capacitor, 5mm	
C15	2.2uF	Film capacitor, 7.2 x 5mm	
C16	33n	Film capacitor, 7.2 x 2.5mm	
C17	3n3	Film capacitor, 7.2 x 2.5mm	
C18	100n	MLCC capacitor, X7R	Power supply filter capacitor.
C19	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
D1	1N5817	Schottky diode, DO-41	
Q1	2N5457	JFET, N-channel, TO-92	
Q2	2N5457	JFET, N-channel, TO-92	
Q3	2N5457	JFET, N-channel, TO-92	
Q4	2N5457	JFET, N-channel, TO-92	
Q5	2N5457	JFET, N-channel, TO-92	
Q6	2N5457	JFET, N-channel, TO-92	
GAIN	1MA	16mm right-angle PCB mount pot	
TONE	100kB	16mm right-angle PCB mount pot	
VOL	100kB	16mm right-angle PCB mount pot	
ROCK	DPDT on-on	Toggle switch, DPDT on-on	
BRIGHT	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.
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

JFET selection

The original DLS circuit uses 2N5457 JFETs. Here's the bad news: through-hole JFETs are getting very scarce these days, and the 2N5457 is no exception.

The good news: with JFETs, there is nothing magical about a specific part number. There is wide variance even within a specific part number, and another part number with similar characteristics will sound exactly the same.

For the DLS circuit, you're looking for JFETs with a relatively low $V_{GS(off)}$ (also called V_P , for pinch-off voltage) as that determines when it goes into clipping. The 2N5457 has an average V_P of around -1.6V.

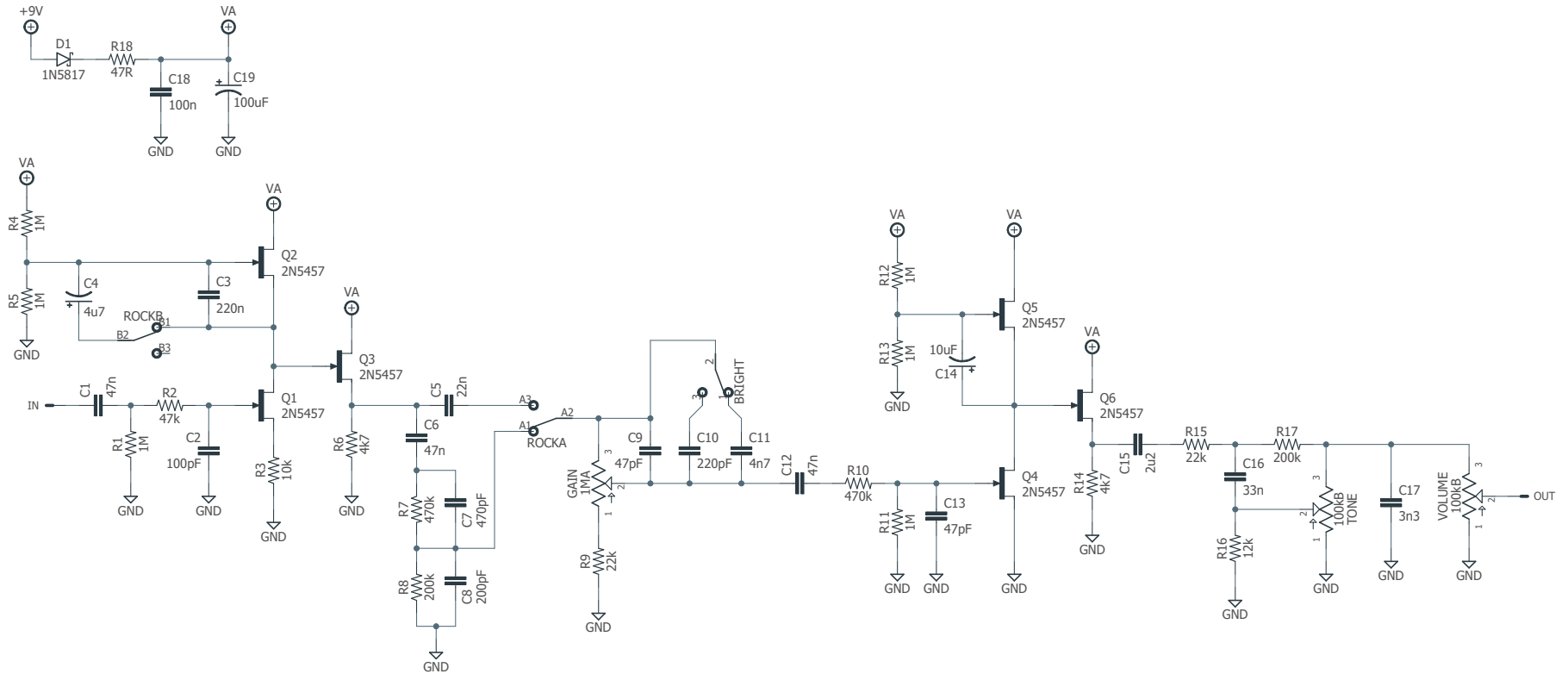
Based on these parameters, any of the following JFETs should be comparable:

- 2SK30A-Y
- J113
- PN4393
- 2N5484

Not all of these have been tested, so this is purely based on reviewing the datasheets. There may be several other types as well. But with JFETs, it's best to have a variety of options so you have a better chance of finding something that works.

If you can't find JFETs with the right specifications, note that just about any general-purpose JFET will sound good in this circuit. But, you'll find that something with a higher V_P will go into clipping later, reducing the total amount of drive available to the circuit and changing the characteristics of the effect.

SCHEMATIC



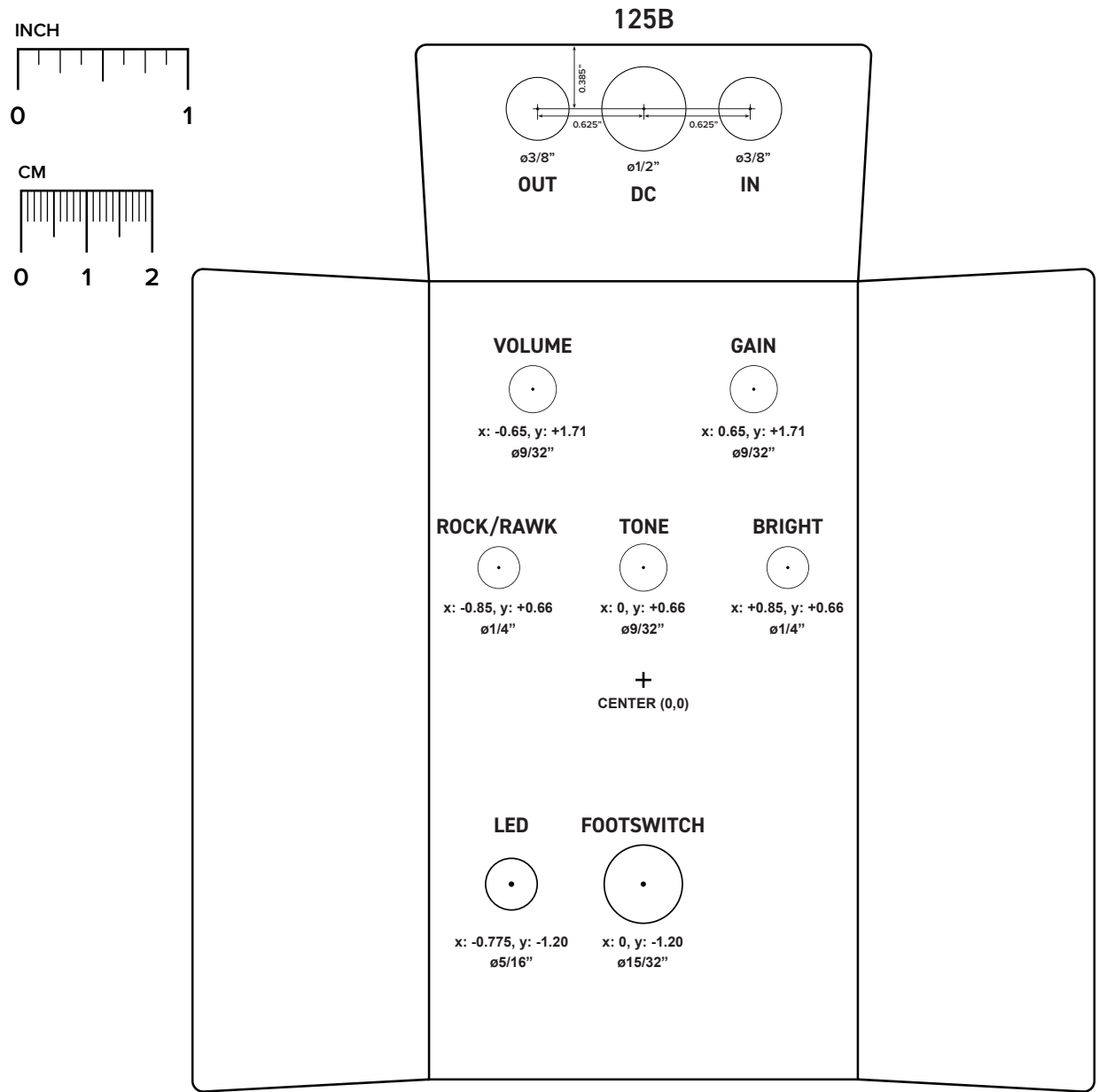
DRILL TEMPLATE

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.

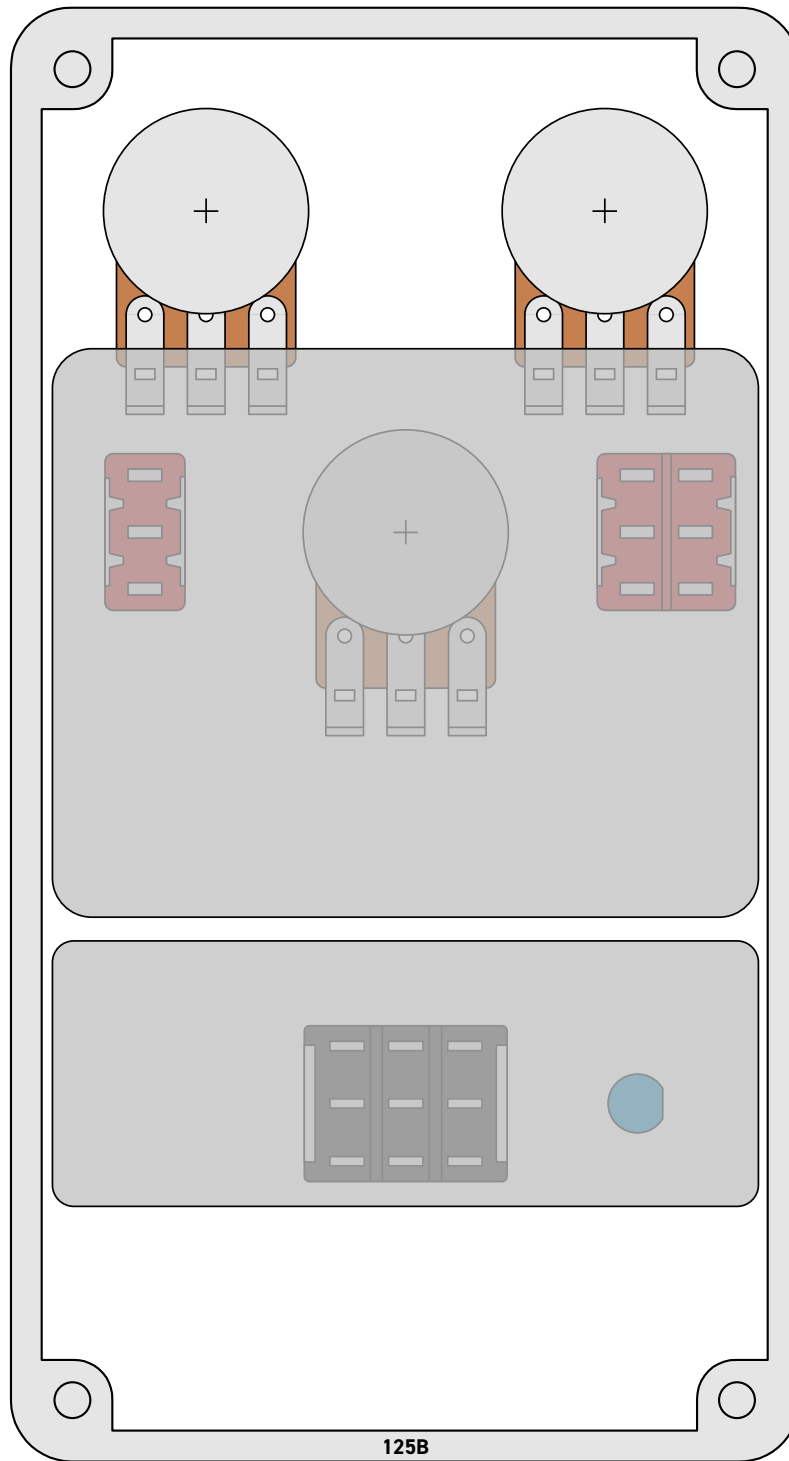
Top jack layout assumes the use of closed-frame jacks like the [Switchcraft 111X](#). If you'd rather use open-frame jacks, please refer to the Open-Frame Jack Drill Template for the top side.

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.

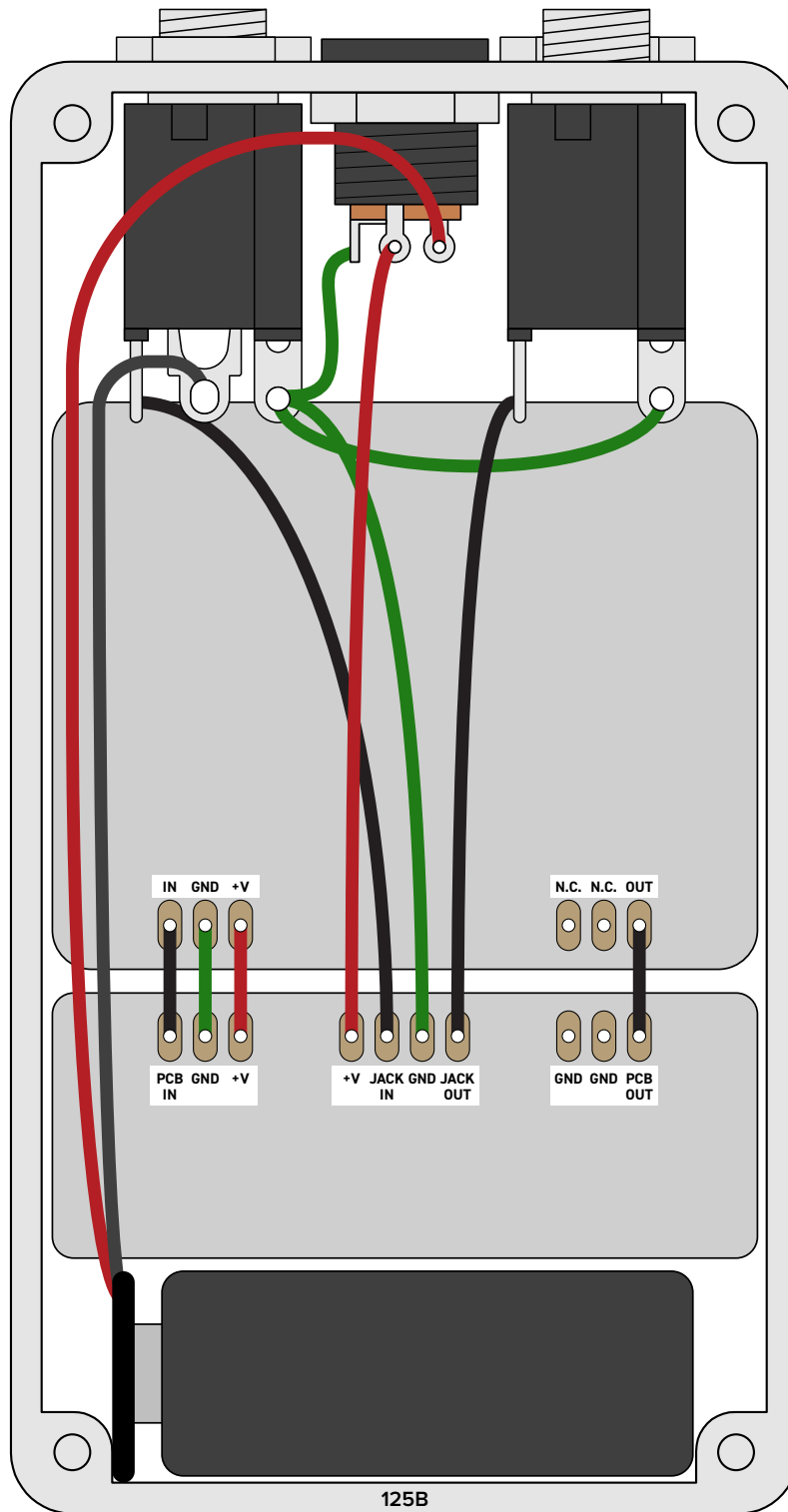


ENCLOSURE LAYOUT

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



WIRING DIAGRAM



*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 (2018-09-22)

Initial release.