

PROJECT NAME

POSITRON

BASED ON

Gorilla TC-35 Tube Cruncher

EFFECT TYPE

Overdrive/preamp

BUILD DIFFICULTY

■■■■□ Intermediate

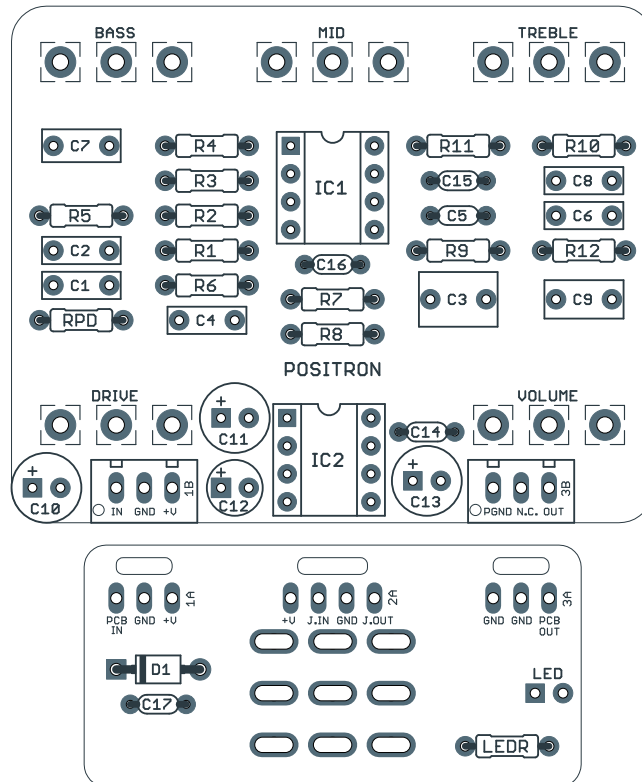
DOCUMENT VERSION

1.0.0 (2020-06-05)



PROJECT SUMMARY

The preamp circuit of the Gorilla TC-35 amplifier adapted for use as an overdrive pedal.



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

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INTRODUCTION

The Positron Preamp Drive is an adaptation of the Gorilla TC-35 Tube Cruncher amplifier that first appeared in 1986. The Gorilla amps were solid-state combo amps aimed at the budget market. They were not terribly well-regarded in their day, but they caught the eye of Josh Homme from Queens of the Stone Age who cranked them for their unique overdrive tone.

Interestingly, there are no clipping diodes present, and so all of the overdrive comes from overloading the opamp. Typically this is an undesirable characteristic that is avoided, but in this circuit it works.

The Positron is an adaptation of the TC-35's preamp section. It's a direct clone of the circuitry based on factory schematics, running on the same voltage as the original, but meant to be used as a standalone drive pedal instead of a true preamp.

USAGE

The Positron has the following controls:

- **Drive** controls the gain of the second op-amp stage. At higher levels, it pushes the op-amp into clipping.
- **Bass, Mid** and **Treble** form a 3-band Fender-style passive tonestack located after the drive stage.
- **Volume** controls the overall output of the effect.

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.

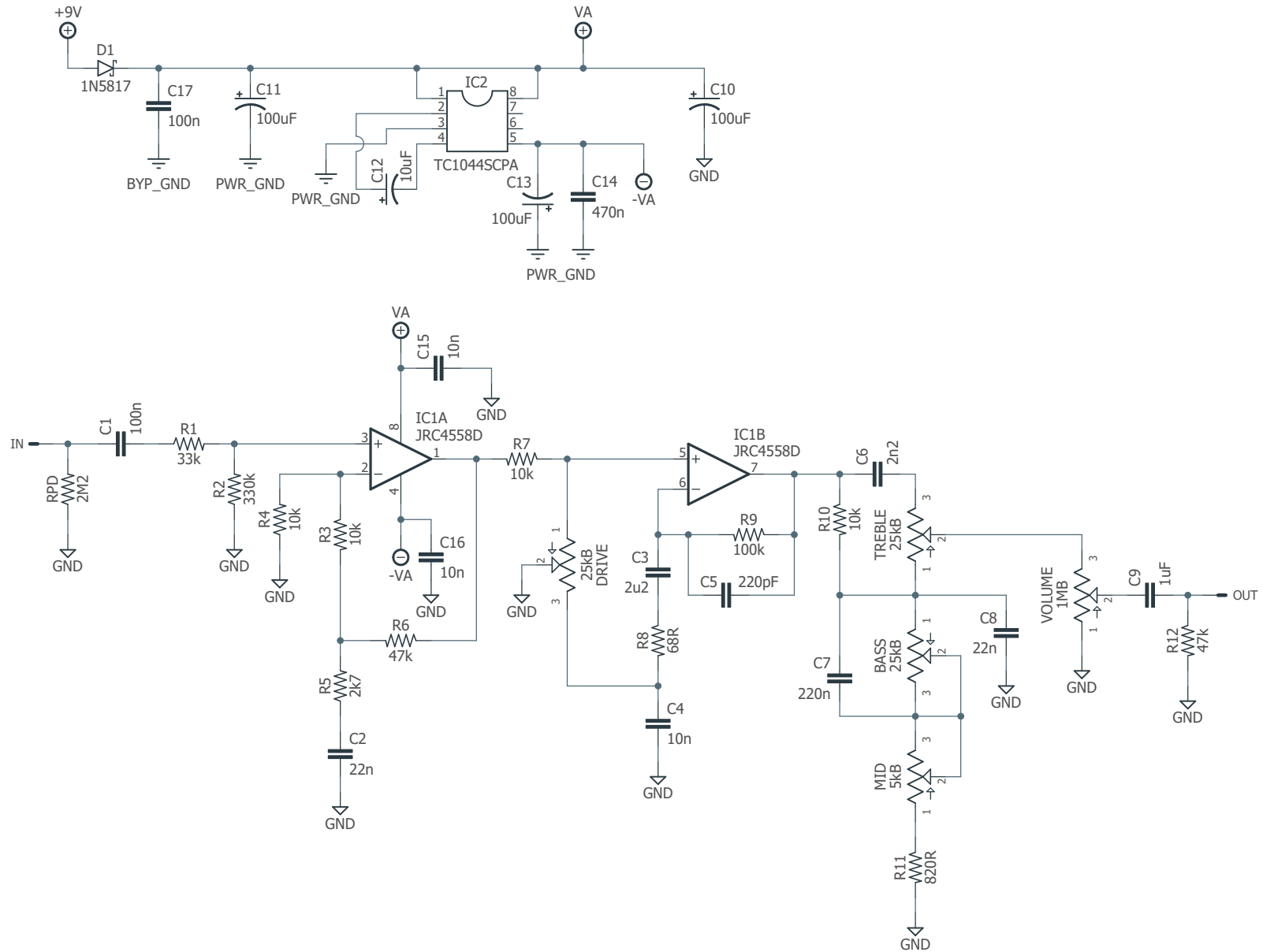
[View parts list spreadsheet](#) →

PART	VALUE	TYPE	NOTES
R1	33k	Metal film resistor, 1/4W	
R2	330k	Metal film resistor, 1/4W	
R3	10k	Metal film resistor, 1/4W	
R4	10k	Metal film resistor, 1/4W	
R5	2k7	Metal film resistor, 1/4W	
R6	47k	Metal film resistor, 1/4W	
R7	10k	Metal film resistor, 1/4W	
R8	68R	Metal film resistor, 1/4W	
R9	100k	Metal film resistor, 1/4W	
R10	10k	Metal film resistor, 1/4W	
R11	820R	Metal film resistor, 1/4W	
R12	47k	Metal film resistor, 1/4W	
RPD	2M2	Metal film resistor, 1/4W	Input pulldown resistor.
LED R	4k7	Metal film resistor, 1/4W	LED current-limiting resistor. Adjust value to change LED brightness.
C1	100n	Film capacitor, 7.2 x 2.5mm	
C2	22n	Film capacitor, 7.2 x 2.5mm	
C3	2.2uF	Film capacitor, 7.2 x 5mm	
C4	10n	Film capacitor, 7.2 x 2.5mm	
C5	220pF	MLCC capacitor, NP0/COG	
C6	2n2	Film capacitor, 7.2 x 2.5mm	
C7	220n	Film capacitor, 7.2 x 2.5mm	
C8	22n	Film capacitor, 7.2 x 2.5mm	
C9	1uF	Film capacitor, 7.2 x 3.5mm	
C10	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C11	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C12	10uF	Electrolytic capacitor, 5mm	
C13	100uF	Electrolytic capacitor, 6.3mm	Negative supply filter capacitor.
C14	470n	MLCC capacitor, X7R	Negative supply filter capacitor.
C15	10n	MLCC capacitor, X7R	IC1 positive supply filter capacitor.
C16	10n	MLCC capacitor, X7R	IC1 negative supply filter capacitor.
C17	100n	MLCC capacitor, X7R	Power supply filter capacitor.

PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
D1	1N5817	Schottky diode, DO-41	
IC1	JRC4558D	JFET, N-channel, TO-92 or SOT-23	
IC1-S	DIP-8 socket	IC socket, DIP-8	
IC2	TC1044SCPA	JFET, N-channel, TO-92 or SOT-23	
IC2-S	DIP-8 socket	IC socket, DIP-8	
DRIVE	25kB	16mm right-angle PCB mount pot	
BASS	50kB	16mm right-angle PCB mount pot	
MID	5kB	16mm right-angle PCB mount pot	
TREBLE	25kB	16mm right-angle PCB mount pot	
VOL.	1MB	16mm right-angle PCB mount pot	
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.

SCHEMATIC



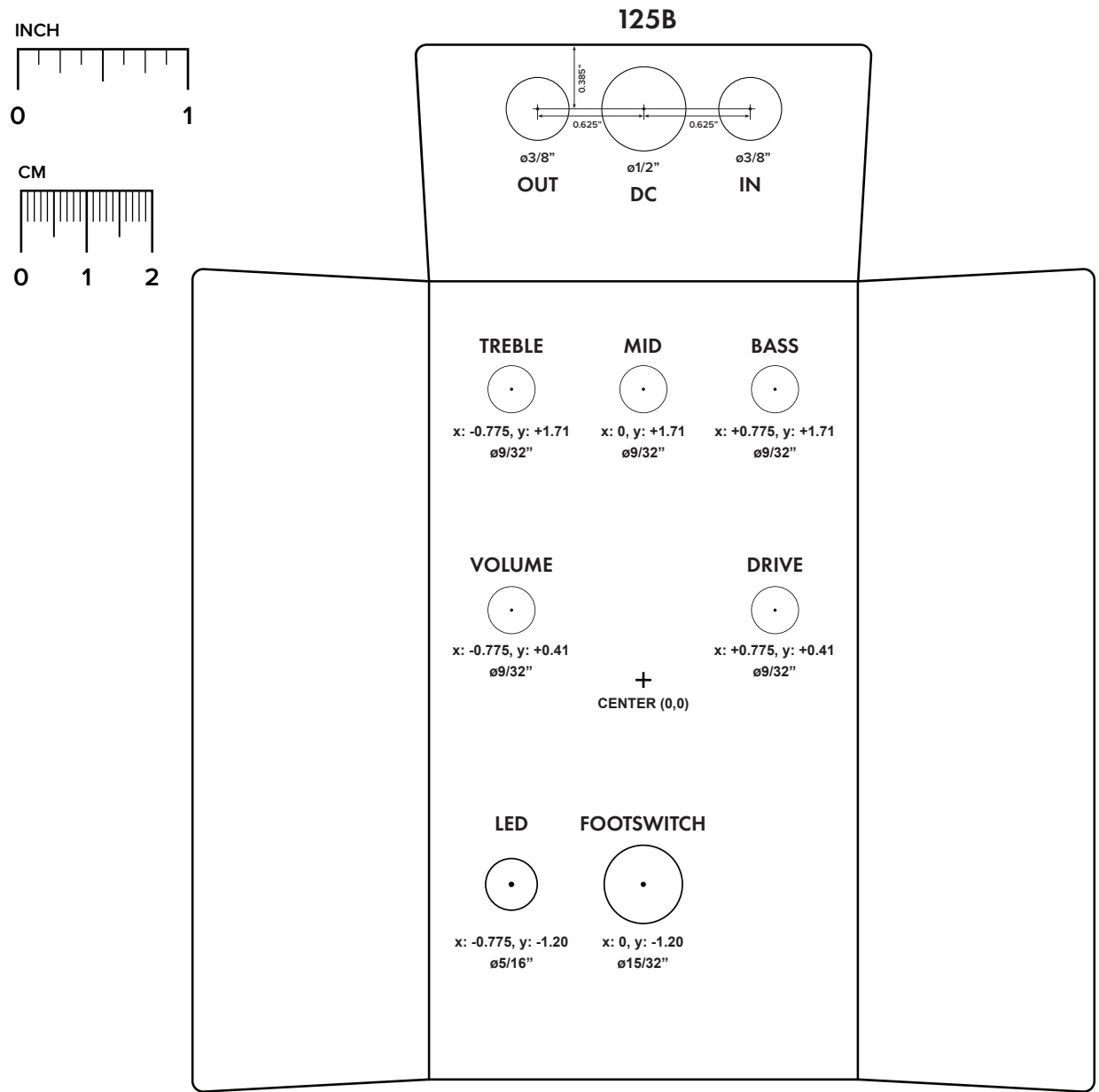
DRILL TEMPLATE

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.

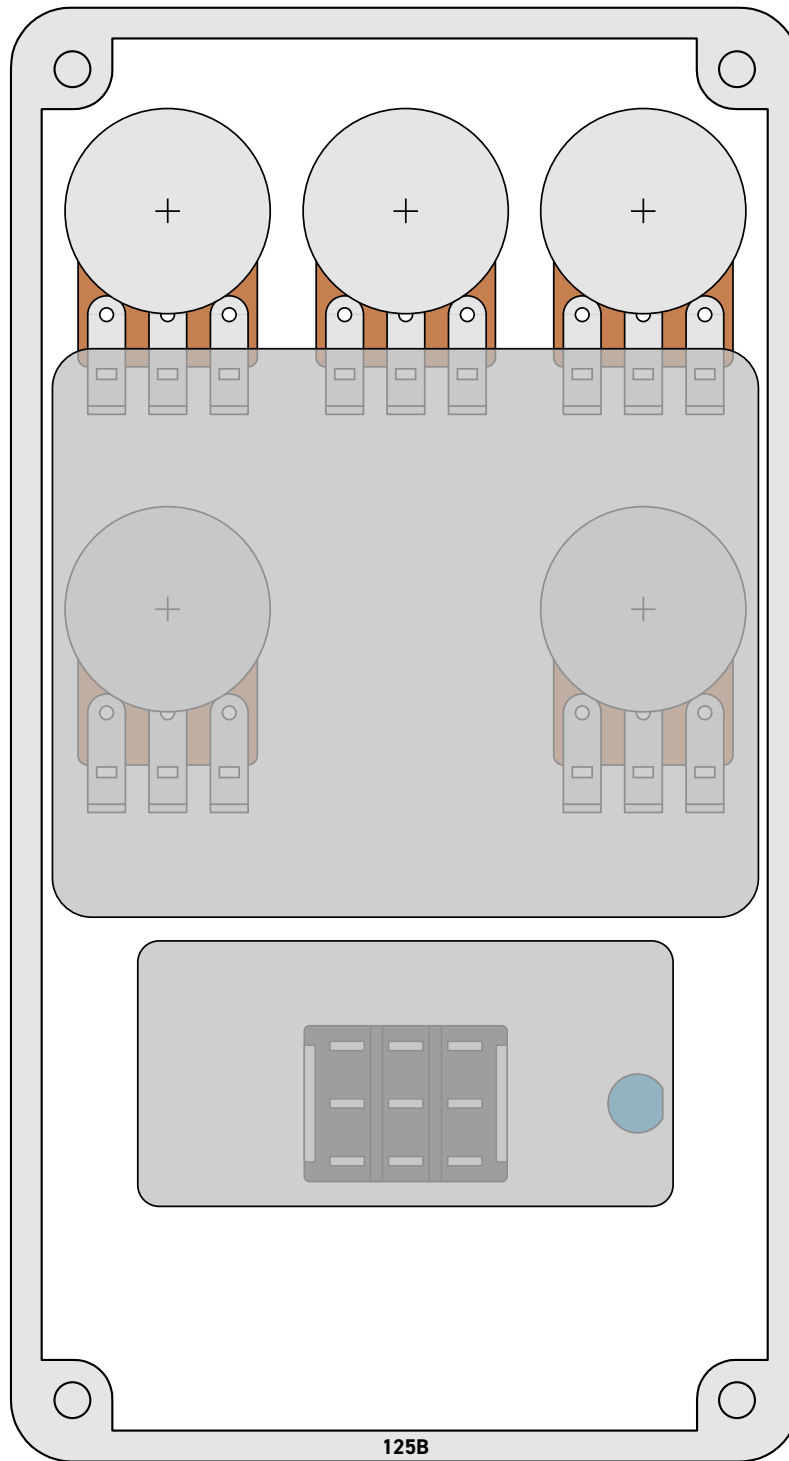
Top jack layout requires the use of closed-frame jacks like the [Switchcraft 111X](#). Open-frame jacks will not fit in layouts with 5 or more knobs due to the placement of the DC jack.

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.

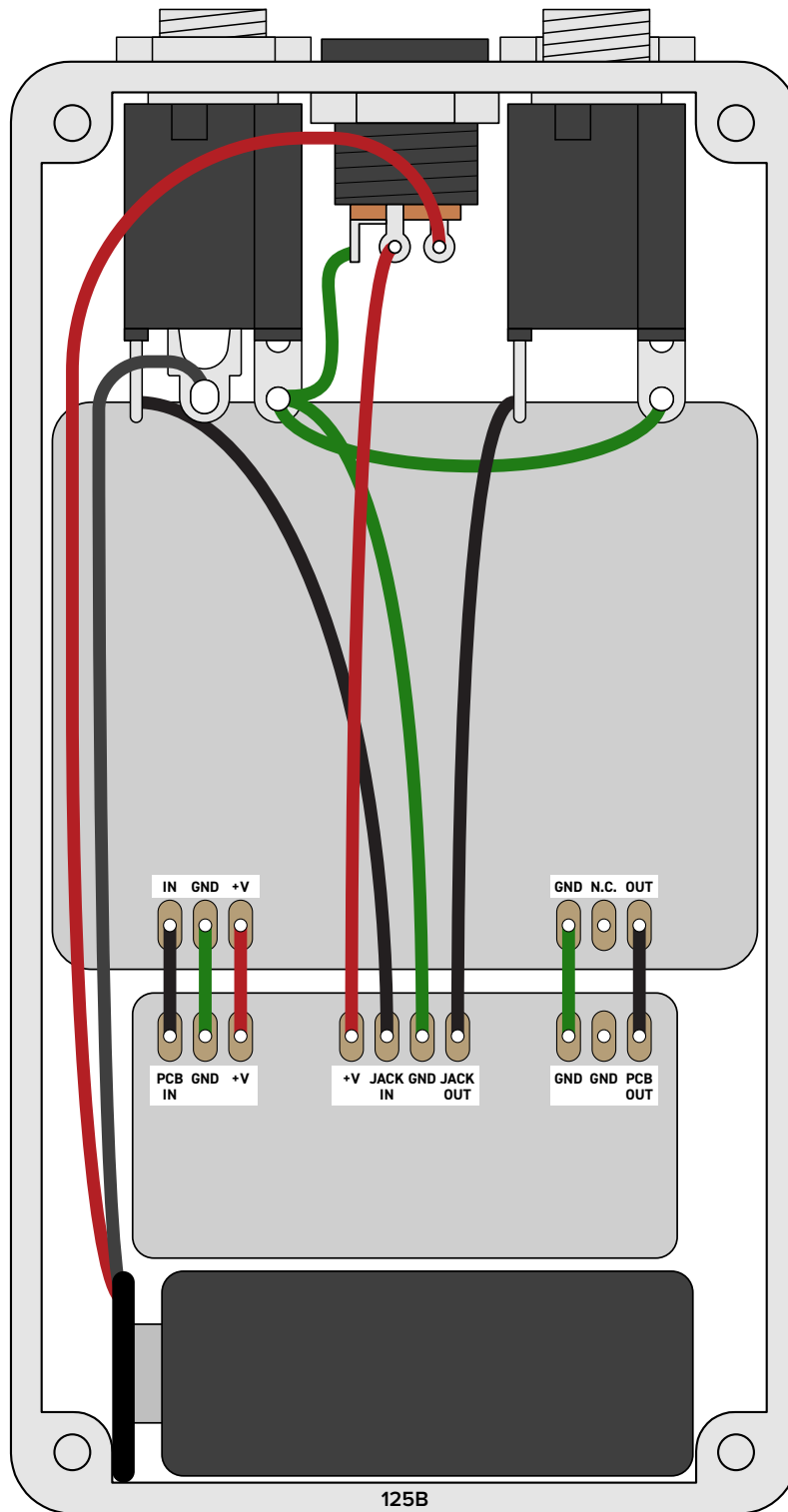


ENCLOSURE LAYOUT

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 (2020-06-05)

Initial release.