

PROJECT NAME

CONVEX



BASED ON

Dinosaural OTC-201 Opticompressor

BUILD DIFFICULTY

■■■■□ Intermediate

EFFECT TYPE

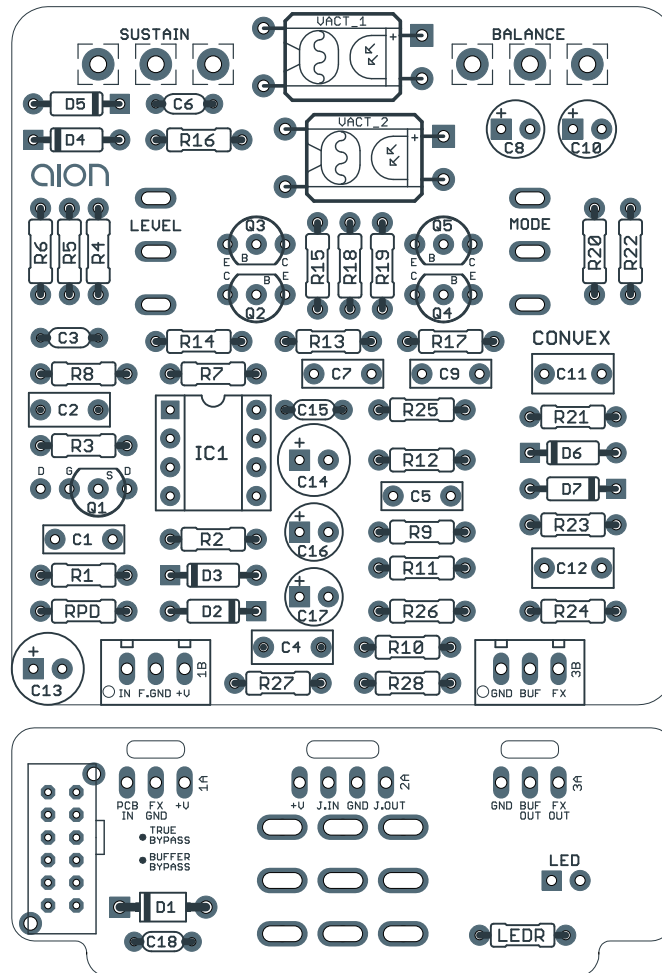
Parallel Optical Compressor

DOCUMENT VERSION

1.0.3 (2019-08-21)

PROJECT SUMMARY

An exceptionally rare and unique optical compressor designed by Dan Coggins of Lovetone fame.



Actual size is 2.3" x 2.43" (main board) and 2.3" x 0.86" (bypass board).

TABLE OF CONTENTS

1	Project Overview	8	Drill Template
2	Introduction & Usage	9	Enclosure Layout
3-5	Parts List	10	Wiring Diagram
6	Build Notes	11	Licensing
7	Schematic	11	Document Revisions

INTRODUCTION

The Convex Parallel Compressor is a clone of the Dinosaural® OTC-201 Opticompressor, an all-original optical compressor designed by Dan Coggins, the chief engineer & circuit designer for Lovetone.

The OTC-201 was made in very small numbers between 2013 and 2016 and remain exceedingly rare today. Despite this, they are universally acclaimed by the few who have had a chance to try one, and an OTC-201 can even be found on the [pedalboard](#) for Ed O'Brien of Radiohead.

Today, an updated version of the Opticompressor called the "Fat General" is available from [ThorpyFX](#), also designed in collaboration with Dan Coggins. This version adds a treble control to allow a more jangly tone to be dialed in, but is otherwise the same circuit as the original.

The Convex is a direct clone of the original OTC-201, with two modifications. First, the internal Mode switch has been moved to the outside, so the blend/direct modes can be more conveniently switched between. Second, while the original OTC-201 was buffered bypass, the Convex adds an internal slide switch that allows you to select between true bypass or buffered bypass.

USAGE

The Convex has the following controls:

- **Sustain** sets the compression threshold and amount of sustain, from subtle limiting to squish.
- **Balance** is either a blend control or a volume control depending on the position of the Mode switch.
- **Mode** (toggle switch, 2 positions) selects between Signal Blend (SB) and Direct (Z) modes. In Signal Blend mode, the Balance control becomes a blend between the dry and compressed signal, with the center position being 50/50. In Direct mode, the Balance control is a standard output volume knob and the signal is 100% compressed.
- **Level** (toggle switch, 3 positions) sets the amount of pre-gain: -3dB cut, no gain, or a +3dB boost. Called "Axematch" in the original, the goal was to be able to compensate for low-output or hot guitars, but it can also be used as a tool to change the character of the compression.

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	10k	Metal film resistor, 1/4W	
R2	1M	Metal film resistor, 1/4W	
R3	10k	Metal film resistor, 1/4W	
R4	10k	Metal film resistor, 1/4W	
R5	10k	Metal film resistor, 1/4W	
R6	13k	Metal film resistor, 1/4W	
R7	10k	Metal film resistor, 1/4W	
R8	10k	Metal film resistor, 1/4W	
R9	39k	Metal film resistor, 1/4W	
R10	330k	Metal film resistor, 1/4W	
R11	10k	Metal film resistor, 1/4W	
R12	8k2	Metal film resistor, 1/4W	
R13	4k7	Metal film resistor, 1/4W	
R14	100k	Metal film resistor, 1/4W	
R15	2k2	Metal film resistor, 1/4W	
R16	180R	Metal film resistor, 1/4W	
R17	4k7	Metal film resistor, 1/4W	
R18	100k	Metal film resistor, 1/4W	
R19	180R	Metal film resistor, 1/4W	
R20	2k2	Metal film resistor, 1/4W	
R21	180R	Metal film resistor, 1/4W	
R22	39k	Metal film resistor, 1/4W	
R23	180R	Metal film resistor, 1/4W	
R24	39k	Metal film resistor, 1/4W	
R25	100R	Metal film resistor, 1/4W	
R26	10k	Metal film resistor, 1/4W	
R27	1k8	Metal film resistor, 1/4W	
R28	8k2	Metal film resistor, 1/4W	
RPD	2M2	Metal film resistor, 1/4W	Input pulldown resistor. Can be as low as 1M.
LEDR	4k7	Metal film resistor, 1/4W	LED current-limiting resistor. Adjust value to change LED brightness.

PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
C1	33n	Film capacitor, 7.2 x 2.5mm	
C2	470n	Film capacitor, 7.2 x 3mm	
C3	330pF	MLCC capacitor, NP0/COG	
C4	220n	Film capacitor, 7.2 x 2.5mm	
C5	10n	Film capacitor, 7.2 x 2.5mm	
C6	330pF	MLCC capacitor, NP0/COG	
C7	33n	Film capacitor, 7.2 x 2.5mm	
C8	10uF	Electrolytic capacitor, 5mm	
C9	33n	Film capacitor, 7.2 x 2.5mm	
C10	10uF	Electrolytic capacitor, 5mm	
C11	1uF	Film capacitor, 7.2 x 3.5mm	
C12	1uF	Film capacitor, 7.2 x 3.5mm	
C13	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C14	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C15	10n	MLCC capacitor, X7R	Power supply filter capacitor.
C16	10uF	Electrolytic capacitor, 5mm	Reference voltage filter capacitor.
C17	10uF	Electrolytic capacitor, 5mm	Reference voltage filter capacitor.
C18	100n	MLCC capacitor, X7R	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	
D6	1N914	Fast-switching diode, DO-35	
D7	1N914	Fast-switching diode, DO-35	
VACT_1	VTL5C4	Vactrol, VTL5C4 or equivalent	Recommended to use Xvive reissues.
VACT_2	VTL5C4	Vactrol, VTL5C4 or equivalent	Recommended to use Xvive reissues.
IC1	TL072	Operational amplifier, DIP8	
IC1-S	DIP-8 socket	IC socket, DIP-8	
Q1	2N5457	JFET, N-channel, TO-92	Substitute. Original uses J113.
Q2	2N5088	BJT transistor, NPN, TO-92	Substitute. Original uses BC549C.
Q3	2N5087	BJT transistor, PNP, TO-92	Substitute. Original uses BC307B.
Q4	2N5087	BJT transistor, PNP, TO-92	Substitute. Original uses BC307B.
Q5	2N5088	BJT transistor, NPN, TO-92	Substitute. Original uses BC549C.

PARTS LIST, CONT.

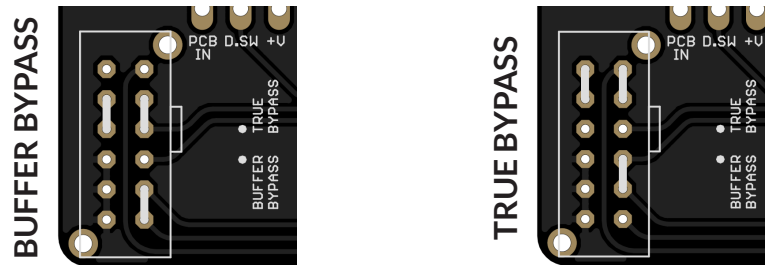
PART	VALUE	TYPE	NOTES
SUST.	100kB	16mm right-angle PCB mount pot	
BAL.	10kA	16mm right-angle PCB mount pot	
MODE	SPDT	Toggle switch, SPDT on-on	
LEVEL	SPDT cntr off	Toggle switch, SPDT on-off-on	
TB-BUF	4PDT slide	Slide switch, 4PDT	E-Switch EG4208 (standard lever) or EG4208A (longer lever)
LED	5mm	LED, 5mm, red diffused	
IN	1/4" mono	1/4" phone jack, closed frame	Switchcraft 111X 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

Bypassing the true bypass / buffer switch

The E-Switch EG4208 slide switch used for the true bypass/buffer selector is available from Mouser Electronics worldwide. However, it may not be accessible to everyone, and there are no real substitutes.

If you are unable to obtain it, you can hard-wire the switch to either true bypass mode or buffered mode by soldering jumpers to the switch pads as shown.



Vactrol selection

The original uses two Excelitas VTL5C4 vactrols. The original part is no longer made and difficult to find, but fortunately the Xvive reissues (same part number) work just as well in this circuit. They're pricey, but it's easier & more reliable than trying to make your own with an LED and LDR.

The VTL5C4 is presently only available from [Cabintech](#) in the USA. Small Bear Electronics carries a Macron work-alike called the [MI1210CLC-R](#). The Macron part hasn't been tested in this circuit, but the Convex isn't too picky so it should perform well.

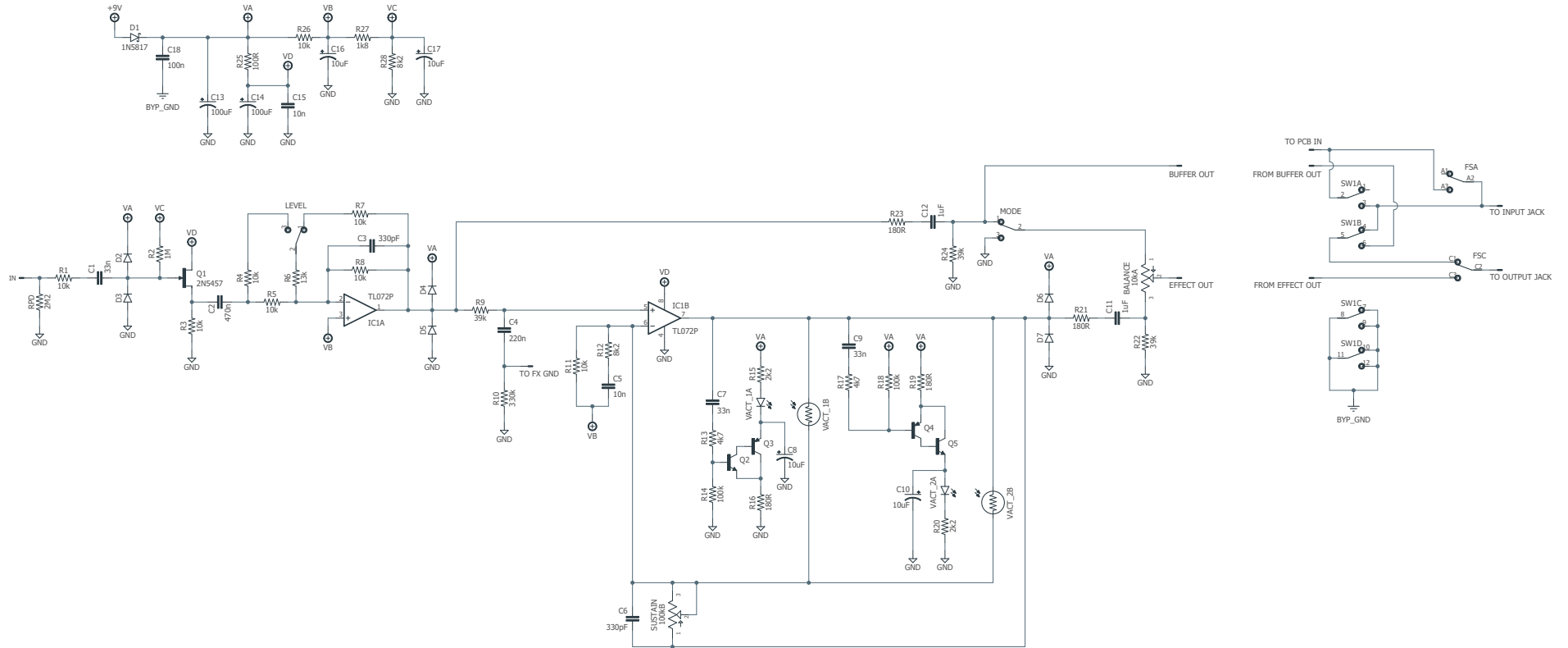
Transistor selection

Being from the UK, the original OTC-201 uses BC549C NPN and BC307B PNP transistors in the vactrol section.

The Convex board is designed for USA equivalents: 2N5088 or 2N3904 for NPN and 2N5087 or 2N3906 for PNP. They will perform identically in this circuit and are more commonly available worldwide. As such, the PCB uses the E-B-C pinout convention, with the pads marked on the silkscreen.

If you want to use the original BC parts, you will probably need to rotate them 180° from the component outline. When using substitutes, though, always confirm pinout with the datasheet!

SCHEMATIC



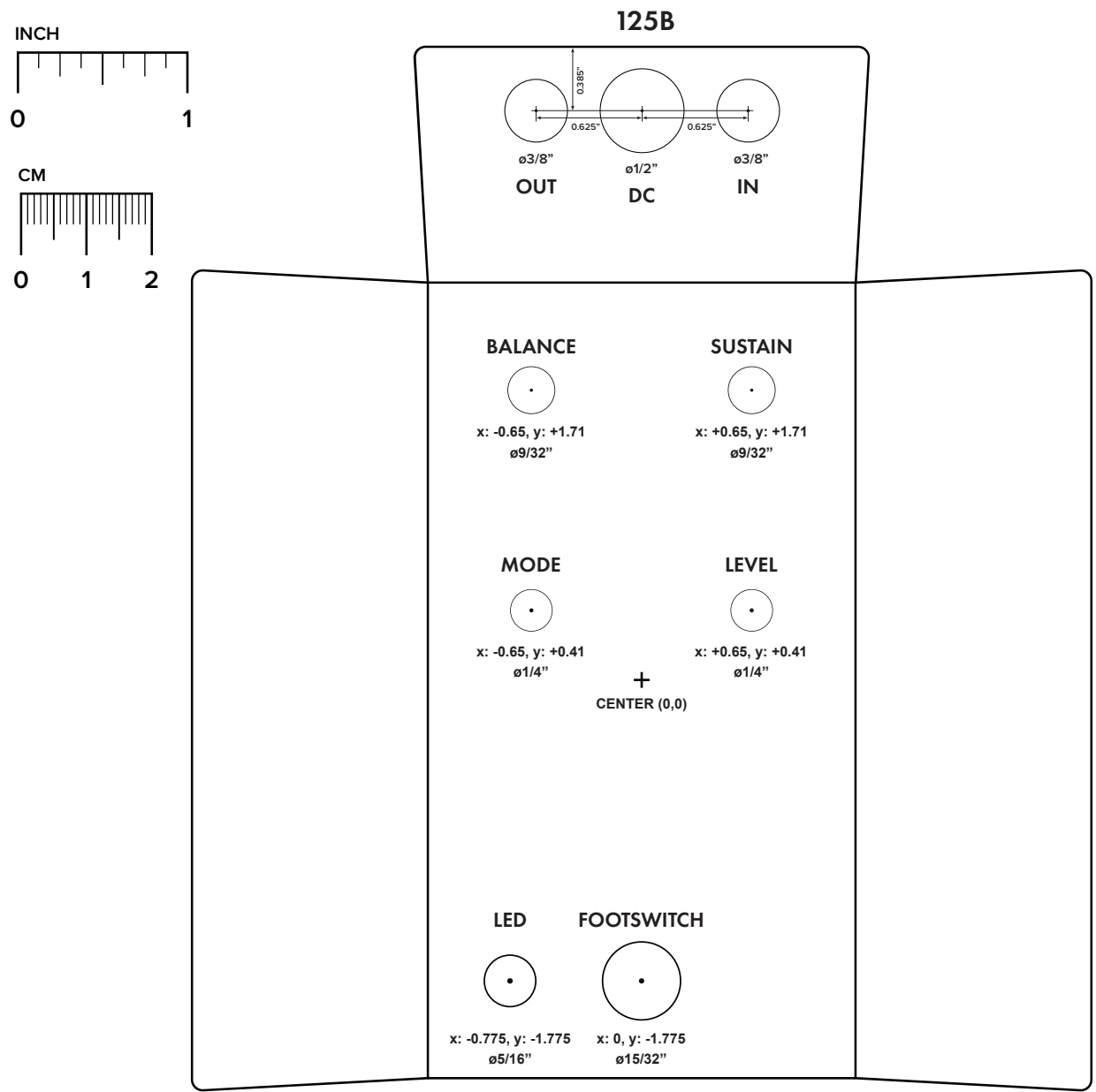
DRILL TEMPLATE

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.

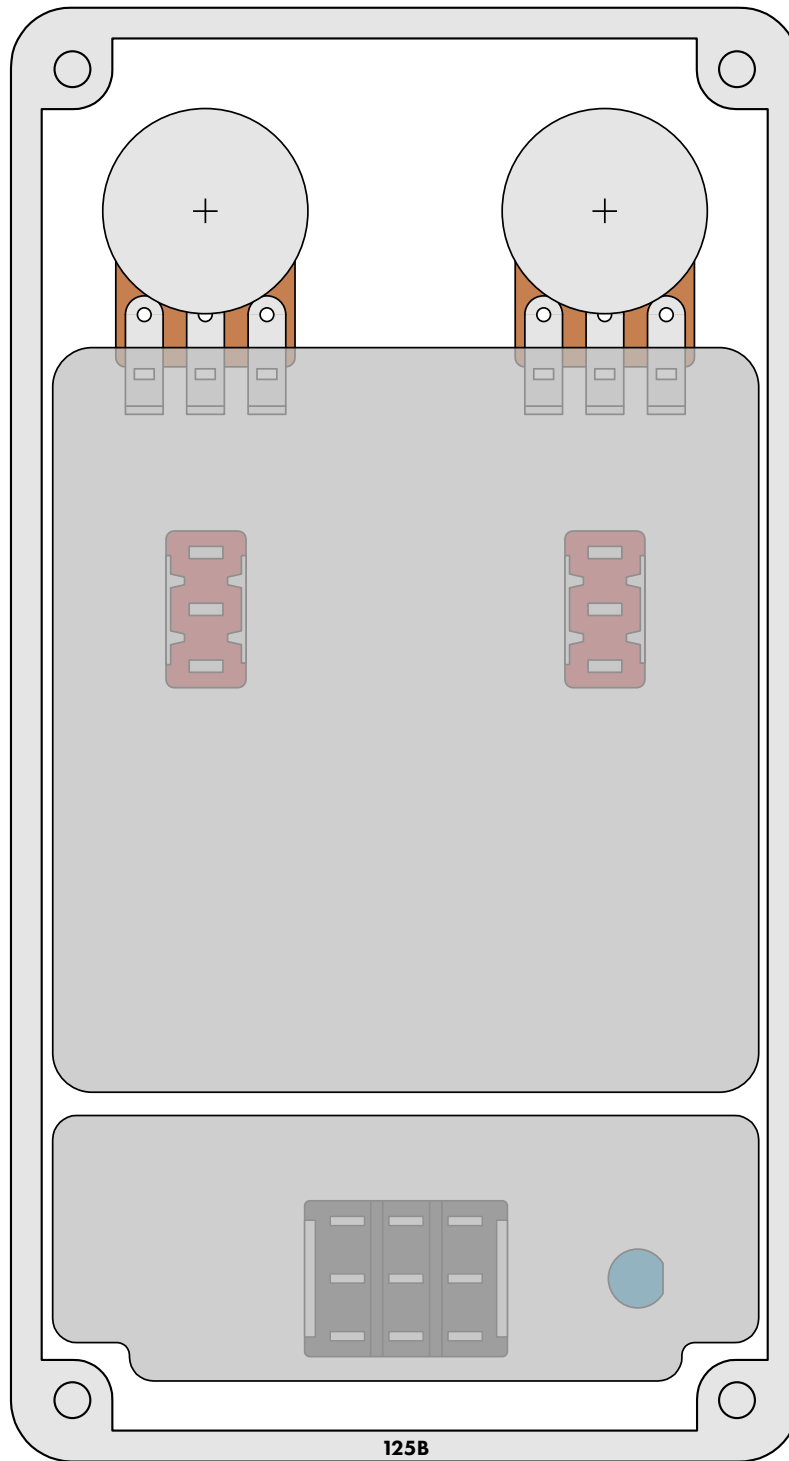
Top jack layout requires the use of closed-frame jacks like the [Switchcraft 111X](#). Open-frame jacks will not fit in layouts with 5 or more knobs due to the placement of the DC jack.

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.

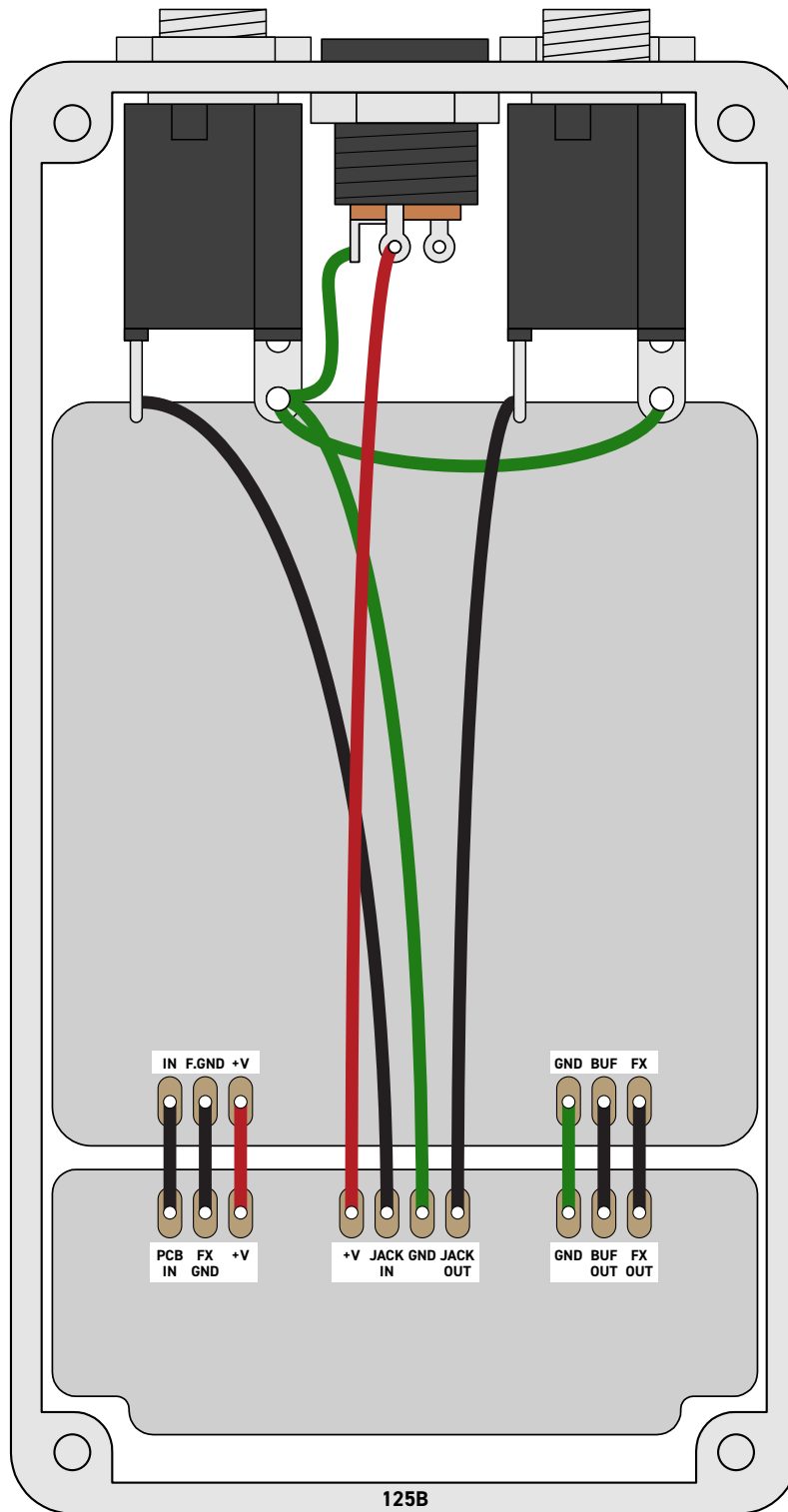


ENCLOSURE LAYOUT

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



WIRING DIAGRAM



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

1.0.3 (2019-08-21)

Corrected taper of Balance pot.

1.0.2 (2019-08-11)

Corrected D2 & D3 in parts list.

1.0.1 (2019-08-07)

Added Q1-5 to parts list.

1.0.0 (2019-08-04)

Initial release.