PROJECT NAME

PERELANDRA DELUXE

aion DIY GUITAR EFFECTS

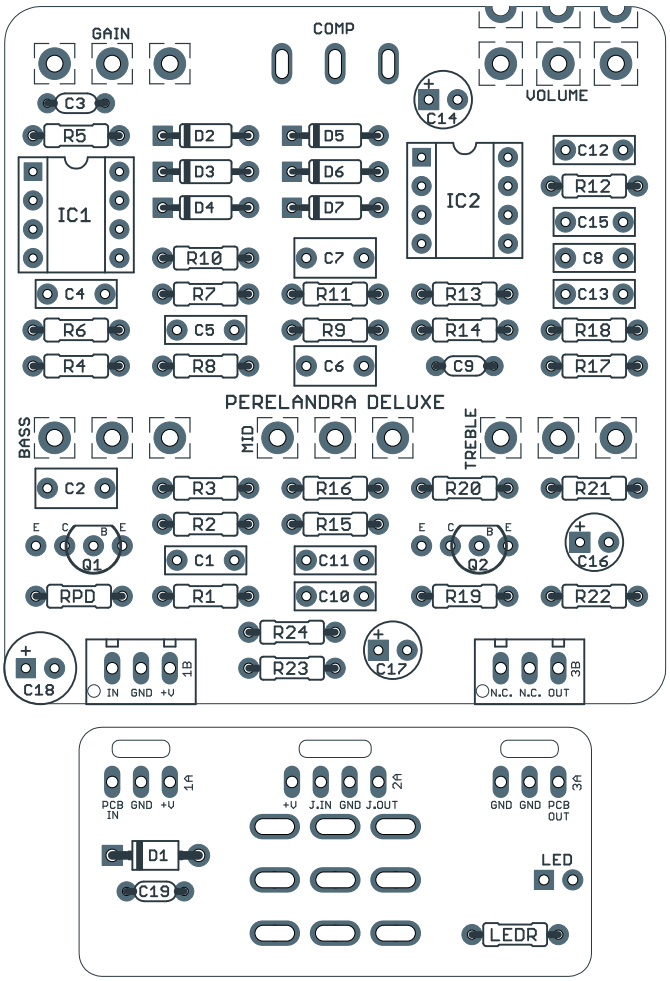
BASED ON
Xotic BB Preamp (Custom Shop)

BUILD DIFFICULTY
Intermediate

EFFECT TYPE
Boost / Overdrive

DOCUMENT VERSION
1.0.3 (2022-06-01)

PROJECT SUMMARY
A flexible drive pedal that can go from clean volume boost to smooth overdrive. Includes a 2-band tone stack for treble & bass as well as a clipping diode switch and midrange tone control.



Actual size is 2.3" x 2.42" (main board) and 1.78" x 0.86" (bypass board).

IMPORTANT NOTE

This documentation is for the **Deluxe** version of the project. Early PCBs were labeled "Perelandra V2" rather than "Perelandra Deluxe". Please make sure your PCB matches the above image (five knobs and a toggle switch) before proceeding since the part numbering is different. The original Perelandra is available as a separate project.

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INTRODUCTION

The Perelandra Deluxe Boost / Overdrive is a recreation of the Xotic BB Preamp, a flexible tone machine that lets you go from a clean boost to a nice smooth overdrive with a 3-band EQ to shape the tone and three clipping options.

This is an expanded version of the original Perelandra, developed based on direct traces of several BB variants. Modifications have been incorporated from the “Comp” and “MB” (mid boost) custom shop models. Each of these modifications can be set to a position that mimics the stock circuit, so while you now have additional tone-shaping tools available, the original tone of the BB Preamp is unaffected.

The Perelandra Deluxe does not replace the original Perelandra, which is a simpler build with fewer controls and components. The original Perelandra also has the option to build the Bass BB Preamp variant which the Deluxe does not cover.

USAGE

The Perelandra Deluxe has six controls:

- **Gain** controls the amount of gain from the op amp that is fed through the feedback clipping diodes.
- **Treble** is one half of the Baxandall tone control, allowing you to boost or cut high frequencies.
- **Bass** is the other half of the Baxandall tone control, allowing you to boost or cut low frequencies.
- **Mid** is the tone control from the “MB” custom shop model, which is two fixed resistors in the standard version. When set at 9:00, it’s identical to the standard circuit.
- **Level** sets the overall output of the effect.
- **Comp** (toggle) selects between different sets of clipping diodes, a modification taken from the “Comp” custom shop model. In the left position, it’s identical to the current-production BB Preamp v1.5. In the right position, it’s identical to the Andy Timmons model, which is based on the earliest BB Preamp version. In the center, the clipping diodes are lifted for “no compression” mode.

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	1k	Metal film resistor, 1/4W	
R2	470k	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	4k7	Metal film resistor, 1/4W	
R7	1k	Metal film resistor, 1/4W	
R8	10k	Metal film resistor, 1/4W	
R9	220R	Metal film resistor, 1/4W	
R10	1k	Metal film resistor, 1/4W	
R11	1k	Metal film resistor, 1/4W	
R12	47k	Metal film resistor, 1/4W	
R13	10k	Metal film resistor, 1/4W	
R14	47k	Metal film resistor, 1/4W	
R15	4k7	Metal film resistor, 1/4W	
R16	4k7	Metal film resistor, 1/4W	
R17	33k	Metal film resistor, 1/4W	
R18	10k	Metal film resistor, 1/4W	
R19	470k	Metal film resistor, 1/4W	
R20	10k	Metal film resistor, 1/4W	
R21	470R	Metal film resistor, 1/4W	
R22	100k	Metal film resistor, 1/4W	
R23	10k	Metal film resistor, 1/4W	
R24	10k	Metal film resistor, 1/4W	
RPD	1M	Metal film resistor, 1/4W	Input pulldown resistor.
LEDR	4k7	Metal film resistor, 1/4W	LED current-limiting resistor. Adjust value to change LED brightness.
C1	22n	Film capacitor, 7.2 x 2.5mm	
C2	1uF	Film capacitor, 7.2 x 3.5mm	
C3	47pF	MLCC capacitor, NP0/C0G	
C4	47n	Film capacitor, 7.2 x 2.5mm	

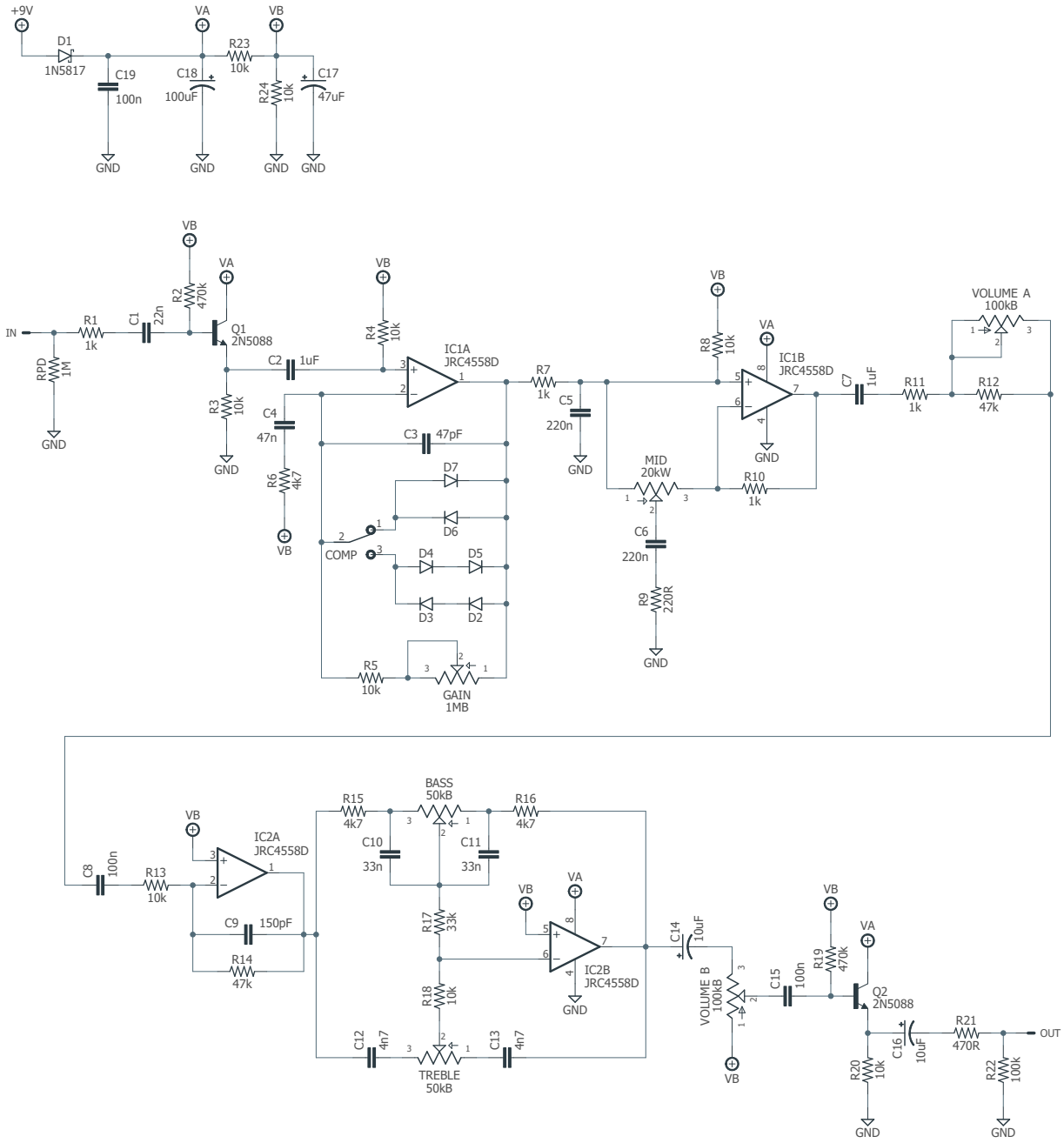
PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
C5	220n	Film capacitor, 7.2 x 2.5mm	
C6	220n	Film capacitor, 7.2 x 2.5mm	
C7	1uF	Film capacitor, 7.2 x 3.5mm	
C8	100n	Film capacitor, 7.2 x 2.5mm	
C9	150pF	MLCC capacitor, NP0/C0G	
C10	33n	Film capacitor, 7.2 x 2.5mm	
C11	33n	Film capacitor, 7.2 x 2.5mm	
C12	4n7	Film capacitor, 7.2 x 2.5mm	
C13	4n7	Film capacitor, 7.2 x 2.5mm	
C14	10uF	Electrolytic capacitor, 5mm	
C15	100n	Film capacitor, 7.2 x 2.5mm	
C16	10uF	Electrolytic capacitor, 5mm	
C17	47uF	Electrolytic capacitor, 5mm	Reference voltage filter capacitor.
C18	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C19	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	
Q1	2N5088	BJT transistor, NPN, TO-92	Substitute. Original uses 2SC1815.
Q2	2N5088	BJT transistor, NPN, TO-92	Substitute. Original uses 2SC1815.
IC1	JRC4558D	Operational amplifier, DIP8	
IC1-S	DIP-8 socket	IC socket, DIP-8	
IC2	JRC4558D	Operational amplifier, DIP8	
IC2-S	DIP-8 socket	IC socket, DIP-8	

PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
GAIN	1MB	16mm right-angle PCB mount pot	
BASS	50kB	16mm right-angle PCB mount pot	
MID	20kW	16mm right-angle PCB mount pot	Modification from “MB” custom shop model.
TREBLE	50kB	16mm right-angle PCB mount pot	
LEVEL	100kB dual	16mm right-angle PCB mount pot	Linear taper, dual right-angle PCB mount.
COMP	SPDT cntr off	Toggle switch, SPDT on-off-on	Modification from “Comp” custom shop model.
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.
FSW	3PDT	Stomp switch, 3PDT	
ENC	125B	Enclosure, die-cast aluminum	Can also use a Hammond 1590N1.

SCHEMATIC


+9V
D1
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1M
C2
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R3
10k
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R6
4k7
R4
10k
IC1A
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R10
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C6
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R9
220R
R8
10k
IC1B
JRC4558D
C7
1uF
VOLUME A
100kB
R11
1k
R12
47k
BASS
50kB
R15
4k7
R16
4k7
C10
33n
C11
33n
IC2A
JRC4558D
C8
100n
R13
10k
C9
150pF
R14
47k
R17
33k
R18
10k
IC2B
JRC4558D
C12
4n7
C13
4n7
TREBLE
50kB
C14
10uF
VOLUME B
100kB
C15
100n
R19
470k
Q2
2N5088
C16
10uF
R21
470R
OUT
R20
10k
R22
100k

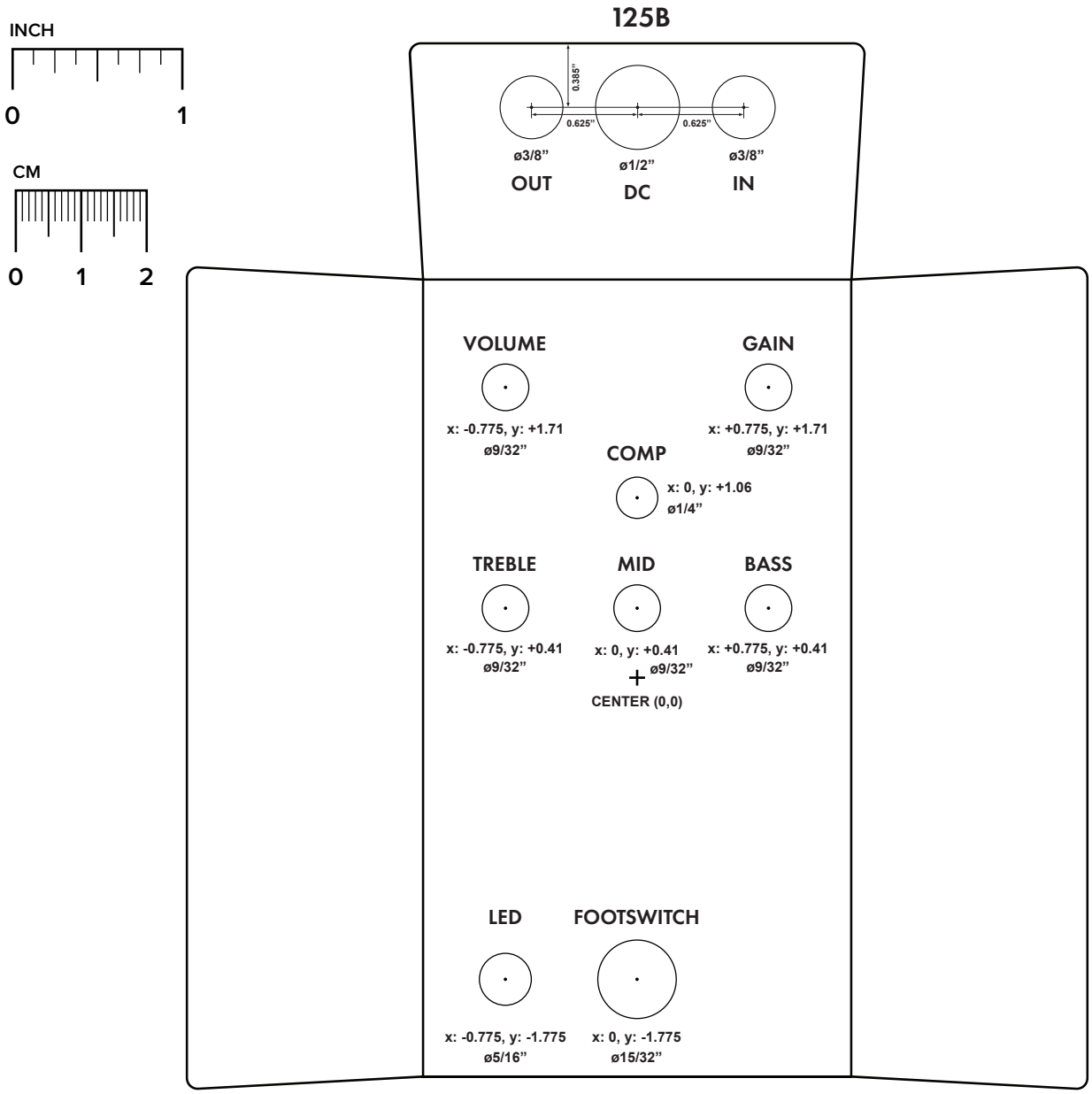
DRILL TEMPLATE

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.

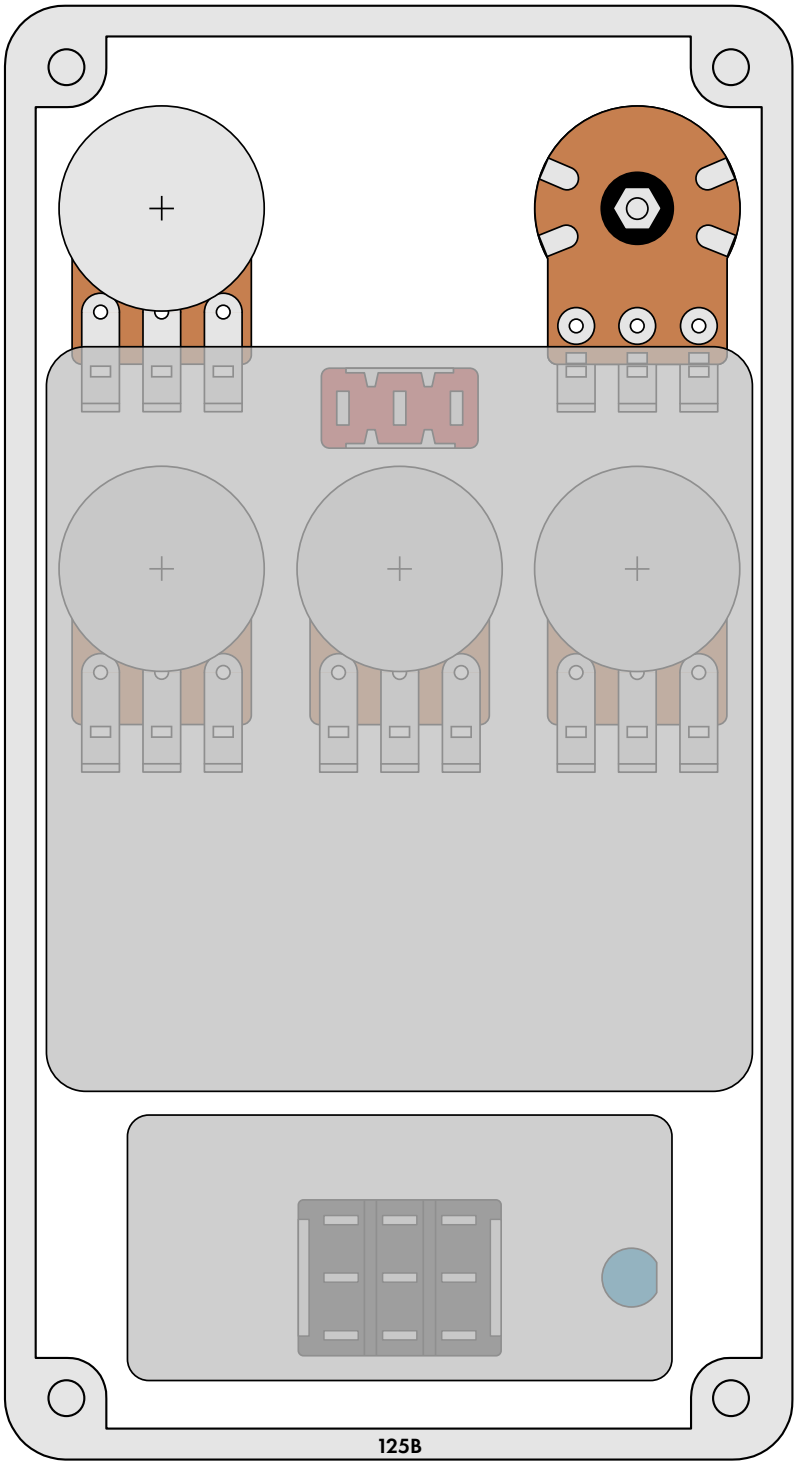
Top jack layout assumes the use of closed-frame jacks like the Switchcraft 111X. If you'd rather use open-frame jacks, please refer to the Open-Frame Jack Drill Template for the top side.

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.

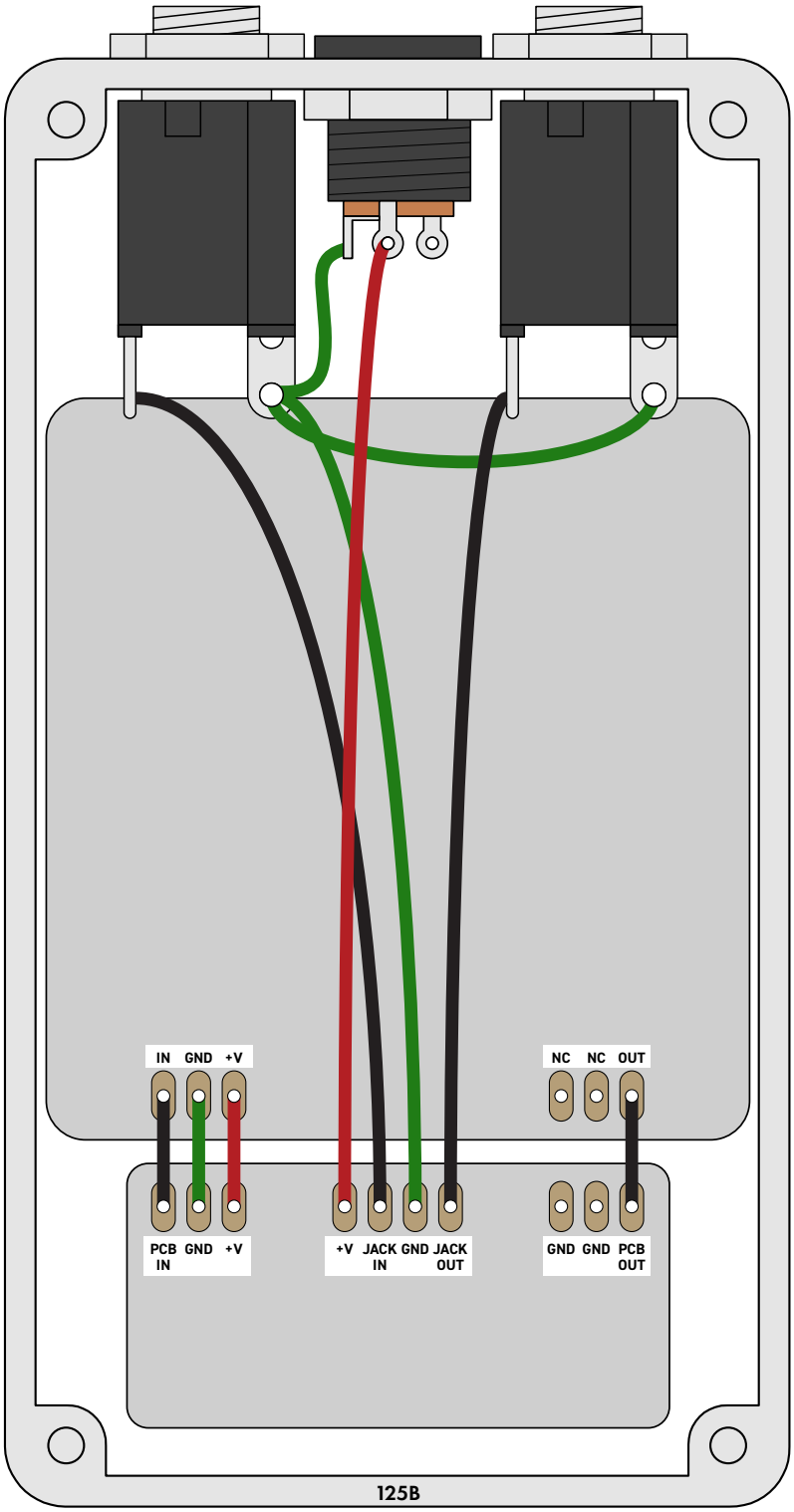


ENCLOSURE LAYOUT

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



WIRING DIAGRAM



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

1.0.3 (2022-06-01)
Corrected value of R13 (listed as 1k but should be 10k).

1.0.2 (2021-11-24)
Corrected placement of the lower row of knobs on the drill template. They were too high by about 0.12".

1.0.1 (2021-11-01)
Corrected y-coordinate of the Comp switch on the drill template. The physical placement was correct, only the coordinate was in error.

1.0.0 (2021-10-22)
Initial release.