

PROJECT NAME
NOMAD



BASED ON
Valve Wizard Engineer's Thumb

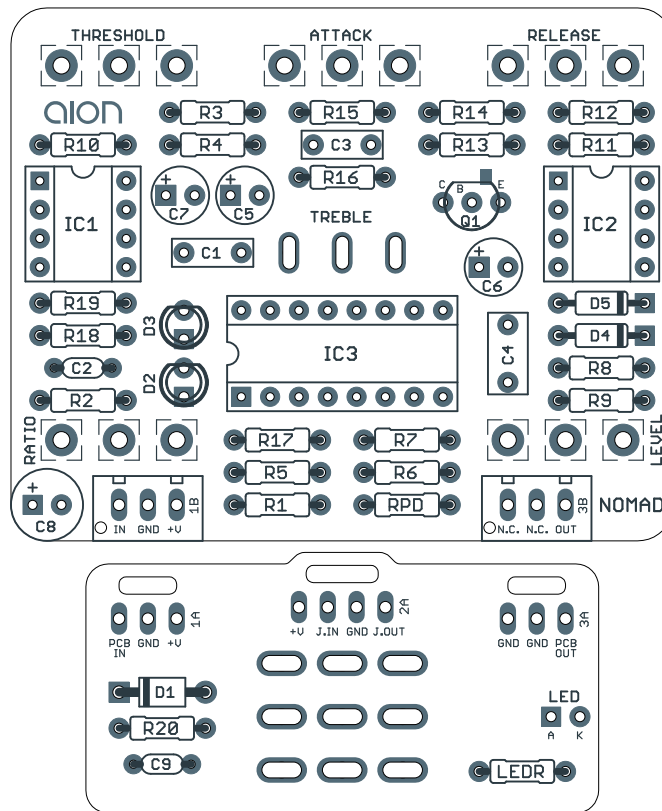
BUILD DIFFICULTY
■■■■■ Easy

EFFECT TYPE
Compressor

DOCUMENT VERSION
1.0.1 (2023-10-12)

PROJECT SUMMARY

A full-featured yet surprisingly simple OTA-based compressor design that operates on a feed-forward principle for better performance and lower noise.



Actual size is 2.3" x 1.86" (main board) and 1.78" x 0.87" (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 Nomad OTA Compressor is based on the Valve Wizard Engineer's Thumb, a DIY classic that was first invented in 2012.

Unlike most OTA-based compressors such as the Ross or Dyna Comp, the Engineer's Thumb uses the LM13700 as a current-controlled feedback resistor in an op-amp gain stage. This reduces noise and significantly increases headroom compared to other designs. The audio path of the circuit actually has a lot more in common with optical compressors such as the [Flatline Compressor](#).

The Engineer's Thumb has four official revisions, with the [most recent](#) being in 2019. While most DIY projects are based on V1 or V2, the Nomad is based on this latest revision, with all of the suggested modifications for a true 5-knob compressor. It's a simple and cheap build with a deluxe control set.

USAGE

The Nomad has the full control set of a deluxe compressor:

- **Attack** controls the speed at which the compressor reacts and clamps down on the signal.
- **Release** sets the length of time the compressor "holds on" to the signal before resetting and awaiting the next trigger.
- **Ratio** blends the uncompressed signal back with the compressed response.
- **Threshold** controls the signal level being sent to the sidechain. By reducing it, the compression portion is less sensitive to the input signal.
- **Level** controls the overall output.
- **Treble** (toggle switch) boosts the treble slightly to compensate for some of the perceived loss of brightness that is inherent to most compressors.

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.

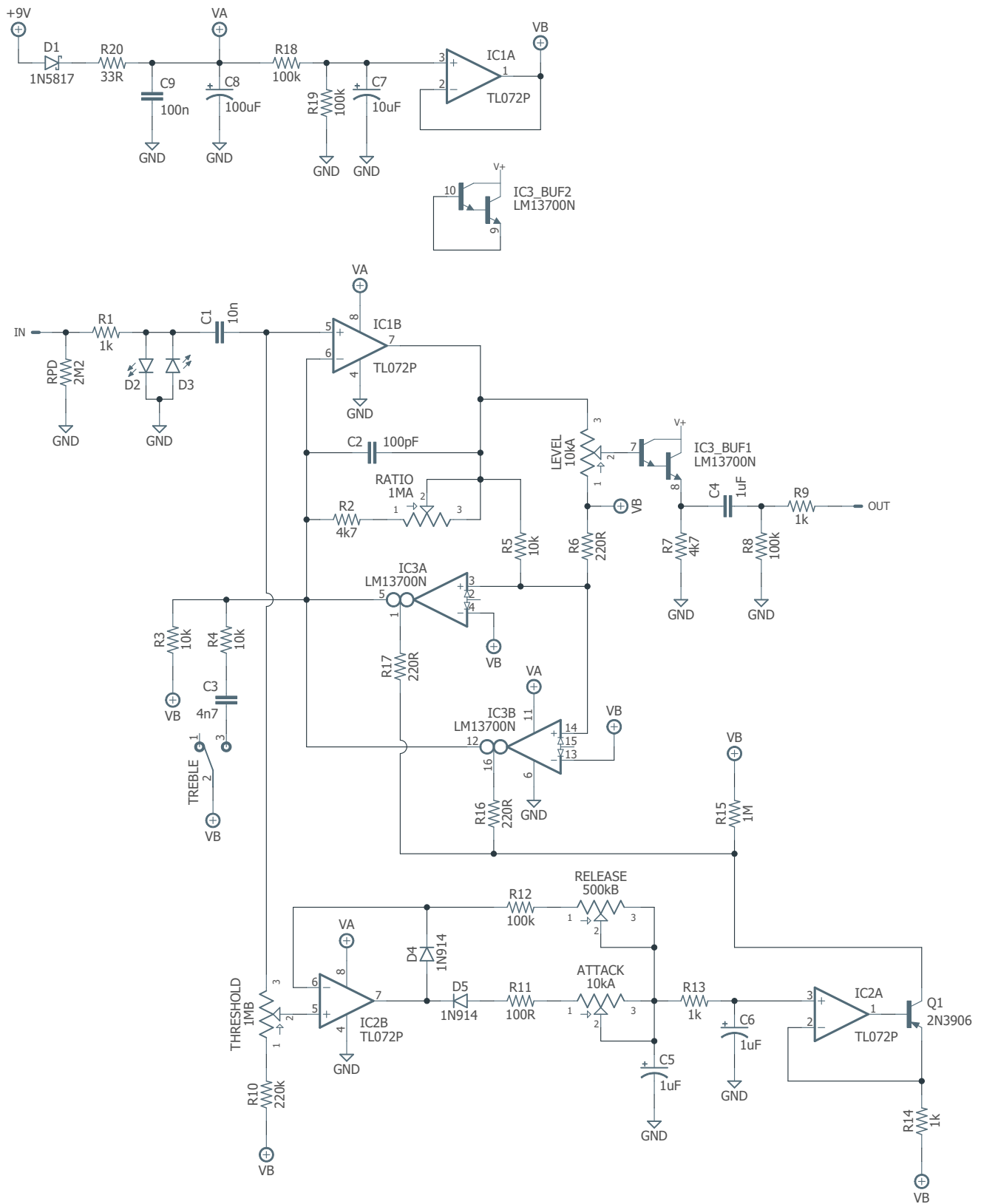
[View parts list spreadsheet](#) →

PART	VALUE	TYPE	NOTES
R1	1k	Metal film resistor, 1/4W	
R2	4k7	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	220R	Metal film resistor, 1/4W	
R7	4k7	Metal film resistor, 1/4W	
R8	100k	Metal film resistor, 1/4W	
R9	1k	Metal film resistor, 1/4W	
R10	220k	Metal film resistor, 1/4W	
R11	100R	Metal film resistor, 1/4W	
R12	100k	Metal film resistor, 1/4W	
R13	1k	Metal film resistor, 1/4W	
R14	1k	Metal film resistor, 1/4W	
R15	1M	Metal film resistor, 1/4W	
R16	220R	Metal film resistor, 1/4W	
R17	220R	Metal film resistor, 1/4W	
R18	100k	Metal film resistor, 1/4W	
R19	100k	Metal film resistor, 1/4W	
R20	33R	Metal film resistor, 1/4W	Power supply filter resistor.
RPD	2M2	Metal film resistor, 1/4W	Input pull-down resistor. Can be as low as 1M.
LEDR	10k	Metal film resistor, 1/4W	LED current-limiting resistor. Adjust value to change LED brightness.
C1	10n	Film capacitor, 7.2 x 2.5mm	
C2	100pF	MLCC capacitor, NP0/C0G	
C3	4n7	Film capacitor, 7.2 x 2.5mm	
C4	1uF	Film capacitor, 7.2 x 3.5mm	
C5	1uF	Electrolytic capacitor, 4mm	
C6	1uF	Electrolytic capacitor, 4mm	
C7	10uF	Electrolytic capacitor, 5mm	Reference voltage filter capacitor.
C8	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C9	100n	MLCC capacitor, X7R	Power supply filter capacitor.

PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
D1	1N5817	Schottky diode, DO-41	
D2	3mm red	LED, 3mm, red diffused	
D3	3mm red	LED, 3mm, red diffused	
D4	1N914	Fast-switching diode, DO-35	
D5	1N914	Fast-switching diode, DO-35	
Q1	2N3906	BJT transistor, PNP, TO-92	
IC1	TL072	Operational amplifier, DIP8	
IC1-S	DIP-8 socket	IC socket, DIP-8	
IC2	TL072	Operational amplifier, DIP8	
IC2-S	DIP-8 socket	IC socket, DIP-8	
IC3	LM13700	Operational amplifier, DIP8	Can also use NE5517.
IC3-S	DIP-16 socket	IC socket, DIP-16	
RATIO	1MA	16mm right-angle PCB mount pot	
ATTACK	10kA	16mm right-angle PCB mount pot	Can also be 100kA (Rev2 and most DIY projects).
RELEASE	500kB	16mm right-angle PCB mount pot	
THRESHOLD	1MB	16mm right-angle PCB mount pot	
LEVEL	10kA	16mm right-angle PCB mount pot	
TREBLE	SPDT on-on	Toggle switch, SPDT on-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.
FSW	3PDT	Stomp switch, 3PDT	
BATT.	9V	9V battery snap	Soft vinyl type. The hard-shell type will not fit.
ENC	125B	Enclosure, die-cast aluminum	Can also use a Hammond 1590N1.

SCHEMATIC



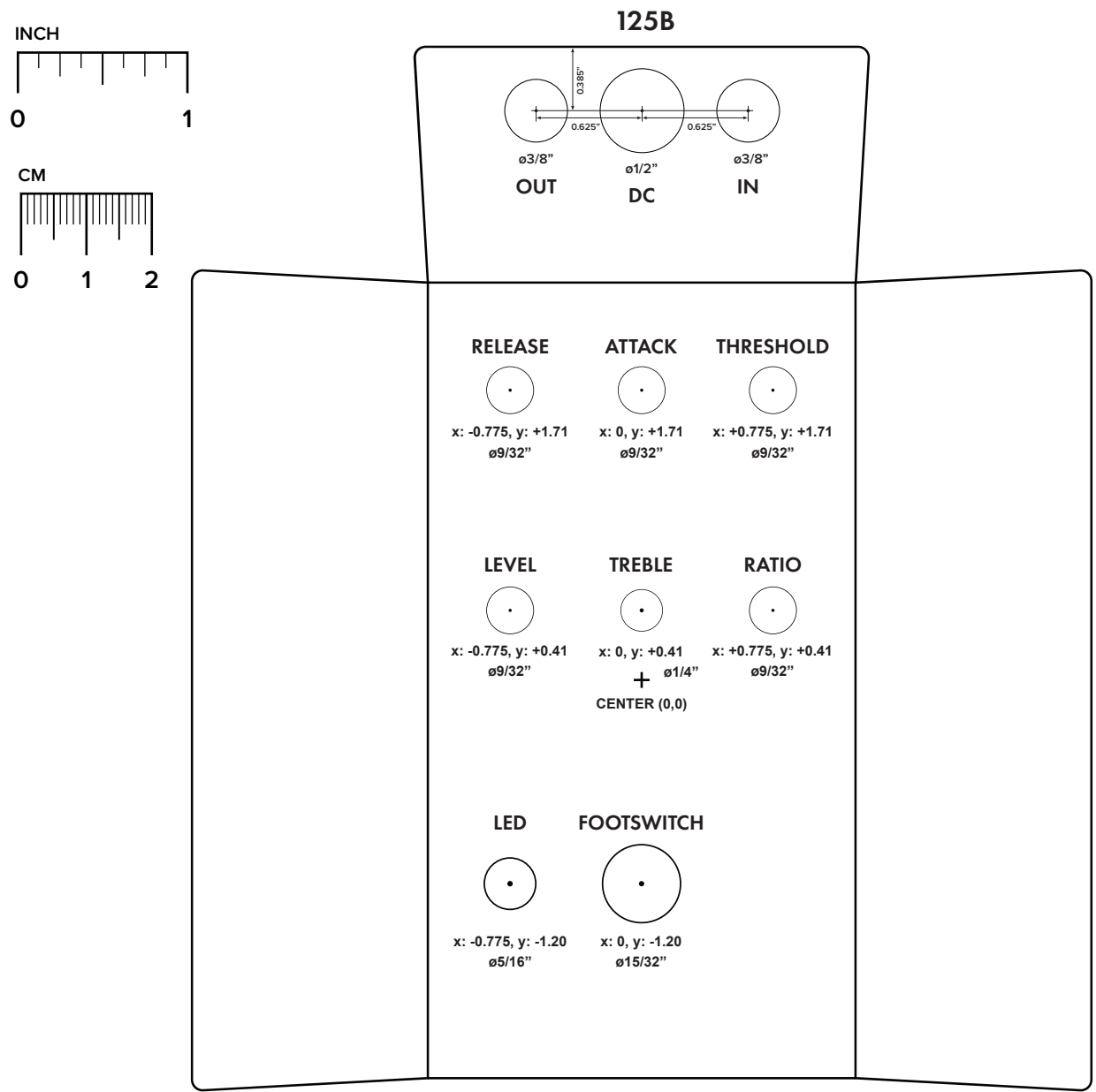
DRILL TEMPLATE

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.

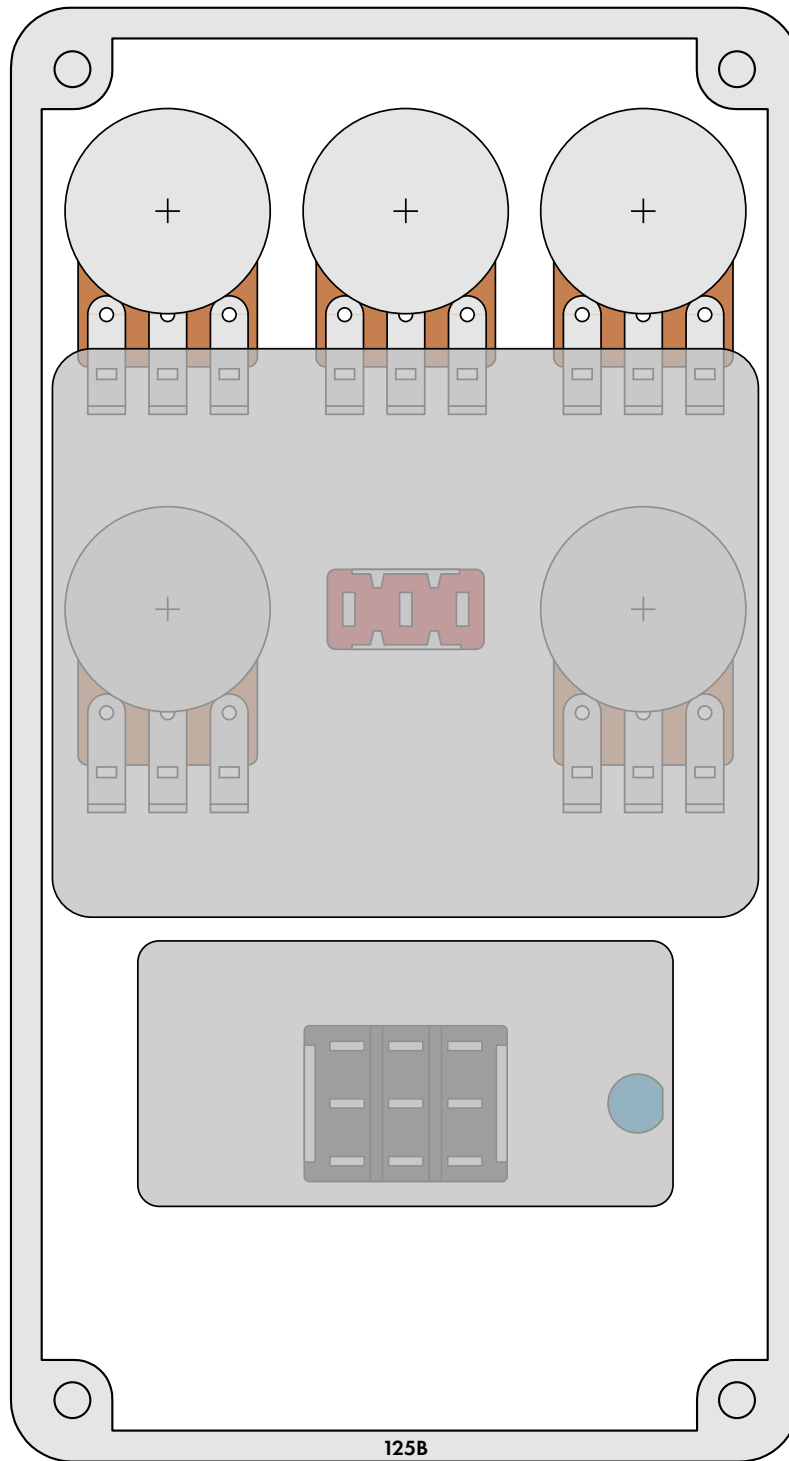
Top jack layout assumes the use of closed-frame jacks like the [Switchcraft 111X](#). If you'd rather use open-frame jacks, please refer to the [Open-Frame Jack Drill Template](#) for the top side.

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.

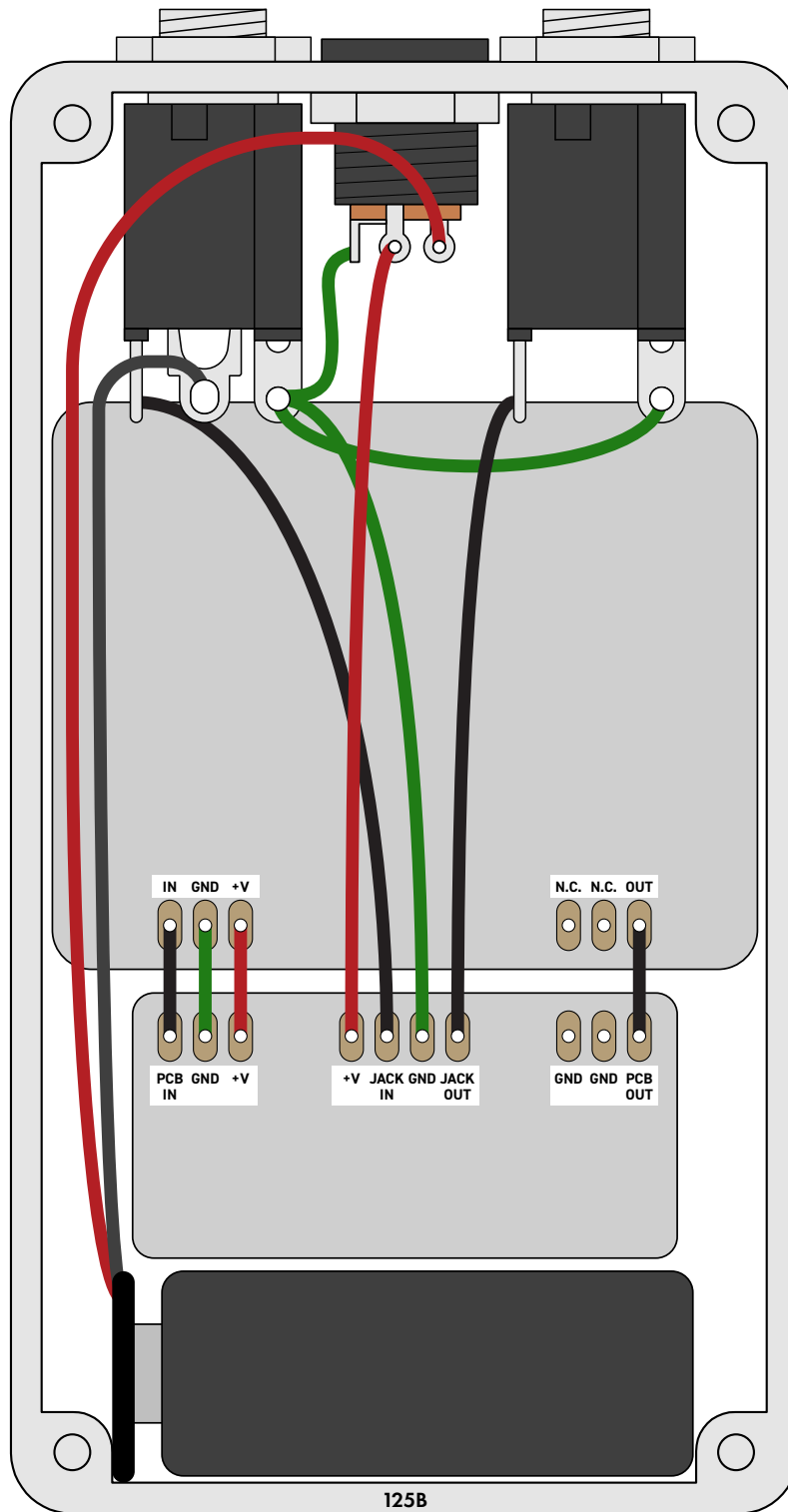


ENCLOSURE LAYOUT

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

1.0.1 (2023-10-12)

Corrected IC2 orientation in schematic. The PCB was correct but the

1.0.0 (2023-04-20)

Initial release.