PROJECT NAME

TARANIS

DIY GUITAR EFFECTS

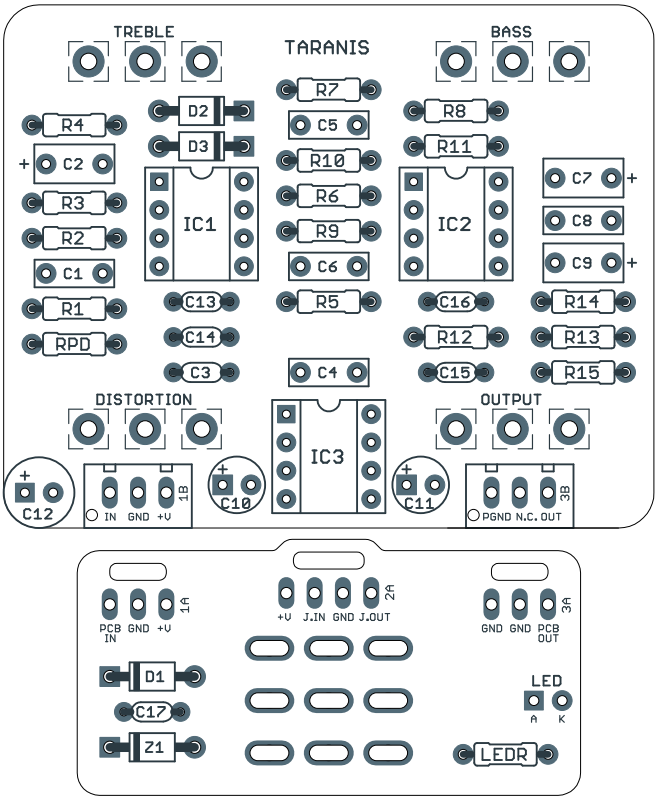
BASED ON
Mr. Black Thunderclaw

BUILD DIFFICULTY
Easy

EFFECT TYPE
Distortion

DOCUMENT VERSION
1.0.1 (2025-04-05)

PROJECT SUMMARY
A high-voltage drive that goes from clean to high gain, with two EQ bands and active volume control.



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

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INTRODUCTION

The Taranis Dynamic Distortion is an adaptation of the Mr. Black Thunderclaw, originally released in 2014 and traced by Aion FX in 2024.

The Thunderclaw is not strictly based on any existing pedal, though it does use several building blocks from other distortion designs. The input section and clipping arrangement resembles a RAT with a clean op-amp boost into back-to-back diodes to ground. The two cascaded tone controls are similar to single-band Baxandalls and bear some resemblance to the Tube Screamer tone control, both of which have boost and cut capabilities.

This is followed by an active volume control, with a potentiometer controlling the gain of an inverting op-amp stage, providing a constant output impedance. All of this is powered by a split-rail (bipolar) +/- 9V supply using a charge pump, which eliminates the need for coupling capacitors within the circuit. It can also reduce noise since there is no 1/2V reference voltage.

The Taranis is a direct adaptation of the Thunderclaw with no modifications or added features. We have included a zener diode for over-voltage protection as well as some extra power filtering for the ICs, but otherwise it is faithful to the original circuit.

USAGE

The Taranis has four controls:

- **Distortion** controls the amount of gain going into the clipping stage.
- **Treble** and **Bass** are active tone controls. The 12:00 position is flat. To the left, the frequency is cut, and to the right, it's boosted.
- **Output** controls the overall volume 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—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	470k	Metal film resistor, 1/4W	
R2	1k	Metal film resistor, 1/4W	
R3	470R	Metal film resistor, 1/4W	
R4	4k7	Metal film resistor, 1/4W	
R5	51k	Metal film resistor, 1/4W	
R6	51k	Metal film resistor, 1/4W	
R7	4k7	Metal film resistor, 1/4W	
R8	470R	Metal film resistor, 1/4W	
R9	4k7	Metal film resistor, 1/4W	
R10	4k7	Metal film resistor, 1/4W	
R11	470R	Metal film resistor, 1/4W	
R12	51k	Metal film resistor, 1/4W	
R13	51k	Metal film resistor, 1/4W	
R14	1k	Metal film resistor, 1/4W	
R15	100k	Metal film resistor, 1/4W	
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	100n	Film capacitor, 7.2 x 2.5mm	
C2	1uF	Film capacitor, 7.2 x 3.5mm	
C3	47pF	MLCC capacitor, NP0/C0G	Optional. See build notes.
C4	100n	Film capacitor, 7.2 x 2.5mm	
C5	10n	Film capacitor, 7.2 x 2.5mm	
C6	1n	Film capacitor, 7.2 x 2.5mm	
C7	1uF	Film capacitor, 7.2 x 3.5mm	
C8	1n	Film capacitor, 7.2 x 2.5mm	
C9	1uF	Film capacitor, 7.2 x 3.5mm	
C10	10uF	Electrolytic capacitor, 5mm	
C11	47uF	Electrolytic capacitor, 5mm	Power supply filter capacitor.
C12	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C13	100n	MLCC capacitor, X7R	Power supply filter capacitor.
C14	100n	MLCC capacitor, X7R	Power supply filter capacitor.

PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
C15	100n	MLCC capacitor, X7R	Power supply filter capacitor.
C16	100n	MLCC capacitor, X7R	Power supply filter capacitor.
C17	100n	MLCC capacitor, X7R	Power supply filter capacitor.
Z1	1N4742A	Zener diode, 12V, DO-41	
D1	1N5817	Schottky diode, DO-41	
D2	1N4001	Rectifier diode, DO-41	
D3	1N4001	Rectifier diode, DO-41	
IC1	RC4558P	Operational amplifier, dual, DIP-8	
IC1-S	DIP-8 socket	IC socket, DIP-8	
IC2	RC4558P	Operational amplifier, dual, DIP-8	
IC2-S	DIP-8 socket	IC socket, DIP-8	
IC3	LT1054CP	Charge pump, DIP-8	
IC3-S	DIP-8 socket	IC socket, DIP-8	
DIST.	50kB	16mm right-angle PCB mount pot	Linear taper.
TREBLE	50kB	16mm right-angle PCB mount pot	Linear taper.
BASS	50kB	16mm right-angle PCB mount pot	Linear taper.
OUTPUT	50kB	16mm right-angle PCB mount pot	Linear taper.
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

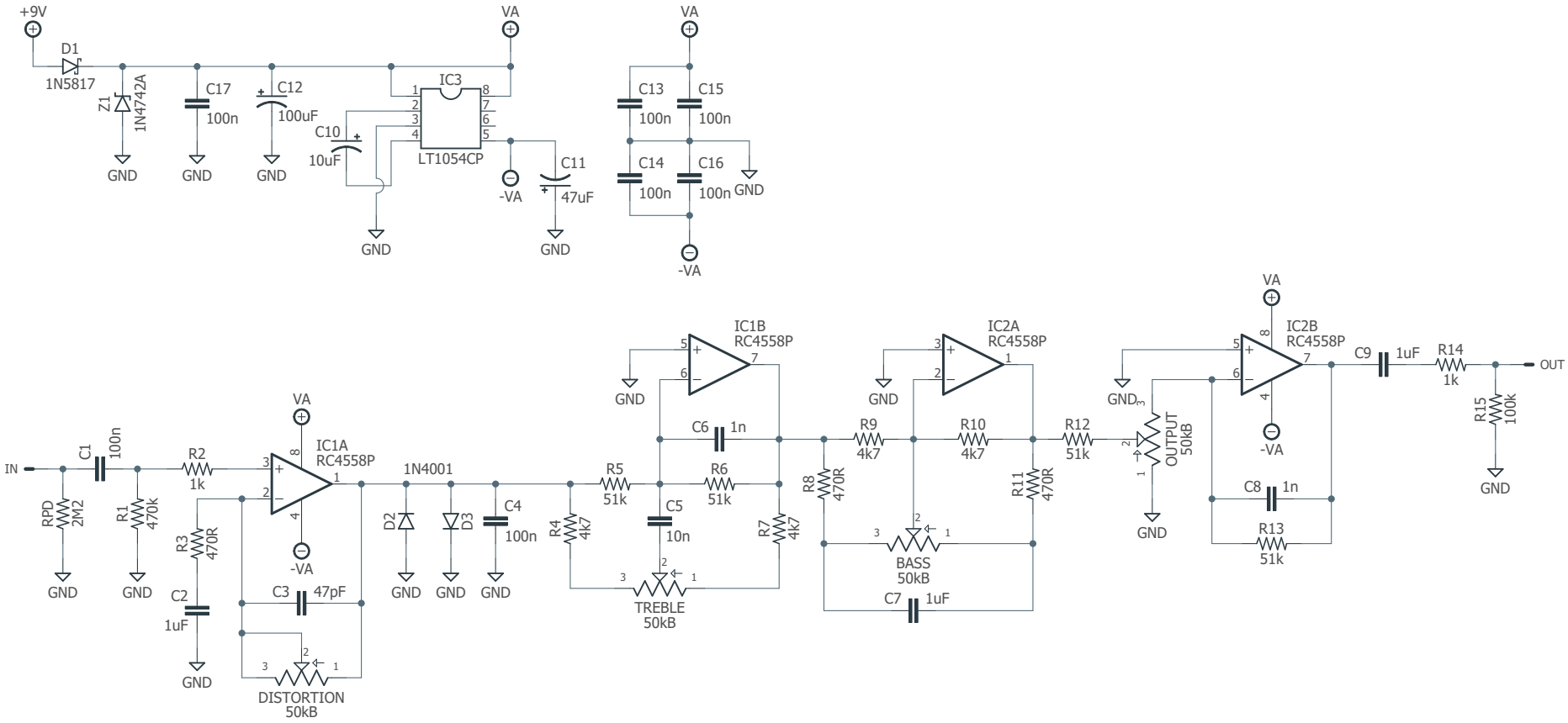
C3 feedback capacitor

The original Thunderclaw has a space for this capacitor, but it is unpopulated. It's typically best practice to have a small-value feedback capacitor in op amp gain stages to prevent high-frequency oscillation, so we recommend using 47pF here, but you can leave it empty if you want.

C13-C16 filter capacitors

C13-C16 are local bypass capacitors for each of the ICs. The original unit also did not have these capacitors, but we had extra space on the PCB so we included them. They are optional, but help provide a more theoretically stable power supply, whether or not they makes any difference in practice.

SCHEMATIC


+9V
D1
1N5817
Z1
1N4742A
C17
100n
C12
100uF
C10
10uF
IC3
LT1054CP
C11
47uF
VA
-VA
GND
C13
C15
C14
C16
100n
IC1A
RC4558P
IC1B
IC2A
IC2B
IN
C1
RPD
2M2
R1
470k
R2
1k
R3
470R
C2
1uF
C3
47pF
DISTORTION
50kB
1N4001
D2
D3
C4
R4
4k7
R5
51k
R6
C5
10n
TREBLE
50kB
C6
1n
R7
R8
R9
R10
R11
R12
BASS
50kB
C7
OUTPUT
50kB
C8
R13
C9
R14
R15
100k
OUT

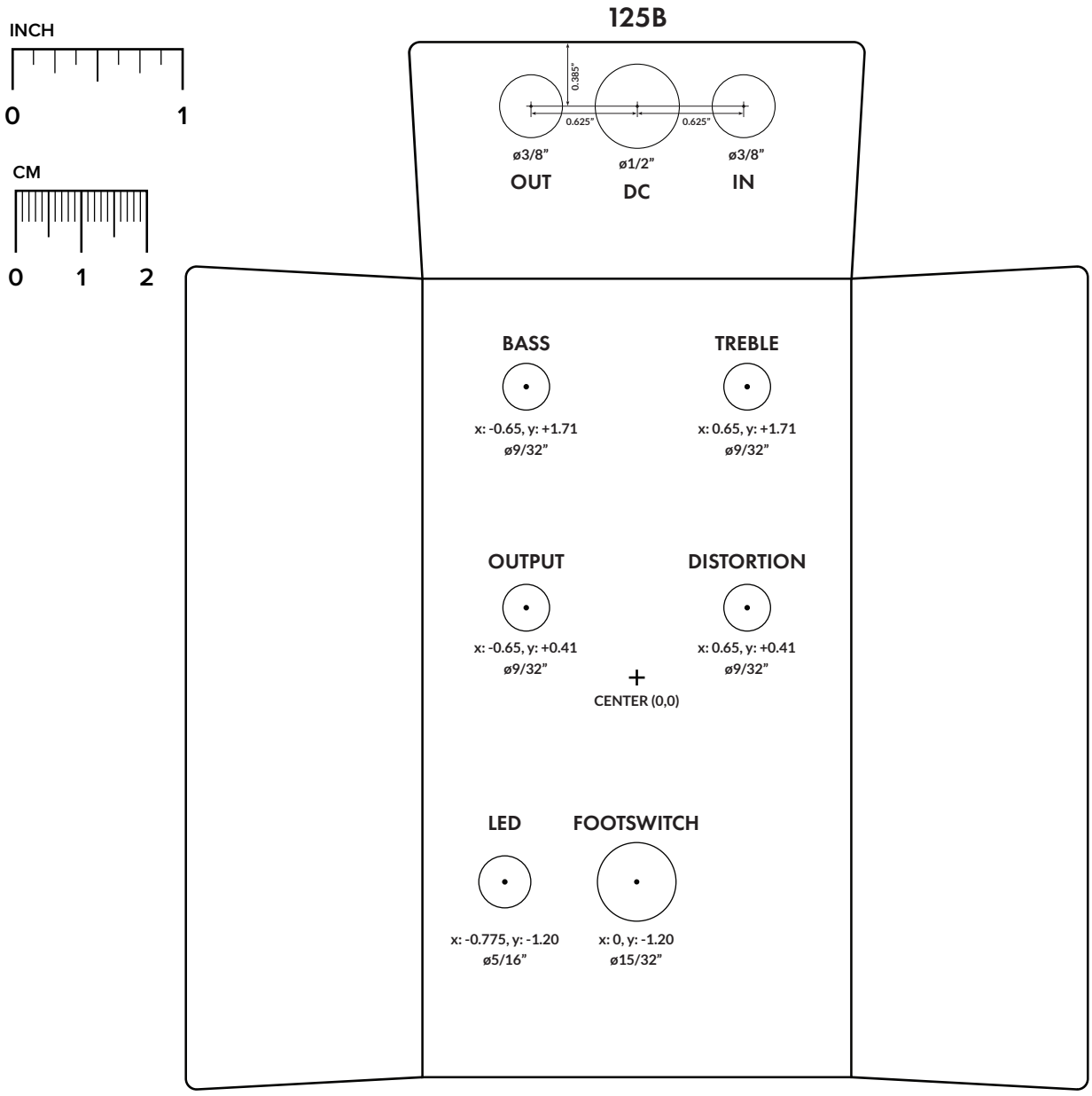
DRILL TEMPLATE

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.

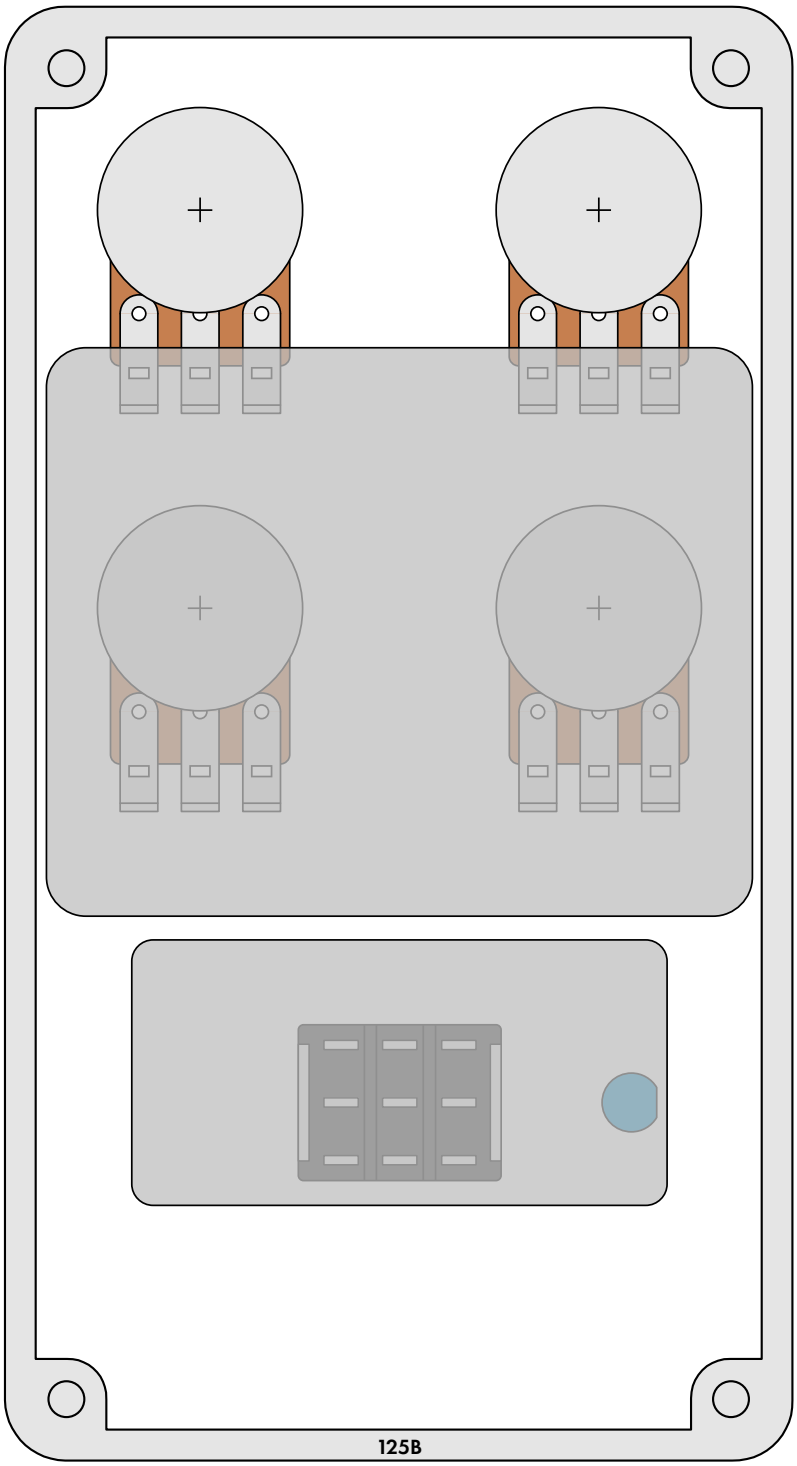
Top jack layout assumes the use of closed-frame jacks like the Switchcraft 111X. If you'd rather use open-frame jacks, please refer to the Open-Frame Jack Drill Template for the top side.

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.

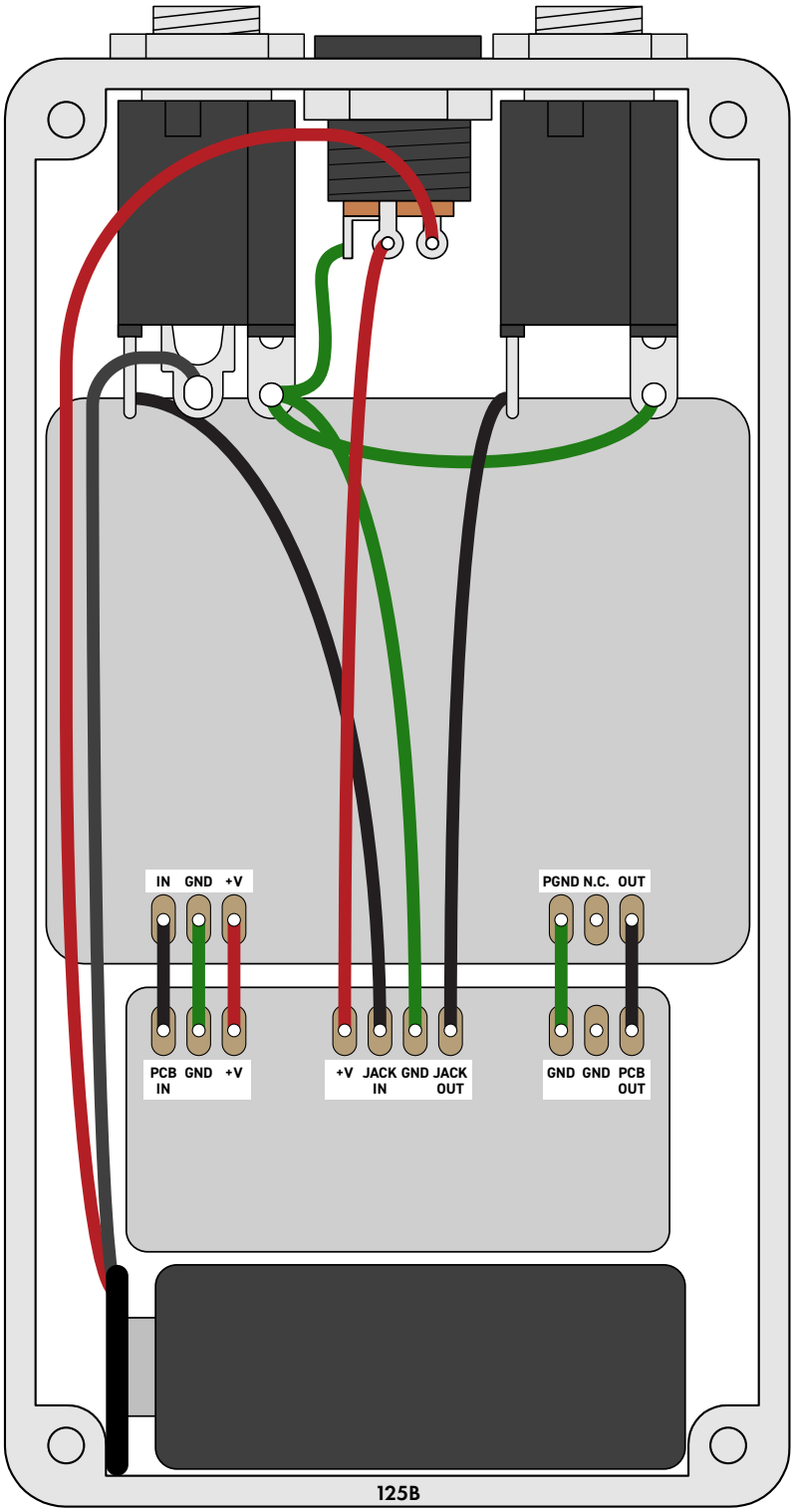


ENCLOSURE LAYOUT

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 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

1.0.1 (2025-04-05)
Updated R4 and R7 to 4k7 based on a review of the original trace.

1.0.0 (2024-11-29)
Initial release.