

PROJECT NAME

# GLADIUS

BASED ON

King Tone Soloist

EFFECT TYPE

Overdrive

BUILD DIFFICULTY

■■■■■ Easy

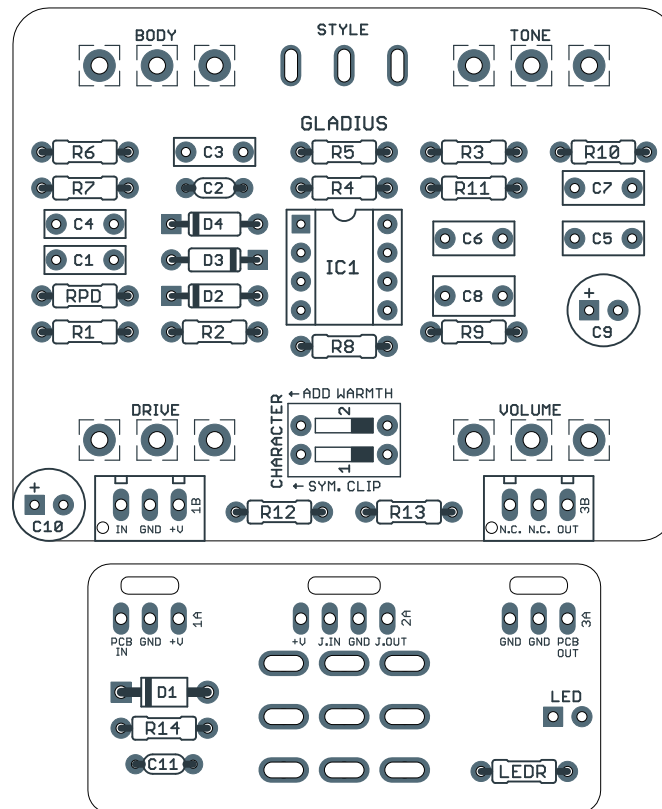
DOCUMENT VERSION

1.0.0 (2022-05-13)



## PROJECT SUMMARY

A single-channel adaptation of side A of the popular Duellist dual pedal, based on a stripped-down Ibanez Tube Screamer with hot-rod'd features.



Actual size is 2.3" x 1.86" (main board) and 1.78" x 0.87" (bypass board).

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## INTRODUCTION

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The Gladius Dynamic Overdrive is based on the King Tone Soloist, [traced by Aion FX](#) in 2022. First released in 2020, the Soloist is side “A” (String-Singer) of the Duellist dual pedal.

It’s no secret that it’s based on the Tube Screamer, but its modifications are significant enough that depending on the control settings, it can either sound nothing like a TS or exactly like one.

However, the Soloist is not an exact copy of the circuit inside the Duellist. A “Body” potentiometer has been added, and the “Fat” toggle mode has been swapped for the new “Edge” mode. The internal DIP switch has been removed, so the “Warmth” and “Asymmetric” modes from the Duellist are not in this circuit.

The Gladius unifies these two circuits, adding the internal DIP switch from the Duellist so that the Warmth and Asymmetric modes are once again available. Otherwise, it’s a direct adaptation of the Soloist standalone pedal.

## USAGE

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The Gladius has five external controls:

- **Drive** controls the amount of gain in the op-amp feedback diode clipping stage.
- **Body** controls the low-end response of the effect before the clipping.
- **Tone** is an active treble boost/cut after the clipping stage.
- **Volume** controls the overall output.
- **Style** (toggle switch) selects between Edge, Stock and Glass modes, which set the pre-clipping treble response.

There are also two internal DIP switch options:

- **Warmth** adds a second treble-cut capacitor before the tone control, reducing the maximum amount of treble available. Engaged when the DIP switch is “on”.
- **Asymmetric** adds another diode in series with the first set for asymmetric clipping. Engaged when the DIP switch is “off”.

## 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	1M	Metal film resistor, 1/4W	
R2	47k	Metal film resistor, 1/4W	
R3	4k7	Metal film resistor, 1/4W	
R4	1k2	Metal film resistor, 1/4W	
R5	3k3	Metal film resistor, 1/4W	
R6	4k7	Metal film resistor, 1/4W	
R7	OMIT		Tapering resistor for Body pot. See build notes.
R8	1k	Metal film resistor, 1/4W	
R9	10k	Metal film resistor, 1/4W	
R10	220R	Metal film resistor, 1/4W	
R11	1k	Metal film resistor, 1/4W	
R12	10k	Metal film resistor, 1/4W	
R13	10k	Metal film resistor, 1/4W	
R14	100R	Metal film resistor, 1/4W	Power supply filter resistor.
RPD	2M2	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	47pF	MLCC capacitor, NP0/C0G	
C3	47n	Film capacitor, 7.2 x 2.5mm	
C4	100n	Film capacitor, 7.2 x 2.5mm	
C5	220n	Film capacitor, 7.2 x 2.5mm	
C6	220n	Film capacitor, 7.2 x 2.5mm	
C7	220n	Film capacitor, 7.2 x 2.5mm	
C8	1uF	Film capacitor, 7.2 x 3.5mm	
C9	100uF	Electrolytic capacitor, 6.3mm	Reference voltage filter capacitor.
C10	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C11	100n	MLCC capacitor, X7R	Power supply filter capacitor.
D1	1N5817	Schottky diode, DO-41	
D2	BAS33	Switching diode, DO-35	
D3	BAS33	Switching diode, DO-35	Original uses BA282 diodes. The BAS33 is the closest available diode currently available. See build notes.
D4	BAS33	Switching diode, DO-35	

## PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
IC1	RC4558P	Operational amplifier, DIP8	
IC1-S	DIP-8 socket	IC socket, DIP-8	
CHAR.	2-pos. DIP	DIP switch, 2-position	
DRIVE	1MA	16mm right-angle PCB mount pot	
BODY	150kC	16mm right-angle PCB mount pot	Can also use 250kC with tapering resistor. See build notes.
TONE	20kW	16mm right-angle PCB mount pot	
LEVEL	100kA	16mm right-angle PCB mount pot	Original uses linear taper, but audio taper will provide better control.
STYLE	SPDT cntr. off	Toggle switch, SPDT on-off-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	
ENC	125B	Enclosure, die-cast aluminum	Can also use a Hammond 1590N1.

## BUILD NOTES

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### Clipping diodes

The Heavyhand uses BA282 diodes, which clip at a slightly higher threshold than standard silicon diodes such as 1N914 (approximately 0.82V compared to 0.7V). These diodes are out of production and hard to find in the old-stuck market.

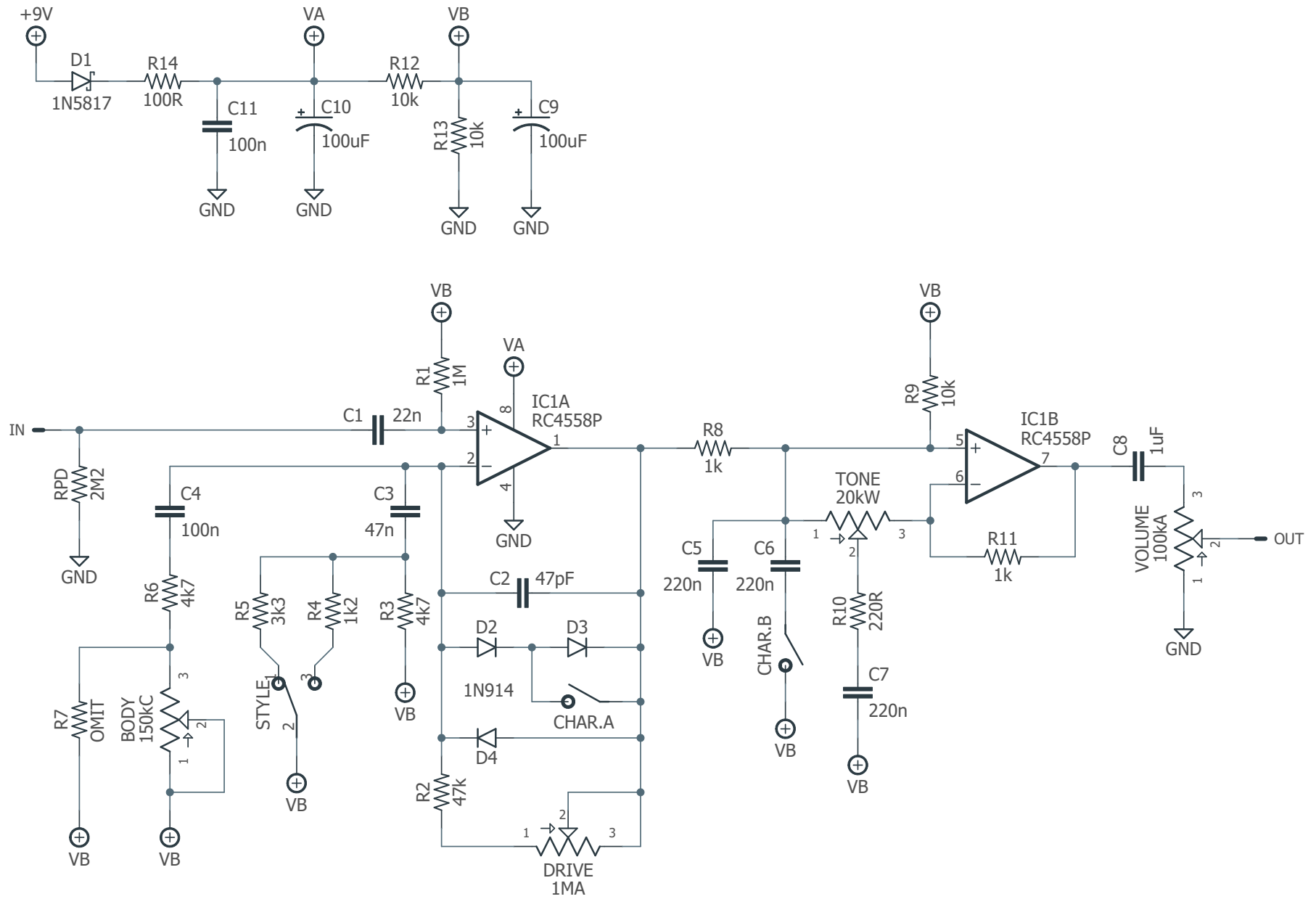
Now, the closest option is the BAS33. These clip at around 0.8V, still significantly higher than the 1N914 and only slightly lower than the BA282. We've compared the curves on a Peak DCA75 and confirmed that they closely match the BA282 across the current test range.

The only problem is that the BAS33 went end-of-life in early 2022. Availability is still high, but eventually they'll join the ranks of the others.

### Body potentiometer

The Body pot is 150kC in the original, which is an odd value (though not impossible to find). R7 has been added as a tapering resistor to approximate the 150kC value using a 250kC pot. If you use 250kC, then use **390k** for R7. The curve will be slightly different, but not drastic.

# SCHEMATIC



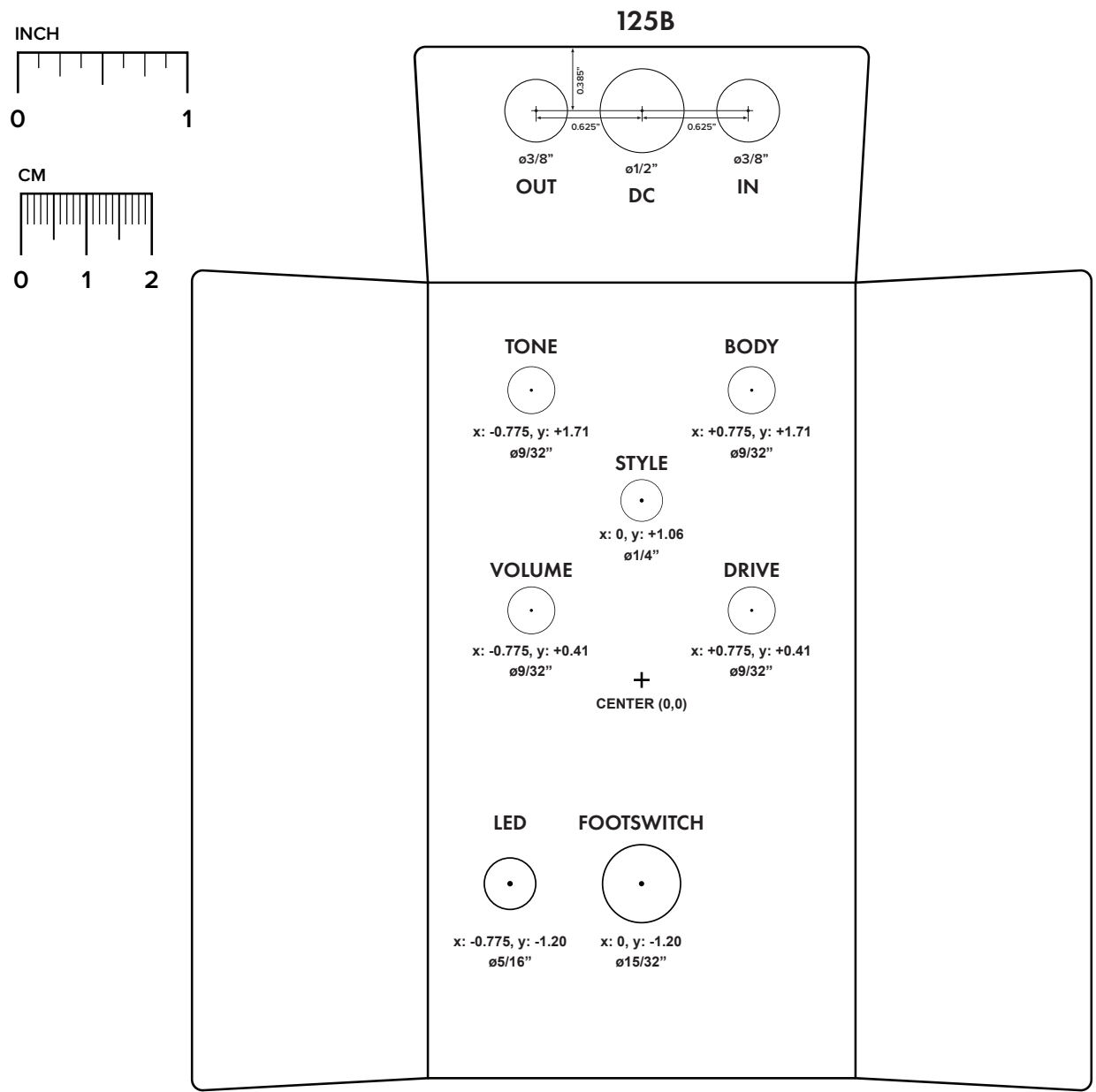
# DRILL TEMPLATE

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.

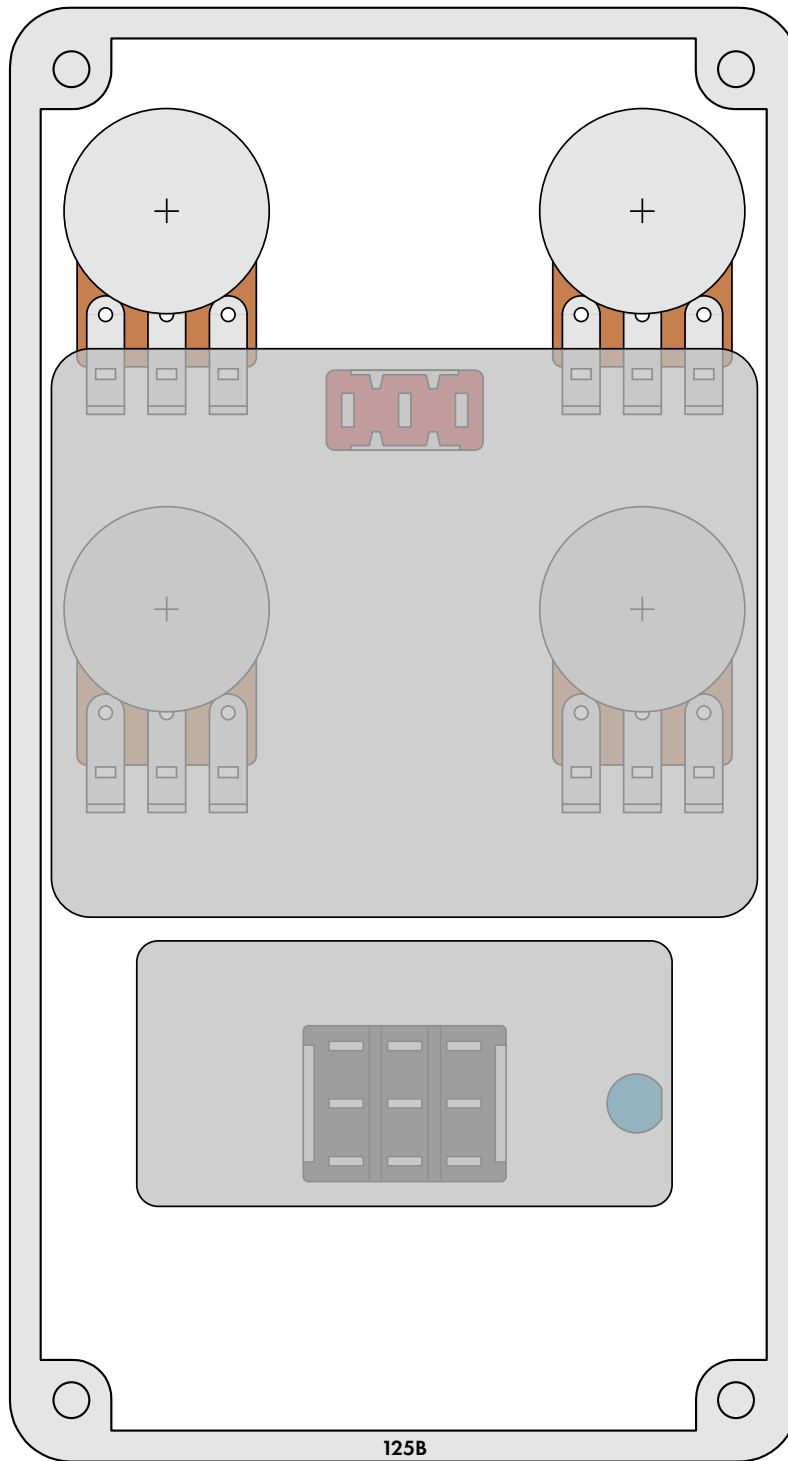
**LED hole drill size** assumes the use of a [5mm LED bezel](#), available from several parts suppliers. Adjust size accordingly if using something different, such as a 3mm bezel, a plastic bezel, or just a plain LED.



# ENCLOSURE LAYOUT

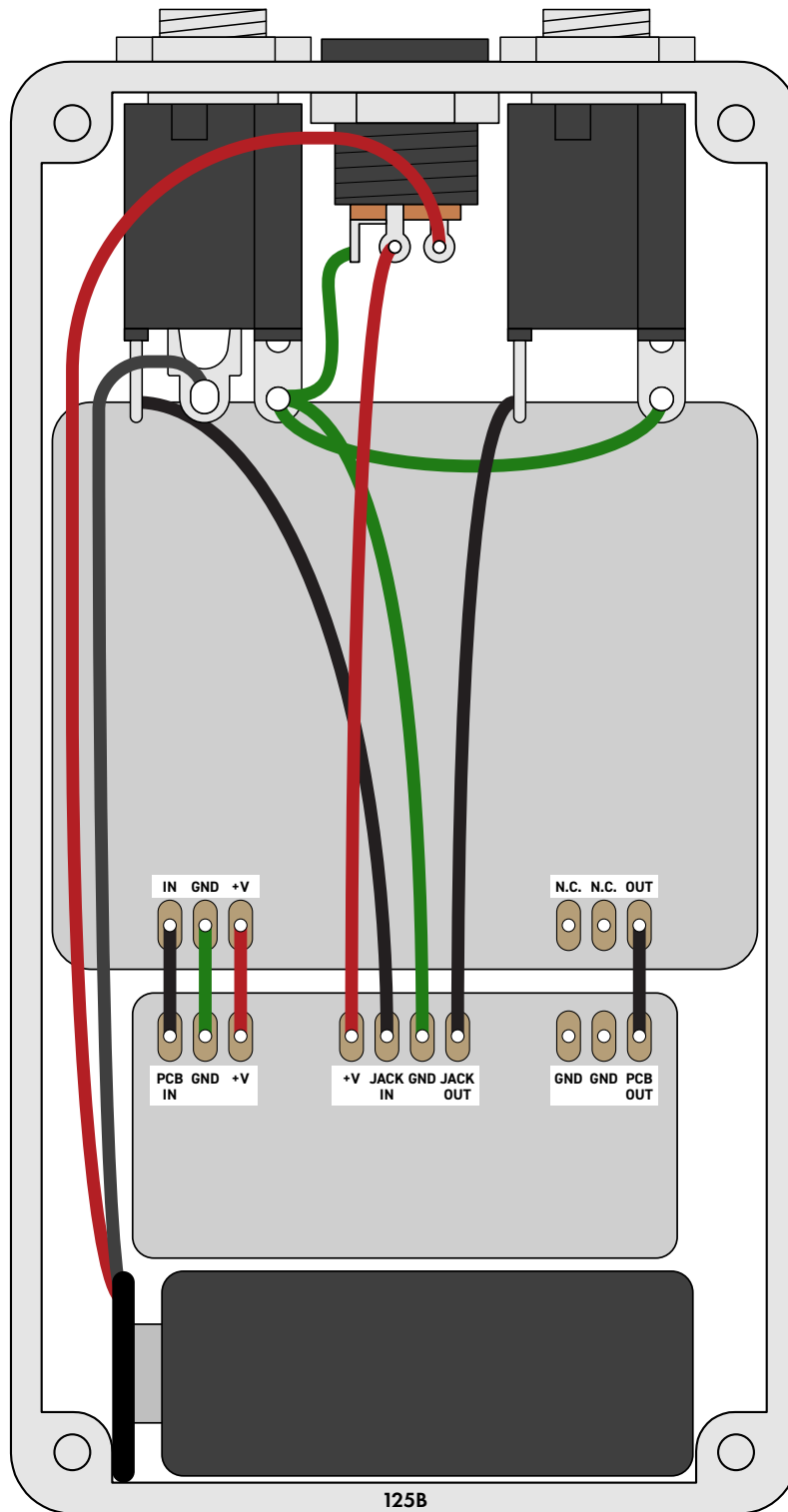
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Enclosure is shown without jacks. See next page for jack layout and wiring.





# WIRING DIAGRAM



## LICENSE & USAGE

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**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

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### 1.0.0 (2022-05-13)

Initial release.