

PROJECT NAME  
**TORUS**

BASED ON  
Mid-Fi Demo Tape Fuzz

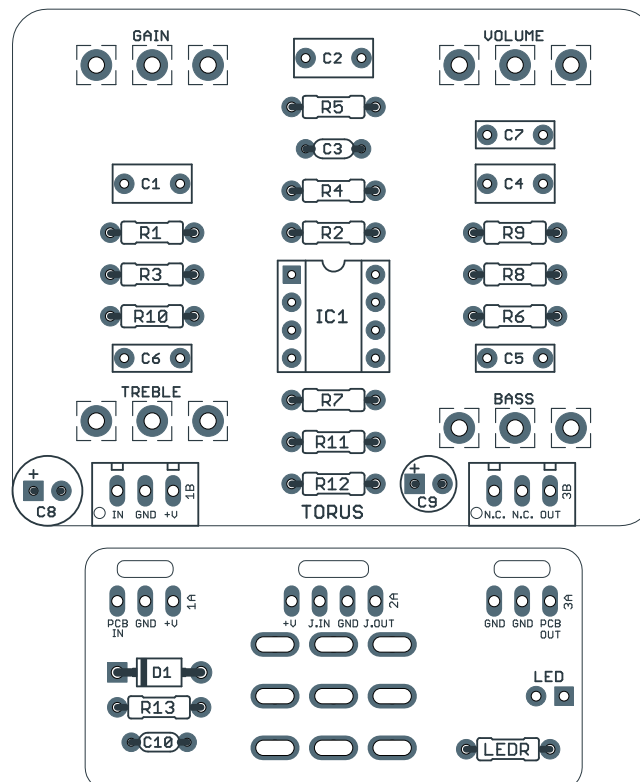
BUILD DIFFICULTY  
■□□□□ Beginner

EFFECT TYPE  
Distortion / Fuzz

DOCUMENT VERSION  
1.0.0 (2019-08-04)

**PROJECT SUMMARY**

A thick fuzz/distortion circuit designed to replicate the low-budget garage tones of an overloaded cassette recorder.



*Actual size is 2.3" x 1.86" (main board) and 1.79" x 0.86" (bypass board).*

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## INTRODUCTION

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The Torus Lo-Fi Fuzz is based on the Demo Tape Fuzz by Mid-Fi Electronics. The Demo Tape Fuzz is a throwback to the days of running a guitar into a cassette recorder and cranking the gain to overload it and create distortion.

The circuit consists of two simple building blocks. It starts out with an op-amp gain stage. This is similar to a Distortion+, so the low-pass frequency changes with the gain. (This is in contrast to most drive circuits after the 1970s where the potentiometer instead controls the feedback resistor, so the low-pass frequency remains constant.) Next, a basic Baxandall tone section allows adjustment of treble & bass.

The interesting thing about this circuit is that, like a cassette recorder, there are no clipping diodes, so all of the distortion/fuzz sound is generated “unintentionally” by op-amp clipping. It can get pretty thick, but retains its rough-around-the-edges character at all settings.

## USAGE

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The Torus has the following controls:

- **Gain** (called “Trim” in the original) controls the amount of gain in the op-amp stage, as well as varying the low-pass filter.
- **Treble** forms half of the Baxandall tone control and allows adjustment of the treble frequencies.
- **Bass** forms the other half and allows adjustment of the bass frequencies.
- **Volume** controls the overall output 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.

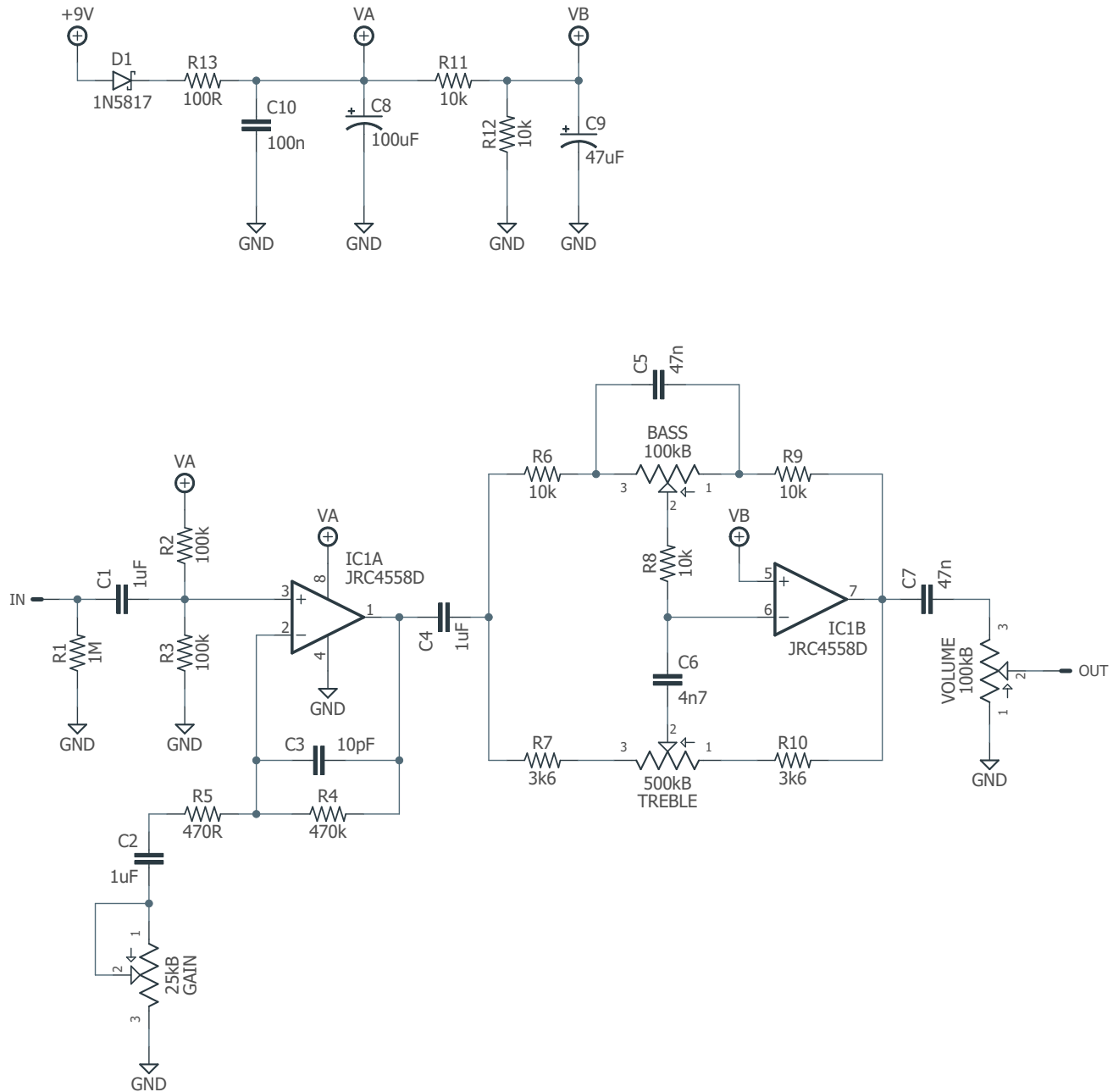
[View parts list spreadsheet](#) →

PART	VALUE	TYPE	NOTES
C1	1uF	Film capacitor, 7.2 x 3.5mm	
C2	1uF	Film capacitor, 7.2 x 3.5mm	
C3	10pF	MLCC capacitor, NP0/C0G	
C4	1uF	Film capacitor, 7.2 x 3.5mm	
C5	47n	Film capacitor, 7.2 x 2.5mm	
C6	4n7	Film capacitor, 7.2 x 2.5mm	
C7	47n	Film capacitor, 7.2 x 2.5mm	
C8	100uF	Electrolytic capacitor, 6.3mm	
C9	47uF	Electrolytic capacitor, 5mm	
C10	100n	MLCC capacitor, X7R	
R1	1M	Metal film resistor, 1/4W	
R2	100k	Metal film resistor, 1/4W	
R3	100k	Metal film resistor, 1/4W	
R4	470k	Metal film resistor, 1/4W	
R5	470R	Metal film resistor, 1/4W	
R6	10k	Metal film resistor, 1/4W	
R7	3k6	Metal film resistor, 1/4W	
R8	10k	Metal film resistor, 1/4W	
R9	10k	Metal film resistor, 1/4W	
R10	3k6	Metal film resistor, 1/4W	
R11	10k	Metal film resistor, 1/4W	
R12	10k	Metal film resistor, 1/4W	
R13	100R	Metal film resistor, 1/4W	
LEDR	4k7	Metal film resistor, 1/4W	
D1	1N5817	Schottky diode, DO-41	
IC1	JRC4558D	Operational amplifier, DIP8	
IC1-S	DIP-8 socket	IC socket, DIP-8	

## PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
GAIN	25kB	Potentiometer, 16mm right-angle	
TREBLE	500kB	Potentiometer, 16mm right-angle	
BASS	100kB	Potentiometer, 16mm right-angle	
VOL.	100kB	Potentiometer, 16mm right-angle	
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.
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.

# SCHEMATIC



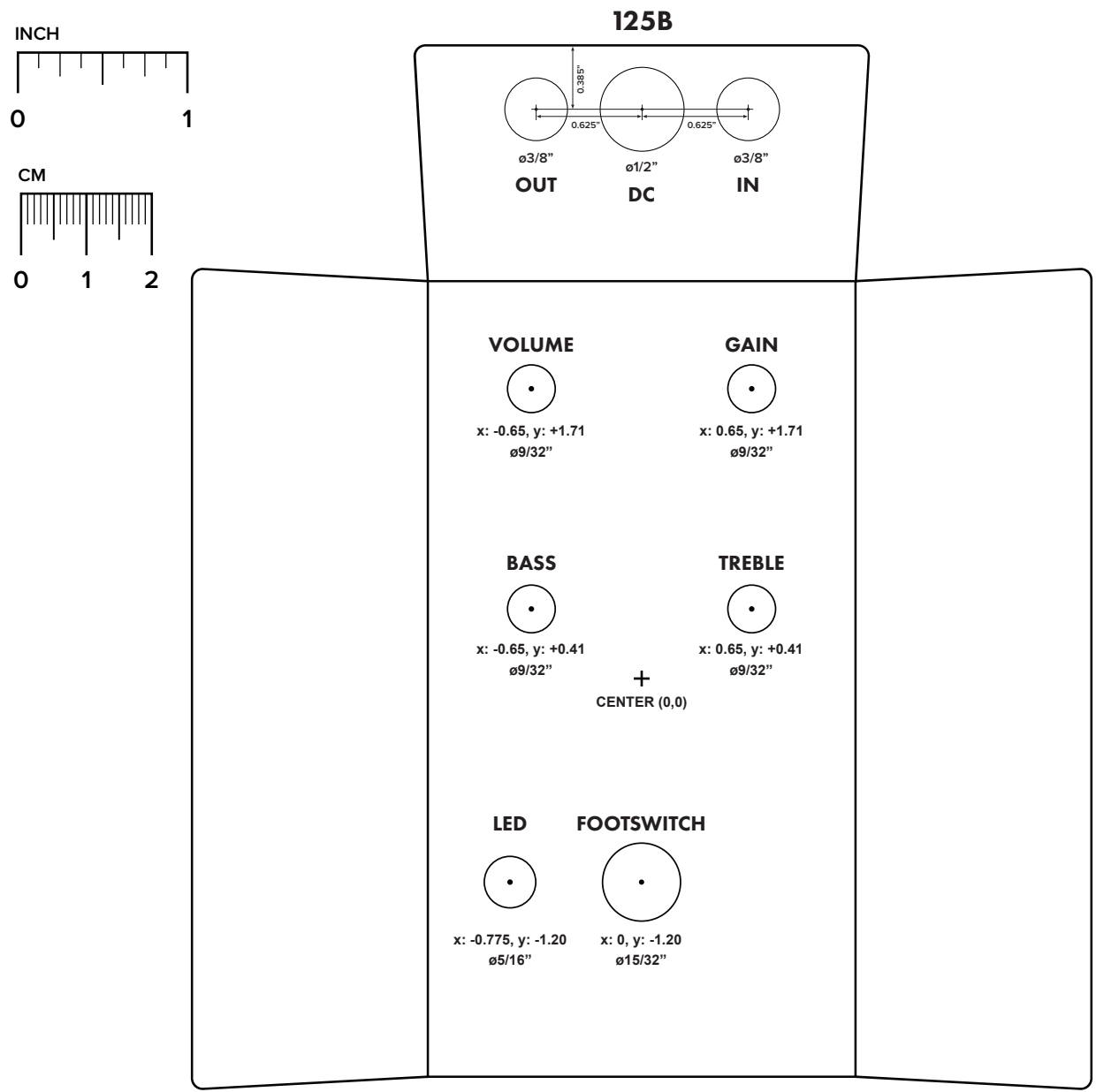
# DRILL TEMPLATE

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.

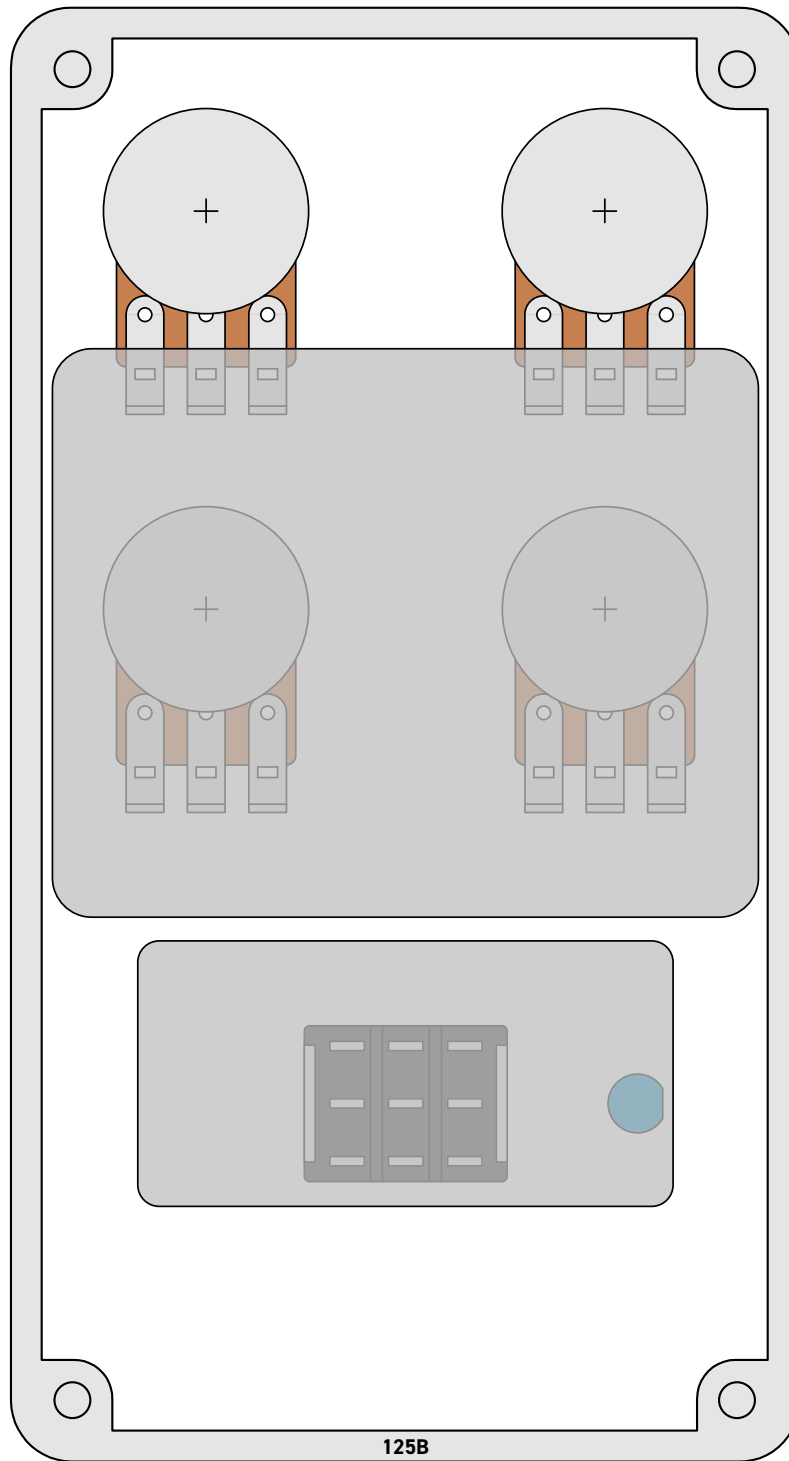
**LED hole drill size** assumes the use of a [5mm LED bezel](#), available from several parts suppliers. Adjust size accordingly if using something different, such as a 3mm bezel, a plastic bezel, or just a plain LED.



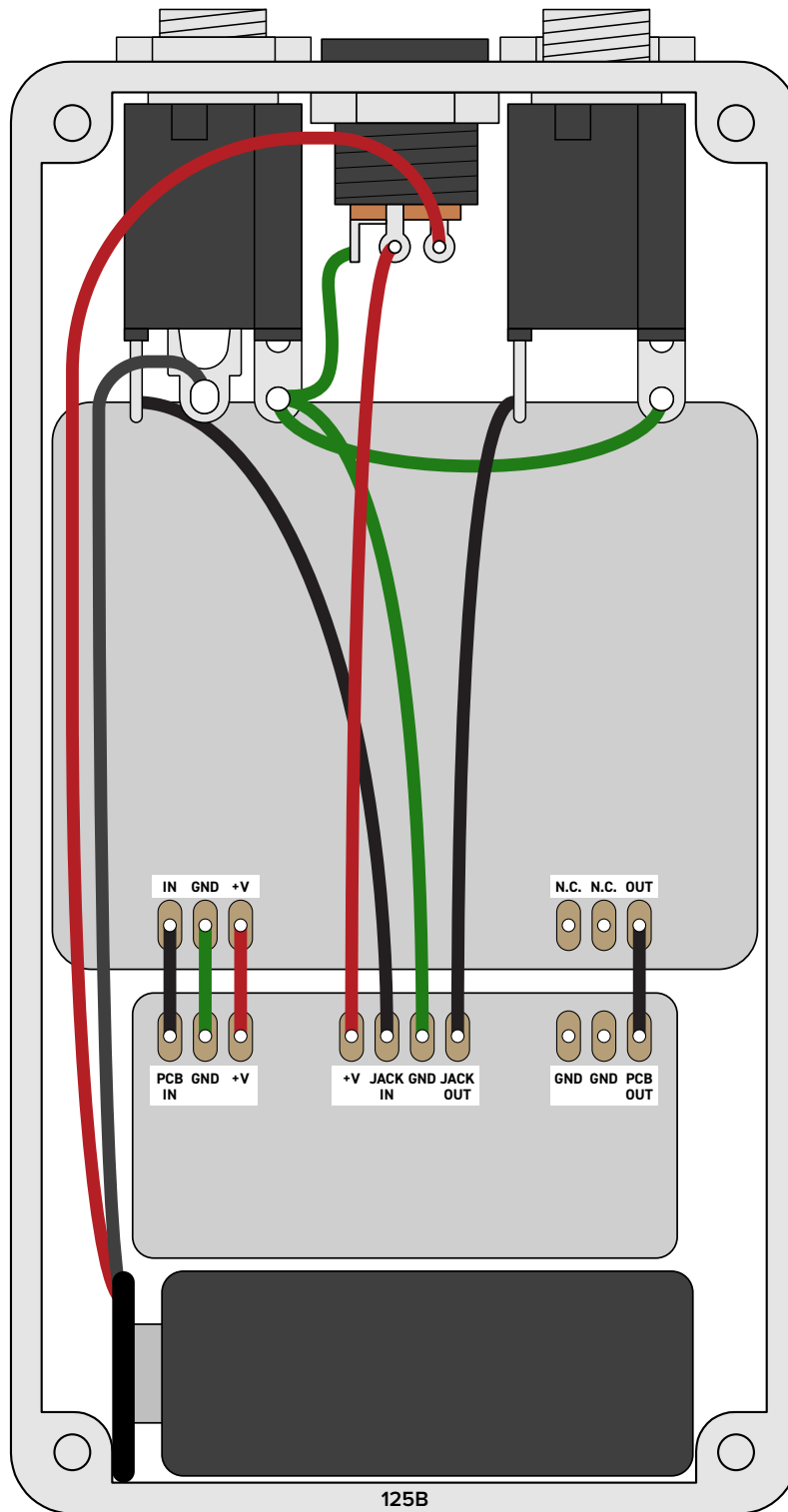
# ENCLOSURE LAYOUT

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



# WIRING DIAGRAM



*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

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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 (2019-08-04)**

Initial release.