

PROJECT NAME

# PHOTON

BASED ON

Seymour Duncan Pickup Booster

BUILD DIFFICULTY

■■■■■ Easy

EFFECT TYPE

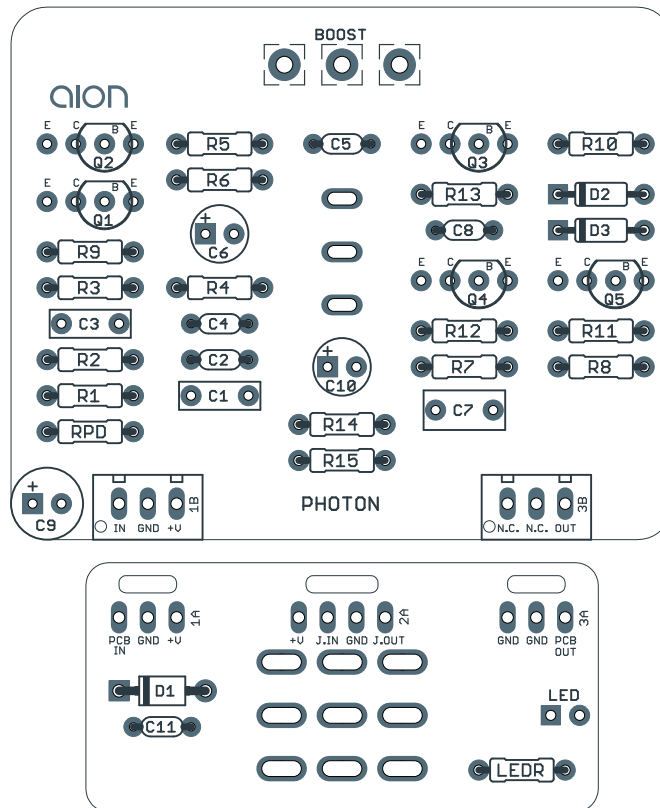
Booster & pickup enhancer

DOCUMENT VERSION

1.0.0 (2019-10-18)

PROJECT SUMMARY

A Class-A amplifier capable of up to 25dB of clean gain, this pedal also has a unique Resonance feature that enables a single-coil pickup to sound like a vintage or modern humbucker.



Actual size is 2.3" x 1.86" (main board) and 1.78" x 0.86" (bypass board).

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## INTRODUCTION

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The Photon Booster / Line Driver is an adaptation of the Seymour Duncan Pickup Booster (version 2, 2015, traced by Aion FX in 2019).

The V2 update of the Pickup Booster added a true class-A output stage. The first version was traced in 2007, but the new version had not yet been dissected by the DIY community.

The Pickup Booster is designed to provide 25dB of crystal-clean Class A boost. It also has a resonant peak switch that makes a single-coil pickup sound more like a vintage or high-output humbucker depending on the setting.

Because of the direct interaction with the pickups, it's recommended to use the pedal as the first effect in the signal chain, otherwise the Resonance switch will not work as advertised and will just act as a slight treble cut.

The Photon is a direct clone of the Pickup Booster with no modifications other than some additional power supply filtering.

## USAGE

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The Photon has the following controls:

- **Boost** sets the overall signal level, from unity gain at minimum all the way to +25dB at maximum.
- **Resonance** sets the resonant peak at the input of the effect. The center position leaves the resonant peak untouched, while the up & down positions can allow a single-coil pickup to sound more like either a vintage humbucker or a modern high-output humbucker.

## 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—most notably potentiometers—so the second tab lists all the non-Mouser parts as well as sources for each.

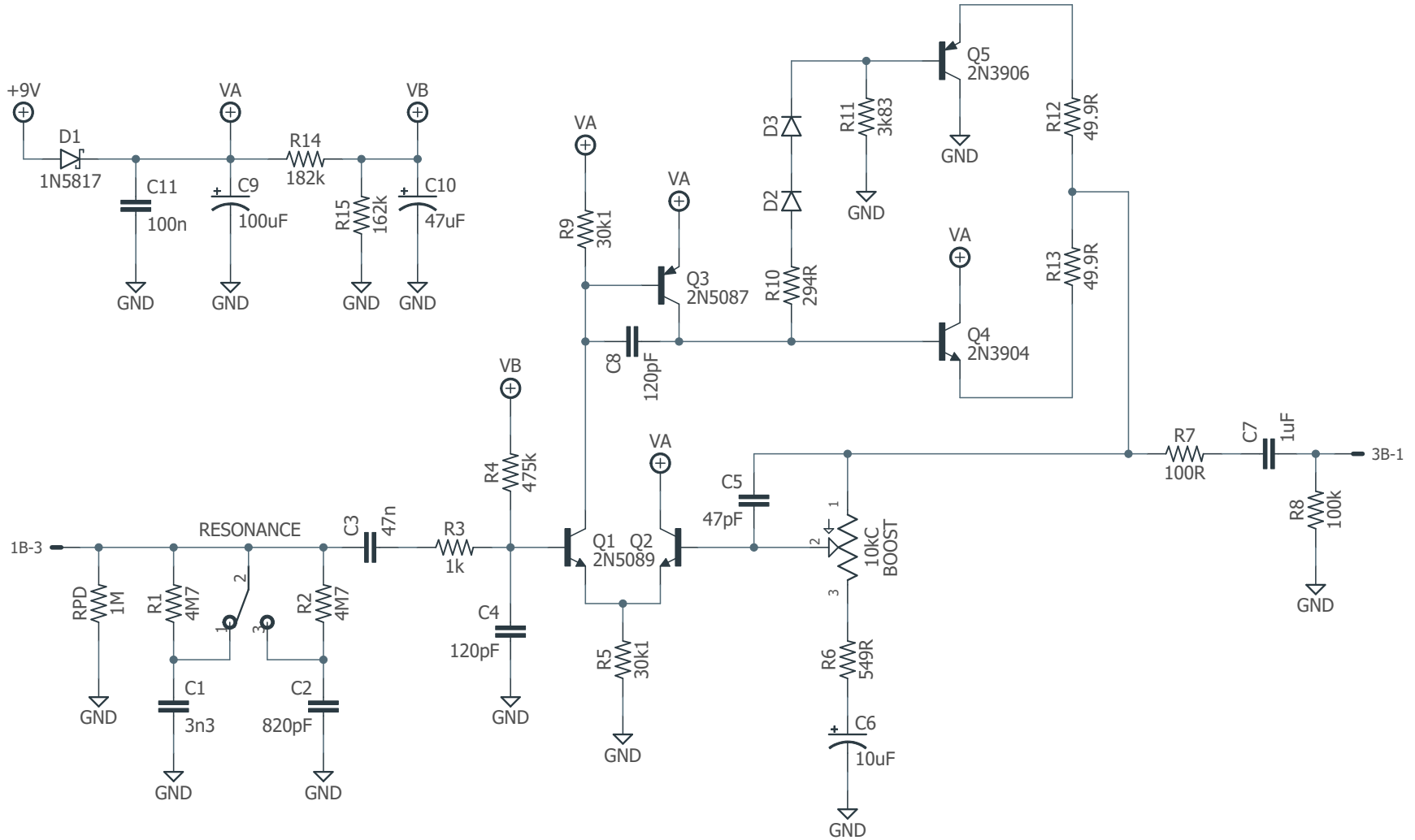
[View parts list spreadsheet](#) →

PART	VALUE	TYPE	NOTES
R1	4M7	Metal film resistor, 1/4W	Anti-pop resistor for Resonance switch.
R2	4M7	Metal film resistor, 1/4W	Anti-pop resistor for Resonance switch.
R3	1k	Metal film resistor, 1/4W	
R4	475k	Metal film resistor, 1/4W	Can substitute 470k.
R5	30k1	Metal film resistor, 1/4W	Can substitute 30k.
R6	549R	Metal film resistor, 1/4W	Can substitute 560R.
R7	100R	Metal film resistor, 1/4W	
R8	100k	Metal film resistor, 1/4W	
R9	30k1	Metal film resistor, 1/4W	Can substitute 30k.
R10	294R	Metal film resistor, 1/4W	Can substitute 300R.
R11	3k83	Metal film resistor, 1/4W	Can substitute 3.9k.
R12	49.9R	Metal film resistor, 1/4W	Can substitute 51R.
R13	49.9R	Metal film resistor, 1/4W	Can substitute 51R.
R14	182k	Metal film resistor, 1/4W	Can substitute 180k.
R15	162k	Metal film resistor, 1/4W	Can substitute 160k.
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	3n3	Film capacitor, 7.2 x 2.5mm	
C2	820pF	MLCC capacitor, NP0/COG	
C3	47n	Film capacitor, 7.2 x 2.5mm	
C4	120pF	MLCC capacitor, NP0/COG	
C5	47pF	MLCC capacitor, NP0/COG	
C6	10uF	Electrolytic capacitor, 5mm	
C7	1uF	Film capacitor, 7.2 x 3.5mm	
C8	120pF	MLCC capacitor, NP0/COG	
C9	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C10	47uF	Electrolytic capacitor, 5mm	Voltage reference filter capacitor.
C11	100n	MLCC capacitor, X7R	Power supply filter capacitor.

## PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
D1	1N5817	Schottky diode, DO-41	
D2	1N914	Fast-switching diode, DO-35	
D3	1N914	Fast-switching diode, DO-35	
Q1	2N5089	BJT transistor, NPN, TO-92	
Q2	2N5089	BJT transistor, NPN, TO-92	
Q3	2N5087	BJT transistor, PNP, TO-92	
Q4	2N3904	BJT transistor, NPN, TO-92	
Q5	2N3906	BJT transistor, PNP, TO-92	
BOOST	10kC	16mm right-angle PCB mount pot	
RES.	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.
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



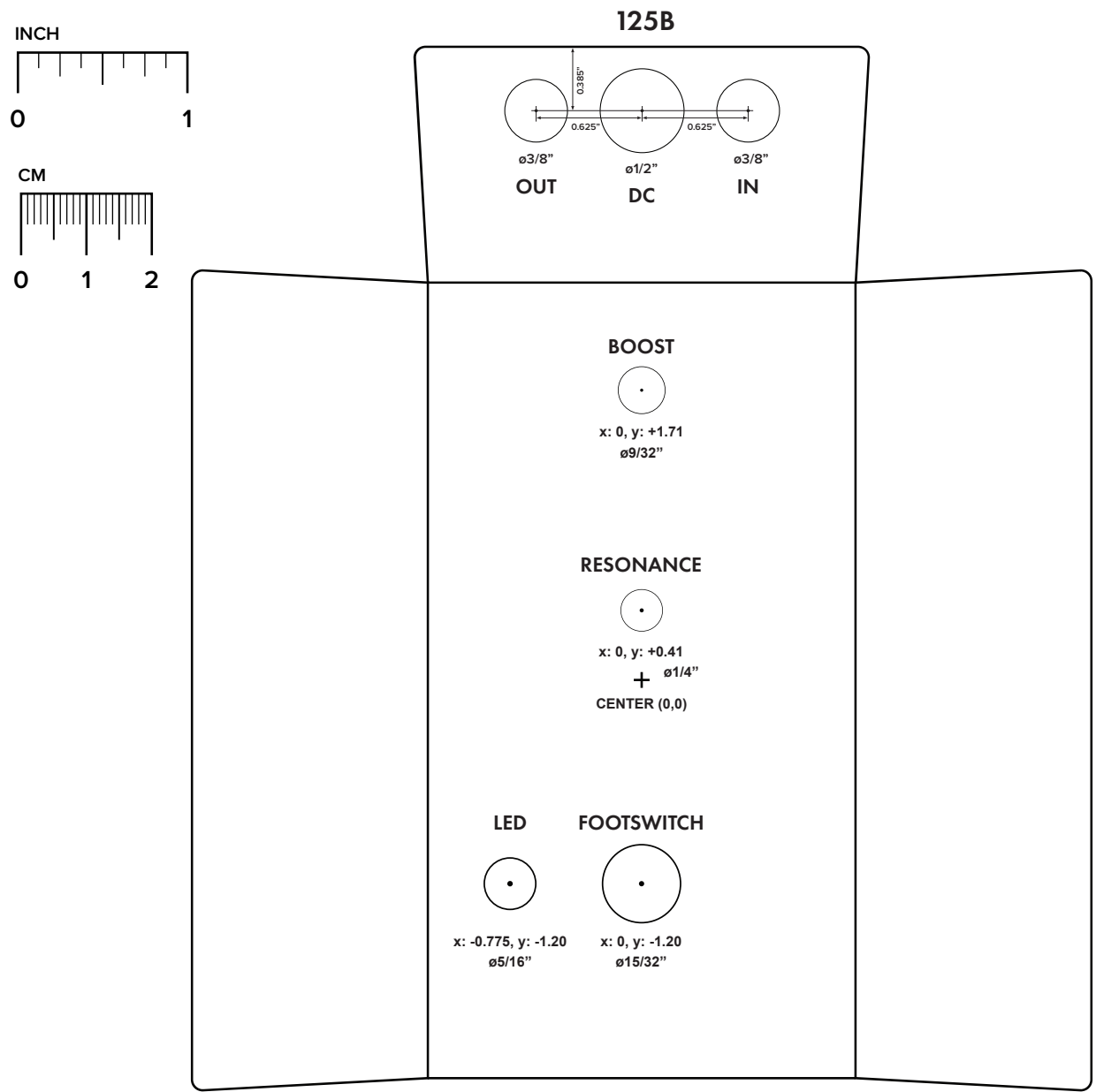
# DRILL TEMPLATE

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** requires the use of closed-frame jacks like the [Switchcraft 111X](#).

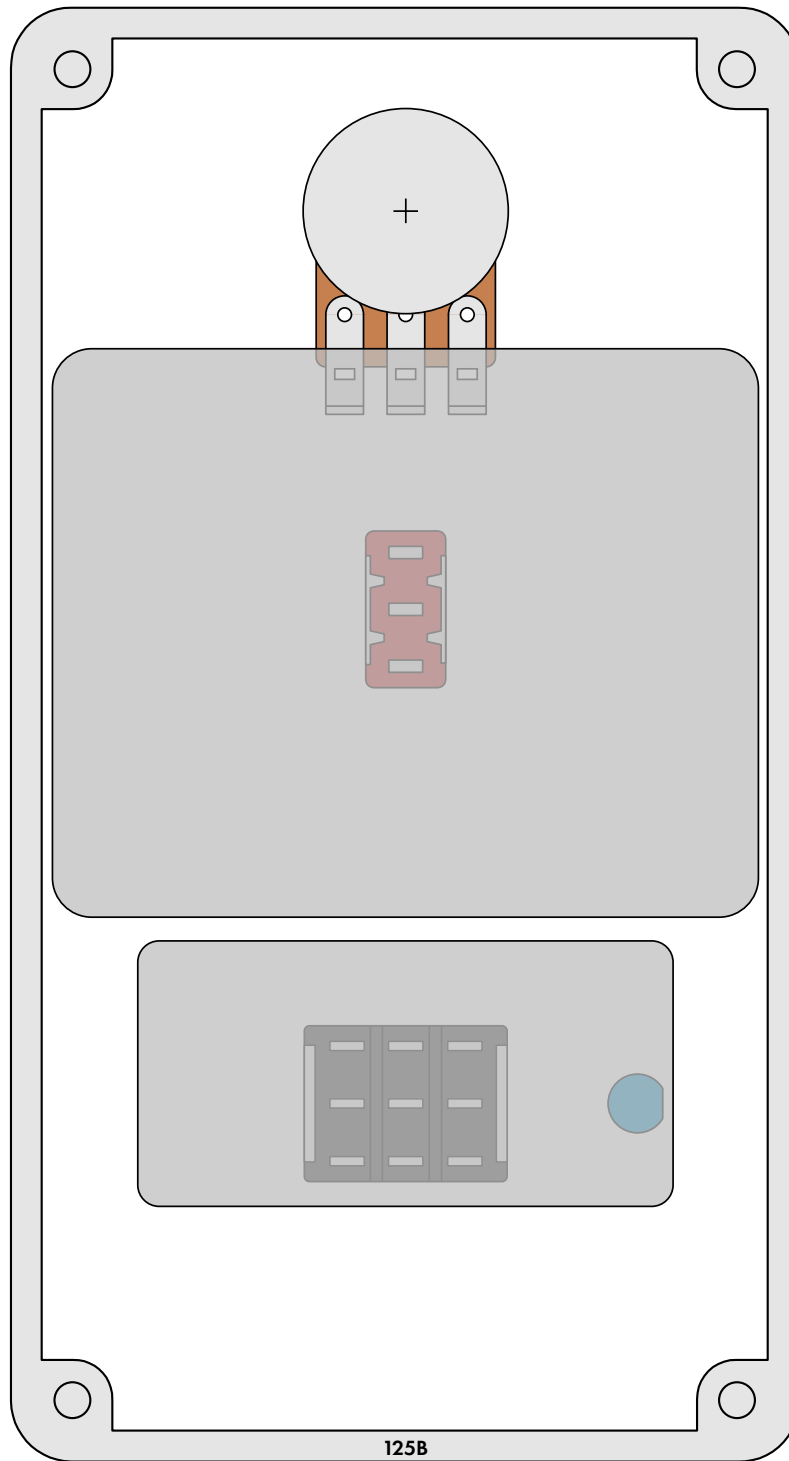
**LED hole drill size** assumes the use of a [5mm LED bezel](#), available from several parts suppliers. Adjust size accordingly if using something different, such as a 3mm bezel, a plastic bezel, or just a plain LED.



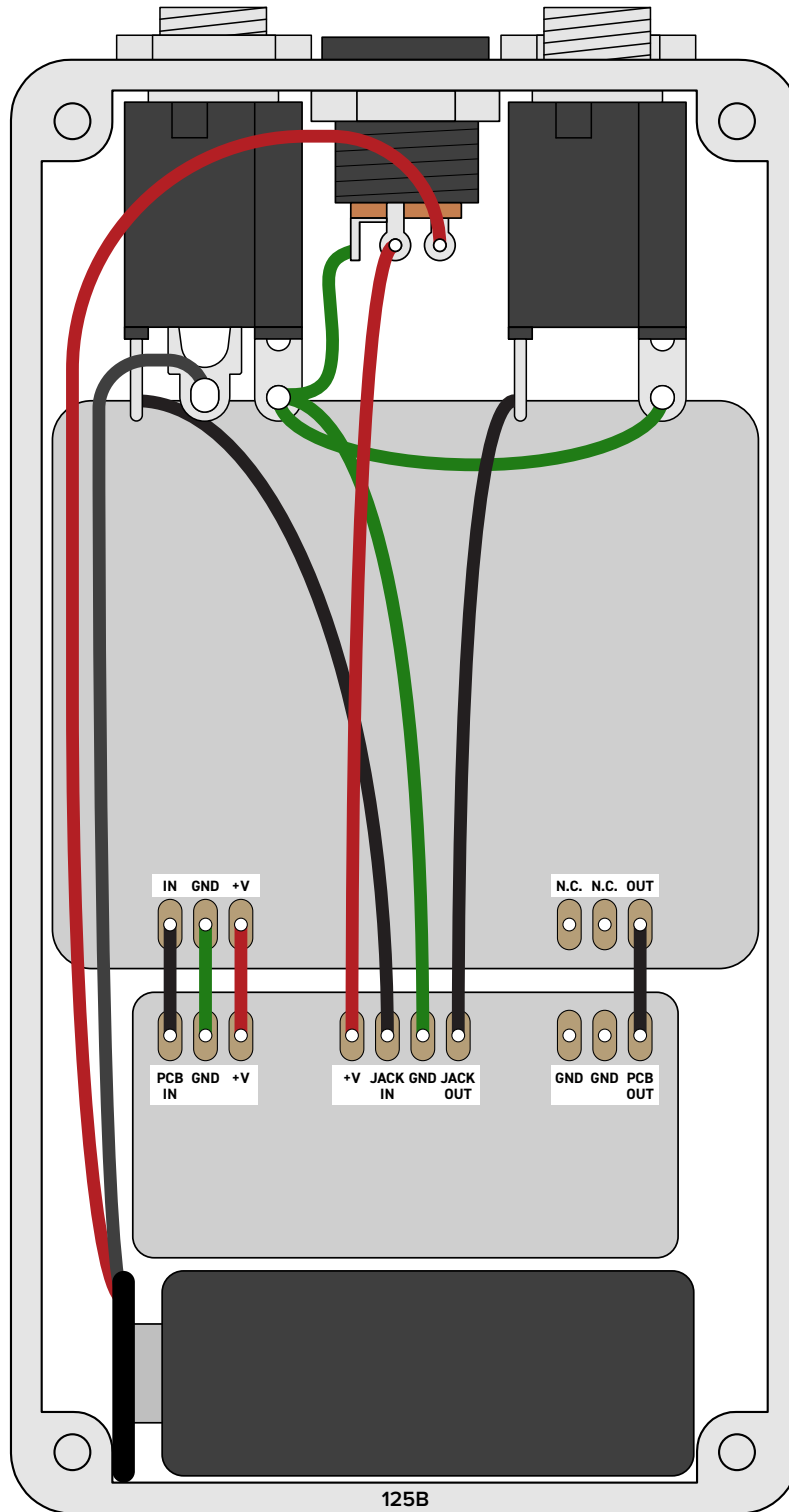
# ENCLOSURE LAYOUT

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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 (2019-10-18)

Initial release.