PROJECT NAME

BLAZE

aion DIY GUITAR EFFECTS

BASED ON
Amptweaker Tight Drive

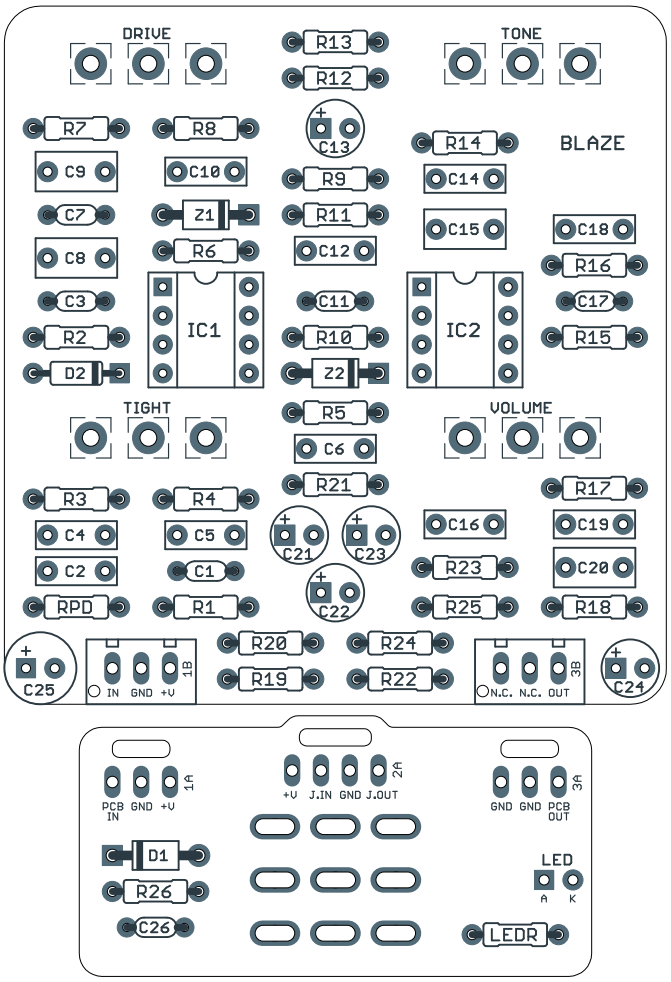
BUILD DIFFICULTY
Intermediate

EFFECT TYPE
Overdrive with bass cut

DOCUMENT VERSION
1.0.0 (2023-11-24)

PROJECT SUMMARY

An original drive pedal design from amp guru James Brown, the designer of the Peavey 5150 and JSX amplifiers.



Actual size is 2.3" x 2.42" (main board) and 1.78" x 0.86" (bypass board).

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INTRODUCTION

The Blaze Dynamic Overdrive is based on the Amptweaker Tight Drive, the very first pedal from amp guru James Brown, who designed the Peavey 5150 amplifier. It was first released in 2010 and traced by Aion FX in 2023.

The Tight Drive predated the Tight Metal and Tight Rock by a year. The topology is overall very similar to these two later pedals, but simplified a bit. (The Tight Metal and Tight Rock circuits are available as a hybrid project called the Ember Metal Distortion.)

In particular, it omits one clipping stage, the noise gate, some midrange shaping after the tone stack, and a hi-cut at the output. The overall concept is similar, though: pre-drive bass cut, high-threshold zener clipping, and a Big Muff-style tone stack.

The Blaze is a close adaptation of the Tight Drive based on our trace, only omitting the SideTrak effects loop that is engaged when the pedal is activated.

USAGE

The Blaze has four knobs:

- **Tight** is a pre-gain bass cut that helps to eliminate flabbiness with quick riffing.
- **Drive** sets the gain of the second op-amp stage, which clips on its own and can also drive the third op-amp stage into clipping.
- **Tone** pans between a high-pass and low-pass filter after the drive section, similar to the Big Muff tone control.
- **Volume** is the overall output 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	47k	Metal film resistor, 1/4W	
R3	15k	Metal film resistor, 1/4W	
R4	3k3	Metal film resistor, 1/4W	
R5	22k	Metal film resistor, 1/4W	
R6	100k	Metal film resistor, 1/4W	
R7	15k	Metal film resistor, 1/4W	
R8	2k7	Metal film resistor, 1/4W	
R9	10k	Metal film resistor, 1/4W	
R10	100k	Metal film resistor, 1/4W	
R11	10k	Metal film resistor, 1/4W	
R12	4k7	Metal film resistor, 1/4W	
R13	1k5	Metal film resistor, 1/4W	
R14	10k	Metal film resistor, 1/4W	
R15	47k	Metal film resistor, 1/4W	
R16	47k	Metal film resistor, 1/4W	
R17	1k	Metal film resistor, 1/4W	
R18	47k	Metal film resistor, 1/4W	
R19	22k	Metal film resistor, 1/4W	
R20	100k	Metal film resistor, 1/4W	
R21	150k	Metal film resistor, 1/4W	
R22	100k	Metal film resistor, 1/4W	
R23	150k	Metal film resistor, 1/4W	
R24	18k	Metal film resistor, 1/4W	
R25	47k	Metal film resistor, 1/4W	
R26	47R	Metal film resistor, 1/4W	Power supply filter resistor.
RPD	1M	Metal film resistor, 1/4W	Input pulldown resistor.
LEDR	10k	Metal film resistor, 1/4W	LED current-limiting resistor. Adjust value to change LED brightness.
C1	47pF	MLCC capacitor, NP0/C0G	
C2	100n	Film capacitor, 7.2 x 2.5mm	
C3	100pF	MLCC capacitor, NP0/C0G	
C4	22n	Film capacitor, 7.2 x 2.5mm	

PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
C5	33n	Film capacitor, 7.2 x 2.5mm	
C6	100n	Film capacitor, 7.2 x 2.5mm	
C7	47pF	MLCC capacitor, NP0/C0G	
C8	220n	Film capacitor, 7.2 x 2.5mm	
C9	220n	Film capacitor, 7.2 x 2.5mm	
C10	33n	Film capacitor, 7.2 x 2.5mm	
C11	100pF	MLCC capacitor, NP0/C0G	
C12	100n	Film capacitor, 7.2 x 2.5mm	
C13	22uF	Electrolytic capacitor, 5mm	
C14	100n	Film capacitor, 7.2 x 2.5mm	
C15	220n	Film capacitor, 7.2 x 2.5mm	
C16	33n	Film capacitor, 7.2 x 2.5mm	
C17	OMIT	MLCC capacitor, NP0/C0G	See build notes for possible modifications.
C18	100n	Film capacitor, 7.2 x 2.5mm	
C19	OMIT	Film capacitor, 7.2 x 2.5mm	See build notes for possible modifications.
C20	220n	Film capacitor, 7.2 x 2.5mm	
C21	22uF	Electrolytic capacitor, 5mm	Reference voltage filter capacitor.
C22	22uF	Electrolytic capacitor, 5mm	Reference voltage filter capacitor.
C23	22uF	Electrolytic capacitor, 5mm	Reference voltage filter capacitor.
C24	22uF	Electrolytic capacitor, 5mm	Reference voltage filter capacitor.
C25	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C26	100n	MLCC capacitor, X7R	Power supply filter capacitor.
D1	1N5817	Schottky diode, DO-41	
D2	1N914	Fast-switching diode, DO-35	
Z1	1N4733A	Zener diode, 5.1V, DO-41	
Z2	1N4733A	Zener diode, 5.1V, DO-41	
IC1	TL072	Operational amplifier, dual, DIP8	
IC1-S	DIP-8 socket	IC socket, DIP-8	
IC2	TL072	Operational amplifier, dual, DIP8	
IC2-S	DIP-8 socket	IC socket, DIP-8	
TIGHT	50kC	16mm right-angle PCB mount pot	Reverse audio (reverse log or antilog) taper.
DRIVE	500kA	16mm right-angle PCB mount pot	Audio (log) taper.
TONE	10kA	16mm right-angle PCB mount pot	Audio (log) taper.
VOLUME	10kB	16mm right-angle PCB mount pot	Linear taper.
IN	1/4" mono	1/4" phone jack, mono	
OUT	1/4" mono	1/4" phone jack, mono	
DC	2.1mm	DC jack, 2.1mm panel mount	

PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
FSW	3PDT	Stomp switch, 3PDT	
ENC	125B	Enclosure, die-cast aluminum	Can also use a Hammond 1590N1.

Omitted capacitors

Two capacitors near the end of the circuit are unpopulated on the PCB. C17 is an op-amp feedback capacitor to prevent oscillation, while C19 forms a low-pass filter to cut highs in conjunction with R17

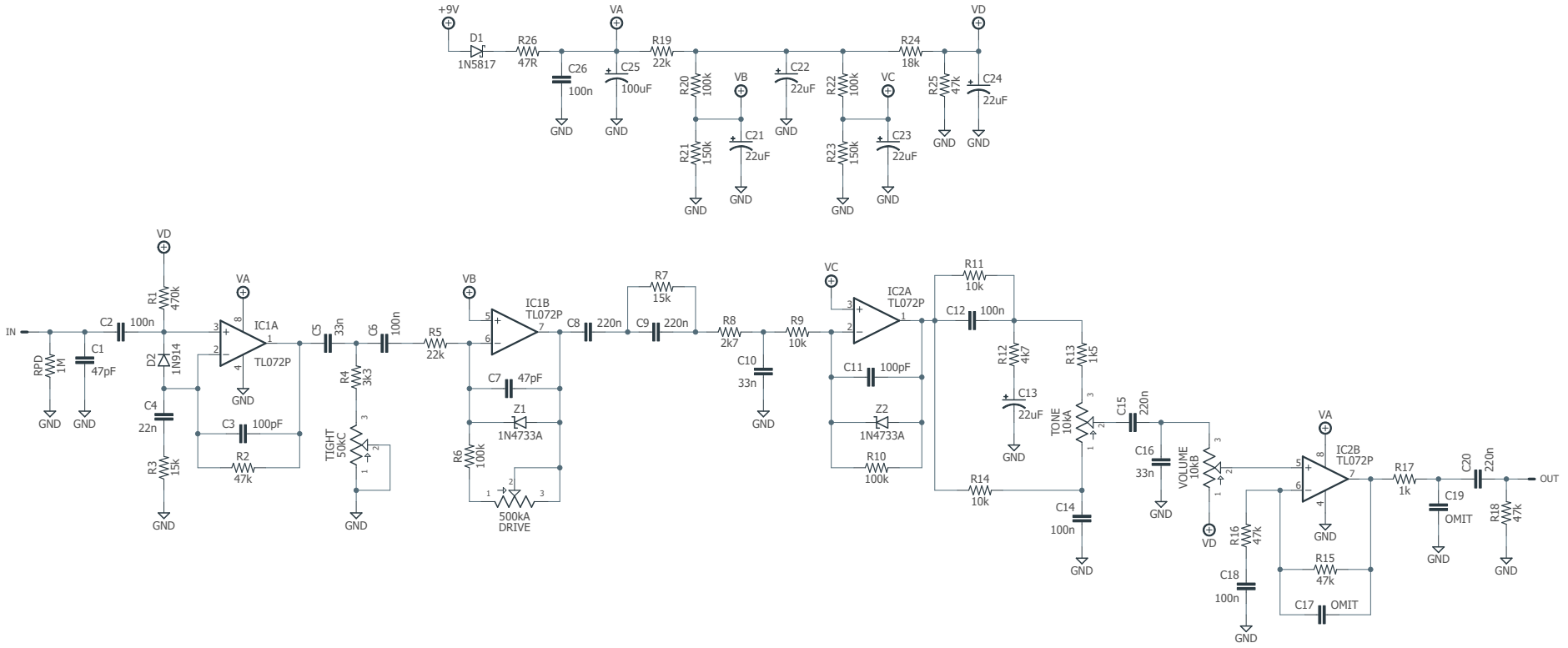
As configured, the final op-amp stage gives a gain of 2. The presence of C17 indicates that the output stage was likely originally designed to have higher gain, since the feedback capacitor is not needed if the op-amp amplifies the signal only a small amount.

C19 indicates that there was originally some added tone shaping at the end, perhaps to correct for an otherwise overly bright circuit. It's possible the tone stack was tweaked in order to remove this brightness so that the hi-cut was no longer needed.

In any event, since there was enough space on the PCB, we left these two capacitors in the circuit so you could experiment if you want. Here are two suggestions to get you started:

- If you want to get more maximum volume out of the circuit, you can increase the value of R15 (e.g. 100k or 150k) and use 47pF for C17.
- To reduce brightness, turn the tone control all the way up and then select a value for C19 that corresponds with the amount of treble you want to cut. For example, 22n will cut above 7.2kHz, or 47n will cut above 3.4kHz.

SCHEMATIC


+9V
D1
1N5817
R26
47R
C26
100n
VA
C25
100uF
R19
22k
R20
100k
VB
C21
22uF
R21
150k
C22
22uF
R22
100k
VC
C23
22uF
R23
150k
R24
18k
R25
47k
VD
C24
22uF
GND
IN
RPD
1M
C1
47pF
C2
100n
R1
470k
D2
1N914
C4
22n
R3
15k
IC1A
TL072P
C3
100pF
R2
47k
C5
33n
C6
100n
R4
3k3
TIGHT
50kC
R5
22k
IC1B
TL072P
C7
47pF
Z1
1N4733A
R6
100k
500kA
DRIVE
C8
220n
C9
220n
R7
15k
R8
2k7
C10
33n
R9
10k
IC2A
TL072P
C11
100pF
Z2
1N4733A
R10
100k
R11
10k
C12
100n
R12
4k7
C13
22uF
R13
1k5
TONE
10kA
R14
10k
C14
100n
C15
220n
C16
33n
VOLUME
10kB
R16
47k
C18
100n
IC2B
TL072P
R15
47k
C17
OMIT
R17
1k
C19
OMIT
C20
220n
R18
47k
OUT

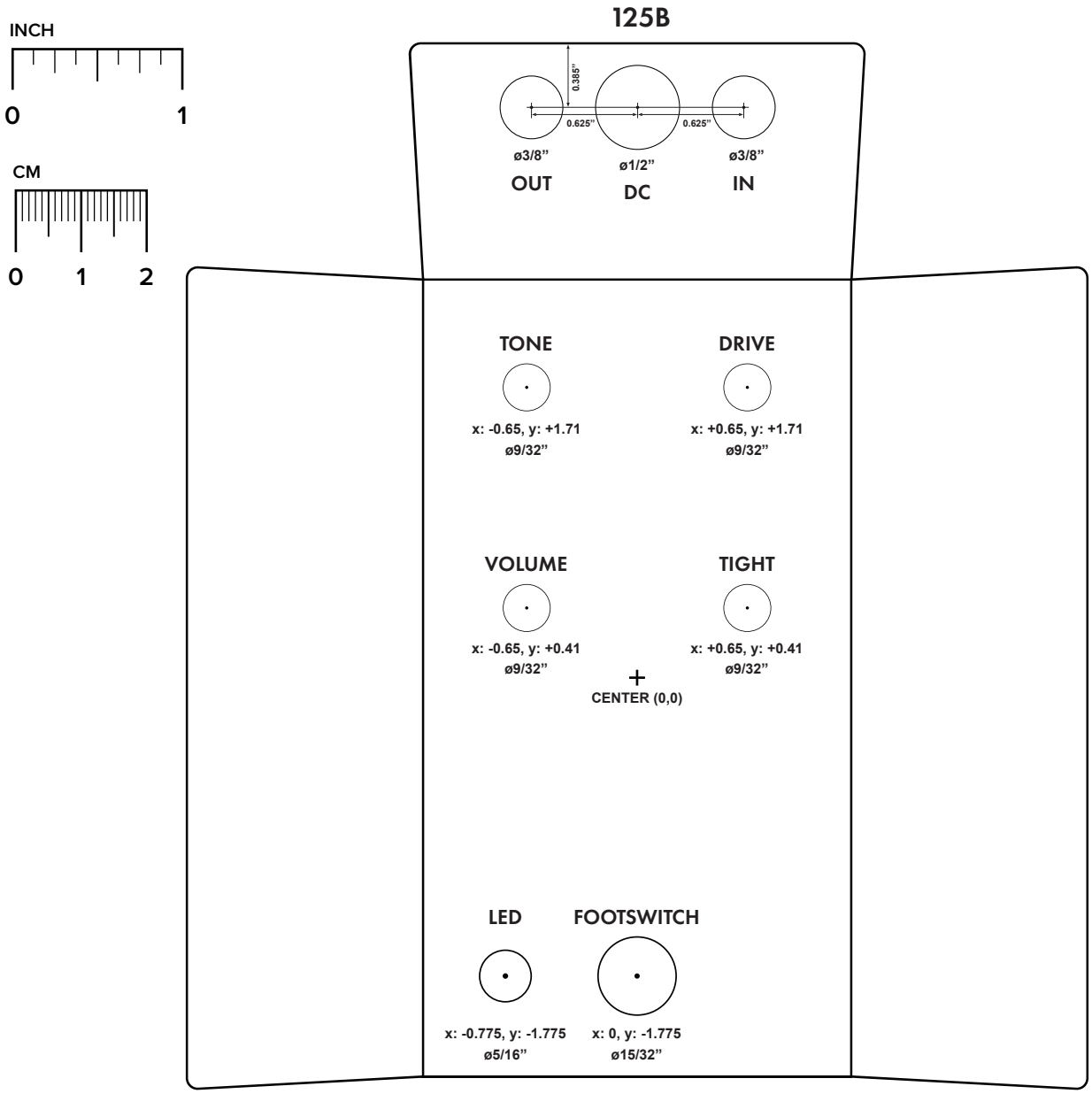
DRILL TEMPLATE

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.

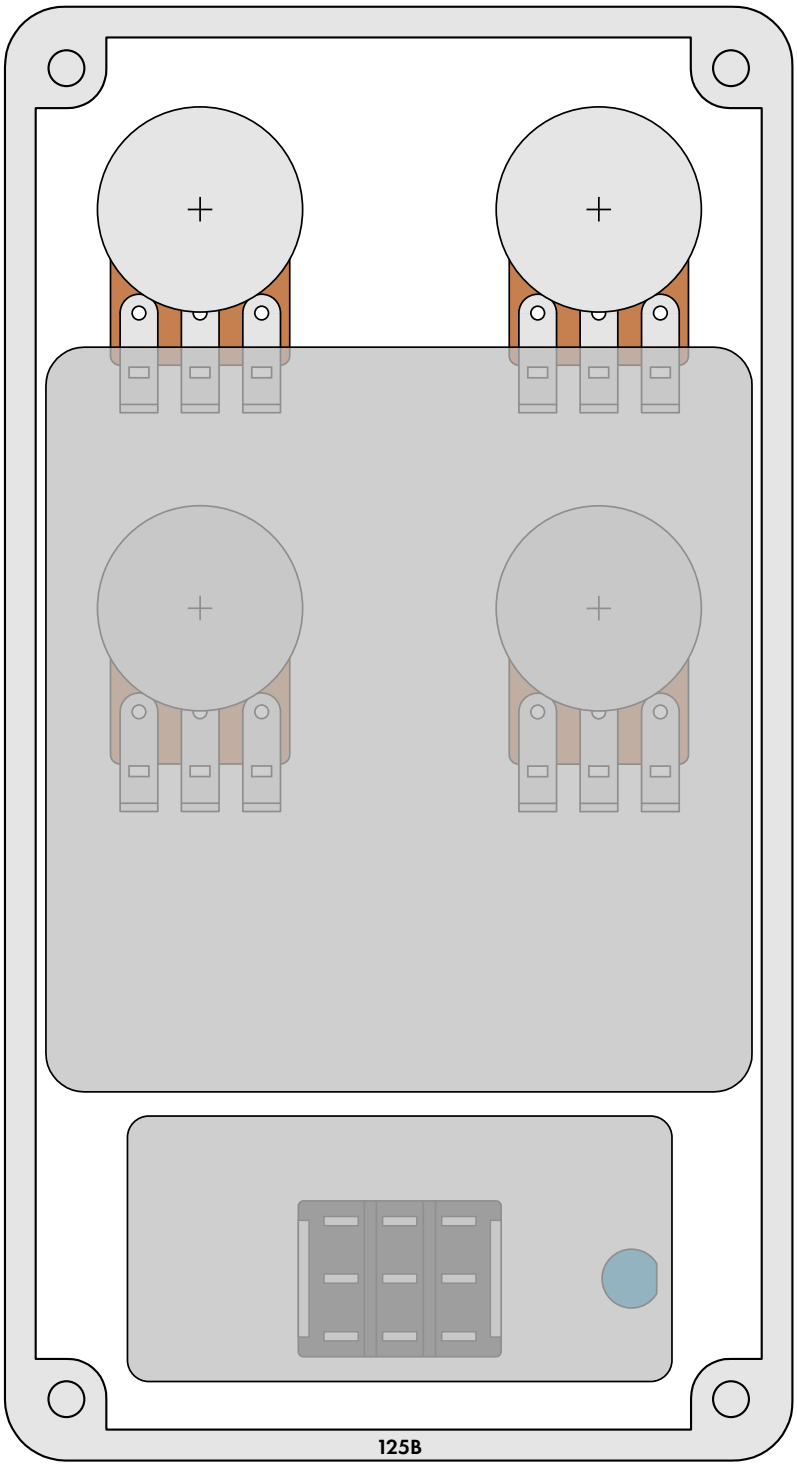
Top jack layout assumes the use of closed-frame jacks like the Switchcraft 111X. If you'd rather use open-frame jacks, please refer to the Open-Frame Jack Drill Template for the top side.

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.

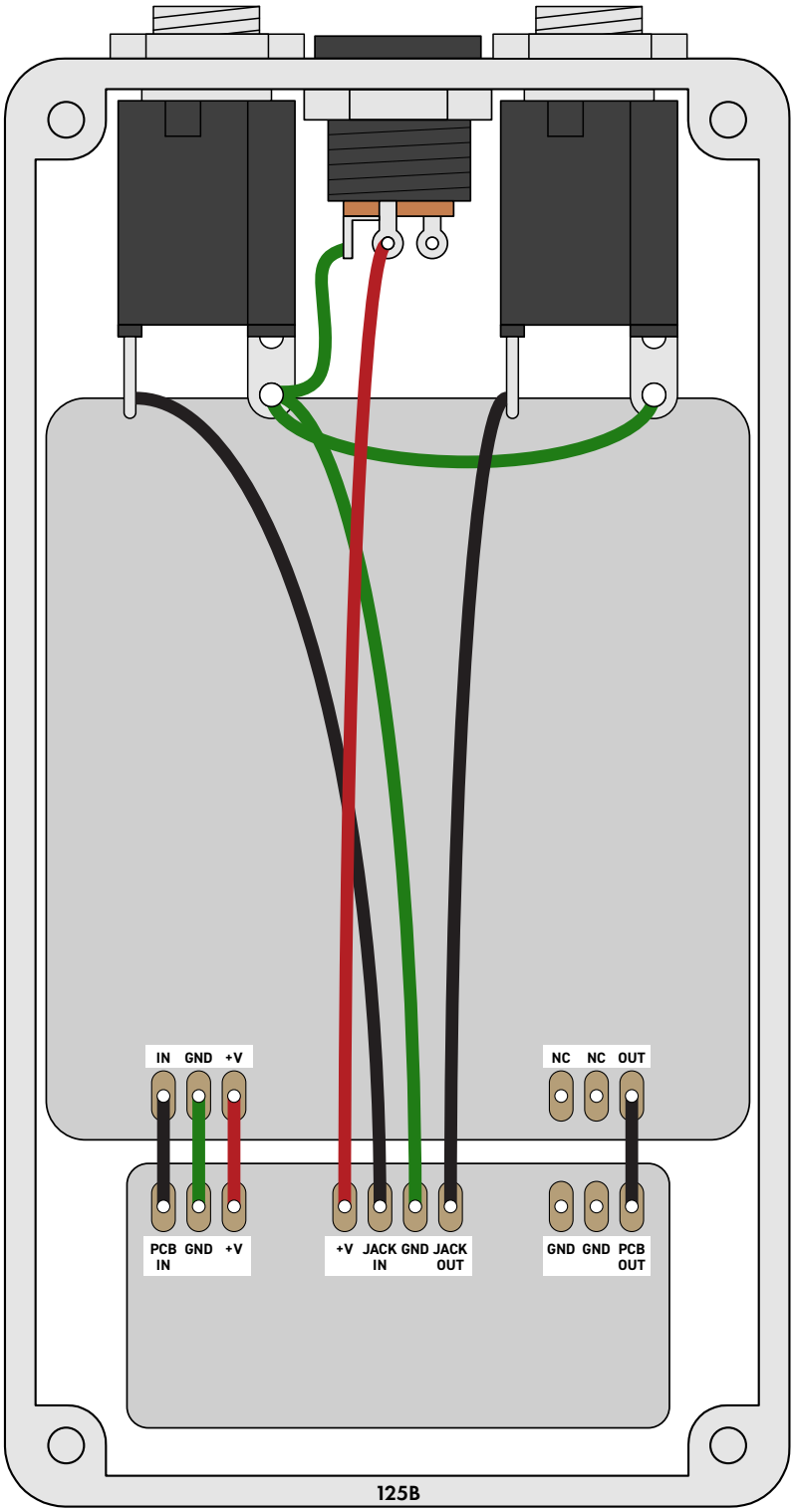


ENCLOSURE LAYOUT

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



WIRING DIAGRAM



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

1.0.0 (2023-11-24)
Initial release.