PROJECT NAME

360 FUZZ

aion DIY GUITAR EFFECTS

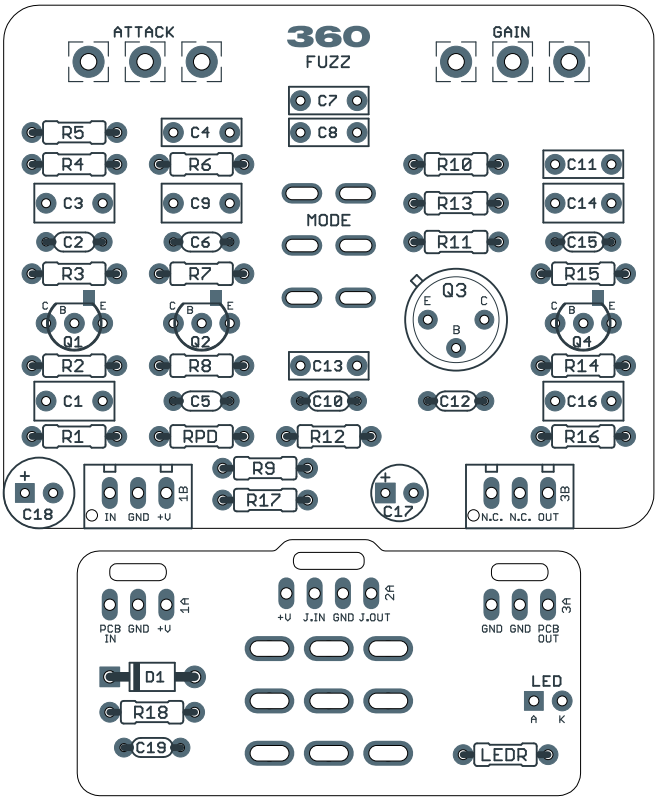
BASED ON
Acoustic 360 fuzz channel

BUILD DIFFICULTY
Easy

EFFECT TYPE
Hybrid silicon/germanium fuzz

DOCUMENT VERSION
1.0.0 (2024-07-04)

PROJECT SUMMARY
The isolated drive section of the Acoustic 360 bass amplifier, a hybrid silicon/germanium fuzz inspired by the Fuzzrite.



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

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INTRODUCTION

The 360 Vintage Fuzz is based on the fuzz section of the Acoustic Control Corporation® Model 360 bass amp and Model 260 guitar amp. This fuzz is footswitchable sub-circuit based on the Mosrite Fuzzrite, but converted to negative ground and utilizing a hybrid silicon/germanium transistor arrangement. Many of the component values are different, but the overall topology is identical.

To best replicate the sound of the fuzz in the original amplifier, we have kept the amp's input and output buffers intact, which are not part of the original Fuzzrite circuit. We have also ported over a modification from our Orpheus project, which switches in two higher-value tone capacitors for a more modern sound where the original vintage circuit can be somewhat thin.

This project allows you to build either the 360 bass or 260 guitar version, which differs only in one capacitor value. The guitar version has a smaller capacitor going into the germanium gain stage, which raises the bass cutoff frequency and keeps it from getting muddy.

The circuit also only runs at 9V since the original amp only used the 24V supply for the input and output buffers, which is in no way important to the sound.

USAGE

The 360 Fuzz has two knobs and one toggle switch:

- **Attack** blends between the output of the first transistor and the second transistor. Since the second transistor is where most of the distortion takes place, it acts as a drive control.
- **Gain** is the output volume of the effect.
- **Mode** (toggle switch) selects between vintage and modern. Modern mode adds significantly more midrange and bass to round out the EQ.

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	22k	Metal film resistor, 1/4W	
R2	1M	Metal film resistor, 1/4W	
R3	4M7	Metal film resistor, 1/4W	
R4	100k	Metal film resistor, 1/4W	
R5	22k	Metal film resistor, 1/4W	
R6	100k	Metal film resistor, 1/4W	
R7	470k	Metal film resistor, 1/4W	
R8	680k	Metal film resistor, 1/4W	
R9	22k	Metal film resistor, 1/4W	
R10	1M	Metal film resistor, 1/4W	
R11	47k	Metal film resistor, 1/4W	
R12	100k	Metal film resistor, 1/4W	
R13	22k	Metal film resistor, 1/4W	
R14	1M	Metal film resistor, 1/4W	
R15	10k	Metal film resistor, 1/4W	
R16	100k	Metal film resistor, 1/4W	
R17	1k	Metal film resistor, 1/4W	Power supply filter resistor.
R18	47R	Metal film resistor, 1/4W	Power supply filter resistor.
RPD	2M2	Metal film resistor, 1/4W	Input pulldown resistor.
LEDR	10k	Metal film resistor, 1/4W	LED current-limiting resistor.
C1	1uF	Film capacitor, 7.2 x 3.5mm	
C2	100pF	MLCC capacitor, NP0/C0G	
C3	1uF	Film capacitor, 7.2 x 3.5mm	
C4	100n	Film capacitor, 7.2 x 2.5mm	
C5	100n	MLCC capacitor, X7R	
C6	150pF	MLCC capacitor, NP0/C0G	
C7	1n	Film capacitor, 7.2 x 2.5mm	
C8	6n8	Film capacitor, 7.2 x 2.5mm	Part of "Mode" switch mod. Can use 10n for more bass.
C9	1uF	Film capacitor, 7.2 x 3.5mm	100n in guitar version.
C10	100n	MLCC capacitor, X7R	
C11	2n2	Film capacitor, 7.2 x 2.5mm	Paralleled with C12 for 2n5 total capacitance. See build notes.

PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
C12	330pF	MLCC capacitor, NP0/C0G	Paralleled with C11 for 2n5 total capacitance. See build notes.
C13	4n7	Film capacitor, 7.2 x 2.5mm	Part of “Mode” switch mod. Can use 8n2 for more bass.
C14	1uF	Film capacitor, 7.2 x 3.5mm	
C15	100pF	MLCC capacitor, NP0/C0G	
C16	1uF	Film capacitor, 7.2 x 3.5mm	
C17	47uF	Electrolytic capacitor, 5mm	Power supply filter capacitor.
C18	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C19	100n	MLCC capacitor, X7R	Power supply filter capacitor.
D1	1N5817	Schottky diode, DO-41	
Q1	2N3904	BJT transistor, NPN, TO-92	Substitute. Original used MPSA09.
Q2	2N5088	BJT transistor, NPN, TO-92	Substitute. Original used 2N3391.
Q3	Ge NPN	Germanium transistor, NPN	See build notes for selection info.
Q4	2N5088	BJT transistor, NPN, TO-92	Substitute. Original used 2N3391.
ATTACK	500kB	16mm right-angle PCB mount pot	
GAIN	500kB	16mm right-angle PCB mount pot	
MODE	DPDT on-on	Toggle switch, DPDT on-on	
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

Silicon transistor selection

The original Acoustic 360 used an MPSA09 for Q1 and 2N3391 for Q2 and Q4.

The MPSA09 is a low-noise medium-gain transistor, and the **2N3904** is an equivalent substitute.

The 2N3391 is higher gain, and so the **2N5088** is an equivalent. You can also use the **BC549C**, but note that the pinout is reversed so you will have to rotate it 180 degrees on the PCB.

Germanium transistor selection

The Acoustic amp used a 2N1306 for Q3. We have never measured the transistor in the actual amp, but based on the datasheet the h_{FE} range is 60 to 300, and anecdotally most of them seem to measure above 130. So this would be a fairly high-gain transistor as germaniums go.

This exact type can be found at Small Bear Electronics as of this writing, but many other types can be used as long as they are similarly high gain.

Note that this is an **NPN** transistor. Germanium NPNs are a bit more obscure than PNP, but usually easy to find and fairly cheap since the classic fuzz circuits all used PNP types. If you inadvertently use a PNP here, it will barely pass signal in germanium mode, so be careful of the type!

Guitar version

The Acoustic 360 was a bass amp and the 260 was the guitar version. Within the fuzz section, there was only one difference: C9 was 100n instead of 1uF. This cuts the bass going into the germanium transistor stage and keeps it from getting muddy.

C11/12 capacitors

In the original Acoustic amp, the coupling capacitor after the germanium stage is 2n5. This value isn't readily available today, so we included space for two capacitors to be used in parallel. A 2n2 box film in parallel with a 330pF MLCC is 2n53, which is well within normal component tolerance. You could also use 1n5 and 1n.

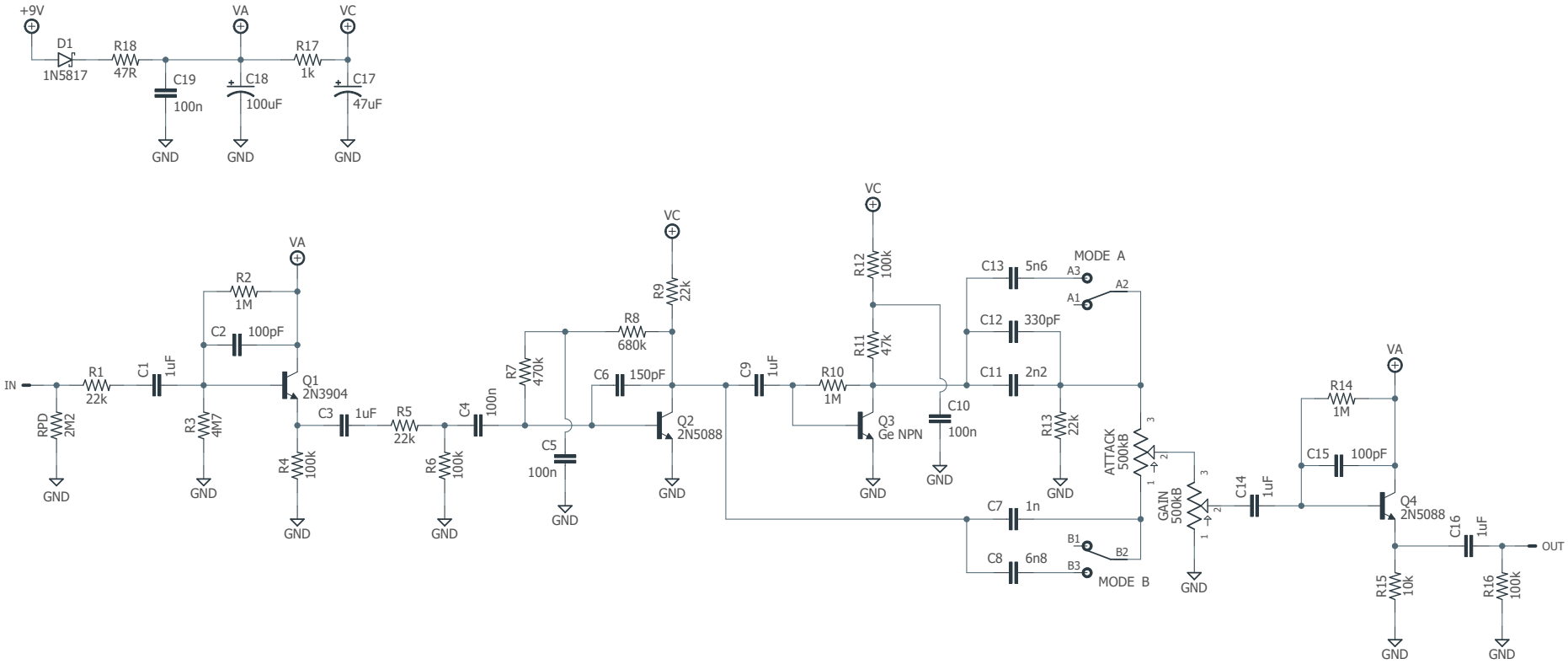
Mode switch modifications

The Mode switch is adapted from the Catalinbread Fuzzrite Germanium. When engaged, it increases the size of the coupling capacitors of both sides of the blend, which allows more midrange and low-end.

In the 360, the two coupling capacitors are different values, 2n5 and 1n, unlike the original Fuzzrite where they were both 2n2. So, our default values for this project are slightly different in order to give them both roughly the same total capacitance in "Modern" mode.

It's recommended to use 6n8 for C8 and 5n6 for C13, which give roughly 8n when put in parallel with the existing capacitors (C7 and C11/C12). If you find that modern mode needs more low end, you can increase them to 8n2 and 10n respectively.

SCHEMATIC


+9V
D1
1N5817
R18
47R
C19
100n
GND
VA
C18
100uF
GND
R17
1k
VC
C17
47uF
GND
IN
RPD
2M2
GND
R1
22k
C1
1uF
R2
1M
C2
100pF
R3
4M7
GND
Q1
2N3904
R4
100k
GND
C3
1uF
R5
22k
R6
100k
GND
C4
100n
R7
470k
R8
680k
C5
100n
GND
C6
150pF
R9
22k
Q2
2N5088
GND
C9
1uF
R10
1M
R12
100k
R11
47k
Q3
Ge NPN
GND
C10
100n
GND
C13
5n6
C12
330pF
C11
2n2
R13
22k
GND
MODE A
A3
A2
A1
ATTACK
500kB
C7
1n
C8
6n8
B1
B2
B3
MODE B
GAIN
500kB
GND
C14
1uF
R14
1M
C15
100pF
Q4
2N5088
C16
1uF
OUT
R15
10k
GND
R16
100k
GND

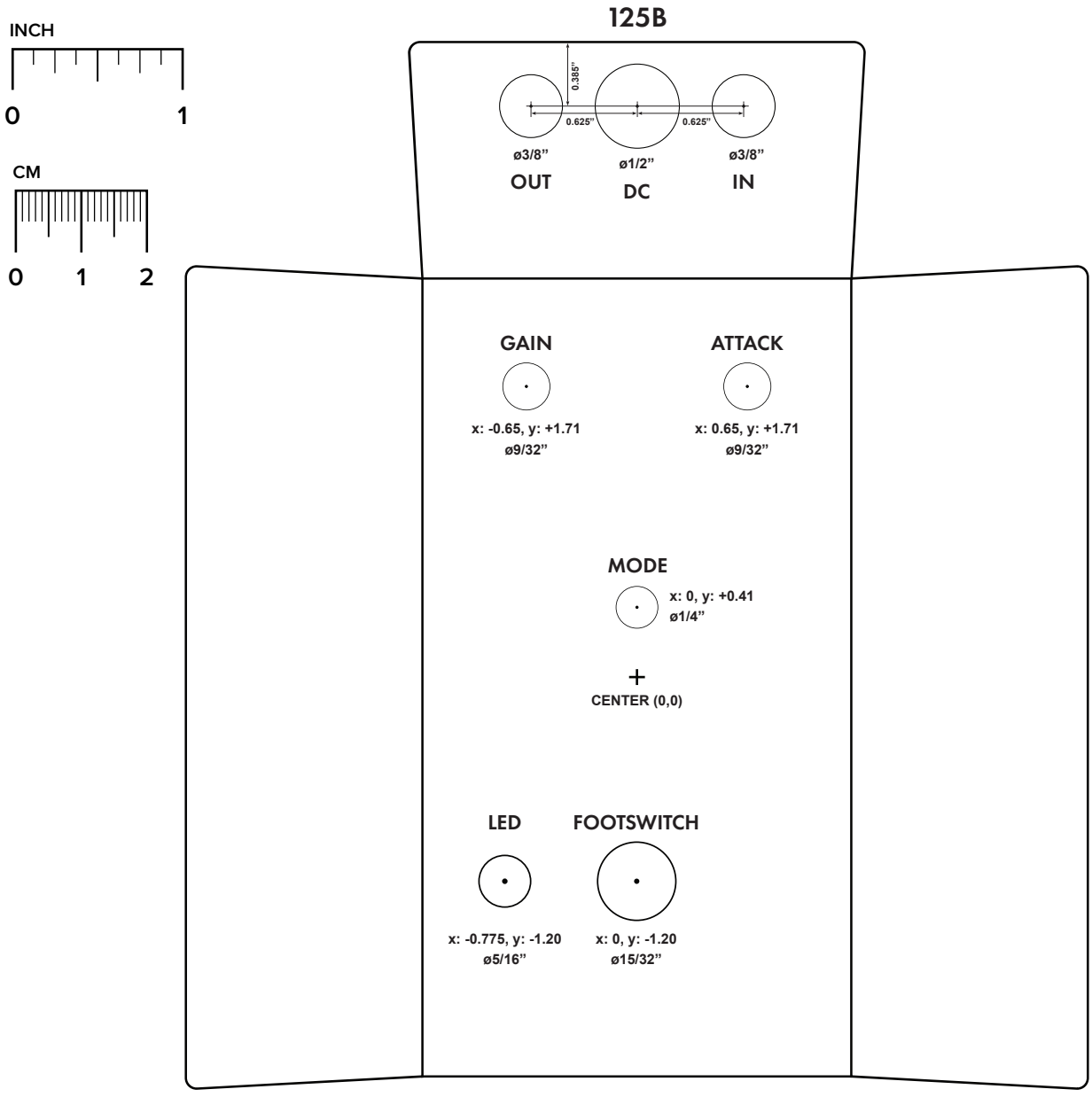
DRILL TEMPLATE

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.

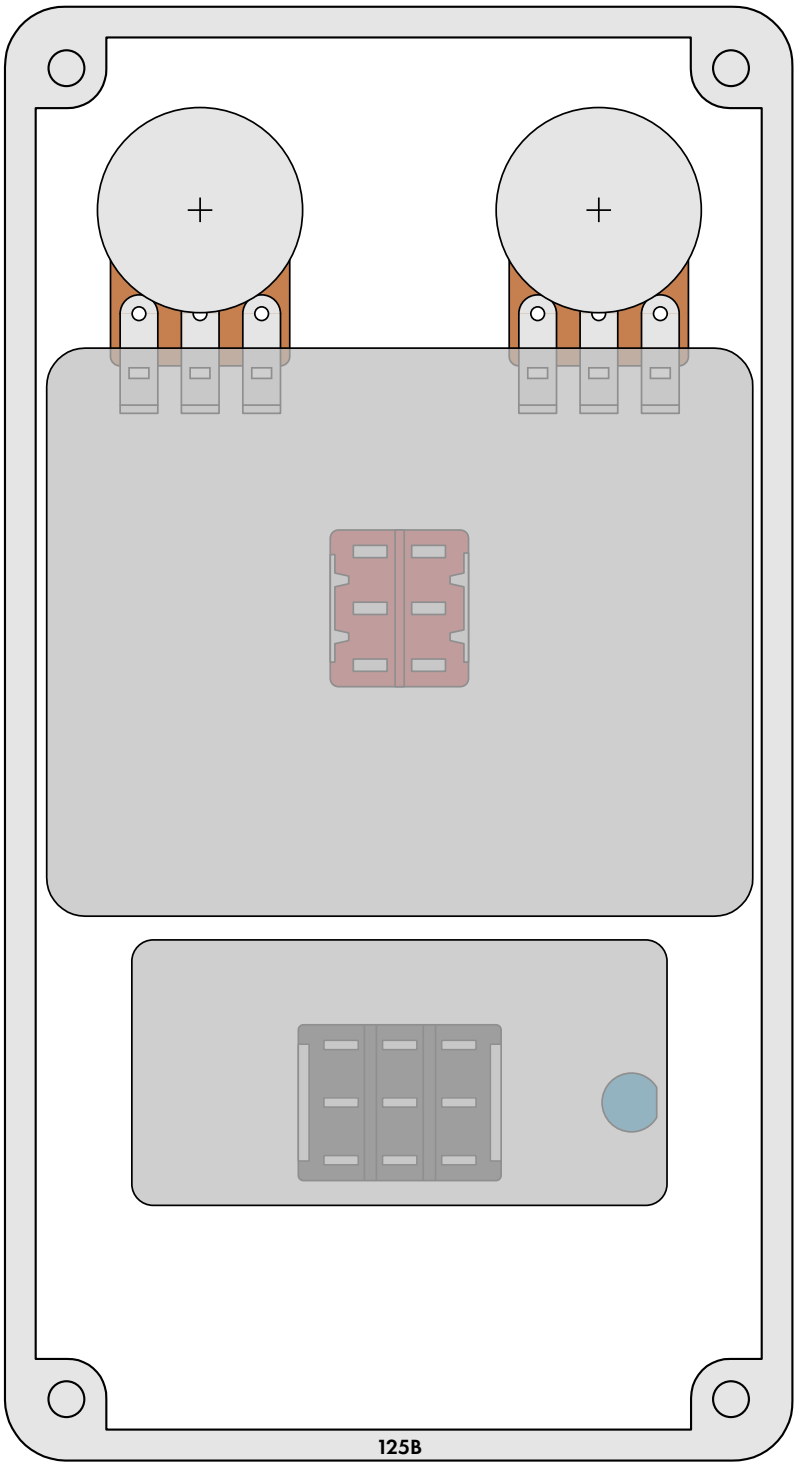
Top jack layout assumes the use of closed-frame jacks like the Switchcraft 111X. If you'd rather use open-frame jacks, please refer to the Open-Frame Jack Drill Template for the top side.

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.

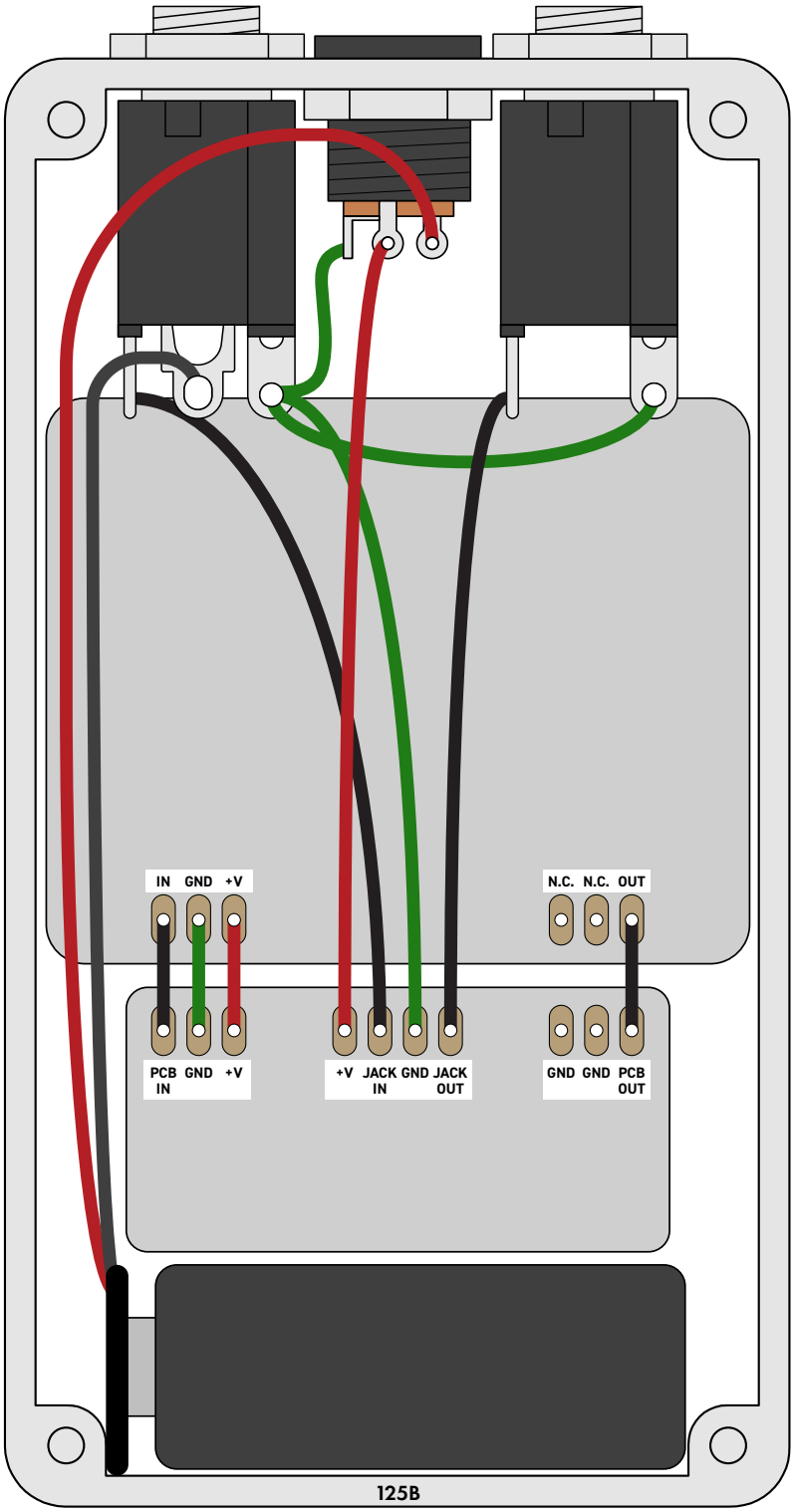


ENCLOSURE LAYOUT

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

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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 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 (2024-07-04)

Initial release.