

PROJECT NAME

# ANOMALY

BASED ON

Crowther Hot Cake (2008)

BUILD DIFFICULTY

■■■■■ Easy

EFFECT TYPE

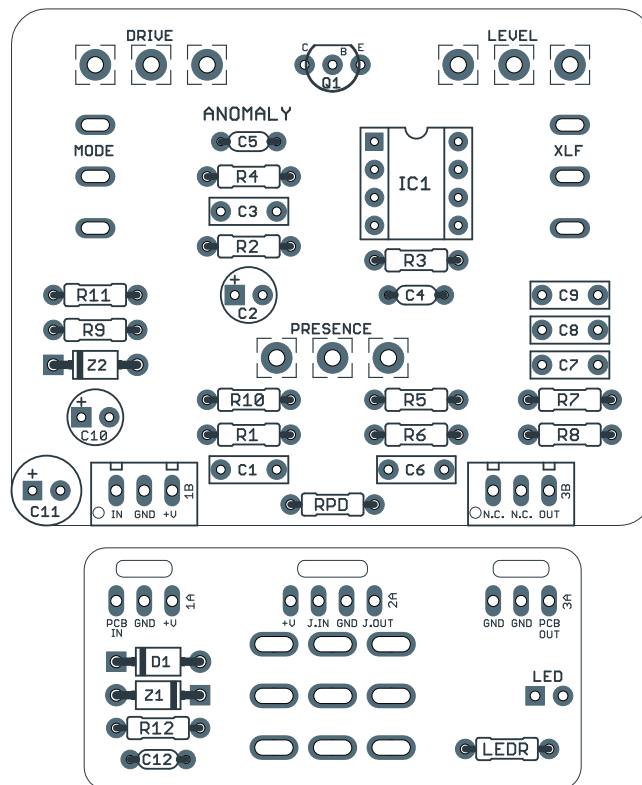
Distortion

DOCUMENT VERSION

1.0.2 (2023-08-25)

## PROJECT SUMMARY

An adaptation of a one of the original boutique overdrive/distortion pedals from the 1970s, notable for its method of overdriving an op-amp directly rather than using diodes for clipping.



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 Anomaly Vintage Distortion is an adaptation of the Crowther Hot Cake, an overdrive pedal from New Zealand that was originally invented in 1976. While the Hot Cake has seen many circuit changes throughout its history, the Anomaly is based on the 2008 revision that includes internal switches for “Bluesberry” and “XLF” (extra low frequency) modes. This version was [traced by Aion FX in 2020](#).

The Hot Cake is notable for its lack of clipping diodes, instead overdriving the TL071 chip directly. Because of this, at some settings (most noticeable at medium gain) there can be a slight “fizz” as the note decays. The Bluesberry mode helps reduce this somewhat, but it’s part of the character of the pedal.

An updated version of the Hot Cake was released in late 2020 and moves the switches to the outside of the enclosure, although according to the manufacturer’s description the “Cream” mode is not the same as the earlier “Bluesberry” mode.

The Anomaly is an identical reproduction of Hot Cake in effect mode, although the bypass mode is somewhat altered. The original Hot Cake uses a relay to disable the gain of the op-amp and deactivate other frequency-shaping filters, transforming it into a unity-gain op-amp buffer. While creative, this approach is overly complicated. The Anomaly converts it to a standard true-bypass configuration.

## USAGE

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The Anomaly has the following controls:

- **Drive** controls the amount of gain in the overdriven op-amp stage.
- **Presence** adds high-end emphasis as the knob is turned to the right.
- **Level** is the overall output level.
- **XLF** (toggle) increases the amount of bass that is passed through the effect, making it better for bass or downtuned guitars. There’s not much difference between the settings on standard guitar.
- **Mode** (toggle) selects between standard and Bluesberry mode. In Bluesberry mode, the op-amp clipping method is changed, softening the clipping for an overall smoother drive tone. Note that this setting can be very rig-dependent, and on some amps the differences may be mostly inaudible.

## 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	1M	Metal film resistor, 1/4W	
R2	10k	Metal film resistor, 1/4W	
R3	100k	Metal film resistor, 1/4W	
R4	220R	Metal film resistor, 1/4W	
R5	10k	Metal film resistor, 1/4W	
R6	10k	Metal film resistor, 1/4W	
R7	1k	Metal film resistor, 1/4W	
R8	1k	Metal film resistor, 1/4W	
R9	82k	Metal film resistor, 1/4W	
R10	100k	Metal film resistor, 1/4W	
R11	220k	Metal film resistor, 1/4W	
R12	220R	Metal film resistor, 1/4W	
RPD	2M2	Metal film resistor, 1/4W	
LEDR	4k7	Metal film resistor, 1/4W	
C1	10n	Film capacitor, 7.2 x 2.5mm	
C2	10uF	Electrolytic capacitor, 5mm	
C3	OMIT		See build notes.
C4	OMIT		See build notes.
C5	OMIT		See build notes.
C6	22n	Film capacitor, 7.2 x 2.5mm	
C7	82n	Film capacitor, 7.2 x 2.5mm	
C8	47n	Film capacitor, 7.2 x 2.5mm	
C9	100n	Film capacitor, 7.2 x 2.5mm	
C10	47uF	Electrolytic capacitor, 5mm	
C11	100uF	Electrolytic capacitor, 6.3mm	
C12	100n	MLCC capacitor, X7R	
D1	1N5817	Schottky diode, DO-41	
Z1	BZX85C10	Zener diode, 10V, DO-41	Can substitute 1N4740A.
Z2	BZX79C2V7	Zener diode, 2.7V, DO-41	Must be a 0.5W zener. See build notes.
Q1	2N3906	BJT transistor, PNP, TO-92	Substitute; original uses BC557.

## PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
IC1	TL071	Operational amplifier, DIP8	
IC1-S	DIP-8 socket	IC socket, DIP-8	
DRIVE	50kC	16mm right-angle PCB mount pot	
PRES.	50kB	16mm right-angle PCB mount pot	
LEVEL	50kA	16mm right-angle PCB mount pot	
XLF	SPDT on-on	Toggle switch, SPDT on-on	
MODE	SPDT on-on	Toggle switch, SPDT 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.
FSW	3PDT	Stomp switch, 3PDT	
ENC	125B	Enclosure, die-cast aluminum	Can also use a Hammond 1590N1.

# BUILD NOTES

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## Transistor selection

The original Hot Cake uses a BC557 transistor for Q1. The pinout on the Anomaly PCB instead uses the USA “2N” convention which is mirrored from the European “BC” convention. So while it’s recommend to use the readily-available 2N3906, if you do want to use a BC557 then it should be rotated 180 degrees from the silkscreen. There is no difference between the two.

## Z2 zener diode

The wattage rating of the Z2 zener is important. More specifically, it needs to be low wattage (0.5W) since higher-wattage types don’t drop enough voltage at low currents. This is the zener diode that is engaged in Bluesberry mode.

The original Hot Cake seems to have used a BZX79C2V7. We’ve tested this in the Anomaly and found it to give the same voltage drop as the original. It is likely that the 1N5223B would work since it’s also 0.5W, though we haven’t tested it. Avoid the BZX85C2V7 (1.3W).

As of right now, the Anomaly PCB silkscreen shows a larger diode outline for Z2, but the actual diode used will be narrower. This will be corrected in a future revision.

Z1 (10V zener) acts as over-voltage protection, so the higher wattage rating is important in this position. BZX85C10 or 1N4740A will perform the same.

## Optional components

Previous versions of the Hot Cake used a 470pF capacitor for C5, so you may try using this here if it’s too bright for your tastes. The 2008 version omits this capacitor (the PCB has a spot for it, but it’s left unpopulated).

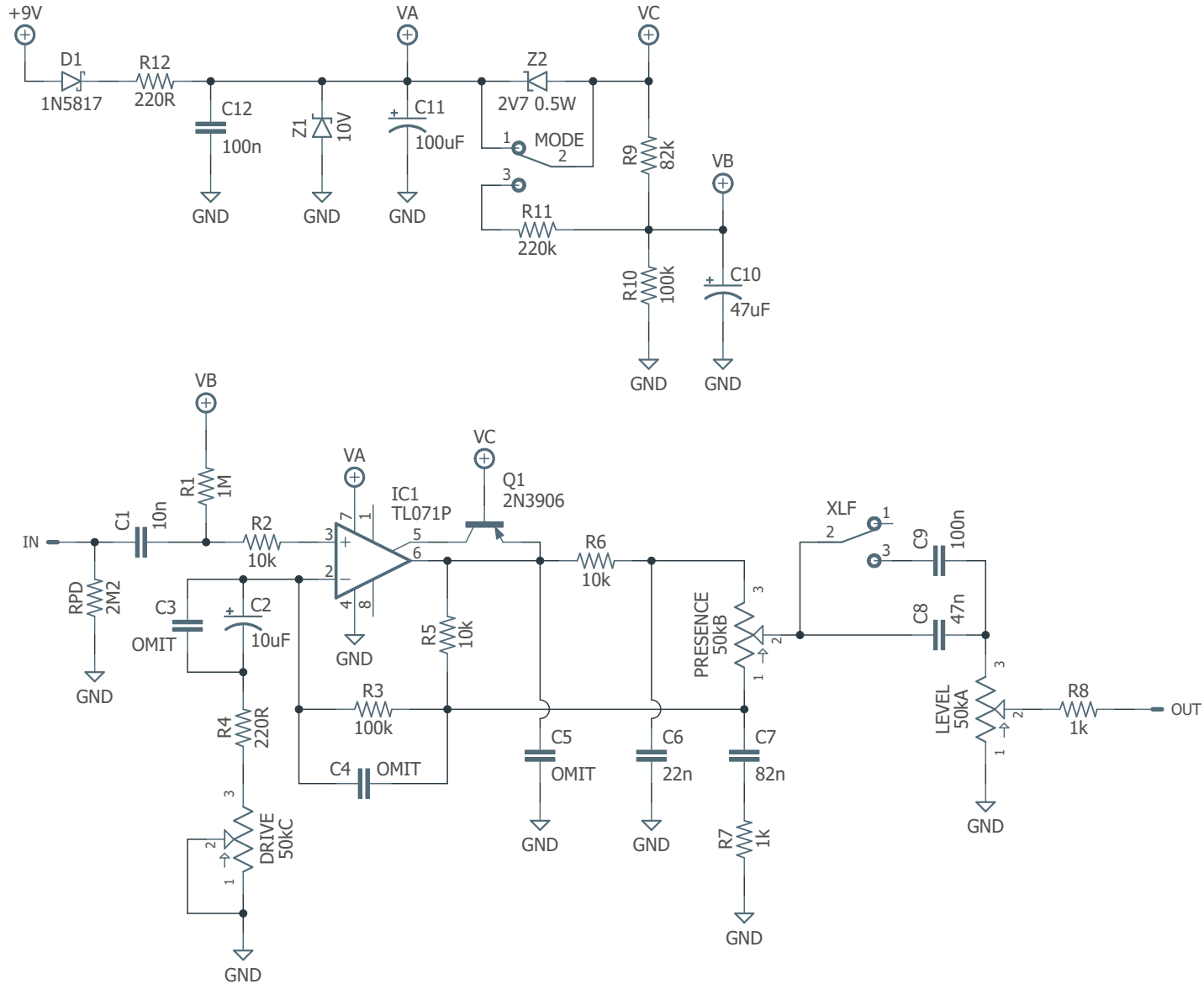
In addition, while the Hot Cake does not include a capacitor in the op-amp’s feedback loop, this is a common modification and the Anomaly includes a space for one. Use a 100pF or 220pF capacitor for C4 to prevent high-frequency oscillation and tame the fizziness a bit.

## Madbean modifications

The Hot Cake has long been a staple among DIYers and there have been some great modifications made throughout the years. Brian at Madbean Pedals has a suggested set of alternate values that he prefers to the original, reducing the gain and cutting bass frequencies:

- **R4:** 220R → 2k2
- **C2:** 10uF → (omit)
- **C3:** (empty) → 100n
- **C4:** (empty) → 220pF
- **C7:** 82n → 39n

# SCHEMATIC



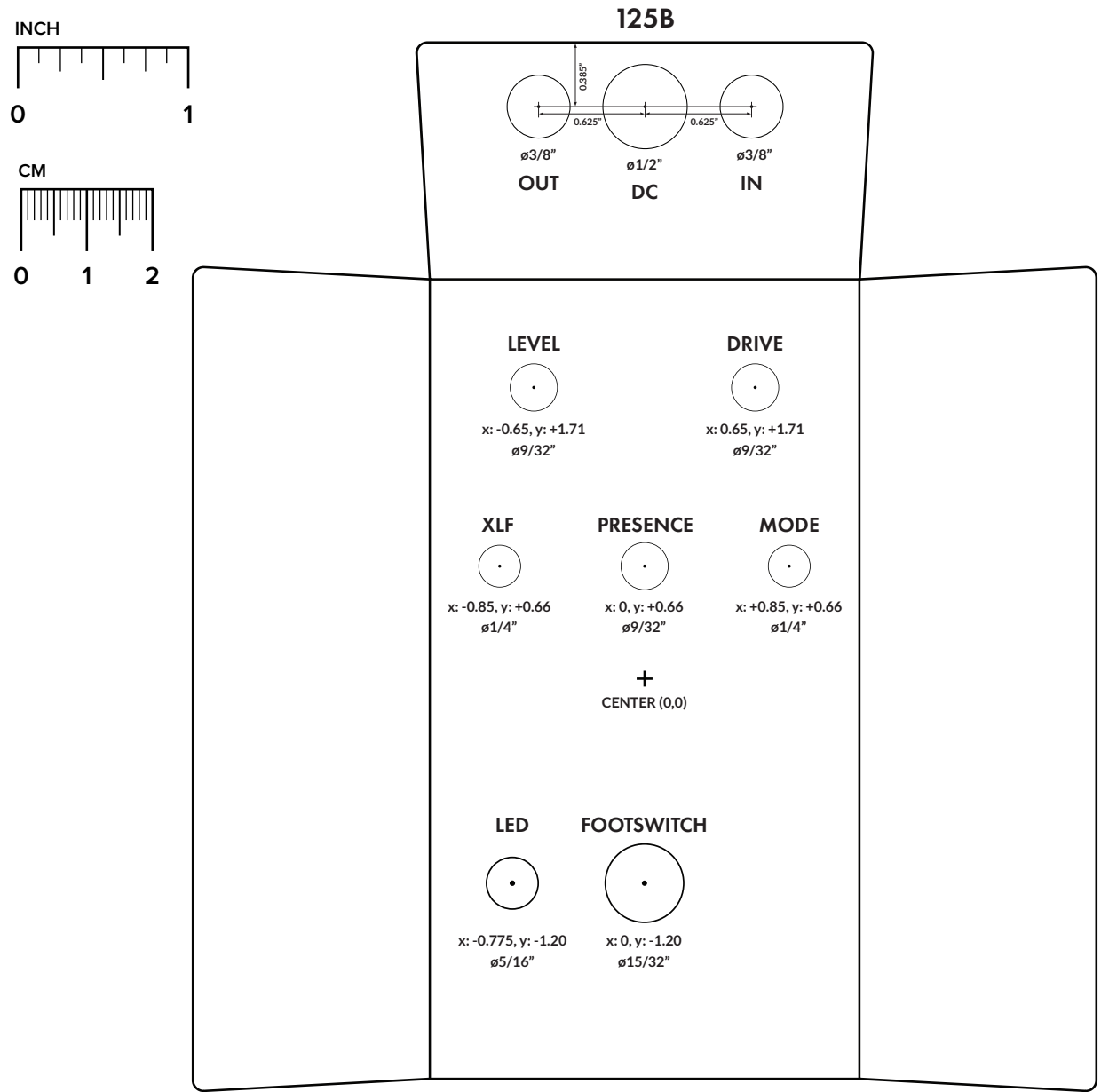
# DRILL TEMPLATE

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.

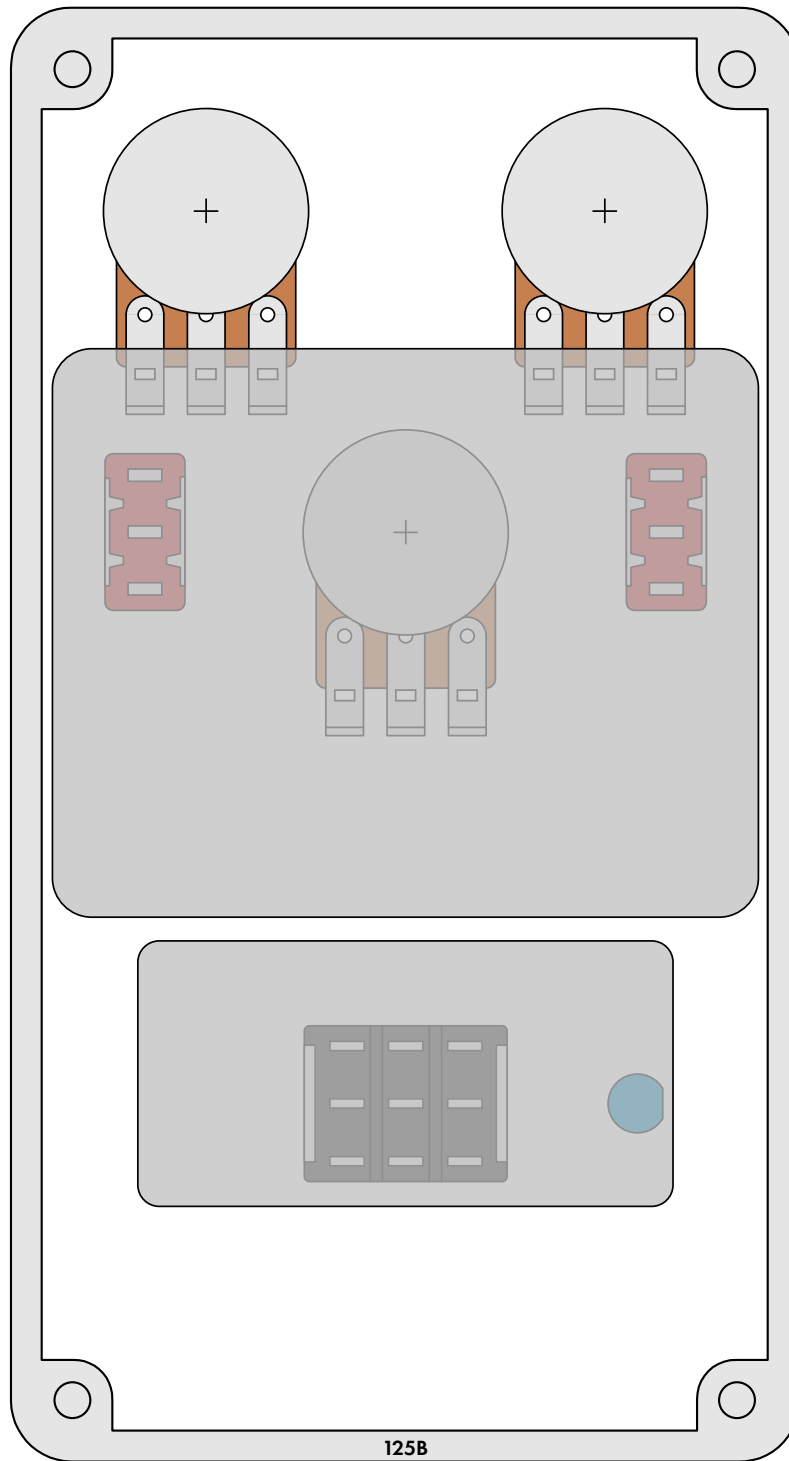
**LED hole drill size** assumes the use of a [5mm LED bezel](#), available from several parts suppliers. Adjust size accordingly if using something different, such as a 3mm bezel, a plastic bezel, or just a plain LED.



# ENCLOSURE LAYOUT

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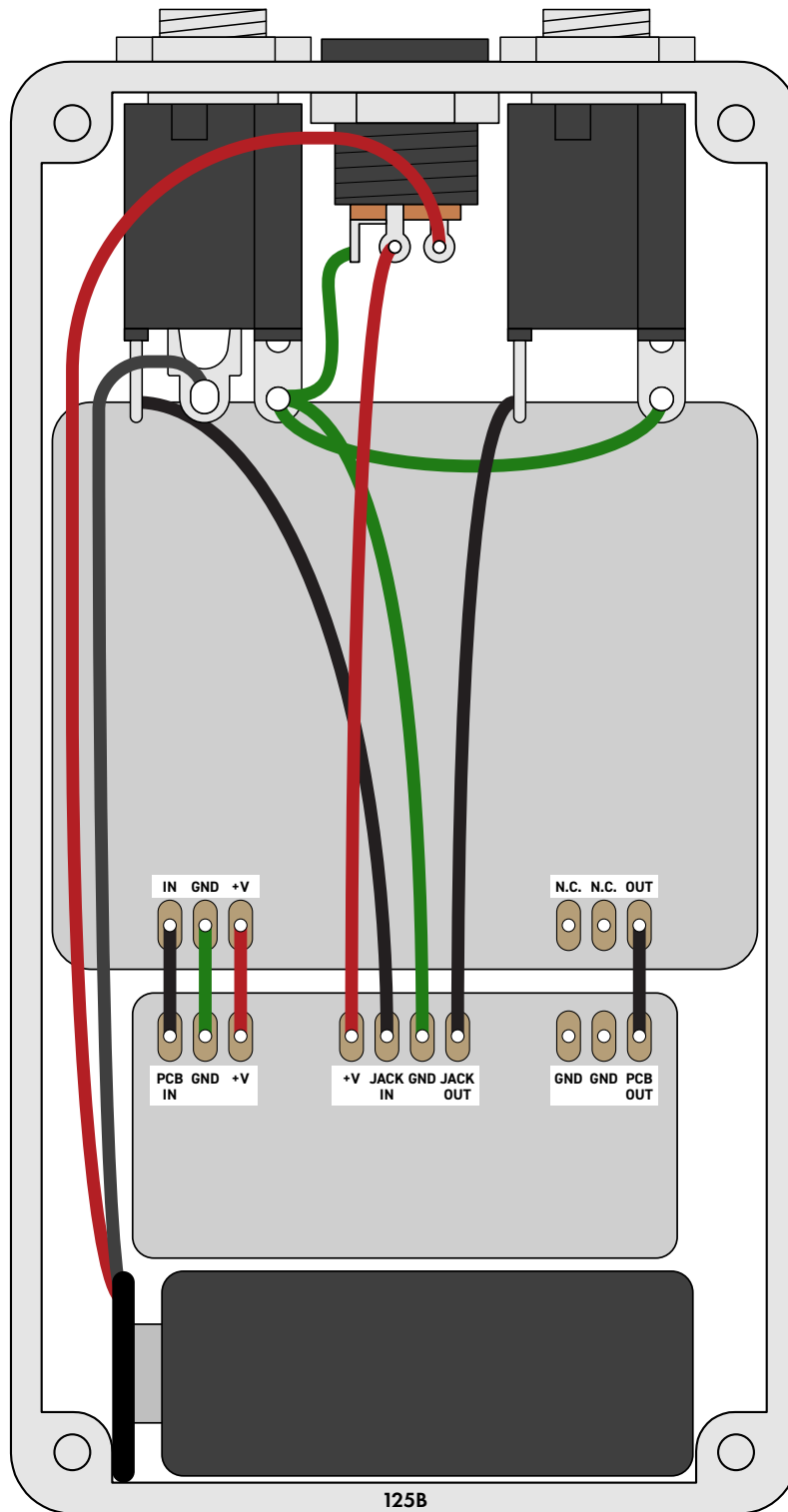
Enclosure is shown without jacks. See next page for jack layout and wiring.





# WIRING DIAGRAM

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## 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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### 1.0.2 (2023-08-25)

Updated Z2 part number to BZX79C2V7 (0.5W). See build notes.

### 1.0.1 (2021-03-08)

Corrected drill template which was missing the two toggle switches.

### 1.0.0 (2020-11-16)

Initial release.