

PROJECT NAME

PROCYON



BASED ON

BJFe Honey Bee Overdrive

BUILD DIFFICULTY



EFFECT TYPE

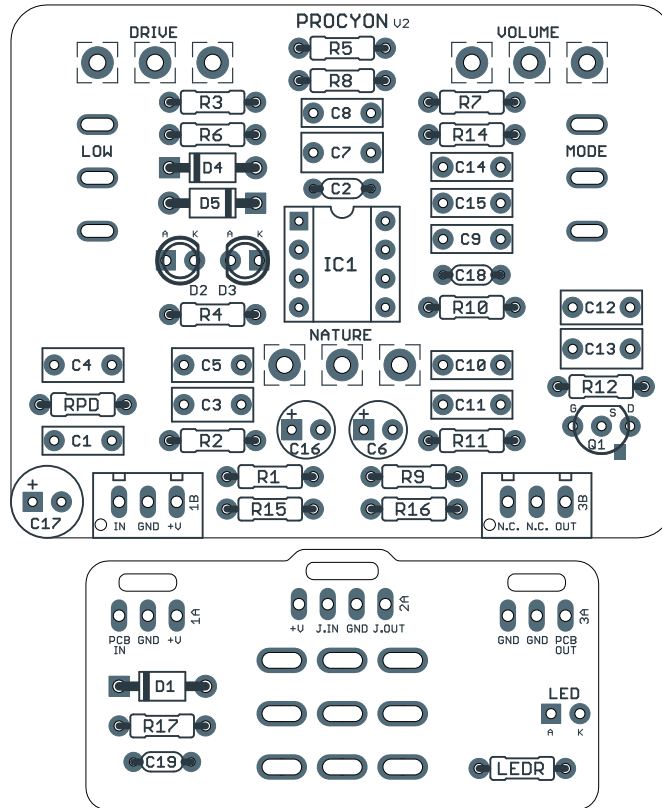
Overdrive

DOCUMENT VERSION

1.0.0 (2023-11-24)

PROJECT SUMMARY

One of the original hand-made boutique pedals, originally modeled after vintage Supro amps and noted for its dynamic low-gain tone.



Actual size is 2.3" x 1.86" (main board) and 1.78" x 0.87" (bypass board).

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INTRODUCTION

The Procyon Natural Overdrive is a clone of the BJFe Honey Bee Overdrive, a circuit first released in 2002 that is credited for starting the “low gain overdrive” trend.

The circuit itself is a rather unique overdrive design, incorporating both soft and hard clipping and utilizing frequency-dependent negative feedback from different points in the circuit, for a result that is often called “amplike” in tone. It is very loosely based on the RAT, and was inspired by the sound of overdriven Supro amps.

These pedals were handmade in Sweden and were extremely expensive (\$300-400 USD), and so in 2011 an agreement was made with BearFoot FX to produce them in the USA for a more reasonable cost.

Bearfoot has also released a number of variants of this basic circuit such as the Model H, Model G, Honey Beest, Uber Bee, and Sparkling Yellow Overdrive. While each of these circuits are similar, the Procyon project only supports the standard Honey Bee (both BJFe and BearFoot versions, which have minor differences).

The updated Procyon V2 has been completely overhauled from the earlier one. Based on our research of several different Honey Bee traces, we concluded that the original FSB schematic (which all DIY Honey Bees have been based on for nearly 15 years) was incorrect and does not represent an actual Honey Bee. You can read more about our conclusions in our article, [Revisiting the original Honey Bee FSB trace](#).

USAGE

The Procyon has three knobs and two toggles:

- **Drive** controls the gain of the op-amp stage which increases the amount of signal clipping.
- **Nature** is a unique tone control, doing two things at once. On one half of the rotation it affects the amount of bass in the input stage and changes the gain ratio of the circuit. The other half depends on the setting of the Mode switch.
- **Volume** controls the overall output level of the effect.
- **Mode** (toggle) selects between two different operations for the second half of the Nature control. Mode I is a source bypass capacitor at Q1, which increases the amount of bass as it’s turned up. Mode II is a variable hi-cut at the end of the circuit.
- **Low** (toggle) selects between three different bass modes: stock, less bass, and more bass.

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	360k	Metal film resistor, 1/4W	
R2	15k	Metal film resistor, 1/4W	
R3	3k	Metal film resistor, 1/4W	
R4	1k	Metal film resistor, 1/4W	
R5	1k	Metal film resistor, 1/4W	
R6	27k	Metal film resistor, 1/4W	
R7	10k	Metal film resistor, 1/4W	
R8	147k	Metal film resistor, 1/4W	
R9	1M	Metal film resistor, 1/4W	
R10	5k6	Metal film resistor, 1/4W	
R11	2k2	Metal film resistor, 1/4W	
R12	4k7	Metal film resistor, 1/4W	
R14	47k	Metal film resistor, 1/4W	
R15	31k6	Metal film resistor, 1/4W	
R16	31k6	Metal film resistor, 1/4W	
R17	51R	Metal film resistor, 1/4W	Power supply filter resistor.
RPD	2M2	Film capacitor, 7.2 x 2.5mm	Input pull-down resistor.
LEDR	10k	MLCC capacitor, NP0/C0G	LED current-limiting resistor. Adjust value to change LED brightness.
C1	47n	Film capacitor, 7.2 x 2.5mm	
C2	100pF	MLCC capacitor, NP0/C0G	
C3	220n	Film capacitor, 7.2 x 2.5mm	
C4	220n	Film capacitor, 7.2 x 2.5mm	
C5	220n	Film capacitor, 7.2 x 2.5mm	
C6	22uF	Electrolytic capacitor, 5mm	
C7	1uF	Film capacitor, 7.2 x 3.5mm	
C8	22n	Film capacitor, 7.2 x 2.5mm	
C9	4n7	Film capacitor, 7.2 x 2.5mm	
C10	22n	Film capacitor, 7.2 x 2.5mm	
C11	4n7	Film capacitor, 7.2 x 2.5mm	
C12	220n	Film capacitor, 7.2 x 2.5mm	
C13	1uF	Film capacitor, 7.2 x 3.5mm	
C14	4n7	Film capacitor, 7.2 x 2.5mm	

PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
C15	4n7	Film capacitor, 7.2 x 2.5mm	
C16	22uF	Electrolytic capacitor, 5mm	Reference voltage filter capacitor.
C17	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C18	470n	MLCC capacitor, X7R	Power supply filter capacitor.
C19	100n	MLCC capacitor, X7R	Power supply filter capacitor.
D1	1N5817	Schottky diode, DO-41	
D2	3mm green LED	LED, 3mm, green diffused	
D3	3mm green LED	LED, 3mm, green diffused	
D4	1N4007	Rectifier diode, DO-41	
D5	1N4007	Rectifier diode, DO-41	
Q1	2N5457	JFET, N-channel, TO-92	Can substitute any general-purpose JFET.
IC1	CA3130EZ	Operational amplifier, DIP8	
IC1-S	DIP-8 socket	IC socket, DIP-8	
DRIVE	500kA	16mm right-angle PCB mount pot	Audio (log) taper.
NATURE	50kA	16mm right-angle PCB mount pot	Audio (log) taper.
VOLUME	50kB	16mm right-angle PCB mount pot	Linear taper.
LOW	SPDT cntr. off	Toggle switch, SPDT on-off-on	
MODE	SPDT on-on	Toggle switch, SPDT on-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.
FSW	3PDT	Stomp switch, 3PDT	
BATT.	9V	9V battery snap	Soft vinyl type. The hard-shell type will not fit.
ENC	125B	Enclosure, die-cast aluminum	Can also use a Hammond 1590N1.

BUILD NOTES

Variants

We compared several versions of the HBOD for the Procyon V2 and found that many of the components had different values across the versions. Here are the circuits we referenced:

- Original BJFe (2 units from FSB trace)
- Bearfoot
- Moody Sounds DIY kit (designed in conjunction with BJFe)
- One Control
- BJFe Blueberry Bass Overdrive

Aside from the Blueberry, the changes are too numerous to list here, so we annotated the schematic instead, which can be found on the next page.

We put the two biggest changes (the bass frequency capacitor and the operation of the Nature switch) on toggle switches. The other changes are for the most part inconsequential.

The default parts list is for the original BJFe Honey Bee.

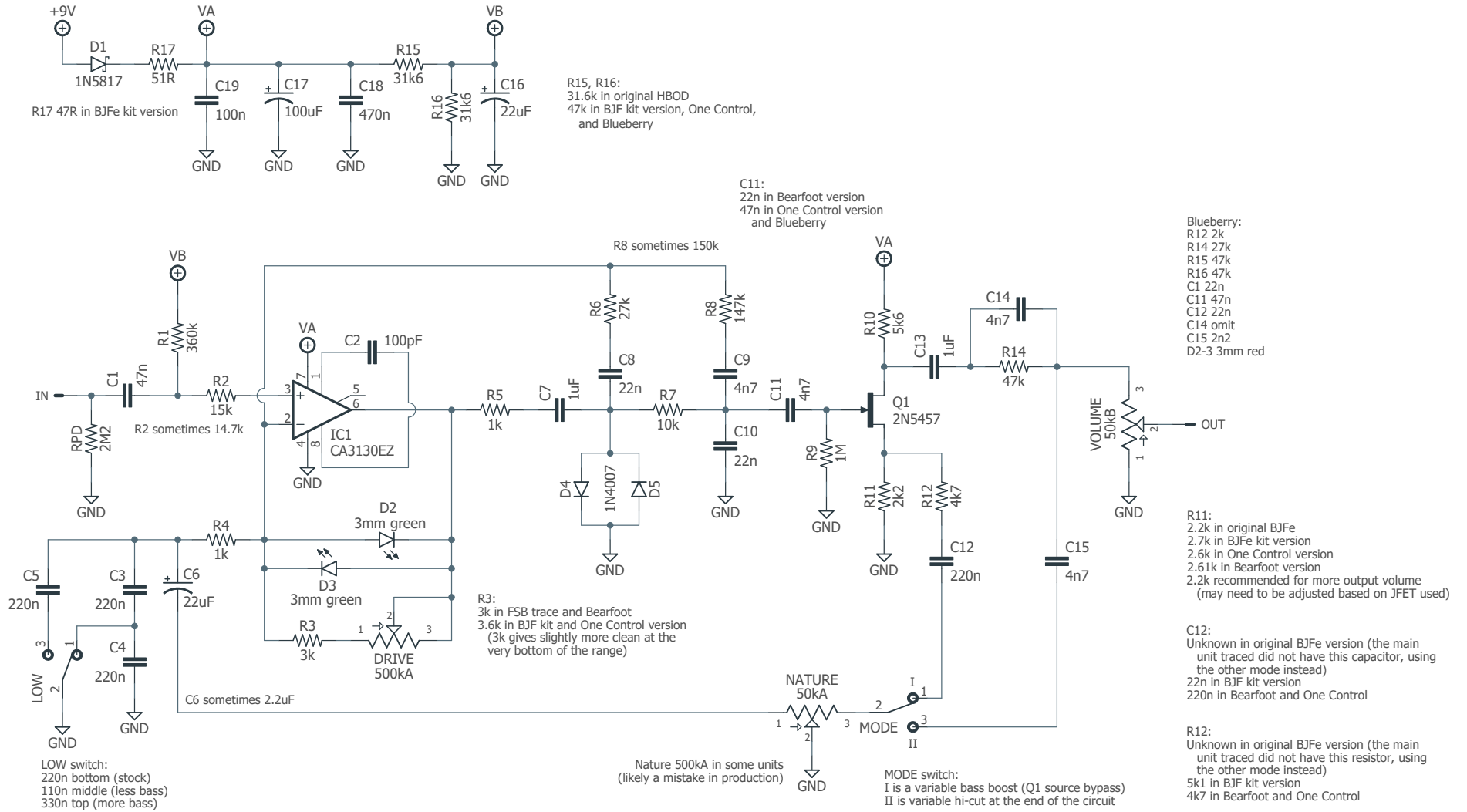
To read more on this process, check out our post: [Revisiting the original Honey Bee FSB trace](#)

Blueberry part substitutions

To build the Blueberry Bass Overdrive, make the following substitutions from the default list:

- **R12:** 4k7 → 2k
- **R14:** 47k → 27k
- **R15:** 31.6k → 47k
- **R16:** 32.6k → 47k
- **C1:** 47n → 22n
- **C11:** 4n7 → 47n
- **C12:** 220n → 22n
- **C14:** omit (4n7 in original)
- **C15:** 4n7 → 2n2
- **D2-3:** 3mm green LED → 3mm red LED

SCHEMATIC



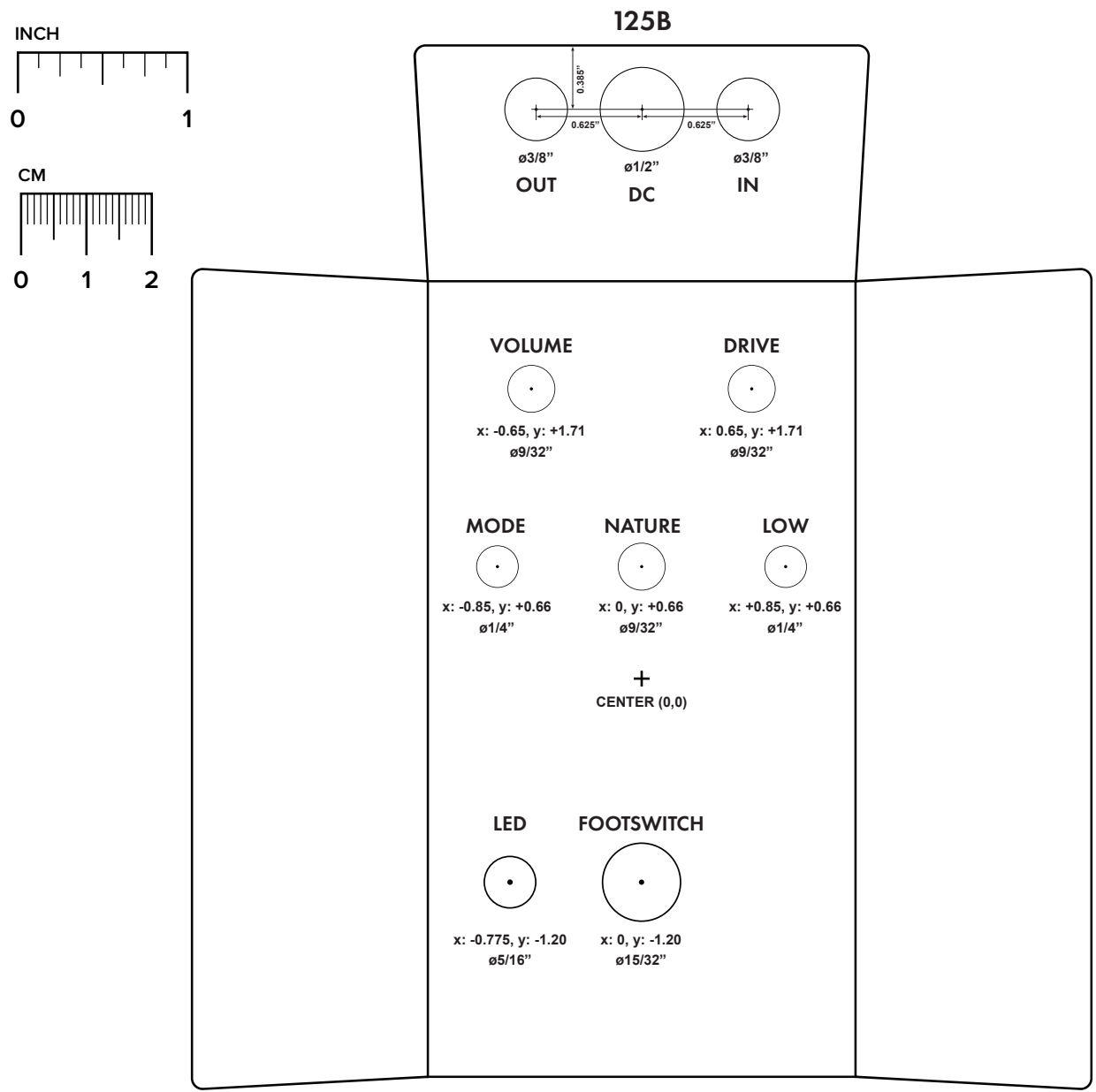
DRILL TEMPLATE

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.

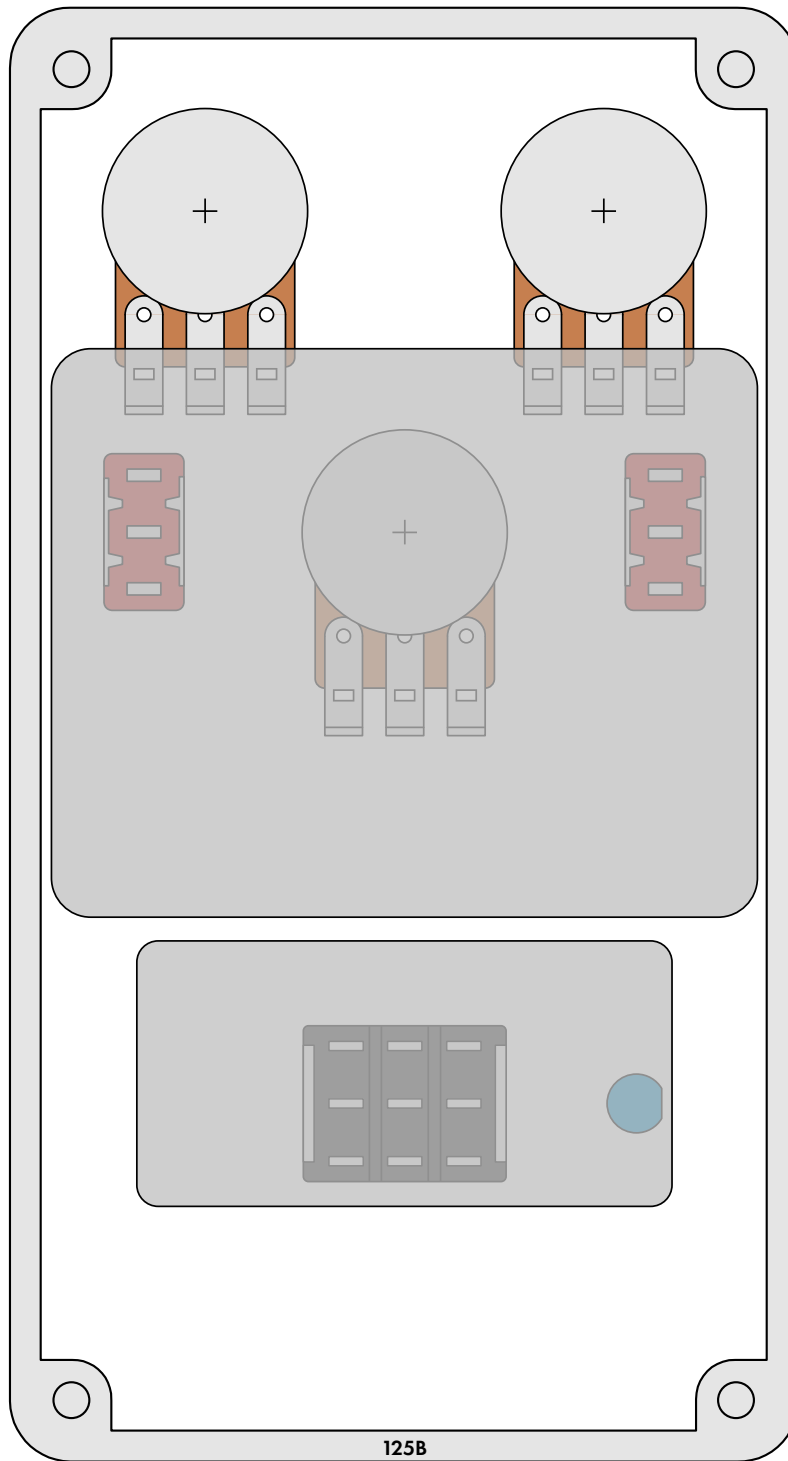
Top jack layout assumes the use of closed-frame jacks like the [Switchcraft 111X](#). If you'd rather use open-frame jacks, please refer to the [Open-Frame Jack Drill Template](#) for the top side.

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.

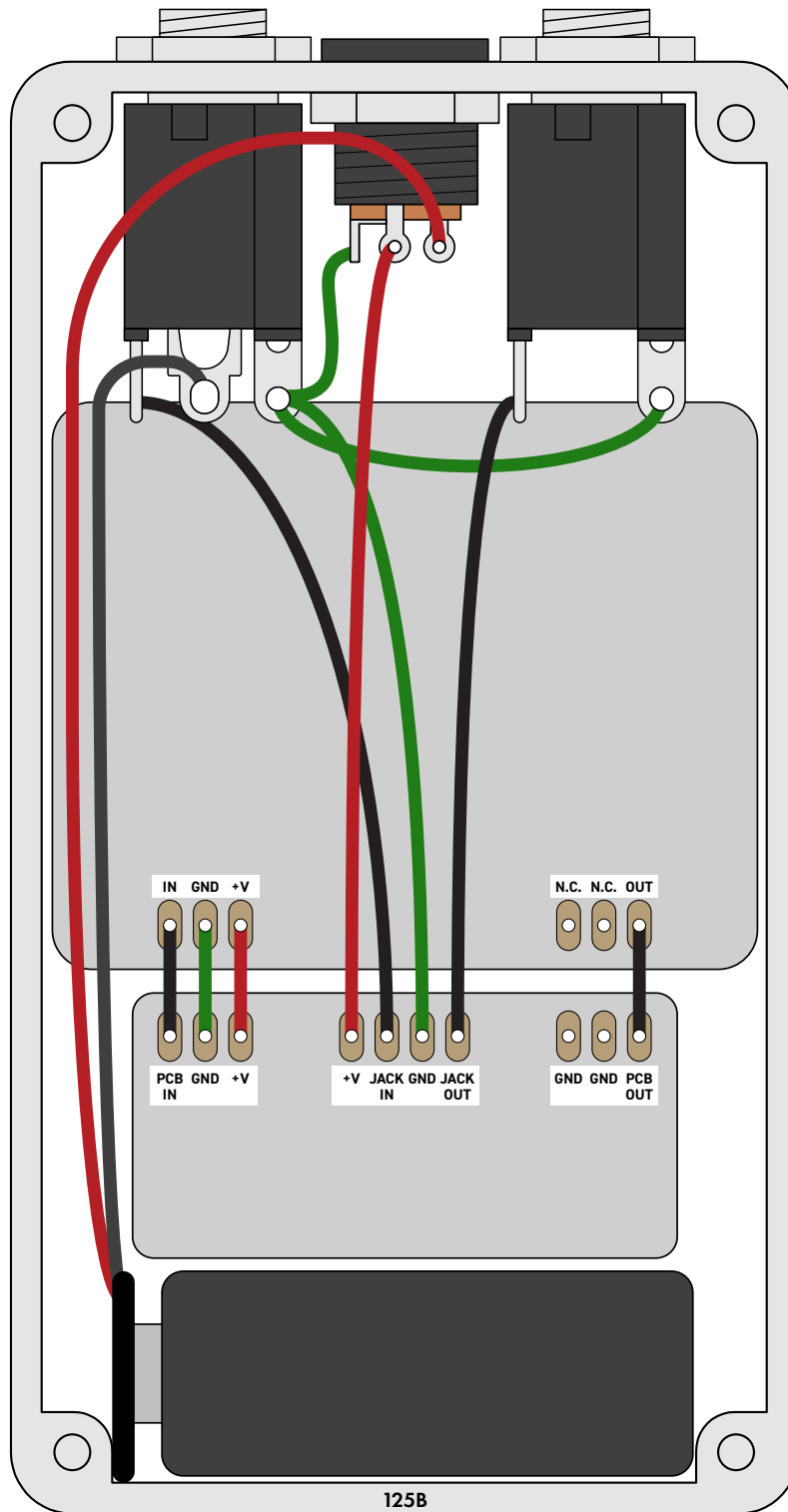


ENCLOSURE LAYOUT

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

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

2.0.0 (2023-11-24)

Complete overhaul based on new research. Added toggle switches inspired by the One Control version.

1.0.1 (2021-11-23)

Corrected R8 to 147k based on likely inaccurate FSB trace dating back more than 10 years. The previous version of the build doc showed 47k.

1.0.0 (2018-08-22)

Initial release.