

PROJECT NAME

SUPREAUX

BASED ON

ROG Supreaux / JHS Superbolt

EFFECT TYPE

JFET overdrive / amp simulator

BUILD DIFFICULTY

■■■■□ Intermediate

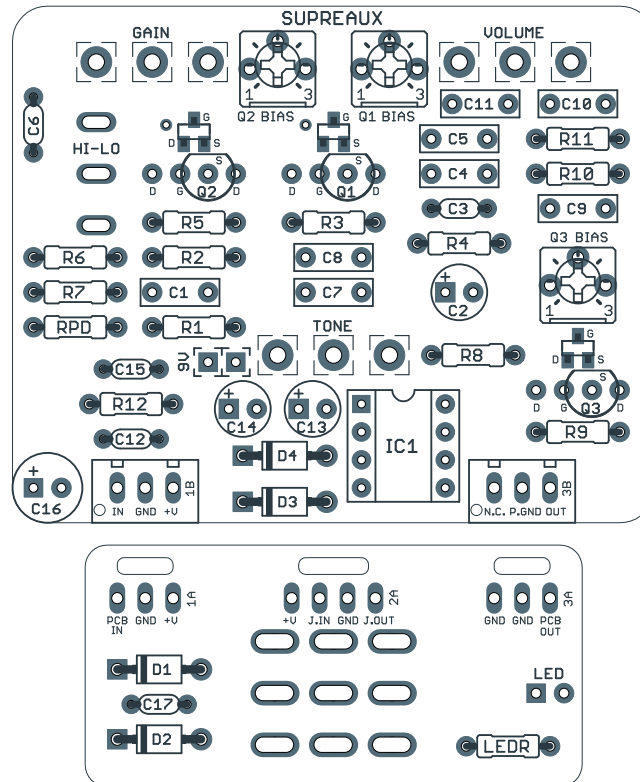
DOCUMENT VERSION

1.0.1 (2021-03-03)



PROJECT SUMMARY

An adaptation of the Supro 16T amplifier, with JFETs replacing the tube stages.



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

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INTRODUCTION

The Runoffgroove Supreaux is an adaptation of the Supro 16T amplifier, originally designed in 2004. While it was later revamped in 2008 as the Supreaux Deux, designed to be more accurate to the sound of the Supro amp, the original version is notable for being the source for the JHS Superbolt, one of their most popular pedals.

The JHS Superbolt, first released in 2012, changed a couple of values to bias the JFETs for 18V operation, as well as adding an on-board charge pump for 18V operation from a 9V supply. A toggle switch was also added to switch between “hi gain” and “low gain” modes.

The second version of the Superbolt from 2016 changed the “Hi/Lo” toggle into a switchable gain boost. It’s not been traced, but from their description, it appears to be a separate boost stage that goes before the main circuit to push it into overdrive more easily.

The Aion FX version of the Supreaux incorporates the JHS mods from the first version of the Superbolt, including the 18V charge pump, and it is more accurate to call it a clone of the Superbolt than the Supreaux. If you want to build the original Supreaux circuit, check the build notes later on for details.

Since the J201 and 2N5457 are very difficult to find in TO-92 through-hole format, and many DIY hobbyists are intimidated by SMD parts, Aion FX offers the [J201](#) and [2N5457](#) in SMD format, pre-soldered to adapters so they can be used as through-hole parts.

USAGE

The Supreaux has the following controls:

- **Gain** controls the volume going into the JFET clipping stage. At higher drive levels, the second JFET will overload and clip the signal.
- **Tone** is a simple passive high-pass filter that can be dampened, retaining more treble as the knob is turned up.
- **Volume** controls the overall output of the effect.
- **Hi/Lo** is a toggle switch that allows changing between low, medium and high gain. The effect is fairly subtle overall, so don’t expect a huge difference in tone, but it does change the character a bit.

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	OMIT	Metal film resistor, 1/4W	Omit for Superbolt variant. For original ROG circuit, use 100k here.
R2	1M	Metal film resistor, 1/4W	
R3	1k5	Metal film resistor, 1/4W	
R4	470k	Metal film resistor, 1/4W	
R5	2k7	Metal film resistor, 1/4W	
R6	120k	Metal film resistor, 1/4W	
R7	220k	Metal film resistor, 1/4W	
R8	470k	Metal film resistor, 1/4W	
R9	220R	Metal film resistor, 1/4W	
R10	12k	Metal film resistor, 1/4W	
R11	12k	Metal film resistor, 1/4W	
R12	100R	Metal film resistor, 1/4W	
RPD	2M2	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	22n	Film capacitor, 7.2 x 2.5mm	Omit for original ROG circuit.
C2	33uF	Electrolytic capacitor, 5mm	
C3	470pF	MLCC capacitor, NP0/C0G	
C4	4n7	Film capacitor, 7.2 x 2.5mm	
C5	4n7	Film capacitor, 7.2 x 2.5mm	
C6	470pF	MLCC capacitor, NP0/C0G	
C7	10n	Film capacitor, 7.2 x 2.5mm	
C8	4n7	Film capacitor, 7.2 x 2.5mm	
C9	10n	Film capacitor, 7.2 x 2.5mm	
C10	3n3	Film capacitor, 7.2 x 2.5mm	
C11	3n3	Film capacitor, 7.2 x 2.5mm	
C12	470n	MLCC capacitor, X7R	Power supply filter capacitor.
C13	10uF	Electrolytic capacitor, 5mm	Power supply filter capacitor.
C14	47uF	Electrolytic capacitor, 5mm	Power supply filter capacitor.
C15	470n	MLCC capacitor, X7R	Power supply filter capacitor.
C16	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.

PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
C17	100n	MLCC capacitor, X7R	Power supply filter capacitor.
D1	1N5817	Schottky diode, DO-41	
D2	1N4742A	Zener diode, 12V, DO-41	
D3	1N5817	Schottky diode, DO-41	
D4	1N5817	Schottky diode, DO-41	
Q1	J201	JFET, N-channel, TO-92 or SOT-23	Can use either J201 (through-hole) or MMBFJ201 (SMD).
Q2	J201	JFET, N-channel, TO-92 or SOT-23	Can use either J201 (through-hole) or MMBFJ201 (SMD).
Q3	2N5457	JFET, N-channel, TO-92 or SOT-23	Can use either 2N5457 (through-hole) or MMBF5457 (SMD).
Q1_TR	100k trimmer	Trimmer, 10%, 1/4"	
Q2_TR	100k trimmer	Trimmer, 10%, 1/4"	
Q3_TR	25k trimmer	Trimmer, 10%, 1/4"	JHS uses 50k and ROG uses 100k, but it's easier to bias with 25k.
IC1	TC1044SCPA	Charge pump, DIP8	
IC1-S	DIP-8 socket	IC socket, DIP-8	
TONE	500kA	16mm right-angle PCB mount pot	
GAIN	500kA	16mm right-angle PCB mount pot	
VOL.	100kA	16mm right-angle PCB mount pot	
HI/LO	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.

BUILD NOTES

Setting bias trimmers

Turn the trimmers so that the drain (“D” pad) of the JFETs measure half the supply voltage, measured with a multimeter (red probe to “D” pad and black probe to ground). For the 18V Superbolt, you’re looking for 9V here, and for the original Runoffgroove circuit you want 4.5V. This is just a guideline, though. You can tweak the trimmers a bit to fine-tune the circuit to your liking. The bias affects the total gain of the circuit, so you can make it a little cleaner or a little dirtier than stock.

JFET usage

The J201 and 2N5457 JFETs are very popular in DIY pedal designs, but were both discontinued in TO-92 through-hole format several years ago and are becoming very scarce.

The MMBFJ201 and MMBF5457 are SMD versions that are still in production. On the PCB, two outlines have been included for each individual JFET, one for TO-92 and one for SMD (called SOT-23) right next to it. Make sure you only use one or the other—don’t put both a through-hole and surface mount part in the two Q1 spots.

JFET adapters

Many DIY builders are intimidated by the small size of surface-mount parts. Aion FX offers pre-soldered [J201](#) and [2N5457](#) JFETs on adapters so they can easily be used as through-hole parts.

JHS Superbolt differences

The JHS Superbolt is a near-exact clone of the Runoffgroove circuit, which is something that caused a great deal of controversy because JHS didn’t get permission from Runoffgroove, didn’t acknowledge their source, and passed it off as an original design.

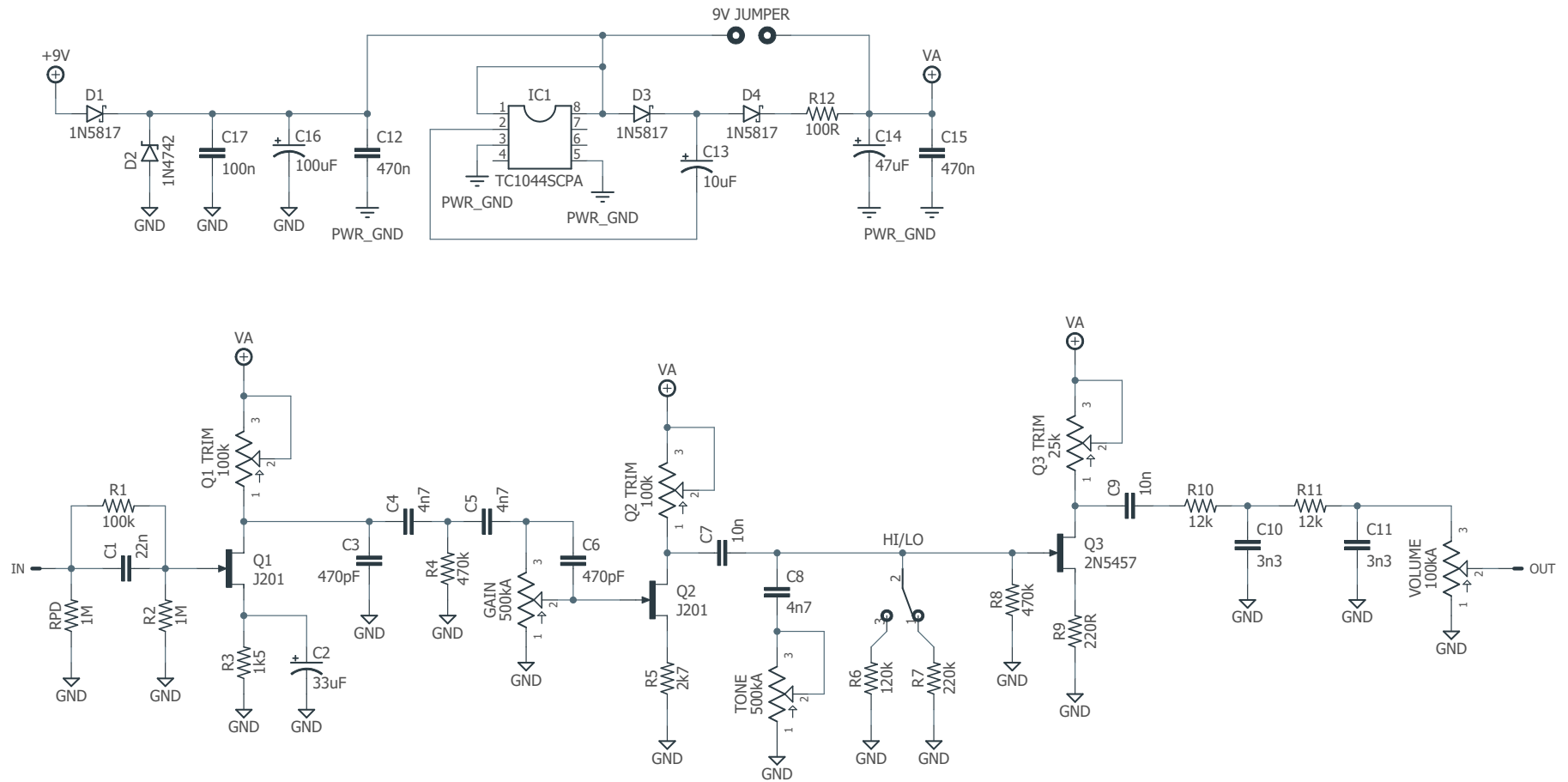
The main parts list for this project is for the JHS version. If you’d like to build the original Runoffgroove circuit, which runs at 9V, the following values need to be changed.

- **C1:** 22n → omit (leave empty)
- **R1:** omit → 100k
- **R5:** 2k7 → 3k9
- **R9:** 220R → 330R
- **IC1:** Omit
- **D3-4:** Omit
- **C12-15:** Omit
- Connect 9V jumper pads

Note that R5 and R9 are strictly just for changing the bias for 18V operation, using Runoffgroove’s own bias calculator on their website to arrive at those values, so these values should only be used at 18V. The only true change in the Superbolt is was swapping R1 for C1 and adding the Hi/Lo toggle.

The only other change is the Q3 trimmer. Runoffgroove specifies 100k and JHS uses 50k. However, even with 50k it can be very difficult to bias Q3, so it’s recommended to use 25k for all versions.

SCHEMATIC



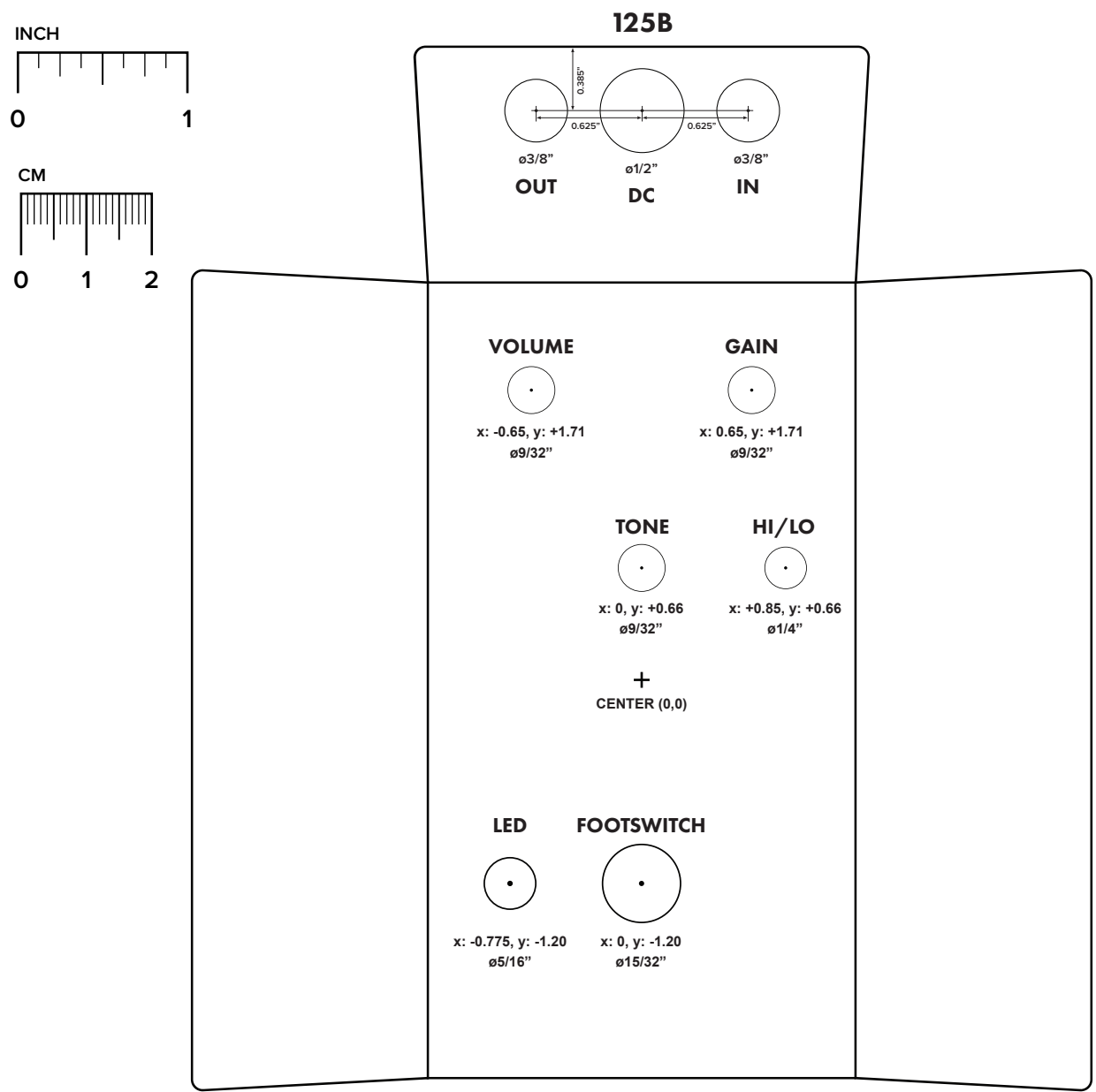
DRILL TEMPLATE

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.

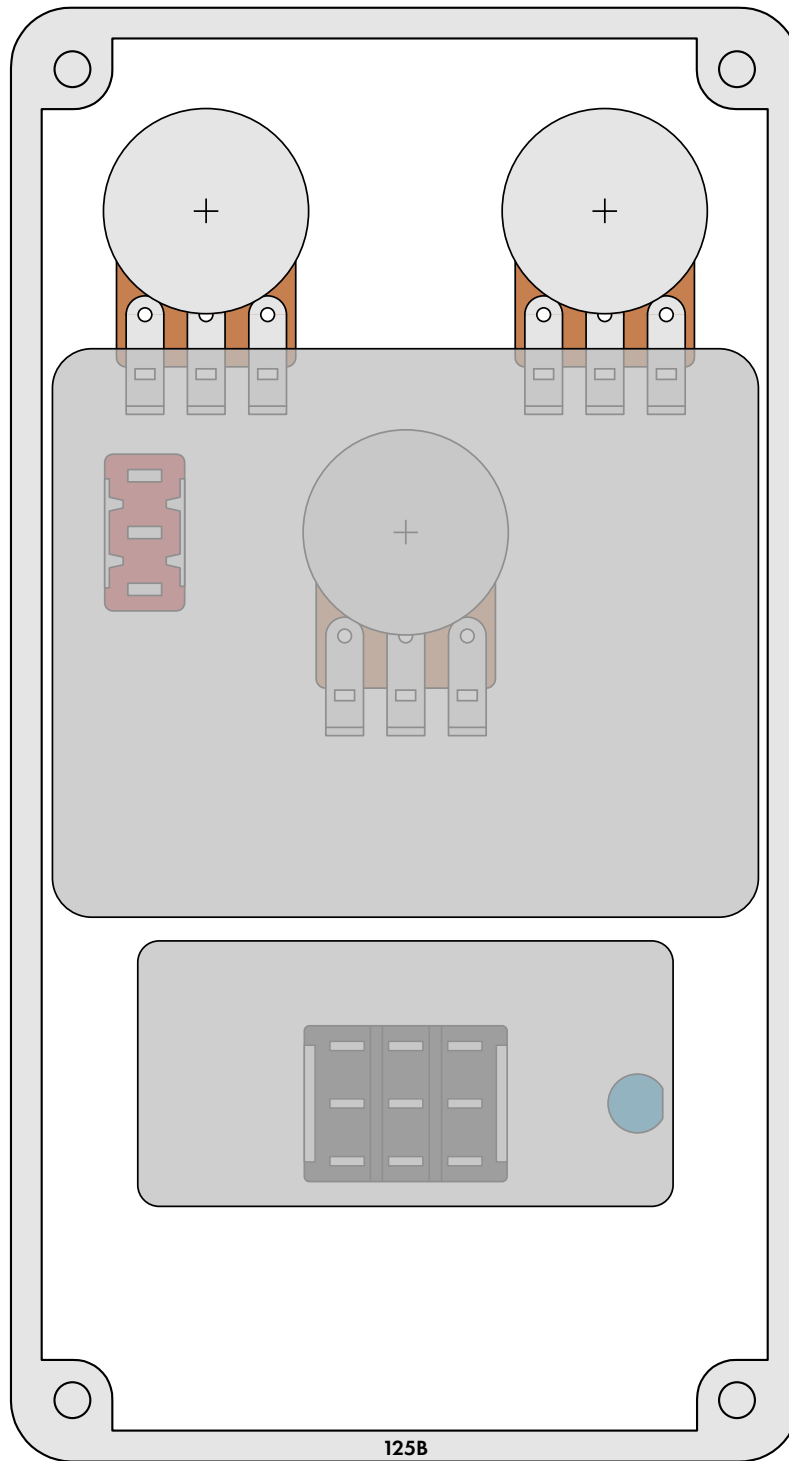
Top jack layout assumes the use of closed-frame jacks like the [Switchcraft 111X](#). If you'd rather use open-frame jacks, please refer to the [Open-Frame Jack Drill Template](#) for the top side.

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.

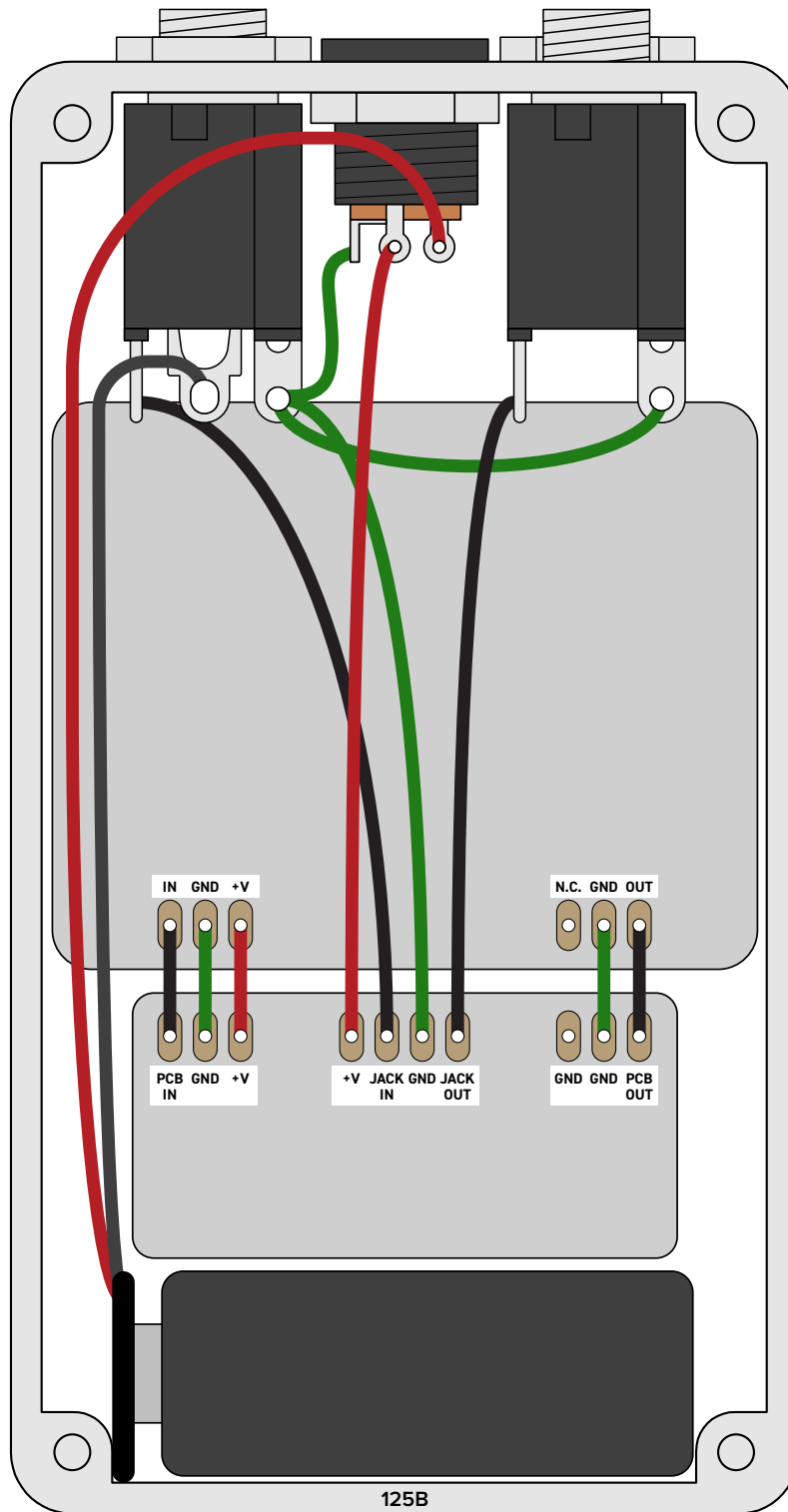


ENCLOSURE LAYOUT

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.

Runoffgroove circuit licensing

Runoffgroove circuits are for personal use only and may not be used for commercial endeavors without approval from Runoffgroove. Here are the terms of use from their site:

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DOCUMENT REVISIONS

1.0.1 (2021-03-03)

Corrected Q3 part number (was listed as J201 instead of 2N5457 in the parts list; the schematic and Mouser spreadsheet were correct).

1.0.0 (2020-06-05)

Initial release.