

## PROJECT NAME

# ORPHEUS SI

## BASED ON

Mosrite® Fuzzrite (silicon)

## EFFECT TYPE

Silicon fuzz

## BUILD DIFFICULTY

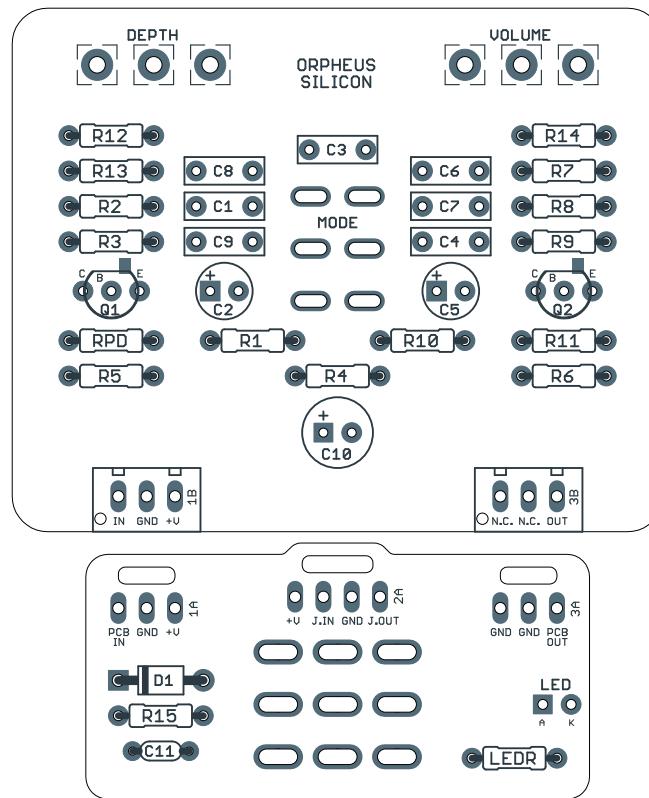
■□□□□ Beginner

## DOCUMENT VERSION

1.0.1 (2024-09-11)

## PROJECT SUMMARY

An updated version of the classic fuzz from the late 1960s, featuring silicon transistors in a unique two-stage blending arrangement.



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

**IMPORTANT NOTE**

This documentation is for the **silicon** version of the project. There is also a [germanium version](#), based on the earliest Fuzzrite circuit. While the names are similar, the schematic and part numbering are different. Confirm your PCB is labeled "Orpheus Silicon" before proceeding.

# TABLE OF CONTENTS

---

1	Project Overview	8	Drill Template
2	Introduction & Usage	9	Enclosure Layout
3-4	Parts List	10	Wiring Diagram
5-6	Build Notes	11	Licensing
7	Schematic	11	Document Revisions

## INTRODUCTION

---

The Orpheus Silicon Fuzz is based on the silicon version of the Mosrite® Fuzzrite, which replaced the germanium version in 1968 around the time that the [Fuzz Face](#) and other fuzz circuits were moving to silicon as well. As with the germanium version, it was designed by Ed Sanner.

The circuit topology is largely the same as the germanium version, but it runs on modern negative-ground power due to the NPN transistors, whereas the germanium version runs on positive ground. The two circuits have very different fuzz textures and both are worth your time. The parts for this version are also significantly easier to source since it uses common silicon transistors and not germanium.

The silicon version was much more widespread, and was whitelabeled or cloned as the Orpheum Fuzz, Guild Foxey Lady, and Electro-Harmonix Axis Fuzz, all of which can be built using this PCB.

Catalinbread released an adaptation in 2010 called the Merkin Fuzz. Later in 2015, they teamed up with the Moseley estate and Ed Sanner to release an official reissue of the Fuzzrite, which was based on the silicon version.

The germanium version followed in 2023, and included a “vintage/modern” toggle switch that reduces the steep bass cut of the original and fills out the midrange of the effect for a more modern sound.

We’ve ported this switch to the silicon version of the Fuzzrite circuit, which suffers from the same issues in the stock configuration.

*Mosrite® is a registered trademark of Mosrite USA, LLC. Aion FX has no affiliation with Mosrite USA or Catalinbread.*

## USAGE

---

The Orpheus Silicon has two knobs and one toggle switch:

- **Depth** 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.
- **Volume** 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	(omit)	Metal film resistor, 1/4W	Axis/Foxey: 470k
R2	(omit)	Metal film resistor, 1/4W	Axis/Foxey: 47k
R3	470k	Metal film resistor, 1/4W	Orpheum: 10M; Axis/Foxey: omit (leave empty)
R4	470k	Metal film resistor, 1/4W	Orpheum & Axis/Foxey: 22k
R5	(jumper)	Metal film resistor, 1/4W	Axis/Foxey: 680R
R6	(omit)	Metal film resistor, 1/4W	Axis/Foxey: 470k
R7	(omit)	Metal film resistor, 1/4W	Axis/Foxey: 47k
R8	470k	Metal film resistor, 1/4W	Orpheum: 1M; Axis/Foxey: omit (leave empty)
R9	470k	Metal film resistor, 1/4W	Orpheum & Axis/Foxey: 47k
R10	(jumper)	Metal film resistor, 1/4W	Orpheum: 100k
R11	(jumper)	Metal film resistor, 1/4W	Axis/Foxey: 680R
R12	22k	Metal film resistor, 1/4W	Some versions of the Fuzzrite omit this resistor. See build notes.
R13	1M2	Metal film resistor, 1/4W	Orpheum & Axis/Foxey: omit (leave empty)
R14	100k	Metal film resistor, 1/4W	Orpheum & Axis/Foxey: omit (leave empty)
R15	100R	Metal film resistor, 1/4W	Power supply filter resistor.
RPD	2M2	Metal film resistor, 1/4W	Input pull-down resistor.
LED R	10k	Metal film resistor, 1/4W	LED current-limiting resistor.
C1	47n	Film capacitor, 7.2 x 2.5mm	Orpheum & Axis/Foxey: 100n
C2	(omit)	Electrolytic capacitor, 5mm	Axis/Foxey: 47uF electrolytic
C3	47n	Film capacitor, 7.2 x 2.5mm	Orpheum & Axis/Foxey: 100n
C4	(omit)	Film capacitor, 7.2 x 2.5mm	Orpheum: 100n
C5	(omit)	Electrolytic capacitor, 5mm	Axis/Foxey: 4.7uF electrolytic
C6	2n2	Film capacitor, 7.2 x 2.5mm	Axis/Foxey: 3n3
C7	4n7	Film capacitor, 7.2 x 2.5mm	Part of the Mode switch mod. Can increase to 8n2 for more bass.
C8	2n2	Film capacitor, 7.2 x 2.5mm	Axis/Foxey: 3n3
C9	4n7	Film capacitor, 7.2 x 2.5mm	Part of the Mode switch mod. Can increase to 8n2 for more bass.
C10	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C11	100n	MLCC capacitor, X7R	Power supply filter capacitor.
D1	1N5817	Schottky diode, DO-41	
Q1	2N3904	BJT transistor, NPN, TO-92	
Q2	2N3904	BJT transistor, NPN, TO-92	

## PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
DEPTH	500kB	16mm right-angle PCB mount pot	Orpheum: 1MB; Axis/Foxey: 100kB
VOLUME	50kA	16mm right-angle PCB mount pot	Orpheum: 100kB; Axis/Foxey: 100kA
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

---

## Versions

This project was designed to allow you to build any of three different variants of the circuit:

- Original silicon Fuzzrite
- Orpheum Fuzz, which was white-labeled as the Clark Fuzz and Manny's Fuzz
- Electro-Harmonix Axis Fuzz, which was white-labeled as the Guild Foxey Lady (2-knob version)

The Orpheum was essentially the same as the Fuzzrite, but with several part substitutions. The Axis made several significant changes, notably the biasing method of both transistors as well as the use of an emitter bypass capacitor on both, but it's still basically the same circuit.

The default parts list above is for the Fuzzrite. Here is a table showing all three variations:

PART	FUZZRITE	ORPHEUM	AXIS/FOXLEY
C1	47n	100n	100n
C2	(omit)	(omit)	47uF electro
C3	47n	100n	100n
C4	(omit)	100n	(omit)
C5	(omit)	(omit)	4.7uF electro
C6	2n2	2n2	3n3
C8	2n2	2n2	3n3
R1	(omit)	(omit)	470k
R2	(omit)	(omit)	47k
R3	470k	10M	(omit)
R4	470k	22k	22k
R5	(jumper)	(jumper)	680R
R6	(omit)	(omit)	470k
R7	(omit)	(omit)	47k
R8	470k	1M	(omit)
R9	470k	47k	47k
R10	(jumper)	100k	(jumper)
R11	(jumper)	(jumper)	680R
R12	(omit)	22k	22k
DEPTH	350kB	1MB	100kB
VOLUME	33kB	100kB	100kA

Note that "omit" means leave empty while "jumper" means to use a bare wire, such as a clipped resistor lead. For any of the three variants, several components will be left empty on the PCB.

## BUILD NOTES (CONT.)

---

### Potentiometer values

The original Fuzzrite used a 350k potentiometer for Depth and 33k for Volume. These are non-standard values, so R13 and R14 have been added in parallel with these pots to allow standard types to be used.

- For **Depth**, use a 500kB potentiometer with a 1M2 resistor for R13.
- For **Volume**, use a 50kA potentiometer with a 100k resistor for R14.

Volume was originally “B” (linear) taper, but “A” (audio or log) provides a better range of control.

An early version of Catalinbread’s silicon Fuzzrite used 500kC (reverse audio or antilog) for Depth, but current versions use “B” taper. 500kC is also the value used in the Germanium version.

The Orpheum and Axis use standard pot values, so omit these two resistors for those variants.

### R12 resistor

The R12 resistor is 22k on the germanium Fuzzrite as well as both the Orpheum and Axis/Foxy Lady. Some, even perhaps most, silicon Fuzzrites omit this resistor. However, the Catalinbread Fuzzrite (silicon version) includes it, and since this is the official reissue developed in partnership with Mosrite by studying original units, we are including it in the default build configuration.

The effect of the resistor is to form a high-pass filter with C6, or C6+C7 if the modern mode is engaged. It also cuts the signal level somewhat, potentially providing more balance across the range of the Depth control depending on how the rest of the circuit is tuned.

Some prefer it at 22k, some prefer it omitted, and others prefer raise it to 100k as a sort of in-between solution. If you want to experiment with your build to tweak the sound or understand how the circuit works, this is a good place to start.

### Mode switch modifications

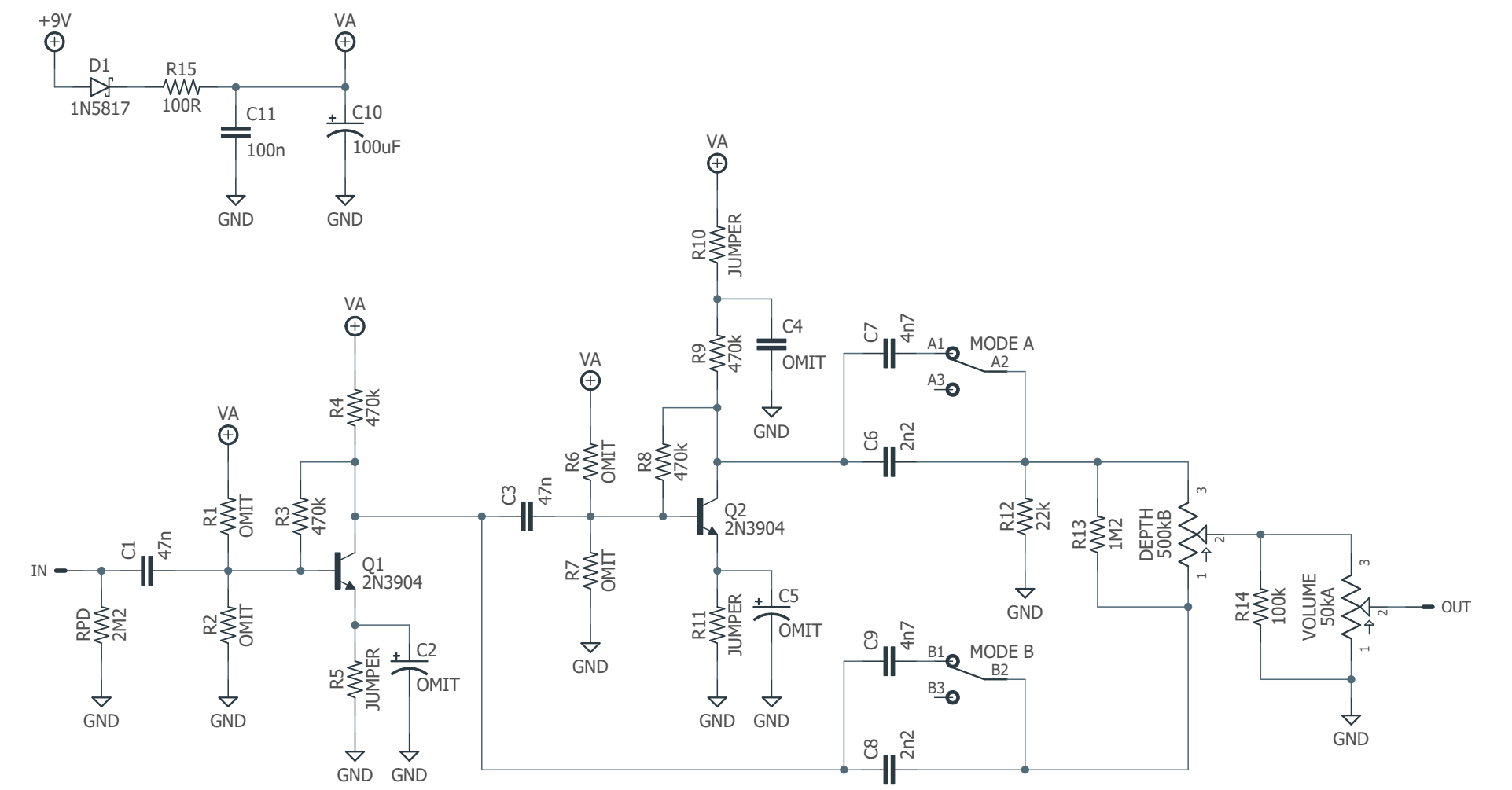
The Mode switch is adapted from the Catalinbread Fuzzrite Germanium. When engaged, it increases the size of the coupling capacitors of both sides of the blend, which allows more midrange and low-end.

It’s recommended to use 4n7 for C7 and C9, which adds up to 6n9 when put in parallel with the existing 2n2 capacitors (C6 and C8). If you find that modern mode is too bassy, you can reduce C7 and C9 to 2n2 or 3n3. Or if you want more low end, you can increase them to 8n2.

C7 and C9 also do not both have to be the same value, for instance if you find that it needs more bass on the higher end of the Depth control but not on the lower end.

The Axis and Foxy Lady use 3n3 for the base coupling capacitors, so for this build you may want to go lower for the modern mode caps, such as using two more 3n3s for a total of 6n6.

# SCHEMATIC



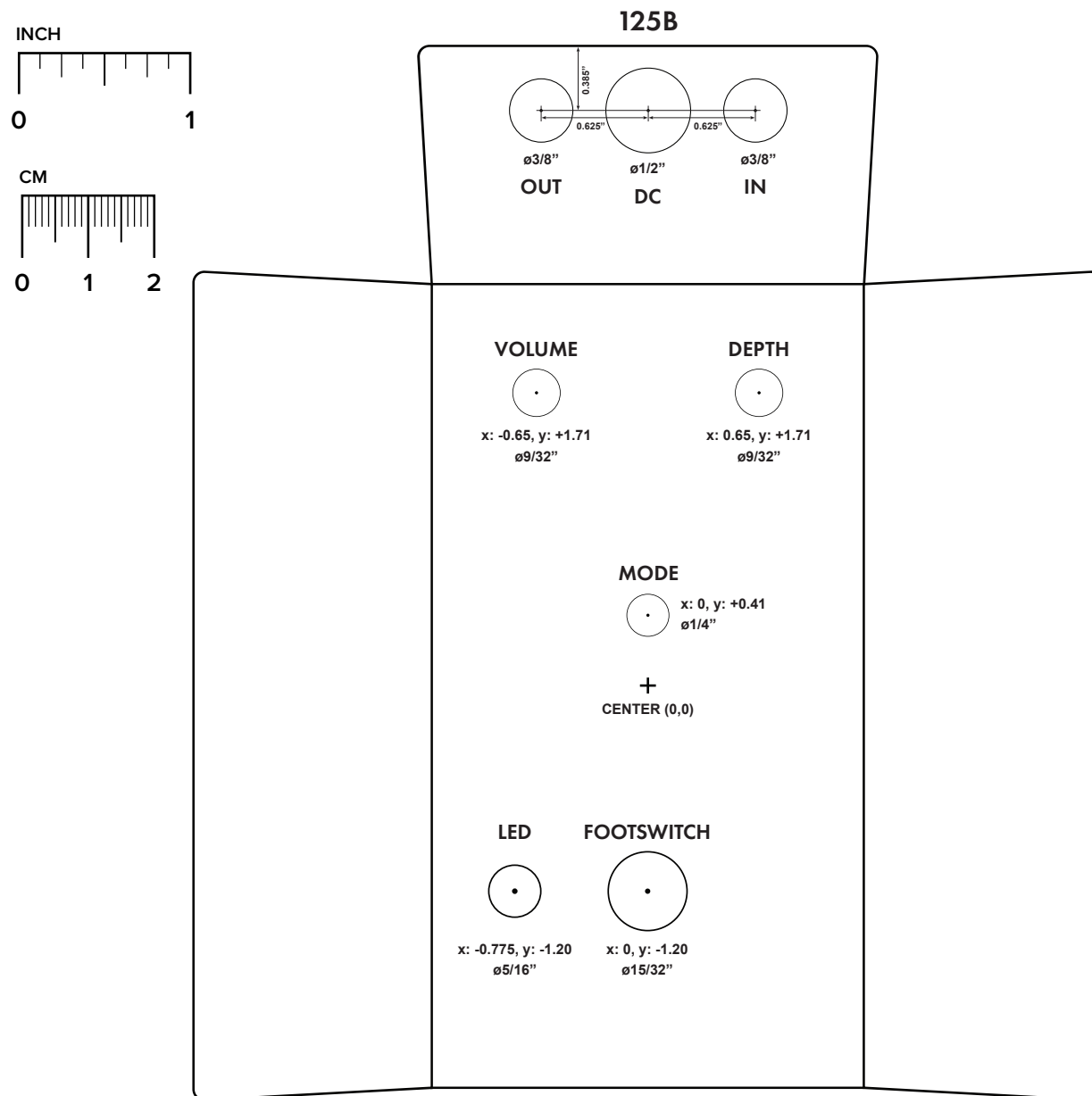
# DRILL TEMPLATE

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.

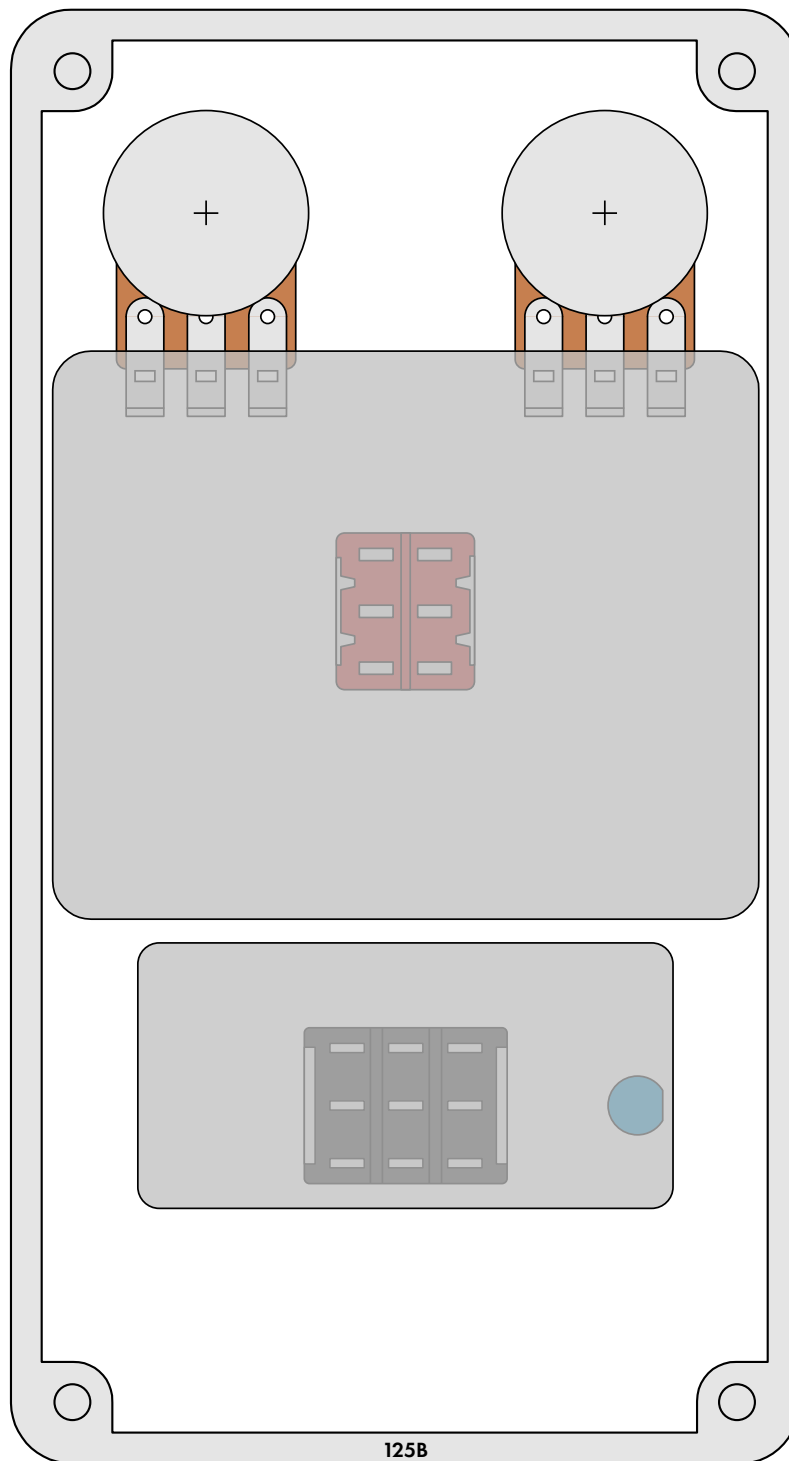




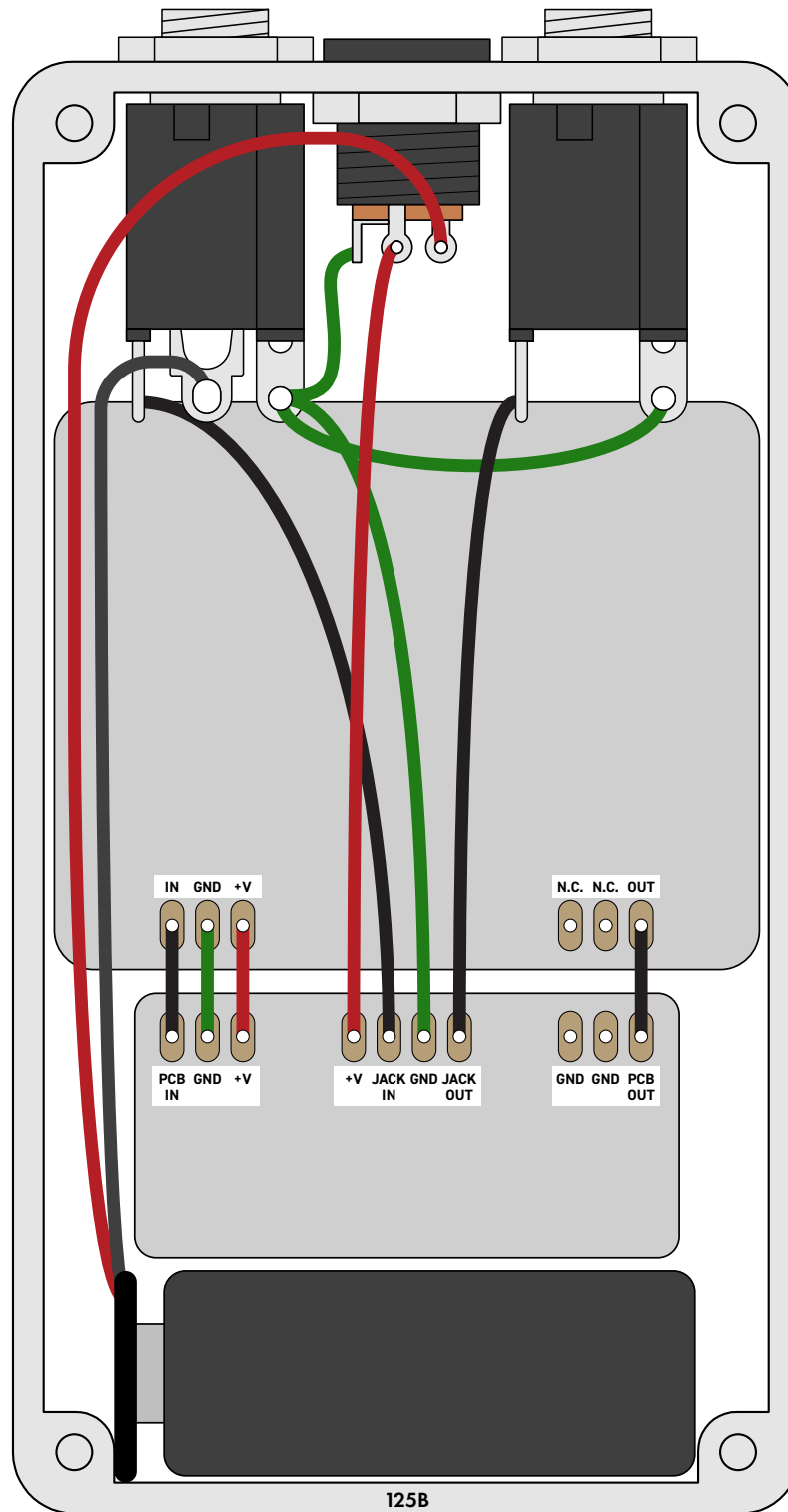
## ENCLOSURE LAYOUT

---

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

---

Mosrite® is a registered trademark of Mosrite USA, LLC.

**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

---

### 1.0.1 (2024-09-11)

Added LEDR, which was missing from the parts list.

### 1.0.0 (2024-07-04)

Initial release.