

PROJECT NAME

NUCLEUS

BASED ON

Colorsound Power Booster

BUILD DIFFICULTY

■■■■□ Intermediate

EFFECT TYPE

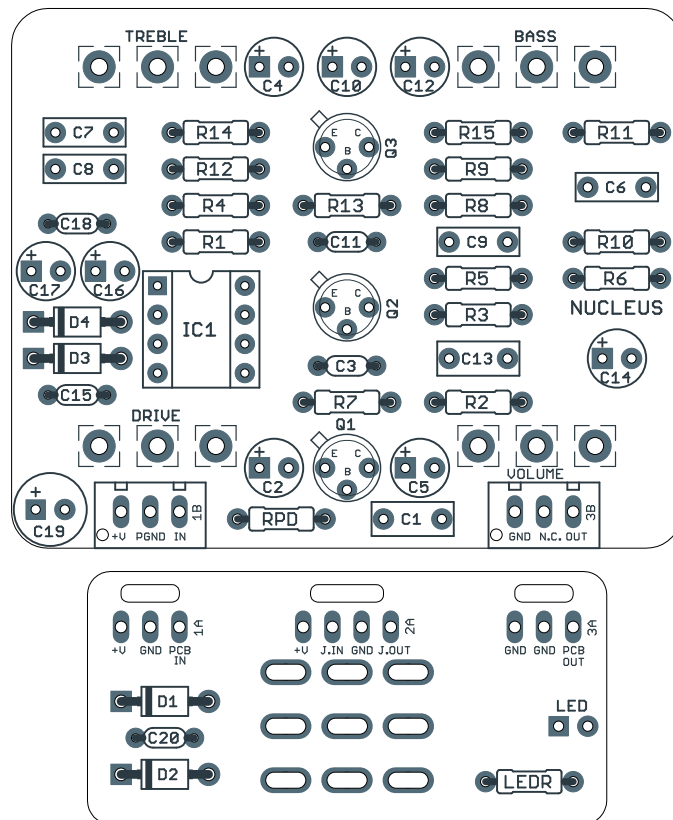
Boost / drive

DOCUMENT VERSION

1.0.1 (2020-07-20)

PROJECT SUMMARY

A reproduction of a boost pedal from the early 1970s that featured a two-band tone stack.



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

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INTRODUCTION

The Nucleus Vintage Boost is a clone of the Colorsound Power Booster, a transistor-based boost/drive pedal with 2-band tonestack that was first sold in 1970 by the Macaris music store in London.

The Power Booster ran at 18V using two batteries in series. There were two versions, an “early version” and a “later version”, with some minor part differences between them. (See build notes for differences.)

The Colorsound Overdriver was an updated version of this circuit, a third revision from 1972, that dropped the power requirement down to a single battery. The Overdriver is available as another project, called the Plasma.

The Nucleus is a direct clone of the Power Booster that allows you to build either the early version or late version, with the addition of an output volume control which the original unit was sorely lacking. This way you can set the gain according to the tone you want without being tied to the volume that is produced along with it.

It also includes an on-board charge pump for 18V operation from a normal 9V supply so you don't need to hunt down an 18V adapter for correct operation.

USAGE

The Nucleus has two controls and one toggle:

- **Gain** controls the amount of gain from the first transistor stage.
- **Treble** controls the high-end response of the circuit and forms half of the Baxandall tone stack.
- **Bass** controls the low-end response of the circuit and forms the other half of the Baxandall tone stack.
- **Volume** is the output volume of the effect.

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 | 120k | Metal film resistor, 1/4W | |
| R2 | 150k | Metal film resistor, 1/4W | |
| R3 | 4k7 | Metal film resistor, 1/4W | |
| R4 | 1k8 | Metal film resistor, 1/4W | |
| R5 | 470R | Metal film resistor, 1/4W | |
| R6 | 1k2 | Metal film resistor, 1/4W | |
| R7 | 12k | Metal film resistor, 1/4W | |
| R8 | 4k7 | Metal film resistor, 1/4W | |
| R9 | 4k7 | Metal film resistor, 1/4W | |
| R10 | 39k | Metal film resistor, 1/4W | |
| R11 | 5k6 | Metal film resistor, 1/4W | |
| R12 | 180k | Metal film resistor, 1/4W | |
| R13 | 33k | Metal film resistor, 1/4W | |
| R14 | 3k9 | Metal film resistor, 1/4W | |
| R15 | 1k | Metal film resistor, 1/4W | |
| RPD | 2M2 | Metal film resistor, 1/4W | Input pulldown resistor. Can be as low as 1M. |
| LEDR | 4k7 | Metal film resistor, 1/4W | LED current-limiting resistor. Adjust value to change LED brightness. |
| C1 | 220n | Film capacitor, 7.2 x 2.5mm | |
| C2 | 22uF | Electrolytic capacitor, 5mm | |
| C3 | 220pF | MLCC capacitor, NP0/COG | |
| C4 | 10uF | Electrolytic capacitor, 5mm | Use 4.7uF for early version. |
| C5 | 22uF | Electrolytic capacitor, 5mm | |
| C6 | 100n | Film capacitor, 7.2 x 2.5mm | |
| C7 | 10n | Film capacitor, 7.2 x 2.5mm | |
| C8 | 10n | Film capacitor, 7.2 x 2.5mm | |
| C9 | 100n | Film capacitor, 7.2 x 2.5mm | |
| C10 | 22uF | Electrolytic capacitor, 5mm | |
| C11 | 100pF | MLCC capacitor, NP0/COG | |
| C12 | 10uF | Electrolytic capacitor, 5mm | Use 4.7uF for early version. |
| C13 | 220n | Film capacitor, 7.2 x 2.5mm | Omit for early version. |

PARTS LIST, CONT.

| PART | VALUE | TYPE | NOTES |
|--------|--------------|--------------------------------|--|
| C14 | OMIT | | Use 4.7uF for early version. |
| C15 | 470n | MLCC capacitor, X7R | |
| C16 | 10uF | Electrolytic capacitor, 5mm | |
| C17 | 10uF | Electrolytic capacitor, 5mm | |
| C18 | 470n | MLCC capacitor, X7R | |
| C19 | 100uF | Electrolytic capacitor, 6.3mm | |
| C20 | 100n | MLCC capacitor, X7R | |
| 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 | 2N5088 | BJT transistor, NPN, TO-92 | Original units used BC109, BC169C, BC184C or BC184L. These are all high-gain transistors (hFE 400+). 2N5088 is a suitable low-noise and commonly-available replacement. See build notes for more info. |
| Q2 | 2N5088 | BJT transistor, NPN, TO-92 | |
| Q3 | 2N5088 | BJT transistor, NPN, TO-92 | |
| IC1 | TC1044SCPA | Charge pump, DIP8 | |
| IC1-S | DIP-8 socket | IC socket, DIP-8 | |
| BASS | 100kB | 16mm right-angle PCB mount pot | |
| DRIVE | 1kC | 16mm right-angle PCB mount pot | Original uses 10kB, but 1kC will provide a much more usable control. |
| TREBLE | 100kB | 16mm right-angle PCB mount pot | |
| VOL. | 100kA | 16mm right-angle PCB mount pot | |
| 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

Transistor outlines

The PCB has outlines for TO-18 (metal can). The BC109C is TO-22, but the other recommended types are TO-92. If using TO-92 transistors, you'll need to bend the center leg to fit the triangle shape.

Be careful of the pinout. For TO-92 transistors, the USA "2N" types are typically 180 degrees rotated from the European "BC" types. Always check the datasheet to confirm, and line them up to the pads marked "B", "C", and "E" on the PCB.

If your unit makes no sound when first powered up, the transistor orientation is the most likely reason.

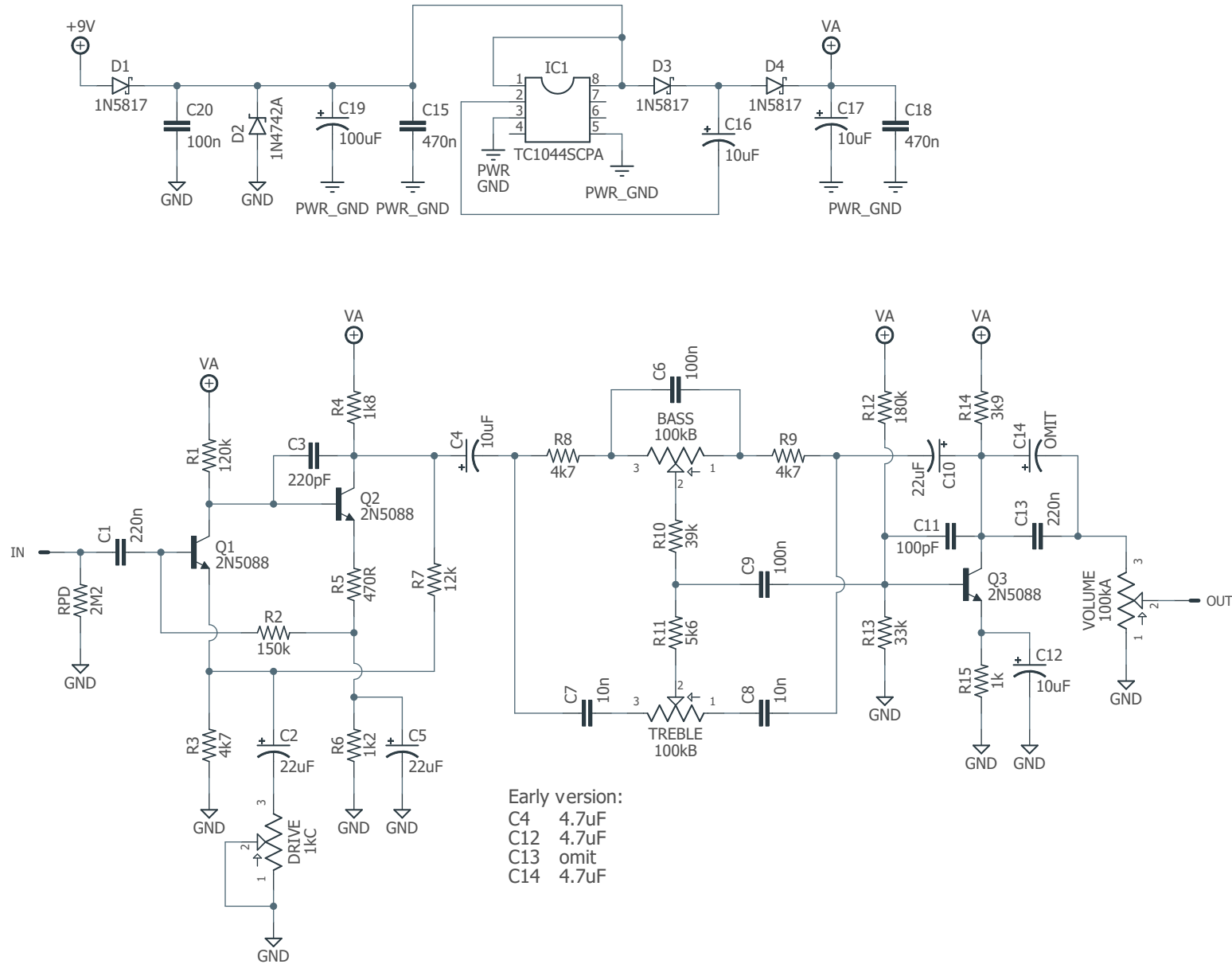
Versions

The Power Booster had one minor revision during its production run. It's not known exactly when the change took place or for what reason, but the following parts were changed.

| PART | EARLY VERSION | LATE VERSION |
|------|---------------|--------------|
| C4 | 4.7uF | 10uF |
| C12 | 4.7uF | 10uF |
| C13 | OMIT | 220n |
| C14 | 4.7uF | OMIT |

The main parts list and schematic for this project show the late version, which is the more commonly-seen variant.

SCHEMATIC



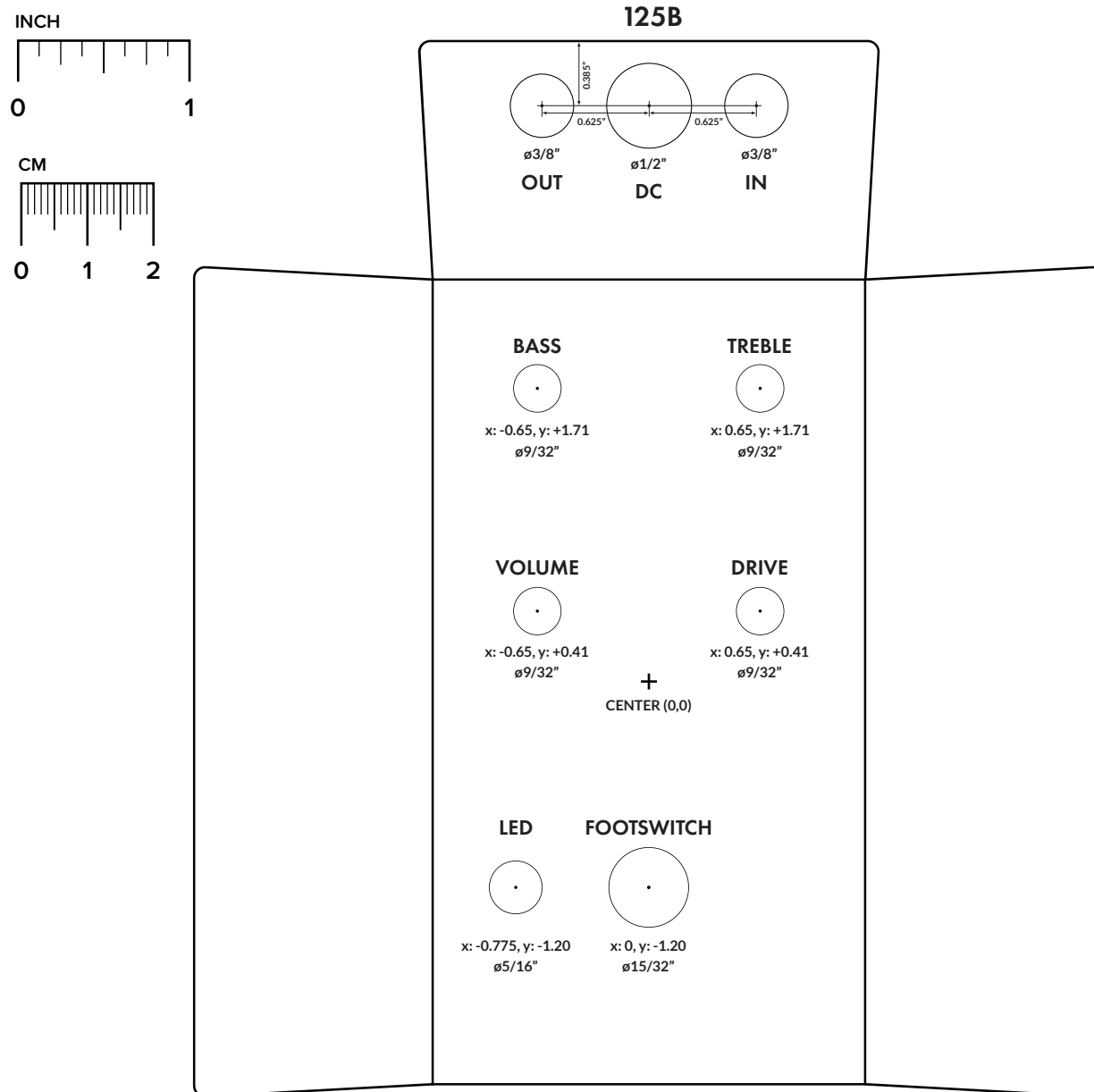
DRILL TEMPLATE

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.

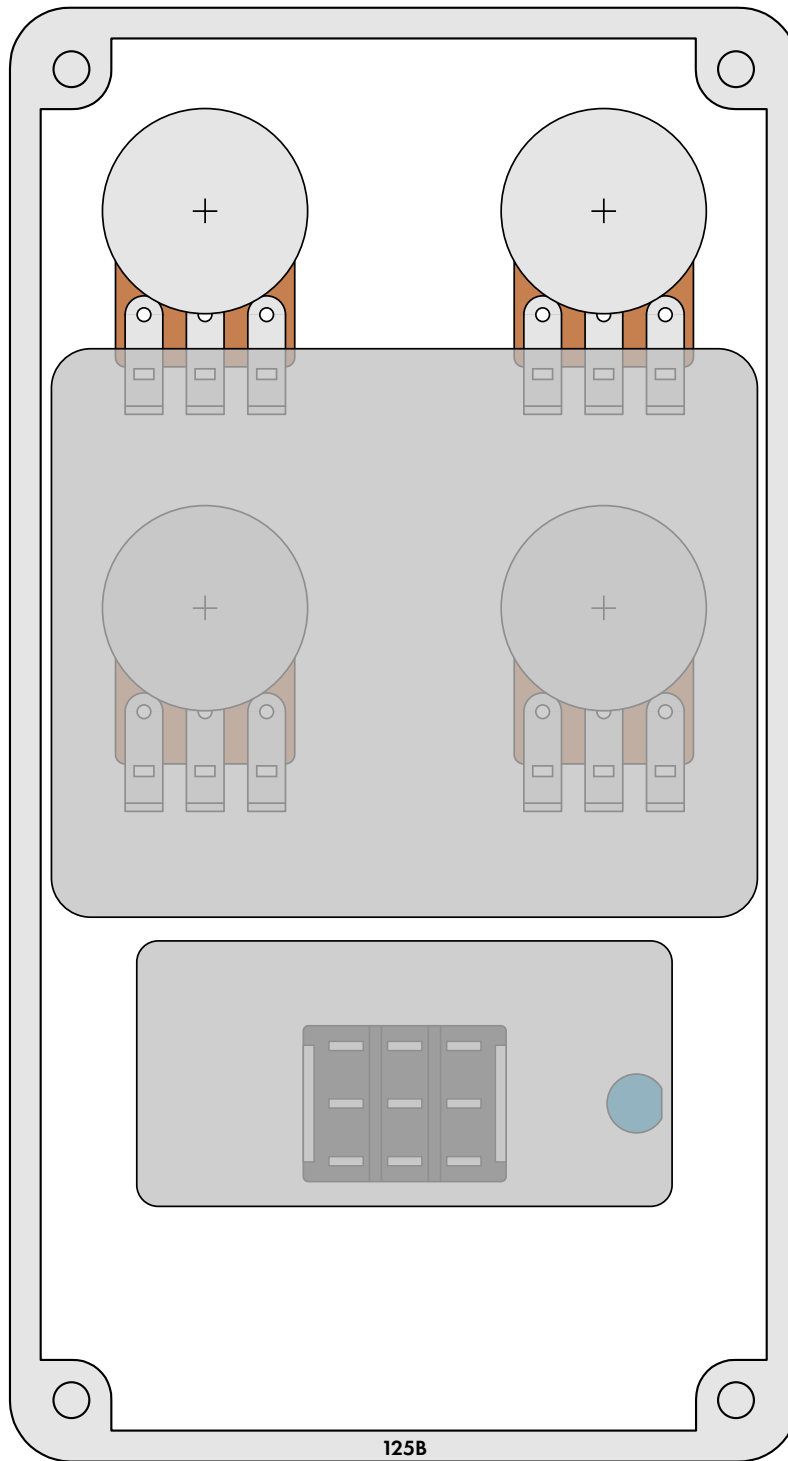
Top jack layout assumes the use of closed-frame jacks like the [Switchcraft 111X](#). If you'd rather use open-frame jacks, please refer to the Open-Frame Jack Drill Template for the top side.

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.

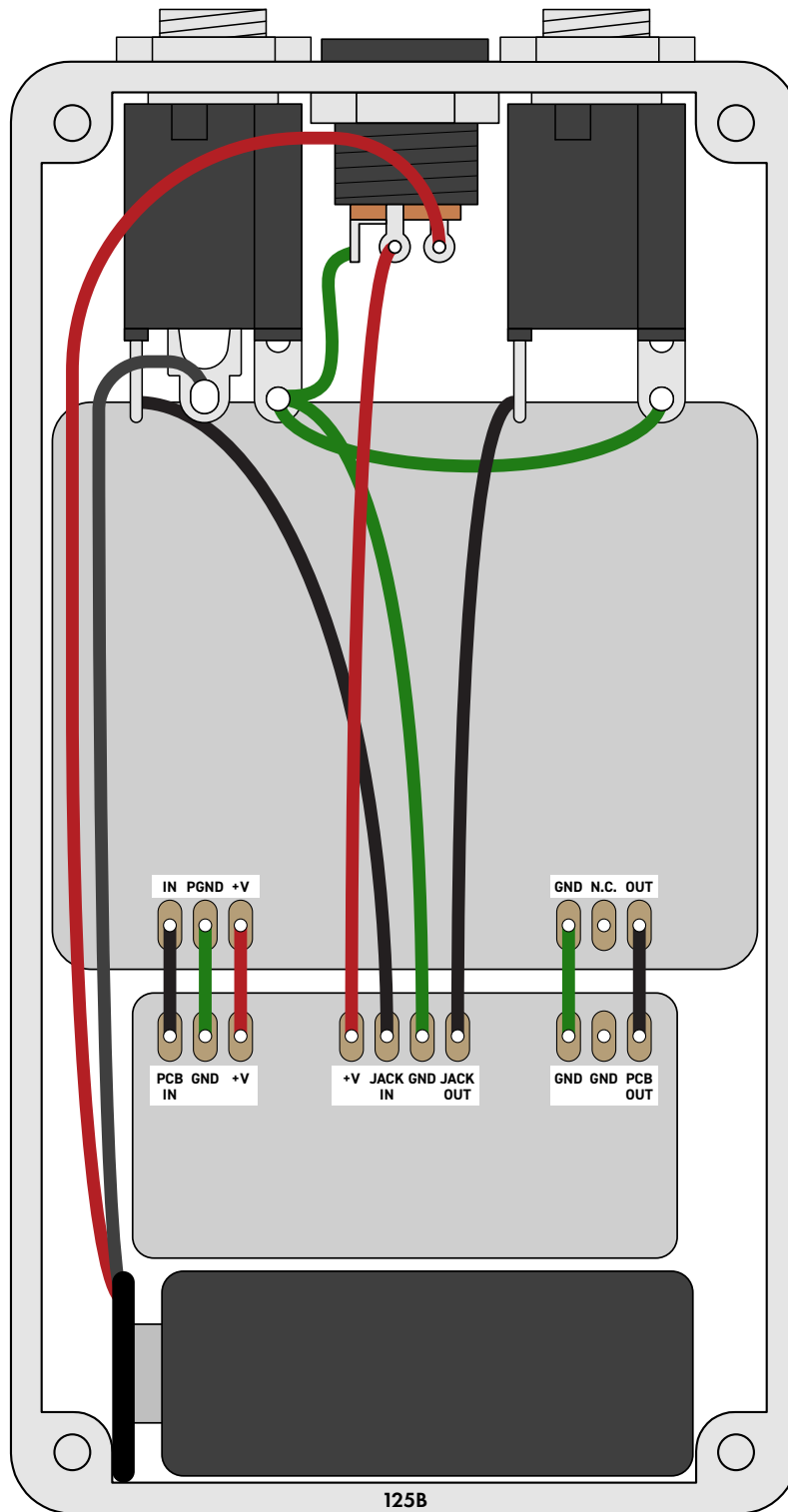


ENCLOSURE LAYOUT

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

1.0.1 (2020-07-20)

Added missing D2-D4 to parts list.

1.0.0 (2020-07-03)

Initial release.