PROJECT NAME

STRATUS

DIY GUITAR EFFECTS

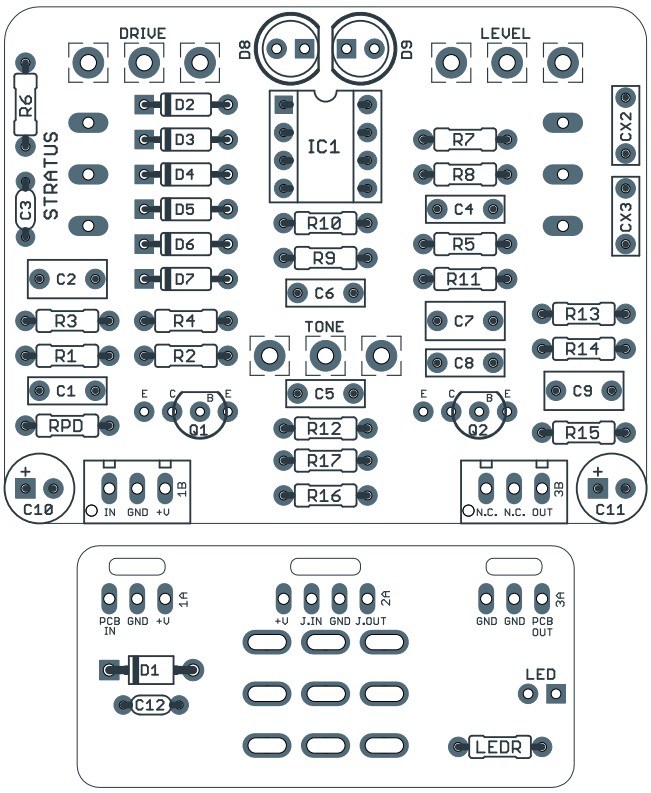
BASED ON
Ibanez TS-9 Tube Screamer

BUILD DIFFICULTY
Easy

EFFECT TYPE
Overdrive

DOCUMENT VERSION
1.0.1 (2024-08-08)

PROJECT SUMMARY
The quintessential mid-hump overdrive pedal made famous by Stevie Ray Vaughan, and the source circuit behind dozens of high-dollar boutique pedals.



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 **PCB-only** version of the project. If you are building the full kit from Aion FX, please use the kit build documentation instead. The instructions are more detailed and may differ in some areas due to the specialized parts and assembly methods used in our kits.

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INTRODUCTION

The Stratus Classic Overdrive is a recreation of the Ibanez TS-9 Tube Screamer, first released in 1979 as the OD-808 Overdrive by Maxon and then later licensed to Ibanez.

Originally designed to compete with the Boss OD-1 Overdrive, the TS-808 and TS-9 added the now-famous tone control, but are otherwise very similar to the OD-1 with regards to the feedback diode-clipping arrangement.

The Tube Screamer is one of the most popular DIY effects, and it serves as the source circuit for a number of boutique effects including the Landgraff Dynamic Overdrive, the Fulltone® Fulldrive, and the Lovepedal Eternity.

The new 125B version of the Stratus has been completely overhauled, reducing some flexibility in favor of an easier and more straightforward build. The previous version of the Stratus will remain available.

USAGE

The Stratus has the same control layout as most overdrive or distortion effects:

- **Tone** controls the treble response of the effect. The center point (12:00) is flat. When turned to the left, it cuts treble, and when turned to the right, it boosts treble.
- **Drive** controls the amount of gain in the op-amp feedback diode clipping stage.
- **Volume** controls the overall output of the effect.

In addition, there are two switch modifications included for added flexibility:

- **Clipping** selects the clipping diodes which changes the character of the drive tone.
- **Bass** sets the low-end EQ of the clipping stage. The stock Tube Screamer value is in the middle position, while the two other switch positions add more bass to the signal.

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 →

Note: Values shown are for the original TS-808.

PART	VALUE	TYPE	NOTES
R1	1k	Metal film resistor, 1/4W	
R2	510k	Metal film resistor, 1/4W	
R3	10k	Metal film resistor, 1/4W	
R4	10k	Metal film resistor, 1/4W	
R5	4k7	Metal film resistor, 1/4W	
R6	51k	Metal film resistor, 1/4W	
R7	1k	Metal film resistor, 1/4W	
R8	10k	Metal film resistor, 1/4W	
R9	220R	Metal film resistor, 1/4W	
R10	1k	Metal film resistor, 1/4W	
R11	1k	Metal film resistor, 1/4W	
R12	510k	Metal film resistor, 1/4W	
R13	10k	Metal film resistor, 1/4W	
R14	100R	Metal film resistor, 1/4W	TS-808 value. Change to 470R for TS-9 specs.
R15	10k	Metal film resistor, 1/4W	TS-808 value. Change to 100k for TS-9 specs.
R16	10k	Metal film resistor, 1/4W	
R17	10k	Metal film resistor, 1/4W	
RPD	2M2	Metal film resistor, 1/4W	Input pulldown resistor. Can be as low as 1M.
LEDR	10k	Metal film resistor, 1/4W	LED current-limiting resistor. Adjust value to change LED brightness.
C1	22n	Film capacitor, 7.2 x 2.5mm	
C2	1uF	Film capacitor, 7.2 x 3.5mm	
C3	47pF	MLCC capacitor, NP0/C0G	Original value is 51pF, but 47pF is the nearest standard value. No difference in tone.
C4	47n	Film capacitor, 7.2 x 2.5mm	
C5	220n	Film capacitor, 7.2 x 2.5mm	
C6	220n	Film capacitor, 7.2 x 2.5mm	
C7	1uF	Film capacitor, 7.2 x 3.5mm	
C8	100n	Film capacitor, 7.2 x 2.5mm	

PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
C9	1uF	Film capacitor, 7.2 x 3.5mm	
C10	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C11	47uF	Electrolytic capacitor, 5mm	Reference voltage filter capacitor.
C12	100n	MLCC capacitor, X7R	Power supply filter capacitor.
CX2	22n	Film capacitor, 7.2 x 2.5mm	
CX3	68n	Film capacitor, 7.2 x 2.5mm	
D1	1N5817	Schottky diode, DO-41	
D2	1N914	Fast-switching diode, DO-35	
D3	1N914	Fast-switching diode, DO-35	
D4	1N914	Fast-switching diode, DO-35	
D5	1N914	Fast-switching diode, DO-35	
D6	1N914	Fast-switching diode, DO-35	
D7	1N914	Fast-switching diode, DO-35	
D8	5mm	LED, 5mm, red diffused	
D9	5mm	LED, 5mm, red diffused	
Q1	2N5088	BJT transistor, NPN, TO-92	
Q2	2N5088	BJT transistor, NPN, TO-92	
IC1	JRC4558D	Operational amplifier, DIP8	
IC1-S	DIP-8 socket	IC socket, DIP-8	
TONE	20kW	16mm right-angle PCB mount pot	
DRIVE	500kA	16mm right-angle PCB mount pot	
VOL	100kA	16mm right-angle PCB mount pot	
CLIP	SPDT cntr off	Toggle switch, SPDT on-off-on	
BASS	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

Clipping switch

The clipping switch allows you select between different sets of diodes.

The downward position of the toggle switch is the stock Tube Screamer clipping arrangement, which has one silicon diode in each direction. The upward position of the toggle is two diodes in each direction, a higher clipping threshold with a more open sound. The center position leaves only the LEDs for a more dynamic and transparent tone.

If you look at the schematic, you'll see that the LEDs, D8 and D9, are always connected. However, in either the up or down switch positions, the lower-threshold diodes are connected and so the LEDs have no effect—there's no signal left for them to clip.

Feel free to experiment, For example, you could jumper D7 for asymmetrical clipping as in the Boss SD-1 Super Overdrive. Or, you could omit the two clipping LEDs for a diode-lift mode in the center position.

Bass switch

The bass switch selects between different EQ settings. Using the default configuration, the center position is the stock Tube Screamer bass setting. The downward position adds more bass and the upward position adds even more.

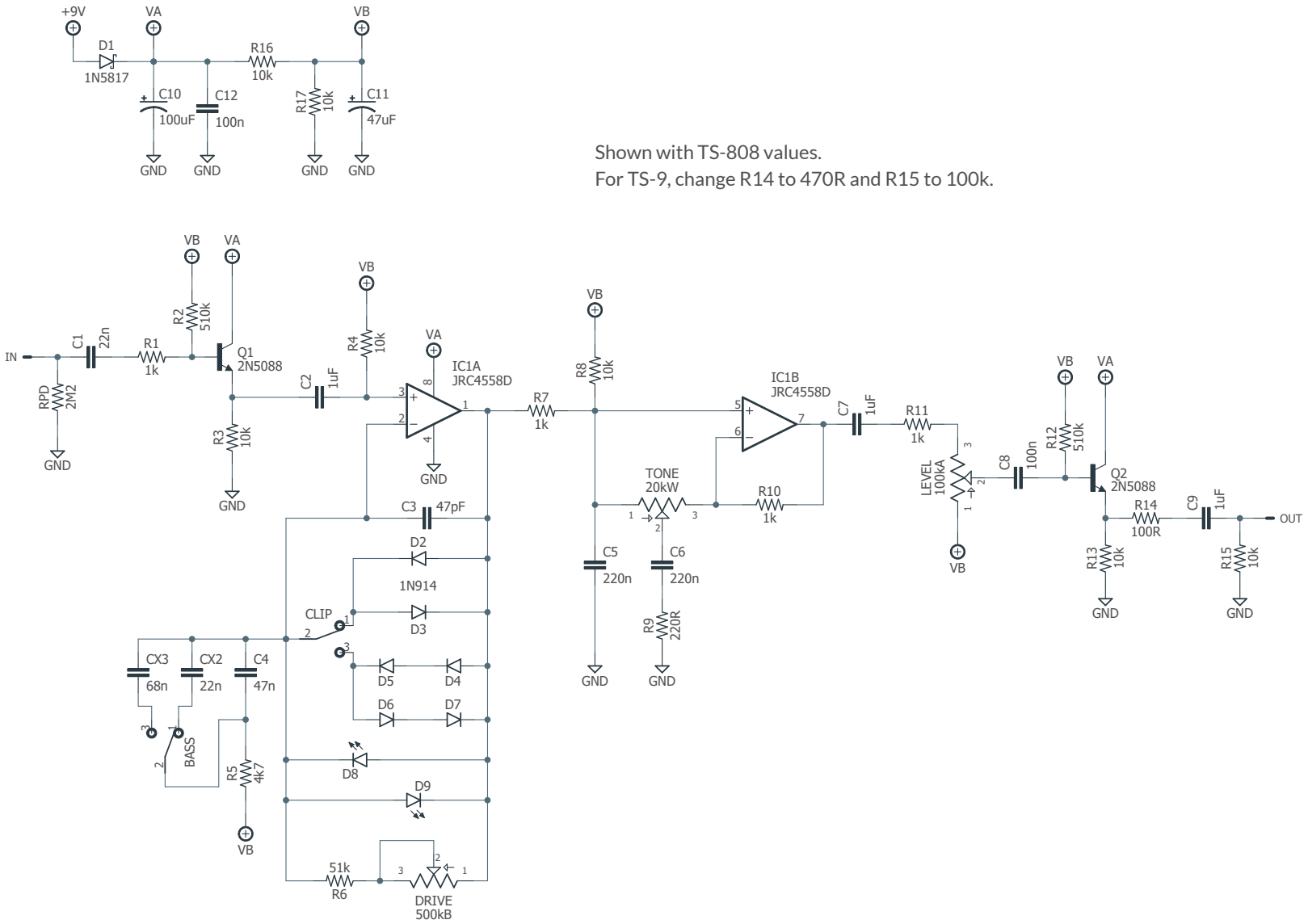
Like the clipping switch, you can experiment with the values here as well to tweak the sound to your liking. The stock Tube Screamer capacitor is C4, and the toggle switch puts CX2 or CX3 in parallel with it (parallel capacitors add their values to each other). By tweaking CX2 and CX3, you can fine-tune the bass settings to something you'd find useful.

There's also a way to set it up for "less bass" if you want. Reduce the value of C4 to something like 33n to make the center position a bass-cut setting. Then make CX2 a 10n or 15n capacitor to put it very close to the 47n stock value. CX3 could be kept at 68n.

Drive pot taper

The original Tube Screamer uses a linear (B) taper potentiometer for the Drive control. We recommend using an audio (A) taper pot instead, which provides better control over the lower end of the gain range. This is what is shown in the default parts list of this project. The minimum and maximum settings are the same, but the in-between settings will be different when doing a direct A/B comparison with an original Tube Screamer.

SCHEMATIC


+9V
VA
VB
D1
1N5817
R16
10k
C10
100uF
C12
100n
R17
10k
C11
47uF
GND
Shown with TS-808 values.
For TS-9, change R14 to 470R and R15 to 100k.
IN
C1
22n
R1
1k
RPD
2M2
R2
510k
Q1
2N5088
R3
10k
C2
1uF
R4
10k
IC1A
JRC4558D
R7
1k
R8
10k
IC1B
JRC4558D
C7
1uF
R11
1k
TONE
20kW
R10
1k
C5
220n
C6
220n
R9
220R
LEVEL
100kA
C8
100n
R12
510k
Q2
2N5088
R14
100R
C9
1uF
OUT
R13
10k
R15
10k
C3
47pF
D2
1N914
D3
CLIP
D5
D4
D6
D7
D8
D9
CX3
68n
CX2
22n
C4
47n
BASS
R5
4k7
51k
R6
DRIVE
500kB

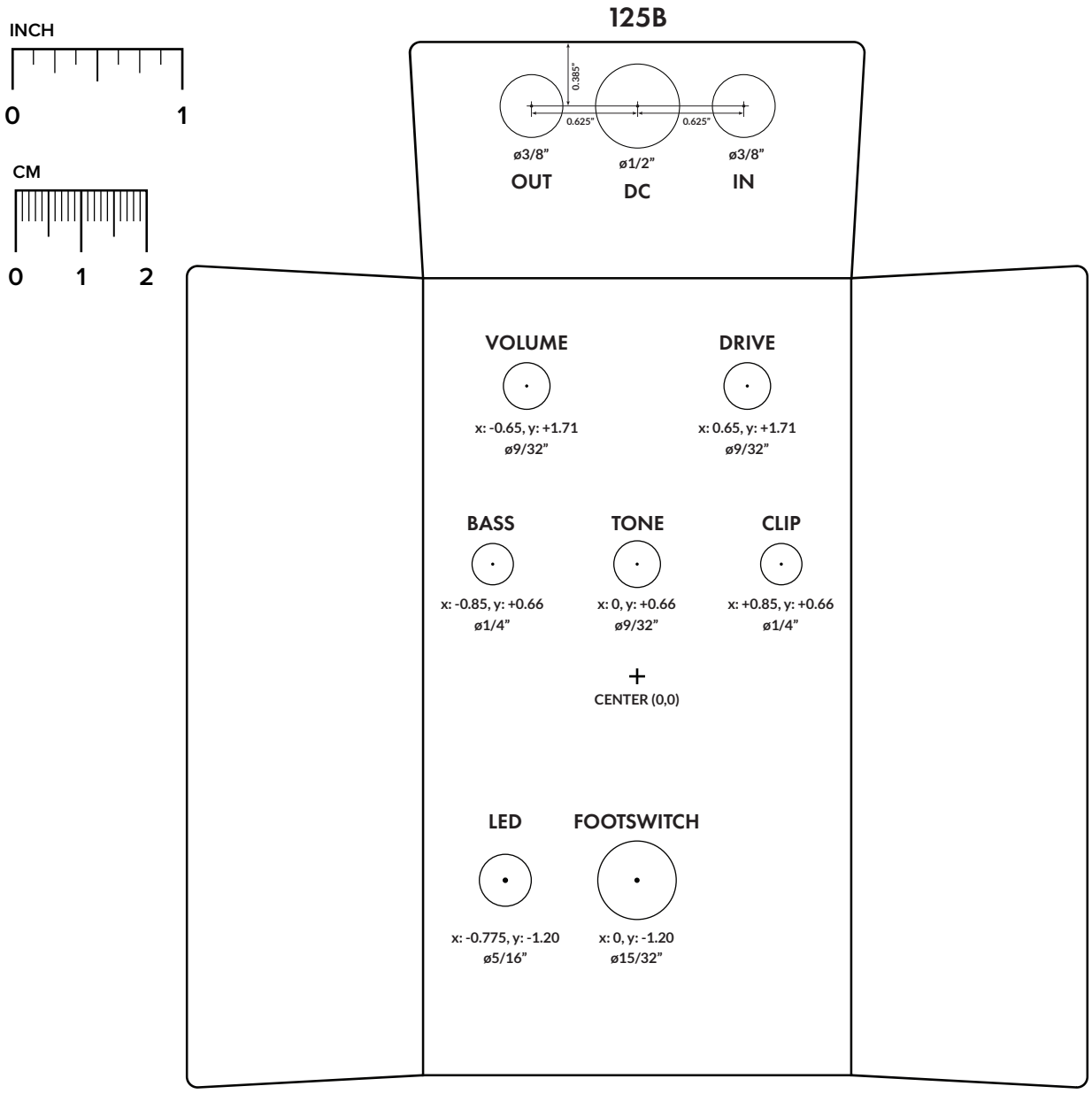
DRILL TEMPLATE

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.

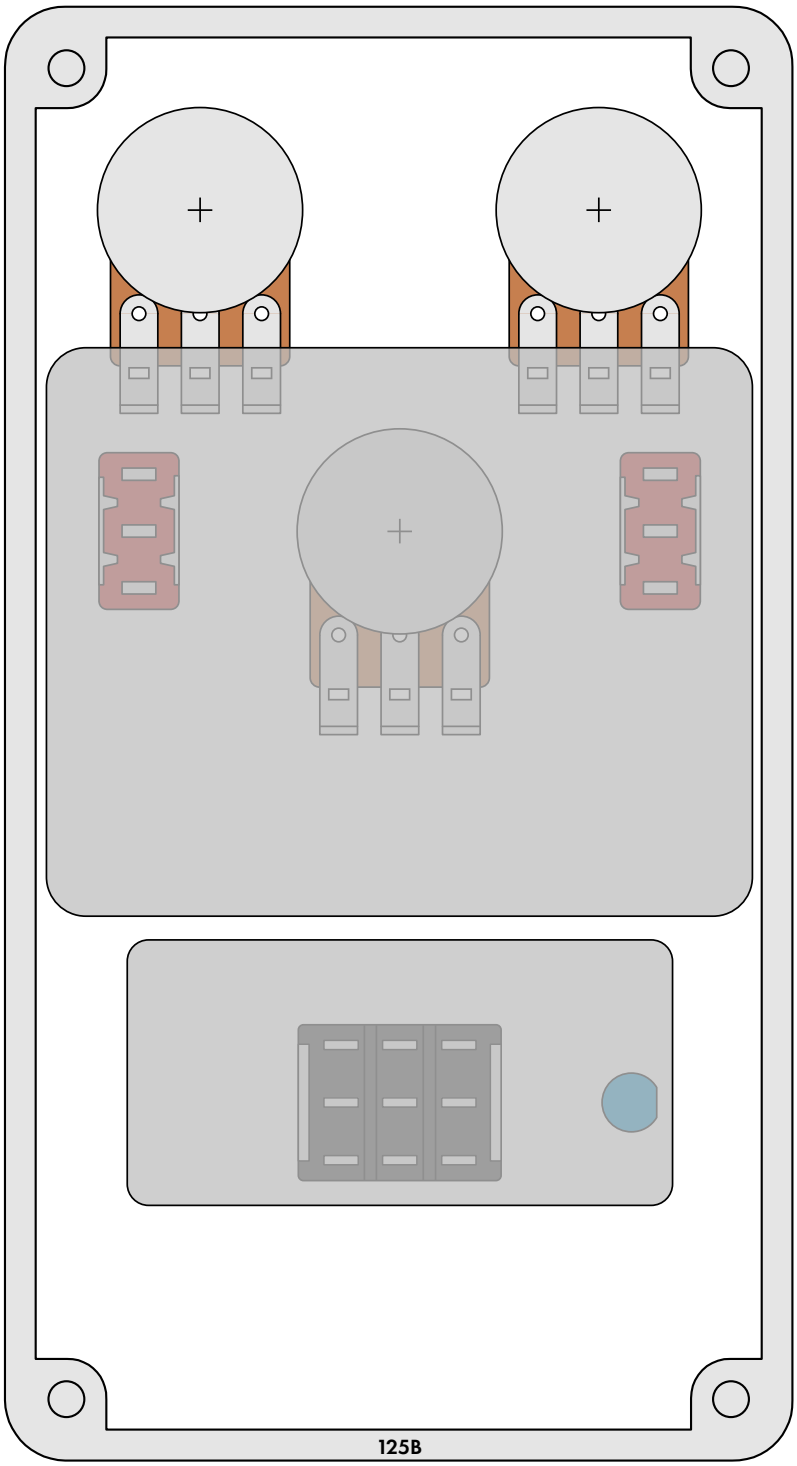
Top jack layout assumes the use of closed-frame jacks like the Switchcraft 111X. If you'd rather use open-frame jacks, please refer to the Open-Frame Jack Drill Template for the top side.

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.

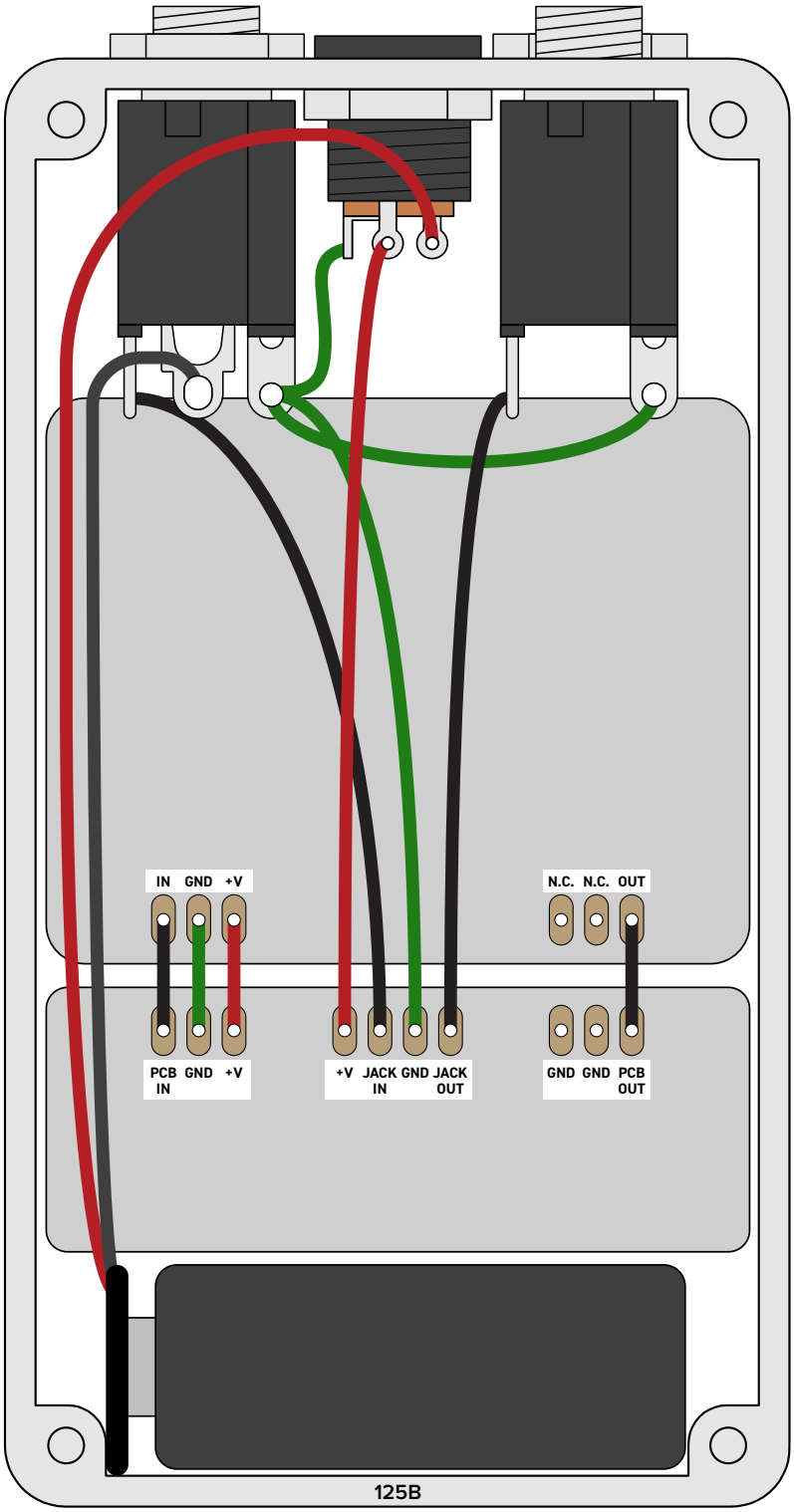


ENCLOSURE LAYOUT

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 (2024-08-08)

- Changed LEDR to 10k to work with a wider variety of LEDs.
- Changed Drive potentiometer to audio taper for better control over the drive range.

1.0.0 (2018-09-22)
Initial release.