

PROJECT NAME  
**SIGMA**

BASED ON  
Cornish ST-2

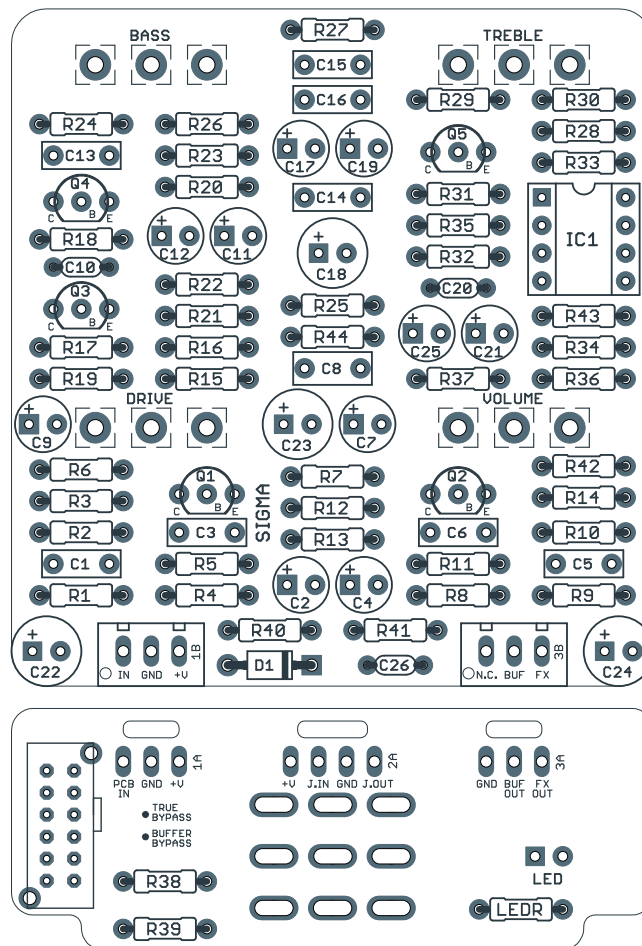
EFFECT TYPE  
Boost / drive

PROJECT SUMMARY

An adaptation of the Colorsound Overdriver, originally designed for David Gilmour as part of his custom integrated effect board.

BUILD DIFFICULTY  
■■■■□ Intermediate

DOCUMENT VERSION  
1.0.0 (2020-09-11)



Actual size is 2.3" x 2.43" (main board) and 2.3" x 0.87" (bypass board).

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## INTRODUCTION

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The Sigma Vintage Drive is adapted from the Pete Cornish ST-2, traced by Aion FX in 2020.

Cornish pedals are best known for being extremely expensive. There are two reasons for this. First, the build quality and reliability is unmatched. Second, the mysterious nature of them, partially due to the fact that the circuit is obscured and partially because of the A-list of clients such as David Gilmour, Brian May and Pete Townshend.

Pete Cornish originally designed the ST-2 for David Gilmour as part of his custom integrated pedalboard. It was later released as a standalone product in 2007. Other owners include Keith Urban and John Shanks. Lou Reed had one as well.

The ST-2 had long been suspected to be based on the Colorsound Overdriver, given the description, control layout and the first customer (Gilmour is a known enthusiast of the Overdriver). However, it's never been confirmed.

After tracing it, it's clear that the ST-2 is definitely based on the Overdriver, but with a few twists. First, it's double-buffered, the same as the [G-2](#). Second, several values have been changed throughout the circuit and so the overall voicing will be different—it's not a direct clone. Lastly, an op-amp gain stage has been added to the end to increase the available volume. The original Overdriver could get loud, but the ST-2 can get even louder!

The Sigma is a faithful reproduction of the ST-2 circuit, but with one major addition: an internal slide switch allowing the pedal to be used in true-bypass mode instead of buffered bypass. As with the Klon KTR, the buffered mode is "almost always better", but with this feature, you can determine for yourself.

## USAGE

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The Sigma has the following controls:

- **Gain** controls the amount of gain in the first transistor gain stage.
- **Bass** boosts or cuts frequencies by +/-14dB at 30 Hz.
- **Treble** boosts or cuts frequencies by +/-18dB at 3 KHz.
- **Volume** is the overall output level.

## 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	10M	Metal film resistor, 1/4W	
R2	1k	Metal film resistor, 1/4W	
R3	120k	Metal film resistor, 1/4W	
R4	120k	Metal film resistor, 1/4W	
R5	200k	Metal film resistor, 1/4W	
R6	7k5	Metal film resistor, 1/4W	
R7	10k	Metal film resistor, 1/4W	
R8	51R	Metal film resistor, 1/4W	
R9	1M	Metal film resistor, 1/4W	
R10	1k	Metal film resistor, 1/4W	
R11	120k	Metal film resistor, 1/4W	
R12	120k	Metal film resistor, 1/4W	
R13	200k	Metal film resistor, 1/4W	
R14	7k5	Metal film resistor, 1/4W	
R15	5k6	Metal film resistor, 1/4W	
R16	120k	Metal film resistor, 1/4W	
R17	18k	Metal film resistor, 1/4W	
R18	150k	Metal film resistor, 1/4W	
R19	1k	Metal film resistor, 1/4W	
R20	680R	Metal film resistor, 1/4W	
R21	1k8	Metal film resistor, 1/4W	
R22	12k	Metal film resistor, 1/4W	
R23	4k7	Metal film resistor, 1/4W	
R24	4k7	Metal film resistor, 1/4W	
R25	5k1	Metal film resistor, 1/4W	
R26	39k	Metal film resistor, 1/4W	
R27	5k6	Metal film resistor, 1/4W	
R28	150k	Metal film resistor, 1/4W	
R29	33k	Metal film resistor, 1/4W	
R30	1k8	Metal film resistor, 1/4W	

## PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
R31	330R	Metal film resistor, 1/4W	
R32	10k	Metal film resistor, 1/4W	
R33	5k1	Metal film resistor, 1/4W	
R34	10R	Metal film resistor, 1/4W	
R35	15k	Metal film resistor, 1/4W	
R36	10k	Metal film resistor, 1/4W	
R37	91R	Metal film resistor, 1/4W	
R38	91R	Metal film resistor, 1/4W	
R39	51k	Metal film resistor, 1/4W	LED current-limiting resistor. Adjust value to change LED brightness.
R40	100R	Film capacitor, 7.2 x 2.5mm	
R41	51R	Electrolytic capacitor, 4mm	
R42	51R	Film capacitor, 7.2 x 2.5mm	
R43	10k	Electrolytic capacitor, 5mm	
R44	10k	Film capacitor, 7.2 x 2.5mm	
LEDR	4k7	MLCC capacitor, NP0/COG	
C1	100n	Film capacitor, 7.2 x 2.5mm	
C2	4.7uF	Electrolytic capacitor, 4mm	
C3	1n	Film capacitor, 7.2 x 2.5mm	
C4	22uF	Electrolytic capacitor, 5mm	
C5	100n	Film capacitor, 7.2 x 2.5mm	
C6	1n	Film capacitor, 7.2 x 2.5mm	
C7	4.7uF	Electrolytic capacitor, 4mm	
C8	220n	Film capacitor, 7.2 x 2.5mm	
C9	22uF	Electrolytic capacitor, 5mm	
C10	220pF	MLCC capacitor, NP0/COG	
C11	22uF	Electrolytic capacitor, 5mm	
C12	10uF	Electrolytic capacitor, 5mm	
C13	100n	Film capacitor, 7.2 x 2.5mm	
C14	10n	Film capacitor, 7.2 x 2.5mm	
C15	10n	Film capacitor, 7.2 x 2.5mm	
C16	100n	Film capacitor, 7.2 x 2.5mm	
C17	10uF	Electrolytic capacitor, 5mm	
C18	100uF	Electrolytic capacitor, 6.3mm	
C19	4.7uF	Electrolytic capacitor, 4mm	
C20	220pF	MLCC capacitor, NP0/COG	

## PARTS LIST, CONT.

PART	VALUE	TYPE	NOTES
C21	22uF	Electrolytic capacitor, 5mm	
C22	220uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C23	100uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C24	220uF	Electrolytic capacitor, 6.3mm	Power supply filter capacitor.
C25	22uF	Electrolytic capacitor, 5mm	Reference voltage filter capacitor.
C26	100n	MLCC capacitor, X7R	Power supply filter capacitor.
D1	1N5817	Schottky diode, DO-41	
Q1	BC549C	BJT transistor, NPN, TO-92	
Q2	BC549C	BJT transistor, NPN, TO-92	
Q3	BC549C	BJT transistor, NPN, TO-92	
Q4	BC549C	BJT transistor, NPN, TO-92	
Q5	BC549C	BJT transistor, NPN, TO-92	
IC1	TL071	Operational amplifier, DIP8	
IC1-S	DIP-8 socket	IC socket, DIP-8	
DRIVE	50kC	16mm right-angle PCB mount pot	
BASS	100kB	16mm right-angle PCB mount pot	
TREBLE	100kB	16mm right-angle PCB mount pot	
VOL.	10kA	16mm right-angle PCB mount pot	
TB-BUF	4PDT slide	Slide switch, 4PDT	E-Switch EG4208 (4mm lever) or EG4208A (6mm lever)
IN	1/4" mono	1/4" phone jack, closed frame	Switchcraft 111X 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	
ENC	125B	Enclosure, die-cast aluminum	Can also use a Hammond 1590N1.

# BUILD NOTES

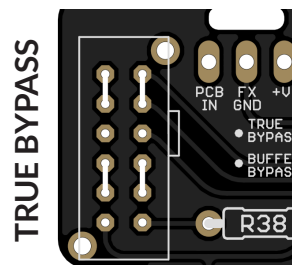
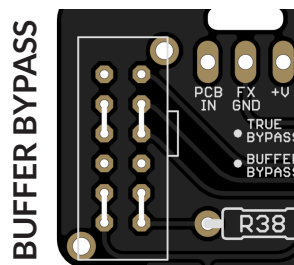
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## Transistor selection

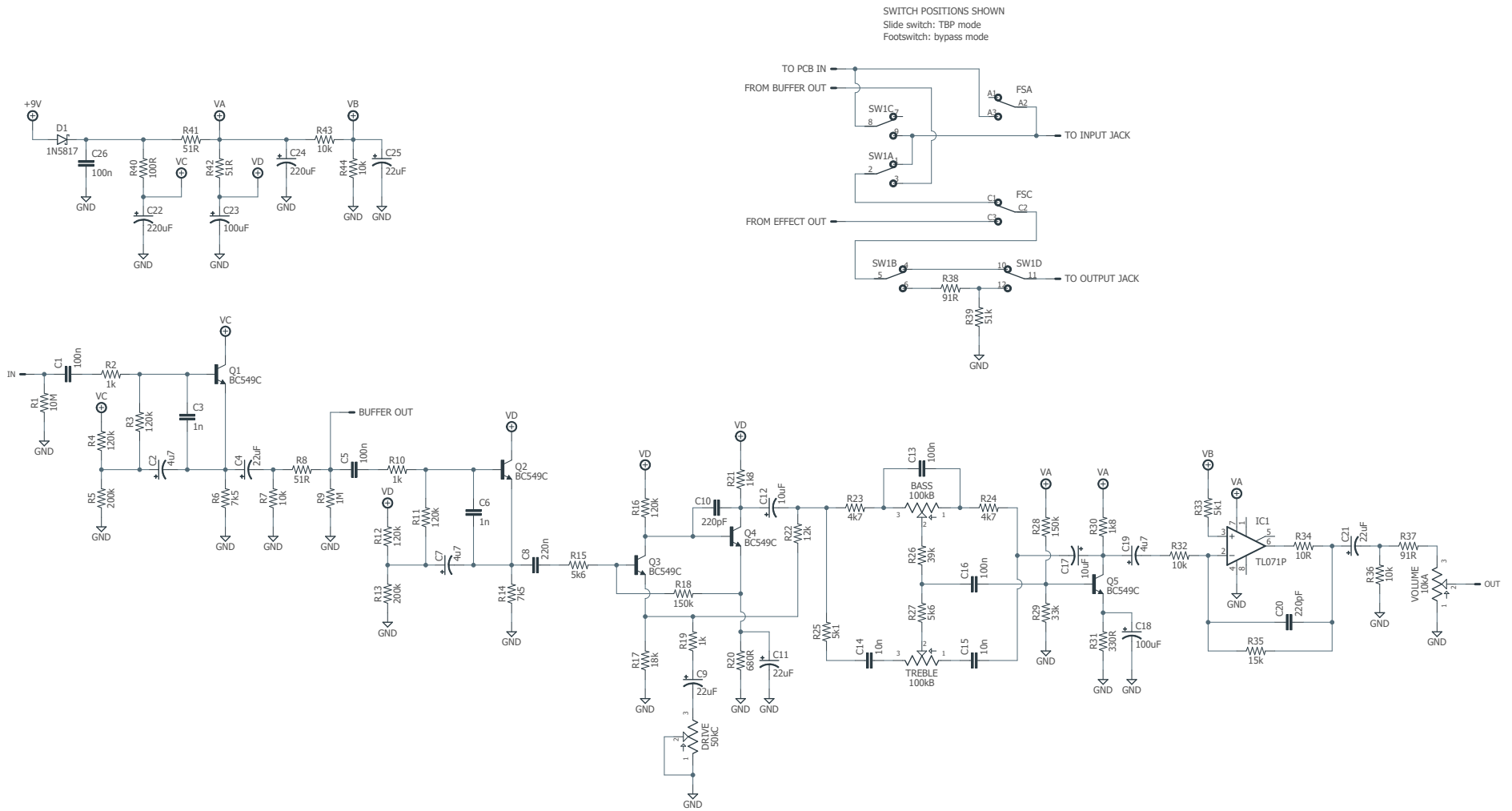
The original ST-2 uses BC549C transistors. The pinout on the Sigma PCB follows this convention. However, the USA-equivalent 2N5088 will work the same here, so these can be substituted if they are easier to find. The 2N5088 should be rotated 180 degrees from the silkscreen since the pinout is mirrored from the BC549C.

## Bypassing the true bypass / buffer switch

The E-Switch EG4208 slide switch used for the true bypass/buffer selector is available from Mouser Electronics but may not be accessible to everyone. If you are unable to obtain it, you can hard-wire the switch to either true bypass mode or buffered mode by soldering jumpers to the switch pads.



# SCHEMATIC



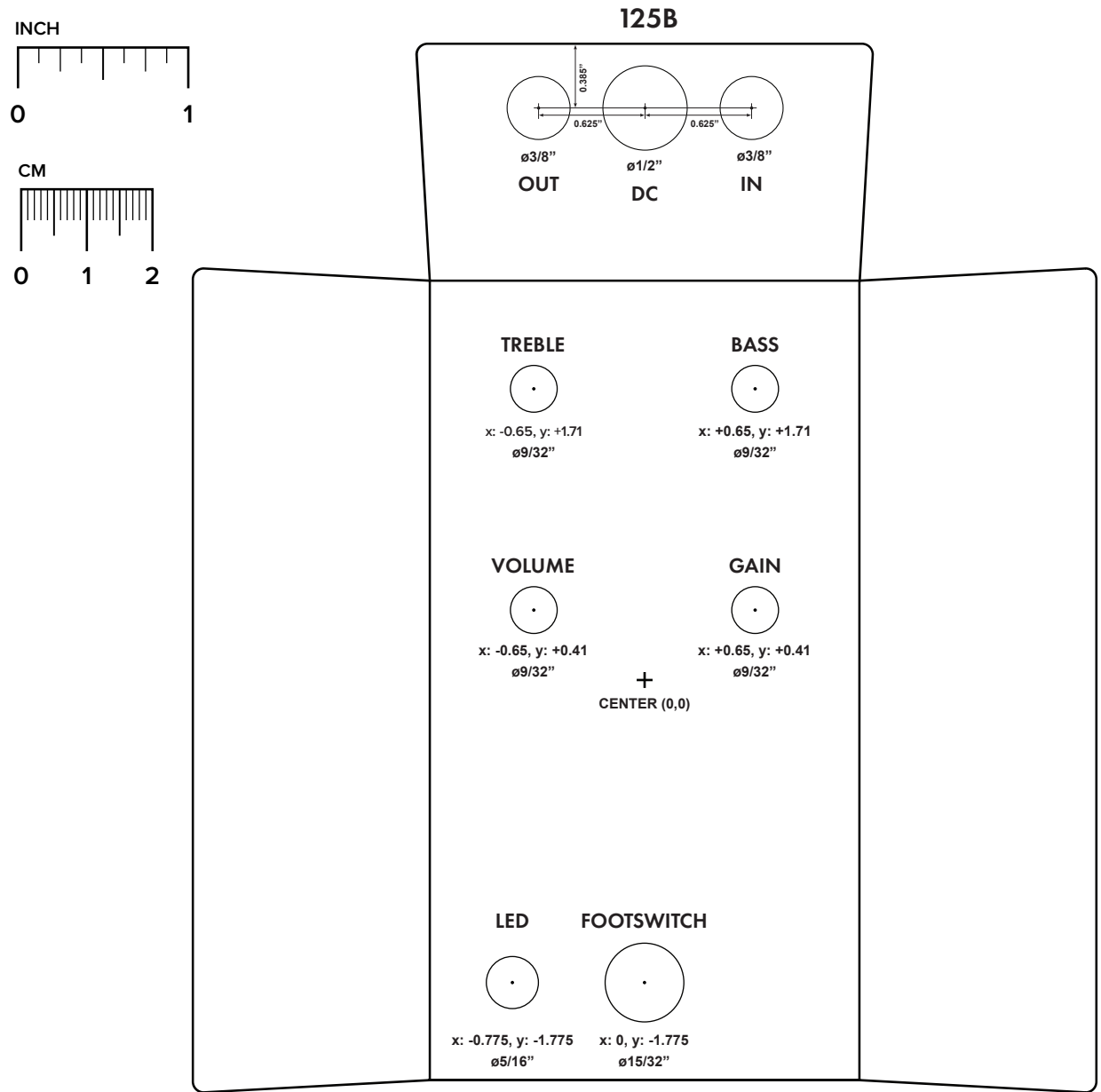
# DRILL TEMPLATE

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.

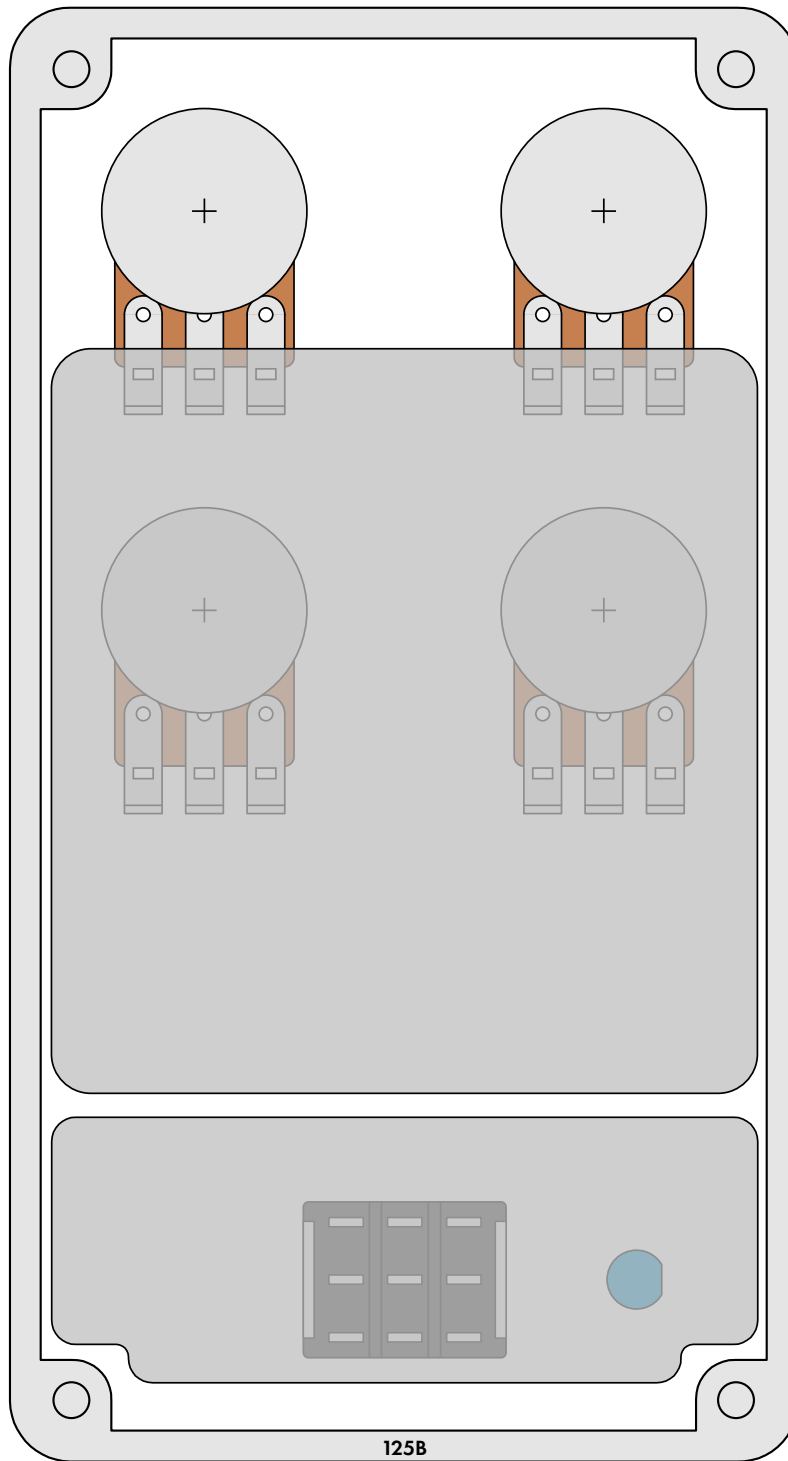




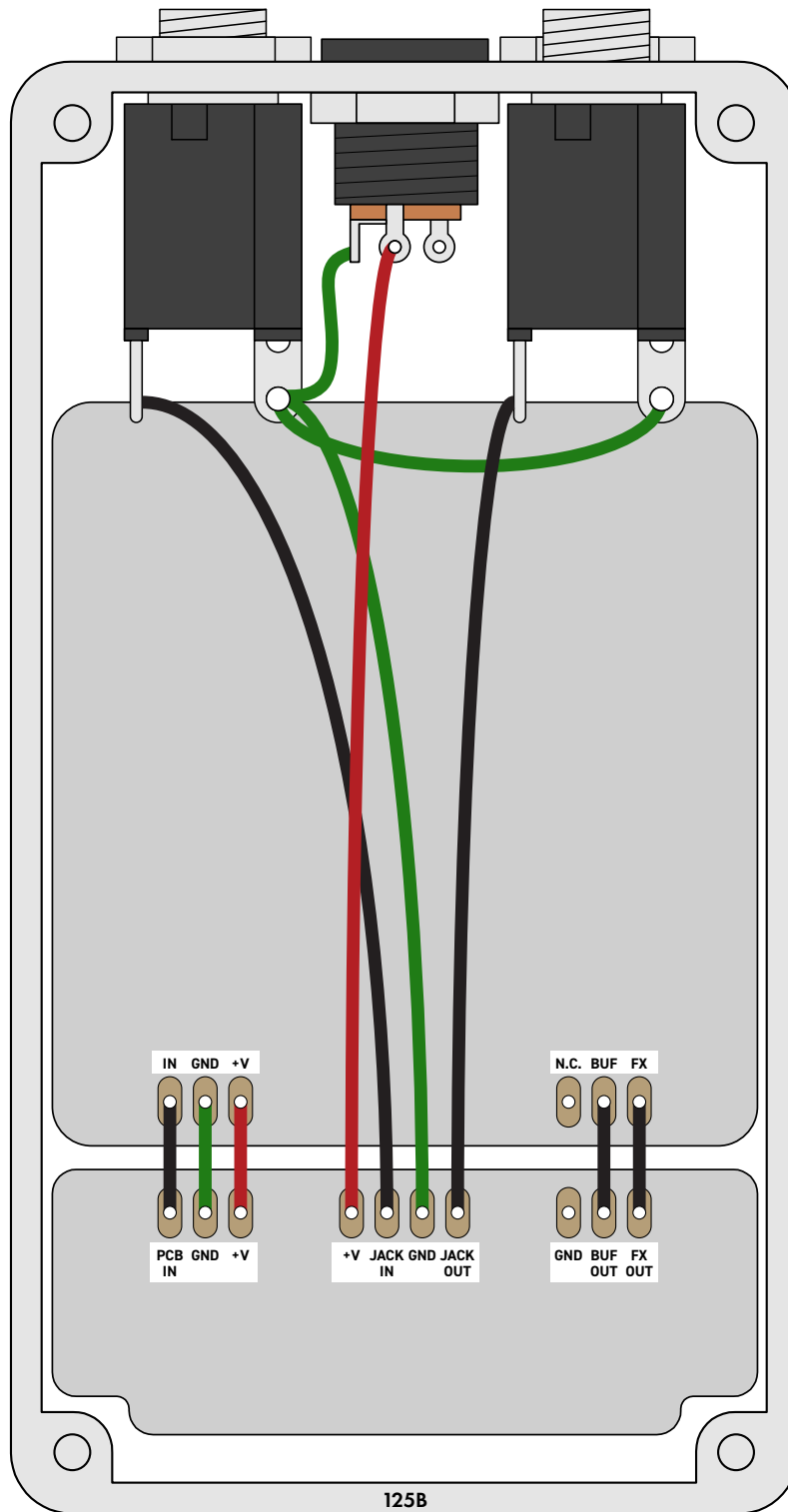
# ENCLOSURE LAYOUT

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Enclosure is shown without jacks. See next page for jack layout and wiring.



# WIRING DIAGRAM



## LICENSE & USAGE

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**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

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**1.0.0 (2020-09-11)**

Initial release.