

# BlueSteel24

**F**X Type: **OVERDRIVE**  
Build Level: Intermediate  
Based On: BOSS® BD-2™

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The *2024 version* of the **BlueSteel** has minor circuit changes and layout tweaks. The power supply filtering was removed in favor of a simpler design and the SUBS switch was converted to an On/On/On.

## Overview

The **Blue Steel** is a faithful adaption of the Boss BD-2 overdrive. The BD-2 very much stands apart from its contemporaries by the use of differential pairs, dual-gang drive control and a gyrator for tone shaping. It produces a very unique timbre as compared to the same old IC-based overdrives that are a dime a dozen these days.

Unlike some other BD-2 projects, the Blue Steel incorporates all the original circuit elements including the input and output buffers. The flip-flop bypass circuitry has been left out for true bypass operation. It also adds a switch to select different amounts of low end (being that a lack of lows is a frequent complaint with the BD-2). Lastly, I have noted the changes needed to mod it to the Keeley specs. I recommend giving these a try. I liked how mine turned out!

## Controls

**VOL, TONE, DRIVE:** As is typical with overdrives (in terms of function).

**SUBS:** This switch offers three levels of low end frequencies: Down (thin), Middle (stock), and Up (fat). The compression amount also varies somewhat in each setting.

Further study:

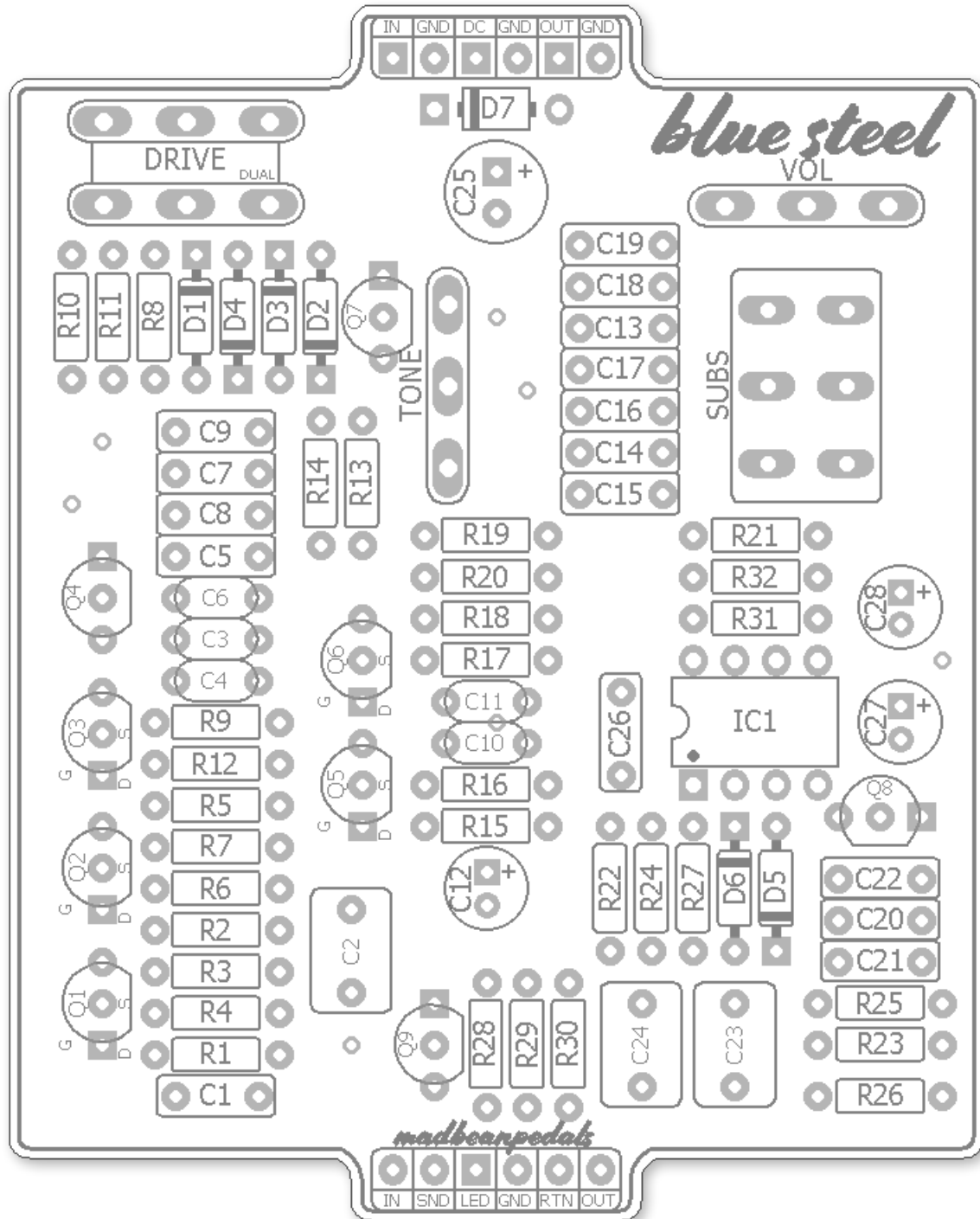
<https://www.analogisnotdead.com/article25/circuit-analysis-the-boss-bd2>

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**Technical assistance** for is available via the [madbeanpedals forum](#). Please go there rather than emailing me for personal assistance. This is because (1) I'm not always available to respond via email in a timely and continuous manner, and (2) posting technical problems and solutions in the forum creates a record from which other members may benefit.

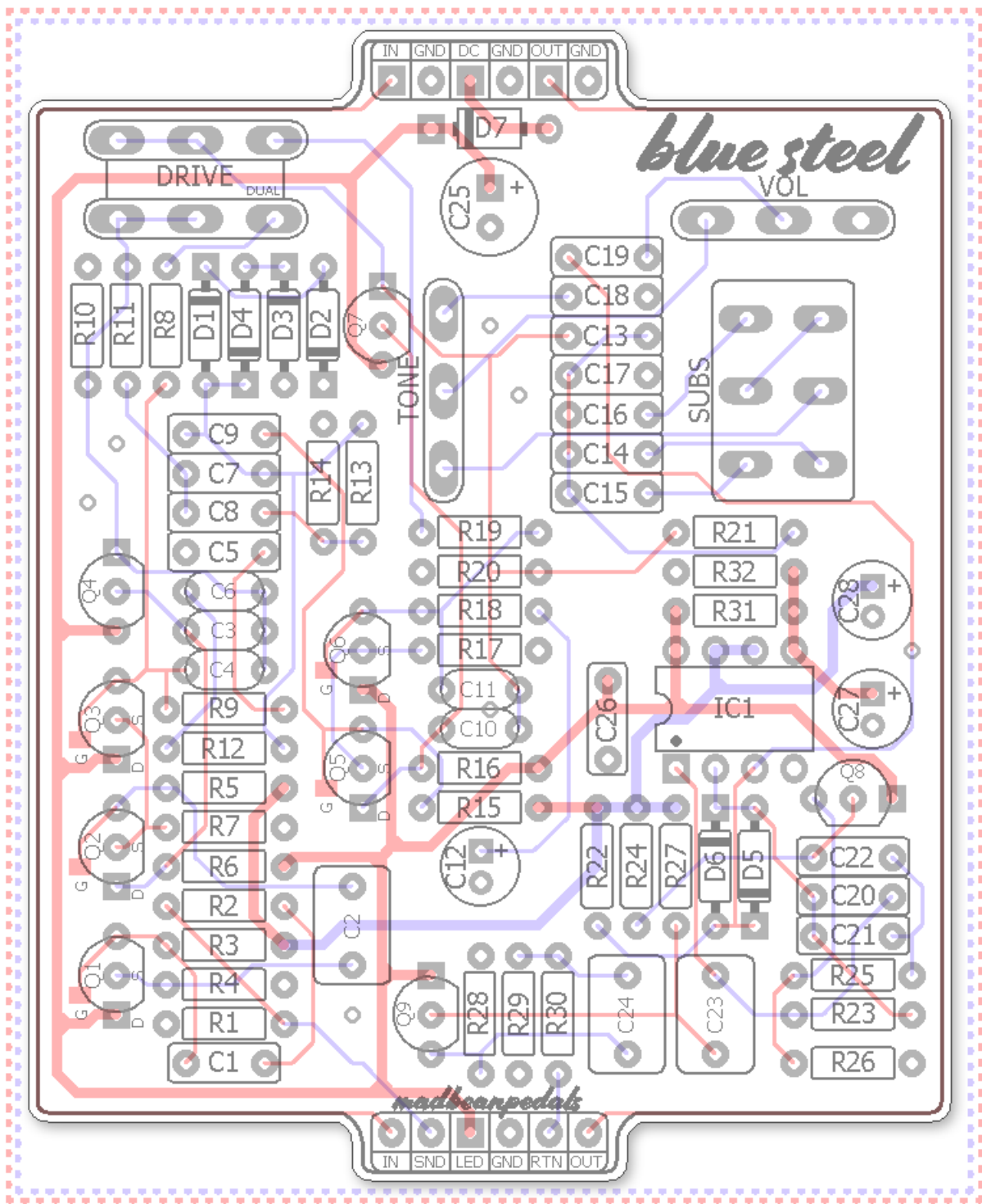
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## Parts Layout

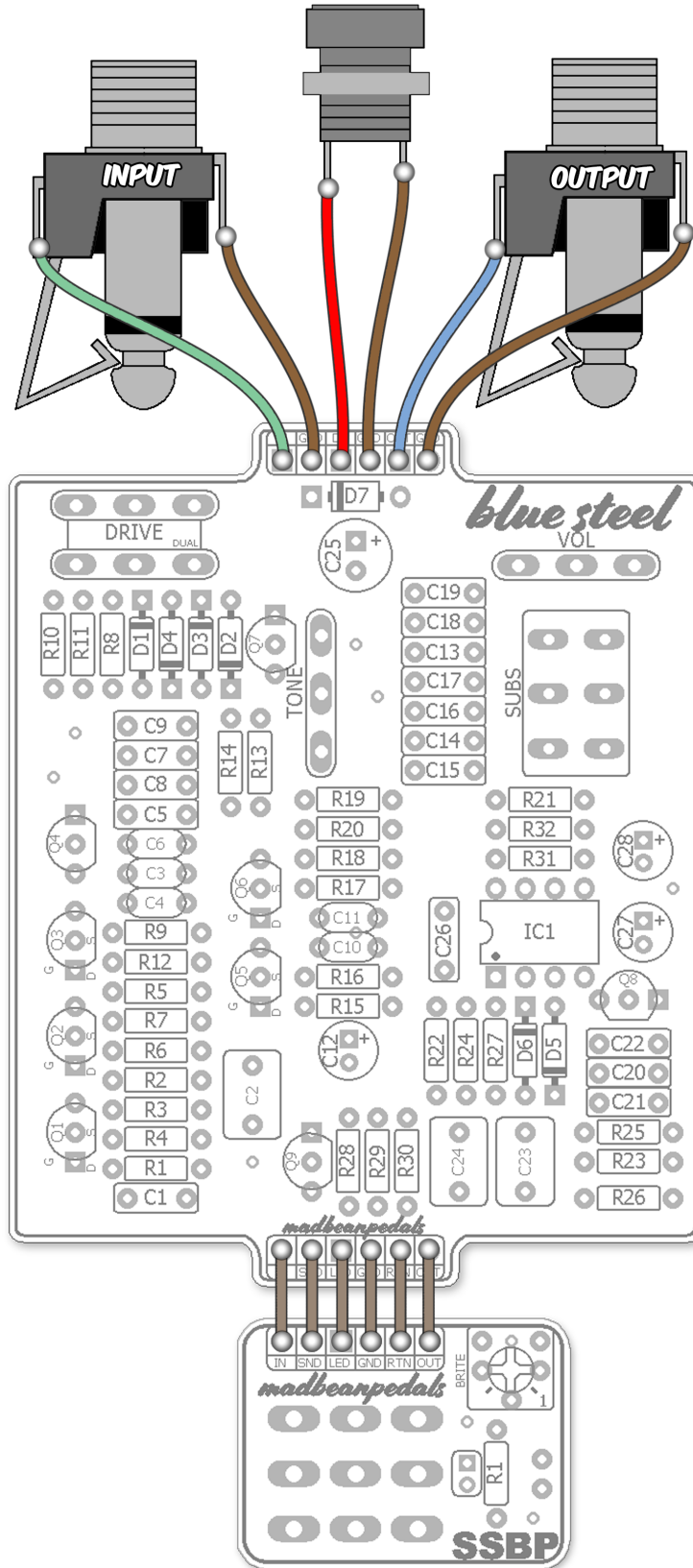




# Trace Layout



## Wiring



The BlueSteel24 is compatible with both the **SSBP** and **SSABP** bypass boards available at madbeanpedals. The wiring is the same for both.

## B.O.M.

Resistors		Caps		Diodes	
R1	1M	C1	47n	D1 - D6	4148
R2	10k	C2	1uF	D7	1n5817
R3	1M	C3	47pF	Transistors	
R4	10k	C4	47pF	Q1	J201
R5	220k	C5	150n	Q2	J201
R6	2k2	C6	220pF	Q3	J201
R7	4k7	C7	100n	Q4	2n3906
R8	22k	C8	47n	Q5	J201
R9	1k5	C9	2n2	Q6	J201
R10	2k2	C10	100pF	Q7	2n3906
R11	100k	C11	100pF	Q8	2n3904
R12	330k	C12	1uF	Q9	2n3904
R13	1M	C13	5n6	ICs	
R14	15k	C14	33n	IC1	TL072
R15	1M	C15	18n	Switches	
R16	2k2	C16	10n	SUBS	On/On/On
R17	4k7	C17	5n6	Pots	
R18	2k2	C18	18n	TONE	10kB
R19	33k	C19	47n	VOL	100kA
R20	2k2	C20	2n2	DRIVE	250kA Dual-Gang
R21	5k6	C21	56n		
R22	470k	C22	56n		
R23	6k8	C23	1uF		
R24	470k	C24	1uF		
R25	1k2	C25	100uF		
R26	10k	C26	100n		
R27	100k	C27	47uF		
R28	10k	C28	47uF		
R29	100k				
R30	1k				
R31	10k				
R32	10k				

## Shopping List

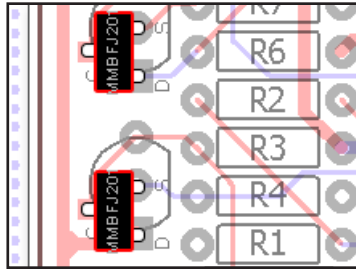
Values	QTY	Type	Rating
1k	1	Metal / Carbon Film	1/4W
1k2	1	Metal / Carbon Film	1/4W
1k5	1	Metal / Carbon Film	1/4W
4k7	2	Metal / Carbon Film	1/4W
2k2	5	Metal / Carbon Film	1/4W
5k6	1	Metal / Carbon Film	1/4W
6k8	1	Metal / Carbon Film	1/4W
10k	6	Metal / Carbon Film	1/4W
15k	1	Metal / Carbon Film	1/4W
22k	1	Metal / Carbon Film	1/4W
33k	1	Metal / Carbon Film	1/4W
100k	3	Metal / Carbon Film	1/4W
220k	1	Metal / Carbon Film	1/4W
330k	1	Metal / Carbon Film	1/4W
470k	2	Metal / Carbon Film	1/4W
1M	4	Metal / Carbon Film	1/4W
47pF	2	Ceramic / MLCC	16v min.
100pF	2	Ceramic / MLCC	16v min.
220pF	1	Ceramic / MLCC	16v min.
2n2	2	Film	16v min.
5n6	2	Film	16v min.
10n	1	Film	16v min.
18n	2	Film	16v min.
33n	1	Film	16v min.
47n	3	Film	16v min.
56n	2	Film	16v min.
100n	2	Film	16v min.
150n	1	Film	16v min.
1uF	3	Film	16v min.
1uF	1	Electrolytic	16v min.
47uF	2	Electrolytic	16v min.
100uF	1	Electrolytic	16v min.
4148	6	or, 1n914	
1n5817	1		
J201	5	through-hole or surface mount	
2n3906	2		
2n3904	2		
TL072	1		
DPDT	1	On/On/On, solder lug or pin	
10kB	1	PCB Right Angle	16mm
100kA	1	PCB Right Angle	16mm
250kA	1	PCB Right Angle, Dual-Gang	16mm

### Additional Hardware

- (1) 125B enclosure
- (2) 1/4" mono jacks
- (1) Slim 2.1mm DC jack
- (1) Standard 3PDT footswitch
- (1) 5mm LED

## Build Notes

The Blue Steel offers space for either through-hole or surface mount JFETs. For surface mount, solder them directly to the through-hole part as shown below.



The SUBS switch has been made a DPDT On/On/On and the associated cap values have been changed from the previous version. The lowest position removes some bass from the circuit. I find this to be very useful for neck position humbuckers. It evens out the bass response without getting too overwhelming. The top position offers thicker bass over the stock setting. Use for thinner sounding guitars or even bass.

The drive control really needs an audio taper to get the most out of it. If you cannot get the 250kA Dual-Gang it's okay to use a 250kB instead. It will just bunch up more in the last 1/3rd of the turn. Alternatively, if you have a 500kA Dual-Gang, put a 500k resistor (or 470k) across pins 1 and 3 of each gang. This will reduce the total value down to about 250k. You could do the same with a 1MA Dual-Gang by using 330k resistors.

250kA Dual-Gang 16mm pot:

<https://stompboxparts.com/pots/16mm-dual-gang-pot-short-pcb-leg/>

## Keeley Mods

- Make C1 100n
- Use 1N4002 for D1-D3 and jumper D4
- Use 1N4002 for D5, D6.



## Circuit Voltages

<b>Q1</b>	<b>J201</b>	<b>Q6</b>	<b>J201</b>
D	9.23	D	9.23
S	4.71	S	4.48
G	4.2	G	5.1
<b>Q2</b>	<b>J201</b>	<b>Q7</b>	<b>2n3906</b>
D	8.55	C	5.14
S	4.84	B	8.61
G	4.5	E	9.23
<b>Q3</b>	<b>J201</b>	<b>Q8</b>	<b>2n3904</b>
D	9.25	C	9.23
S	4.84	B	3.65
G	5.1	E	3.14
<b>Q4</b>	<b>2n3906</b>	<b>IC1</b>	<b>TL072</b>
C	5.09	1	4.59
B	8.55	2	4.59
E	9.23	3	4.41
<b>Q5</b>	<b>J201</b>	4	0
D	8.7	5	4.62
S	4.79	6	4.62
G	4.27	7	4.62
		8	9.23

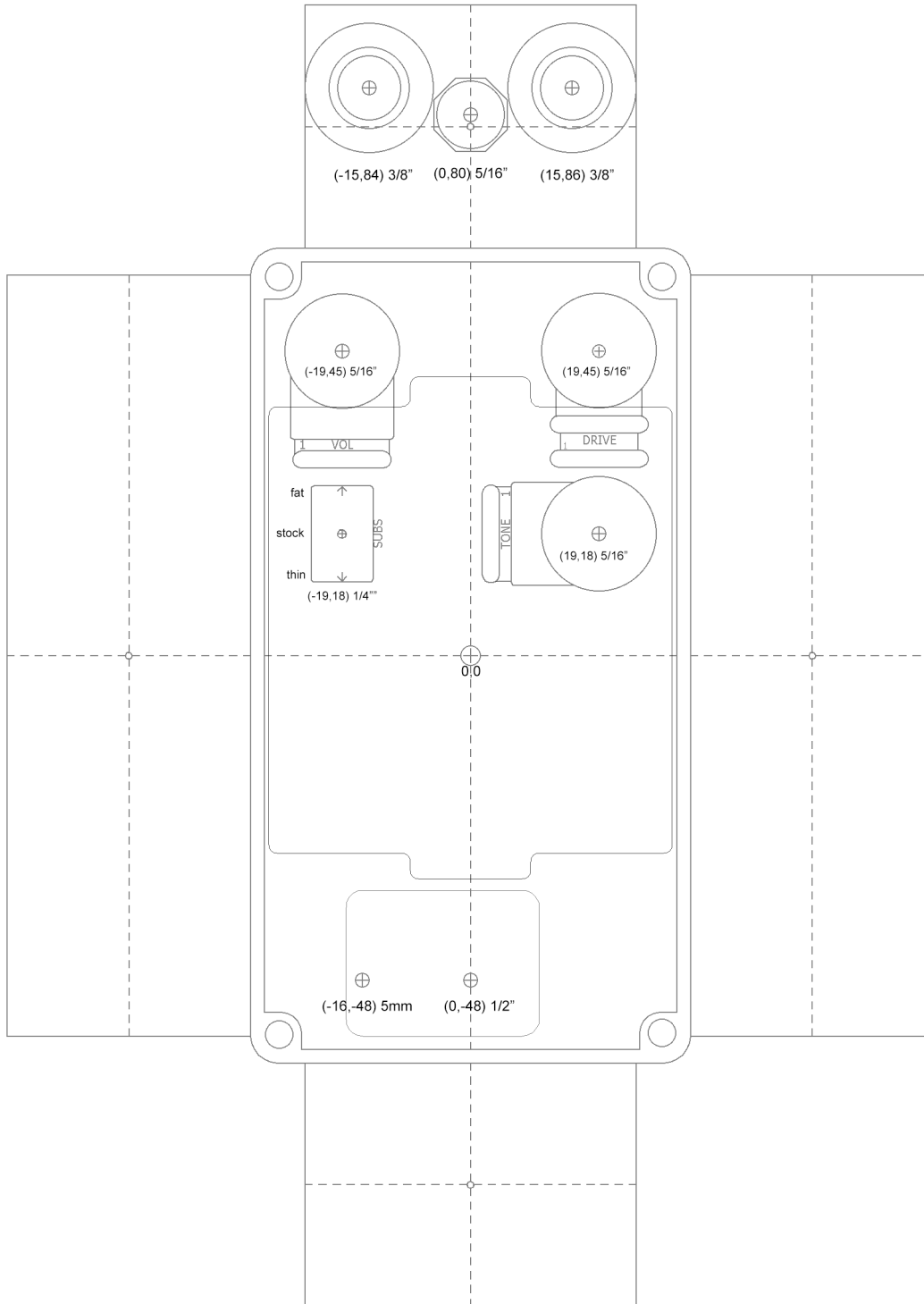
9.44vDC One Spot supply  
Current Draw: 11mA

Pots @ 50%, Switch center

## Drill Template

Coordinates are denoted in (X,Y), drill size format starting from the center (0,0) location of the enclosure.

Tayda drill template: [https://drill.taydakits.com/box-designs/new?public\\_key=V0M5RzEzaG9ldXFzVHoxQjFJcitGdz09Cg==](https://drill.taydakits.com/box-designs/new?public_key=V0M5RzEzaG9ldXFzVHoxQjFJcitGdz09Cg==)

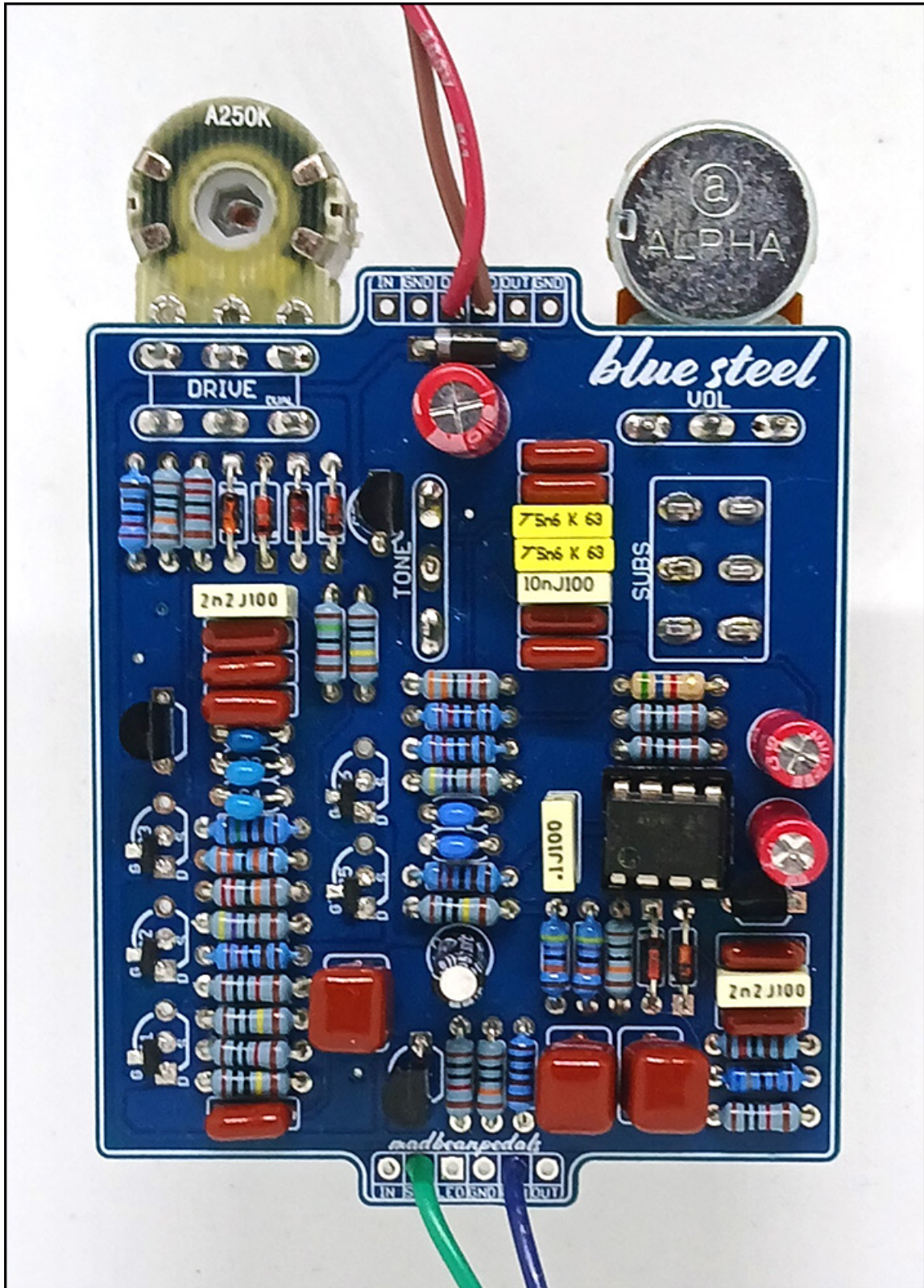


### Hardware

125B enclosure  
Mono jacks  
Slim 2.1mm DC jack  
Standard 3PDT footswitch  
5mm LED

**NOTE: Different 1/4" and DC jack styles may require different sized drill holes.**

# Build Pic



# Schematic

