

# MUDBUNNY2020

## FX TYPE: Distortion

Based on the EHX® Big Muff™

Enclosure Size: 1590B, 1590B2, 125B

"Softie" compatibility: Softie1&2

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## Overview

For the 2020 version of the Mudbunny I have completely re-designed the PCB to conform to the new layout strategy for mbp overdrives. This layout allows you to build the Mudbunny in different sized enclosures, with an option for different bypass methods.

The 2020 version also includes a Tone Bypass switch. This not only lets you defeat the tone circuit, but completely changes the character, IMO. It takes it to a more mids-focused distortion which many players will enjoy. For the tone bypass, I have included a DIP switch that allows you change the knee of the filter created by the cap/voltage divider in that audio path. The voltage divider also reduces the tone bypass volume so it more closely matches the tone circuit when engaged.

I've adopted the Ram's Head as the "default" BOM for this version, as it is very popular and a good representative of what the BM sounds like. However, there are many varieties you can build. In the zip file for this project I have included the old spreadsheet that has different BOMs for a few versions. Also, I highly suggest you check out the Kitrae Big Muff pages: not only for a complete history of the effect, but for additional possible BOMS.

[http://www.kitrae.net/music/big\\_muff\\_history.html](http://www.kitrae.net/music/big_muff_history.html)

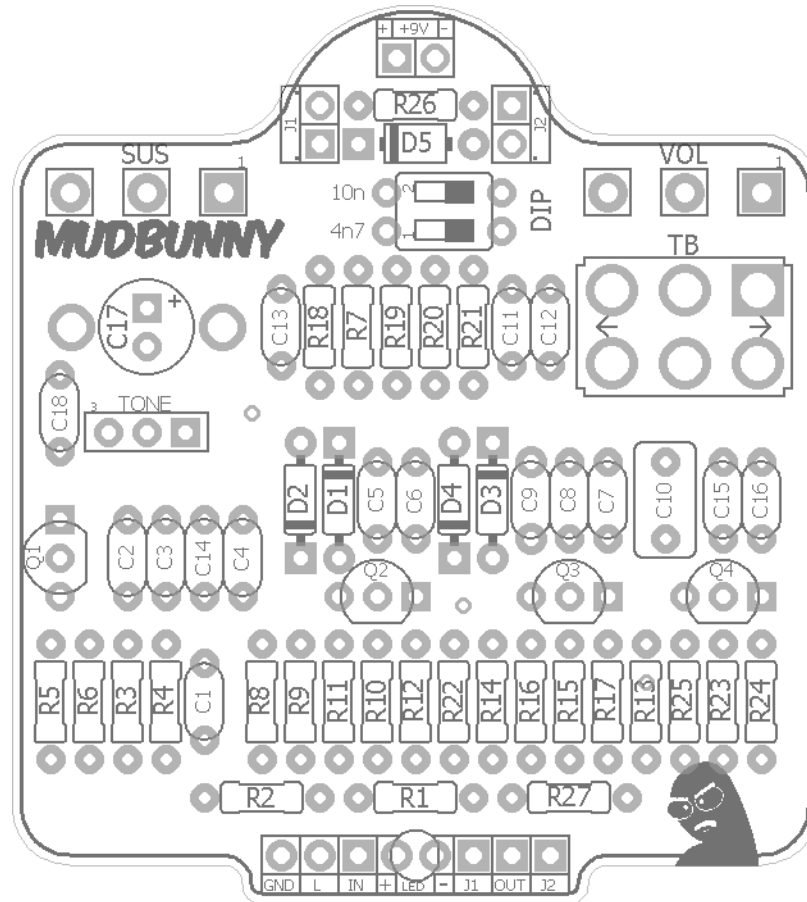
## Controls

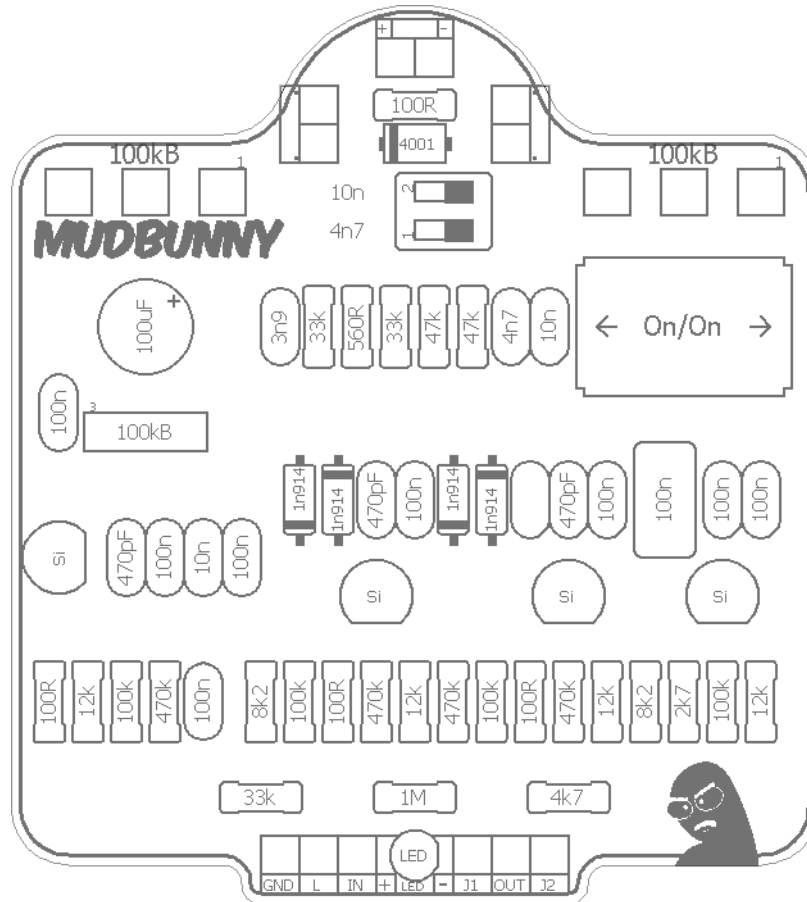
- **VOL** - Total Output.
- **SUS** - Total distortion.
- **TONE** - CCW - HP filter, CW - LP filter with a huge range in-between.
- **TB** - The Tone Bypass removes the tone circuit and makes it more mids-focused (right position).
- **DIP** - Two position DIP switch that gives you three options for how the bypassed tone sounds. 4n7 is a "stuck wah" type tone, 10n is probably the most balanced between mids and bass, and both together (which is about 15n) is a bit more bass-heavy.

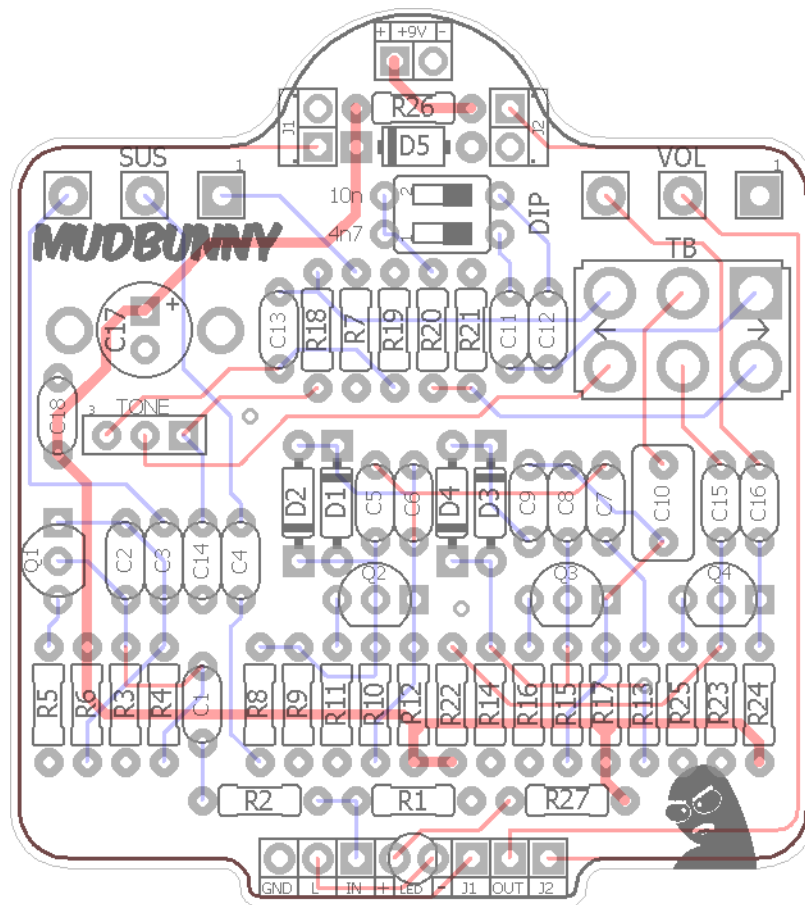
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**Technical assistance** for your build(s) is available via the [madbeanpedals forum](http://madbeanpedals.com/forum). Please go there rather than emailing me for assistance on builds. This is because (1) I'm not always available to respond via email 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.







Resistors		Caps		Diodes	
R1	1M	C1	100n	D1 - D4	1n914
R2	33k	C2	470pF	D5	1N4001
R3	100k	C3	100n	Transistors	
R4	470k	C4	100n	Q1 - Q4	Si
R5	100R	C5	470pF	Dip Switch	
R6	12k	C6	100n	DIP	2-pos.
R7	560R	C7	100n	Switch	
R8	8k2	C8	470pF	TB	DPDT
R9	100k	C9	100n	Pots	
R10	470k	C10	100n	SUS	100kB
R11	100R	C11	4n7	TONE	100kB
R12	12k	C12	10n	VOL	100kB
R13	8k2	C13	3n9		
R14	100k	C14	10n		
R15	470k	C15	100n		
R16	100R	C16	100n		
R17	12k	C17	100uF		
R18	33k	C18	100n		
R19	33k				
R20	47k				
R21	47k				
R22	470k				
R23	100k				
R24	12k				
R25	2k7				
R26	100R				
R27	4k7				

'73 Rams Head BOM

Value	QTY	Type	Rating
100R	4	Metal / Carbon Film	1/4W
560R	1	Metal / Carbon Film	1/4W
2k7	1	Metal / Carbon Film	1/4W
4k7	1	Metal / Carbon Film	1/4W
8k2	2	Metal / Carbon Film	1/4W
12k	4	Metal / Carbon Film	1/4W
33k	3	Metal / Carbon Film	1/4W
47k	2	Metal / Carbon Film	1/4W
100k	4	Metal / Carbon Film	1/4W
470k	4	Metal / Carbon Film	1/4W
1M	1	Metal / Carbon Film	1/4W
470pF	3	Ceramic / MLCC	16v min.
3n9	1	Film	16v min.
4n7	1	Film	16v min.
10n	2	Film	16v min.
100n	10	Film	16v min.
100uF	1	Electrolytic	16v min.
1n914	4		
1N4001	1		
Si	4	NPN - medium hFE	
2-pos.	1	Dip Switch	
DPDT	1	On/On, Solder Lug or Pin Mount	
100kB	1	PCB Mount, Plastic Shaft	9mm
100kB	2	PCB Mount, Right Angle	16mm

I've listed the transistors just as "Si" because there are many BJT that will work here. If you want the true "Rams Head" experience then I have linked two versions of the period correct transistors used on the next page. I'm not sure of the pinouts of the smallbear transistors.

I did not have either of them so I used plain old 2n5088 for my build.

**2N5133:**

<http://smallbear-electronics.mybigcommerce.com/transistor-2n5133/>

**SE4010 (Higher gain version of the 2N5133):**

<http://smallbear-electronics.mybigcommerce.com/transistor-se4010-fairchild/>

**2-pos DIP switch:**

<http://smallbear-electronics.mybigcommerce.com/dip-switch-2-position/>

**16mm pots:**

<http://smallbear-electronics.mybigcommerce.com/alpha-single-gang-16mm-right-angle-pc-mount/>

**9mm Plastic Shaft pot:**

<http://smallbear-electronics.mybigcommerce.com/alpha-single-gang-9mm-right-angle-pc-mount-w-knurled-plastic-shaft/>

**On/On Toggle:**

<http://smallbear-electronics.mybigcommerce.com/dpdt-short-lever-on-on/>

**Thinline DC Jack:**

<http://smallbear-electronics.mybigcommerce.com/dc-power-jack-all-plastic-unswitched-2-1-mm/>

**Enclosed Mono:**

<http://smallbear-electronics.mybigcommerce.com/1-4-in-mono-enclosed-jack/>

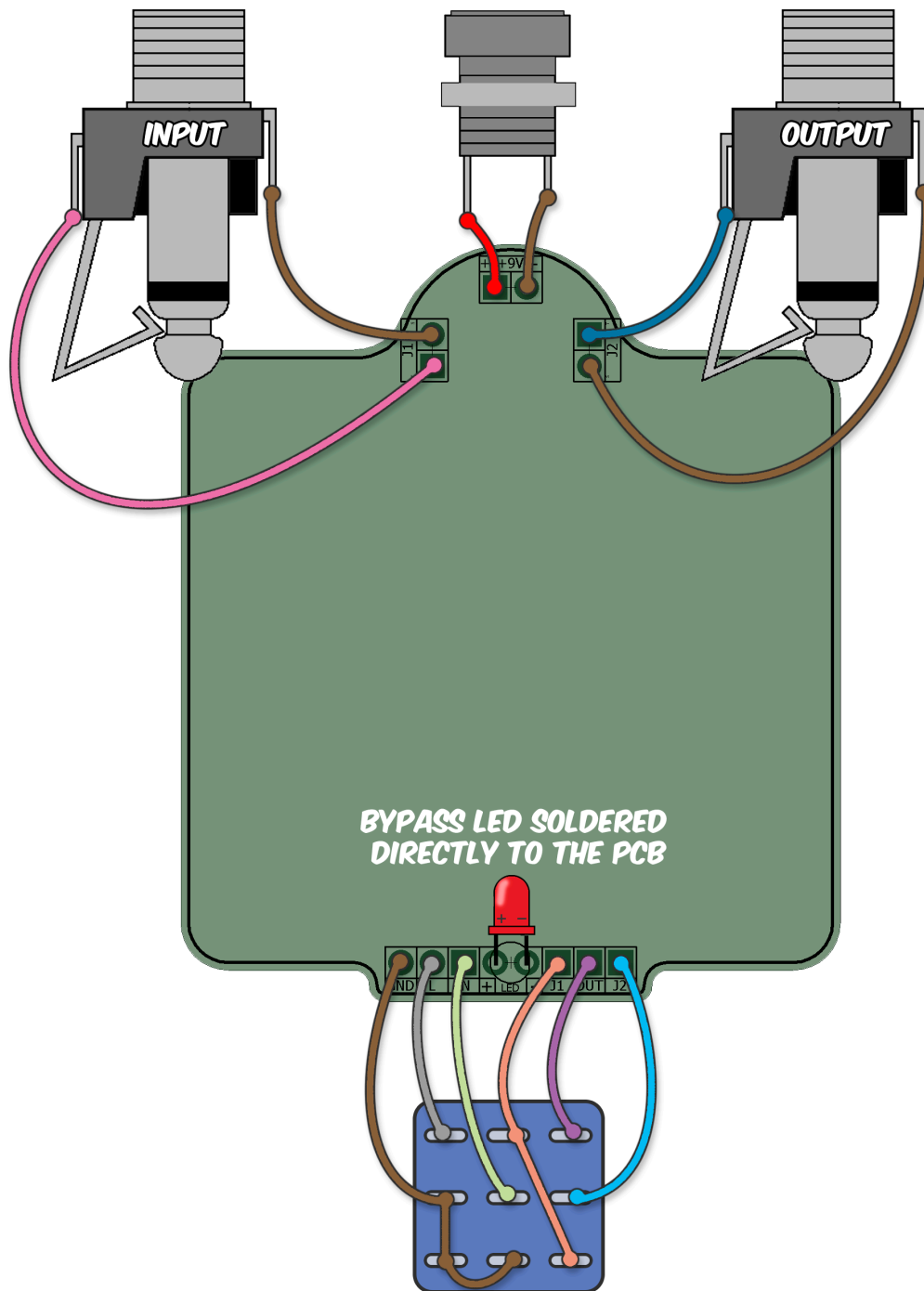
<http://smallbear-electronics.mybigcommerce.com/1-4-in-mono-enclosed-switchcraft-111x/>

**Lumberg Mono:**

<http://smallbear-electronics.mybigcommerce.com/lumberg-1-4-compact-shrouded-mono-jack/>

- There are many transistors you can use in the Mudbunny. Alternatives to the 2n5088 include BC549C, BC550, BC182L, 2n5089, and MPSA18, as well as many more. Using different transistors can create unique variations in tone. Be careful to use the correct pin-outs, however. Some transistors, such as the BC549C will need to be rotated 180° from the silk screen drawing on the PCB due to its reversed pin-out. Always check the appropriate datasheet for your transistor BEFORE soldering.
- You can also create unique tones by using different diodes in place of the 1n914 (or the equivalent 1n4148). Different diodes such as germanium, LED, and mosfets (wired as diodes) offer the opportunity to customize the Mudbunny to your personal taste. Typical alternatives include 1n34a, 1n270, BAT41, red or green diffused 3mm or 5mm LEDs, and 2n7000 mosfets.
- Using germanium diodes in the D3/D4 position will sometimes create a very light octave effect. If you use them for both D1/D2 and D3/D4 you may get a slight “bloom” in the note decay (a VERY COOL effect). However, one caveat I’ve found with germanium diodes in the Muff is it sometimes does not fully clip the lowest frequencies. It seems counter-intuitive but it can happen. YMMV.
- If using a mosfet for clipping, simply solder the gate and drain pins together on each mosfet and use the two leads (source and gate/drain) as the diode in a back to back configuration on the D1/ D2 and/or D3/D4 positions.
- One useful way to develop your own variation (instead of breadboarding) is to use a PCB as a development board. By socketing most of the pads on the PCB you can easily swap out different values and component types to gauge changes in tone. You could also use pin headers for the pots to easily switch out different values for them. Experimentation is the key here, and this is an easy way to use the Mudbunny as a learning tool.
- You will need to turn at least one of the DIP switch slides to the “on” position for the tone bypass to work.

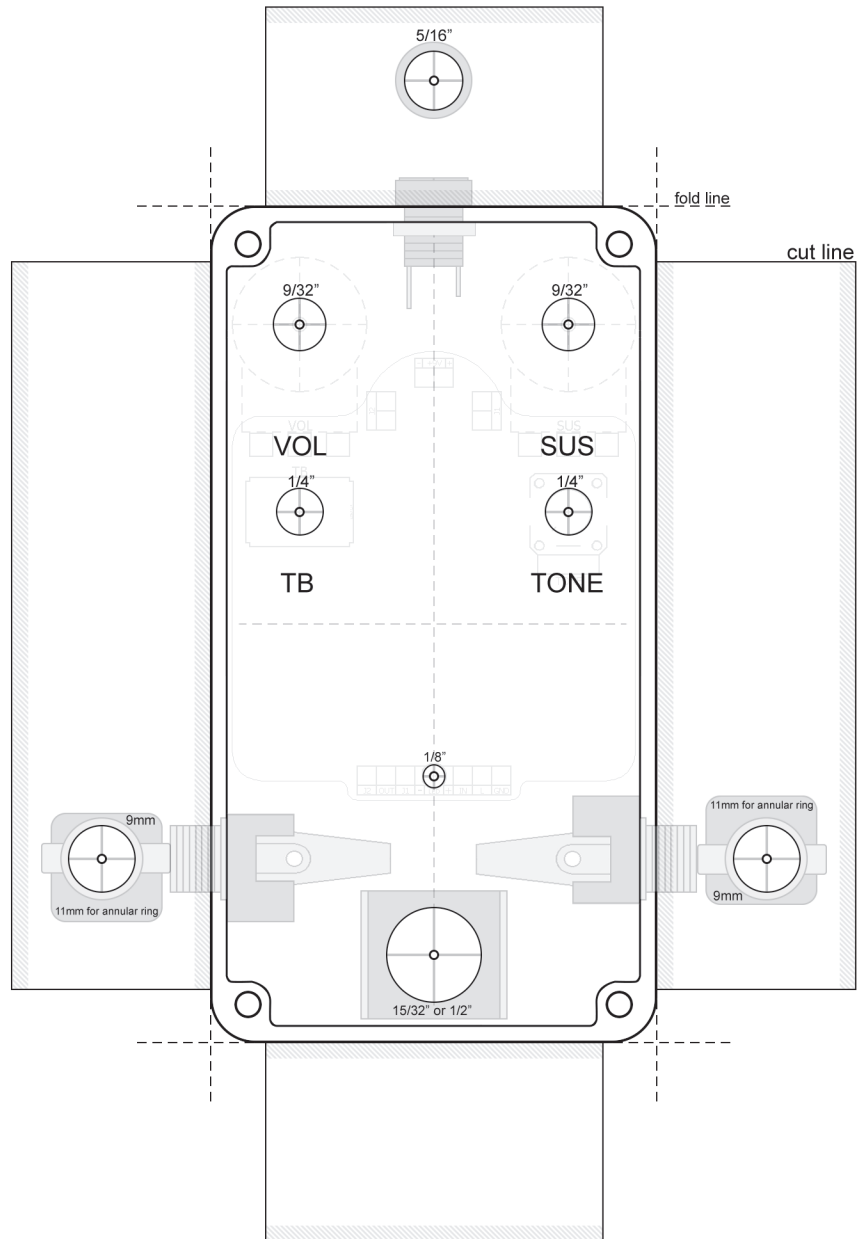




This shows wiring for the standard 3PDT bypass. If you are using either the Softie1 or 2 relay bypass, please refer to those documents for wiring.

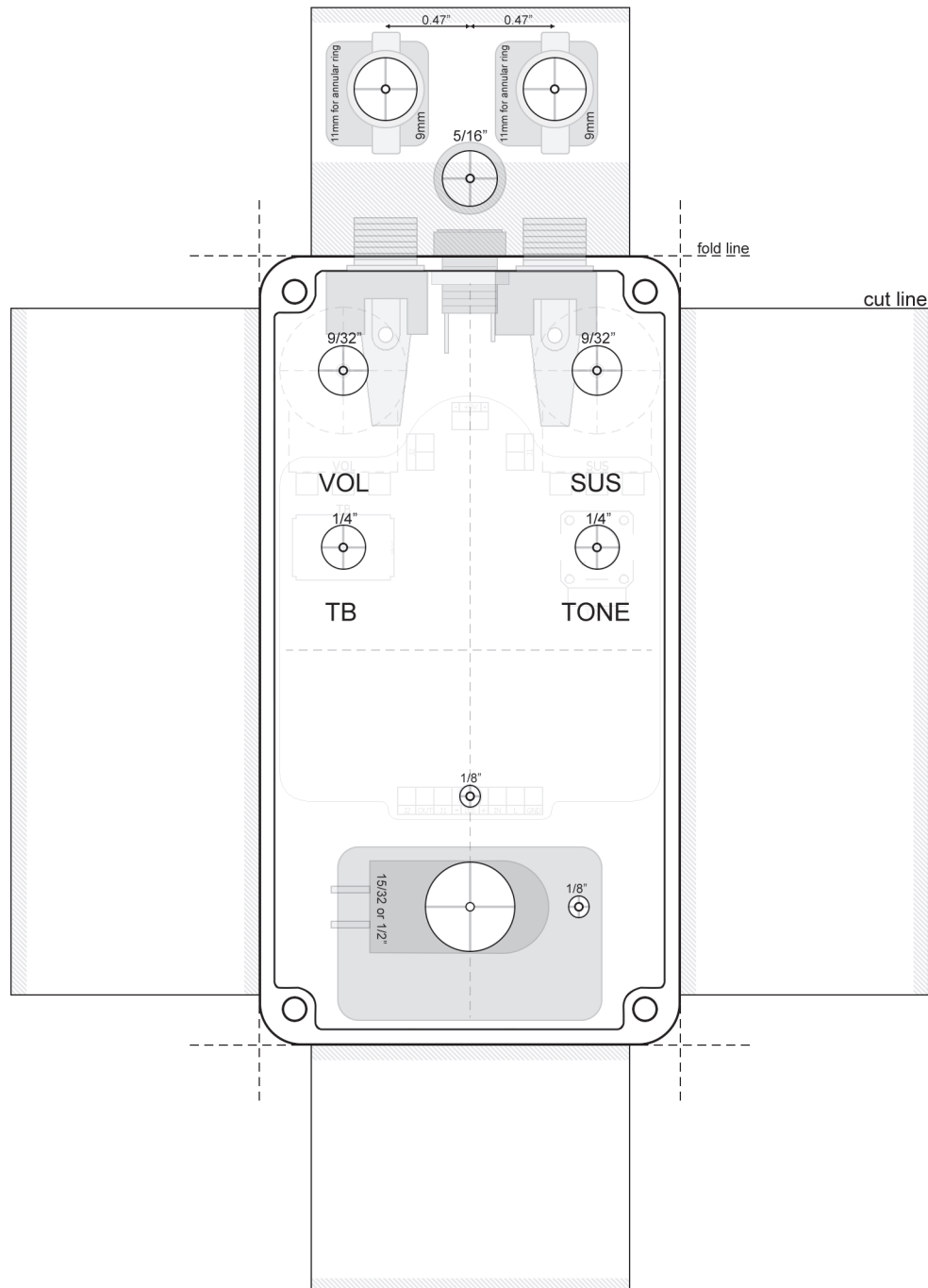
Note, if you are building in a 1590B you do not need to use the J1 and J2 connections at the top. Just wire your input and output jacks directly to the switch.

**Note:** Drill Guides are approximate and may require tweaking depending on the types of jacks, switches and pots you use.



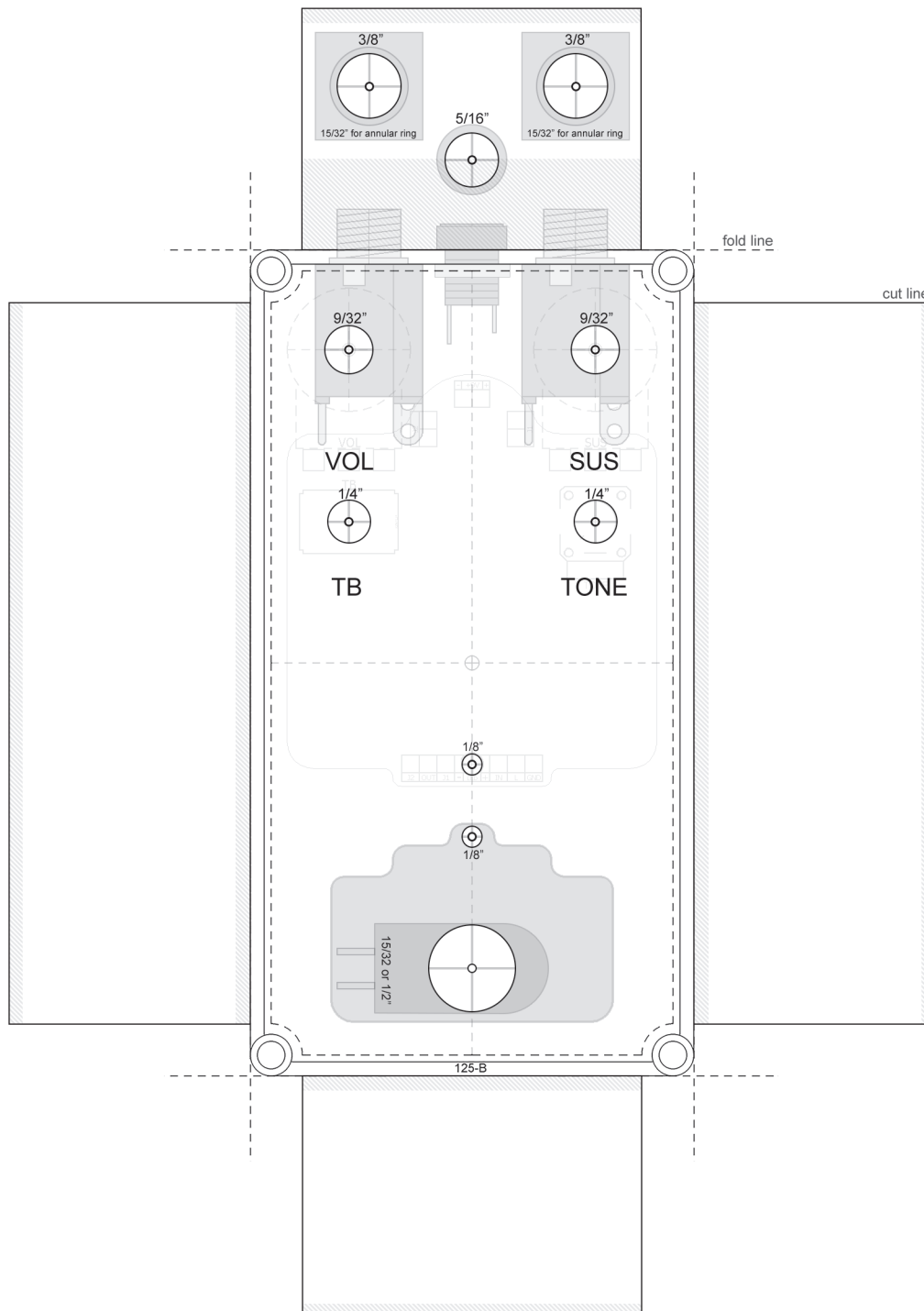
- This is a tight fit, but should work if you use the Lumberg style 1/4" jacks.
- I don't recommend using any of the mbp 3pdt boards for this enclosure.

**Note:** Drill Guides are approximate and may require tweaking depending on the types of jacks, switches and pots you use.



- Shown with Softie 2 relay bypass. If you are using one of the mbp 3pdt bypass boards, or just a 3pdt switch on its own, move the drill spot for the switch a bit lower so you can fit everything properly. Drill only one LED spot!
- Lumberg style jacks are used here but other styles may fit using the same drill locations.

**Note:** Drill Guides are approximate and may require tweaking depending on the types of jacks, switches and pots you use.



- Shown with Softie 1 relay bypass. Use the same drill spot for 3PDT switch or move to your desired location. Drill only one LED spot!
- Enclosed top jacks are used here, but you should also be able to fit open-frame metal jacks or the Lumberg style.
- You could also use side jacks but you'll need to move the Softie1 drill spot down. If you use side jacks with a regular 3pdt instead of the Softie simply pick your drill spots for the jacks.

Q1	Si
C	4.12
B	0.64
E	42mV

Q3	Si
C	4.12
B	0.64
E	42mV

Q2	Si
C	4.12
B	0.64
E	42mV

Q4	Si
C	4.96
B	1.55
E	0.96

- 9.42vDC One Spot
- Current Draw ~ 2mA



“Mudwell”, the mudbunny

