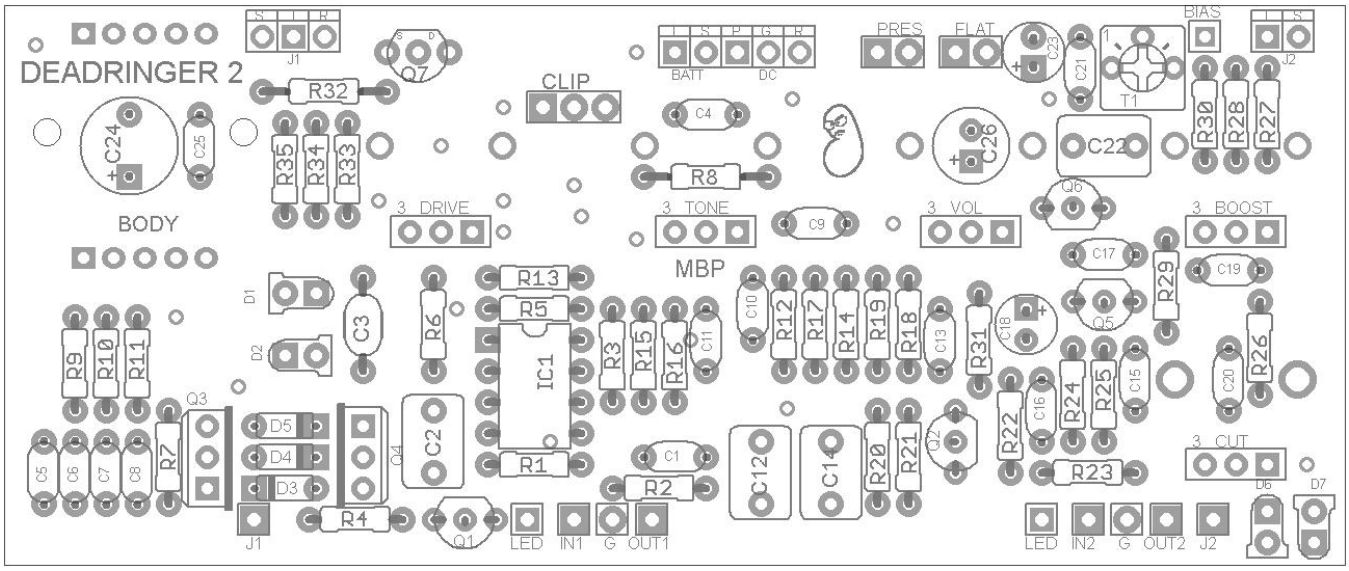
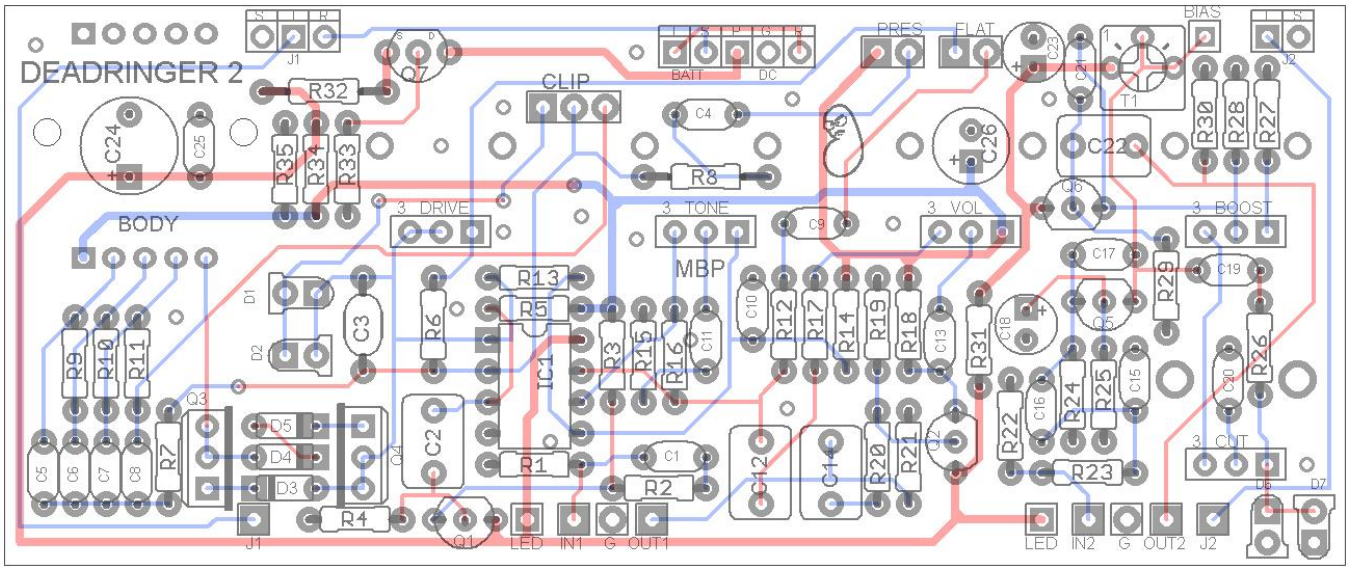
Deadringer 2

FX Type: Overdrive/Boost

4.3” W x 1.8” H

01.24.15 – Replaced 1590BB drill templates.



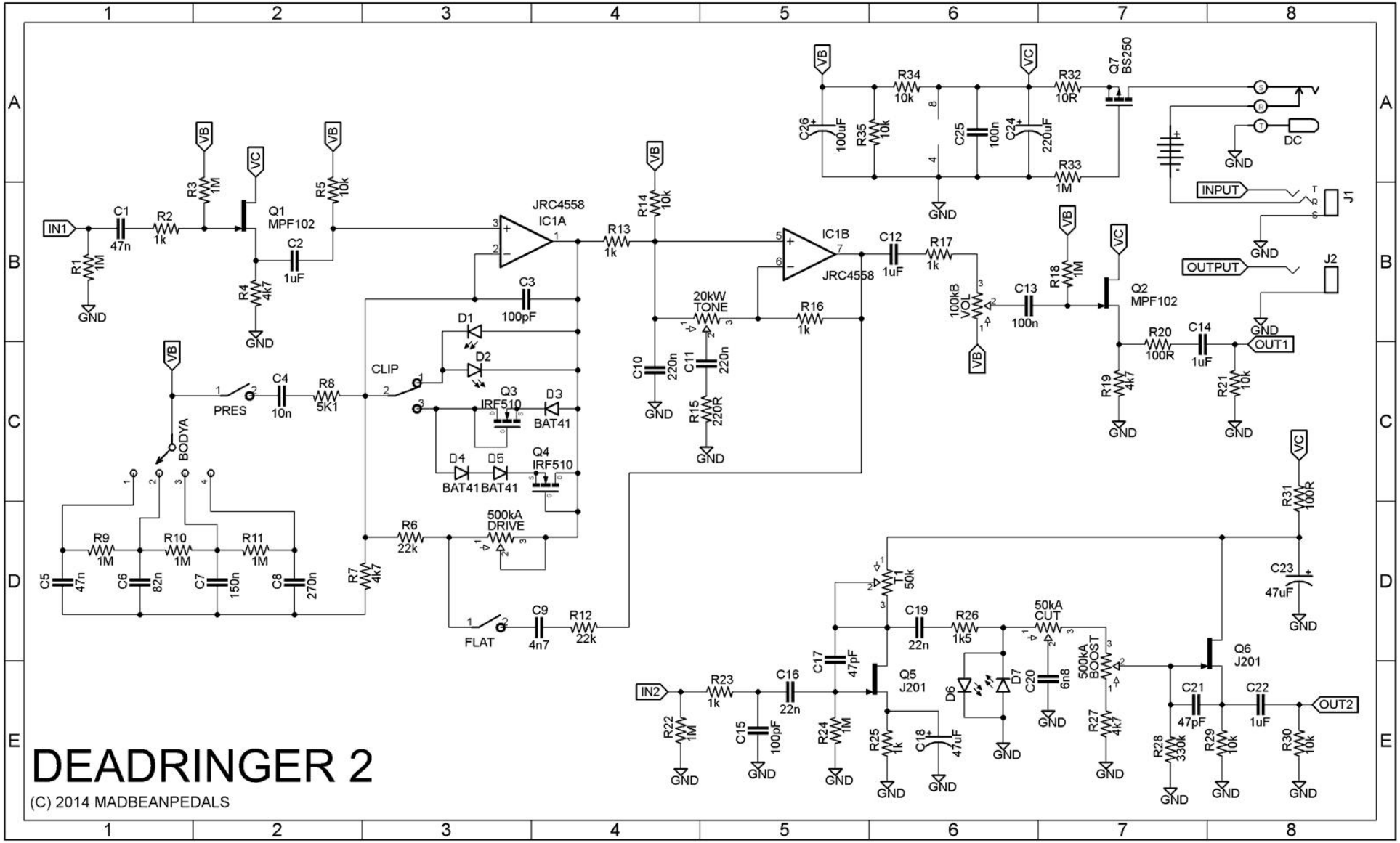


The extra small holes on the PCB are **vias**: they connect top and bottom traces and/or grounding planes. You do not need to do anything with them.

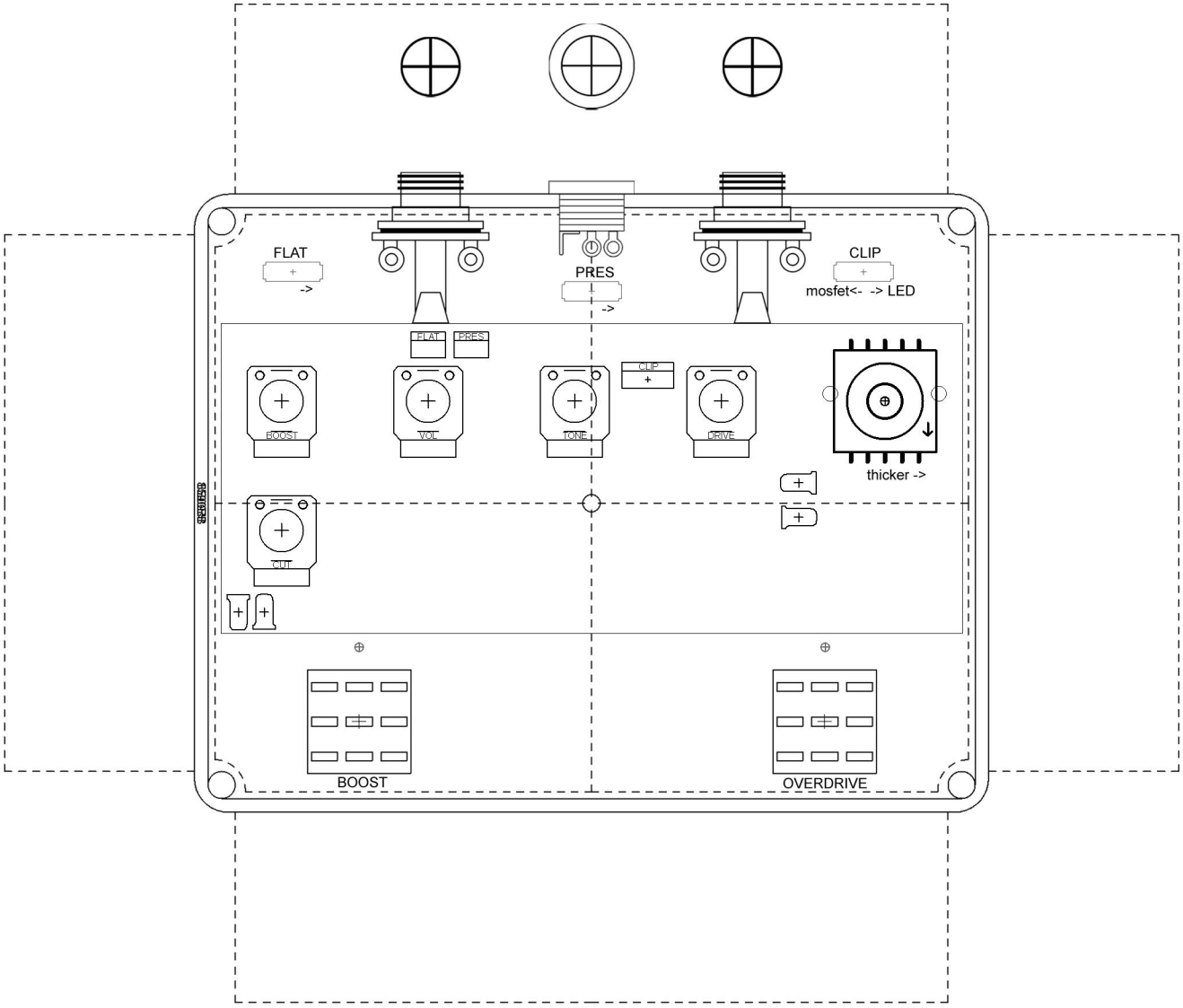
Terms of Use: *You are free to use purchased **Deadringer 2** circuit boards for both DIY and small commercial operations. You may not offer **Deadringer 2** boards for resale or as part of a “kit” in a commercial fashion. Peer to peer re-sale is, of course, okay.*

Resistors		Caps		Diodes	
R1	1M	C1	47n	D1	LED
R2	1k	C2	1uF	D2	LED
R3	1M	C3	100pF	D3	BAT41
R4	4k7	C4	10n	D4	BAT41
R5	10k	C5	47n	D5	BAT41
R6	22k	C6	82n	D6	LED
R7	4k7	C7	150n	D7	LED
R8	5K1	C8	270n	**Transistors**	
R9	1M	C9	4n7	Q1	MPF102
R10	1M	C10	220n	Q2	MPF102
R11	1M	C11	220n	Q3	IRF510
R12	22k	C12	1uF	Q4	IRF510
R13	1k	C13	100n	Q5	J201
R14	10k	C14	1uF	Q6	J201
R15	220R	C15	100pF	Q7	BS250
R16	1k	C16	22n	**IC**	
R17	1k	C17	47pF	IC1	JRC4558
R18	1M	C18	47uF	**Switches**	
R19	4k7	C19	22n	BODY	2P4T
R20	100R	C20	6n8	FLAT	SPDT
R21	10k	C21	47pF	PRES	SPDT
R22	1M	C22	1uF	CLIP	SPDT
R23	1k	C23	47uF	**Trimpot**	
R24	1M	C24	220uF	T1	50k
R25	1k	C25	100n	**Pots**	
R26	1k5	C26	100uF	DRIVE	500kA
R27	4k7			TONE	20kW
R28	330k			VOL	100kB
R29	10k			BOOST	500kA
R30	10k			CUT	50kA
R31	100R				
R32	10R				
R33	1M				
R34	10k				
R35	10k				

Shopping List			
Value	QTY	Type / Subs	Rating
10R	1	Metal / Carbon	1/2W
100R	2	Metal / Carbon	1/4W
220R	1	Metal / Carbon	1/4W
1k	6	Metal / Carbon	1/4W
1k5	1	Metal / Carbon	1/4W
4k7	4	Metal / Carbon	1/4W
5K1	1	Metal / Carbon	1/4W
10k	7	Metal / Carbon	1/4W
22k	2	Metal / Carbon	1/4W
330k	1	Metal / Carbon	1/4W
1M	9	Metal / Carbon	1/4W
47pF	2	Ceramic	25v or more
100pF	2	Ceramic / Film / Mica	25v or more
4n7	1	Film	25v or more
6n8	1	Film	25v or more
10n	1	Film	25v or more
22n	2	Film	25v or more
47n	2	Film	25v or more
82n	1	Film	25v or more
100n	2	Film	25v or more
150n	1	Film	25v or more
220n	2	Film	25v or more
270n	1	Film	25v or more
1uF	4	Film	25v or more
47uF	2	Electrolytic	25v or more
100uF	1	Electrolytic	25v or more
220uF	1	Electrolytic	25v or more
LED	4	red diffused	3MM
MPF102	2	or, 2n5457, J201	
IRF510	2	or, 2n7000	
J201	2		
BS250	1		
JRC4558	1	or other DIP	
2P4T	1	* see notes	
SPDT	3	On/On	
50k	1	Bourns 2262P	
500kA	2	Right Angle	9mm
20kW	1	Right Angle	9mm
100kB	1	Right Angle	9mm
50kA	1	Right Angle Plastic Shaft	9mm

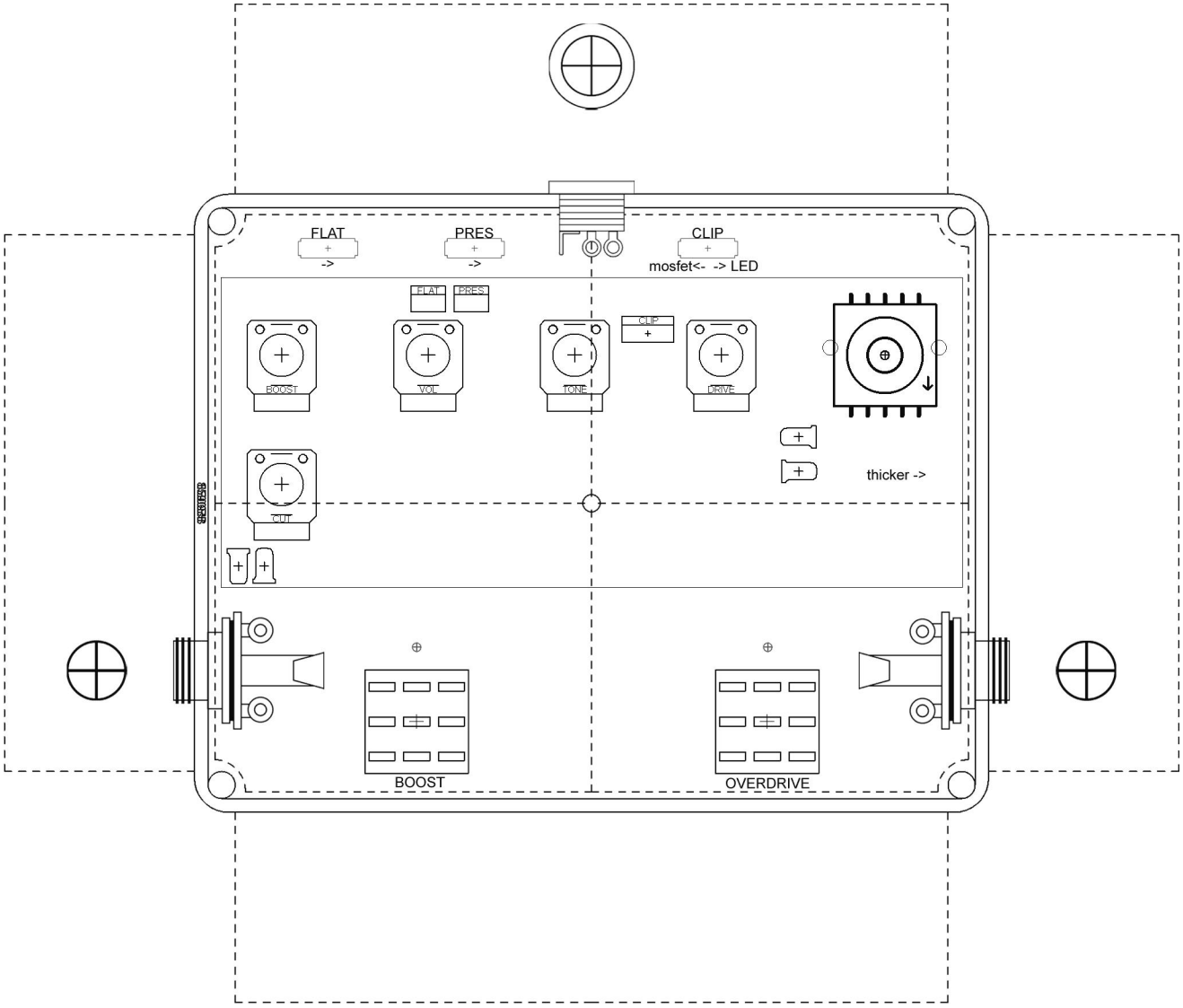

DEADRINGER 2
(C) 2014 MADBEANPEDALS
IN1
IN2
OUT1
OUT2
INPUT
OUTPUT
J1
J2
DC
VB
VC
GND
Q1 MPF102
Q2 MPF102
Q3 IRF510
Q4 IRF510
Q5 J201
Q6 J201
Q7 BS250
JRC4558 IC1A
IC1B JRC4558
D1
D2
D3 BAT41
D4 BAT41
D5 BAT41
D6
D7
CLIP
PRES
FLAT
BODYA
20kW TONE
100kB VOL
500kA DRIVE
50kA CUT
500kA BOOST
R1 1M
R2 1k
R3 1M
R4 4k7
R5 10k
R6 22k
R7 4k7
R8 5K1
R9 1M
R10 1M
R11 1M
R12 22k
R13 1k
R14 10k
R15 220R
R16 1k
R17 1k
R18 1M
R19 4k7
R20 100R
R21 10k
R22 1M
R23 1k
R24 1M
R25 1k
R26 1k5
R27 4k7
R28 330k
R29 10k
R30 10k
R31 100R
R32 10R
R33 1M
R34 10k
R35 10k
C1 47n
C2 1uF
C3 100pF
C4 10n
C5 47n
C6 82n
C7 150n
C8 270n
C9 4n7
C10 220n
C11 220n
C12 1uF
C13 100n
C14 1uF
C15 100pF
C16 22n
C17 47pF
C18 47uF
C19 22n
C20 6n8
C21 47pF
C22 1uF
C23 47uF
C24 220uF
C25 100n
C26 100uF

1590BB Enclosure Top Mount
6.8” W x 5.8” H



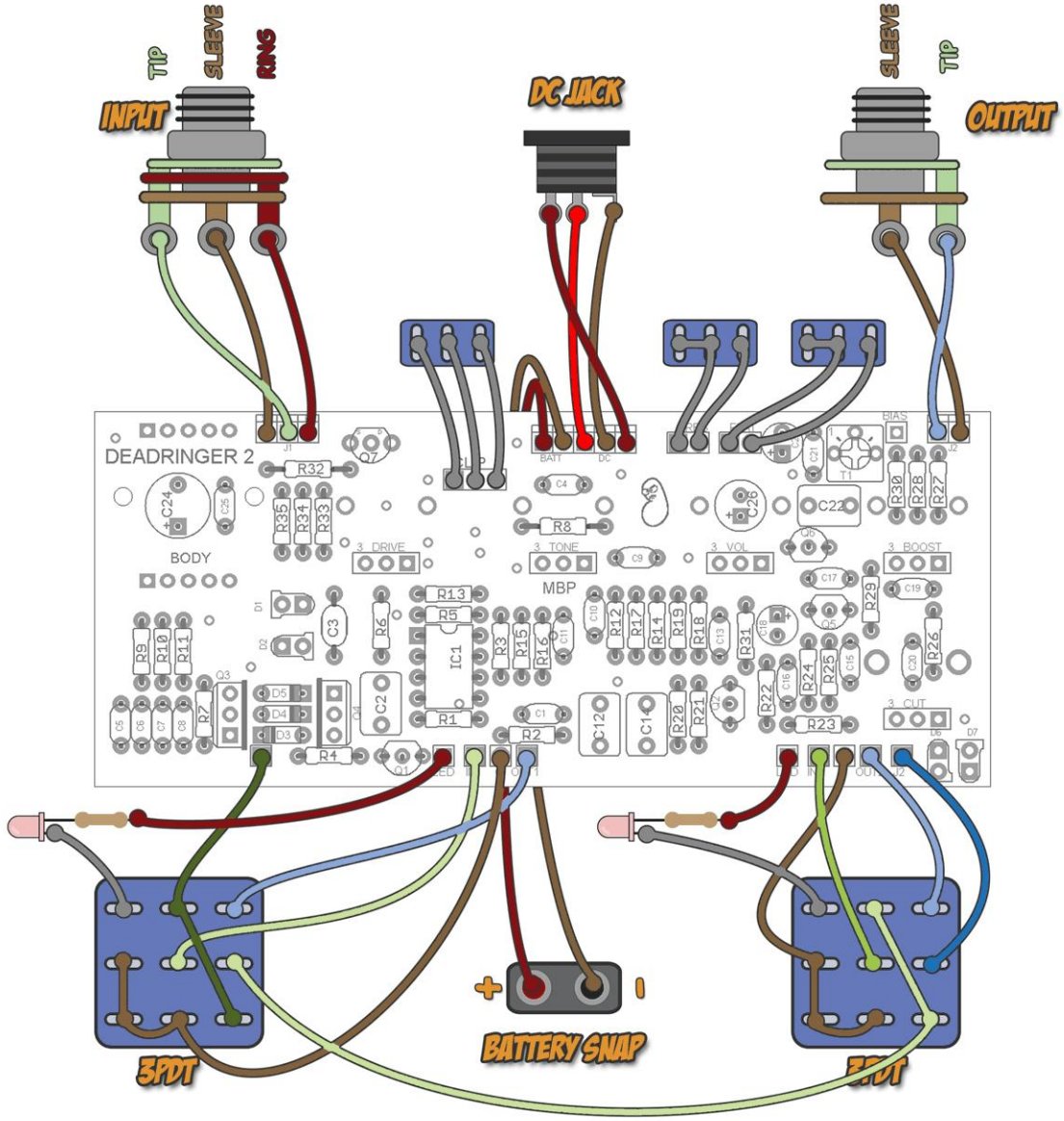
This template is approximate. Using smaller frame/sized jacks is a good idea when doing a top mount drill. I used ones similar to these:
http://www.mouser.com/ProductDetail/Kobiconn/161-MJ159M-EX/?qs=0F0hBdgh9sStuomxdS0hjg%3D%3D

1590BB Enclosure Side Mount
6.8” W x 5.8” H



Download the Photoshop file used for these templates:
http://www.madbeanpedals.com/projects/Deadringer2/Deadringer2_DRILL.zip

Wiring Diagram



Special Notes about the BOM:

There are two different types of pots used in the Deadringer 2

9mm Alpha Right Angle: http://www.smallbearelec.com/servlet/Detail?no=1139
These are used for the two 500kA, 20kW and 100kB pots.

The “Cut” pot is a 50kA 9mm Alpha Right Angle Plastic Shaft pot:
http://www.smallbearelec.com/servlet/Detail?no=1277

Both of these types of pots are also available from Tayda, although I don’t think they have the 20kW. If ordering from Tayda, use a 20kB or 25kB pot for the tone control.

The “Body” switch is a specific 2P4T

http://www.mouser.com/ProductDetail/Alpha-Taiwan/SR1712F-0204-20F0A-N9-N/?qs=sGAEpiMZZMvNbjZ2WlReYqBsoziRjTWUDACTxOT1rRE%3d

Unfortunately, these are not available from smallbear or Tayda. There may be other shops that have them such as Digikey or overseas suppliers. Mouser does have more than enough in stock for this project, though.

This rotary is D-Shaft, but that’s okay: set screw knobs seem to work on it fine.

If you are unable to acquire the rotary indicated check pgs.8-9 of this document where I demonstrate alternatives. You may even prefer the modded way of doing it! The mod requires one of these two parts:

Alpha 9mm Rotary: http://www.smallbearelec.com/servlet/Detail?no=581
or, a 50kB pot: http://www.smallbearelec.com/servlet/Detail?no=693

Everything else in the BOM should be easy to acquire. Good luck!

The Fulltone® Full-Drive™ is arguably one of two pedals (the other being the Klon™) that launched the entire boutique industry we have today. It is a staple on many pedalboards from professionals, weekend warriors, to hobbyist. There are probably as many different opinions on Mike Fuller as there are TGP members, but we don't have to involve ourselves in knitting circle gossip. The fact is that Fulltone® builds some real solid pedals and they are priced very reasonably. So, of course, we DIY'ers want to clone them!

The original Deadringer from way back in 2010 was pretty much that. That project was moderately successful but looking back the PCB design choice was a poor one. It was small, tight and unruly; meant to fit in a 1590B with much cursing. Four years later, I knew that I could do a much better job.

The **Deadringer 2** is NOT a Full-Drive™ clone. Rather, it is what I want the Full-Drive™ to be…the version I want to play. The design objective was to use the first Deadringer as a springboard to expand and broaden it into an "ideal" dual channel overdrive.

- The first "must" was having an independent boost section that can be used without the overdrive. This was accomplished via a straight-forward JFET style booster with a tone cut control.
- Secondly, I wanted to make the clipping choices more disparate. I put in my favorite choices on the **Clip** switch: symmetrical LEDs and asymmetrical mosfets. The LEDs are loud and aggressive. The mosfets are smooth and textured. Just the options I want in an overdrive ☺
- The third objective was more tone shaping ability to account for different types of gear and/or situational needs. The **Body** switch offers four choices of clipped frequencies from the traditional Tube Screamer @ 720Hz down to a very meaty 120Hz. The **Presence** switch was added as a counter-balance to the **Body** switch. It adds in some extra 3kHz clipping; the perfect frequency to liven up single note playing in the upper registers.
- I decided to keep the **Flat** switch from the original Deadringer. This acts as an additional filter in parallel with the tone control to lessen the "mid focus" that so many people complain about with the Tube Screamer and its derivatives. The impact of the Flat switch is subtle, but it can be useful. It is one area where I encourage experimentation with different values. I would start with the ranges of 4n7 – 15n on the cap and 10k -47k on the resistor. The BOM values are pretty middle-of-the-road.
- Lastly, I wanted to address the problem of noise. My experience with TS-style overdrives is that they are on the noisy side. This isn't like fuzz where some amount of noise can be masked by the effect. We want to be able to dial in sweet, sweet overdrive while playing our bitchen' penta-ta-tonic and hypermixurydian scales! First I added a bit more PS filtering…a no-brainer. The second choice was to make the buffers FET instead of BJT. This does indeed seem to lessen the noise floor…at least with the suggested MPF102. Other JFETs may be suitable such as the J201 or 2N5457. I did not try any mosfets, though, so maybe someone else will experiment with a BS170.

With all the design changes in mind, it seemed obvious that this would be a BIG pcb. That's okay: I snorted some magic bean dust and hammered it out. It only took two prototypes to get it right!

(no, I don't snort drugs…geez)

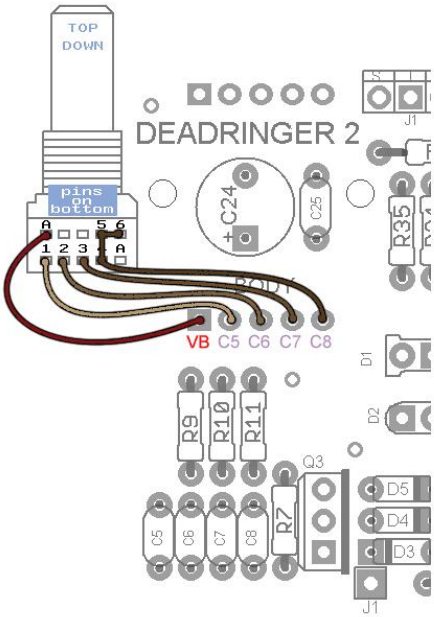
General Notes

- You can run the Deadringer 2 at 18v. Just make sure that you use 25v caps or higher. The higher voltage will give the effect more headroom, and perhaps even more dynamics.
- The **"Bias"** pad on the PCB is for biasing Q5. You can do it by ear or using a DMM. By ear, turn the Boost pot up nearly all the way and adjust T1 for the highest gain. If you use a DMM, ground the black lead and touch the red lead to the Bias pad. Adjust the trimmer to around 4.5v. If you are going to run the Deadrigner 2 at 18v, you might go as high as 6v on the bias. Luckily, it is an easy adjustment if you need to tweak after-the-fact.
- The drilling diagram shows the locations of the two sets of LED clippers in the circuit. If you want to have some fun, externally mount one from each pair. It will light up with the boost and/or overdrive when it clips! You can drill a hole directly beneath the LED so you don't have to wire it or use a bezel.
- If you don't have the IRF510 mosfets for Q3 and Q4, use 2n7000. But, you will need to flip the 2n7000 180° due to the opposing pin-outs.
- The BS250 is used for the polarity protection scheme first proposed by RG Keen on www.geofex.com. It is very robust in that the voltage drop is lower than using the typical series or parallel diode and it will protect your entire circuit from reverse polarity at the same time.
- As mentioned earlier in the doc, I suggest socketing C9 and R12 (the Flat switch) to try different values. This is one where I never really decided, "YES, these are indisputably the best values to use for these two components". Of course, everything else on the Deadringer 2 is perfect… ☺

Rotary Switch Alternatives

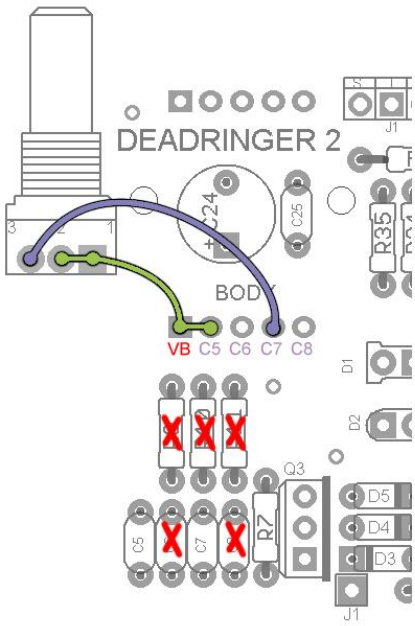
If you are unable to source the rotary listed in the BOM there are a couple alternatives. The first one uses the Alpha 9mm 1P6T that smallbear offers: http://www.smallbearelec.com/servlet/Detail?no=581

This rotary will go in the same position on the "Body" switch and will fit under the PCB. Unfortunately, this rotary has no "stopper" so you cannot limit it to just 4 terminals like we are using. So, we will tie terminal 4-6 together so that they all have the same setting. Wire the rotary as follows:



The second alternative is to set up a control similar to the Bass pot on the Timmy™. It requires only a 50k pot instead of a rotary switch and continuously blends two caps in parallel. However, on the Timmy™ it is set up as a bass cut, and we want it to be a bass boost. So, we will wire it in the opposite direction.

Use a 50kB pot for the bass boost: http://www.smallbearelec.com/servlet/Detail?no=693
For the caps, stick with the 47n on C5. For the large cap, you could go higher than 270n (anywhere between 330n-1uF)…it's entirely up to you. A 1uF would be great for bass players. Whatever you choose put the large cap in the C7 position instead of C8 to allow more room for the component. You will also omit R9, R10 and R11.



Jumper the VB and C5 pads together on the Body switch area and wire that to pins 1 and 2 on the new pot. Wire the C7 pad to pin3 on the pot.

When the pot is fully counter-clockwise, the large cap has 50k of resistance in its path. As the pot is turned up, the resistance is reduced toward "0"Ohm, so the caps are blended together in parallel, thereby increasing the total capacitance.
