GREENBEAN2019

FX TYPE: Overdrive

Based on the Ibanez® Tube Screamer™

Enclosure Size: 1590B, 1590B2, 125B

“Softie” compatibility: Softie1&2

Overview

The GreenBean 2019 is a tweak of the GreenBean projects of old but done in a newly adopted format for mbp designs. The goal was to establish a more consistent look and “design protocol” across all mbp products which allows the builder to put them in different configurations. Like 1590B with side jacks? Can do! Prefer top jacks but still want a small enclosure? Put this in a 1590B2. Like a bit more space and/or want to incorporate relay bypass? The 125B is what you need :)

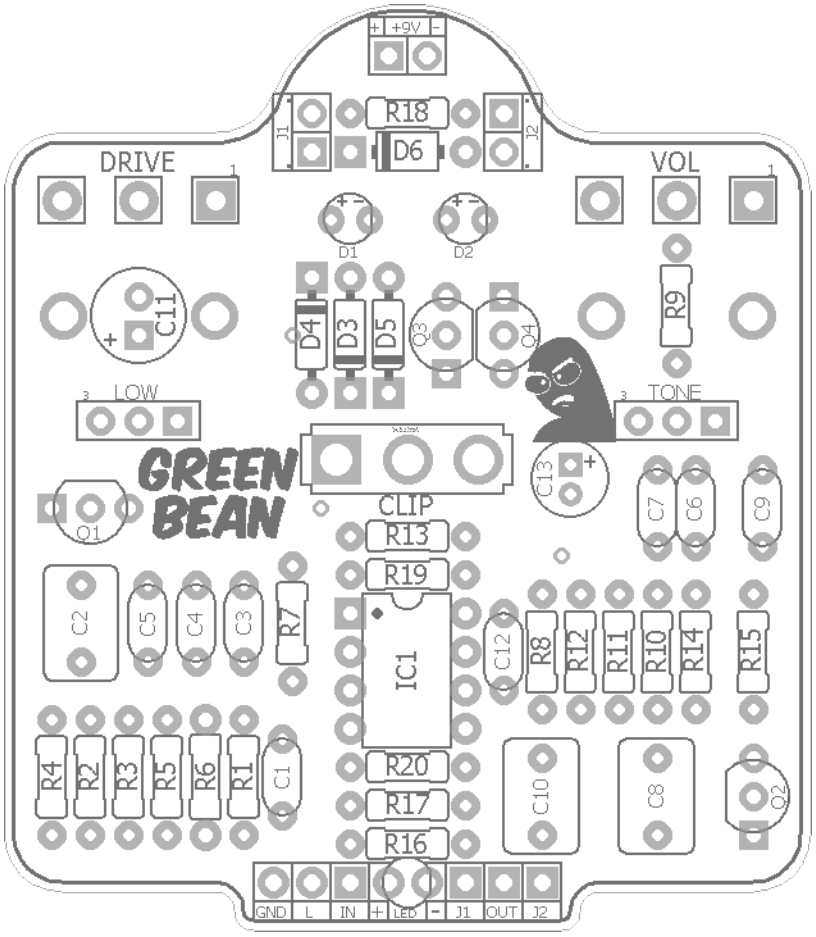
The TS-808/9 really doesn’t need any introduction. It’s the most widely recognized overdrive pedal ever created. Imperfect, maybe; but the basis of hundreds of “also-ran” designs in the pedal world. The GreenBean is not a 100% clone, though. This is DIY and DIY does it better. So, a bit of tweaking has been added with one additional pot and a clipping switch. You can get the classic 808 tone plus much more from the GreenBean 2019.

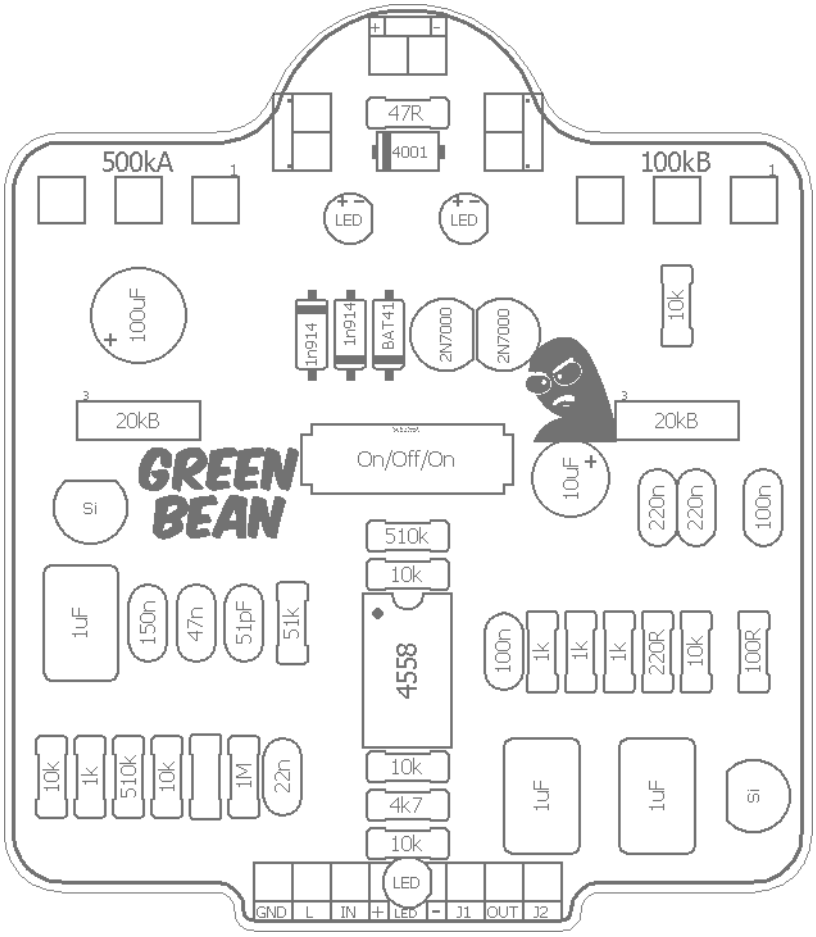
The main consideration in this type of design is that while it will produce a pleasant enough overdrive on its own it really shines when you use lower gain settings through a tube amp on the edge of breakup. The essence of a non-inverting op-amp overdrive is that it mixes clipped signal with a bit of clean signal to produce a nice responsive touch dynamic. When this is combined with harmonically rich tube compression it can produce god-tier overdrive. If you doubt that, realize that SRV famously used a TS-10 (!!) through cranked Fenders to get some of the greatest blues tones on guitar ever achieved. Will the GreenBean give you that? Absolutely not, because you and I are not Stevie Ray Vaughan.

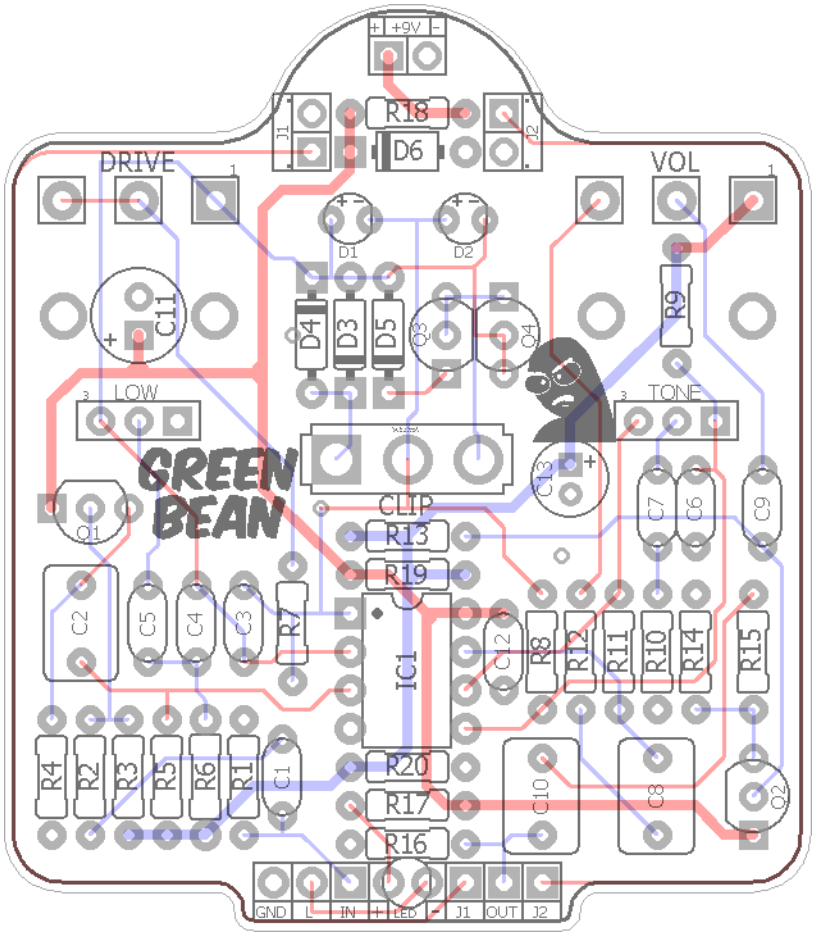
Controls

- **VOL -** Total Output.
- **Drive -** Total Overdrive.
- **Low -** Sets the range of clipped frequencies from the stock 720Hz down to 172Hz.
- **Tone -** Active treble cut/boost.
- **Clip -** Choice of three independent clipping configurations: LED, Si and FET.

Technical assistance for your build(s) is available via the madbeanpedals 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.


+9V
R18
D6
J1
J2
DRIVE
VOL
D1
D2
C11
D4
D3
D5
Q3
Q4
R9
LOW
TONE
GREEN
BEAN
Q1
CLIP
C13
C7
C6
C9
R13
R19
C2
C5
C4
C3
R7
IC1
C12
R8
R12
R11
R10
R14
R15
R4
R2
R3
R5
R6
R1
C1
R20
R17
R16
C10
C8
Q2
GND
L
IN
+
LED
-
J1
OUT
J2


47R
4001
500kA
100kB
LED
LED
100uF
1n914
1n914
BAT41
2N7000
2N7000
10k
20kB
20kB
GREEN BEAN
On/Off/On
10uF
220n
220n
100n
Si
510k
10k
1uF
150n
47n
51pF
51k
4558
100n
1k
1k
1k
220R
10k
100R
10k
1k
510k
10k
1M
22n
10k
4k7
10k
1uF
1uF
Si
LED
GND
L
IN
+
LED
-
J1
OUT
J2


+9V
R18
D6
J1
J2
DRIVE
VOL
D1
D2
C11
D4
D3
D5
Q3
Q4
R9
LOW
TONE
GREEN
BEAN
CLIP
C13
C7
C6
C9
Q1
R13
R19
C2
C5
C4
C3
R7
IC1
C12
R8
R12
R11
R10
R14
R15
R4
R2
R3
R5
R6
R1
C1
R20
R17
R16
C10
C8
Q2
GND
IN
LED
J1
OUT
J2

Resistors		Caps		Diodes	
R1	1M	C1	22n	D1, D2	LED
R2	1k	C2	1uF	D3, D4	1n914
R3	510k	C3	51pF	D5	BAT41
R4	10k	C4	47n	D6	1N4001
R5	10k	C5	150n	Transistors	
R6	4k7	C6	220n	Q1, Q2	Si
R7	51k	C7	220n	Q3, Q4	2N7000
R8	1k	C8	1uF	IC	
R9	10k	C9	100n	IC1	4558
R10	220R	C10	1uF	Switch	
R11	1k	C11	100uF	CLIP	On/Off/On
R12	1k	C12	100n	Pots	
R13	510k	C13	10uF	LOW	20kB
R14	10k			TONE	20kB
R15	100R			VOL	100kB
R16	10k			DRIVE	500kA
R17	4k7				
R18	47R				
R19	10k				
R20	10k				

Value	QTY	Type	Rating
47R	1	Metal / Carbon Film	1/4W
100R	1	Metal / Carbon Film	1/4W
220R	1	Metal / Carbon Film	1/4W
1k	4	Metal / Carbon Film	1/4W
4k7	2	Metal / Carbon Film	1/4W
10k	7	Metal / Carbon Film	1/4W
51k	1	Metal / Carbon Film	1/4W
510k	2	Metal / Carbon Film	1/4W
1M	1	Metal / Carbon Film	1/4W
51pF	1	Ceramic, MLCC, Mica	25v min.
22n	1	Film	25v min.
47n	1	Film	25v min.
100n	2	Film	25v min.
150n	1	Film	25v min.
220n	2	Film	25v min.
1uF	3	Film	25v min.
10uF	1	Electrolytic	25v min.
100uF	1	Electrolytic	25v min.
LED	2	Red, Diffused	3 or 5mm
1n914	2		
BAT41	1	or, 1n34a	
1N4001	1		
Si	2	MPSA18, 2n3904, BC550, etc	
2N7000	2		
4558	1	or, other dual op-amp	
On/Off/On	1	Solder Lug	
20kB	2	PCB Mount Right Angle, Plastic Shaft	9mm
100kB	1	PCB Mount Right Angle	16mm
500kA	1	PCB Mount Right Angle	16mm

BAT41: http://smallbear-electronics.mybigcommerce.com/diode-schottky-bat41/

MPSA18: http://smallbear-electronics.mybigcommerce.com/transistor-mpsa18/

These are the original transistors used in the TS. They have an ECB pinout so if you use them you will need to bend the transistors leads around a bit to fit the EBC pinout on the GreenBean PCB.
2SC1815: http://smallbear-electronics.mybigcommerce.com/transistor-2sc1815-gr/

2n7000: http://smallbear-electronics.mybigcommerce.com/transistor-fet-2n7000/

4558: http://smallbear-electronics.mybigcommerce.com/ic-rc4558p/

On/Off/On: http://smallbear-electronics.mybigcommerce.com/spdt-short-lever-center-off/

20kB: https://www.taydaelectronics.com/potentiometer-variable-resistors/rotary-potentiometer/linear/20k-ohm-linear-taper-potentiometer-round-knurled-plastic-shaft-pcb-9mm.html

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You can use 25kB in place of the 20kB.
25kB: http://smallbear-electronics.mybigcommerce.com/alpha-single-gang-9mm-right-angle-pc-mount-w-knurled-plastic-shaft/

100kB, 500kA: http://smallbear-electronics.mybigcommerce.com/alpha-single-gang-16mm-right-angle-pc-mount/

Thinline DC Jack:
http://smallbear-electronics.mybigcommerce.com/dc-power-jack-all-plastic-unswitched-2-1-mm/

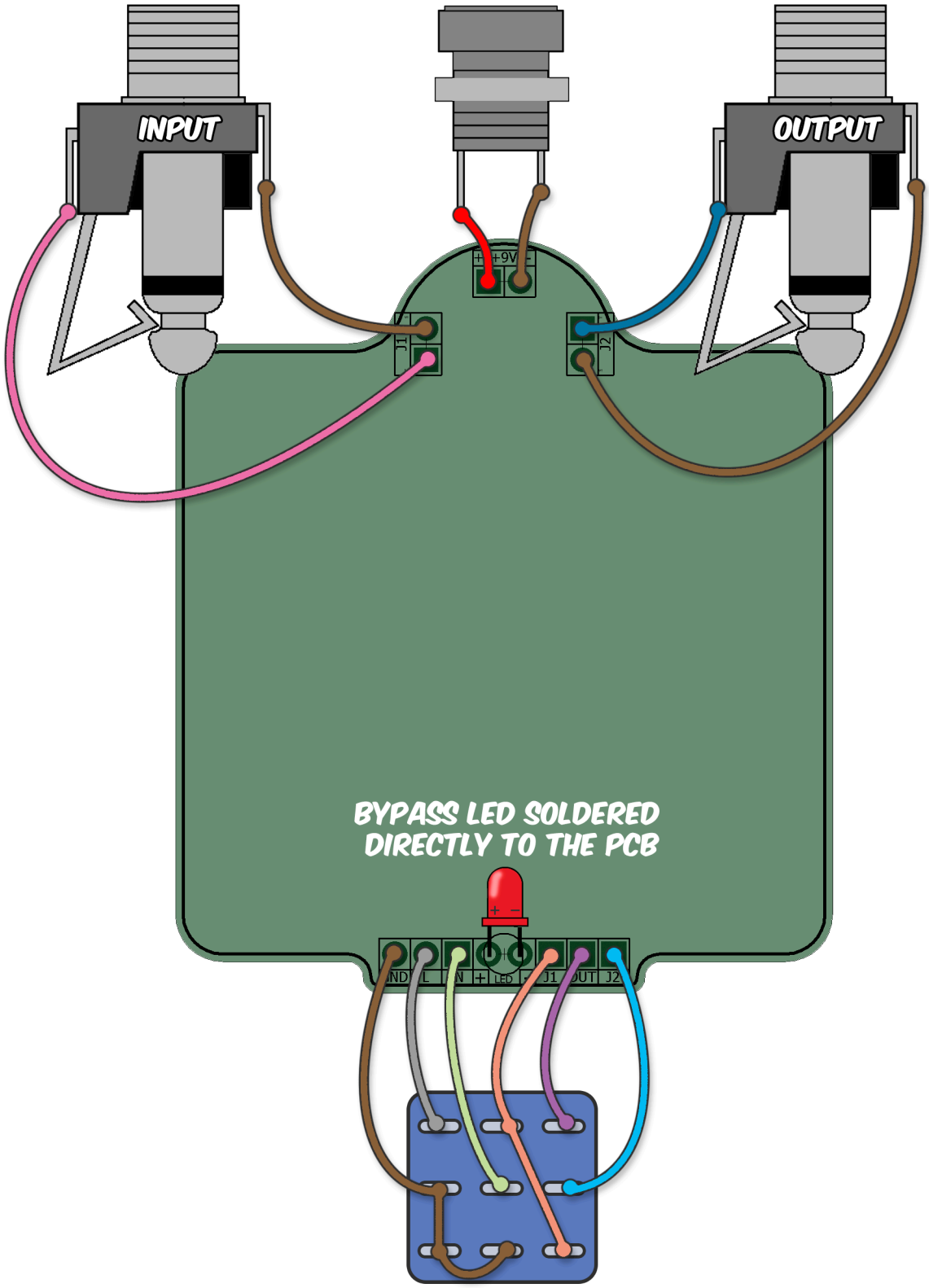
Enclosed Mono:
http://smallbear-electronics.mybigcommerce.com/1-4-in-mono-enclosed-jack/
http://smallbear-electronics.mybigcommerce.com/1-4-in-mono-enclosed-switchcraft-111x/

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

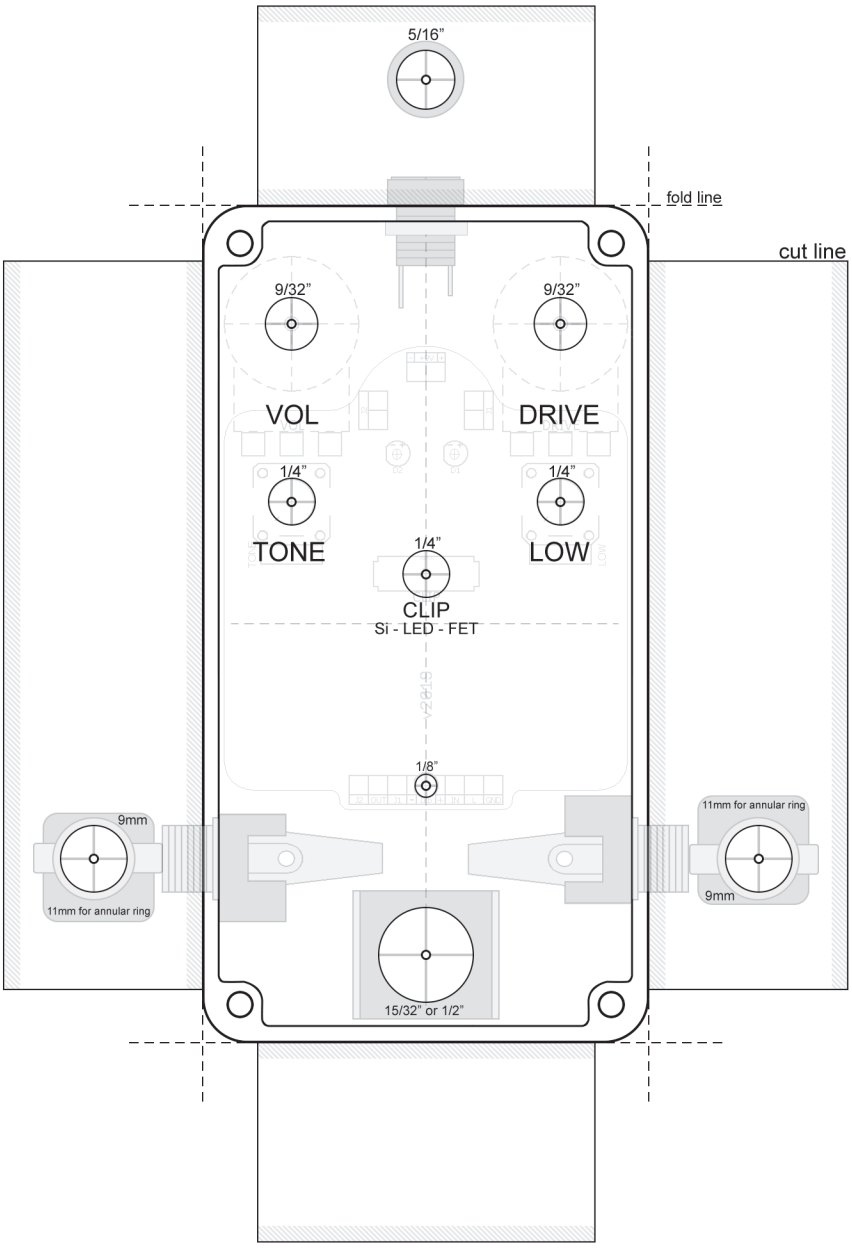
- The GreenBean2019 uses a 20kB (or 25kB) pot for the tone control instead of the stock 20kW in the Tube Screamer. This is simply because that taper is not available in the 9mm pot used in this build. You can use one of the 16mm 20kW pots for the tone if you want, but you will need to move the drill spot for the control to accommodate the larger size pot. Keep in mind you can still get the same range from either but the feel is a bit different and the same settings will be in slightly different places due to the different tapers.

- Of course, there are dozens of different ICs you can try in place of the 4558 and it's a fun thing to experiment with. Some possibilities are the 4559, 4580DD, LM1458, OPA2134a and LM833. Plus many more.

- You can also try different diodes (sockets would be a good idea). Some alternate choices would be 1N4001, 1n34a, multiple 1n914 in series, etc. As is, the stock GreenBean diodes give a good range of tones. The LEDs are pretty crunchy, the 1n914 are smooth, and the FETs are maybe a bit in-between (a bit louder than 1n914 and more asymmetrical).

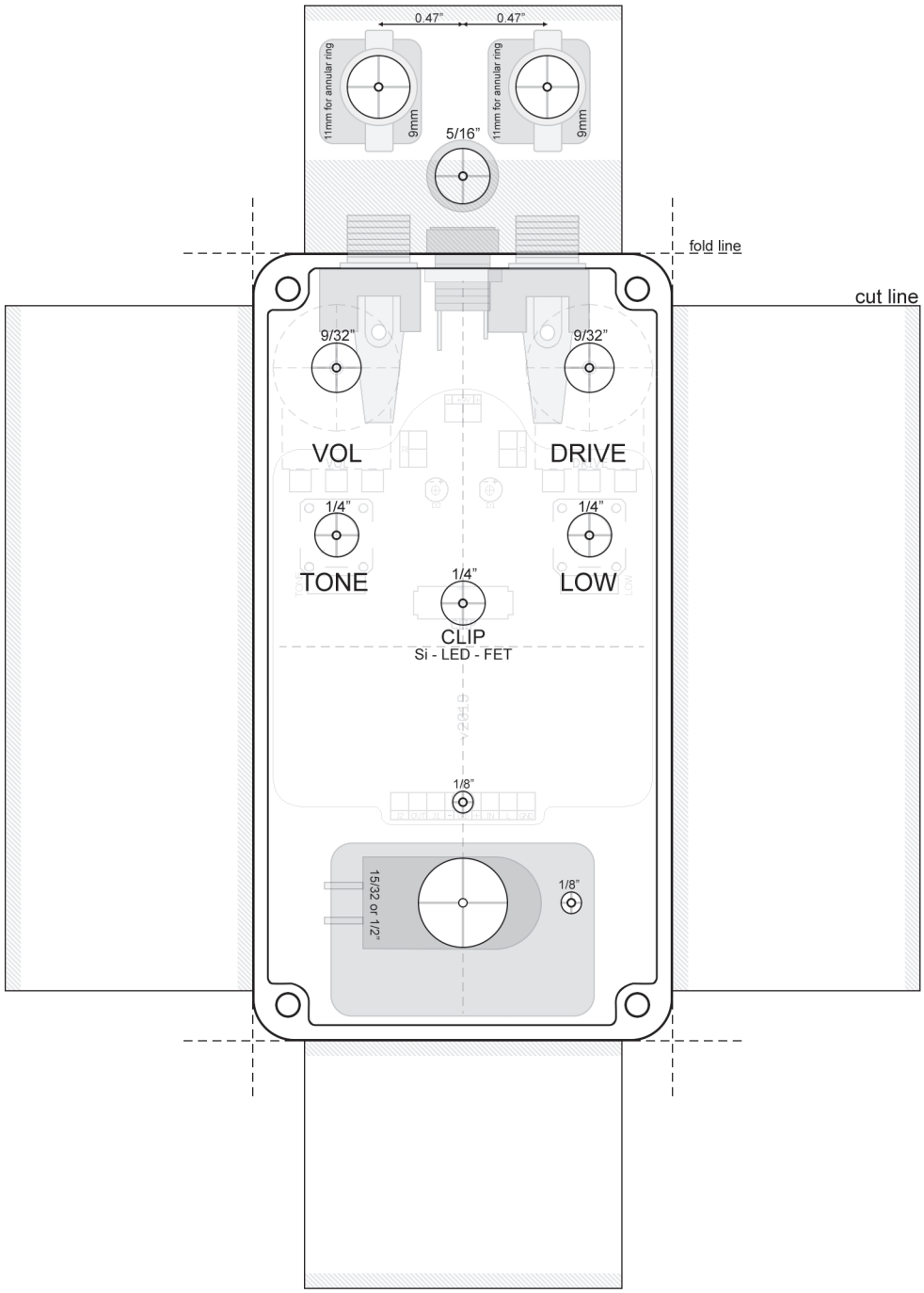

INPUT
OUTPUT
+9V
J1
J2
BYPASS LED SOLDERED
DIRECTLY TO THE PCB
LED
J1
J2

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



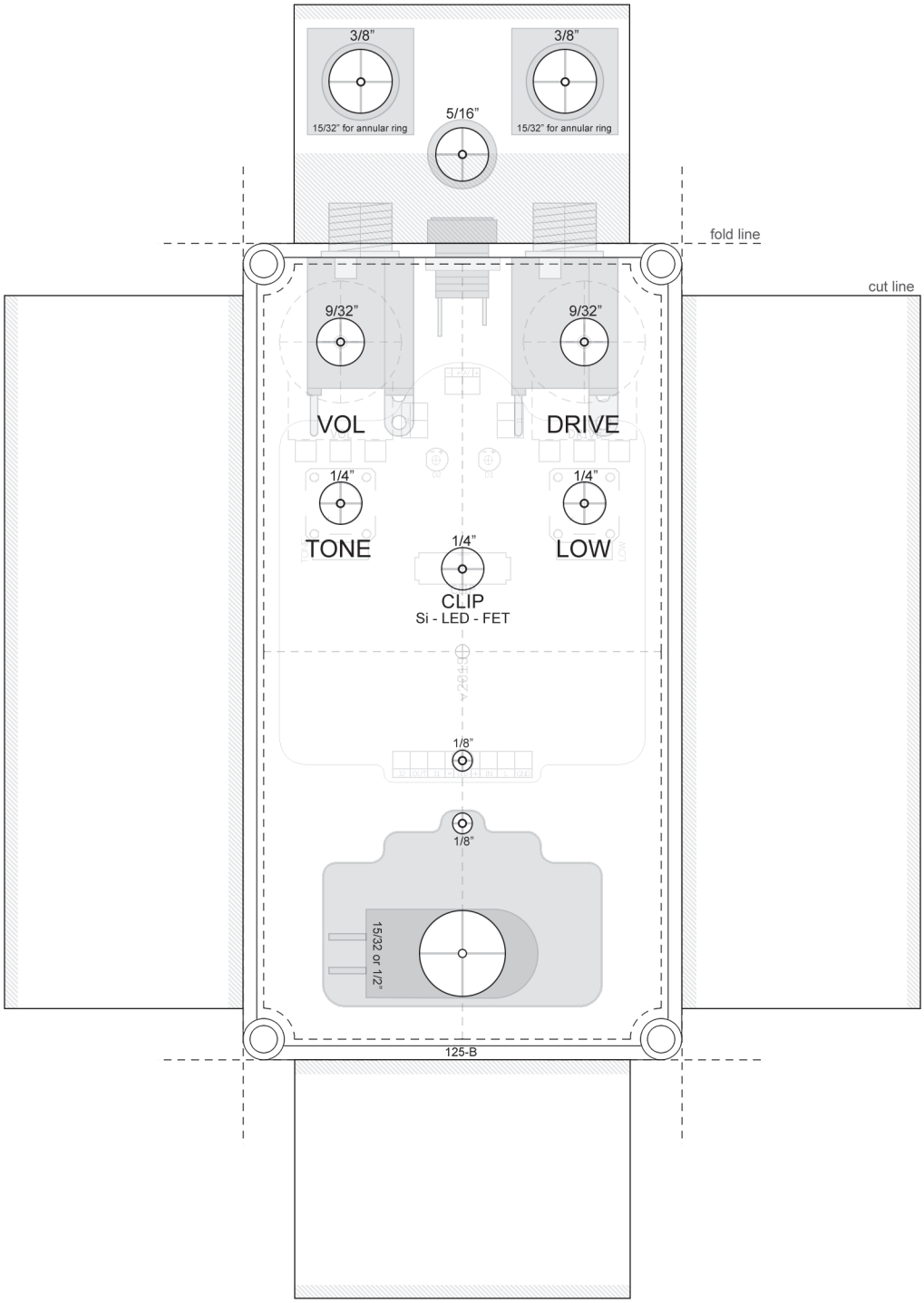
- This is a tight fit, but should work if you use the Lumberg style 1/4” jacks.
- I don’t recommend using any of the mbp 3pdt boards for this enclosure.

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.

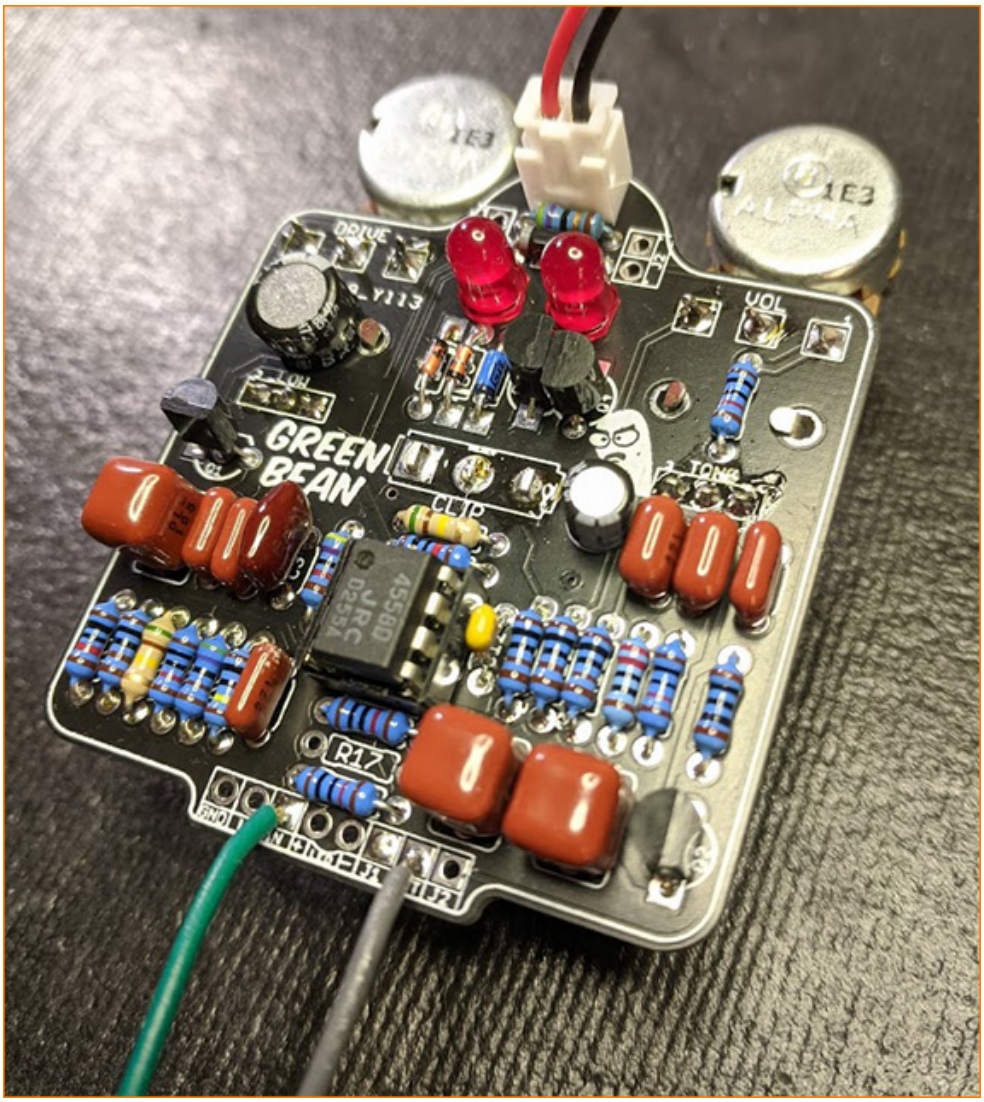
Note: *Drill Guides are approximate and may require tweaking depending on the types of jacks, switches and pots you use.*



- 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.

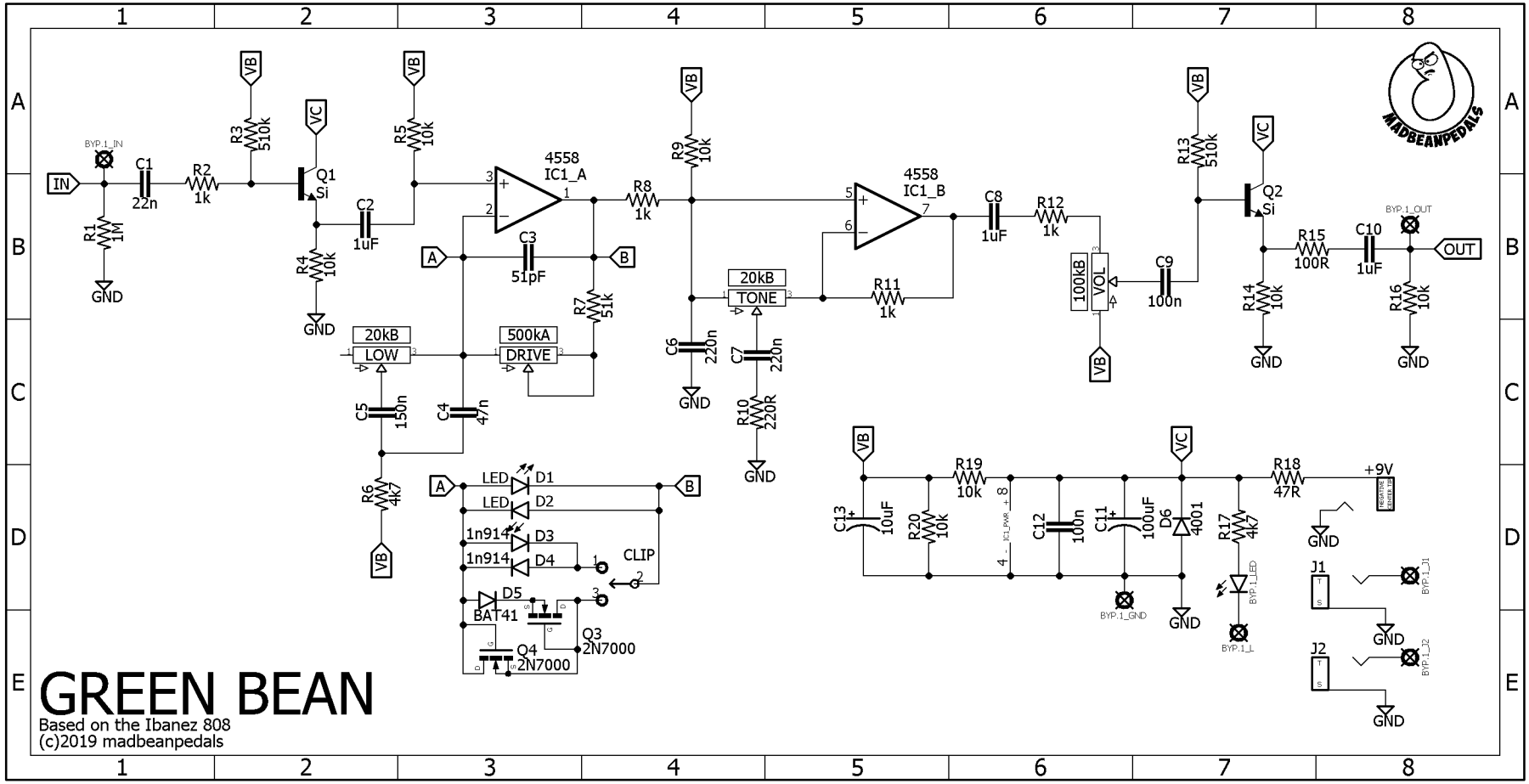
Q1	DC	IC1	DC
C	9.13	1	4.54
B	3.7	2	4.54
E	3.27	3	4.51
		4	0
Q2	**DC**	5	4.51
C	9.13	6	4.52
B	3.68	7	4.53
E	3.22	8	9.13

- 9.42vDC One Spot
- Current Draw ~ 5mA
- The 2n7000 are used as clippers and will sit at about 4.5v on each pin.



- I used BC550 for my transistors which is why they are facing the opposite way.

- BTW - the red LEDs don't light up so don't go putting them on the outside of the enclosure thinking you are going to get a light show!


GREEN BEAN
Based on the Ibanez 808
(c)2019 madbeanpedals
MADBEANPEDALS
IN
OUT
BYP.1_IN
BYP.1_OUT
BYP.1_GND
BYP.1_J1
BYP.1_J2
BYP.1_LED
4558
IC1_A
IC1_B
IC1_PWR
Q1
Si
Q2
Si
Q3
2N7000
Q4
2N7000
D1
LED
D2
LED
D3
1n914
D4
1n914
D5
BAT41
D6
4001
CLIP
20kB
LOW
500kA
DRIVE
20kB
TONE
100kB
VOL
R1
1M
R2
1k
R3
510k
R4
10k
R5
10k
R6
4k7
R7
51k
R8
1k
R9
10k
R10
220R
R11
1k
R12
1k
R13
510k
R14
10k
R15
100R
R16
10k
R17
4k7
R18
47R
R19
10k
R20
10k
C1
22n
C2
1uF
C3
51pF
C4
47n
C5
150n
C6
220n
C7
220n
C8
1uF
C9
100n
C10
1uF
C11
100uF
C12
100n
C13
10uF
VB
VC
GND
+9V
J1
J2
A
B
1
2
3
4
5
6
7
8
A
B
C
D
E