PORK BARREL 2019

FX TYPE: Modulation

Based on the Boss® CE-2™

New for 2019

The 2019 version is the same basic circuit as before but has an optional Blend control added. This control allows you to blend between dry, chorus and vibrato effects. The Blend control is implemented with minimal modification in mind. If you want to build a traditional CE-2 only, simply omit the Blend pot. Not other changes are necessary.

Overview

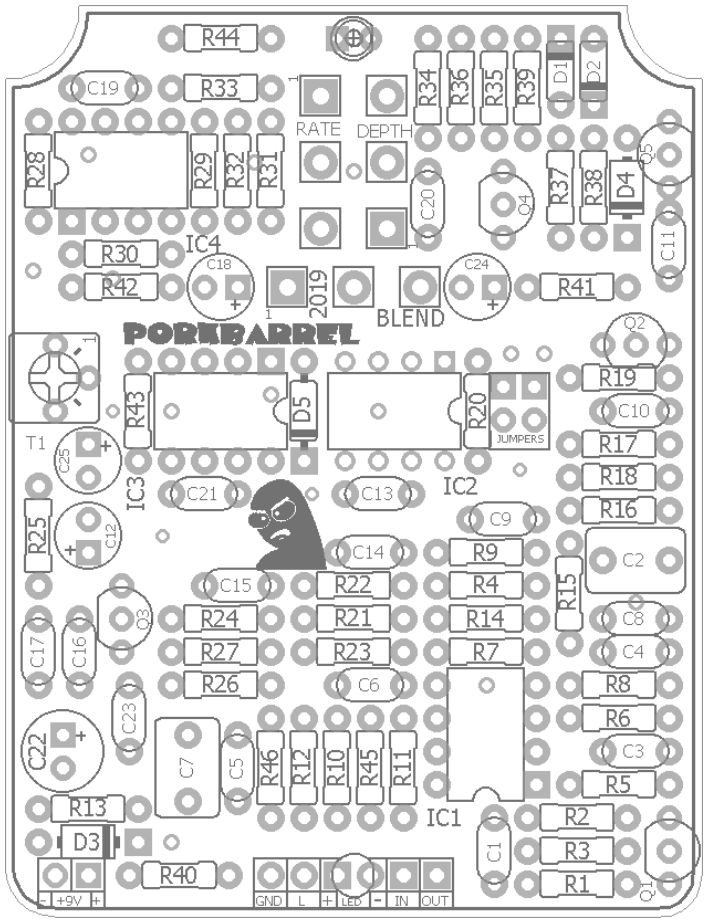
The Pork Barrel is a clone of the classic Boss® CE-2™. The CE-2™ has a signature sound and been a staple of many guitar and bass pedal boards for decades. Next to the EHX Small Clone, it is one of the most instantly recognizable chorus effects out there. Even if you don't like chorus, this is one of the best analog ones ever made.

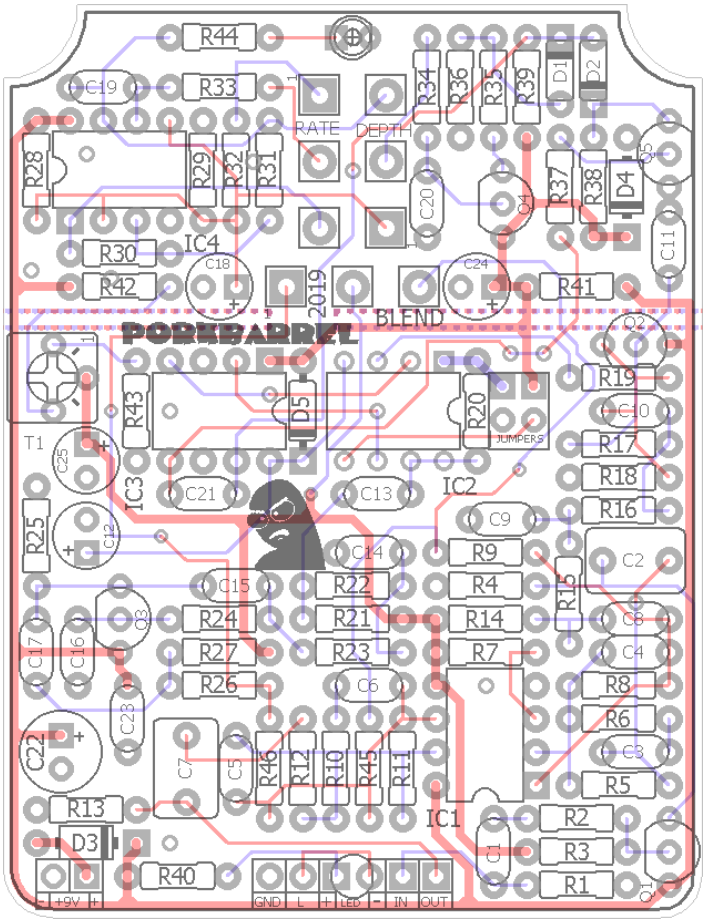
The Pork Barrel is designed to utilize several different BBD types depending on availability and price. Minimal modifications are required to set the build up for these different BBDs, and this will be explained in detail later on in this document.

Controls

- **RATE:** Chorus speed from slow to fast.
- **DEPTH:** Chorus depth from min to max.
- **BLEND:** Mix of dry, chorus and vibrato. CCW is dry (no modulation), 1/4 up to middle is chorus and fully CW is vibrato.
- **T1:** Sets he bias of the chorus effect.

Layout &Traces





B.O.M.

Resistors		Resistors		Caps		Diodes	
R1	1M	R31	33k	C1	47n	D1	1n914
R2	1k	R32	10k	C2	1uF	D2	1n914
R3	470k	R33	1M	C3	6n8	D3	1N5817
R4	10k	R34	220k	C4	100pF	D4	*see notes
R5	47k	R35	4k7	C5	100pF	D5	omit
R6	10k	R36	4k7	C6	6n8	Transistors	
R7	10k	R37	33k	C7	1uF	Q1 - Q5	2N5088
R8	47k	R38	2k7	C8	33n	IC	
R9	27k	R39	150k	C9	3n3	IC1	4558
R10	10k	R40	4k7	C10	8n2	IC2	BBD
R11	47k	R41	33R	C11	470pF	IC3	CLOCK
R12	470R	R42	4k7	C12	1uF	IC4	TL062
R13	100k	R43	4k7	C13	33n	Trimmer	
R14	100k	R44	10k	C14	3n3	T1	10k
R15	10k	R45	20k	C15	8n2	Pots	
R16	10k	R46	20k	C16	470pF	DEPTH	100kB
R17	10k			C17	33n	RATE	100kB
R18	10k			C18	47uF	BLEND	50kC
R19	4k7			C19	100n		
R20	56k			C20	10n		
R21	330k			C21	47pF		
R22	10k			C22	100uF		
R23	10k			C23	100n		
R24	10k			C24	47uF		
R25	10k			C25	47uF		
R26	27k						
R27	1M						
R28	10k						
R29	10k						
R30	47k						

Shopping List

Value	QTY	Type	Rating
33R	1	Metal / Carbon Film	1/4W
470R	1	Metal / Carbon Film	1/4W
1k	1	Metal / Carbon Film	1/4W
2k7	1	Metal / Carbon Film	1/4W
4k7	6	Metal / Carbon Film	1/4W
10k	16	Metal / Carbon Film	1/4W
20k	2	Metal / Carbon Film	1/4W
27k	2	Metal / Carbon Film	1/4W
33k	2	Metal / Carbon Film	1/4W
47k	4	Metal / Carbon Film	1/4W
56k	1	Metal / Carbon Film	1/4W
100k	2	Metal / Carbon Film	1/4W
150k	1	Metal / Carbon Film	1/4W
220k	1	Metal / Carbon Film	1/4W
330k	1	Metal / Carbon Film	1/4W
470k	1	Metal / Carbon Film	1/4W
1M	3	Metal / Carbon Film	1/4W
47pF	1	MLCC / MICA	25v min.
100pF	2	Ceramic / MLCC	25v min.
470pF	2	Ceramic / MLCC	25v min.
3n3	2	Film	25v min.
6n8	2	Film	25v min.
8n2	2	Film	25v min.
10n	1	Film	25v min.
33n	3	Film	25v min.
47n	1	Film	25v min.
100n	2	Film	25v min.
1uF	2	Film	25v min.
1uF	1	Electrolytic	25v min.
47uF	3	Electrolytic	25v min.
100uF	1	Electrolytic	25v min.
1n914	2		
1N5817	1		
Zener	1	*see notes	
2N5088	5		
4558	1		
BBD	1	*see notes	
CLOCK	1	*see notes	
TL062	1		
10k	1	Bourns 3362p	
100kB	2	Right Angle, PCB Mount	16mm
50kC	1	Right Angle, PCB Mount	16mm

Parts Guide

9.1v Zener:
http://smallbear-electronics.mybigcommerce.com/diode-zener-1n4739a/

12v Zener:
http://smallbear-electronics.mybigcommerce.com/diode-zener-1n4742a/

MN3007:
http://smallbear-electronics.mybigcommerce.com/ic-mn3007/

MN3101 (currently out of stock):
http://smallbear-electronics.mybigcommerce.com/ic-mn3101/

BL3207:
http://smallbear-electronics.mybigcommerce.com/ic-bl3207/

BL3102:
http://smallbear-electronics.mybigcommerce.com/ic-bl3102/

v3207:
http://smallbear-electronics.mybigcommerce.com/ic-v3207d/

v32012:
http://smallbear-electronics.mybigcommerce.com/ic-v3102d/

TL062:
http://smallbear-electronics.mybigcommerce.com/ic-tl062/

Bourns 10k trimpot:
https://www.mouser.com/ProductDetail/Bourns/3362P-1-103LF?qs=sGAEpiMZZMvygUB3GLcD7k%252Bod3ZqvEIQboR-RPdOKB6M%3D

https://www.taydaelectronics.com/potentiometer-variable-resistors/cermet-potentiometers/3362p/10k-ohm-trimmer-potentiometer-cermet-1-turn-3362p.html

16mm PCB Mount pots:
http://smallbear-electronics.mybigcommerce.com/alpha-single-gang-16mm-right-angle-pc-mount/

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

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

Notes

What are the advantages of the different BBDs?

The vintage unit used the MN3007. You can safely use 9 – 12v DC to power the effect, with the higher voltage providing a small amount of additional headroom. Note that if you use 12v, you will want it to be well regulated either by your power supply, or by using a charge pump like the Road Rage. Anything over 12v will not work for this design. It may be possible to mod the circuit for 15v operation but I've never tried it so I cannot advise on what exactly to change.

The MN3207, v3207 and BL3207 have lower current requirements, are less expensive and easier to source. These BBDs should not be operated at higher than 9vDC. IMO, there is little to no difference in the different BBD types for the CE-2™.

BBD Chart

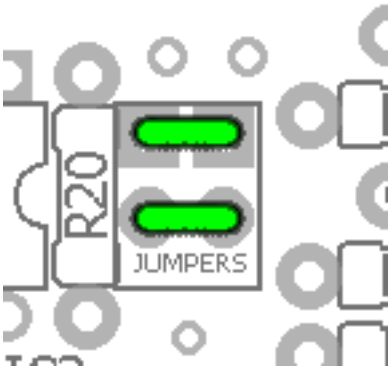
These are the combinations of BBD and clocks you can use when building the Pork Barrel.

IC2 (BBD)	IC3 (Clock)	Zener (D4)	Max Power
MN3007	MN3101	12v or 15v	12v
MN3207	MN3102	9.1v	9v
BL3207	BL3102	9.1v	9v
v3207	v3102	9.1v	9v

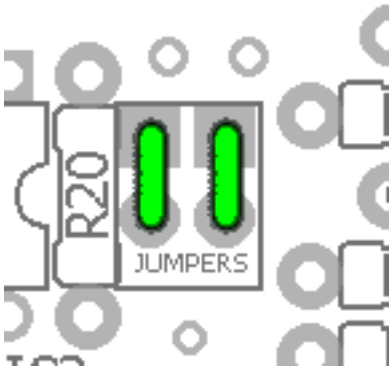
Jumpers

You must set one pair of jumpers on the Pork Barrel PCB to correspond to the type of BBD you are using. These jumpers determine which pins get power and ground, and sets R20 to be a pull-up or pull-down resistor.

MN3007



MN3207, v3207, BL3207



Biasing

Biasing the Pork Barrel is very straight forward. Set your Rate knob to its midpoint and the Depth knob to maximum. Adjust the T1 trimmer until you get the maximum chorus effect with minimal distortion. That's it!

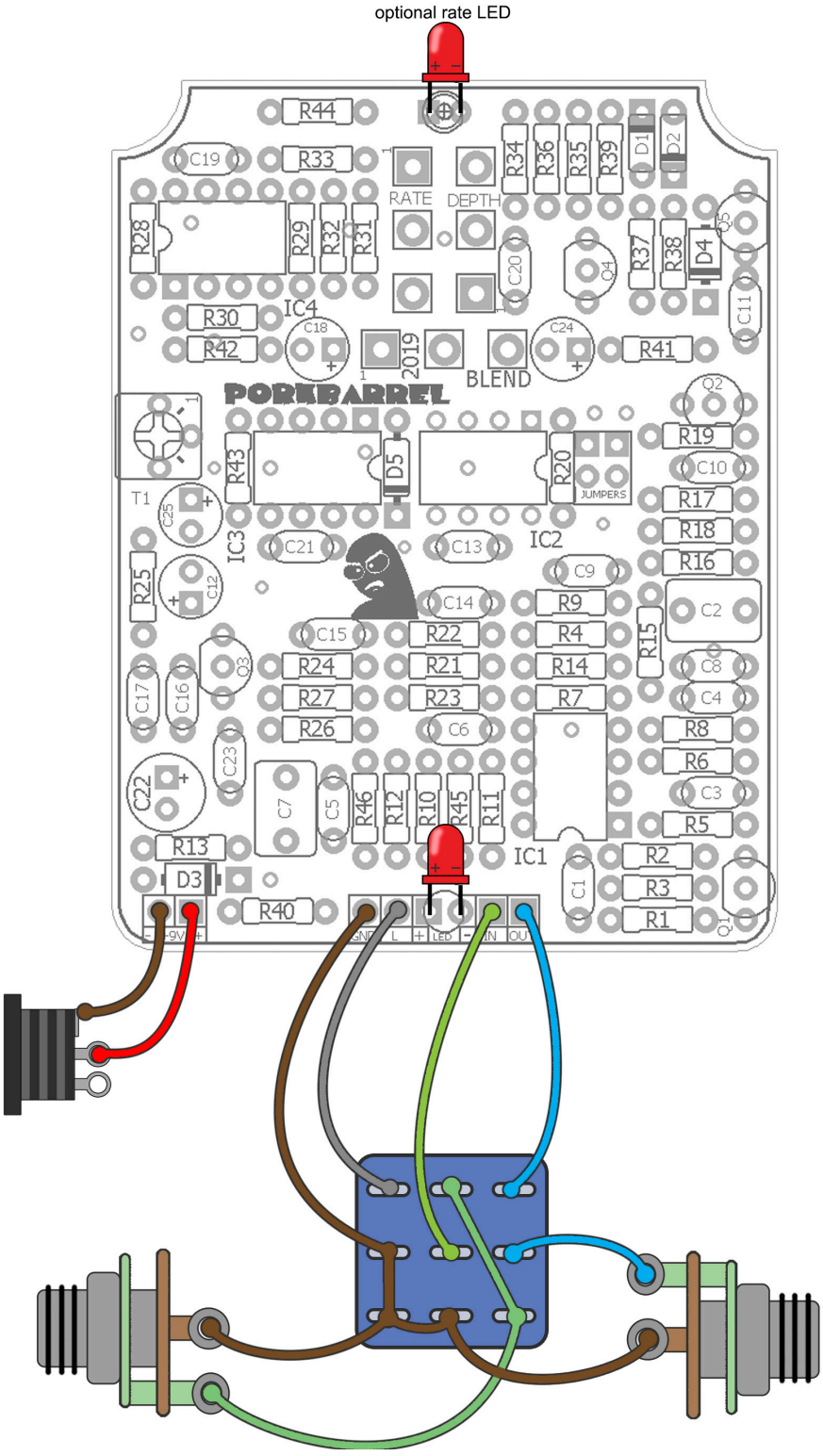
Blend Pot

You can omit the Blend control by simply not soldering in the pot. This gives you chorus only and is exactly like the previous versions of the Pork Barrel.

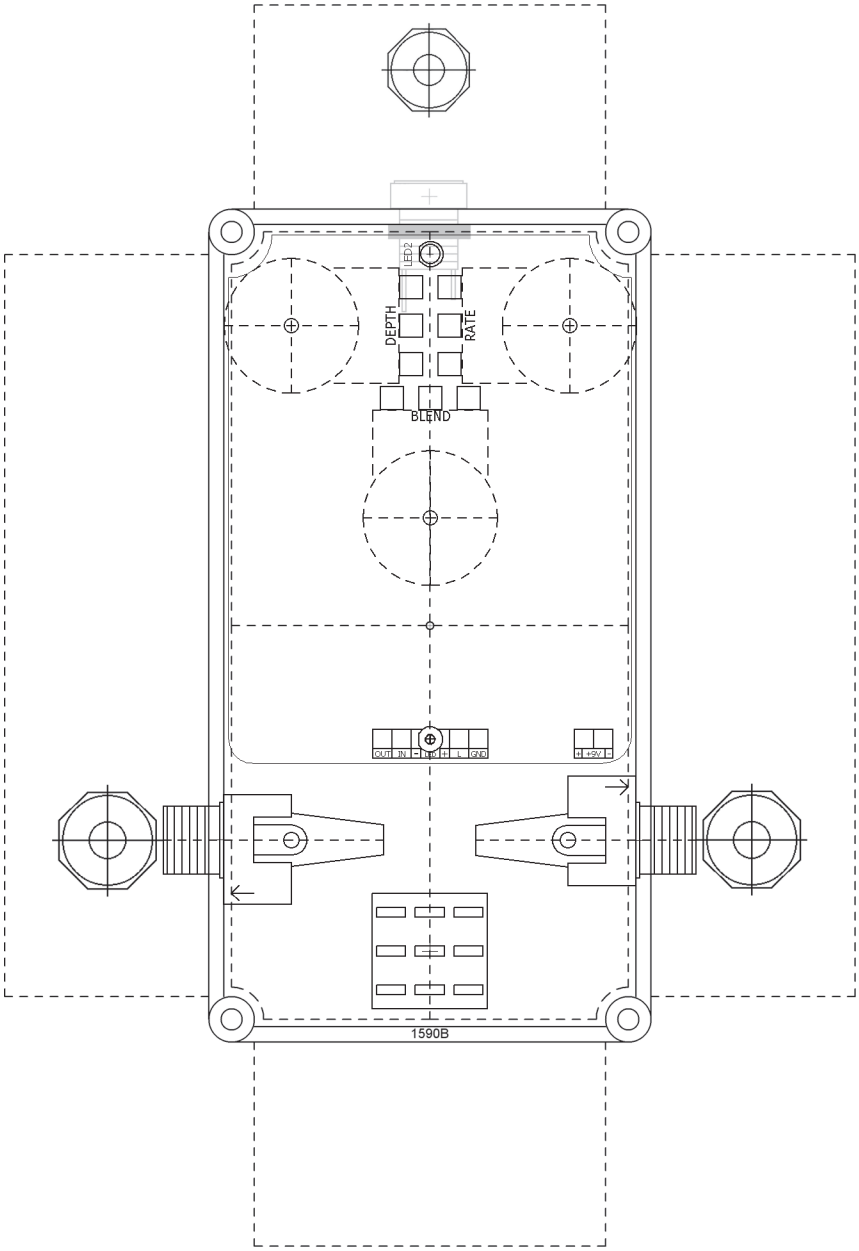
Speed Mod

Because the CE-2 was not designed to be a vibrato, its overall speed range is not ideal for that type of effect (assuming you like really fast vibrato). You can modify the LFO to get a much faster max speed but it comes with the caveat of shifting the slowest speed forward as well. If you want to try different speed ranges, socket R33. Try a 470k or 680k there (lower values means faster speeds). Check the new range with both the Chorus and Vibrato settings on the Blend pot to see if you like it. FYI: a different way to modify the range is leave R33 at 1M and change C19 to 82n or 68n.

Wiring

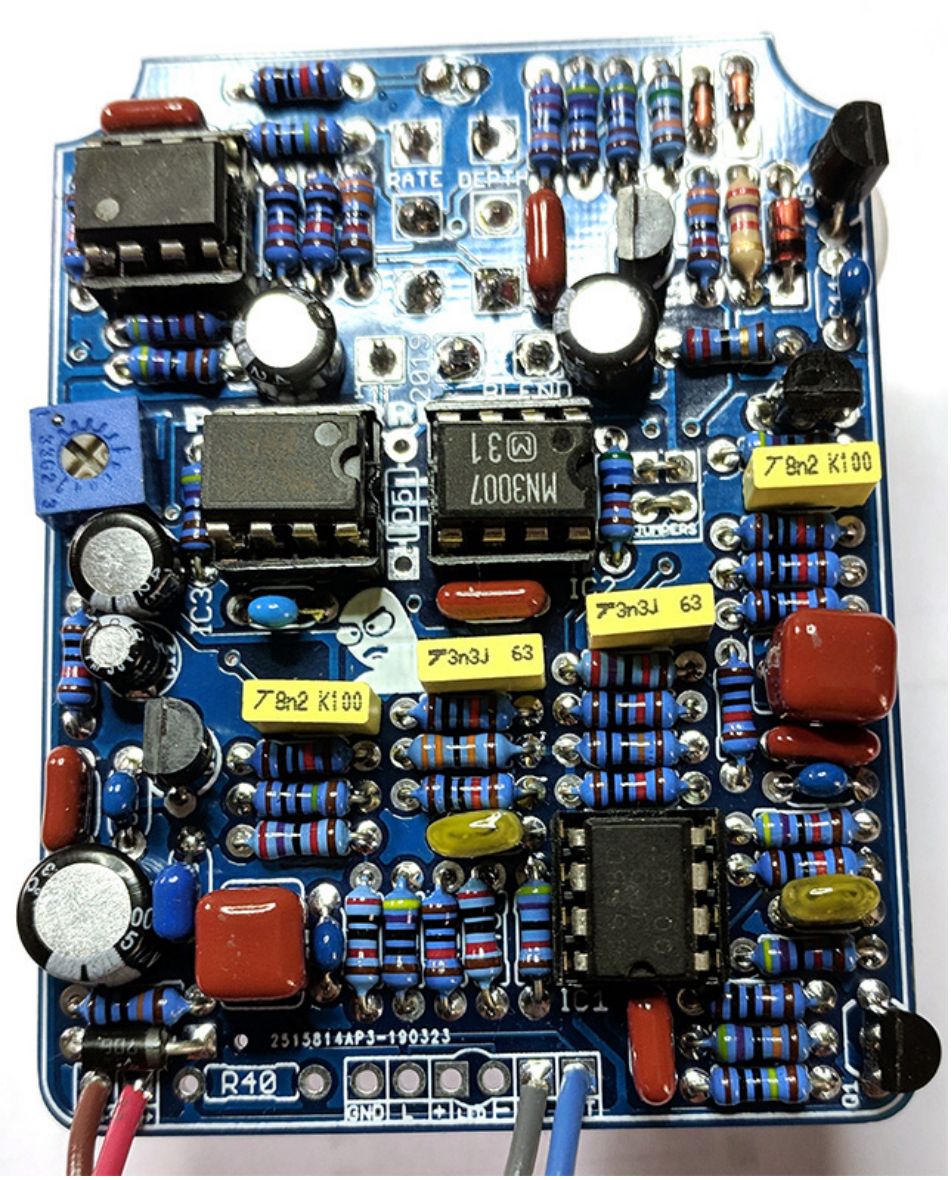

optional rate LED
R44
C19
R33
RATE
DEPTH
R34
R36
R35
R39
D1
D2
R28
R29
R32
R31
C20
Q4
R37
R38
D4
C11
IC4
R30
R42
C18
2019
C24
R41
BLEND
PORKBARREL
Q2
R19
C10
R17
R18
R16
T1
R43
D5
R20
JUMPERS
C25
IC3
C21
C13
IC2
R25
C12
C9
C14
R9
C2
C15
R22
R4
R15
R24
R21
R14
C8
Q3
C17
C16
R27
R23
R7
C4
R26
C6
R8
C23
R6
C22
C7
C5
R46
R12
R10
R45
R11
C3
R5
R13
IC1
R2
D3
C1
R3
R40
R1
Q1
-9V+
GND
L
+
LED
-
IN
OUT

1590B Drill Guide



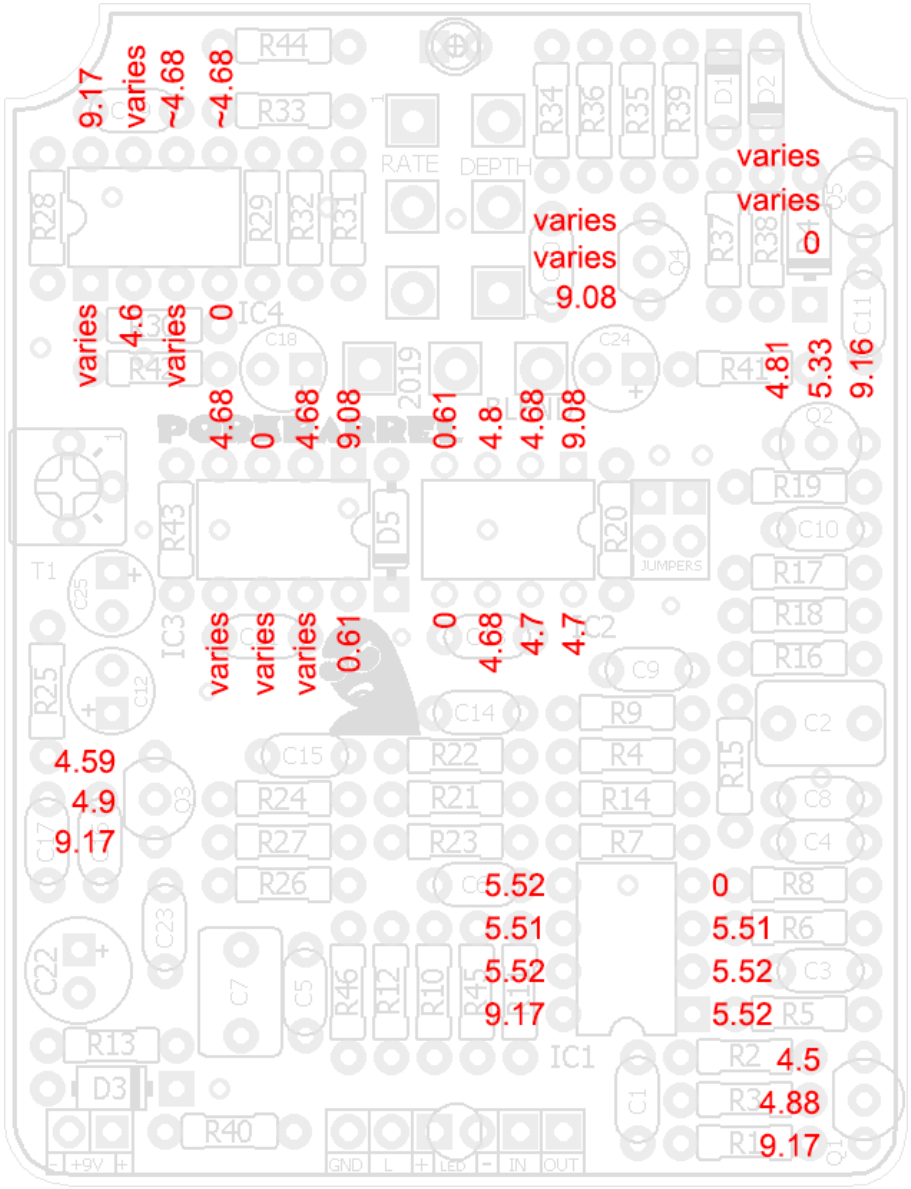
I recommend using the smaller Lumberg style jacks for the input, output and DC jacks on this build. It's a tight fit in the 1590B.

Build Pic



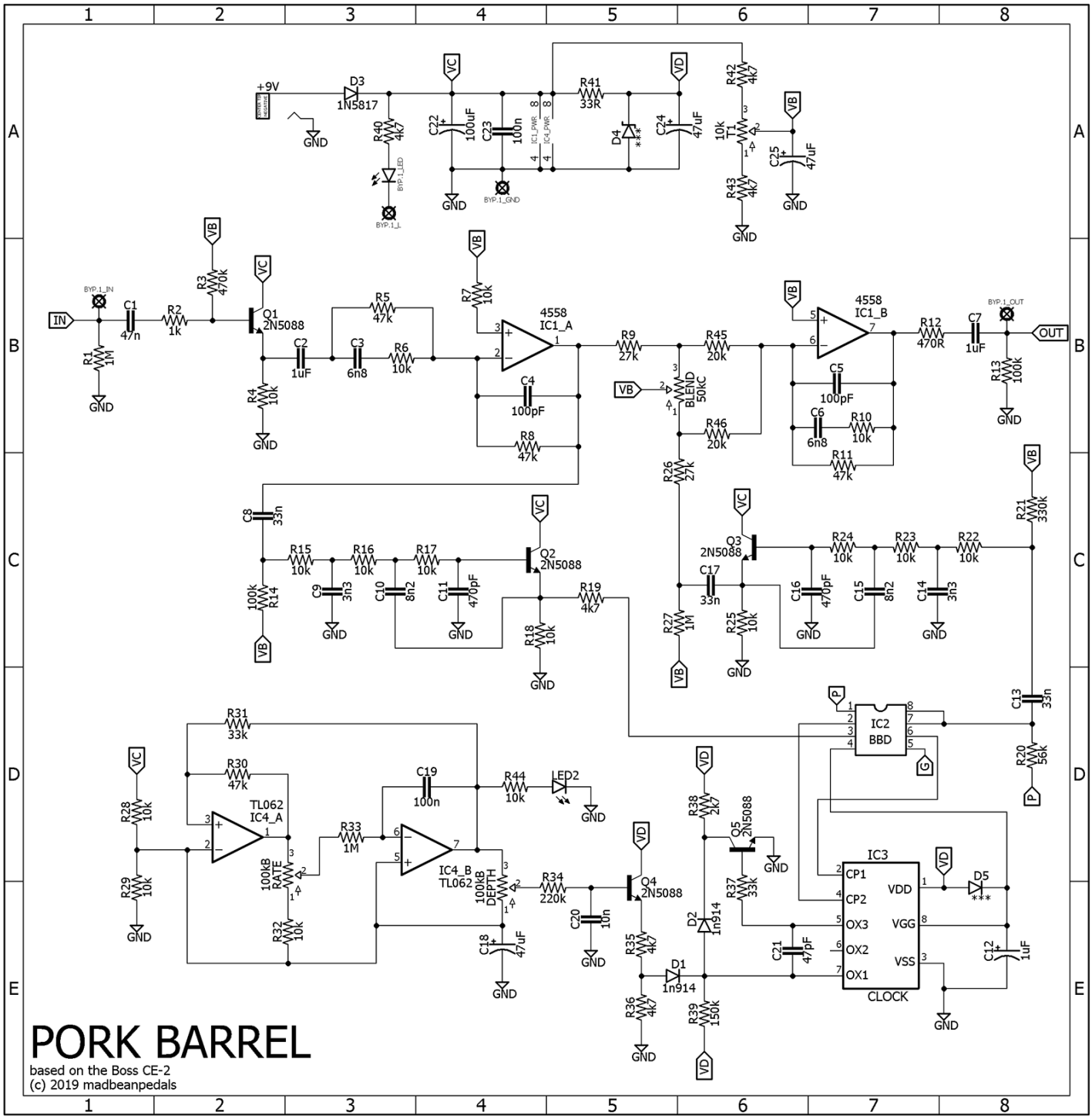
This is at least my 5th Pork Barrel build and maybe 7th or 8th CE-2 overall.

Voltages



9.42v One Spot - Current Draw: 8mA
Some voltages on IC1 will vary depending on where T1 is set.

Schematic


PORK BARREL
based on the Boss CE-2
(c) 2019 madbeanpedals
+9V
D3
1N5817
GND
VC
VD
VB
R41
33R
R42
4k7
R40
4k7
C22
100uF
C23
100n
D4
***
C24
47uF
10k
T1
C25
47uF
R43
4k7
BYP.1_LED
BYP.1_L
BYP.1_GND
IC1_PWR
IC4_PWR
BYP.1_IN
IN
C1
47n
R2
1k
R3
470k
Q1
2N5088
R1
1M
R4
10k
C2
1uF
C3
6n8
R5
47k
R6
10k
R7
10k
4558
IC1_A
C4
100pF
R8
47k
R9
27k
R45
20k
BLEND
50kC
R46
20k
R26
27k
4558
IC1_B
C5
100pF
C6
6n8
R10
10k
R11
47k
R12
470R
C7
1uF
R13
100k
BYP.1_OUT
OUT
C8
33n
R15
10k
R16
10k
R17
10k
Q2
2N5088
100k
R14
C9
3n3
C10
8n2
C11
470pF
R19
4k7
R18
10k
Q3
2N5088
R24
10k
R23
10k
R22
10k
R21
330k
C17
33n
C16
470pF
C15
8n2
C14
3n3
R27
1M
R25
10k
C13
33n
IC2
BBD
R20
56k
R31
33k
R30
47k
TL062
IC4_A
R28
10k
R29
10k
100kB
RATE
R32
10k
R33
1M
C19
100n
IC4_B
TL062
100kB
DEPTH
R44
10k
LED2
C18
47uF
R34
220k
C20
10n
Q4
2N5088
R35
4k7
D1
1n914
R36
4k7
R39
150k
D2
1n914
R38
2k7
Q5
2N5088
R37
33k
C21
47pF
IC3
CP1
CP2
OX3
OX2
OX1
VDD
VGG
VSS
CLOCK
D5
***
C12
1uF