

3PDT-05

FX TYPE: Bypass

Enclosure Size: 1590B and up

"Softie" compatibility: none

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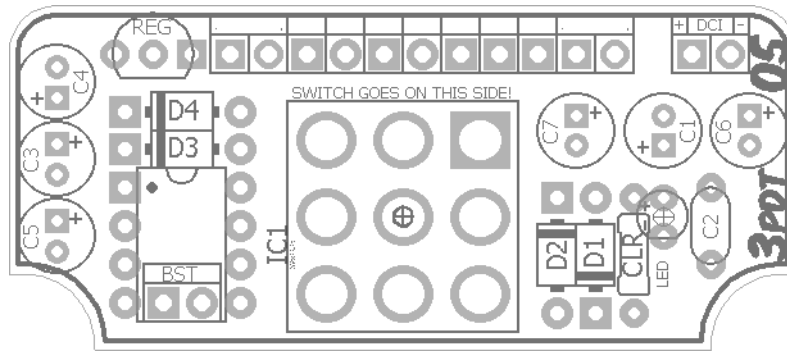
Overview

The 3PDT-05 is a re-design of the older 3PRR project on madbeanpedals.

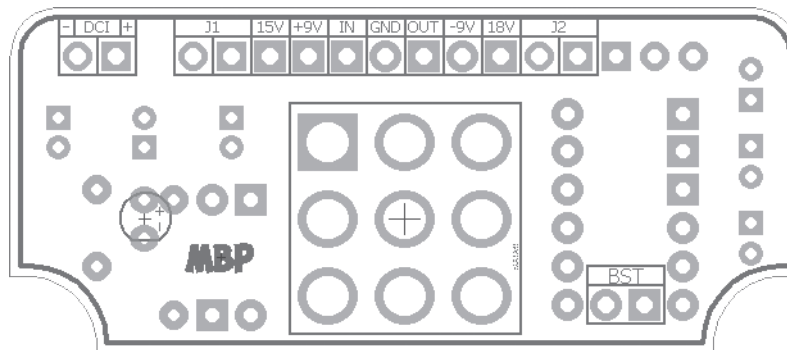
It is a combination of two utility circuits onto a single PCB: a charge pump / voltage inverter and bypass switcher. The switching mechanism is true bypass with effect input grounded, and the charge pump section can provide + or – 9v, +18v (unregulated) and/or +15v (or +12v) regulated. All outputs can be used simultaneously, if needed, so long as the circuit load does not exceed the current supply available through the charge pump. This ranges from 20mA-100mA depending on the charge pump used.

Terms of Use: You are free to use purchased **3PDT-05** circuit boards for both DIY and small commercial operations. You may not offer **3PDT-05** PCBs for resale or as part of a "kit" in a commercial fashion. Peer to peer re-sale is fine, though.

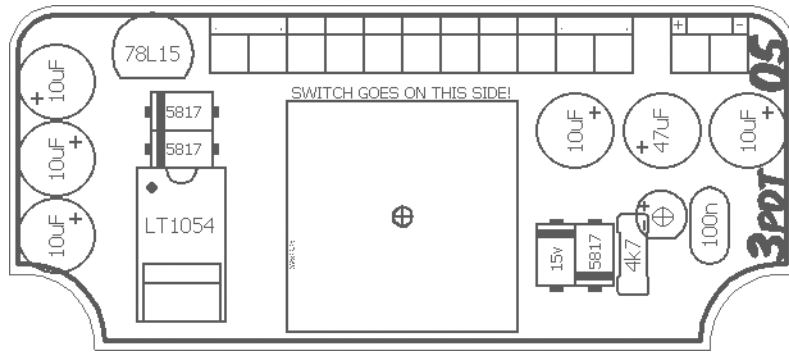
Technical assistance for your build(s) is available via the [madbeanpedals forum](#). Please go there rather than emailing me for assistance on [builds](#). This is because (1) I'm not always available to respond via email in a timely and continuous manner, and (2) posting technical problems and solutions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

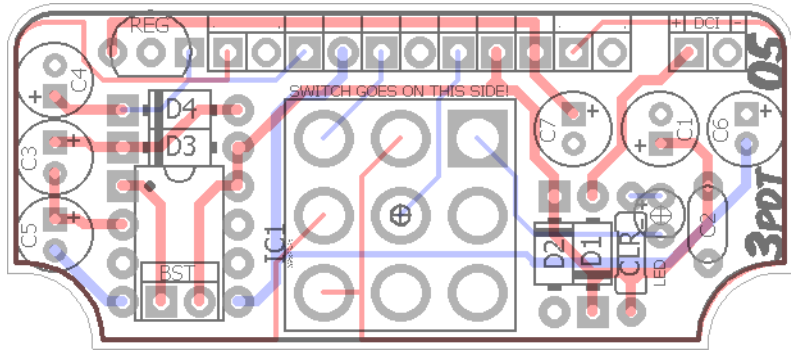


- All components go on this side of the PCB



- The entire thing gets flipped over to mount in your enclosure.





Resistor

CLR 4k7

Caps

C1 47uF

C2 100n

C3 10uF

C4 10uF

C5 10uF

C6 10uF

C7 10uF

Diodes

D1 1N5817

D2 15v Zener

D3 1N5817

D4 1N5817

LED *your choice

Regulator

REG LM78L15

IC

IC1 LT1054

Switch

BYP 3PDT

Value	QTY	Type	Rating
4k7	1	Metal / Carbon Film	1/4W
100n	1	Film / MLCC	25v min.
10uF	5	Electrolytic	25v min.
47uF	1	Electrolytic	25v min.
1N5817	3		
15v Zener	1		
LED	1	your choice	3 or 5mm
LM78L15	1		
LT1054	1		
3PDT	1	Solder Lug	

smallbear doesn't seem to stock 15v Zeners. You can use a 12v instead:

<http://smallbear-electronics.mybigcommerce.com/diode-zener-1n4742a/>

1N5817:

<http://smallbear-electronics.mybigcommerce.com/diode-schottky-1n5817g/>

Electrolytics (you can use regular 11mm electros for the 3PDT-05):

<http://smallbear-electronics.mybigcommerce.com/electrolytic-radial-25v-1-f-1000-f/>

Low-Profile Electrolytics (low-profiles are cool, but not required):

<http://smallbear-electronics.mybigcommerce.com/electrolytic-radial-low-profile-16v-1-f-100-f/>

78L15:

<http://smallbear-electronics.mybigcommerce.com/ic-78l15/>

LT1054:

<http://smallbear-electronics.mybigcommerce.com/ic-lt1054cp/>

Charge Pump alternatives:

These have lower current output (~20mA) than the LT1054 (~100mA) but will work for just about any overdrive or boost you want to run at a higher voltage. See Notes for more details.

<http://smallbear-electronics.mybigcommerce.com/ic-tc1044scpa/>

<http://smallbear-electronics.mybigcommerce.com/ic-max1044cpa/>

- For the LED, it's easiest just to insert that loose before mounting the 3pdt to the enclosure. Then simply solder the LED in place.
- You can use a 12v regulator (LM78L12) in place of a 15v if you only need 12v output.
- You can use multiple outputs of the 3PDT-05. It can also be used as the basis of a test/prototype rig for breadboarding.
- The 3PDT-05 is designed for the 1590B, but will also fit in a 125B or 1590BB.

Charge Pumps:

Type	Suffix	Connect Pads?	Max Input Voltage	Max Current	Zener Diode (D2)
LT1054	-	NO	16v	100mA	15v
ICL7660	SCPA	YES	12v	45mA	12v
MAX1044	CPA	YES	10v	20mA	9.1v
TC1044	SCPA	YES	12v	20mA	12v

These are the four most common charge pumps used in guitar effects. However, you should be able to use any pin compatible charge pump so long as it will accept a 9v input.

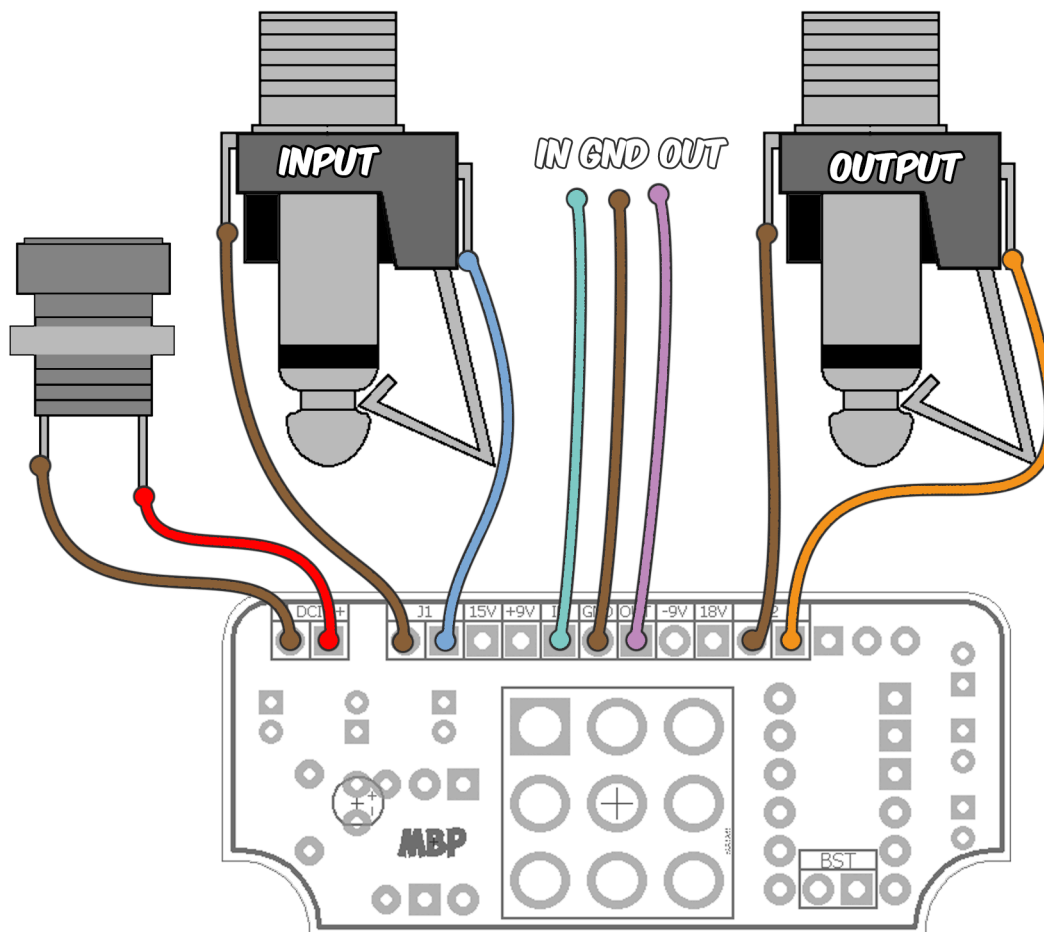
Suffix: When ordering parts, make sure you get the ones with these exact suffix. The ICL and TC brands have both “CPA” and “SCPA” types. You need the “SCPA” type. The MAX one only has the CPA, but that is the correct one to use for the 3PDT-05. The LT1054 does not have the CPA or SCPA category.

The two “BST” pads under IC1 must be connected according to the list above. Failure to connect the pads correctly will result in an audible whine in your audio path. **The LT1054 is the only one that does NOT need the pads connected.**

Max Voltage: This is the maximum input voltage the charge pump can accept. Note that when you use higher input voltages, your outputs will scale accordingly; a 12v in means 24v out instead of 18v. The 15v output on the PCB will still be 15v since that is determined by the regulator.

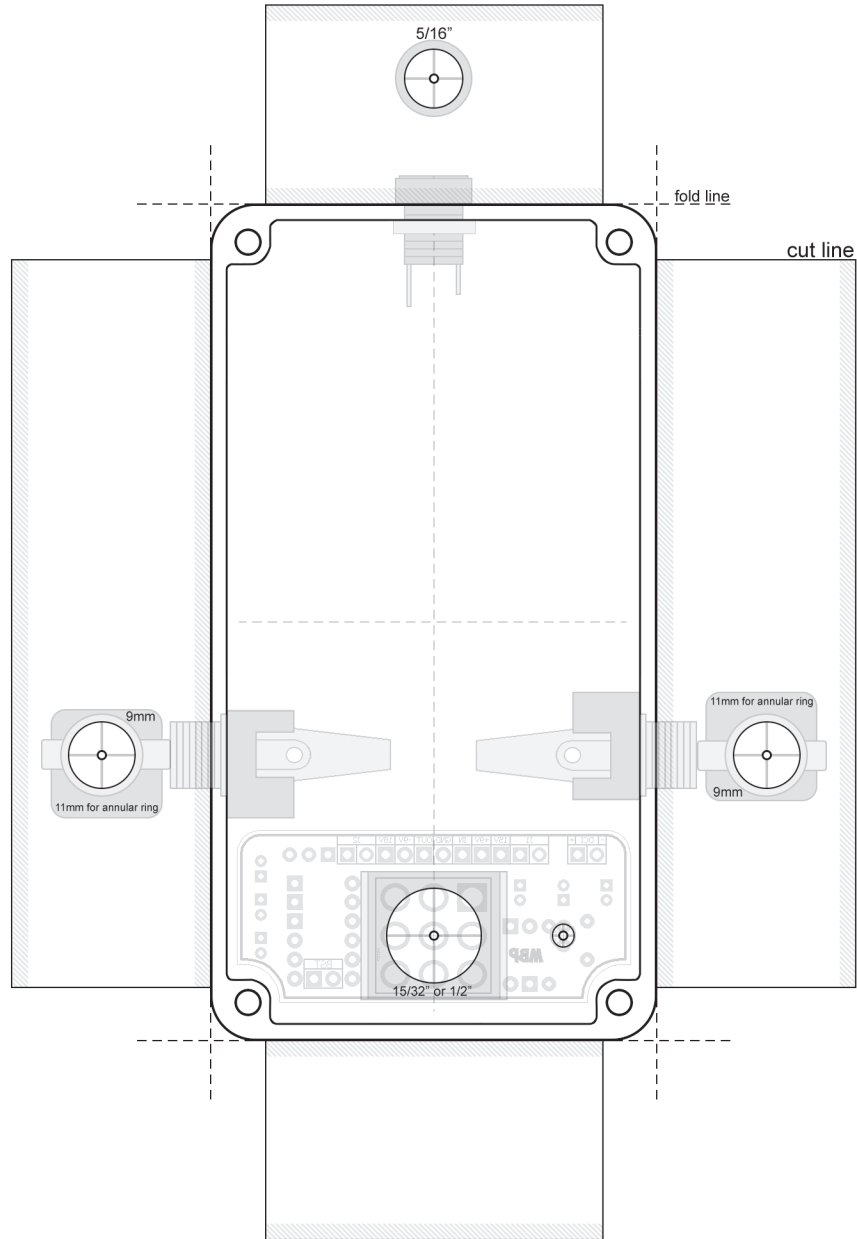
Max Current: This is very important. This is the maximum amount of current the charge pump can supply. So, why not use the LT1054 for everything since it has the most current output? Because it is more expensive. If you are using the 3PDT-05 to run a dirt pedal at 18v, one of the other charge pumps will suffice 99% of the time since dirt pedals tend to draw low current. However, some effects (like an analog delay or Univibe) will have higher current consumption. In those cases, the LT1054 is necessary.

Zener Diode: This diode will protect your IC from an over-voltage supply. This is optional (the 3PDT-05 work without it) but if you need to protect the circuit from using a wrong power supply, then use this list to determine what value Zener to use. If you only plan to use the 3PDT-05 with a 9v supply, you can use a 10v Zener for all options.



This shows the basic connections. Use whichever DC output you need to power your circuit from the 4 available. You can use more than one at a time (for example, +/-9v).

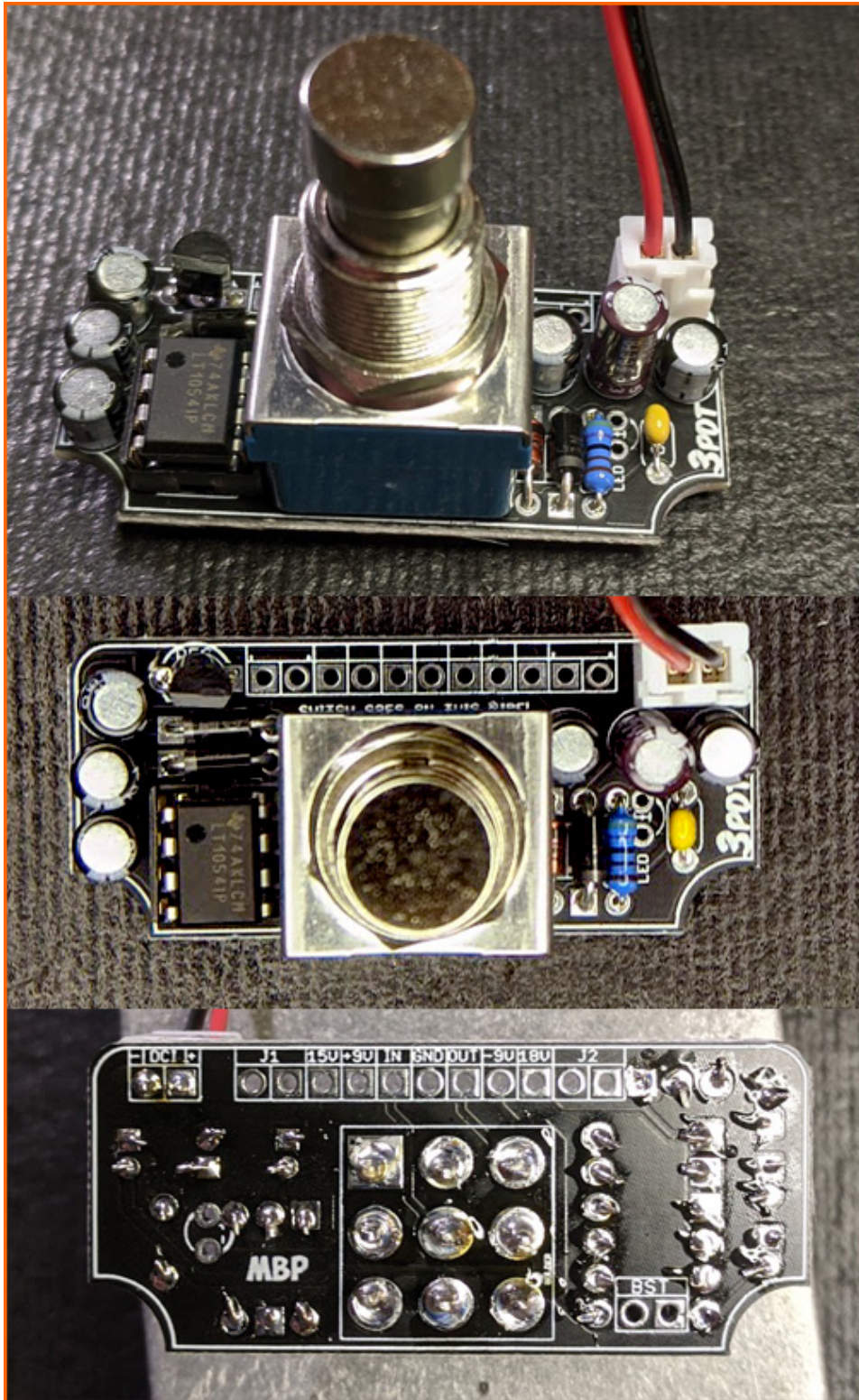
Note: Drill Guides are approximate and may require tweaking depending on the types of jacks, switches and pots you use.



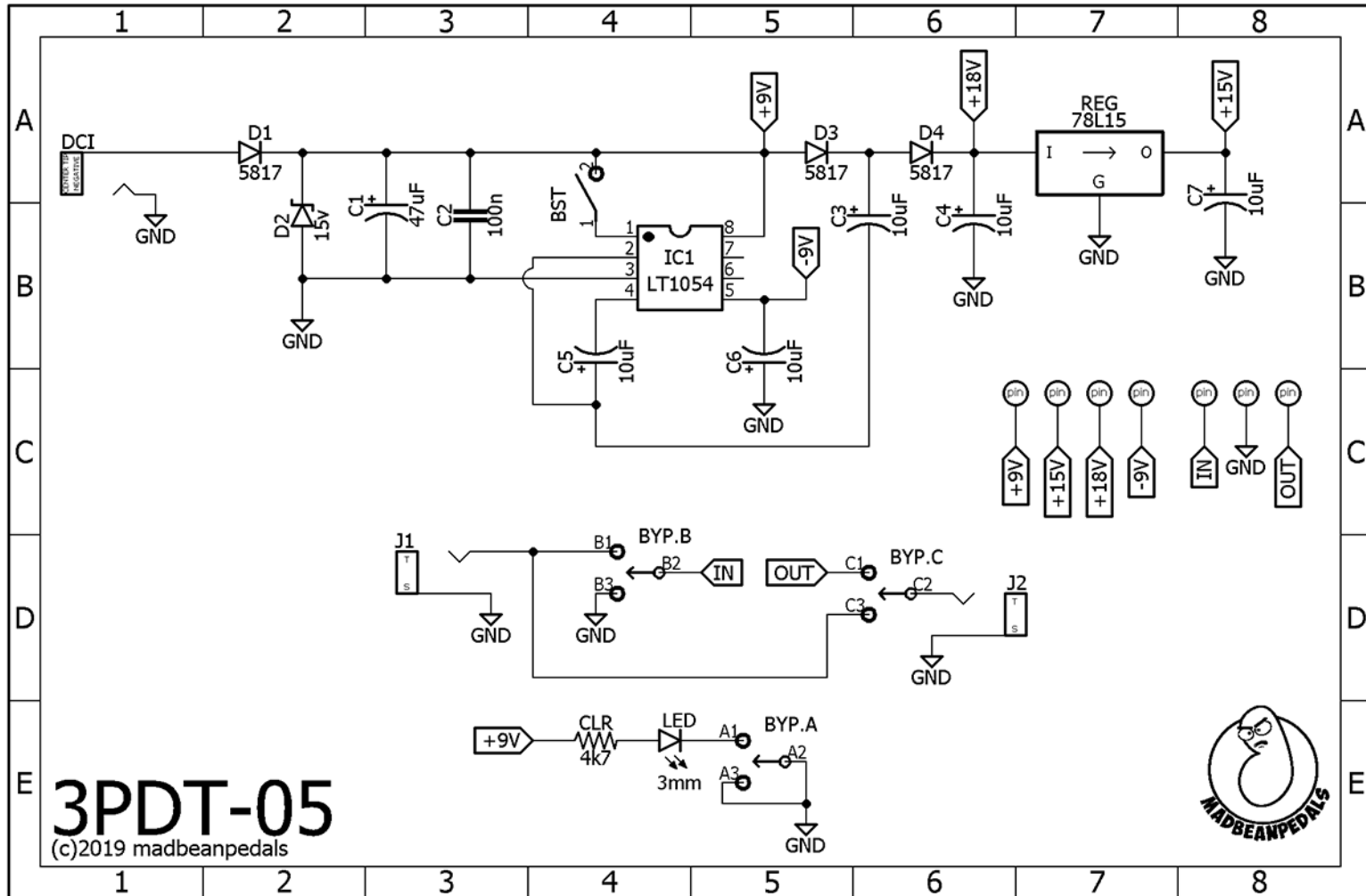
- A mock 1590B layout showing how the 3PDT-05 will fit.
 - 11.22 update: fixed LED drill spot

IC1	DC	OUTPUTS	DC
1	1.93	18v	17.75
2	4.96	15v	14.96
3	0	9v	9.17
4	-4.08	-9v	-8.99
5	-8.99		
6	2.53		
7	1.39		
8	9.17		

- 9.42vDC One Spot
- Readings shown with no load on any of the DC outputs.
- Current Draw: ~8mA



- You can also use the PCB pin mounted version of the 3PDT, as I have done here.



3PDT-05
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