

NEURO-DRIVE

PCB V1.7 BUILDER'S MANUAL

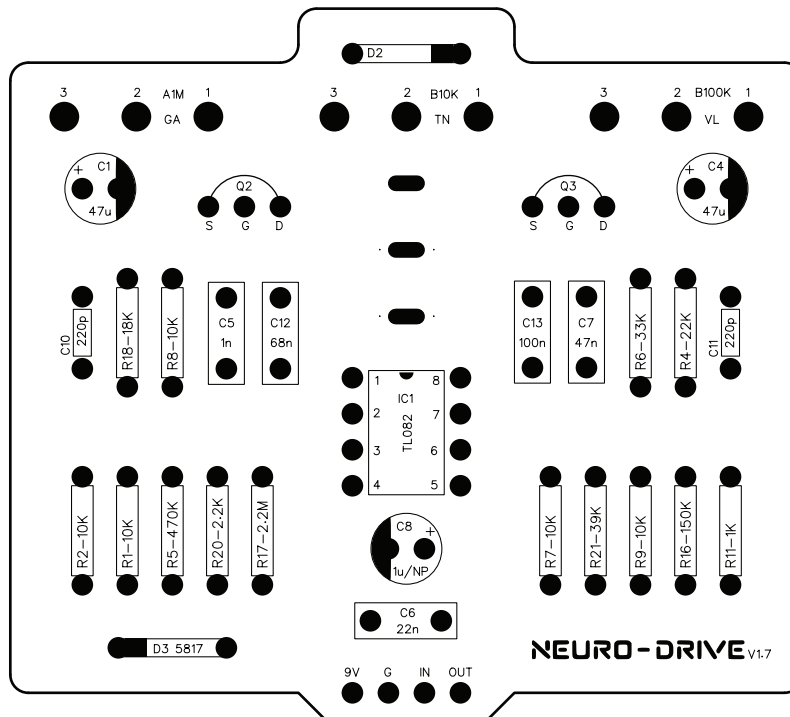


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PCB boards designed to allow direct mount
90 degree potentiometers

Dimensions (W=55.88mm x H=50.17mm)
Recommended enclosure 125B

Drill Template: HT125B-3KT-08

For a downloadable PDF copy of this manual, visit www.hammondtoneworks.com/support

DISCLAIMER:

All board layouts have been tested and verified. While I do offer a guarantee on the functionality of purchased PCBs, there is an understood assumption that the end user (you) have the knowledge and skill required to assemble the product and accept any risk involved with assembling the provided boards or parts. This understood skill level includes knowing how to properly solder, troubleshooting steps, etc. If you have any questions concerning any Hammond Toneworks products, feel free to send a message on the platform of purchase, or contact support at support@hammondtoneworks.com

COMMERCIAL USE:

You may use Hammond Toneworks PCBs in commercial projects as long as the completed project is not sold as a Hammond Toneworks branded pedal, and the model name of the PCB is not used on the enclosure. Crediting the use of the PCB is not required. PCBs are not be resold as an item themselves.

Hammond Toneworks PCB boards are manufactured to accomodate the following recommended components

- Resistor:** 1/4w metal film or carbon film resistors
(7.62mm lead spacing on all resistor connections)
- Film Cap (B):** Film box type capacitor
(5mm lead spacing unless otherwise noted)
- Cer Cap (M):** Monolithic ceramic capacitor
(5.08mm lead spacing, ceramic disc capacitor can be used as a substitution)
- Cer Cap (D):** Ceramic disc capacitor
(2.54mm lead spacing)
- Elec Cap:** 25V Electrolytic Capacitor recommended, unless otherwise noted.
(2.54mm lead spacing)
- Transistor:** All transistor holes are spaced to 2.54mm
(2.54mm lead spacing)
- Diode:** 7.62mm lead spacing and 0.9mm hole diameter on PCB
- Pots:** Potentiometers are to be connected to the effect board directly. Common 16mm right angle pots are recommended.
(5mm lead spacing) NOTE: Potentiometer hole diameters are sized to allow pots to be connected via wire if preferred.
- Wires:** Wiring connection holes are drilled to 1mm diameter and are spaced 2.54mm apart.
Use of 24G stranded wire is recommended for easy assembly

RECCOMENDED ASSEMBLY ORDER**1. EFFECT BOARD ASSEMBLY**

- Solder small components first (resistors, diodes, etc) then work your way up to soldering the tallest components , then potentiometers, and finally the connection wires to the 3PDT daughter board (if used) NOTE: This is the general order of assembly, if any particular board is assembled easier using a different oder, it will be noted in the respective build docs.

2. OFFBOARD WIRING

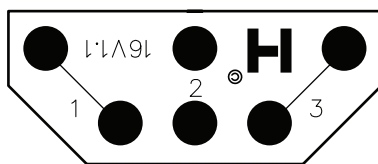
- Refer to the recommended offboard wiring methods on pages 8 or 9 (depending on your preference)

16mm PCB PIN POTENTIOMETER ADAPTER BOARD

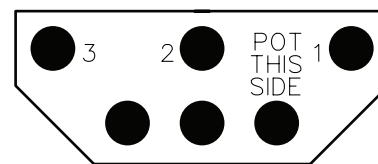
Optional potentiometer adapter boards are available for purchase directly or via our Reverb store. These allow a secure connection with potentiometers that have a straight pcb pin type connection and to help organize offboard wiring. **These adapters are optional, and only recommended if the potentiometers in use do not have solder lugs or are unable to be connected directly to the pcb.**

NOTE:

It is easier to attach the wires to the adapter boards first, then solder the potentiometer to the adapter board **LAST**. Attach the wires to the front side of the PCB with the Hammond Toneworks logo, and attach the potentiometer to the rear side of the PCB that is marked with "POT THIS SIDE".



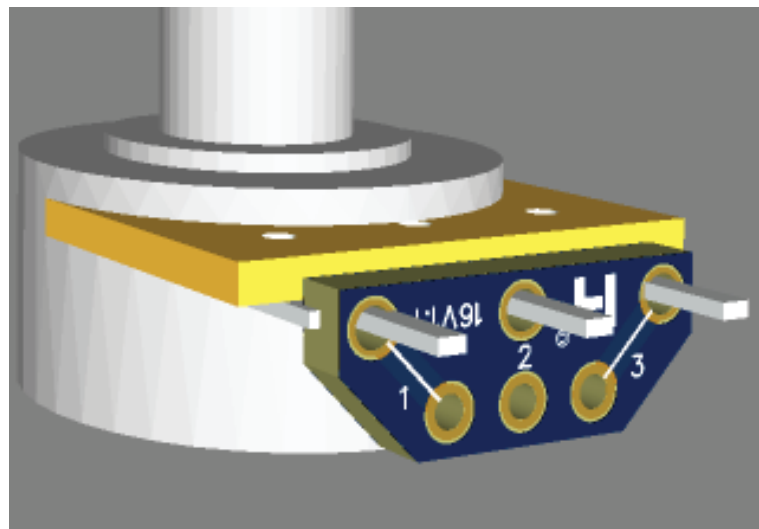
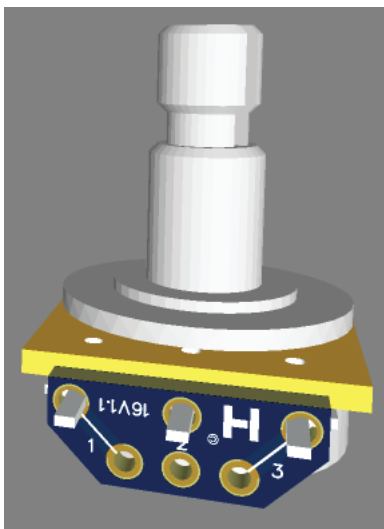
FRONT



REAR

ASSEMBLED

(SHOWN WITHOUT WIRING)

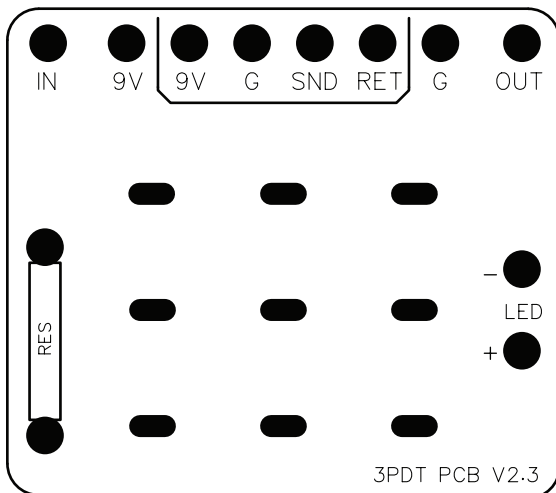


3PDT DAUGHTERBOARD PCB

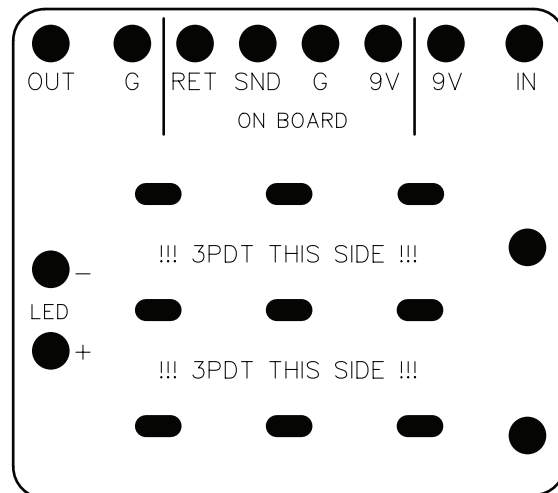
Included with your board is an optional 3PDT daughterboard PCB (compatible with enclosure sizes 1590B and larger) to help organize offboard wiring and simplify connections to the main circuit. Follow the wiring diagrams on pages 7 & 8 if using the 3PDT PCB daughterboard.

NOTE:

Attach all PCB connections and components first, then solder the 3PDT switch to the 3PDT PCB board **LAST**. This is necessary due to the fact that the switch itself blocks access to some of the onboard soldering points located on the daughterboard to save space. Assemble the components and wires to the front side of the PCB, and attach the 3PDT switch to the reverse side of the PCB that is marked with "3PDT THIS SIDE" wiring points are labeled on both sides of the PCB for ease of assembly.

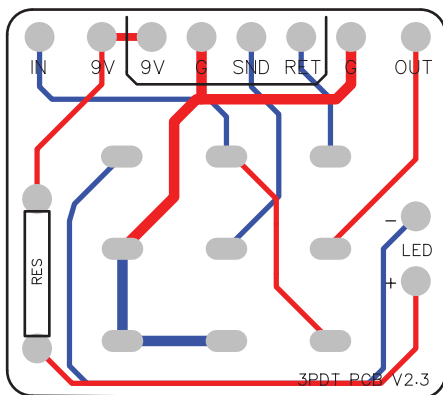


FRONT



REAR

LAYOUT



ASSEMBLED

(SHOWN WITHOUT WIRING)

NEURO-DRIVE v1.7

The Neuro-drive v1.7 PCB is a faithful recreation of the *Fulltone OCD v1.7** circuit, traced from the real deal in my personal pedal arsenal. At the time of this writing, there were little to no easily available resources concerning the 1.7 version of the circuit, which is my personal favorite of the lineup. So here is my humble offering to the DIY pedal building community. The Neuro-Drive PCB allows you to build a verified v1.7 circuit with an optional spot onboard for the asymmetrical clipping diode found in the earlier v1.4, just in case anyone is a fan of that build. This PCB keeps the same part numbering as the original circuit, so any references to part numbers when modding the original circuit translate over to this project.

- Shane Hammond

CONTROLS

GAIN:

The GAIN control adjusts the amount of op amp gain in the circuit, turn the potentiometer clockwise to increase the gain.

TONE:

The TONE control adjusts the EQ curve of the signal. This is adjusted according to your preference. Turn clockwise for more overall brightness, and counter clockwise for an overall darker tone.

VOLUME:

The VOLUME control adjusts the overall output volume of the circuit. Turn clockwise to increase the output level of the circuit.

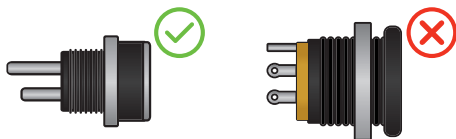
HP/LP TOGGLE:

The toggle switch controls the HIGH PEAK / LOW PEAK section of the circuit. Flip the toggle up for the high peak function, and flip down for the low peak function. In short, up for bright, down for dark.

SPECIAL NOTES:

DC JACK NOTE:

Due to the board size and inline knob design of this PCB, the DC Jack for this build must be the smaller 2-pin type DC jack like the one below.



** Hammond Toneworks is in no way affiliated with any other brands or products mentioned in this document besides Hammond Toneworks itself. Other products or brands are mentioned in this document only as a reference.*

BILL OF MATERIALS

NOTE: Off board components are not listed (indicator LED, input/output jacks, power input jack, footswitch)

Quantity	Name	Designator
RESISTORS		
1	1k	R11
1	2.2k	R20
5	10k	R1,R2,R7,R8,R9
1	18k	R18
1	22k	R4
1	33k	R6
1	39k	R21
1	150k	R16
1	470k	R5
1	2.2M	R17
CERAMIC MONOLITHIC CAPS		
2	220p	C10,C11
BOX FILM CAPS		
1	1n	C5
1	22n	C6
1	47n	C7
1	68n	C12
1	100n	C13
ELECTROLYTIC CAPS		
* 1	1u	C8
2	47u	C1,C4
DIODES		
1	5817	D3
* 1	JUMPER	D2
TRANSISTOR		
2	2N7000	Q2,Q3
IC		
1	TL082CP	U1
TOGGLE		
1	SPDT 1/1	SW2
* 1	-OR-	
1	SPST 1/0	SW2
POTS		
1	A1M	GAIN
1	B10K	TONE
1	B100K	VOL

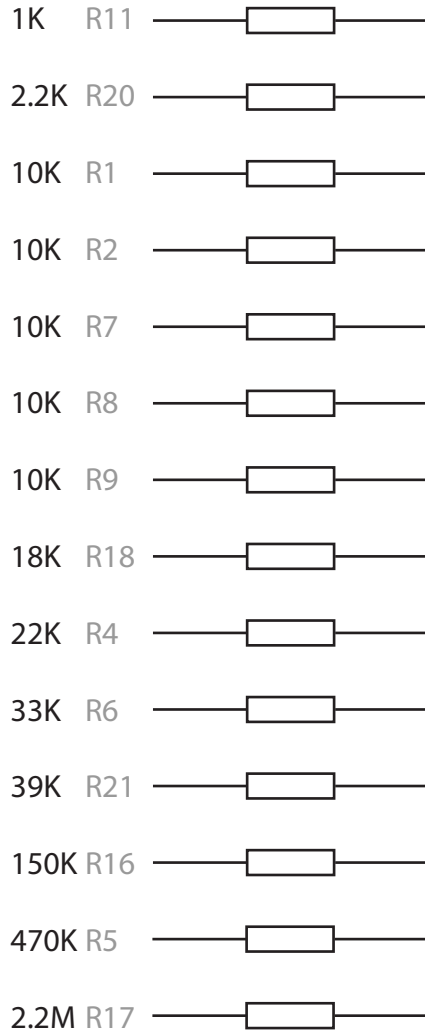
*** COMPONENT NOTES:**
C8 can be either non-polar electrolytic or polarized electrolytic

D2 is optional, but **must** be jumped if empty, add a D2 diode of your choice for asymmetrical clipping. For the v1.7 circuit insert jumper here.

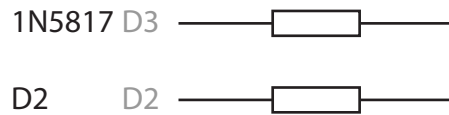
SW2 can be either SPDT ON/ON or SPST ON/OFF

SMALL COMPONENT TABLE (Small components may be taped down here)

RESISTORS

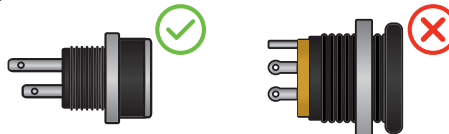


DIODES

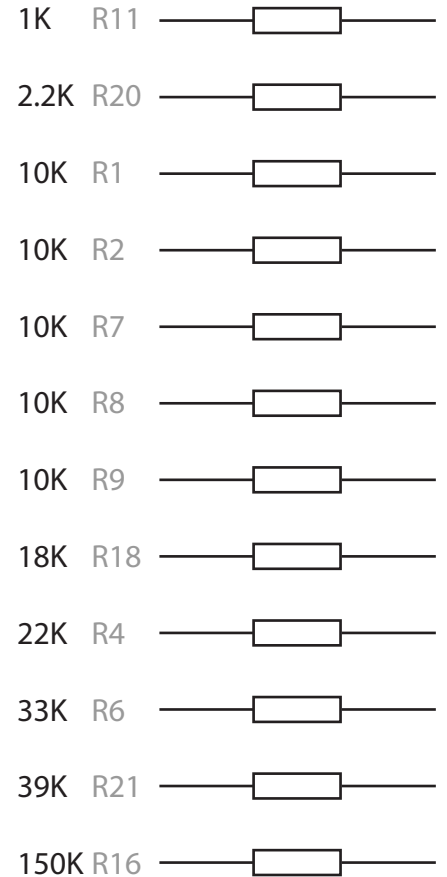


DC JACK NOTE:

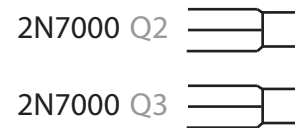
Due to the board size and inline knob design, the DC Jack for this build must be the smaller 2-pin type DC jack like the one below.



RESISTORS



TRANSISTORS

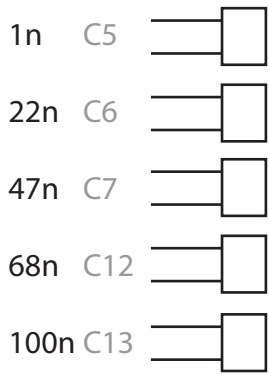


CERAMIC CAPS

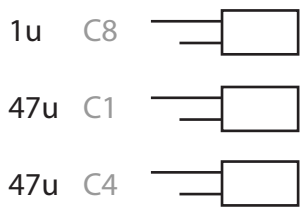


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BOX FILM CAPS



ELECTROLYTIC CAPS



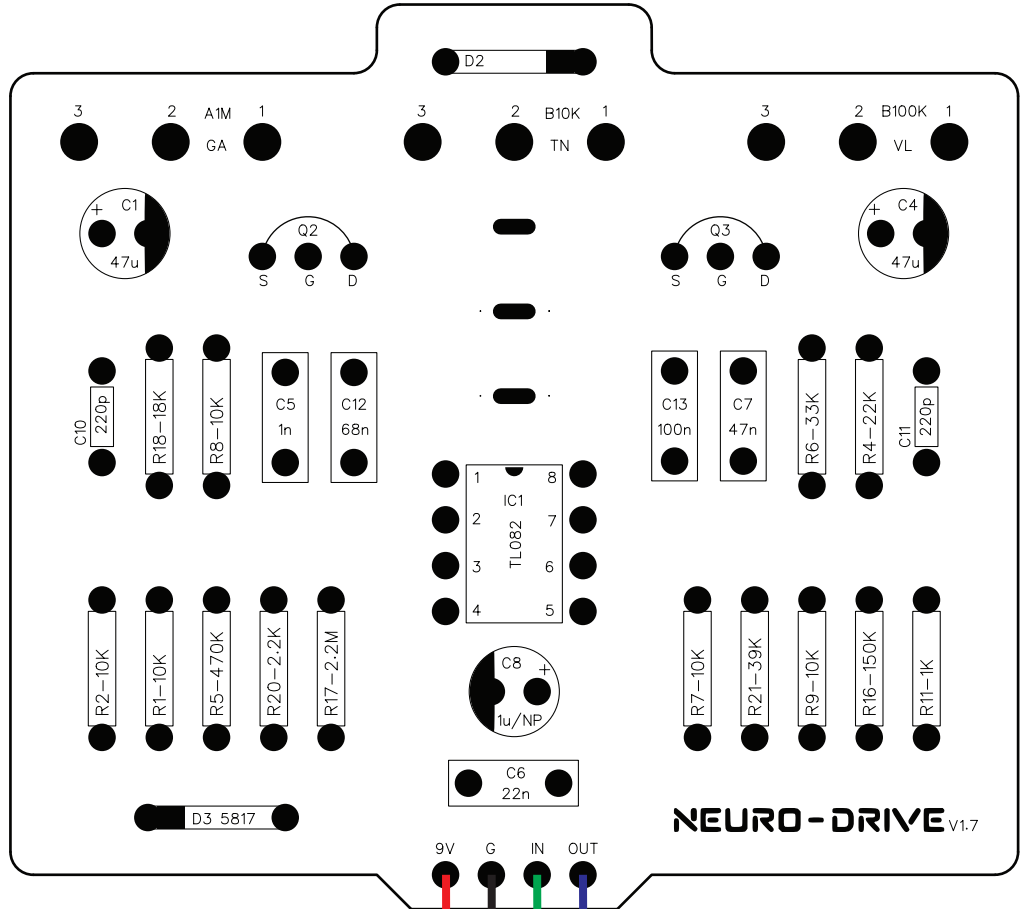
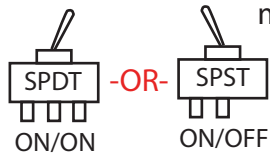
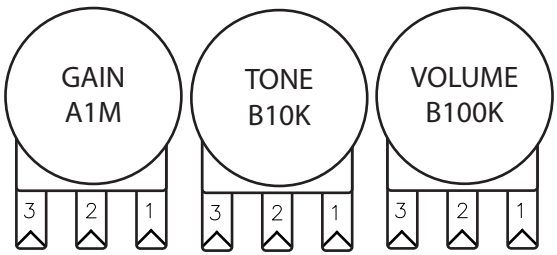
NOTES

Large empty rectangular area for notes.

Refer to the illustration below when attaching components to your PCB

(wire length, boards, and pots are not shown to scale. They have been sized to fit this page for illustration purposes)

Board mounted pots (see page 7a for pot mounting)



← 50.17mm →

← 55.88mm →

D2 DIODE NOTE:

The D2 spot on the PCB must be jumped if not using the optional asymmetrical clipping diode. This spot is only included on this board as an option if that type of clipping is preferred. The 1.4 version of this circuit uses a germanium 1N34A in this place. Socketing this spot and trying some other combinations is a fun way to find your own flavor of clipping in this circuit. (you can always socket a jumper and experiment back and forth as well)

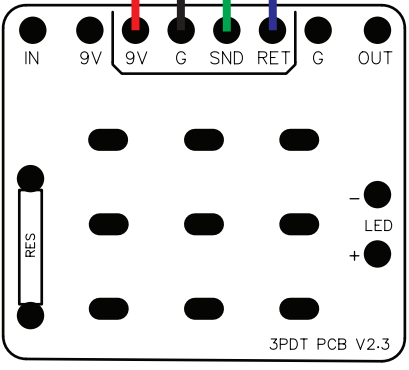
C8 CAPACITOR NOTE:

The original circuit uses a 50v non-polarized electrolytic cap in this spot. You can either use the original non-polar cap, or use the more common polarized electrolytic capacitor, following the polarity markings.

(Please make sure C1, C4, and C8 are rated for 25v or above if you plan on using this circuit with an 18v DC adapter.)

SPDT vs SPST:

This PCB has been designed to accept an SPDT on/on switch OR an SPST ON/OFF switch for the HP/LP toggle section. The end result is exactly the same, no matter which switch you decide to use. If using the SPDT switch, the orientation does not matter. If using the SPST switch, make sure the two switch pins insert into the lower two slots (marked with dots on the PCB), leaving the top slot open. There are also markings on the rear of the PCB to help with the proper SPST orientation.



(3PDT PCB OPTIONAL)

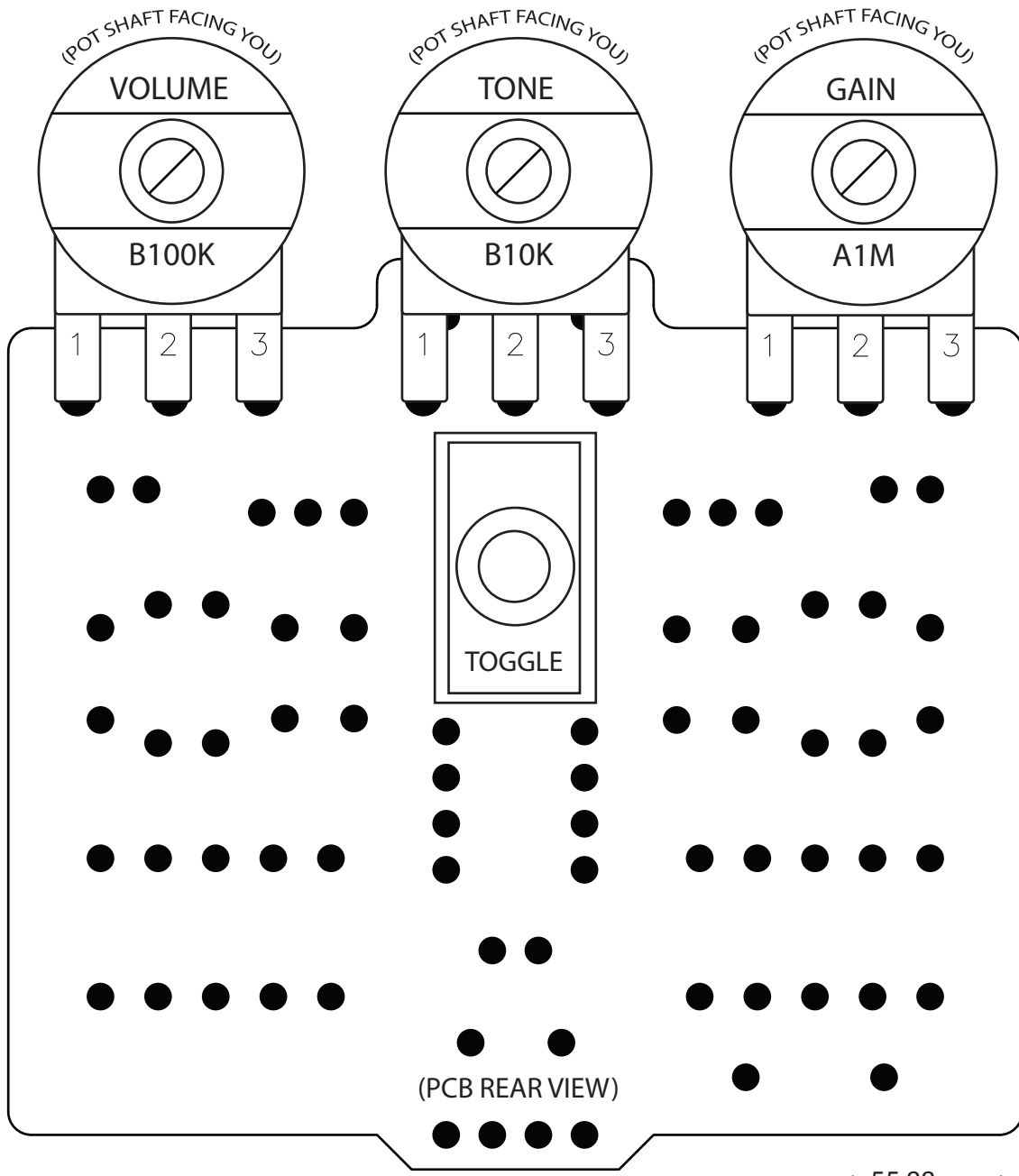
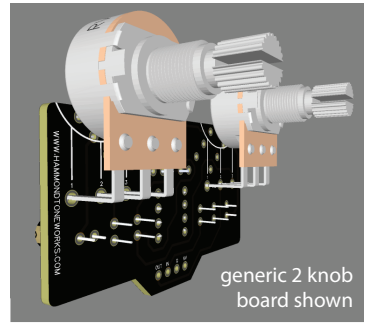
Bill of materials on page 6

Refer to the illustration below when attaching components to your PCB

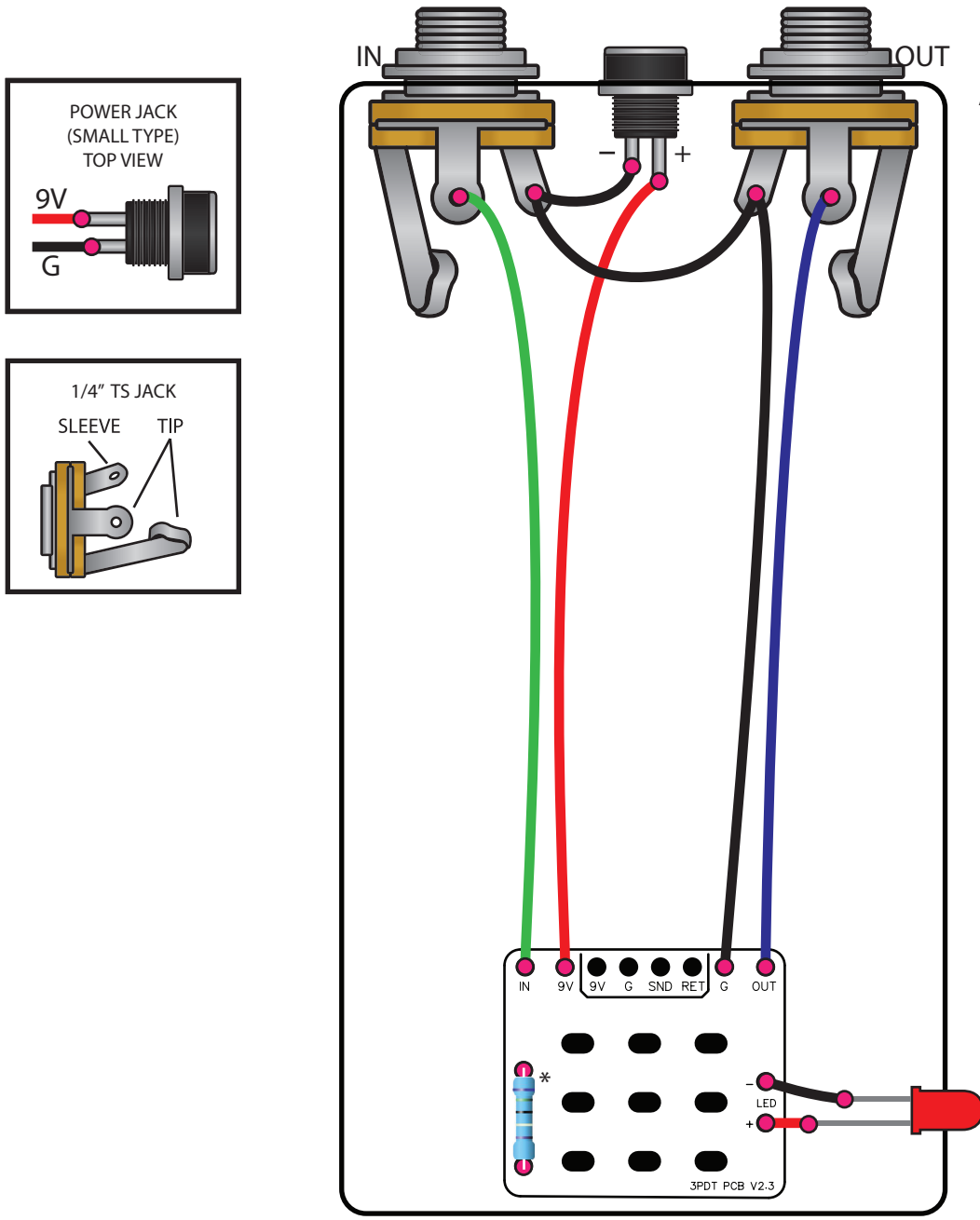
BOARD MOUNTED POTS (PCB REAR VIEW)

(Pots are not shown to scale. They have been sized to fit this page for illustration purposes)

EXAMPLE VIEW



A 3PDT PCB board is included with your effect board to simplify the offboard wiring process. You may use your own method of offboard wiring if preferred. The illustration below is recommended if you are using the included 3PDT PCB. As long as the effect PCB receives the correct 9V, Ground, In, and Out connections, it will work properly. The method below allows the pedal to be powered using a common standard modern 9V positive sleeve/negative center power supply.



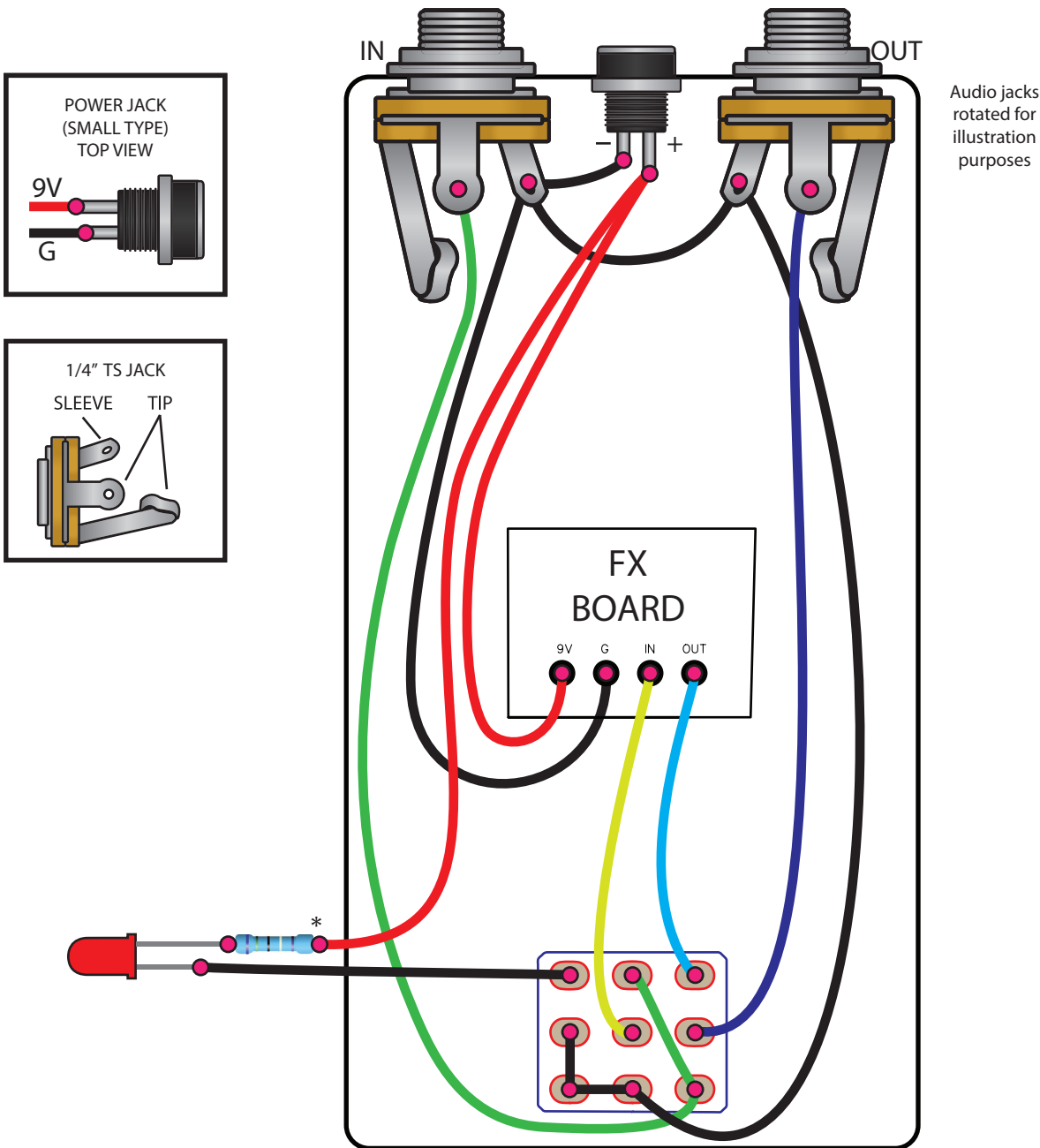
Audio jacks rotated for illustration purposes

NOTE:
If using a 3PDT PCB, it is easier to solder all wires and components first, and then solder the 3PDT switch to the board last.

● = Solder point

* LED resistor can be any value of your choice. Typical recommendation is 4.7k for normal red diffused LEDs, but may require up to 33k or so, depending on LED type and color.

The following wiring is recommended only if no 3PDT board is available. As long as the effect PCB receives the correct 9V, Ground, In, and Out connections, it will work properly. **A 3PDT PCB board is included with your effect PCB to simplify the offboard wiring process, if you would like to use the included 3PDT board, see page 8.** The offboard wiring method below allows the pedal to be powered using a common standard modern 9V positive sleeve/negative center power supply.



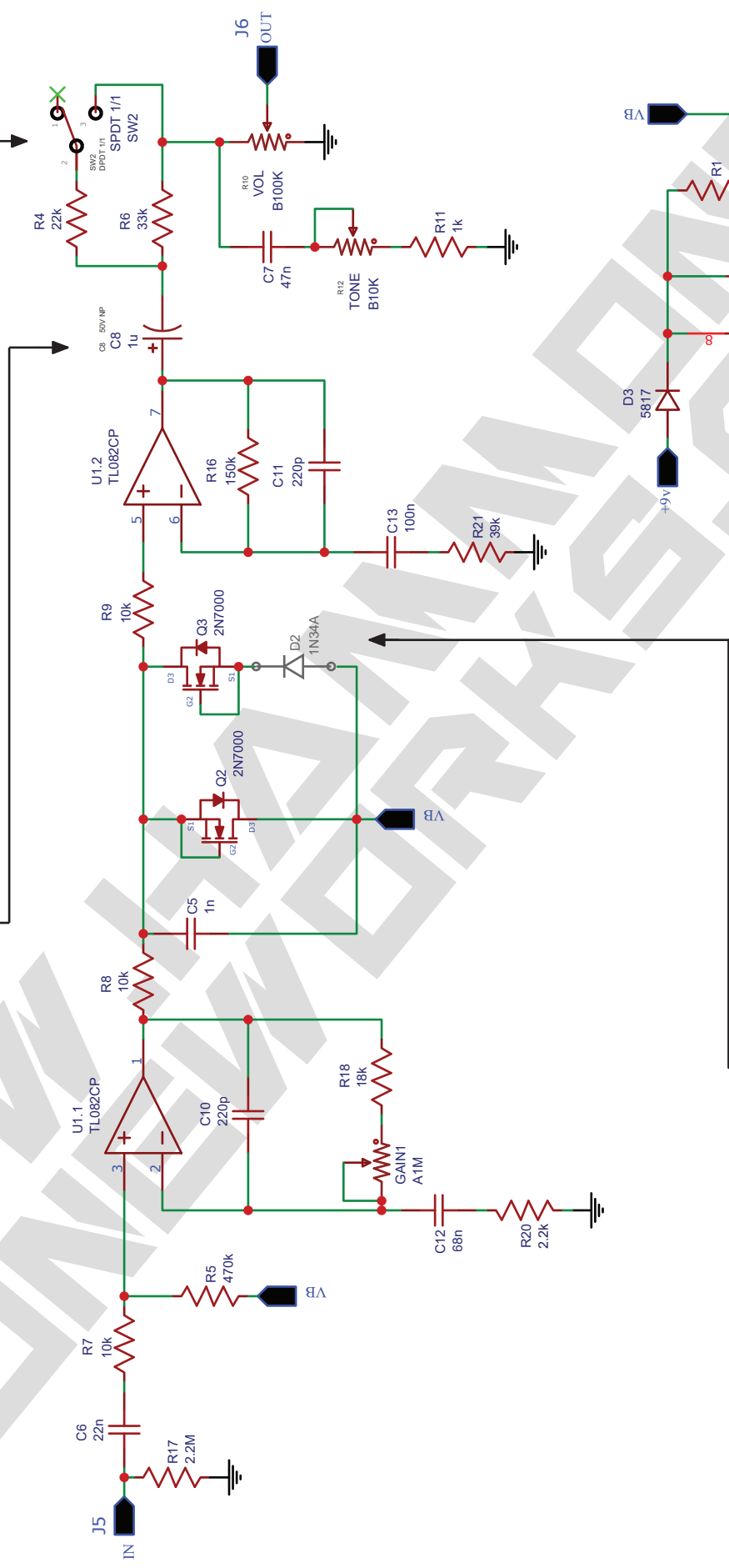
● = Solder point

* LED resistor can be any value of your choice.

Typical recommendation is 4.7k for normal red diffused LEDs, but may require up to 33k or so, depending on LED type and color.

HP/LP TOGGLE NOTE:
Original circuit used a DPDT switch with the pins jumped to function as an SPDT. The Neuro-drive has been designed to accept either an SPDTON/OFF switch or an SPST ON/OFF switch while keeping the same functionality for the HP/LP toggle section. See page 6 or 7 for more info.

C8 CAPACITOR NOTE:
The original circuit uses a 50v non-polarized electrolytic cap in this spot. You can either use the original non-polar cap, or use the more common polarized electrolytic capacitor, following the polarity markings.
(Please make sure C1, C4, and C8 are rated for 25v or above if you plan on using this circuit with an 18v DC adapter.)



D2 DIODE NOTE:
The D2 spot on the PCB must be jumped if not using the optional asymmetrical clipping diode. It is not present on the original circuit. This spot is only included on this board and schem as an option if that type of clipping is preferred. The 1.4 version of this circuit uses a germanium 1N34A in this place. If you would like to build the v1.7 to spec, insert a jumper in this spot.

GENERAL SCHEMATIC NOTES:
This PCB and schematic follows the same component numbering as the original circuit, allowing mods to translate over easily. Any small text in gray are additional notes about that particular part. This schematic is traced from OCD v1.7 #113857

**PRINT THIS PAGE
ACTUAL SIZE**

**TAYDA DRILL TEMPLATE
HT125B-3KT-08 (small DC)**

**125B
3 Knob Drill Template
Including drill size**

DIRECTIONS:

1. Cut along dotted lines, and fold along the solid outline to preshape the paper template.

2. Carefully align template to the empty enclosure (without bottom lid) and tape in place to the enclosure.

You can also tape the corners of the template together once it is attached, to have a "cast" paper template ready if drilling more than one enclosure.

3. Using a steel punch, mark the drilling holes in the center of each cross. (mind the number of knobs) The punch should mark the enclosure even through the paper.

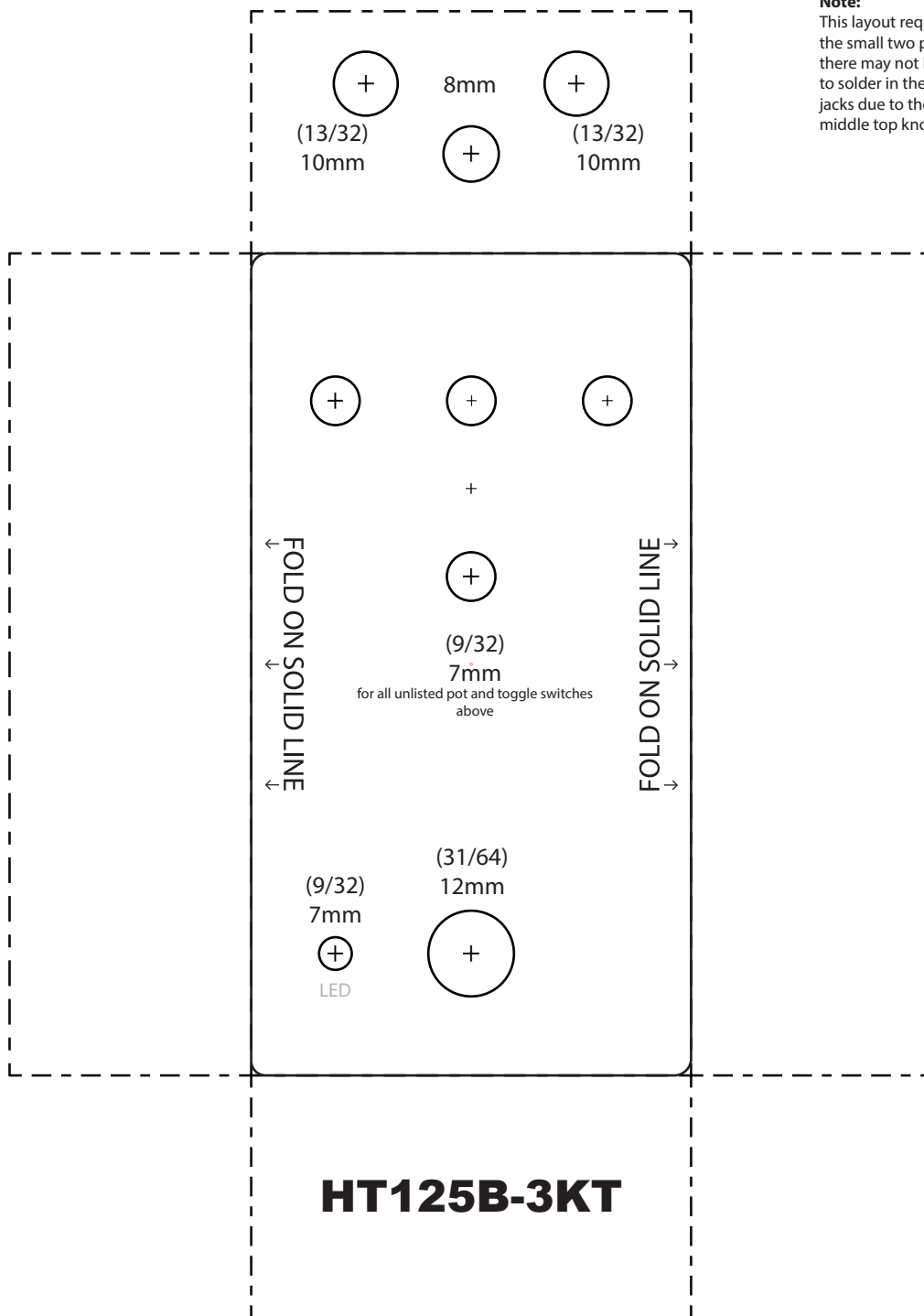
4. Remove template and check spacing on punched drill markers to ensure that everything will fit nicely. It's better to find out now than later. A common issue is the 1/4" jacks being too high, low, or offset. Hold a jack centered on the punch mark to see the clearance and make sure the lid will close (requires 2mm clearance from the open end of enclosure). Re-punch the drill markers if needed

5. Drill away!
Take your time. It's more rewarding to be patient and have a properly drilled enclosure than to rush and be out of alignment.

TIP:
After drilling, check your top jack fitment. Make sure you can fit both audio and power jacks in place properly. Top jacks are a tight fit, if one is off, bore out the hole slightly to get a good position if needed, no more than 1mm extra, as the external washer still needs to be able to have enough space around the hole to grab the enclosure.

Max knob diameter: 16mm

Note:
This layout requires the use of the small two prong DC jacks, there may not be enough room to solder in the larger 12mm DC jacks due to the tight fit of the middle top knob.



* This template and its measurements were calculated using manufacturer's specs and physically tested on Tayda branded size 125B enclosures.

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