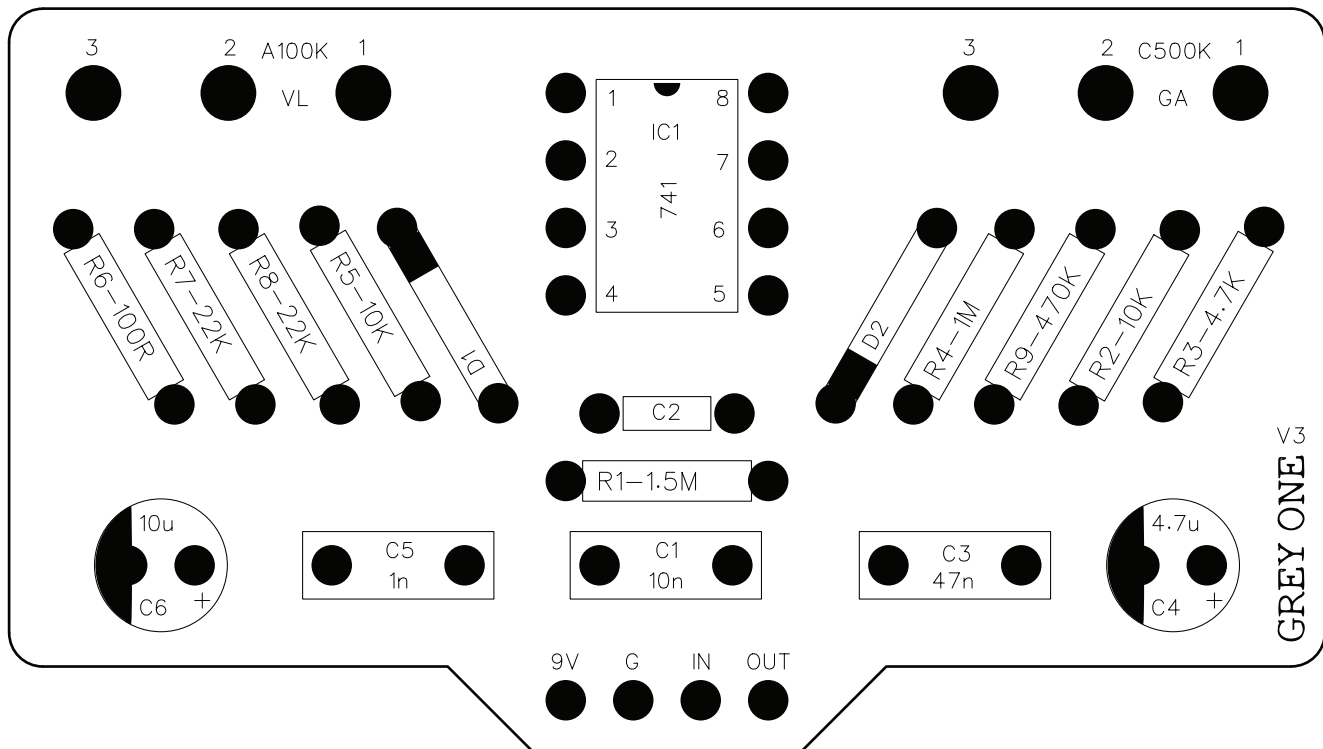


# GREY ONE

## PCB V3 BUILDER'S MANUAL



### TABLE OF CONTENTS

1. Title Page
2. General Build Notes
3. 16mm Pot Adapter Board Info
4. 3PDT Daughterboard Info
5. Circuit Info
6. Bill of Materials
7. Onboard Wiring / Component Layout
8. Offboard Wiring (3PDT PCB)
9. Offboard Wiring (No 3PDT PCB)
10. Schematic
11. Drill Template



PCB boards designed to allow direct mount  
90 degree potentiometers

Dimensions (W=49.53mm x H=27.94mm)  
Recommended enclosure 125B

Drill template: HT125B-2K-08, HT125B-2K-12

For a downloadable PDF copy of this manual, visit [www.hammondtoneworks.com/support](http://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](mailto: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.

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

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- 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 (50V caps recommended if using over 9V power)  
(2.54mm lead spacing)
- Transistor:** All transistor holes are spaced to 2.54mm for easier soldering  
(2.54mm lead spacing)
- Diode:** 6.32mm-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 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**

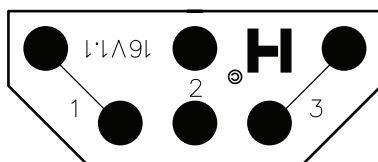
- Refer to the recommended offboard wiring methods on pages 8 or 9 (depending on your preference)

## 16mm PCB PIN POTENTIOMETER ADAPTER BOARD

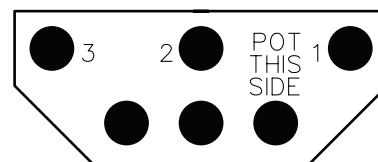
Optional potentiometer adapter boards are available for purchase directly or via our Reverb store. These allow a secure connection with potentiometers that have a straight pcb pin type connection and to help organize offboard wiring. **These adapters are optional, and only recommended if the potentiometers 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".



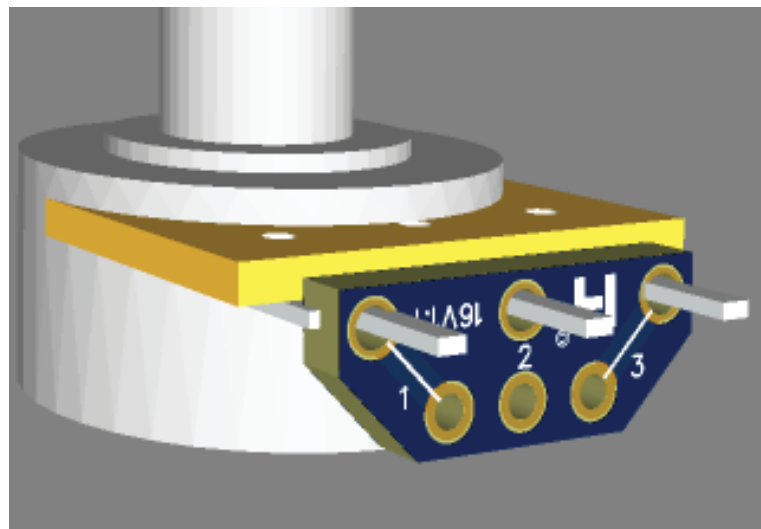
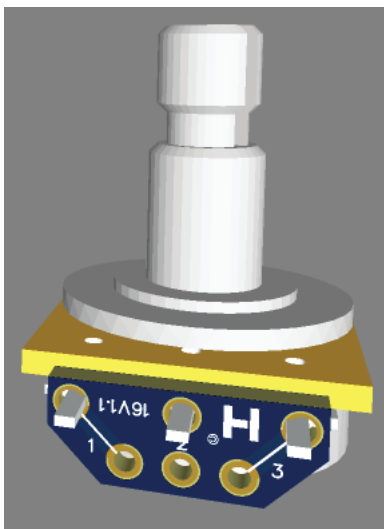
**FRONT**



**REAR**

### ASSEMBLED

(SHOWN WITHOUT WIRING)

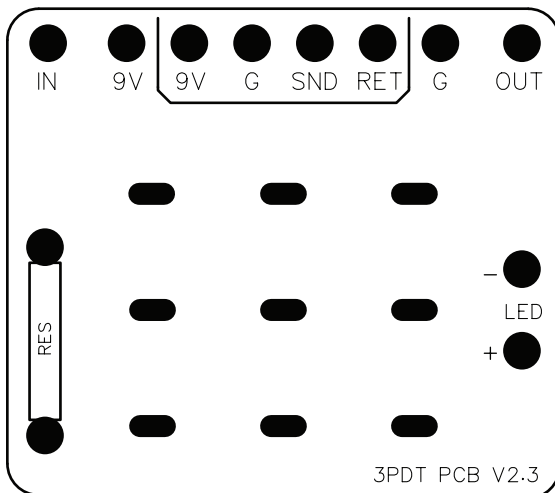


# 3PDT DAUGHTERBOARD PCB

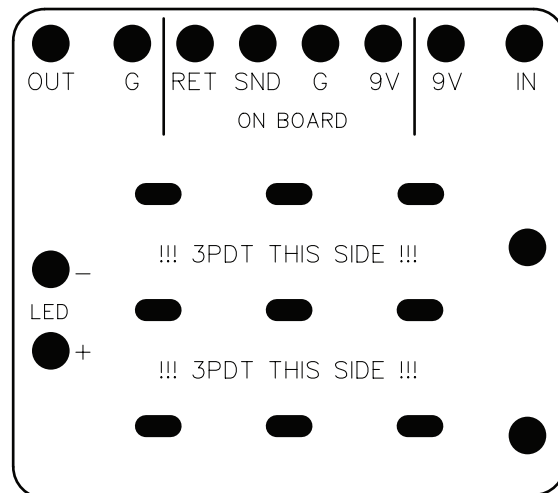
Included with your board is an optional 3PDT daughterboard PCB (compatible with enclosure sizes 1590B and larger) to help organize offboard wiring and simplify connections to the main circuit. Follow the wiring diagrams on pages 7 & 8 if using the 3PDT PCB daughterboard.

**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 with the Hammond Toneworks logo, 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. This page references the current v2.3 PCB, the the older v2.2 PCB is the same except for the input hole location.

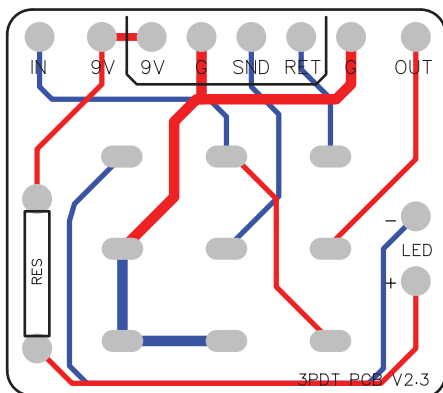


**FRONT**



**REAR**

**LAYOUT**



**ASSEMBLED**

(SHOWN WITHOUT WIRING)

# GREY ONE

Classic late 70's op-amp distortion. With it's two-knob simplicity and popular sound, this pedal circuit is a favorite of builders and players alike. Based on the original *DOD 250 Overdrive / Preamp\** schematic, the Grey One can be built to the specs of the 1977-81 vintage grey box, an alternate "transition" version based on the early yellow box models, and the *MXR Distortion +\**.

## CONTROLS

### GAIN:

The GAIN control adjusts the amount of op-amp gain in the circuit, turn the potentiometer clockwise to increase the gain and therefore increase clipping of the op amp, plus creating a signal loud enough to be clipped by the hard clipping diodes near the end of the circuit.

### VOLUME:

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

\* Hammond Toneworks is in no way affiliated with Harman International Industries, Inc.  
or Dunlop Manufacturing, inc.

## VERSION INFO AND B.O.M. PAGE INDEX

The Grey One V3 board is capable of being built to a few different version specs, a summary of the values are listed in the chart to the right.

For full bill of materials and components, please refer to the pages listed below according to which version of the circuit you would like to build.

**77-81 Grey Spec - 6a**

**80's Alternate - 6b**

**1979 Dist + - 6c**

HT GREY ONE - COMPONENT VALUE CHART			
COMP.	1977-80 GRY	ALTERNATE	DIST +
U1	741	TL081	741
<b>RESISTORS</b>			
R1	1.5M	1.5M	1.5M
R2	10K	10K	10K
R3	4.7K	4.7K	4.7K
R4	1M	1M	1M
R5	10K	10K	10K
R6	100R	100R	JUMPER
R7	22K	22K	1M
R8	22K	22K	1M
R9	470K	470K	1M
<b>FILM CAPS</b>			
C1	10n	10n	10n
C3	47n	47n	47n
C5	1n	1n	1n
<b>CERAMIC CAPS</b>			
C2	OMIT	25p	OMIT
<b>ELECTROLYTIC CAPS</b>			
C4	4.7u	4.7u	1u
C6	10u	10u	1u
<b>DIODES</b>			
D1	1N4148	1N4148	1N270
D2	1N4148	1N4148	1N270
<b>POTS</b>			
GAIN	C500K	C500K	B1M
VOLUME	B100K	B100K	A10K

**BILL OF MATERIALS**

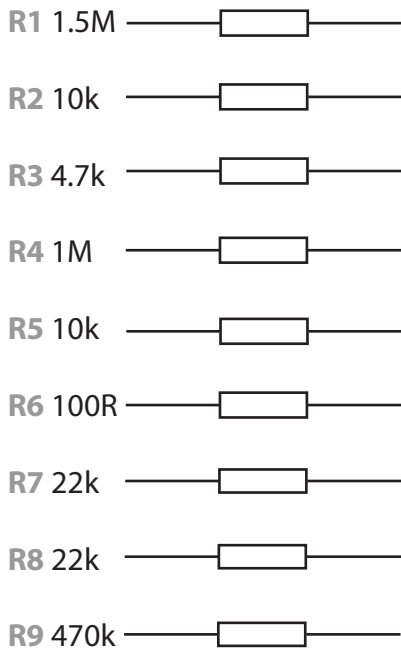
RESISTOR		FILM CAP (B)		ELEC CAP		DIODE		IC		POTS	
QTY	VALUE	QTY	VALUE	QTY	VALUE	QTY	VALUE	QTY	VALUE	QTY	VALUE
1	100R	1	1n	1	4.7u	2	1N4148	1	LM741	1	A100K
1	4.7K	1	10n	1	10u					1	C500K
2	10K	1	47n								
2	22K										
1	470K										
1	1M										
1	1.5M										

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

**SMALL COMPONENT TABLE**

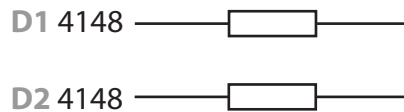
(Small components may be taped down here)

**RESISTORS**

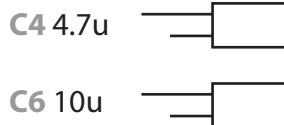


R1 is not on original schematic. A pull down resistor is added here to prevent popping when the effect is powered on. a value of 1.5M-2M is recommended

**DIODES**



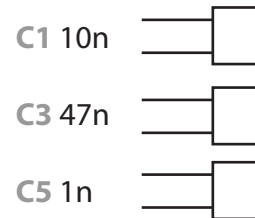
**ELECTRO CAPACITORS**



**CERAMIC CAPACITORS**

C2 OMIT

**FILM CAPACITORS**



**POTENTIOMETER**

GAIN C500K

VOL A100K

**DISCREPANCIES:**  
 Some early runs of this circuit are reported to have used some of the following values, though they may not be the norm. You may use these if you would like. (These are the '77 specs from the old build docs)

R1 - 1nF film capacitor

R6 - Not present on some runs

R7/R8/R9 - 20k/20k/510k  
 (R7,R8, R9 must be changed together, they make up the voltage divider section and control voltage to the IC)

D1/D2 - 1N4001/1N4001

**BILL OF MATERIALS**

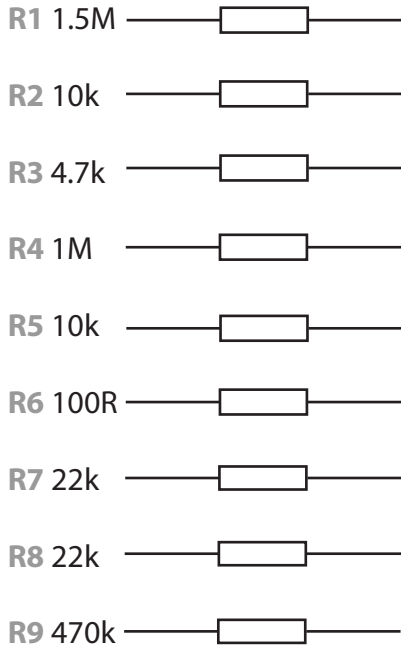
RESISTOR		FILM CAP (B)		CER CAP (M)		ELEC CAP		DIODE		IC		POTS	
QTY	VALUE	QTY	VALUE	QTY	VALUE	QTY	VALUE	QTY	VALUE	QTY	VALUE	QTY	VALUE
1	100R	1	1n	1	25p	1	4.7u	2	1N4148	1	TL081	1	A100K
1	4.7K	1	10n			1	10u					1	C500K
2	10K	1	47n										
2	22K												
1	470K												
1	1M												
1	1.5M												

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

**SMALL COMPONENT TABLE**

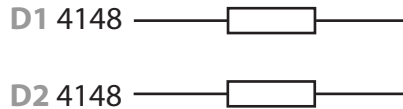
(Small components may be taped down here)

**RESISTORS**

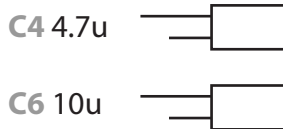


R1 is not on original schematic. A pull down resistor is added here to prevent popping when the effect is powered on. a value of 1.5M-2M is recommended

**DIODES**



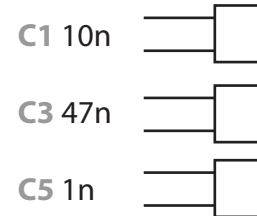
**ELECTRO CAPACITORS**



**CERAMIC CAPACITORS**



**FILM CAPACITORS**



**POTENTIOMETER**



**NOTE ABOUT THIS VERSION:**

The 250 is a very early pedal that went through several revisions before it arrived to the modern day yellow version. This "alternate" build was kind of a backup spec 250 that was actually included in some early schematics. This version of the circuit (using either a LF351 or a TL081, depending on availability) was produced during a transition time from the gray to the yellow versions in the very early 80's before the manufacturer decided to go with the more modern 4558 version. The TL081 is a bit brighter than the 741, which is why C2 was added in those builds to help cut off some of the high end frequencies to better match the original sound. If you want your build to be a bit brighter than the gray version, this would be a good version to try out. If you socket your op amp and C2, you can swap back in forth to find which version you like best. Think of it as kind of a mix between both generations. While you're in the modding mood, you can also try a 1N4001 in the D2 spot for asymmetrical clipping. A TL071 can also be used in the op amp spot if you prefer.



**BILL OF MATERIALS**

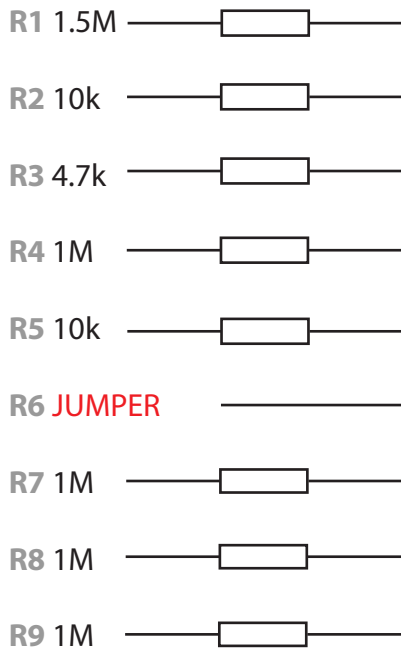
RESISTOR		FILM CAP (B)		ELEC CAP		DIODE		IC		POTS	
1	4.7k	1	1n	2	1u	2	1N270	1	LM741	1	A10K
2	10k	1	10n							1	B1M
4	1M	1	47n								
1	1.5M										

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

**SMALL COMPONENT TABLE**

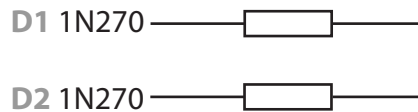
(Small components may be taped down here)

**RESISTORS**

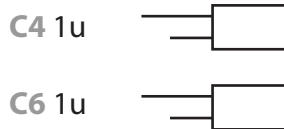


R1 is not on original schematic. A pull down resistor is added here to prevent popping when the effect is powered on. a value of 1.5M-2M is recommended

**DIODES**



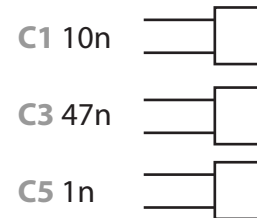
**ELECTRO CAPACITORS**



**CERAMIC CAPACITORS**

C2 OMIT

**FILM CAPACITORS**



**POTENTIOMETER**

GAIN B1M

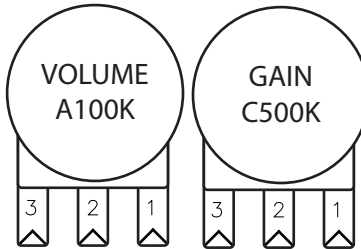
VOL A10K

**DIODE NOTE:**  
 1N270 germanium diodes are becoming more difficult to source. A common substitute in the DIY community is the 1N34A or a D9E germanium diode. Try socketing the diodes and play around with whichever sound best for your setup, or maybe even a mix of different types :)

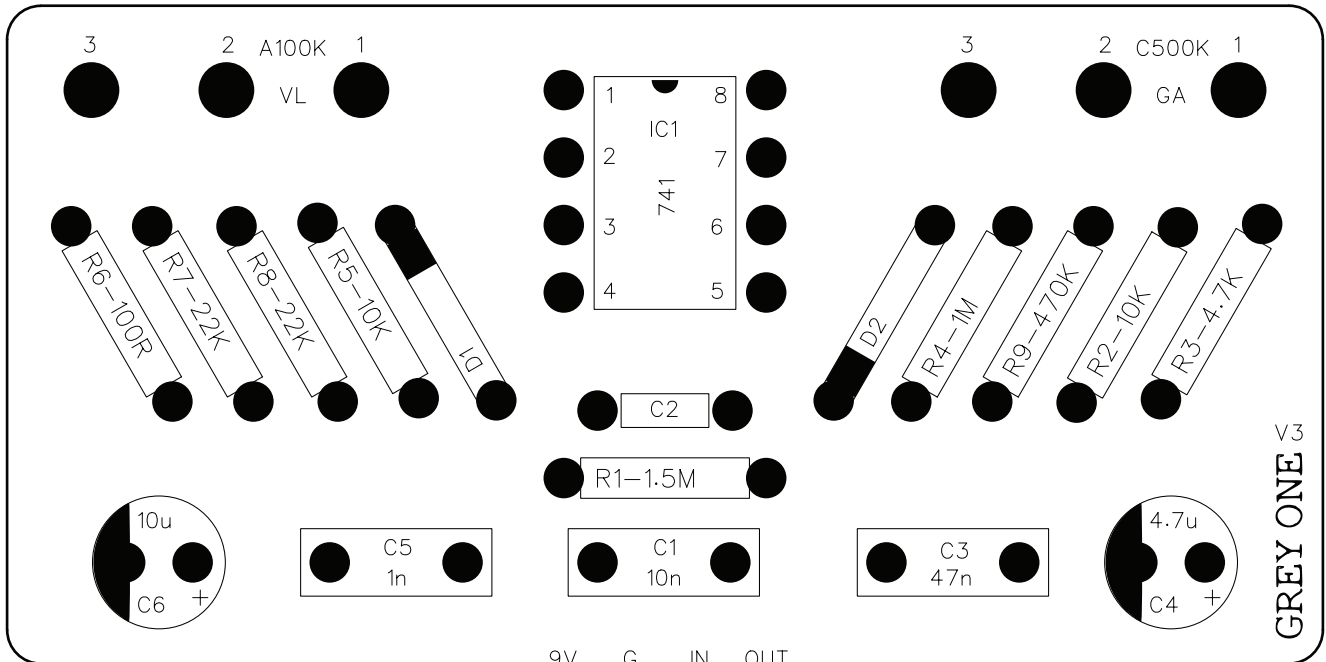
**Refer to the illustration below when attaching components to your PCB**

(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)



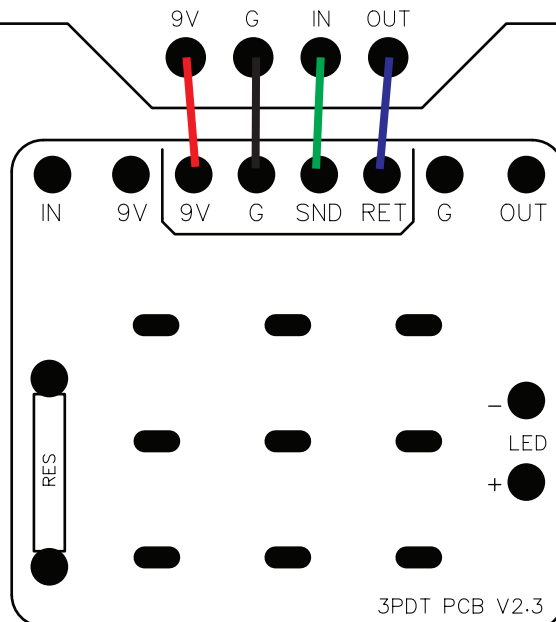
Grey version values are marked on the board by default. If building the Dist + please refer to page 6c for values.



GREY ONE V3

<- 27.94mm ->

<- 49.53mm ->



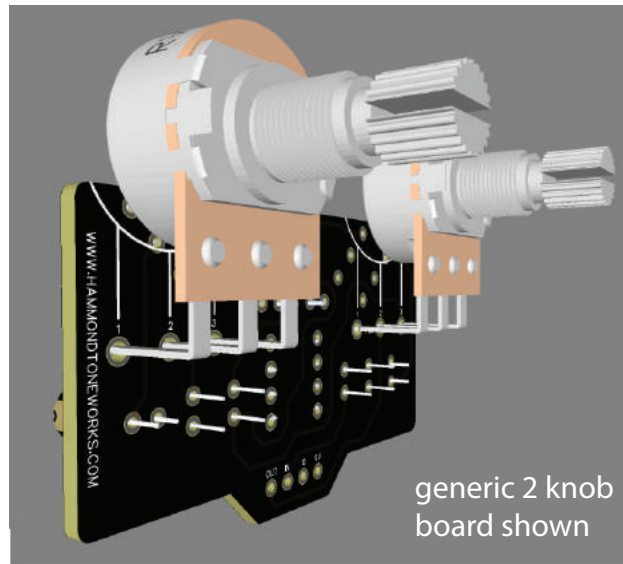
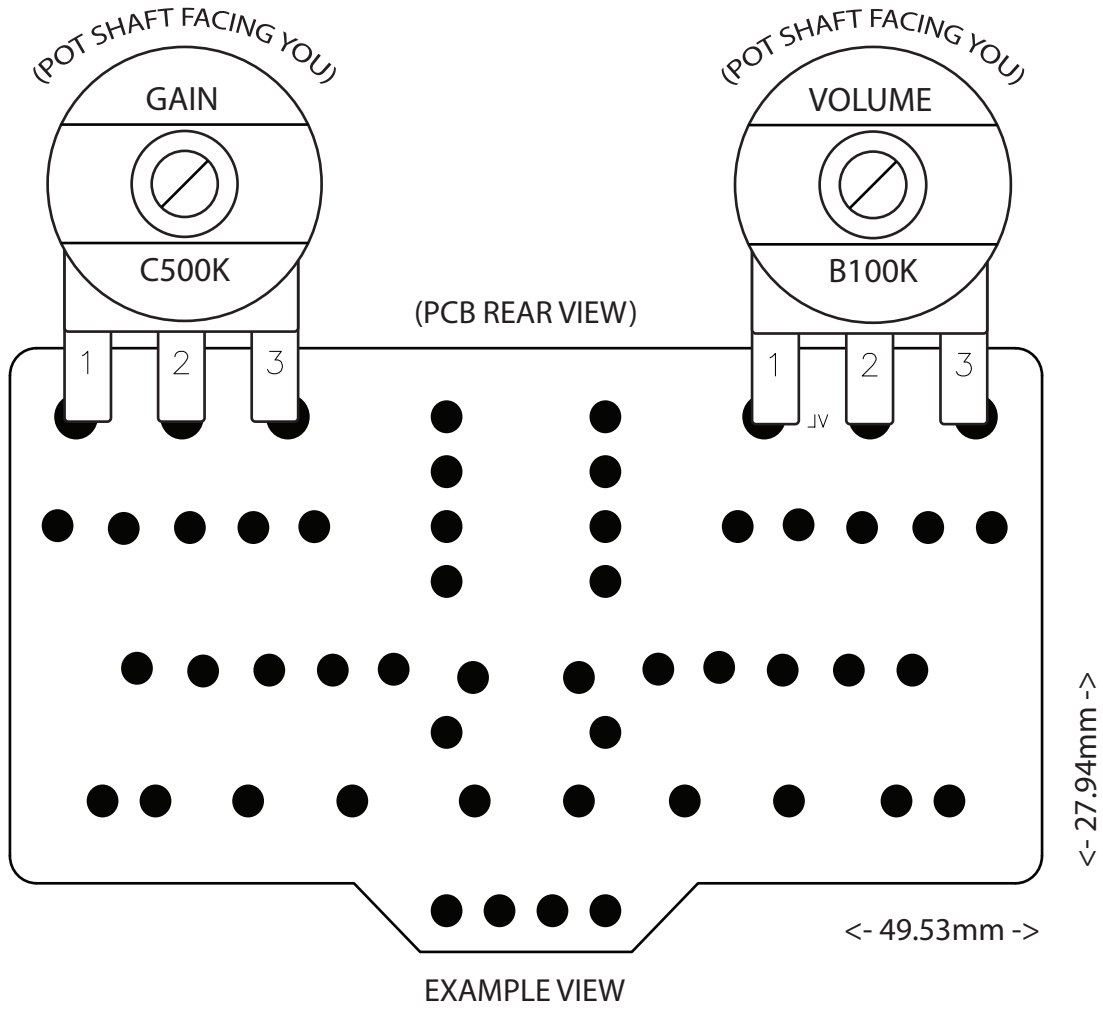
(3PDT PCB OPTIONAL)

**Bill of materials on page 6**

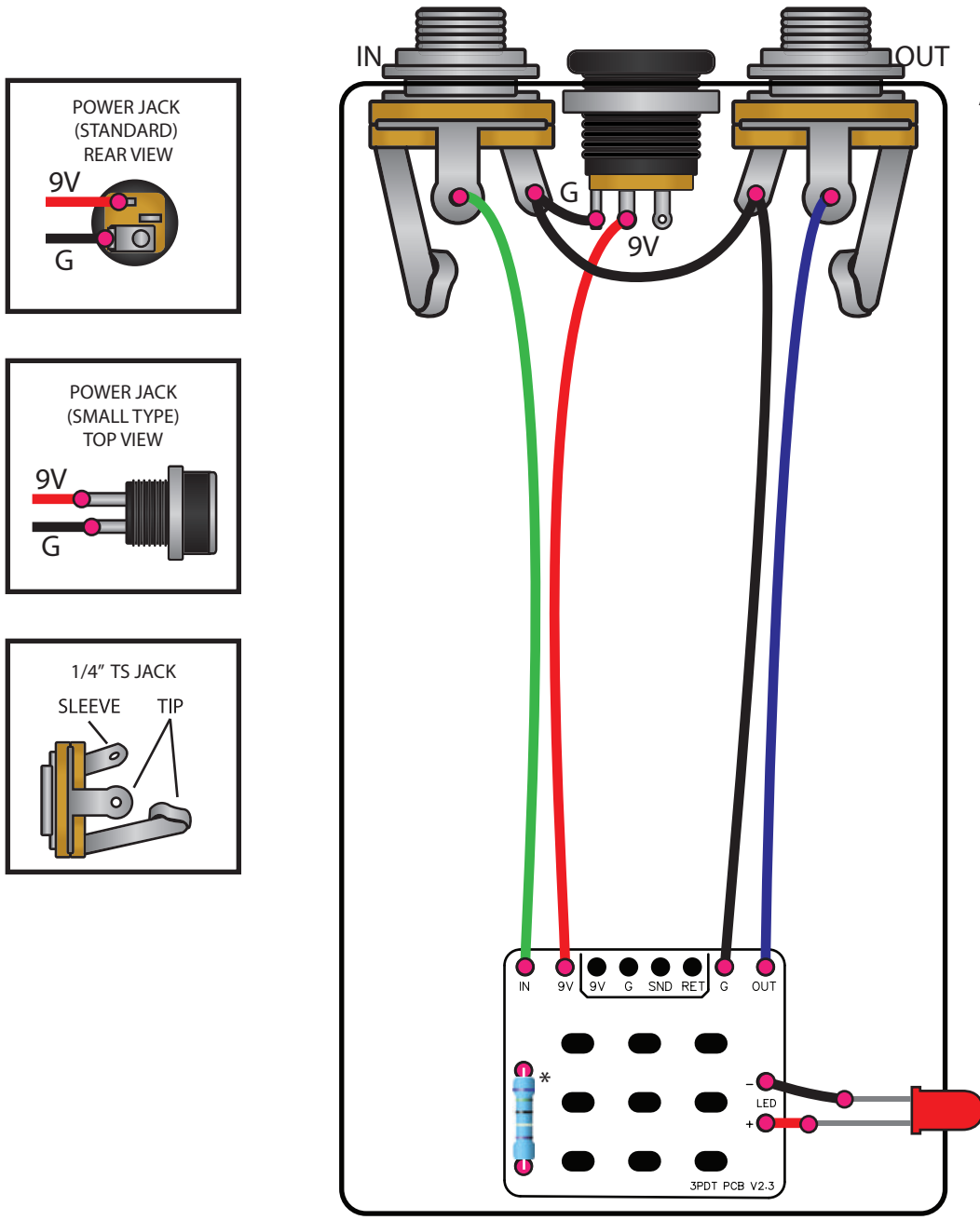
Refer to the illustration below when attaching components to your PCB

BOARD MOUNTED POTS (PCB REAR VIEW)

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



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.



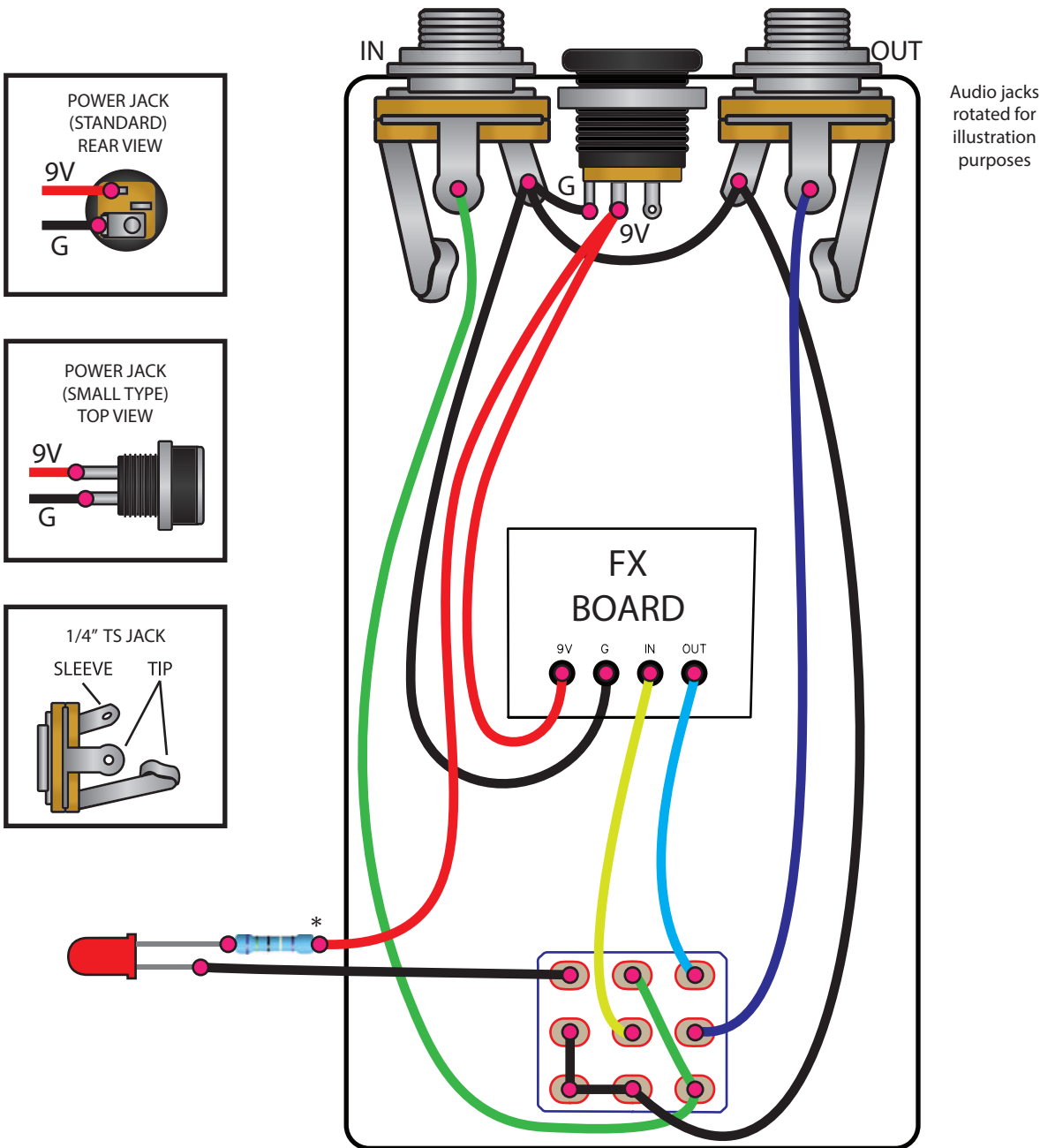
Audio jacks rotated for illustration purposes

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.



## PRINT THIS PAGE ACTUAL SIZE

TAYDA DRILL TEMPLATE  
HT125B-2K-08 (small DC)  
HT125B-2K-12 (large DC)

**125B**  
Top Jack 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.

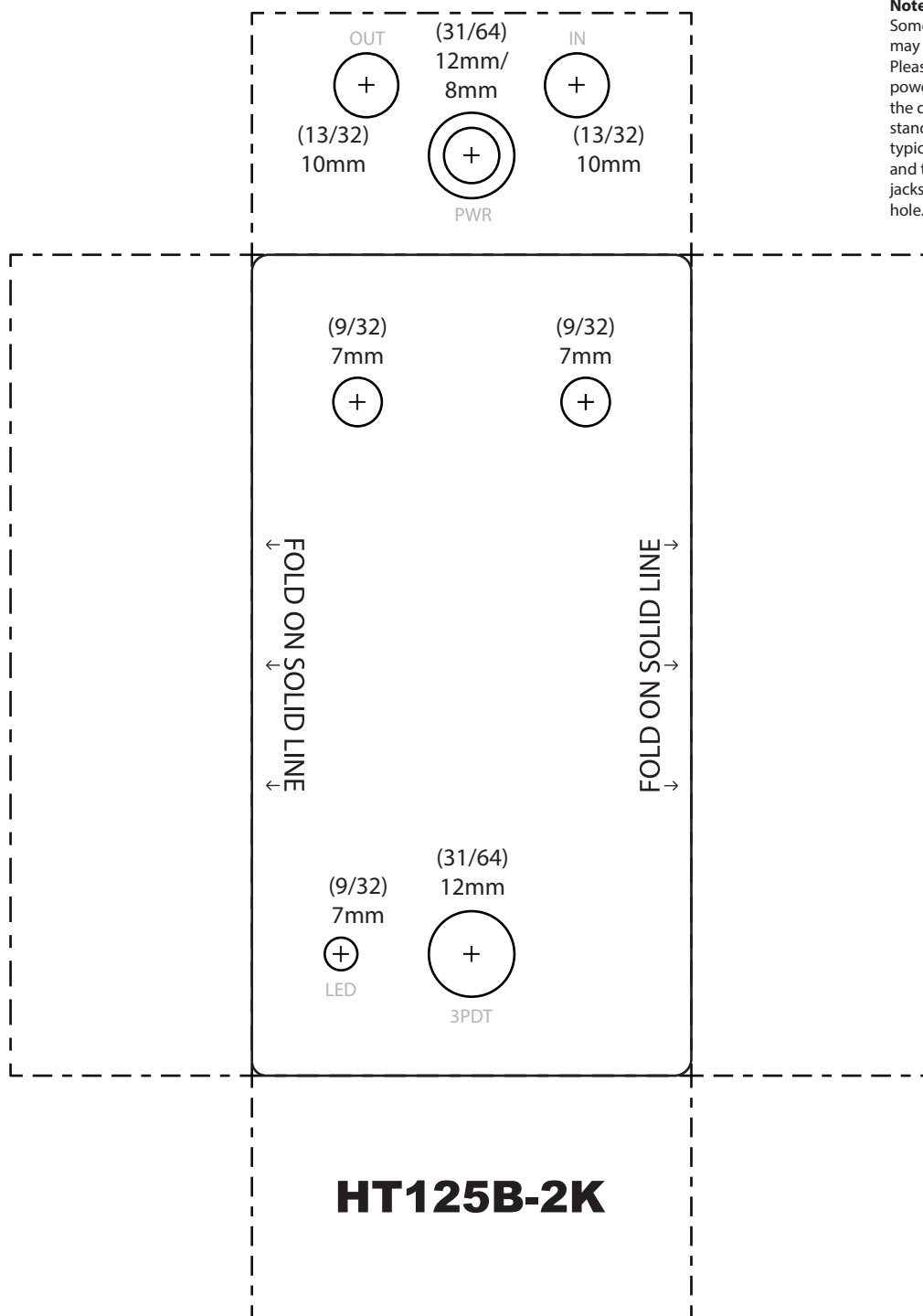
4. Remove template and check spacing on punched drill markers to ensure that everything will fit nicely. It's better to find out now than later. A common issue is the 1/4" jacks being too high, low, or offset. Hold a jack centered on the punch mark to see the clearance and make sure the lid will close (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: 29mm

**Note:**  
Some power jack diameters may be smaller than 12mm. Please refer to your preferred power jack spec sheet to find the diameter needed. The standard threaded DC jacks typically require a 12mm hole, and the smaller two prong DC jacks typically require an 8mm hole.



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

Hammond Toneworks is in no way affiliated with Tayda Electronics