1 KNOB FUZZ

PCB V2.0
BUILDER'S MANUAL

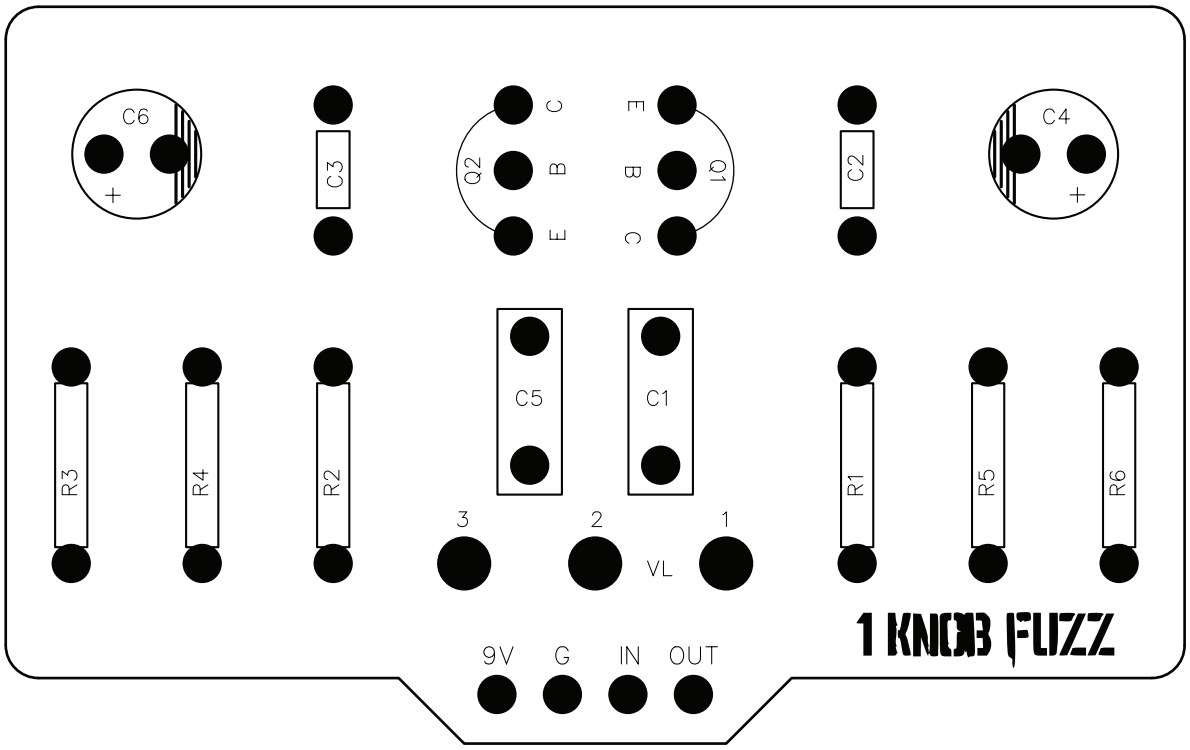

TABLE OF CONTENTS

ONBOARD POTS

PCB boards designed to allow direct mount 90 degree potentiometers

Dimensions (W=45.72mm x H=28.57mm)
Recommended enlcosure 1590B/125B

Drill Template: HT1590B-1K-08, HT11590B-1K-12
HT125B-1K-08, HT125B-1K-12

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

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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.

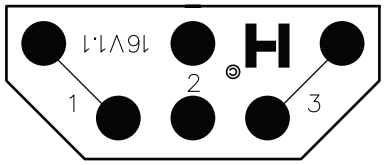
2. OFFBOARD WIRING

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

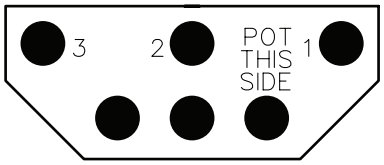
16mm PCB PIN POTENTIOMETER ADAPTER BOARD

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" .



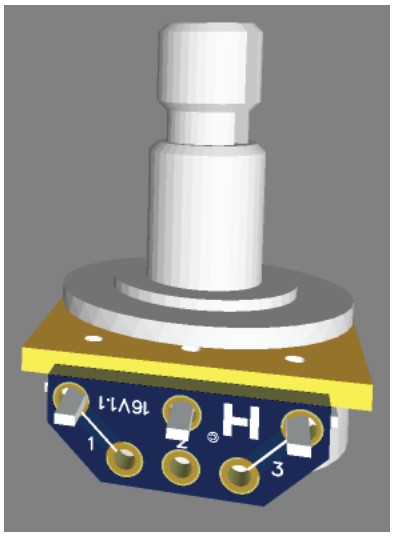
FRONT

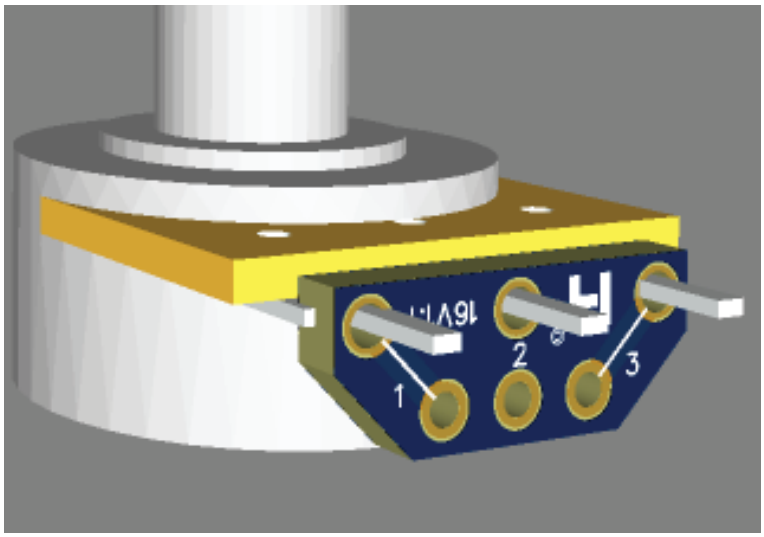


REAR

ASSEMBLED

(SHOWN WITHOUT WIRING)

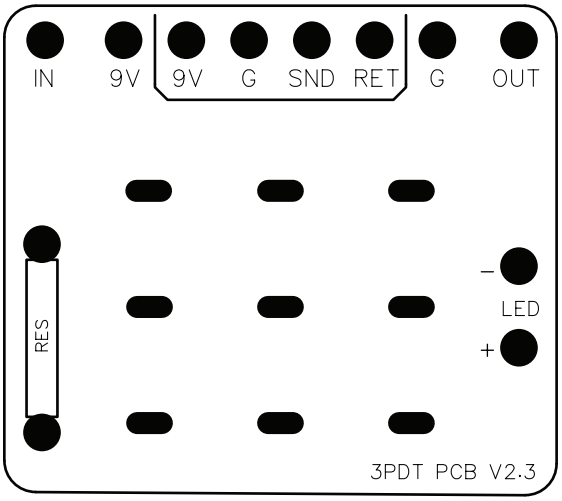




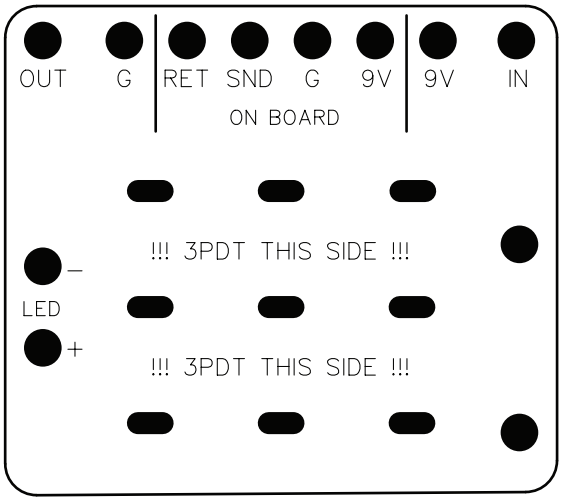
3PDT DAUGHTERBOARD PCB

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.

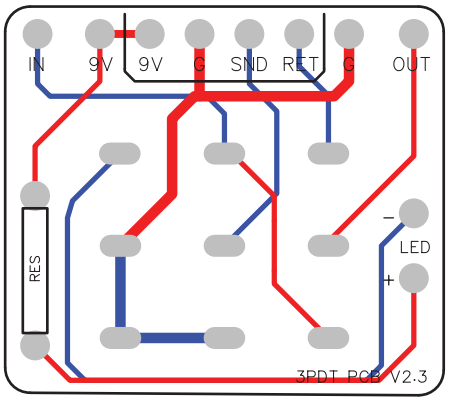


FRONT



REAR

LAYOUT



ASSEMBLED

(SHOWN WITHOUT WIRING)

1 KNOB FUZZ

The 1-Knob Fuzz PCB allows for multiple classic and modern one knob fuzz builds from a single board. Based on popular and tweakable one knob fuzz projects that countless D.I.Y. builders have made or modified. Featuring a low parts count and spaced out components for assembling ease. This kit includes the instructions and layouts for the following one knob fuzz builds:

- *Colorsound Fuzz Box **
- *D*A*M Meathead **
- *D*A*M Meathead Dark **
- *Dr. Tony Balls 1966 **
- *Black Arts Toneworks Ritual Fuzz **
- *Doom Fuzz*

Or try modding one to create a fuzz of your own! Experimentation with different transistors and cap values can create some pretty great sounding fuzz circuits. Just watch your transistor pinout. This board is designed to for NPN transistors with an EBC or CBE pinout, the collector, base, and emitter pin locations are printed on the PCB to mark for the correct orientation.

This PCB was designed for a 1590B enclosure, but can be housed in a 125B using the offboard wiring on pg 8a and the drill template on pg 11a.

CONTROLS

VOLUME:
The VOLUME control adjusts the overall output volume of the circuit. Turn clockwise to increase the output level of the circuit. This circuit has a preset amount of fuzz. The pedal volume knob does not control the amount of fuzz, but how loud the output of the pedal is. You can roll back the volume knob on your guitar to adjust the level of fuzz produced overall.

** Hammond Toneworks is in no way affiliated with any company or products mentioned. These names are used for references.*

VERSION INFO AND B.O.M. PAGE INDEX

The 1-Knob Fuzz PCB is capable of being built to several different fuzz specs, a summary of the values are listed in the chart below.

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

NOTE: For the MH & MHD, the values for Q1 & Q2 have had conflicting reports from different sources. This document states the most commonly used transistors for those variants. The other reported transistors used are noted on the BOM page for those specific circuits.

1-KNOB FUZZ VALUES CHART						
COMP	ColorSound	Meathead	Meathead Dark	1966	Ritual	Doom Fuzz
R1	1.5M	1.5M	1.5M	1.5M	1.5M	1.5M
R2	10K	18K	18K	10K	10K	18K
R3	820 R	820 R	820 R	1K	820 R	820 R
R4	2.2K	4.7K	4.7K	8.2K	2K	4.7K
R5	150K	120K	120K	47K	150K	120K
R6	1K	1K	1K	1K	1K	1K
C1	100n	47n	470n	220n	680n	47n
C2	220p	470p	470p	220p	150p	470p
C3	OMIT	47p	47p	OMIT	OMIT	47p
C4	10u	10u	10u	22u	10u	10u
C5	220n	22n	100n	6.8n	220n	220n
C6	47u	47u	47u	47u	100u	100u
Q1 NPN	BC109	2N3904	2N3904	BC107	2N2222A	BC548
Q2 NPN	BC108	BC182B	BC182B	BC108	2N2222A	2N5089
LEVEL	A500K	A500K	A500K	A500K	A500K	A500K

BILL OF MATERIALS

RESISTOR		FILM CAP (B)		CER CAP (M)		ELEC CAP		TRANSISTOR		POTS	
1	820R	1	100n	1	220p	1	10u	1	BC109	1	A500K
1	1K	1	220n			1	47u	1	BC108		
1	2.2K										
1	10K										
1	150K										
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 1.5M

R2 10k

R3 820R

R4 2.2k

R5 150k

R6 1k

ELECTRO CAPACITORS

C4 10u

C6 47u

FILM CAPACITORS

C1 100n

C5 220n

CERAMIC CAPACITORS

C2 220p

C3 OMIT

TRANSISTORS

Q1 BC109

Q2 BC108

NOTES:

BILL OF MATERIALS

RESISTOR		FILM CAP (B)		CER CAP (M)		ELEC CAP		TRANSISTOR		POTS	
1	820R	1	47n	1	470p	1	10u	1	2N3904	1	A500K
1	1K	1	22n	1	47p	1	47u	1	BC182B		
1	4.7K										
1	18K										
1	120K										
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 1.5M

R2 18k

R3 820R

R4 4.7k

R5 120k

R6 1k

ELECTRO CAPACITORS

C4 10u

C6 47u

FILM CAPACITORS

C1 47n

C5 22n

CERAMIC CAPACITORS

C2 470p

C3 47p

TRANSISTORS

Q1 2N3904

Q2 BC182B

NOTE: Q2 is originally BC182L. The BC182B is mentioned in this document due to the pinout being compatible with the 1-knob fuzz PCB. A 2N5088 has been reported to work well as a replacement if you would rather build it with a more common component. Socketing transistors is a fun way to find which sound you prefer. ALWAYS MIND YOUR PINOUT

NOTES:

BILL OF MATERIALS

RESISTOR		FILM CAP (B)		CER CAP (M)		ELEC CAP		TRANSISTOR		POTS	
1	820R	1	470n	1	470p	1	10u	1	2N3904	1	A500K
1	1K	1	100n	1	47p	1	47u	1	BC182B		
1	4.7K										
1	18K										
1	120K										
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 1.5M

R2 18k

R3 820R

R4 4.7k

R5 120k

R6 1k

ELECTRO CAPACITORS

C4 10u

C6 47u

FILM CAPACITORS

C1 470n

C5 100n

CERAMIC CAPACITORS

C2 470p

C3 47p

TRANSISTORS

Q1 2N3904

Q2 BC182B

NOTE: Q1 has also been reported to be BC239C.
Q2 is originally BC182L. The BC182B is mentioned in this document due to the pinout being compatible with the 1-knob fuzz PCB.
A 2N5088 has been reported to work well as a replacement if you would rather build it with a more common component. Socketing transistors is a fun way to find which sound you prefer. ALWAYS MIND YOUR PINOUT

NOTES:

BILL OF MATERIALS

RESISTOR		FILM CAP (B)		CER CAP (M)		ELEC CAP		TRANSISTOR		POTS	
1	1K	1	220n	1	220p	1	22u	1	BC107	1	A500K
1	1K	1	6.8n			1	47u	1	BC108		
1	8.2K										
1	10K										
1	47K										
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 1.5M

R2 10k

R3 1k

R4 8.2k

R5 47k

R6 1k

ELECTRO CAPACITORS

C4 22u

C6 47u

FILM CAPACITORS

C1 220n

C5 6.8n

CERAMIC CAPACITORS

C2 220p

C3 OMIT

TRANSISTORS

Q1 BC107

Q2 BC108

NOTES:

BILL OF MATERIALS

RESISTOR		FILM CAP (B)		CER CAP (M)		ELEC CAP		TRANSISTOR		POTS	
1	820R	1	680n	1	150p	1	10u	2	2N2222A	1	A500K
1	1K	1	220n			1	100u				
1	2K										
1	10K										
1	150K										
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 1.5M

R2 10k

R3 820R

R4 2k

R5 150k

R6 1k

ELECTRO CAPACITORS

C4 10u

C6 100u

FILM CAPACITORS

C1 680n

C5 220n

CERAMIC CAPACITORS

C2 150p

C3 OMIT

TRANSISTORS

Q1 2N2222A

Q2 2N2222A

NOTES:

BILL OF MATERIALS

RESISTOR		FILM CAP (B)		CER CAP (M)		ELEC CAP		TRANSISTOR		POTS	
1	820R	1	47n	1	470p	1	10u	1	BC548	1	A500K
1	1K	1	220n	1	47p	1	100u	1	2N5089		
1	4.7K										
1	18K										
1	120K										
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 1.5M

R2 18k

R3 820R

R4 4.7k

R5 120k

R6 1k

ELECTRO CAPACITORS

C4 10u

C6 100u

FILM CAPACITORS

C1 47n

C5 220n

CERAMIC CAPACITORS

C2 470p

C3 47p

TRANSISTORS

Q1 BC548

Q2 2N5089

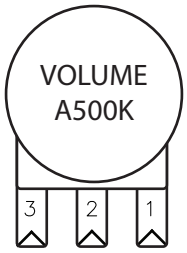
NOTES:

Refer to the illustration below when attaching components to your PCB

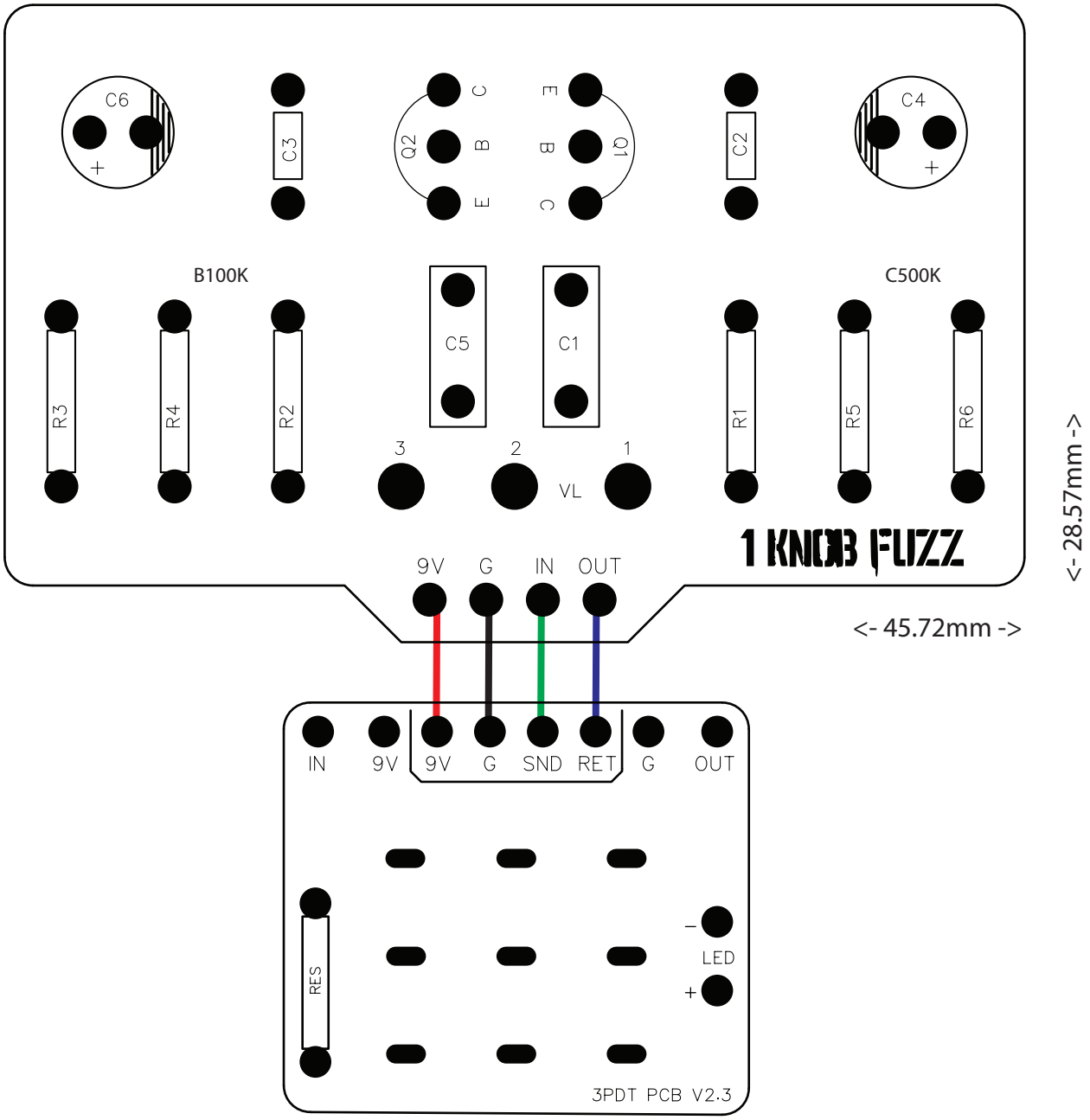
(wire length, boards, and pots are not shown to scale. They have been sized to fit this page for illustration purposes)

Board mounted pots

(see page **7a** for pot mounting)



NOTE: Some transistors may not follow the "crescent" marking around the Q1 , Q2 lettering on the PCB. This is expected as different circuits call for different transistors, but they should always follow the printed EMITTER, BASE, and COLLECTOR pin locations on the PCB.



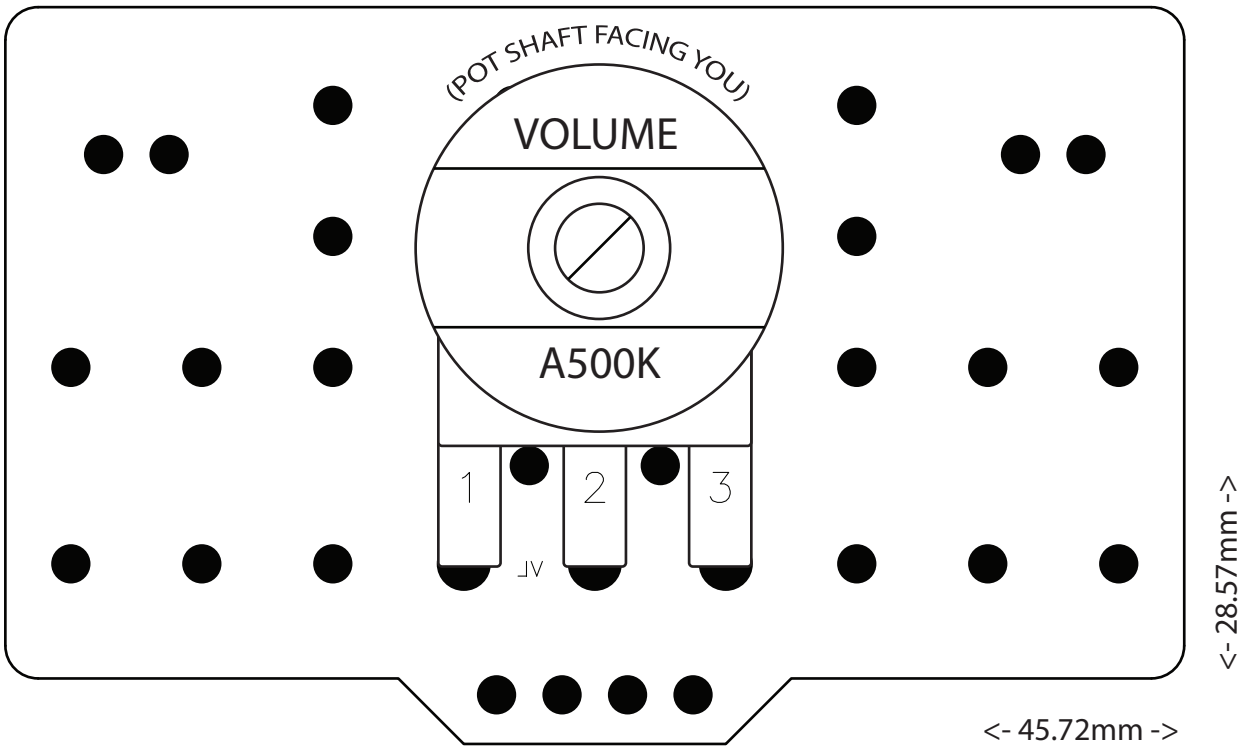
(3PDT PCB OPTIONAL)

Bill of materials on page 6

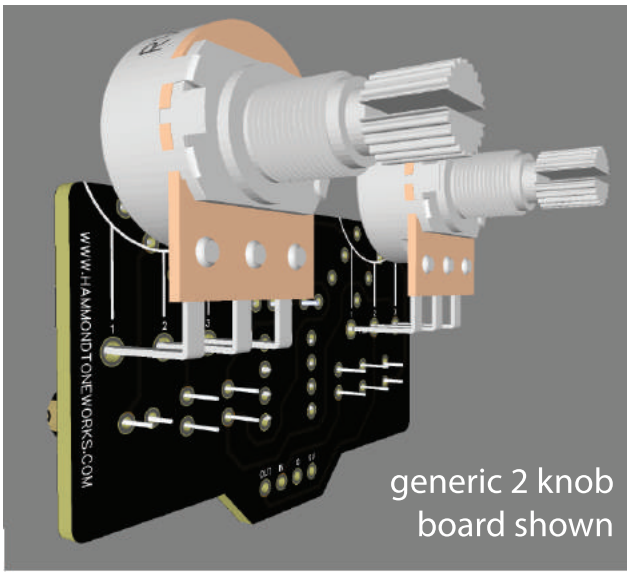
Refer to the illustration below when attaching components to your PCB

BOARD MOUNTED POTS
(PCB REAR VIEW)

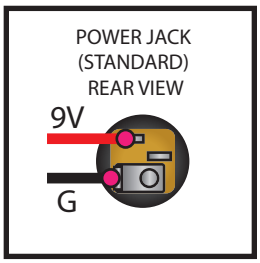
(Pots are not shown to scale. They have been sized to fit this page for illustration purposes)

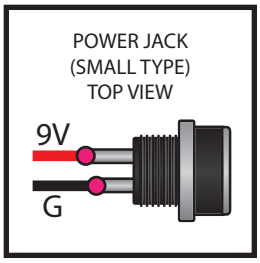


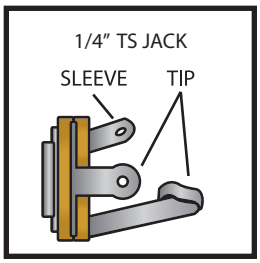
EXAMPLE VIEW

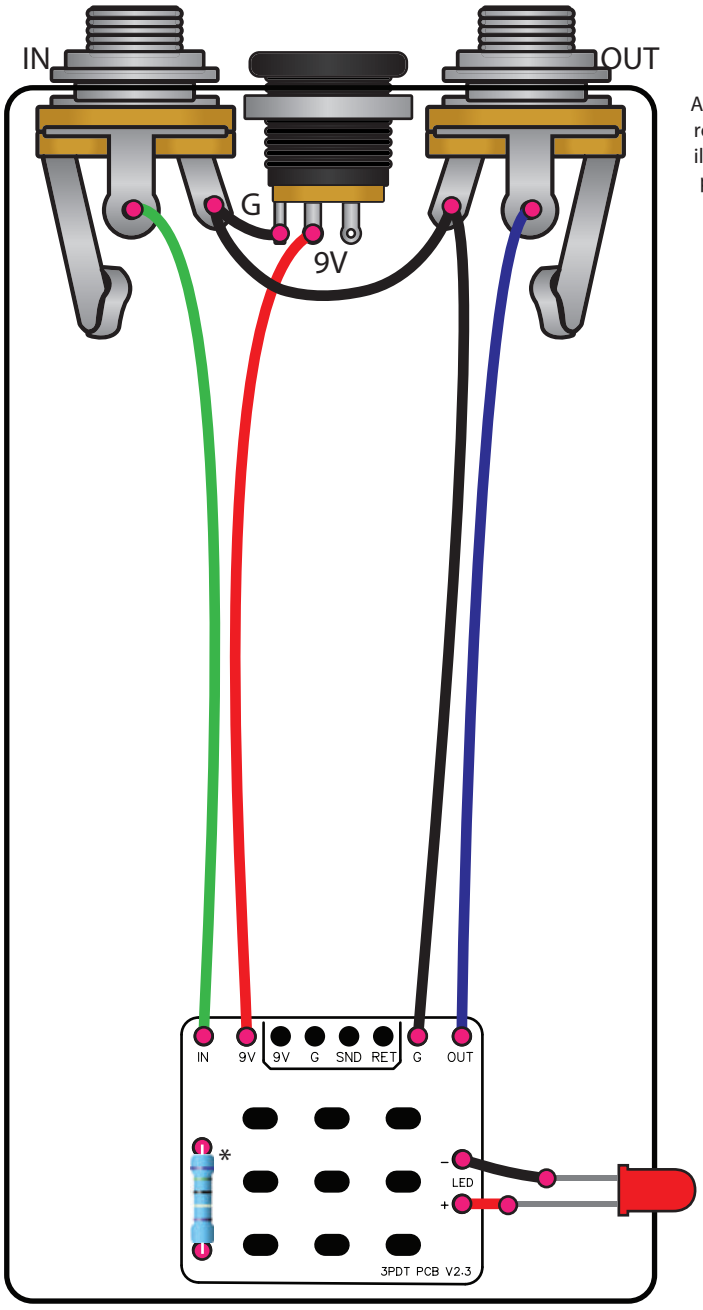


A 3PDT PCB board is included with your effect board to simplify the offboard wiring process. You may use your own method of offboard wiring if preferred. The illustration below is recommended if you are using the included 3PDT PCB. As long as the effect PCB receives the correct 9V, Ground, In, and Out 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.









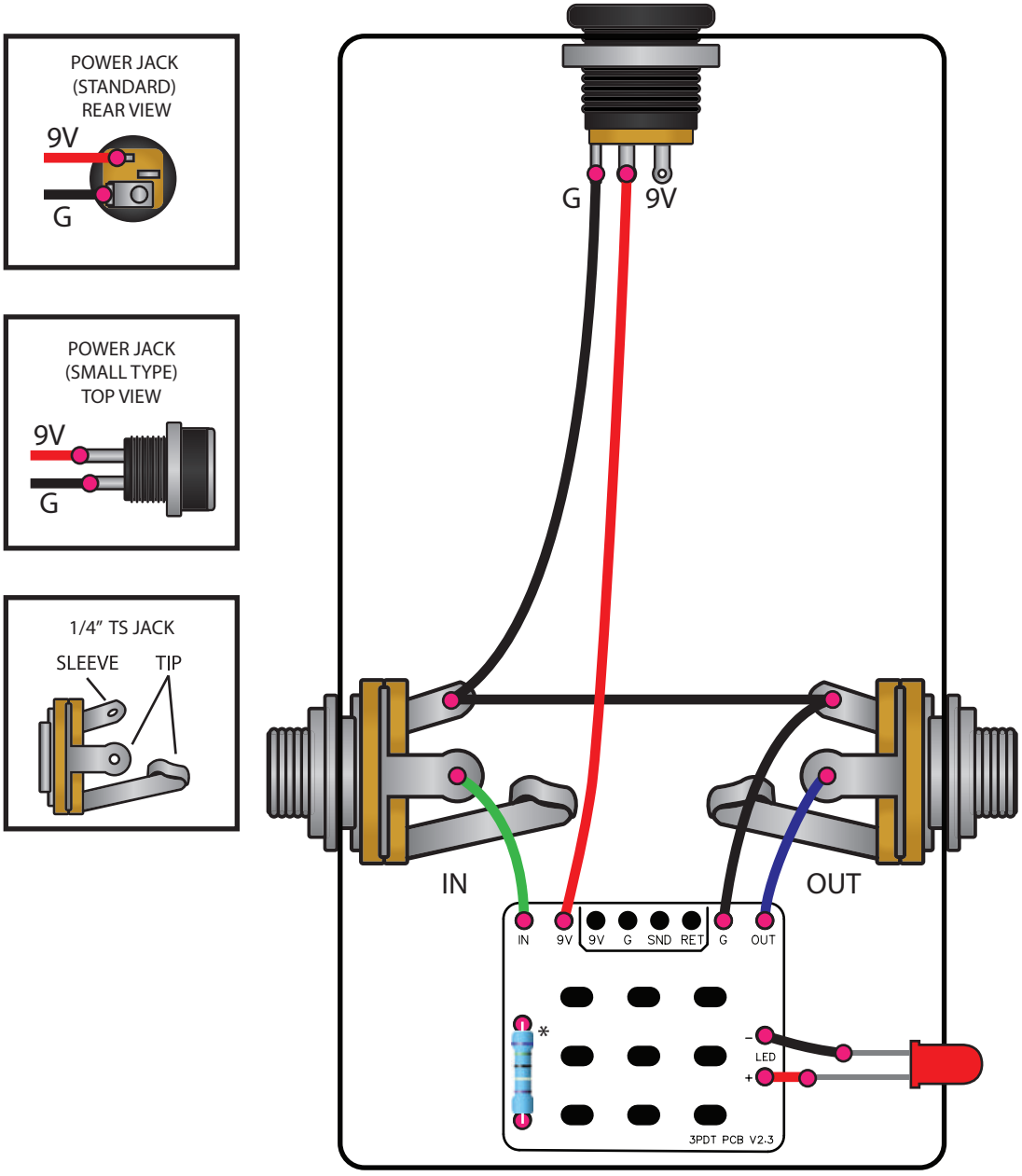
Audio jacks rotated for illustration purposes

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.

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.

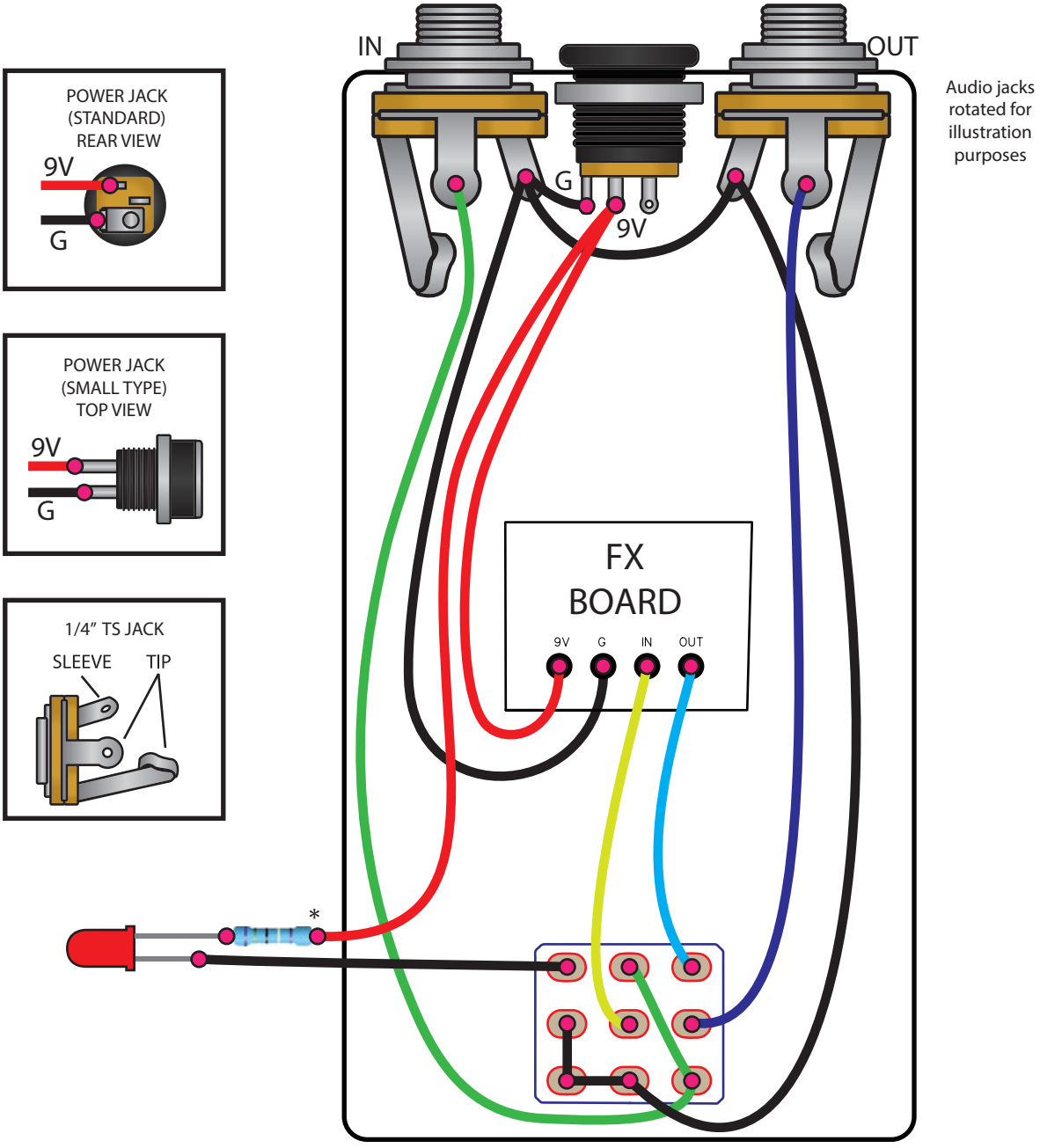


NOTE:
If using a 3PDT PCB, it is easier to solder all wires and components first, and then solder the 3PDT switch to the board last.

● = 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.

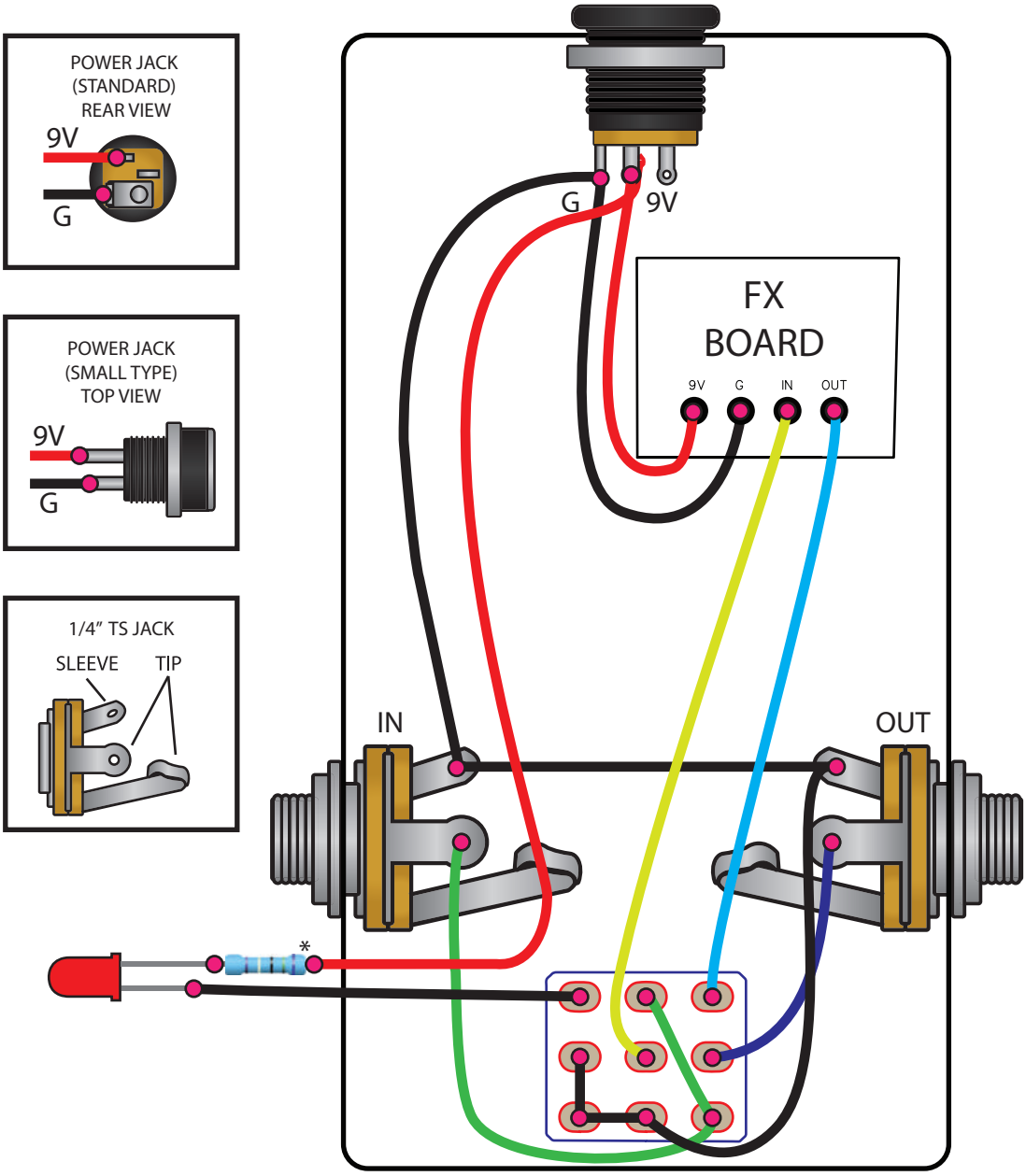
The following wiring is recommended only if no 3PDT board is available. As long as the effect PCB receives the correct 9V, Ground, In, and Out connections, it will work properly. **A 3PDT PCB board is included with your effect PCB to simplify the offboard wiring process, if you would like to use the 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

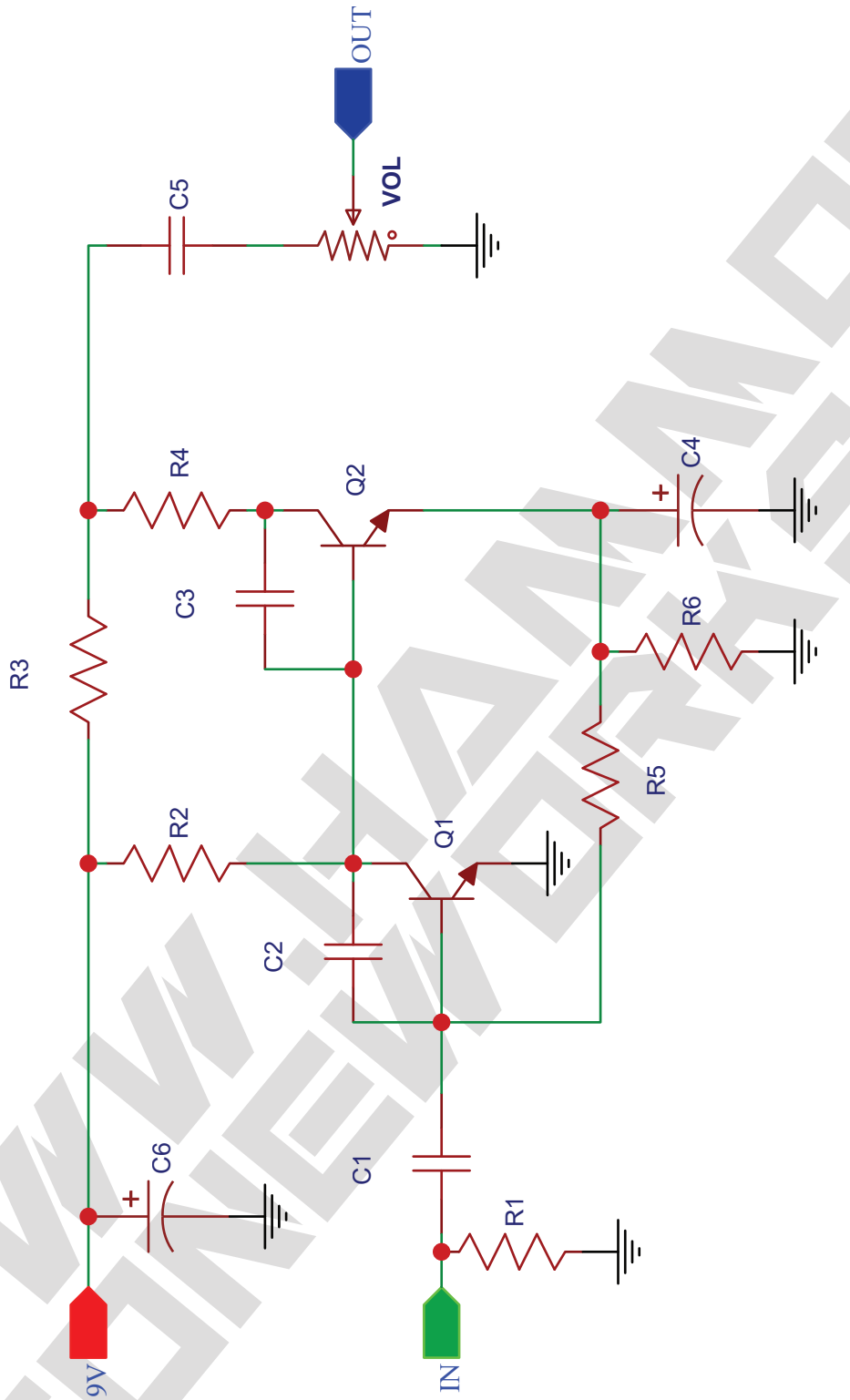
* LED resistor can be any value of your choice.
Typical recommendation is 4.7k for normal red diffused LEDs, but may require up to 33k or so, depending on LED type and color.

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.



Please refer to Page 6 in this document to find component values

PRINT THIS PAGE
ACTUAL SIZE

TAYDA DRILL TEMPLATE
HT1590B-1K-08 (small DC)
HT1590B-1K-12 (large DC)

1590B
1 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.

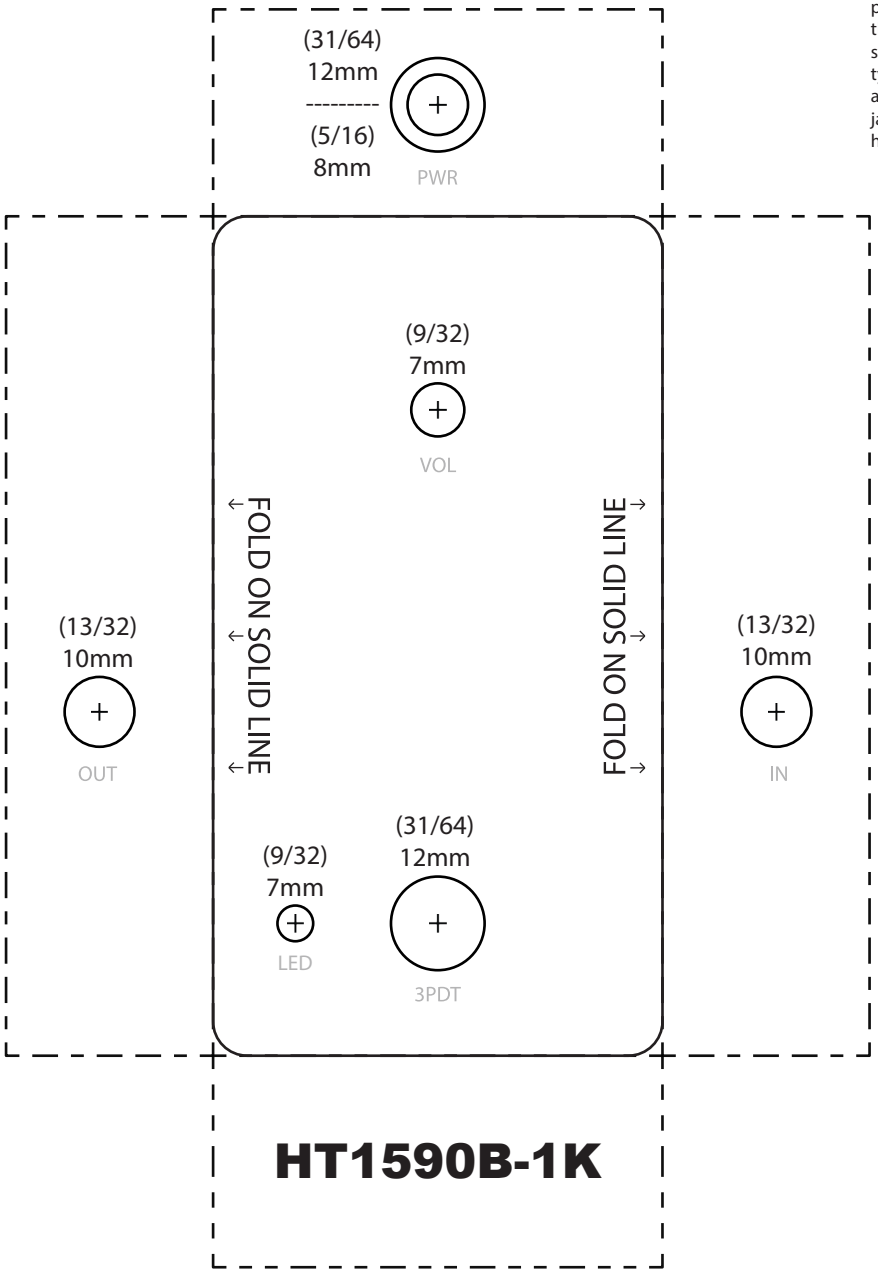
3. Using a steel punch, mark the drilling holes in the center of each cross. The punch should mark the enclosure even through the paper.

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 jacks being too high or low, 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) and that the jack is not touching the bottom of the 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.

Max knob diameter: 45mm

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 Hammond Manufacturing branded size 1590B enclosures.*

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PRINT THIS PAGE
ACTUAL SIZE

TAYDA DRILL TEMPLATE
HT125B-1K-08 (small DC)
HT125B-1K-12 (large DC)

125B
Top Jack Drill Template
1-KNOB
Including drill size

DIRECTIONS:

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

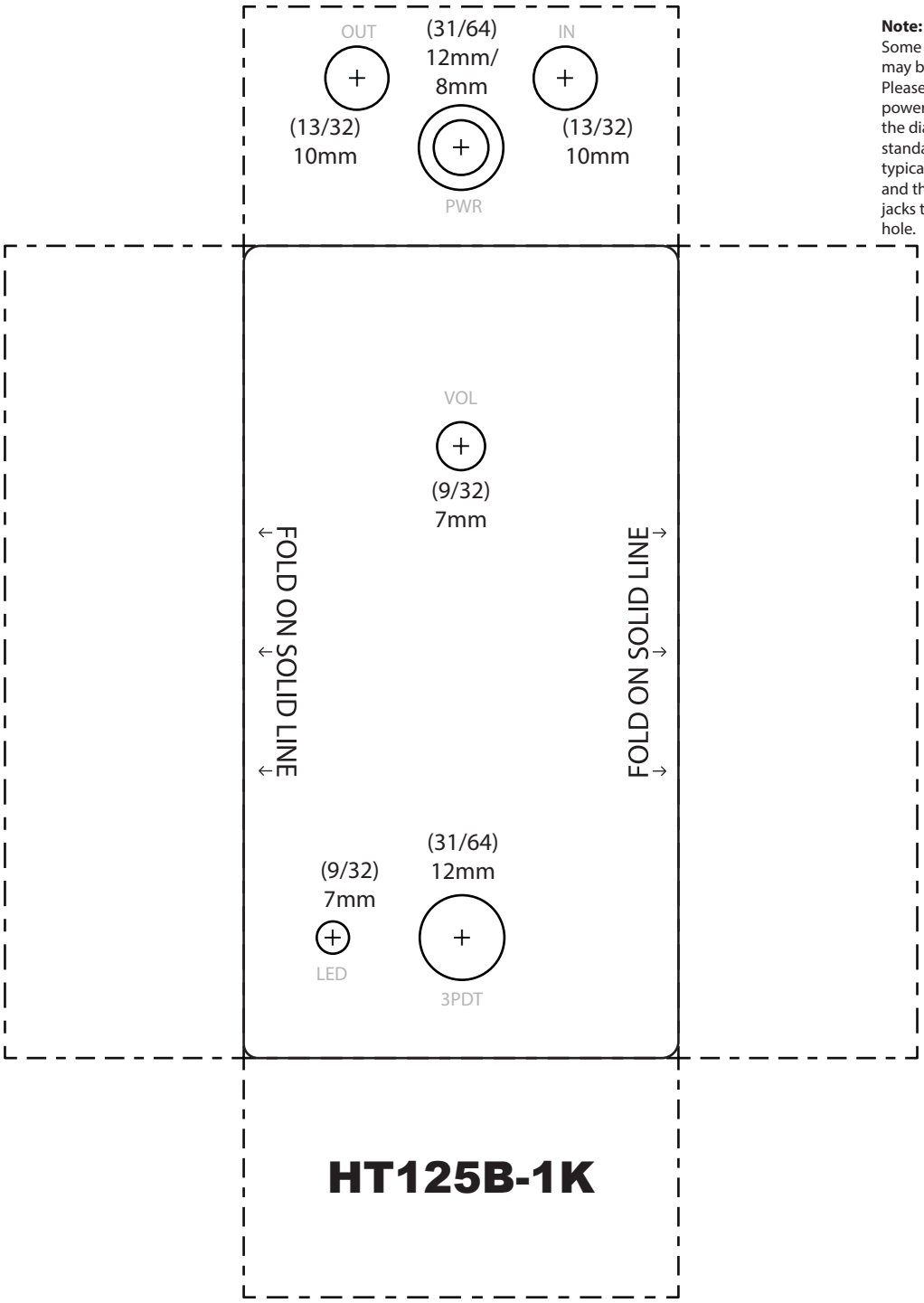
2. Carefully align template to the empty enclosure (without bottom lid) and tape in place to the enclosure.
You can also tape the corners of the template together once it is attached, to have a "cast" paper template ready if drilling more than one enclosure.

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 nough space around the hole to grab the enclosure.



Max knob diameter: 52mm

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.*

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