

Tone Bender Mk III

Granddaddy of super-cool
vintage fuzz tone



IMPORTANT STUFF

Go no further until you've read this page.

Components numbered in **green** on the BOMs are for the voltage inverter circuit (shaded area in schematic), so ignore them if you're not using one.

If you aren't using the voltage inverter you must connect pads J1 and J2 with a jumper wire. Otherwise leave them empty.

R1 is an optional anti-pop resistor not in the original circuit.

R13 significantly drops the output level. Replace this with a jumper wire for more vol.

Transistor hFE values should be approx:

Q1-2 - 45-55

Q3 - 90-110

The above aren't what you'd typically expect for a 'Tone Bender Set' such as you'd use in a Mk II Pro. In the Mk III a typical TB set may give you too much gain, resulting in squishy, undefined fuzz. Up to you, but the above values give excellent results.

CAPACITOR ORIENTATION

C3 and C5 have been placed the wrong way round on the PCB.

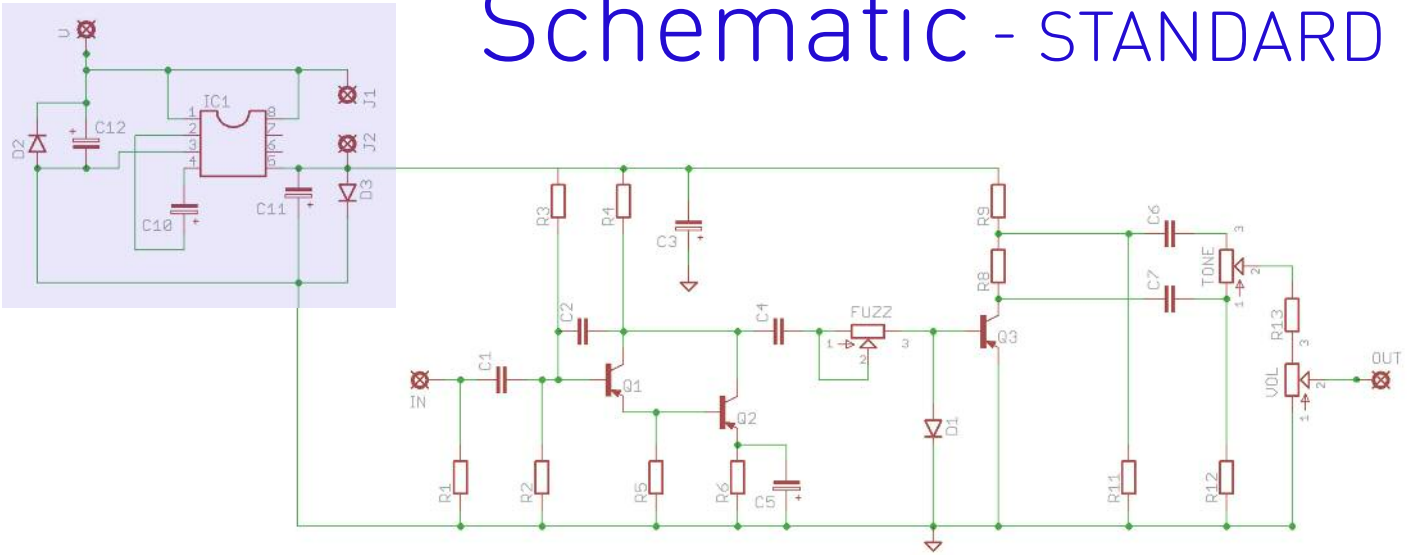
If you're using PNP transistors you must reverse them (+ leg in round hole).

NPN VERSIONS

You can use NPN Ge transistors in any of the PNP versions. Simply forget about the voltage inverter, connect pads J1 and J2, reverse D1 and place C3 and C5 as shown on the board, i.e. + leg to square pad.

Pots should be soldered in last as they will cover the pads of other components. However, if you're using the voltage inverter you may find it easier to put in C10 and C11 last as they'll hinder access to the Fuzz pot pads once in place.

Schematic - STANDARD



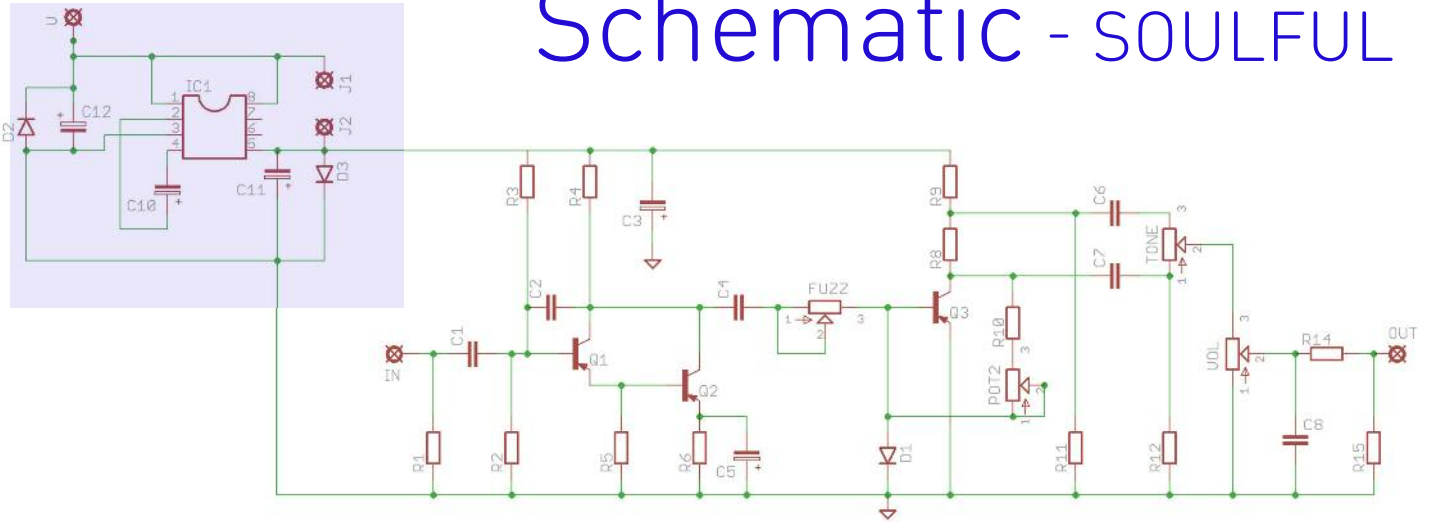
BOM - Colorsound MkIII (Vox MkIII)

R1	1M5	C1	100n	Q1-3	PNP Ge
R2	47K (100K)	C2	220p	D1	1N270
R3	220K (680K)	C3	22u elec	D2	1N4001
R4	10K	C4	220n	D3	1N4148
R5	10K	C5	10u elec (6.8u)	IC1	7660S
R6	3K3	C6	100n	FUZZ	100KB
R7	Jumper	C7	2n2	TONE	100KB
R8	18K	C8	Empty	VOL	100KB
R9	10K	C9	Empty		
R10	Empty	C10	10u elec		
R11	10K	C11	10u elec		
R12	10K	C12	100u elec		
R13	220K				
R14	Jumper				
R15	Empty				

There are extra resistor and cap spots not shown on the schematic - these are for making different versions of the circuit shown overleaf.

The Vox version originally had a 6.4uf C5 and a 2n C7, but closest modern values have been substituted. They'll make not a scrap of difference.

Schematic - SOULFUL



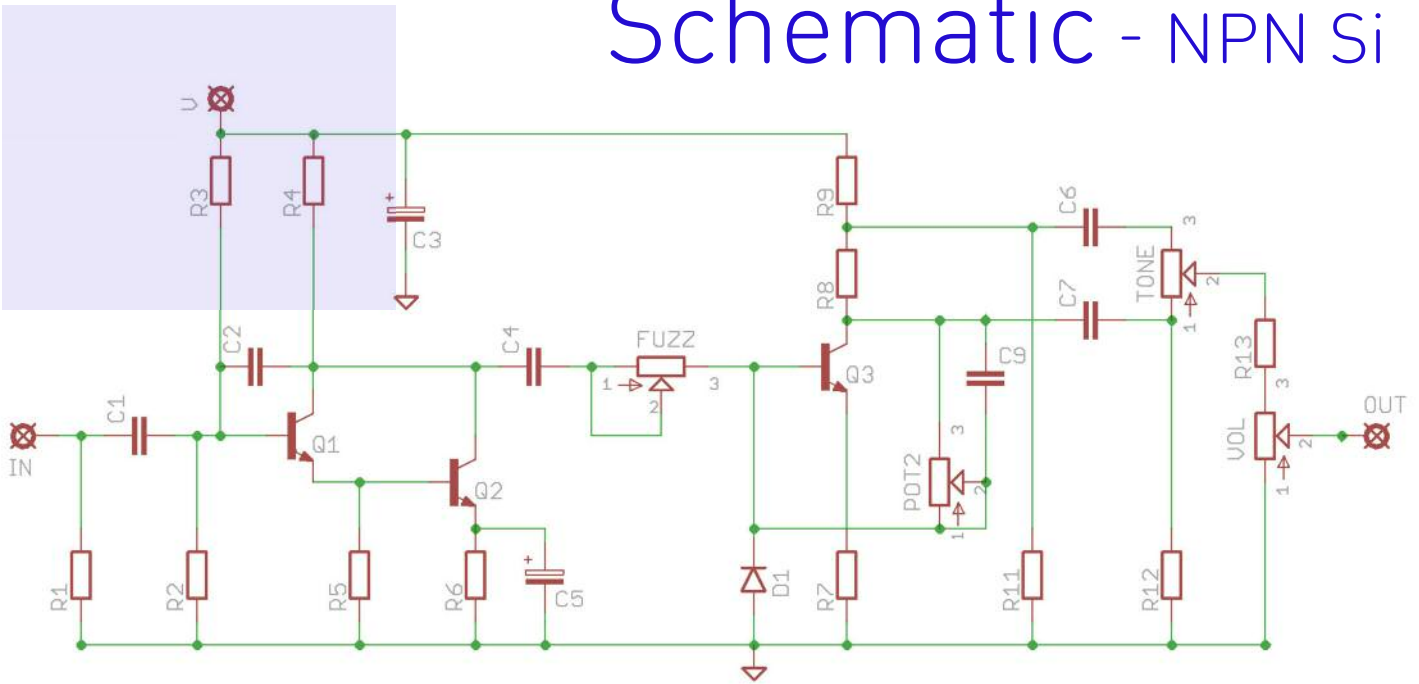
BOM

R1	1M5	C1	100n	Q1-3	PNP Ge
R2	47K	C2	100p	D1	1N270
R3	220K	C3	22u elec	D2	1N4001
R4	10K	C4	220n	D3	1N4148
R5	10K	C5	10u elec	IC1	7660S
R6	3K3	C6	100n	FUZZ	100KB
R7	Jumper	C7	15n	TONE	100KB
R8	18K	C8	150p	VOL	500KA
R9	10K	C9	Empty	TRIM	500K
R10	10K	C10	10u elec		
R11	Empty	C11	10u elec		
R12	10K	C12	100u elec		
R13	Jumper				
R14	47K				
R15	1M				

A 'boutique' (don't you hate that term?) take on the TB MkIII.

Adjust the trimmer until you get the sound you want.

Schematic - NPN Si



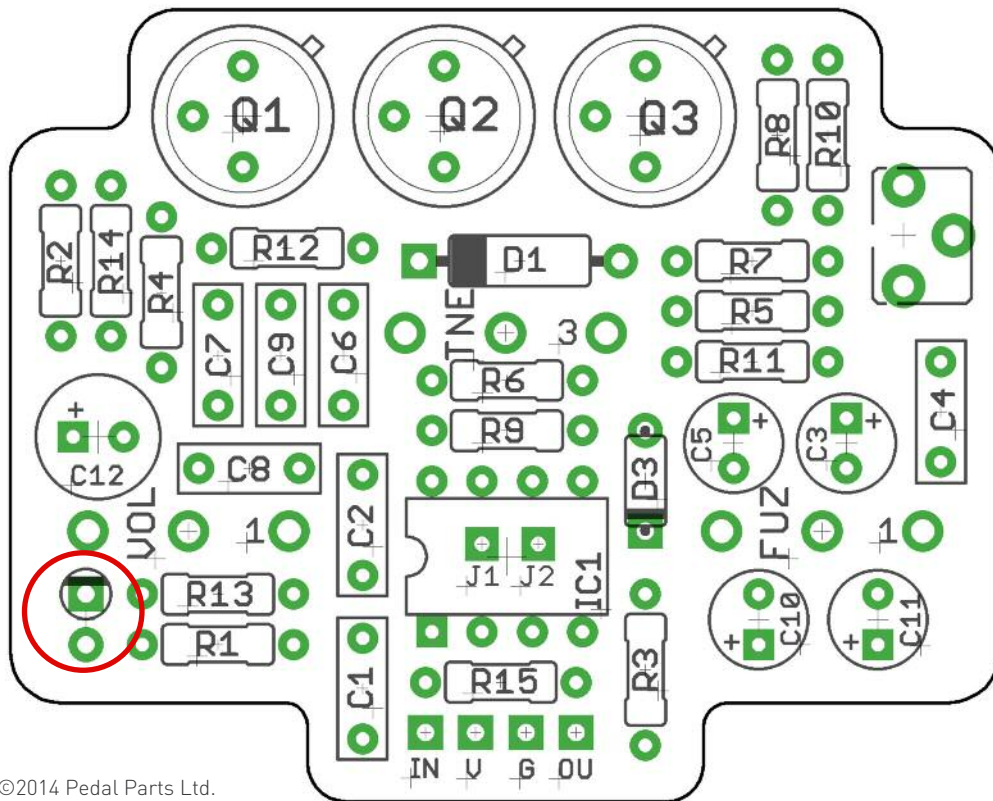
BOM

R1	1M5	C1	100n	Q1-3	NPN Si
R2	47K	C2	100p	D1	1N4148
R3	220K	C3	22u elec	D2	Empty
R4	10K	C4	220n	D3	Empty
R5	10K	C5	10u elec	IC1	Empty
R6	3K3	C6	100n	FUZZ	100KB
R7	330R	C7	15n	TONE	100KB
R8	18K	C8	150p	VOL	100KB
R9	10K	C9	220p	TRIM	1M
R10	Empty	C10	Empty		
R11	10K	C11	Empty		
R12	10K	C12	Empty		
R13	220K				
R14	Jumper				
R15	Empty				

Not everyone wants those smooth germanium tones. Maybe a silicon version is for you..? You could give any old NPN silicon cans a whirl (2N3904, 2N5088 etc). Socket them and experiment. Adjust the trimmer to taste. Remember to put a jumper wire between J1 and J2. No need for the inverter on this one - you're ready to roll with negative-ground supply.

NOTE: D1 should be reversed, i.e. striped leg to round hole. C3 and C5 should go in as shown on the PCB, i.e. + leg to square pad.

PCB Layout



PCB Layout ©2014 Pedal Parts Ltd.

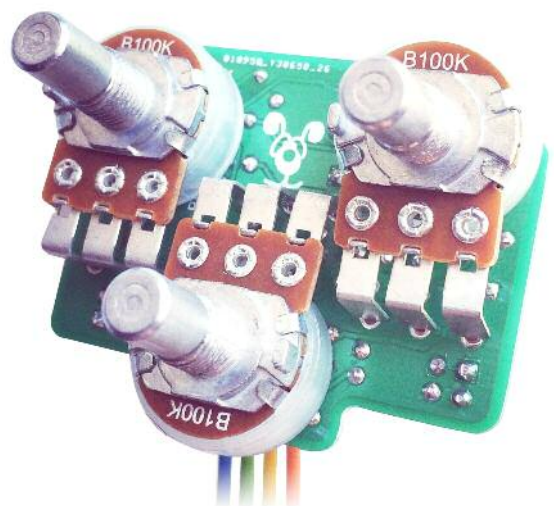
The legend is missing for D2 - that's it circled above.

The power and signal pads on the PCB conform to the FuzzDog Direct Connection format, so can be paired with the appropriate daughterboard for quick and easy offboard wiring.

Snap the small metal tag off the pots so they can be mounted flush in the box.

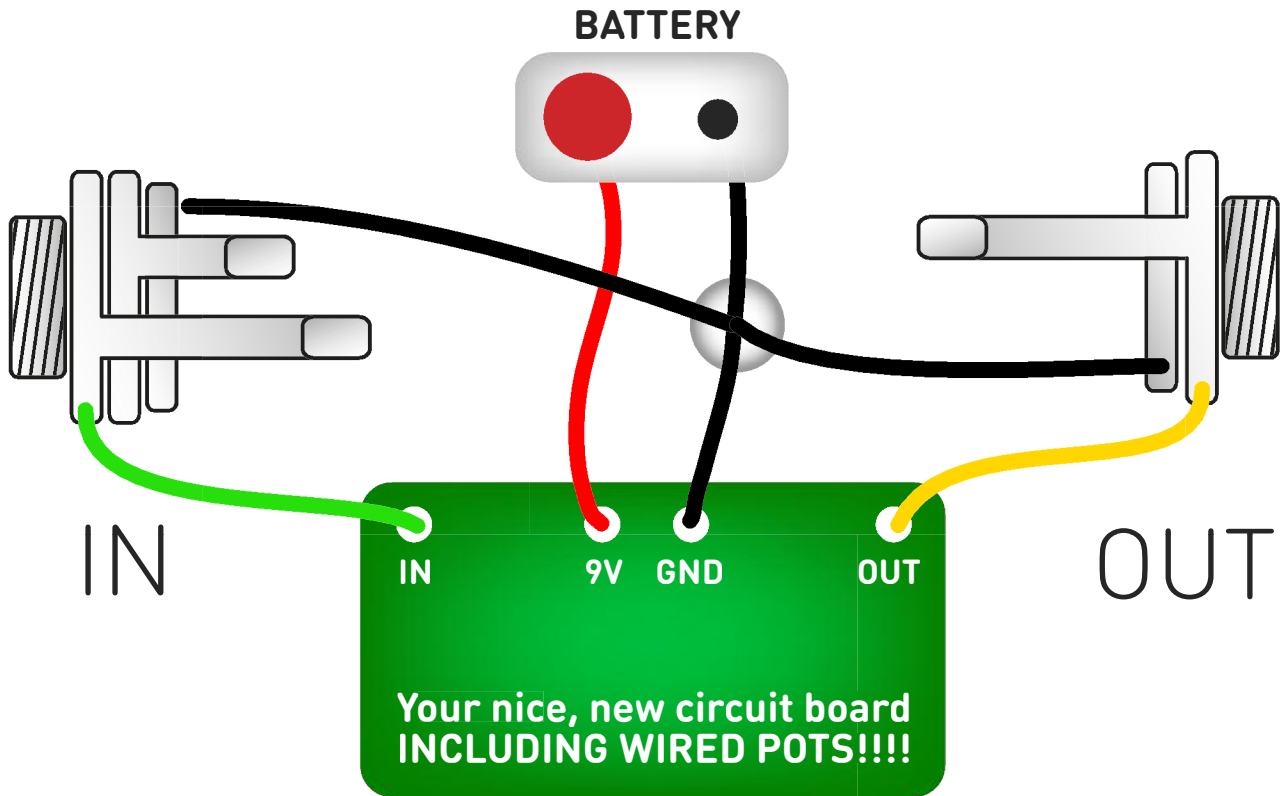
Pots mount on the opposite side of the board to the other components.

The board has been designed to take vertical-mount pots, but you can wire in normal ones or use header pins to attach them.



Test the board!

NPN and Voltage Inverter builds



UNDER NO CIRCUMSTANCES will troubleshooting help be offered if you have skipped this stage. No exceptions.

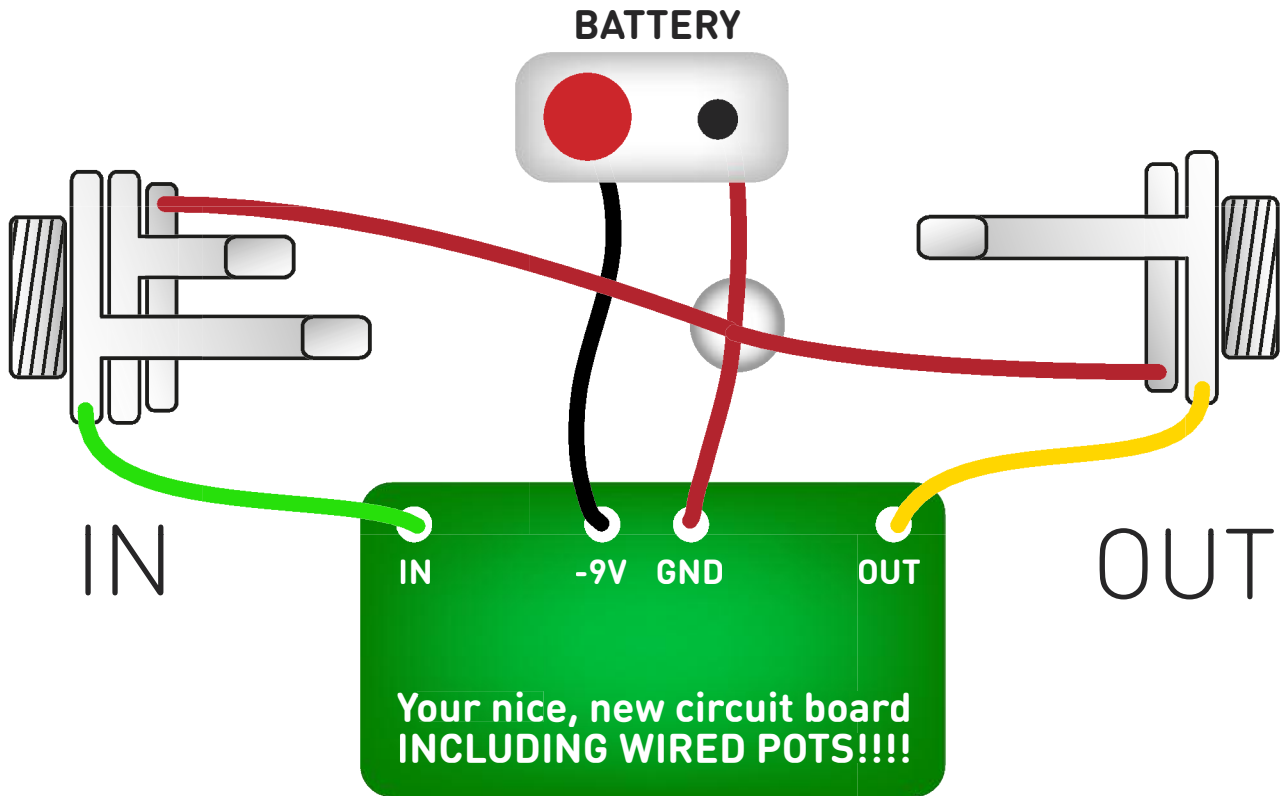
Once you've finished the circuit it makes sense to test it before starting on the switch and LED wiring. It'll cut down troubleshooting time in the long run. If the circuit works at this stage, but it doesn't once you wire up the switch - guess what? You've probably made a mistake with the switch.

Solder some nice, long lengths of wire to the board connections for 9V, GND, IN and OUT. Connect IN and OUT to the jacks as shown. Connect all the GNDs together (twist them up and add a small amount of solder to tack it). Connect the battery + lead to the 9V wire, same method. Plug in. Go!

If it works, crack on and do your switch wiring. If not... aw man. At least you know the problem is with the circuit. Find out why, get it working, THEN worry about the switch etc.

Test the board!

PNP builds without Voltage Inverter



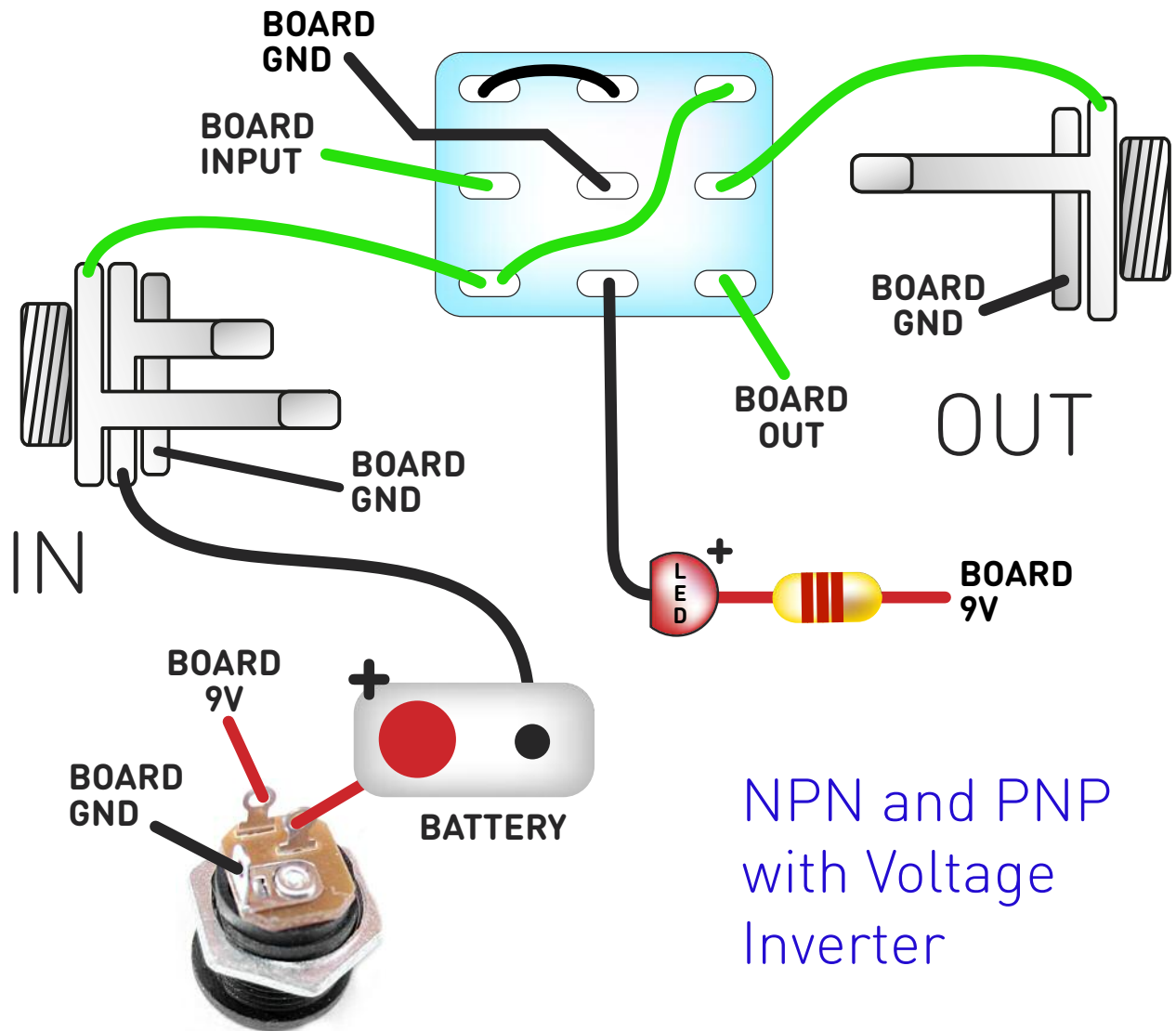
UNDER NO CIRCUMSTANCES will troubleshooting help be offered if you have skipped this stage. No exceptions.

Once you've finished the circuit it makes sense to test it before starting on the switch and LED wiring. It'll cut down troubleshooting time in the long run. If the circuit works at this stage, but it doesn't once you wire up the switch - guess what? You've probably made a mistake with the switch.

Solder some nice, long lengths of wire to the board connections for -9V, GND, IN and OUT. Connect IN and OUT to the jacks as shown. Connect all the GNDs together (twist them up and add a small amount of solder to tack it). Connect the battery - lead to the -9V wire, same method. Plug in. Go!

If it works, crack on and do your switch wiring. If not... aw man. At least you know the problem is with the circuit. Find out why, get it working, THEN worry about the switch etc.

Wire it up (if using a daughterboard please refer to the relevant document)



Wiring shown above will disconnect the battery when you remove the jack plug from the input, and also when a DC plug is inserted.

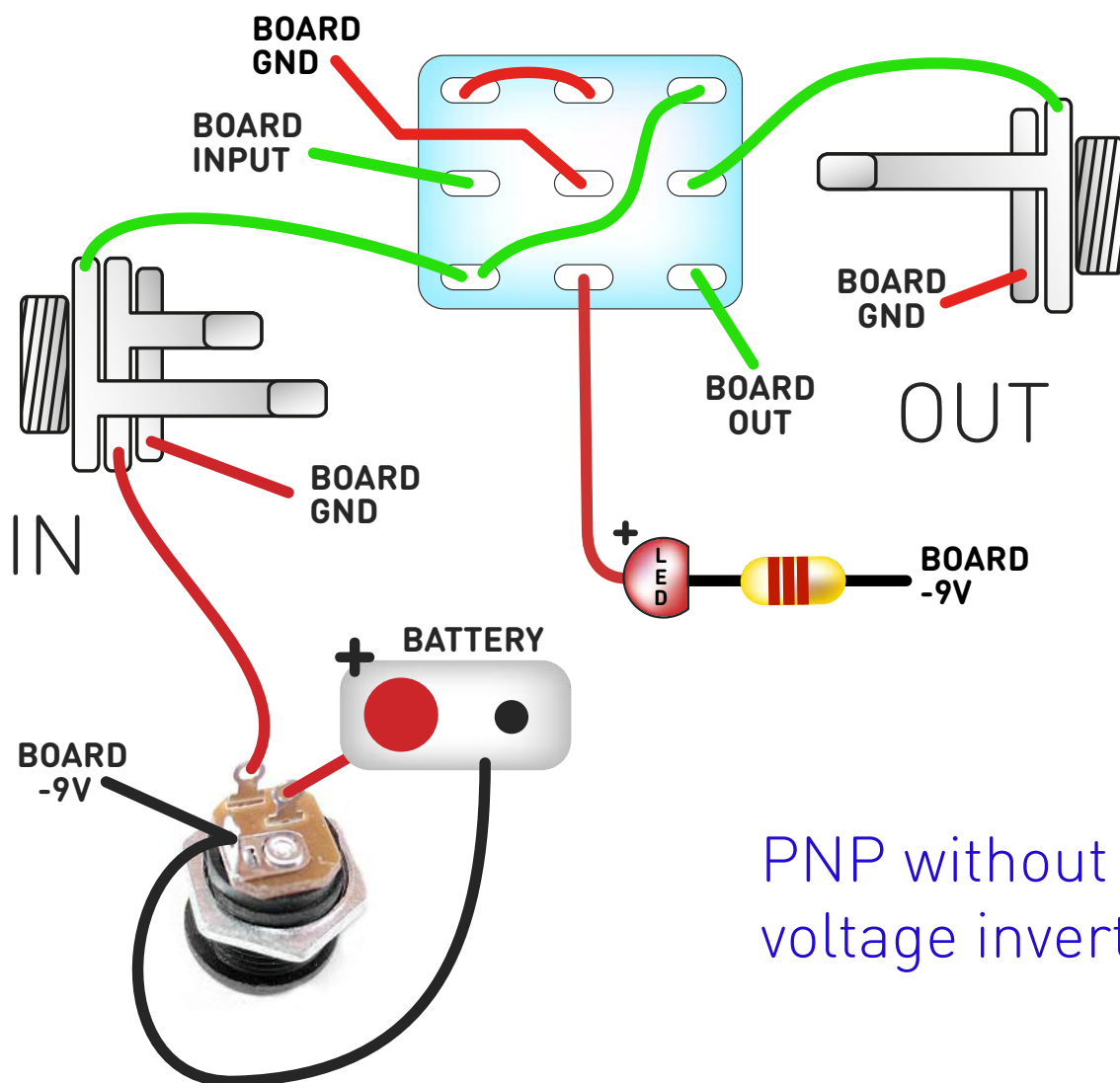
The Board GND connections don't all have to directly attach to the board. You can run a couple of wires from the DC connector, one to the board, another to the IN jack, then daisy chain that over to the OUT jack.

It doesn't matter how they all connect, as long as they do.

This circuit is standard, Negative GND. Your power supply should be Tip Negative / Sleeve Positive. That's the same as your standard pedals (Boss etc), and you can safely daisy-chain your supply to this pedal.

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Wire it up (if using a daughterboard please refer to the relevant document)



PNP without
voltage inverter

Wiring shown above will disconnect the battery when you remove the jack plug from the input, and also when a DC plug is inserted.

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