

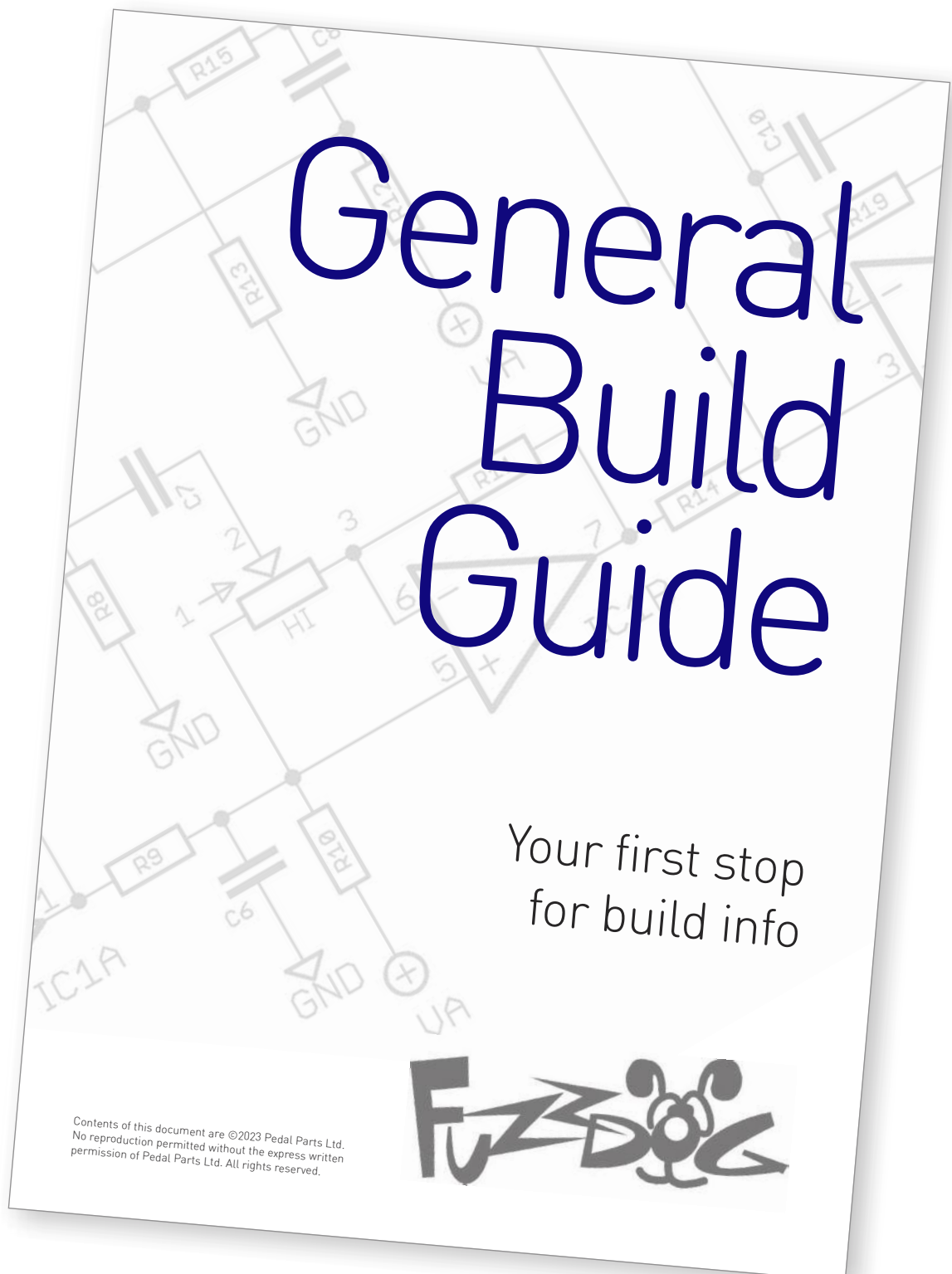
Tone Bender Mk II

Classic fuzz goodness with
optional voltage inverter

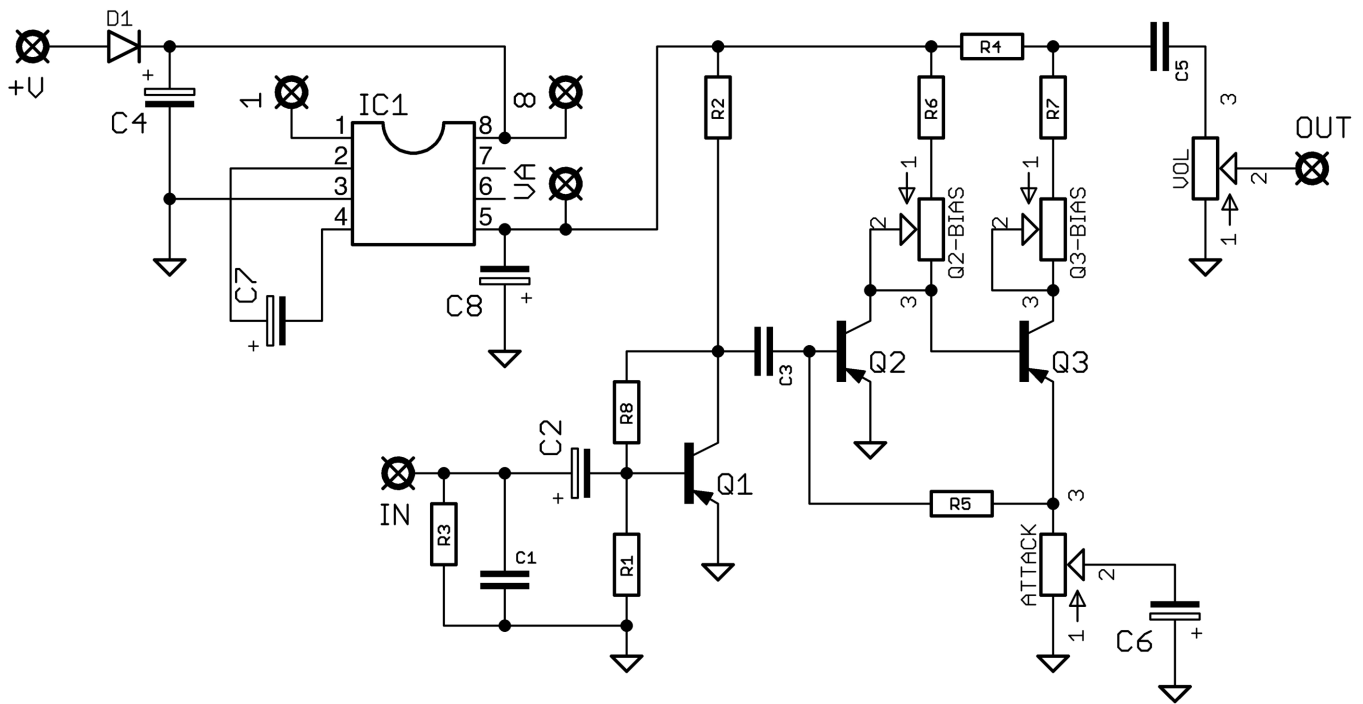


Before you dig in, ensure you download and read the **General Build Guide**.

It contains all the information you need for a successful outcome.



Schematic + BOM



R1	100K	Q1	PNP Ge <>60hFE
R2	10K	Q2	PNP Ge <>80hFE
R3	1M - 2M2*	Q3	PNP Ge <>100hFE
R4	470R	IC1	TL7660SEPA
R5	100K	D1	1N5817
R6	10K	ATT	1KC
R7	1K	VOL	100KA
R8	1M - 1M5**	Q2-BIAS	100K Trim
C1	10n	Q3-BIAS	20K Trim
C2	4u7 elec		
C3	100n		
C4	100u elec***		
C5	10n		
C6	4u7 elec		
C7	10u elec		
C8	10u elec		

Parts listed in green are the optional voltage inverter.

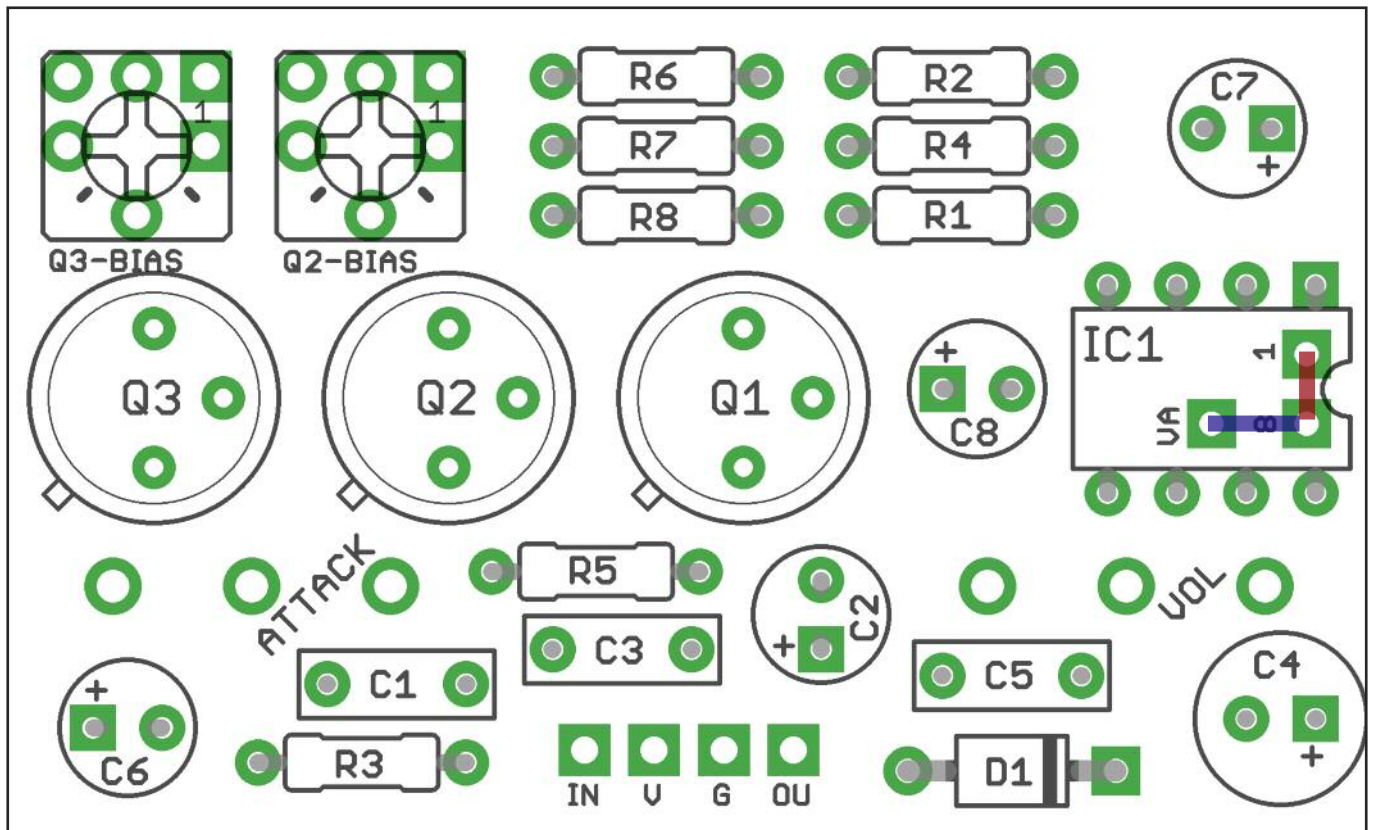
If you're going to wire this as a posi-ground and use an isolated supply, leave these out.

*Optional pull-down resistor for anti-pop.

**Optional resistor to emulate leakage on Q1 if your transistor isn't leaky enough.

***Reverse this. It was positioned incorrectly when laying out the PCB. Anode to round pad.

See notes on next page regarding part orientation voltage inverter.



PCB layout ©2023 Pedal Parts Ltd.

The board has been designed to use a voltage inverter to supply the circuit with -9V from a standard 9V supply. This can be a 7660SEPA, a MAX1044S. If using either of these you need to place a jumper as shown above in red.

You can also go for a LT1054. In this case the red jumper is not required.

You can also opt to leave out the inverter circuitry altogether. This is the case if you wish to wire your pedal positive-ground and use an isolated power supply, or you're using NPN transistors in a standard negative-ground configuration (see next page). In this case you would omit C7, C8 and IC1 and place a jumper as shown in blue.

BIASING

To get the circuit sounding good you need to set the bias of Q1 and Q2. This is not a by-numbers operation, and you should trust your ears over the multimeter readout.

You'll likely need to move back and forth between the Q2 and Q3 bias trimmers before you hit the sweet spot.

Set your meter on DC Voltage, 20V range.

Set Q3-BIAS in the centre position. Put your negative meter lead on a ground point, the posi lead onto the collector of Q3.

Adjust Q2-BIAS until you get around -8V at this point. If you can't get near, give Q3-BIAS a slight turn and try again. Repeat until you hit -8V.

Now put your posi lead onto the collector of Q2. Adjust Q2-BIAS until you get around -0.2V.

Now re-check the collector of Q3. Adjust Q3-BIAS until you hit that -8V again.

From there you can tweak both bias trimmers until you get a satisfactory sound - smooth fuzz with no oscillation.



Variations

NPN / NEGATIVE GROUND

If you're fortunate enough to come across a good set of NPN germaniums there's no reason you can't build one of these for a standard polarity supply. Now that Russian transistors are freely available it shouldn't be too much trouble.

To achieve this configuration, do the following:

- Leave out C7, C8 and IC1.
- Place a jumper between pads 8 and VA as shown on the previous page.
- Reverse the orientation of C2 and C6.

POSI GROUND SUPPLY

If you're a purist and want to have a posi-ground pedal but without the inverter - no problem.

To achieve this configuration, do the following:

- Leave out C7, C8 and IC1.
- Place a jumper between pads 8 and VA as shown on the previous page.
- Reverse the polarity of C4 and D1.
- Wire for positive-ground as detailed in the General Build Guide.

MARSHALL SUPA FUZZ

Substitute these part values:

- R1 - 10K
- C2 and C6 - 10u

VOX TONE BENDER

Substitute these part values:

- C1 and C5 - 15n

Drilling template

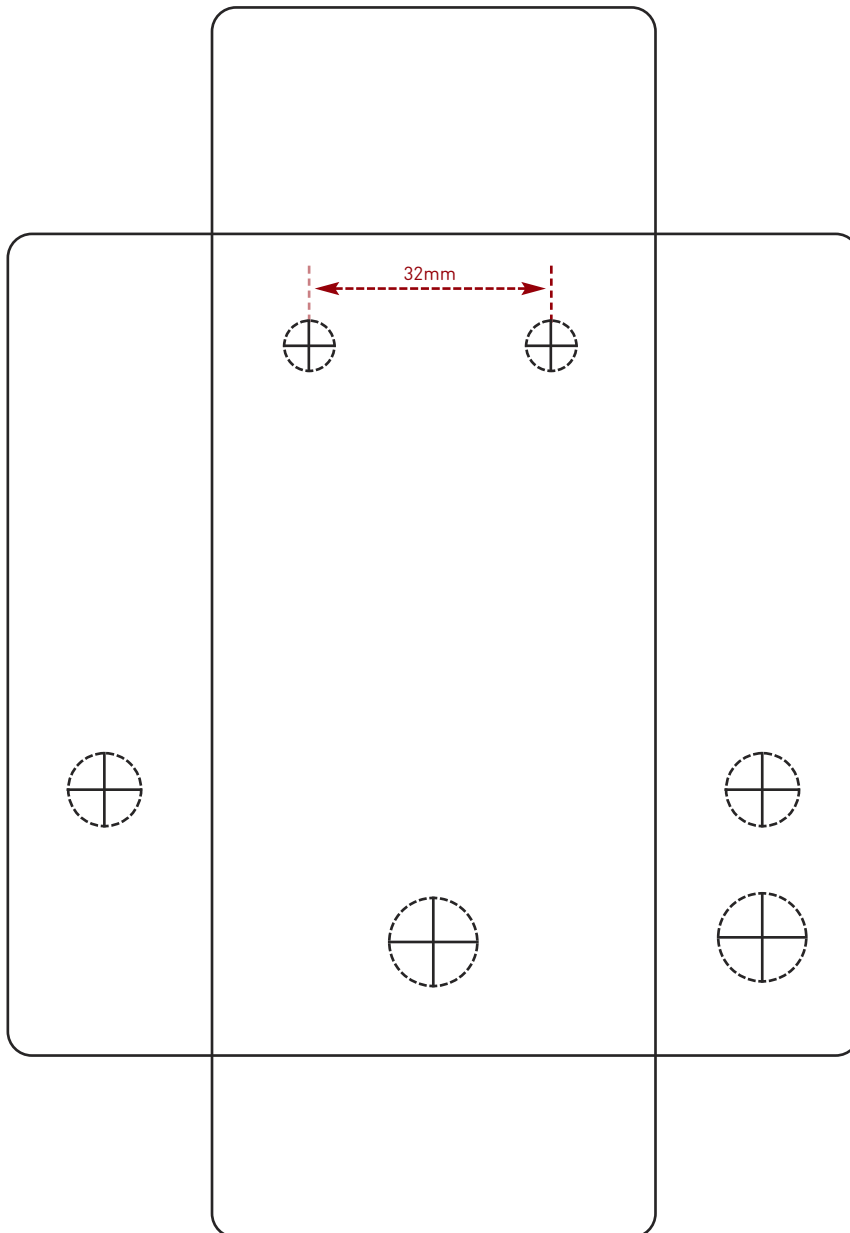
Hammond 1590B - 60 x 111 x 31mm

Drill sizes listed are minimum.

It's a good idea to add 1mm to anything mounted on the PCB that'll poke through the front of the enclosure.

Drill sizes:

Pots	7mm
Jacks	10mm
Footswitch	12mm
DC Socket	12mm
Toggle switches	6mm
Rotary switches	10mm



This template is a rough guide only. You should ensure correct marking of your enclosure before drilling. You use this template at your own risk.

Pedal Parts Ltd can accept no responsibility for incorrect drilling of enclosures.

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