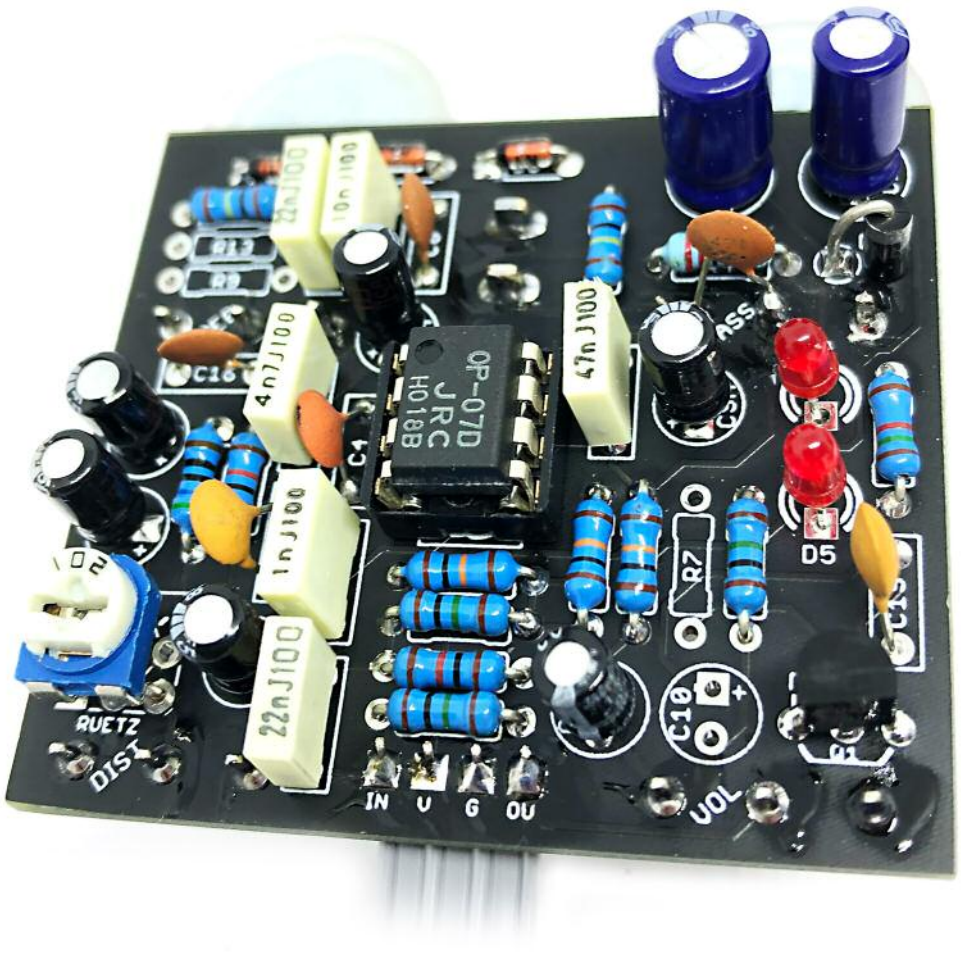


Bax Rat

(Only for PCBs marked V1.2)

Classic roar (gnaw?) with
super tweakable EQ

Important notes

If you're using any of our footswitch daughterboards, DOWNLOAD THE DAUGHTERBOARD DOCUMENT

- Download and read the appropriate build document for the daughterboard as well as this one BEFORE you start.
- DO NOT solder the supplied Current Limiting Resistor (CLR) to the main circuit board even if there is a place for it. This should be soldered to the footswitch daughterboard.

POWER SUPPLY

Unless otherwise stated in this document this circuit is designed to be powered with 9V DC.

COMPONENT SPECS

Unless otherwise stated in this document:

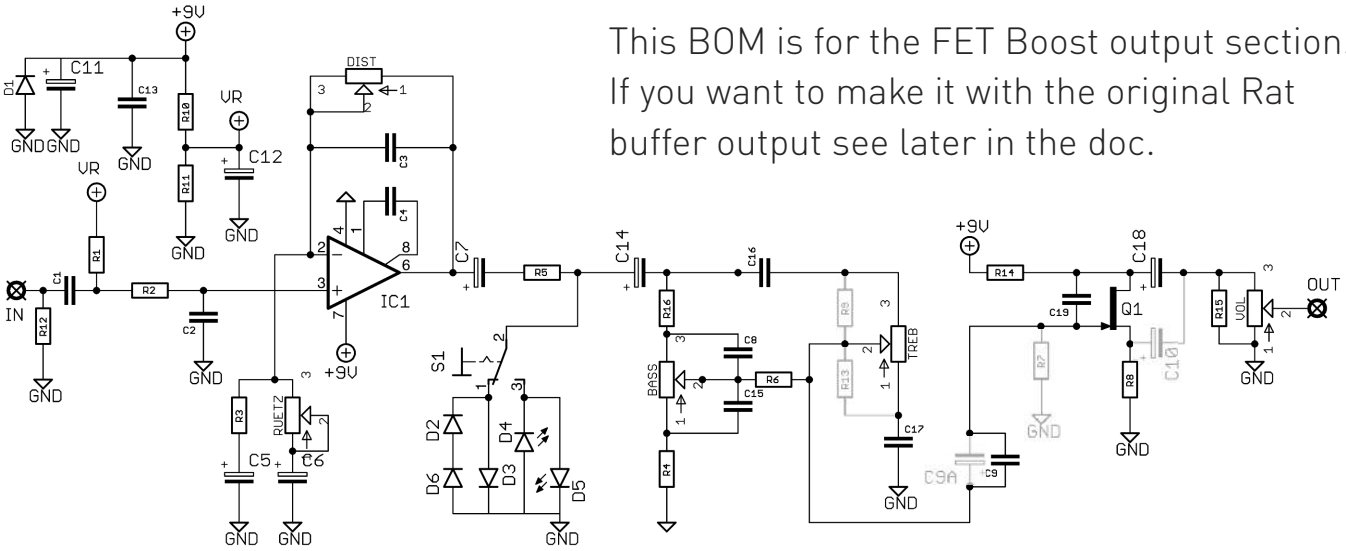
- Resistors should be 0.25W. You can use those with higher ratings but check the physical size of them.
- Electrolytics caps should be at least 25V for 9V circuits, 35V for 18V circuits. Again, check physical size if using higher ratings.

LAYOUT CONVENTIONS

Unless otherwise stated in this document, the following are used:

- **Electrolytic capacitors:**
  Long leg (anode) to square pad.
- **Diodes/LEDs:**
  Striped leg (cathode) to square pad. Short leg to square pad for LEDs.
- **ICs:**
  Square pad indicates pin 1.

Schematic + BOM Guitar



This BOM is for the FET Boost output section. If you want to make it with the original Rat buffer output see later in the doc.

R1	1M
R2	1K
R3	560R
R4	2K2
R5	1K
R6	100K
R7	Empty
R8	1K5
R9	Empty
R10	10K
R11	10K
R12	1M
R13	Empty
R14	10K
R15	1M
R16	100K

C1	22n
C2	1n
C3	100p
C4	33p
C5	4u7 elec
C6	2u2 elec
C7	4u7 elec
C8	470p‡
C9	22n
C9A	Empty
C10	Empty
C11	100u elec
C12	47u elec
C13	47n
C14	4u7 elec
C15	10n
C16	470p
C17	4n7
C18	1u elec
C19	100p

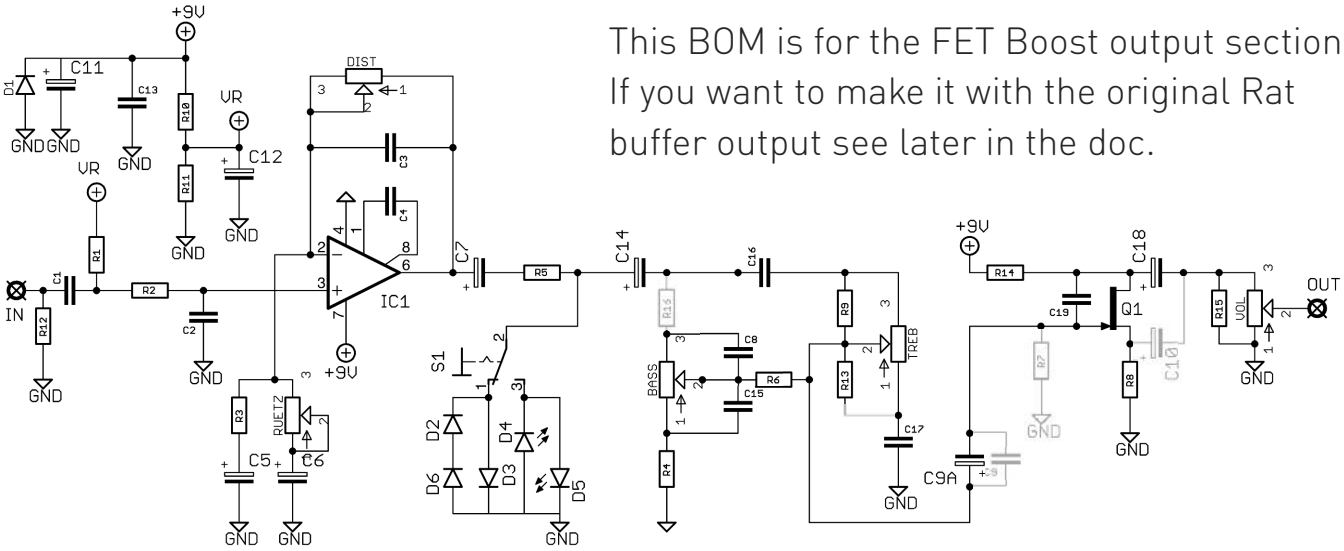
D1	1N4001
D2-3	1N4148
D4-5	3mm red LEDs*
D6	Jumper*
Q1	2N5457 / J201** (SMT - MMBF5457 / MMBFJ201)
IC1	LM308N / OP-07
BASS	500KB
TREB	500KB
DIST	100KA
VOL	100KA
RUEZ	1K TRIM or 47R resistor***

*See later for more details of the clipping section.

**Either will work fine.
You can also use the SMT version of either if you're happy soldering tiny parts.

***See page 6 for resistor placement.

Schematic + BOM Bass/Drop



This BOM is for the FET Boost output section. If you want to make it with the original Rat buffer output see later in the doc.

R1	1M
R2	1K
R3	560R
R4	1K
R5	1K
R6	10K
R7	Empty
R8	1K5
R9	10K
R10	10K
R11	10K
R12	1M
R13	1K
R14	10K
R15	1M
R16	Jumper

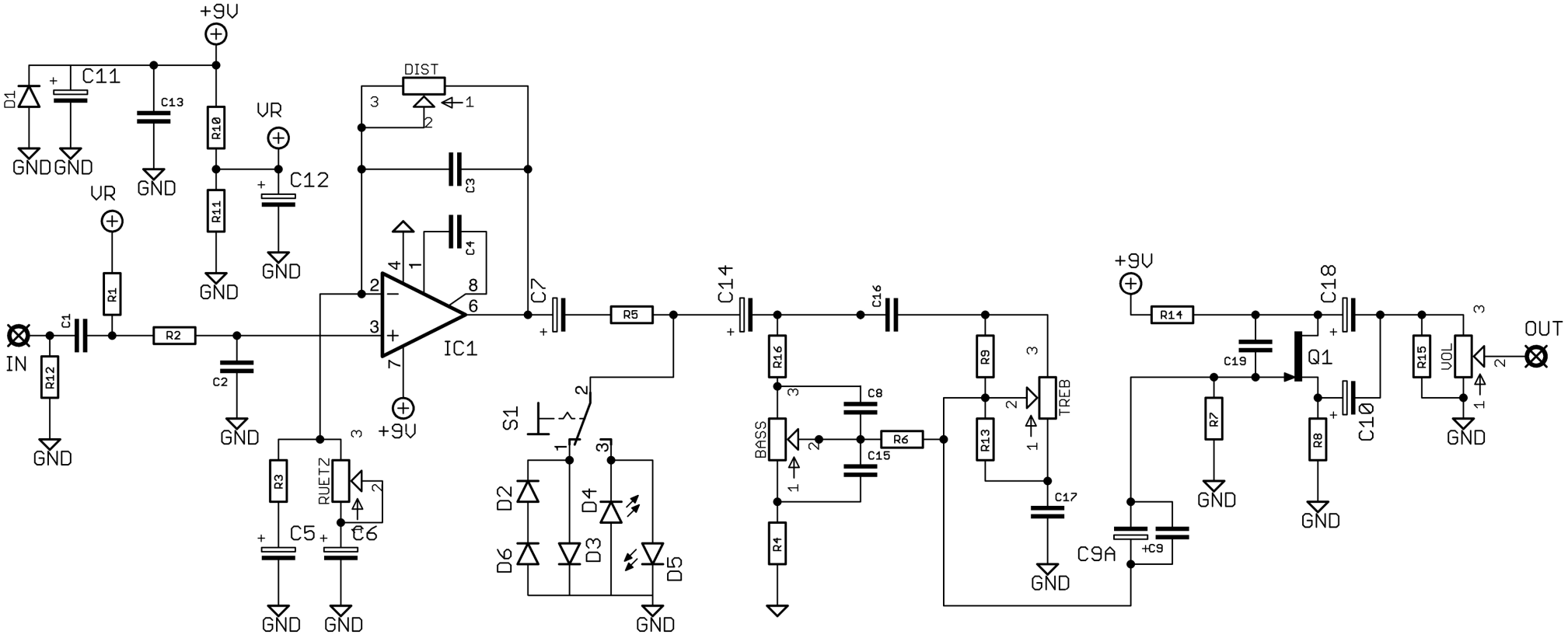
C1	100n
C2	1n
C3	100p
C4	33p
C5	4u7 elec
C6	2u2 elec
C7	10 elec
C8	33n
C9	Empty
C9A	10u elec
C10	Empty
C11	100u elec
C12	47u elec
C13	47n
C14	10u elec
C15	330n
C16	15n
C17	150n
C18	10u elec
C19	100p

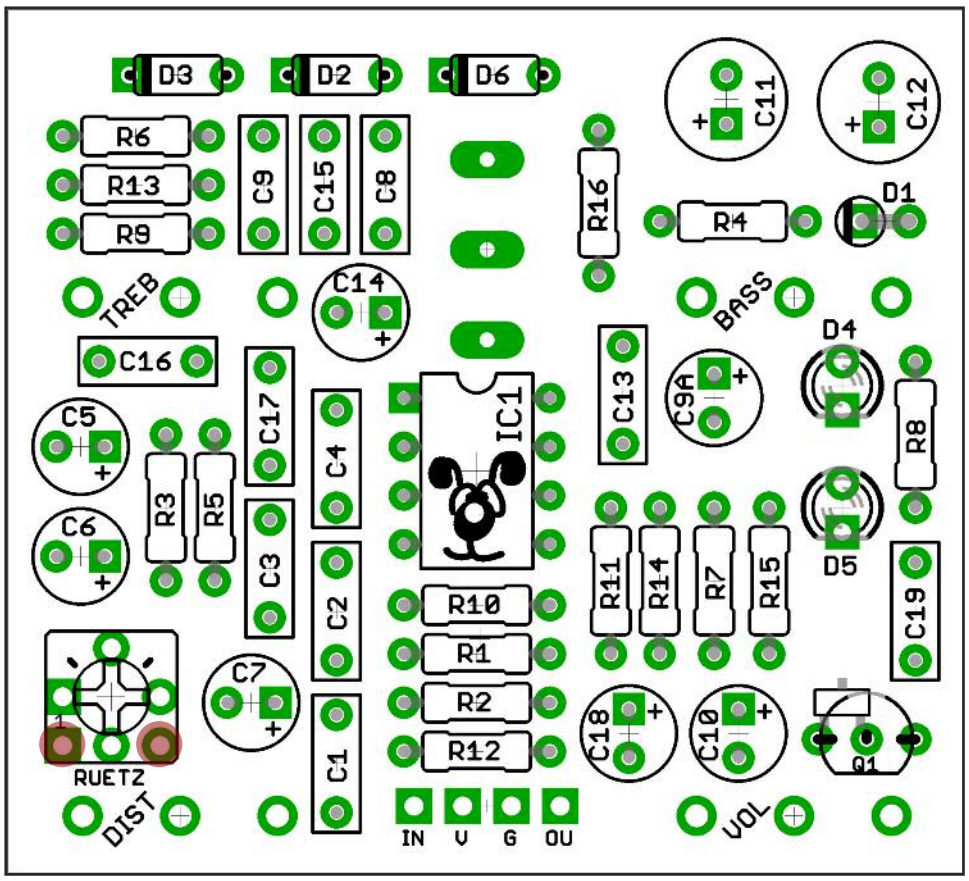
D1	1N4001
D2-3	1N4148
D4-5	3mm red LEDs*
D6	Jumper*
Q1	2N5457 / J201** (SMT - MMBF5457 / MMBFJ201)
IC1	LM308N / OP-07
BASS	100KC
TREB	100KC
DIST	100KA
VOL	100KA
RUEZ	1K TRIM or 47R resistor***

*See later for more details of the clipping section.

**Either will work fine.
You can also use the SMT version of either if you're happy soldering tiny parts.

***See page 6 for resistor placement.


+9V
C11
D1
C13
R10
VR
C12
R11
GND
DIST
C3
C4
IC1
C7
R5
C14
C16
R16
R9
C8
C15
R6
R13
TREB
C17
BASS
R4
+9V
R14
C18
C19
Q1
C10
R15
VOL
OUT
R7
R8
C9A
+C9
IN
C1
R1
R2
R12
C2
R3
RUETZ
C5
C6
S1
D2
D4
D6
D3
D5



No Ruetz, No Cry

If you're using a fixed resistor instead of the Ruetz trimmer, place it vertically using the two pads marked in red.

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. Check the separate daughterboard document for details.

Be very careful when soldering the FET and diodes. They're very sensitive to heat. You should use some kind of heat sink (crocodile clip or reverse action tweezers) on each leg as you solder them. Keep exposure to heat to a minimum (under 2 seconds). Same goes for the IC if you aren't using a socket.

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

You should solder all other board-mounted components before you solder the pots. Once they're in place you'll have no access to much of the board. Make sure your pots all line up nicely.

The best way to do that is to solder a single pin of each pot in place then melt and adjust if necessary before soldering in the other two pins. If your pots don't have protective plastic jackets ensure you leave a decent gap between the pot body and the PCB otherwise you risk shorting out the circuit.

Same goes for the toggle switch if you're including it. If not, don't forget the required jumper wire. See next page.

Clipping

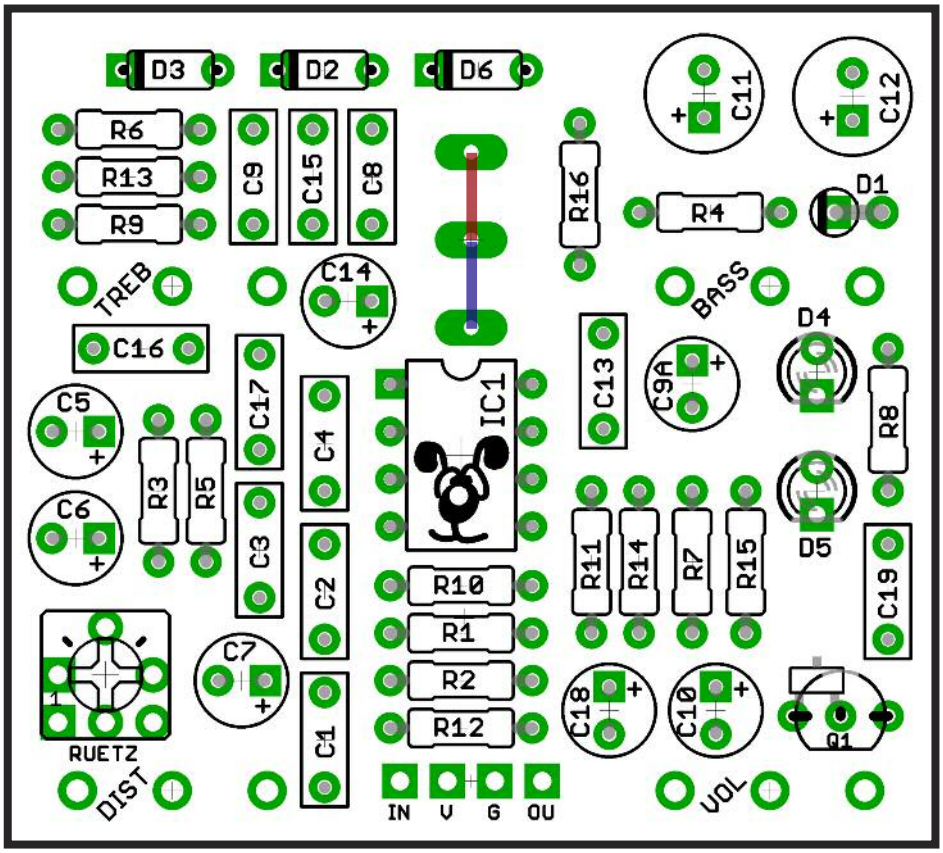
No rules here. Go for typical Rat clipping options or experiment with your own. Here's a starting point using the different Rat models:

Standard	2 x 1N4148
Turbo	2 x 3mm red LEDs
You Dirty	2 x 1N34A germanium

Use either D2-3 or D4-5 for these, depending on which fits better. You'll have to stand germanium diodes in D07 cases on end.

D6 is optional and is in series with D2. Adding a diode here will give you asymetrical clipping. If you want symetrical clipping you should jumper D6 when using D2-3.

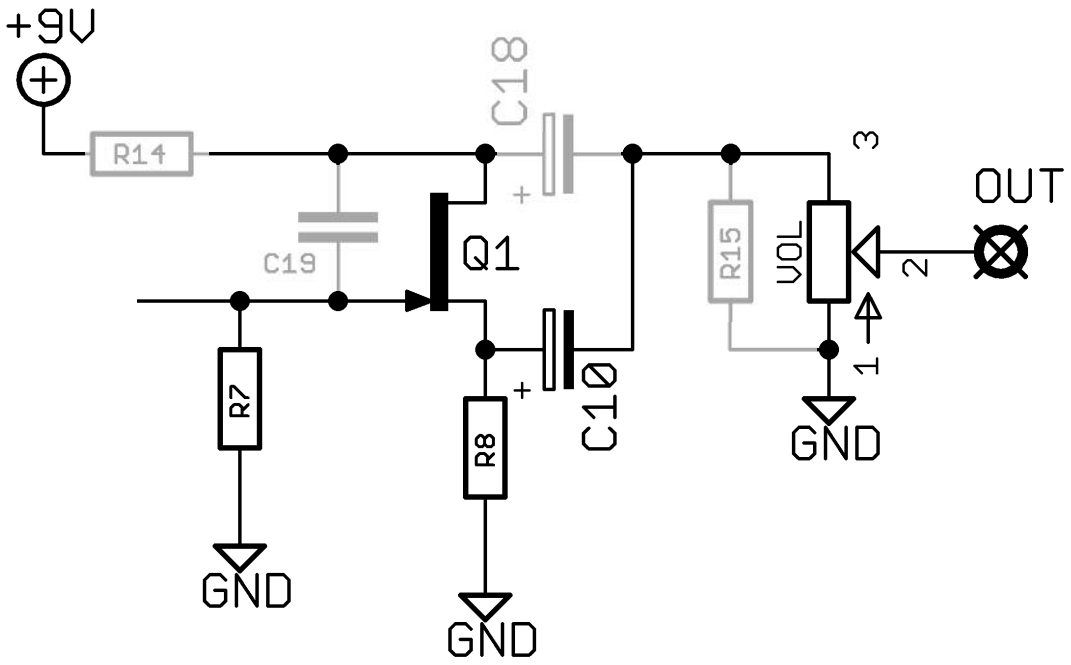
The toggle switch will engage D2-3 and D6 when down, D4-5 when up. If you're only using one set of diodes you should jumper the switch pads. Red jumper for D2-3 and D6, blue for D4-5



Output buffer

We've included spots for the parts to make the normal Rat output buffer section rather than the boosted output. We'd advise going for the boost, as the standard buffer version will hit unity pretty late in the volume sweep, but if you really want to...

R7	1M	C10	1u guit / 10u bass
R8	10K	C18	Empty
R14	Jumper	C19	Empty
R15	Empty		



Test the board!

Check the relevant daughterboard document for more info before you undertake this stage.

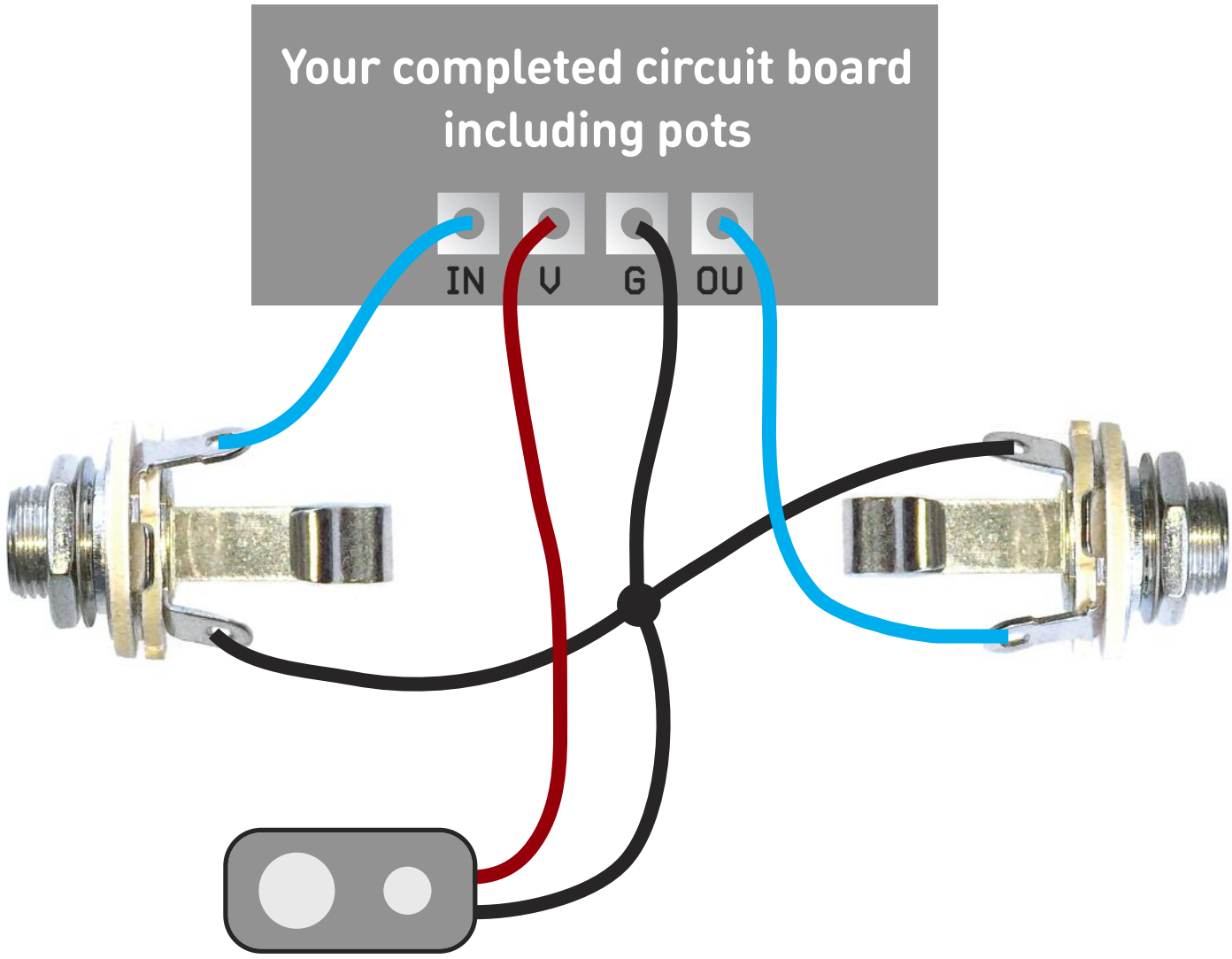
UNDER NO CIRCUMSTANCES will troubleshooting help be offered if you have skipped this stage. No exceptions.

Once you've finished the circuit it makes sense to test is 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.

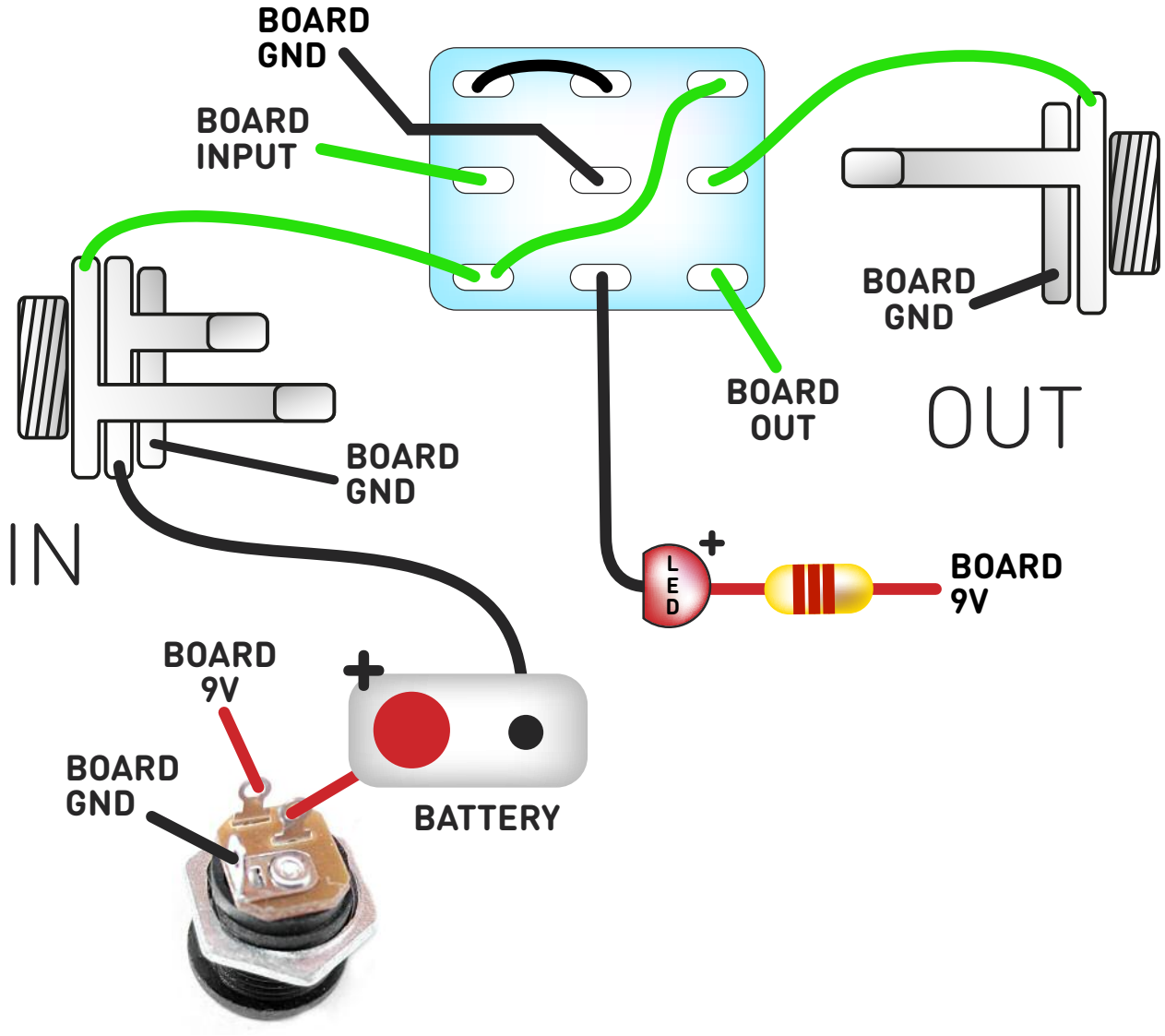
Solder some nice, long lengths of wire to the board connections for 9V, GND, IN and OUT. Connect IN and OUT to the jacks as shown. Connect all the GNDs together (twist them up and add a small amount of solder to tack it). Connect the battery + lead to the 9V wire, same method. Plug in. Go!

If you're using a ribbon cable you can tack the wires to the ends of that. It's a lot easier to take them off there than it is do desolder wires from the PCB pads.

If it works, carry 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.

Drilling template

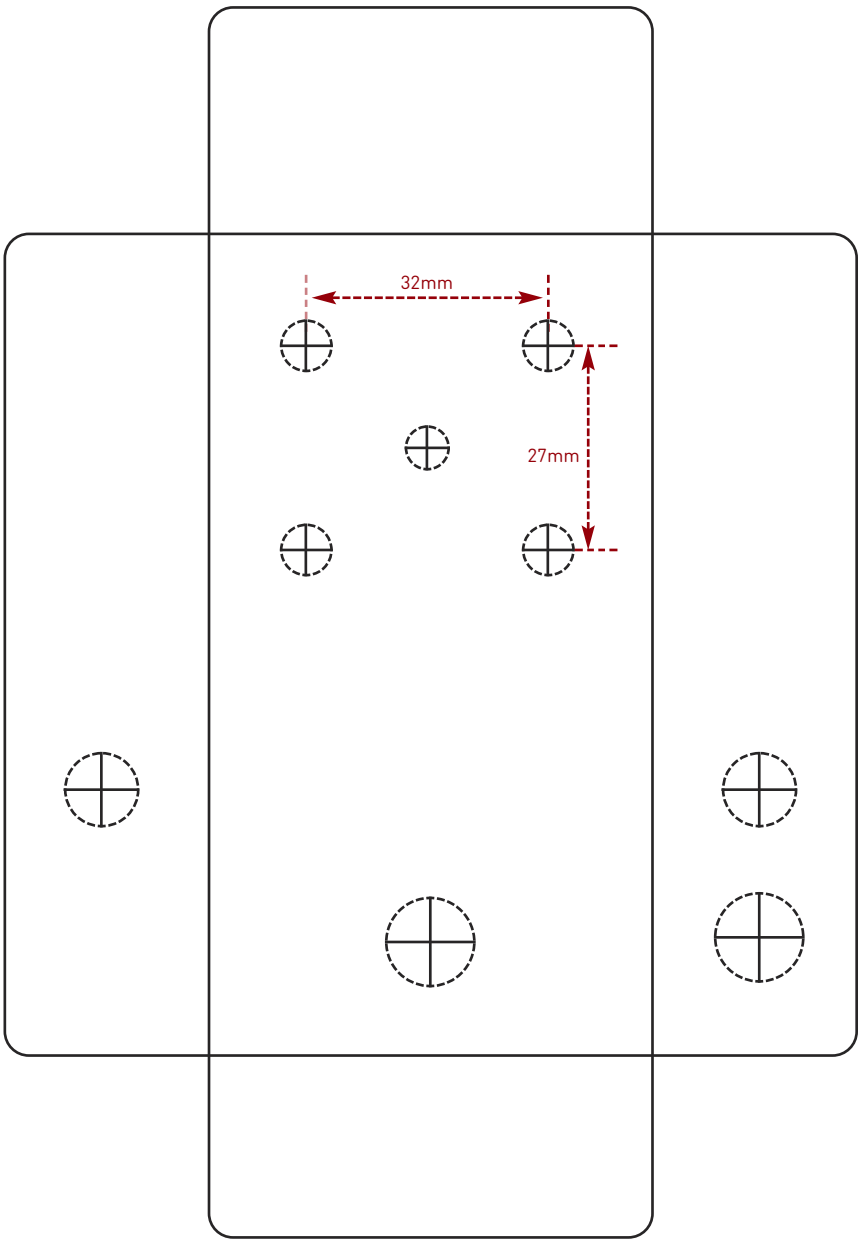
Hammond 1590B

60 x 111 x 31mm

It's a good idea to drill the pot and toggle switch holes 1mm bigger if you're board-mounting them.
Wiggle room = good!

Recommended drill sizes:

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



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.

FuzzDog.co.uk