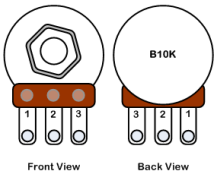
Ghost Effects Warmjet V PCB Guide.
Thank you for buying a Ghost Effects Warmjet V PCB, whilst the circuit is not 100% a clone of the very rare WEM Project V, it is extremely close and mainly misses out the Drive and Edge switches of the original.
This Project should be undertaken by someone with some experience of soldering to a PCB and general effects pedal construction and troubleshooting, I cannot be held responsible for injury or damage through use of this PCB.
I'm happy to answer general questions about parts etc, but cannot guarantee that I will be able to help out if you get everything wired up and the circuit doesn't work, but I will try my best.
If you have any questions and would like to get in touch my email is **info@ghosteffects.co.uk**

Potientometers
See below for the numbering scheme for all pots in this project.



Component List
All component numbers match up with the numbers on the PCB.

Resistors - 1/4 watt carbon or metal film are fine. If you want to use carbon composition be aware that this may make the circuit a little more noisy.

R1 390r
R2 2k2
R3 10k
R4 1m5
R5 100r
R6 22k
R7 10k
R8 27k
R9 1k5
R10 1k5
R11 1k5
R12 330r
R13 1k5
R14 1k5
R15 4r7
R16 4r7
R17 10k
R18 100k

Capacitors - Electrolytic polarity is indicated on the PCB, be sure to follow this correctly.

C1 6800pf 10mm pitch
C2 2.2uf electrolytic axial 15mm pitch
C3 2.2uf electrolytic axial 15mm pitch
C4 2.2uf electrolytic axial 15mm pitch
C5 2.2uf electrolytic axial 15mm pitch
C6 22uf electrolytic axial 15mm pitch
C7 47uf electrolytic axial 15mm pitch
C8 330uf electrolytic radial 5mm pitch
C9 6800pf 10mm pitch
C10 0.01uf 10mm pitch
C11 100uf electrolytic radial 3mm pitch

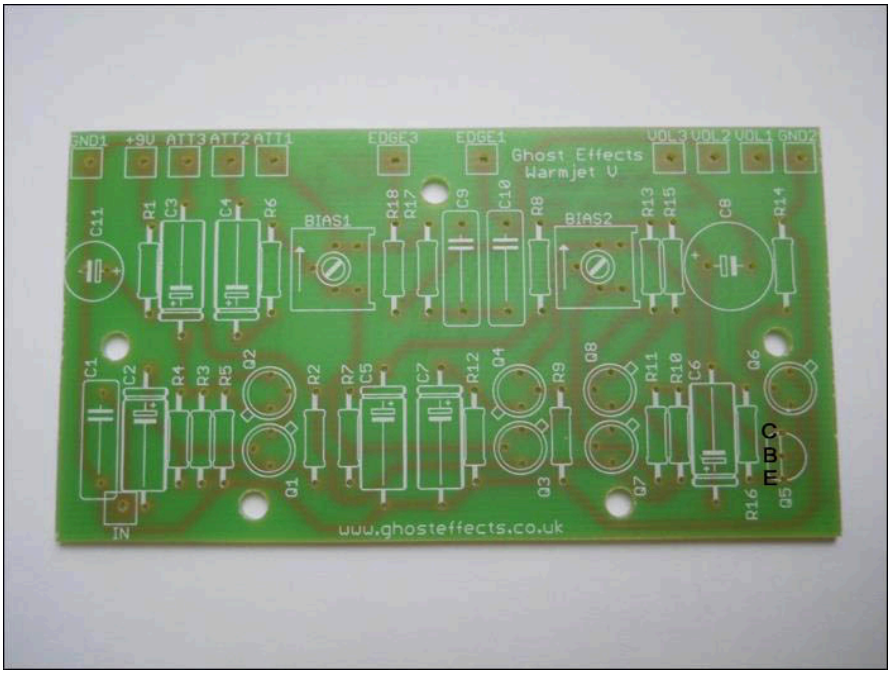
Bias 1 50k trimpot or external 50k lin
Bias 2 5k trimpot or external 5k lin

Attack = 10k log
Level = 1k log
Edge = 100k log

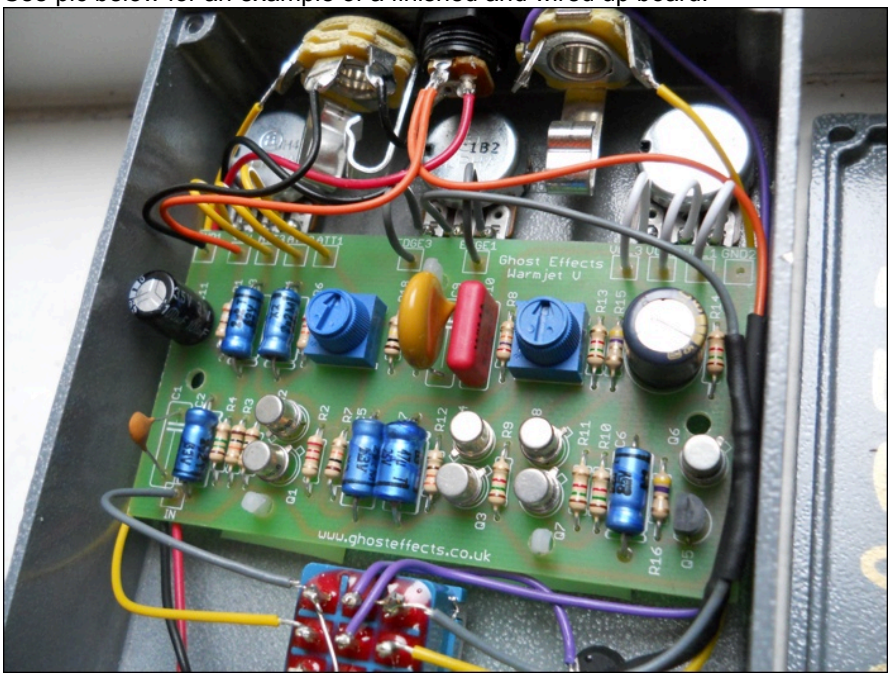
Q1, Q2, Q3, Q4, Q6, Q7, Q8 = BC108b npn
Q5 = BC557b pnp

Other common transistors will probably work just as well.
In terms of gains I aim for the 250-400 hfe range for each one.

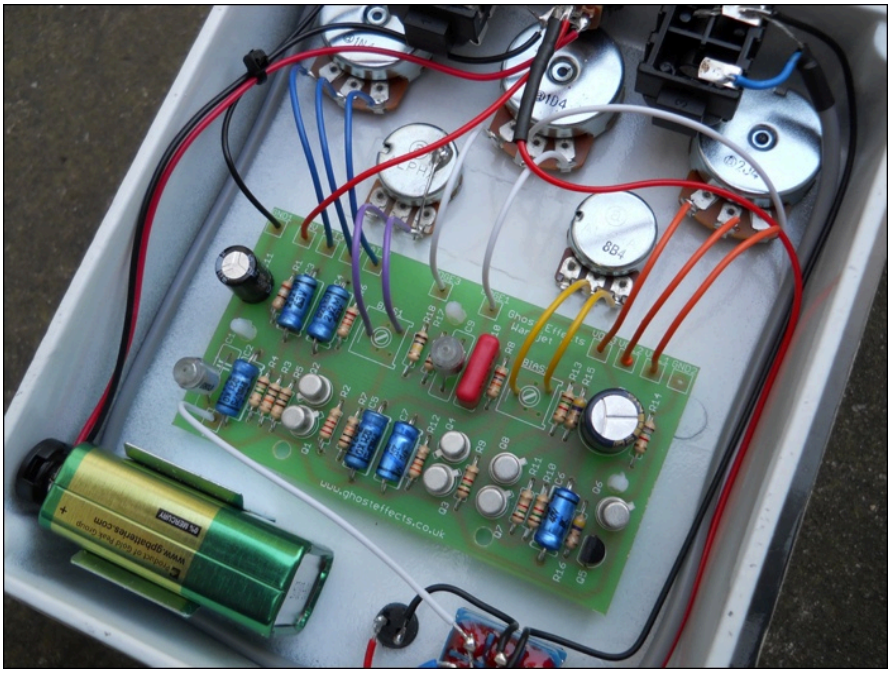
The pinout for Q5, the only pnp transistor, is detailed below. For the npn transistors line up the emitter tabs with those on the board.



See pic below for an example of a finished and wired up board.



And another.

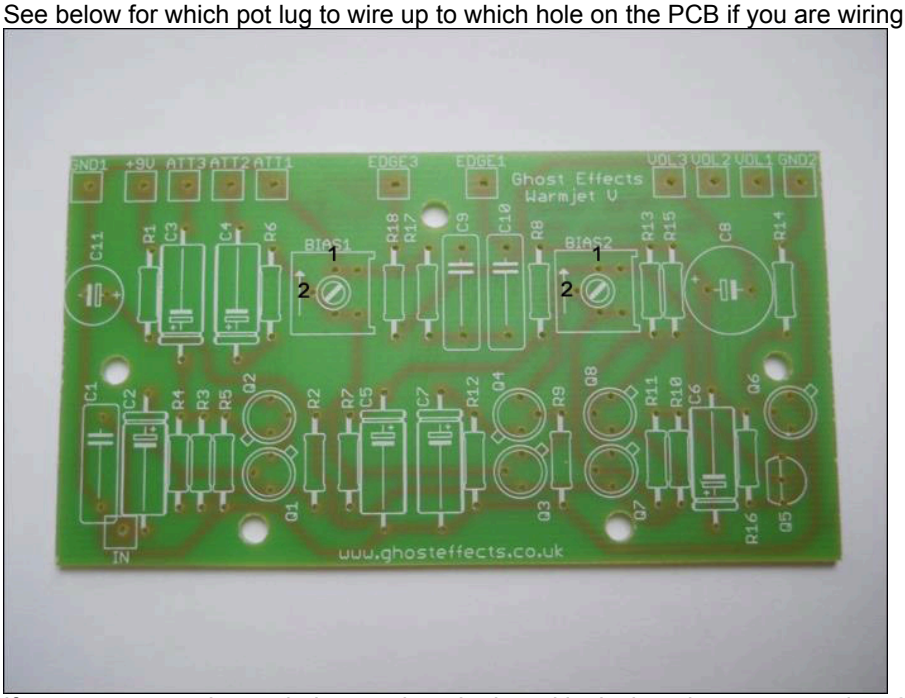


Biasing

There are 2 Bias trimpots in the circuit, legend has it that Brian Eno adjusted these trimpots to get the sound he wanted.
Bias 1 on the PCB controls the overall gain of the 1st part of the circuit, this needs to be up 1/4-1/2 way at least for the circuit to work.
Bias 2 on the PCB could be seen as controlling the overall texture of the fuzz sound.
When trying out your circuit for the first time have both trimpots approximately half way up.

I like to set Bias 1 just less than halfway then sweep Bias 2 around its own halfway point until I get a sound I like, aiming for maximum sustain and minimum noise.
Some settings will make the circuit noisy, back off either of the Bias controls to lessen this.
The trimpots can be wired directly to the board or wired as external pots, see below for which pot lug to wire up to which hole on the PCB if you are wiring them externally.

See below for which pot lug to wire up to which hole on the PCB if you are wiring them externally.



If you want to use internal trimpots then the board is designed to accommodate 2 different types of

trimpots so you should have no problem finding a trimpot type to fit.
Here is a link to the ones I use, but other modern types will work just as well.
http://www.rapidonline.com/Electronic-Components/3-8in-Single-Turn-Finger-Adjustable-Cermet-Potentiometer-81452

I personally think the best method is to have the gain bias as an internal trim, with the texture bias mounted externally. To set this up have the texture bias turned up all the way, then adjust the gain bias so that there is only background noise at the top of the texture bias travel. If set up right you should have the background noise going away as you turn down the texture bias and a good sweep of sounds across the control.

Output
The output of the circuit comes from Edge pot lug 2, and would normally go to the circuit output lug on the pedal footswitch.

Power
The circuit is negative ground and can be powered with a 9v battery or a 9v DC adaptor.
With a battery snap Red lead goes to power on the board, Black lead goes to ground (or the appropriate lug on a switched jack).

Mods
The 'Edge' Tone control can be changed to a High Pass Filter by omitting C10 and using a jumper instead, I usually use a zero ohm resistor but a piece of wire will do. This gives a less scooped sound to the 'Edge' control when it is turned down. Alternatively each option could be accessed via a dpdt toggle switch, just run wires from the holes in the PCB where C10 should be.

It's possible to discard the Edge 'Tone' control. Don't bother with R17/C9/C10 and use a terminal pin connected to 'Edge 3' on the PCB. Connect a wire going to the output lug on the pedal footswitch, as well as an 18k (or trimpot to control the amount of attenuation) resistor connecting the pin (output) to ground.

If you prefer a lower overall volume so you get more sweep from the level control you can use a resistor between the output of the circuit (lug 2 on the Edge pot) and the output lug on the footswitch. Somewhere between 100k and 470k will be enough.

It is also possible to increase the value of the 1k level pot, say 5k-50k, but you will definitely have to limit the overall output volume using the above tip. This may increase the bottom end as well.

For a bassier sound use 4.7uf capacitors instead of 2.2uf, and use a different pot value for the level control, see the tip above.

Try a highish gain PNP Germanium transistor for the solitary PNP Silicon transistor.

Project V
By soldering extra parts to the underside of the PCB you can attempt to recreate the original Project V circuit, this is just a rough guide and I would only recommend doing this if you are familiar with the PCB and the original Project V schematic, AND are an experienced pedal builder.

This is straight out of my notebook!
22pf, 390pf, 100k - between bias 2 bottom right hole, and R9 bottom hole (ground)
47uf - between R2 bottom hole, and R12 bottom hole (ground), negative to ground.
0.047uf - between R1 bottom hole, and R5 bottom hole (ground)
Jumper R18
Edge 3 - Output to Gain and Edge switches.

The info on the Gain and Edge switches can be found on the Project V schematic online.

Ian Sherwen Ghost Effects December 2012-May 2017.