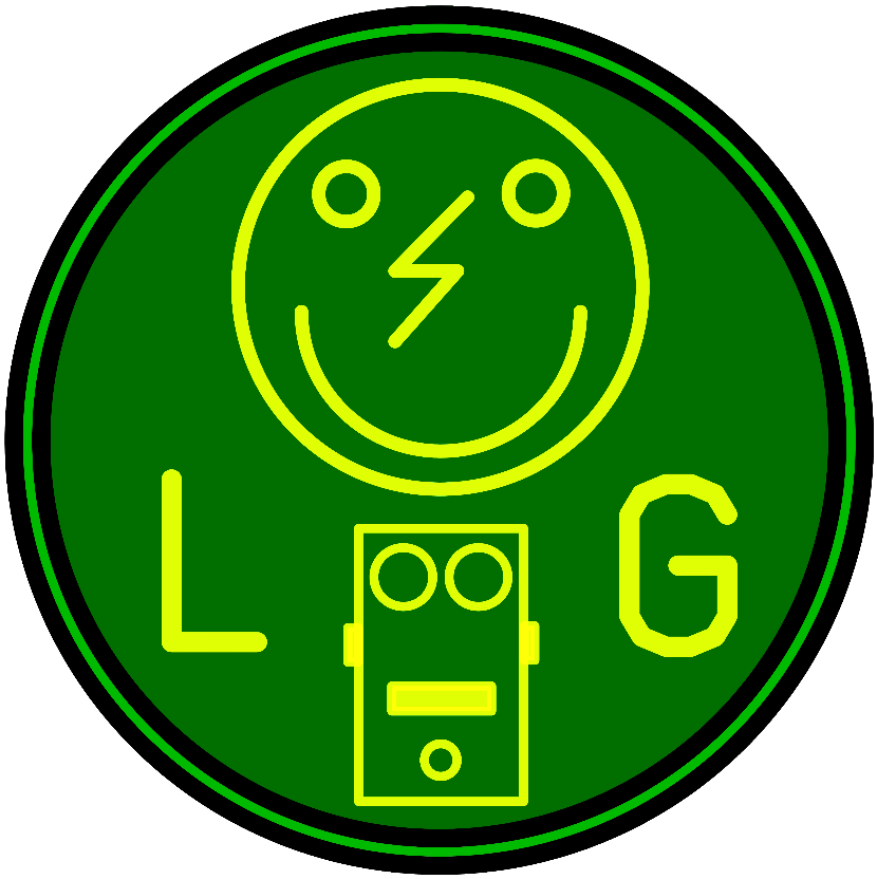
Fuzzy Joe

Building instructions

v1.1



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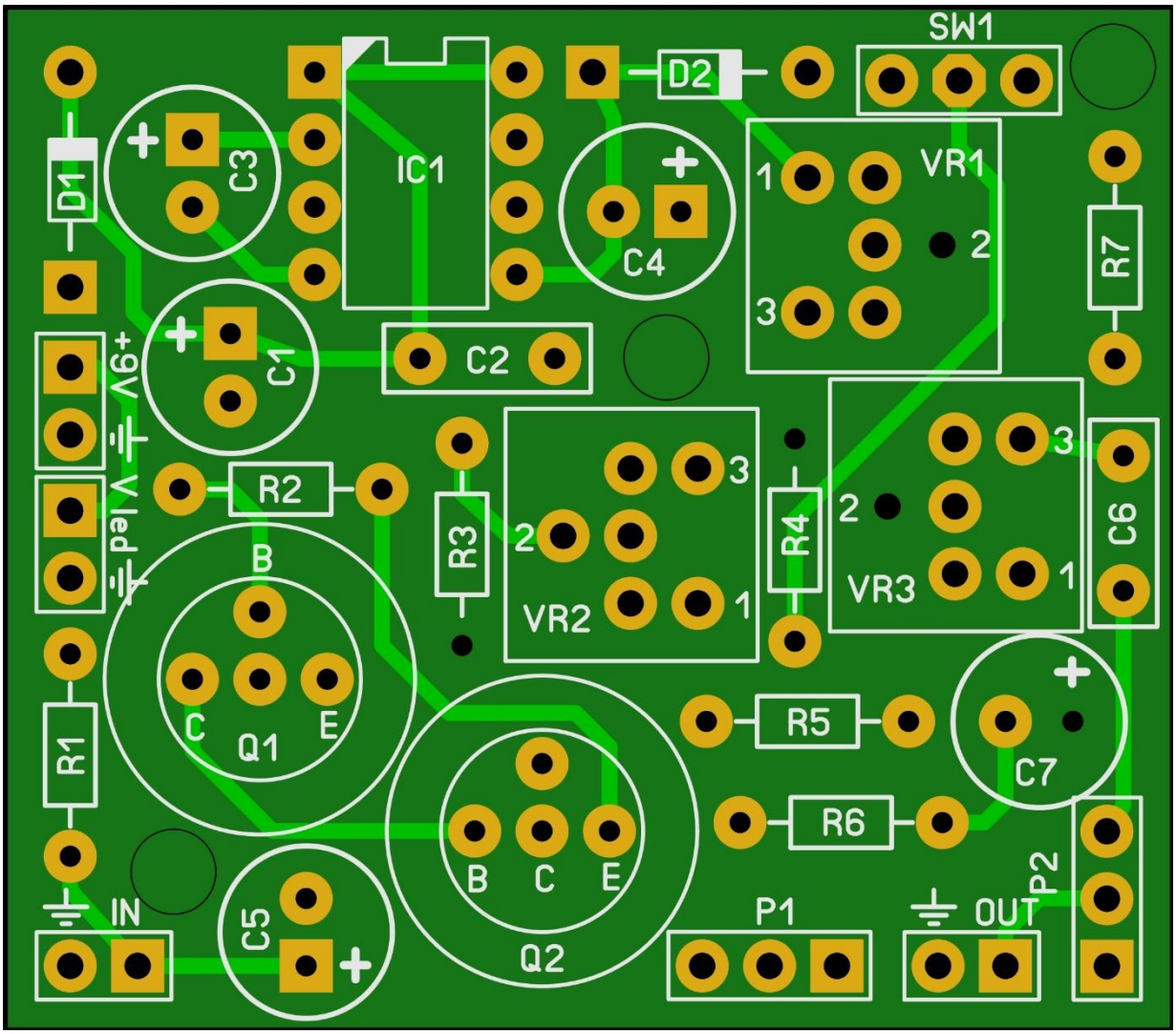
Read this <u>entire</u> manual <u>thoroughly</u> before you start building the effect! There are some available options and you should choose which one you want to incorporate before starting your build.

Last update: 26-10-2019

PCB layout



Dimensions: 44 mm x 38,6 mm
1.73 inch x 1.52 inch

Components

Name	Value	Comment	Name	Value	Comment
C1	100u	Electrolyte	**Q1**	MP39Б	
C2	100n	MKT	**Q2**	GT308B	
C3	10u	Electrolyte	**R1**	1M	1% metalfilm
C4	47u	Electrolyte	**R2**	100k	1% metalfilm
C5	2u2	Electrolyte	**R3**	20k	1% metalfilm
C6	10n	SMF	**R4**	332R	1% metalfilm
C7	22u	Electrolyte	**R5**	3k16	1% metalfilm
D1	1N5817		**R6**	10R	1% metalfilm
D2	1N4001		**R7**	4k7	1% metalfilm
IC1	ICL7660S		**SW1**	SPDT	
P1	B1k	Fuzz	**VR1**	B10k	Sag
P2*	A470k	Volume	**VR2**	B25k	Bias 1
			VR3	B10k	Bias 2

A=Log, B=Lin, C=Rev. Log

* 470k logarithmic pots maybe hard to find or expensive. You could just get a A500k and ask your vendor to get one of around 470k as most pots are rated +/- 10% or more.

Note that the original uses 400V axial electrolytes for **C5** and **C7** capacitors. They will fit in an upright position, but I advise you use radial electrolyte capacitors and choose the good ones like Elna, Fine Gold Panasonics etc. that will fit. **C6** is originally a foil capacitor (eg. Mallory), but a 10n SMF sounds great.

Also note that the resistors **R2** to **R6** in the original are carbon film ones (eg. Piher). They will not directly fit, but you could put them in an upright position and then they will fit.

Lastly, **R1** is not in the original. It is a pull down resistor used to prevent the pop when switching the true bypass switch and can be left out without any problem. Also **R7** is added as offset for the sag (see the chapter “power section”). You should not waste an expensive carbon resistor on them!

Power section

Ok, let's first address the elephant in the room, the power section. As almost all vintage fuzzes, this one also uses positive ground (yes, yes, technically there is no such thing as positive ground). All purists say you should only use a battery preferably one that is close to death. For them the consistent -9V kills the fuzzy sound. Well… this effect has a surprise for them!

This effects power section is designed to accommodate all sorts of power. Let's take a look at all the possibilities.

Battery only

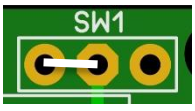
Do not solder **IC1**, **C1 to C4**, **D1**, **D2**, **VR1** and **R7** and **SW1**. That should save you money! Instead you should solder the **BLACK** wire of the battery to the octagonal pad of **SW1** and the **RED** wire to the **Ring** of the stereo **input** jack. Also the status LED needs to be reversed! Take a good look at the off board wiring section!

Switchable Voltage Inverter

The PCB incorporates a built in voltage inverter so you can daisy chain it with other (negative ground) effects. It has a nice extra feature that can simulate a dying battery by using a sag pot (**VR1**). You can use this as a "set and forget" by installing an internal 6mm trim pot or as an extra external 16mm sag pot so you can easily adjust the sag during play. With the current **R7** at 4k7 you can turn down the voltage to approximately -3V. If you want to go down to 0V you can just solder a jumper instead of a resistor in **R7**. If you want a higher minimum voltage then you can install a higher resistor in **R7** (eg. 10k will result in approximately -4,5V). PS my personal favorite voltage setting is around -4,6V.

By installing **SW1** you can switch between -9V and the sag voltage. Make it an external switch so you can use it during play or leave it internal to "set and forget". You can also leave out **SW1** and only use the sag as an external pot. If you turn the pot all the way to the left it will give you the whole -9V and if you turn it to the right it will give you the sag (amount dependent on the resistor used in **R7** as mentioned before). If you want to do this then do not forget to solder a jumper between the right pad of **SW1** and the center octagonal pad.

Also you can choose to use the inverter just to deliver a constant -9V. To do so, just leave out **SW1**, **VR1** and **R7** and solder the left pad of **SW1** to the center octagonal pad.



NEVER let the outer 2 lugs of **SW1** tough each other and also never connect all 3 pins of **SW1** together. If the IC gets hot then there is a short in the power section and you must disconnect the effect immediately from the adapter and find the fault.

I strongly suggest you install the “Sag”. My best tones came from using it and at -9V some transistors from the batch just could not produce a good sound at all! And it is switchable so if you do not agree with me… switch it off or turn the pot all the way to the left to produce -9V!

Build sequence

Soldering this board can be very complicated for some people since the solder pads are very close together. Use a magnifying glass to make the job easier. The trick to soldering a PCB is to work from small to big components. My building sequence suggestions in this section are based on the parts I used myself. Sometimes some components are smaller (or bigger) so always use your own common sense and change the order accordingly. Usually capacitors can differ a lot in size depending on their rating and value.

Note: Do not blow on your solder in an attempt to cool it down. That can result in a bad join that might corrode!

Start by soldering the resistors and jumpers (if needed). Next come the diodes, IC socket. If needed you can create a jumper using a spare piece of lead from a resistor or diode. If you want to experiment with other transistors then you could socket them instead of soldering them to the board. You’ll need a some 20 SIL sockets, break off the sockets and solder them to the board. Now is the time to solder these sockets on the PCB as well as the socket for the IC. Place the transistors and IC once you are finished with all soldering and off board wiring!

Now continue by soldering the SMF and MKT capacitors then solder the internal trimpots (**VR**). Now finish with soldering the transistors (if not socketed) and the electrolytes.

I suggest you now drill the holes in your enclosure so you can use it during the off board wiring.

Note: Really take some time to determine where to place the pots, switches, jacks and PCB in the enclosure before you start drilling. Measure twice, drill once.

You are almost ready to rock, well… not really. The difficult part starts now.

Besides the components mentioned in the components table, you will need:

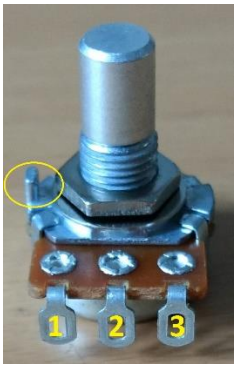
- **2 mono input jacks**.
- **1 x 3PDT footswitch** (9 pins)
- **2,1mm DC jack** (isolated).
- **9v battery clip** (optional).
- **22 gage stranded hook-up wire.**
- **LED holders.** This enables you to mount the LEDs in the enclosure.
- **1 x LED (3mm or 5mm depending on your taste)**
- **Hammond 125B** case (or similar) in your favorite color.

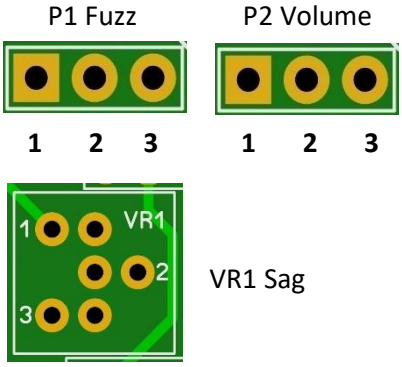
Off board wiring

Potentiometers

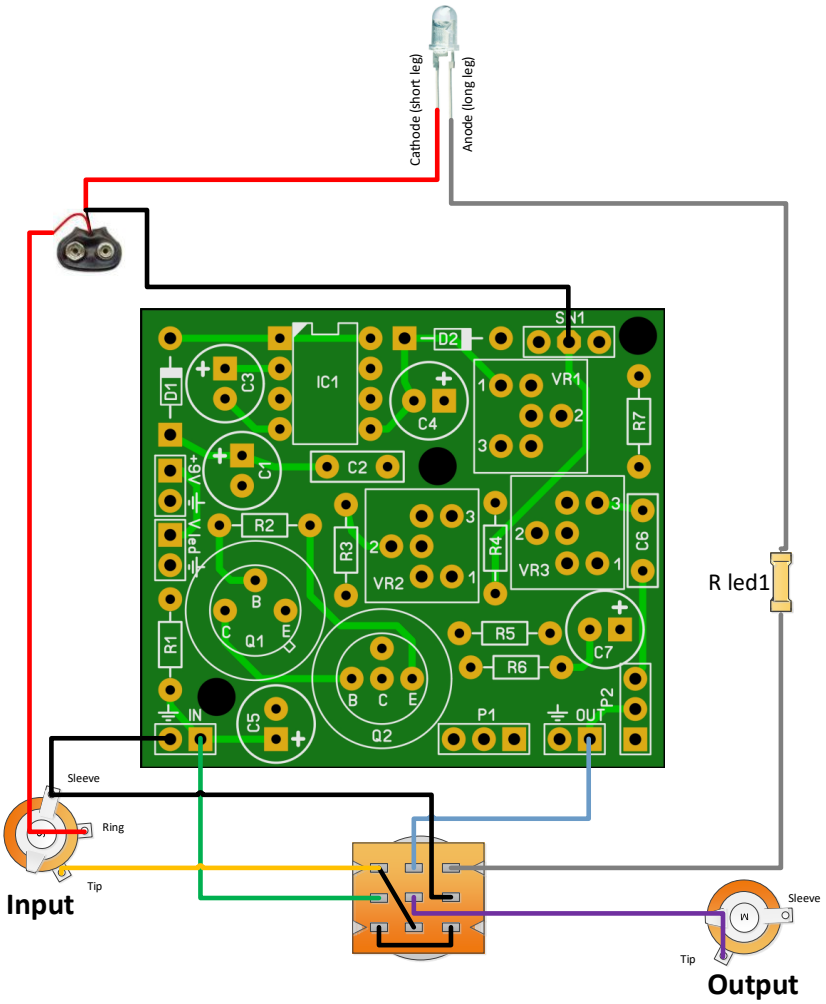
In the pictures below you see the correct pin numbering of the pots (Alpha 16mm style).
Solder the wires accordingly and it is always a good idea to twist the wires together to create some extra shielding against external noise. **VR1** is labeled on the PCB with the correct pin numbers so you can use an external pot as mentioned in the power section chapter.

You can break off the pin I marked with the yellow circle with a small pair of pliers.

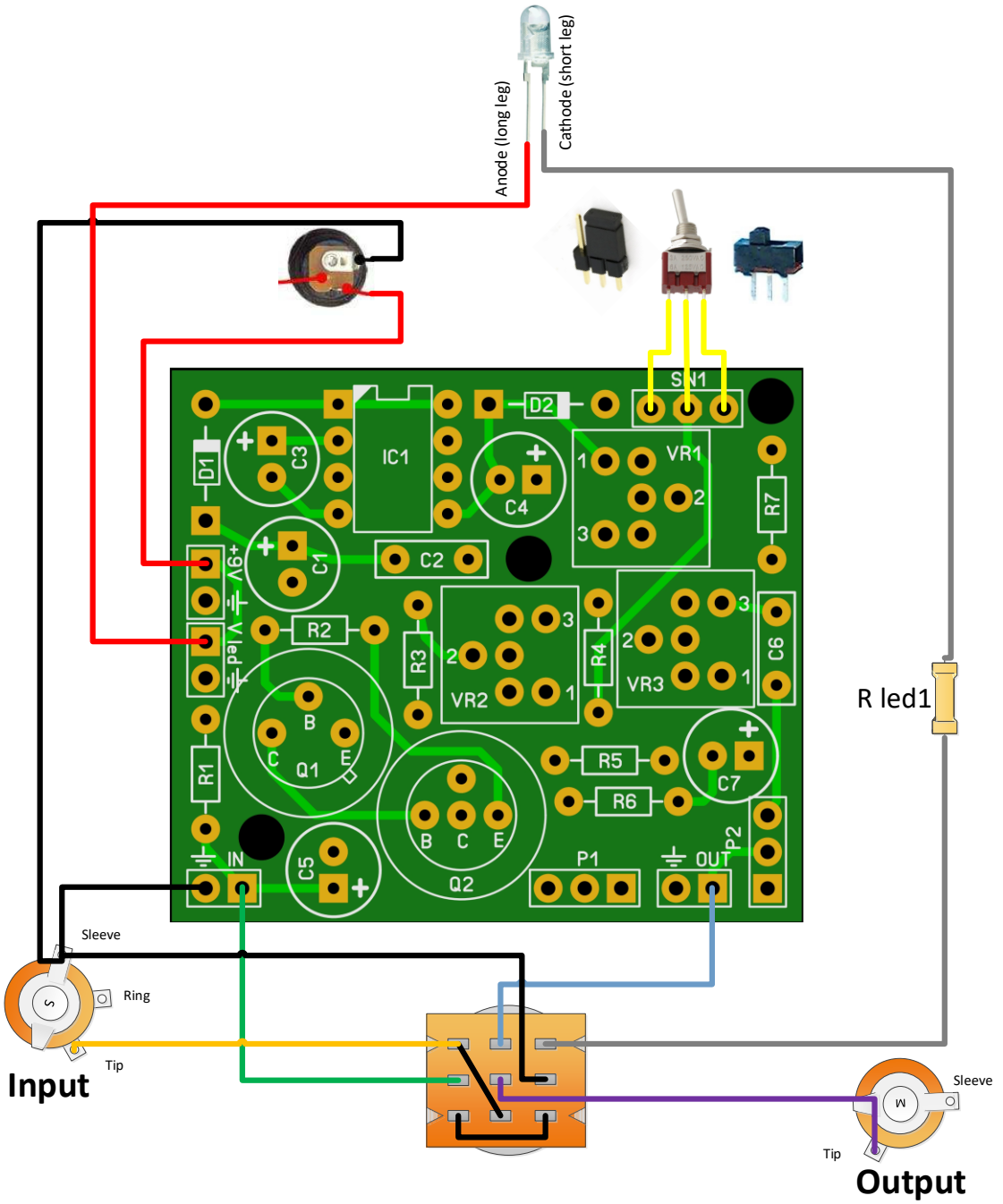




Battery only wiring



Voltage Inverter wiring



Note that **R led1** is **4k7** resistors. You can change this value depending on the type of LED you use but 4k7 is safe enough for almost all LEDs for (-)9V.

It is now time to place your transistors and IC in the sockets if needed. Connect everything, build it in your enclosure and enjoy your effect!

The sleeve on the output jack is not connected on purpose. Make sure the output jack is in good electronic contact with the enclosure else you can try and connect the sleeves of the input and output together. If you test the unit outside of an enclosure you need to connect the output sleeve to ground!

Biasing

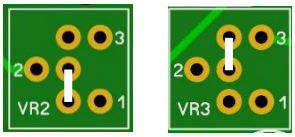
The transistors need to be biased. The best way to do this is by using the bias pots **VR2** and **VR3**. Start by using the following settings:

VR1	: all the way to the left (or switch **SW1** to -9V = connect left and middle pad)
VR2	: all the way to the right
VR3	: all the way to the left
Fuzz	: max
Volume	: max

Now move **VR2** and **VR3** more to 12 o'clock and test it with different fuzz levels by turning the fuzz pot. Stop when you found your sweet spot. Remember that germanium transistors are very sensitive to temperature changes and will need to be re-biased every now and again.

Fixed resistors

If you have trouble biasing or just do not want it, you can replace **R3** with a 33k resistor and **R5** with a 8k2 resistor and leave out **VR2** and **VR3**. You will then also need to short pad 1 and 2 on **VR2** and pad 2 and 3 on **VR3**.



Transistors and resistors

As you might have concluded from the schematic, the effect is a basic positive ground Fuzz Face with some small changes. You can adjust any value resistor you want to make it sound any way you like. You can also use any type of PNP transistors instead of the ones mentioned in the components list.

Troubleshooting

All PCB's have been 100% factory e-tested and out of every batch I receive I build an effect to double check, so there should not be a connection problem on the PCB itself.

The board is not working (at all), what now?

- Check if your 9V is plugged in correctly (and/or soldered correctly on the board). Pay special attention to the polarity.
- Check that you oriented the capacitors, IC's ,transistors and diodes the right way. SMF, MKT and ceramic capacitors as well as resistors do not need to be oriented. A likely sign of incorrect capacitors and/or orientation is when an effect is sputtering, rumbling or "motorboating".
- Check if you used the correct values of the components. For resistors you can look here: http://www.diyaudioandvideo.com/Electronics/Color/
- Double and triple check your soldering! A loose or cold solder can be really bad for your board.
- Replace the IC and/or transistors, one might be defective. Before doing that first unplug the 9V and wait for 5 seconds.
- Check that you have good/high grade components. A lot of Chinese sourced parts are fakes (especially high end opamps, audio capacitors, vintage diodes and transistors) so be careful that you source your parts from reliable suppliers.

Schematic