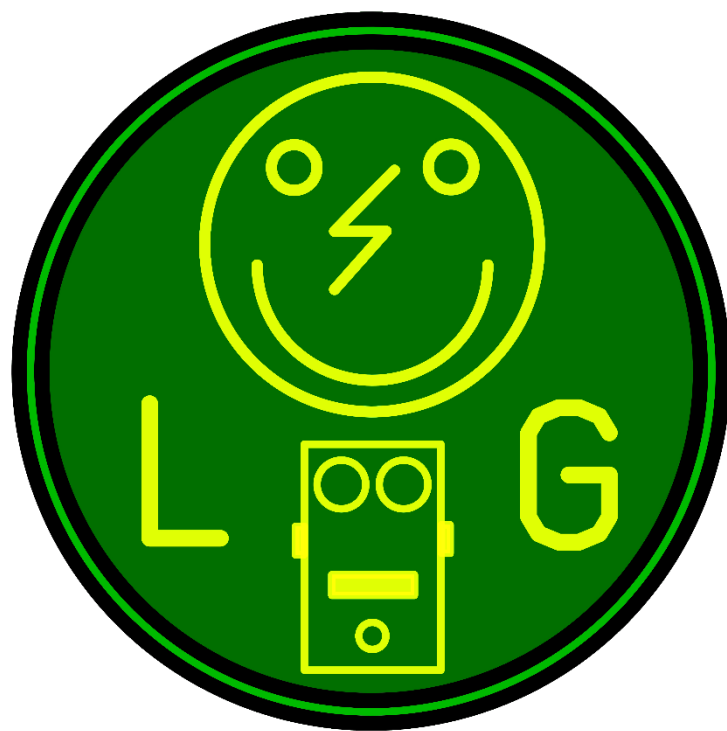


# Autowah

## Building instructions

### V1.1



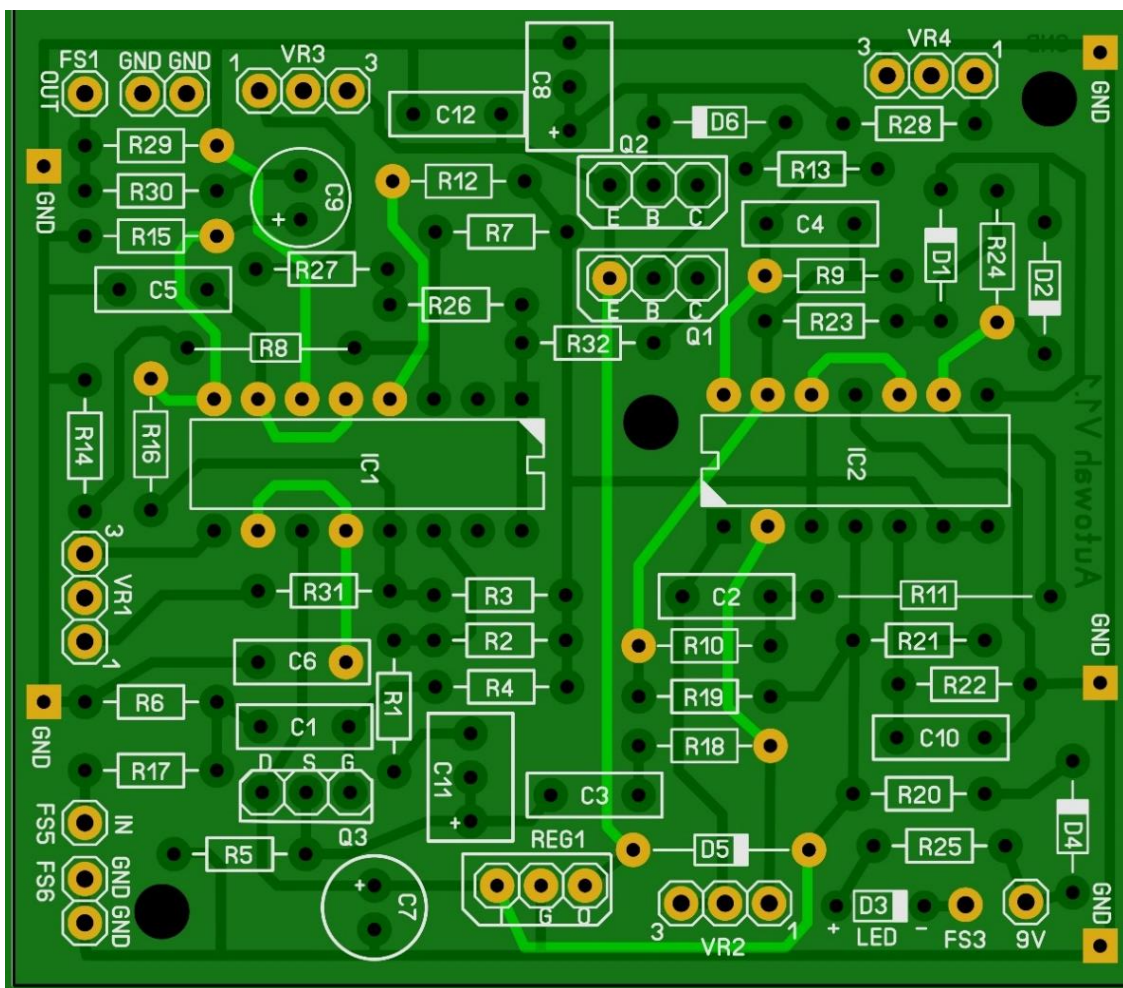
## Table of contents

Components .....	3
General guideline for components.....	4
General building tips .....	4
Modifications.....	5
Offboard wiring .....	5
Troubleshooting .....	7
Schematic .....	8

Read this entire manual thoroughly before you start to building the effect! Especially the Building and Modification part. Decide before building the effect which mods you want to try so that you do not need to desolder parts later.

## Components

C1	22n	R1	5K1	R17	10k	D1	1N4148
C2	68n	R2	330R	R18	20k	D2	1N4148
C3	220n	R3	330R	R19	4M7	D3	LED
C4	8n2	R4	1M	R20	47R	D4	1N5817
C5	22n	R5	10k	R21	47k	D5	1N4001
C6	22n	R6	1M	R22	47k	D6	1N4148
C7	100u	R7	330R	R23	10k		
C8	2u2	R8	6k8	R24	10k/20k	IC1	LM13700
C9	1u	R9	4M7	R25	3k3	IC2	TL074
C10	100n	R10	20k	R26	3k6	REG1	LM78L05
C11	1u	R11	20k	R27	4k3		
C12	100n	R12	330R	R28	4k7		
		R13	330R	R29	100k	VR1 (RESONANCE)	B50k (linear)
Q1	BC550C	R14	4k7	R30	1k	VR2 (SENSITIVITY)	B100k (linear)
Q2	BC550C	R15	4k7	R31	6k8	VR3 (BIAS)	B50k (linear)
Q3	2N5457	R16	6k8	R32	6k8	VR4 (DECAY)	C1M (reverse log)



## General guideline for components

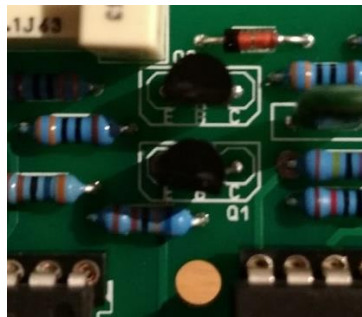
- Capacitors: All values under 1nF should be ceramic disks. From 1nF up to 1uF should be MKT or SMF (metal film capacitors). For over 1uF use electrolyte caps 16V+ rated and watch out for polarity! C9 is also electrolyte.
- Resistors: use 1% metal film for the best results.
- Socket all IC's and transistors. This way you can easily mod them or replace them if they brake.

## General building tips

Soldering this board can be moderately complicated for some people since the solder pads can be very close together. Use a magnifying glass to make the job more easy.

Start by soldering the resistors and diodes. Next, solder the sockets for the IC's and transistors. For the transistors you can buy a 20 pin SIL socket and cut of the pins you need. IC1 needs a 16 pin DIL socket and IC2 needs a 14 pin DIL socket. If you want to socket D6 (see MODS below) than solder the socket now. Next you can solder the MKT capacitors and finish by soldering the electrolyte capacitors. Note that C8 and C11 fit both MKT as well as electrolyte but watch the polarity! If you look at the picture on page 3, the positive side is marked with a + and the hole above of the + is also positive. Only the top most hole for both C8 and C11 are negative (-). Now you can place the IC's and transistors. The white triangle on the IC's point to where pin 1 of the IC should be inserted.

**Note: Q1 and Q2 are both displayed misprinted on the PCB. Rotate both transistors 180 degrees to correctly place them.**



Besides the components mentioned in the table on the first page, you will need:

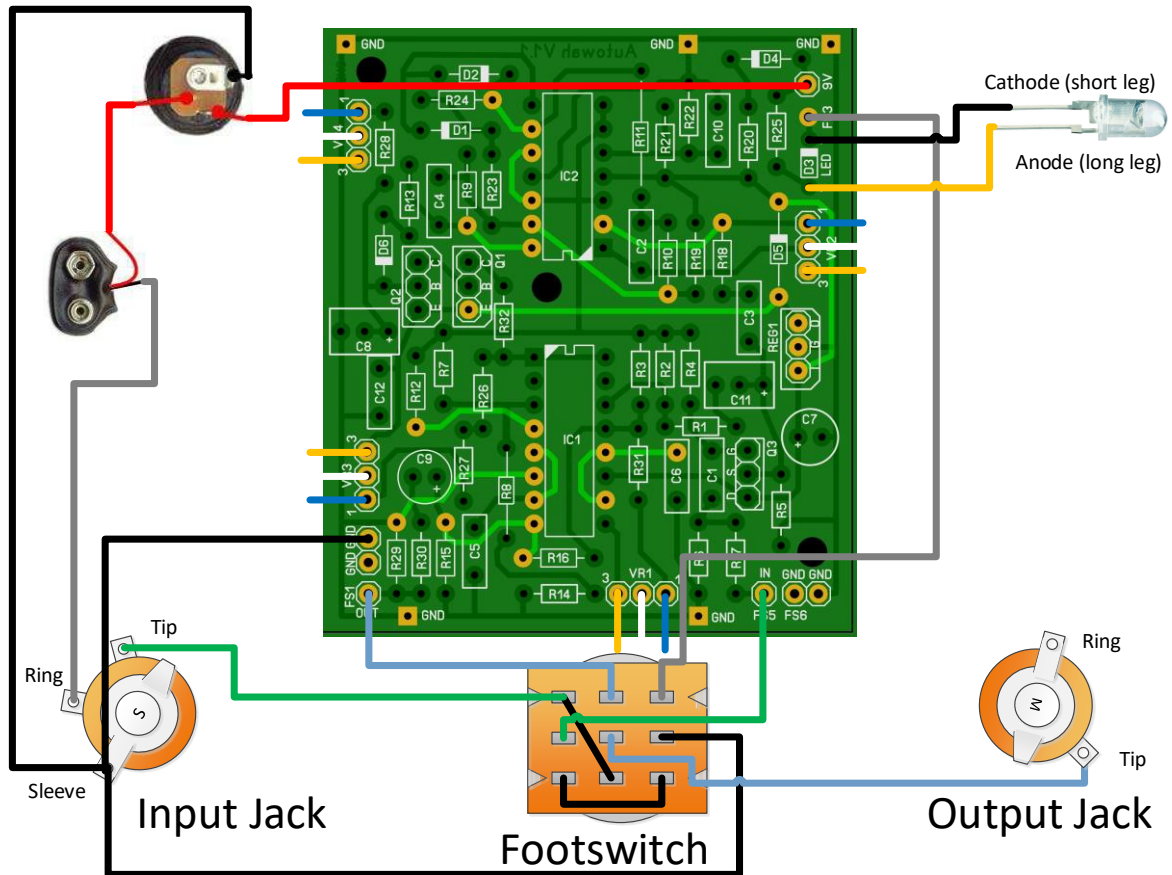
- 2 input jacks. 2 mono jacks if you are not going to use a battery clip, only 9V adapter, or 1 mono (for output) and 1 stereo jack (for input) if you will be using a battery clip.
- 3PDT footswitch (9 pins) and a LED to build in your casing (see page 5).
- 2,1mm DC jack (isolated).
- 9v battery clip (optional).
- 22 gage stranded hook-up wire
- Hammond 1590BB case (or similar) in your favourite colour.

## Modifications

- You can try to replace **D6** (1n4148) with a 1N34 for smoother operation. You can also experiment with other diodes. To do this you can solder 2 IC pins in the holes of **D6** so you can easily mount different diodes.
- It's been reported that the use of a 1uF electrolyte cap in **C8** instead of a 2u2 electrolyte makes things more smooth.
- Change **R18** from 20k to 47K for more linear sensitivity response.
- If you are using a different LED than you can alter the value of R25 accordingly. Generally 3k3 will be enough for most bright LEDs, but a bright green one might need a 680R to function correctly. Please check which value suits your LED best before using it.
- The original uses a LM324 instead of a TL074, but I personally prefer the TL074.
- Because there is no 7k9 resistor in existence, I chose to split it in 2 resistors (**R26**=3k6, **R27**=4k3). But as the resistor value is not that important because the BIAS (**VR3**) can compensate for it, you could choose to use a 7k5 or 8k2 and compensate by turning the Bias pot a bit more up or down. To do so, insert the 7k5/8k2 in the bottom pad of R27 and the top pad of R26



## Offboard wiring



- Blue = pin 1
- White = pin 2
- Yellow = pin 3

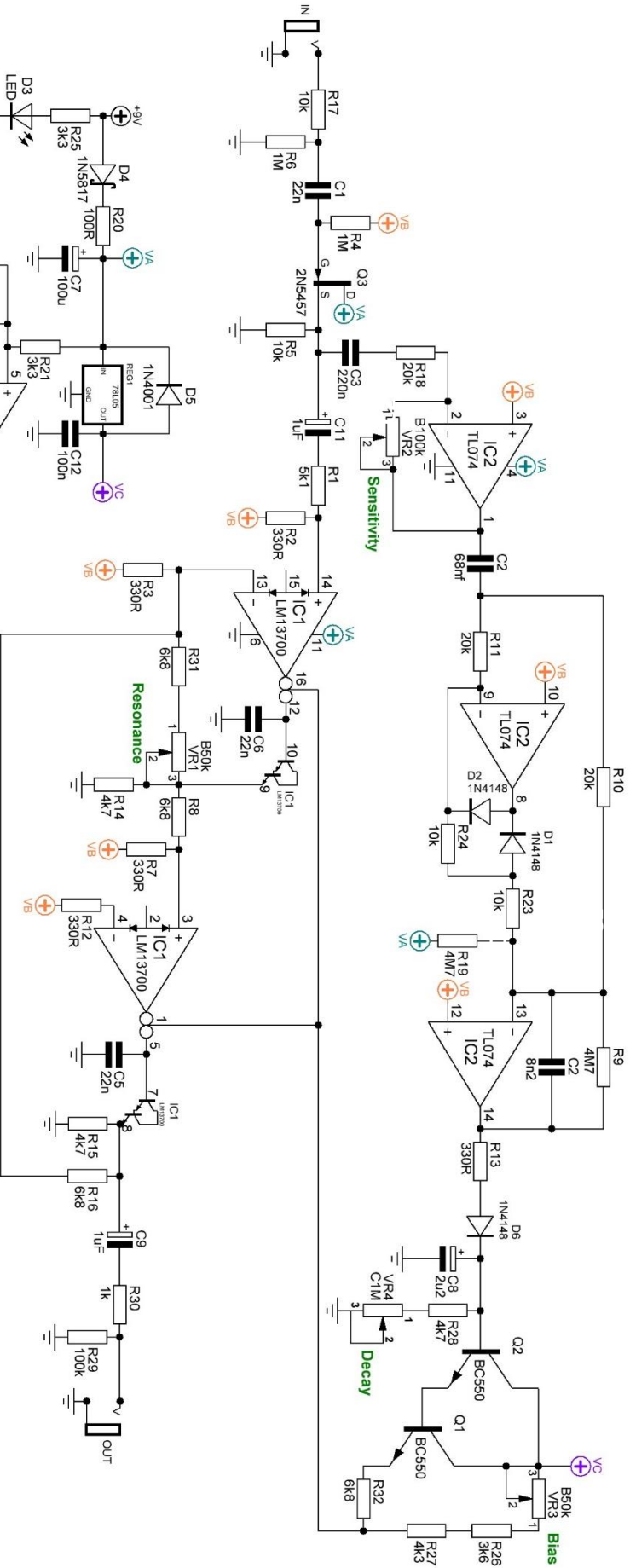
Notice that in the “off” position the effect input is connected to ground to prevent possible oscillation. If you are using your own 3PDT PCB then you should not install R25 and only connect the +9V side of your 3PDT PCB to the R25 hole next to the +9V on the autowah PCB.

## Troubleshooting

All PCB's have been e-tested 100% so there should not be a connection problem on the PCB itself.

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

- Check that you oriented the capacitors, IC's ,transistors and diodes the right way. MKT capacitors and resistors do not need to be oriented. Also check if your 9V is plugged in correctly (and/or soldered correctly on the board).
- Double and triple check your soldering! A lose or cold solder can be really bad for your board.
- Check if you used the correct values of the components. For resistors you can look here: <http://www.diyaudioandvideo.com/Electronics/Color/>
- Replace the IC's and transistors, one might be defective. Before doing that first unplug the 9V and wait 5 seconds.
- Check that you have good/high grade components. A lot of Chinese sourced parts are fakes (especially high end opamps) so be careful that you source your parts from reliable suppliers.



**Autawah v1.1.1**  
**Drawn by: Arnold Dikstaal (2017)**  
Thanks to freestompboxes.org, vulcanofx and tapboardeffects

Schematic