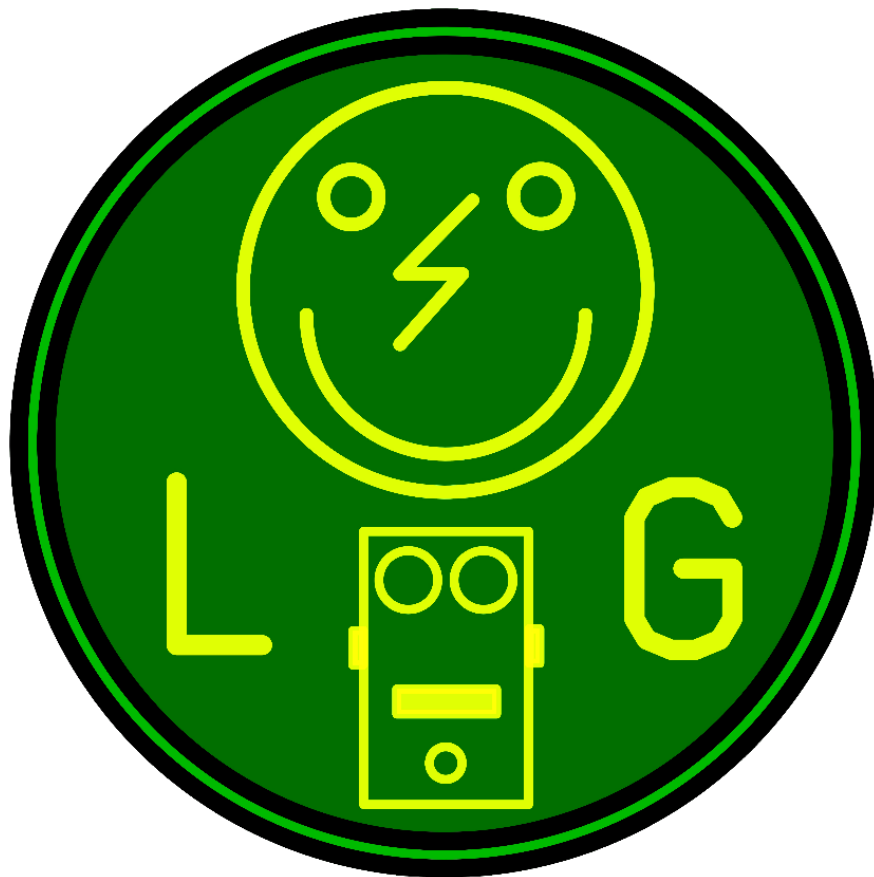


# Magnum

## Building instructions

### V1.0



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

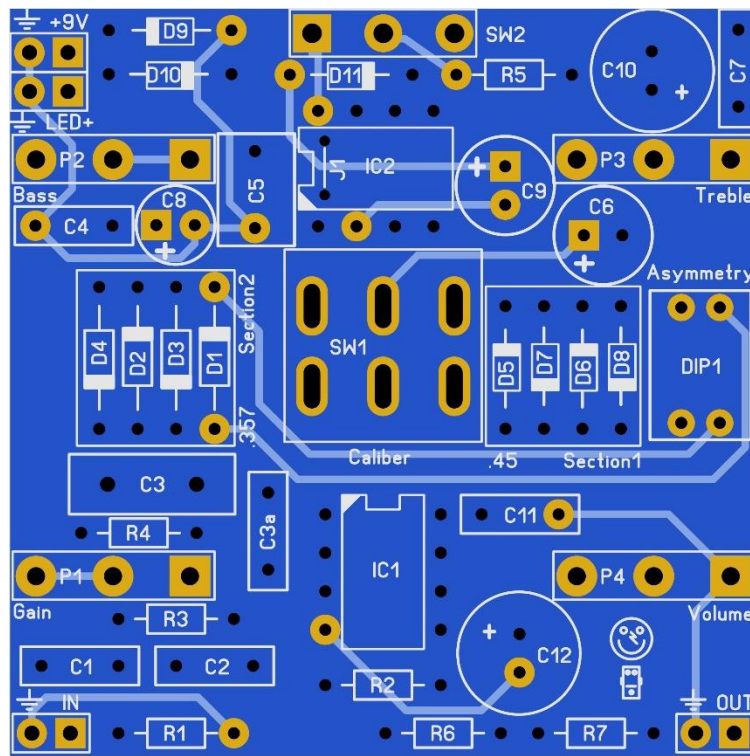
Last update: 02-02-2020

## Components

Name	Value	Comment	Name	Value	Comment
C1	220p	MLCC/Ceramic	D8	1N4001	
C2	150n	SMF/MKT/Wima	D9	1N4001	
C3(a)	22p	MLCC/Silver Mica	D10	1N5817	
C4	100n	SMF/MKT/Wima	D11	1N5817	
C5	470n	SMF/MKT/Wima	DIP1	DIP2	
C6	4u7	Electrolytic 25V+	IC1	JRC4558	
C7	47n	SMF/MKT/Wima	IC2	LT1054	
C8	2u2	Electrolytic 25V+	P1	A250k	Gain
C9	10u	Electrolytic 25V+	P2	A25k	Bass
C10	47u	Electrolytic 25V+	P3	B10k	Treble
C11	100n	SMF/MKT/Wima	P4	B100k	Volume
C12	47u	Electrolytic 25V+	R1	1M	1% metalfilm
D1	1N34A	MLCC/Ceramic	R2	470k	1% metalfilm
D2	1N914	Germanium Diode	R3	4k7	1% metalfilm
D3	1N34A	Germanium Diode	R4	820R	1% metalfilm
D4	1N34A	Germanium Diode	R5	10R	1% metalfilm
D5	1N4001	Germanium Diode	R6	47k	1% metalfilm
D6	1N4148		R7	47k	1% metalfilm
D7	1N4148		SW1	DP3T	Caliber (diodes)
			SW2	SPDT	Voltage

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

## PCB layout



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## Building 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.

First decide which charge pump you want to use. **IC2** can fit a LT1054 or even the cheaper ICL7660S. When using the 7660S, you must place a jumper in **J1**! Do not blow on your solder in an attempt to cool it down. That will possibly result in a bad join that might corrode!

If you want to experiment with other diodes then you could socket them instead of soldering them to the board. You'll need a 20 SIL, break off the sockets and solder them to the board. **Note:** Glass diodes are fragile. Do not expose them to heat for too long or they'll break!

Start by soldering the jumper (if needed), resistors and then the diodes (if not socketed). Solder the IC socket next and then the small SMF/MKT capacitors, the DIP switch, the electrolytes and finish with the **C3** silver mica. If you want to use a regular 22pF MLCC for **C3**, you can use the **C3a** pads.

Do not yet place the IC (and diodes if socketed). Wait until after you soldered the potentiometers and switches.

Besides the components mentioned in the table on the page 4, you will need:

- **2 input jacks.** 2 mono jacks if you are not going to use a battery but only the 9V adapter. 1 mono (for output) and 1 stereo jack (for input) if you will be using both a 9V battery and the 9V adapter.
- **3PDT footswitch** (9 pins)
- **2,1mm DC jack** (isolated).
- **9v battery clip** (optional).
- **22 gage stranded hook-up wire.**
- **LED and LED flange.**
- **Hammond 125B** case (or similar) in your favorite color. If you need more space, use a Hammond 1590BB.



## Modifications

### Diodes and Op amp

You can use other diodes than the mentioned combinations. Try LED's, MA858/859 (very nice!!), D9E, etc. **D1-D4** best fit the bigger glass germanium diodes. **D5-D8** best fit the smaller silicon diodes.

**IC1** can be any dual op amp of your liking. Try the JRC4558, JRC4559, AD712, MC1458, TL072, OPA2134, OP275, etc, etc.

### Clipping Diode Configurations

There are really a lot of ways to configure the diodes in the soft clipping section of this effect. There are 2 diode sections that you can load with whatever 4 diode combination you like. The Dip switch is added so that you can switch between symmetrical and asymmetrical clipping. Dipswitch 1 bypasses **D8** and dipswitch 2 bypasses **D1**.

Feel free to experiment with different diodes and configurations. **SW1** is a DP3T (on-off-on) switch that enables you to switch between the 2 sections and in the middle position it takes out any diode section to let you hear the op amp clipping only.



## Off board wiring

The biggest challenge of this build is to get all the offboard wiring correct and fit it in a box. Take your time measuring and testing before you start fitting everything in the box.

**P1-P4** are PCB mounted potentiometers (Alpha). The rectangle pad marks pin 1 of a potentiometer.

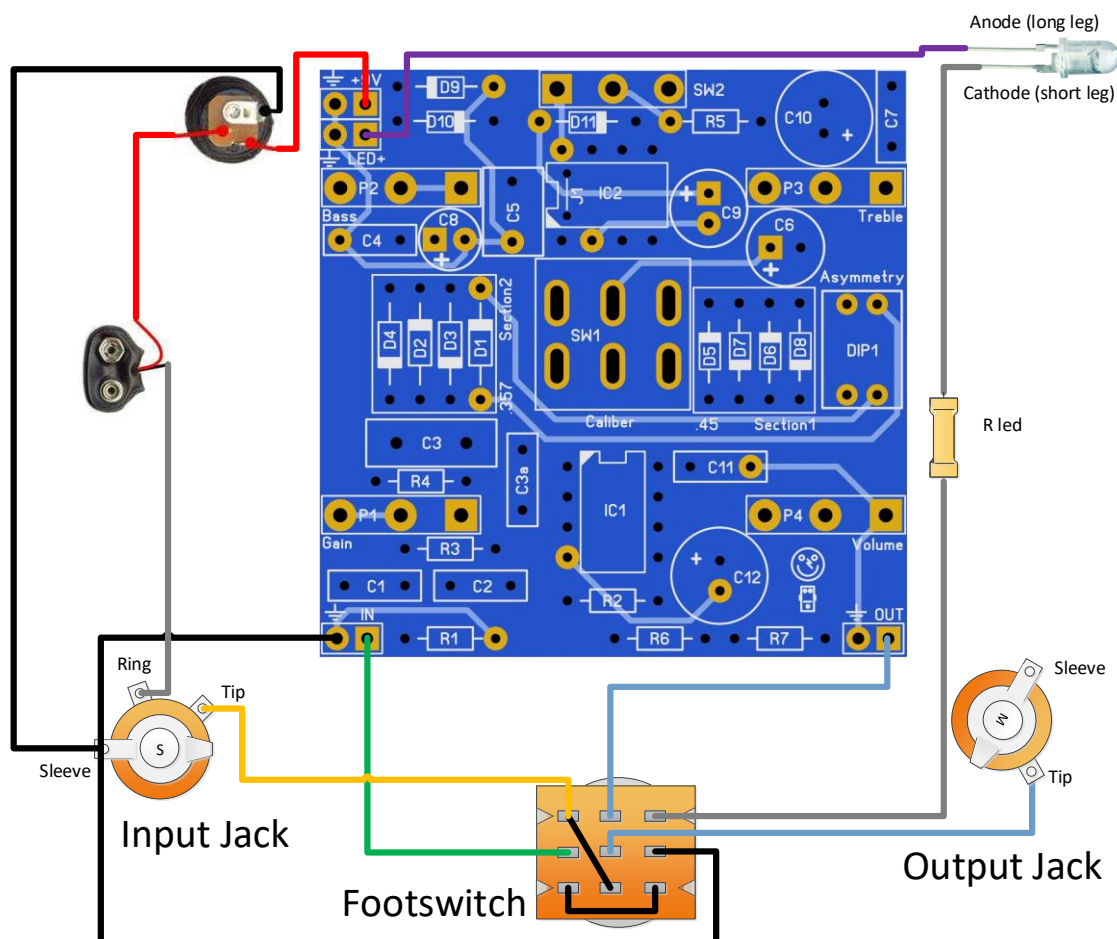
The images below show how you can recognize which pin is which on a potentiometer. You can break off the pin I marked with the *yellow circle* with a small pair of pliers.



**SW1** is a regular DP3T (on-off-on) switch with solderlugs and **SW2** is a PCB mount version SPDT switch.

Place the potentiometers and switches in the predrilled enclosure and then insert the PCB. Once the PCB fits nicely and is not touching the enclosure, solder the potentiometers and switches to the PCB.

Now you will need to wire the footswitch, LED and DC jack:



The LED requires a resistor (R led in the diagram) depending on the type of LED you are using. An ultra-bright red, green or blue LED requires a 4k7 resistor, diffuse green requires 680R. If you want to be more exact then go here: <http://www.muzique.com/schem/led.htm>



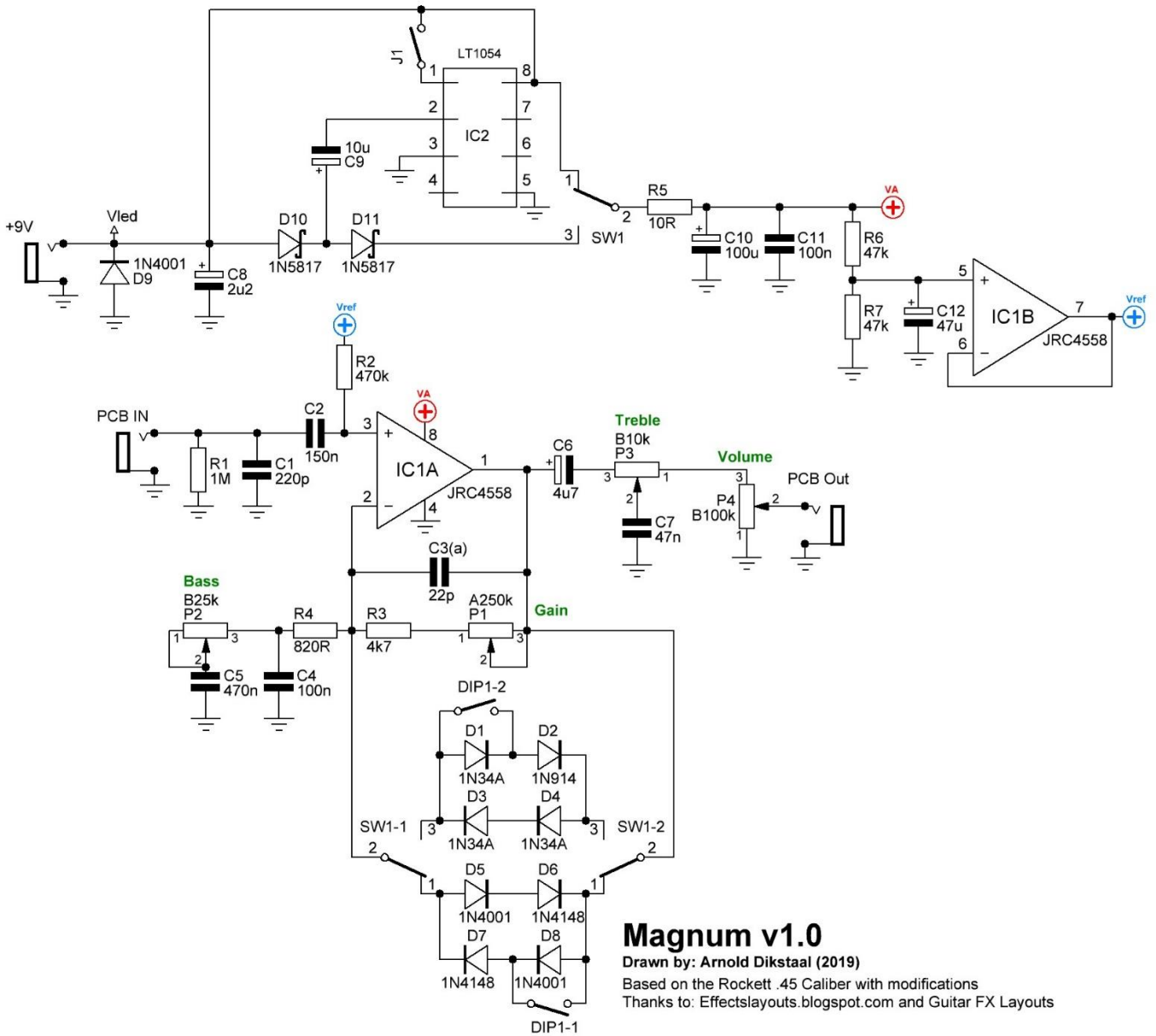
## Troubleshooting

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).
- 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.
- 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, it 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, vintage diodes and transistors) so be careful that you source your parts from reliable suppliers.

# Schematic



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