★ Small Basstar ★

Kit mounting instructions.

Zorg Effects

Summary

Important notice.

This DIY kit is not that easy and require a bit of knowledge. If you're a beginner, you're likely to go into some hardcore problems and should try easier kits before. There's a debugging chapter that you can check in case of emergency, but:

- I cannot be held responsible of any malfunction or a component burning. This board has been tested and I use it in when I build pedals myself. It's 100% functioning when everything is done correctly.
- The debugging chapter cannot take in account all the problems you may reach. (Murphy's law you know....)
- I won't refund any malfunctioning kit that has been mounted.
- Here's what you should do in case of problems:

  1- Keep calm.

  2- Check another time that each component is at it's right place and all the solders are ok.

  3- Check the debugging chapter at the end of this document.

  4- Ask for help in your surrounding family or friends. Someone who can see, plug, check and test your board is more valuable than someone on a forum or mail 10000km far.

  5- Check the freestombox forum, and ask for help if needed. When asking for help be sure to give the maximum of information: http://www.freestompboxes.org/viewtopic.php?uid=75835&f=13&t=29166&start=0

  I may reply to you on freestombox, I check it sometimes.

  6- Mailing me is the very last thing you will do. And if you do, be sure to write the maximum of information I need to answer you. Yes you may add pictures if you think it's relevant. Mails with only “My kit is not working” will be either ignored, either replied with a kind of passive aggressive tone, if not clearly aggressive... After all this is “Do it YOURSELF” and not “Zorg, can you do it for me please?”, and I'm always under a heavy load of work, so please spare me at the maximum!!!

- Any feedback on this document is welcome. If there's something missing, something you don't understand, something you're not sure, if you reworked the document with better explanations, pics and pink elephants, grammatical or ortografik faults, please feel free to mail me.

What's in the kit?

This is all you must find in your Glorious Basstar kit:

Pot A10k (log)	3	BALANCE1 TREBLE1 VOLUME1
Cap Mica 22pF	1	C11
Caps Panasonic 10nF	5	C8 C10 C13 C12
Caps ceramic 100nF	4	C5 C6 C7 C9
Caps polarised 10uF	2	C2 C4
Cap polarised 100uF	1	C3
Diode 1N4148	3	D1 D2
Socket SIL	9	GND1 GND2 GND3 GND4 IN1 LED1 OUT1
Pot A1M (log)	1	MGAIN1
ICL7660S	1	P1
Switch bypass	1	P3
Transistors 2N7000	2	Q1 Q2
Resistance 560	1	R24
Resistance 1k	9	R3 R4 R5 R8 R14 R15 R16 R23 R26
Resistance 1.5k	1	R2 (normal)/R27(Relay bypass option)
Resistance 2k	3	R6 R20 R21
Resistance 20k	2	R22 R25
Resistance 27k	2	R10 R13
Resistance 78k	4	R7 R9 R11 R12
Resistance 1M	2	R1 R17
Dual DIP switch	2	R18 R19
Switch DPDT	2	SW1 SW2
TL074	1	U2
OPA1652	1	U3
LED	2	Red + Blue or Orange
Socket LED	1	
Jacks	1	
Jack DC	1	
PCB	1	
Enclosure	1	
Wood plate	1	
Cable, heat shrink tube, insuler	-	
Knobs	4	
Socket DIL 8	1	DIP-SW
Relay Bypass option:		
Relay Omron	1	RELAY
NE555	1	P4
Resistance 100k	2	R29 R30
Resistance 200k	1	R28
Cap polarised 1uF	1	C14
Cap Kemet 10nF	1	C15
Diode 1N4148	1	D4

Components numbers in the right column, C1, R1 etc. are tied to the PCB's marks.

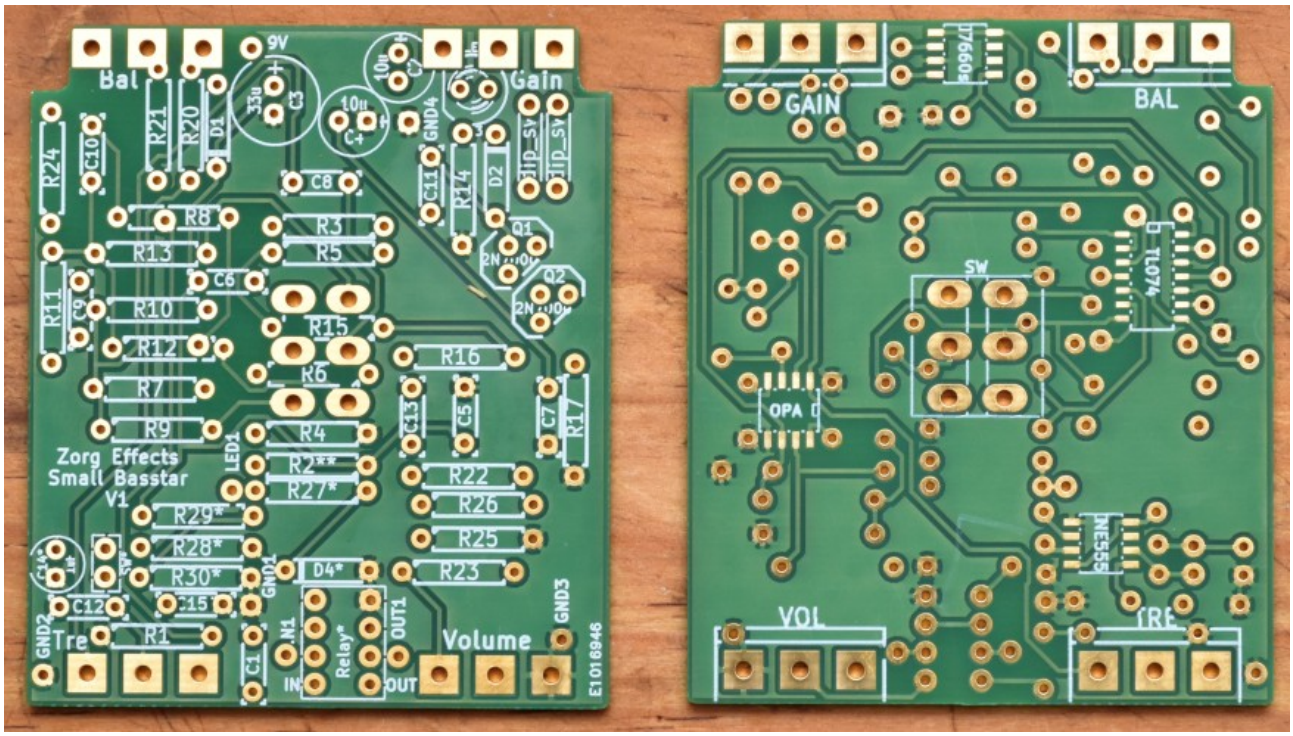
What you'll need.

The following tools are needed to build your Glorious Basstar pedal:

- A soldering iron.
- A un-soldering pump.
- A voltmeter/ohmmeter.
- Pliers to cut wire and remove the wire sheath.
- Pliers to screw nuts.
- A cruciform screw driver.
- And eventually wrenches.
- A 9v dc power unit, center negative.
- It's best to have an oscilloscope, and a frequency generator but not mandatory.

Soldering on the pcb.

This is the PCB (Top/Bottom):



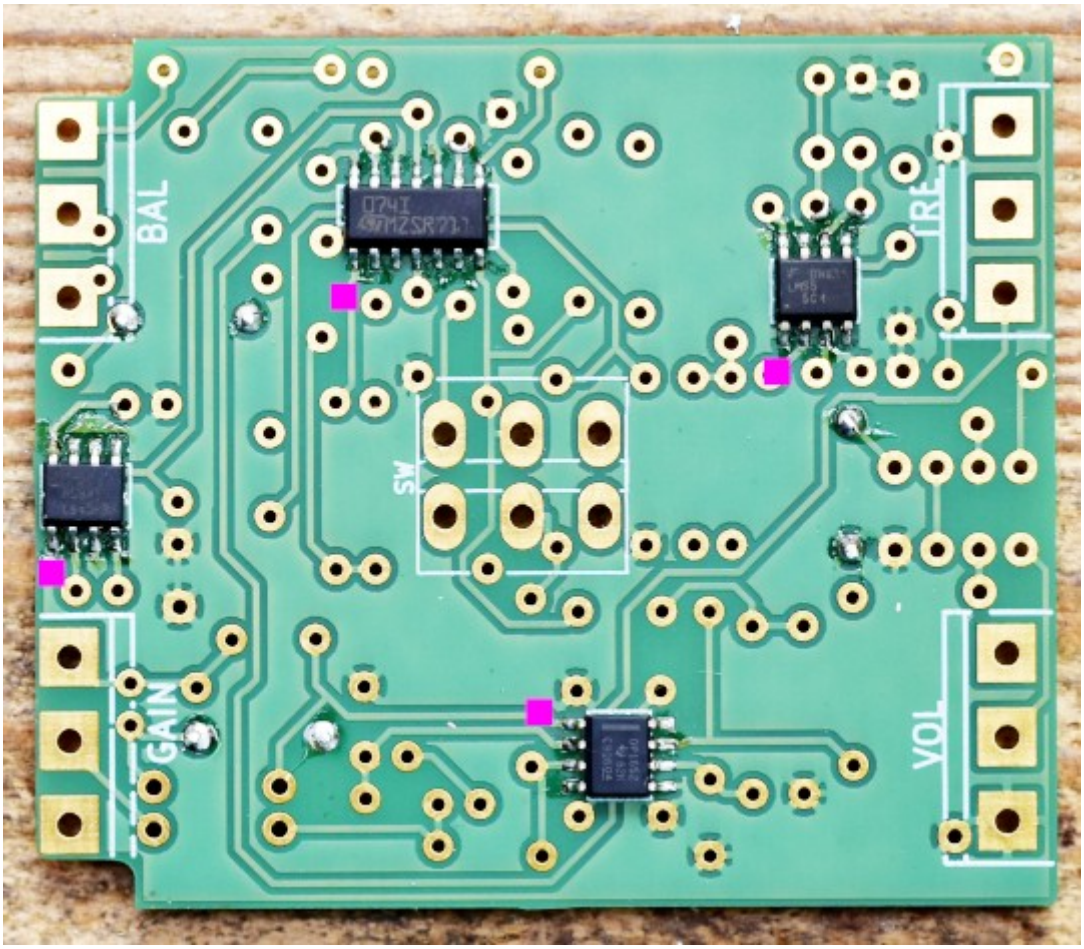
Note that it’s a two side PCB. Components will be harder to unsold than on a single side PCB. Be very careful!

The components labeled with a star * are optional. They are the components for the true bypass relay option. According to the chosen option, the resistance R2/R27 of 1,5k should be soldered in a different place: with the relay true bypass option, it should be soldered in R27. Without the option it should be soldered in R2.

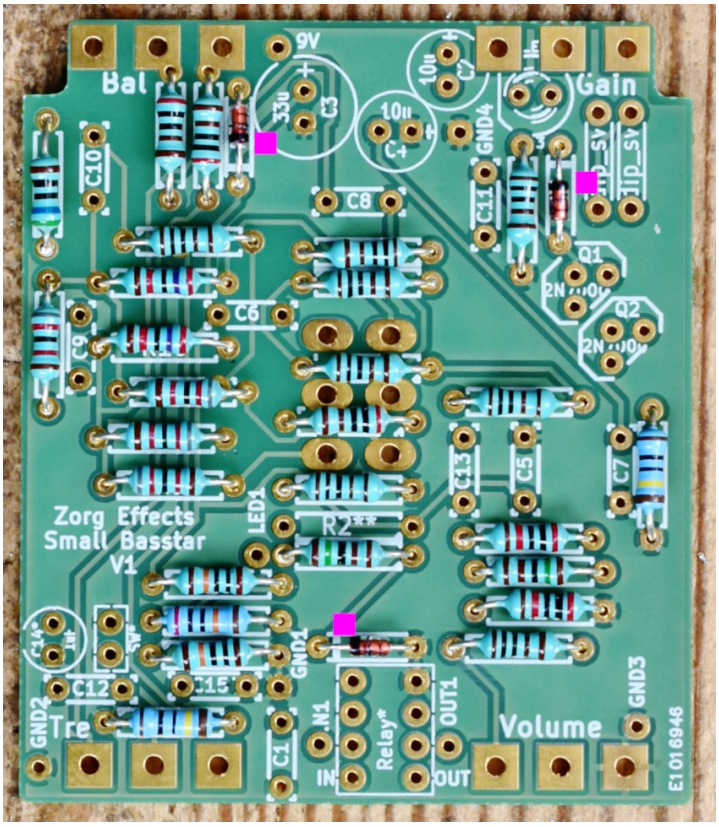
The upcoming pictures shows the true bypass relay option mounting. The mounting without the option is the same without a few components.

First we need to solder the CMS components on the back. Beware of their directions and be rely careful with your solders. To get the component directions, the picture below shows a magenta dot near the leg number 1 of each component. The marking in the PCB also shows the orientation. But on the component itself, it’s tricky to know where the leg number 1:

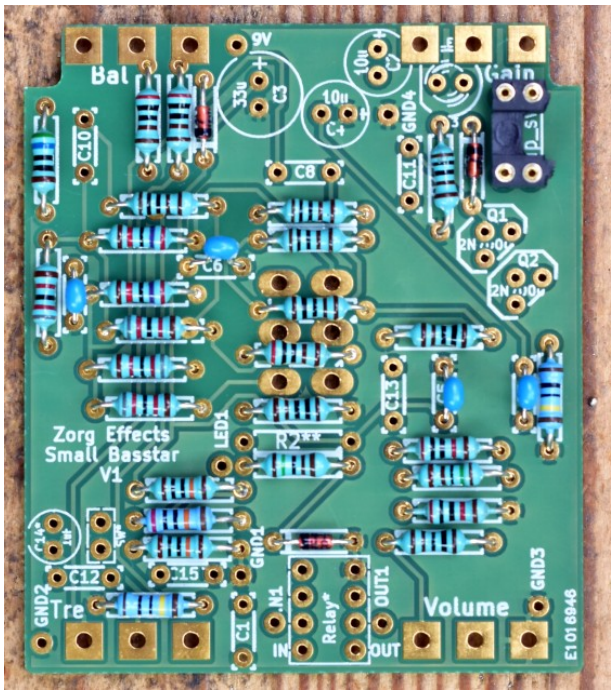
- On the TL074, the side of legs 1 to 7 is more slanted than the other side.
- On the NE555, there a dot near leg number 1.
- On the OPA1652, there’s a bar between legs 1 and 8.
- ICL7660s: its black enclosure has a light round recess near leg 1.



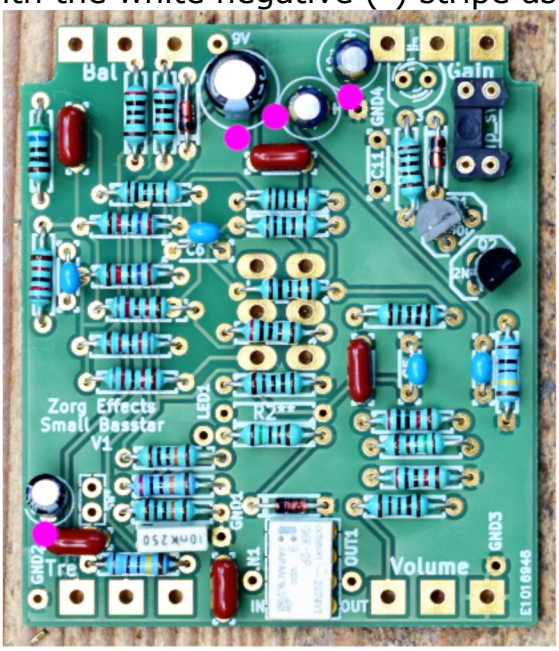
On the other side we're going to solder the components from the smaller to the bigger. First the diodes and resistance. Beware of the diodes directions. They must respect the directions shown in this picture:



Then add the blue decoupling caps and half the IC socket:

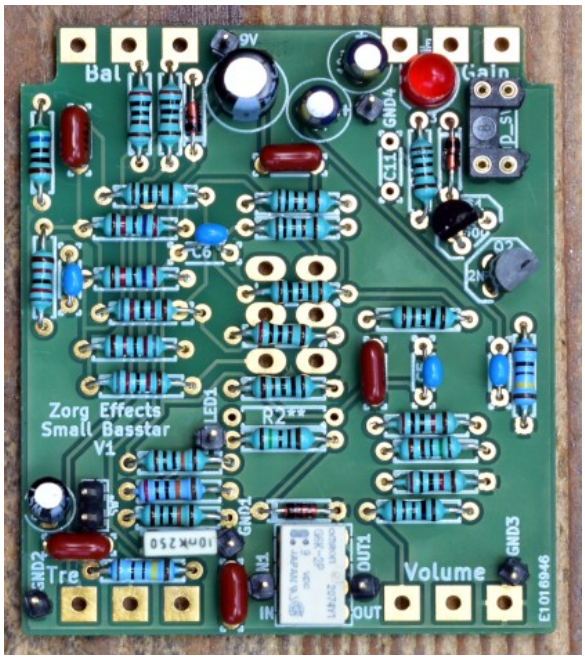


Then add the wima/panasonic/kemet caps, the transistors (beware of their directions, flat side must be has marked on the board), the optional relay and the electrolytic caps. Beware of the electrolytic caps direction. They must placed be with the white negative (-) stripe as shown by the magenta dots :



Cut the 9 in line socket to make soldering terminals for inputs/outputs (GND1,2,3, IN1 etc...). In the case of the true bypass relay option, two pins must be soldered in the sw* print, and two others in OUT1 and IN1. Without the option, sw* should be left empty and pins must be soldered in IN and OUT inside the relay's empty print.

The add the red led. Beware of its direction, its flat side should be the same as the board's mark. You can then add the dip swicth, and you may solder it on its socket.



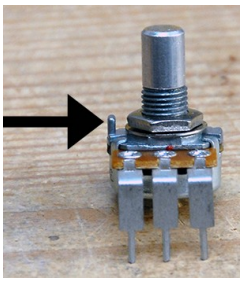
Now flip the board. We're going to solder the switch and pots on the other side.

Begin with the switch. You should push it all the way into the board and add a nut on its axis so that its height will be the same as the pot’s height. The problem will be that the height of the switch will be a bit lower than the pots height and this can somewhat be a problem when screwing the pots and the switch on the enclosure...

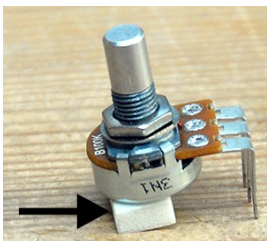
Now we're going to solder the pots on the same side of the switch.

First you'll need to prepare the pots:

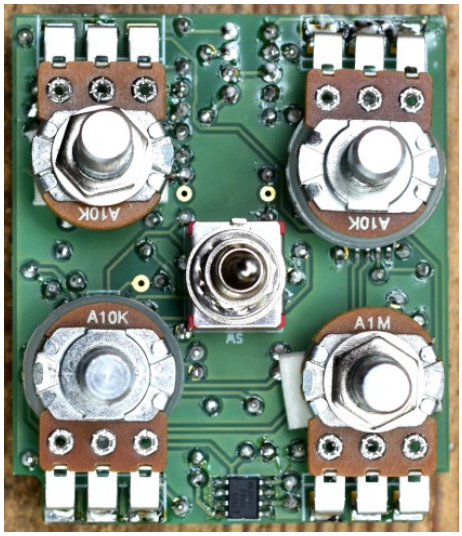
Cut the little rectangular shaft next to the axis, you won't need it.



Stick 16mm length of window insulator under each pot. It's in order to prevent solders on the board to connect with the body of the pot and shortcut some circuits.



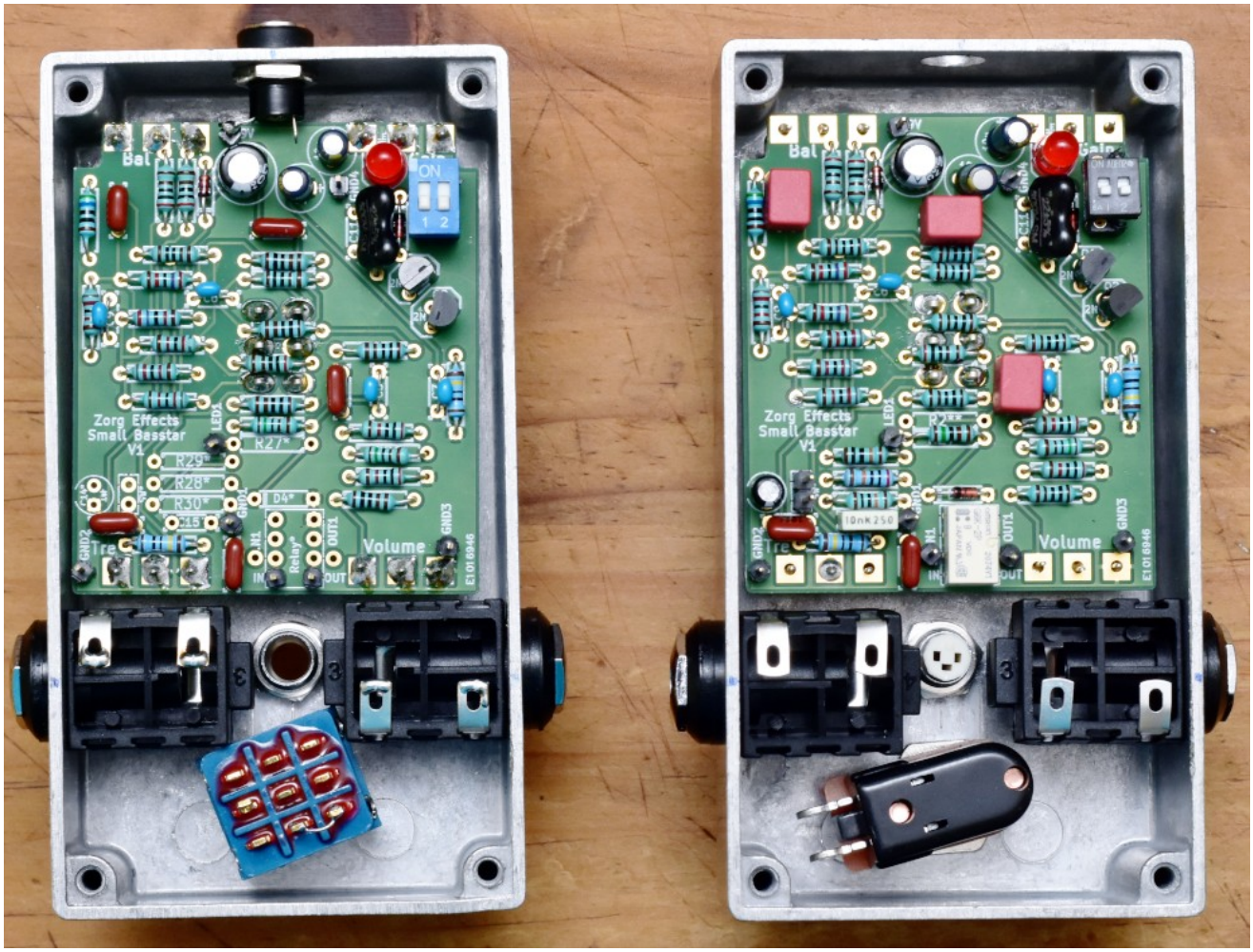
Now you are ready to solder them on the board. But don't go too quick! First put one of them and solder ONLY the middle leg. Then try to fit the card in the enclosure. It can happen that the pot is not in right the middle of the hole in the enclosure. If it's the case, you have only one solder to heat to move it a bit and rectify the position. Then add them one by one, soldering only the middle leg, and adjusting after each one to have them in front of their holes. At the end it should enter the enclosure without to much force (sometime a bit though). When it's fitting well in the enclosure with all pots, solder the remaining legs. You should now be proud to have that:



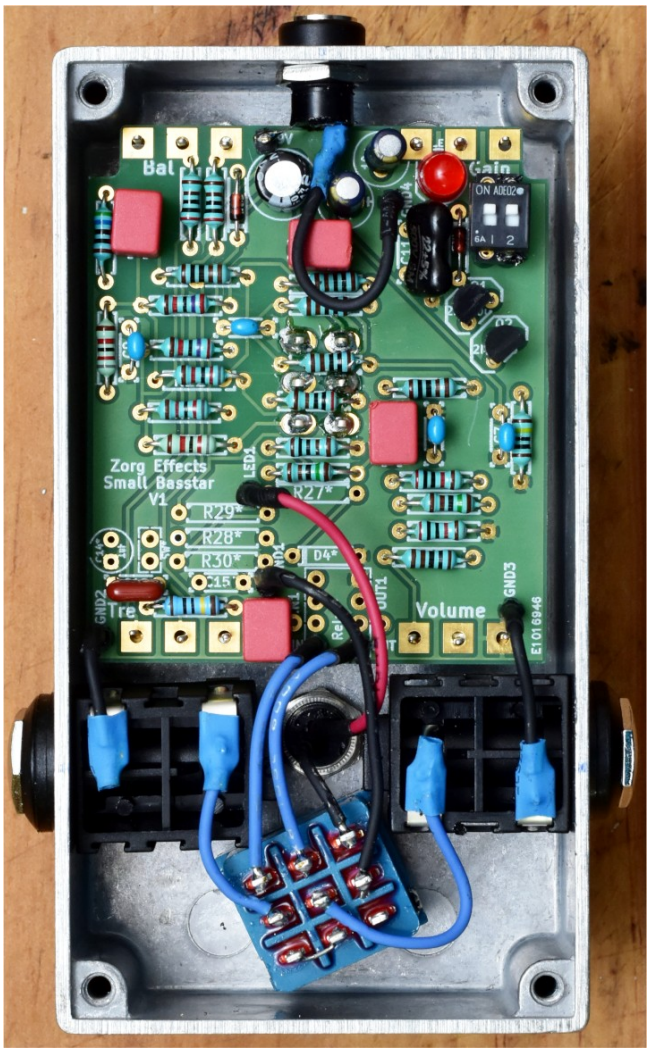
Now insert the card in the enclosure a screw the switch on the enclosure. We're going to...

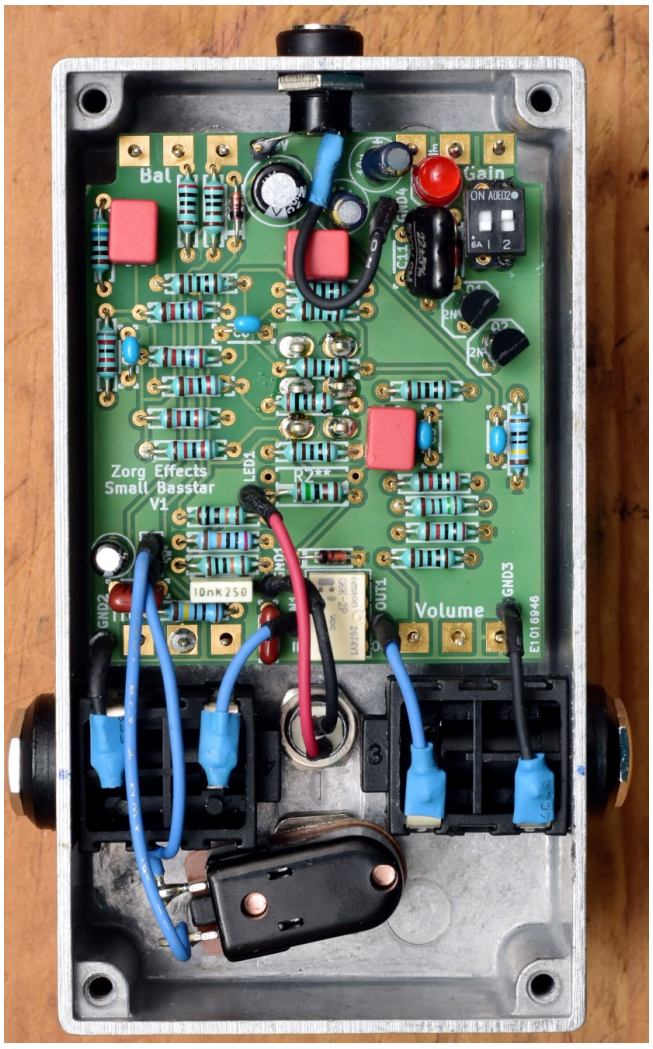
Wiring the pedal.

So there you go with the card in the box. You may now add the jacks, the DC jack, the footswitch the wooden plate and the led socket. Right is the relay bypass option, left is without the option:



We're going to wire it like this:





Here's what to solder in both options, it's important to use heat shrink tube to strengthen and protect your connexions (on the board and on the jacks)

9v goes to +9v of the DC jack (long leg if you wish to wire it center negative)

Gnd4 goes to GND of the DC jack (short leg if you wish to wire it center negative)

GND2 and GND3 go to ground of the audio jack.

LED1 goes to the positive leg of your display led.

Without the relay true bypass option:

If you number the bypass switch has below:

1 2 3

4 5 6

7 8 9

Then:

1 is connected to OUT.

2 is connected to IN.

3 is connected to the negative (short) leg of the bypass led.

4 is connected to the signal of the input jack.

5 is connected to the signal of the output jack.

6 is connected to GND1.

7 and 8 are connected together.

9 is not connected.

With the true bypass relay option :

Both pins of sw* should be wired to the footswitch.

IN1 is connected to the signal of the input jack.

OUT1 is connected to the signal of the output jack.

GND1 is connected to the negative (short) leg of the bypass led.

We’re now ready to...

Test the board.

Step 1: connect your 9v DC power unit to the DC jack. Switch on/off your footswitch. The led MUST also switch on and off. If not there's likely to be a bad connection somewhere... (See "debug" paragraph)

Step 2: If you made everything fine, your glorious basstar should be working now. Plug in your favorite instrument an rock it! (And then screw all the pots screws as well as the knobs).

If this is not working you're good to read the...

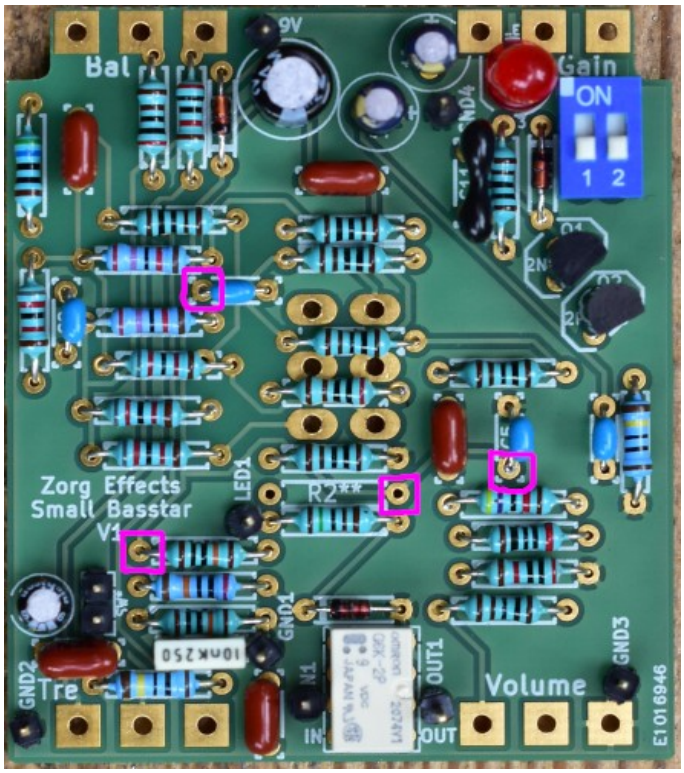
Debugging chapter.

First, voltages!

- Check that your DC power unit is working.

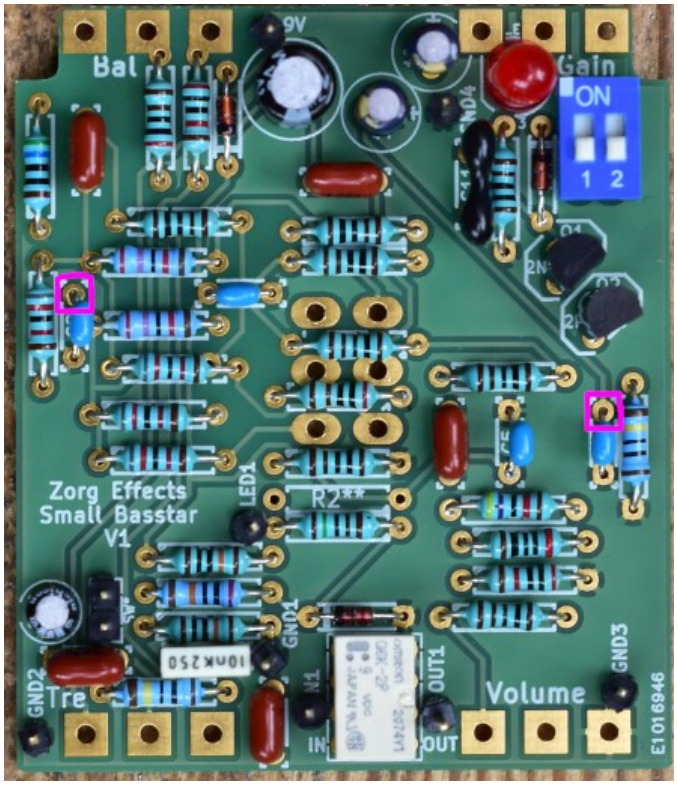
- That the connections between the plug and the board are ok.

- Check that you have between 8 and 9 volts on the legs rounded in magenta on the picture below:



If you don't get the right tensions, check with a voltmeter that you didn't shortcut the 9v rail to the ground with a bad solder.

- Then check that you have the negative tension generated by the ICL7660s. Both legs rounded in magenta on the picture below should have between -8 and -9V.



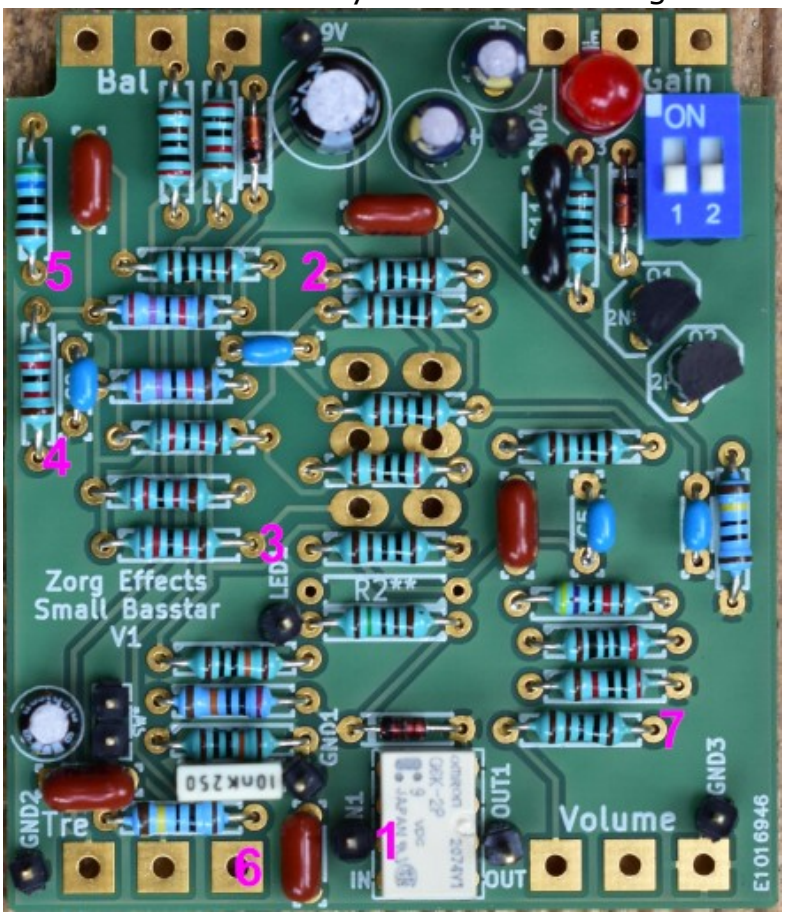
If it’s not the case, unplug immediately your pedal power supply and check the temperature of the ICL7660s.

- If it’s really hot, check your electrolytic caps directions.

- If it’s cold, check that you have -7 to -9 volts on leg number 5 of it. If it’s not the case, it’s likely to be dead. Check that all you components are all at their right place and without shortcuts between them and with the ground.

No or poor audio? (Even with all volume pots at 100%?)

You'll need an oscilloscope and a frequency generator. Send a 200Hz sin wave in the pedal input. Set the switch to middle position (Low freq). Then check the tests points below for the sin wave. They are in order of signal flow:



1- This is the input. No signal here might come from bad solders of the input wires.

2- Output of input buffer. No signal here means your TL074 might be dead.

3,4,5- Respectively output of Treble, Mid and Bass bands. These three output are produced by the same filter. No sine wave here means you have a problem within your filter. Check components values and solders and that there's no short cuts between components of this part of the board.

6- Output of treble clipper. No sine wave here means you have a problem within your clipping stage. Check components values and solders and that there's no short cuts between components of this part of the board.

7- Output of the mixing and output gain stage. No sine wave here means you have a problem within your mix/output stage. Check components values and that there's no short cuts between components of this part of the board.

In any case you don’t have any signal on 6 and 7, you’re OPA1652 might be dead.

