# Zorgtaver 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 informations: http://freestompboxes.org/viewtopic.php?f=13&t=27466

  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 informations 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, grammatic or ortografik faults, please feel free to mail me.

## What's in the kit?

This is all you must find in your Zorgtaver kit:

| Name | Value | Units |
|---|---|---|
| OUT1 LOOP_IN1 9V1 LED_PW1 IN1 LEDIN1 LEDOUT1 GND1 GND4 GND2 GND3 LOOP_OUT1 | Socket SIL 12 pins | 12 |
| P2 | ICL7660szcpa | 1 |
| R26 | 22 ohms | 1 |
| R10 | 100 ohms | 1 |
| R8 R19 | 1k | 2 |
| R11 R28 | 2k | 1 |
| R12 R17 R18 R21 R22 | 10k | 5 |
| R4 R7 R13 R29 R30 R31 R32 R33 R34 R35 | 20k | 10 |
| R14 | 42k | 1 |
| R15 | 68k | 1 |
| R2 R5 R16 | 100k | 3 |
| R3 R6 | 150k | 2 |
| R23 R24 | 470k | 2 |
| R25 R1 R9 | 1M | 3 |
| SQUARE1 -1OCT1 -2OCT1 | Potentiometer A100k (log) | 3 |
| TONE1 TONE2 | Potentiometer A100k (log-Stereo) | 1 |
| VOL1 | Potentiometer A250k (log) | 1 |
| TRIG1 | Potentiometer A500k (log) | 1 |
| U1 U2 U3 U4 | TL074 | 4 |
| U5 U6 | CD4013 | 2 |
| U7 | PHOTORESISTOR | 1 |
| TRI_S1 TRI_2 TRI_1 | SPST switch on-on | 3 |
| C8 C9 C25 C27 | 4.7nF | 4 |
| C16 | 10nF | 1 |
| C5 C6 C7 C10 | 15nF | 4 |
| C12 C13 C15 C17 C19 C21 C22 C23 C24 C26 C29 C30 | 100nFd (ceramic) | 12 |
| C20 | 470p | 1 |
| C1 C35 | 120nF | 2 |
| C31 | 820nF | 1 |
| C2 | 33u | 1 |
| C18 | 3.3 nF | 1 |
| C11 C28 | 100 pF | 2 |
| C14 (16v) C32 C33 C34 (Panasonic) C3 C4 (25v) | 10 uF | 6 |
| D1 | 1N4001 | 1 |
| D2 D3 D4 | 1N4148 | 3 |
| DRY1 | Potentiometer A1M (log) | 1 |
| Jacks Mono, unswitched | | 3 |
| Jacks stéréo switched | | 1 |
| DC jack | | 1 |
| Led socket | | 2 |
| Leds (Red and blue) | | 2 |
| 3PDT footswitch | | 1 |
| Enclosure | | 1 |
| PCB | | 1 |

Knobs (Blue) 7
Câble, heat shrink tube, window insulator. 1

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

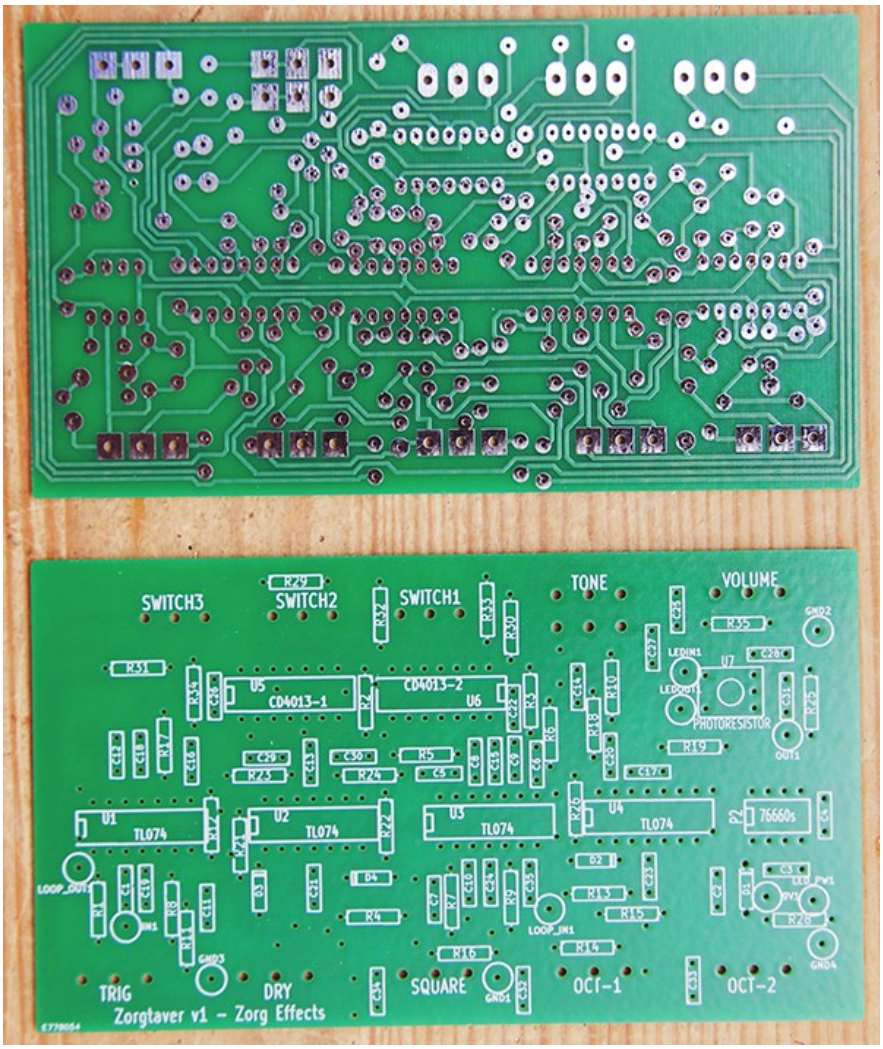
### What you'll need.

The following tools are needed to build your Zorgtaver 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.

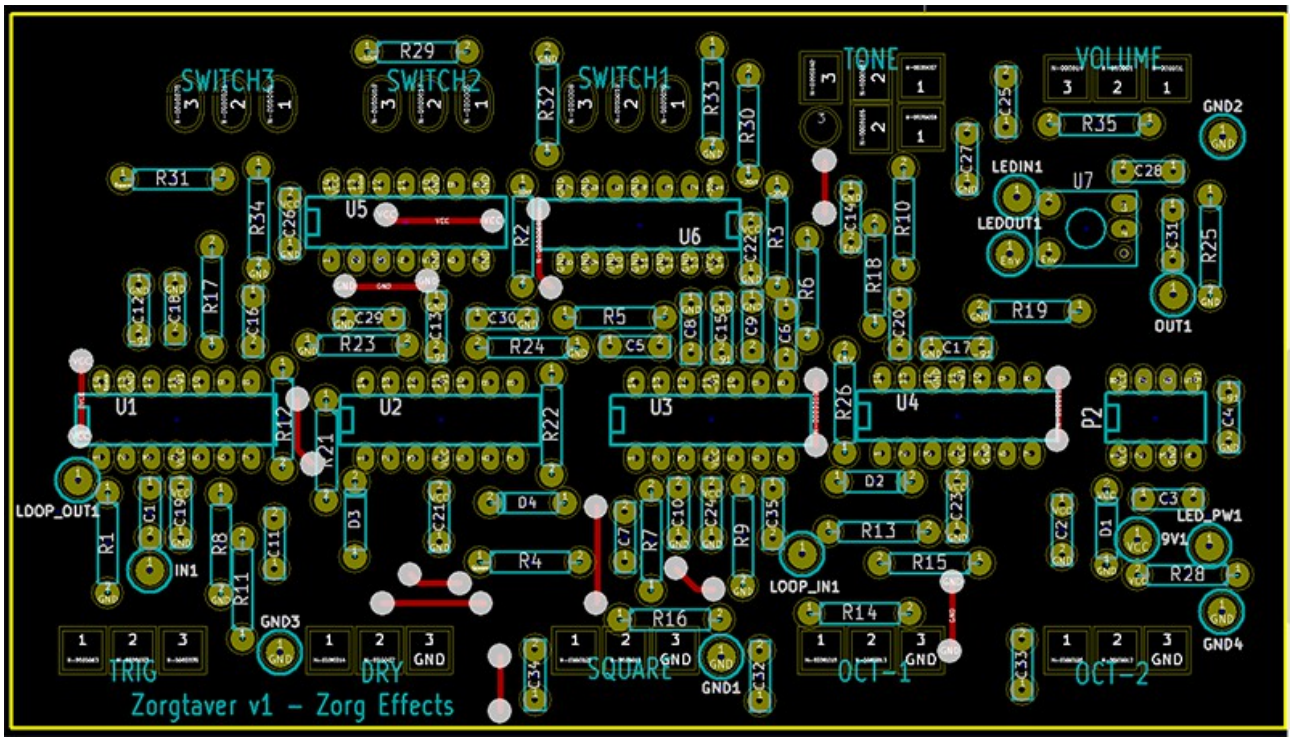
### Soldering on the pcb.

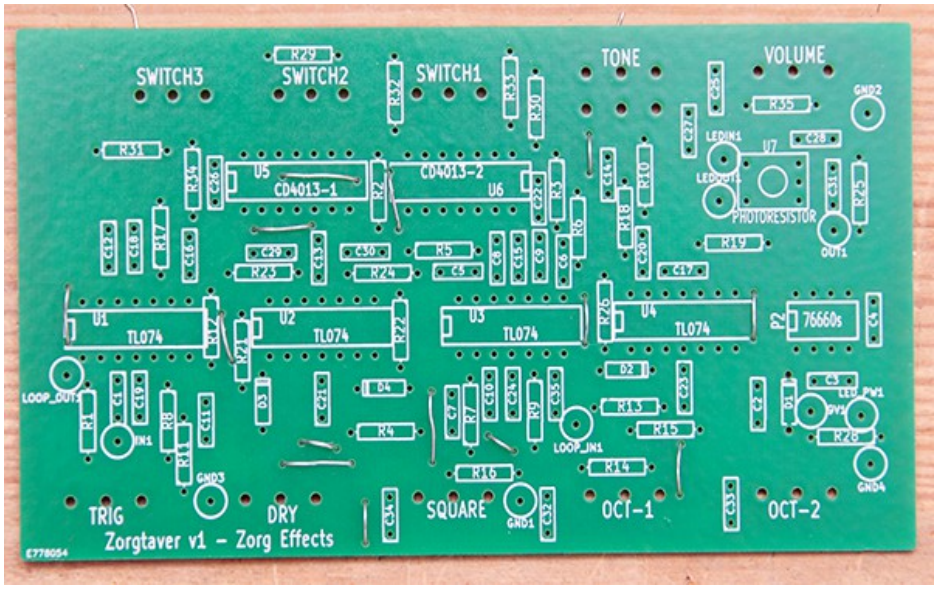
This is the PCB (Top/Bottom):



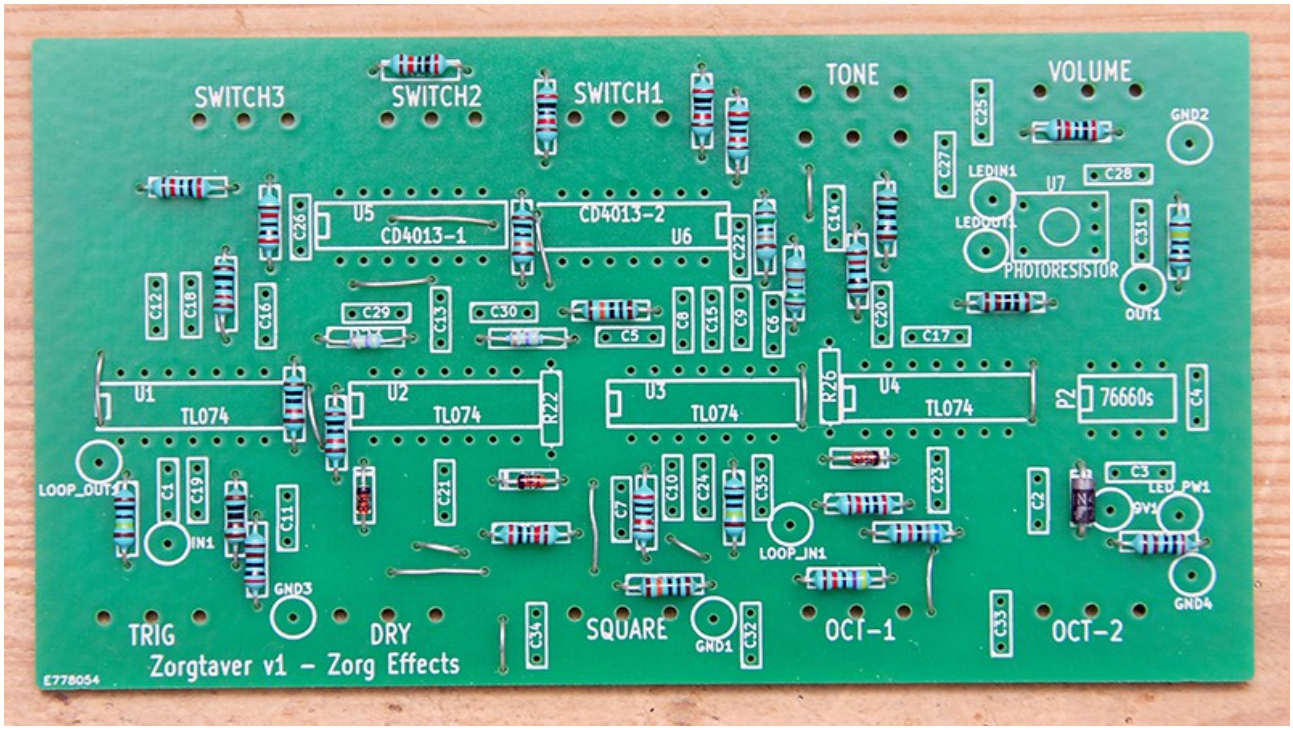
First let's solder wire jumpers. You wanna cut part of resistances legs to make them. There are 14 of them, as you can see in red lines with white dots here :



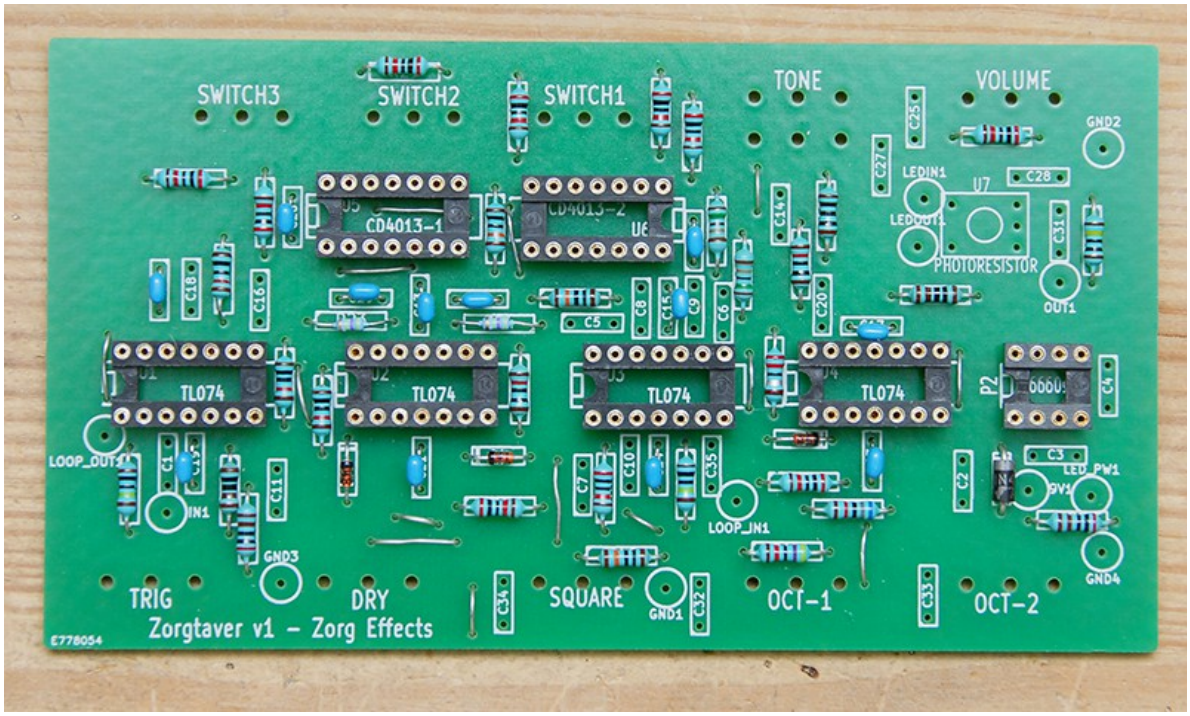

Then we're going to solder components from the smaller to the taller. First, diodes and resistances. You shall take care of the diodes positions. They MUST be on the same direction as on this picture :



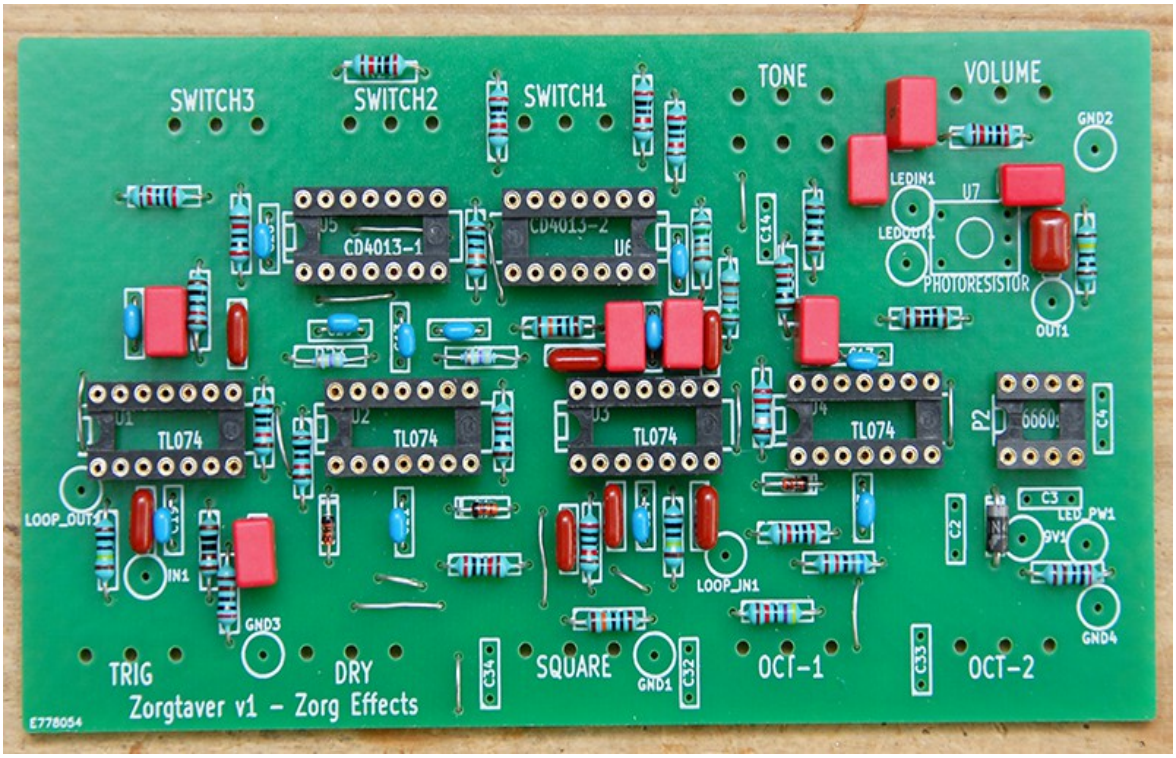

Then by order :

– IC sockets and blue 100nF capacitances which are decoupling caps.

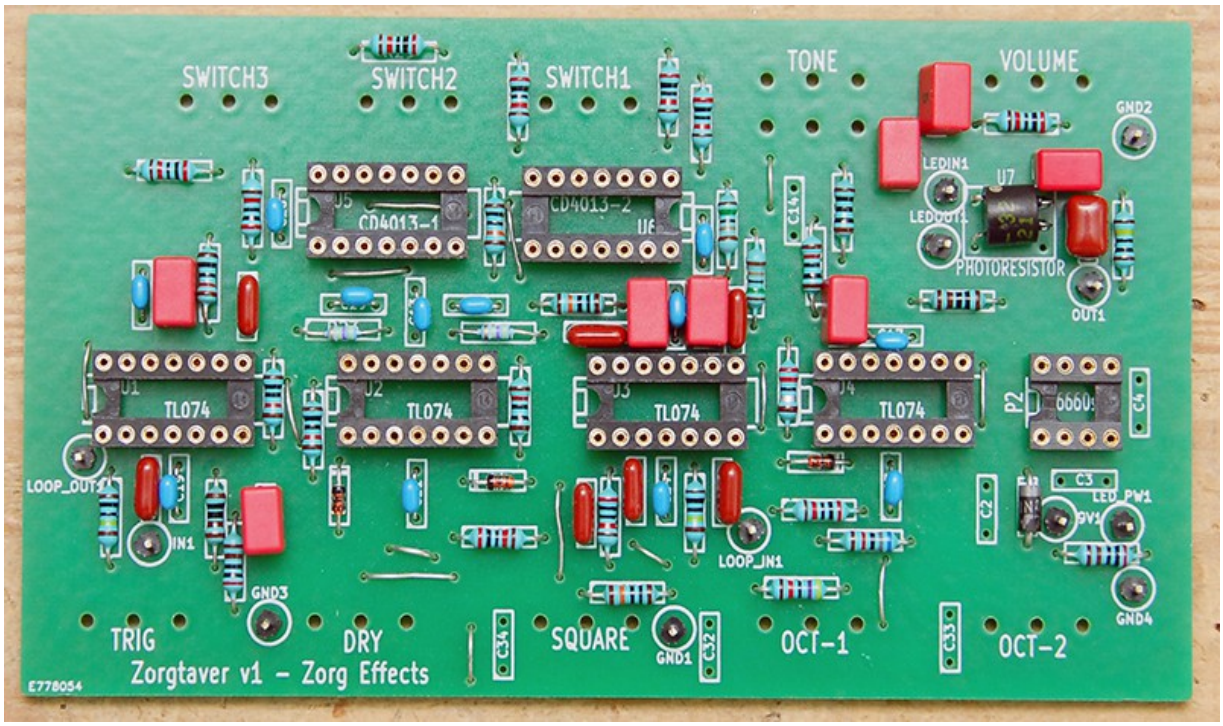



– Panasonic and red Wima caps.

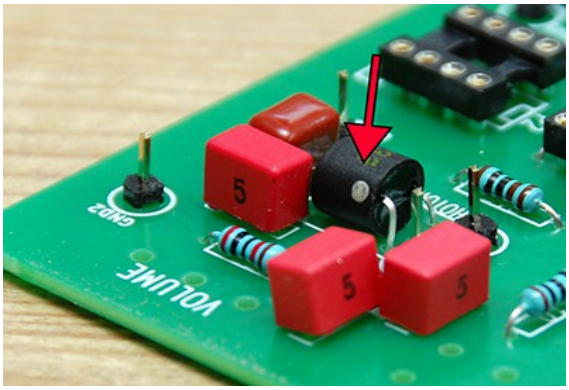



Cut the SIL12 in line socket to make soldering terminals for inputs/outputs (GND1,2,3, IN1 etc...). Then put the NSL-32 photoresistor.

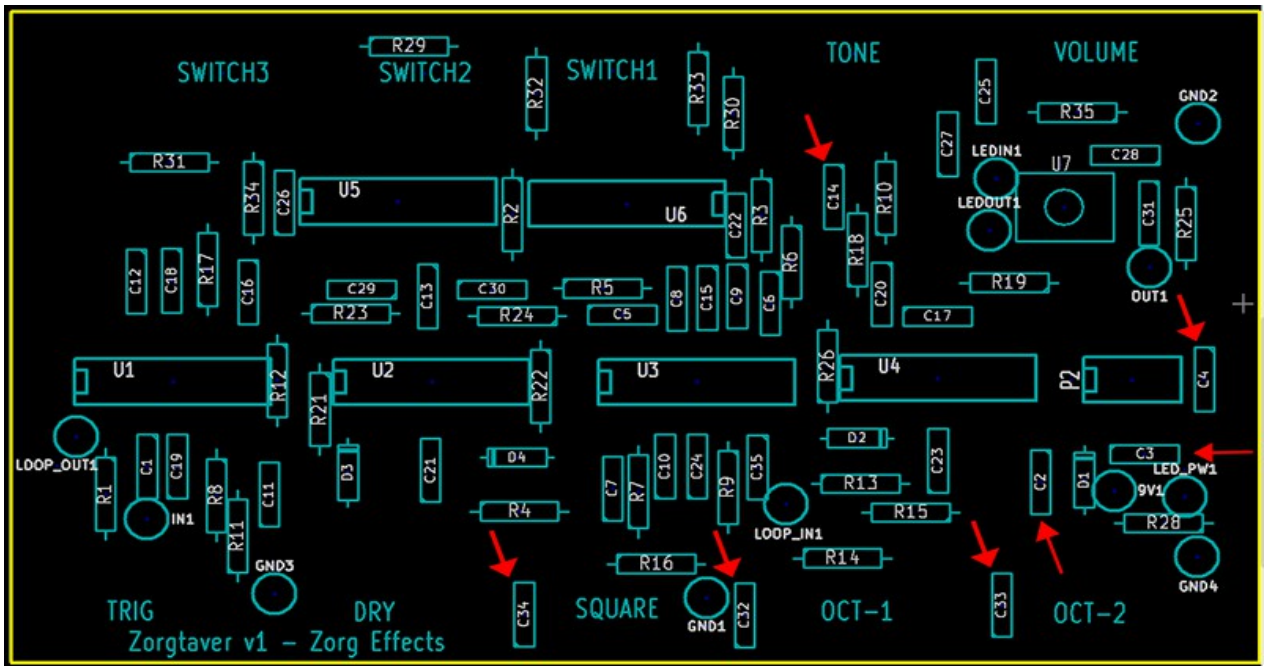


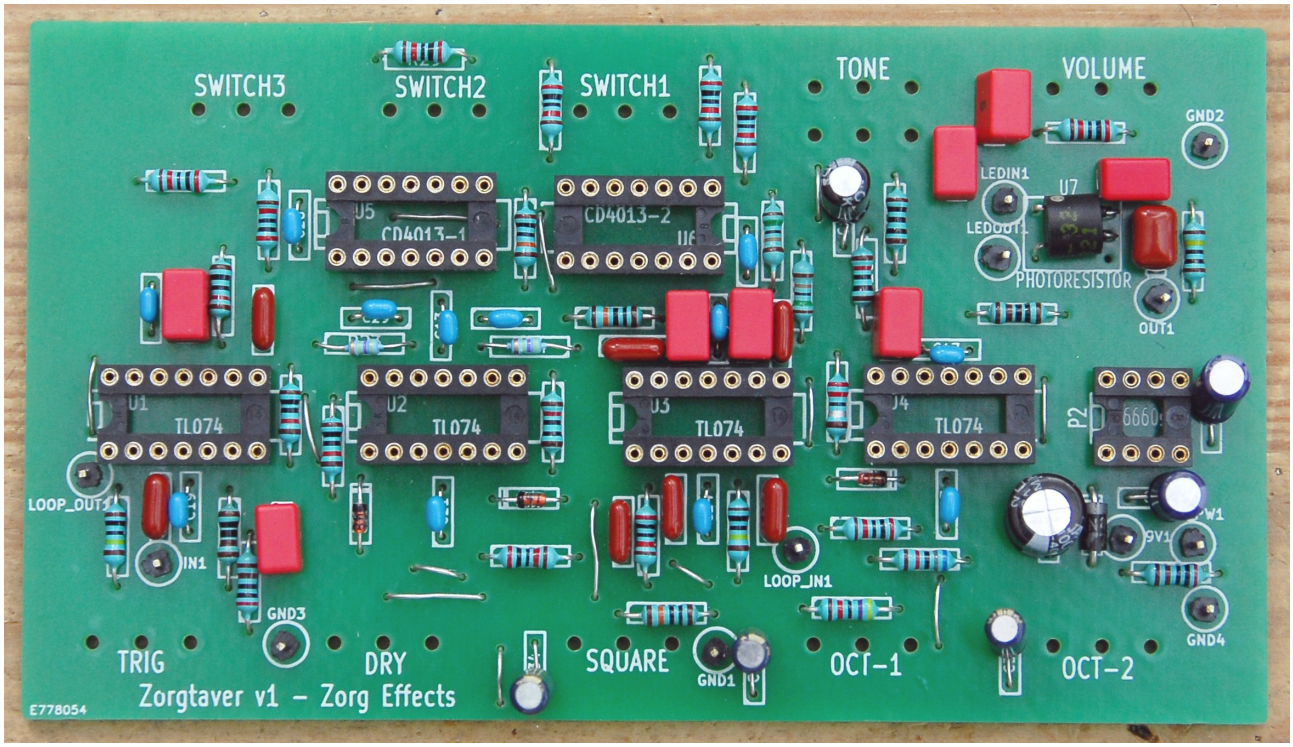

Check out the direction for the NSL-32, the white dot must be left side on top :




Then add electrolytic caps. Beware of the direction of electrolytic caps, they must be with the white negative (-) stripe as shown by the red arrows :



Now flip the board. We're going to solder the switches on the other side.

Soldering the switches is a bit shitty. First you should push it all the way into the board. If you let some space between the board and the switch, the problem will be that the height of the switch will be a bit higher than the pots height and this can somewhat be a problem when screwing the pots on the enclosure... When pushing the SPDT switches all the way they'll be lower than the pots, so you can let a bit of space between the board and the SPDT switch so that it has the same height as the pots. Or you can use a washer to rise it up. At the end pots and switches should be raised at the same level.

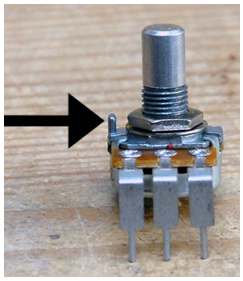
But doing so, there's little place left between the switch and the PCB to solder his legs. You'll need a fine soldering iron.

Then just after soldering, you must test that your solders are ok.

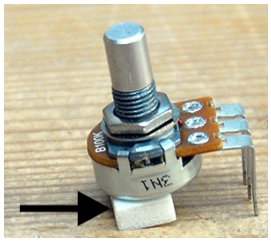
Many of the problems with this board can come from a bad soldering on the switches.

Then you'll need to prepare the pots:

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



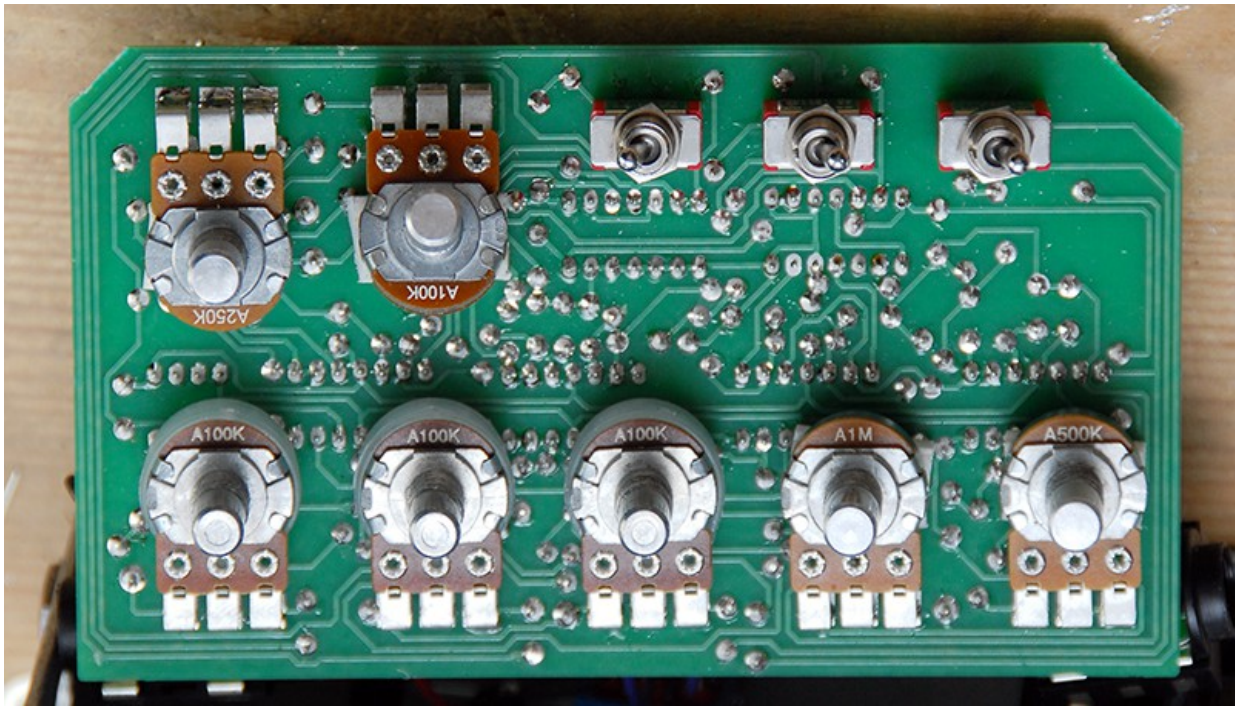
Stick 16mm length of window insulator under each pot. It's in order to prevent solders on the board to connect with the body of the pot and shortcut some circuits.



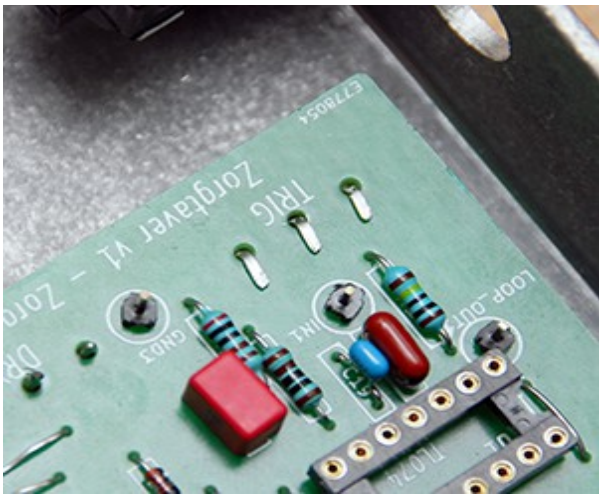
Now you are ready to solder them on the board. But don't go too quick! First put one of them and solder ONLY the middle leg. Then try to fit the card in the enclosure. It can happen that the pot is not in right the middle of the hole in the enclosure. If it's the case, you have only one solder to heat 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:




You'll also need to fold the Trig and -2 pots legs to make space for the loop jacks:



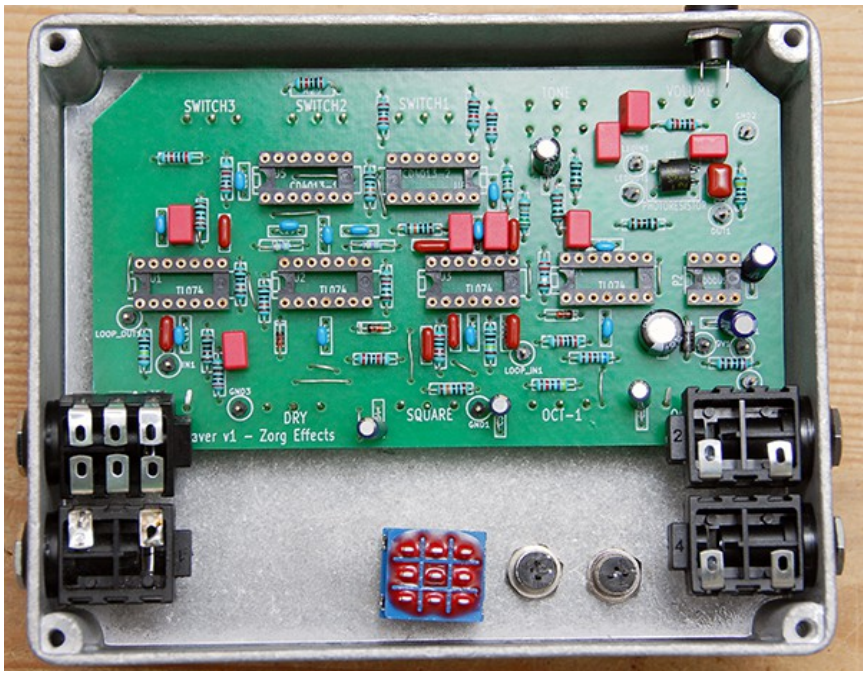

Now insert the card in the enclosure and screw the switches on the enclosure. We're going to...

## Wiring the pedal.

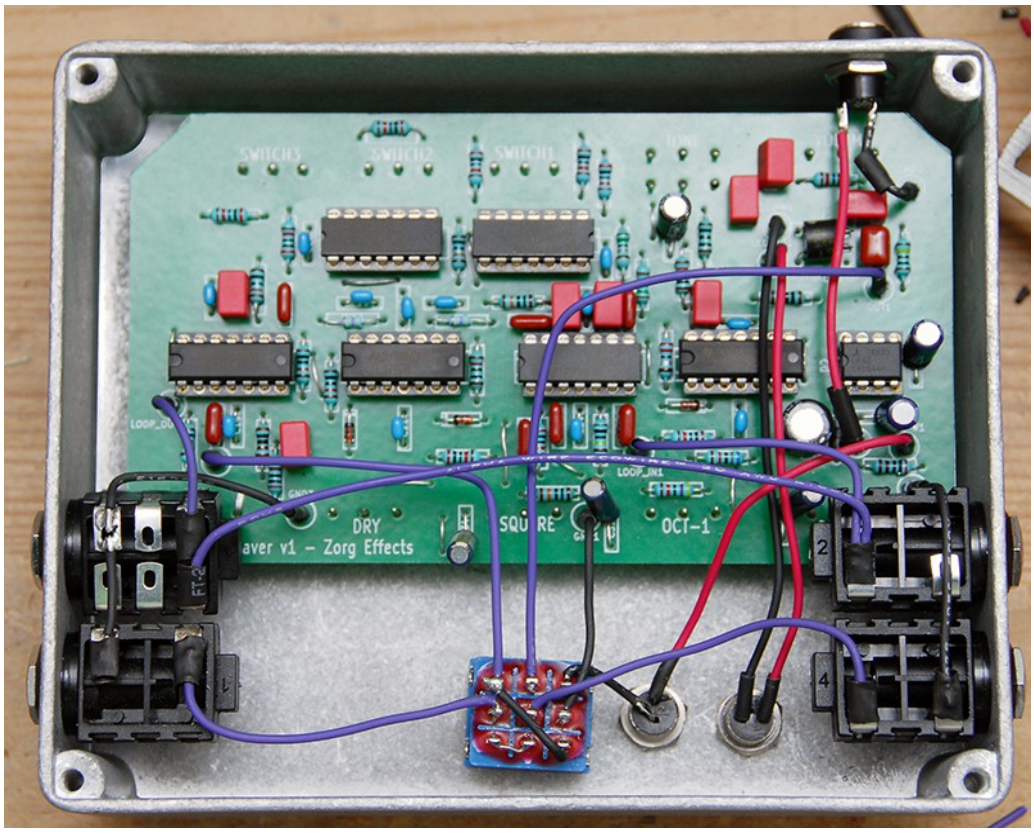
Before putting the card in the box, you might have to remove the top corners with a plier if I didn't do it before sending it.

So there you go with the card in the box:




Now you can screw the audio jacks, led socket, footswitches and DC jack. The loop jack might be a little leaning because of the board under it. Take care that the jacks legs do not touch components on the board. The stereo jack must be put at the position like the picture above.

We're going to wire that, like this:



Lets assume the footswitch has the following legs numbers:

1 2 3

4 5 6

7 8 9

And when we're switching it, 4 connects to 1 or 7, 5 to 2 or 8 and 6 to 9 and 3.

Lets also assume that for the effect loop LPI jack is the jack that will go to the INPUT of your effect, and LPO the jack that will go to the OUTPUT of it.

Important: Use the eat shrink tube to strengthen and protect all your wire connections (on the board and on the connectors).

The connections are thus the following:

7 and 8 must be soldered together.

4 is connected to audio jack input.

5 is connected to audio jack output.

1 is connected to IN1

2 is connected to OUT1

1 and 9 are connected together

6 is connected to GND1

3 is connected to bypass blue led negative leg (flat side)

LEDIN1 is connected to Red led negative leg (flat side)

LEDOUT1 is connected to Red led positive leg

LED_PW1 is connected to Blue led positive leg

GND3 is connected to loop in (LPI) stereo jack ground.

Input jack ground is connected to LPI jack ground.

GND2 is connected to DC jack short leg (Assuming you want a center negative alim)

9V1 is connected to DC jack long leg (Assuming you want a center negative alim)

GND4 is connected to output jack ground.

Loop out jack ground (LPO) should be left unsoldered to avoid ground loop noise.

LPI signal switch side leg must be connected to LPO signal. (To bypass the effect loop when nothing is plugged in it.)

LOOP_OUT1 must be connected to LPI signal

LOOP_IN1 must be connected to LPO signal

You're ready to plug your Zorgtaver and...

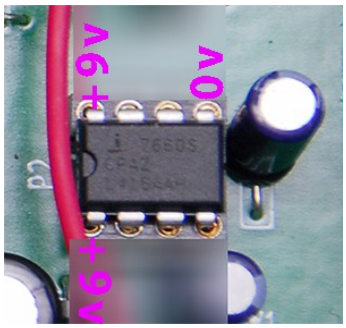
 

## Test the board.

**Now don't put the ICs on their sockets**. First we're going to test the power supply.

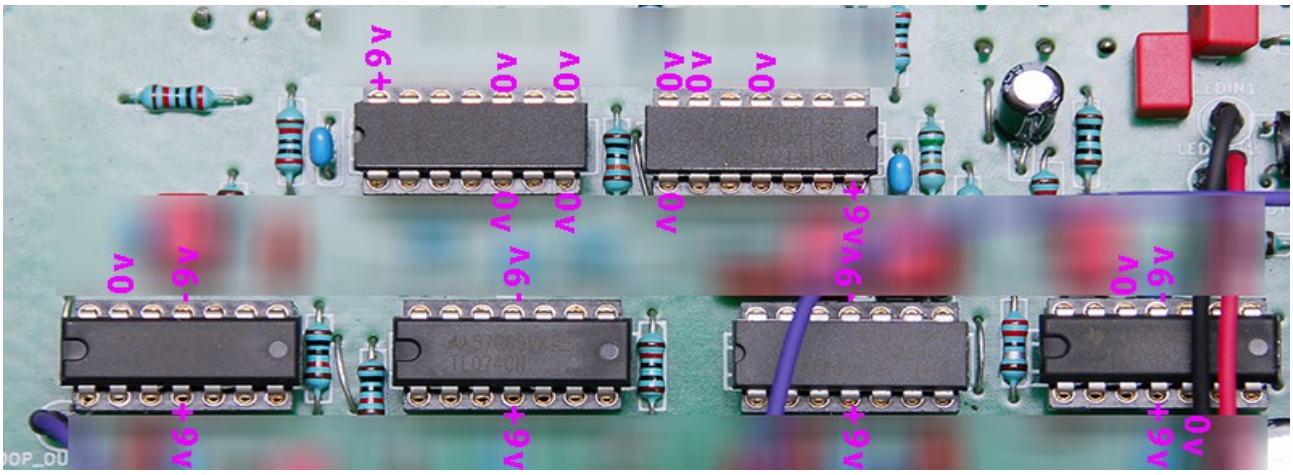
Step 1: connect your 9v DC power unit to the DC jack. Switch on/off your footswitch. The bypass led MUST also switch on and off. If not there's likely to be a bad connection somewhere... (See “debug” paragraph)

Step 2:check the voltages with a voltmeter on the ICL7660s socket:




Step3: if step 2 is ok, add the ICL 7660scpa in his socket. Be careful of the orientation (see image above) or you'll blow it up.

Then check the voltages on U1 to U6 (-9v values might be a bit lower, -8v will be ok too):




Step 4: insert the TL074s and 4013 in their sockets. Be carefull of their orientation (See image above).

If you made everything fine, Zorgtaver 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!

If at step 2 of tests chapter you don't have 9v voltages on the 7660 socket, check:

- That your DC power unit is working.
- That the connections between the plug and the board are ok.

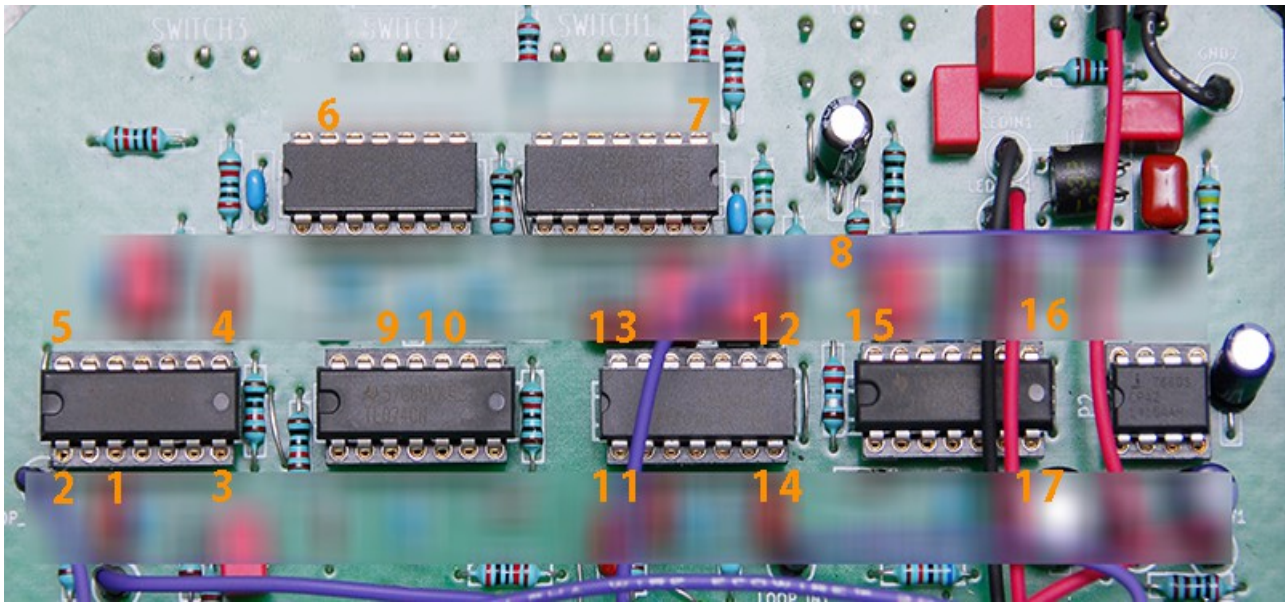
If at step 3 of tests chapter you don't have -9v voltages on the TL074s or CD4013s socket, remove the DC power immediately. Check the temperature of the ICL7660s.

- If it's hot, check the IC and electrolytic caps directions.
- If it's cold, check that you've around -9v on pin 5 of the ICL7660, if not, it's likely to be dead. If there's between -7v and -9v it's ok. If there's between -2v and -7v it's strange, check that all components are at their right place and without shortcuts in between.

No or poor audio? (Even with all volume pots at 100%?). Note that this is normal to have a bit of parasites on the dry signal.

First, check your solders, then, check your solders. After that check your solders.

Then you'll need an oscilloscope and a frequency generator. Send a 400Hz 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- Input of the zorgtaver. No signal here : check your wirings.

2- Output of the input buffer. No signal here : it's likely you have a problem with the TL074.

3- Output of trig gain stage. Your input sin must be multiplied by x2 to x502 according to the trig potentiometer position. If it's not, check your solders. Specially those of the trig pot.

4- Output of the trig filter stage. No signal here, check your solders.

5- Output of the fuzz stage. Your signal must be changed into a square wave. No signal here... Check your solders...

6- You should see a 200Hz square wave out of here. If not check points 9 and 10. If they're ok your CD4013 could be dead.

7- You should see a 100Hz square wave out of here. If not your CD4013 could be dead.

8- Output of the enveloppe filter on positive side of C14. You should measure a positive continuous voltage here that changes as you change the Trig pot value. If not, check D2 and C14 directions. Or U4 may be dead...

9- Trig stage negative side. You shoud see here a negative continuous voltage, changing with the trig pot value. This negative value should have a little ripple at 400Hz.

10- Trig stage positive side. You shoud see here a positive continuous voltage, changing with the trig pot value. This negative value should have a little ripple at 400Hz.

11- Square signal filter. You should see a 400Hz signal in between a square and a sin wave. If not check your... Solders... Or U3 may be dead.

12- -2 Octaves signal filter. You should see a 100Hz signal in between a square and a sin wave. If not check your... Solders... Or U3 may be dead.

13- -1 Octaves signal filter. You should see a 200Hz signal in between a square and a sin wave. If not check your... Solders... Or U3 may be dead.

14- Output of the loop return buffer. If no signal here, check your wirings.

15- This is the output of the sum stage of -2 octave, -1 octave and square signal.  Changing the values of the corresponding potentiometers and filters switches should change the waveshape out of here. If not, do check your filters switches and the potentiometers solders.

16- Output of the global tone/treble filter. No output here : Check your tone stereo potentiometer solders.

17- This is the output. Check your solders on volume potentiometer if no signal here.