Jour de FET
Mounting instructions.

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=27972&p=261173

  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 Jour de FET kit:

Name	Value	Qty
BASS1	Potentiometer A50k	1
C16 C18	Cap 47nF	2
9V1 GND1 GND2 GND3 GND4 IN1 LED1 OUT1	SIL 8 pins	8
C11	Cap Wima 100pF	1
C17	Cap Wima 1nF	1
C19	Cap Wima 2.2nF	1
C8 C10	Cap Wima 3.3nF	2
C9 C14	Cap Wima 4.7nF	2
C15	Cap 68nF	1
C1 C2 C5 C7 C13	Cap 100nF	5
C3	Cap 10uF/25V	1
C12 C21	Cap 10uF/50V	2
C4 C6	Cap 100uF/25V	2
D2	1N4001	3
D1 D3	1N4148	3
GAIN1	Potentiometer A50k (log)	1
GAIN2 GAIN3 GAIN4	Trimpot B100k	3
P3	ICL7660S	1
Q1 Q2 Q3	J201	3
Q4 Q5	BC550	2
R4 R10 R12 R15 R18	Resistor 1k	5
R2	Resistor 1.5k	1
R20	Resistor 6k8	1
R6 R19	Resistor 20k	2
R13 R14	Resistor 47k	2
R7 R11 R16	Resistor 100k	3
R8 R9 R17	Resistor 200k	3
R1 R5	Resistor 1M	2
SW3 SW4	Switch 2PDT on-on	1
SW1 SW2	DIP 2	2
TREBLE1	Potentiometer C100k	1
VOLUME1	Potentiometer A250k (log)	1
Trim_Voice1	TrimpotB100k (lin)	1
Jacks		2
DC jack		1
Led socket		1
Bypass led bleue		1
Knobs		4
PCB		1
Enclosure		1
3PDT Footswitch		1
Wire, heat shrink tube, window insulator		1
DIP8 holder		2

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

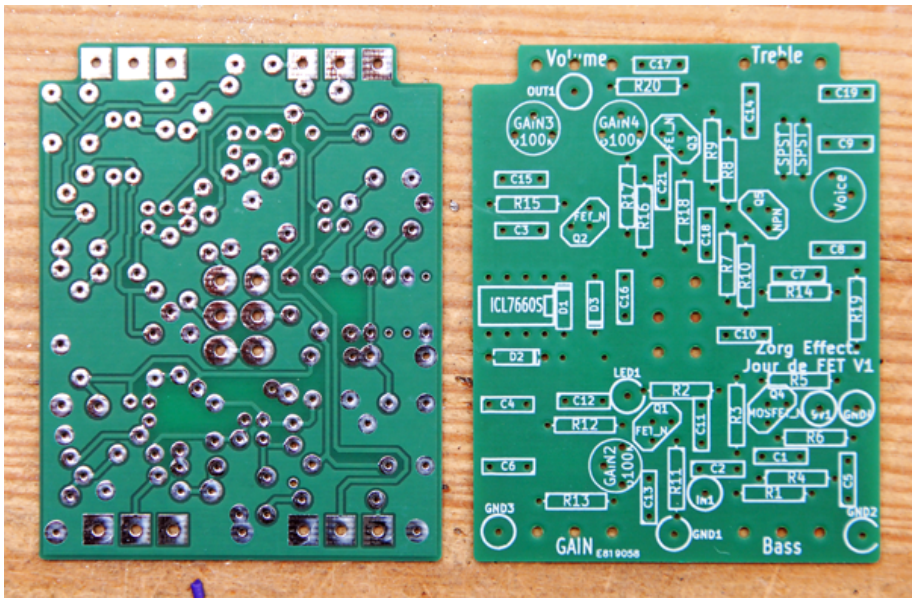
What you'll need.

The following tools are needed to build your Jour de FET pedal:

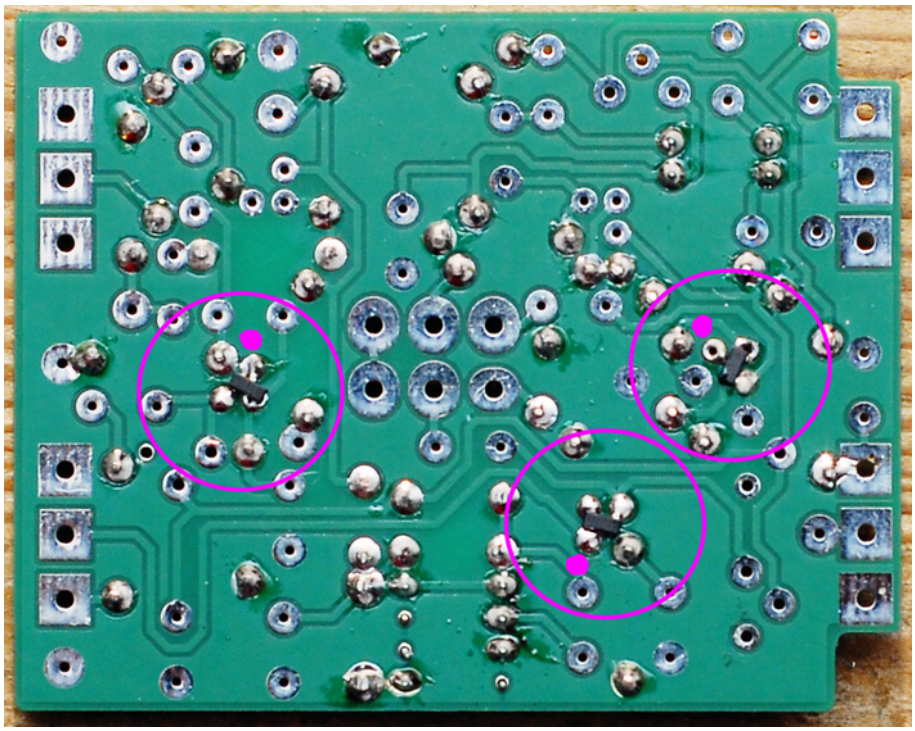
- A soldering iron.
- A un-soldering pump.
- A voltmeter/ohmmeter.
- Pliers to cut wire and remove the wire sheath.
- Pliers to screw nuts.
- A cruciform screw driver.
- And eventually wrenches.
- A 9v dc power unit, center negative.
- an oscilloscope, and a frequency generator.

Soldering on the pcb.

This is the PCB (Top/Bottom):

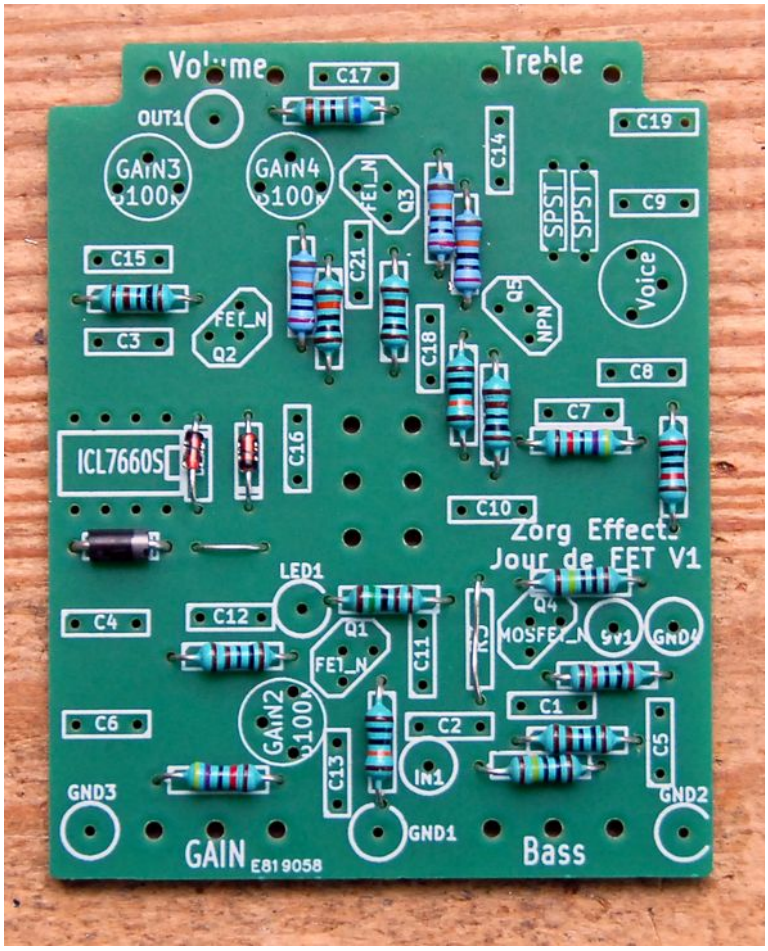


On copper side, begin by soldering the 3 J201 CMS transistors. Beware of their directions, they must be like on the picture below. The purple dot shows the pad where the transistor's grid must be soldered. The grid being the single leg on the rectangle's side. Because of the transistor's size, one must use a precise soldering iron. Be careful that the solders do not overlap eahc others. Test with your multi-meter if needed.

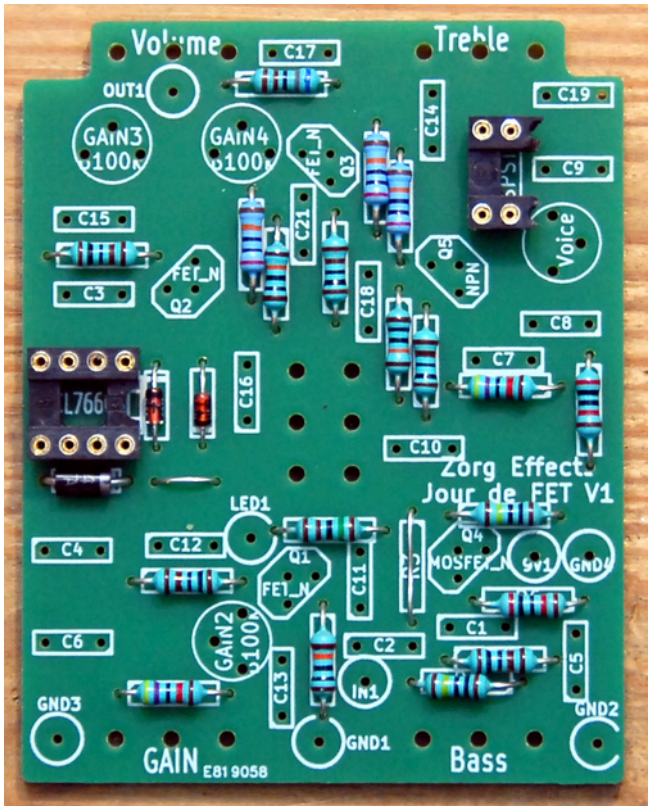


Flip the board and solder the 2 jumpers by using resistance's legs. One of the is used to bypass R3. See picture below.

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



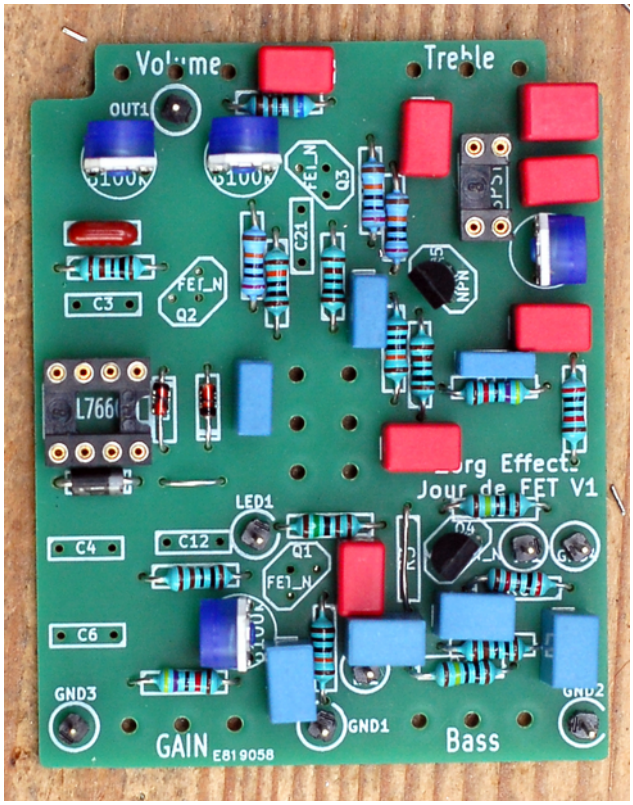
Add the sockets. The 2nd socket is used to level up the dip switch for easier access. You'll have to cut it in half and keep only four legs:



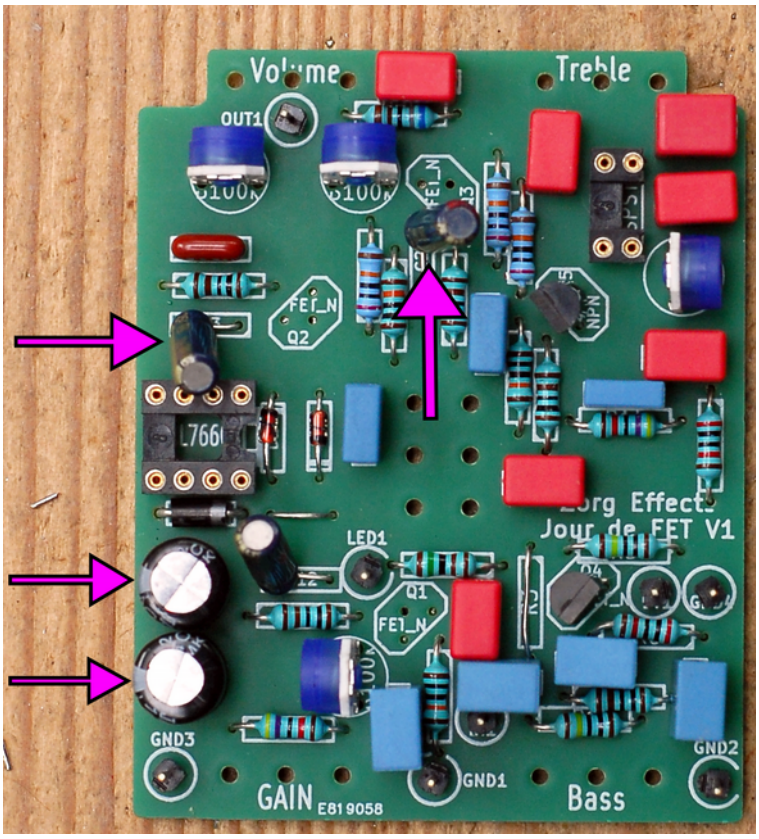
Note that on this picture above, the socket cut is far from ideal. Actually you'll need a bit of space between the socket and C14 and C9 to glue the dip switch with heat shrink tube. We'll see that point later, but for now, if its touching C14 or C9, shorten the socket a bit with pliers.

And then by size :

- The panasonic cap C15
- Red WIMA caps 100pF, 3.3nF, 4.7nF, la capa C7 100nF
- Transistors Q4 and Q5, beware of their directions!
- 47nF caps
- The trimpots
- Cut the SIL8 to make terminals used for GND1,2,3, IN1 etc...
- The 4 big 100nF caps

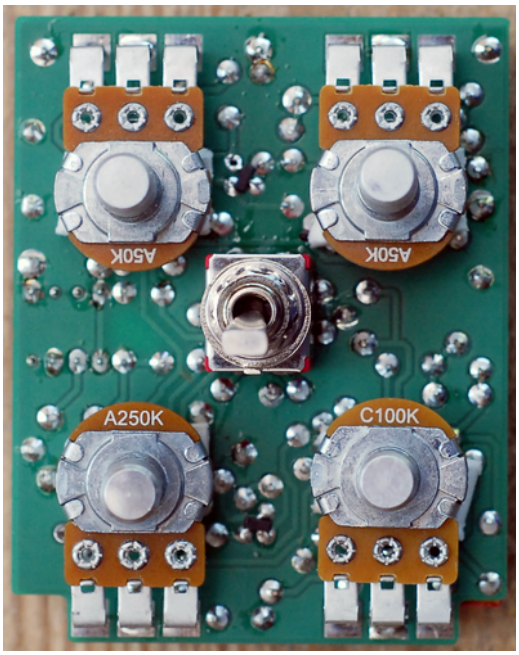


We now can add electrolytic caps. Beware of the direction of electrolytic caps, they must be with the white negative (-) stripe as shown by the arrows on the picture below.



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

Begin with the DPDT switch and pots at the end.

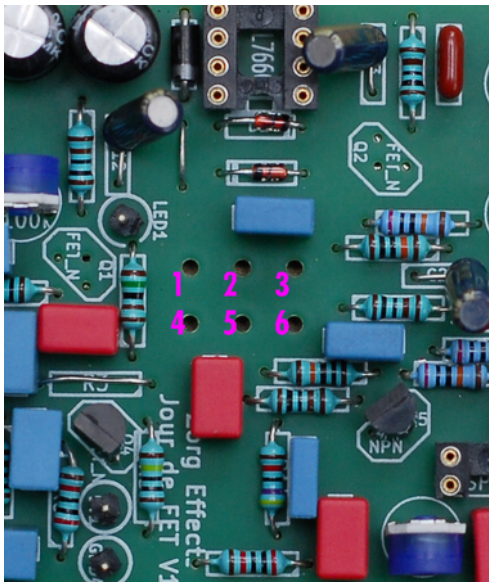


Soldering the switch is a bit shitty. First you should push it all the way into the board. If you let some space between the board and the switch, the problem will be that the height of the switch will be a bit higher than the pots height

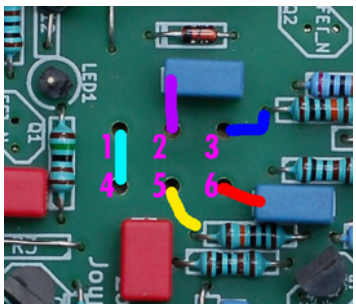
and this can somewhat be a problem when screwing the pots on the enclosure...

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. **This stage is really important: 99% of your problems will come from a badly soldered switch!!!** To do so, use your ohmmeter and check that the following path are not opened, assuming we have:



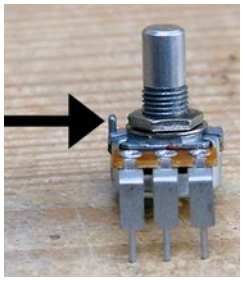
- 1 and 4 must be connected together. (Light blue path)
- 2 must be connected to C16 left leg. (Purple path)
- 3 must be connected to R16 left leg. (Dark blue path)
- 5 must be connected to R7 left leg. (Yellow path)
- 6 must be connected to C18 left leg. (Red path)



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.



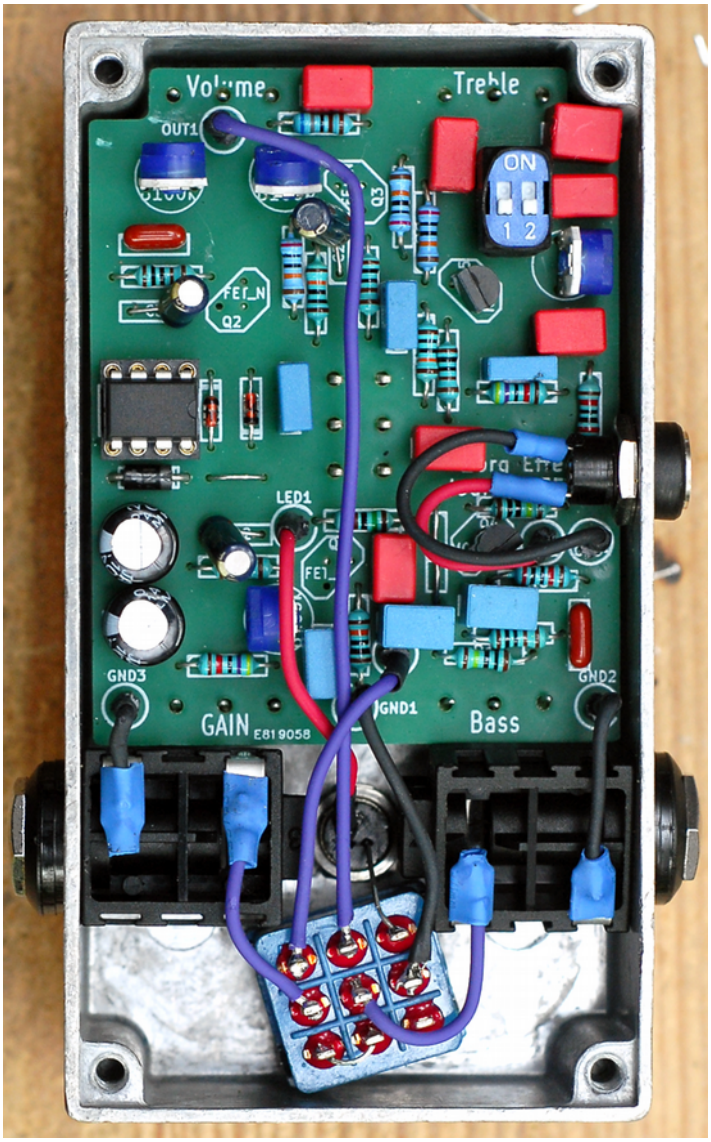
Stick 16mm length of window insulator under each pot. It's in order to prevent solders on the board to connect with the body of the pot and shortcut some circuits.

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).

Wiring the pedal.

So there you go with the card in the box.

Now you can screw the audio jacks, led socket, footswitches and DC jack.We're going to wire it like this:



Here's a list of the wirings:

9v1 goes +9v of DC jack (long leg if you wish to wire it center negative)

Gnd4 (left of 9v1) goes to gnd of the DC jack (short leg if you wish to wire it center negative)

GND3 and GND2 go to audio jacks grounds.

LED1 goes on the positive leg of the LED (longest leg).

If we number the legs of the footswitch :

1 2 3

4 5 6

7 8 9

Then :

4 Is connected to input jack

5 Is connected to output jack

6 Is connected to GND1 on the board

7 and 8 are soldered together. 9 is not connected

1 Is connected to IN1 on the board

2 Is connected to OUT1 on the board

3 Is connected to the negative leg of the LED (Flat side, shorter of both leg)

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

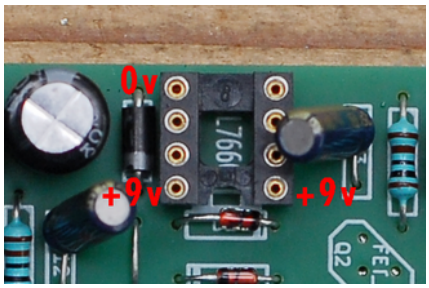
Now, there's only left to...

Test the board.

Now don't put the ICs in the box. First we're going to test the power supply.

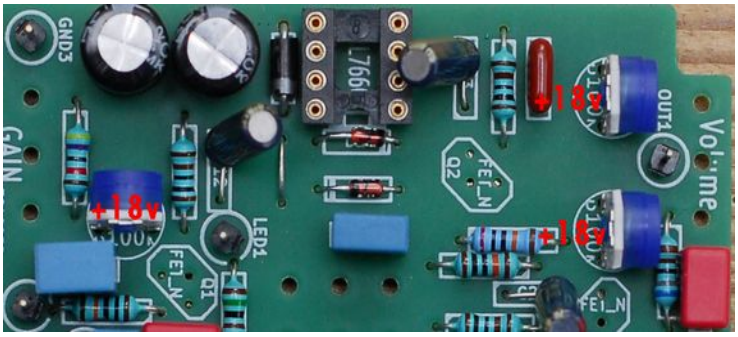
Step 1: connect your 9v DC power unit to the DC jack. Switch on/off your footswitch. The led MUST also switch on and off. If not there's likely to be a bad connection somewhere... (See “debug” paragraph)

Step 2: check the following 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 or you'll blow it up. Important: the pedal can work without the ICL7660s, but you’ll need to re-bias it. You’ll also have less gain and output volume.

Then check the following voltages on the 3 trimpots middle legs. They must be between 16V and 18V.

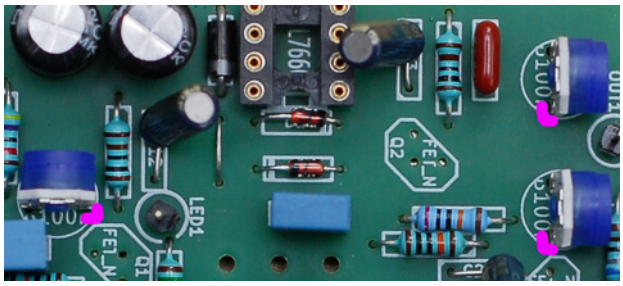


Step 4: put the tonestack trimpot in the middle position. You'll

Step 5: Bias the JFETs.

For this step, you'll need a voltmeter, an oscilloscope and a frequency generator.

You can first make a simple bias with a voltmeter. Put the black probe one the ground and the red on the following 3 measurement points on the trimpots legs, in purple in this image:



For each point, trim the pots to get a 8,5v tension on them.

This could be enough and your Jour de FET should somehow be working now.

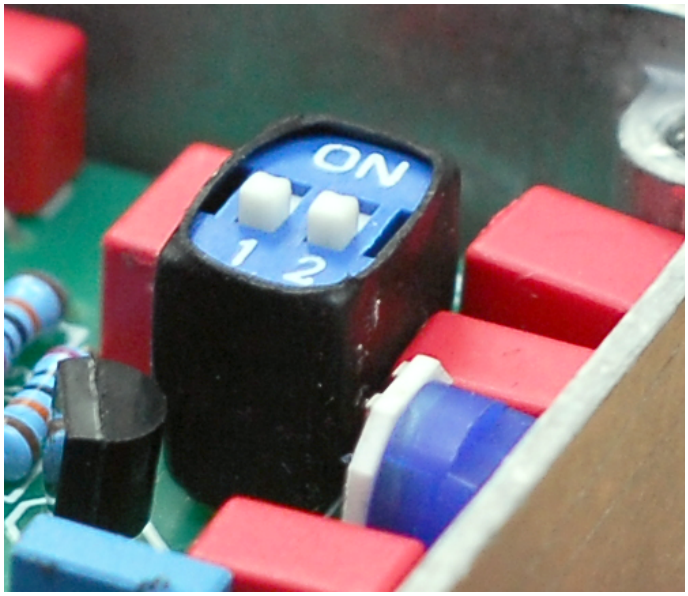
But we can make a more accurate bias. Plug in your frequency generator at the Jour de FET input and send a 1kHz sine.

Then, with your oscilloscope probe, check for the signal on test point 1. And rotate the trimpot trim1 to get the maximum of gain from this stage.

Then set the gain pot a bit upper that the minimum and do the same to test points 2 to 4 with trimpots trim2, trim3 and trim4. At each stage, lower the gain or your input signal so that you can work with an unsaturated signal (specially at the last stage).

Note that for each stage you should get between x10 to x15 gain... If you didn't get the components from me and don't get that much gain, like x1 to x3, well you should know that some counterfeit JFETs are on the market. If you get components from me I test them and should be working.

Step 6: add the 2xdip switch on the socket. Use the very large heat shrink tube to glue the switch to the socket. The heat shrink tube must be put all the way down to the board and all the way up a bit higher than the switch. Then shrink it, specially around the socket, so that it held firmly :



If you made everything fine, the Jour de FET should be working now. Plug in your favorite instrument and 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:

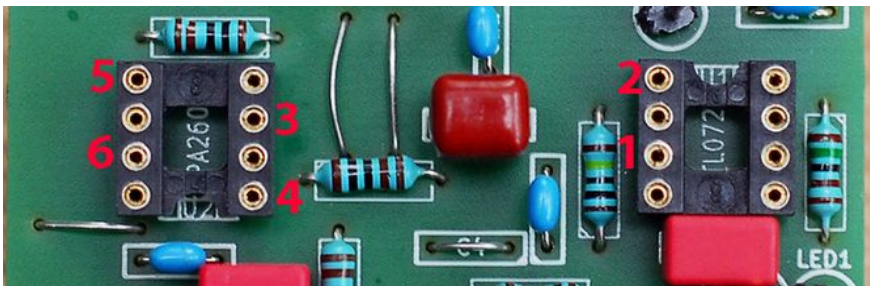
- That your DC power unit is working.
- That the connections between the plug and the board are ok.

If at step 3 of tests chapter you don't have 16-18v on the trimpots, 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 2 of the ICL7660, if not, it's likely to be dead. Check that all components are at their right place and without shortcuts in between.

Poor audio?

If you didn’t make the bias with the oscilloscope, do it. If you did, check that your J201 are not counterfeits (It happens...).



Hacks!!!

Sure you can also try some other JFETs than J201. But six others fun mods can be done:

- Change the 4 caps of the tone stack C8, C9, C10, C14 to change it's frequency response. You may use this little tool by Duncan audio to calculate these values: http://www.duncanamps.com/tsc/index.html
- Change C17 for a smaller values to had more aggressive high frequency treble.
- Use a Mosfet input buffer with a 2N7000 for Q4, by changing R3 and R6 to a Mosfet well fitting value and adding a 9v zener diode to protect the grid.
- More gain: replace R13,R16 and R7 to ½ of their values.
- Even more gain: replace R13,R16 and R7 to 1k. This might be too much though…
- Replace R9 by a 250k bias pot. You'll get stupid out of bias synths sounds!!!

