

How to Build pedalSHIELD MEGA.

This is a 5 steps guide to assembly pedalSHIELD MEGA. With all the materials on hand it takes around 2-3 hours to build it successfully. Take your time, play your favourite background music and enjoy the fine art of building electronics.

Step 0 – Prepare the Materials.

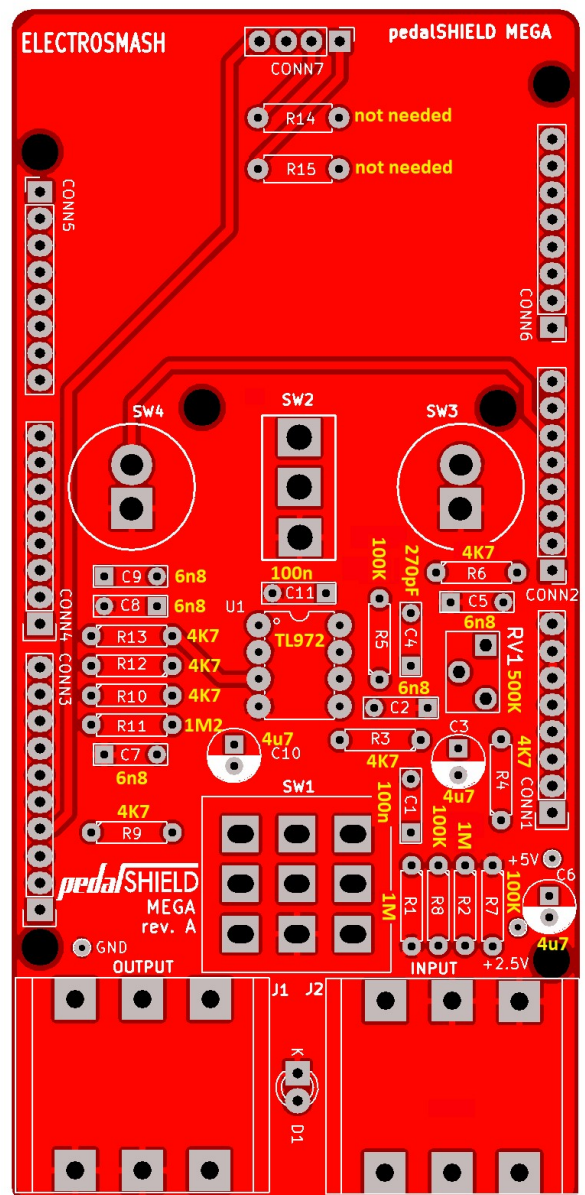
You would need a soldering iron, lead and cutting pliers. Additionally cutter, scissors and pliers are convenient. The PCB has solder mask and plated holes, so it is easy to solder with any 15-30W solder iron.



Keep in short hand the PCB plan and the Bill of Materials:

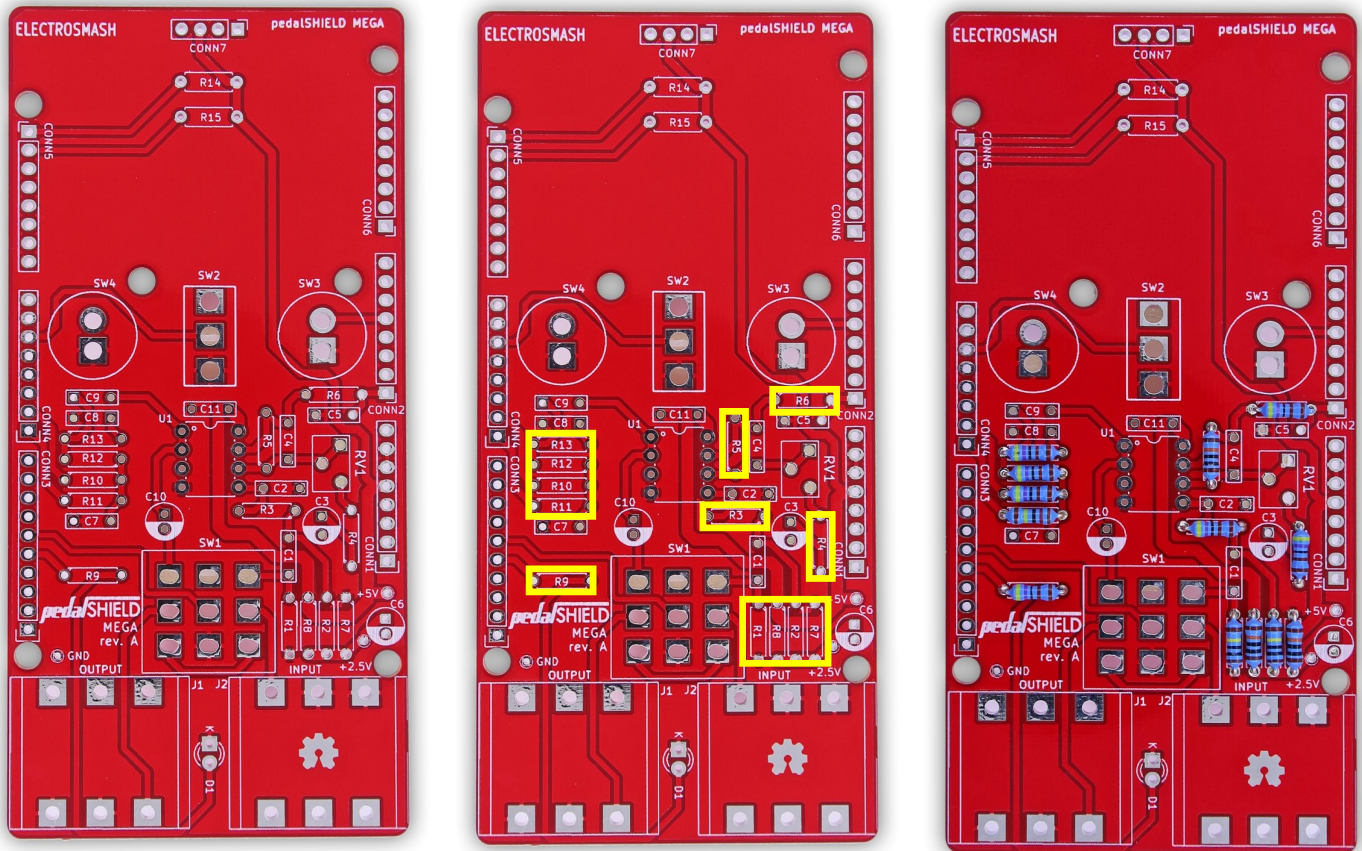
pedalSHIELD MEGA Bill of Materials.

Reference	Qty	Value
Capacitors		
C5,C2, C7, C8, C9	5	6.8n
C3, C6, C10	3	4.7u
C1, C11	2	100n
C4	1	270p
Resistors		
R12,R13, R10, R9, R6, R4, R3	7	4.7K
R5, R7, R8,	3	100K
R1, R2	2	1M
R11	1	1M2
Others		
RV1	1	500K
D1	1	Led 3mm blue
U1	1	TL972 pdip-8
socket	1	dip 8 socket
SW1	1	3DPT foot-switch
SW2	1	Toggle switch
SW3, SW4	2	Push-button
Conn1,2,3,4,5,6,7	2	40 pin header
J1, J2	2	1/4 Jack audio
OLED Display	1	1.3 inches, 4 pins



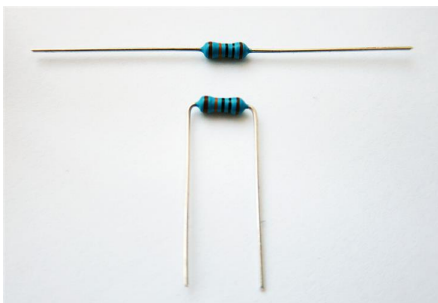
STEP1 – Soldering Resistors.

There are 13 resistors to be placed:



- **4.7K Ω** resistors (7 units): R3, R4, R6, R9, R10, R12, R13.
- **100K Ω** resistors (3 units): R5, R7, R8.
- **1M** resistors (2 units): R1, R2.
- **1.2M** resistor: R11.

Tips before soldering:



Bend the resistor leads as close to the body as possible, fit them in the footprint and once soldered cut the excess of lead as short as possible to avoid short circuits.

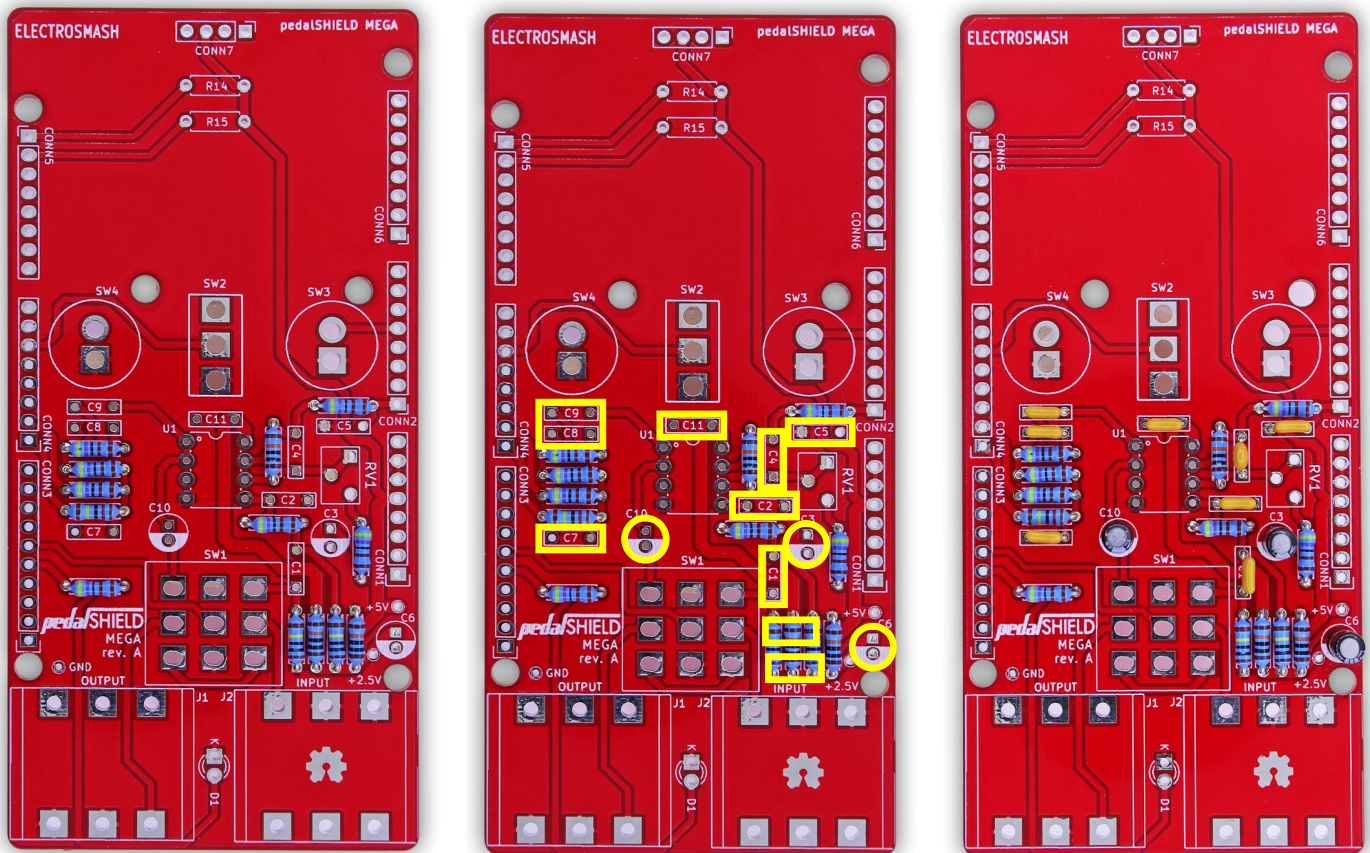
Once the leads are cut, touch again with the soldering iron the joint to secure the connection.

There is a [nice video on Youtube](#) to learn how to solder from scratch.

Note: The two resistors on the top of the PCB (R14 and R15) are optional pull-ups for the I2C bus, they are not needed.

STEP 2 – Soldering the Capacitors.

There are 9 film/ceramic and 7 electrolytic caps.



Soldering the caps from small to big:

- **6.8nF** capacitors (5 units): C2, C5, C7, C8, C9.
- **100nF** capacitors (2 units): C1, C11.
- **270pF** capacitor: C4.
- **4.7uF** capacitors (3 units): C3, C6, C10.

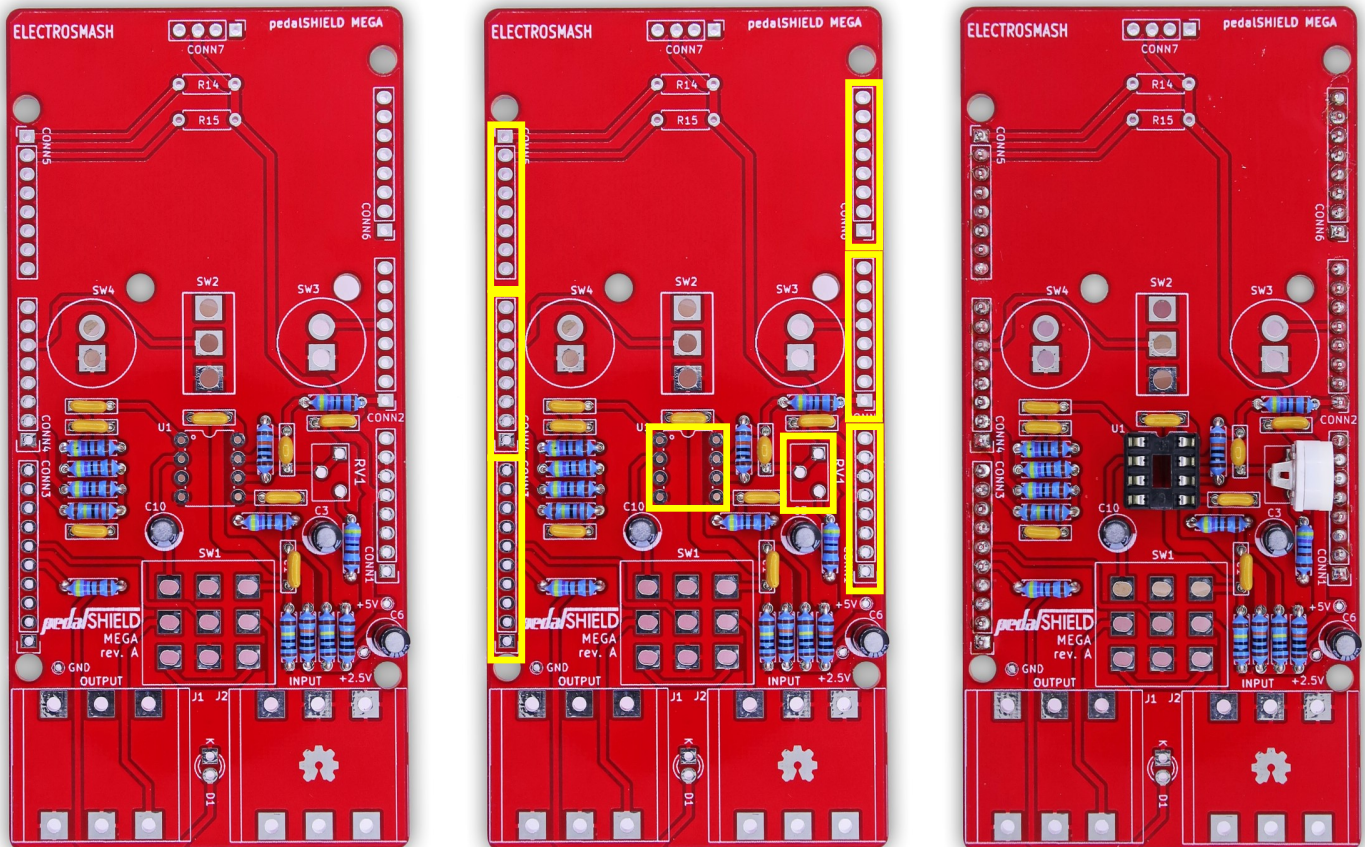
Tips before soldering:

Be careful with the electrolytic caps polarity, the negative lead (the short one) has to be placed in the round hole with the white semi-circular paint, check the image below:



STEP 3 – Medium Size Components.

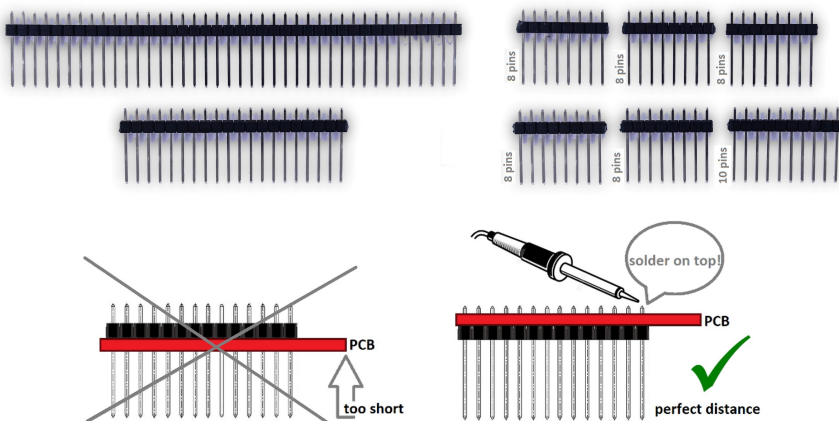
The last components to be placed are the dip sockets, resistor trimmer, led, jack, switches, etc:



In this step it is important to solder the remaining parts from small to big, the optimum order is:

- 8pin socket.
- 500K Resistor Trimmer.
- Pin headers. (read * first)

Tips before soldering:



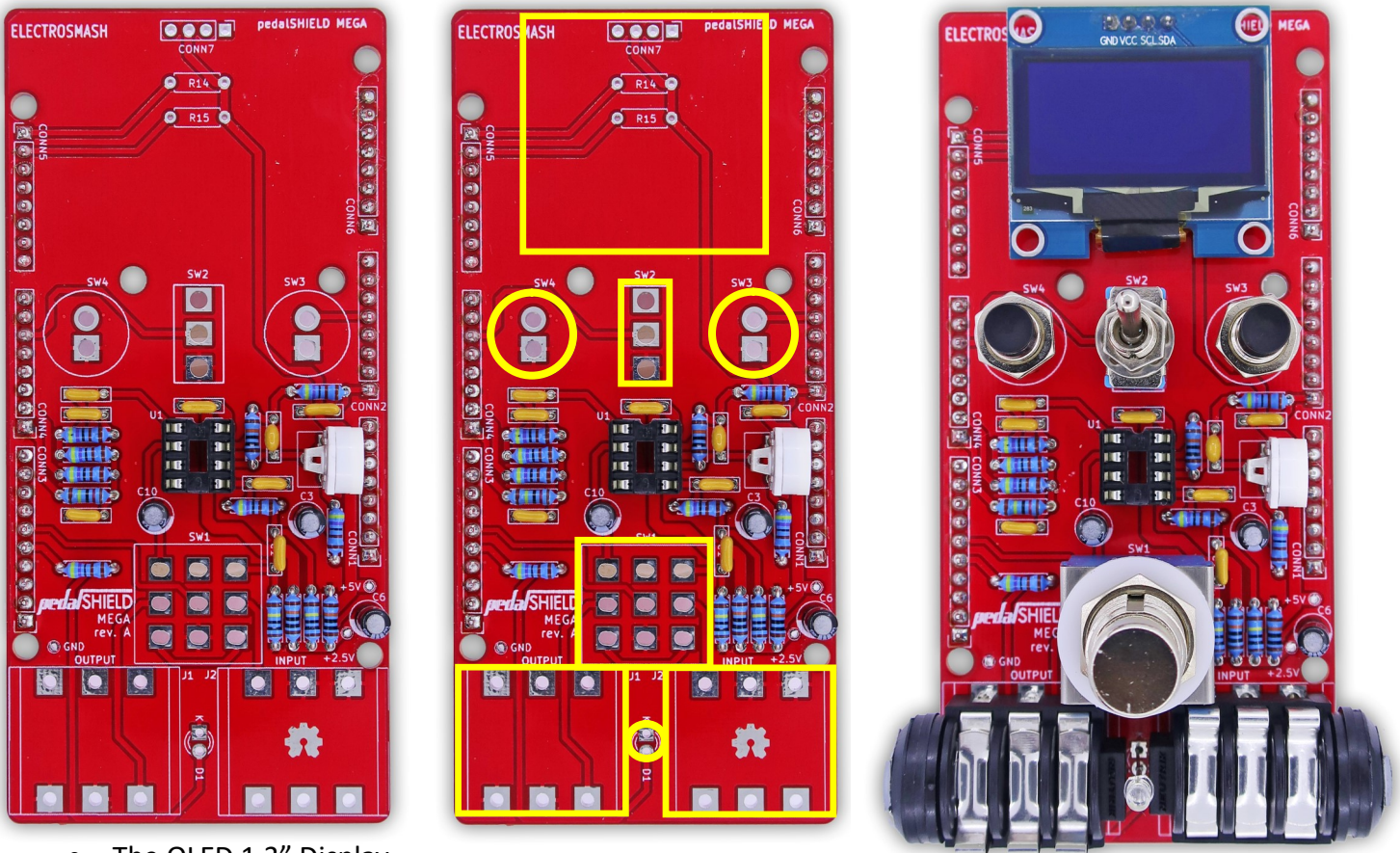
Use a wire cutters to separate the pin headers into smaller segments to fit into the PCB: 5x8 pins and 1x10pins.

Solder each segment like the picture on the left

* Make sure that the smaller segments of pin headers are straight and aligned with the Arduino MEGA board. **A good idea** is to solder only the 1st pin of each segment, plug the shield on top of the Arduino, and once you are sure that all is straight and aligned, solder the rest of the pins.

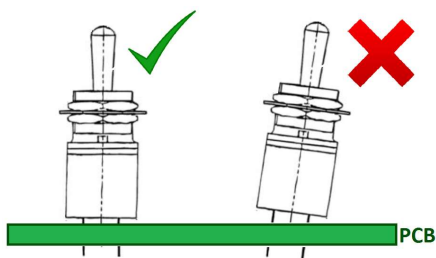
STEP 3 – BIG Components.

The big components are the last to be soldered:



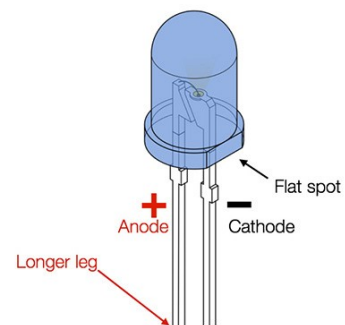
- The OLED 1.3" Display
- 2 Push-Buttons
- 1 Toggle Switch
- 3PDT True Bypass foot-switch
- 2 Audio jacks
- 3mm LED

Tips before soldering:



ALL the big components tend to tilt when are soldered, make sure they are straight. A good idea is to solder only one pin and once you are sure that it's perpendicular, solder the rest of the pins.

It would be good to check their positioning against the acrylic cover.

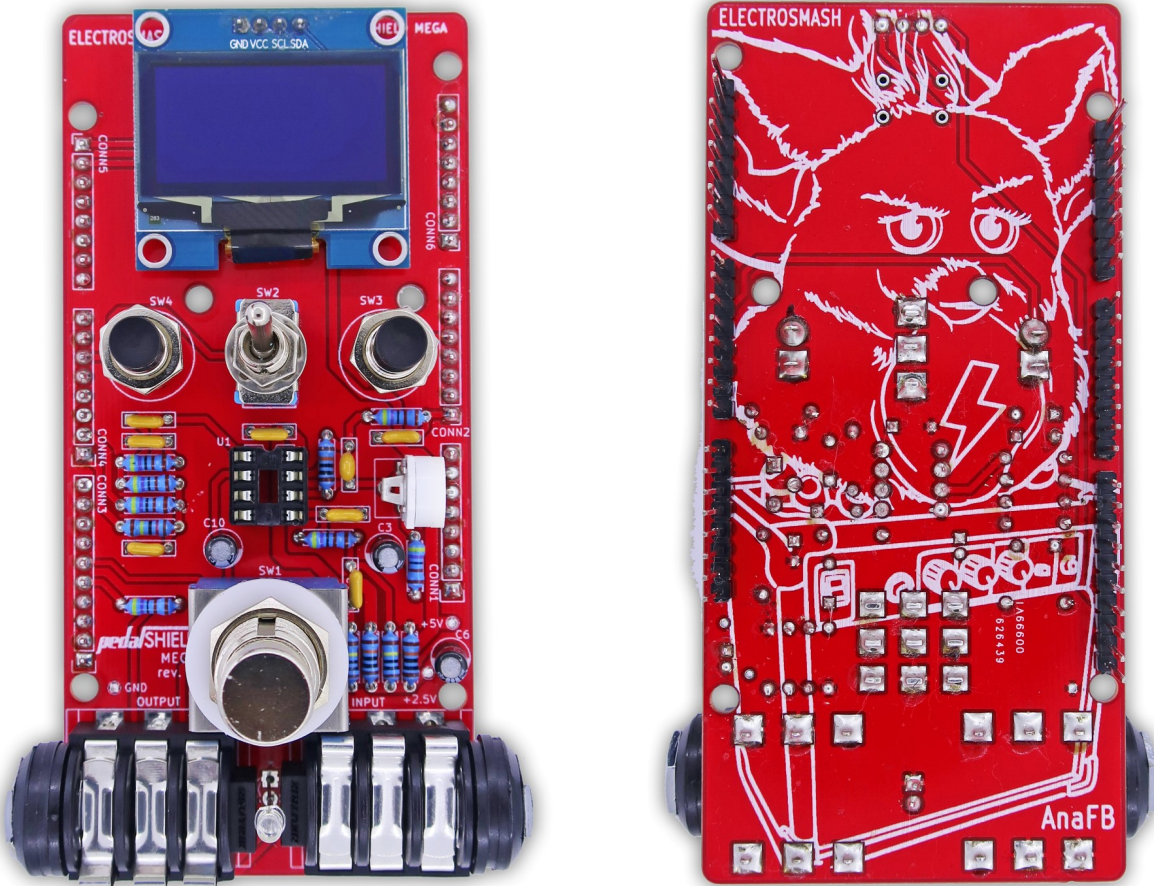


Take care with the LED D1 soldering: present the acrylic cover to size the length of the leads.

The short lead (cathode) it is marked with a "K" on the PCB.

STEP4 – Checking Out the Job Done.

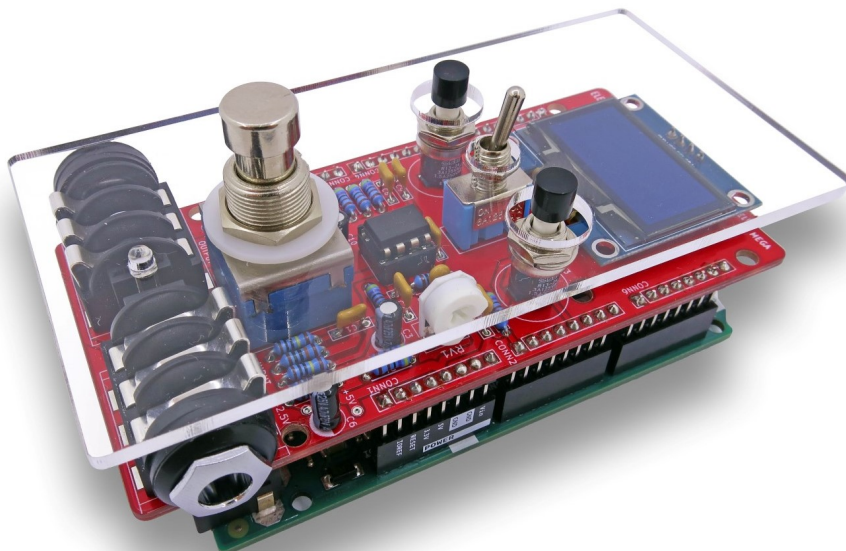
After this 4 stages you will have a mounted board exactly like the one shown below:



Double check your PCB with the model component by component. Before power it up, check this 3 ticks:

- ✓ 1. Visual inspection of the PCB bottom, there is no short circuits or long uncut leads.
- ✓ 2. Electrolytic caps are placed with the marking matching the PCB silkscreen.
- ✓ 3. The Op-Amp is placed right (not upside down).

If you need more help there is a topic in the forum called [Guide to troubleshoot Pedal-Pi](#).



The acrylic cover is kept in place by the foot-switch nut & plastic washer, simple and practical.