4sum

portable audio mixer

assembly instructions*

v0.95

by SyntherJack.net

*I've tried to keep it short and informative. Nobody reads manuals.

Main features:

- 4x mono inputs,
- 1x stereo (double mono) output,
- long battery life (average 100 hours),
- output in phase with input,
- high quality components,
- designed for portability,
- LED on/off indicator.

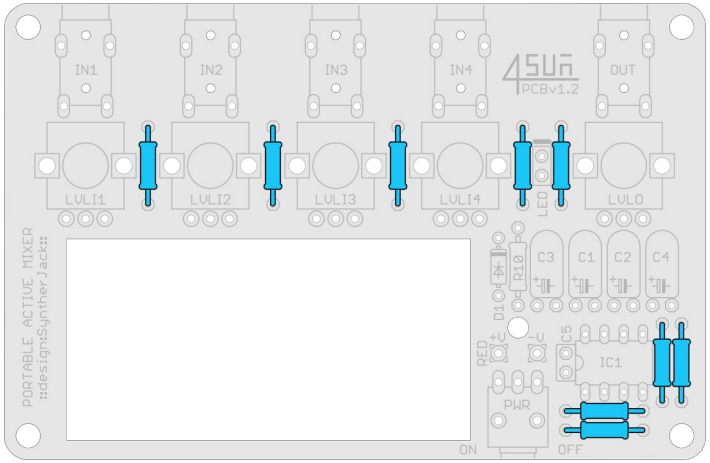
Mechanical data:

- size:
  - without knobs : 93 x 60 x 29 mm,
  - with knobs : 93 x 60 x 35 mm,
- weight:
  - without battery: 90 g,
  - with battery: ~120 g.

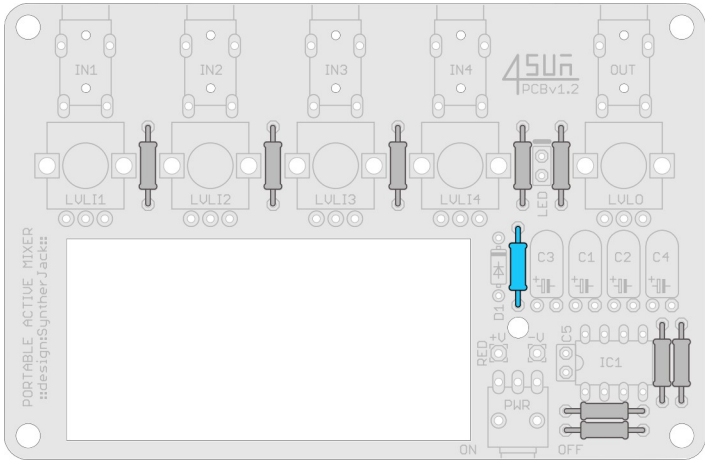
Electrical data:

- max. input signal level: 6 Vp-p,
- max. amplification x2 (+6 dB),
- power supply: single 6F22 battery,
- current draw: ~5,5 mA @ 9V,
- battery life:
  - ~100 h (average cheap battery),
  - up to 200 h (lithium battery),
- works with rechargable USB batteries.

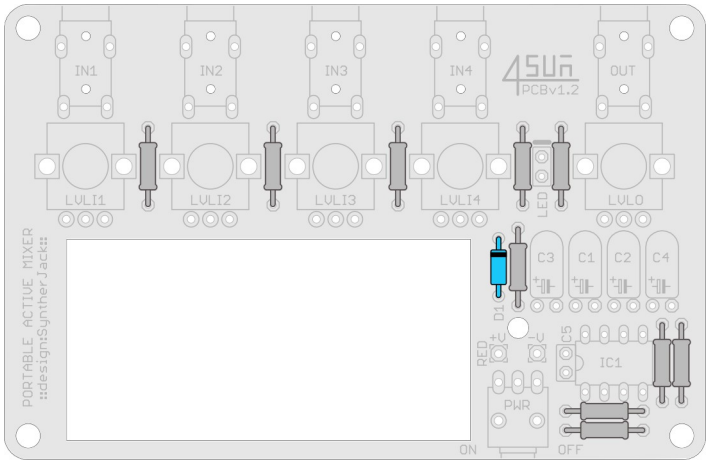
BILL OF MATERIALS				
	Part/value	**Count**	**Part on PCB**	**Description**
Resistors				
1	47 kΩ	9	R1, R2, R3, R4, R5, R6, R7, R8, R9	0,6 W, metal film, 1%
2	4,7 kΩ	1	R10	0,6 W, metal film, 1%
Potentiometers				
3	100 kA	5	LVLI1, LVLI2, LVLI3, LVLI4, LVLO	Alpha Taiwan RV09AF-40-20K-A100K
Capacitors				
4	10 µF	4	C1, C2, C3, C4	tantalum, 25 V
5	100 nF	1	C5	ceramic, 50 V
Semiconductors				
6	TL072	1	IC1	opamp, DIL8
7	BAT43	1	D1	Schottky diode
8	LED	1	LED	3 mm, red
Mechanical				
9	Jack socket	5	IN1, IN2, IN3, IN4, OUT	Lumberg 1503-08
10	DIL8 socket	1	IC1	standard
11	Slide switch	1	PWR	Canal Electronic TS-6S-QH
12	Battery connector	1	+V (RED), -V	Keystone 84-8
13	Male spacer	4	-	8 mm, M3
14	Female spacer	4	-	8 mm (+thread length 6 mm), M3
15	Screw	8	-	6 mm, M3
16	Top cover	1	-	custom
17	Bottom cover	1	-	custom
18	PCB	1	-	custom



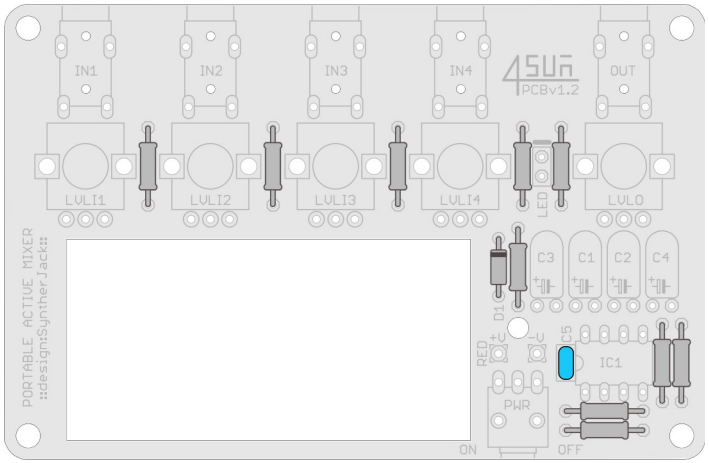
Step I : solder nine 47 kΩ resistors (*R1..R9*).



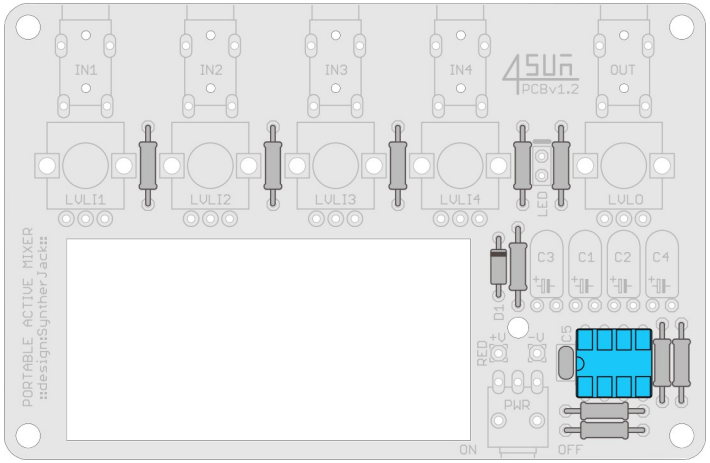
Step II : solder one 4,7 kΩ resistor (*R10*).



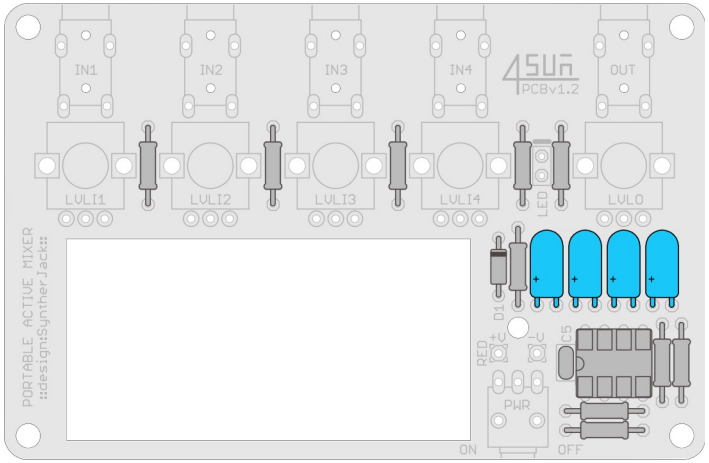
Step III : solder one Schottky diode (*D1*).
Mind the polarity! **Black strip** should be pointing **top**!



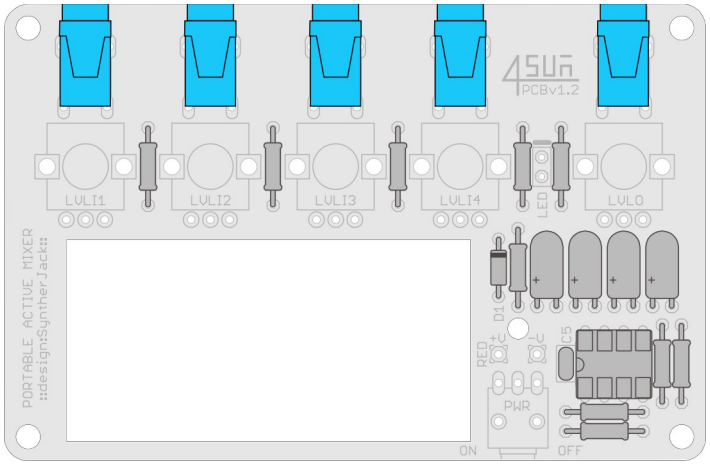
Step IV : solder one 100 nF ceramic capacitor (*C5*).



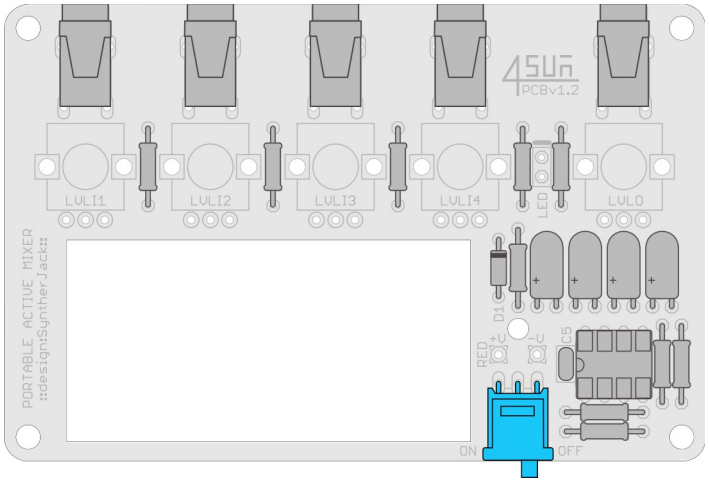
Step V : solder DIL8 socket (*IC1*).
The small **notch** in socket should be pointing to the **left**!



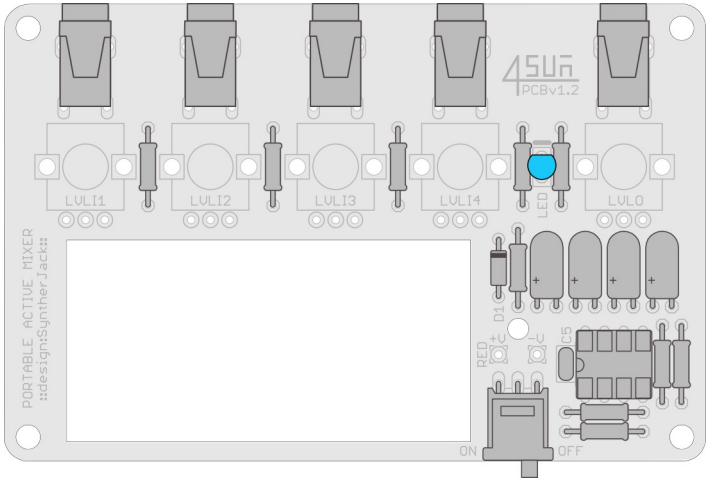
Step VI : bend legs of four 10 µF capacitors (*C1..C4*) and solder them (see photo).
Mind the polarity! On tantalum capacitor **positive (longer) lead** is marked and it should be pointing to the **left**!



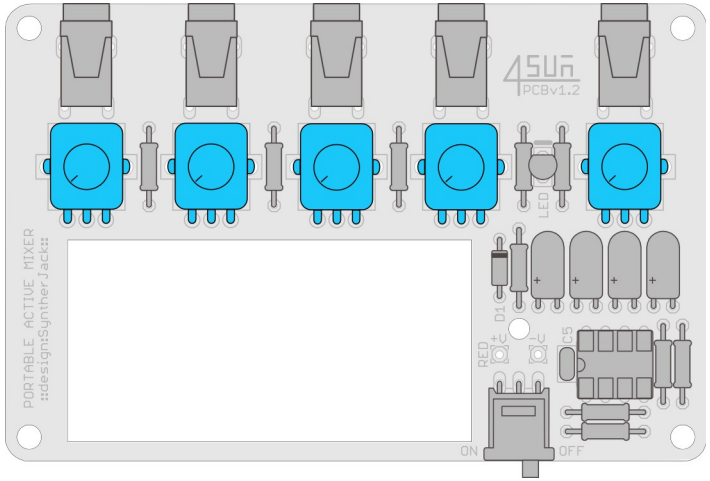
Step VII : solder five jack connectors (*IN1..IN4, OUT*).



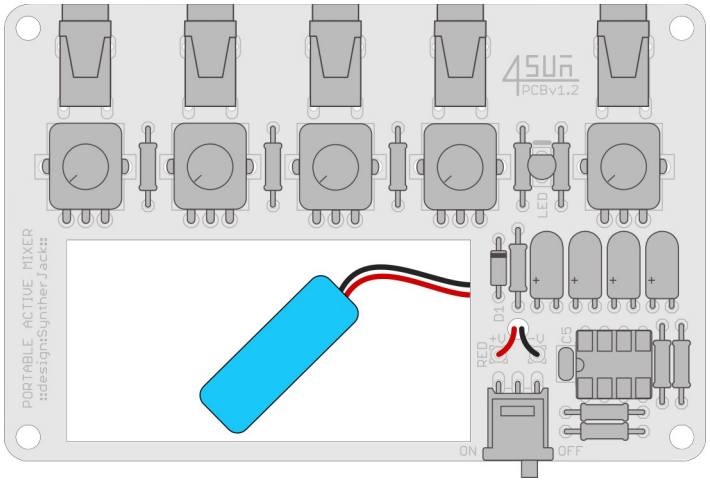
Step VIII : solder power switch (*PWR*) and slide it to the right.



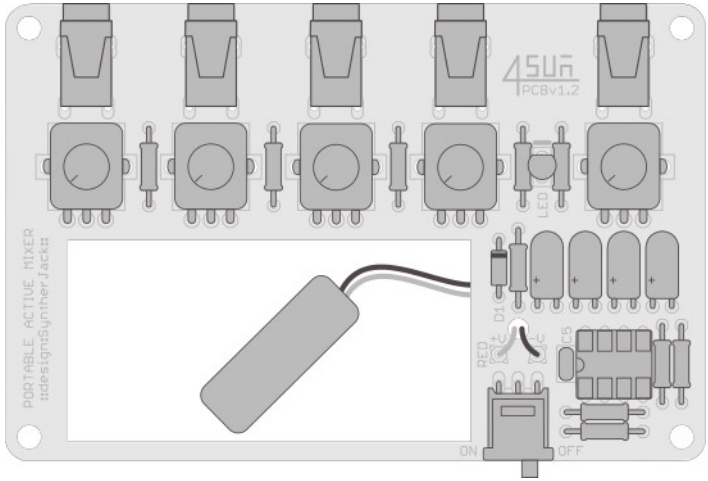
Step IX : solder LED (*LED*) slightly (*~1 mm*) above resistors. Mind the polarity! **Cut edge (shorter lead)** of the LED should be pointing to the **top**!



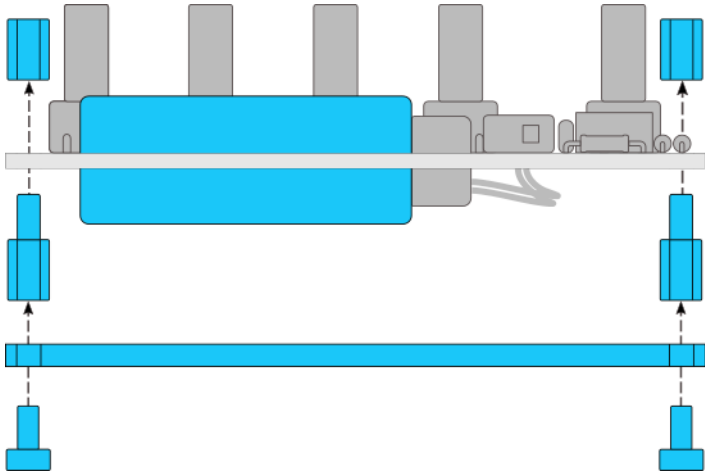
Step X : solder five potentiometers (LVL*1..LVL4, LVLO*).



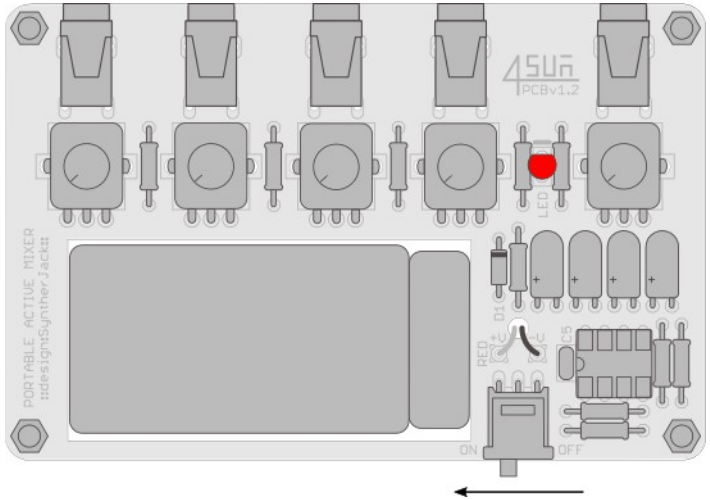
Step XI : cut the battery connector to around 85 mm, strip both ends of the wires and solder them (*red to V+*).



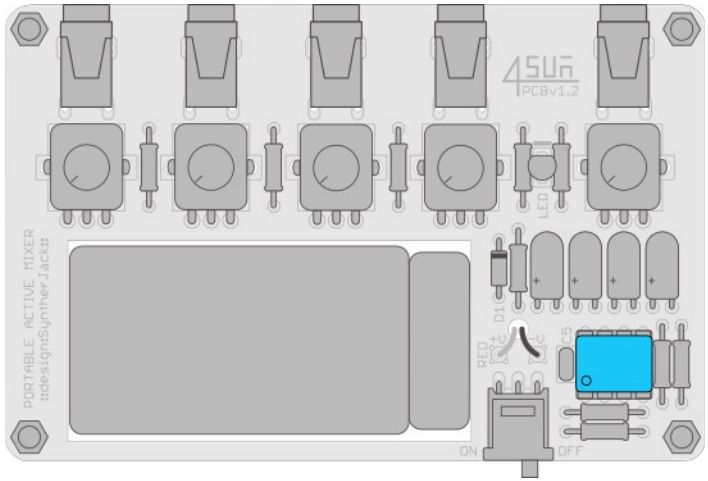
Step XII : inspection – double check all the joints. They should be nice and shiny. If you have isopropyl alcohol, clean them.



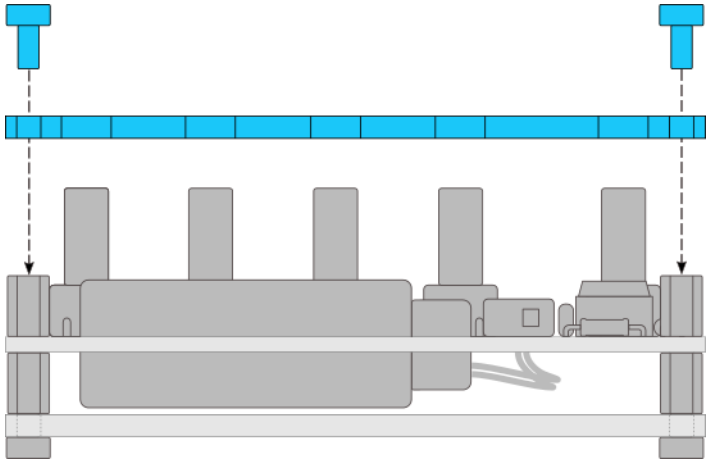
Step XIII : insert the battery, remove protection form acrylic cover and connect it with screws and spacers using fingers.



Step XIV : turn the device on – the LED should lit. The chance you've soldered everything correctly just increased! Turn it off.

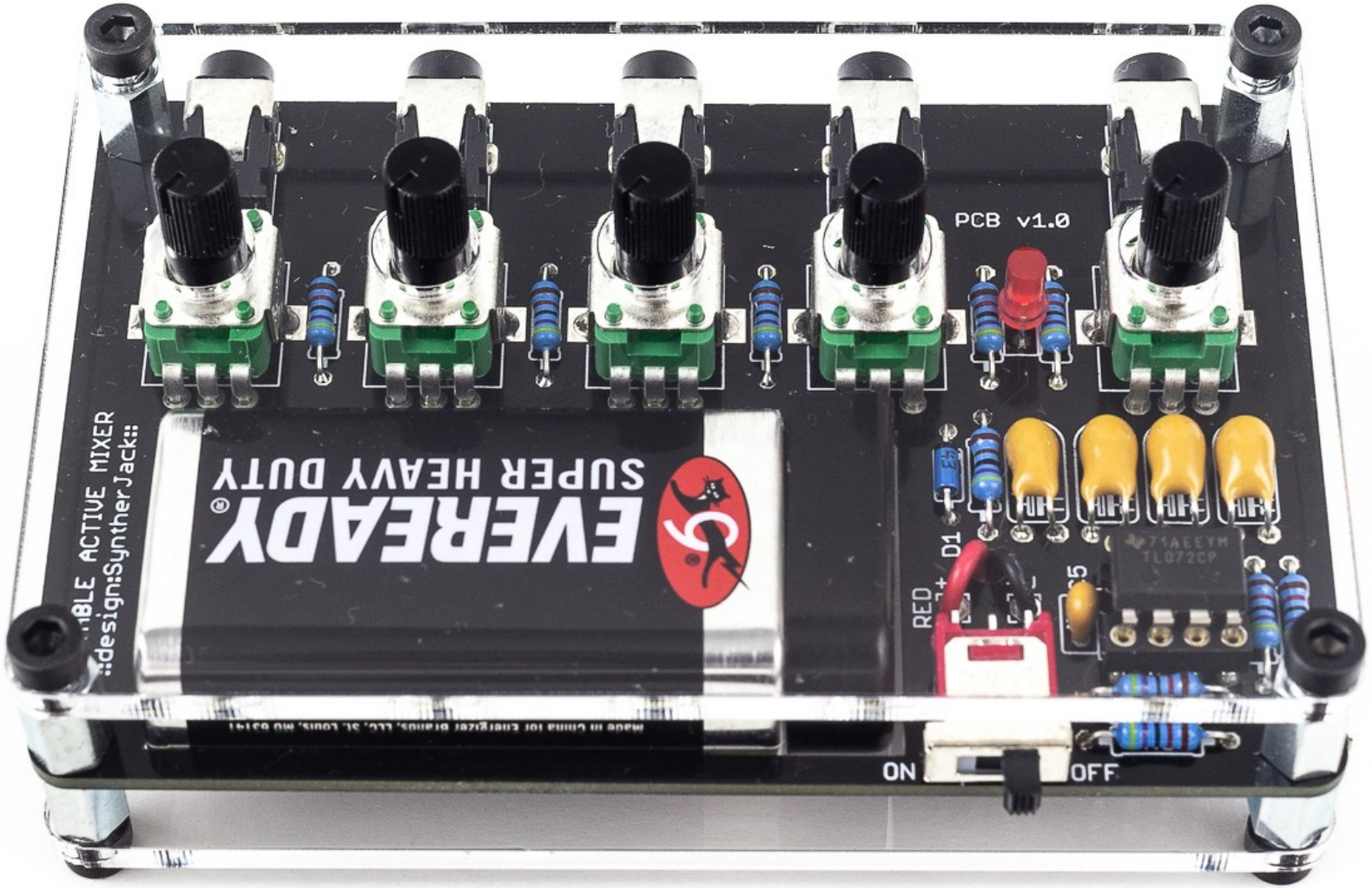


Step XV : Slightly bend the IC leads and put it into the socket.
Notch on the IC should match **notch** on the socket!



Step XVI : Install the top cover.

Step XVII : Congratulations! Your brand new and shiny portable mixer is ready, I hope it looks as good as mine :)



Operation manual

Controls:

- each knob sets the level for the corresponding input/output (*see diagram*),
- fully left (*anticlockwise*) is equal to silence, fully right (*clockwise*) to maximum volume level possible.

First run:

- turn mixer OFF,
- turn all IN knobs to around 50% (*12 o'clock*),
- turn OUT knob full anticlockwise (*min. level*),
- provide signal to INs of choice,
- connect OUT to your favourite piece of equipment,
- turn mixer ON,
- turn OUT knob slowly clockwise to increase output level.

Notes:

- inputs are monophonic and take signal from the tip of the jack plug (*usually left channel*),
- output is stereophonic (*or rather double mono*) and **works only with stereo cable**,
- max. amplification of mixer is x2 (+6 dB),
- both inputs and output are AC coupled,
- for fresh battery **maximum** mixers **output is 5,6 Vp-p** and it will drop with supply voltage,
- **6 Vp-p** can be considered as **safe input** voltage level (*don't worry if you fry TL072, they are relatively cheap*).