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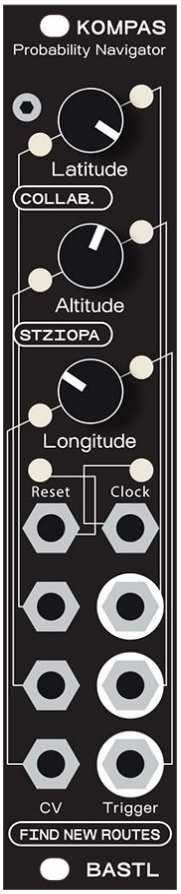
B A S T L
INSTRUMENTS

KOMPAS v1.2 - Assembly Guide

bastl-instruments.com



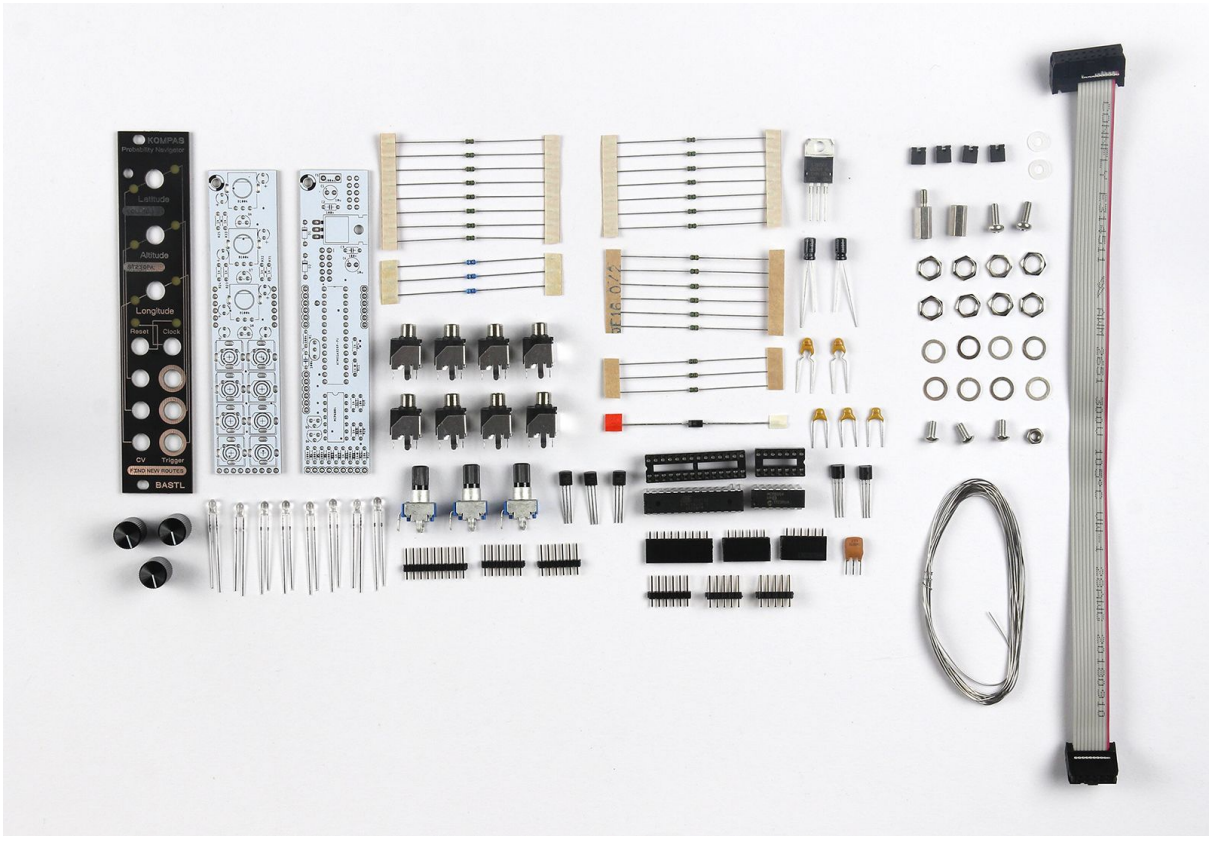
INTRODUCTION

This guide is for building **KOMPAS** module from Bastl Instruments. It is good to have basic soldering skills and to be able to identify electronic components before starting this kit. However if you have never soldered before, check out this tutorial first[1]. We even included some of the best quality solder to help you solder everything faster and better.

The KOMPAS kit consists of two boards. All the parts comes in three bags separated for Top board, Bottom board and Assembly parts. See the Bill of Materials for detailed list.

[1] https://cdn-learn.adafruit.com/downloads/pdf/adafruit-guide-excellent-soldering.pdf?timestamp=1559628255

BILL OF MATERIALS



KOMPAS_V.1.2 BOM		
qty	**value**	**part**
RESISTORS		
15	1k	R-EU_0204/5
3	10k	R-EU_0204/5
6	100k	R-EU_0204/5
3	1M	R-EU_0204/5
CAPACITORS		
3	100nF	ceramic capacitor
2	10uF	electrolytic capacitor
SEMICONDUCTORS		
1	1N4007	DIODE-D-7.5
1	7805	voltage regulator
5	2N3904	NPN, **BULK**
1	MCP6004	IC - in foam
1	ATMEGA328-PU	IC - in foam

1	16mHz	resonator
2	100mA	fuse
HARDWARE		
1	14 pin DIL	DIL socket - in foam
1	28 pin DIL	DIL socket - in foam
3	POT LIN B100k 20mm	linear potentiometer
8	PJ-301BMB	jack 3.5mm
1	27 pin	male
1	21 pin	female
2	2x5 pin	male
8	3 mm white	LED
ASSEMBLY		
1	M3_11,5_II	spacer
1	M3_11_IA	spacer
8		jack nut
8		jack washer
3	M3_6_I	screw
2	M3_8_X	screw
1	3 mm	nut
3		knob
1	kompas_top	PCB
1	kompas_bottom	PCB
1		power cable
4		jumper
1		faceplate
1		allen key

BEFORE STARTING THIS KIT...

Before starting the kit, prepare the following tools:

- Soldering iron
- Multi-meter
- Flush cutters
- n2. hex screwdriver or allen key (enclosed with kit)
- Phillips screwdriver
- Wrench No. 8
- Protective eyewear
- Isopropyl alcohol + smaller and clean brush (optional)

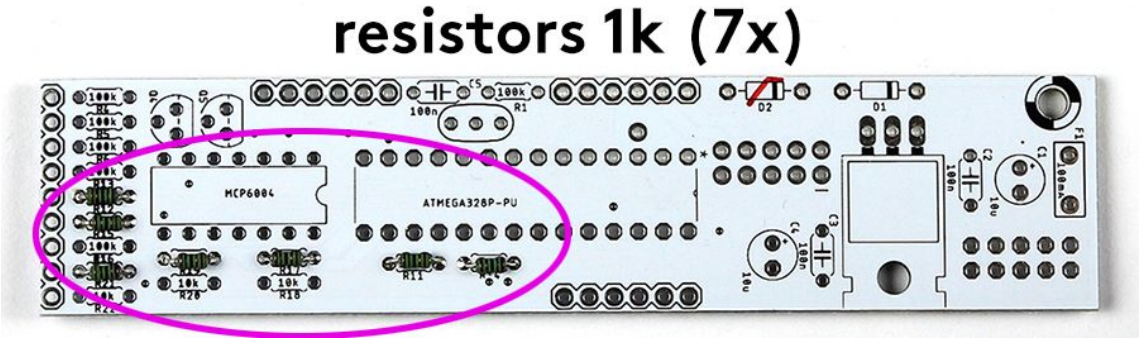
We suggest that you work in a clean, well lit and ventilated environment to avoid accidents or losing any of the small components. Also go through this guide briefly and make sure that you understand all the steps before you start soldering.

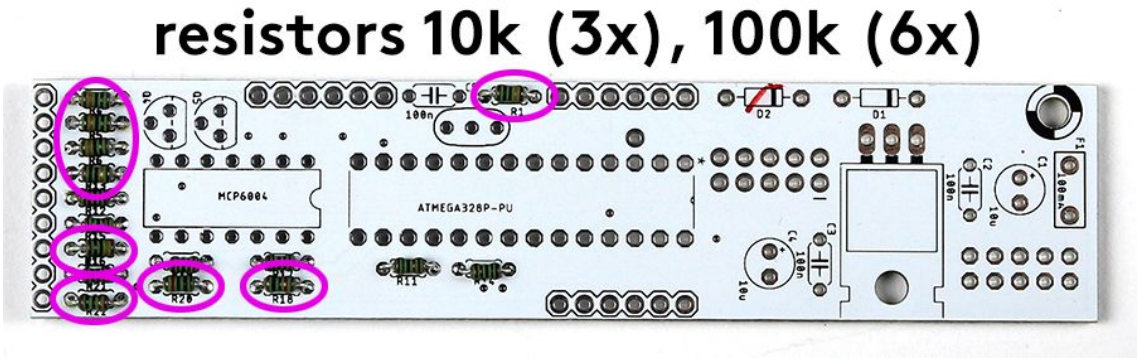
BOTTOM BOARD

RESISTORS

Start with the bottom board parts. First of all, take your time and check the **values of all resistors** using the multimeter[2] (or you can check the color codes if you are seasoned enough): **1k** (7x), **10k** (3x), **100k** (6x).

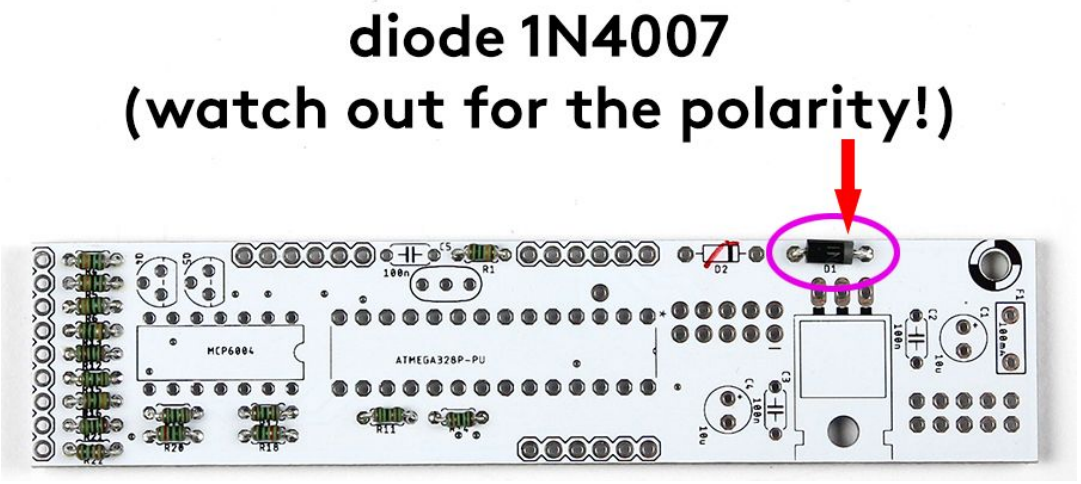
Then solder them on the bottom PCB to their spot and snip the leads close to the PCB - the joints need to stay there, just cut off the wires (be sure to make this step on all remaining leads in the course of this guide).





DIODE

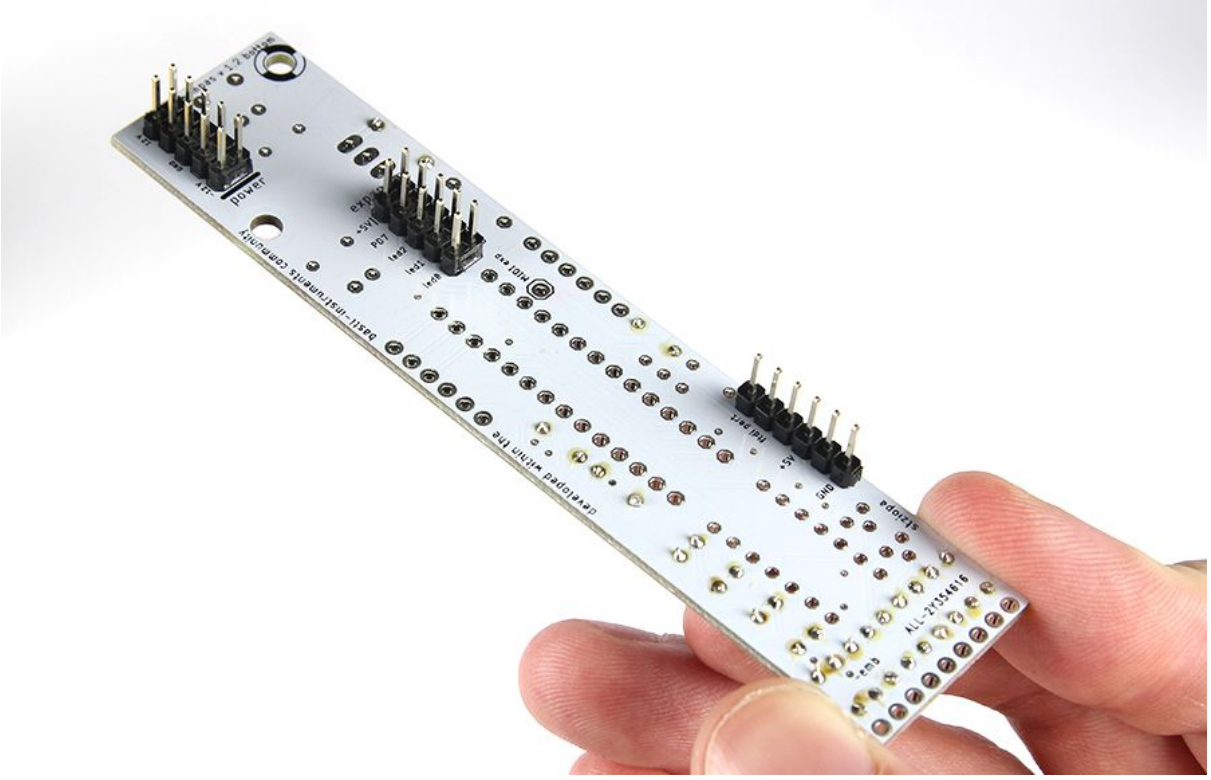
Move to the **diode** (**1N4007**). Be careful, **diodes are polarized**! Make sure that the marking ring on the diode body matches the marking on the circuit board **(**check out the photo below).



[2] https://learn.sparkfun.com/tutorials/how-to-use-a-multimeter/measuring-resistance

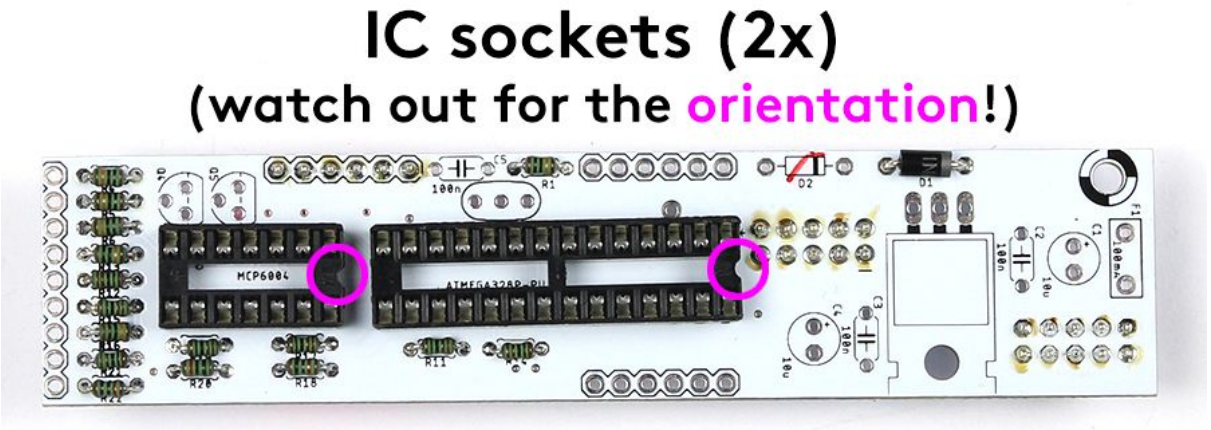
MALE HEADERS

Solder the **male pinheaders** now (one **6 pins** and two **double 5 pins**). Be careful to solder them straight. This part could be tricky: you may first solder just one of the pins, take the board in your hand and reheat that pin while pressing down on the header to align it (be careful, you don't want to touch the pin that you are heating up). Wait for it to cool and solder the rest of the pins.



IC SOCKETS

Solder both **IC sockets** (14 pin and 28 pin). **Make sure that the notch on the socket matches the print on the board**.

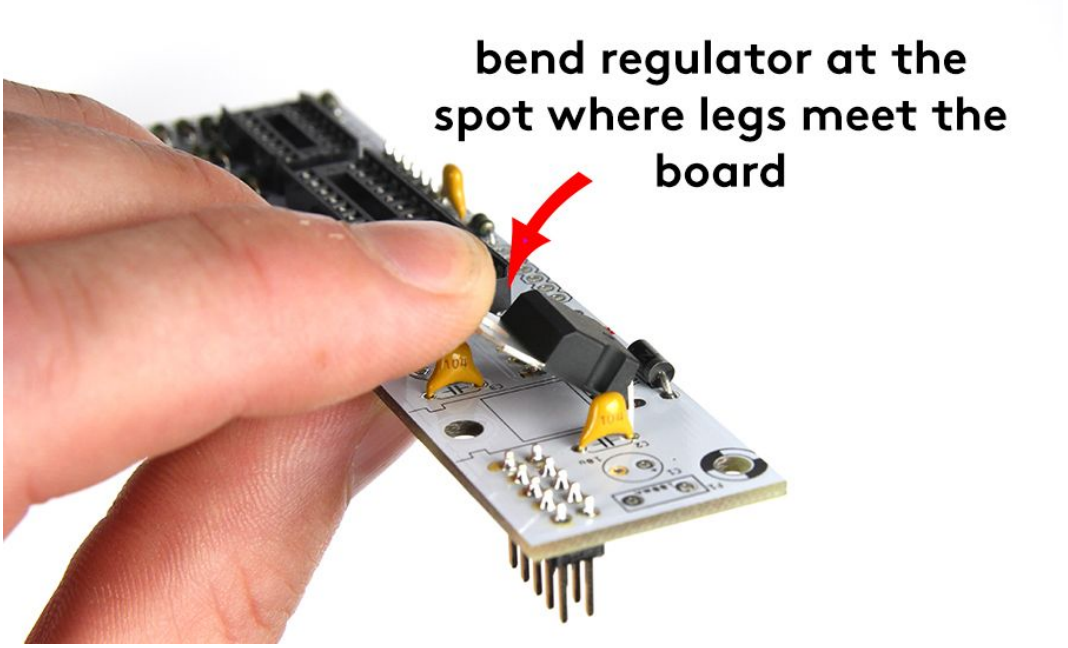


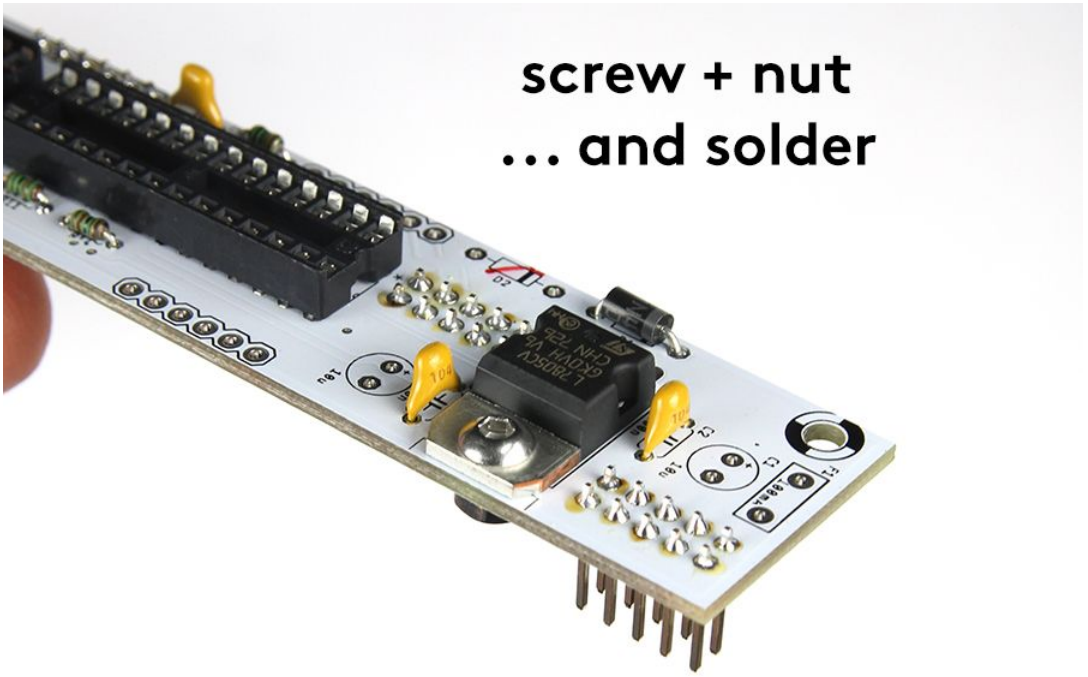
CERAMIC CAPACITORS

Let's do the **100nF ceramic capacitors** now. There are **three** of them (marked "104" on itself).

VOLTAGE REGULATOR

Proceed to the **7805 voltage regulator.** Bend its legs close to the body first. Insert it then to the spot and make it lay on the PCB.



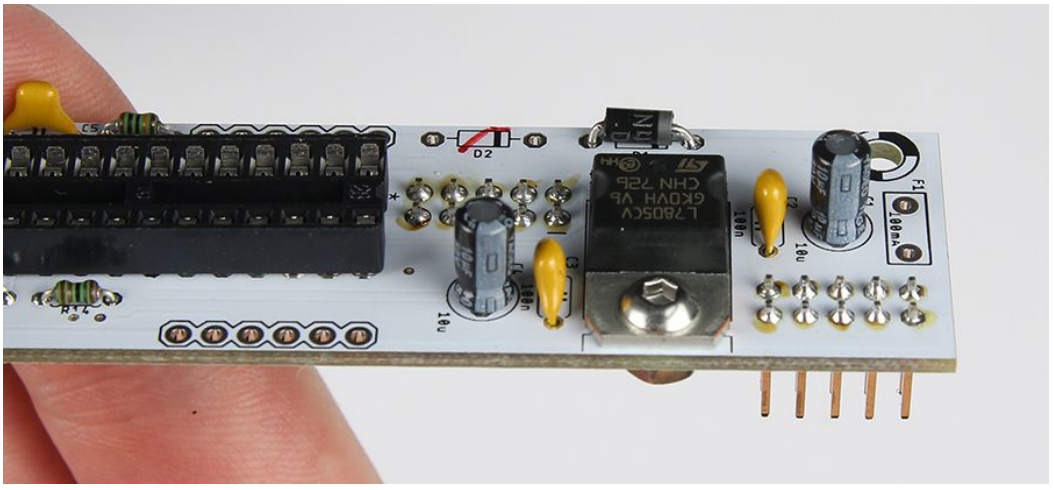


TRANSISTORS

Add **two transistors** (**2N3904**). Just be aware of the right **orientation**. Also don't try to push these parts on the board as you can see on the photo.

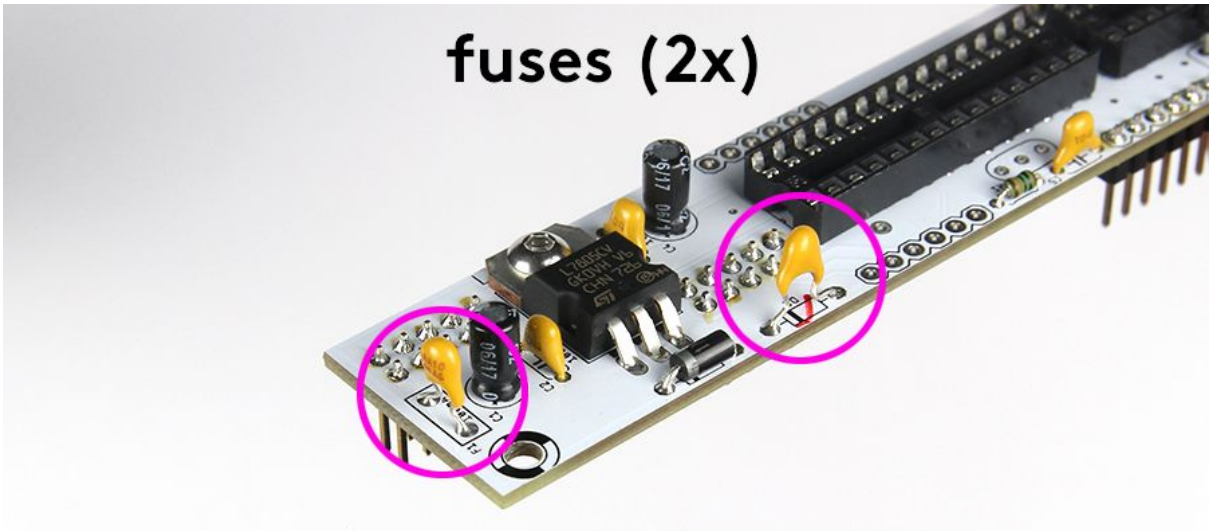
ELECTROLYTIC CAPACITORS

Let's do the **electrolytic caps** (2x **10µF**). These ones are **polarized!** There is a plus (+) sign on the PCB that has to match the longer lead of the electrolytic capacitor (actually the minus (–) side is also marked on the body of the capacitor with a white strip).



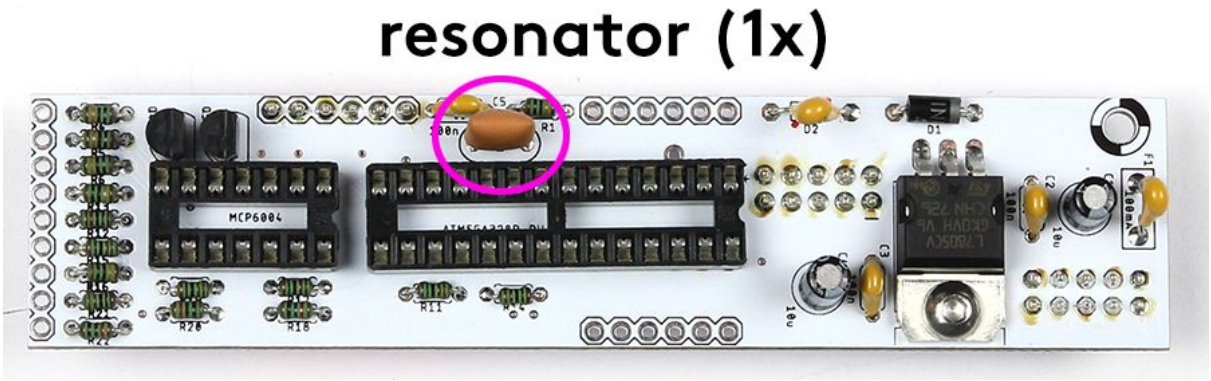
FUSES

Fuses look quite similar to capacitors so don't let it confuse you. Solder two **fuses** right into the rectangular spot signed "100mA" and ptc sign.



RESONATOR

Insert also the **resonator** (the orange component with 3 leads). This part is not polarized so you can insert it in any direction.



INSERTING ICs

Next don't forget to place **ICs** into the sockets (1x **MCP6004**, 1x **Atmega**). **There is a notch on each IC that should match with the notch on the socket.** Installing ICs can be also a little tricky. You should bend the IC leads in slightly with your fingers. Then press all the leads into the sockets in one shot.

FEMALE HEADERS

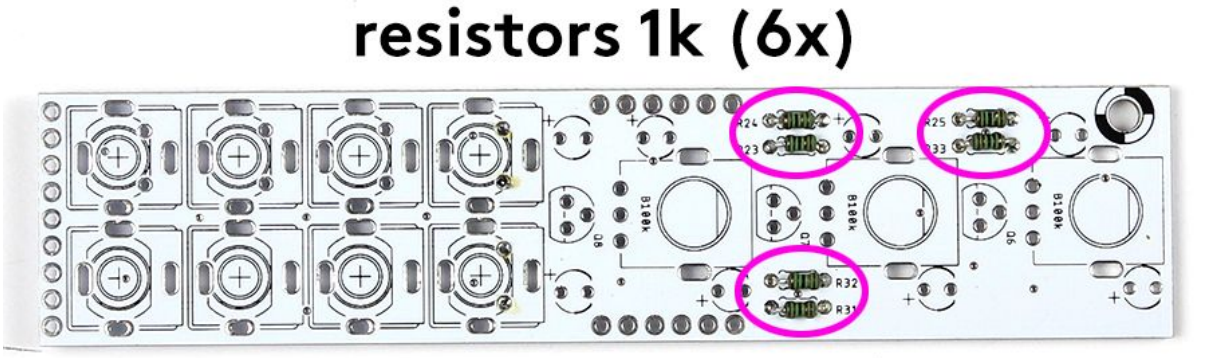
As you can see **the female pinheaders left**. Hold on with these parts. You will use them in later steps.

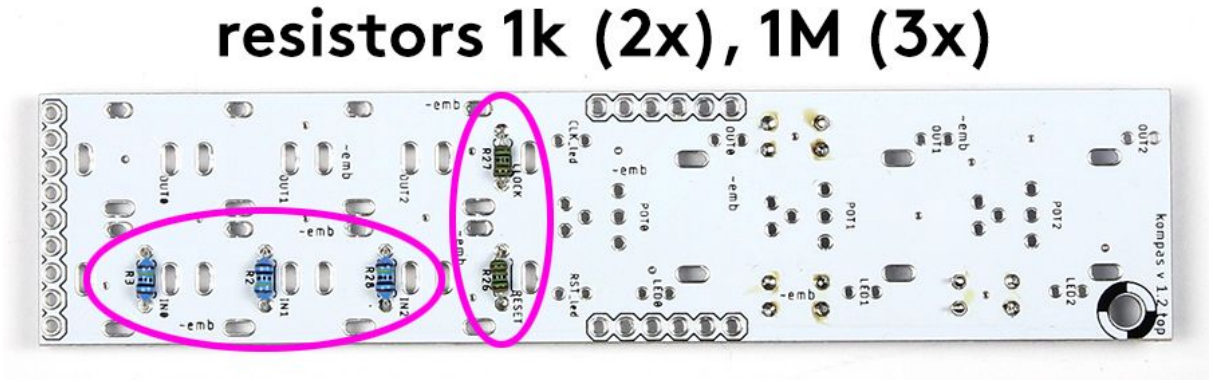
For now you are done with the bottom board. Make the last check that all parts are on the right place and everything is properly soldered.

TOP BOARD

RESISTORS

Let's move to the top PCB now. Again, start with the **resistors**: **1k** (8x), **1M** (3x). You are going to place them from both sides of the PCB. Just be sure that the legs are properly cut so they are not going to be touched with the jacks.





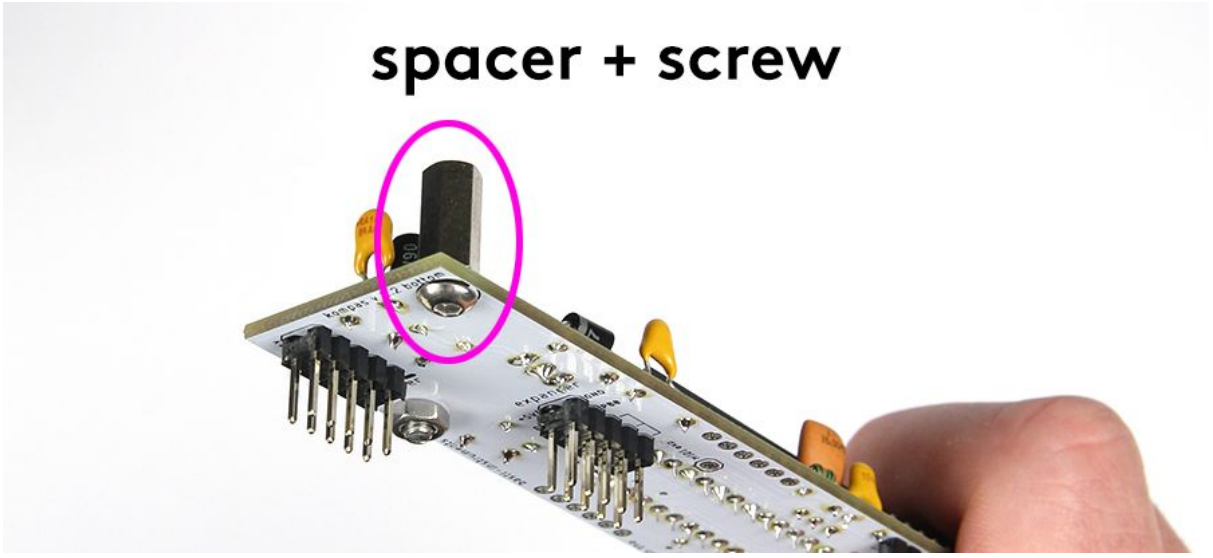
TRANSISTORS

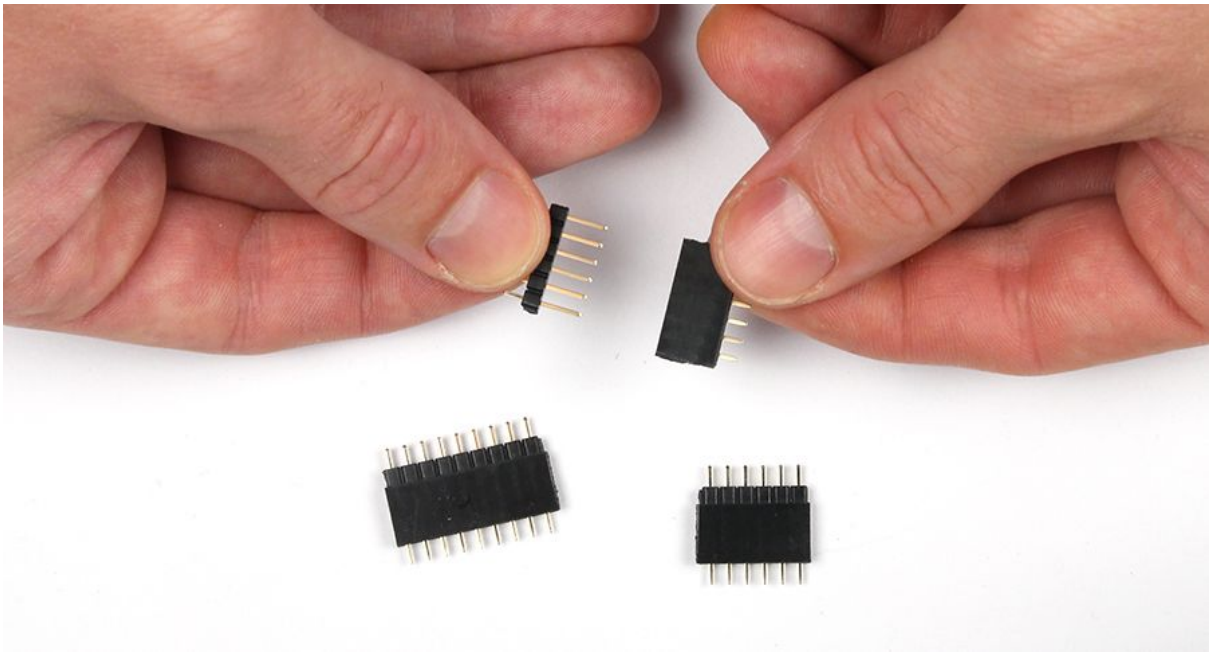
Add next **three transistors** (**2N3904**). Again: keep in mind the **orientation** and don't push the transistors absolutely down to the PCB.

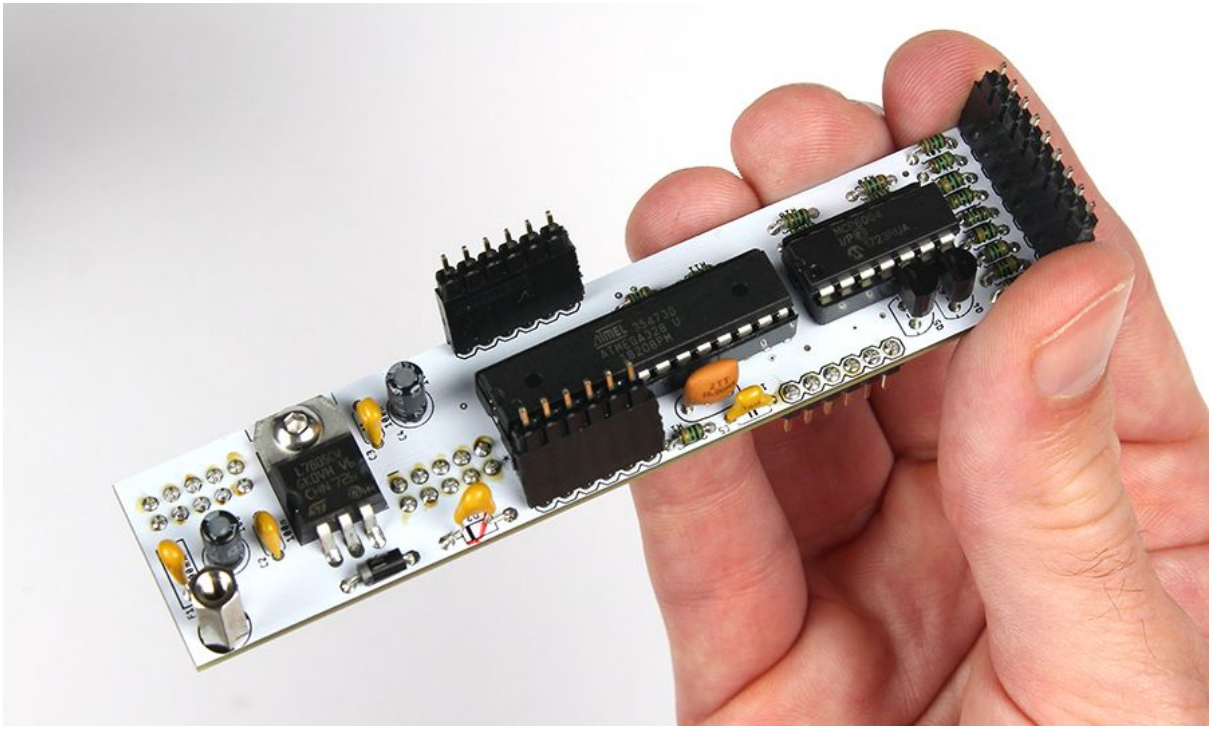
PINHEADERS

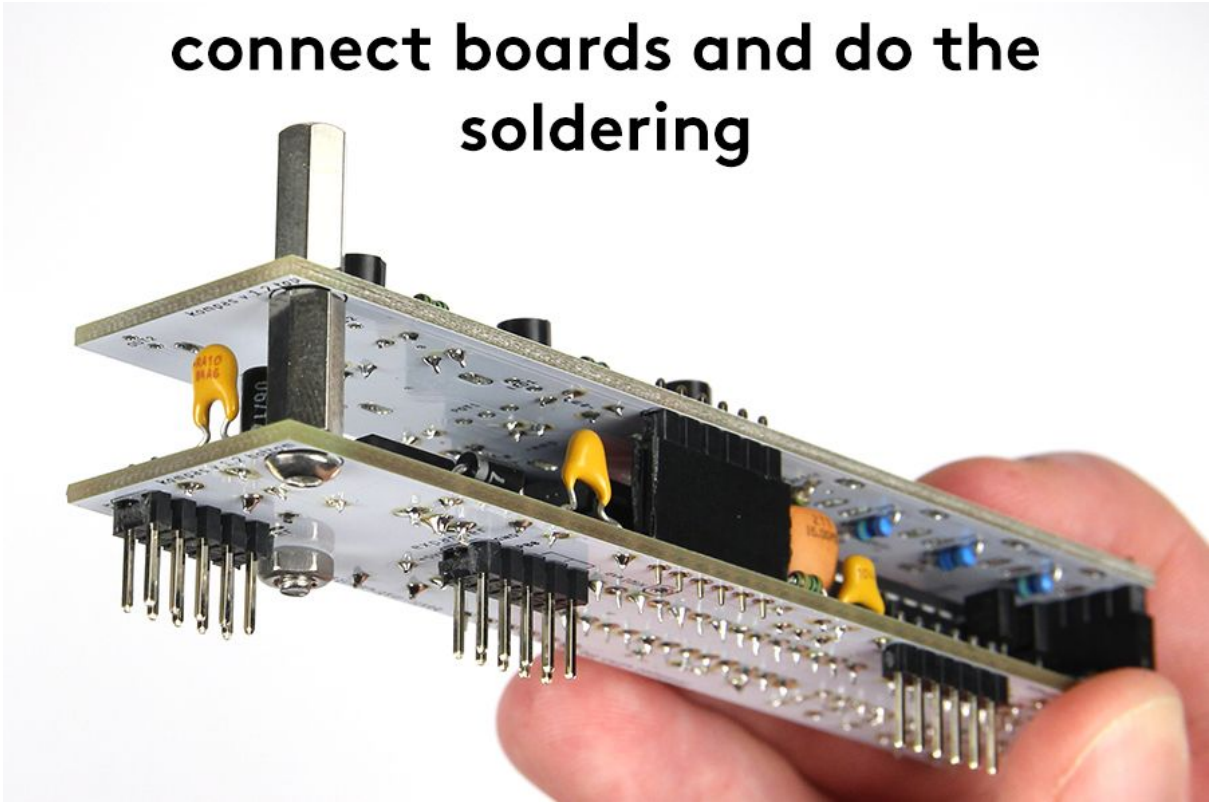
Now it's time to connect the boards with pinheaders:

1) Mount the spacer (nut x nut) with the screw to the bottom board first.
2) Insert male headers into the female ones.
3) Put the headers on the bottom board facing the female ones down.
4) Place the top board on and secure it with the other spacer. Check the position and do the soldering of headers finally.





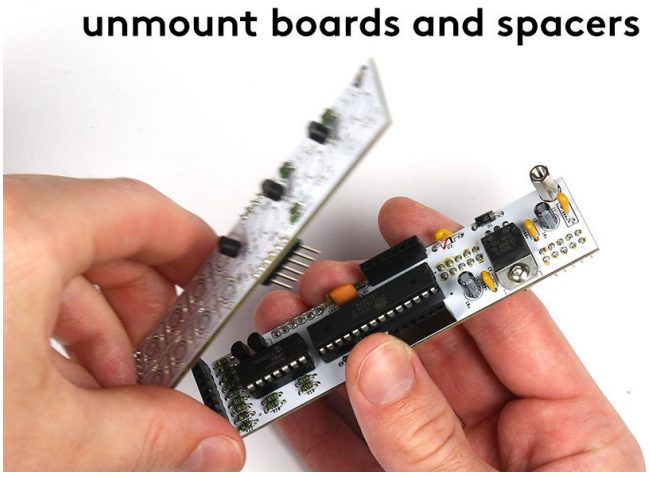



connect boards and do the soldering

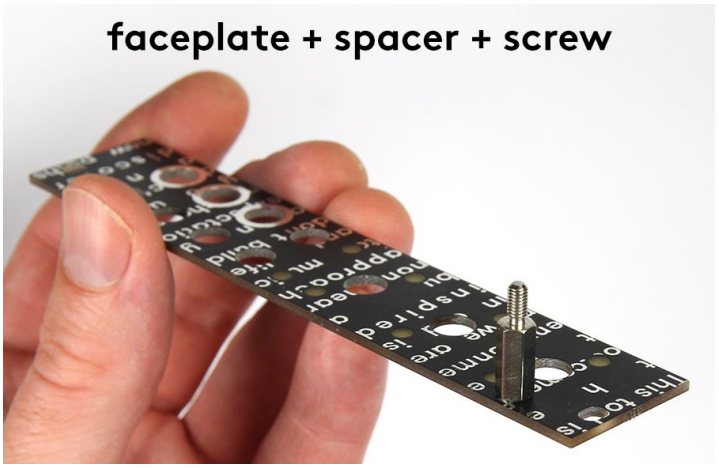
JACK CONNECTORS, POTENTIOMETERS & LEDS

You are almost done. Let's do the rest of the components by just putting them in first (**no soldering yet! It starts at point 7**):

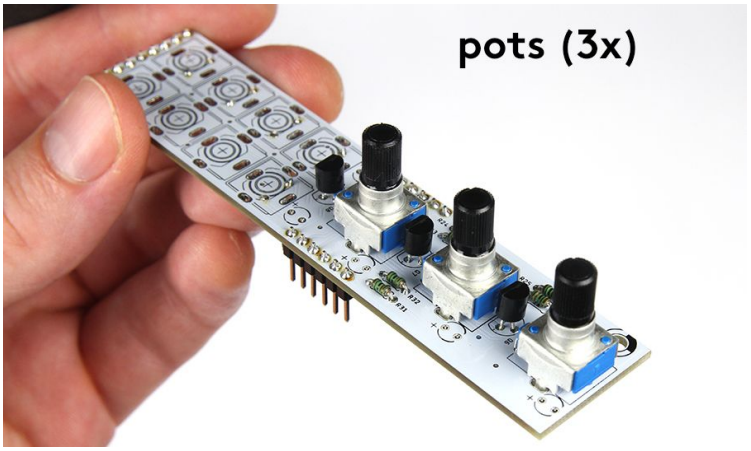
1) Unmount the top board. Unmount the spacers.



2) Mount the spacer (nut x screw) to the **faceplate** first.

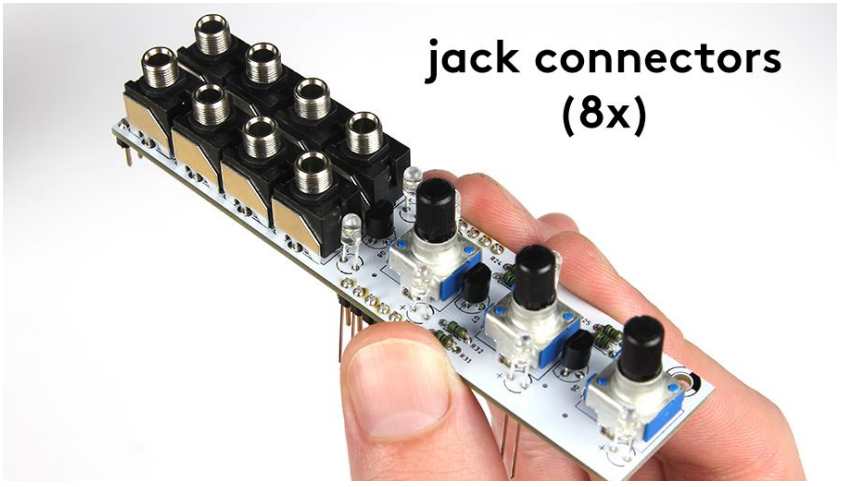


3) Insert the **potentiometers** (3x) on the board. Be sure they're placed in the right angle and they're right on the board.

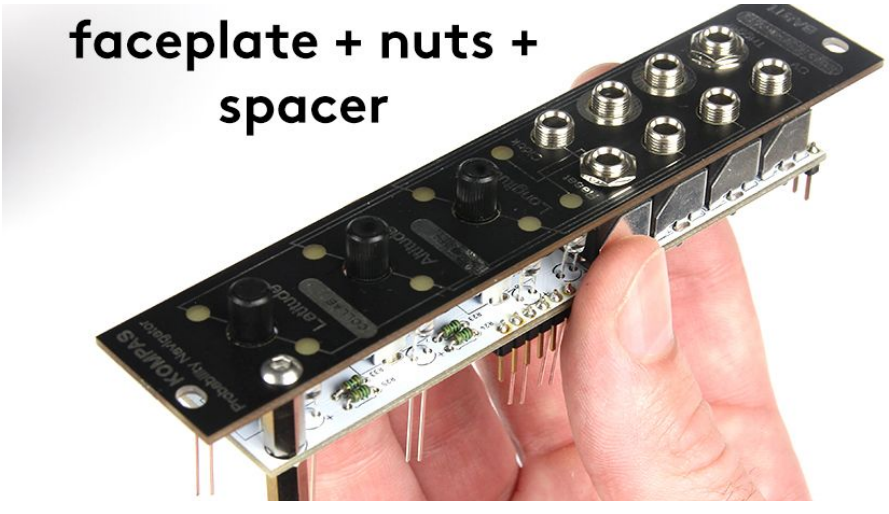


4) Insert the **white LEDs** - **watch out for orientation**! (the longer lead has to go into the plus (+) hole signed on PCB).

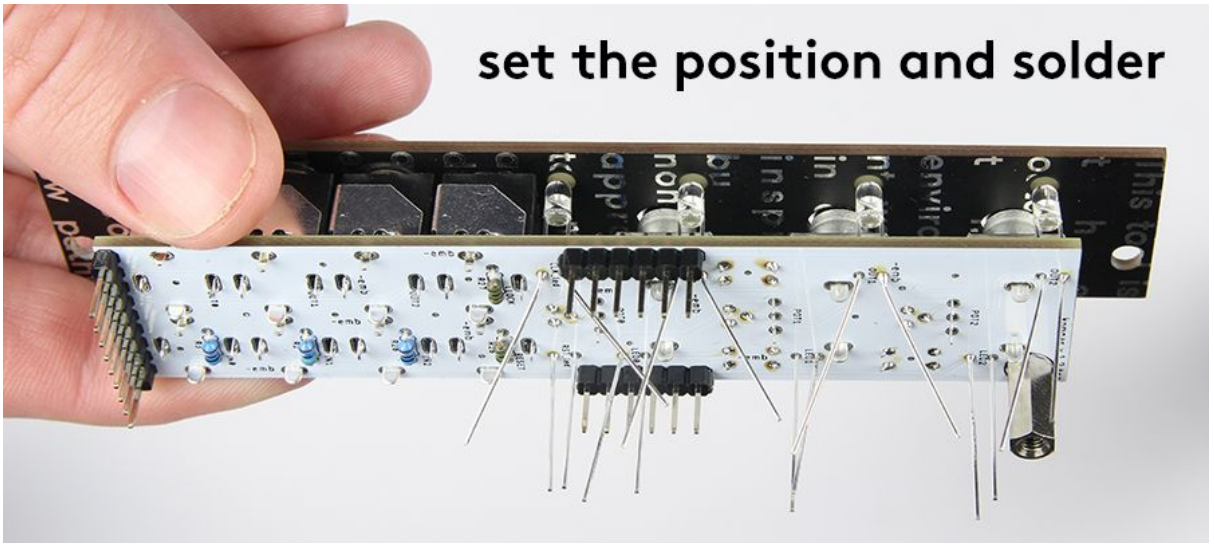
5) Insert **jack connectors** (8x).



6) Place the **faceplate** on and mount few jacks with **nuts.** Add the **spacer** too.

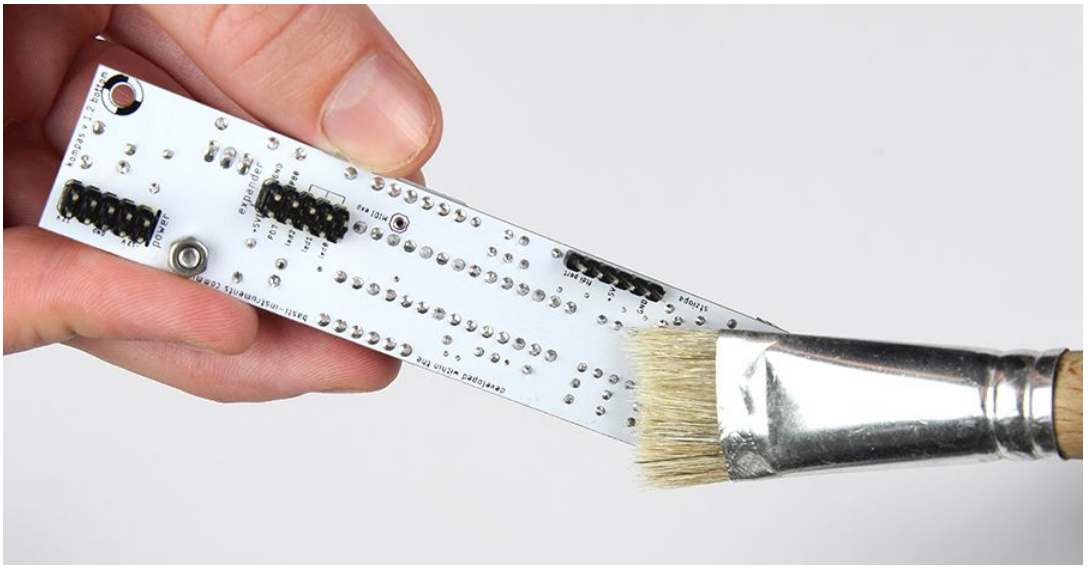


7) Check the position of all the parts if they are flat on the board and at the right angle, push the LEDs to the faceplate and do the soldering - for LEDs solder just one leg of each first, align them then to the faceplate. - LEDs (one leg) + pots + jacks
*(**SOLDERING TIP**: you can start by soldering just one of the leg at each component so you can make adjustments easier by reheating)*

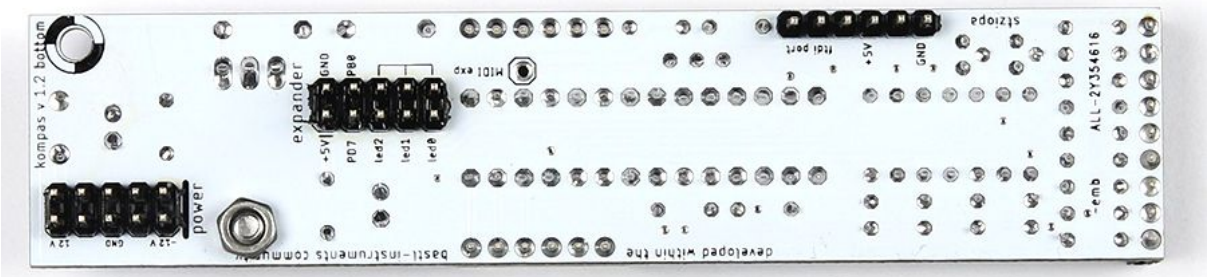


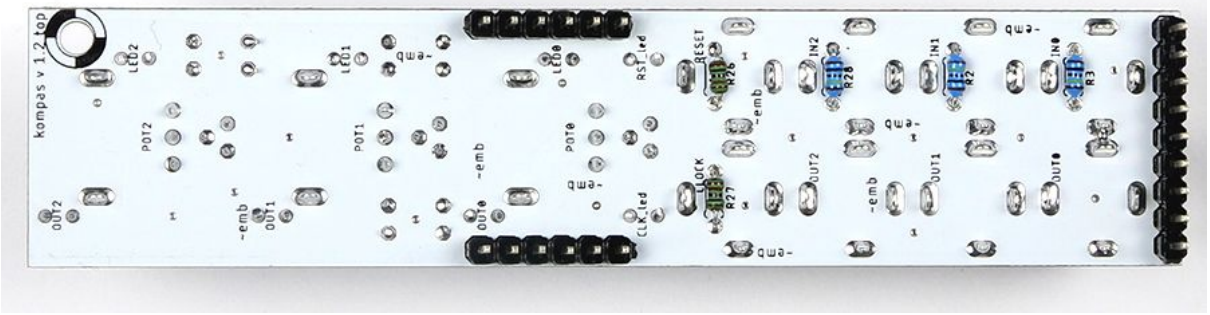
CLEANING (OPTIONAL) & FINAL CHECK

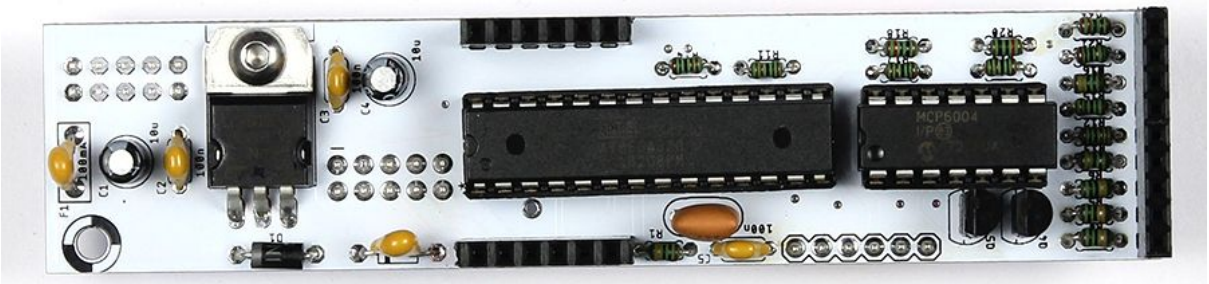
After the soldering is done you might want to **clean** your PCB. You can use e.g. isopropyl alcohol. Spread some of the liquid all over the PCB using the brush (be aware to not let it flow into the potentiometers!), let it act for a few seconds and sweep it off. Then just let it dry. You can repeat these steps until you are satisfied with the result.

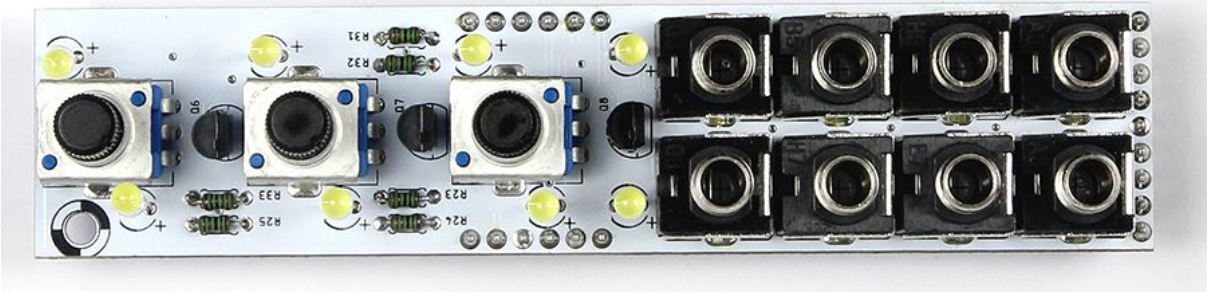


This is also a right time to check the boards if everything is placed and soldered properly.



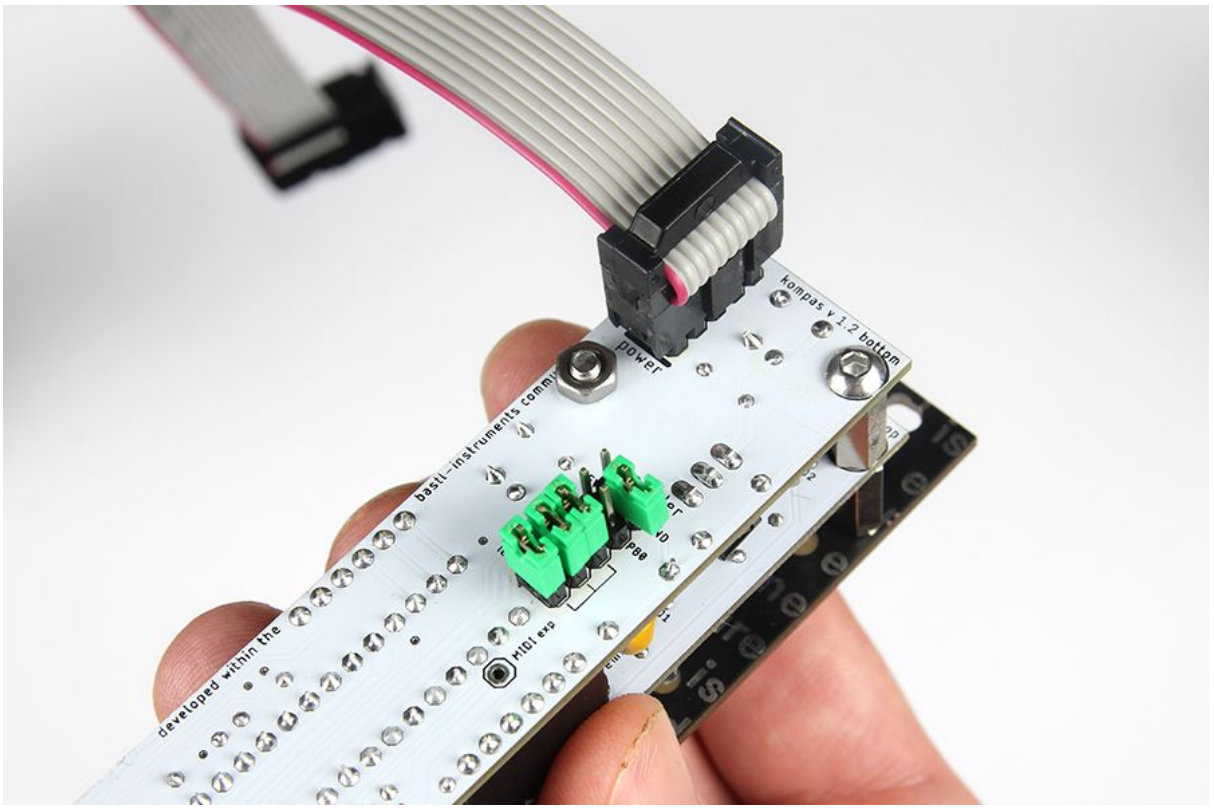






FINAL ASSEMBLY

Congratulations! You have made it through. Now just put the boards back together, put the **faceplate** on (secured by the screw and nuts with washers) and your KOMPAS is ready to work! Oh and don't forget to put the **knobs** and **jumpers** on (the *led0*, *led1*, *led2* positions; 4th jumper must be left unconnected for default operation - see picture).



Before you connect anything, make sure that your system is disconnected from power. Also double check the polarity of the ribbon cable, the red cable should match the -12V rail both on the module and on the bus board!

TROUBLESHOOTING

If you have any issues with the module, please check the F.A.Q. at our website first. You can reach us here: diy@bastl-instruments.com. We also provide service for the DIY stuff called Come to Daddy (available at https://noise.kitchen).