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BASTL
INSTRUMENTS

KASTLE v1.2 - Assembly Guide

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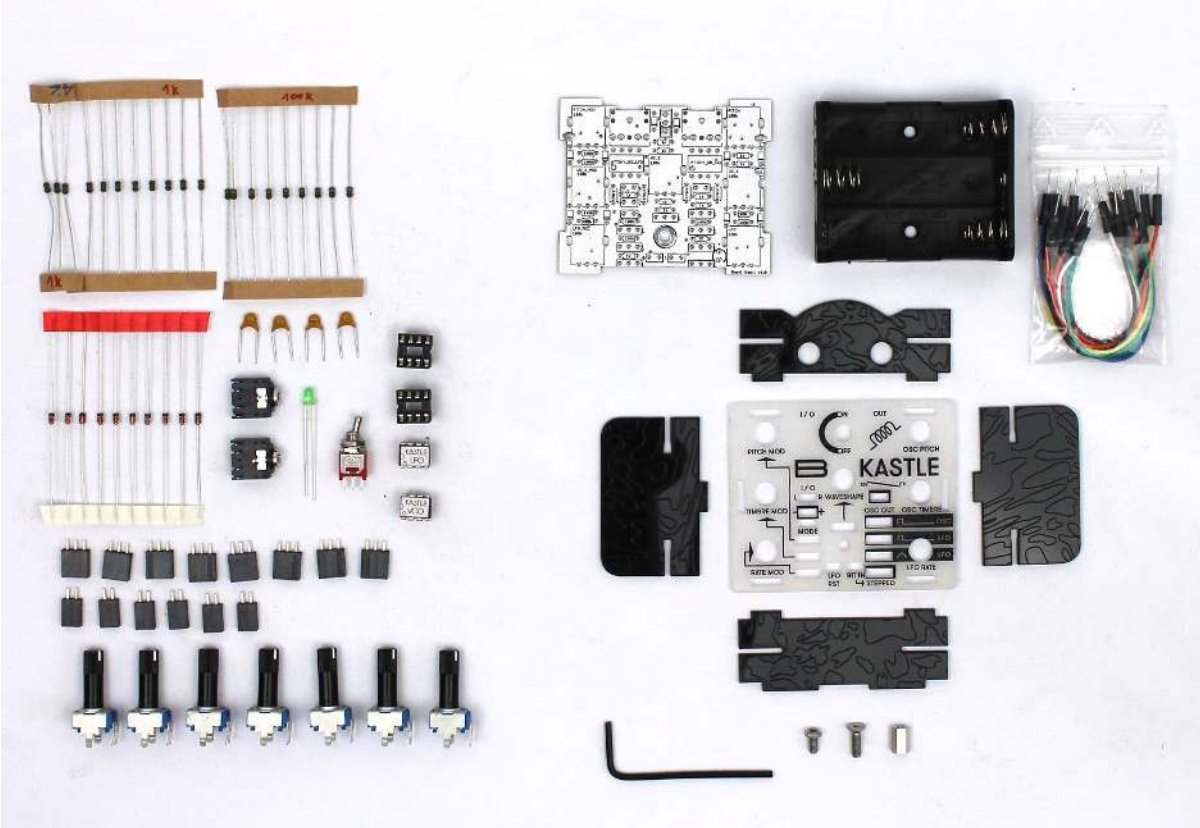
INTRODUCTION

Welcome to the assembly guide for the Kastle kit - mini modular synthesizer. It is suitable for beginners. 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 some of tutorials here or here. We also included some of the best quality solder to help you solder everything faster and better.

The Kastle kit consists of just one PCB. All the parts comes in two bags separated for the soldering and assembly parts. Please check all of your parts BEFORE you begin work to make sure you are not missing anything. See the bill of materials for detailed list.

BILL OF MATERIALS

qty	value	part
11	1k	R-EU_0204/5
9	100k	R-EU_0204/5
4	470nF	ceramic capacitor
10	Zener diode 5V1	DIODE-D-7.5
2	jack TRS 3.5mm	audio connector
7	B100k	POT LIN
1	difuse green 3mm	LED
1	SPDT TOGGLE	SWITCH 2PP
6	1x2pin	female pinheader
8	1x3pin	female pinheader
2	8 pin DIL	DIL socket - in foam
1	attiny 85 pre-programmed VCO	IC in foam
1	attiny 85 pre-programmed LFO	IC in foam
1	Kastle 1.0	PCB
1	BH-331-3D	1.5V BATTERY HOLDER
1	8mm nut x nut	spacer
1	10mm	screw
1	6mm	screw
1	top	plastic case
2	side	plastic case
1	front	plastic case
1	back	plastic case
10		jumper cables
1		allen key



BEFORE STARTING THE KIT...

Prepare the following tools:

- Soldering iron (15-20W)
- Flush cutters
- n2. hex screwdriver or allen key (enclosed with kit)
- Needlenose pliers
- Protective eyewear

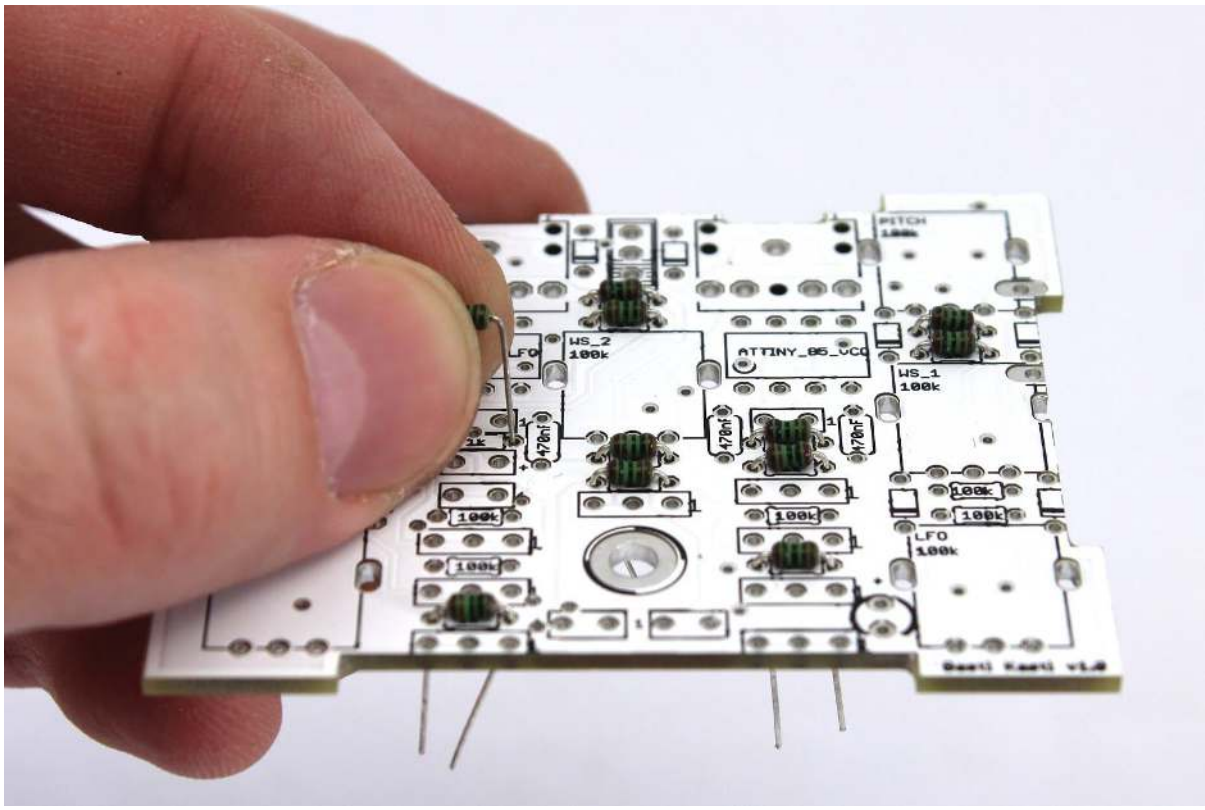
We suggest to work in a clean and a well lit and ventilated environment to avoid accidents or losing any of the small components.

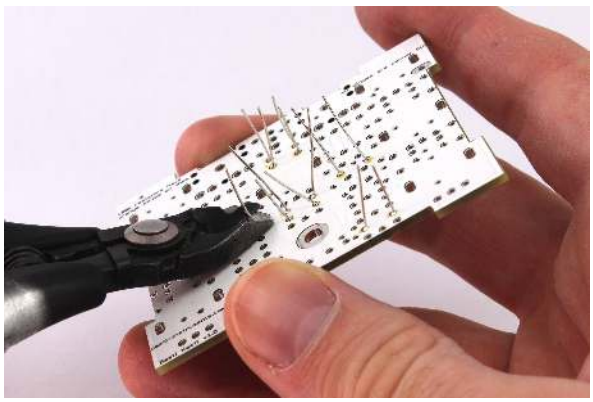
Also briefly go through this guide and make sure that you understand all the steps.

SOLDERING

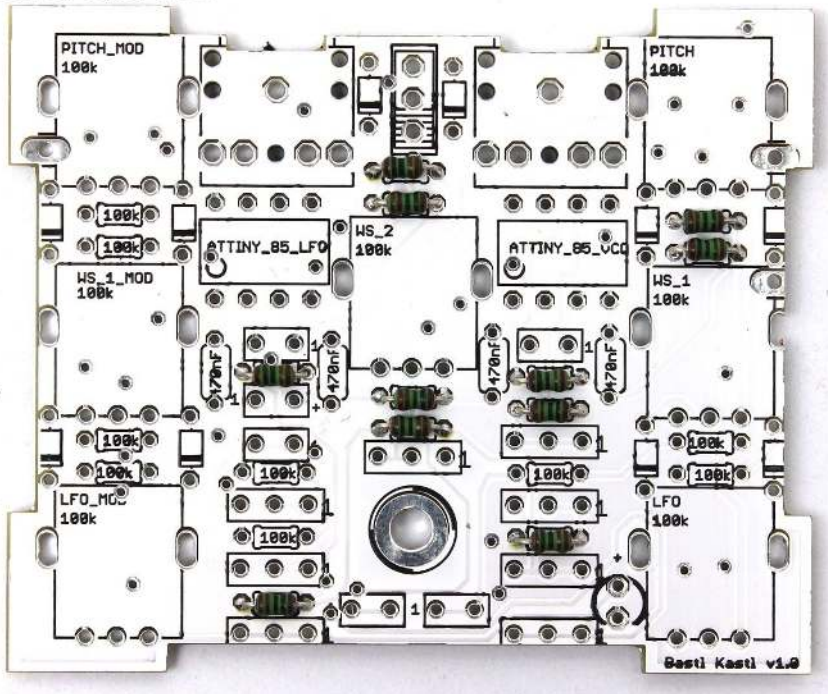
Start the soldering with the **resistors**. There are just **two values** of them: **1k** (11x) and **100k** (9x). Before you will start soldering, check the values by using a multimeter[1] or you can check the color codes - the 100k's have the **orange stripe**. Then snip the leads close to the PCB (be sure to make this step on all remaining leads in the course of this guide) and **set aside a few of them**. You will use them later. Solder also the **Zener diodes** (10x) - **be careful, diodes are polarized!** Make sure that the black stripe on the diode matches the stripe on the PCB. See the photos below for all these steps.

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

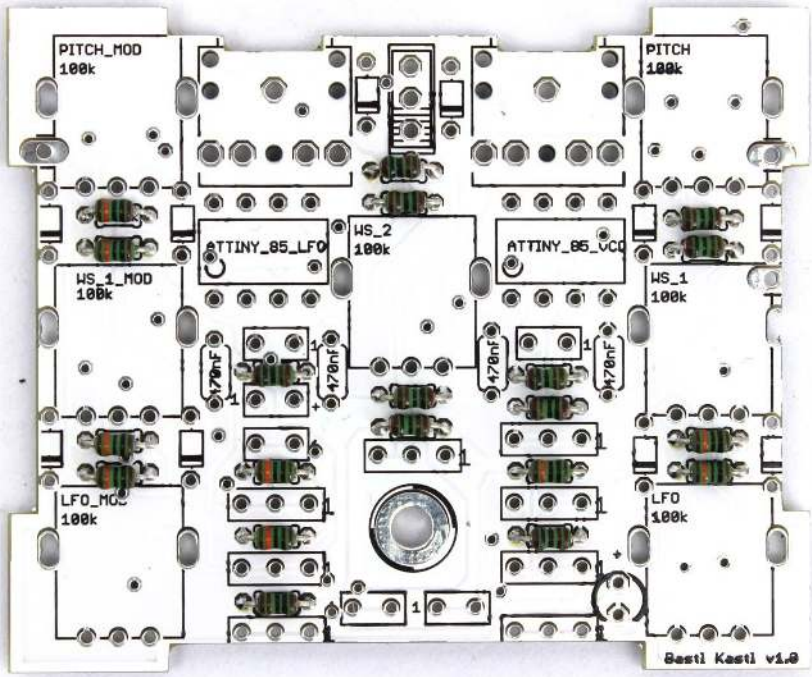

PITCH
100k
LFO
WS_2
100k
ATTINY_85_VCC
WS_1
100k
470nf
470nf
470nf
100k
100k
100k
100k
LFO
100k

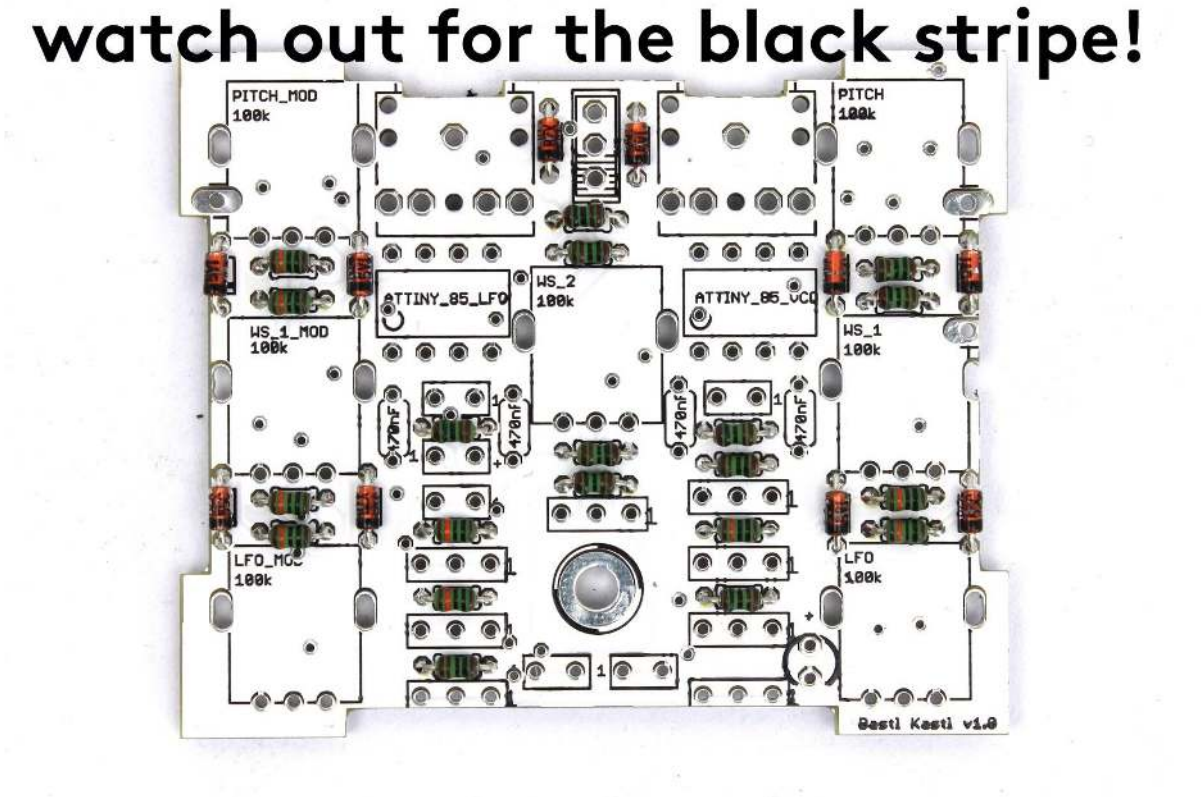


1k resistors

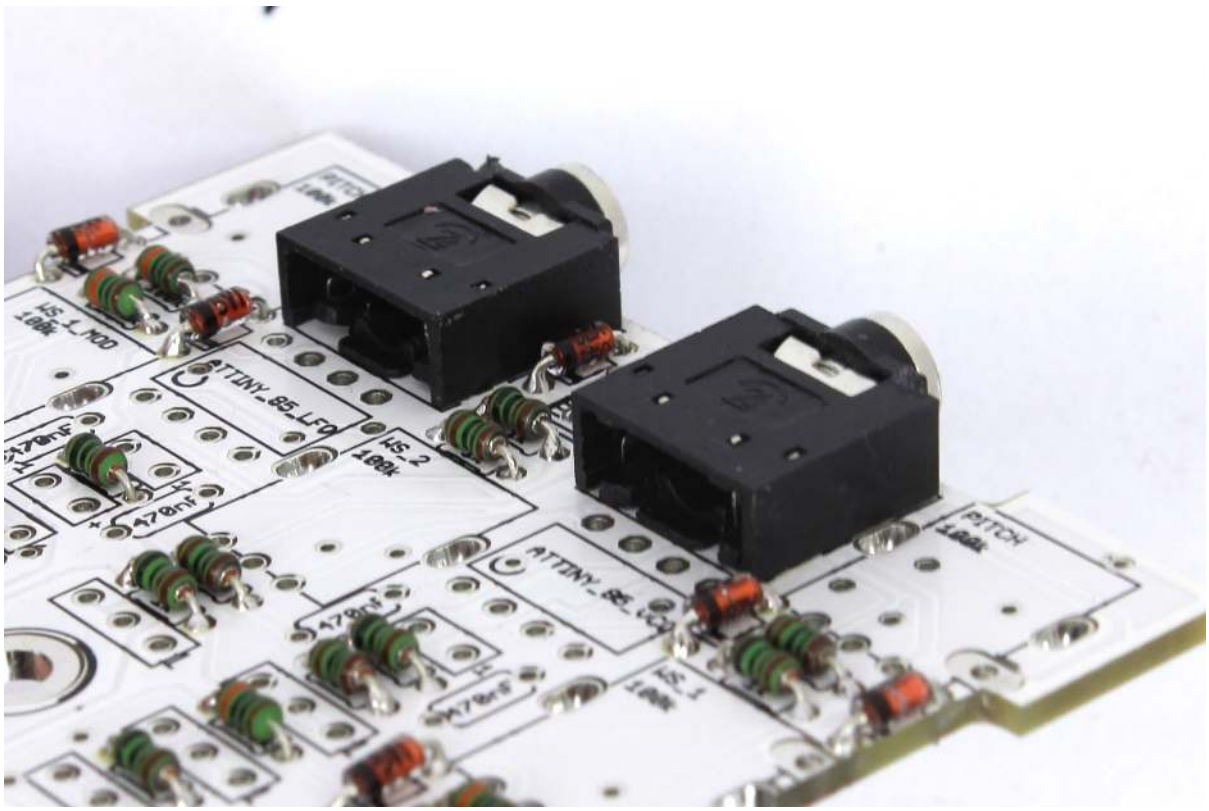


1k + 100k resistors

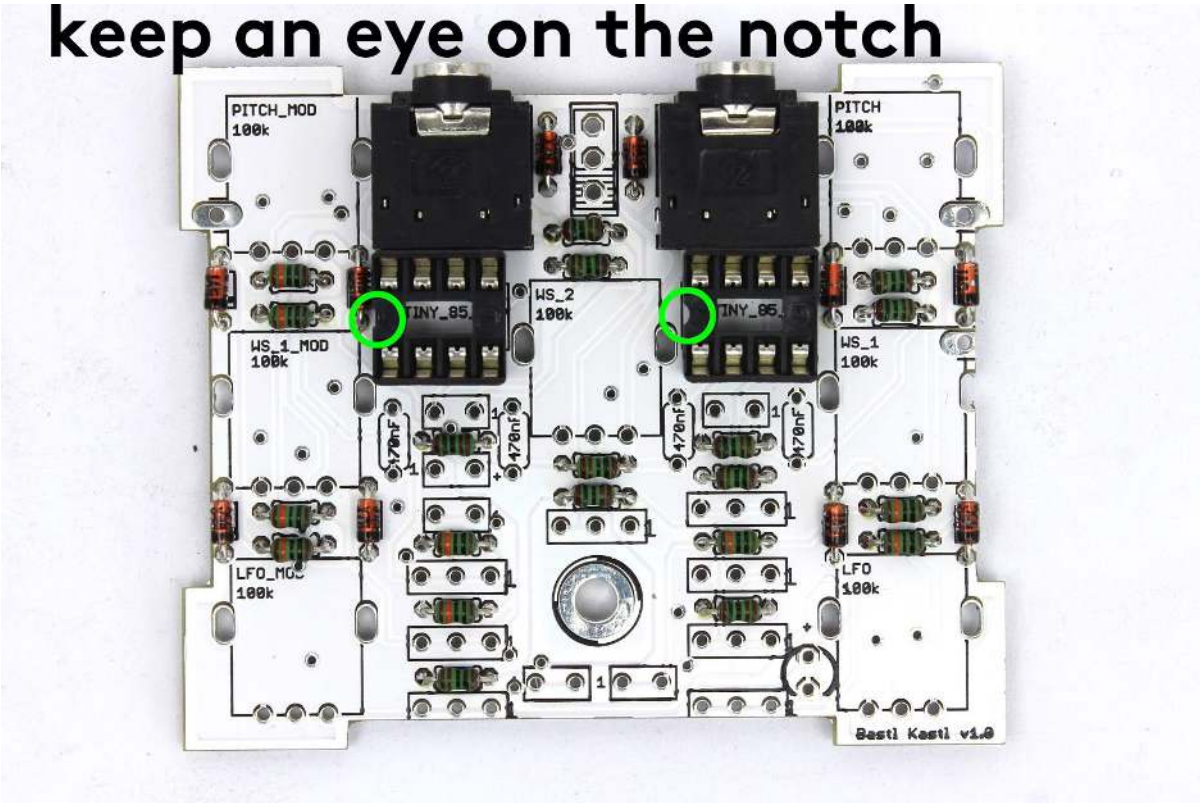




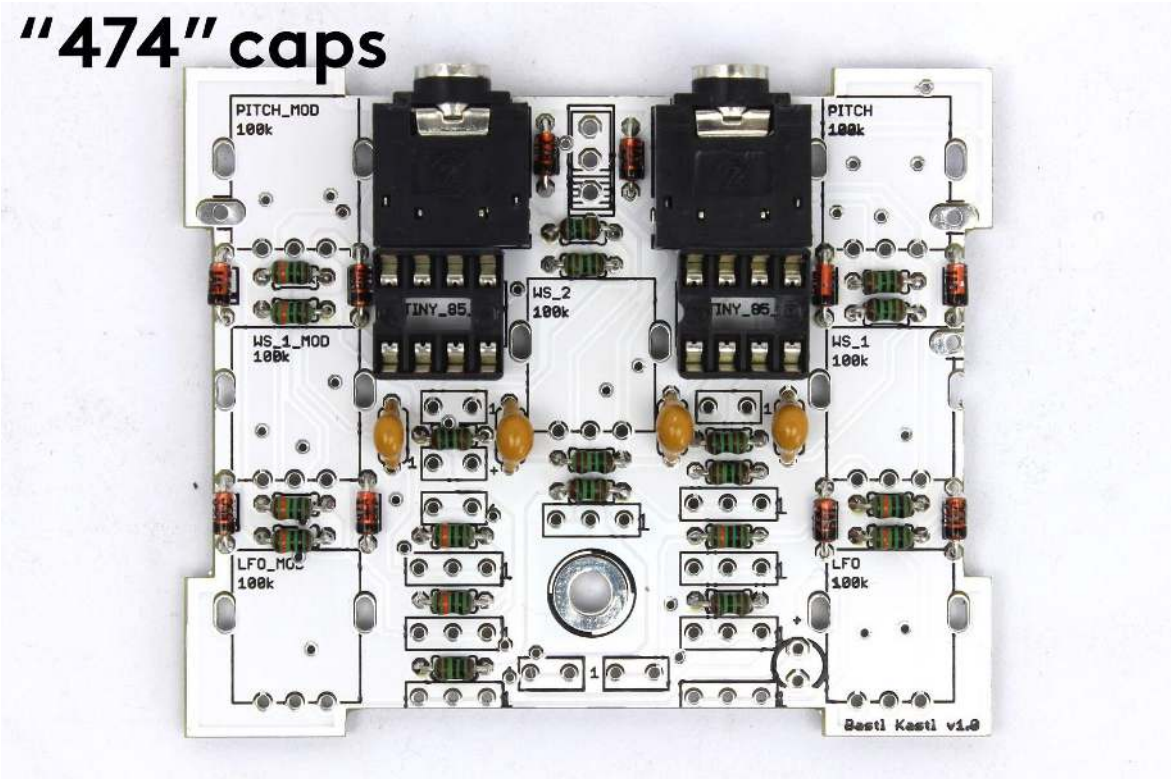
Add the **3,5mm jack connectors** (2x).



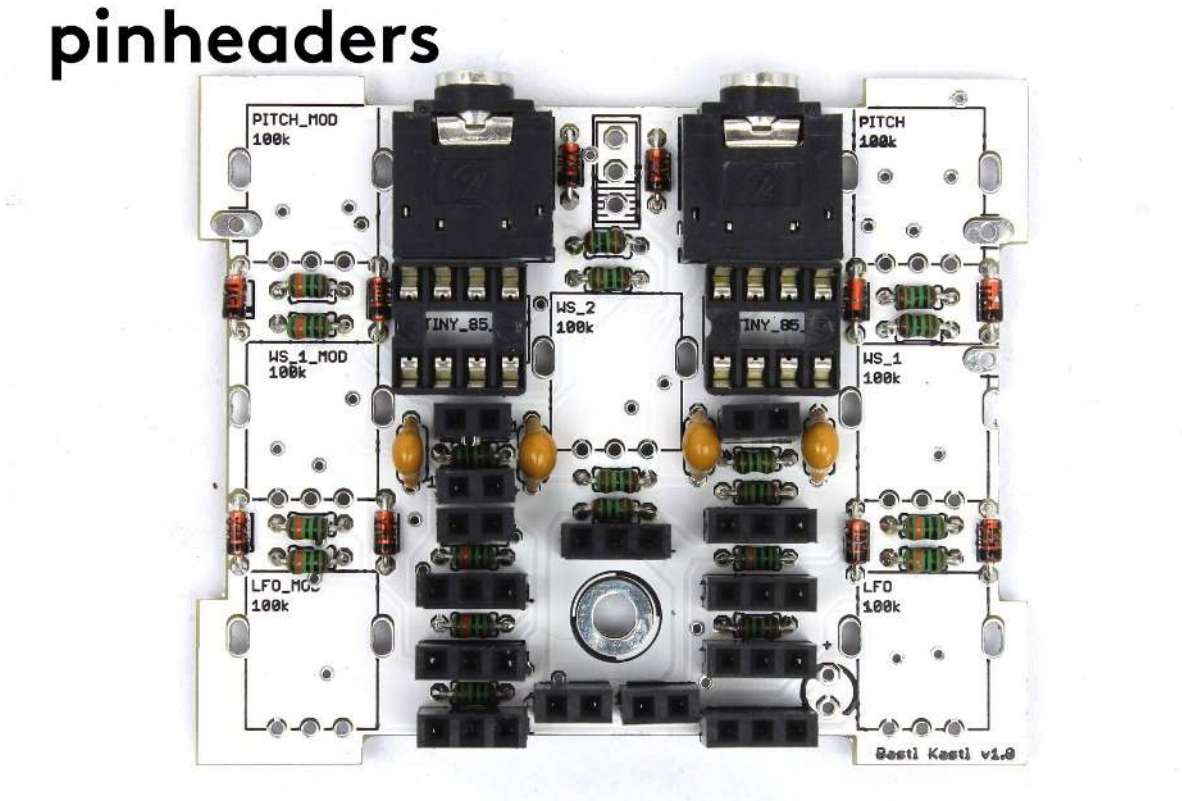
Insert the **IC sockets** (2x; 8 pin DIL). Just be aware of the **right direction of sockets** - there is a notch on the sockets that has to match with the ring on the PCB.



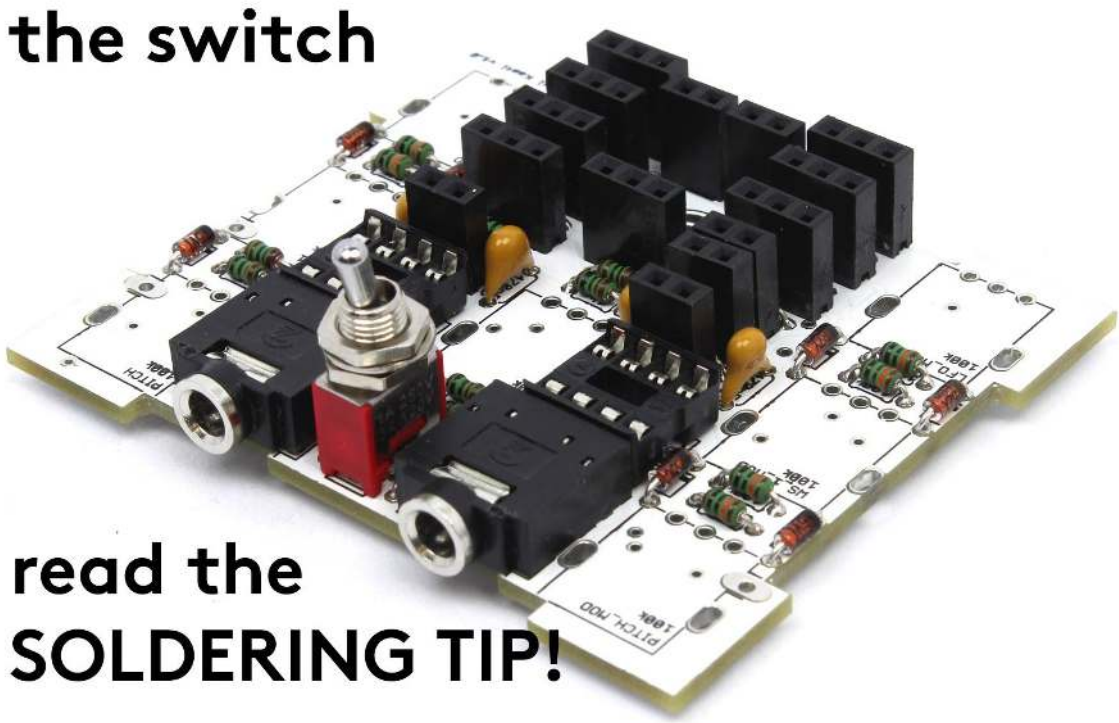
Add the **ceramic capacitors** now. There are just four of them of the same value - 470nF (they are marked "474" on itself).



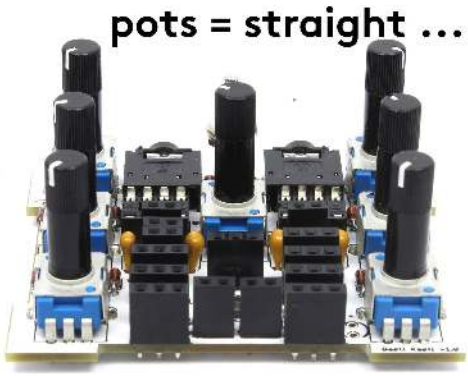
Now let's do the **female pinheaders**: **2 pin** ones (6x) and **3 pin** ones (8x). It may take a little patience to insert them well. Be sure to solder them straight.

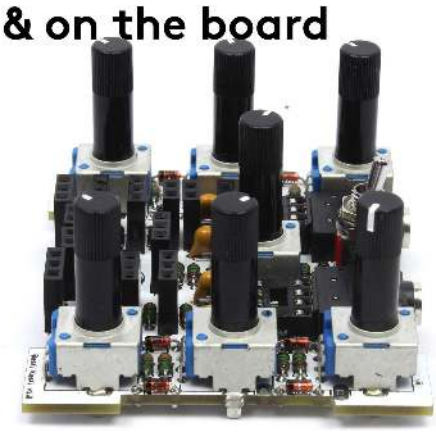


Go for the **switch** now. This may be one of the parts that is a little tricky to solder. Here is **the SOLDERING TIP**: start with soldering just ONE solder point of the part. Check the part to see if it is in straight. If there is a problem simply melt the solder and reposition the part.

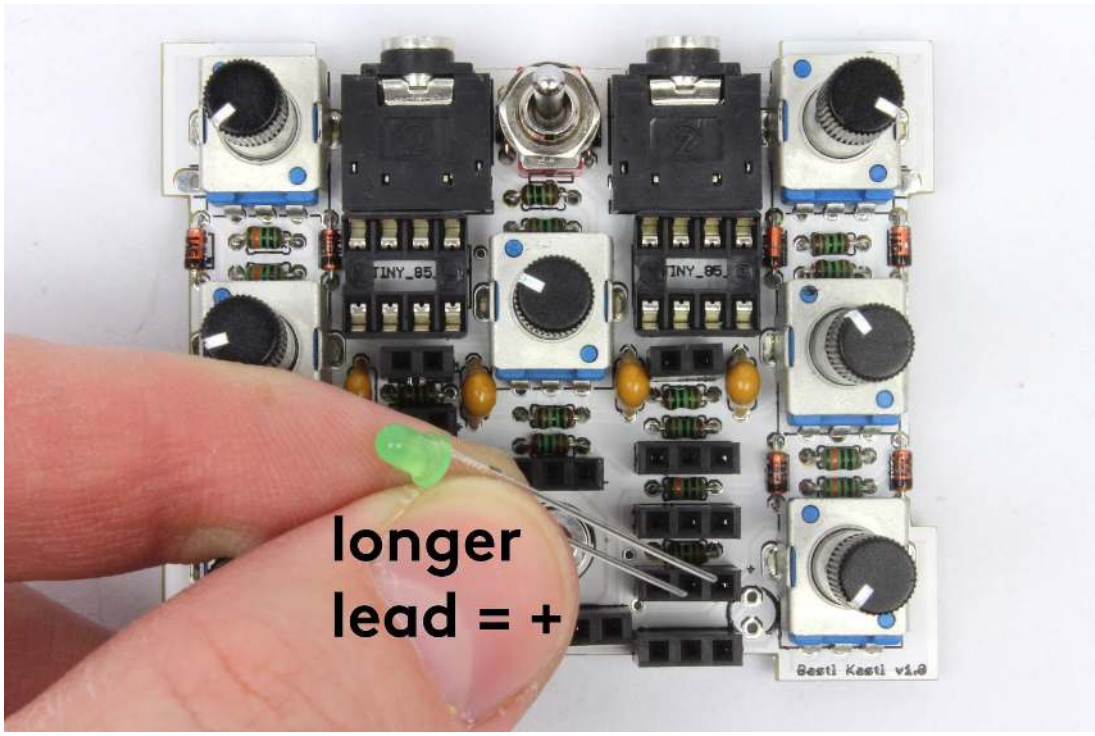


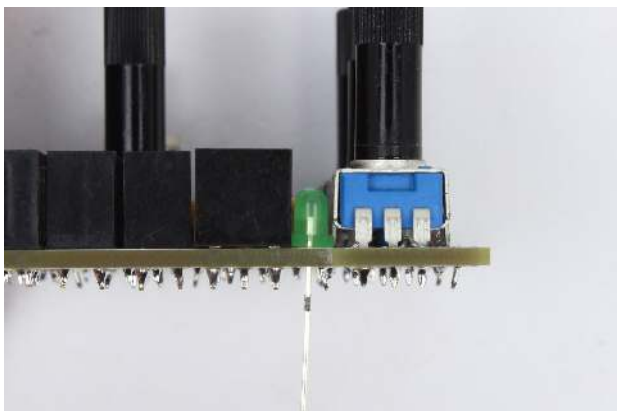
Next move to soldering of **potentiometers** (B100k). Proceed the same way as with the switch: install potentiometers in straight, solder just one leg, check the position and solder the rest if there is no problem.



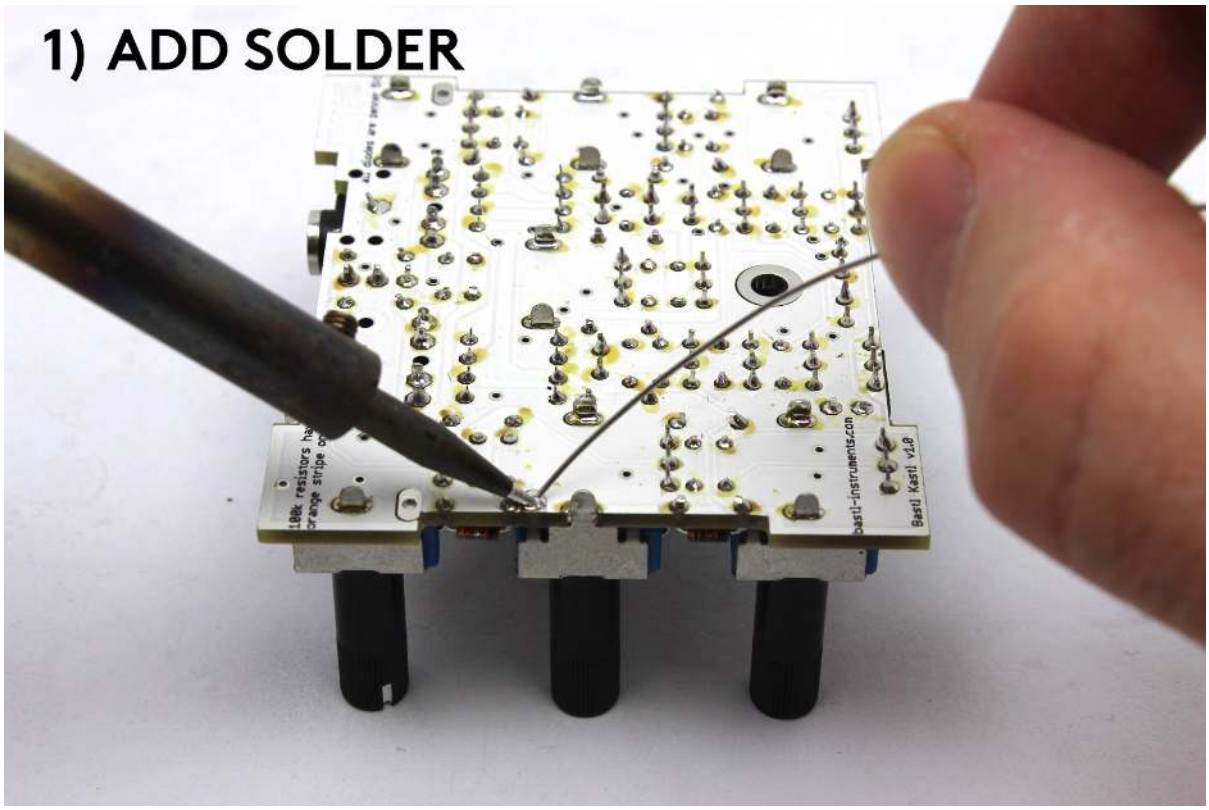


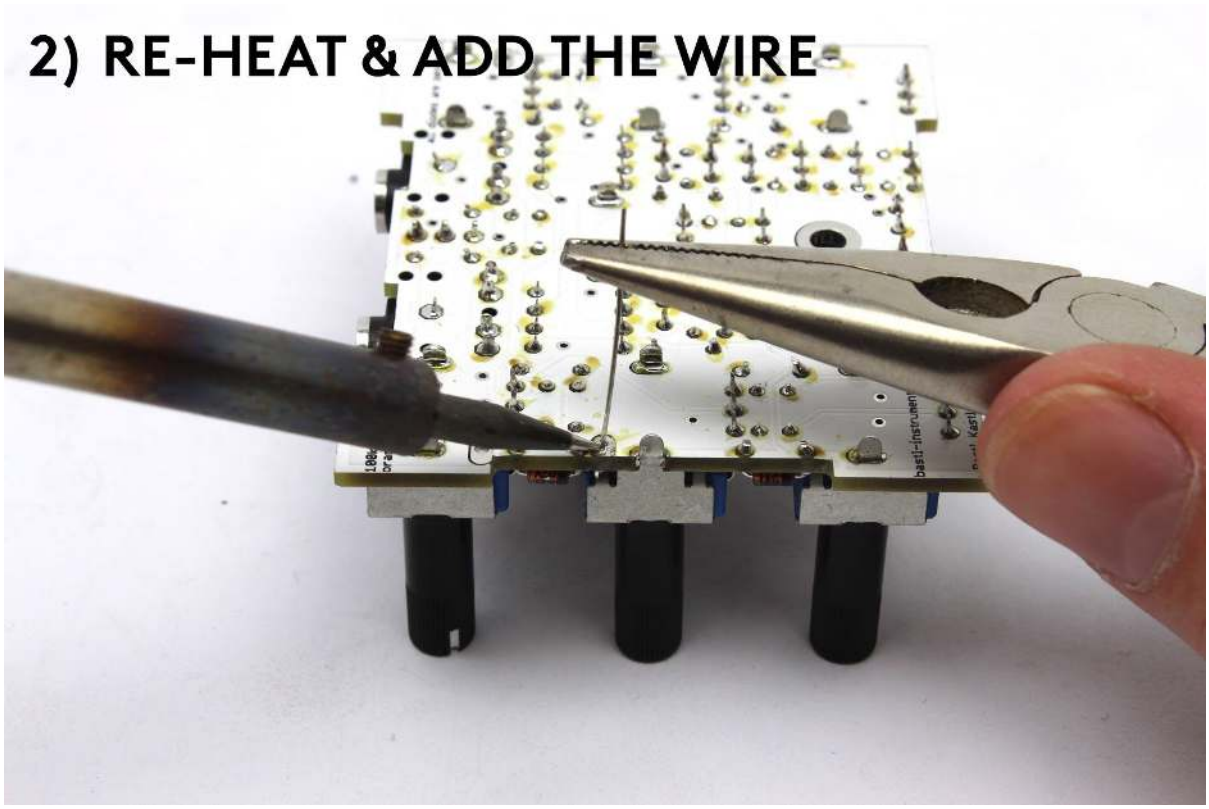
Solder the green **LED** - be sure to insert the longer lead into the plus (+) hole. Push the LED down to the PCB.



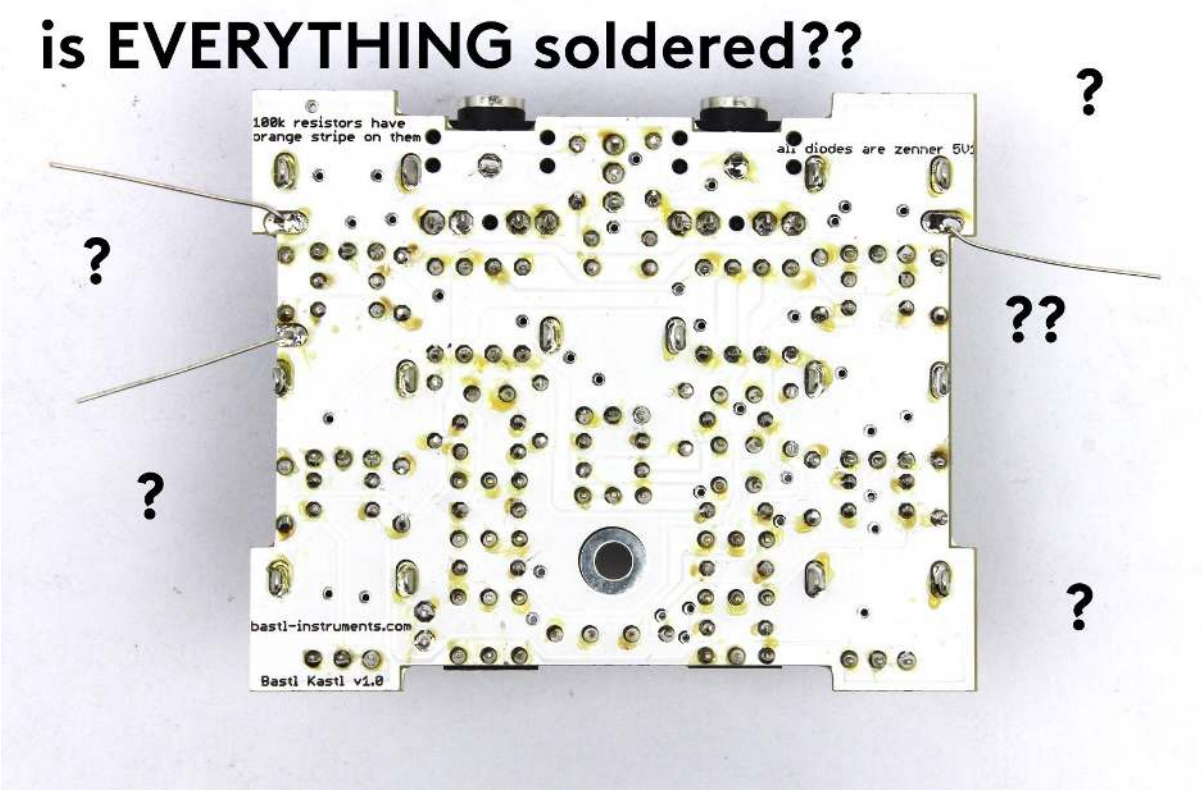


You will need the cutted leads from resistors now. Turn the PCB around and give a little bit iron into the remaining "**HOLD**", "**BAT_-**" and "**BAT_+**" holes. Re-heat them and insert the leads using needlenose pliers. The leads can not be connected with the potentiometers on the other side.

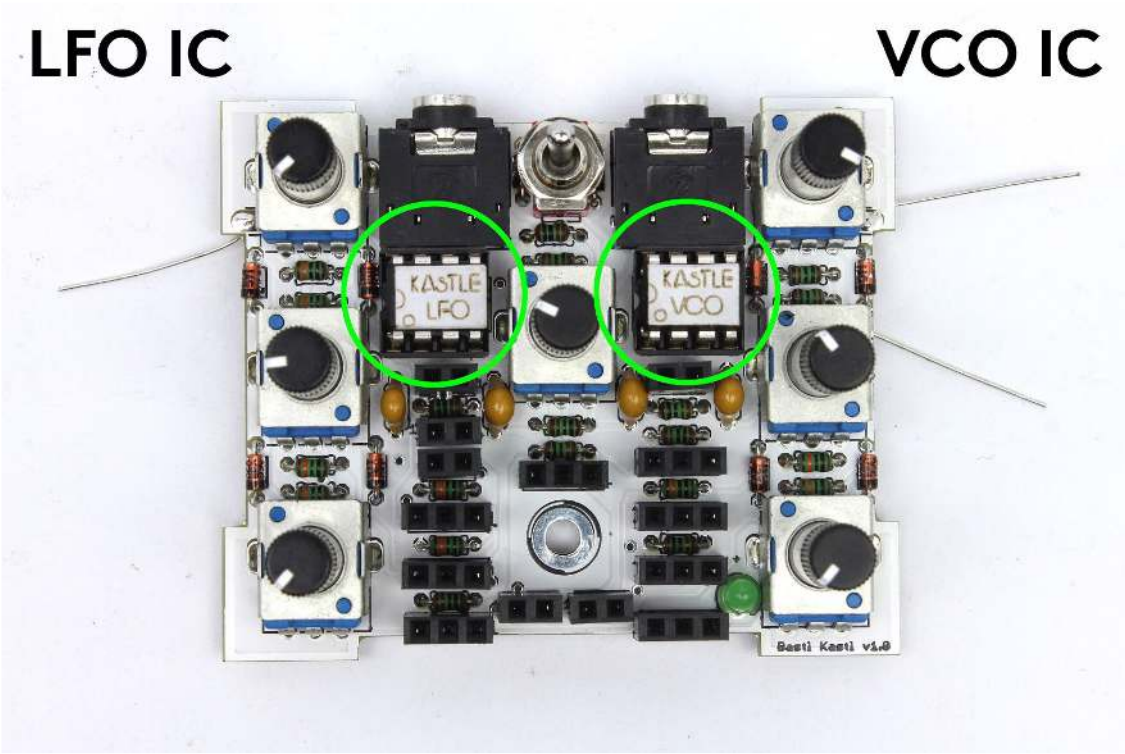




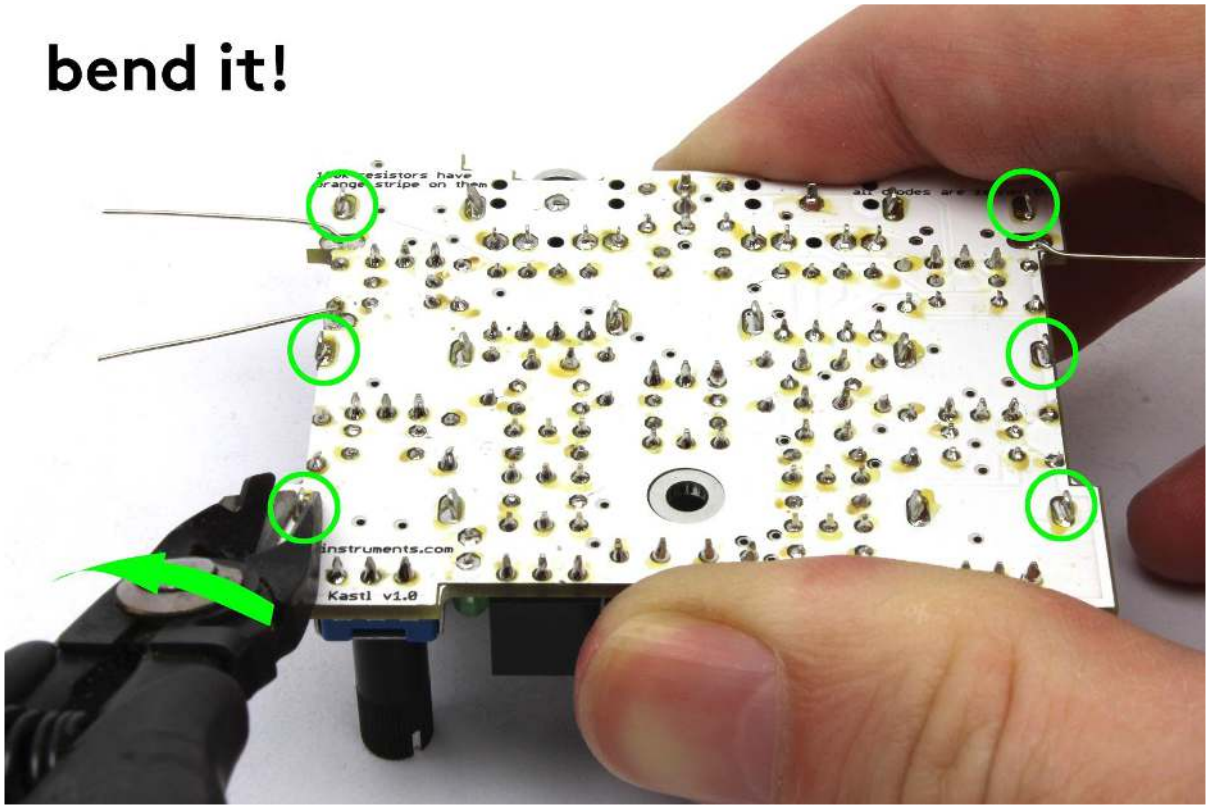
Take your time now and relax for a while. Then do the last **double check of all soldered joints at this point**. After next steps it would be **MUCH HARDER** to do any repairment.



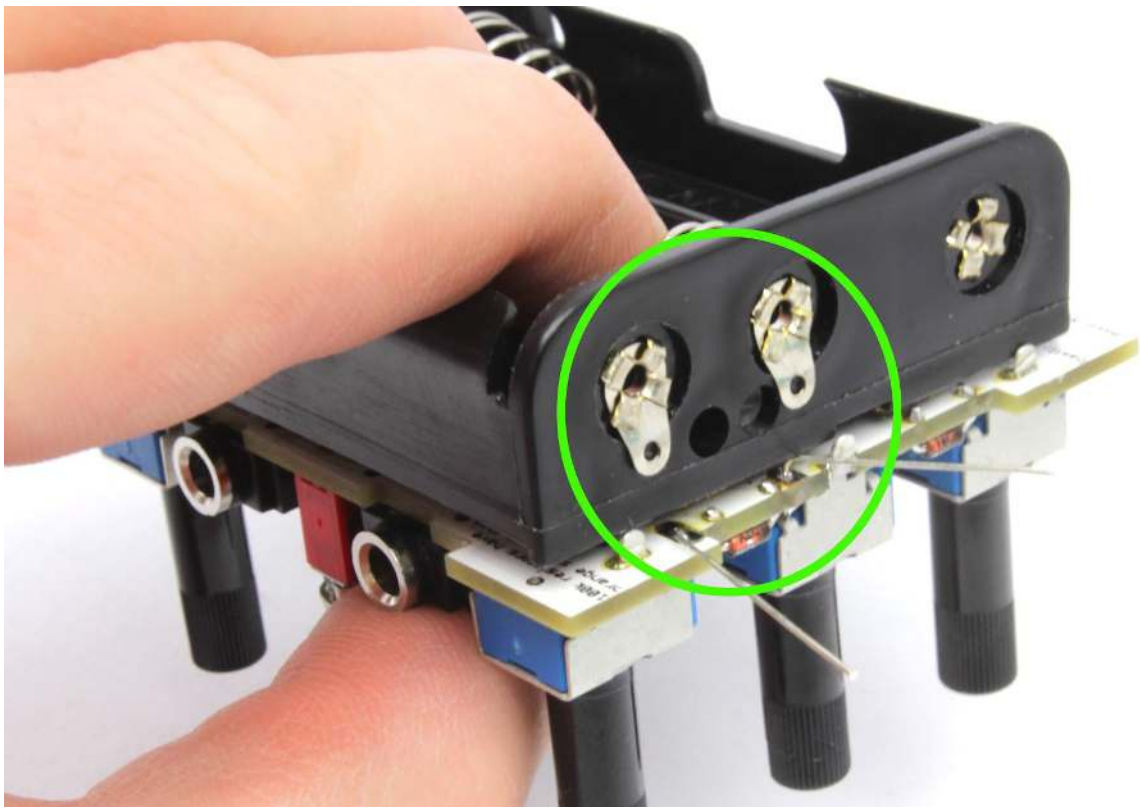
Don't forget to place the **ICs** into the sockets (2x; Attiny85). There is a signed **notch on each IC** that has to match with the **notch on the socket**. Be also aware that LFO goes to the socket on the left and VCO to the right one. Installing ICs can be also a little tricky. You should bend the IC leads in slightly with your fingers. Then press all the leads into the sockets in one shot.



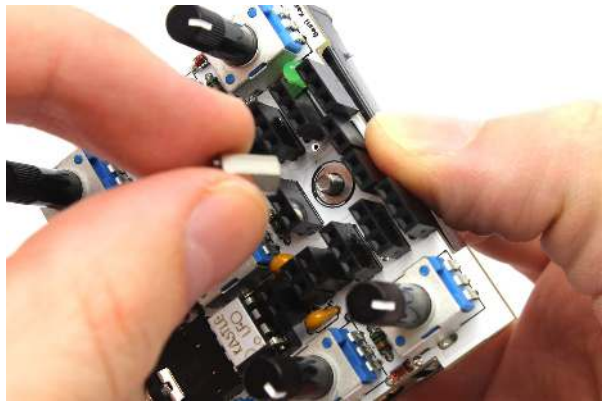
Bend the potentiometers legs on the edge of the PCB outwards (see the photo).



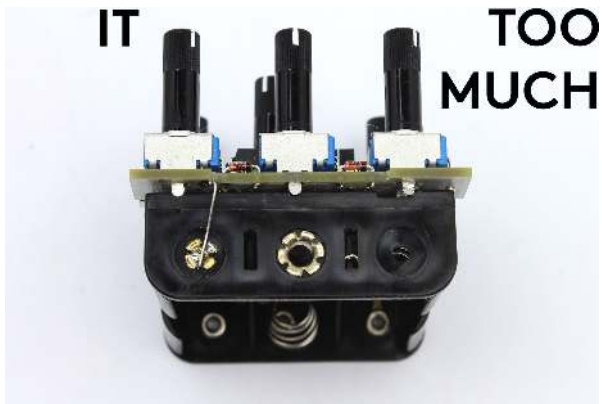
Now place the **battery holder** to the PCB. Watch out for the **orientation**!



Mount the holder with **spacer** and the longer **screw**. It may be a little tricky. Don't tighten the screw too much because you are dealing with plastic material, you know.

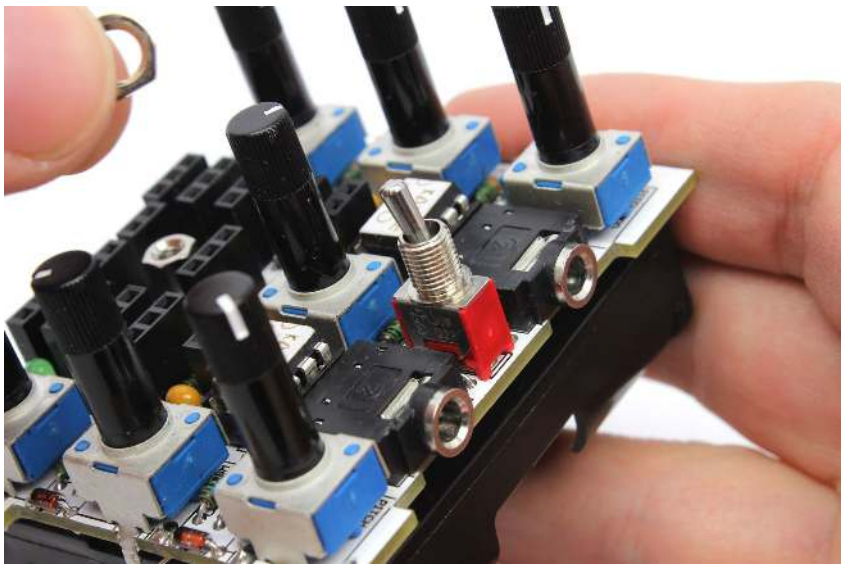


And now the last soldering challenge! You have to connect the leads with the lugs. **Do not let the lug heat too much!** (it would break the connection of the coil and the lug) Use just the tip of your soldering iron.

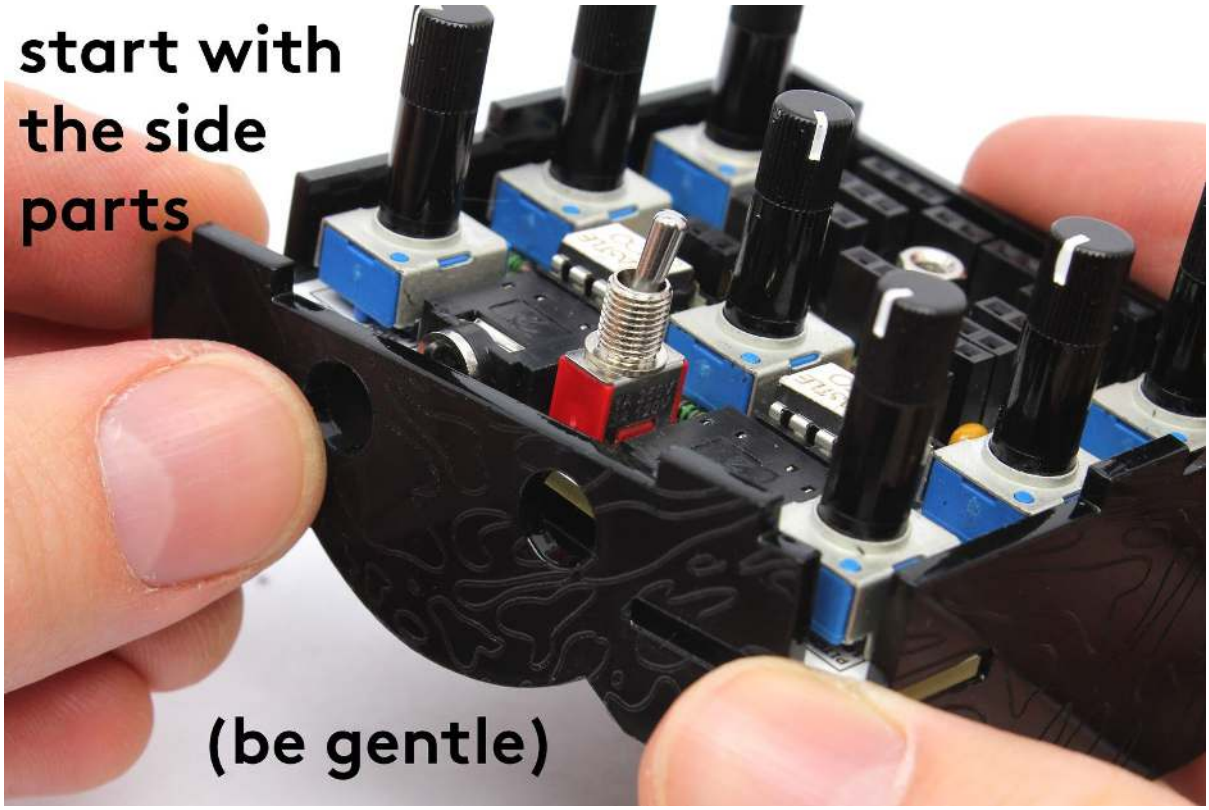


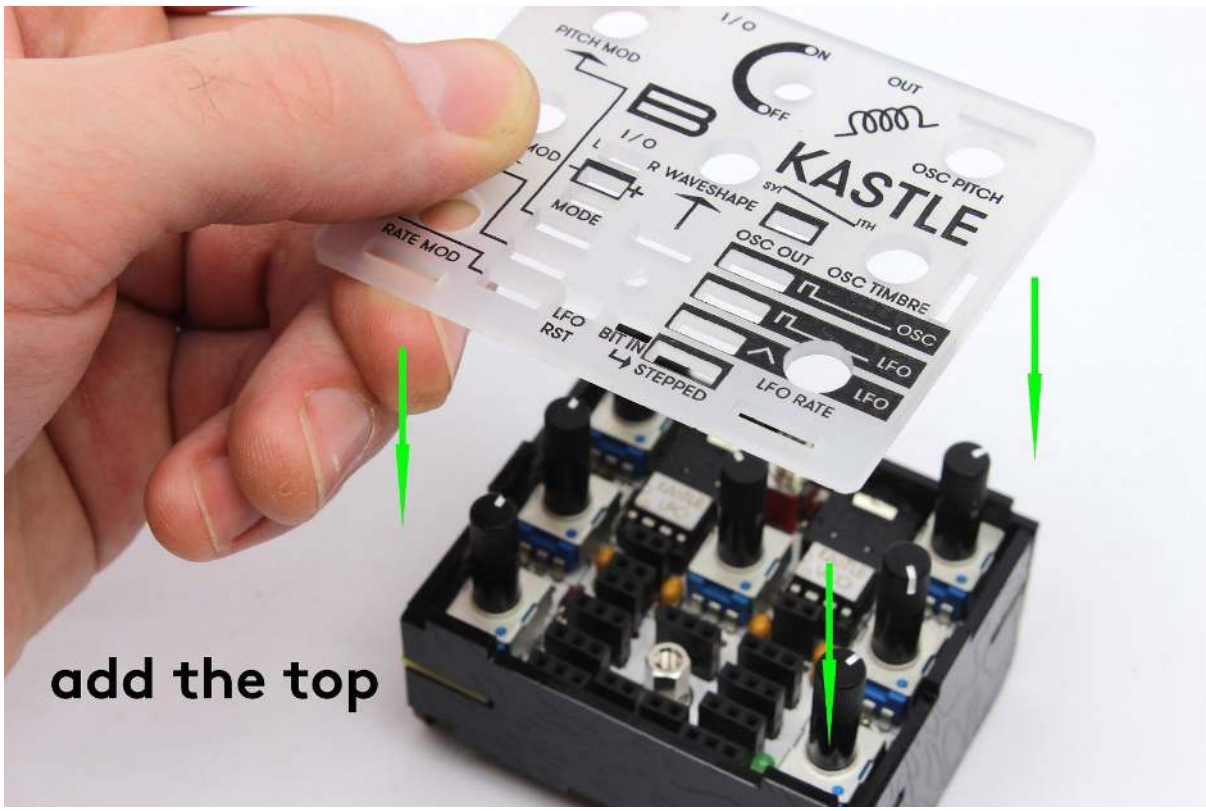
YOU ARE ALMOST DONE...

Unmount the washer and nuts from the switch. Keep them aside.



Now you can complete the Kastle with the plastic case parts. Start with the **side parts** (push them just in the corners). Finish it with the **top cover**, mounting the **nut** (to the switch) and **screw**. Again, please be gentle, you should not use too much power to put the parts together.






I/O
ON
OFF
PITCH MOD
OSC PITCH
I/O
L
R WAVESHAPE
KASTLE
RATE MOD
OSC OUT
OSC TIMBRE
OSC
LFO
LFO
LFO RATE
LFO
RST
BIT IN
STEPPED
gently...


I/O
ON
OUT
PITCH MOD
OFF
OSC PITCH
KASTLE
I/O
L
R WAVESHAPE
TIMBRE MOD
OSC OUT
OSC TIMBRE
MODE
OSC
LFO
LFO
RATE MOD
LFO RATE

Here it is, your Kastle is finally completely alive! Congratulations!

TROUBLESHOOTING

Check the F.A.Q.[2] on our website first. If you are still in trouble the best thing is to take a nap! Especially late at night! Then you can can send the detailed description of the problem with enclosed high-resolution photos on diy@bastl-instruments.com. Consider our "Come to Daddy" service if you think that you are unable to make the instrument work on your own.

[2] http://www.bastl-instruments.com/diy-kits-f-a-q/