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BASTL
INSTRUMENTS

KASTLE v1.5b - Assembly Guide

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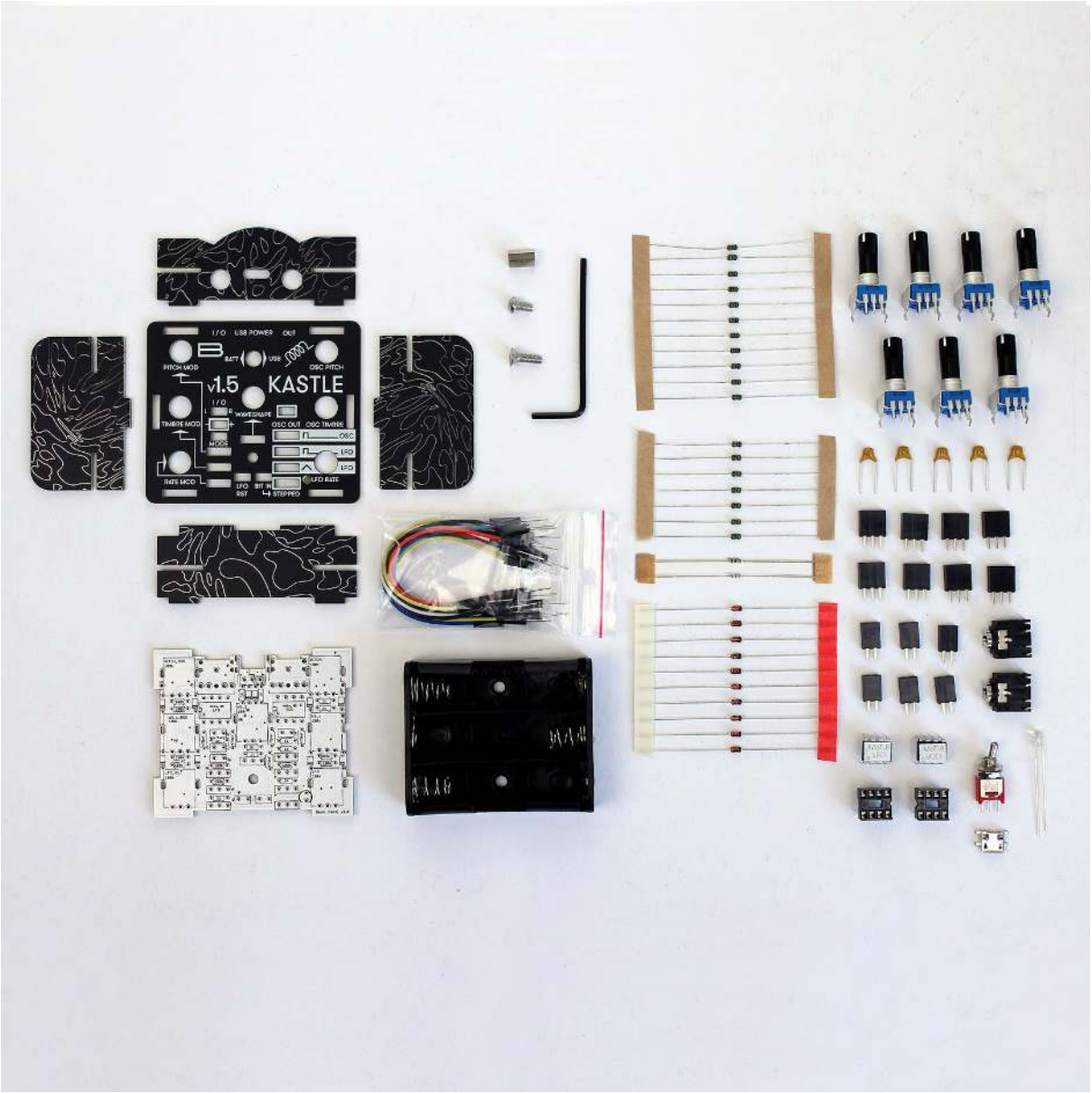
INTRODUCTION

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

KASTLE v1.5b BILL OF MATERIALS		
qty	**value**	**part**
11	1k	R-EU_0204/5
7	100k	R-EU_0204/5
2	220k	R-EU_0204/5
5	470nF	ceramic capacitor
10	Zener diode 5V1	DIODE-D-7.5
2	jack TRS 3.5mm	audio connector
7	B100k 25mm W	POT LIN
1	difuse white 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		USB micro 2.0 connector
1	Kastle 1.5	PCB
1	BH-331-3D	1.5V BATTERY HOLDER
1	8,4 mm nut x nut	spacer
1	10mm	screw
1	6mm	screw
1	top	enclosure
2	side	enclosure
1	front	enclosure
1	back	enclosure
10		jumper cables
1		allen key



BEFORE STARTING THE KIT...

Prepare the following tools:

- Soldering iron
- 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.

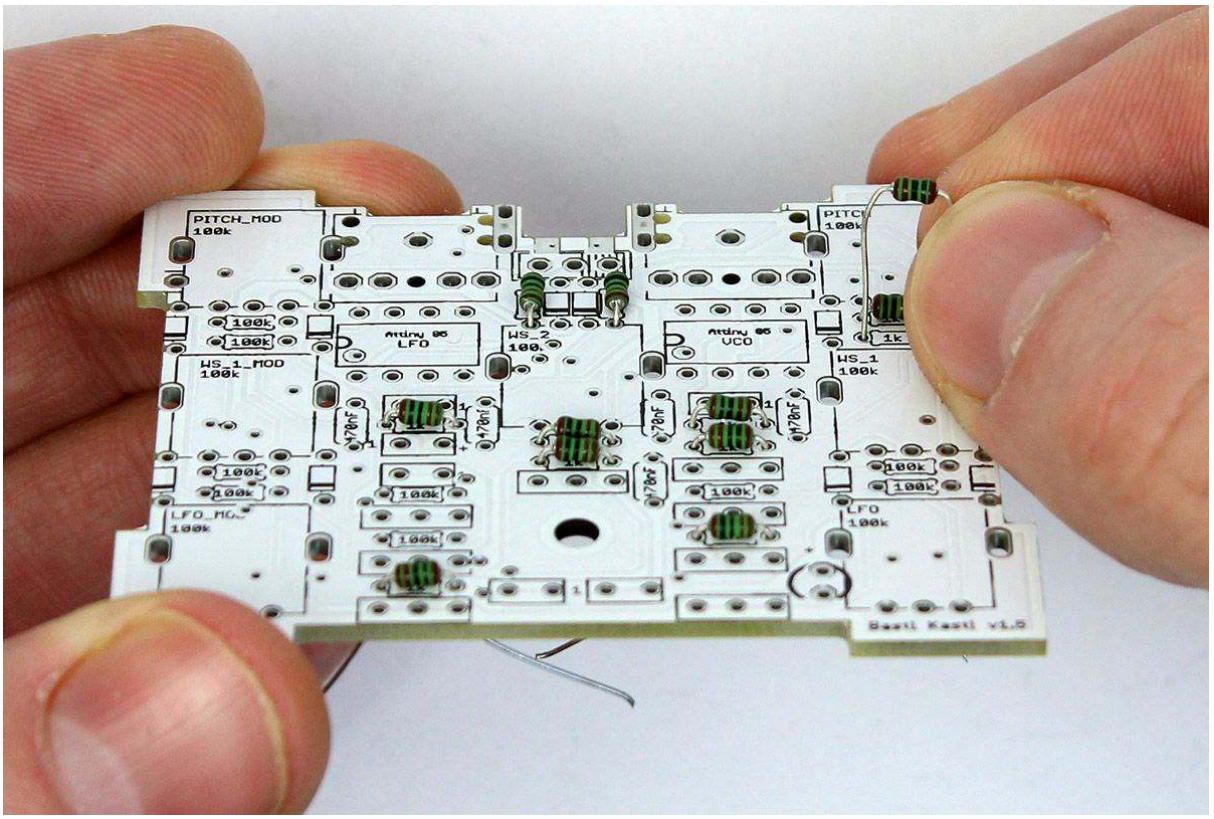
Also briefly go through this guide and make sure that you understand all the steps.

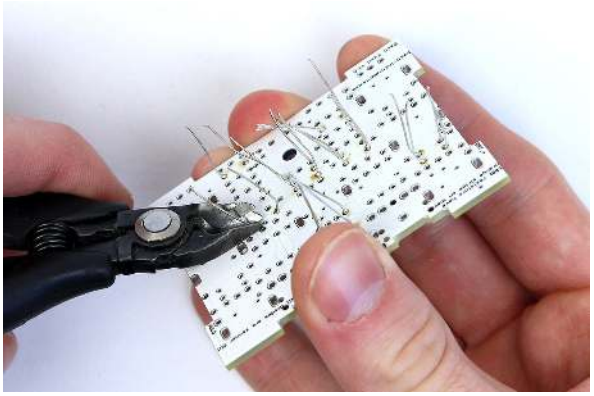
Version 1.5 Note: There is a little upgrade in this version (1.5b) in compare to the original one: Two 100k resistors were replaced by 220k resistors. Please keep this in mind during the guide.

SOLDERING

RESISTORS

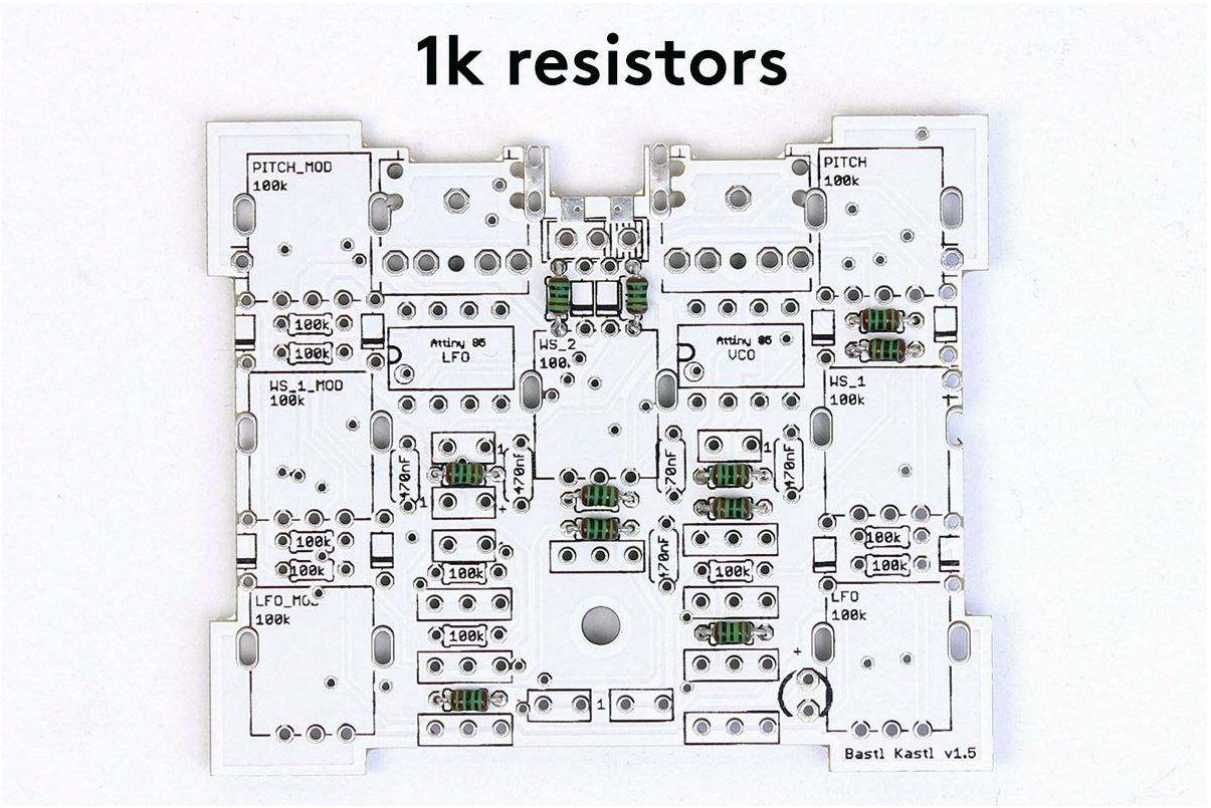
Start the soldering with the **resistors**. There are just **three values** of them: **1k** (11x), **100k** (7x) and **220k** (2x). Before you will start soldering, check the values by using a multimeter[1] or you can check the color codes - the 100k's have the **orange stripe**. Then snip the leads 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.



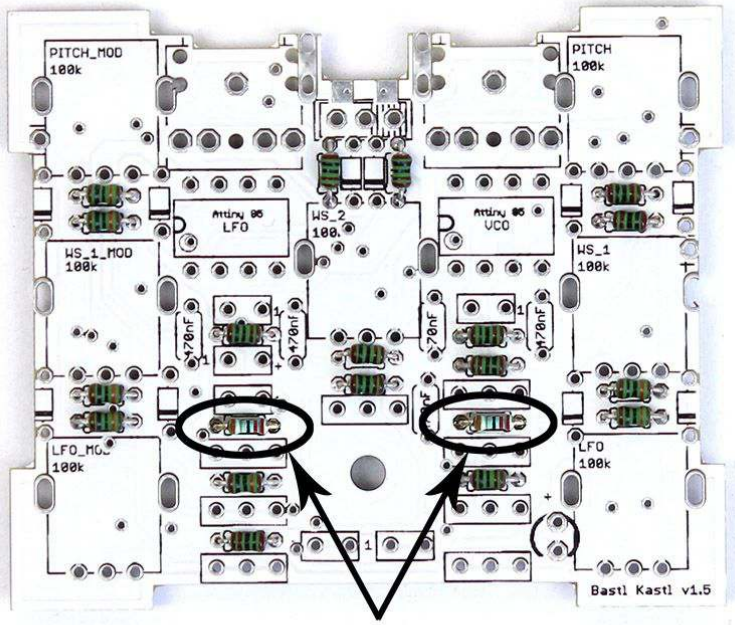


[1] https://learn.sparkfun.com/tutorials/how-to-use-a-multimeter/measuring-resistance

1k resistors



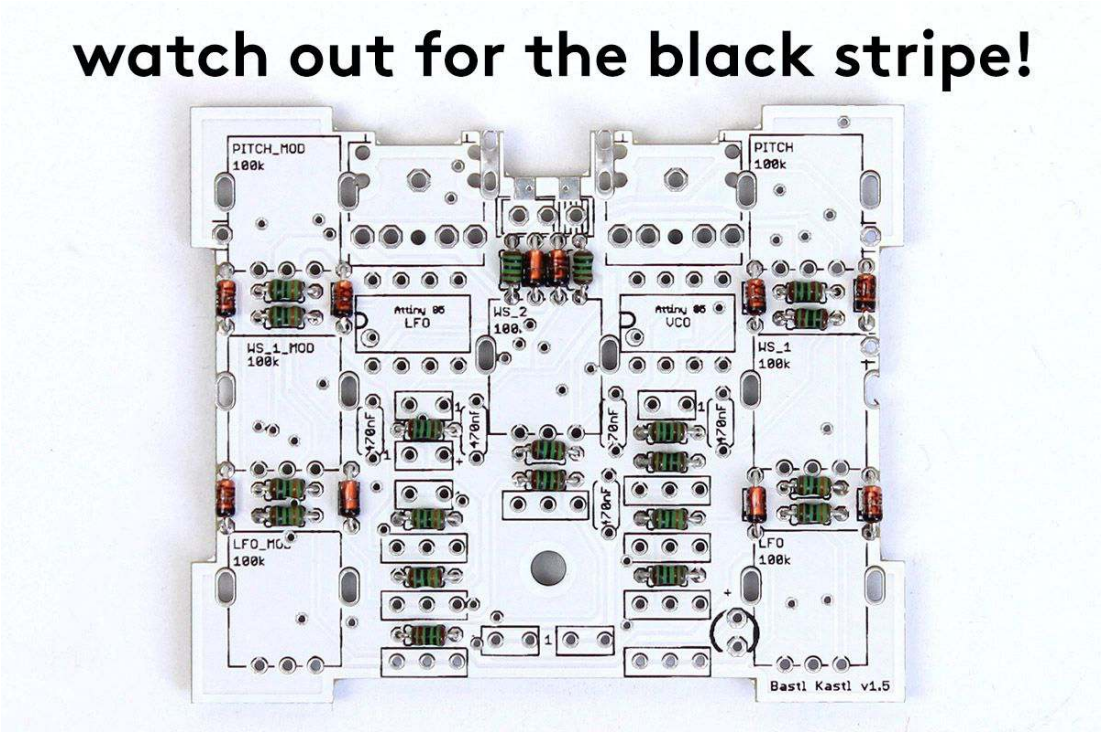
1k resitors + 100k resistors



220k resistors

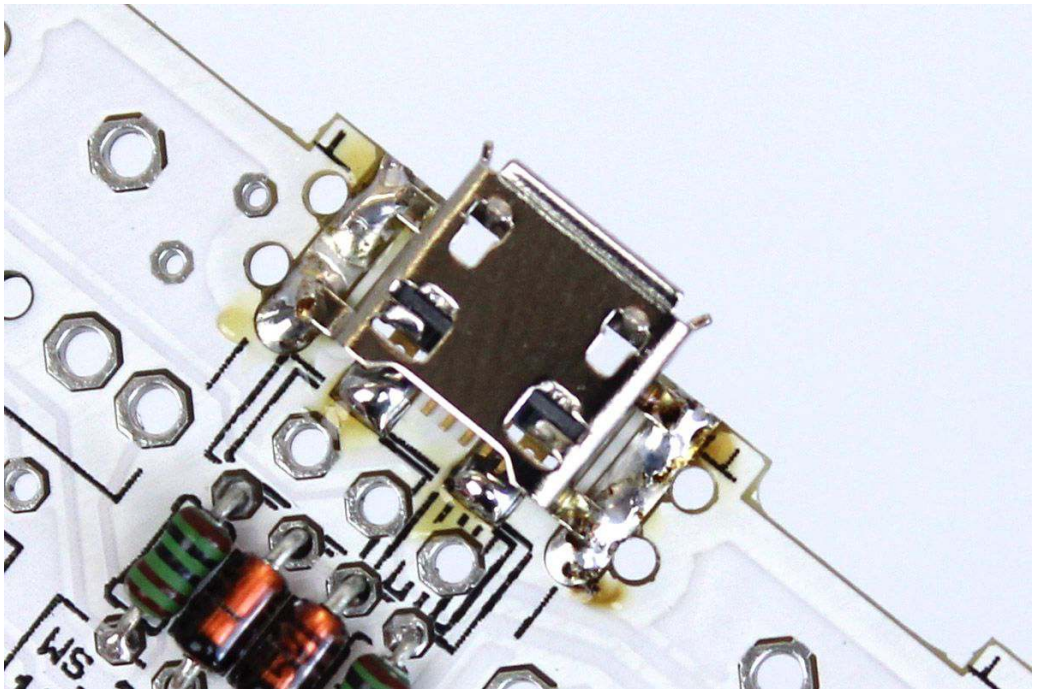
DIODES

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.



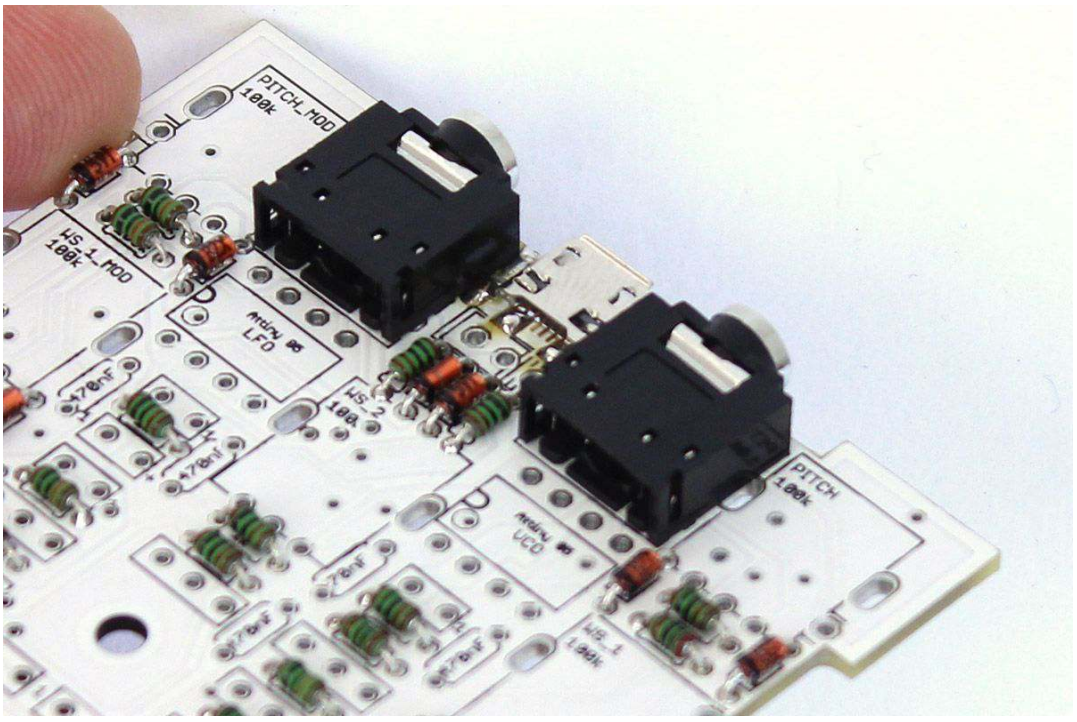
USB CONNECTOR

Move to the **USB connector** now. Place it from the top and solder from the same side. There are two legs on both sides that has to be soldered along with those on the back except the three in the centre (see the photo). Start with just one side leg so you can make the adjustments by re-heating. The connector should be flat right on the board.



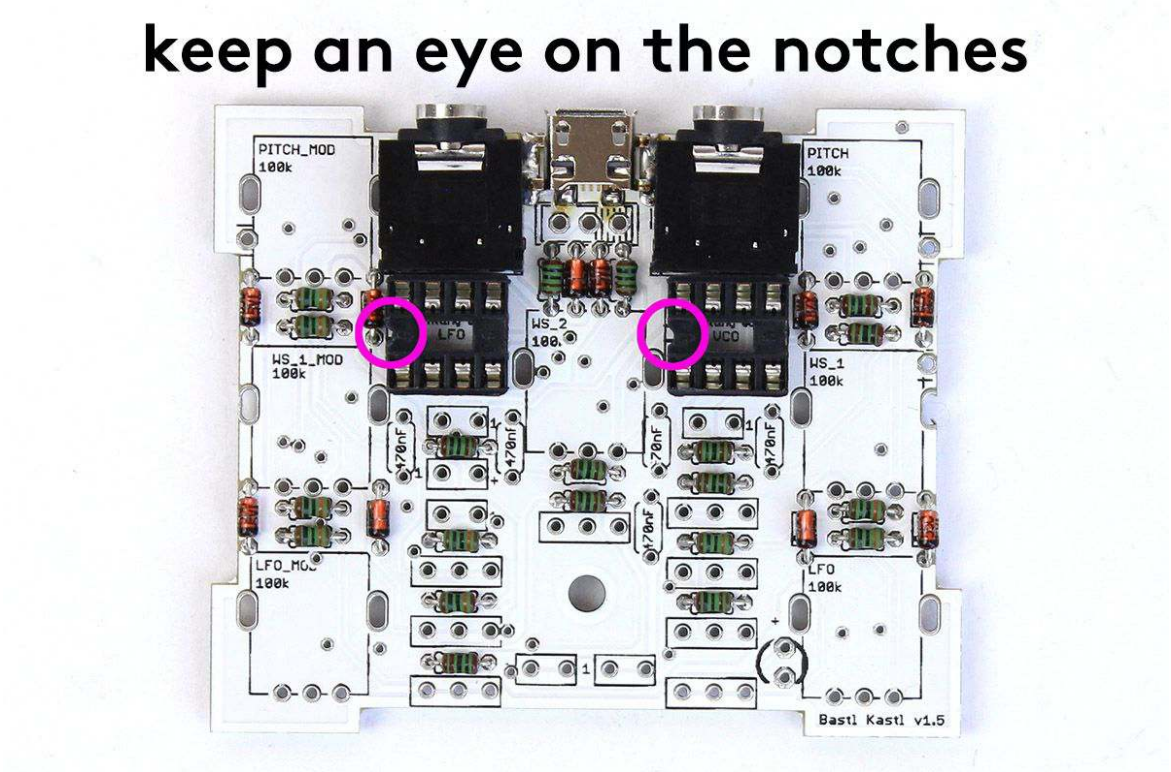
JACK CONNECTORS

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



IC SOCKETS

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 notch sign on the PCB.

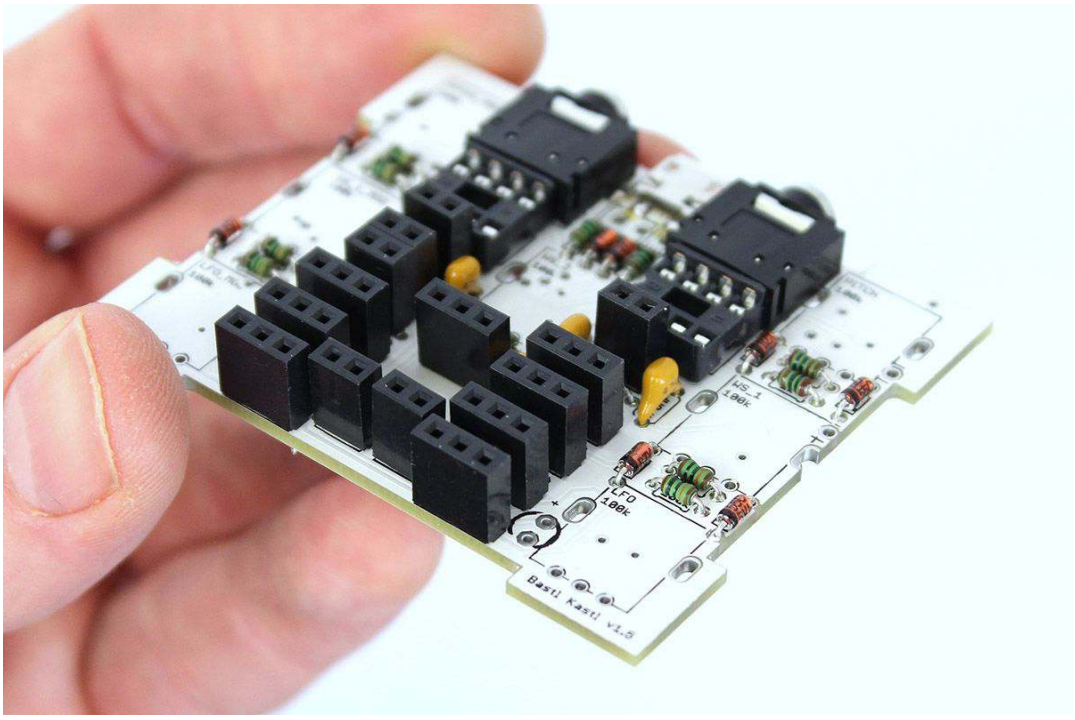


CERAMIC CAPACITORS

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

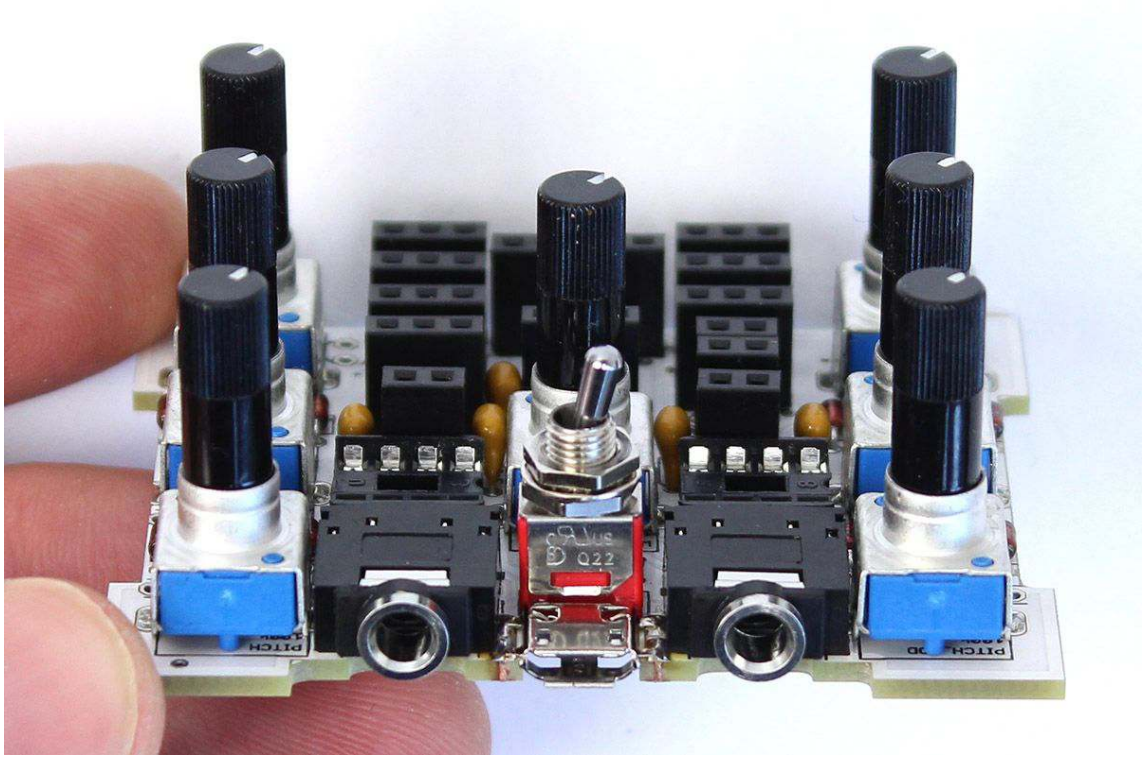
FEMALE PINHEADERS

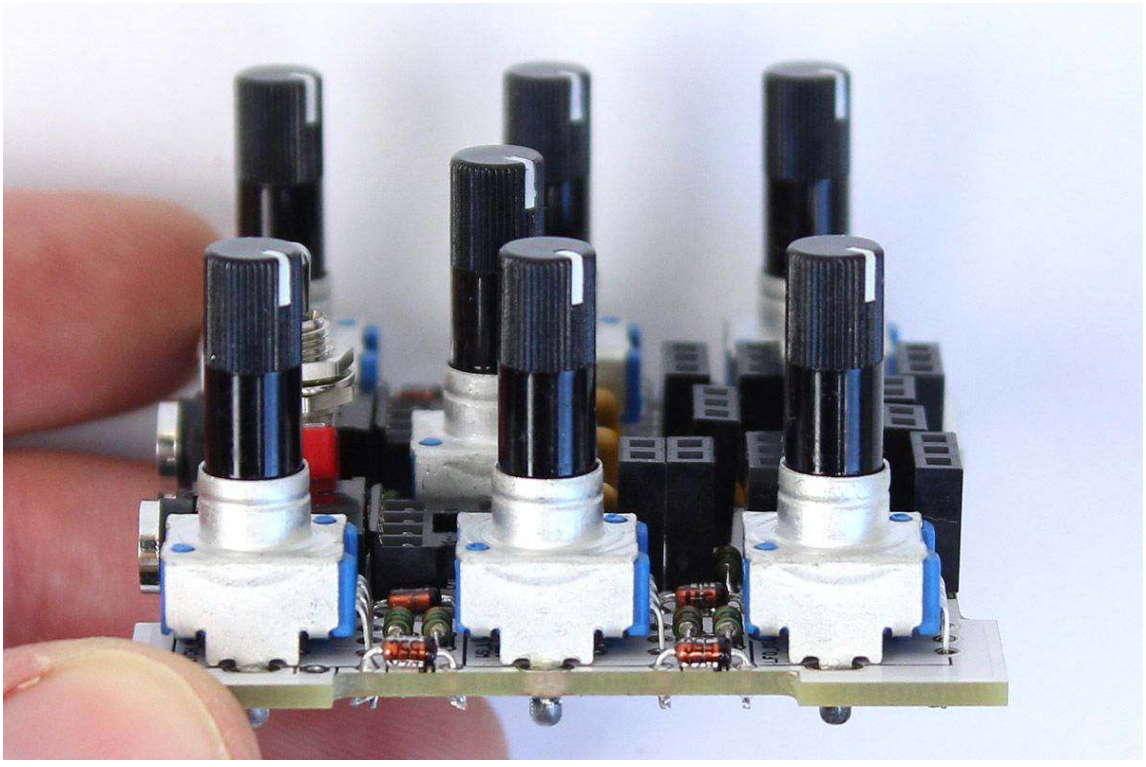
Now let's do the **female pinheaders**: **2 pin** ones (6x) and **3 pin** ones (8x). It may take a little patience to insert them well. Be sure to solder them straight.



SWITCH & POTENTIOMETERS

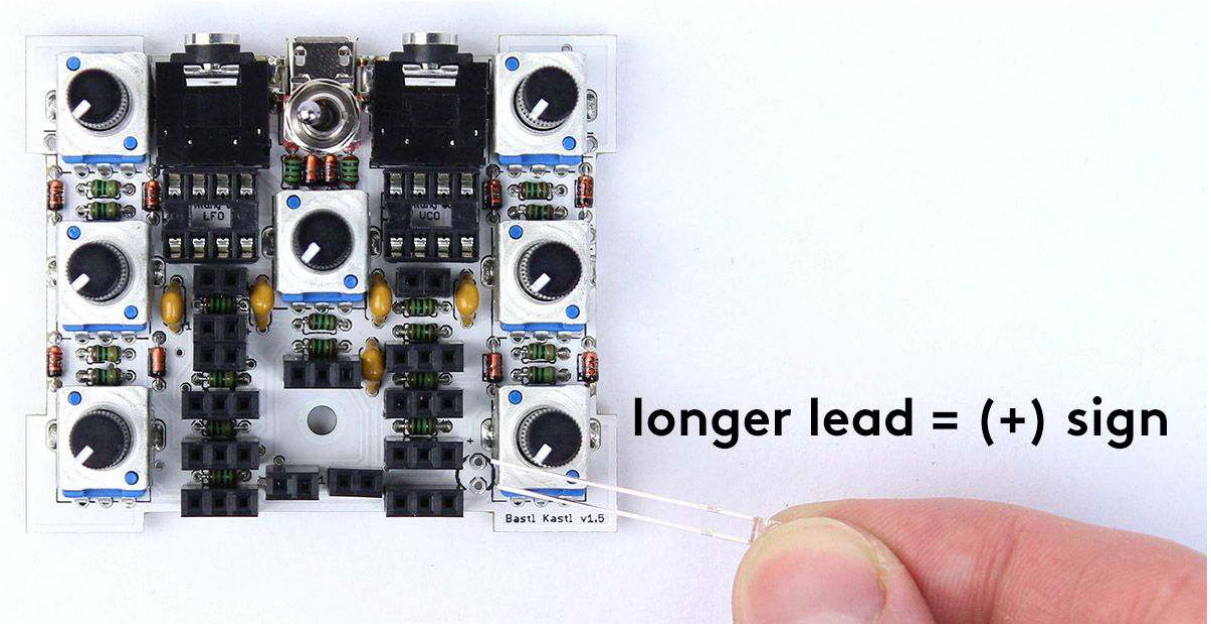
Go for the **switch**. Be sure that it's straight from all views and right on the board. Then move to soldering of **potentiometers** (B100k). Proceed this way: install potentiometers in straight, solder just one leg, check the position and solder the rest if there is no problem (if you don't solder the pots straight you won't be able to put the enclosure on easily).

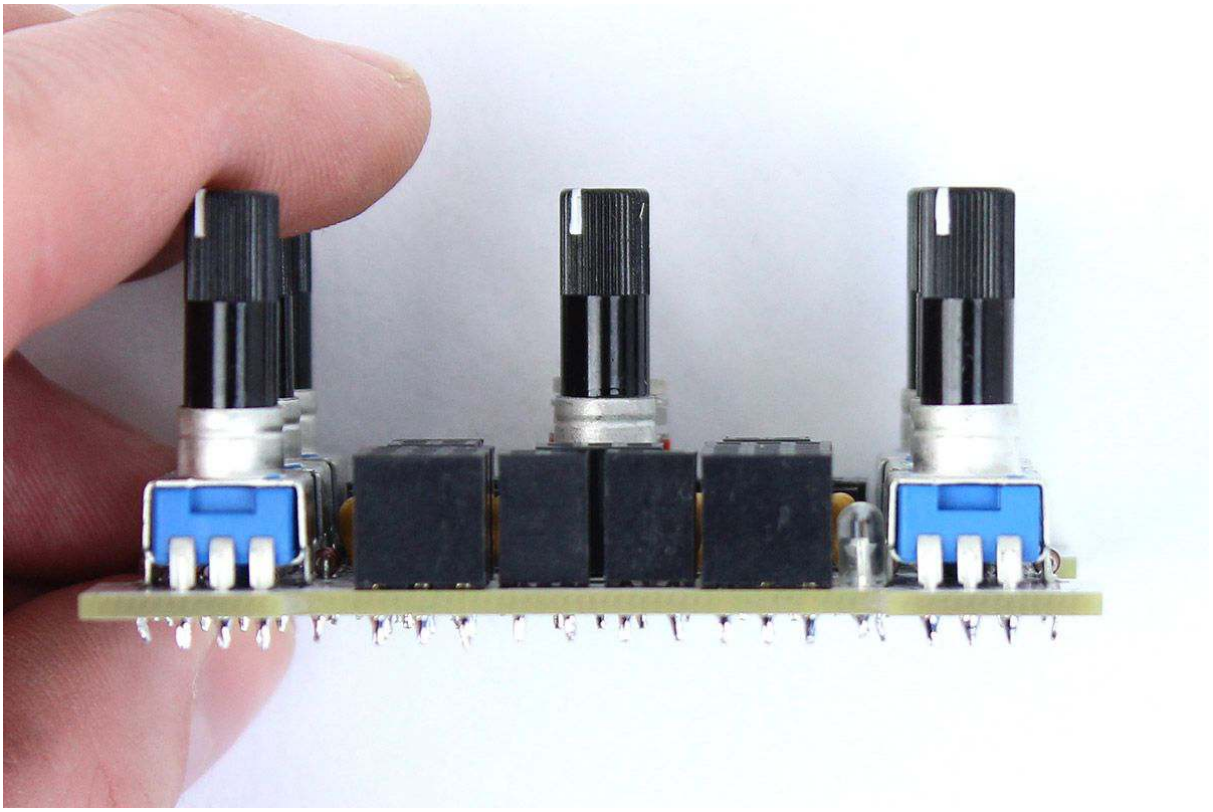




WHITE LED

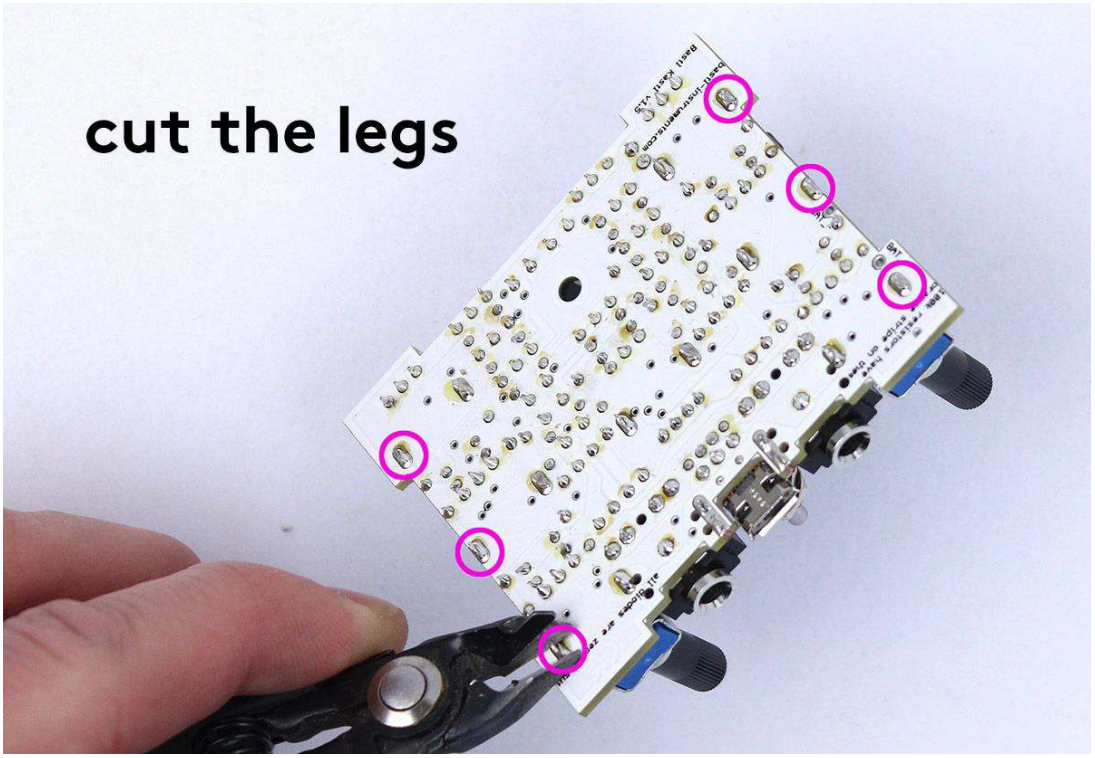
Solder the white **LED** - be sure to insert the longer lead into the plus (+) hole. Push the LED down to the PCB.





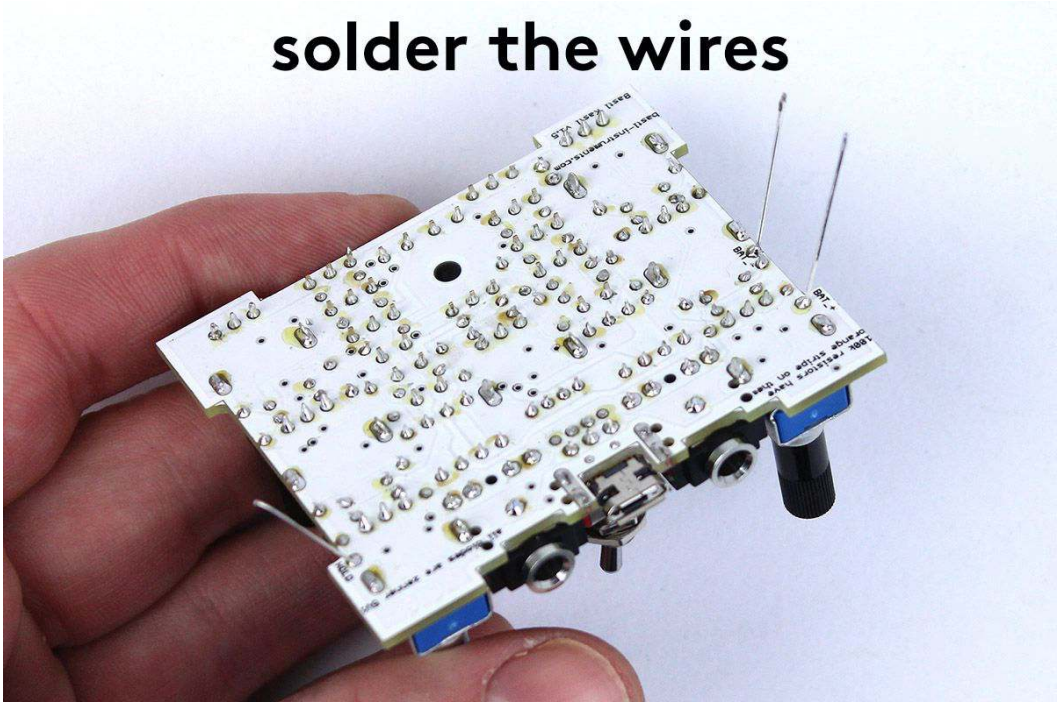
CUTTING

Now you can cut the side legs from pots.



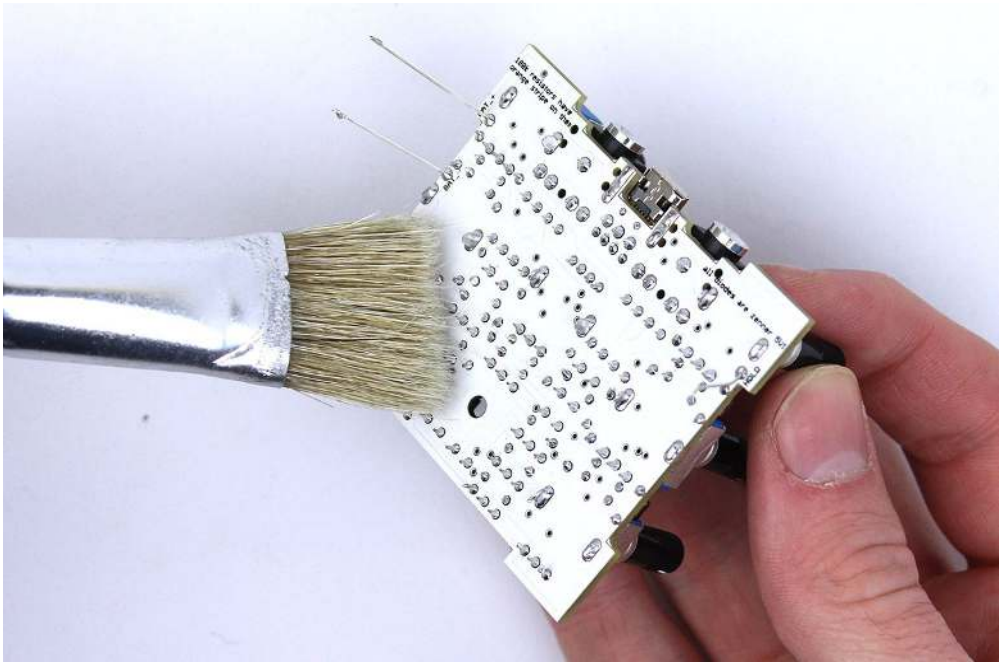
WIRES

You will need the cutted leads from resistors now. Put these wires through the "**HOLD**", "**BAT_-**" and "**BAT_+**" holes and solder them. The leads can't be connected with the potentiometers on the other side.



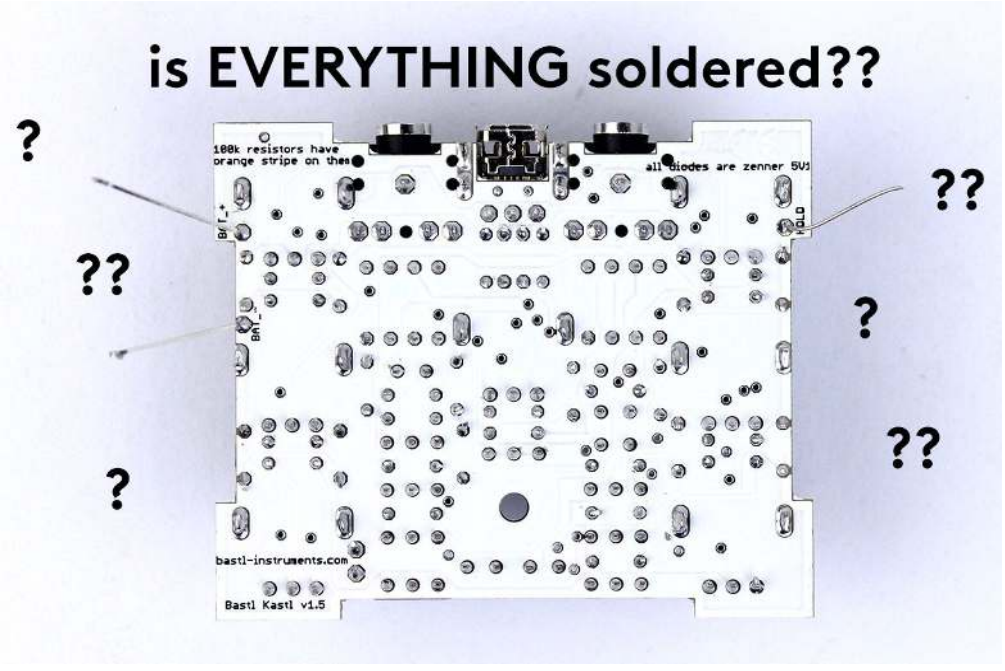
CLEANING (OPTIONAL)

Before you begin to move forward, you might want to **clean** your PCB. You can use e.g. isopropyl alcohol. Put some of the liquid all over the PCB using the brush (don't let it flow into the pots), let it act for a while and sweep it off . Then just let it dry. You can repeat these steps until you are satisfied with the result.



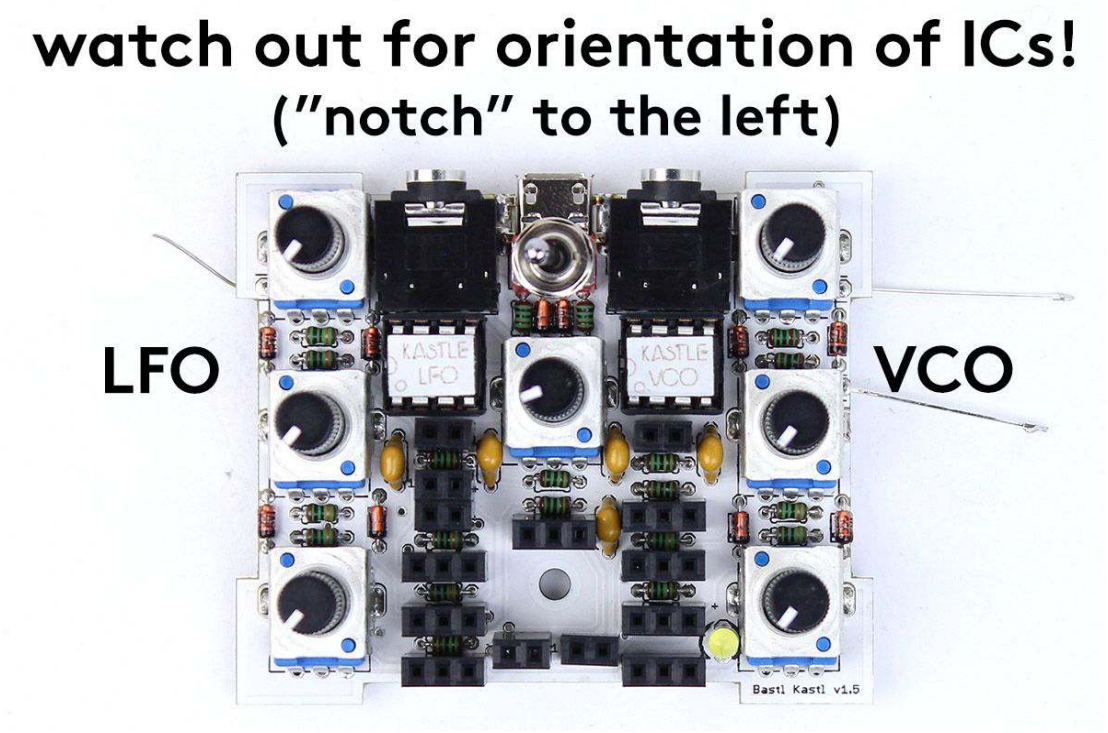
LAST CHECK

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



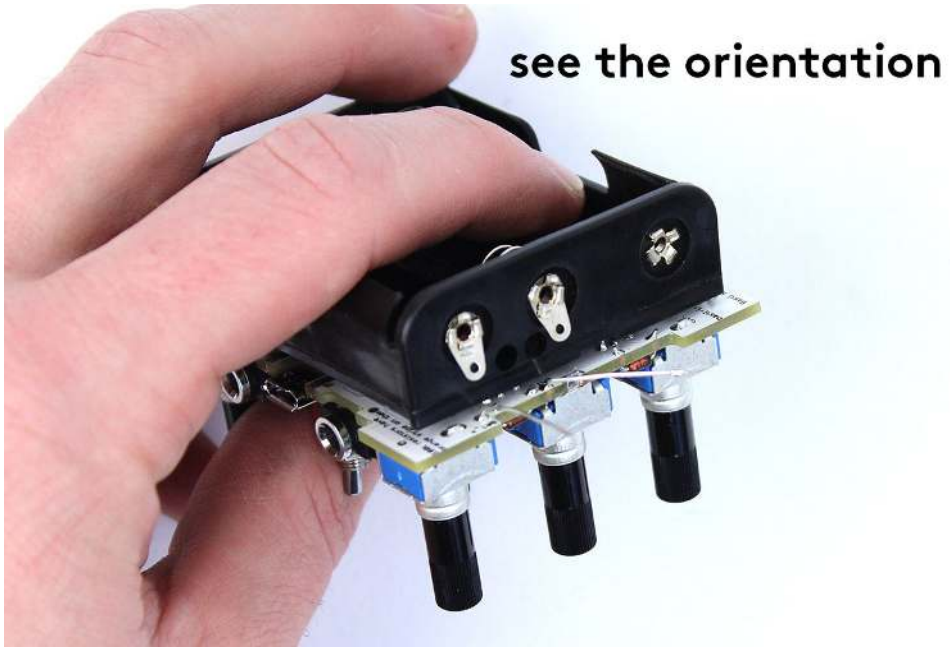
INSERT ICs

Don't forget to place the **ICs** into the sockets. 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.

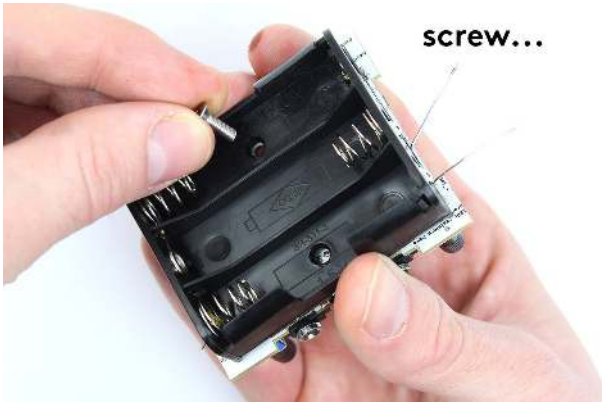


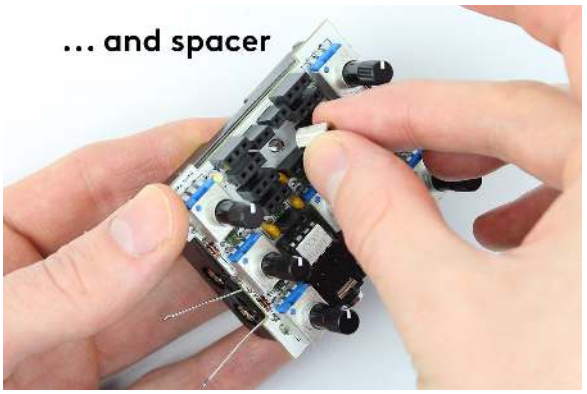
BATTERY HOLDER

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.



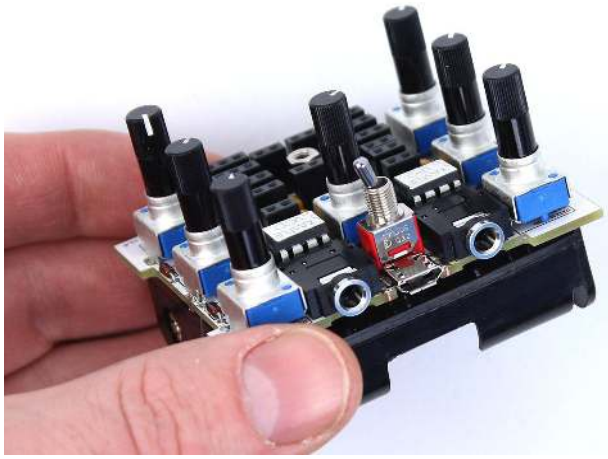


And now the last soldering challenge! You have to connect the leads with the lugs. **Do not let the lug heat too much!** (it would break the connection of the coil and the lug, use just the tip of your soldering iron).

(Note: at this point you can make a pretest before putting enclosure on by turning the unit on.)

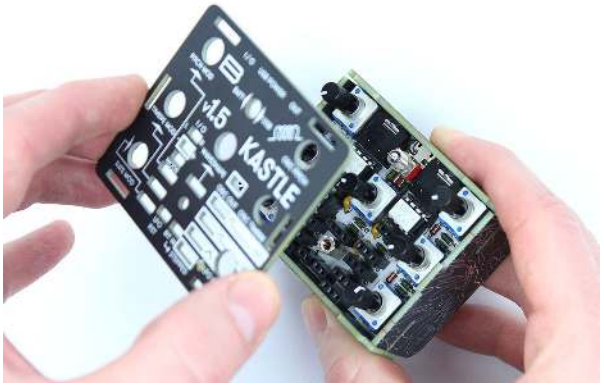
YOU ARE ALMOST DONE...

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**.



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/