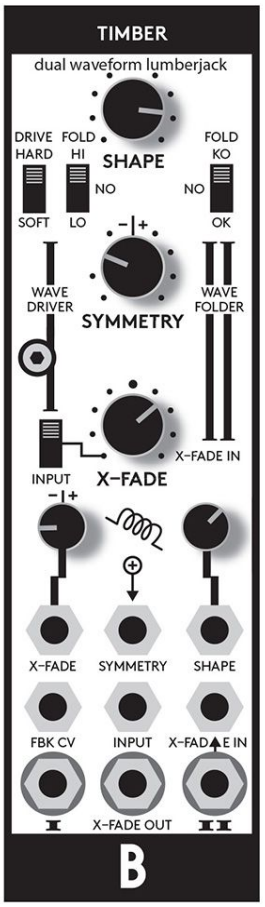
last update: 15. 3. 2019

BASTL INSTRUMENTS

TIMBER v1.1 - Assembly Guide

bastl-instruments.com



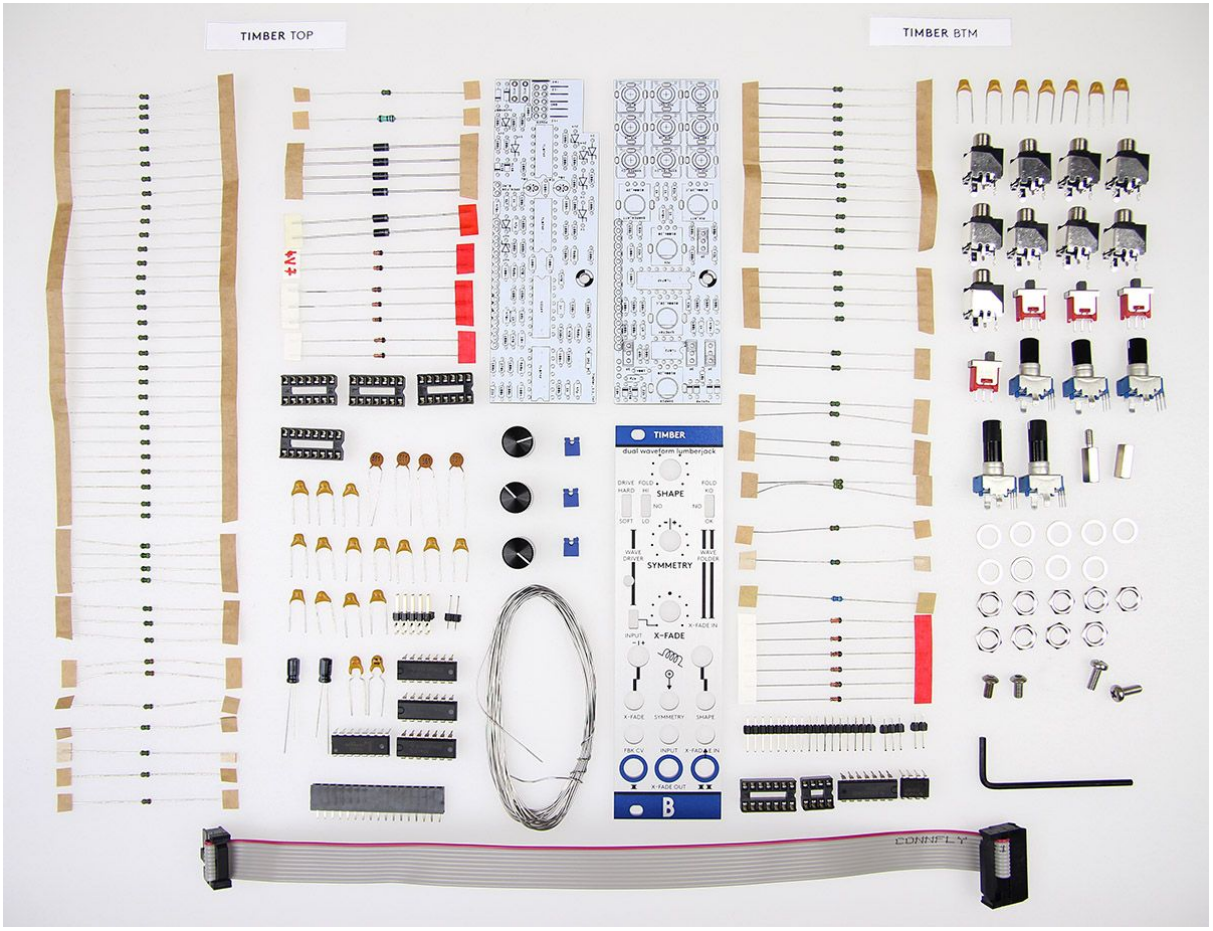
INTRODUCTION

This guide is for building TIMBER 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].

The TIMBER 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 (BOM) for detailed list. We even included some of the best quality solder to help you solder everything faster and better.

[1] http://www.instructables.com/id/How-to-solder/

BILL OF MATERIALS



TIMBER v1.1 BILL OF MATERIALS		
TOP BOARD		
Qty	**Value**	**Part**
4	1k	R-EU_0204/5
2	10k	R-EU_0204/5
2	22k	R-EU_0204/5
2	43k	R-EU_0204/5
1	68k	R-EU_0204/5
2	82k	R-EU_0204/5
12	100k	R-EU_0204/5
1	150k	R-EU_0204/5
1	1M	R-EU_0204/5
6	1N4148	diode
1	47pF	ceramic capacitor
4	100nF	ceramic capacitor

2	470nF	ceramic capacitor
1	8 pin DIL	DIL socket - in foam
1	14 pin DIL	DIL socket - in foam
1	TL072	TL072
1	TL074P	TL074P
2	B100k 20mm	POT LIN B100k
1	B100k 20mm W CD	POT LIN B100k W CD
1	B100k 25mm W	POT LIN B100k 25mm W
1	B100k 25mm W CD	POT LIN B100k 25mm W CD
1	2P	Switch 2P
3	3P	Switch 3P
1	17 pin	male header
1	3 pin	male header
1	2 pin	male header
9	PJ301BM	Jack connector
BOTTOM BOARD		
4	470R	R-EU_0204/5
3	1K	R-EU_0204/5
1	4k7	R-EU_0204/5
1	22k	R-EU_0204/5
1	68k	R-EU_0204/5
30	100k	R-EU_0204/5
1	150k	R-EU_0204/5
1	270k	R-EU_0204/5
2	330k	R-EU_0204/5
1	680k	R-EU_0204/5
1	2M2	R-EU_0207/5
2	1N4007	diode
2	1N4148	diode
4	1V	zener diode
3	2V4	zener diode
2	4V7	zener diode
2	47pF	ceramic capacitor
8	100nF	ceramic capacitor
2	470nF	ceramic capacitor
1	1nF	ceramic capacitor
1	10nF	ceramic capacitor

4	560pF	ceramic capacitor
2	10uF	electrolytic condensator
1	16 pin DIL	DIL socket - in foam
3	14 pin DIL	DIL socket - in foam
3	TL074P	IC in foam
1	V2164	IC in foam
1	17 pin	female header
2	100mA	fuse
1	2 pin	male header
1	2x5 pin	double male header
ASSEMBLY		
1	M3 x 11mm	spacer nut x nut
1	M3 x 11,5mm	spacer nut x screw
9		jack washers
9		jack nuts
2	M3 x 6mm	screw
2	M3 x 8mm	panel screw + washers
3		jumper
1		allen key
1	TOP	PCB
1	BOTTOM	PCB
1		front panel
1		power cable 10-16pin
3		knob

BEFORE STARTING THE KIT...

Before starting this kit, prepare the following tools:

- Soldering iron
- Multi-meter
- Flush cutters
- Smaller pliers
- 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 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 before you start soldering.

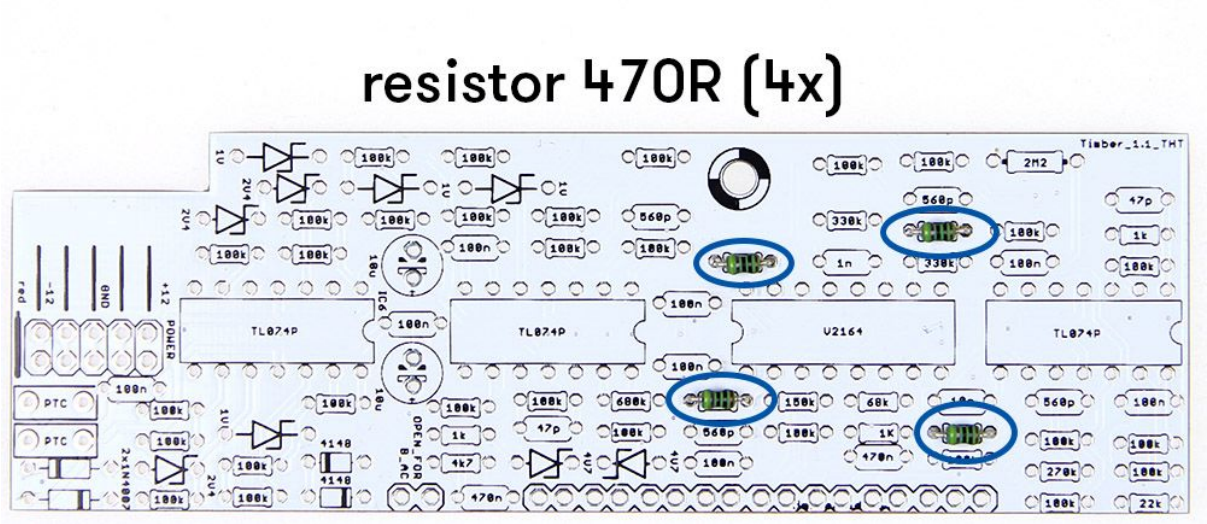
BOTTOM BOARD

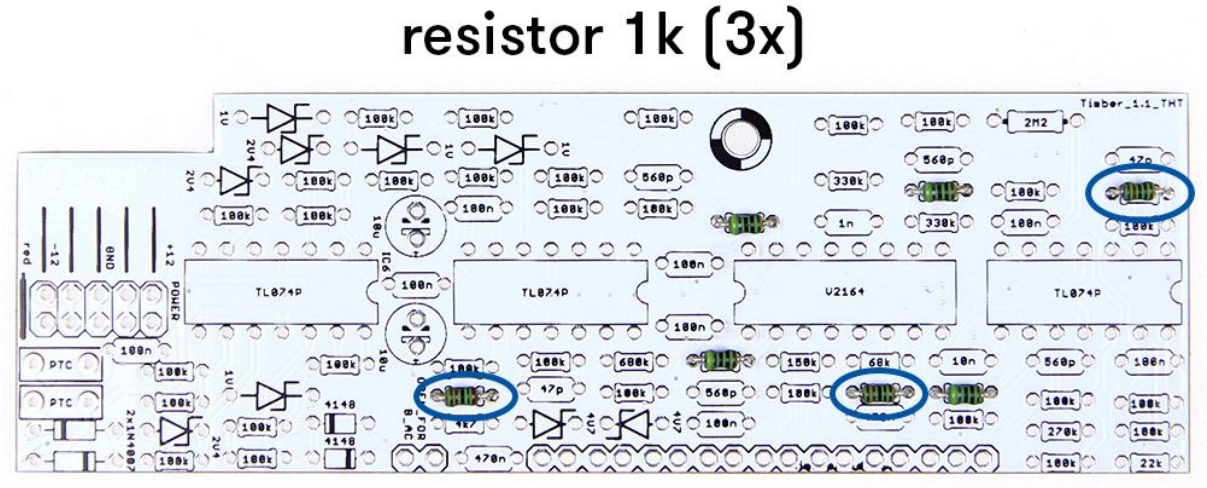
RESISTORS

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

- **470R** (4x), **1k** (3x), **4k7** (1x), **22k** (1x), **68k** (1x), **100k** (30x), **150k** (1x), **270k** (1x), **330k** (2x), **680k** (1x), **2M2** (1x).

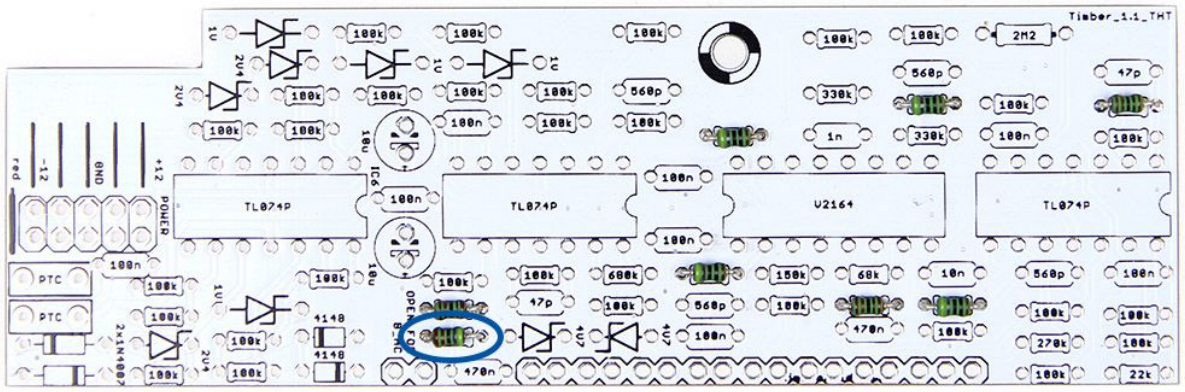
Then solder them on the bottom PCB and snip the leads close to the PCB (be sure to make this step on all remaining leads in the course of this guide).



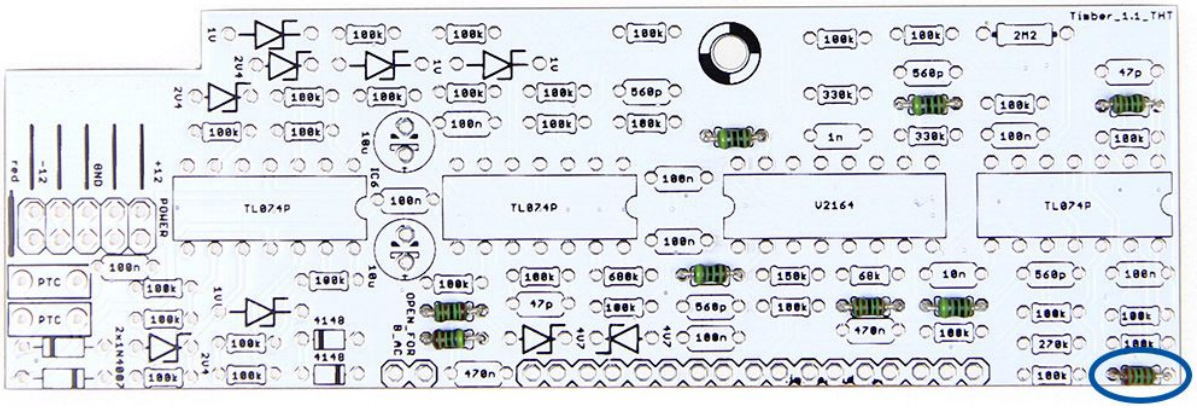


[2] https://learn.sparkfun.com/tutorials/how-to-use-a-multimeter/measuring-resistance

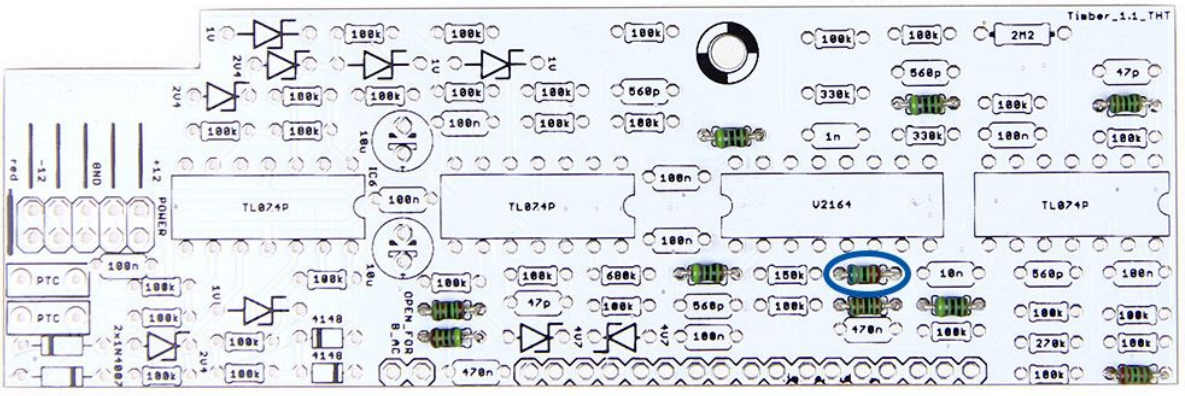
resistor 4k7



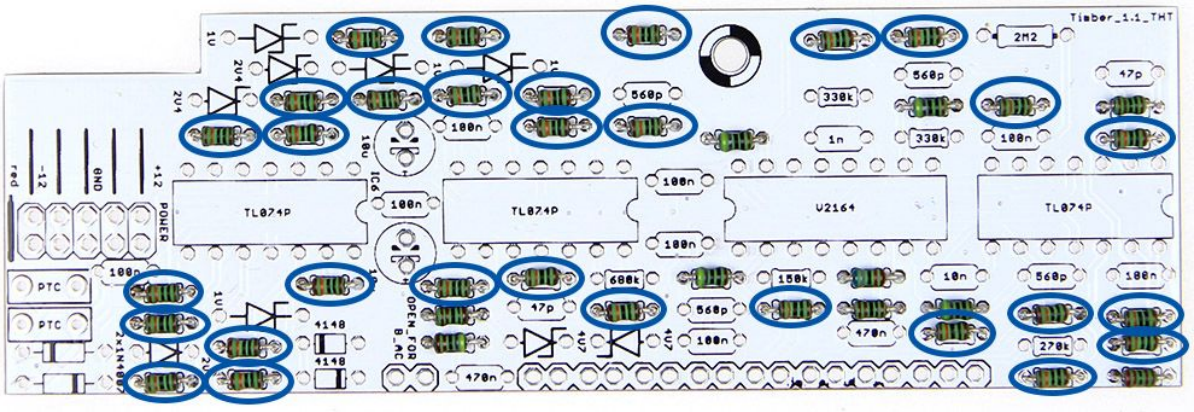
resistor 22k



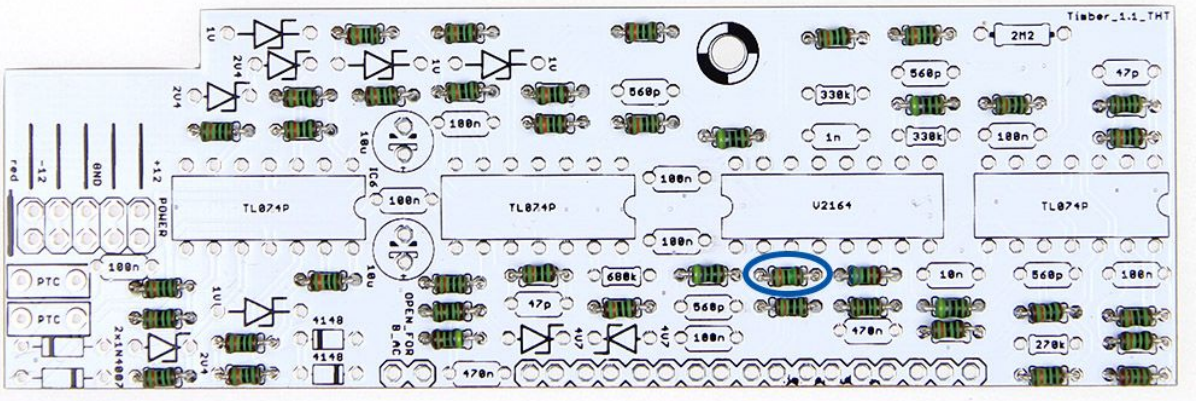
resistor 68k



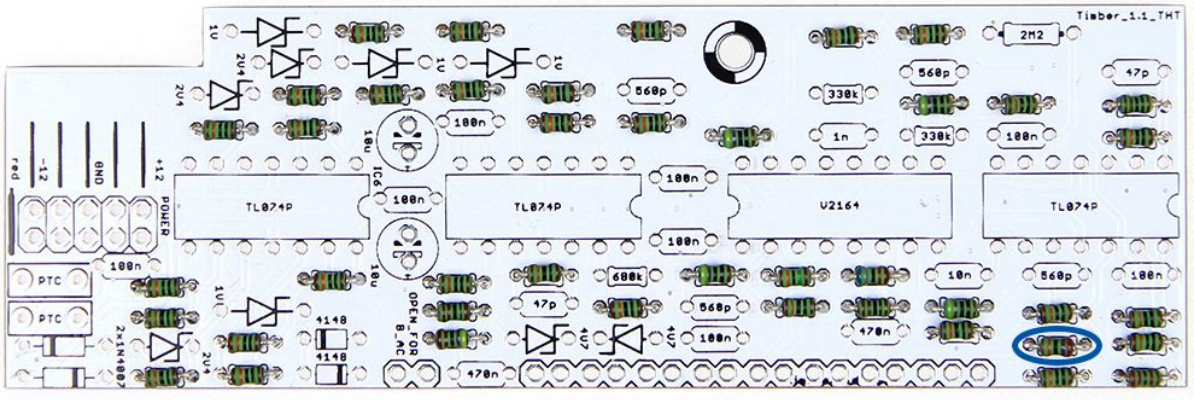
resistor 100k (30x)



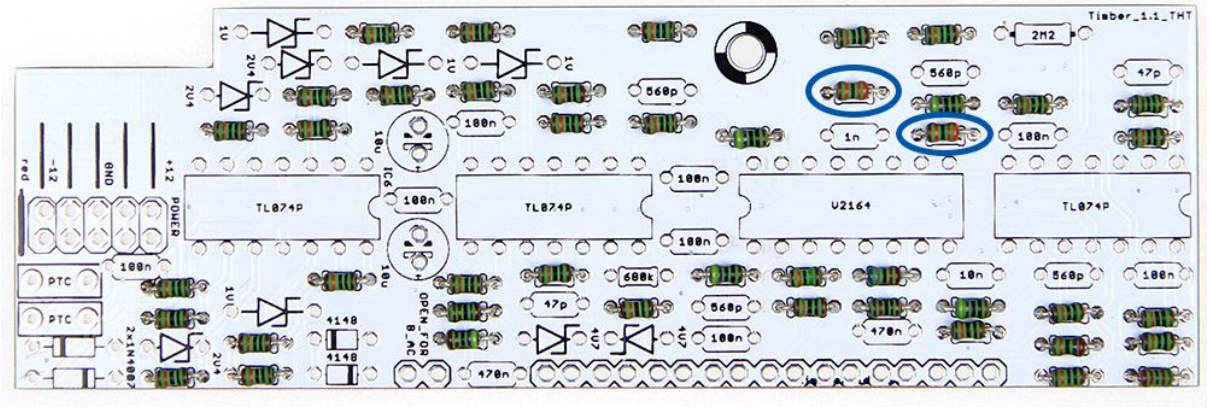
resistor 150k



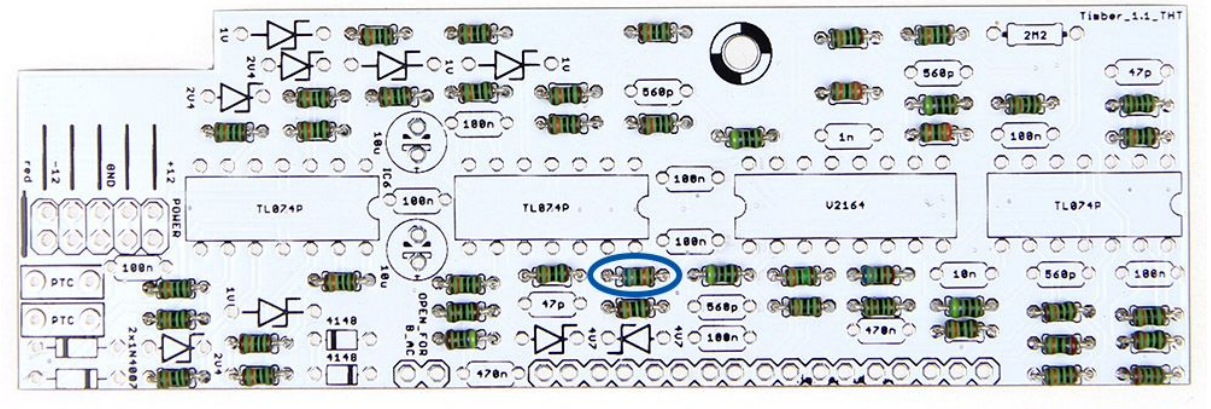
resistor 270k



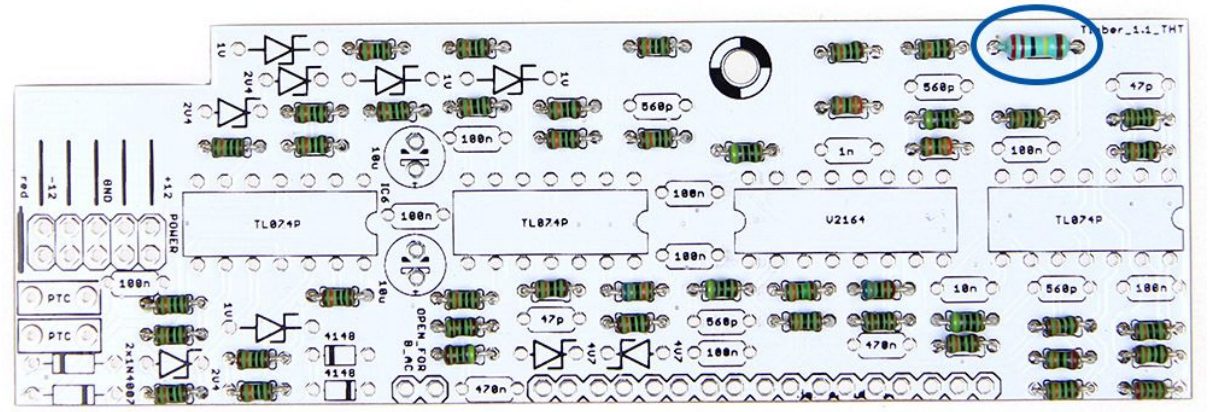
resistor 330k (2x)



resistor 680k

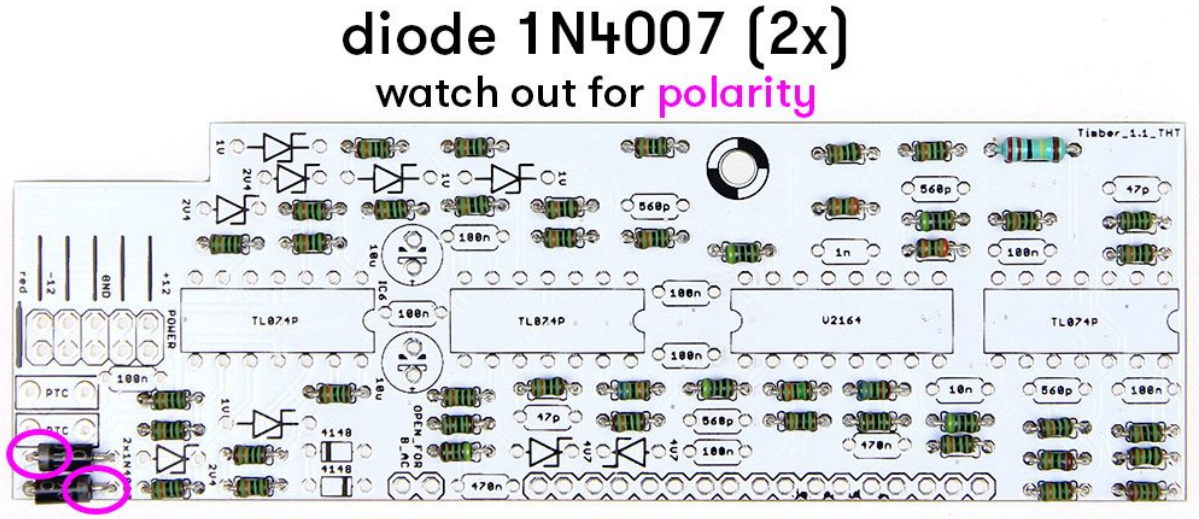


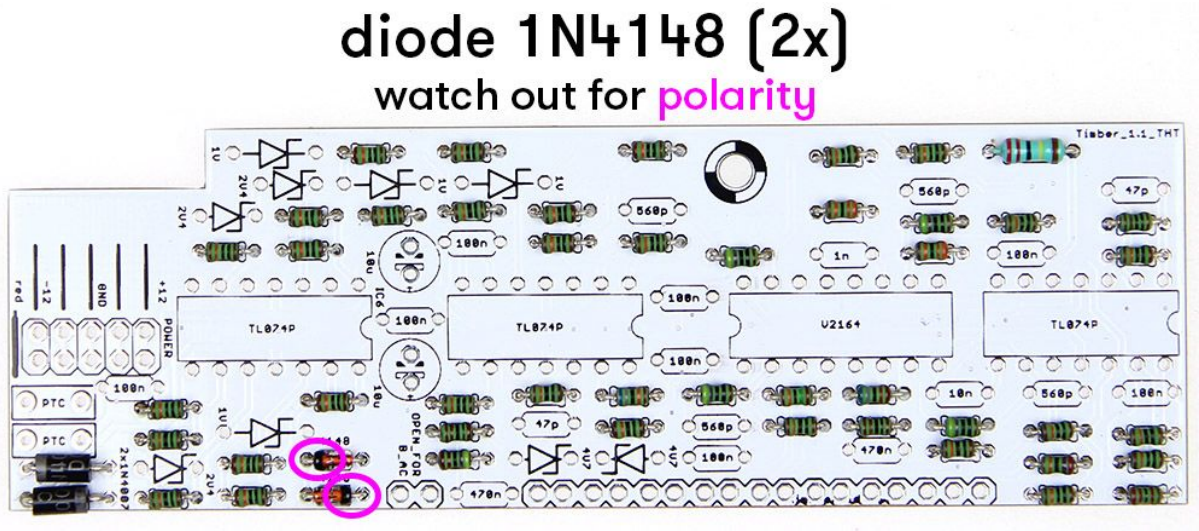
resistor 2M2



DIODES

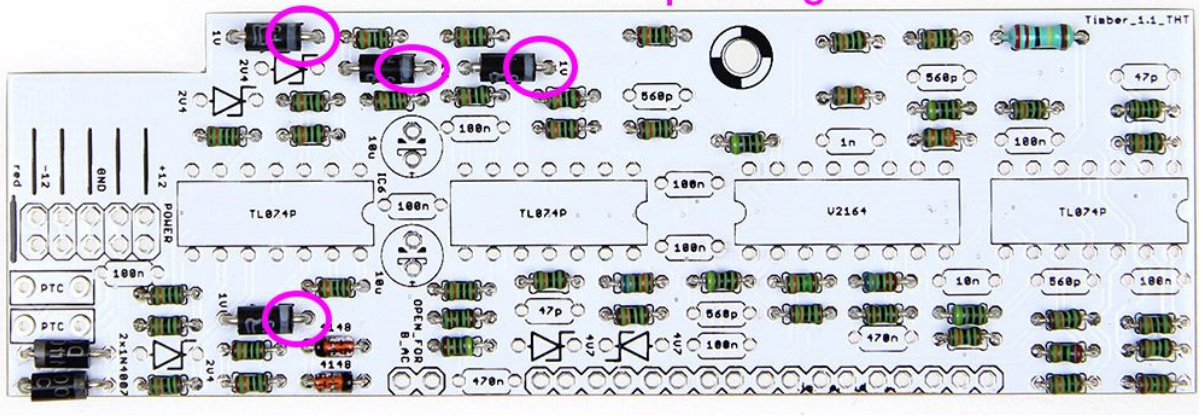
Solder also the **diodes.** There are actually five types of them: **1N4007** (2x), **1N4148** (2x), **1V zener diode** (4x), **2V4 zener diode** (3x) and **4V7 zener diode**. Be careful, **diodes are polarized**!
Make sure that the marking ring on the diode body matches the marking on the circuit board**.** Check the photo below.





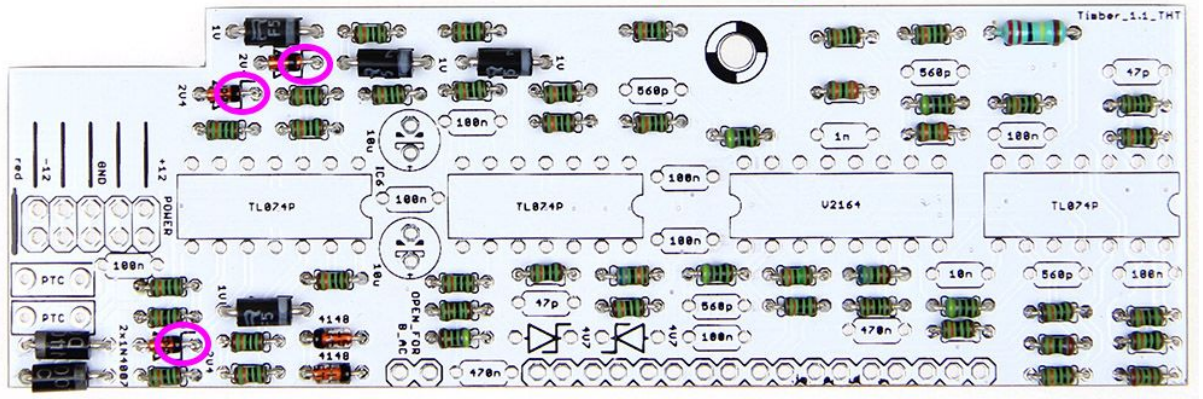
diode 1V zener (4x)

watch out for polarity



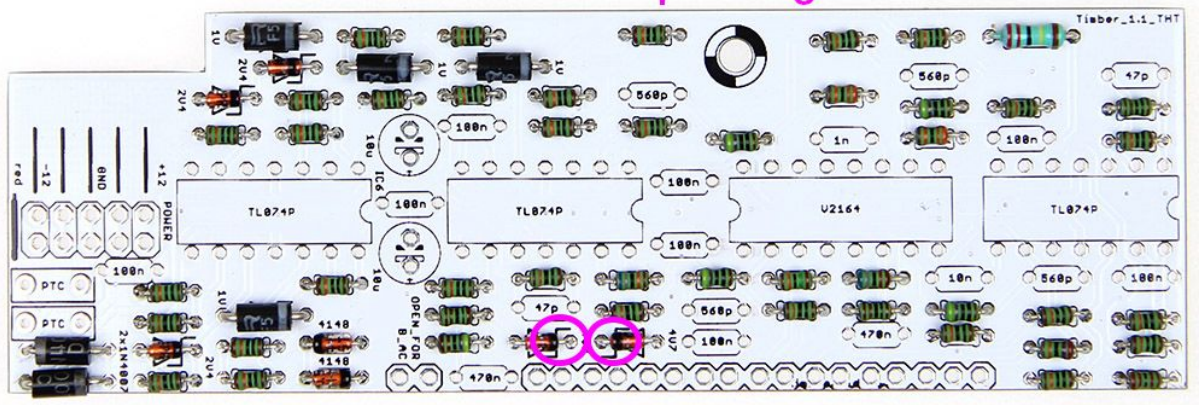
diode 2V4 zener (3x)

watch out for polarity



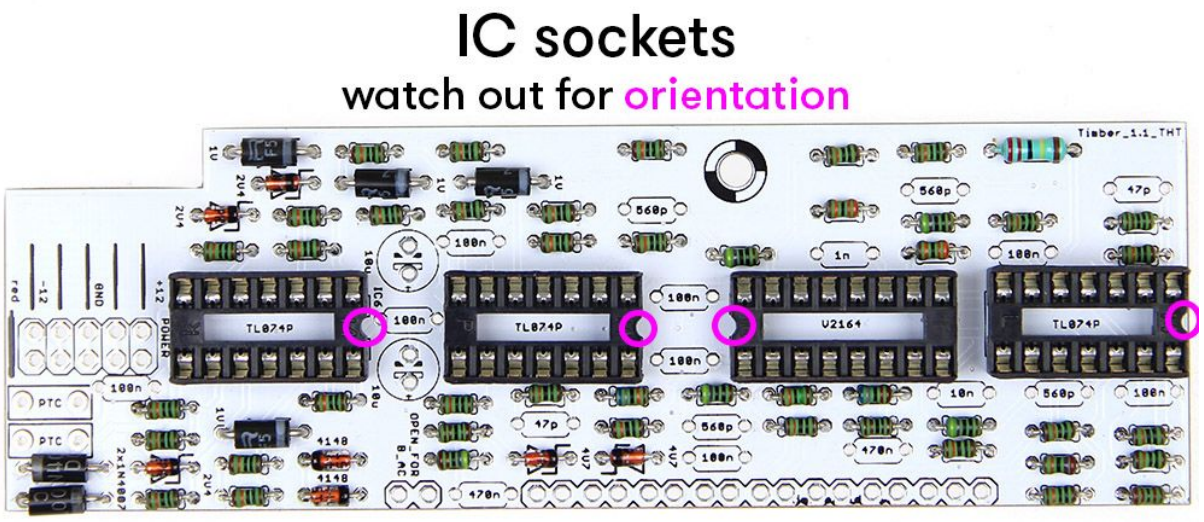
diode 4V7 zener (2x)

watch out for polarity



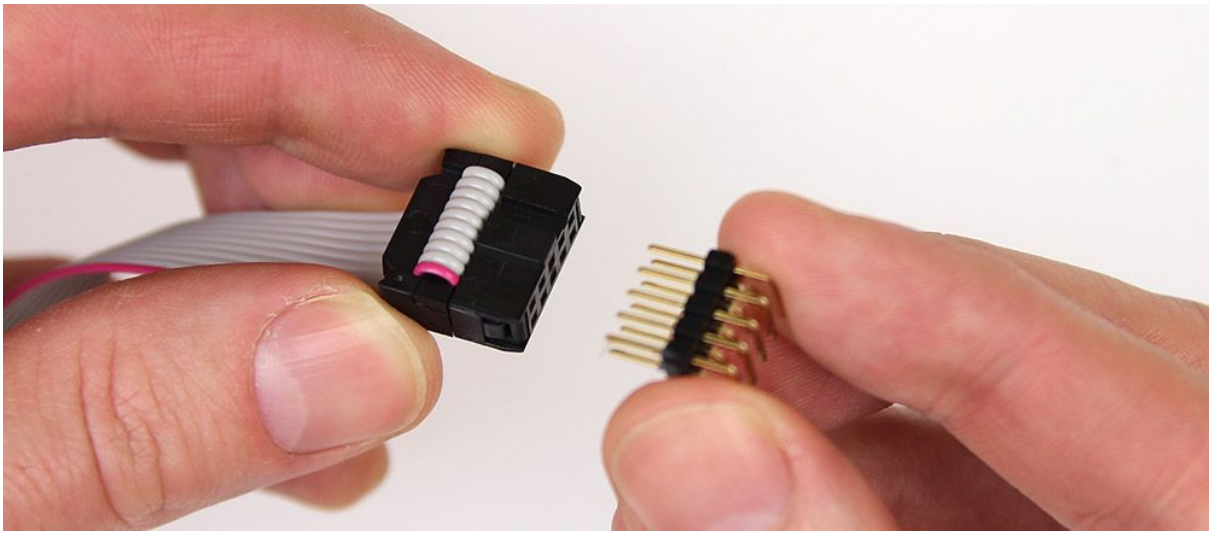
IC SOCKETS

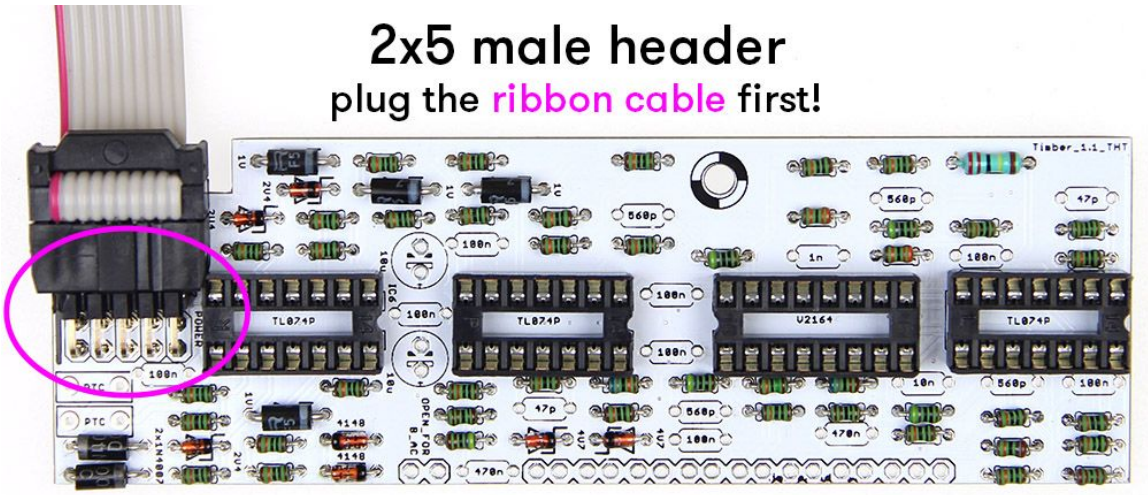
Now solder the **IC sockets** (3x 14 pin and 1x 16 pin). **Make sure that the notch on the socket matches the print on the board**.

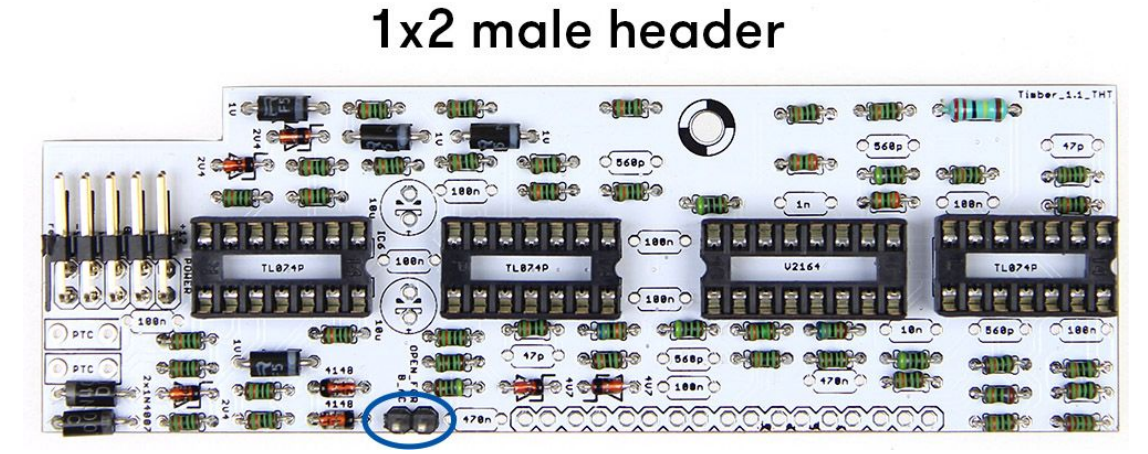


MALE HEADERS

Move to the **male pinheaders** now (one **2 pins** and one **double 5 pins right angled**). First help yourself with connecting the power cable to the double pinheader (see the picture). Then place it on the board and solder it. The other 2 pin male is a piece of cake. Just place it on the board facing it by longer part to your face and solder from the other side as with the previous pinheader.



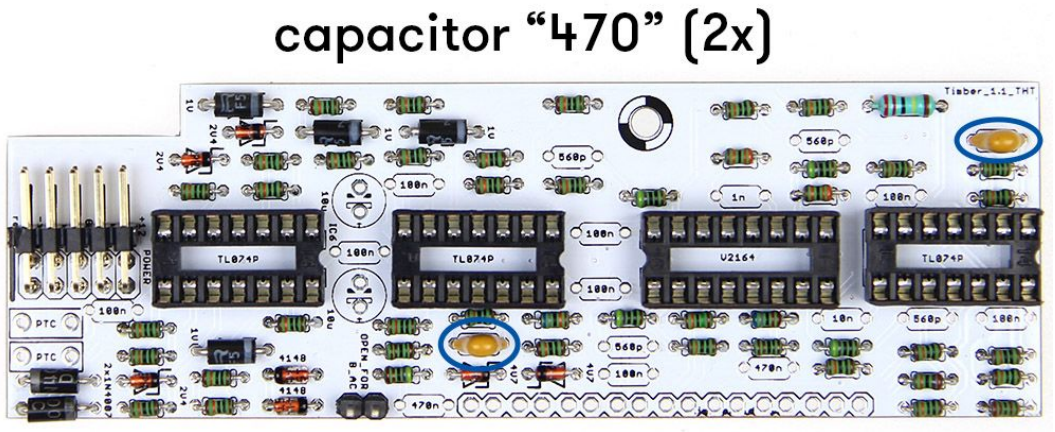




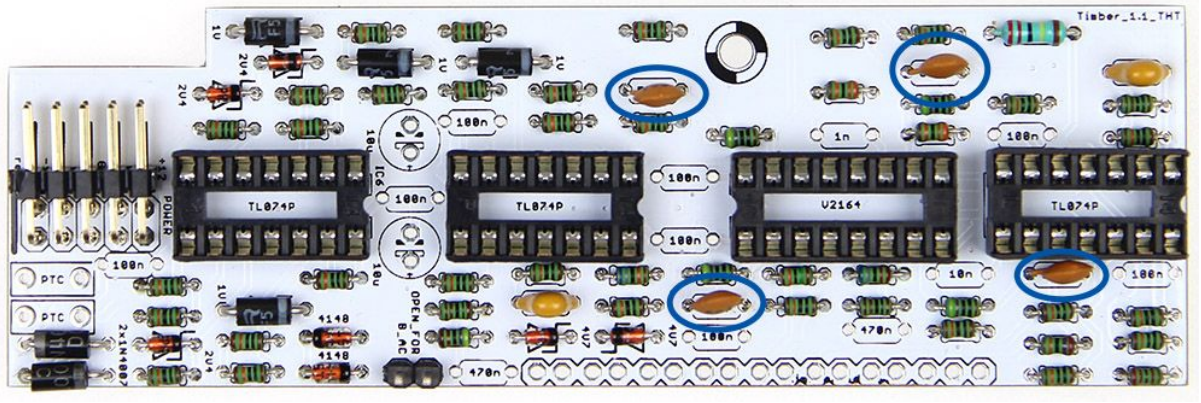
CERAMIC CAPACITORS

Let's do the **ceramic capacitors**. These parts are not oriented. There are **six values** of them:

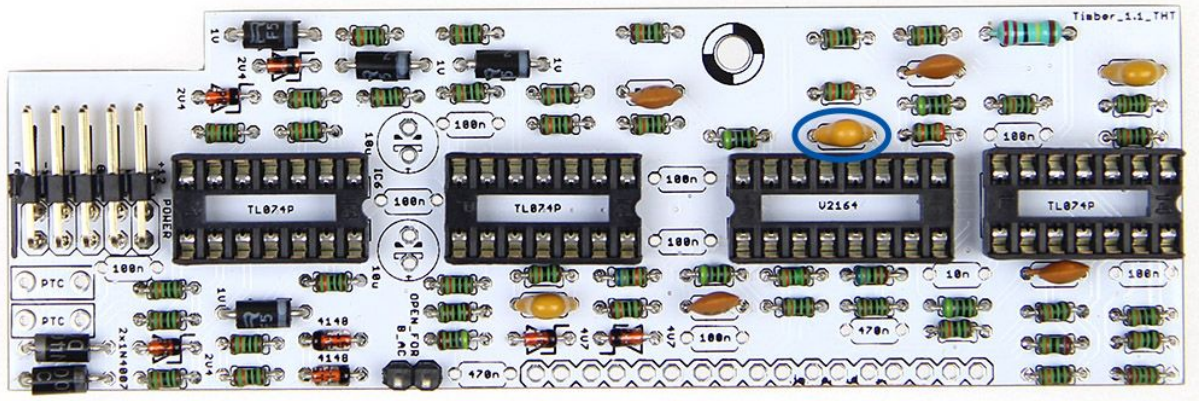
- **47pF** (2x, marked "470" on itself)
- **560pF** (4x, marked "561")
- **1nF** (1x, marked "102")
- **10nF** (1x, marked "103")
- **100nF** (8x, marked "104")
- **470nF** (2x, marked "474")



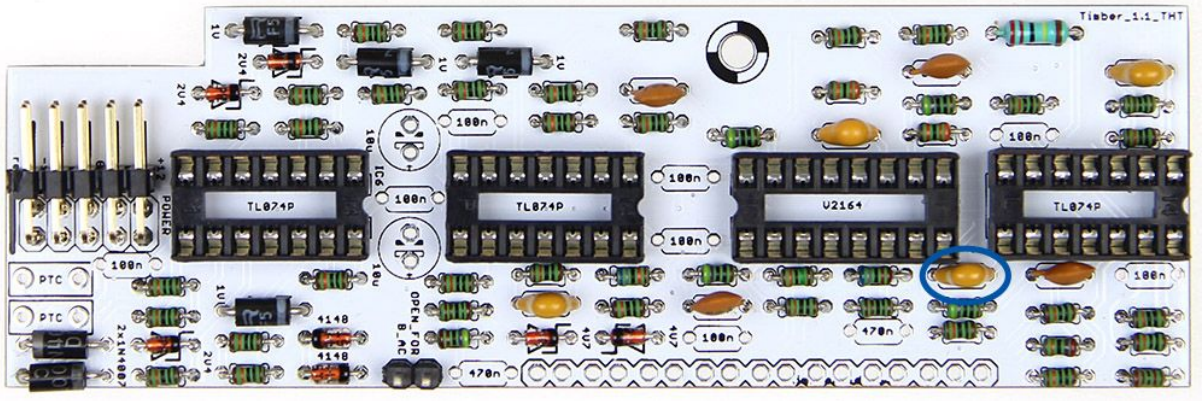
capacitor “561” (4x)



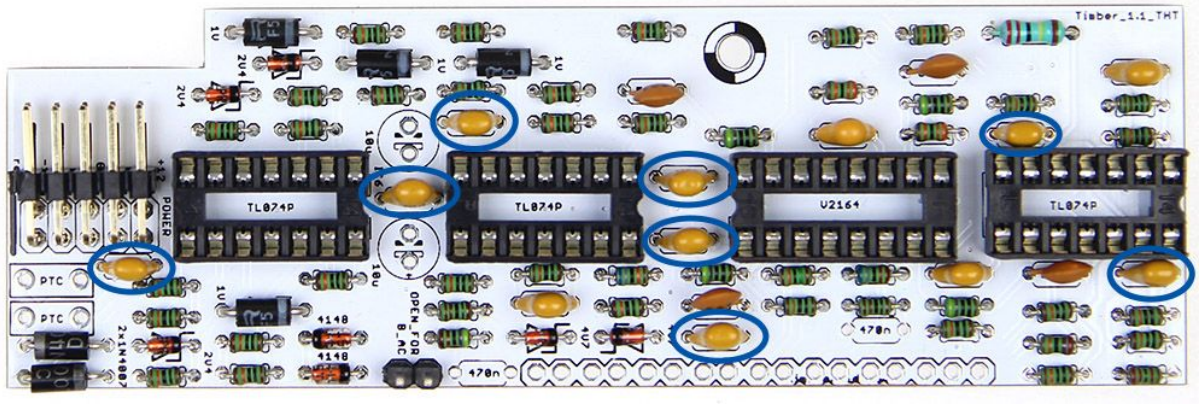
capacitor “102”



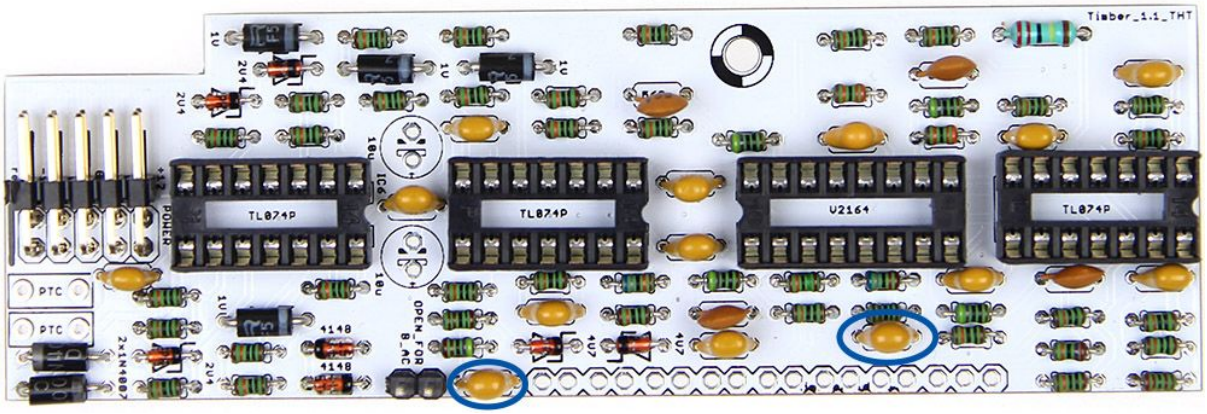
capacitor “103”



capacitor “104” (8x)

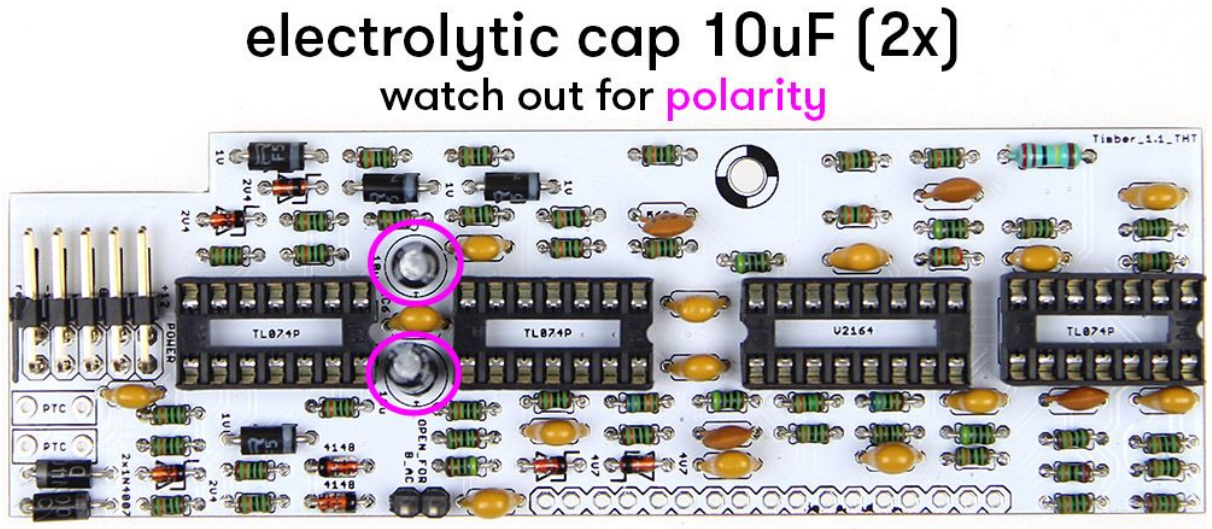


capacitor “474” (2x)



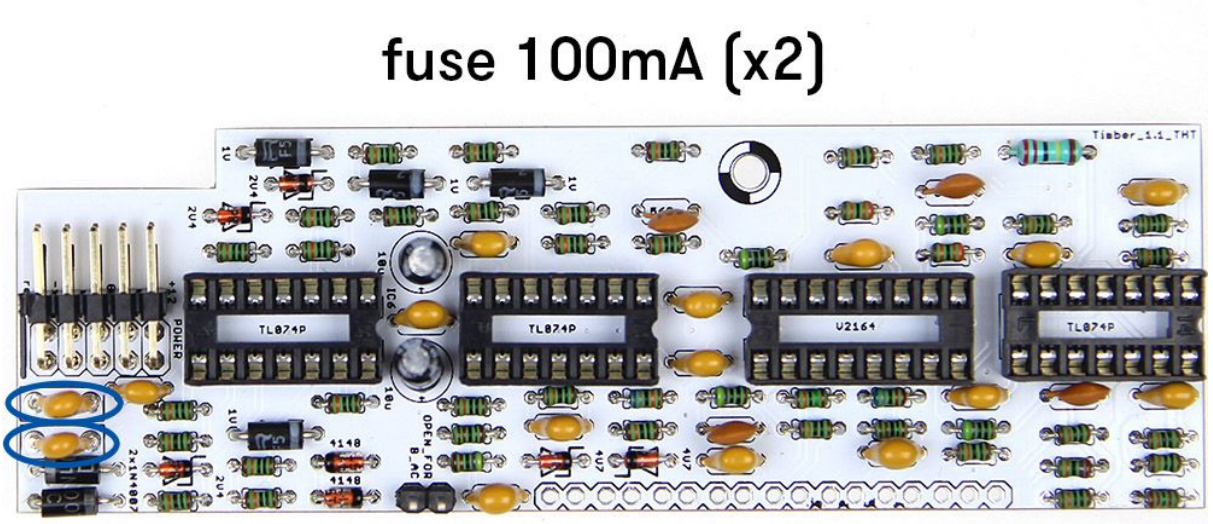
ELECTROLYTIC CAPACITORS

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).



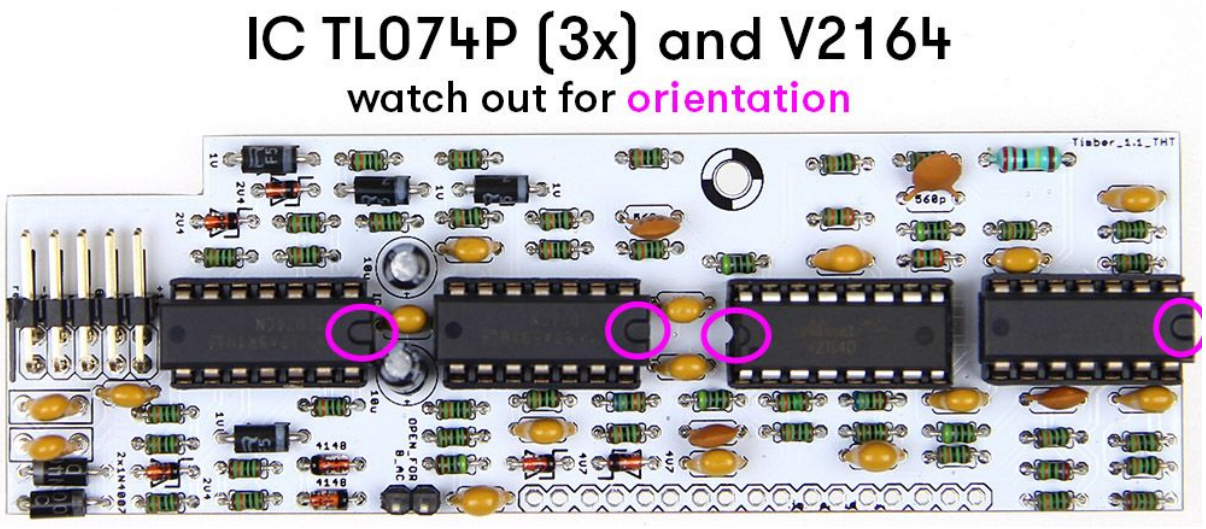
FUSES

Solder the two **fuses** right on the rectangular spot signed "PTC". These parts look quite similar to capacitors so don't let it confuse you.



INSERTING ICs

Next don't forget to place **ICs** into the sockets (1x **V2164**, 3x **TL074P**). **There is a notch on each IC that should match with the notch on the socket (this is super IMPORTANT!).** 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.



BEFORE THE LAST STEP FOR THE BOTTOM BOARD… (FEMALE HEADERS)

As you can see **one female pinheader left**. Hold on with this part. You will use it in later steps.

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

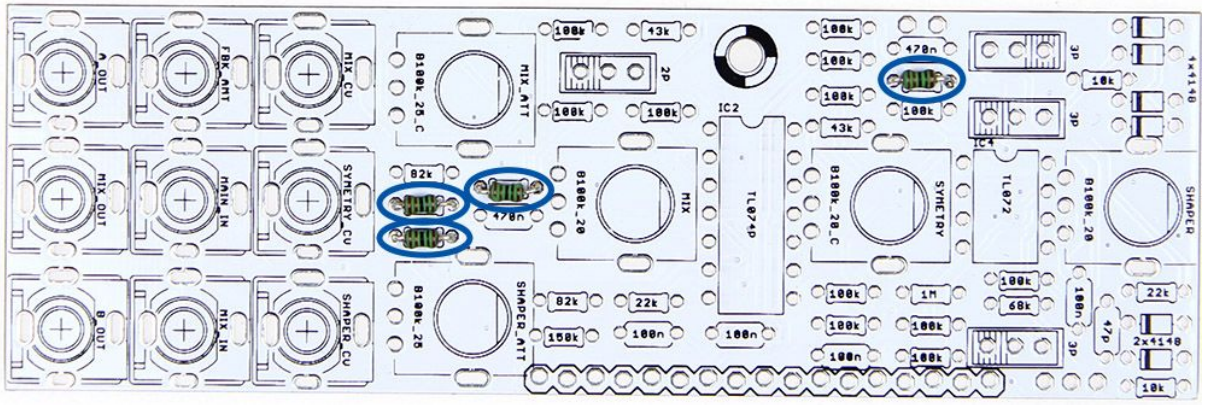
TOP BOARD

RESISTORS

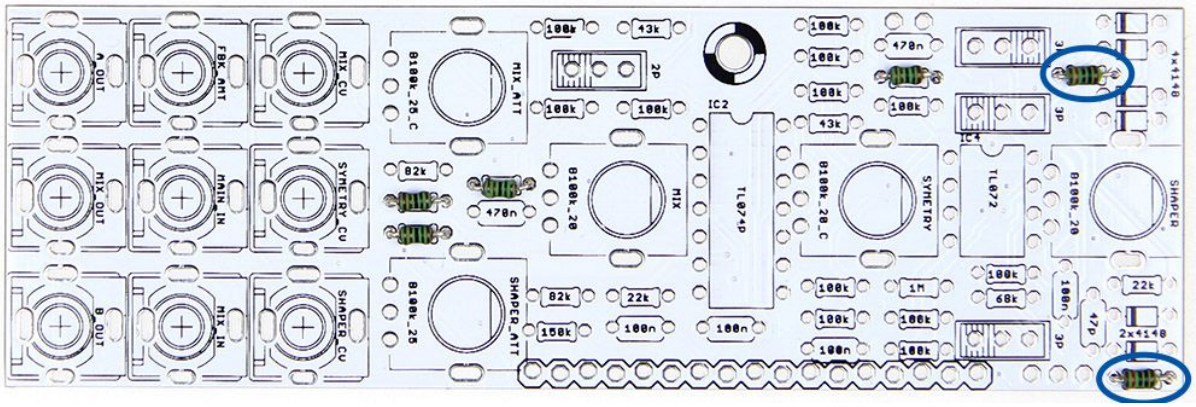
Let's move to the top PCB now. Again, start with the **resistors**:

- **1k** (4x), **10k** (2x), **22k** (2x), **43k** (2x), **68k** (1x), **82k** (2x), **100k** (12x), **150k** (1x), **1M** (1x)

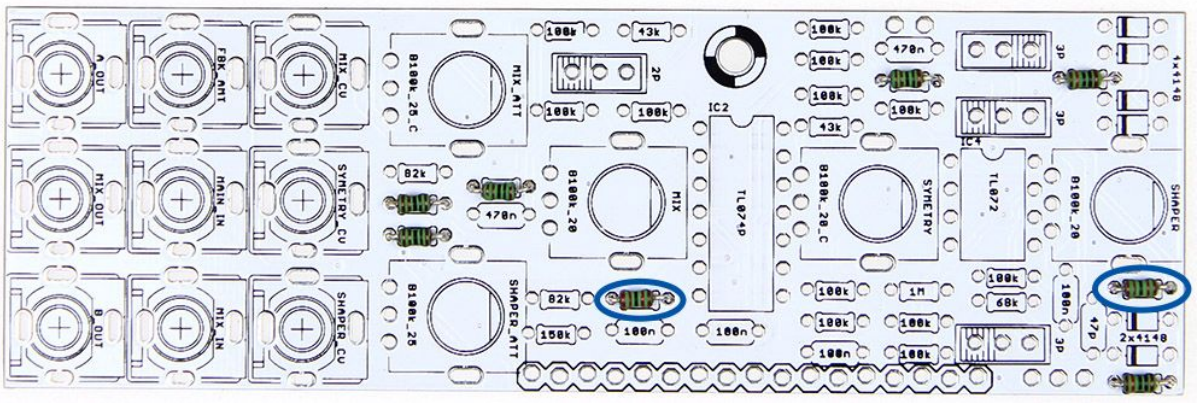
resistor 1k (4x)



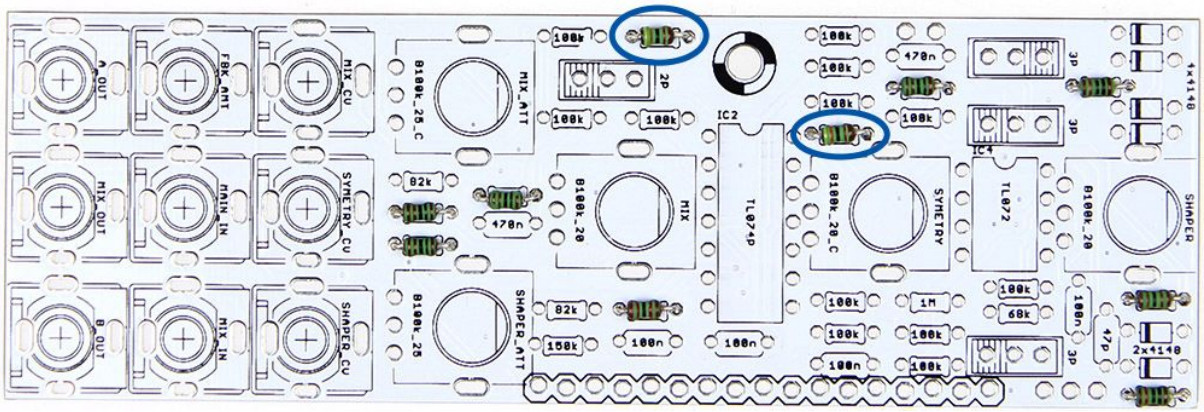
resistor 10k (2x)



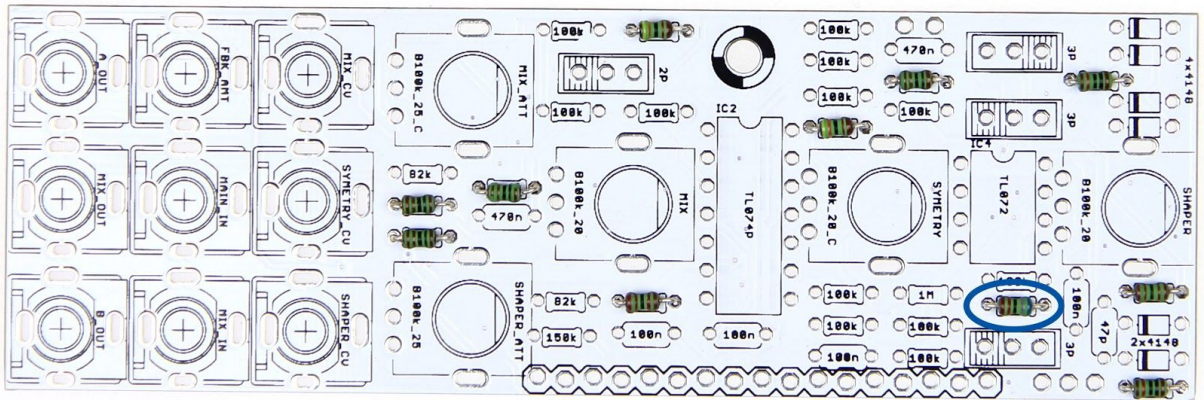
resistor 22k (2x)



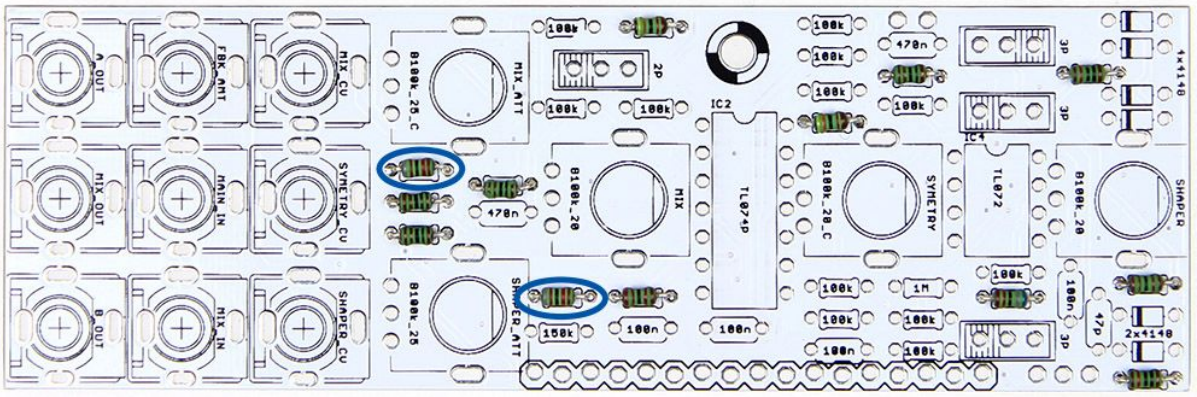
resistor 43k (2x)



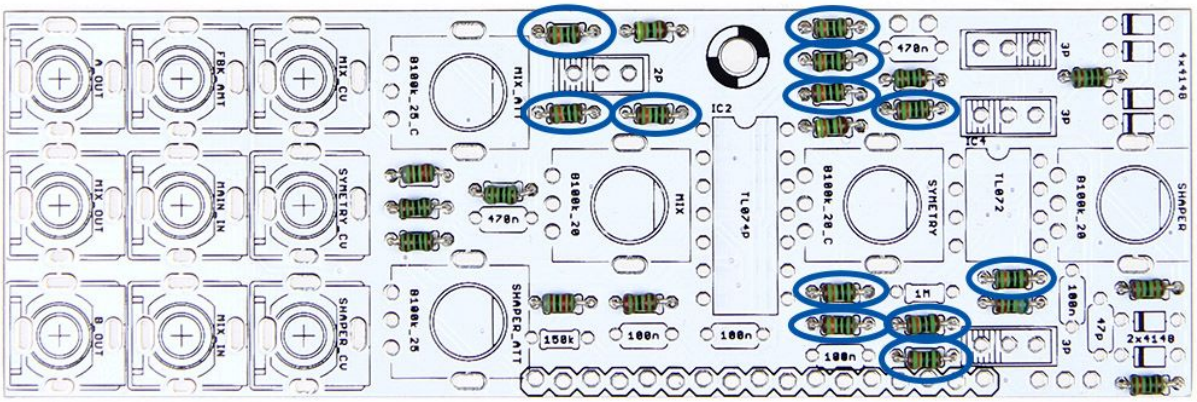
resistor 68k



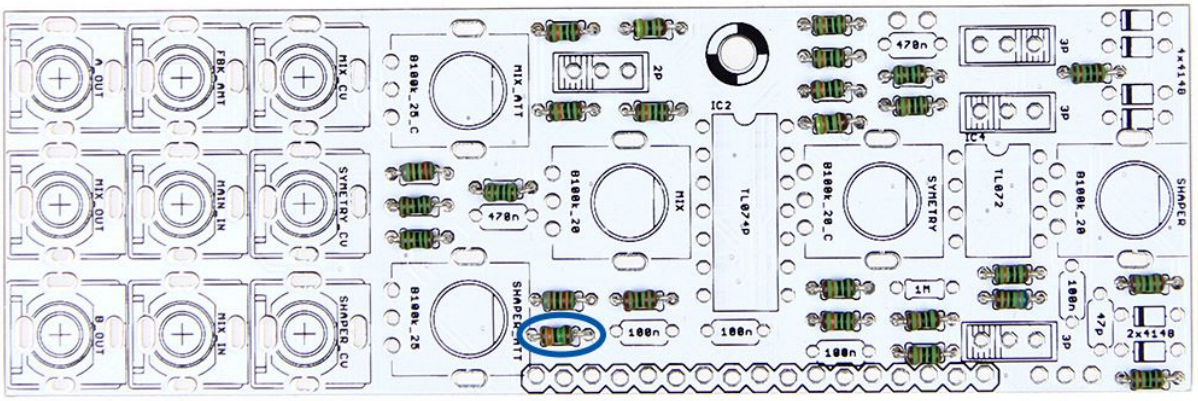
resistor 82k (2x)



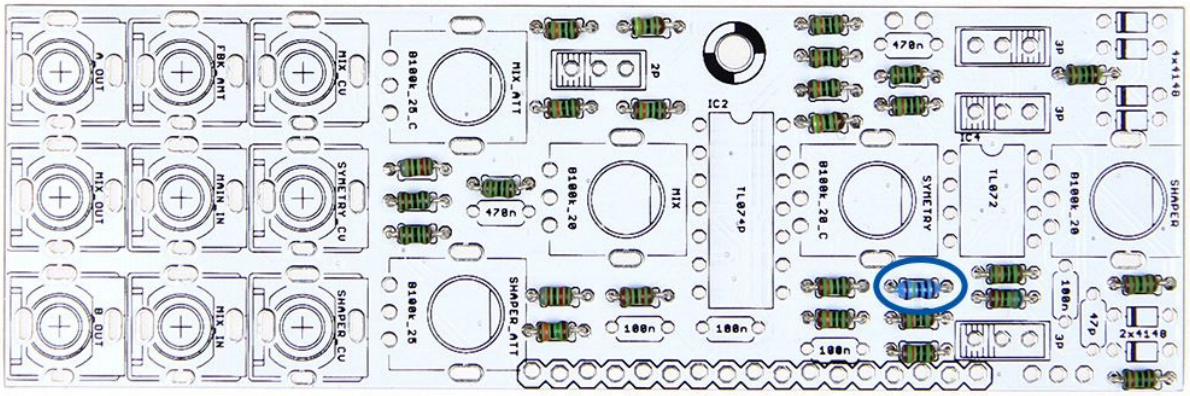
resistor 100k (12x)



resistor 150k



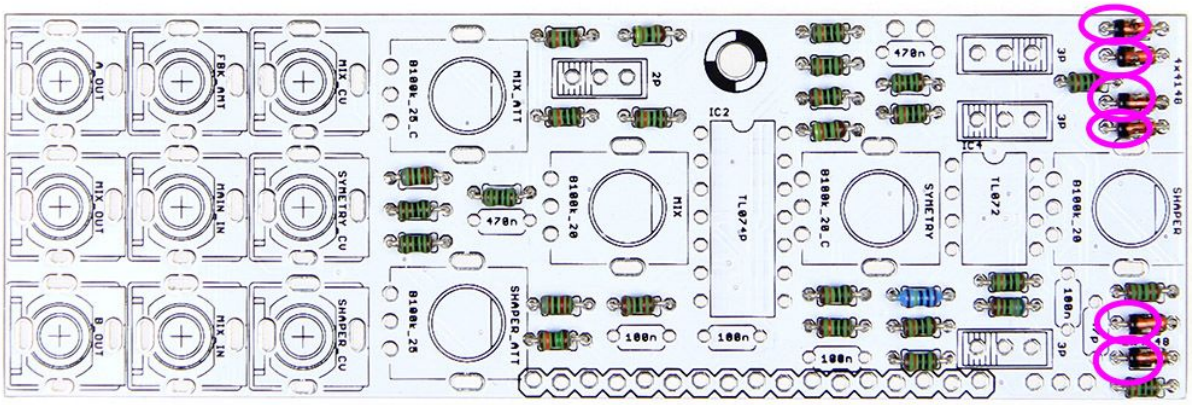
resistor 1M



DIODES

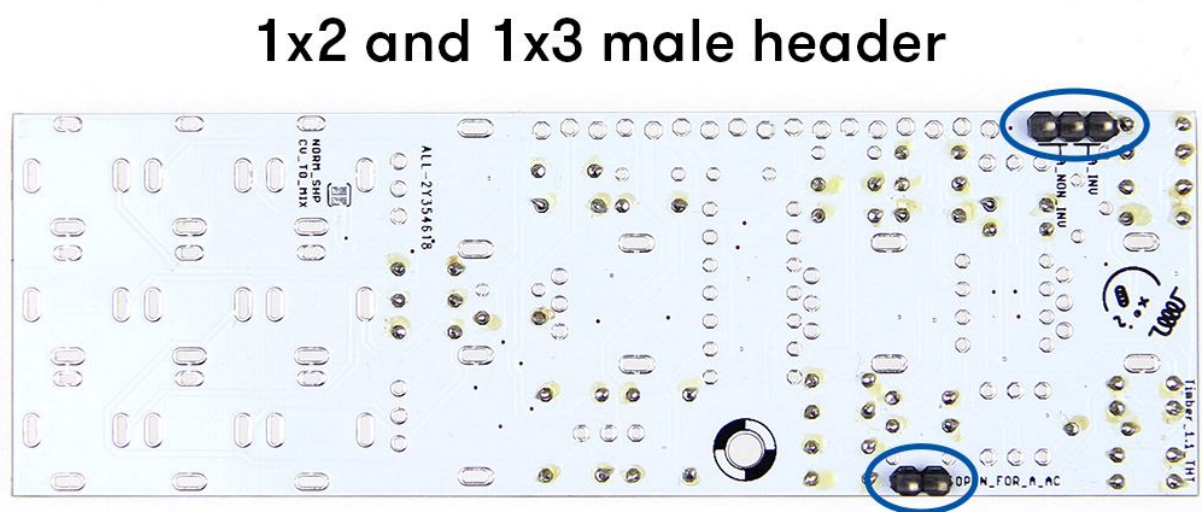
Next solder the **1N4148 diodes** (6x)**.** Be careful again, **diodes are polarized**!

diode 1N4148 (6x)



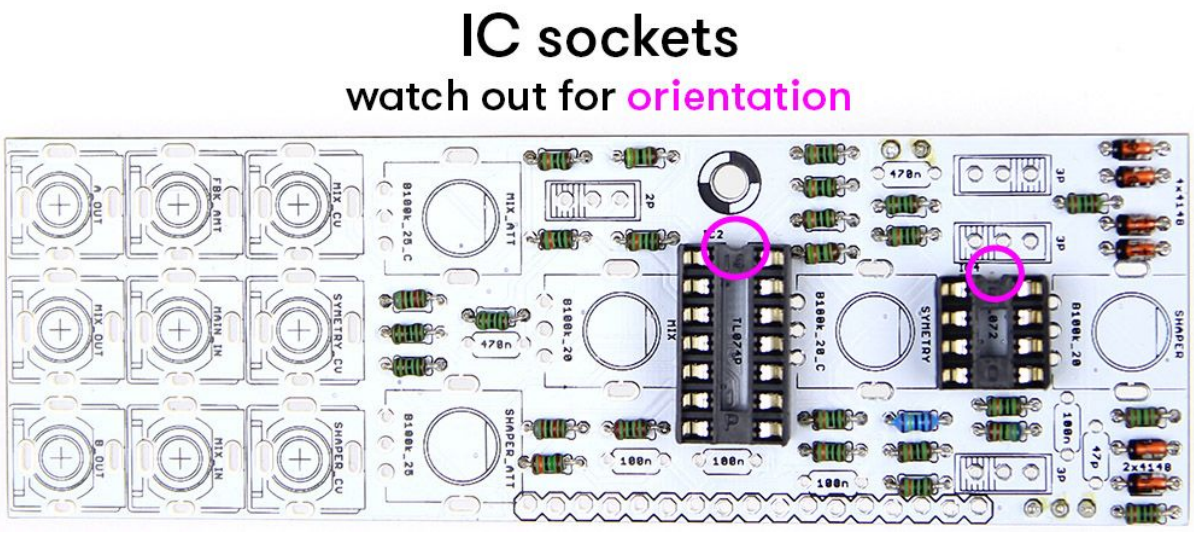
MALE PINHEADERS

Add the tiny **male pinheaders** from the other side of the board (one **2 pins** and one **3 pins**). Just be careful to solder them straight.



IC SOCKETS

Move to the **IC sockets** (1x 8 pin and 1x 14 pin). Watch out for the **orientation**!

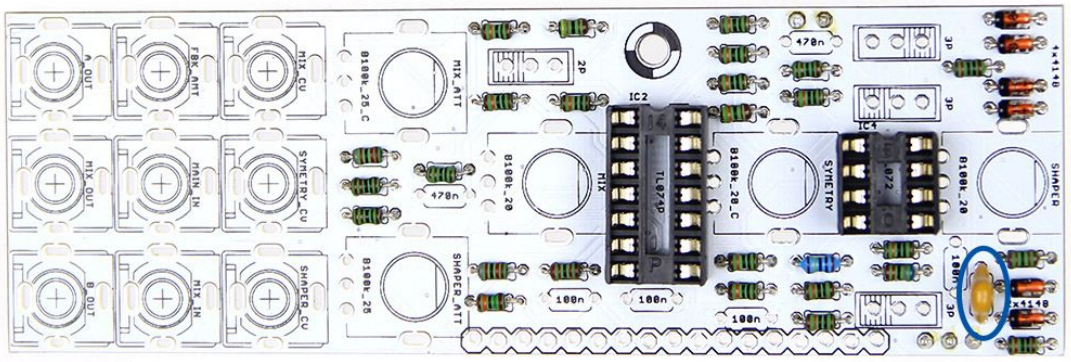


CERAMIC CAPACITORS

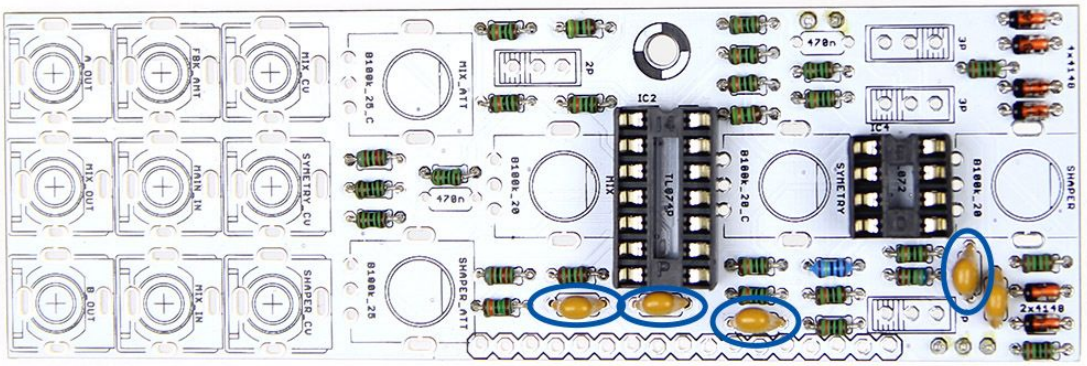
Now add the **ceramic capacitors**. There are just seven of them in three different values:

- **47pF** (1x, marked “470” on itself)
- **100nF** (4x, marked “104”)
- **470nF** (2x, marked “474”)

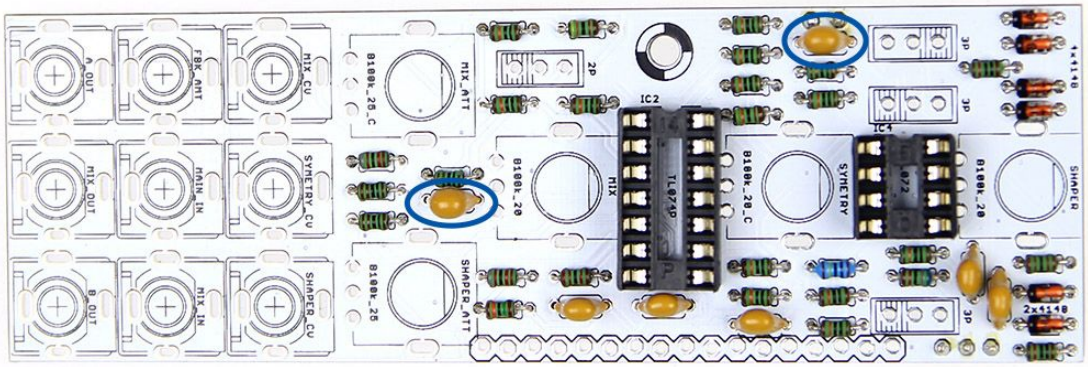
capacitor “470”



capacitor “104” (4x)



capacitor “474” (2x)

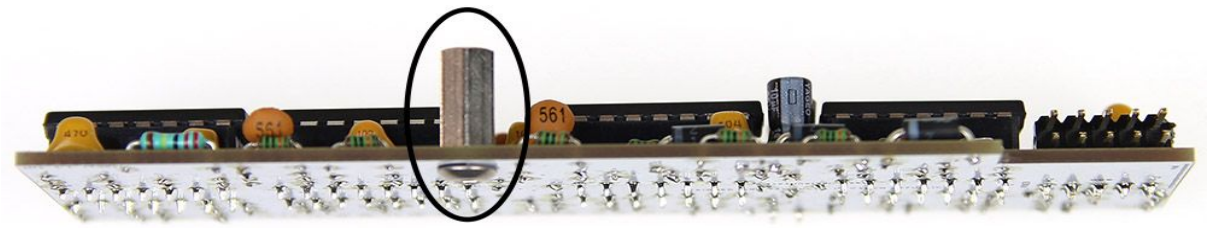


PINHEADERS

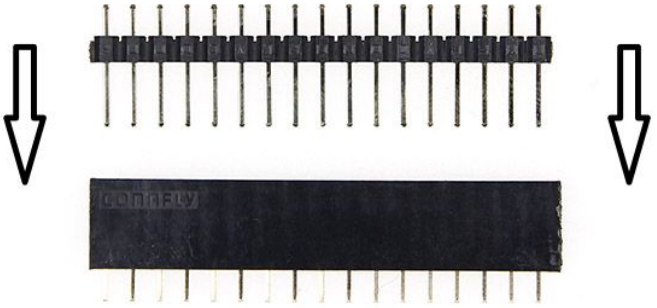
Now it's time to connect the boards with pinheaders.

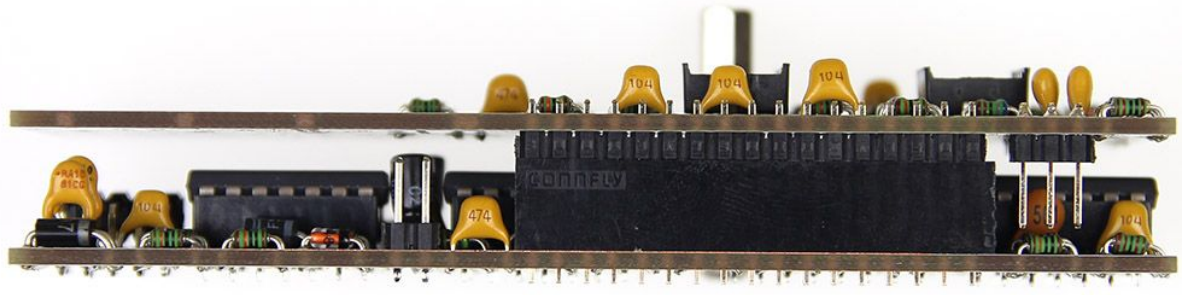
1) Mount the spacer with the screw to the bottom board first.
2) Insert male header into the female one.
3) Put the header on the bottom board facing the female one down.
4) Place the top board on and secure it with the other spacer. Check the position and do the soldering of headers finally.

spacer + screw

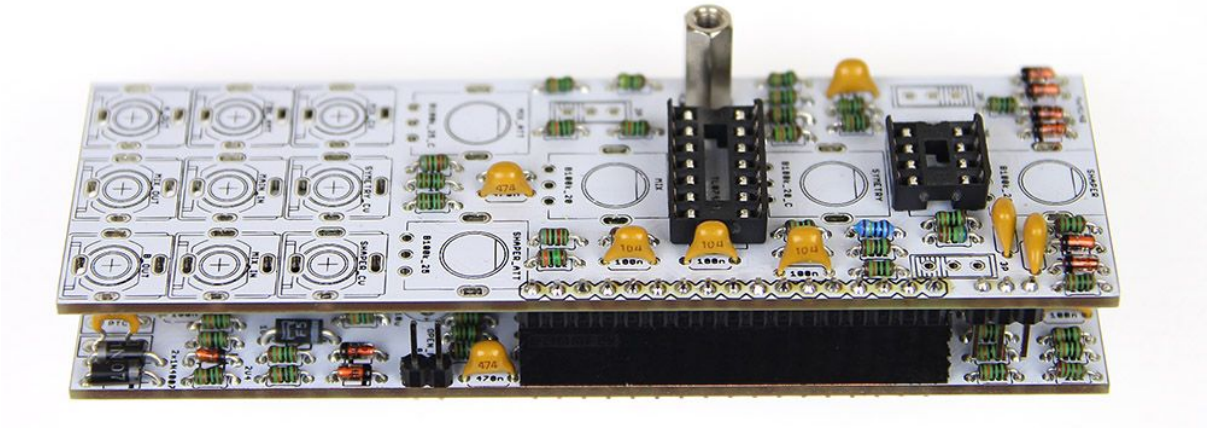


1x17 male + female header





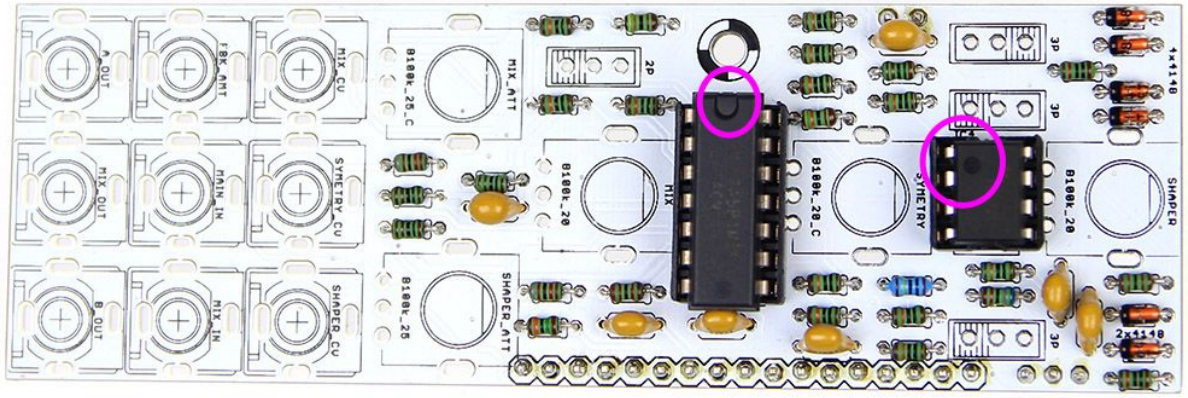
headers + spacer



INSERTING ICs

Before the last soldering run, insert the **ICs** into the sockets (1x **TL072**, 1x **TL074P**). Again, watch out for the **notch orientation**! **(for TL072 is relevant the dot on it)**

IC TL074P and TL072

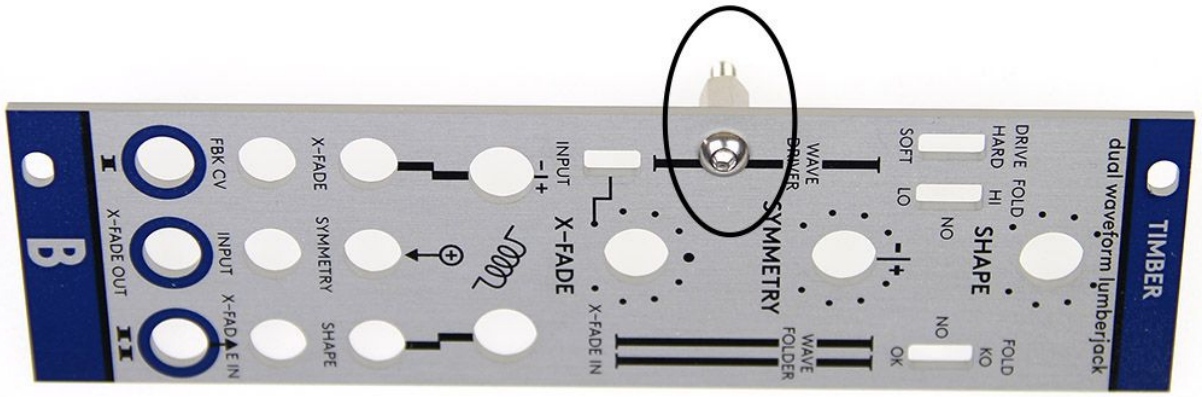


JACK CONNECTORS, POTENTIOMETERS & SWITCHES

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.
2) Mount the spacer to the **front panel**.

faceplate + spacer + screw



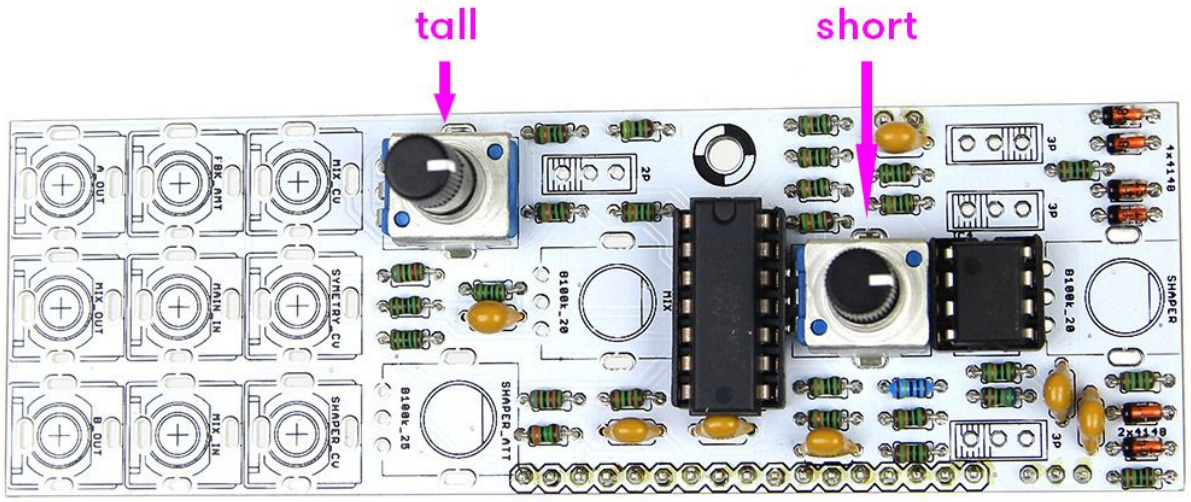
3) Check the set of **potentiometers** now. There are five of them of four kinds (see the picture below).
    a) First, check the **center detent ones (2x)** and place them at their spot on the board (the longer one goes to the bottom line).
    b) The other taller one goes also to the bottom line on the right. The last two ones goes to the spots that left. Be sure that the pots are placed in the right angle and they are right on the board.

potentiometers

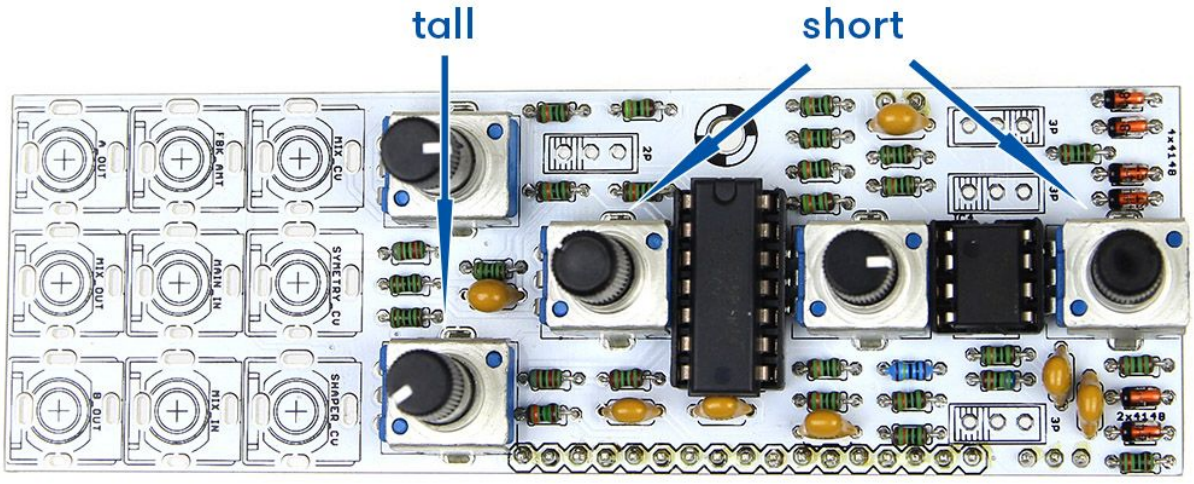
center detent (2x)

non-center detent (3x)

potentiometer center detent (2x)

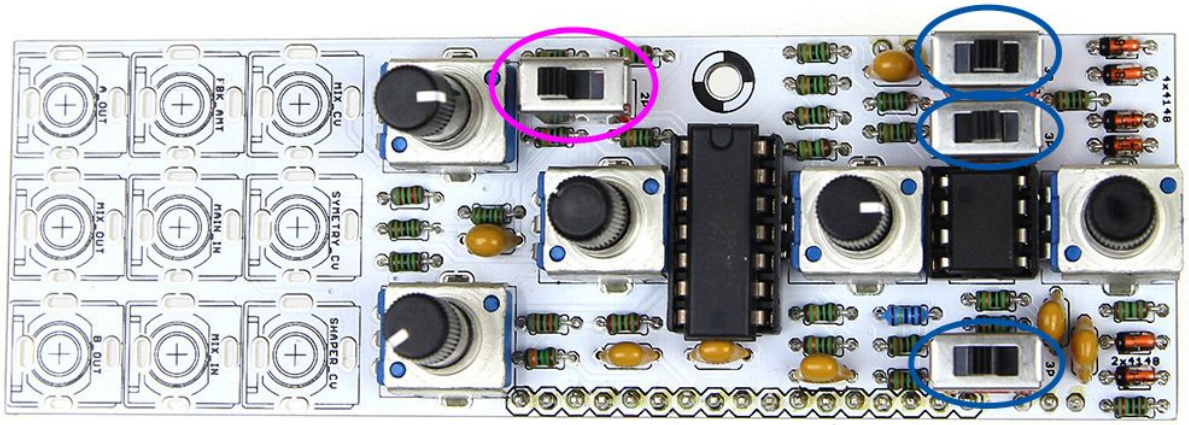


potentiometer (3x)



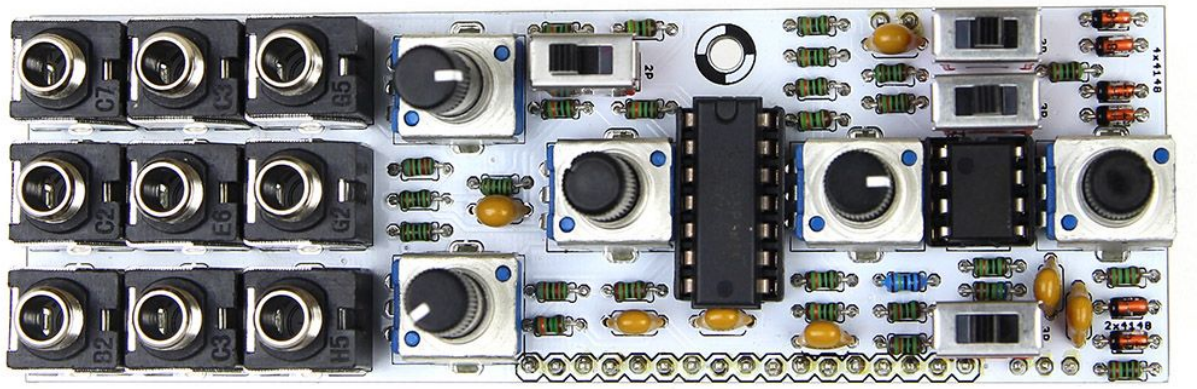
4) Check the **switches**: **three-position ones** (3x) goes to the top line, the **two-position one** is placed in the bottom. The orientation doesn't matter on these parts.

switch 2P and 3P (3x)

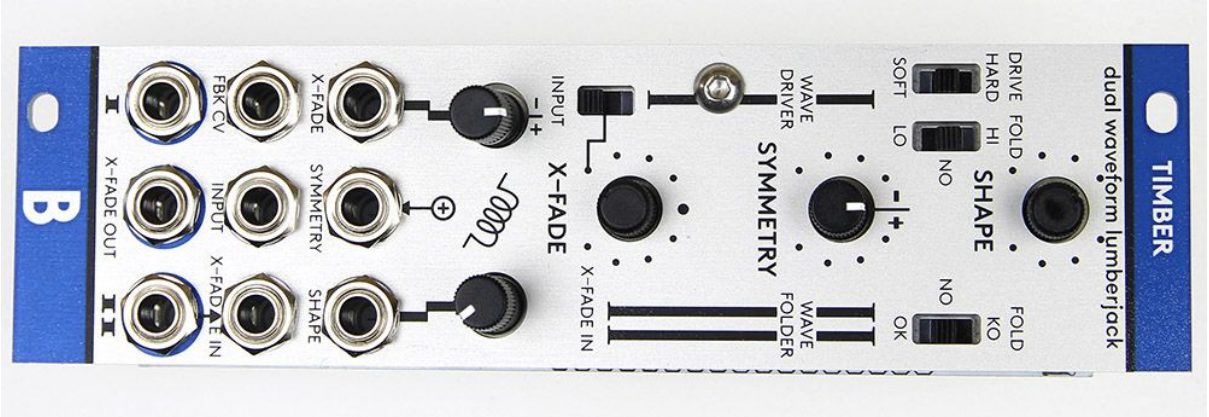


5) Insert **jack connectors** (9x).

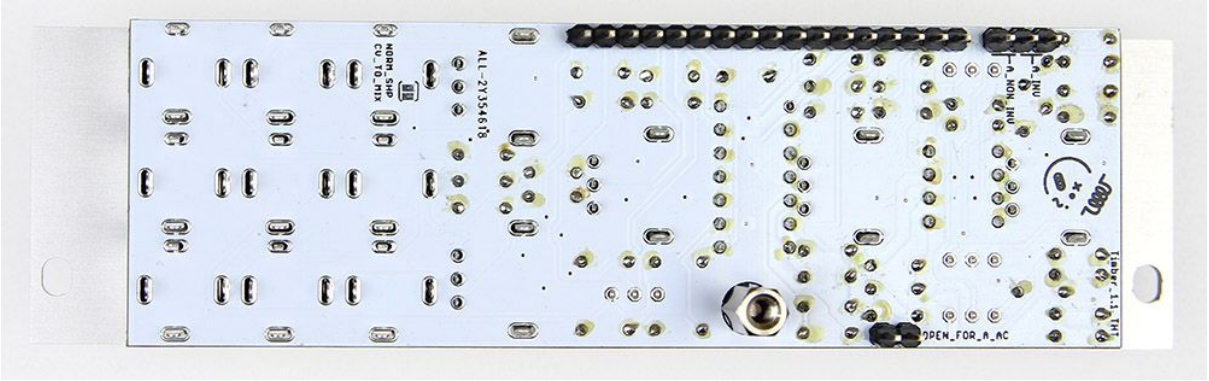
jack connectors



6) Place the **front panel** on the top board and mount the jacks.



7) Mount the spacer with the other one. Check the position of all the parts if they are flat on the board and at the right angle and do the soldering (**SOLDERING TIP**: you can start by soldering just one of the leg at each component so you can make adjustments easier by reheating)

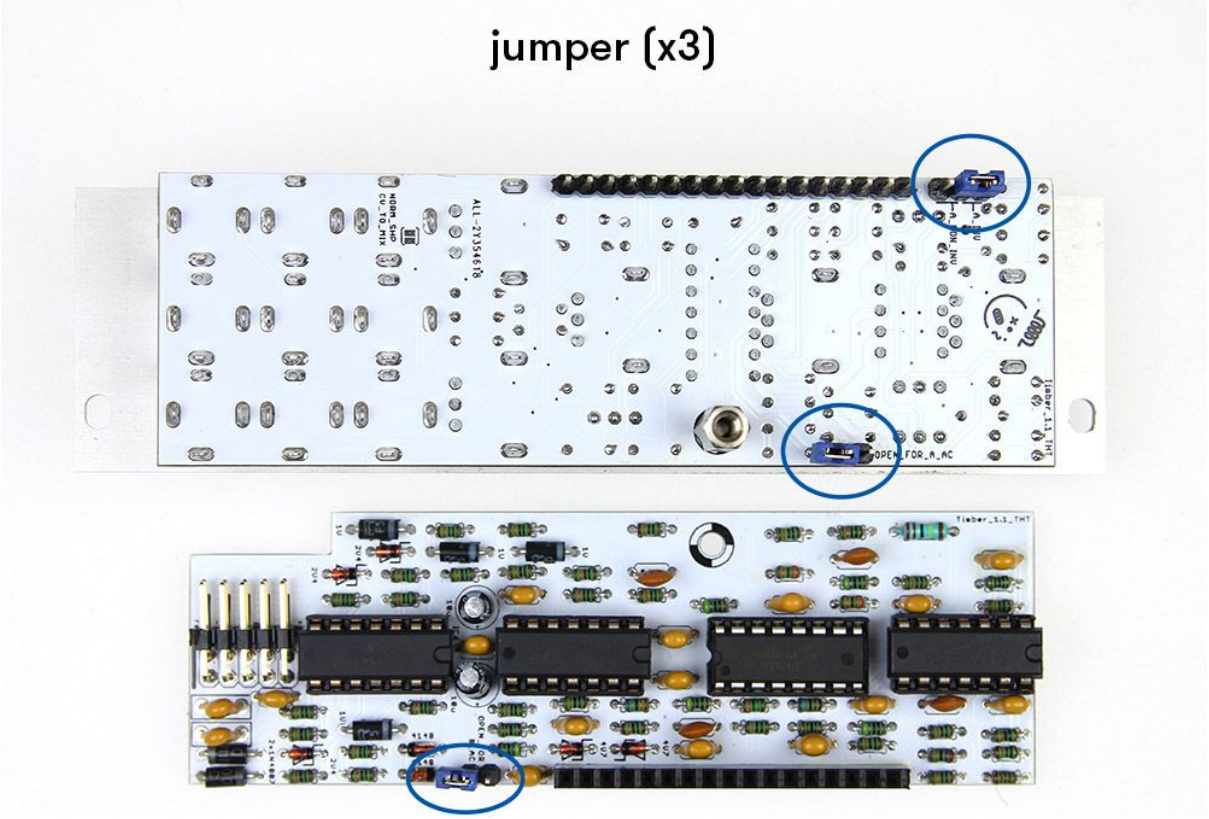


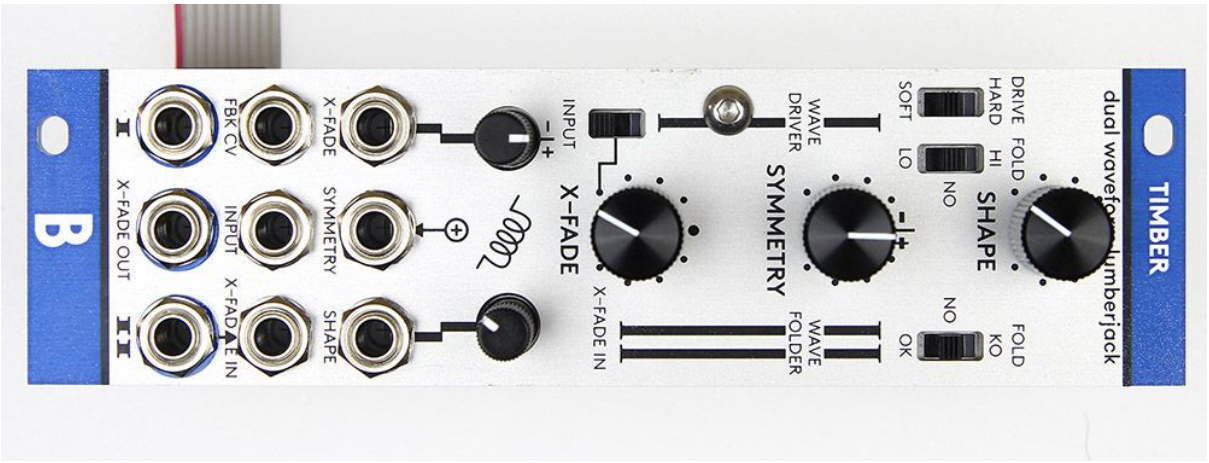
CLEANING (OPTIONAL)

After the soldering is done 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 (be aware to not 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.

FINAL ASSEMBLY

Congratulations! You have made it through, your TIMBER is ready to work! Just add the **knobs** and set the **jumpers** as you want (see the photo and manual). 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 also reach us here: diy@bastl-instruments.com. Or send the module straight back to us using our Come to Daddy service.