

Tubbutec Sumtiple Kit Version – Construction Manual

This document describes the construction of the Sumtiple Kit. The following parts are included:

- 1x Sumtiple PCB with SMD-Parts already soldered
- 1x Front panel
- 8x Jack sockets and nuts
- 1x RGB-LED
- 1x 10-Pin Header
- 1x Power supply cable

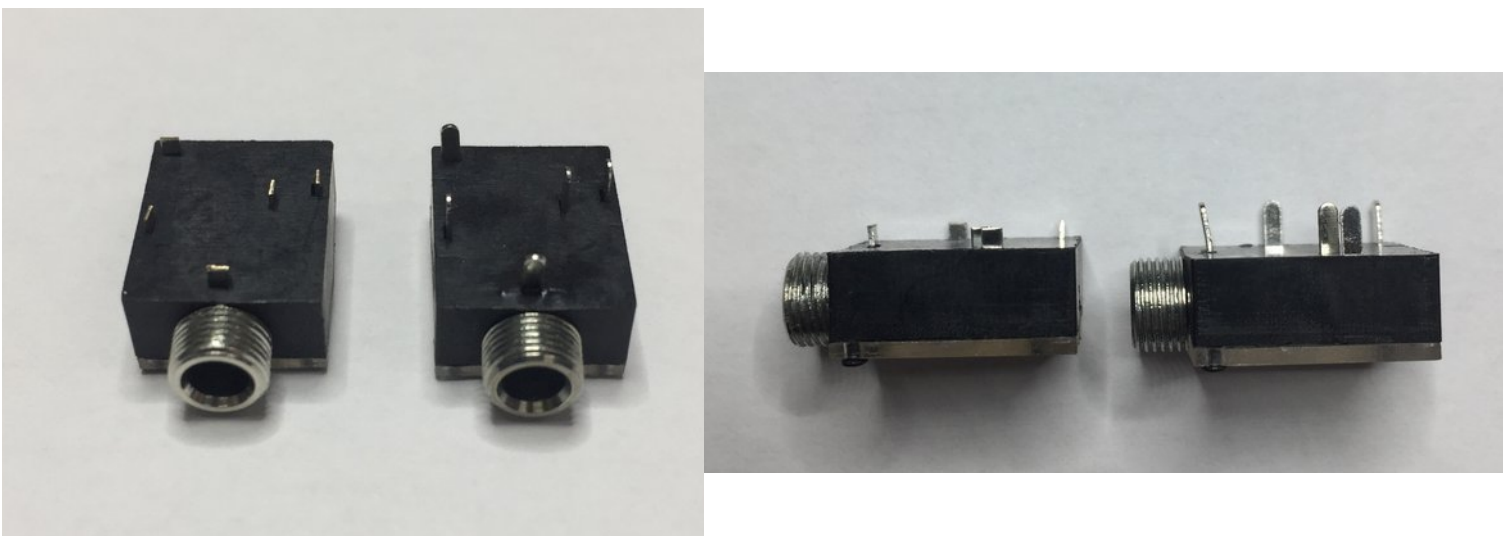
Tools needed to build Sumtiple:

- Soldering iron, solder
- Side cutter
- Pliers
- Multimeter for calibration
- Small screwdriver

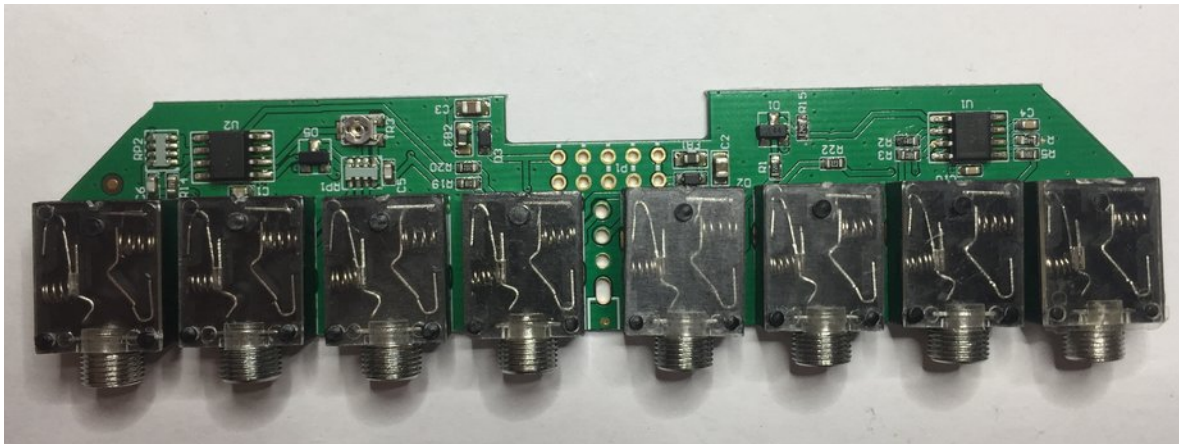
Construction

First you should start with preparing the parts needed for proper construction. Check the pictures for a better understanding of what needs to be done.

First take the jack sockets, you need to pinch off a little of each pin. The pins need to be cut to a length of 1mm. If they are not short enough, they will stick out of the board and may touch a module next to it.

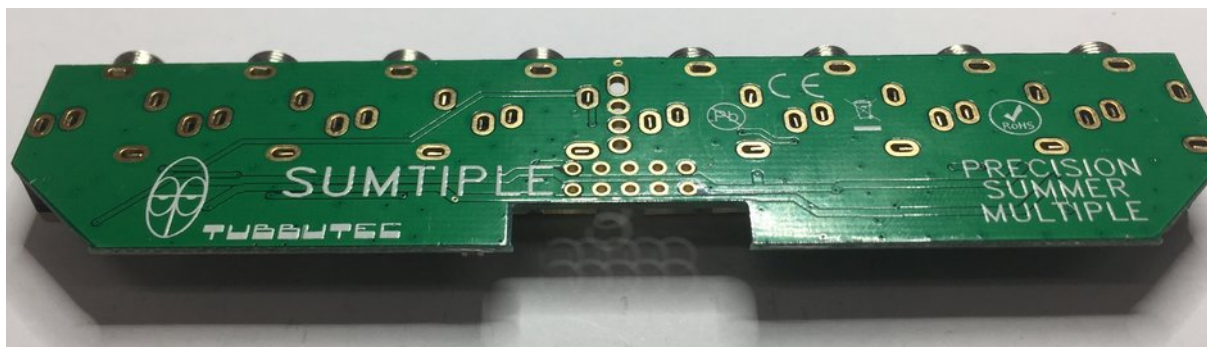


The sockets should look like the one left in the pictures above. When you have prepared all 8 sockets, take the PCB and put the sockets on it like shown.

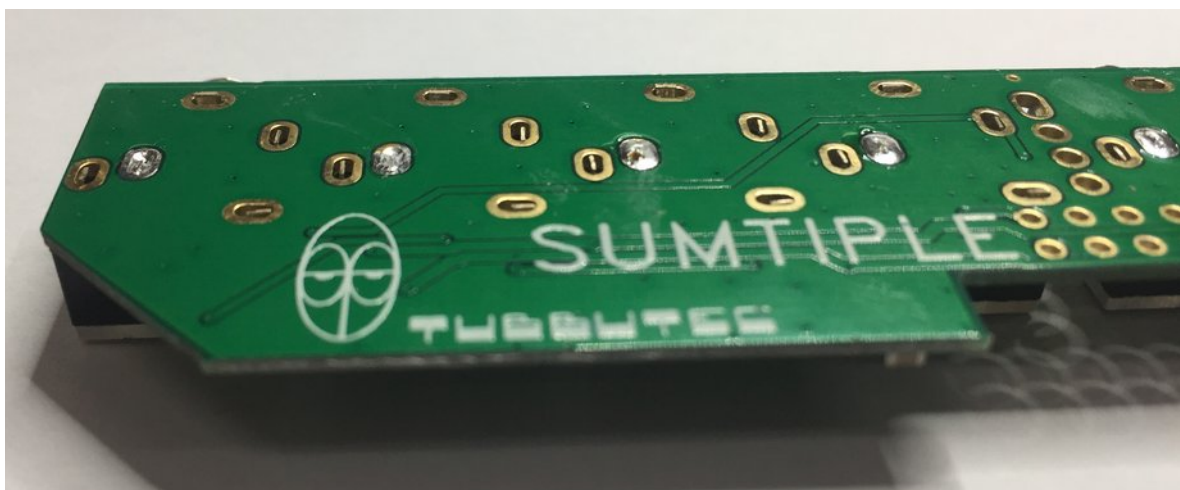


Now turn the board over. The easiest way, without all the sockets falling out, is to take a ruler and put it on top of the sockets, hold it with the PCB and turn it around. When you put it on the table, you can slide the sockets and PCB off the ruler.

If you cut the pins to the right length, the PCB with the sockets should look something like this:

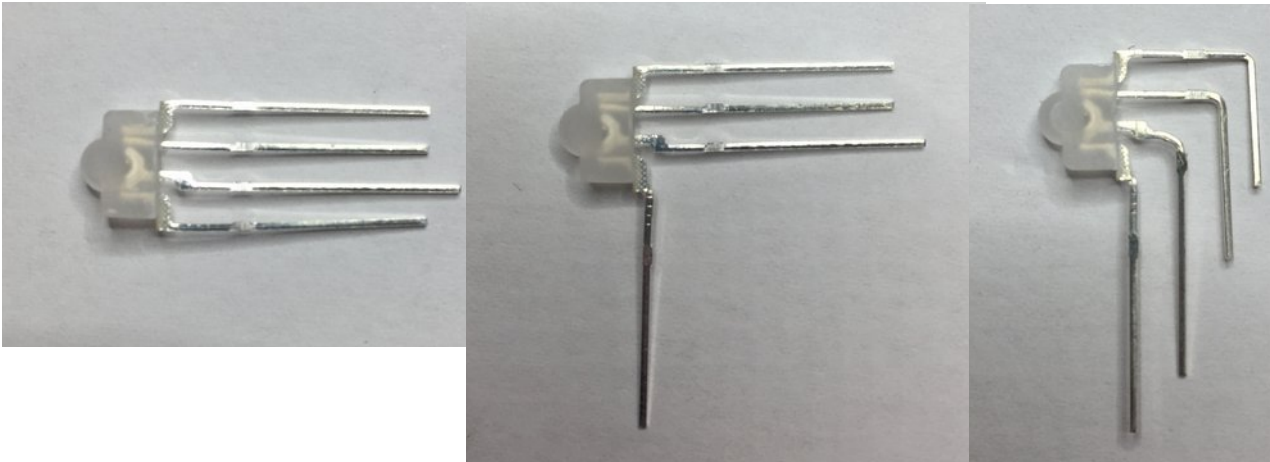


You can see that the pins are level with the PCB and not sticking out (This should be the case for every pin on the board [the LED and pin header pins]) Now start soldering one pin of each jack. That makes it easier to realign them before soldering the rest of the pins. We used the second pin from the left in the picture above.



Use as little solder as possible or cut/pinch off the solder afterwards, so it looks like above. Check if the jacks are aligned, then you can solder the pins that are left, again, try to use as little solder as possible.

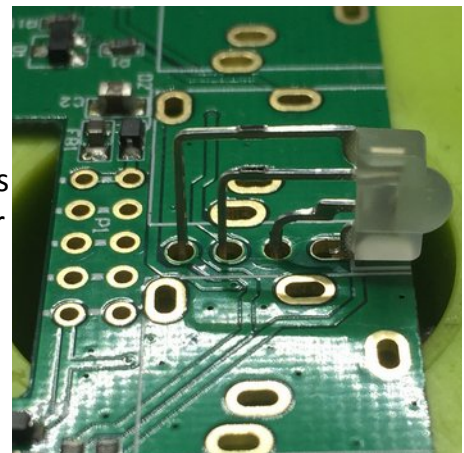
Now take the RGB-LED. You need to bend the wires in a 90° angle for the LED to fit.



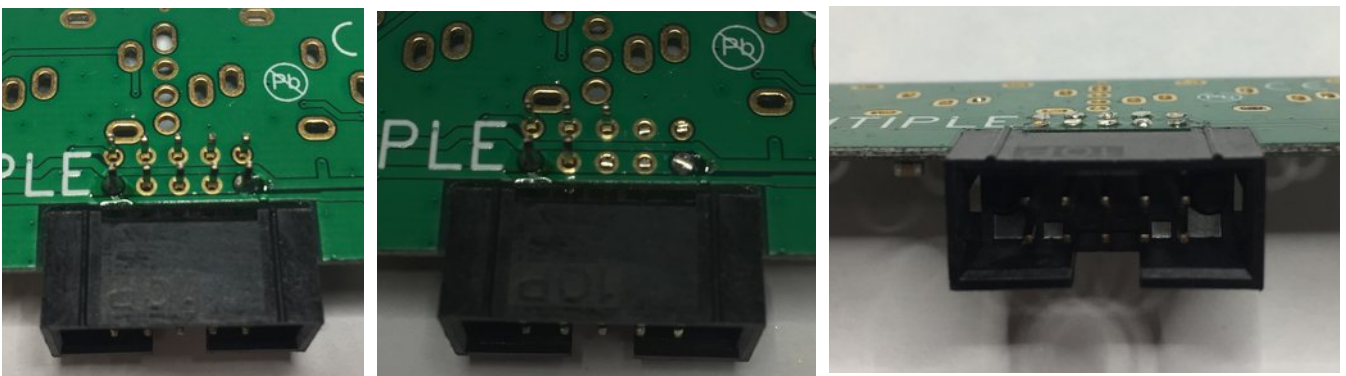
The flat side is looking towards you, note that one wire that is longer than the other three. The wire underneath it must be bent as near to the plastic part as possible.

Now you need to bend the other wires, so that they are 2.5mm apart from each other.

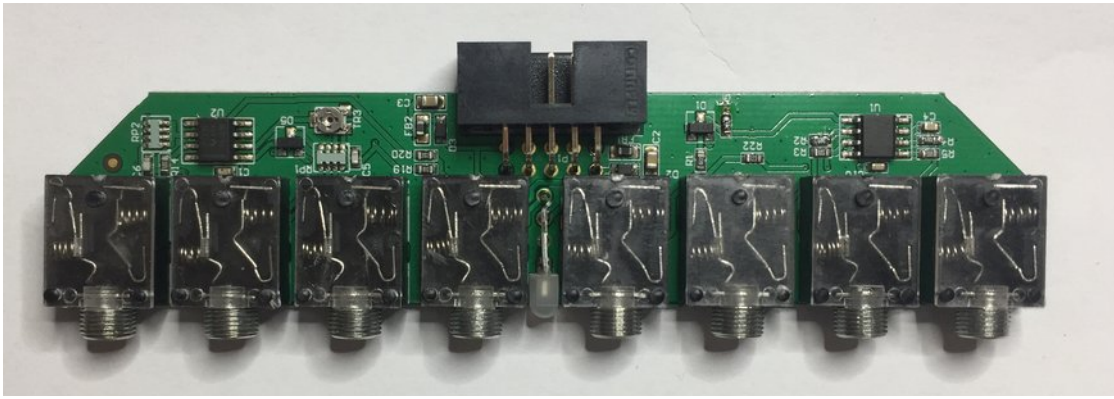
Now you can fit the LED to the PCB (note: for a better overview the sockets are not yet placed in the pictures, it is VERY IMPORTANT that the sockets are placed first!). Solder the shortest pin, then pinch off all pins as close to the PCB as possible. Make sure the LED sits properly on the board like on the right picture. Now solder the other pins.



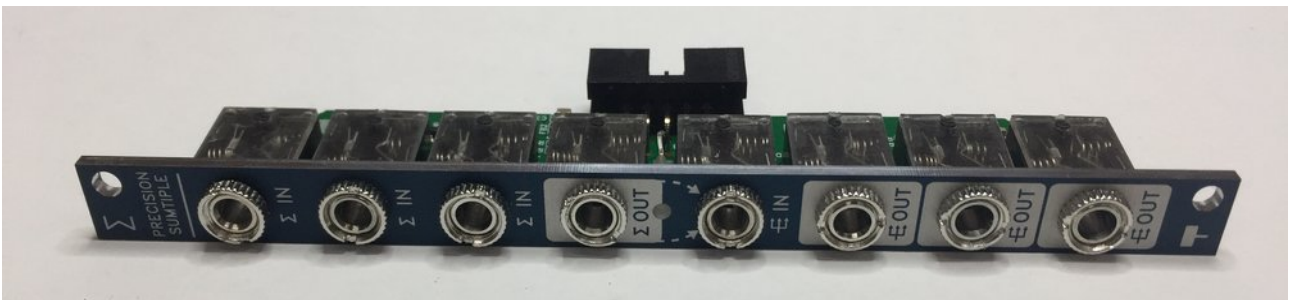
You can now place the 10-Pin-Header. Make sure it aligns with the board and solder two pins on every corner. Pinch off all pins so they only stick out a little.



After pinching off the pins and soldering them, the pin header and the PCB should now look something like the right picture above.



The Sumtiple is almost finished. The board should look like this now. You can take the front panel, attach it to the board and screw the nuts to the jacks. Note the correct orientation of the front panel.



You only need to calibrate the Sumtiple for the high precision and you are done!

Testing

A quick test is recommended. Attach some voltage or signal to the summer inputs and measure all outputs.

Calibration

For calibration you need a DC voltage source of about 10V. The exact value is not important, anything between 9 – 10V is fine. You can also use a lower voltage, such as 5V, but that may result in a more difficult calibration.

Attach the voltage source to the first summing inputs and measure the voltage between the input and the summer output with a multimeter, preferably in mV range.

Adjust the trimmer on the PCB until the voltage reads as close to 0V as possible. The three summing inputs will have slightly different gains (variation of maximum 0.05%), so it is recommended to try all three inputs and minimize the total error.