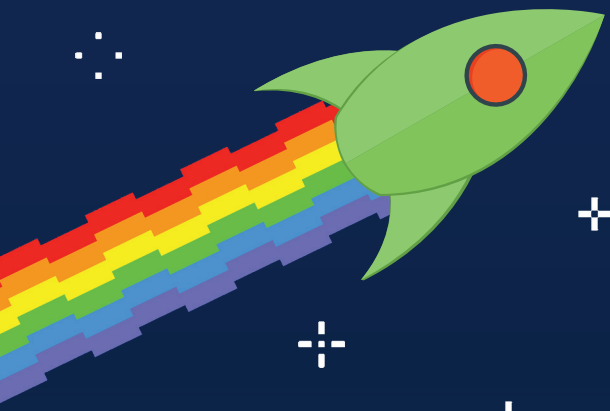
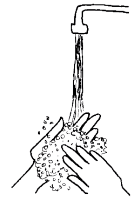


BlinkenRocket V2

Manual

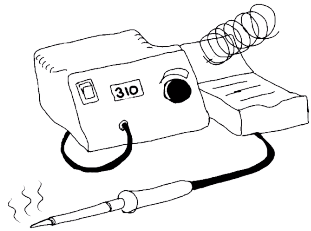
SECURITY ADVISORY

Once you are done with soldering you should wash your hands thoroughly using soap and water. Solder is not healthy and must not touch your drinks and food. Thus do not drink and eat while soldering.



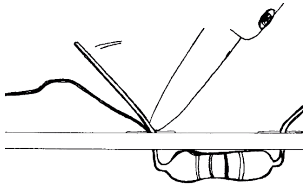
HOW TO SOLDER

You need a soldering iron with a temperature between 310°C and 350°C (590°F to 660°F). At these temperatures solder becomes liquid and bonds whatever you like to solder to the printed circuit board. Heat is dangerous so take care and securely store your soldering iron once you are done.

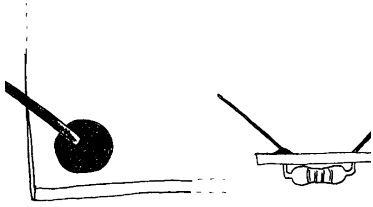


SOLDER THROUGHHOLE PARTS

Put the part through the right holes on the PCB. The part has to lay flat on the surface on the side with markings. If the part is loose and falls, you may bend the legs a little to stabilize the part. Now solder each individual leg of the part by heating the leg and the circuit board. Then apply some solder from the side until there is a small hill of solder bonding the part to the circuit board.

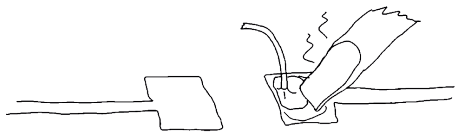


IF the blob of solder looks like the one on the image, you're doing a great job. If it is not quite right you may heat it again and move the hot tip of the soldering iron toward the end of the leg. Don't worry, practise will make everything look awesome!

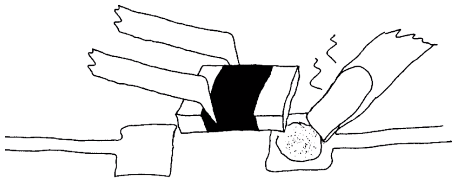


SOLDER SURFACE MOUNT DEVICES

SMD parts are soldered to so called "solder pads" on the surface of the printed circuit board. One side of a pair of soldering pads is heated first with the tip of your soldering iron and then some solder is put there. It is important that only one pad of each pair is covered with solder. Otherwise soldering is will be more challenging.



Now heat the previously created hill so that the solder becomes liquid again. Now grab the part with tweezers and gently push one side of the part into the hill of molten solder. Then put away the heat so that the solder becomes solid again.

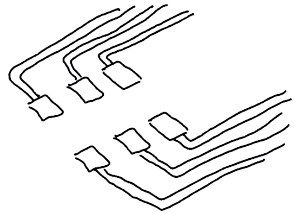


To solder to other side of the part, heat the pad and put some solder on the other side of the part. Do not heat the other side for too long as the already soldered side might become liquid again due to the heat. High temperatures may also damage the part.

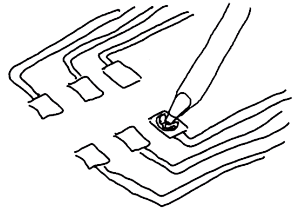
The soldering results should look like the one on the picture. The pins of the part should be completely covered with solder. In addition the parts should not move and fall when you flip the circuit board.

SOLDER SMD PARTS WITH PLENTY PINS

In contrast to SMD parts with just two pins or legs, there exist parts with multiple pins. For each of the pins there is a matching pad on the surface of the printed circuit board. Pads can be small but don't be afraid - you can do it if you are following this guide!



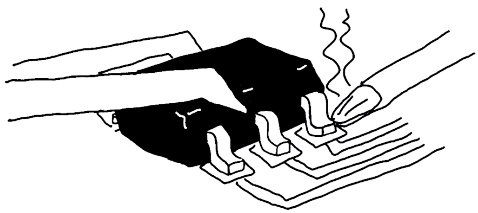
First, choose a pad that matches the corner of your part. Put a small hill of solder on the pad, just like you would do with a two pin SMD part too. It does not matter which corner you choose as long as you only choose one corner.



Now grab the part with tweezers and place it in a way that matches the pads. Take care that the markings on the part exactly match with the markings on the circuit board. Otherwise the part won't function correctly and can be completely damaged.

Having the part securely fixed with tweezers, heat the little hill of solder and gently push the part in while the solder is still liquid. Once you are satisfied with the positioning, remove the tip of the soldering iron, let the solder cool and finally remove the tweezers. If you are not satisfied with the position, you may heat the pad again and adjust the position with tweezers. Never use your hands for this task!

Finally secure the part by soldering the adjacent side to the pin you just soldered. Make use of tweezers if the part still moves. Once finished, continue with the remaining pins.



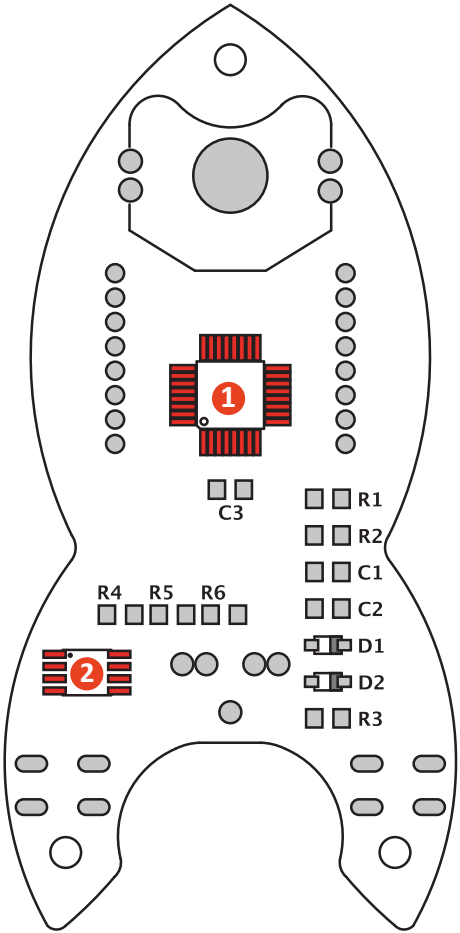
HOW TO SOLDER BLINKENROCKET: THE MICROCONTROLLER

1 Rotate the printed circuit board so that it looks like the one pictured on the right page. If the microcontroller is already soldered, please go ahead with step two. Otherwise solder the microcontroller to the printed circuit board at the U1 marking.

Instructions for soldering SMD parts with plenty pins can be found in this manual if you are unsure how to do it. It is crucial that the direction of the package is just right. For this part there is a little circular marking that has to face in the direction of the circle on the circuit board. If themarkings do not match, the rocket won't function correctly. If you made a mistake by accident, please search for a tutorial on how to "desolder" SMD parts using solder wick.

2 The second part is a so called EEPROM which has to be soldered to the pads marked with U2. If the part is already soldered to the circuit board, go ahead with step three.

Soldering the EEPROM is easy once you aligned the markings. Follow the instructions in the manual for soldering SMD parts with plenty pins and you will be good to go!

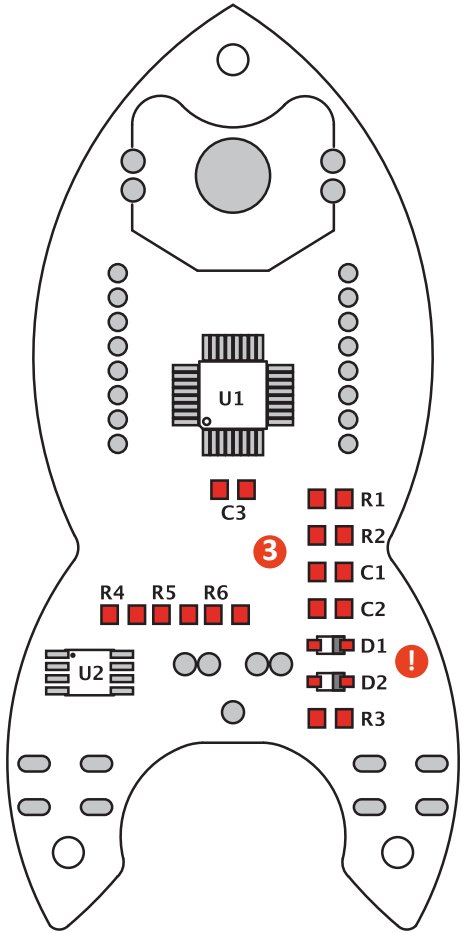

1
2
C3
R1
R2
C1
C2
D1
D2
R3
R4
R5
R6

HOW TO SOLDER BLINKENROCKET: THE SMALL PARTS

3 Solder the remaining SMD parts to the circuit board. If the parts are already soldered to the circuit board, continue with step four. The position of each part matches a marking on the circuit board (like "R1", "C1" or "D1"). We have color coded the parts so that you can distinguish them easier. The table below shows which color corresponds to which marking.

Take special care that each part is always correctly placed and aligned in the middle between two pads. Otherwise they do not connect well and your rocket won't work.

! Caution! Diodes marked D1 and D2 have to have the same direction. Take care that the markings on the two parts align. Otherwise transmitting data to the rocket won't work.

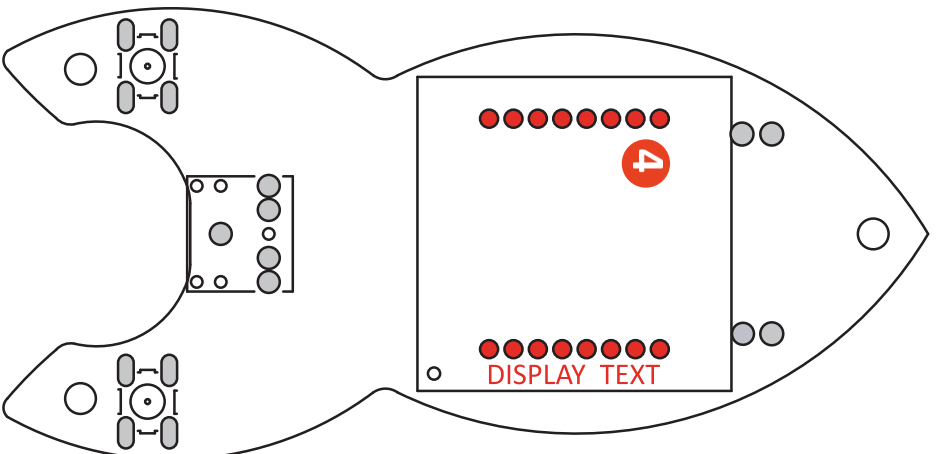

U1
C3
3
R1
R2
C1
C2
D1
D2
R3
R4
R5
R6
U2
!

HOW TO SOLDER BLINKENROCKET: THE MATRIX DISPLAY

4 Turn the circuit board so to the side without parts. In the next steps you need to put the legs of the part through the holes so that you can solder them to the PCB at the side where you already soldered the small SMD parts.

The next part is the matrix display. Crefully put each leg through the holes and take care that they do not bend. Either align the pin marked with one to the hole marked one or align the text on the display so that it faces the right side. Before you actually solder the display check twice as, desoldering and soldering the display is very time consuming and may damage the display completey. Loch gesteckt werden! Once you checked the right direction, solder each leg to the printed circuit board. Try to be quick because overheating the legs may damage the display.

! Caution! Take care of the markings and double check if in doubt. The display sits on the side of the circuit board without SMD parts and needs to be soldered on the side with SMD parts.

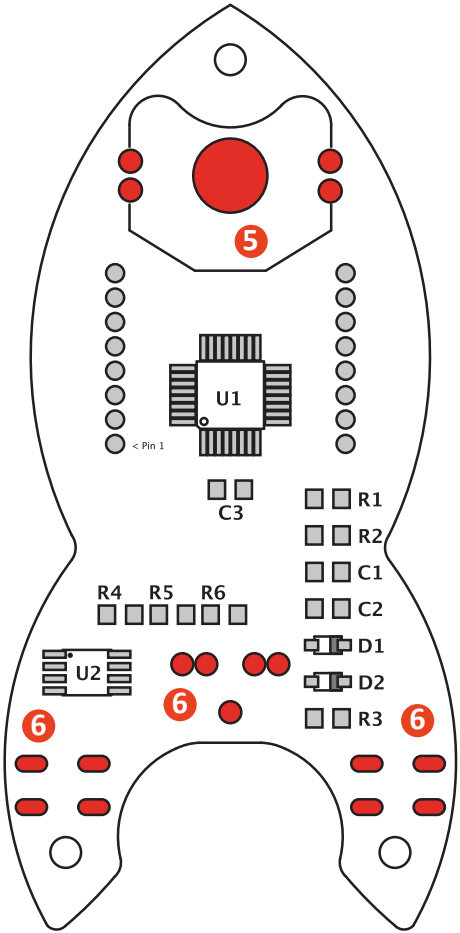

4
DISPLAY TEXT

HOW TO SOLDER BLINKENROCKET: THE THROUGHHOLE PARTS

5 Flip the PCB again and heat the big round area near the battery holder. Put some solder there to enhance the connectivity of the battery. Then insert the battery holder and solder it to the printed circuit board. Take care since you have to solder it on the other side where the matrix display is located.

6 Now put the remaining parts on the printed circuit board and solder them to the side with the SMD parts. The parts include two tactile switches and one 3.5mm audio connector. Take care that the parts are located on the same side as the matrix display. If the parts fall when you flip the circuit board, put something heat-resistent under the part to secure it while soldering.

! Please double check that you soldered everything correctly. If you see something that does not look quite right, apply some heat to fix it. Only when you soldered everything correctly your BlinkenRocket will work.


5
U1
< Pin 1
C3
R1
R2
C1
C2
D1
D2
R3
R4
R5
R6
U2
6
6
6

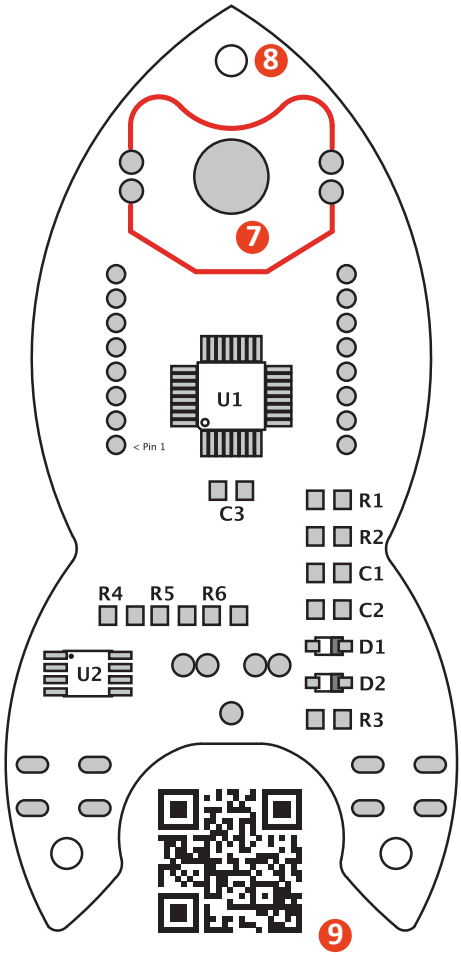
MAKE BLINKENROCKET FLY

7 Slide the battery into the battery holder with the plus side facing up. The BlinkenRocket display should light up and show something. If not, please check whether all pins are correctly soldered and whether every part has the correct orientation.

8 You may put a lanyard through this hole to wear the BlinkenRocket as a necklace. This way your BlinkenRocket acts as your personal name tag and puts your awesome soldering skills to display!

9 The audio cable / adapter included allows to add text and animations to BlinkenRocket. Put the adapter into a device having a web browser and and an audio output. Turn the volume to max and stop any music placing.

Then scan the QR code or go to http://blinkenrocket.com and use the editor to create your custom texts and animations. Once you are satisfied hit transmit and see your results on the rocket. If something does not work, check whether you soldered everything correclty and the volume is at maximum level.


8
7
U1
< Pin 1
C3
R1
R2
C1
C2
D1
D2
R3
R4
R5
R6
U2
9

ABOUT BLINKENROCKET

Changing the display contents of BlinkenRocket is easy. Use a smartphone, tablet or any computer with sound output and open **http://blinkenrocket.com** in a web browser and follow the instructions. Firmware and source-code are hosted on **http://github.com/blinkenrocket/**

The first version of BlinkenRocket was crafted in numerous hours by volunteers of the Chaos Computer Club Düsseldorf e.V. and the shack e.V.. You may support both registered associations financially if you like! The second version of BlinkenRocket has been enhanced by the Metalab and is available for sale at the Hackerspaceshop. More details and the web ship can be found here: **http://hackerspaceshop.com**

This DIY soldering kit has been created by Sebastian 'muzy' Muszytowski and Florian 'overflo' Bittner with support from the Chaos Computer Club e.V. as part of the "Chaos macht Schule" project. Special thanks to derf, marudor, rashfael, metachris and Chris Veigl as well as tele and linx for their great contributions and support.