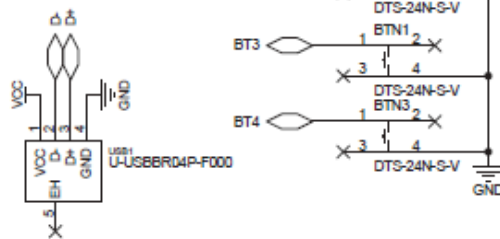
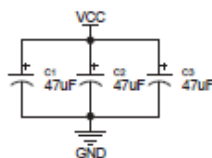
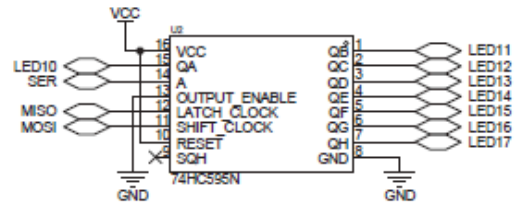
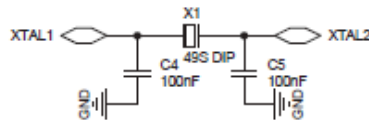
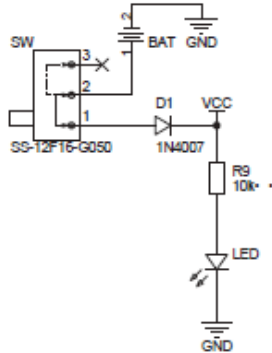
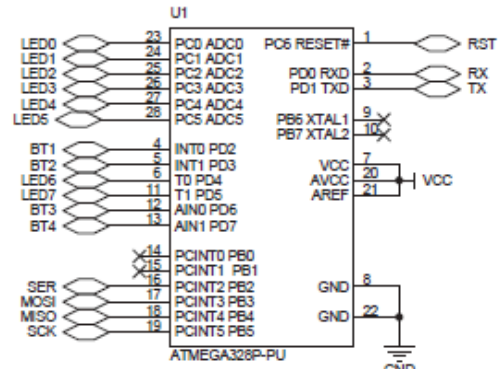
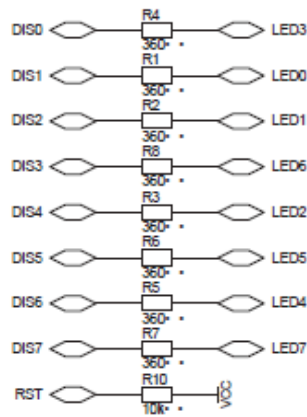
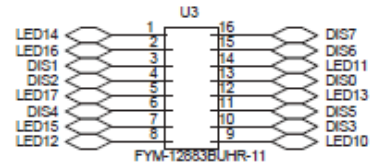
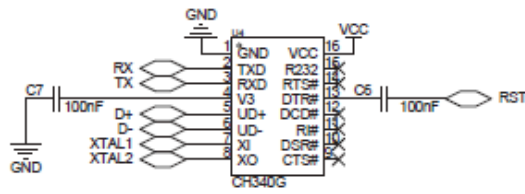


Circuit Diagram



Parts List

Before starting, verify that all listed components are included.

Designation	Component	Details	Qty
R1-R8	Resistor	330R	8 pcs
R9-R10	Resistor	10k	2 pcs
R12	Resistor	1k	1 pc
D1	Diode	1n4007	1 pc
C7	Electrolytic Capacitor	10uF	1 pc
SW1	Switch	S1501	1 pc
SW2-SW5	Push Button	-	4 pcs
LED	THT LED	5 mm	1 pc
U1	Shift Register	74hc595	1 pc
U2	Microcontroller	ATmega328p	1 pc
U3	Display	FYM-12883BUHR	1 pc
DIL16	IC Socket	-	1 pc
DIL28	IC Socket	-	1 pc
BAT	Battery Holder	-	1 pc
PCB	Printed Circuit Board	GamePad	1 pc



R1-R8

Resistor

8 pcs

330R



R9-R10

Resistor

2 pcs

10k



D1

Diode

1 pc



C7

Electrolytic Capacitor

1 pc



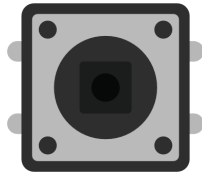
LED

THT LED

1 pc



SW1
Switch
1 pc



SW2-SW5
Push Button
4 pcs



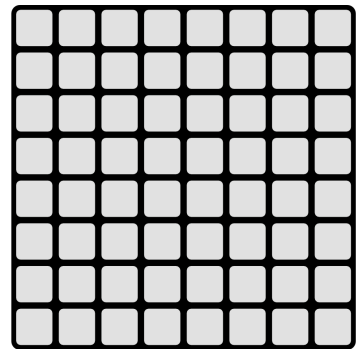
BAT
Battery Holder
1 pc



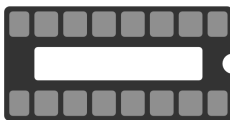
U1
Shift Register
1 pc



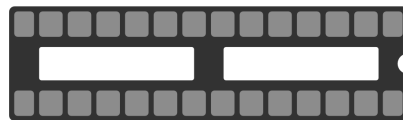
U2
Microcontroller
1 pc



U3
Display
1 pc



DIL16
IC Socket
1 pc



DIL28
IC Socket
1 pc

Assembly

Resistors

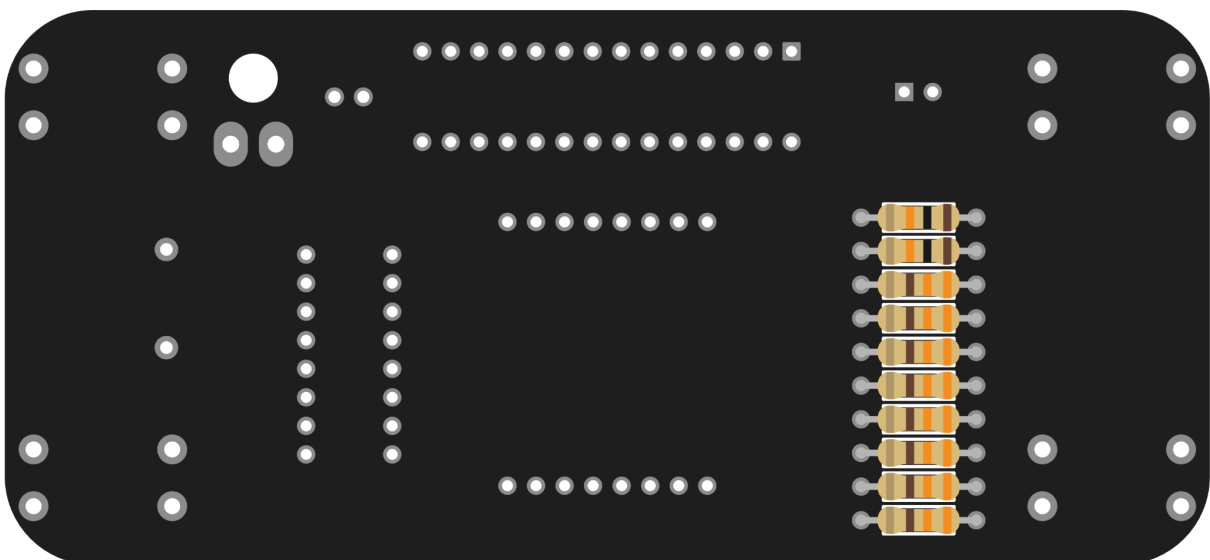
Place **resistors R1–R9 and R12** on the printed circuit board first. Orientation does not matter—they work the same in both directions.



R1-R8
330R



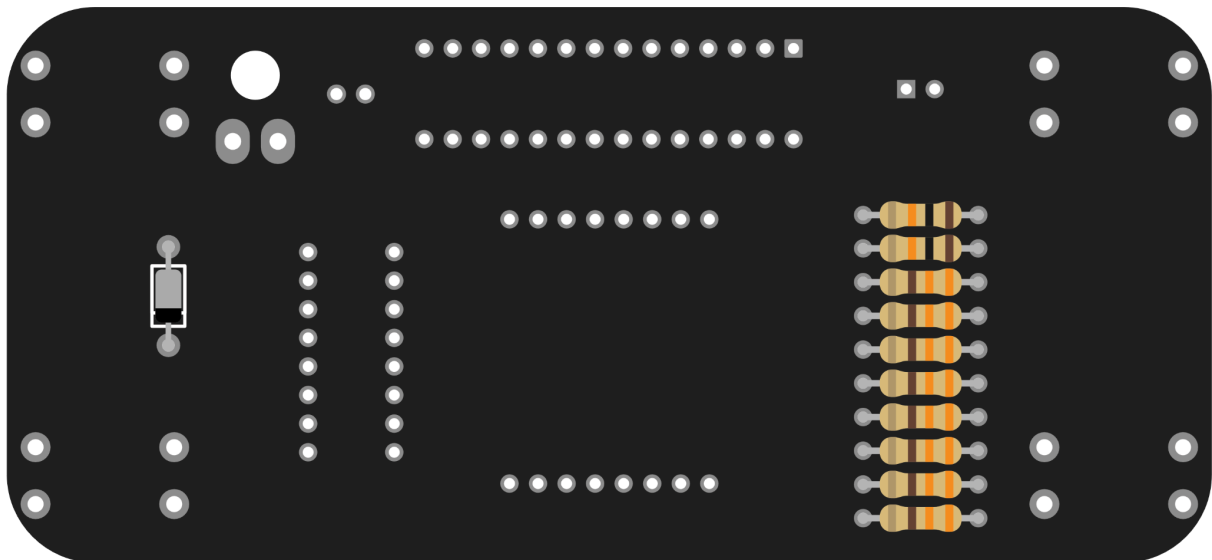
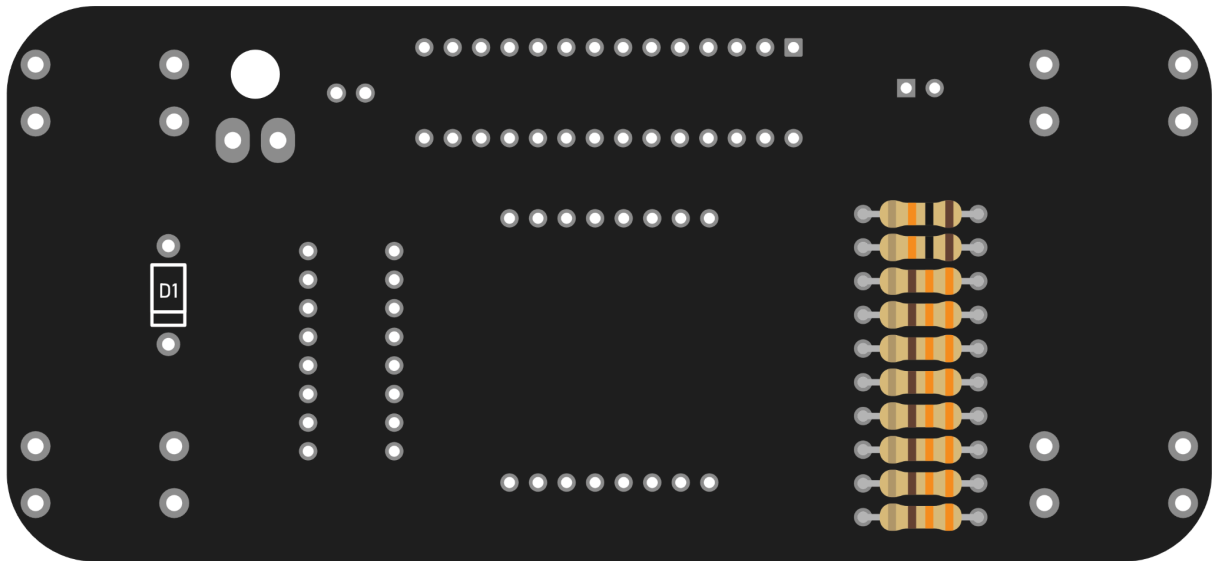
R9
10k



Diode

Ensure correct orientation when installing diode D1 to maintain polarity.

The diode has a ring on one side, which is also marked on the PCB and serves as a guide.



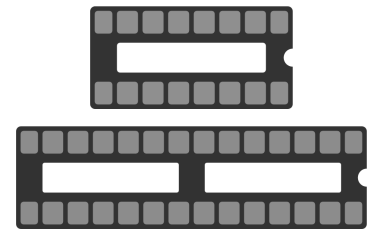
IC Sockets

Integrated circuits U1 and U2 are sensitive components and can be easily damaged by heat.

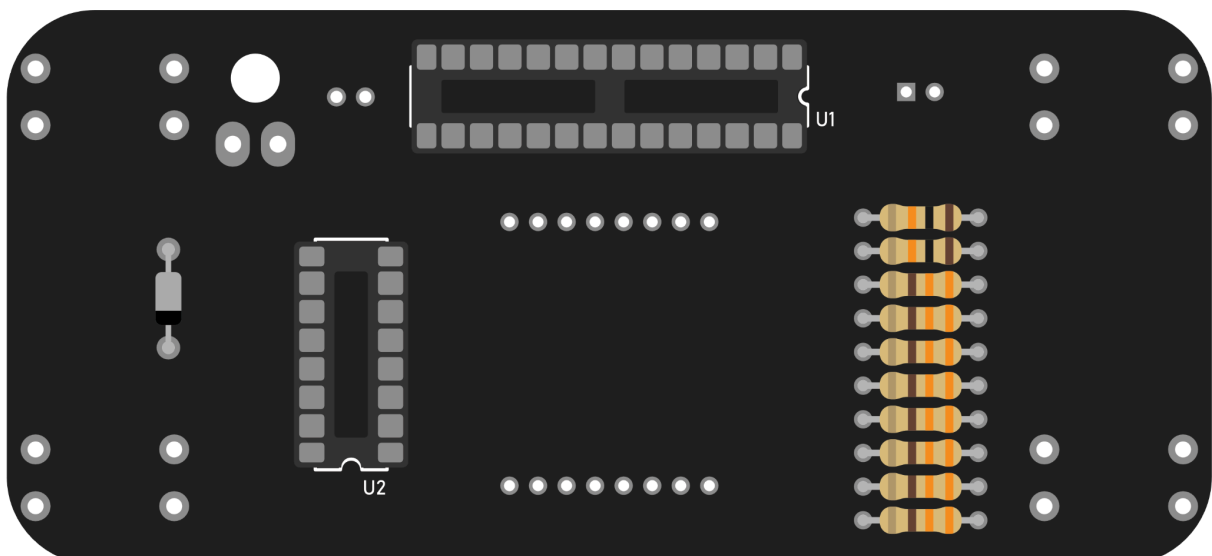
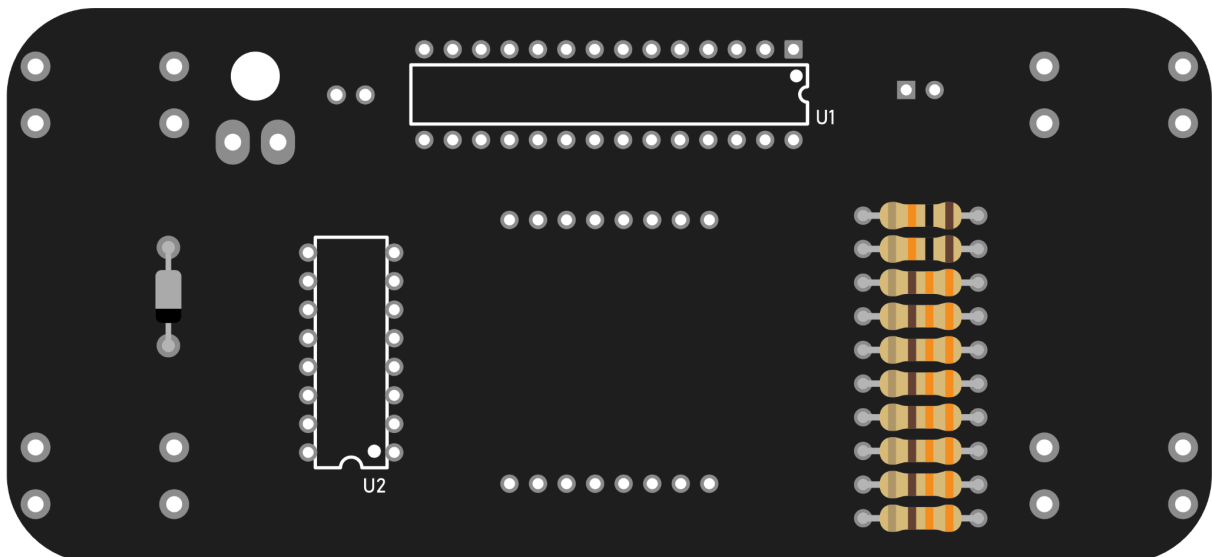
Therefore, they are placed into the **DIL16 and DIL28 IC sockets**.

When installing the sockets, pay attention to the notch on one side—this indicates the **correct orientation** of the socket.

Do not insert the ICs at this stage.



DIL16, DIL28



Display

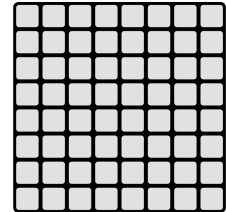
The **matrix display U3** is also heat sensitive.

Therefore, solder carefully and avoid overheating the contacts.

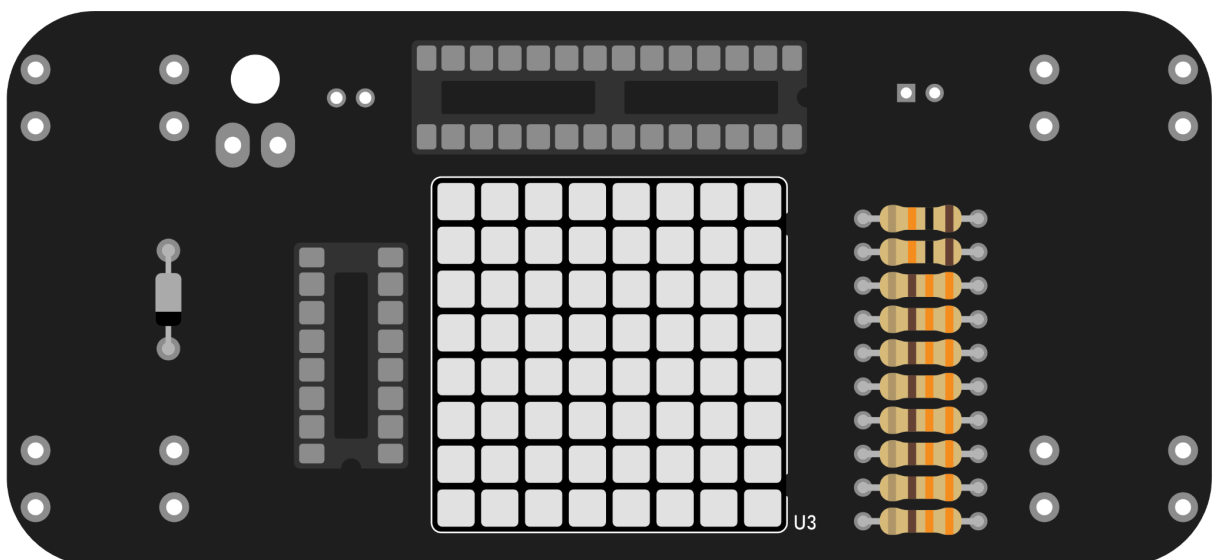
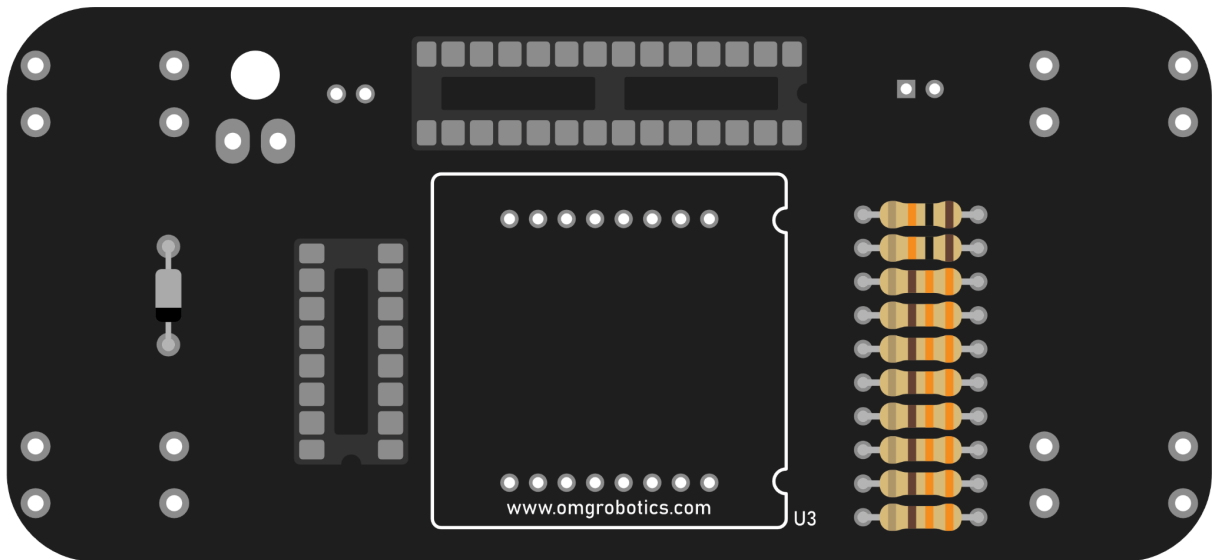
Take short breaks between individual soldering steps.

The display orientation is indicated by two embossed indentations on the side of the housing.

These indentations must face right, as shown in the illustration.



U3

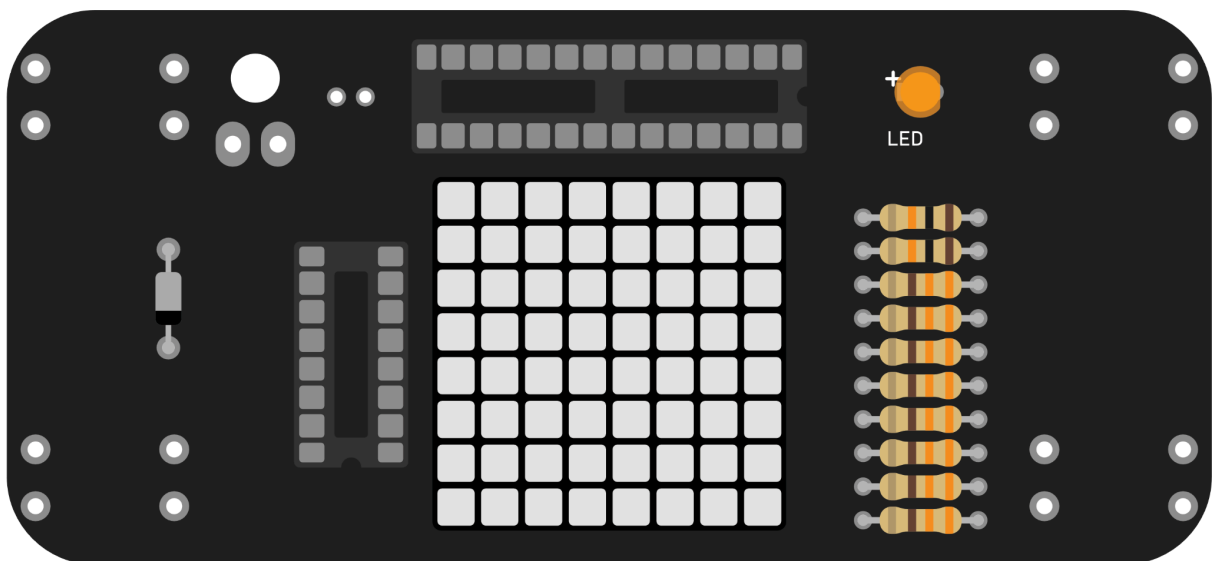
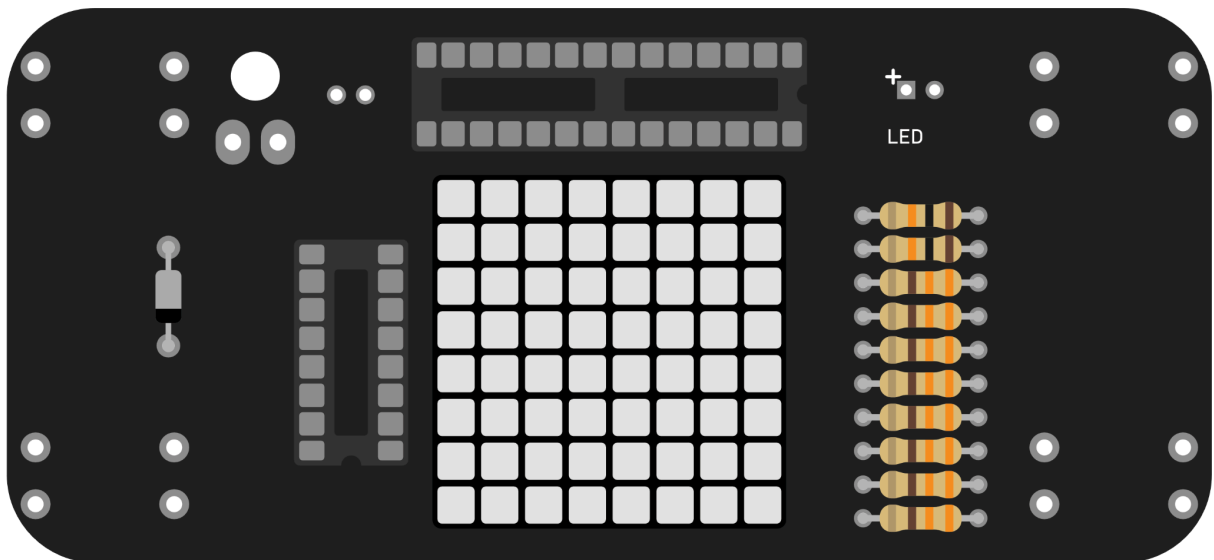
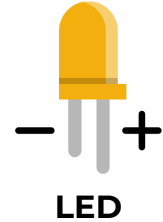


LED

Solder the signal **LED** carefully as well.

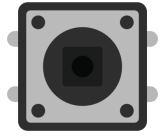
The **correct orientation** can be easily determined by the leg length:

Insert the longer leg into the square hole marked with a plus sign (+), and the shorter leg into the round hole.

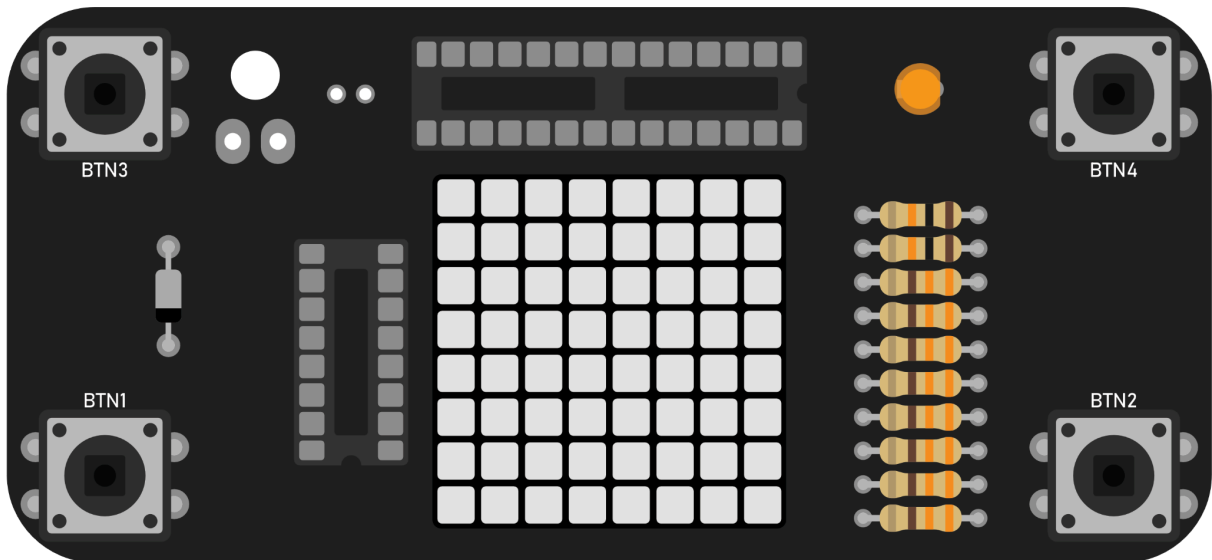
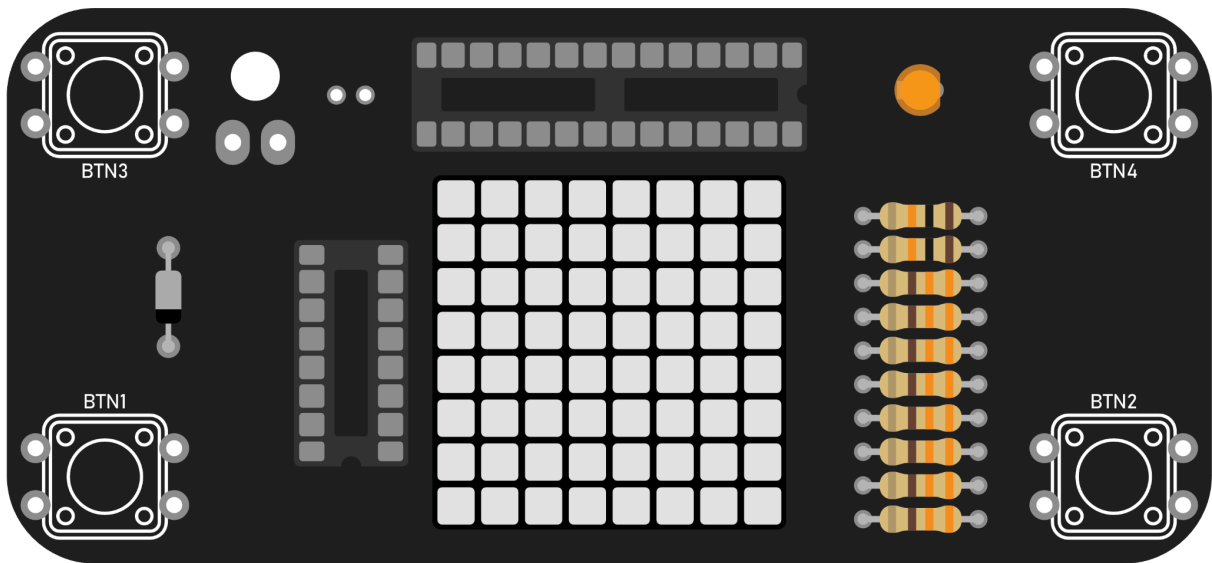


Push Buttons

Install **push buttons SW2-SW5** according to the markings on the PCB.
Orientation does not affect their function.



SW2-SW5

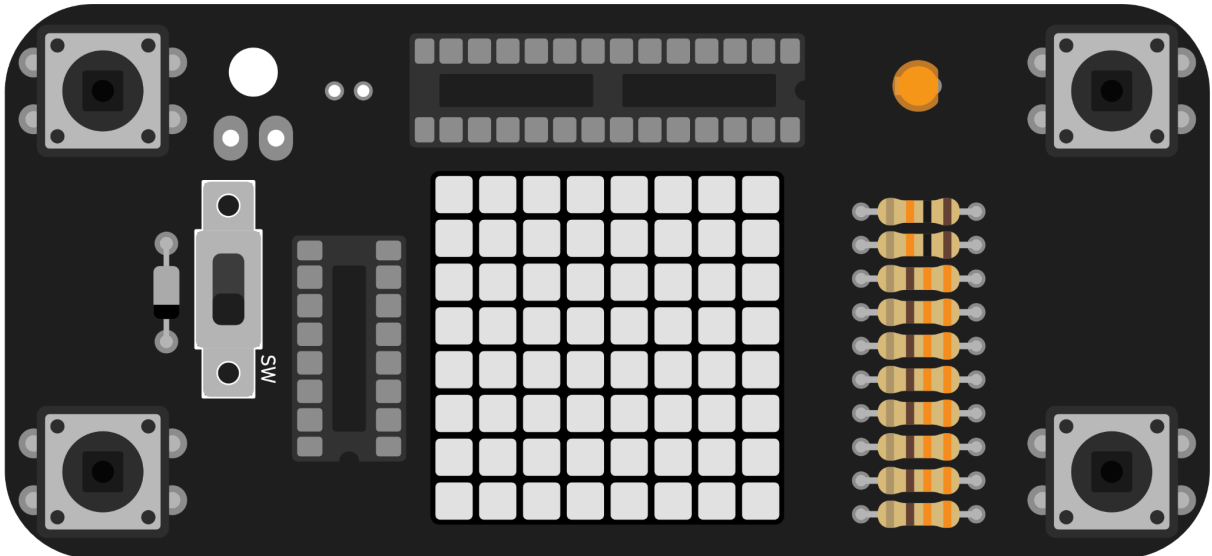
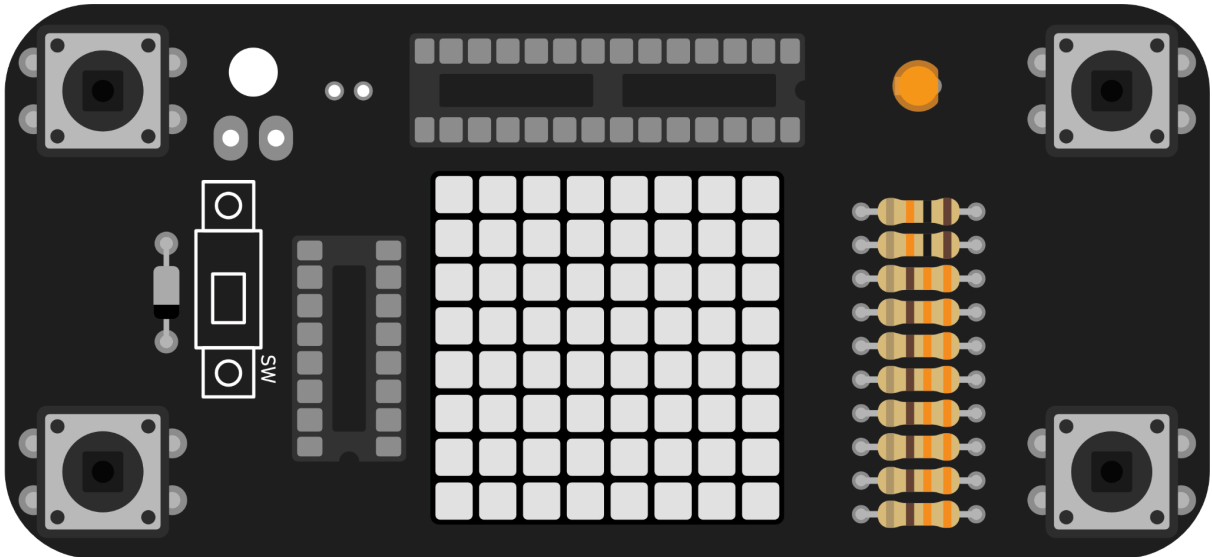


Switch

The **switch SW1** can be installed in either direction.
Polarity does not matter.



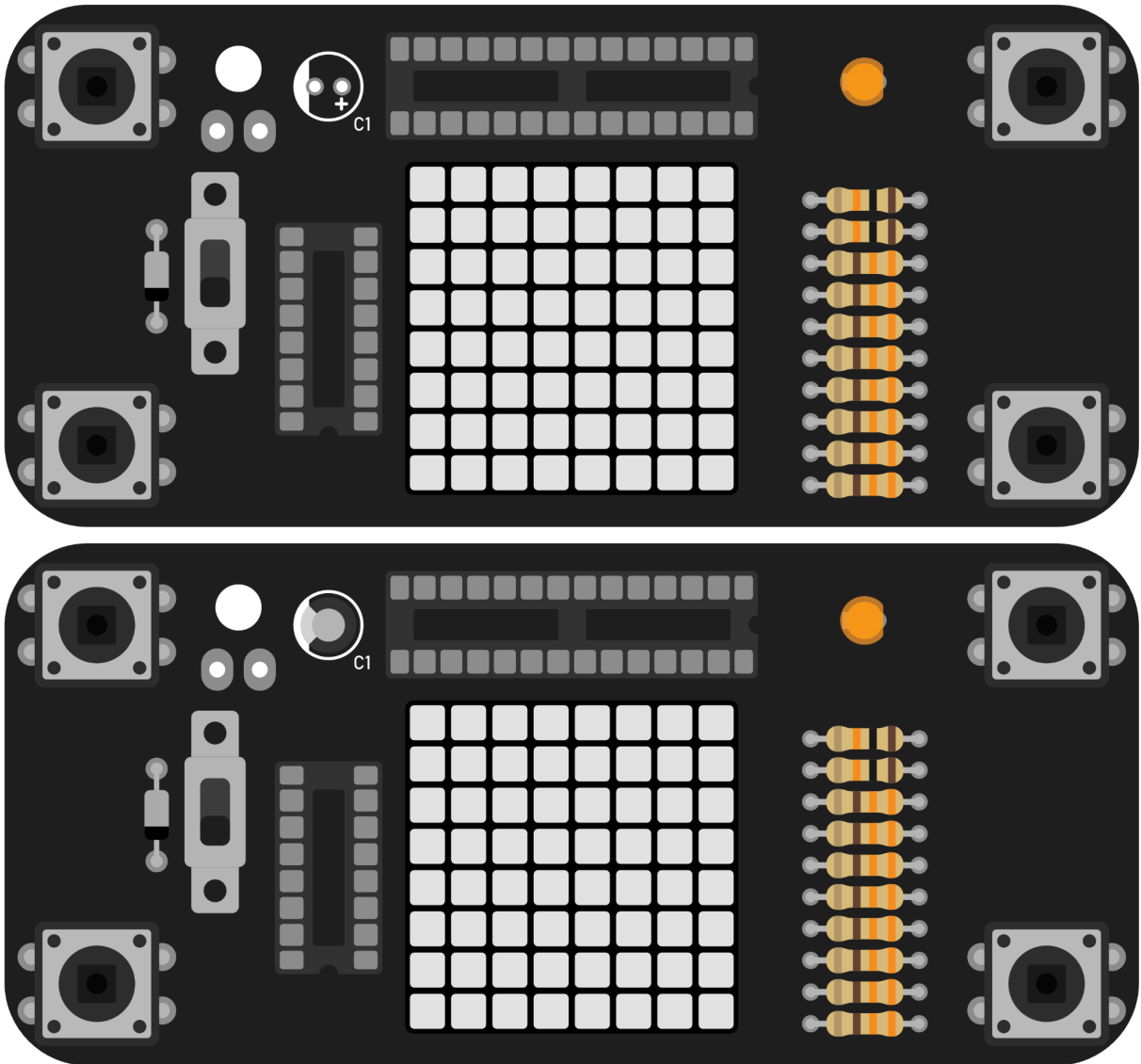
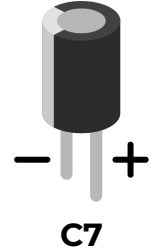
SW1



Capacitor

Capacitor **C7** is an electrolytic capacitor—pay attention to correct orientation.

The correct polarity is indicated by stripes on both the PCB and the component. The other designated capacitor locations remain unpopulated.



Battery Holder

Mount the **battery holder BAT** on the backside of the PCB.

Exercise special caution when soldering to avoid damaging surrounding components.

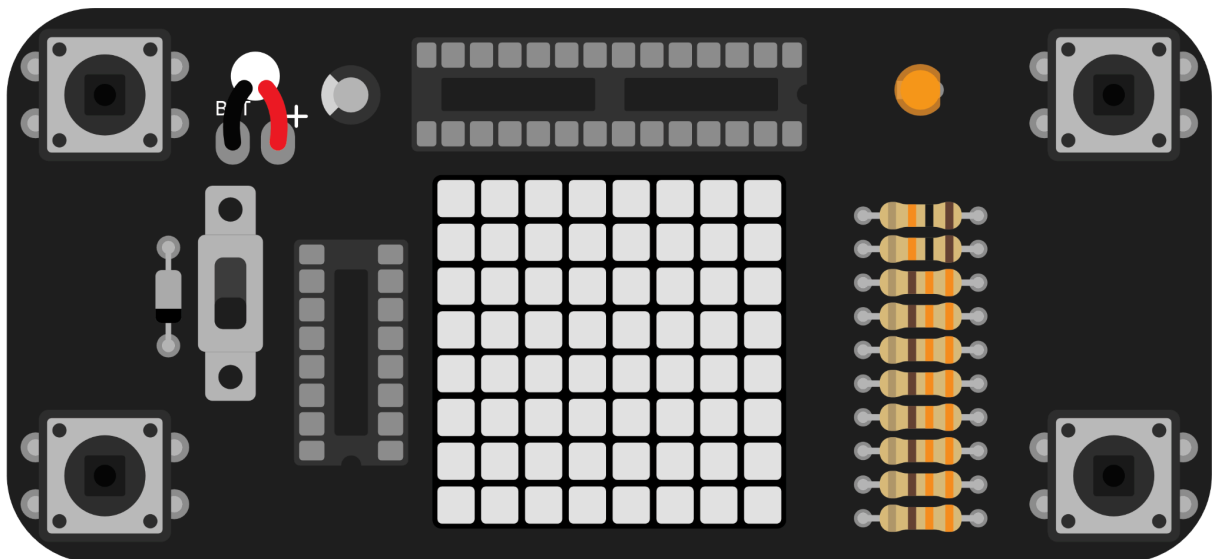
Solder the red wire to the lower hole marked with a plus sign (+).

The battery holder can be attached to the underside of the PCB with double-sided tape or a hot glue gun.

Do not insert the batteries at this stage.



BAT



Integrated Circuits

Now insert **integrated circuits U1 and U2**.

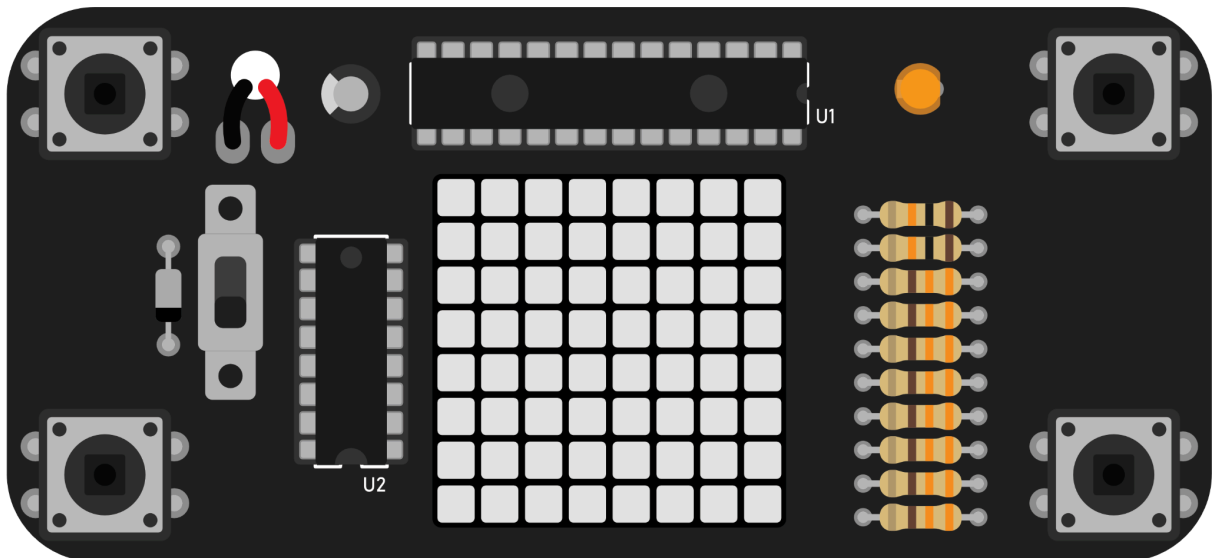
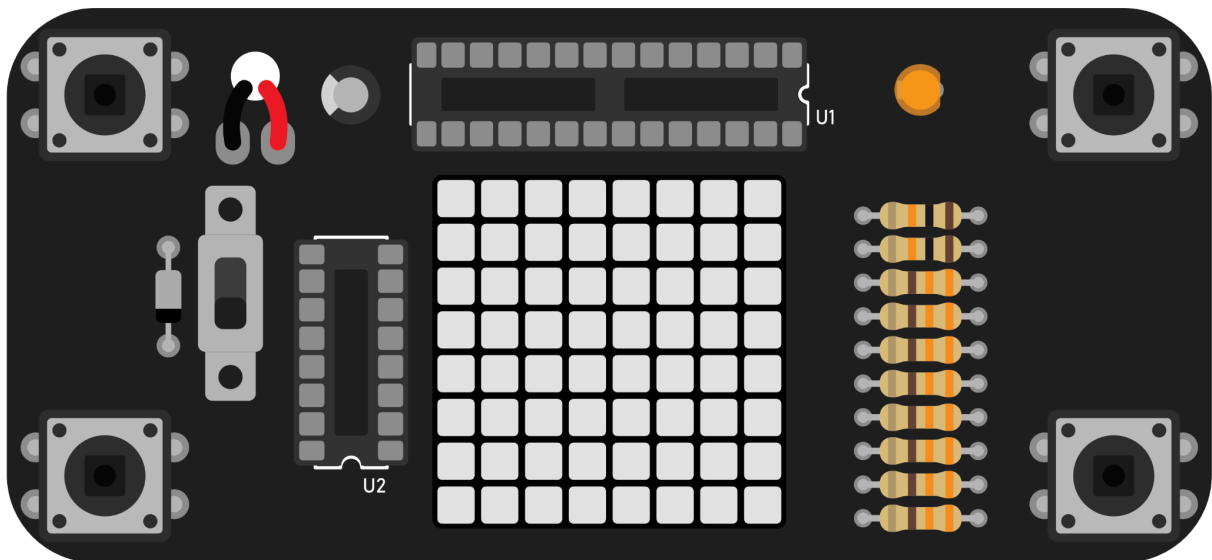
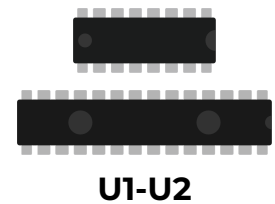
As with soldering the sockets, **pay attention to correct orientation**.

The IC package has a round notch on one side—this must align with the marking on the socket.

Before inserting into the socket, carefully bend the two rows of pins slightly toward each other

to make it easier to insert the IC.

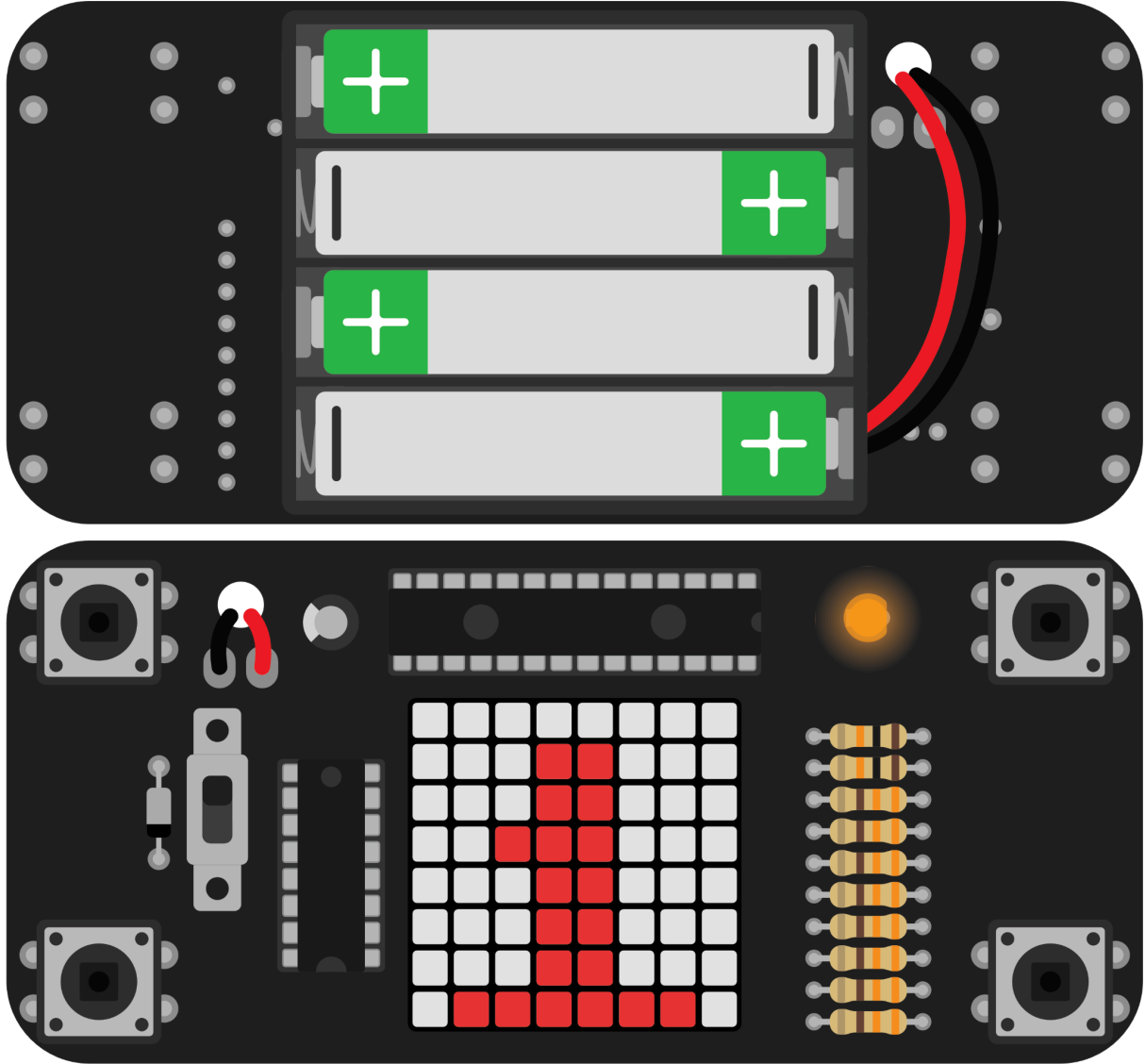
Always take care not to bend any pins!



Testing

Insert the batteries into the holder now.

If all components have been soldered correctly, the power LED will light up when switched on, and the game selection will appear on the display.



Tips & Troubleshooting

Note

On the back of the PCB, solder pads are provided for a USB connector used to program the microcontroller.

This connector is not included in this set.

Power-Up

If all steps have been followed correctly, the device will work upon first insertion of the batteries.

Possible Issues

- **Short circuits** – Two adjacent pins may be accidentally connected, creating an unwanted conductive path.
- **Cold solder joints** – A solder connection may not have been completed properly and lacks electrical contact.
- **Incorrect orientation** – Components may be installed in the wrong direction; check all positions and polarities according to the manual.
- **Misplaced components** – Components may have been installed in the wrong positions (e.g., resistors in incorrect locations).
- **Heat-damaged components** – Some parts may have been damaged by excessive heat during soldering. Identify and replace the affected component.

How It Works

The central element of the circuit is the ATmega328p microcontroller.

It is programmed to perform a specific function. The program was created using the Arduino IDE, allowing users to write their own programs as well.

The microcontroller uses an internal 8 MHz oscillator, which is sufficient for this application.

The user interface consists of four push buttons for controlling the console and an LED matrix display.

The display is driven by a shift register and is directly connected to the microcontroller.

Without this additional circuitry, there would not be enough I/O pins on the microcontroller to cover all functions.

The console is powered by four AAA batteries. The microcontroller must not be operated above 5.5 V. A rectifier diode causes a voltage drop of about 0.7 V at the input— thus, the circuit cannot be damaged even with four batteries.

Game Control

Menu

After turning on the console, the menu is displayed.

Use the lower buttons to select a game based on the number shown on the display.

Confirm the selection with one of the upper buttons to start the game.

Game Over

When a life is lost, a sad face appears.

At this point, the following actions are possible:

1. The lower buttons continue the game.
2. The upper buttons return to the menu.

Games

Ping-Pong (Game 1)

Number of players: 2

Description: Move the paddle and keep the ball in play.

Controls: The left buttons move the left paddle up and down, the right buttons control the right paddle.

Snake (Game 2)

Number of players: 1

Description: Control the snake, collect points, and avoid collisions.

Controls: Use the lower buttons to steer left and right, use the right upper button to speed up movement.

Flappy Bird (Game 3)

Number of players: 1

Description: Jump between obstacles—do not touch the ground!

Controls: Use the lower buttons to make the bird jump.

Tetris (Game 4)

Number of players: 1

Description: Rotate and arrange blocks to complete full rows.

Controls: The lower buttons move the block left and right, the right upper button rotates the block, and the left upper button speeds up the fall.