Laser Beam Project

Introduction

Build and assemble a project that demonstrates how a photoresistor and a laser work together. Print the required parts, assemble the model, and explore the principles of optical sensing.

What Can Be Done with It?

- Learn how a photoresistor works.
- Understand the operating principle of a laser.
- Learn how to program and use both components.
- Detect interruptions of a laser beam.
- Extend the project with a display and show the number of beam interruptions.

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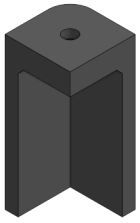
Required Components

3D-Printed Parts:

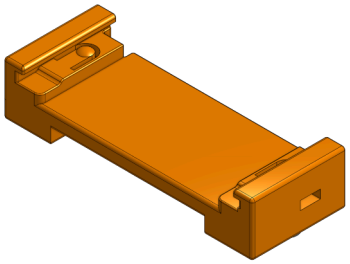
Foot

4 pcs



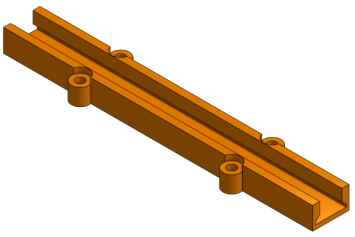
MB3 holder

1 pc



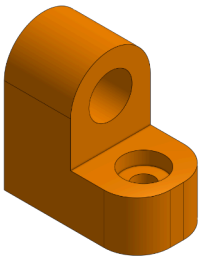
LED holder

1 pc



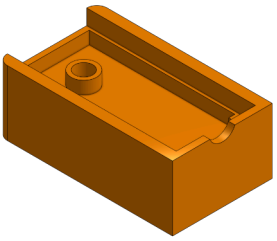
Laser housing

1 pc



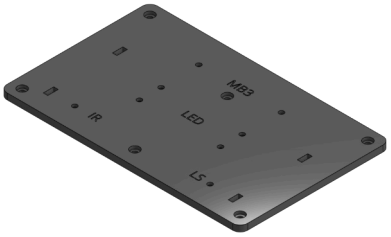
Sensor housing

1 pc



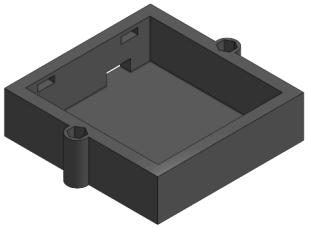
Base plate

1 pc



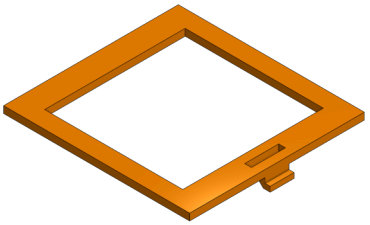
Battery pack holder

1 pc



Battery pack cover

1 pc



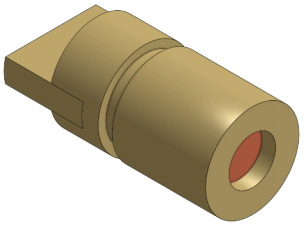
Electronic Components:

4×AAA battery holder

1 pc

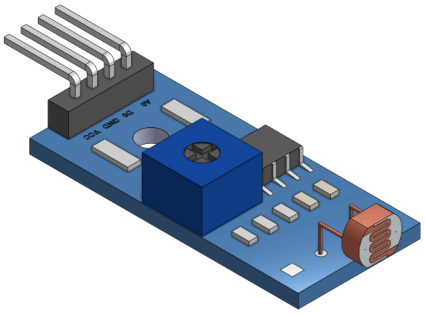
Laser module

1 pc



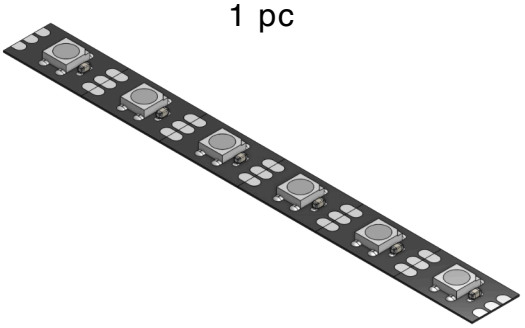
Photoresistor module

1 pc



LED strip

1 pc



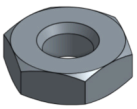
Mechanical Components:

M3×16 screw

3 pcs

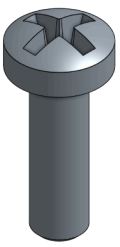
M3 nut

14 pcs



M3×10 screw

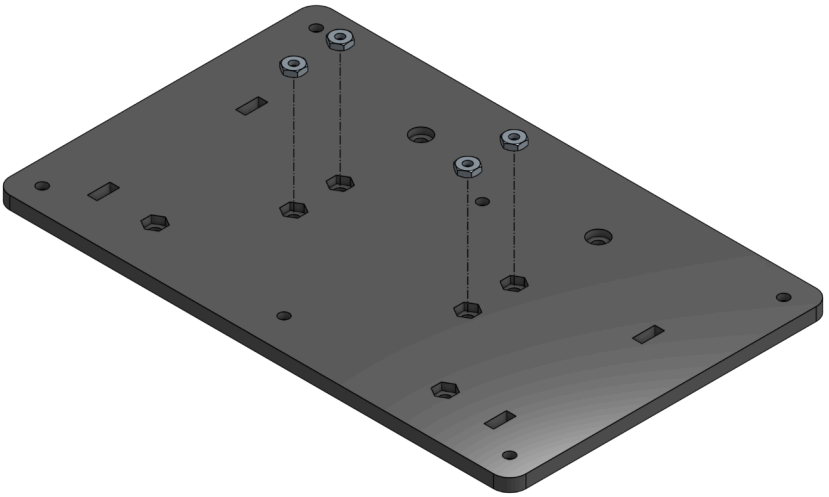
11 pcs



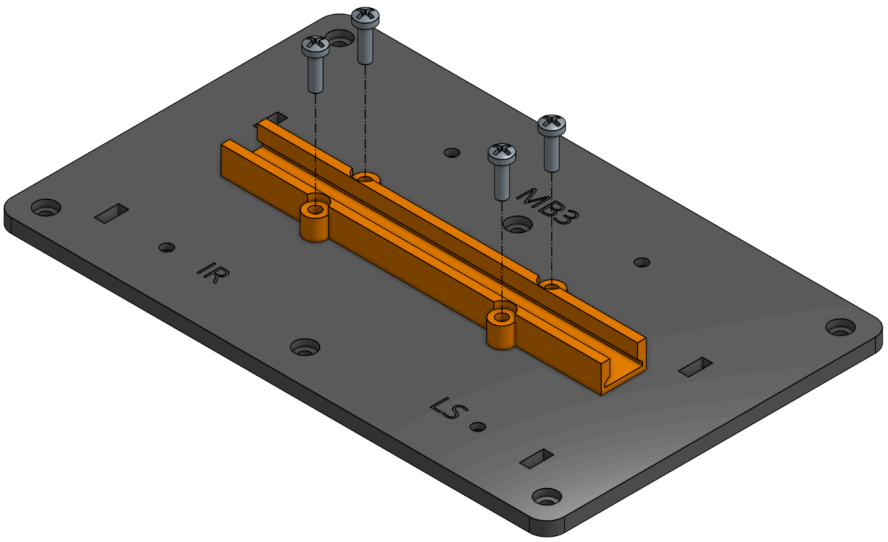
Assembly

1. LED Holder

- Prepare the base plate, LED holder, four M3×10 screws, and four M3 nuts.
- Identify the top and bottom sides of the base plate. The side marked LED, MB3, and SEN is the top side.
- Insert four M3 nuts into the underside of the base plate below the LED marking as shown in the illustration.
- Position the LED holder on the base plate.



- Insert four M3×10 screws through the LED holder and tighten them.
- The orientation of the LED holder is not important, as the part is symmetrical.

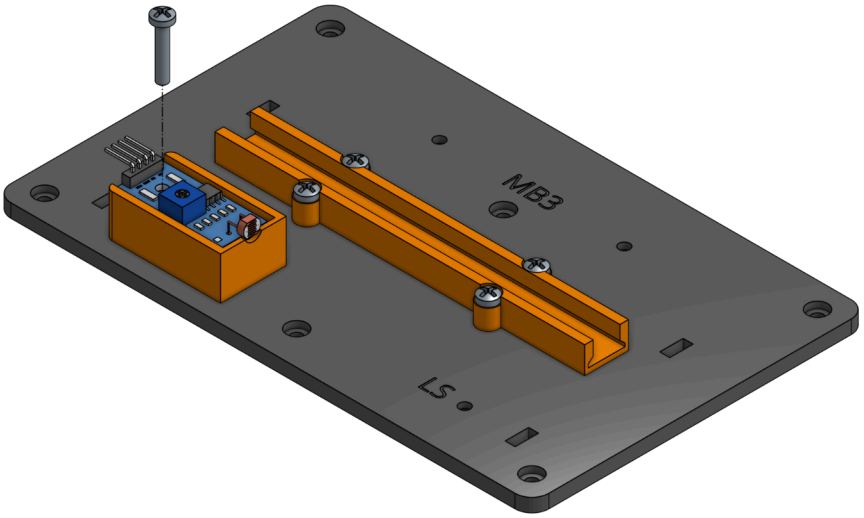


2. Photoresistor

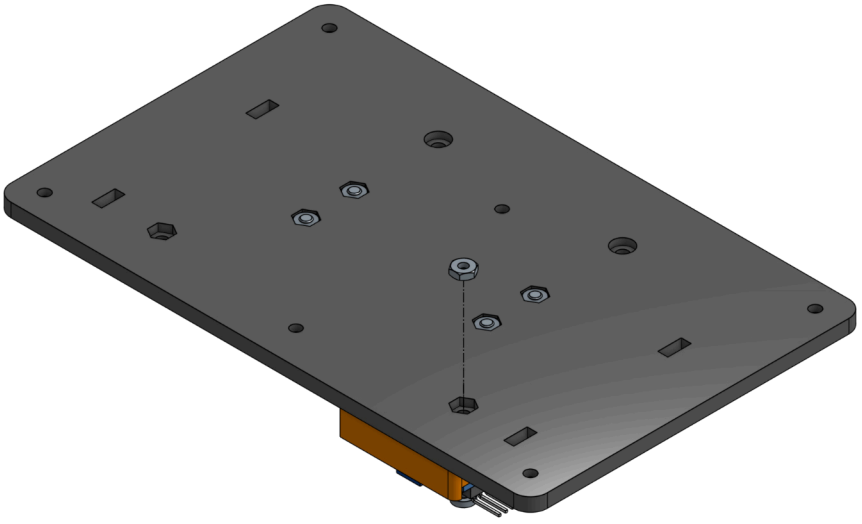
• Prepare the base plate, sensor housing, photoresistor module, one M3×16 screw, and one M3 nut.

• Place the photoresistor module into the sensor housing.

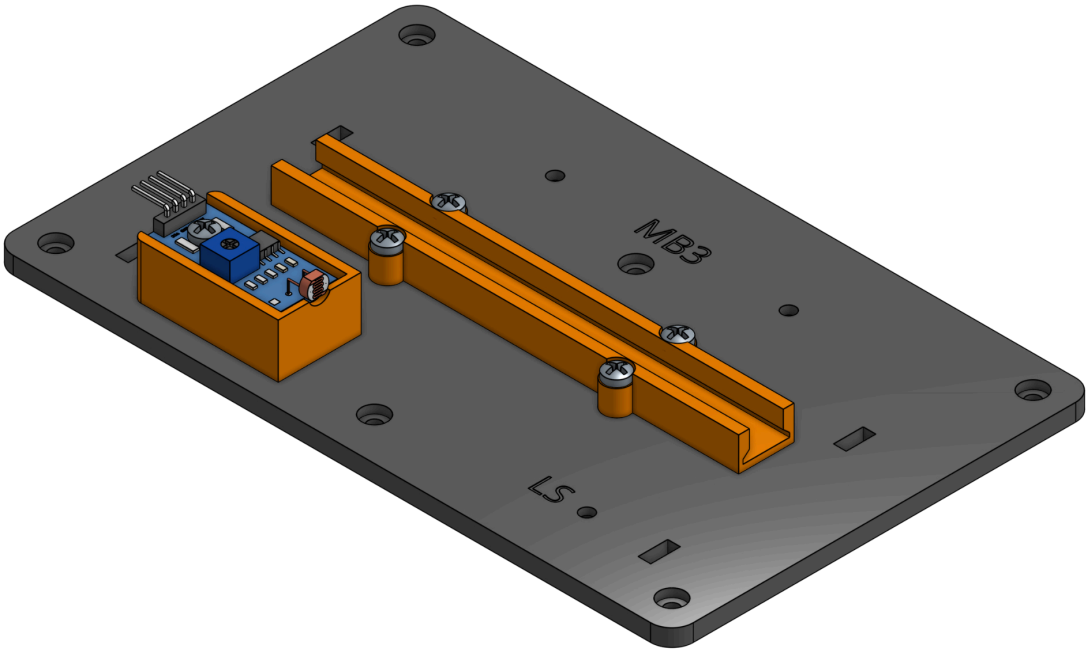
• Insert the M3×16 screw through the photoresistor module and into the sensor housing as shown in the illustration.



• Insert one M3 nut into the underside of the base plate below the IR marking.



• Position the sensor housing on the base plate and tighten the screw to secure it in place.



3. Laser Module

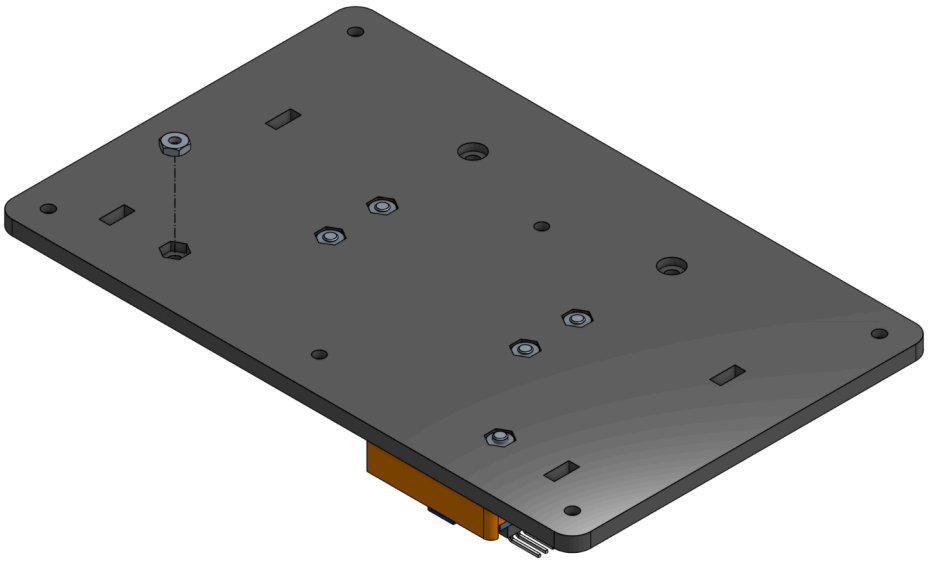
• Prepare the base plate, laser housing, laser module, one M3×10 screw, and one M3 nut.

• Connect the Dupont cable to the laser module.

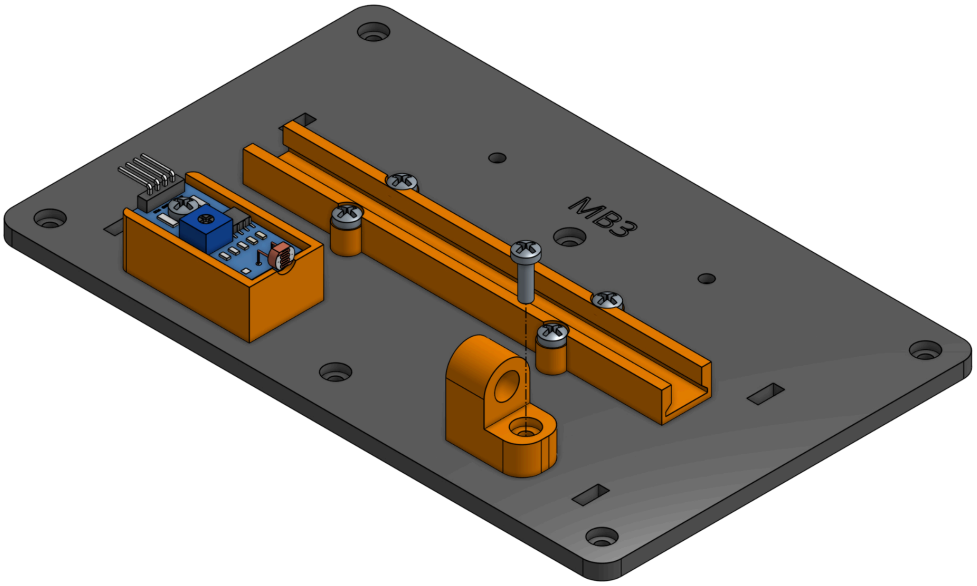
• Insert one M3 nut into the underside of the base plate below the LS marking.

• Route the cable through the laser housing and place the laser module into the housing.

• Position the laser housing on the base plate.



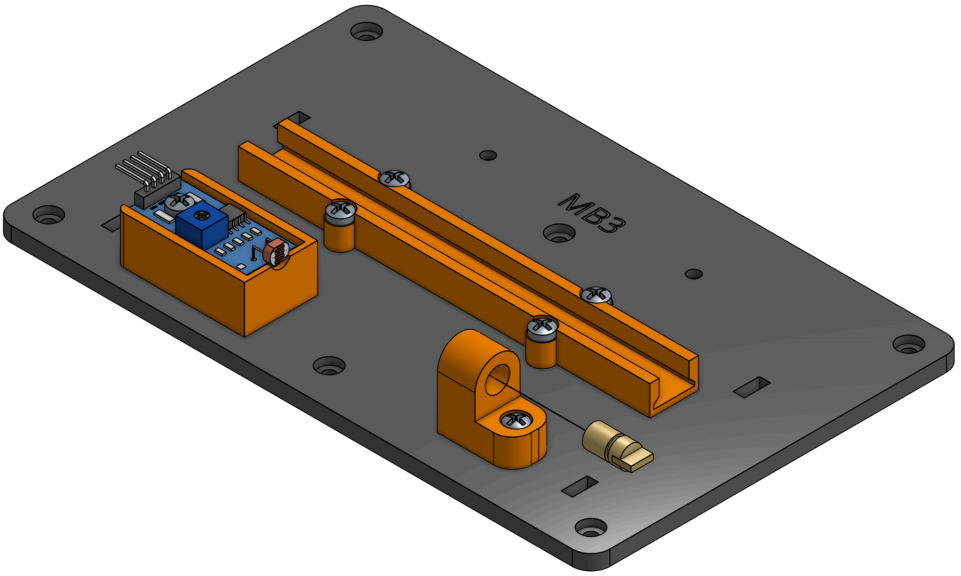
• Insert the M3×10 screw into the laser housing and tighten it to secure the assembly.



- The final step is to insert the laser module into the laser housing.
- Align the laser module so that it points directly at the photoresistor module.
- Compare the assembly with the reference images below to verify the correct alignment.

Note

Proper alignment of the laser beam and the photoresistor is important for reliable operation of the project. The laser beam should be aimed directly at the sensing area of the photoresistor module.

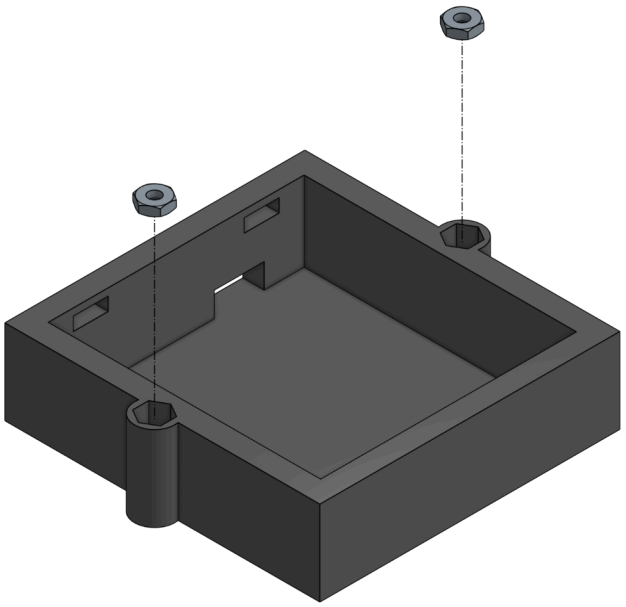


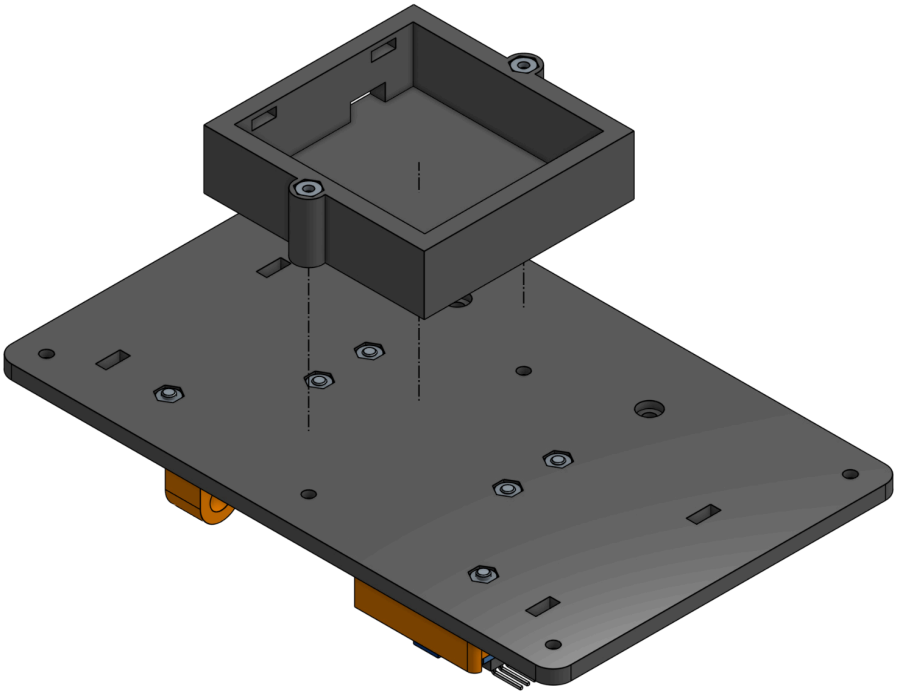
4. Battery Pack

• Prepare the base plate, battery pack holder, battery pack, battery pack cover, two M3×16 screws, and two M3 nuts.

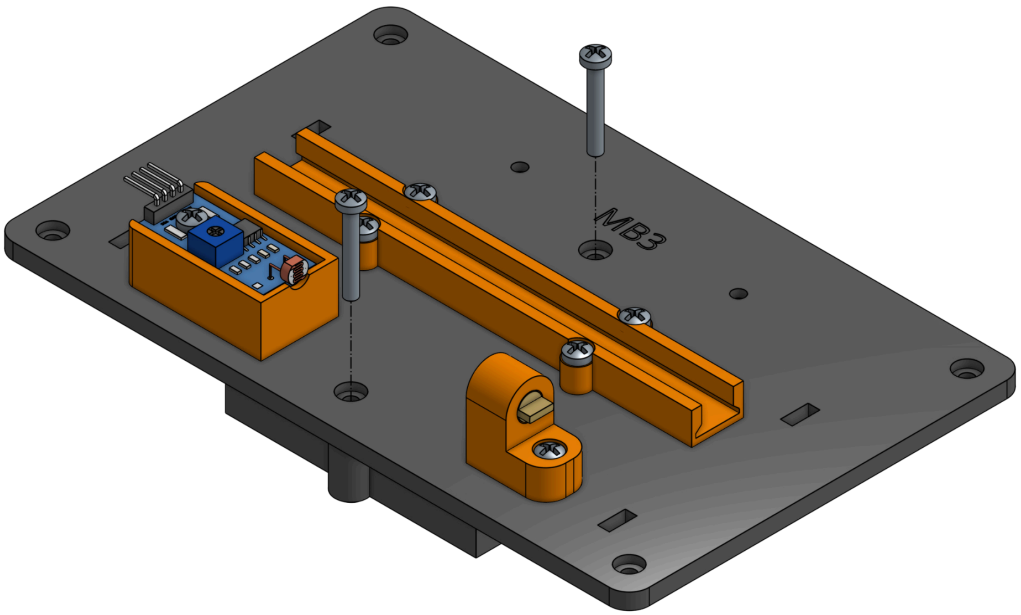
• Insert two M3 nuts into the battery pack holder.

• Turn the holder over and orient it as shown in the illustration below.



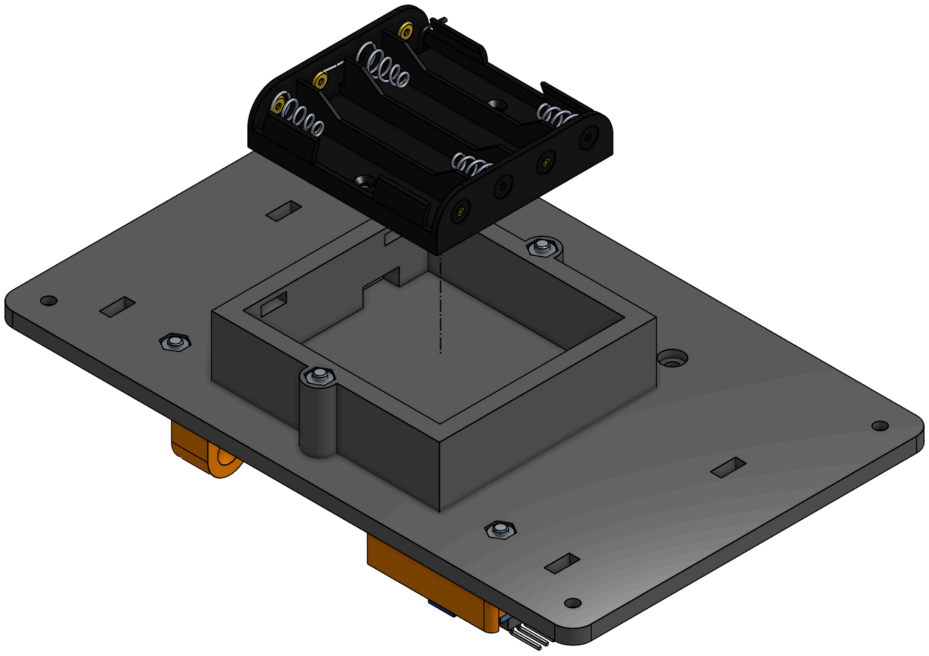


• Insert two M3×16 screws through the top side of the base plate and tighten them into the battery pack holder.



• Insert the battery pack into the holder.

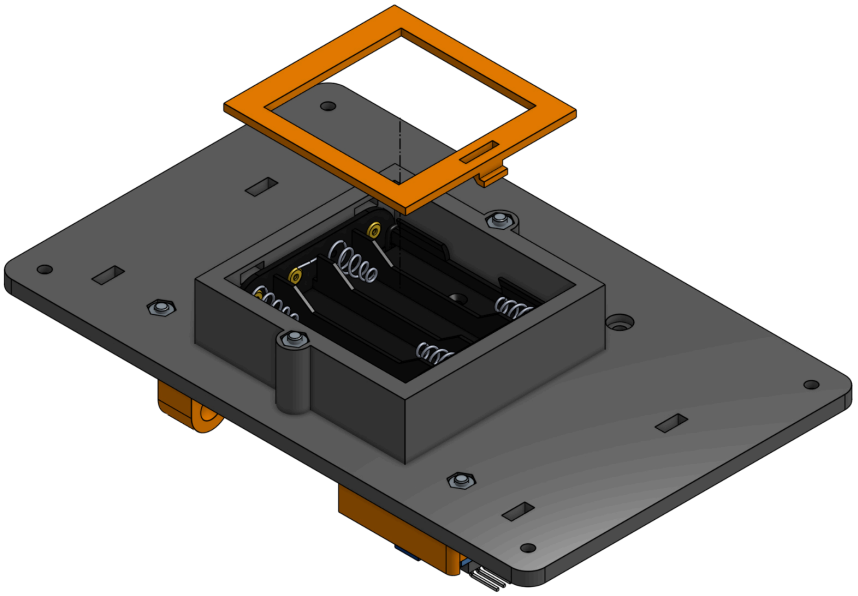
• Position the battery pack so that the two wires exit through the side opening of the holder.



• The final step is to install the battery pack cover onto the battery pack holder.

• The cover can be inserted in only one orientation.

• Slide the cover into place until it is fully seated and securely attached.

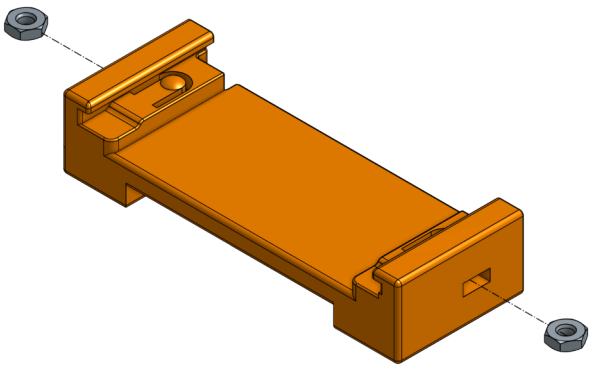


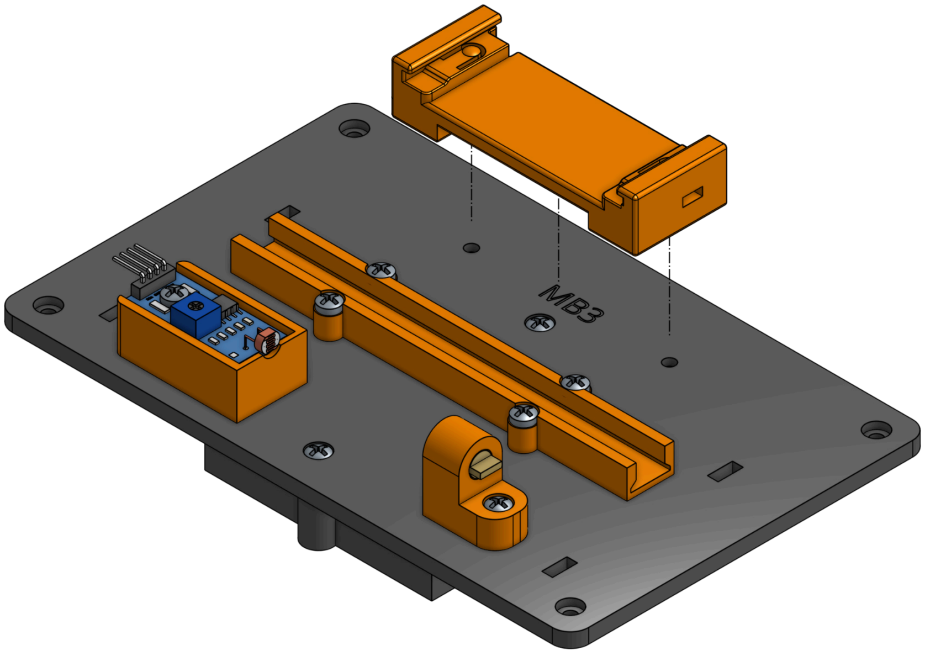
5. MB3 Holder

• Prepare the base plate, MB3 holder, two M3×10 screws, and two M3 nuts.

• Insert one M3 nut into each side of the MB3 holder as shown in the illustration.

• Ensure that both nuts are fully seated before mounting the holder to the base plate.

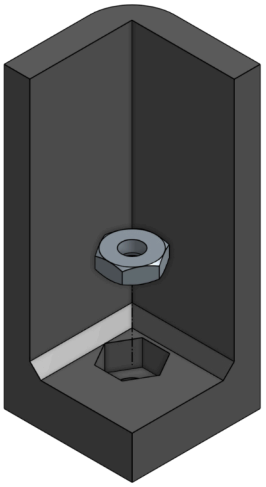




• Position the MB3 holder above the MB3 marking on the base plate.
• Insert two M3×10 screws from the underside of the base plate and tighten them to secure the holder in place.

6. Feet

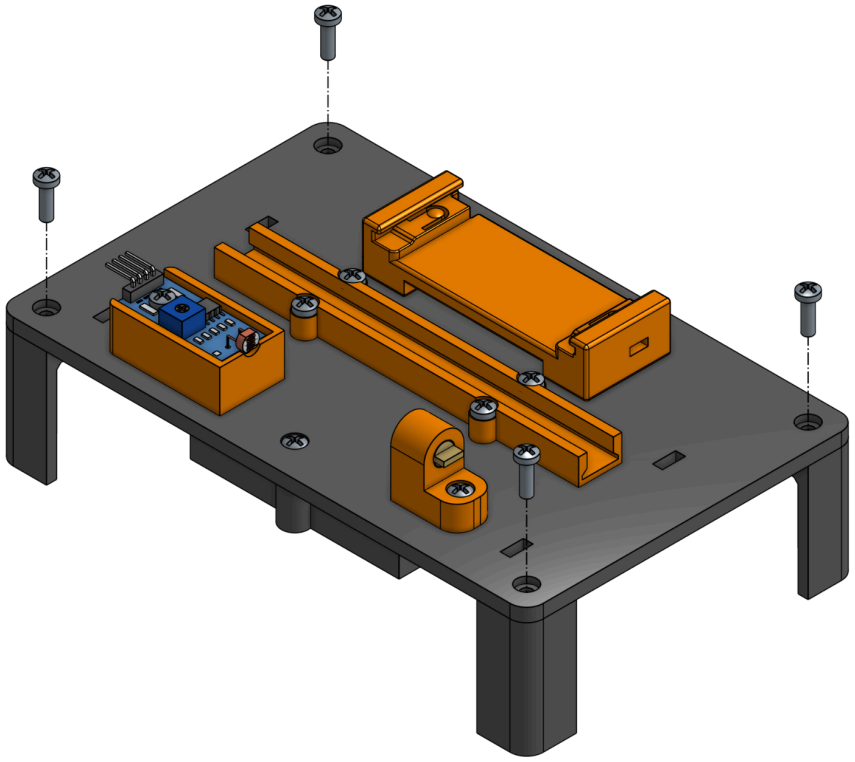
• Prepare the base plate, four feet, four M3×10 screws, and four M3 nuts.
• Insert one M3 nut into each foot as shown in the illustration.
• Ensure that the nut is seated securely and cannot rotate while the screw is being tightened.



• Insert an M3×10 screw through the top side of the base plate into each foot.

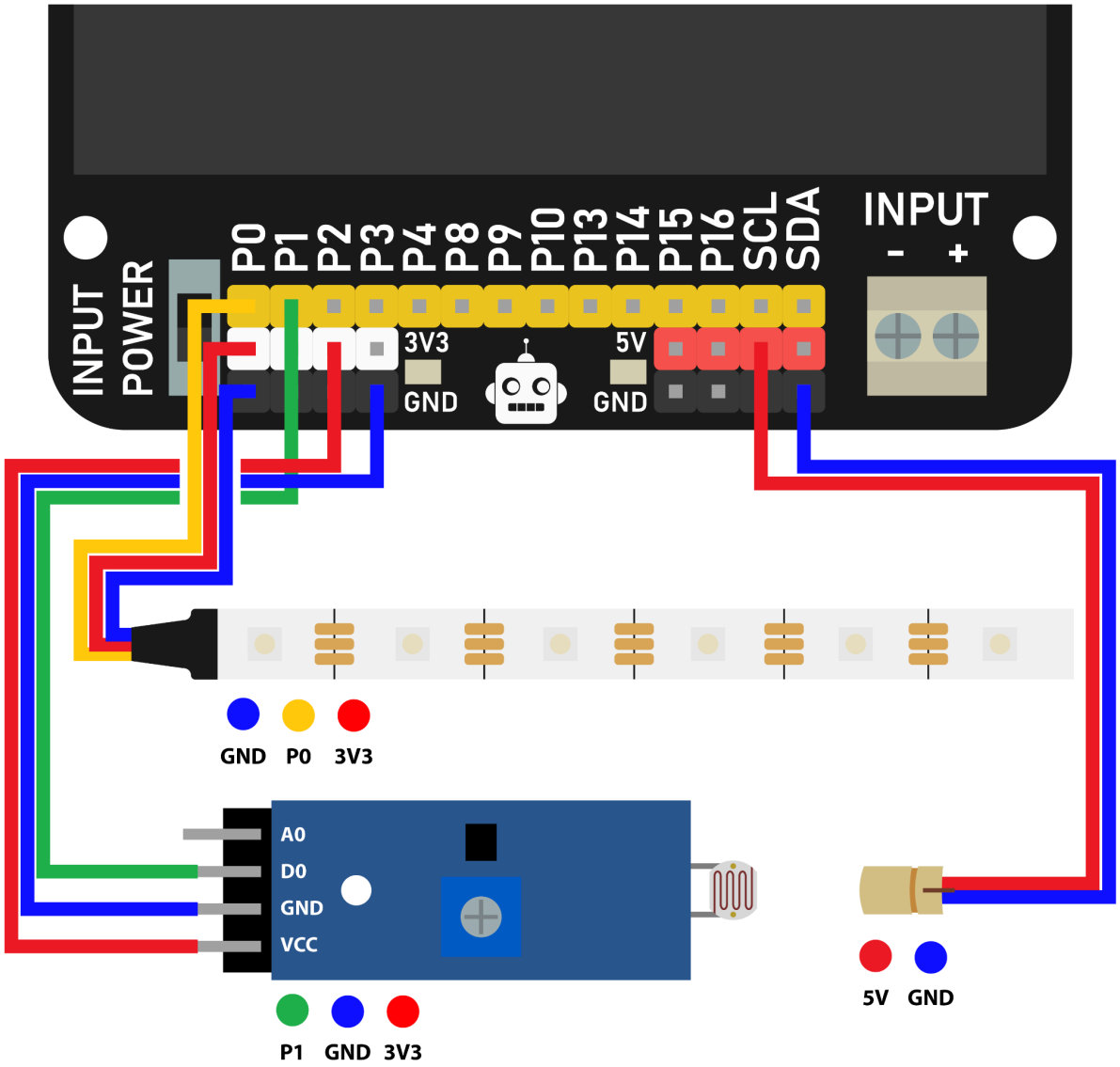
• Tighten the screws until the feet are securely fastened and cannot rotate.

• Repeat this procedure for all four feet.



• The assembly is now complete.

Circuit Diagram



Power Wiring Diagram