

MEC-1 Assembly Guide

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Before You Begin

Notes

1. **Fasteners:** The default fasteners for this project are H2.5x6 machine screws, with exceptions specified separately. All parts are included in the CyberBrick kit.
2. **Controller:**
 - a. Compatible with the official controller. Please follow the official guide for assembly and wiring.
 - b. This project uses two lithium batteries and two switches. The CyberBrick kit also includes an AAA battery pack for the controller. However, AAA batteries quickly lose voltage and provide poor endurance. You may consider purchasing an additional set of lithium batteries and switches
3. **Mecanum wheel rollers:** In addition to silicone molding, TPU90A printed rollers are provided as an alternative. Silicone offers excellent grip and is highly recommended as the first choice!

BOM

Note: This project is designed for the CyberBrick Ultimate Kit, but not all components will be used. Buying the full kit is usually more cost-effective. If you wish to purchase parts individually, or if you already own the Biginer Kit and want to buy only the missing components, please refer to the Maker's supply list at the bottom of the model page.

- CyberBrick Ultimate Kit x1
- 20A silicone (molding use), 50g
- Silicone dye (optional)

Tools

- H1.5 hex screwdriver
- Phillips screwdriver
- Super glue
- Tweezers (optional)

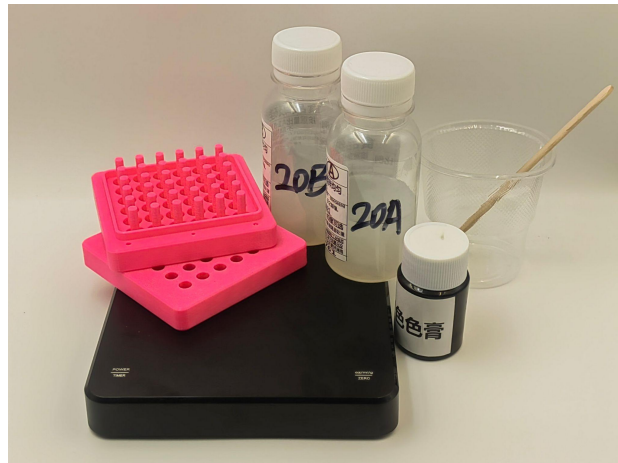
For silicone rollers:

- Digital scale
- Mixing container
- Stirring tool

Mecanum Wheels

Rollers

Method 1. Silicone Molding

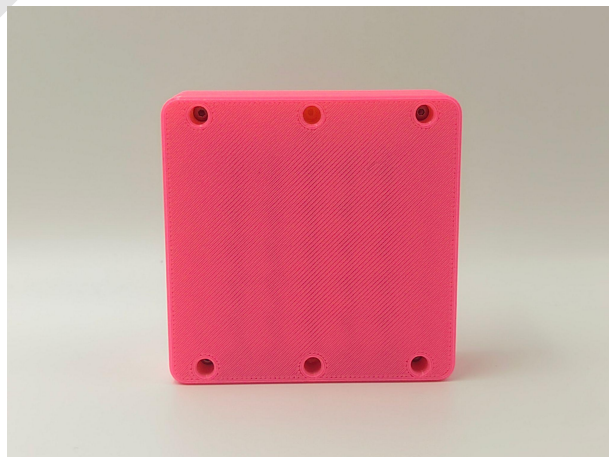


Required materials/tools:

AB silicone (20A hardness), total 50g; silicone dye (optional); digital scale; container; stir stick

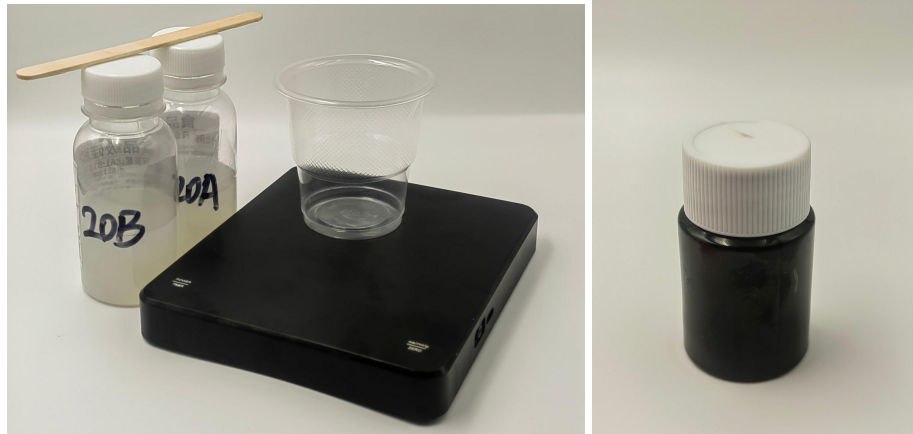


The picture shows the difference between no dye added (left) and adding black dye (right)

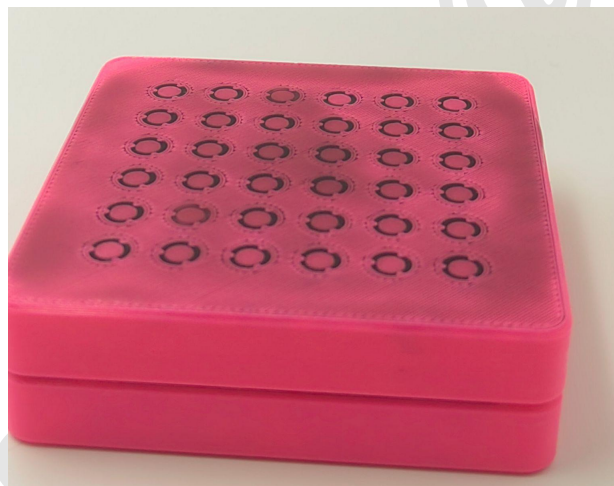


1. Remove the supports and assemble the upper and lower molds.

2. Tighten the four screws diagonally in sequence, gradually tightening them in multiple passes.
3. Insert the two center screws (these two screws are not for fastening but for separating the molds later).



Measure a total of 50 g of AB silicone at a 1:1 ratio. Add dye (optional) and stir thoroughly until evenly mixed.



1. Pour the silicone from the top in small amounts multiple times until the mold is completely filled. Keep the remaining silicone as backup.
2. Over time, bubbles will rise and a small amount of silicone may overflow from the sides. It is recommended to top up every 20 minutes during the first hour.
3. After 1 hour, the silicone will gradually lose fluidity. If the excess silicone on top is too thick, trim it off to avoid increasing post-processing difficulty. Then let it sit until fully cured.

Tips:

- *The curing time of silicone is affected by temperature: the lower the temperature, the longer it takes.*
- *The product I purchased claims to cure at room temperature within 3 hours, but in practice the curing time varies depending on the location.*
- *From repeated tests at an ambient temperature of about 27 °C: after 3 hours, the leftover silicone in the mixing container was fully cured, but the silicone inside the mold was not. Specifically, the main body was mostly cured, while the part in direct contact with the printed mold remained semi-cured.*

- *If the curing is very thorough, demolding can be more difficult. Using pliers to pull it out may help (for reference, I succeeded without tools).*
- *Removing the piece while the contact surface is still semi-cured and then allowing it to finish curing is also a good strategy, with little impact on the final result.*

In conclusion, it is recommended to demold after about 4 hours, but since many factors are involved, you will need to judge based on your situation.



1. Remove the four screws at the bottom corners.
2. Alternately tighten the two center screws little by little to push up and separate the upper part of the mold.
3. Pull out the rollers.



1. **Post-processing:** Remove the thin film along the parting line (can be peeled off by hand).
2. The top injection gate structure is relatively thin; handle carefully during processing to avoid damage.

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Method 2. Printing with TPU 90A

Notes:

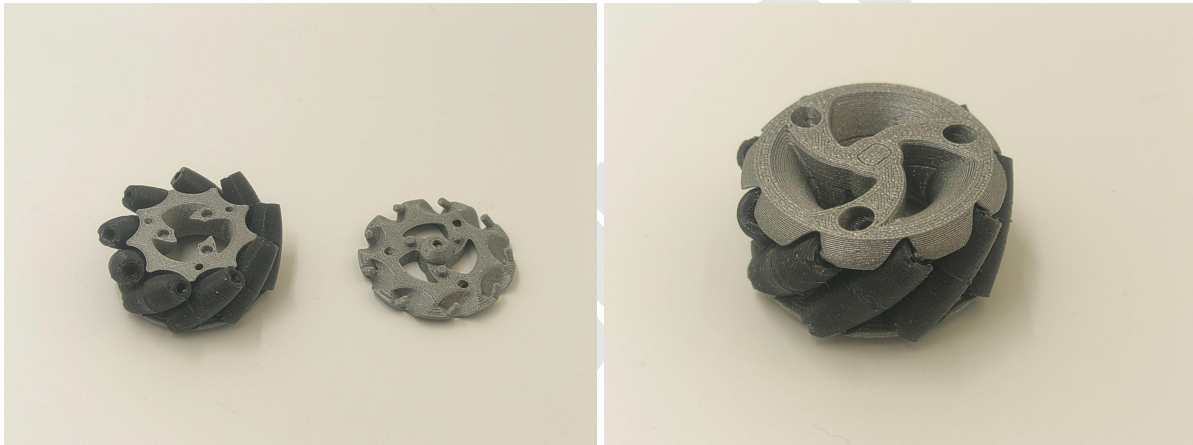
- Dry the material before printing, otherwise severe stringing may occur.

Assembly

(Instructions apply to both TPU and silicone rollers.)



Insert printed axis



Insert rollers as shown, snap into place (note A/B wheel distinction).



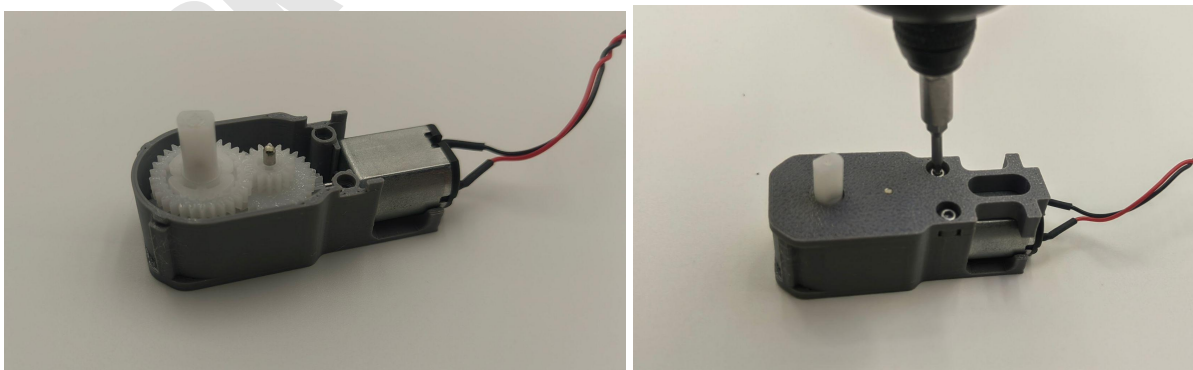
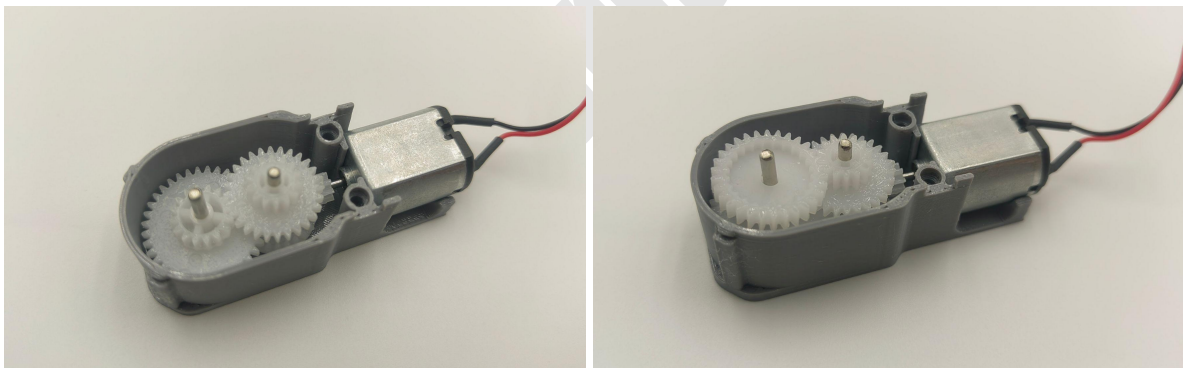
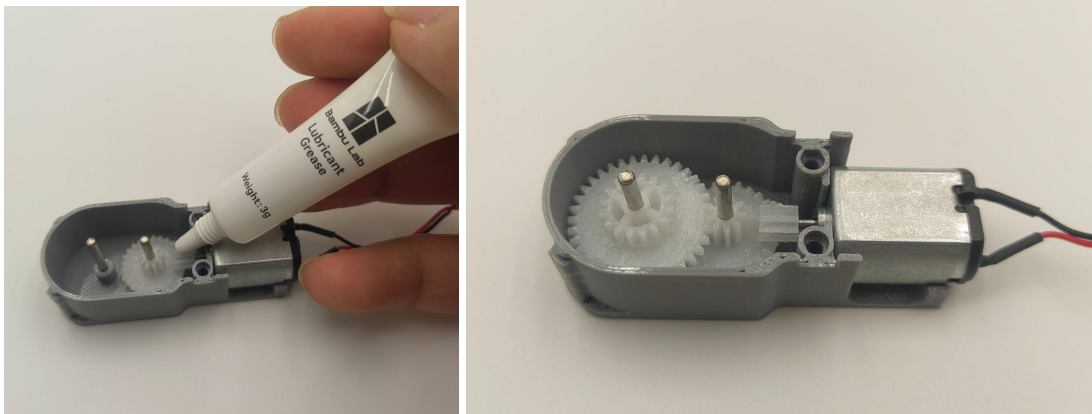
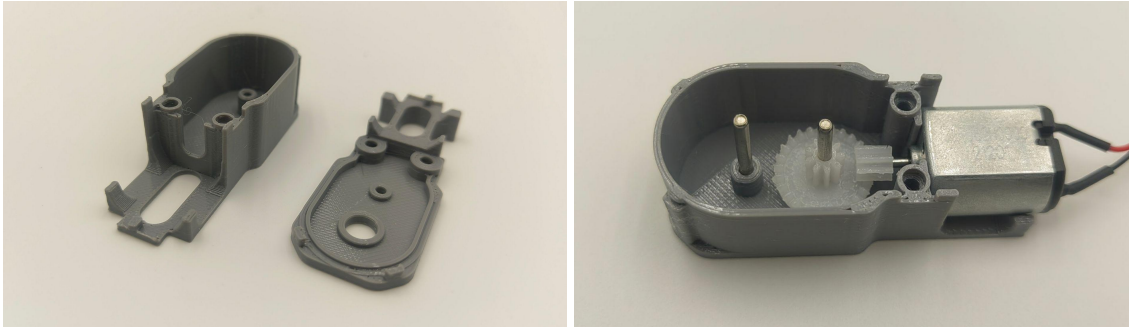
Tighten screws.



Repeat for remaining wheels.

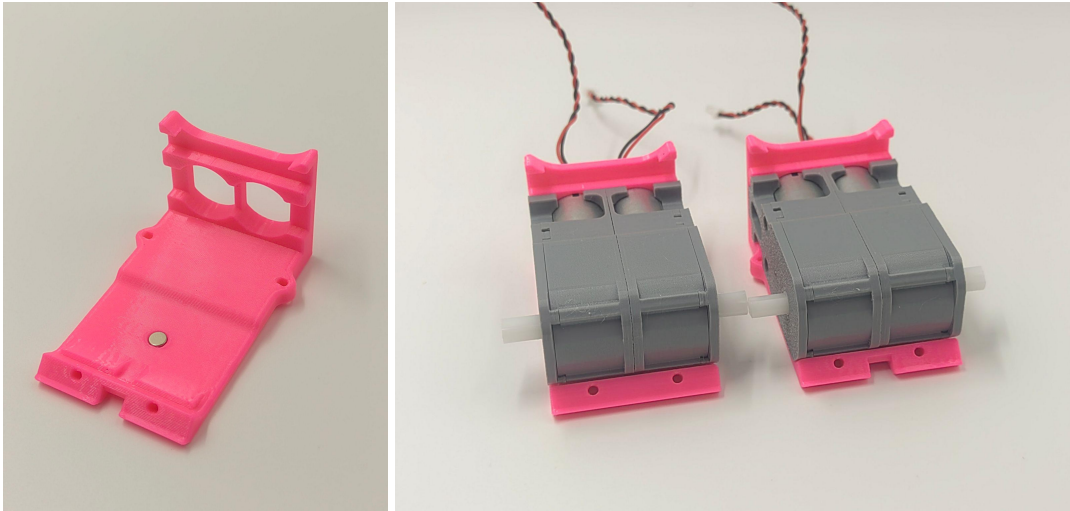
Gearbox

Materials: 48:1 gear set; DC motor

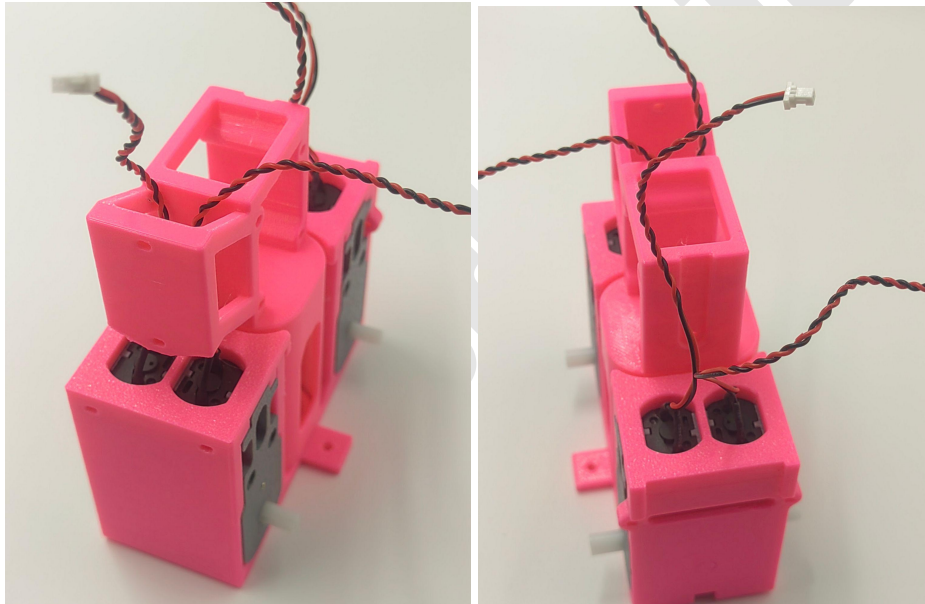


Apply grease to gear teeth.

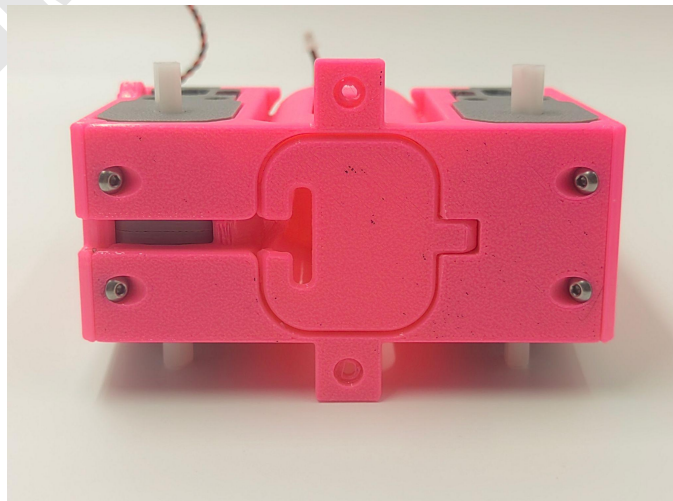
Main Part



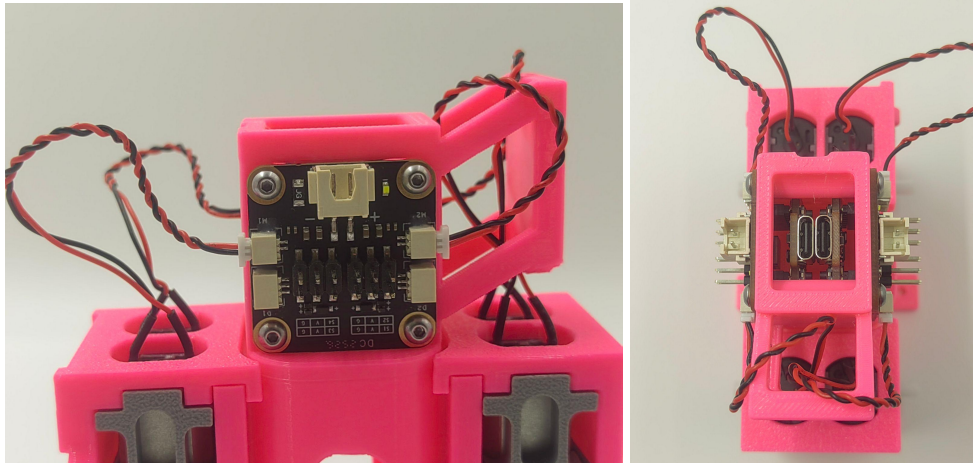
Place 4×2mm magnet; assemble cover plate and gearbox



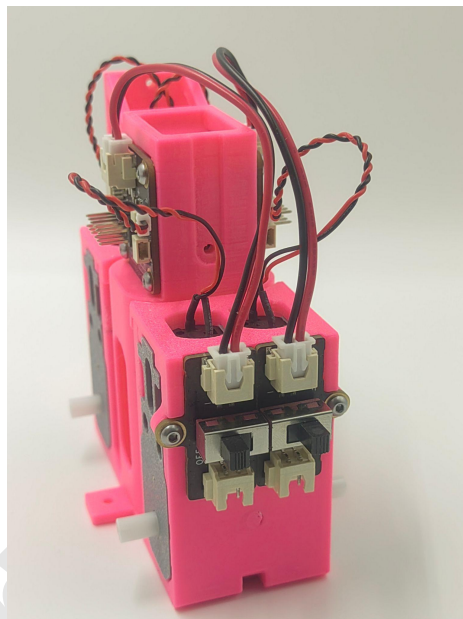
Two types of cover plates (front and rear)—do not confuse them.



Tighten screws.

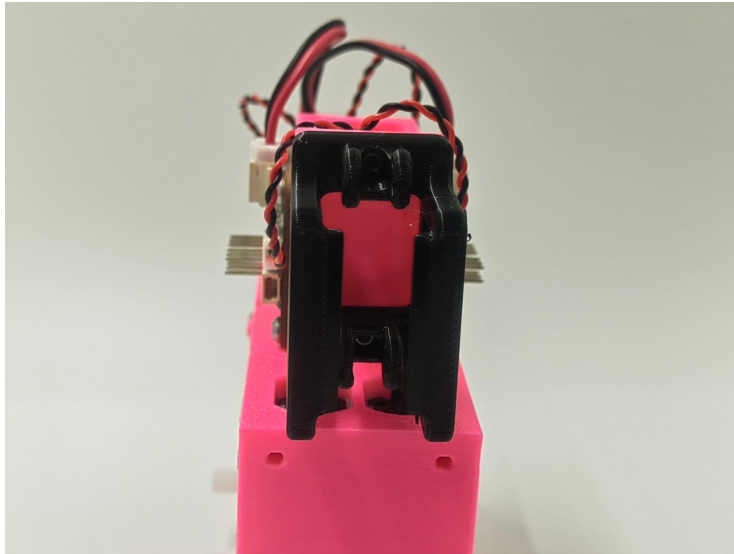


Install 2 receivers; connect motors as shown.



Install power switches.

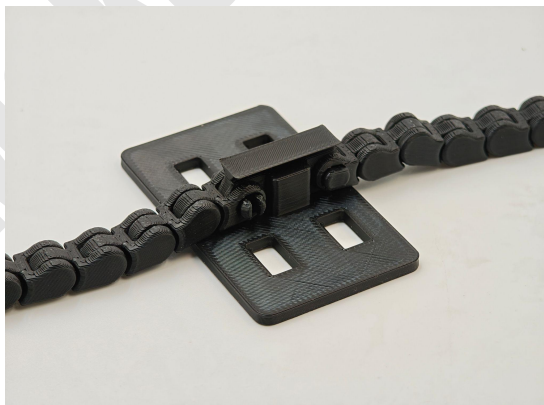
Forklift Module



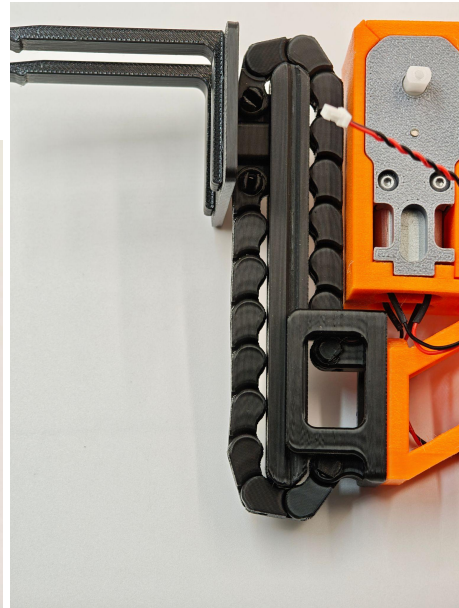
Install forklift module connector (2 screws).



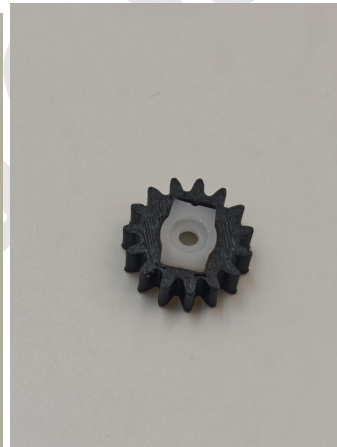
Flex chain joints slightly.



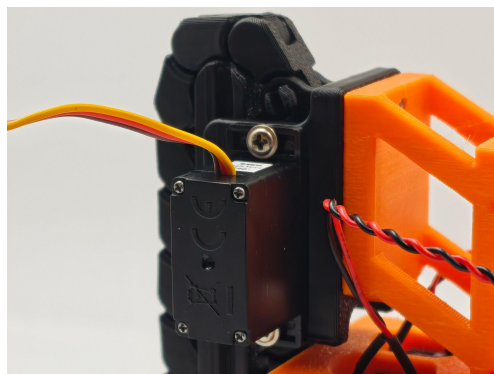
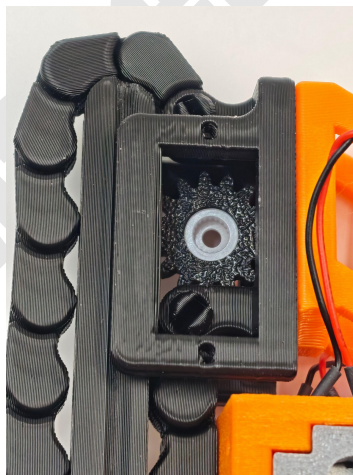
Insert pins; assemble rack and arm mounting plate.



Install forklift arms; insert remaining pins.



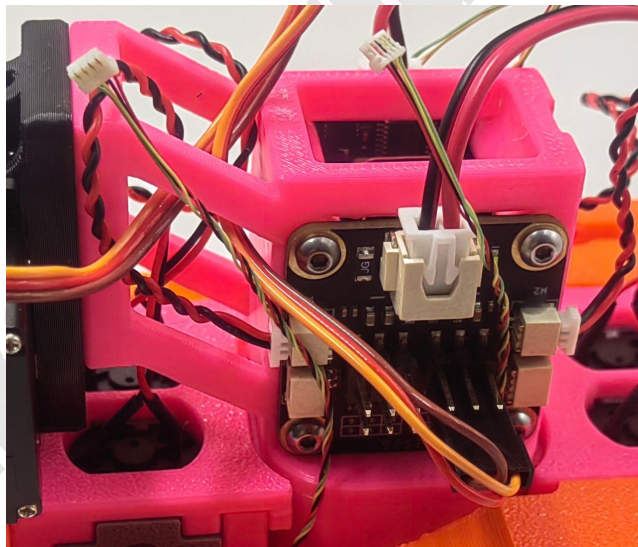
Cut the first hole of the servo's attachment part,
insert into gear hole



Put gear in (Mind the direction).
Install 360° servo(2 longer screws from the servo kit).
push the gear to connect with servo.

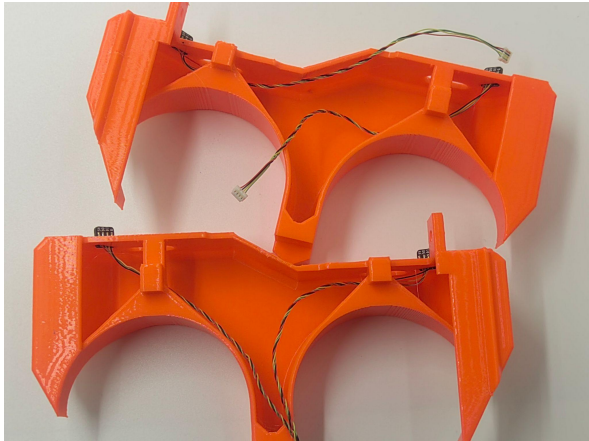


Tighten screw(Shorter one from the servo kit).

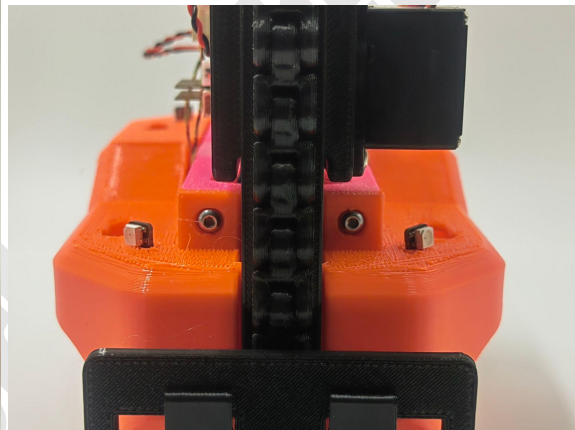
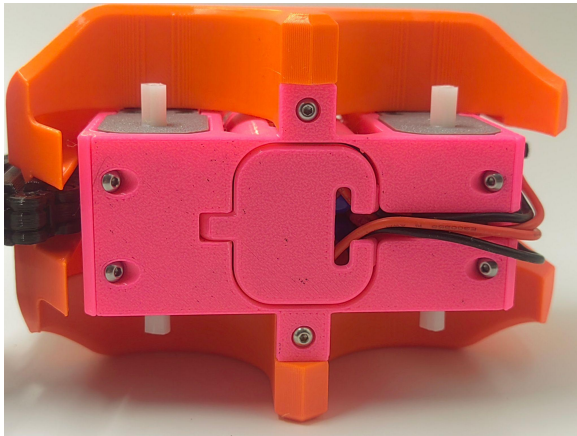


Connect servo(bottom right 3-pin).
Note: orange wire on the right.

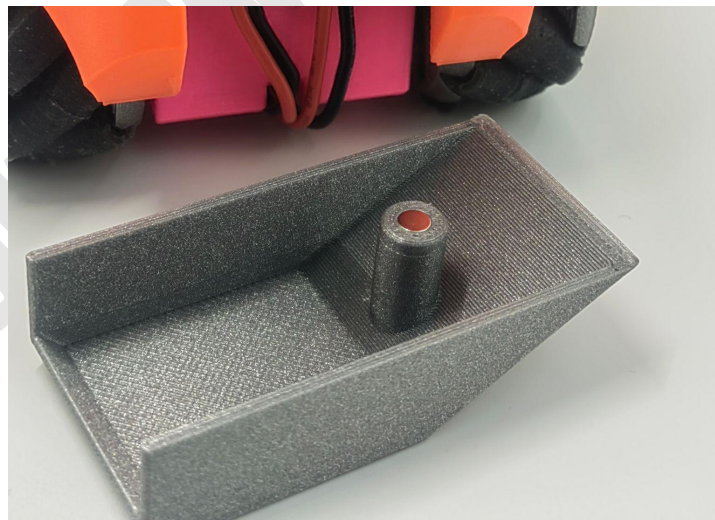
Lower Shell & LED



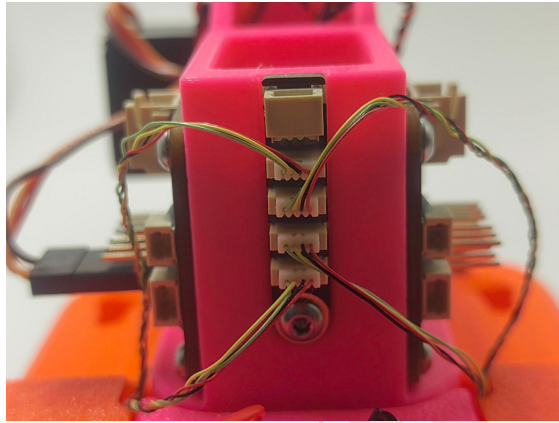
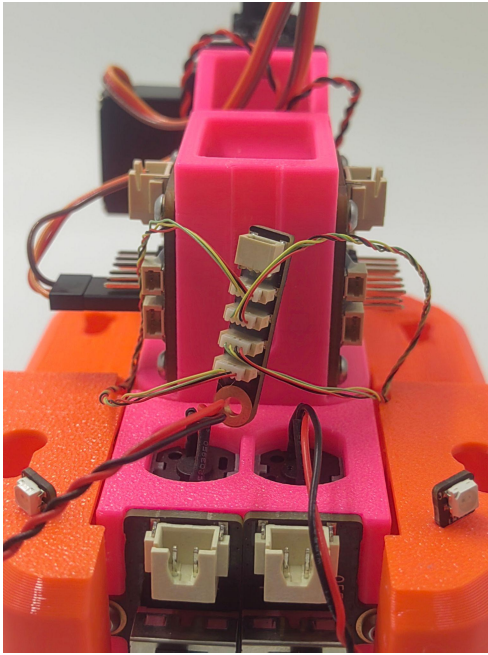
Thread LED ports through designated holes; secure LEDs.



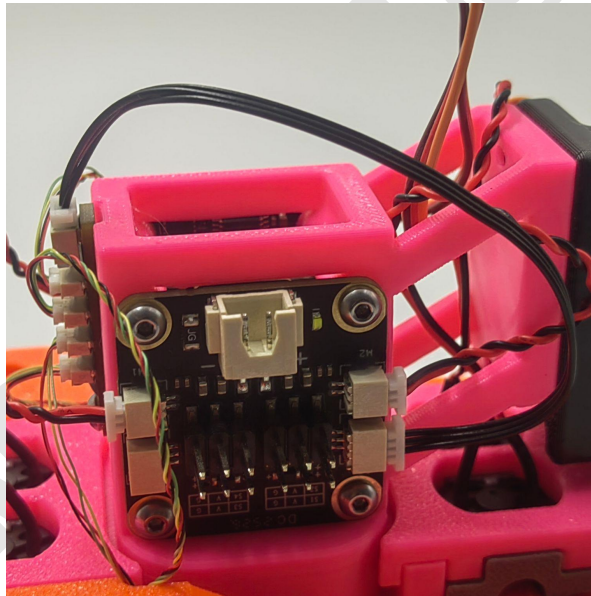
Tighten screws at bottom and front.



Insert 4×2mm magnet, ensure polarity matches previously embedded magnet;
fix with super glue.



1. Connect LEDs to LED hub (disconnect interfering wires if necessary).
2. LED hub labels: OUTPUT 1/2/3/4 = Rear Left / Rear Right / Front Right / Front Left.
3. Screw LED hub.

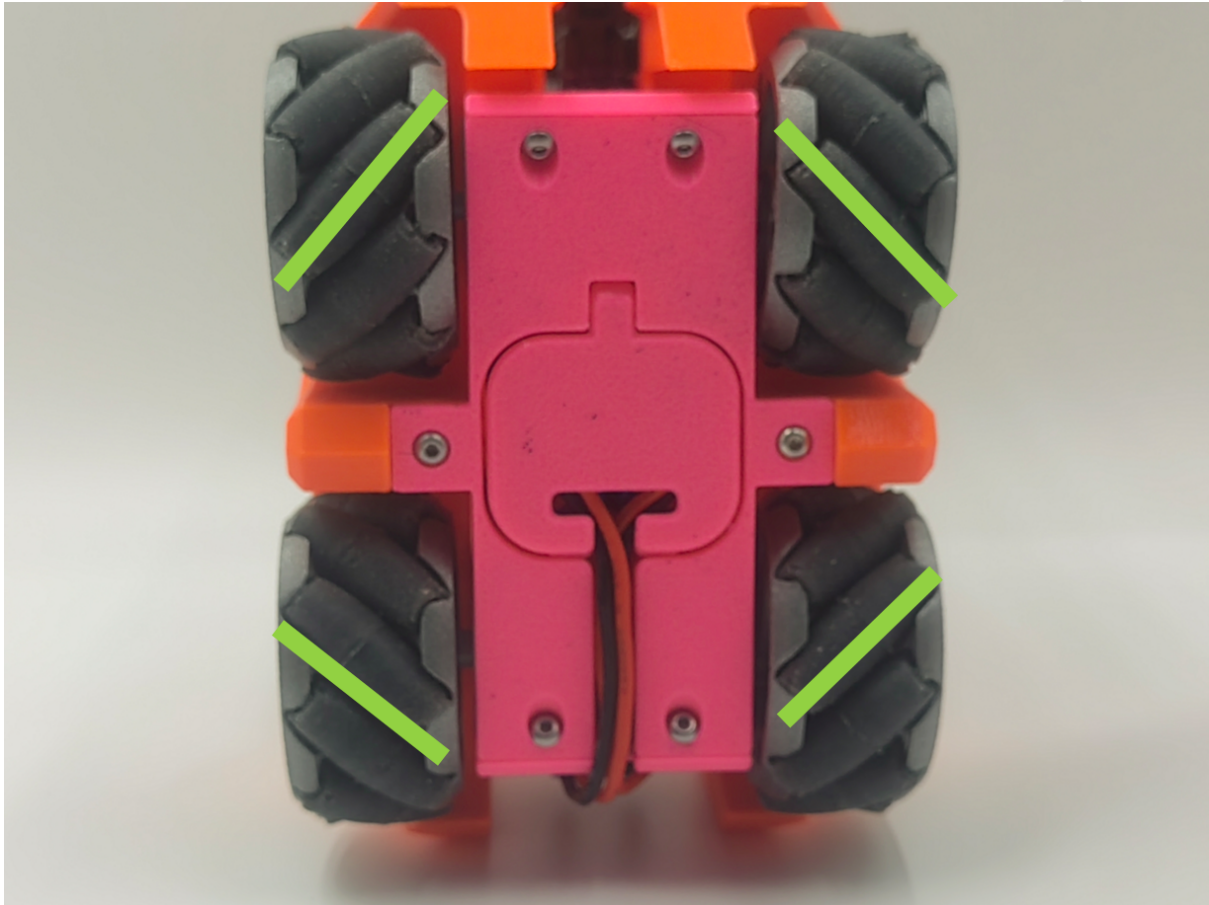


Connect LED hub with SH1.0 3 PIN

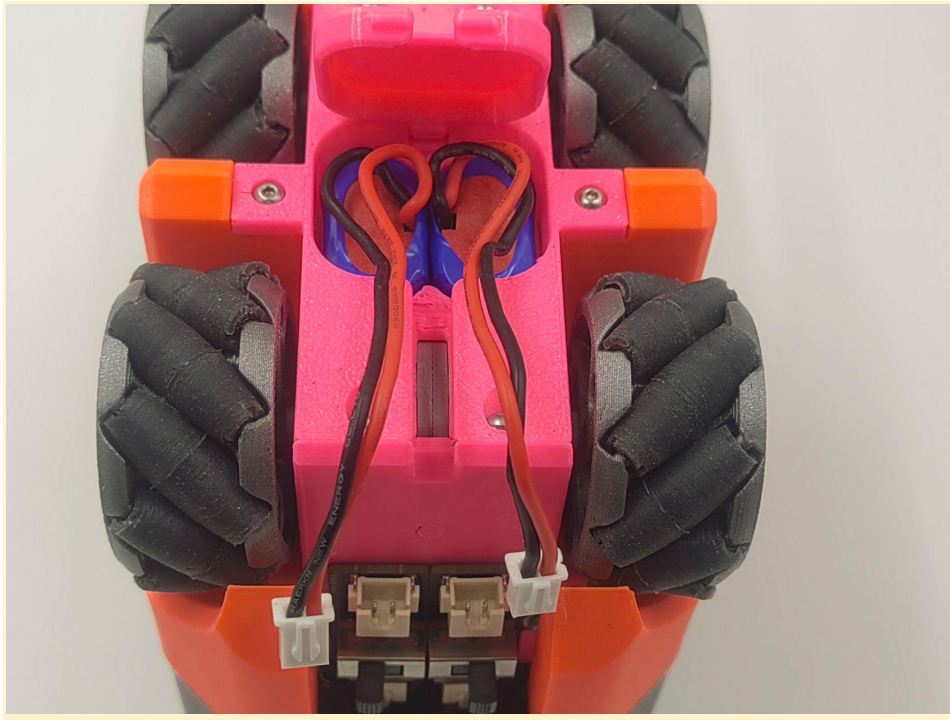
Wheels Installation

Tips:

1. Mecanum wheels are divided into two types, A and B, and need to be installed according to specific position relationships (check the figure below)
2. Wheels are press-fit with gearbox. Be careful when disassembling to avoid gearbox damage.

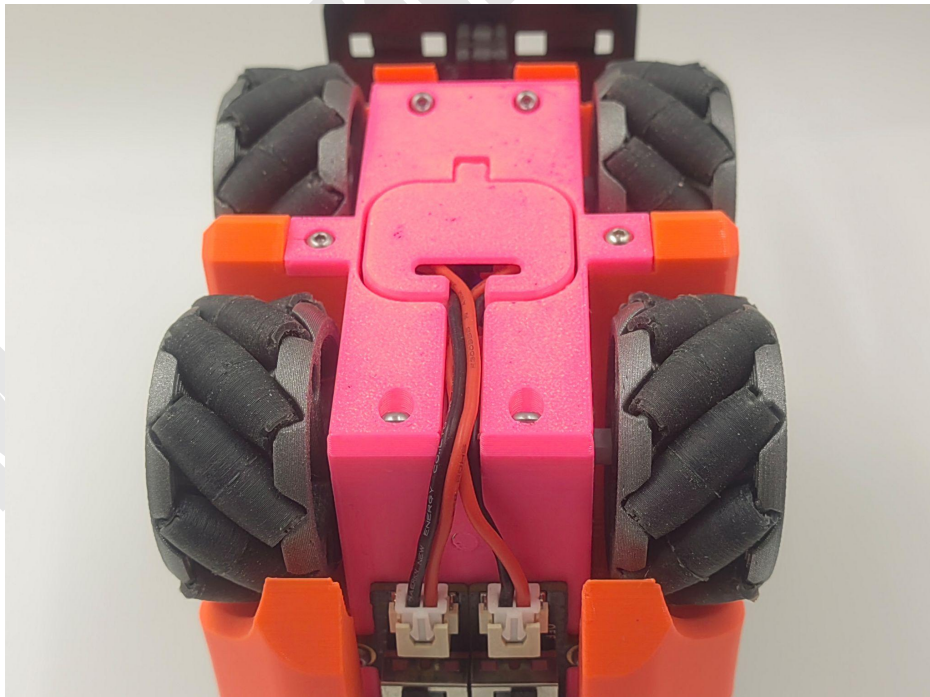


Battery

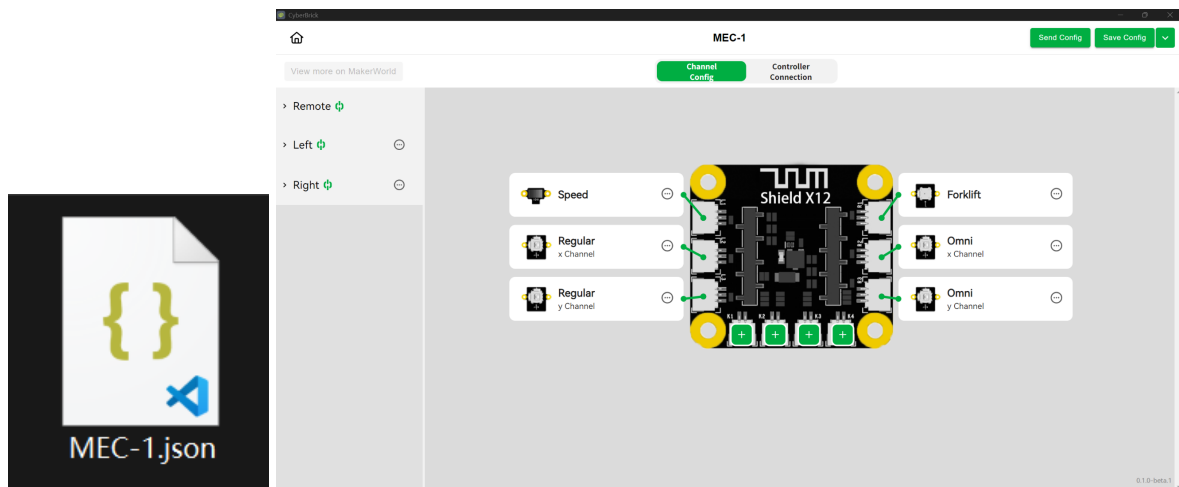


Tips:

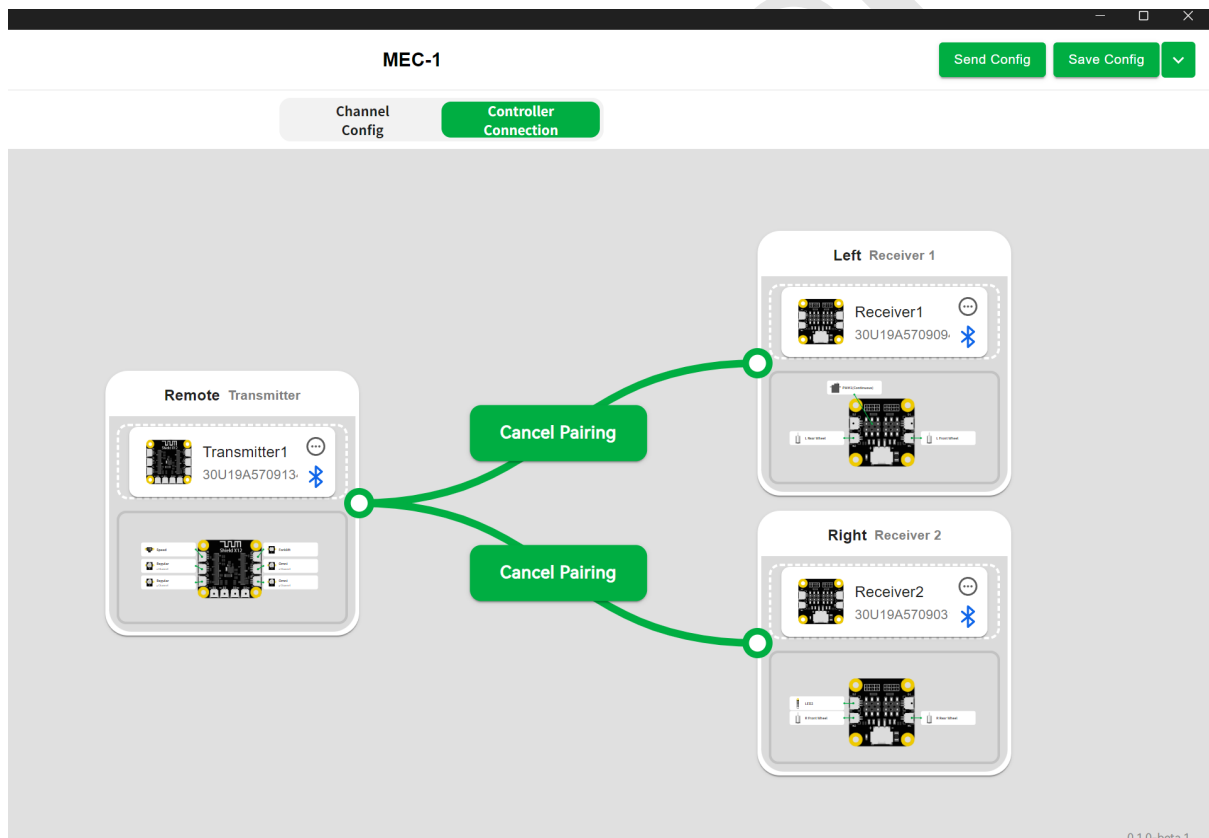
If the battery compartment is hard to open, use a tool to pry it open.
Before first use, remove internal support pieces.。



CyberBrick Config

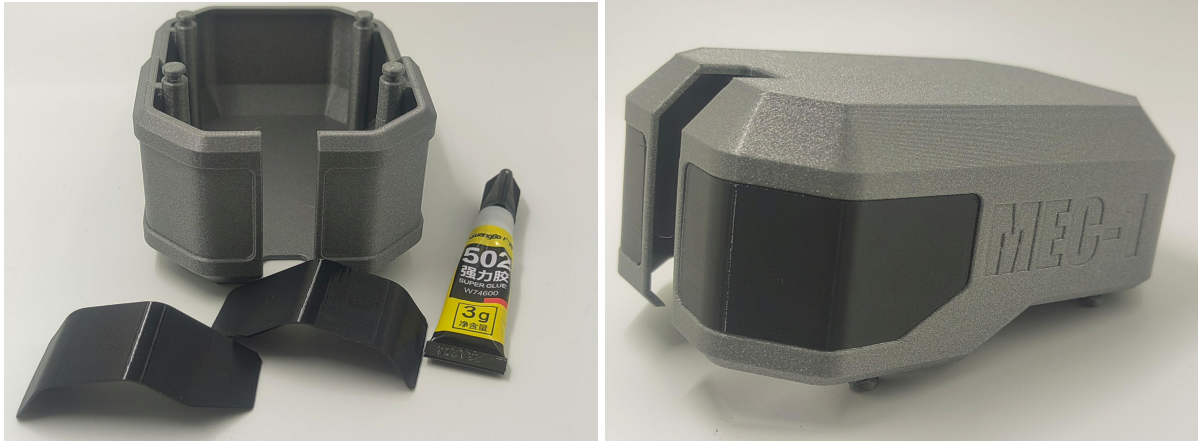


1. Download `Mec-1.json`, open with CyberBrick Desktop.

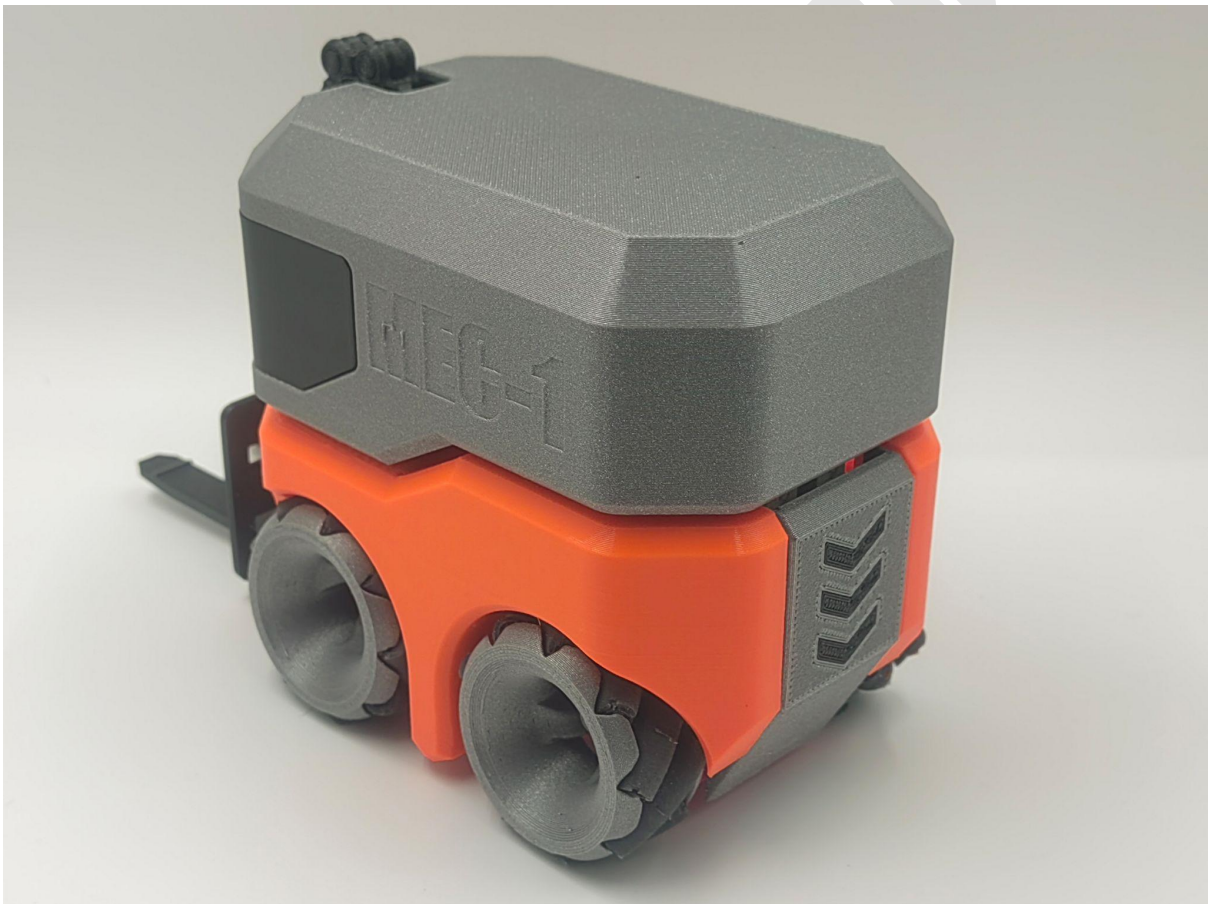


2. Pair transmitter and receivers (Receiver 1 = Left, Receiver 2 = Right).
3. Click "Send Config" at top right; wait until finished.

Upper Shell



Use super glue to fix decorative parts.
Don't forget to remove small supports on 4 pillars.



Align pillars with lower shell holes and push in, slide backward to lock in.

Tips:

1. Arrange cables before installation to avoid damage.
2. Lower forklift before installation, otherwise upper shell cannot be installed.

Advanced Light Effect

The basic lighting effects are already built into the CyberBrick configuration file ([MEC-1.JSON](#)), so this guide is completely optional. It explains how to manually import an enhanced lighting script for smoother animations and additional lighting features.

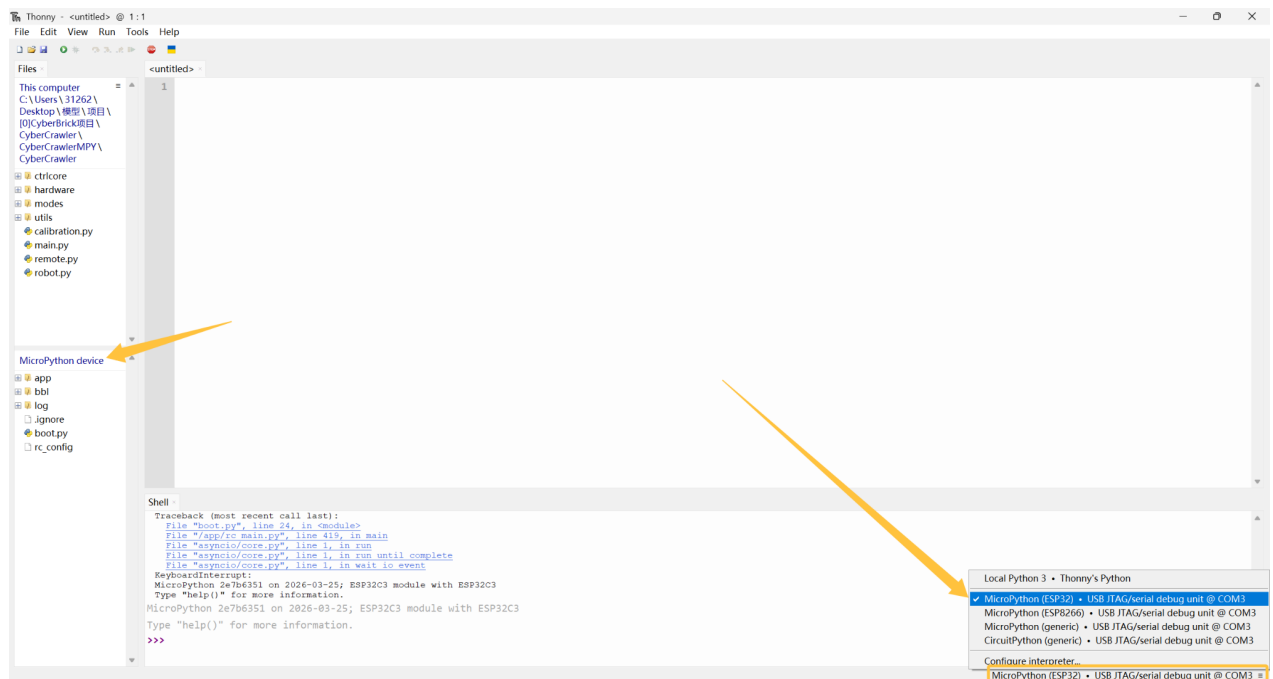
This guide explains how to manually import the lighting code to enable smoother and more advanced lighting effects.

The advanced lighting system provides several improvements over the default version, including:

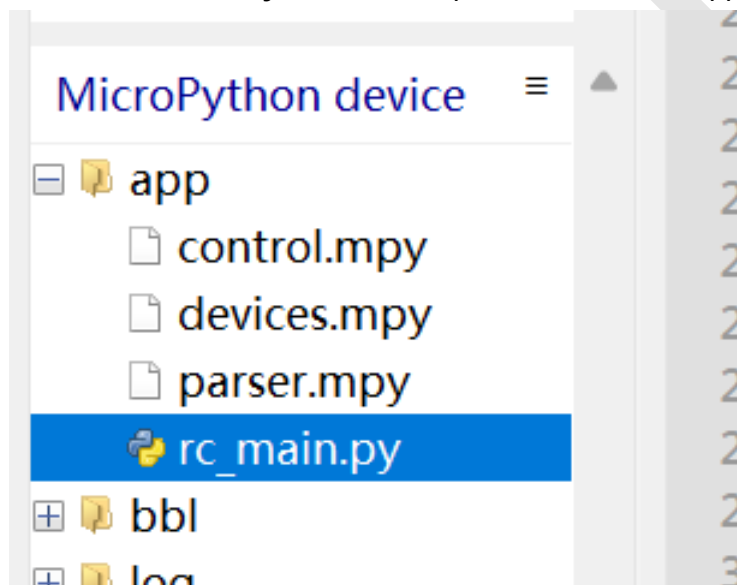
- **Directional movement indicators** – During omnidirectional movement, the LEDs corresponding to the movement direction will illuminate. For example, when moving diagonally forward-right, the front-right LEDs will light up.
- **Differential steering indicators** – Adds turn signal effects for differential steering, which are not included in the default lighting configuration.



Use a USB Type-C cable to connect the CyberBrick core on the right side of the vehicle to your computer.



Install and open Thonny (<https://thonny.org/>). In the bottom-right corner, select your ESP32 device. The **MicroPython Device** panel should then appear on the left side of the window.



In the **MicroPython Device** panel, locate `/app/rc_main.py` and double-click it to open.

```

1  # -*- coding: utf-8 -*-
2
3  # The CyberBrick Codebase License, see the file LICENSE for details.
4
5  # Copyright (c) 2025 MakerWorld
6
7
8  import sys
9  import gc
10 import machine
11 import uasyncio
12 import time
13 import ujson
14 import ulogger
15
16 sys.path.append("/app")
17 sys.path.append("/bbl")
18 if ".frozen" in sys.path:
19     sys.path.remove('.frozen')
20     sys.path.append('.frozen')
21
22 conf_update_flag = True # Flag to indicate configuration update is needed
23 setting = None # Parsed configuration settings
24 CUSTOM_LIGHT_ENABLED = True
25
26
27 def _disable_builtin_led_effects(rc_conf):
28     for key in rc_conf:
29         if key.startswith('receiver_'):
30             receiver = rc_conf.get(key)
31             if isinstance(receiver, dict):
32                 receiver['LED'] = 0
33
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```

Traceback (most recent call last):
 File "boot.py", line 24, in module
 File "/app/rc_main.py", line 419, in main
 File "uasyncio/core.py", line 1, in run
 File "uasyncio/core.py", line 1, in run until complete
 File "uasyncio/core.py", line 1, in wait to event

KeyboardInterrupt:
 MicroPython 2.7.6b351 on 2026-03-25; ESP32C3 module with ESP32C3
 Type "help()" for more information.
 MicroPython 2.7.6b351 on 2026-03-25; ESP32C3 module with ESP32C3
 Type "help()" for more information.
 >>>

Download the [rc_main.txt](#) attachment from my model page. Open the file, copy all of its contents, then replace the entire contents of `/app/rc_main.py` with the copied code and save the file.