

RoArm-M1 Tutorial VII: Assembly Graphics Tutorial

From Waveshare Wiki

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RoArm-M1 Assembly Graphics Tutorial

- This document is for RoArm-M1 assembly.

Assembly Guide

First, you need to install the pan-tilt.

Install the silver metal edge flat head screw CM3*6 and the silver metal circular spacer column M3*35 to the disc-shaped part.



([/wiki/File:RoArm-M1_assembly01.png](#))

Use the black metal round head self-tapping screw PA2*5 to install the servo on the disc-shaped part.



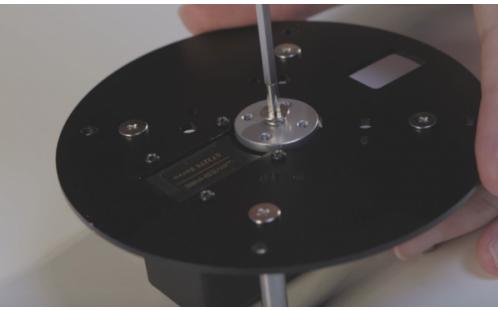
([/wiki/File:RoArm-M1_assembly02.png](#))

Install the green rubber ring on the toothed turntable and install it on the gear of the servo. The rubber ring is used to increase the mechanical damping of the servo.



([/wiki/File:RoArm-M1_assembly03.png](#))

Install the elastic gasket on the silver flat head screw CM3*6 and fix it on the turntable of the servo.

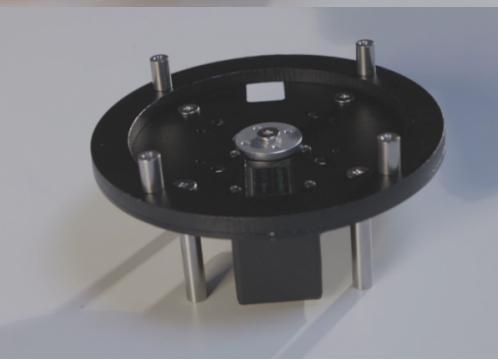


(/wiki/File:RoArm-M1_assembly04.png)

Use black cup head screws M3*10 and silver metal circular spacer posts M3*10 to install the ring-shaped part to the disc-shaped part.

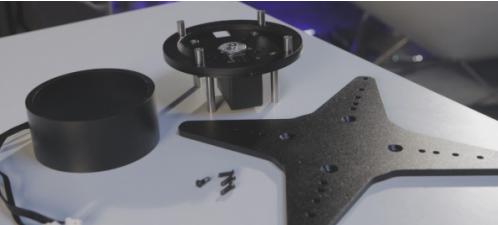


(/wiki/File:RoArm-M1_assembly05.png)



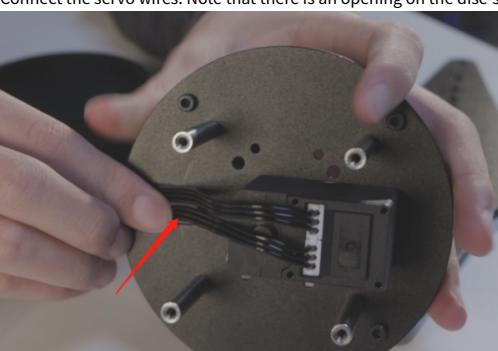
(/wiki/File:RoArm-M1_assembly06.png)

The installation of the pan-tilt comes to an end first, and then the chassis is installed.



(/wiki/File:RoArm-M1_assembly07.png)

Connect the servo wires. Note that there is an opening on the disc-shaped part, and the servo wires need to be placed above the opening.



(/wiki/File:RoArm-M1_assembly08.png)

Install the aluminum tube, and pay attention that there should be no gap between the aluminum tube and the pan-tilt.



(/wiki/File:RoArm-M1_assembly09.png)

Install the X-type chassis with black countersunk screws KM3*10.



(/wiki/File:RoArm-M1_assembly10.png)

Next, install the pan-tilt, install the silver metal spacer column M3*10 on the small disc-shaped part shown in the picture with the silver flat head screw CM3*6.



(/wiki/File:RoArm-M1_assembly11.png)

Install elastic washers on the silver flat head screws CM3*6 to fix the small disc-shaped parts of the pan-tilt. After installing the small disc, make sure that the small disc can rotate smoothly without hindrance.



(/wiki/File:RoArm-M1_assembly12.png)

Install the deep groove ball bearings on the pan-tilt.



(/wiki/File:RoArm-M1_assembly0012.png)

Fix another small disc part to the pan-tilt with a silver cup-head hexagon screw M3*6; then fix the ring-shaped part for carrying the drive board to the pan-tilt with a silver cup-head hexagon screw M3*6. Pay attention to the position of the parts and the servo wire here. Please install it correctly. Otherwise, it will limit the rotation range of the chassis servo.



(/wiki/File:RoArm-M1_assembly13.png)



(/wiki/File:RoArm-M1_assembly14.png)

Install the upper arm of the mechanical arm, and fix the synchronous wheel and the upper arm with the silver flat head screw CM3*10. Pay attention to the position between the upper arm and the timing wheel.



(/wiki/File:RoArm-M1_assembly15.png)

Install the positioning parts and fix them with silver flat head screws CM3*4.



(/wiki/File:RoArm-M1_assembly16.png)

Install the flange bearing F6800ZZ, both sides of the big rocker arm must be installed.



(/wiki/File:RoArm-M1_assembly17.png)

(/wiki/File:RoArm-M1_assembly18.png)

Fix the big rocker arm with lock nuts, the order is lock nuts > side panel assembly > plane bearing F10-18M > timing wheel assembly > plane bearing F10-18M > side panel assembly > elastic washer > flat head screw CM8*16. Pay attention to the direction of the big rocker arm and tighten the fasteners.



(/wiki/File:RoArm-M1_assembly19.png)

Put the timing belt on the timing wheel, and then install pan-tilt components on the pan-tilt with black cup head inner hexagon screws M3*8. There is no need to pay attention to the installation angle here, and you can set the middle position for the servo later. After installation, turn the rocker arm to ensure smoothness.

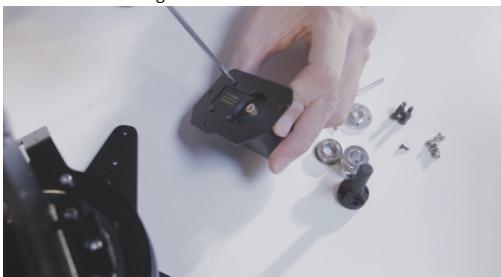


(/wiki/File:RoArm-M1_assembly20.png)



(/wiki/File:RoArm-M1_assembly21.png)

Use the black self-tapping screw PA2*5 to install the servo to the part shown in the picture, and then use the silver cup head screw M3*6 to install the toothed turntable. There is no need for a rubber ring here.



(/wiki/File:RoArm-M1_assembly22.png)



(/wiki/File:RoArm-M1_assembly23.png)

Install the flange shaft of the robotic arm with the black cup head inner hexagon screw M3*8.



(/wiki/File:RoArm-M1_assembly24.png)

Install the small timing wheel, and pay attention to the direction of tightening the screws to the flat side of the flange shaft of the mechanical arm.



(/wiki/File:RoArm-M1_assembly25.png)

Install the flange bearing F688ZZ, then install the flange shaft assembly, and install the servo components to the robotic arm component with silver flat head screws CM3*4.



(/wiki/File:RoArm-M1_assembly26.png)

(/wiki/File:RoArm-M1_assembly27.png)

After installing the pan-tilt and arm, start installing the gripper. First, install the mini flange bearing on the gripper, pay attention to the direction of the flange bearing, the wide surface close to the gripper is on the top, the wide surface away from the gripper is on the bottom, and the other gripper is opposite.



(/wiki/File:RoArm-M1_assembly28.png)

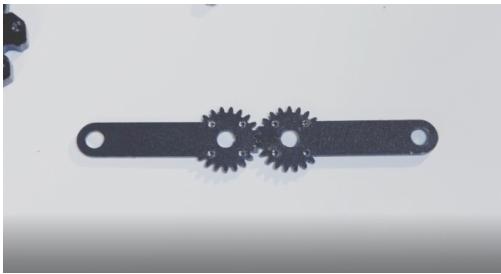
(/wiki/File:RoArm-M1_assembly29.png)

Continue to install the mini flange bearing, when installed on this part, the flange bearing is in the same direction.



(/wiki/File:RoArm-M1_assembly30.png)

When installing geared parts, pay attention to the alignment of the gears and install the mini flange bearing in the same direction when the parts are flush.



(/wiki/File:RoArm-M1_assembly31.png)

Use black flat-head screws CM3*14 and black M3 self-locking nuts to fix the parts. The side where the screws are placed is the wide side of the flange bearing, and a plane bearing F6-12M is installed between the flange bearings of the two parts. Note that the screws and nuts should not be too tight to ensure that the parts can be easily rotated; they should not be too loose to cause slippage on the plane.

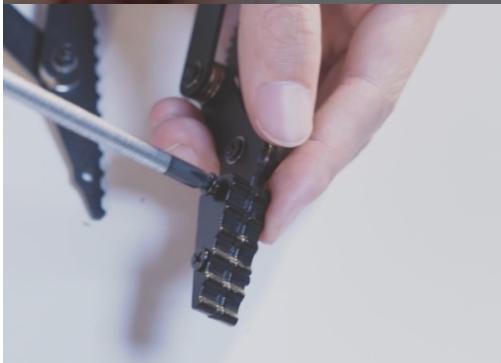


(/wiki/File:RoArm-M1_assembly32.png)

Reinforce the gripper. Pay attention to the diameter of the screw hole of the fasteners. Place the small hole under the gripper, and the large hole without thread under the gripper. Tighten it with black flat head screws CM3*14.



(/wiki/File:RoArm-M1_assembly33.png)



(/wiki/File:RoArm-M1_assembly34.png)

Install the mini flange bearing, the wide surface close to the central axis is on the top, and the wide surface away from the central axis is downward.



(/wiki/File:RoArm-M1_assembly35.png)

Use black flat-head screws CM3*14 and M3 self-locking nuts to install the gripper. Note that the two-gear connectors should be parallel.



(/wiki/File:RoArm-M1_assembly36.png)



(/wiki/File:RoArm-M1_assembly37.png)

Install the servo with black self-tapping screws PA2*5.



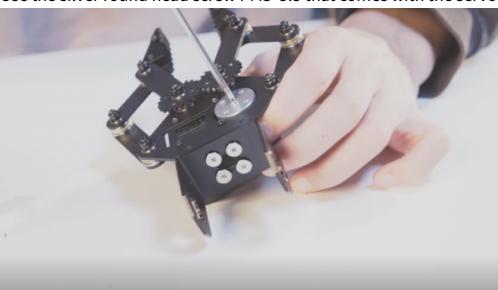
(/wiki/File:RoArm-M1_assembly38.png)

Silver flat head screws CM3*6 are used here, and washers need to be added.



(/wiki/File:RoArm-M1_assembly39.png)

Use the silver round head screw PM3*5.5 that comes with the servo to fix the toothed turntable of the servo.



(/wiki/File:RoArm-M1_assembly40.png)

Install the gear, and pay attention to the size of the screw hole of the gear.



(/wiki/File:RoArm-M1_assembly41.png)

Use the silver round head screw M2*8 to install the small screw hole gear on the connector. Note that there is an arrow on the gear, and the direction of the arrow should be consistent with that of the gear on the connector.



(/wiki/File:RoArm-M1_assembly42.png)

Align the two large screw hole gears and fix them with black flat head screws CM3*14 with elastic washers. Try turning the gripper after installation to make sure it turns easily.



(/wiki/File:RoArm-M1_assembly43.png)

Install the servo with black self-tapping screws PA2*5, pay attention to the direction of the servo.



(/wiki/File:RoArm-M1_assembly44.png)

After putting on the rubber ring, install the toothed turntable, and then install the servo component on the big rocker arm with the black cup head hexagon socket screw M3*10 with gasket, pay attention to the installation direction.



(/wiki/File:RoArm-M1_assembly45.png)

Use the black flat head screw CM3*14 to install the black 16mm thickened tube clamp, don't tighten it too much, just install the carbon fiber tube and then tighten it.



(/wiki/File:RoArm-M1_assembly46.png)

Install the servo with black self-tapping screws PA2*5.



(/wiki/File:RoArm-M1_assembly47.png)

The toothed turntable and non-toothed turntable are covered with rubber rings and then installed on both sides of the servo, and installed on the gripper component with silver flat head screws CM3*6 with washers. There are 5 screws on the turntable with teeth and 4 screws on the turntable without teeth.



(/wiki/File:RoArm-M1_assembly48.png)

Use the black flat head screw CM3*14 to install the thickened tube clamp, and then connect the other side of the carbon fiber tube to the robotic arm. At this time, the two planes should be flush.



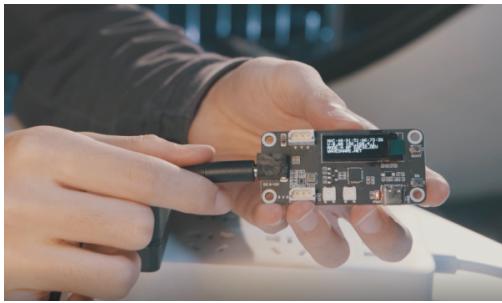
(/wiki/File:RoArm-M1_assembly49.png)



(/wiki/File:RoArm-M1_assembly50.png)

After the installation is complete, shake each servo to see if it cannot shake or is difficult to shake.

The robotic arm has been assembled. Next, set the servo ID, plug in the power to the driver board, and turn it on.

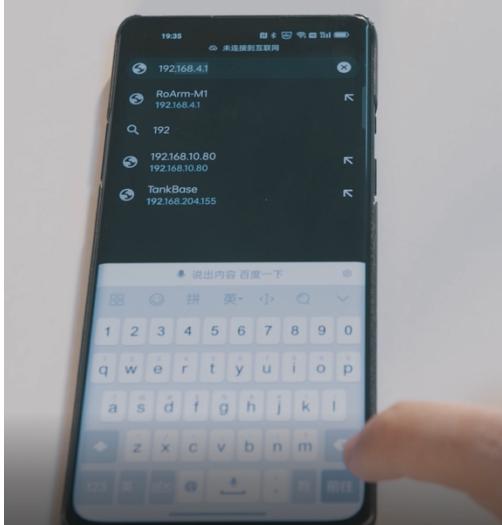


(/wiki/File:RoArm-M1_assembly51.png)

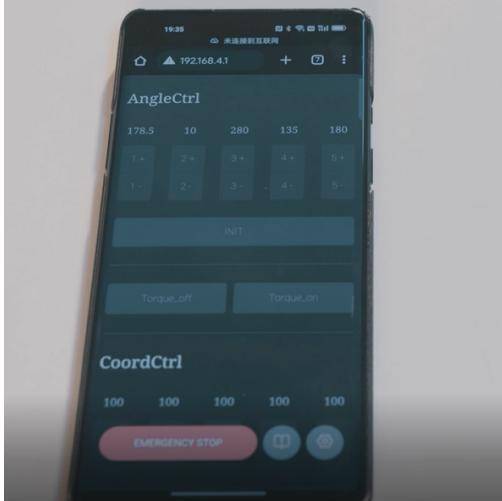
Use a mobile phone or computer to connect to WiFi: ESP32_DEV, the password is 12345678, after connecting to WiFi, use Google Chrome to log in to the URL 192.168.4.1.



(/wiki/File:RoArm-M1_assembly52.png)

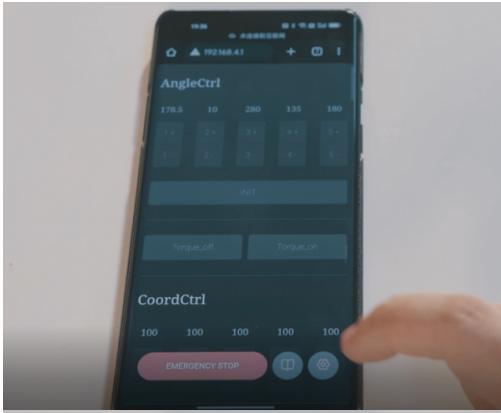


(/wiki/File:RoArm-M1_assembly53.png)

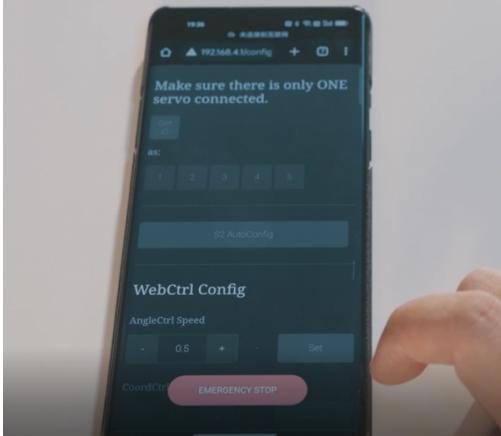


(/wiki/File:RoArm-M1_assembly54.png)

After entering the webpage, click the setting in the lower right corner of the webpage to start setting the servo ID.



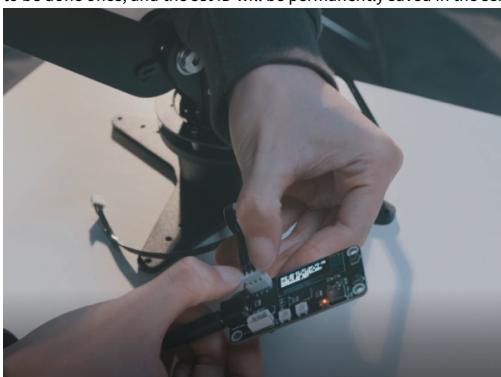
(/wiki/File:RoArm-M1_assembly55.png)



(/wiki/File:RoArm-M1_assembly56.png)

Starting from the bottom servo, use the servo cable to connect the driver board to the servo. After connecting, click Get ID, and then select 1. After setting, disconnect the servo from the driver board. Repeat the steps just now for the next 4 servos from bottom to top to set ID2, 3, 4, and 5 in sequence.

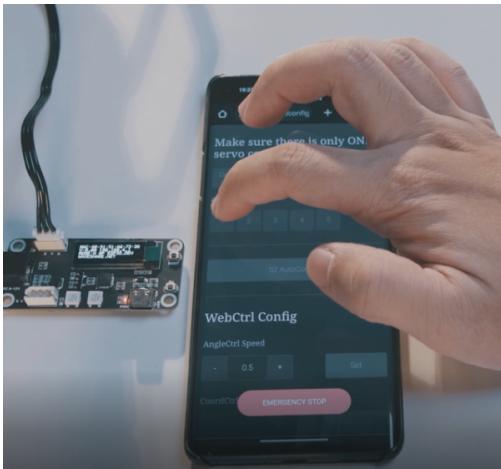
Note that only one servo can be connected to the driver board each time you set the ID. After all the settings are completed, you can disconnect the power cord. This step only needs to be done once, and the set ID will be permanently saved in the servo. Change the ID.



(/wiki/File:RoArm-M1_assembly57.png)



(/wiki/File:RoArm-M1_assembly58.png)

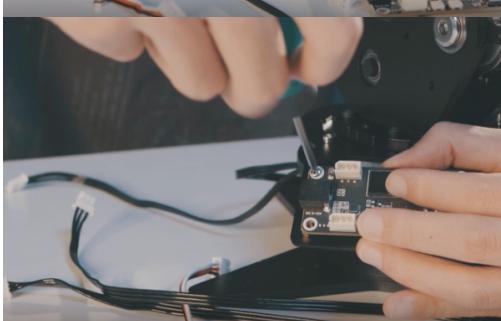


(/wiki/File:RoArm-M1_assembly59.png)

To install the driver board, first, install the hexagonal copper column M2.5*5 + 6 and the silver nut M2.5 on the robot arm to isolate the driver board and the parts of the robot arm to prevent short circuit of the driver board, and then use the silver round head screw PM2 .5*4 fixed driver board.



(/wiki/File:RoArm-M1_assembly60.png)



(/wiki/File:RoArm-M1_assembly61.png)

Connect the servo wire and connect the servo in series. One of the two servo wires drawn from the chassis is connected to the drive board, the other is connected to the pan-tilt of the servo, and the remaining servo is connected in series with the servo wires one by one. When connecting the two servos on both sides of the carbon fiber tube, you can pass the servo cable through the carbon fiber tube. Except for the original servo cable for the servo of the chuck, the others are connected with a 26cm black servo cable.



(/wiki/File:RoArm-M1_assembly62.png)



(/wiki/File:RoArm-M1_assembly63.png)

After the servos are connected in series, turn the servos to check whether they will be stuck by the servo wires and cannot be rotated.

Servo Calibration

Note: The servo calibration has been completed before the product leaves the factory. This tutorial is only applicable to customers who need to recalibrate. The robotic arm has been assembled; next, set the servo IDs and power on the driver board.

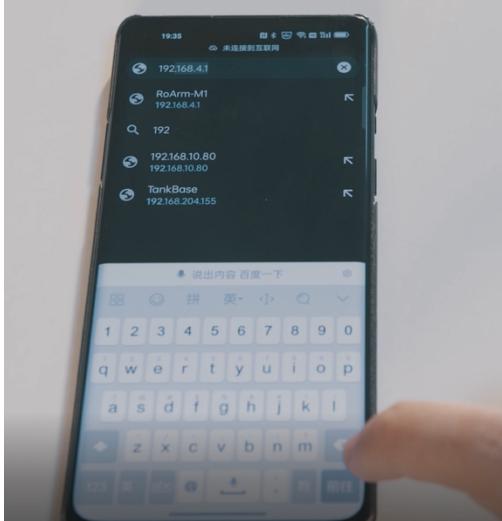


(/wiki/File:RoArm-M1_assembly51.png)

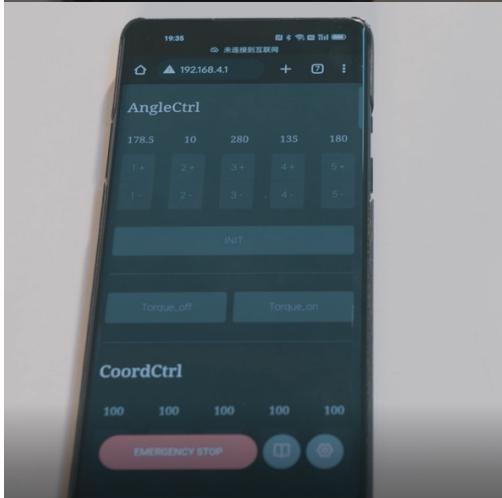
Use your cell phone or computer to connect to WiFi: ESP32_DEV, the password is 12345678. After connecting to WiFi, you can use Google Chrome to log in to the URL 192.168.4.1.



(/wiki/File:RoArm-M1_assembly52.png)

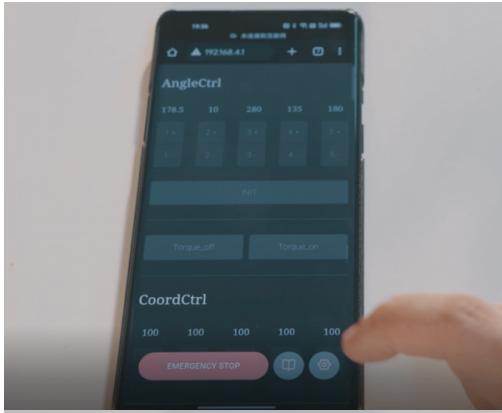


(/wiki/File:RoArm-M1_assembly53.png)

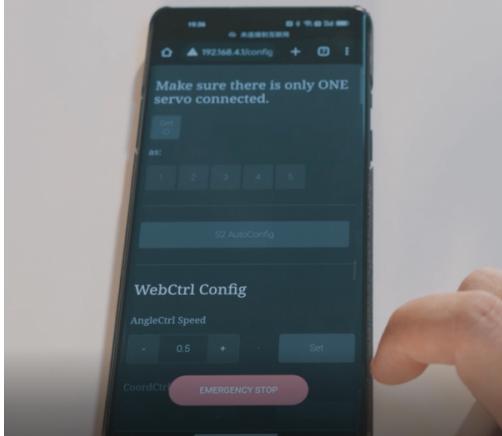


(/wiki/File:RoArm-M1_assembly54.png)

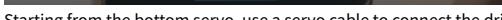
Once entering the page, click on settings in the bottom right corner of the page to start setting up the servo ID.



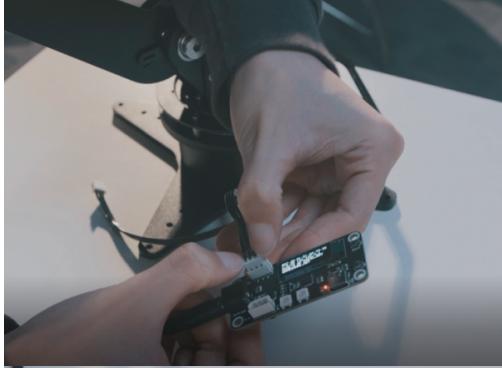
(/wiki/File:RoArm-M1_assembly55.png)



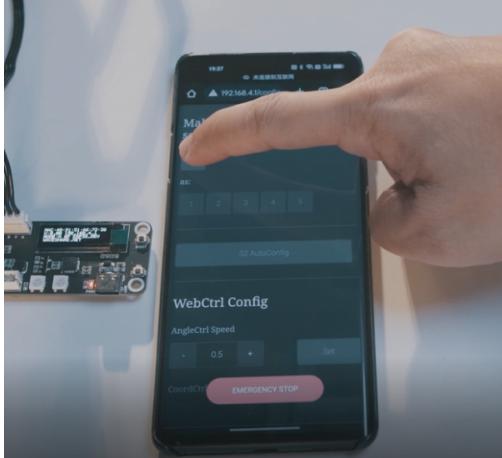
(/wiki/File:RoArm-M1_assembly56.png)



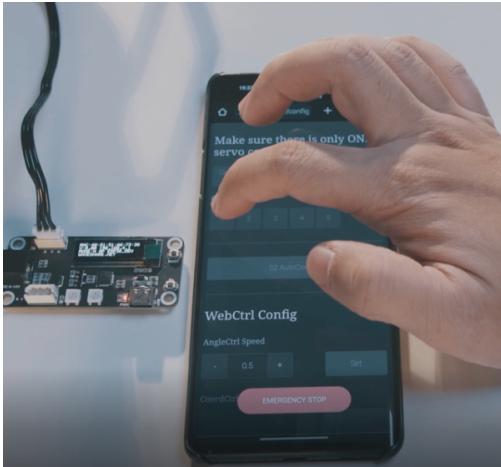
Starting from the bottom servo, use a servo cable to connect the driver board and the servo. After connecting, click on "Get ID," then select "1" to set it. Once set, disconnect the servo from the driver board. Repeat the same steps for the next four servos from the bottom to the top, setting them to IDs 2, 3, 4, and 5. Please note that when setting the ID, only one servo should be connected to the driver board at a time. After setting all the IDs, you can disconnect the power cable. This step only needs to be performed once, as the assigned IDs will be permanently saved in the servos until you change them.



(/wiki/File:RoArm-M1_assembly57.png)



(/wiki/File:RoArm-M1_assembly58.png)

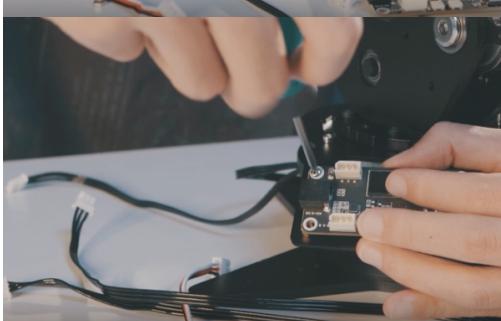


(/wiki/File:RoArm-M1_assembly59.png)

To install the driver board, first attach the hexagonal brass spacers M2.55+6 and silver nuts M2.5 to the robotic arm. These are used to isolate the driver board from the robotic arm components, preventing any short circuits. Next, secure the driver board using silver round-head screws PM2.54.

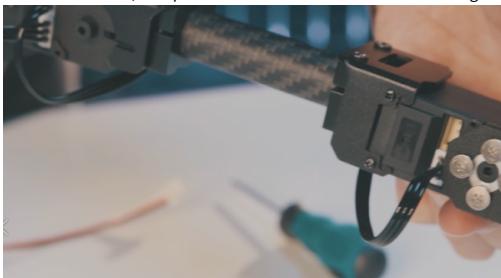


(/wiki/File:RoArm-M1_assembly60.png)



(/wiki/File:RoArm-M1_assembly61.png)

Connect the servo wires and the servos in series. The two servo wires from the chassis are connected to the driver board, one is connected to the servo of the pan-tilt, and the rest of the servos are connected in series one by one with the servo wires. When connecting the two servos on both sides of the carbon fiber tube, you can thread the servo cable through the carbon fiber tube, except for the servo of the chuck with the original servo cable, all other servos are connected with 26cm black servo cable.

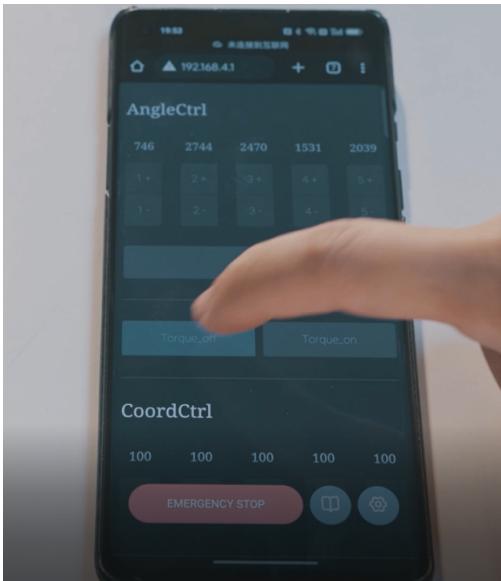


(/wiki/File:RoArm-M1_assembly62.png)



(/wiki/File:RoArm-M1_assembly63.png)

Click on the "Torque_off" key to turn off the servo torque lock, and you can manually rotate the servo when it is powered on. The "Torque_on" key is to turn on the torque lock.



(/wiki/File:RoArm-M1_assembly64.png)

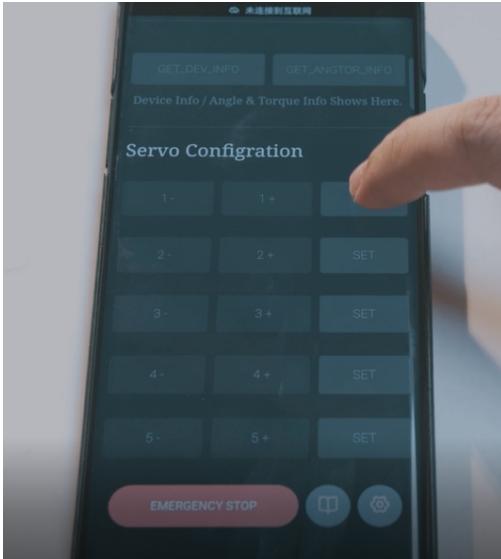
After turning off the torque lock, you can save the position after manually rotating.

The arrow on the small disk-shaped part is aligned with the arrow on the ring.



(/wiki/File:RoArm-M1_assembly65.png)

Find the corresponding servo ID to save by clicking on "SET" in the Servo Configuration.



(/wiki/File:RoArm-M1_assembly66.png)

Align the holes in the two parts with the holes in the large arm to save the position.



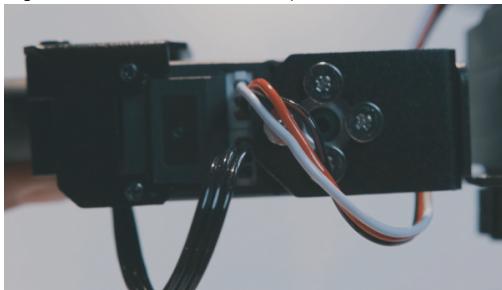
(/wiki/File:RoArm-M1_assembly67.png)

Align the locating holes on the large arm with the locating holes on the connector to save the position.



(/wiki/File:RoArm-M1_assembly68.png)

Align the two connectors and save the position.



(/wiki/File:RoArm-M1_assembly69.png)

The two connectors on each side of the connector are turned to the same straight line to save the position.



(/wiki/File:RoArm-M1_assembly70.png)

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