



Muto Hexapod Robot

说明书/Manual



ROS 版 (ROS Version)

①使用前请仔细阅读本说明书
①Please read this manual carefully before use

②本公司保留说明书解释权
②Our company reserves the right of interpretation for this manual

③产品外观请以实物为准
③Product appearance, please prevail in kind

④阅后请妥善保留
④Please keep the manual properly after reading



Android/iOS 手机用户请扫描二维码下载遥控软件。
iOS 用户也可在 App store 苹果应用商城搜索并下载
[YahboomRobot]



Android users search "YahboomRobot" in
Play Store to download APP.
iOS users search "YahboomRobot" in App
Store to download APP.

<https://www.yahboom.com/study/Muto-RS>

提取码: unym

<http://www.yahboom.net/study/Muto-RS>

在产品使用过程中，如对以下说明有疑问的，请根据说明书首页的网址查阅最新的网页资料或者联系我们技术支持。
! Any questions about the instructions on manual, please enter the tutorial link on the homepage, check the latest information on our website or contact our technical support.

Packing List

Chassis	USB HUB board
	OLED board
	OLED board accessory pack(6)
OLED fixed plate	OLED board acrylic board
USB HUB board accessory pack(3)	Charger
Battery pack	PS2 handle+AAA battery
Astra Pro depth camera	Depth camera mounting bracket
⑤ screw pack	XH2.54 cable
USB3.0 male-male	Micro USB cable (right-bend)
OLED connection cable	Manual
Screwdriver	Velcro

Raspberry Pi Accessories(optional)

Raspberry Pi 5 (optional)	TF card
Cool cooler Pi 50	Card reader
Muto Raspberry Pi accessory pack(2)	RPI 5 power supply expansion board pack

Jetson NANO 4GB Accessories(optional)

Jetson NANO 4GB (optional)	U disk
Muto NANO 4GB accessory pack(1)	4010 fan
M.2 antennas	DC power cable

SLAM A1 Lidar (optional)

SLAM A1 Lidar	Micro USB data cable (right bend)
④ screw pack	

YDLIDAR 4ROS Lidar (Optional)

4ROS Lidar	Lidar adapter board
Type-c data cable	④ screw pack

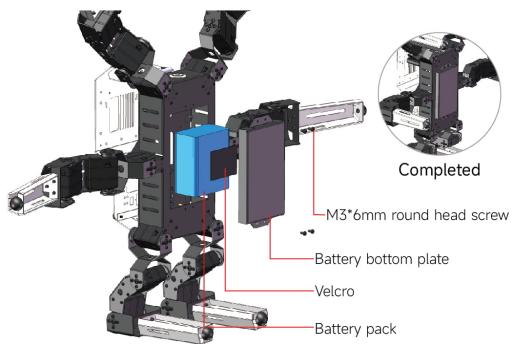
Assembly Steps

1. Unload battery bottom plate

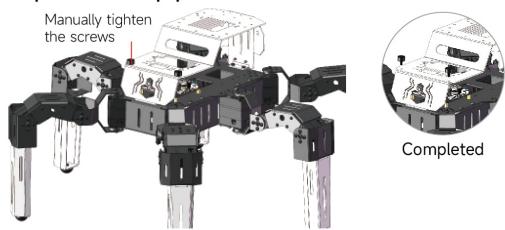


2. Install battery (Ensure power button is not pressed before installation)

Note: Connect the wiring of the battery pack first, and then put it into the position of the battery. When installing the battery, please stand the hexapod upright with the head facing down.



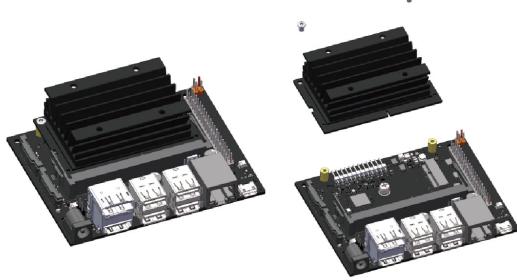
3. Open Muto top plate



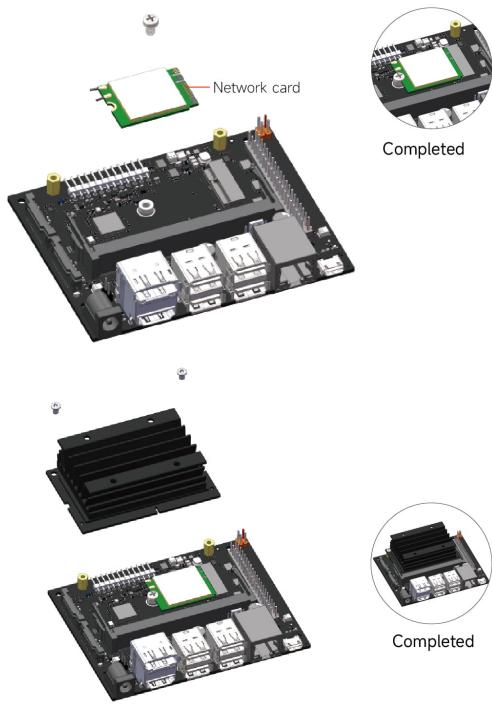
4. Install Jetson NANO board (Just for Jetson NANO version)

① Remove the core board

Note: Please remove the core board carefully. The clips on both sides are easy to broken.

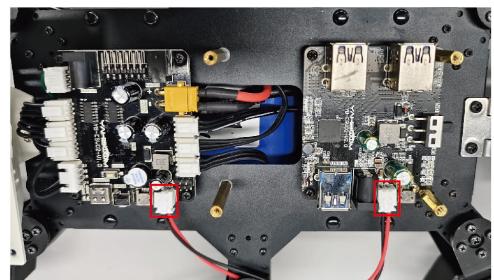
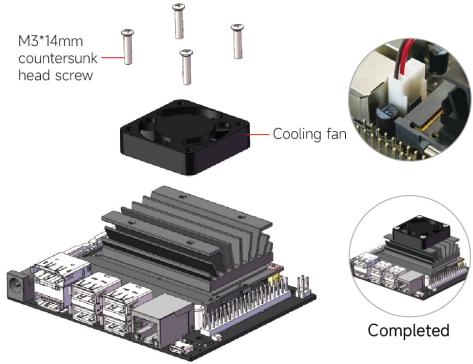


② Install network card



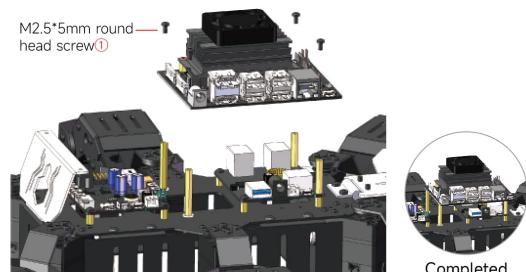
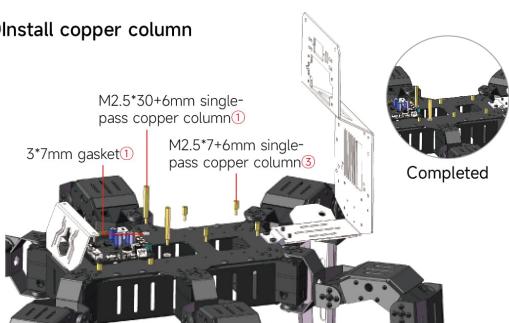
③Install cooling fan

Note: After the fan is installed, connect the wires.



④Install copper column

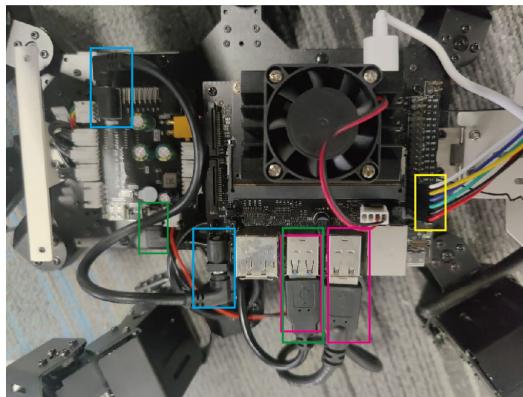
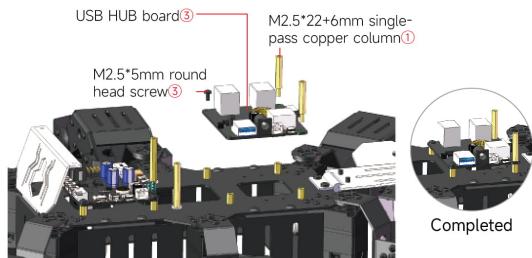
④Install copper column



Completed

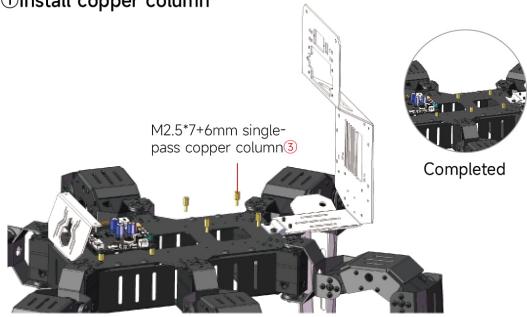
Yellow area represents the OLED connection cable, please refer to P27 for wiring details.

⑤Install USB HUB board

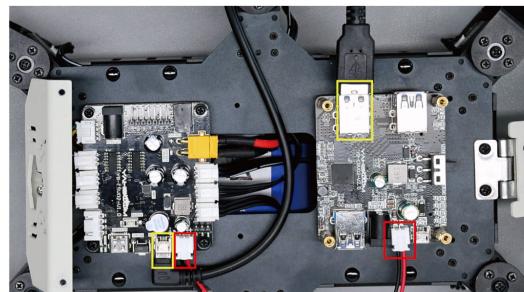
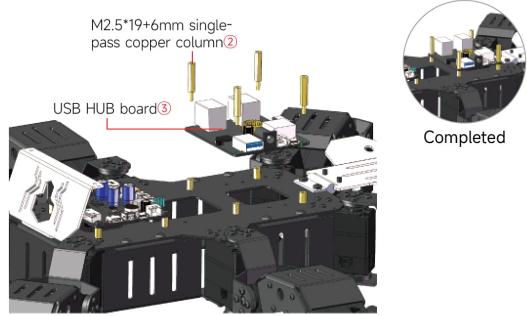


5. Install Raspberry Pi board (Just for Raspberry Pi version)

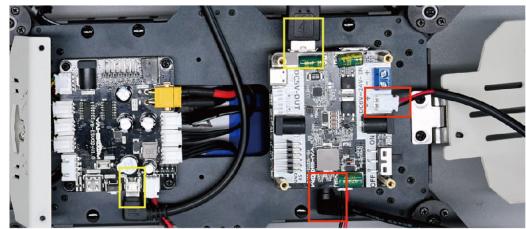
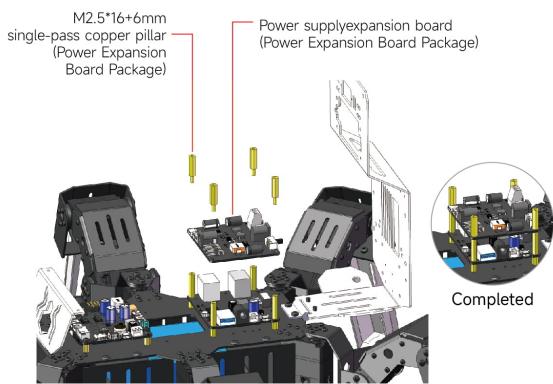
①Install copper column



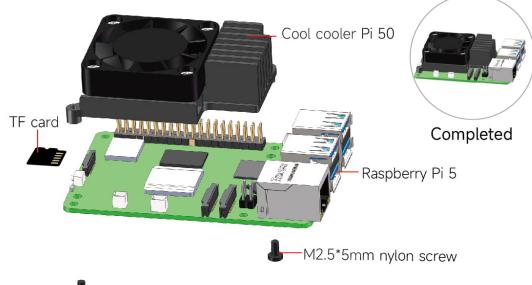
②Install USB HUB board



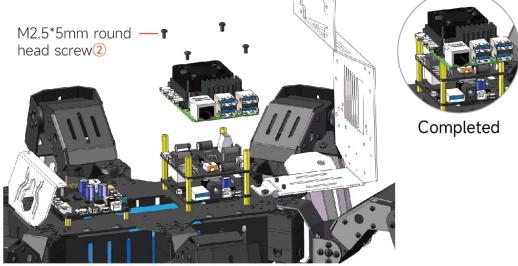
③Install power supply expansion board



④Install Cool cooler Pi 50

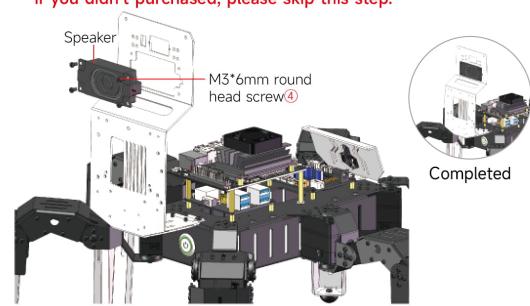


⑤Install Raspberry Pi board

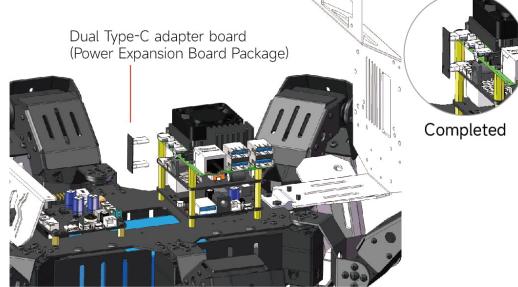


6. Install speaker(voice module optional)

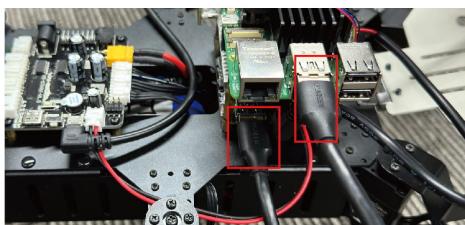
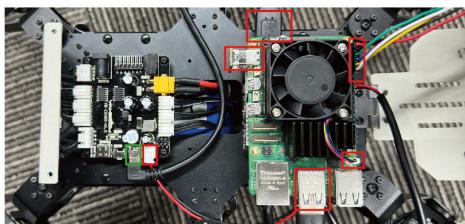
If you didn't purchased, please skip this step.



⑥Install dual Type-c adapter board

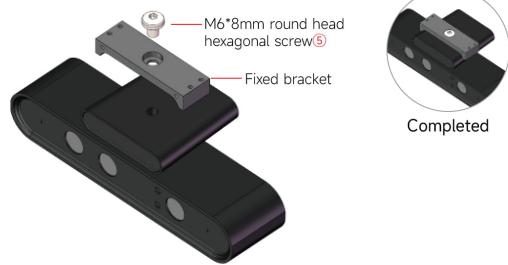


Please view pages 27, 28, 29 for wiring details.

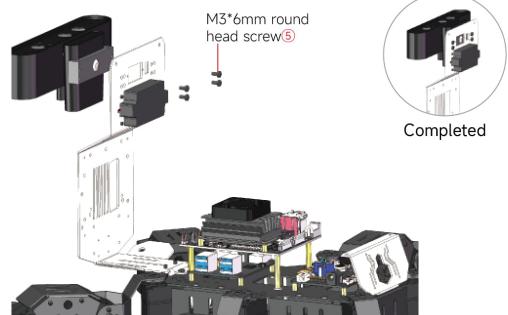


7. Install depth camera

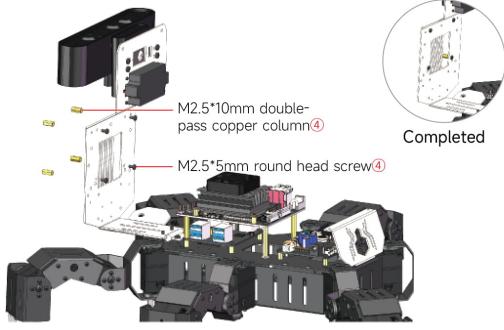
①Install bracket



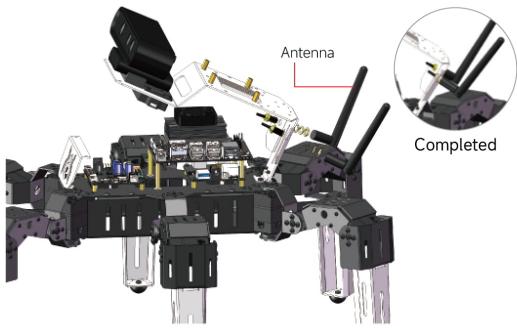
②Install depth camera



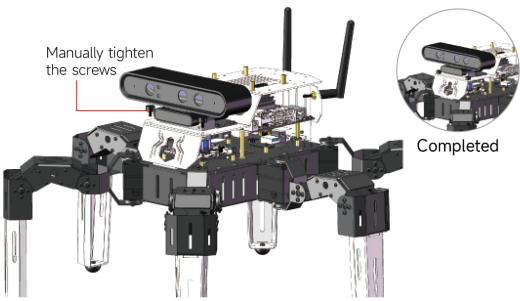
8. Install voice module copper pillar(voice module optional)
If you didn't purchase, please skip this step.



9. Install JETSON NANO antenna (Just for nano version)

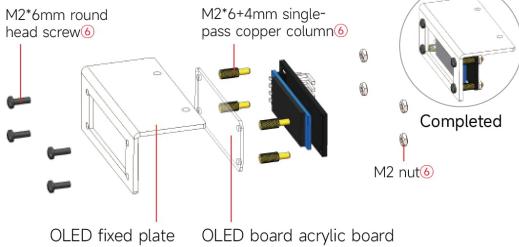


10. Close Moto top plate (Nano version as an example)

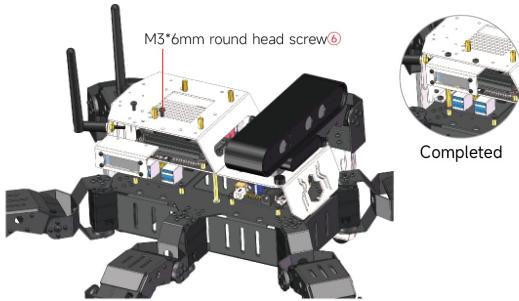


11. Install OLED screen

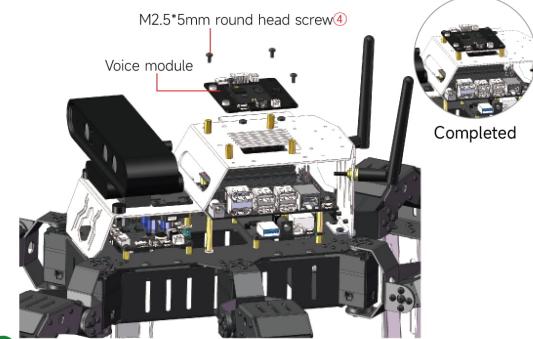
Note: After installation, connect the OLED wires properly, please refer to P27 for wiring details.



12. Install OLED



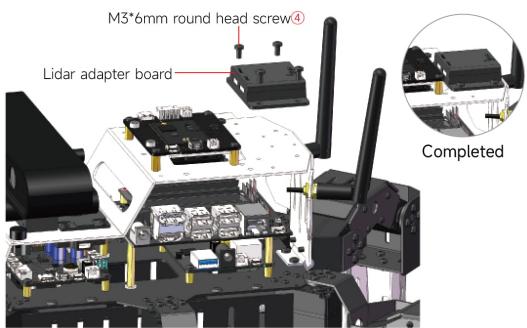
13. Install voice module(Optional)
If you didn't purchase, please skip this step.



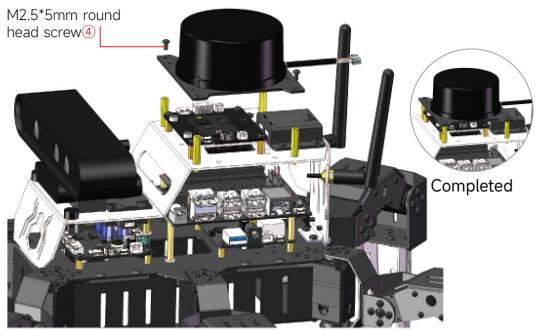
14. Install YDLIDAR 4ROS lidar(Optional)

If you didn't purchased, please skip this step.

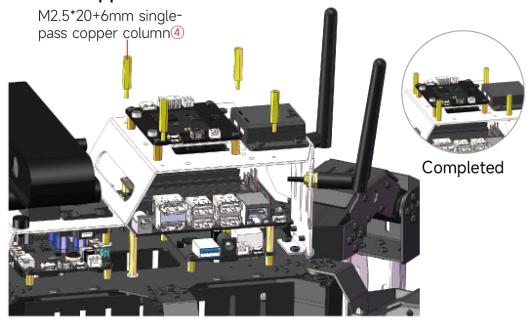
①Install lidar adapter board



④Install 4ROS lidar



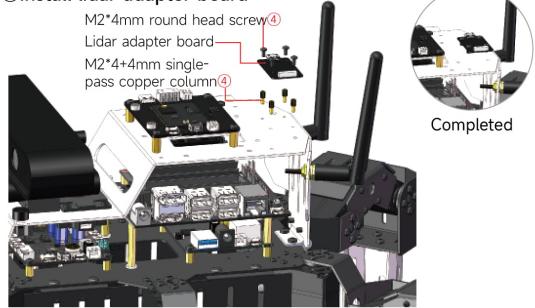
②Install copper column



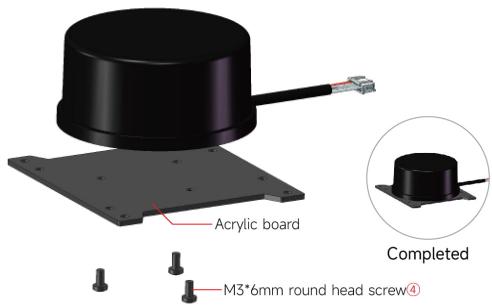
15. Install A1 lidar(Optional)

If you didn't purchased, please skip this step.

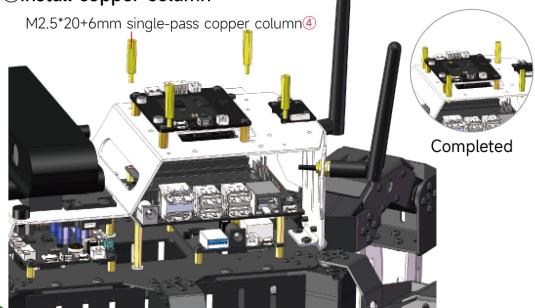
①Install lidar adapter board



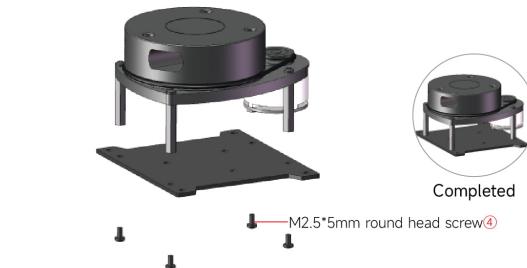
③Install acrylic board on 4ROS lidar



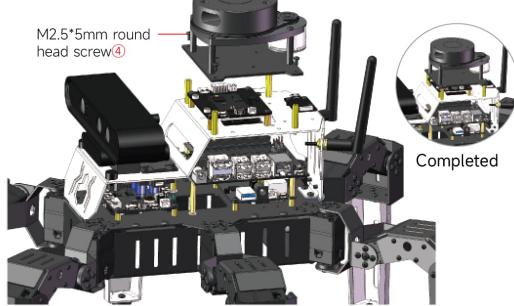
②Install copper column



③Install acrylic board on A1 lidar



④Install A1 lidar



About voice module, depth camera and lidar wiring, please view P27 and P28.

Install U disk/TF card

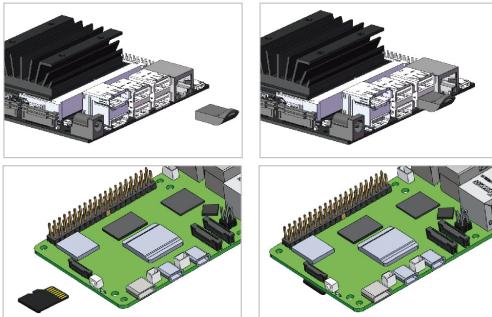
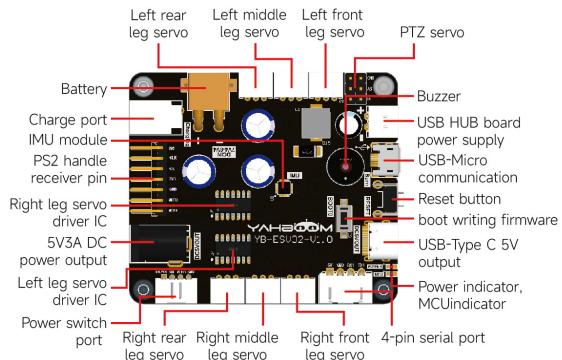


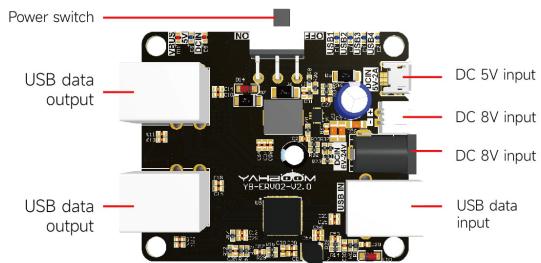
Figure 1-2 Insert USB disk into Jetson Nano board.
Figure 3-4 Insert TF card into Raspberry Pi board.

Expansion Board Interface Description

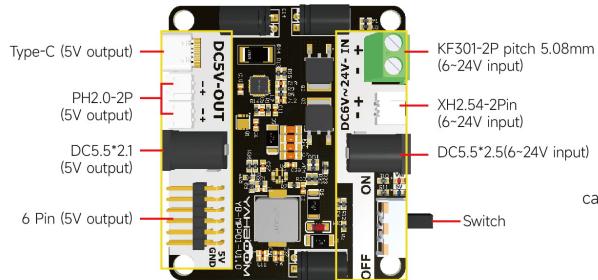
①Muto robot expansion board



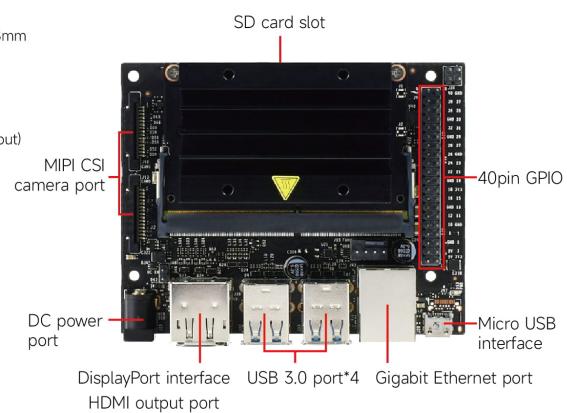
②USB HUB expansion board



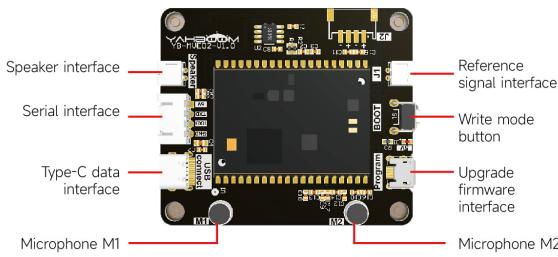
③Power supply expansion board



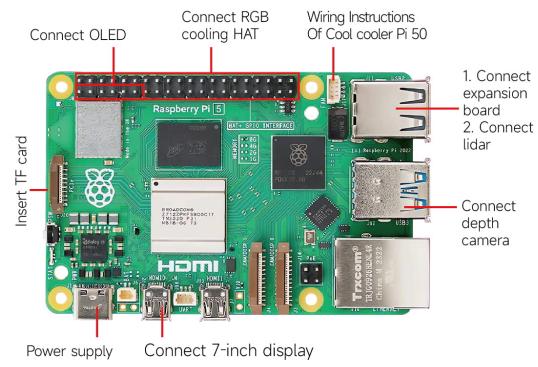
JETSON NANO 4GB Board Interface



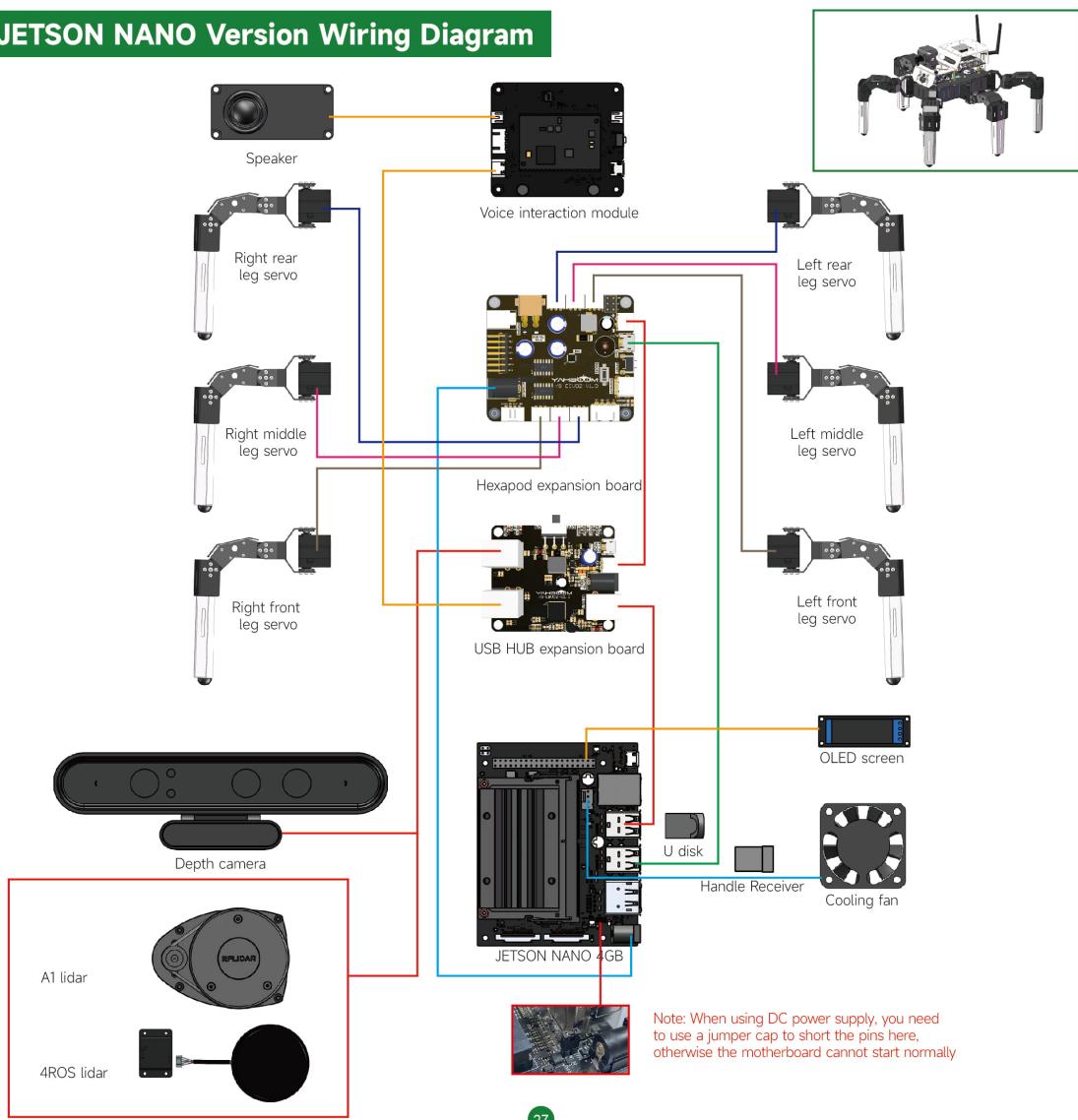
④Voice interaction module



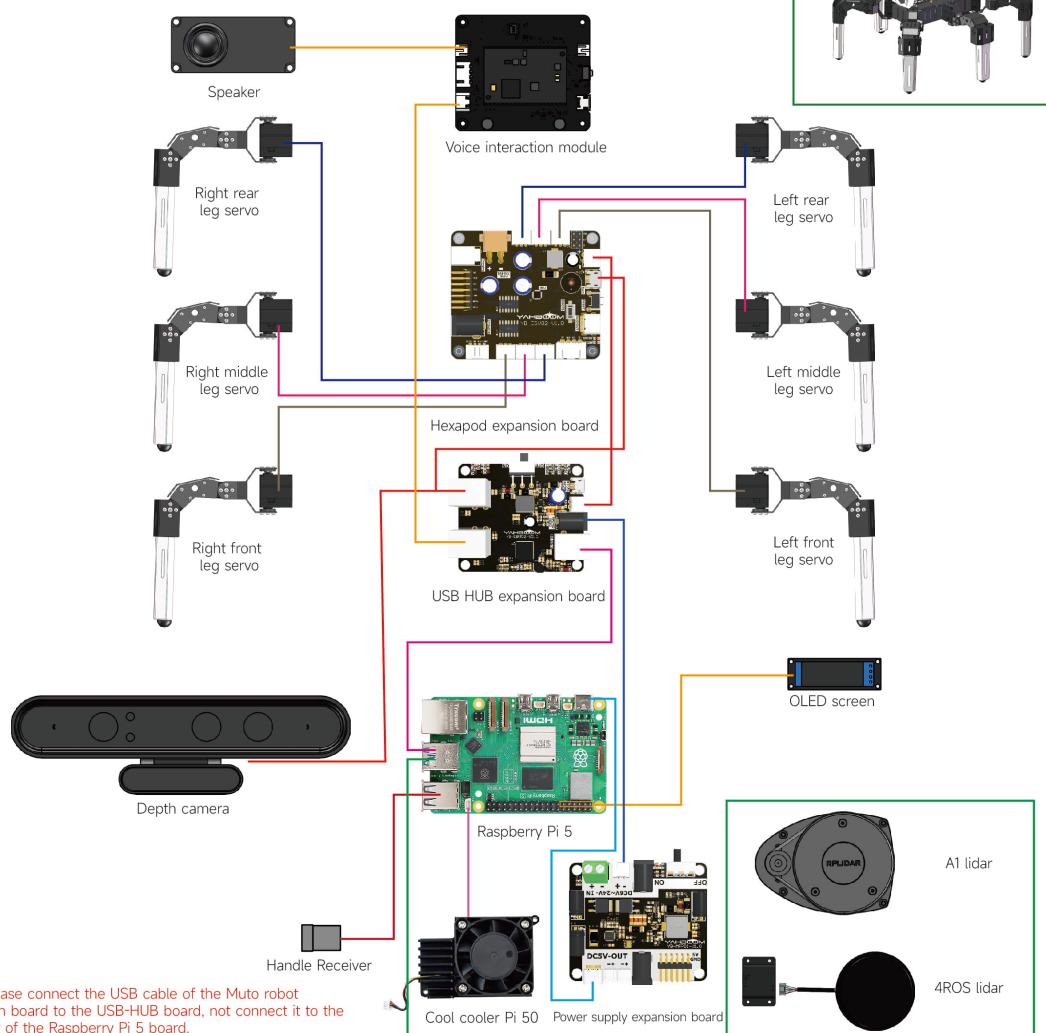
Raspberry Pi Board Interface



JETSON NANO Version Wiring Diagram



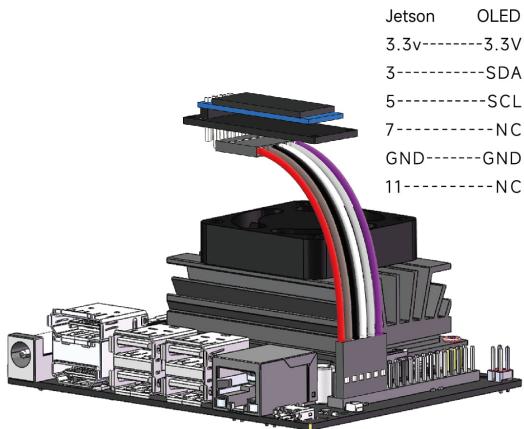
Raspberry Pi Version Wiring Diagram



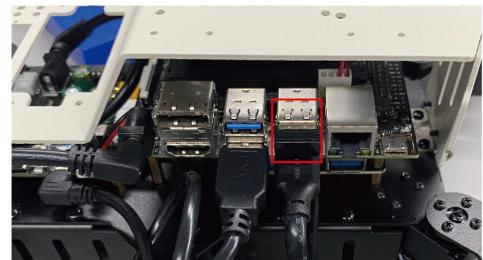
OLED module wiring diagram

1. For Jetson version

(Please connect the OLED and Jetson board correctly, as shown below.)

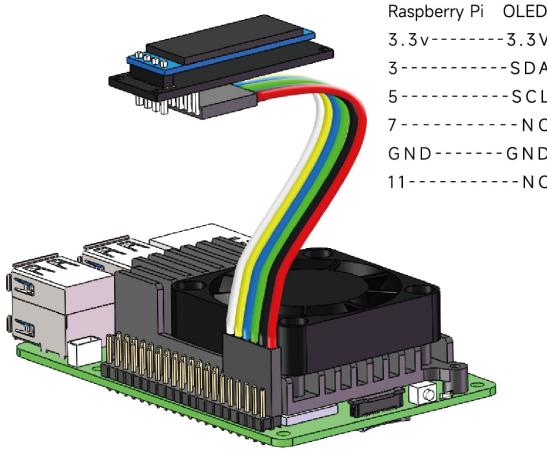


Handle Receiver Connection Instructions

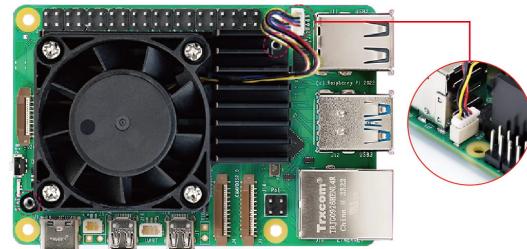


2. For Raspberry Pi version

(Please connect the OLED and Raspberry Pi board correctly, as shown below.)



Wiring Instructions Of Cool cooler Pi 50

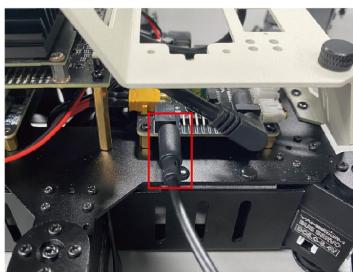


Charging

Plug the charger into the power outlet at home, and the indicator light of the charger will be green. As shown below.



Turn off the power switch of the robot. Then, insert the charger into the charging port on expansion board. As shown below.



When charging, the charger indicator light is red.



When fully charged, the charger light will become green.
Unplug the charger, and place the it in a safe area.

Download and install APP

- Android users search "YahboomRobot" in Play Store or scan the QR code with browser to download APP.
- iOS users search "YahboomRobot" in App Store or scan the QR code with camera to download APP.



Start up robot

The U disk or TF card provided by Yahboom has been written into the robot specific system image file. You can be use them directly.

After completing all wiring according to the wiring diagram. Open the power switch and you can see green light on switch. Muto robot will stand up, wait patiently for 2 minutes, when you hear the buzzer whistle three times, which means the system has been successfully started. At the same time, you can see some information is displayed on the OLED.

Raspberry Pi system: user name: pi password: yahboom
Jetson NANO system: user name: jetson password: yahboom

Connect Muto robot

If you are using the system image file provided by Yahboom, after the robot starts normally, it will emit a WIFI hotspot signal [Muto-WIFI], the password is 12345678. You can make your phone connect this WIFI to form a local area network between them. Or make robot and phone connect the same network.

1. Select device

Open the [YahboomRobot] APP, and select the [ROS Robot]--[MUTO].



2. Fill in the IP address displayed by the OLED on the robot, as shown below. Port:6000, and Video:6500.

Click [Connect], after the connection is successful, it will automatically jump to the main control interface.



Note: Before connecting the device, please confirm that the phone is connected to the hotspot signal of the robot, or that the phone and the robot are connected to the same router. And the APP control program has already been started.

APP function introduction

1. Remote control



Click the [Remote control] icon, you can see the following interface.



Part 1. Speed: Control the motion speed of the robot.

Part 2. Height: Controls the height of the robot body.

Part 3. Step width: Control the width of the robot walking step.

Part 4. Control method: Left side: Button control, up for forward, down for backward, left for translate left, right for translate right, middle button for stop. Right side: Rocker control, up for forward, down for backward, left for left rotation, right for right rotation, middle button for stop.

Part 5. Head Up I Down: Control the robot to head up I Down.

Part 6. Left/Right Rotation: Control the robot to rotate left/right

2. Performance



Click the [Performance] icon, you can see the following interface.



Part 1. The eight preset actions are run once per click.

Part 2. Reset button: The robot returns to its default posture.

3.FPV Control



Click the [FPV Control] icon, you can see the following interface.

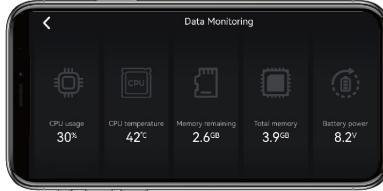


- Part 1. Hide: Hidden button, keep the full screen camera image.
- Part 2. Rocker: Control robot movement position.
- Part 3. X/Y axis servo: Control camera PTZ. (Note: ROS version does not support this function)

4.Data Monitoring



Click the [Data Monitoring] icon, you can see the following interface.



- Part 1. CPU usage: Display the CPU usage of the motherboard.
- Part 2. CPU temperature: Display the temperature of the motherboard CPU.
- Part 3. Memory remaining: Display the remaining memory space on the motherboard.
- Part 4. Total memory: Display the total amount of memory on the motherboard.
- Part 5. Battery power: Display the voltage of the robot battery.

5. Robot Calibration

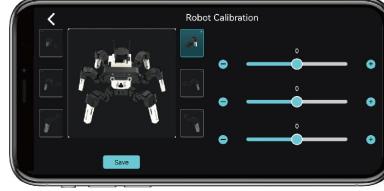
Note: The robot has been calibrated at the factory. In generally, does not require calibration. Improper calibration operation will cause the robot to not work properly.



Before entering the robot calibration interface, the APP will prompt the following content, please click [Next].



Click the [Robot Calibration] icon, you can see the following interface.



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As shown in the above figure, the six buttons on the left correspond to the six legs of the robot. If the icon is lit, it indicates that the leg is selected. Click [save] button is used to save the current servo data. The three sliding bars on the right can control the three servo motors of the selected leg.

Robot calibration steps:

- ① Put the Muto robot on a flat ground, facing yourself, and check whether all six legs are on the ground.
- If one of the legs does not touch the ground, we need to calibrate the servo on this leg.
- ② Select the corresponding leg icon and click the [save] button to clear the previously saved data.
- ③ Adjust the three sliders on the right until the leg touches the ground.
- ④ Click [save] button again to save the current servo data.

FAQ

1.Does Muto robot support ROS2?

A: Yes, the Muto robot comes with system file developed based on the ROS2, it supports the ROS2 environment through docker.

2.When use depth camera or radar, there is a device error problem.

A: Ensure the wiring of the depth camera is correct, then exit the process and re-plug the wiring.

3.How to power supply the robot?

A: The battery pack is included in the robot kit, connect the battery to the battery interface of the expansion board. Turn on the power switch, and the expansion board integrates a voltage conversion chip to provide power to all devices.

4.Which functions on the expansion board are managed by the MCU?

A: Active buzzer, attitude sensor, RESET key, PWM servo interface, serial port servo interface, etc.

5. When running a single routine, why do we need to close the APP control process?

A: After the robot starts, it will automatically run the APP control program, but it will occupy resources such as the camera and serial port.

Before running a single routine, we need to close the APP control process first to avoid calling resources such as cameras and serial ports and reporting errors.

If you do not use APP control for a long time, you can permanently close the APP control process according to the tutorial.

6. What should I do if the legs does not touch the ground when the robot is stationary?

A: Open the APP control interface, click [robot calibration], complete the calibration of the servo according to the calibration steps.

Lithium-ion battery safety specification

1.It is strictly forbidden to connect to equipment that exceeds the load used by the product.

2.Please use the official battery, power adapter provided by Yahboom.

3.When the battery level is less than 6.5v, the buzzer will sound the alarm. At this time, we need turn off power switch and charge the robot.

4.Please turn off the power switch before charging. For safety reasons, the robot cannot be used during charging.

33 5.When charging, the indicator light of the charger is red,

when the indicator light become green, indicating that the battery is fully charged. When charging the battery, some one should take care of it. After charging, unplug the charger in time to avoid over-charging.

6.After use, the power switch should be turned off. When the device is not used for a long time, we should be kept battery voltage is between 7.0V-7.8V. Remove the bottom battery box and unplug the battery cable, take out the lithium battery pack and place it in a battery safe area. Do not mix with metal objects, and the insulating film wrapped outside cannot be torn off.

7.Keep away from heat, fire, any liquid. Don't use it in wet or rain. Damp environment may cause the battery to ignite or even explode.

8.If the charger or battery pack smokes or hot (the outer packaging will crack in severe cases) or the battery leaks,please disconnect the power strip or the main gate, then quickly pull out the charger, remove the battery and put it in an open area.

9.When the lithium battery pack or battery charger catches fire or smoke, please use sand or dry powder fire extinguisher to extinguish the fire, and then quickly evacuate to a safe area.

10.Don't use the battery when it is leaking, damaged, heated, deformed, discolored, smelly or any other abnormal phenomenon, and contact Yahboom or other agents in time.

11.Please use the battery at 0°C~45°C environment. The battery will be damaged or the discharge performance will be extremely reduced at other temperatures.

12.Deliberate piercing, short circuit, reverse connection, unauthorized welding, impact, extrusion and throwing of batteries are strictly prohibited.

13.Do not use the battery in a strong static and magnetic-field environment, otherwise the battery may leak fluid,catch fire or even explode.

14.It is strictly forbidden to modify the hardware circuit board without permission.

15.Do not allow children to replace batteries without adult supervision. Keep batteries out of the reach of children.

Solemnly declare: Users must read this manual carefully, especially the parameter indicators, precautions,etc., understand the use method and application range of the product. Any economic loss and safety accident caused by failure to comply with the above-mentioned lithium ion battery use specifications or operating errors shall be borne by the user.

Tutorial Link

<http://www.yahboom.net/study/Muto-RS>

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