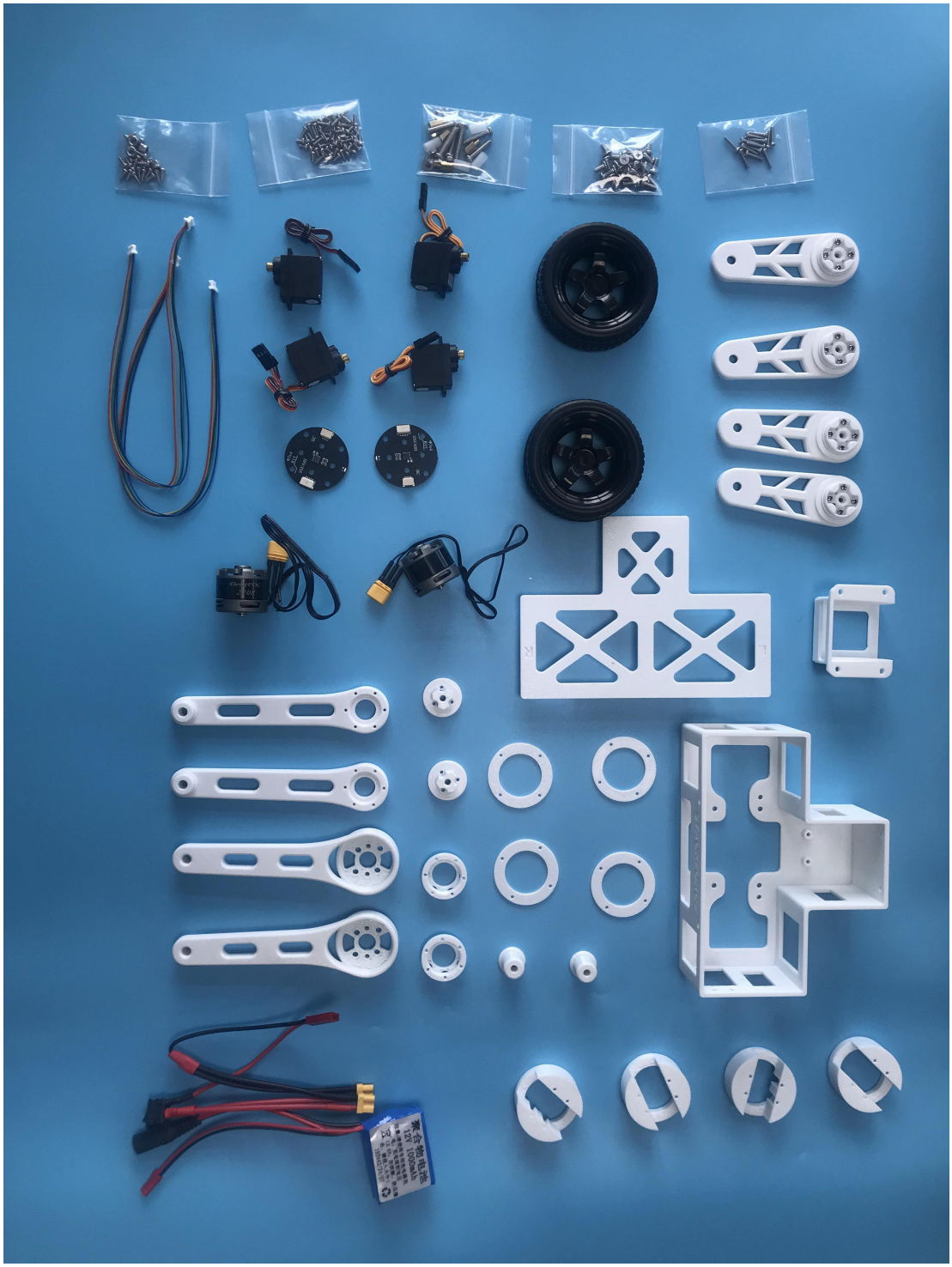
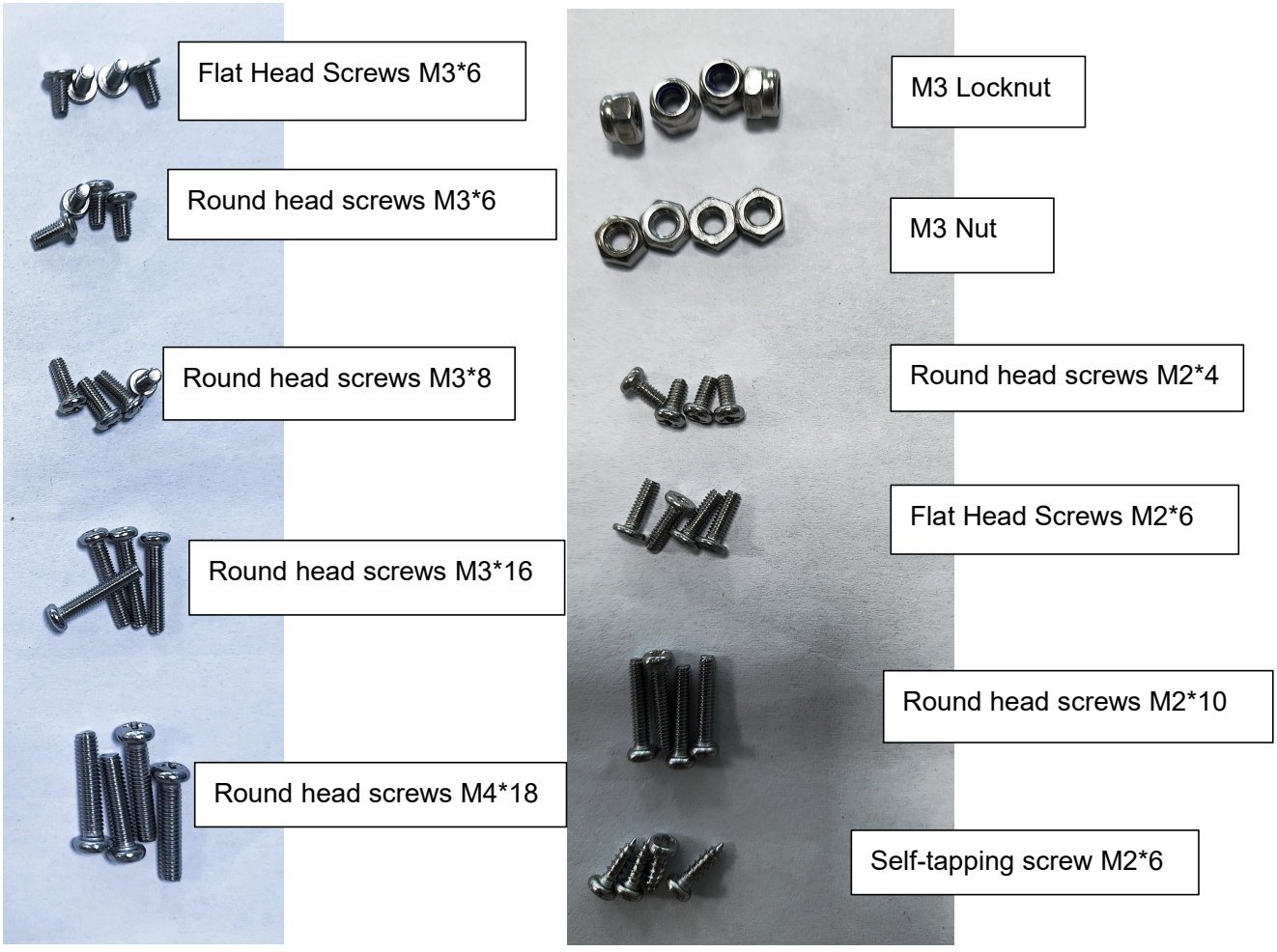
Mini-Wheeled-legged robot installation diagram



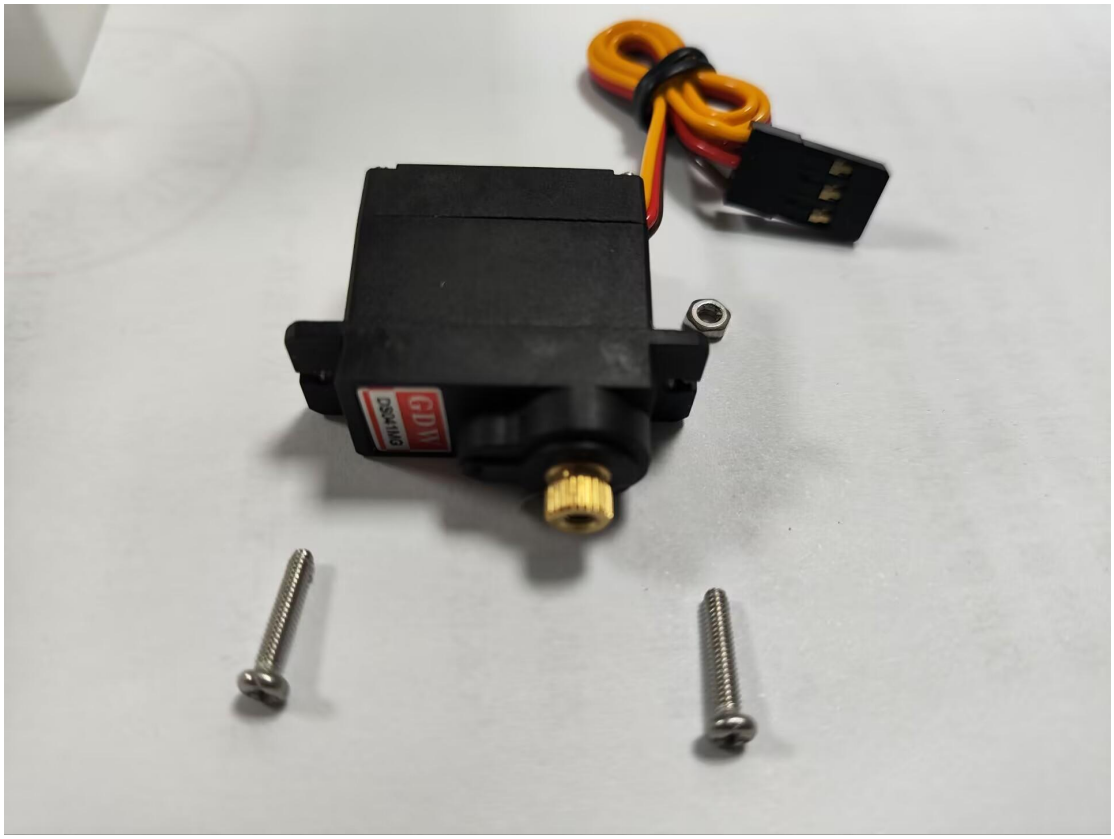
螺丝介绍


Flat Head Screws M3*6
Round head screws M3*6
Round head screws M3*8
Round head screws M3*16
Round head screws M4*18
M3 Locknut
M3 Nut
Round head screws M2*4
Flat Head Screws M2*6
Round head screws M2*10
Self-tapping screw M2*6

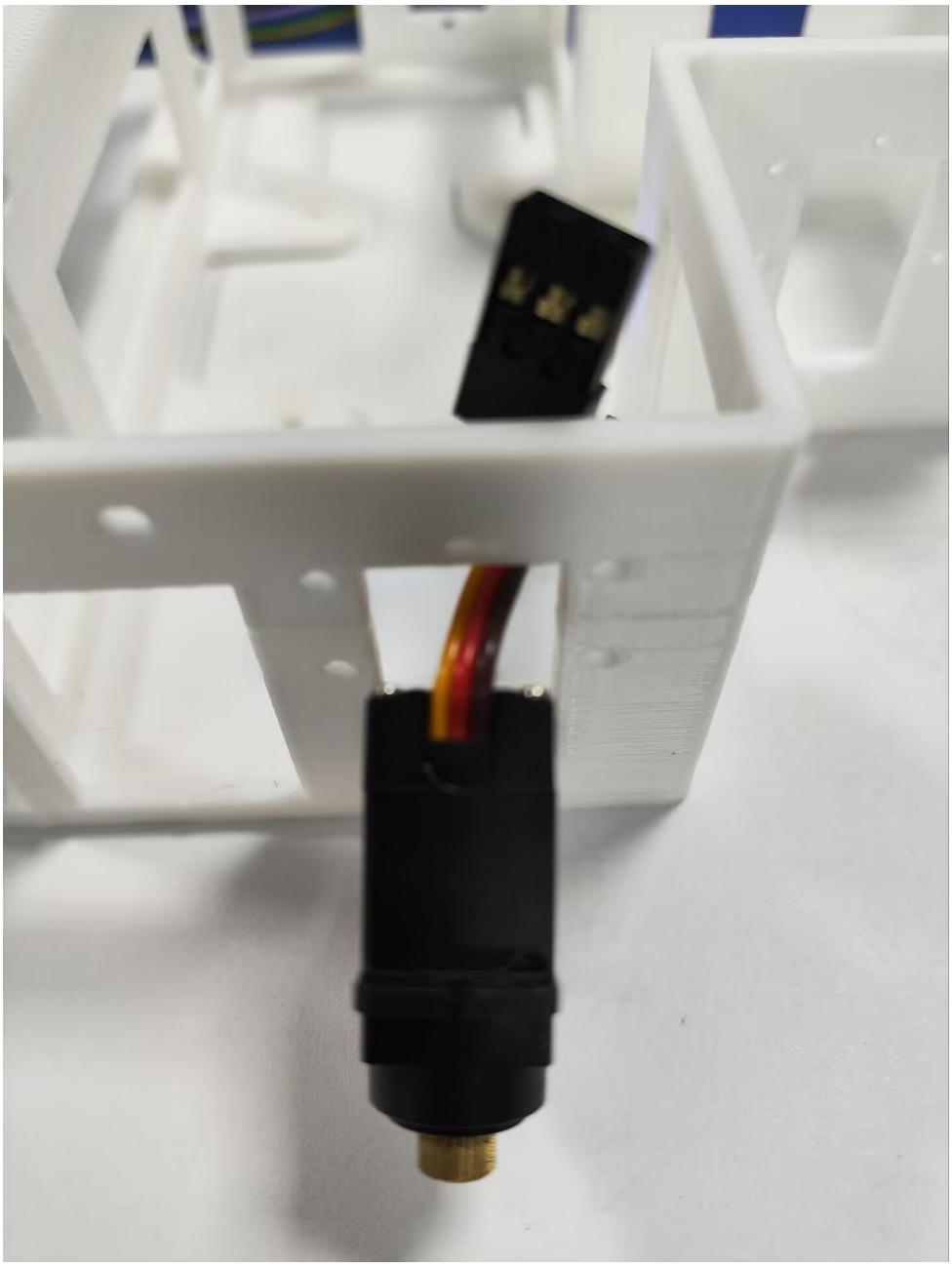

M2 Nut
M3 Nut
Gasket
Round head screws M2*4
M2 Locknut
Copper pillar
Flat Head Screws M2*6
Round head screws M3*4
M4*18
Round head screws M2*10
Magnet
Round head screws M3*6
Flat Head Screws M2*12
Flat Head Screws M3*6
Nylon sleeve (white sleeve)
Round head screws M3*8
Black servo screws in the servo box
Round head screws M3*16

二、Rack Mounting

1. Remove the servo from the servo box and install 8 round-head M2*10 screws and 4 M2 nuts.

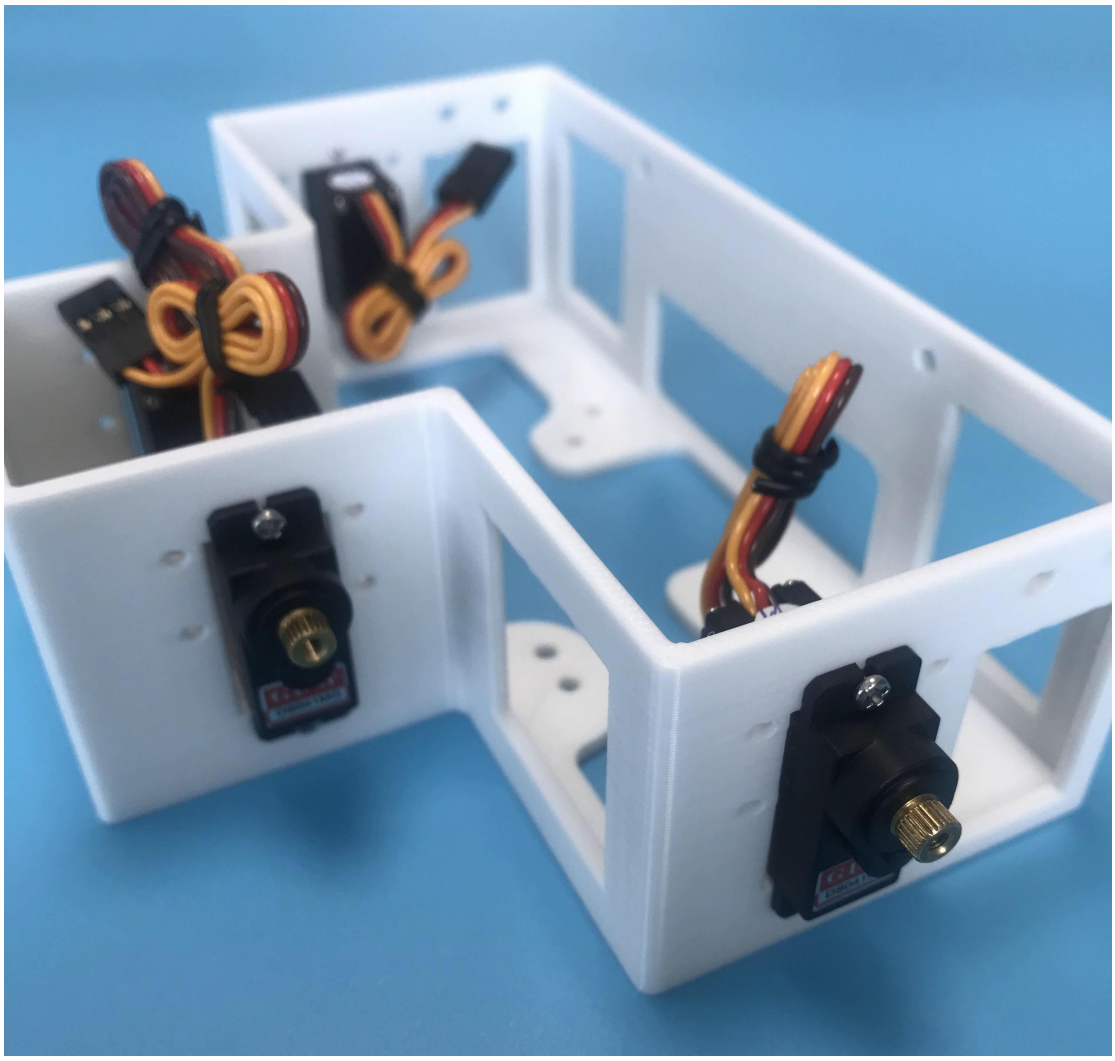


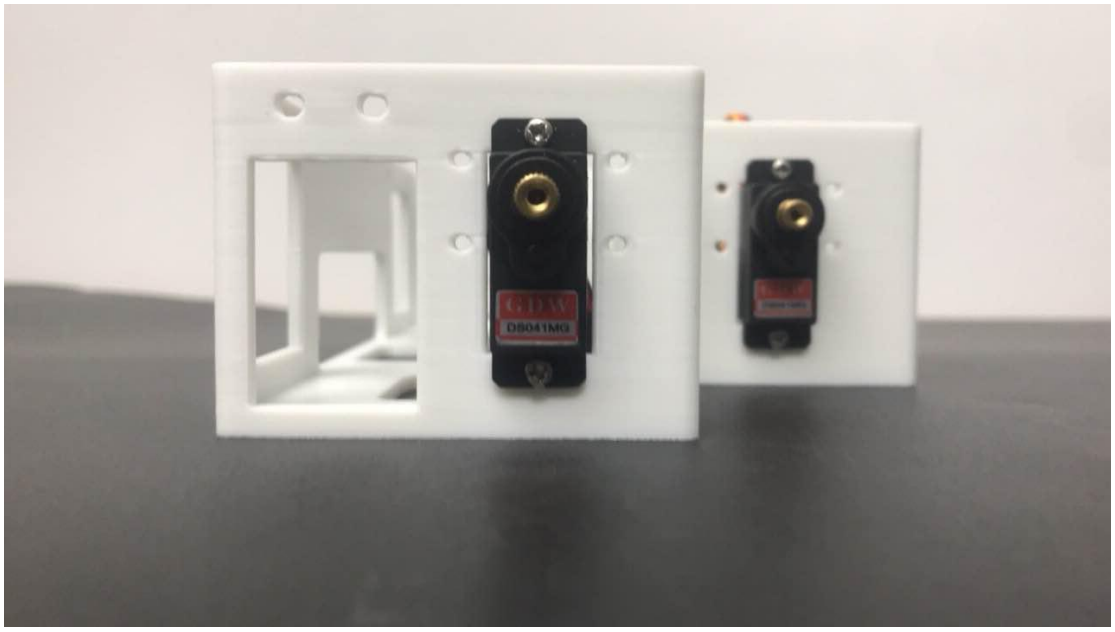
Place the servo motor from the outside of the fuselage inwards, with the wired side on top.



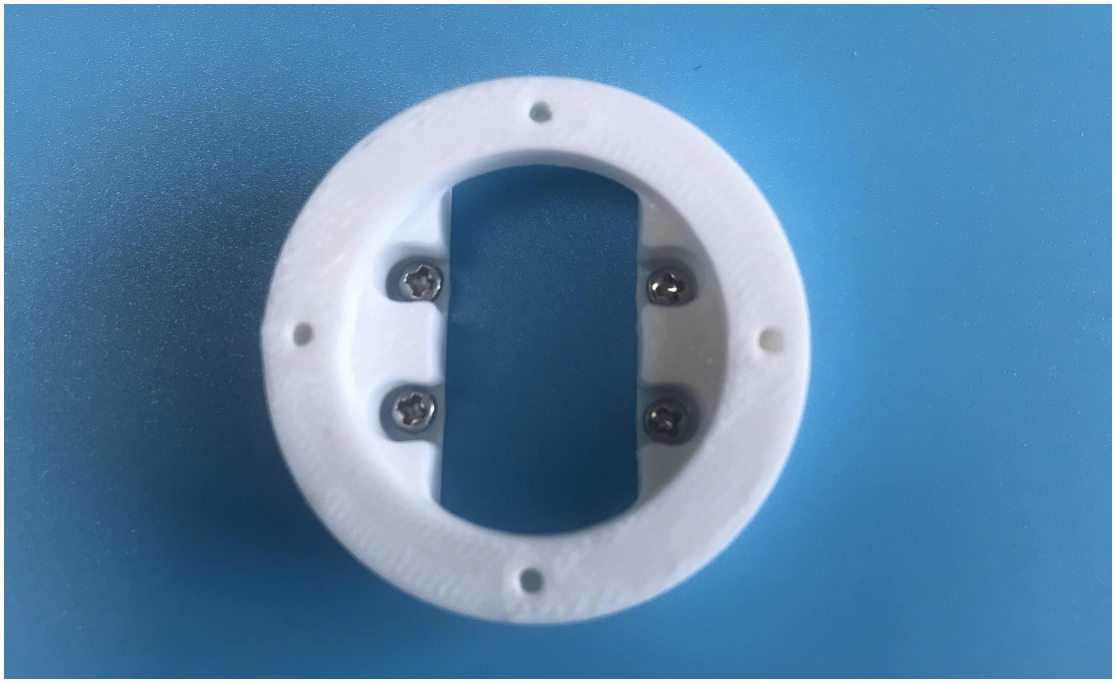
The lower screw hole is secured with an M2*10 screw (no nut required), and the upper screw is tightened with an M2*10 screw. Alternatively, an M2 nut can be used for securing. The other four servos are secured in the same way.

2. Servo assembly completed





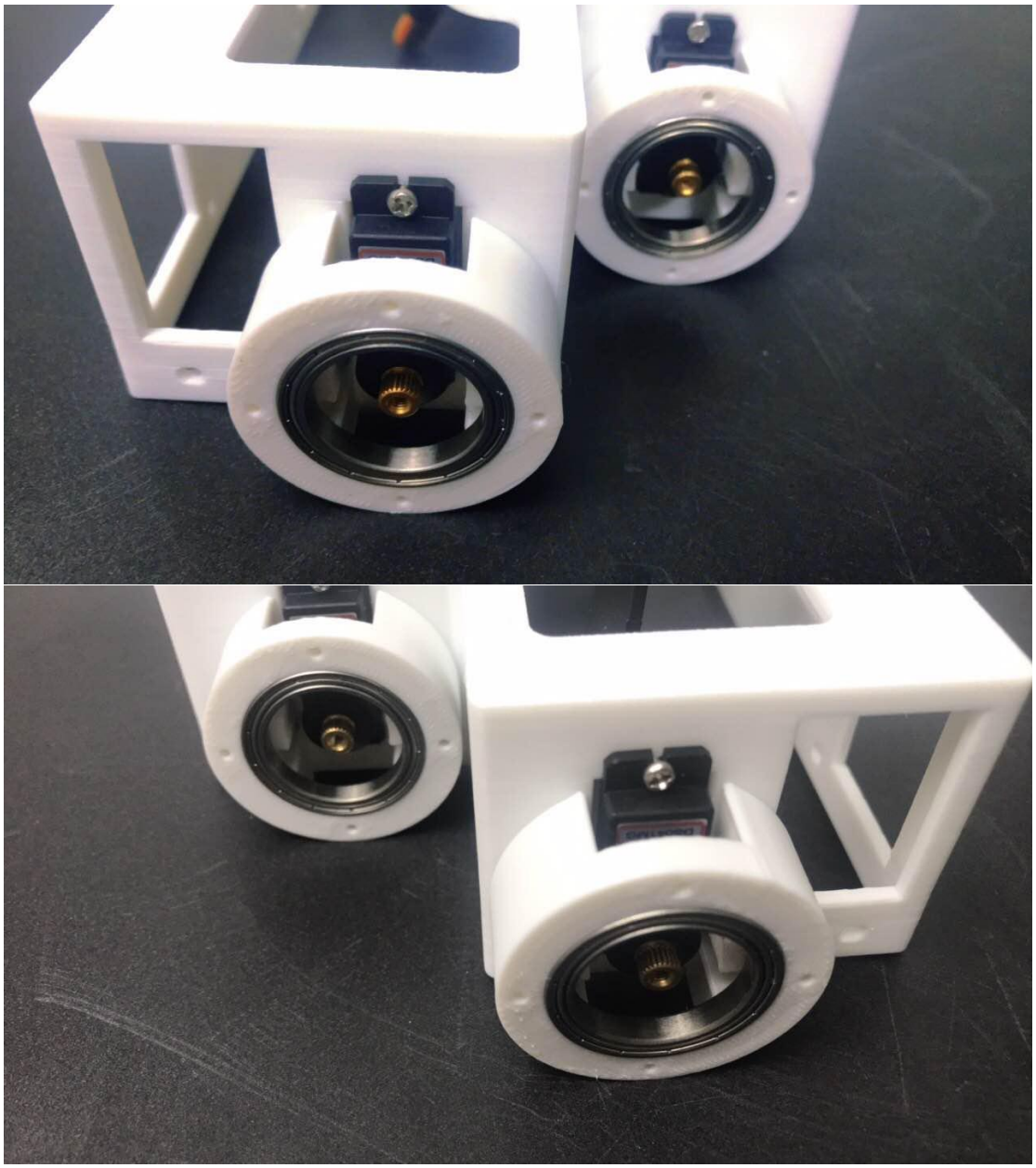
3. Remove 16 M2*10 round head screws and 4 servo outer rings. Screw the M2*10 screws into the servo outer rings (just enough to tighten them slightly, no need to drive them too deep yet), as shown in the picture.



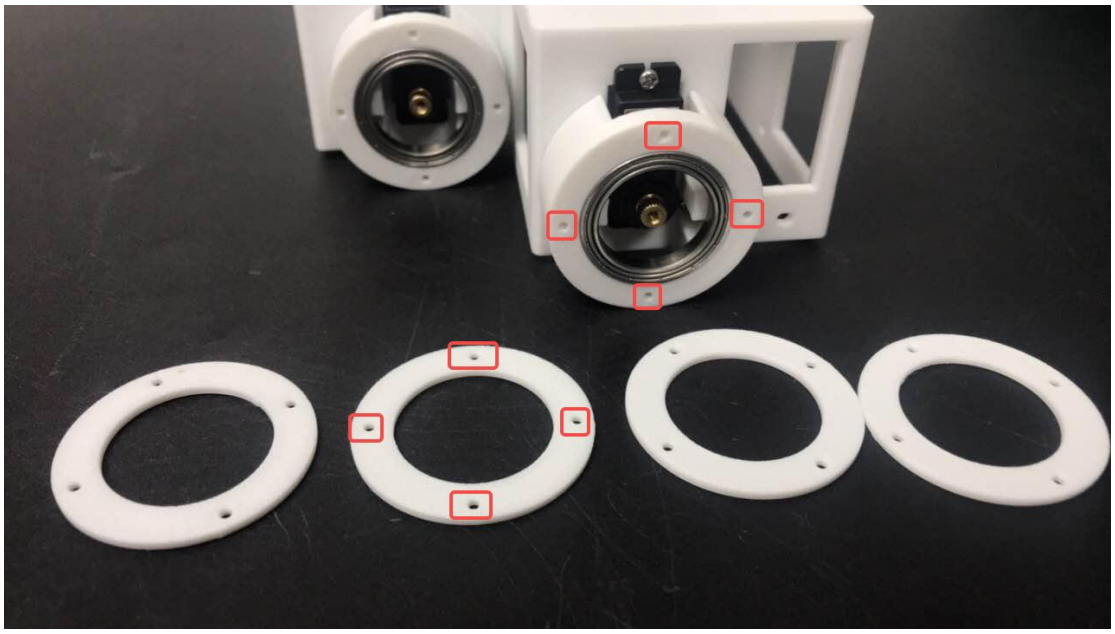
4. Align the screws with the holes marked in the diagram and tighten them.

5. You can choose to use M2 nuts to secure the two M2*10 screws above, and the other three rings can be secured in the same way.

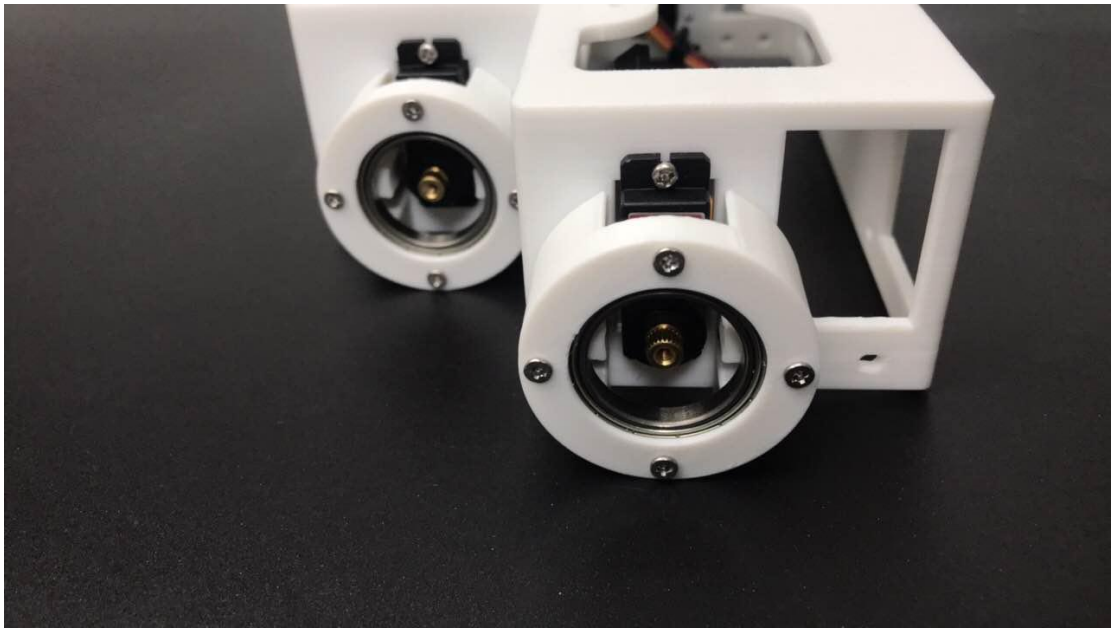
6. Press the four large bearings into the four outer rings of the servo motors, until they are flush with the outer rings of the servo motors.

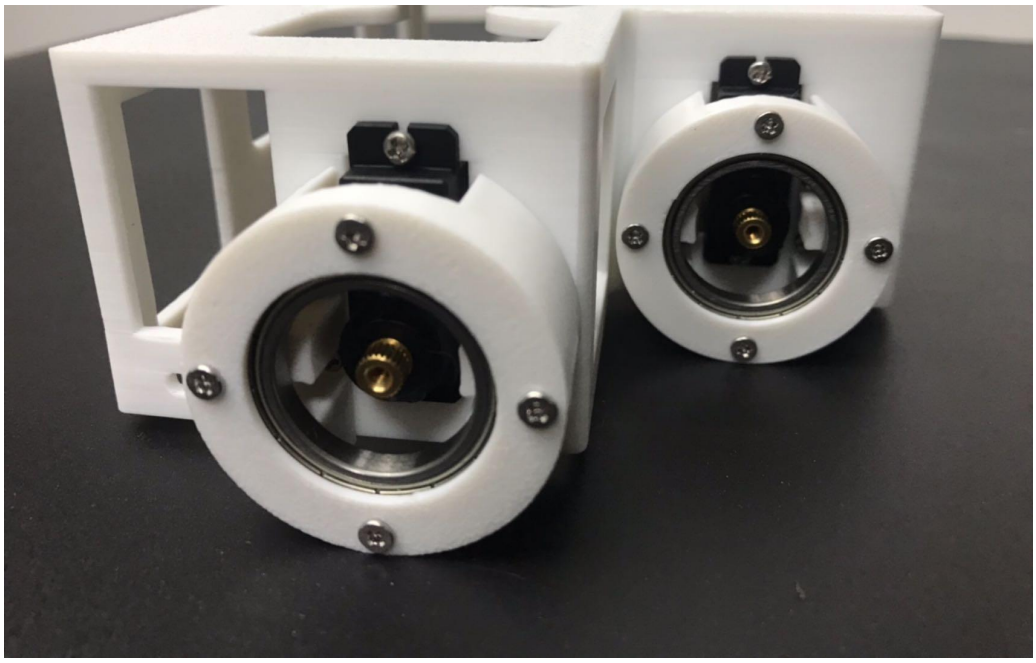


7. Remove 4 bearing cover plates and 16 M2*6 flathead screws, and place the bearing cover plates on the outer ring of the servo motor.



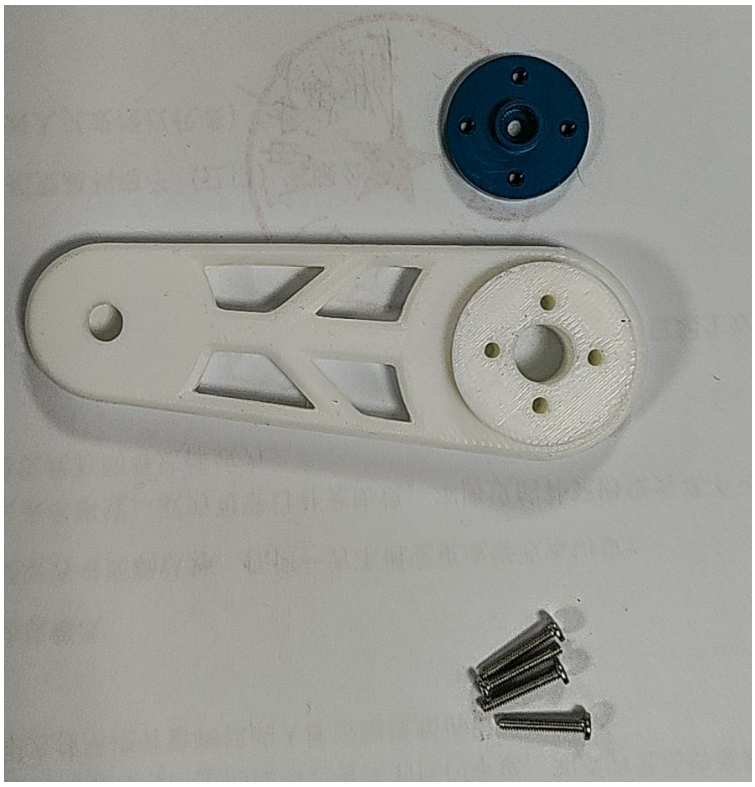
8. The assembly result is shown in the picture below.





三、Thigh Installation

1.Remove the metal servo plate, the thigh, and the four M2*12 screws.



2.Place the metal servo plate on the bulge of your thigh, making sure the gear side of the servo plate is facing upwards.

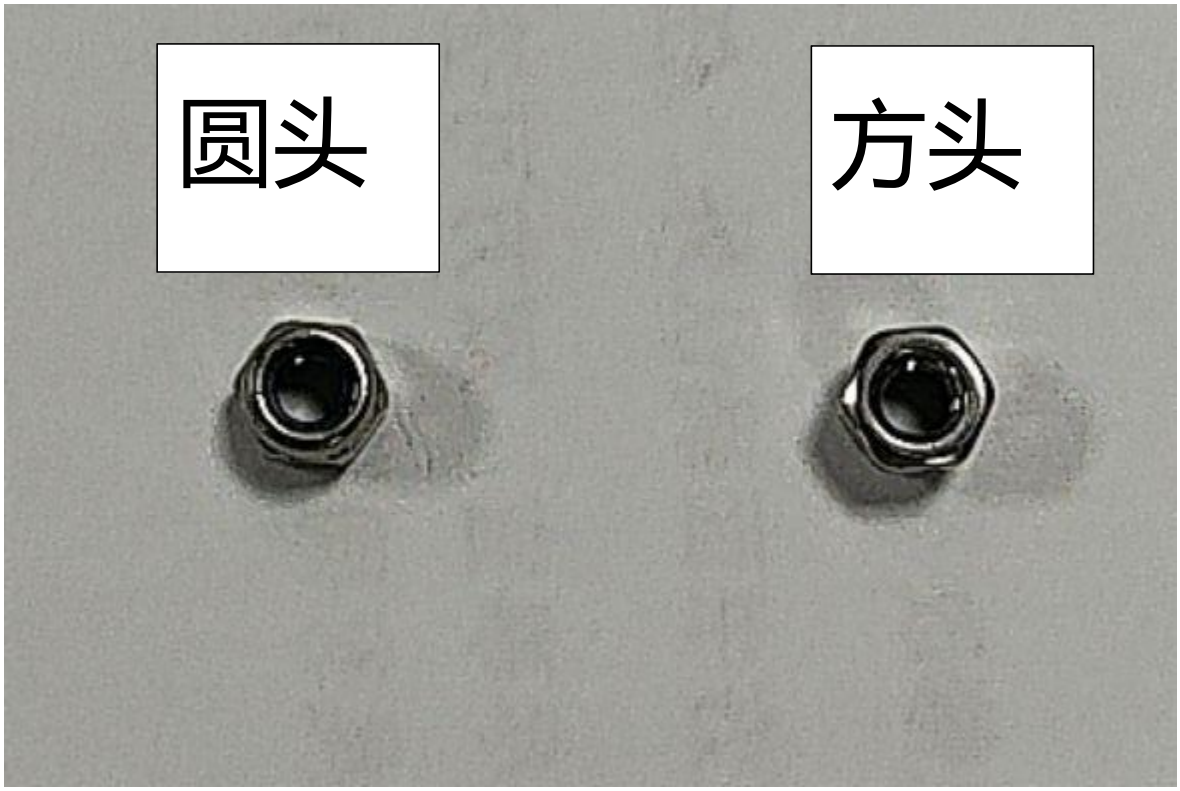
3. Secure the servo plate to the back of the thigh using M2*12 screws. Repeat this process for the other three thighs.

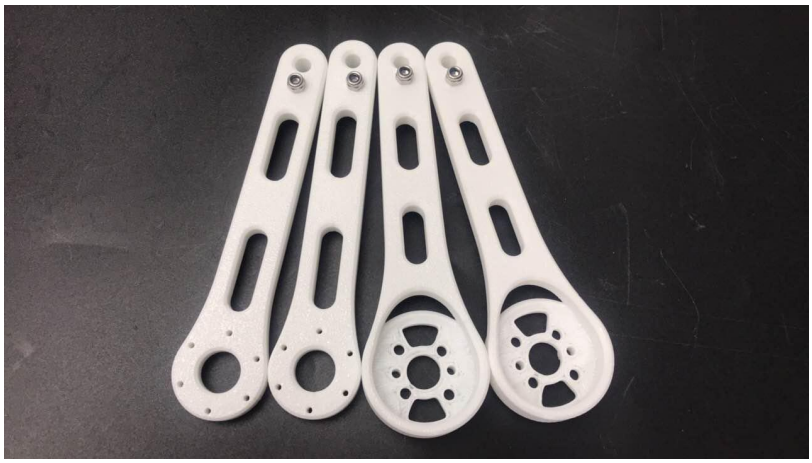
四、 Inner/outer leg joint installation

1. **Press the M3 lock nut into the small round hole on the outer leg (with the round end of the nut facing outwards)，as shown in the picture below (the left side of the picture is the outer leg, and the right side is the inner leg; both require the nut to be pressed in).**

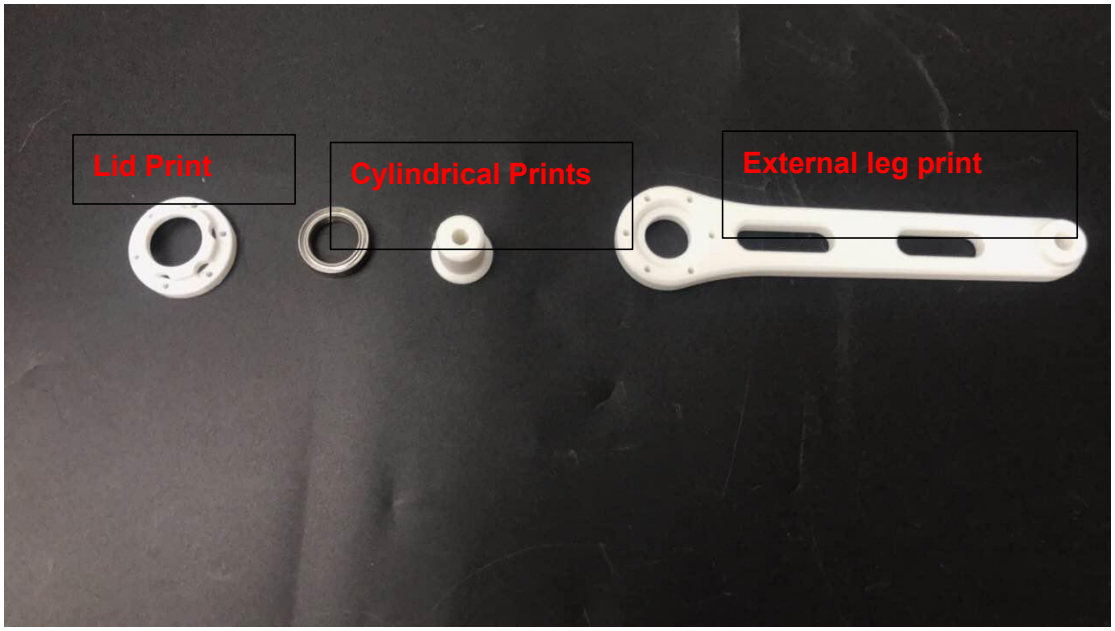
Make sure the rounded end faces outwards, otherwise it won't prevent loosening.

You can use a hammer to push it in.

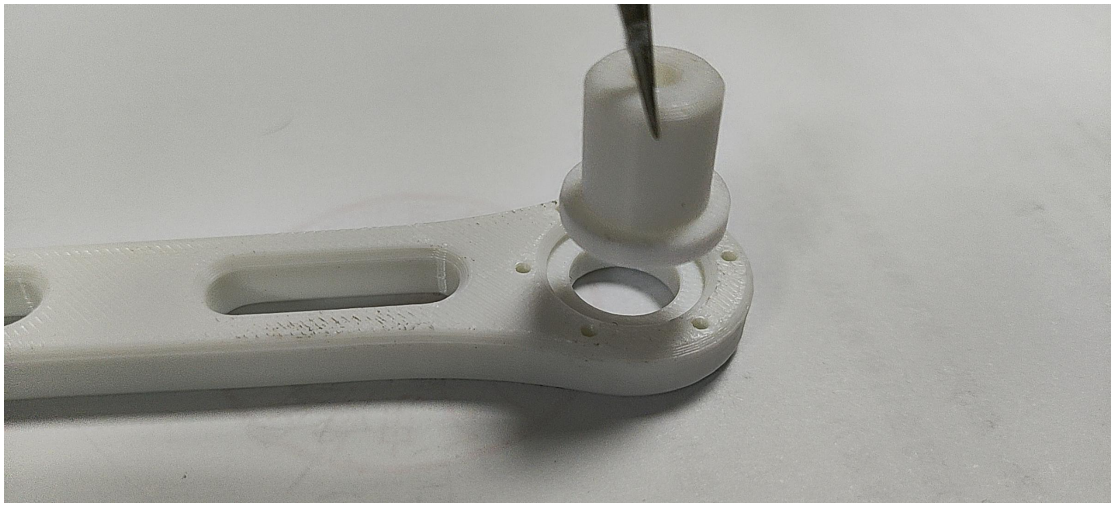


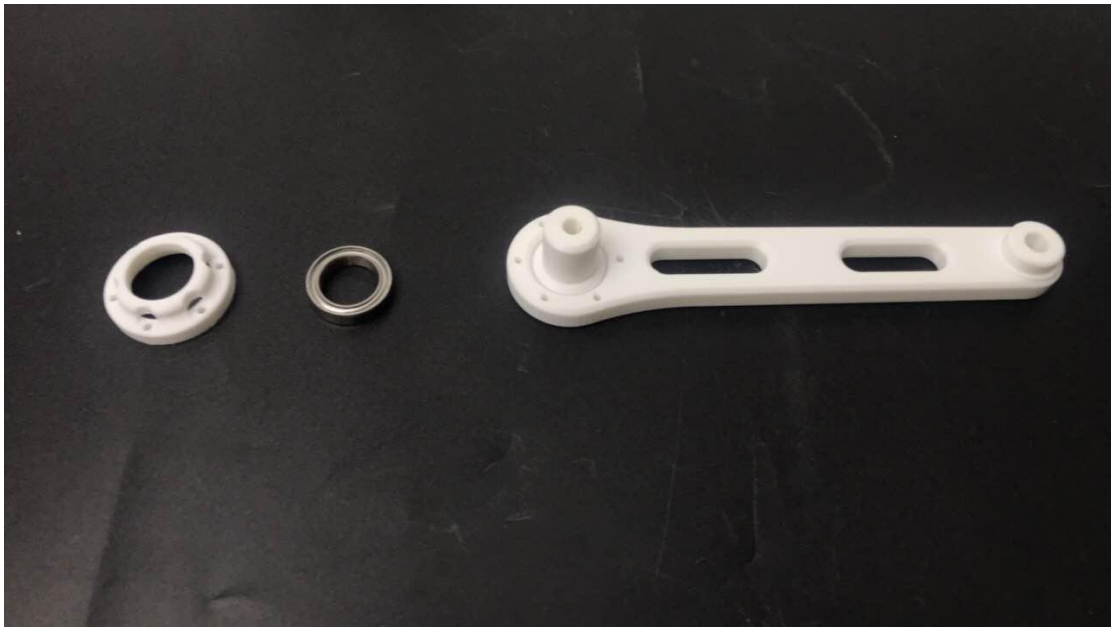


2. Remove 12 M2*10 screws, 6 small bearings, and 4 M3*16 round head screws, and remove the printed part shown in the image below. Install according to the steps shown in the image below.

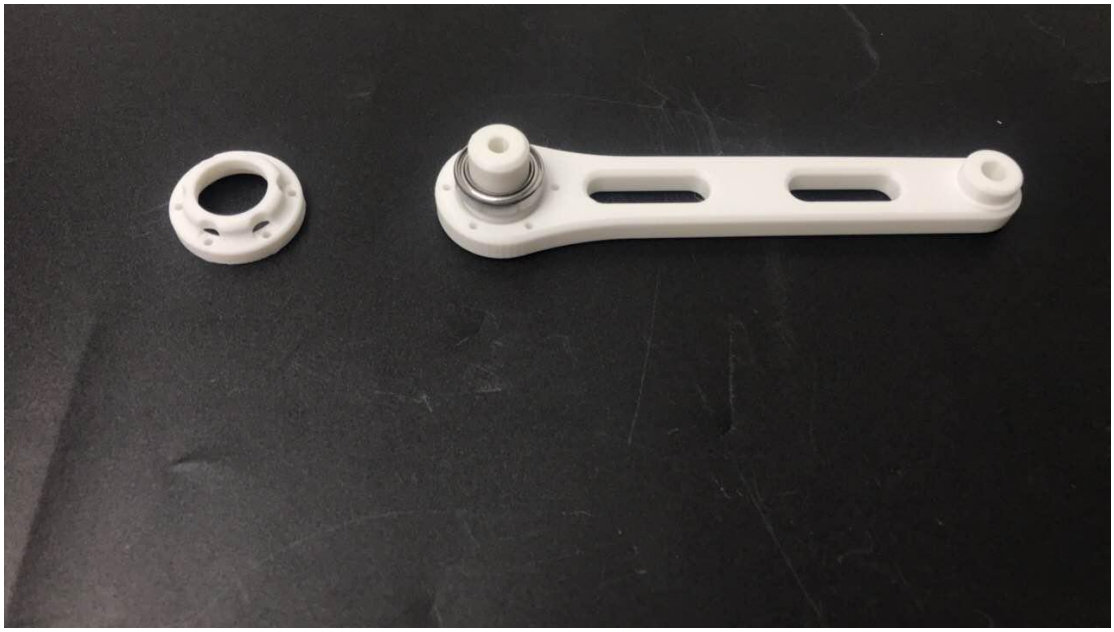


The cylinder is placed in the recess of the outer leg.



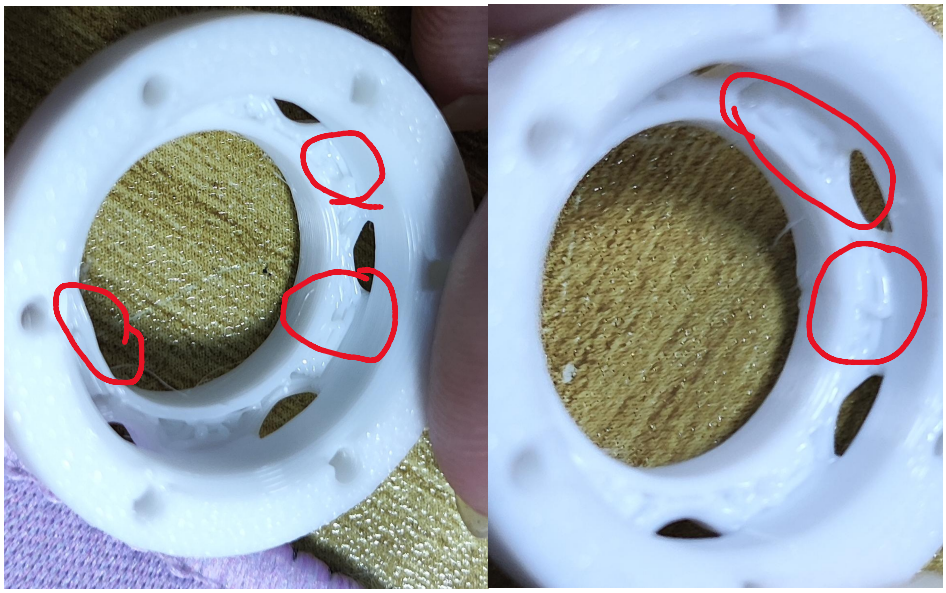


Bearing fitted into cylinder

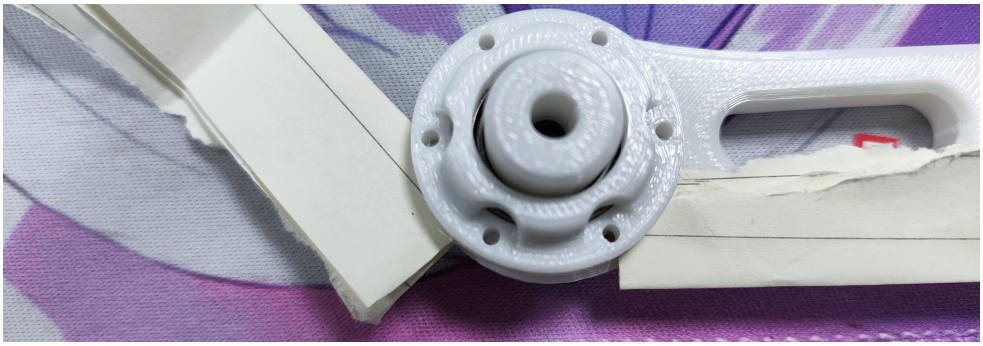


If the motor bearing installation fails during later debugging due to insufficient pole pair count, return here to reinstall it.

This part will affect the motor's self-test; the cylinder must rotate smoothly. Clean the protruding part with a tool.

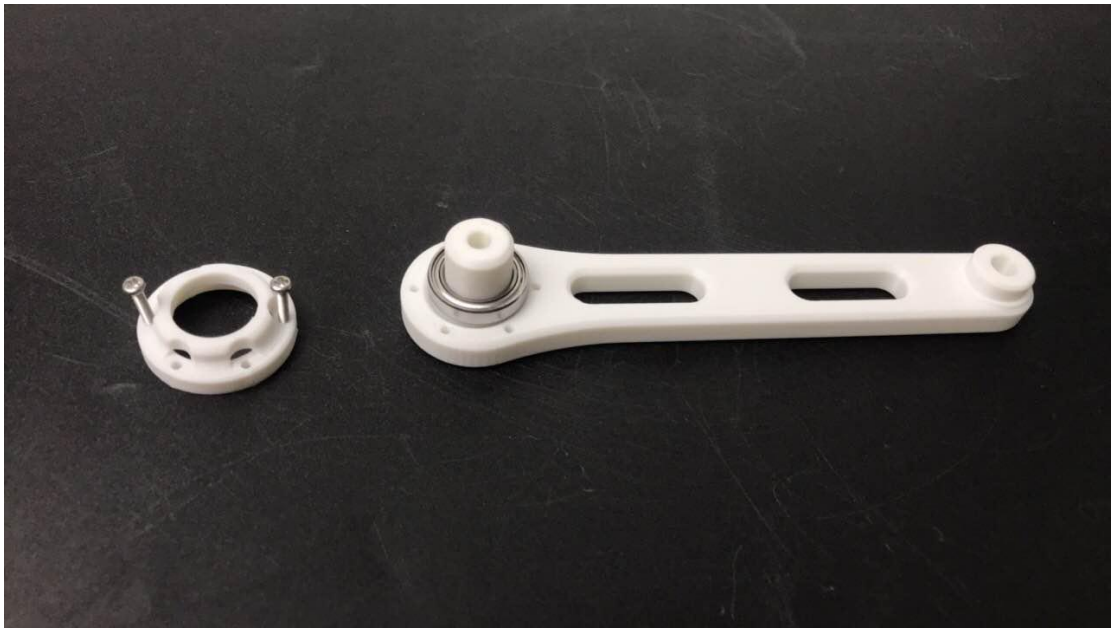


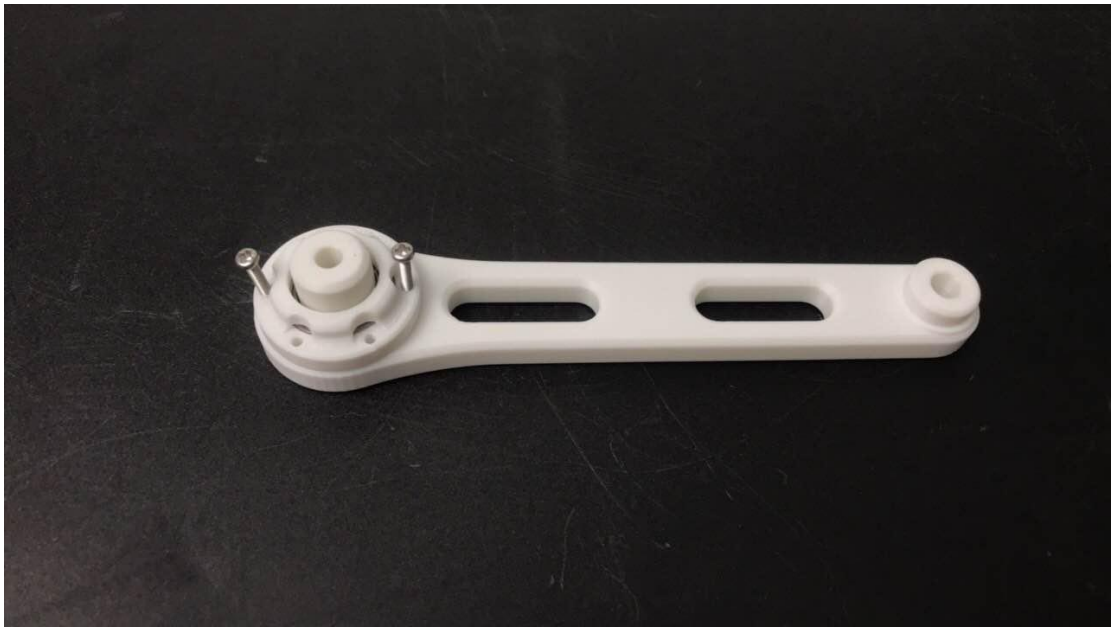
Use a piece of paper as a pad to increase the height and reduce friction, but not too high, and there shouldn't be any shaking. It must fit perfectly and there should be no resistance when rotating the cylinder.

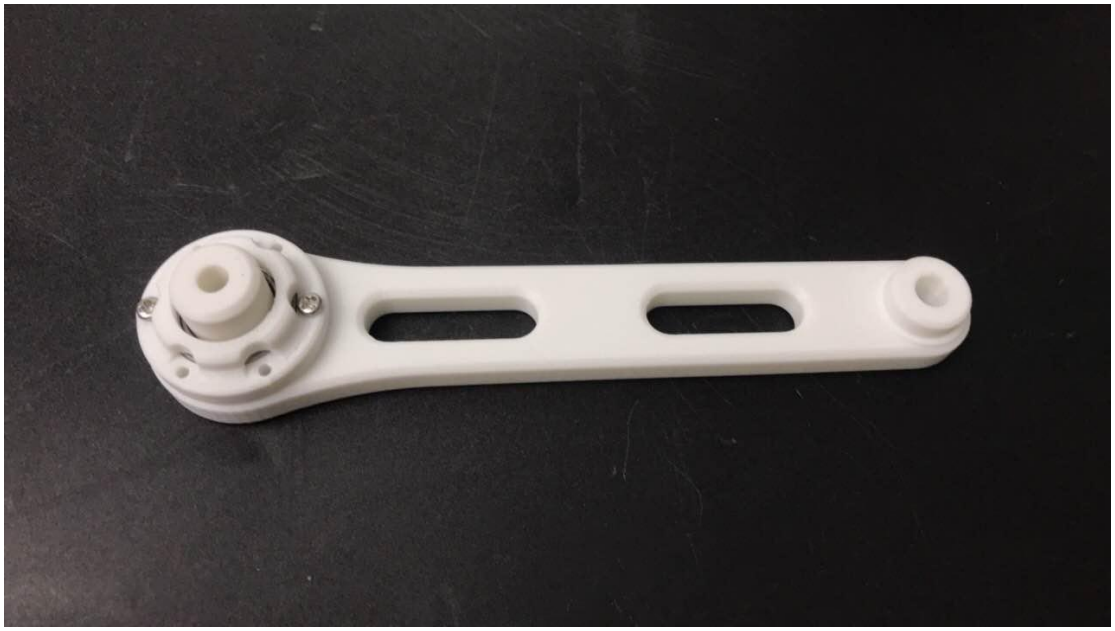


3. Install the printed part as shown in the diagram below, securing it with M2*10 screws.

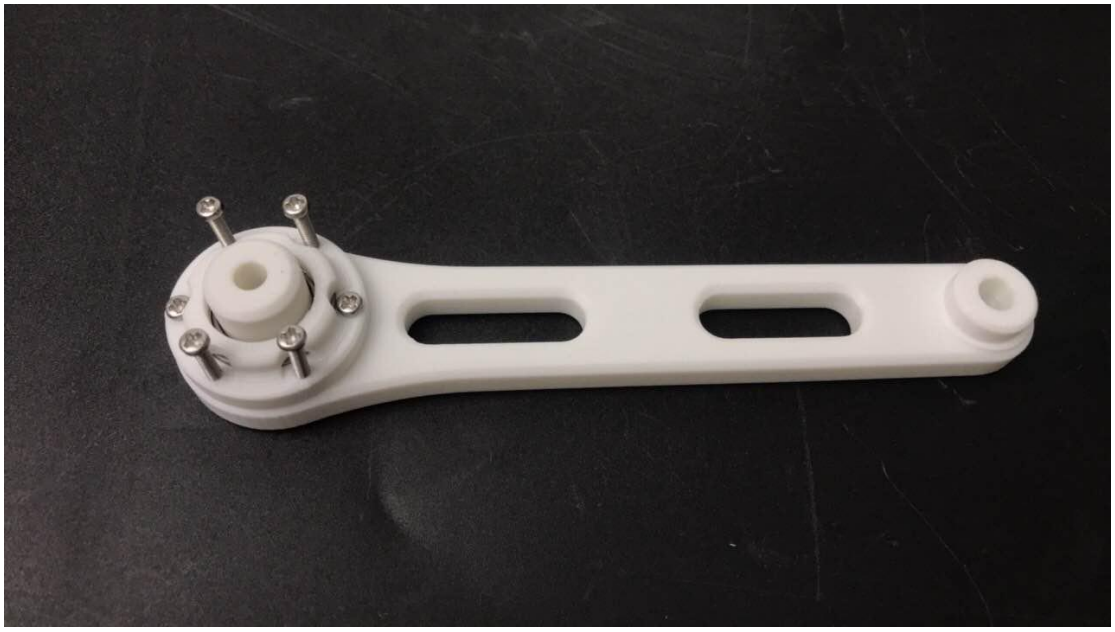
Secure with two screws first.



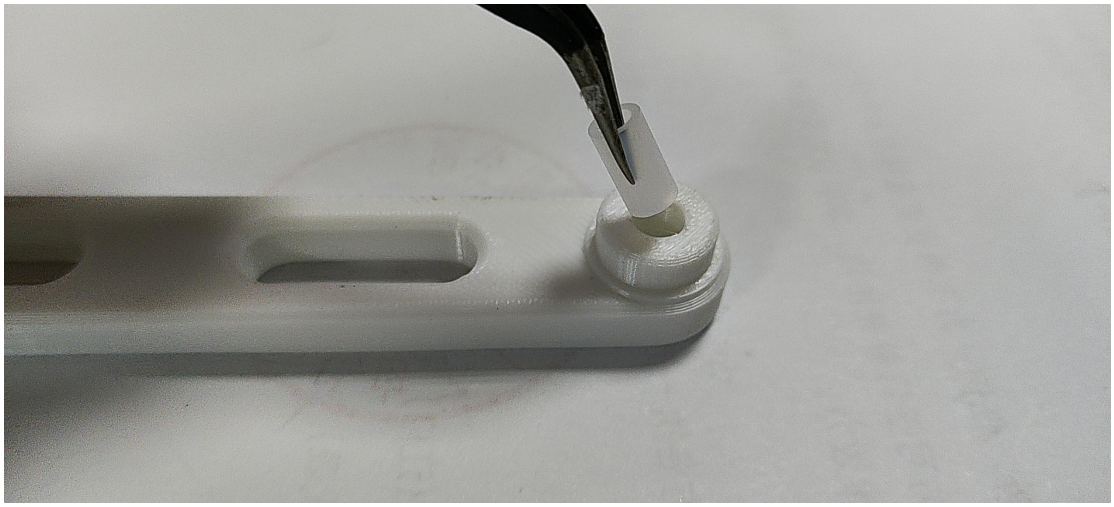




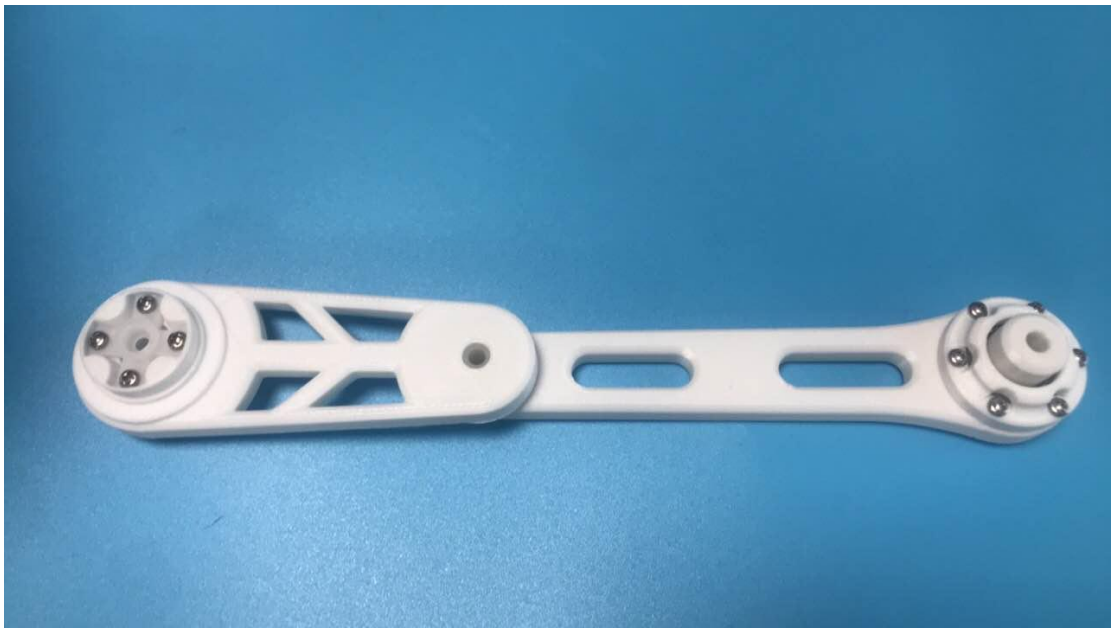
Then install the remaining 4 screws.



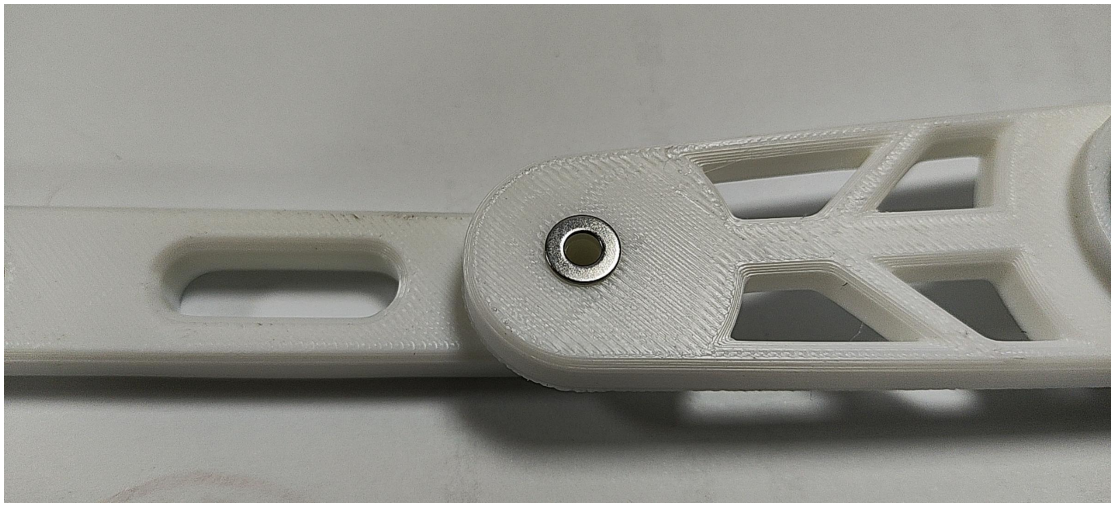
4. Take out the assembled outer legs and pre-assembled thighs, put the white sleeve from the parts package into the hole framed in the picture (it is important to put it in, otherwise the robot will shake), and put in the small bearing.



5. As shown in the diagram below, the joints of the thigh and outer leg are connected.



6. Insert the M3*16 screw and washer from the side of the thigh and secure it (note that there should be a washer under the screw). After tightening, move the joint around a bit. If it's too tight, loosen it slightly. It should be able to turn easily.



The other three legs were installed in the same way.

7. Repeat the above steps to install the other outer/inner legs. The final result is shown in the figure.

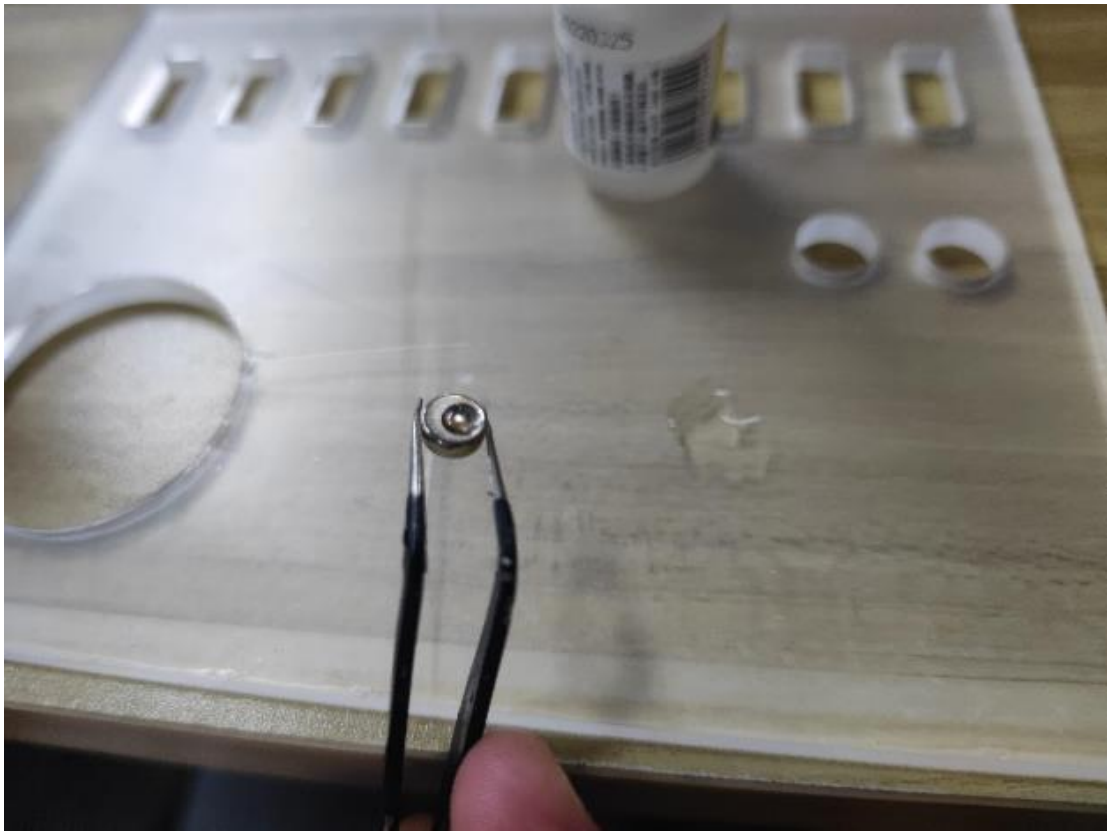
五、Motor and Encoder Installation

1. Install magnets or magnetic rings

Magnet installation: Use 502 glue to attach the magnet to the bottom of the motor (the wired end).

Method 1: Apply a drop of 502 glue directly to the magnet. Only half a drop is needed; avoid using too much glue, which could cause the motor bearing to stick!

Method 2 (safest): Find a platform or mat where you can drip super glue. First, drip the super glue onto the platform, then use tweezers to hold the magnet and gently tap it with the super glue.



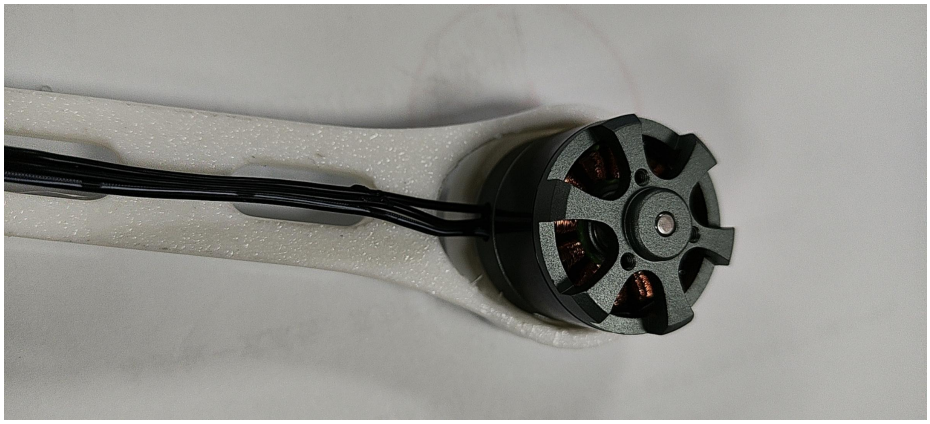
Align the center of the magnet with the center of the motor and ensure they are firmly attached. After installing the magnet, rotate it to check for any misalignment, and poke it with your finger to check if it falls off. View it at eye level to ensure the magnet is not uneven.

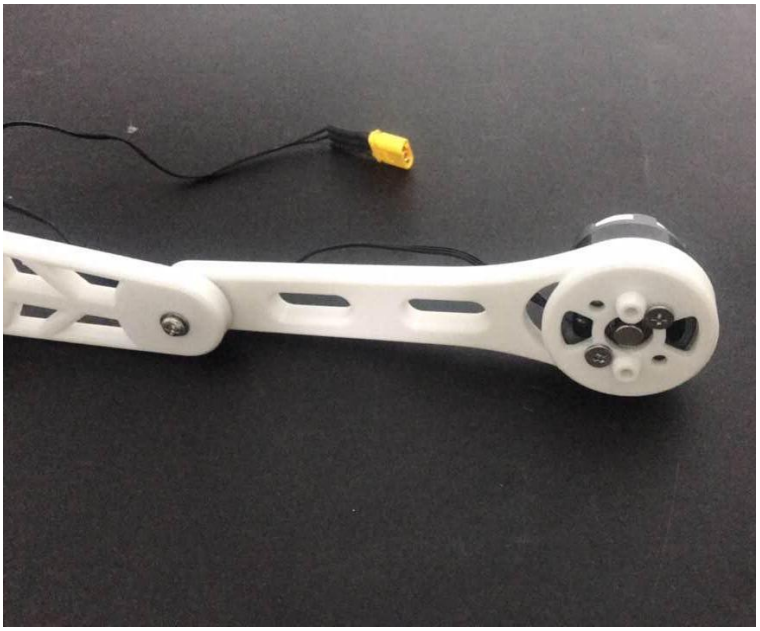
2. Remove the motor, the printed part in the picture (coupling), and three flat-head M2*6 screws.

3.After cleaning the support at the bottom of the coupling, align the motor with the groove in the coupling, then align the holes and tighten the M2*6 flat-head screws. The finished result is shown in the figure.

3. Install the side of the motor with the magnet into the groove of the inner leg, and secure it diagonally with four M3*6 screws. Tighten them slightly to prevent vibration.

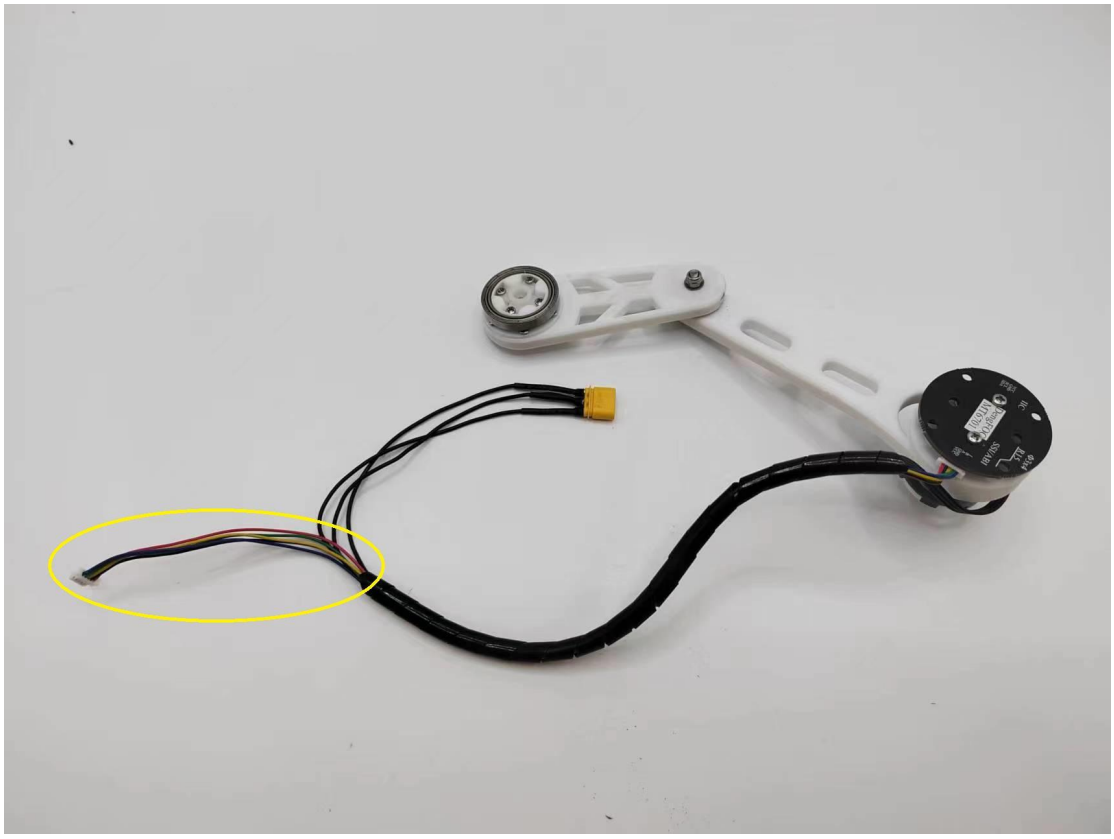
Note that the motor wire should be placed inside the printed part.



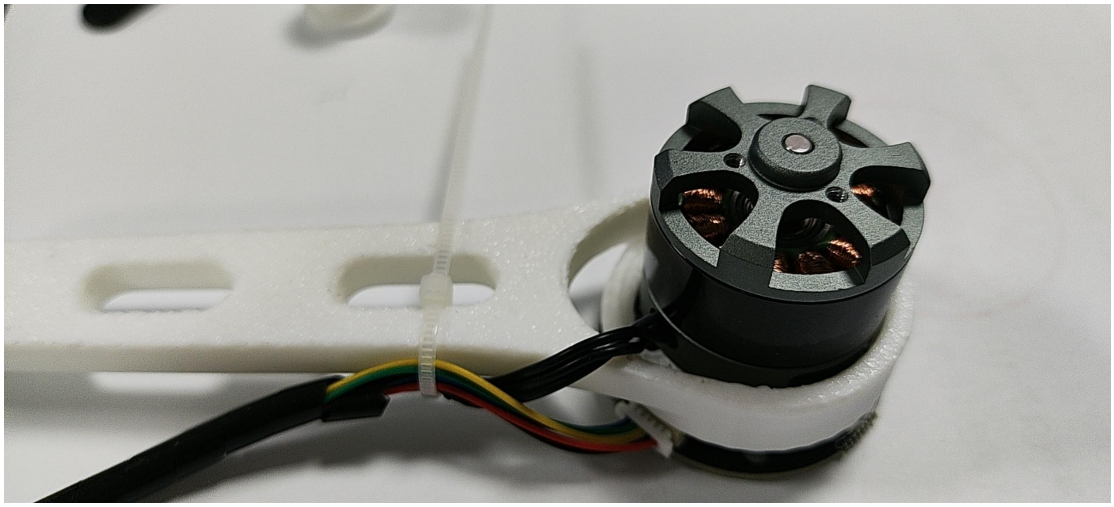


5. Remove the encoder, secure it with two M3*6 screws (with the chip close to the magnet), and then plug in the encoder cable.

6. Wrap the motor wires and encoder wires with tubing, as shown in the picture. Note that the other end of the encoder wire should have a certain length left, preferably 3cm, as marked in the picture.



7. Finally, use cable ties to secure the encoder wires and motor wires. The installation result is shown in the figure.

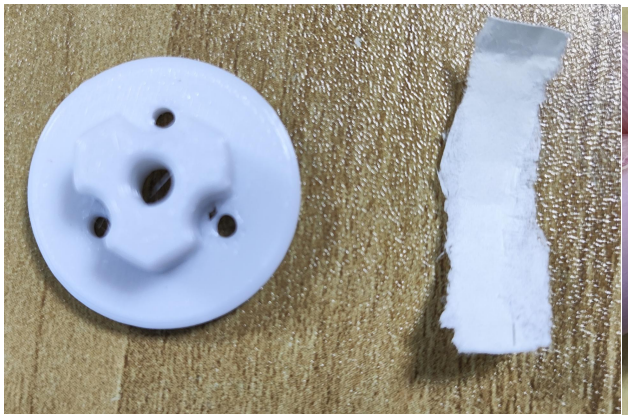


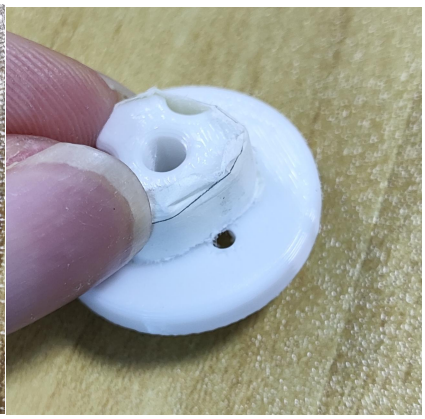
Pull the cable as taut as possible, making sure it doesn't touch the motor; if it does, the rear wheel won't turn.

七、 Wheel installation

1.Take out the inner leg and two wheels that you just installed, and align the hexagonal grooves of the wheels with the motor coupling as shown in the figure.

Hold the motor down with one hand and turn the wheel with the other to check if it's loose (skip this step if it's not loose). If it's loose, use a piece of paper to increase its thickness before installing the wheel.





2. Take out the outer leg that you just installed, align the M4*18 screw (the largest screw) with the hole on the wheel, and then tighten the screw.

3. The other printout was created using the same steps, and the result is shown in the image (this image does not show the encoder cable).

八、Leg connection and installation with the robotb body

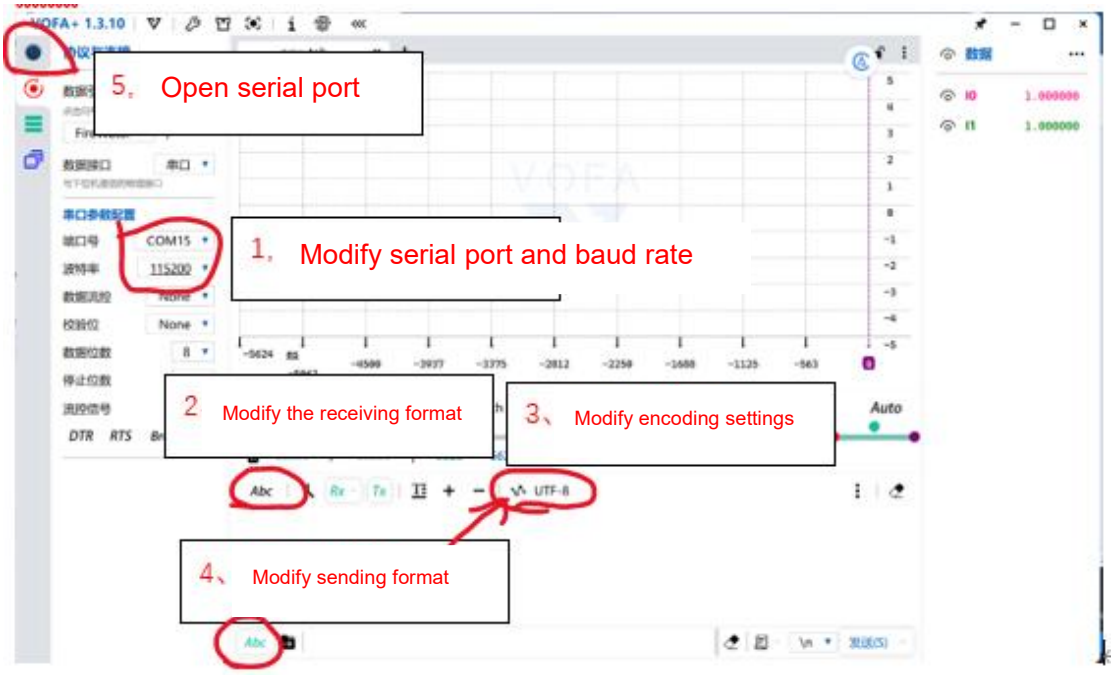
Main control board testing (Remember the following steps to avoid incorrect programming that could damage the chip).

1. Open the serial port assistant, set the baud rate to 115200, and view the serial port information.

VOFA (Virtual Oscilloscope for Embedded Systems) download URL: [Download Center | VOFA-Plus](#)

(Ctrl+Click to open the download link)

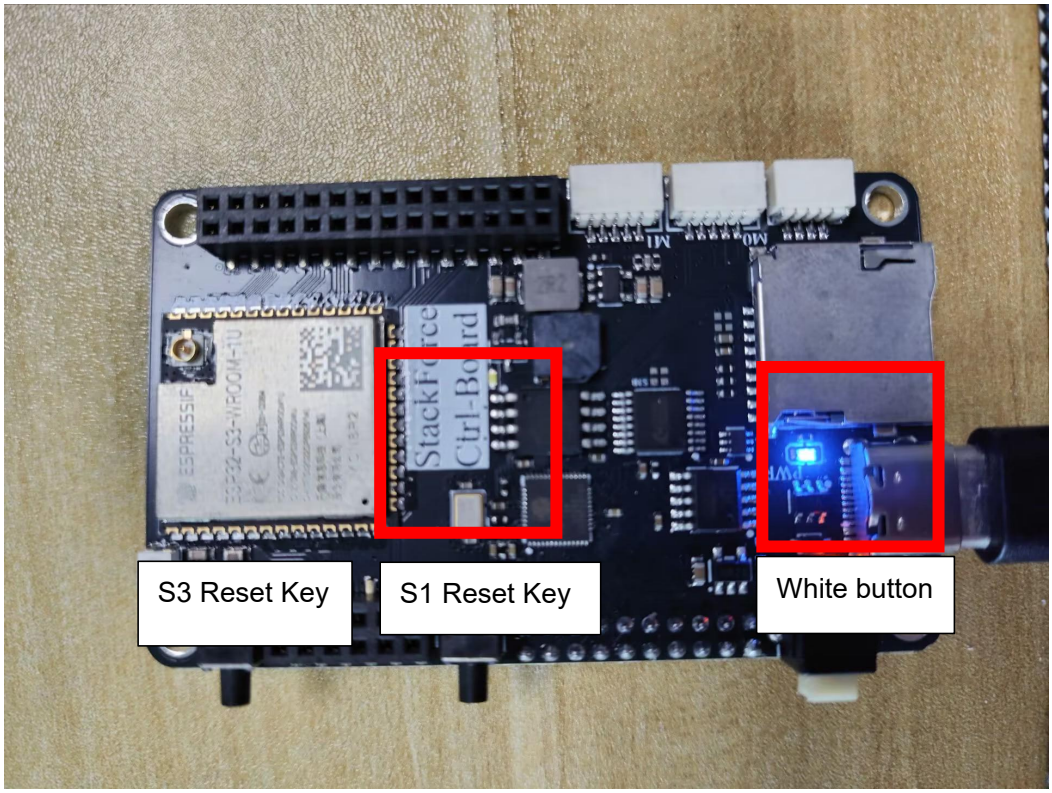
The tutorial is as follows. Follow the steps in order, ensuring that the status of all controls except the serial port number is the same as shown in the image, and then continue reading.



2.Configure communication with the S1 chip on the main control board.

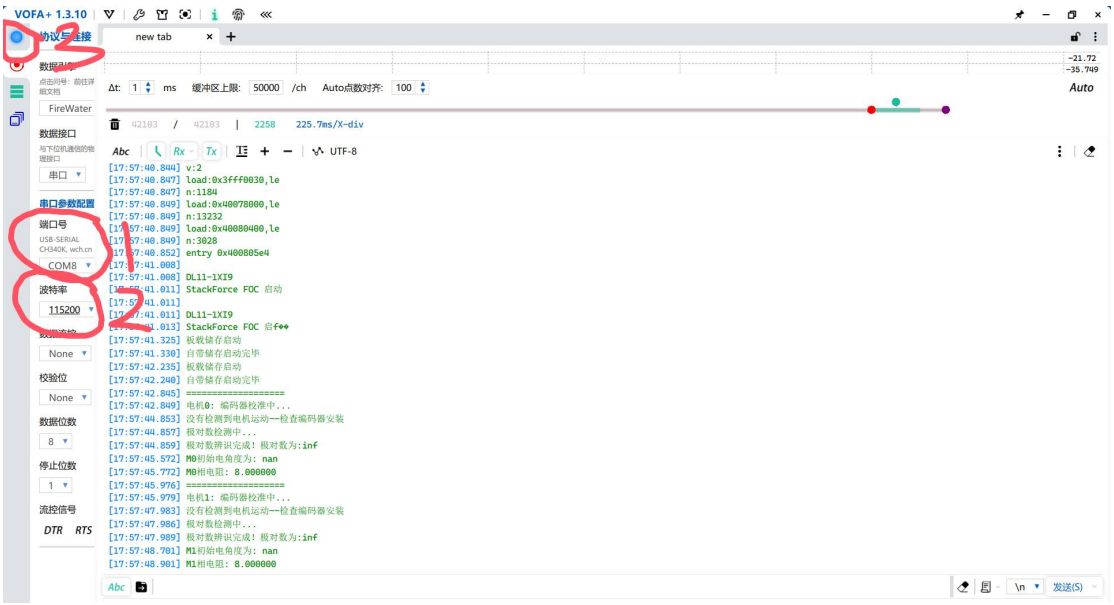
2.1 Connect via USB, with the gapped side of the USB connector facing upwards and the seamless side facing downwards. Release the white button to switch to the S1 chip (yellow light on).

This is the USB port opening; if it's not there, it might be a charging cable.

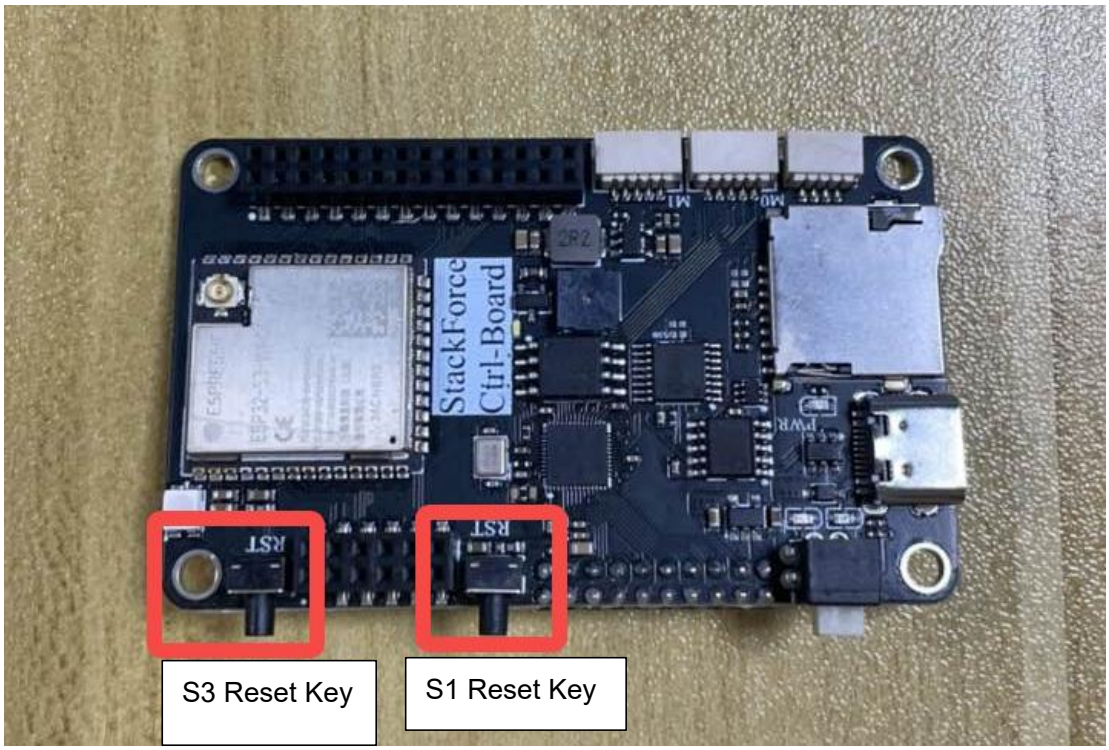


2.2 Open VoFA. 1. Select the port number (USB must be plugged in). 2. Set the baud rate to 115200 (do not set it to 1152000). 3. Open the serial port. 4. Press the S1 reset button (see the image above).

When selecting the port number, choose one containing "CH340". If it's not listed, the CH340 driver is not installed. You can check the "CH340 Installation Tutorial" in the "Tools" section of the package you received.

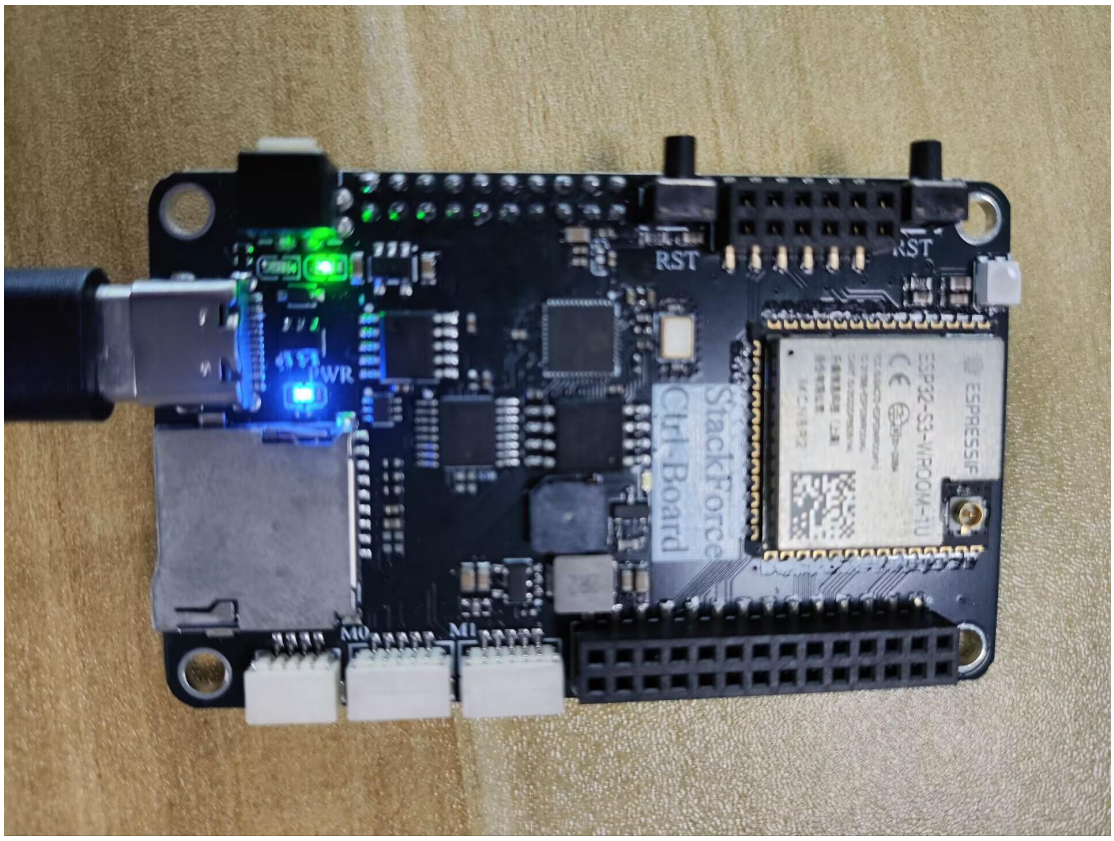


2.3 Press the S1 chip reset button as shown in the picture below to see the serial port information. The bottom line is the registration code, which is the same as the registration code on the bag. Don't lose it.

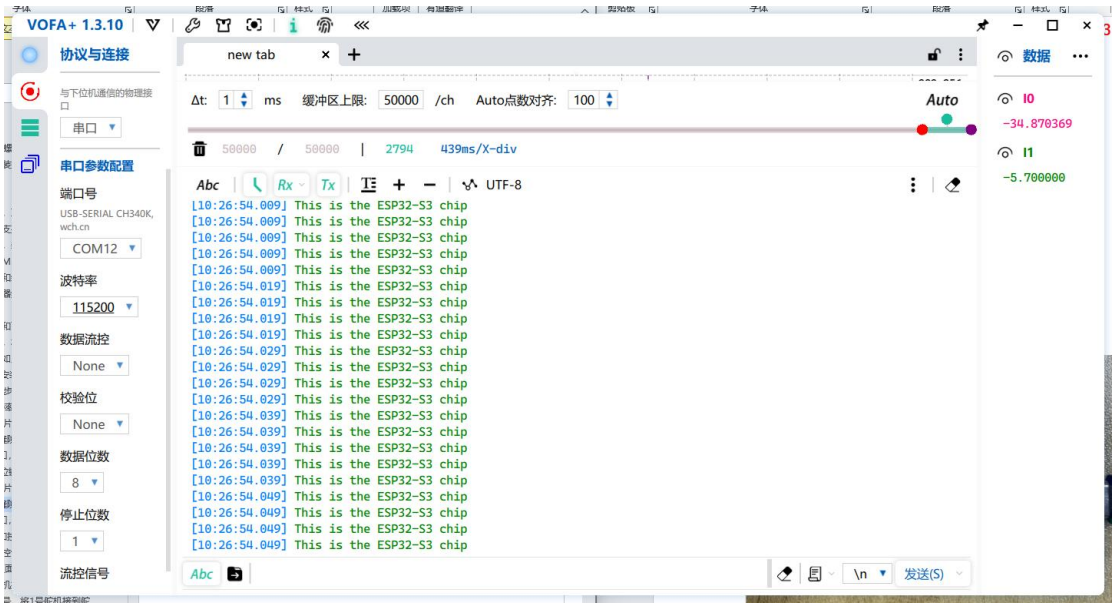


3. Configure communication with the S3 chip on the main control board.

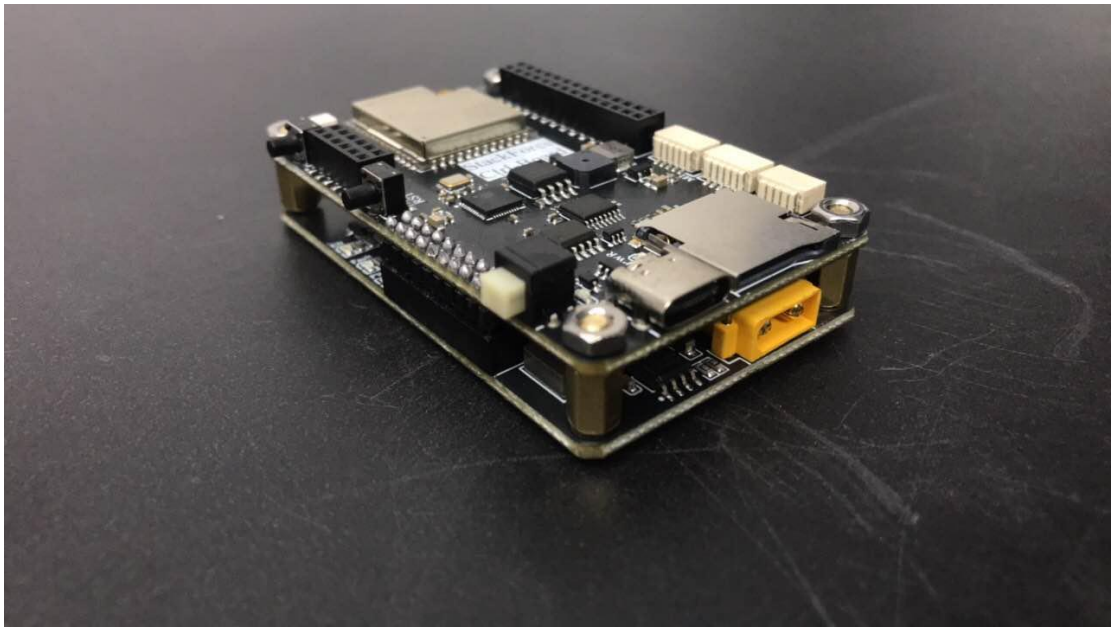
3.1 Connect the USB cable with the gapped side facing up and the seamless side facing down (the seamless side should always face down). Press the white button to switch to the S3 chip (green light will on).

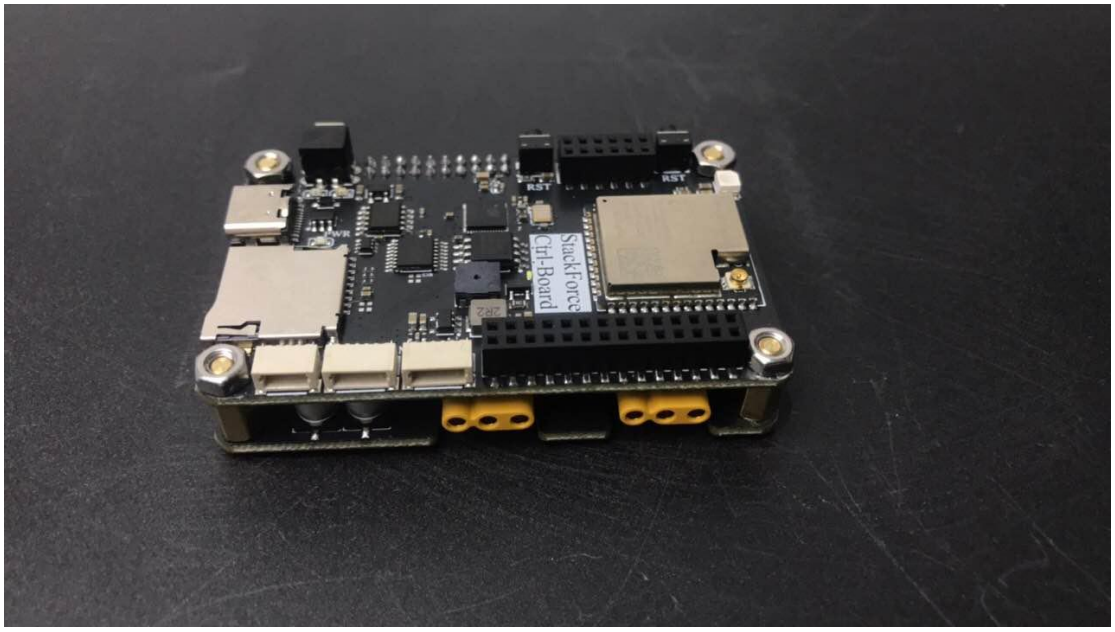


3.2 Open VOFA, select the serial port, set the baud rate to 115200, and open the serial port. You will see the following serial port information, which is from the S3 chip.

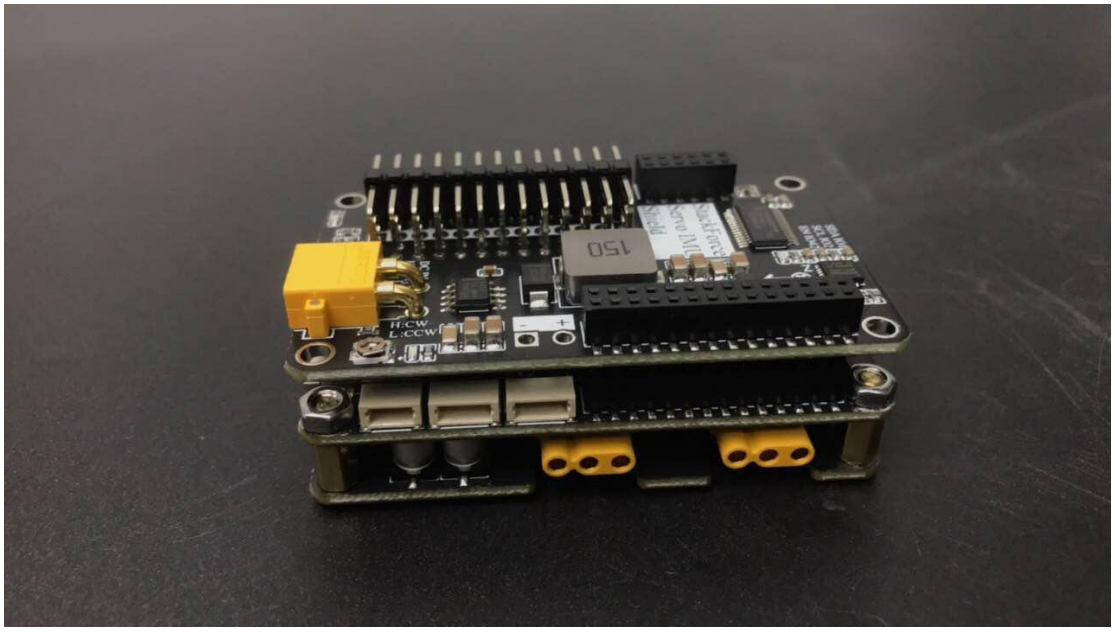


1. Remove the four copper pillars, nuts, control board, and low-current board, and install them as shown in the diagram below.





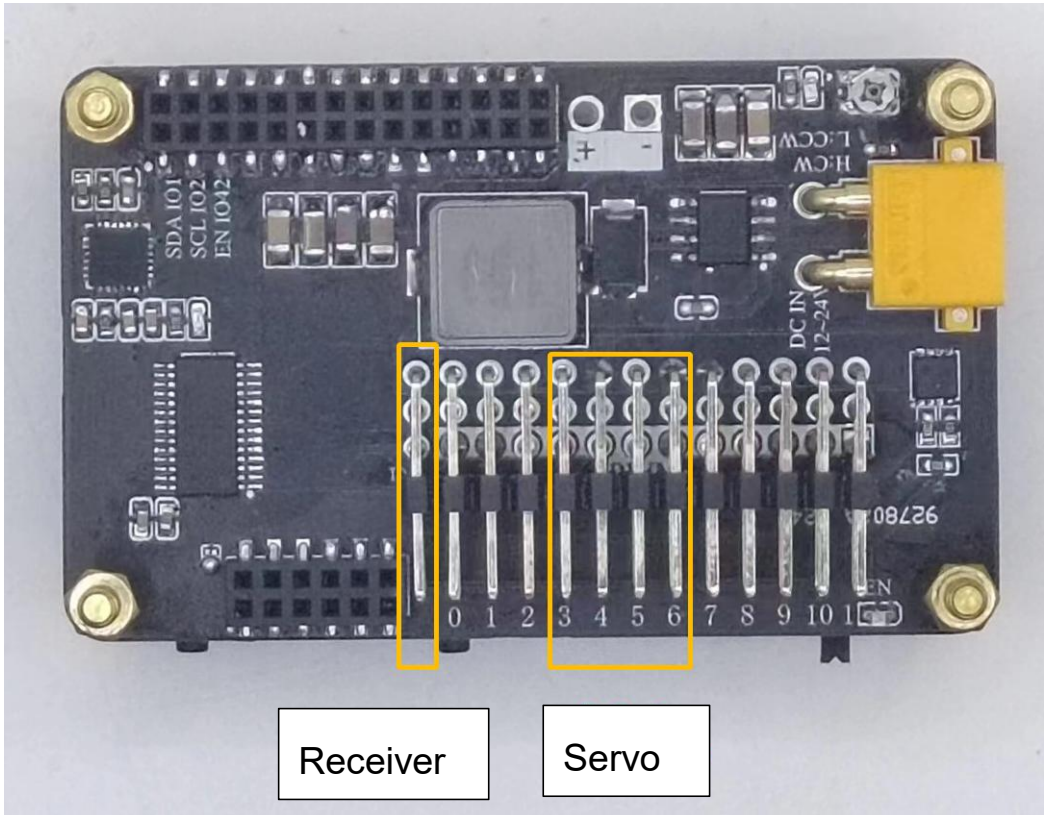
2. Then insert the servo board into the main control board (align it with the pin header and nut, and insert it).



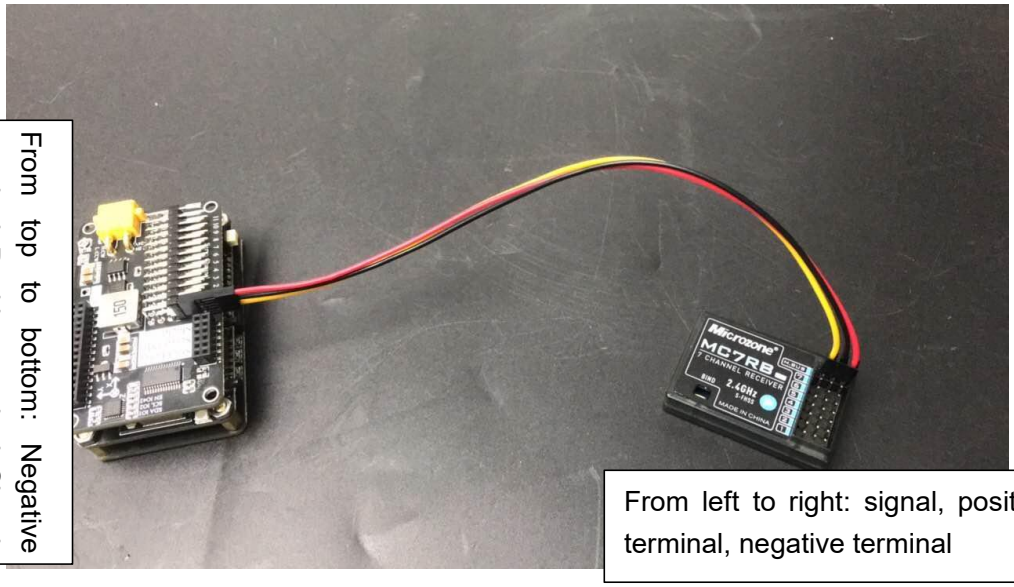
If you have a multimeter, you can perform the following test: use the multimeter's siren setting to test whether the solder joints at both ends of the six wires below are conductive (between the servo board and the main control board).

If it's not conductive, bend the non-conductive pin on the servo board as shown in the image below and then reinsert it into the main control board. Then test it as described above.

3.Wiring section (Note that the top row is GND, the middle row is VCC, and the bottom row is the signal line).



4. Connect the model aircraft receiver to the servo control board. Use DuPont wires to connect the receiver's M.bus to the leftmost column of the servo board without numbers (red GND to the top of the servo board, black positive to the middle, and yellow signal wire to the bottom; the color of this DuPont wire does not indicate positive or negative).

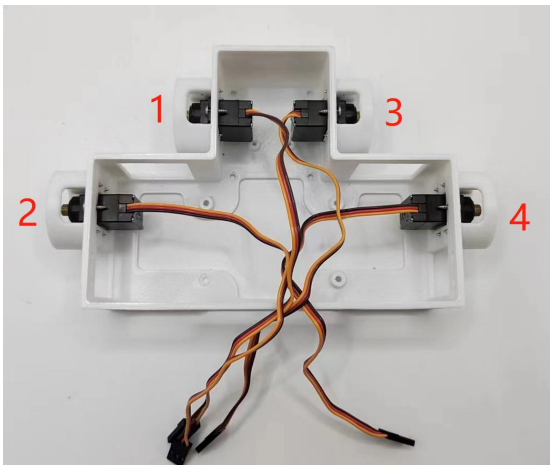


From top to bottom: Negative terminal, Positive terminal, Signal

From left to right: signal, positive terminal, negative terminal

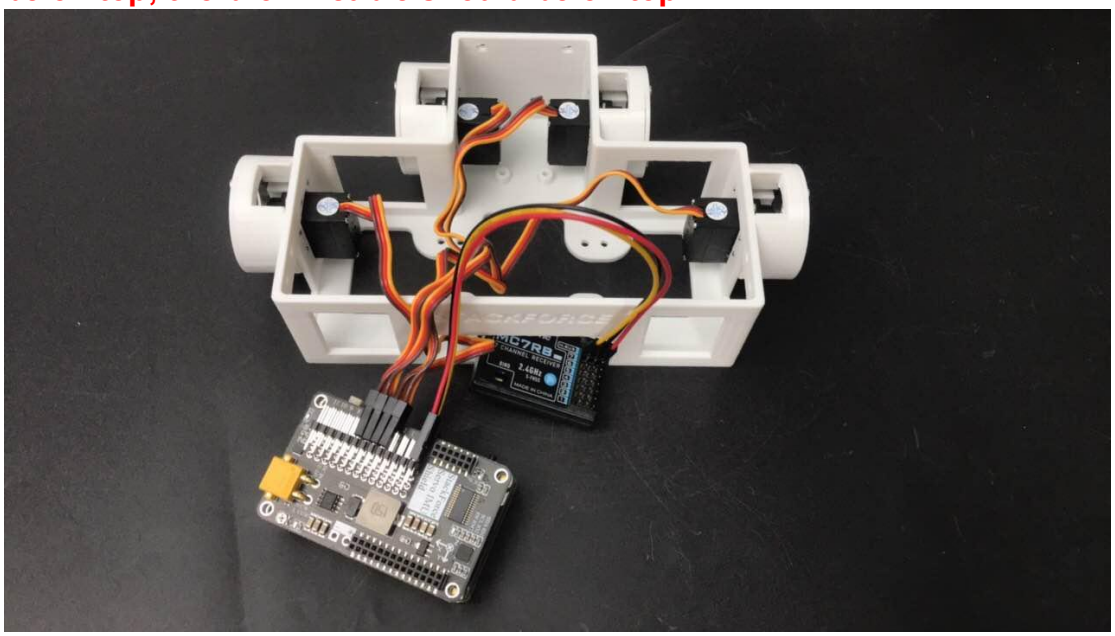
5. As shown in the diagram, connect servo number 1 to position 3 of the servo board bend pin, servo number 2 to position 4, servo number 3 to position 5, and servo number 4 to position 6.

Brown servo wires on top



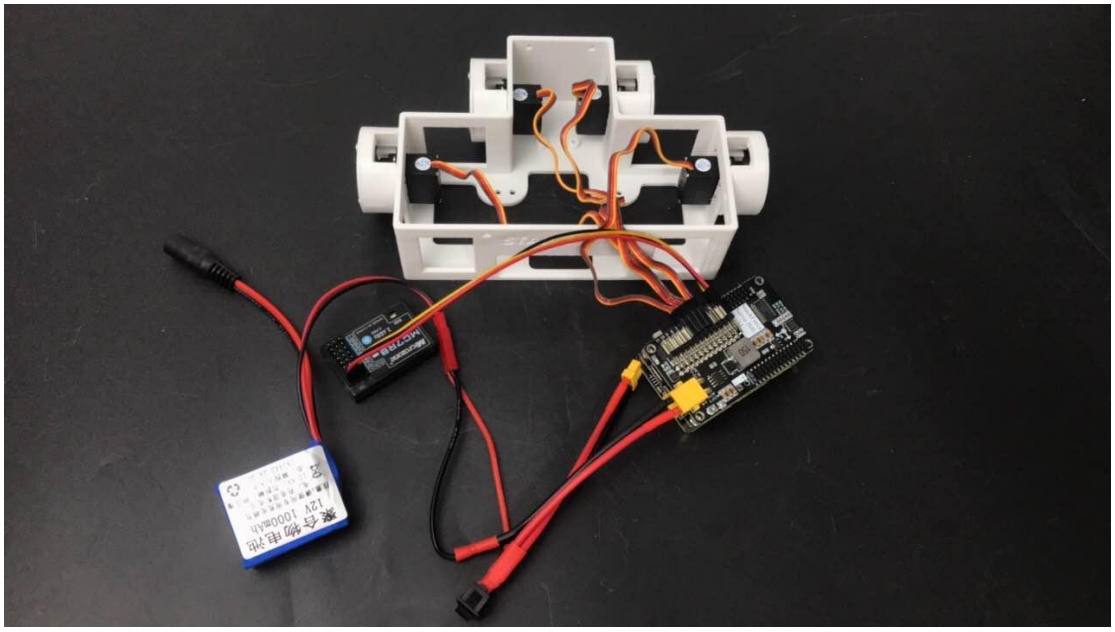
6.The finished result is shown in the figure.

Note: The brown servo cable should be on top; the brown cable should be on top; the brown cable should be on top.



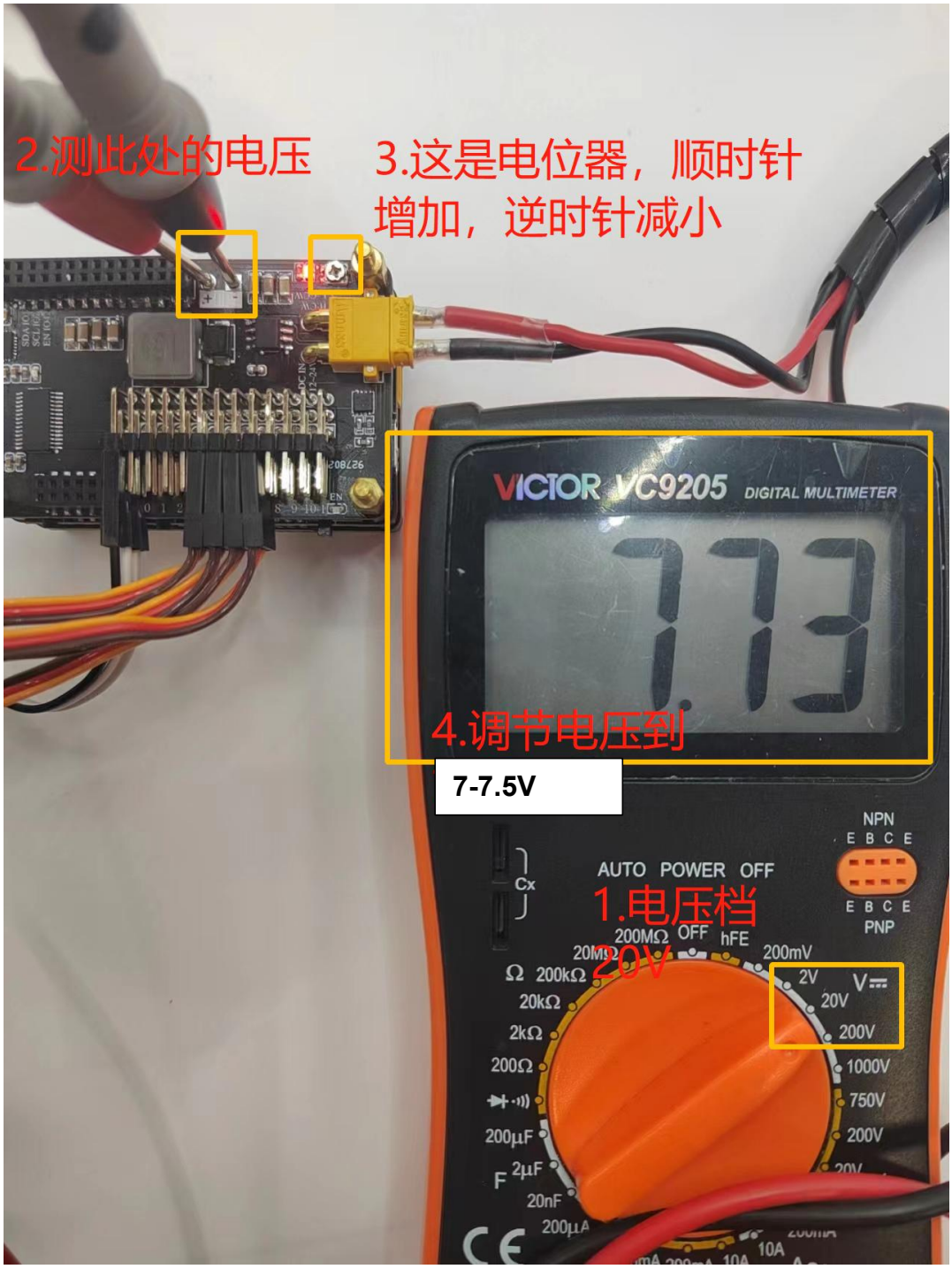
7.Remove the battery power cable, connect one to the servo drive board and the other to the low-current board (motor drive board). Be careful to prevent reverse insertion of the XT30 interface and do not use brute force.

Make sure both wires are connected. The main control board should not conduct 12V between the two boards.

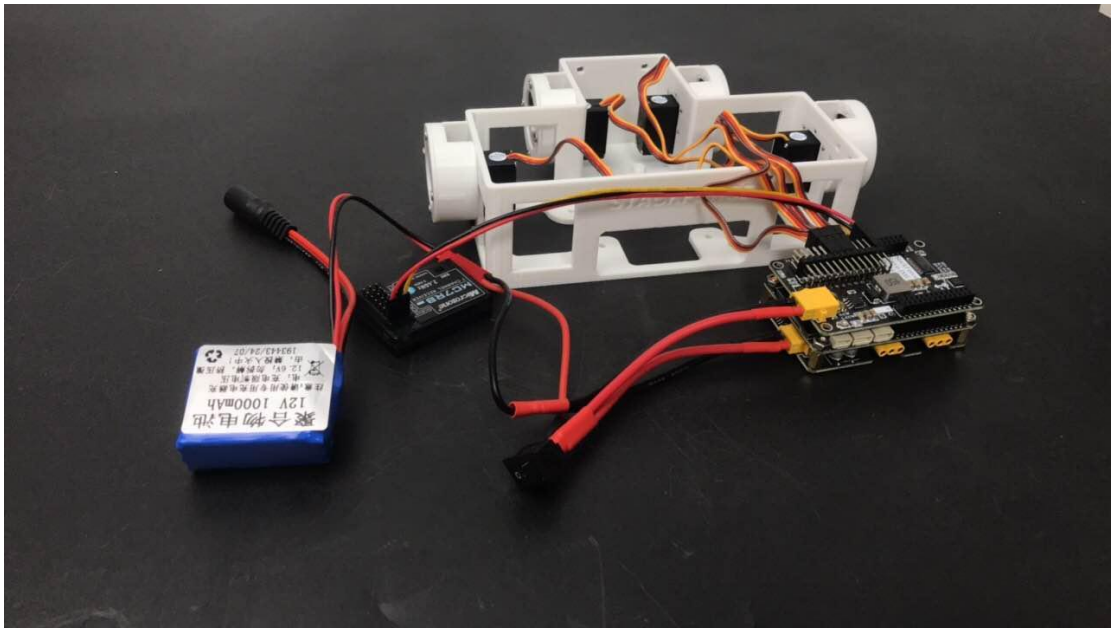


9.Then turn on the power switch. The potentiometer is located in the upper right corner of the board shown in the picture. Follow the steps shown in the picture. Note: Rotating clockwise increases the output voltage, and rotating counterclockwise decreases the output voltage. Set it to 7~7.5V. Note: Do not exceed 8V!!!

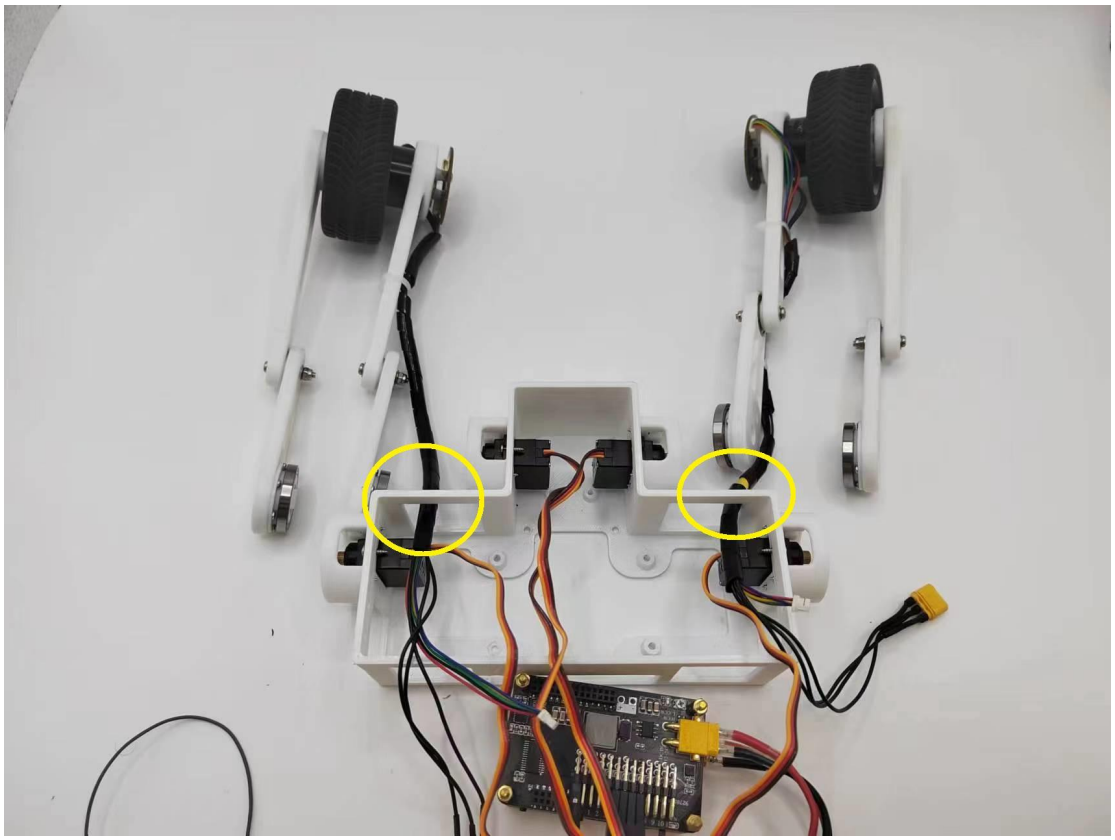
This step has already been adjusted; you can ignore it.



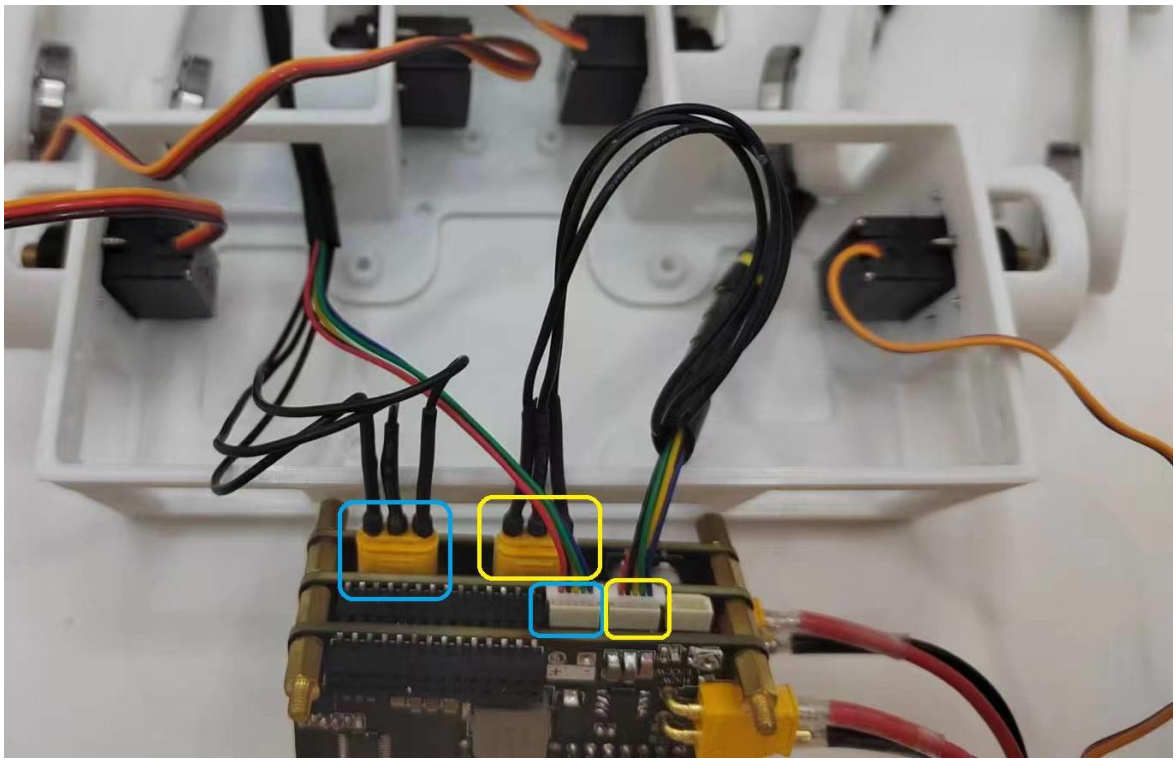
10. After adjusting the voltage, connect the power cord to the motor drive board (both power cords must be connected; the main control board does not transmit 12V power).



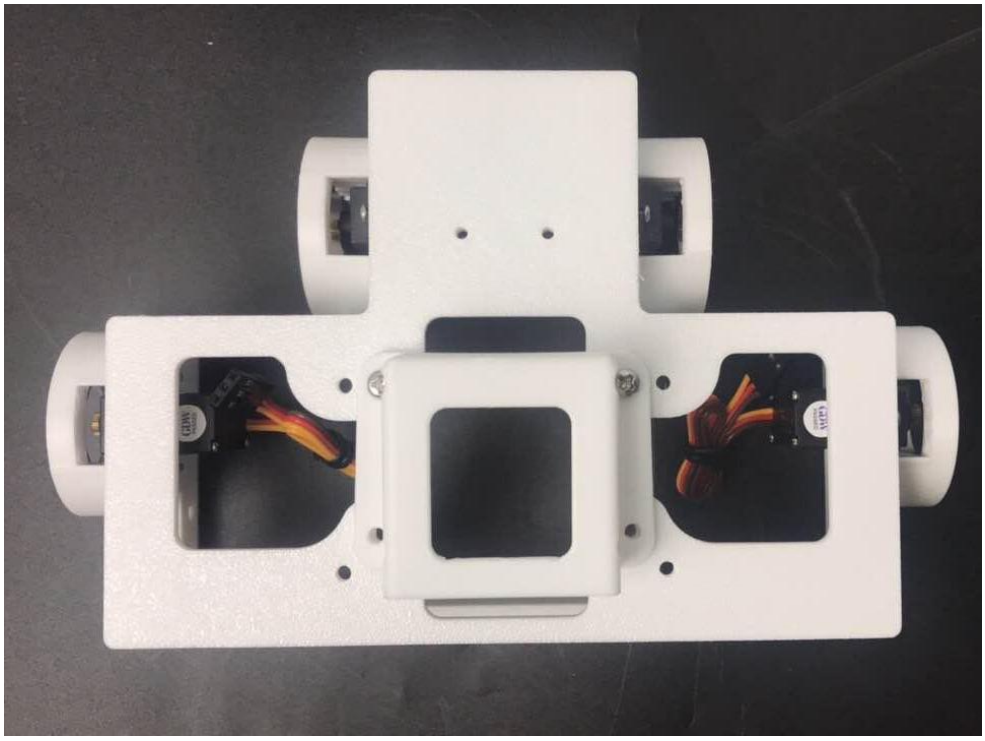
11. Pass the wound thread through the marked area in the diagram, as shown.

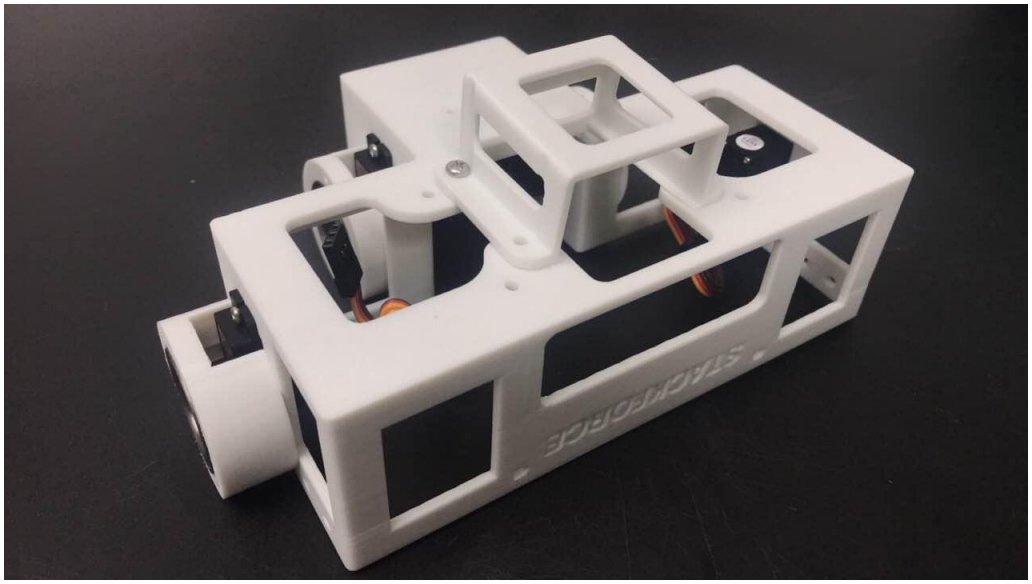


12. Connect the motor and encoder wires on the left to the interface on the left side of the board (blue box in the diagram), and connect the wires on the right to the interface on the right (yellow box in the diagram), as shown in the figure.

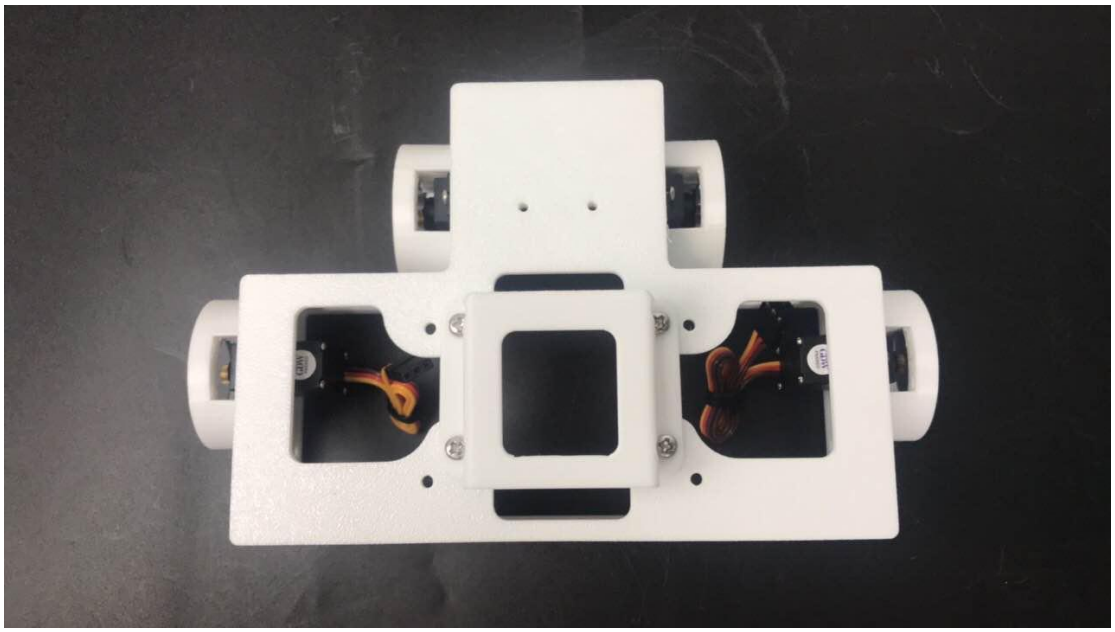


13. Install the battery frame as shown in the diagram below. First, install the two front screws (note that the battery frame has a front and back; if the screws do not align with the screw holes, press down on the battery frame to tighten the screws). Install one screw first. If the other screw is misaligned, use one hand to press down on the battery frame and the other hand to turn the screw.

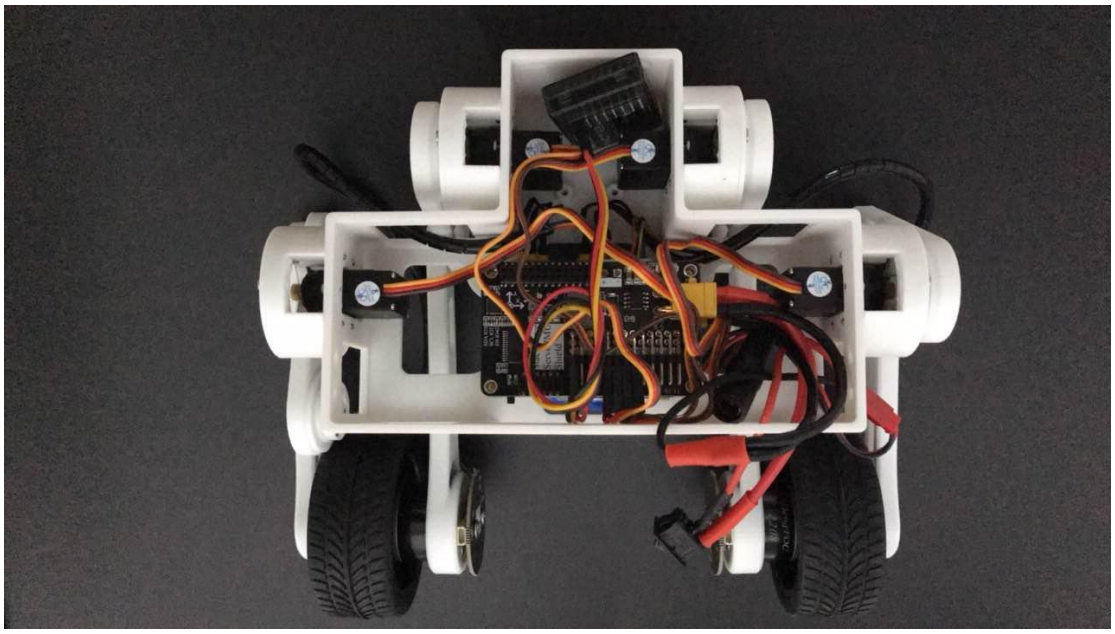




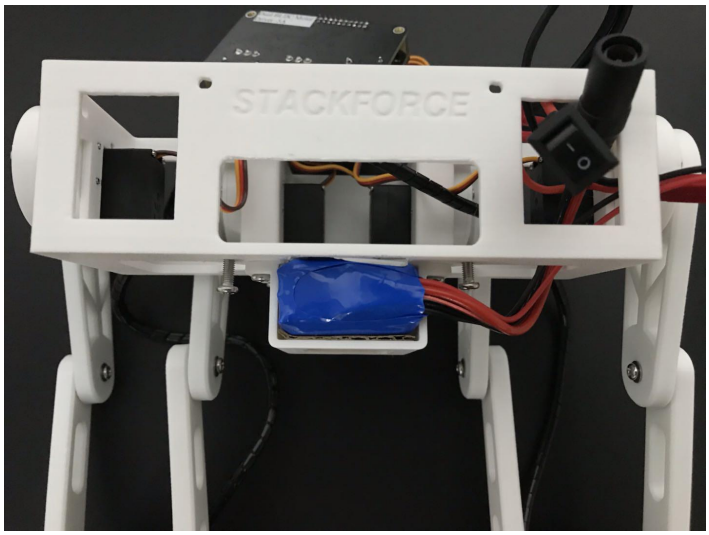
Then install the remaining two screws.



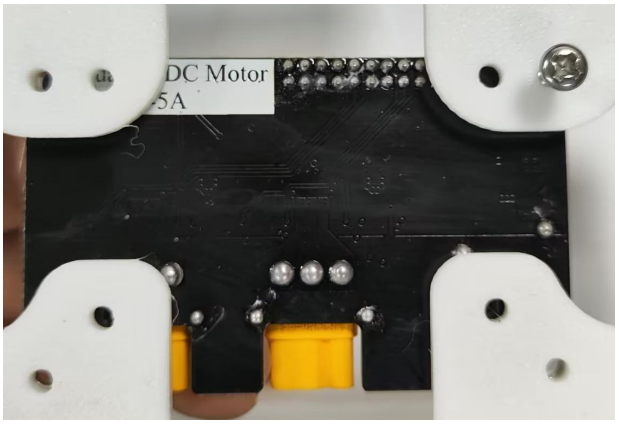
The overall installation effect is shown in the following figure.

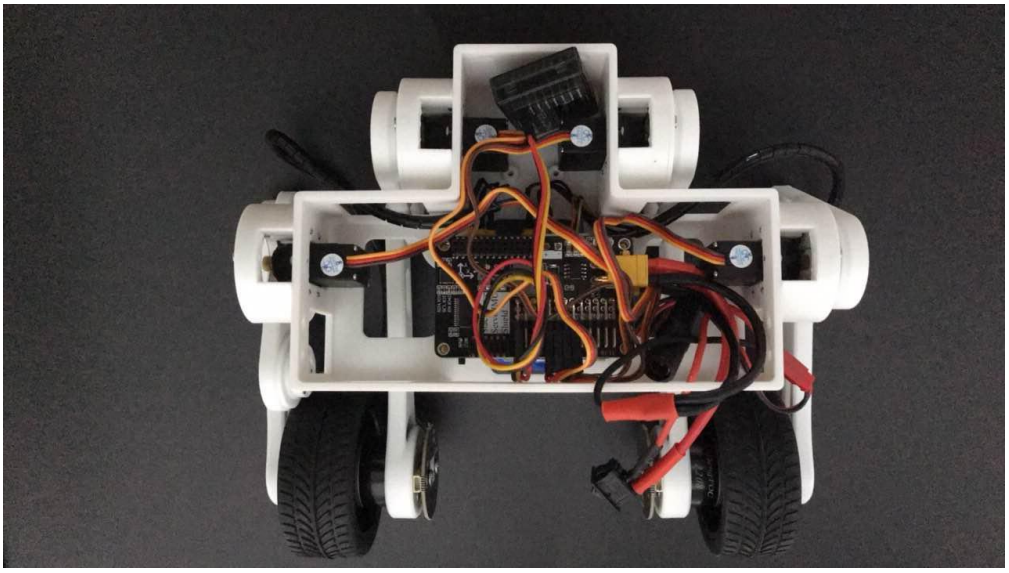


14. Unplug the power cord, insert the battery into the battery compartment, you can use paper to pad it or tie it with cable ties. After installing the battery, pass the power port and charging port through the bottom hole, and then connect them to the board's power cord.



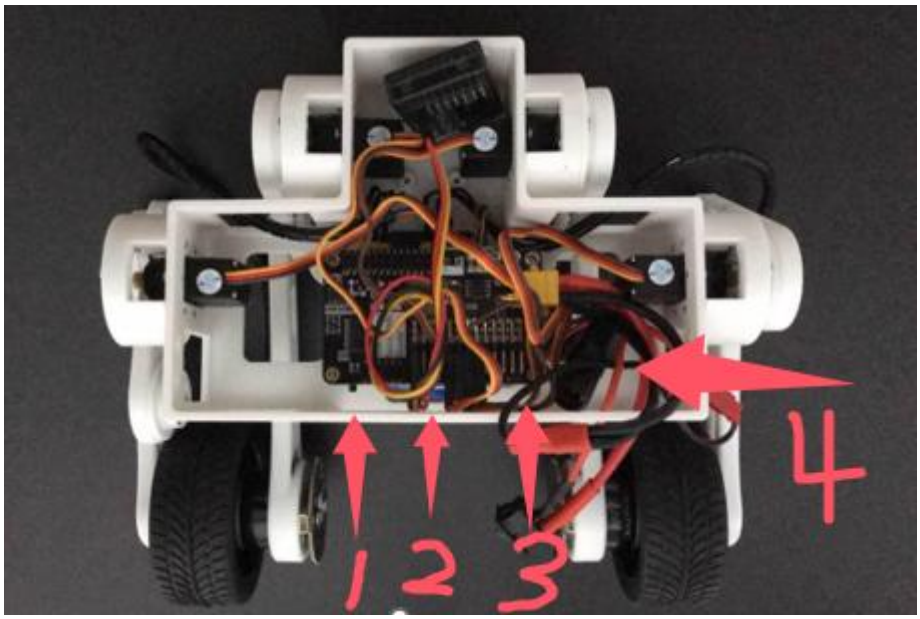
15. Place the board into the rack as shown in the picture, and tighten it with M3*8 screws aligned with the copper pillars.





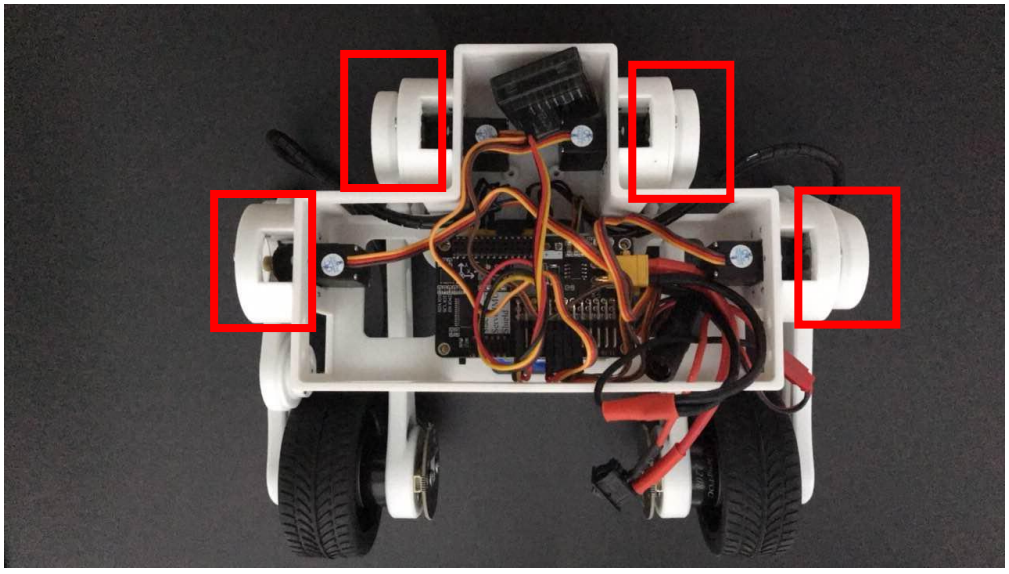
16 Once finished, you can use cable ties to tidy it up (this is optional).

17、External Interface

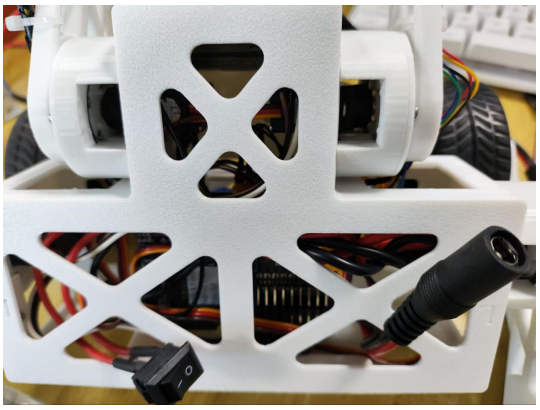


1---S3 chip reset button, 2---S1 chip reset button, 3---White button for switching communication chips, 4---USB insertion point, make sure the seamless side is facing up.

18. Thigh mounting: The four locations in the image below are the connection points between the thigh and the servo. The screws are the black screws from the servo box. They will not be installed here for now because they need to be removed for subsequent calibration.



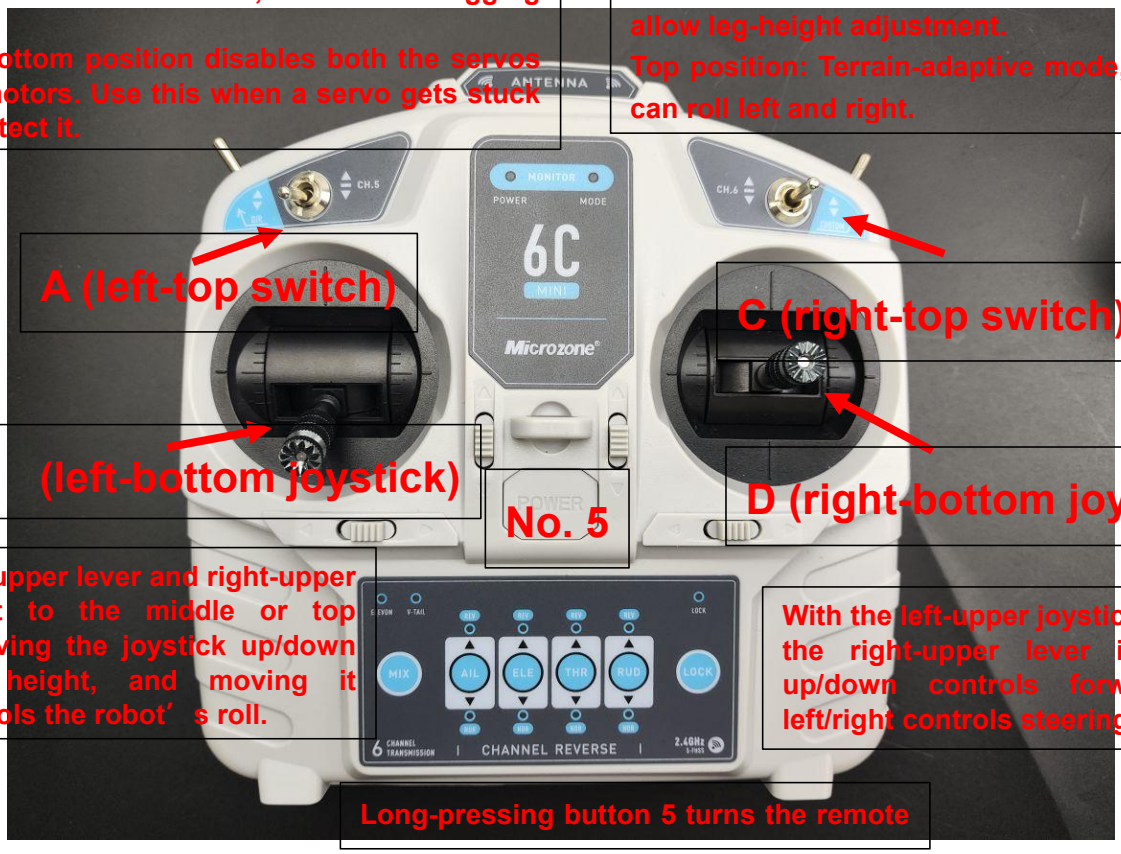
19. Install the cover, and after closing the cover, pull out the power switch and charging port, then use an M3*6 screw to screw it in from the side.



Remote Control Button Configuration Instructions

The top position enables both the servos and motors, robot is self-balancing mode.
The middle position enables only the servos and disables the motors, servo is debugging mode.
The bottom position disables both the servos and motors. Use this when a servo gets stuck to protect it.

Bottom position: Servo calibration mode (servo coordinates set to `0,70`). The servo will only move when the left-top joystick is switched to the middle (servo-enabled) position.
Middle position: Exit servo calibration and allow leg-height adjustment.
Top position: Terrain-adaptive mode, the robot can roll left and right.



A (left-top switch)

C (right-top switch)

B (left-bottom joystick)

D (right-bottom joystick)

No. 5

When the left-upper lever and right-upper lever are set to the middle or top positions, moving the joystick up/down adjusts leg height, and moving it left/right controls the robot's roll.

With the left-upper joystick at the top and the right-upper lever in the middle, up/down controls forward/back, and left/right controls steering.

Long-pressing button 5 turns the remote

After completing the above steps, congratulations on completing the wheel installation. The next step is wheel calibration and adjustment. Please refer to the next folder for the calibration and adjustment documentation.