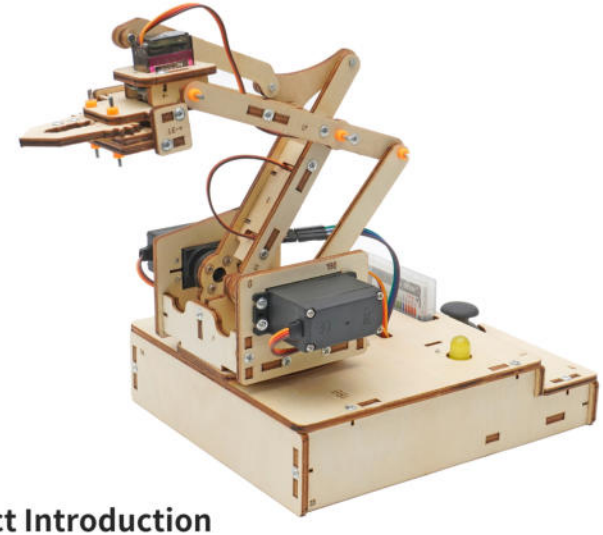
HS-A02 Robotic arm

Learning kit assembly instructions



Product Introduction

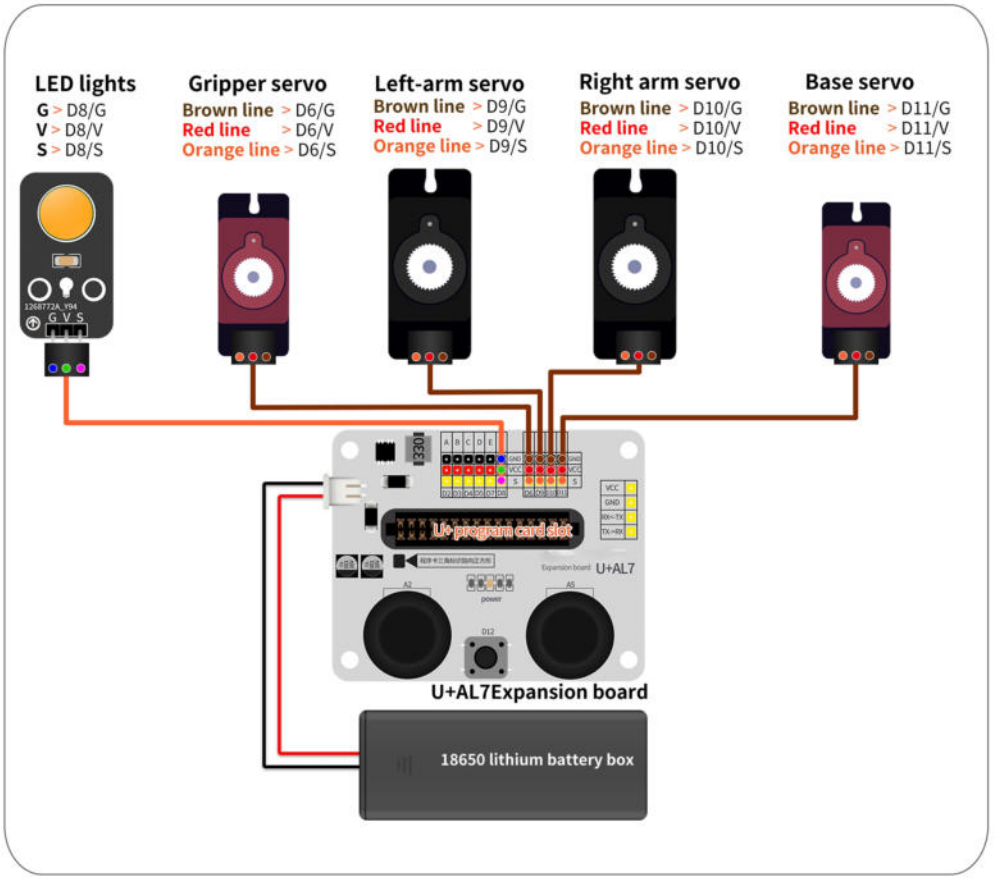
The robotic arm is an intelligent kit composed of LED lights, servos and other accessories.
The kit provides flexible rotation of the gripping item and features a track recording function that records the clamping process and cycles and repeats the previous operation.
You can also modify the sample program through programming software such as Arduino IDE, Mixly, etc., or write new programs yourself to control the robotic arm.

This product must be paired with a U+ program card (U+ PROGRAM CARD) USE
U+ PROGRAM CARD SUPPORT ARDUINO IDE, PROGRAMMING SOFTWARE SUCH AS MIXLY, ARDUBLOCK, SCRATCH, ETC

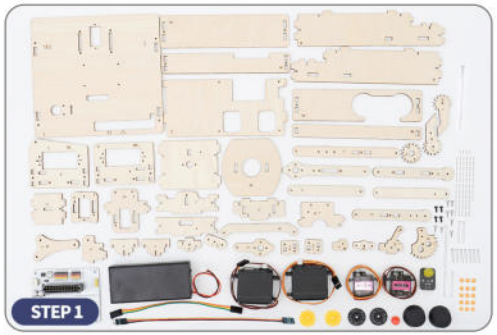
Preparation of tools and assembly considerations

Self-equipped assembly tools: 3mm diameter Phillips screwdriver, scissors.
Self-provided debugging tools: 1 computer with Windows 7, 8, 10, 11 operating system, 1 U+ program card, 1 data cable, 1 pair of 18650 lithium battery.
If you want to easily assemble the kit, you need to read the assembly manual carefully, assemble step by step

Warning: Persons under the age of 14 must be under the guidance of a professional teacher or knowledgeable adult!
The assembly and debugging of the product require the use of relevant tools, please take safety precautions when assembling to avoid injury!
This product is a teaching and experimental product, please do not use its function as a daily necessities, there will be instability!
When you are not using this product, please turn off the power switch on the battery compartment and remove the battery, keep the battery safe!

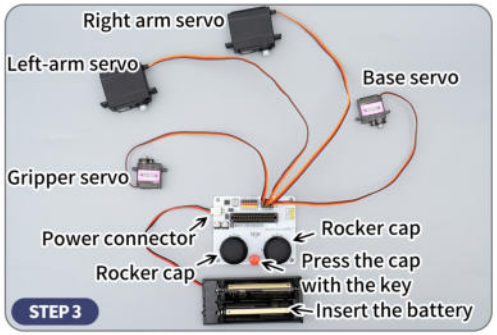


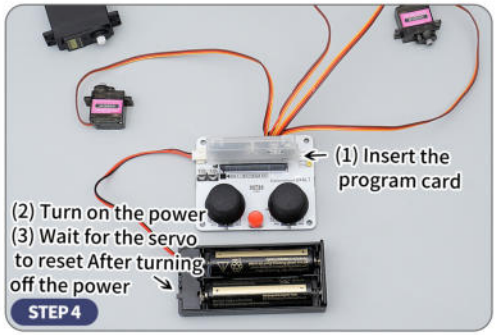
- Circuit wiring reference diagram



- Prepare all accessories and wood materials, and carefully check the number on the materials when assembling the wood materials.**The board has a number side as the front and no number as the back.**

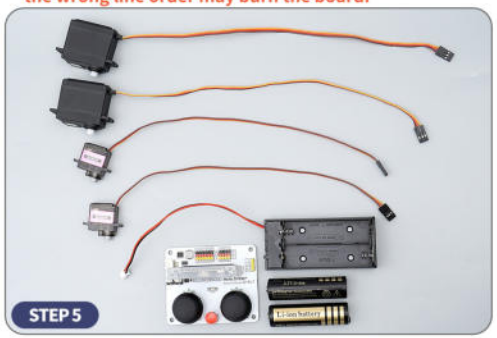
- Use the Mixly software to upload the kit's initializer to the U+ program card.

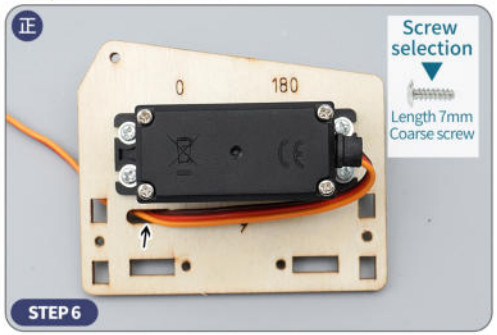




- Refer to [Circuit Wiring Diagram] Plug the four servo wire terminals into the D6, D9, D10, D11 interfaces on the U+AL7 expansion board, then load the battery into the battery box, and plug the battery box wire terminals into the power interface of the U+AL7 expansion board, and finally install the button press cap and two rocker caps on the expansion board.**Note: Please check the port order before inserting, the wrong line order may burn the board.**

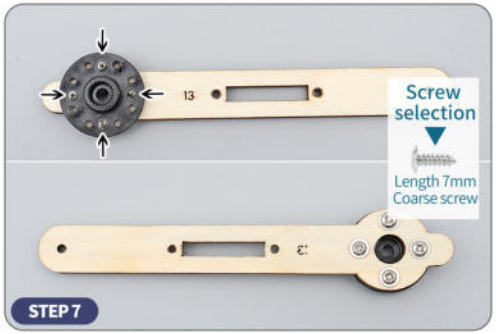
- Insert the downloaded program card into the card slot of the expansion board, then turn on the power switch, wait for the servo to reset and then turn off the power.**Note: The triangle identification of the program card points to the square logo of the expansion board, the battery compartment switch OFF means off, and ON means on.**

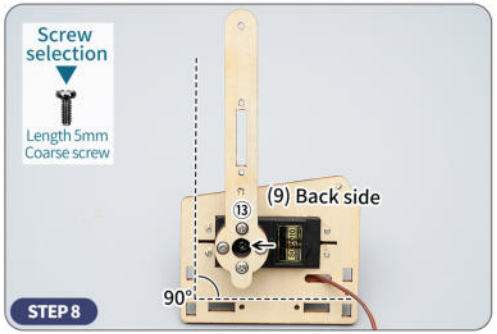




- Remove accessories from the expansion board, program cards and key caps do not need to be removed.

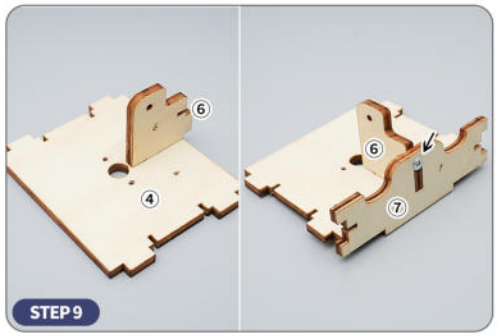
- Use 7mm rough screws to mount the right arm servo on the front of board (9), and then pass the servo wire through the wire hole of board (9).

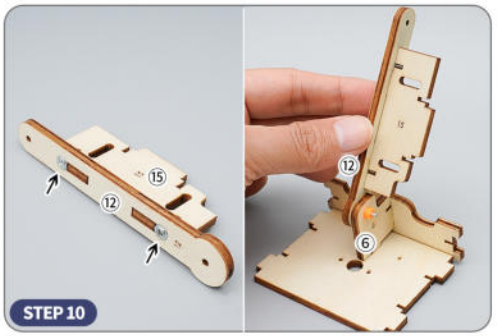




- Use 7mm self-tapping screws to mount the servo disc on board (13).

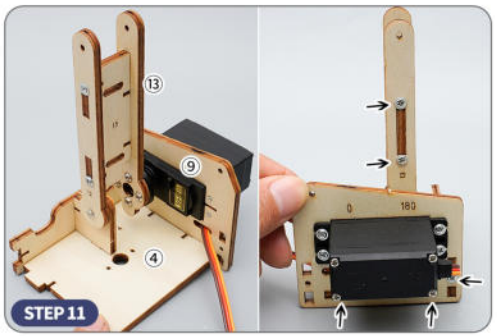
- Use 5mm servo screws to mount the servo disc on the right arm servo.**Note: Please be sure to install the servo disc (arm) when the power is off, and do not have mechanical resistance such as screwing, breaking, pulling when the servo is powered on, the resistance is greater than the servo torque will be hot and burn the servo.**

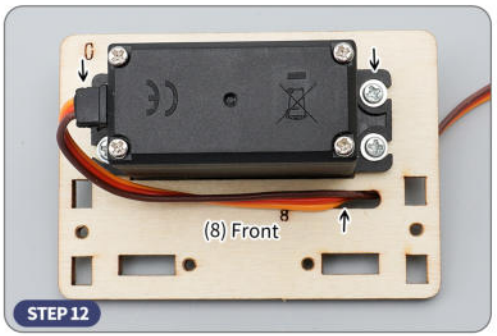




- First install board (6) on board (4), and then install board (7) on board (6) with 7mm rough screws.

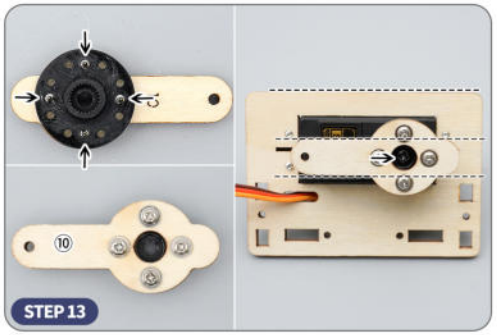
- First install the (15) plate on the (12) board with a 7mm rough grain screw, then string the (12) plate and the (6) plate together with a 1.3cm head nail, and finally fix it with an orange retaining ring.

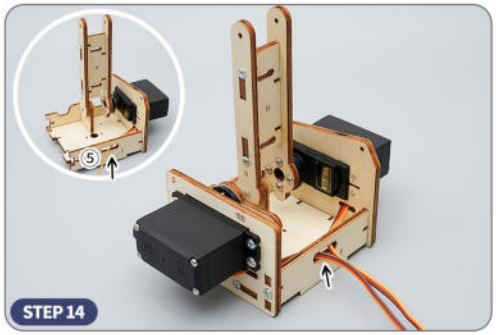




- First install the (15) board on the (13) board with 7mm rough grain screws, and then install the (7) and (4) boards on the (9) board with 7mm rough grain screws.

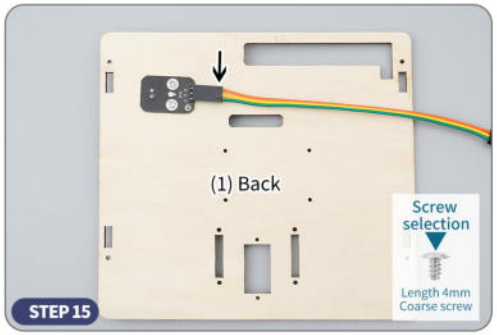
- Use 7mm rough screws to mount the left arm servo on the front of board (8), and then pass the wire through the wire hole of plate (8).



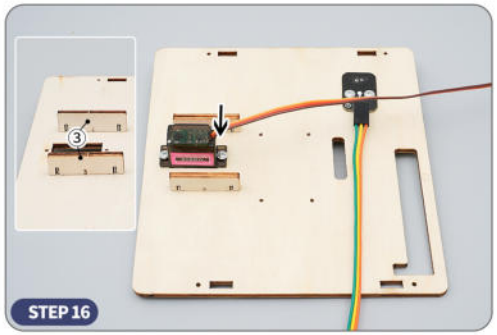


- Install the servo disc on board (10) with 7mm self-tapping screws, and then mount the servo disc on the left arm servo with 5mm servo screws.**Note: Please be sure to install the servo disc (arm) when the power is off, and do not have mechanical resistance such as screwing, breaking, pulling when the servo is powered on, the resistance is greater than the servo torque will be hot and burn the servo.**

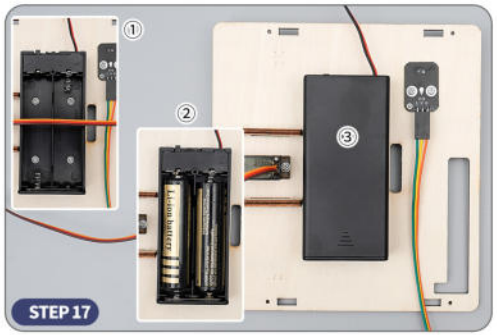
- First install the (5) plate on the (9) board with 7mm rough screws, and pass the servo wire through the wire hole of the (5) board, and then use the 7mm rough screw to install the (8) board on the (4), (7), (5) board, and pass the servo wire through the wire hole of the (5) board.



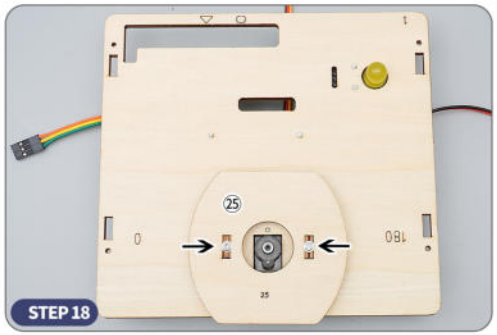
- First plug the 3P DuPont wire terminal into the LED light module, and then use 4mm rough screws to install the LED light module on the back of board (1).



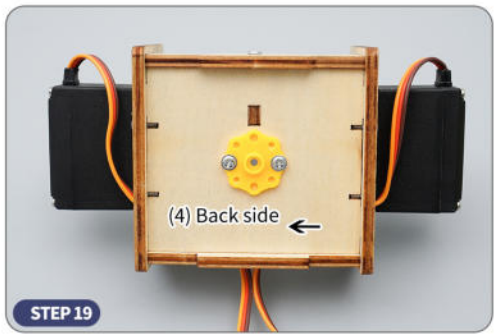
- First use 7mm rough screws to install two (3) plates on the back of (1) plate, and then use 7mm rough screws to install the base servo on the back of (1) plate.



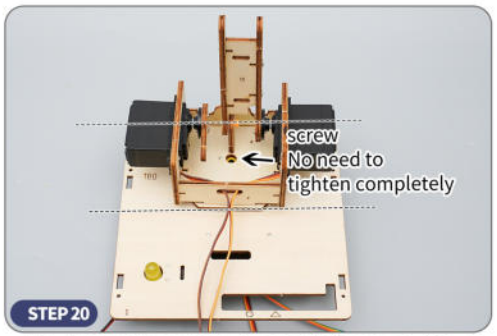
- (1) First use 4mm coarse screws to install the battery box on the back of the (1) plate.
  (2) Then load the battery in the battery compartment.
  (3) Finally, cover the battery compartment cover.



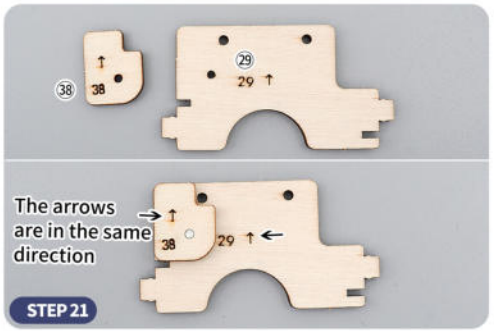
- Install plate (25) on two boards (3) and board (1) with 7mm rough screws.



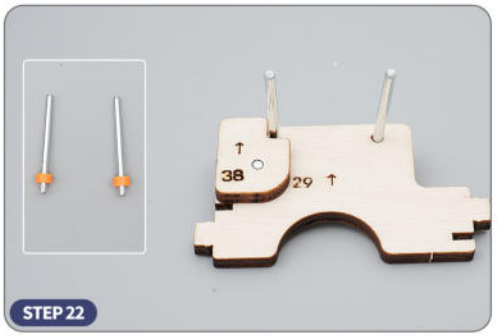
- Install the servo disc on the back of board (4) with 7mm rough screws.



- Use 5mm servo screws to mount the servo disc on board (4) on the base servo.**Note: Please be sure to install the servo disc (arm) when the power is off, and do not have mechanical resistance such as screwing, breaking, pulling when the servo is powered on, the resistance is greater than the servo torque will be hot and burn the servo.**



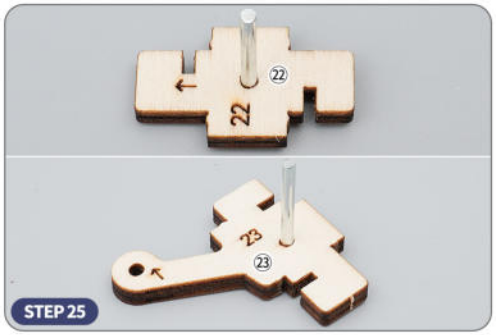
- Install plate 38 on the front of board (29) and secure it from the back of board (29) with 7mm rough grain screws.



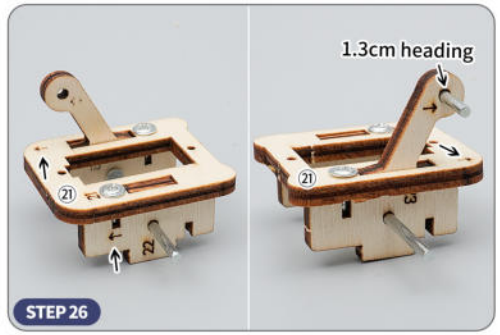
- An orange retaining ring is placed on each of the two 3 cm axes, and then the two 3 cm axes are passed through the holes in plate (29).

- Install the (27) plate on the (26) board with 7mm rough screws.**Note: This is the right gripper.**

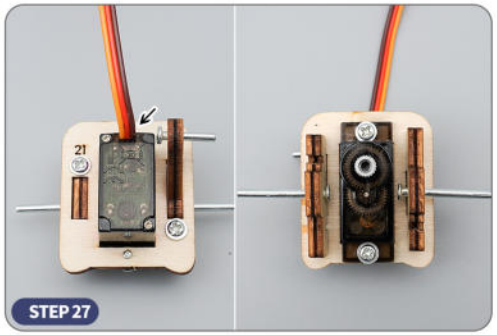
- Plate (28) (left gripper) and (26) and (27) (right gripper) are stacked on board (29) and 38 through two 3cm shafts.



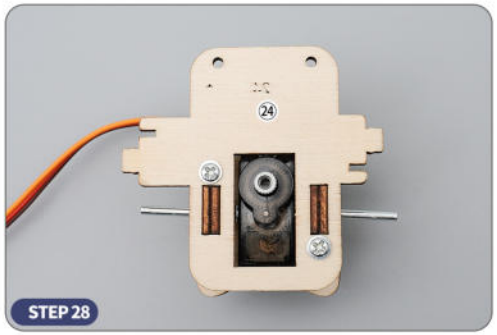
- Pass two 2.1cm headings through plates (22) and (23).



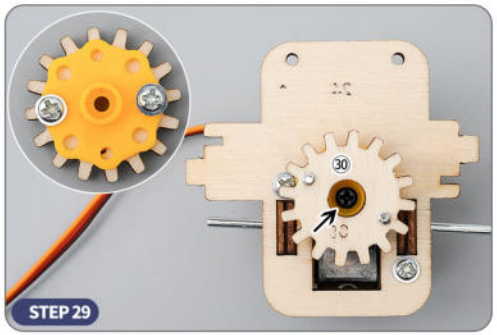
- Install the (22) and (23) plates on the (21) plate with 7mm rough grain screws, and then install a 1.3cm headpin on the (23) board.



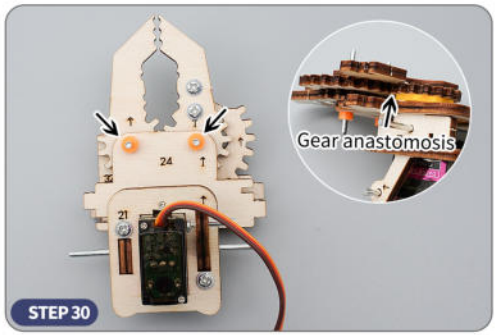
- First load the gripper servo together with the wires from the back of board (21), and then use 7mm coarse grain screws to fix the gripper servo on the back of board (21).



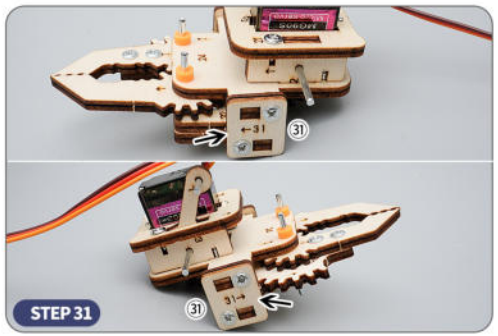
- Install the (24) plate on the (22) and (23) plates with 7mm rough screws.



- First use 7mm rough grain screws to install the servo disc on the (30) plate, and then use 5mm servo screws to install the servo disk on the gripper servo.

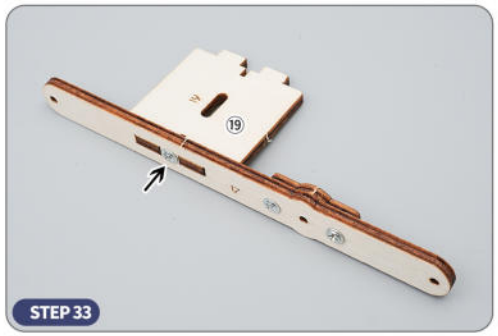


- Pass the (24) plate through two 3 cm shafts and secure it with two orange retaining rings.

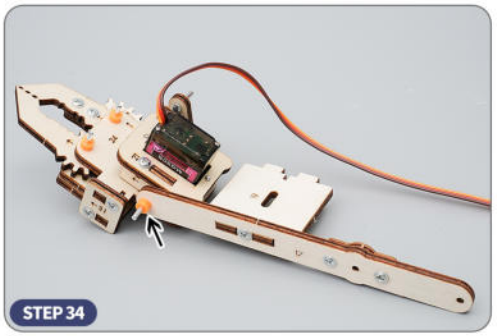


- Install two (31) plates on both sides of (24) and (29) boards with 7mm rough screws.

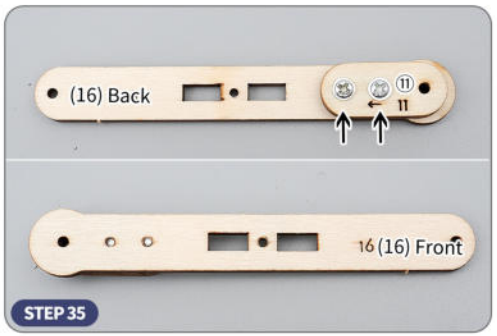
- Install plate (20) on the back of plate (17) with 7mm rough grain screws, and screw in from the front of plate (17).



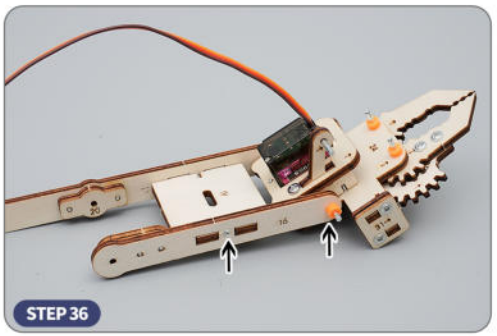
- Install the (19) plate on the back of the (17) plate with 7mm rough grained screws.



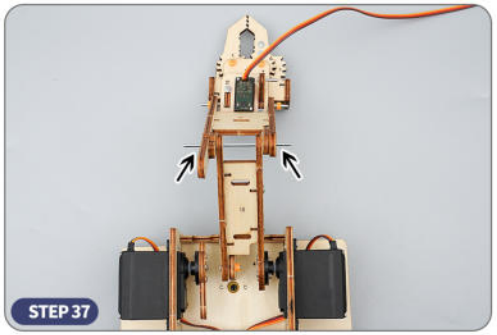
- Pass the (17) plate through the 2.1 cm head-stud and secure it with an orange retaining ring.



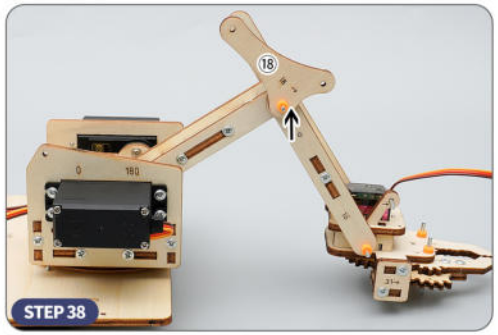
- Install plate (11) on the back of board (16) with 7mm rough grain screws.



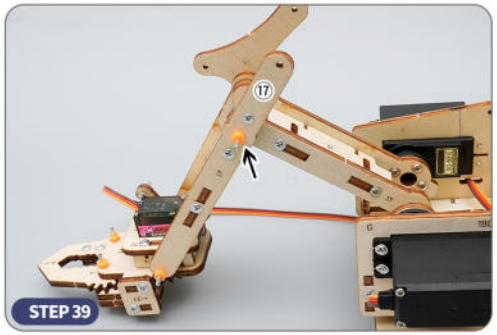
- First install the (16) plate through the 2.1cm headpegs and fix it with an orange retaining ring, and then install the (16) plate with 7mm rough grain screws to install the (19) plate.



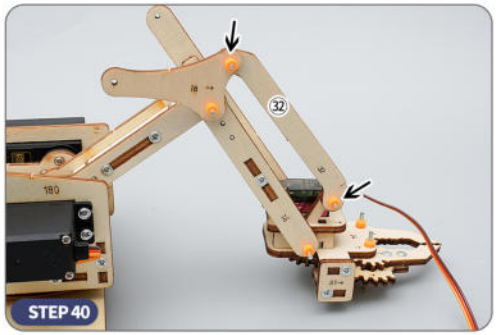
- Use one 6cm shaft to thread the (11), (12), (13), (16), (17), (20) plates together.



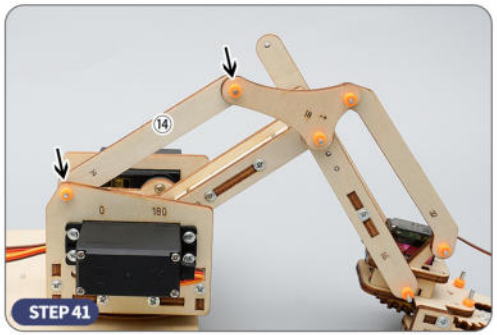
- Board (18) is mounted on board (16) through a 6 cm shaft and secured with an orange retaining ring.



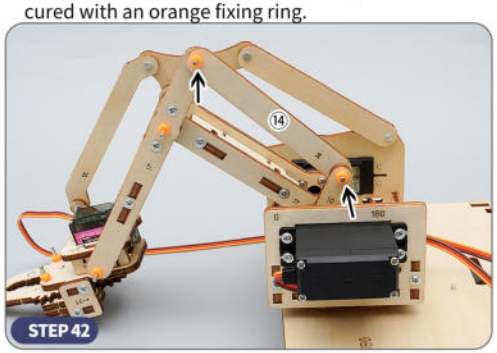
- Secure an orange retaining ring to the 6 cm axis on this side of the (17) plate.



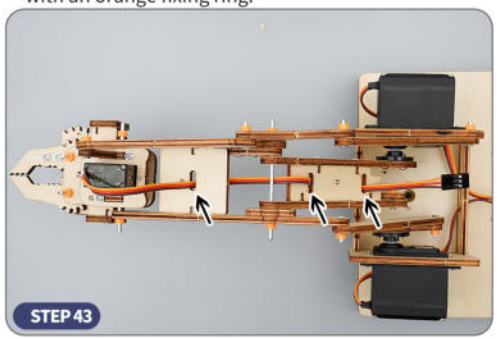
- First the (32) plate is mounted on the 1.3 cm headpeg on the (23) plate and secured with an orange fixing ring, and then the (32) plate and the (18) plate are threaded together with a 1.3 cm headpiece and secured with an orange fixing ring.



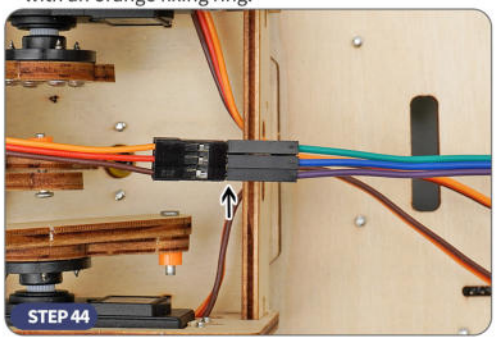
- First thread the (14) plate and the (18) plate together with a 1.3cm headpin and secure it with an orange fixing ring, and then use a 1.3cm headpin to thread the (14) plate and the (9) plate together and secure it with an orange fixing ring.



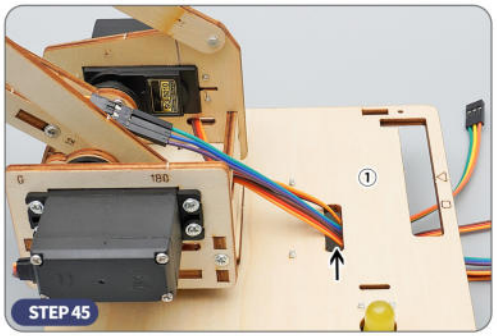
- First use a 1.3cm headpin to thread another (14) plate and (17) plate together and secure it with an orange fixing ring, and then use a 1.3cm headpin to thread the (14) plate and (10) plate together and secure it with an orange fixing ring.



- Pass the wire of the gripper servo through the wire holes of the (19) and (15) plates.

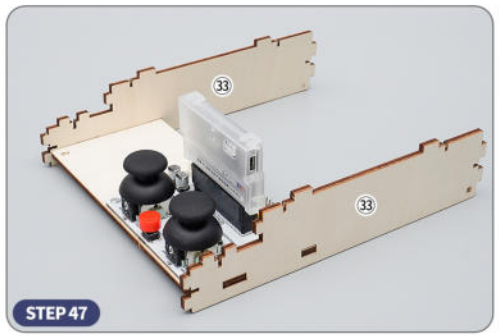


- Plug the 3P male and female DuPont wire into the gripper servo wire port.



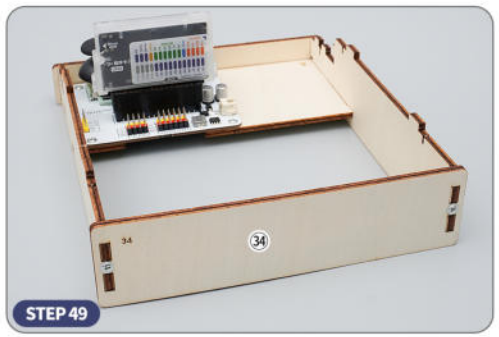
- Thread all wires through the wire holes of plate (1).

- Install the expansion board on board (2) with 4mm rough screws.



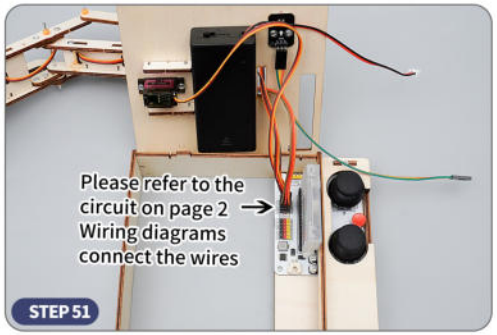
- Install two (33) plates on either side of (2).

- Install the (35) plate on two (33) plates with 7mm rough screws.

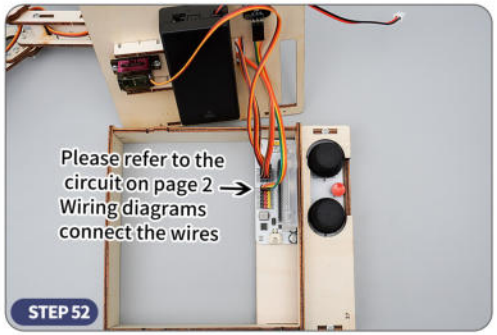


- Install two (33) plates with 7mm rough grained screws to plate (34).

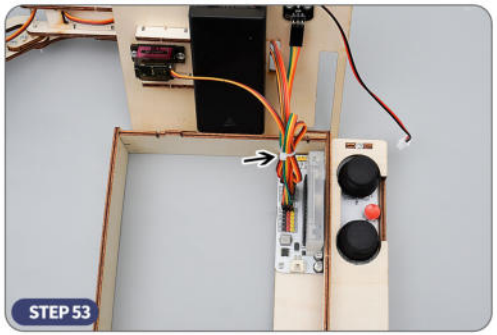
- Install plate 36 on two (33) plates, and then install board 37 on two (33) boards with 7mm rough screws.



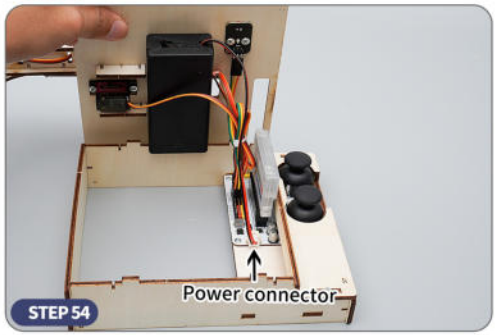
● Refer to [Circuit Wiring Diagram] to plug the four servo wire ports into the D6, D9, D10, and D11 interfaces on the expansion board.**Note: Please check the port order before inserting, the wrong line order may burn the board.**



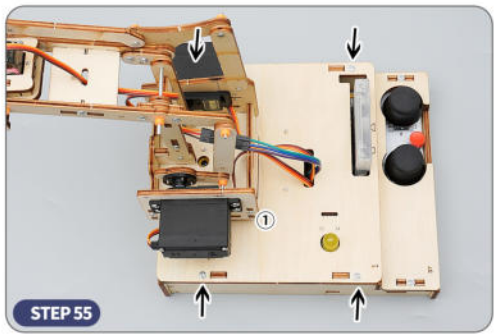
● Refer to [Circuit Wiring Diagram] to plug the wire port of the LED light module into the D8 interface of the expansion board.**Note: Please check the port order before inserting, the wrong line order may burn the board.**



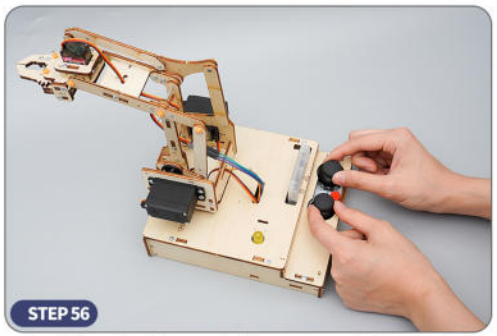
● Tie the servo wire and LED light module wire with a cable tie, and then trim off the excess cable tie with scissors.**Note: When using scissors, handle carefully to avoid injury.**



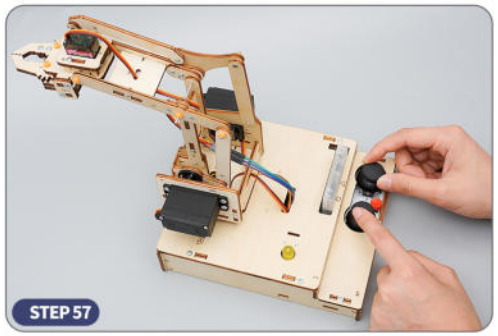
● Refer to [Circuit Wiring Diagram] to plug the battery box wire port into the power interface of the expansion board.



● Install the (1) plate on two (33) plates with 7mm rough screws.



● Joystick manipulator: control the movement of the manipulator ar through the left and right joysticks, the left joystick turns the manip lator arm left, the right pulls the manipulator to turn right, the ba gripper is lifted up, the front gripper is pressed down, the rig joystick is forward-pulling the manipulator arm is extended forwar the back pulling manipulator arm is leaning back, the left gripper opened, the right gripper is closed, the next press is pressed to clo the gripper to open the gripper, the LED light goes out to lock t gripper, and the LED light can control the gripper. **Note: The gripp closed servo is 90 degrees and the opening is 0 degrees.**



● Memory manipulator: control the robotic arm through the remote rod, press the left remote rod when it reaches the designated position, record the grabbing position (the LED light goes out and returns to the solid light to indicate that it has been recorded) and then control the robotic arm through the remote rod, reach another designated position and press the left remote rod, record the placement position (the LED light goes off and returns to the solid light to indicate that it has been recorded) and then automatically ends the recording, the robotic arm automatically resets to the initialized position to automatically execute and cycle the previously recorded actions, press the program card restart button or red button, Stop the automatic cycle (the LED light turns off and returns to solid light and enters manual operation mode).
Note: The gripper is initialized to the open state (0 degrees), the recorded action will disappear after restart or reset, you need to re-record the previous action, do not appear obstruction on the rotation path of the manipulator

After the assembly is completed, you also need to check whether the installation is correct to avoid danger during commissioning!

1. Carefully check whether the whole kit has the wrong accessories, if there are wrong accessories, it will cause the whole kit to not operate normally.
2. Carefully refer to the circuit wiring diagram to check whether the wire connection is correct, the wrong wire connection will lead to a short circuit in the circuit, burn electronic components, and seriously lead to fire, explosion and other dangerous situations.
3. Carefully check whether the pins at the bottom of the circuit board accessories are in contact with other metals, and if there is contact, please check whether the accessories are not installed, resulting in the circuit board and other metals are not isolated.
4. Please check the power supply type and battery model used in this kit, the wrong use of the power supply or battery will cause fire, explosion and other dangerous situations.
5. If you encounter problems that you do not understand, please contact the online customer service of the official service website or find relevant professionals for consultation during working hours from Monday to Saturday 9:00-18:00, do not operate blindly, otherwise there will be danger.

Refer to the procedure below to debug the kit

Download and install the U+ program card driver and install the pro- → Download the sample program to the U+ program card with the data cable. → Insert the U+ program card into the expansion board slot of the kit. → Turn on the kit power switch and the kit starts working.

You may encounter the following problems during debugging, refer to the tips below to see if you can troubleshoot!

1. Check whether the wiring is loose or incorrectly connected, please refer to the circuit wiring diagram for details.
2. Check whether the battery has run out of power, it is recommended to replace the new battery.
3. Check whether the DuPont wire of the sensor and the expansion board is connected correctly, please refer to the circuit wiring diagram.
4. Check whether the U+ PROGRAM CARD program card has downloaded the program.
5. Check whether the U+ PROGRAM CARD program card is plugged in backwards, which will cause a short circuit, please refer to the [STEP4] card insertion method for inserting the card.