HS-BOI Smart Fan Learning Kit Assembly Manual

This product must be used with (U+ PROGRAM CARD)

U+ PROGRAM CARD SUPPORT ARDUINO IDE, PROGRAMMING SOFTWARE SUCH AS MIXLY, ARDUBLOCK, SCRATCH, ETC

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!

Product Introduction

Smart fan is an intelligent kit composed of motor drive module, 130 motor, servo, infrared receiving module, ultrasonic module, four-digit clock digital tube and other accessories.

This kit can realize ultrasonic speed control moving head fan, infrared remote control speed control moving head fan, one-key shift fan and other functions.

You can also modify the sample program through programming software such as Arduino IDE, Mixly or write a new program yourself to control the smart fan.

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

Security warnings ⚠

1. This product is a teaching and experimental product, please do not use its function as a daily necessities, there will be instability.
2. When you do not use this product, please turn off the power switch on the battery box and remove the battery, and keep the battery properly.

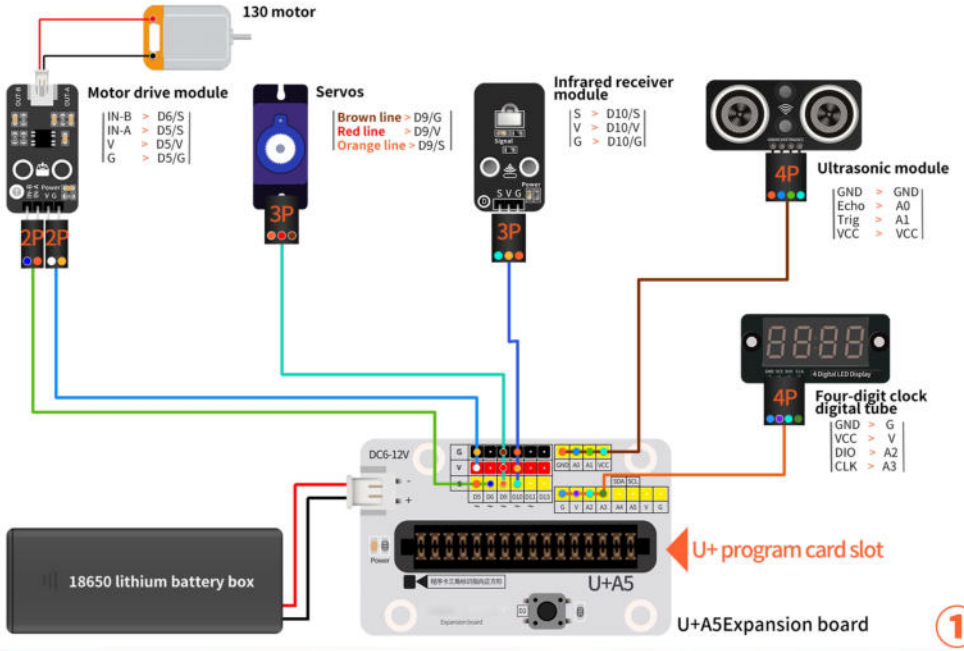
List of experimental materials

The materials provided by yourself are not the materials in this product kit, and you need to equip yourself

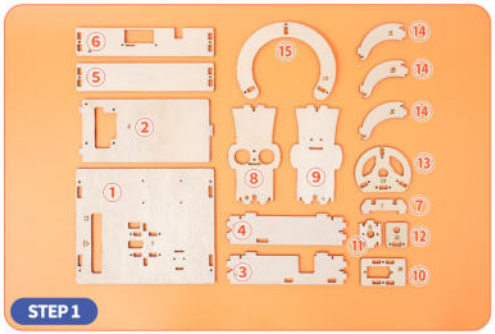
	name		Image		name		Image		name		Image
1	micro usb (Owned)	1*		2	U+progamcard (Owned)	1*		3	18650 lithium battery (Owned)	2*	
4	Infrared receiver module + 18650 Lithium battery case	1* 1*		5	Four-leaf fan blades + remote control	1* 1*		6	U+A5 Expansion board	1*	
7	Four-digit clock Nixie tube (TM1637) + Ultrasonic module	1* 1*		8	Servo disc + 9G servo + Cable ties	1* 1* 1*		9	Motor drive module + 130 motor	1* 1*	
10	Press the cap with the key + 4mm Coarse screws + 7mm Coarse screws	1* 16* 29*		11	Main structural panel	1*		12	2PDuPont Line (20cm) + 3PDuPont Line (15cm) + 4PDuPont Line (15cm)	2* 1* 2*	

Circuit wiring diagram

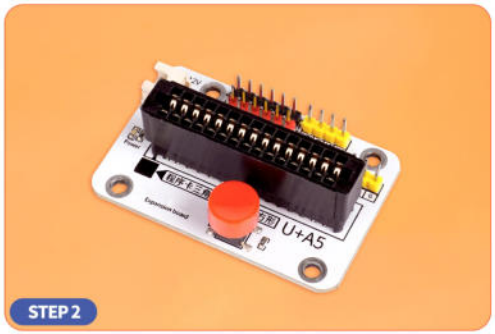
DuPont line color random distribution, line connection please refer to the corresponding identification information of the entrance!



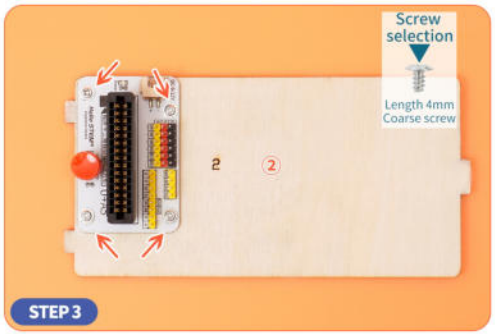
Start assembling



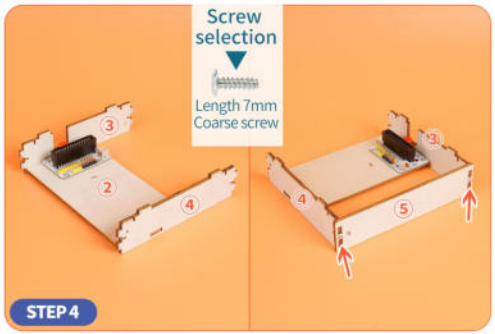
- Prepare all accessories and wood materials, and carefully check the number on the materials when assembling the wood materials.**(The planks have a number side as the front side and no number as the reverse side)**



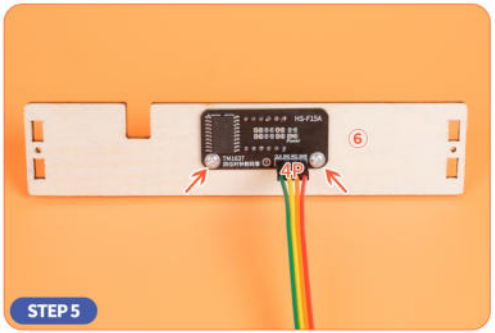
- Install the red keycap on the U+A5 expansion board.



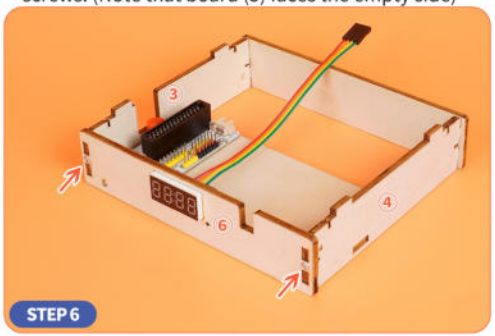
- Secure the U+A5 expansion board with 4mm rough screws on the side of board (2) that has numbers.**(Note that the expansion plate holes of plate (2) are aligned)**



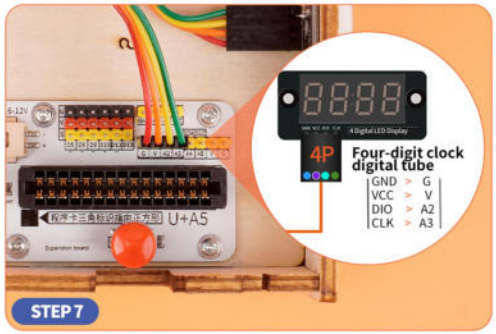
- Snap the numbers of boards (3) and (4) into both sides of board (2) respectively with the digital side facing outwards (note that board (3) is on the side of the expansion board), and then install board (5) on one side of board (3) and (4) and fix it with 7mm rough screws. (Note that board (5) faces the empty side)



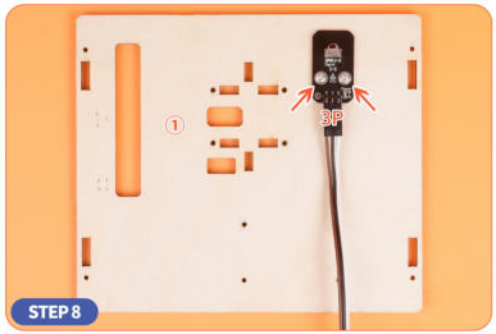
- Install the four-digit clock digital tube on the side of board (6) without numbers, and fix it with 4mm rough screws, and finally insert the 4P DuPont cable port into the [GND, VCC, DIO, CLK] of the four-digit clock digital tube.



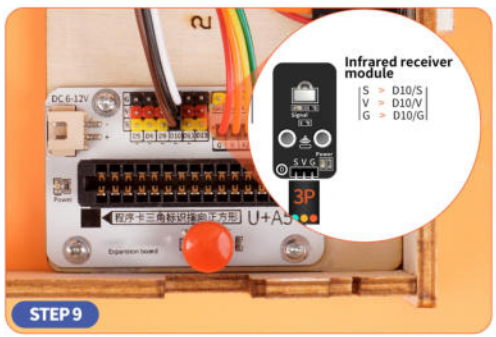
- Install plate (6) on the other side of board (3) and (4) and secure it with 7mm rough grain screws.**(Note the orientation of the installation)**



- Refer to [Circuit Wiring Diagram] Plug the DuPont cable port of the four-digit clock digital tube into the [G, V, A2, A3] interface on the expansion board.**(Please check the port order before inserting, the wrong insertion of the wire order may burn the board)**

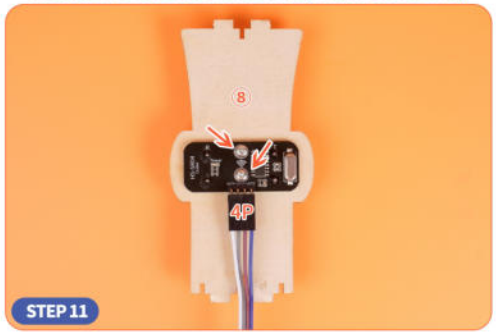


- Referring to the above figure, install the infrared receiver module on the back of board (1), fix it with 4mm rough screws, and finally insert the 3P DuPont line port into the [S, V, G] of the infrared receiver module.

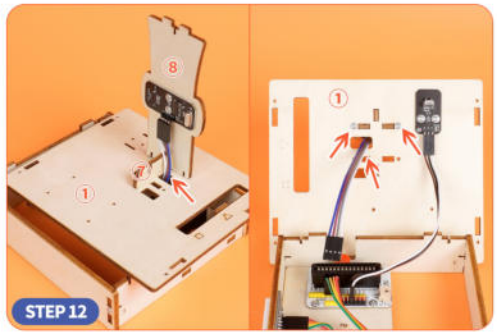


- Refer to [Circuit Wiring Diagram] to plug the DuPont cable port of the infrared receiver module into the [D10] interface on the expansion board.**(Please check the port order before inserting, the wrong insertion of the wire order may burn the board)**

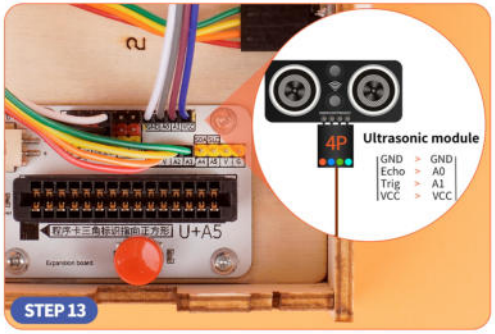
- Refer to the picture above, install plate (7) on the front of board (1).



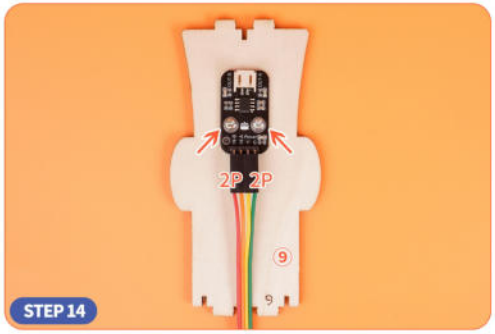
- Install the ultrasonic module on the back of board (8), fix it with 4mm rough screws, and finally insert the 4P DuPont cable port into the [GND, Echo, Trig, VCC] of the ultrasonic module.



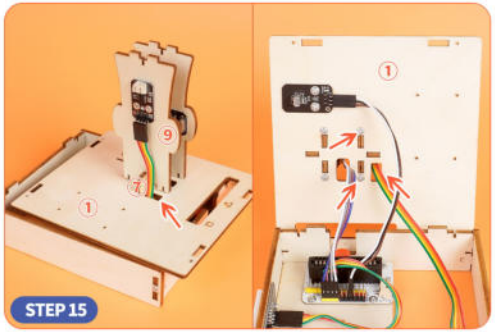
- First, pass the DuPont wire of the ultrasonic module through the wire hole, and then snap the front of board (8) towards board (6), snap it into the hole position of board (7), and install it on board (1), and fix it with 7mm coarse screws on the back of board (1).**(Note the orientation of the installation)**



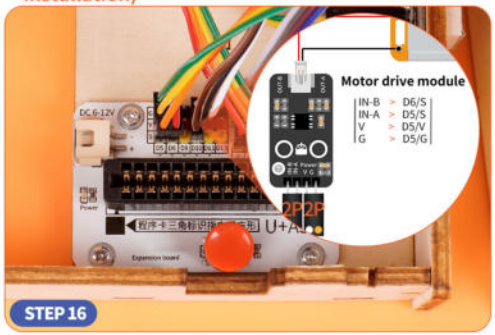
- Refer to [Circuit Wiring Diagram] Plug the DuPont cable port of the ultrasonic module into the [GND, A0, A1, VCC] interface on the expansion board.**(Please check the port order before inserting, the wrong insertion of the wire order may burn the board)**



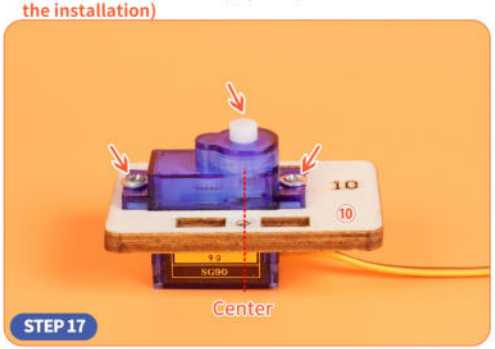
- Referring to the figure above, insert two 2P DuPont wire ports into the [IN-B, IN-A], [V, G] of the motor drive module, and then install the motor drive module on the front of the (9) board and fix it with 4mm rough screws.**(Note the orientation of the installation)**



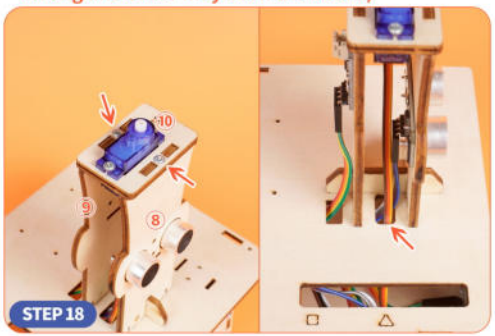
- Referring to the above figure, first pass the DuPont wire of the motor drive module through the wire hole, and then snap the (9) plate face outward into the hole position of the (7) plate, install it on the (1) plate, and fix it with 7mm rough screws on the back of the (1) plate.**(Note the orientation of the installation)**



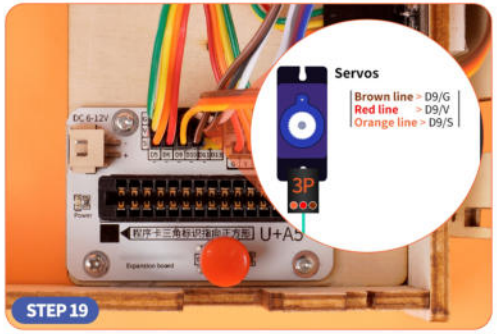
- Refer to [Circuit Wiring Diagram] Plug the two DuPont cable ports of the motor drive module into the [D6/S, D5/S] [D5/V, D5/G] interfaces on the expansion board. **(Please check the port order before inserting, the wrong line order may burn the board)**



- First pass the servo wire through the (10) plate, then install the servo head facing up, from top to bottom on the digital face of the (10) board, and fix it with 7mm coarse screws.**(Note that the servo is centered on board (10)**



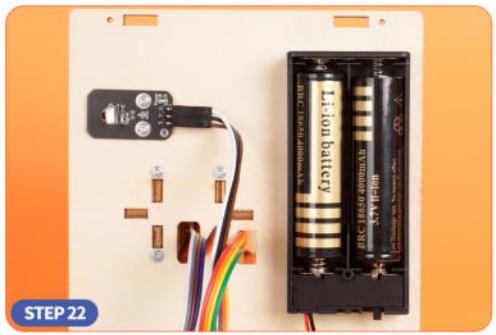
- Install the STEP 17 mounted servo module on boards (8) and (9), fix it with 7mm rough screws, and finally thread the servo wire through the wire hole.**(Note the orientation of the installation)**



- Refer to [Circuit Wiring Diagram] to plug the servo wire port into the [D9] interface on the expansion board.**(Please check the port order before inserting, the wrong insertion of the wire order may burn the board)**

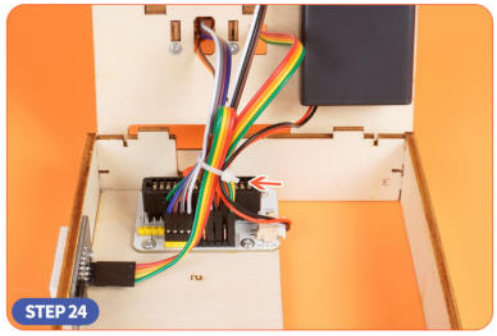
- Install the battery compartment on the back of plate (1) and secure it with 4mm rough screws.**(Note the orientation of the installation)**

- Refer to [Circuit Wiring Diagram] to insert the battery box wire port into the [DC 6-12V] power interface on the expansion board.

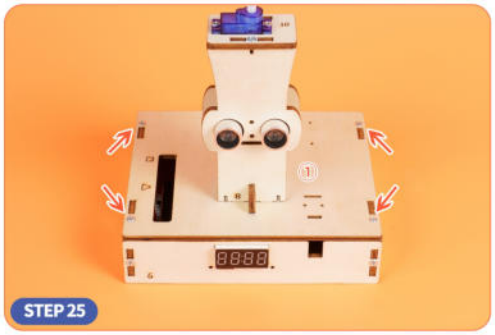


- Load the 18650 battery into the battery compartment.

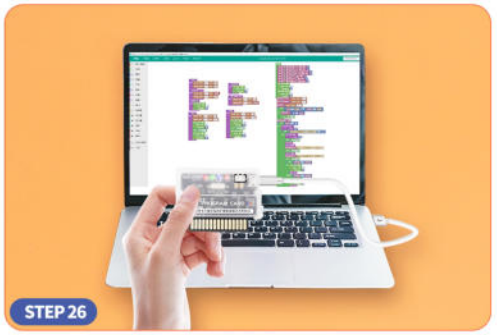
- Refer to the above figure, install the battery compartment cover and turn on the power, the power switch is on the side with the wire, [ON means the power is on, OFF means the power is off].
(This step of powering up is to bring the servo back to right)



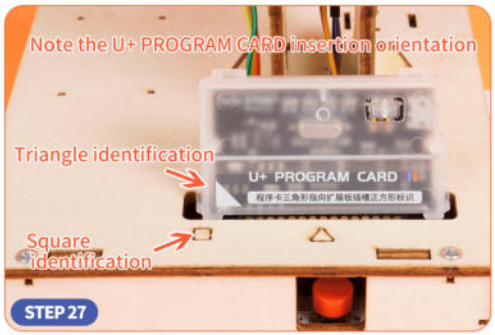
- Refer to the picture above, comb all the wires and tie the cable ties, and then trim the excess cable ties with scissors.**(Note: Be safe when using scissors to avoid injury)**



- Flip plate (1) into the front, align and mount on board (3) and (4), and secure it with 7mm rough screws.



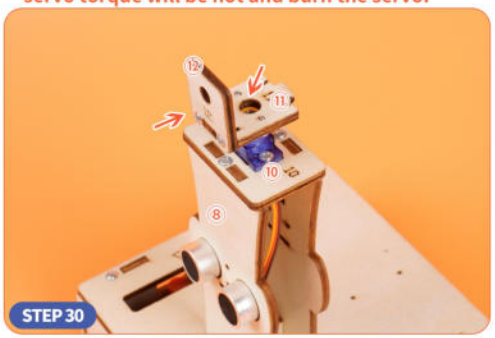
- Use the Mixly software to upload the first sample program of the kit to the U+ program card.



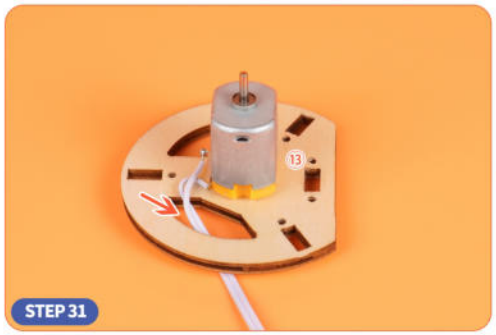
- Insert the program card into the card slot on the expansion board.(Note the program card insertion direction, the program card triangle identification points to the expansion board slot square identification)

- Turn off the power by pulling the switch in the direction of OFF.**Note: Please install the servo disc when the power is off, do not have mechanical resistance (such as screw tightening, breaking) when the servo is powered on, the resistance is greater than the servo torque will be hot and burn the servo.**

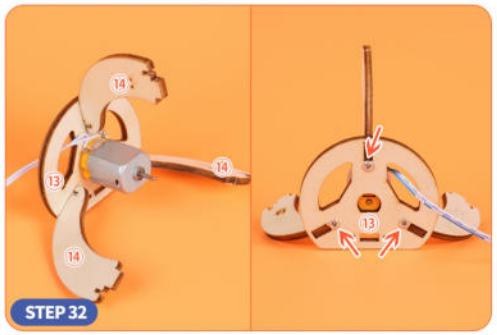
- First, install the servo disc protrusion facing on the (11) plate and fix it with 7mm rough screws, and then install the (12) plate on the (11) board and fix it with 7mm rough screws.**(Note the orientation of the installation)**



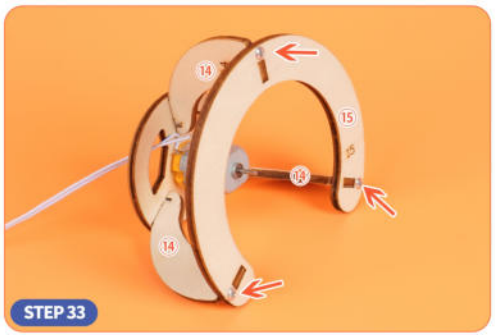
- The assembled modules of the STEP 29 are mounted on the servo of board (10) and fixed with 7mm rough screws.**(Note that plate (12) is oriented towards board (8), and do not turn the servo during installation)**



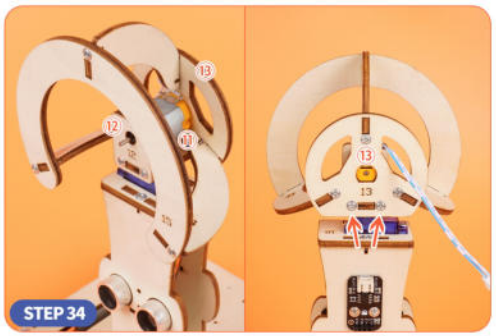
- Snap the bottom of the 130 motor into the (13) plate and thread the wire through the wire hole.



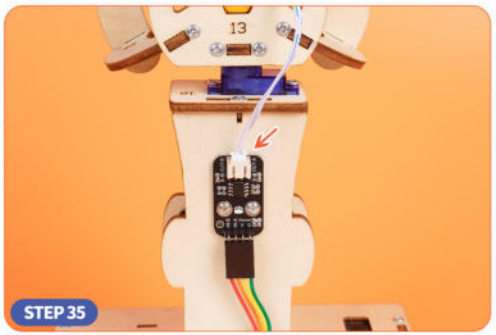
- Install three (14) plates on board (13) and secure them with 7mm rough screws on the back of board (13).



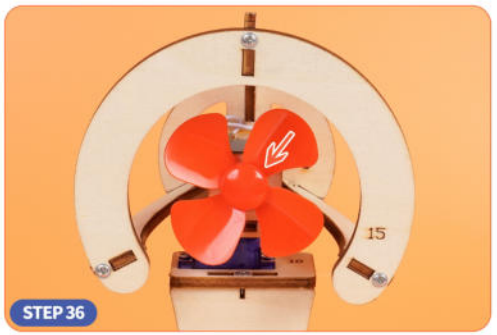
- Align the (15) plate on three (14) plates and secure it with 7mm rough screws.



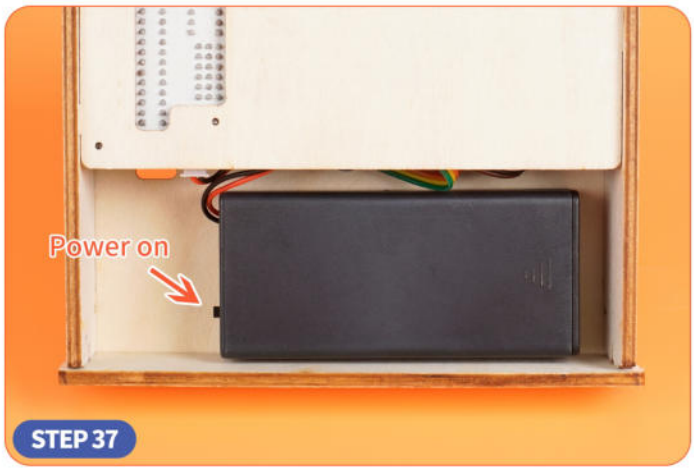
- The 130 motor and the (13) board are mounted on the (12) and (11) boards respectively and fixed with 7mm rough screws.



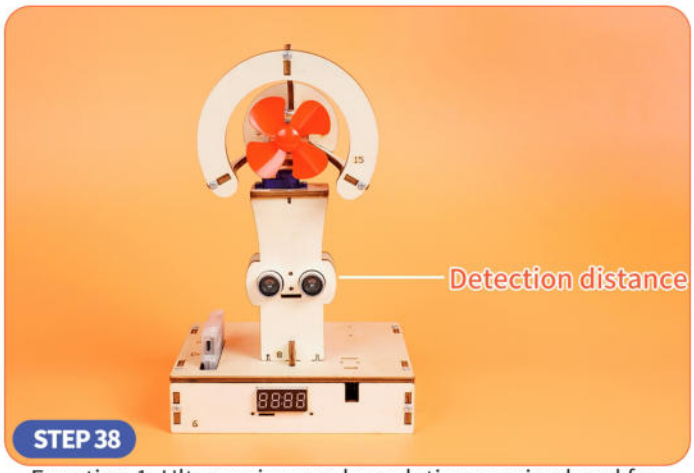
- Plug the lead port of the 130 motor into the port of the motor drive module.



- Install the four-bladed fan blades on the shaft of the 130 motor.

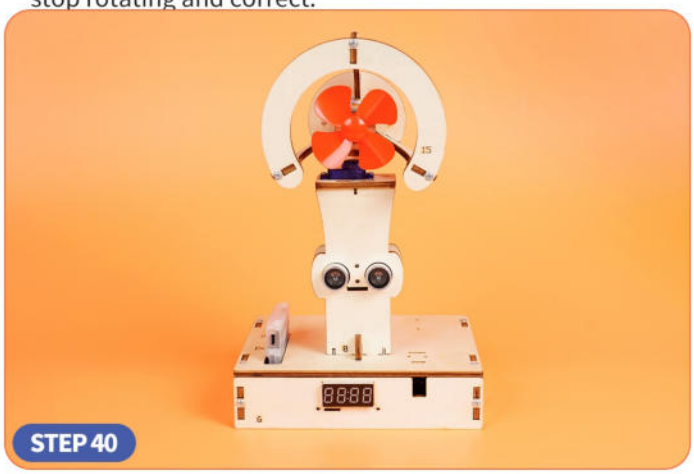


- Turn on the power switch, the power switch is on the side with the wire, [ON means power on, OFF means power off].



- Function 1: Ultrasonic speed regulation moving head fan
  Expansion board button control shaking head; Ultrasonic control of wind speed, with the detection distance is smaller, the wind speed is smaller; With the greater the detection distance, the wind speed increases; When the detection distance exceeds 60cm, the fan stops, press the expansion board button to shake the head, and beyond 60cm it will stop rotating and correct.

- Function 2: Infrared remote control speed control moving head fan
  The infrared remote control buttons are "A" start and stop 130 motor, "C" moving head servo start and stop, "<" servo to turn left (angle decreased), ">" servo to turn right (angle increase), "∧" motor speed increases, "∨" motor speed decreases Small.



- Function 3: One-key shift fan
  Each time you press the Red Hat button on the expansion board, you can switch between three wind speeds, and the number of gears will be displayed on the digital display when you change gears.

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 following procedure to debug and experiment with the kit

Download and install the U+ program card driver and install the programming software. → Download the sample program to the U+ program card with a data cable. → Insert the program card into the U+ program card 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!

The Smart Fan does not work after the installation is complete.

1. Check whether the wiring is loose and wrong, 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 downloads the program.
5. Check whether the U+ program card is plugged inversely, if the program card indicator light is not light or dim, please pull it out immediately, plugging in the reverse will cause a short circuit, please refer to the card insertion method of STEP 27 for inserting the card.