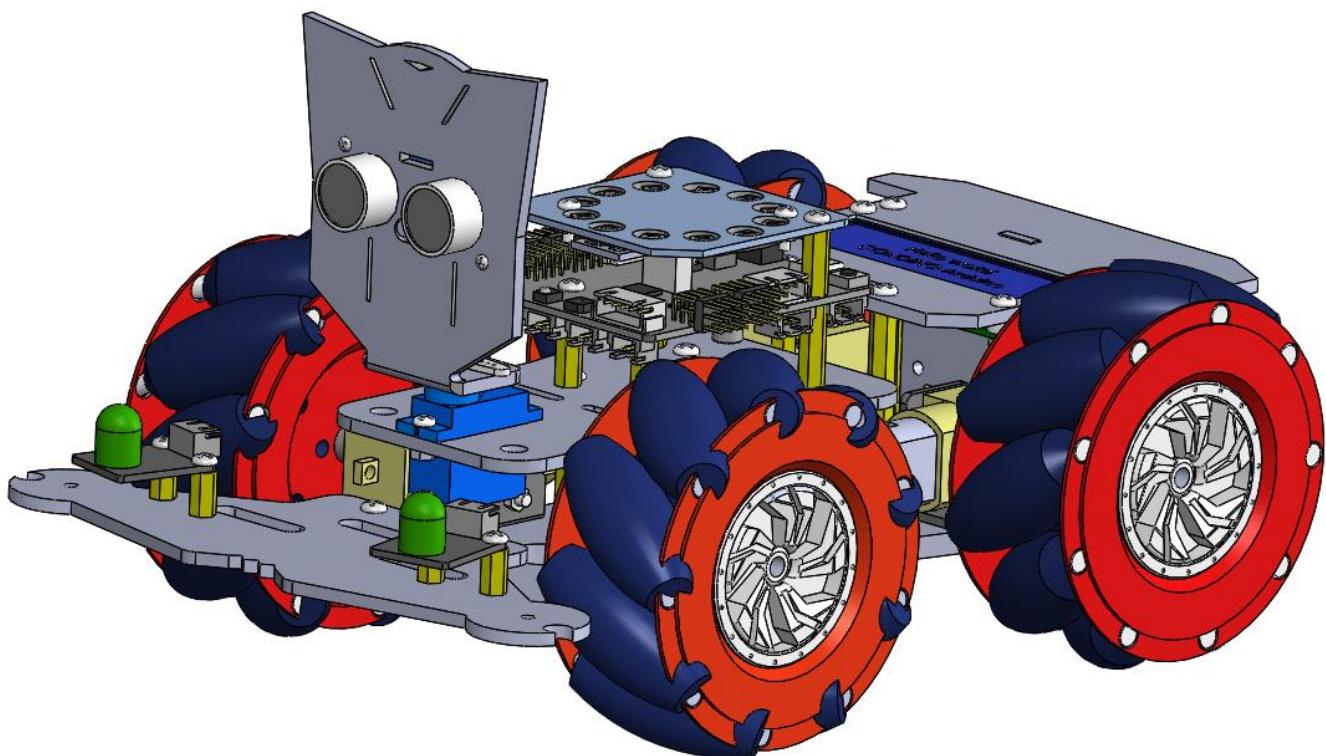


Lesson 12 Assemble the 4WD Smart Mecanum Robot Car

Table

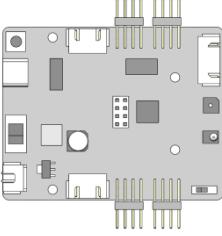
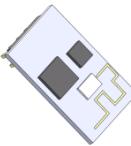
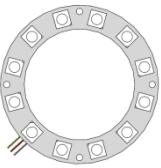
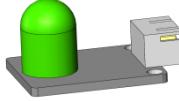
1	1. What's in the package.....	2
	2. Precautions for assembly	8
	3. Suggestions for purchasing 18650 batteries:	9
	4. Assembly	9
	5. Circuit diagram:	44



1. What's in the package

1.1 Electronic module

2

Picture	Category	Name	Quantity
	Controller	LK COKOINO Control Board	1
	Module	I2C LCD1602 Display	1
	Module	SR-04 Ultrasonic Module	1
	Module	Line tracking module	1
	Module	ESP-01 Module	1
	Module	SW2812 LDE Module	1
	Module	10mm LED	2

1.2 Parts used to connect or fix

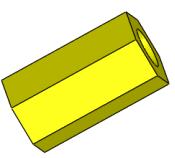
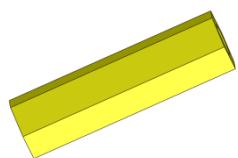
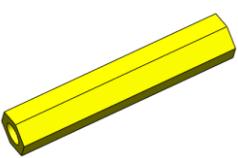
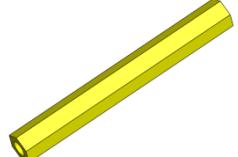
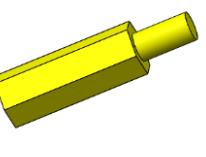
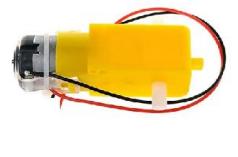
3

Picture	Category	Name	Quantity
	Screw	P1.2*5 self-tapping screw	8
	Screw	M1.6*10 round head screw	4
	Screw	M1.6 nut	4
	Screw	M2*8 round head screw	6
	Screw	M2 nut	6
	nylon washer	M3*3mm nylon washer	8
	Screw	M3*6MM round head screw	10

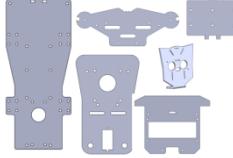
4

	Screw	M3*25 round head screw	9
	Screw	M3*14 countersunk head screw	3
	Screw	M3*8 countersunk head screw	3
	Nut	M3 self-locking nut	10
	Screw	M3*10MM round head screw	36
	Screw	M3*8MM round head screw	10
	Screw	M3 Nut	18

5

	copper pillar	M3*10 double-pass copper column	8
	copper pillar	M3*20 double-pass copper column	4
	copper pillar	M3*30 double-pass copper column	4
	copper pillar	M3*45 double-pass copper column	4
	copper pillar	M3*15+6 single-pass copper column	3
	Battery case	18650 battery box	1
	TT motor	Biaxial reduction ratio 1:48	4

6

	Servo	SG90 servo	1
	Wheel	80MM Red Mecanum Wheel R	2
	Wheel	80MM Red Mecanum Wheel L	2
	Bracket	TT Motor metal bracket	4
	remote control	Infrared remote control	1
	structural parts	Acrylic structural parts	1

1.3 Tool

Picture	Category	Name	Quantity

	wrench	M3 sample wrench	1
	screwdriver	M3 Phillips screwdriver	1
	screwdriver	M1.5 Phillips screwdriver	1

1.4 Wire

Picture	Category	Name	Quantity
	Wire	5Pin-150MM for line tracking module	1
	Wire	4Pin-180MM for LCD display	1
	Wire	4Pin-130MM for Ultrasonic module	1
	Wire	3Pin-145MM for LED module	2
	ribbon	150mm ribbon	3

	USB	White type-C 2A USB cable	1
---	-----	---------------------------	---

2. Precautions for assembly

8

2.1 Before assembly, turn the power switch on the control board to OFF, and turn the ESP-01 switch to the side away from the "ESP-01" silk screen

2.2 Before assembling the servo to the car frame, please make sure that the servo has been adjusted to 65 degrees.

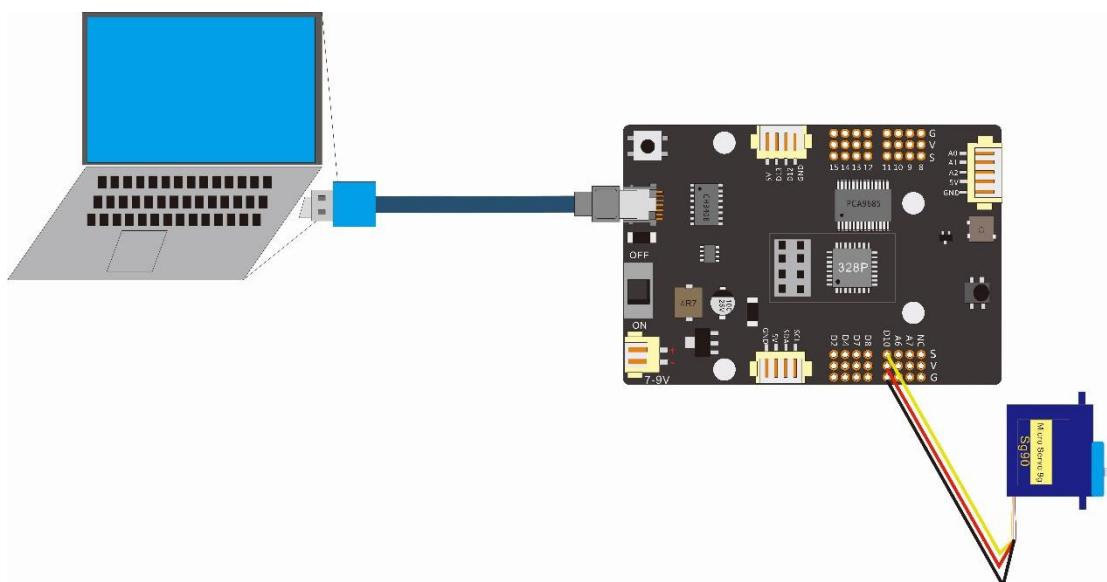
The code is placed in this folder:

E:\CKK00014-main\Tutorial\sketches\Servo_65_ADJ

Code:

```
#include<Servo.h>
Servo myservo; // Create a servo class

void setup() {
  myservo.attach(10); //Set the servo control pin as D10
  delay(100); //delay 100ms
}
///////////
void loop() {
  myservo.write(65); //The servo is 65 degrees
  delay(1000);
}
```



Support email:cokoino@outlook.com

Wiring between the servo and the control board	
Connector of the Servo	Connector of the control board
+	5V
-	GND
Signal	D10

9

- 2.3 Please use the screw type in strict accordance with the requirements of the assembly document
- 2.4 The battery case for two 18650 batteries is provided in the Smart Robot car kit, but the 18650 batteries is not provided. You need to prepare two 18650 batteries with enough power by yourself.

3. Suggestions for purchasing 18650 batteries:

18mm in diameter, 65mm in length;

Cylindrical battery with a top;

Rechargeable;

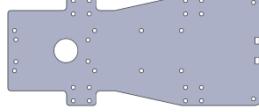
Voltage 3.7V, charging termination voltage 4.2V;

Capacity 1500mAh--3000mAh.

4. Assembly

4.1 Assembly Steps

Note: 1. Before assembling, we need to use a screwdriver to peel off the yellow protective paper of the black acrylic board;

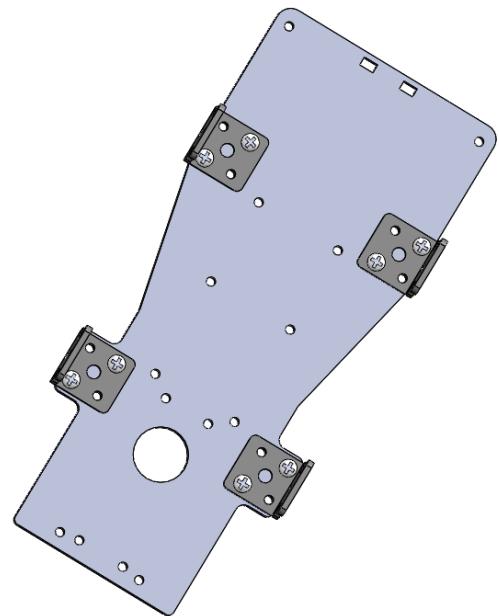
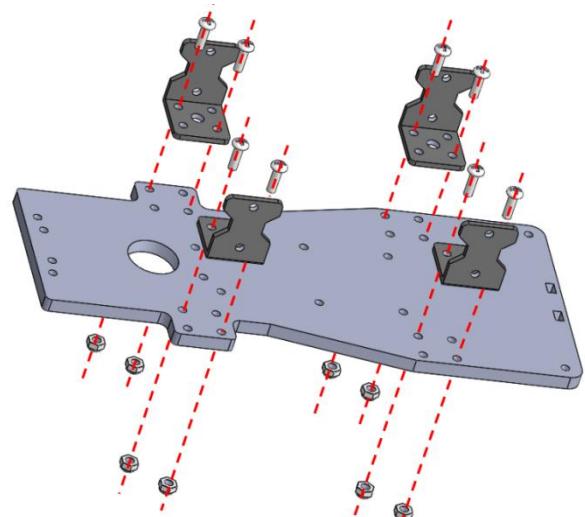
10	Step 1	Installation of motor bracket and structure A	Tool	M3 Phillips screwdriver
				
Parts List	Name	Quantity	Unit	Picture
	structure A	1	PCS	
	motor bracket	4	PCS	
	M3 self-locking nut	8	PCS	
M3*10 round head screw	8	PCS		
Detailed steps	Description		Installation Diagram	

11

A

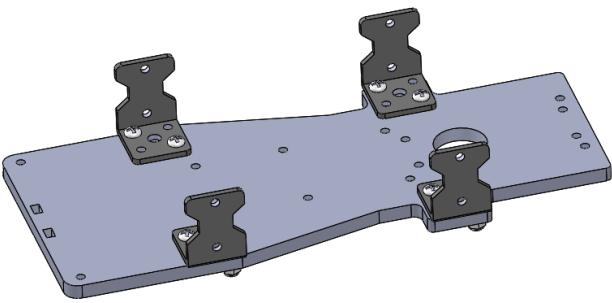
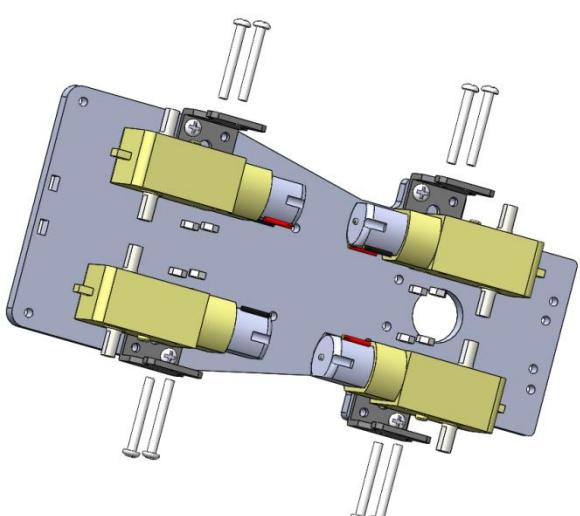
1. Fix the bracket to structural component A using M3 * 10 round head screws and M3 self-locking nuts.

Note : Assemble direction of the bracket

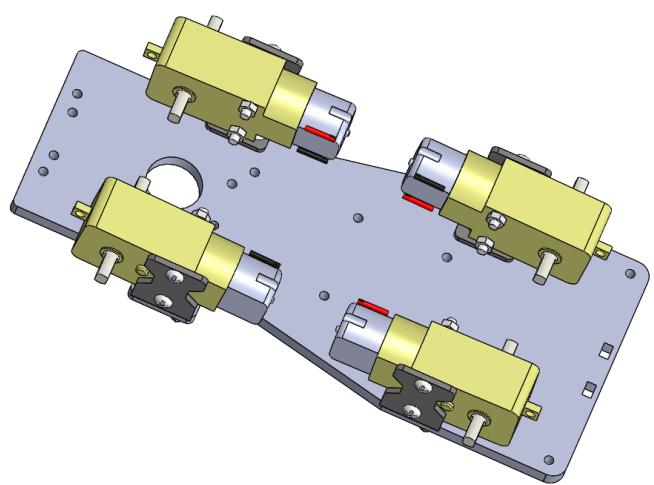


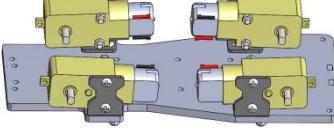
Step 2		Assemble the TT Motor		Tool	M3 Phillips screwdriver
Part list	Name	Quantity	Unit	Picture	
					

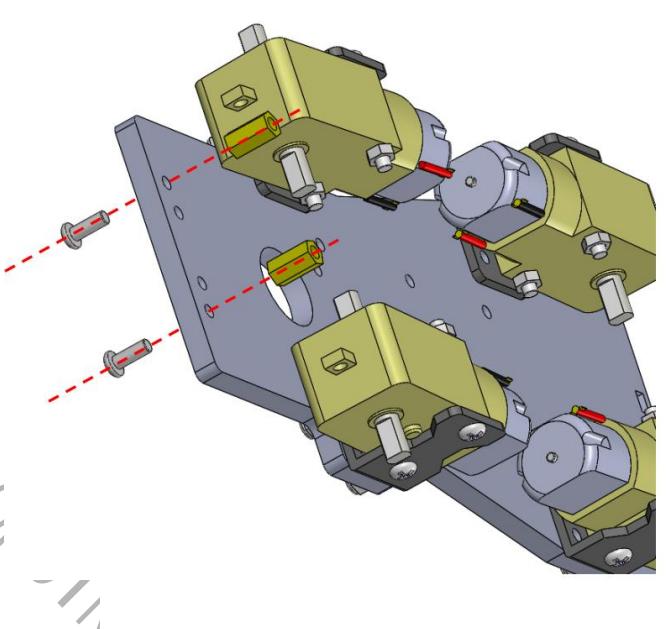
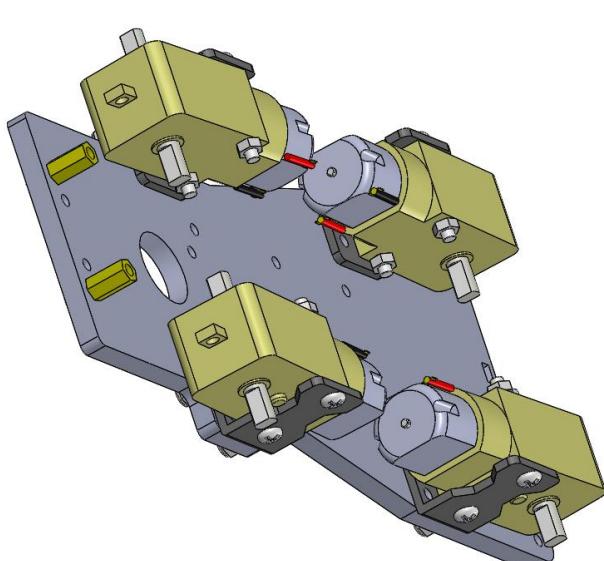
12

	step 1 structure	1	PCS	
	TT motor	4	PCS	
	M3 screw	8	PCS	
	M3*25 round head screw	8	PCS	
Detailed steps	Description			Installation Diagram
A	<p>1. Installation direction of the bracket: 1. Use M3 * 25MM round head screws and M3 nuts to fix the TT motor onto the motor bracket in sequence;</p> <p>Note: Installation direction of the TT motors</p>			

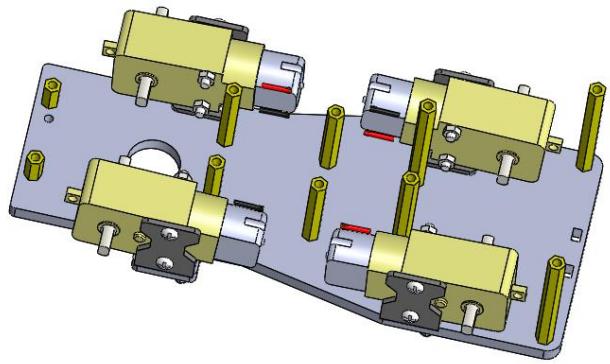
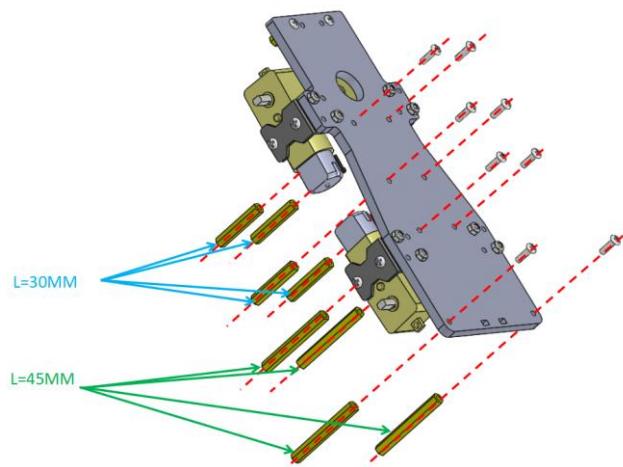
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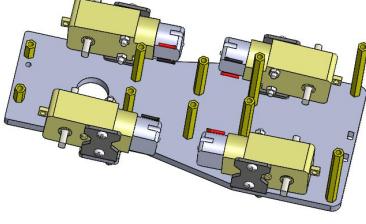
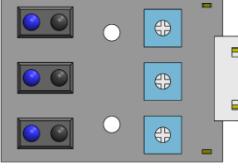


Step 3			Assemble the copper pillar	Tool	M3 Phillips screwdriver
Part list	Name	Quantity	Unit	Picture	
	step 2 structure	1	PCS		
	M3*10 double pass copper pillar	2	PCS		
	M3*45 double pass copper pillar	4	PCS		
	M3*10 round head screw	8	PCS		
	M3*8 round head screw	2	PCS		

	M3*30 double pass copper pillar	4	PCS	
Detailed steps	Description		Installation Diagram	
14 A	<p>1. Use M3 * 8 round head screws to fix the M3 * 10 copper column on structural component A;</p> <p>2. Use M3 * 10 round head screws to fix M3 * 45 copper columns and M3 * 30 copper columns to structural component A in sequence;</p> <p>Attention: Installation direction of copper columns</p>			

15



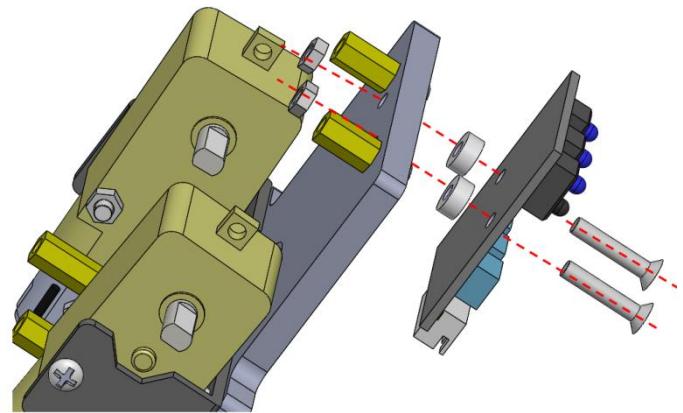
Step 4		Assemble the line tracking module		Tool	M3 Phillips screwdriver
					
Part list	Name	Quantity	Unit	Picture	
	Step 3 structure	1	PCS		
	Line tracking module	1	PCS		
	M3*14 Countersunk screw	2	PCS		
	M3 nut	2	PCS		
	M3 nylon washer	2	PCS		
	150MM 5PIN Wire	1	PCS		
Detailed steps	Description			Installation Diagram	

16

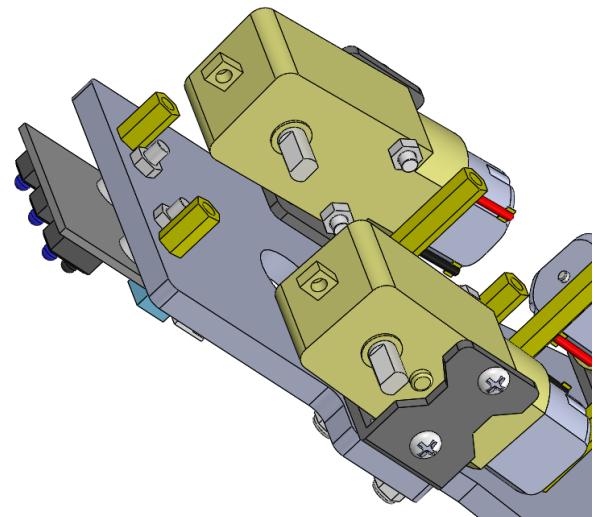
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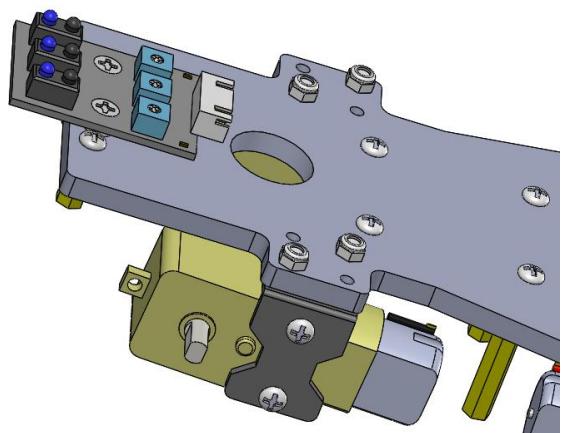
1. Use M3 * 14 countersunk screws and M3 nuts to fix the M3 nylon washer and line tracking module to structural component A (pay attention to the installation direction of the line tracking module);

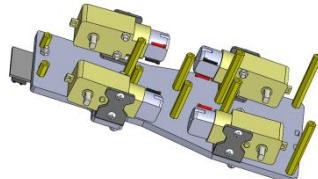
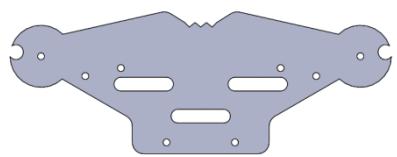
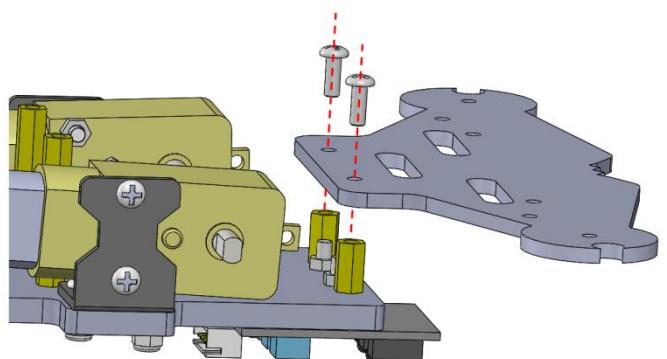


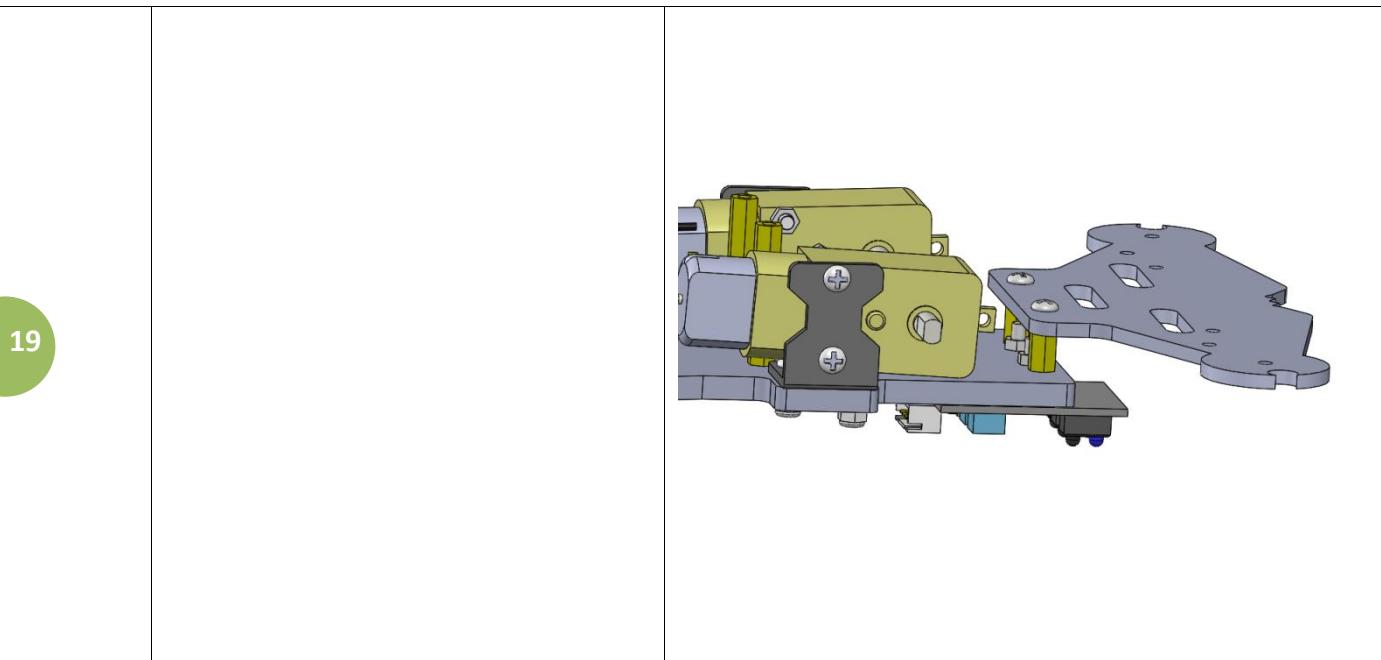
2. Install the 5 Pin wire connector on the line tracking module and thread the other end of the connector through the circular hole on structure A; (picture committed)



Note: The black line of the connecting wire corresponds to the GND of the line tracking module

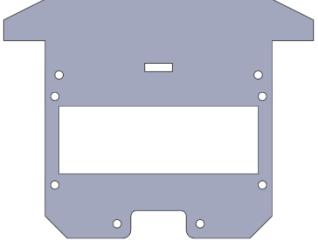
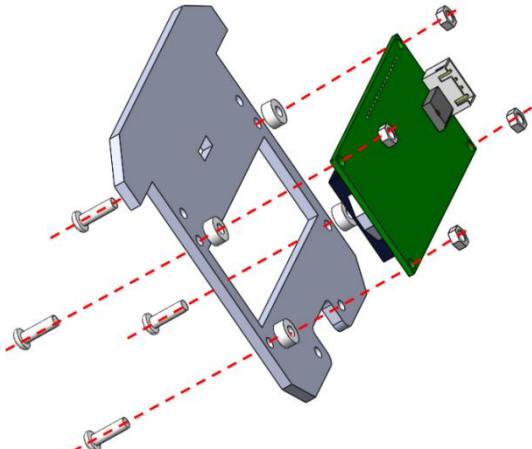


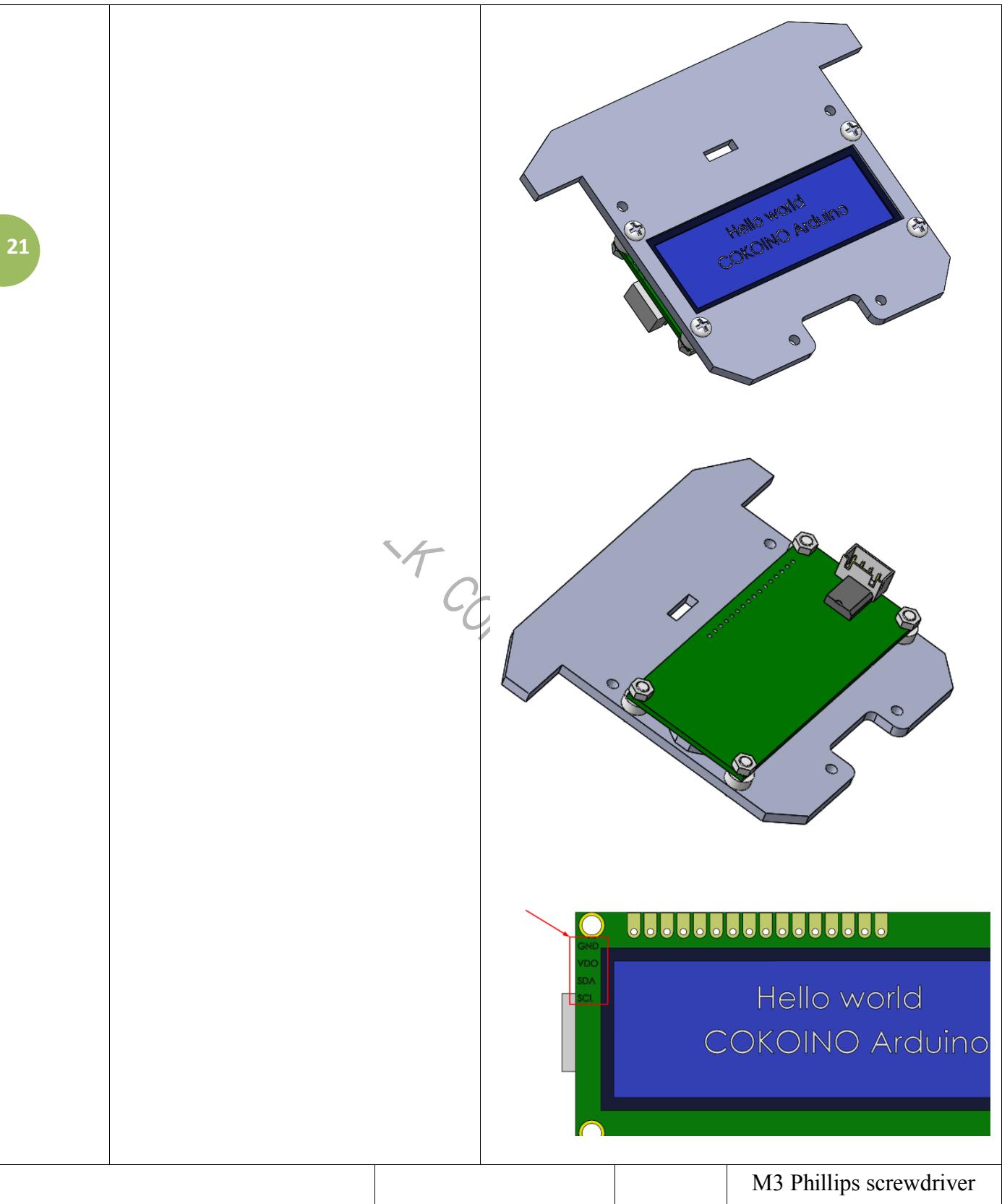
Step 5		Assemble the structural component B		Tool	M3 Phillips screwdriver		
Part list	Name	Quantity	Unit	Picture			
	step 4 structure	1	PCS				
	structural component B	1	PCS				
	M3*8 round head screw	2	PCS				
Detailed steps	Description		Installation Diagram				
A	1. Use M3 * 8mm round head screws to fix structure B to the copper column.						



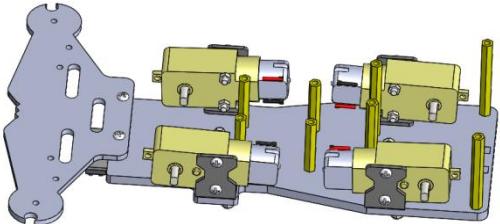
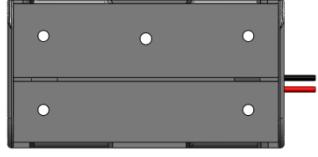
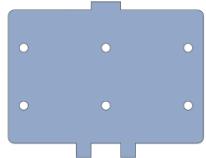
Step 6	Install the 1602 LCD	Tool	M3 Phillips screwdriver
			

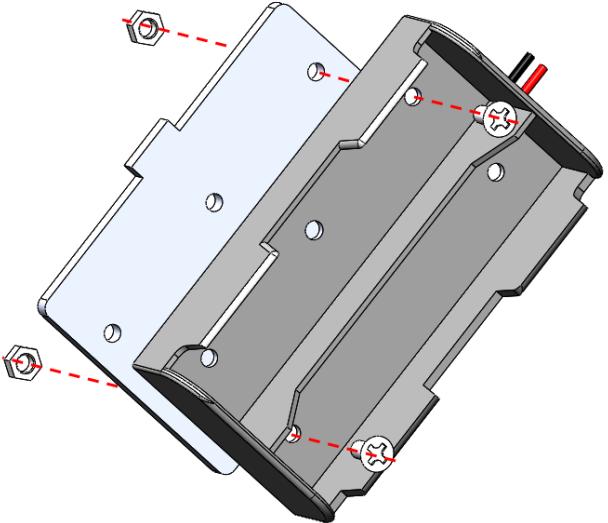
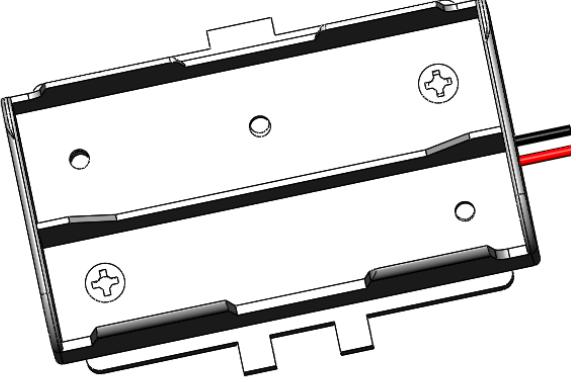
Part list	Name	Quantity	Unit	Picture
	1602 LCD	1		
	180MM 4Pin Wire	1	PCS	
	M3 nylon washer	4	PCS	

20	Structural component D	1	PCS	
	M3 nut	4	PCS	
	M3*10 round head screw	4	PCS	
Detailed steps	Description		Installation Diagram	
A	<p>1. Use M3 * 10 round head screws and M3 nuts to fix the M3 nylon column and 1602 LCD screen to structure D in sequence.</p> <p>Note:pay attention to the installation direction of the 1602 LCD screen</p> <p>2. Insert the end of 180MM 4Pin Wire into the 1602 LCD wiring terminal, with the corresponding wire sequence as follows:</p> <p>GND - black wire;</p> <p>VDO - red wire;</p> <p>SDA - yellow wire;</p> <p>SCL - white wire;</p>			

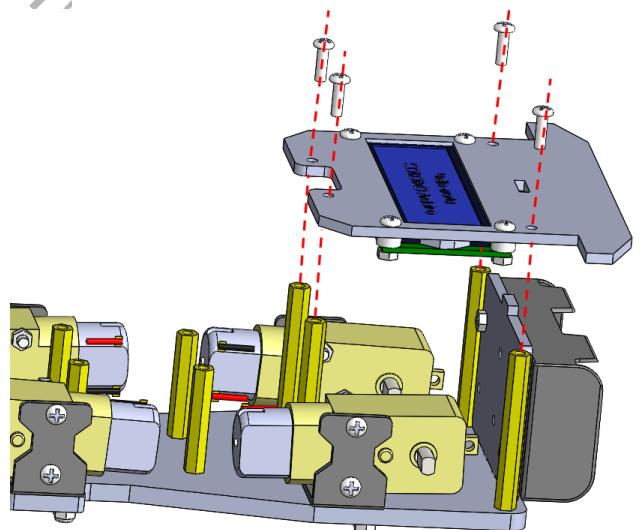
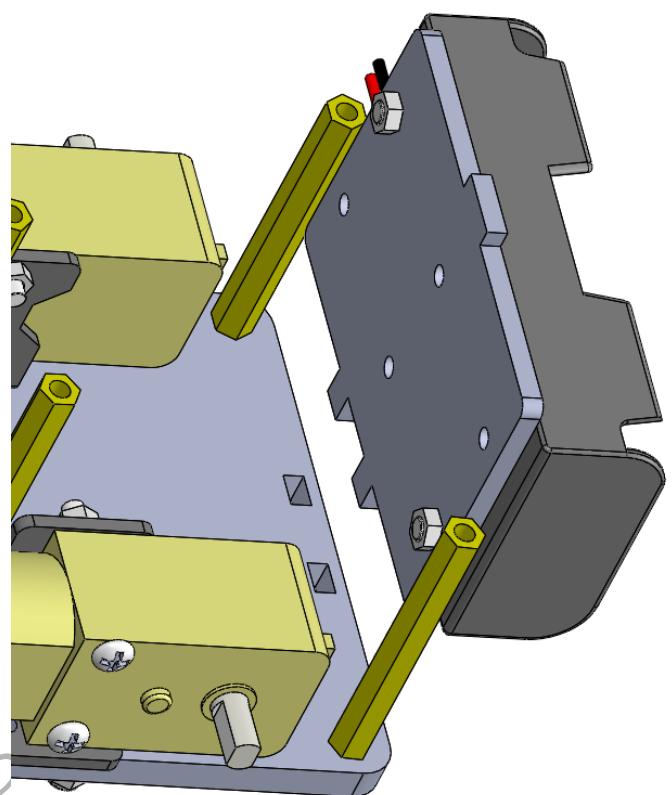


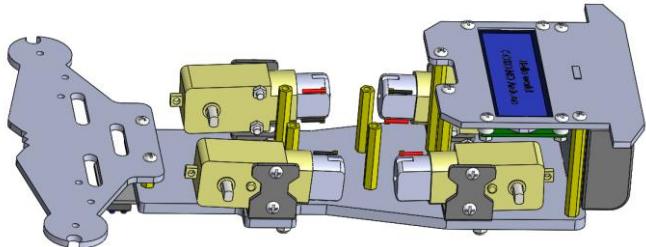
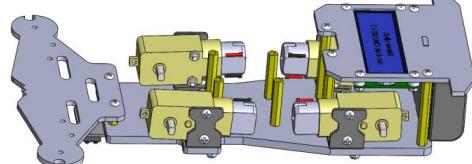
Step 7	Install the battery box	Tool	M3 Phillips screwdriver
			

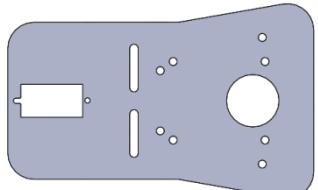
Part list	Name	Quantity	Unit	Picture
	step 5 structure	1	PCS	
	step 6 structure	1	PCS	
	18650 battery box	1	PCS	
	Structural component C	1	PCS	
	M3 nut	2	PCS	
	M3*8mm countersunk screw	2	PCS	
	M3*10 round head screw	4	PCS	

Detailed steps	Description	Installation Diagram
23 A	<p>1. Use M3 * 8 countersunk screws to fix the 18650 battery box on structural component C . (pay attention to the installation direction of the battery box)</p> <p>2. Install the semi-finished product installed in the previous step on step 5 structure.</p> <p>3. Fix the Step 6 structure onto the M3 * 45 copper column using M3 * 10 round head screws. (Pay attention to the combination of structural component C and structural component D at the same time)</p>	 

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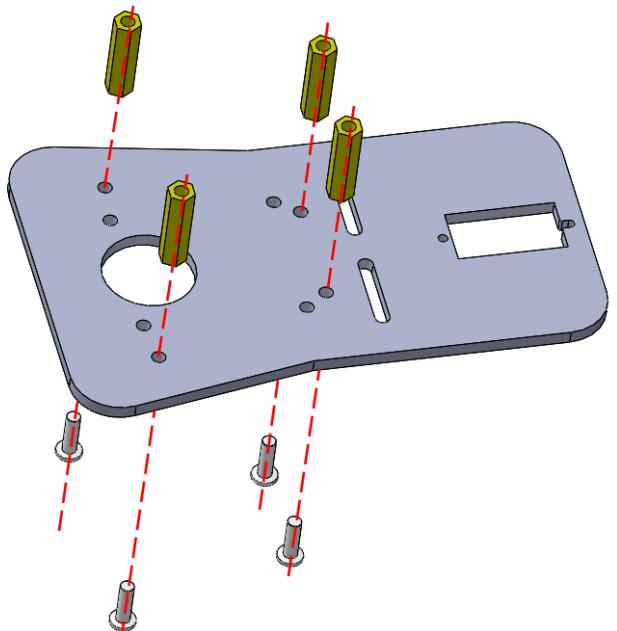
25				
Step 8	Install the structure E and the Servo	Tool	M3 Phillips screwdriver	
Part list	Name	Quantity	Unit	Picture
	Step 7 structure	1	PCS	
	Servo	1	PCS	
	M2*8 round head screw	2	PCS	

26	M2 nut	2	PCS	
	Structural component E	1	PCS	
	M3*10 round head screw	8	PCS	
	M3*20 double pass copper pillar	4	PCS	
	Detailed steps	Description		Installation Diagram
A				

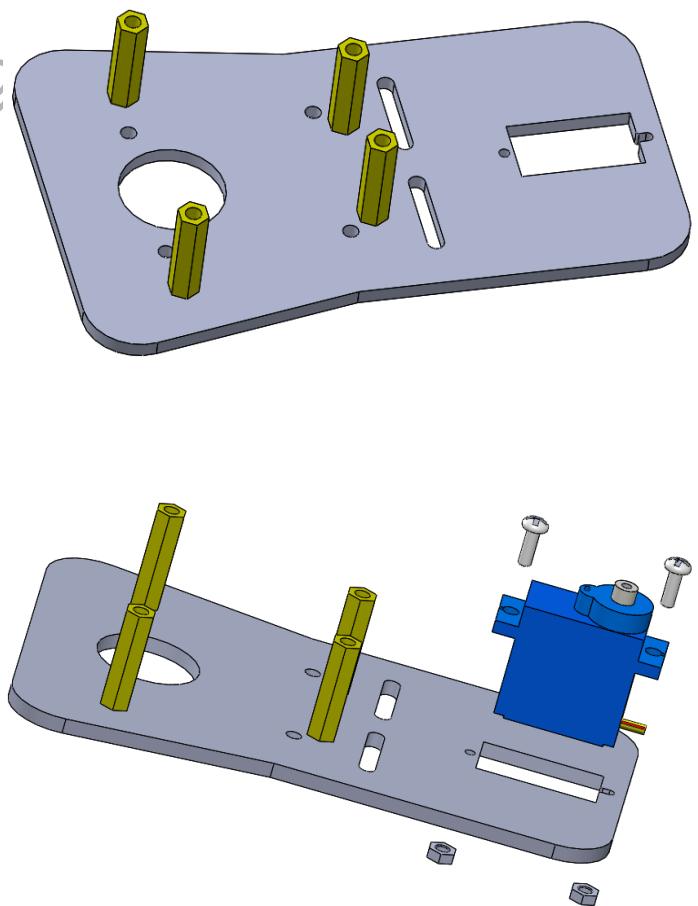
27

1. Use M3 * 10MM round head screws to secure the M3 * 20 double pass copper pillar to the Structural Component E

(Pay attention to the installation direction of the copper column)



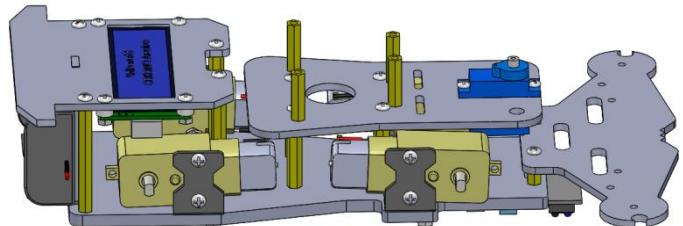
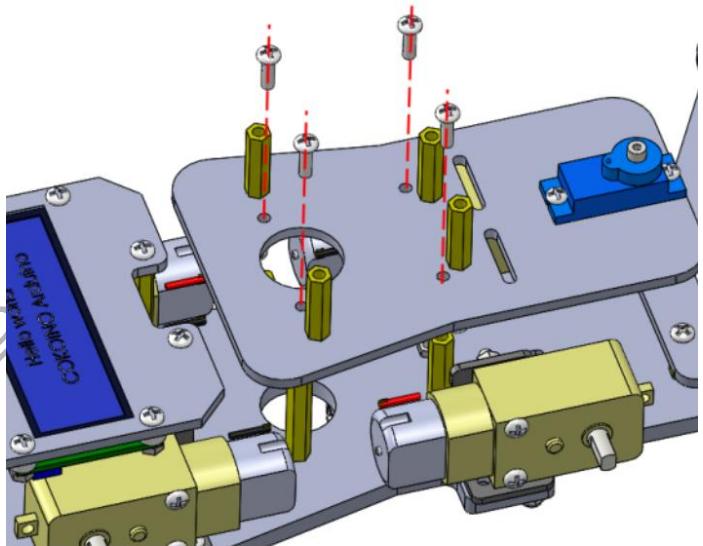
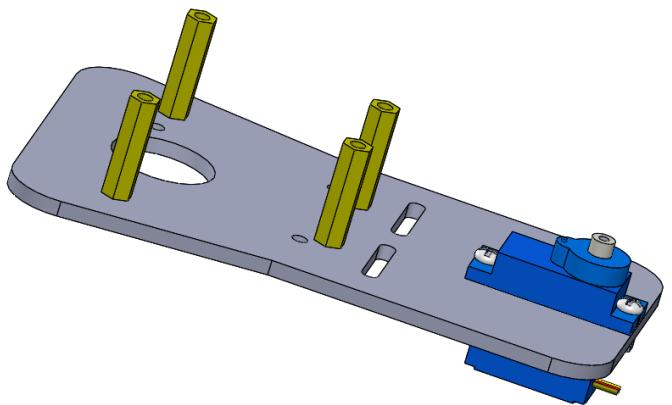
2. Use M2 * 8 round head screws and M2 nuts to secure Servo to Structural Component E



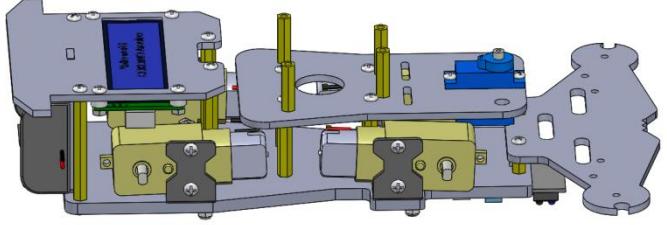
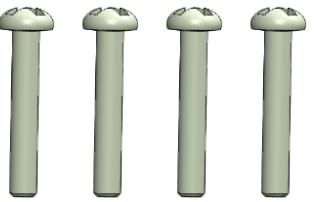
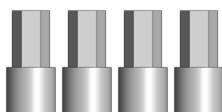
3. Thread the TT motor cable, Line tracking module cable, 1602 LCD cable, and servo cable through the circular hole of structural component E (Image omitted)

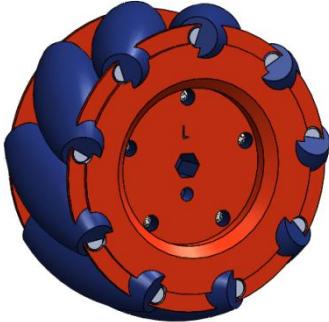
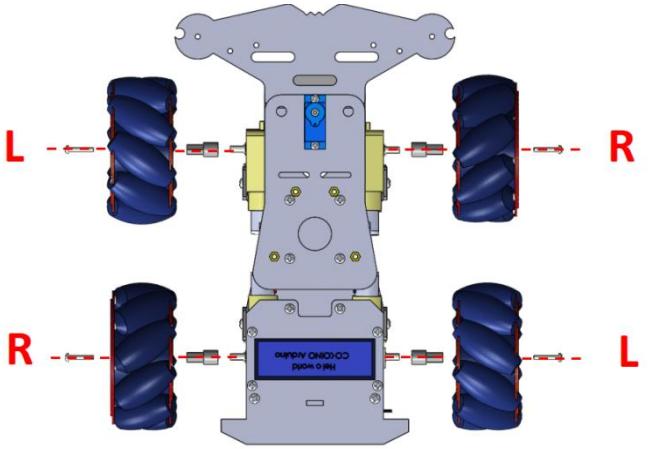
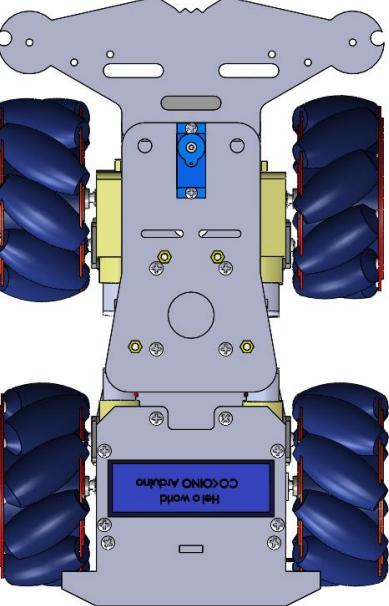
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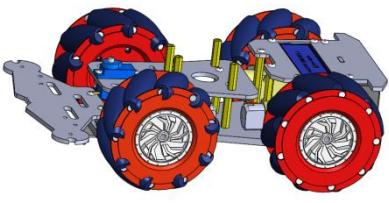
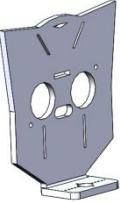
4. Use M3 * 10mm round head screws to fix the semi-finished product completed in the previous step on Step 7 structure

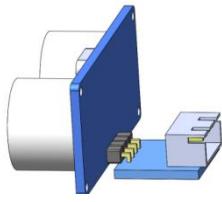
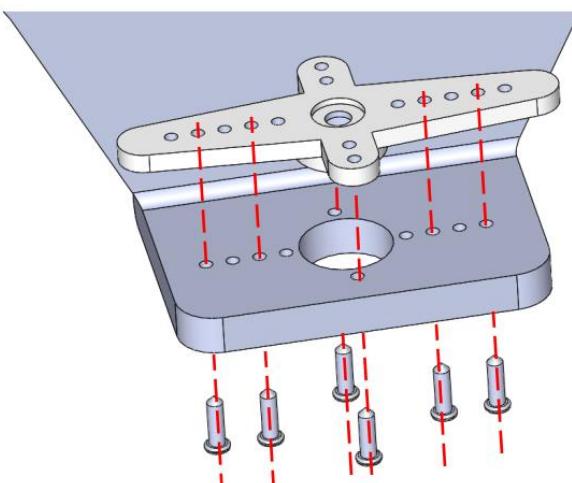


Step 9	Install the Mecanum	Too	M3 Phillips screwdriver
--------	---------------------	-----	-------------------------

			wheels		
Part list	Name	Quantity	Unit	Picture	
	Step 8 structure	1	PCS		
	Mecanum screws 2.4*20	4	PCS		
	Mecanum coupling	4	PCS		
	R- Mecanum Wheel	2	PCS		

30	L-Mecanum Wheel	2	PCS	
Detailed steps	Description		Installation Diagram	
	<p>1. Install Mecanum coupling on the TT motor shaft.</p> <p>2. Install L-Mecanum Wheel and R-Mecanum Wheel respectively on Mecanum coupling.</p> <p>(There are columns "L" and "R" on the Mecanum wheel body)</p>			
A	<p>3. Use the M2.4 * 20 screws provided with the McNair wheel to fix the McNair wheel.</p>			

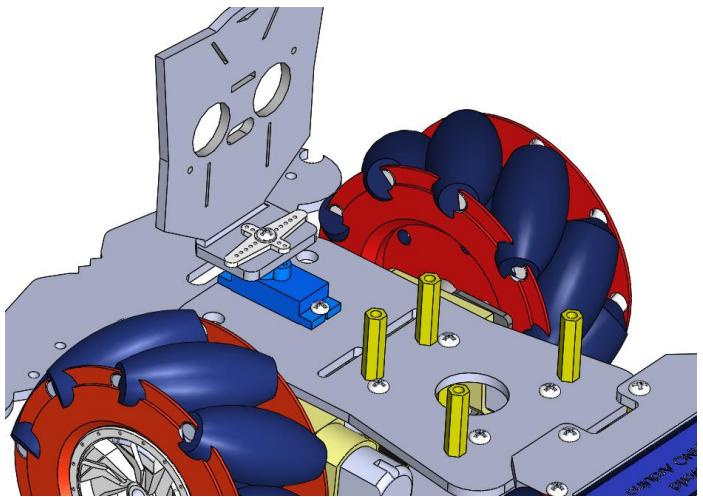
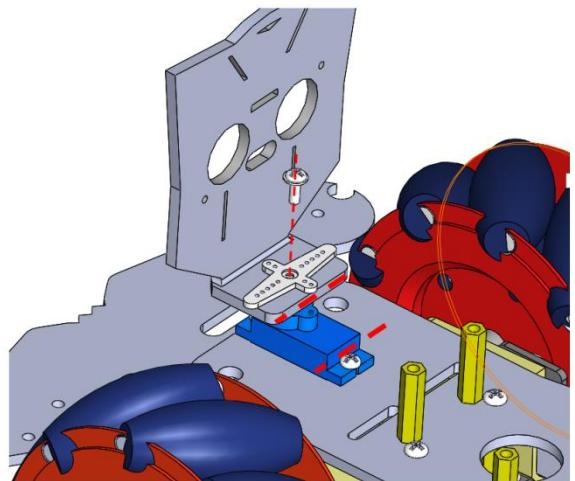
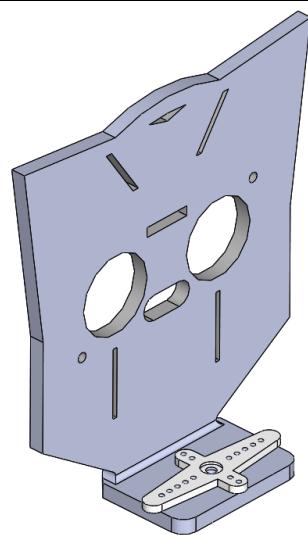
Step 10		Install the SR-04 Ultrasonic Module		Tool	M1.5 Phillips screwdriver
					
Part list	Name	Quantity	Unit	Picture	
	Step 9 structure	1	PCS		
	Structural component F	1	PCS		
	Servo cross	1	PCS		
	Servo screw	1	PCS		
PM1.2*5mm Self tapping screw		6			

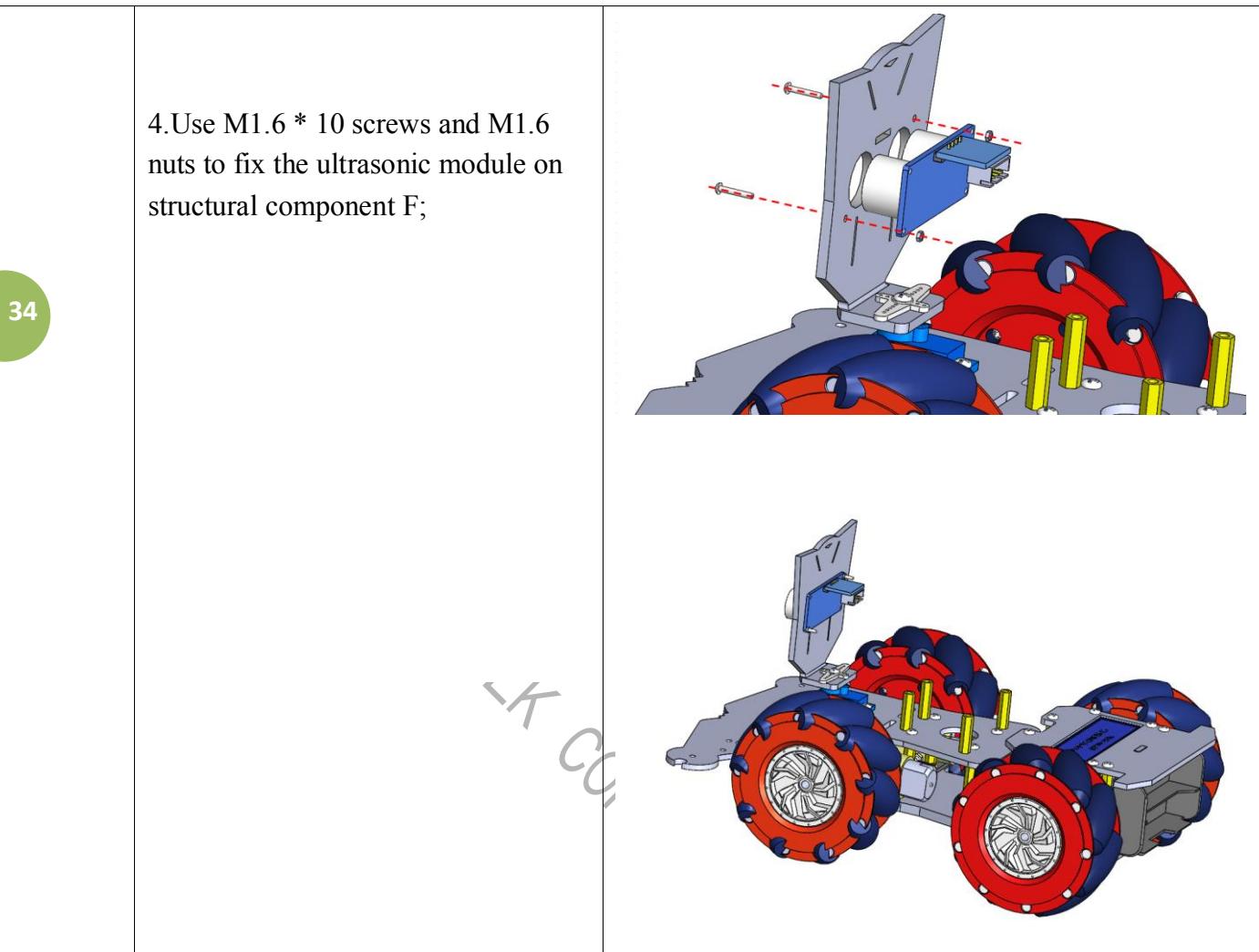
32	M1.6*10 round head screw	2	PCS	
	M1.6 nut	2	PCS	
	SR-04 Ultrasonic Module	1	PCS	
Detailed steps	Description		Installation Diagram	
A	<p>1. Use P1.2 * 5 self tapping screws to install the servo cross on structural component F; (Pay attention to the installation direction);</p> <p>2. Before assembling 9g Servo, you need to adjust it to 65 degree, and the code is stored in this folder: E:\CKK0014-main\Tutorial\sketches\Servo_65_ADJ</p> <p>Please refer to lesson 4 to set the servo to 65 degrees.</p>			

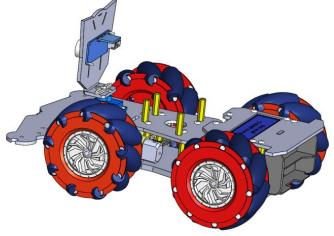
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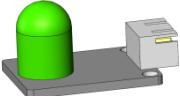
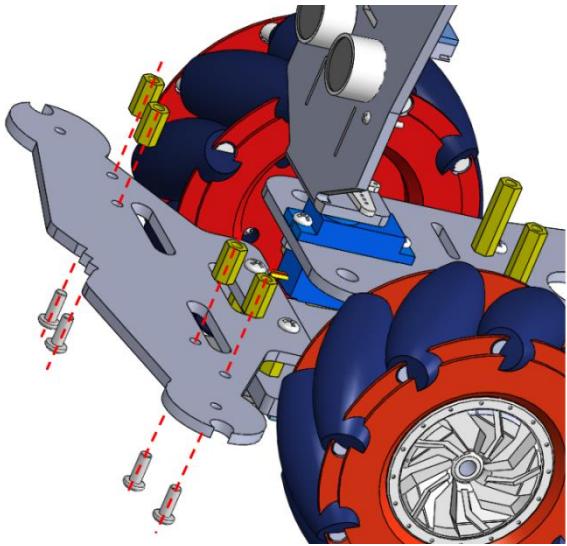
3. Install the structural component F vertically onto the Servo shaft. After installation, when viewed from the front of the robot car, the structural component F is centered and perpendicular to the Robot car. At this point, the Servo built-in screws can be used to fix the structural component F and Servo together.

If the structural component F is not centered perpendicular to the Robot car body, it needs to be removed and reinstalled.





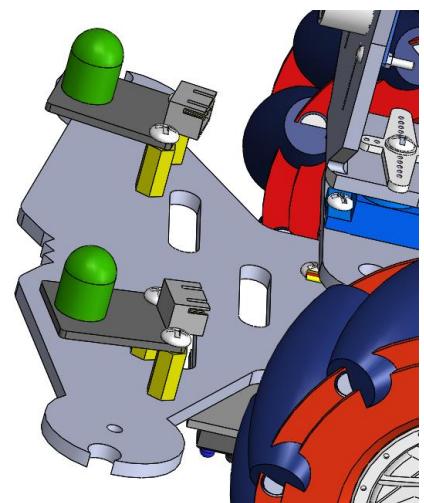
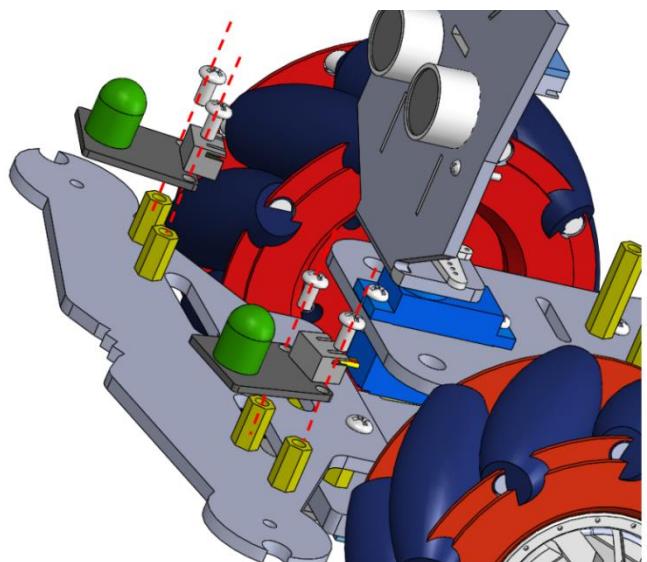
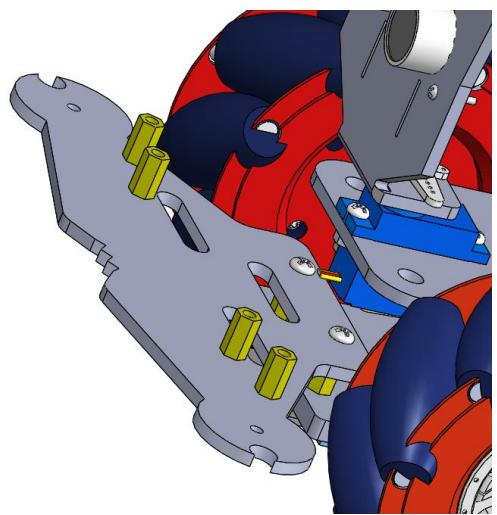
Step 11		Install the green led module		Tool	M3 Phillips screwdriver
Part list	Name	Quantity	Unit		
	Step 10 structure	1	PCS		

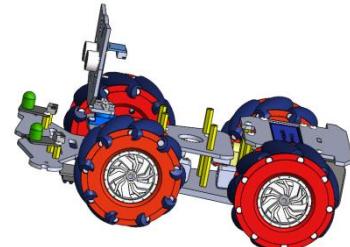
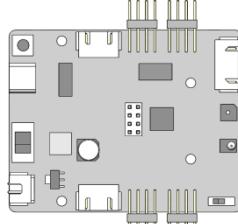
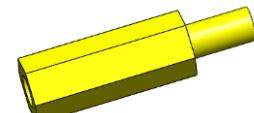
35	green led modules	2	PCS	
	M3*10 double pass copper pillar	4	PCS	
	M3*6 round head screw	4	PCS	
	M3*8 round head screw	4	PCS	
Detailed steps	Description		Installation Diagram	
	1. Use M3 * 8 round head screws to fix the M3 * 10 copper column to structural component B;			

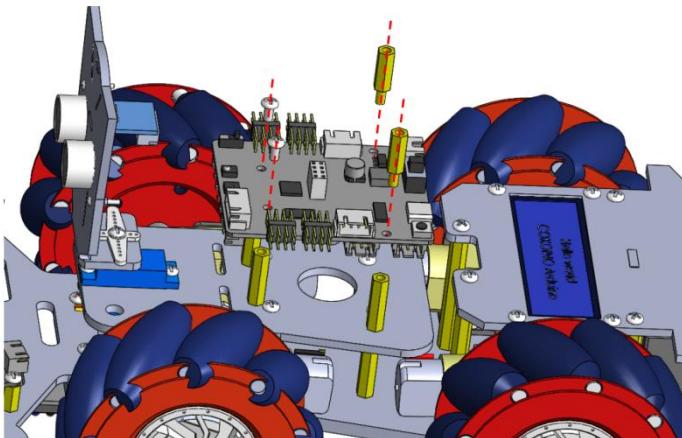
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Use M3 * 6 round head screws to fix the LED module on the M3 * 10 copper column;

Pay attention to the installation direction of the LED module

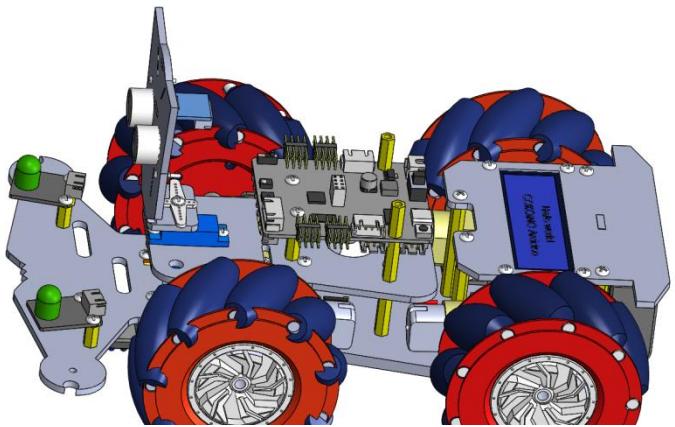


	Step 12	connect the module and Install the Robot control board	Tool	M3 Phillips screwdriver
				
Part list	Name	Quantity	Unit	Picture
	Step 11 structure	1	PCS	
	Robot control board	1	PCS	
	M3*15MM+ 6 Single pass copper pillar	2	PCS	
	M3*6 round head screw	2	PCS	

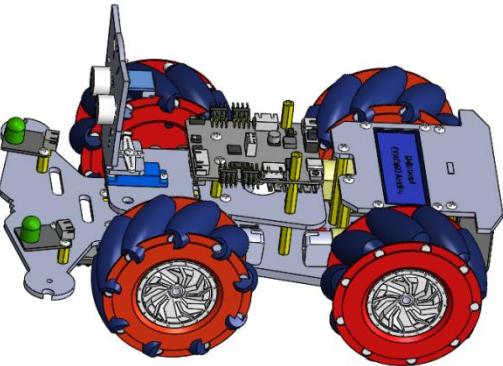
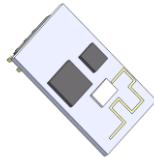
38	ribbon	2	PCS	
	4Pin-130M M wire	1	PCS	
	3Pin-145M M wire	2	PCS	
Detailed steps	Description		Installation Diagram	
	1. Install one end of the 3Pin-145MM connecting wire onto the 10MM LED module; (Note line sequence: GND corresponds to black line; VCC corresponds to red line; IN corresponds to yellow line) 2. Install one end of the 4Pin-130MM connecting wire onto the ultrasonic module; (Note line sequence: GND corresponds to black line; VCC corresponds to red line) 3. According to the circuit connection diagram: connect the left LED module to the X6 Port of the control board connect the right LED module to the X8 Port of the control board			

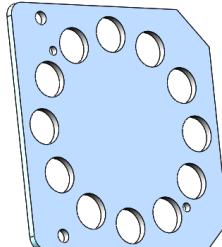
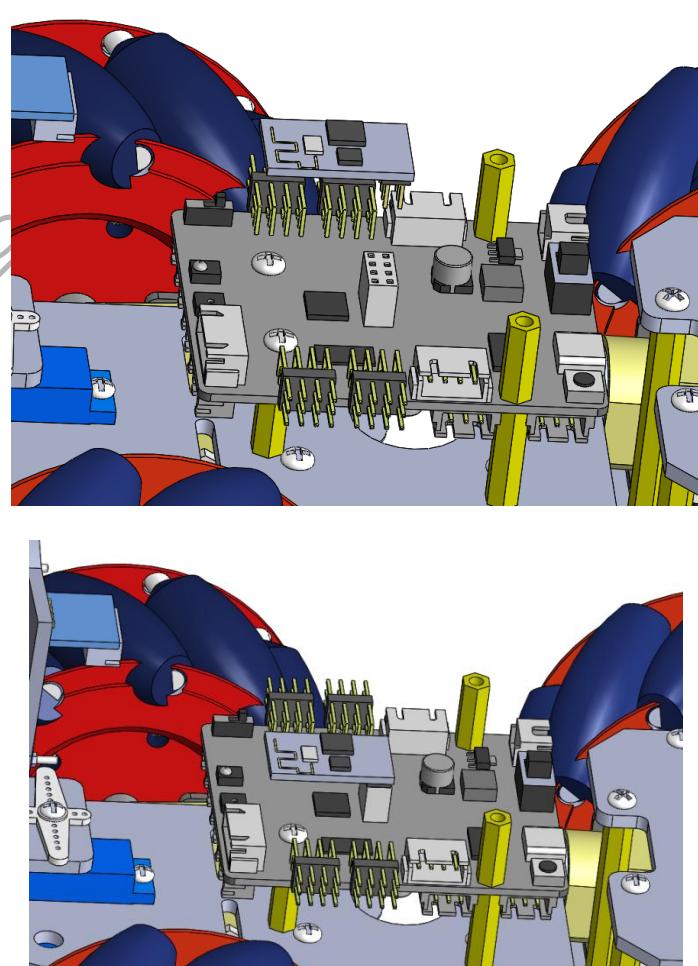
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- connect the left front TT motor to the M4 Port of the control board
- connect the left back TT motor to the M2 Port of the control board
- connect the right front TT motor to the M3 Port of the control board.
- connect the right back TT motor to the M1 Port of the control board.
- connect the 1602 LCD module to the X3 Port of the control board.
- connect the servo wire to the D10 pin base of the control board.
- connect the battery box wire to the power port of the control board.
- connect the line tracking module wire to the X1 Port interface corresponding to the control board. (Pay attention to the wiring sequence and corresponding interfaces)
- Note: The circuit connection diagram is on the last page of this lesson!**
4. Use 2 M3 * 6MM round head screws and 2 M3 * 15MM+6 single pass copper columns to fix the connected control board; (Pay attention to organizing the connecting wires to prevent damage to them)
 5. Use a ribbon to fix the LED module connection wire to the small circular hole next to the servo of structure E.



Step 13	Install 8266 wifi module and LED light ring module	Tool	M3 Phillips screwdriver
			

	Name	Quantit y	Unit	Picture
Part list	Step 12 structure	1	PCS	
	8266 wifi module	1	PCS	
	LED light ring module	1	PCS	
	M2*8MM round head screw	2	PCS	
	M2 nut	2	PCS	
	M3*6 round head screw	2	PCS	

	Structural component G	1	PCS	
41	Detailed steps	Description		Installation Diagram
		1. Install the 8266 module to the control board 8266 interface position; (Pay attention to the installation direction of 8266)		

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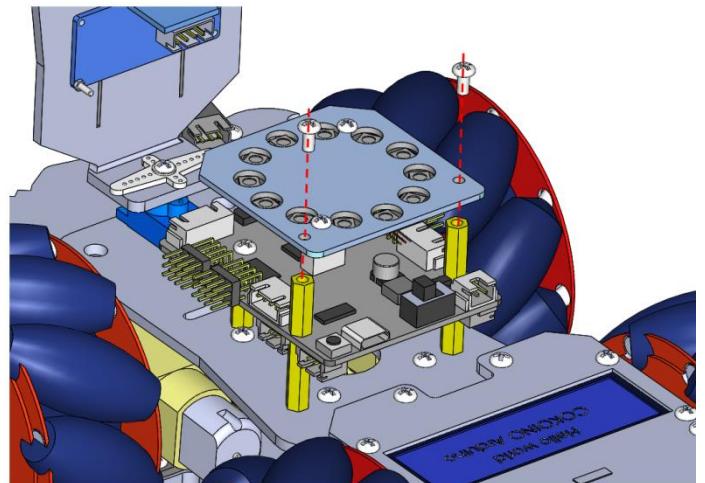
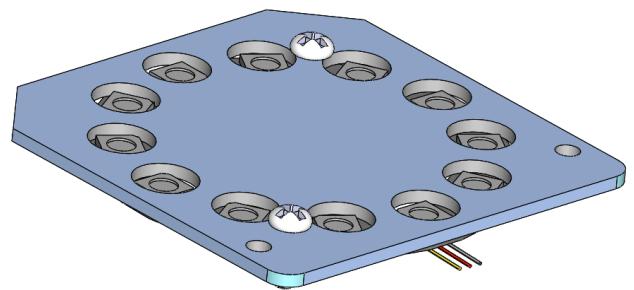
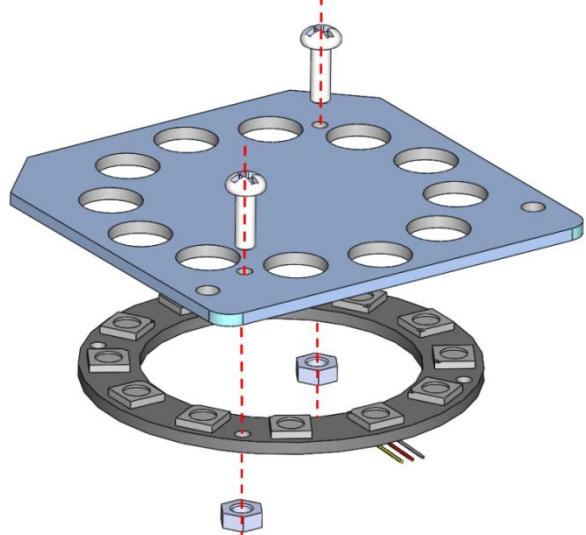
2. Use M2 * 8MM screws and M2 nuts to fix the LED light ring module to structural component B;

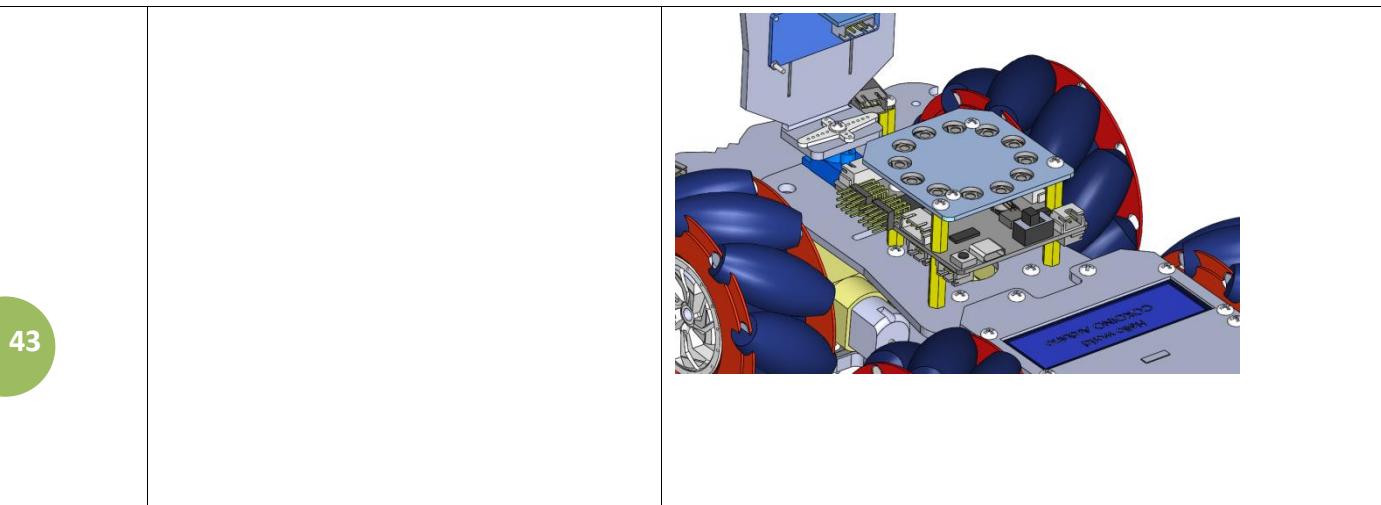
3. Use M3 * 6 MM screws to fix the structural component B the copper column;

(Pay attention to the direction of notch in structure B)

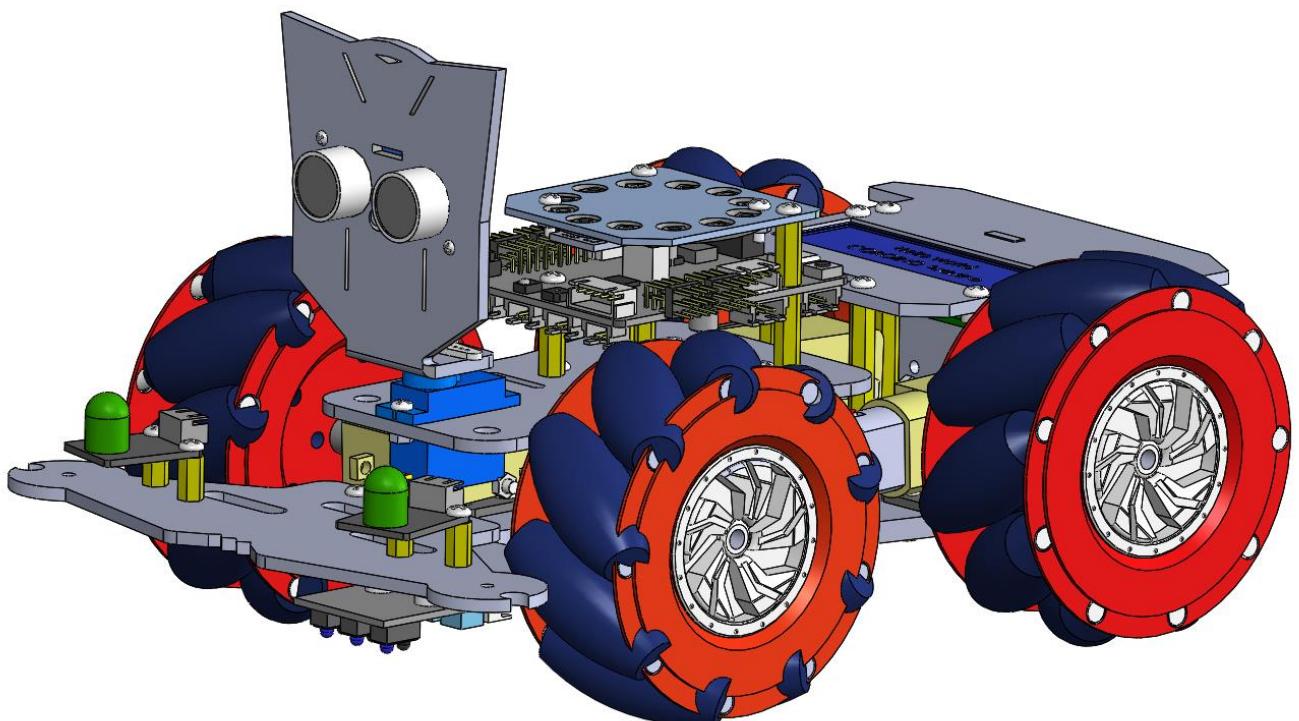
4. connect the WS2812 LED light ring module to the X7 port of the control board

Note: The circuit connection diagram is on the last page of this lesson!





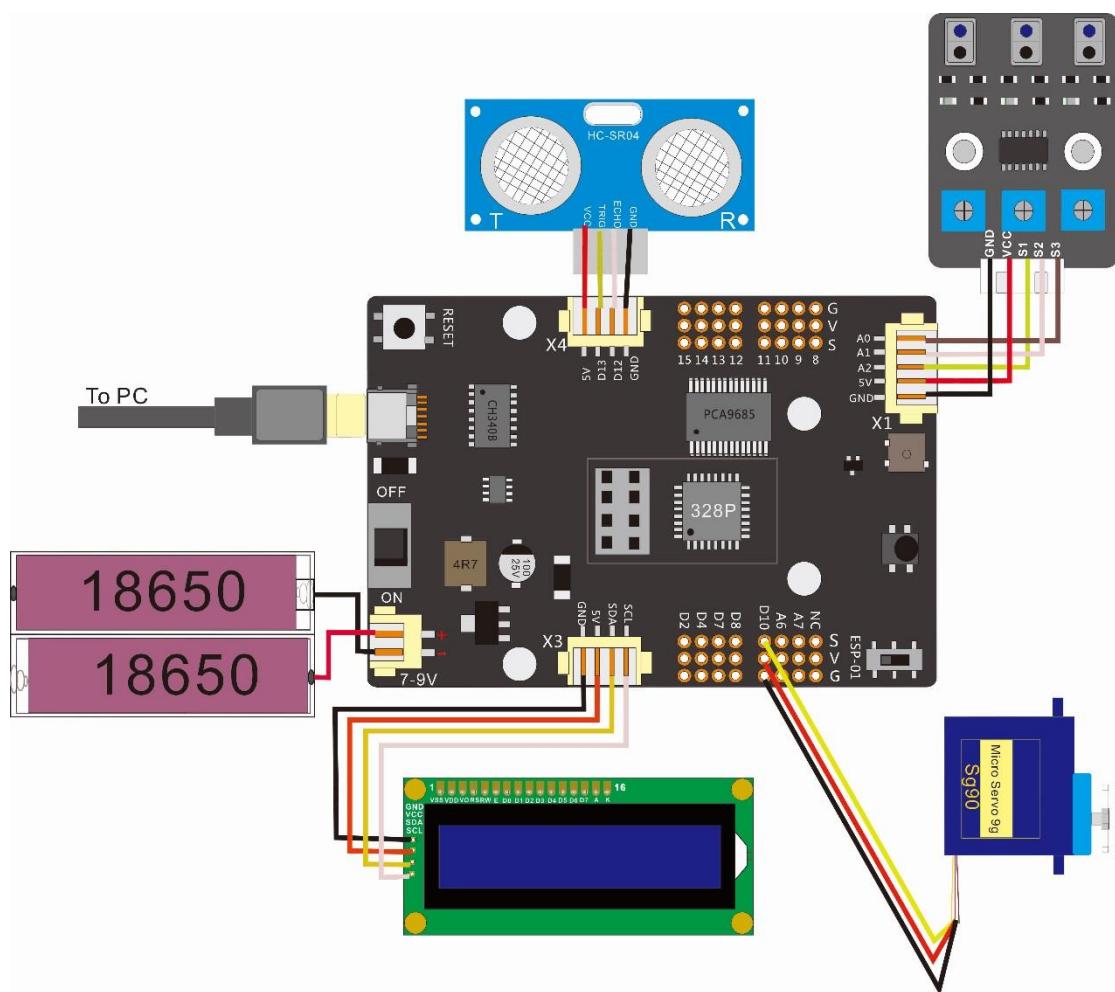
Congratulations, an interesting 4WD smart mecanum car is finished, and you can start the journey of exploration!



5. Circuit diagram:

After assembling the Smart Robot car according to the tutorial, do not turn the power switch on the control board to ON immediately. Before that, you need to check whether the circuit connection is correct and whether there is a short circuit, such as checking whether 5V and GND, 3.3V and GND are short-circuited.

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