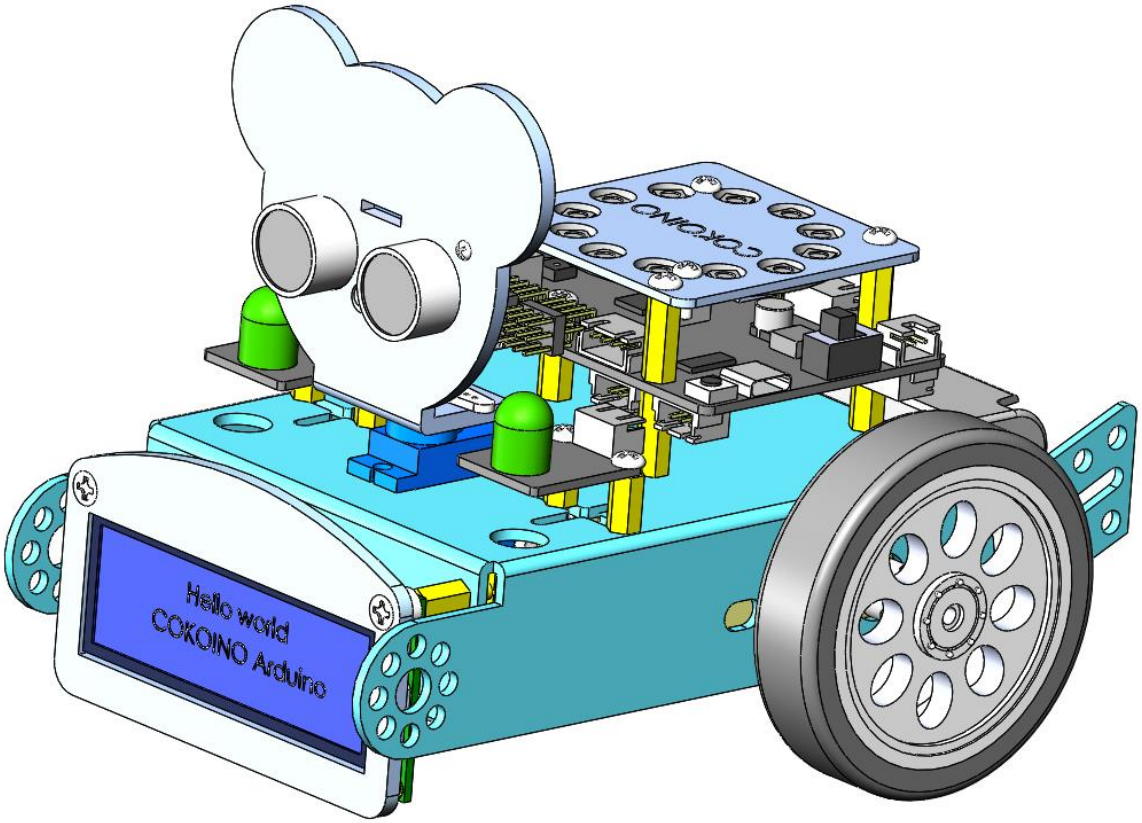
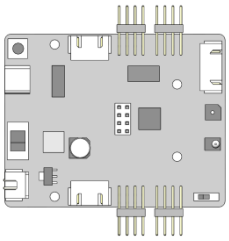
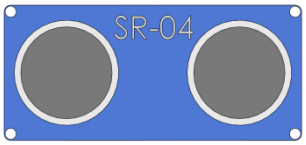
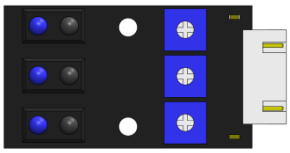
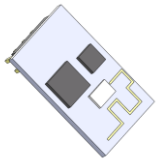
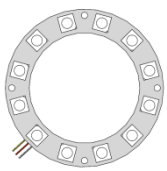
Lesson 12 Assemble the Smart Robot Car

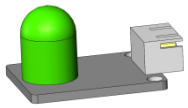
Table



1. What's in the package

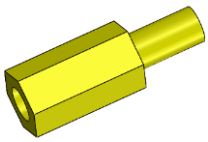
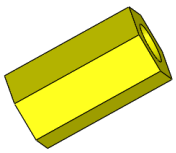
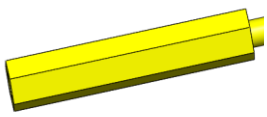
1.1 Electronic module

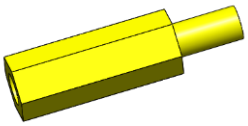
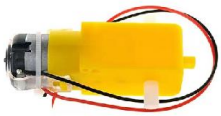
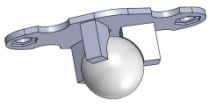
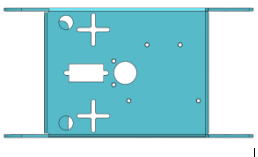
Picture	Category	Name	Quantity
	Controller	LK COKOINO Control Board	1
	Module	I2C LCD1602 Display	1
	Module	SR-04 Ultrasonic Module	1
	Module	Line tracking module	1
	Module	ESP-01 Module	1
	Module	SW2812 LDE Module	1

	Module	10mm LED	2

1.2 parts used to connect or fix

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	4
	Screw	M2 nut	4
	nylon washer	M3*3mm nylon washer	4

	Screw	M3*6MM round head screw	18
	Screw	M3*25 round head screw	6
	Screw	M3*12 countersunk head screw	6
	Screw	Nut M3	6
	copper pillar	M3*10+6 single-pass copper column	2
	copper pillar	M3*10 double-pass copper column	4
	copper pillar	M3*30MM+6 single-pass copper column	2

	copper pillar	M3*15+6 single-pass copper column	6
	Battery case	18650 battery box	1
	TT motor	Biaxial reduction ratio 1:48	2
	Servo	SG90 servo	1
	Wheel	TT motor wheel	2
	Universal wheel	Metal Universal heel	1
	Car frame	Aluminum Car frame	1

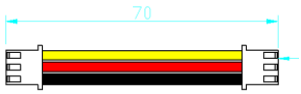
	remote control	Infrared remote control	1
	tructural parts	Acrylic structural parts	1

1.3 Tool

Picture	Category	Name	Quantity
	wrench	Four-way socket 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	3P-70MM for LED module	2
	USB Cable	1M Type-C USB Cable	1

2. Precautions for assembly

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.

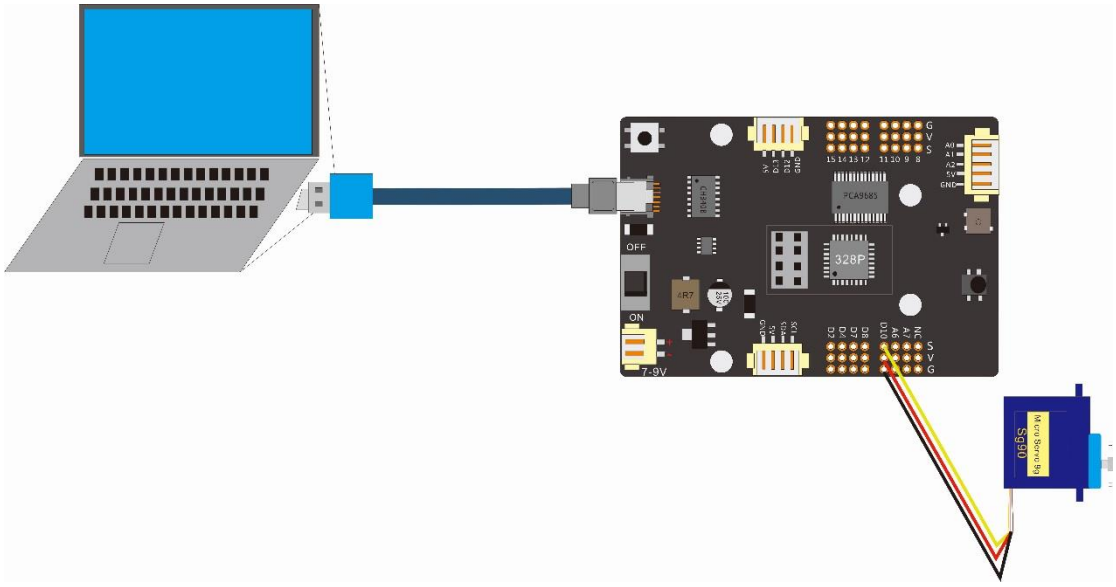
The code is placed in this folder：

E:\CKK0002-master\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);
 }
```

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

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;

9 Rechargeable;

Voltage 3.7V, charging termination voltage 4.2V;

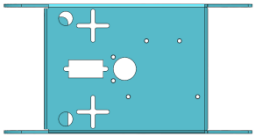
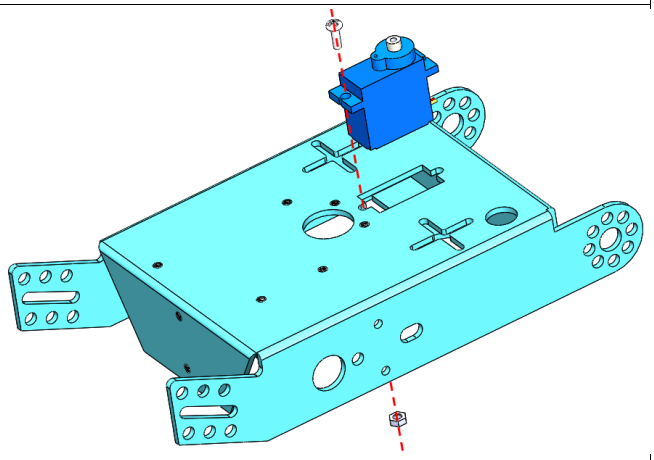
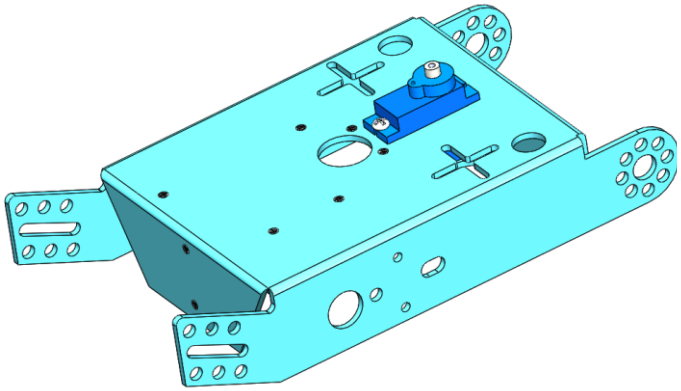
Capacity 1500mAh--3000mAh.

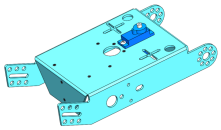
4. Assembly

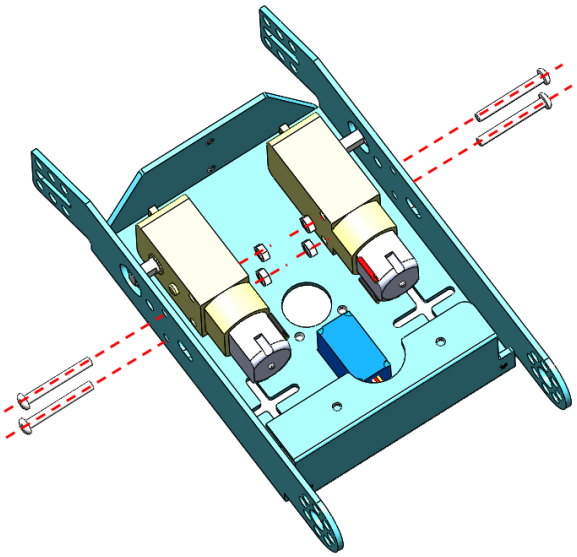
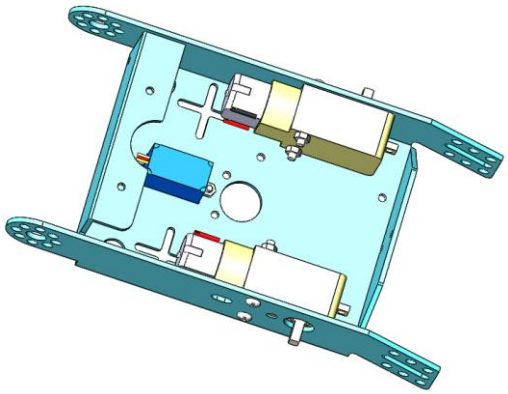
4.1 Assembly Steps

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

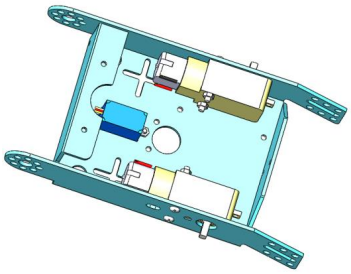
Step 1			Install 9g Servo	Tool	M3 Phillips screwdriver 
Parts List	Name	Quantity	Unit	Picture	

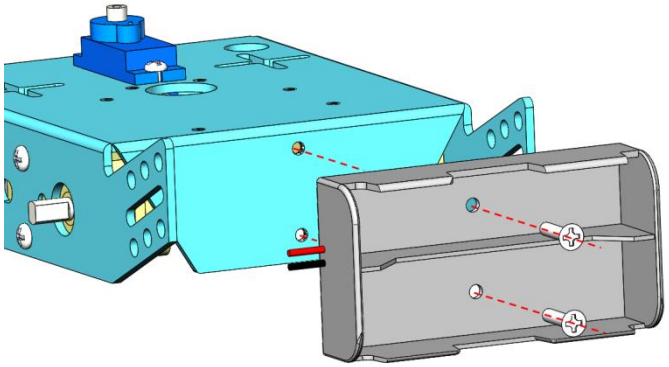
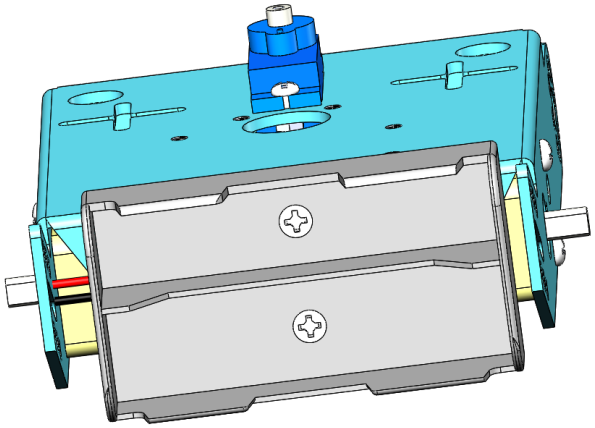
	Car frame	1	PCS	
	9gServo	1	PCS	
	M2 screw	1	PCS	
	M2*8 round head screw	1	PCS	
Detailed steps	Description			Installation Diagram
A	1.Before assembling 9g Servo, you need to adjust it to 65 degree, and the code is stored in this folder: E:\CKK0002-master\Tutorial\sketches\Servo_65_ADJ Please refer to lesson 4 to set the servo to 65 degrees. 2.Use M2*8 round head screws and M2 nuts to fix 9g Servo on the car frame; Pay attention to the installation direction of 9gServo； 3.Pass the Servo cable from the bottom of the frame through the round hole in the frame;			 

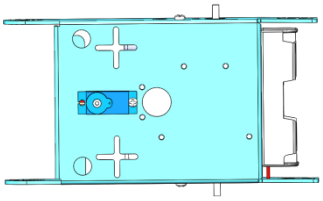
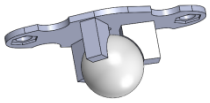
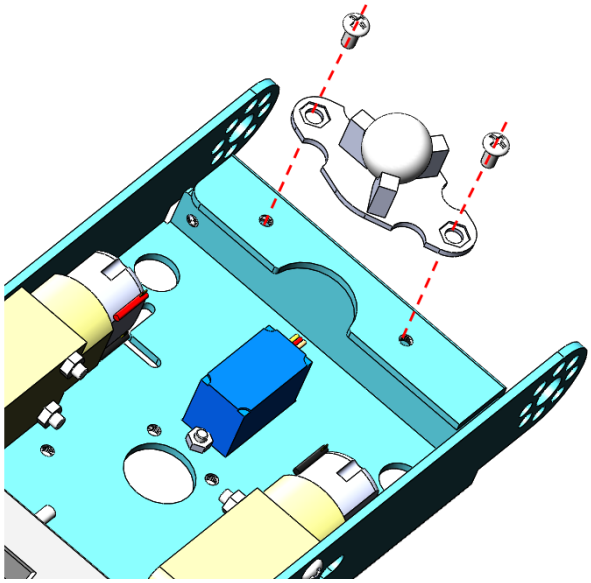
Step 2			Install TT motor	Tool	M3 Phillips screwdriver 
Part list	Name	Quantity	Unit	Picture	
	step 1 structure	1	PCS		
	TT motor	2	PCS		
	M3 screw	4	PCS		
	M3*25MM screw	4	PCS		
Detailed steps	Description			Installation Diagram	

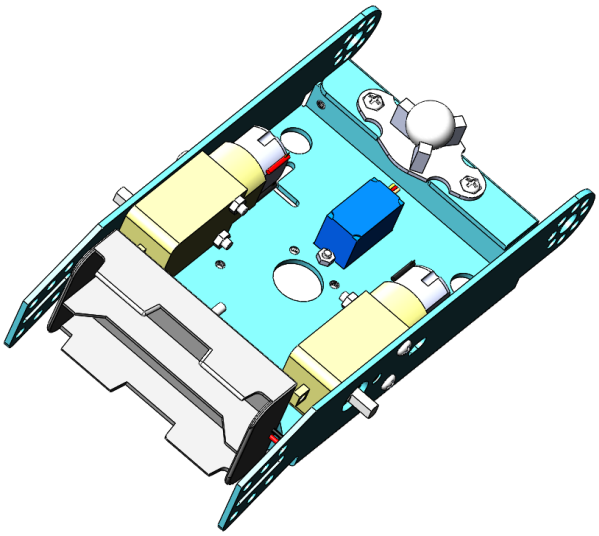
A	1. Use M3*25 screws and M3 nuts to install the TT motor on the frame (note the installation direction of the TT motor); 2. Pass the TT motor cable from the bottom of the frame through the round hole in the middle of the frame; (picture omitted)	 

Step 3	Install 18650 case	Tool	M3 Phillips screwdriver 

	Name	Quantity	Unit	Picture
Part list	step 2 structure	1	PCS	

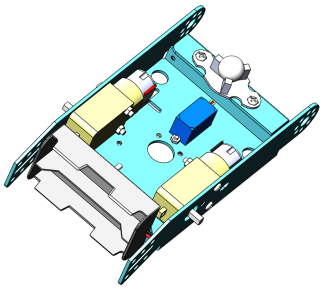
	Battery case	2	PCS	
	M3 screw	2	PCS	
	M3*12 countersunk screw	2	PCS	
Detailed steps	Description			Installation Diagram
A	1. Use M3*12MM countersunk screws to fix the 18650 battery box on the car frame (note the installation direction of the 18650 battery box)			 

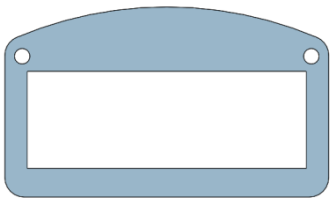
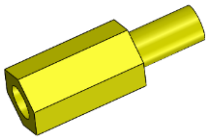
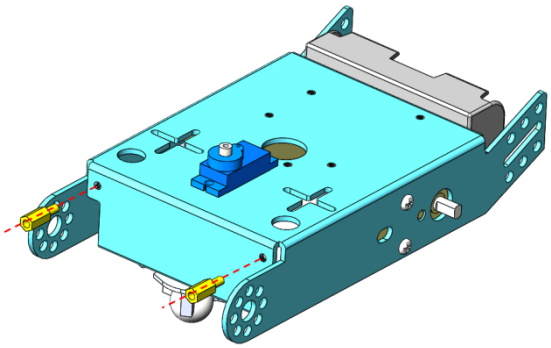
Step 4			Install Universal wheel	Tool	M3 Phillips screwdriver
Part list	Name	Quantity	Unit	Picture	
	Step 3 structure	1	PCS		
	Universal wheel	1	PCS		
	M3*6 round head screw	2	PCS		
Detailed steps	Description			Installation Diagram	
A	1. Use M3*6 round head screws to fix the universal wheel on the car frame; Note the installation direction of the universal wheel;				



Step 5	Install the 1602 LCD	Tool	M3 Phillips screwdriver/Four-way socket wrench

Part list	Name	Quantity	Unit	Picture
	step 4 structure	1	PCS	
	LCD display	1	PCS	



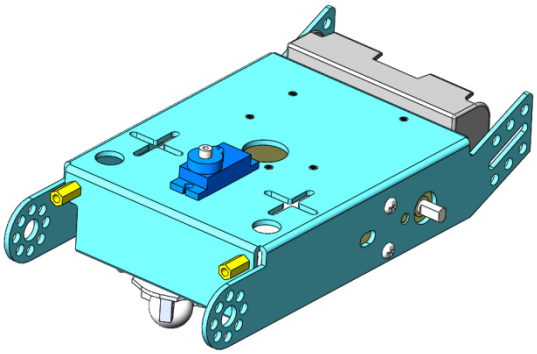
	Structure A	1	PCS	
	M3*10MM+6 copper column	2	PCS	
	M3*12MM screw	2	PCS	
	M3 nylon washer	2	PCS	
	4P-180MM wire	1	PCS	
Detailed steps	Description			Installation Diagram
A	1. Use the Four-way socket wrench to fix the M3*10MM+6 hexagonal copper column on the frame; 2. Use the 4P-180MM LCD cable to connect to the LCD module; LCD wiring method: GND - black wire; VDO - red line;			

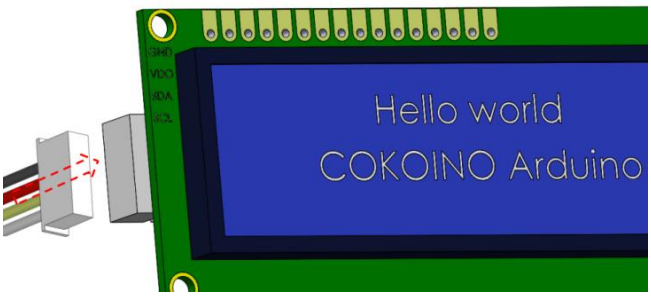
SDA - yellow line;

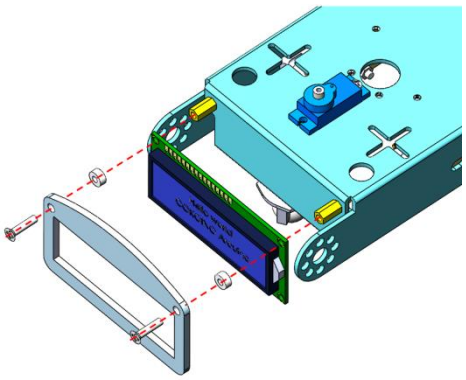
SCL - white line;

3. Use M3*12 countersunk screws to fix the structural part A, M3 nylon washer, and LCD module on the copper pillar on the car frame in sequence;

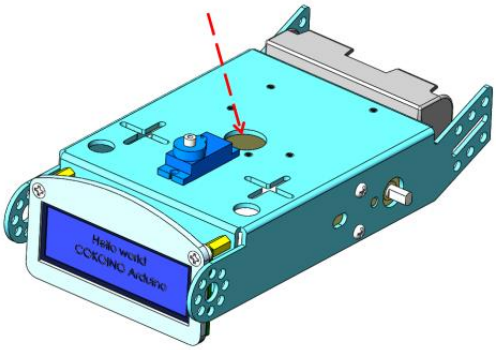
4. Pass the other end of the cable through the middle hole of the car frame from the bottom of the car frame;



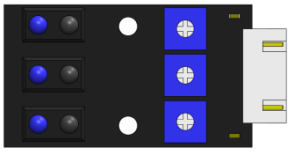
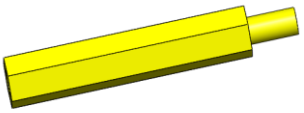


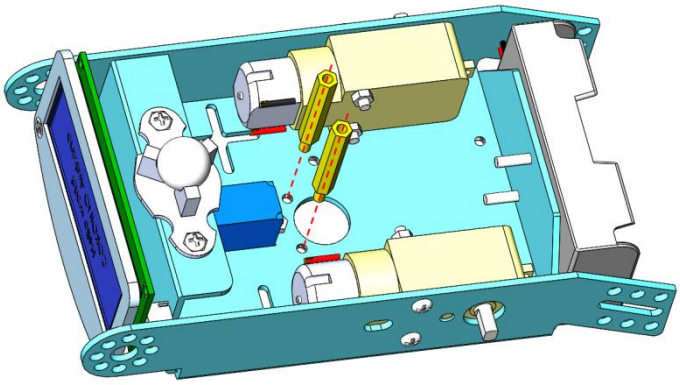
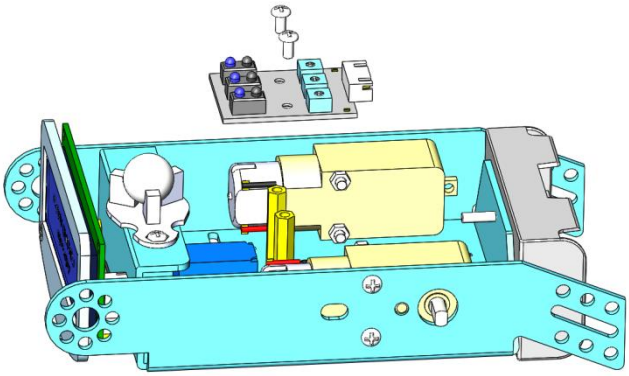
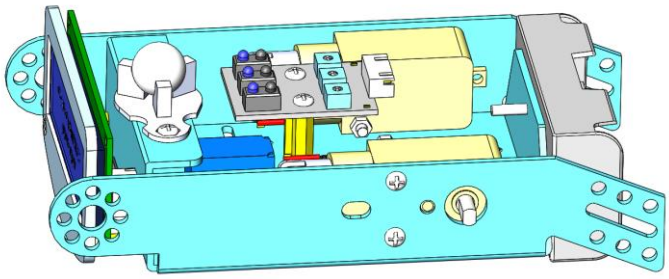


Round hole



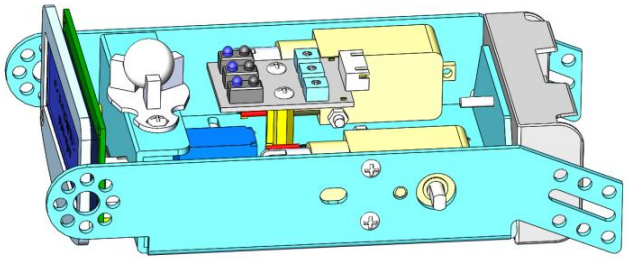
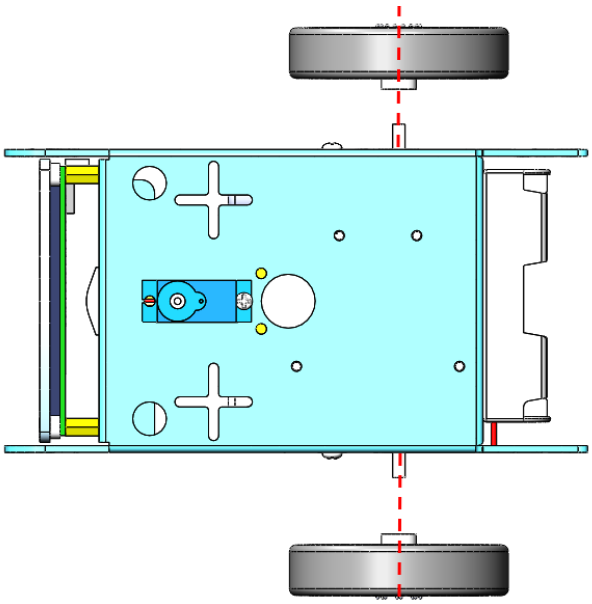
Step 6		Install the line tracking module	Tool	M3 Phillips screwdriver/Four-way socket wrench  

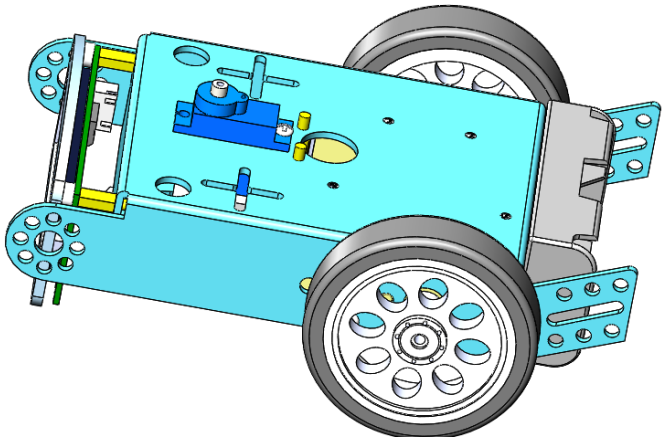
	Name	Quantity	Unit	Picture
Part list	150MM 5P wire	1	PCS	
	line tracking module	1	PCS	
	M3*30MM+6 single pass copper column	2	PCS	
	M3*6 round head screw	2	PCS	
Detailed steps	Description			Installation Diagram

A	1. Use the four-way socket wrench to fix the M3*30MM+6 single pass copper column to the car frame(note the installation direction of the copper column); 2. Use one end of the 5P-150MM wire to connect the tracking module, and the other end passes through the middle hole in the car frame; 3.Use M3*6 round head screws to install the line tracking module on the copper pillar on the car frame; (note the installation direction of the tracking module)	  

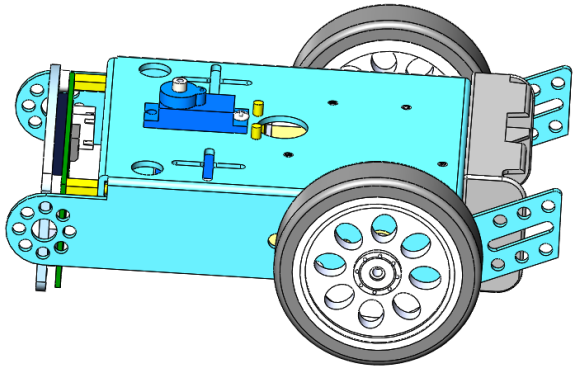
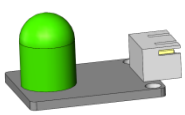
Step 7	Install TT motor	Tool	#
			#

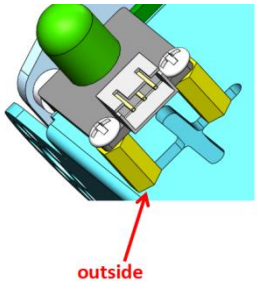
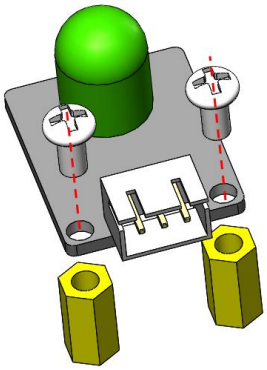
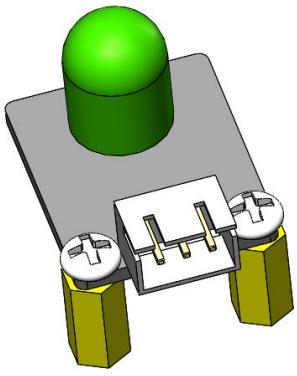
Part list	Name	Quantity	Unit	Picture

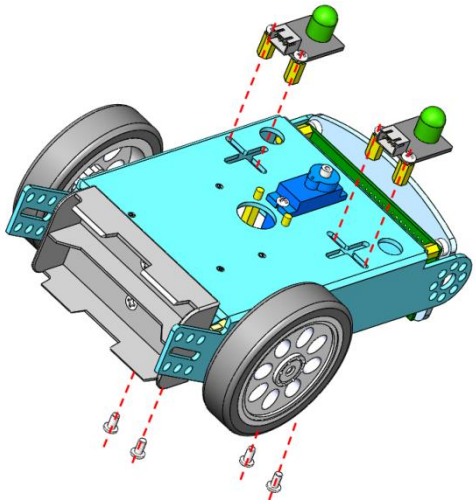
	step 6 structure	1	PCS	
	TT motor	2	PCS	
Detailed steps	Description			Installation Diagram
A	1. Install the TT motor wheels on the shaft of the TT motor respectively;			

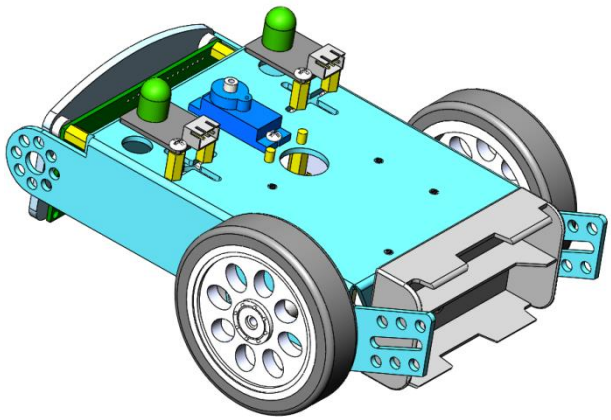


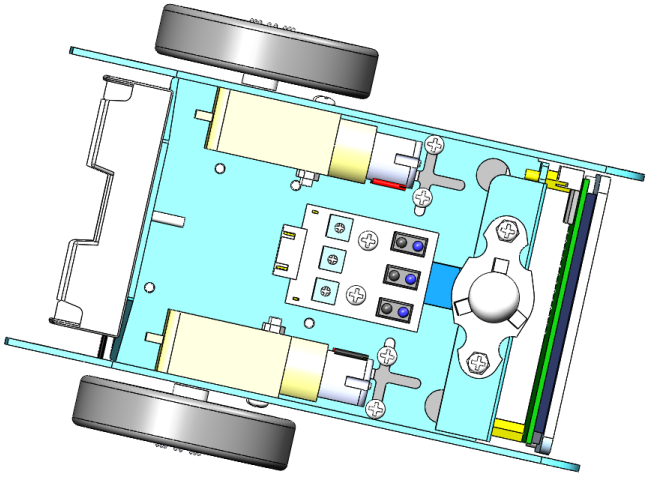
Step 8	Install 10MM LED module	Tool	M3 Phillips screwdriver 

Part list	Name	Quantity	Unit	Picture
	Step 7 structure	1	PCS	
	10MM LED module	2	PCS	

22	M3*6 round head screw	8	PCS	
	M3*10 Double-pass copper column	4	PCS	
Detailed steps	Description			Installation Diagram
A	1. Use M3*6MM round head screws to fix the M3*10 double-pass copper column to the 10MM LED module (note the installation direction of the copper column); 2. Use M3*6 round head screws to install the Step 7 structure in the grooves on both sides of the car frame; (note that the copper pillars are on the outside when installing) 			 

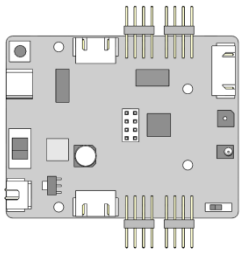
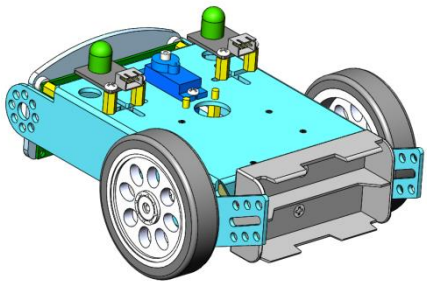
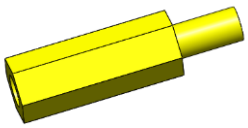
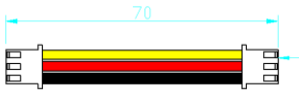


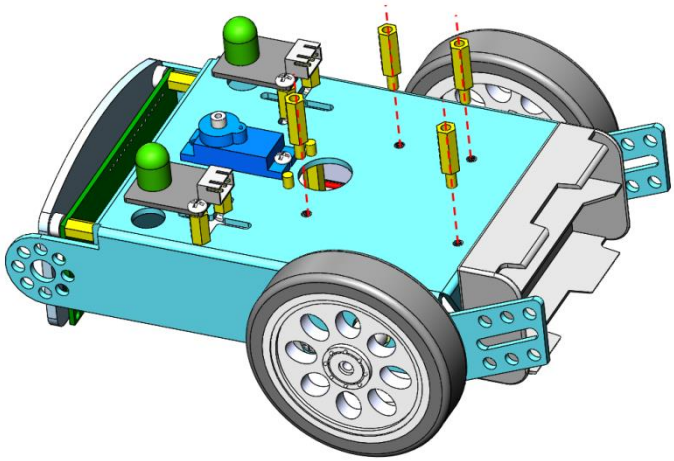
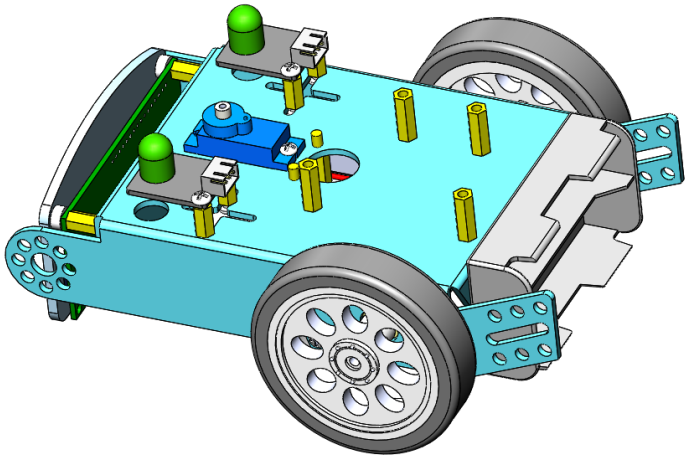
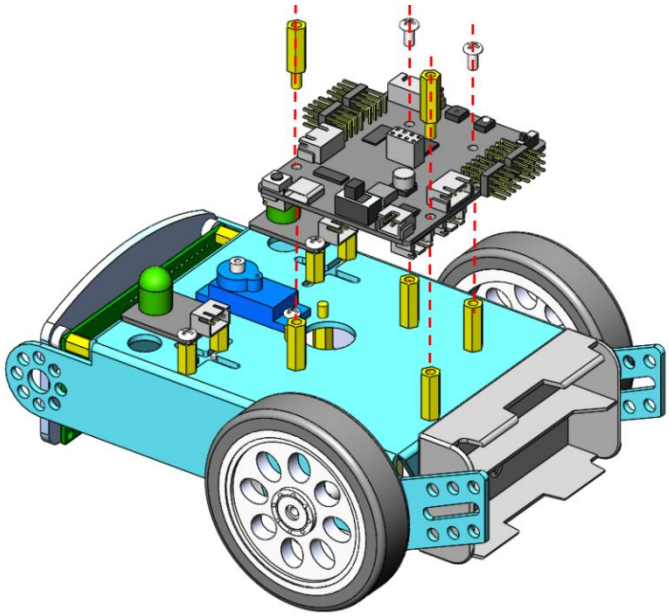


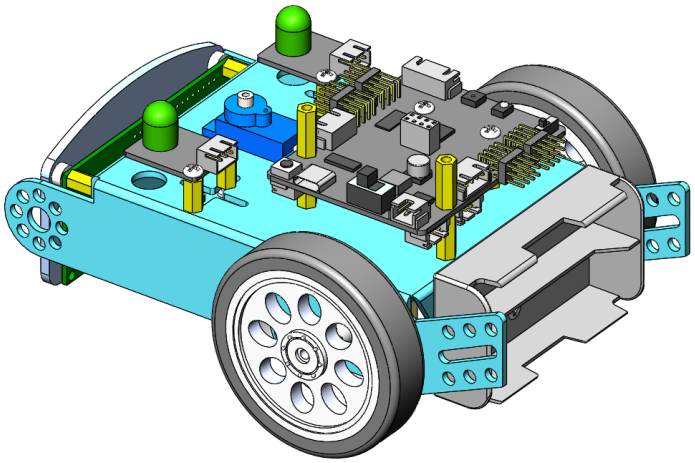


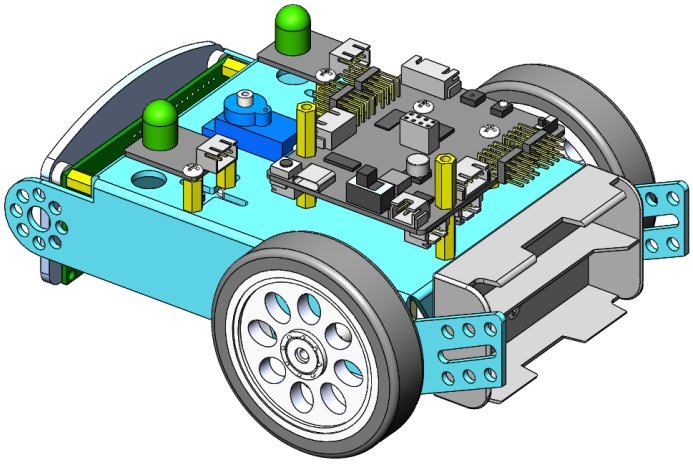
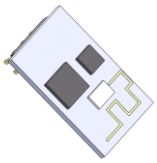
Step 9	Install the control and	Too	M3 Phillips screwdriver/Four-way socket

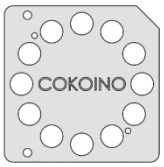
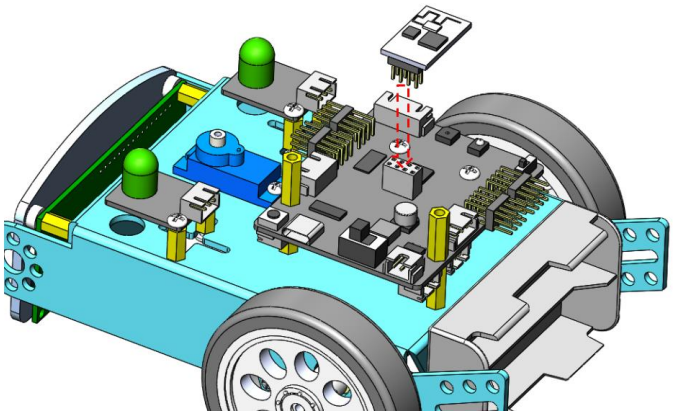
	connect the module		wrench 

	Name	Quantity	Unit	Picture
Part list	Control board	1	PCS	
	Step 8 structure	1	PCS	
	M3*15MM+6 single pass copper column	6	PCS	
	M3*6 round head screw	2	PCS	
	3P-70MMwire	2	PCS	
Detailed steps	Description			Installation Diagram

A	1.Connect one end of the 3P-70MM wire to the 10MM LED module; (note the wire sequence: GND>black wire; VCC>red wire; IN>yellow wire) 2.Screw 4 M3*15MM+6 single-pass copper posts on the frame; 3.According to the circuit connection diagram provided by us, connect the left LED module to the X7 Port of the control board, connect the right LED module to the X6 Port of the control board, connect the left TT motor to the M1 port of the control board, connect the right TT motor to the M1 port of the control board, connect the LCD module to the X3 Port of the control board, connect the servo to the D10 pin of the control board, connect the battery box to the power port of the control board, connect the line tracking module to the X1 Port of the control board; (pay attention to the wiring sequence and corresponding interface) **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 column to fix the control board;	  

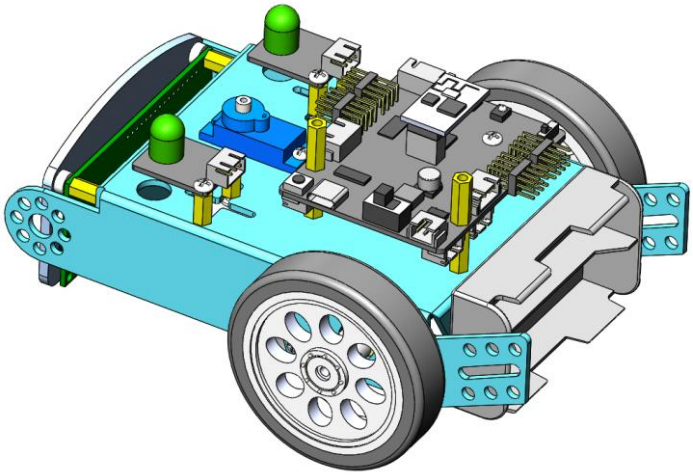
		

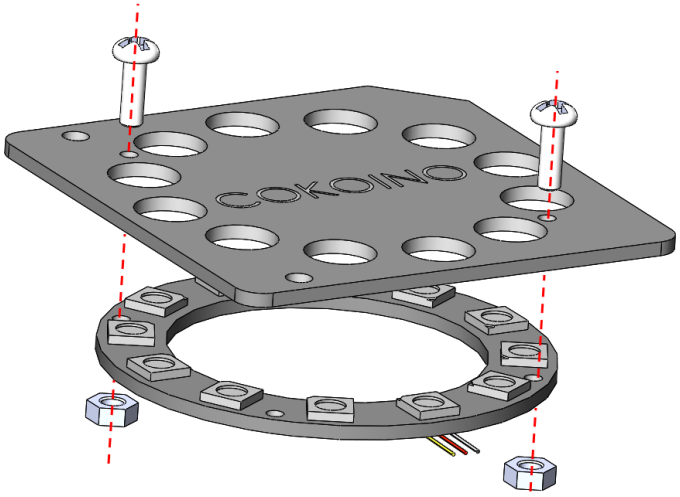
Step 10			Install 8266 wifi module and LED light ring module	Tool	M3 Phillips screwdriver
					
Part list	Name	Quantity	Unit	Picture	
	Step 10 structure	1	PCS		
	8266 wifi module	1	PCS		

	LED light ring module	1	PCS	
	Structure B	1	PCS	
	M2*8MM round head screw	2	PCS	
	M2 nut	2	PCS	
	M3*6 round head screw	2	PCS	
Detailed steps	Description			Installation Diagram
A	1. 1. Install the 8266 wifi module to the interface of the control board; (note the installation direction of the 8266 wifi module); 2. Use M2*8MM screws and M2 nuts to fix the light ring module on the structure B; 3. Use M3*6 round head screw to fix the Step 10 structure to the copper column; (note the direction of the notch in structure B)			

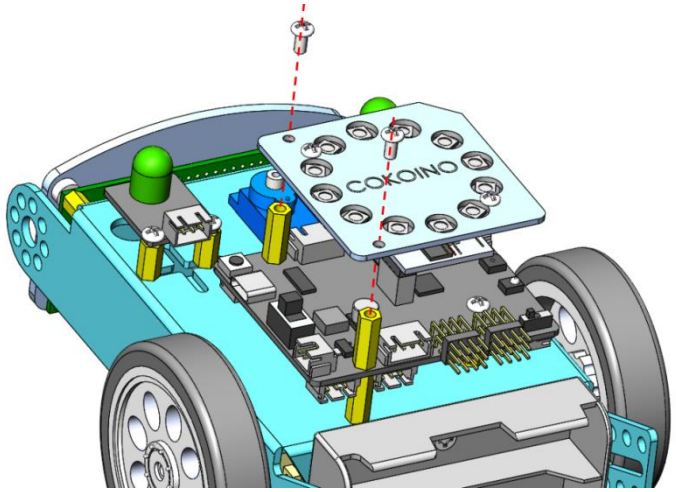
4. Connect the cable of the WS2812 light ring module to the X8 connector of the control board;

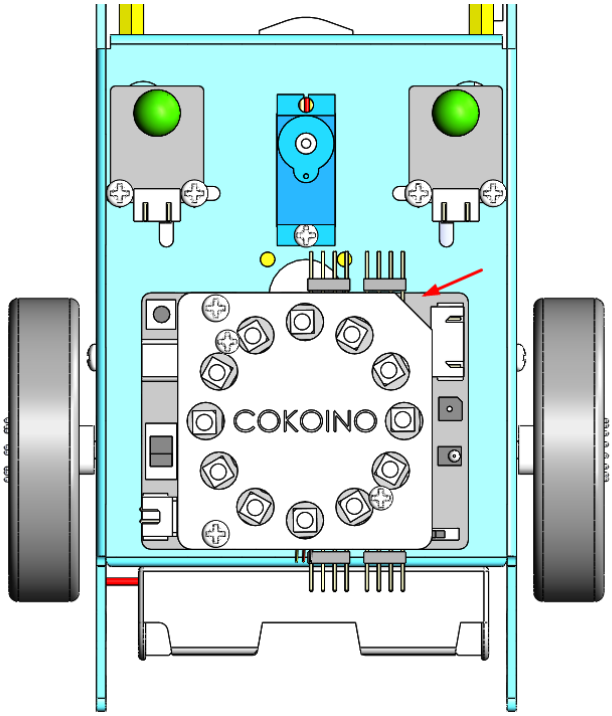
NOTE: The wiring diagram is on the last page of this lesson!





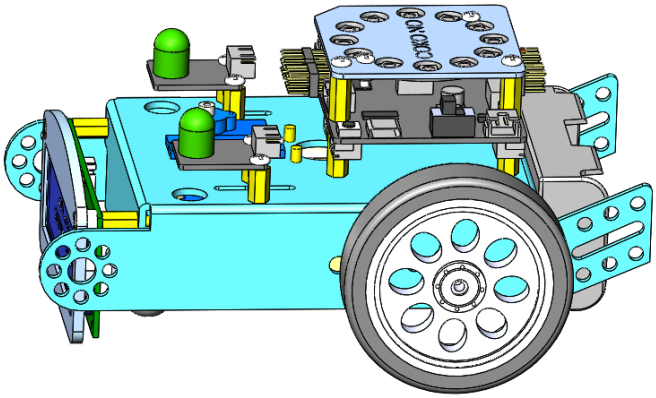

COKOINO

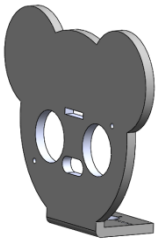
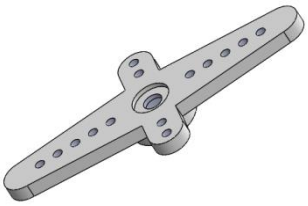

COKOINO

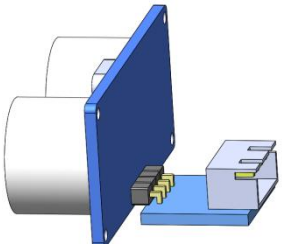
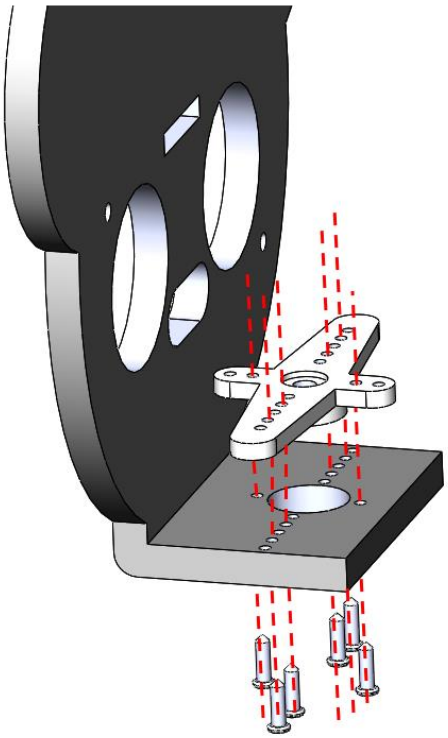


Step 11	Install the Ultrasonic Module	Tool	M3 Phillips screwdriver/Four-way socket wrench

Part list	Name	Quantity	Unit	Picture
	Step 2 structure	1	PCS	



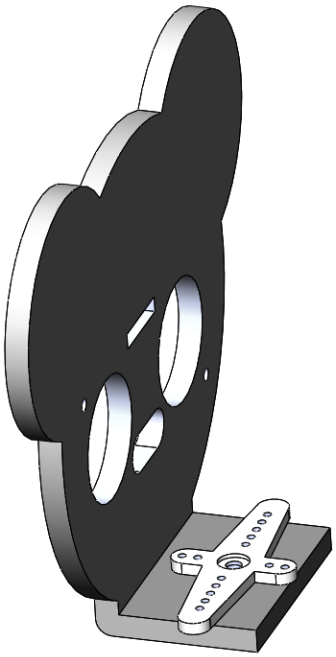
	Structure C	1	PCS	
	Servo cross	1	PCS	
	Servo screw （Packaged with Servo）	1	PCS	
	P1.2*5 self-tapping screw	6	PCS	
	M1.6 nut	2	PCS	
	M1.6*8MM round head screw	2	PCS	

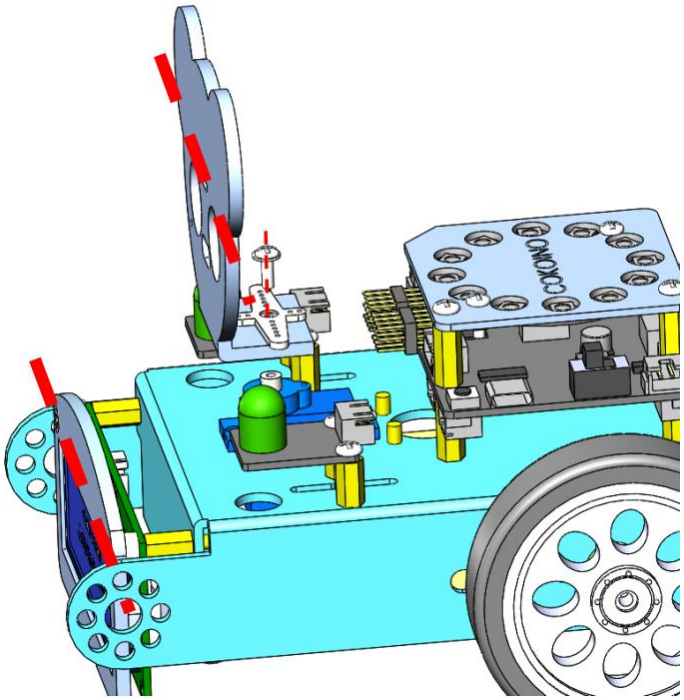
	4P-130MM wire	1	PCS	
	Ultrasonic module	1	PCS	
Detailed steps	Description			Installation Diagram
A	1. Use P1.2*5 self-tapping screws to install the servo cross on the structure C; （Pay attention to the installation direction of the Servo cross） 2. Install the above structure on the Servo shaft; (note that structure C is parallel to structure A when installing) 3. Use M1.6*8 screws and M1.6 nuts to fix the ultrasonic module on structure C; (note the installation direction of the			

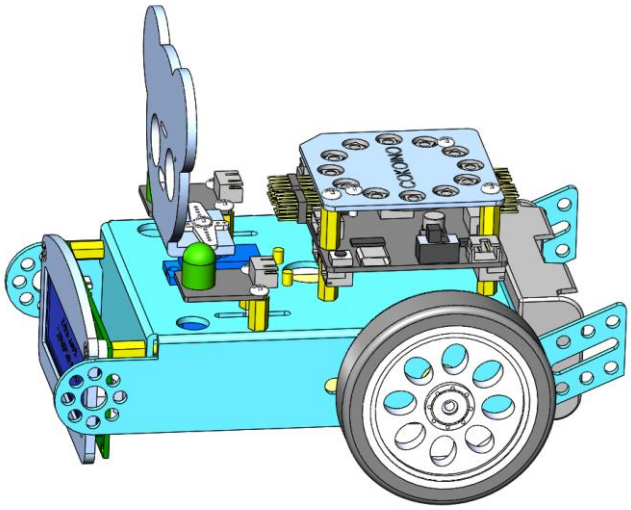
ultrasonic module)

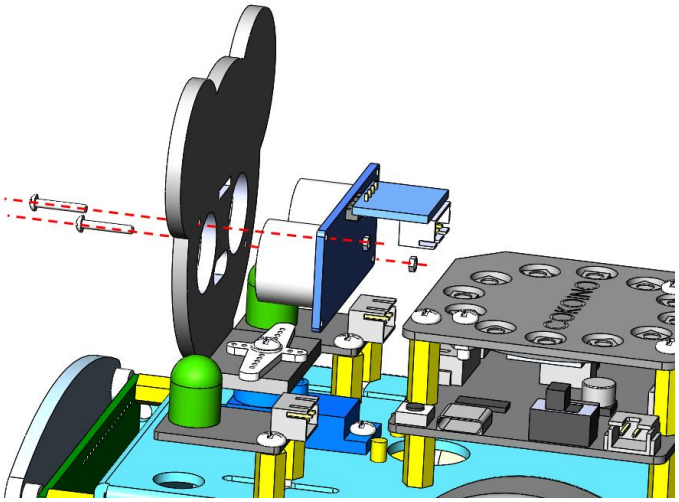
4.Use 4P-130MM wire to connect the ultrasonic module to the X4 interface of the control board;

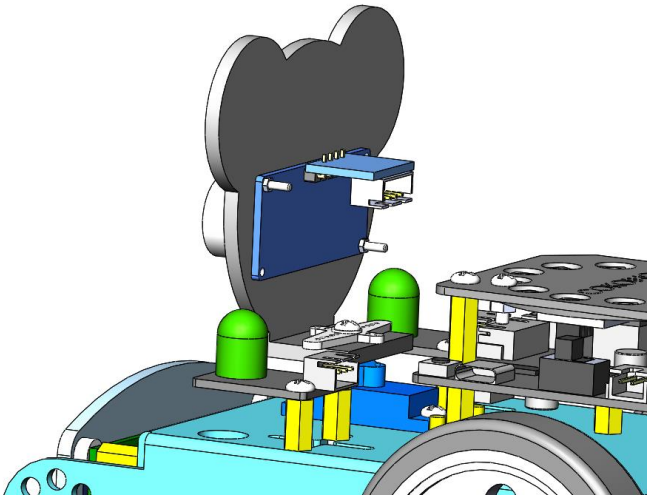
NOTE: The wiring diagram is on the last page of this lesson!



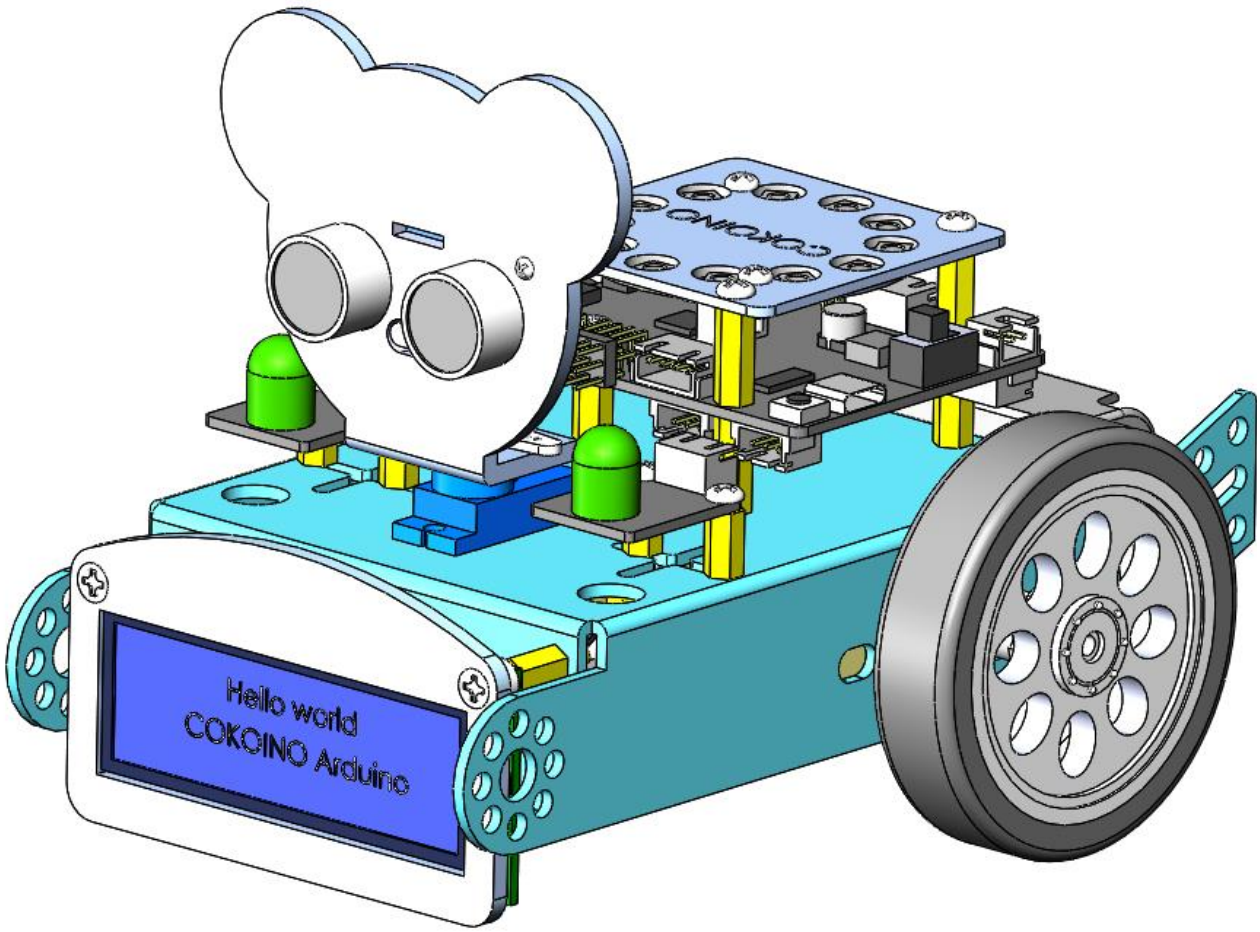






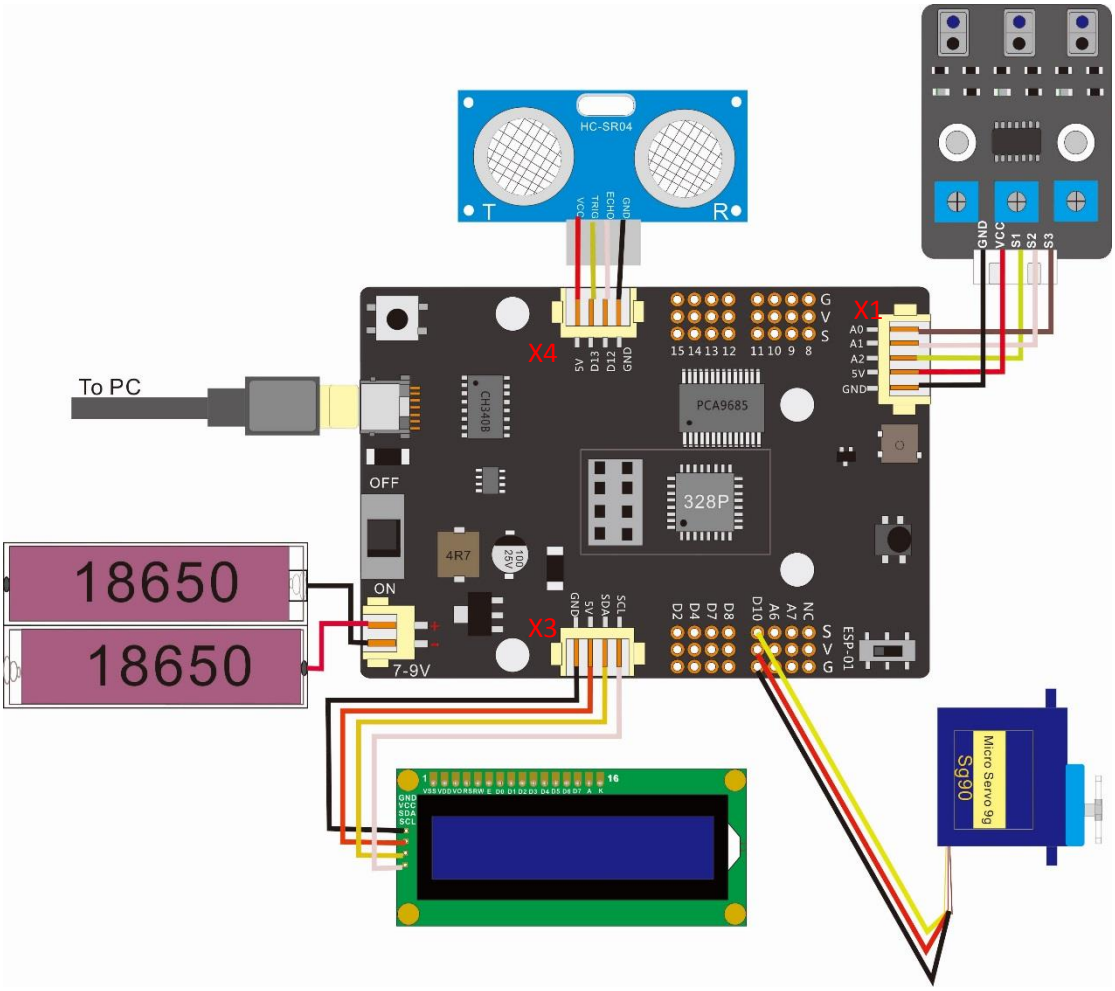


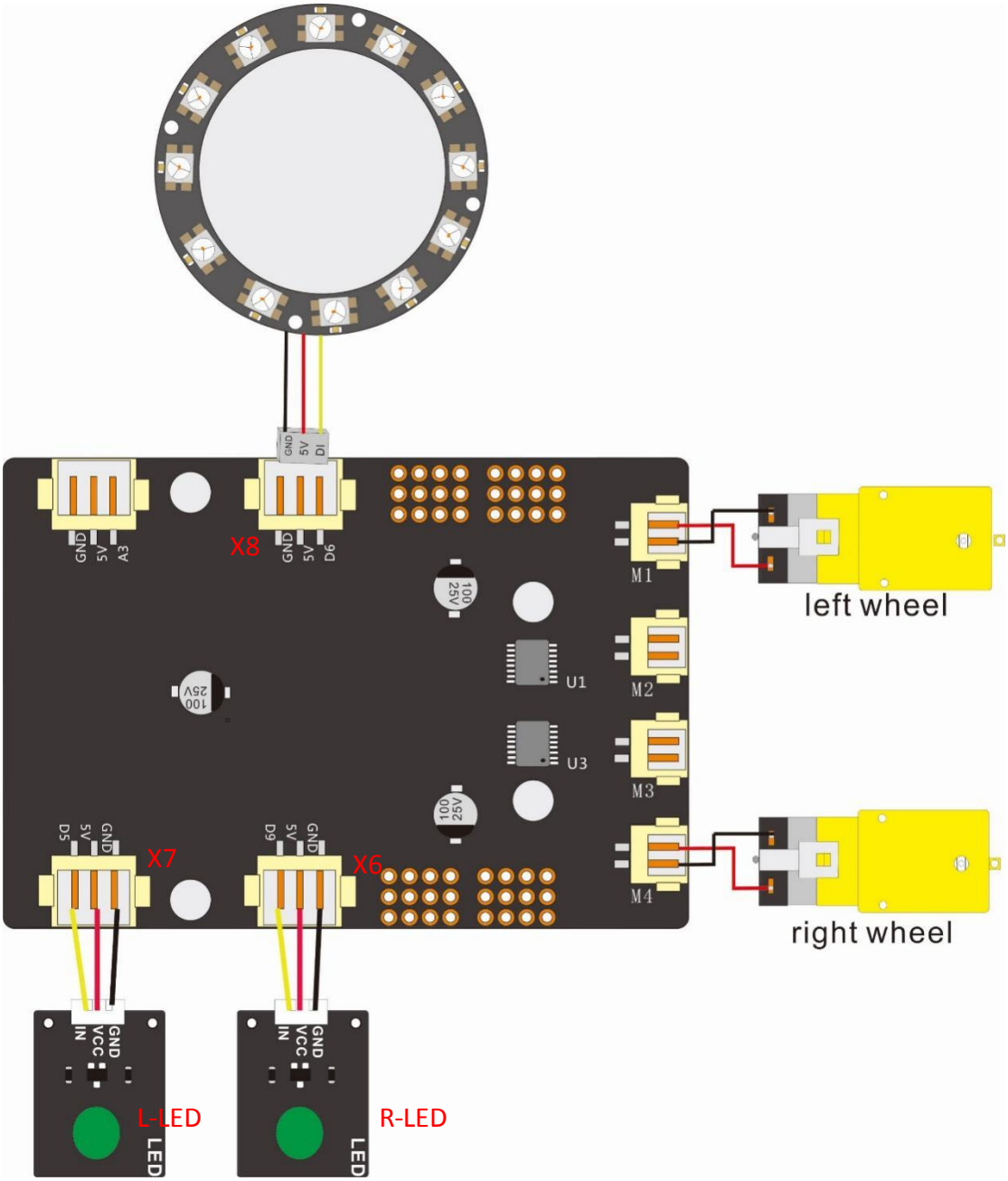
Congratulations, an interesting smart car is finished, and you can start the journey of exploration !



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.




GND
5V
D1
GND
5V
A3
X8
GND
5V
D6
M1
left wheel
M2
U1
M3
U3
M4
right wheel
D5
5V
GND
X7
D9
5V
GND
X6
IN
VCC
GND
LED
L-LED
IN
VCC
GND
LED
R-LED