

## D2-5 Smart Car Kit Instructions

### Foreword

Thank you for choosing the D2-5 smart car kit. This kit gives you an initial understanding of the principles and techniques of automatic control. We hope you can learn useful knowledge and skills in this product and lay a good foundation for further study. Use this product please press assemble according to the requirements in the instruction manual in order to use this product correctly.

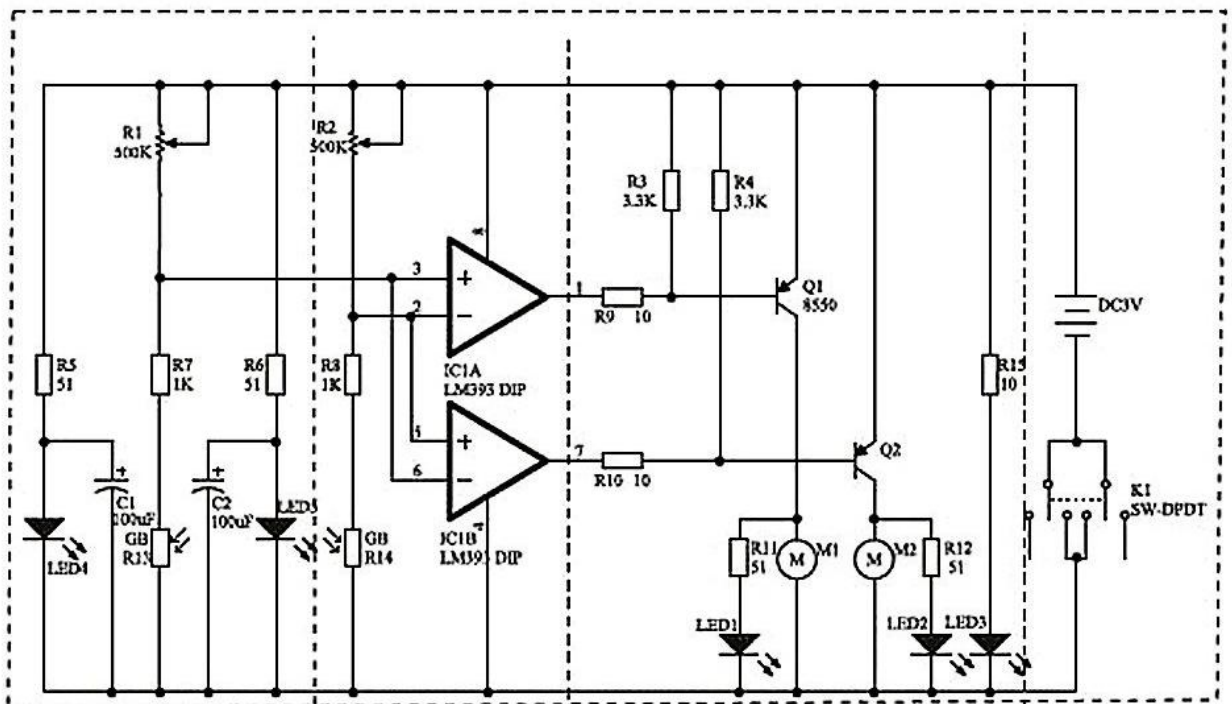
### 1. Introduction

There is a 16mm wide black runway in the white field. This tracking car can drive along the black runway automatically. No matter how the runway is bent, the car can be driven automatically. We all know that the reflectivity is different when the light source to the white objects and black objects. Here we use red light source. The light is reflected through the ground to the photoresistor. By detecting the resistance of the photosensitive resistor can determine whether the car is driving in the black area. If the detection is black runway, then the car to change the direction of driving and motor will slow down or even stop and Red LED OFF on PCB front side. Drive the car in the opposite direction so that the car is always running along the runway. You can also use the 1.5~2.0 cm black electrical tape directly on the ground to design the complex runway. It would be even more fun!

### 2. Overview

- PCB Size: 104\*72\*1.6mm
- Installation dimension: 104\*72\*55mm
- Work Voltage: 3V

### 3. Schematic



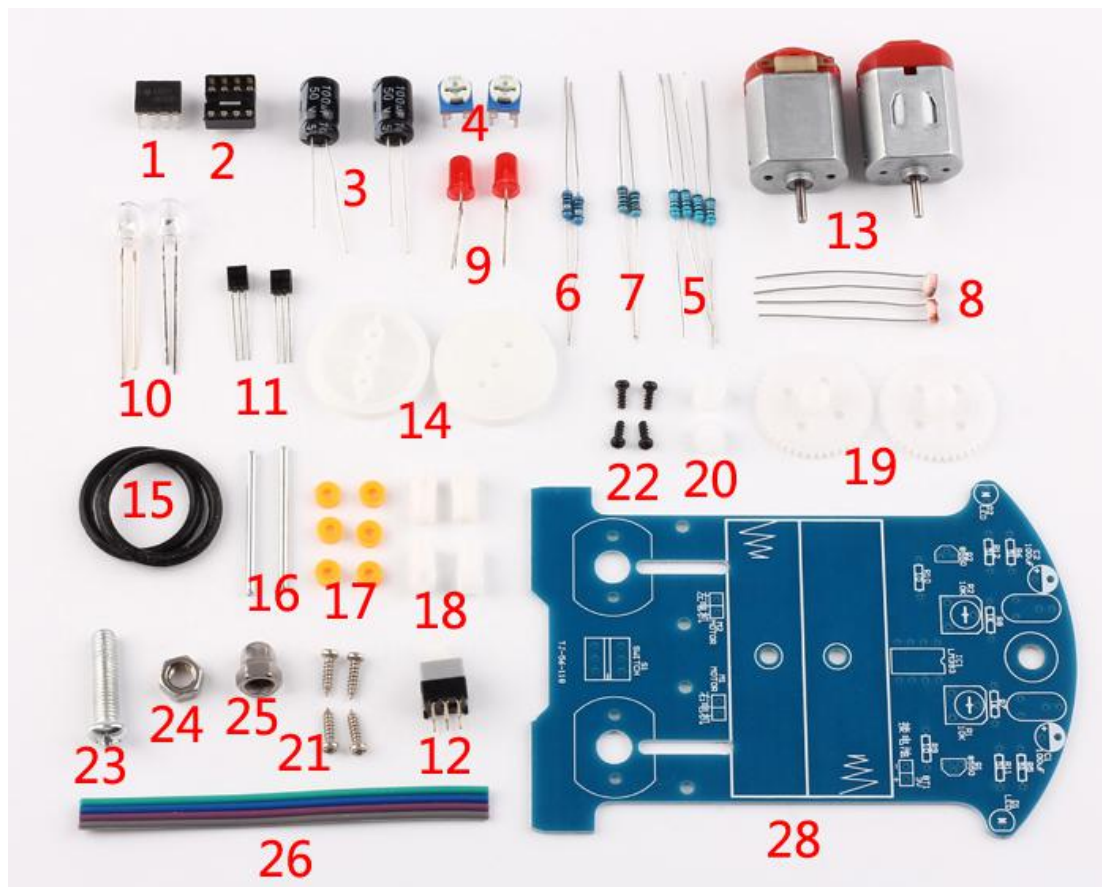
## WHDTs Smart Car Kit D2-5 Electric Soldering DIY Kits

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### 4. Component listing

NO.	Component Name	PCB Marker	Parameter	Qty	Remarks
Electronic Component					
1	LM393	IC1	DIP-8	1	
2	IC Socket	IC1	DIP-8	1	
3	Electrolytic Capacitor	C1,C2	100uF	2	
4	Potentiometer	R1,R2	103 10K	2	
5	Metal Resistance	Film R5,R6,R11,R12	51ohm	4	
6	Metal Resistance	Film R7,R8	1K	2	
7	Metal Resistance	Film R9,R10	10ohm	2	
8	Photoresistor	R13,R14	CDS5	2	
9	Red LED	D1,D2	5mm	2	Red Shell,Red Light
10	White LED	D4,D5	5mm	2	White Shell,Red Ligth
11	S8550	Q1,Q1	TO-92	2	
12	Self-Locking switch	S1	6*6mm	1	
Mechanical Part					
13	DC Motor	M1,M2	JD3-100	2	
14	Wheel		24mm	2	
15	Tires		24mm	2	
16	Axle		D2*30mm	2	
17	Gasket		D2.0mm	6	Non-essential
18	Three-way sleeve		D2.5mm	4	
19	Gear		D22mm	2	
20	Worm		D5mm	2	
21	Screw		D2.2*8mm	4	
22	Motor Screw(Black)		D1.7*4mm	4	
23	Gaster Screw		M5*20mm	1	
24	Gaster Nut		M5	1	
25	Gaster Screw Cap		M5	1	
Other Component					
26	Cable		6mm	4	
27	Battery Case		AA*2	1	With adhesive
28	PCB		D2-5	1	104*72*1.6mm

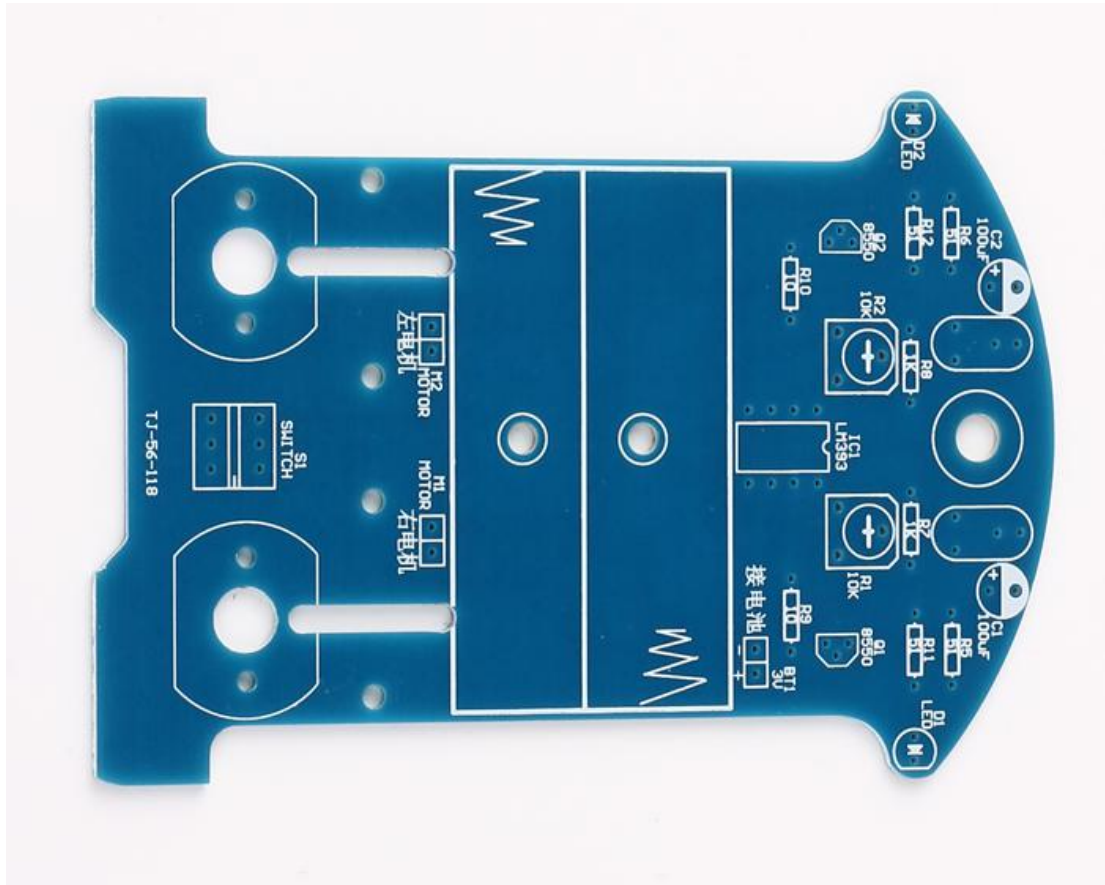
## 5. Components

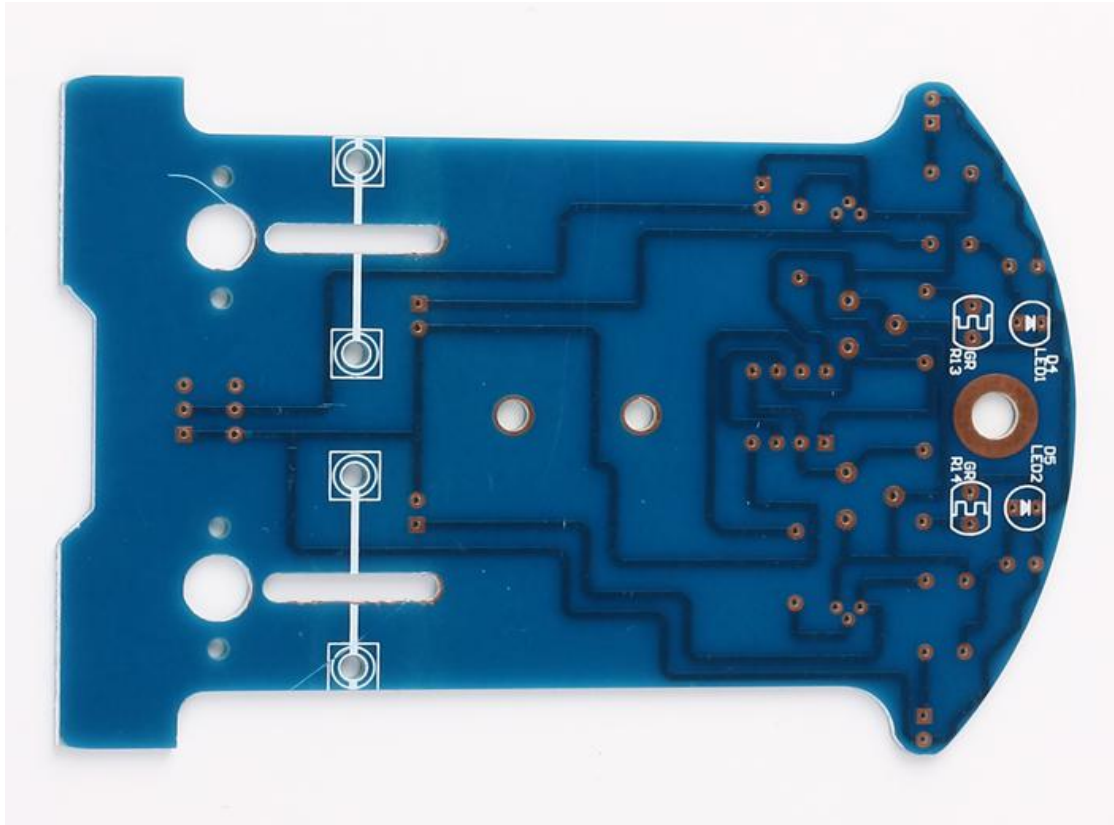


- 1>. 1pcs LM393 DIP-8
- 2>. 1pcs IC Socket DIP-8
- 3>. 2pcs 100uF Electrolytic Capacitor
- 4>. 2pcs 10K Potentiometer
- 5>. 4pcs 51ohm Metal Film Resistance
- 6>. 2pcs 1K Metal Film Resistance
- 7>. 2pcs 10ohm Metal Film Resistance
- 8>. 2pcs Photoresistor
- 9>. 2pcs 5mm Red LED
- 10>. 2pcs 5mm White LED
- 11>. 2pcs TO-92 S8550
- 12>. 1pcs 6\*6 Self-Locking switch
- 14>. 2pcs Wheel

- 15>. 2pcs Tires
- 16>. 2pcs Axle
- 17>. 6pcs Gasket(Non-essential)
- 18>. 4pcs Three-way sleeve
- 19>. 2pcs Gear
- 20>. 2pcs Worm
- 21>. 4pcs Screw
- 22>. 4pcs Motor Screw(Black)
- 23>. 1pcs Mecanum wheels Screw
- 24>. 1pcs Mecanum wheels Nut
- 25>. 1pcs Mecanum wheels Screw Cap
- 26>. 4pcs 6mm Cable
- 27>. 1pcs AA\*2 Battery Case(Not shown in the picture)
- 28>. 1pcs PCB

## 6. Installation Steps



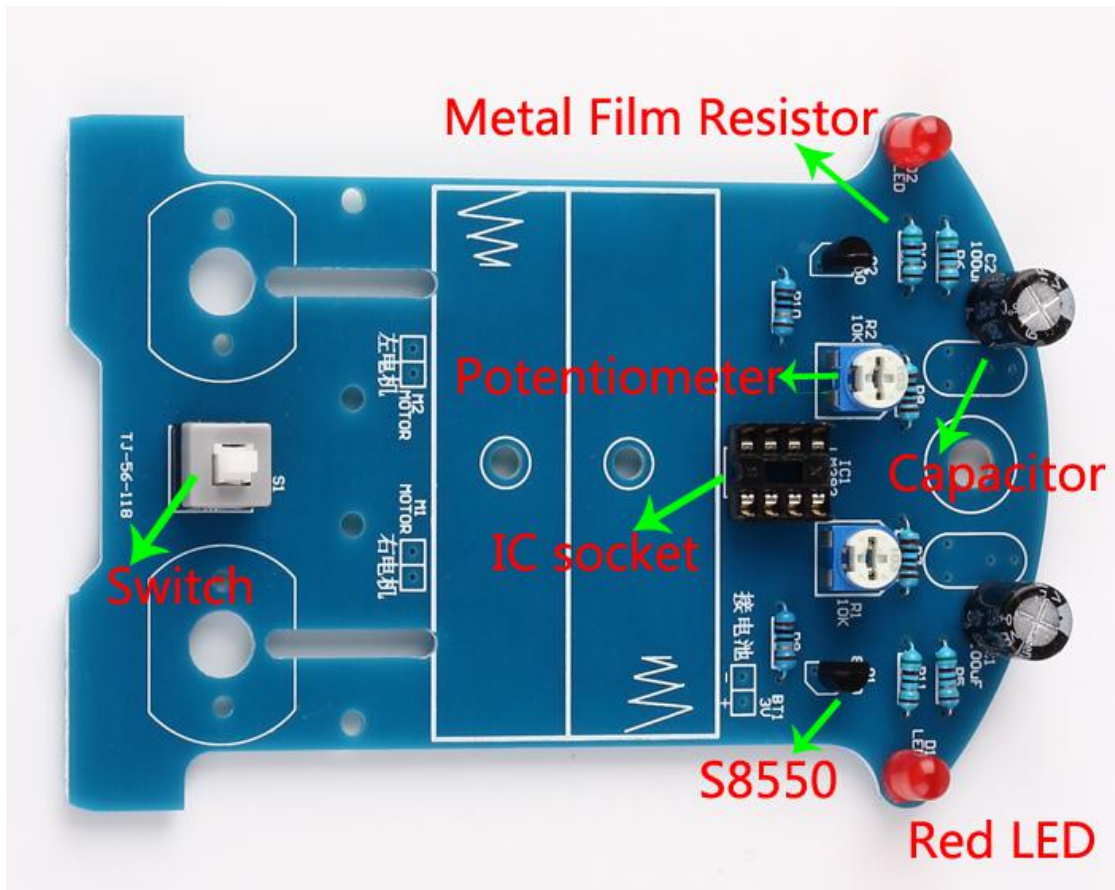


1>.Install circuit.

1.1 Please solder the color ring resistance, 8-pin IC holder, switch, potentiometer, transistor, electrolytic capacitor and  $\phi$  5.0 light-emitting diode successively on the circuit board according to the identifiers on the circuit diagram and board.

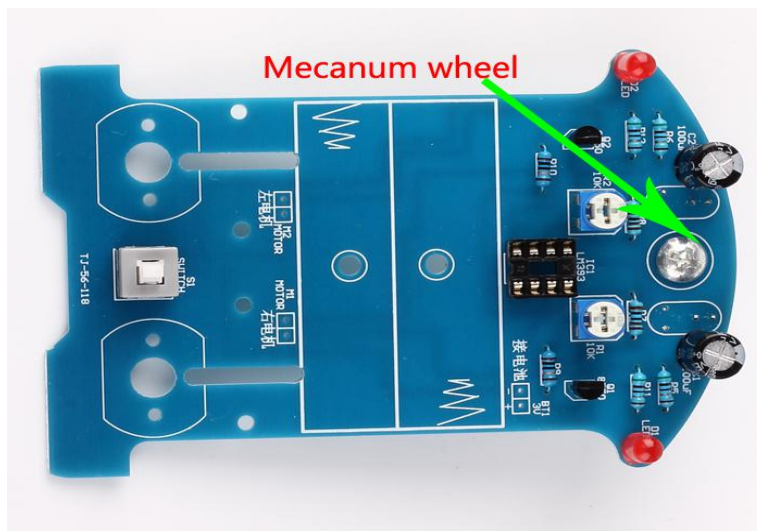
1.1.1 Pay attention to the direction of IC Socket.

1.1.2 In addition to facilitate debugging, don't install IC LM393 temporarily.

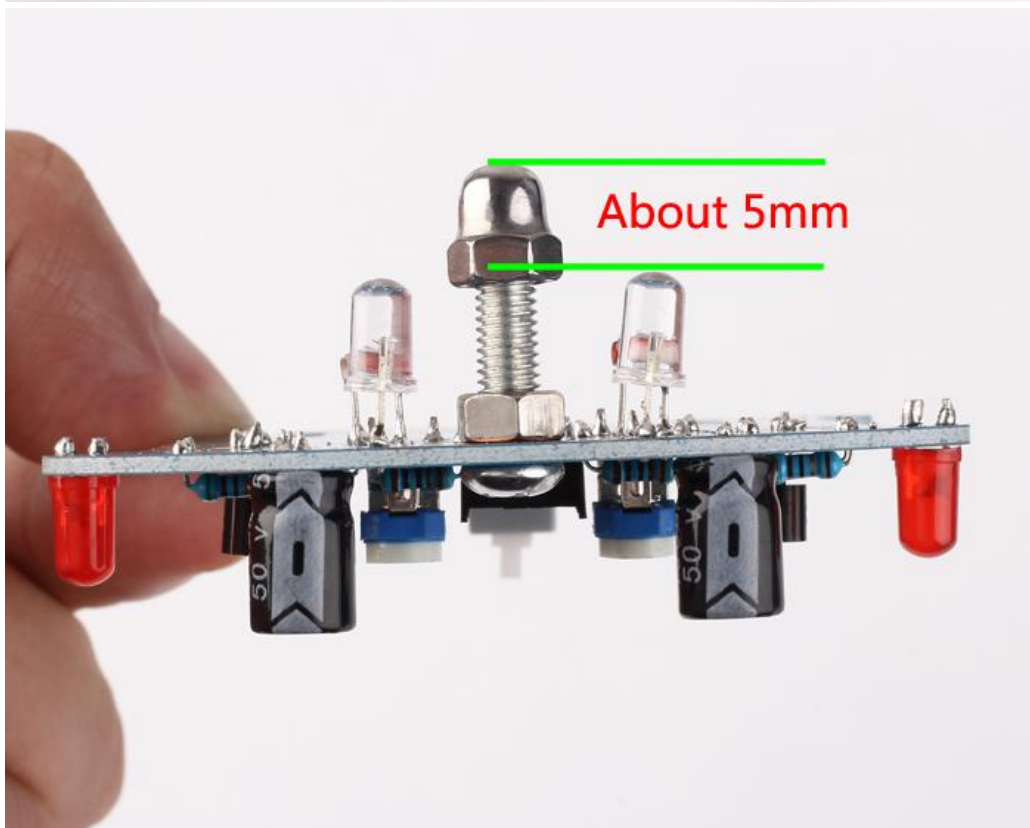
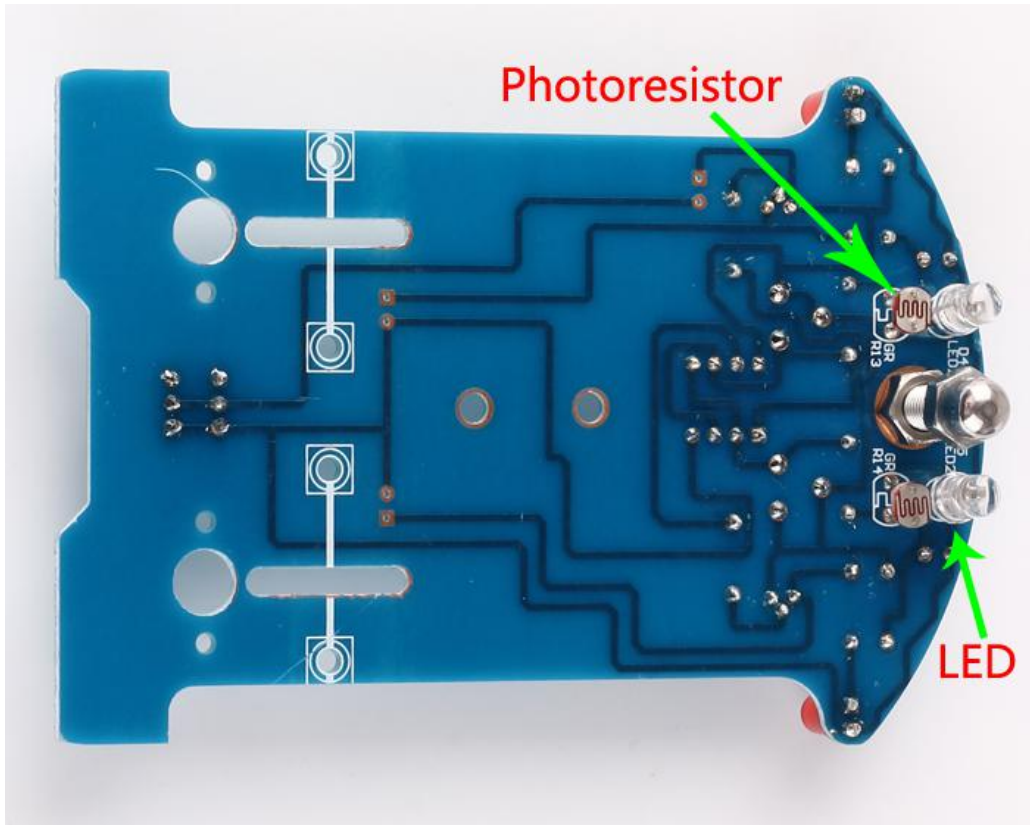


1.2 Install Mecanum wheel

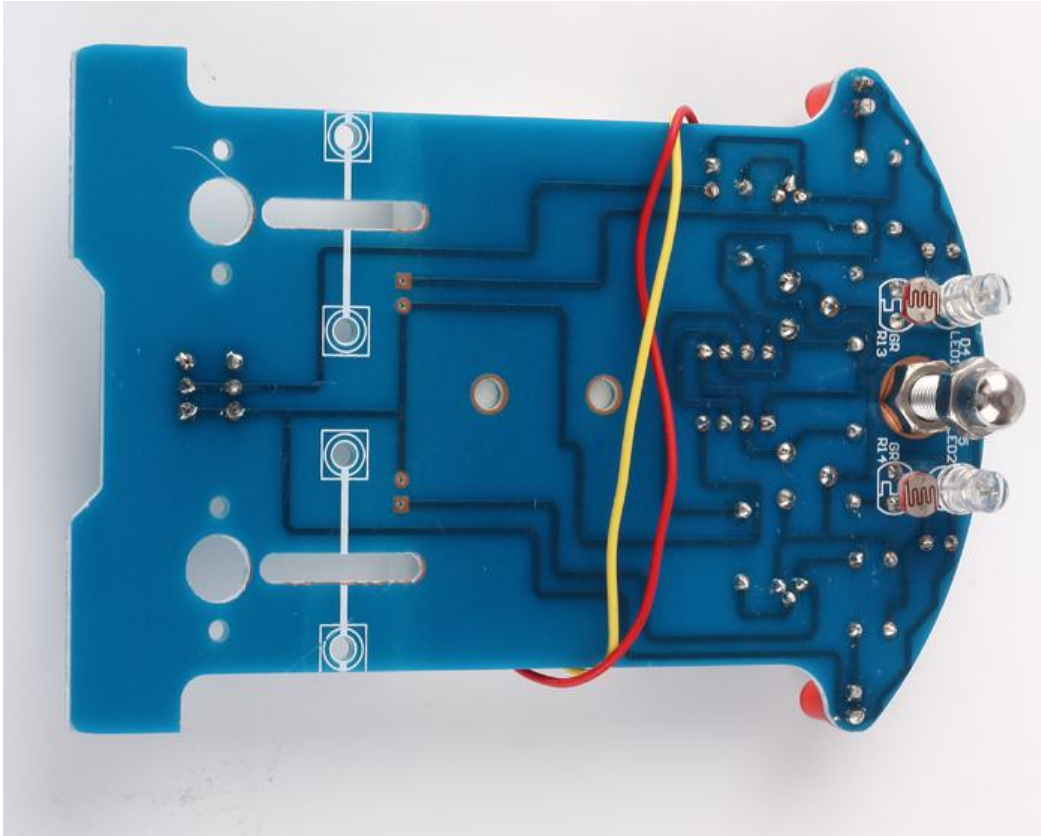
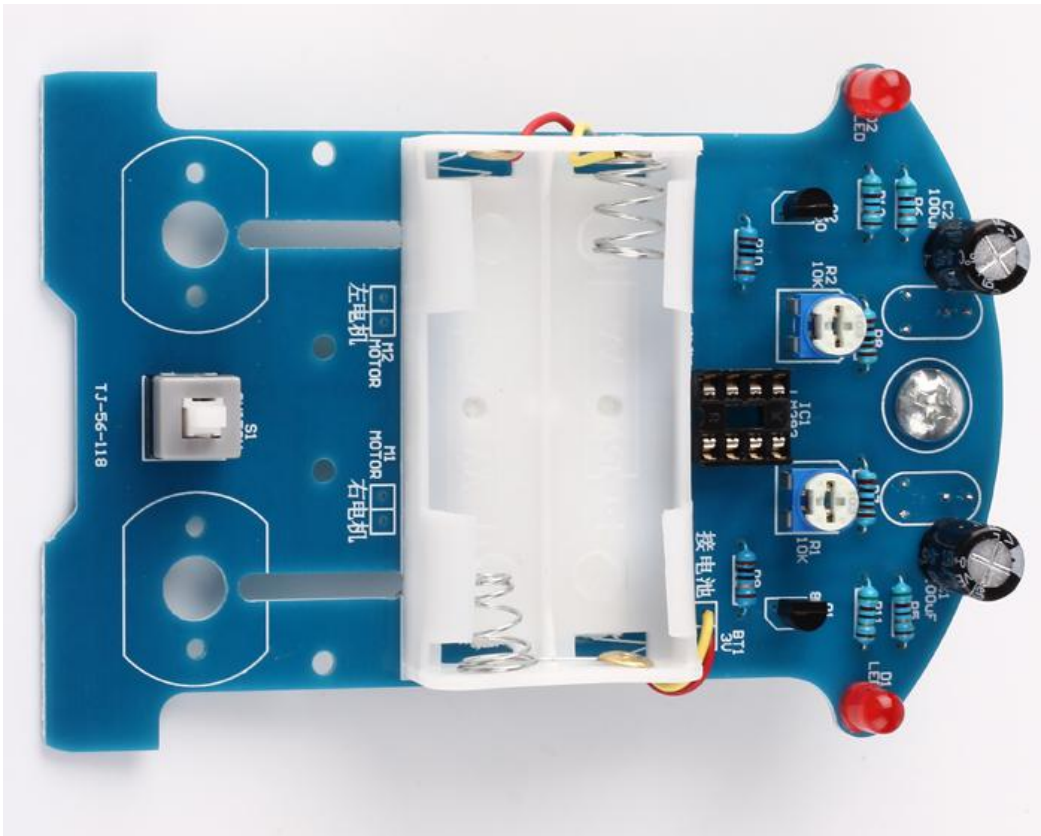
1.2.1 Put the PCB on the front. Insert the caster's support bolt into the hole, tighten the nut screwed into the caster, then install the caster and tighten it.



1.3 Install photoresistor and white LED on PCB reverse. But please make sure the distance is about 5mm between top of mecanum wheel (top of screw cap top) and photoresistor/LED.



1.4 Install battery case.





### 1.5 Test.

1.5.1 Install 2pcs AA battery.

1.5.2 Press on switch. If 2pcs white LED ON, the installation is successful. If LED off, please check the welding. Pay attention to the direction of LED and other component and check pseudo soldering.

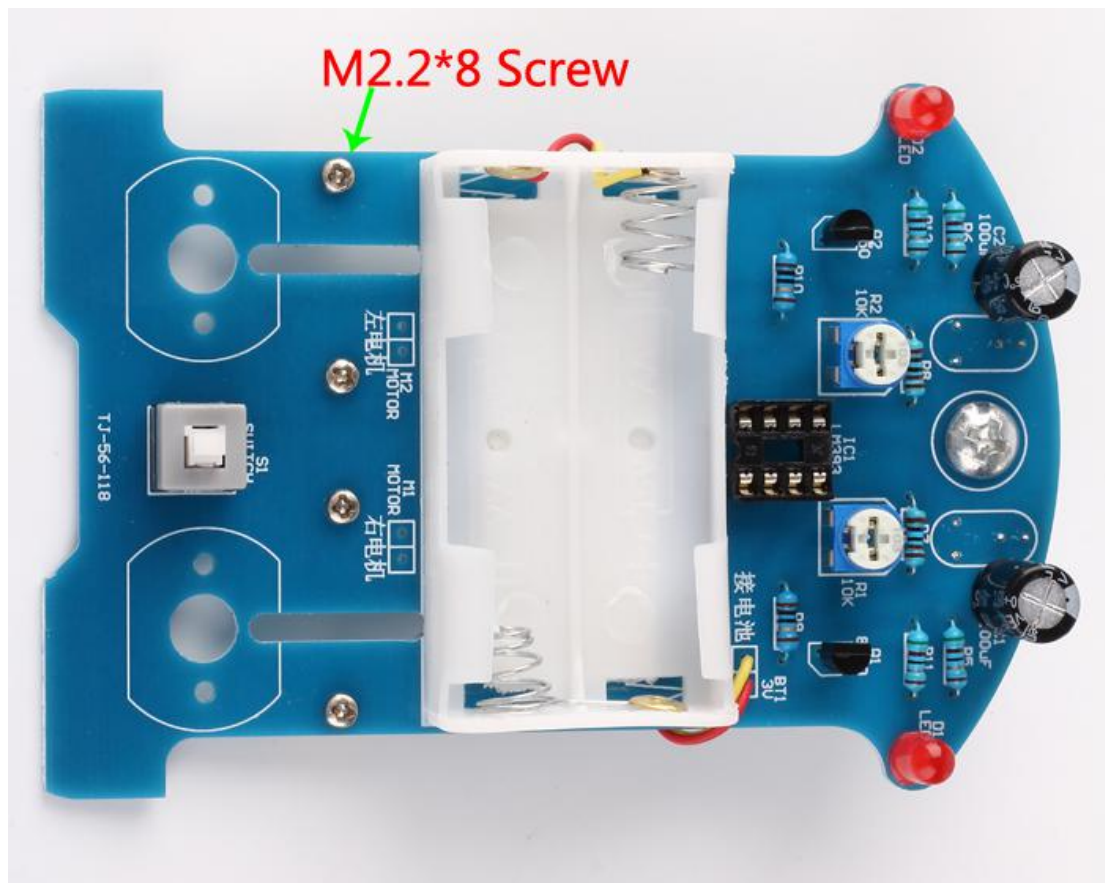
### 2>. Install mechanical parts

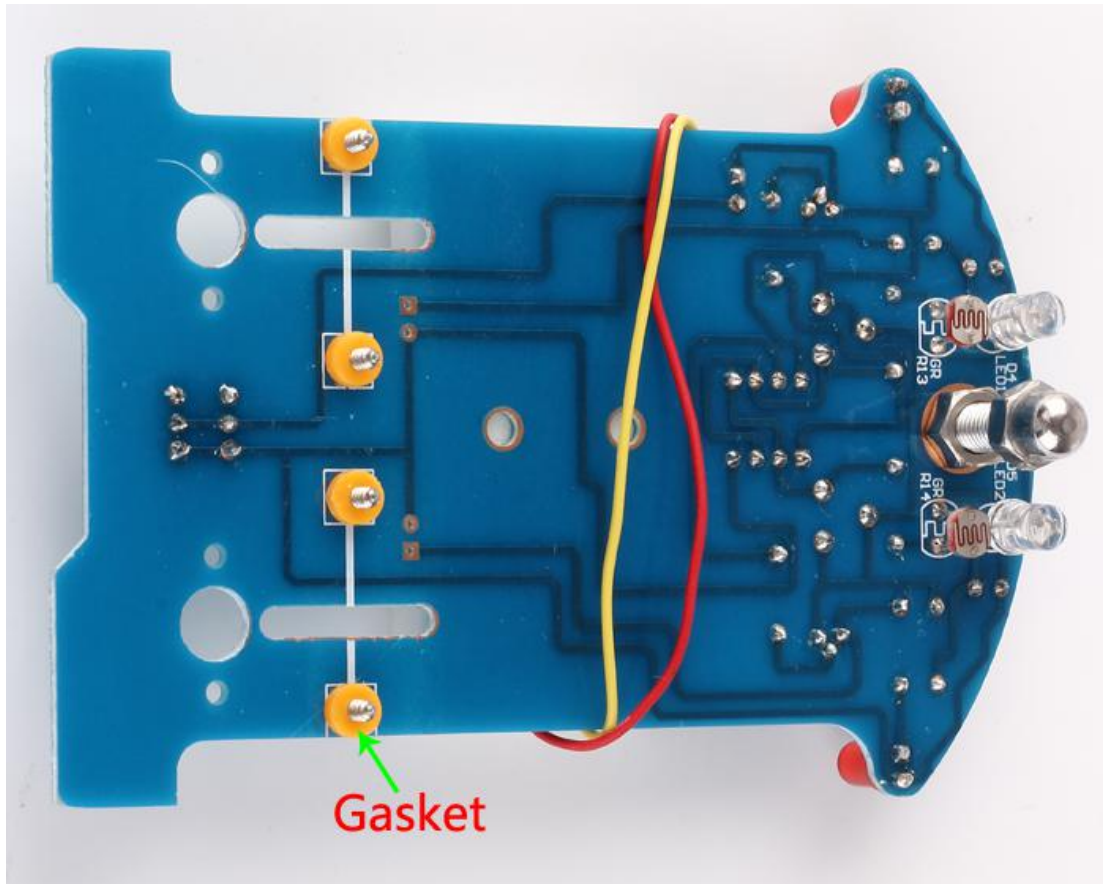
2.1 Install the four gaskets on the circuit board.

The role of the gasket is to increase the gap between the axle and the circuit board, so that the gear mounted on the shaft has enough rotation space.

First insert a M2.2 \* 8 screw from the front of the board into the mounting hole, place a gasket from the back of the circuit board on the screw.

Clamp the gasket with a small pliers, turn the screw with a small screwdriver until the gasket is close to the circuit board at last.

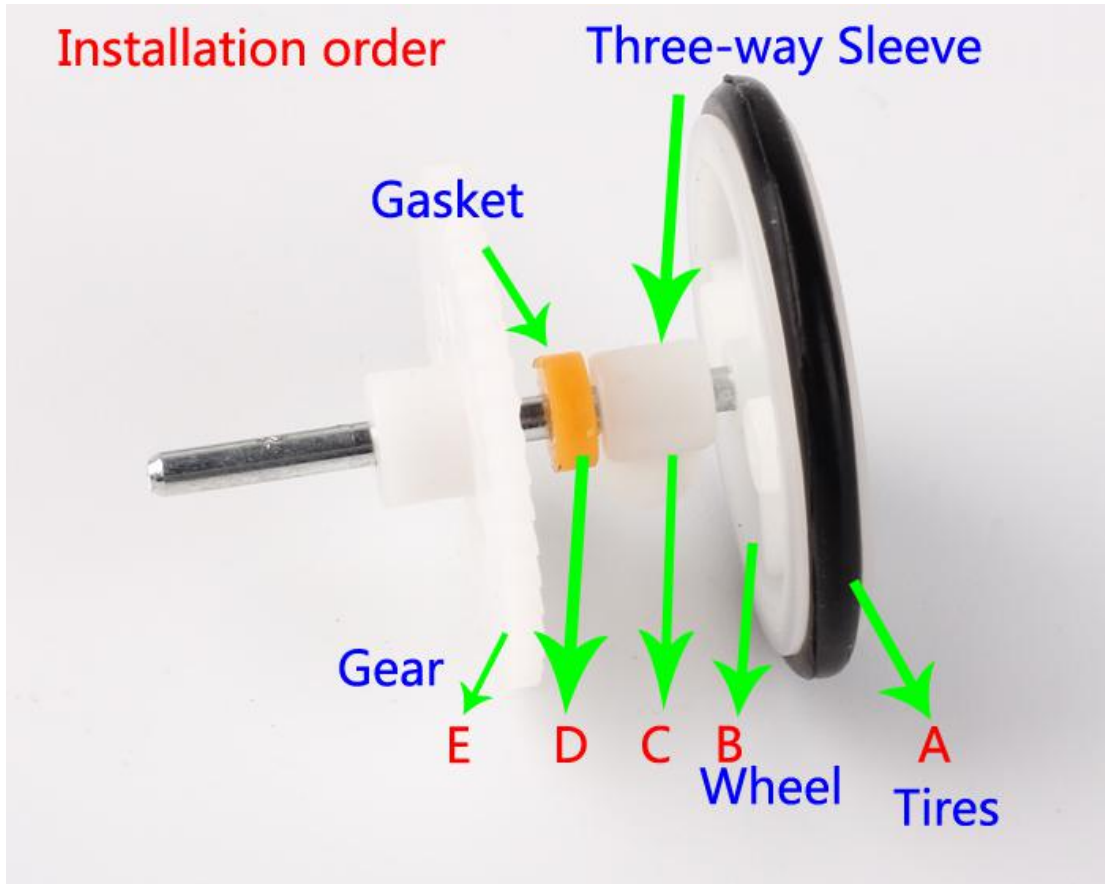




2.2 Pass a steel shaft through the center hole of the wheel, paying attention to the direction of insertion from one side of the wheel's raised sleeve. Insert the steel shaft into the smooth side of the wheel and align it as well.

2.3 A three-way shaft sleeve is inserted into the steel shaft and is adjacent to the wheel. Then a gasket is inserted into the steel shaft and is adjacent to the three-way shaft sleeve. After being installed, the three-way shaft sleeve is toggled, and the rotation should be flexible. Otherwise, increase the gap between them properly.

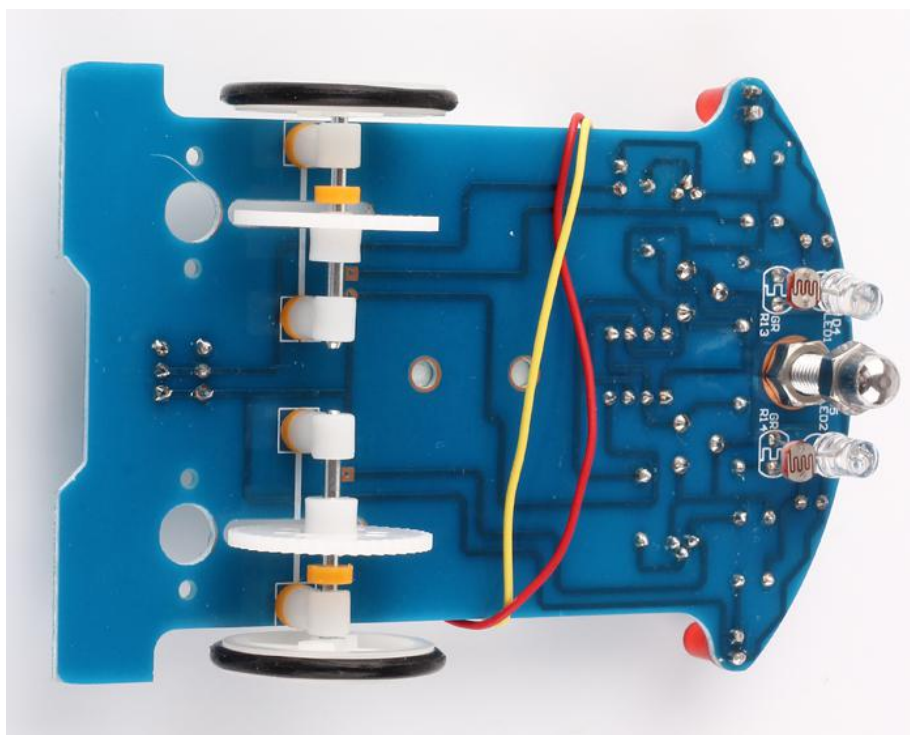
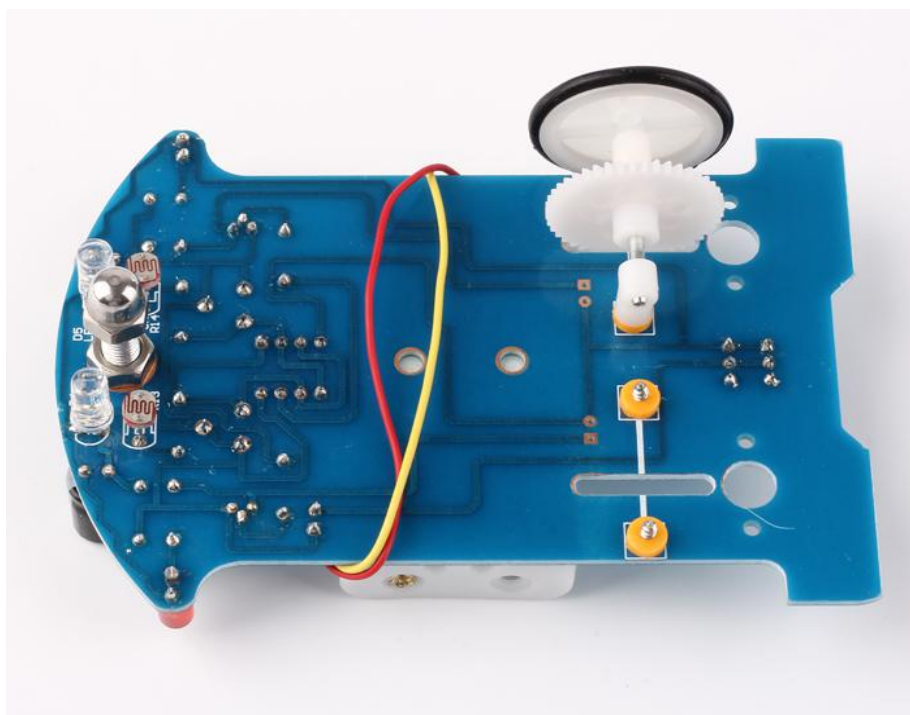
2.4 Place a gear into the steel shaft in the center of the steel shaft.



2.5 Put a three-axis sleeve into the end of the steel shaft so that the car side of the wheel assembly to complete.

Hold the wheel by hand, keep the steel shaft horizontal, and adjust the position of the three-way shaft sleeve on the steel shaft. The gears on the steel shaft should fall into the gear slot, otherwise the gear position should be adjusted until it meets the requirements.

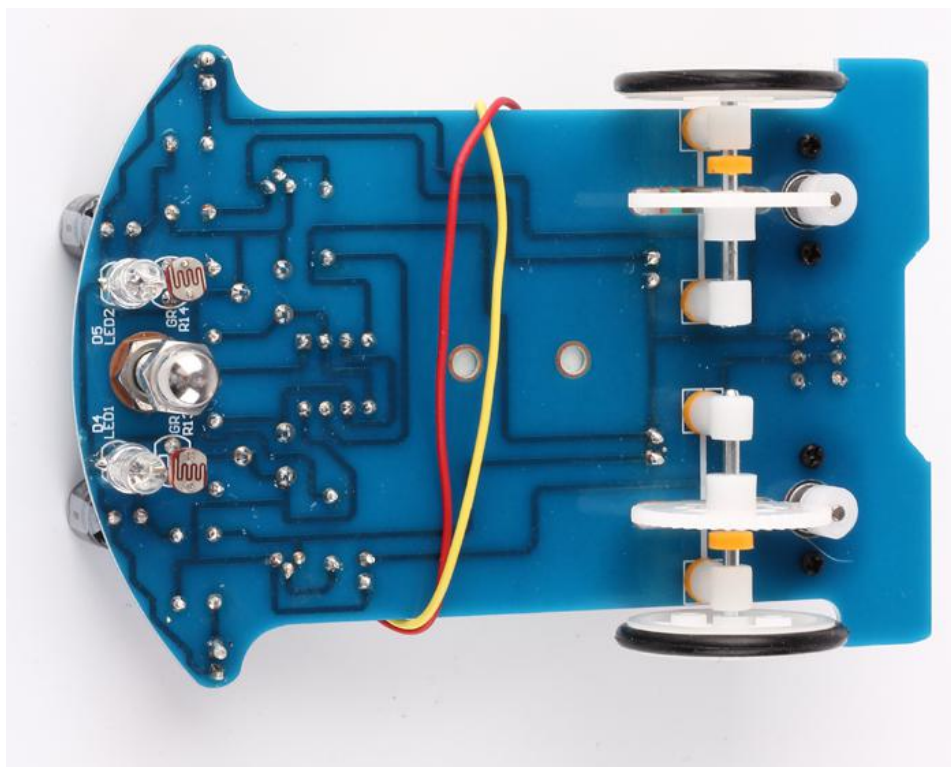
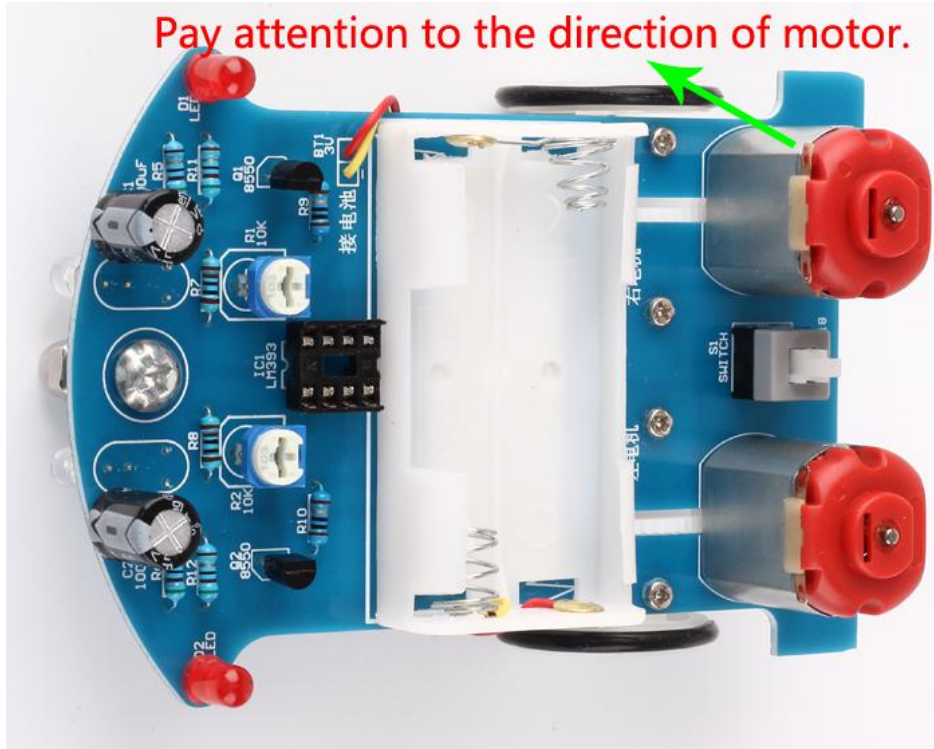
Finally, the two shafts on the steel shaft are fitted into the screw projections of the fixed washers and tightened with a small screwdriver so that the wheel assembly is installed. Install the other side of the wheel assembly in the same way.



### 2.6 Install Motor

Insert a worm into the motor shaft, Then thread worm from the front of the circuit board to others. Use two small screws to hold the motor. Pay attention to the direction of motor. Contact motor and PCB by cable.

It can reverse the wire of motor if motor move on the contrary when power on.



3. Test.

3.1 Power on. Check S8550 or 10ohm resistor if motor don't move.

3.2 Install LM393(Pay attention to the direction of IC).

3.3 If you have any other question, please feel free to contact us. We'd love to help!

Finish soldering your smart car, you did it!

You can also design more complex runways. **Have fun !**

