HC-SR04 Ultrasonic Obstacle Avoidance Car DIY Kit

1.Introduction:

HU-046 is a HC-SR04 Ultrasonic Automatic Obstacle Avoidance Intelligent Car DIY Kit. The car automatically advances, and when the sensor senses an obstacle in front, it automatically turns left or right, or even directly reverses to avoid the obstacle and continue moving forward. The sensing distance of ultrasound can be reset by pressing the button.

It's a DIY kit which comes with various components. User need to install each component by hand. It not only can exercise and improve soldering skills, but also increase the interest in electronic technology. Great for electronics hobbyists, beginners, school and home education.It is a very interesting DIY electronic product which enables users to understand the circuit more clearly and learn soldering skills.

2.Feature:

1>.Ultrasonic automatic sensing distance
2>.Programmable induction detection distance
3>.Multiple exercise modes:Forward, backward, left turn, right turn, rotate in place
4>.High simulation obstacle avoidance robot operation
5>.DIY Hand Soldering

3.Parameter:

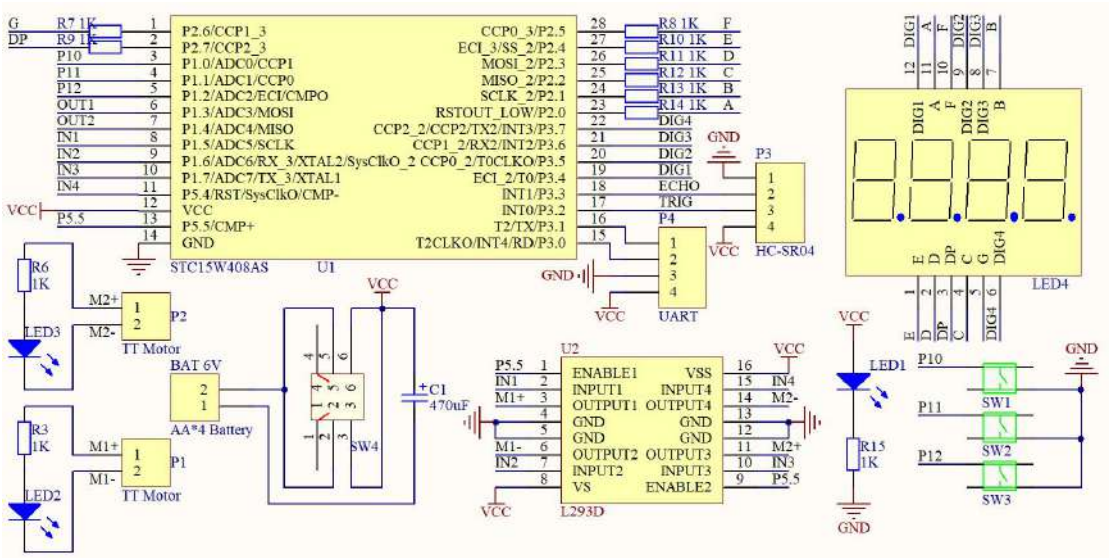
1>.Product Name:HC-SR04 Ultrasonic Obstacle Avoidance Car DIY Kit
2>.Work Voltage:DC 6V
3>.Power Type: AA*4 Battery(NOT Include)
4>.Work Current:<300mA
5>.Sense Distance:<5m
6>.Obstacle Avoidance Set Range:0~2.55m(0-0.5m is the best and default is 0-0.2m)
7>.Display Type: 4Bit Red Display Screen
8>.Work Temperature:-20℃~85℃
9>.Work Humidity:5%~85%RH
10>.Size(Installed):135*85*50mm

4.Component Listing:

NO.	Component Name	PCB Marker	Parameter	QTY
1	Electrolytic Capacitor	C1	470uF	1
2	Metal Film Resistor	R3,R6-R15	1Kohm	11
3	4Bit Digital Display Tube	LED4	Red	1
4	Black Button	SW1-SW3	6*6*10mm	3
5	5mm Red LED	LED1-LED3	2Pin	3
6	Self-locking Switch	SW4	8*8mm	1
7	L293D Motor Driver	U2	DIP-16	1
8	IC Socket	U2	DIP-16	1
9	STC15W408AS Controller	U1	DIP-28	1
10	IC Socket	U1	DIP-28	1
11	HC-SR04 Ultrasonic Sensor	P3		1
12	Black Rubber Tires			2
13	Yellow Rubber Wheel			2
14	AA*4 Battery Box			1
15	1:48 TT Motor	P1,P2		2
16	Double-Sided Tape for Motor		30*20mm	2
17	Double-Sided Tape for Battery Box		60*25mm	1
18	M2.5*8mm Self Tapping Screw			2
19	Red/Black Wire		50mm	2
20	Nylon Ties		3*200mm	2

21	M4*35mm Screw			1
22	M4 Nut			1
23	M4 Nut Ball			1
24	PCB		120*73mm	1
NOTE:Users can complete the installation according to the PCB silk screen and component list.				

5.Schematic:



6.Note:

1>.Disable obstacle avoidance function if the parameter is set to 0.

2>.The car does not move straight forward, even if there are no obstacles. Because the installation of the motor or wheel has a certain angle.

3>.The motor should be as close to the edge of the PCB as possible to avoid affecting the installation of the wheels and causing them to get stuck by the PCB.

7.Application:

1>.Training welding skills
2>.Student school
3>.DIY production
4>.Project Design
5>.Electronic competition
6>.Gift giving
7>.Crafts collection
8>.Home decoration
9>.Souvenir collection
10>.Graduation design
11>.Holiday gift

8.Installation Tips:

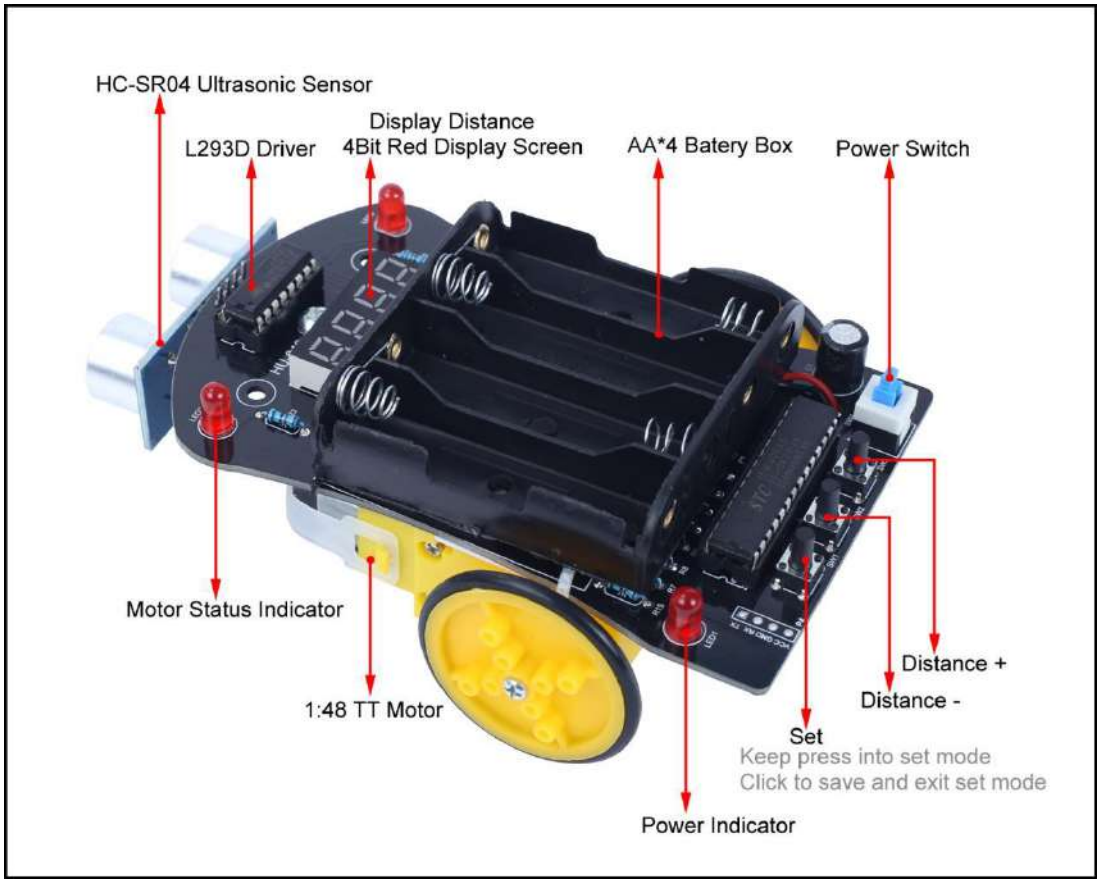
1>.User needs to prepare the welding tool at first.
1.1>.Soldering iron (<50 Watt)
1.2>.Rosin core ("radio") solder
1.3>.Wire cutters
1.4>.Wire strippers
1.5>.Philips screwdriver
2>.Please be patient until the installation is complete.
3>.The package is DIY kit.It need finish install by user.

4>.The soldering iron can't touch the components for a long time(3s), otherwise damage components.
5>.Pay attention to the positive and negative of the components.
6>.Strictly prohibit short circuit.
7>.Install complex components preferentially.
8>.Make sure all components are in right direction and right place.
9>.It is strongly recommended to read the installation manual before starting installation!!!
10>.Please wear anti-static gloves or anti-static wristbands when installing electronic components.

9.Installation Steps(Please be patient install!!!):

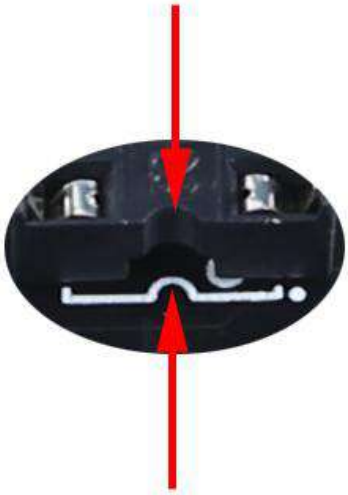
1>.Step 1: Install 11pcs 1Kohm Metal Film Resistor at R3,R6-R15.
2>.Step 2: Install 1pcs DIP-28 IC Socket at U1.There is a gap mark on one end of the IC Socket and there is a gap mark on PCB silk screen where the IC Socket can place on.These two marks are corresponding to each other and are used to specify the installation direction of the IC Socket.
3>.Step 3: Install 1pcs DIP-28 IC Socket at U2 in the same methods.
4>.Step 4: Install 3pcs 5mm Red LED at LED1-LED3. Note:The longer pin is positive pole and connect to ‘ + ’ pads.
5>.Step 5: Install 3pcs 6*6*10mm Black Button at SW1-SW3.
6>.Step 6: Install 1pcs 4Bit Red Digital Tube at LED4. Pay attention to the installation direction of the decimal point.
7>.Step 7: Install 1pcs 8*8mm Self-locking Switch at SW4. It is power switch.
8>.Step 8: Install 1pcs 470uF Electrolytic Capacitor at C1.Note:The longer pin is positive pole and connect to ‘ + ’ pads.
9>.Step 9: Install 1pcs DIP-28 IC STC15W408AS Controller.There is a gap mark on one end of the IC and there is a gap mark on DIP-28 IC Socket where the IC can place on.These two marks are corresponding to each other and are used to specify the installation direction of the IC.
10>.Step 10: Install 1pcs DIP-16 IC L293D Motor Driver at U2 in the same methods.
11>.Step 11: Install 1pcs HC-SR04 Ultrasonic Sensor at P3. Note that HC-SR04 is installed on the back of the PCB.
12>.Step 12: Install 2pcs 50mm Red/Black Wire on 2pcs 1:48 TT Motor. Pay attention to wire color and motor placement direction. It will cause the car to rotate abnormally if installed incorrectly.
13>.Step 13: Paste 2pcs 30*20mm double-sided adhesive on the surface of the motor. Pay attention to the placement direction of the motor.
14>.Step 14: Paste 2pcs motors onto the surface of the PCB. Note:The motor should be as close to the edge of the PCB as possible to avoid affecting the installation of the wheels and causing them to get stuck by the PCB.
15>.Step 15: Fix motors by 2pcs 3*200mm Nylon Ties.
16>.Step 16: Connect 2pcs motor to P1 and P2. Note: Red wires connect to ‘ + ’ pads.
17>.Step 17: Retain about 5cm wire for battery box and cut off excess wires.
18>.Step 18: Fix AA*4 Battery Box on PCB by 60*25mm double-sided adhesive.
19>.Step 19: Wire passes through the hole and connects to the power pad. Note: Red wire connect to ‘ + ’ pad.
20>.Step 20: Nut Version: Fix M4*35mm Screw by M4 Nut and M4 Nut Ball as front wheel of the car. Pay attention to using the version you received.
20>.Step 20: Universal Wheel Version: Fix 1pcs universal wheel by 2pcs copper pillar screw, 2pcs screw and 2pcs nut as front wheel of the car. Pay attention to using the version you received.
21>.Step 21: Install Black Rubber Tires on Yellow Rubber Wheel.
22>.Step 22: Fix 2pcs Yellow Rubber Wheel on TT Motor by 2pcs M2.5*8mm Self Tapping Screw.

10.Install shown steps:

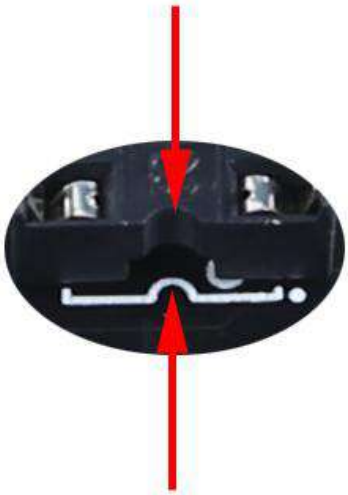


Step 1: Install 11pcs 1Kohm Metal Film Resistor at R3,R6-R15.

Step 2: Install 1pcs DIP-28 IC Socket at U1.There is a gap mark on one end of the IC Socket and there is a gap mark on PCB silk screen where the IC Socket can place on. These two marks are corresponding to each other and are used to specify the installation direction of the IC Socket.



Step 3: Install 1pcs DIP-28 IC Socket at U2 in the same methods.



Step 4: Install 3pcs 5mm Red LED at LED1-LED3. Note:The longer pin is positive pole and connect to ‘ + ’ pads.

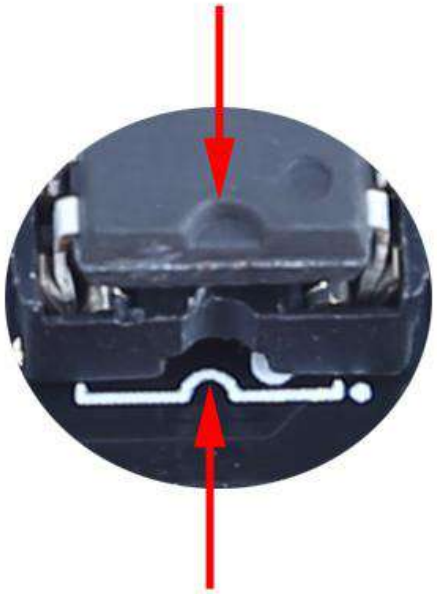
Step 5: Install 3pcs 6*6*10mm Black Button at SW1-SW3.

Step 6: Install 1pcs 4Bit Red Digital Tube at LED4. Pay attention to the installation direction of the decimal point.

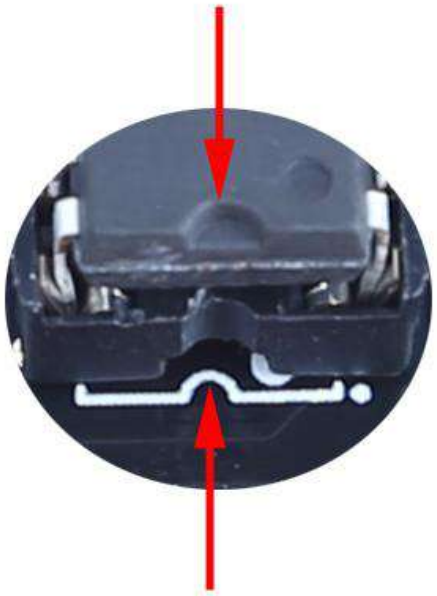
Step 7: Install 1pcs 8*8mm Self-locking Switch at SW4. It is power switch.

Step 8: Install 1pcs 470uF Electrolytic Capacitor at C1.Note:The longer pin is positive pole and connect to ' + ' pads.

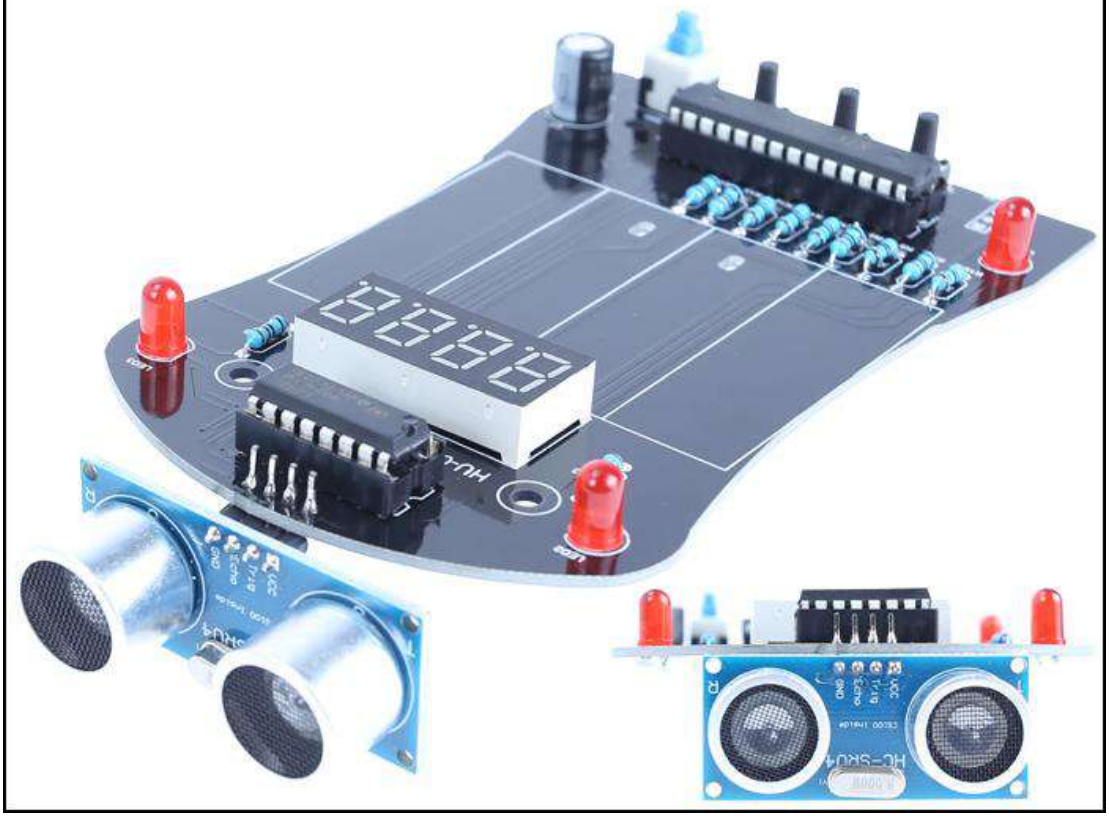
Step 9: Install 1pcs DIP-28 IC STC15W408AS Controller.There is a gap mark on one end of the IC and there is a gap mark on DIP-28 IC Socket where the IC can place on.These two marks are corresponding to each other and are used to specify the installation direction of the IC.



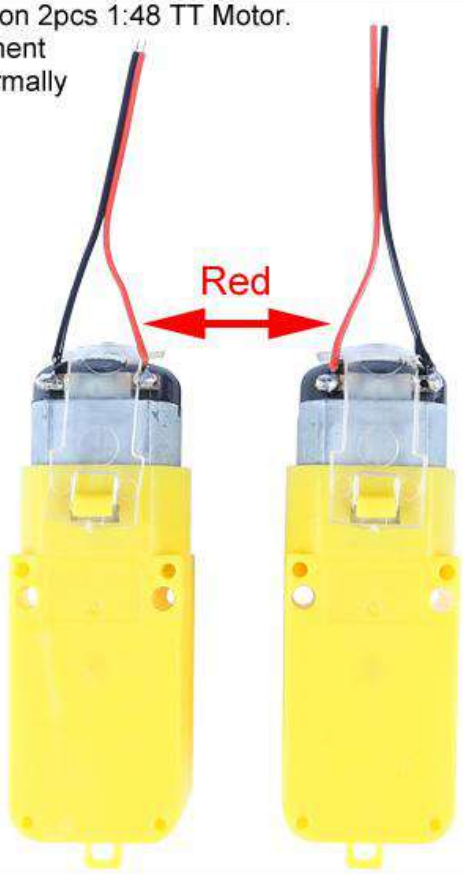
Step 10: Install 1pcs DIP-16 IC L293D Motor Driver at U2 in the same methods.



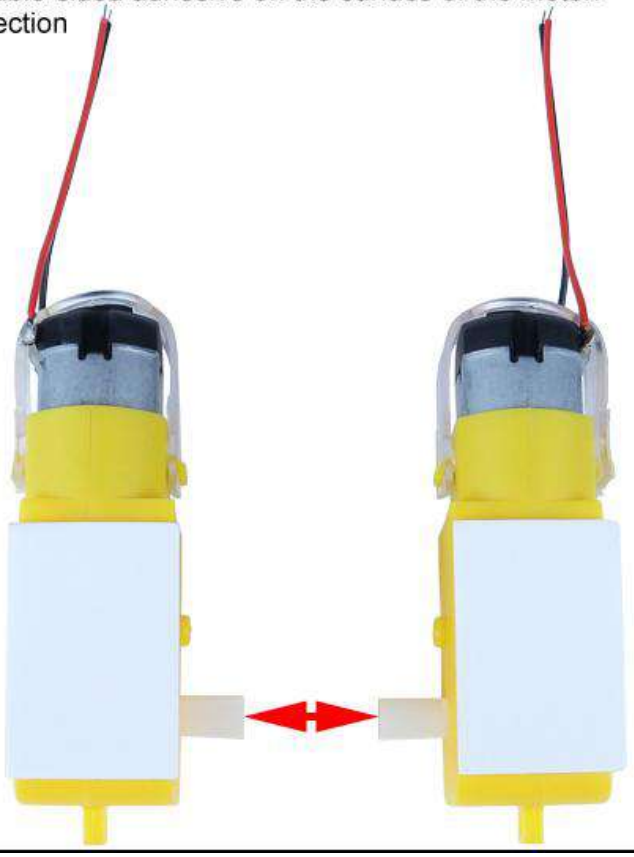
Step 11: Install 1pcs HC-SR04 Ultrasonic Sensor at P3.
Note that HC-SR04 is installed on the back of the PCB.



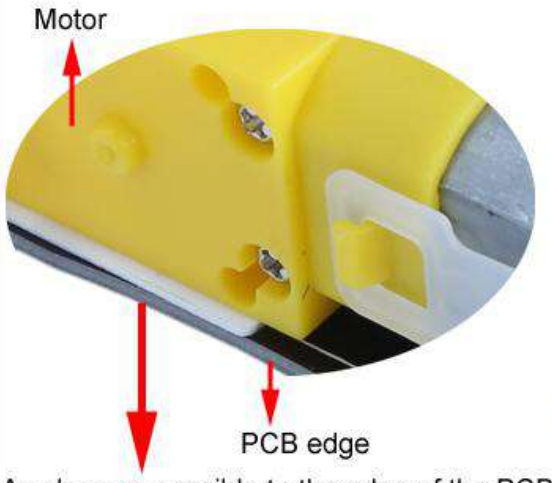
Step 12: Install 2pcs 50mm Red/Black Wire on 2pcs 1:48 TT Motor.
Pay attention to wire color and motor placement direction. It will cause the car to rotate abnormally if installed incorrectly.



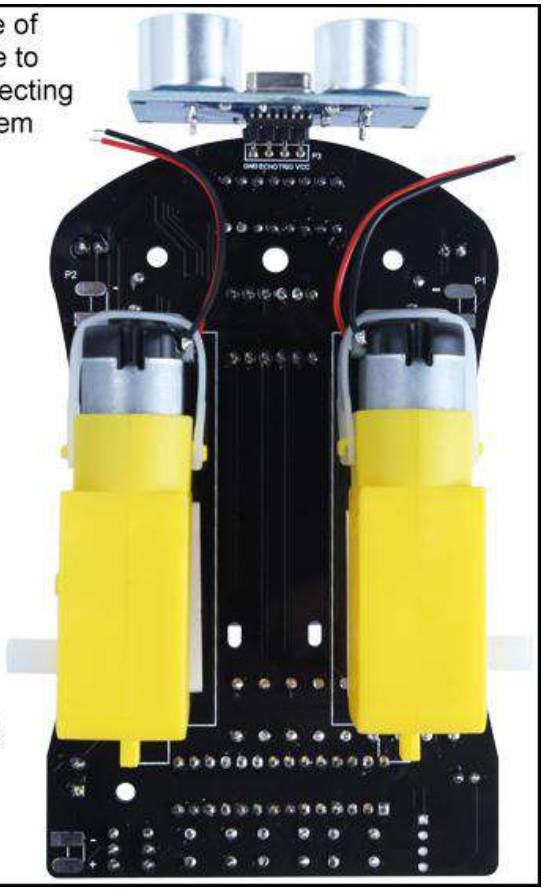
Step 13: Paste 2pcs 30*20mm double-sided adhesive on the surface of the motor.
Pay attention to the placement direction of the motor.



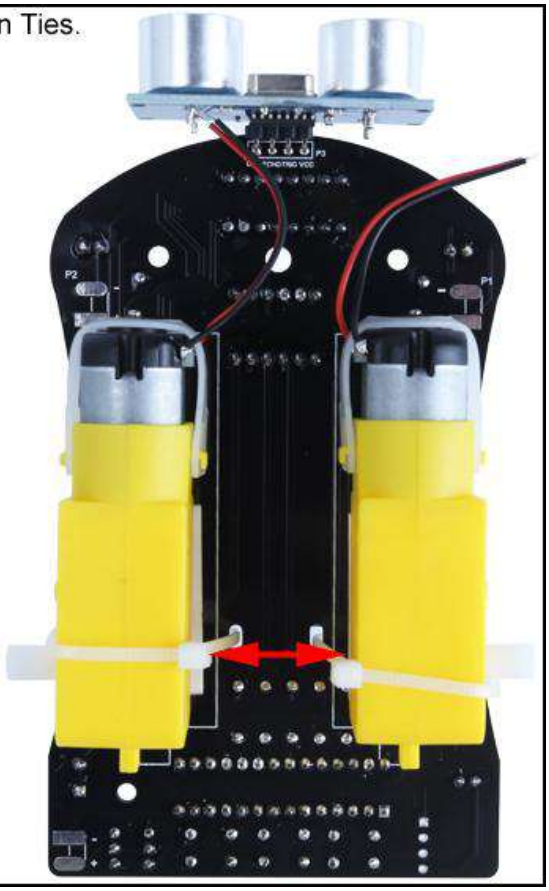
Step 14: Paste 2pcs motors onto the surface of the PCB. Note:The motor should be as close to the edge of the PCB as possible to avoid affecting the installation of the wheels and causing them to get stuck by the PCB.



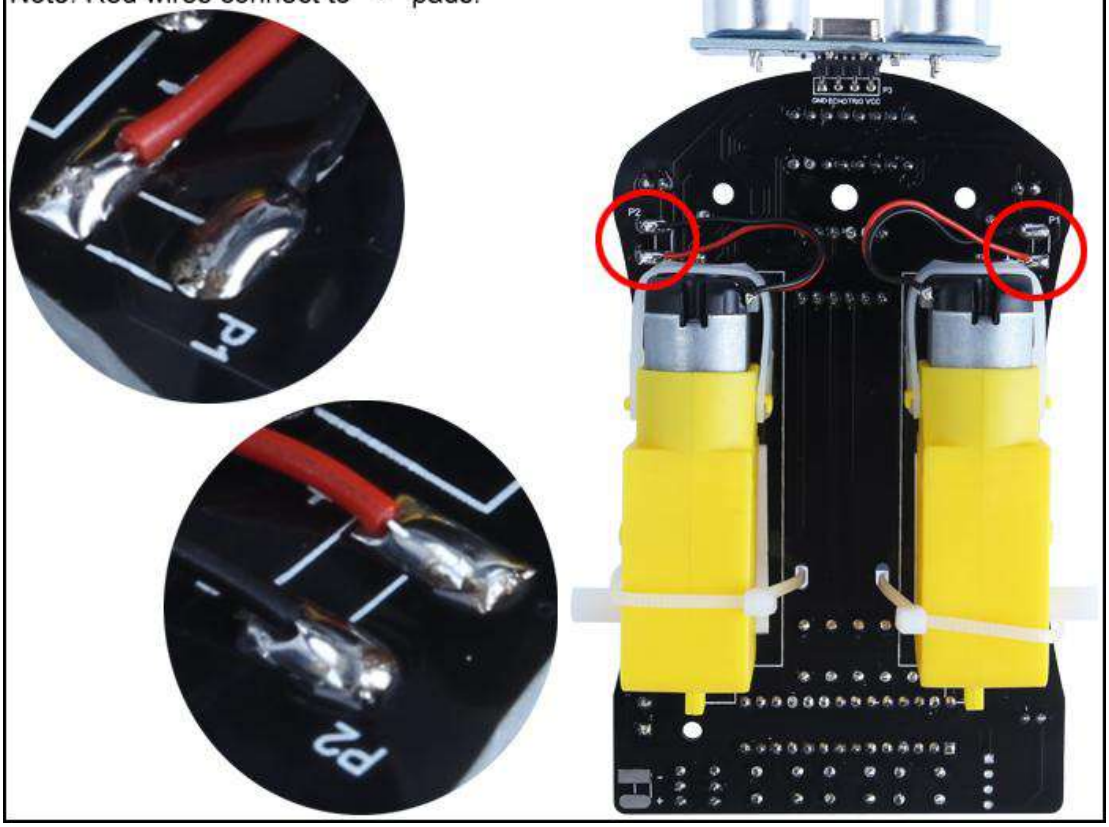
As close as possible to the edge of the PCB



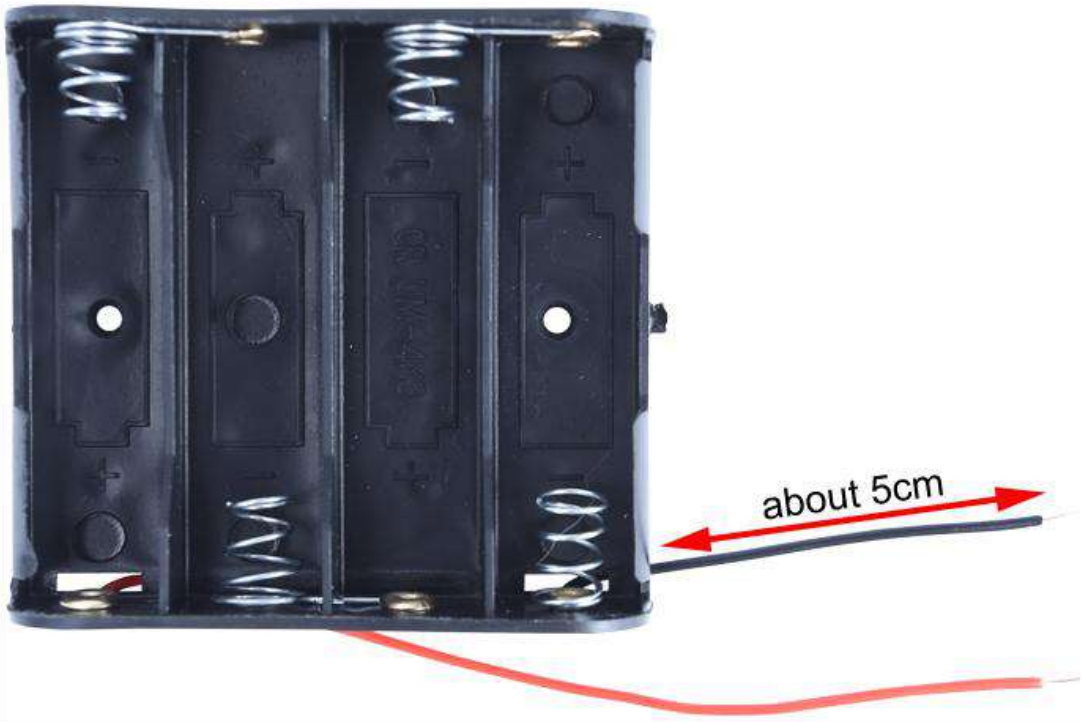
Step 15: Fix motors by 2pcs 3*200mm Nylon Ties.



Step 16: Connect 2pcs motor to P1 and P2.
Note: Red wires connect to ' + ' pads.

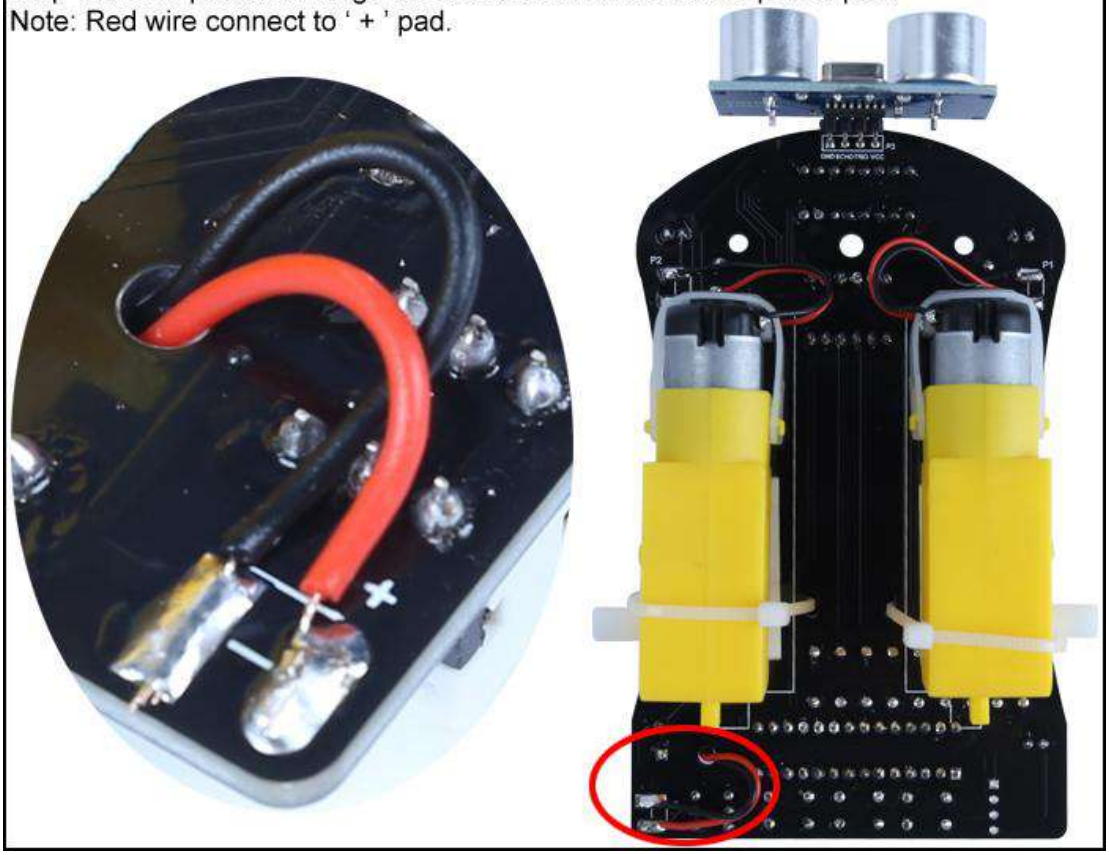


Step 17: Retain about 5cm wire for battery box and cut off excess wires.



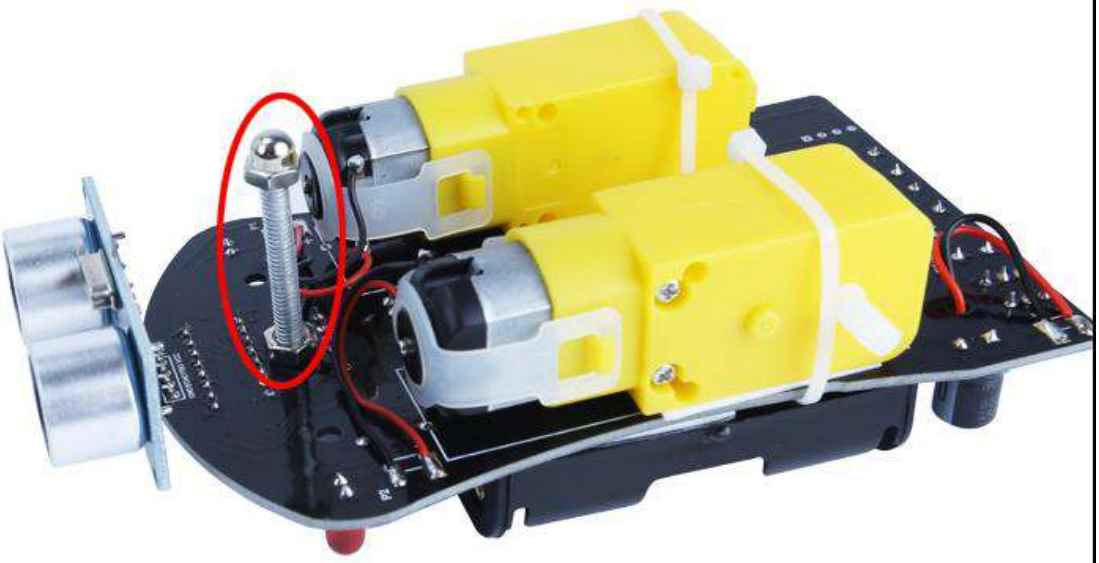
Step 18: Fix AA*4 Battery Box on PCB by 60*25mm double-sided adhesive.

Step 19: Wire passes through the hole and connects to the power pad.
Note: Red wire connect to ‘ + ’ pad.

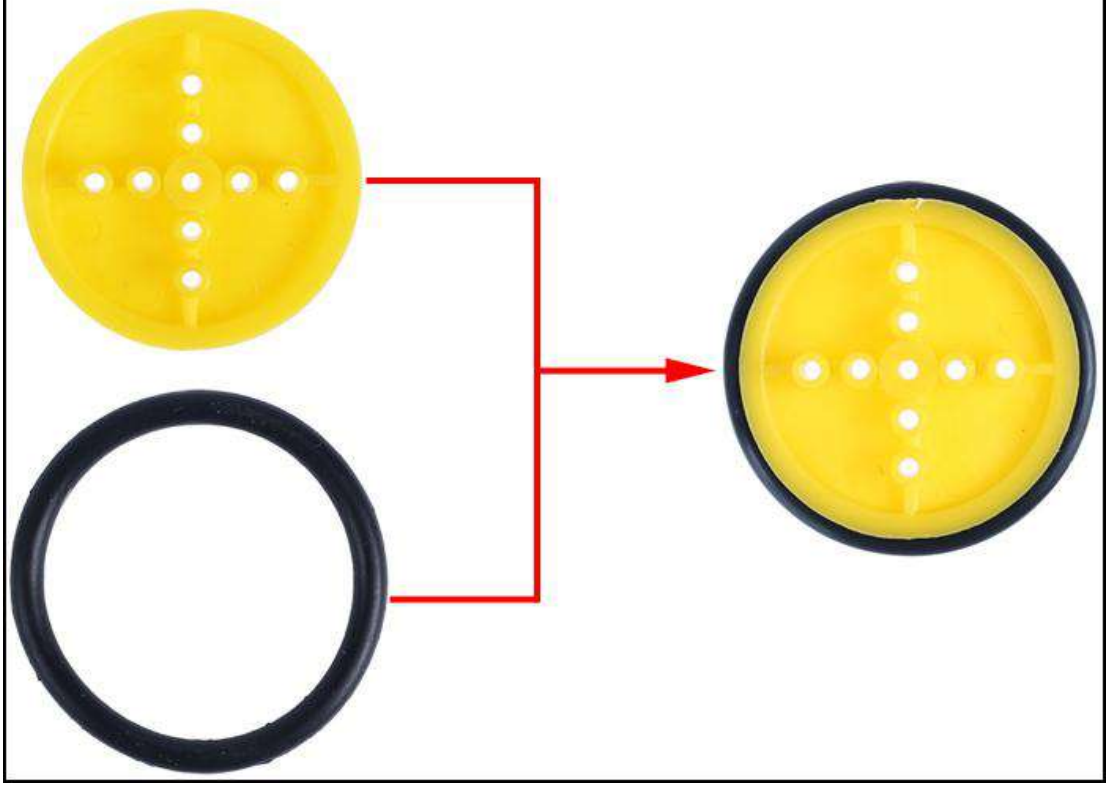


Step 20: Universal Wheel Version: Fix 1pcs universal wheel by 2pcs copper pillar screw, 2pcs screw and 2pcs nut as front wheel of the car. Pay attention to using the version you received.

Step 20: Nut Version: Fix M4*35mm Screw by M4 Nut and M4 Nut Ball as front wheel of the car. Pay attention to using the version you received.



Step 21: Install Black Rubber Tires on Yellow Rubber Wheel.



Step 22: Fix 2pcs Yellow Rubber Wheel on TT Motor by 2pcs M2.5*8mm Self Tapping Screw.