TJ-56-535 Smart Track-following Car Illustrated Tutorial

Video tutorial

1. Component List

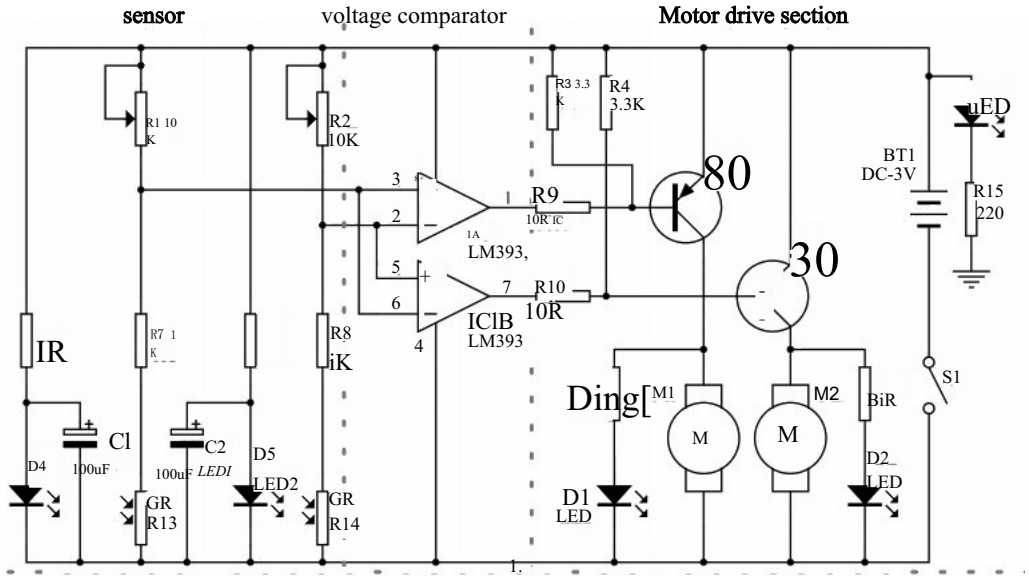
Order number	Name	Model	Grade	Quantity
1	Five-color ring resistor	3.3K (color wheel: orange, orange, black, brown, brown)	R3 R4	2
2	Five-color ring resistor	51R (color wheel: green, brown, black, gold, brown)	R5 R6 R11 R12	4
3	Five-color ring resistor	1K (color wheel: brown, black, black, brown, brown)	R7 R8	2
4	Five-color ring resistor	10R (color wheel: brown, black, black, gold, brown)	R9 R10	2
5	Five-color ring resistor	220R (color wheel: red, red, black, black, brown)	R15	1
6	Integrated circuit	LM393	IC1	1
7	IC Seat	8P	IC1	1
8	Blue and white potentiometer	10K (103) Horizontal	R1 R2	2
9	Dynatron	8550	Q1 Q2	2
10	Lockout switch	8.5*8.5	S1	1
11	Electrolytic capacitor	100uF/25V	C1 C2	2
12	LED	Green hair, 3mm round head	D1 D2	2
13	LED	Red hair 5mm round head	D4 D5 LED3	3
14	Light dependent resistors	GL5516	R13 R14	2
15	Gearbox	3-12V,1:48 speed reduction	M1 M2	2
16	Battery case	Section 2: 5-cell battery case	BT1	1
17	Wheel	39mm hole 2mm yellow		2
18	Tyre	Black		2
19	Self-tapping screw	M2*10		2
20	PM Machine Screw	M5*30		2
21	Nut	M5		1
22	Nut cap	M5		1
23	Steel support			4
24	PM Machine Screw	M3*25		4
25	Nut	M3		4
26	PM Machine Screw	M2*10		2
27	Nut	M2		2
28	Winding displacement	1P 10CM Color		4
29	Circuit board	TJ-56-535		1

2. Product Features

This product is mainly composed of light-emitting diode, photoresistor, and dual voltage comparator integrated circuit and other direct components. Due to the simple circuit, the assembly success rate is high, which can greatly improve the interest in learning electronic technology, and is suitable as the experimental equipment for electronic teaching and training activities.

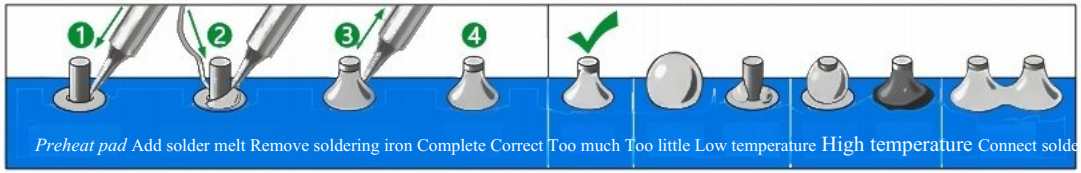
The finished cart operates on 3V DC power, powered by two AA batteries. When placed on a uniformly colored surface, it moves in a straight line. When a sensor on one side detects darker surroundings, the cart turns toward that side. Therefore, when positioned on a black track, the cart advances along the path while following its curvature.

3. Circuit Diagram



4. Welding and Installation

4.1 Direct Insertion Component Welding Method



4.2 Welding and Installation Steps

1 Color ring resistor welding

电阻	阻值	安装位置
	3. 3K	R3 R4
	51R	R5 R6 R11 R12
	1K	R7 R8
	10R	R9 R10
	220R	R15

Screen printing25 .

Color ring resistors do not distinguish polarity. Identify the resistance value according to the color ring on the surface, and then install it in the position marked by screen printing.

2 IC socket welding

One end of the IC socket has a notch, and the silk-screened side also has a corresponding notch for alignment. Installation position: IC1.

3 Blue and white potentiometer soldering

10K

Silk-screen

The blue and white potentiometer is installed according to the shape of the screen-printed pad, and the " 103" label on the top indicates

Its maximum resistance is 10K.

Installation location: R1, R2;

4 Transistor soldering

8550

silk-screen

The three-stage pipe has a D-shaped cross-section, with the flat side aligned to the screen-printed flat side.

Installation location: Q1, Q2;

5 Weld self-locking switch

Lockout switch

Silk-screen

The bottom of the self-lock switch has a square hole for the white short line in the screen printing.

Installation location: S1;

6 Electrolytic capacitor welding

The long lead of the electrolytic capacitor is the positive terminal, with the side bearing the "+" symbol on the screen-printed label.

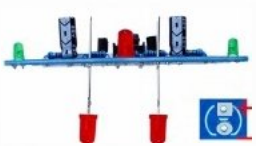
Installation location: C1, C2;

7 LED Welding 1

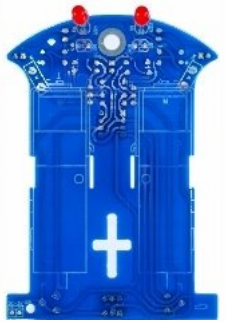
The short pin of the light-emitting diode is the negative pole, and the negative electrode area inside the light ball is larger, and the flat side of the screen printed is the negative pole.

Installation locations: Green hair → D1, D 2; Red hair → LED3, D4 (on the back), D5.

8 LED welding 2



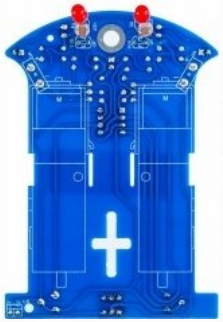
When welding a backlit diode, leave a suitable length of pin so that the pin on the front side of the circuit board is aligned with the electrolytic capacitor.



9 Photoresistor welding

The photoresistor does not distinguish polarity. Keep an appropriate pin length when soldering so that the pin on the front of the circuit board is aligned with the electrolytic capacitor.

Installation location: R13, R14;



10 Battery case welding

Secure the battery case to the circuit board with M2 screws and nuts, connecting the red wire (positive) to the '+' pad and the black wire to the '-' pad.

11 Integrated circuit installation

Both the integrated circuit and the IC base have a semicircle at one end

Shape notch, installed in the corresponding direction.

Installation location: IC1;

12 Rubber ring tire assembly

13 Wire bonding

First, split the cable into individual wires, strip the wire ends, and tin them. Apply solder to the speed reduction motor terminal, ensuring the wire ends fit snugly against the terminal. Then, use a soldering iron to re-melt the solder and complete the welding.

14 Wheel installation

15 Metal brac支架安装

Install the metal bracket i支架，
It will then be used to定
the speed reducer mot

16 Installation of the speed reducer

M3*25 screw

M3 nut

Use two pairs of M3 screws and nuts to fix the speed reducer motor to the metal bracket. Note that the nuts are installed on the inside to facilitate the installation of the speed reducer motor on the other side.

17 Welding of reduction gear

Before welding, tin the pad. Connect the lower terminal to the pad marked "1" and the upper terminal to the pad marked "+".

During welding, the wire end is tightly attached to the pad, and then the solder is melted again with the soldering iron to complete the welding.

18 Install the swivel wheel

Secure the M4 screw to the circuit board with an M4 nut, then install the cap as the cart's swivel wheel.

19 Battery installation

Check before power on: false soldering, short circuit, reverse positive and negative electrode installation and other errors!

The finished cart operates on 3V DC power, requiring two AA batteries to run normally.

Press the self-lock switch to start the car. At this time, the car may not work on one side of the motor. You can make it work normally through subsequent debugging.

20 Debug

Place the cart on a white sheet of paper to eliminate ambient light interference with the sensor.

Raise objects to slow down

The motor lifts the wheels off the ground to prevent the car from moving around during debugging.

The red light in the middle of the car is the power indicator light, which is lit when the self-lock switch is pressed. The green light on both sides of the car is the motor status light, and the motor on that side will run when the green light is lit.

Adjust the two blue and white potentiometers at the rear of the car to make the green lights on both sides of the car light up at the same time, so that the car can drive along the black line.

If the position of the photoresistor is changed during use, the small part needs to be re-aligned.

Initialize and debug the vehicle.