Infrared remote control

This tutorial is a comprehensive experiment combining multiple peripherals. You can first understand a single peripheral before performing this experiment.

1. Software-Hardware

- **STM32F103CubeIDE**
- **STM32 Robot Development Board**

  Buzzer, RGB, LED, IR Receiver (HS0038B): Onboard

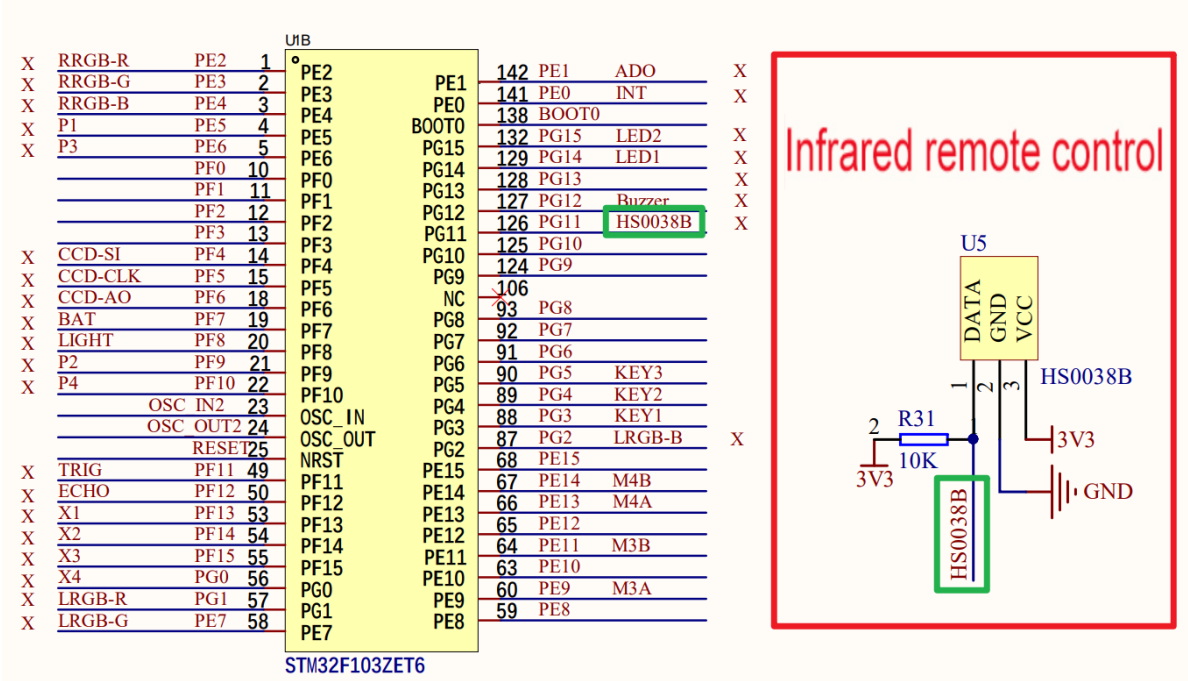
  310 motor*4: external
- **Type-C data cable or ST-Link**

  Download programs or simulate the development board

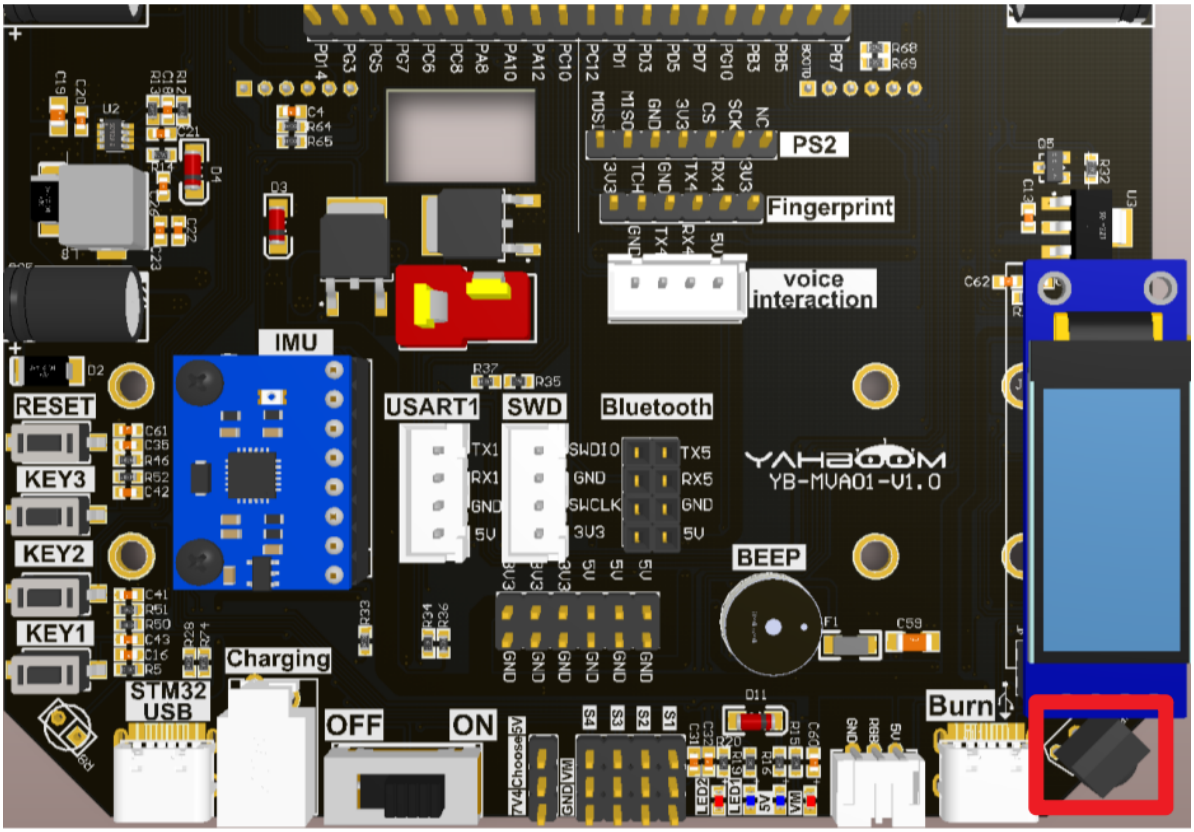
2. Brief principle

1. Hardware schematic diagram

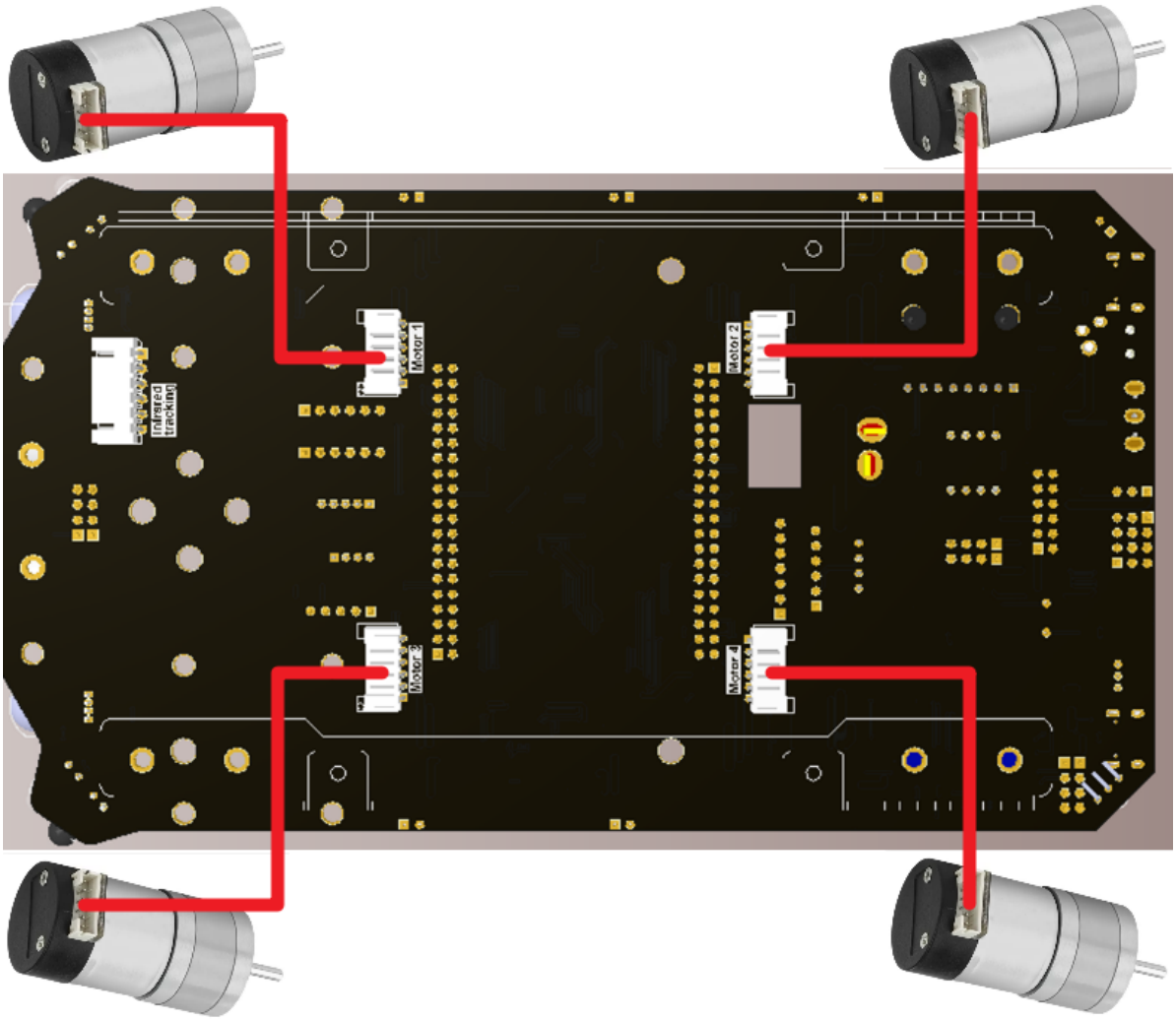
Since there are many modules involved, here we mainly introduce the infrared receiver (HS0038B)



2.Physical connection diagram



- **Motor Wiring**



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For battery pack assembly, please see [5. Smart Car Experiment: Car Line Patrol]
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3. Control principle

Control different states (key values) of different cars according to the key values of the remote control.

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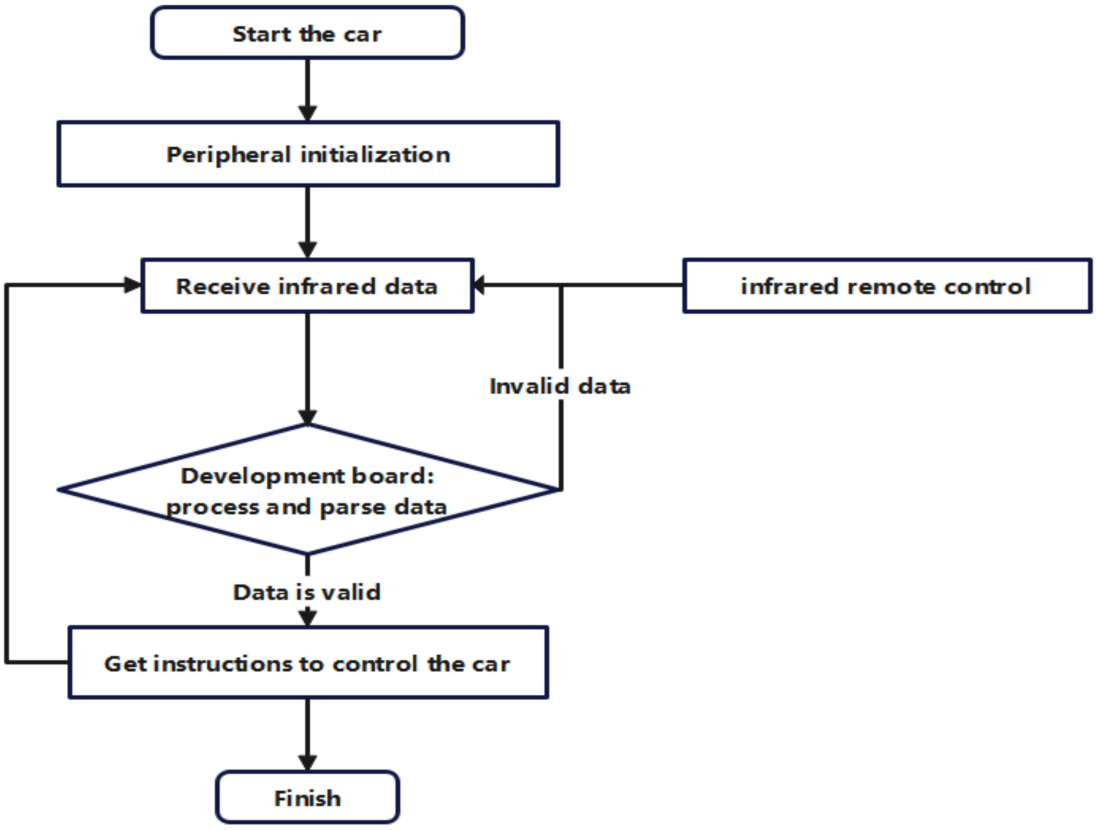
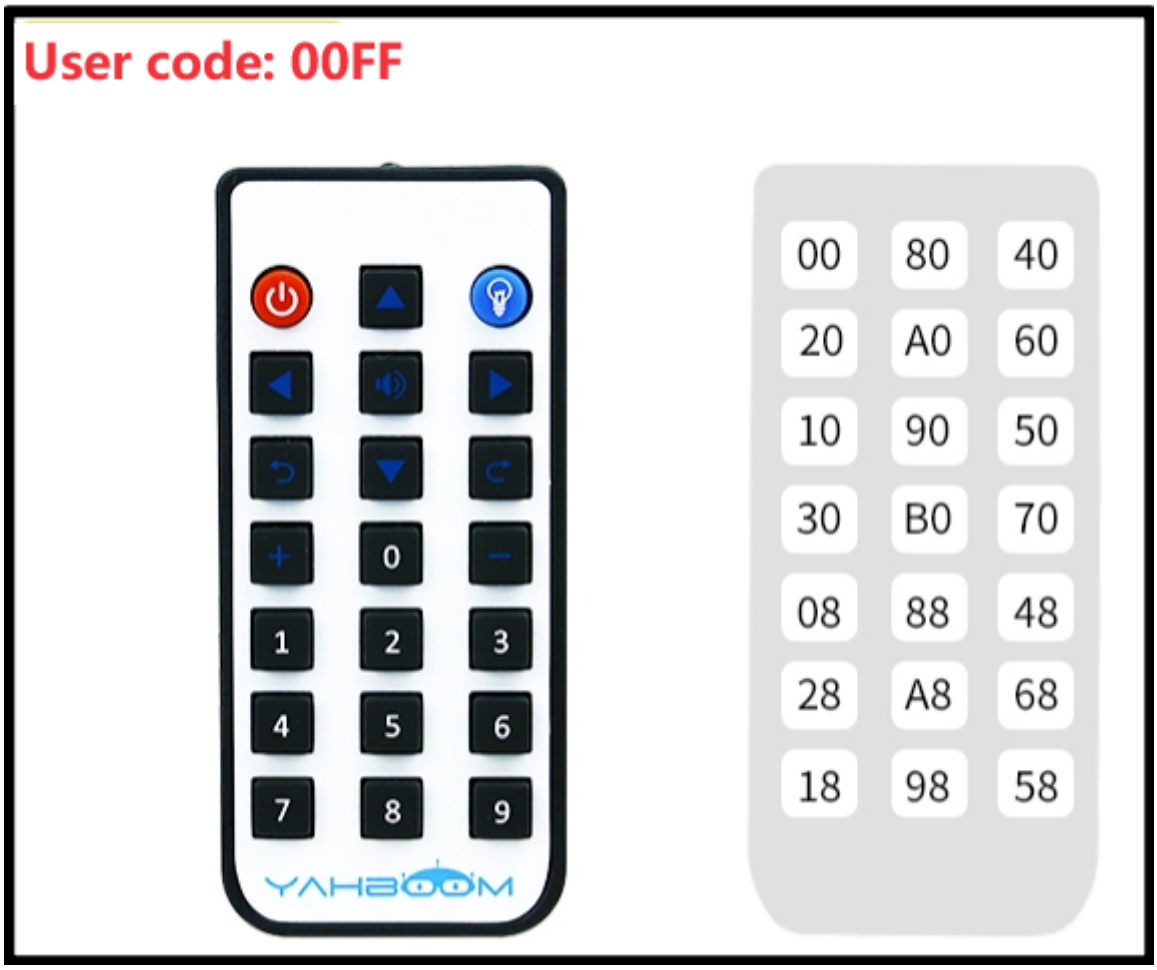
Use an external interrupt to receive the data sent by the infrared, and parse this data through the function:
Pressing different key values on the infrared remote control will receive different data. We control different functions of the car based on this data (Switch statement is used in the program);
Different key values correspond to different functions, and there are also some undefined keys that can be defined by yourself.
```

- **Program flow chart**



- **Infrared remote control**



Remote control (key value)	Function (customizable)	Actual function of this tutorial code
0x00	IR_POWER	Turn off all peripherals
0x80	IR_UP	Control the car to move forward for 3s
0x40	IR_LIGHT	Control RGB lights (press once to turn on, press again to turn off)
0x20	IR_LEFT	Control the car to turn left for 3 seconds
0xA0	IR_BEEP	Control the buzzer (press once to turn on, press again to turn off)
0x60	IR_RIGHT	Control the car to turn right for 3 seconds
0x10	IR_LEFT_SPIN	Control the car to turn left for 3s
0x90	IR_DOWN	Control the car to move backward for 3s
0x50	IR_RIHGT_SPIN	Control the car to turn right for 3 seconds
0x30	IR_ADD	Control car acceleration
0x70	IR_SUB	Control the car to slow down
0xB0	IR_0	Control the car to stop

Remote control (key value)	Function (customizable)	Actual function of this tutorial code
0x08	IR_1	Control LED1 (press once to turn on, press again to turn off)
0x88	IR_2	Control LED2 (press once to turn on, press again to turn off)
0x48	IR_3	Undefined
0x28	IR_4	Undefined
0xA8	IR_5	Undefined
0x68	IR_6	Undefined
0x18	IR_7	Undefined
0x98	IR_8	Undefined
0x58	IR_9	Undefined
0xFF	CLR_CLR	

3. Main functions

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The functions introduced before will not be introduced again!
```

> **Function: Irrmote_car**

Function prototype	void Irrmote_car(void)
Function description	Infrared remote control car
Input parameters	None
Return value	None

4. Experimental Phenomenon

After successfully downloading the program, press the RESET button on the development board and use the infrared remote control to control the car!

```
For program download, please refer to [2. Development environment construction
and use: program download and simulation]
```

Phenomenon:

Pressing different buttons according to the buttons on the remote control will activate different functions of the car.

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For experimental phenomena, you can see [Infrared Remote Control_Experimental
Phenomenon.mp4]
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