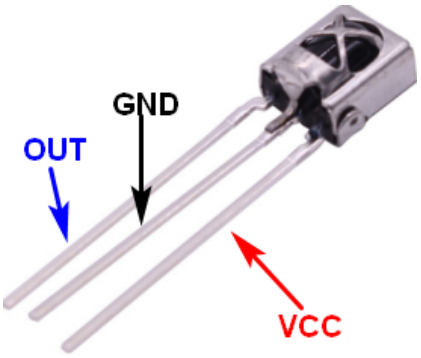
Infrared remote controller

When using infrared remote control, we need to use infrared remote control and infrared receiver. The physical map of the two is shown below:



1.Introduction of infrared remote controller :

This remote controller with a standard **38K** modulation frequency to accommodate a variety of infrared receivers on the market. It possess 0~9 number keys, 4 direction keys, acceleration and deceleration, left and right rotation, lighting, sound and other buttons, which can be easily applied to various smart cars and development boards. Built-in universal 3V button battery, long time and easy to replace.

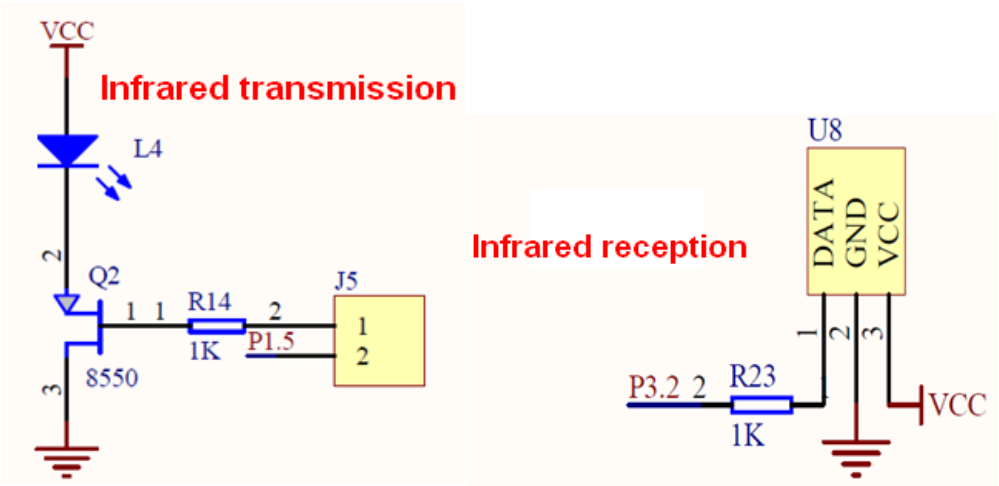
2.Introduction of infrared receiver :

This infrared receiver comes with an iron-shell shield cover to prevent external interference. Built-in dedicated IC, with infrared remote control, can be applied to audio-visual equipment, home appliances, microcontroller learning, robot remote control and so on.

3.Introduction of infrared：

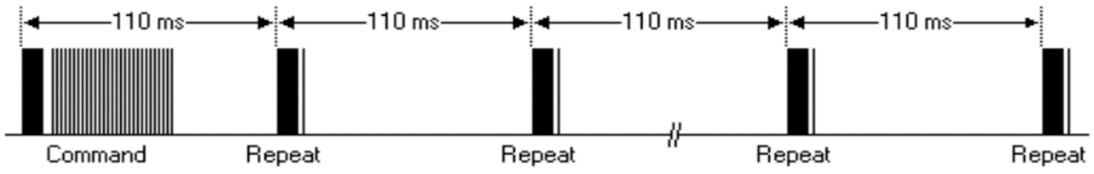
Electromagnetic waves having a wavelength from 760 nm to 400 um in the spectrum are called infrared rays, which is an invisible light. At present, almost all video and audio equipment can be remotely controlled by infrared remote control, such as televisions, air conditioners, DVD players, etc., and the infrared remote control can be seen.

4.Schematic analysis

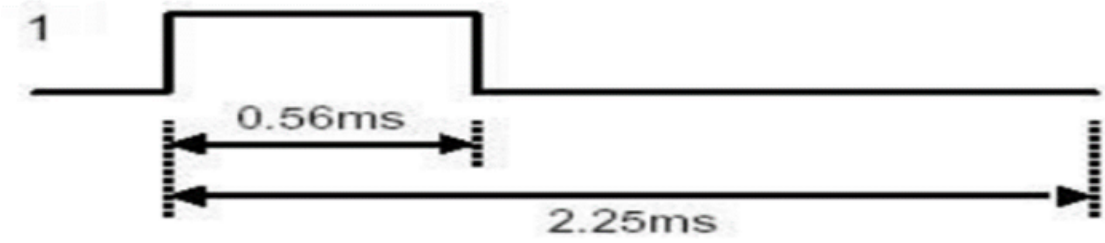


5.NEC agreement

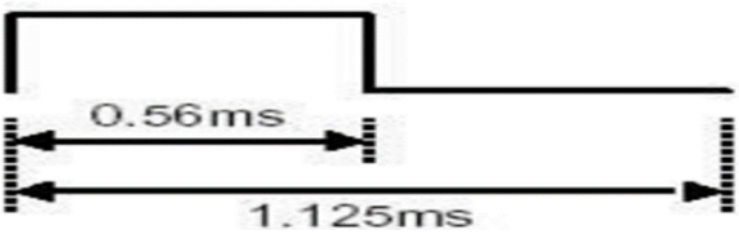
5.1 The agreement specifies that the low position is sent first. A series of messages first send a 9ms AGC (automatic gain control) high pulse, then send a 4.5ms start low, next send four byte address code and command code.
The four bytes are: address code; address code inverse code; command code; command code inverse code.
5.2 If you keep pressing the button, a series of messages can only be sent once, always pressed, and the transmission is a repetition code of 110ms.
5.3 The received signal is exactly opposite to the transmitted signal.
5.4 The format of the repeat code consists of a 9ms AGC high level, a 4.5ms low level and a 560us high level, as shown below.



5.5 Logic 1 is a pulse representation consisting of a high level of 560us and a low level of 1.69ms,as shown below.



5.6 Logic 0 is a pulse representation consisting of a high level of 560us and a low level of 565us, as shown below.



6. Code analysis

6.1 Frist, generate a falling edge, enter the interrupt function of external interrupt 0.

6.2 After delay, detect IO whether the port is high, if the port is high, we wait for the high level of 9ms to be sent and continue to wait for the low level of 4.5ms to be sent.

6.3 Next, start receiving the 4 sets of data transmitted.

6.4 Frist, we need to wait for the high level of 560us to be sent, and detect the duration of the high level, if it is more than 1.12ms then prove that it is low level (The duration of the low level is 1.69 ms and the duration of the high level is 565 us.)

6.5 The received data is detected and the inverse of the data is compared to determine whether the two data are the same.

Infrared code value table：

User code:0XFF

00	80	40
20	A0	60
10	90	50
30	B0	70
08	88	48
28	A8	68
18	98	58