

Basic course ---4.Ultrasonic RGB

1. Learning goal

In this lesson, we will learn how to control the RGB light of the ultrasonic module.

2. Preparation

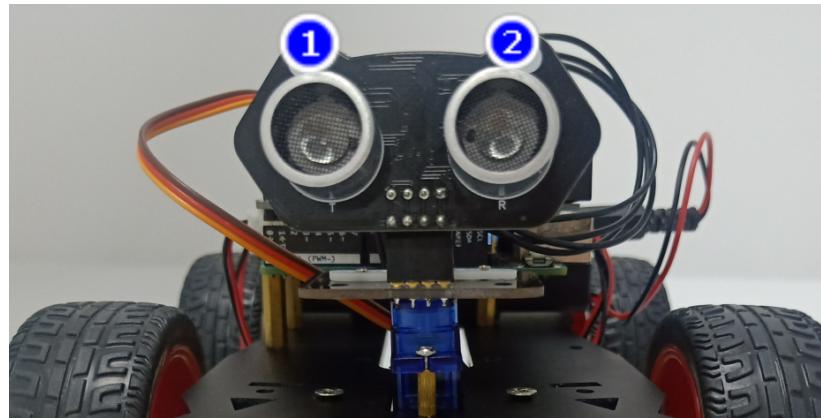
- 2.1 The position of the RGB light of the ultrasonic module. As shown below.
- 2.2 The pin of UNO board is connected the RGB light of ultrasonic module.

3. Principle of experimental

RGB light (red, green, blue) are packaged in the LED module. We can mix different colors(256*256*256) by controlling the brightness of the three LEDs.

From the hardware interface manual, we can know that Ultrasonic RGB light is driven by Pin 11 of UNO board.

| Classification | Function | The number of Drive chip PCA9685 | Drive Method | Connection with CPU | Uno board |
|---------------------|------------------------------|----------------------------------|--------------------------|---------------------|-----------|
| Left Motor | Left front motor forward | LINB(13) | PCA9685 | I2C_SDA/I2C_SCL | A4/A5 |
| | Left front motor reverse | LINA(12) | | | |
| | Left rear motor forward | RINB(15) | | | |
| | Left rear motor reverse | RINA(14) | | | |
| Right Motor | Right front motor forward | LED10 | | | |
| | Right front motor reverse | LED11 | | | |
| | Right rear motor forward | LED8 | | | |
| | Right rear motor reverse | LED9 | | | |
| Servo | Control S1 | LED0 | | | |
| | Control S2 | LED1 | | | |
| | Control S3 | LED2 | | | |
| | Control S4 | S1 (3) | | | |
| LOGO light | Control bluelight | LED7 | | | |
| Tarcking sensor | Left tracking sensor | | | | A0 |
| | Middle tracking sensor | | | | A1 |
| | Right tracking sensor | | | | A2 |
| | Ultrasonic Echo | | | | 12 |
| Ultrasonic sensor | Ultrasonic RGB light | | Uno board drive directly | | 11 |
| Key | K1 | | | | |
| IR | IR control | | | | |
| Bluetooth interface | RX | | | | |
| | TX | | | | |
| On board RGB Light | RGB Light on expansion board | | | | |
| Buzzer | Control buzzer | | | | |



4. About code

For the code of this course, please refer to: [Ultrasonic_RGB_light.ino](#) in the [Ultrasonic_RGB_light](#) folder.

```
#include <Wire.h>
#include <Adafruit_PWMServoDriver.h>
Adafruit_PWMServoDriver pwm = Adafruit_PWMServoDriver(0x40);

#include "RGBLed.h"
#define RGB_GREEN    0xFF0000    //Define different
color(green,red,blue)
#define RGB_RED     0x00FF00
#define RGB_BLUE    0x0000FF
#define RGB_YELLOW   0xFFFF00
#define RGB_PURPLE   0x00FFFF
#define RGB_WHITE    0xFFFFFFFF
#define RGB_OFF     0x00000000

const int RgbPin = 11;      //Define pin of Ultrasonic RGB light
RGBLed mRgb(RgbPin,2);

void setup()
{
    pinMode(RgbPin,OUTPUT);
    pwm.begin();
    pwm.setPWMFreq(60); // Analog servos run at ~60 Hz updates
    LOGO_breathing_light(255, 40, 5); //Gradually light the blue light of the
Yhaboom_LOGO
    mRgb.setColor(1,RGB_OFF);
    mRgb.setColor(2,RGB_OFF);
    mRgb.show();
}

void LOGO_breathing_light(int brightness, int time, int increament)
```

```

{
    if (brightness < 0)
    {
        brightness = 0;
    }
    if (brightness > 255)
    {
        brightness = 255;
    }
    for (int b = 0; b < brightness; b += increament)
    {
        int newb = map(b, 0, 255, 0, 4095);
        pwm.setPWM(7, 0, newb);
        delay(time);
    }
}

void loop()
{
    mRgb.setColor(1,RGB_WHITE); //There are two RGB light on the
Ultrasonic module No.1 and No.2
    mRgb.setColor(2,RGB_WHITE);
    mRgb.show();
}

```

5. Compiling and downloading code

5.1 We need to open the **Ultrasonic_RGB_light.ino** file by Arduino IDE software. Then click“√”under the menu bar to compile the code, and wait for the word "**Done compiling**" in the lower right corner, as shown in the figure below.

Ultrasonic_RGB_light | Arduino 1.8.5

File Edit Sketch Tools Help

Ultrasonic_RGB_light RGBLed.cpp RGBLed.h

```

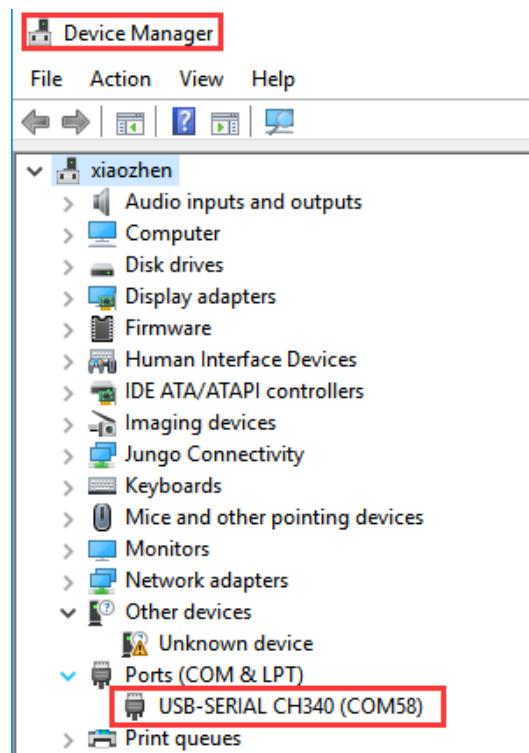
/*
#include <Wire.h>
#include <Adafruit_PWMServoDriver.h>
Adafruit_PWMServoDriver pwm = Adafruit_PWMServoDriver(0x40);

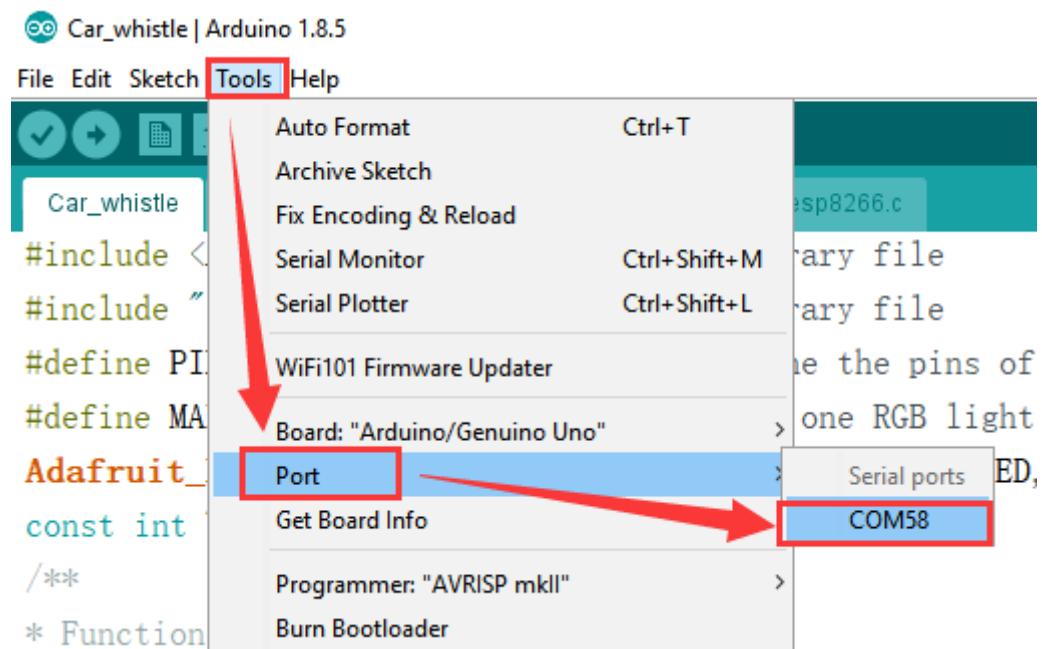
#include "RGBLed.h"
#define RGB_GREEN 0xFF0000 //Define different color(green, red, blue)
#define RGB_RED 0x00FF00

```

< Done compiling.

5.2 In the menu bar of Arduino IDE, we need to select 【Tools】---【Port】--- selecting the port that the serial number displayed by the device manager just now, as shown in the figure below.





5.3 After the selection is completed, you need to click “→”under the menu bar to upload the code to the UNO board. When the word “**Done uploading**” appears in the lower left corner, the code has been successfully uploaded to the UNO board, as shown in the figure below.

Ultrasonic_RGB_light | Arduino 1.8.5

File Edit Sketch Tools Help

Ultrasonic_RGB_light RGBLed.cpp RGBLed.h

```
/*
 * @par Copyright (C): 2010-2019, Shenzhen Yahboom Tech
 * @file      Ultrasonic_RGB_light.c
 * @author    Cindy
 * @version   V1.0
 * @date      2019.07.30
 * @brief     Car_run
 * @details
 * @par History NO
 *
 */
#include <Wire.h>
```

Done uploading.

Sketch uses 4368 bytes (13%) of program storage space. Maxi
Global variables use 275 bytes (13%) of dynamic memory, lea

6. Experimental phenomena

After the program is downloaded, we can see that RGB light of the ultrasonic module will become white.