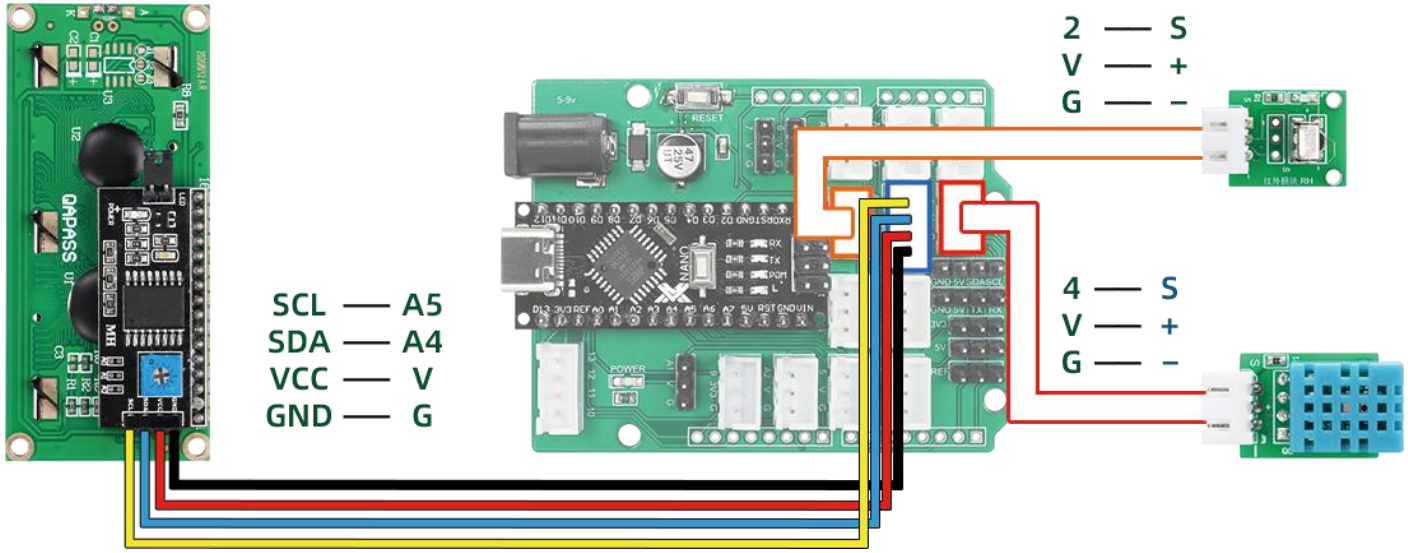
Project13-Infrared remote control LCDdisplay temperature and humidity

1. project description

In this project, we will review the relevant knowledge of the DHT11 temperature and humidity sensor and LCD screen display, and learn how to use an infrared remote control to control the temperature and humidity to be displayed or turned off on the LCD screen .

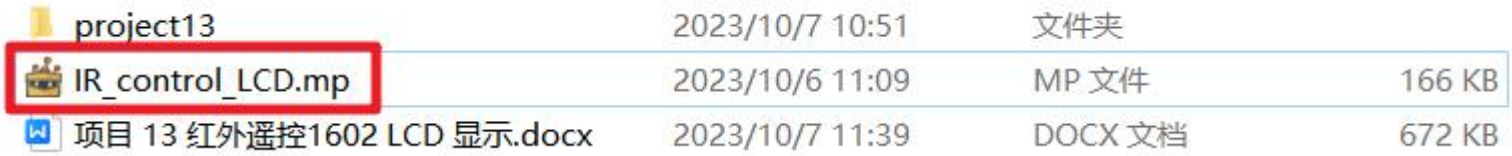
2. Project wiring diagram



3. Download the Arduino code

Confirm that IRremote.zip, dht.zip and LiquidCrystal_I2C.zip have been successfully installed. If not, please go back to project 9/10/11 to see how to install these three libraries.

Open the project Arduino code file (path: project 13 infrared remote control 1602 LCD display\project13\project13.ino)



Connect the main control board to the computer using USB, select the board type as Nano, select the newly displayed COM number, click "Download" to start compiling and downloading the program to the main control board.

Code analysis:

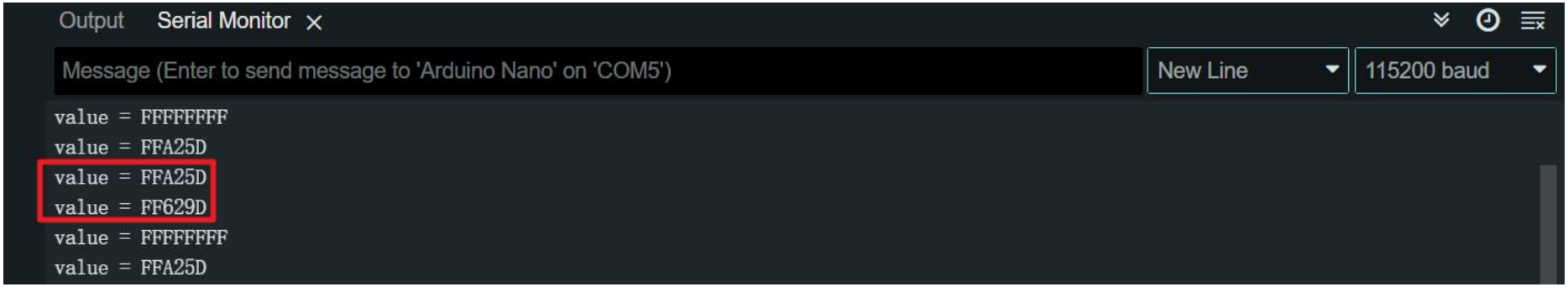
```
1  #include <Wire.h>
2  #include <dht.h>                //添加温湿度库    Add temperature and humidity library
3  #include <LiquidCrystal_I2C.h>  //添加LCD显示屏库   Add LCD display library
4  #include <IRremote.h>           //添加红外接收器库    Reference infrared library
```

```
dht DHT;              //实例化温湿度对象为DHT   Instantiate the temperature and humidity object as a DHT

#define DHT11_PIN 4   //定义温湿度传感器引脚4   Define pin 4 of the temperature and humidity sensor
#define IR_PIN 2      //定义红外接收器引脚2   Define pin 2 of the infrared receiver

#define ON  0XFFA25D  //遥控器按钮1的值为 0XFFA25D   The value of button 1 of the remote control is 0XFFA25D
#define OFF 0XFF629D  //遥控器按钮2的值为 0XFF629D    The value of button 2 of the remote control is 0XFF629D

//设置LCD地址为0x27，以实现16字符和2行显示   set the LCD address to 0x27 for a 16 chars and 2 line display
LiquidCrystal_I2C lcd(0x27,20,4);
IRrecv irrecv(IR_PIN); //实例化红外接收器对象为irrecv    Instantiate the infrared receiver object as irrecv
decode_results results; //红外接收数据指针    Infrared receiving data pointer
```

```
void setup()
{
  Serial.begin(115200);
  lcd.init();           //初始化lcd   initialize the lcd
  lcd.backlight();      //开启LCD背光   Enable LCD backlight
  irrecv.enableIRIn(); //启动红外接收    Start the receiver
```

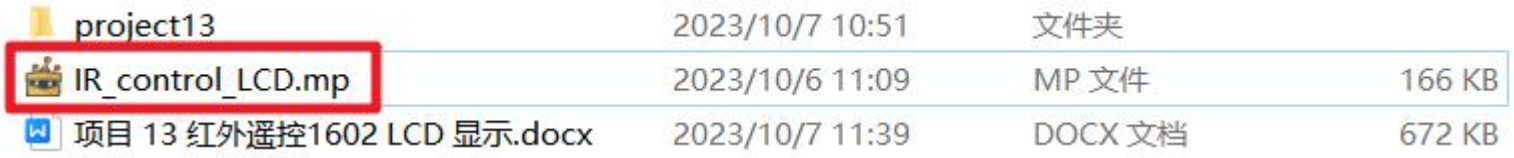
```
if (irecv.decode(&results))  //判断接受到红外遥控信息    Determine received infrared remote control infor
{
    Serial.print("value = ");
    Serial.println(results.value, HEX);//十六进制方式打印信息值   Print information values in hexadecimal
    if (results.value == ON ) //接收到红外编码值与NO变量一致    The received IR coded values are consisten
    {
      lcd.backlight();        //开启LCD背光   Open the backlight
    }
    else if (results.value == OFF ) //接收到红外编码值与OFF变量一致   The received IR coded values are con
    {
        lcd.noBacklight();    //关闭LCD背光   Close the backlight
        lcd.clear();
    }
    irecv.resume();           //接收下一个值  Receive the next value
```

Print the value sent by the infrared remote control to the serial monitor. When the "1" key message is received, the LCD backlight is turned on. Otherwise, the LCD backlight is turned off when the "2" key is received.



4. Download Mind+ graphical code

Open the project Mind+code file (path: Project 13 Infrared Remote Control 1602 LCD Display\IR_control_LCD.mp)



Connect the main control board to the computer with a USB cable and select the newly appeared CH340 serial port COM number. Click "Upload to Device" to complete the code upload.

Programming analysis:

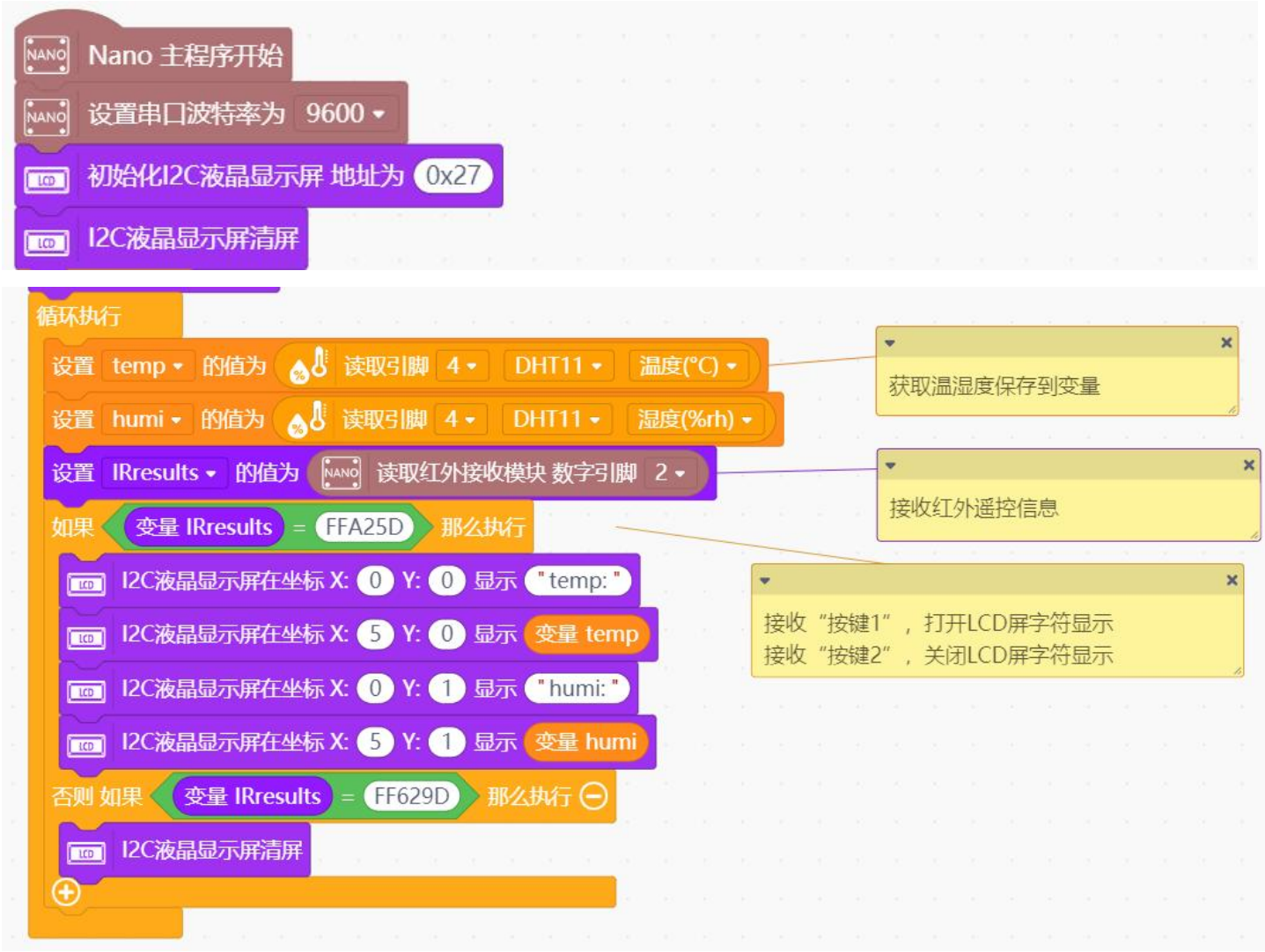
Click "Extension" in the lower left corner, and then select the main control board type as Nano. Add library files : LCD1602 module, DHT11 module.

After the addition is successful, you can see that there are three more categories in the programming block column on the left: Nano, "Sensor" and "Display"

The infrared receiving module building block can be found directly in the Nano category of the main control board, no additional addition is required (only pins 2 or 3 are supported by default)

The complete programming is as follows:

Initialize the baud rate and LCD screen


Nano 主程序开始
设置串口波特率为 9600
初始化I2C液晶显示屏 地址为 0x27
I2C液晶显示屏清屏
循环执行
设置 temp 的值为 读取引脚 4 DHT11 温度(°C)
设置 humi 的值为 读取引脚 4 DHT11 湿度(%rh)
设置 IRresults 的值为 读取红外接收模块 数字引脚 2
如果 变量 IRresults = FFA25D 那么执行
I2C液晶显示屏在坐标 X: 0 Y: 0 显示 "temp: "
I2C液晶显示屏在坐标 X: 5 Y: 0 显示 变量 temp
I2C液晶显示屏在坐标 X: 0 Y: 1 显示 "humi: "
I2C液晶显示屏在坐标 X: 5 Y: 1 显示 变量 humi
否则 如果 变量 IRresults = FF629D 那么执行
I2C液晶显示屏清屏
获取温湿度保存到变量
接收红外遥控信息
接收“按键1”，打开LCD屏字符显示
接收“按键2”，关闭LCD屏字符显示