Item 11-LCD display

1. project description

Through this project, you can understand the LCD display and its programming, and learn how to adjust the contrast of the LCD display. Learn how to display desired text on an LCD display.

2. Introduction to modules

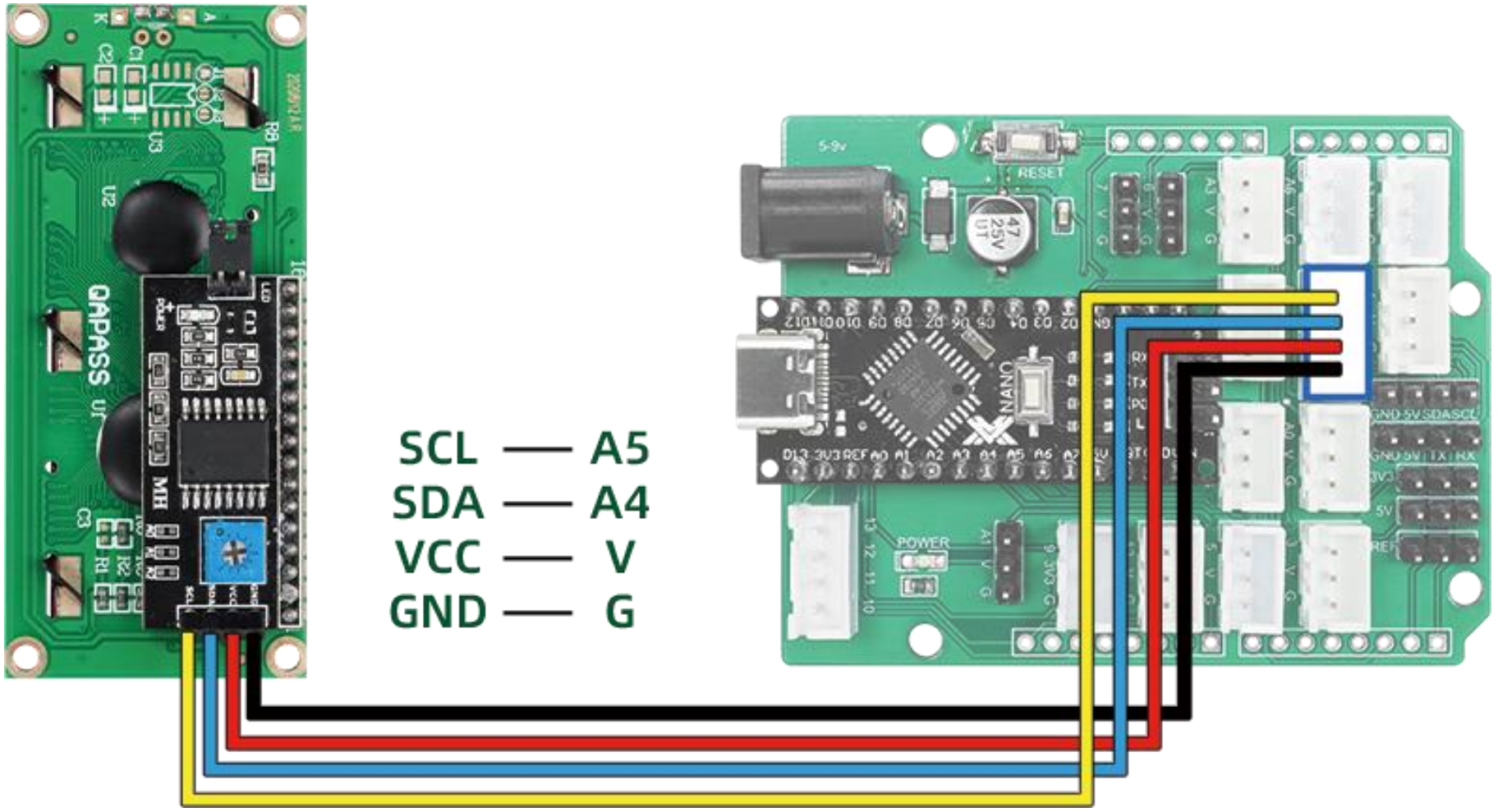
2.1 1602 display

The 1602 LCD (hereinafter referred to as the 1602 LCD) is a common character-type LCD. It is named because it can display 16*2 characters.

Usually the 1602LCD we use is integrated with a font chip. Through the API provided by the LiquidCrystal class library, we can easily use 1602LCD to display English letters and some symbols. Before using the 1602 LCD, we need to connect it to the main control board. In the project, we use the IIC LCD1602 module to integrate the IIC I/O expansion chip PCA8574, making the use of the LCD1602 easier.

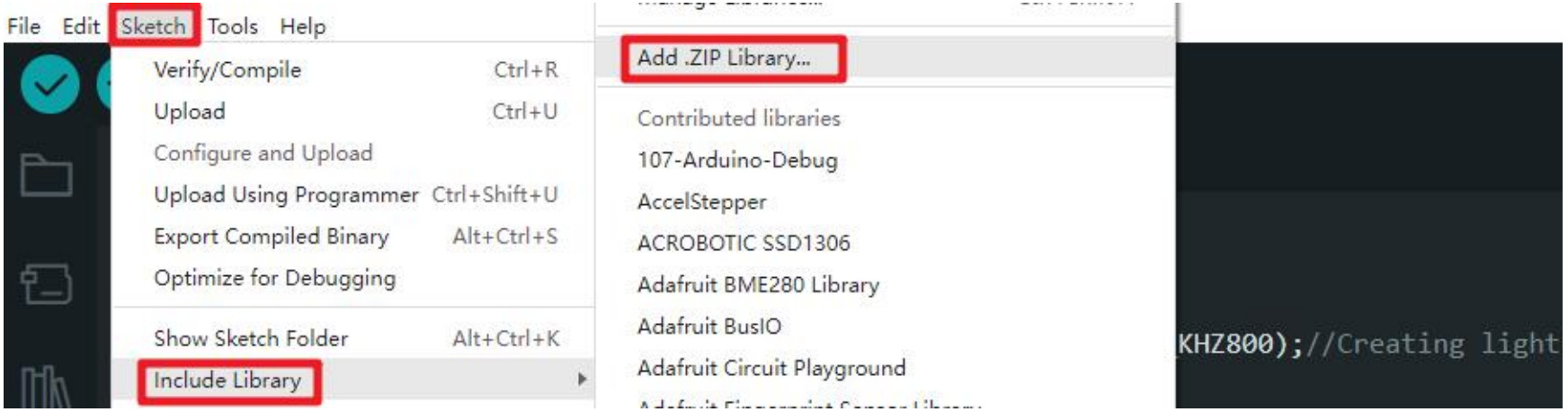
Through the two-wire IIC bus (serial clock line SCL, serial data line SDA), the purpose of controlling the LCD 1602 display can be achieved. It not only simplifies the circuit, but also saves I/O ports. The contrast of the LCD display can be adjusted through the potentiometer on the module. A silver-white potentiometer can be seen on the back of the module. Rotate it to adjust the contrast of the 1602 LCD. If the contrast is too high, the actual output text cannot be seen, and a screwdriver is needed to rotate the potentiometer to adjust. In addition, the address may be incorrect . The wiring pins on the back are GND, VCC, SDA, and SCL (SDA and SCL are the data lines and clock lines of IIC communication respectively). You can also set the address: 0x20-0x27 by setting the jumper, so that one control board can control multiple LCD 1602.

3. Project wiring diagram



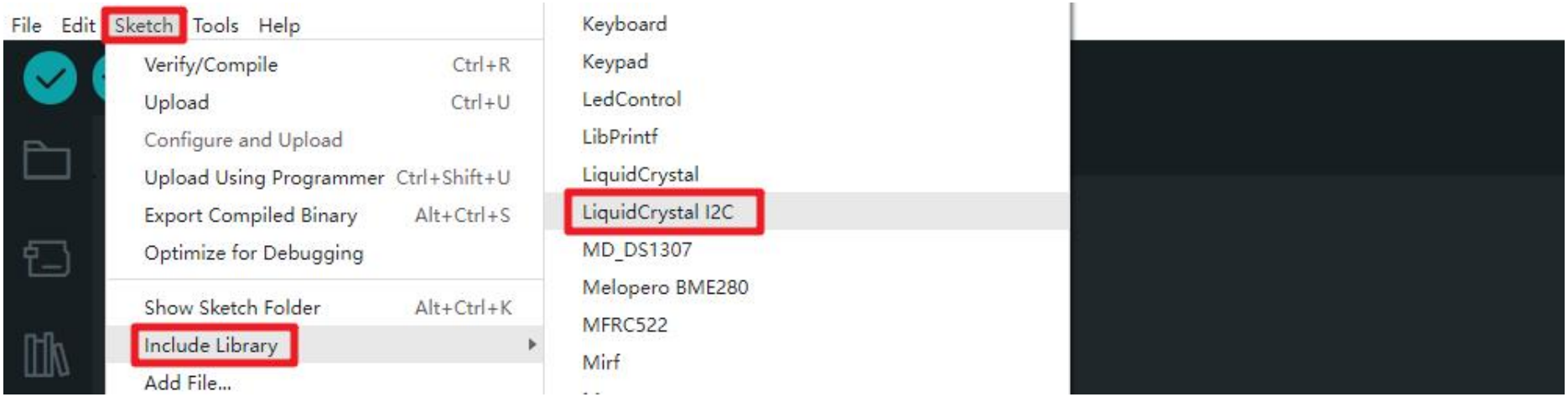
4. Add LiquidCrystal_I2C library

In the Arduino IDE, navigate to Sketch > Include Library > Add .ZIP Library and at the top of the drop-down list, select the "Add .ZIP Library" option.



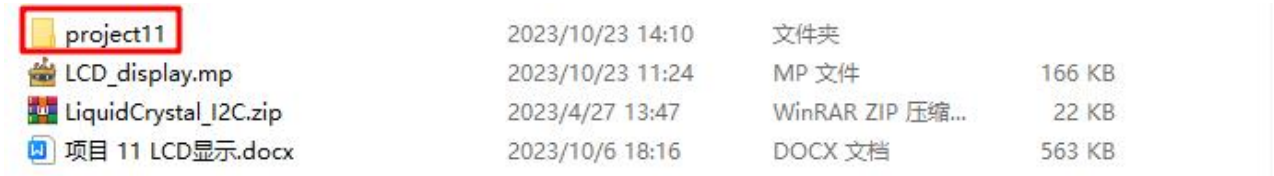
The system will prompt you to select the library to add , as shown below, navigate to the path location of the LiquidCrystal_I2C .zip file saved in your computer (*Item 11 LCD Display*\ LiquidCrystal_I2C *.zip*) and open it .

Open the Sketch > Include Library menu. You should now see Libraries at the bottom of the drop-down menu. It's ready to use in your sketches .



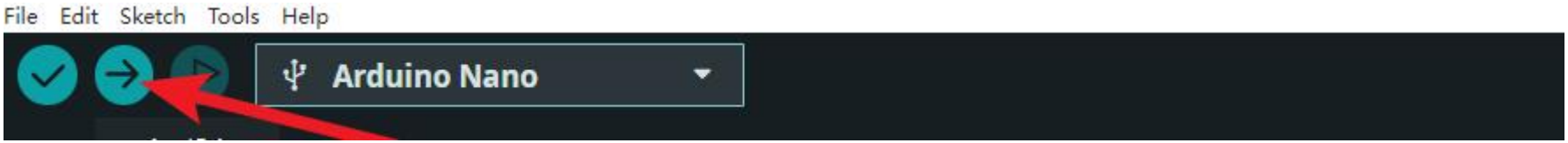
5. Download Arduino code

Open the project Arduino code file (path: project 11 LCD display\project11\project11.ino)



As with the previous project, use USB to connect the main control board to the computer, select the newly displayed COM

number, click "Download" to start compiling and downloading the program to the main control board.



After the download is completed, check the LCD screen display.

When you find that the LCD screen can light up but no characters are displayed, you need to adjust the contrast. Use a screwdriver tool to turn the potentiometer on the back of the LCD screen and observe the display.

Code analysis:

```
#include <Wire.h>
#include <LiquidCrystal_I2C.h>  //添加LCD显示屏库   Add LCD display library
//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);

void setup()
{
  Serial.begin(9600);
  lcd.init();         //初始化lcd   initialize the lcd
  lcd.backlight();    //开启LCD背光
  // lcd.noBacklight();  //关闭LCD   Close the backlight
  lcd.clear();        //清除内容    clear LCD
}
void loop()
{
    /*
    *lcd.setCursor(x,y);  //设置第y行，第x个字符开始显示
    *lcd.print("number:");//设置要显示的内容
    */
    lcd.setCursor(0,0);   //从第1个字符开始显示number:
    lcd.print("number:");
    lcd.setCursor(7,0);   //从第7个字符开始显示123
    lcd.print("123");     //在第一行显示数值    Displaying number

    lcd.setCursor(0,1);
    lcd.print("char:");
    lcd.setCursor(5,1);
    lcd.print("ABC");    //在第二行显示字符    Displaying characters
    delay(100);
```

6. Download Mind+ graphical code

Open the project Mind+code file (path: Project 11 LCD display\LCD_display.mp)

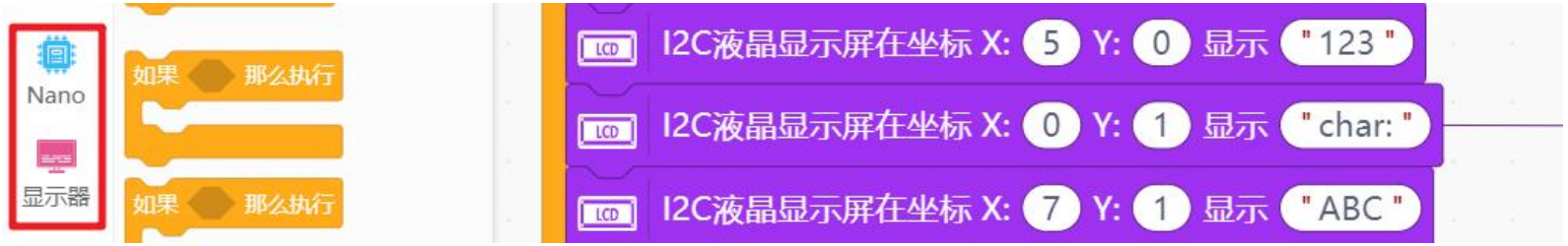
Connect the main control board to the computer with a USB cable and select the newly appeared CH340 serial port COM number. Click "Upload to Device" to complete the code upload.

The above is the function of obtaining the LCD screen display by downloading the code provided and downloading it to the control panel. When you want to create a new file and start programming again, you need to add an LCD display module. Click "Extension" in the lower left corner, enter and then select the main control board type as Nano.

Add the LCD1602 module library file : click the "Display" type and select the LCD1602 module

After the addition is successful, you can see that there are two more categories in the programming block column on the left:

Nano and "Display"



The complete programming is as follows: