# Project 27-Bluetooth Controlled LCD Display

1. project description

Through this project, you can learn how to use ZY -type-c Nano combined with a temperature and humidity sensor to obtain temperature and humidity and display it on the LCD screen and APP . The function of this program is to obtain real-time temperature and humidity through Bluetooth device connection and display it on the APP, and control the LCD to display temperature and humidity through buttons .

2. Project wiring diagram
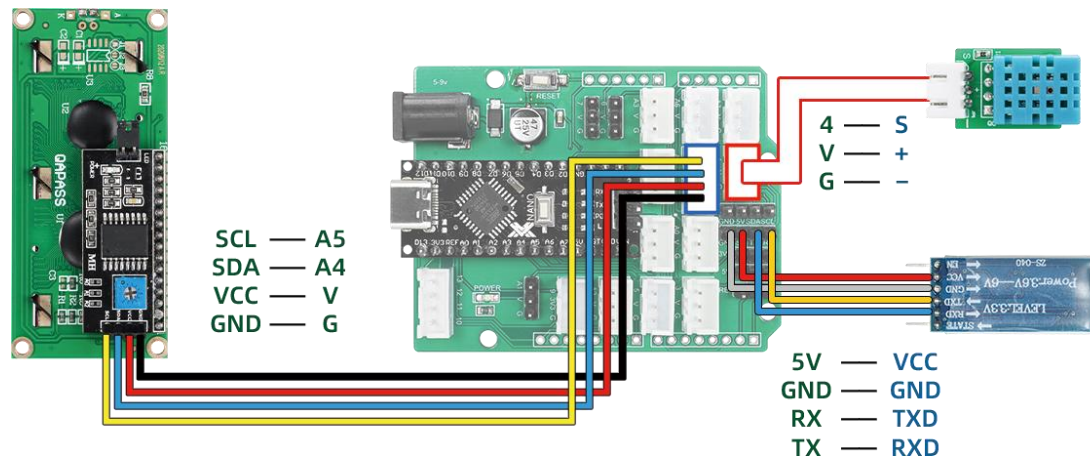
3. Download Arduino code

Please confirm that the dht.zip library and LiquidCrystal_I2C.zip have been installed. If not, please return to "Project 10" and "Project 11" to see how to install the library.

Open the project Arduino code file (path: Project 27 Bluetooth Control 1602 LCD Display\project27\project27.ino)

📁 project27	2023/10/18 15:11	文件夹	
📹 Bluetooth control LCD.mp	2023/10/18 13:45	MP 文件	167 l
📄 项目 27 蓝牙控制1602 LCD显示.docx	2023/10/18 15:17	DOCX 文档	1,234 l

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. (At the same time, you should unplug the Bluetooth before downloading, and plug the Bluetooth back in after the download is successful.)

Code analysis:

```
1   #include <LiquidCrystal_I2C.h>//添加LCD屏库    Add LCD screen library
2   #include <Wire.h>
3   #include <dht.h>        //添加温湿度库     Add temperature and humidity library
4   #define DHT11_PIN 4    //定义温湿度传感器引脚4   Define temperature and humidity sensor pin4
5   dht DHT;               //实例化温湿度对象为DHT   Instantiate the temperature and humidity object as a DHT
6   struct SensorData {    //定义温湿度结构体变量    Define the temperature and humidity structure variables
7       float temperature;
8       float humidity;
9   };
```

```
10    char ser_val;
11    bool LCD_switch = false;
12    //将16个字符和2行显示的LCD地址设置为0x27 set the LCD address to 0x27 for a 16 chars and 2 line display
13    LiquidCrystal_I2C lcd(0x27,20,4);
14
15    void setup()
16    {
17      Serial.begin(9600);
18      pinMode(DHT11_PIN, INPUT);
19      lcd.init();                  //初始化LCD屏 initialize the lcd
20      lcd.noBacklight();           //关闭LCD屏背光 Turn off the LCD backlight.
21    }
22
23    void loop()
24    {
25      if(Serial.available() > 0) {  //判断收到蓝牙数据    Verify receipt of Bluetooth data
26        ser_val = Serial.read();
27        if( ser_val == 'F'){        //判断接收到LCD开关按钮被点击  Determine that the received LCD switch b
28          LCD_switch = !LCD_switch; //按钮状态转换 State transitions
29        }
30      }
31      sendSensorData();     //调用发送温湿度数据函数     Call the function that sends the temperature and hum
32      ShowHumiture();       //调用温湿度LCD显示函数       Call the temperature and humidity display function
33    }
```

```
34  /*
35  *蓝牙串口发送温湿度数据函数 sendSensorData()
36  *以字节方式发送
37  */
38  void sendSensorData() {
39      int chk = DHT.read11(DHT11_PIN);
40      delay(100);
41      SensorData data = { DHT.temperature, DHT.humidity };    //采样温度和湿度数据   Sample temperature and humidity data
42      String dataString;
43      if(LCD_switch){
44        dataString = String(data.temperature, 1) + "," + String(data.humidity, 1);    //保留一位小数点将温湿度以逗号隔开方式拼接成字符串
45      }else{
46        dataString = "0.0,0.0";
47      }
48      Serial.println(dataString);         //发送温湿度数据     Send the data string
49  }
50
51  void ShowHumiture(){
52      if(LCD_switch){
53        lcd.backlight();              //打开LCD背光 Open the backlight
54        lcd.setCursor(0,0);
55        lcd.print("humi:");
56        lcd.setCursor(5,0);
57        lcd.print(DHT.temperature); //LCD屏显示温度值    The LCD screen displays the temperature value
58
59        lcd.setCursor(0,1);
60        lcd.print("temp:");
61        lcd.setCursor(5,1);
62        lcd.print(DHT.humidity);     //LCD屏显示湿度值    The LCD screen displays the humidity value
63      }else{
64        lcd.noBacklight();           //关闭LCD   Close the backlight
65        lcd.clear();                 //清除内容    clear LCD
66      }
```
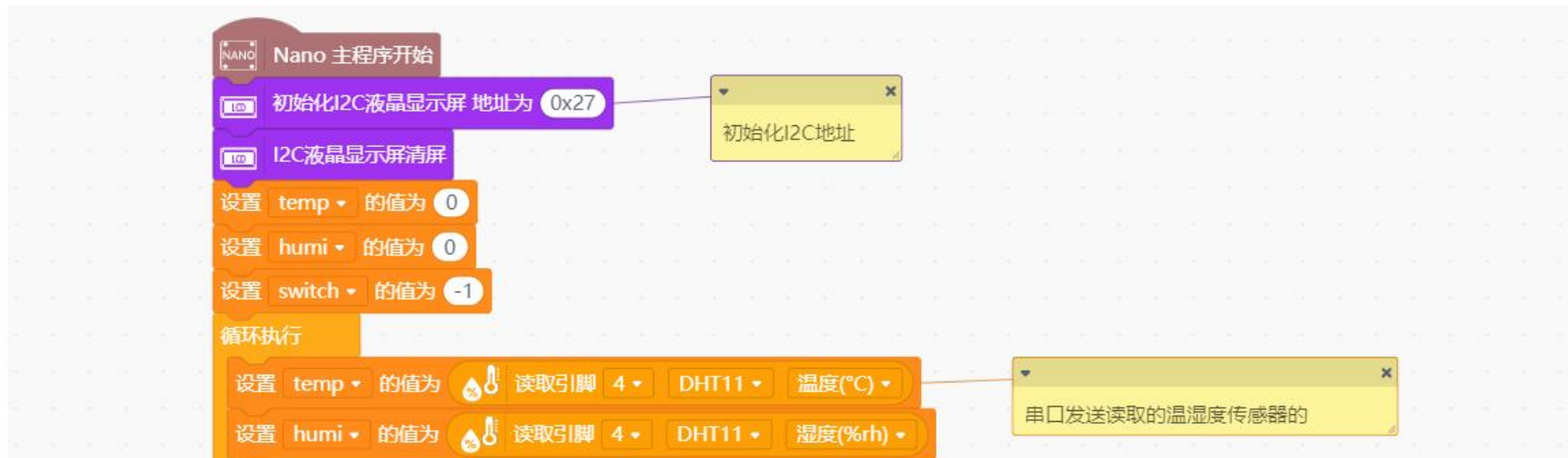
4. Download Mind+ graphical code

Open the project Mind+code file (path: Project 27 Bluetooth control 1602 LCD display\Bluetooth control LCD.mp)
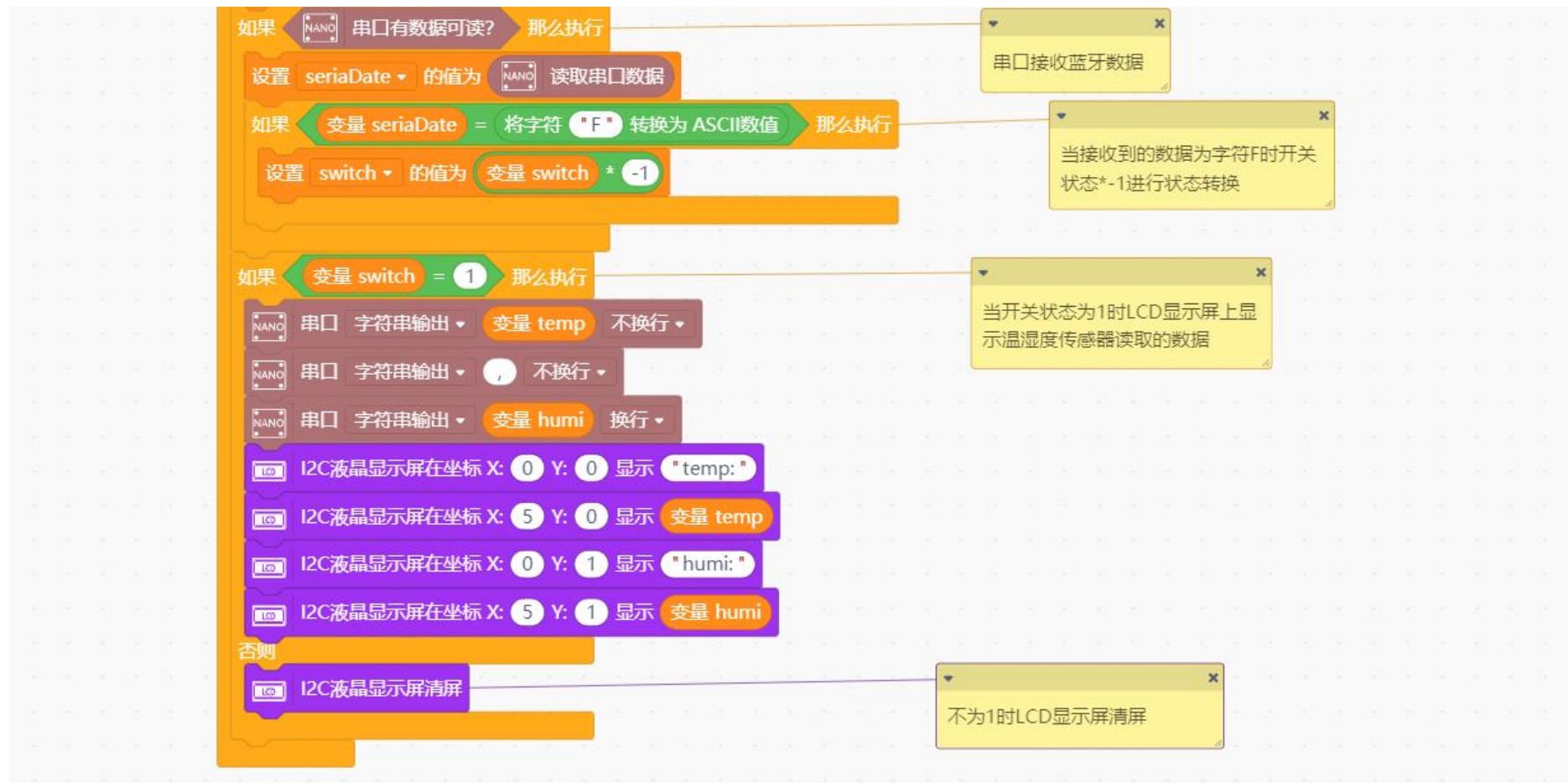

Connect the main control board to the computer with a USB cable and select the newly appeared CH340 serial port COM number. Click "Upload to Device" to complete the code upload.

Complete code:

Initialize the LCD screen and define temperature and humidity variables

如果 [NANO] 串口有数据可读? 那么执行 ────────────── 串口接收蓝牙数据

设置 seriaDate▾ 的值为 [NANO] 读取串口数据

如果 变量 seriaDate = 将字符 "F" 转换为 ASCII数值 那么执行 ────── 当接收到的数据为字符F时开关状态*-1进行状态转换

设置 switch▾ 的值为 变量 switch * -1

如果 变量 switch = 1 那么执行 ────────── 当开关状态为1时LCD显示屏上显示温湿度传感器读取的数据

[NANO] 串口 字符串输出▾ 变量 temp 不换行▾

[NANO] 串口 字符串输出▾ , 不换行▾

[NANO] 串口 字符串输出▾ 变量 humi 换行▾

[LCD] I2C液晶显示屏在坐标 X: 0 Y: 0 显示 "temp:"

[LCD] I2C液晶显示屏在坐标 X: 5 Y: 0 显示 变量 temp

[LCD] I2C液晶显示屏在坐标 X: 0 Y: 1 显示 "humi:"

[LCD] I2C液晶显示屏在坐标 X: 5 Y: 1 显示 变量 humi

否则

[LCD] I2C液晶显示屏清屏 ────────── 不为1时LCD显示屏清屏

5. Operation on APP

5.1 Please confirm that TSCIBUNY.apk APP has been installed. If not, please go back to item 23 to see how to install the APP. Android users send "TSCINBUNY.apk" to their mobile phones and install it. There may be a newer version of the software when you see this tutorial. When prompted to upgrade, please allow the upgrade and keep your phone connected to the network.

For ios device users, please open the App Store, search and install TSCIBUNY

5.2 TSCINBUNY remote control APP enters the project interface

After successfully connecting to Bluetooth, enter the project. This project is 27, so please select the third column. (How to search and connect Bluetooth? Please see item 23)

Project effect: Click the control button on the APP and the LCD screen will light up and display the temperature and humidity values. Click again to turn off the LCD and temperature and humidity display.