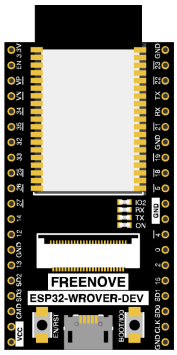
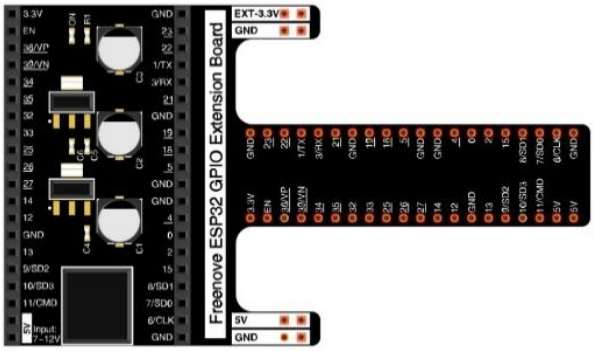
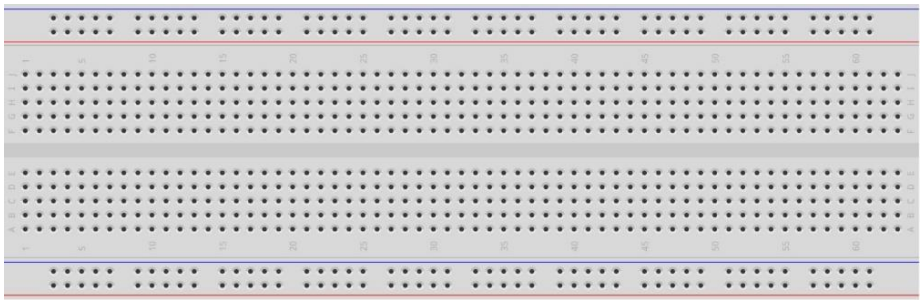
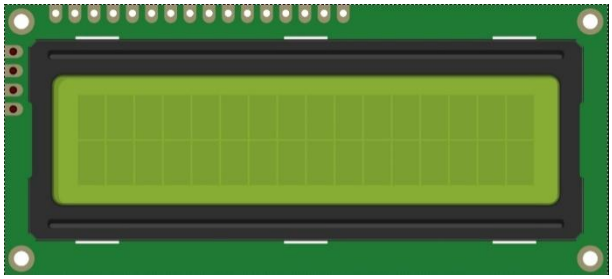
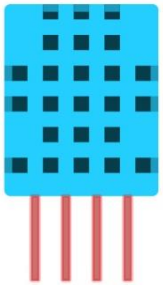
Project 24.2 Hygrothermograph

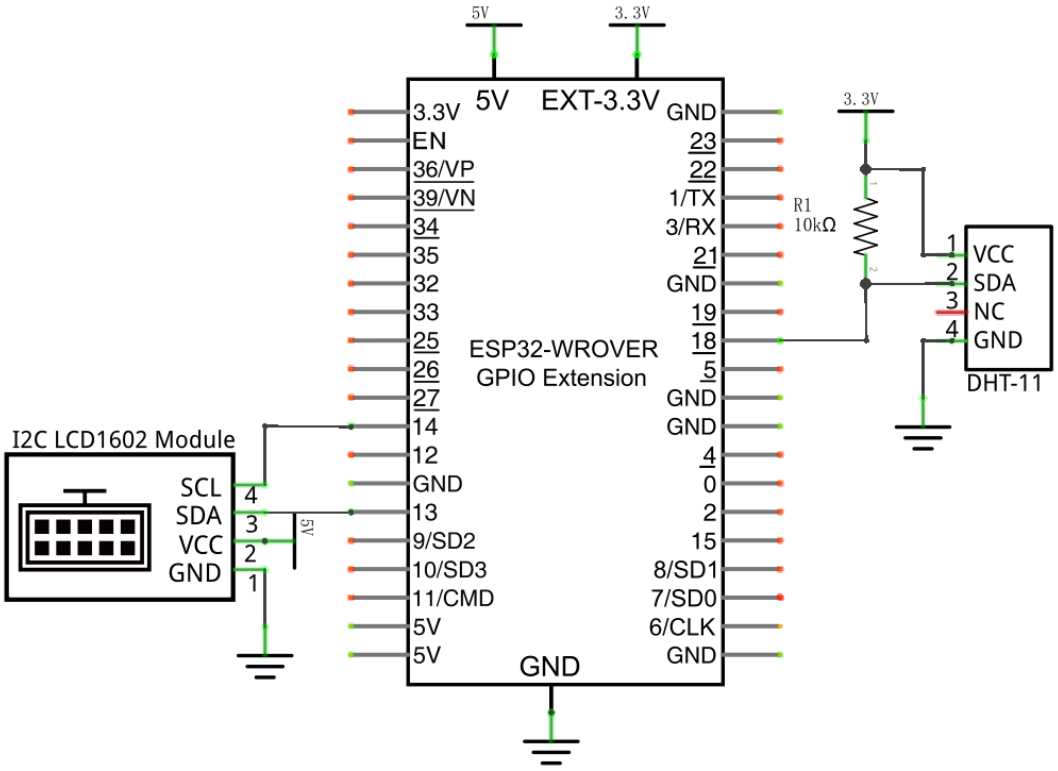
In this project, we use L2C-LCD1602 to display data collected by DHT11.

Component List

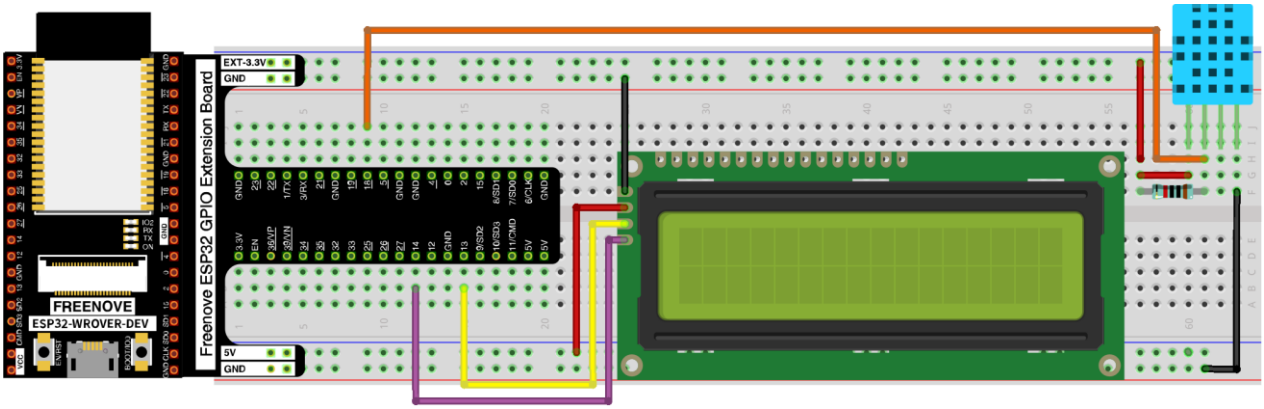
<table>
<tr><td>ESP32-WROVER x1
  </td><td>GPIO Extension Board x1
  </td></tr>
<tr><td colspan="2">Breadboard x1
  </td></tr>
<tr><td>LCD1602 Module x1
  </td><td>Resistor 10kΩ x1
  </td></tr>
<tr><td>Jumper F/M x4
Jumper M/M x4
  </td><td>DHT11 x1
  </td></tr>
</table>

Circuit

Schematic diagram



Hardware connection. If you need any support, please feel free to contact us via: support@freenove.com



Sketch

This code uses the DHTesp and LiquidCrystal_I2C libraries, so make sure the relevant library files are added before writing the program.

Sketch_24.2_Temperature_and_Humidity_Sensor

Sketch_24.2_Temperature_and_Humidity_Sensor_I2C | Arduino IDE 2.0.4

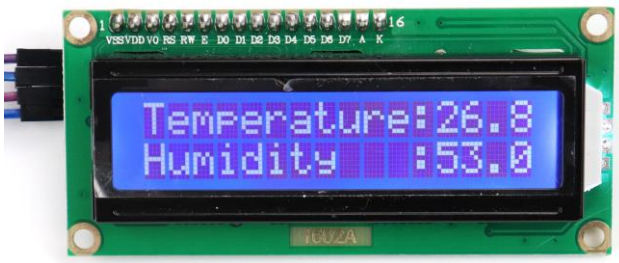
File Edit Sketch Tools Help

ESP32 Wrover Module

Sketch_24.2_Temperature_and_Humidity_Sensor_I2C.ino

```
/**************************************************************************
  Filename    : Temperature and Humidity Sensor
  Description : Use DHT11 to measure temperature and humidity.Print the result to the L
  Auther      : www.freenove.com
  Modification: 2020/07/11
**************************************************************************/
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
#include "DHTesp.h"

#define SDA 13                    //Define SDA pins
#define SCL 14                    //Define SCL pins

DHTesp dht;                       // create dht object
LiquidCrystal_I2C lcd(0x27,16,2); //initialize the LCD
int dhtPin = 18;                  // the number of the DHT11 sensor pin

void setup() {
  Wire.begin(SDA, SCL);           // attach the IIC pin
  if (!i2CAddrTest(0x27)) {
    lcd = LiquidCrystal_I2C(0x3F, 16, 2);
  }
  lcd.init();                     // LCD driver initialization
  lcd.backlight();                // Open the backlight
  dht.setup(dhtPin, DHTesp::DHT11); //attach the dht pin and initialize it
}

void loop() {
```

Download the code to ESP32-WROVER. The first line of LCD1602 shows the temperature value, and the second line shows the humidity value. Try to "pinch" the thermistor (without touching the leads) with your index finger and thumb for a brief time to observe the change in the LCD display value.



The following is the program code:

```
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
#include "DHTesp.h"

#define SDA 13                    //Define SDA pins
#define SCL 14                    //Define SCL pins
DHTesp dht;                       // create dht object
LiquidCrystal_I2C lcd(0x27,16,2); //initialize the LCD
int dhtPin = 18;                  // the number of the DHT11 sensor pin

void setup() {
  Wire.begin(SDA, SCL);           // attach the IIC pin
  if (!i2CAddrTest(0x27)) {
    lcd = LiquidCrystal_I2C(0x3F, 16, 2);
  }
  lcd.init();                     // LCD driver initialization
  lcd.backlight();                // Open the backlight
  dht.setup(dhtPin, DHTesp::DHT11); //attach the dht pin and initialize it
}

void loop() {
  // read DHT11 data and save it
  flag:TempAndHumidity DHT = dht.getTempAndHumidity();
  if (dht.getStatus() != 0) {       //Determine if the read is successful, and if it fails, go back to flag and re-read the data
    goto flag;
  }
  lcd.setCursor(0, 0);              //set the cursor to column 0, line 1
  lcd.print("Temperature:");        //display the Humidity on the LCD1602
  lcd.print(DHT.temperature);
  lcd.setCursor(0, 1);              //set the cursor to column 0, line 0
  lcd.print("Humidity    :");      //display the Humidity on the LCD1602
  lcd.print(DHT.humidity);
  delay(2000);
}
bool i2CAddrTest(uint8_t addr) {
  Wire.begin();
  Wire.beginTransmission(addr);
  if (Wire.endTransmission() == 0) {
    return true;
  }
  return false;
}
```

First, add the library function header file.

```
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
#include "DHTesp.h"
```

Second, initialize the pins associated with the DHT11 sensor and I2C-LCD1602.

```
DHTesp dht;                          // create dht object
LiquidCrystal_I2C lcd(0x27,16,2); //initialize the LCD
int dhtPin = 18;                     // the number of the DHT11 sensor pin

void setup() {
  Wire.begin(SDA, SCL);              // attach the IIC pin
  if (!i2CAddrTest(0x27)) {
    lcd = LiquidCrystal_I2C(0x3F, 16, 2);
  }
  lcd.init();                        // LCD driver initialization
  lcd.backlight();                   // Open the backlight
  dht.setup(dhtPin, DHTesp::DHT11); //attach the dht pin and initialize it
}
```

Finally, the data of temperature and humidity sensor are obtained and displayed on LCD1602. The first row shows the temperature and the second shows the humidity.

```
flag:TempAndHumidity DHT = dht.getTempAndHumidity();
  if (dht.getStatus() != 0) {       //Determine if the reading is successful, and if it fails, go back to flag and re-read the data
    goto flag;
  }
  lcd.setCursor(0, 0);               //set the cursor to column 0, line 1
  lcd.print("Temperature:");         //display the Humidity on the LCD1602
  lcd.print(DHT.temperature);
  lcd.setCursor(0, 1);               //set the cursor to column 0, line 0
  lcd.print("Humidity    :");       //display the Humidity on the LCD1602
  lcd.print(DHT.humidity);
```