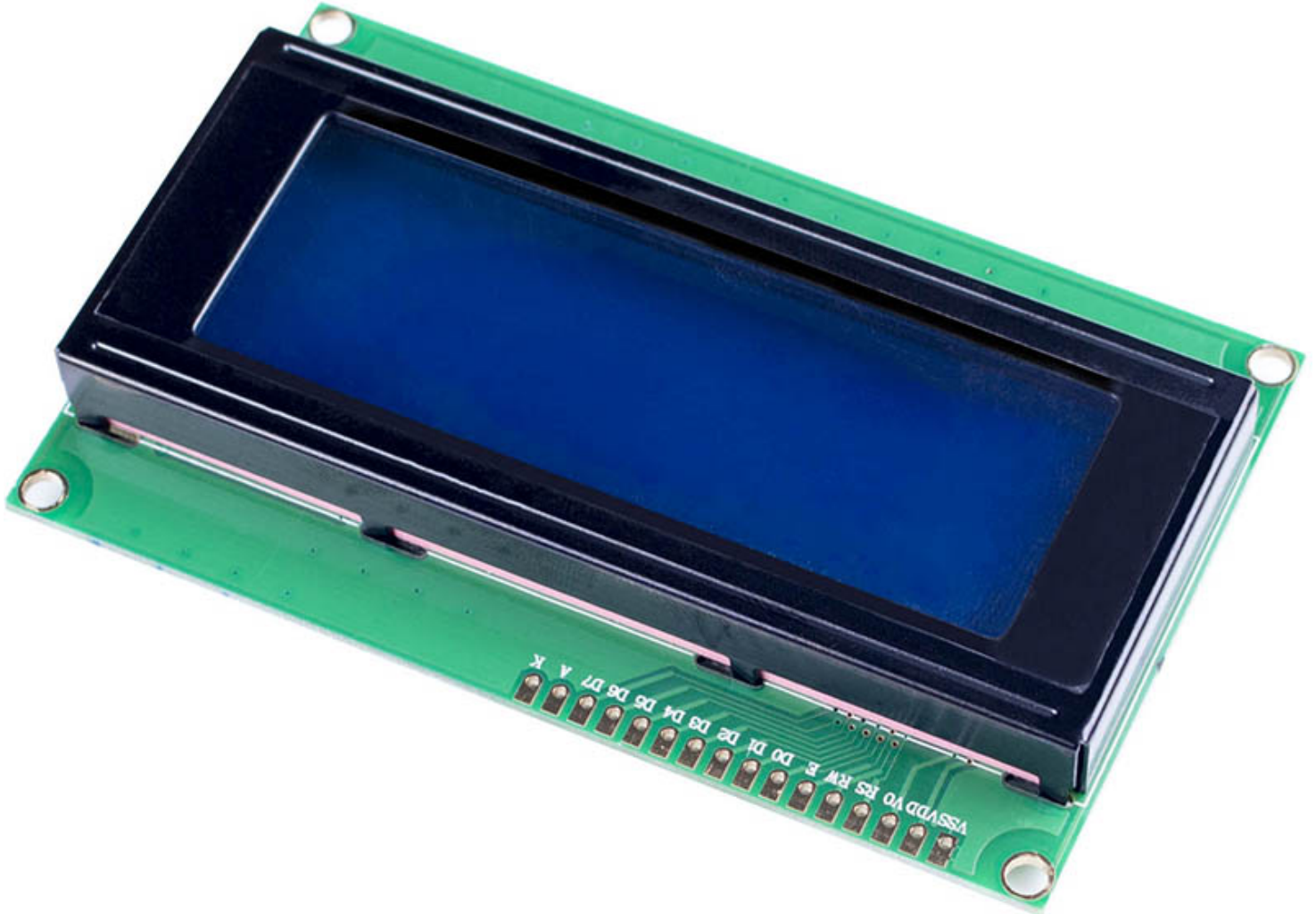


Introduction



LCD2004, or 2004 character-type liquid crystal display, is a kind of dot matrix module to show letters, numbers, and characters and so on. It's composed of 5x8 dot matrix positions; each position can display one character. There's a dot pitch between two characters and a space between lines, thus separating characters and lines. The model 2004 means it displays 4 rows of 20 characters.

Generally, LCD2004 has parallel ports, that is, it would control several pins at the same time. LCD2004 can be categorized into eight-port and four-port connections. If the eight-port connection is used, then all the digital ports of the SunFounder Uno board are almost completely occupied. If you want to connect more sensors, there will be no ports available. Therefore, the four-port connection is used here for better application.

Pins Functions

Pin	Function
VSS	connected to ground
VDD	connected to a +5V power supply
VO	to adjust the contrast
RS	A register select pin that controls where in the LCD's memory you are writing data to. You can select either the data register, which holds what goes on the screen, or an instruction register, which is where the LCD's controller looks for instructions on what to do next.
R/W	A Read/Write pin to select between reading and writing mode
E	An enabling pin that reads the information when High level (1) is received. The instructions are run when the signal changes from High level to Low level.
D0-D7	to read and write data
A	Pins that control the LCD backlight. Connect A to 3.3v.
K	Pins that control the LCD backlight. Connect K to GND.

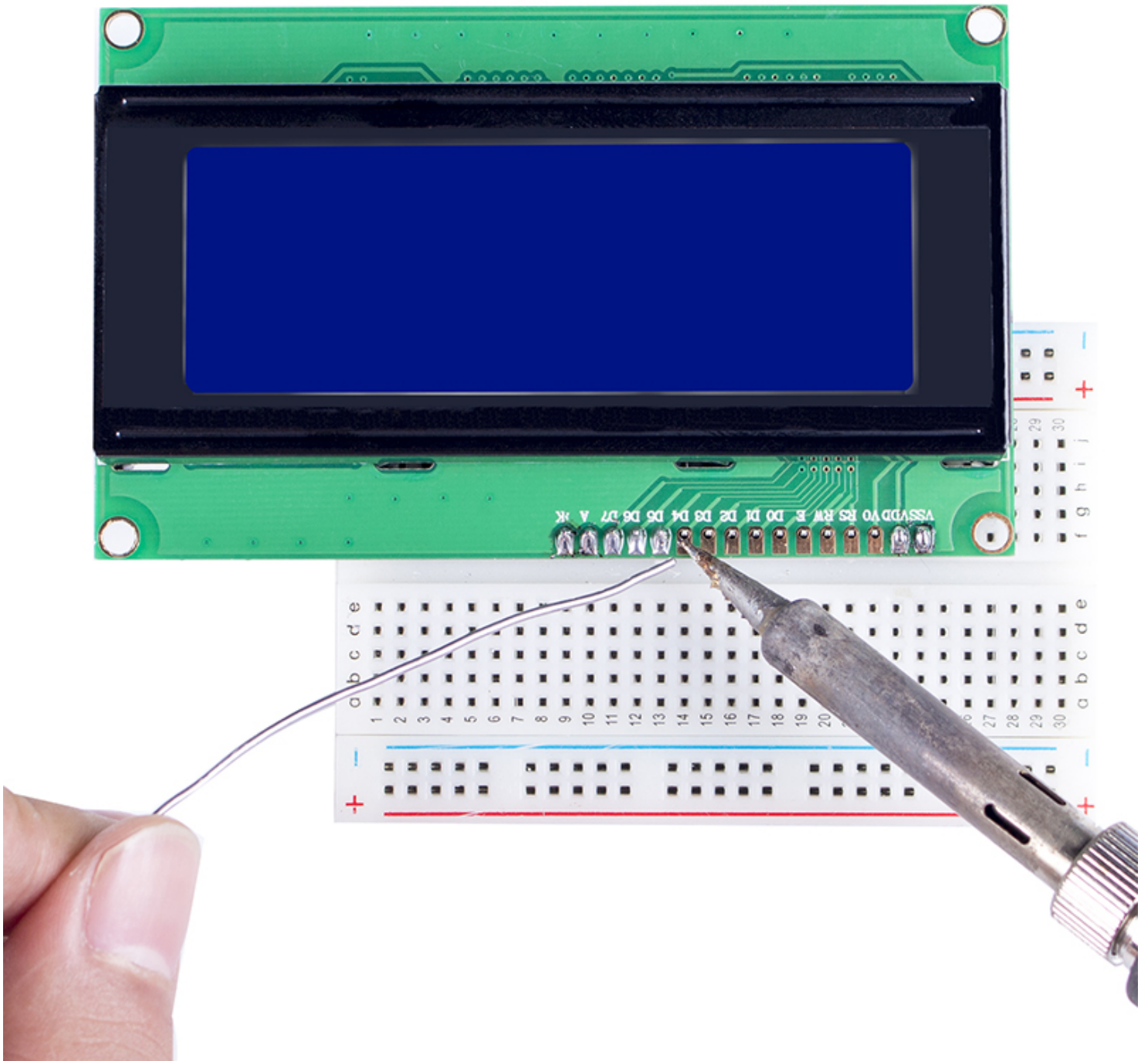
The Experiment for Arduino

Components

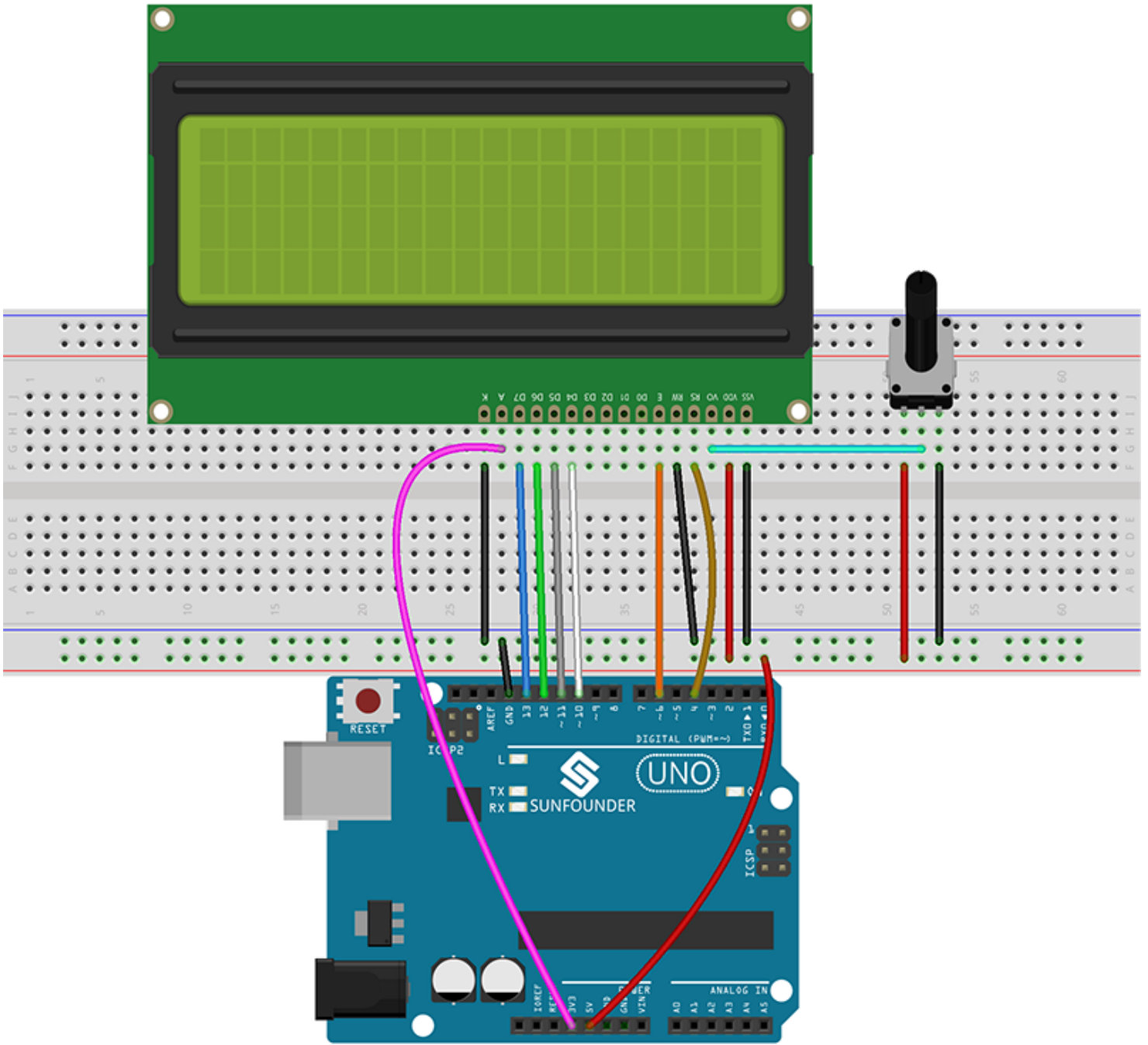
- 1 * SunFounder Uno Board
- 1 * Breadboard
- 1 * LCD2004
- 1 * Potentiometer (50kΩ)
- 1 * USB Cable
- Several Jumper Wires

Experimental Procedures

Note: Before connecting circuit, need to plug the pin headers onto a breadboard, and then put the LCD2004 on to it for easy soldering.

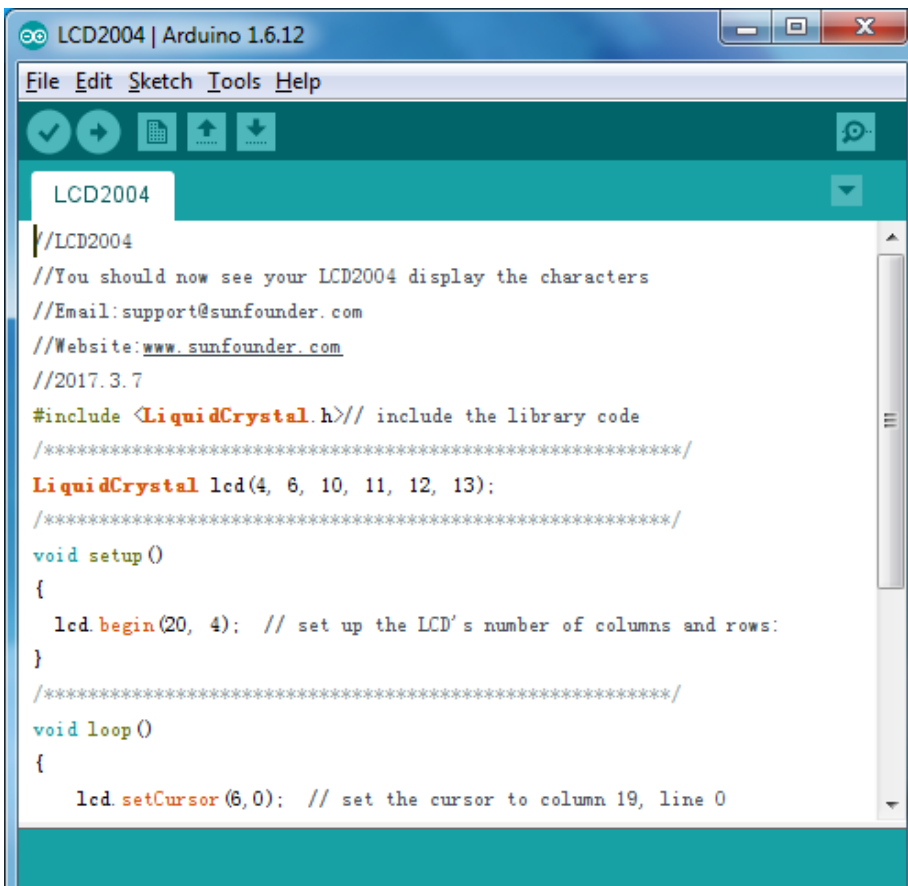


Step 1: Build the circuit (make sure the pins are connected correctly. Otherwise, characters will not be displayed properly):



fritzing

Step 2: Download the package `LCD2004_for_Arduino` , then unzip it and open the `LCD2004.ino` file



```
LCD2004 | Arduino 1.6.12
File Edit Sketch Tools Help
LCD2004
//LCD2004
//You should now see your LCD2004 display the characters
//Email:support@sunfounder.com
//Website:www.sunfounder.com
//2017.3.7
#include <LiquidCrystal.h> // include the library code
/*****/
LiquidCrystal lcd(4, 6, 10, 11, 12, 13);
/*****/
void setup()
{
  lcd.begin(20, 4); // set up the LCD's number of columns and rows:
}
/*****/
void loop()
{
  lcd.setCursor(6,0); // set the cursor to column 19, line 0
```

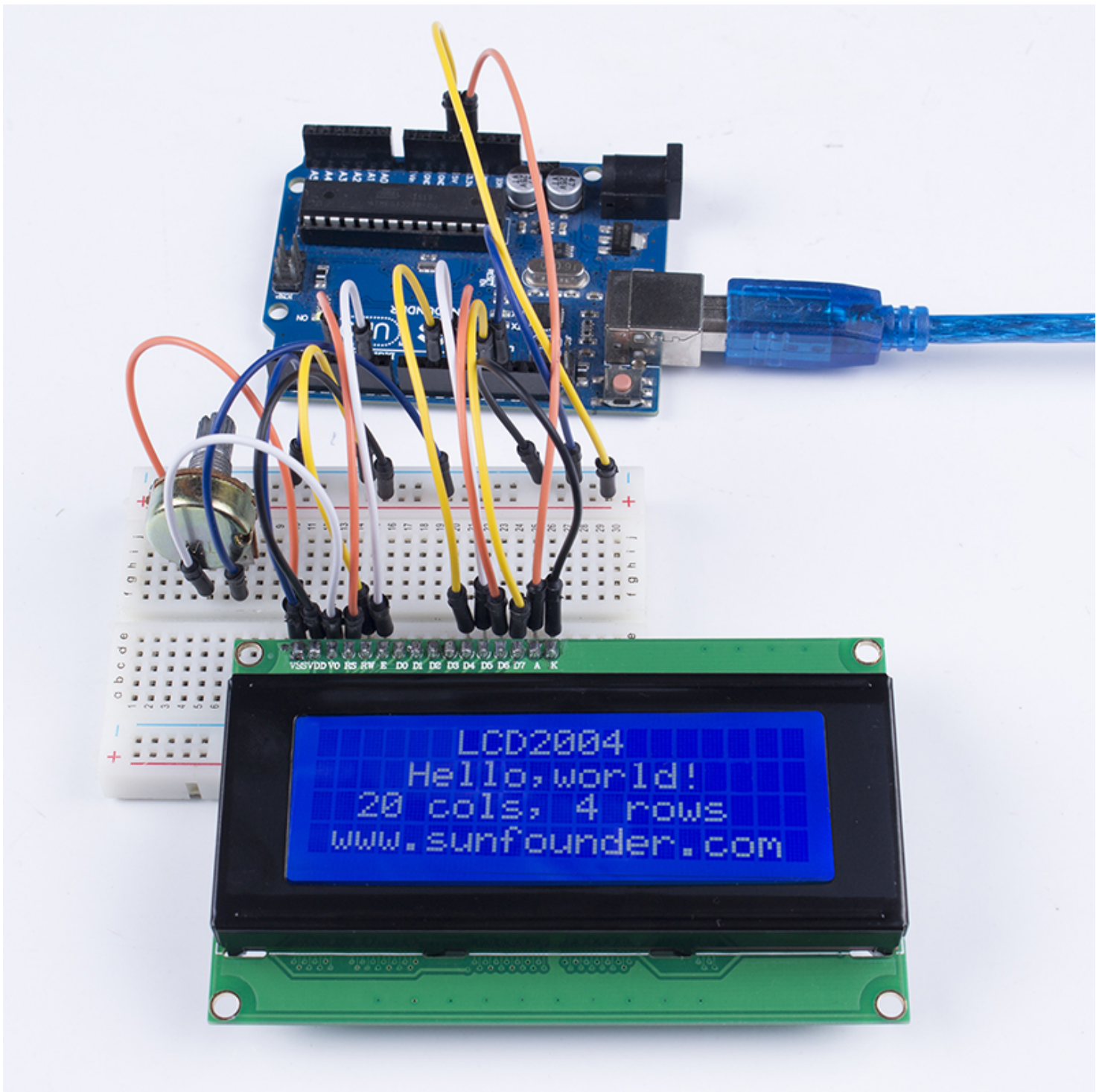
Step 3: Select correct Board and Port

Step 4: Upload the sketch to the SunFounder Uno board

Experimental Phenomenon

Note: You may need to adjust the potentiometer on the LCD2004 until it can display clearly.

You should now see the characters "LCD2004", "Hello, world!", "20 cols, 4 rows" and "www.sunfounder.com" on the LCD.



The Experiment for Raspberry Pi

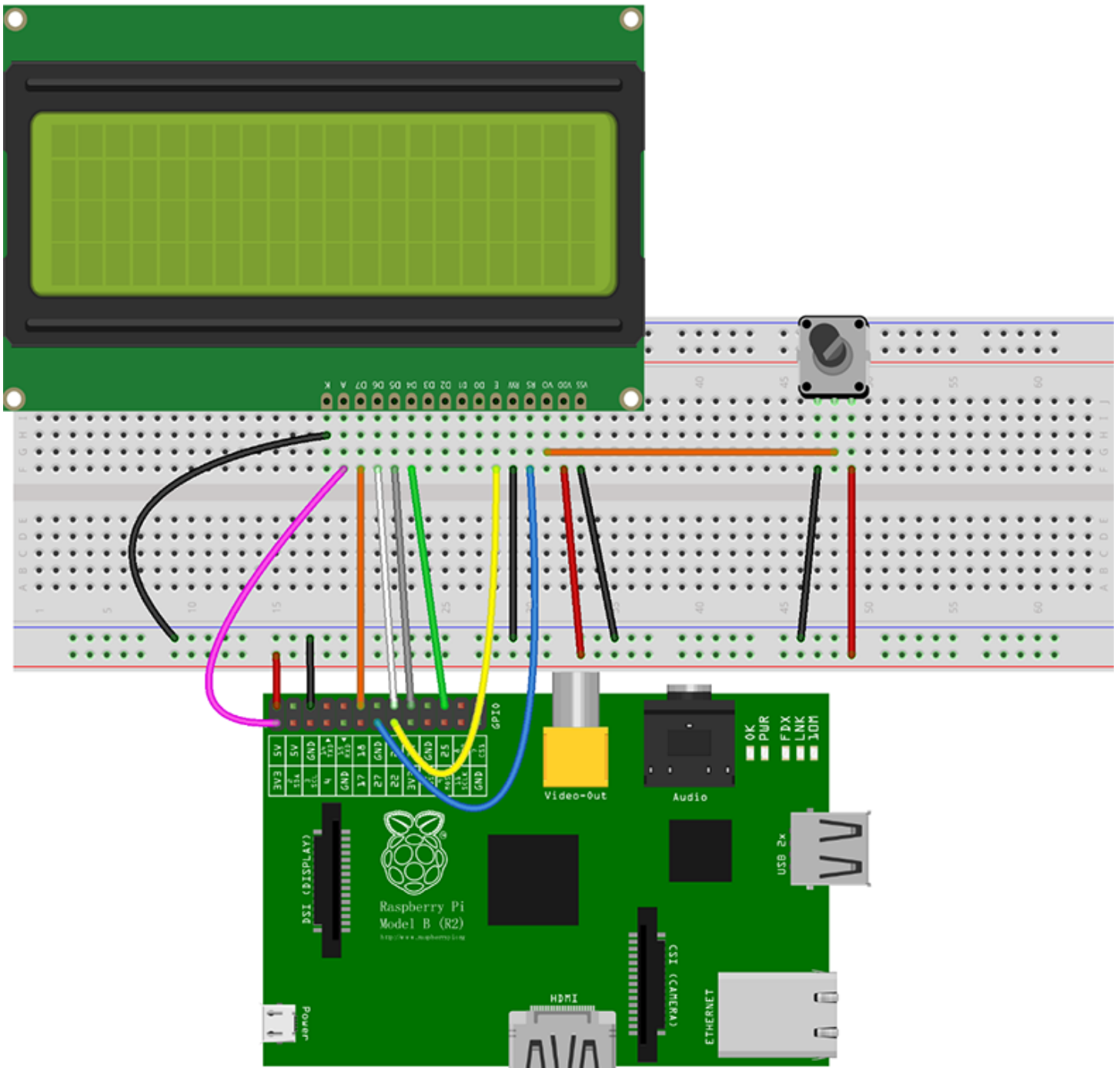
Components

- 1 * Raspberry Pi
- 1 * Breadboard
- 1 * LCD2004
- 1 * Potentiometer
- Several Jumper Wires

Experimental Procedures

Step 1: Build the circuit (please be sure the pins are connected correctly. Otherwise, characters will not be displayed properly):

LCD2004	Raspberry Pi
VDD	GND
VSS	5V
VO	Connect to the middle pin of potentiometer
RS	GPIO27
R/W	GND
E	B22
D0-D3	Not connected
D4	GPIO 25
D5	GPIO 24
D6	GPIO 23
D7	GPIO 18
A	3.3V
K	GND



Note: After you run the code, characters may not appear on the LCD1602. You need to adjust the contrast of the screen (the gradual change from black to white) by spinning the potentiometer clockwise or anticlockwise, until the screen displays characters clearly.

Step 2: Transfer the package `LCD2004_for_Raspberry_Pi` to the Raspberry Pi

```
wget http://wiki.sunfounder.cc/images/b/bb/LCD2004_for_Raspberry_Pi.zip
```

Step 3: Extract the package

```
unzip LCD2004_for_Raspberry_Pi.zip
```

Step 4: Get into the folder of code

```
cd LCD2004_for_Raspberry_Pi
```

Step 5: Run

```
sudo python lcd2004.py
```

Experimental Phenomenon

You should see four lines of characters displayed on the LCD2004: "LCD2004", "Hello, world!", "20 cols, 4 rows" and "www.sunfounder.com".

