LROBRUYA

45 Sensor kit

LROBRUYA

Content

Preface

Company Profile

Founded in 2014, Shenzhen Lonten Technology Co., Ltd. focuses on the design, research production of Electronics Module for robotics related products. Consisting of professional researchers and skilled engineers, our R&D team constantly strives for creative function and excellent user experience. The company's R&D investments on arduino kits raspberry pi kits, as well as 3D printer and robots that back up STEAM education.

Customer Service

Our self-owned factory is certificated with BSCI and SO, covering an area of 5,000 square meters, and achieving an annual production capacity of over 10,000 units. Our products are all certified to CE, FCC, and ROHS standards, have exported to more than 100 countries including, but not limited to France, the United States of America, Australia, Russia, the United Kingdom, Germany, Singapore, Egypt, and India, bringing technological innovation to all walks of life.

Tutorial

This tutorial include codes, libraries and detailed user documentation. It is designed for beginners. You will learn all the basic knowledge about how to use Arduino controller board, sensors and components.

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Kit Introduction

This is a 45 in 1 sensor learning kit for Arduino, rolled out by LONTEN.

Inside this kit are digital/analog sensors, as well as some special modules such as ultrasonic module, joystick, relay module and acceleration modules, etc.

For each module, we provide a clear connection diagram and a sample code. Although you are a beginner, you can readily pick up how sensors work.

The sample codes for this sensor kit are based on Arduino. In addition, you have an alternative to apply this kit to other MCU development platform, such as 51, STM32, Raspberries Pi since the working principle is almost same.

Now, let's start from the basic lessons.

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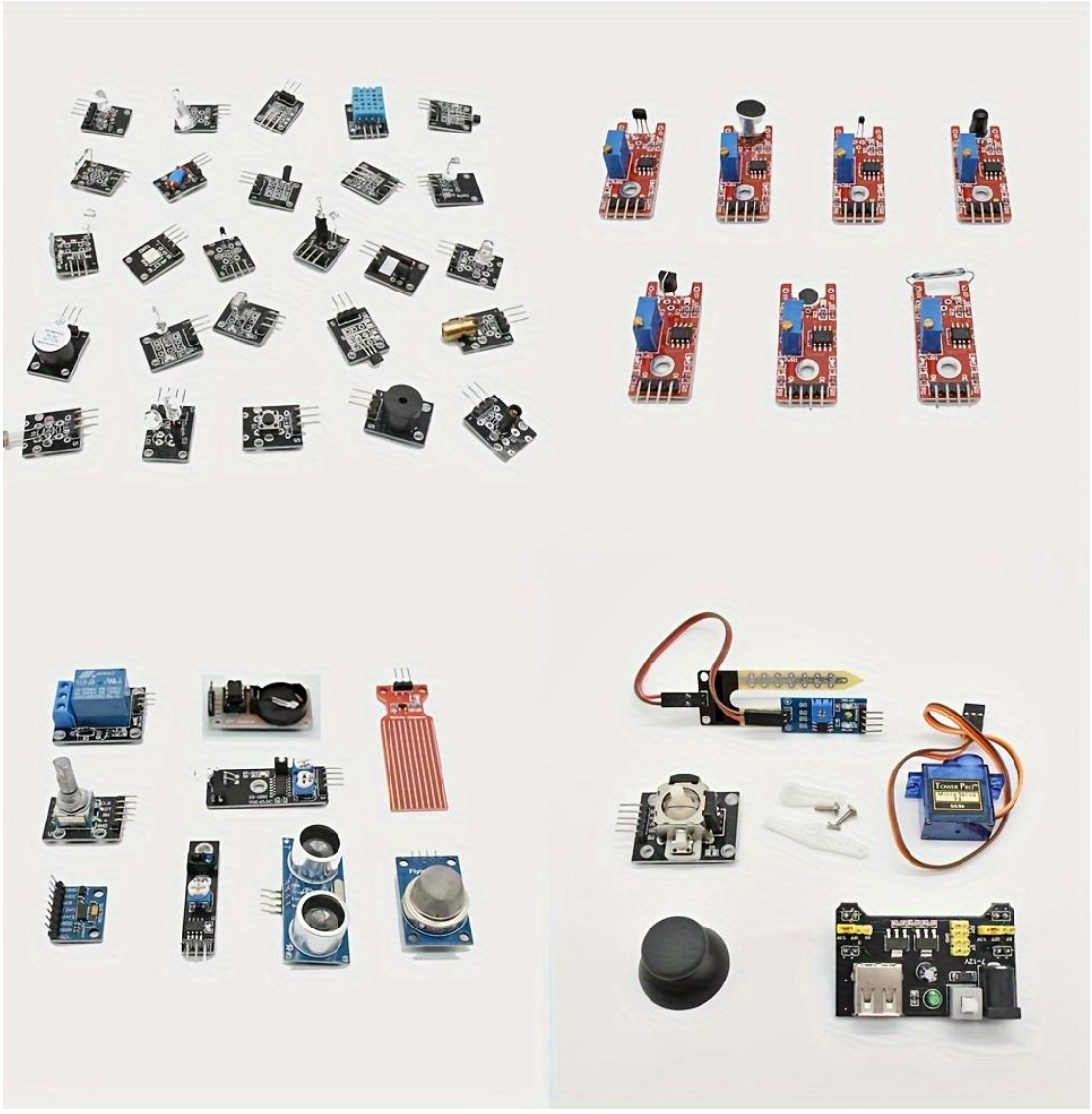
Kit List



How to Install Arduino IDE

Introduction

The Arduino Integrated Development Environment (IDE) is the software side of the Arduino platform.

In this Project, you will learn how to setup your computer to use Arduino and how to set about the Projects that follow.

The Arduino software that you will use to program your Arduino is available for Windows, Mac and Linux. The installation process is different for all three platforms and unfortunately there is a certain amount of manual work to install the software.

STEP 1: Go to https://www.arduino.cc/en/software.

The version available at this website is usually the latest version, and the actual version may be newer than the version in the picture.

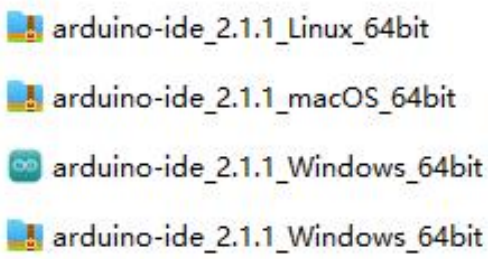
STEP2：Download the development software that is compatible with the operating.

system of your computer. Take Windows as an example here.

Click Windows Win 10 and newer,64 bits.

Click JUST DOWNLOAD.

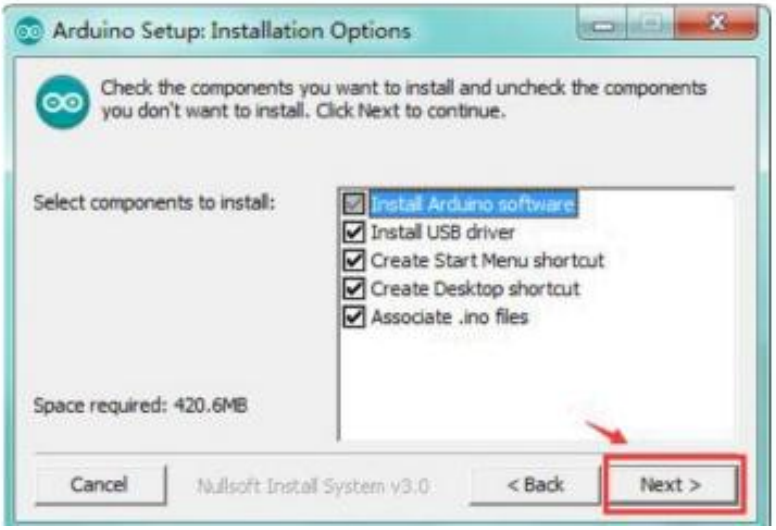
Also version 2.1.1 is available in the material we provided, and the versions of our materials are the latest versions when this course was made.



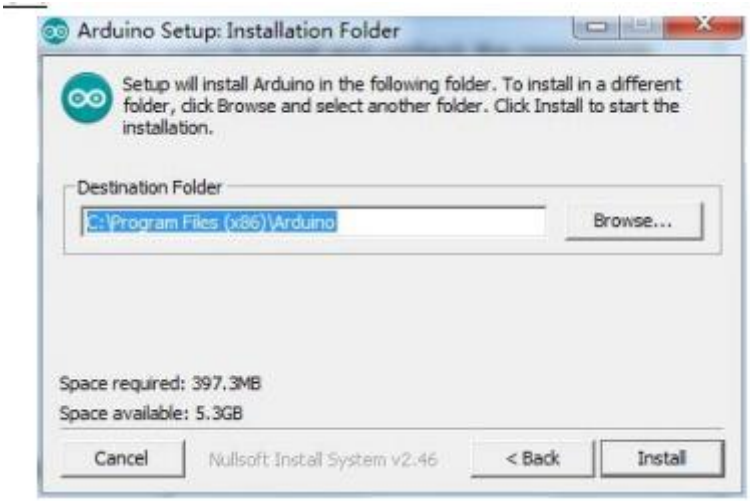
Installing Arduino (Windows)

Install Arduino with the exe. Installation package.

Click I Agree to see the following interface.

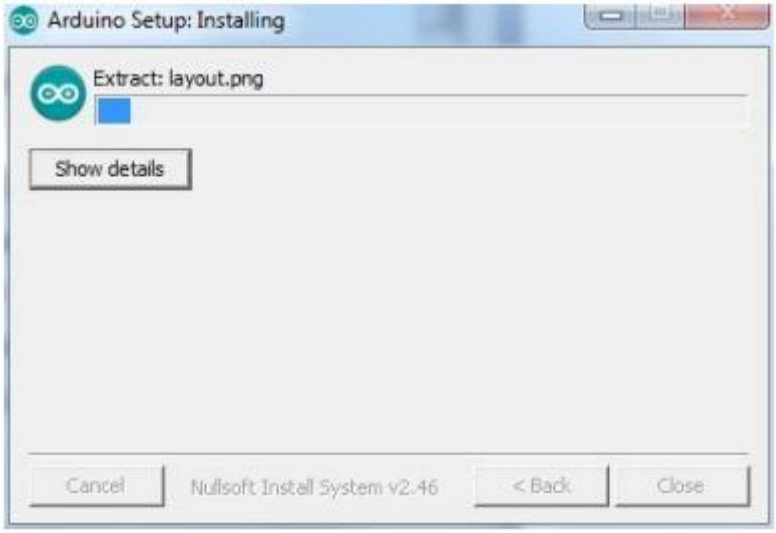


Click Next

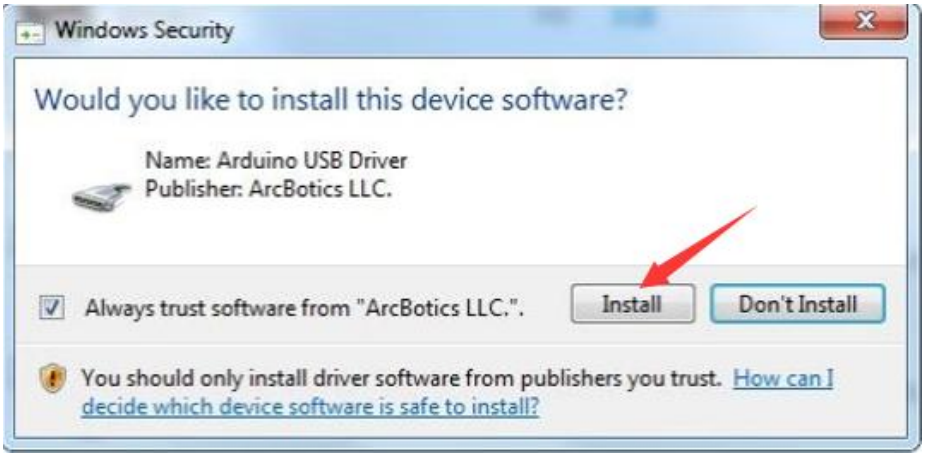


You can press Browse… to choose an installation path or directly type in the directory you want.

Click Install to initiate installation

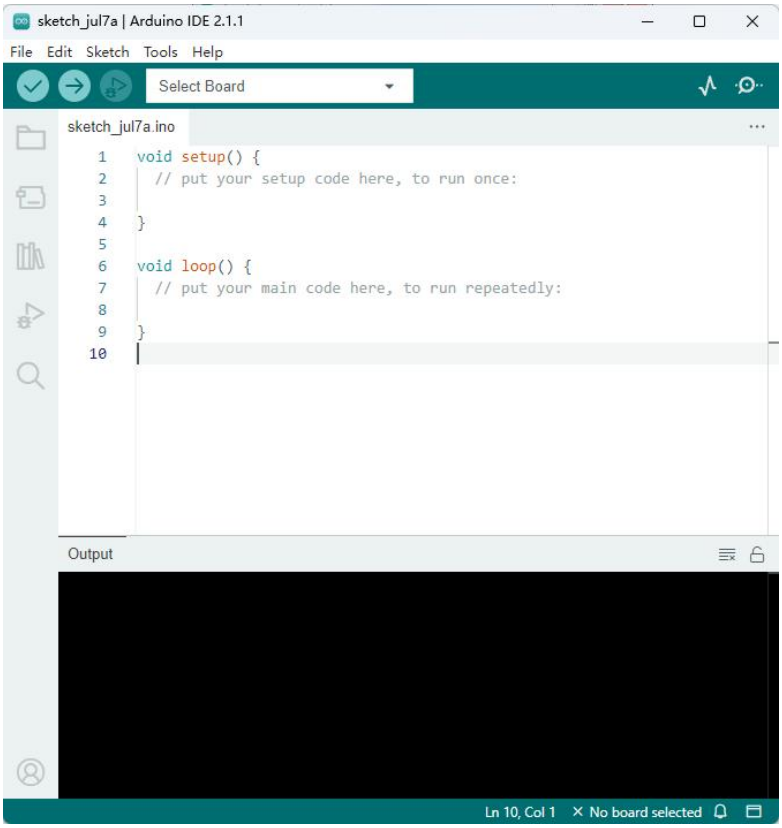


Finally, the following interface appears, click Install to finish the installation.



Next, the following icon appears on the desktop

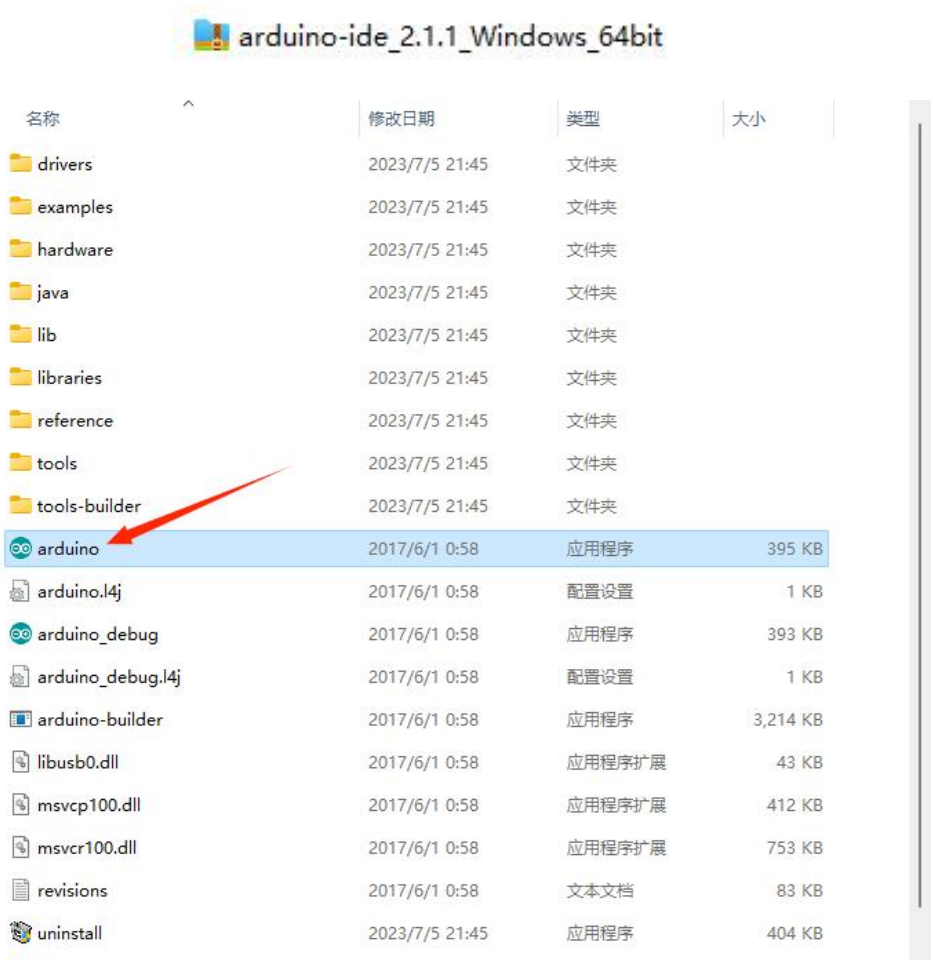
Double-click to enter the desired development environment

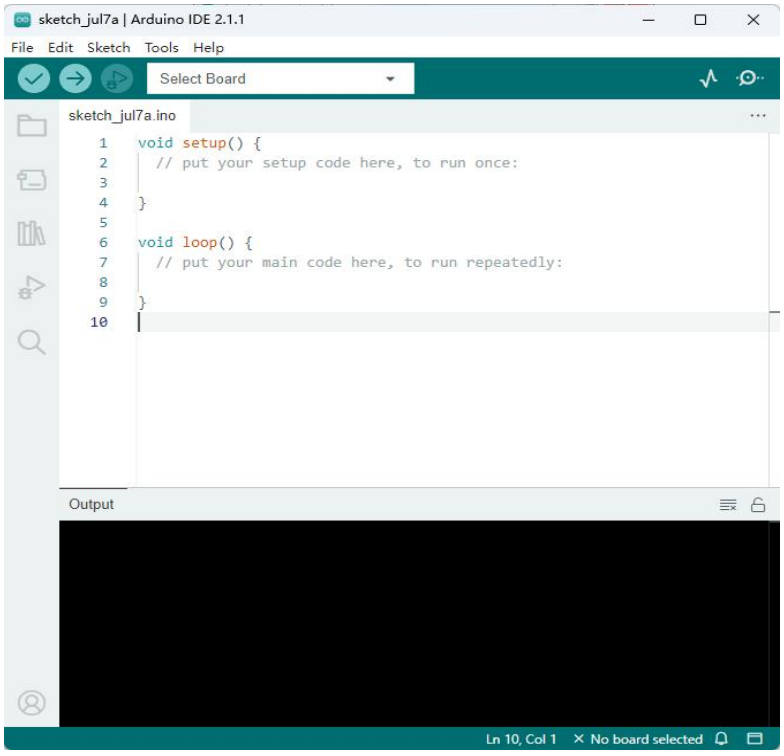


You may directly choose the installation package for installation and

skip the contents below and jump to the next section. But if you want to learn some methods other than the installation package, please continue to read the section.

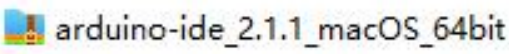
Unzip the zip file downloaded, Double-click to open the program and enter the desired development environment.





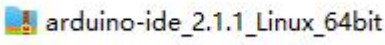
Installing Arduino (Mac OS X)

Download and Unzip the zip file, double click the Arduino.app to enter Arduino IDE; the system will ask you to install Java runtime library if you don't have it in your computer. Once the installation is complete you can run the Arduino IDE.



Installing Arduino (Linux)

You will have to use the make install command. If you are using the Ubuntu system, it is recommended to install Arduino IDE from the software center of Ubuntu.



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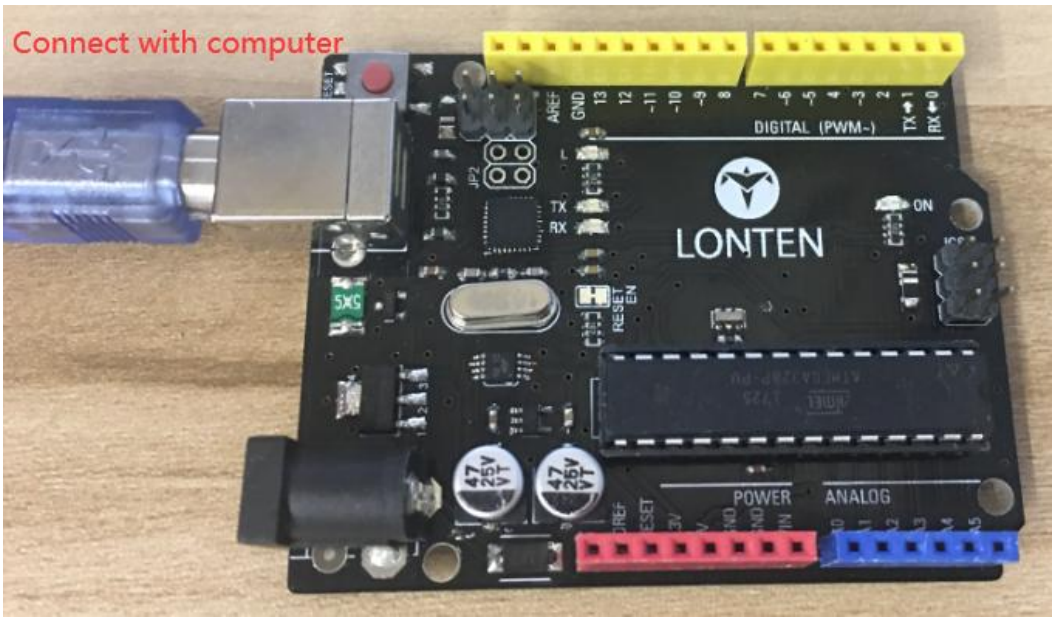
How to Install Arduino Driver

For Windows

Arduino UNO

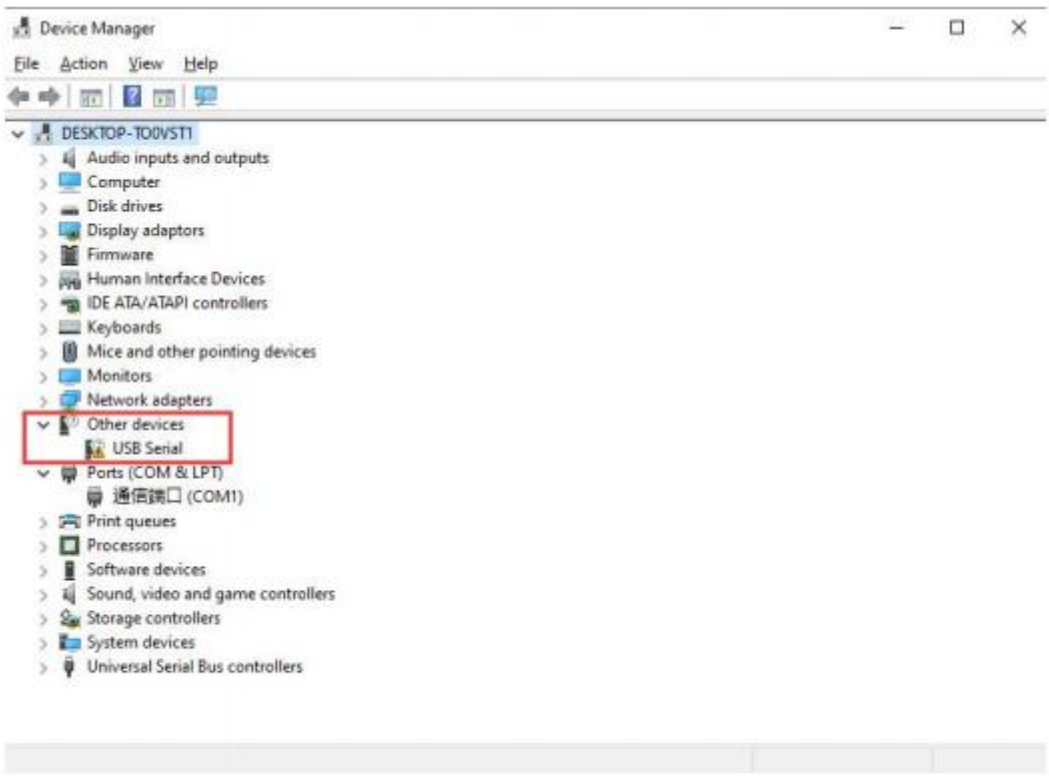


The USB to serial port chip of this control board is CH340G. So you need to install the driver for the chip. You can click the driver file here.

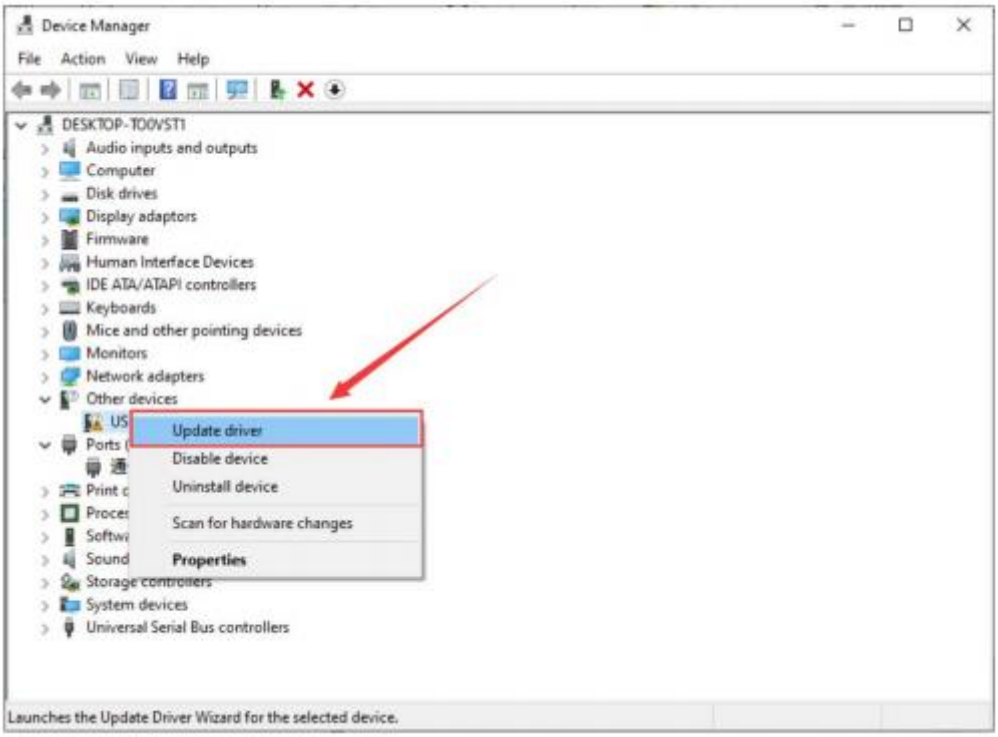
In different systems, the driver installation is similar. Here we start to install the driver on the Win10 system. You can find the "USB_Drive_CH341_3_1" folder in the information we provide, this is the driver file we want to install.

Plug one end of your USB cable into the Arduino UNO CH340 Board and the other into a USB socket on your computer.

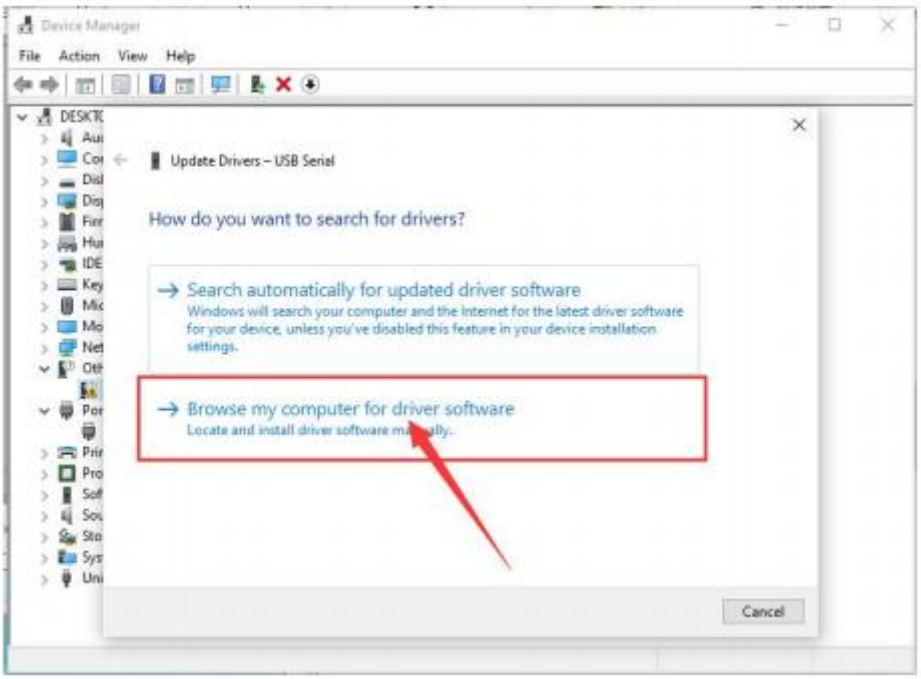
When you connect the Arduino UNO CH340 Board to your computer at the first time, right click your “My Computer”—>for “Properties”—>click the “Device manager”, under Other devices, you should see the “USB-Serial” or “Unknown device ”.Or you can search for "devi" in your computer, or you can open the device manager of your computer.



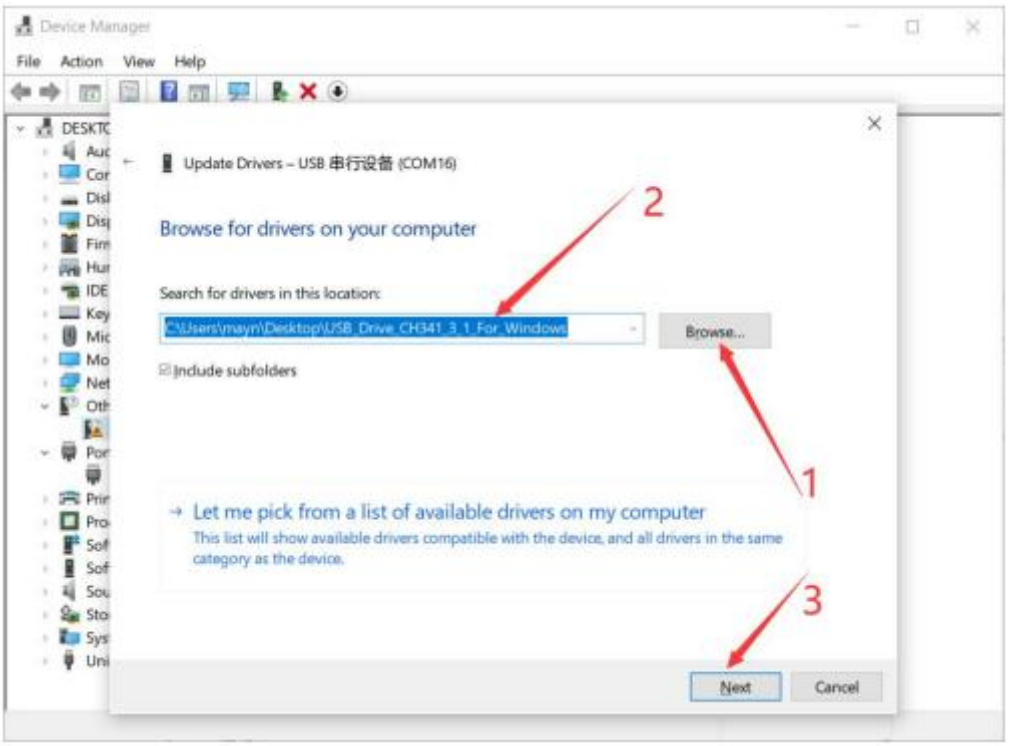
Then right-click on the device and select the top menu option (Update Driver Software...) shown as the figure below.



Then it will be prompted to either “Search Automatically for updated driver software” or “Browse my computer for driver software”. Shown as below. In this page, select “Browse my computer for driver software”.

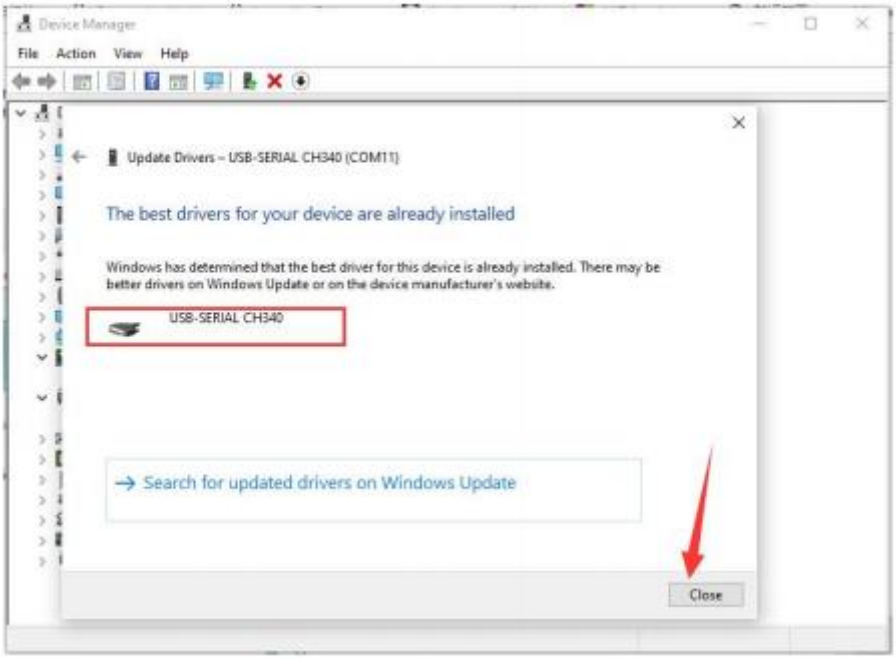


After that, select the browse option and navigate to the drive folder "USB_Drive_CH341_3_1", which can be found in the information we provide.(Note that the file path selects the location of the .For example, I store this driver file on the computer desktop, so the file path I choose is C:\Users\mayn\Desktop\USB_Drive_CH341_3_1_For_Windows)

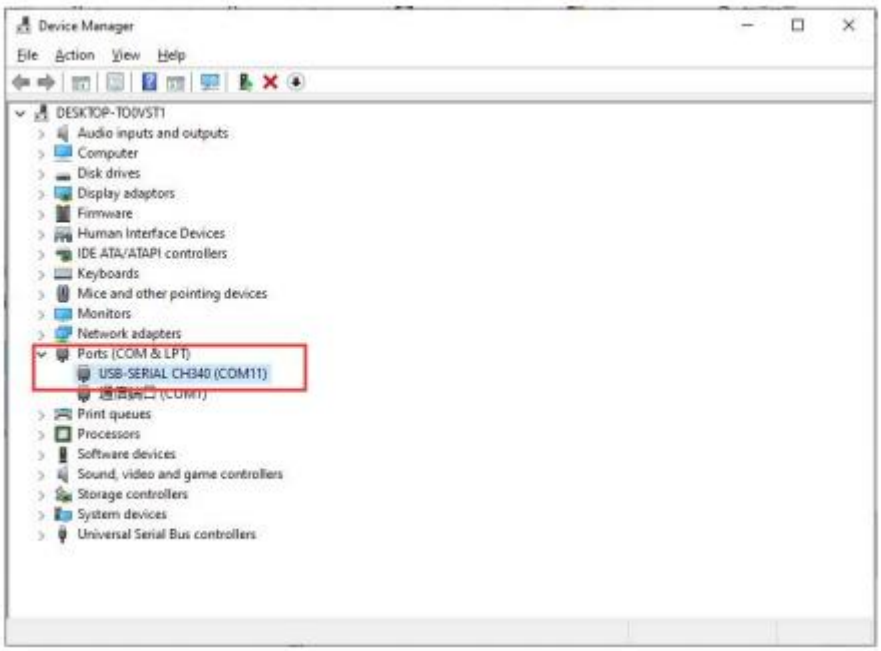


Once the software has been installed, you will get a confirmation message.

Installation completed, click “Close”.



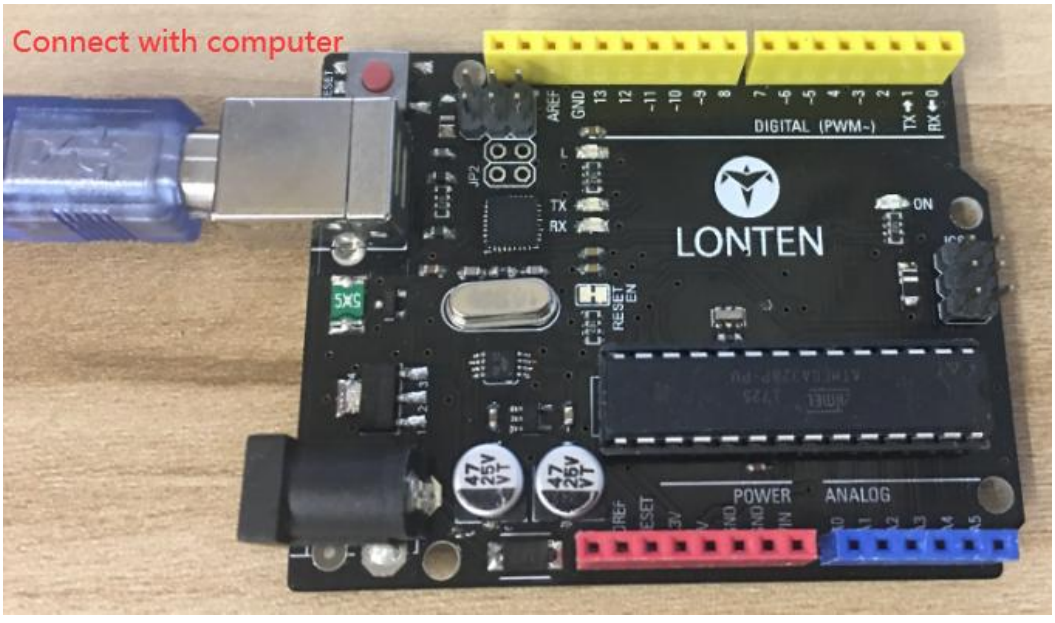
Up to now, the driver is installed well. Then you can right click “My Computer”—>for “Properties”—>click the “Device manager”, you should see the device as the figure shown below. Or you can search for "devi" in your computer, or you can open the device manager of your computer.



For MAC System

Arduino UNO

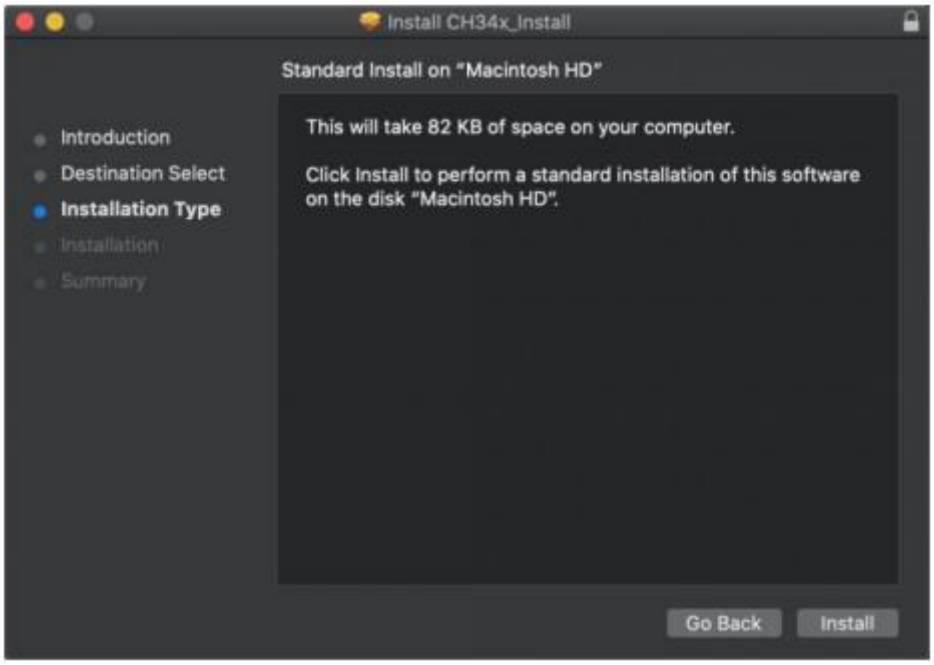
Plug one end of your USB cable into the Arduino UNO CH340 Board and the other into a USB socket on your computer.



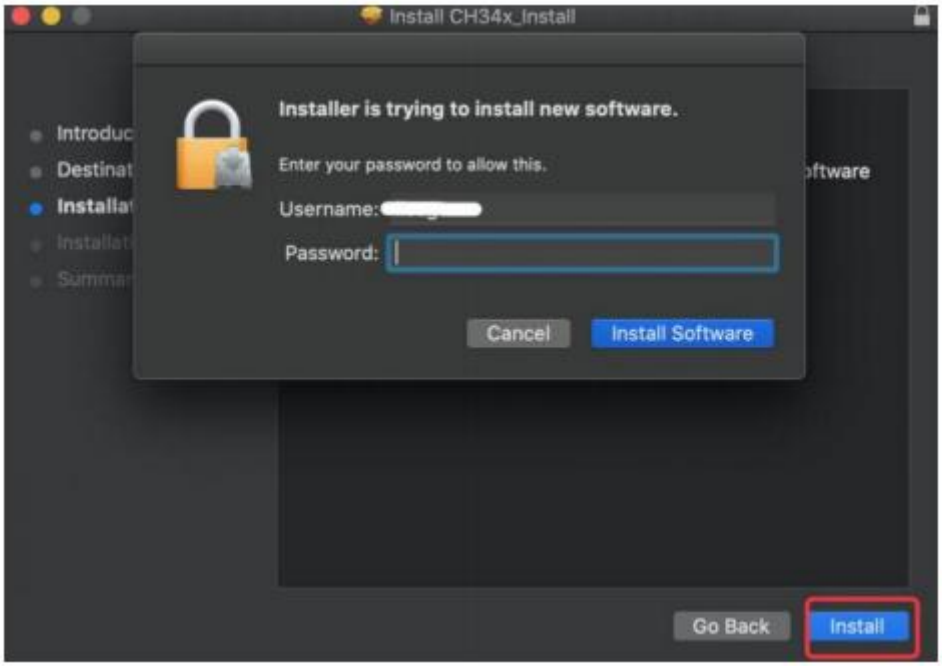
The driver file of the CH340G of the MAC system is provided in the tutorial data package.

Double-click installation package and tap Continue

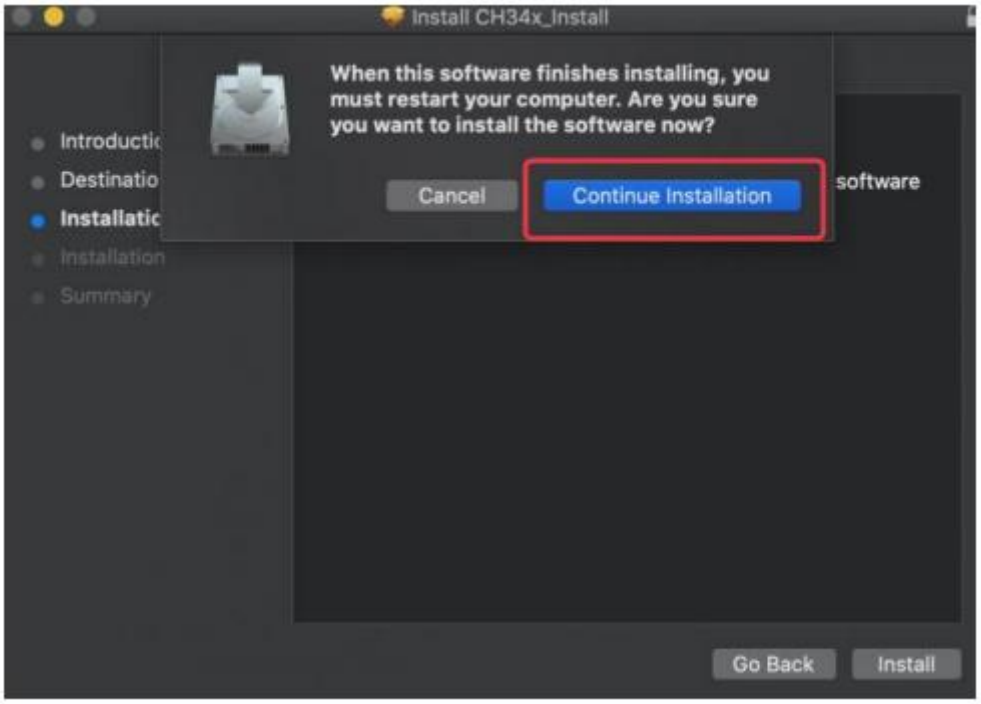
Click Install



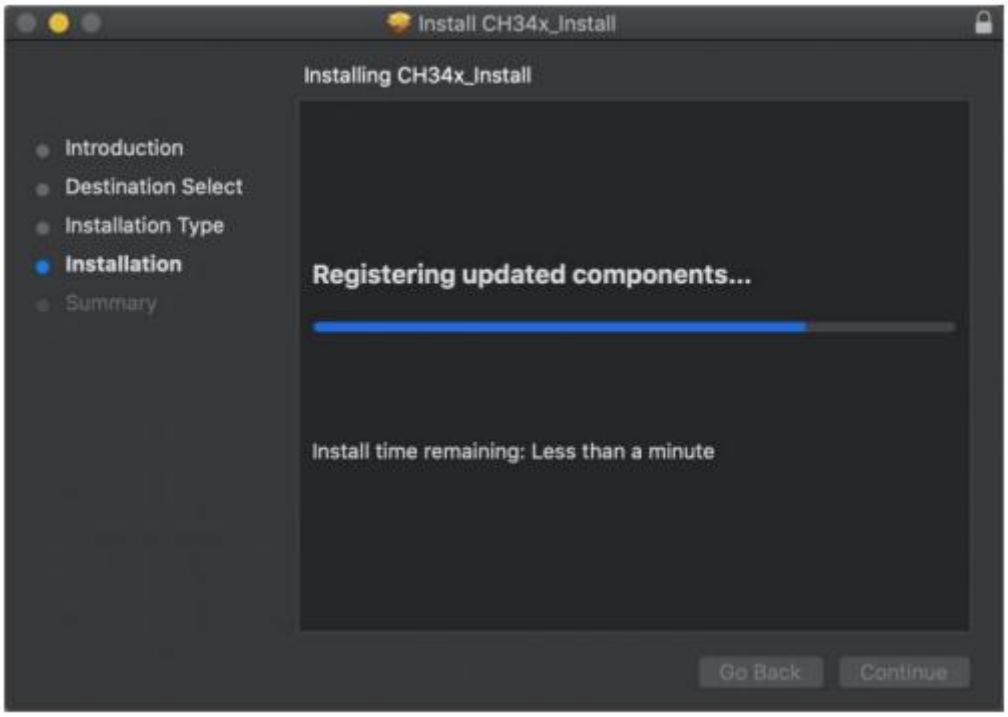
Input your user password and click Install Software



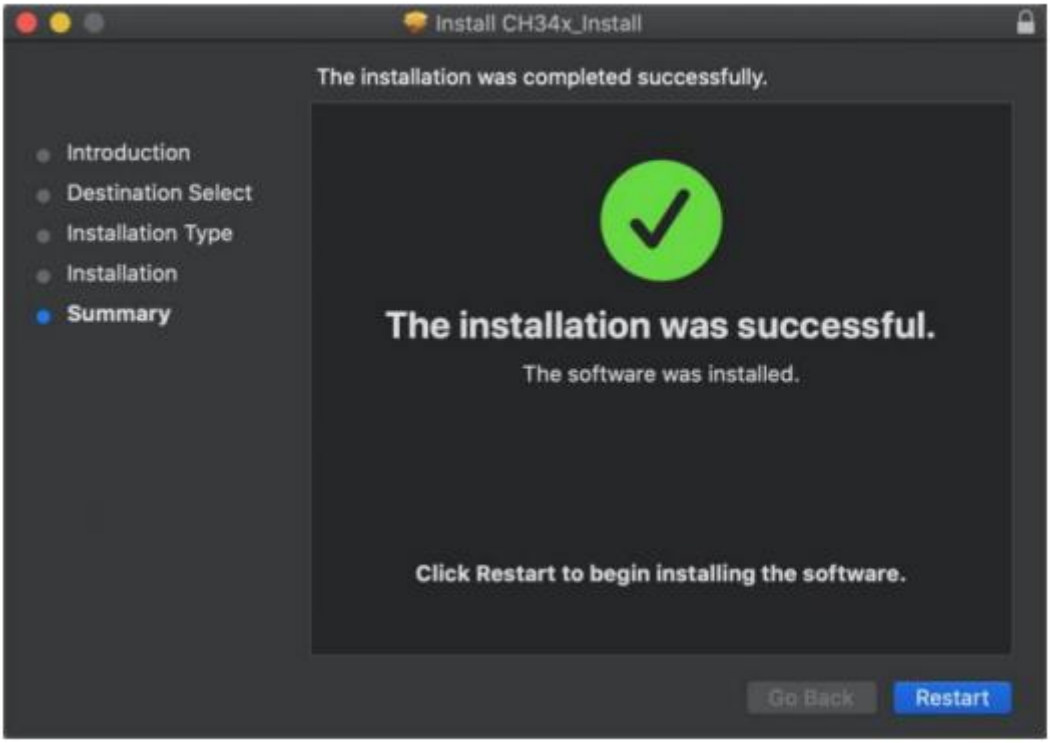
Tap Continue Installation



Wait to install



Click Restart after the installation is finished



How to Add Arduino Libraries

Installing Additional Arduino Libraries

Once you are comfortable with the Arduino software and using the built-in functions, you may want to extend the ability of your Arduino with additional libraries.

What are Libraries?

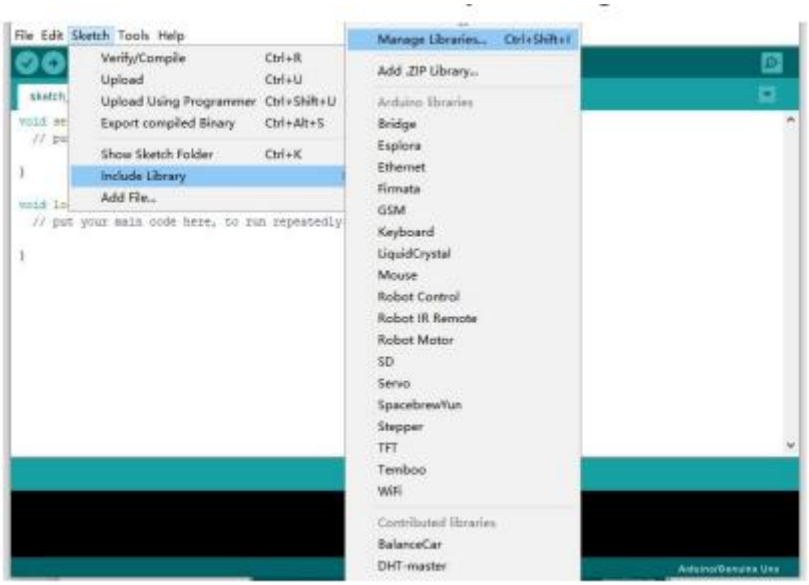
Libraries are a collection of code that makes it easy for you to connect to a sensor, display, module, etc. For example, the built-in Liquid Crystal library makes it easy to talk to character LCD displays. There are

hundreds of additional libraries available on the Internet for download. The built-in libraries and some of these additional libraries are listed in the reference. To use the additional libraries, you will need to install them.

How to Install a Library

Using the Library Manager

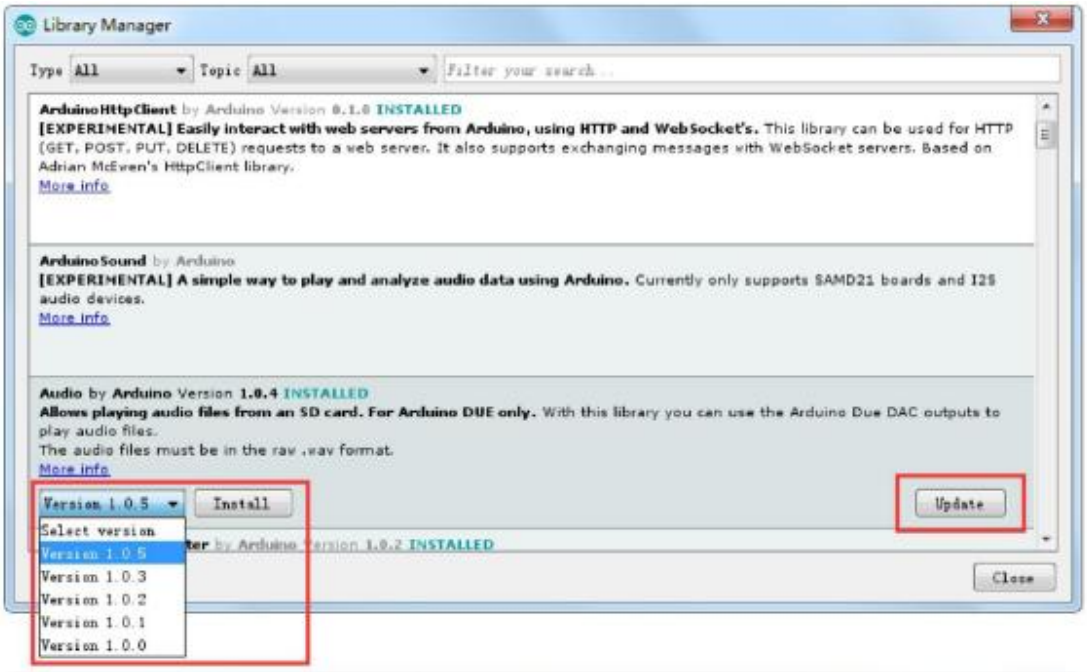
To install a new library into your Arduino IDE you can use the Library Manager (available from IDE version 1.8.0). Open the IDE and click to the "Sketch" menu and then Include Library > Manage Libraries.

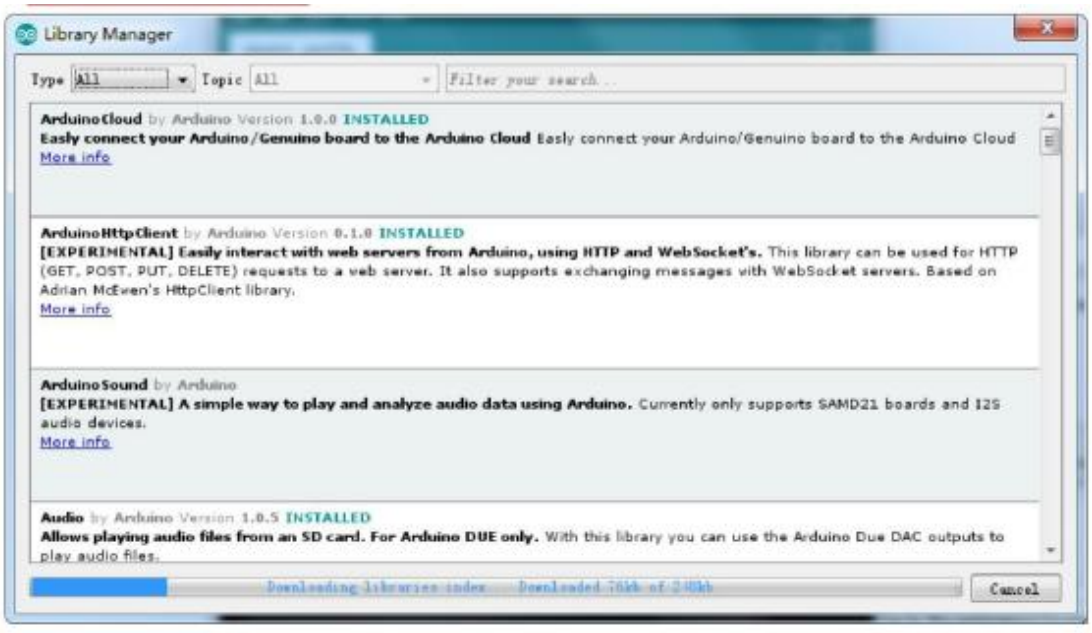


Then the library manager will open and you will find a list of libraries that are already installed or ready for installation. In this example we will install the Bridge library. Scroll the list to find it, then select the version of the library you want to install. Sometimes only one version of the

library is available. If the version selection menu does not appear, don't worry: it is normal.

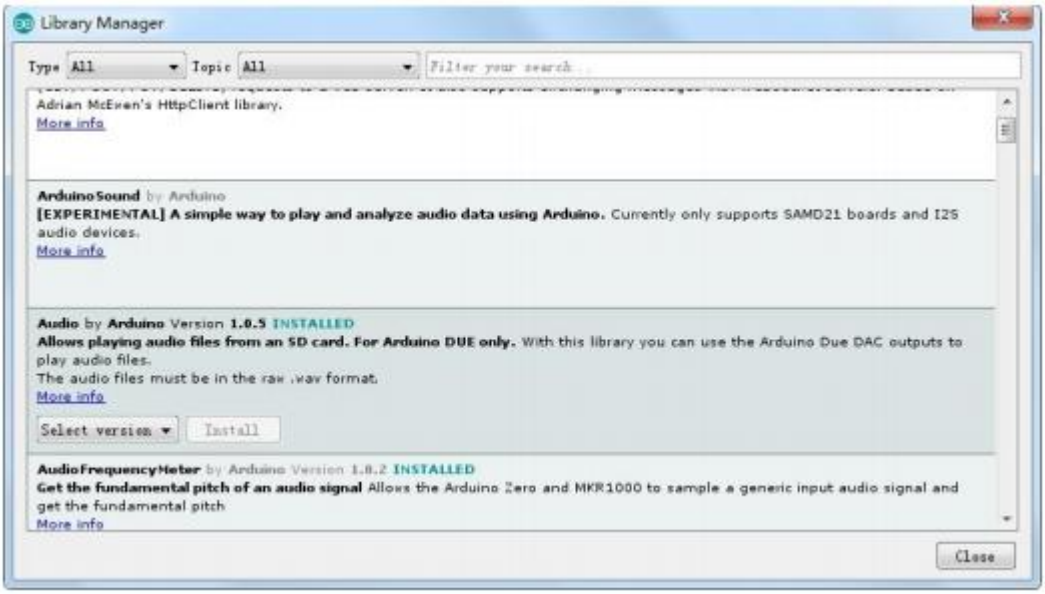
There are times you have to be patient with it, just as shown in the figure. Please refresh it and wait.





Finally click on install and wait for the IDE to install the new library.

Downloading may take time depending on your connection speed. Once it has finished, an Installed tag should appear next to the Bridge library. You can close the library manager.



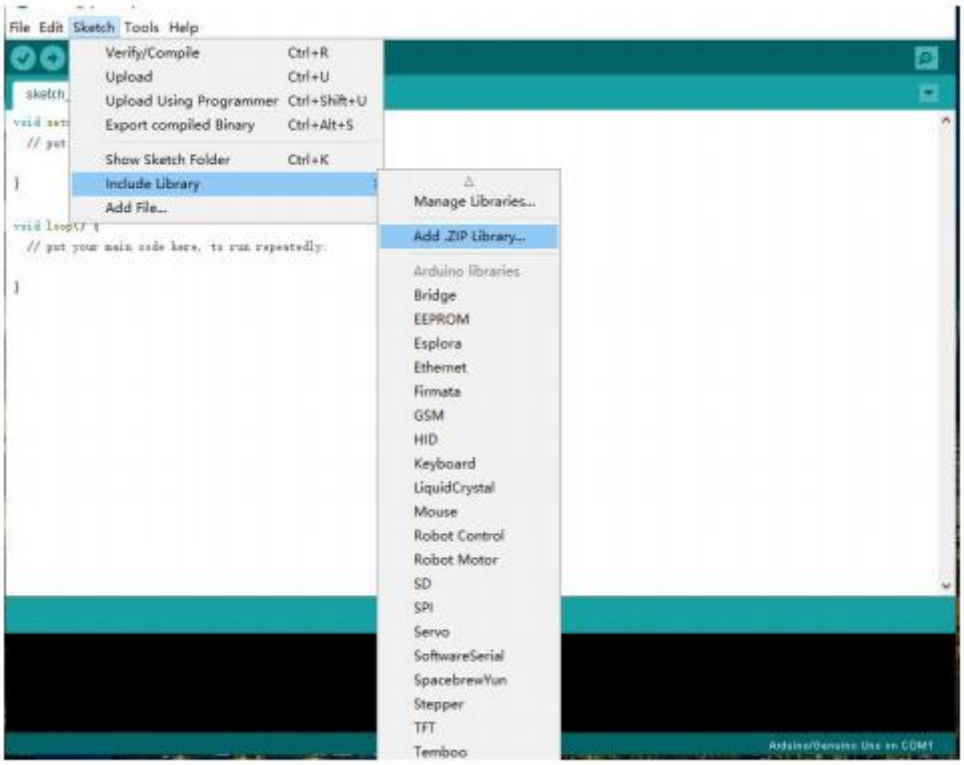
You can now find the new library available in the Include Library menu. If you want to add your own library open a new issue on Github.

Importing a .zip Library

Libraries are often distributed as a ZIP file or folder. The name of the folder is the name of the library. Inside the folder will be a .cpp file, a .h file and often a keywords.txt file, examples folder, and other files required by the library. Starting with version 1.0.5, you can install 3rd party libraries in the IDE. Do not unzip the downloaded library, leave it as is.

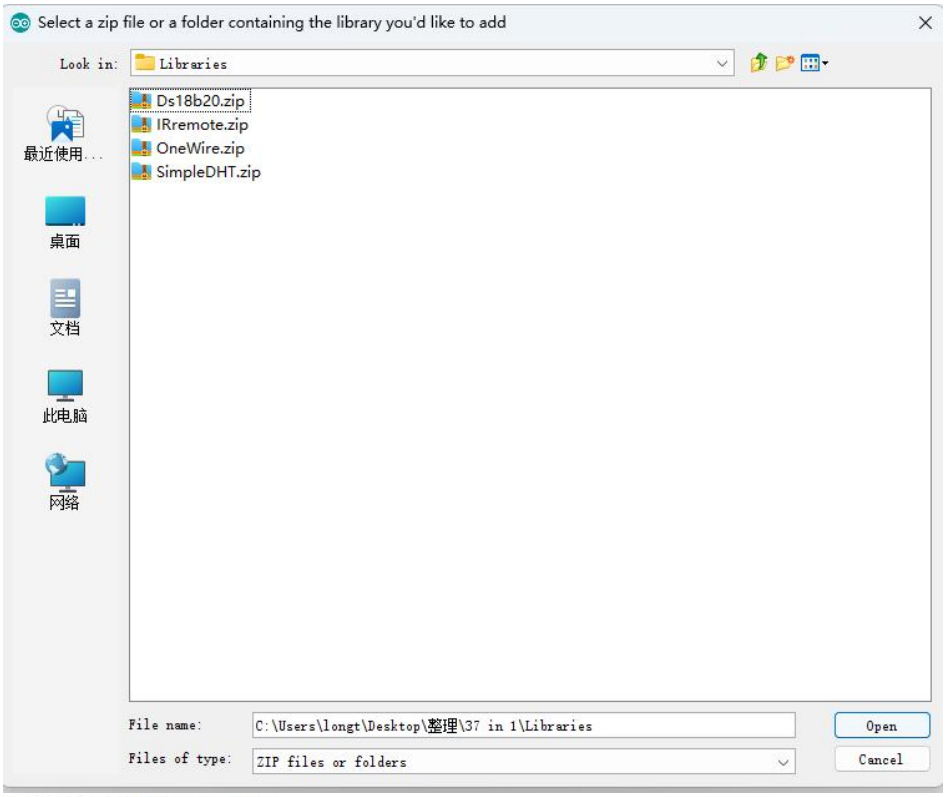
In the Arduino IDE, navigate to Sketch > Include Library. At the top of

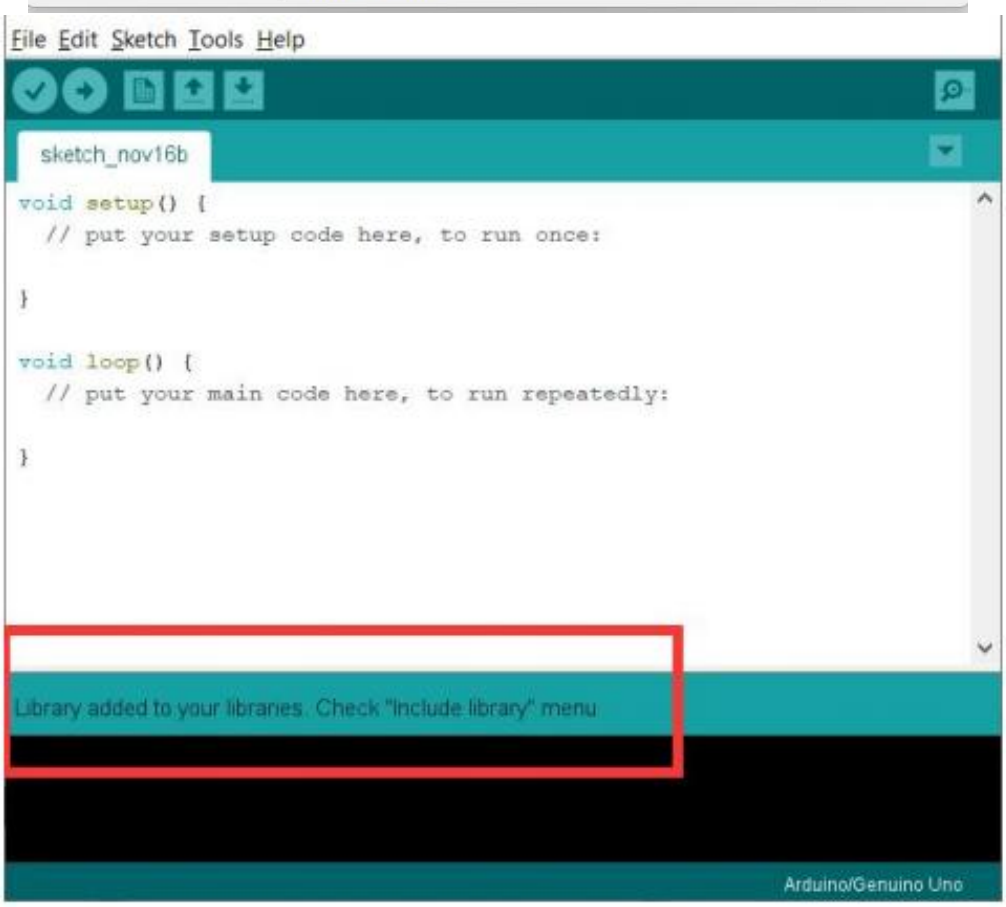
the drop down list, select the option to "Add .ZIP Library".



You will be prompted to select the library you would like to add.

Navigate to the .zip file's location and open it.


Select a zip file or a folder containing the library you'd like to add
Look in:
Libraries
Ds18b20.zip
IRremote.zip
OneWire.zip
SimpleDHT.zip
最近使用...
桌面
文档
此电脑
网络
File name:
C:\Users\longt\Desktop\整理\37 in 1\Libraries
Open
Files of type:
ZIP files or folders
Cancel


File Edit Sketch Tools Help
sketch_nov16b
void setup() {
// put your setup code here, to run once:
}
void loop() {
// put your main code here, to run repeatedly:
}
Library added to your libraries. Check "include library" menu
Arduino/Genuino Uno

Return to the Sketch > Import Library menu. You should now see the library at the bottom of the drop-down menu. It is ready to be used in your sketch. The zip file will have been expanded in the libraries folder in your Arduino sketches directory. NB: the Library will be available to use in sketches, but examples for the library will not be exposed in the File > Examples until after the IDE has restarted.

Blink Test

Overview

In this Project, you will learn how to program your UNO R3 controller board to blink the Arduino's built-in LED, and how to download programs by basic steps.

Component Required:

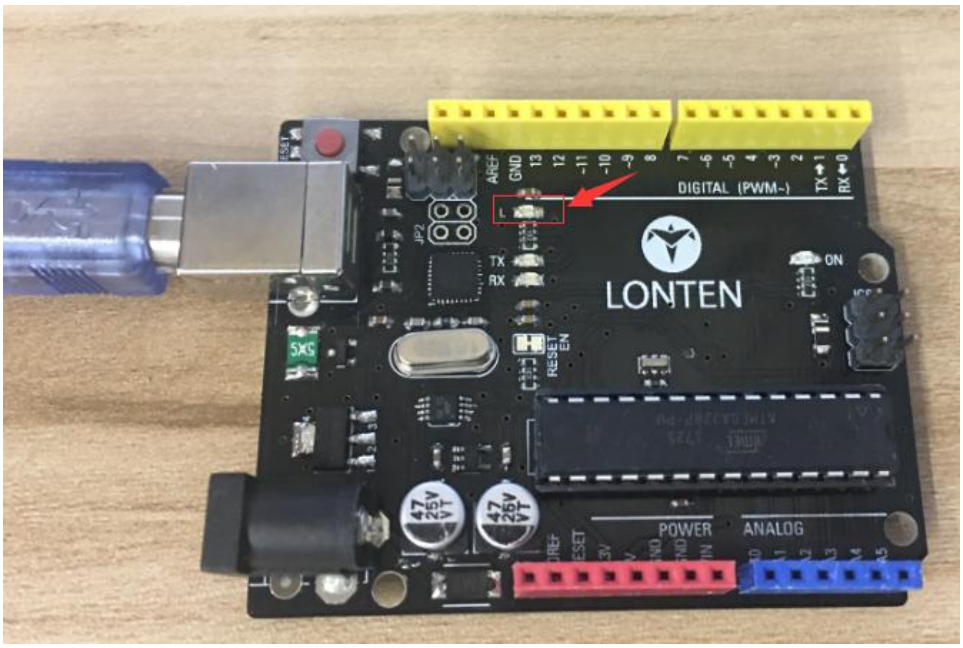
LONTEN Uno R3 Board* 1

Principle

The UNO R3 board has rows of connectors along both sides that are used to connect to several electronic devices and plug-in 'shields' that extends its capability.

It also has a single LED that you can control from your sketches. This LED is built onto the UNO R3 board and is often referred to as the 'L'

LED as this is how it is labeled on the board.

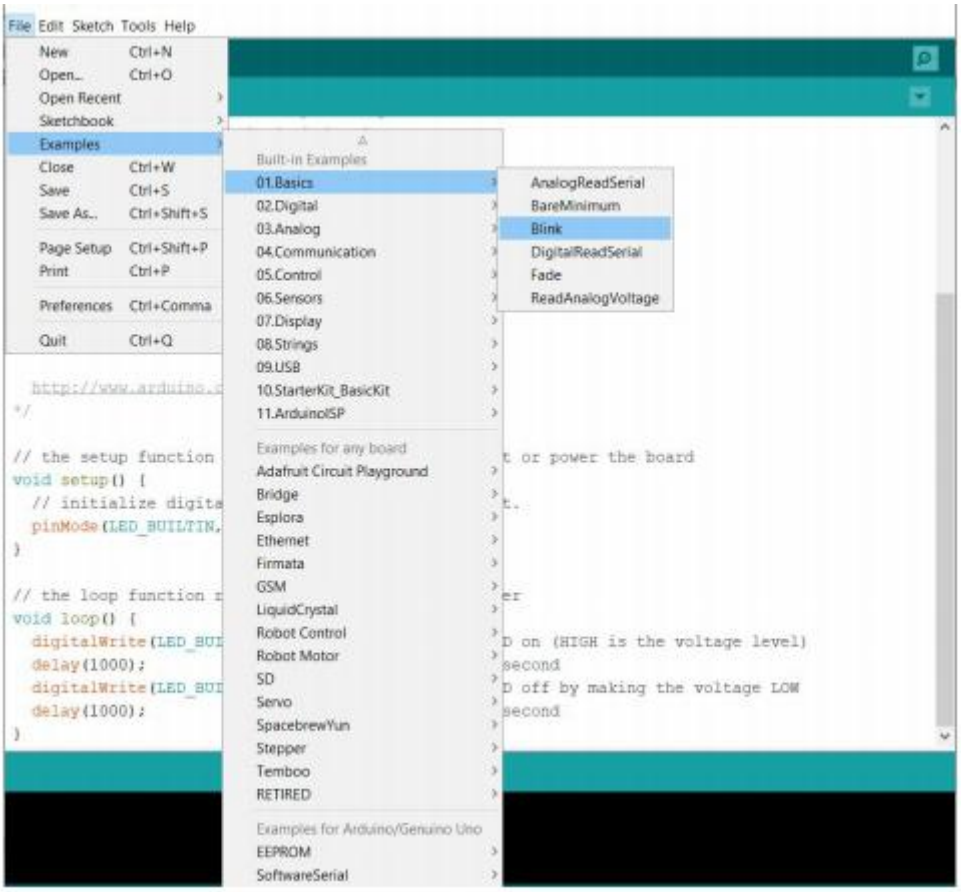


In this Project, we will reprogram the UNO board with our own Blink sketch and then change the rate at which it blinks.

In the previous chapter-How to install Arduino IDE, you set up your Arduino IDE and made sure that you could find the right serial port for it to connect to your UNO board. The time has now come to put that connection to the test and program your UNO board.

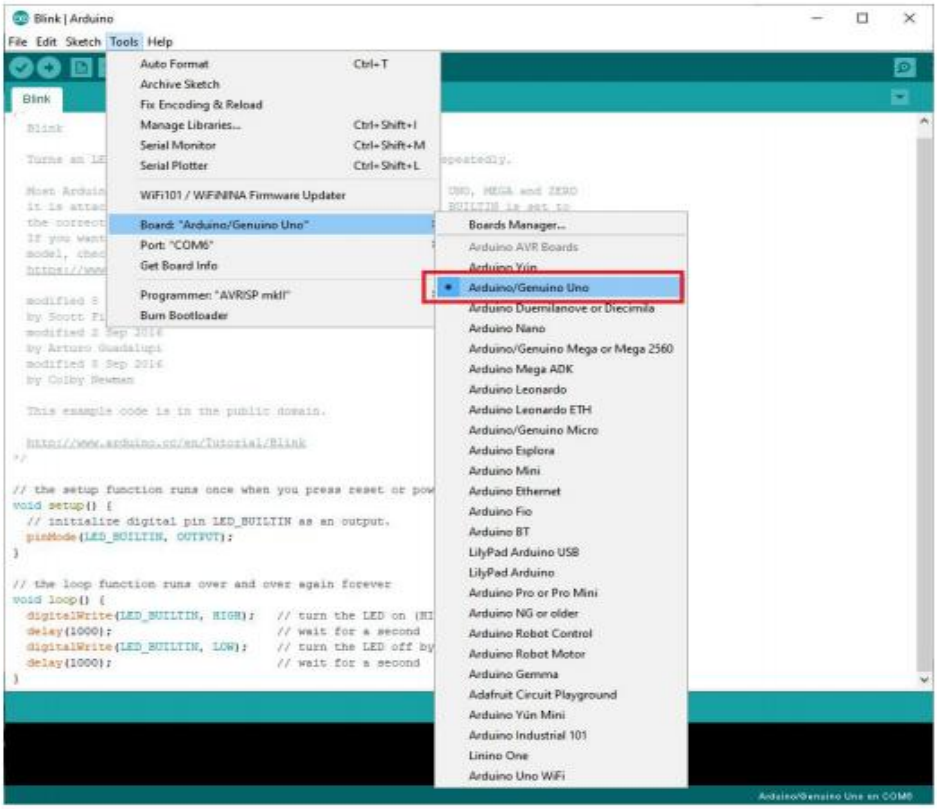
The Arduino IDE includes a large collection of example sketches that you can load up and use. This includes an example sketch for making the 'L' LED blink.

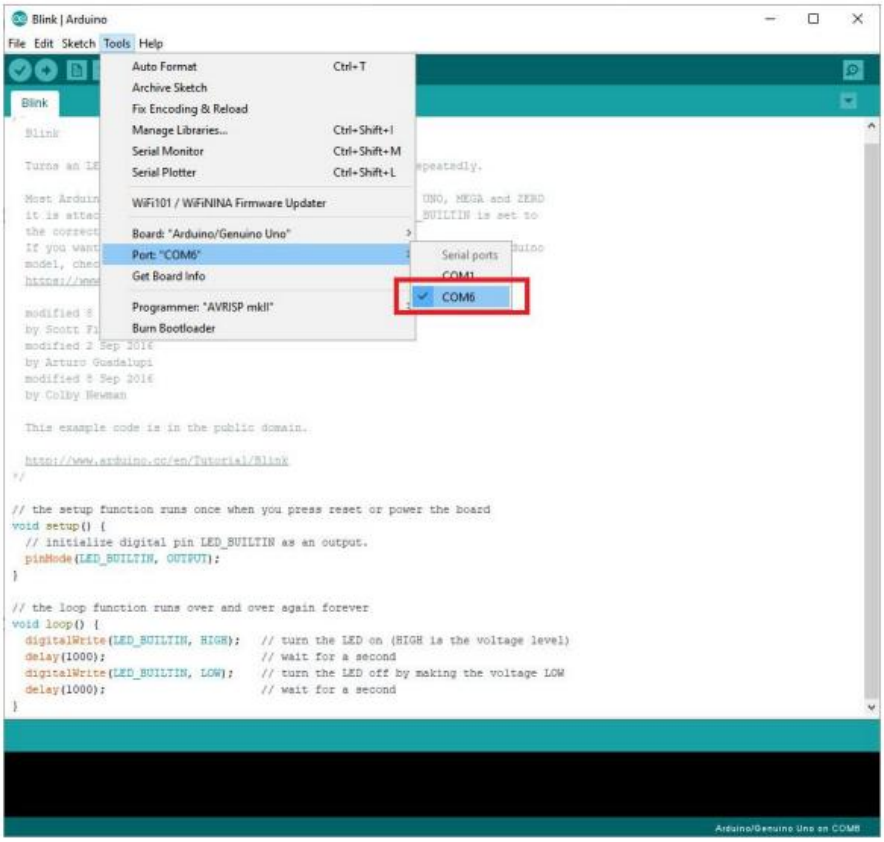
Load the 'Blink' sketch that you will find in the IDE's menu system under File > Examples > 01.Basics > Blink

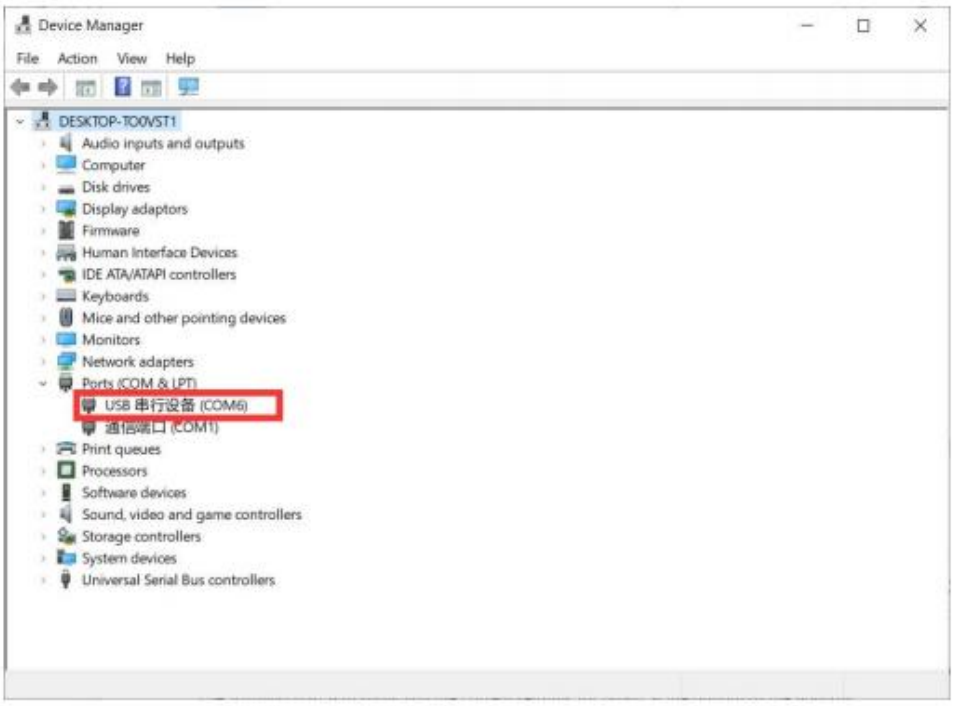


When the sketch window opens, enlarge it so that you can see the entire sketch in the window.

Attach your Arduino board to your computer with the USB cable and check that the 'Board Type' and 'Serial Port' are set correctly.


Blink | Arduino
File Edit Sketch Tools Help
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Manage Libraries... Ctrl+Shift+I
Serial Monitor Ctrl+Shift+M
Serial Plotter Ctrl+Shift+L
WiFi101 / WiFiNINA Firmware Updater
Board: "Arduino/Genuino Uno"
Port: "COM6"
Get Board Info
Programmer: "AVRISP mkII"
Burn Bootloader
Boards Manager...
Arduino AVR Boards
Arduino Yún
Arduino/Genuino Uno
Arduino Duemilanove or Diecimila
Arduino Nano
Arduino/Genuino Mega or Mega 2560
Arduino Mega ADK
Arduino Leonardo
Arduino Leonardo ETH
Arduino/Genuino Micro
Arduino Esplora
Arduino Mini
Arduino Ethernet
Arduino Fio
Arduino BT
LilyPad Arduino USB
LilyPad Arduino
Arduino Pro or Pro Mini
Arduino NG or older
Arduino Robot Control
Arduino Robot Motor
Arduino Gemma
Adafruit Circuit Playground
Arduino Yún Mini
Arduino Industrial 101
Linino One
Arduino Uno WiFi

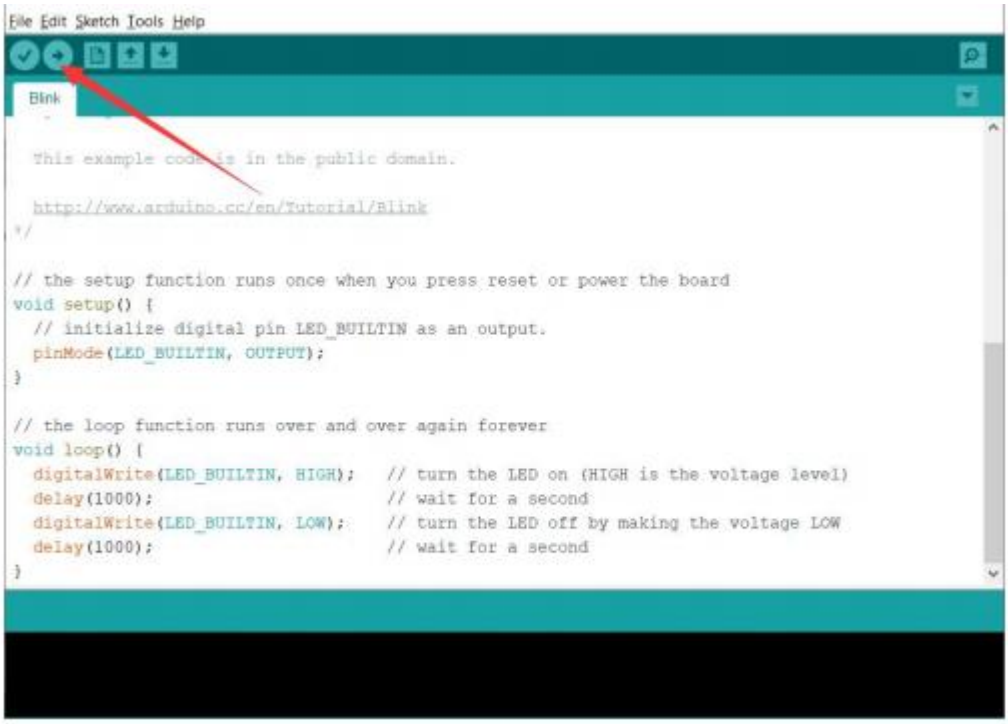

Blink | Arduino
File Edit Sketch Tools Help
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Manage Libraries... Ctrl+Shift+I
Serial Monitor Ctrl+Shift+M
Serial Plotter Ctrl+Shift+L
WiFi101 / WiFiNINA Firmware Updater
Board: "Arduino/Genuino Uno"
Port: "COM6"
Get Board Info
Programmer: "AVRISP mkII"
Burn Bootloader
Serial ports
COM1
COM6
// the setup function runs once when you press reset or power the board
void setup() {
// initialize digital pin LED_BUILTIN as an output.
pinMode(LED_BUILTIN, OUTPUT);
}
// the loop function runs over and over again forever
void loop() {
digitalWrite(LED_BUILTIN, HIGH); // turn the LED on (HIGH is the voltage level)
delay(1000); // wait for a second
digitalWrite(LED_BUILTIN, LOW); // turn the LED off by making the voltage LOW
delay(1000); // wait for a second
}



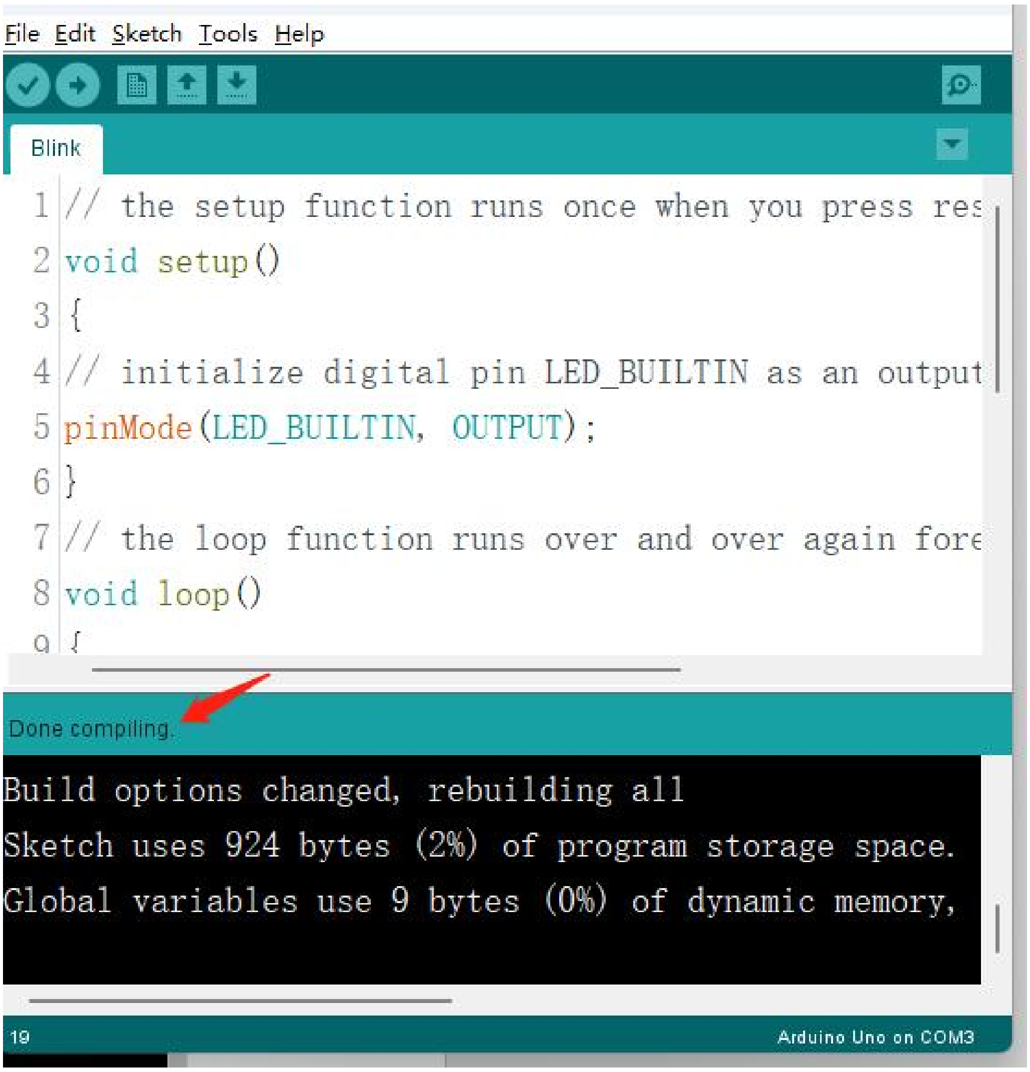
Note: The Board Type and Serial Port here are not necessarily the same as shown in picture. If you are using UNO, then you will have to choose Arduino UNO as the Board Type, other choices can be made in the same manner. And the Serial Port displayed for everyone is different, despite COM 6 chosen here, it could be COM3 or COM4 on your computer. A right COM port is supposed to be COMX (arduino XXX), which is by the certification criteria.

The Arduino IDE will show you the current settings for board at the bottom of the window.

Click on the 'Upload' button. The second button from the left on the toolbar.



When the status bar prompts "Done uploading", it means the code upload is successful.



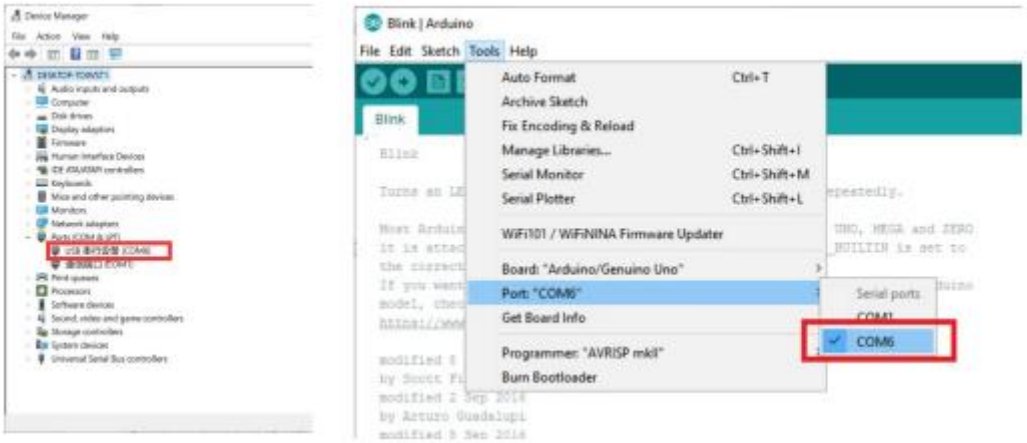
If an error message appears.

There can be several reasons:

1. The arduino uno driver software is not installed successfully, please

refer to the course for the installation steps: How to Install Arduino Driver.

2. The communication serial port selection of arduino uno is wrong; you can check the communication port COMx of your arduino uno in the computer in the device manager.

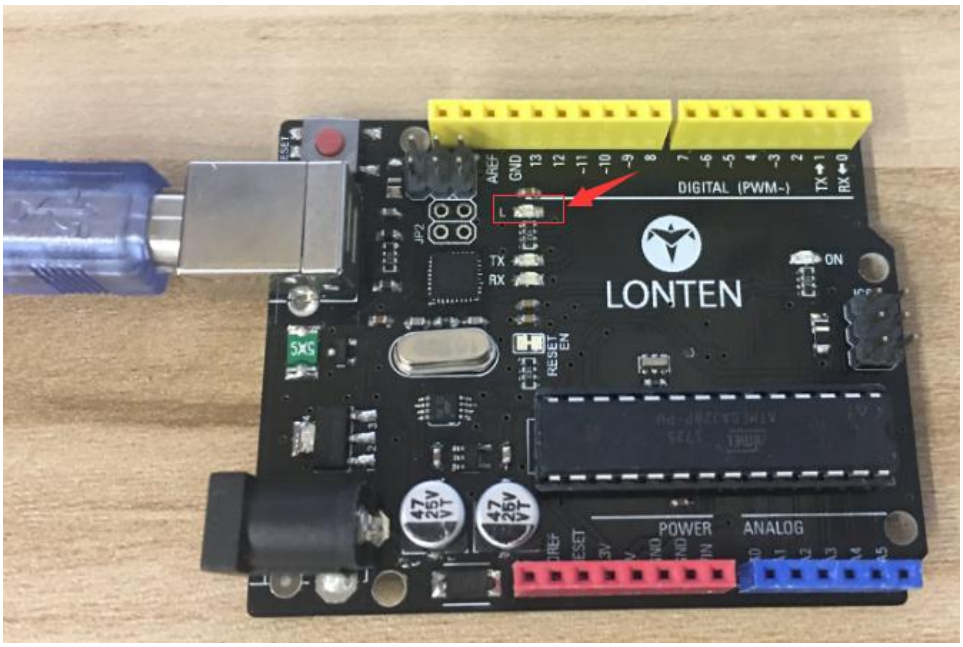


3. If your Arduino uno is connected to a Bluetooth module, it will occupy the communication serial port. You need to remove the Bluetooth module connection before uploading the code.

4. The USB data cable is not firmly connected. Check if there are any of the above problems. After correcting, follow the previous steps to re-operate.

Sample Program

```
// the setup function runs once when you press reset or power the board
void setup()
{
// initialize digital pin LED_BUILTIN as an output.
pinMode(LED_BUILTIN, OUTPUT);
}
// the loop function runs over and over again forever
void loop()
{
digitalWrite(LED_BUILTIN, HIGH);
// turn the LED on (HIGH is the voltage level)
delay(1000);
// wait for a second
digitalWrite(LED_BUILTIN, LOW);
// turn the LED off by making the voltage LOW
delay(1000);
// wait for a second
}
```



After the code is successfully uploaded, the "L" character LED will flash once per second. So far, you have completed the testing process of your first program.

Lesson 1 LED Flash

Overview

LED has wide applications. Most signal lights we saw in our daily life use LED as its major light source. In today's experiment, we are going to use Arduino to make LED module flashing.

Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

(3) LED module* 1

(4) Breadboard* 1

(5) Breadboard Jumper Wires* Several

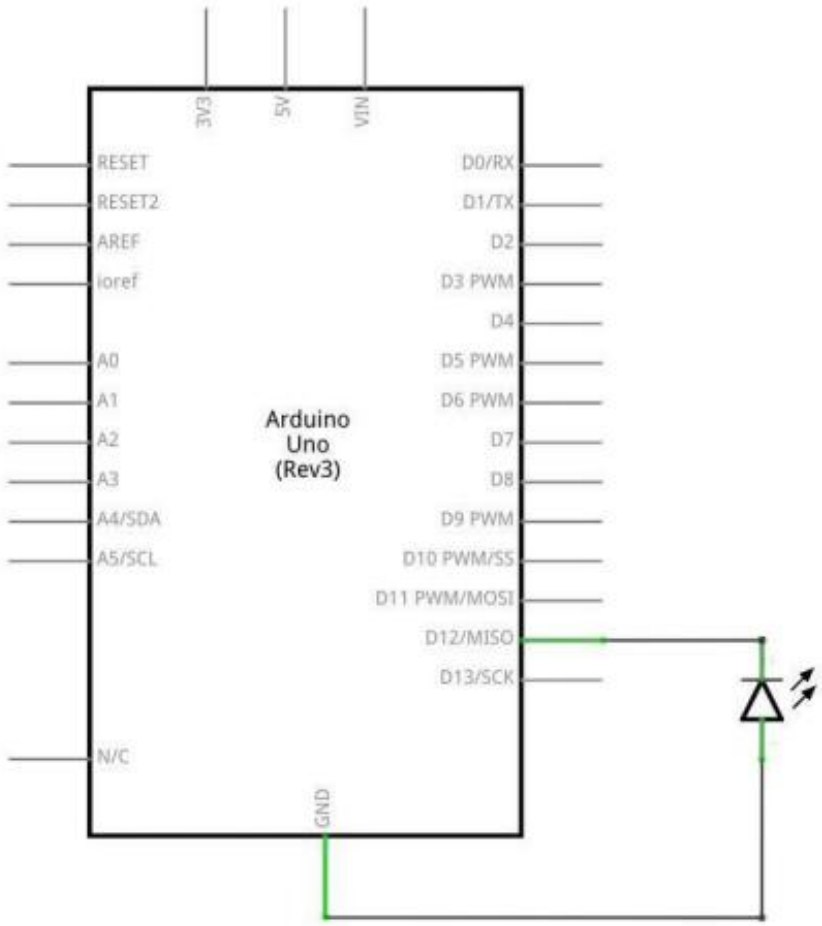
Component Introduction

This is a special LED module. When you connect it to ARDUINO development board, after program, it can emit beautiful light. Of course, you can also control it using PWM. It will be like fireflies at night.

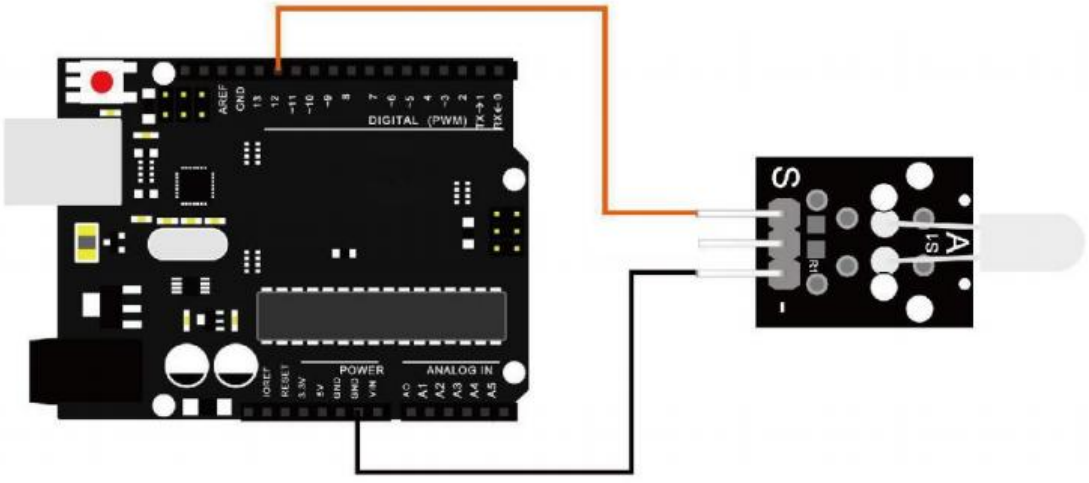
Note: You can choose other LED modules to emit different color like yellow, red, green and blue.

Connection

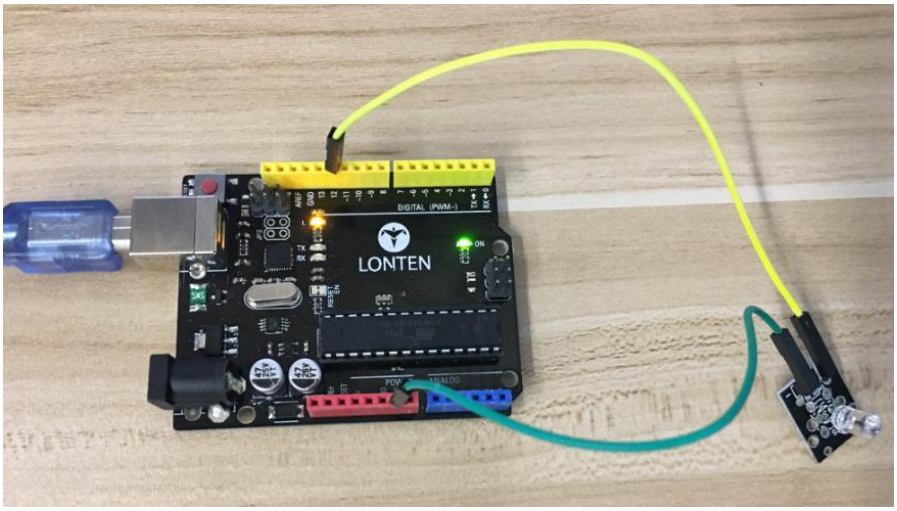
Schematic



wiring diagram



Example picture



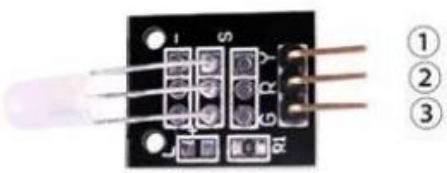
Result

Done uploading the code, you can see the LED on the module flashing for one second then off for one second, repeatedly.

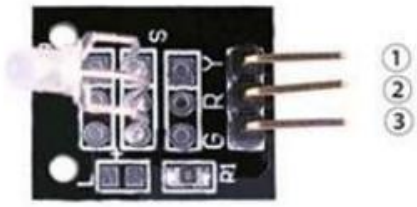
Lesson 2 Dual-Color Common-cathode LED

Overview

In this experiment, we will learn how to use Dual-color Common-Cathode LED.There are two inside the box.



1.YELLOW
2.RED
3.GND:ground



1.YELLOW
2.RED
3.GND:ground

Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

(3) Dual-color Common-Cathode LED* 1

(4) Breadboard* 1

(5) Breadboard Jumper Wires* Several

Component Introduction

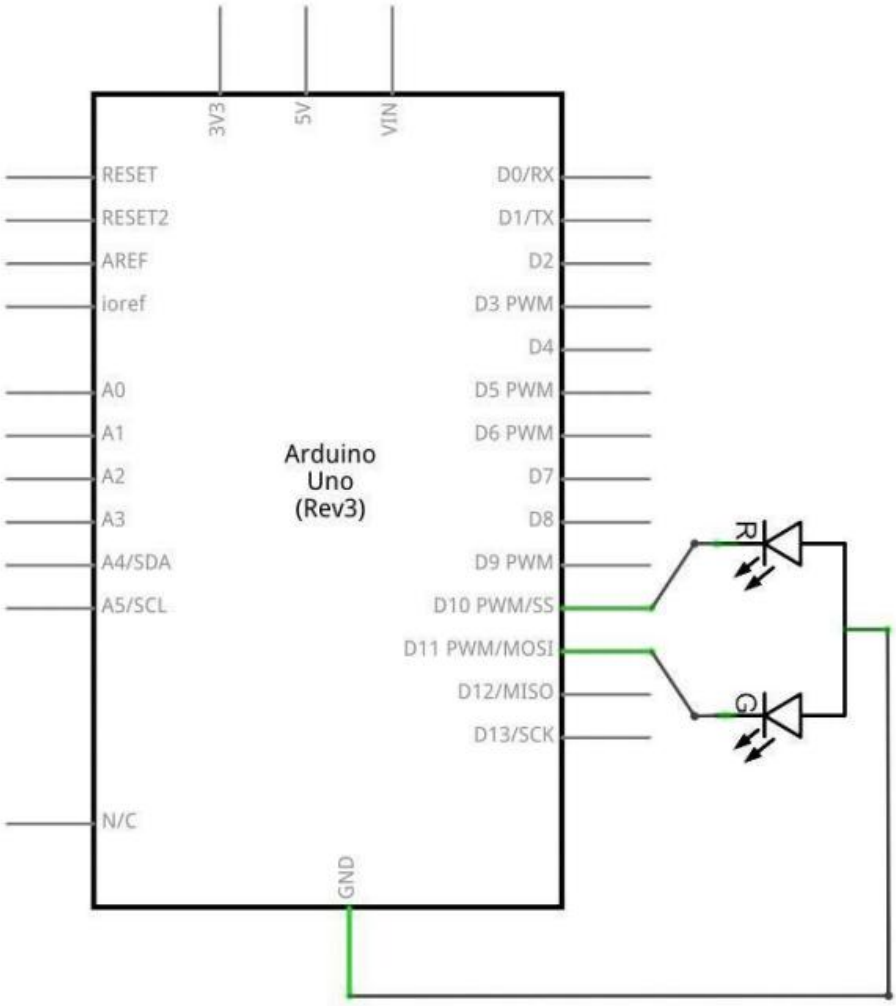
Dual-color Common-Cathode led:

Electro-Optical Characteristics: (T_A = +25°C unless otherwise specified)

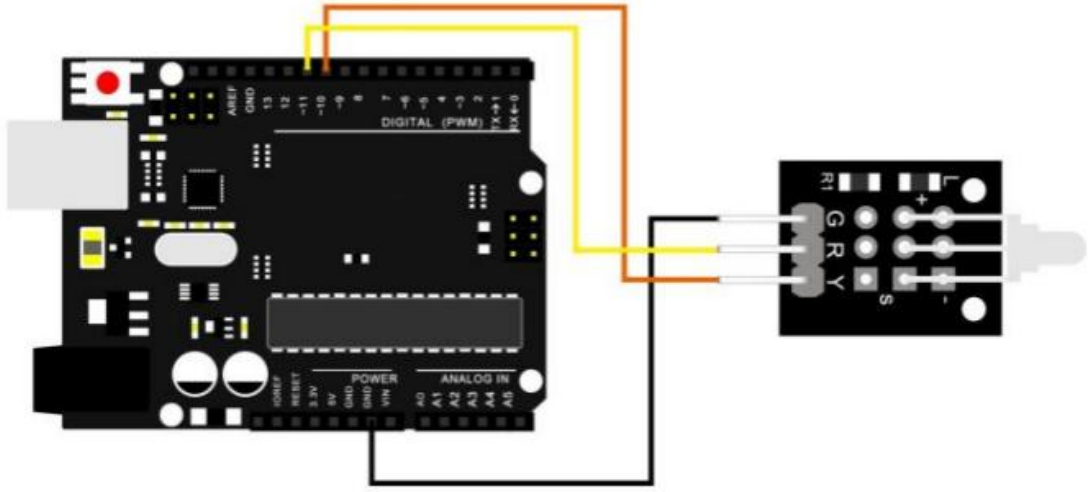
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
View Angle of Half Power	2θ 1/2	IF = 20mA	–	40	–	deg
Forward Voltage High Efficiency Red	VF	IF = 20mA	–	2.05	2.80	V
Yellow-Green			–	2.15	2.80	V
Luminous Intensity (Note 1)	IV	IF = 20mA	35	60	–	mcd
Peak Emission Wavelength High Efficiency Red	λp	IF = 20mA	–	625	–	nm
Yellow-Green			–	570	–	nm
Dominate Wave Length (Note 2) High Efficiency Red	λd(HUE)	IF = 20mA	–	618	–	nm
Yellow-Green			–	567	–	nm

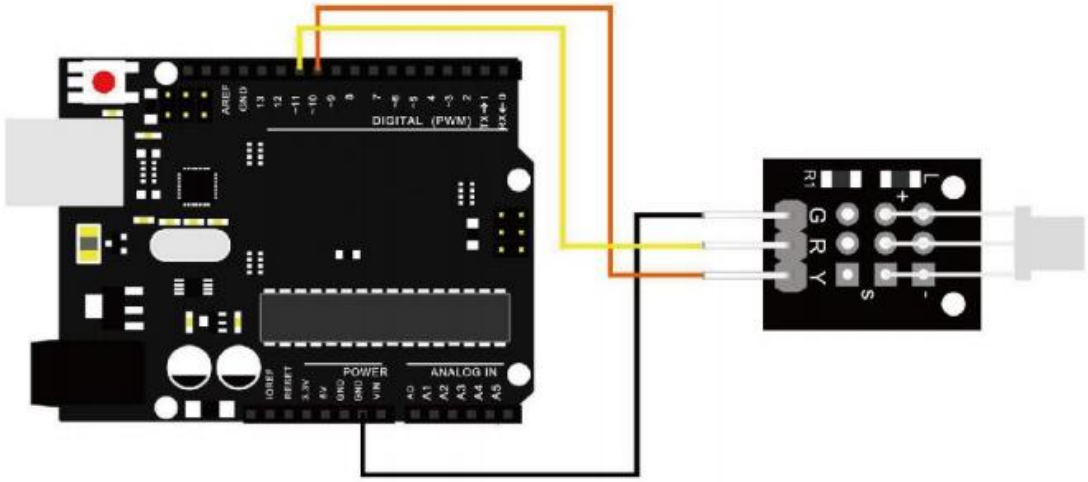
Connection

Schematic

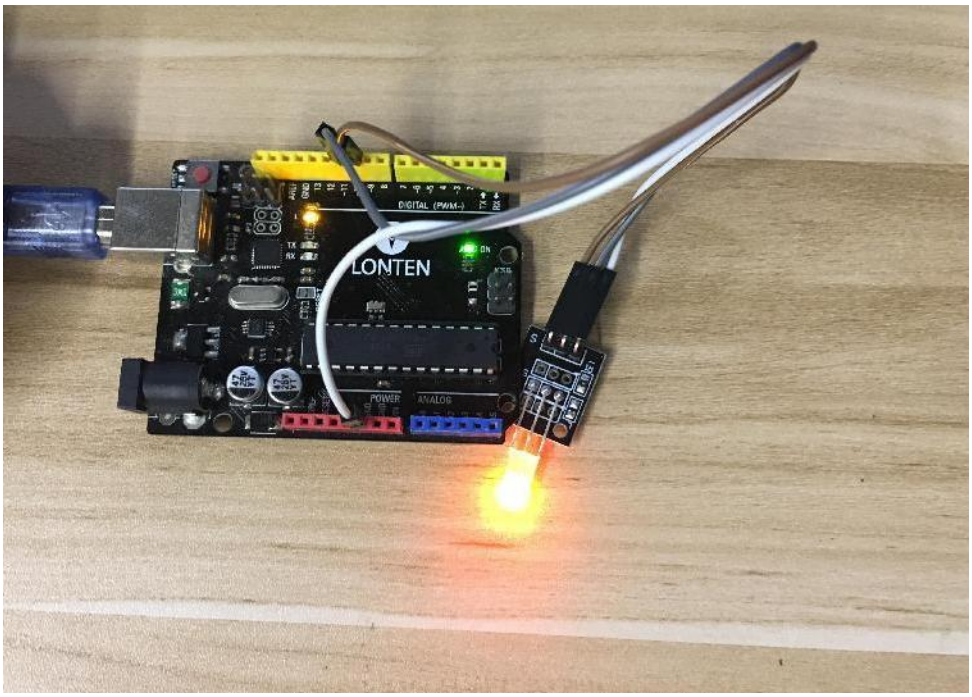


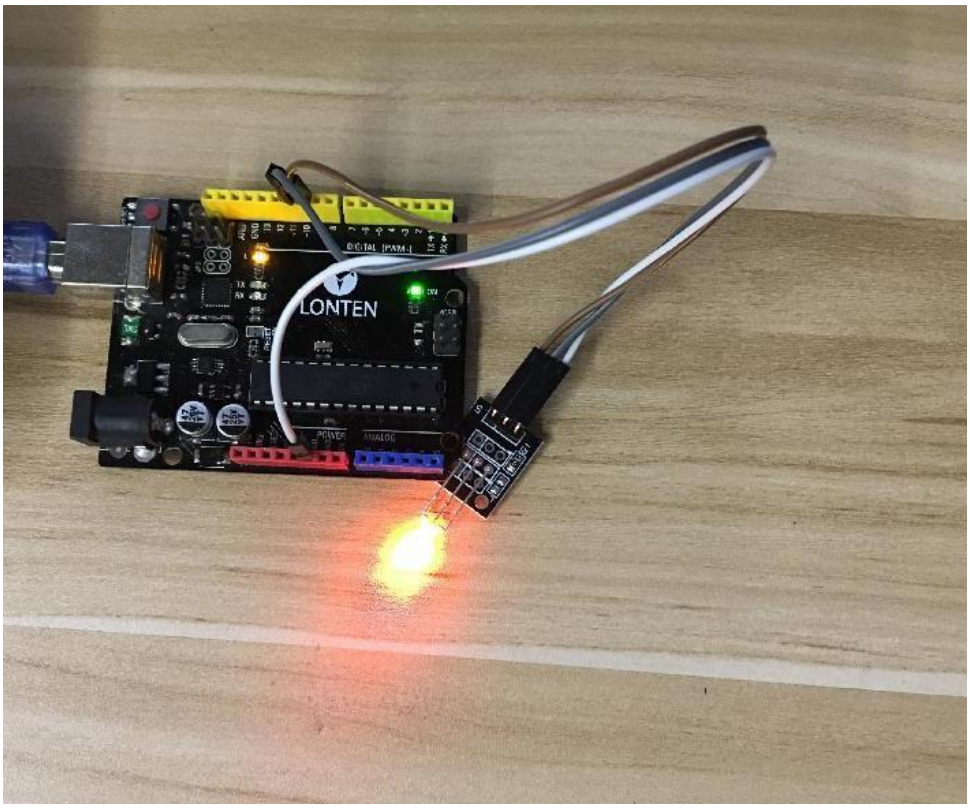
wiring diagram





Example picture





Result

After we connect the circuit as the picture, we upload the program of each module. We can see the module changing their color as the code set. If you want to make it change the color in different way, you can revise the code.

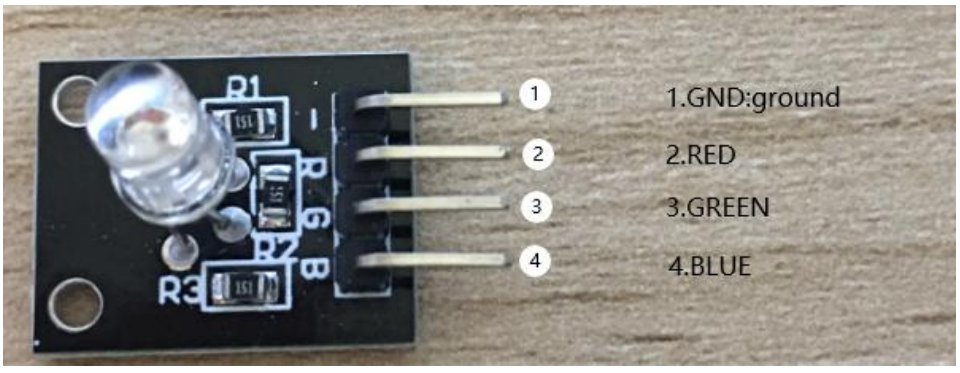
Lesson 3 SMD RGB Module and RGB Module

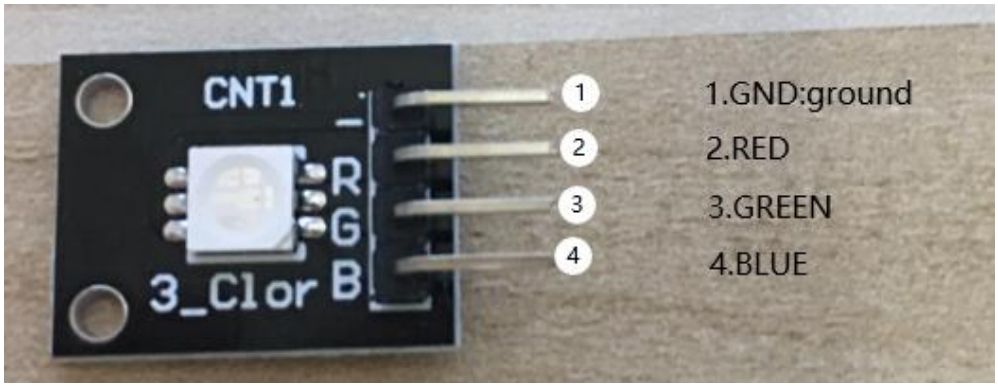
Overview

In this experiment, we will learn how to use SMD RGB module and RGB module.

The function of SMD RGB module and RGB module are almost the same. But we can choose the shape we like or we need.

SMD RGB LED module and RGB module are made from a patch of full-color LED. By adjusting the voltage input of R, G, B pins, we can adjust the strength of the three primary colors (red/blue/green) so to implementation result of full color effect.





Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

(3) SMD RGB module* 1

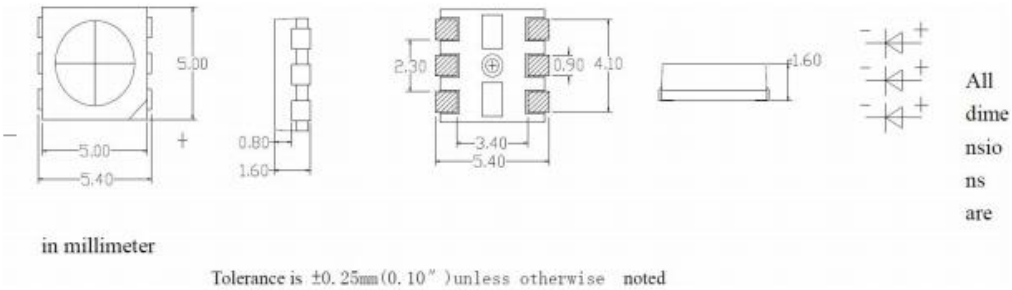
(4) RGB module* 1

(5) Breadboard* 1

(6) Breadboard Jumper Wires* Several

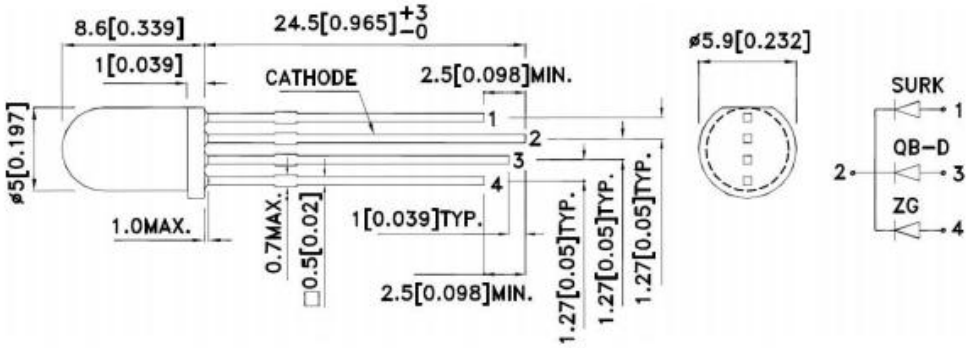
Component Introduction

SMD RGB:



Parameter	Symbol	Value	Unit
Forward Current	If	20	mA
Reverse Voltage	Vr	5	V
Operating Temperature	Topr	-25～+85	℃
Storage Temperature	Tstg	-35～+85	℃
Soldering temperature	Tsol	260±5℃ (for4sec)	℃
Power Dissipation	Pd	R=40	mW
Pulse Current	I_{FP}	100	mA

RGB:



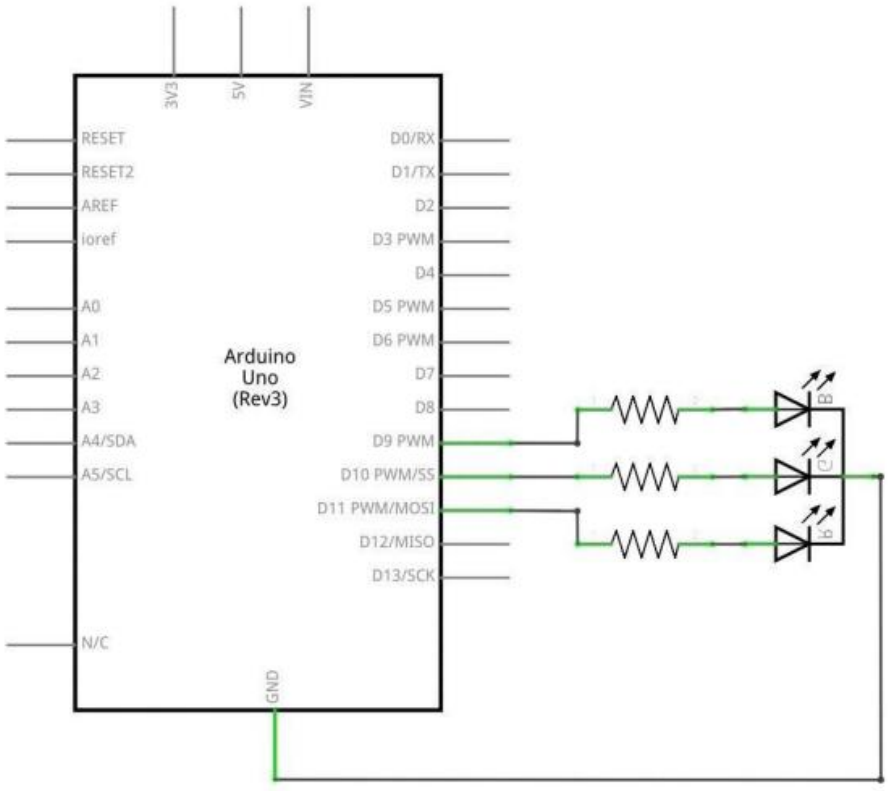
Electrical / Optical Characteristics at TA=25°C

Symbol	Parameter	Device	Typ.	Max.	Units	Test Conditions
λpeak	Peak Wavelength	Hyper Red Blue Green	650 468 515		nm	IF=20mA
λD [1]	Dominant Wavelength	Hyper Red Blue Green	630 470 525		nm	IF=20mA
Δλ1/2	Spectral Line Half-width	Hyper Red Blue Green	28 25 30		nm	IF=20mA
C	Capacitance	Hyper Red Blue Green	35 100 45		pF	VF=0V;f=1MHz
VF [2]	Forward Voltage	Hyper Red Blue Green	1.95 3.3 3.3	2.5 4 4.1	V	IF=20mA
IR	Reverse Current	Hyper Red Blue Green		10 50 50	uA	VR=5V

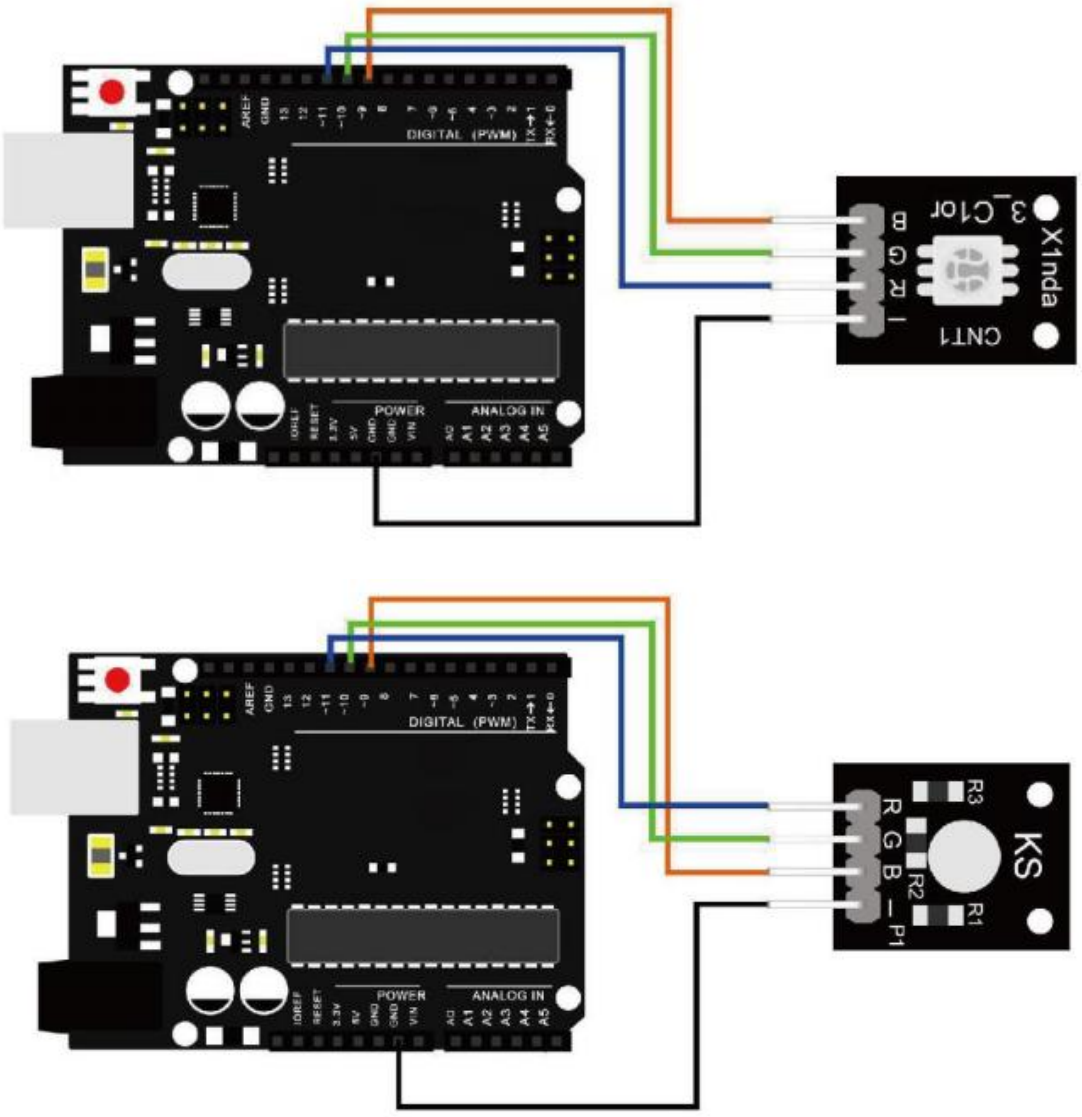
Notes:
1.Wavelength: +/-1nm.
2. Forward Voltage: +/-0.1V.

Connection

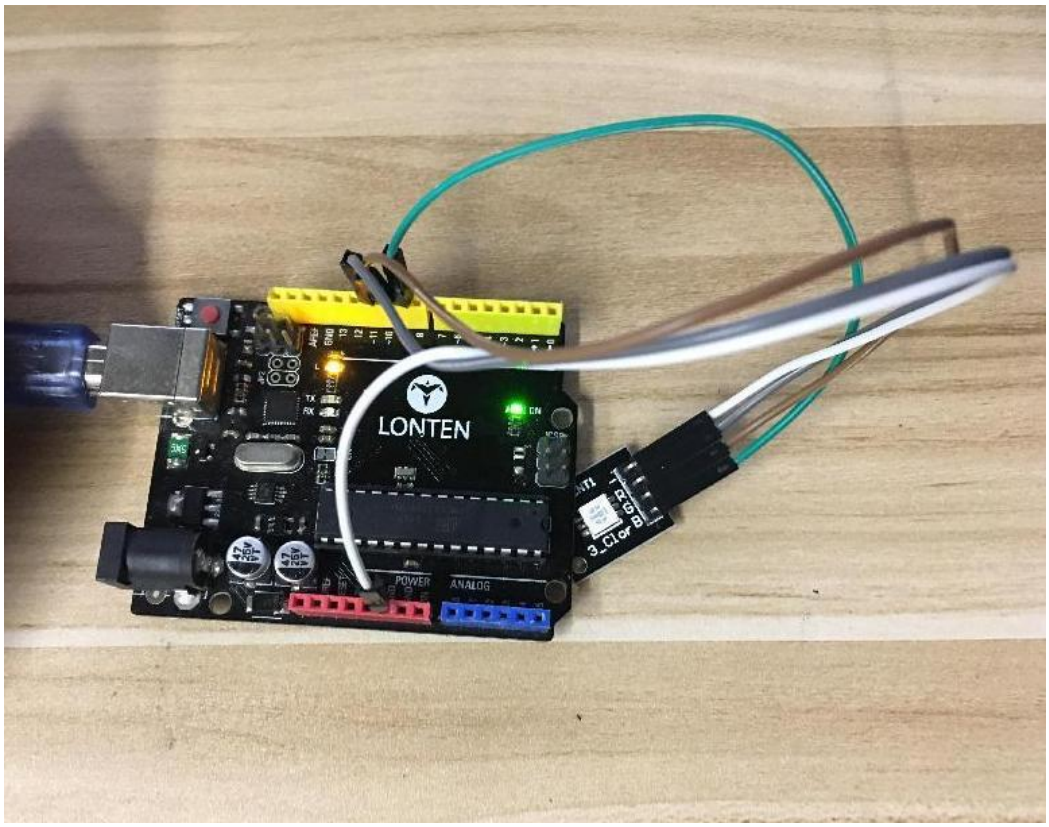
Schematic

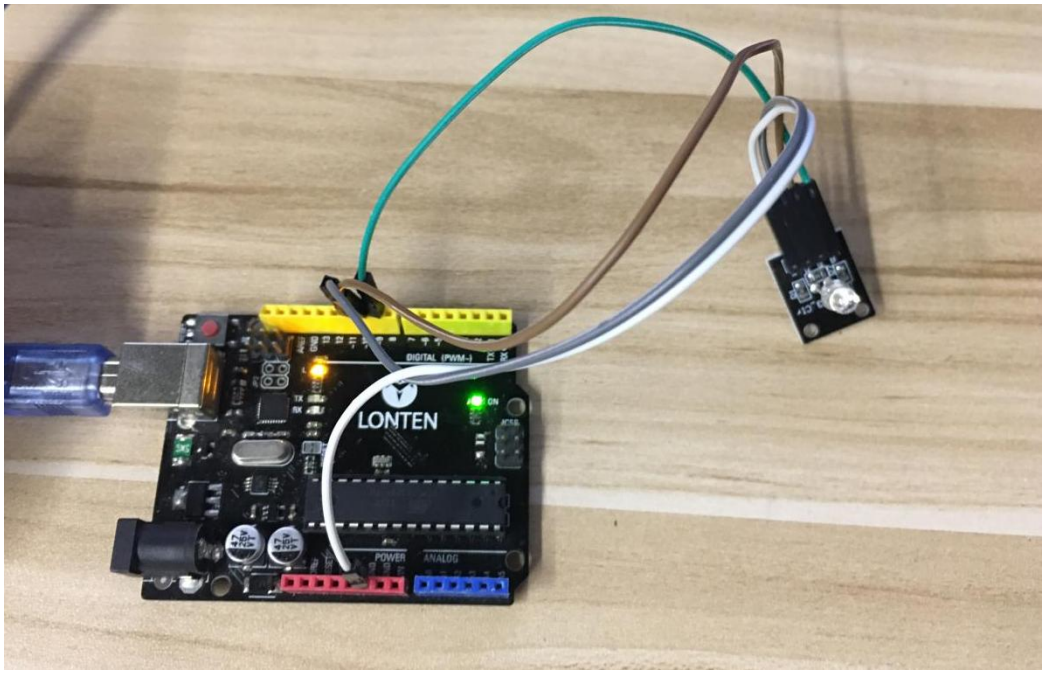


wiring diagram



Example picture





Result

After we connect the circuit as the picture, we upload the program of each module. We can see the module changing their color as the code set. If you want to make it change the color in different way, you can revise the code.

Lesson 4 7 Color Flash LED Module

Overview

In this experiment, we will learn how to use the 7 color flash LED module.

Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

(3) 7 color flash led module * 1

(4) Breadboard* 1

(5) Breadboard Jumper Wires* Several

Component Introduction

7 color flash led:

7 color flashing LED module automatically uses 5mm round high-brightness light-emitting diode which has the following characteristics:

Product Type: LED

Product Model: YB-3120B4PnYG-PM

Shape: Round LED 5mm DIP type

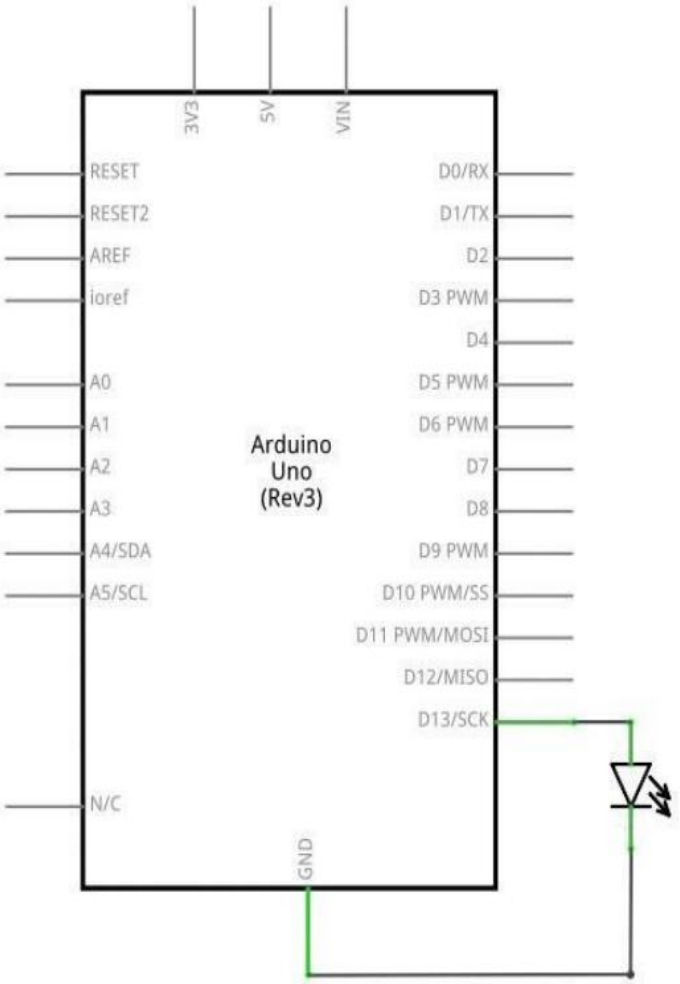
Color: pink yellow green (high brightness)

Lens type: white mist

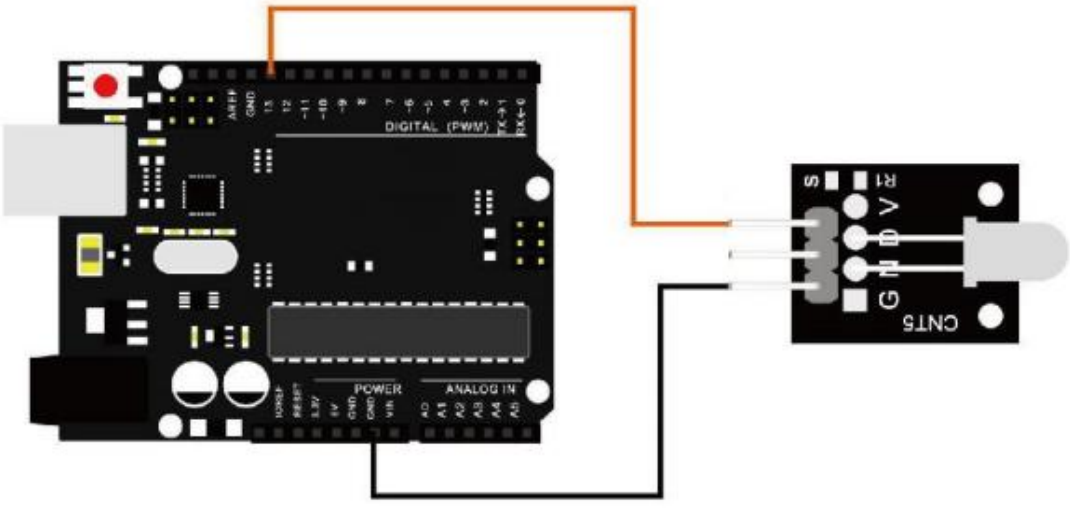
Standard Forward Voltage :3.0-4 .5 V

Connection

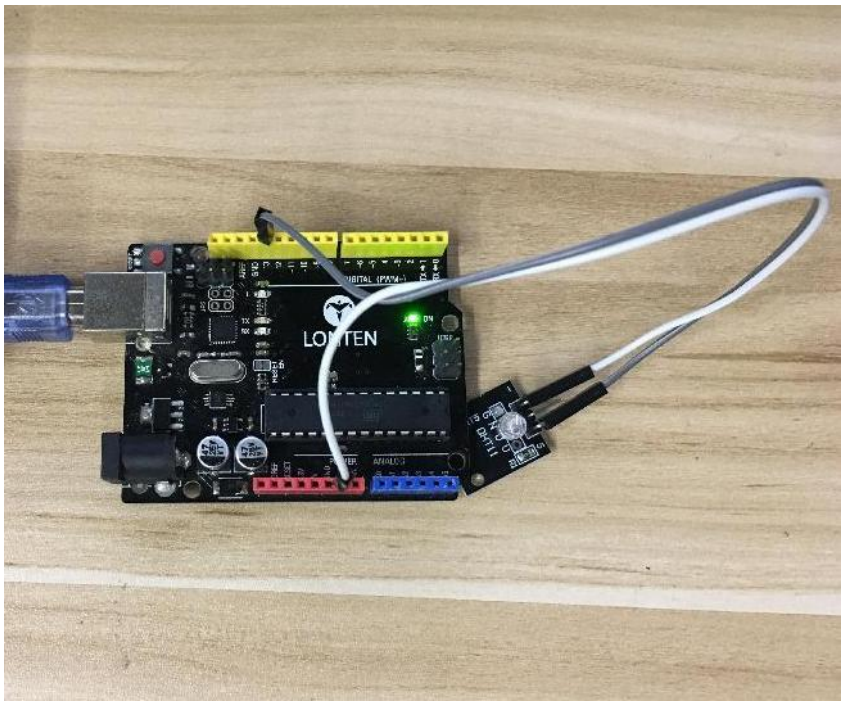
Schematic



wiring diagram



Example picture



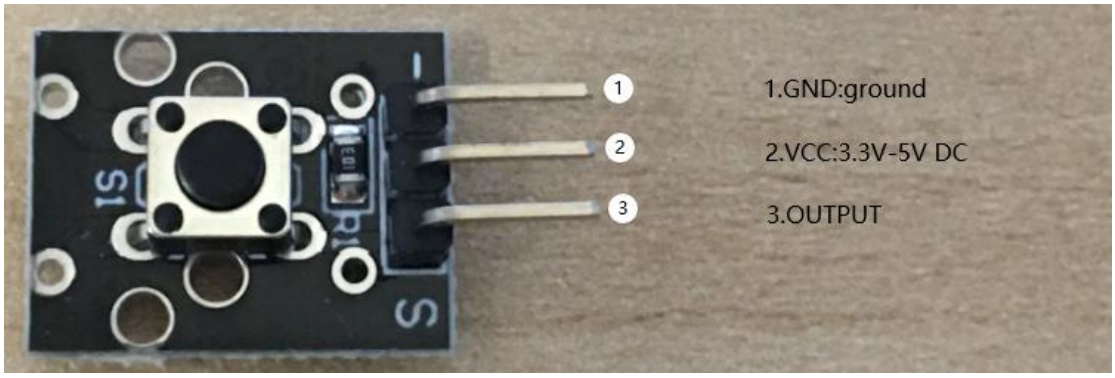
Result

We can see that the LED switches between different colors.

Lesson 5 Button Switch Module

Overview

In this experiment, we will learn how to use button switch.



Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

(3) Button Module* 1

(4) Breadboard* 1

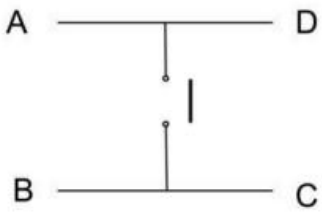
(5) Breadboard Jumper Wires* Several

Component Introduction

PUSH SWITCHES:

Switches are simple components. When you press a button or flip a lever, they connect two contacts together so that electricity can flow through them.

The little tactile switches that are used in this lesson have four connections, which can be a little confusing.



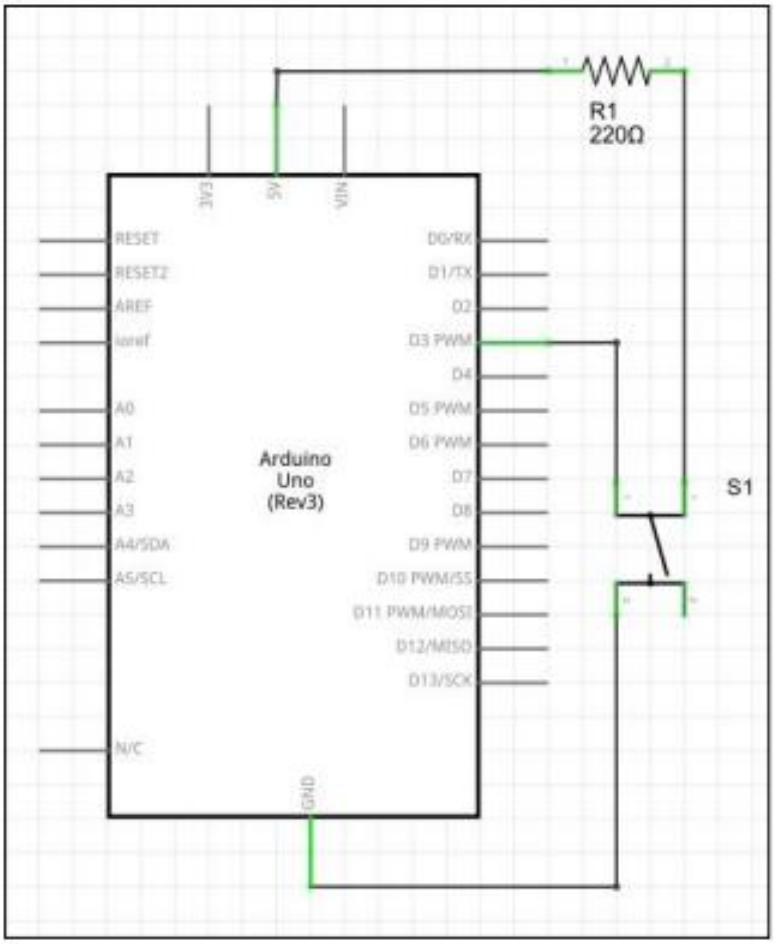
There are only really two electrical connections, as inside the switch package pins B and C are connected together, as are A and D.

Principle

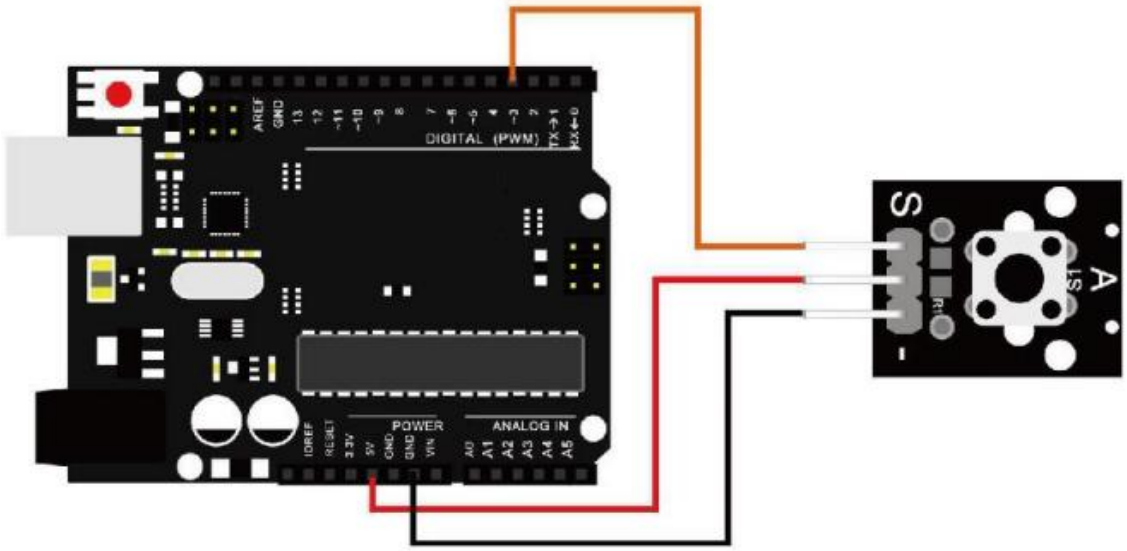
BUTTON SWITCH and number 13 port have the built-in LED simple circuit. To produce a switch flasher, we can use connect the digital port 13 to the built-in LED and connect the BUTTON SWITCHS port to number 3 port of LONTEN Uno board. When the switch sensing, LED twinkle light to the switch signal.

Connection

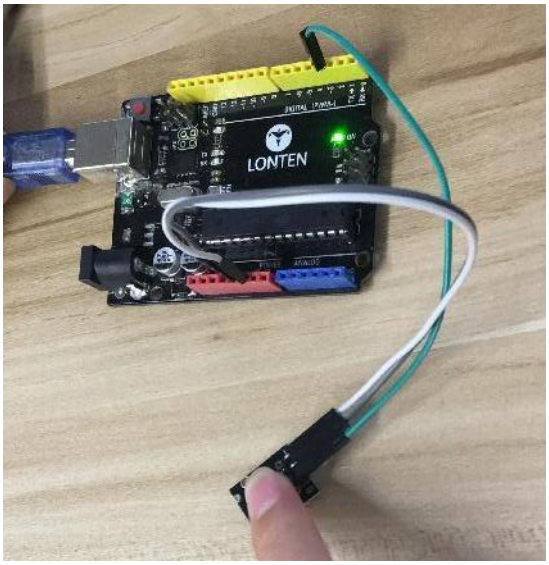
Schematic



wiring diagram



Example picture



Result

Connect the circuit as above and upload the program. when the button sensor have pressed, LED off.If no pressed,LED on.

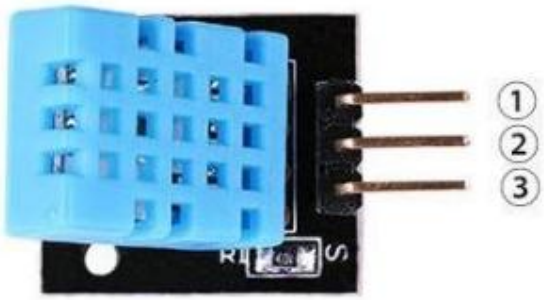
LROBRUYA

Lesson 6 Temp and Humidity module

Overview

In this tutorial we will learn how to use a DHT11 Temperature and Humidity Sensor. It has excellent quality, fast response, anti-interference ability and high cost performance advantages. Each DHT11 sensor features extremely accurate calibration data of humidity calibration chamber.

Again we will be using a Library specifically designed for these sensors that will make our code short and easy to write.



1.GND:ground
2.VCC: 3.3V-5V DC
3.OUTPUT

Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

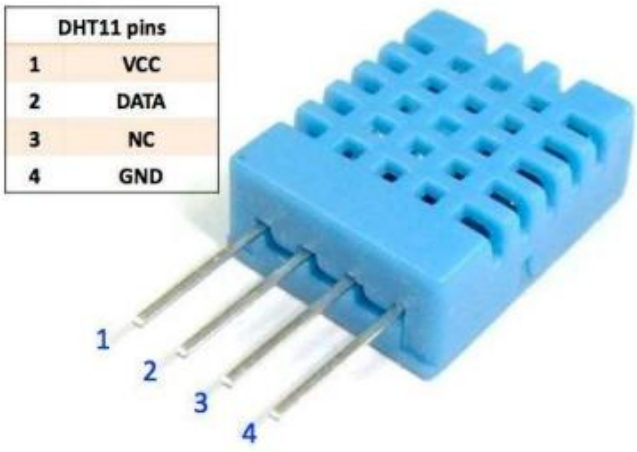
(3) Temperature and Humidity Unit *1

(4) Breadboard* 1

(5) Breadboard Jumper Wires* Several

Component Introduction

Temp and humidity sensor:



This DHT11 Temperature and Humidity Sensor features calibrated digital signal output with the temperature and humidity sensor complex. Its technology ensures high reliability and excellent long-term stability. A high-performance 8-bit micro controller is connected. This sensor includes a resistive element and a sense of wet NTC temperature measuring devices.

Applications: HVAC, dehumidifier, testing and inspection equipment, consumer goods, automotive, automatic control, data loggers, weather stations, home appliances, humidity regulator, medical and other humidity measurement and control.

Product parameters Relative

humidity: Resolution: 16Bit

Repeatability: ±1% RH

Accuracy: At 25℃ ±5% RH

Interchangeability: fully interchangeable

Response time:1/e(63%)of25℃ 6s

1m / s air 6s

Hysteresis: <± 0.3%RH

Long-term stability: <± 0.5% RH / yr in

Temperature:

Resolution: 16Bit

Repeatability: ±0.2℃

Range: At 25℃ ±2℃

Response time: 1 / e (63%) 10S

Electrical Characteristics

Power supply: DC 3.5～5.5V

Supply Current: measurement 0.3mA standby 60μA

Sampling period: more than 2 seconds

Pin Description:

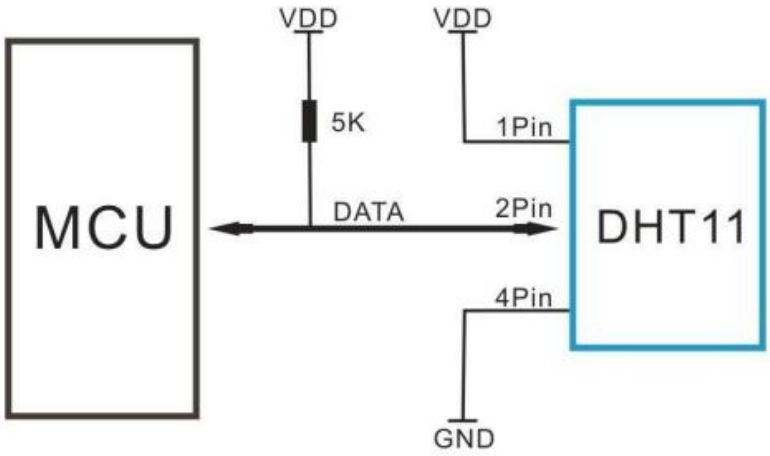
1, the VDD power supply 3.5～5.5V DC

2 DATA serial data, a single bus

3, NC, empty pin

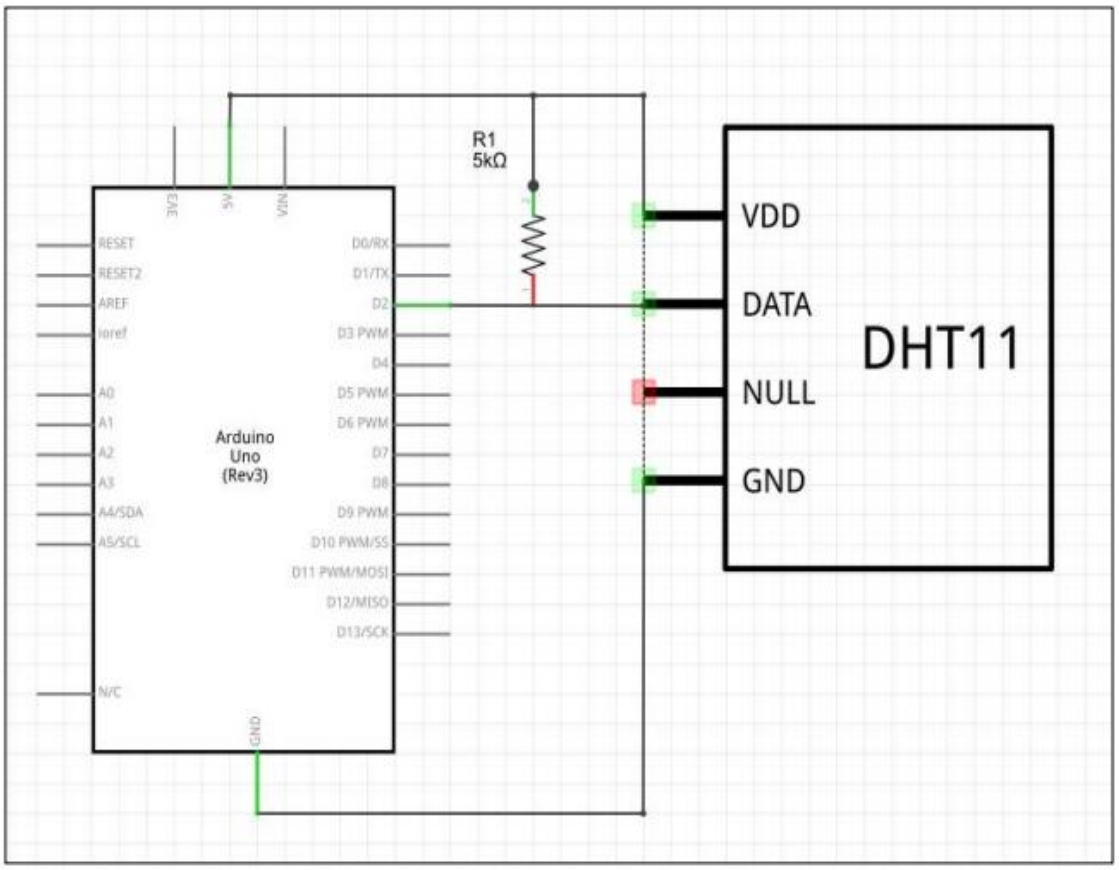
4, GND ground, the negative power

Typical Application

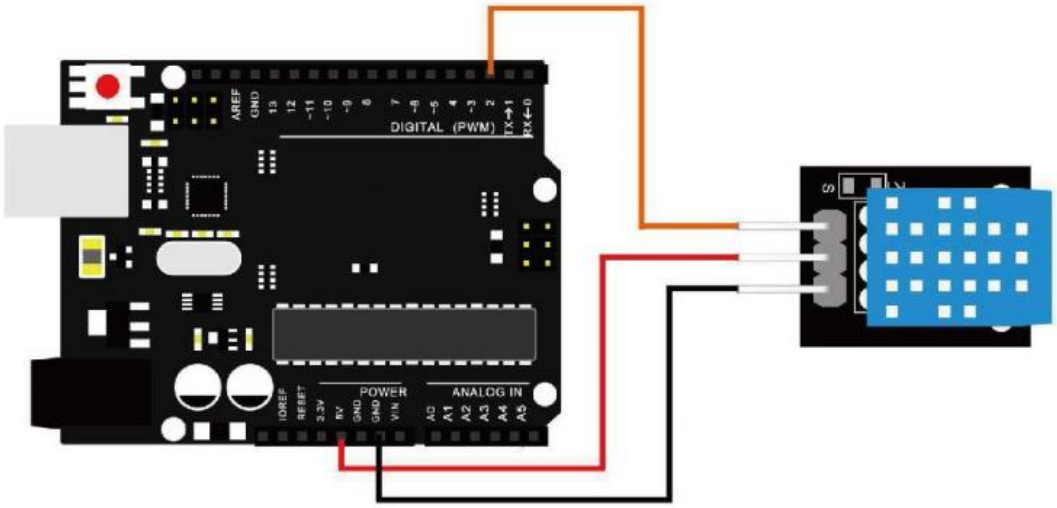


Connection

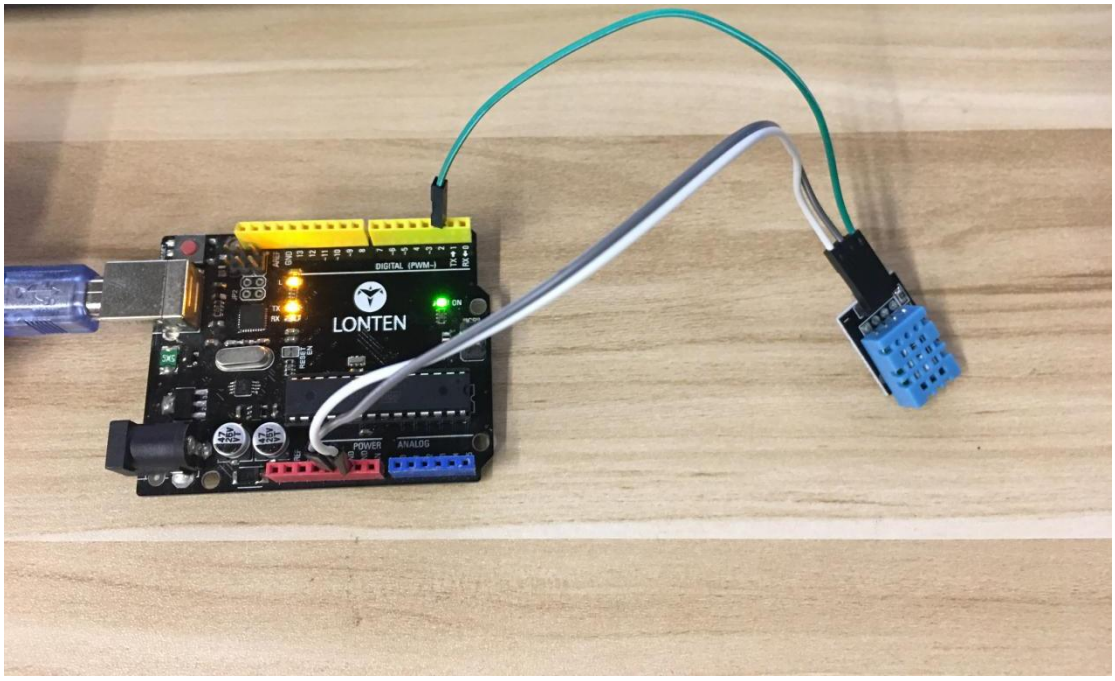
Schematic



wiring diagram

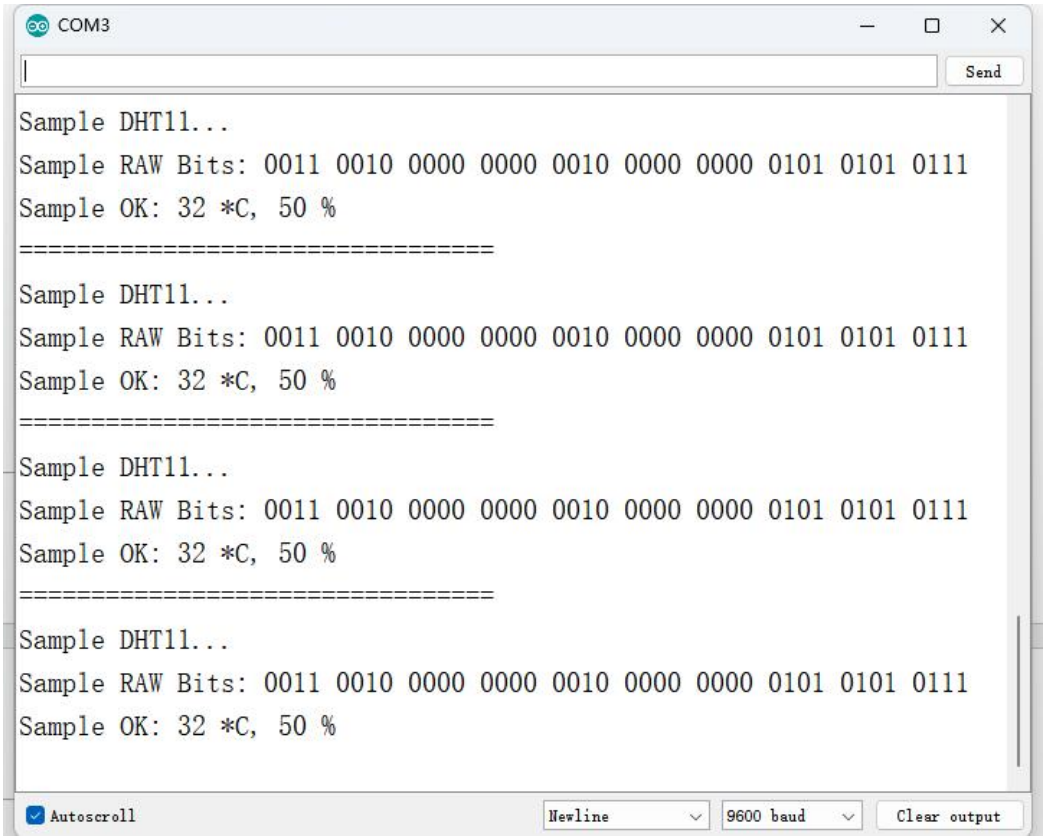


Example picture



Result

Upload the program then open the monitor, we can see the data as below:(It shows the temperature of the environment, we can see it is 32 degree).



Lesson 7 DS18B20 Digital Temperature Sensor Module

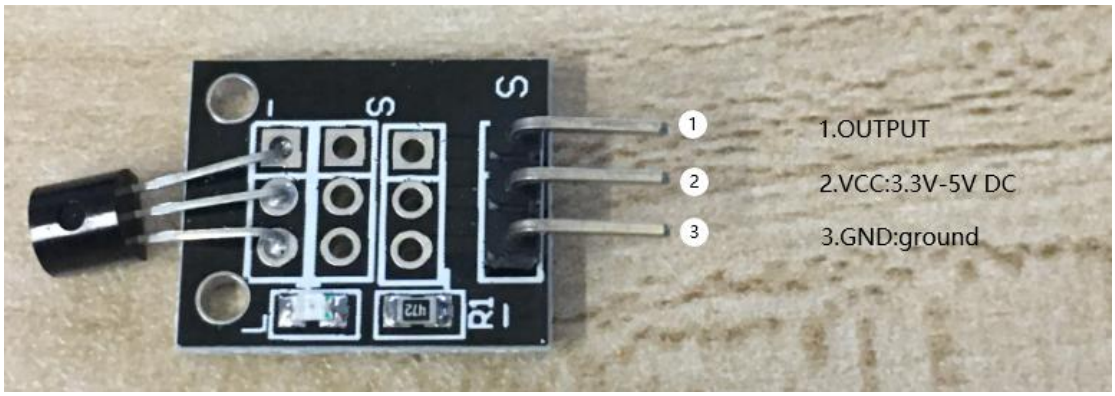
Overview

In this experiment, we will learn how to use DS18B20 module test the environmental temperature and make a thermometer.

Since the previous temperature sensor output is analog. So we need to add additional A/D and D/A chip into the line transformation. More over, the Arduino external port is not rich resources and the utilization rate is not high. These cause a big challenge. So we are create the Ds18b20 module.

The new DS18B20 Temperature Sensor Module is very good solve the problem. It have the characteristic of the economy, unique1 wide band it can fully apply the Arduino platform.

Users can easily form a sensor network through using this module.



Component Required:

(1) LONTEN UNO Board * 1

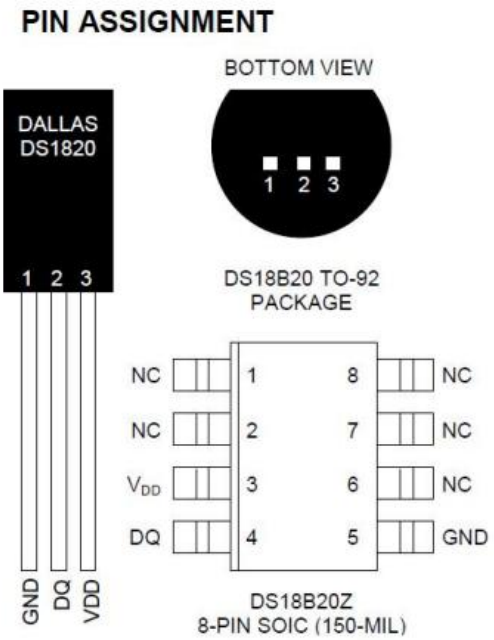
(2) USB Cable* 1

(3) DS18B20 Module* 1

(4) Breadboard* 1

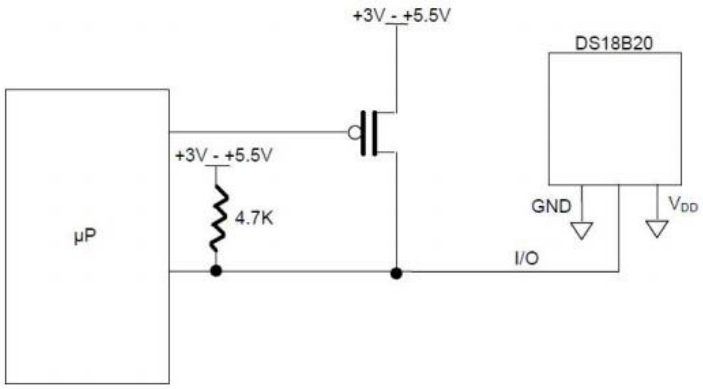
(5) Breadboard Jumper Wires* Several

DS18B20:



PIN DESCRIPTION

GND - Ground
DQ - Data In/Out
V_{DD} - Power Supply Voltage
NC - No Connect



Principle

DS18B20 module is using a single bus. The power supply voltage range of 3.0 V to 5.5 V and no standby power supply. It can Measure

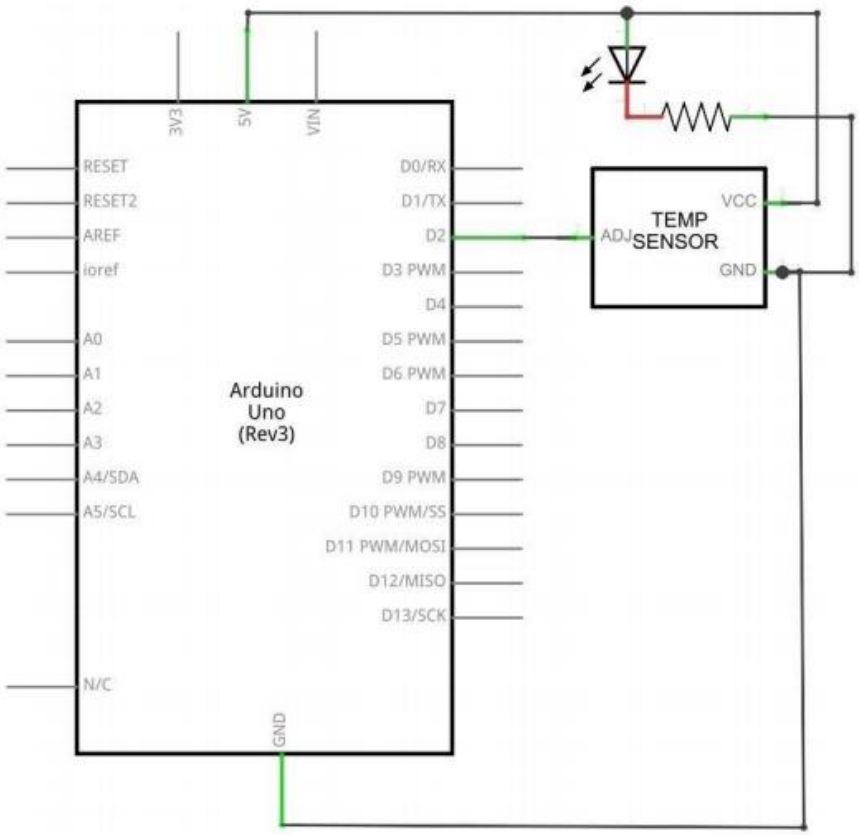
temperature range for -55 degree to +125 degree with accuracy of+/-0.5°C.

The programmable DPI of temperature sensor is from 9 to 12. temperature conversion is 12 digits lattice type. maximum is 750 milliseconds. Families can be defined non-volatile temperature alarm Settings.

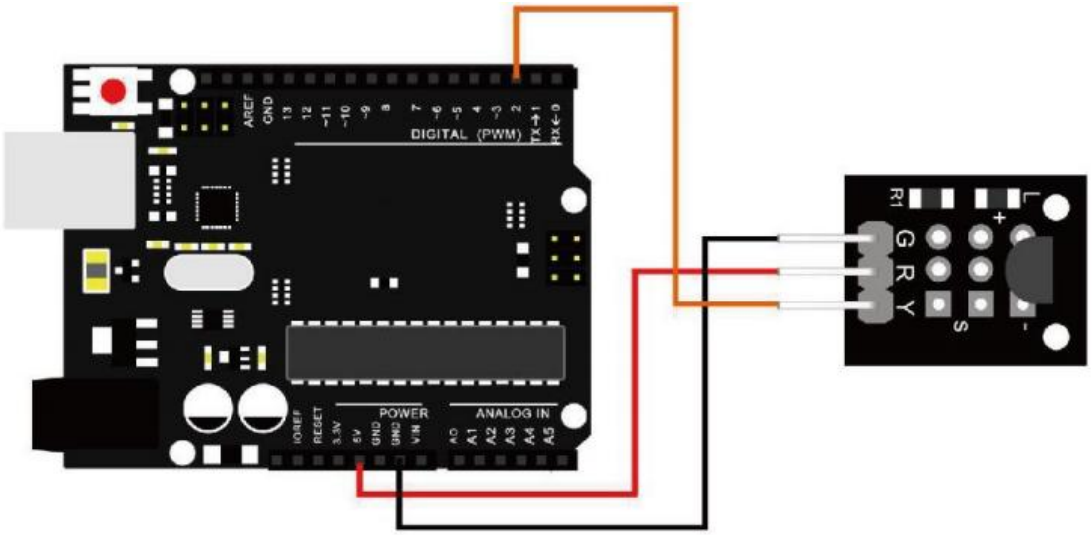
Each DS18B20 contains a unique serial number so that multiple ds18b20 scan exist in a bus.

Connection

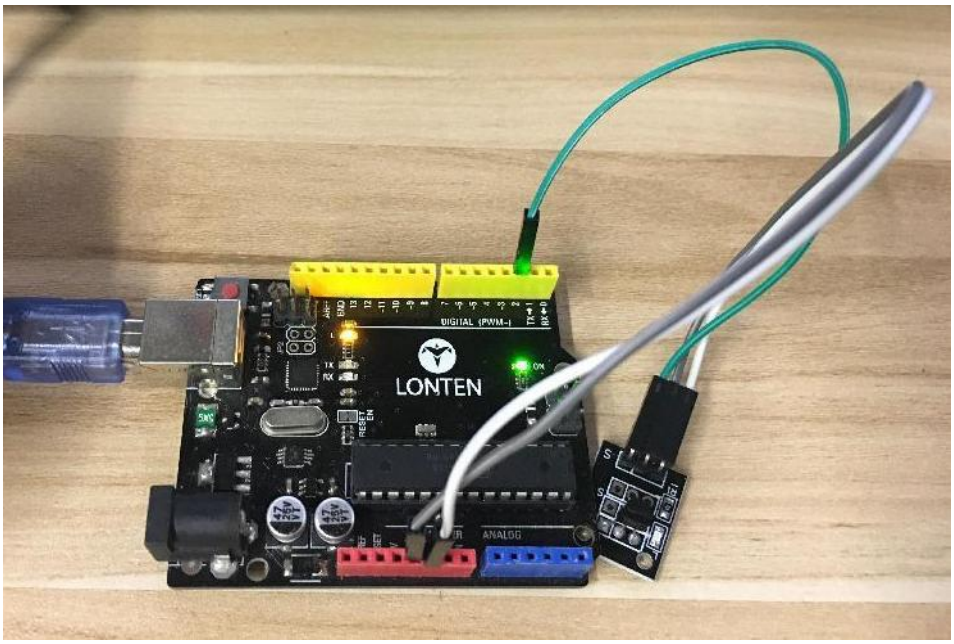
Schematic



wiring diagram



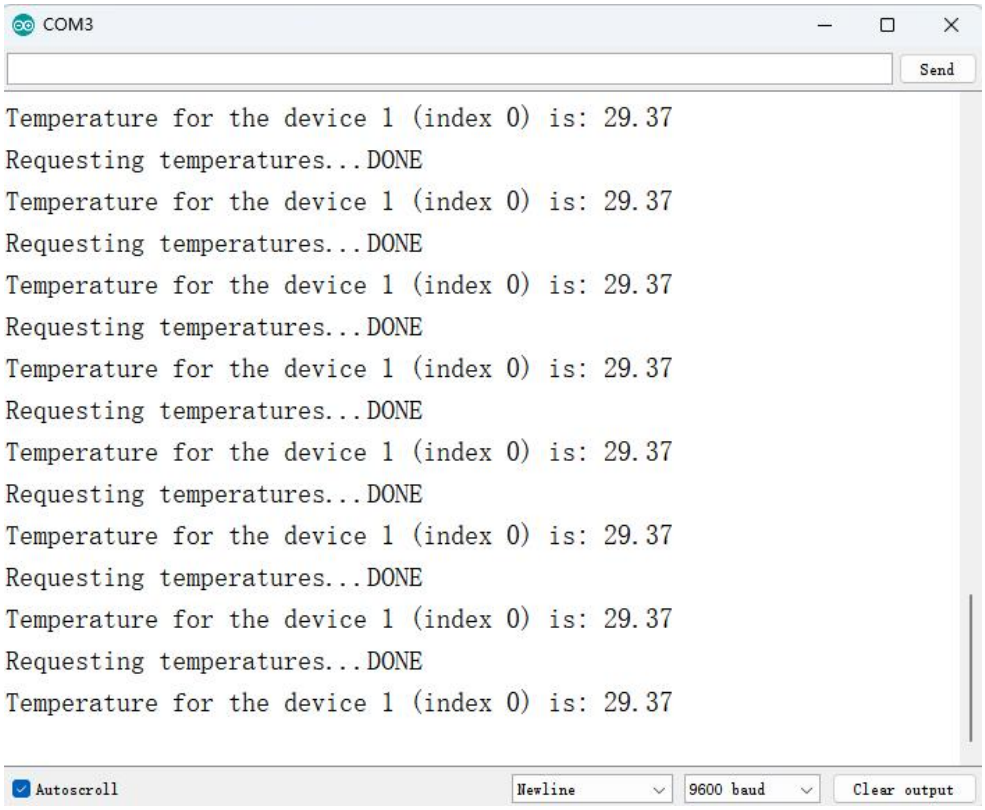
Example picture



Result

Temperature sensor can detect temperature in numbers of different places at the same time.

Upload the program then open the monitor, we can see the data as below:

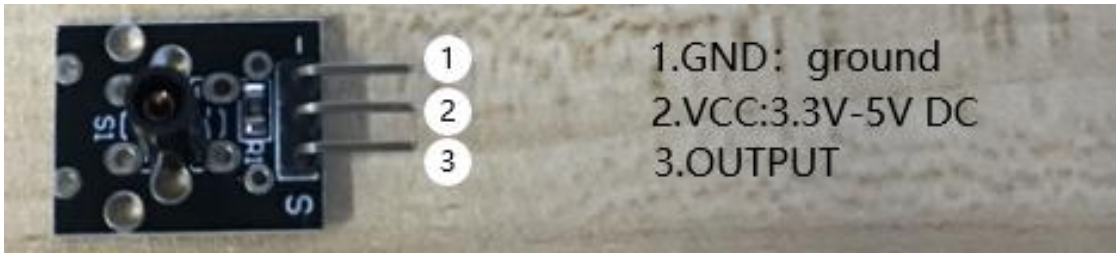


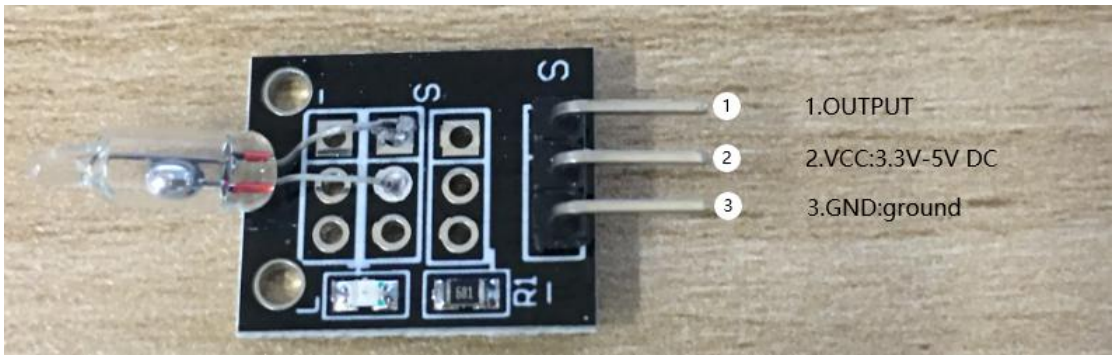
Lesson 8 Four Type of Switch Module

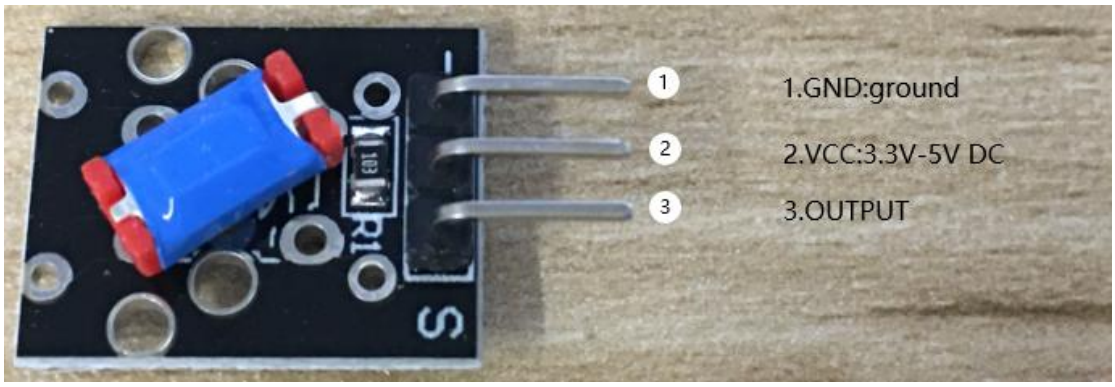
Overview

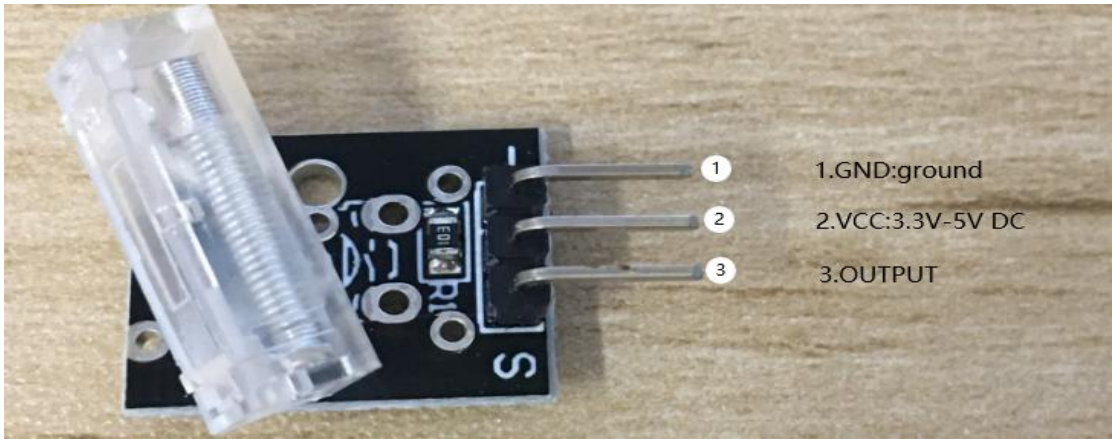
In this experiment, we will learn how to use switch modules.

Including shock switch module, mercury switch module, tilt switch module and knock switch module.









Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

(3) Shock switch module* 1

(4) Mercury switch module* 1

(5) tilt switch module* 1

(6) Knock switch module* 1

(7) Breadboard* 1

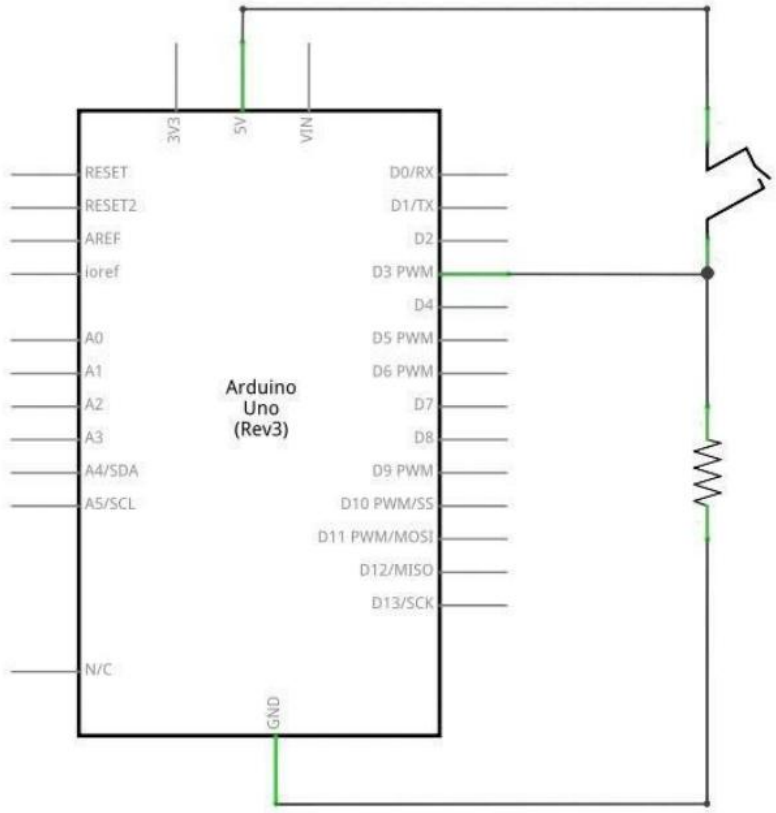
(8) Breadboard Jumper Wires* Several

Principle

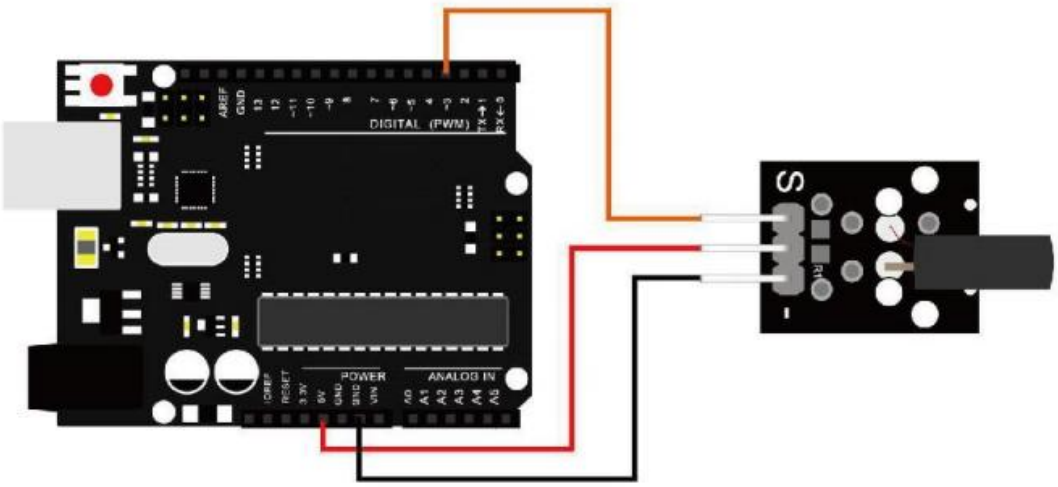
switch and number 13 port have the built-in LED simple circuit. To produce a SWITCH flasher, we can use connect the digital port 13 to the built-in LED and connect the SWITCH S port to number 3 port of LONTEN Uno board. When the SWITCH sensing, LED twinkle light to the SWITCH signal.

Connection

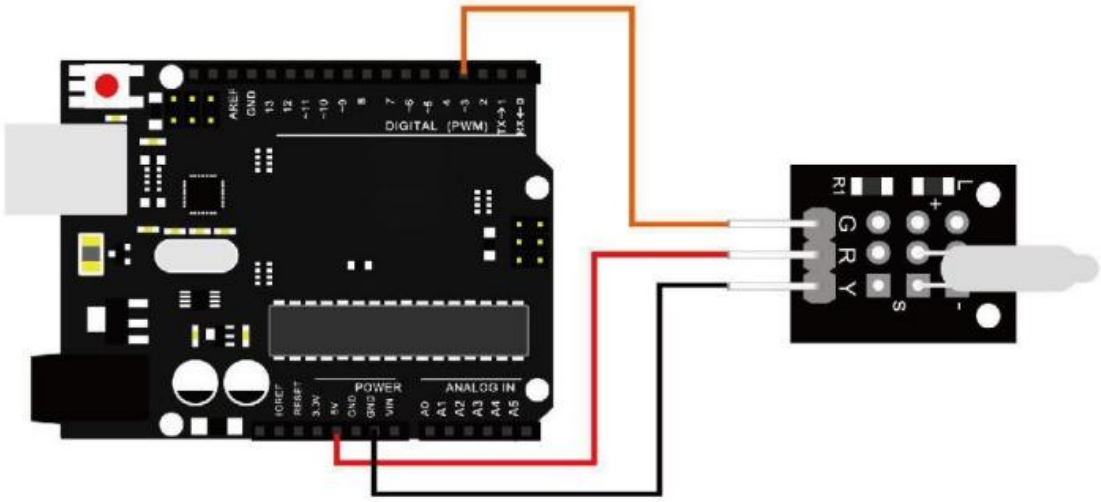
Schematic

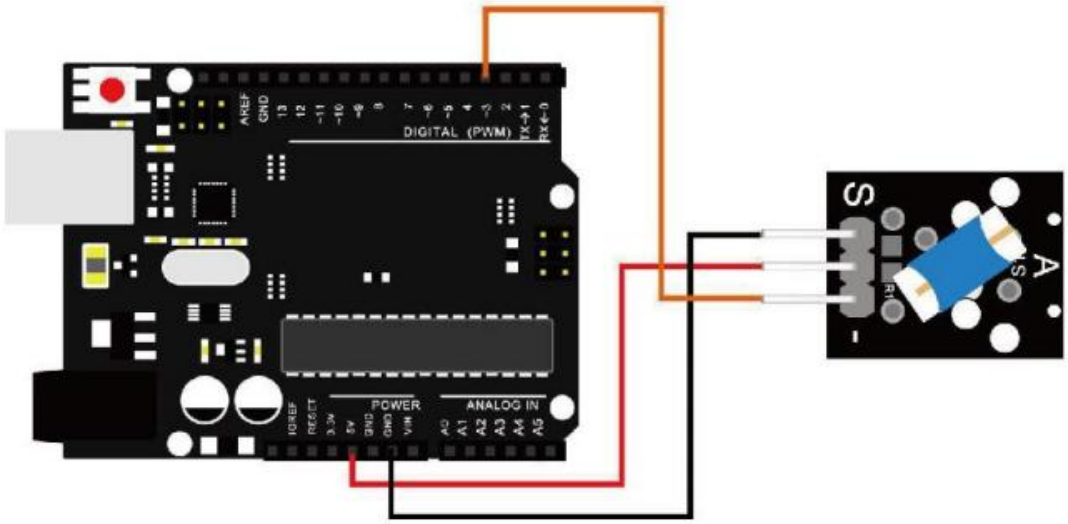


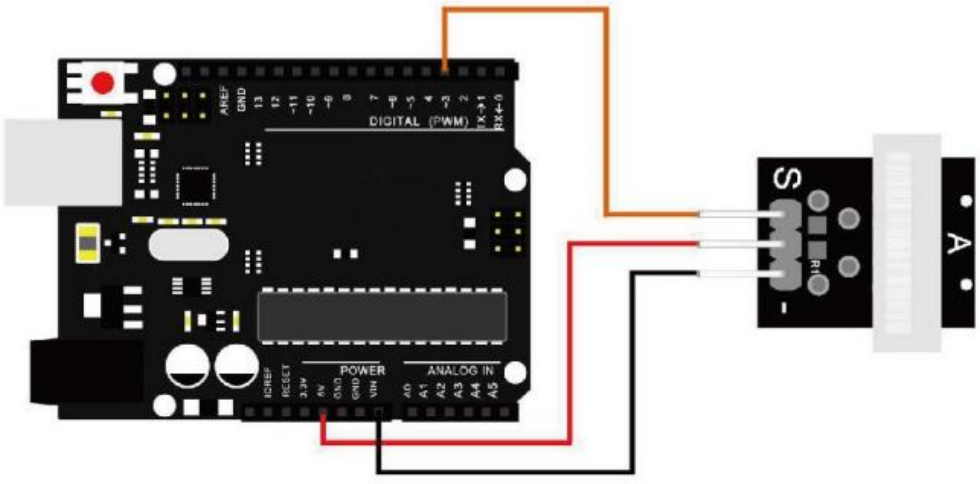
wiring diagram



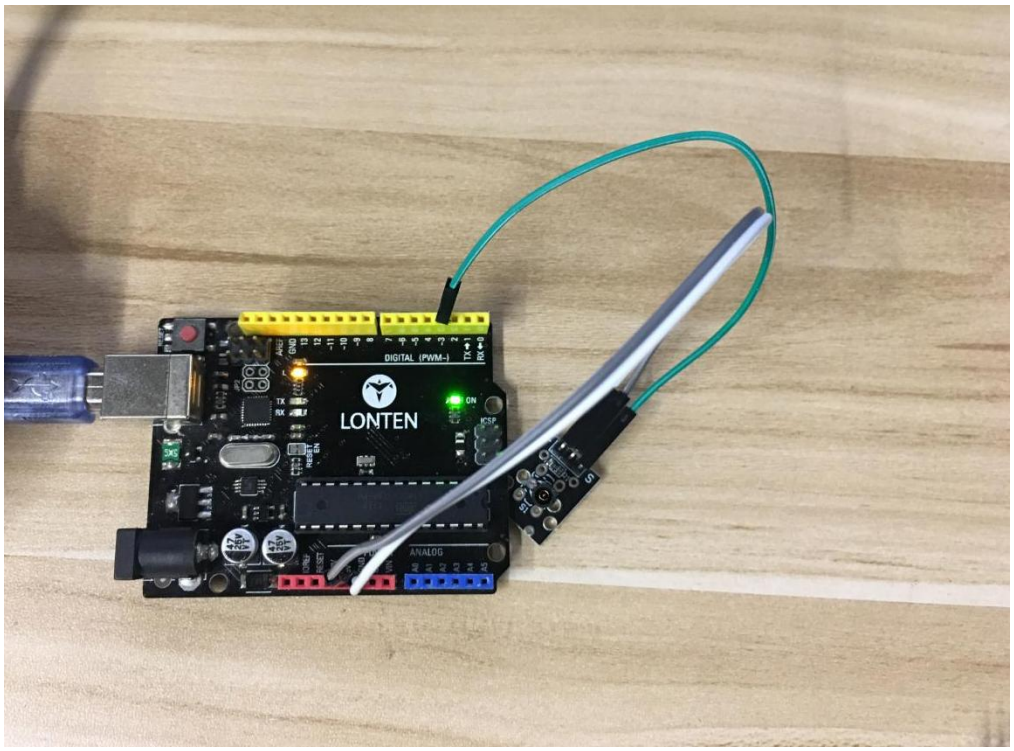
LROBRUYA

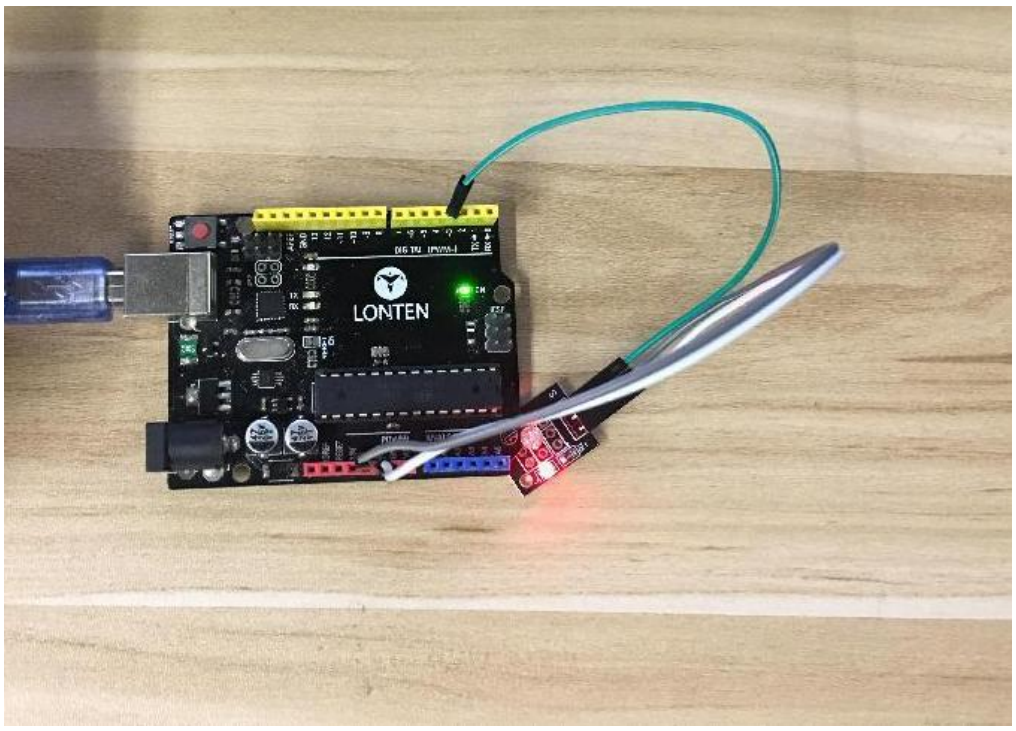

DIGITAL (PWM)
POWER
ANALOG IN
R1
G
R
Y
S
+
-


DIGITAL (PWM)
POWER
ANALOG IN
S
R1
-

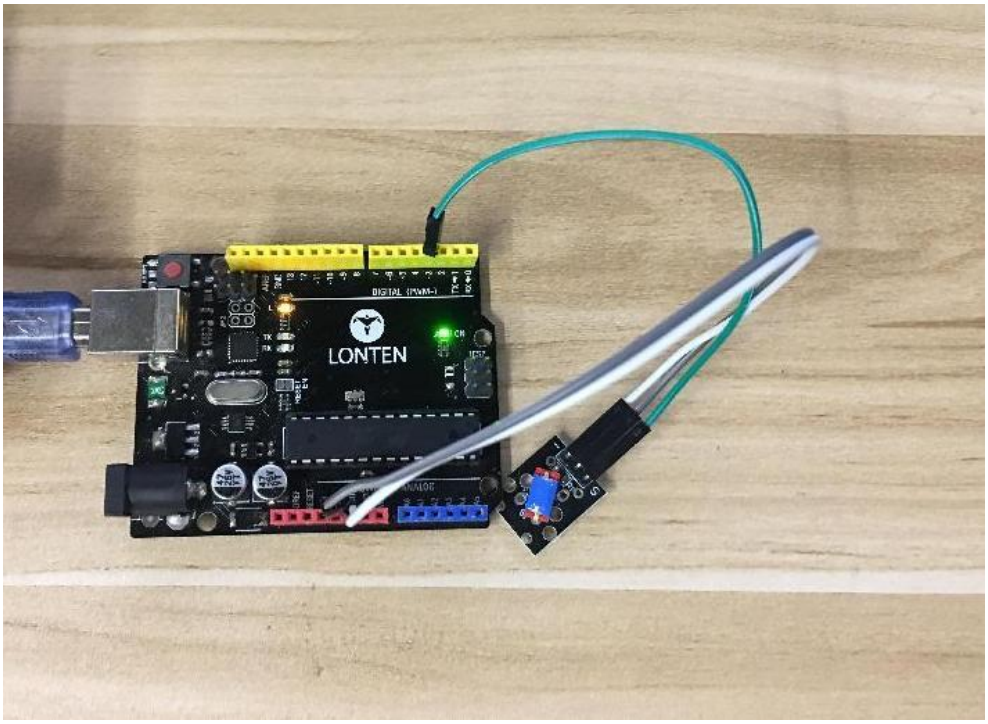

DIGITAL (PWM)
POWER
ANALOG IN
S
R1
-

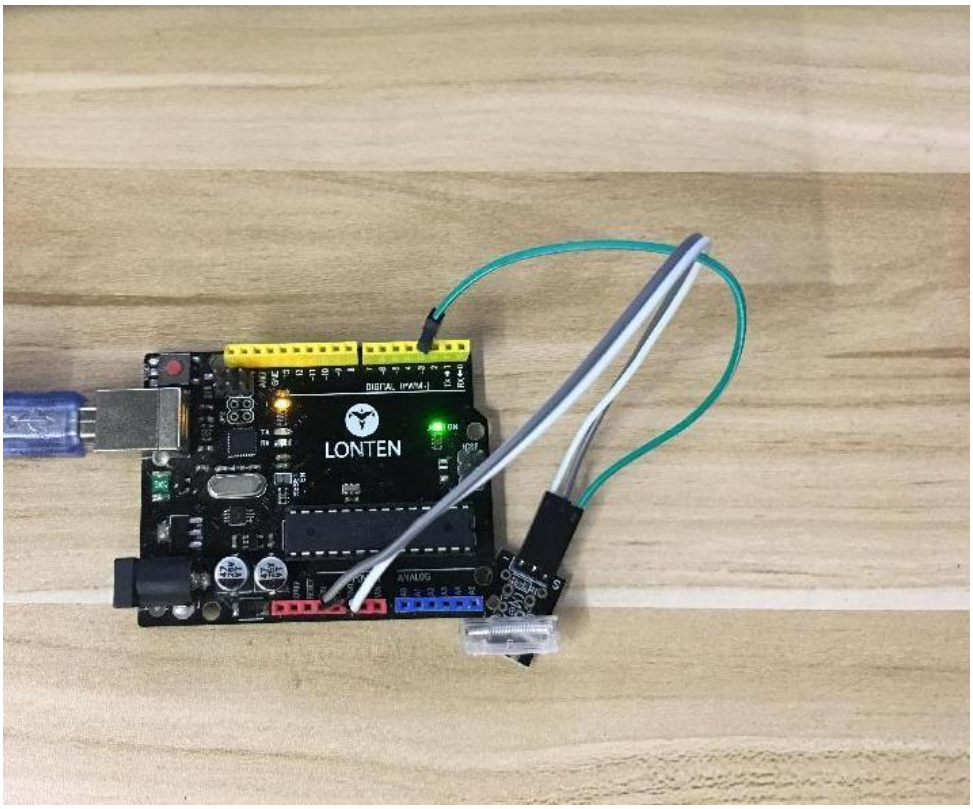
Example picture





LROBRUYA





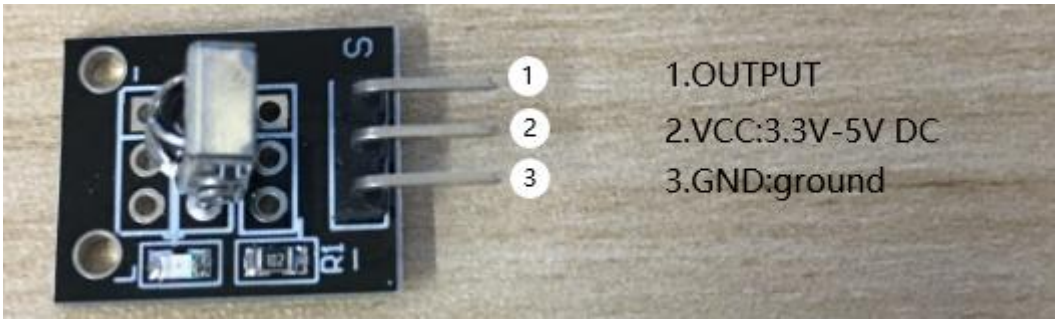
Result

Connect the circuit as above and upload the program. Then lean or shock the sensor, you can see led on and off.

Lesson 9 Digital IR Receiver

Overview

In this experiment, we will learn how to use Infrared Receiver module. IR is widely used in remote control. With this IR receiver, Arduino project is able to receive command from any IR remoter controllers if you have the right decoder. Well, it will be also easy to make your own IR controller using IR transmitter.



Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

(3) IR Receiver module* 1

(4) Breadboard* 1

(5) Breadboard Jumper Wires* Several

Component Introduction

IR RECEIVER SENSOR:

IR detectors are little microchips with a photocell that are tuned to listen to infrared light. They are almost always used for remote control detection every TV and DVD player has one of these in the front to listen for the IR signal from the clicker. Inside the remote control is a matching IR LED, which emits IR pulses to tell the TV to turn on, off or change channels. IR light is not visible to the human eye, which means it takes a little more work to test a setup.

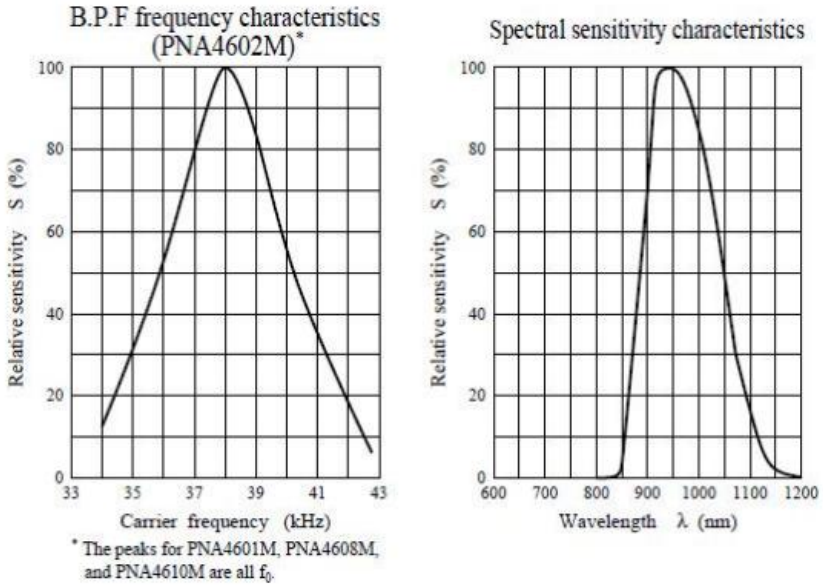
There are a few difference between these and say a CdS Photocells:

IR detectors are specially filtered for Infrared light, they are not good at detecting visible light. On the other hand, photocells are good at detecting yellow/green visible light, not good at IR light.

➢ IR detectors have a demodulator inside that looks for modulated IR at 38 KHz. Just shining an IR LED won't be detected, it has to be PWM blinking at 38KHz. Photocells do not have any sort of demodulator and can detect any frequency (including DC) within the response speed of the photocell (which is about 1KHz) .

➢ IR detectors are digital out - either they detect 38KHz IR signal and output low (0V) or they do not detect any and output high (5V). Photocells act like resistors, the resistance changes depending on how much light they are exposed to.

What You Can Measure



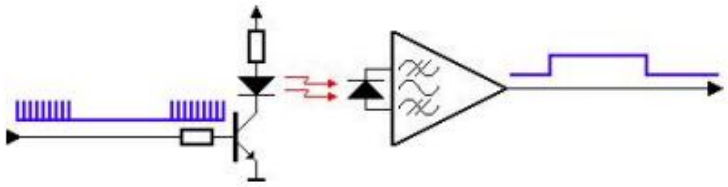
As you can see from these datasheet graphs, the peak frequency detection is at 38KHz and the peakLED color is 940nm. You can use from about 35KHz to 41KHz but the sensitivity will drop off so that it wont detect as well from afar. Likewise, you can use 850 to 1100nm LEDs but they wont work as well as 900 to 1000 nm so make sure to get matching LEDs! Check the datasheet for your IR LED to verify the wavelength.

Try to get a 940nm - remember that 940nm is not visible light (its Infra Red)!

Principle

Firstly, let's know the structure of the infrared receiving head: there are two important elements inside the infrared receiving head, IC and PD. IC is receiving head processing components, mainly composed of silicon and circuit. It is a highly integrated device. The main function is filter, plastic, decoding, amplification, etc. PD is a photosensitive diode. The main function is to receive the light signal.

Below is a brief working principle diagram:

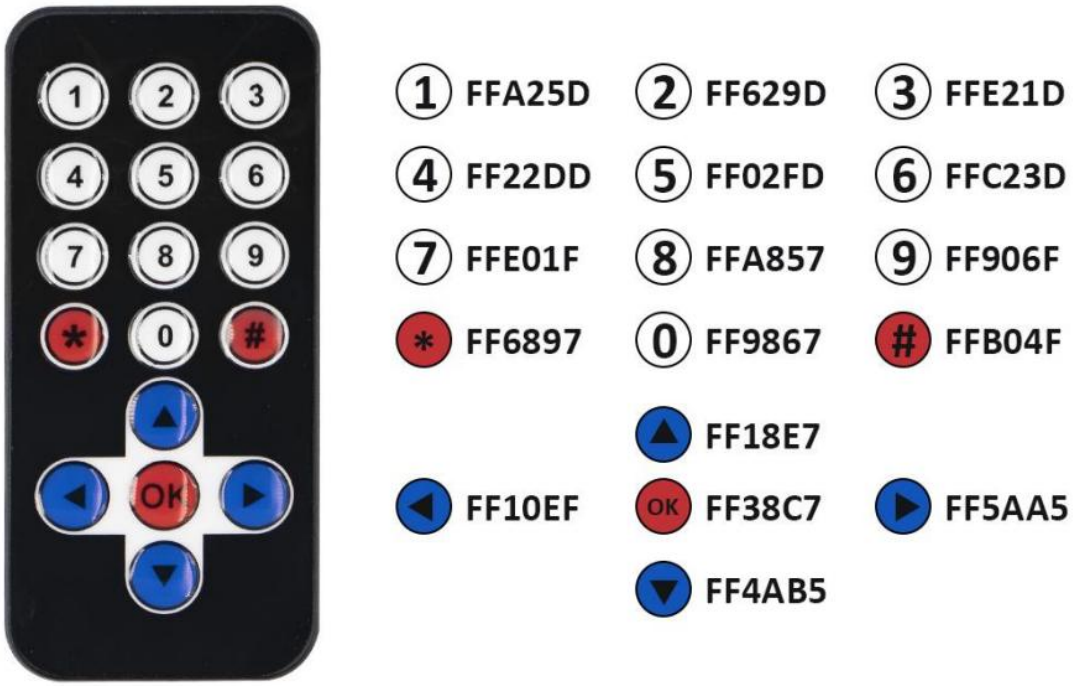


Infrared emitting diode launch out the modulation signal and infrared receiver head will receive, decode, filter and soon to regain the signal.

Infrared emitting diode: keep clean and in good condition. All the parameters in the process of working shall not exceed the limit value (positive To the current 30~60mA, positive pulse current 0.3~1A, reverse voltage 5V, dissipation power 90mW, working temperature range -25~+80 ℃ , and storage temperature range between 40~100 ℃ , the

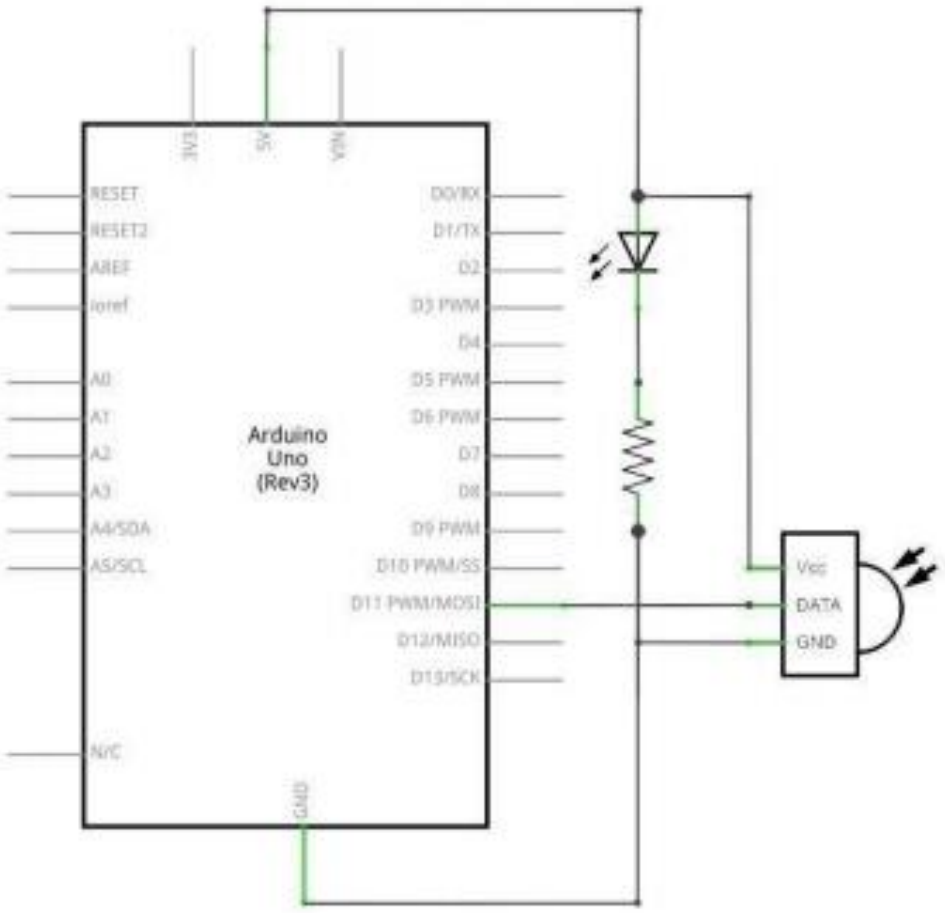
welding temperature 260℃) infrared to be with a closed head should be matching use, otherwise it will influence the sensitivity.

Remote control code:

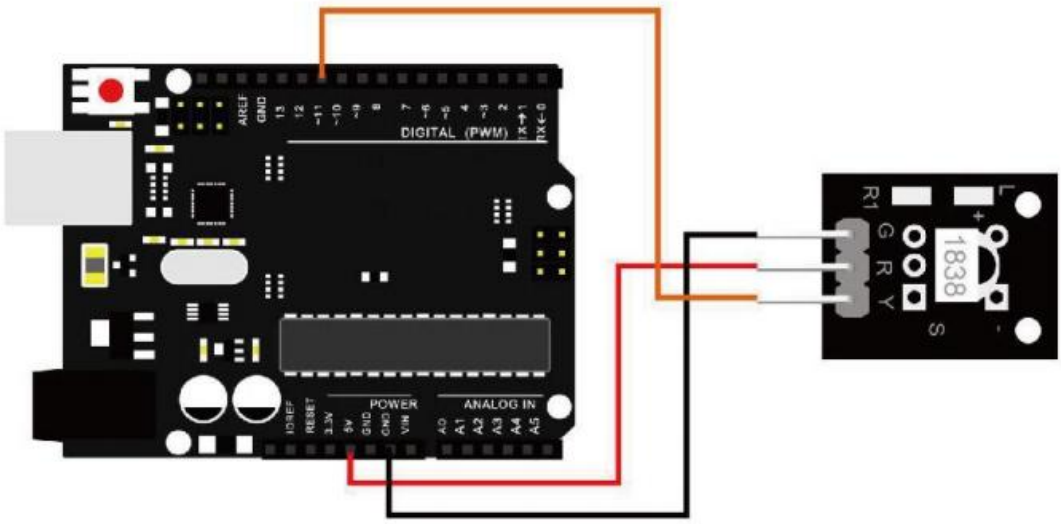


Connection

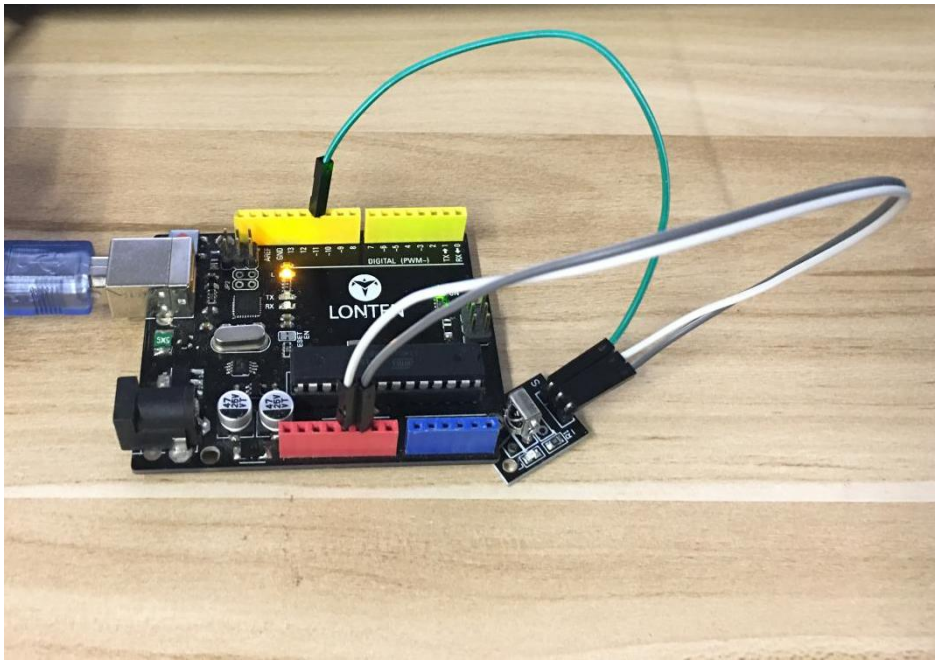
Schematic



wiring diagram

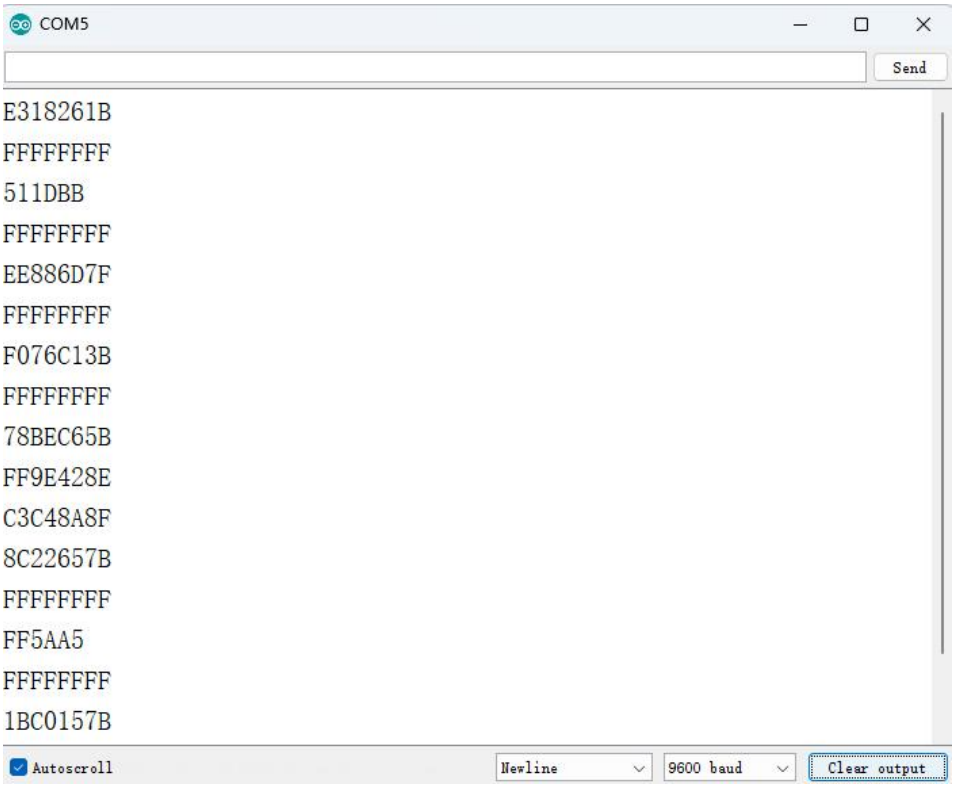


Example picture



Result

After connection and uploading codes, aim at IR receiving module and press the key, finally you can see corresponding codes. If you press the key too long, it will show messy codes easily as shown in bellow figure.

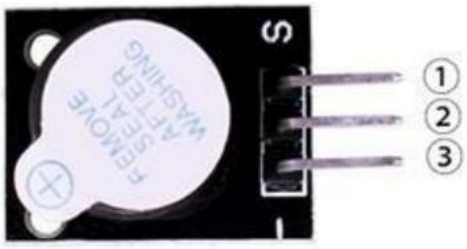


Lesson 10 Active and Passive Buzzer

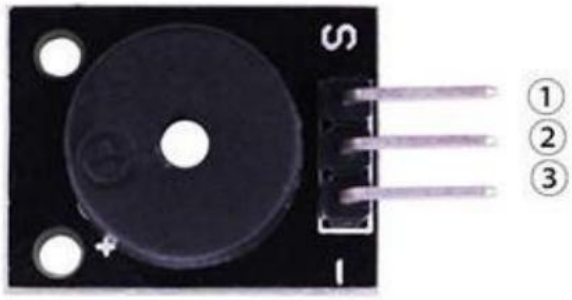
Overview

In this experiment, we will learn how to use buzzer module.

With the Arduino we can complete a lot of interactive work, commonly what we used is the light shows. And we has been use the LED small lights in the experiment before. In this experiment we will make the circuit having noise. The common components that can make sound are buzzer and speakers. Compared to the speaker, buzzer is more simple and easy to use so in this experiment we adopts the buzzer.



1.OUTPUT
2.VCC: 3.3V-5V DC
3.GND:ground



1.OUTPUT
2.VCC: 3.3V-5V DC
3.GND:ground

Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

(3) Active buzzer module* 1

(4) Passive buzzer module* 1

(5) Breadboard* 1

(6) Breadboard Jumper Wires* Several

Component Introduction

Active Buzzer:

As a type of electronic buzzer with integrated structure, buzzers, which are supplied by DC power, are widely used in computers, printers,

photocopiers, alarms, electronic toys, automotive electronic devices, telephones, timers and other electronic products for voice devices.

Buzzers can be categorized as active and passive ones (see the following picture). Turn the pins of two buzzers face up, and the one with a green circuit board is a passive buzzer, while the other enclosed with a black tape is an active one.

The difference between an active buzzer and a passive buzzer is:

An active buzzer has a built-in oscillating source, so it will make sounds when electrified. But a passive buzzer does not have such source, so it will not tweet if DC signals are used; instead, you need to use square waves whose frequency is between 2K and 5K to drive it. The active buzzer is often more expensive than the passive one because of multiple built-in oscillating circuits.

Passive Buzzer:

Passive buzzer, in fact, just use PWM generating audio, drives the buzzer, allowing the air to vibrate, can sound. Appropriately changed as long as the vibration frequency, it can generate different sound scale. For example, sending a pulse wave can be generated 523Hz Alto Do, pulse 587Hz can produce mid range Re, 659Hz can produce mid range Mi. If

you then with a different beat, you can play a song. Here be careful not to use the Arduino analog Write () function to generate a pulse wave, because the frequency analog Write () is fixed (500Hz), no way to scale the output of different sounds.

Distinguish between Active and Passive Buzzer

Teach you to distinguish between active and passive buzzer

Now a small buzzer on the market because of its small size (diameter of only 11 mm),light weight, low price, solid structure, and is widely used in a variety of needs audible electrical equipment, electronic production and microcontroller circuits, etc. .

From the exterior, two kinds of buzzer seems the same, but a closer look, a slight difference between the height of the active buzzer a, height of 9mm, and passive buzzer b height of 8mm. When the buzzer as the two pins are facing up, you can see there is a green circuit board is passive buzzer, no closed circuit boards with a vinyl is active buzzer .

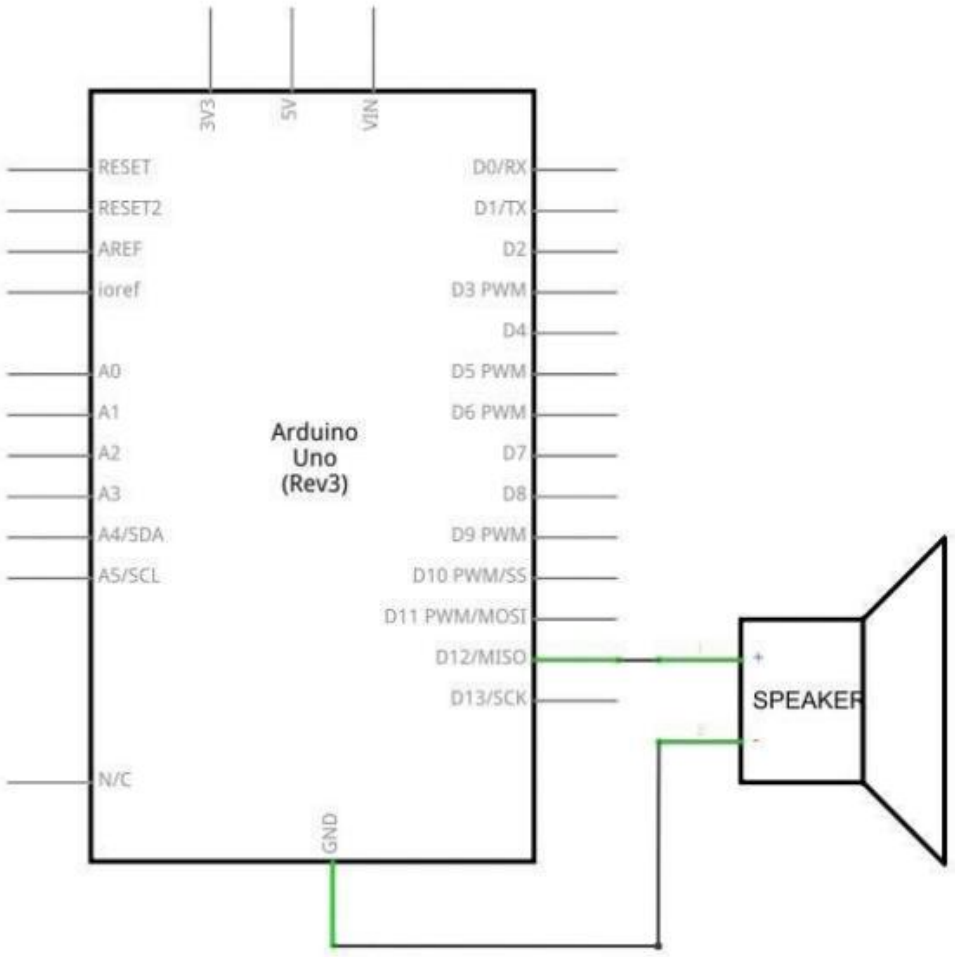
Further determine the active and passive buzzer, you can also use a multimeter to test the resistance profile Rxl file:buzzer with black pen then"+" pin, the red pen to touch on another pin back and forth, if trigger a cracking, cracking sound and the resistance only 8Ω (or 16Ω) is passive

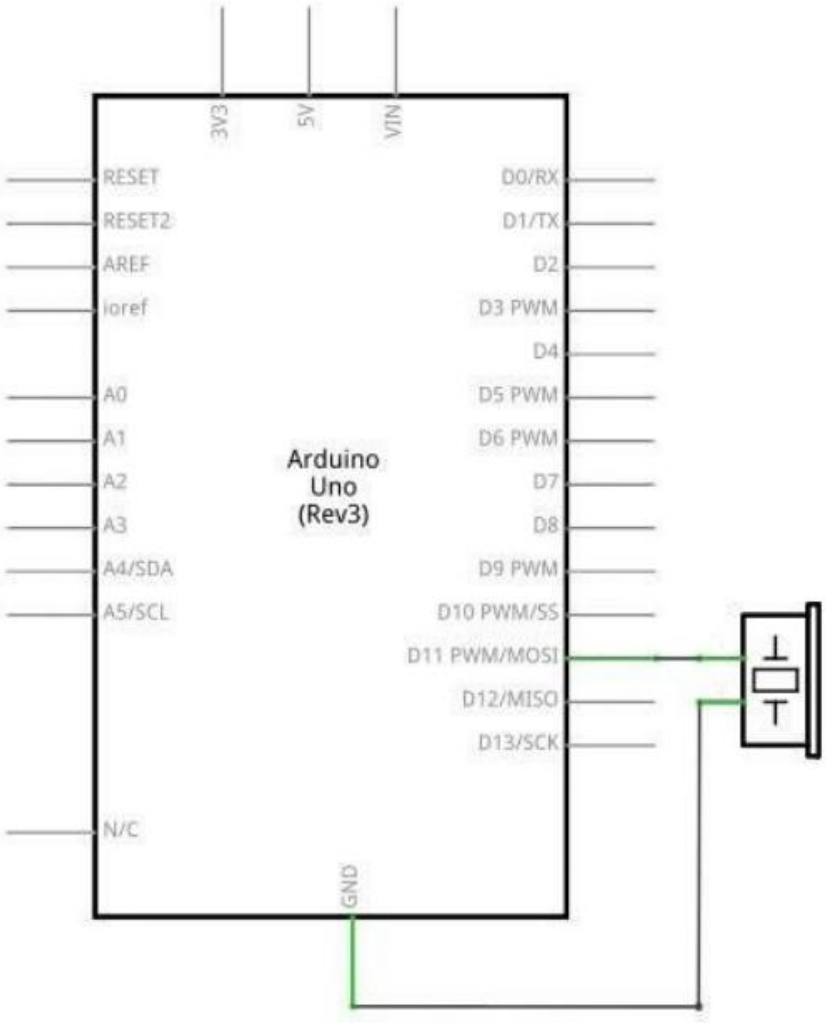
buzzer; If you can emit continuous sound, and the resistance in Europe and more than a few hundred, and is an active buzzer.

Active buzzer directly connected to the rated power (new buzzer has stated on the label) can be a continuous sound; rather passive electromagnetic buzzer and speaker are the same, you need to take in order to sound the audio output circuit .

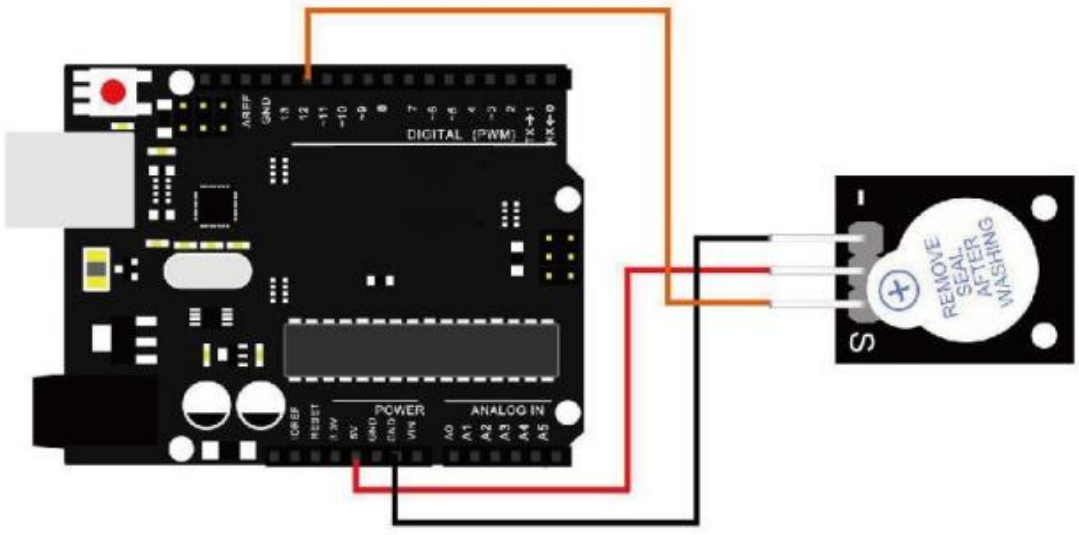
Connection

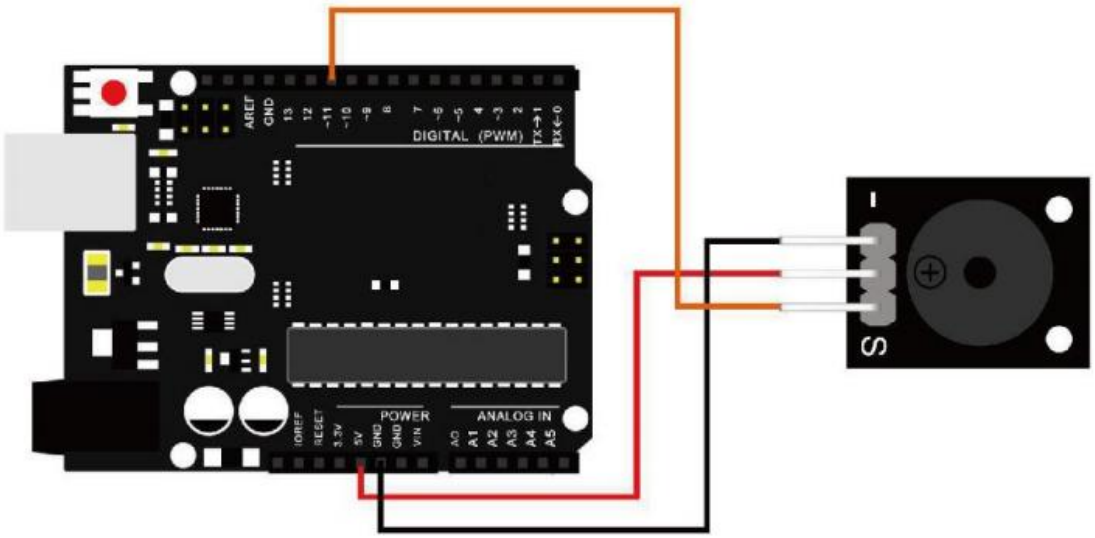
Schematic



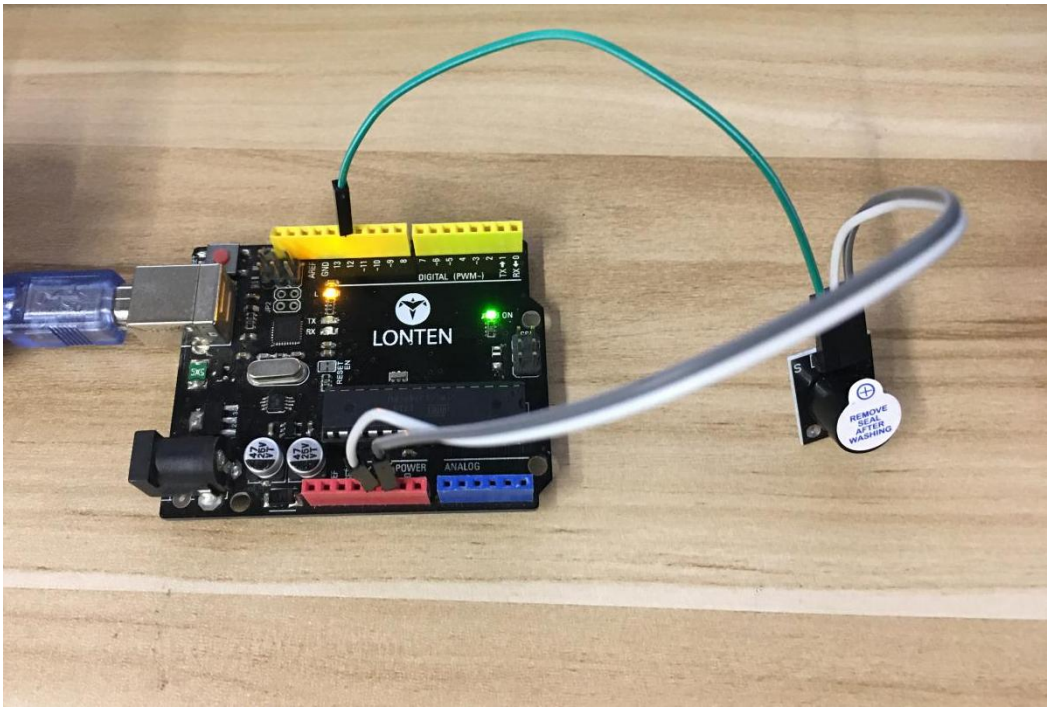


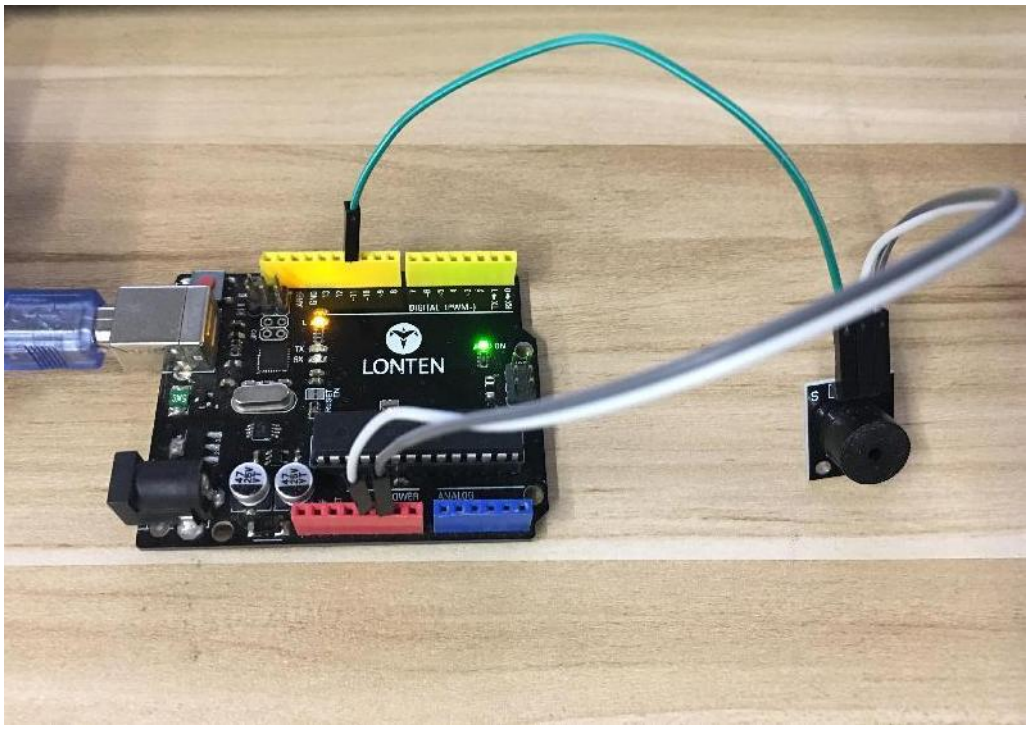
wiring diagram





Example picture





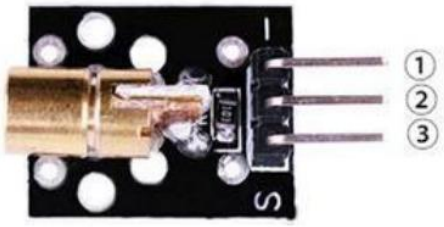
Result

After we connect the circuit as the picture, we upload the program of each module. We can hear that the active buzzer can make sound in one voice. And the passive can sing a song.

Lesson 11 Laser Module

Overview

In this experiment, we will learn how to use laser module.



1.GND:ground
2.VCC:3.3V-5V DC
3.OUTPUT

Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

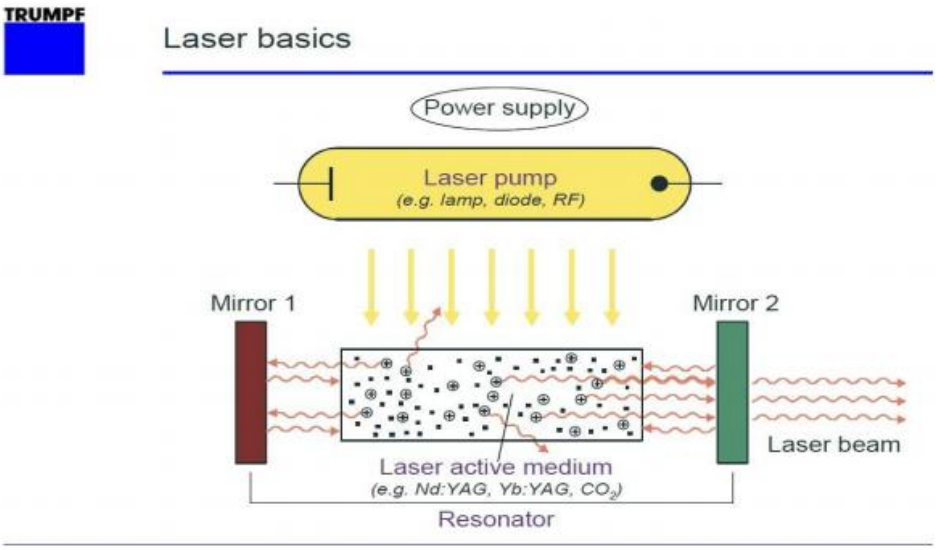
(3) Laser module* 1

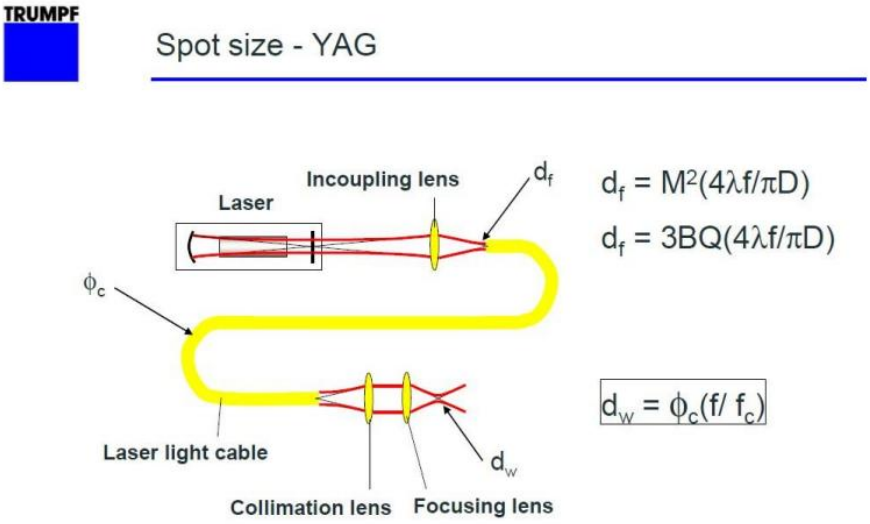
(4) Breadboard* 1

(5) Breadboard Jumper Wires* Several

Component Introduction

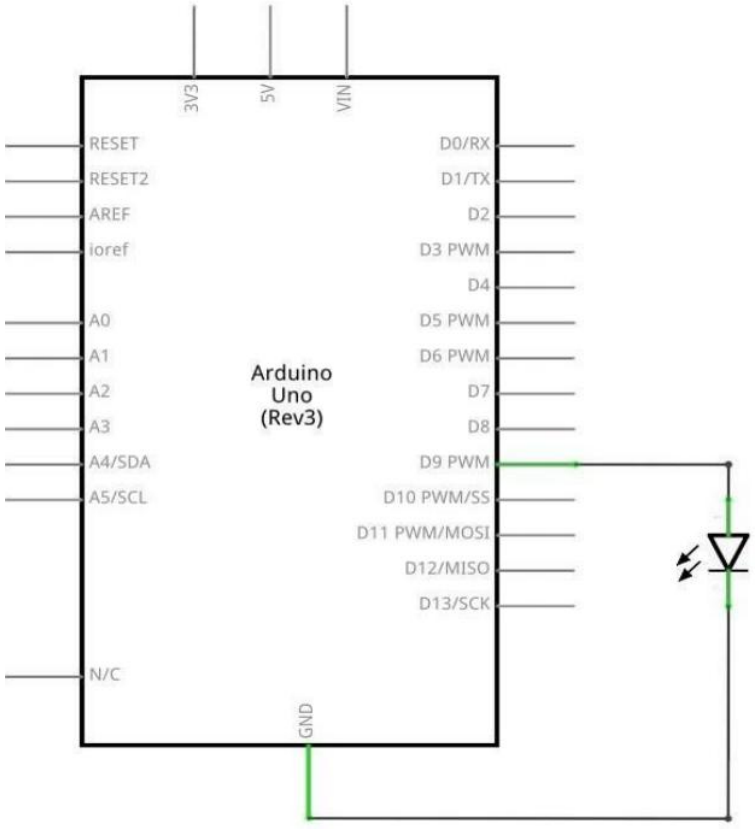
Laser sensor:



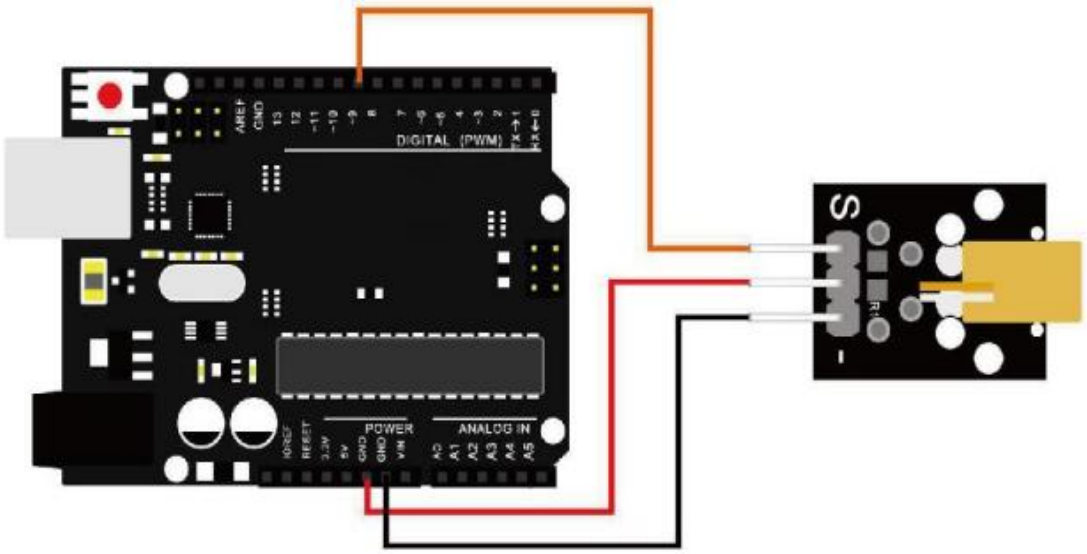


Connection

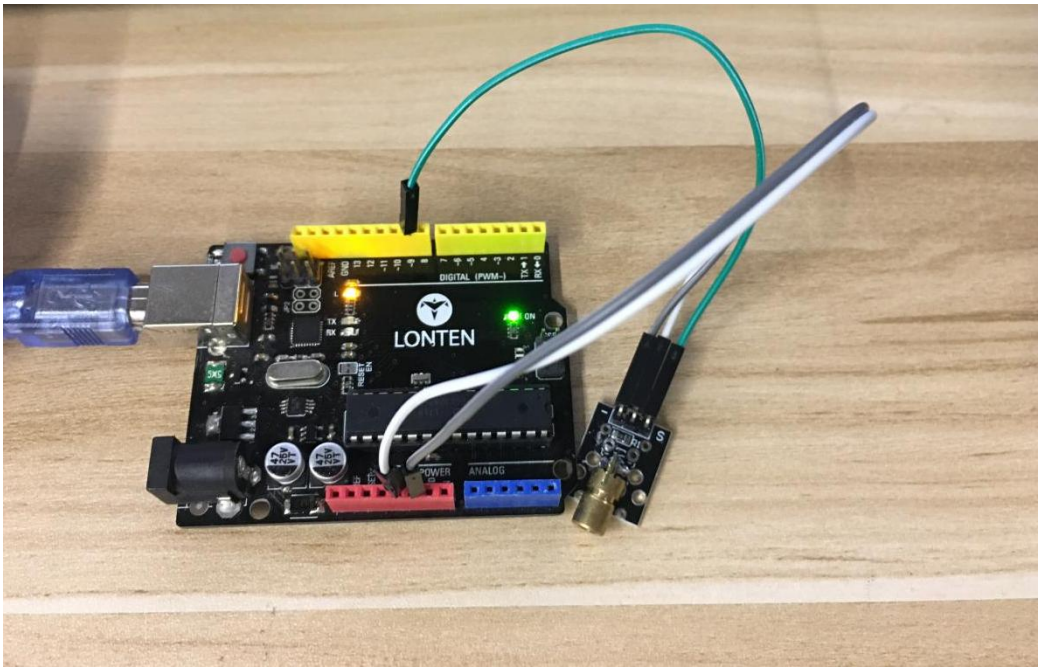
Schematic



wiring diagram



Example picture



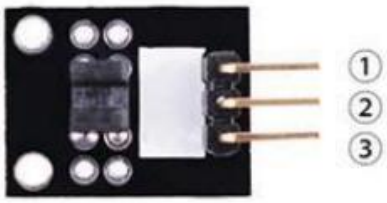
Result

After we connect the circuit as the picture, we upload the program. We can see the module can emission lasers.

Lesson 12 Photo-Interrupter Module

Overview

In this experiment, we will learn how to use Photo-interrupter module.



1.OUTPUT
2.VCC:3.3V-5V DC
3.GND:ground

Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

(3) Photo-interrupter module* 1

(4) Breadboard* 1

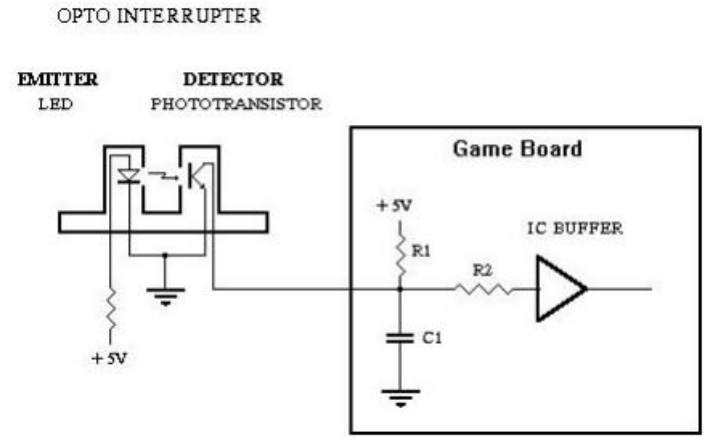
(5) Breadboard Jumper Wires* Several

Component Introduction

Opto Interrupter Sensor:

Opto Interrupters are commonly used in many arcade games e.g. steering assembly in older driving games, scoring switches in Whack A Crock etc. Uninterrupted light beam will turn the phototransistor "ON" connecting the ground to the game board input. When the light beam is interrupted the phototransistor turns "OFF" , the ground is disconnected from the input and the pull-up resistor R1 forces the input to go "HIGH" (5V level).

Principle



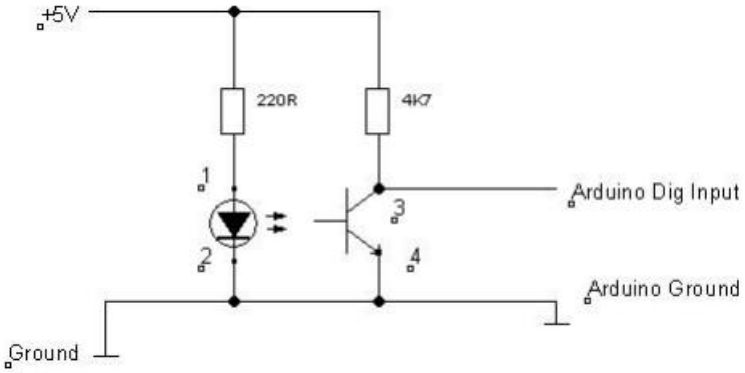
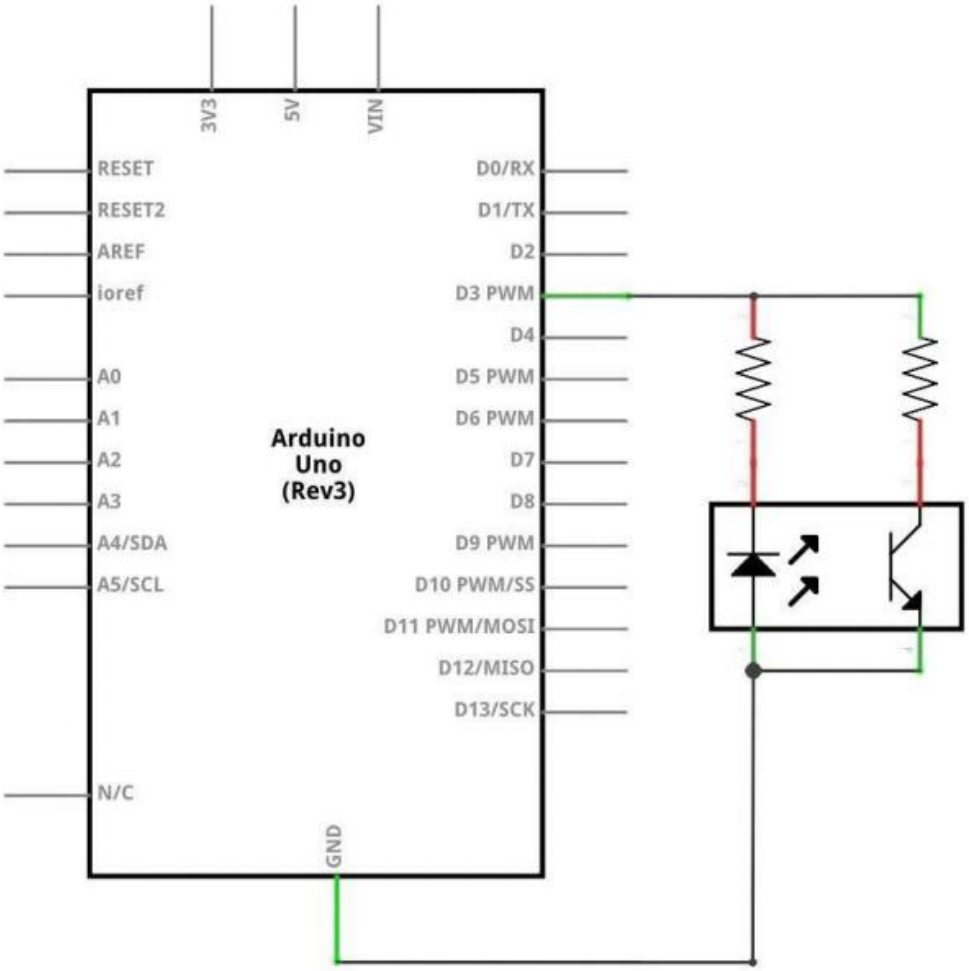


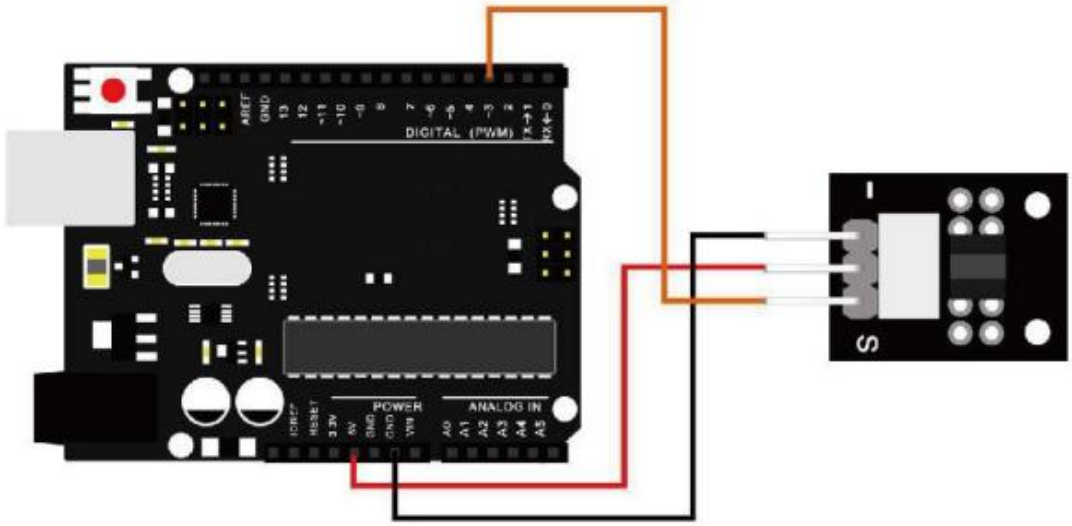
Photo-interrupter module and number 13 port have the built-in LED simple circuit. To produce a switch flasher, we can use connect the digital port 13 to the built-in LED and connect the Photo-interrupter MODULES port to number 3 port of LONTEN Uno board. When the switch sensing, LED twinkle light to the switch signal.

Connection

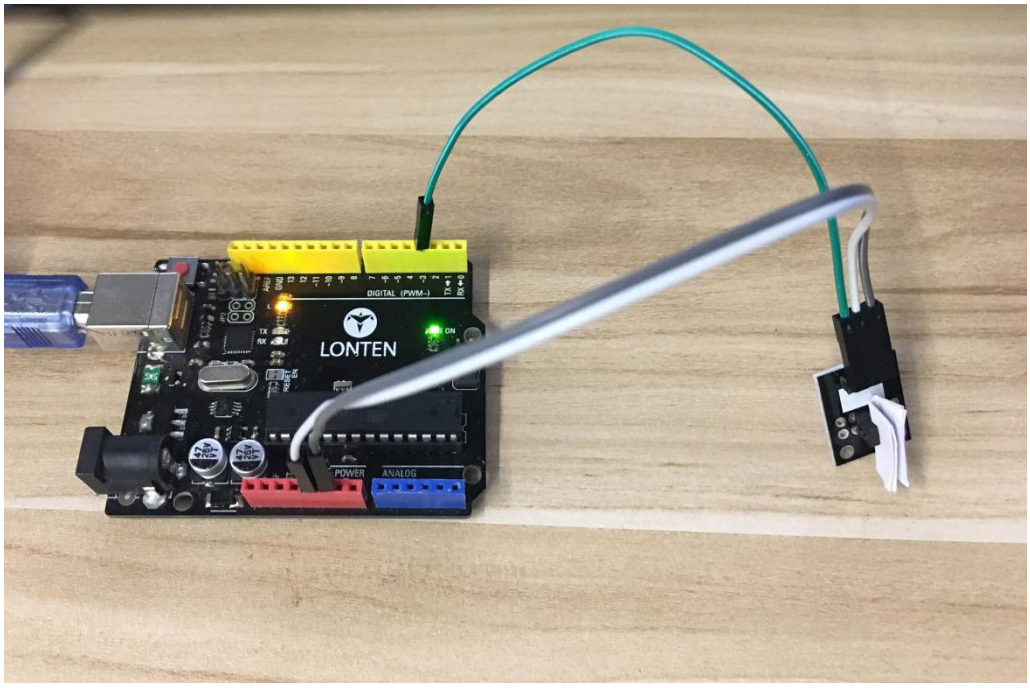
Schematic



wiring diagram



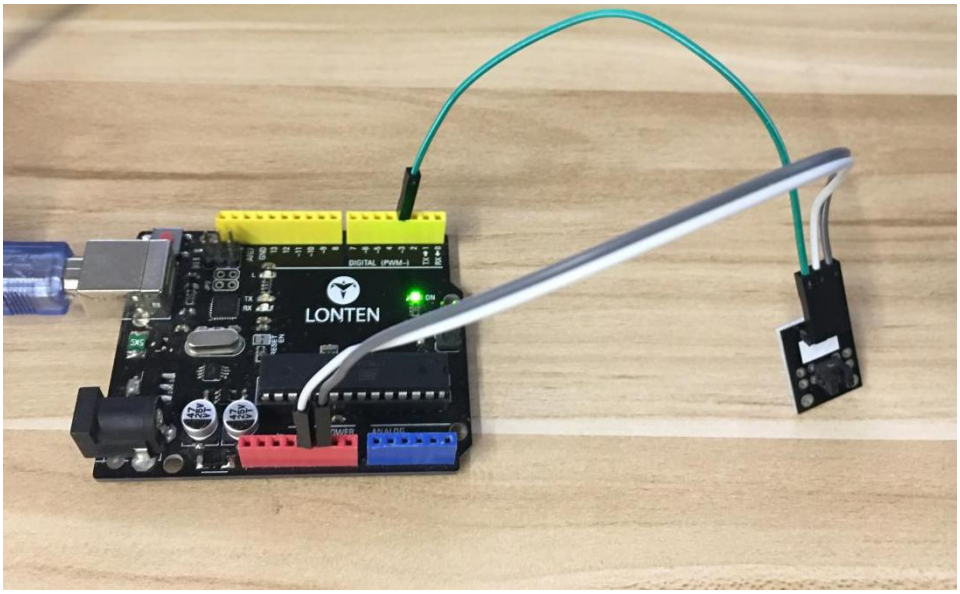
Example picture



Result

After we connect the circuit as the picture, we upload the program, we sensing the opto Interrupter, then we can see the LED13 light up and light off.

When pick up a paper on groove joint of module, the signal is interrupted,and LED13 on the module will be turned off.



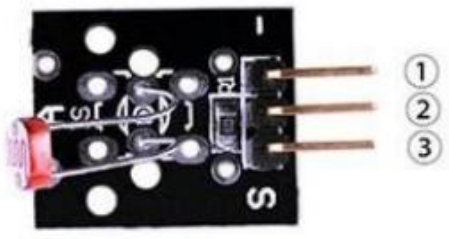
Lesson 13 Photoresistor Module

Overview

In this experiment, we will learn how to use the photo-resistor module.

Photo-resistor is very common in our daily life. it is mainly used in intelligent switch so as to bring convenience to our life. At the same time, in our daily life, we also use it in electronic design. So in order to use it in

a better, we provide the corresponding modules to help us to use it more conveniently and efficiently.



1.GND:ground
2.VCC:3.3V-5V DC
3.OUTPUT

Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

(3) Photoresistor module* 1

(4) Breadboard* 1

(5) Breadboard Jumper Wires* Several

Component Introduction

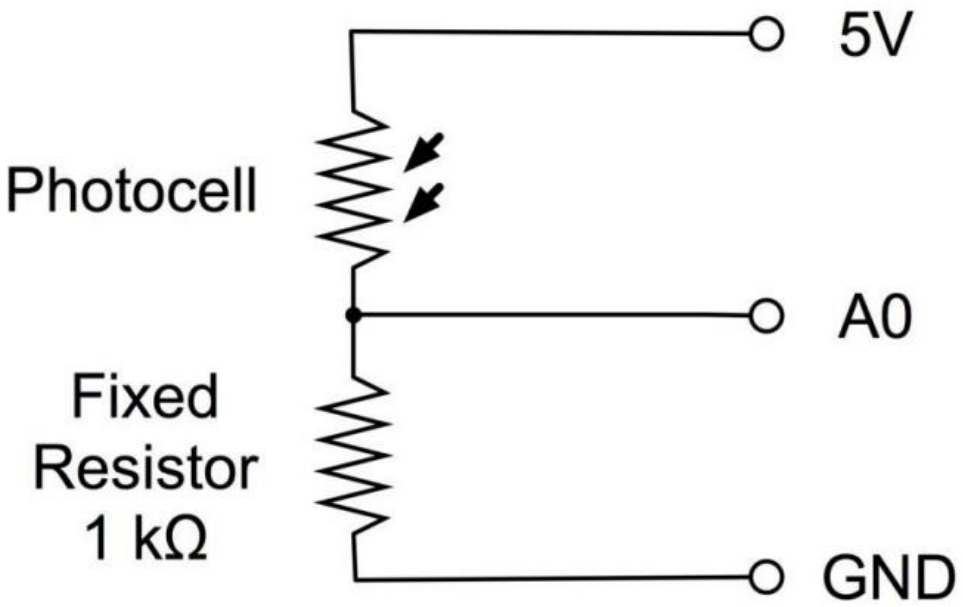
PHOTOCELL:

The photocell used is of a type called a light dependent resistor, sometimes called an LDR. As the name suggests, these components act just like a resistor, except that the resistance changes in response to how much light is falling on them.

This one has a resistance of about 50 kΩ in near darkness and 500 Ω in bright light. To convert this varying value of resistance into something we

can measure on an Arduino's analog input, it need to be converted into a voltage.

The simplest way to do that is to combine it with a fixed resistor.



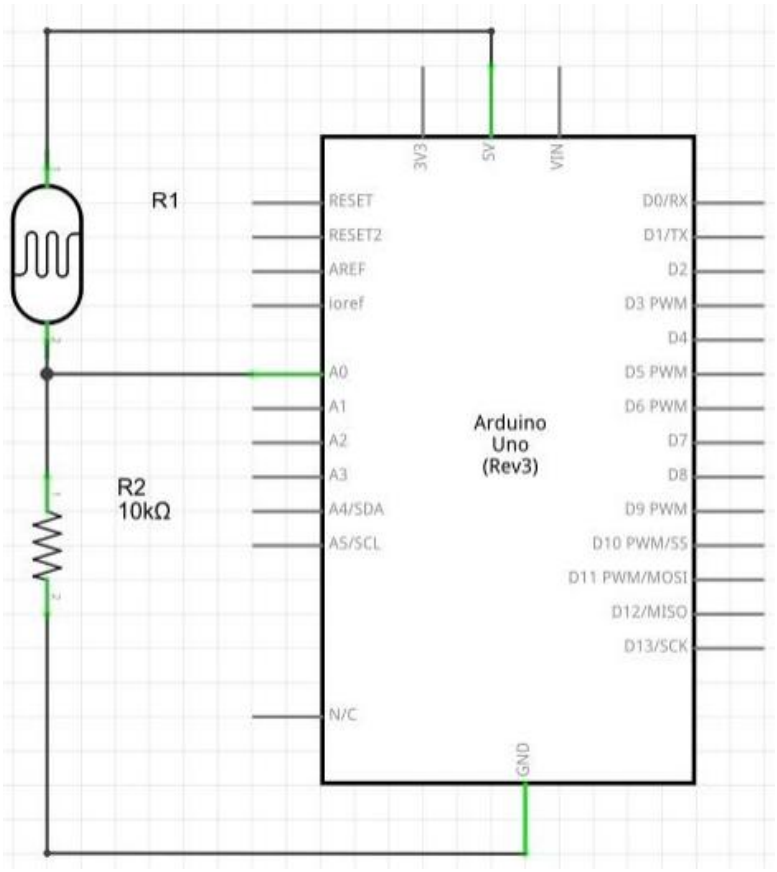
The resistor and photocell together behave rather like a pot. When the light is very bright, then the resistance of the photocell is very low compared with the fixed value resistor, and so it is as if the pot were turned to maximum.

When the photocell is in dull light the resistance becomes greater than the fixed 1kΩ resistor and it is as if the pot were being turned towards GND.

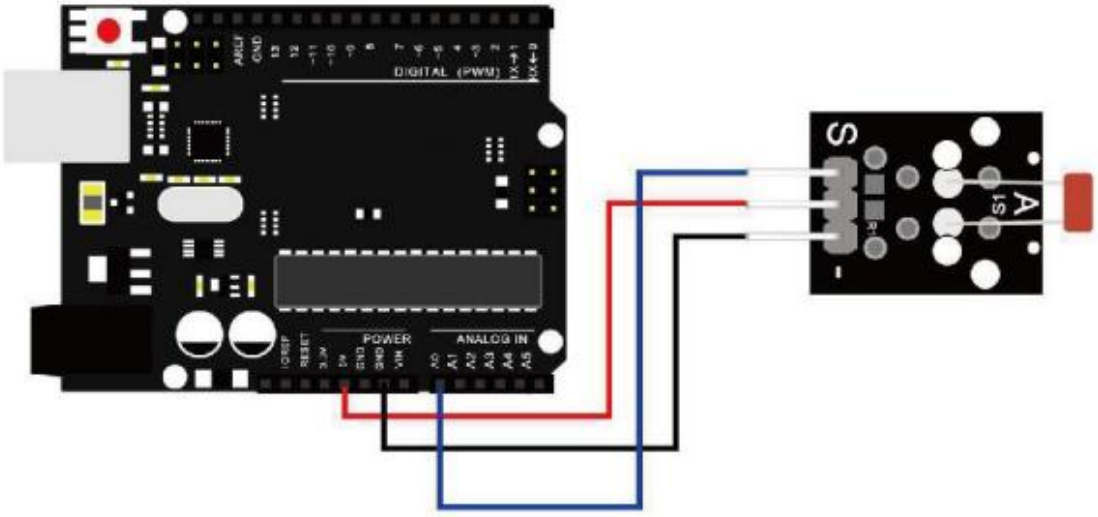
Load up the sketch given in the next section and try covering the photocell with your finger, and holding it near a light source.

Connection

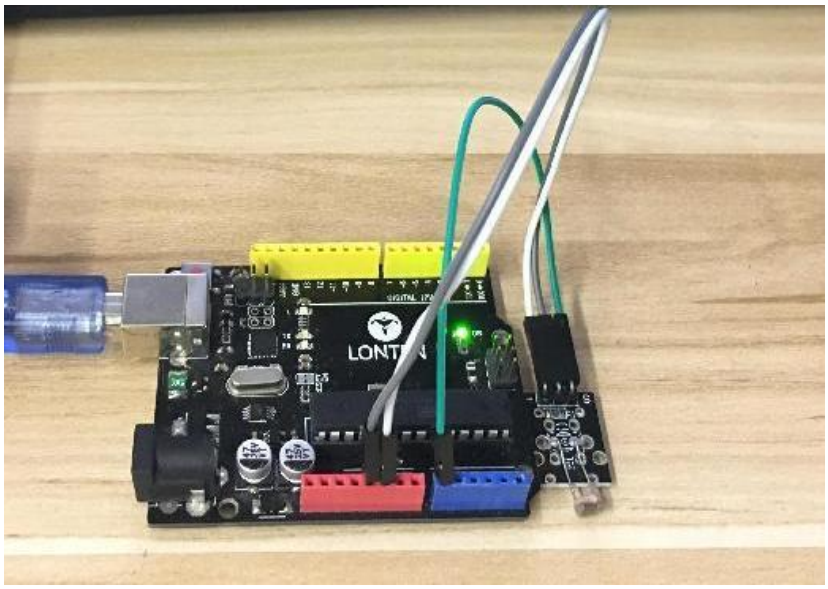
Schematic



wiring diagram

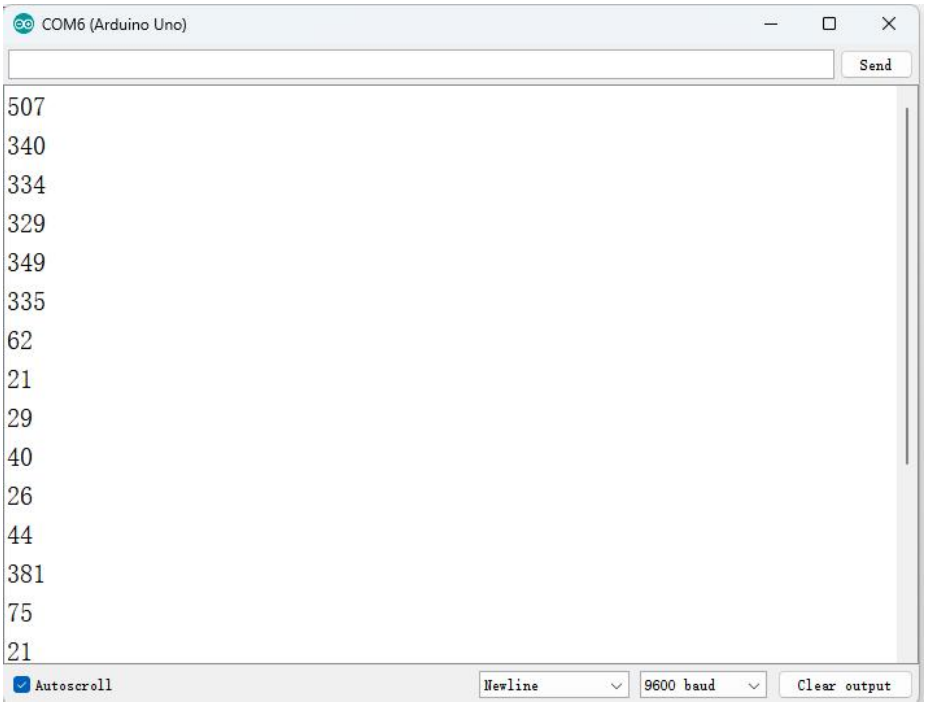


Example picture



Result

Upload the program then open the monitor, we can see the data as below:



In the test, we only read the output analog voltage value of photo-resistor module. In the test results, we will find that when there is lighting, high

voltage output equivalently of switch on, when there is no light, low voltage equivalently of switch off. This is what we can use this in practice.

Lesson 14 Big Sound Sensor Module and Small Sound Sensor Module

Overview

In this experiment, we will learn how to use the High sensitive Voice Sensor.

1.DO:digital output
2.VCC: 3.3V-5V DC
3.GND:ground
4.AO:analog output

1.DO:digital output
2.VCC: 3.3V-5V DC
3.GND:ground
4.AO:analog output

Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

(3) Big sound sensor module* 1

(4) Small sound sensor module* 1

(5) Breadboard* 1

(6) Breadboard Jumper Wires* Several

Component Introduction

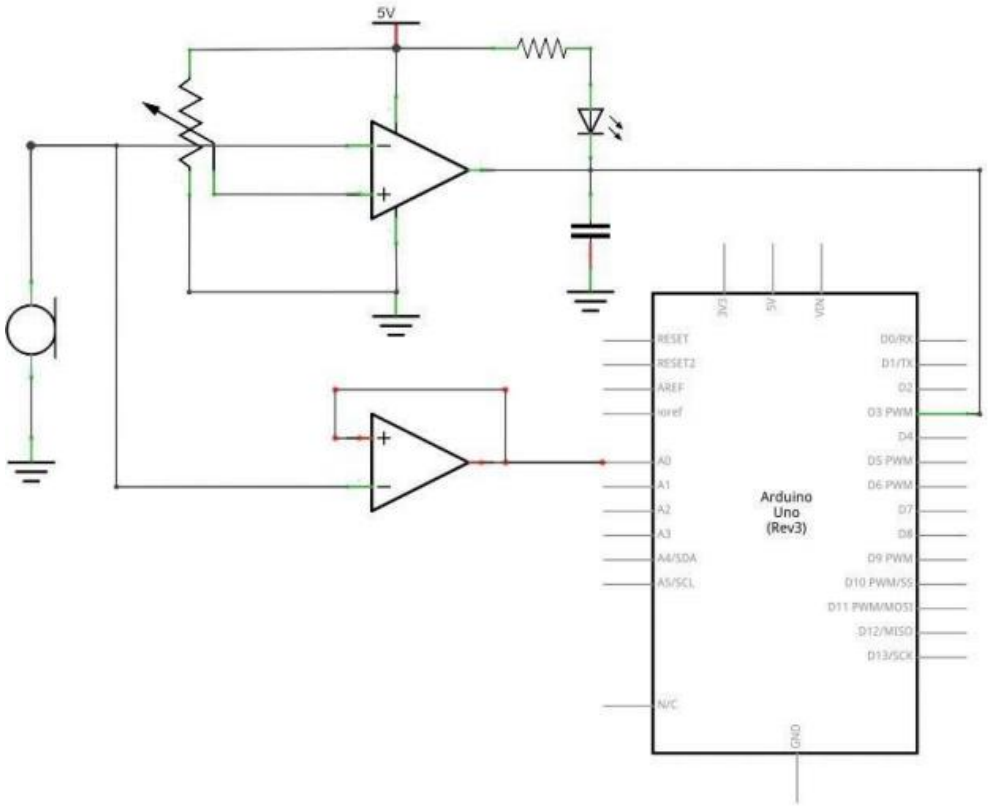
Sound sensor:

The sound sensor module provides an easy way to detect sound and is generally used for detecting sound intensity. This module can be used for security, switch, and monitoring applications. Its accuracy can be easily adjusted for the convenience of usage.

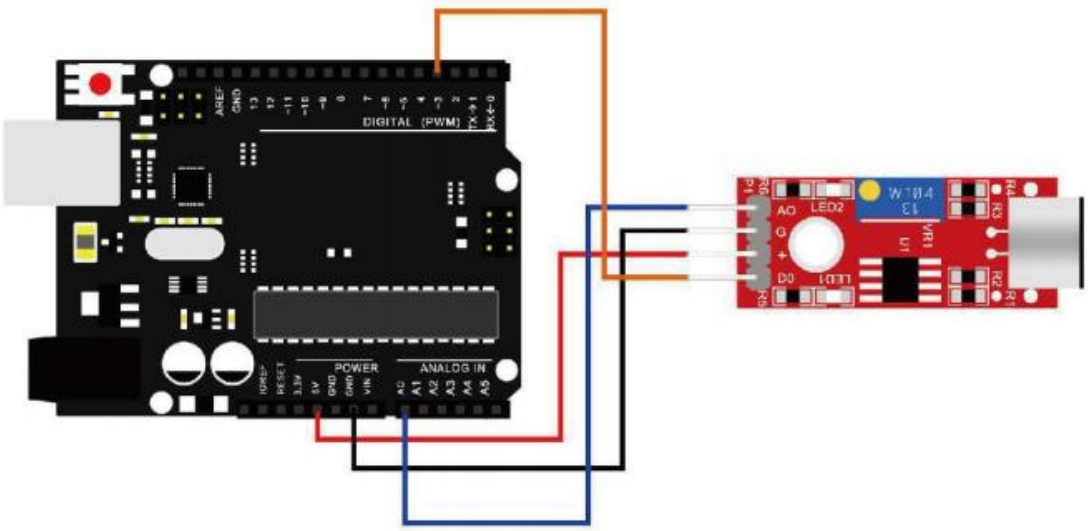
It uses a microphone which supplies the input to an amplifier, peak detector and buffer. When the sensor detects a sound, it processes an output signal voltage which is sent to a microcontroller then performs necessary processing.

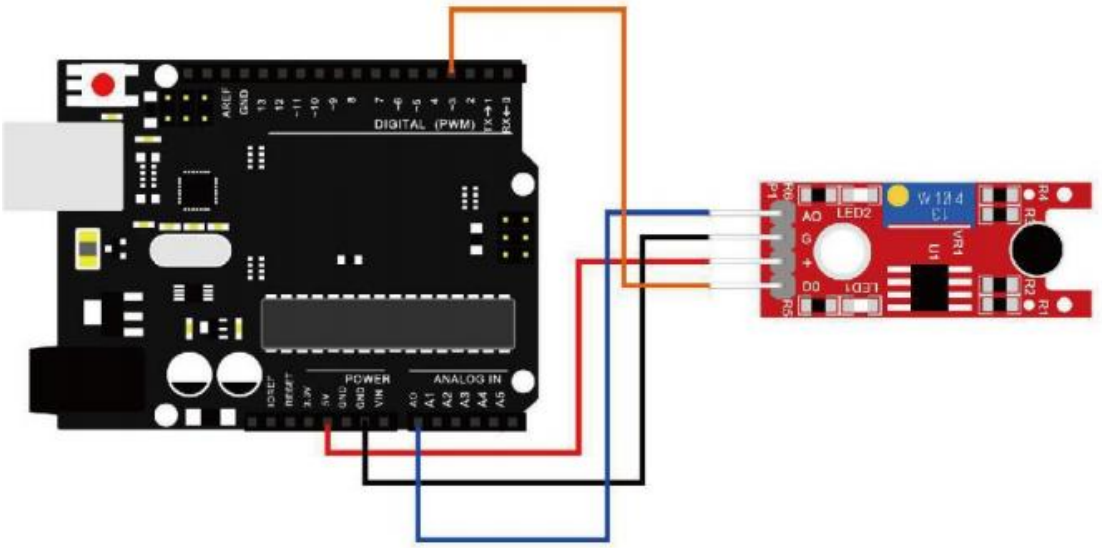
Connection

Schematic

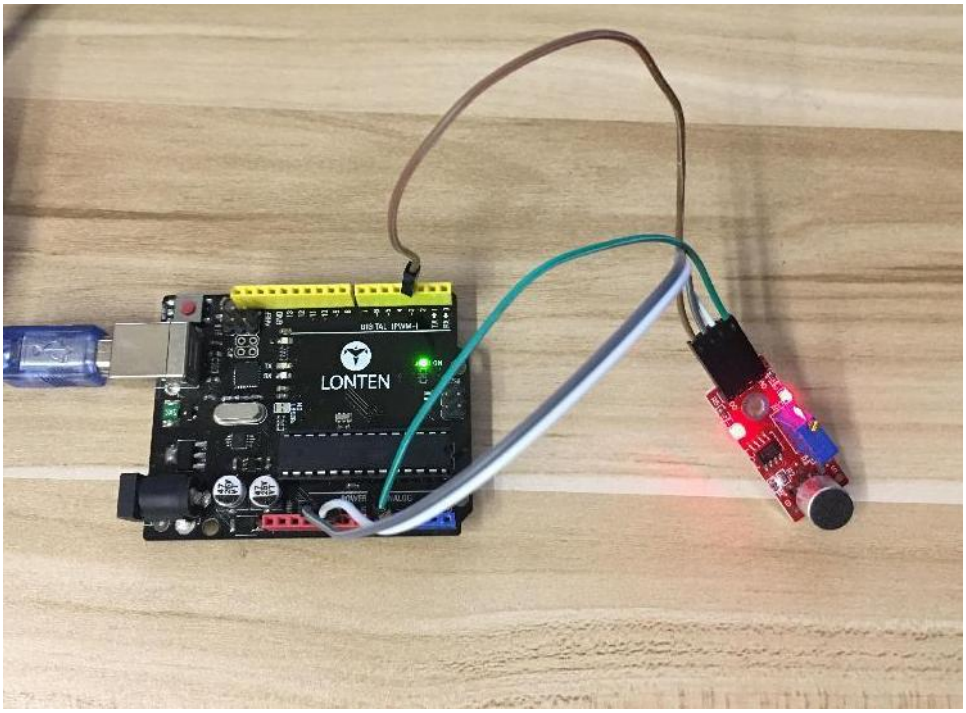


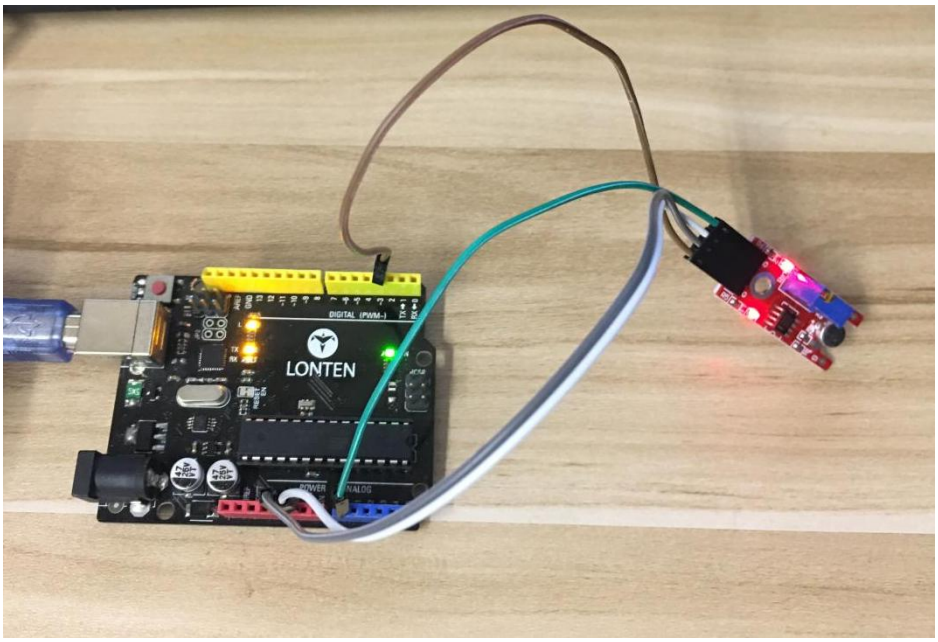
wiring diagram





Example picture





Result

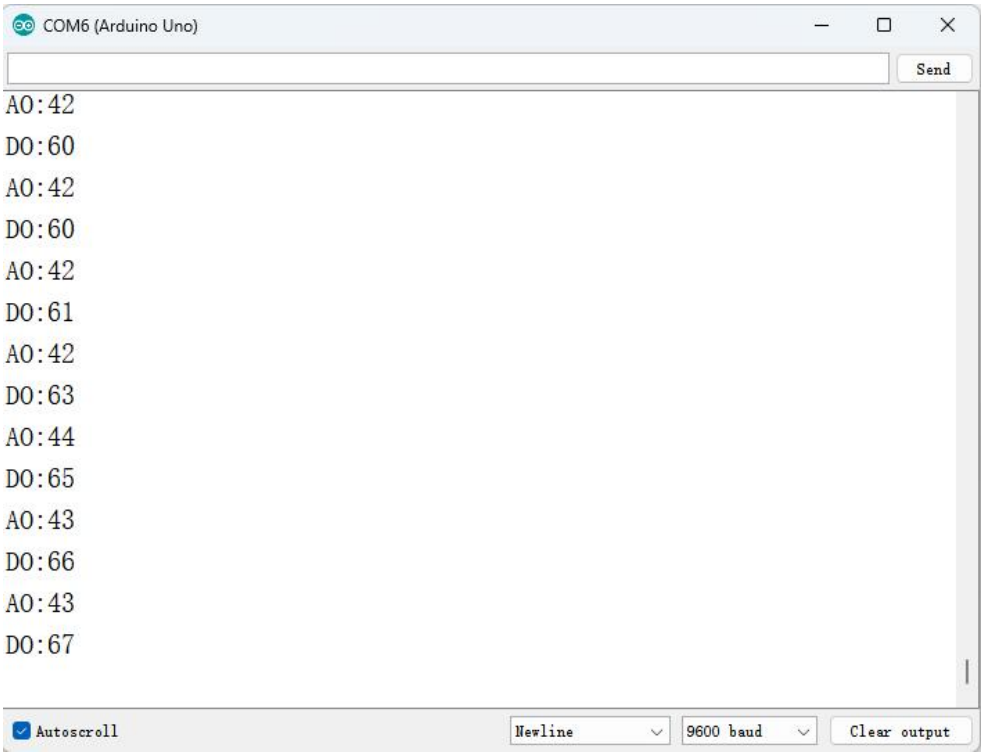
High-sensitive Voice Sensor has two output:

AO, analog output, real-time output voltage signal of microphone

DO, when the intensity of the sound to reach a certain threshold, the output high and low level signal, the threshold-sensitivity can be achieved by potentiometer adjustment period.

The module features:

The installation of 3mm screw holes use 5 v dc power supply have analog output turn a threshold level of output microphone GaoGan degree, high sensitivity. has a power light the comparator output indicator light. Upload the program then open the monitor, we can see the data as below:

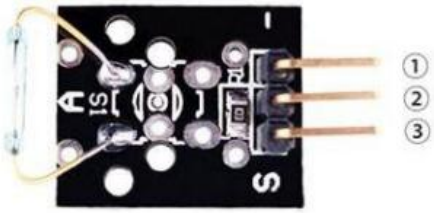


Lesson 15 Reed Switch and mini Reed Switch Module

Overview

In this experiment, we will learn how to use reed switch and mini reed switch module.

1.DO:digital output
2.VCC: 3.3V-5V DC
3.GND:ground
4.AO:analog output



1.GND:ground
2.VCC:3.3V-5V DC
3.OUTPUT

Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

(3) Reed switch module* 1

(4) Mini Reed switch module* 1

(5) Breadboard* 1

(6) Breadboard Jumper Wires* Several

Component Introduction

Reed Switch and Reed Sensor Activation:

Although a reed switch can be activated by placing it inside an electrical coil, many reed switches and reed sensors are used for proximity sensing and are activated by a magnet. As the magnet is brought into the proximity of the reed sensor/switch, the device activates. As the magnet is removed from the proximity of the reed sensor/switch, the device deactivates. However, the magnetic interaction involved in activating the reed switch contacts is not necessarily obvious. One way of thinking about the interaction is that the magnet induces magnetic poles into the metal parts of the reed switch and the resulting attraction between the electrical contacts causes the reed switch to activate.

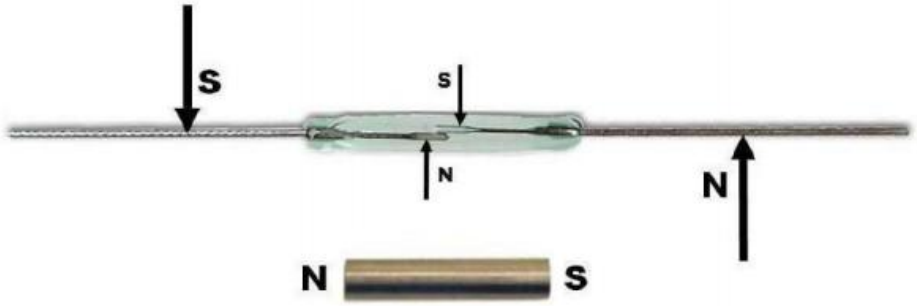


Figure 1 – Magnetic Induction

Another equally valid way of thinking about the interaction between a magnet and a reed switch is that the magnet induces magnetic flux through the electrical contacts. When the magnetic flux is high enough, the magnetic attraction between the contacts causes the reed switch to close.

Figure 2 – Magnetic Flux

The following are examples of typical reed switch and reed sensor activate distances.

Difference between the reed switch module and mini reed switch module

As we can see, the reed switch module is bigger than the mini reed switch module. So the bigger one may have more function than the mini one.

The reed switch can output in two ways: digital and analog. The mini reed can only output in digital.

In the 45 sensor kit, there have 7 red pcb modules. The difference between the red and small pcb is same as above.

Principle

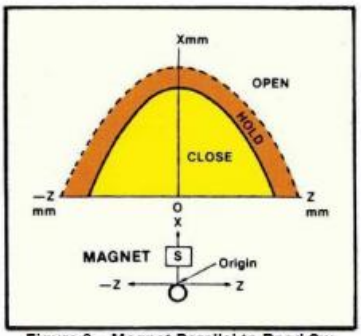


Figure 3 – Magnet Parallel to Reed Sw.

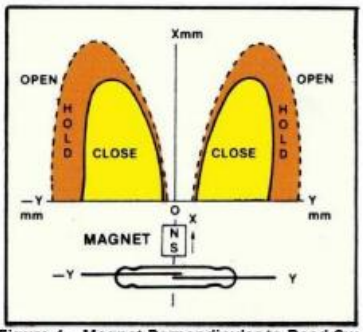


Figure 4 – Magnet Perpendicular to Reed Sw.

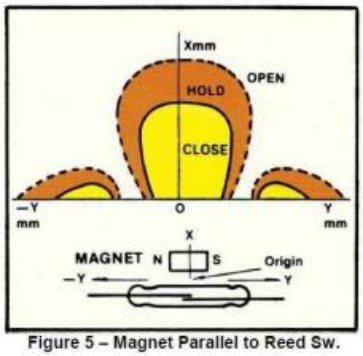


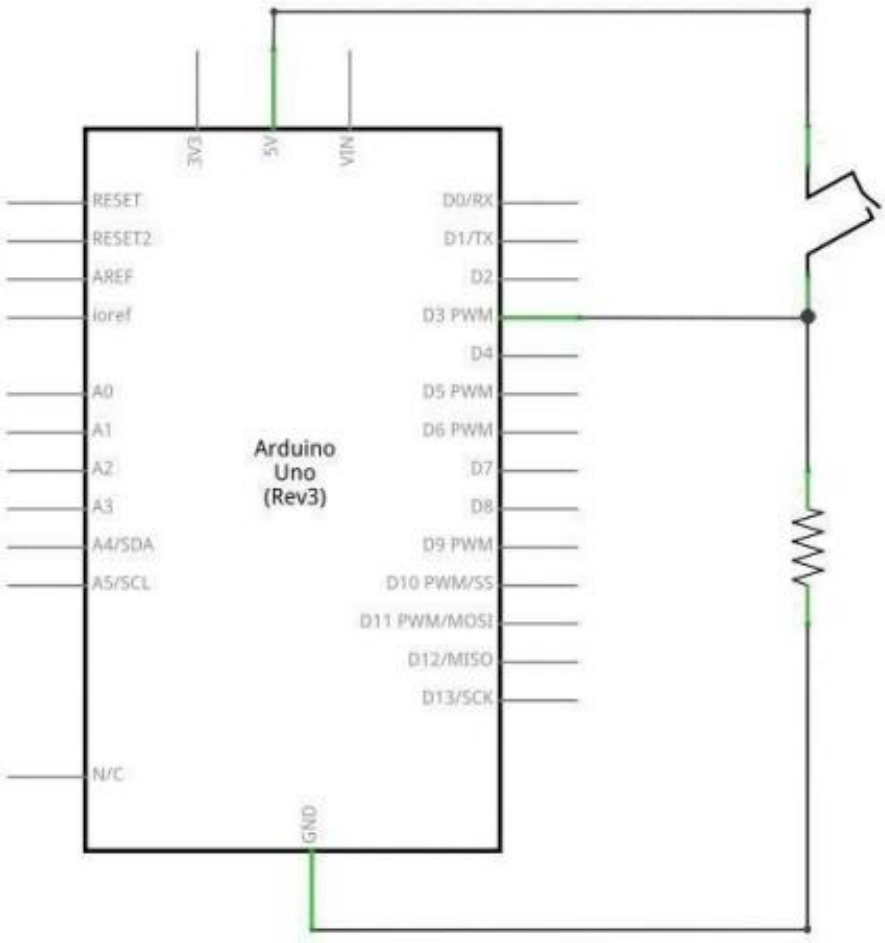
Figure 5 – Magnet Parallel to Reed Sw.

As can be seen, the magnetic orientation and location relative to the reed switch play important roles in the activation distances. In addition, the size of the activate regions(lobes) will vary depending on the strength of the magnet and the sensitivity of the reed switch. Proper orientation of the magnet with respect to the reed sensor/switch is an important consideration in meeting the application's requirements across the

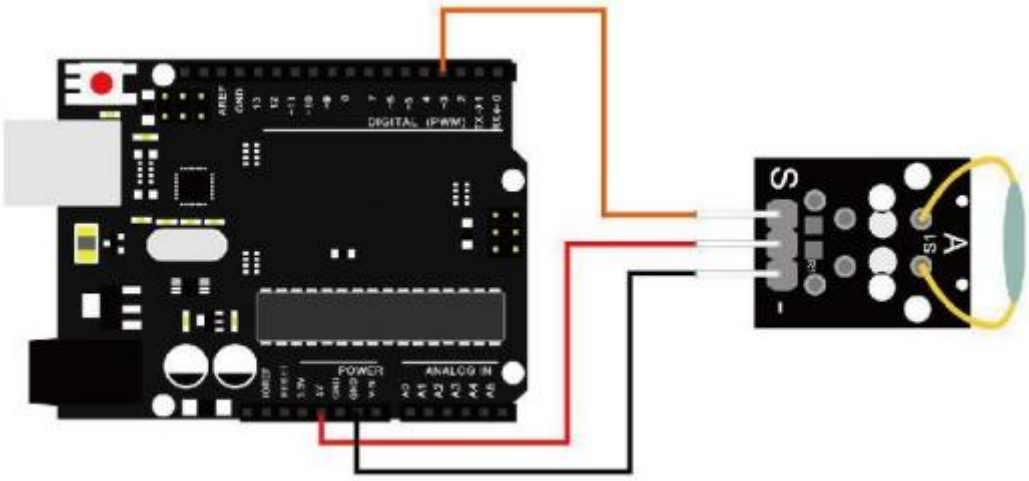
tolerance range for mechanical systems, magnetic strength and reed sensor or reed switch sensitivity.

Connection of mini reed switch module

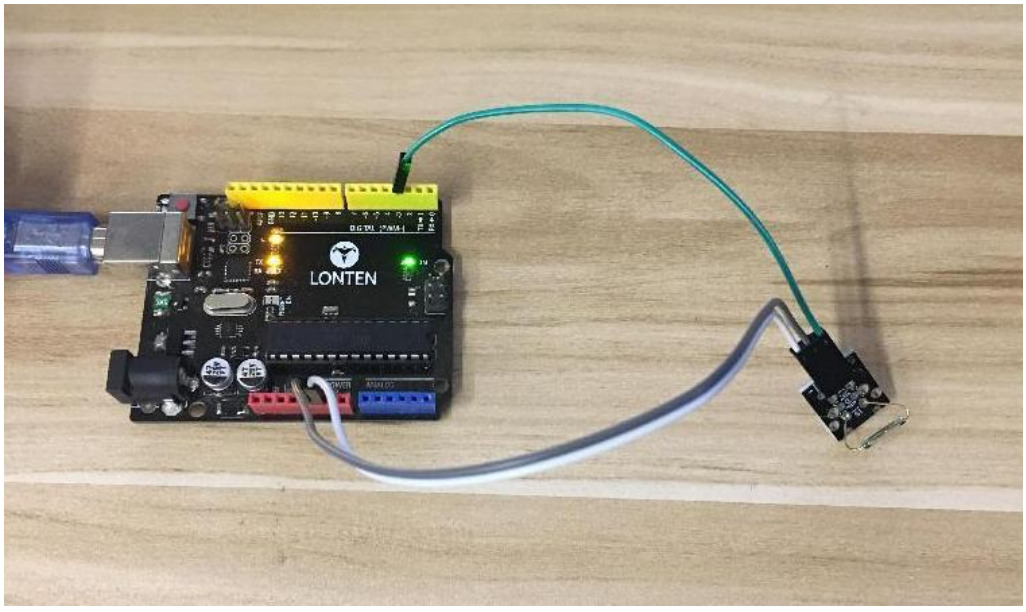
Schematic



wiring diagram



Example picture



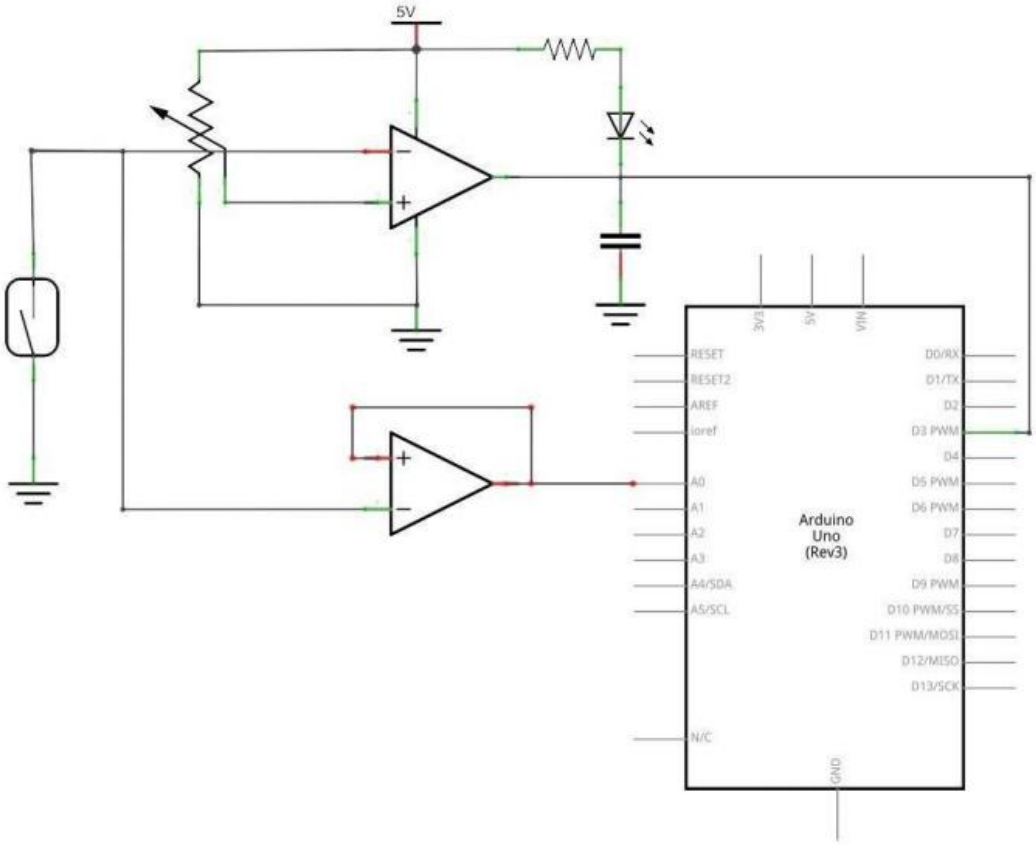
Result

Upload the program, When the module access to magnetic, you can see the led on or off. Mini switch module and number 13 port have the built in LED simple circuit. To produce a switch flasher, we can use connect

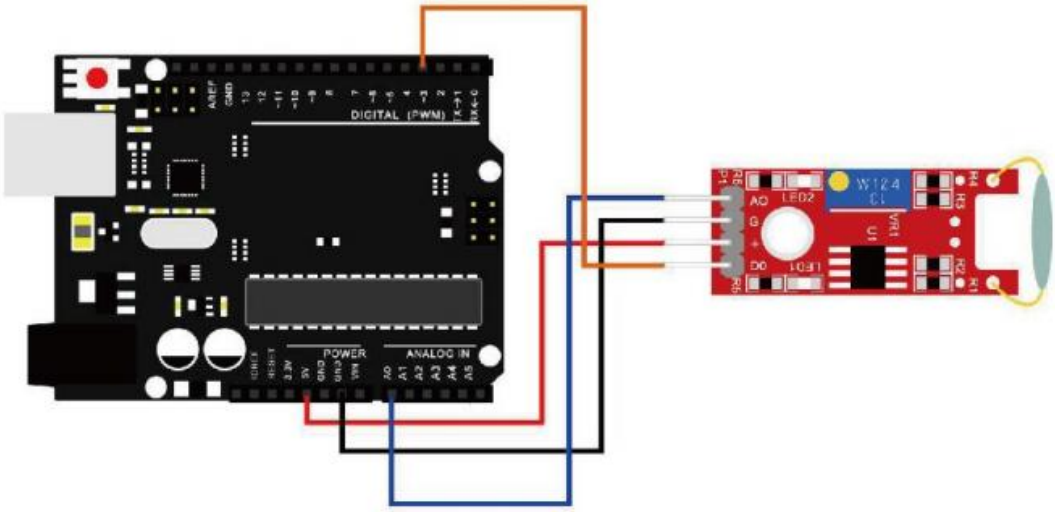
the digital port 13 to the built in LED and connect the switch module Sport to number 3 port of LONTEN Uno board. When the switch sensing, LED twinkle light to the switch signal.

Connection of reed switch module

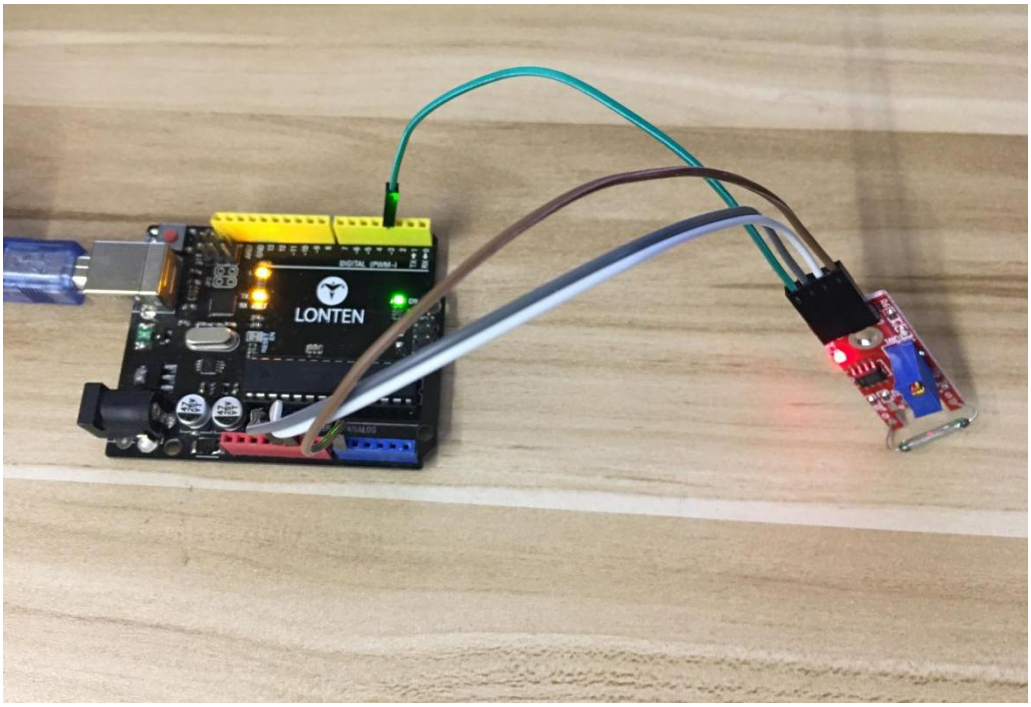
Schematic



wiring diagram



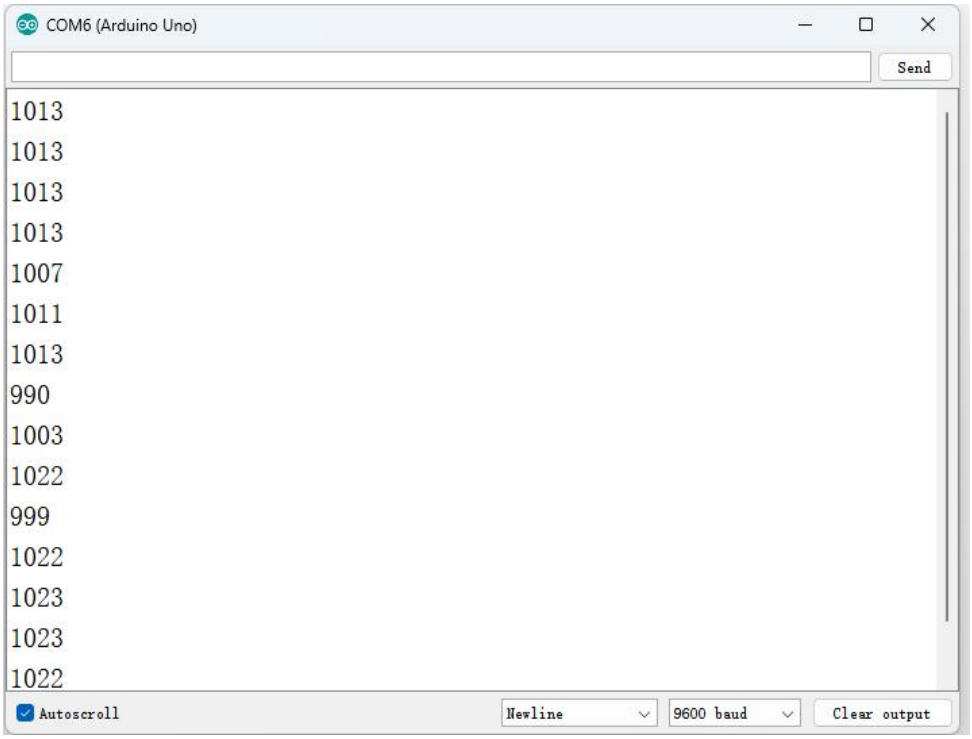
Example picture



Result

In this experiment, we use the AO pin of reed switch module. When the sensor sensing magnetism, the module will output a data which reflect the strength of the magnetism. The number is from 0 to 1023.

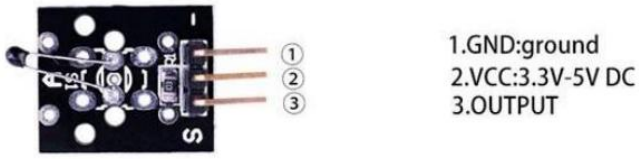
Upload the program then open the monitor, we can see the data as below:



Lesson 16 Digital Temperature Module

Overview

In this experiment, we will learn how to use digital temperature module and analog temp module.



Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

(3) digital temperature module* 1

(4) temperature module * 1

(5) Breadboard* 1

(6) Breadboard Jumper Wires* Several

Component Introduction

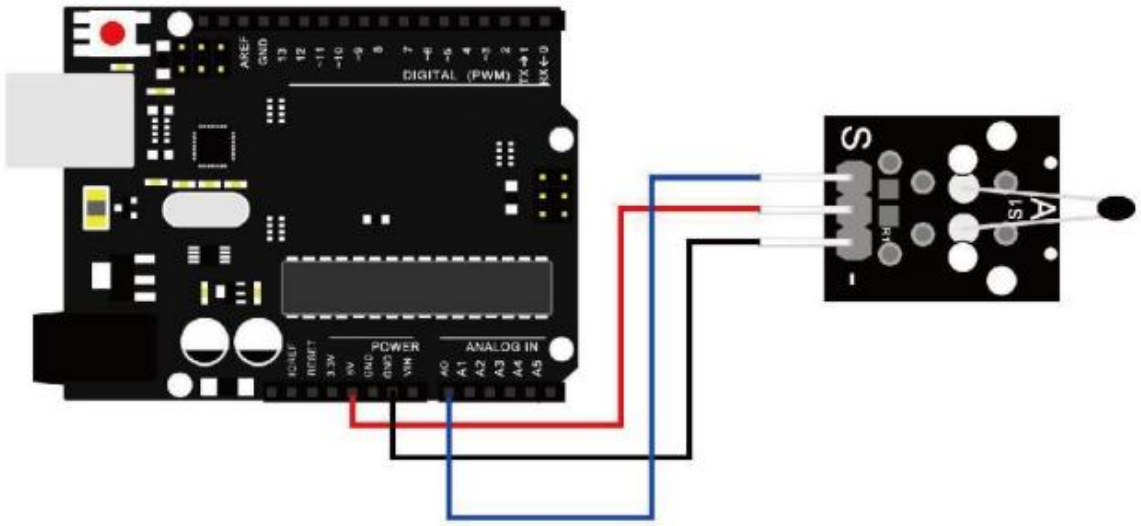
Thermistor：

These thermistors have a narrow tolerance on the B-value, the result of which provides a very small tolerance on the nominal resistance value over a wide temperature range. For this reason the usual graphs of R = f(T) are replaced by Resistance Values at Intermediate Temperatures Tables, together with a formula to calculate the characteristics with a high precision.

RS stock no.	151-215	151-221	151-237	151-243
Resistance at +25℃	3k Ω	5k Ω	10k Ω	100k Ω
Temperature range	-55℃ to +150℃			
Tolerance(0 to +70℃)	±0.2℃			
Dissipation constant	1mW			
Time constant	10s			

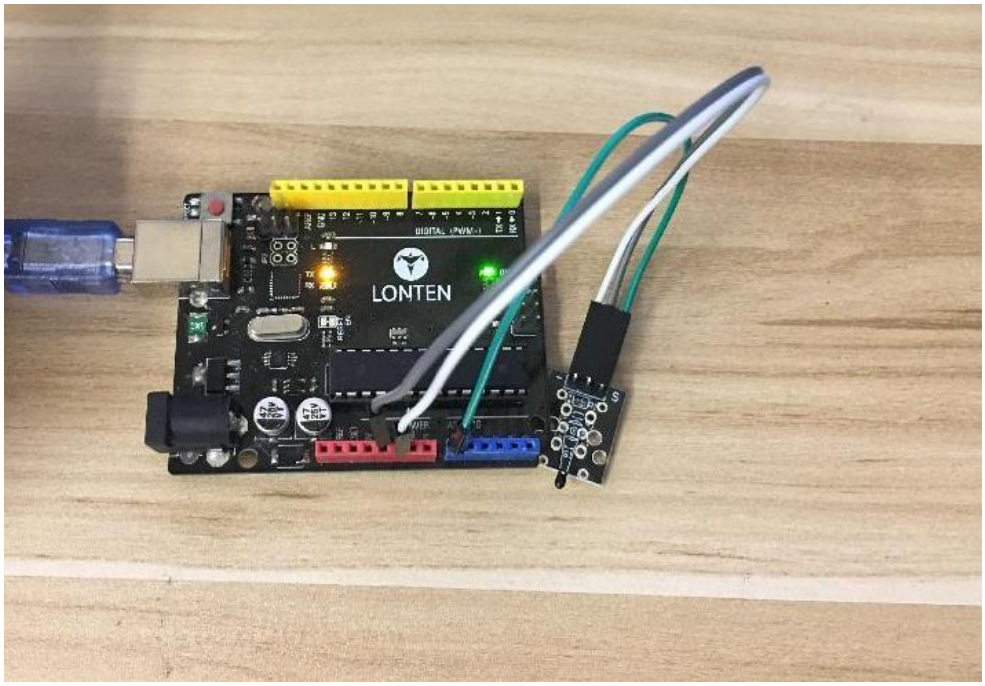
Connection of digital temperature module

wiring diagram



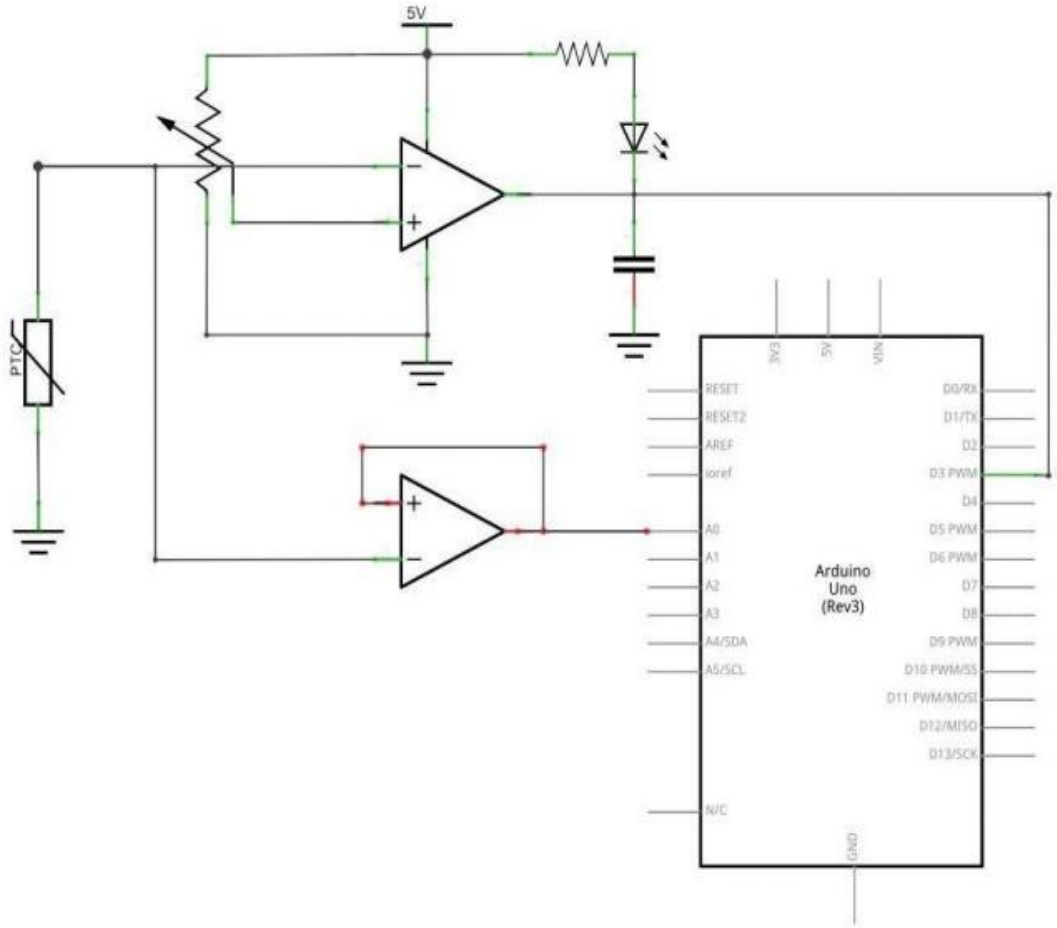
Example picture

LROBRUYA

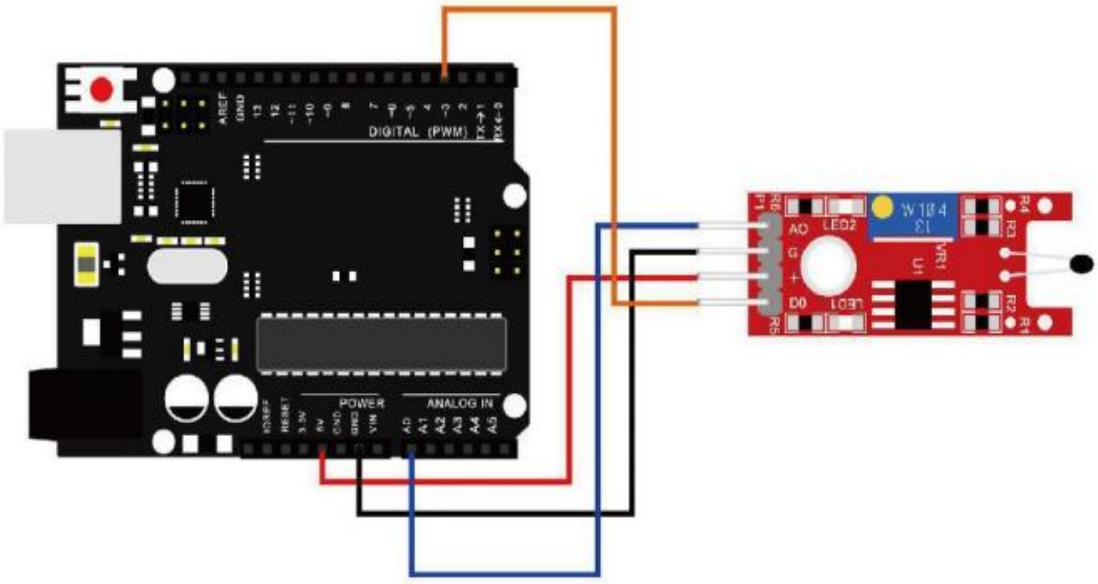


Connection of temperature module

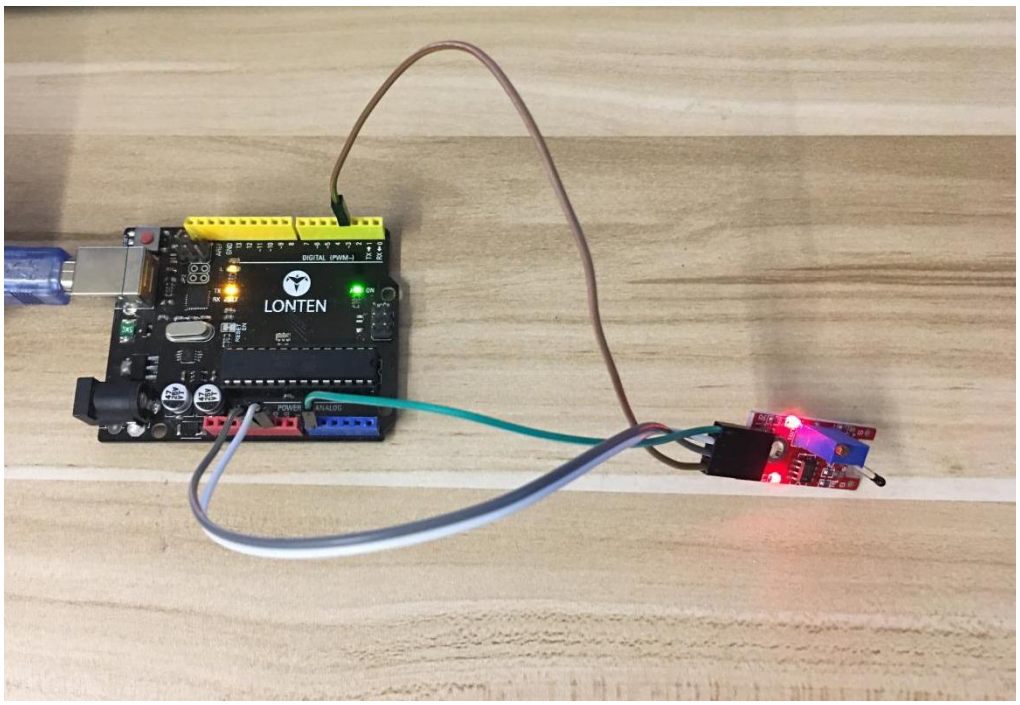
Schematic



wiring diagram



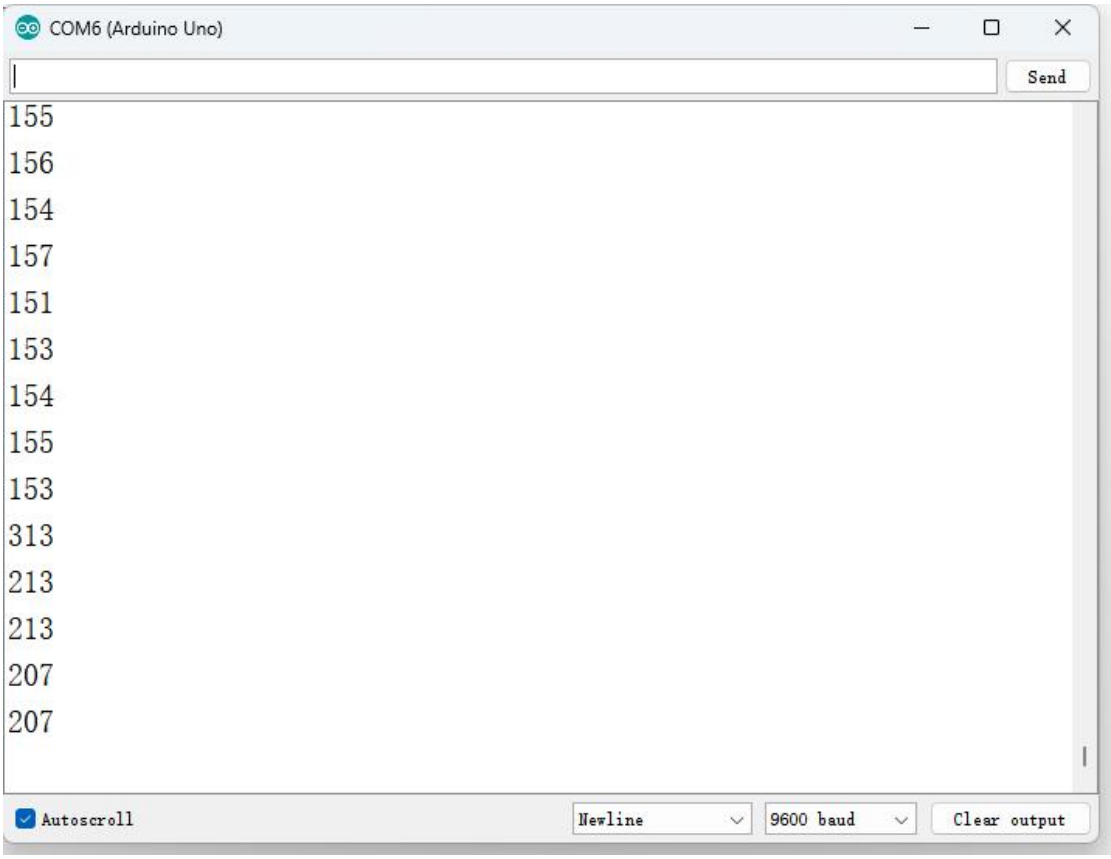
Example picture



Result

In this experiment, we use the AO pin of reed switch module. When the sensor sensing temperature, the module will output a data which reflect the temperature. The number is from 0 to1023.

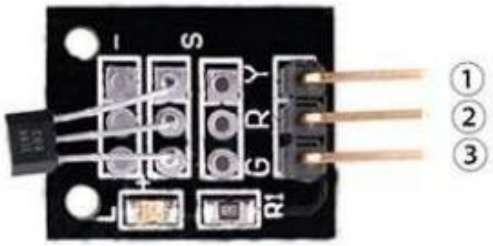
Upload the program then open the monitor, we can see the data as below:

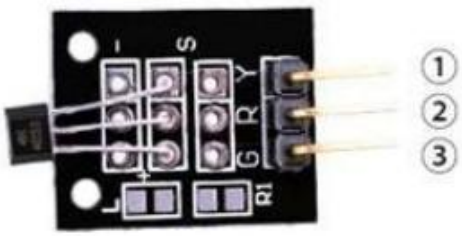


Lesson 17 Linear Hall and Analog Hall Module

Overview

In this experiment, we will learn how to use the linear hall and analog hall module.





Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

(3) linear hall module* 1

(4) analog hall module* 1

(5) Breadboard* 1

(6) Breadboard Jumper Wires* Several

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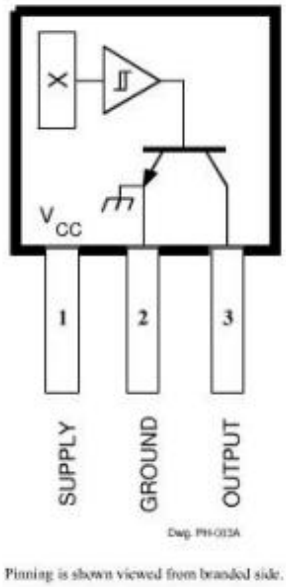
Component Introduction

Hall Sensor:

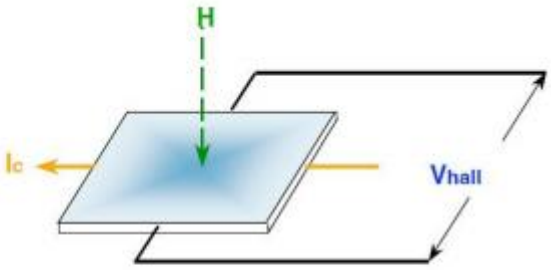


Pinning is shown viewed from branded side.

ABSOLUTE MAXIMUM RATINGS
at T_A = +25°C

Supply Voltage, V_{CC}	28 V
Reverse Battery Voltage, V_{RCC}	-35 V
Magnetic Flux Density, B	Unlimited
Output OFF Voltage, V_{OUT}	28 V
Reverse Output Voltage, V_{OUT}	-0.5 V
Continuous Output Current, I_{OUT}	25 mA
Operating Temperature Range, T_A	
Suffix 'E–'	–40°C to +85°C
Suffix 'L–'	–40°C to +150°C
Storage Temperature Range, T_S	-65°C to +170°C

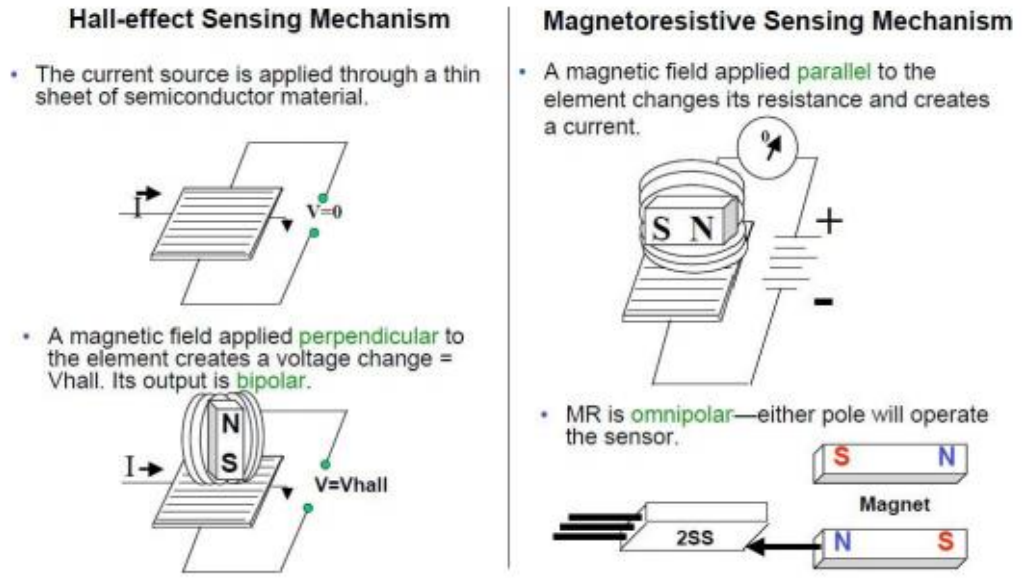
$V_{hall} \propto I_c \times H$



Vhall = Output Hall-effect voltage

H = Magnetic Flux created by magnet or current-carrying conductor

Ic = Constant supply current



Design Factors – Magnetic Types

Unipolar: Only a south pole will operate the sensor. Thiessens or turns on with the south pole(+) and off when the south pole is removed.

• Bipolar: Sensor output is pole-dependent. A south pole (+) is designed to activate the sensor; A north pole(-) is designed to deactivate. It's possible that the sensor could turn off and still be within a positive Gauss level.

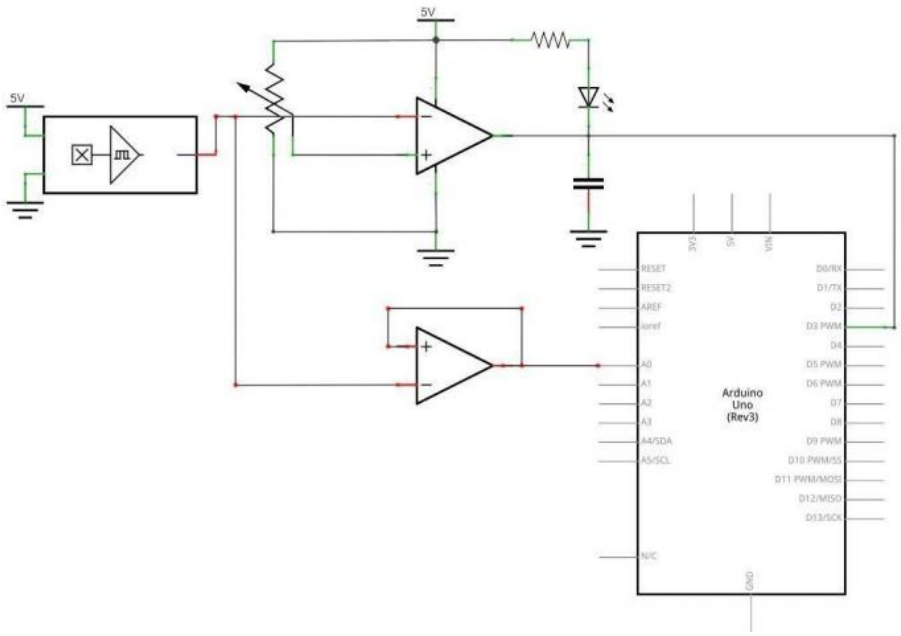
• Latching: Specifications are tighter on latching. Sometimes it is designed to make certain that when the south pole(+) is removed from the sensor, it will stay on until it sees the opposite pole(-).

•Omnipolar: The sensor is designed to operate with either magnetic pole(+ or -).

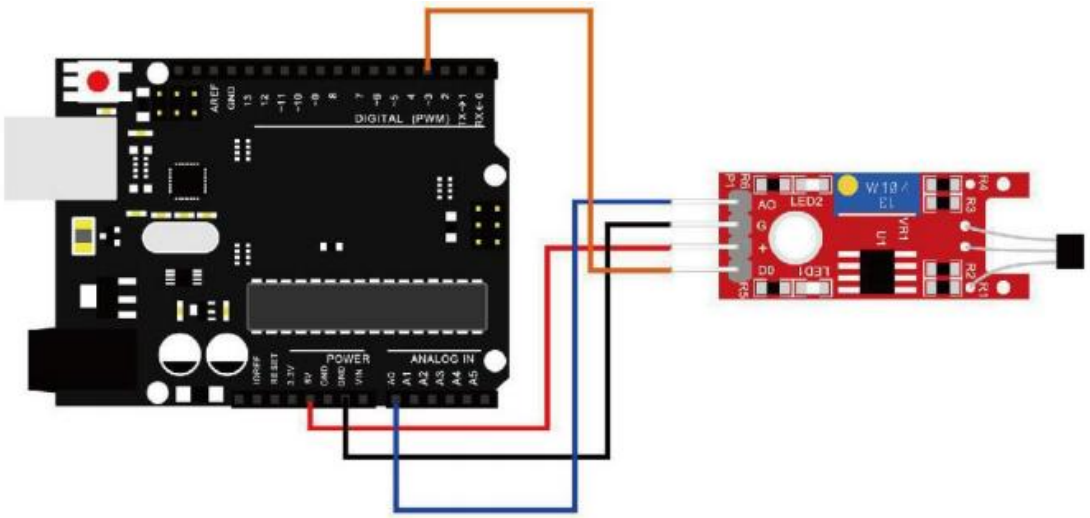
•Ratiometric linear: Output is proportional to magnetic field strength. Output sensitivity range is 2.5 – 3.75 mV per unit of Gauss.

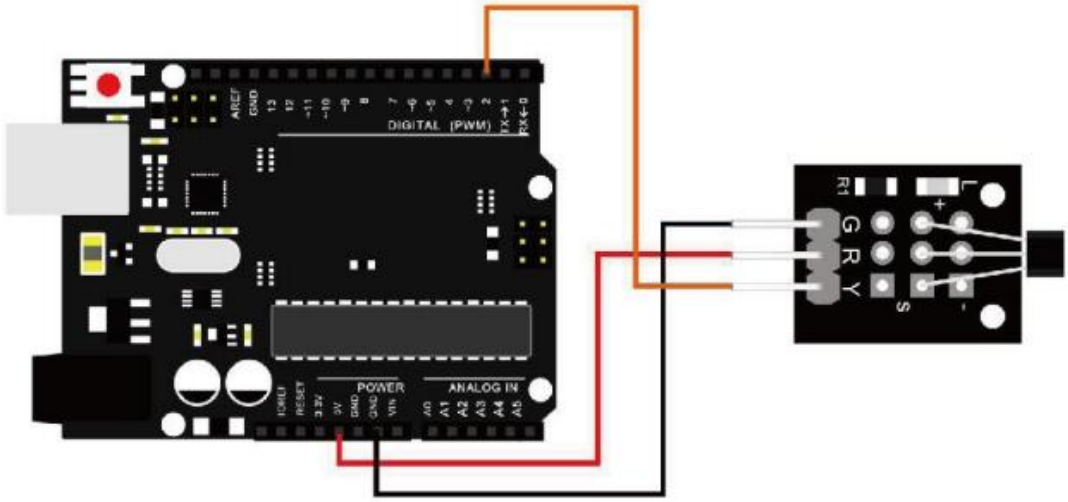
Connection

Schematic

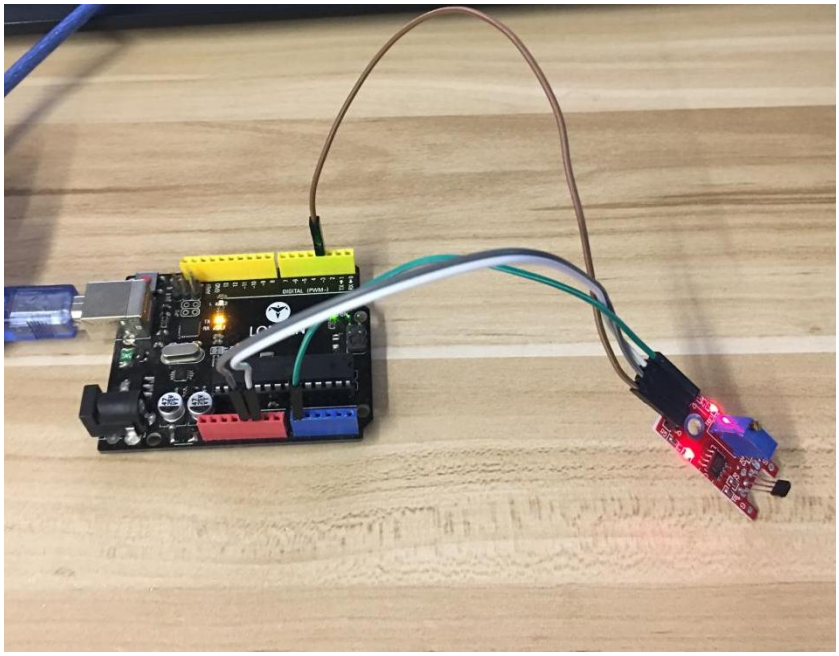


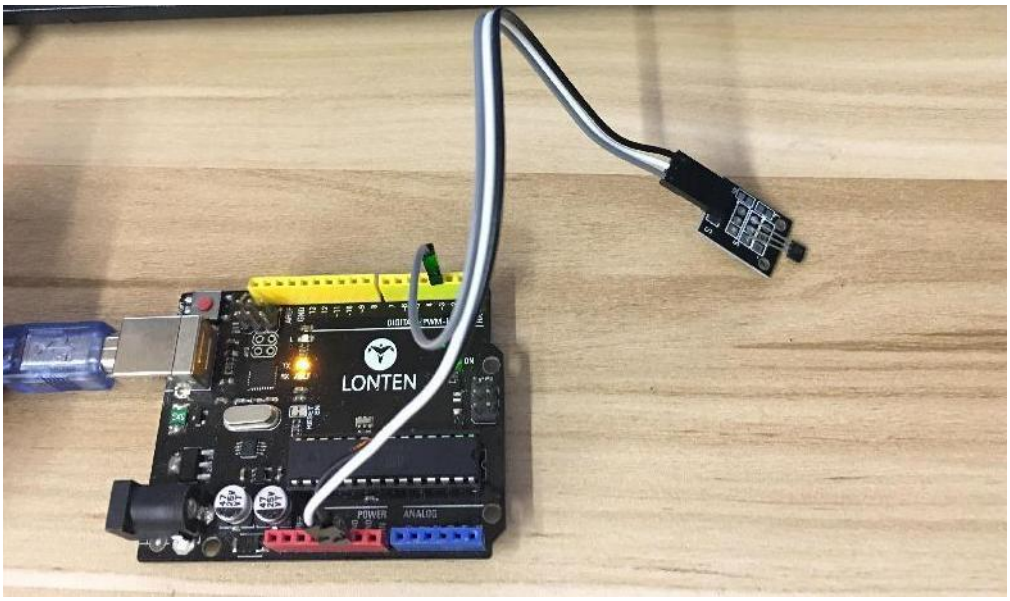
wiring diagram





Example picture



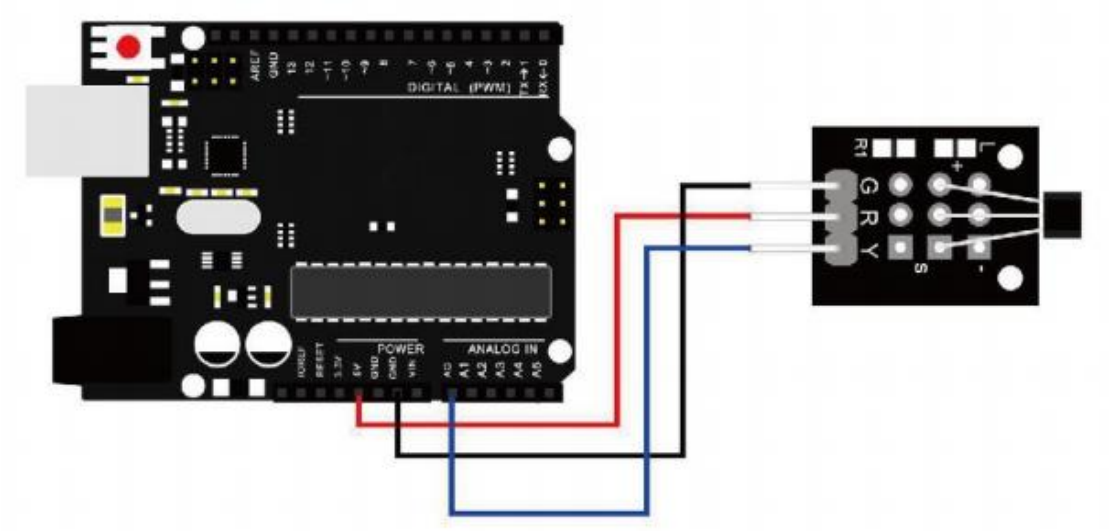


Result

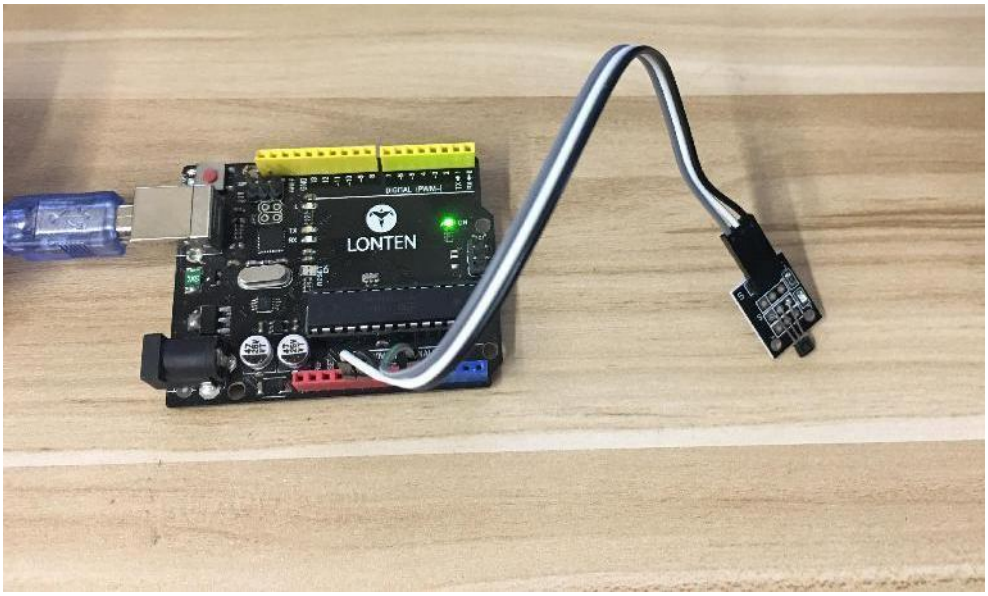
For the hall sensor module, we can choose the output: digital output or analog output. In the following picture, we use the DO port to output. so we can see that if the hall sensor sensing the magnetic force, the light will turn on.

Connection

wiring diagram



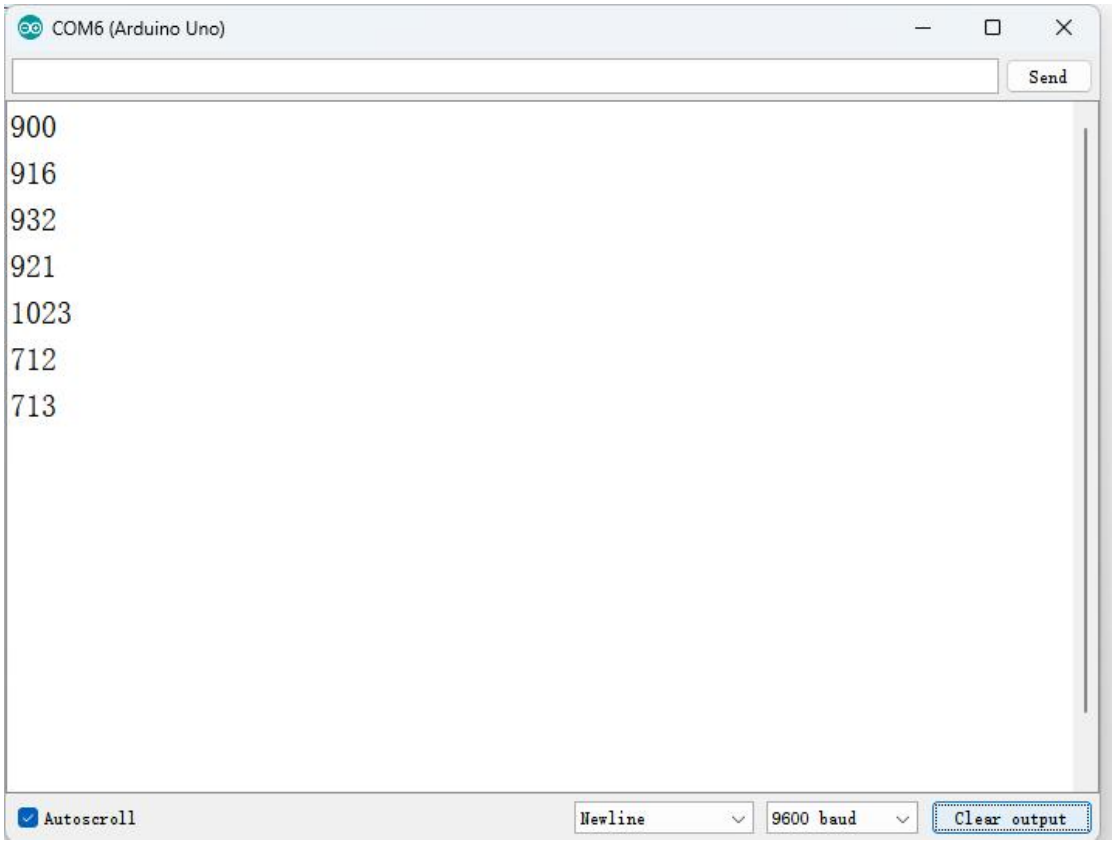
Example picture



Result

In the following picture, we use the AO port to output. so we can see that if the hall sensor sensing the magnetic force, the module will output a data which reflect the strength of the magnetic force. The number is from 0 to 1023.

Upload the program then open the monitor, we can see the data as below:



Lesson 18 Flame Sensor Module

Overview

In this experiment, we will learn how to use the flame sensor module.

This module is sensitive to the flame and radiation. It also can detect ordinary light source in the range of a wavelength 760nm-1100nm. The detection distance is up to 100 cm. The Flame sensor can output digital or analog signal. It can be used as a flame alarm or in fire fighting robots.

Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

(3) Flame sensor module* 1

(4) Breadboard* 1

(5) Breadboard Jumper Wires* Several

Component Introduction

Flame sensor:

• Detects a flame or a light source of a wavelength in the range of 760nm-1100nm

• Detection distance: 20cm (4.8V) ~ 100cm (1V)

• Detection angle about 60 degrees, it is sensitive to the flame spectrum.

• Comparator chip LM393 makes module readings stable.

• Adjustable detection range.

• Operatingvoltage3.3V-5V

• Digital and Analog Output

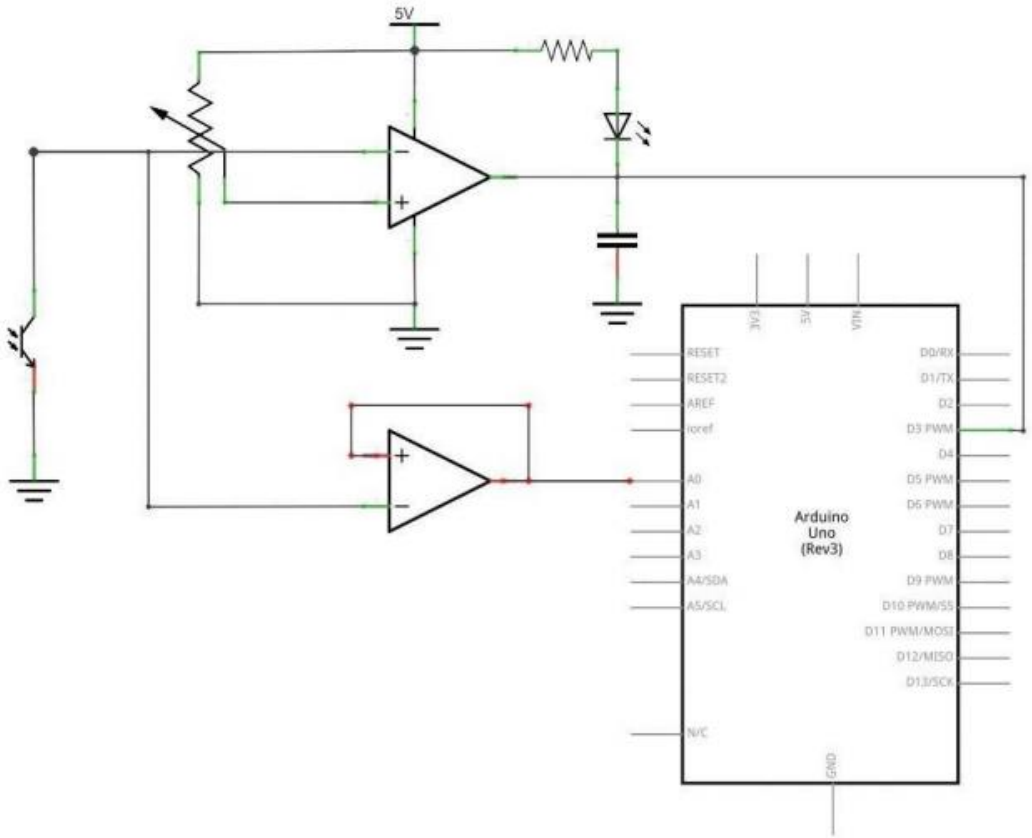
DO digital switch outputs (0 and 1)

AO analogvoltage output

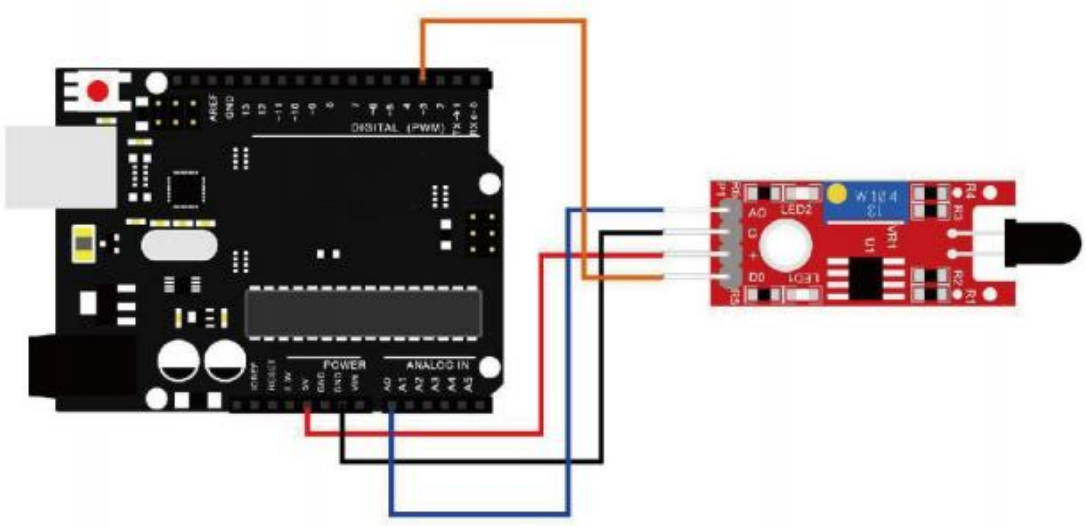
• Power indicator and digital switch output indicator

Connection

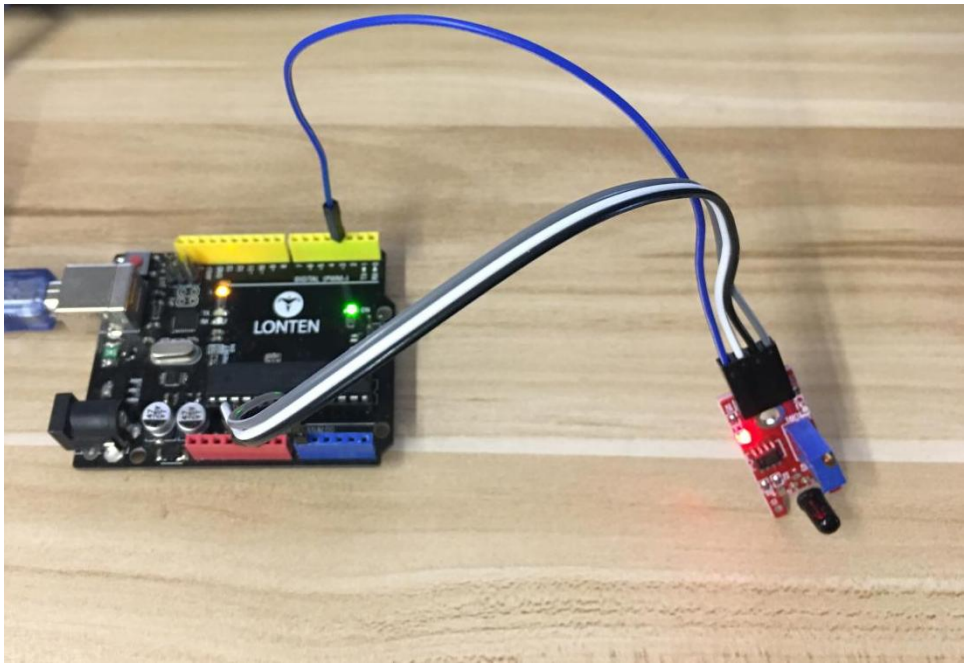
Schematic



wiring diagram



Example picture



Result

For the flame sensor module, we can choose the output: digital output or analog output. In the following picture, we use the DO port to output. so we can see that if the flame sensor sensing the flame, the light will turn on.

In the following picture, we use the AO port to output. so we can see that if the flame sensor sensing the flame, the module will output a data which reflect the strength of the flame. The number is from 0 to 1023.

Lesson 19 Mental Touch Module

Overview

In this experiment, we will learn how to use the mental touch module.

Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

(3) Mental touch module * 1

(4) Breadboard* 1

(5) Breadboard Jumper Wires* Several

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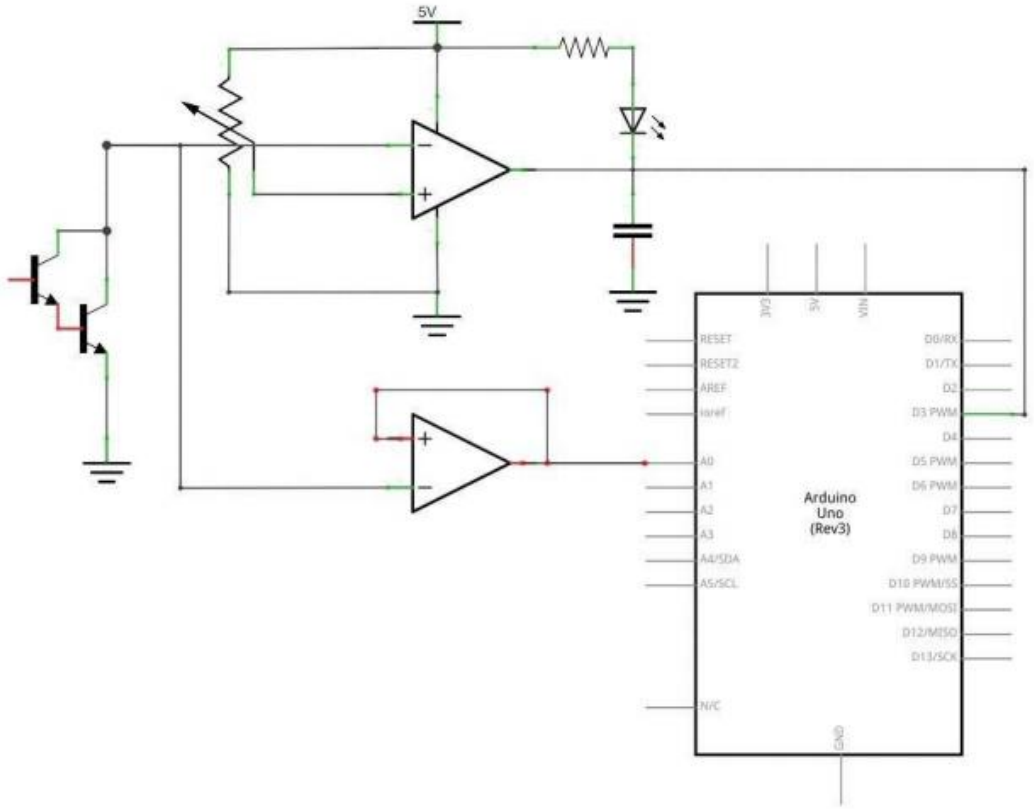
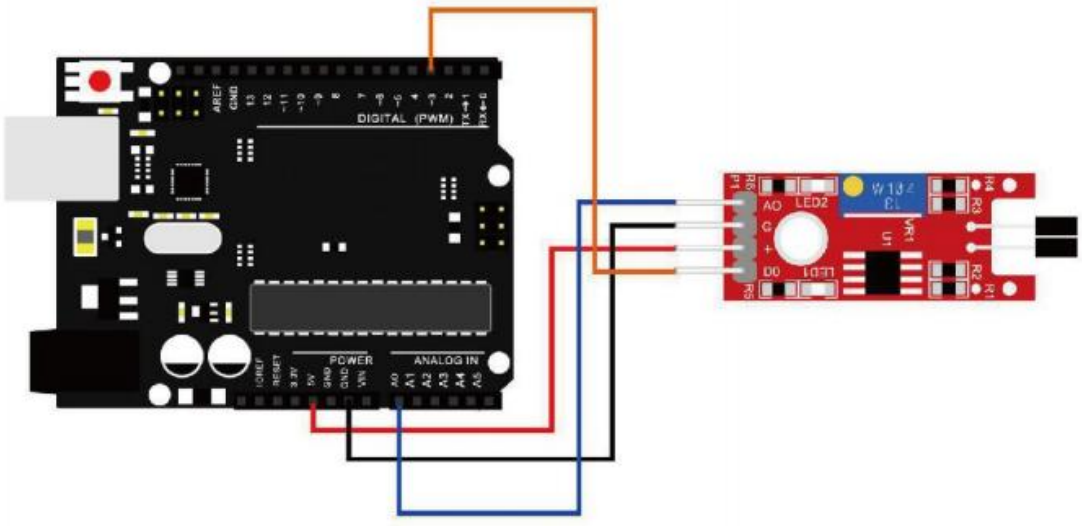
Connection

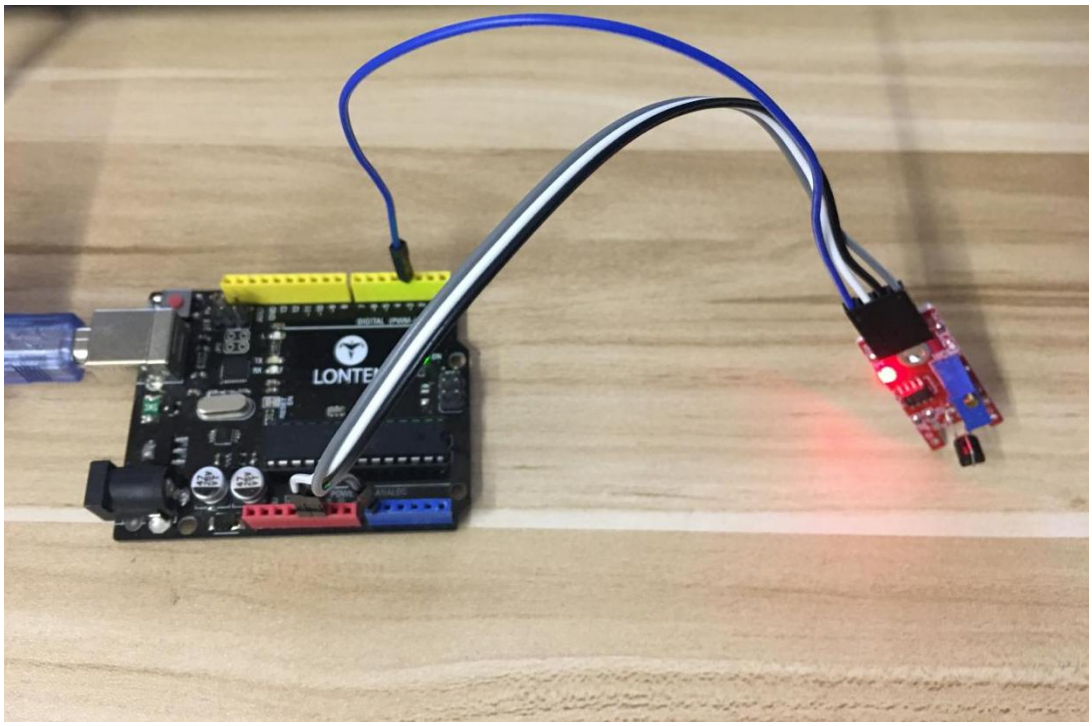
Schematic



wiring diagram



Example picture



Result

For the mental touch module, we can choose the output: digital output or analog output. In the following picture, we use the DO port to output. so we can see that if the sensor sensing, the light will turn on.

Lesson 20 Magic Light Cup Module

Overview

In this experiment, we will learn how to use the light cup module.

1.LED
2.OUTPUT
3.VCC: 3.3V-5V DC
4.GND:ground

Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

(3) Magic Light Cup module * 1

(4) Breadboard* 1

(5) Breadboard Jumper Wires* Several

Component Introduction

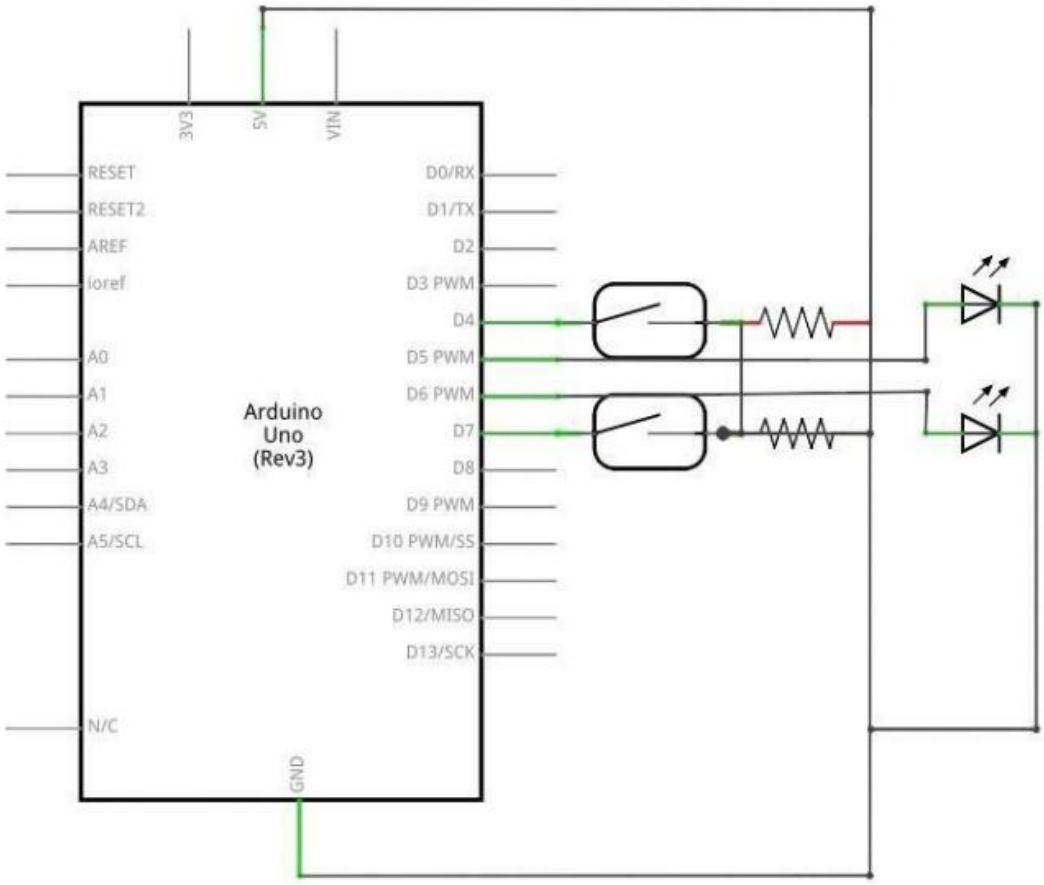
Magic light cup module:

Magic light cup module is a product which can easily interact with the Arduino module, the principle is to use the PWM dimming, change the brightness of the two modules.

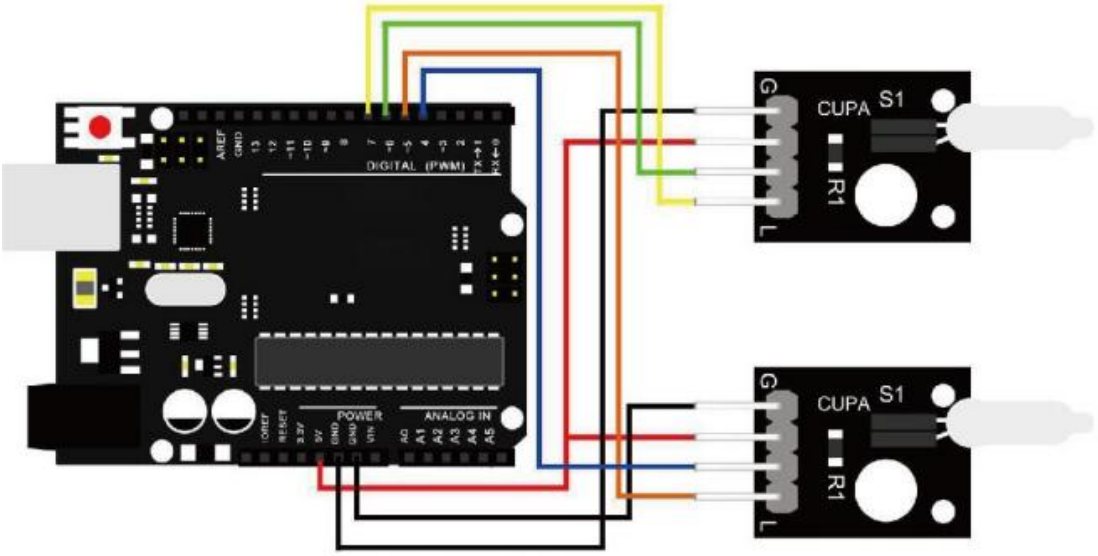
Mercury switch provides digital signal, trigger PWM adjustment. Through the design program, we can see the result which is similar to the effect of two cup full of light pouring to each other.

Connection

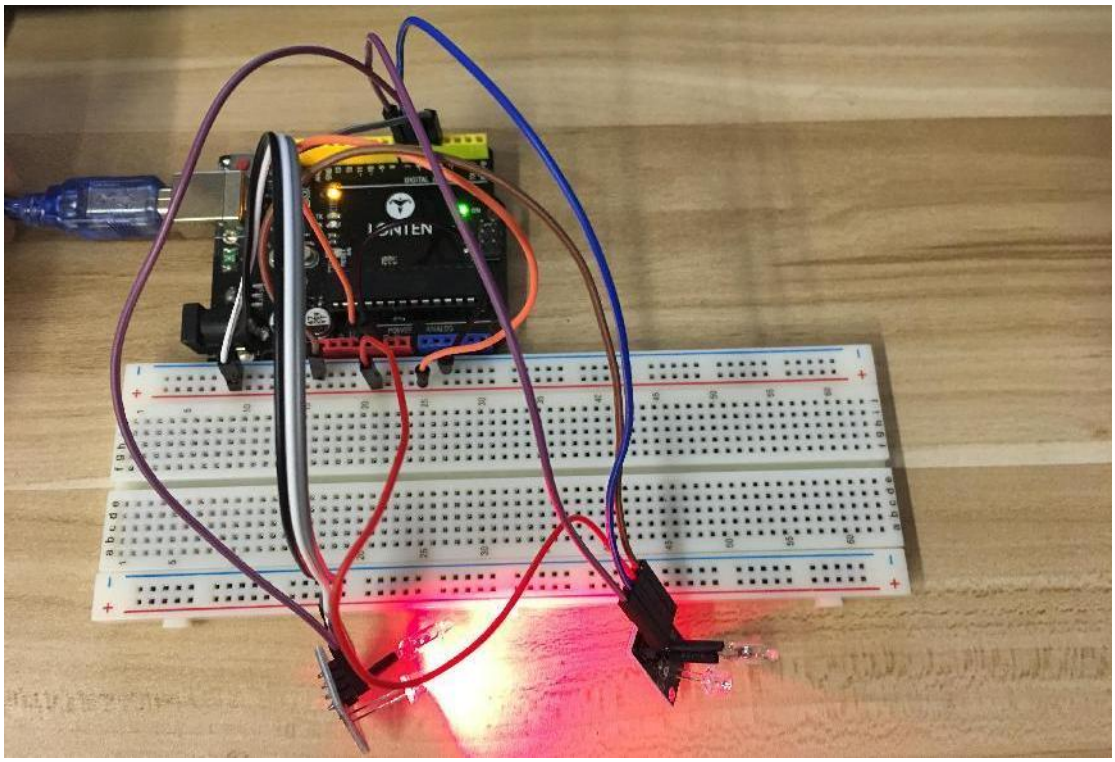
Schematic



wiring diagram



Example picture



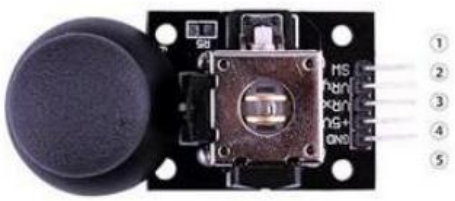
Result

Wire it up as the above diagram and upload well the code to the board, then you can see one cap lights up while the other one is off. When tilt these two caps towards the same side, one cap is gradually become bright, another bright cap is gradually off.

Lesson 21 Joystick Module

Overview

Just like a joystick on game console. you can control x, y and z dimensions input by this joystick module. It can be considered as combination of potentiometers and one button. Data type of the x, y dimensions are analog input signals and z dimension is digital input signal. thus the x and y ports connect to analog pins of Sensor Shield, while z port connects to digital pin.



1.SW
2.VRY
3.VRX
4.VCC:+5V
5.GND:+5V

Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

(3) Joystick module* 1

(4) Breadboard* 1

(5) Breadboard Jumper Wires* Several

Component Introduction

Joystick sensor:

Lots of robot projects need joystick. This module provides an affordable solution. By simply connecting to two analog inputs, the robot is at your commands with X, Y control. It also has a switch that is connected to a digital pin. This joystick module can be easily connected to Arduino by IO Shield. This module is for Arduino (V5) with cables supplied.

Specification

Supply Voltage: 3.3V to 5V

Interface: Analog x2, Digital x1

Size: 40*28mm

Weight: 12g

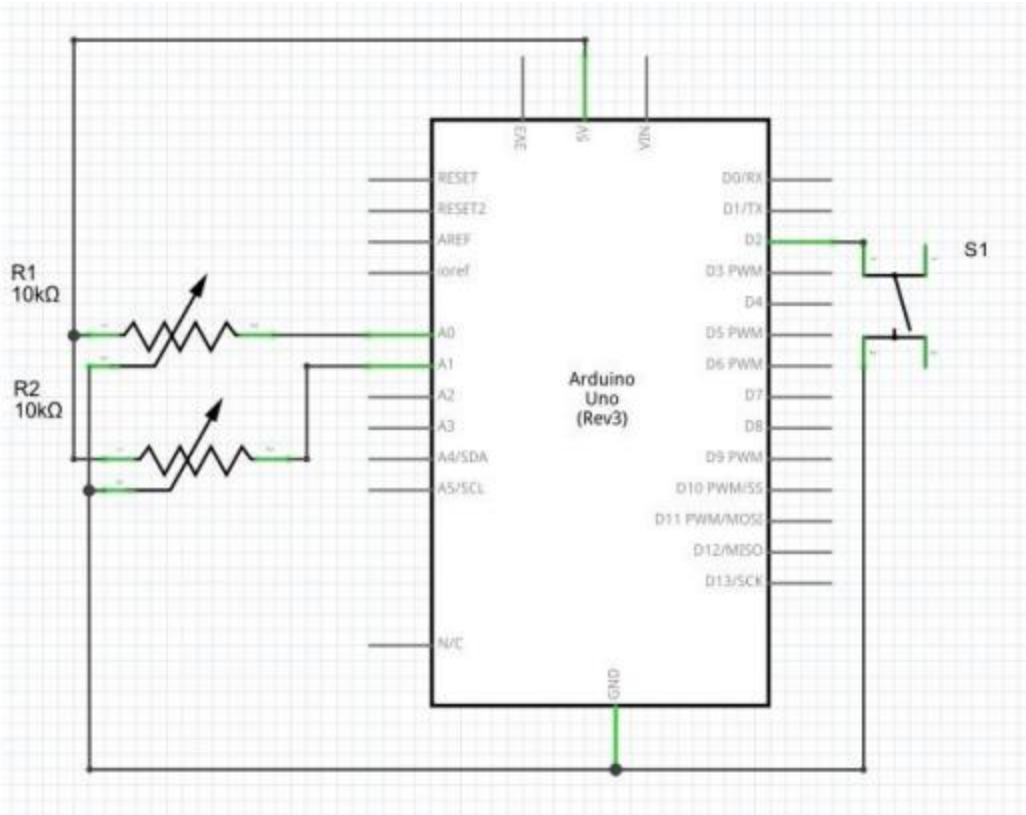
The module has 5 pins: Vcc, Ground, X, Y, Key. Note that the labels on yours may be slightly different, depending on where you got the module from. The thumb stick is analog and should provide more accurate readings than simple ‘directional’ joysticks tact use some forms of

buttons, or mechanical switches. Additionally, you can press the joystick down (rather hard on mine) to activate a ‘press to select’ push-button.

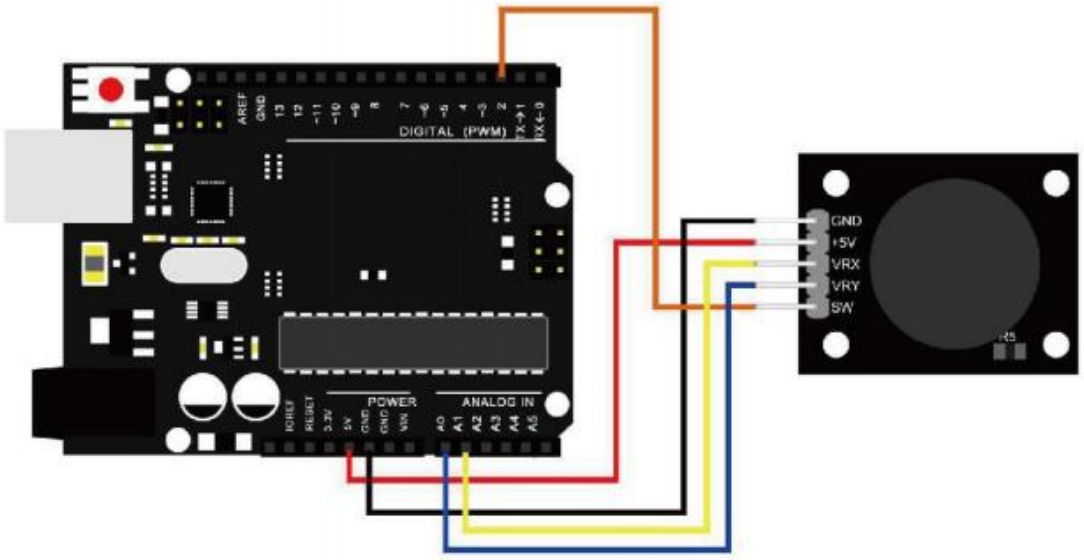
We have to use analog Arduino pins to read the data from the X/Y pins, and a digital pin to read the button. The Key pin is connected to ground, when the joystick is pressed down, and is floating otherwise. To get stable readings from the Key /Select pin, it needs to be connected to Vcc via a pull-up resistor. The built in resistors on the Arduino digital pins can be used. For a tutorial on how to activate the pull-up resistors for Arduino pins, configured as inputs

Connection

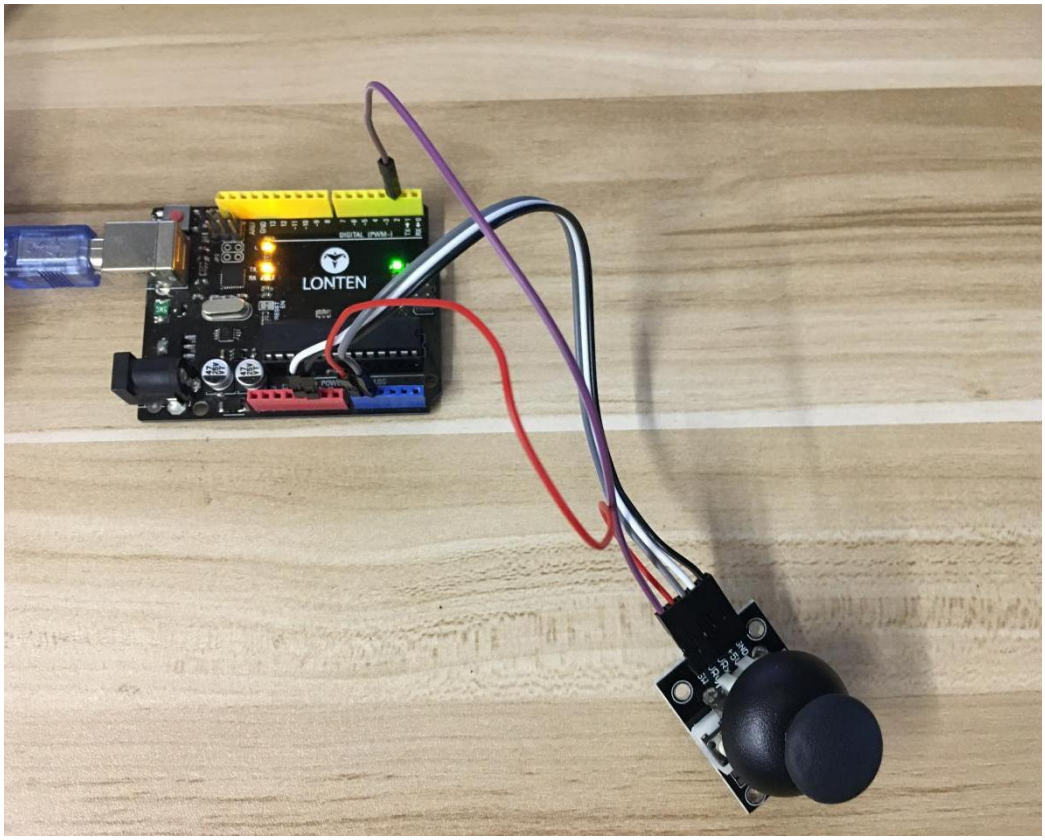
Schematic



wiring diagram



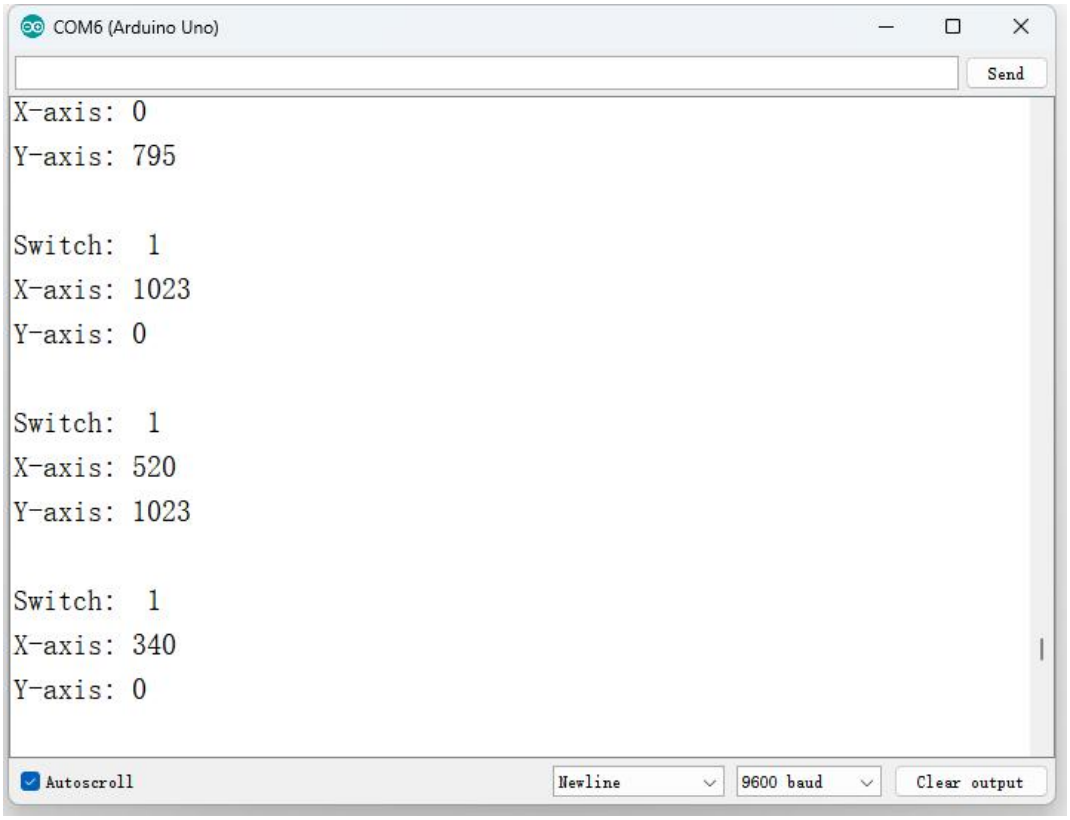
Example picture



Result

Analog joysticks are basically potentiometers so they return analog values.

When the joystick is in the resting position or middle, it should return a value of about 512. The range of values go from 0 to 1024.



Lesson 22 Tracking Module

Overview

In this experiment, we will learn how to use the tracking module and avoidance module.

Infrared obstacle avoidance sensor is designed for the design of a wheeled robot obstacle avoidance sensor distance adjustable. This ambient light sensor Adaptable, high precision, having a pair of infrared transmitter and receiver, transmitter tubes emit a certain frequency of infrared, When detecting the direction of an obstacle (reflector), the

infrared receiver tube receiver is reflected back, when the indicator is lit, Through the circuit, the signal output interface output digital signal that can be detected by means of potentiometer knob to adjust the distance, the effective distance From 2 ~ 40cm, working voltage of 3.3V-5V, operating voltage range as broad, relatively large fluctuations in the power supply voltage of the situation Stable condition and still work for a variety of microcontrollers, Arduino controller, BS2 controller, attached to the robot that can sense changes in the is surroundings.

Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

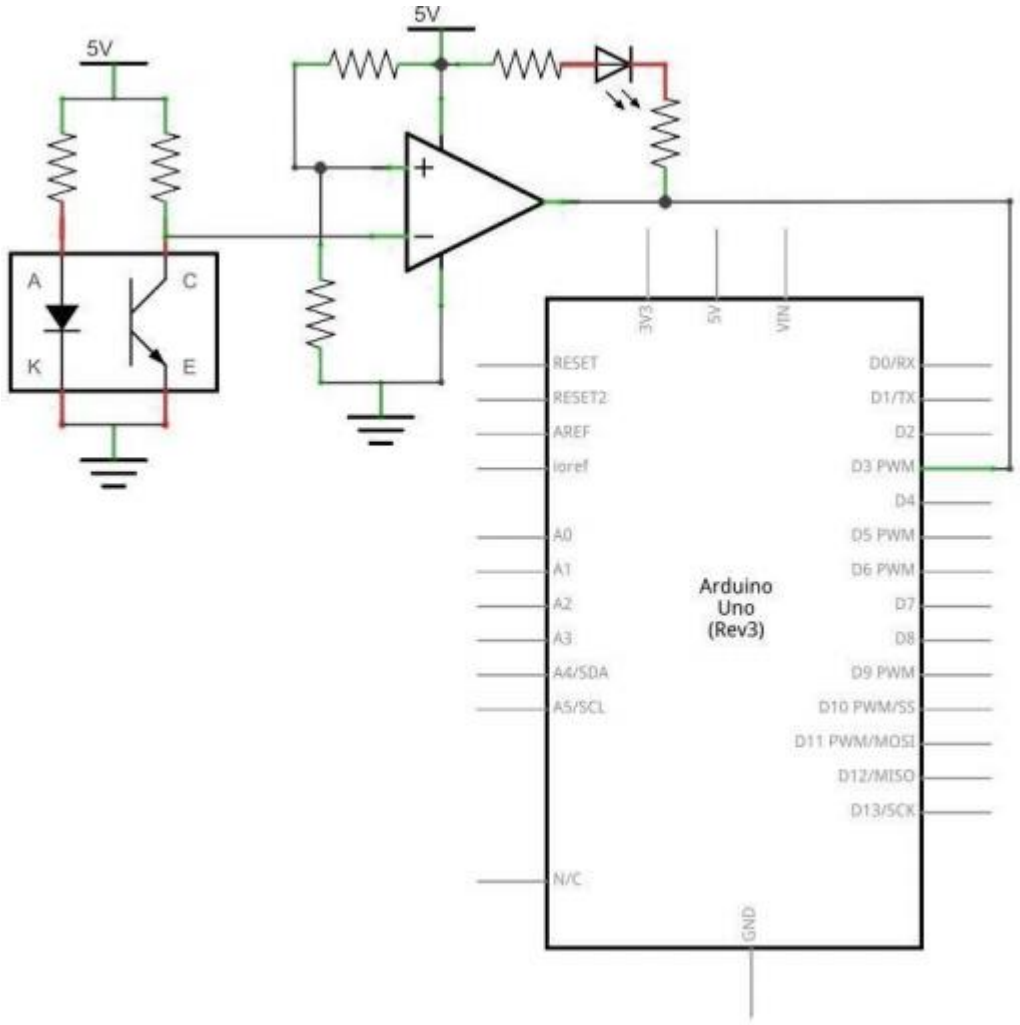
(3) Tracking module * 1

(4) Breadboard* 1

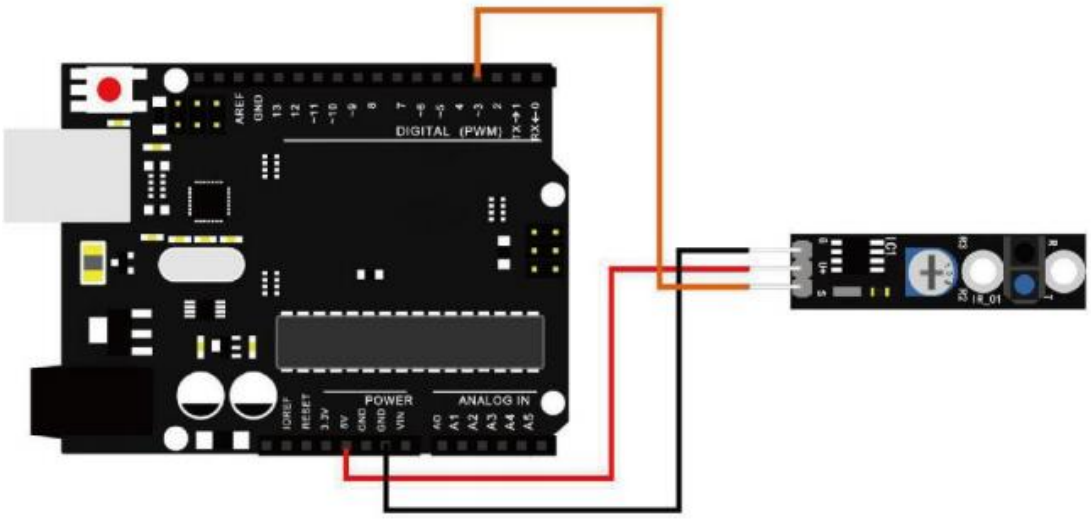
(5) Breadboard Jumper Wires* Several

Connection

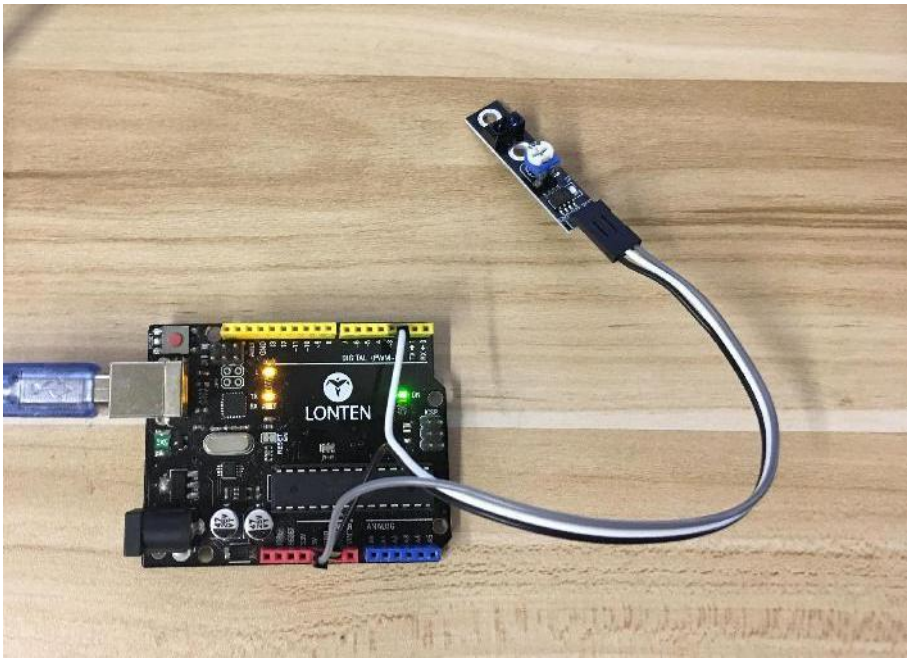
Schematic



wiring diagram

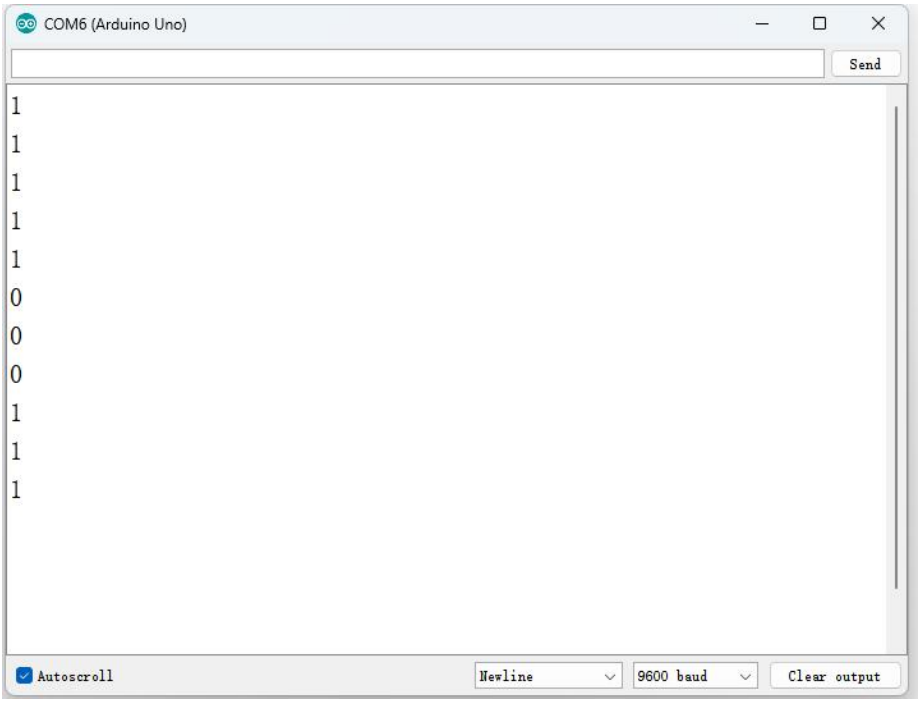


Example picture



Result

Upload the program then open the monitor, we can see the data.



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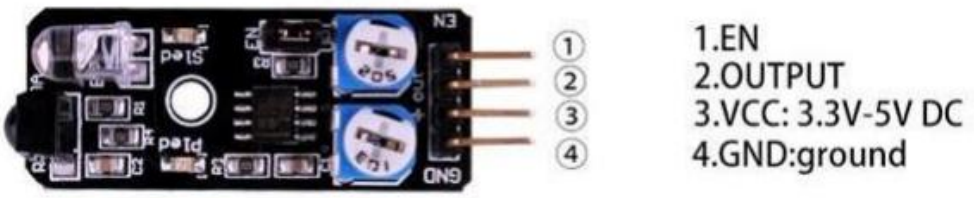
Lesson 23 Infrared 38KHz Obstacle Avoidance Module

Overview

Non logic chip oscillation frequency regulation 38KHz detection circuit. This infrared 38KHZ obstacle avoidance module can completely block the traditional photoelectric obstacle detection distance and a single normally open or normally closed signal output function.



Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

(3) Obstacle avoidance module * 1

(4) Breadboard* 1

(5) Breadboard Jumper Wires* Several

Component Introduction

Obstacle avoidance module:

Specifications

Working voltage: DC 3.3V-5V

Working current: ≥ 20mA

Operating temperature: -10 ℃ - +50 ℃

detection distance :2-40cm

IO Interface: 4-wire interfaces (- / + / S / EN)

Output signal: TTL level (low level there is an obstacle, no obstacle high)

Adjustment: adjust multi-turn resistance

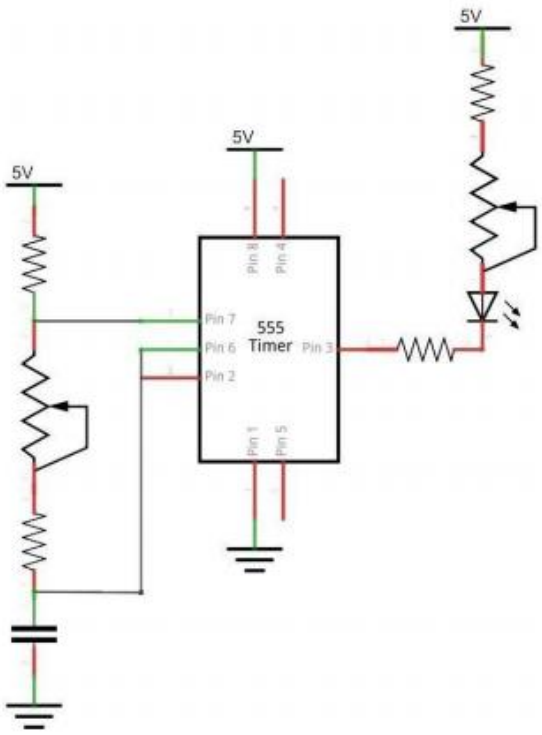
Effective angle: 35 °

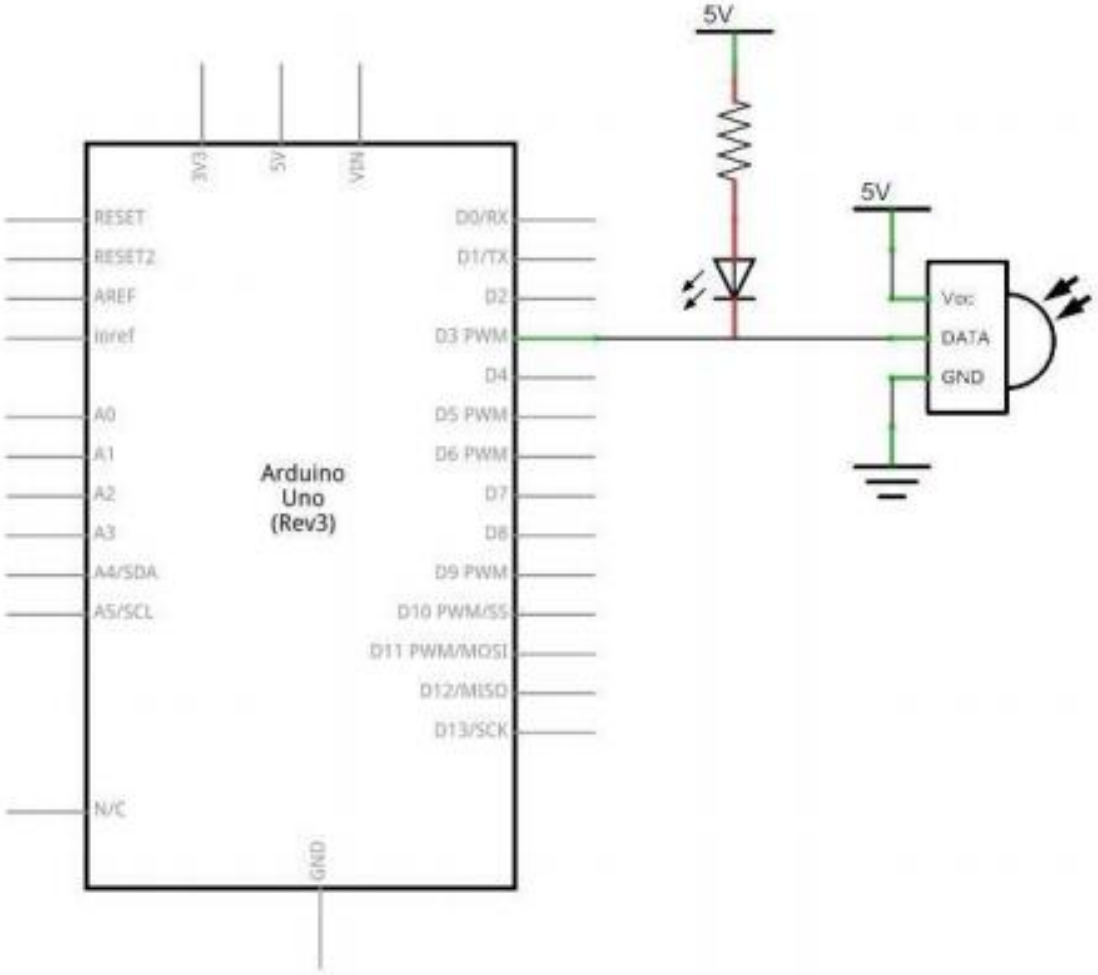
Size: 28mm × 23mm

Weight Size:9g

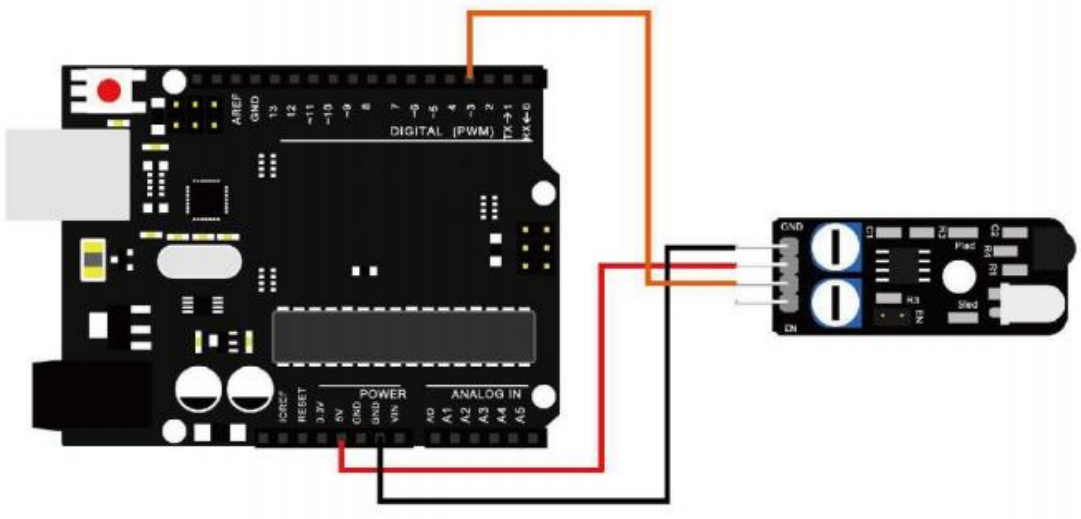
Connection

Schematic

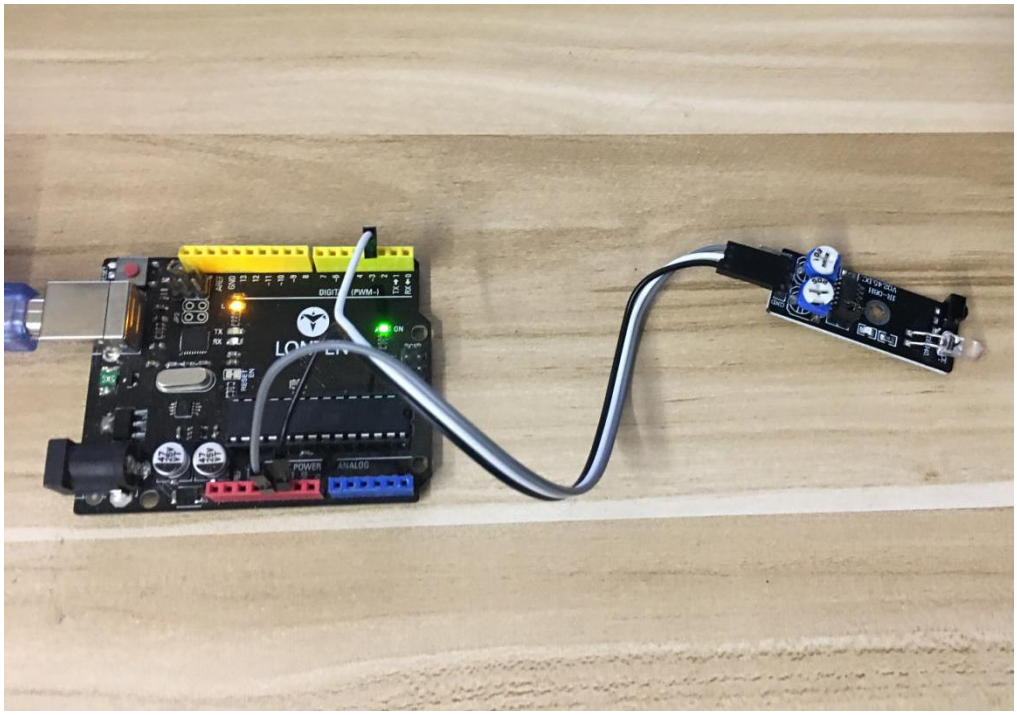




wiring diagram



Example picture



Result

Here we use the obstacle avoidance module and a digital interface, built-in 13 LED build a simple circuit, making avoidance warning lamp, the obstacle avoidance Sensor Access Digital 3 interface, If we put a foam block in front of the sensor, this time when sensor detects the obstacle, sled on the sensor will be turned on.

Lesson 24 Rotary Encoders Module

Overview

In this experiment, we will learn how to use the rotary encoders module.

1.CLK
2.DT
3.SW
4.VCC:3.3V-5V DC
5.GND:ground

Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

(3) Rotary Encoders module * 1

(4) Breadboard* 1

(5) Breadboard Jumper Wires* Several

Component Introduction

Rotary Encoders:

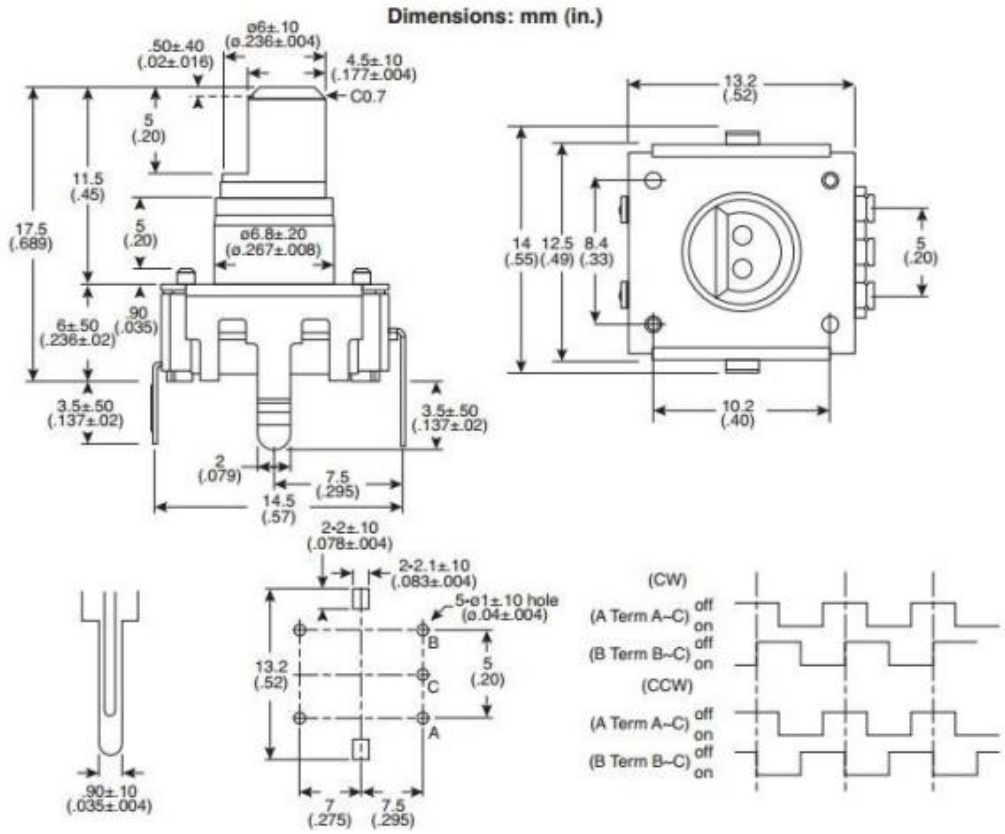
Mechanical Specifications:
- Operating Temp: -10°C to 70°C
- Storage Temp: -40°C to 85°C
- Rotational Torque: 50gf.cm max.
- No. and Pos. of detents: 12 detents (Step angle 30°±3°)
- Terminal Strength: A static load for 300gf.cm shall be applied to the tip of the terminals for 10 sec. in any direction
- Shaft push-pull strength: 5.1kgf
- Rotational life: 30,000 cycles

Note:
- RoHS Compliant

Electrical Specifications:
- Rating: 1mA/10VDC
- Insulation Resistance: 50VDC 10MΩ Min.
- Dielectric Strength: 50VAC for 1 min.
- Resolution: 12 pulses/360° for each phase

Soldering Specifications:
- Soldering: To be performed in 5 seconds within 260±5°C
- Manual Soldering: To be performed in 3 seconds within 350±5°C
- Preheating: The entire flow duration should not exceed 2 min., and soldering surface temperature (undersurface of PCB) shall be settled within 100°C

Push-on Switch Specifications:
- Type: Single Pole Single Throw (Push on)
- Rating: 10mA/5VDC
- Switch Travel (mm): 0.5±0.4
- Operating Force: 200~460gf
- Operating Life: 20,000 times



Principle

Incremental encoders give two-phase square wave, the phase difference between them 90 °, often referred to as A and B channels. One of the channels is given and speed-related Information, at the same time, by sequentially comparing two channel signals, the direction of rotation of the information obtained. There is also a special signal called Z or Zero channel, which gives the absolute zero position encoder, the signal is a square wave with the center line of channel A square wave coincide.

Clockwise counterclockwise

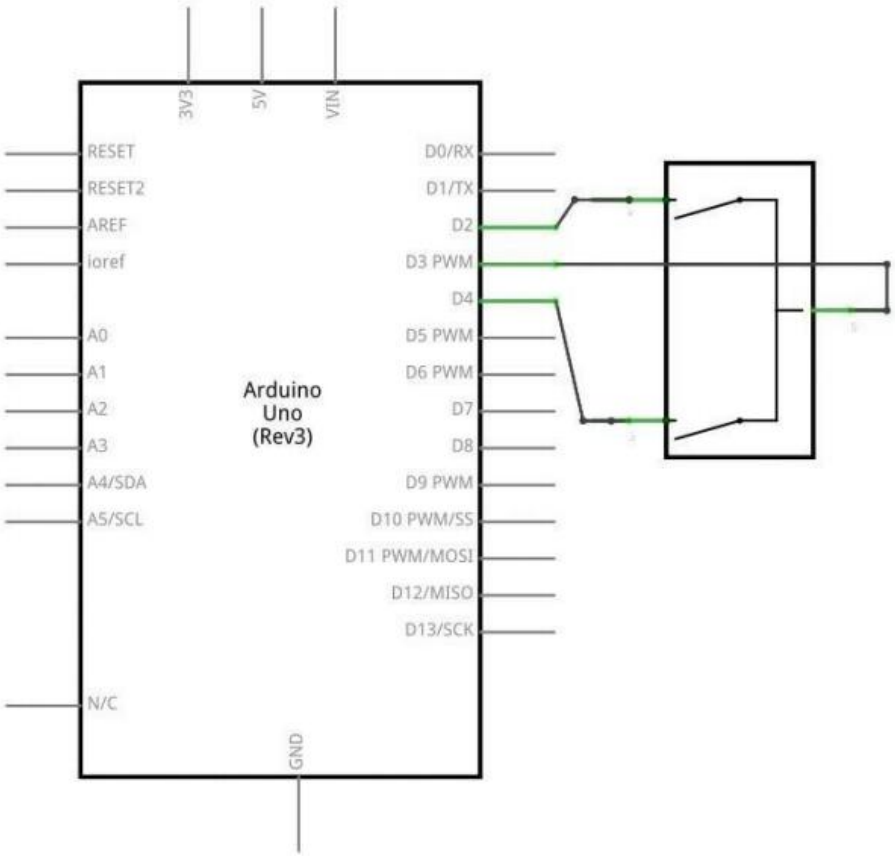
A	B
1	1
0	1
0	0
1	0
1	1
1	0
0	0
0	1

Incremental encoder accuracy depends on the mechanical and electrical two factors, these factors are: Raster indexing error, disc eccentricity, bearing eccentricity, e-reading Several means into the optical portion of the errors and inaccuracies. Determine the encoder resolution is measured in electrical degrees, the encoder accuracy depends Set the pulse encoder generates indexing. The following electrical degrees with a 360 ° rotation of the shaft to said machine, and rotation of the shaft must be a full week of Period. To know how much electrical equivalent of the mechanical angle of 360 degrees can be calculated with the following formula: Electrical 360 = Machine 360 ° /n ° pulses / revolution

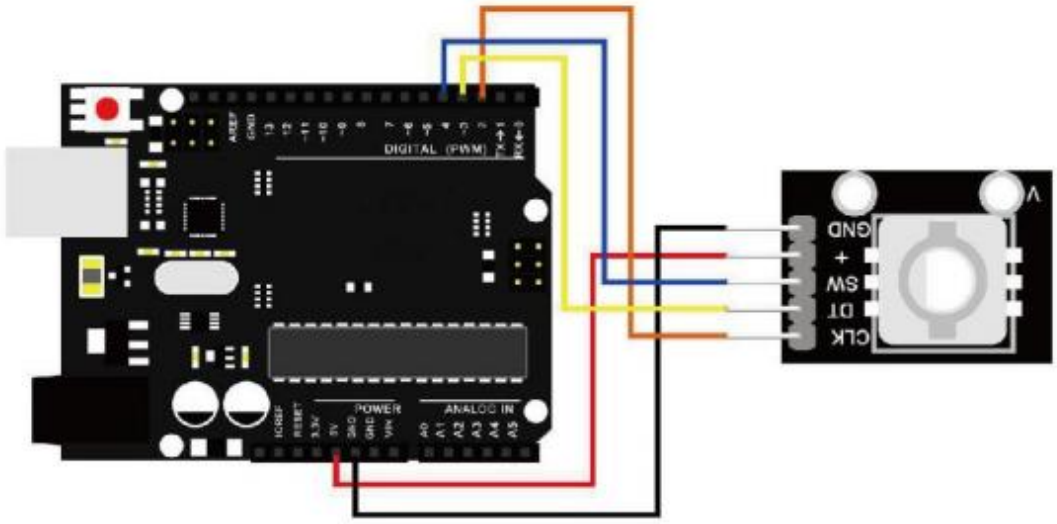
Encoder indexing error is the electrical angle of the unit two successive pulse maximum offset to represent. Error exists in any encoder, which Is caused by the aforementioned factors. Eltra encoder maximum error is ± 25 electrical degrees (declared in any condition), equivalent to the rated Offset values ± 7%, as the phase difference 90 ° (electrical) of the two channels of the maximum deviation ± 35 electrical degrees is equal to ± 10% deviation left Ratings Right.

Connection

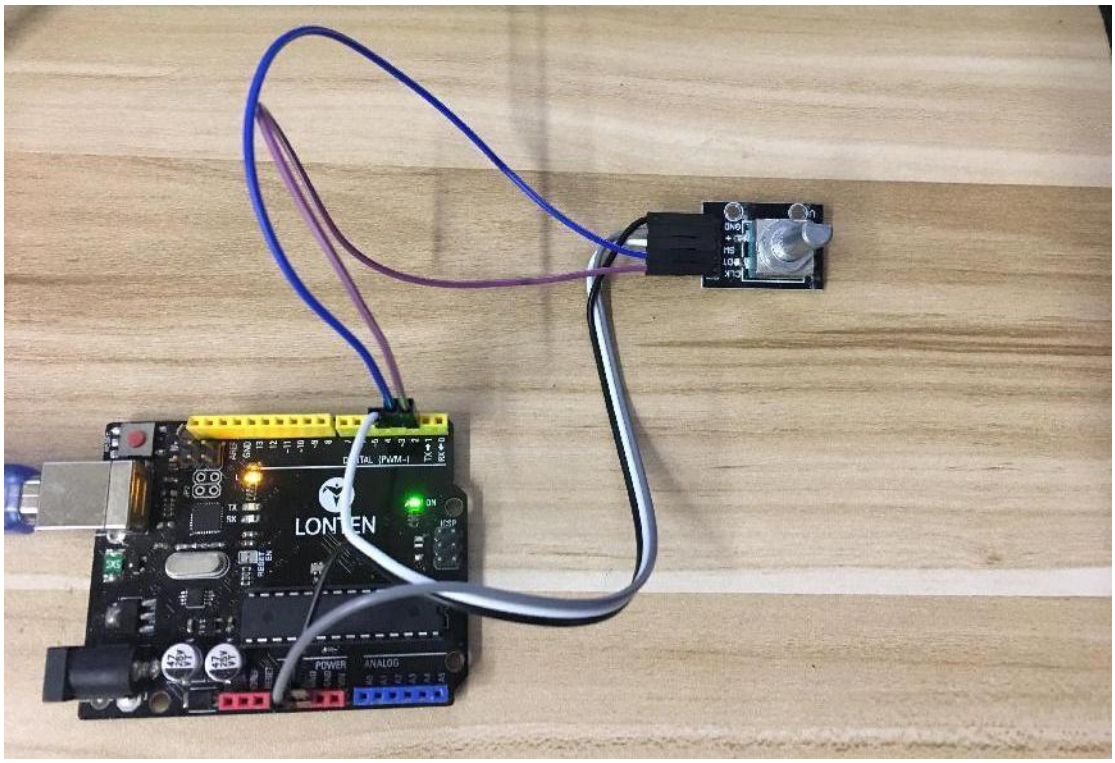
Schematic



wiring diagram

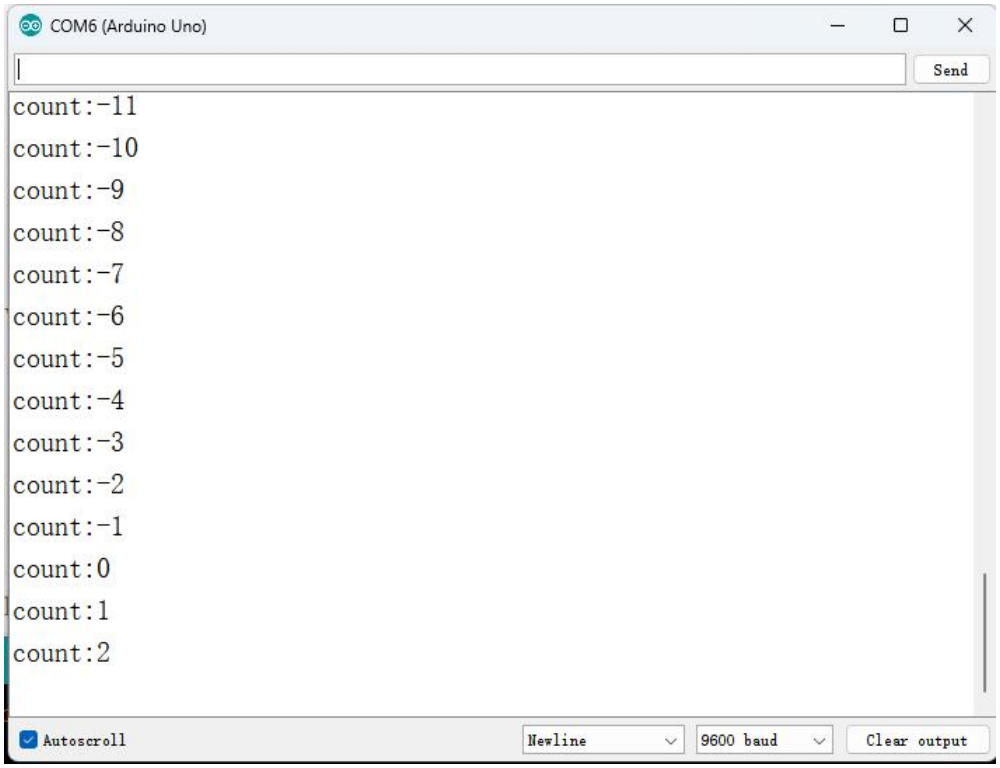


Example picture



Result

Upload the program, rotate the encodes then open the monitor, we can see the data as below:



Lesson 25 1Channel Relay Module

Overview

In this experiment, we will learn how to use the 1 channel relay module. Relay is a kind of component when the change of the input variables (incentive) to specified requirements, the output electric circuits of the charged amount occurs due to the step change of a kind of electrical

appliances. This company produces the relay module can meet in 28 v to 240 v ac or dc power to control all kinds of other electric parts.

MCU can be used to achieve the goal of timing control switch. Can be applied to guard against theft and alarm, toys, construction and other fields. Relay is an electrical control device. It has a control system (also called input circuit) and control system (also called the output circuit), the interaction between. Usually used in automatic control circuit, it is actually with a small current to control large current operation of a kind of automatics.

1.GND:ground
2.VCC:3.3V-5V DC
3.OUTPUT

Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

(3) 1 channel relay module * 1

(4) Breadboard* 1

(5) Breadboard Jumper Wires* Several

Component Introduction

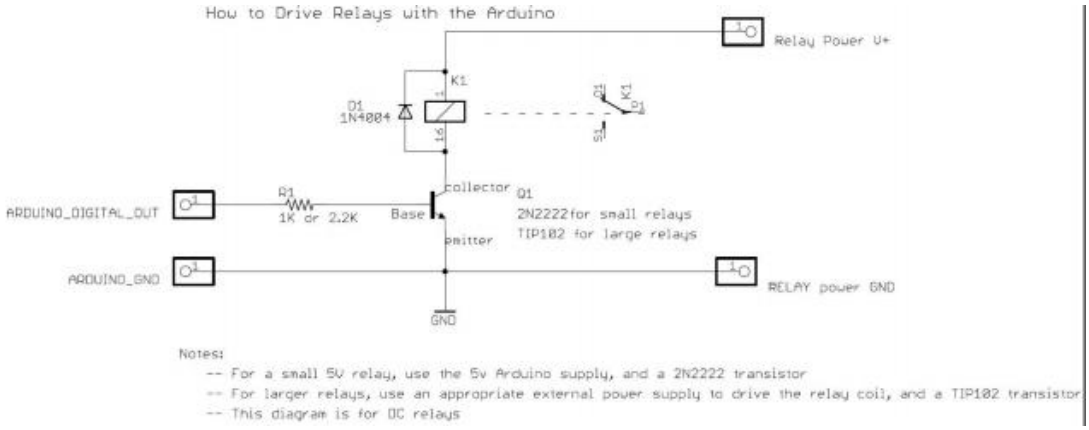
Relay:

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits as amplifiers: they repeated the signal coming in from one circuit and re-transmitted it on another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations.

A type of relay that can handle the high power required to directly control an electric motor or other loads is called a contactor. Solid-state relays control power circuits with no moving parts, instead using a semiconductor device to perform switching. Relays with calibrated operating characteristics and sometimes multiple operating coils are used to protect

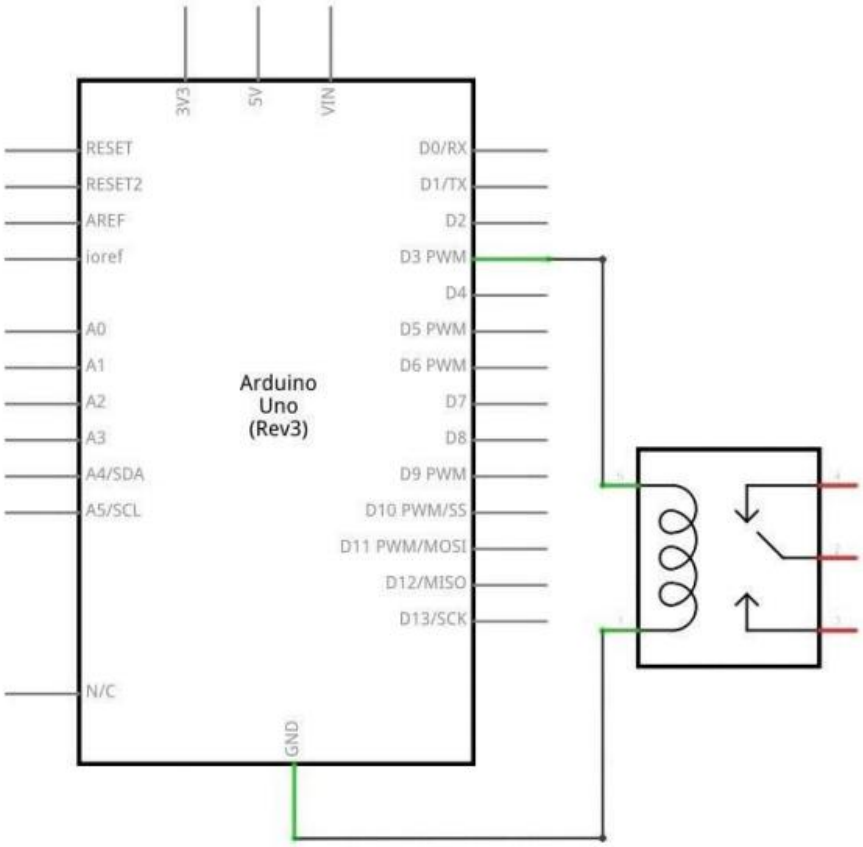
electrical circuits from overload or faults; in modern electric power systems these functions are performed by digital instruments still called "protective relays".

Bellow is the schematic of how to drive relay with arduino (down load from the arduino.cc)

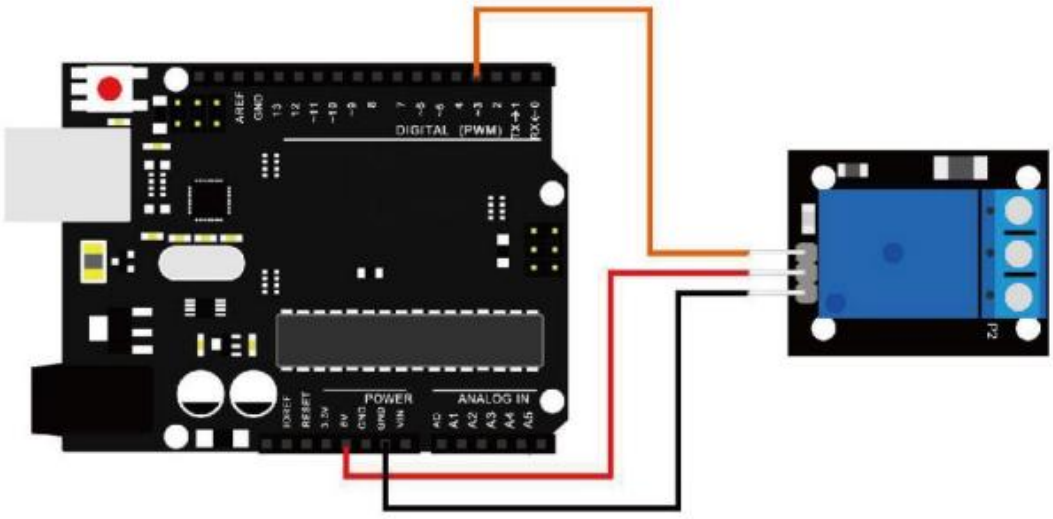


Connection

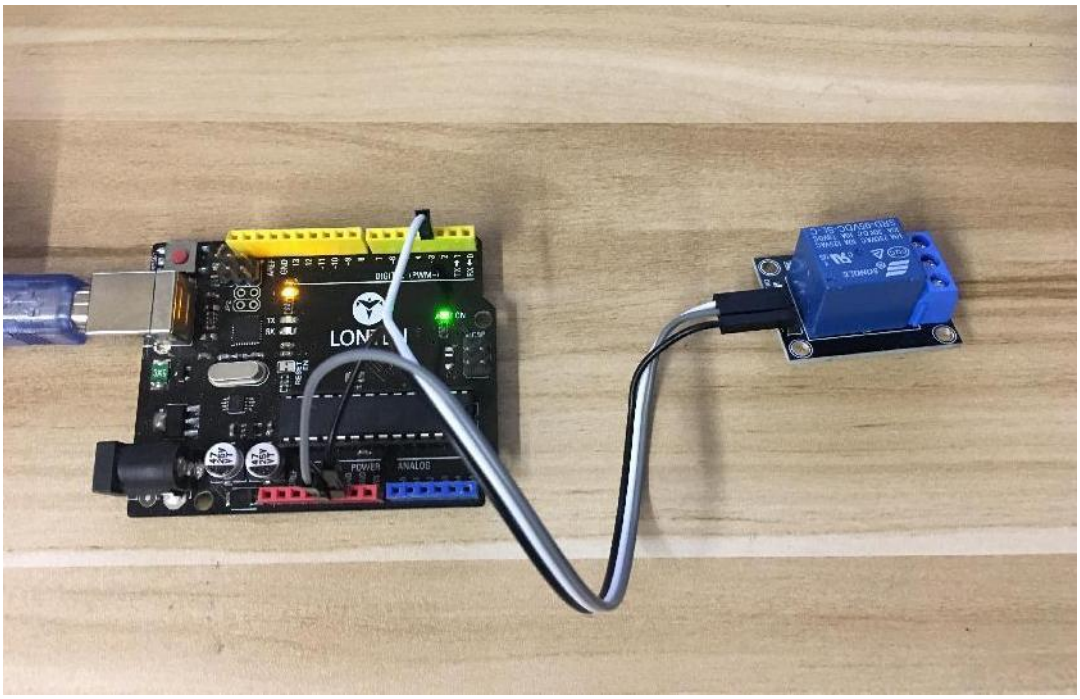
Schematic



wiring diagram



Example picture



Result

This relay module is active at HIGH level.

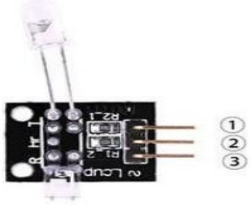
Wire it up well, powered up, then upload the above code to the board, you will see the relay is turned on (ON connected, NC Disconnected) for two seconds, then turned off for two seconds (NC closed,ON disconnected), repeatedly and circularly. When the relay is turned on,external LED is on. If relay is turned off,external LED is off.

Lesson 26 Heartbeat Module

Overview

This project uses bright infrared (IR) LED and a phototransistor to detect the pulse of the finger, a red LED flashes with each pulse. Pulse monitor works as follows: The LED is the light side of the finger, and phototransistor on the other side of the finger, phototransistor used to obtain the flux emitted, when the blood pressure pulse by the finger when the resistance of the photo transistor will be slightly changed. The project's schematic circuit as shown, We chose a very high resistance resistor R1, because most of the light through the finger is absorbed, it is desirable that the phototransistor is sensitive enough. Resistance can be selected by experiment to get the best results. The most important is to keep the shield stray light into the phototransistor. For home lighting that is particularly important because the lights at home mostly based 50HZor 60HZfluctuate, so faint heartbeat will add consider able noise.

When running the program the measured values are printed. To get a real heartbeat from this could be challenging.



1.GND:ground
2.VCC: 3.3V-5V DC
3.OUTPUT

Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

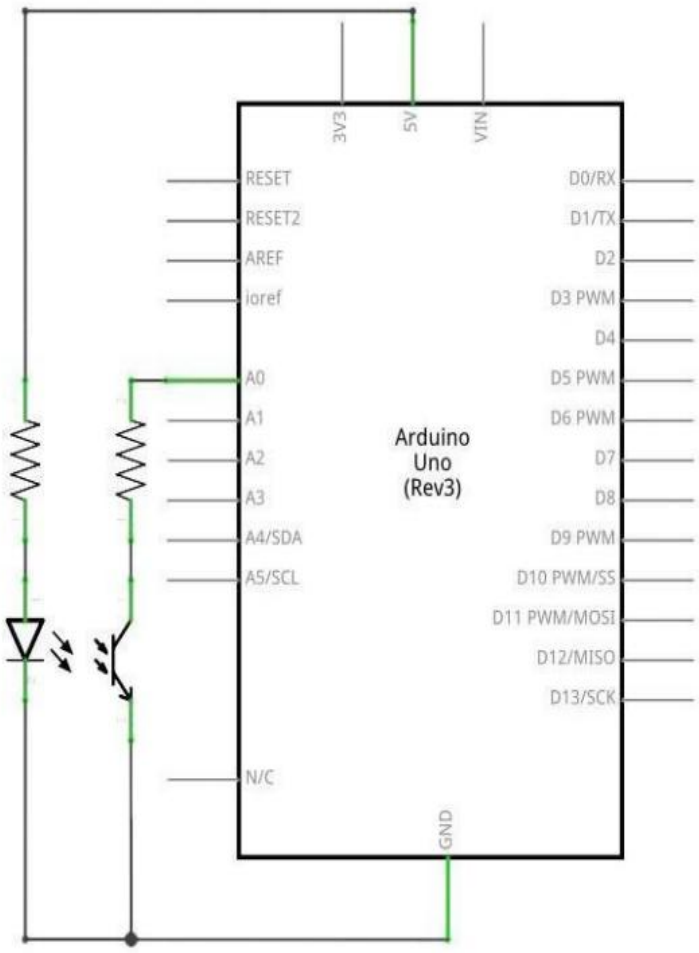
(3) Heartbeat module * 1

(4) Breadboard* 1

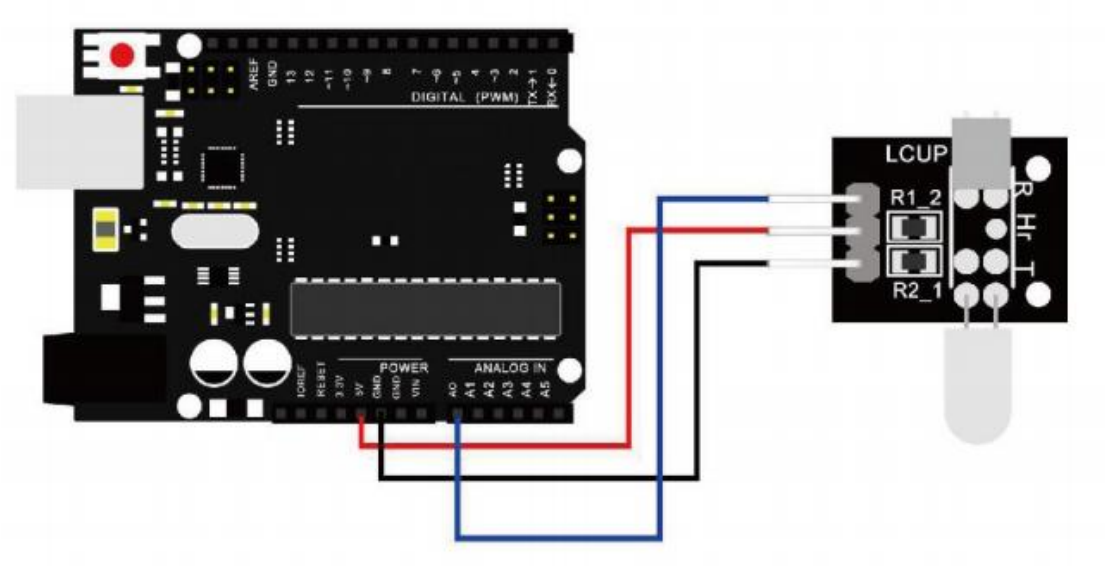
(5) Breadboard Jumper Wires* Several

Connection

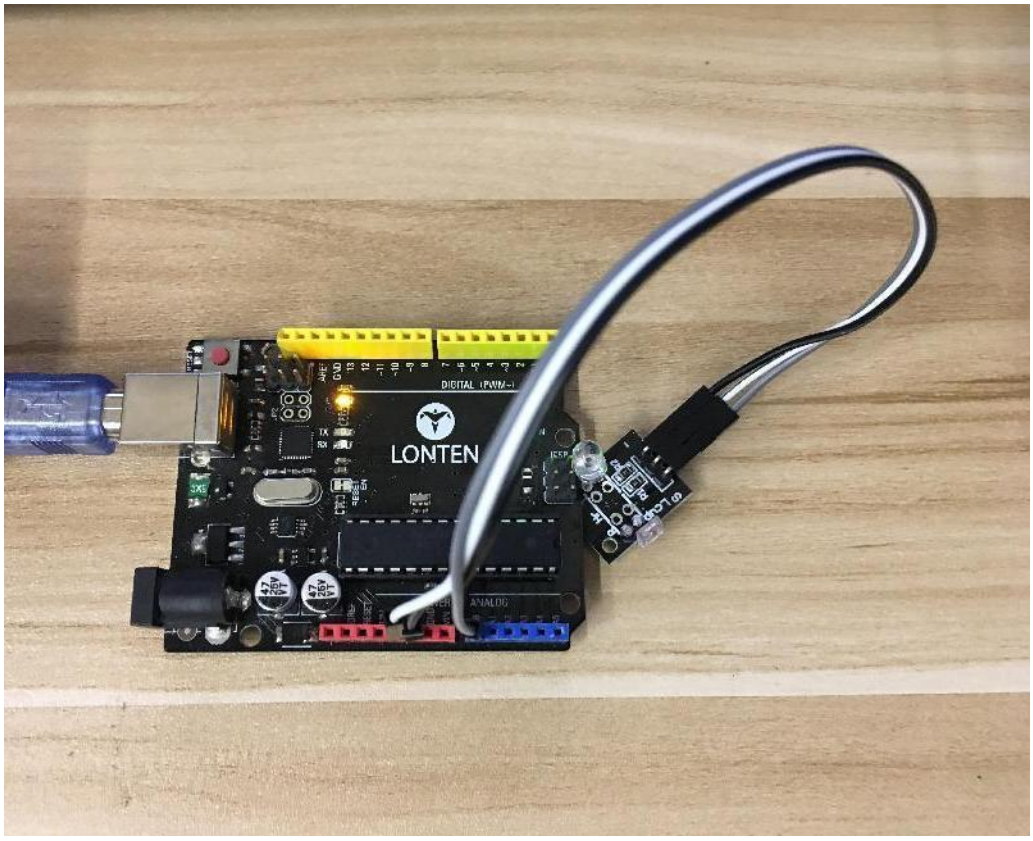
Schematic



wiring diagram

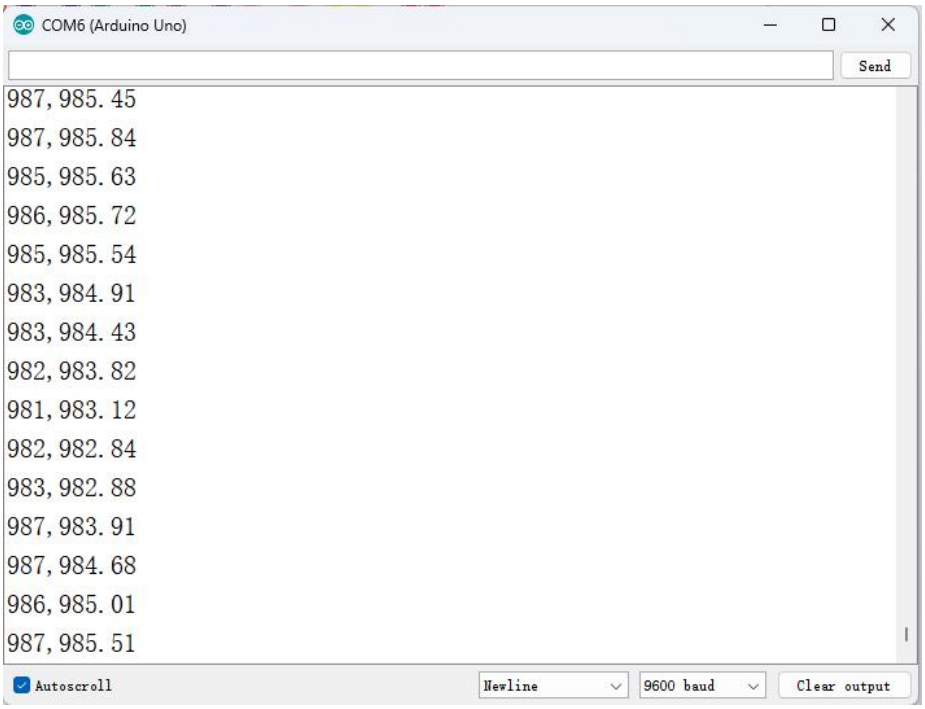


Example picture



Result

Upload the program then open the monitor, we can see the data as below:



Lesson 27 HC-SR04 Ultrasonic Sensor

Overview

As the ultrasonic has strong direction, slow energy consumption and far spread distance in the media, so it is commonly used in the measurement of distance, such as range finder and position measuring instrument.

Using ultrasonic is more rapid, convenient, simple to calculate and more easier to achieve real-time control, so it has also been widely used in the development of mobile robots.

Ultrasonic detector module can provide 2cm-450cm non-contact sensing

distance, and its ranging accuracy is up to 3mm, very good to meet the normal requirements. The module includes an ultrasonic transmitter and receiver as well as the corresponding control circuit.

Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

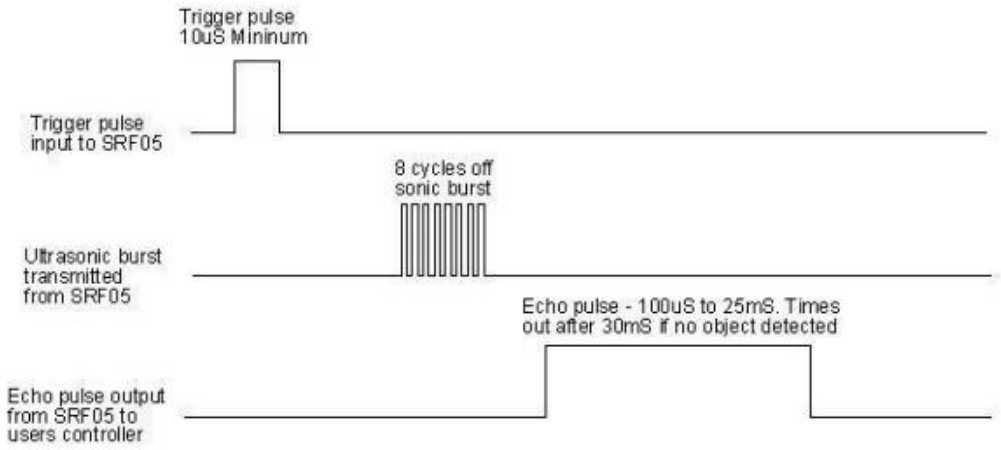
(3) Ultrasonic sensor * 1

(4) Breadboard* 1

(5) Breadboard Jumper Wires* Several

Working Schematics

Please refer to the working sequence as below：



1. First pull down the TRIG, and then trigger it with at least 10us high level signal;

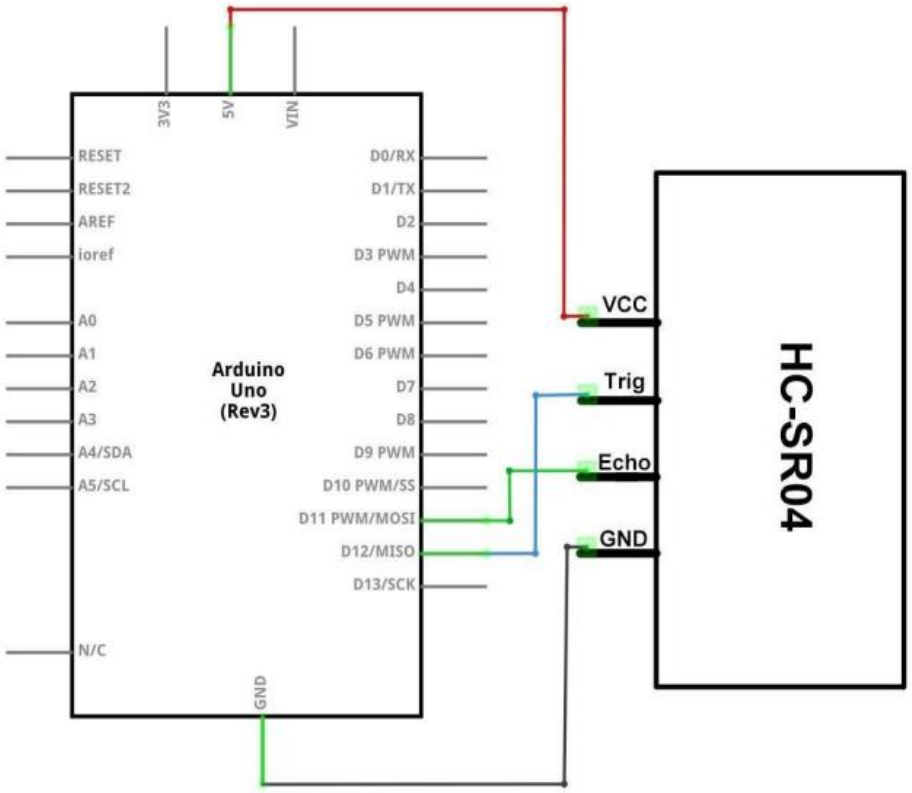
2. After triggering, the module will automatically transmit eight 40KHZ square waves, and automatically detect whether there is a signal to return.

3. If there is a signal returned back, through the ECHO to output a high level, the duration time of high level is actually the time from emission to reception of ultrasonic.

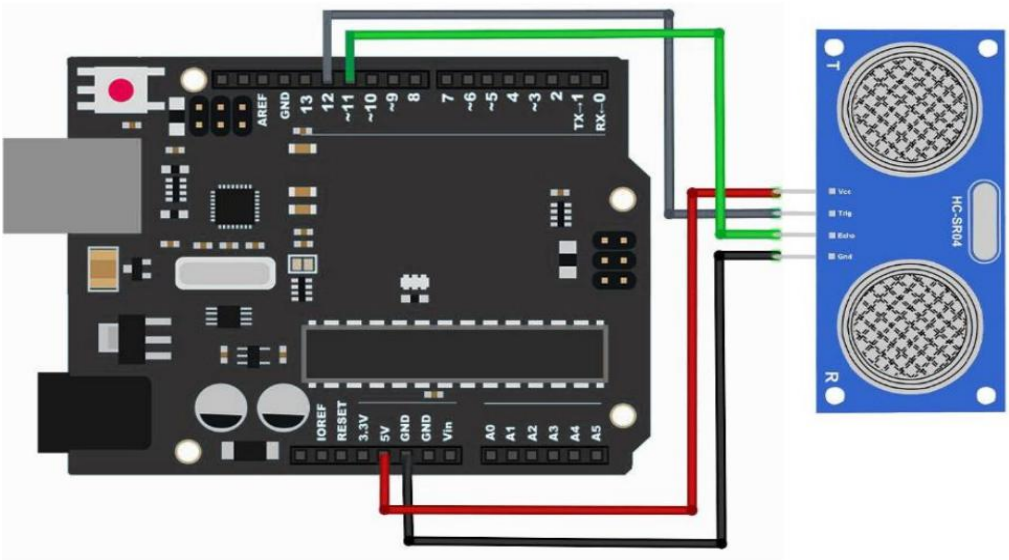
Test distance = high level duration * 340m/s * 0.5.

Connection

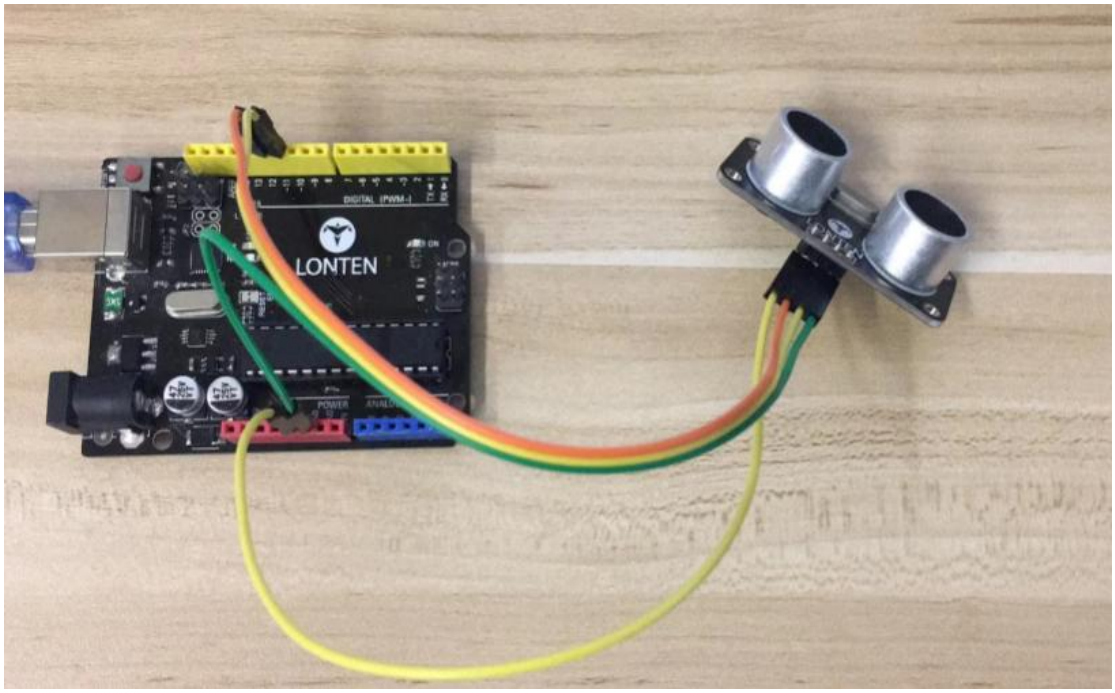
Schematic



wiring diagram



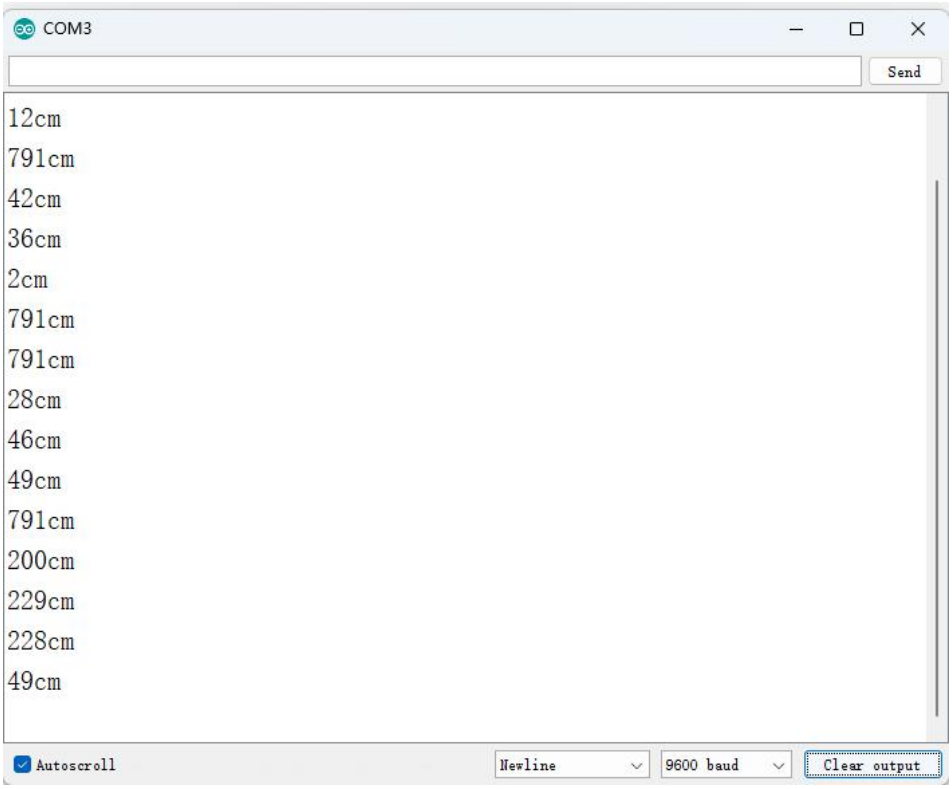
Example picture



Result

Using a Library designed for these sensors will make our code short and simple. We include the library at the beginning of our code, and then by using simple commands we can control the behavior of the sensor.

Open the monitor then you can see the data as blow:



Lesson 28 Steam Sensor

Overview

This is a commonly used water level sensor. The principle is to detect the amount of water through the exposed printed parallel lines on the circuit board. The more water, the more wires are connected. As the conductive contact area increases, the output voltage will gradually increase. The water level sensor can be used as a rain detector switch. When the humidity on the sensor surface increases sharply, the output voltage will increase.

Caution: connection parts is non-waterproof, so please don't put them into water.

Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable* 1

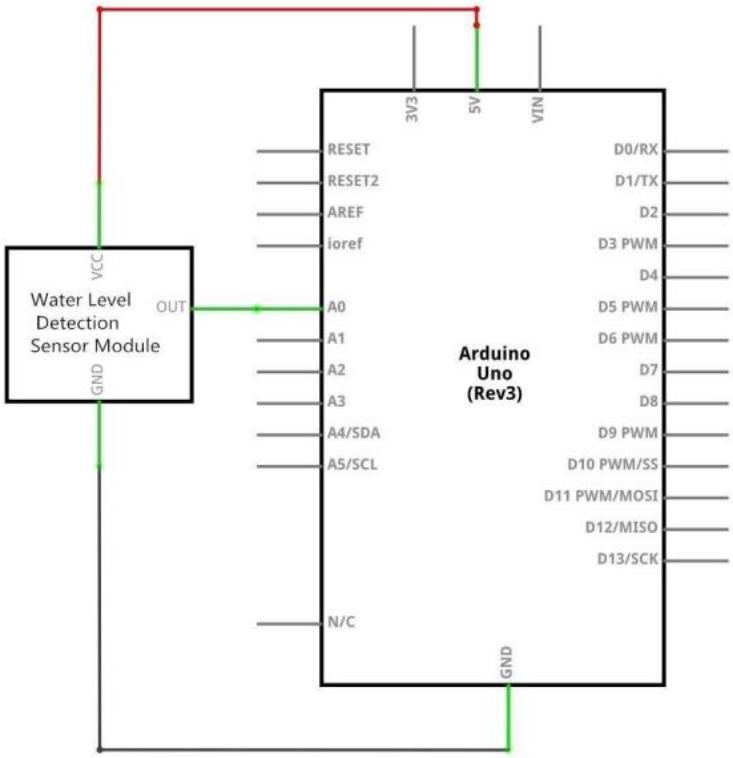
(3) Steam sensor module * 1

(4) Breadboard* 1

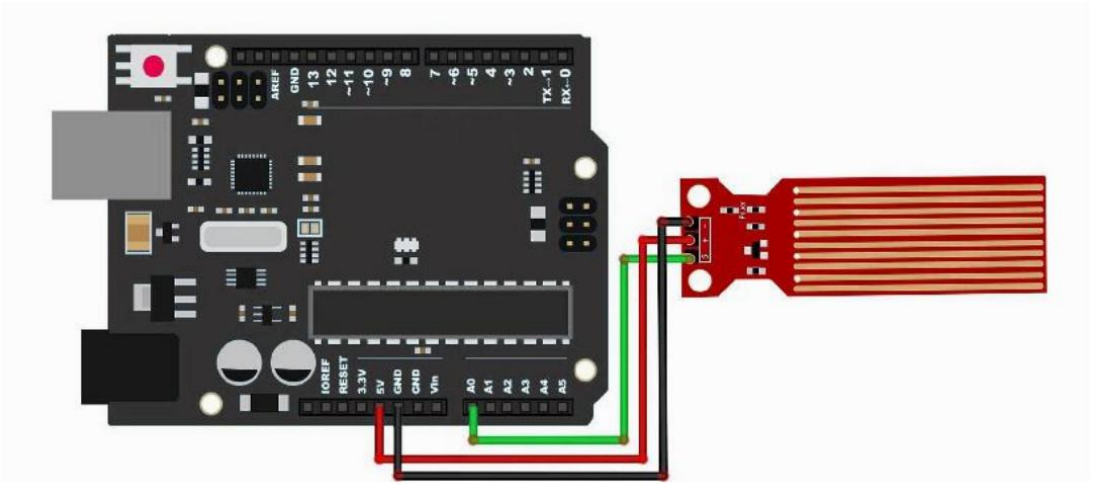
(5) Breadboard Jumper Wires* Several

Connection

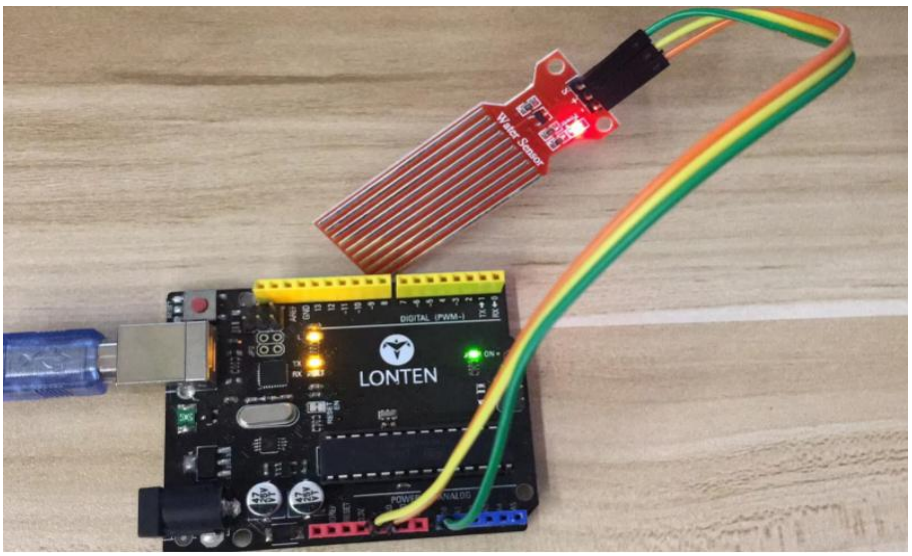
Schematic



wiring diagram

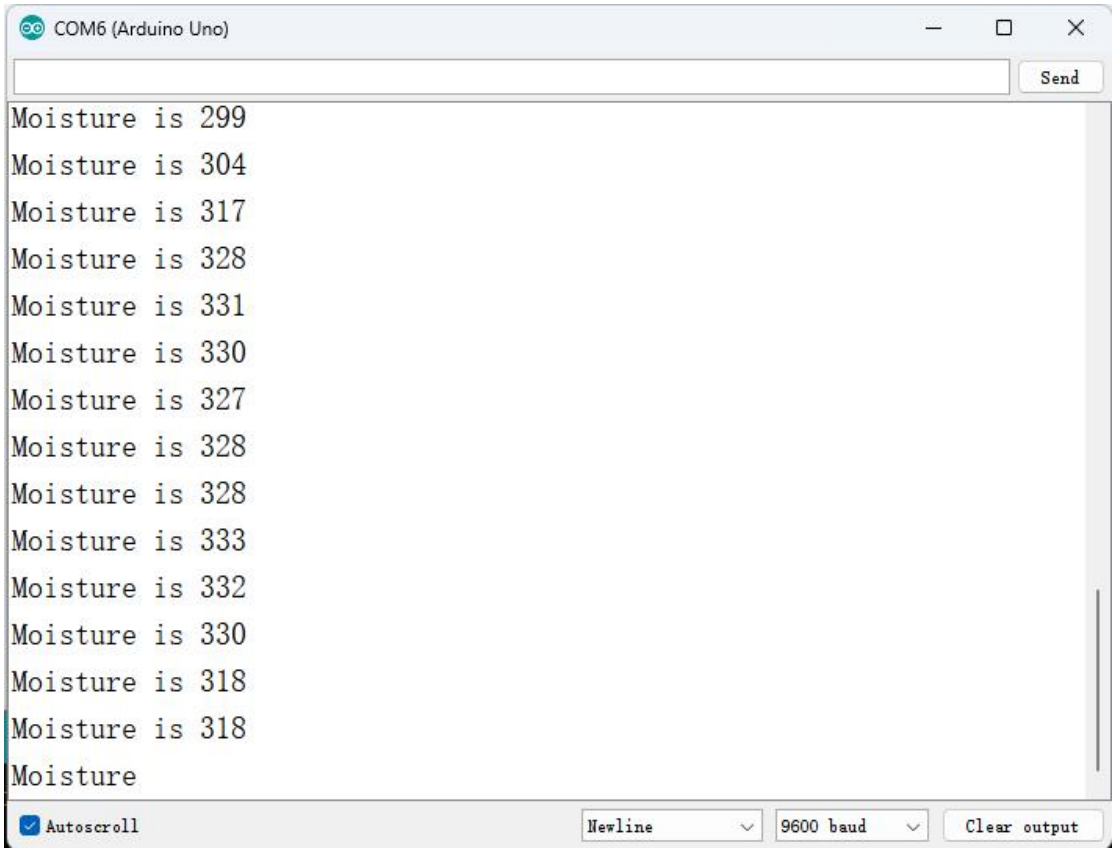


Example picture



Result

Upload the program then open the monitor, we can see the data as below:

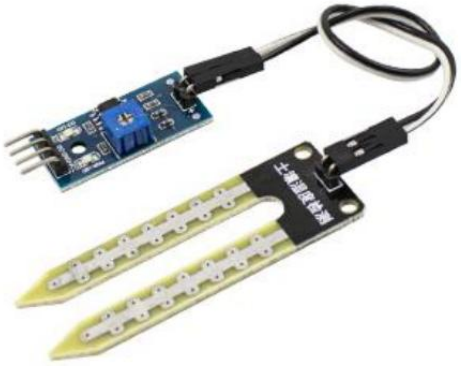


Lesson 29 Soil Moisture Module

Overview

Used to detect the degree of soil drought. The AO interface of the module outputs the analog voltage value of soil moisture (0-1023). 1023 means the driest. 0 means the highest moisture content.

When the soil moisture of the module exceeds the set threshold, the DO port will output a low level "0". When the soil moisture and humidity are lower than the set threshold, the module D0 will output a high level "1";



Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable *1

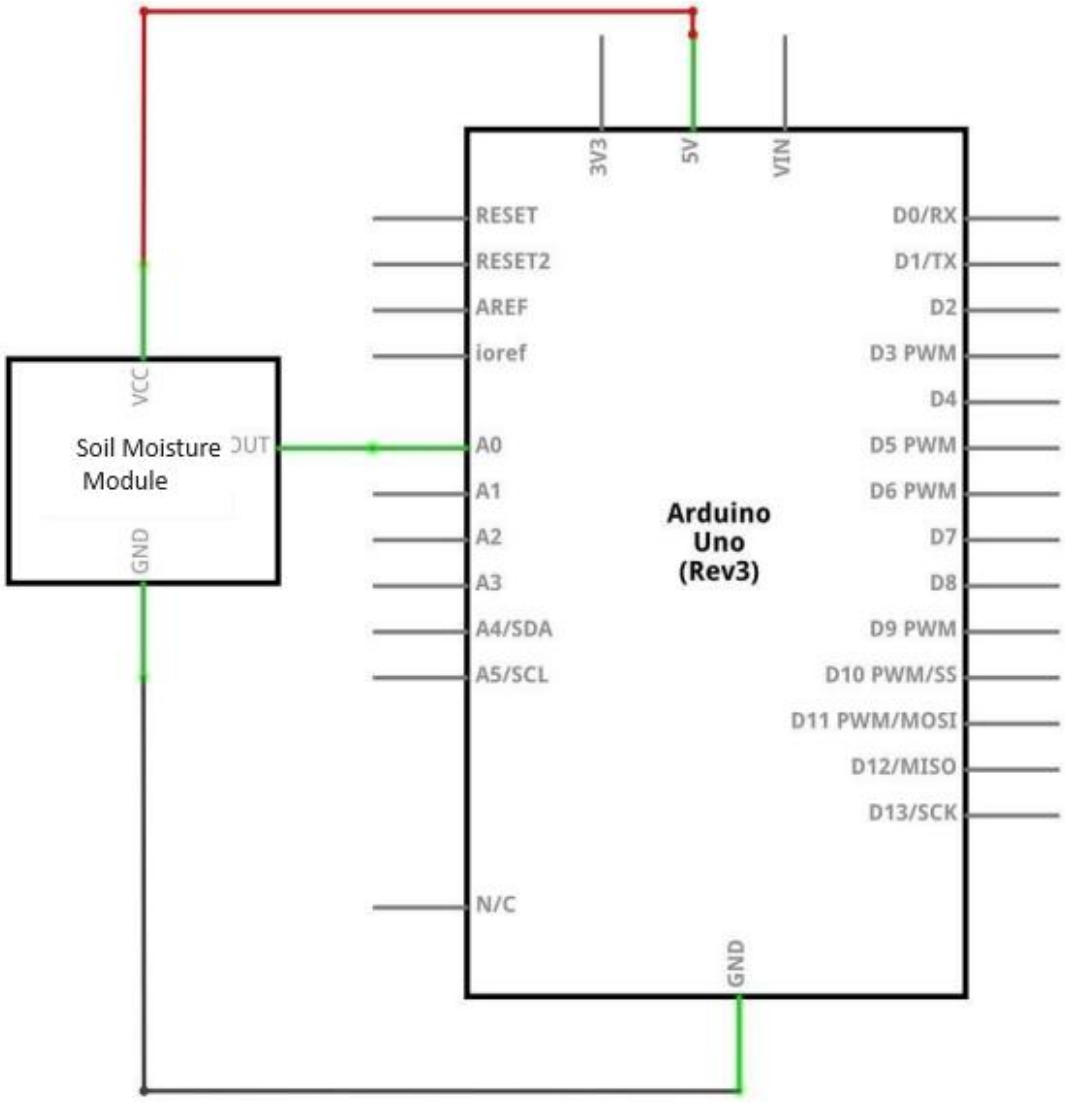
(3) Soil Moisture Module*1

(4) Breadboard*1

(5) Breadboard Jumper Wires* Several

Connection

Schematic



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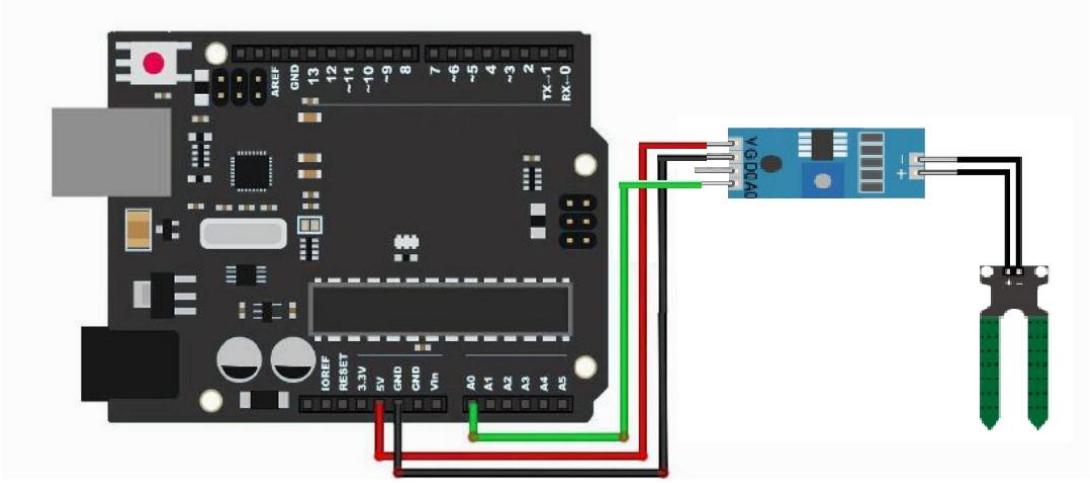
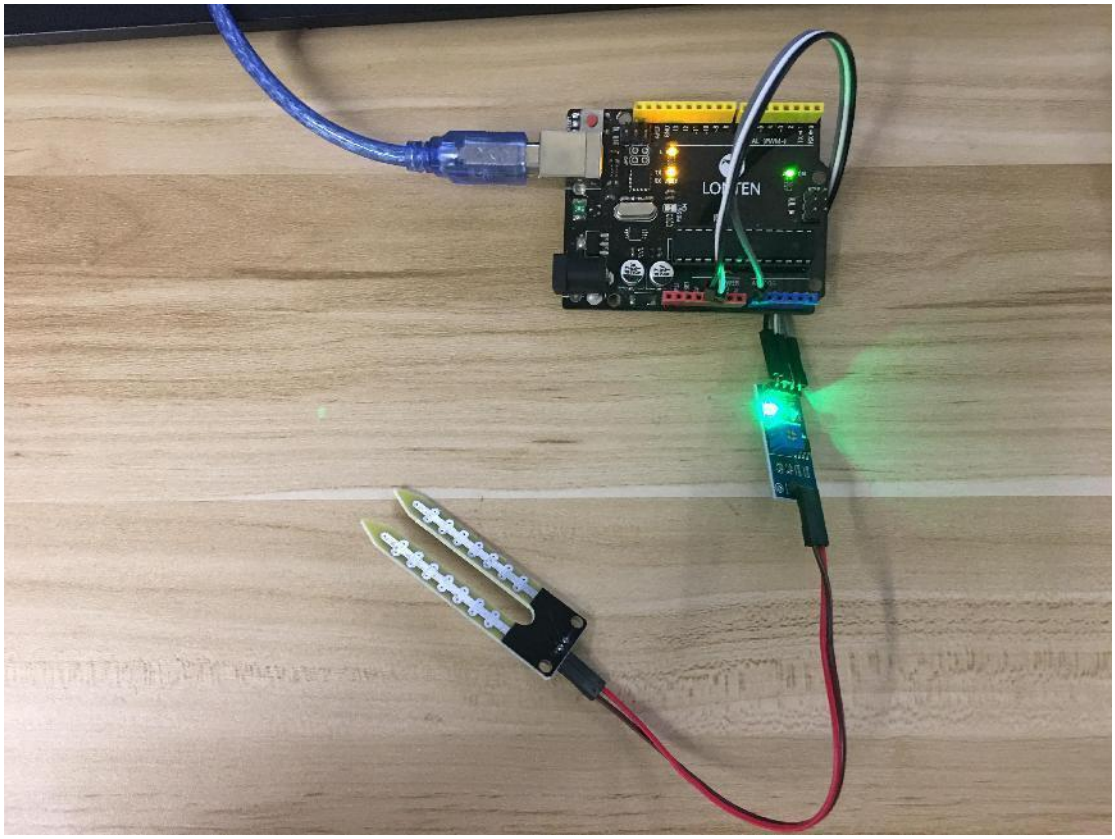
wiring diagram

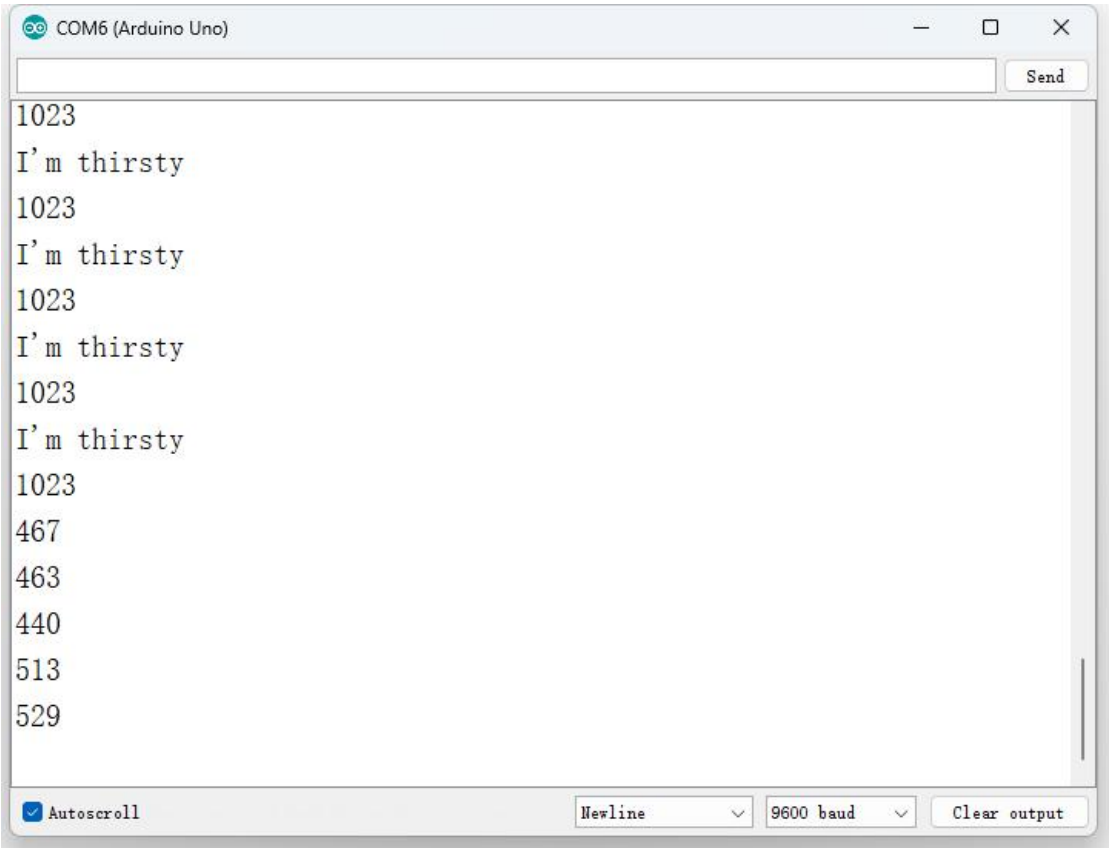


Example picture



Result

After the program is uploaded. Insert the soil moisture sensor into the soil, open the serial monitor, and observe the data sent back from the soil sensor to the serial monitor.



Lesson 30 DC Motors

Overview

In this lesson, you will learn how to control a small DC motor using an UNO R3 and a transistor.

Component Required:

(1) LONTEN UNO Board * 1

(2) USB Cable *1

(3) Power Supply Module*1

(4) Breadboard*1

Component Introduction

Breadboard Power Supply

The small DC motor is likely to use more power than an UNO R3 board digital output can handle directly. If we tried to connect the motor straight to an UNO R3 board pin, there is a good chance that it could damage the UNO R3 board. So we use a power supply module provides power supply.

Product Specifications:

Locking On/Off Switch

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LED Power Indicator

Input voltage: 6.5-9v (DC) via 5.5mm x 2.1mm plug

Output voltage: 3.3V/5v

Maximum output current: 700 mA

Independent control rail output. 0v, 3.3v, 5v to breadboard

Output header pins for convenient external use

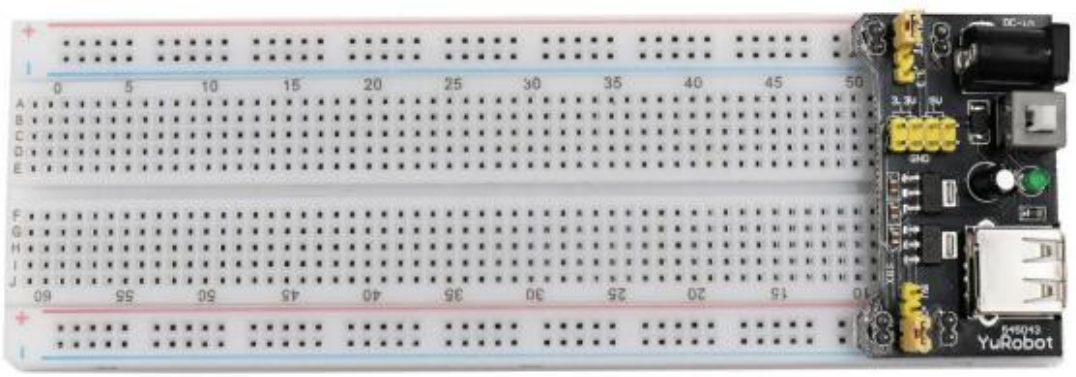
Size: 2.1 in x 1.4 in

USB device connector onboard to power external device

Setting up output voltage:

The left and right voltage output can be configured independently. To select the output voltage, move jumper to the corresponding pins.

Note: power indicator LED and the breadboard power rails will not power on if both jumpers are in the “OFF” position.



Important note:

Make sure that you align the module correctly on the breadboard. The negative pin(-) on module lines up with the blue line(-) on breadboard and that the positive pin(+) lines up with the red line(+). Failure to do so could result in you accidently reversing the power to your project.

Lesson 31 DS1302 clock module

Overview

There are currently many popular serial clock circuits, such as DS1302, DS3231, DS1307, PCF8485, etc. They are widely used due to their simple interface, low cost, and ease of use. In this experiment, we will use the DS1302 real-time clock module, which is a high-performance, low-power, RAM equipped real-time clock circuit that can time the year, month, day, week, hour, minute, and second, and has leap year compensation function.

Component Required

(1) LONTEN UNO Board * 1

(2) USB Cable *1

(3) DS1302 clock module*1

(4) Breadboard Jumper Wires* Several

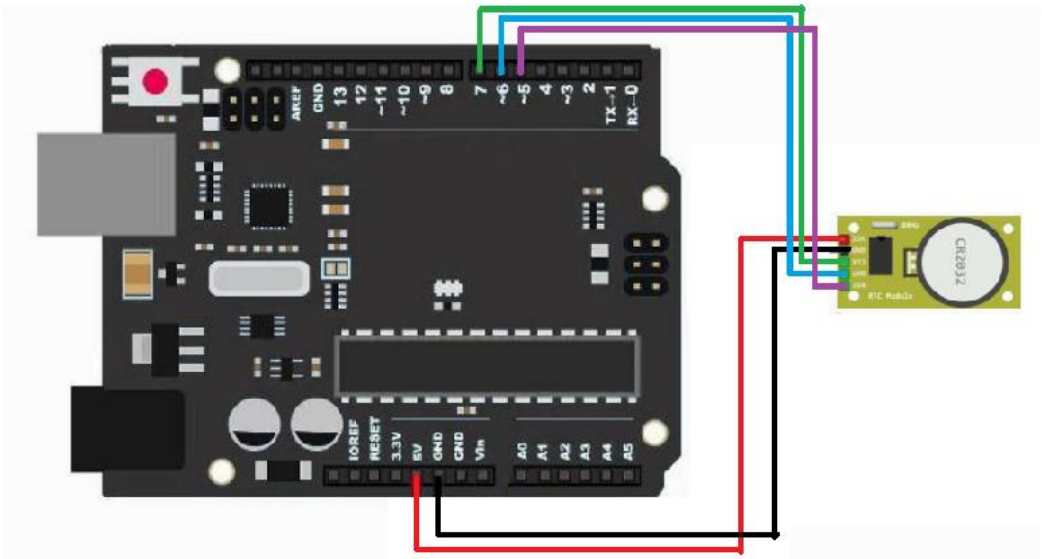
Component Introduction

DS1302

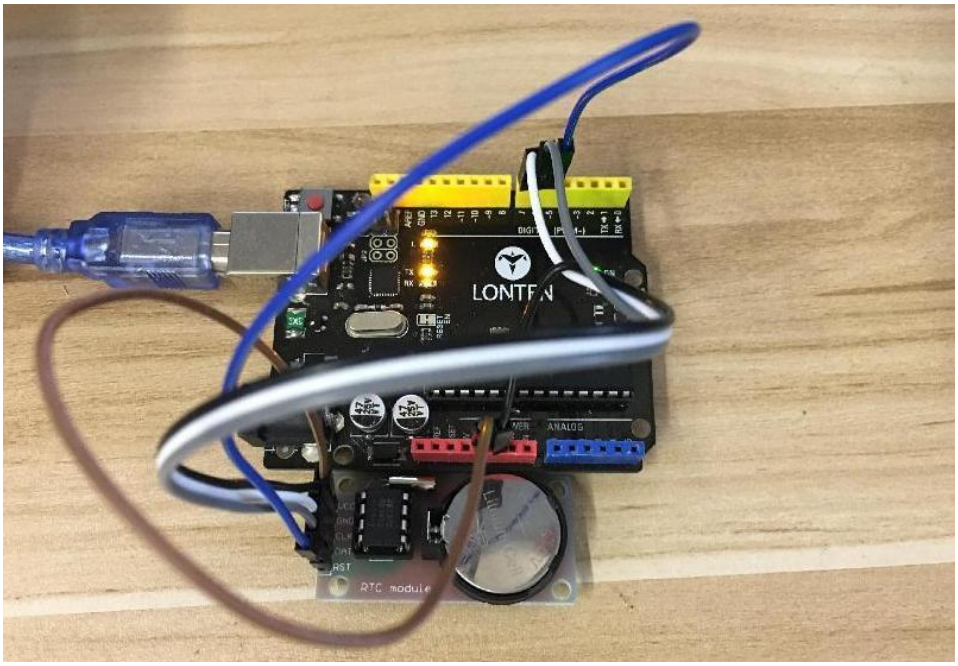
DS1302 is a trickle charging clock chip launched by DALLAS company, which contains a real-time clock/calendar and 31 bytes of static RAM. It communicates with the microcontroller through a simple serial interface. The real-time clock/calendar circuit provides information on seconds, minutes, hours, days, weeks, months, and years, and the number of days per month and leap years can be automatically adjusted. The clock operation can be determined to use 24 or 12 hour format through AM/PM instructions. The communication between DS1302 and microcontroller can be simply achieved through synchronous serial communication, using

only three port lines: (1) RST reset, (2) I/O data line, and (3) SCLK serial clock. The read/write data of the clock/RAM is communicated in one byte or up to 31 byte character sets. The power consumption of DS1302 is very low during operation, and the power for maintaining data and clock information is less than 1mW.

Circuit Connection

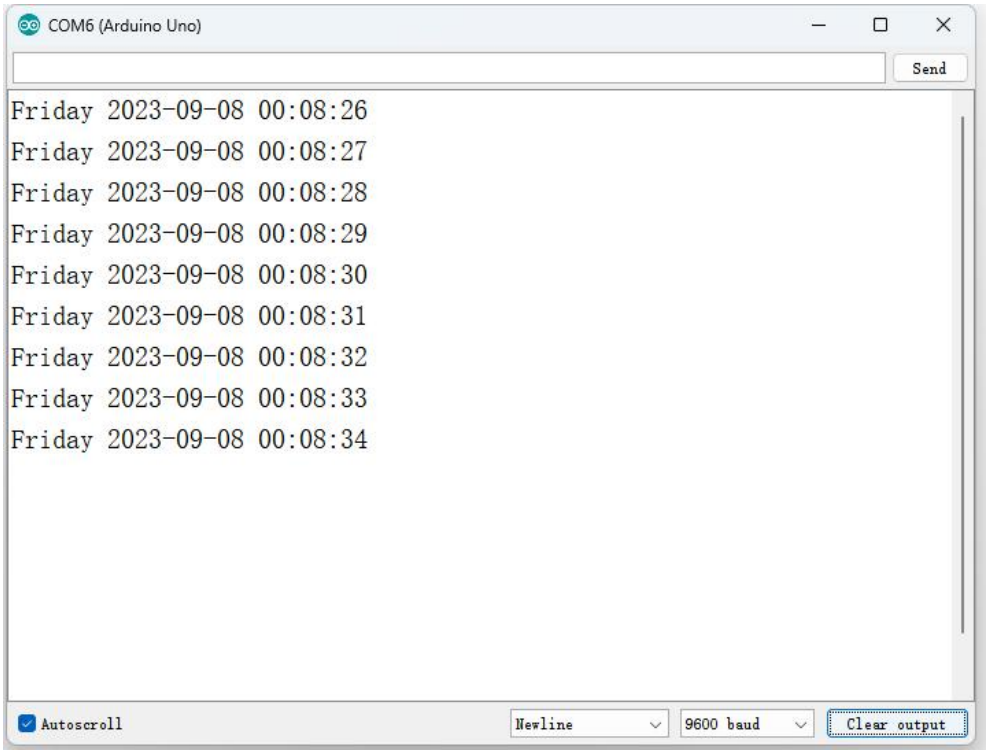


Example picture



Result

Open the monitor then you can see the data as blow:



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Lesson 32 Servo

Overview

Servo is a type of geared motor that can only rotate 180 degrees. It is controlled by sending electrical pulses from your UNO R3 board. These pulses tell the servo what position it should move to. The Servo has three wires, of which the brown one is the ground wire and should be connected to the GND port of UNO, the red one is the power wire and should be connected to the 5v port, and the orange one is the signal wire and should be connected to the Dig #9 port.

Component Required

(1) LONTEN UNO Board * 1

(2) USB Cable *1

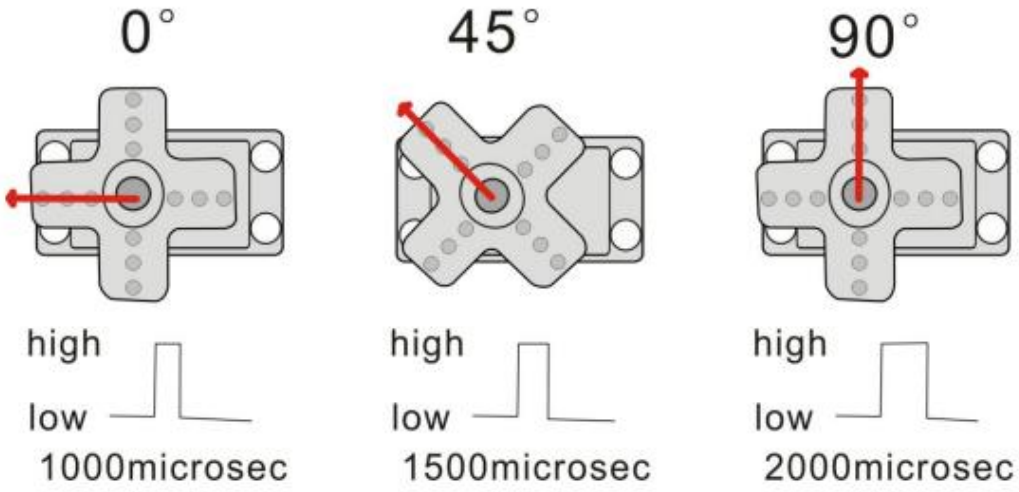
(3) Servo (SG90)*1

(4) Breadboard Jumper Wires* Several

Component Introduction

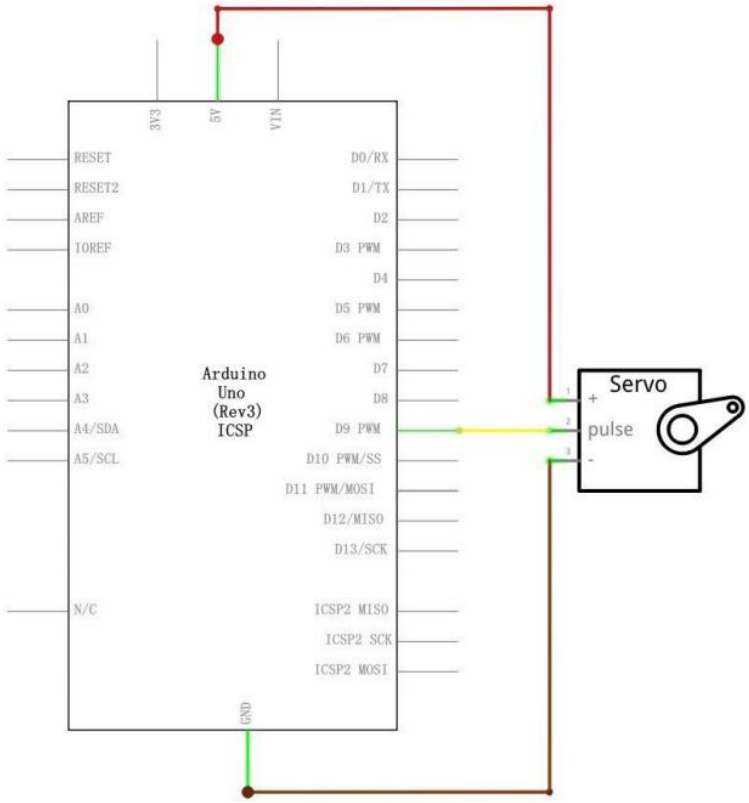
SG90

The rotation angle of servo is controlled by regulating the duty cycle of the PWM(Pulse-Width Modulation) signal. The standard cycle of the PWM signal is fixed at 20ms (50 Hz), and the pulse width is distributed between 1ms-2ms. The pulse width corresponds to the rotation angle (0°～90°) of servo.

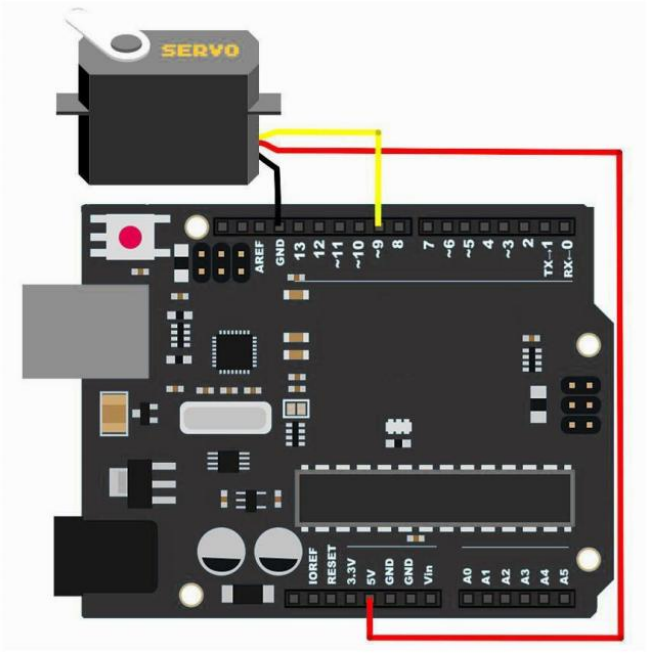


Connection

Schematic

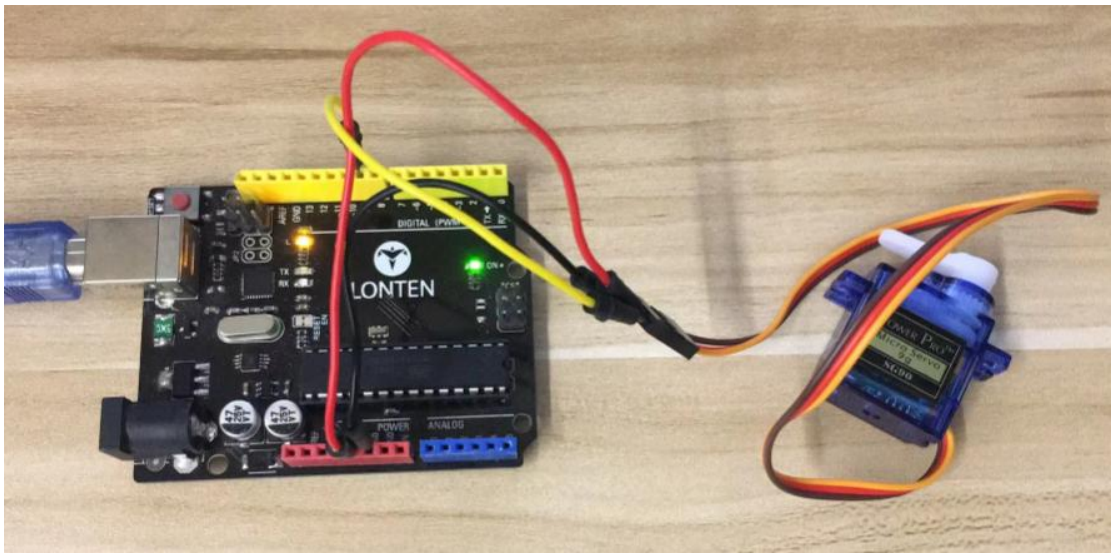


Circuit Connection



Example picture

In the picture, the brown wire of servo is adapted via the black M-M wires, the red one is adapted via the red M-M wires, and the orange one is adapted via the yellow M-M wires.



Lesson 33 Analog（MQ-2）Sensor

Overview

This gas sensor is used for household gas leak alarms, industrial combustible gas alarms and portable gas detection instruments. And it is suitable for the detection of liquefied gas, benzene, alkane, alcohol, hydrogen, etc., and widely used in various fire alarm systems. The MQ-2 smoke sensor can be accurately a multi-gas detector, and has the

advantages of high sensitivity, fast response, good stability, long life, and simple drive circuit.

Component Required

(1) LONTEN UNO Board * 1

(2) USB Cable *1

(3) Gas Sensor (MQ2)*1

(4) Breadboard Jumper Wires* Several

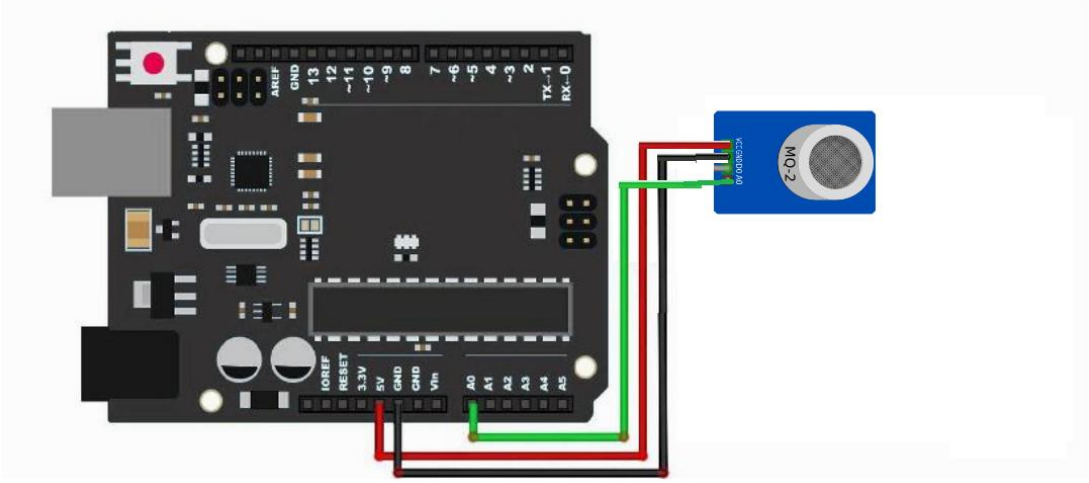
Component Introduction

MQ2

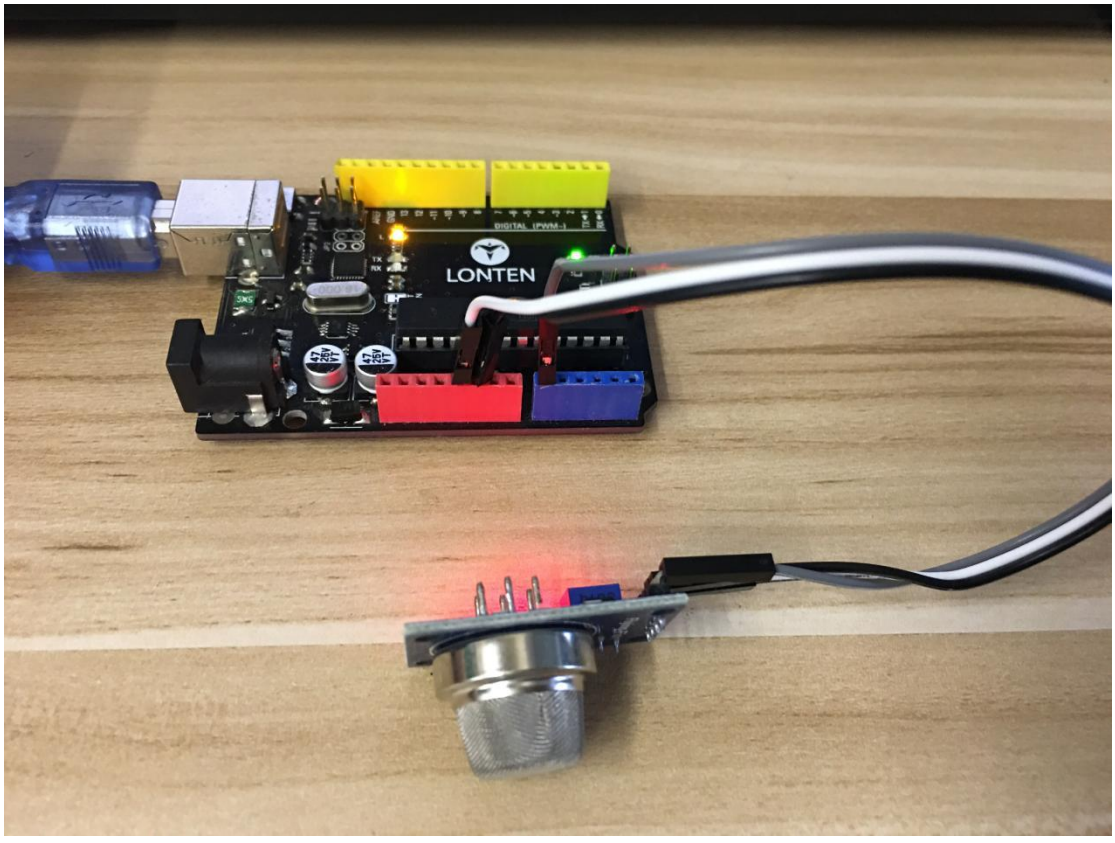
The MQ-2 type smoke sensor belongs to the tin dioxide semiconductor gas sensing material and belongs to the surface ion type N-type semiconductor. At temperatures ranging from 200 to 300 degrees Celsius, tin dioxide adsorbs oxygen in the air, forming a negative ion adsorption of oxygen, reducing the electron density in semiconductors and increasing their resistance value. When in contact with smoke, if the potential barrier at the grain boundary is adjusted by smoke, it will cause a change in surface conductivity. By utilizing this point, information about the presence of this type of smoke can be obtained. The higher the

concentration of smoke, the higher the conductivity, and the lower the output resistance, the larger the output analog signal.

Circuit Connection

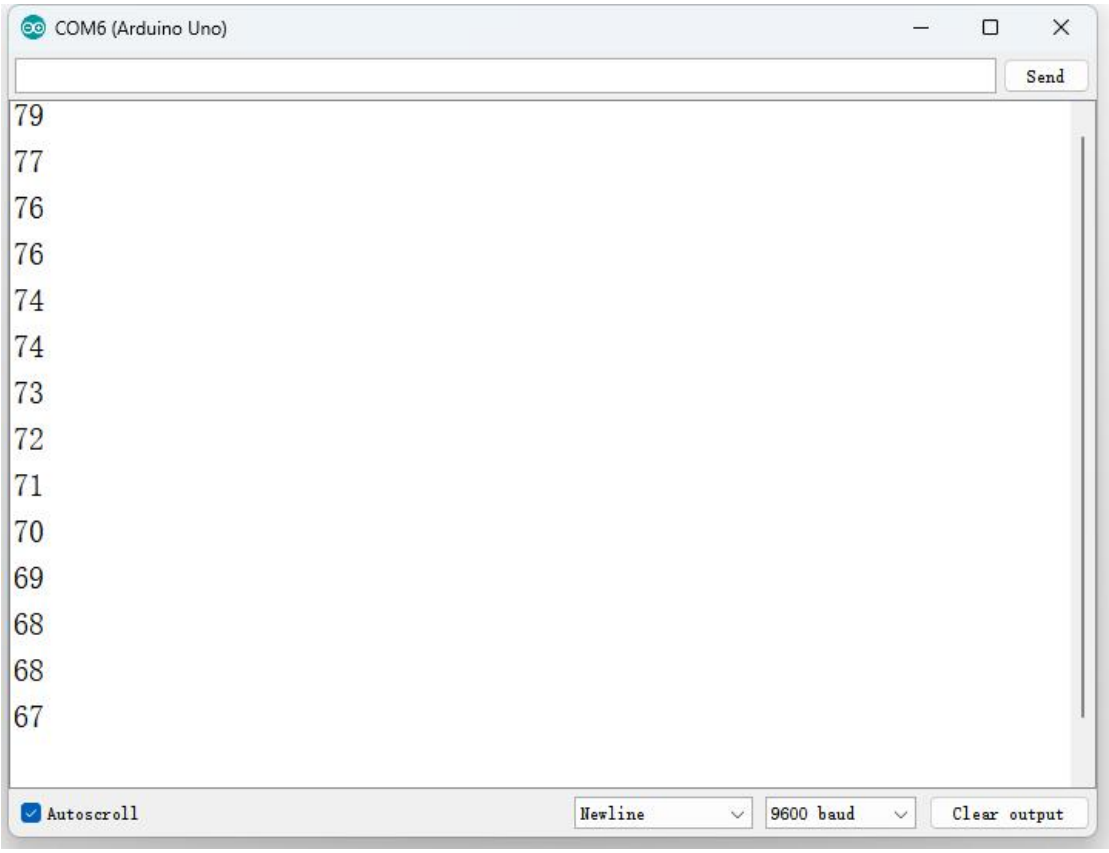


Example picture



Result

Upload test code, wire up components according to connection diagram and power on. When the detected value of flammable gas is greater than 80, the passive buzzer will emit sound and reverse rotation of the fan motor, however, when there is no flammable gas, the passive buzzer won't emit a sound and the motor stops rotating.



Lesson 34 GY-291 Sensor

Overview

ADXL345 is a complete 3-axis acceleration measurement system with selectable measurement ranges of ± 2 g, ± 4 g, ± 8 g, or ± 16 g. It can measure both dynamic acceleration caused by motion or impact, as well as static acceleration, such as gravitational acceleration, making the device usable as a tilt sensor. The sensor is a surface micromachined structure of polycrystalline silicon, located at the top of the wafer. Due to the application of acceleration, polycrystalline silicon springs are suspended on the structure of the wafer surface, providing force resistance. The differential capacitor is composed of an independent fixed plate and a movable mass connection plate, which can measure structural deflection. Acceleration causes the inertia mass to deflect and the differential capacitance to become unbalanced, resulting in the amplitude of the sensor output being proportional to the acceleration. Phase sensitive demodulation is used to determine the amplitude and polarity of acceleration.

Component Required

(1) LONTEN UNO Board * 1

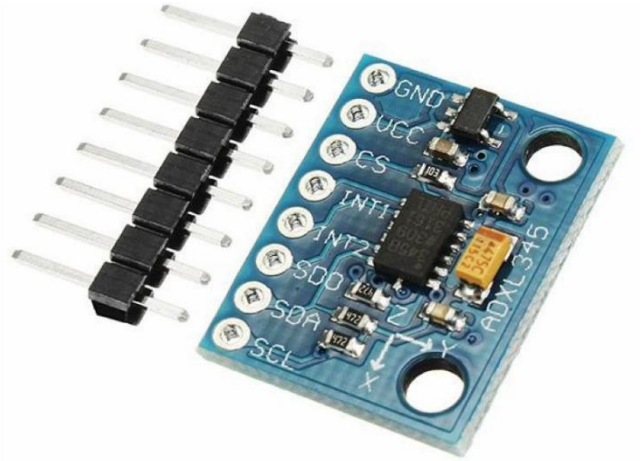
(2) USB Cable *1

(3) GY-291 Sensor *1

(4) Breadboard Jumper Wires* Several

Component Introduction

GY-291 Sensor

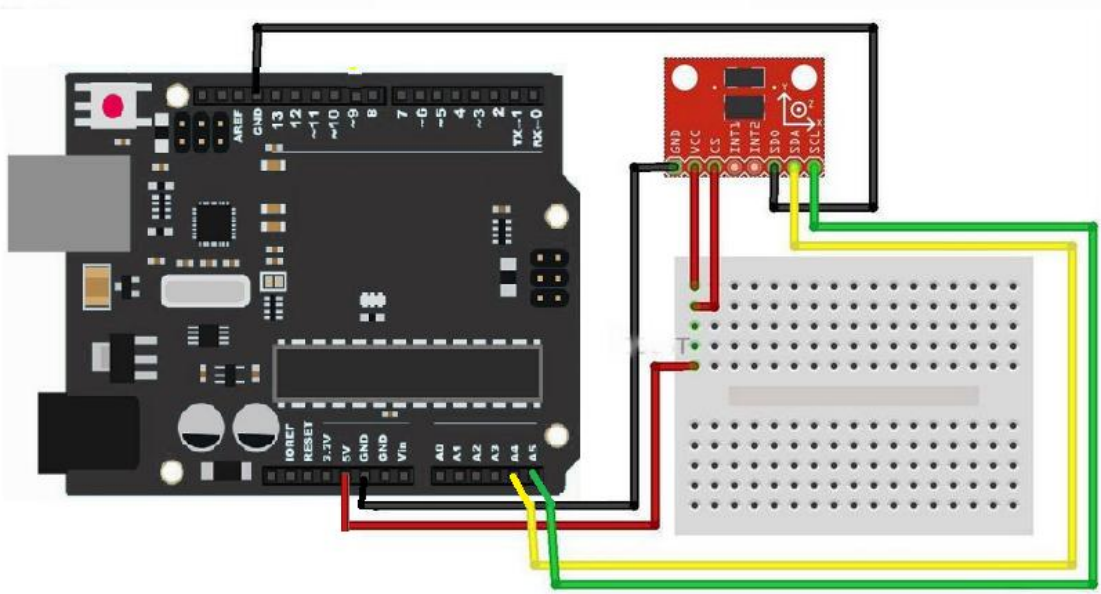


ADXL345 is a small and thin low-power 3-axis accelerometer with high resolution (13 bits) and a measurement range of ± 16g. The digital output data is in 16 bit binary complement format and can be accessed through SPI (3-wire or 4-wire) or I2C digital interface. The ADXL345 is very suitable for mobile device applications. It can measure static gravity acceleration in tilt detection applications, as well as dynamic acceleration caused by motion or impact. It has a high resolution (4 mg/LSB) and can measure tilt angle changes of less than 1.0 °. This device provides various special detection functions. The active and inactive detection function detects the occurrence of motion and whether the acceleration on

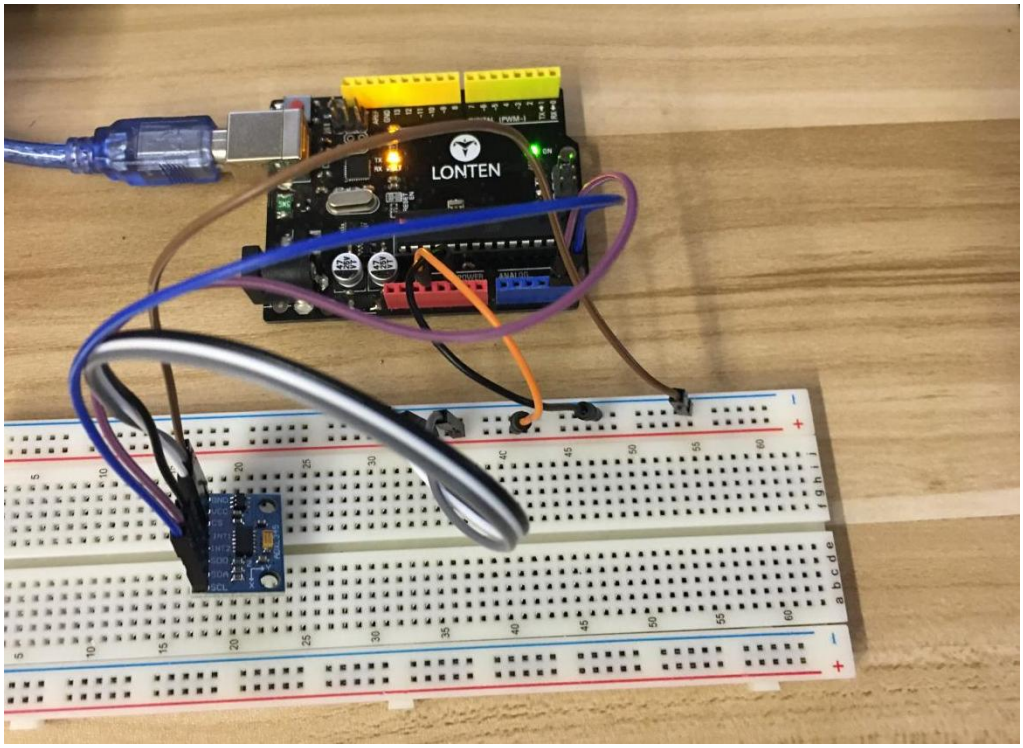
any axis exceeds the user set limit. The knock detection function can detect click and double-click actions. The free fall detection function can detect whether the device is falling. These functions can be mapped to one of the two interrupt output pins. The 32 level first in first out (FIFO) buffer currently under patent application can be used to store data and minimize host processor intervention. The low-power mode supports intelligent power management based on motion, enabling threshold sensing and motion acceleration measurement at extremely low power consumption.

ADXL345 adopts 3 mm × 5 mm × 1 mm, 14 pin small ultra-thin plastic packaging.

Circuit Connection



Example picture



Result:

Upload test code, wire up components according to connection diagram and power on.

During the detection process, ADXL345 continuously outputs acceleration values sampled on the three axes based on the sampling rate. Due to the presence of gravity acceleration, changes in readings can be observed when adjusting the module tilt, corresponding to the three axis direction marked on the PCB. When the axis is facing the ground, the reading will reach the maximum negative value, and when it is facing back to the ground, the maximum positive value can be read. Based on the data sampled on the three axes, the device attitude (tilt) can be determined (if it is currently stationary).