



KEYESTUDIO Mega Plus STEM Starter Kit for Arduino

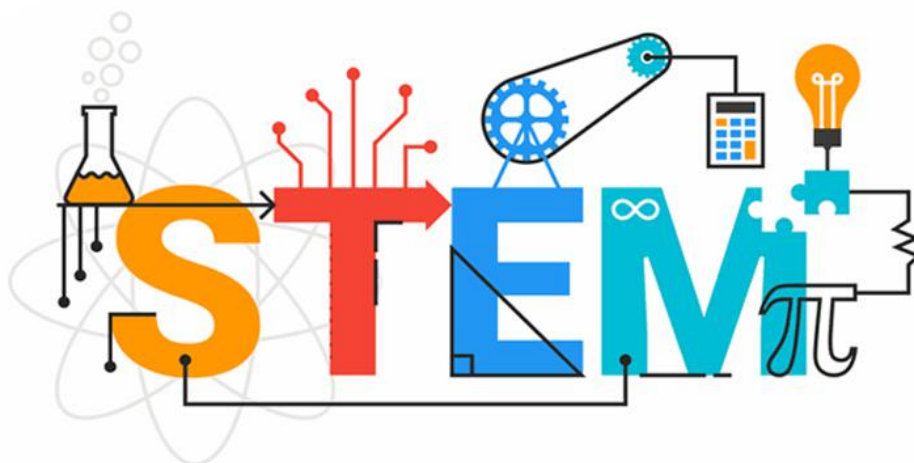


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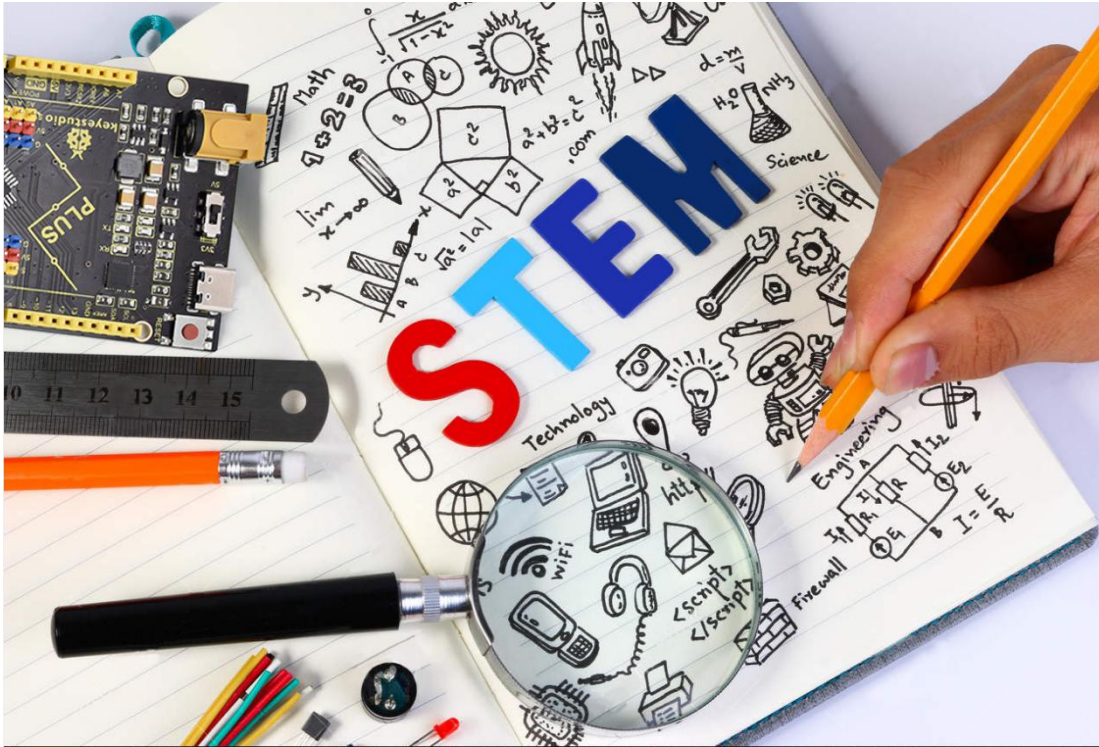
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1.Introduction

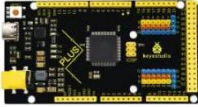
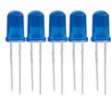
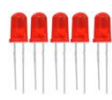
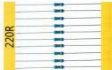
Do you want to acquire programming knowledge? As long as you are passionate about science and dare to explore new things, this STEM starter kit must be your best choice.

KEYESTUDIO STEM Starter Kit is a programming learning kit based on Arduino. With a controller, numerous sensors, modules and electronic components, you can do many different DIY projects.

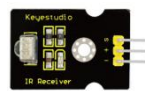
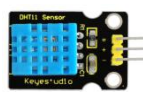
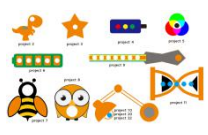
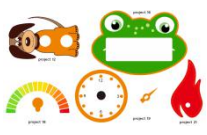
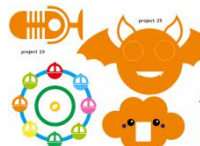
This kit also comes with 28 projects tutorials, which are entirely suitable for beginners. Each tutorial has detailed wiring diagrams and fascinating Project Codes. You can learn electronics, physics, science and programming knowledge.



2. Part List

					
Mega Plus board*1	LED - Blue*5	LED - Red*5	LED - Yellow*5	LED - Green*5	LED - RGB*1
					
220Ω Resistor*10	10KΩ Resistor*10	1KΩ Resistor*10	10K Ω Potentiometer*1	Buzzer (Active)*1	Buzzer (Passive)*1
					
Button Switch*4	Ball Tilt Sensor*2	Photo Cell*3	Flame Sensor*1	LM35 Temp Sensor*1	IC 74HC595N *1



					
TIP122 Transistor*1	1 Digital Tube Display*1	4 Digital Tube Display*1	8*8 LED Matrix*1	1602 I2C LCD *1	IR Receiver*1
					
IR Remote Control*1	Servo Motor*1	130 Motor Propeller*1	130 Dc Motor*1	Stepper Driver*1	Stepper Motor*1
					
Joystick Module*1	Sound Sensor*1	PIR Motion Sensor*1	HC-SR04 Ultrasonic*1	DHT11 Sensor*1	400-hole Breadboard*1
					
Arduino holder*1	Male to Female Dupont Wire*10	Female to Female Dupont Wire*10	Flexible jumper Wire*20	Preformed Jumper Wire*1	9v Battery Connector*1
					
Type c USB Cable*1	Cartoon paper	Cartoon paper	Cartoon paper	Resistor card	

3.KEYESTUDIO Mega Plus Development Board

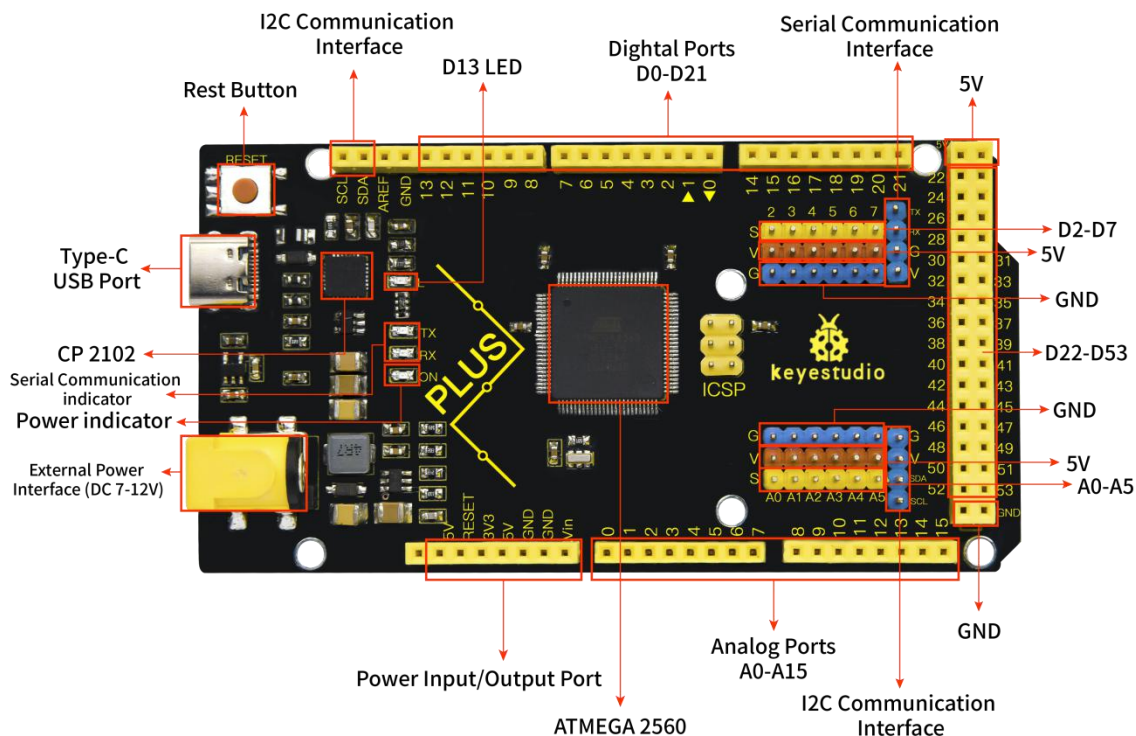


Before we get started with the KEYESTUDIO STEM Starter Kit, we first introduce the Mega plus development board, it is the core of all the projects.

KEYESTUDIO Mega plus board, whose processor core is ATMEGA2560-16AU, is fully compatible with ARDUINO Mega REV3.

USB to TTL chip adopts more economic and stable CP2102.

This Mega plus board consists of 54-channel digital input and output ports, of which 15 pins are served as PWM output, 16 analog inputs, 4 serial communication ports, one 16MHz crystal oscillator, 1 USB port, 1 power socket, 1 ICSP interface and 1 reset button.



Special Interfaces Description



Serial communication interface(4 channel): Serial (D0 =RX0, D1 =TX0) ,

Serial1 (D19 is RX1, D18 is TX1)

Serial2 (D17 is RX2, D16 equals to TX2) , Serial3 (D15 is RX3, D14 is TX3),

D0 and D1 are connected to ATMEGA16U2-MU

PWM port (Pulse width modulation): D2-D13 and D44-D46

External interrupt pins: D2 (interrupt 0), D3(interrupt 1), D21 (interrupt 2),

D20 (interrupt 3), D19(interrupt 4) and D18 (interrupt 5)

SPI communication interface: D53 stands for SS, D51 is MOSI, D50 is MISO,

D52 equals to SCK

IIC communication interface: D20 represents SDA, D21 is SCL

4.Installing Driver For Windows

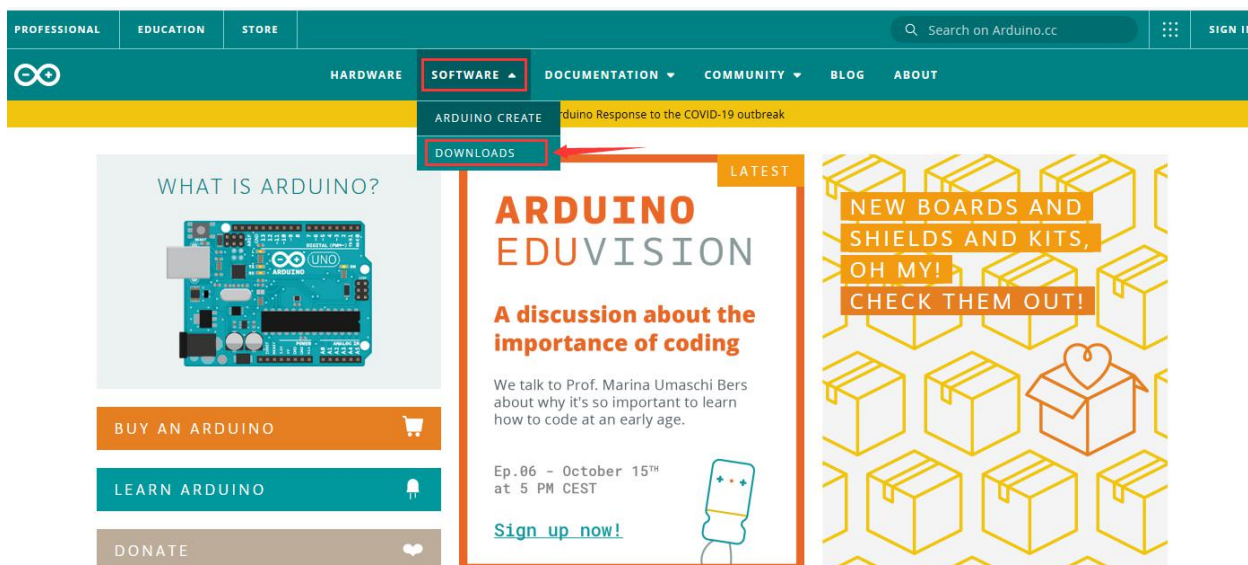


4.1 Download Software

Arduino IDE is the open-source Software makes it easy to write code and upload it to the board. When getting the control board, we first need to install Arduino IDE

Go to the website <https://www.arduino.cc/> and you will see the following page.

Click **SOFTWARE** and **DOWNLOADS**





Then you will see a page where you can download the latest version of the IDE. There are the Installer (.exe) and the Zip packages you can choose for Windows. We suggest you use the first one that installs directly everything you need to use the Arduino Software (IDE), including the drivers. With the Zip package you need to install the drivers manually. The Zip file is also useful if you want to create a portable installation.

Arduino IDE 1.8.13

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. This software can be used with any Arduino board.

Refer to the [Getting Started](#) page for Installation instructions.

SOURCE CODE

Active development of the Arduino software is [hosted by GitHub](#). See the instructions for [building the code](#). Latest release source code archives are available [here](#). The archives are PGP-signed so they can be verified using [this](#) gpg key.

DOWNLOAD OPTIONS

- Windows** Win 7 and newer
- Windows** ZIP file
- Windows app** Win 8.1 or 10 [Get](#)
- Linux** 32 bits
- Linux** 64 bits
- Linux** ARM 32 bits
- Linux** ARM 64 bits
- Mac OS X** 10.10 or newer

[Release Notes](#) [Checksums \(sha512\)](#)

Pull down this page, you can also click "previous version of the current release" to enter another page to select and install the previous version of Arduino Software.

Previous Releases

Download the [previous version of the current release](#) the classic [Arduino 1.0.x](#), or the [Arduino 1.5.x Beta version](#).

All the [Arduino 00xx versions](#) are also available for download. The Arduino IDE can be used on Windows, Linux (both 32 and 64 bits), and Mac OS X.



In this project, we choose Installer (.exe) for Windows.

Click Windows Win 7 and newer and JUST DOWNLOAD.

Support the Arduino IDE

Since its first release in March 2015, the Arduino IDE has been downloaded **48,821,909** times — impressive! Help its development with a donation.

DOWNLOAD OPTIONS

- Windows Win 7 and newer
- Windows ZIP file

\$3 \$5 \$10 \$25 \$50 Other

JUST DOWNLOAD **CONTRIBUTE & DOWNLOAD**

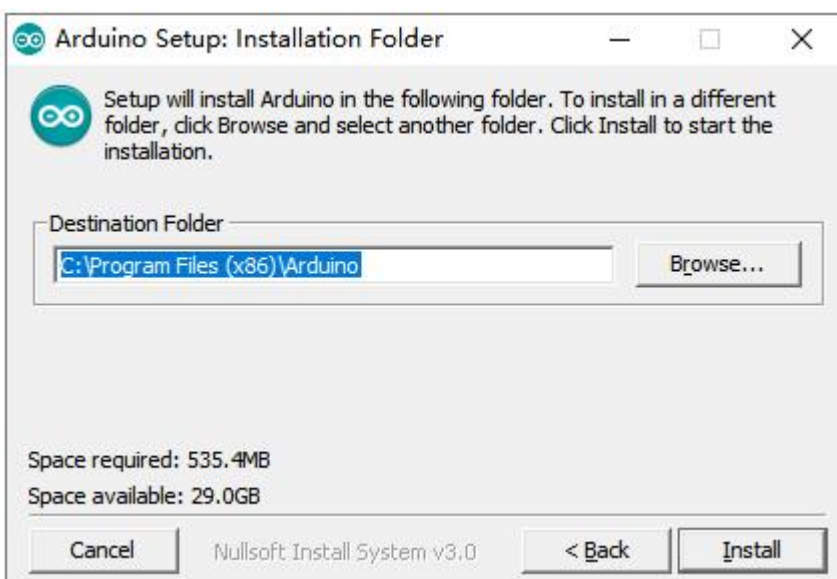
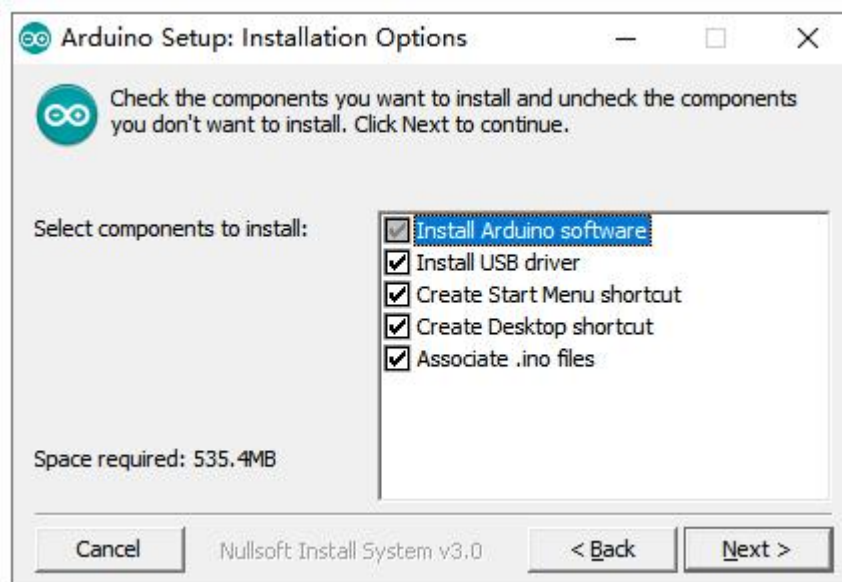
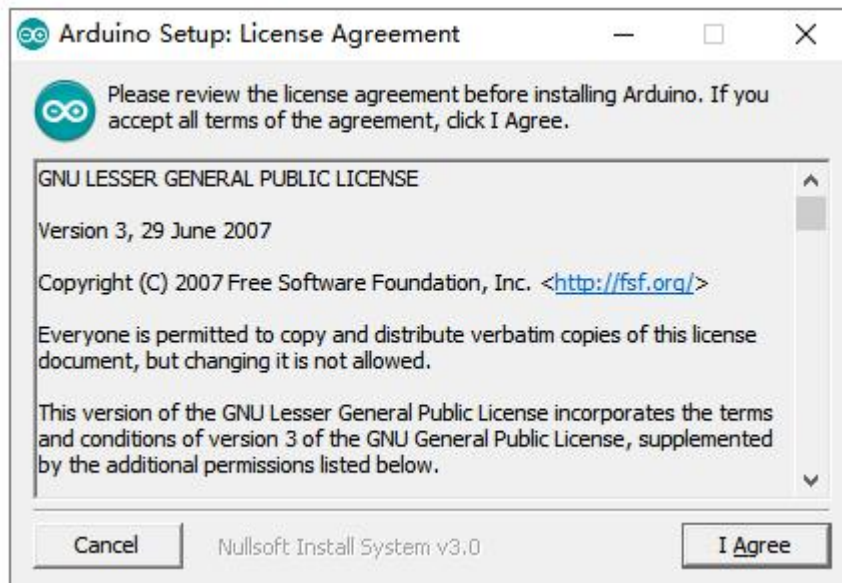
The download file: **arduino-1.8.13-windows**

Double-click the arduino IDE (.exe) file

Choose "I Agree" to see the following interface.

Choose "Next" to see the following interface.

Press "Install" to initiate installation.





If the following interface appears, you should choose “Install” .



4.2 Installing Driver on Windows

Before using the KEYESTUDUO Mega plus control board, you must install the driver of it, otherwise it will not communicate with computer.

Unlike the USB series chip (ATMEGA8U2) of the Arduino UNO R3, the KEYESTUDIO Mega plus development board is used the CP2102 chip USB series chip and USB type C interface.

The driver of the CP2102 chip is included in 1.8.0 version and newer version of Arduino IDE. Usually, you connect the board to the computer and wait for Windows to begin its driver installation process. After a few moments, the process will succeed.

If the driver installation process fail, you need to install the driver manually.

Note:



1. Please make sure that your IDE is updated to 1.8.0 or newer version
- 2.If the version of Arduino IDE you download is below 1.8, you should download the driver of CP2102 and install it manually.

Link to download the driver of CP2102:

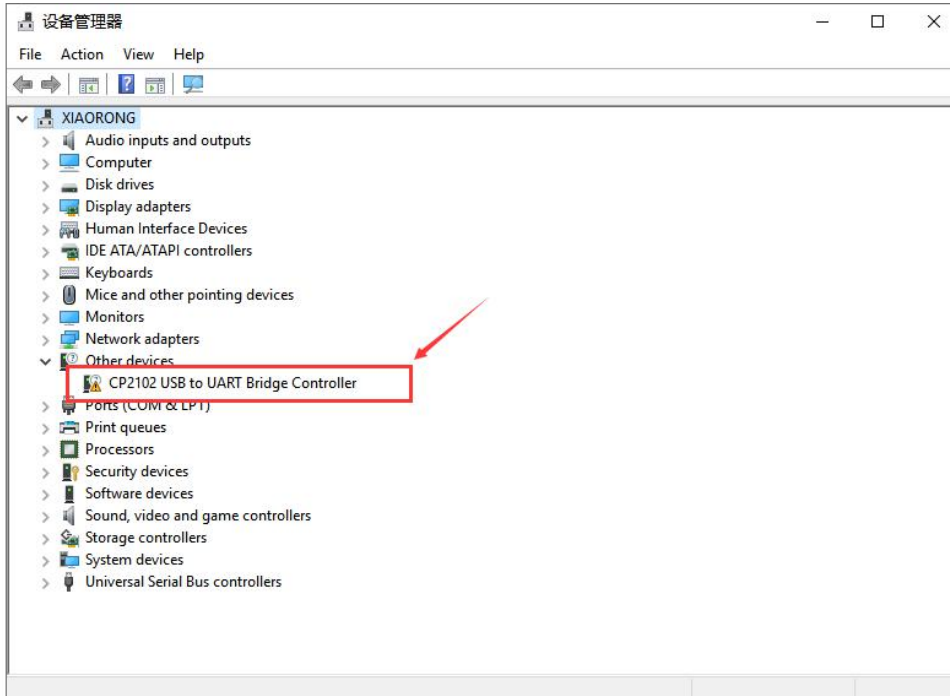
<https://fs.keyestudio.com/CP2102-WIN>

To install the drive manually, open the device manager of computer.

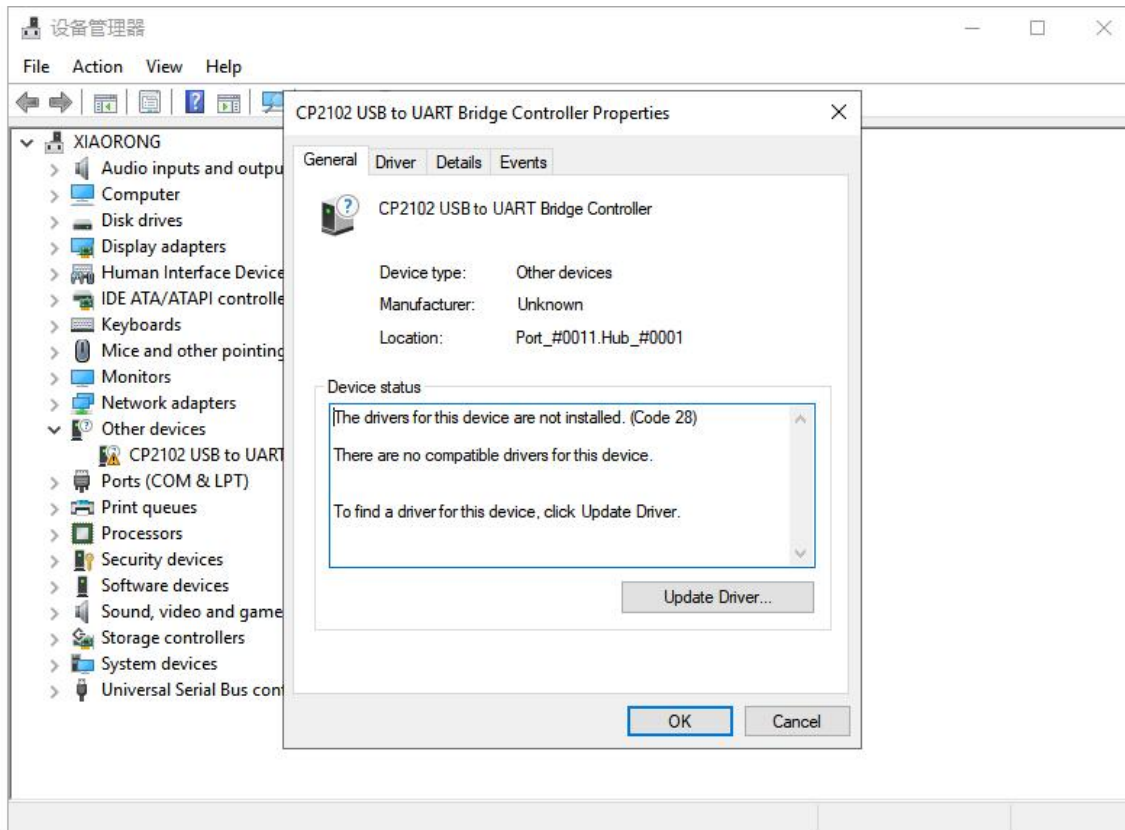
Right click Computer----- Click Properties-----Click Device Manager.

Look under Ports (COM & LPT) or other device.

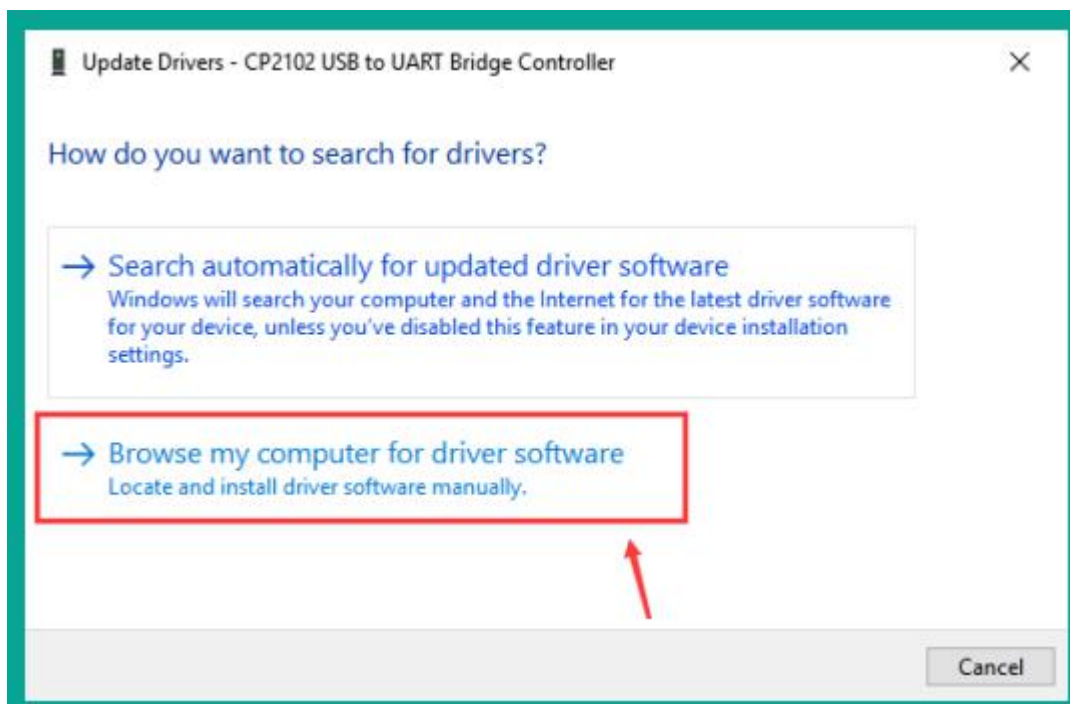
A yellow exclamation mark means that the CP2102 driver installation failed.



Double-click the font with yellow exclamation mark and click "OK"

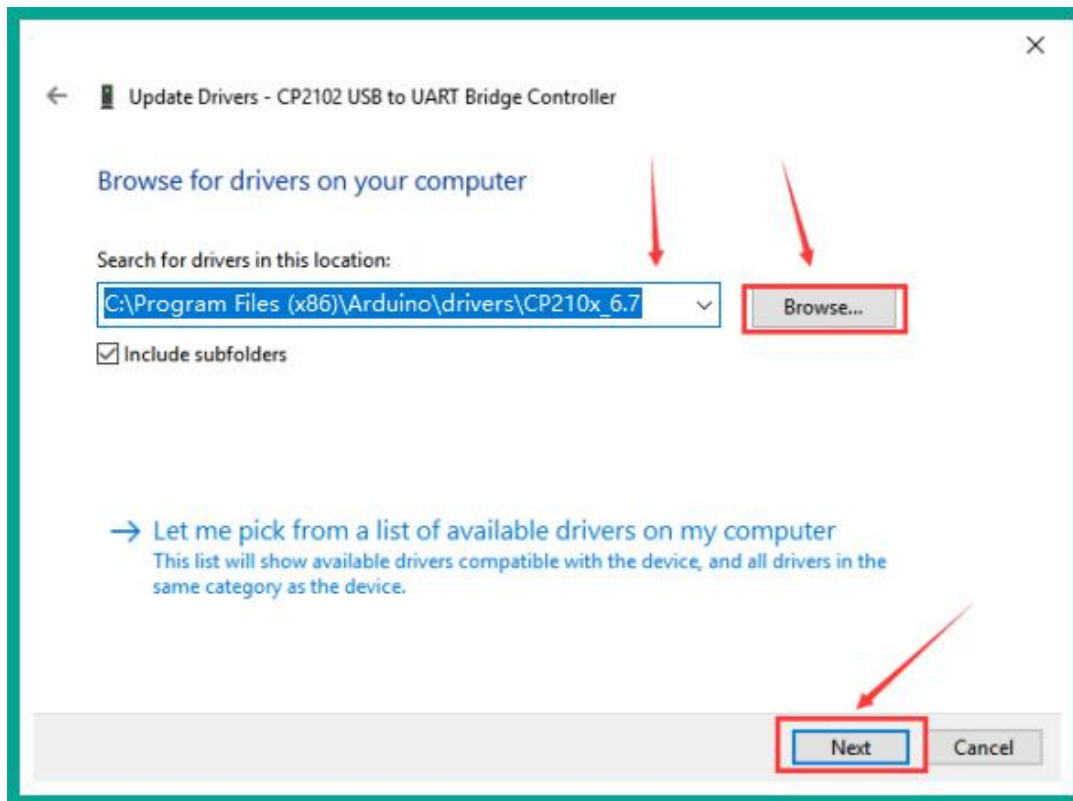


Click “browse my computer for updated driver software” .

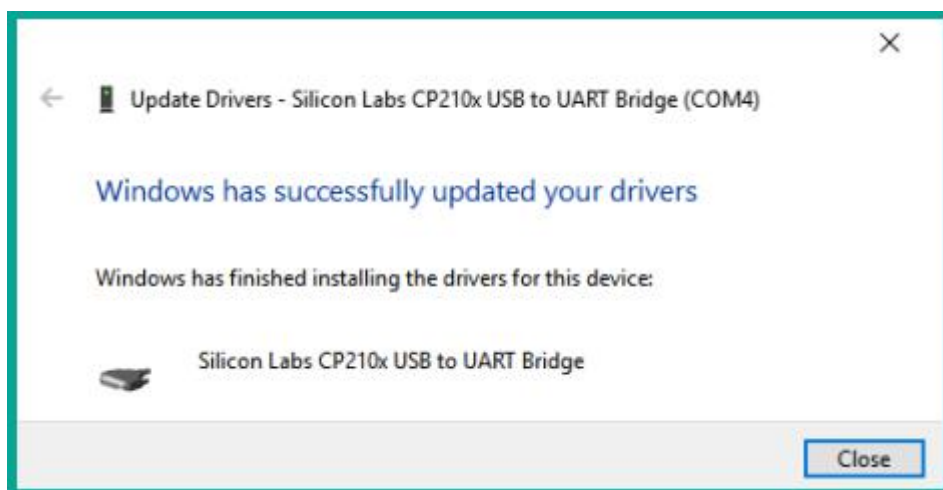




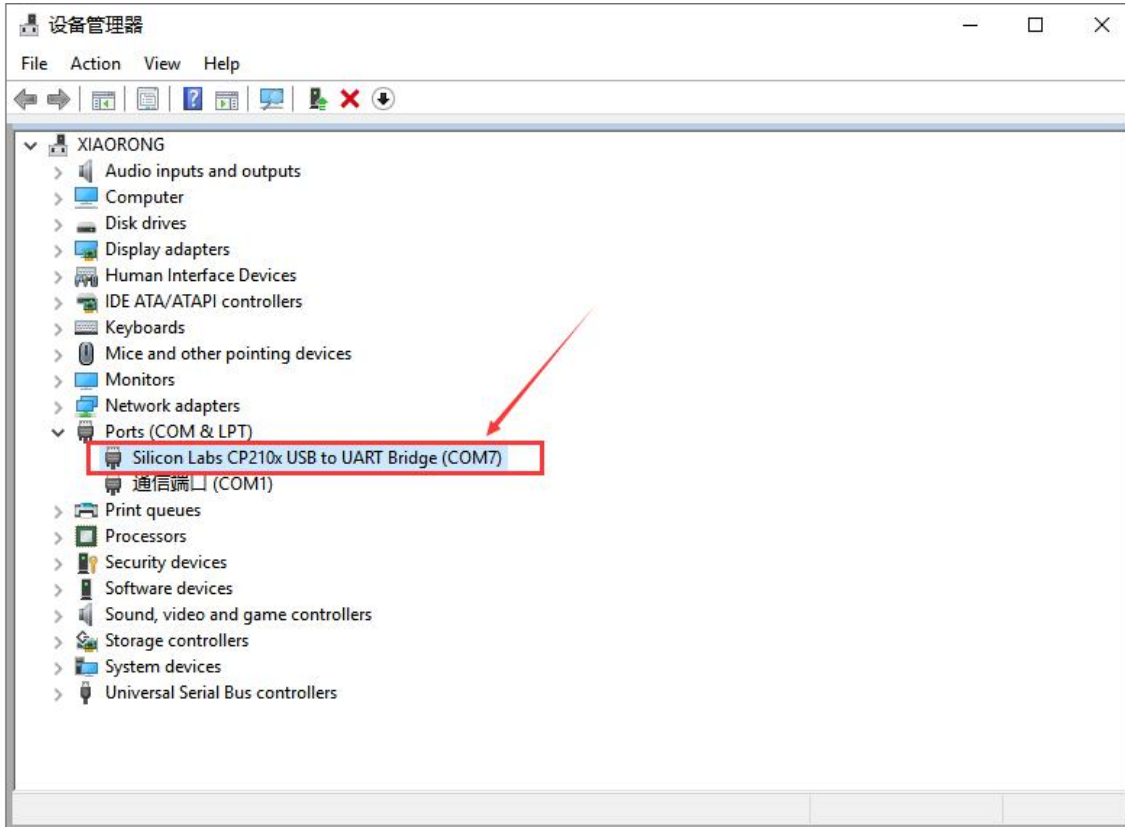
Navigate to the "Drivers" folder of the Arduino Software you have download and click "Next" to install the drive.



The driver is installed successfully.



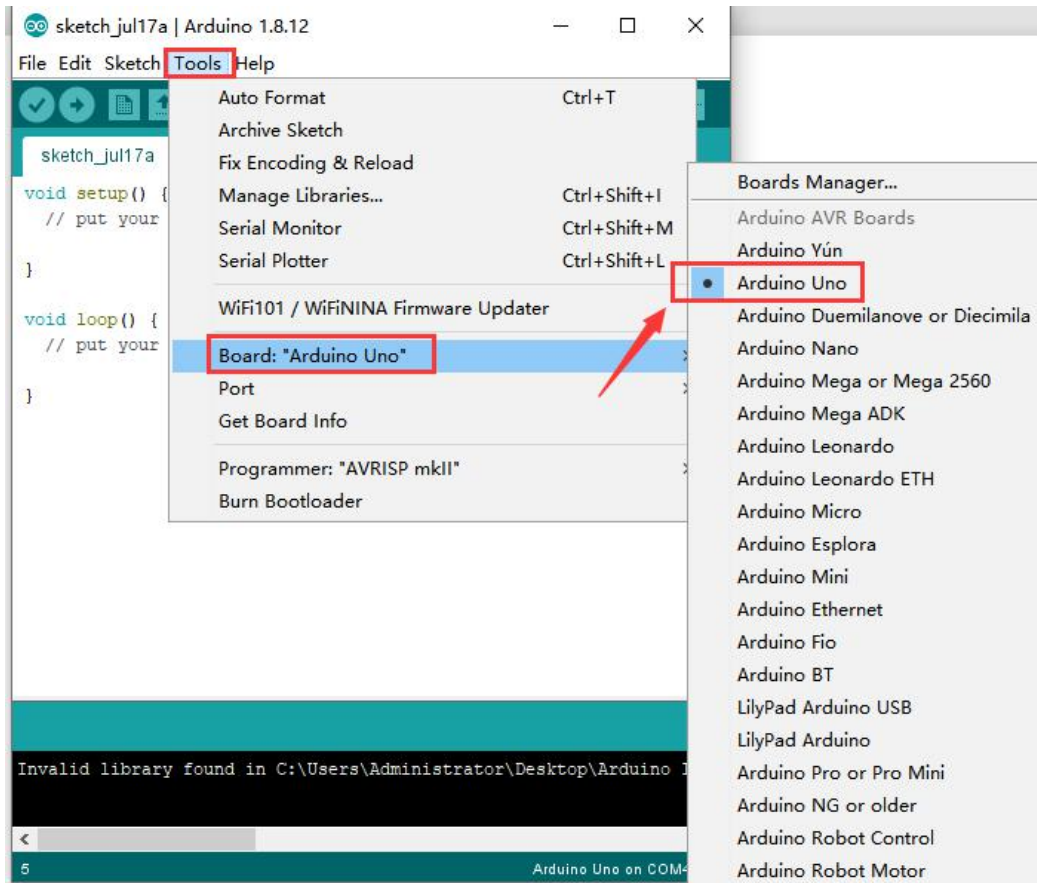
Open device manager, we will find the yellow exclamation mark disappear. The driver of CP2102 is installed successfully.



4.3 Configure Arduino IDE

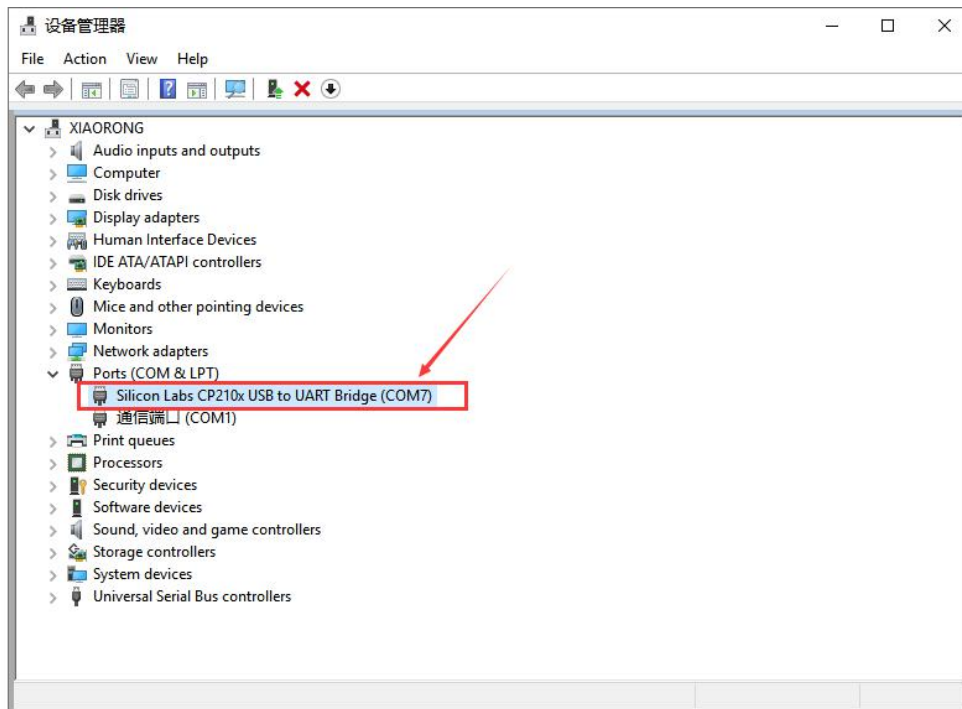
After the driver is successfully installed, it's time to configure the IDE to use the same device and port to start uploading code.

For the KEYESTUDIO Mega plus control board, we should navigate to Tools > Board > and select Arduino Uno(as shown below). However, if you are using a different board (i.e., not the Arduino Uno or KEYESTUDIO Control Board), you must select the proper board!

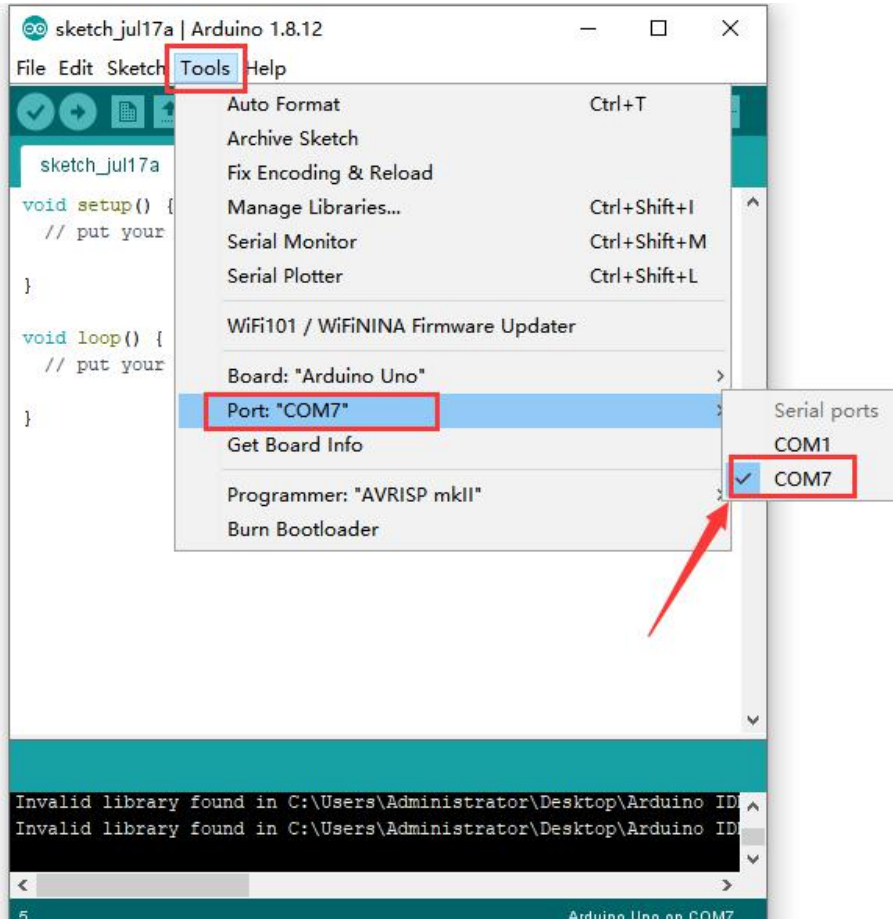


Then select the correct COM port.

You can see the corresponding COM port after the driver is successfully installed.

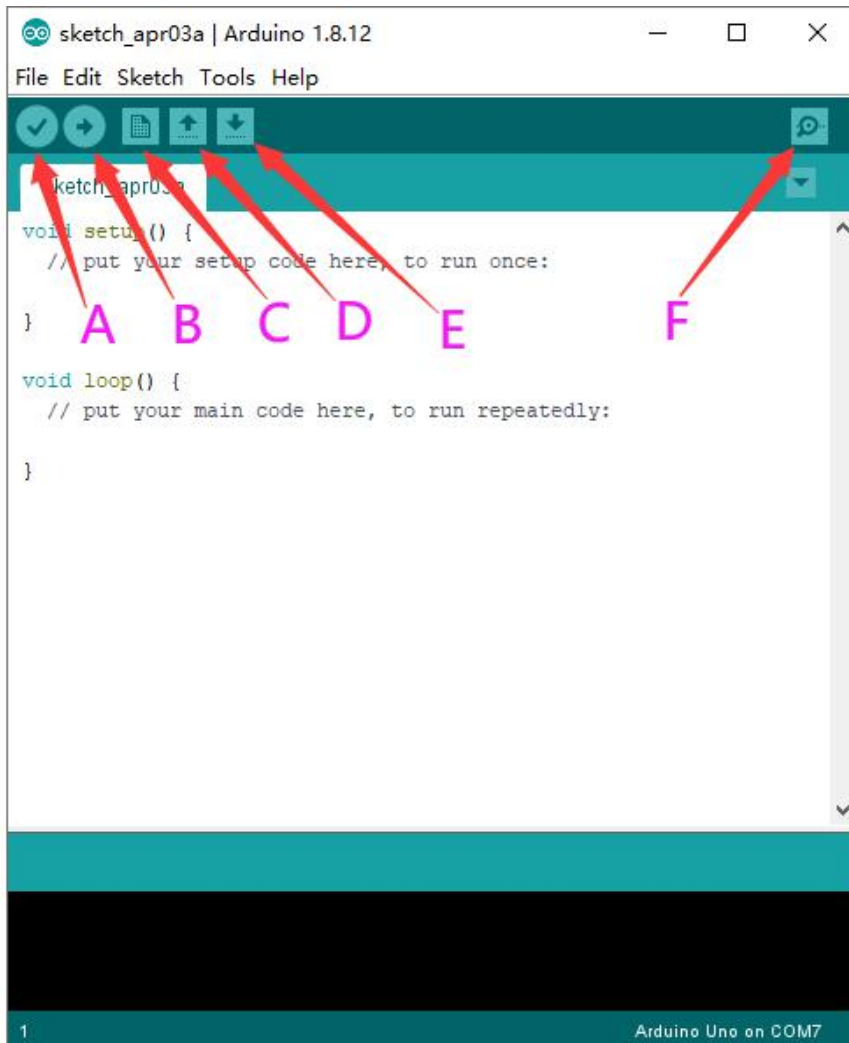


Navigate to Tools > Port > COM7





The function of each symbol in the Arduino IDE toolbar.



A- verify whether there is any compiling mistakes or not.

B- upload the sketch to your Arduino board.

C- create shortcut window of a new sketch.

D- directly open an example sketch.

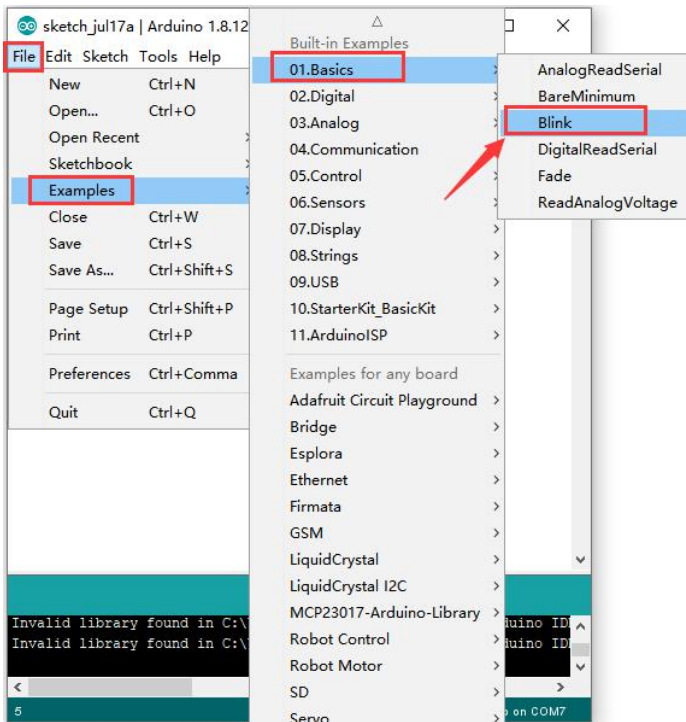
E- save the sketch.

F- send the serial data received from board to the serial monitor.

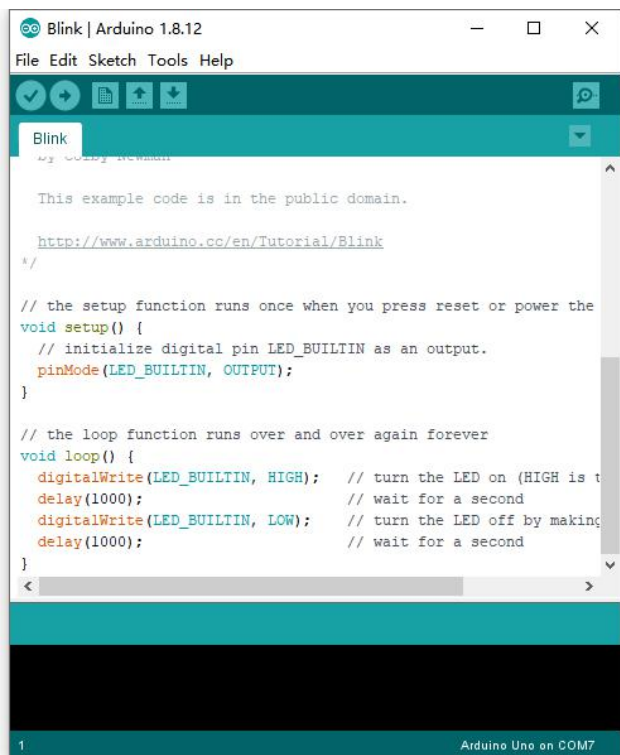
4.4 Start First Program



Click File -> Examples -> 01.Basics -> Blink



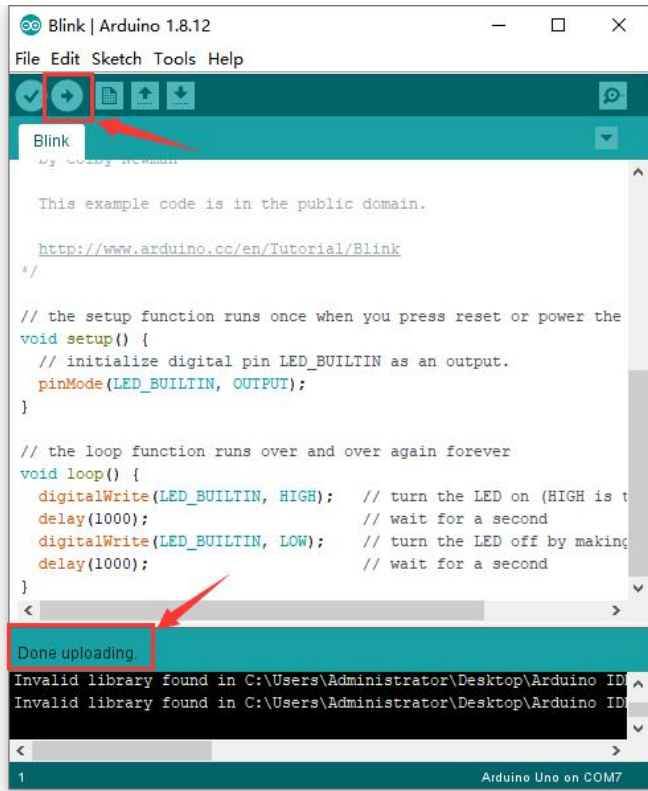
When the sketch window opens, you can see the entire sketch in the window.





Choose the correct board type and COM port

Click  to upload the code.



Dode uploarding!

The onboard LED lights on for 1s, lights off for 1s.

Congratulation, you finish the first program.



5.Installing Driver on MAC



5.1 Download Software

Click and download Arduino IDE for MAC system :
Downloads



Arduino IDE 1.8.13

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. This software can be used with any Arduino board.

Refer to the [Getting Started](#) page for Installation instructions.

SOURCE CODE

Active development of the Arduino software is [hosted by GitHub](#). See the instructions for [building the code](#). Latest release source code archives are available [here](#). The archives are PGP-signed so they can be verified using [this](#) gpg key.

DOWNLOAD OPTIONS

Windows Win 7 and newer
Windows ZIP file

Windows app Win 8.1 or 10 [Get](#)

Linux 32 bits
Linux 64 bits
Linux ARM 32 bits
Linux ARM 64 bits

Mac OS X 10.10 or newer

[Release Notes](#) [Checksums \(sha512\)](#)

5.2 Download the Driver of CP2102



<https://fs.keyestudio.com/CP2102-MAC>

5.3 How to Install the Driver of CP2102

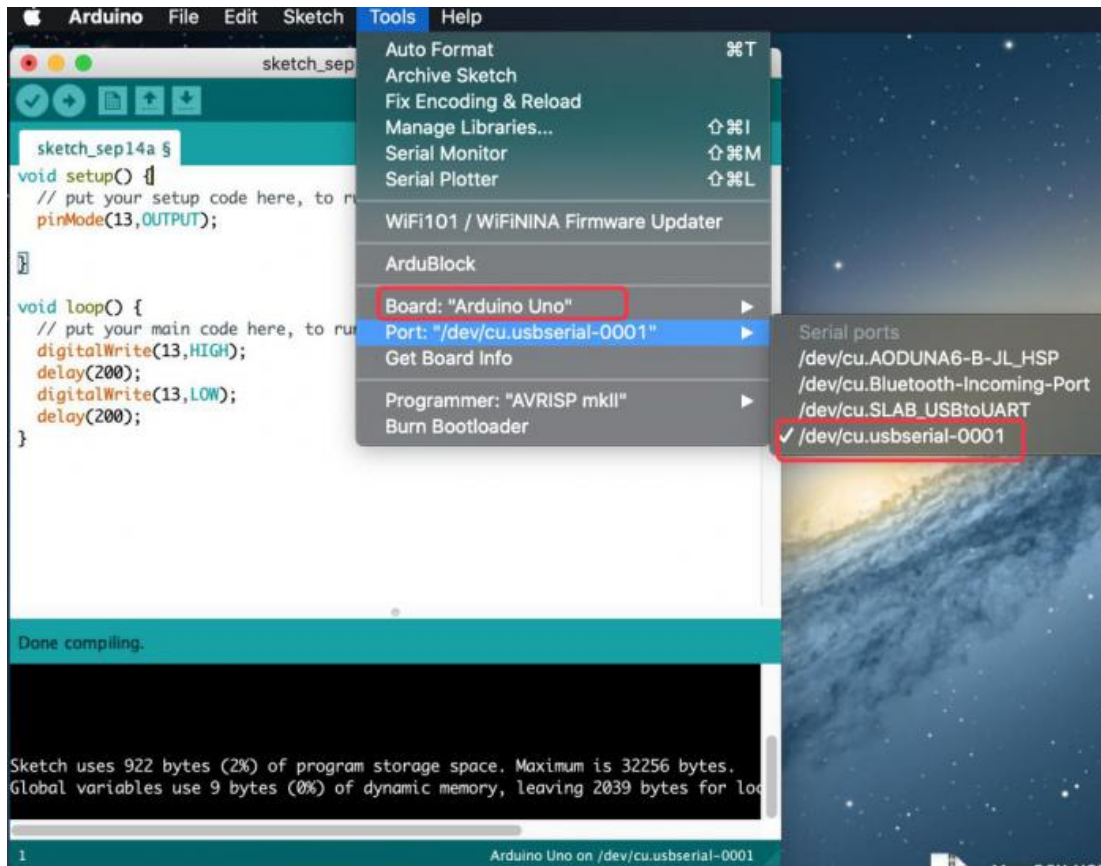
Connect the Mega plus development board to your computer, and open Arduino IDE



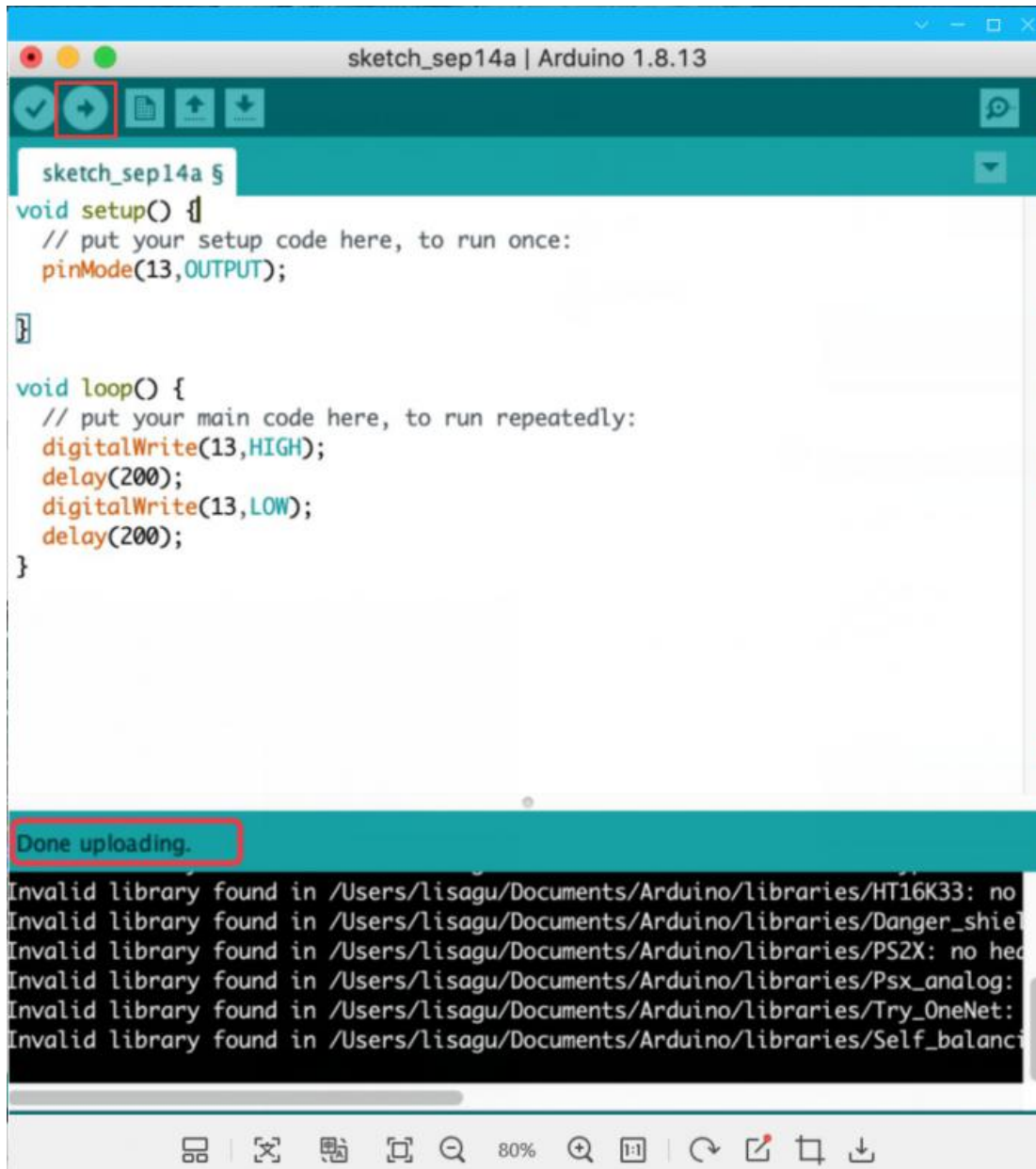
Click Tools to configure Board and Port: Arduino Uno and



/dev/cu.usbserial-0001



Tap Upload to upload code, if burn successfully, you will view done uploading.



Note: If burn unsuccessfully, you need to install driver of CP2102, please continue to follow the instructions as below:

Download the driver of CP2102:

<https://www.silabs.com/products/development-tools/software/u>



sb-to-uart-bridge-vcp-drivers

1.Select Mac OSX edition

Download for WinCE

Platform	Software	Release Notes
WinCE 6.0 (2.1)	Download VCP (276 KB)	Download WinCE 6.0 Revision History
WinCE 5.0 (2.1)	Download VCP (271 KB)	Download WinCE 5.0 Revision History

Download for Macintosh **OSX (v5.3.5)**

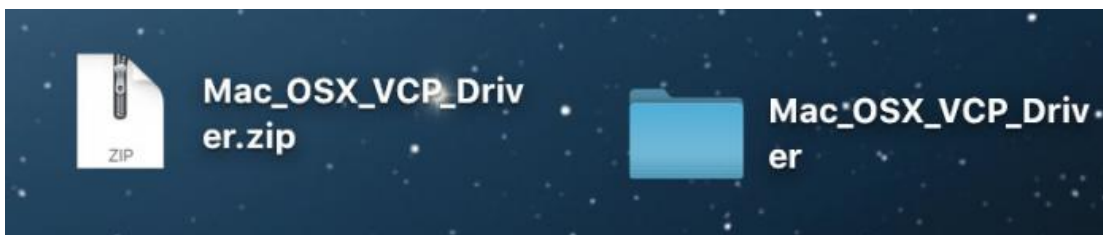
Platform	Software	Release Notes
Mac OSX	Download VCP (832 KB)	Download Mac VCP Revision History

Download for Linux

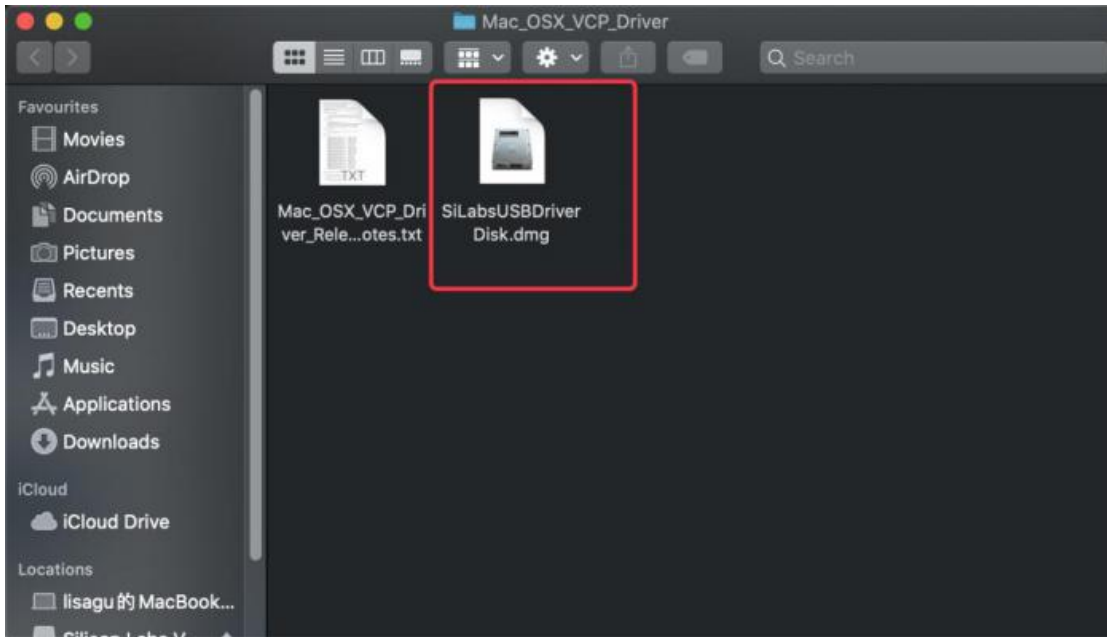
Platform	Software	Release Notes
Linux 3.x.x and 4.x.x	Download VCP (10.0 KB)	Download Linux 3.x.x and 4.x.x VCP Revision History
Linux 2.6.x	Download VCP (10.2 KB)	Download Linux 2.6.x VCP Revision History

*Note: The Linux 3.x.x and 4.x.x version of the driver is maintained in the current Linux 3.x.x and 4.x.x tree at www.kernel.org.

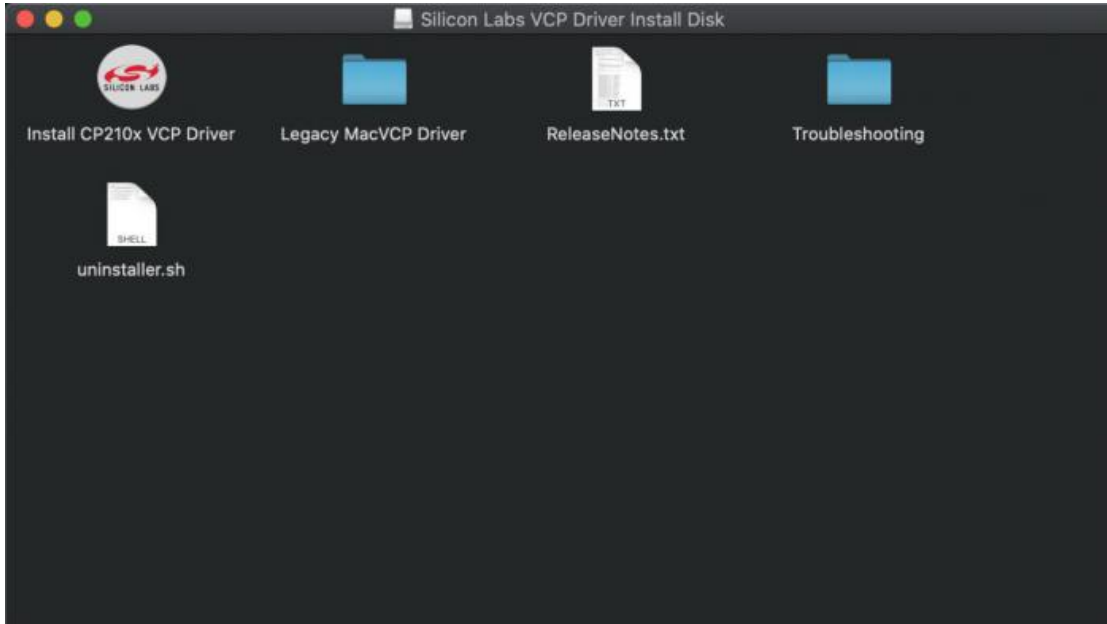
2.Unzip the downloaded package



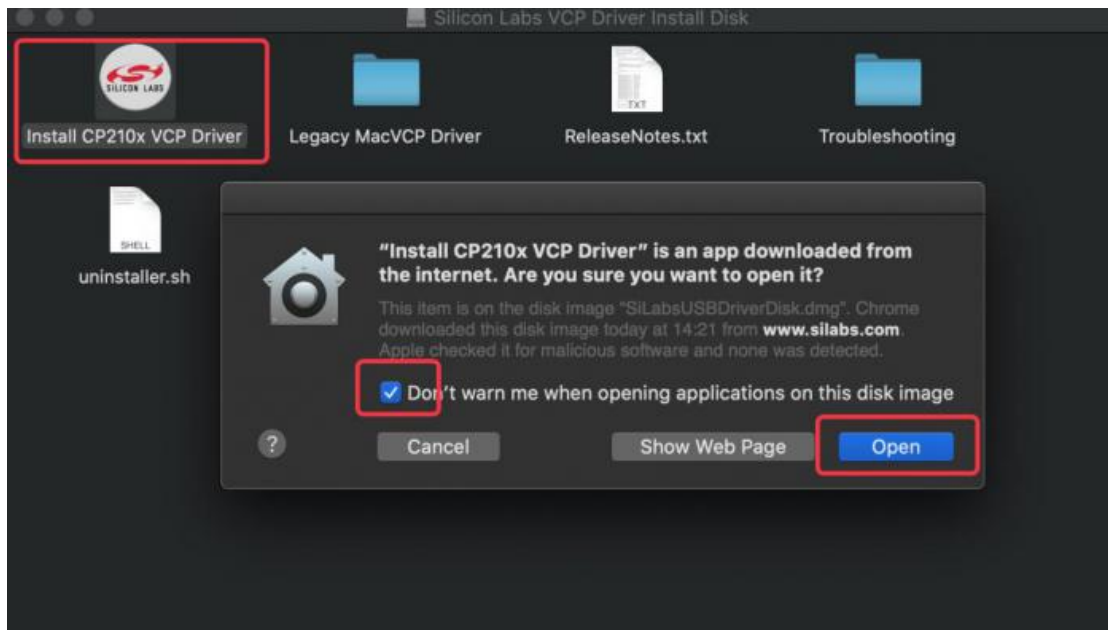
3.Open folder and double-click SiLabsUSBDriverDisk.dmg file.



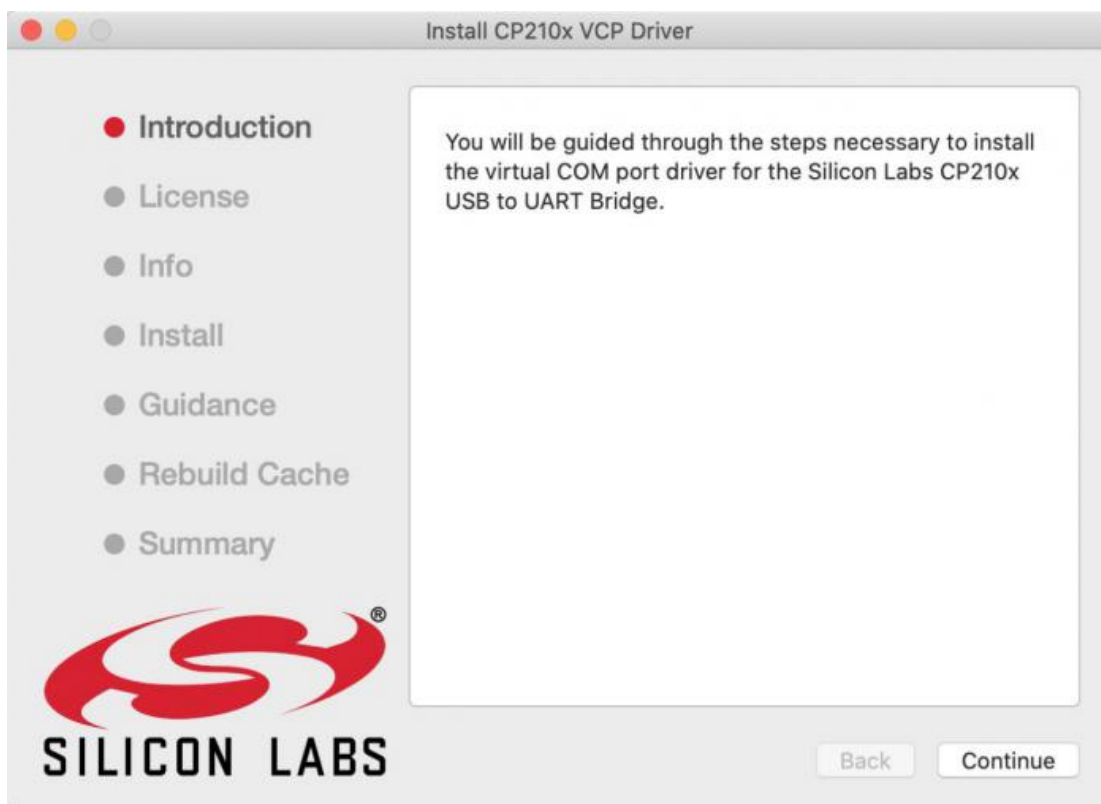
4. You will view the following files as follows:



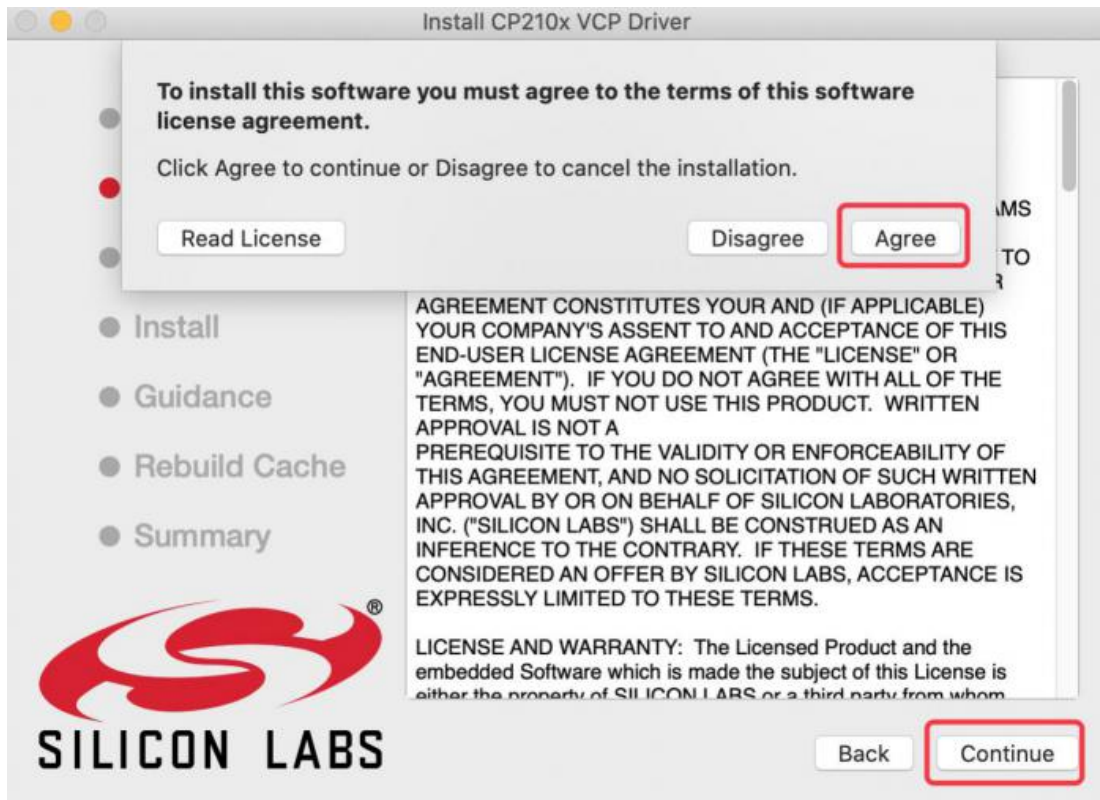
5. Double-click Install CP210x VCP Driver, tick Don't warn me and tap Open



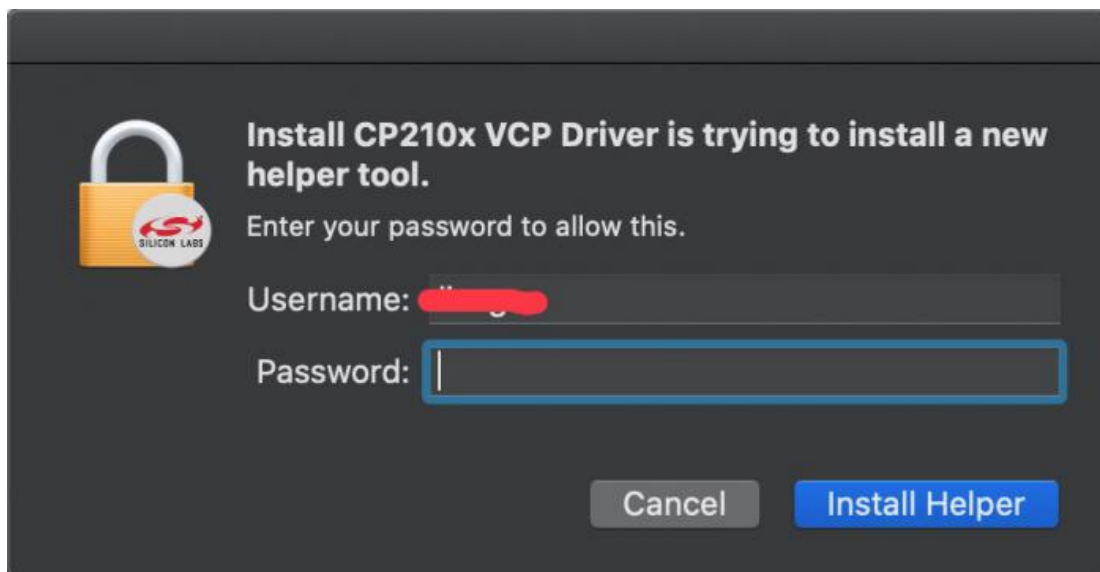
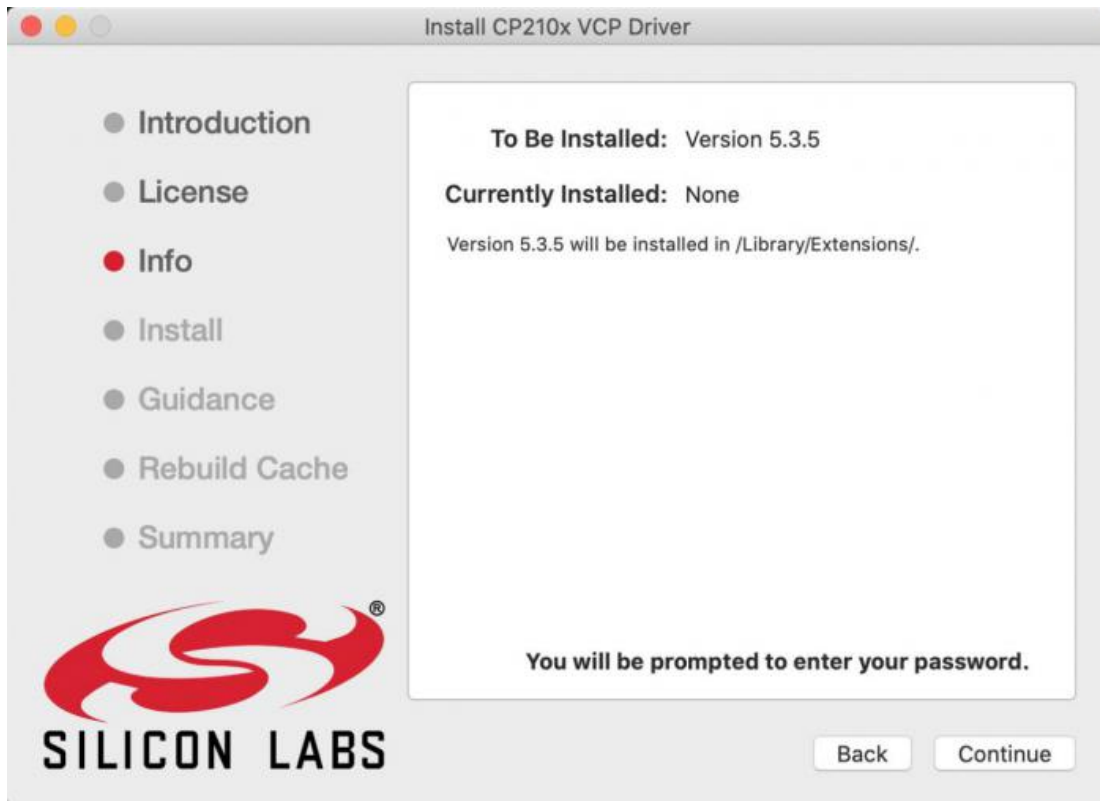
6. Tap Continue



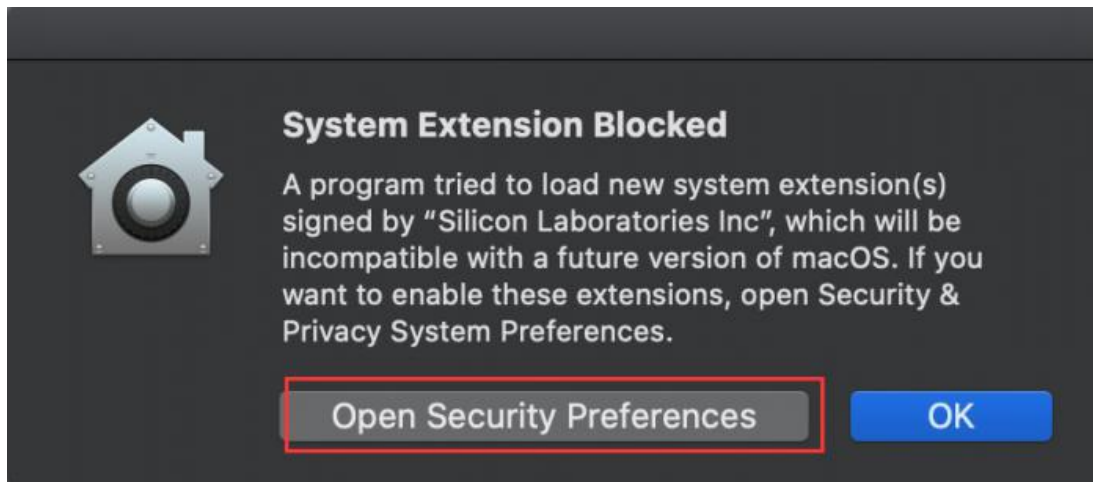
7. Tap Continue and Agree



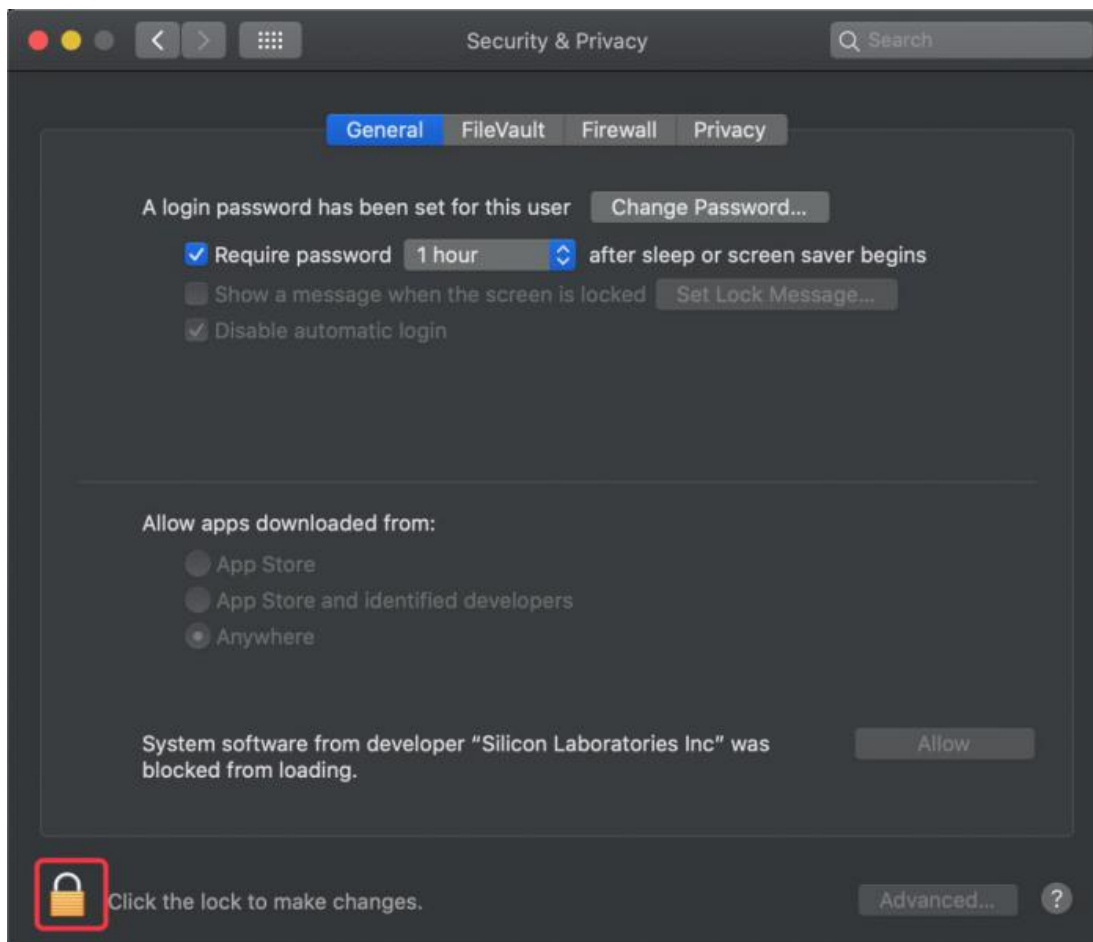
8. Click Continue and input your password

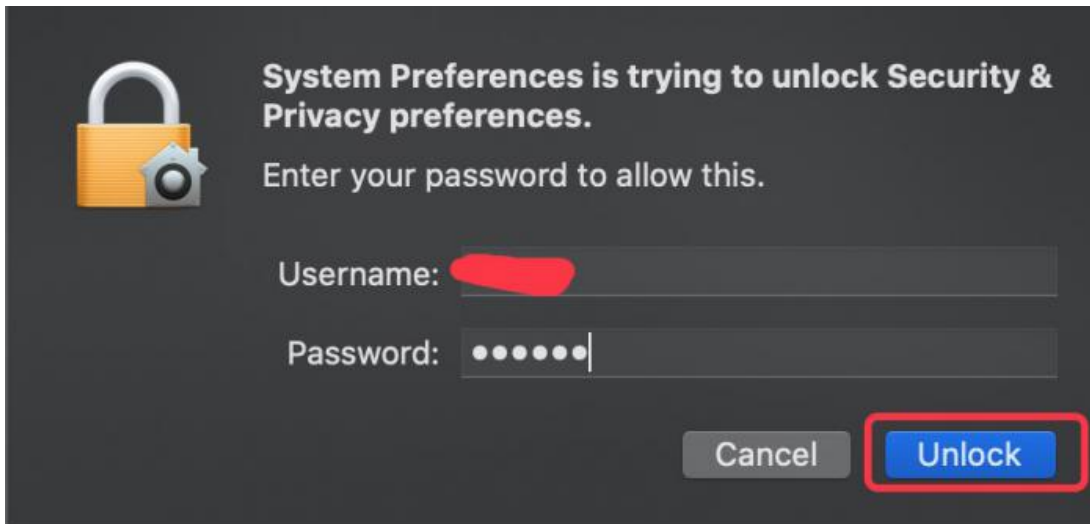


9. Select Open Security Preferences

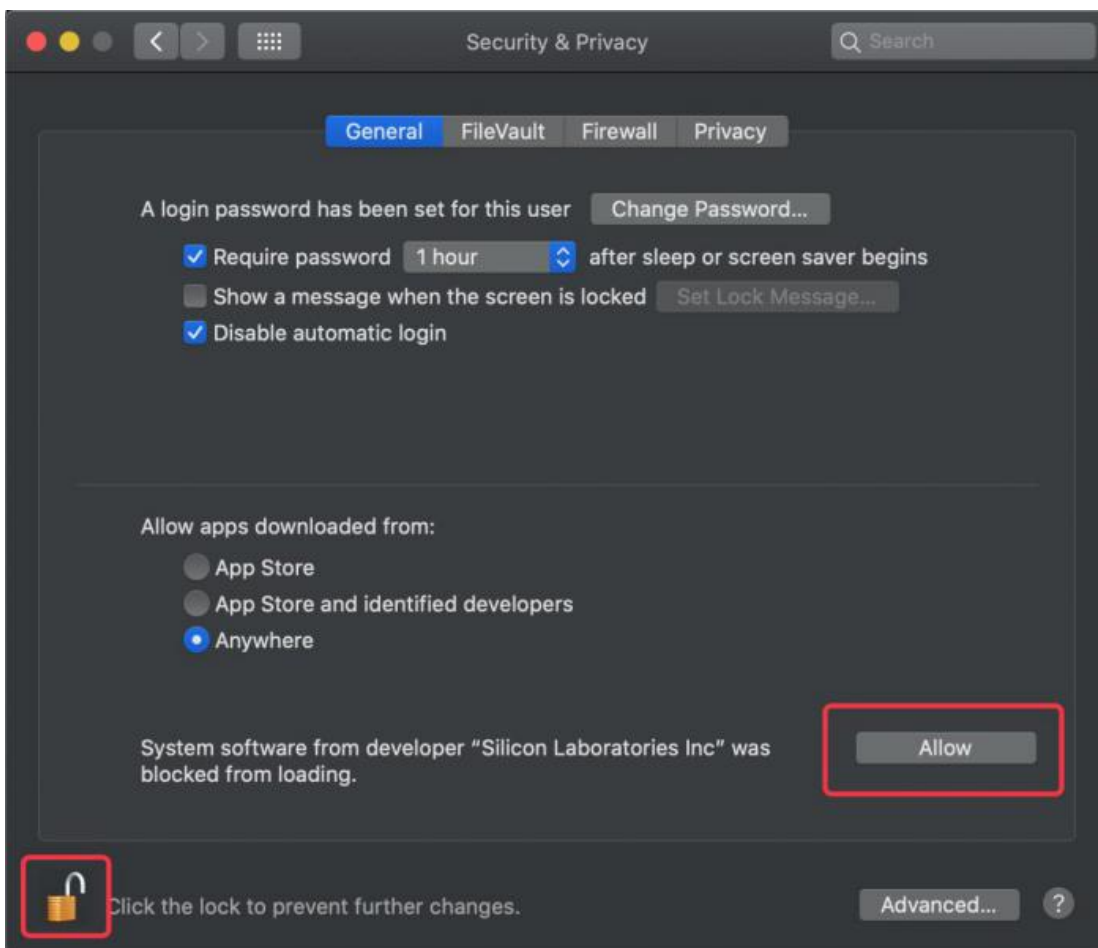


10. Click the lock to unlock security & privacy preference.

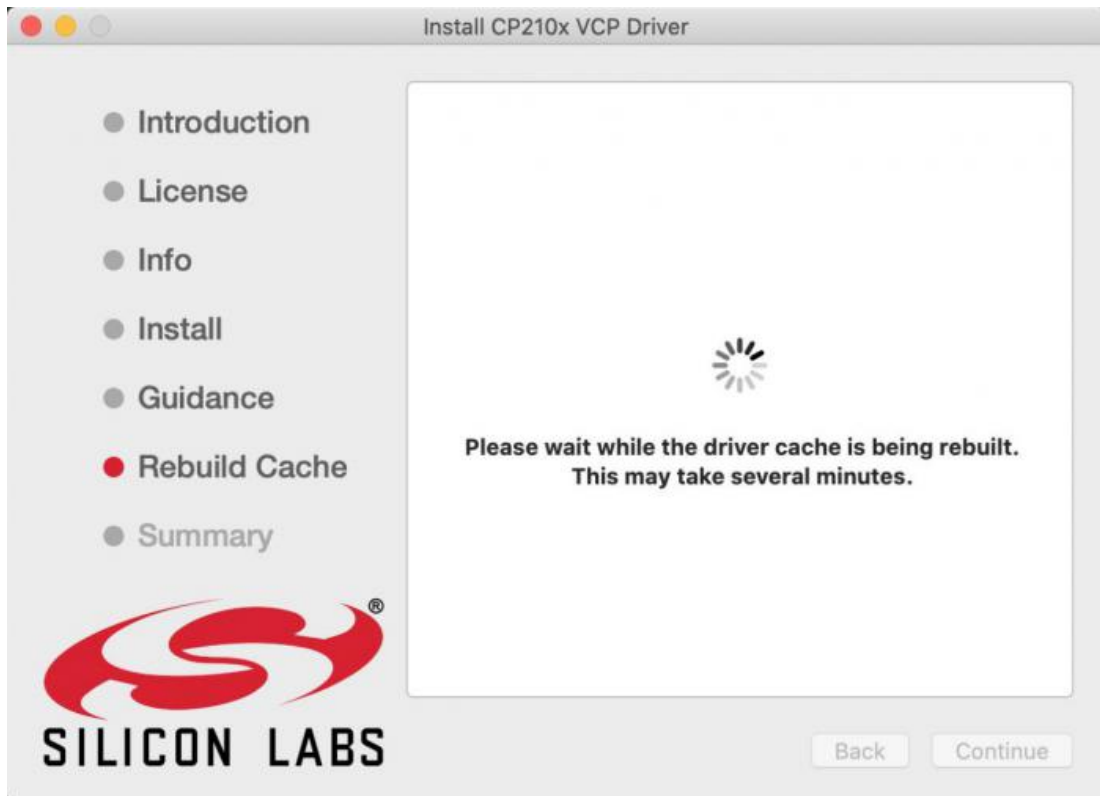




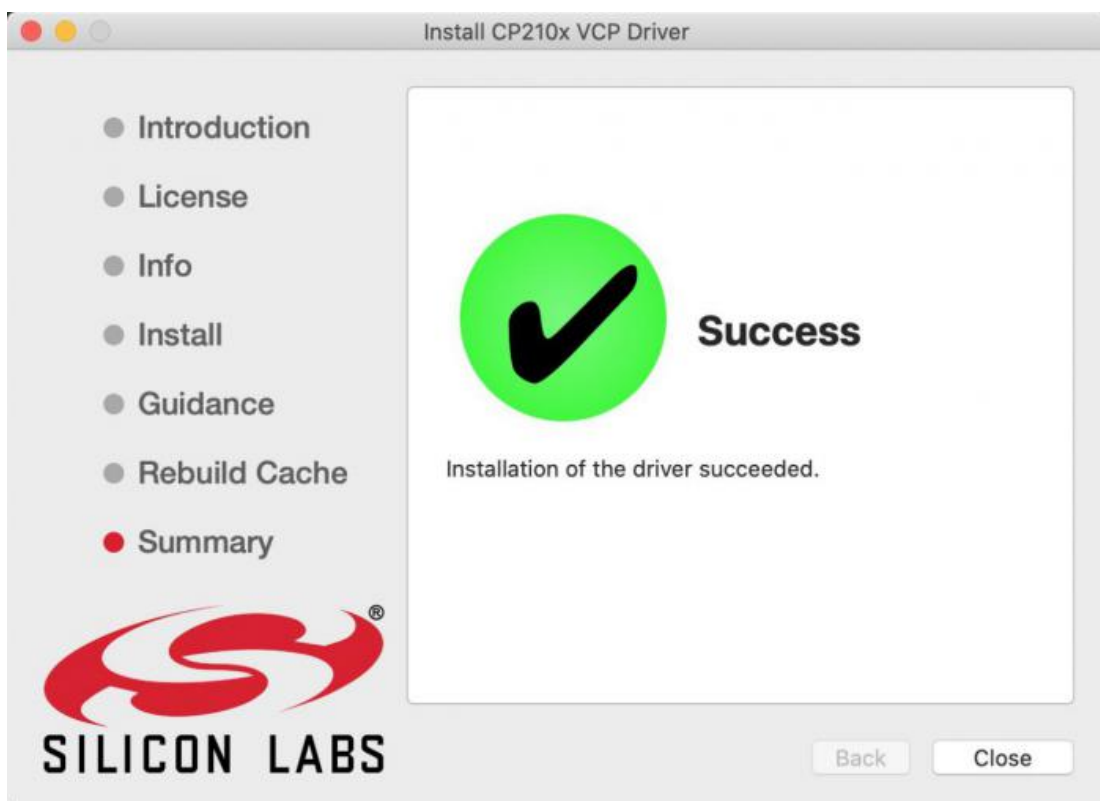
11. Then click Allow



12. Back to installation page, and wait to install.



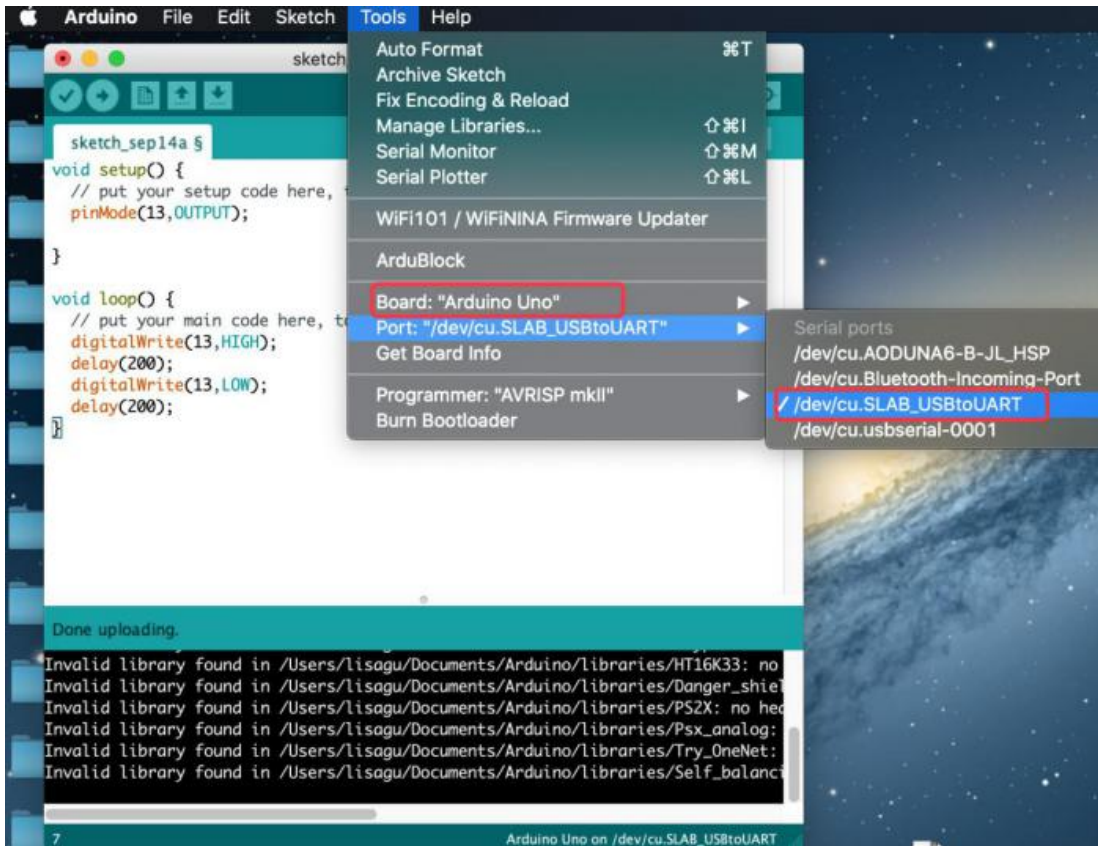
13. Successfully installed



14. Then enter ArduinoIDE, click Tools and select Board: Arduino Uno



and /dev/cu.SLAB_USBtoUAPT



15. Click  to upload code and you will see "Done uploading" .



The screenshot shows the Arduino IDE interface. The top bar indicates the sketch name 'sketch_sep14a' and the version '1.8.13'. The toolbar at the top has several icons, with the 'Upload' icon (a right-pointing arrow) highlighted by a red box. Below the toolbar, the sketch code is displayed in a text area. The code defines a setup function and a loop function. The setup function calls `pinMode(13, OUTPUT);`. The loop function calls `digitalWrite(13, HIGH);`, `delay(200);`, `digitalWrite(13, LOW);`, and `delay(200);`. Below the code area, a terminal window is open, showing a message 'Done uploading.' highlighted by a red box. Below this message, there are several error messages indicating that various libraries found in the user's library folder are invalid. The bottom status bar shows the board '13' and the port 'Arduino Uno on /dev/cu.SLAB_USBtoUART'.

```
sketch_sep14a | Arduino 1.8.13
```

```
sketch_sep14a §
```

```
void setup() {  
  // put your setup code here, to run once:  
  pinMode(13, OUTPUT);  
}  
  
void loop() {  
  // put your main code here, to run repeatedly:  
  digitalWrite(13, HIGH);  
  delay(200);  
  digitalWrite(13, LOW);  
  delay(200);  
}
```

```
Done uploading.
```

```
Invalid library found in /Users/lisagu/Documents/Arduino/libraries/HT16K33: no  
Invalid library found in /Users/lisagu/Documents/Arduino/libraries/Danger_shiel  
Invalid library found in /Users/lisagu/Documents/Arduino/libraries/PS2X: no hea  
Invalid library found in /Users/lisagu/Documents/Arduino/libraries/Psx_analog:  
Invalid library found in /Users/lisagu/Documents/Arduino/libraries/Try_OneNet:  
Invalid library found in /Users/lisagu/Documents/Arduino/libraries/Self_balanci
```

```
13 Arduino Uno on /dev/cu.SLAB_USBtoUART
```

6. Install the Libraries to Arduino



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 LiquidCrystal library helps talk to 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 (<https://www.arduino.cc/en/Reference/Libraries>) .

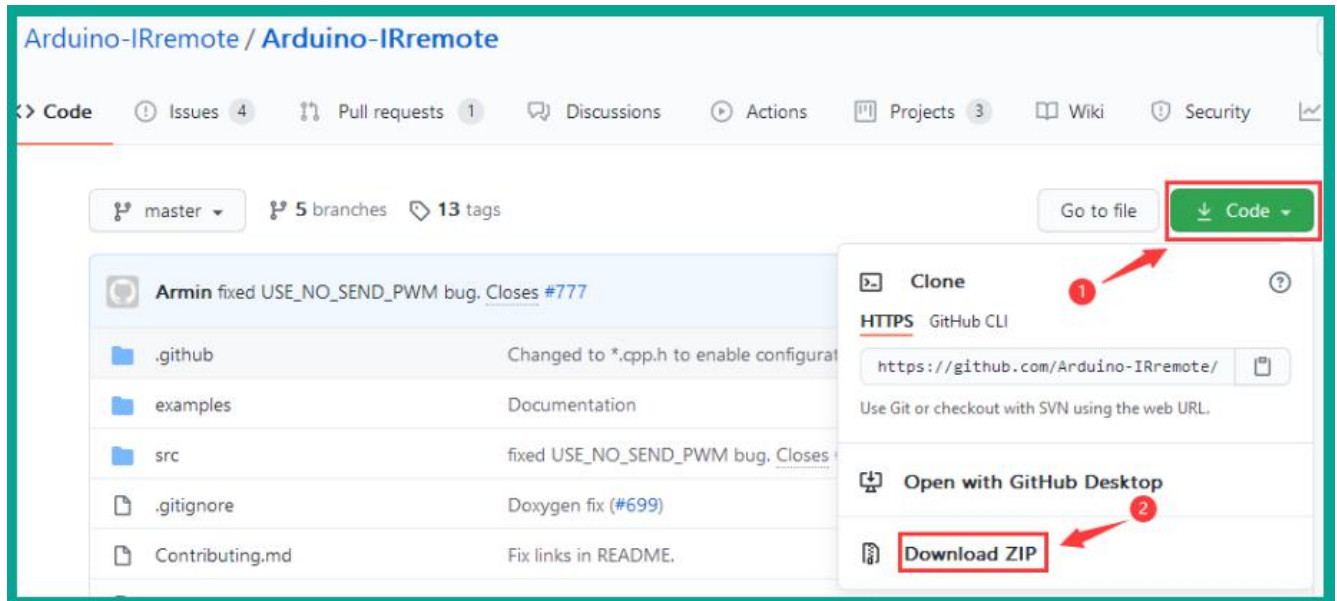
How to Install a Library

6.1 Manual installation

When you want to add a library manually, first quit the Arduino application, then you need to download library as a ZIP file, expand it and put in the proper directory.

For this example, we will install the IR Remote Library which can be found on GitHub: <https://github.com/shirriff/Arduino-IRremote>

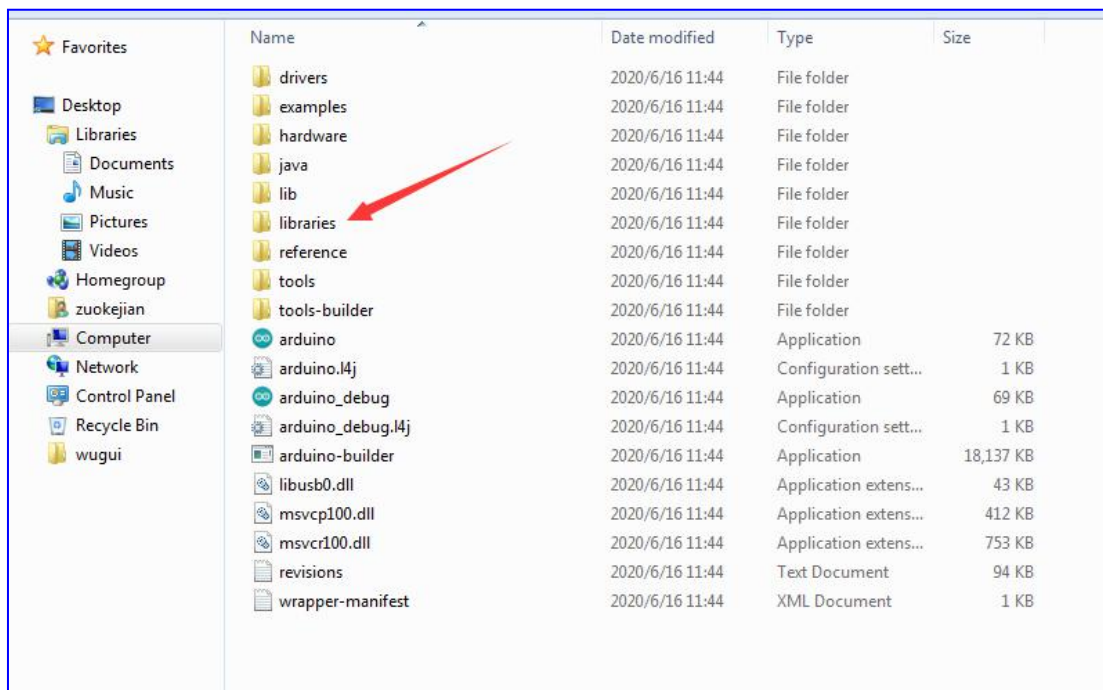
First, download the library as a ZIP, which is done by clicking the green "Code" button and then clicking "Download ZIP" .



Once downloaded, Unzip the the IR Remote Library package.



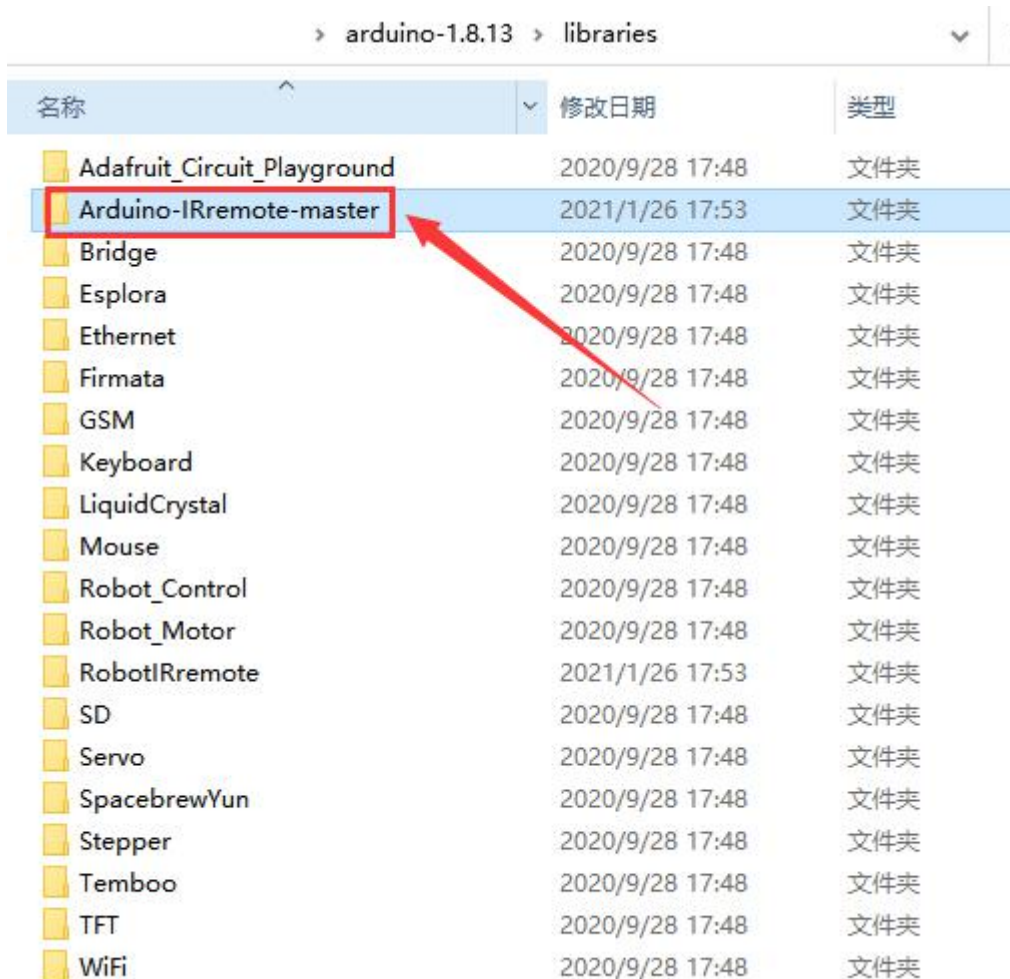
Then go to your Arduino folder.





Open the “Libraries” folder in the Arduino folder and then drag the “Arduino-IRremote-master” folder into the libraries folder.

The library file is manually installed.



The screenshot shows the 'libraries' folder in the Arduino IDE. The 'Arduino-IRremote-master' folder is highlighted with a red box, and a red arrow points to it from the right. The table below lists the contents of the libraries folder.

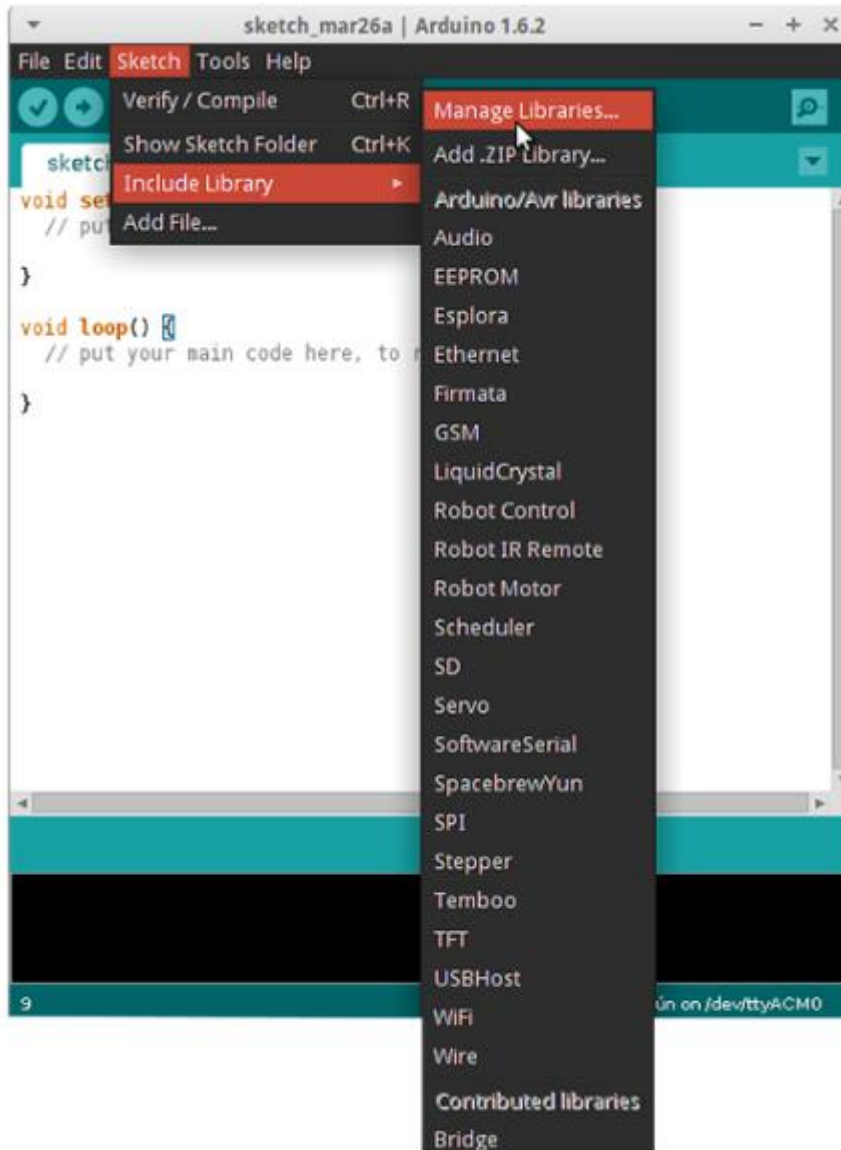
名称	修改日期	类型
Adafruit_Circuit_Playground	2020/9/28 17:48	文件夹
Arduino-IRremote-master	2021/1/26 17:53	文件夹
Bridge	2020/9/28 17:48	文件夹
Esplora	2020/9/28 17:48	文件夹
Ethernet	2020/9/28 17:48	文件夹
Firmata	2020/9/28 17:48	文件夹
GSM	2020/9/28 17:48	文件夹
Keyboard	2020/9/28 17:48	文件夹
LiquidCrystal	2020/9/28 17:48	文件夹
Mouse	2020/9/28 17:48	文件夹
Robot_Control	2020/9/28 17:48	文件夹
Robot_Motor	2020/9/28 17:48	文件夹
RobotIRremote	2021/1/26 17:53	文件夹
SD	2020/9/28 17:48	文件夹
Servo	2020/9/28 17:48	文件夹
SpacebrewYun	2020/9/28 17:48	文件夹
Stepper	2020/9/28 17:48	文件夹
Temboo	2020/9/28 17:48	文件夹
TFT	2020/9/28 17:48	文件夹
WiFi	2020/9/28 17:48	文件夹

6.2 Using the Library Manager

To install a new library into your Arduino IDE you can use the Library



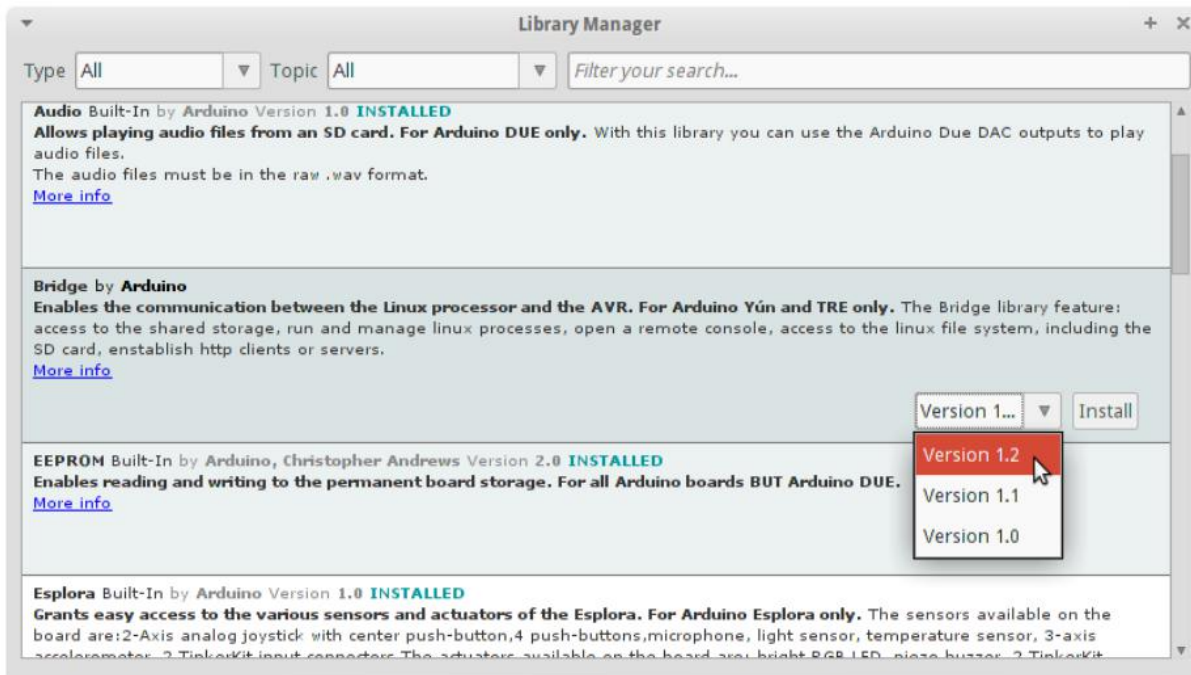
Manager (available from IDE version 1.6.2). Open the IDE and click to the "Sketch" menu and then Include Library > Manage Libraries.



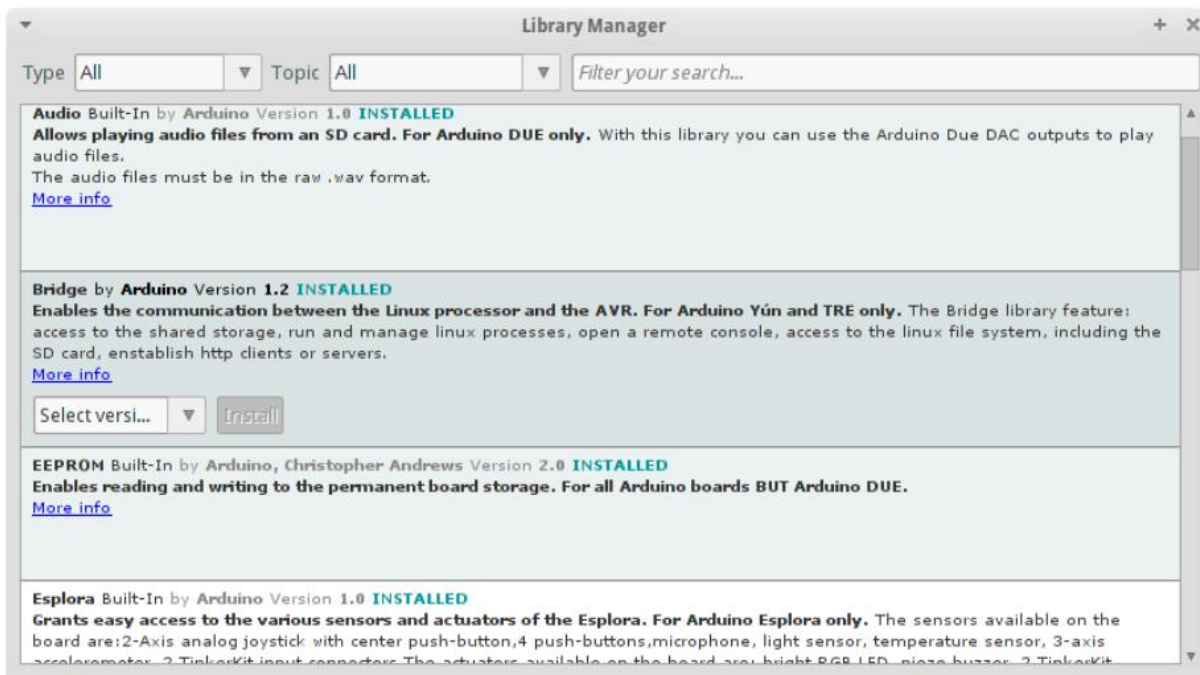
Then the Library Manager will open and you will find a list of libraries that are already installed or ready for installation. In this example we will install the Bridge library. Scroll the list to find it, click on it, then select the version of the library you want to install. Sometimes only one version of the library is available. If the version selection menu



does not appear, don't worry: it is normal.



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.

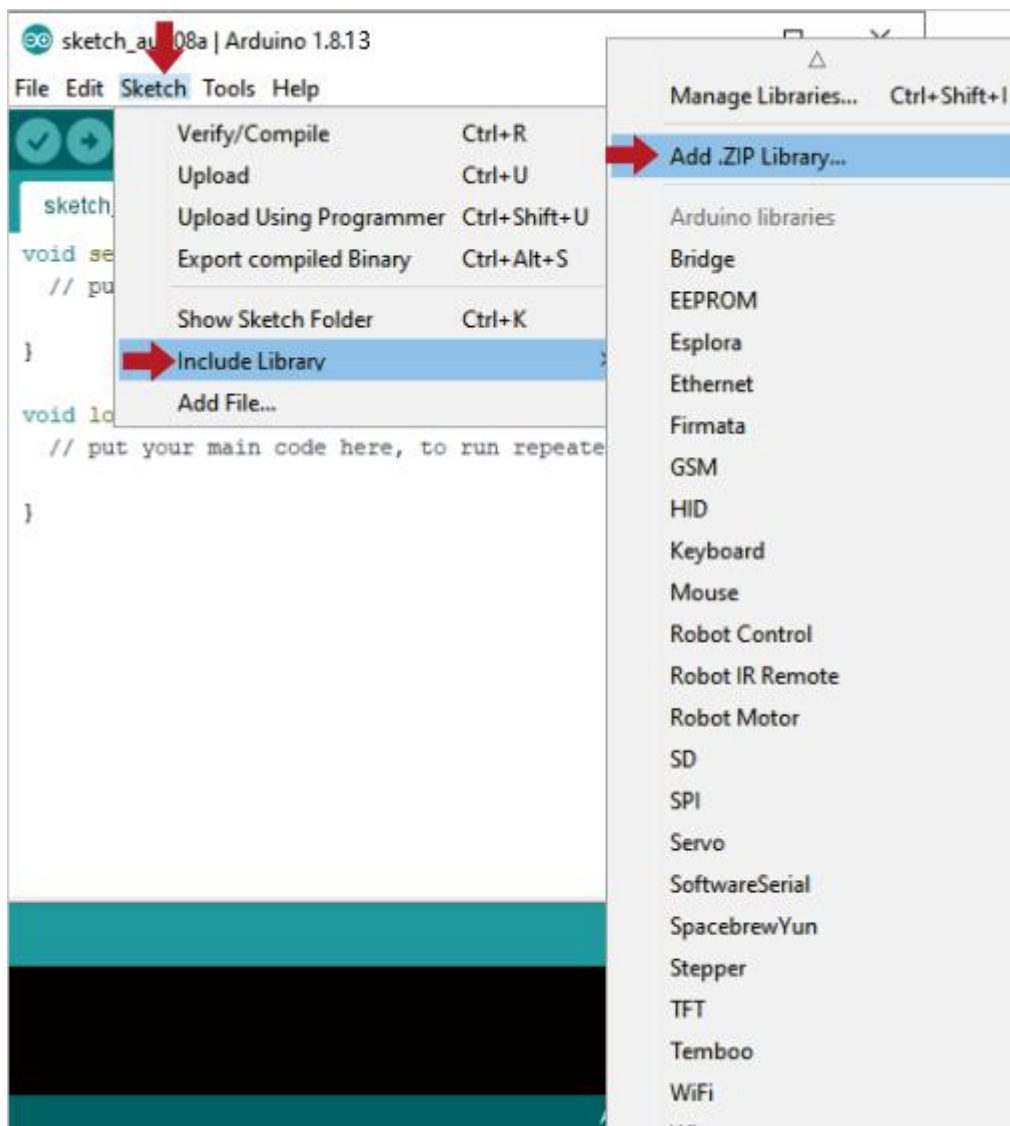




You can now find the new library available in the Sketch > Include Library menu.

6.3 Importing a .zip Library

Open the Arduino IDE, navigate to Sketch > Include Library. At the top of the drop down list, select the option to "Add .ZIP Library".

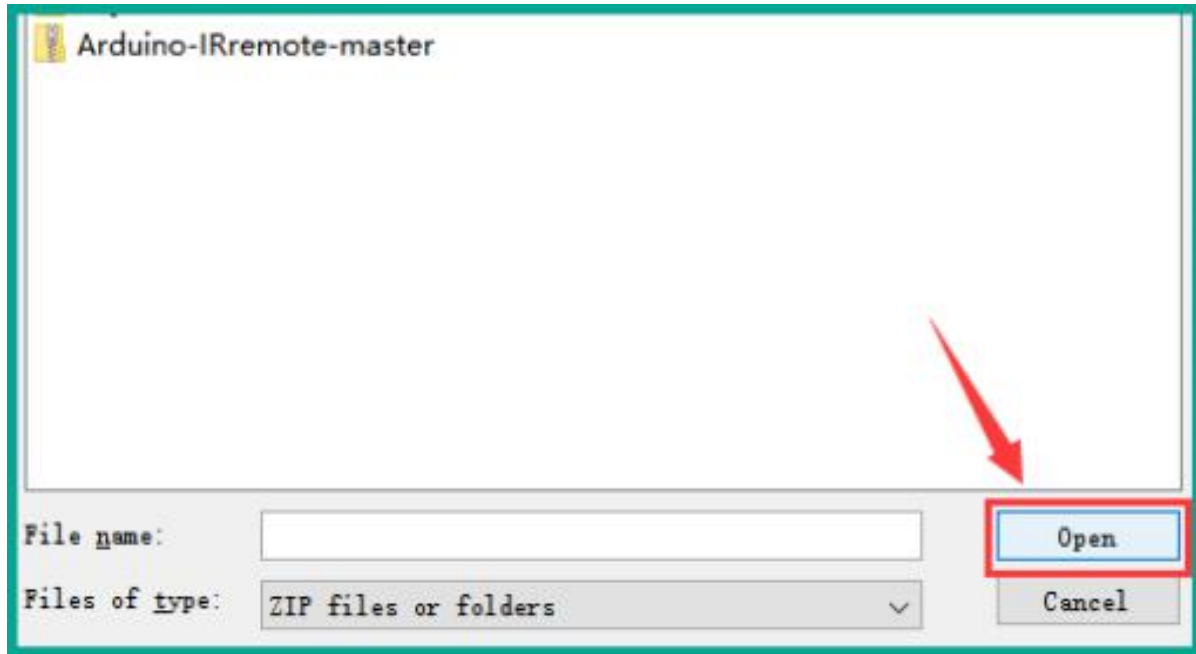


We will install the IR Remote Library which can be found on GitHub:
<https://github.com/shirriff/Arduino-IRremote>



First, download the library as a ZIP, which is done by clicking the green “Code” button and then clicking “Download ZIP” .

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



Return to the Sketch > Import Library menu.

You should now see the library at the bottom of the drop-down menu.