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Inland ESP32 Core Board (Black and Eco-friendly)

By [wmcclellan](#) Last Updated: **Feb 8, 2022**

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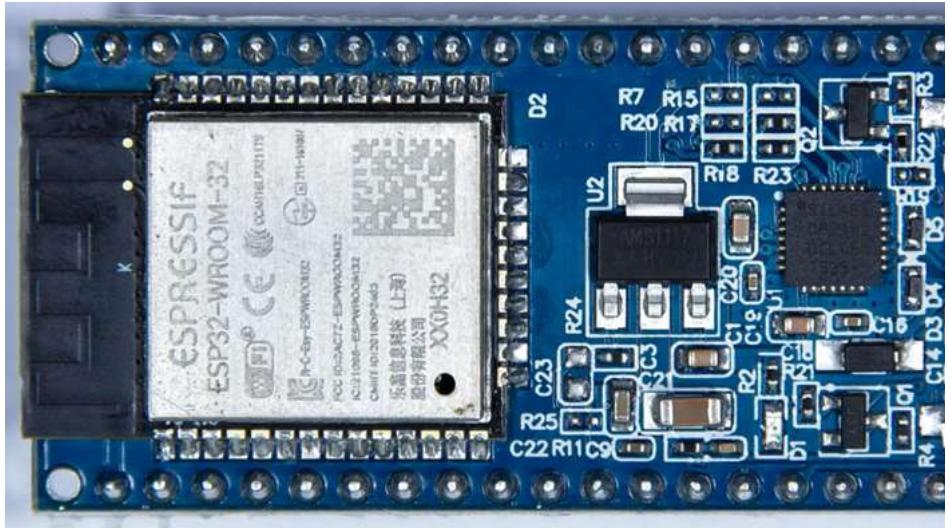
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Inland ESP32 Core Board (Black and Eco-friendly)



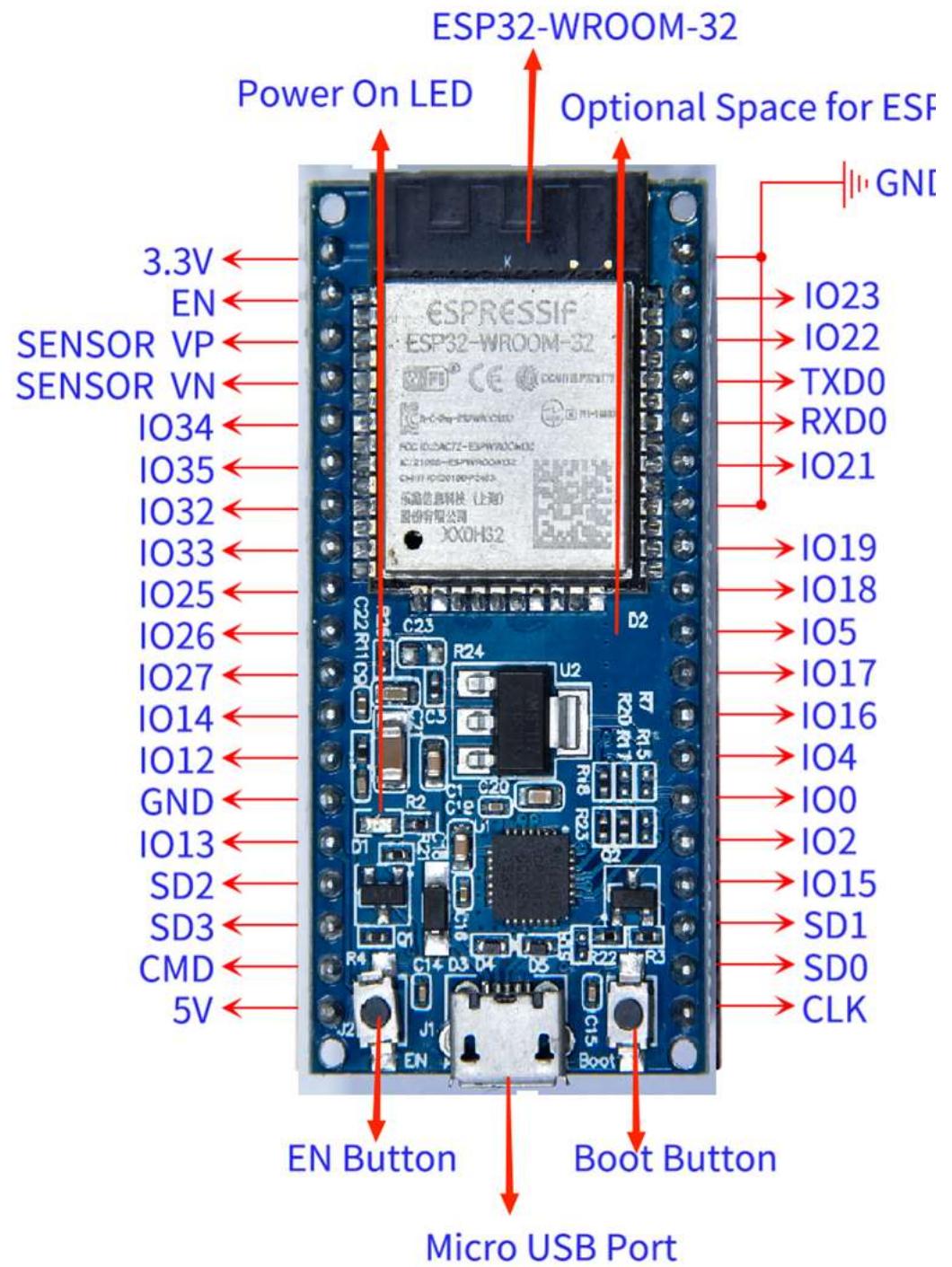
amplifiers, filters and power management modules. At the same time, it also integrates with TSMC's low-power 40nm tech performance and RF performance are safe and reliable, easy to expand to a variety of applications.

Technical Details:

- Microcontroller: ESP-WROOM-32 module
- USB to Serial Port Chip: CP2102-GMR
- Operating Voltage: DC 5V
- Operating Current: 80mA(average)
- Current Supply: 500mA(Minimum)
- Operating Temperature Range: -40°C ~ +85°C
- WiFi mode: Station/SoftAP/SoftAP+Station/P2P
- WiFi protocol: 802.11 b/g/n/e/i (802.11n, speed up to 150 Mbps)
- WiFi frequency range: 2.4 GHz ~ 2.5 GHz
- Bluetooth protocol: conform to Bluetooth v4.2 BR/EDR and BLE standards
- Dimensions: 55mm*26mm*13mm
- Weight: 9.3g

Element and Interfaces:

Here is an explanation of what every element and interface of the board has:



Specialized Functions of Some Pins:

PINS	EXPLANATIONS
IO23	VSPI MOSI/SPI MOSI
IO22	Wire SCL
TXD0	IO1/Serial TX
RXD0	IO3/Serial RX
IO21	Wire SDA
IO19	VSPI MISO/SPI MISO
IO18	VSPI SCK/SPI SCK
IO5	VSPI SS/SPI SS
IO4	ADC10/TOUCH0
IO0	ADC11/TOUCH1
IO2	ADC12/TOUCH2
IO15	HSPI SS/ADC13/TOUCH3/TDO
SD1	IO8/FLASH D1
SD0	IO7/FLASH D0
CLK	IO6/FLASH SCK
CMD	IO11/FLASH CMD
SD3	IO10/FLASH D3
SD2	IO9/FLASH D2

IO13	HSPI MOSI/ADC14/TOUCH4/TCK
IO12	HSPI MISO/ADC15/TOUCH5/TDI
IO14	HSPI SCK/ADC16/TOUCH6/TMS
IO27	ADC17/TOUCH7
IO26	ADC19/DAC2
IO25	ADC18/DAC1
IO33	ADC5/TOUCH8
IO32	ADC4/TOUCH9
IO35	ADC7
IO34	ADC6
SENSOR VN	IO39/ADC3
SENSOR VP	IO36/ADC0
EN	RESET

Detailed Using Method as follows:

Step 1| Install the Arduino IDE

When programming the control board, first you should install the Arduino software and driver.

You can download the different versions for different systems from the link below:

<https://www.arduino.cc/en/Main/OldSoftwareReleases#1.5.x>

This control board is compatible with the Arduino 1.8.7 or latest version.

So next we will download the Arduino 1.8.7 software to test the keyestudio ESP32 core board.



Arduino 1.6.x, 1.5.x BETA

These packages are no longer supported by the development team.



Version	Windows	MAC OS X	Linux
1.8.7	Windows Windows Installer	MAC OS X	Linux 32 Bit Linux 64 Bit Linux ARM
1.8.6	Windows Windows Installer	MAC OS X	Linux 32 Bit Linux 64 Bit Linux ARM
1.8.5	Windows Windows Installer	MAC OS X	Linux 32 Bit Linux 64 Bit Linux ARM
1.8.4	Windows Windows Installer	MAC OS X	Linux 32 Bit Linux 64 Bit Linux ARM
1.8.3	Windows Windows Installer	MAC OS X	Linux 32 Bit Linux 64 Bit Linux ARM

In this Windows system page, there are two options. One is Windows version, the other is Windows Installer.

For Windows Installer, you can download the installation file, this way you need to install the arduino IDE.

Version	Windows	MAC OS X	Linux
1.8.7	Windows Windows Installer	MAC OS X	Linux 32 Bit Linux 64 Bit Linux ARM

For simple Windows version, you can download the software directly, do not need to install, just directly use the software ↗

Version	Windows	MAC OS X	Linux
1.8.7	Windows Windows Installer	MAC OS X	Linux 32 Bit Linux 64 Bit Linux ARM

Next, we click the **Windows**, pop up the interface as below.

Contribute to the Arduino Software

Consider supporting the Arduino Software by contributing to its development. (US tax payers, please note that contributions are not tax deductible). [Learn more on how your contribution will be used.](#)



- Click **JUST DOWNLOAD**.

Download the **arduino-1.8.7-windows.zip** package to your computer, unzip the package. Open the Arduino-1.8.7 folder, you



Name	Date modified	Type
drivers	9/11/2018 5:33 PM	File folder
examples	9/11/2018 5:35 PM	File folder
hardware	9/11/2018 5:35 PM	File folder
java	9/11/2018 5:35 PM	File folder
lib	9/11/2018 5:35 PM	File folder
libraries	9/11/2018 5:35 PM	File folder
reference	9/11/2018 5:35 PM	File folder
tools	9/11/2018 5:35 PM	File folder
tools-builder	9/11/2018 5:34 PM	File folder
arduino.exe	9/11/2018 5:35 PM	Application
arduino.l4j	9/11/2018 5:35 PM	Configuration
arduino_debug.exe	9/11/2018 5:35 PM	Application
arduino_debug.l4j	9/11/2018 5:35 PM	Configuration
arduino-builder.exe	9/11/2018 5:34 PM	Application
libusb0.dll	9/11/2018 5:33 PM	Application ex
msvcp100.dll	9/11/2018 5:33 PM	Application ex
msvcr100.dll	9/11/2018 5:33 PM	Application ex
revisions	9/11/2018 5:33 PM	Text Document



Click the icon of ARDUINO software to open. This is your Arduino.

File Edit Sketch Tools Help



sketch_may13a

```
void setup() {  
    // put your setup code here, to run once:  
  
}  
  
void loop() {  
    // put your main code here, to run repeatedly:  
  
}
```

Arduino/G

Step 2 | Installing the Driver

The USB to serial port chip of this control board is CP2102-GMR. So you need to install the driver for the chip.

You can click the driver tool download link: <https://www.silabs.com/products/development-tools/software/usb-to-uart-b>

Download Software

The CP210x Manufacturing DLL and Runtime DLL have been updated and must be used with v6.0 and later of the CP210x Windows Vt Software downloads affected are AN144\$W.zip, AN205\$W.zip and AN223\$W.zip. If you are using a 5.x driver and need support you can Application Note Software.

[Legacy OS software and driver package download links and support information >](#)

Download for Windows 10 Universal (v10.1.7)

Platform	Software	Release Notes
 Windows 10 Universal	Download VCP (2.3 MB)	Download VCP Revision History

Download for Windows 7/8/8.1 (v6.7.6)

Platform	Software	Release Notes
 Windows 7/8/8.1	Download VCP (5.3 MB) (Default)	Download VCP Revision History
 Windows 7/8/8.1	Download VCP with Serial Enumeration (5.3 MB) Learn More »	Download VCP Revision History

Download for Windows XP/Server 2003/Vista/7/8/8.1 (v6.7)

Platform	Software	Release Notes
 Windows XP/Server 2003/Vista/7/8/8.1	Download VCP (3.66 MB)	Download VCP Revision History

It includes different drivers for different computer's systems. Download and install the driver according to your computer's system. For example, we download the driver for Windows 7. Get the compression package of CP210x_Windows_Drivers

Download for Windows 7/8/8.1 (v6.7.6)

Platform	Software	Release Notes
 Windows 7/8/8.1	Download VCP (5.3 MB) (Default)	Download VCP Revision History
 Windows 7/8/8.1	Download VCP with Serial Enumeration (5.3 MB) Learn More »	Download VCP Revision History



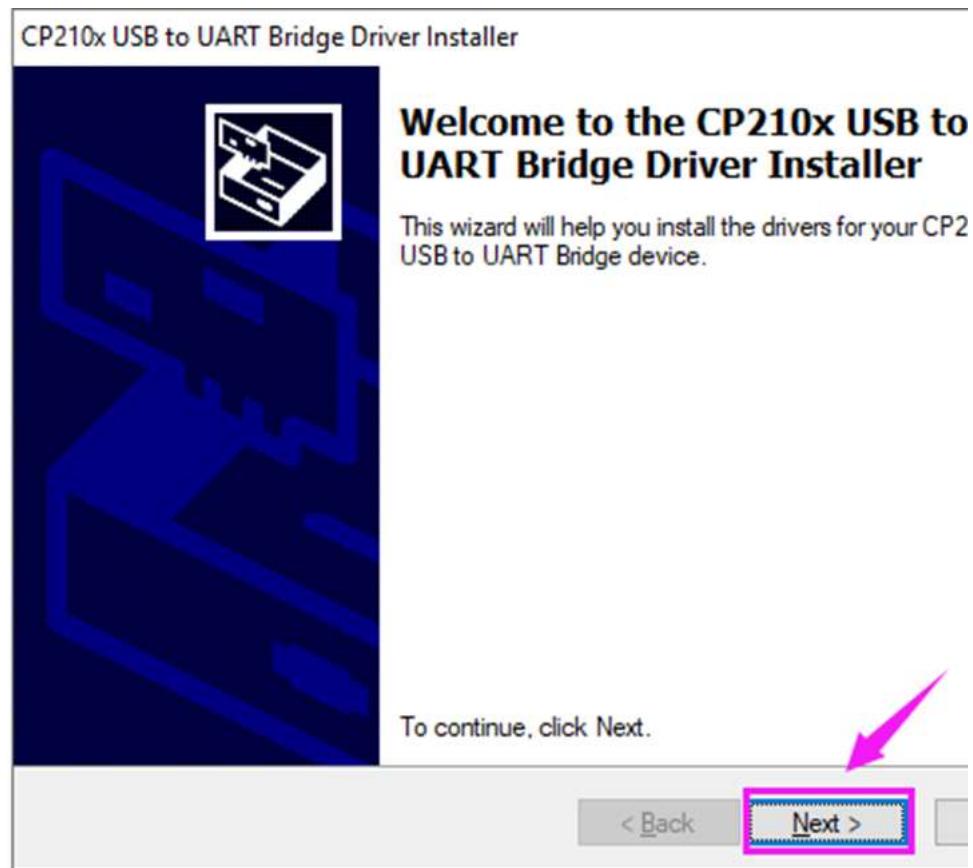
CP210x_Windows_Drivers

Then extract the compression package; you should see the application to install.

Name	Date modified	Type
x64	5/14/2019 8:18 AM	File folder
x86	5/14/2019 8:18 AM	File folder
CP210xVCPInstaller_x64.exe	9/28/2017 1:58 AM	Application
CP210xVCPInstaller_x86.exe	9/28/2017 1:58 AM	Application
dpinst	9/28/2017 1:45 AM	XML Document
SLAB_License_Agreement_VCP_Windows	9/28/2017 1:46 AM	Text Document
slabvcp	6/2/2018 4:35 AM	Security Catalog
slabvcp	6/2/2018 4:35 AM	Setup Information
v6-7-6-driver-release-notes	6/16/2018 2:51 AM	Text Document

The driver software installation is very simple. Just select the driver application as you like.

Click the .exe package to install the driver. Click "Next".



Click to select "I accept this agreement" and click "Next".

CP210x USB to UART Bridge Driver Installer

License Agreement



To continue, accept the following license agreement. To read the entire agreement, use the scroll bar or press the Page Down key.

LICENSE AGREEMENT

SILICON LABS VCP DRIVER

IMPORTANT: READ CAREFULLY BEFORE AGREEING TO TERMS

THIS PRODUCT CONTAINS THE SILICON LABS VCP DRIVER AND INSTALLER PROGRAMS AND OTHER THIRD PARTY SOFTWARE. TOGETHER THESE PRODUCTS ARE REFERRED TO AS THE "LICENSED SOFTWARE". USE OF THE LICENSED SOFTWARE IS SUBJECT TO THE TERMS OF THIS LICENSE

I accept this agreement

I don't accept this agreement

Save As

Print

< Back

Next >



CP210x USB to UART Bridge Driver Installer

The drivers are now installing...



Please wait while the drivers install. This may take some time to complete.

< Back

Next >



Wait for the installation complete. Finally click "Finish" to close the window.

CP210x USB to UART Bridge Driver Installer



Completing the Installation of t CP210x USB to UART Bridge Dr

The drivers were successfully installed on this computer

Driver Name	Status
✓ Silicon Laboratories Inc. ...	Device Updated

< Back

Finish

Step 3 | Building ESP32 Environment

At first, open the Arduino-1.8.7 folder, you will see the hardware folder;

File Explorer window showing the contents of the 'arduino-1.8.7-windows' folder.

The 'hardware' folder is highlighted with a pink arrow pointing to it.

Name	Date modified	Type
drivers	9/11/2018 5:33 PM	File folder
examples	9/11/2018 5:35 PM	File folder
hardware	9/11/2018 5:35 PM	File folder
java	9/11/2018 5:35 PM	File folder
lib	9/11/2018 5:35 PM	File folder
libraries	9/11/2018 5:35 PM	File folder
reference	9/11/2018 5:35 PM	File folder
tools	9/11/2018 5:35 PM	File folder
tools-builder	9/11/2018 5:34 PM	File folder
arduino.exe	9/11/2018 5:35 PM	Application
arduino.l4j	9/11/2018 5:35 PM	Configuration set
arduino_debug.exe	9/11/2018 5:35 PM	Application
arduino_debug.l4j	9/11/2018 5:35 PM	Configuration set
arduino-builder.exe	9/11/2018 5:34 PM	Application
libusb0.dll	9/11/2018 5:33 PM	Application exten
msvcp100.dll	9/11/2018 5:33 PM	Application exten
msvcr100.dll	9/11/2018 5:33 PM	Application exten
revisions	9/11/2018 5:33 PM	Text Document
wrapper-manifest	9/11/2018 5:35 PM	XML Document

Then open the hardware folder and add a new folder, remember to name it **espressif** shown below.

File Explorer window showing the contents of the 'hardware' folder.

The 'espressif' folder is highlighted with a pink arrow pointing to it.

Name	Date modified	Type
arduino	9/11/2018 5:35 PM	File folder
espressif	5/14/2019 10:28 AM	File folder
tools	9/11/2018 5:33 PM	File folder
package_index_bundled.json	9/11/2018 5:35 PM	JSON File
platform.keys.rewrite	9/11/2018 5:35 PM	Text Document
platform	9/11/2018 5:35 PM	Text Document

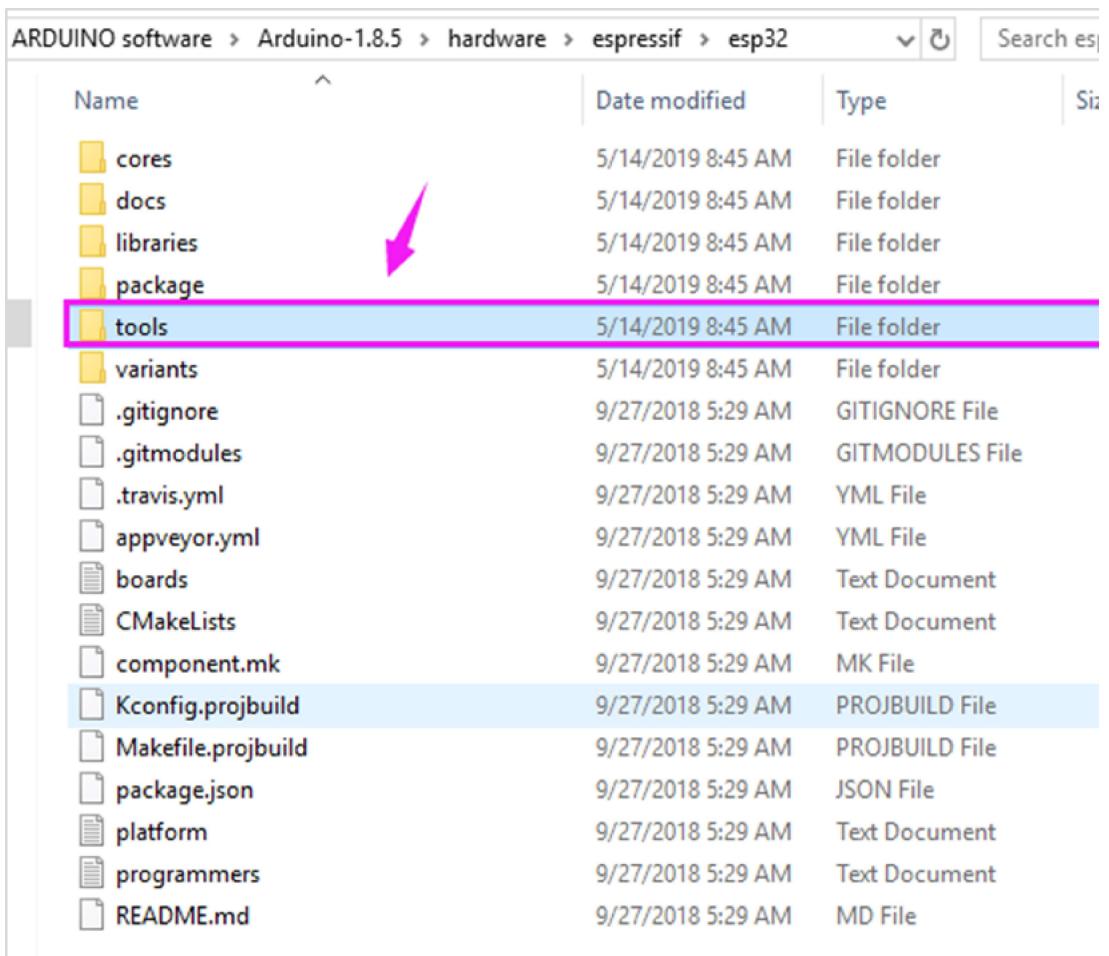
After that, unzip the esp32 compression package we provided, and copy to the **espressif** folder.



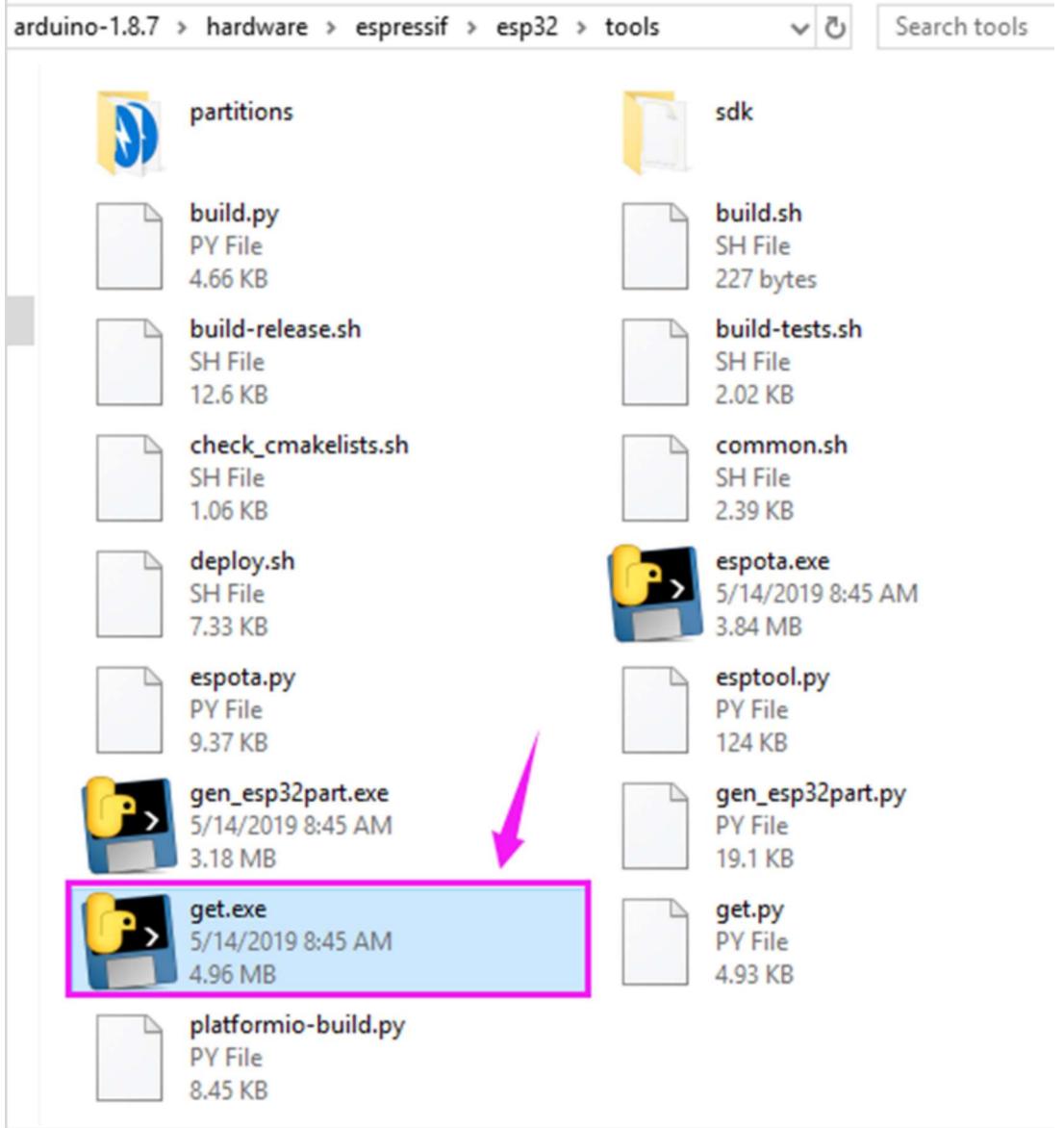
So inside the **espressif** folder should see the esp32 folder as below. Note that the folder should not name a type.



Now, click to enter the esp32 folder and you can see the **tools** folder below.



Enter the **tools** folder and click to run the **get.exe** application as an administrator. (But the precondition is that you have all



When run the **get.exe** application, ensure that your network is unblocked and wait for the program download. Done download automatically close.

```
F:\ARDUINO software\arduino-1.8.7-windows\arduino-1.8.7\hardware\espressif\esp32\tools\get.exe
System: Windows, Info: Windows-10-10.0.17763
Platform: i686-mingw32
Downloading xtensa-esp32-elf-win32-1.22.0-80-g6c4433a-5.2.0.zip
Done
Extracting xtensa-esp32-elf-win32-1.22.0-80-g6c4433a-5.2.0.zip
Downloading esptool-2.5.0-windows.zip
Done
Extracting esptool-2.5.0-windows.zip
Downloading mkspiffs-0.2.3-arduino-esp32-win32.zip
Done
Extracting mkspiffs-0.2.3-arduino-esp32-win32.zip
```

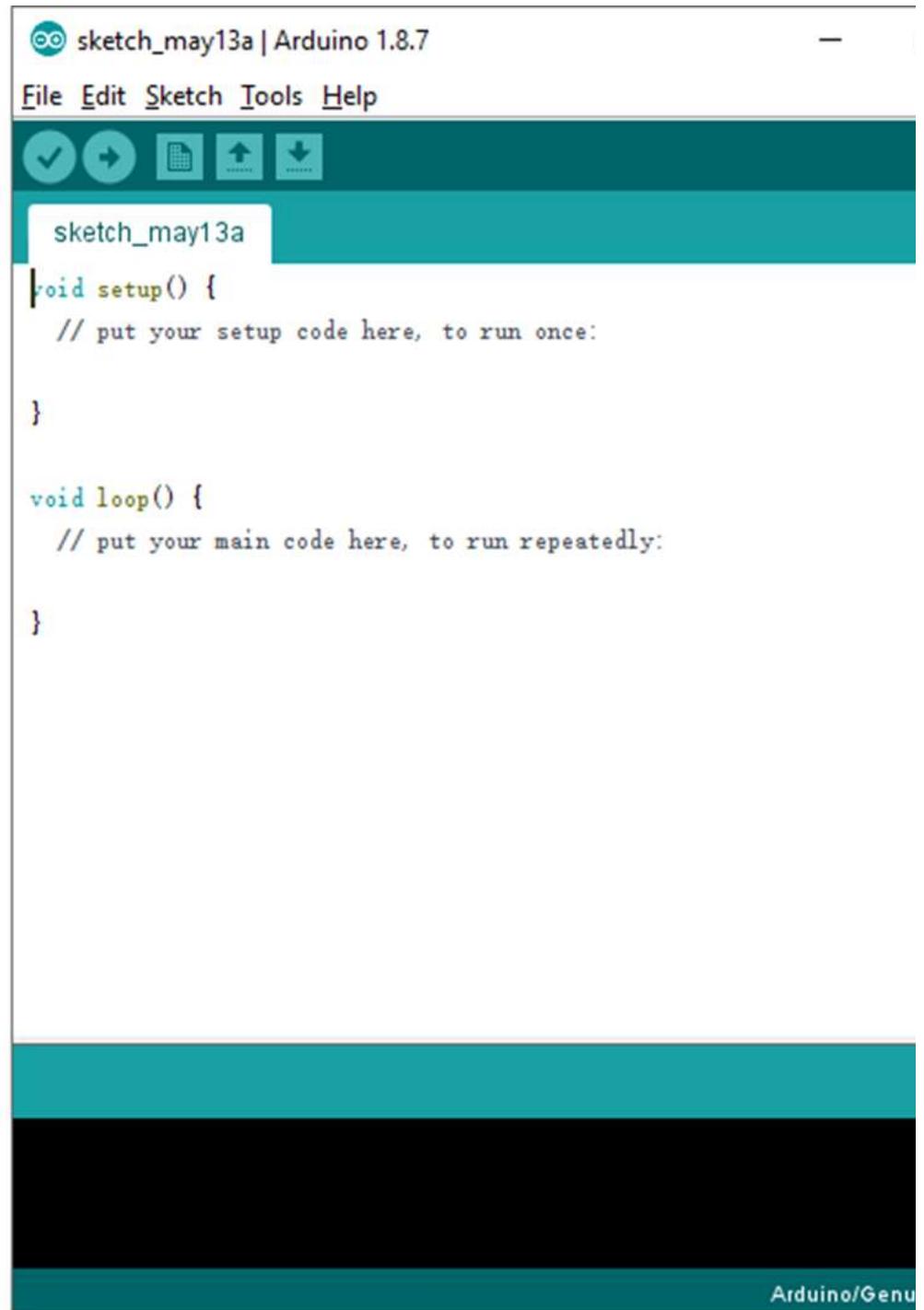
```
F:\ARDUINO software\arduino-1.8.7-windows\arduino-1.8.7\hardware\espressif\esp32\tools\get.exe
System: Windows, Info: Windows-10-10.0.17763
Platform: i686-mingw32
Tool xtensa-esp32-elf-win32-1.22.0-80-g6c4433a-5.2.0.zip already downloaded
Extracting xtensa-esp32-elf-win32-1.22.0-80-g6c4433a-5.2.0.zip
```

Double-click the icon of Arduino software downloaded to open the IDE.



arduino.exe

This is your Arduino 1.8.7 interface.



(**Note:** if the Arduino software loads in the wrong language, you can change it in the preferences dialog. See the environment section below.)

The functions of each button on the Toolbar are listed below:

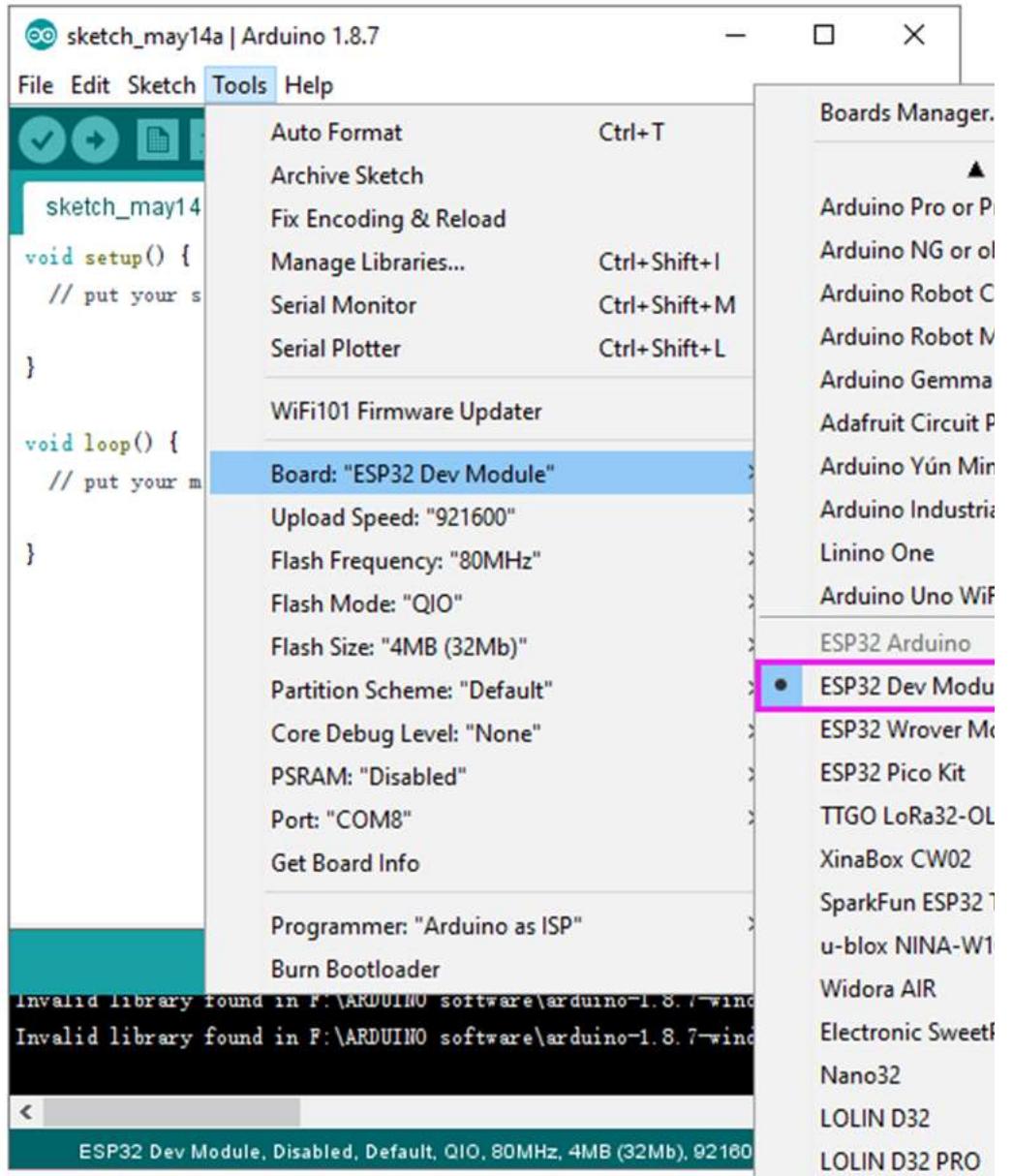
	Check the code for errors
	Upload the current Sketch to the Arduino
	Create a new blank Sketch
	Show a list of Sketches
	Save the current Sketch
	Display the serial data being sent from the Arduino

Attach your ESP32 core board to your computer with the USB cable.

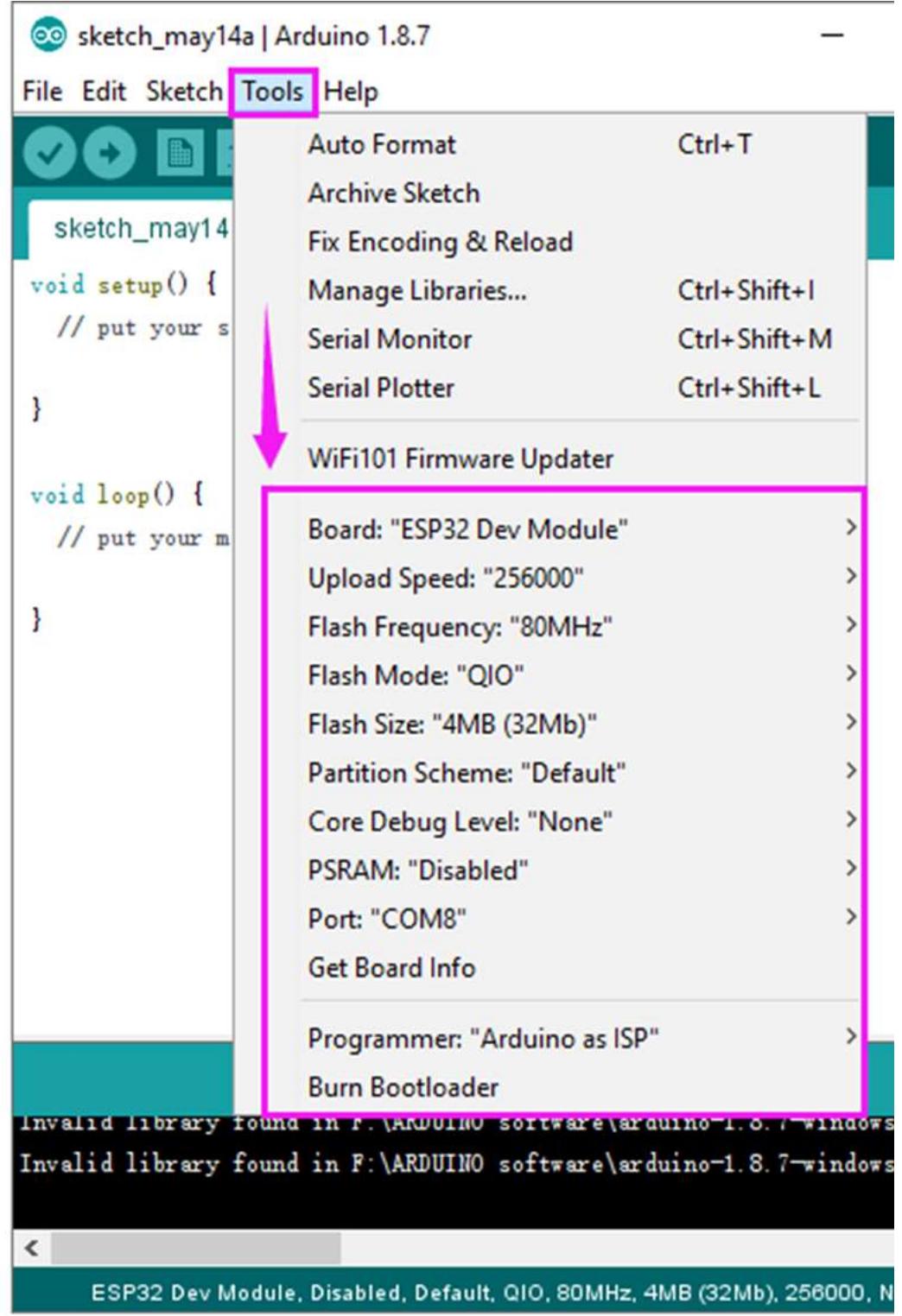


Check that the "Board Type" and "Serial Port" are set correctly.

Click to open the "**Tools**", for "**Board**", scroll to select the ESP32 Dev Module.

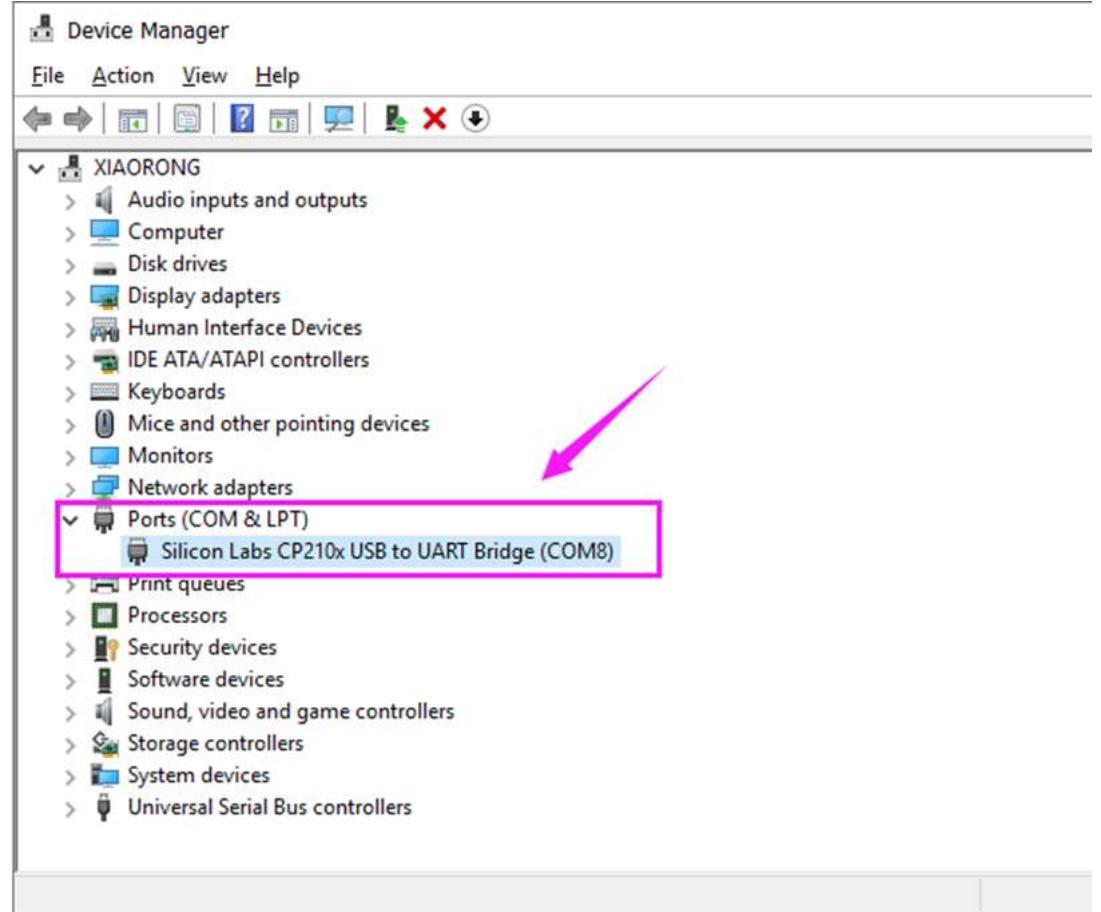


Select well the correct board and then should set the detailed information as shown below.

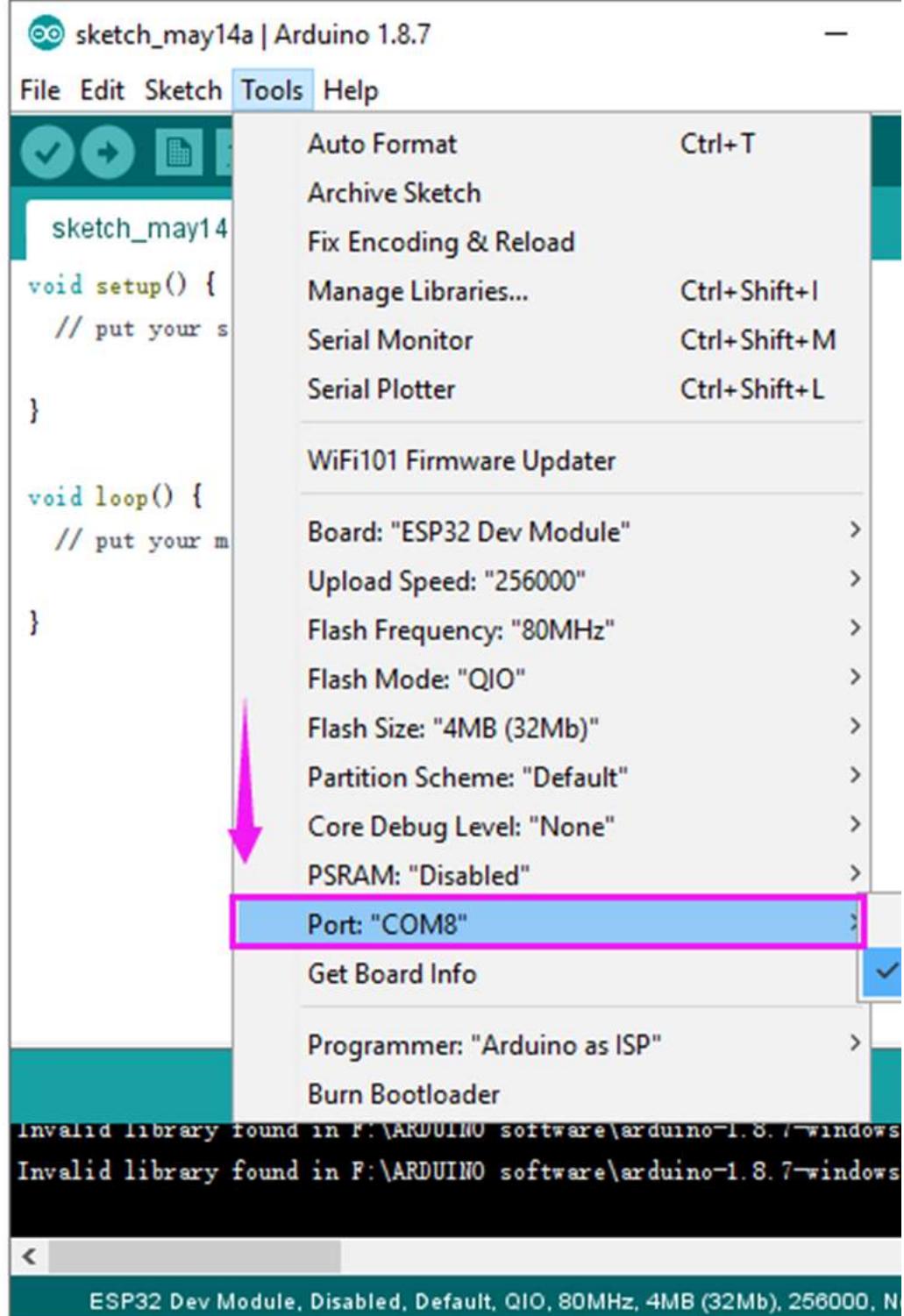


Pay close attention to select the proper **COM** port. (Arduino driver installed well, you are supposed to see the corresponding port in Device Manager).

Check out the COM port in the Device Manager of your computer's control panel.



Here we can know the COM port is COM 8. Then select the Port COM 8 in the Arduino Tools.



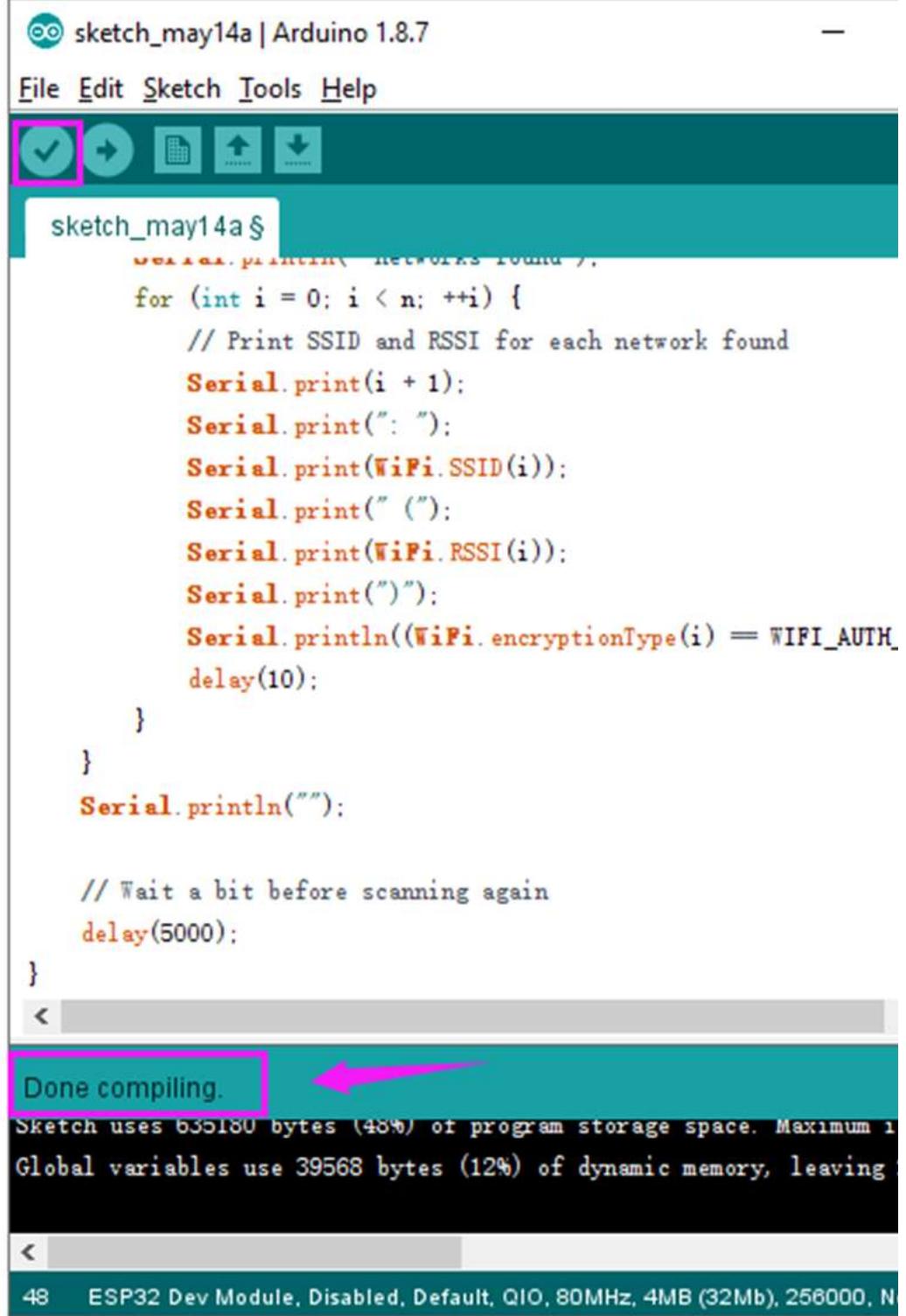
Step 5 | Upload the Code

Paste and copy the source code below to Arduino IDE.

Special Note: when compile and upload the source code, hold the BOOT button on the ESP32 board until upload well the code.

This sketch demonstrates how to scan WiFi networks. * The API is almost the same as with the WiFi Shield libr

Click verify button to check the errors. If compiling successfully, the message "Done compiling." will appear in the status b;



```
sketch_may14a | Arduino 1.8.7
File Edit Sketch Tools Help
sketch_may14a §
for (int i = 0; i < n; ++i) {
    // Print SSID and RSSI for each network found
    Serial.print(i + 1);
    Serial.print(": ");
    Serial.print(WiFi.SSID(i));
    Serial.print(" (");
    Serial.print(WiFi.RSSI(i));
    Serial.print(")");
    Serial.println((WiFi.encryptionType(i) == WIFI_AUTH_WPA2));
    delay(10);
}
Serial.println("");
// Wait a bit before scanning again
delay(5000);
}

<
Done compiling. ←
Sketch uses 635180 bytes (48%) of program storage space. Maximum i
Global variables use 39568 bytes (12%) of dynamic memory, leaving
<
48  ESP32 Dev Module, Disabled, Default, QIO, 80MHz, 4MB (32Mb), 256000, N
```

After that, click the "Upload" button to upload the code. If the upload is successful, the message "Done uploading." will appear.

Special Note: if fail to upload, when upload the source code, hold the BOOT button on the ESP32 board until upload well the code.

File Edit Sketch Tools Help



sketch_may14a §

```
  Serial.println(" Networks found ");

    for (int i = 0; i < n; ++i) {
        // Print SSID and RSSI for each network found
        Serial.print(i + 1);
        Serial.print(": ");
        Serial.print(WiFi.SSID(i));
        Serial.print("(");
        Serial.print(WiFi.RSSI(i));
        Serial.print(")");
        Serial.println((WiFi.encryptionType(i) == WIFI_AUTH_WPA2));
        delay(10);
    }
}

Serial.println("");
```

```
// Wait a bit before scanning again
delay(5000);
```

}

<

Done uploading.

```
invalid library found in F:\ARDUINO software\arduino-1.8.7-windows
Invalid library found in F:\ARDUINO software\arduino-1.8.7-windows
```

<

48 ESP32 Dev Module, Disabled, Default, QIO, 80MHz, 4MB (32Mb), 256000, N

Done uploading the code to your board, open the serial monitor and set the baud rate to 115200. You should be able to see it up window.



Serial

sketch_may14a §

```
  Serial.println(" Networks found ");

    for (int i = 0; i < n; ++i) {
        // Print SSID and RSSI for each network found
        Serial.print(i + 1);
        Serial.print(": ");
        Serial.print(WiFi.SSID(i));
        Serial.print("(");
        Serial.print(WiFi.RSSI(i));
        Serial.print(")");
        Serial.println((WiFi.encryptionType(i) == WIFI_AUTH_WPA2));
        delay(10);
    }
}

Serial.println("");
```

```
// Wait a bit before scanning again
delay(5000);
```

}

<

Done uploading.

```
invalid library found in F:\ARDUINO software\arduino-1.8.7-windows
Invalid library found in F:\ARDUINO software\arduino-1.8.7-windows
```

<

48 ESP32 Dev Module, Disabled, Default, QIO, 80MHz, 4MB (32Mb), 256000, N

```

COM8

scan start
scan done
10 networks found
1: ww (-79)*
2: yihongfushi (-81)*
3: 508-1 (-82)*
4: ChinaNet-ixRU (-82)*
5: TP-LINK_B316 (-85)*
6: ChinaNet-suxR (-85)*
7: TP-LINK_1F77 (-91)*
8: ZHEINDEMAN (-92)*
9: HUAWEI-3L9ML8 (-93)*
10: ChinaNet-bYmd (-95)*

scan start
scan done
10 networks found
1: 508-1 (-83)*
2: yihongfushi (-85)*

 Autoscroll  Show timestamp
Newline
115200 bps

```

Resource Download:

You can download all the data package from the link: <https://drive.google.com/open?id=1qZ8MGRd-KwID4wXACALr3P6Vc>

Download the ARDUINO Software: <https://www.arduino.cc/en/Main/OldSoftwareReleases#1.5.x>

Download the Driver: <https://www.silabs.com/products/development-tools/software/usb-to-uart-bridge-vcp-drivers>

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