Updating ESP32-S3 Firmware (WiFi Board)

In this tutorial, we will learn how to update the ESP32-S3 firmware on V5 Wi-Fi board.

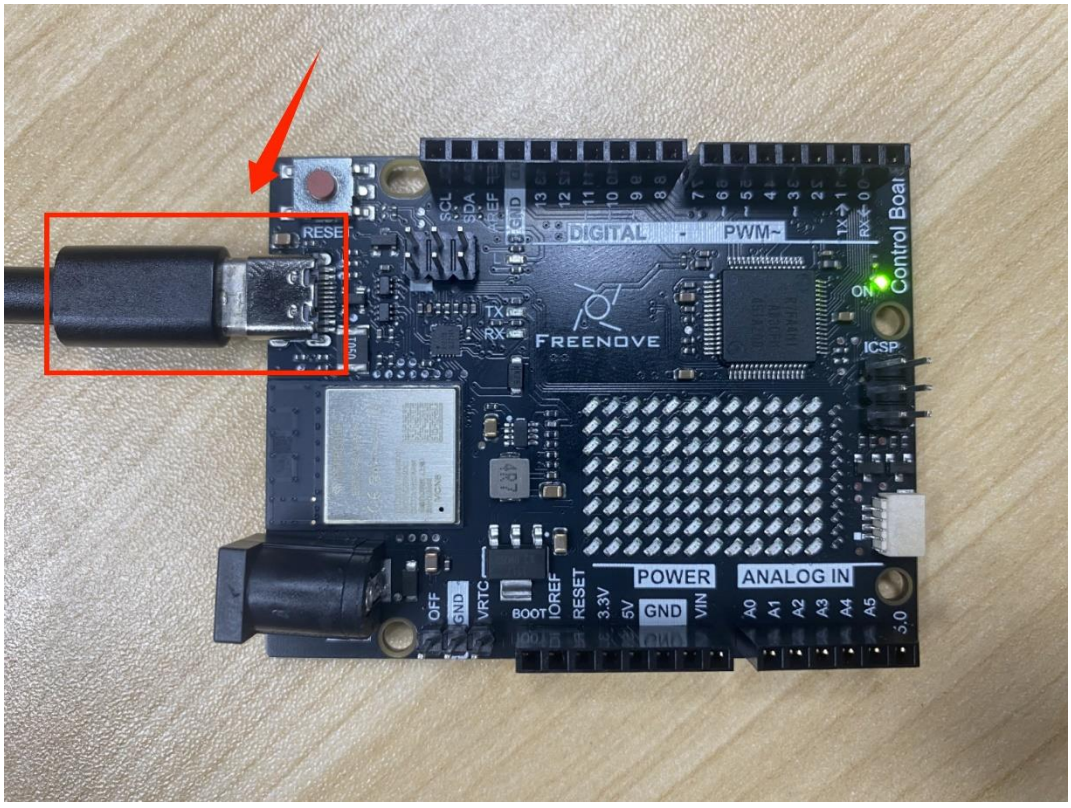
Updating on Arduino IDE (Recommended)

Notes:

1. **This method is only supported on Arduino IDE version 2.2.1 or higher.**
2. **This method is only applicable when the Arduino IDE can still correctly detect the V5 board. If the Arduino IDE can no longer properly detect the V5 board, please use espflash for updating.**

Please strictly follow the steps below to update the firmware.

Step 1: Connect the Board to your computer with a USB data cable

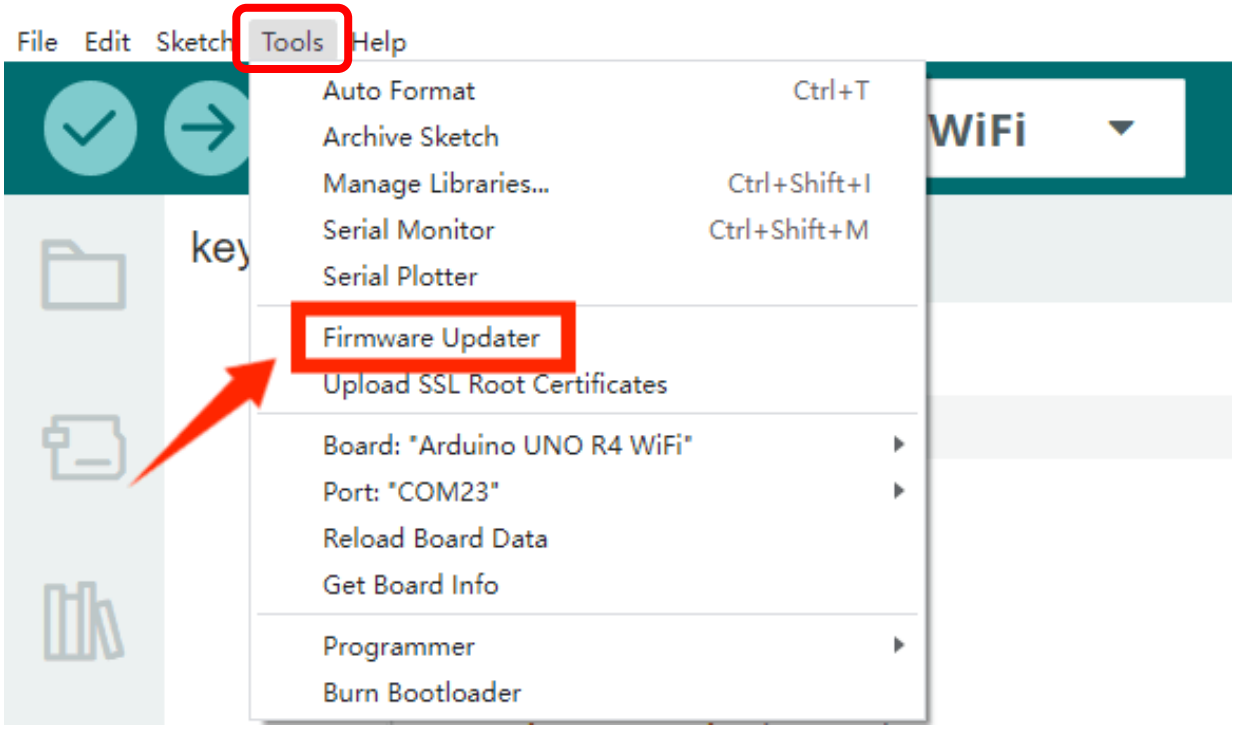


Step 2: Close Serial Monitor

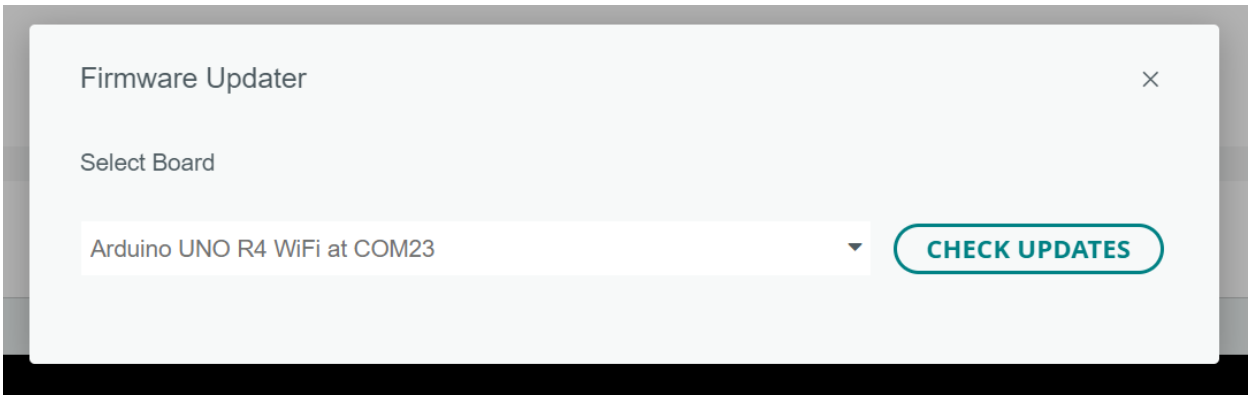
Important note: When flashing the firmware, the serial monitor on Arduino IDE must be closed; otherwise, the firmware flashing may fail.

Step 3: Open Firmware Updater

Click **Tools** -> **Firmware Updater**

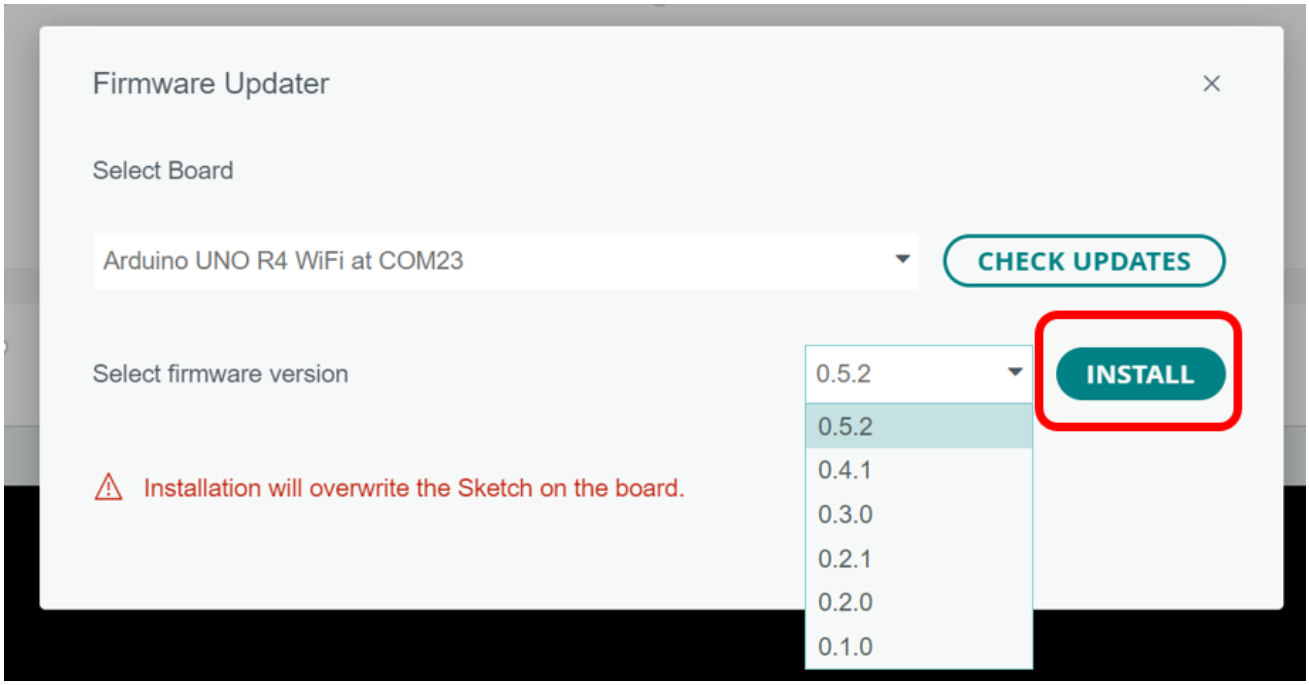


Step 4: Click CHECK UPDATES



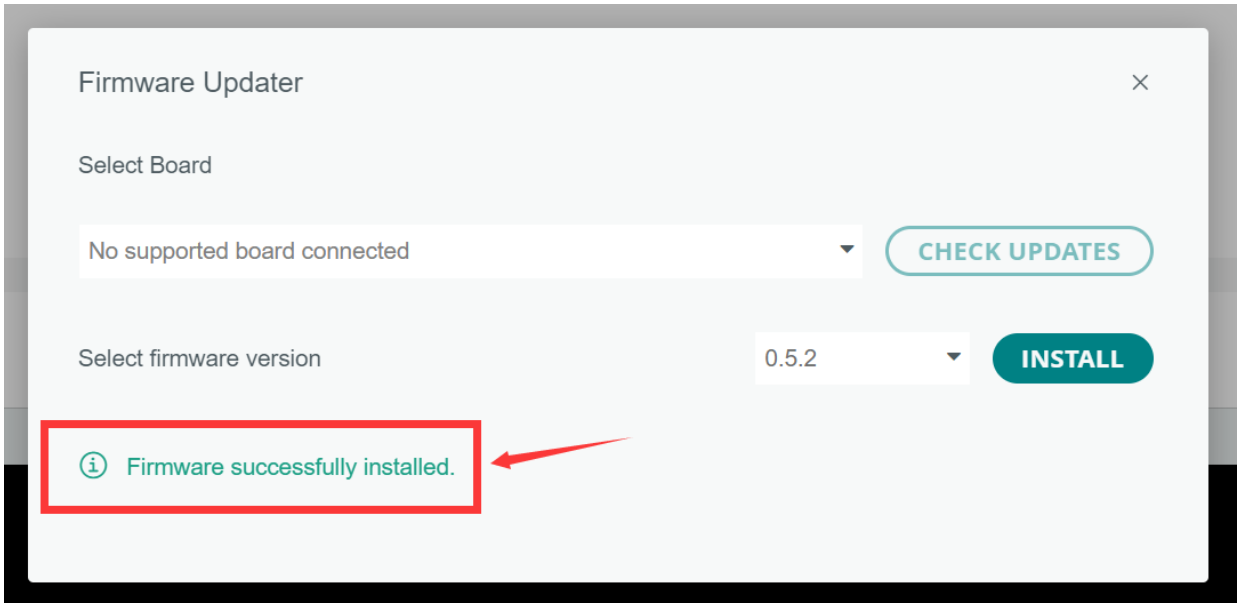
Step 5: Click INSTALL

You can install the latest one.



Step 6: Wait for the firmware to finish installing

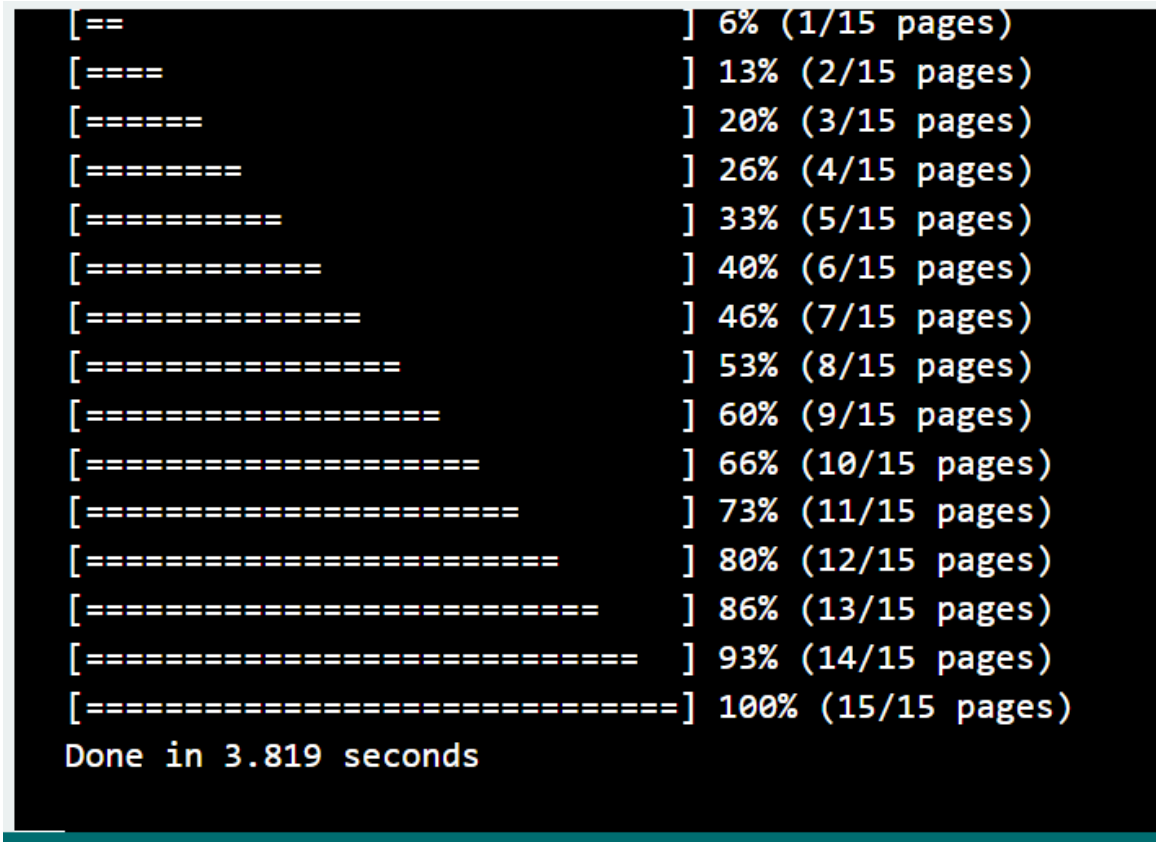
Step 7: Fiemware Sucessfully Installed



Step 8: Disconnect the board from your computer and reconnect them (Necessary)

After flashing the firmware on the UNO R4 WiFi, the board will remain in ESP Download mode until you disconnect and reconnect it from your computer. If you upload a sketch while the board is in ESP Mode, it will erase the special firmware that lets the ESP32 chip function as an USB bridge.

Step 9: Try uploading the sketch again



Updating the Connectivity Module Firmware Using Arduino Cloud

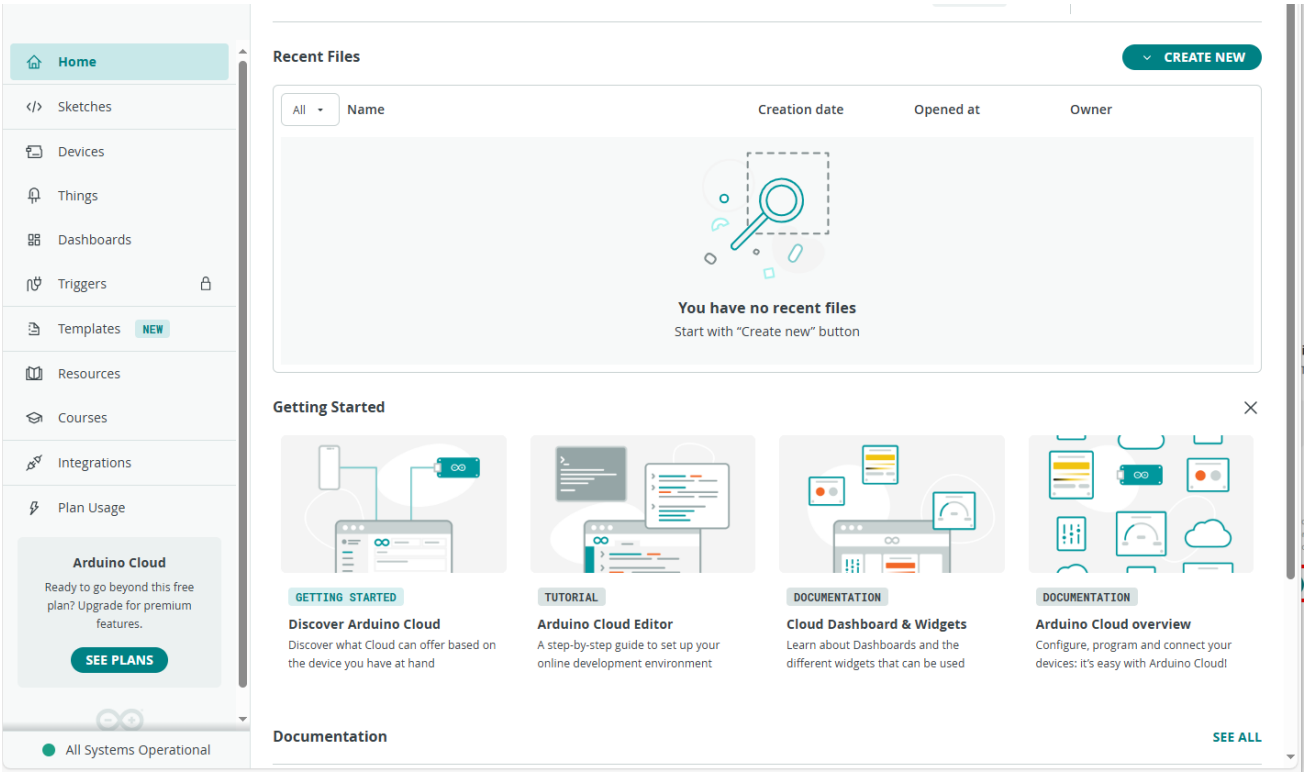
When you add a new device to Arduino Cloud, the connectivity module firmware will update automatically, and the current firmware version of the V5 board will be displayed.

Important Notes:
This method only works if the Arduino IDE can still detect the V5 board.
If the board is no longer recognized, use espflash to update instead.

Follow These Steps Carefully to Update the Firmware:

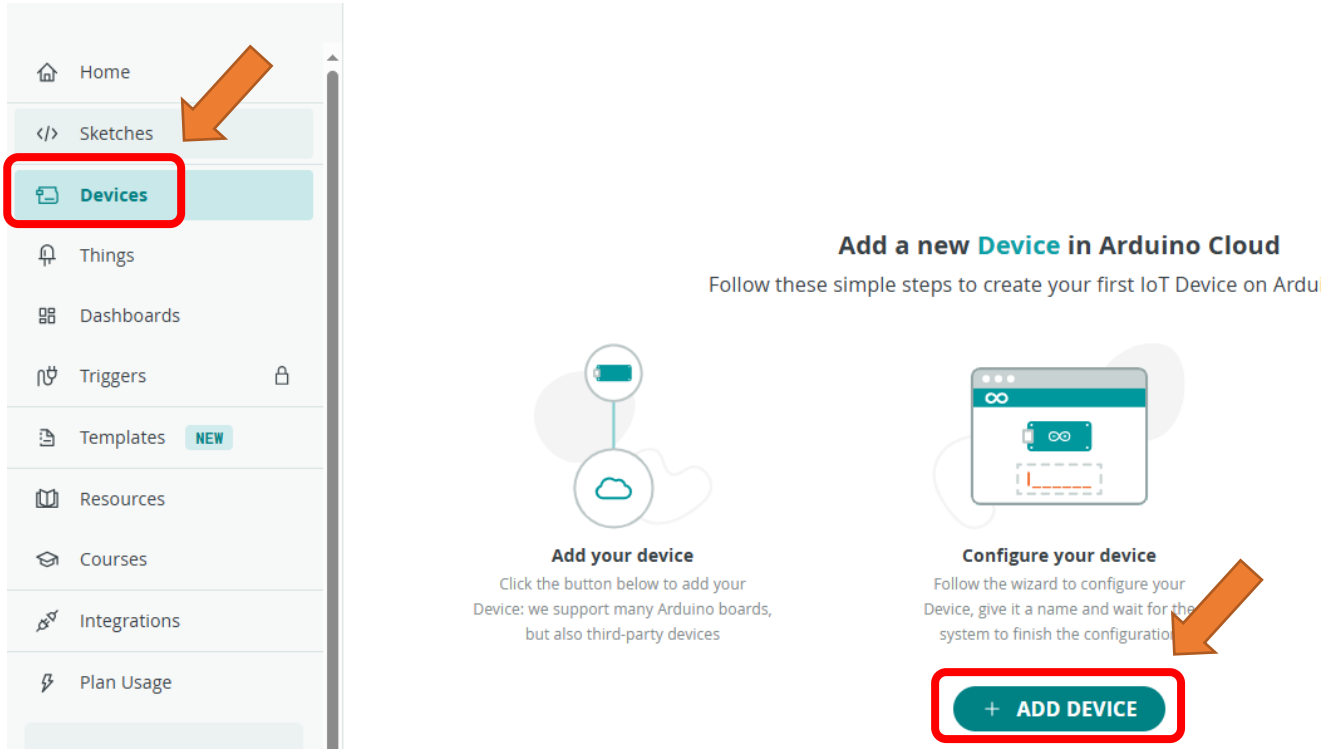
Step 1: Open Arduino Cloud

Arduino Cloud

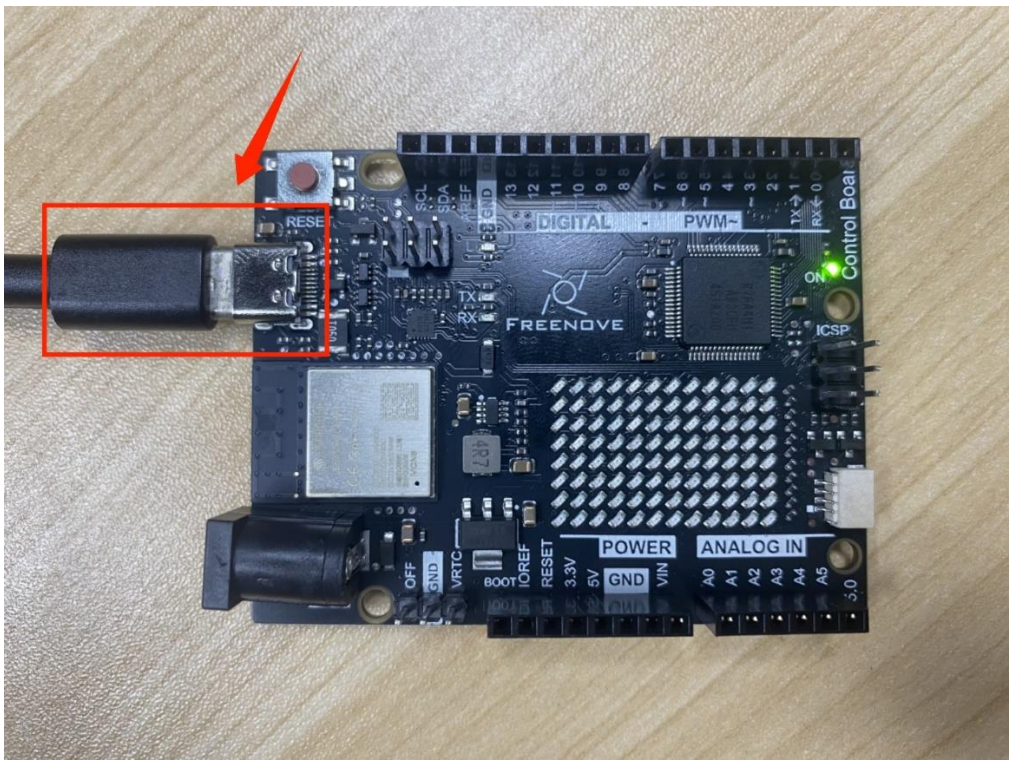


Step 2: Add Device

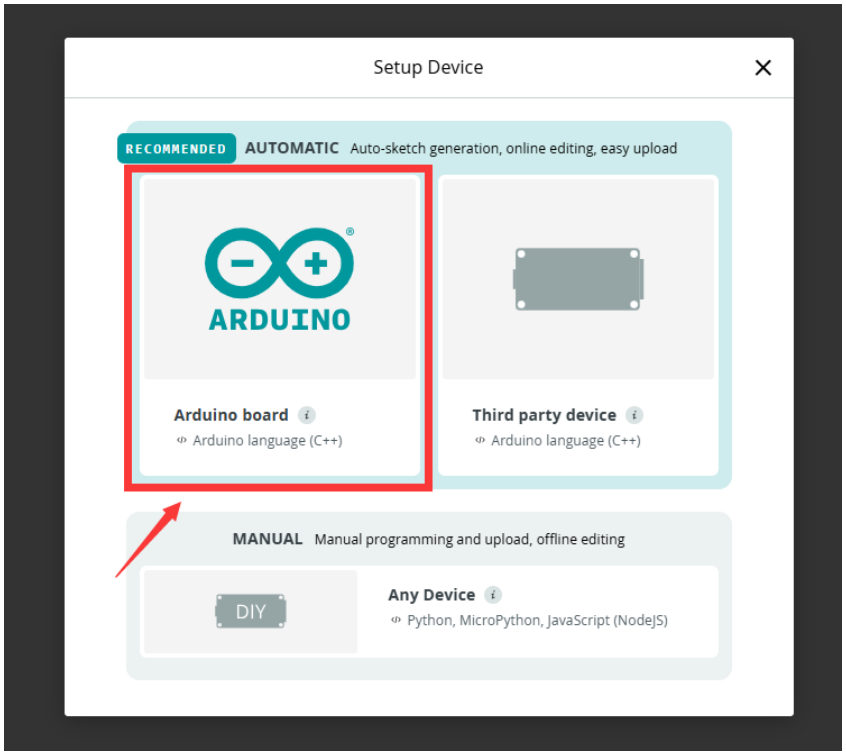
Click **Devices** -> **ADD DEVICE**



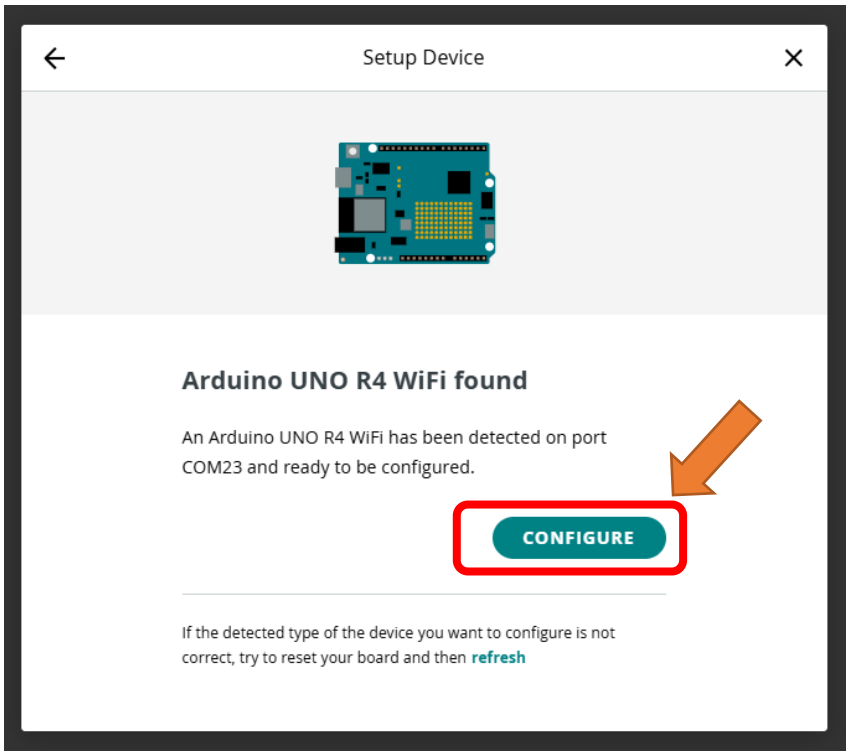
Step 3: Connect the board to your computer



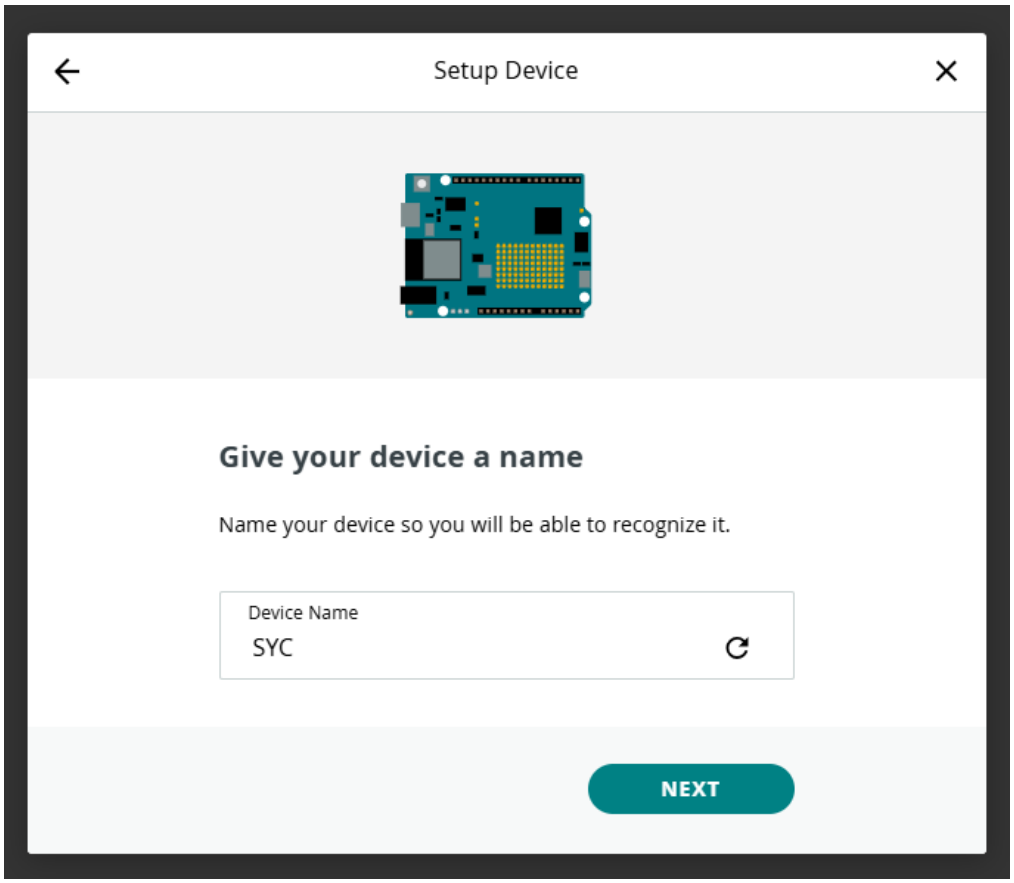
Step 4: Select Arduino board



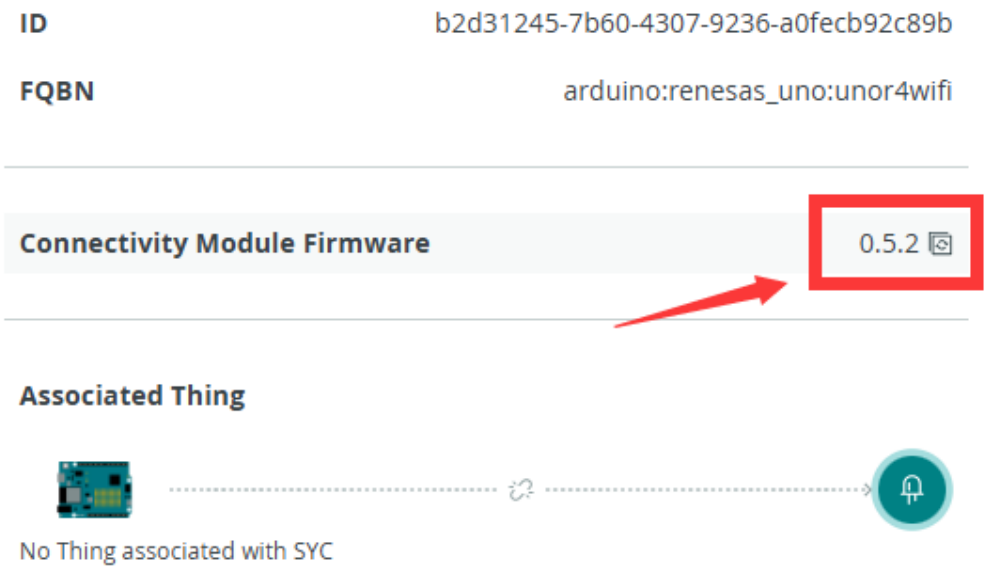
Step 5: Click CONFIGURE



Step 6: Give your device a name



Step 7: The firmware has been updated to the latest version



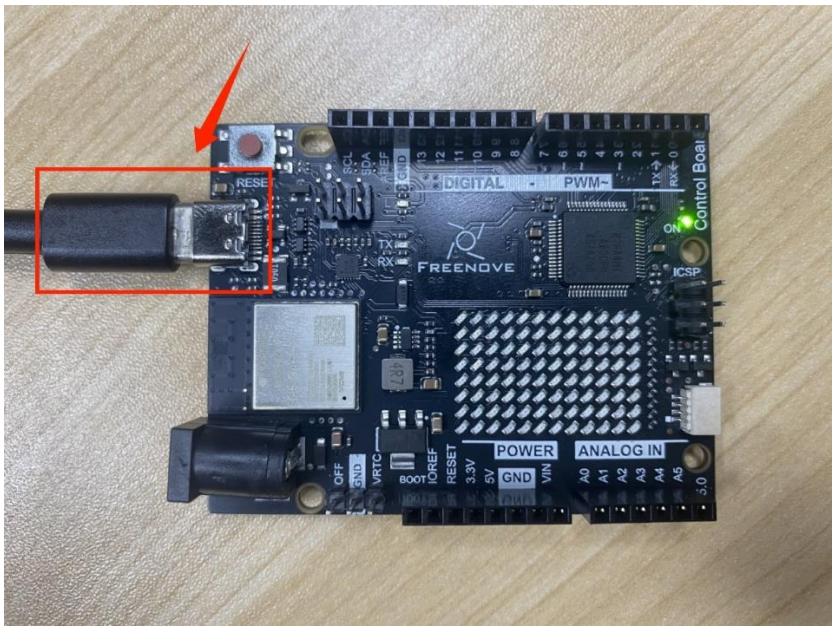
Updating Firmware Using the Update Script

Important Notes:
This method only works if the Arduino IDE can still detect the V5 board.
If the board is no longer recognized, use espflash to update instead.

Follow These Steps Carefully to Update the Firmware:

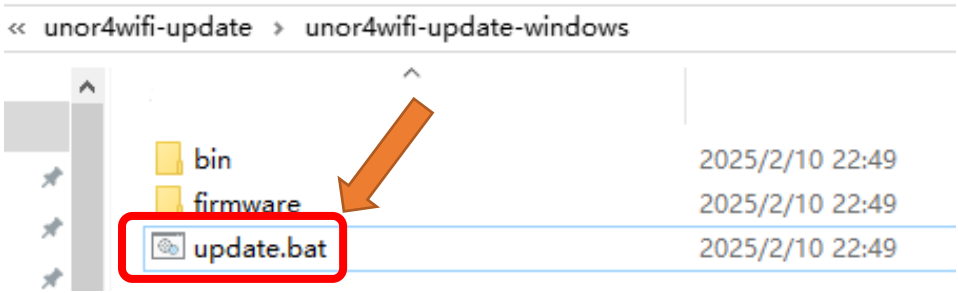
Windows

Step 1: Connect the board to your computer



Step 2: Open update.bat

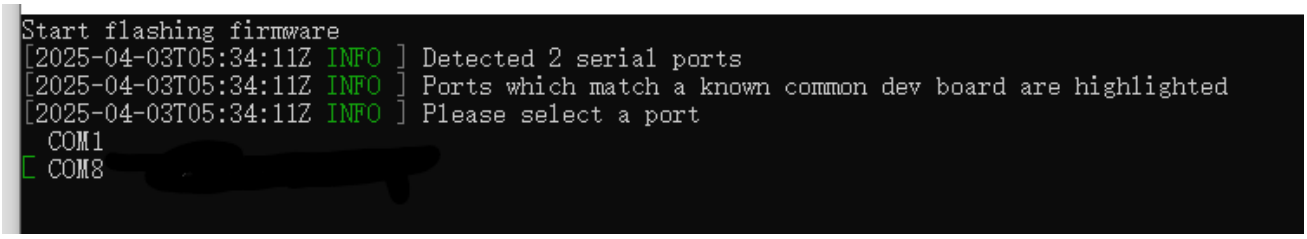
The update script is located at the following path
unor4wifi-update\unor4wifi-update-windows



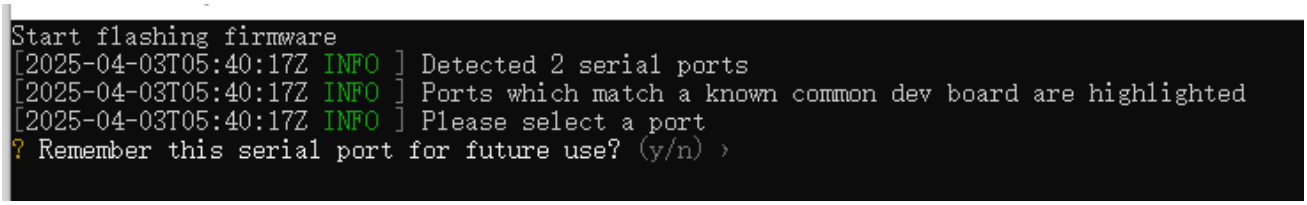
Step 3 : Press the ↓ (Down) Arrow Key to select the port, and press Enter to confirm.

Important Notes:

1. **Wait Patiently After Launching**
2. **COM1 Is Typically Not the Correct Port**

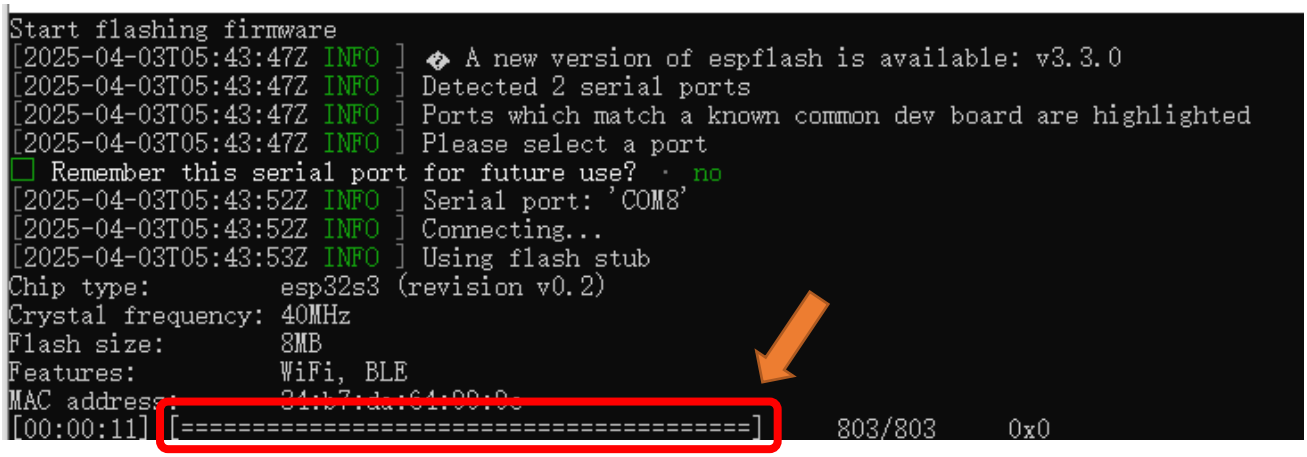


Step 4: Enter n and it will automatically start to download the firmware



Step 5: Wait for the firmware to finish downloading

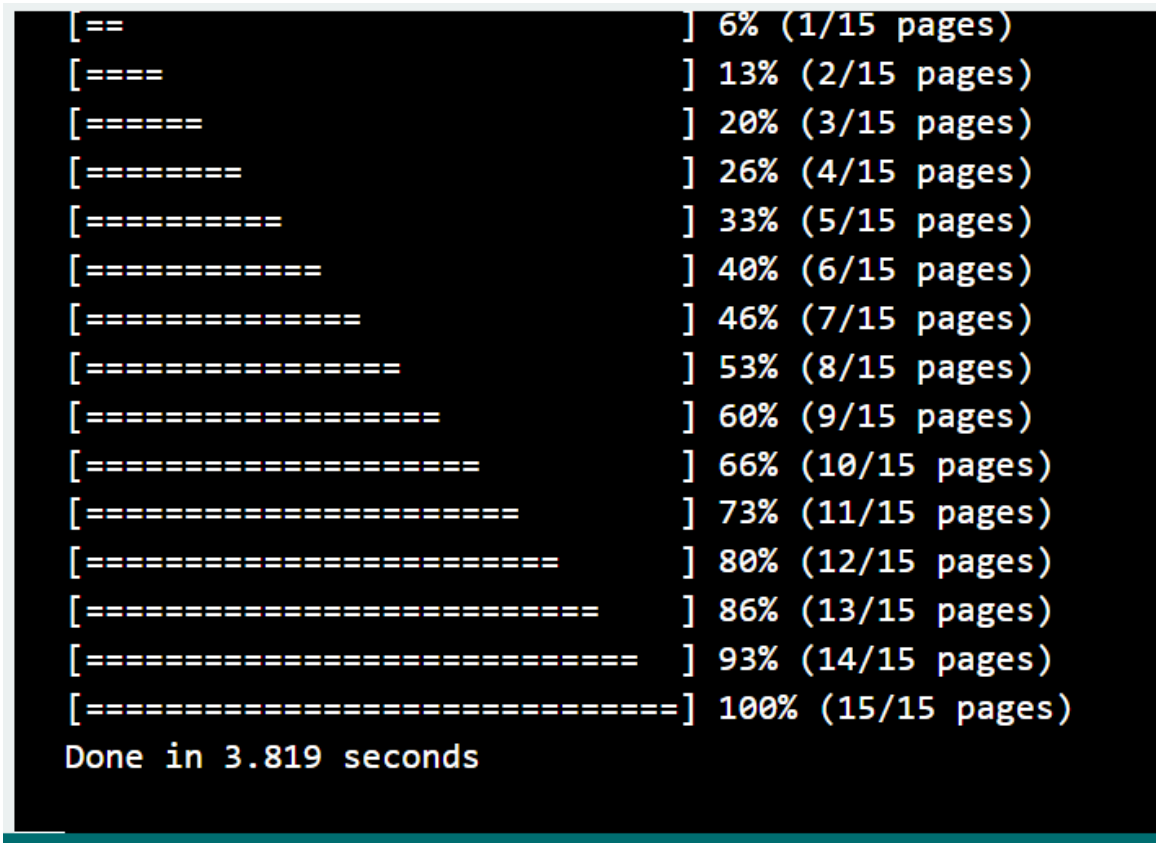
When it finishes, you should see the following prompts.



Step 6: Disconnect the board from your computer and reconnect them (Necessary)

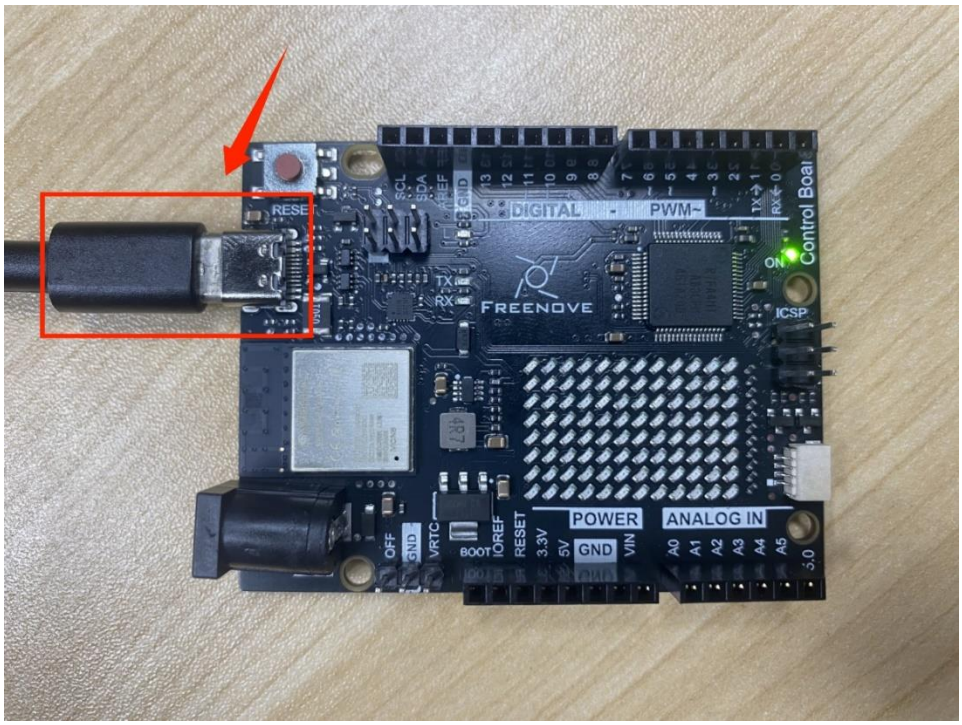
After flashing the firmware on the UNO R4 WiFi, the board will remain in ESP Download mode until you disconnect and reconnect it from your computer. If you upload a sketch while the board is in ESP Mode, it will erase the special firmware that lets the ESP32 chip function as an USB bridge.

Step 7: Try uploading the sketch again



Mac

Step 1: Connect the board to your computer



Step 2 Open the Terminal under the folder

Path of the file:
unor4wifi-update\unor4wifi-update- macos

Control-click on the **unor4wifi-update-macos** folder and select "**New Terminal at Folder**" from the context menu. A terminal window will open.

Step 3 Enter the command on Terminal and press Enter

Type the following command in the **Terminal** window:

```
1  chmod a+x update.command && sudo xattr -d com.apple.quarantine bin/espflash && sudo xattr -d com.apple.quarantine bin/unor4wifi-reboot-macos
```

Press Enter

Note: If you get an or error, it means that the command has already been run, or is otherwise not needed. Proceed with the next step.xattr: bin/espflash: No such xattr: com.apple.quarantinexattr: bin/espflash: No such xattr: com.apple.quarantine

Step 4: Enter the user password and press Enter

Type your macOS user password in the "Password" prompt and press the key again

Step 5: Type the command in the Terminal and press Enter

Type the following command in the **Terminal** window:

```
1 ./update.command
```

Press Enter

Note: If you get a error: disconnect and reconnect the board, then run the command again.Cannot put the board in ESP mode. (via 'unor4wifi-reboot')

Step 6: Press the ↓ (Down) Arrow Key to select the port, press Enter to confirm

Slect the port like dev/cu.usbmodem* and press Enter to confirm.

Step 7 Enter n to start the fimware downloading

You should see the following messages in the Terminal:
? Remember this serial port for future use? (y/n) ›

Enter n and it will start downloading

Step 8: Wait for the firmware to finish downloading

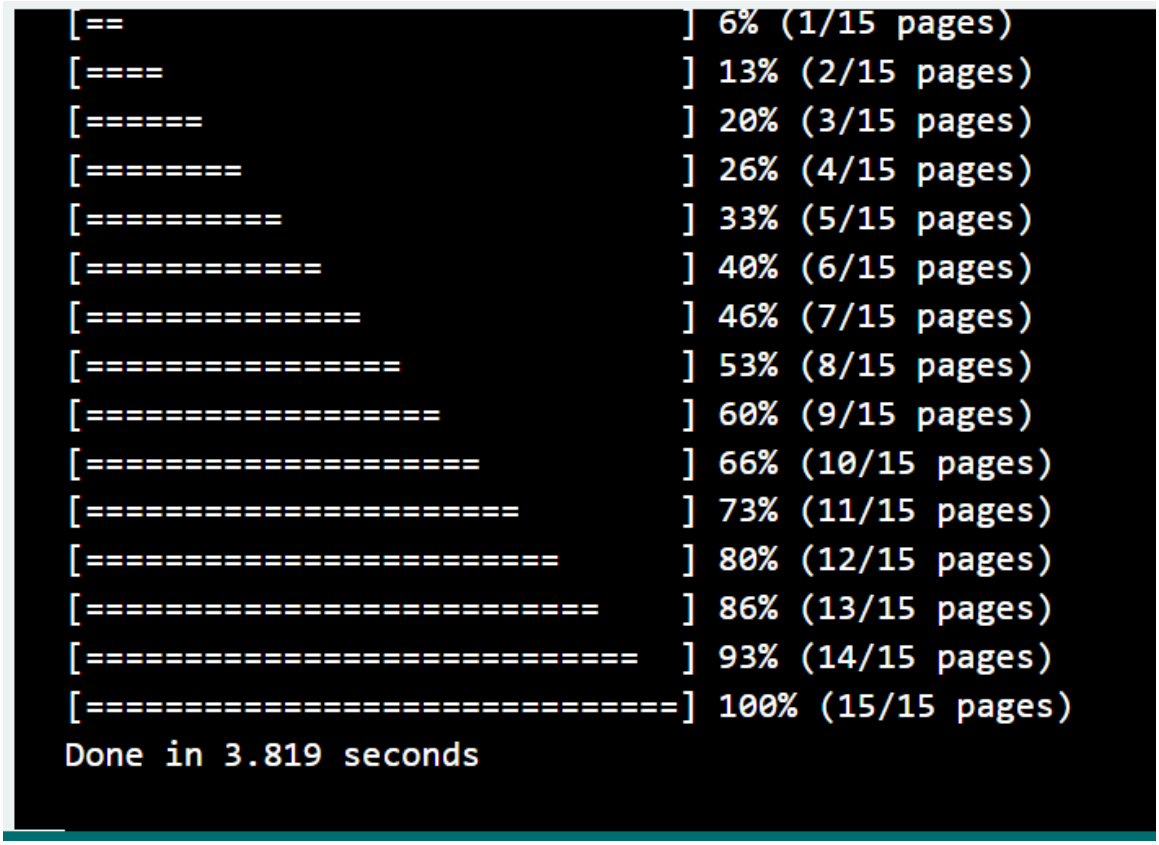
When it finishes, you should see the following messages:

```
[2025-04-01T08:59:44Z INFO ] Serial port: '/dev/cu.usbmodem2214101'
[2025-04-01T08:59:44Z INFO ] Connecting...
[2025-04-01T08:59:45Z INFO ] Using flash stub
Chip type:         esp32s3 (revision v0.1)
Crystal frequency: 40MHz
Flash size:        8MB
Features:          WiFi, BLE
MAC address:       dc:54:75:c4:c6:54
[00:00:14] [========================================]     803/803     0x0
```

Step 9 : Disconnect the board from your computer and reconnect them (Necessary)

After flashing the firmware on the UNO R4 WiFi, the board will remain in ESP Download mode until you disconnect and reconnect it from your computer. If you upload a sketch while the board is in ESP Mode, it will erase the special firmware that lets the ESP32 chip function as an USB bridge.

Step 10: Try uploading the firmware again



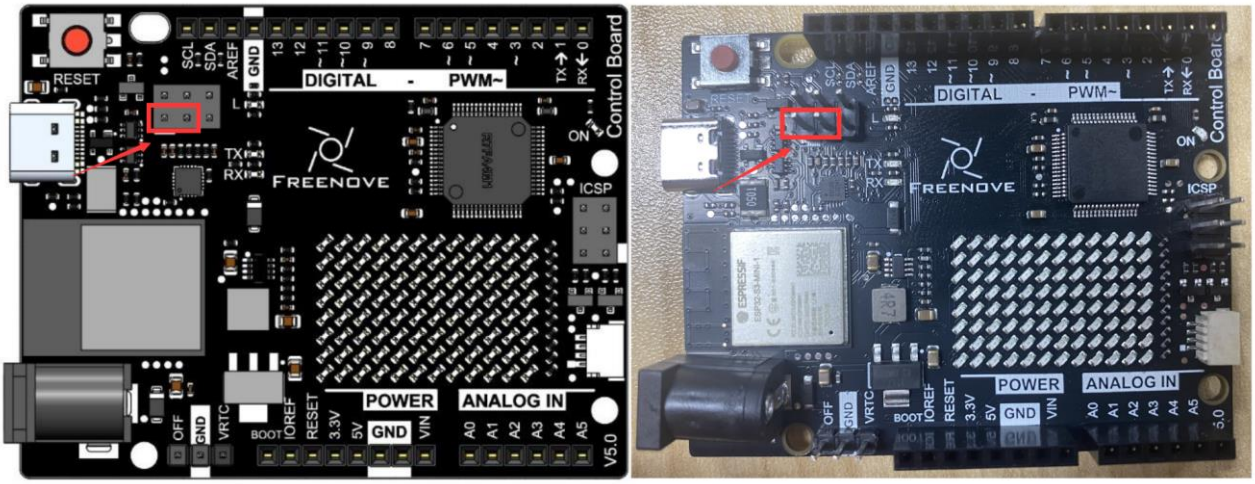
Run espflash

If the board cannot be recognized as an UNO R4 WiFi, the updater will not work. This may occur if the custom firmware for the ESP32-S3 connectivity module is completely missing or not functioning properly. However, the board can still be recovered by directly running espflash.

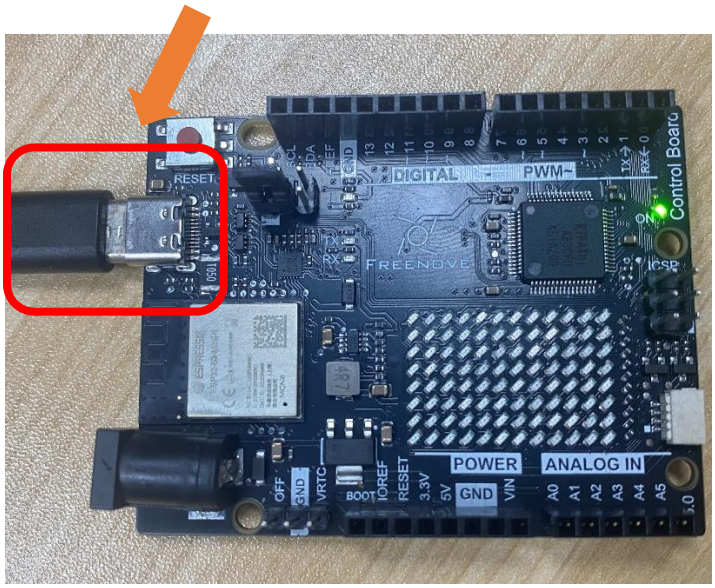
Step 1: Disconnect the control board from the computer

Step 2: Connect Download and GND

Use a jumper wire to connect the "Download" and "GND" pins on the 2x3 header near the Type-C socket on the board. You can use a jumper cap or a DuPont wire, as shown in the figure below.



Step 3: Connect the V5 board to your computer

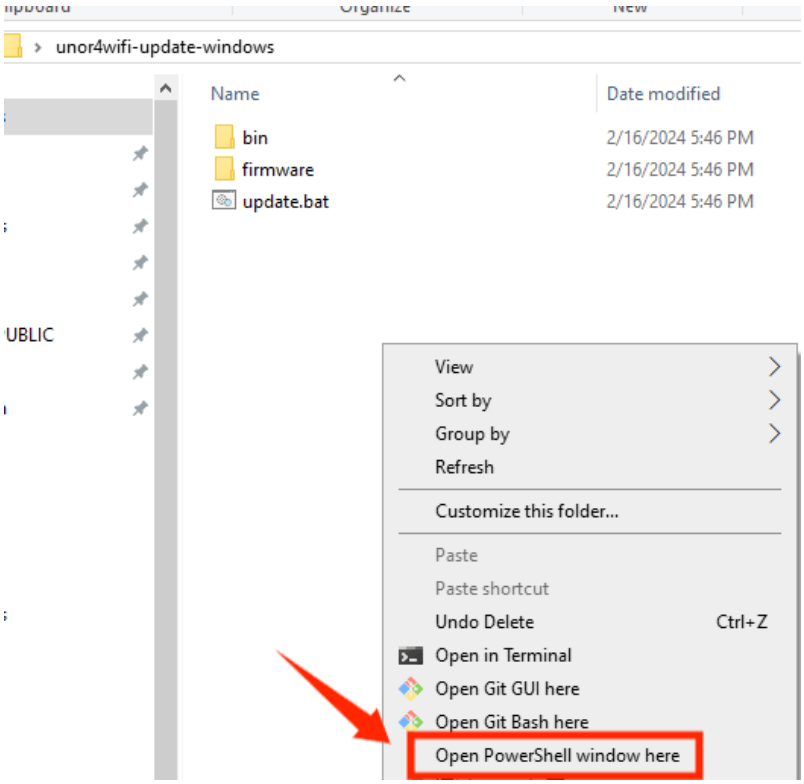


Step 4 Open PowerShell window under the current folder

Path of the filw

Freenove_Complete_Starter_Kit_for_Control_Board_V5\unor4wifi-update\unor4wifi-update-windows

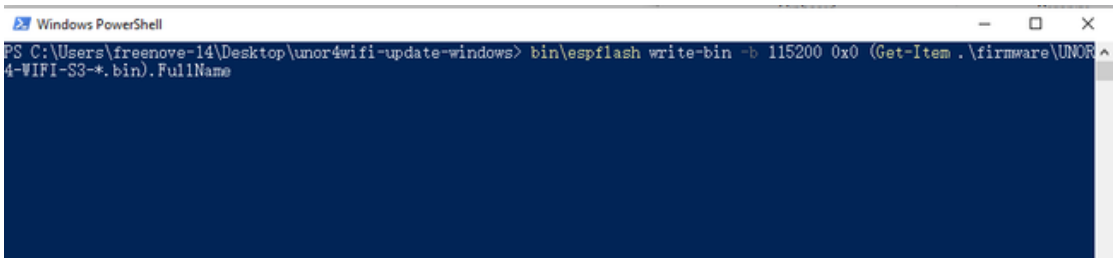
In the folder list, hold down the Shift key and right-click, then select "Open PowerShell window here".



Step 5 Enter the command in powershell

In the PowerShell window, enter the following command:

bin\espflash write-bin -b 115200 0x0 (Get-Item .\firmware\UNOR4-WIFI-S3-*.bin).FullName

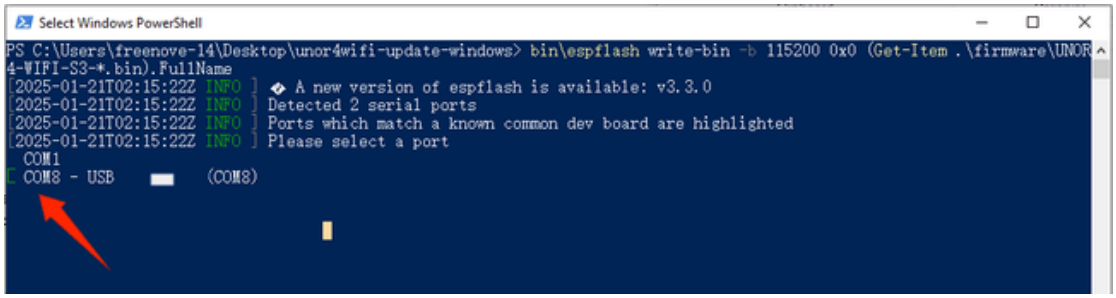


Press Enter

Step 6: Select the port of the board

At this point, the PowerShell window will display a list of serial ports. Use the ↑ (Up) and ↓ (Down) arrow keys on your keyboard to select the correct V5 board port, then press Enter.

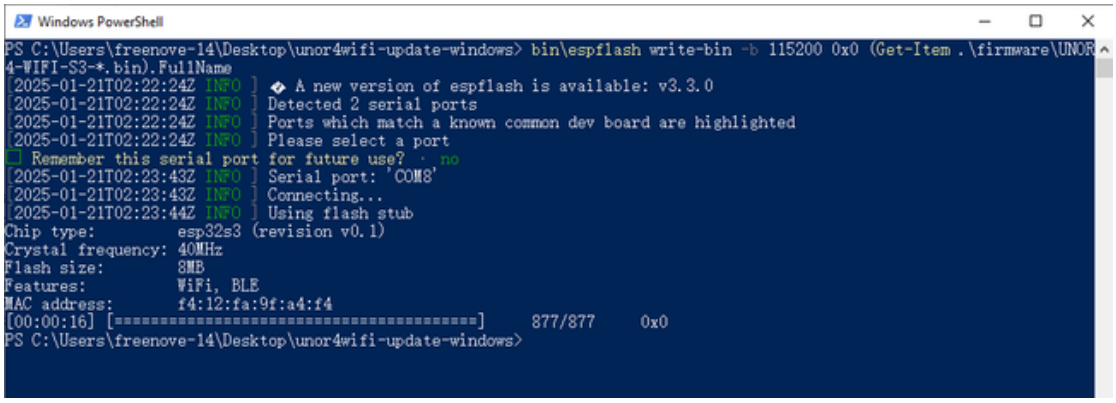
(Note: The serial port is usually not COM1—look for a higher COM number like COM3, COM4, etc.)



Step 7 Press “n” to start the firmware downloading

Step 8: Wait for the writing to finish

When it is finished, you should see the following prompts.



Step 9: Disconnect the board from your computer and reconnect them (Necessary)

Step 10: Disconnect the jumer connected in Step 2 (Necessary)

Reconnect the V5 board to your computer using the USB cable, then you can retry uploading the code.