

Updating ESP32-S3 Firmware (WiFi Board)

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

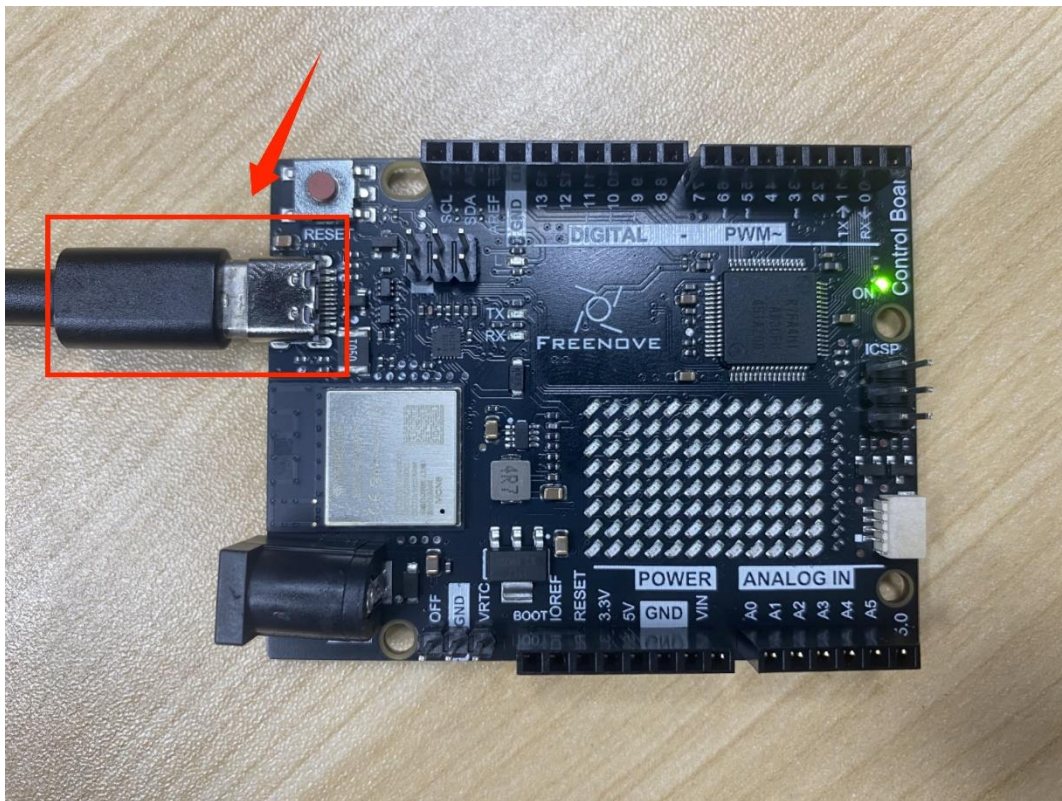
Updating on Arduino IDE (Recommended)

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 [esptool](#) 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



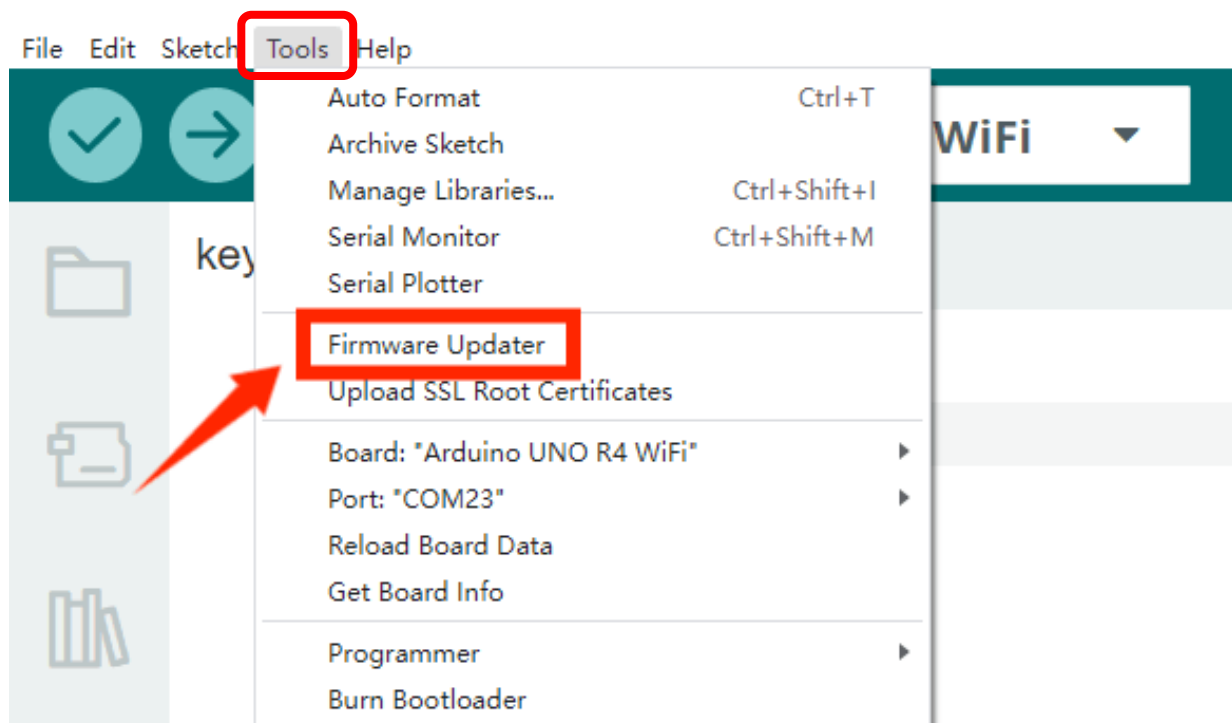
Step 2: Close Serial Monitor

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

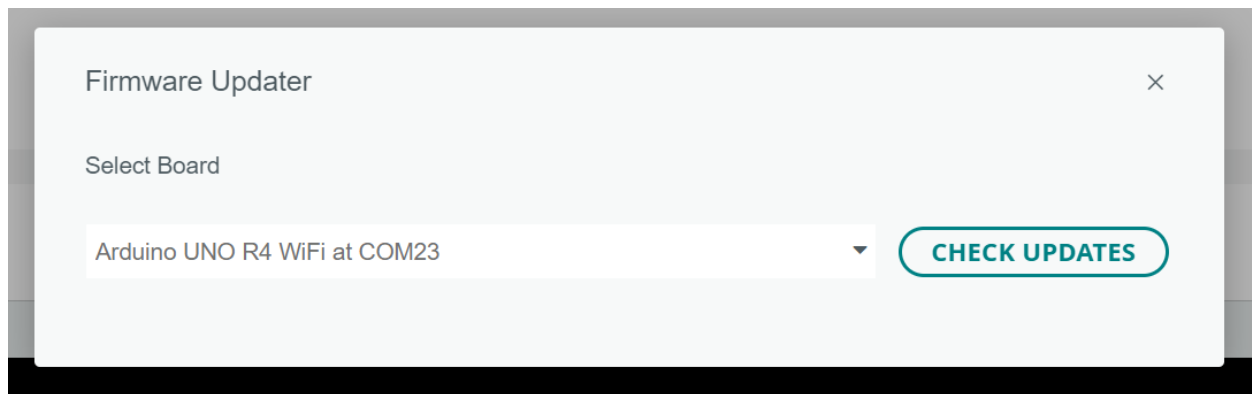


Step 3: Open Firmware Updater

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

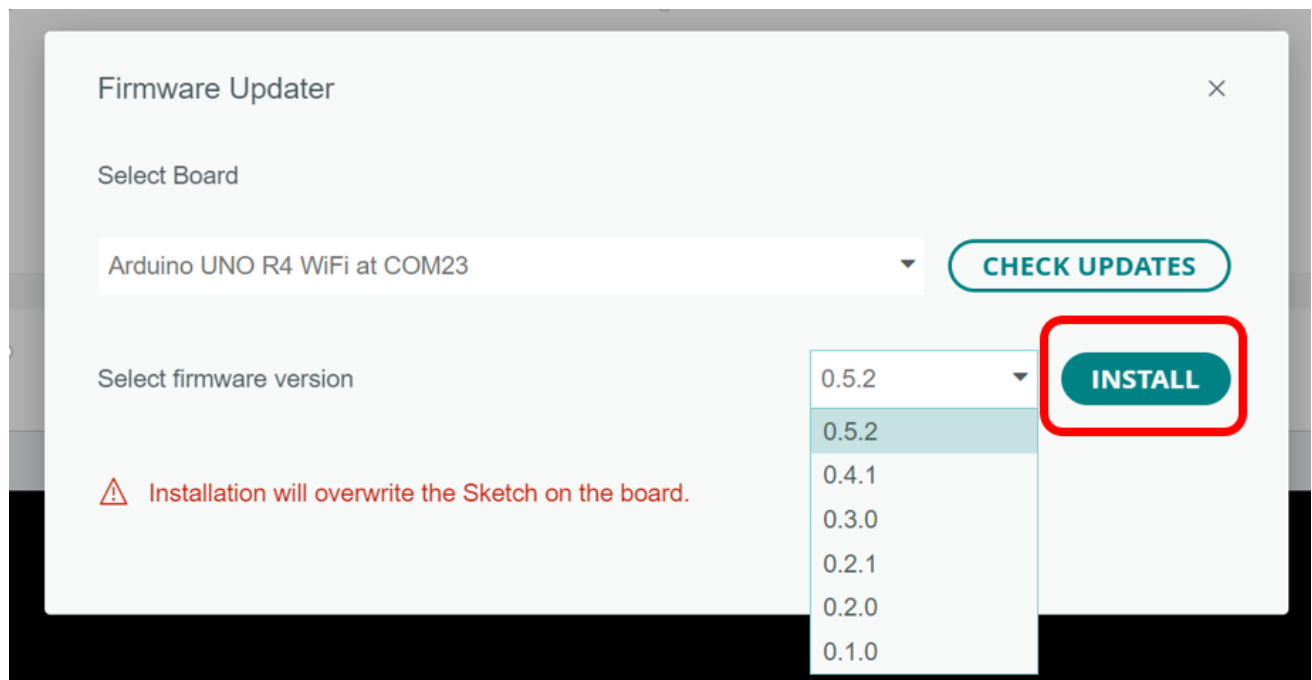


Step 4: Click CHECK UPDATES

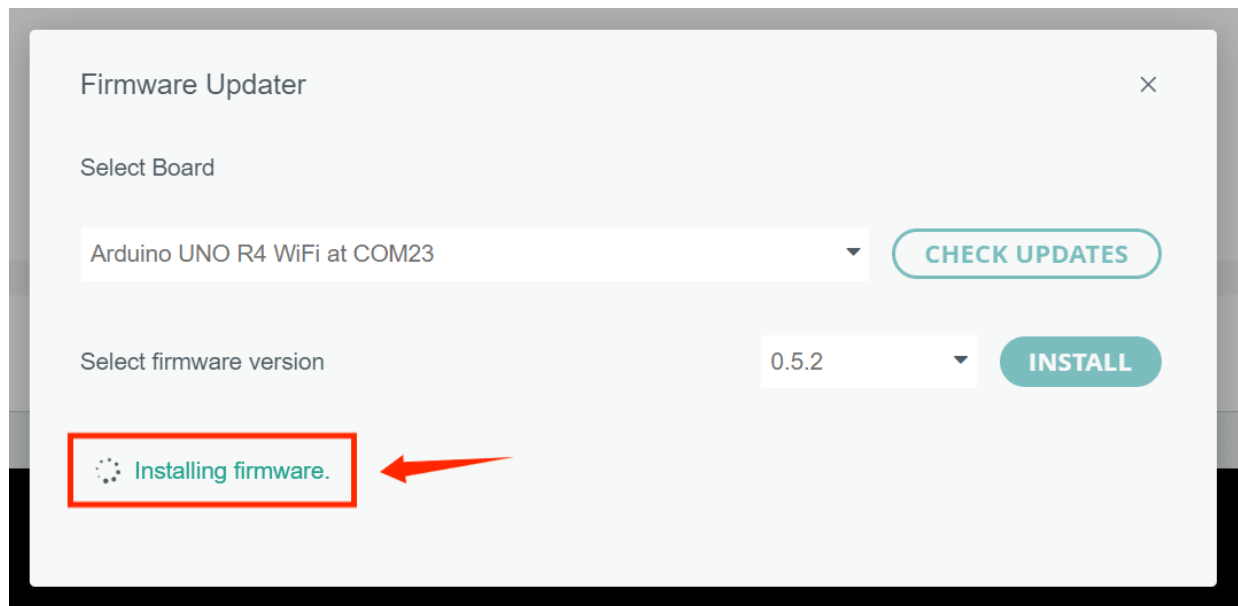


Step 5: Click INSTALL

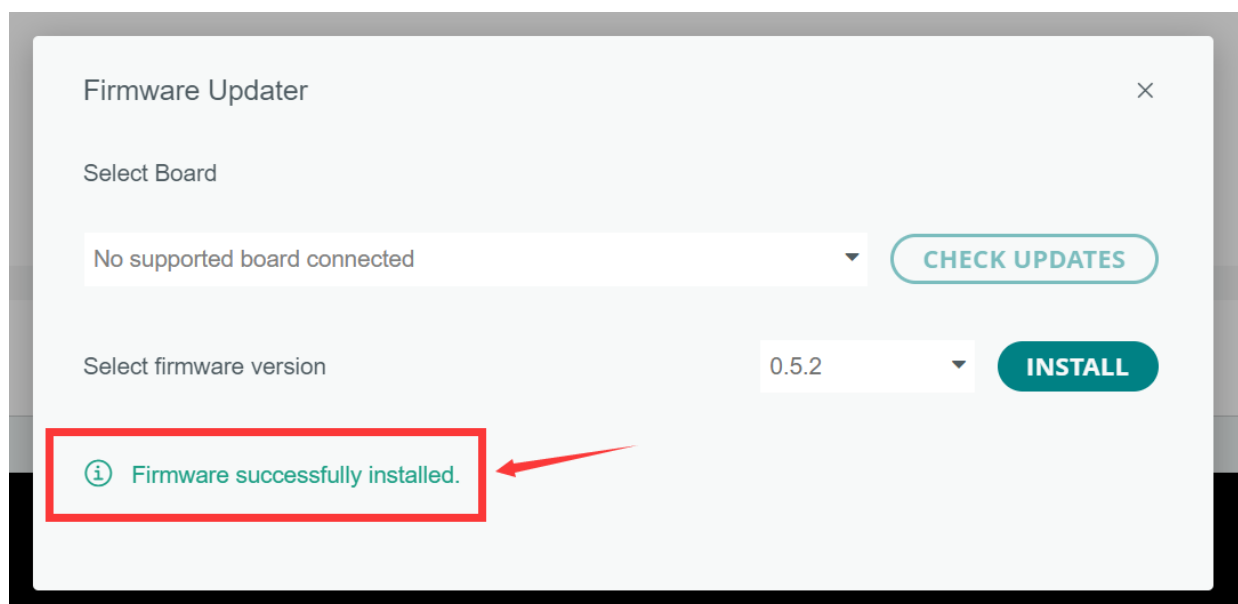
You can install the latest one.



Step 6: Wait for the firmware to finish installing



Step 7: Firmware Successfully 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

```
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Done in 3.819 seconds
```

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](#)

Recent Files [CREATE NEW](#)

All	Name	Creation date	Opened at	Owner
<p>You have no recent files Start with "Create new" button</p>				

Getting Started

GETTING STARTED

Discover Arduino Cloud
Discover what Cloud can offer based on the device you have at hand

TUTORIAL

Arduino Cloud Editor
A step-by-step guide to set up your online development environment

DOCUMENTATION

Cloud Dashboard & Widgets
Learn about Dashboards and the different widgets that can be used

DOCUMENTATION

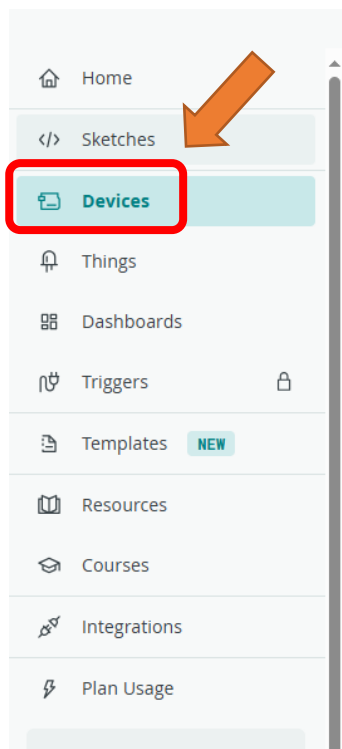
Arduino Cloud overview
Configure, program and connect your devices: it's easy with Arduino Cloud!

Documentation [SEE ALL](#)

All Systems Operational

Step 2: Add Device

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



Add a new Device in Arduino Cloud

Follow these simple steps to create your first IoT Device on Ardu



Add your device

Click the button below to add your Device: we support many Arduino boards, but also third-party devices

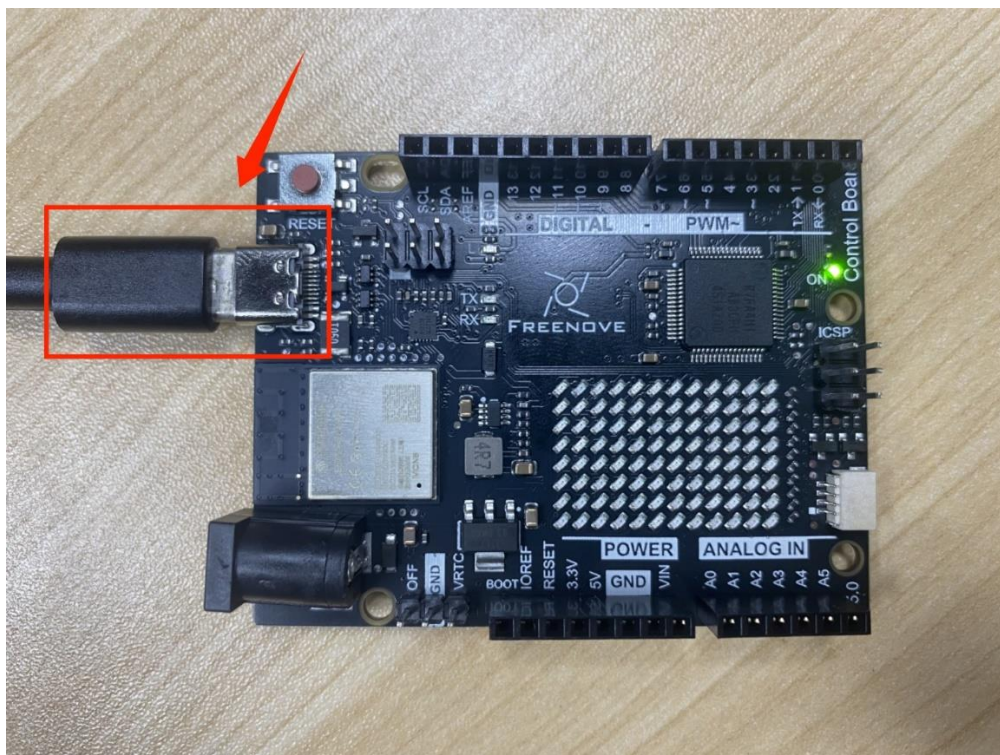


Configure your device

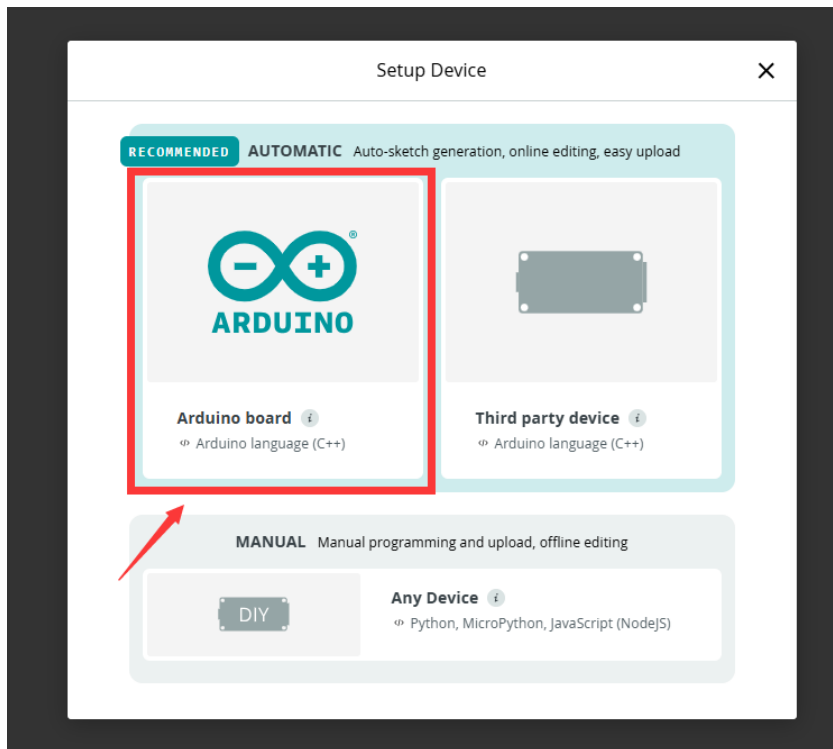
Follow the wizard to configure your Device, give it a name and wait for the system to finish the configuration

+ ADD DEVICE

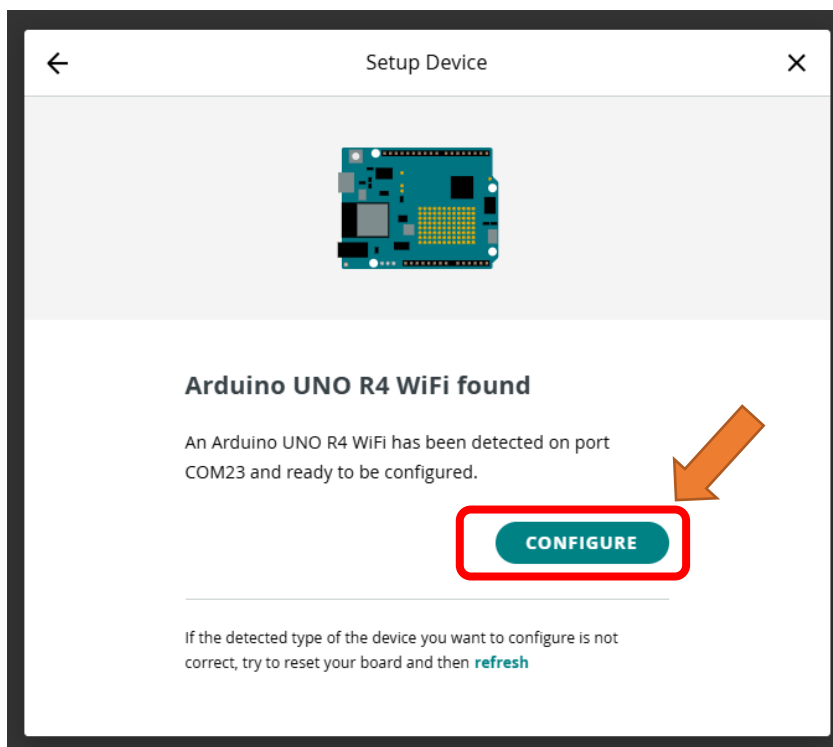
Step 3: Connect the board to your computer



Step 4: Select Arduino board



Step 5: Click CONFIGURE

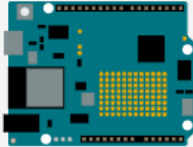


Step 6: Give your device a name

←

Setup Device

×



Give your device a name

Name your device so you will be able to recognize it.

Device Name

SYC

↻

NEXT

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


ID

b2d31245-7b60-4307-9236-a0fecb92c89b




FQBN

arduino:renesas_uno:unor4wifi

Connectivity Module Firmware

0.5.2 

Associated Thing

No Thing associated with SYC

Updating Firmware Using the Update Script

Important Notes:

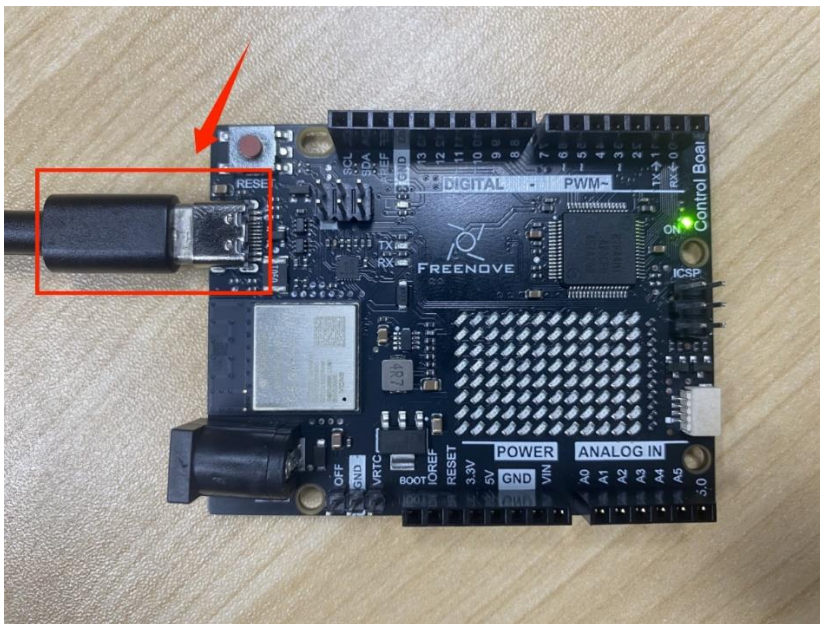
This method only works if the Arduino IDE can still detect the V5 board.

If the board is no longer recognized, use [esptool](#) to update instead.

Follow These Steps Carefully to Update the Firmware:

Windows

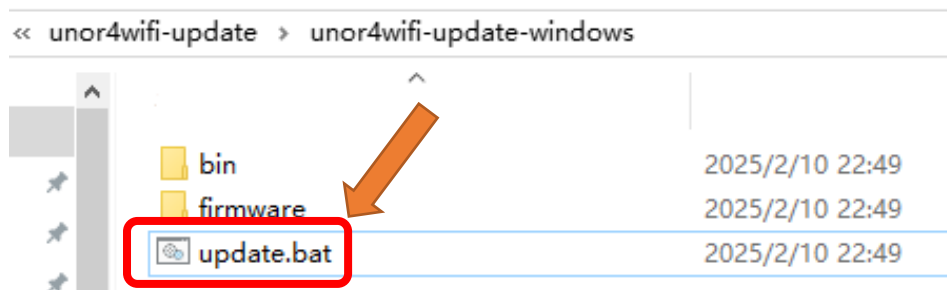
Step 1: Connect the board to your computer



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

```
Start flashing firmware
[2025-04-03T05:34:11Z INFO ] Detected 2 serial ports
[2025-04-03T05:34:11Z INFO ] Ports which match a known common dev board are highlighted
[2025-04-03T05:34:11Z INFO ] Please select a port
COM1
[ COM8
```


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

```
Start flashing firmware
[2025-04-03T05:40:17Z INFO ] Detected 2 serial ports
[2025-04-03T05:40:17Z INFO ] Ports which match a known common dev board are highlighted
[2025-04-03T05:40:17Z INFO ] Please select a port
? Remember this serial port for future use? (y/n) >
```

Step 5: Wait for the firmware to finish downloading

When it finishes, you should see the following prompts.

```
Start flashing firmware
[2025-04-03T05:43:47Z INFO ] ⚡ A new version of espflash is available: v3.3.0
[2025-04-03T05:43:47Z INFO ] Detected 2 serial ports
[2025-04-03T05:43:47Z INFO ] Ports which match a known common dev board are highlighted
[2025-04-03T05:43:47Z INFO ] Please select a port
[ Remember this serial port for future use? : no
[2025-04-03T05:43:52Z INFO ] Serial port: 'COM8'
[2025-04-03T05:43:52Z INFO ] Connecting...
[2025-04-03T05:43:53Z INFO ] Using flash stub
Chip type:      esp32s3 (revision v0.2)
Crystal frequency: 40MHz
Flash size:      8MB
Features:        WiFi, BLE
MAC address:     84:1b:7:da:64:88:80
[00:00:11] [=====] 803/803 0x0
```



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

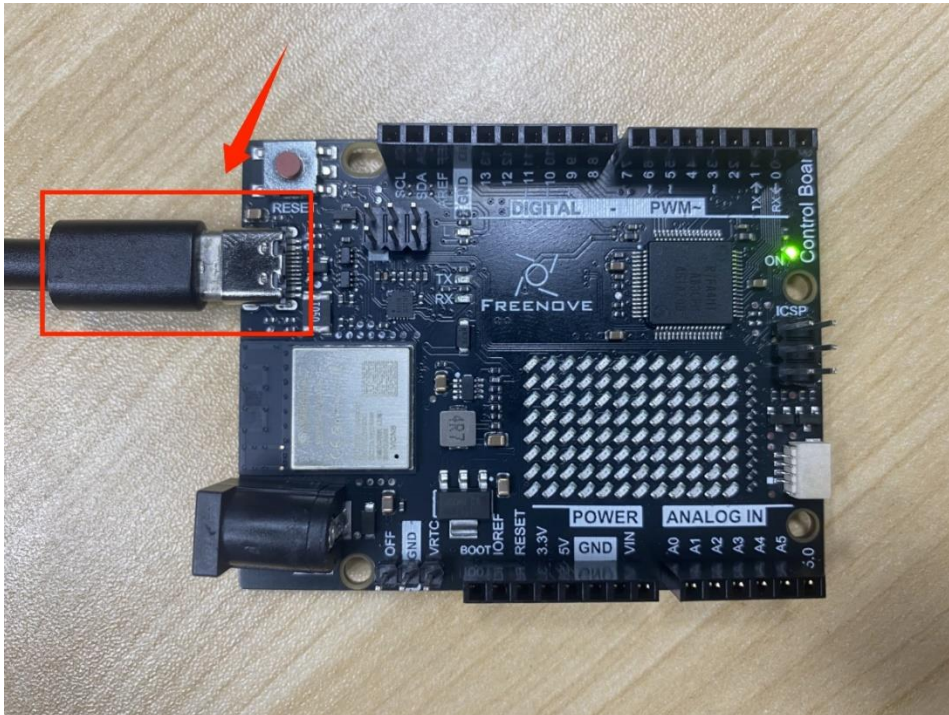
After flashing the firmware on the UNO R4 WiFi, the board will remain in ESP Download mode until you disconnect and reconnect it from your computer. If you upload a sketch while the board is in ESP Mode, it will erase the special firmware that lets the ESP32 chip function as an USB bridge.

Step 7: Try uploading the sketch again

```
[==] 6% (1/15 pages)
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[=====] 26% (4/15 pages)
[=====] 33% (5/15 pages)
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[=====] 60% (9/15 pages)
[=====] 66% (10/15 pages)
[=====] 73% (11/15 pages)
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[=====] 86% (13/15 pages)
[=====] 93% (14/15 pages)
[=====] 100% (15/15 pages)
Done in 3.819 seconds
```

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

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

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

Step 7 Enter n to start the firmware 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

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[=====] 80% (12/15 pages)
[=====] 86% (13/15 pages)
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[=====] 100% (15/15 pages)
Done in 3.819 seconds
```

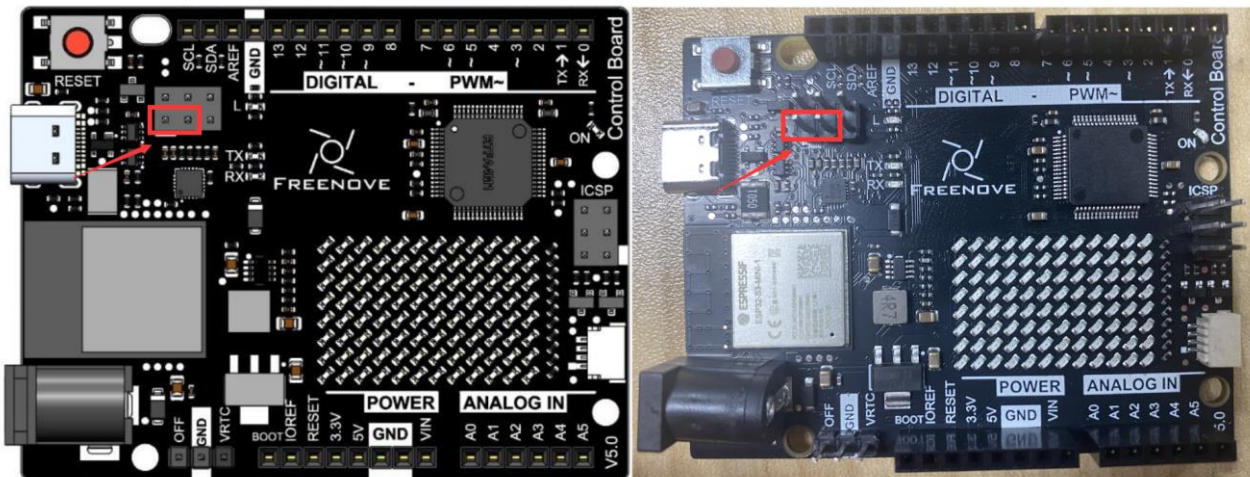

Run esptool

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 esptool.

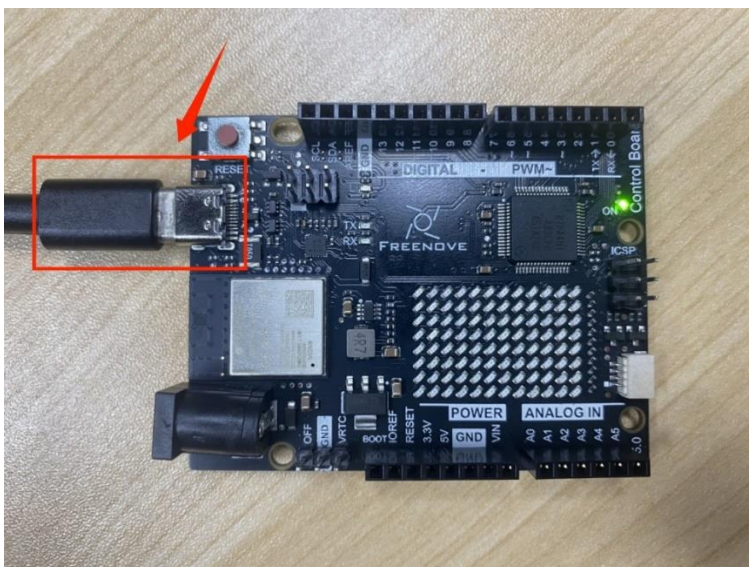
Step 1: Disconnect the control board from the computer

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

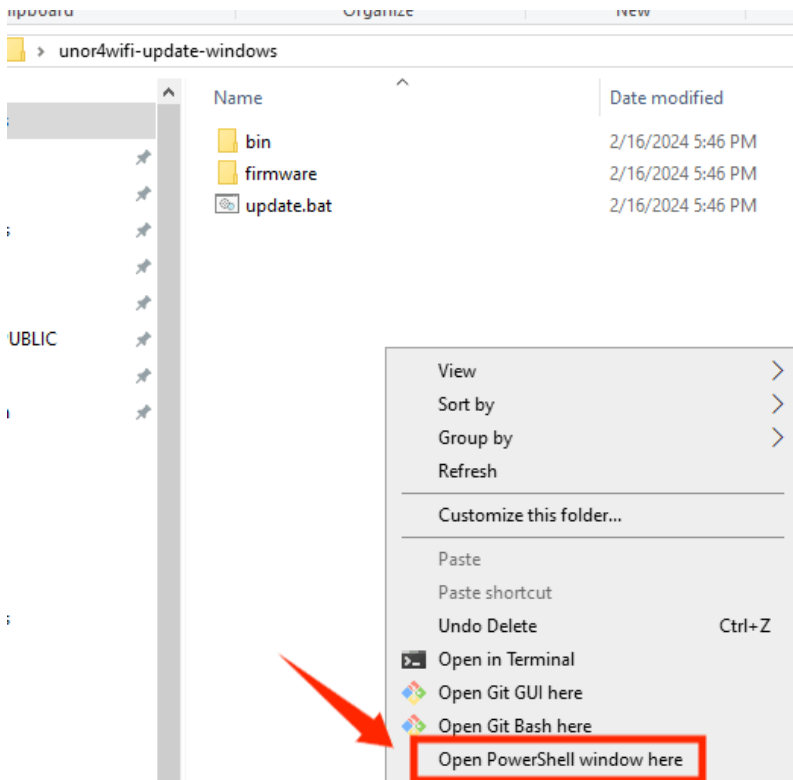


Step 4 Open PowerShell window under the current folder

Path of the file

Freenove_Complete_Starter_Kit_for_Control_Board_V5\unor4wifi-update\unor4wifi-update-windows

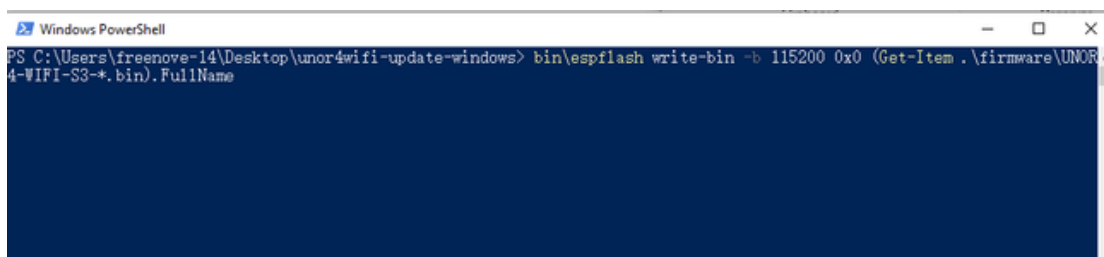
In the folder list, hold down the Shift key and right-click, then select "Open PowerShell window here".



Step 5 Enter the command in powershell

In the PowerShell window, enter the following command:

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

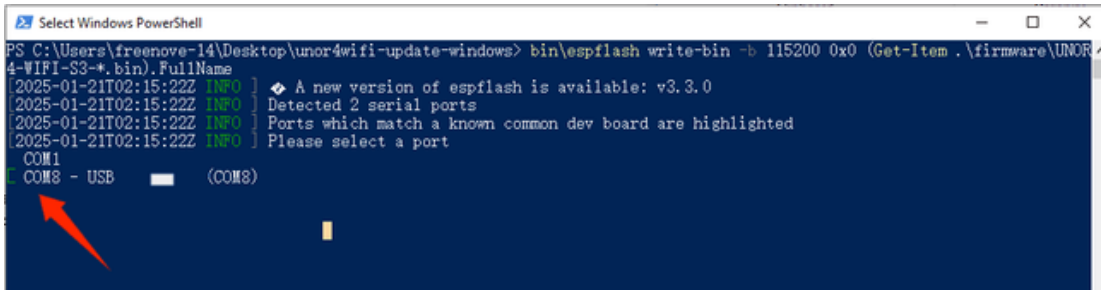


Press Enter

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.)



```
PS C:\Users\freenove-14\Desktop\unor4wifi-update-windows> bin\esptool write-bin -b 115200 0x0 (Get-Item .\firmware\UNOR4-WIFI-S3-*.bin).FullName
[2025-01-21T02:15:22Z INFO] A new version of esptool is available: v3.3.0
[2025-01-21T02:15:22Z INFO] Detected 2 serial ports
[2025-01-21T02:15:22Z INFO] Ports which match a known common dev board are highlighted
[2025-01-21T02:15:22Z INFO] Please select a port
COM1
COM8 - USB (COM8)
```

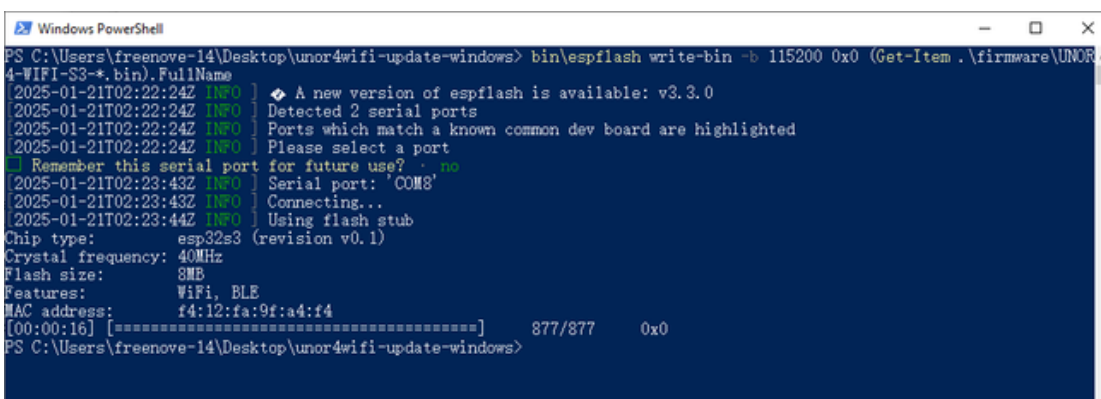
Step 7 Press “n” to start the firmware downloading



```
PS C:\Users\freenove-14\Desktop\unor4wifi-update-windows> bin\esptool write-bin -b 115200 0x0 (Get-Item .\firmware\UNOR4-WIFI-S3-*.bin).FullName
[2025-01-21T02:22:24Z INFO] A new version of esptool is available: v3.3.0
[2025-01-21T02:22:24Z INFO] Detected 2 serial ports
[2025-01-21T02:22:24Z INFO] Ports which match a known common dev board are highlighted
[2025-01-21T02:22:24Z INFO] Please select a port
COM8
Remember this serial port for future use? (y/n) n
```

Step 8: Wait for the writing to finish

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



```
PS C:\Users\freenove-14\Desktop\unor4wifi-update-windows> bin\esptool write-bin -b 115200 0x0 (Get-Item .\firmware\UNOR4-WIFI-S3-*.bin).FullName
[2025-01-21T02:22:24Z INFO] A new version of esptool is available: v3.3.0
[2025-01-21T02:22:24Z INFO] Detected 2 serial ports
[2025-01-21T02:22:24Z INFO] Ports which match a known common dev board are highlighted
[2025-01-21T02:22:24Z INFO] Please select a port
COM8
Remember this serial port for future use? (y/n) n
[2025-01-21T02:23:43Z INFO] Serial port: 'COM8'
[2025-01-21T02:23:43Z INFO] Connecting...
[2025-01-21T02:23:44Z INFO] Using flash stub
Chip type: esp32s3 (revision v0.1)
Crystal frequency: 40MHz
Flash size: 8MB
Features: WiFi, BLE
MAC address: f4:12:fa:9f:a4:f4
[00:00:16] [=====] 877/877 0x0
PS C:\Users\freenove-14\Desktop\unor4wifi-update-windows>
```

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

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

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

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Done in 3.819 seconds
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