Welcome

Thank you for choosing Freenove products!

Getting Started

When reading this, you should have downloaded the ZIP file for this product.
Unzip it and you will get a folder containing tutorials and related files. Please start with this PDF tutorial.

! Unzip the ZIP file instead of opening the file in the ZIP file directly.
! Do not move, delete or rename files in the folder just unzipped.

Get Support

Encounter problems? Don't worry! Refer to “TroubleShooting.pdf” or contact us.

When there are packaging damage, quality problems, questions encountering in use, etc., just send us an email. We will reply to you within one working day and provide a solution.

support@freenove.com

Safety and Precautions

Please follow the following safety precautions when using or storing this product:

- Keep this product out of the reach of children under 6 years old.
- This product should be used only when there is adult supervision present as young children lack necessary judgment regarding safety and the consequences of product misuse.
- This product contains small parts and parts, which are sharp. This product contains electrically conductive parts. Use caution with electrically conductive parts near or around power supplies, batteries and powered (live) circuits.
- When the product is turned ON, activated or tested, some parts will move or rotate. To avoid injuries to hands and fingers, keep them away from any moving parts!
- It is possible that an improperly connected or shorted circuit may cause overheating. Should this happen, immediately disconnect the power supply or remove the batteries and do not touch anything until it cools down! When everything is safe and cool, review the product tutorial to identify the cause.
- Only operate the product in accordance with the instructions and guidelines of this tutorial, otherwise parts may be damaged or you could be injured.
- Store the product in a cool dry place and avoid exposing the product to direct sunlight.
- After use, always turn the power OFF and remove or unplug the batteries before storing.

About Freenove

Freenove provides open source electronic products and services worldwide.

Freenove is committed to assist customers in their education of robotics, programming and electronic circuits so that they may transform their creative ideas into prototypes and new and innovative products. To this end, our services include but are not limited to:

- Educational and Entertaining Project Kits for Robots, Smart Cars and Drones
- Educational Kits to Learn Robotic Software Systems for Arduino, Raspberry Pi and micro: bit
- Electronic Component Assortments, Electronic Modules and Specialized Tools
- **Product Development and Customization Services**

You can find more about Freenove and get our latest news and updates through our website:

http://www.freenove.com

Copyright

Any concerns? ✉ support@freenove.com

Contents

Preface

The Freenove Breakout Board for ESP32 is a circuit board based on either the Freenove ESP32 Wrover Board or the Freenove ESP32 S3 Wroom Board. It is highly practical for various external expansion projects.

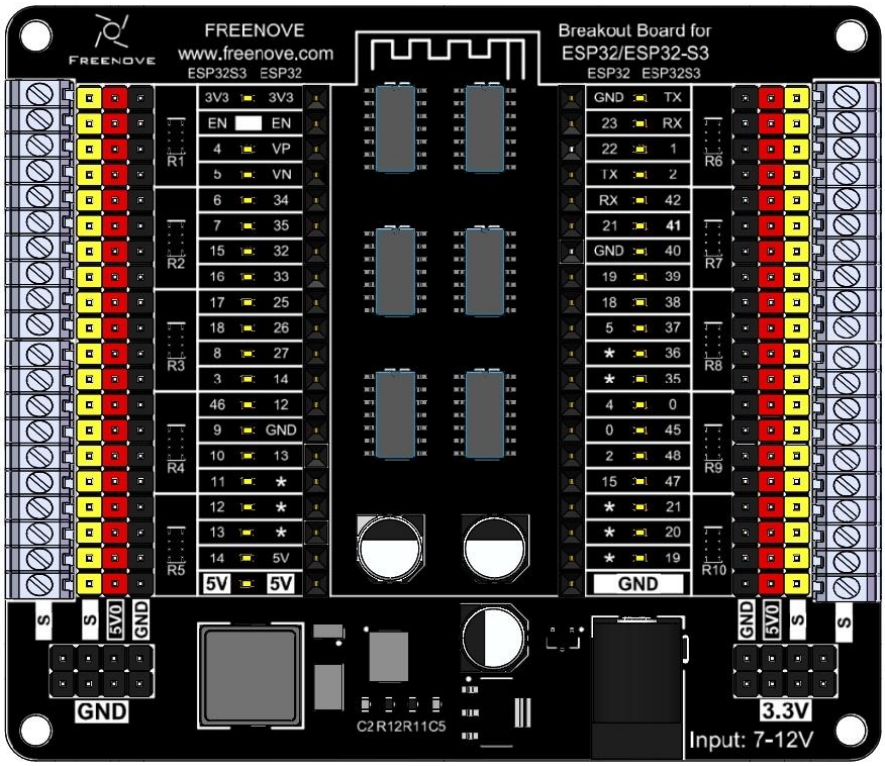
If you haven't downloaded the related material for Raspberry Pi Pico tutorial, you can download it from this link:
https://github.com/Freenove/Freenove_Breakout_Board_for_ESP32/archive/refs/heads/master.zip

After completing the projects in this tutorial, you can also combine the components in different projects to make your own smart homes, smart car, robot, etc., bringing your imagination and creativity to life with Freenove Breakout Board for ESP32.

If you have any problems or difficulties using this product, please contact us for quick and free technical support: support@freenove.com

Freenove Breakout Board for ESP32

Before learning Freenove Breakout Board for ESP32, we need to know about it. Below is an imitated diagram of Freenove Breakout Board for ESP32, which looks very similar to the actual Freenove Breakout Board for ESP32.



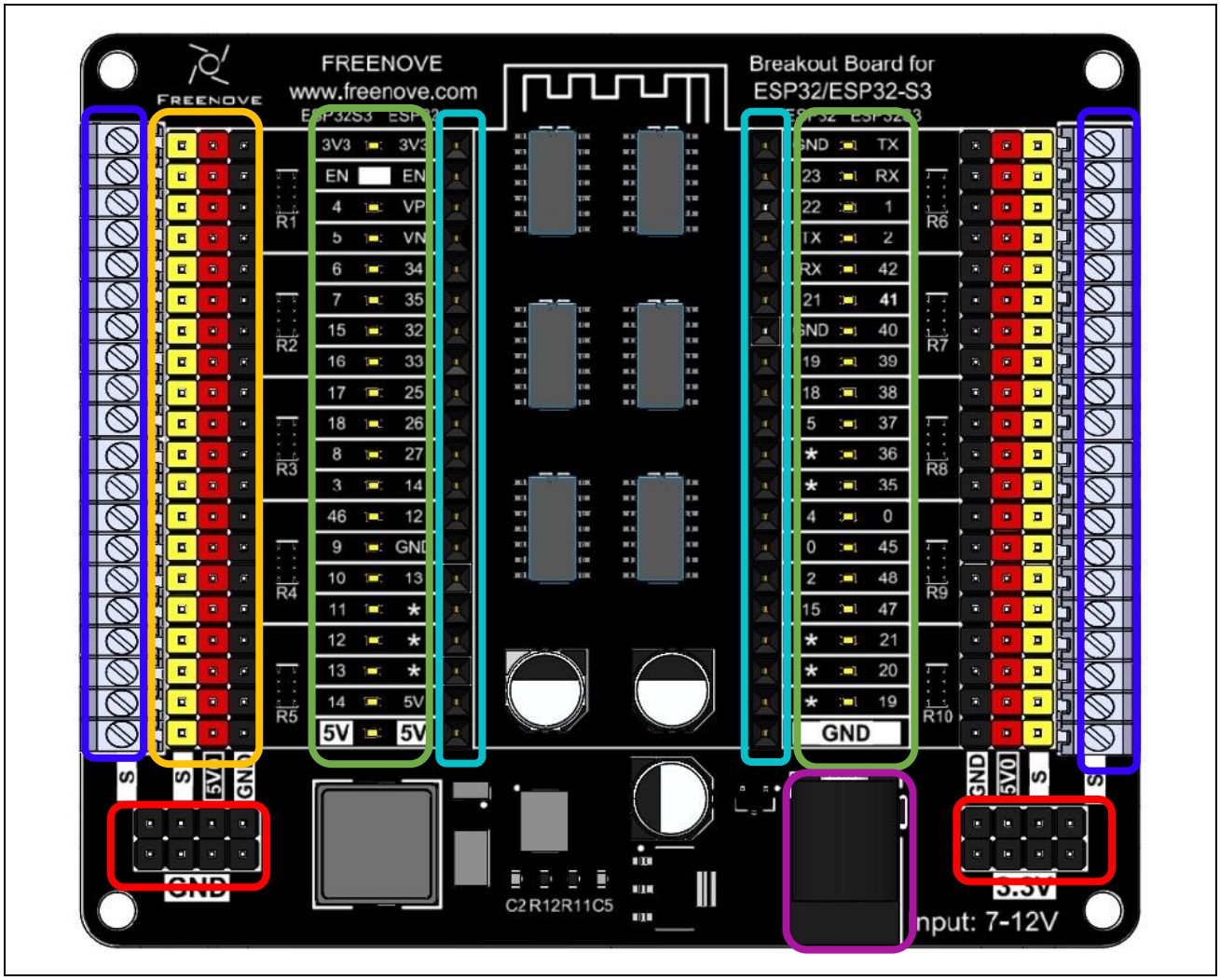
Note:

1. The Freenove Breakout Board for ESP32 supports both the Freenove ESP32 and Freenove ESP32S3 boards. Please pay attention to the orientation of the ESP32 board when using it. Inserting it incorrectly or misaligning it could lead to board damage.
2. The 5V0 is powered by the DC jack, and it supports a maximum ourput current of 3A.
3. For all pins marked "*", their pin numbers depends on those of the esp32 board in use. This is because we have issued various versions of esp32 board with different pinout.
4. The S terminal directly connects to the ESP32 board, with a level range of 0-3.3V.

Most electronic modules in the market apply TTL signals, with some powered by 3.3V and others by 5V. According to the TTL Logic Levels, the range of high level is 2-5V and low ranges from 0 to 0.8V. Therefore, even if a 5V device is used, it can still be driven by the pins of the S Terminal. However, if level conversion chip is added to the circuit, it will cause malfunction to the 3.3V devices.

5. The power supply of the 3.3V pins depends on whether you connect power supply to USB or DC jack.

The hardware interfaces are distributed as follows:



	External Power Interface: Please use a 7-12V power supply, and it is recommended to use a 12V 5A power supply.
	Power Supply Interface: Please note that the 3.3V interface can only output a maximum of 0.5A current. It is suggested for powering external chips and not recommended for use in external high-current circuits.
	ESP32/ESP32S3 Interface: Pay attention to the antenna's position and do not insert the ESP32/ESP32S3 reversely. When inserting, ensure the interface is correctly connected before applying power to the power supply interface to avoid damaging the board due to misalignment.
	Indicator LED Circuit: LEDs can indicate the level status of ESP32/ESP32S3 pins. The inner row of silkscreen indicates the pin distribution for the ESP32, while the outer row is for the ESP32S3.
	Pin Expansion: The yellow header connects to the ESP32/ESP32S3 interface. The red header receives power from the external power supply, supporting a maximum of 3A current. The black header connects to the external power ground.
	Pin Expansion: Terminal blocks connect to the ESP32/ESP32S3 interface.

Any concerns? ✉ support@freenove.com

Chapter 0 ESP32/ESP32S3(Important)

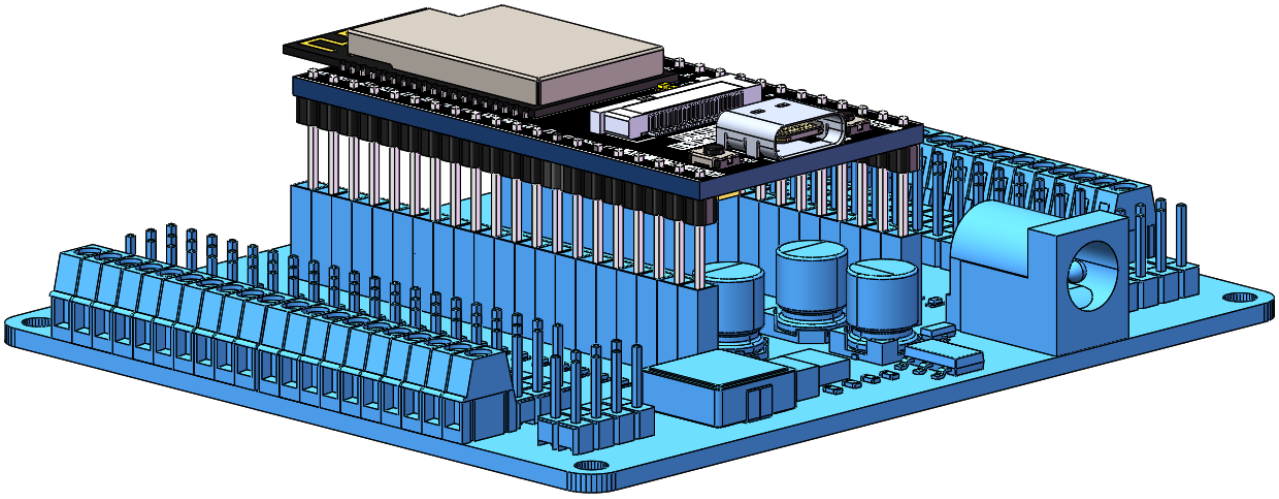
Project 0.1 Freenove ESP32 WROVER Board

Materials forFreenove ESP32 WROVER Board

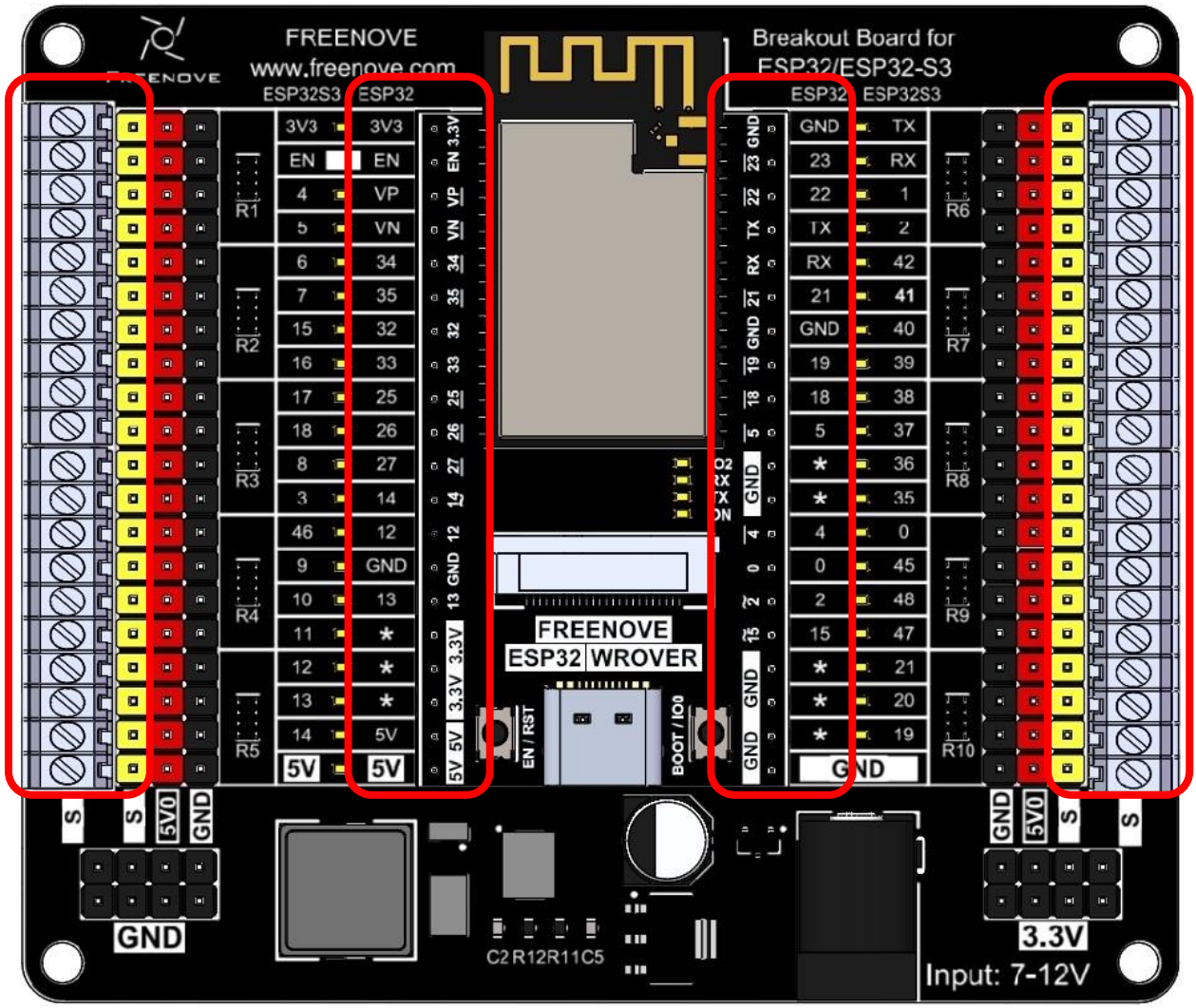
Download link for Freenove ESP32 WROVER Board:
https://freenove.com/fnk0047/
Or you can visit our github to download:
Regarding the programming instructions for the Freenove ESP32S3 WROOM Board, we won't delve into them here.
If you're interested, please refer to the following resources:
For For C Programming Tutorial, you can check **Freenove_Ultimate_Starter_Kit_for_ESP32\C\C_Tutorial.pdf**
For Python Programming Tutorial, you can refer to
Freenove_Ultimate_Starter_Kit_for_ESP32\Python\Python_Tutorial.pdf

Board Assembly

Please pay attention to the position of the antenna and ensure that the ESP32S3 is correctly inserted onto the base board.



After assembly:



Note:

1. For all pins marked "*", their pin numbers depends on those of the esp32 board in use.
2. Note: The S terminal of the breakout board directly connects to the pins of the ESP32 board.

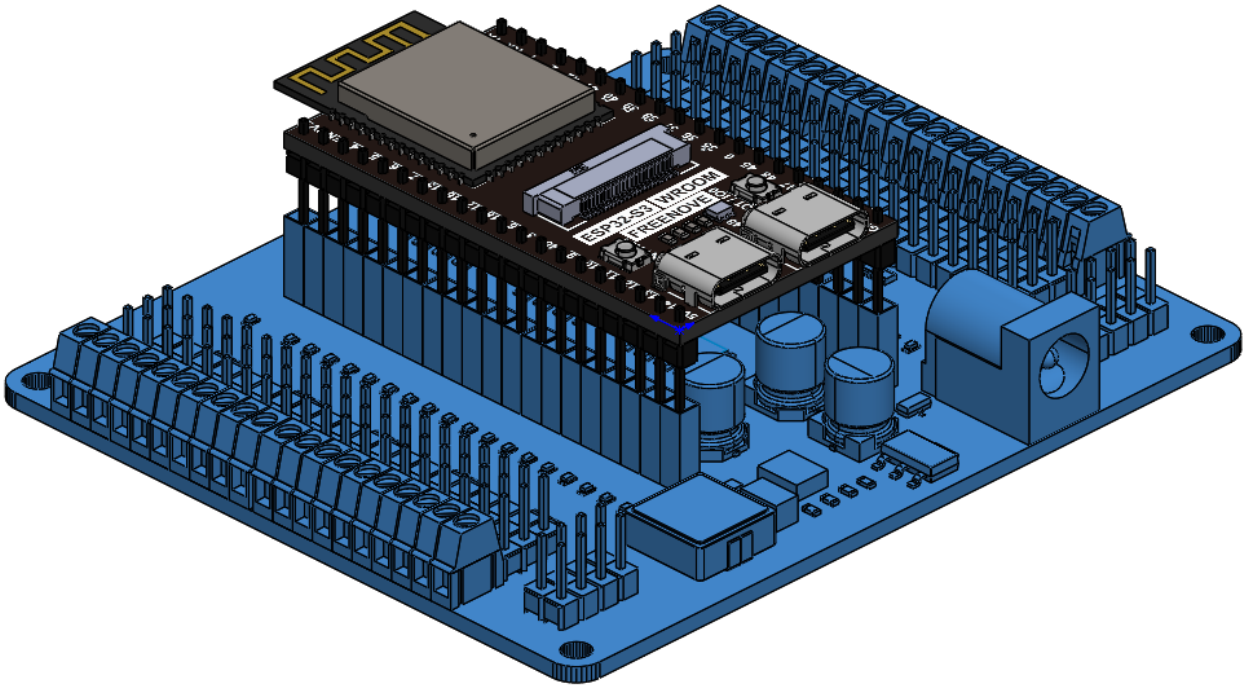
Project 0.2 Freenove ESP32S3 WROOM Board

Freenove ESP32S3 WROOM Board

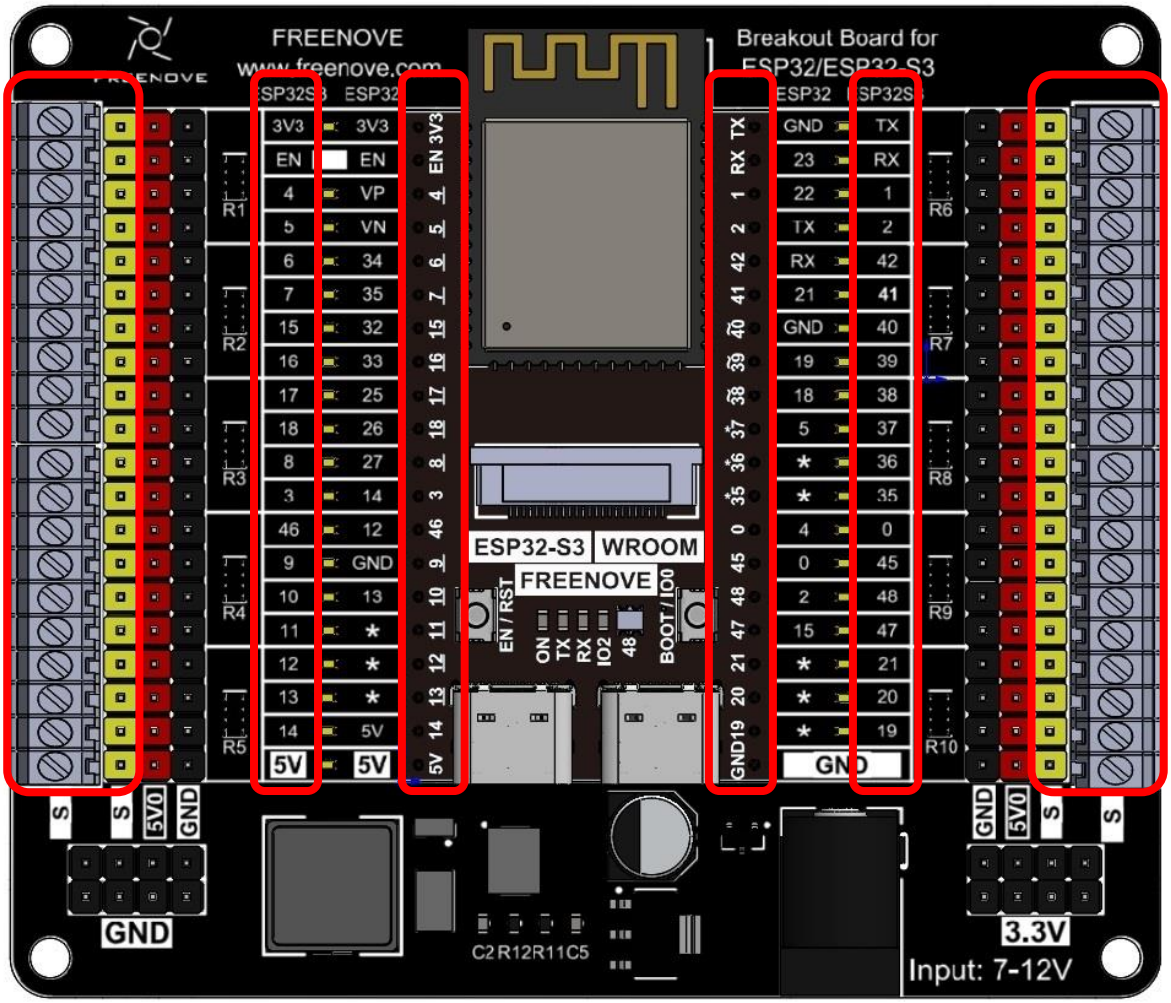
Download link for Freenove ESP32S3 WROOM Board:
https://freenove.com/fnk0082/
Or you can visit our github to download:
https://github.com/Freenove/Freenove_Ultimate_Starter_Kit_for_ESP32_S3
Regarding the programming instructions for the Freenove ESP32S3 WROOM Board, we won't delve into them here.
If you're interested, please refer to the following resources:
For C Programming Tutorial, you can check **Freenove_Ultimate_Starter_Kit_for_ESP32_S3\C\C_Tutorial.pdf**.
For Python Programming Tutorial, you can refer to **Freenove_Ultimate_Starter_Kit_for_ESP32_S3\Python\Python_Tutorial.pdf.**

Board Assembly

Please pay attention to the position of the antenna and ensure that the ESP32S3 is correctly inserted onto the base board.



After assembly:



Note: The S terminal of the breakout board directly connects to the pins of the ESP32 board.

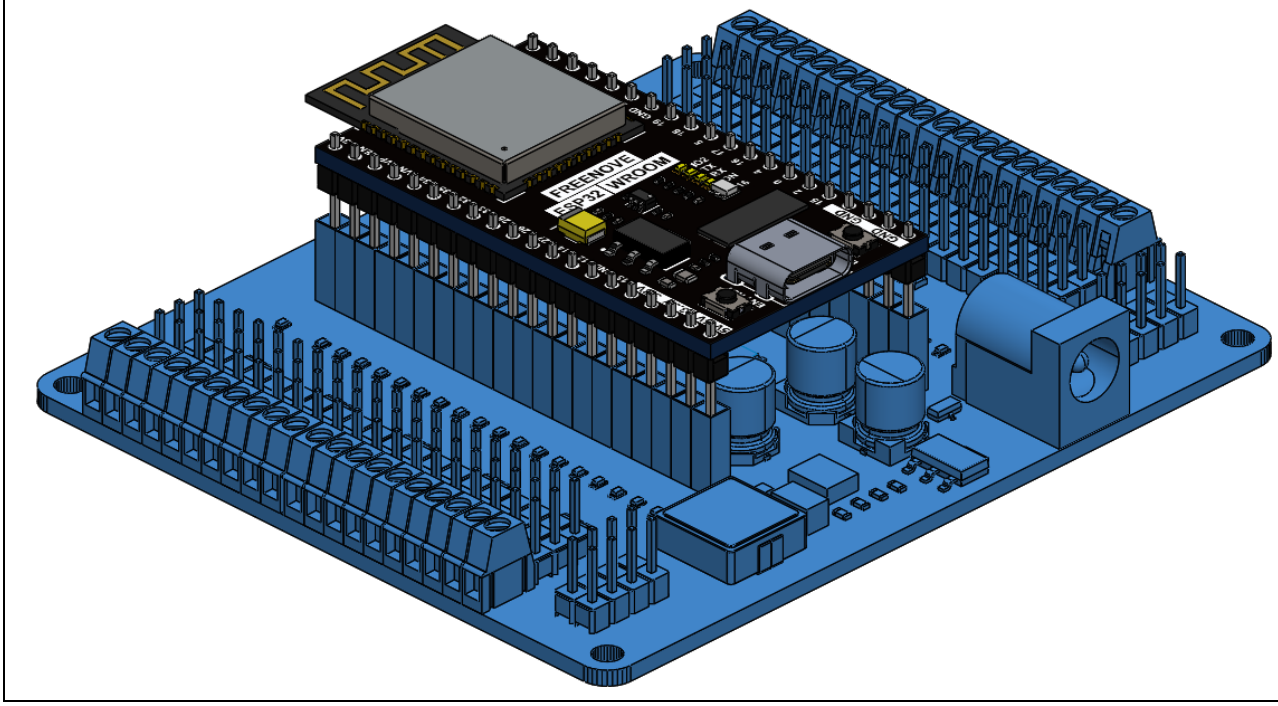
Project 0.3 Freenove ESP32 WROOM Board

Freenove ESP32 WROOM Board

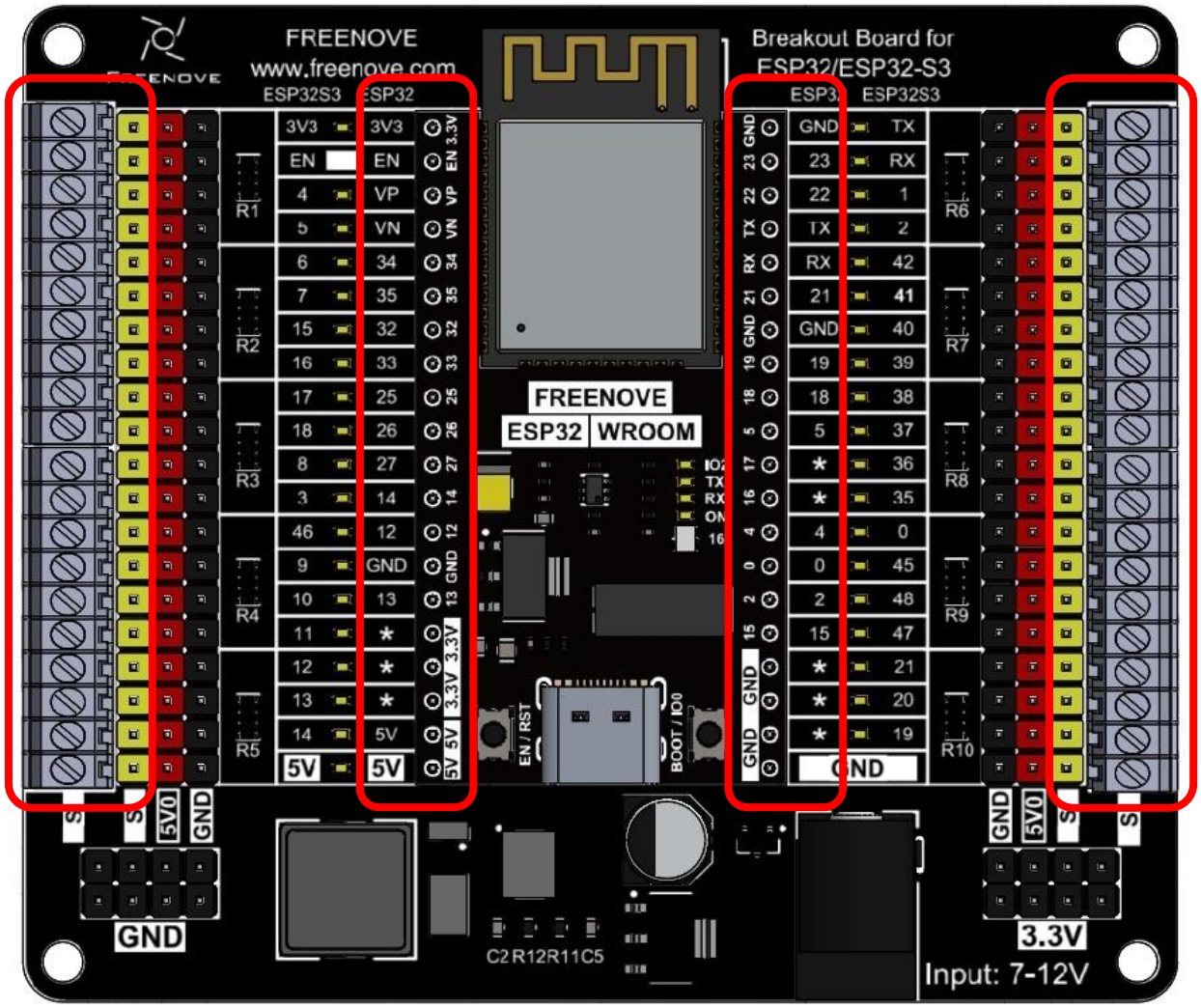
Download link for Freenove ESP32 WROOM Board:
https://freenove.com/fnk0090/
Or you can visit our github to download:
https://github.com/Freenove/Freenove_ESP32_WROOM_Board
Regarding the programming instructions for the Freenove ESP32S3 WROOM Board, we won't delve into them here.
If you're interested, please refer to the following resources:
For C Programming Tutorial, you can check **Freenove_ESP32_WROOM_Board\C\C_Tutorial.pdf**.
For Python Programming Tutorial, you can refer to
Freenove_ESP32_WROOM_Board\Python\Python_Tutorial.pdf.

Board Assembly

Please pay attention to the position of the antenna and ensure that the ESP32 is correctly inserted onto the base board.



After assembly:



Note:

1. For all pins marked "*", their pin numbers depends on those of the esp32 board in use.
2. Note: The S terminal of the breakout board directly connects to the pins of the ESP32 board.

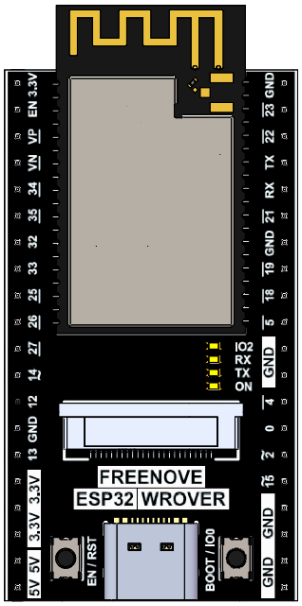
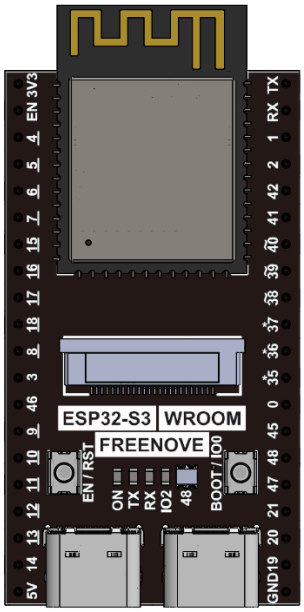
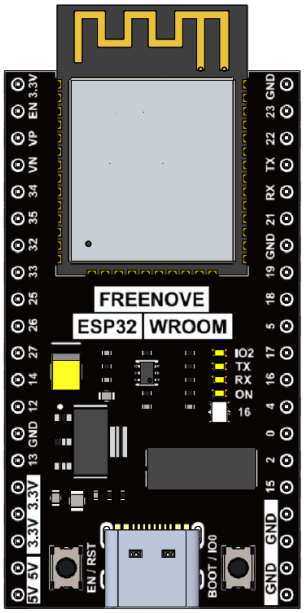
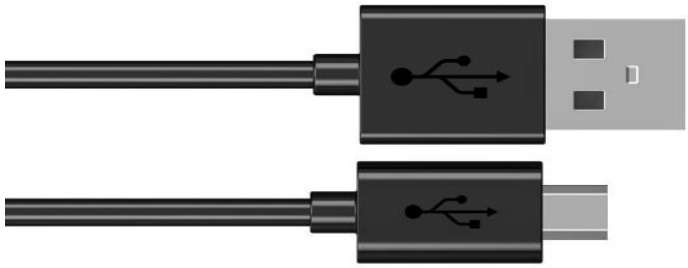
Chapter 1 Example

This chapter is the Start Point in the journey to build and explore ESP32 electronic projects. We will start with simple “Blink” project.

Project 0.1 Blink

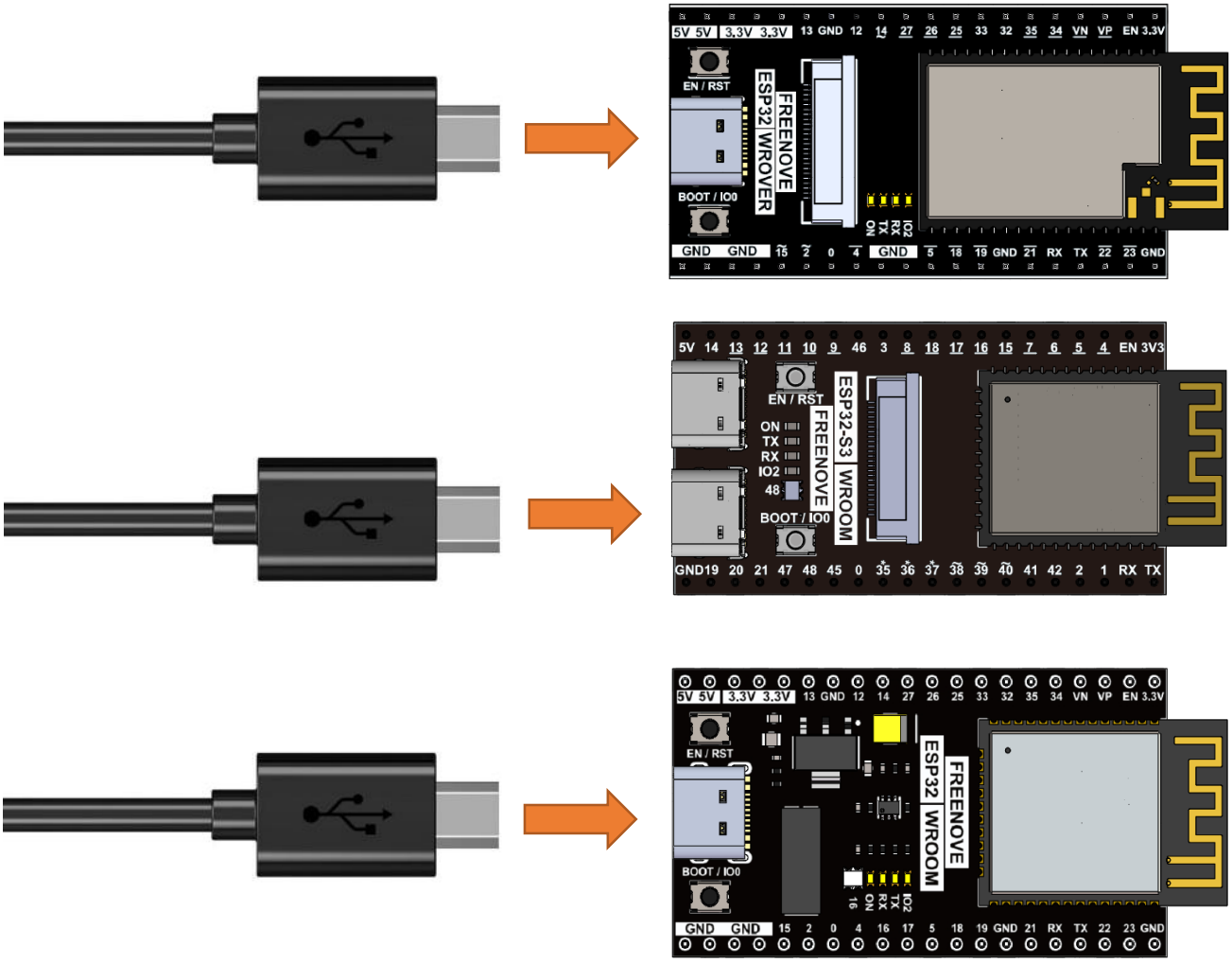
In this project, we will use either ESP32 or ESP32S3 to control the blinking of the onboard LED.

Component List

ESP32 WROVER x1	ESP32 S3 WROOM 1 x1	ESP32 WROOM x1
		
USB cable		
		

Power

ESP32 WROVER and ESP32S3 WROOM needs 5v power supply. In this tutorial, we need connect ESP32-WROVER to computer via USB cable to power it and program it. We can also use other 5v power source to power it.



Sketch

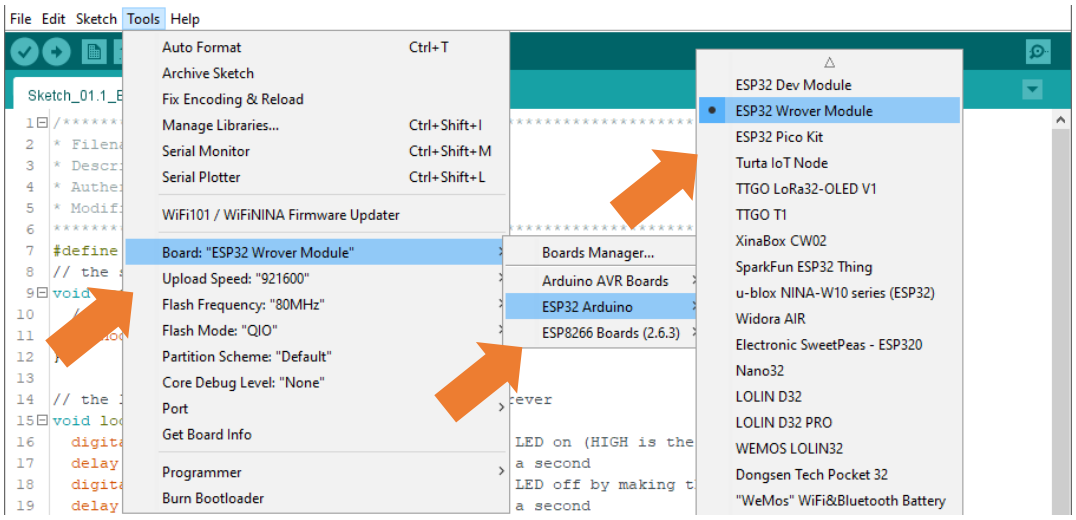
If you are not familiar with programming ESP32 WROVER or ESP32S3 WROOM development boards, please start by downloading the following resources and studying them:

ESP32 WROVER: https://github.com/Freenove/Freenove_Ultimate_Starter_Kit_for_ESP32

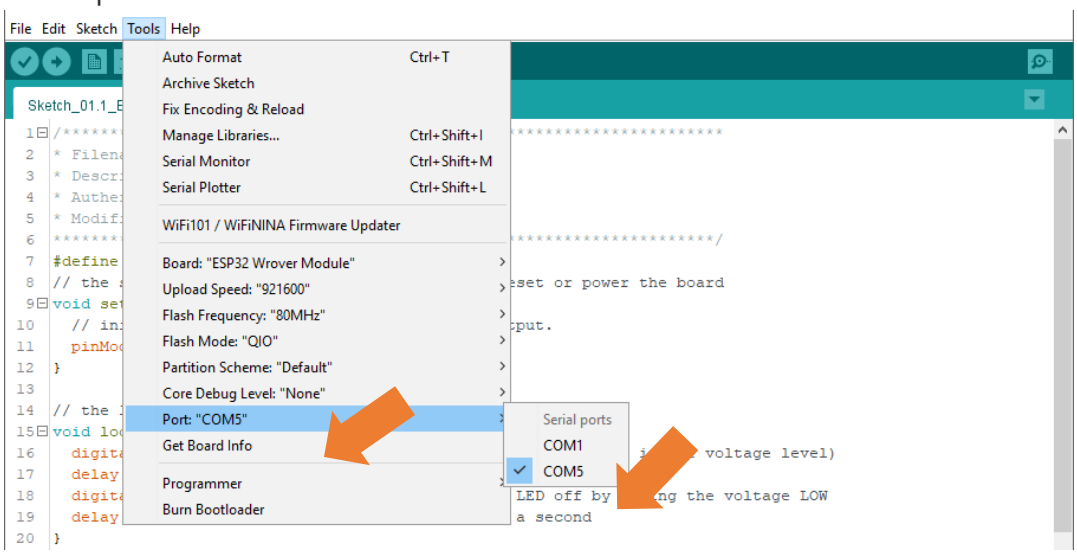
ESP32S3 WROOM: https://github.com/Freenove/Freenove_Ultimate_Starter_Kit_for_ESP32_S3

ESP32 WROOM: https://github.com/Freenove/Freenove_ESP32_WROOM_Board

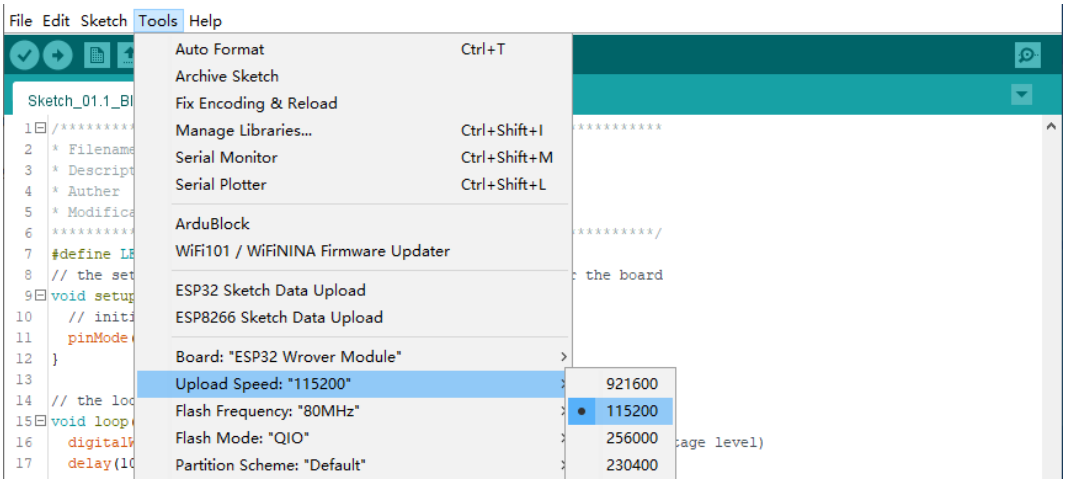
Here we take ESP32 WROVER as an example and develop with Arduino IDE. Upload the following sketch.
Freenove_Ultimate_Starter_Kit_for_ESP32\Sketches\Sketch_01.1_Blink.
Before uploading the code, click "**Tools**", "**Board**" and select "**ESP32 Wrover Module**".



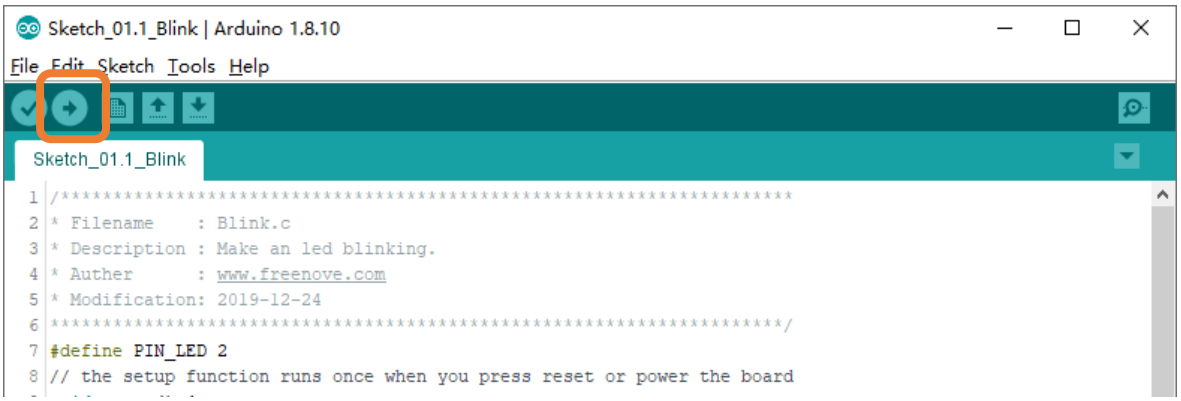
Select the serial port.



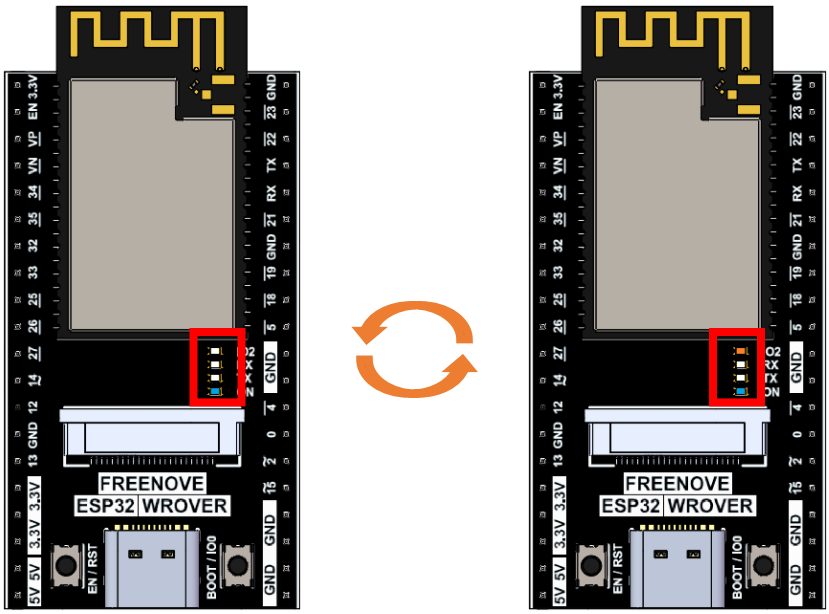
Note: For macOS users, if the uploading fails, please set the baud rate to 115200 before clicking "Upload Using Programmer".



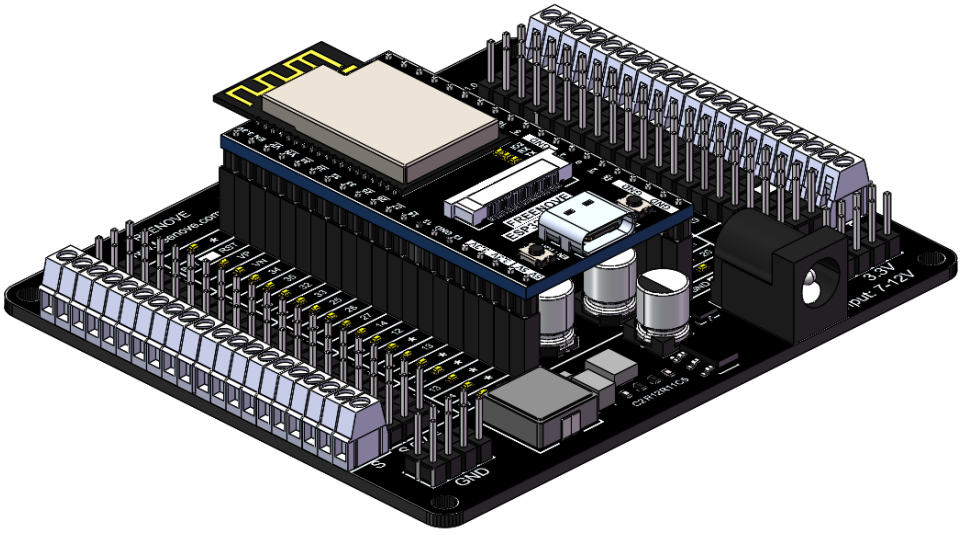
Sketch_01.1_Blink



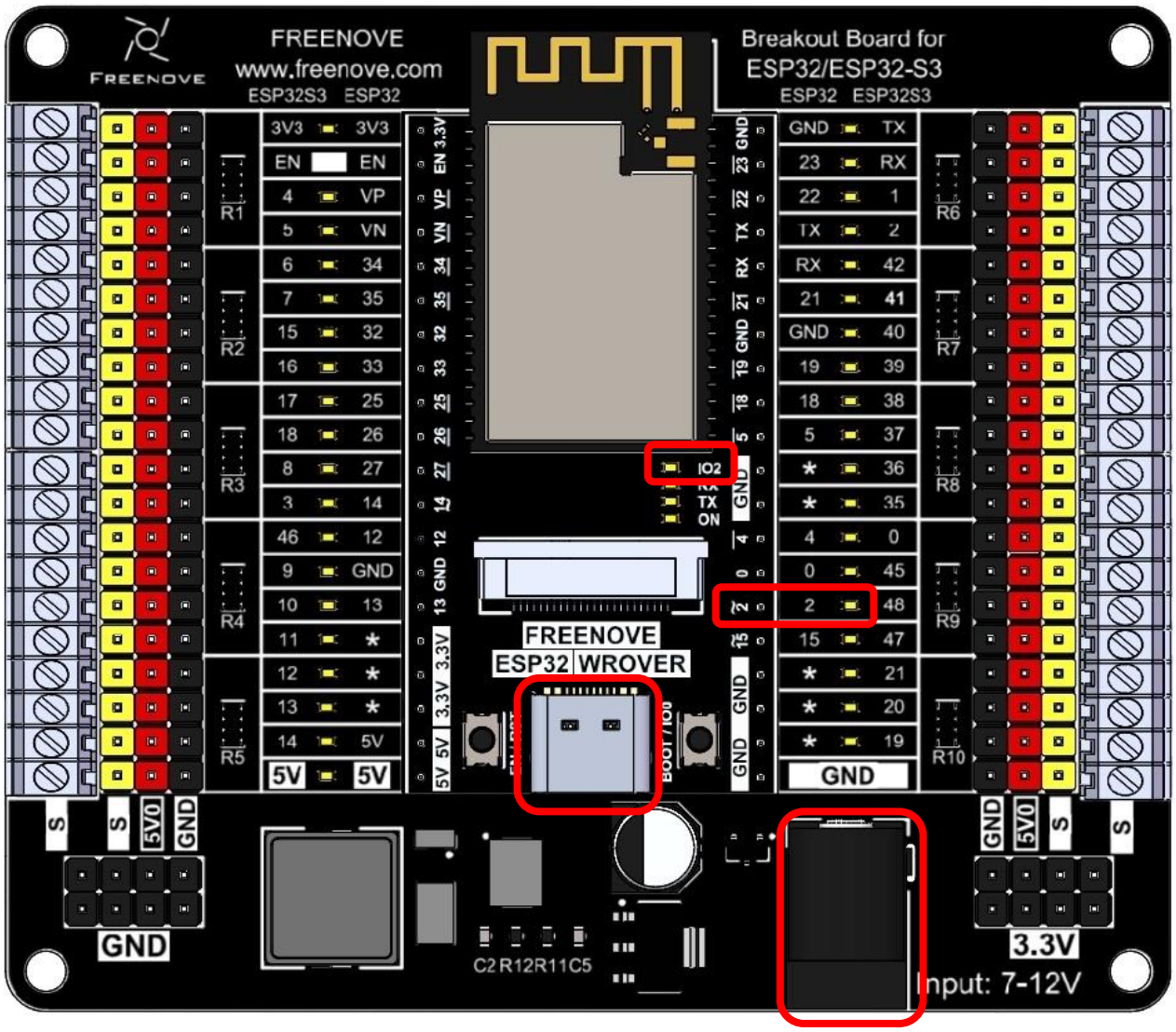
Click "Upload", Download the code to ESP32-WROVER and your LED in the circuit starts Blink.



Disconnect the USB data cable. Install the ESP32 WROVER onto the Freenove Breakout Board for ESP32 as shown in the image below:



Power the board using an external power supply or connect the ESP32 WROVER via a USB cable. You will observe that the onboard indicator LED will also blink accordingly.



What's Next?

THANK YOU for participating in this learning experience!

We have reached the end of this Tutorial. If you find errors, omissions or you have suggestions and/or questions about the Tutorial or component contents of this Kit, please feel free to contact us: support@freenove.com
We will make every effort to make changes and correct errors as soon as feasibly possible and publish a revised version.

If you want to learn more about Arduino, Raspberry Pi, Smart Cars, Robotics and other interesting products in science and technology, please continue to visit our website. We will continue to launch fun, cost-effective, innovative and exciting products.

https://www.freenove.com/

https://www.amazon.com/freenove

Thank you again for choosing Freenove products.