ESP32-S3-RS485-CAN

From Waveshare Wiki
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Introduction

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ESP32-S3-RS485-CAN



(https://www.waveshare.com/esp32-s3-rs485-can.htm)

RS485, CAN, I2C/GPIO; USB/WiFi/BLE

Warning

> Warning: This product is intended for lawful development, learning, research, and industrial use only. It is strictly prohibited to connect to any CAN bus for unauthorized cracking, tampering, unlocking, or function hijacking. Such actions may constitute illegal offenses. The user shall bear all legal liability and consequences of any incidents, and the company assumes no responsibility.We also do not provide any technical support for such applications.

Usage Guide

ESP32-S3-RS485-CAN currently provides **Arduino IDE** development tool and framework, and you can choose the right development tool according to your project needs and personal habits.

Development Tool



(/wiki/File:270px-Arduino-IDE-logo.jpg)

Arduino IDE

Arduino IDE is an open source electronic prototyping platform, convenient and flexible, easy to get started. After a simple learning, you can start to develop quickly. At the same time, Arduino has a large global user community, providing an abundance of open source code, project examples and tutorials, as well as rich library resources, encapsulating complex functions, allowing developers to quickly implement various functions.

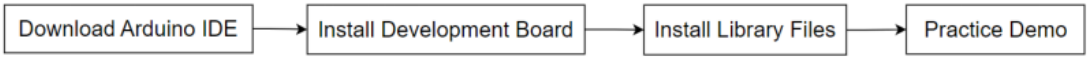
Components Preparation

- ESP32-S3-RS485-CAN x1
- USB cable (Type-A male to Type-C male) x1
- USB TO RS232/485 (https://www.waveshare.com/USB-TO-RS485-B.htm) x 1
- USB-CAN-A (https://www.waveshare.com/USB-CAN-A.htm) x 1

Before operating, it is recommended to browse the table of contents to quickly understand the document structure. For smooth operation, please read the FAQ carefully to understand possible problems in advance. All resources in the document are provided with hyperlinks for easy download.

Working with Arduino

This chapter introduces setting up the Arduino environment, including the Arduino IDE, management of ESP32 boards, installation of related libraries, program compilation and downloading, as well as testing demos. It aims to help users master the development board and facilitate secondary development.

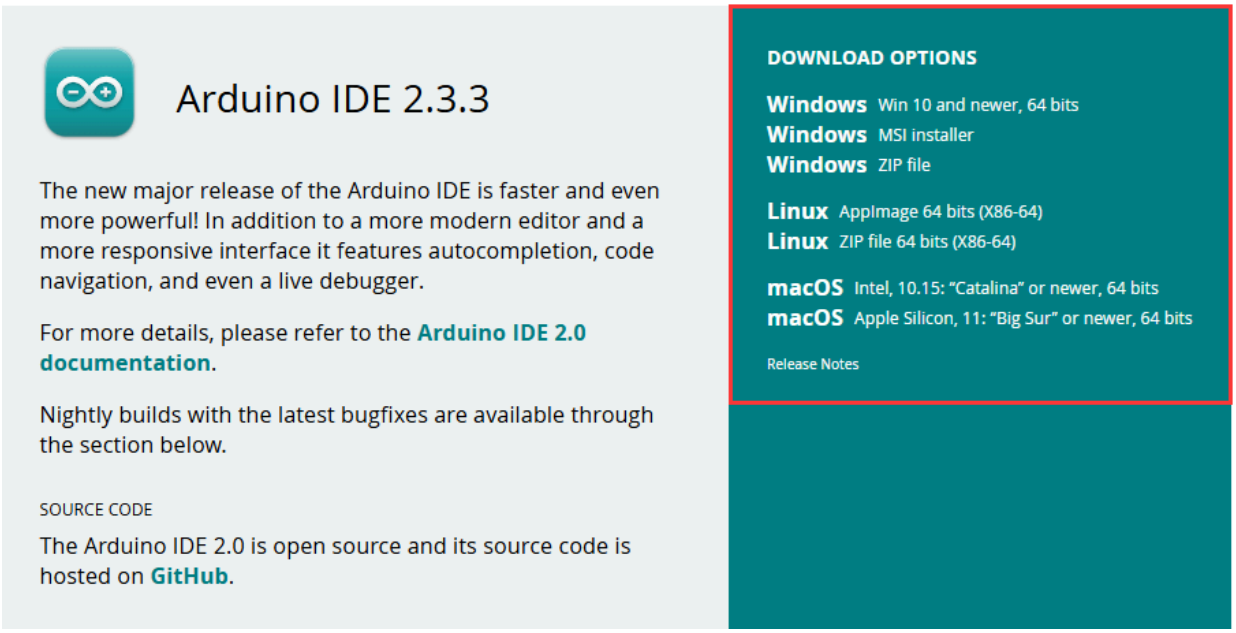


(/wiki/File:Arduino-flow-04.png)

Environment Setup

Download and Install Arduino IDE

- Click to visit the Arduino official website (https://www.arduino.cc/en/software), select the corresponding system and system bit to download



(/wiki/File:ESP32-S3-AMOLED-1.91-Ar-software-01.png)

- Run the installer and install all by default

Install ESP32 Development Board

- Regarding ESP32-related motherboards used with the Arduino IDE, the **esp32 by Espressif Systems** library must be installed first.
- According to **Board installation requirement**, it is generally recommended to use **Install Online**. If online installation fails, use **Install Offline**
- For the installation tutorial, please refer to Arduino board manager tutorial (https://www.waveshare.com/wiki/Arduino_Board_Managers_Tutorial)

- ESP32-S3-RS485-CAN required development board installation description

Board name	Board installation requirement	Version number requirement
esp32 by Espressif Systems	"Install Offline" / "Install Online"	3.0.x

Install Library

- When installing Arduino libraries, there are usually two ways to choose from: **Install online** and **Install offline**. **If the library installation requires offline installation, you must use the provided library file**
  For most libraries, users can easily search and install them through the online library manager of the Arduino software. However, some open-source libraries or custom libraries are not synchronized to the Arduino Library Manager, so they cannot be acquired through online searches. In this case, users can only manually install these libraries offline.
- For library installation tutorial, please refer to Arduino library manager tutorial (https://www.waveshare.com/wiki/Arduino_Library_Manager_Tutorial)

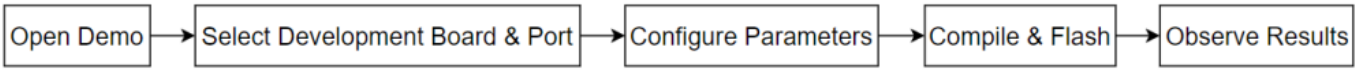
- ESP32-S3-RS485-CAN library file is stored in the demo, click here to jump: ESP32-S3-RS485-CAN Demo
  - ESP32-S3-RS485-CAN library file installation description

Library Name	Description	Version	Library Installation Requirement
ArduinoJson	Lightweight JSON library	v6.21.4	"Install Online" or "Install Offline"
PubSubClient	MQTT message subscription publishing library	v2.8.0	"Install Online" or "Install Offline"
NTPClient	Network time synchronization client library	v3.2.1	"Install Online" or "Install Offline"

Run the First Arduino Demo

If you are just getting started with ESP32 and Arduino, and you don't know how to create, compile, flash, and run Arduino ESP32 programs, then please expand and take a look. Hope it can help you! [Expand]

Demo

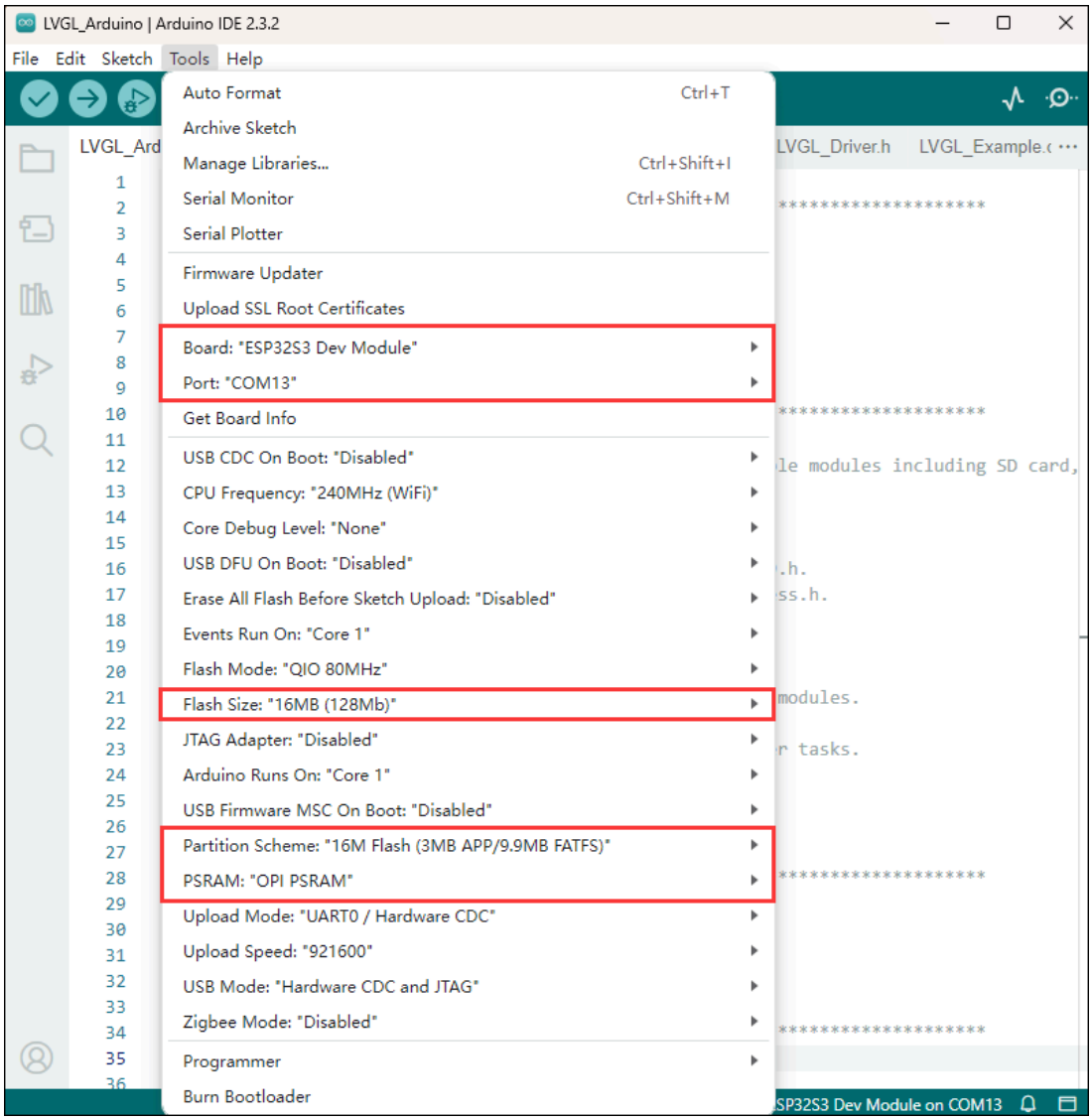


(/wiki/File:Demo-flow-01.png)

- ESP32-S3-RS485-CAN demos

Demo	Basic Description	Dependency Library
01_MAIN_WIFI_AP	RS485 interface control, CAN interface control, Bluetooth control, Bluetooth send IP, Web page control (short distance)	Can be flashed directly Web pages are only available if they are connected to device WIFI
02_MAIN_WIFI_STA	RS485 interface control, CAN interface control, Bluetooth control, Bluetooth send IP, Web page control (short distance)	Need to **modify** the WIFI network to connect to Web pages can only be used within the intranet

Arduino Project Parameter Setting



(/wiki/File:ESP32-S3-16MB-OPI-Parameters.png)

01_MAIN_WIFI_AP

Demo Description

- This example implements the control of RS485 and CAN interfaces through WiFi. The AP mode of WiFi is enabled in this example

Precautions

- Can be flashed directly
- Web pages are only available if they are connected to device WIFI

Web Page Control

- Jump to Web Control Tutorial (https://www.waveshare.com/wiki/ESP32-S3-RS485-CAN-Web), this example is in AP mode

02_MAIN_WIFI_STA

Demo Description

- This example implements the control of six relay switches through WiFi, Bluetooth, and RS485. The STA mode of WiFi is enabled in this example

Precautions

- Need to modify the WIFI network to connect to
- The Web page only supports controlling the device and this product to be used under the same network, if you use the mobile phone control, you need to turn off the mobile network

Web Page Control

- Jump to Web Control Tutorial (https://www.waveshare.com/wiki/ESP32-S3-RS485-CAN-Web), this example is in STA mode

Flash Firmware Flashing and Erasing

- **The current demo provides test firmware, which can be used to test whether the onboard device functions properly by directly flashing the test firmware**
- **bin file path:**

```
..\ESP32-S3-RS485-CAN\Firmware\Factory bin
```

Flash firmware flashing and erasing (https://www.waveshare.com/wiki/Flash_Firmware_Flashing_and_Erasing) for reference

Resources

Demo

- ESP32-S3-RS485-CAN Demo (https://files.waveshare.com/wiki/ESP32-S3-RS485-CAN/ESP32-S3-RS485-CAN-Demo.zip)

Schematic

- ESP32-S3-RS485-CAN Schematic (https://files.waveshare.com/wiki/ESP32-S3-RS485-CAN/ESP32-S3-RS485-CAN-Schematic.pdf)

Datasheets

ESP32-S3

- ESP32-S3 Datasheet (https://files.waveshare.com/wiki/common/Esp32-s3_datasheet_en.pdf)
- ESP32-S3 Technical reference manual (https://files.waveshare.com/wiki/common/Esp32-s3_technical_reference_manual_en.pdf)

Software Tools

Arduino

- Arduino IDE Official download link (https://www.arduino.cc/en/software/)

- ESP32_Arduino offline package (https://drive.google.com/drive/folders/1Pcs_A4FKWvdSHnz9lEBYqOpr-noTMbIv?usp=sharing)

VScode

- VScode official website (https://code.visualstudio.com/download)

Thonny

- Thonny official download link (https://thonny.org/)

Debugging Tools

- Flash_download_tool (https://dl.espressif.com/public/flash_download_tool.zip)
- SSCOM (https://files.waveshare.com/wiki/ESP32-S3-Relay-6CH/SSCOM5.13.1_For_ESP32_S3_Relay_6CH.zip)
- Bluetooth debugging tool (nRF Connect) (https://www.nordicsemi.com/Products/Development-tools/nRF-Connect-for-mobile)

Other Resource Links

- ESP32-Arduino official documentation (https://docs.espressif.com/projects/arduino-esp32/en/latest/index.html)

Project Resources

This section features third - party project resources. We merely provide links and bear no responsibility for content updates or maintenance. Thank you for your understanding.

Vincent - Demo ComfoSense Touch

- YouTube: https://www.youtube.com/watch?v=69VF5-dpnYU (https://www.youtube.com/watch?v=69VF5-dpnYU)
- GitHub: https://github.com/vincentmakes/ComfoSense-Touch (https://github.com/vincentmakes/ComfoSense-Touch)

  https://github.com/vincentmakes/canbus_hoval (https://github.com/vincentmakes/canbus_hoval)

trailcurrentopensource - Waveshare ESP32-S3-RS485-CAN Review

- YouTube: https://www.youtube.com/watch?v=PGqziLmQzHw (https://www.youtube.com/watch?v=PGqziLmQzHw)

JordanzhaoD - Waveshare ESP32-S3 single-CAN standalone firmware — open-source Atlas Single CAN toolkit

- GitHub: https://github.com/JordanzhaoD (https://github.com/JordanzhaoD)

EEVblog - This $19 ESP32 Makes Home Automation EASY!

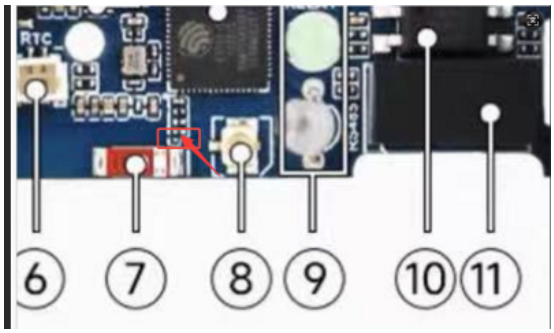
- YouTube: https://www.youtube.com/watch?v=kHu2xe9iCIc (https://www.youtube.com/watch?v=kHu2xe9iCIc)

FAQ

Question: How to use the onboard external antenna?

Answer:

- Change the resistor in the below image from vertical soldering (default) to horizontal soldering.



(/wiki/File:Photo2.png)

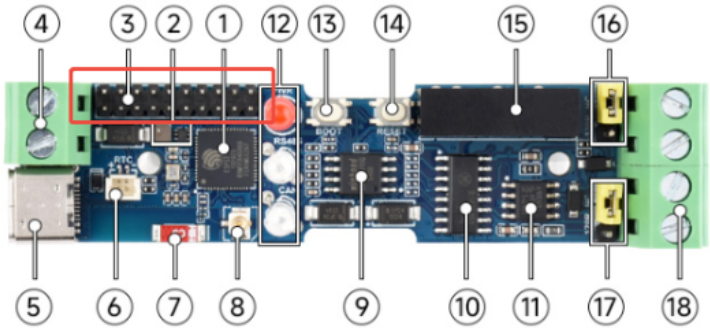
Question: What baud rates are supported by RS485 and CAN?

Answer:

- This product uses ESP32-S3 as the main MCU, so the communication baud rates for both RS485 and CAN can be freely set via software.
- CAN (TWAI) interface: theoretical rate up to 1 Mbps.
- RS485 (UART) interface: theoretical UART rate up to 5 Mbps. However, due to the addition of isolation, level shifting, and protection circuits on the board, the actual usable rate will be slightly lower. It is generally recommended to set it within 115200 bps. The exact value should be verified based on the actual communication environment and application.

Question: What is the pin header pitch on the board?

- **Pin header pitch: 2.0mm**



(/wiki/File:%E4%BC%81%E4%B8%9A%E5%BE%AE%E4%BF%A1%E6%88%AA%E5%9B%BE_17605874917022.png)

Answer:

Question: After the module downloads the demo and re-downloads it, why sometimes it can't connect to the serial port or the flashing fails?

Answer:

- Long press the BOOT button, press RESET at the same time, then release RESET, then release the BOOT button, at this time the module can enter the download mode, which can solve most of the problems that can not be downloaded.

Question: Why does the module keep resetting and flicker when viewed the recognition status from the device manager?

Answer:

- It may be due to Flash blank and the USB port is not stable, you can long-press the BOOT button, press RESET at the same time, and then release RESET, and then release the BOOT button, at this time the module can enter the download mode to flash the firmware (demo) to solve the situation.

Question: How to deal with the first compilation of the program being extremely slow?

Answer:

- It's normal for the first compilation to be slow, just be patient

Question: How to handle the display "waiting for download..." on the serial port after successfully ESP-IDF flashing?

Answer:

- If there is a reset button on the development board, press the reset button; if there is no reset button, please power it on again

Question: What should I do if I can't find the AppData folder?

Answer:

- Some AppData folders are hidden by default and can be set to show.
- English system: Explorer->View->Check "Hidden items"
- Chinese system: File Explorer -> View -> Display -> Check "Hidden Items"

Question: How do I check the COM port I use?

Answer:

- Windows system:

①View through Device Manager: Press the Windows + R keys to open the "Run" dialog box; input devmgmt.msc and press Enter to open the Device Manager; expand the "Ports (COM and LPT)" section, where all COM ports and their current statuses will be listed.

②Use the command prompt to view: Open the Command Prompt (CMD), enter the "mode" command, which will display status information for all COM ports.

③Check hardware connections: If you have already connected external devices to the COM port, the device usually occupies a port number, which can be determined by checking the connected hardware.

- Linux system:

①Use the dmesg command to view: Open the terminal.

①Use the ls command to view: Enter ls /dev/ttyS* or ls /dev/ttyUSB* to list all serial port devices.

③Use the setserial command to view: Enter setserial -g /dev/ttyS* to view the configuration information of all serial port devices.

Question: Why does the program flashing fail when using a MAC device?

Answer:

- Install MAC Driver (https://files.waveshare.com/wiki/common/CH34XSER_MAC.7z) and flash again.

Question: Why is there no output after successfully flashing the code with no issues?

Answer:

- Check the schematic diagram for different development boards with Type-C interfaces, and handle the output accordingly:
  - For development boards with direct USB output, printf function is supported for printing output. If you want to support output via the Serial function, you will need to enable the USB CDC On Boot feature or declare HWCDC.
  - For development boards with UART to USB conversion, both printf and Serial functions are supported for printing output, and there is no need to enable USB CDC On Boot.

Question: Please note!

Answer:

- The factory demo is for learning only, if it is used for practical application, please optimize the demo logic by yourself.

Question: When controlling other devices using RS485, it is not sensitive or communication fails?

Answer:

- Please move the jumper cap to 120R and try again. Some RS485 devices require a 120R resistor to be connected in series

Question: Can I power the board using both the terminal block and the USB interface simultaneously?

Answer:

- No, this may risk damaging the module.

Support

Technical Support

If you need technical support or have any feedback/review, please click the **Submit Now** button to submit a ticket, Our support team will check and reply to you within 1 to 2 working days. Please be patient as we make every effort to help you to resolve the issue.
Working Time: 9 AM - 6 PM GMT+8 (Monday to Friday)

Submit Now (https://service.waveshare.com/)

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