LILYGO T-RSS3

LILYGO T-RSS3 ESP32-S3 Development Board User Manual

Model: T-RSS3 | Brand: LILYGO

1. Introduction

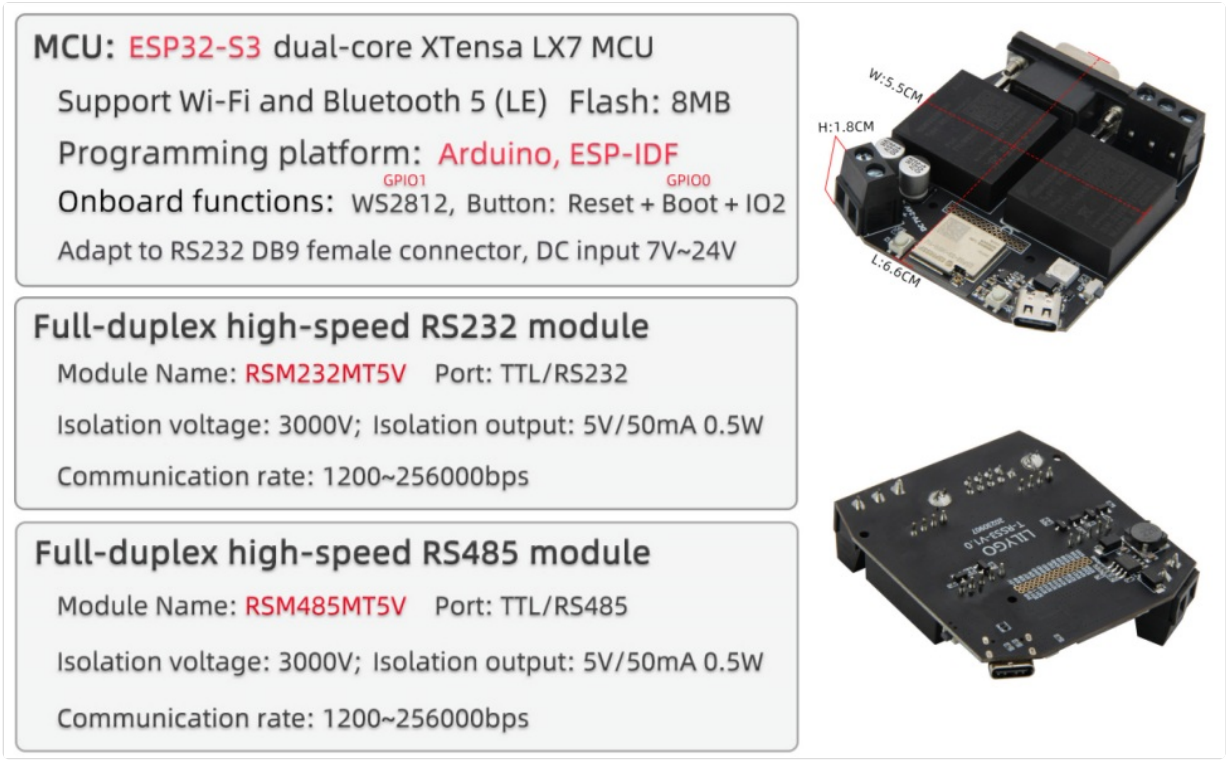
The LILYGO T-RSS3 is a versatile development board featuring an ESP32-S3 dual-core XTensa LX7 MCU. It integrates full-duplex high-speed RS232 and RS485 modules, along with on-board Wi-Fi and Bluetooth 5 (LE) connectivity. Designed for various applications requiring robust serial communication and wireless capabilities, it supports programming via Arduino and ESP-IDF environments.

Your browser does not support the video tag.

Official introduction video demonstrating the key features and components of the LILYGO T-RSS3 development board.

2. Features

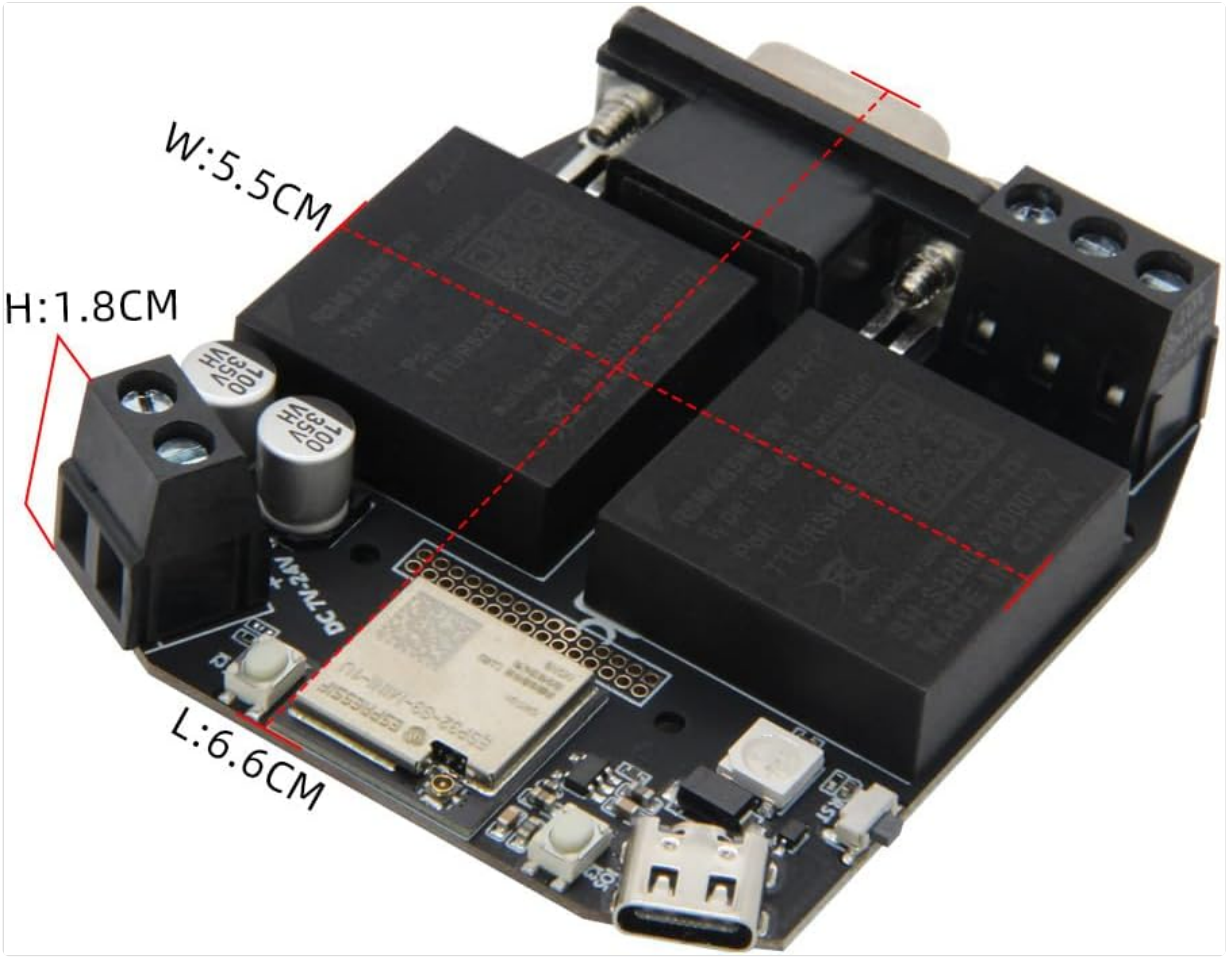
- **Microcontroller:** ESP32-S3 dual-core XTensa LX7 MCU
- **Wireless Connectivity:** Integrated Wi-Fi and Bluetooth 5 (LE)
- **Serial Communication:** Full-duplex high-speed RS232 (DB9 female connector) and RS485 modules
- **Power Input:** DC 7V-24V via terminal block
- **Programming Platforms:** Compatible with Arduino and ESP-IDF
- **Onboard Peripherals:** WS2812 RGB LED, Reset button, Boot button (IO0), IO2
- **USB Interface:** Type-C port for programming and serial communication
- **Isolation:** 3000V isolation voltage for RS232/RS485 modules
- **Communication Rate:** 1200-256000bps



An overview of the LILYGO T-RSS3 board, highlighting its key features including the ESP32-S3 MCU, WS2812 RGB LED, Type-C port, Reset and Boot buttons, and the RS232 and RS485 modules. Dimensions are also indicated.

3. Specifications

Attribute	Value
Brand	LILYGO
Model Name	T-RSS3
Connectivity Technology	Bluetooth, Wi-Fi
Operating System	Linux
CPU Manufacturer	Espressif
Processor Brand	Espressif
Wireless Compatibility	Bluetooth
Compatible Devices	Computers (PCs, laptops), smartphones, microcontrollers (Arduino, Raspberry Pi models)
RAM Memory Technology	LPDDR4
Processor Count	2
Total USB Ports	1 (Type-C)



The LILYGO T-RSS3 board showing its physical dimensions: Length (L) 6.6cm, Width (W) 5.5cm, Height (H) 1.8cm.

4. Package Contents

The LILYGO T-RSS3 package typically includes the following items:

- 1 x LILYGO T-RSS3 Development Board
- 1 x 1.27mm (2*15Pin) Female Header
- 1 x WiFi Antenna

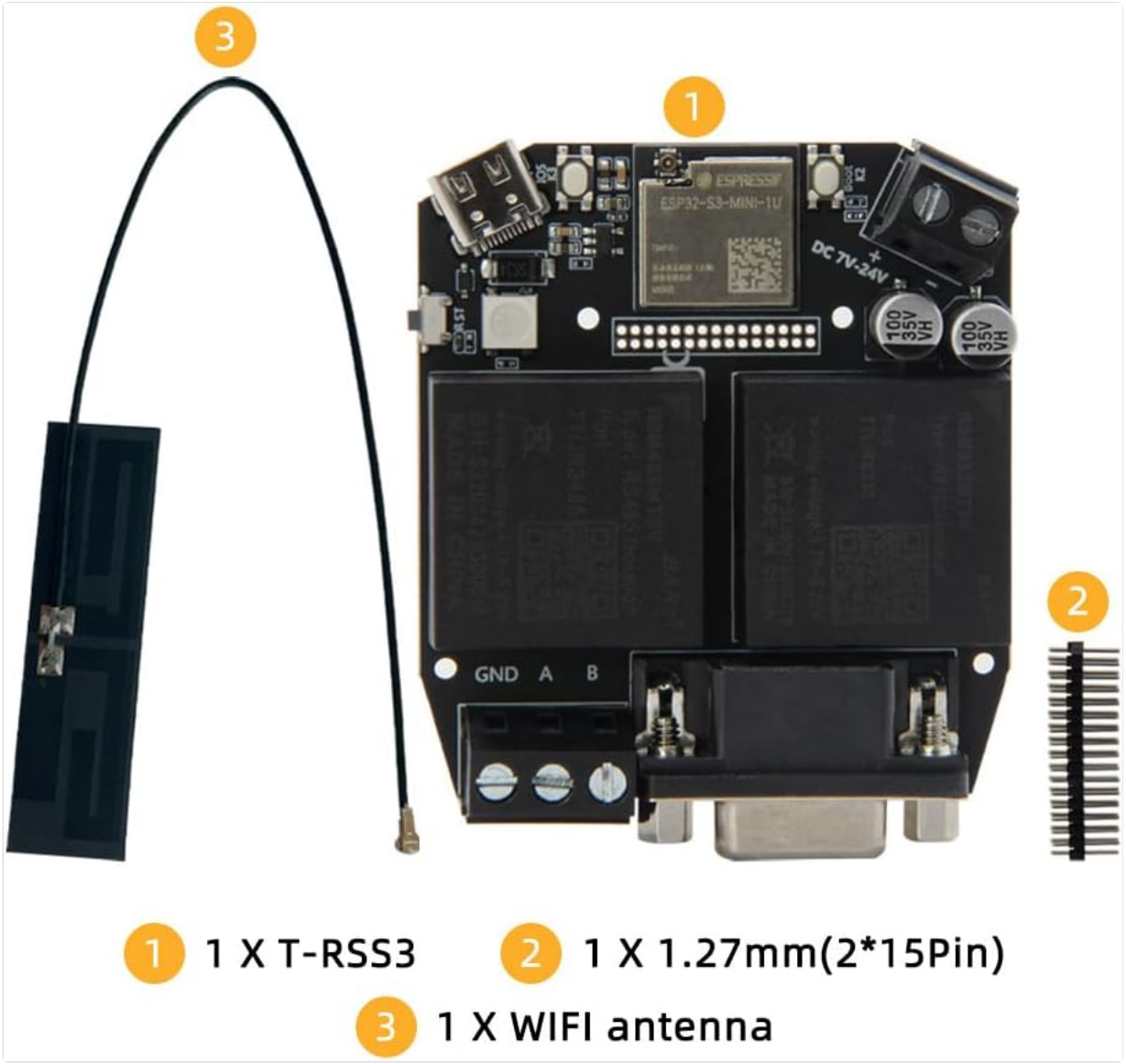
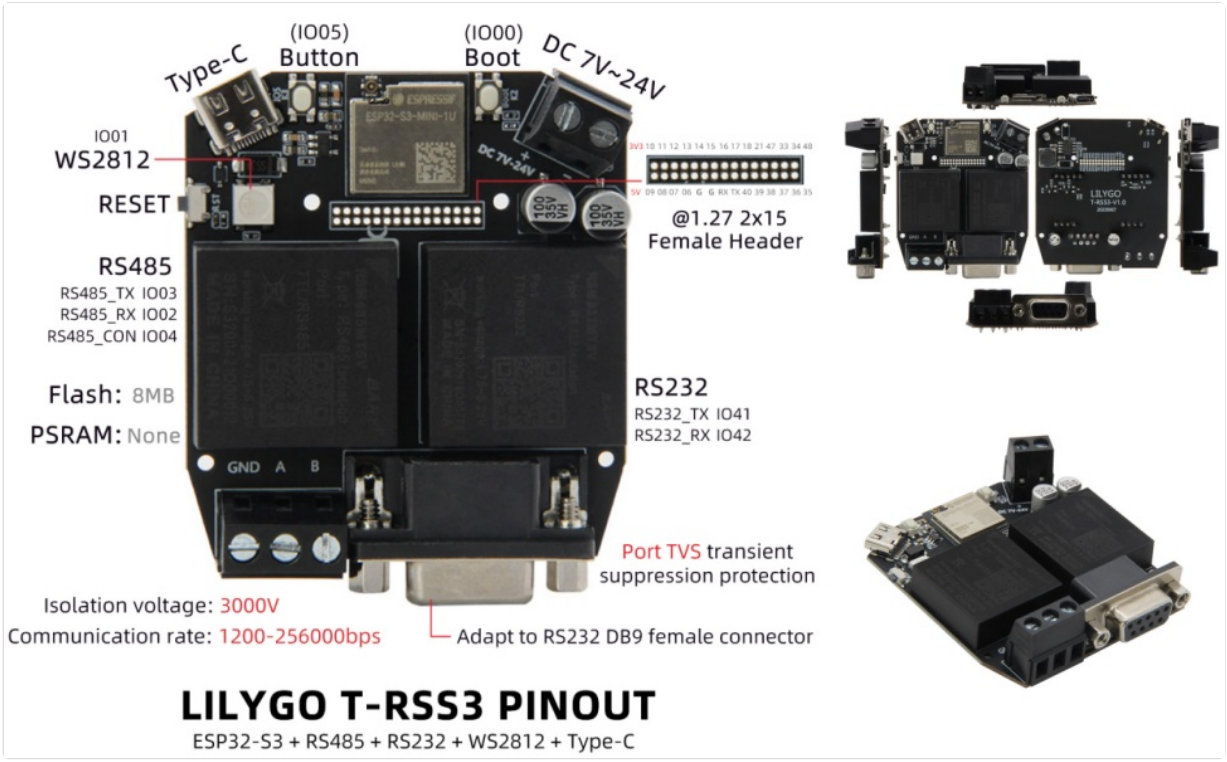


*Image illustrating the components included in the LILYGO T-RSS3 package: the main T-RSS3 board, a 1.27mm (2*15Pin) female header, and a WiFi antenna.*

5. Pinout Diagram

Understanding the pinout is crucial for connecting external components and utilizing the board's full functionality. Refer to the diagram below for detailed pin assignments.



Detailed pinout for the LILYGO T-RSS3 board, showing connections for Type-C, WS2812, Reset, Boot, RS485, RS232, and power input. It also indicates the 1.27 x 15 female header.

6. Setup

1. **Power Connection:** Connect a DC power supply (7V-24V) to the terminal block labeled "DC 7V-24V". Ensure correct polarity.
2. **USB Connection:** Connect the LILYGO T-RSS3 board to your computer using a Type-C USB cable. This connection is used for programming, serial communication, and can also power the board if the DC input is not used (though DC input is recommended for stable operation, especially with RS232/RS485).
3. **Antenna Attachment:** Carefully attach the provided WiFi antenna to the IPEX connector on the board. This is essential for optimal Wi-Fi and Bluetooth performance.
4. **Programming Environment Setup:** Install the Arduino IDE or ESP-IDF development environment on your computer. Follow the official LILYGO GitHub repository instructions for installing the necessary board support packages and libraries for the ESP32-S3.
5. **Driver Installation:** Ensure that the USB-to-Serial drivers for the ESP32-S3 are correctly installed on your operating system.

7. Operating Instructions

1. **Firmware Upload:** Once your programming environment is set up, write or load your desired firmware. To upload, select the correct board and COM port in your IDE. If the upload fails, you may need to manually put the board into download mode by holding the Boot button (IO0), pressing and releasing the Reset button, then releasing the Boot button.
2. **Basic Operation:** After successful firmware upload, the board will automatically execute the programmed application. Monitor serial output via the USB Type-C connection for debugging.
3. **RS232 Communication:** Connect your RS232 device to the DB9 female connector. Ensure your code correctly initializes the RS232 module and sets the appropriate baud rate and communication parameters.

4. **RS485 Communication:** Connect your RS485 device to the terminal block labeled 'A' and 'B'. Ensure your code correctly initializes the RS485 module and sets the appropriate baud rate and communication parameters. The 'GND' terminal is for ground connection.
5. **Wi-Fi and Bluetooth:** Implement Wi-Fi and Bluetooth functionality within your firmware. The ESP32-S3 supports various Wi-Fi modes (station, access point) and Bluetooth 5 (LE) for wireless communication.
6. **Onboard WS2812 RGB LED:** The WS2812 RGB LED is connected to IO2. You can control its color and brightness programmatically using appropriate libraries (e.g., FastLED for Arduino).

8. Maintenance

- **Cleaning:** Keep the board clean and free from dust, moisture, and conductive debris. Use a soft, dry brush or compressed air for cleaning. Avoid using liquids directly on the board.
- **Storage:** When not in use, store the LILYGO T-RSS3 in an anti-static bag or container in a dry environment to prevent electrostatic discharge damage and corrosion.
- **Firmware Updates:** Regularly check the official LILYGO GitHub repository (github.com/Xinyuan-LilyGO/T-RSC3) for the latest firmware, examples, and documentation. Keeping your firmware updated can provide new features and bug fixes.
- **Physical Inspection:** Periodically inspect the board for any signs of physical damage, loose connections, or component issues.

9. Troubleshooting

- **Board Not Powering On:**
  - Verify that the DC input voltage is within the specified range of 7V-24V.
  - Check power supply connections for proper polarity and secure contact.
  - If using USB power, ensure the Type-C cable is functional and connected to a powered USB port.
- **Unable to Upload Firmware:**
  - Ensure the Type-C USB cable is correctly connected and is a data-capable cable (not just charging).
  - Check if the correct COM port is selected in your Arduino IDE or ESP-IDF configuration.
  - Try manually entering download mode: Press and hold the Boot button (IO0), then press and release the Reset button, and finally release the Boot button.
  - Verify that the necessary USB-to-Serial drivers for the ESP32-S3 are installed on your computer.
- **Wi-Fi/Bluetooth Not Working:**
  - Ensure the WiFi antenna is securely connected to the IPEX connector.
  - Check your code for correct Wi-Fi/Bluetooth initialization, network credentials, and proper API usage.
  - Verify that the power supply is stable and providing sufficient current, especially during wireless operations.
- **RS232/RS485 Communication Issues:**
  - Verify the wiring to the DB9 connector (RS232) or the terminal block (RS485) is correct according to the pinout.
  - Ensure that the baud rate and other communication parameters (data bits, parity, stop bits) in your software match those of the connected device.
  - Confirm that the connected serial device is properly configured and functional.

10. Support & Warranty

For technical support, detailed documentation, code examples, and community resources, please visit the official LILYGO GitHub repository:

github.com/Xinyuan-LilyGO/T-RSC3

Warranty information for the LILYGO T-RSS3 is typically provided with your purchase documentation. Please refer to your retailer or LILYGO's official website for specific warranty terms, conditions, and return policies. Keep your proof of purchase for any warranty claims.