## LILYGO T3S3 ESP32-S3 LoRa SX1262 915MHZ

# LILYGO T3S3 ESP32-S3 LoRa TTGO Development Board User Manual

Model: T3S3 ESP32-S3 LoRa SX1262 915MHZ

## 1. Introduction

This manual provides comprehensive instructions for the LILYGO T3S3 ESP32-S3 LoRa TTGO Development Board. It covers product features, setup, operation, maintenance, and troubleshooting to ensure optimal performance and longevity of your device. The LILYGO T3S3 is a versatile development board integrating an ESP32-S3 microcontroller with LoRa wireless communication capabilities and an onboard 0.96-inch OLED display.

## 2. Product Overview

The LILYGO T3S3 board is designed for IoT applications requiring long-range, low-power wireless communication. Key features include:

- **Wireless Protocol:** Wi-Fi and Bluetooth 5.0 for versatile connectivity.
- **Onboard Functions:** Reset and Boot Buttons for easy programming and control.
- **Storage:** Support for TF Card (MicroSD) for expanded data storage.
- **Power Supply:** Supports USB power and 3.7V LiPo battery power supply with an integrated battery switch.
- **Display:** Integrated 0.96-inch OLED Display (SSD1306 driver, 128x64 resolution, I2C interface).
- **LoRa Transceiver:** Equipped with the SX1262 LoRa chip for 915MHz frequency band communication.

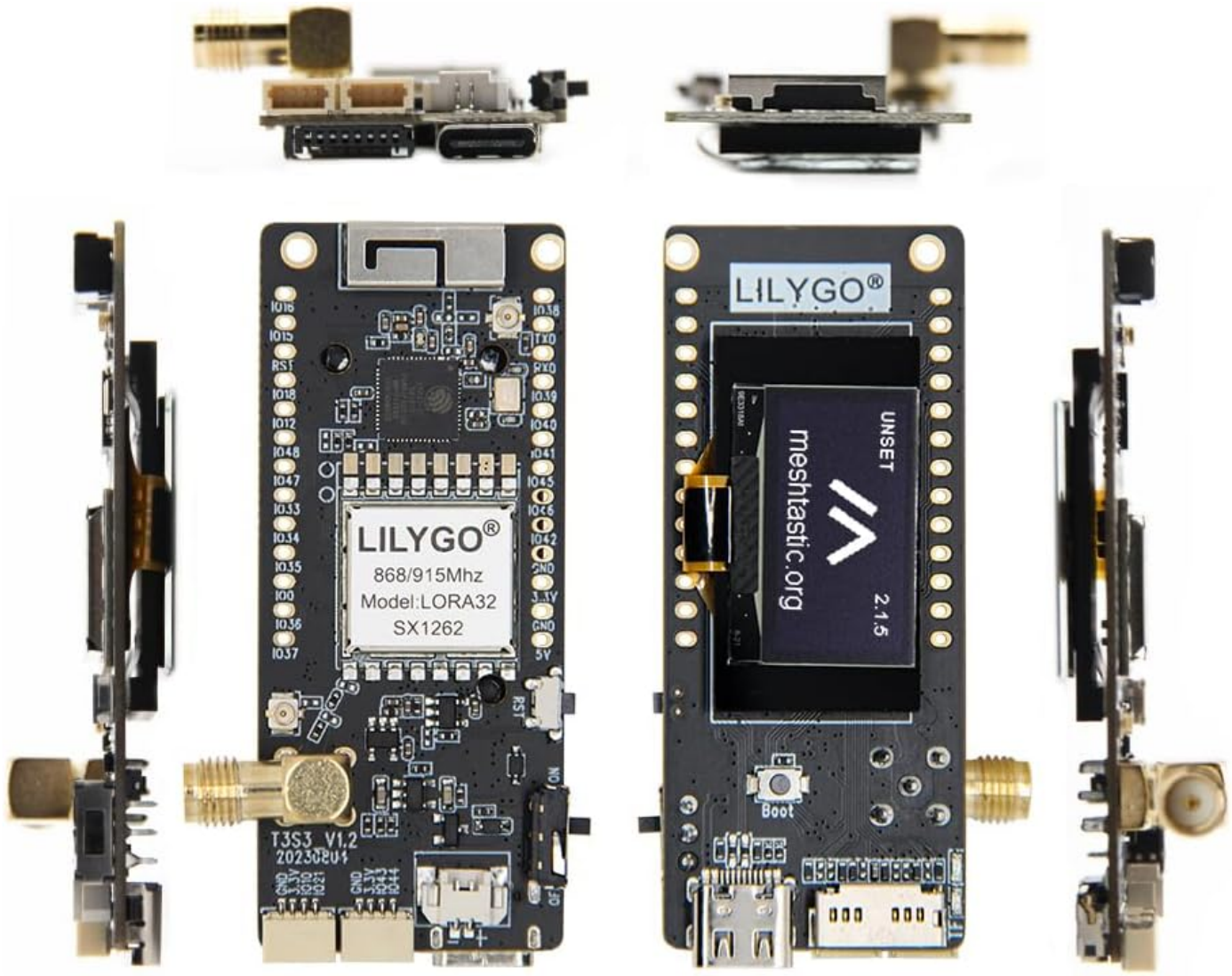



*Figure 2.1: Front, back, and side views of the LILYGO T3S3 development board.*




*Figure 2.2: The LILYGO T3S3 board with the included antenna connected.*

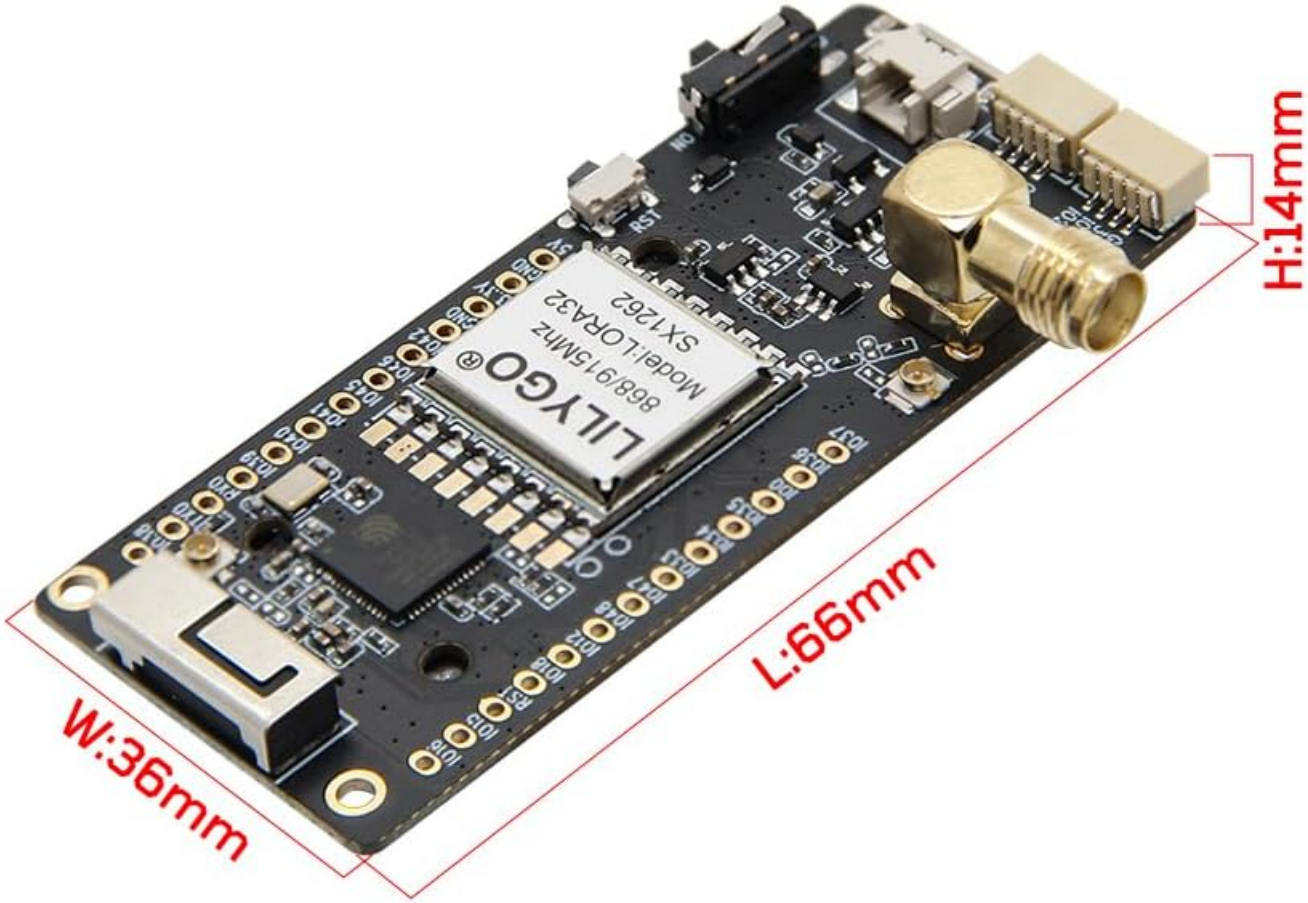



*Figure 2.3: Dimensions of the LILYGO T3S3 board: Length (L) 66mm, Width (W) 36mm, Height (H) 14mm.*

## 3. Setup

Follow these steps for initial setup of your LILYGO T3S3 development board:

1. **Connect Antenna:** Carefully screw the provided LoRa antenna onto the SMA connector on the board. Ensure it is finger-tight to avoid damage.
2. **Power Supply:** Connect the board to a computer using a USB Type-C cable. Alternatively, connect a 3.7V LiPo battery to the JST connector and ensure the battery switch is in the 'ON' position.
3. **Driver Installation:** Depending on your operating system, you may need to install USB-to-serial drivers (e.g., CP210x or CH340) for your computer to recognize the board.
4. **Development Environment Setup:** Install the Arduino IDE or PlatformIO. Add ESP32 board support to your chosen IDE.
5. **Firmware Upload:** Obtain example code or firmware from the official LILYGO GitHub repository (github.com/Xinyuan-LilyGO/Lilygo-LoRa-Epaper-series). Compile and upload the desired firmware to the board using the USB connection.
6. **TF Card Insertion (Optional):** If using a TF card, insert it into the designated slot on the board.

## 4. Operating Instructions

Once the board is set up and firmware is uploaded, you can begin operation:

- **Power On:** The board will power on automatically when connected via USB or when the battery switch is turned on.

- **OLED Display:** The 0.96-inch OLED display will show information as programmed in the firmware. This can include sensor data, network status, or other relevant information.
- **LoRa Communication:** The LoRa module will transmit and receive data according to the loaded firmware. Ensure your LoRa network parameters (frequency, spreading factor, coding rate) match those of other devices in your network.
- **Wi-Fi/Bluetooth:** If enabled in the firmware, the ESP32-S3 can connect to Wi-Fi networks or establish Bluetooth connections for data transfer or configuration.
- **Reset Button:** Press the 'Reset' button to restart the board and re-execute the loaded program.
- **Boot Button:** The 'Boot' button is typically used in conjunction with the 'Reset' button to enter bootloader mode for firmware uploading. Consult specific programming guides for your IDE.




*Figure 4.1: Detailed pinout diagram for the LILYGO T3S3 V1.0 board, showing GPIOs, power pins, and connections for OLED, TF card, and USB Type-C.*

## 5. Maintenance

Proper care and maintenance will extend the lifespan of your LILYGO T3S3 board:

- **Handle with Care:** The board contains sensitive electronic components. Avoid dropping it or subjecting it to physical shock.
- **Static Electricity:** Always handle the board in an anti-static environment or take precautions to discharge static electricity before touching it.
- **Cleanliness:** Keep the board free from dust, dirt, and moisture. Use a soft, dry brush or compressed air for cleaning. Avoid liquids.
- **Storage:** When not in use, store the board in its original packaging or an anti-static bag in a cool, dry place away from direct sunlight and extreme temperatures.
- **Antenna Care:** Ensure the antenna is securely connected during operation. Avoid bending or stressing the antenna connector.

## 6. Troubleshooting

If you encounter issues with your LILYGO T3S3 board, consider the following:

- **Board Not Detected by PC:**
  - Ensure USB cable is fully inserted and functional.
  - Verify USB-to-serial drivers are correctly installed for your operating system.
  - Try a different USB port or computer.
- **Firmware Upload Fails:**
  - Check that the correct board and COM port are selected in your IDE.
  - Ensure the board is in bootloader mode (often by holding 'Boot' and pressing 'Reset', then releasing 'Reset' and then 'Boot').
  - Verify your code compiles without errors.
- **OLED Display Not Working:**
  - Confirm the OLED is correctly initialized in your firmware.
  - Check I2C connections (SDA, SCL) if you are using external OLED. For the integrated OLED, ensure the correct library and initialization code are used.
- **LoRa Communication Issues:**
  - Ensure the antenna is properly connected.
  - Verify that LoRa frequency, spreading factor, and other parameters match between transmitting and receiving devices.
  - Check for physical obstructions or excessive distance between devices.
- **Power Issues:**
  - If using battery, ensure it is charged and the battery switch is on.
  - Check USB power source for sufficient current.

For more detailed troubleshooting and community support, refer to the official LILYGO GitHub repository and related forums.

## 7. Specifications

Detailed technical specifications for the LILYGO T3S3 ESP32-S3 LoRa Development Board:

| Feature | Detail |
| --- | --- |
| MCU | ESP32-S3FH4R2 |
| Flash Memory Size | 4 MB |
| PSRAM | 2 MB |
| Wireless Protocol | Wi-Fi, Bluetooth 5.0 |
| LoRa Transceiver | SX1262 |
| LoRa Frequency | 915MHz |
| Display | 0.96-inch SSD1306 OLED |
| Display Resolution | 128x64 pixels |
| Display Interface | I2C (SDA-IO18, SCL-IO17) |
| Power Supply | USB Type-C / 3.7V LiPo Battery |
| Onboard Functions | Reset Button, Boot Button, TF Card Slot, Battery Switch |
| Dimensions (LxWxH) | 3.45 x 2.6 x 1.06 inches (approx. 87.6 x 66 x 26.9 mm) |
| Operating System | Linux (compatible with various development environments) |



*Figure 7.1: Visual representation of key T3S3 specifications.*

## 8. What's in the Box

The LILYGO T3S3 ESP32-S3 LoRa TTGO Development Board package typically includes the following components:

- 1 x LILYGO T3S3 Development Board
- 1 x LoRa Antenna (915MHz for this variant)
- 1 x JST Cable (for battery connection)
- 2 x Pin Headers (for breadboard compatibility)

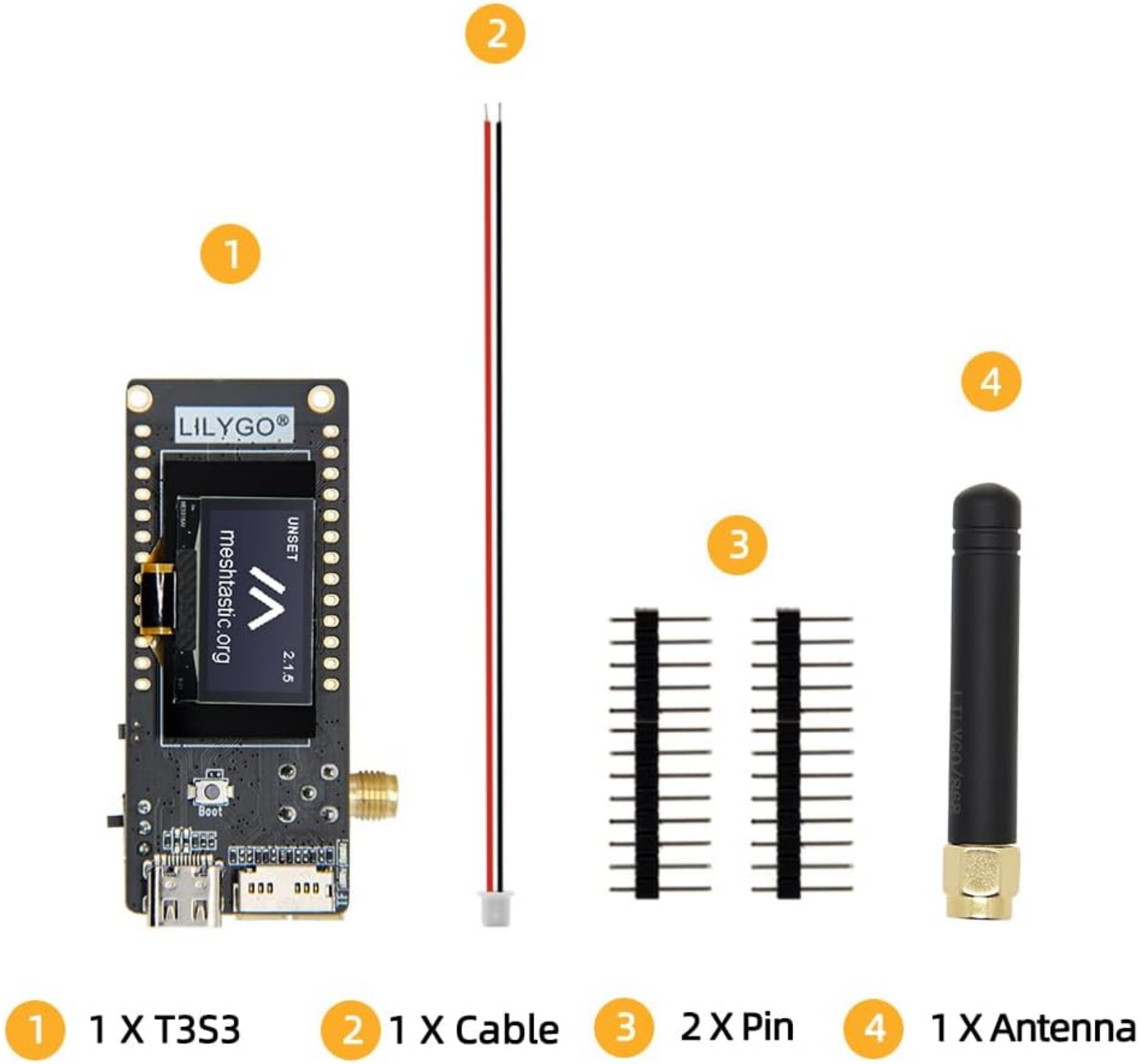



*Figure 8.1: Contents of the LILYGO T3S3 package, including the board, antenna, cable, and pin headers.*

## 9. Warranty and Support

LILYGO products are designed for reliability and performance. For specific warranty information, please refer to the purchase platform or contact the seller directly. For technical support, community discussions, and the latest firmware updates, please visit the official LILYGO GitHub repository:

**github.com/Xinyuan-LilyGO/Lilygo-LoRa-Epaper-series**

If you have any questions or suggestions regarding the product, please feel free to contact the manufacturer or seller. They will endeavor to answer your questions as soon as possible.


### Ask a question about this manual

Ask about setup, troubleshooting, compatibility, parts, safety, or missing instructions. Manuals+ will review the question and use this page's manual context to help answer it.

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