LILYGO 915Mhz

LILYGO T3 V3.0 ESP32 LoRa Development Board User Manual

Model: 915Mhz

1. Introduction

This manual provides comprehensive instructions for the LILYGO T3 V3.0 ESP32 LoRa Development Board (915Mhz). It covers product features, setup, operation, maintenance, and troubleshooting to ensure optimal performance and longevity of your device. The LILYGO T3 V3.0 is a versatile development board designed for IoT projects, integrating Wi-Fi, Bluetooth, and LoRa capabilities.

2. Safety Information

Please read and understand all safety precautions before using the LILYGO T3 V3.0 development board. Failure to follow these instructions may result in electric shock, fire, or damage to the device.

- Do not expose the board to moisture or extreme temperatures.
- Ensure proper power supply (USB/3.7V Lipo battery) as specified.
- Avoid short-circuiting pins or components.
- Handle with care to prevent electrostatic discharge (ESD) damage.
- Keep out of reach of children.

3. Package Contents

Verify that all items listed below are included in your package:

- 1 x LILYGO T3 V3.0 ESP32 LoRa Development Board
- 1 x Power Cable (JST-PH 2.0mm)
- 2 x Pin Headers
- 1 x LoRa Antenna

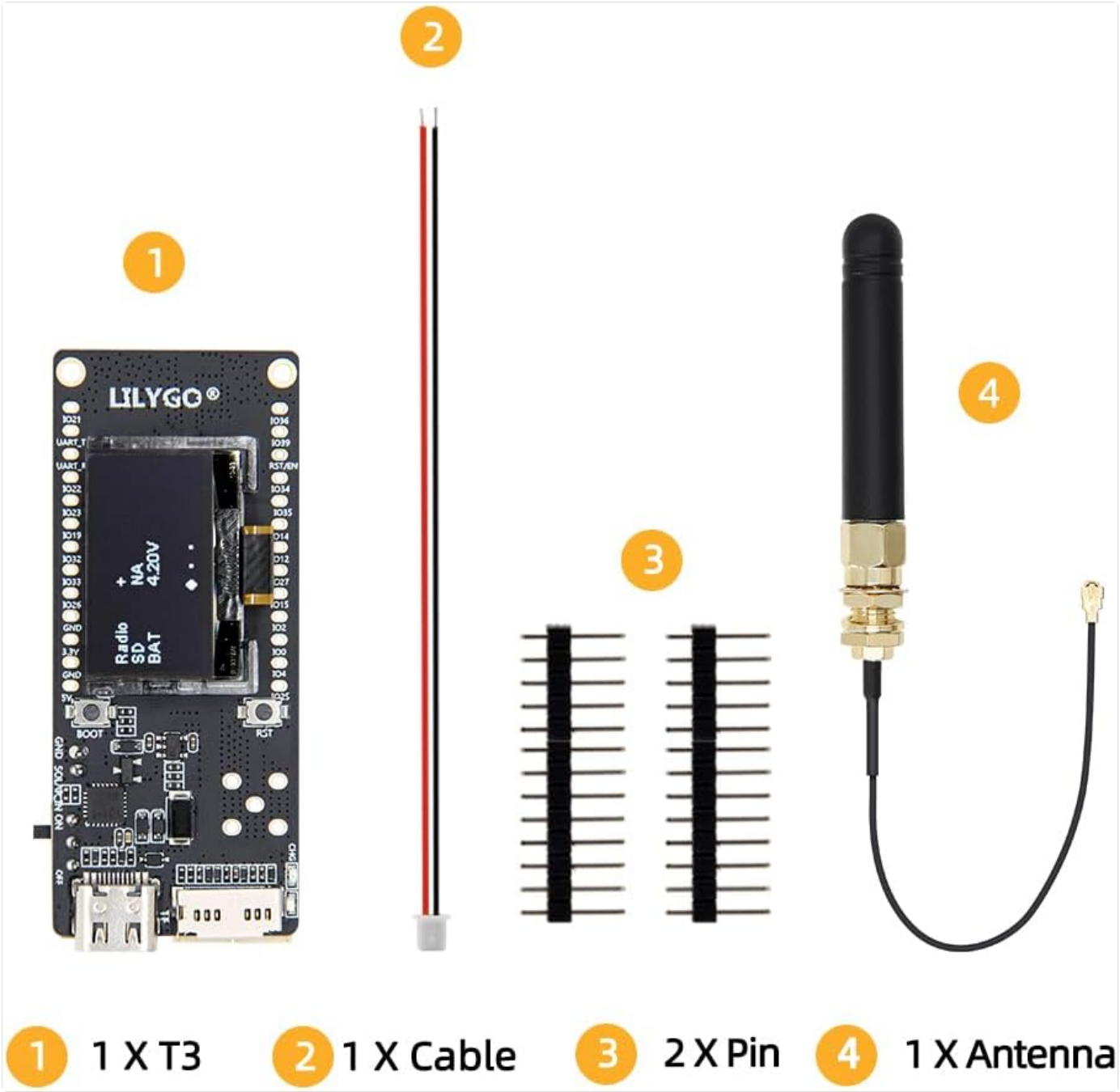


Image showing the LILYGO T3 V3.0 board, power cable, pin headers, and LoRa antenna included in the package.



Another view of the package contents, including the board, antenna, and connection cables, neatly arranged.

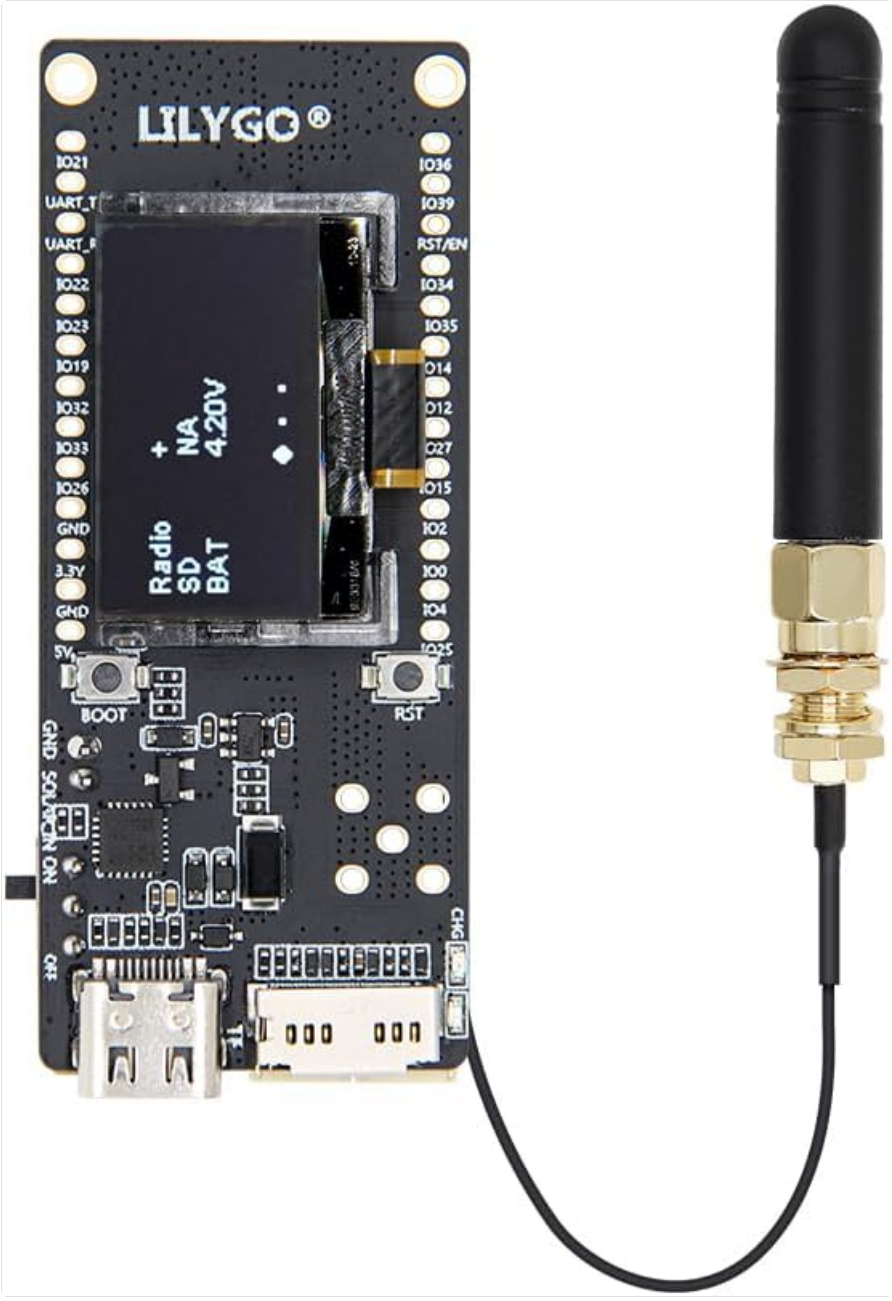
4. Product Overview

The LILYGO T3 V3.0 is a compact and powerful development board featuring the ESP32 microcontroller, a SX1276 LoRa transceiver, and a 0.96-inch OLED display. It is designed for rapid prototyping of IoT applications requiring long-range wireless communication.

4.1 Key Features

- **Wireless Protocols:** Wi-Fi, Bluetooth V4.2 BLE, LoRa (915Mhz).
- **Onboard Functions:** Reset and Boot Buttons, TF Card support.
- **Power Supply:** Supports USB and 3.7V Lipo battery with battery switch.
- **Display:** 0.96" SSD1306 I2C OLED (128x64 resolution).
- **LoRa Transceiver:** Low Power SX1276 LoRa Transceiver with +14dBm frequency bands.

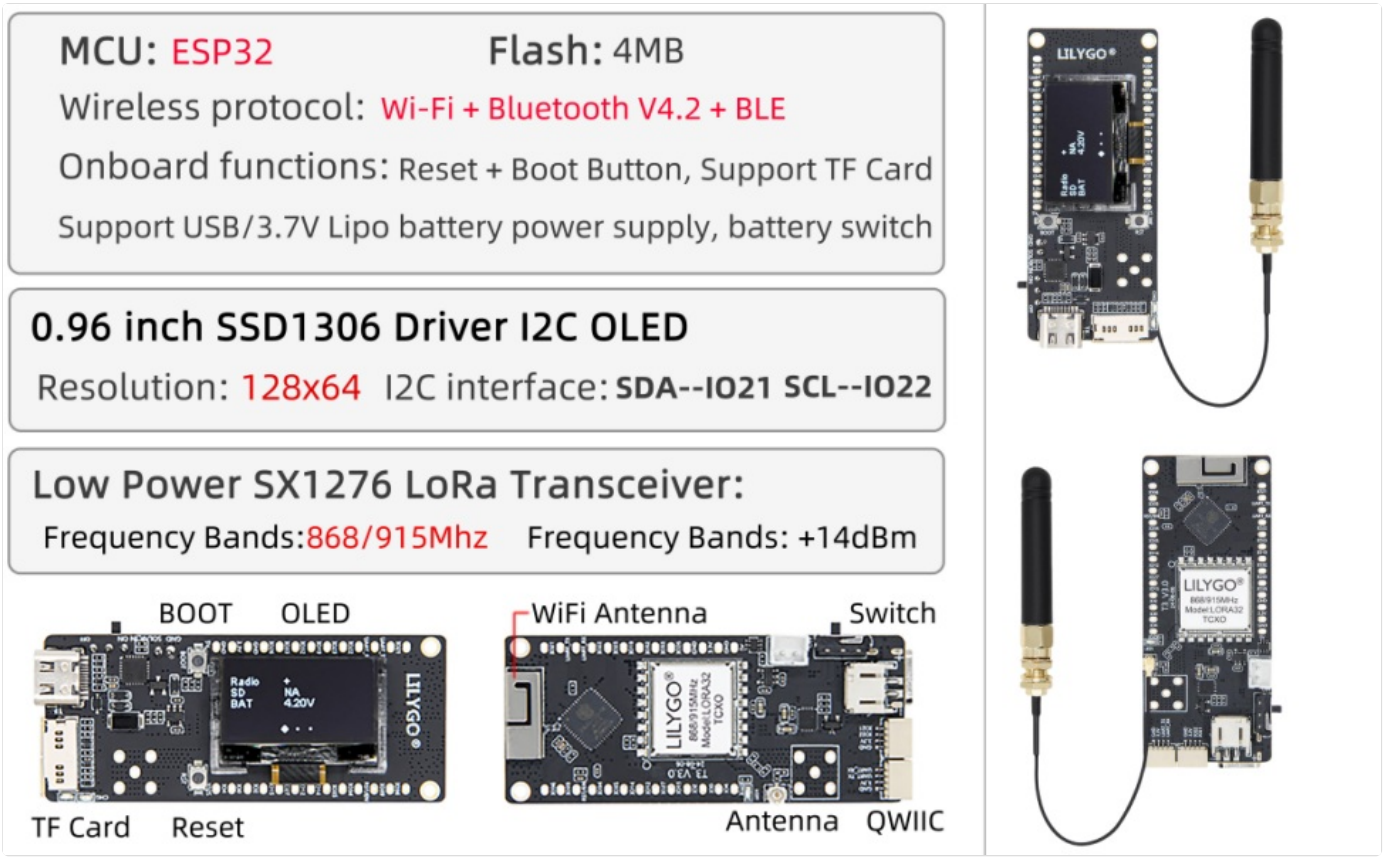
4.2 Board Layout and Components



Front view of the LILYGO T3 V3.0 board, showing the OLED display, USB port, and TF card slot.



Back view of the LILYGO T3 V3.0 board, highlighting the ESP32 chip and LoRa module.



Detailed pinout diagram for the LILYGO T3 V3.0 board, showing GPIOs, power pins, and peripheral connections.

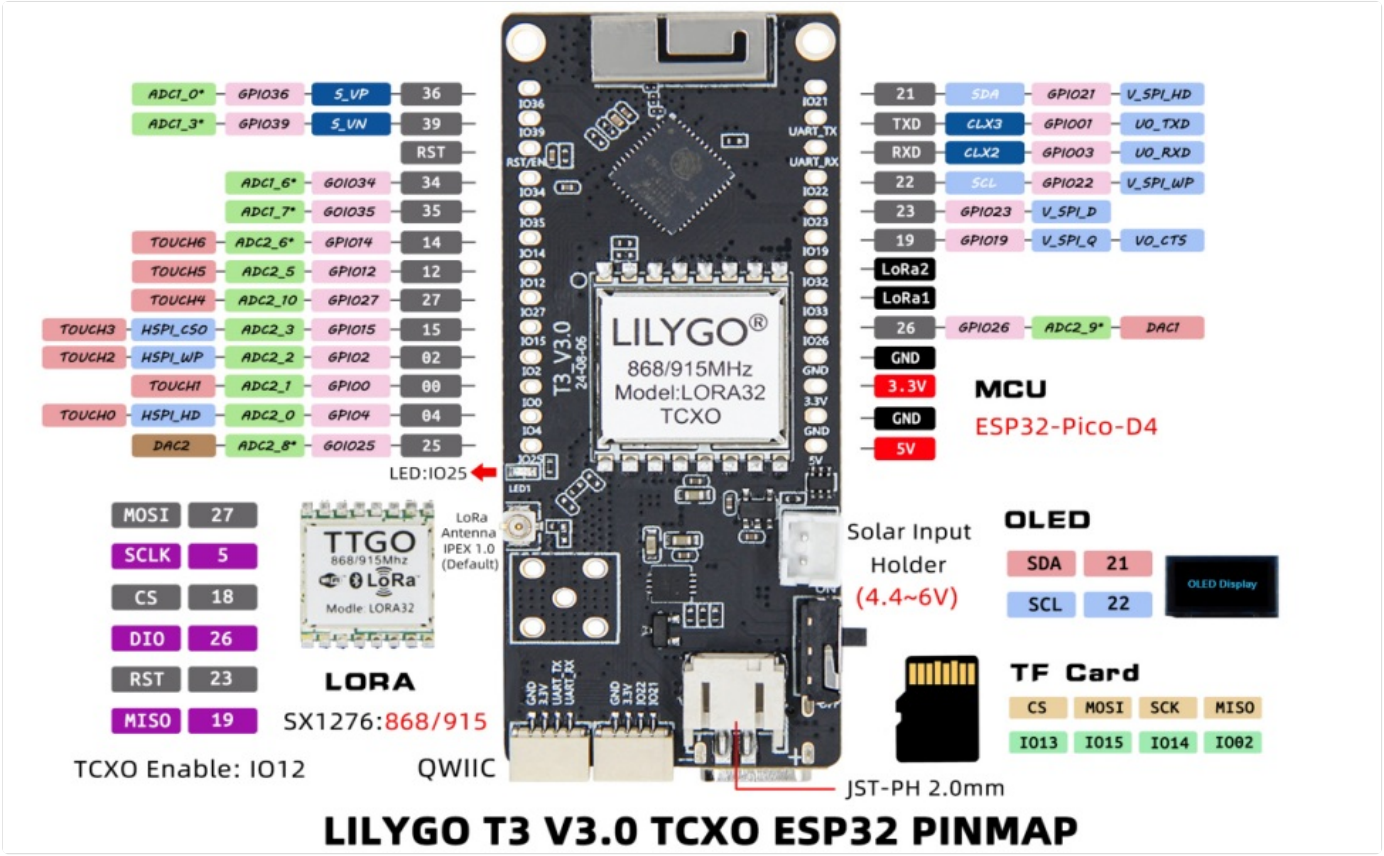


Diagram illustrating key features and components of the LILYGO T3 V3.0 board, including MCU, wireless protocols, and onboard functions.

5. Setup

This section outlines the basic steps to get your LILYGO T3 V3.0 board ready for development.

1. **Connect Antenna:** Carefully screw the provided LoRa antenna onto the IPEX connector on the board. Ensure it is securely fastened but do not overtighten.
2. **Power Supply:**
    - **USB Power:** Connect the board to your computer using a USB cable. This will also provide a serial connection for programming.
    - **Battery Power:** If using a 3.7V Lipo battery, connect it to the JST-PH 2.0mm battery connector. Ensure the battery switch is in the 'ON' position.
3. **Install Drivers:** Depending on your operating system, you may need to install USB-to-serial drivers (e.g., CP210x or CH340G) 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.
    - Install necessary libraries for LoRa, OLED, and other peripherals (e.g.,LoRa library, U8g2 library for OLED).

6. Operating Instructions

The LILYGO T3 V3.0 board is programmable and operates based on the firmware uploaded to it. Here are general steps for programming and basic operation:

1. **Connect to Computer:** Ensure the board is connected to your computer via USB.
2. **Select Board and Port:** In your IDE (e.g., Arduino IDE), select "ESP32 Dev Module" or similar from the board manager and choose the correct COM port for your board.
3. **Upload Sketch:** Write or load an example sketch (e.g., a basic LoRa sender/receiver, or an OLED display test). Click the "Upload" button in your IDE. You may need to press and hold the "BOOT" button on the board while uploading, then release it when the upload starts.
4. **Monitor Serial Output:** Open the Serial Monitor in your IDE to view debug messages or data from your program.
5. **LoRa Communication:** For LoRa applications, ensure both sender and receiver boards are configured with the same frequency (915Mhz for this model), spreading factor, bandwidth, and coding rate.
6. **TF Card Usage:** Insert a formatted TF card into the slot for data logging or storage as per your program's requirements.

Refer to the official LILYGO GitHub repositories for example code and detailed programming guides:

- LilyGo-LoRa-Series GitHub
- T-Display-S3 GitHub (for general ESP32 examples)

7. Maintenance

Proper maintenance ensures the longevity and reliable operation of your LILYGO T3 V3.0 board.

- **Cleaning:** Use a soft, dry cloth to clean the board. Avoid using liquids or abrasive cleaners.
- **Storage:** Store the board in a dry, anti-static environment when not in use. Keep it in its original packaging or an anti-static bag.
- **Firmware Updates:** Regularly check the official LILYGO GitHub for firmware updates or new examples that might improve performance or add features.
- **Component Inspection:** Periodically inspect the board for any loose connections, damaged components, or signs

of corrosion.

8. Troubleshooting

If you encounter issues with your LILYGO T3 V3.0 board, refer to the following common troubleshooting steps:

Problem	Possible Cause	Solution
Board not recognized by computer.	Missing USB-to-serial drivers; faulty USB cable; incorrect port selected.	Install necessary drivers (CP210x/CH340G). Try a different USB cable and port. Verify port selection in IDE.
Upload fails.	Incorrect board/port selection; BOOT button not pressed (if required); power issue.	Ensure correct board and port are selected. Press and hold BOOT button during upload. Check power supply.
OLED display not working.	Incorrect wiring (if external); wrong library or initialization code; display damaged.	Verify I2C connections (SDA, SCL). Ensure correct OLED library (U8g2) and initialization code are used.
LoRa communication issues.	Antenna not connected; frequency mismatch; incorrect LoRa parameters (SF, BW, CR); range issues.	Ensure antenna is securely connected. Verify both sender/receiver use 915Mhz and matching LoRa parameters. Test at closer range.

For more detailed troubleshooting, consult the LILYGO community forums or the official GitHub repositories.

9. Specifications

Detailed technical specifications for the LILYGO T3 V3.0 ESP32 LoRa Development Board (915Mhz):

Feature	Detail
MCU	ESP32-Pico-D4 (Processor Brand: Espressif)
Flash Memory	4MB
Wireless Protocols	Wi-Fi, Bluetooth V4.2 BLE
LoRa Transceiver	SX1276
LoRa Frequency	915Mhz
OLED Display	0.96" SSD1306 I2C OLED (128x64 resolution)
Power Supply	USB / 3.7V Lipo battery
Onboard Functions	Reset Button, Boot Button, TF Card Slot, Battery Switch
Operating System	Linux (compatible development environments)
Dimensions (Approx.)	Length: 66mm, Width: 27mm, Height: 13mm



Image showing the approximate dimensions of the LILYGO T3 V3.0 board: Length 66mm, Width 27mm, Height 13mm.

10. Warranty and Support

LILYGO products are designed for reliability and performance. For specific warranty information, please refer to the purchase platform or contact LILYGO directly through their official channels.
Support Resources:

- **Official LILYGO Website:** lilygo.cc
- **GitHub Repositories:** For code examples, schematics, and technical discussions:
  - github.com/Xinyuan-LilyGO/LilyGo-LoRa-Series
  - github.com/Xinyuan-LilyGO/T-Display-S3
- **Community Forums:** Search for online communities or forums dedicated to ESP32 and LoRa development for peer support and project ideas.

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Question

Example: How do I reset this device or fix this error?

Details

Model number, symptoms, what you tried, or the section of the manual you are using.

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