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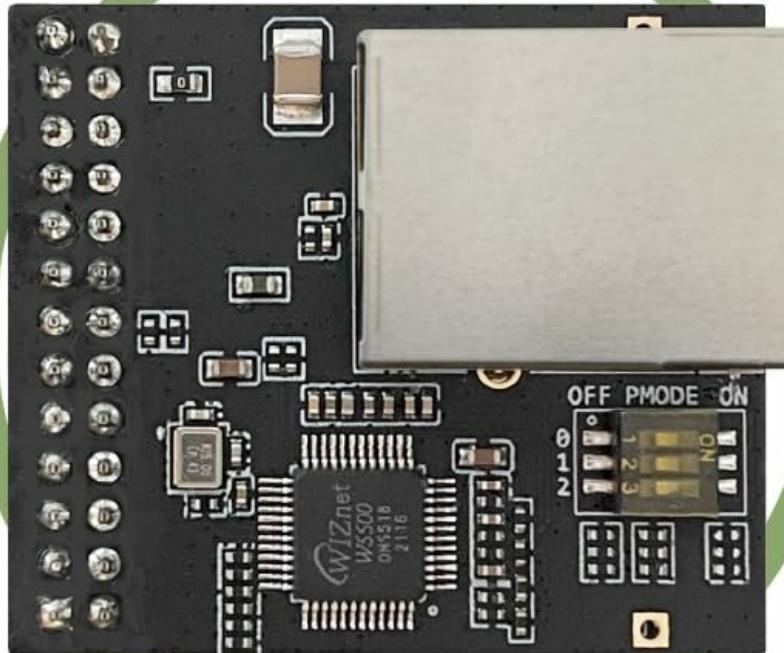
## Espressif ESP Thread Border Router/Zigbee Gateway

# Espressif ESP Thread Border Router/Zigbee Gateway Sub-Ethernet Board User Manual

## 1. INTRODUCTION

This document provides instructions for the Espressif ESP Thread Border Router/Zigbee Gateway Sub-Ethernet Board. This board is designed to integrate the ESP32-S3 System-on-Chip (SoC) and the ESP32-H2 Radio Co-Processor (RCP), facilitating the development of Thread Border Router and Zigbee Gateway products. It supports Thread 1.3 and the Matter application, offering features such as Bi-directional IPv6 connectivity, Service Discovery Delegate, Service Registration Server, Multicast Forwarding, NAT64, and a user-friendly Web GUI for configuration.

**Important Note:** This is a Sub Board and must be used in conjunction with a Main Board for full functionality. It supports the addition of daughter boards to expand its capabilities, such as an Ethernet interface (available separately), HMI, and Voice Control.



An image showing the Espressif ESP Thread Border Router/Zigbee Gateway Sub-Ethernet Board, highlighting its compact design and various connectors.

## 2. SETUP

To set up your ESP Thread Border Router/Zigbee Gateway Sub-Ethernet Board, follow these general steps. For detailed, up-to-date instructions, please refer to the official Espressif user guide:

- **Prerequisites:** Ensure you have the compatible Main Board and any necessary daughter boards (e.g., Ethernet interface) if you plan to expand functionality.
- **Physical Connection:** Carefully connect the Sub-Ethernet Board to the designated slot on your Main Board. Ensure all connectors are properly aligned and seated.
- **Power Supply:** Connect the Main Board to a suitable power source as per its specifications. The Sub-Ethernet Board will draw power from the Main Board.
- **Initial Configuration:** Access the device's Web GUI for initial network configuration. This typically involves connecting the Main Board to a computer via USB or Ethernet (if an Ethernet daughter board is installed) and navigating to a specific IP address in a web browser.

For comprehensive setup procedures, including software installation and network configuration, please visit

the official user guide: [Espressif Thread Border Router User Guide](#).

## 3. OPERATING THE DEVICE

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The ESP Thread Border Router/Zigbee Gateway Sub-Ethernet Board enables robust smart home and IoT connectivity. Once properly set up, it functions as a central hub for Thread and Zigbee networks.

### 3.1. Thread Border Router Functionality

As a Thread Border Router, the device facilitates communication between a Thread network and other IP-based networks (e.g., Wi-Fi, Ethernet). Key functions include:

- **Bi-directional IPv6 Connectivity:** Allows Thread devices to communicate with the internet and vice-versa.
- **Service Discovery Delegate:** Enables discovery of services within the Thread network by external devices.
- **Service Registration Server:** Registers services from the Thread network for external access.
- **Multicast Forwarding:** Routes multicast traffic between Thread and external networks.
- **NAT64:** Provides IPv4 connectivity to IPv6-only Thread devices.
- **Matter Application Support:** Complies with the Matter standard for interoperability across smart home devices.

### 3.2. Zigbee Gateway Functionality

As a Zigbee Gateway, the board allows Zigbee devices to connect and communicate with other networks, often bridging them to IP networks for broader control and integration.

### 3.3. Web GUI Configuration

The device features a user-friendly Web GUI for easy configuration and management. Access this interface via a web browser after connecting the device to your network. The GUI allows you to:

- Configure network settings.
- Manage Thread and Zigbee network parameters.
- Monitor device status and connected nodes.

## 4. MAINTENANCE

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Proper maintenance ensures the longevity and optimal performance of your Espressif Sub-Ethernet Board.

- **Environmental Conditions:** Operate the board within its specified temperature and humidity ranges. Avoid extreme conditions, direct sunlight, and moisture.
- **Cleaning:** Keep the board free from dust and debris. Use a soft, dry cloth for cleaning. Do not use liquid cleaners or solvents.
- **Firmware Updates:** Regularly check the Espressif website for firmware updates. Keeping the firmware updated can improve performance, add new features, and address security vulnerabilities.
- **Physical Handling:** Handle the board with care to avoid damaging components or connectors.

## 5. TROUBLESHOOTING

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If you encounter issues with your ESP Thread Border Router/Zigbee Gateway Sub-Ethernet Board, consider the following troubleshooting steps:

- **No Power:** Ensure the Main Board is properly connected to a power source and that the power indicator LED (if present) is illuminated.
- **No Network Connectivity:**
  - Verify all physical connections between the Sub-Ethernet Board, Main Board, and network cables (if applicable).
  - Check your router and internet connection.
  - Confirm network settings in the Web GUI are correct.
- **Cannot Access Web GUI:**
  - Ensure your computer is on the same network as the device.
  - Verify the device's IP address.
  - Try clearing your browser's cache or using a different browser.
- **Thread/Zigbee Devices Not Connecting:**
  - Check that the Thread or Zigbee network is active and configured correctly in the Web GUI.
  - Ensure devices are within range and in pairing mode.
  - Consult the specific device's manual for pairing instructions.
- **General Issues:** Try restarting the Main Board and the Sub-Ethernet Board.

If problems persist, refer to the official Espressif user guide or contact technical support.

## 6. SPECIFICATIONS

The following table outlines the key specifications for the Espressif ESP Thread Border Router/Zigbee Gateway Sub-Ethernet Board:

Feature	Specification
Model Name	ESP Thread Border Router/Zigbee Gateway
Processor	ESP32-S3 SoC, ESP32-H2 RCP
Operating System	FreeRTOS, Linux
Connectivity Technology	Ethernet (via daughter board), Bluetooth, Thread
Wireless Type	Infrared (as per product data, typically for remote control/sensing)
RAM	LPDDR4
Item Weight	1.94 ounces
Package Dimensions	5.98 x 4.29 x 2.17 inches
Included Components	Bluetooth, Thread (referring to supported protocols)
ASIN	B0C89J43LN

Feature	Specification
Date First Available	June 16, 2023

## 7. WARRANTY INFORMATION

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Espressif products are typically covered by a manufacturer's warranty against defects in materials and workmanship. Specific warranty terms, duration, and conditions may vary. Please refer to the official Espressif website or the documentation included with your Main Board for detailed warranty information. Keep your proof of purchase for warranty claims.

## 8. SUPPORT

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For technical assistance, business inquiries, or further questions regarding your Espressif ESP Thread Border Router/Zigbee Gateway Sub-Ethernet Board, please contact Espressif Systems directly.

**Technical and Business Support:**

- **Email:** [sales@espressif.com](mailto:sales@espressif.com)
- **Official User Guide:** <https://docs.espressif.com/projects/esp-thread-br/en/latest/>

When contacting support, please be prepared to provide your product model, ASIN (B0C89J43LN), and a detailed description of the issue.