LILYGO T-Zigbee T-U2T Kit

LILYGO T-Zigbee Dual MCU Development Board ESP32-C3 TLSR8258 Instruction Manual

Model: T-Zigbee T-U2T Kit

1. Introduction

The LILYGO T-Zigbee Dual MCU Development Board is an advanced module designed for Internet of Things (IoT) applications, featuring both an ESP32-C3 and a TLSR8258 ultra-low-power chip. This combination provides robust connectivity options including Wi-Fi, Bluetooth Low Energy (BLE), and Zigbee, making it suitable for smart control systems and various embedded projects. This manual provides essential information for setting up, operating, and maintaining your T-Zigbee development board.

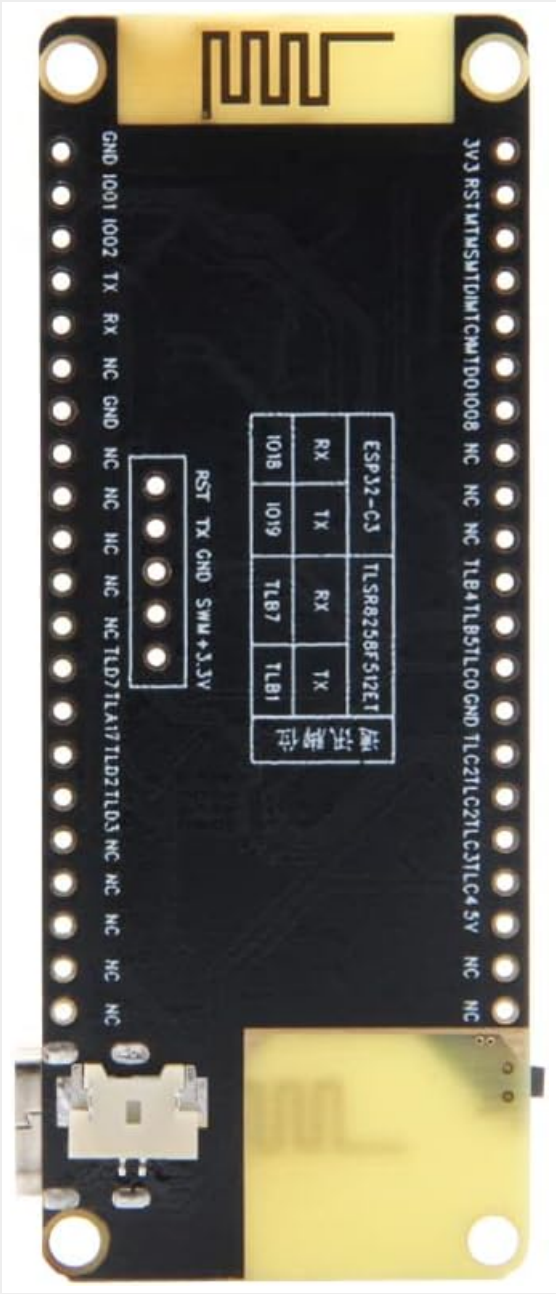


Figure 1: LILYGO T-Zigbee Dual MCU Development Board (Top View)

2. Setup and Initial Programming

To begin using your LILYGO T-Zigbee development board, follow these steps for initial setup and program uploading.

2.1 Package Contents

Ensure all components are present in your T-Zigbee T-U2T Kit:

- T-Zigbee V1.1 Development Board
- PH2.54 Pin Headers (1*21 Pin)
- Ultra-Thin 1.25mm 2p Cable
- T-U2T Downloader (USB to TTL)

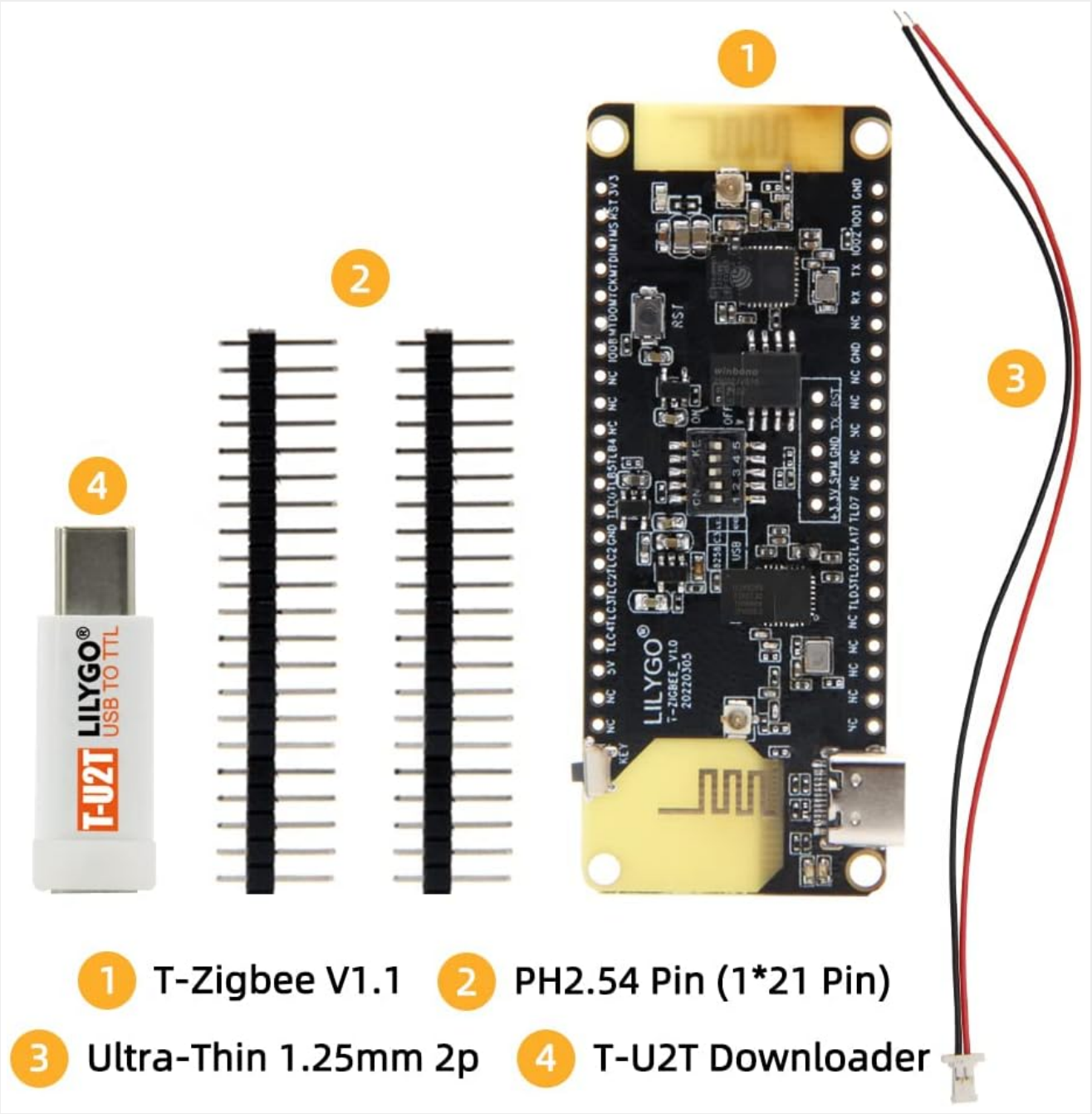


Figure 2: T-Zigbee T-U2T Kit Components. Includes the T-Zigbee board, pin headers, a 2-pin cable, and the T-U2T Downloader.

2.2 Connecting the T-U2T Downloader

The LILYGO T-Zigbee board requires the dedicated T-U2T automatic downloader for program uploading. Direct programming via the board's built-in USB-C port is not supported for firmware flashing. Connect the T-U2T downloader to your computer's USB port and then to the T-Zigbee board as instructed in the burning guide.



Figure 3: Adjusting the Dial Switch for Programming. This switch is used to select the operating mode or programming mode.

For detailed instructions on burning firmware, refer to the official guide: zbhci.readthedocs.io/en/latest/user-guide/burning.html.

3. Operating the T-Zigbee Board

The T-Zigbee board features two main microcontrollers (MCUs) that can operate in different modes.

3.1 Dual MCU Functionality

- **MCU 1: TLSR8258** - An ultra-low-power chip supporting BLE 5 Mesh, Zigbee, RF4CE, Thread, 6LoWPAN, HomeKit, ANT 2.4GHz proprietary standard, and a 6-channel PWM function. It includes programmable LEDs (Red LED: PD04, Green LED: PA00).
- **MCU 2: ESP32-C3** - Equipped with a RISC-V processor SoC, supporting 2.4 GHz Wi-Fi and Bluetooth 5 (LE). It operates at a main frequency of 160 MHz with built-in 400 KB SRAM and 384 KB ROM. It includes programmable buttons (IO02, Blue LED: IO03).

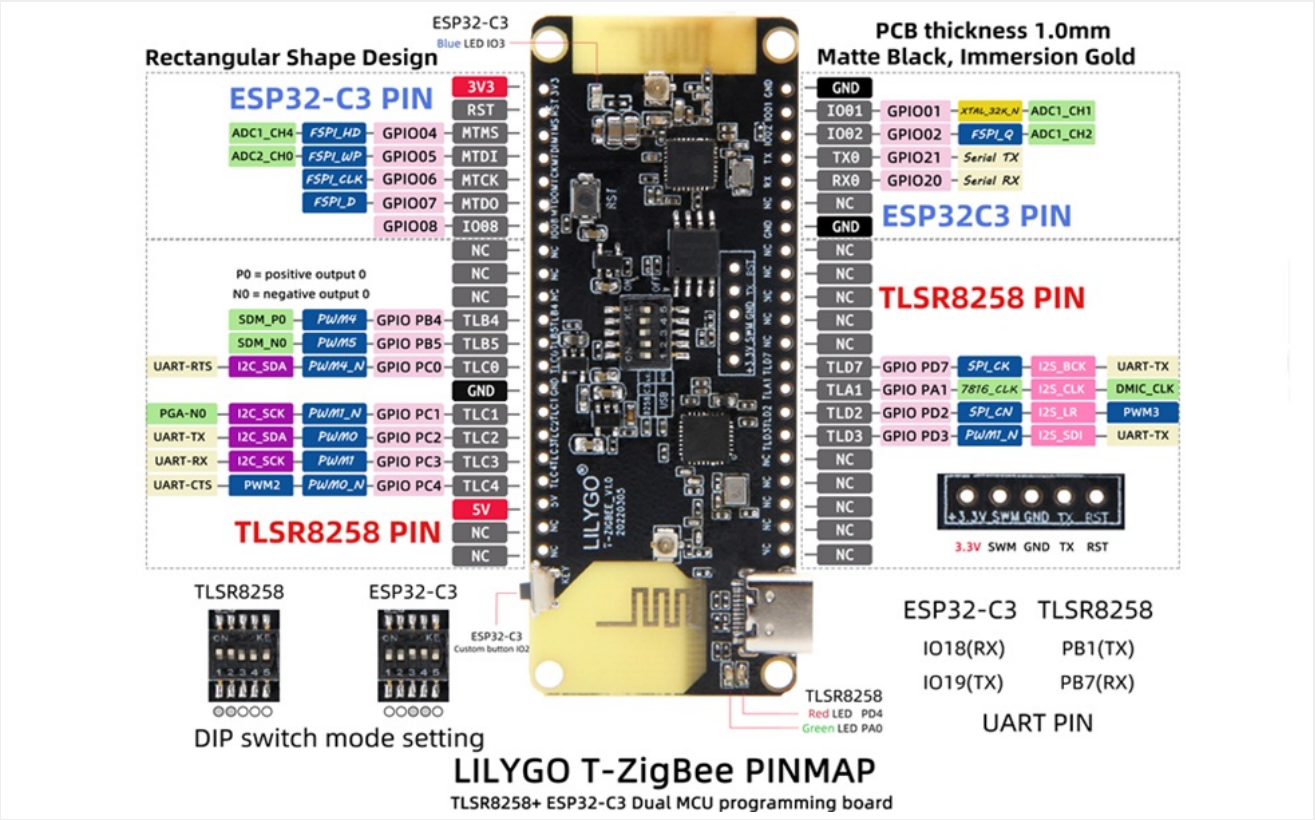


Figure 4: T-Zigbee Specifications Overview and Working Mode Switch. This diagram illustrates the capabilities of each MCU and how to switch between their operating modes using the DIP switch.

3.2 Working Mode Selection

The board features a DIP switch to select the active MCU or working mode. Refer to the pinout diagram and official documentation for specific switch configurations for TLSR8258 Work Mode and ESP32-C3 Work Mode.

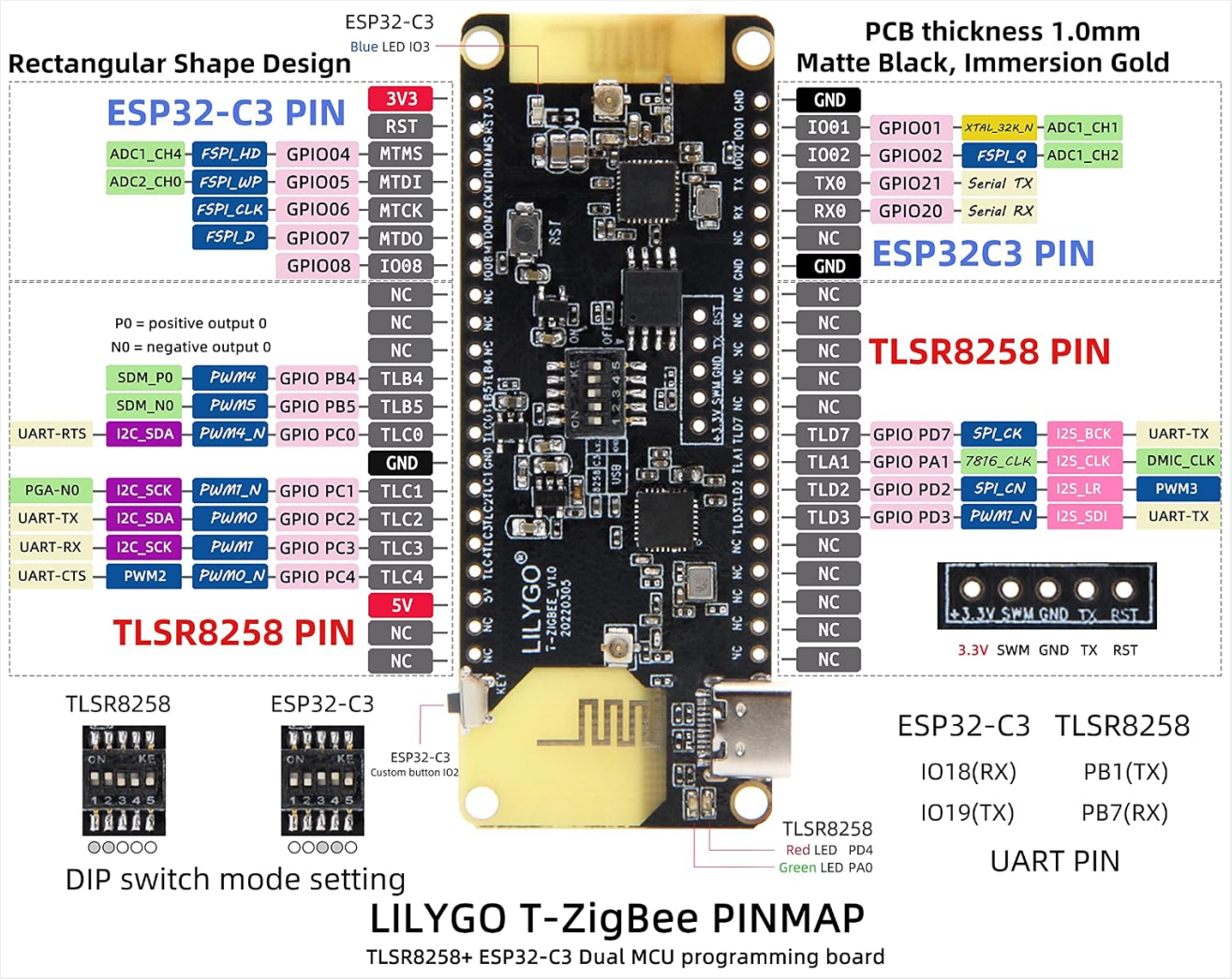


Figure 5: LILYGO T-Zigbee Pinout Diagram. Details the pin assignments for both the ESP32-C3 and TLSR8258 MCUs, including GPIOs, power, and communication interfaces.

4. Maintenance

Proper handling and storage will ensure the longevity of your LILYGO T-Zigbee development board.

- **Storage:** Store the board in an anti-static bag when not in use to prevent electrostatic discharge (ESD) damage. Keep it in a dry environment, away from extreme temperatures.
- **Handling:** Avoid touching the electronic components directly. Always handle the board by its edges.
- **Cleaning:** If necessary, gently clean the board with a soft, dry brush or compressed air to remove dust. Do not use liquids or abrasive materials.
- **Power Supply:** Ensure you use a stable and appropriate power supply (3.3V or 5V as indicated on the board) to prevent damage.

5. Troubleshooting

This section addresses common issues you might encounter with the LILYGO T-Zigbee board.

- **Board Not Programming:**
  - Ensure you are using the **T-U2T automatic downloader** provided in the kit. The board's built-in USB-C port is for power and serial communication, not for direct firmware flashing.
  - Verify that the T-U2T downloader is correctly connected to both your computer and the T-Zigbee board.
  - Check the burning guide for specific steps and driver installations.
- **USB Connectivity Issues:**
  - Some users have reported issues with USB-C to USB-C cables. If experiencing connectivity problems, try using a **USB-A to USB-C cable**.
  - Ensure your computer's USB drivers are up to date.
- **No Power/LEDs Not Lighting Up:**
  - Check your power source. Ensure it provides stable 5V power.
  - Verify all connections are secure.
- **MCU Not Responding:**
  - Confirm the DIP switch settings are correct for the desired MCU (TLSR8258 or ESP32-C3) and operating mode.
  - Perform a hard reset by disconnecting and reconnecting power.

6. Specifications

Key technical specifications for the LILYGO T-Zigbee Dual MCU Development Board:

Feature	Detail
Brand	LILYGO
Model Name	LILYGO T-Zigbee Dual MCU Development Board ESP32-C3 TLSR8258
MCU 1	TLSR8258 (Ultra Low Power, supports BLE 5 Mesh, Zigbee, RF4CE, Thread, 6LoWPAN, HomeKit, ANT 2.4GHz)
MCU 2	ESP32-C3 (Rev3, RISC-V processor, supports 2.4 GHz Wi-Fi, Bluetooth 5 LE)
ESP32-C3 Frequency	160 MHz
ESP32-C3 Memory	400 KB SRAM, 384 KB ROM
Wireless Type	Bluetooth, Wi-Fi, Zigbee
Connectivity Technology	I2C, Wi-Fi
Operating System	FreeRTOS
Included Components	T-Zigbee Dual MCU Development Board, T-U2T automatic downloader, T-Zigbee T-U2T Kit accessories
Item Weight	1.44 ounces
Package Dimensions	4.65 x 4.53 x 1.57 inches

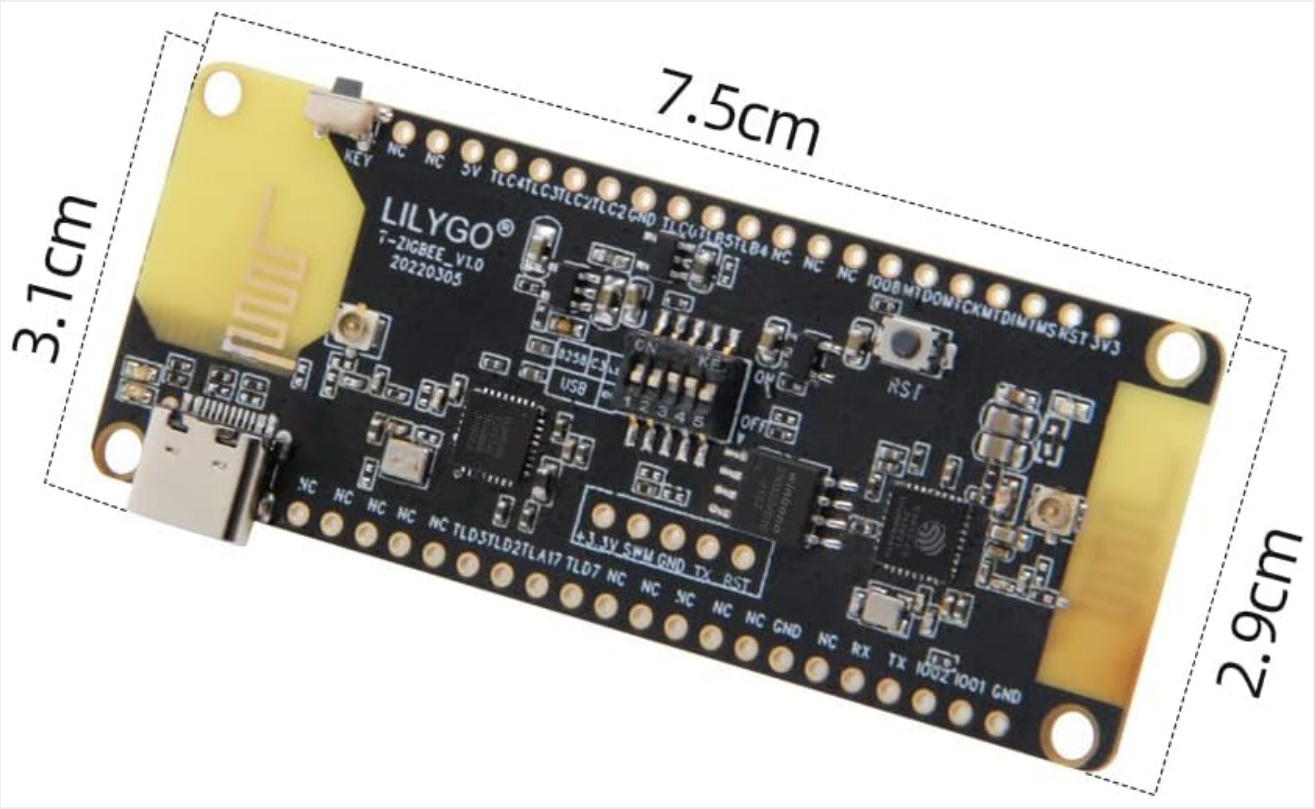


Figure 6: LILYGO T-Zigbee Board with Dimensions. The board measures approximately 7.5cm in length, 3.1cm at its widest point, and 2.9cm at its narrowest point.

7. Warranty and Support

For warranty information, technical support, and further resources, please refer to the official LILYGO channels.

- **Official Documentation and GitHub:** The most up-to-date information, examples, and community support can be found on the LILYGO GitHub repository: github.com/Xinyuan-LilyGO/T-ZigBee.
- **Burning Guide:** For detailed programming instructions, visit: zbhci.readthedocs.io/en/latest/user-guide/burning.html.
- **Manufacturer Contact:** For specific product inquiries or warranty claims, please contact LILYGO directly through their official website or authorized distributors.