LILYGO T-Embed CC1101 Plus

LILYGO T-Embed CC1101 Plus ESP32-S3 Development Board User Manual

Model: T-Embed CC1101 Plus | Brand: LILYGO

1. INTRODUCTION

The LILYGO T-Embed CC1101 Plus is a versatile development board designed for various applications requiring robust wireless communication and processing capabilities. It integrates an ESP32-S3 dual-core microprocessor, a 1.9-inch ST7789V IPS TFT LCD, and multiple wireless transceivers including Wi-Fi, BLE 5, nRF24L01, CC1101, and PN532 NFC. This manual provides essential information for setting up, operating, maintaining, and troubleshooting your device.

2. PRODUCT OVERVIEW AND FEATURES

The LILYGO T-Embed CC1101 Plus development board offers a compact design with powerful features for embedded projects and wireless communication. Key components and features are detailed below:

- **Microcontroller Unit (MCU):** ESP32-S3 Dual-core LX7 microprocessor for high-performance processing.
- **Wireless Connectivity:** Integrated 2.4 GHz Wi-Fi, BLE 5, nRF24L01 Worldwide 2.4GHZ ISM, CC1101 Low-Power Sub-1 GHz RF Transceiver, and PN532 NFC (13.56MHz) HF transceiver module.
- **Display:** 1.9 inch ST7789V IPS TFT LCD with a resolution of 170(H)RGB x 320(V) for clear visual feedback.
- **Memory:** 16MB Flash and 8MB PSRAM.
- **Onboard Functions:** Includes Boot and Reset buttons, IR Transceiver, and Battery Detection (IO04).
- **Power Supply:** Supports dual power supply via USB or a built-in 1300mAh Li-Po Battery.

Figure 2.1: Front view of the LILYGO T-Embed CC1101 Plus Development Board.

Figure 2.2: The LILYGO T-Embed CC1101 Plus displaying 'Sub-G' and 'WS2812' on its 1.9-inch IPS TFT LCD screen.

Figure 2.3: Internal view of the device, showing the main circuit board, battery, and antenna connections.

Figure 2.4: Detailed diagram highlighting key features and components such as the LCD, IR transceiver, microphone, boot button, speaker slot, JST GH 1.25mm connector, nRF24L01, and built-in battery.

Figure 2.5: Pinmap diagram illustrating the connections for the ESP32-S3, CC1101, LCD, PN532, microphone, and nRF24L01 modules.
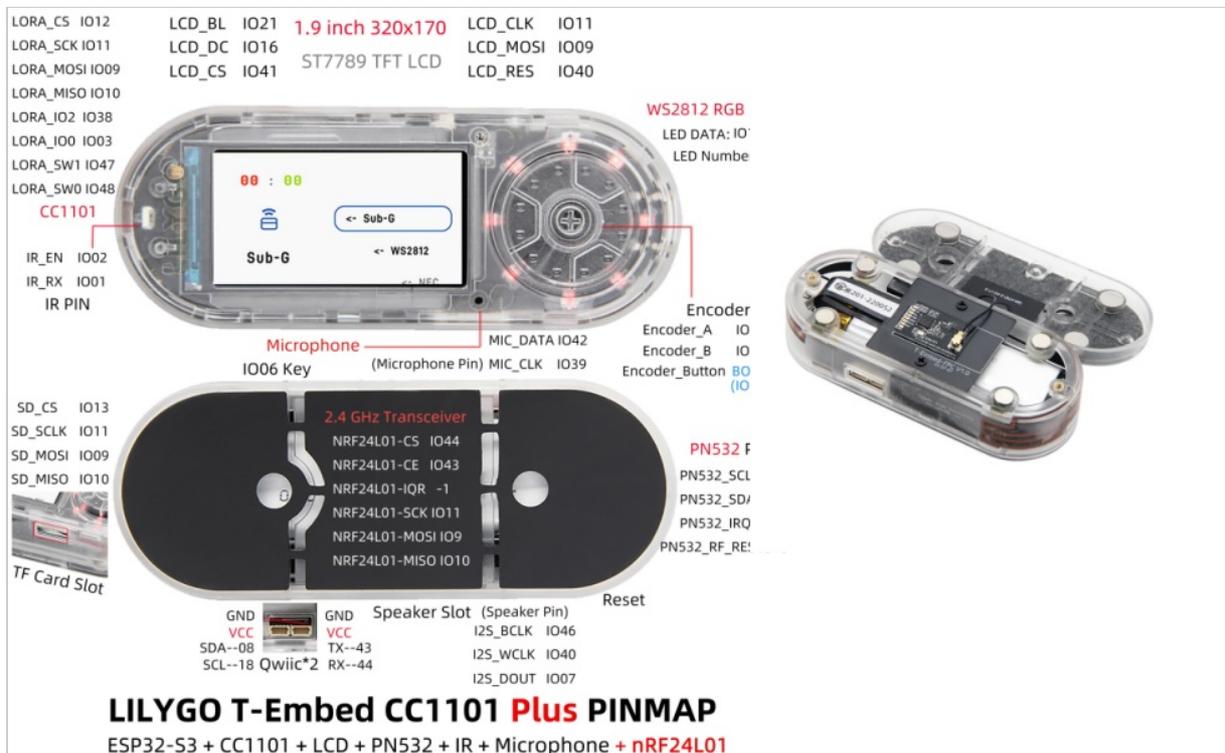
Figure 2.6: Diagram indicating the locations of the IR TX/RX, CC1101, NFC, and WiFi/Bluetooth antennas on the device.

3. SETUP

Follow these steps for initial setup of your LILYGO T-Embed CC1101 Plus:

1. **Unboxing:** Carefully remove the device and all accessories from the packaging. Verify that all components listed in the 'What's in the Box' section are present.
2. **Initial Charge:** Connect the device to a power source using a compatible USB cable. Allow the device to charge fully before first use. The charging indicator (if available) will show charging status.
3. **Firmware Installation/Update:** The device may come with basic firmware. For advanced functionalities or specific applications, you may need to flash custom firmware. Refer to the official GitHub repository for examples and instructions: github.com/Xinyuan-LilyGO/T-Embed-CC1101/tree/master/examples/nrf2401.
4. **SD Card Insertion (Optional):** If your application requires external storage, insert a compatible microSD card into the designated slot. Note that some firmware versions may have limitations on SD card size (e.g., up to 32GB for certain open-source firmwares).

Figure 3.1: The LILYGO T-Embed CC1101 Plus shown with its packaging and included accessories, such as screws and an NFC electronic tag.

4. OPERATING INSTRUCTIONS

Operating the LILYGO T-Embed CC1101 Plus involves interacting with its physical buttons, display, and various wireless modules. Specific operations will depend on the firmware loaded onto the device.

- **Power On/Off:** Locate the power button (often labeled 'Boot' or 'RST' on the board, or an external button if provided by the enclosure). Press and hold to power on or off.
- **Navigation:** Use the integrated joystick or directional buttons (if present) to navigate through menus on the 1.9-inch IPS TFT LCD.
- **Wireless Functions:** Depending on the firmware, you can configure and utilize Wi-Fi, BLE, nRF24L01, CC1101, and NFC for various communication tasks. Refer to your specific firmware documentation for detailed usage of these modules.
- **Microphone:** The integrated microphone allows for audio input, which can be processed by the ESP32-S3 for applications like voice commands or audio analysis.
- **IR Transceiver:** Use the infrared transceiver for sending and receiving IR signals, enabling control of IR-

compatible devices.

5. MAINTENANCE

Proper maintenance ensures the longevity and optimal performance of your LILYGO T-Embed CC1101 Plus.

- **Cleaning:** Use a soft, dry cloth to clean the device's exterior. Avoid using liquid cleaners or solvents, which can damage components.
- **Battery Care:** To prolong battery life, avoid fully discharging the device frequently. Store the device in a cool, dry place when not in use for extended periods.
- **Storage:** Store the device in its original packaging or a protective case to prevent physical damage and exposure to dust or moisture.
- **Firmware Updates:** Regularly check the official LILYGO GitHub repository for firmware updates to ensure you have the latest features and bug fixes.

6. TROUBLESHOOTING

This section addresses common issues you might encounter with your LILYGO T-Embed CC1101 Plus.

- **Device Not Powering On:**

  - Ensure the device is fully charged. Connect it to a power source and wait for a few minutes.
  - Verify that the power button is being pressed correctly.

- **Connectivity Issues (Wi-Fi/BLE/RF):**

  - Check your firmware settings to ensure the wireless modules are enabled and configured correctly.
  - Ensure the device is within range of the intended network or other devices.
  - Verify that antennas are properly connected internally (refer to Figure 2.6 for antenna locations).

- **Display Not Working:**

  - Restart the device.
  - Ensure the display ribbon cable is securely connected to the main board (if you have opened the device for inspection).

- **Firmware Upload Failure:**

  - Ensure you are using the correct drivers for your operating system.
  - Verify that the USB cable is functioning correctly and is securely connected.
  - Follow the specific flashing instructions provided with your chosen firmware.

7. SPECIFICATIONS

Detailed technical specifications for the LILYGO T-Embed CC1101 Plus:

Feature	Detail
Brand	LILYGO
Model Name	T-Embed CC1101 Plus
Connectivity Technology	Wi-Fi, BLE, nRF24L01 Worldwide 2.4GHZ ISM
Included Components	User Manual

Feature	Detail
Operating System	Linux (compatible)
Processor Brand	Espressif
Compatible Devices	Computers (PCs, laptops), nRF24L01 devices, Microcontrollers
RAM Memory Technology	LPDDR4
Processor Count	2 (Dual-core LX7 microprocessor)
Total USB Ports	1
UPC	717382831442
Model Number	T-Embed CC1101 Plus
Manufacturer	LILYGO
ASIN	B0FMFD54K3
GTIN	717382831442

8. WARRANTY AND SUPPORT

LILYGO is committed to providing quality products and support. While specific warranty details are not provided in this manual, if you have any questions or suggestions regarding the LILYGO T-Embed CC1101 Plus, please feel free to contact LILYGO customer service. They will endeavor to answer your questions as soon as possible.