LILYGO T-Internet

LILYGO T-Internet ESP32 Module User Manual

Model: T-Internet

1. Product Overview

The LILYGO T-Internet ESP32 module is a versatile development board designed for Internet of Things (IoT) applications, featuring an ESP32 microcontroller, Ethernet connectivity, and slots for SIM and TF cards. It integrates various bus interfaces and wireless communication capabilities for flexible project development.

Key Features:

- **Microcontroller:** ESP32-WROVER-E
- **USB to TTL Chip:** CH9102 for reliable serial communication
- **Bus Interfaces:** UART, SPI, I2C, CAN, I2S, SDIO
- **Wireless Connectivity:** Wi-Fi (802.11 b/g/n), BLE V4.2
- **Onboard Components:** RST and BOOT buttons, WS2812 RGB LED (GPIO12)
- **Storage & Communication:** SIM card slot, TF card slot, Type-C connector
- **Ethernet:** LAN8720 Ethernet Network Port

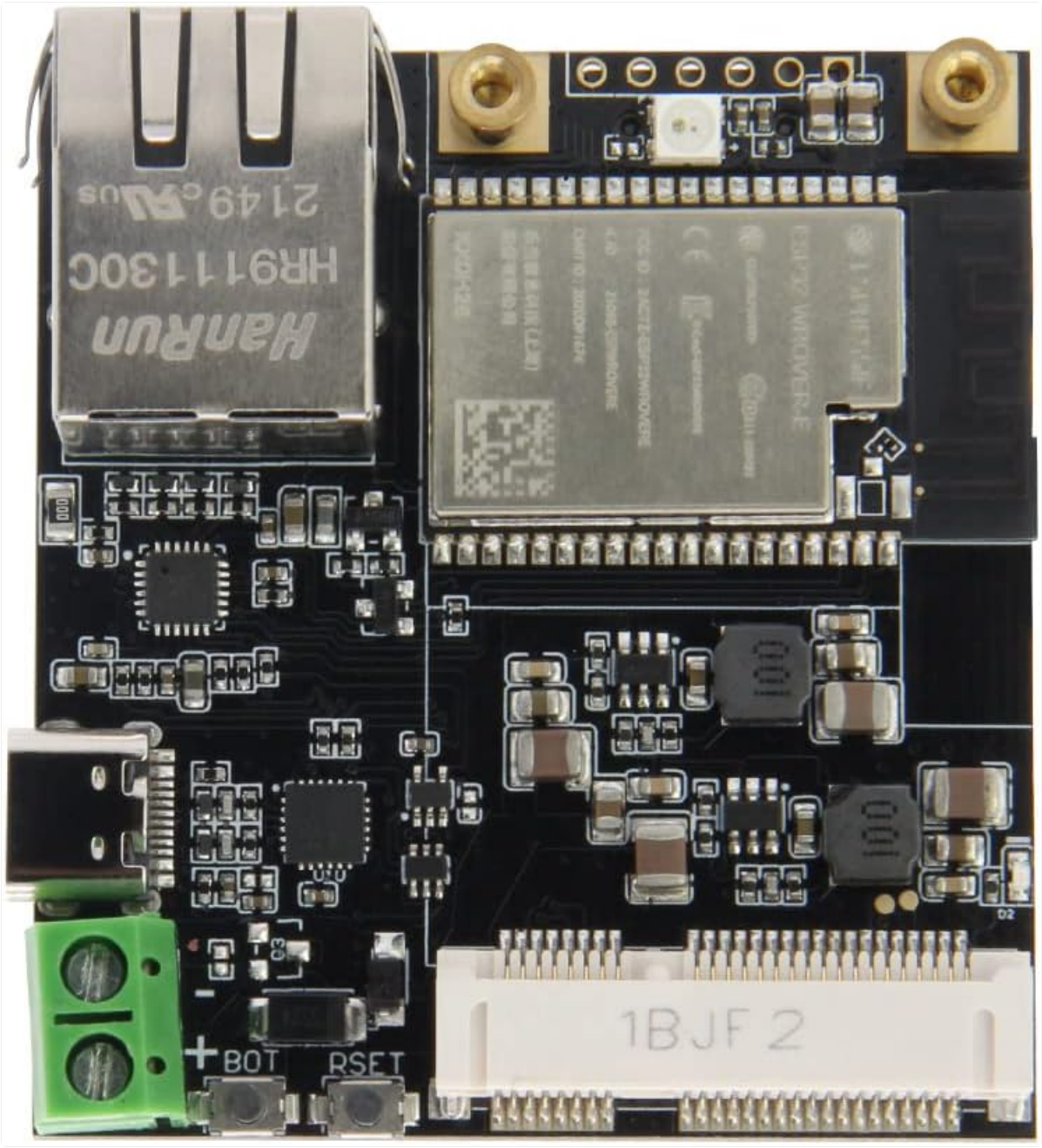

Figure 1: Top view of the LILYGO T-Internet ESP32 module, showing the ESP32-WROVER-E chip, Ethernet port, and various components.

2. Setup Guide

2.1 Power Supply

Connect a DC 5-12V power source to the module via the Type-C USB connector. Ensure the power supply provides stable voltage within the specified range.

2.2 Driver Installation

The module uses a CH9102 USB to TTL chip. Before connecting to your computer for programming, you may need to install the appropriate drivers for your operating system. Drivers are typically available on the manufacturer's website or through common CH9102 driver packages.

2.3 SIM and TF Card Insertion

The module includes slots for a SIM card and a TF (MicroSD) card. Carefully insert the cards into their respective slots on the underside of the board, ensuring correct orientation. Refer to Figure 2 for slot locations.

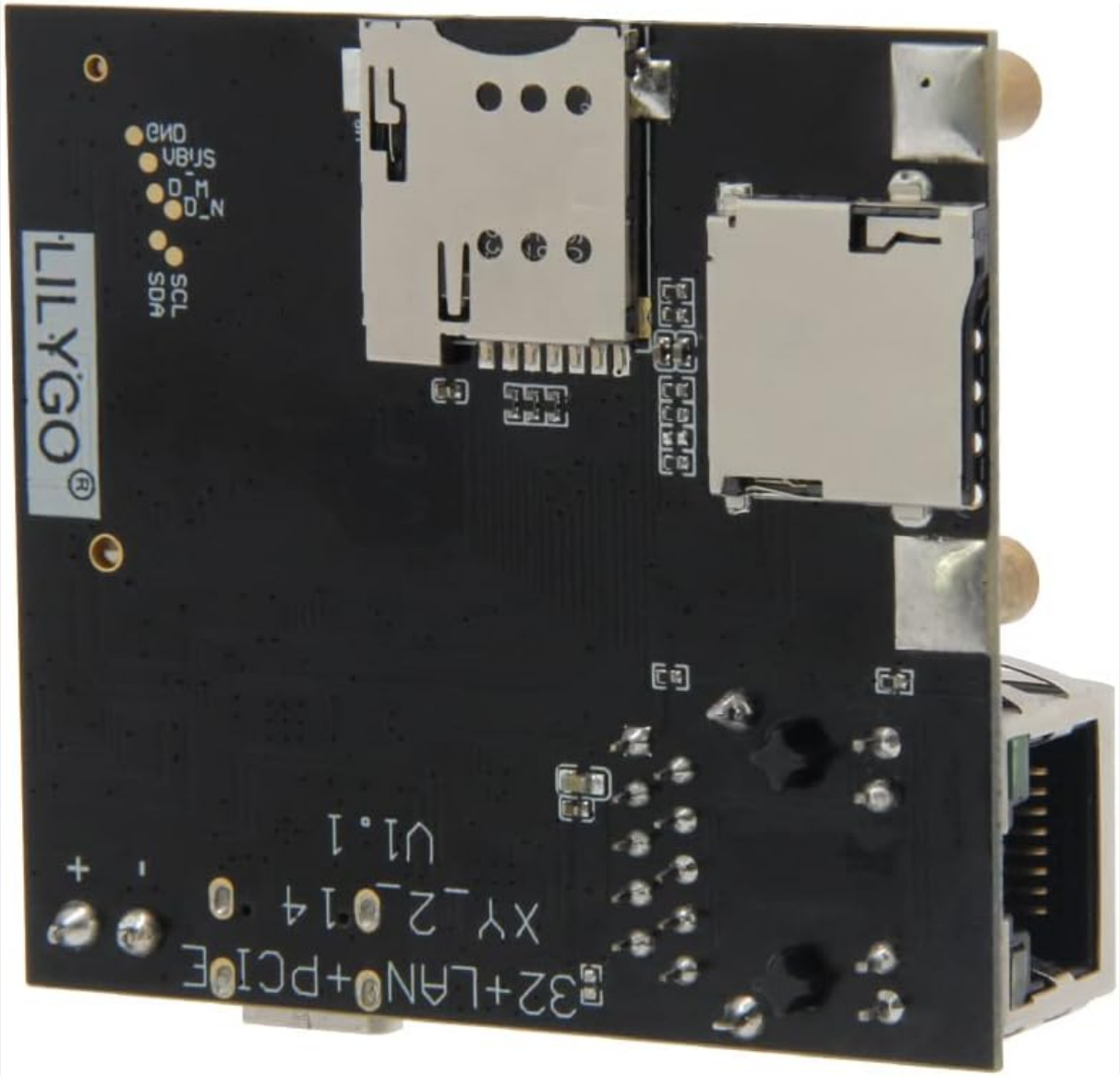

Figure 2: Bottom view of the module, highlighting the SIM card and TF card slots.

2.4 T-PCIE Module Integration

The LILYGO T-Internet module supports various LILYGO T-PCIE modules for extended functionality. Align the T-PCIE module with the dedicated connector on the T-Internet board and gently press to secure it. Ensure proper alignment to avoid damage.

3. Operating Instructions

3.1 Basic Operation

- **Power On:** After connecting the power supply, the module will power on.
- **Reset Button (RST):** Press this button to restart the ESP32 microcontroller.
- **Boot Button (BOOT):** This button is typically used to put the ESP32 into bootloader mode for flashing new firmware. It is usually pressed while holding RST, then releasing RST, then releasing BOOT.
- **WS2812 RGB LED:** An addressable RGB LED is connected to GPIO12, allowing for visual feedback in your applications.

3.2 Network Connectivity

- **Ethernet:** Connect an Ethernet cable to the LAN8720 port for wired network access.
- **Wi-Fi:** Utilize the ESP32's integrated Wi-Fi (802.11 b/g/n) for wireless network communication.

- **Bluetooth:** The module supports BLE V4.2 for short-range wireless communication.

3.3 Programming and Development

The LILYGO T-Internet ESP32 module can be programmed using various development environments, including the Arduino IDE with ESP32 board support, or the ESP-IDF (Espressif IoT Development Framework). Detailed programming examples and libraries are available on the official LILYGO GitHub repository.
GitHub Repository: github.com/Xinyuan-LilyGO/T-Internet-COM

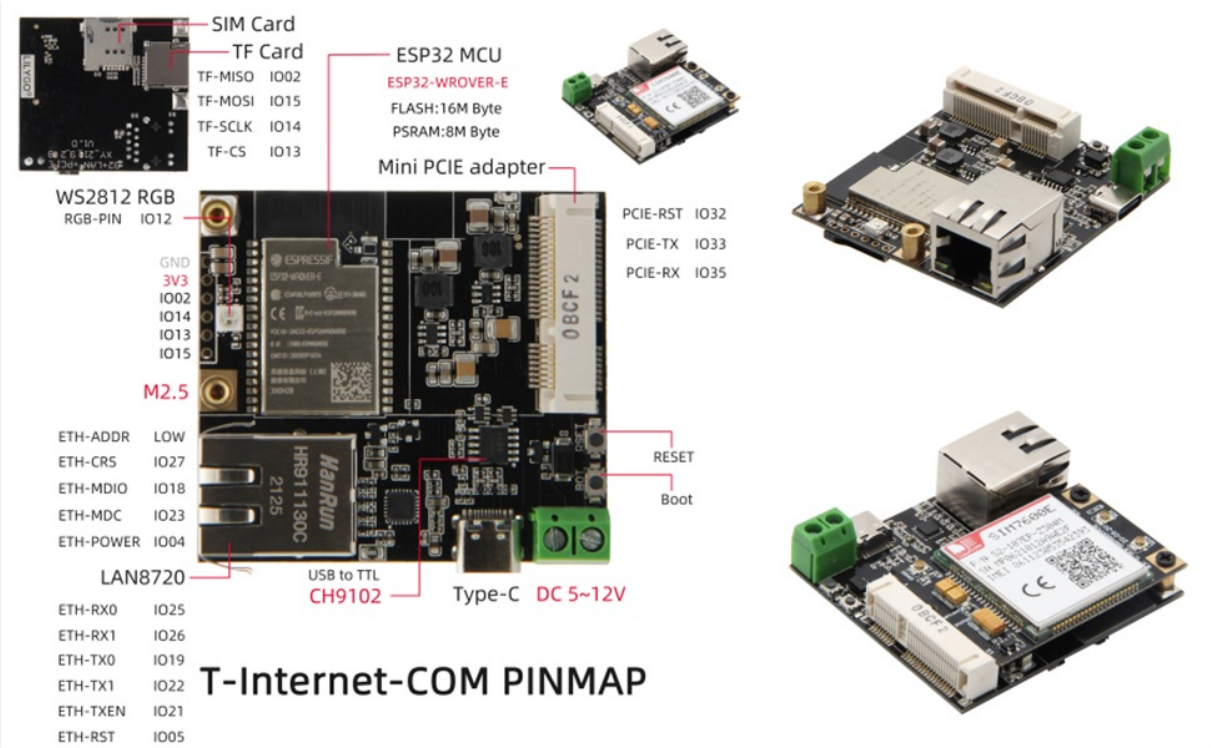

Figure 3: T-Internet-COM Pinmap, illustrating the various GPIOs and connections for development.

4. Maintenance

- **Handling:** Handle the module with care to avoid damaging sensitive electronic components. Avoid static discharge.
- **Environment:** Keep the module in a dry environment, away from extreme temperatures, humidity, and corrosive substances.
- **Cleaning:** If necessary, gently clean the board with a soft, dry brush or compressed air. Do not use liquids or abrasive cleaners.
- **Firmware Updates:** Regularly check the official GitHub repository for firmware updates and security patches to ensure optimal performance and stability.

5. Troubleshooting

5.1 Power Issues

- **No Power Indicator:** Ensure the Type-C cable is securely connected and the power supply is providing 5-12V DC. Test with a different cable or power adapter if available.

5.2 Connectivity Problems

- **USB Not Detected:** Verify that the CH9102 drivers are correctly installed on your computer. Try a different USB port or cable.
- **Wi-Fi/Ethernet Connection Failure:** Check your network configuration in the firmware. Ensure the Ethernet

cable is properly connected and your router is functioning. For Wi-Fi, confirm SSID and password are correct.

5.3 Programming Errors

- **Upload Failed:** Ensure the correct board (e.g., ESP32 Dev Module) and COM port are selected in your IDE. Try holding the BOOT button while initiating the upload, then releasing it.
- **Code Not Running:** Verify your code logic and ensure all necessary libraries are included. Check serial monitor output for error messages.

For more detailed troubleshooting and community support, please visit the official LILYGO GitHub repository.

6. Specifications

Brand	LILYGO
Model Name	T-Internet
Microcontroller	ESP32-WROVER-E
Flash Memory	16MB
PSRAM	8MB
USB to TTL Chip	CH9102
Connectivity Technology	USB (Type-C), Wi-Fi, Bluetooth
Wireless Compatibility	Wi-Fi: 802.11 b/g/n, BLE V4.2
Bus Interfaces	UART, SPI, I2C, CAN, I2S, SDIO
Ethernet	LAN8720 Network Port
Onboard Components	RST+BOOT buttons, WS2812 RGB LED (GPIO12)
Card Slots	SIM card slot, TF (MicroSD) card slot
Power Input	DC 5-12V via Type-C
Operating System Support	FreeRTOS, Linux
Compatible Devices	Computers, Cameras, Microcontrollers
Dimensions (L x W x H)	56mm x 51mm x 17mm (approximate)

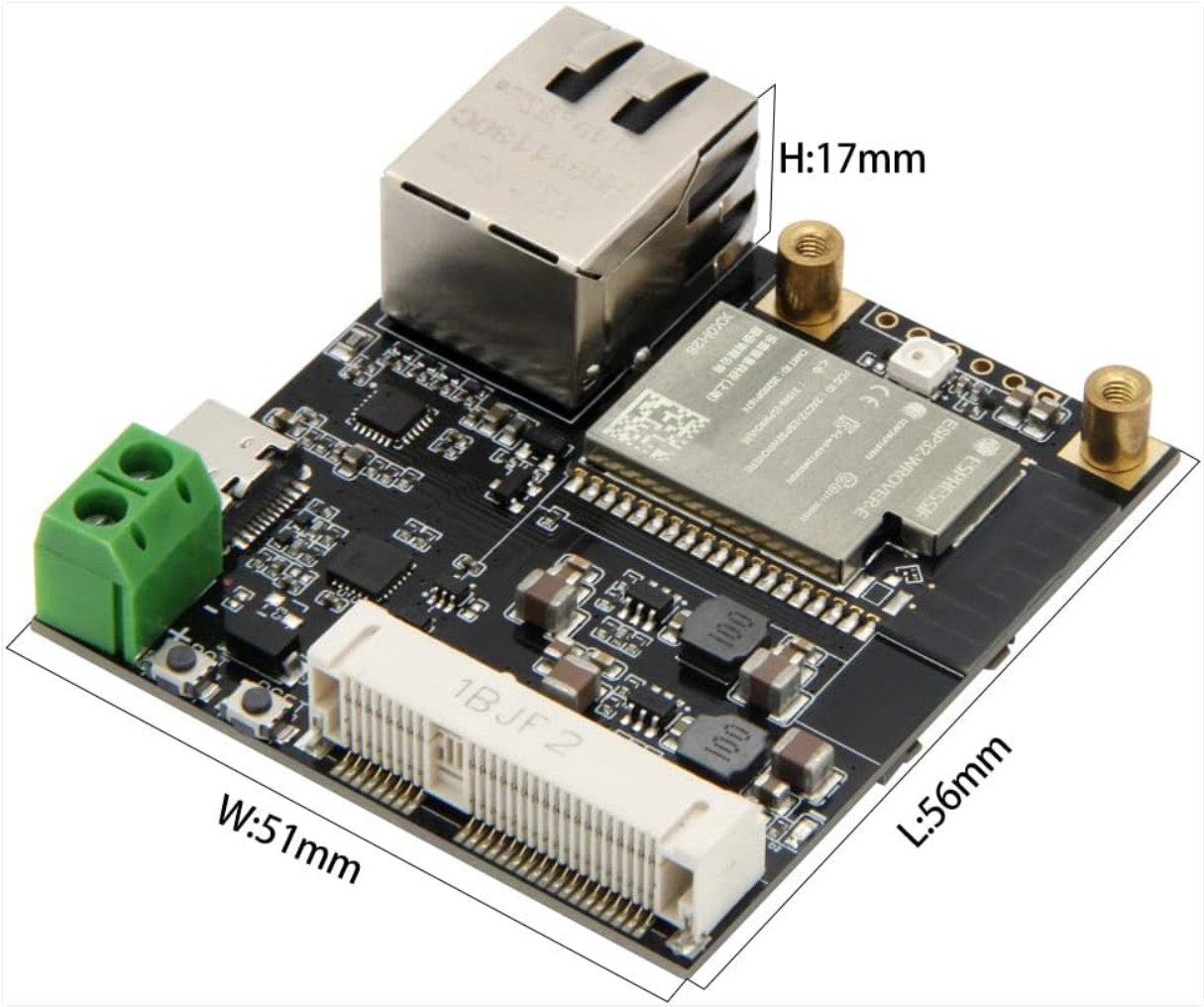

Figure 4: Module dimensions, showing approximate length, width, and height.

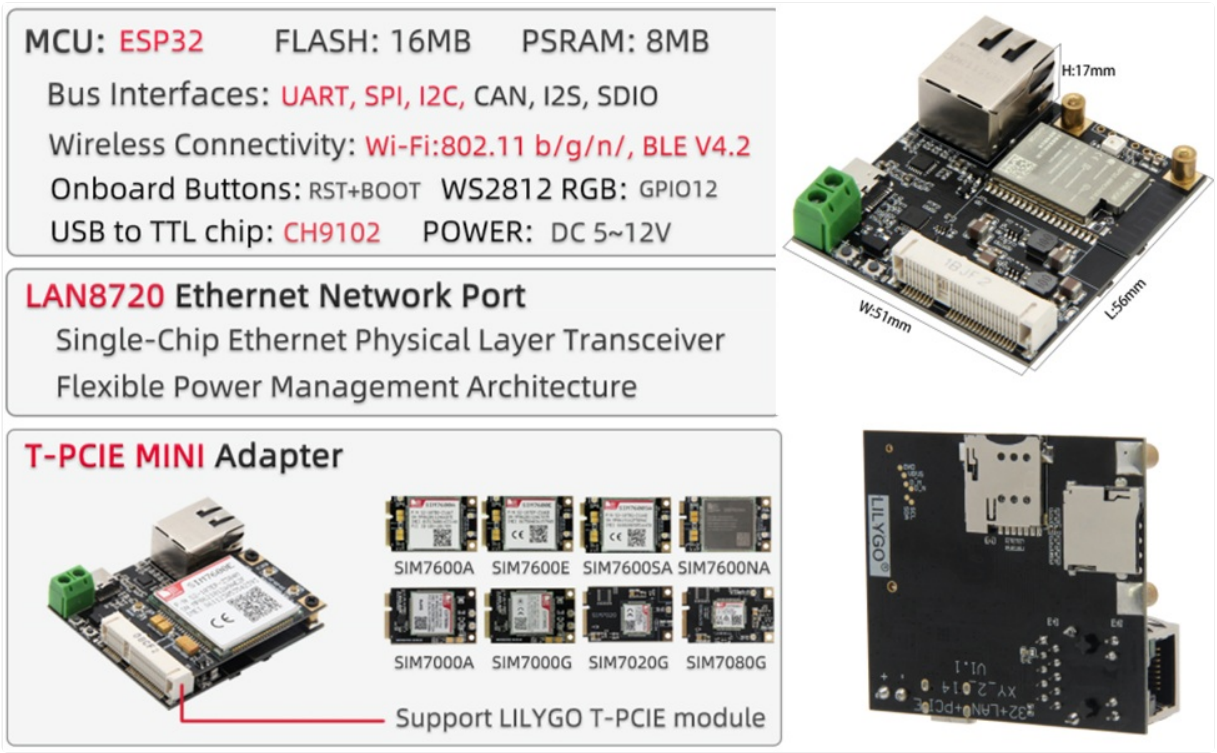

Figure 5: Overview of key features including MCU, memory, bus interfaces, and power.

7. Warranty Information

LILYGO products typically come with a limited manufacturer's warranty covering defects in materials and workmanship. The specific duration and terms of the warranty may vary. Please retain your proof of purchase. For detailed warranty information, refer to the official LILYGO website or contact customer support.

8. Technical Support

For technical assistance, documentation, and community support, please refer to the following resources:

- **Official LILYGO Website:** Visit the LILYGO website for product information and updates.
- **GitHub Repository:** The primary resource for code examples, schematics, and community discussions. github.com/Xinyuan-LilyGO/T-Internet-COM
- **Online Forums/Communities:** Engage with other users and developers in relevant online forums for troubleshooting and project ideas.