LILYGO T-Display 16MB CH9102F

LILYGO ESP32 T-Display Module User Manual
Model: T-Display 16MB CH9102F

INTRODUCTION

This manual provides comprehensive instructions for the LILYGO ESP32 T-Display Module Development Board. It covers setup, operation, and troubleshooting to help users effectively utilize the module's features, including its integrated IPS ST7789V 1.14-inch LCD, Wi-Fi, and Bluetooth Low Energy (BLE) capabilities.

Figure 1: LILYGO ESP32 T-Display Module (Angled View)

This image shows the LILYGO ESP32 T-Display Module from an angled perspective, highlighting its compact form factor, the integrated 1.14-inch IPS LCD screen, and the USB Type-C port. The screen displays the LILYGO logo.

PACKAGE CONTENTS

Verify that all items are present in the package:

- 1 x TTGO T-Display (16M CH9102F)
- 1 x Charging Cable
- 2 x Pin Headers

Figure 2: Package Contents

This image displays the contents typically found in the LILYGO ESP32 T-Display Module package: the development board itself, a charging cable, and two sets of pin headers for connectivity.

SPECIFICATIONS

Feature	Detail
MCU	ESP32 Xtensa dual-core LX6 microprocessor
Flash Memory	16MB
Display	IPS ST7789V 1.14 Inch LCD (Resolution: 135 x 240, 260 ppi)

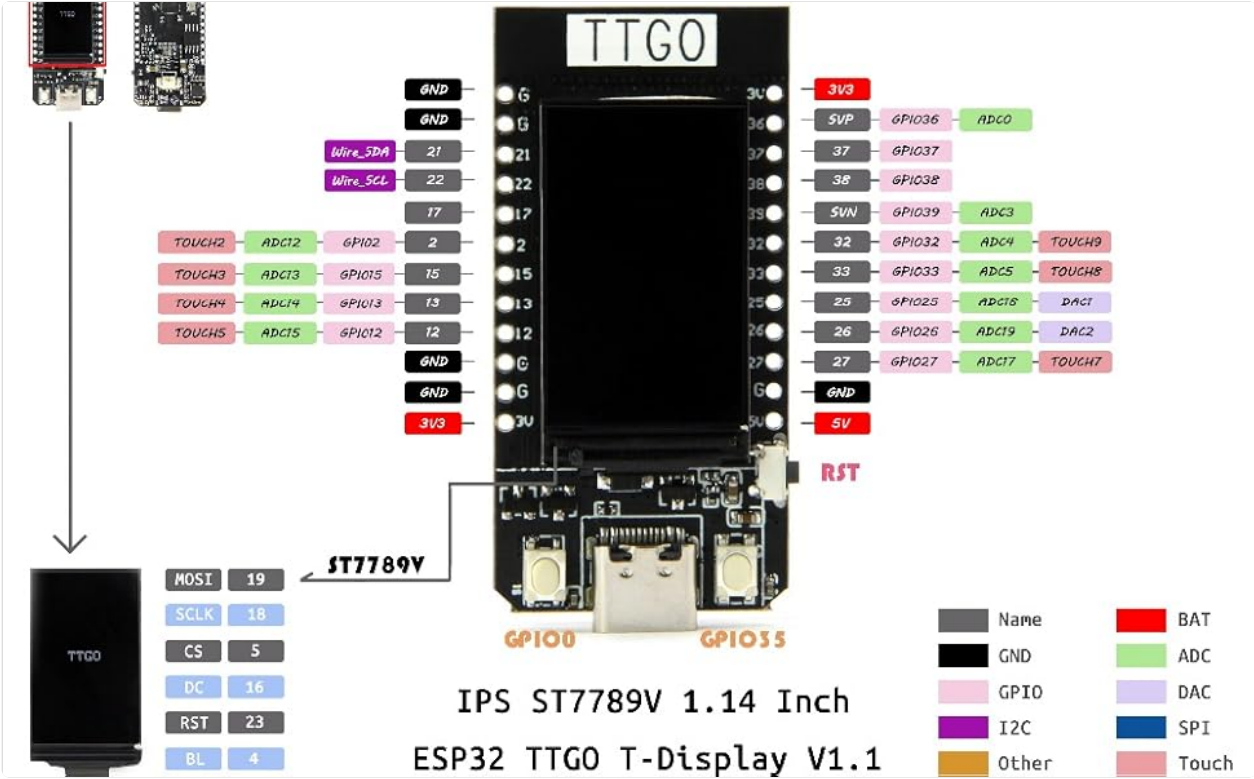|	
USB Interface	Type-C
Wireless Connectivity	Wi-Fi 802.11 b/g/n, Bluetooth Low Energy (BLE) V4.2
Programming Platform	Arduino-IDE, MicroPython
Serial Chip	CH9102F
Working Current	Approximately 67mA
Sleep Current	Approximately 350uA
Power Supply	USB / Li-Po Battery Dual Power Supply (JST GH 1.25mm connector)
Dimensions	4.25 x 2.68 x 1.14 inches (approx. 108 x 68 x 29 mm)
Weight	0.704 ounces (approx. 20g)

Figure 3: Key Features and Specifications Overview

This diagram provides a visual summary of the LILYGO ESP32 T-Display Module's core components and capabilities, including the MCU, wireless connectivity, display type, and power supply options.
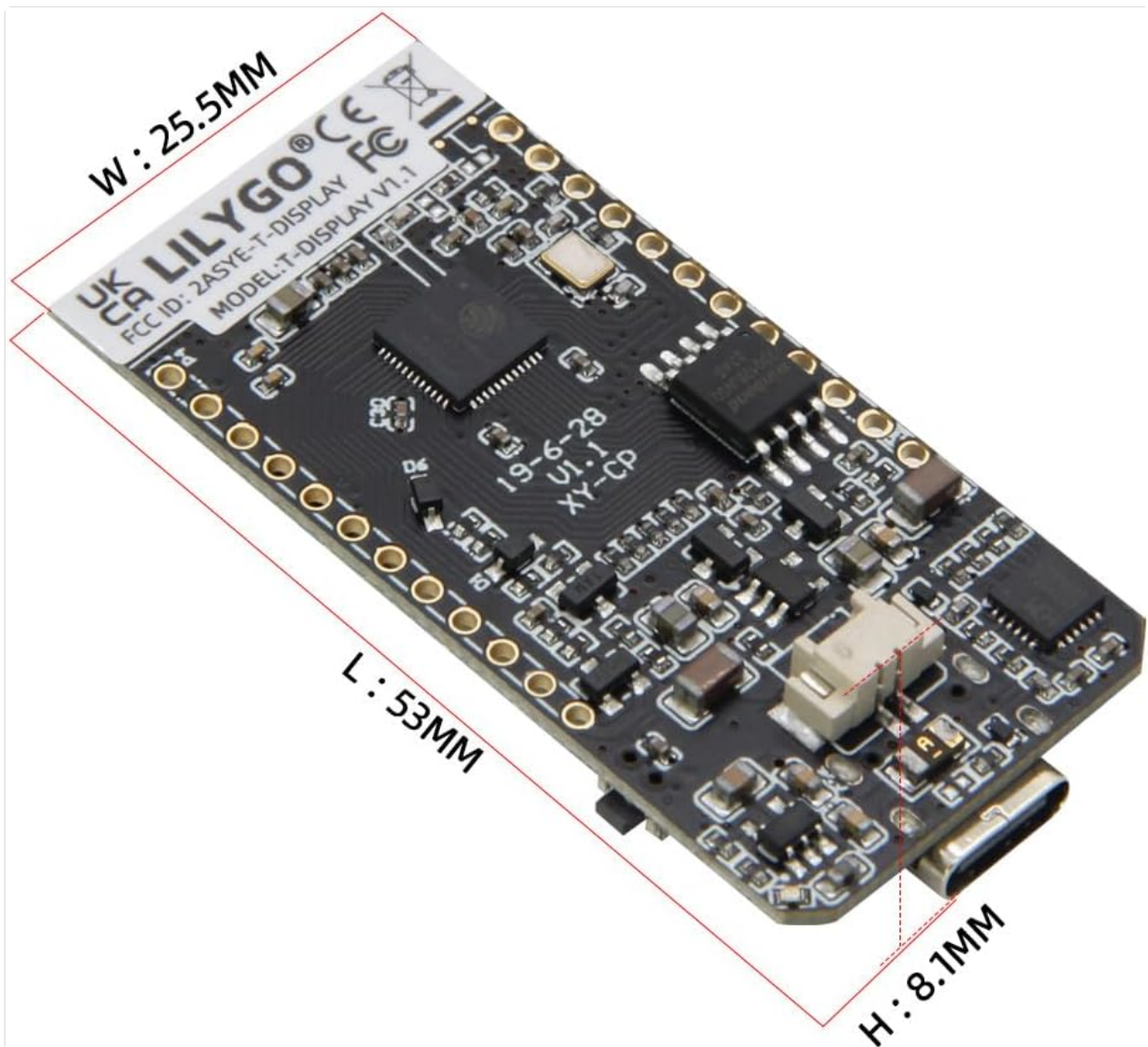
Figure 4: Module Dimensions

This image illustrates the physical dimensions of the LILYGO ESP32 T-Display Module, showing its length, width, and height for integration into projects.

SETUP AND PROGRAMMING

Pinout Diagram

Understanding the pinout is crucial for connecting external components and sensors to the T-Display module.
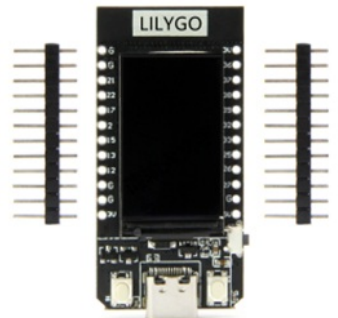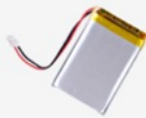
Figure 5: Pinout Diagram

This diagram details the General Purpose Input/Output (GPIO) pins, power pins, and other interfaces available on the LILYGO ESP32 T-Display Module, essential for hardware connections.

Quick Start Guide for Arduino IDE

Follow these steps to get started with programming your LILYGO ESP32 T-Display Module using the Arduino IDE:

1. Copy the **TFT_eSPI** library to your Arduino libraries directory (e.g., *C:\Users\Your User Name\Documents\Arduino\libraries*).
2. Open Arduino IDE and navigate to the **TFT_eSPI** examples. For instance, the T-Display factory test program is located at **TFT_eSPI -> FactoryTest**.
3. You can also use other sample programs provided by **TFT_eSPI**.
4. In the Arduino IDE tool options, select the development board **ESP32 Dev Module**.
5. Select **Disable** in the **PSRAM** option.
6. Select **4MB** in the **Flash Size** option. Keep other settings as default.
7. Select the corresponding serial port. If unsure, remove all other serial ports, leaving only the board in the USB connection state, then select that one.
8. Finally, click **Upload** (the right arrow next to the tick icon) to flash your code.
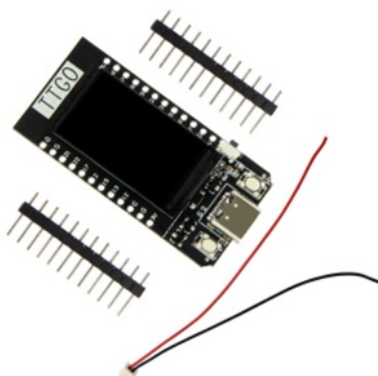

Figure 6: Quick Start Instructions

This image provides a textual summary of the quick start steps for setting up the LILYGO ESP32 T-Display Module with the Arduino IDE, including library installation and board configuration.

For more detailed information and resources, refer to the official GitHub repository:github.com/Xinyuan-LilyGO/TTGO-T-Display

OPERATING THE MODULE

Once programmed, the LILYGO ESP32 T-Display Module operates based on the uploaded firmware. The integrated 1.14-inch IPS LCD can display various information, and the Wi-Fi and BLE capabilities allow for network communication and device interaction.

Powering the Module

The module supports dual power supply options:

- **USB Type-C:** Connect the provided charging cable to the USB-C port on the module and a power source (e.g., computer USB port, USB wall adapter).
- **Li-Po Battery:** A JST GH 1.25mm connector is available for connecting a compatible Li-Po battery for portable applications. The module includes battery power detection.
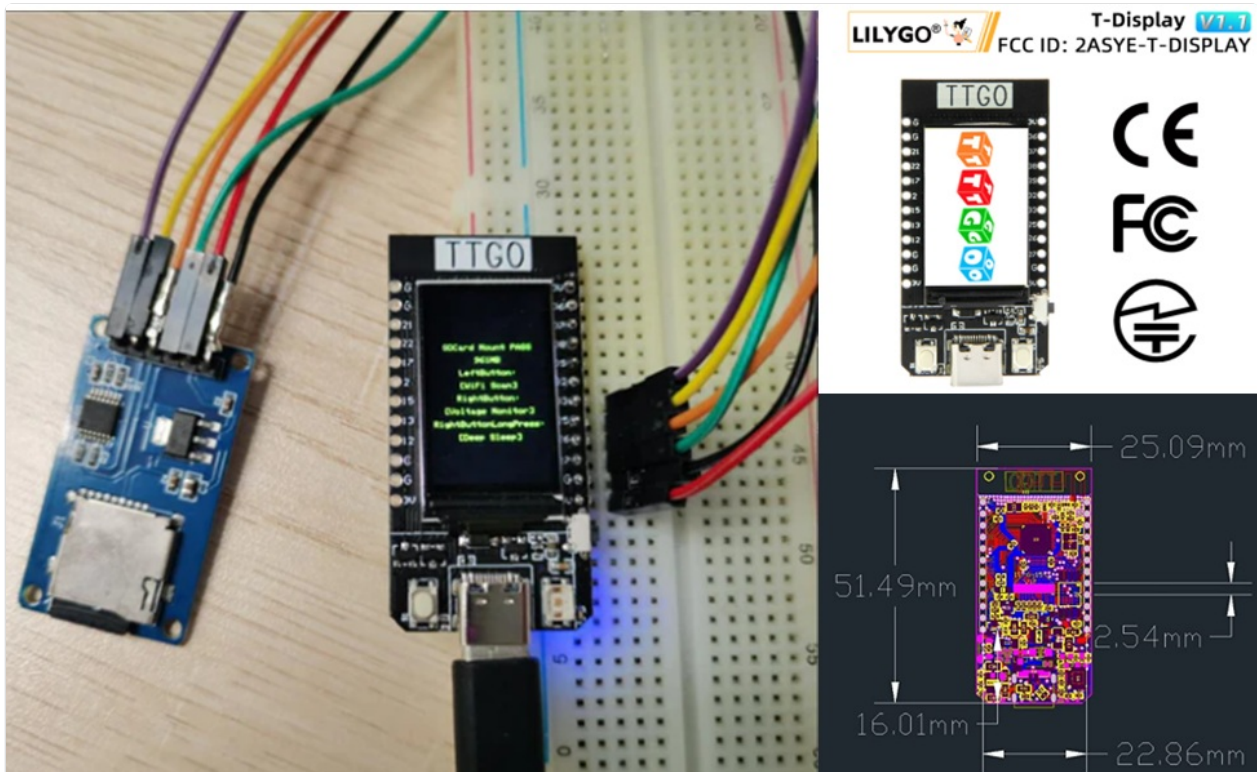

Figure 7: Example Application Setup

This image demonstrates the LILYGO ESP32 T-Display Module integrated into a breadboard setup, connected to an external SD card module, showcasing its expandability for various projects.

MAINTENANCE

The LILYGO ESP32 T-Display Module is designed for durability, but proper care ensures its longevity:

- Keep the module in a clean, dry environment, away from dust and moisture.
- Avoid exposing the module to extreme temperatures or direct sunlight.
- Handle the board by its edges to prevent damage to components or static discharge.
- When cleaning, use a soft, dry cloth. Do not use liquid cleaners or solvents.
- Ensure proper ventilation if enclosing the module in a case, especially during operation, to prevent overheating.

TROUBLESHOOTING

If you encounter issues with your LILYGO ESP32 T-Display Module, consider the following common troubleshooting steps:

Problem	Possible Cause / Solution
Module not recognized by computer / Upload fails	- Ensure USB cable is securely connected and is a data cable (not charge-only). - Install correct USB-to-Serial driver (CH9102F). - Select the correct serial port in Arduino IDE. - Verify board selection is "ESP32 Dev Module" and flash size is "4MB". - Try pressing the BOOT button while connecting USB or during upload if issues persist.
Display not working or showing garbage	- Check if the correct display library (TFT_eSPI) is installed and configured for ST7789V. - Verify pin definitions in your code match the module's pinout. - Ensure power supply is stable (3.3V).
Wi-Fi/BLE connectivity issues	- Check Wi-Fi credentials (SSID, password) in your code. - Ensure the module is within range of the Wi-Fi access point or BLE device. - Verify antenna connection (if external). - Confirm correct library usage for Wi-Fi/BLE functions.
Module becomes unresponsive or crashes	- Review your code for potential memory leaks or infinite loops. - Ensure adequate power supply, especially when using Wi-Fi/BLE or external components. - Try a different USB port or power adapter. - Perform a hard reset by disconnecting and reconnecting power.

Support and Warranty

For product support, technical inquiries, or warranty information, please contact LILYGO directly. They are committed to assisting users with any questions or suggestions regarding the product.
Contact information:

- **Product Service:** If you have any questions or suggestions about the product, please feel free to contact us. We will answer your question as soon as possible.
- **Official GitHub:** github.com/Xinyuan-LilyGO/TTGO-T-Display (Contains code examples, documentation, and community support).