Waveshare ESP32-S3-4.3inch-Touch-LCD-B-BOX

Waveshare ESP32-S3 4.3-inch LCD Touch Screen Development Board User Manual

Model: ESP32-S3-4.3inch-Touch-LCD-B-BOX

1. Introduction

The Waveshare ESP32-S3-Touch-LCD-4.3B-BOX is a microcontroller development board designed for Human-Machine Interface (HMI) and other ESP32-S3 applications. It integrates a 4.3-inch capacitive touch screen with an 800x480 resolution and 65K colors, along with 2.4GHz Wi-Fi and Bluetooth 5 (LE) connectivity. The board features an Xtensa 32-bit LX7 dual-core processor, high-capacity Flash, and PSRAM, making it suitable for running GUI programs like LVGL and interfacing with various peripherals. This manual provides essential information for setting up, operating, and maintaining your development board.

2. Package Contents

- ESP32-S3-Touch-LCD-4.3B-BOX Development Board x1

Please inspect the package contents upon receipt to ensure all items are present and undamaged. If any components are missing or damaged, please contact customer support.

3. Product Overview

The ESP32-S3-Touch-LCD-4.3B-BOX features a comprehensive layout of components and interfaces. Understanding these components is crucial for proper setup and operation.

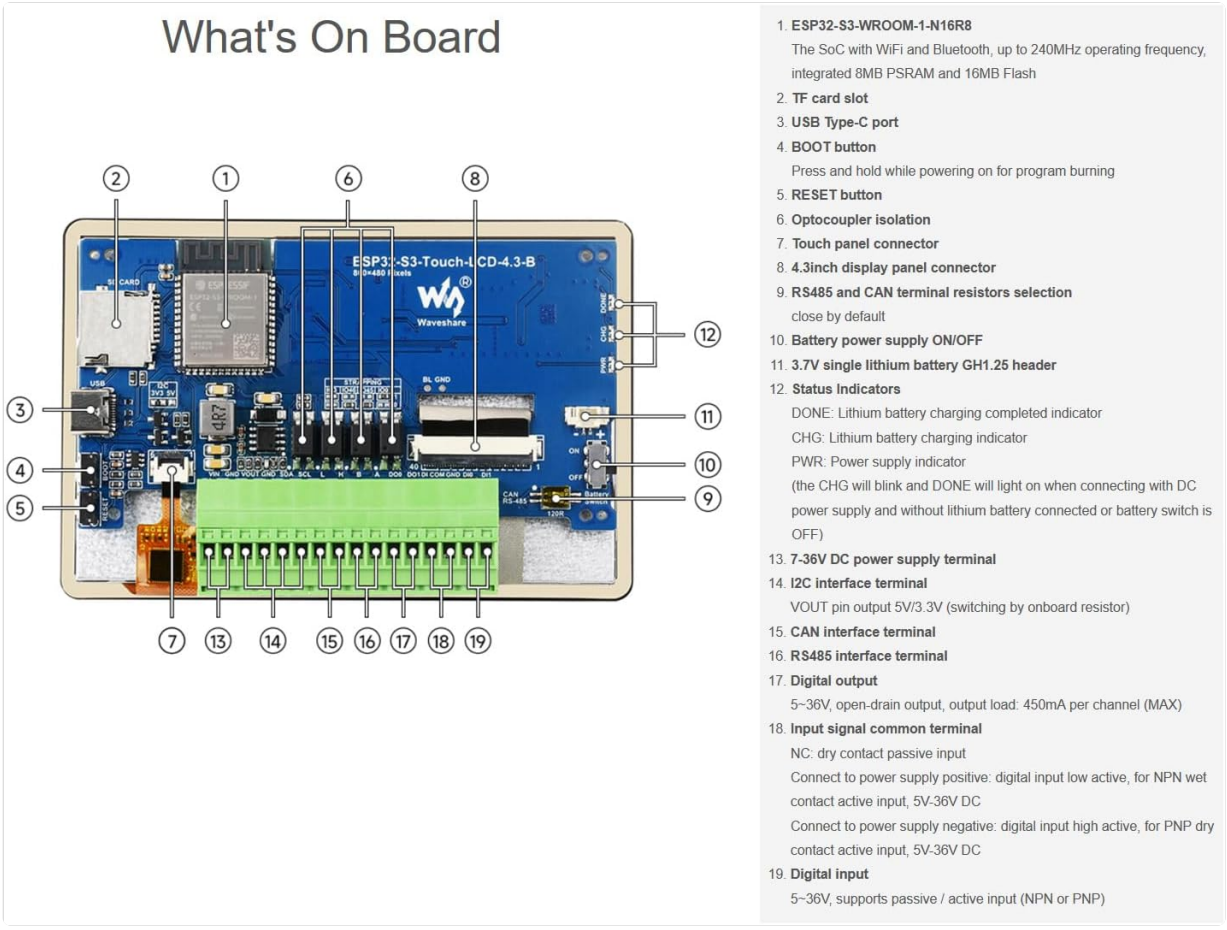


Figure 3.1: ESP32-S3-Touch-LCD-4.3B-BOX Component Layout

Component Identification:

1. **ESP32-S3-WROOM-1-N16R8:** The System-on-Chip (SoC) with Wi-Fi and Bluetooth, up to 240MHz operating frequency, integrated 8MB PSRAM and 16MB Flash.
2. **TF card slot:** For external storage.
3. **USB Type-C port:** For power supply and data communication.
4. **BOOT button:** Press and hold while powering on for program burning.
5. **RESET button:** Resets the board.
6. **Optocoupler isolation:** Provides electrical isolation for digital I/O.
7. **Touch panel connector:** Connects to the capacitive touch screen.
8. **4.3inch display panel connector:** Connects to the LCD display.
9. **RS485 and CAN terminal resistors selection:** Jumpers for enabling/disabling terminal resistors (closed by default).
10. **Battery power supply ON/OFF:** Switch for controlling battery power.
11. **3.7V single lithium battery GH1.25 2P header:** Connector for a 3.7V lithium battery.
12. **Status Indicators:**
    - **DONE:** Lithium battery charging completed indicator.
    - **CHG:** Lithium battery charging indicator.
    - **PWR:** Power supply indicator. (CHG and DONE LEDs illuminate when connected to DC power supply and with battery connected or battery switch is OFF).
13. **7-36V DC power supply terminal:** Main power input.
14. **I2C interface terminal:** VOUT pin outputs 5V/3.3V (switching via onboard resistor).

15. **CAN interface terminal:** For CAN bus communication.
16. **RS485 interface terminal:** For RS485 communication.
17. **Digital output:** 5-36V, open-drain output, output load: 450mA per channel (MAX).
18. **Input signal common terminal:** NC: dry contact passive input. Connect to power supply positive: digital input low active, for NPN wet contact active input, 5V-36V DC. Connect to power supply negative: digital input high active, for PNP dry contact active input, 5V-36V DC.
19. **Digital input:** 5-36V, supports passive / active input (NPN or PNP).

4. Setup

4.1 Powering the Board

The board can be powered via the USB Type-C port or the 7-36V DC power supply terminal. For portable applications, a 3.7V lithium battery can be connected to the GH1.25 2P header.

4.2 Wiring Methods

The ESP32-S3-Touch-LCD-4.3B-BOX supports two primary wiring methods for integrating into various application scenarios, such as DIN rail or embedded devices. The case version does not support bottom wiring.

Figure 4.1: Supported Wiring Methods

4.3 Peripheral Connections

The board offers various interfaces for expanding functionality:

- **I2C Interface:** For connecting I2C compatible sensors and modules.

- **CAN Interface:** For Controller Area Network communication.
- **RS485 Interface:** For serial communication over long distances.
- **Digital Isolated I/O:** Supports passive and active digital input with bi-directional optocoupler isolation, and digital output with optocoupler isolation providing up to 450mA sinking current.

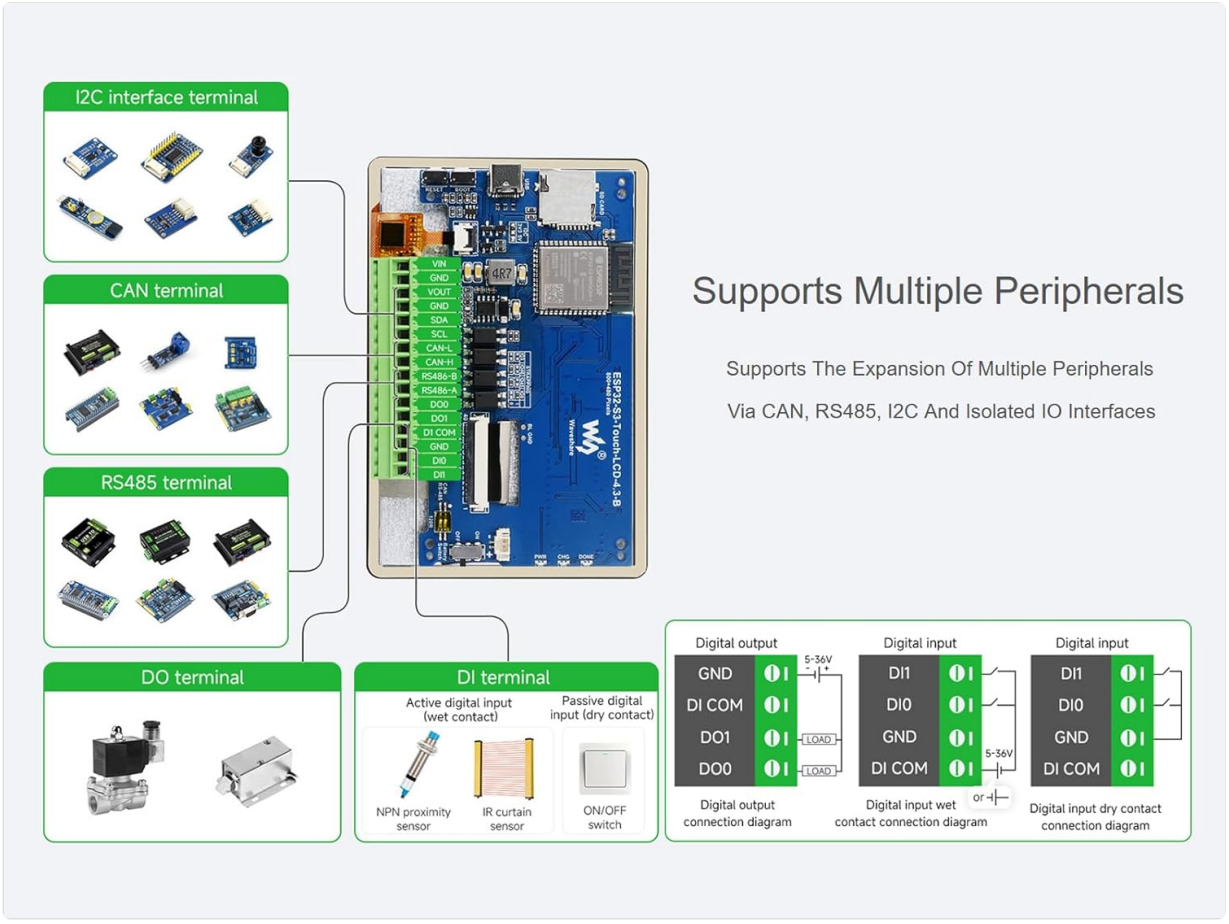


Figure 4.2: Multiple Peripheral Support

5. Operating Instructions

5.1 Basic Operation

1. **Power On:** Connect a 7-36V DC power supply to the terminal or a 3.7V lithium battery (ensure the battery switch is ON), or connect the USB Type-C cable to a power source. The PWR indicator LED will illuminate.
2. **Touch Screen:** The 4.3-inch capacitive touch screen supports 5-point touch control via an I2C interface. It is designed for smooth GUI interaction.
3. **Wi-Fi & Bluetooth:** The ESP32-S3 SoC supports 2.4GHz Wi-Fi (802.11 b/g/n) and Bluetooth 5 (LE) with an onboard antenna. These features can be utilized through appropriate firmware development.

Figure 5.1: IPS Display Panel and Capacitive Touch Functionality

5.2 Software Development

The board is suitable for GUI development using frameworks such as LVGL. Developers can utilize the ESP-IDF or Arduino IDE for programming the ESP32-S3. Refer to the official Espressif documentation and Waveshare's provided resources for detailed programming guides and examples.

5.3 Application Scenarios

The ESP32-S3-Touch-LCD-4.3B-BOX is versatile for various applications:

- **Human-Machine Interface (HMI):** Ideal for creating interactive control panels and displays.
- **LVGL GUI Development:** A powerful platform for developing rich graphical user interfaces.
- **IoT Devices:** With Wi-Fi and Bluetooth, it can serve as a central control unit for smart home or industrial IoT applications.

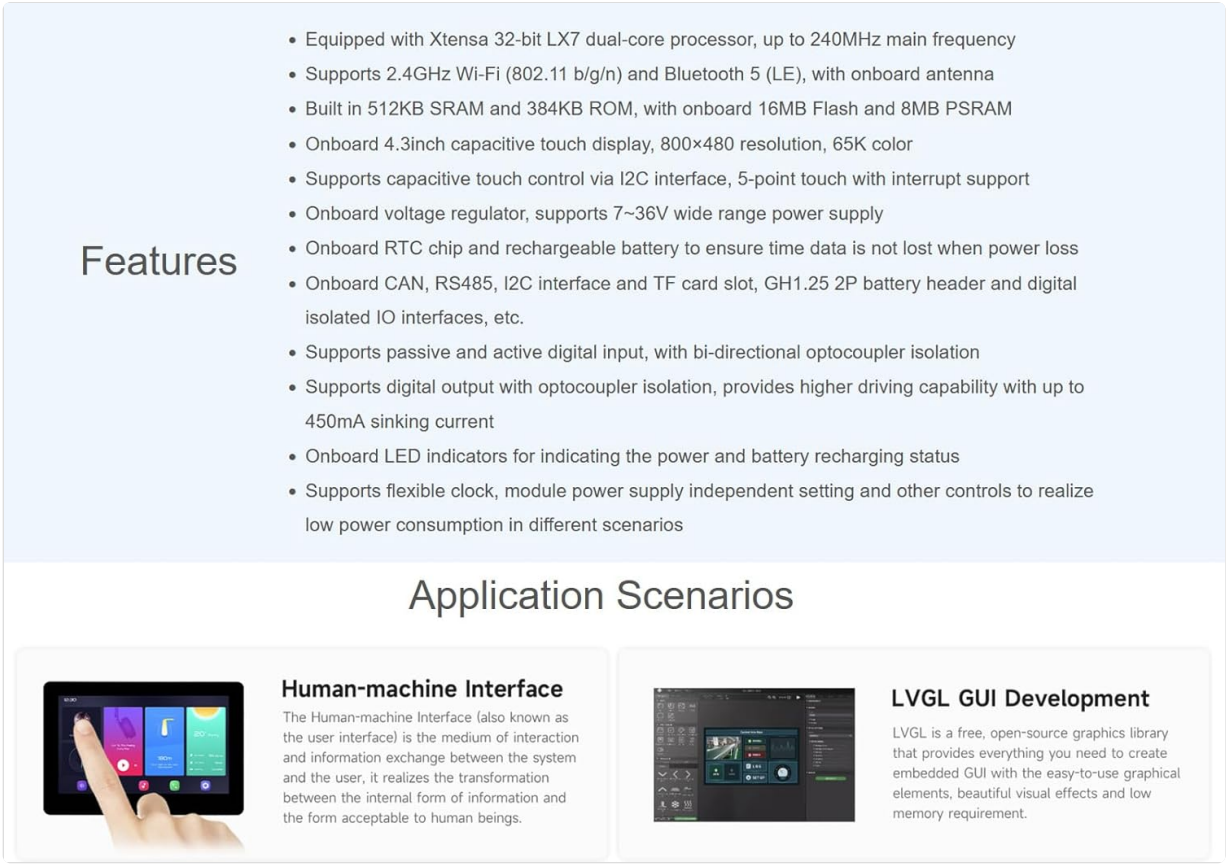


Figure 5.2: Application Scenarios

6. Maintenance

6.1 Cleaning

To clean the display and case, use a soft, dry, lint-free cloth. For stubborn smudges, a slightly damp cloth with water or a mild screen cleaner can be used. Avoid abrasive materials or harsh chemicals.

6.2 Firmware Updates

Periodically check the Waveshare official website or relevant community forums for firmware updates. Keeping the firmware updated can improve performance, add new features, and resolve potential issues. Follow the provided instructions carefully when performing updates.

7. Troubleshooting

This section addresses common issues you might encounter with the ESP32-S3-Touch-LCD-4.3B-BOX.

7.1 Power Issues

- **Board does not power on:** Ensure the power supply is connected correctly and provides sufficient voltage (7-36V DC or 5V via USB-C). If using a battery, check its charge level and ensure the battery power switch is ON.
- **Charging indicator (CHG) not lit:** Verify the battery is properly connected and the DC power supply is active. The DONE indicator will light when charging is complete.

7.2 Display and Touch Issues

- **Display is blank or distorted:** Check the connection of the display panel. Ensure the firmware loaded supports the display and is initialized correctly.
- **Touch screen unresponsive:** Verify the touch panel connector is secure. Ensure the I2C interface for the touch controller is correctly configured in your software.

7.3 Connectivity Issues (Wi-Fi/Bluetooth)

- **Cannot connect to Wi-Fi/Bluetooth:** Ensure the onboard antenna is not obstructed. Verify your software configuration for Wi-Fi/Bluetooth is correct, including SSID, password, and device discovery settings.

7.4 Development Environment Issues

- **Code compilation errors:** Ensure all necessary libraries are installed and compatible with your ESP-IDF or Arduino IDE version. Refer to the Waveshare documentation and community resources for specific library requirements.
- **GPIO conflicts:** When developing complex applications, be aware of potential GPIO conflicts, especially when using multiple peripherals simultaneously with the display and touch functions. Careful planning of pin assignments in your code is recommended.

8. Specifications

Feature	Specification
Processor	Xtensa 32-bit LX7 dual-core, up to 240MHz
Wireless Connectivity	2.4GHz Wi-Fi (802.11 b/g/n), Bluetooth 5 (LE)
Memory	512KB SRAM, 384KB ROM, 16MB Flash, 8MB PSRAM
Display	4.3-inch capacitive touch, 800x480 resolution, 65K color IPS
Touch Control	I2C interface, 5-point touch with interrupt support
Power Supply	7-36V DC (terminal), 5V via USB Type-C, 3.7V Lithium Battery (GH1.25 2P header)
Onboard Features	RTC chip, rechargeable battery support, CAN, RS485, I2C, TF card slot, Digital Isolated I/O
Digital Output	Optocoupler isolation, up to 450mA sinking current
Digital Input	Passive and active (NPN/PNP) with bi-directional optocoupler isolation
Dimensions	4.58 x 3.11 x 0.7 inches (116.30 x 79.00 x 18.00 mm)
Weight	6.7 ounces (approx. 190g)

9. Warranty and Support

9.1 Warranty Information

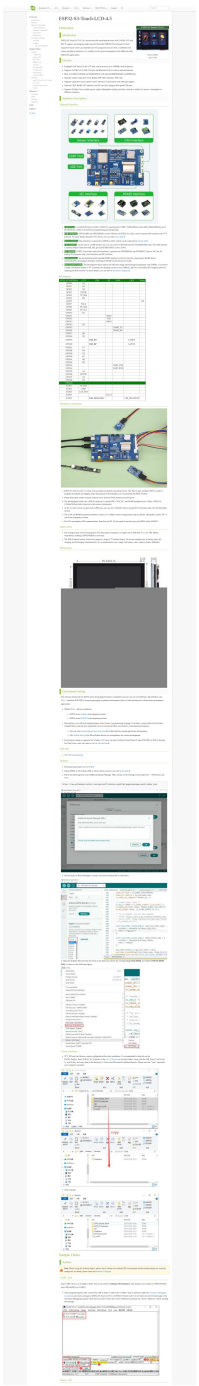
Waveshare products are typically covered by a limited warranty against defects in materials and

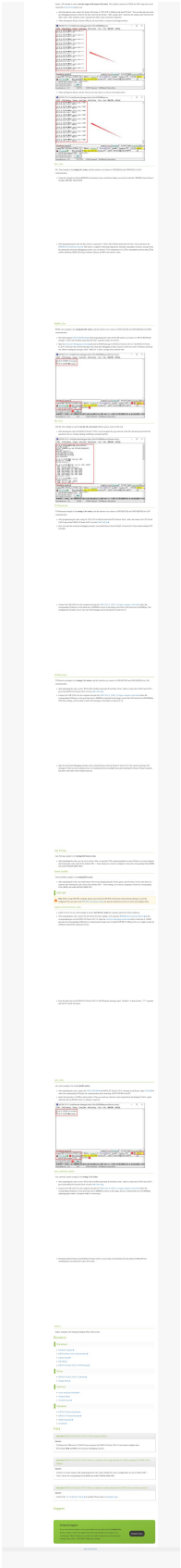
workmanship. Please refer to the official Waveshare website or your purchase documentation for specific warranty terms and conditions.

9.2 Technical Support

For technical assistance, development resources, and further documentation, please visit the official Waveshare website. Online development resources and technical support are provided. If you encounter any problems, please contact Waveshare customer support directly.

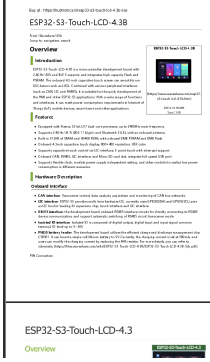
Related Documents - ESP32-S3-4.3inch-Touch-LCD-B-BOX





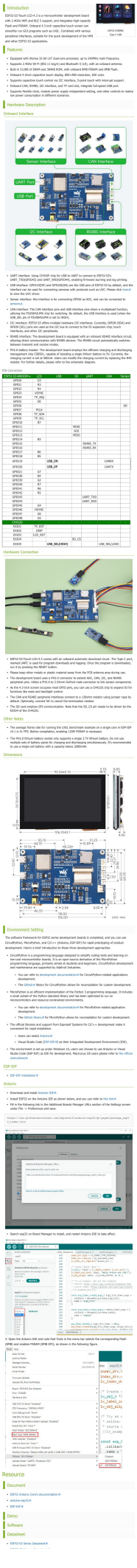
[Waveshare ESP32-S3-Touch-LCD-4.3 Development Board: Features & Guide]

Explore the Waveshare ESP32-S3-Touch-LCD-4.3, a powerful microcontroller development board featuring a 4.3-inch capacitive touch display, WiFi, BLE 5, and multiple interfaces like CAN, RS485, and I2C. Learn about its hardware, setup, and sample demos for HMI development.



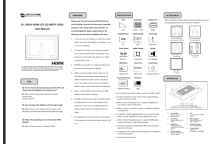
[ESP32-S3-Touch-LCD-4.3B: Development Board Overview and Setup Guide]

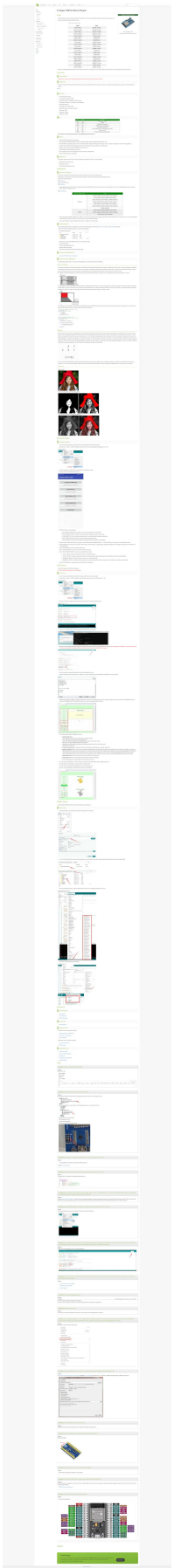
Explore the ESP32-S3-Touch-LCD-4.3B, a powerful microcontroller development board from Waveshare. This guide covers its features, hardware description, interface details, and provides instructions for setting up the development environment using ESP-IDF and VSCode.



[ESP32-S3-Touch-LCD-4.3 Development Board Overview and Setup]

A comprehensive guide to the ESP32-S3-Touch-LCD-4.3 development board, detailing its features, hardware description, pin connections, environmental setup for CircuitPython, MicroPython, and C/C++ (Arduino, ESP-IDF), and configuration within the Arduino IDE.

	
	[Waveshare 10.1-inch HDMI LCD (G) User Manual: Setup, Specs, and Connections] Explore the Waveshare 10.1-inch HDMI LCD (G) with Case. This user manual covers essential specifications, safety warnings, connection guides for Raspberry Pi, Jetson Nano, and PCs, and answers common questions.



[Waveshare E-Paper ESP32 Driver Board: Features, Demos, and Guide]

Explore the Waveshare E-Paper ESP32 Driver Board. This guide details its features, hardware connection, Bluetooth and WiFi demos, and common FAQs for e-paper display projects.


4inch DSI LCD

Introduction

Features

Working with Raspberry Pi

Hardware connection

Software settings

Method 1: Install Manually

Method 2: Program Pre-Install Image

Rotation

Method 1: Graphical Interface Rotation

Method 2: Rotation Display In Lite Version

Touch To Rotate

Backlight Control

Method 1: Graphical Interface Dimming

Method 2: Lite Version Dimming Command

Note

Resources

Software

Pre-installed images

FAQ

Anti-Piracy

Beware of knock-offs

Support

If you require technical support, please go to the page and open a ticket.

[Waveshare 4inch DSI LCD Display for Raspberry Pi: Setup and Guide]

Detailed guide for the Waveshare 4inch DSI LCD display, covering features, hardware connection, software installation, screen rotation, backlight control, and troubleshooting for Raspberry Pi.