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XYGStudy ESP32-S3-Touch-LCD-7B

XYGStudy ESP32-S3-Touch-LCD-7B 7-inch LCD Development Board User Manual

Model: ESP32-S3-Touch-LCD-7B

1. Introduction

The XYGStudy ESP32-S3-Touch-LCD-7B is a high-performance microcontroller development board designed for Human-Machine Interface (HMI) applications. It integrates a 7-inch LCD with 1024x600 resolution and capacitive touch functionality, powered by an Xtensa 32-bit LX7 dual-core processor. This board supports 2.4GHz Wi-Fi and Bluetooth BLE 5, making it suitable for a wide range of embedded projects requiring display and connectivity.
This manual provides essential information for setting up, operating, and maintaining your ESP32-S3-Touch-LCD-7B development board.



Figure 1: The ESP32-S3-Touch-LCD-7B Development Board, featuring a 7-inch display with touch capabilities.

2. Package Contents

Verify that all items listed below are included in your package. If any components are missing or damaged, please contact customer support.

- ESP32-S3-Touch-LCD-7B Development Board × 1
- HY2.0 2P to 2PIN male cable × 3
- HY2.0 3P to 3PIN male cable × 1
- HY2.0 4P to 4PIN male cable × 2
- Screws pack × 1

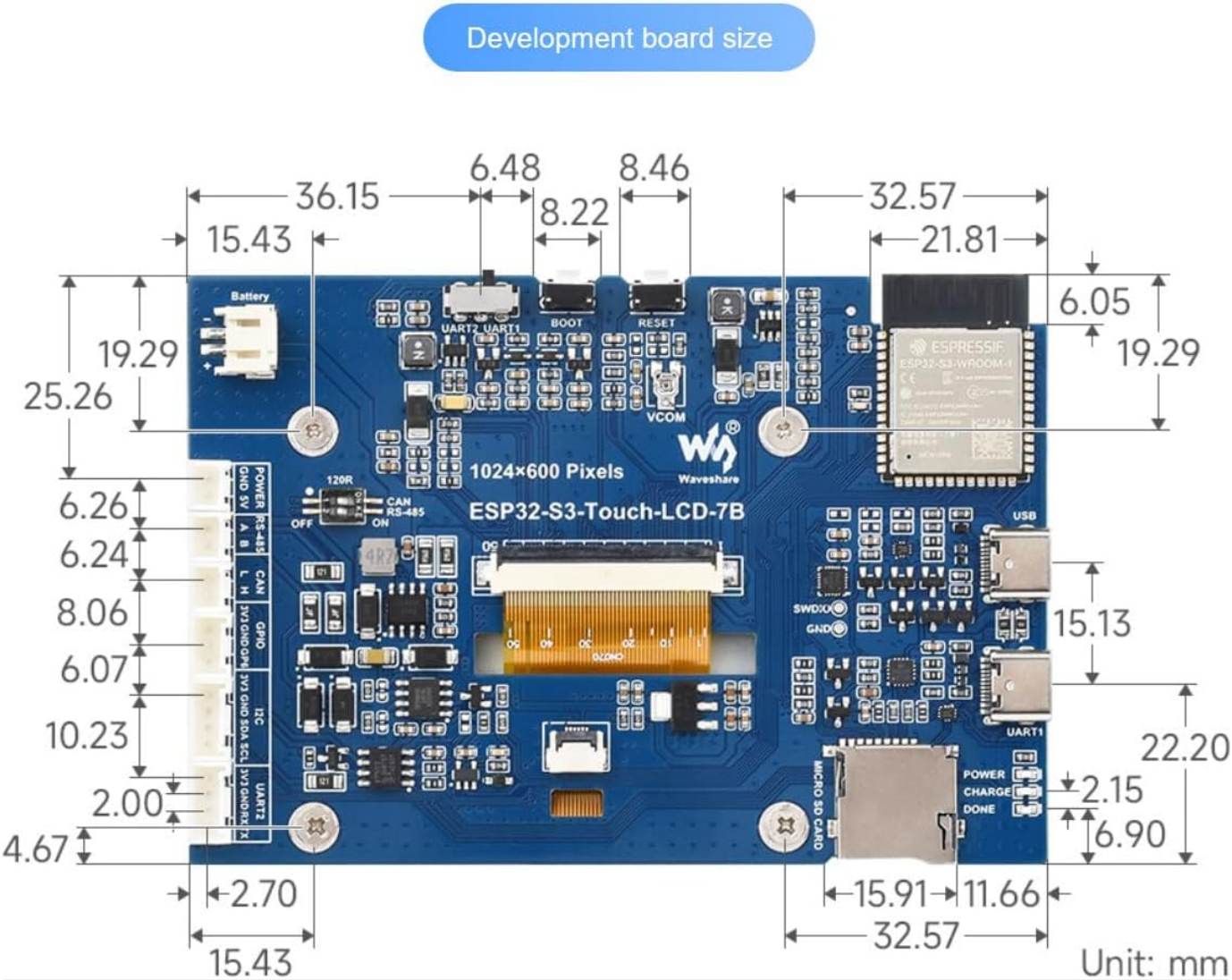


Figure 2: Visual representation of the ESP32-S3-Touch-LCD-7B package contents, including the board, various cables, and screws.

3. Key Features

The ESP32-S3-Touch-LCD-7B development board offers a robust set of features for advanced embedded applications:

- **Processor:** High-performance Xtensa 32-bit LX7 dual-core processor, operating up to 240MHz.
- **Display:** 7-inch LCD with 1024 × 600 resolution and 65K color depth.
- **Touch Function:** 5-point capacitive touch control via I2C interface with interrupt support.
- **Wireless Connectivity:** Supports 2.4GHz Wi-Fi (802.11 b/g/n) and Bluetooth 5 (LE) with an onboard antenna.
- **Memory:** Built-in 512KB SRAM and 384KB ROM, with onboard 16MB Flash and 8MB PSRAM.

- **Peripheral Interfaces:** Onboard CAN, RS485, I2C, and TF card slot. Integrates a full-speed USB port.
- **Power Management:** LED indicators for power status and battery charging status. Supports backlight adjustment and real-time battery voltage monitoring.
- **Low Power Modes:** Flexible clock and multiple power modes for optimized power consumption.

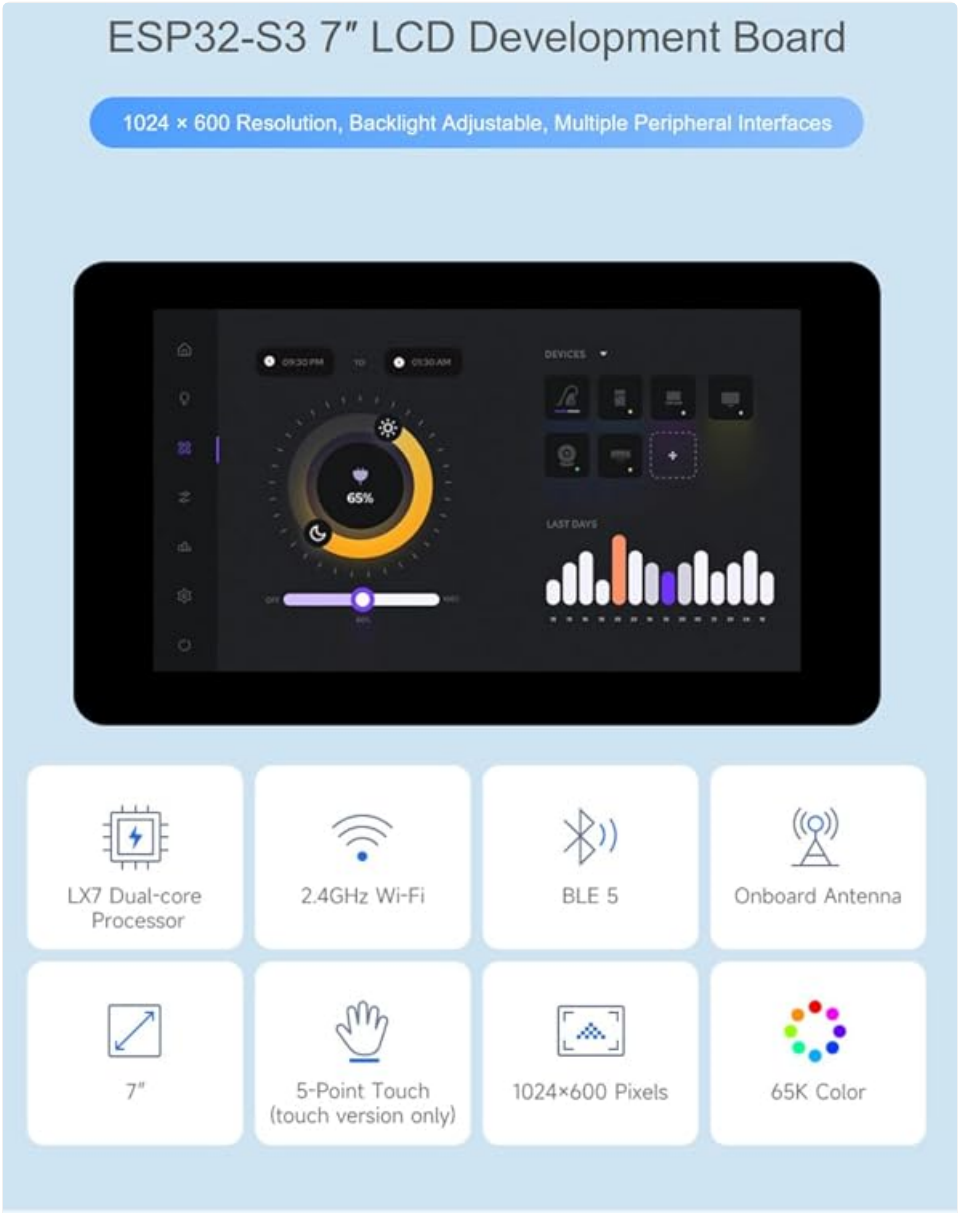






Figure 3: Overview of the ESP32-S3 7-inch LCD Development Board's key features, including processor, connectivity, and display specifications.

Features

This product is a microcontroller development board that supports 2.4GHz Wi-Fi and Bluetooth BLE 5, integrates high-capacity Flash and PSRAM. Onboard 7inch LCD display can smoothly run GUI programs such as LVGL. Combined with multiple peripheral interfaces, it is suitable for rapid development of ESP32-S3 HMI applications.

- Equipped with high-performance Xtensa 32-bit LX7 dual-core processor, up to 240MHz main frequency
- Supports 2.4GHz Wi-Fi (802.11 b/g/n) and Bluetooth 5 (LE), with onboard antenna
- Built-in 512KB SRAM and 384KB ROM, with onboard 16MB Flash and 8MB PSRAM
- Onboard 7inch LCD display, 1024 × 600 resolution, 65K color
- Supports 5-point capacitive touch control via I2C interface, with interrupt support (for touch version only)
- Onboard CAN, RS485, I2C interface and TF card slot, integrates full-speed USB port
- LED indicators for easy monitoring of power status and battery charging status
- Supports backlight adjustment and real-time battery voltage monitoring
- Supports accurate control such as flexible clock and multiple power modes to realize low power consumption in different scenarios

Application Scenarios

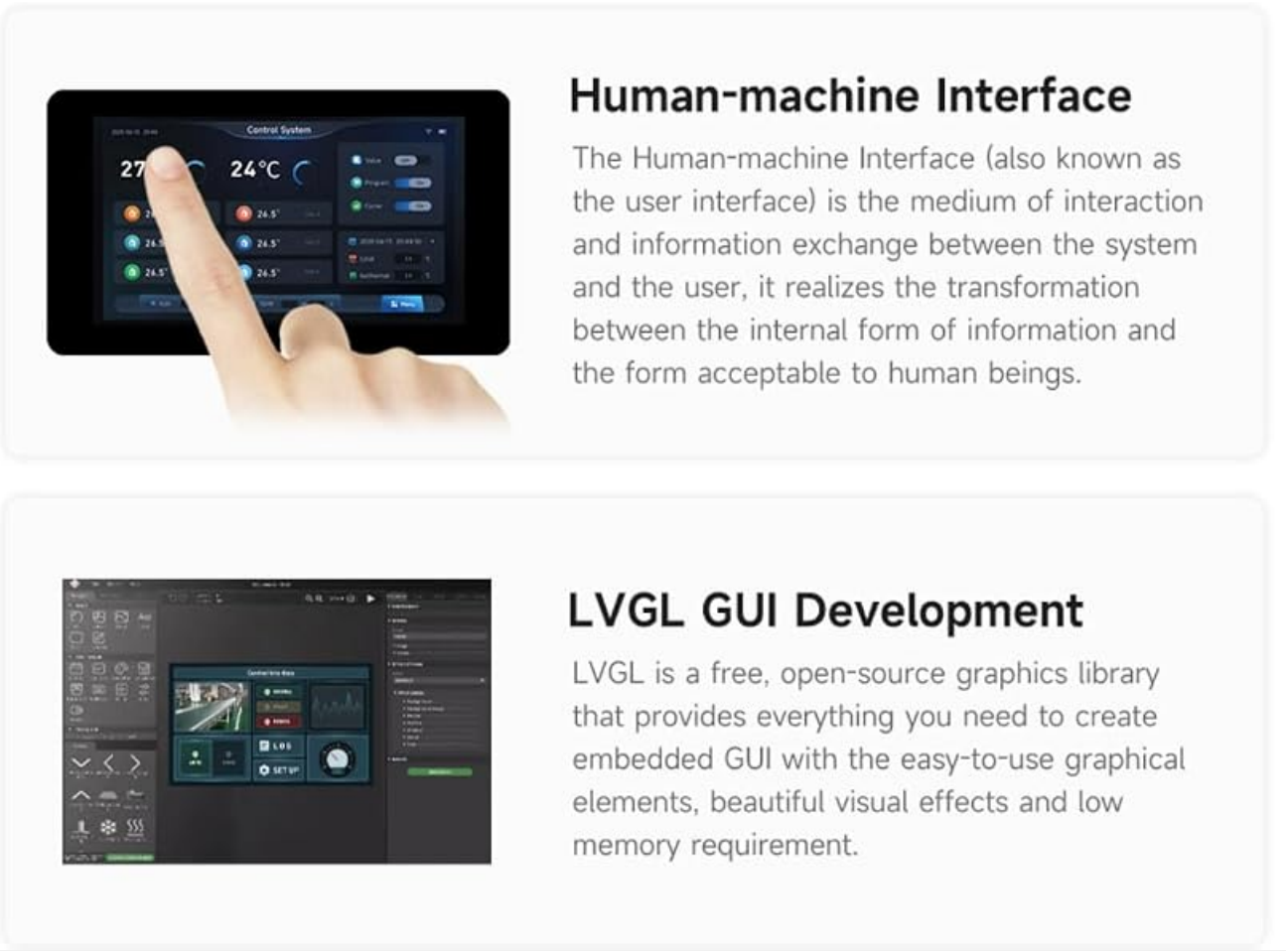
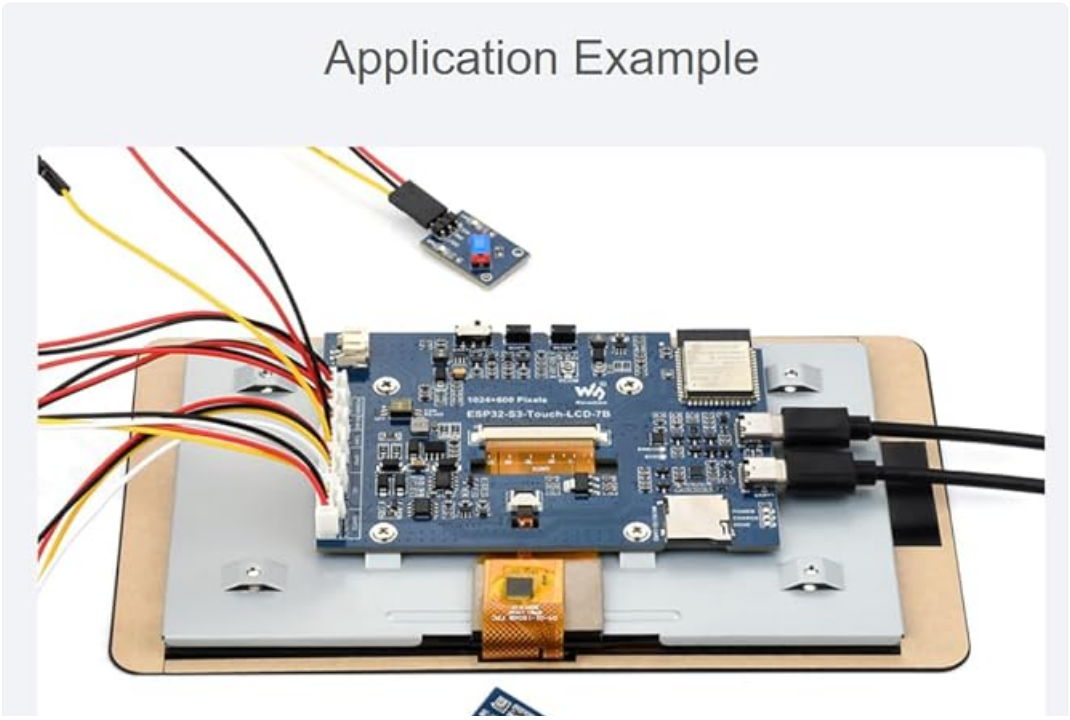


Figure 4: Illustrates potential application scenarios such as Human-Machine Interface (HMI) and LVGL GUI development, highlighting the board's versatility.

4. Setup Guide

4.1 Component Identification

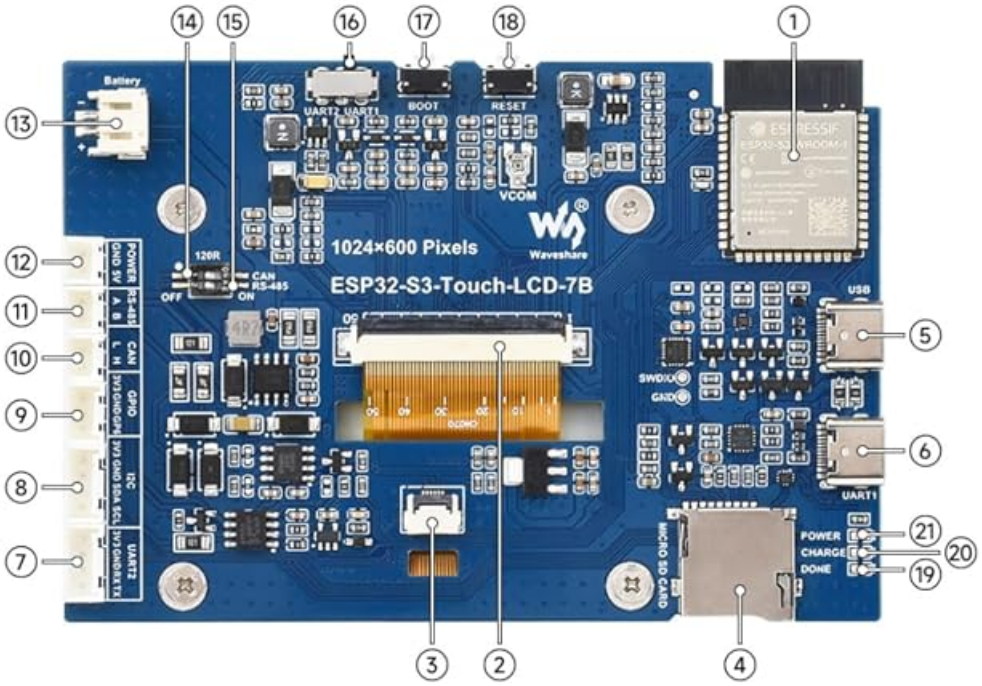
Before beginning, familiarize yourself with the various components and interfaces on the development board. Refer to the diagram below for a detailed layout.





for reference only, please refer to the Package Content for the detailed part list

What's On Board



1. **ESP32-S3-WROOM-1-N16R8 module**
   The SoC with WiFi and Bluetooth, up to 240MHz operating frequency, integrated 8MB PSRAM and 16MB Flash
2. **Display panel connector**
3. **Touch panel connector**
4. **TF card slot**
5. **USB Type-C port**
6. **UART1 Port**
   USB TO UART Type-C port
7. **UART2 header**
   UART1 and UART2 are the same UART, selected by switch
8. **I2C header**
9. **Sensor header**
10. **CAN header**
11. **RS485 header**
12. **5V output**
13. **3.7V Lithium battery PH2.0 header**
14. **CAN terminal resistor selection**
15. **RS485 terminal resistor selection**
16. **UART selection**
    select UART1 or UART2
17. **BOOT button**
    Press and hold while powering on for program burning
18. **RESET button**
19. **DONE**
    Lithium battery charging completed indicator
20. **CHARGE**
    Lithium battery charging indicator
21. **POWER**
    Power supply indicator

Figure 5: Diagram showing the various peripheral interfaces supported by the ESP32-S3 development board, including RS485, CAN, I2C, GPIO, USB, and UART.

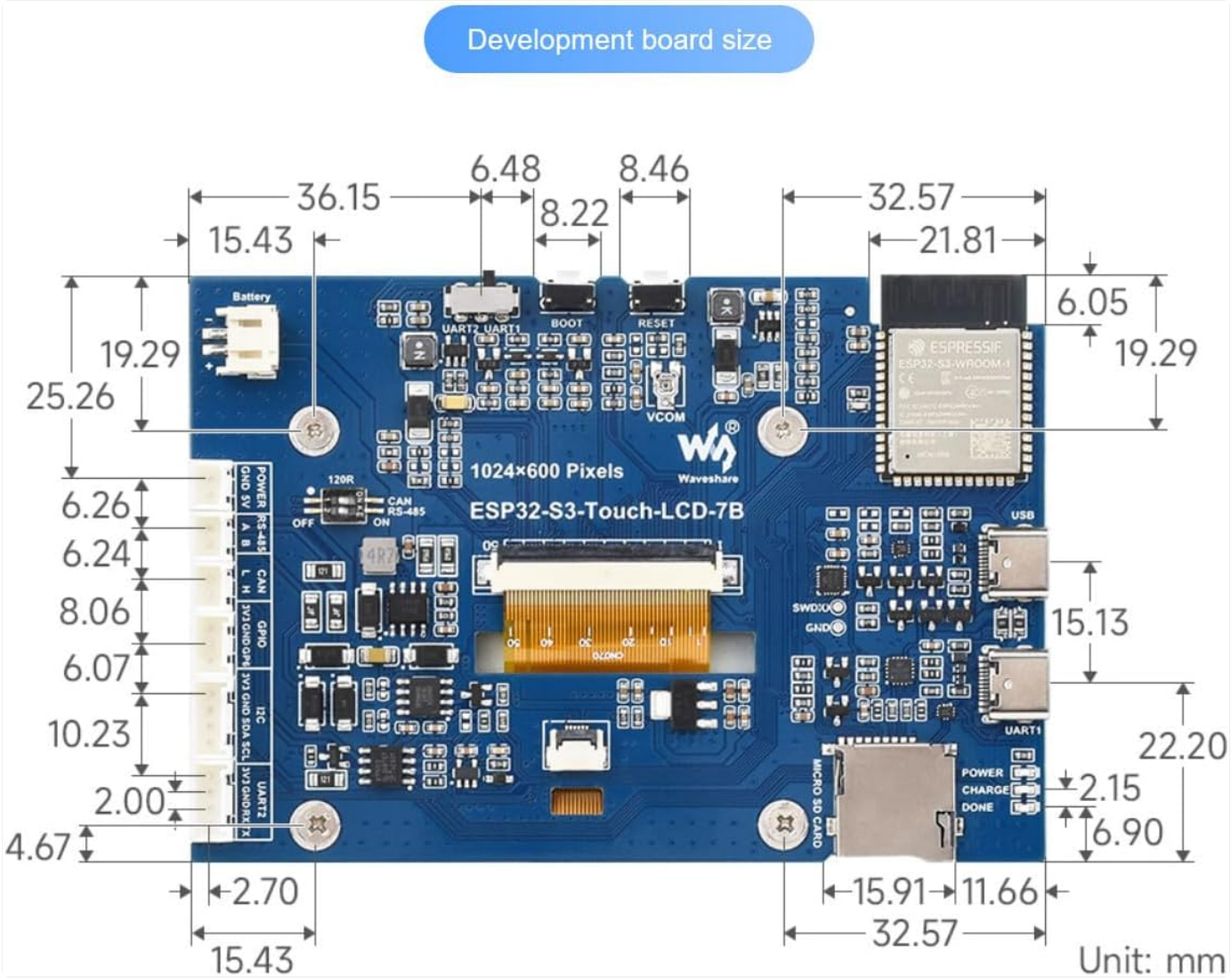


Figure 6: Detailed labeled diagram of the ESP32-S3-Touch-LCD-7B board, identifying key components such as the ESP32-S3 module, display connector, USB ports, and various headers.

4.2 Initial Connection

1. **Power Supply:** Connect a 5V power supply to the USB Type-C port (labeled as USB on the board diagram) or the 3.7V Lithium battery PH2.0 header. Ensure the power indicator LED illuminates.
2. **USB Connection:** For programming and serial communication, connect the board to your computer using a USB Type-C cable.
3. **TF Card (Optional):** If using a TF card for storage or boot, insert it into the TF card slot.
4. **Peripheral Connections (Optional):** Connect any external sensors or modules to the appropriate CAN, RS485, I2C, or GPIO headers using the provided cables as needed for your project.

4.3 Software Environment

To develop applications for the ESP32-S3-Touch-LCD-7B, you will need to set up a development environment. This typically involves:

- Installing the ESP-IDF (Espressif IoT Development Framework) or Arduino IDE with ESP32 board support.
- Installing necessary drivers for the USB-to-serial converter (if not automatically detected).
- Refer to the official Espressif documentation for detailed instructions on setting up your development environment.

5. Operation

5.1 Basic Operation

Once powered, the board will execute the firmware loaded onto its Flash memory. The 7-inch LCD will display the graphical user interface (GUI) if programmed to do so. The capacitive touch screen allows for interactive control of your applications.

5.2 Programming and Firmware Upload

To upload new firmware:

1. Connect the board to your computer via the USB Type-C port.
2. Put the board into bootloader mode by holding down the **BOOT** button (labeled 17 in Figure 6) and then pressing the **RESET** button (labeled 18 in Figure 6). Release the **RESET** button, then release the **BOOT** button.
3. Use your chosen IDE (e.g., ESP-IDF, Arduino IDE) to compile and upload your code.
4. After successful upload, press the **RESET** button to run the new firmware.

5.3 Wi-Fi and Bluetooth Connectivity

The ESP32-S3 supports 2.4GHz Wi-Fi and Bluetooth 5 (LE). Your firmware can utilize these features for network communication, data transfer, and IoT applications. Refer to the ESP-IDF or Arduino libraries for specific API calls and examples.

5.4 Using Peripheral Interfaces

The board provides various interfaces for expanding its functionality:

- **I2C:** Connect I2C sensors or devices. The touch screen also uses an I2C interface.
- **CAN/RS485:** For industrial communication protocols.
- **GPIO:** General Purpose Input/Output pins for connecting buttons, LEDs, and other digital components.
- **TF Card Slot:** For external storage, useful for logging data or storing display assets.

6. Maintenance

Proper care and maintenance will extend the lifespan of your development board:

- **Cleaning:** Use a soft, dry cloth to clean the display and board. Avoid abrasive cleaners or solvents. For the screen, a microfiber cloth is recommended.
- **Handling:** Handle the board by its edges to avoid touching sensitive components. Static electricity can damage electronic components, so use anti-static precautions if possible.
- **Storage:** Store the board in a dry, cool environment, away from direct sunlight and extreme temperatures. Keep it in its original packaging or an anti-static bag when not in use.
- **Power:** Always use a stable 5V power supply. Avoid over-voltage or reverse polarity connections.

7. Troubleshooting

If you encounter issues with your ESP32-S3-Touch-LCD-7B, consider the following troubleshooting steps:

- **Board Not Powering On:**
  - Ensure the power supply is correctly connected and providing 5V.
  - Check the power indicator LED. If it's off, verify the power source and cable.
- **Display Not Working:**
  - Confirm the display ribbon cable is securely connected to the board.
  - Verify that your firmware initializes the display correctly.

- **Touch Screen Unresponsive:**
  - Ensure the touch screen's I2C connection is secure.
  - Check your firmware for proper touch controller initialization and event handling.
- **Failed Firmware Upload:**
  - Ensure the board is in bootloader mode (hold BOOT, press/release RESET, then release BOOT).
  - Verify the correct COM port is selected in your IDE.
  - Check USB cable and drivers.
- **Wi-Fi/Bluetooth Connectivity Issues:**
  - Confirm your code correctly configures and connects to networks/devices.
  - Check for interference or range issues.

For more advanced issues, consult the Espressif documentation or relevant online communities.

8. Technical Specifications

Feature	Specification
Model Number	ESP32-S3-Touch-LCD-7B
Processor	Xtensa 32-bit LX7 Dual-core, up to 240MHz
Display Size	7-inch
Display Resolution	1024 × 600 pixels
Color Depth	65K colors
Touch Type	5-point Capacitive Touch
Wi-Fi	2.4GHz (802.11 b/g/n)
Bluetooth	Bluetooth 5 (LE)
SRAM	512KB
ROM	384KB
Onboard Flash	16MB
Onboard PSRAM	8MB
Interfaces	CAN, RS485, I2C, TF Card Slot, USB Type-C
Power Input	5V via USB-C, 3.7V Lithium Battery
Manufacturer Part Number	Zero-DISP-7A
UPC	795602426616
ASIN	B0FGNKC86V

8.1 Dimensions

The physical dimensions of the development board are provided below for integration and enclosure design purposes.

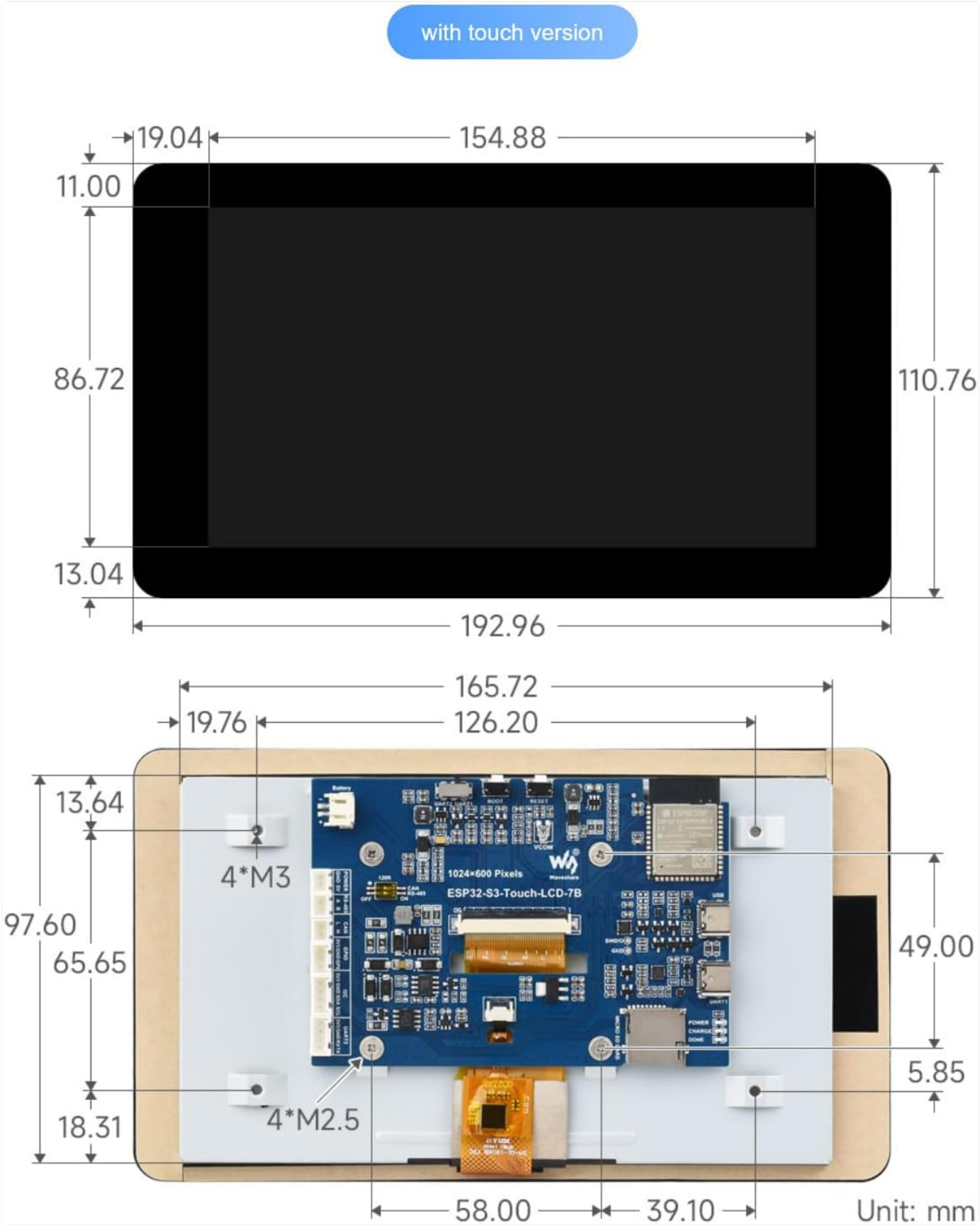


Figure 7: Technical drawing showing the dimensions of the ESP32-S3 development board in millimeters.

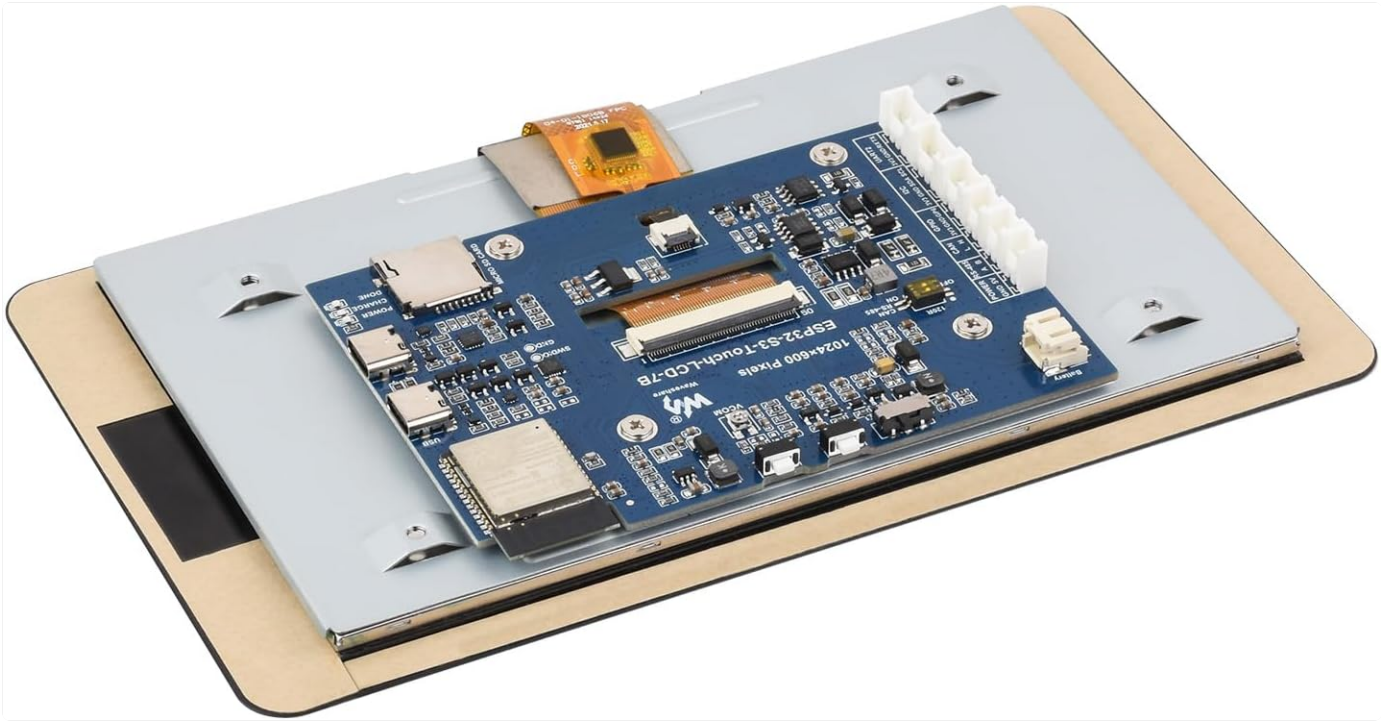


Figure 8: Technical drawing showing the overall dimensions of the ESP32-S3-Touch-LCD-7B model, including the integrated touch screen, in millimeters.

9. Warranty and Support

9.1 Warranty Information

This XYGStudy product comes with a **1-Year Warranty** from the date of purchase. The warranty covers manufacturing defects and malfunctions under normal use. It does not cover damage caused by misuse, accidents, unauthorized modifications, or improper installation.

9.2 Customer Support

For technical assistance, warranty claims, or any questions regarding your ESP32-S3-Touch-LCD-7B development board, please contact XYGStudy customer support through the Amazon messaging system. Provide your order number and a detailed description of the issue for prompt assistance.

Ask a question about this manual

Ask about setup, troubleshooting, compatibility, parts, safety, or missing instructions. Manuals+ will review the question and use this page's manual context to help answer it.

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Question

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Details

Model number, symptoms, what you tried, or the section of the manual you are using.

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