Waveshare 1.47inch Touch LCD

Waveshare 1.47inch LCD Display Module with Touch Panel User Manual

Model: 1.47inch Touch LCD

1. Introduction

This manual provides essential information for setting up, operating, and maintaining your Waveshare 1.47inch LCD Display Module with Touch Panel. This micro LCD display features a 172x320 resolution, 262K colors, and an IPS panel, offering clear and vibrant visuals. It integrates a JD9853 driver chip for the display and an AXS5106L capacitive touch control chip, utilizing SPI and I2C communication respectively. The module is designed for compatibility with various controller boards, including Raspberry Pi, Raspberry Pi Pico, and ESP32S3, minimizing the required I/O pins for integration into your projects.

2. Package Contents

Verify that all items listed below are included in your package:

- 1.47inch Touch LCD x1
- SH1.0 13PIN cable ~100mm x1
- FFC cable x1

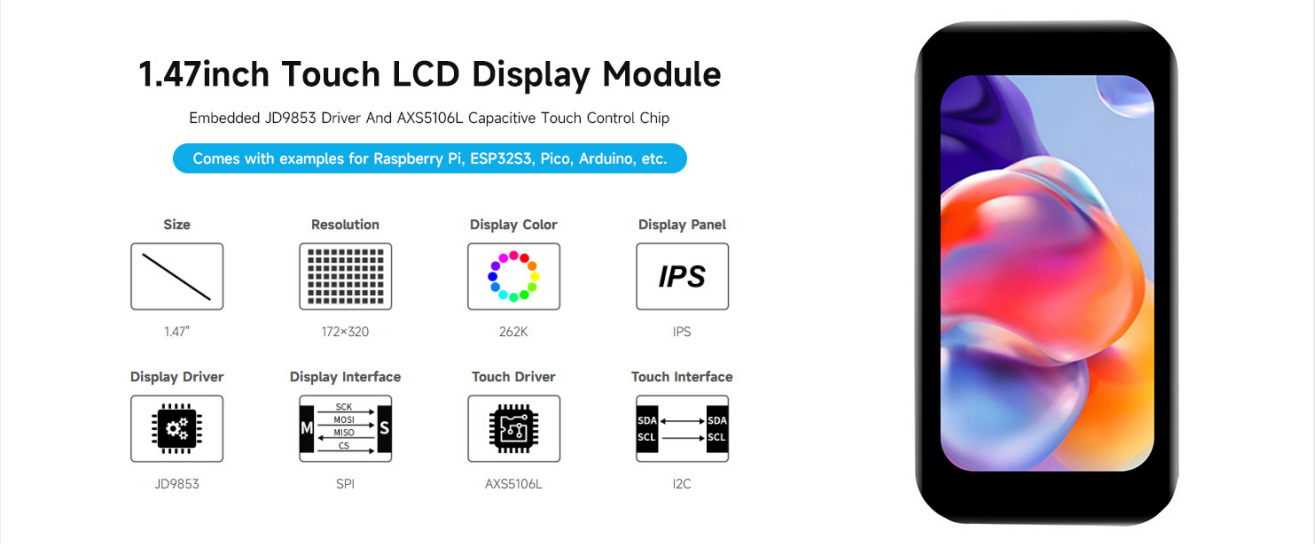


Figure 2.1: Contents of the Waveshare 1.47inch LCD Display Module package, including the display, SH1.0 13PIN cable, and FFC cable.

3. Features

The Waveshare 1.47inch LCD Display Module offers the following key features:

- **172x320 Resolution:** Provides a clear and colorful display effect with 262K colors.
- **High Touch Screen Transmittance:** Ensures fast response and long lifetime for touch interactions.
- **Integrated Driver Chips:** Embedded JD9853 driver chip for the display and AXS5106L capacitive touch control chip.
- **Flexible Communication:** Uses SPI for display and I2C for touch, minimizing required I/O pins.
- **Broad Compatibility:** Supports controller boards such as Raspberry Pi, ESP32S3, and Raspberry Pi Pico.
- **Rich Wiki Resources:** Official Wiki resources are available for development and examples.

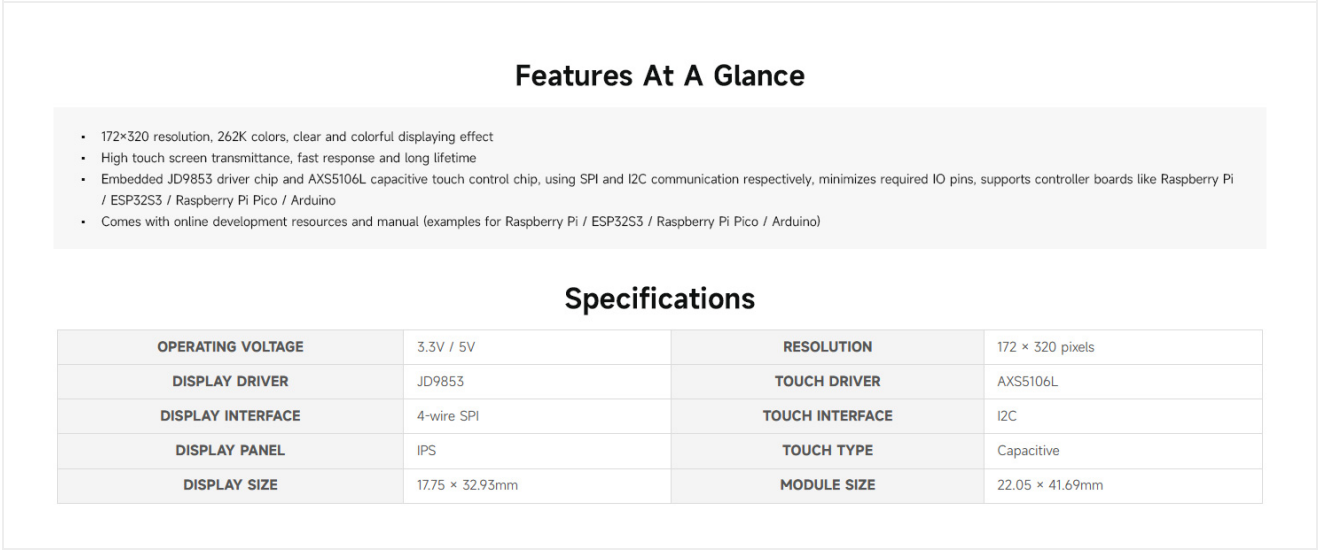


Figure 3.1: Visual summary of the 1.47inch Touch LCD Display Module's key features and specifications.

4. Specifications

Detailed technical specifications for the 1.47inch Touch LCD Display Module:

Parameter	Value	Parameter	Value
Operating Voltage	3.3V / 5V	Resolution	172 x 320 pixels
Display Driver	JD9853	Touch Driver	AXS5106L
Display Interface	4-wire SPI	Touch Interface	I2C
Display Panel	IPS	Touch Type	Capacitive
Display Size	17.75 x 32.93mm	Module Size	22.05 x 41.69mm
Item Weight	0.64 ounces	Package Dimensions	2.7 x 1.9 x 0.6 inches

Features At A Glance

- 172×320 resolution, 262K colors, clear and colorful displaying effect
- High touch screen transmittance, fast response and long lifetime
- Embedded JD9853 driver chip and AXS5106L capacitive touch control chip, using SPI and I2C communication respectively, minimizes required IO pins, supports controller boards like Raspberry Pi / ESP32S3 / Raspberry Pi Pico / Arduino
- Comes with online development resources and manual (examples for Raspberry Pi / ESP32S3 / Raspberry Pi Pico / Arduino)

Specifications

OPERATING VOLTAGE	3.3V / 5V	**RESOLUTION**	172 × 320 pixels
DISPLAY DRIVER	JD9853	**TOUCH DRIVER**	AXS5106L
DISPLAY INTERFACE	4-wire SPI	**TOUCH INTERFACE**	I2C
DISPLAY PANEL	IPS	**TOUCH TYPE**	Capacitive
DISPLAY SIZE	17.75 × 32.93mm	**MODULE SIZE**	22.05 × 41.69mm

Figure 4.1: Key specifications of the display module.

5. Setup

5.1 Onboard Voltage Translator

The module includes an onboard voltage translator, making it compatible with both 3.3V and 5V power inputs. This simplifies integration with various microcontrollers without requiring external level shifters.

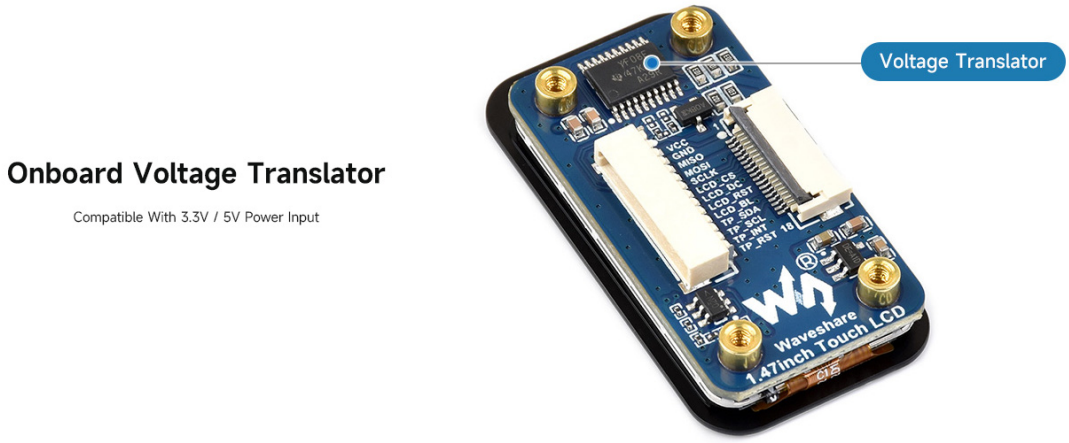


Figure 5.1: The module's onboard voltage translator for 3.3V/5V compatibility.

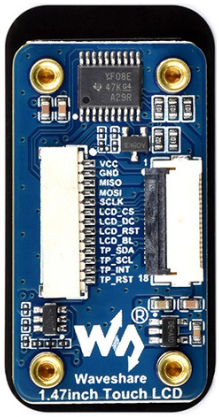
5.2 SPI and I2C Control Interfaces

The display uses a 4-wire SPI interface for data transfer, while the capacitive touch panel communicates via I2C. This dual-interface design optimizes pin usage.

Pinout Description

Pin	Description
VCC	Power (3.3V / 5V input)
GND	Ground
MISO	SPI MISO pin

Pin	Description
MOSI	SPI MOSI pin
SCLK	SPI Clock pin
LCD_CS	LCD Chip Selection, low active
LCD_DC	LCD Data/Command selection (high for data, low for command)
LCD_RST	LCD Reset, low active
LCD_BL	LCD Backlight
TP_SDA	TP Data pin
TP_SCL	TP Clock pin
TP_INT	TP Interrupt pin
TP_RST	TP Reset, low active



SPI And I2C Control Interfaces

Embedded JD9853 Driver And AXS5106L Capacitive Touch Control Chip

VCC	Power (3.3V / 5V input)
GND	Ground
MISO	SPI MOSI pin
MOSI	SPI MOSI pin
SCLK	SPI Clock pin
LCD_CS	LCD Chip Selection, low active
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TP_SDA	TP Data pin
TP_SCL	TP Clock pin
TP_INT	TP Interrupt pin
TP_RST	TP Reset, low active

Figure 5.2: Pinout details for connecting the display module.

5.3 Connection Examples

The module can be easily connected to various development boards. Below are examples for Raspberry Pi and ESP32-S3.

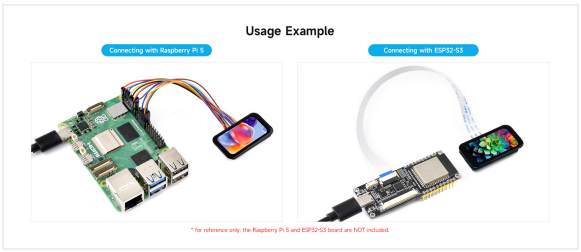

Figure 5.3: Connecting with Raspberry Pi 5.

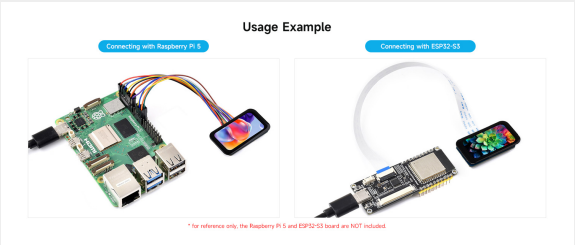

Figure 5.4: Connecting with ESP32-S3.

Note: Raspberry Pi 5 and ESP32-S3 boards are not included with the display module.

6. Operating Instructions

To operate the Waveshare 1.47inch LCD Display Module, you will need to program your chosen microcontroller (e.g., Raspberry Pi, ESP32S3, Raspberry Pi Pico) to communicate with the display and touch controller.

6.1 Software Configuration

1. **Install Libraries:** Depending on your development board and programming language (e.g., Python, C/C++), you will need to install specific libraries for SPI and I2C communication, as well as display and touch control.
2. **Initialize Display:** Configure the display driver (JD9853) via SPI to initialize the screen, set resolution, and manage colors.
3. **Initialize Touch:** Configure the touch controller (AXS5106L) via I2C to enable touch detection and read touch coordinates.
4. **Display Content:** Use graphics libraries to draw text, shapes, and images on the LCD.
5. **Handle Touch Input:** Implement code to read touch events and respond to user interactions.

For detailed programming examples, code libraries, and comprehensive tutorials, please refer to the official Waveshare Wiki resources. These resources provide platform-specific guides for Raspberry Pi, ESP32S3, Raspberry Pi Pico, and Arduino.

Official Wiki Resources: Visit Waveshare Wiki

7. Maintenance

Proper care and maintenance will ensure the longevity and optimal performance of your display module.

- **Handling:** Avoid applying excessive force to the display or touch panel. Handle the module by its edges to prevent damage to components.
- **Cleaning:** Use a soft, lint-free cloth, slightly dampened with water or a mild screen cleaner, to gently wipe the display surface. Avoid abrasive materials or harsh chemicals.
- **Storage:** Store the module in a dry, dust-free environment, away from direct sunlight and extreme temperatures. If not in use for extended periods, consider storing it in its original anti-static packaging.
- **Power:** Ensure the power supply voltage is within the specified 3.3V to 5V range. Incorrect voltage can damage the module.

8. Troubleshooting

If you encounter issues with your Waveshare 1.47inch LCD Display Module, refer to the following troubleshooting tips:

- **Display Not Lighting Up:**
    - Check power connections (VCC and GND) to ensure they are correctly wired and receiving the appropriate voltage (3.3V or 5V).

- Verify the LCD backlight (LCD_BL) pin is correctly connected and enabled in your software.
- Ensure the SPI communication pins (MISO, MOSI, SCLK, LCD_CS, LCD_DC, LCD_RST) are correctly wired and configured.

- **No Display Output / Garbled Display:**
  - Confirm that the display driver (JD9853) is correctly initialized in your code.
  - Check for correct SPI mode and clock speed settings.
  - Ensure all SPI data lines are securely connected and free from shorts.
- **Touch Not Responding:**
  - Verify I2C connections (TP_SDA, TP_SCL) are correct.
  - Ensure the touch controller (AXS5106L) is correctly initialized via I2C in your software.
  - Check if the TP_INT pin is correctly configured and monitored for touch events.
  - Ensure the touch panel surface is clean and free from obstructions.
- **Communication Errors:**
  - Double-check all wiring against the pinout diagram.
  - Ensure your microcontroller's GPIO pins are correctly configured for SPI and I2C.
  - Consult the Waveshare Wiki for specific examples and common issues related to your development board.

9. Dimensions

The physical dimensions of the Waveshare 1.47inch LCD Display Module are provided below for integration planning.

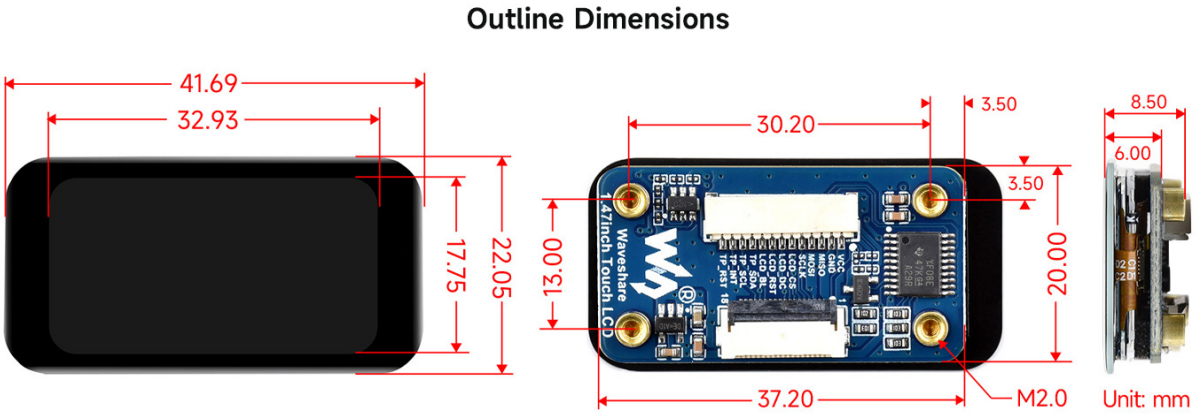

Figure 9.1: Outline dimensions of the 1.47inch Touch LCD module (Unit: mm).

10. Official Product Videos

Explore these official product videos for additional guidance and demonstrations:

Video 10.1: Product overview and demonstration of the Waveshare 1.47inch LCD Display Module.

Video 10.2: Detailed look at the features and capabilities of the display module.

Video 10.3: Guide on connecting the display module to a development board.

Video 10.4: Software setup and programming examples for the display module.

Video 10.5: Demonstration of touch functionality and responsiveness.

Video 10.6: Quick start guide for initial setup of the display module.

Video 10.7: Advanced usage scenarios and project ideas with the display module.

Video 10.8: Compatibility and integration with various single-board computers.

11. Warranty and Support

Waveshare products are designed for reliability and performance. For specific warranty information, please refer to the purchase documentation or contact Waveshare directly.

For technical support, detailed documentation, and community forums, please visit the official Waveshare Wiki. The Wiki provides extensive resources, including setup guides, programming examples, and troubleshooting tips for the 1.47inch Touch LCD module.

Waveshare Support: https://www.waveshare.com/wiki/Main_Page