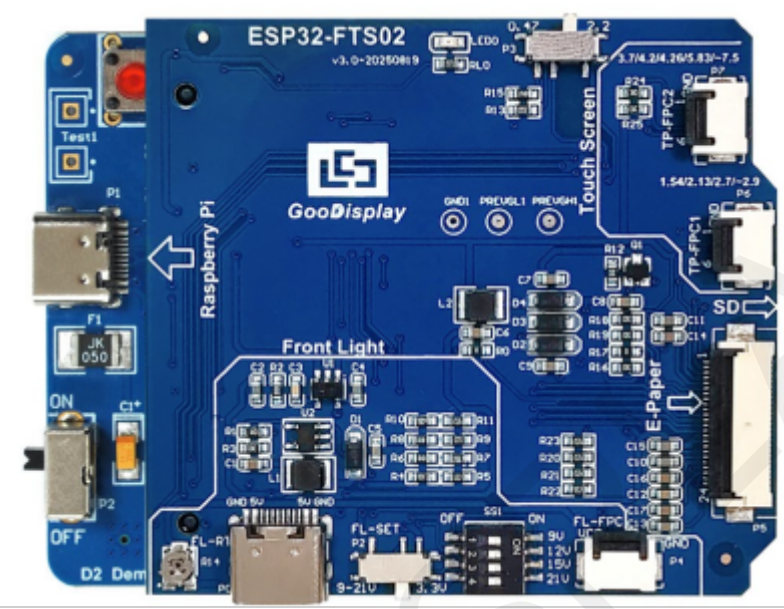
E-paper Display Development Kit

GooDisplay®

ESP32-L（FTS02）

Dalian Good Display Co., Ltd.

Product Specifications



Customer	**Standard**
Description	Evaluation Kit For E-paper Display
Model Name	ESP32-L(FTS02)
Date	2025/09/02
Revision	v1.0

	Design Engineering		
	Approval	**Check**	**Design**
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1.Overview

The ESP32-L (FTS02) development board helps developers accelerate and streamline the development of e-paper display projects. It is designed for SPI interface e-paper displays, compatible with the 24PIN connector, and capable of driving e-paper panels up to 13.3 inches. It also supports e-paper touchscreens up to 7.5 inches, front lights under 21V, microSD card image expansion, and Raspberry Pi interface. This enables seamless collaboration between the touchscreen, front light, and e-paper display, making it convenient for early-stage project debugging and significantly speeding up the development process. The mainboard is equipped with an LED indicator, reset button, font chip, FLASH chip, and other features.

The ESP32-L (FTS02) development kit includes two parts: the ESP32-L mainboard and the ESP32-FTS02 adapter board.

The ESP32-L (FTS02) development kit is intended solely for driving e-paper displays, touchscreens, and front lights. Other functions such as WiFi and Bluetooth require customers to develop independently according to their project needs.

2. Structure Specification

Parameter	Specification
Model	ESP32-L(FTS02)
Platform	Arduino
Dimension	MotherBoard：70mmx54mm(ESP32-L) Adapter：58.6mmx54.7mm(DESPI-FTS02)
Power Interface	Type-C
Example Code	Available
Operating Temp.	-20℃~70℃
Main Function	Learn how to drive e-paper displays, touch screens, and front lights. Test and evaluate e-paper displays, touch screens, and front lights. Conduct secondary development based on this board.
Additional Function	Current detection, font chip, Flash chip, etc., with support for touchscreen driving, front light driving, and micro SD card interface.

3. ESP32-L Main Board Function Overview

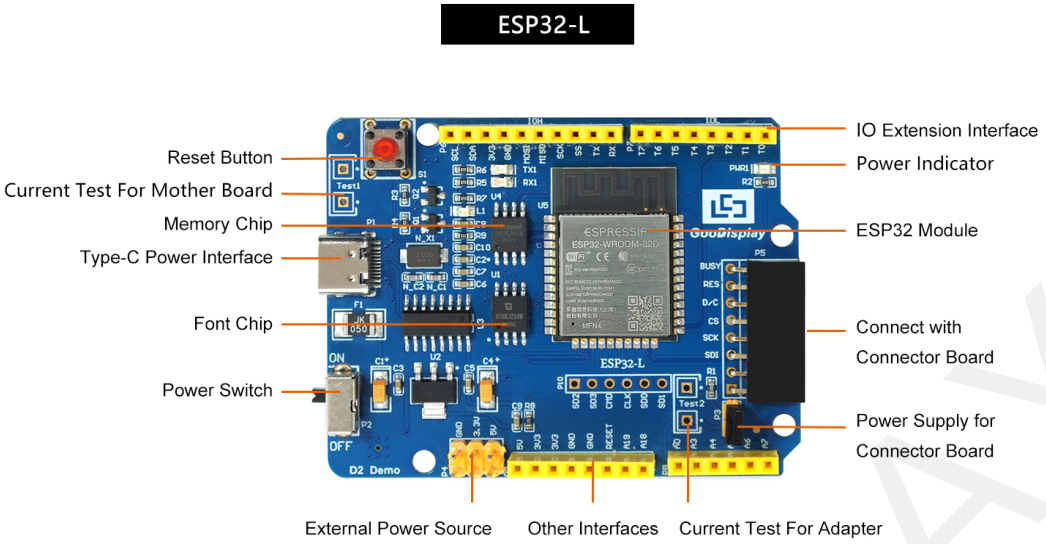

Figure 1：ESP32-L

3.1 Power Module

The development board input voltage is DC 5V, powered through the Type-C interface.

3.2 Communication

This development board uses USB-to-serial communication. The CH340 driver must be installed before programming.

3.3 P3 Jumper Cap

The P3 jumper cap controls the power supply to the adapter board (i.e., the e-paper power). It must be connected during use.

3.4 Current Measurement

This development board supports current measurement for both the main board and the adapter board.

1. Main board current measurement: Set the power switch to OFF and connect the ammeter in series to TEST1.
2. Adapter board current measurement: Set the power switch to ON, remove the P3 jumper cap, and connect the ammeter in series to TEST2. After testing, reconnect the P3 jumper cap.

3.5 IO Expansion

This development board provides breakout pins for digital input/output T0－T7, analog input/output A0－A19, SPI, IIC, and UART interfaces, making it convenient for early development and testing.

3.6 Indicator Light

This development board has one status indicator light for development use.

3.7 Reset Button

This development board includes a reset button for easy operation.

3.8 Extended Functions

This product is equipped with the GT30L32S4W font chip for convenient font extraction. It is also equipped with the W25Q16 data storage chip for storing images and test data.

4. ESP32-FTS02 Adapter Board Function Overview

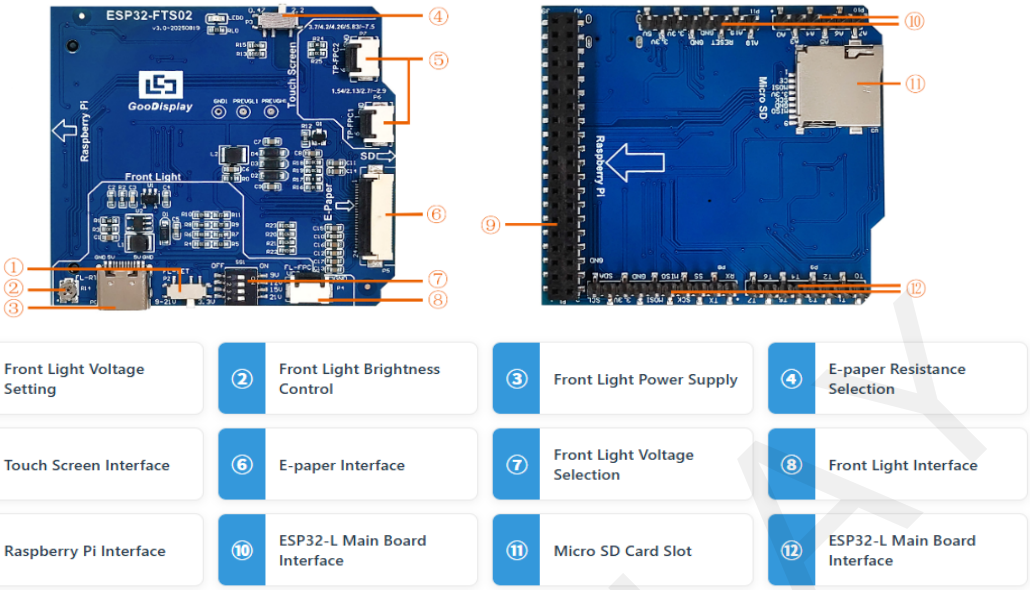

Figure 2：ESP32-FTS02 Adapter Board Functions

4.1 DIP Switch P3

The DIP switch P3 is used for selecting the matching resistor (RESE resistor) of the current feedback in the e-paper peripheral boost circuit. Different models of e-paper require different RESE resistors. Choosing the wrong resistor may result in the e-paper failing to refresh properly.

1. Set P3 to the 0.47 position for UC (UltraChip) driver IC series e-paper.
2. Set P3 to the 2.2 position for SSD (Solomon) driver IC series e-paper.
3. Set P3 to the 2.2 position for black/white/red/yellow four-color e-paper.

4.2 E-paper FPC Interface

The e-paper display is connected to the adapter board through this interface.
When connecting, place the display facing upward and insert the FPC into the P5 connector of the adapter board. After inserting, press down the black FPC latch to secure the connection.

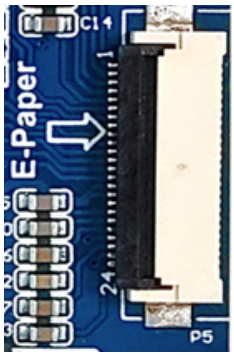

Figure 3: E-paper Interface

4.3 Touchscreen Interface

This adapter board can connect to a touchscreen, as shown in Figure 4.
For touchscreens under 2.9 inches, use the P6 interface; for touchscreens above 3.7 inches, use the P7 interface.

Note: 2.9-inch and 7.5-inch touchscreens must be inserted in reverse orientation into the corresponding interface.

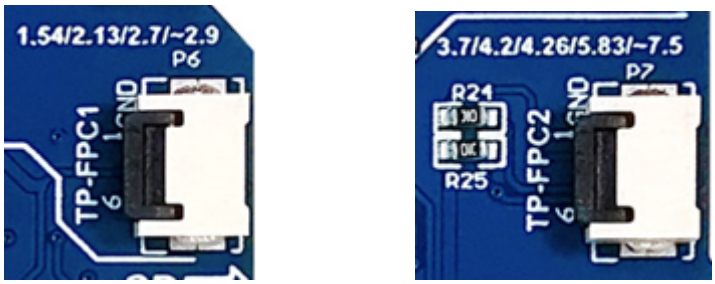

Figure 4: Touch Screen Interface

4.4 Front Light Interface

This adapter board can connect a front light, as shown in Figure 5. P0 is the front light power input, connected to the Type-C power cable. R14 is a potentiometer that can be rotated to adjust the front light brightness. Use P2 to select 3.3V or a higher voltage.

1. 3.3V setting (P2 set to 3.3V): for 1.54-inch, 2.13-inch, 2.66-inch, 3.7-inch, and 2.9-inch front lights (FPC inserted in reverse)
2. 12V setting (P2 set to 9 – 21V range, SS1 set to 12V): for 2.7-inch front light
3. 21V setting (P2 set to 9 – 21V range, SS1 set to 21V): for 4.2-inch front light
4. 9V and 15V settings reserved

Note: Do not connect a touchscreen to the front light interface, as this may damage the touchscreen.

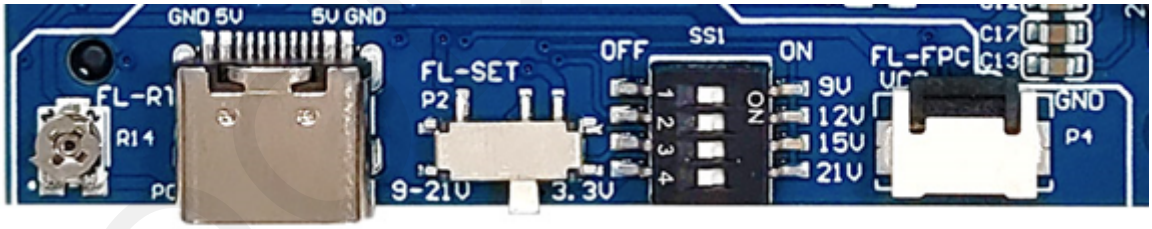

Figure 5: Front Light Interface

4.5 SD Card Interface

The adapter board can connect a micro SD card on the back, as shown in Figure 6. Insert the micro SD card into the U3 slot to allow users to expand applications using the micro SD card.

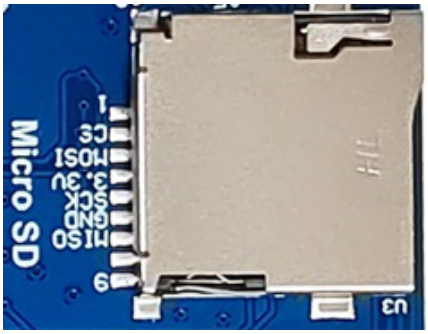

Figure 6: micro SD Card Interface (on the back of the adapter board)

4.6 Raspberry Pi Interface

This adapter board can be connected directly to a Raspberry Pi, as shown in Figure 7. The corresponding Raspberry Pi interface is P1. The connection between the adapter board and Raspberry Pi is illustrated in Figure 8.

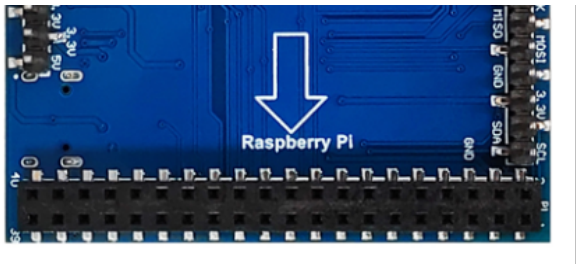

Figure 7: Raspberry Pi Interface (on the back of the adapter board)

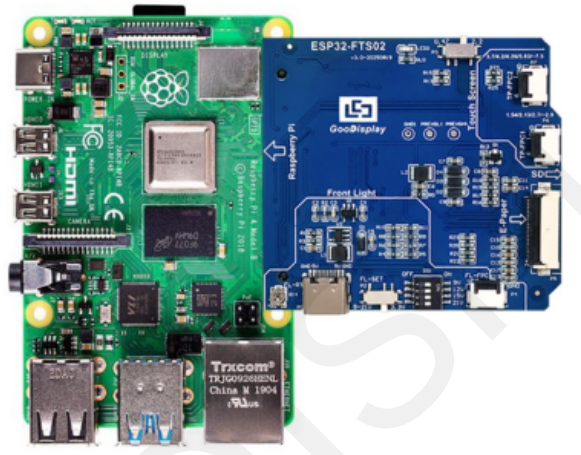

Figure 8: Raspberry Pi Connection Diagram
(interface on the back of the adapter board)

4.7 ESP32-L Main Board Interface

This adapter board can be directly connected to the ESP32-L main board, as shown in Figure 9. The corresponding ESP32-L interfaces are P8 – P11. Users can use this connection to test e-paper display, touchscreen driving, front light operation, and micro SD card image expansion functions.

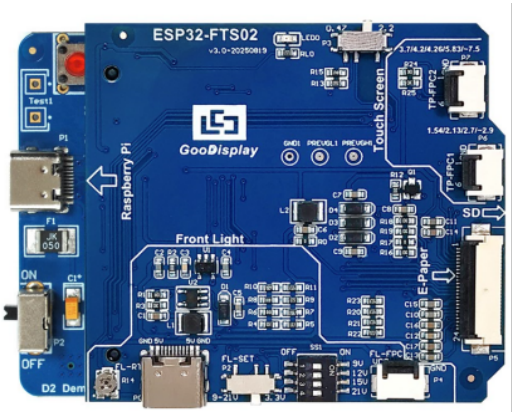

Figure 9: ESP32-L Main Board Connection Diagram
(interfaces on the back of the adapter board)

5. Program Downloading

This development board uses a serial port to download the program and requires the Arduino IDE programming software, a Type-C data cable, CH340 driver, etc. The steps for setup are as follows:

5.1 Arduino IDE Installation and ESP32 Board Setup

1) Download the Arduino IDE software from the official website: www.arduino.cc. Use version 2.3.3 as an example.
2) In the Arduino IDE, go to Tools and find Board. Select Boards Manager from the Board menu.
3) In the Boards Manager, search for ESP32, select the appropriate version, and click INSTALL.

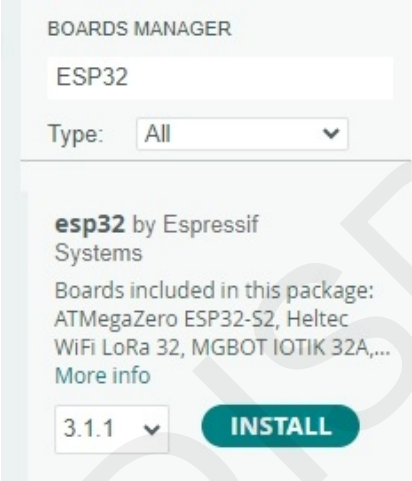

Figure 5 ESP32 Development Board Library Installation Diagram

4) After the ESP32 development board installation is complete, you will see the relevant board information in Tools > Board.

5.2 Downloading the ESP32 Development Board Driver

1) Use a Type-C data cable to connect the development board's USB interface to the computer.
2) Open the .ino project file from the ePaper driver program folder in the Arduino IDE, as shown in the image below.

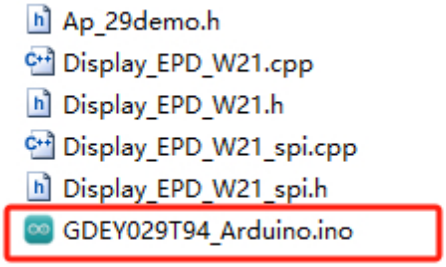

Figure 6 Opening the ino Project File

3) Steps to Download the E-paper Driver Program for the ESP32 Development Board

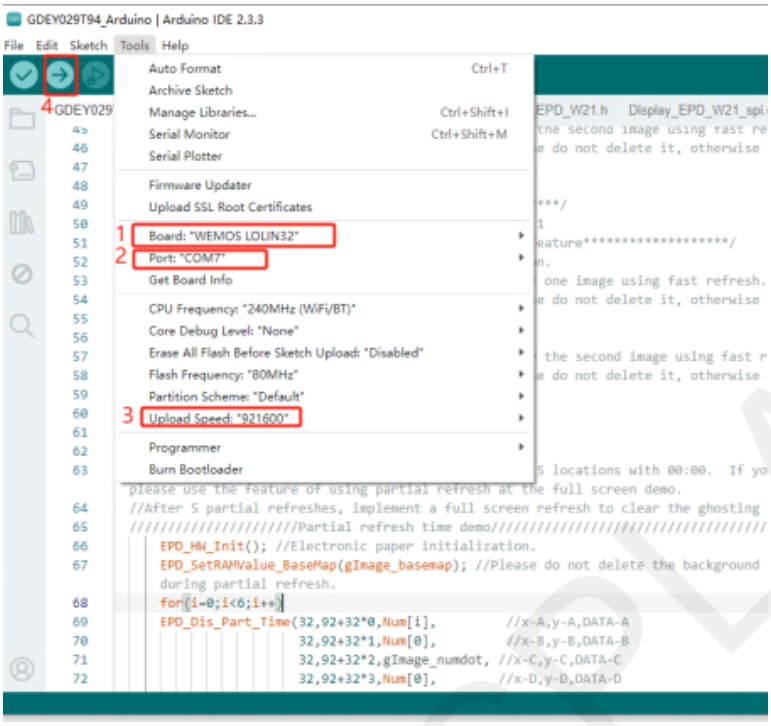

Figure 7 Program Download Operation Steps

1--Select the development board model "WEMOS LOLIN32".
2--Select the COM port.
3--Select the serial baud rate "921600".
4--Download the program to the development board.

4) After a successful download, first power off the development board, connect the e-paper display to the adapter board, then power on again. The e-paper will display th e image normally.

5.3 Using the ESP32epdx E-paper Official Library

Users can search for "ESP32epdx" in Manage Libraries in the Arduino IDE and install the official ePaper library. This library includes common Good Display ePaper driver programs and supports GUI functions. Additionally, new ePaper application features will be continuously added to the library, such as controlling ePaper displays via Blue tooth, Wi-Fi, and more.

GitHub: [https://github.com/gooddisplayshare/ESP32epdx]

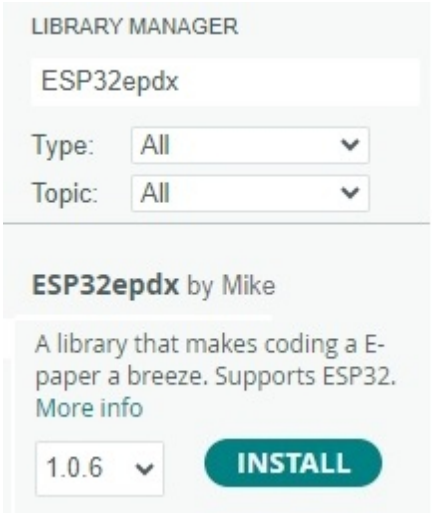

Figure 8 ESP32epdx Official Library Installation Diagram