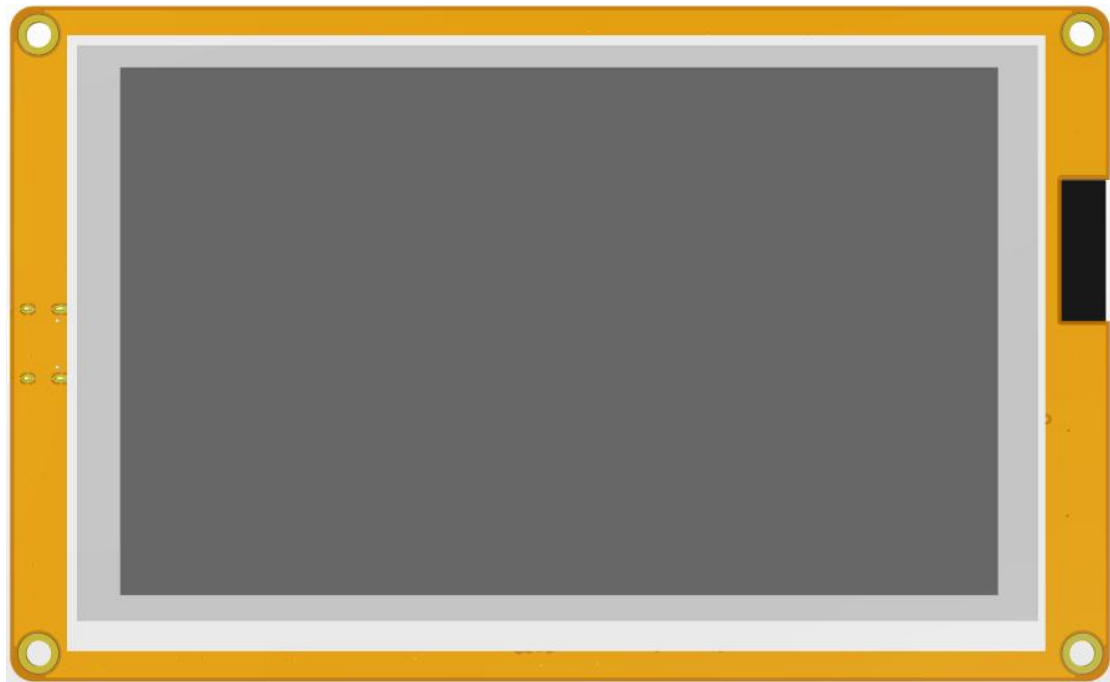


5-inch ESP32-S3 Display Module User Manual



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1. Data Package Description

The data directory is shown in the following figure:

名称	修改日期	类型
1-示例程序_Demo	2026/4/16 10:10	文件夹
2-规格书_Specification	2026/4/17 13:47	文件夹
3-尺寸图_Structure_Diagram	2026/4/17 13:41	文件夹
4-数据手册_DataSheet	2026/2/6 16:17	文件夹
5-原理图_Schematic	2026/4/17 13:46	文件夹
6-用户手册_User_Manual	2026/4/17 13:47	文件夹
7-工具软件_Tool_software	2026/2/6 16:17	文件夹
8-快速使用_Quick_Start	2026/2/6 16:17	文件夹

Figure 1.1 Product Data Package Directory

Directory	Content Description
1-示例程序_Demo	Demo program code, third-party software libraries dependent on demo programs, third-party software library replacement files, software development environment setup instructions, and demo program description documents.
2-规格书_Specification	Display module product specification, LCD screen specification.
3-尺寸图_Structure_Diagram	Display module product dimension drawing.
4-数据手册_DataSheet	LCD display datasheet, ESP32-S3 main control datasheet, and hardware design guide document.
5-原理图_Schematic	Product hardware schematic, ESP32-S3 module IO resource allocation table, schematic and PCB component packaging.
6-用户手册_User_Manual	Product user instruction document.
7-工具软件_Tool_software	WIFI and Bluetooth test APP and debugging tools, ESP32 Flash download tool software, character dot matrix tool, and serial port debugging tool.
8-快速使用_Quick_Start	Bin files to be burned, flash download tool, and usage instruction document.

2. Software Usage Instructions

The software development steps for the display module are as follows:

- A、Set up the ESP32 platform software development environment;
- B、Import third-party software libraries as the development foundation if necessary;
- C、Open the software project project to be debugged, or create a new software project project;
- D、Power on the display module, compile and download the debugged program, then check the software running effect;
- E、If the software effect does not meet expectations, continue to modify the program code, then compile and download until the effect meets expectations;

3. Hardware Usage Instructions

3.1. Brief Introduction to Hardware Resources of the Display Module

The hardware resources of the module are shown in the following two figures::



Figure 3.1 Module Hardware Resources

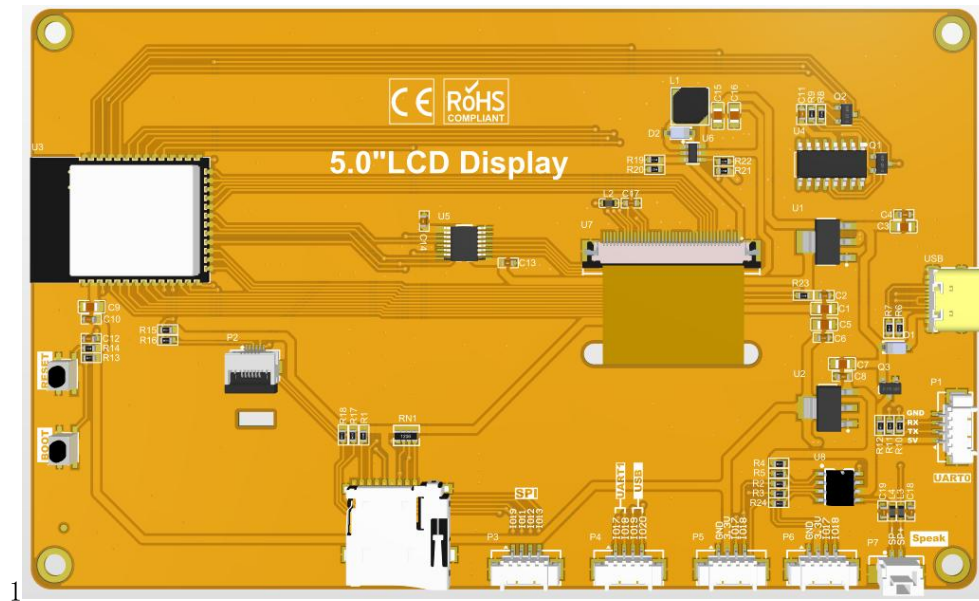


Figure 3.2 Module Hardware Resources 2

The description of hardware resources is as follows:

1) LCD Screen

The LCD screen has a 5-inch display with a resolution of 800x480. It connects to the ESP32-S3 via an RGB communication interface. The board features an XPT2046 chip that controls the resistive touch screen using SPI communication, and the display is connected to the FPC interface on the back of the PCB through a ribbon cable.

2) ESP32-S3 Module

This module has a built-in ESP32-S3 chip. The chip uses an Xtensa dual-core 32-bit LX7 dual-core microprocessor, supporting a maximum main frequency of 240MHz. It has 384KB ROM, 512KB SRAM, 16KB RTC SRAM, 8MB OPI PSRAM, and an external 16MB QSPI Flash. It supports 2.4GHz WIFI, Bluetooth V5.0, and BLE modules. It has 45 external GPIO ports, supporting peripheral interfaces such as SD card, UART, and SPI.

3) MicroSD Card Slot

It is connected to the ESP32-S3 using SPI communication mode and supports MicroSD cards of various capacities.

4) Serial Port

An external CH340 USB-to-serial module is used for module serial

communication.

5) USB-to-Serial and One-Click Download Circuit

The core component is CH340C, which is connected to the computer's USB on one end and the ESP32 serial port on the other end, thereby realizing USB-to-TTL serial port conversion. In addition, a one-click download circuit is added, which means that when downloading a program, it can automatically enter the download mode without external control.

6) BOOT Button

After the display module is powered on, pressing it will pull I00 low. If I00 is pulled low at the moment the module is powered on or when the ESP32-S3 is reset, it will enter the download mode. It can be used as a normal button in other cases.

7) Type-C Interface

The main power supply interface and program download interface of the display module. It is connected to the USB-to-serial and one-click download circuit, and can be used for power supply, download, and serial communication.

8) 5V to 3.3V Voltage Regulator Circuit

It includes two circuits: ESP32-S3 5V to 3.3V circuit and other 5V to 3.3V circuits. The ESP32-S3 5V to 3.3V circuit is specially used to supply power to the main control MCU circuit, and the other 5V to 3.3V circuits are specially used to supply power to circuits other than the main control. The core component of the circuit is an AMS1117 voltage regulator tube. This voltage regulator circuit supports a wide voltage input of 4.3V ~ 15V, a stable 3.3V voltage output, and a maximum output current of 1A, which can fully meet the voltage and current requirements of the display module.

9) RESET Button

After the display module is powered on, pressing it will pull the reset pin of the ESP32-S3 low (the default state is high), thereby realizing the reset function.

10) Extended Pins

2 free IO ports of the ESP32-S3 chip. They are led out for use by peripherals.

11) Backlight Control Circuit

The core component is the SY7200AABC high-current boost-type LED driver. With +5V as the input, it provides a stable constant current drive for the LED backlight string of the LCD screen through a boost topology. It also supports PWM dimming to adjust the backlight brightness and integrates safety mechanisms such as overvoltage protection to ensure the stable and reliable operation of the circuit and LEDs.

12) Audio control circuit

The core component is the NS4168 single-channel I2S input D-class audio power amplifier chip. The circuit is powered by +5V and receives I2S digital audio signals (SDATA, LRCLK, BCLK) from the main control. The chip enable/mute control is achieved through a voltage divider circuit on the CTRL pin. After converting the digital signal to analog audio internally, the internal D-class amplification circuit outputs the driving signal, which is then filtered by an LC low-pass filter network (inductor + 1nF capacitor) to drive the speaker. It also integrates anti-distortion, overcurrent, and overheat protection functions to ensure stable and reliable audio output.

13) SPI Peripheral Interface

A 4-wire horizontal interface. It leads out the I2C0 bus of the ESP32-S3 for connecting external I2C devices. It is shared with the SD card and resistive touch IC. If the touch and audio functions are not used, it can also be used as a normal IO port.

3.2. Precautions for Using the Display Module

- 1) If programming failure or white screen occurs, it may be caused by automatic reset due to touching the components on the backplane. You can try to power on again. If programming still fails, it may be due to poor interface contact; you can try replacing the charging cable and power on again.

- 2) During use, do not touch the LDO voltage regulator tube and battery charge management IC with your hands to avoid being scalded by high temperature.
- 3) When connecting the led-out IO ports, pay attention to the IO usage to avoid incorrect connection leading to mismatch with the program code definition.
- 4) Use this product safely and reasonably.