Connector Board for E-paper Display

DESPI-C02

Product Specifications

Customer	Standard
Description	Adapter Board
Model Name	DESPI-C02
Date	2025/10/26
Revision	2.0

	Design Engineering		
	Approval	Check	Design
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Content

1. Overview

DESPI-C02 is an SPI serial port adapter board specifically designed for electronic paper displays. It is tailored for 24-pin interface SPI serial port e-paper modules, ensuring precise compatibility with specifications and broad support for most models of 13.3 inches and smaller with the same interface. This board significantly simplifies the early-stage debugging process in projects, eliminating the need for developers to handle complex interface adaptations. It enables seamless device integration, functional verification, and accelerated development progress, ultimately saving valuable time for project deployment.

2. Product Specifications

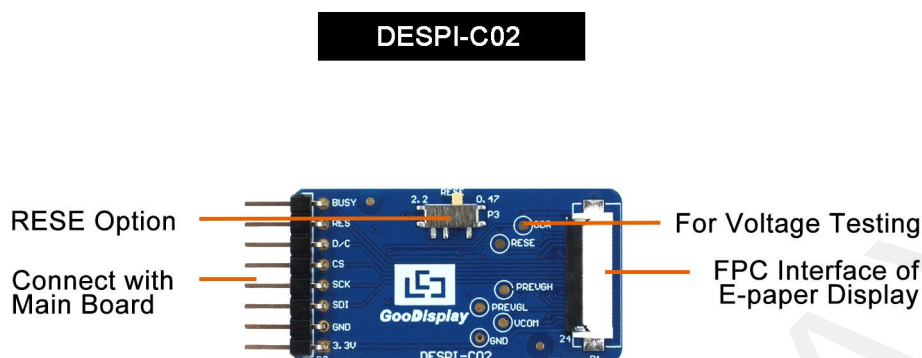|	Product Specifications
Model	DESPI-C02
Supported Platforms	Keil4、Arduino
Dimensions	41x 22mm
Power Supply	3.3V
Example Programs	Available
Operating Temperature	-20 ℃ ~ 70 ℃
Main Functions	• Supports 24-pin e-paper interface • Supports direct plugging between STM32-L, ESP32-L, ESP8266-L, Arduino UNO R4-L mainboards and the adapter board • Enables users to quickly master the use of e-paper
Auxiliary Functions	E-paper power consumption measurement, e-paper operating status detection

3. Main Functional Modules

Figure 1 DESPI-C02 Adapter Board Functional Diagram

3.1 DIP Switch P3

The DIP switch P3 is used to select the matching resistor (RESE resistor) for the current feedback circuit of the e-paper's peripheral boost converter. Different e-paper models require specific RESE resistor values; selecting an incorrect value may prevent the e-paper from refreshing the display.

1) Set P3 to the **0.47** position for e-paper modules using the UC (Good Display) series driver ICs.

2) Set P3 to the **2.2** position for e-paper modules using the SSD (Solomon Systech) series driver ICs.

3) Set P3 to the **2.2** position for black/white/red/yellow four-color e-paper modules.

3.2 E-Paper FPC Interface

1) The e-paper connects to the adapter board via this interface. When connecting, ensure the e-paper display surface faces upward and insert the FPC into the P5 connector on the adapter board.
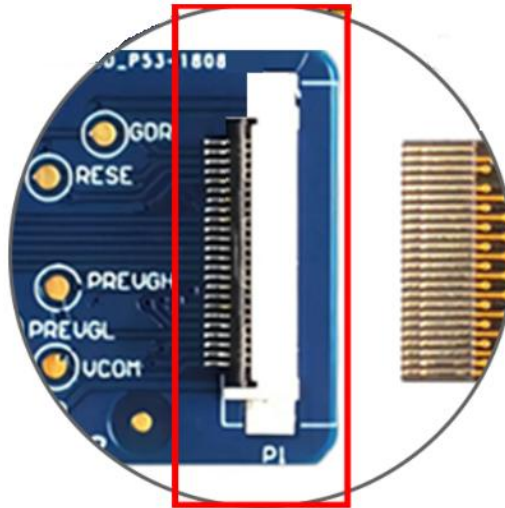
Figure 2 E-Paper FPC Switch in Open Position

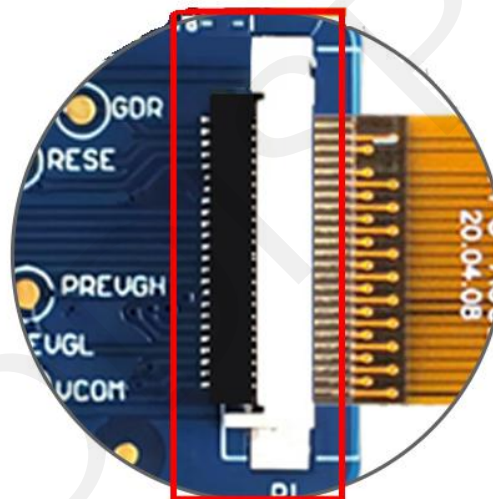2) After insertion, ensure to press down the black FPC switch.

Figure 3 E-Paper FPC Switch in Closed Position

3.3 Mainboard Docking Interface
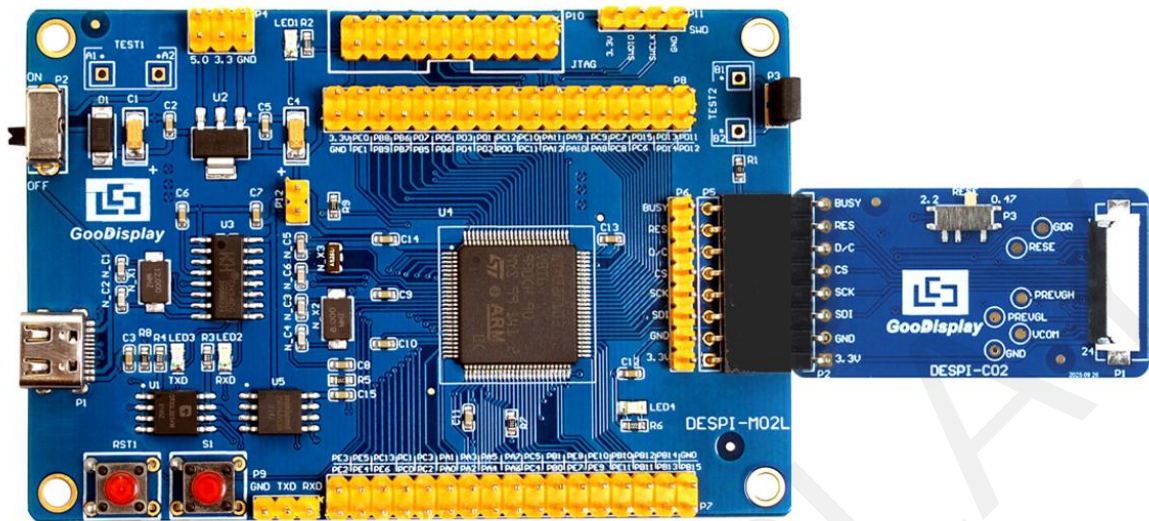
1) Used for direct docking with the STM32-L

Figure 4 STM32-L Mainboard Docking Schematic

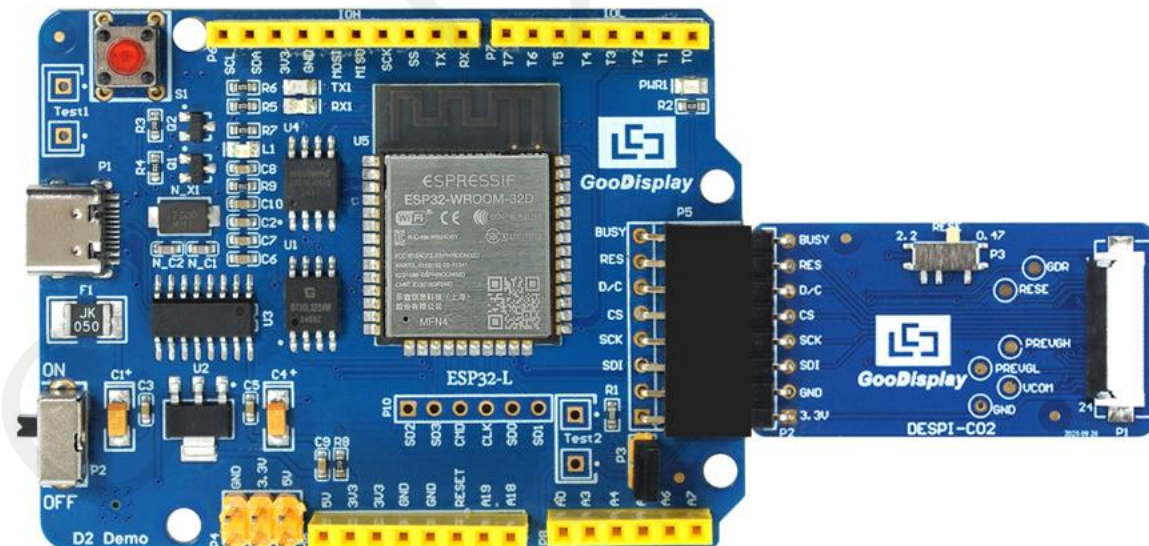2) Used for direct docking with the ESP32-L

Figure 5 ESP32-L Mainboard Docking Schematic

3) Used for direct docking with the ESP8266-L 。

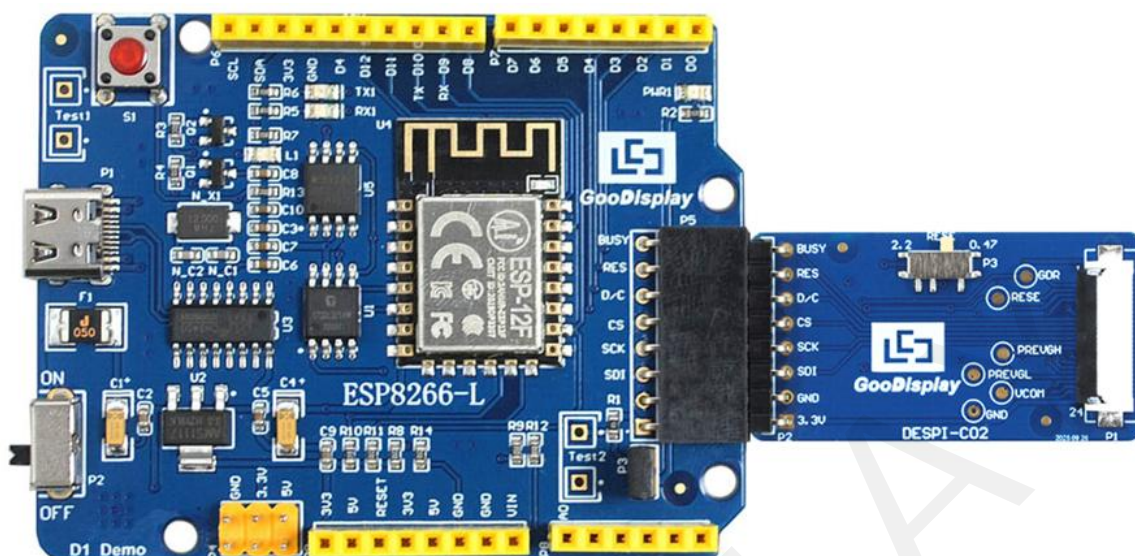Figure 6 ESP8266-L Mainboard Docking Schematic
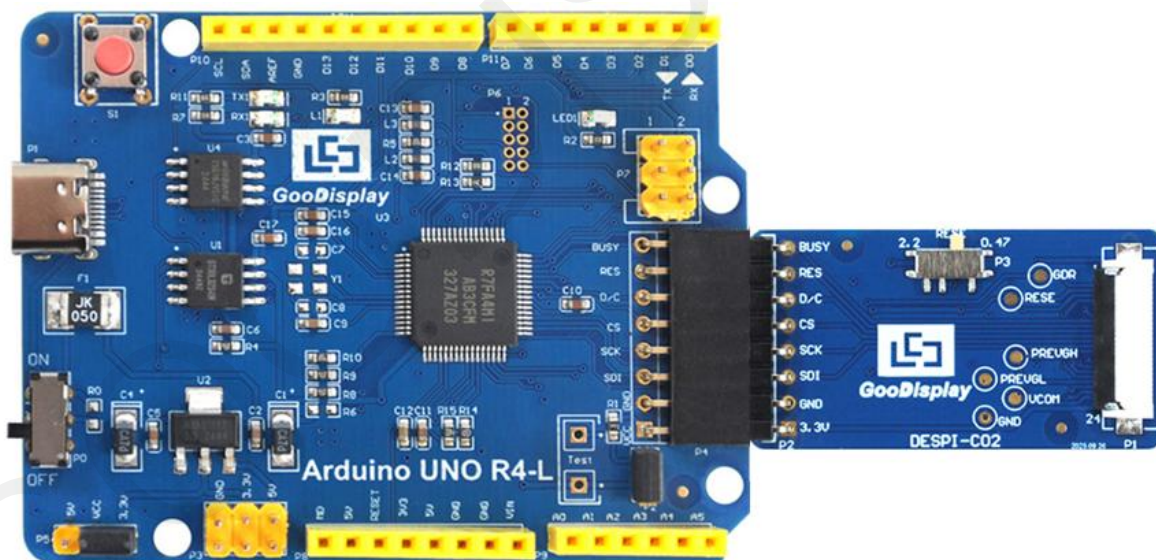
4) Used for direct docking with the Arduino UNO R4-L

Figure 7 Arduino UNO R4-L Mainboard Docking Schematic

3.4 Test Points

The adapter board provides test points for the e-paper peripheral circuits, as shown in **Figure 8**. The test points include PREVGH, PREVGL, VCOM, and GND. Their functions are as follows:

1) PREVGH: Positive high-voltage test point of the boost circuit.

2) PREVGL: Negative high-voltage test point of the boost circuit.

3) VCOM: E-paper contrast voltage (VCOM) test point.

4) GND: Power supply ground (common reference for test point voltages).

Figure 8 Voltage Test Points

4. Common Issues in E-Paper Driver Circuit Design

4.1 Custom Driver Board Fails to Drive E-Paper

First, measure the voltages at PREVGH and PREVGL to verify whether the boost converter is functioning correctly. If the boost fails, check the following:

* Ensure the boost circuit section of the driver schematic is correct.

* Verify that all components meet requirements (particularly, ensure the boost capacitor has sufficient voltage rating; insufficient rating may cause the capacitor to burn out during boosting).

* Inspect soldering quality. The MOSFET is the most common point of failure.

If the boost circuit operates normally, inspect the FPC connector for cold joints or poor connections. Finally, review the software implementation.

4.2 Inductor Selection for E-Paper Driver Circuit

1. UC (Good Display) series: 10 µH, 1 A shielded inductor.

2. SSD (Solomon Systech) series: 47 µH, 500 mA shielded inductor.

4.3 MOSFET Selection for E-Paper Driver Circuit

Recommended: Si1304BDL or Si1308EDL.

If these are unavailable, AO3400 may be used as a substitute.

4.4 Schottky Diode Selection for E-Paper Driver Circuit

Select a Schottky diode with parameters equivalent to MBR0530. The switching frequency must meet practical requirements.

4.5 FPC Connector Selection for E-Paper

Use a 24-pin FPC connector with top or top/bottom contact configuration and a 0.5 mm pin pitch.

Note: The capacitor parameters on the DESPI-C02 adapter board may differ from those specified in the e-paper datasheet. When designing based on this reference circuit, users must strictly follow the component parameters listed in the e-paper datasheet.