Connector Board for E-paper Display

DESPI-C03

GooDisplay

Product Specifications
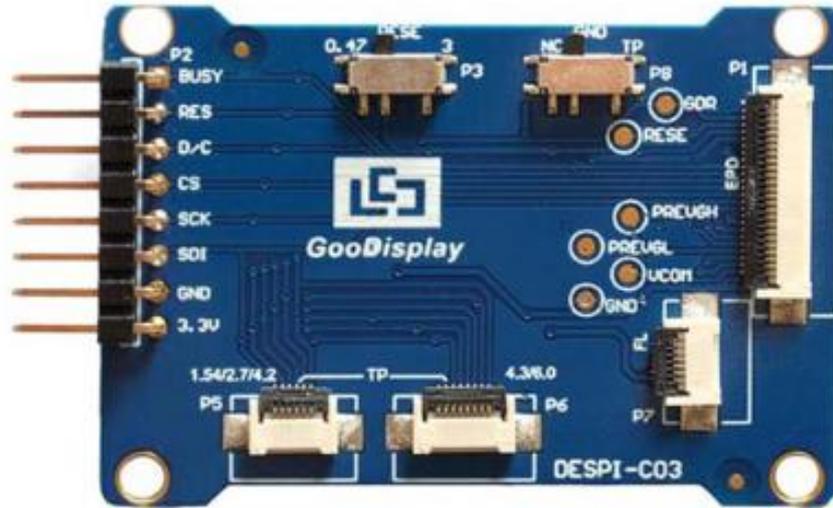
Customer	Standard
Description	Connector Board for E-paper Display
Model Name	DESPI-C03
Date	2020/03/11
Revision	1.1

	Design Engineering		
	Approval	Check	Design

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1.Overview

DESPI-C03 is designed for SPI e-paper display. It can boost the driving voltage of Good Display's black-white e-paper display and three-color (black, white and red/Yellow) e-paper display: 1.54'', 2.04'', 2.13'', 2.6'', 2.7'', 2.9'', 3.71'', 4.2'', 5.83'' and 7.5''. It can drive touch panel and front light panel, too.

2.Mechanical Specifications

| Parameter	Specification
Model	DESPI-C03
Platform	STM32、Arduino、Raspberry Pi
Dimension	52mm x 36mm
Power Supply	3.3V
Sample Code	Available (please contact sales)
Operating Temp.	-20°C ~+70°C
Main Function	Provide driving voltage for e-paper, touch panel and front light panel; Provide interface for e-paper and motherboard; Help users operate e-paper quickly.
Additional Function	Measurement of e-paper power consumption; Test of e-paper working condition.

3.Functions
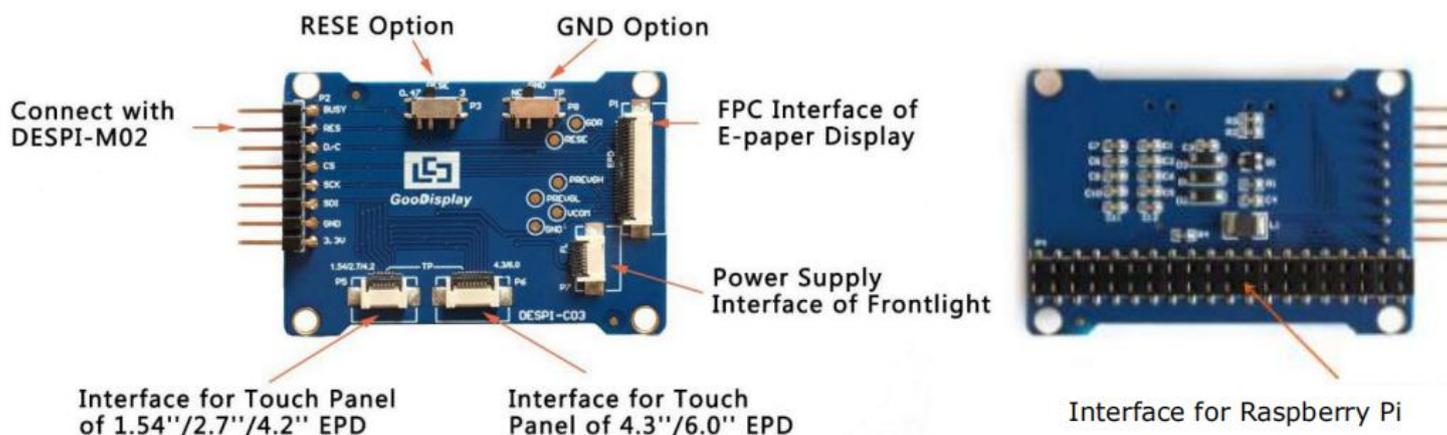
Figure 1 : DESPI-C03

3.1 Pin function

1) BUSY: Busy signal of e-paper. When the e-paper is refreshing, the BUSY pin sends out "busy" signal to MCU, then MCU can not read and write the e-paper IC; When the e-paper refresh is completed, the BUSY pin sends out "free" signal, then MCU can read and write the e-paper IC. GDEW series e-paper busy state is high level (GDEH series is low level), and free state is opposite.

2) RES: Reset signal of e-paper. Low level effective.

3) D/C: Data / Command selection. High level for data, low level for command.

4) CS: Chip selection. Low level effective.

5) SCK: SPI serial communication clock signal line.

6) SDI: SPI serial communication data signal line.

7) GND: Negative power supply.

8) 3.3V: Positive power supply.

Tips: When setting IO during programming, the BUSY pin should set to input mode, others should set to output mode.

3.2 Switch P8

The switch P8 on DESPI-C03 is used to select GND. It needs to be set to NC when driving e-papers (default NC), and to TP when driving touch panels.

3.3 Switch P3

The switch P3 on DESPI-C03 is used to select the RESE resistor, different e-papers need to match different RESE resistors, a wrong RESE resistor will cause the e-paper cannot be refreshed.

When RESE is set to 0.47 :

1.54 inch：GDEW0154T8、GDEW0154I9F、GDEW0154Z17、
            GDEW0154Z04、GDEW0154C39

2.13 inch：GDEW0213T5、GDEW0213I5F、GDEW0213Z16、
            GDEW0213C38

2.6 inch：GDEW026T0、GDEW026Z3

2.7 inch：GDEW027W3、GDEW027C44

2.9 inch：GDEW029T5、GDEW029I6F、GDEW029Z10、
　　　　　GDEW029C32

3.71 inch：GDEW0371W7、GDEW0371Z80

4.2 inch：GDEW042T2、GDEW042Z15、GDEW042C37

5.83 inch：GDEW0583T8、GDEW0583Z21、GDEW0583Z83、
　　　　　　GDEW0583C64

7.5 inch：GDEW075T7、GDEW075Z08、GDEW075Z09、
　　　　　GDEW075C21、GDEW075C64

When RESE is set to 3 :

1.54 inch：GDEP015OC1、GDEH0154D67、GDEM0154E97LT

2.04 inch：GDE021A1

2.13 inch：GDEH0213B73、GDEH0213D30LT、GDEM0213E28LT

2.9 inch：GDEH029A1、GDEH029D56LT、GDEM029E27LT

5.83 inch：GDEW0583T7

7.5 inch：GDEW075T8

3.4 Connection between DESPI-C03 and e-paper

There is a FPC interface P1 on DESPI-C03, which can connect the e-paper. Users should connect the e-paper FPC to P1 as shown in Figure 2. (Pay attention to the direction of the e-paper.) And set P8 to NC.
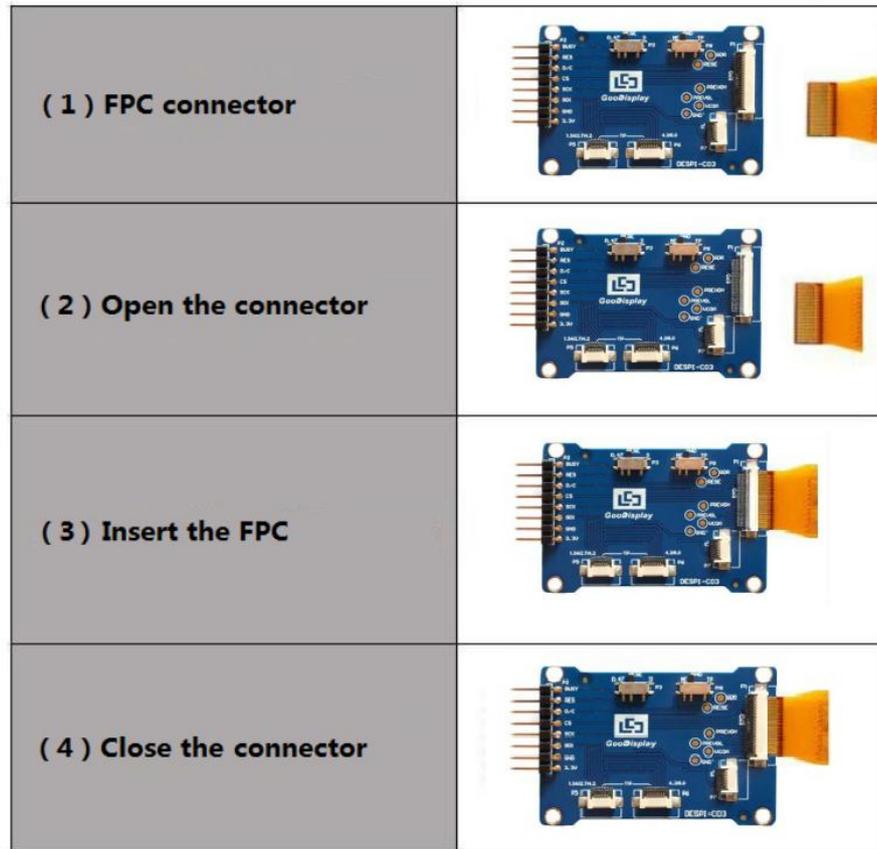
Figure 2 : Connection between DESPI-C03 and e-paper

3.5 Connection between DESPI-C03 and front light panel

DESPI-C03 supports 3.3 V powered front light panel driving, the corresponding interface is P7 as shown in Figure 3. The pin definitions are as follows: 3.3V (1,2), NC (3,4), GND (5,6). The power supply of front light panel must be divided from the power supply of e-paper, otherwise it may affect the display of e-paper.

Figure 3 : Connection between DESPI-C03 and front light panel

3.6 Connection between DESPI-C03 and touch panel

As shown in Figure 4, 1.54-inch, 2.7-inch, 4.2-inch touch panel use interface P5, and 4.3-inch, 6.0-inch touch panel use interface P6. Connect the touch panel to DESPI-C03 with the touch area upside. In addition, P8 needs to be set to TP when driving touch panels.
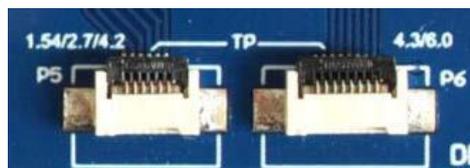

Figure 4 : Connection between DESPI-C03 and touch panel

3.7 Connection between DESPI-C03 and Raspberry Pi

Connect DESPI-C03 to Raspberry Pi motherboard in the direction shown in Figure 5. The pins of DESPI-C03 should in the same direction with the USB interface of Raspberry Pi.
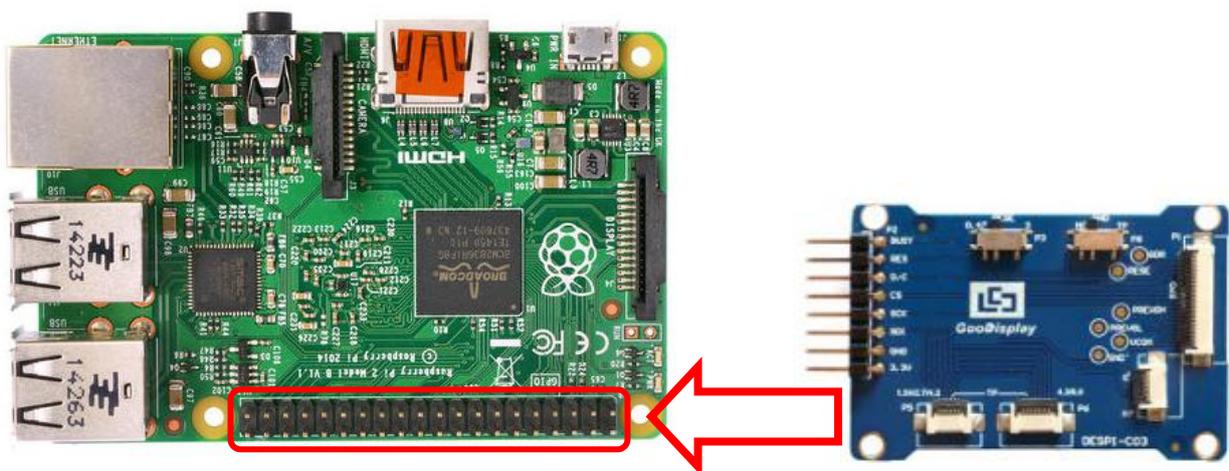

Figure 5 : Connection between DESPI-C03 and Raspberry Pi

3.8 Voltage measurement

This connector board supports voltage measurement. The points for measurement include PREVGH, PREVGL, VCOM, RESE, GDR and GND, the functions are as follows:

1) PREVGH: Boost circuit positive high voltage.

2) PREVGL: Boost circuit negative high voltage.

3) VCOM: Common ground of e-paper.

4) RESE: Boost circuit feedback current.

5) GDR: N-MOS. (SI1304BDL/SI1308EDL drive signal.)

6) GND: Power negative. (Common ground for measurement.)

4.Problems of designing drive circuit

4.1 Self-made drive board cannot drive e-papers

Measure the voltage of PREVGH and PREVGL to see if it boost successfully. If it doesn't boost successfully, check if the boost part of the schematic is correct and the components meet the requirements. (Make sure the max voltage of the booster capacitor is adequate. If it is not enough, the capacitor will be burned out during boost.) Check the welding, the most likely problem is the MOS tube. If it boost successfully, please check whether there is virtual welding in FPC socket and so on, and finally check the software.

4.2 Inductors selection for e-paper drive circuit

A 10uH 1A winding inductor is recommended.

4.3 MOS tube selection for e-paper drive circuit

Si1304BDL or Si1308EDL is recommended. If these two are difficult to get, AO3400 can be a substitute.

4.4 Diode selection for e-paper drive circuit

A schottky diode equivalent to the MBR0530 parameters is recommended. And the switching frequency should meet the actual requirements.

4.5 FPC socket for e-paper selection

Select the 24 PIN FPC socket with 0.5mm pin spacing which has contact at up side or both side.

4.6 High current in deep sleep mode

The high current in deep sleep mode may be due to the larger capacitance in the boost part.

Tips: The capacitor parameters in DESPI-C03 may be different from the e-paper specification. So users need to strictly refer to the component parameters in specification when designing according to this circuit.