



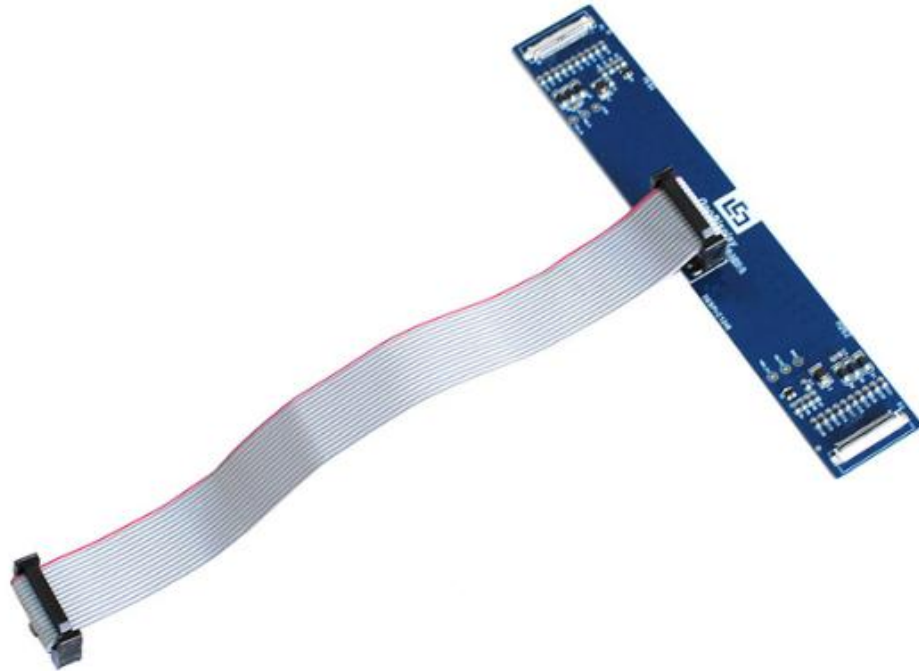
Connector Board for E-paper Display



DESPI-C1248

Dalian Good Display Co., Ltd.

Product Specifications



Customer	Standard
Description	Connector Board for E-paper Display
Model Name	DESPI-C1248
Date	2020/03/11
Revision	1.1

	Design Engineering		
	Approval	Check	Design
			

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1. Overview

This connector board is designed for SPI e-paper display. It can boost the driving voltage of Good Display's 12.48" black-white e-paper display and three-color (black, white and red/Yellow) e-paper display. And it supports measurement of e-paper boost part VGH, VGL, VOM voltage value. Users need to pay attention to these parameters when designing drive board. The typical value of VGH is +20V, and the typical value of VGL is -20V.

2.Mechanical Specifications

Parameter	Specification
Model	DESPI-C1248
Platform	STM32、Arduino、Raspberry Pi
Dimension	150.2mm x 26mm
Power Supply	3.3V
Sample Code	Available (please contact sales)
Operating Temp.	-20°C ~+70°C
Main Function	Provide driving voltage for e-paper; 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

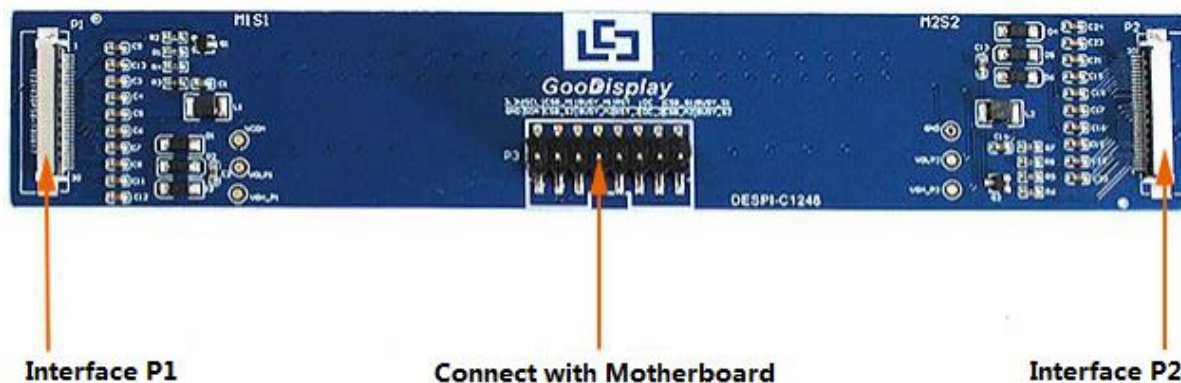


Figure 1 : DESPI-C1248

3.1 Pin P3 function

- 1) GND: Negative power supply.
- 2) 3.3V: Positive power supply.
- 3) SDA: SPI serial communication data signal line.
- 4) SCL: SPI serial communication clock signal line.
- 5) CSB_S2: Chip selection 2 of slave FPC. Low level effective.
- 6) CSB_M1: Chip selection 1 of master FPC. Low level effective.
- 7) BUSY_M2: Busy signal 2 of master FPC. Low level effective.
- 8) BUSY_M1: Busy signal 1 of master FPC. Low level effective.
- 9) RST_2: Reset signal 2 of e-paper. Low level effective.
- 10) RST: Reset signal 1 of e-paper. Low level effective.
- 11) DC_2: Data / Command selection 2. High level for data, low level for command.

- 12) DC: Data / Command selection 1. High level for data, low level for command.
- 13) CSB_M2: Chip selection 2 of master FPC. Low level effective.
- 14) CSB_S1: Chip selection 1 of slave FPC. Low level effective.
- 15) BUSY_S2: Busy signal 2 of slave FPC. Low level effective.
- 16) BUSY_S1: Busy signal 1 of slave FPC. Low level effective.

BUSY: 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. Busy state is low level and free state is opposite.

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

3.2 Connection with Motherboard

DESPI-C1248 connect with motherboard by a 16PIN connector as shown in Figure 2. When connecting, align the protruding portion of the connector to the notch direction of P3 in Figure 2.

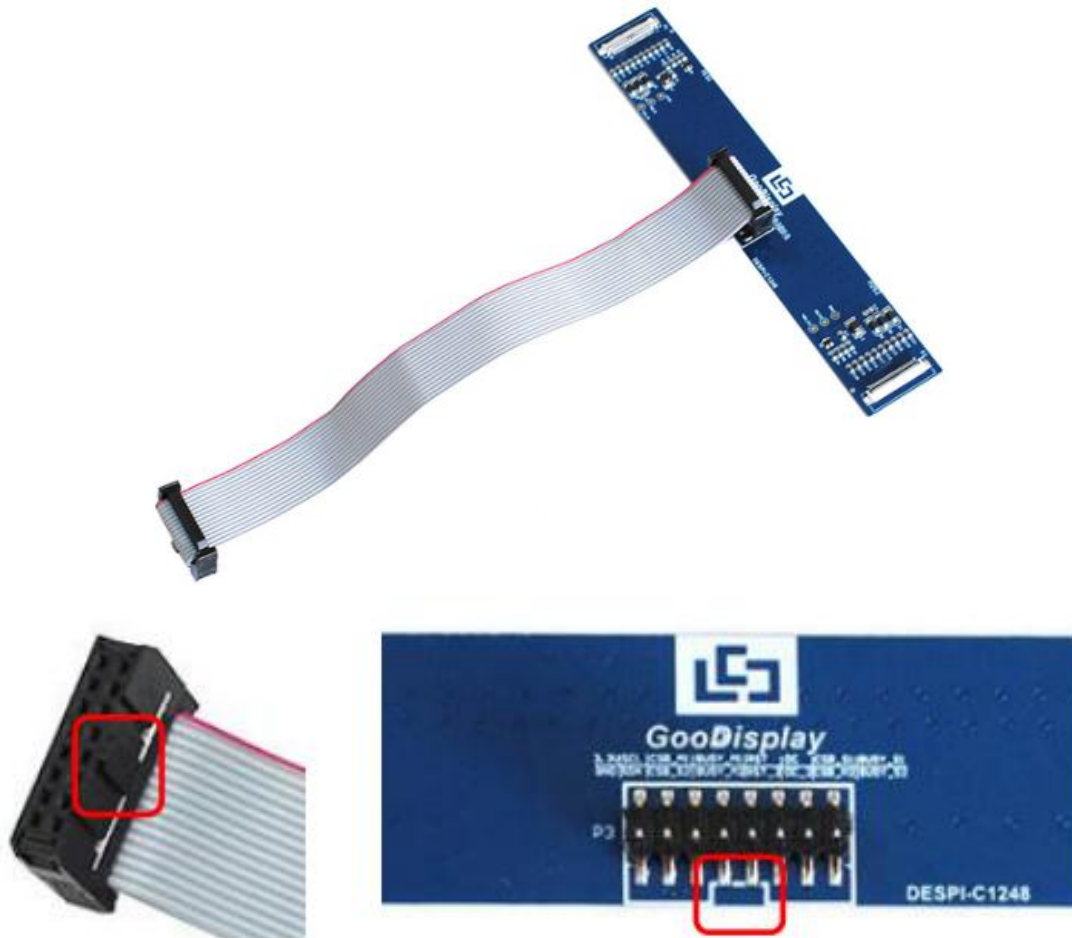


Figure 2 : Connection between DESPI-C1248 and 16PIN connector

3.3 Interface P1 and P2

The e-paper should be connected to DESPI-C1248 by interface P1 (left) and interface P2 (right) in Figure 3.

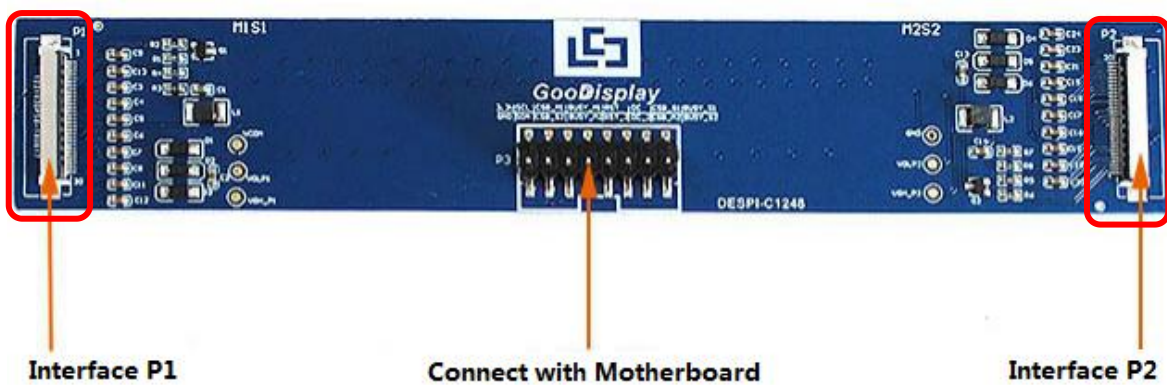


Figure 3 : Interface P1 and interface P2

1) The interface P1 should connect to the master FPC which the silk print is WFT1248BZ23 as shown in Figure 4.



Figure 4 : Silk print of the master FPC

2) The interface P2 should connect to the slave FPC which the silk print is WFT1248BZ24 as shown in Figure 5.



Figure 5 : Silk print of the slave FPC

3.4 Completed connection mode

Completed connection mode is as Figure 6. The master FPC and the slave FPC should not be reversed, otherwise the e-paper will not be refreshed.

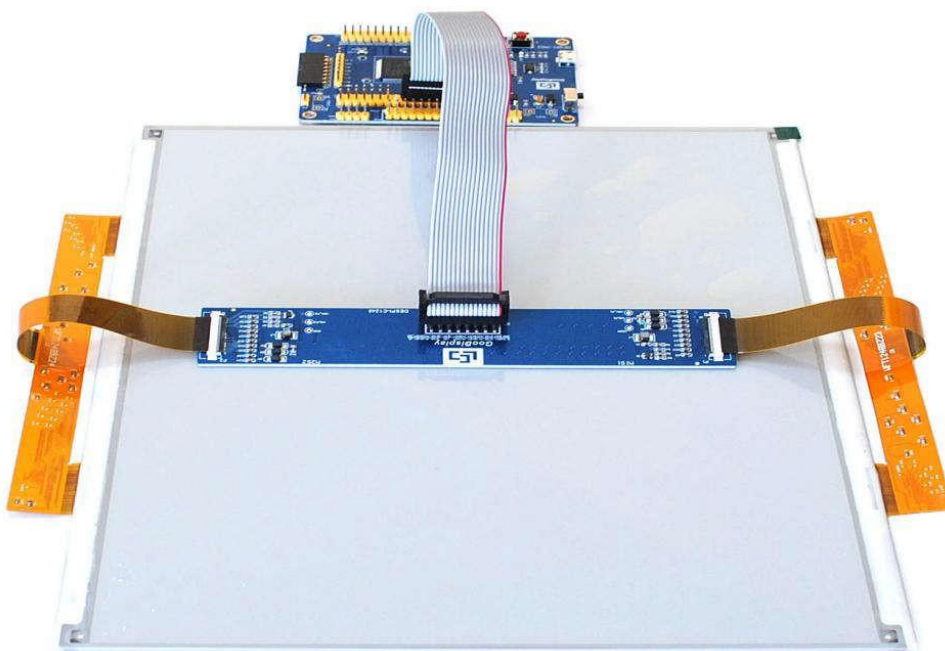


Figure 6 : Completed connection mode

3.5 Voltage measurement

This connector board supports voltage measurement. The points for measurement include VGH_P1, VGH_P2, VGLP1, VGLP2, VCOM and GND, the functions are as follows:

- 1) VGH_P1: P1 MOS tube gate positive voltage.
- 2) VGH_P2: P2 MOS tube gate positive voltage.
- 3) VGLP1: P1 MOS tube gate negative voltage.
- 4) VGLP2: P2 MOS tube gate negative voltage.
- 5) VCOM: Common ground of e-paper.
- 6) GND: Power negative. (Common ground for measurement.)

3.6 Raspberry Pi-C1248

DESPI-C1248 supports Raspberry Pi driving. Raspberry Pi-C1248 (Figure 7) is the connector board between DESPI-C1248 and Raspberry Pi motherboard.

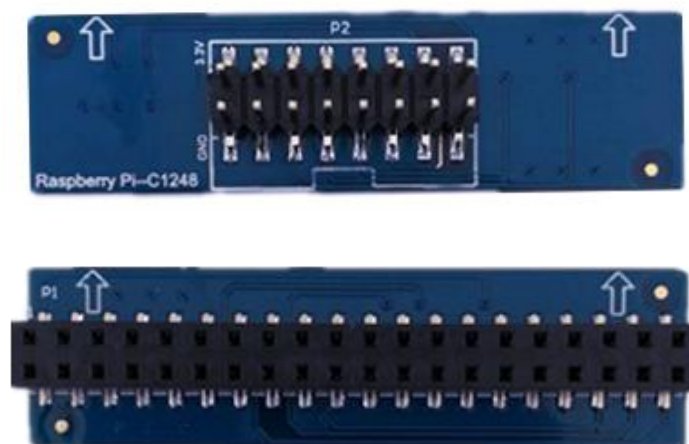


Figure 7 : Raspberry Pi-C1248

Connection between Raspberry Pi-C1248 and Raspberry Pi motherboard is as shown in Figure 8.

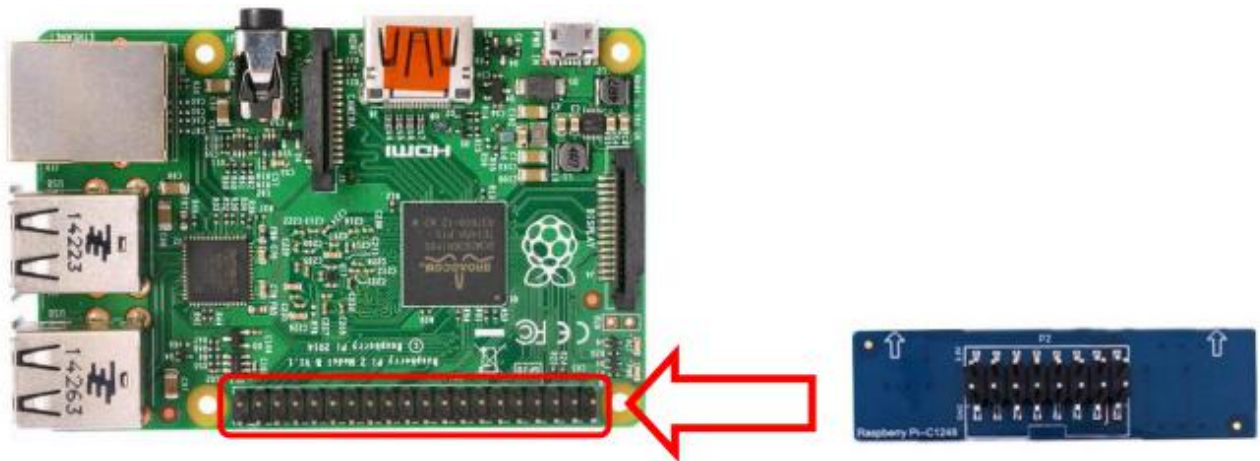


Figure 8 : Connection between Raspberry Pi-C1248 and Raspberry Pi

Raspberry Pi-C1248 connect with DESPI-C1248 by a 16PIN connector as shown in Figure 9. When connecting the 16PIN connector with Raspberry Pi-C1248, align the protruding portion of the 16PIN connector to the notch direction of P2 as shown in Figure 10.

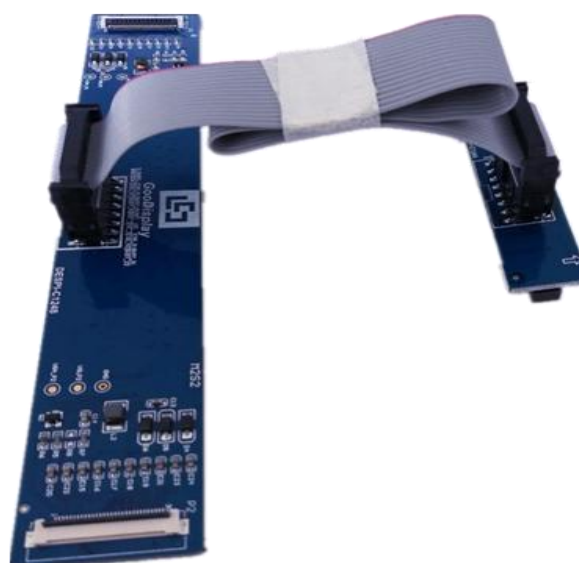


Figure 9 : Connection between Raspberry Pi-C1248 and DESPI-C1248

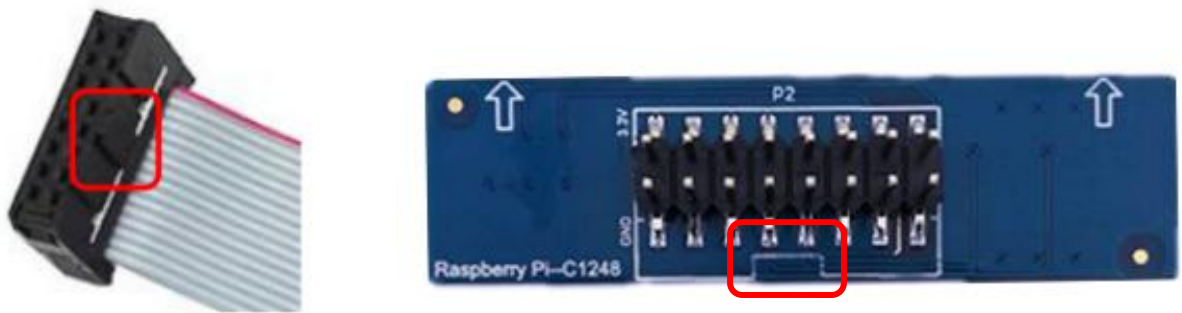


Figure 10 : Connection between Raspberry Pi-C1248 and connector

4. Problems of designing drive circuit

4.1 Self-made drive board cannot drive e-papers

Measure the voltage of VGH_P1, VGLP1 and VGH_P2, VGLP2 separately 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.

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 selection for e-paper drive circuit

Select the 30 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.