1. Operation Description

1） Hardware configuration:

This module provides 3 kinds of driver interfaces; they are 3-wire SPI, 4-wire SPI and I2C interface. In its factory settings, BS0/BS1 pins are set to 0/0 and 4-wire SPI is selected as default.

Different working mode and pin function of the module can be set by hardware selection on BS0/BS1 pins. (Notice: In this operation, welding is required. Any changes under no guidance from Waveshare will be considered as a waiver of warranty).

BS0/BS1	Working mode	CS	D/C	DIN	CLK
0/0	4-wire SPI	CS	D/C	MOSI	SCLK
0/1	I2C	0	0/1	SDA	SCL
1/0	3-wire SPI	CS	0	MOSI	SCLK

Table 1: Working mode setting

2） How to use

We will illustrate the usage of the module with an example of 4-wire SPI mode (default working mode) by connecting a development board STM32.

a) Download the relative codes to the development board.

b) Connect the development board to a PC via a serial wire and the module to the development board. Then, power up the development board and start the serial debugging software.

Here is the configuration of the connection between the module and the development board.

Pin No.	Symbol	Descriptions
1	VCC	Positive power supply (3.3~5V input voltage)
2	GND	Supply ground
3	NC	NC
4	DIN	Data input pin
5	CLK	Clock signal input pin
6	CS	Chip select input pin (active LOW)
7	D/C	This is Data/Command control pin. When it is pulled HIGH (i.e. connect to VDD), the data at D[7:0] is treated as data. When it is pulled LOW, the data at D[7:0] will be transferred to the command register.
8	RES	Reset signal input pin (active LOW)

Table 2: Pin descriptions

Here is the configuration of the serial port.

Baud rate	9600
Data bits	8
Stop bit	1
Parity bit	None

Table 3: Baud rate settings

c) Relative data is shown in the screen as followed:
This is OLED 4-Wire SPI mode test

d) OLED displays information as Figure 1 shows.

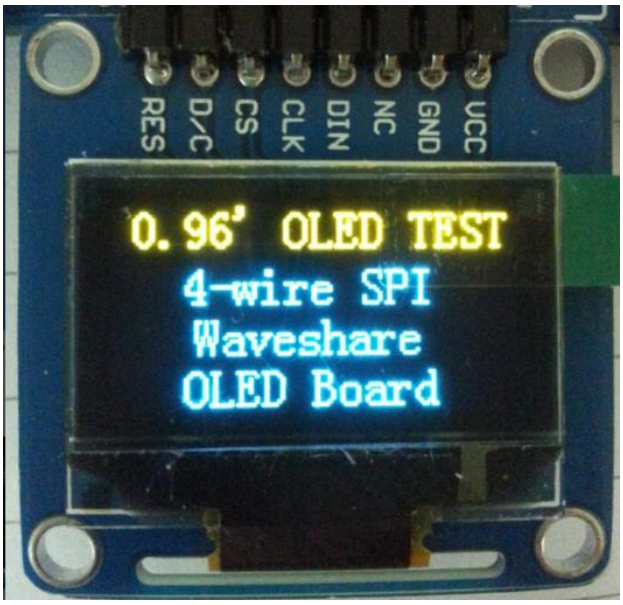

Figure 1: OLED information display under SPI mode

2. Selecting I2C mode

Notices: The module can be set to I2C mode by hardware selection on BS0/BS1 pins. In this operation, welding is required. Any changes under no guidance from Waveshare will be considered as a waiver of warranty.

1） Hardware configuration

To switch to I2C mode, you should tie BS0 pin to LOW and BS1 pin to HIGH respectively (i.e. BS0:0, BS1:1, in which 0 stands for LOW and 1 stands HIGH), as Figure 2 shows. And other hardware settings are remained the same.

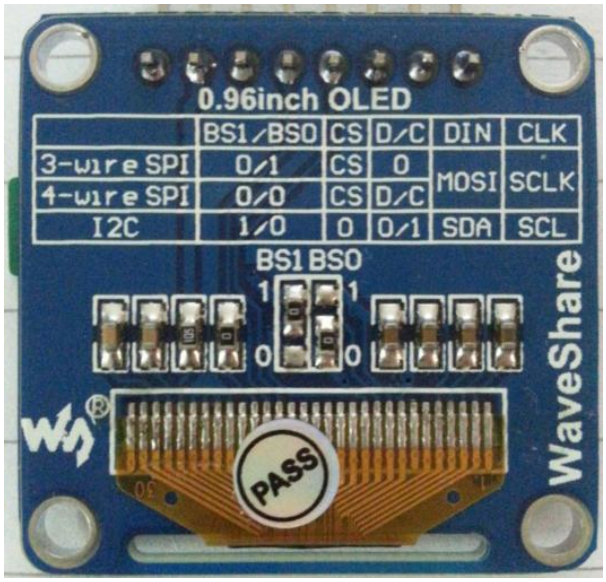

Figure 2: Settings of BS0 and BS1 pins

2） Software configuration

Also, you should modify the codes in the file SSD1306_Cfg.h, changing "#define OLED_MODE OLED_SPI_4LINE_MODE" into "#define OLED_MODE OLED_IIC_MODE". Then, download the modified codes to the development board, and connect the development board to a PC and the module to the development board. You will see relative data shown in the screen as followed:

This is OLED I2C mode test

OLED displays information as Figure 3 shows.

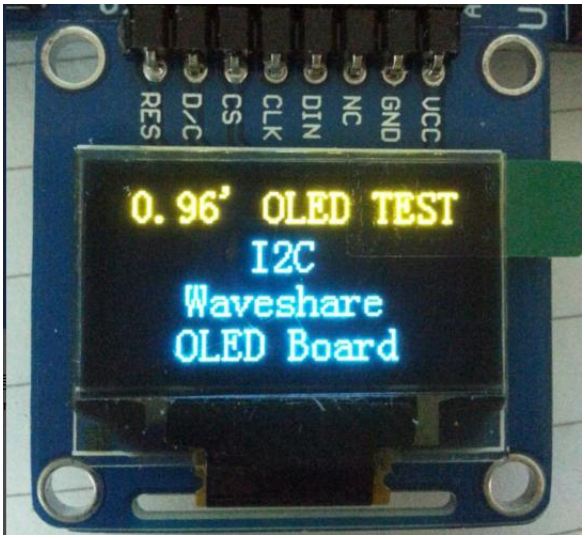

Figure 3: OLED information display under I2C mode

3. Principle introduction

In this document, we provide a briefly introduction to the implementation of two

interface modes: 4-wire SPI mode and I2C mode. However, there are 3 kinds of driver interfaces in the module. For more detailed information, please refer to SSD1306-Revision_1.1.pdf, Section 8.1 MCU Interface selection.