

## Test platform introduction:

This set of STM32 test programs use the development board of the ALIENTEK, as follows:

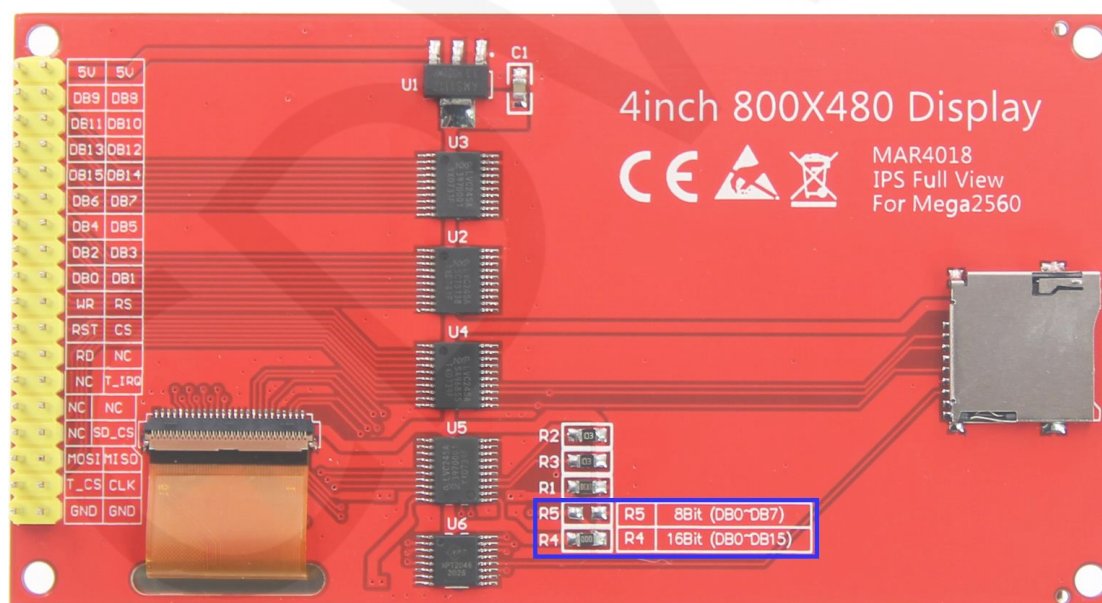
Development board: MiniSTM32, Elite STM32, STM32F407VxT6, Explorer STM32F4, Apollo STM32F4/F7

MCU: STM32F103RCT6, STM32F103ZET6, STM32F407VGT6, STM32F407ZGT6, STM32F429IGT6, STM32F767IGT6, STM32H743IIT6

Main frequency: 72MHz, 72MHz, 168MHz, 168MHz, 180MHz, 216MHz, 400MHz  
(Corresponding to the above MCU)

Crystal frequency: 8MHz, 8MHz, 8MHz, 8MHz, 25MHz, 25MHz, 25MHz  
(Corresponding to the above MCU)

## Wiring instructions:



Picture1. Pin silkscreen picture

### Note:

1. The pins labeled NC in figure 1 are not used and do not require wire connection;

**Important Note:**

1. The following pin numbers 1~30 are the pin number of Module pin with PCB backplane of our company. If you purchase a bare screen, please refer to the pin definition of the bare screen specification, refer to the wiring according to the signal type instead of directly Wire according to the following module pin numbers. For example: LCD\_CS is 20 pin on our module. It may be x pin on different size bare screen. The following wiring program instructions tell you to connect LCD\_CS signal to the PC9 pin of STM32 microcontroller.
2. About VCC supply voltage: If you purchase a module with PCB backplane, VCC/VDD can be connected to 5V (module has integrated ultra low dropout 5V to 3.3V circuit), if you buy a bare screen LCD, remember only Can connect to 3.3V.
3. About the backlight voltage: the module with the PCB backplane has access to 3.3 V and no more manual access is required. If you are buying a bare screen, the LEDA is connected to 3.0V-3.3V and the LEDKx is grounded.

STM32F103RCT6 microcontroller test program wiring instructions				
Number	Module Pin	Corresponding to Mini STM32 development board wiring pin(using FSMC bus )		Remarks
		8-bit mode	16-bit mode	
1	5V	5V		Power pin
2	5V			
3	DB8	No need to connect	PB8	Data bus high 8-bit pin
4	DB9		PB9	
5	DB10		PB10	
6	DB11		PB11	

7	DB12		PB12	
8	DB13		PB13	
9	DB14		PB14	
10	DB15		PB15	
11	DB7	PB7		Data bus low 8-bit pin
12	DB6	PB6		
13	DB5	PB5		
14	DB4	PB4		
15	DB3	PB3		
16	DB2	PB2		
17	DB1	PB1		
18	DB0	PB0		
19	RS	PC8		LCD register / data selection pin(high level: data, low level:register)
20	WR	PC7		LCD write control pin
21	CS	PC9		LCD chip select control pin(low level active)
22	RST	PC4		LCD reset control pin(low level active)
23	NC	No need to connect		Undefined, reserved
24	RD	PC6		LCD read control pin
25	T_IRQ	PC1		Touch screen interrupt control pin(low level active)
26	NC	No need to connect		Undefined, reserved
27	NC			
28	NC			
29	SD_CS	No need to connect		Extended reference: SD card select pin
30	NC	No need to connect		Undefined, reserved
31	MISO	PC2		SPI bus input pin (extended application)
32	MOSI	PC3		SPI bus output pin (extended application)
33	CLK	PC0		SPI bus clock pin (extended application)

34	T_CS	PC13	Touch screen chip select pin(low level active)
35	GND	GND	Power ground pin
36	GND		

### STM32F103ZET6 microcontroller test program wiring instructions

Number	Module Pin	Corresponding to Elite STM32 development board wiring pin(using FSMC bus )		Remarks
		8-bit mode	16-bit mode	
1	5V	5V		Power pin
2	5V			
3	DB8	No need to connect	PE11	Data bus high 8-bit pin
4	DB9		PE12	
5	DB10		PE13	
6	DB11		PE14	
7	DB12		PE15	
8	DB13		PD8	
9	DB14		PD9	
10	DB15		PD10	
11	DB7	PE10		Data bus low 8-bit pin
12	DB6	PE9		
13	DB5	PE8		
14	DB4	PE7		
15	DB3	PD1		
16	DB2	PD0		
17	DB1	PD15		
18	DB0	PD14		
19	RS	PG0		LCD register / data selection pin(high level: data, low level:register)

20	WR	PD5	LCD write control pin
21	CS	PG12	LCD chip select control pin(low level active)
22	RST	MCU Reset Pin	LCD reset control pin(low level active)
23	NC	No need to connect	Undefined, reserved
24	RD	PD4	LCD read control pin
25	T_IRQ	PF10	Touch screen interrupt control pin(low level active)
26	NC	No need to connect	Undefined, reserved
27	NC		
28	NC		
29	SD_CS	No need to connect	Extended reference: SD card select pin
30	NC	No need to connect	Undefined, reserved
31	MISO	PB2	SPI bus input pin (extended application)
32	MOSI	PF9	SPI bus output pin (extended application)
33	CLK	PB1	SPI bus clock pin (extended application)
34	T_CS	PF11	Touch screen chip select pin(low level active)
35	GND	GND	Power ground pin
36	GND		

### STM32F407VGT6 microcontroller test program wiring instructions

Number	Module Pin	Corresponding to STM32F407VxT6 development board wiring pin(using FSMC bus )		Remarks
		8-bit mode	16-bit mode	
1	5V	5V		Power pin
2	5V			

3	DB8	No need to connect	PE11	Data bus high 8-bit pin
4	DB9		PE12	
5	DB10		PE13	
6	DB11		PE14	
7	DB12		PE15	
8	DB13		PD8	
9	DB14		PD9	
10	DB15		PD10	
11	DB7	PE10		Data bus low 8-bit pin
12	DB6	PE9		
13	DB5	PE8		
14	DB4	PE7		
15	DB3	PD1		
16	DB2	PD0		
17	DB1	PD15		
18	DB0	PD14		
19	RS	PD11		LCD register / data selection pin(high level: data, low level:register)
20	WR	PD5		LCD write control pin
21	CS	PD7		LCD chip select control pin(low level active)
22	RST	MCU Reset Pin		LCD reset control pin(low level active)
23	NC	No need to connect		Undefined, reserved
24	RD	PD4		LCD read control pin
25	T_IRQ	PB1		Touch screen interrupt control pin(low level active)
26	NC	No need to connect		Undefined, reserved
27	NC			
28	NC			
29	SD_CS	No need to connect		Extended reference: SD card select pin

30	NC	No need to connect	Undefined, reserved
31	MISO	PB2	SPI bus input pin (extended application)
32	MOSI	PC4	SPI bus output pin (extended application)
33	CLK	PB0	SPI bus clock pin (extended application)
34	T_CS	PC13	Touch screen chip select pin(low level active)
35	GND	GND	Power ground pin
36	GND		

### STM32F407ZGT6 microcontroller test program wiring instructions

Number	Module Pin	Corresponding to Explorer STM32 development board wiring pin(using FSMC bus )		Remarks
		8-bit mode	16-bit mode	
1	5V	5V		Power pin
2	5V			
3	DB8	No need to connect	PE11	Data bus high 8-bit pin
4	DB9		PE12	
5	DB10		PE13	
6	DB11		PE14	
7	DB12		PE15	
8	DB13		PD8	
9	DB14		PD9	
10	DB15		PD10	
11	DB7	PE10		Data bus low 8-bit pin
12	DB6	PE9		
13	DB5	PE8		
14	DB4	PE7		

15	DB3	PD1	
16	DB2	PD0	
17	DB1	PD15	
18	DB0	PD14	
19	RS	PF12	LCD register / data selection pin(high level: data, low level:register)
20	WR	PD5	LCD write control pin
21	CS	PG12	LCD chip select control pin(low level active)
22	RST	MCU Reset Pin	LCD reset control pin(low level active)
23	NC	No need to connect	Undefined, reserved
24	RD	PD4	LCD read control pin
25	T_IRQ	PB1	Touch screen interrupt control pin(low level active)
26	NC	No need to connect	Undefined, reserved
27	NC		
28	NC		
29	SD_CS	No need to connect	Extended reference: SD card select pin
30	NC	No need to connect	Undefined, reserved
31	MISO	PB2	SPI bus input pin (extended application)
32	MOSI	PF11	SPI bus output pin (extended application)
33	CLK	PB0	SPI bus clock pin (extended application)
34	T_CS	PC13	Touch screen chip select pin(low level active)
35	GND	GND	Power ground pin
36	GND		

### STM32F429IGT6, STM32F767IGT6, STM32H743IIT6 microcontroller test program wiring instructions

Number	Module Pin	Corresponding to	Remarks
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		Apollo STM32F4/F7 development board wiring pin(using FSMC bus )		
		8-bit mode	16-bit mode	
1	5V	5V		Power pin
2	5V			
3	DB8	No need to connect	PE11	Data bus high 8-bit pin
4	DB9		PE12	
5	DB10		PE13	
6	DB11		PE14	
7	DB12		PE15	
8	DB13		PD8	
9	DB14		PD9	
10	DB15		PD10	
11	DB7	PE10		Data bus low 8-bit pin
12	DB6	PE9		
13	DB5	PE8		
14	DB4	PE7		
15	DB3	PD1		
16	DB2	PD0		
17	DB1	PD15		
18	DB0	PD14		
19	RS	PD13		LCD register / data selection pin(high level: data, low level:register)
20	WR	PD5		LCD write control pin
21	CS	PD7		LCD chip select control pin(low level active)
22	RST	MCU Reset Pin		LCD reset control pin(low level active)
23	NC	No need to connect		Undefined, reserved
24	RD	PD4		LCD read control pin

25	T_IRQ	PH7	Touch screen interrupt control pin(low level active)
26	NC	No need to connect	Undefined, reserved
27	NC		
28	NC		
29	SD_CS	No need to connect	Extended reference: SD card select pin
30	NC	No need to connect	Undefined, reserved
31	MISO	PG3	SPI bus input pin (extended application)
32	MOSI	PI3	SPI bus output pin (extended application)
33	CLK	PH6	SPI bus clock pin (extended application)
34	T_CS	PI8	Touch screen chip select pin(low level active)
35	GND	GND	Power ground pin
36	GND		

## Demo function description:

1. This test program is applicable to STM32F103RCT6, STM32F103ZET6, STM32F407VGT6, STM32F407ZGT6, STM32F429IGT6, STM32F7671GT6, STM32H743IIT6 seven STM32 MCU platforms;
2. Please follow the wiring instructions above to find the corresponding development board and MCU for wiring;
3. This set of test program supports 8-bit and 16-bit data bus mode switching. For details, see the following mode setting instructions (This module supports 8-bit and 16-bit data bus mode switching, and defaults to 8-bit mode);
4. This set of tests supports display switching in four directions. For details, see the following display direction switching instructions
5. This set of test procedures contains the following test items:
  - A. the main interface displays the test;

- B. simple brush test;
- C. rectangular drawing and filling test;
- D. circular drawing and filling test;
- E. triangle drawing and filling test;
- F. English display test;
- G. Chinese display test;
- H. picture display test;
- I. rotating display test;
- J. touch test

## Mode switching instructions:

Find the macro definition `LCD_USE8BIT_MODEL` in `lcd.h`, as shown below:

```
#define LCD_USE8BIT_MODEL 1 //定义数据总线是否使用8位模式 0,使用16位模式.1,使用8位模式  
////////////////////////////////////
```

`LCD_USE8BIT_MODEL 0 // Use 16-bit data bus mode`

`LCD_USE8BIT_MODEL 1 // Use 8-bit data bus mode`

### Note:

1. This module hardware supports 8-bit and 16-bit data bus mode switching. For details, see the blue box in Picture 1 above or refer to the module schematic (this module defaults to 16-bit data bus mode);
2. Not every LCD screen supports 8-bit/16-bit mode. Please check with us to see if you have purchased it;
3. After the 8/16-bit switch is performed on the software, the hardware also needs to be changed to the corresponding mode to be able to drive normally. Please consult us for how to modify the bare screen.

## Display direction switching instructions:

Find the macro definition `USE_HORIZONTAL` in `lcd.h` as shown below:

```
//////////////////////////////////// 用户配置区 //////////////////////////////////////  
#define USE_HORIZONTAL 0 //定义液晶屏顺时针旋转方向 0-0度旋转, 1-90度旋转, 2-180度旋转, 3-270度旋转
```

`USE_HORIZONTAL 0` //0° Rotate

`USE_HORIZONTAL 1` //90° Rotate

`USE_HORIZONTAL 2` //180° Rotate

`USE_HORIZONTAL 3` //270° Rotate