STM32 Test platform introduction:

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

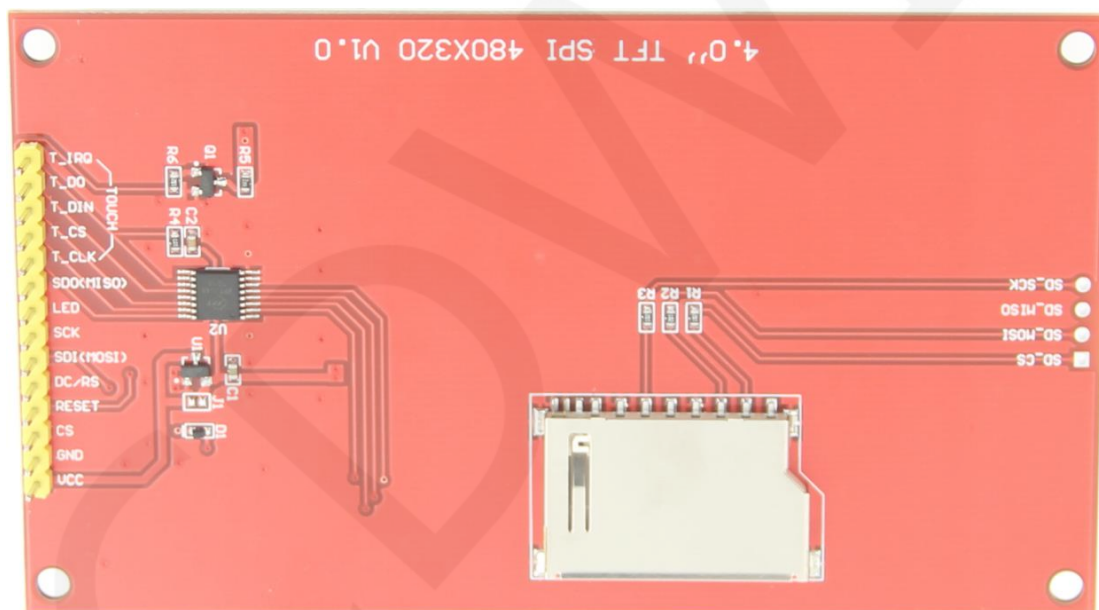Development board: MiniSTM32, Elite STM32, Explorer STM32F4, Apollo STM32F4/F7

MCU: STM32F103RCT6, STM32F103ZET6, STM32F407ZGT6, STM32F429IGT6 , STM32F767IGT6、STM32H743IIT6 (Corresponding to the above development boards)

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

Wiring instructions:

Picture1. Pin silkscreen picture

STM32F103RCT6 microcontroller test program wiring instructions			
Number	Module Pin	Corresponding to MiniSTM32 development board wiring pin	Remarks
1	VCC	5V/3.3V	LCD power supply is positive

Number	Module Pin	Corresponding to Elite STM32 development board wiring pin	Remarks
			(3.3V~5V)
2	GND	GND	LCD Power ground
3	CS	PB11	LCD selection control signal(low level enable)
4	RESET	PB12	LCD reset control signal(low level reset)
5	DC/RS	PB10	LCD data / command selection control signal(high level: data, low level: command)
6	SDI(MOSI)	PB15	LCD SPI bus write data signal
7	SCK	PB13	LCD SPI bus clock signal
8	LED	PB9	LCD backlight control signal (high level lighting, if you do not need control, please connect 3.3V)
9	SDO(MISO)	PB14	LCD SPI bus read data signal (can not be connected if not needed)
10	T_CLK	PC0	Touch screen SPI bus clock signal
11	T_CS	PC13	Touch screen chip select control signal(low level enable)
12	T_DIN	PC3	Touch screen SPI bus write data signal
13	T_DO	PC2	Touch screen SPI bus read data signal
14	T_IRQ	PC10	Touch screen touch interrupt detection signal(low level when touch is detected)

STM32F103ZET6 microcontroller test program wiring instructions

Number	Module Pin	Corresponding to Elite STM32 development board wiring pin	Remarks
1	VCC	5V/3.3V	LCD power supply is positive (3.3V~5V)
2	GND	GND	LCD Power ground
3	CS	PB11	LCD selection control signal(low level enable)

4	RESET	PB12	LCD reset control signal(low level reset)
5	DC/RS	PB10	LCD data / command selection control signal(high level: data, low level: command)
6	SDI(MOSI)	PB15	LCD SPI bus write data signal
7	SCK	PB13	LCD SPI bus clock signal
8	LED	PB9	LCD backlight control signal (high level lighting, if you do not need control, please connect 3.3V)
9	SDO/MISO	PB14	LCD SPI bus read data signal (can not be connected if not needed)
10	T_CLK	PC0	Touch screen SPI bus clock signal
11	T_CS	PC13	Touch screen chip select control signal(low level enable)
12	T_DIN	PC3	Touch screen SPI bus write data signal
13	T_DO	PC2	Touch screen SPI bus read data signal
14	T_IRQ	PC10	Touch screen touch interrupt detection signal(low level when touch is detected)

STM32F407ZGT6 microcontroller test program wiring instructions			
Number	Module Pin	Corresponding to Explorer STM32F4 development board wiring pin	Remarks
1	VCC	5V/3.3V	LCD power supply is positive (3.3V~5V)
2	GND	GND	LCD Power ground
3	CS	PB15	LCD selection control signal(low level enable)
4	RESET	PB12	LCD reset control signal(low level reset)
5	DC/RS	PB14	LCD data / command selection control signal(high level: data, low

			level: command)
6	SDI(MOSI)	PB5	LCD SPI bus write data signal
7	SCK	PB3	LCD SPI bus clock signal
8	LED	PB13	LCD backlight control signal (high level lighting, if you do not need control, please connect 3.3V)
9	SDO(MISO)	PB4	LCD SPI bus read data signal (can not be connected if not needed)
10	T_CLK	PB0	Touch screen SPI bus clock signal
11	T_CS	PC5	Touch screen chip select control signal(low level enable)
12	T_DIN	PF11	Touch screen SPI bus write data signal
13	T_DO	PB2	Touch screen SPI bus read data signal
14	T_IRQ	PB1	Touch screen touch interrupt detection signal(low level when touch is detected)

STM32F429IGT6 microcontroller test program wiring instructions			
Number	Module Pin	Corresponding to Apollo STM32F4/F7 development board wiring pin	Remarks
1	VCC	5V/3.3V	LCD power supply is positive (3.3V~5V)
2	GND	GND	LCD Power ground
3	CS	PD11	LCD selection control signal(low level enable)
4	RESET	PD12	LCD reset control signal(low level reset)
5	DC/RS	PD5	LCD data / command selection control signal(high level: data, low level: command)
6	SDI(MOSI)	PF9	LCD SPI bus write data signal
7	SCK	PF7	LCD SPI bus clock signal
8	LED	PD6	LCD backlight control signal (high level lighting, if you do not need

Number	Module Pin		Remarks
			control, please connect 3.3V)
9	SDO(MISO)	PF8	LCD SPI bus read data signal (can not be connected if not needed)
10	T_CLK	PH6	Touch screen SPI bus clock signal
11	T_CS	PI8	Touch screen chip select control signal(low level enable)
12	T_DIN	PI3	Touch screen SPI bus write data signal
13	T_DO	PG3	Touch screen SPI bus read data signal
14	T_IRQ	PH11	Touch screen touch interrupt detection signal(low level when touch is detected)

STM32F767IGT6,STM32H743IIT6 microcontroller test program wiring instructions			
Number	Module Pin	Corresponding to Apollo STM32F4/F7 development board wiring pin	Remarks
1	VCC	5V/3.3V	LCD power supply is positive (3.3V~5V)
2	GND	GND	LCD Power ground
3	CS	PD11	LCD selection control signal(low level enable)
4	RESET	PD12	LCD reset control signal(low level reset)
5	DC/RS	PD5	LCD data / command selection control signal(high level: data, low level: command)
6	SDI(MOSI)	PB15	LCD SPI bus write data signal
7	SCK	PB13	LCD SPI bus clock signal
8	LED	PD6	LCD backlight control signal (high level lighting, if you do not need control, please connect 3.3V)
9	SDO(MISO)	PB14	LCD SPI bus read data signal (can not be connected if not needed)

10	**T_CLK**	PH6	Touch screen SPI bus clock signal
11	**T_CS**	PI8	Touch screen chip select control signal(low level enable)
12	**T_DIN**	PI3	Touch screen SPI bus write data signal
13	**T_DO**	PG3	Touch screen SPI bus read data signal
14	**T_IRQ**	PH11	Touch screen touch interrupt detection signal(low level when touch is detected)

Demo function description:

1. This test program contains six test procedures for STM32 MCU, namely: STM32F103RCT6, STM32F103ZET6, STM32F407ZGT6, STM32F429IGT6, STM32F767IGT6, STM32H743IIT6;

2. Each MCU test program includes two functional tests: software SPI and hardware SPI;

3. When using the software SPI function or hardware SPI function of each MCU, the wiring pin definition is the same, but the initialization is different;

4. Please follow the above wiring instructions to find the corresponding development board and MCU for wiring;

5. This set of tests supports display switching in four directions. For details, see the display direction switching instructions.

6. After touching the display direction, the touch screen needs to be calibrated;

7. This set of test procedures contains the following test items:

   A. the main interface display 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 screen handwriting test

8. If the module does not touch or does not require touch function, please remove the touch screen handwriting test item;

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