Test platform introduction:

Development board:Apollo STM32F4/F7, F429_V1

MCU: STM32F429IGT6, STM32F767IGT6, STM32H743IIT6

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

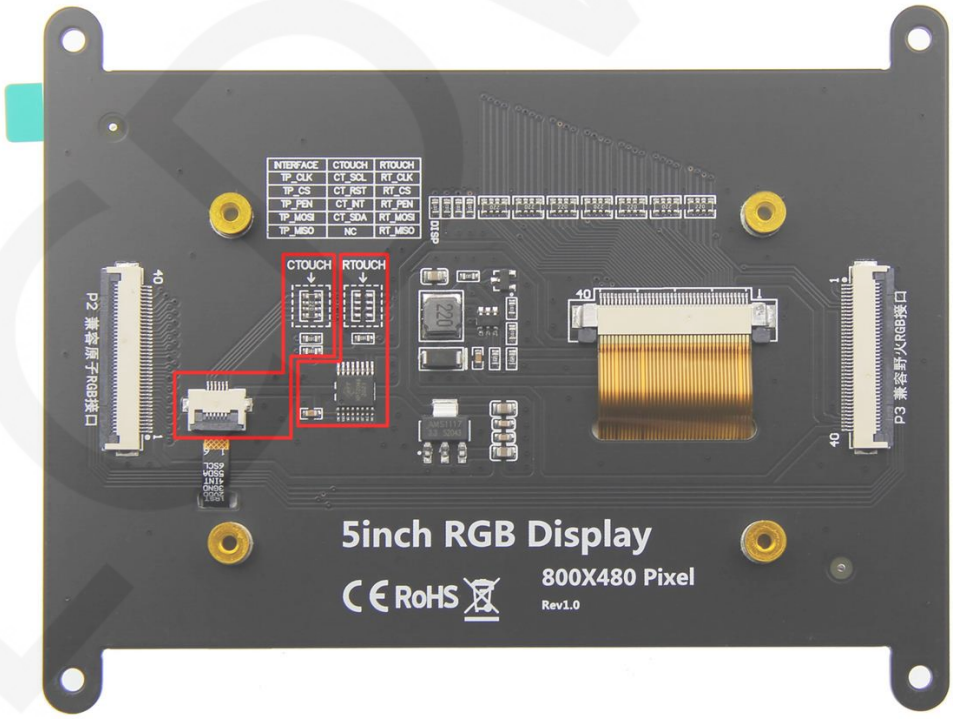
Crystal frequency: 25MHz、25MHz、25MHz (Corresponding to the above MCU)

Wiring instructions:

There are two points to note before wiring: touch screen selection and DISP resistance welding.

1. touch screen selection

If capacitive touch screen is selected, **CTOUCH** circuit will be welded; if resistance touch screen is selected, **RTOUCH** circuit will be welded (as shown in Picture 1). The simplest way to switch the type of touch screen is to weld the other components, and only switch the resistance in the two dotted lines. If the touch screen is not required or the circuit has been soldered, this step can be omitted.

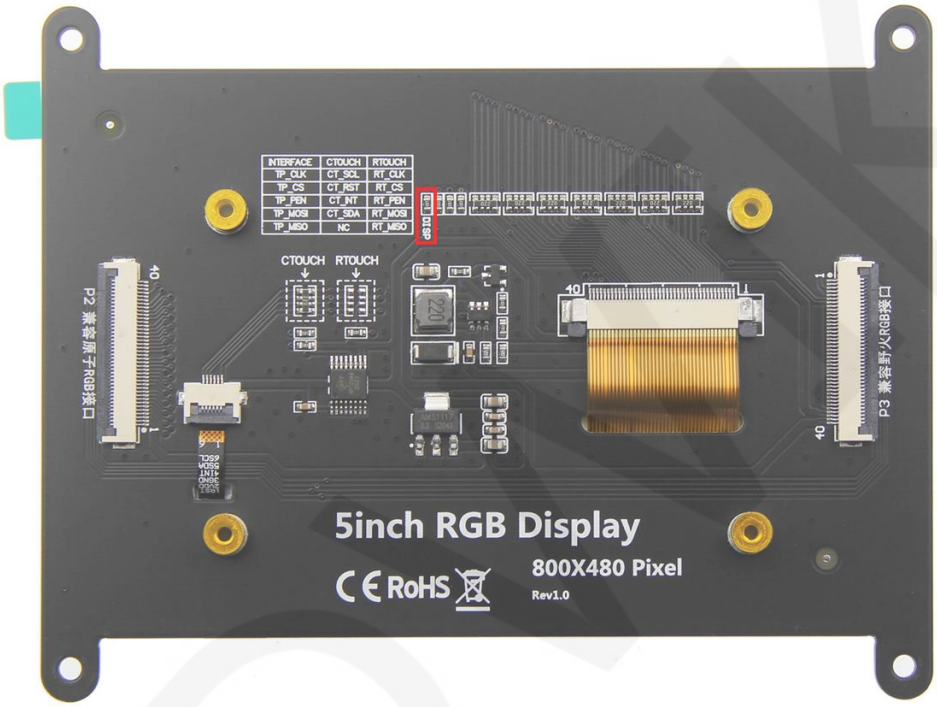


Picture.1 Select screen resolution

2. DISP resistance welding

When using the wildfire development board, you need to remove the disp resistance (as shown in the red box Picture 2), otherwise the screen will not display after the development board is reset.

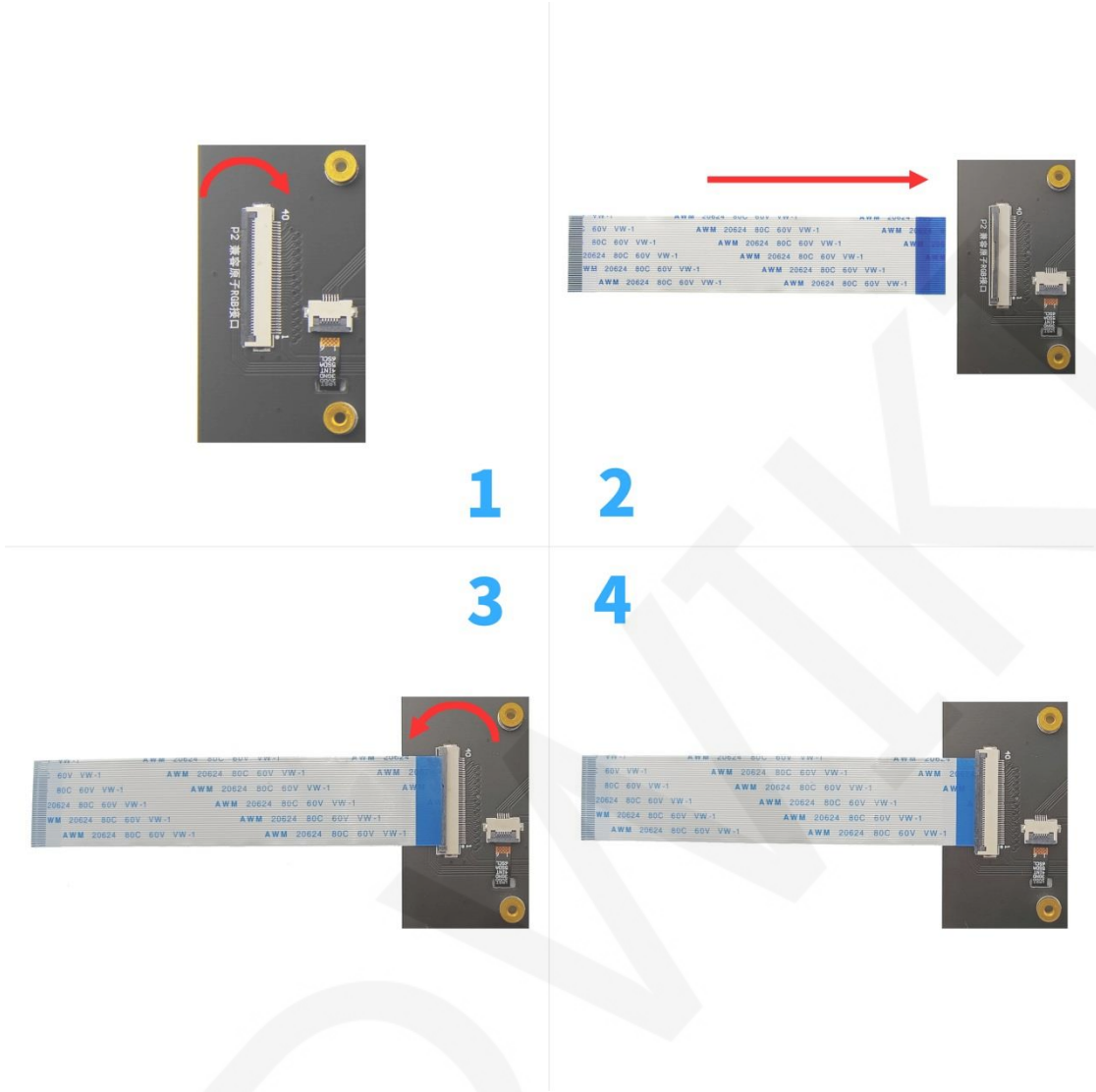
When using punctual atom development board, disp resistance welding is needed, otherwise the screen will not be displayed at any time.



Picture 2. DISP Resistance

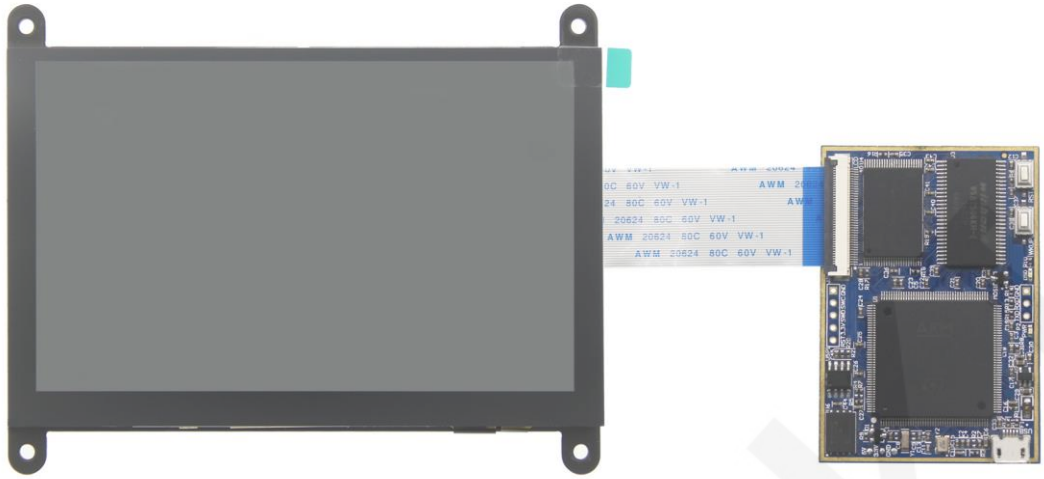
Wiring is carried out in two steps:

A. Use 40pin flexible cable to connect the RGB interface on the display module. Among them, P2 interface is compatible with punctual atomic development board, and P3 interface is compatible with wildfire development board (as shown in Picture 3, the connection method of P3 interface is the same as that of P2 interface).

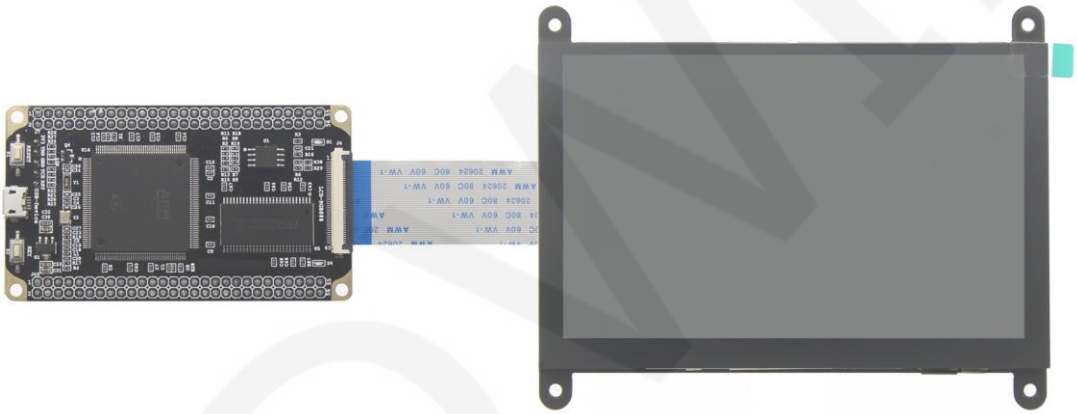


Picture 3. Connect RGB display module

B. After the display module is connected successfully, connect the other end of the flexible cable to the development board (as shown in Picture 4 and Picture 5). It should be noted that the flat cable should not be inserted reversely, so that the 1 ~ 40 pins of the display module interface and the 1 ~ 40 pins of the development board interface should be connected one by one.



Picture 4. Connect atomic core development board



Picture 5. Connect wildfire core development board

STM32F429 / STM32F767 / STM32H743 core board RGB LCD connection instructions			
Number	**Module Pin**	**Corresponding to STM32F429IGT6、STM32F767IGT6、STM32H743IIT6 microcontroller internal connection pin**	**Remarks**
1	**VCC5**	5V	Power input pin（connect to 5V）
2	**VCC5**	5V	Power input pin（connect to 5V）

3	R0	GND	8-bit RED data pin (where R0 ~ R2 is not used)
4	R1	GND	
5	R2	GND	
6	R3	PH9	
7	R4	PH10	
8	R5	PH11	
9	R6	PH12	
10	R7	PG6	
11	GND	GND	power ground pin
12	G0	GND	8-bit GREEN data pin (where G0, G1 is not used)
13	G1	GND	
14	G2	PH13	
15	G3	PH14	
16	G4	PH15	
17	G5	PI0	
18	G6	PI1	
19	G7	PI2	
20	GND	GND	power ground pin
21	B0	GND	8-bit BLUE data pin (where B0 ~ B2 is not used)
22	B1	GND	
23	B2	GND	
24	B3	PG11	
25	B4	PI4	
26	B5	PI5	
27	B6	PI6	
28	B7	PI7	
29	GND	GND	power ground pin
30	PCLK	PG7	Pixel clock control pin
31	HSYNC	PI10	Horizontal synchronous signal control pin
32	VSYNC	PI9	Vertical synchronous signal control pin
33	DE	PF10	Data enable signal control pin
34	BL	PB5	LCD backlight control pin

35	TP_CS	PI8	Capacitor touch screen reset pin (resistance touch screen chip selection pin)
36	TP_MOSI	PI3	Data pin of IIC bus of capacitance touch screen (write data pin of SPI bus of resistance touch screen)
37	TP_MISO	PG3	Resistance touch screen SPI bus read data pin (capacitance touch screen not used)
38	TP_CLK	PH6	IIC bus clock control pin of capacitive touch screen (SPI bus clock control pin of resistance touch screen)
39	TP_PEN	PH7	Touch screen interrupt control pin
40	RST	NRST	LCD reset control pin (effective at low level)

STM32F429_V1 core board RGB LCD connection instructions			
Number	**Module Pin**	**Corresponding to STM32F429IGT6、microcontroller internal connection pin**	**Remarks**
1	TP_SCL	PH4	IIC bus clock control pin of capacitive touch screen
2	TP_SDA	PH5	Data pin of IIC bus of capacitance touch screen
3	TP_PEN	PD13	Touch screen interrupt control pin
4	TP_RST	PD11	Capacitor touch screen reset pin
5	GND	GND	power ground pin
6	BL	PD7	LCD backlight control pin
7	DISP	PD4	LCD display enable pin (enable at high level)
8	DE	PF10	Data enable signal control pin
9	HSYNC	PI9	Horizontal synchronous signal control pin
10	VSYNC	PI10	Vertical synchronous signal control pin

11	**PCLK**	PG7	Pixel clock control pin
12	**B7**	PB9	8-bit BLUE data pin
13	**B6**	PB8	
14	**B5**	PA3	
15	**B4**	PI4	
16	**B3**	PG11	
17	**B2**	PD6	
18	**B1**	PG12	
19	**B0**	PE4	
20	**G7**	PI2	8-bit GREEN data pin
21	**G6**	PC7	
22	**G5**	PI0	
23	**G4**	PH15	
24	**G3**	PG10	
25	**G2**	PH13	
26	**G1**	PE6	
27	**G0**	PE5	
28	**R7**	PG6	8-bit RED data pin
29	**R6**	PB1	
30	**R5**	PA12	
31	**R4**	PA11	
32	**R3**	PB0	
33	**R2**	PH8	
34	**R1**	PH3	
35	**R0**	PH2	
36	**GND**	GND	power ground pin
37	**VCC3.3**	3.3V	Power input pin（connect to 3.3V）
38	**VCC3.3**	3.3V	Power input pin（connect to 3.3V）
39	**VCC5**	5V	Power input pin（connect to 5V）
40	**VCC5**	5V	Power input pin（connect to 5V）

Demo function description:

1. This test program can be used for RGB LCD test, in which **F429_ V1_ Core_ STM32F429IGT6** test program is used to test RGB LCD of wildfire development board (supports rgb565 and rgb888), and other test procedures are used for RGB LCD (only supports rgb565) test of punctual atomic development board;
2. The test program is applicable to three STM32 MCU platforms: STM32F429IGT6、STM32F767IGT6、STM32H743IIT6;
3. Please follow the wiring instructions above to find the corresponding development board and MCU for wiring;
4. The test supports four directions of display switching. For specific methods, please refer to the following display direction switching instructions;
5. The test program supports the switching between resistance touch screen and capacitive touch screen. For specific methods, please refer to the following description of touch screen type switching;
6. This test program supports the touch screen working mode switching (polling and interrupt). For specific methods, please refer to the following description of touch screen working mode switching;
7. This set of test procedures contains the following test items:
   A. the main interface displays the test;
   B. read ID and color value test;
   C. simple brush test;
   D. rectangular drawing and filling test;
   E. circular drawing and filling test;
   F. triangle drawing and filling test;
   G. English display test;
   H. Chinese display test;
   I. picture display test;
   J. rotating display test;

K. touch screen handwriting test;

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

Description of touch screen type switching

Find the macro definition TP_TYPE in touch.h as shown below:

```
//电容触摸屏和电阻触摸屏选择定义
#define TP_TYPE 1     //0-电阻触摸屏，1-电容触摸屏
```

TP_TYPE 0 // Using the resistive touch screen

TP_TYPE 1 // Use capacitance touch screen

NOTE:

When the touch screen type is switched in software, it should also be switched synchronously in hardware, as shown in Picture 1 above

Description of touch screen operation mode switching

Find the macro definition SCAN_TYPE in touch.h as shown below:

```
//触摸屏工作模式选择定义
#define SCAN_TYPE 0    //0-轮询模式，1-中断模式
```

SCAN_TYPE 0 // Use polling mode

SCAN_TYPE 1 // Use interrupt mode