## 1. Introduction to Testing Platform

Development board: STC89/STC12 development board

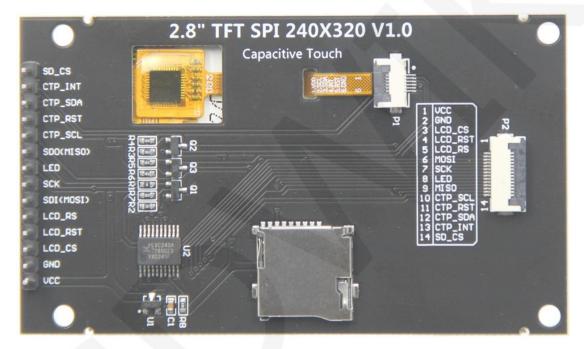
MCU : STC89C52RC, STC12C5A60S2

Frequency: 11.0592MHZ

## 2. Pin connection instructions

The display module is connected to the microcontroller using a DuPont cable,

with specific instructions as follows:



### **Module Back Pins**

STC	39C52RC a	and STC12C5A60S2 micr wiring instructior	
Number	Module Pin	Corresponding to STC89/STC12 development board wiring pin	Remarks
1	VCC	5V	LCD power positive
2	GND	GND	LCD Power ground
3	LCD_CS	P13	LCD selection control signal, Low level active
4	LCD_RST	P33	LCD reset control signal, Low level reset

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			LCD command / data selection					
5	LCD_RS	P12	control signal					
	_		High level: data, low level:					
			command					
6	SDI(MOSI)	P15	SPI bus write data signal(SD card					
			and LCD screen used together)					
7	SCK	P17	SPI bus clock signal(SD card and					
,	JER	1 17	LCD screen used together)					
			LCD backlight control signal (If					
8	LED	623	you need control, please connect					
õ	LED	P32	the pins. If you don't need control,					
			you can skip it)					
0		DCC	SPI bus read data signal (SD card					
9	SDO(MISO)	P16	and LCD screen used together)					
			Capacitive touch screen IIC bus					
10		200	clock signal (modules without touch					
10	CTP_SCL	P36	screens do not need to be					
			connected)					
	CTD DCT		Capacitor touch screen reset					
			control signal, low-level reset					
11	CTP_RST	P37	(modules without touch screens do					
			not need to be connected)					
			Capacitive touch screen IIC bus					
40		224	data signal (modules without touch					
12	CTP_SDA	P34	screens do not need to be					
			connected)					
			Capacitor touch screen IIC bus					
			touch interrupt signal, when					
			generating touch, input low level to					
13	CTP_INT	P35	the main control (modules without					
			touch screens do not need to be					
			connected)					
			SD card selection control signal,					
14	SD_CS	NC	low level active (without SD card					
			function, can be disconnected)					

# 3. Demo Function Description

This testing program includes two types of MCU programs: STC89C52RC and STC12C5A60S2. STC12C5A60S2 includes software SPI and hardware SPI programs, while STC89C52RC only has software SPI programs, which are located in

Demo\_ Under the C51 directory, as shown in the following figure:

	A & TO COT & D TO COLOR MOTOR COMMENTS		
$\bigcirc$	▼ 📙 « 1-Demo ト Demo_C51 ト 🔹 😽 搜索 Demo	o_C51	Q
文件(F)	编辑(E) 查看(V) 工具(T) 帮助(H)		
组织 ▼	包含到库中▼  共享▼  新建文件夹		
· -	名称		-
	Demo_MSP2833_MSP2834_STC12C5A60S2_Hardware	e_SPI	
<b>(</b>	Demo_MSP2833_MSP2834_STC12C5A60S2_Software_	_SPI	
	Demo_MSP2833_MSP2834_STC89C52RC_Software_SF	Ы	~
	•		•

The ROM of the STC89C52RC microcontroller is only 25KB and cannot store overly complex and large programs, so only simple screen swiping tests are performed; STC12C5A60S2 microcontroller test program contains the following test items:

- A. The main interface displays the test;
- B. Display screen ID and GRAM color value reading test (only software SPI is supported, and there are exceptions when hardware SPI reads ID);
- 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. Dynamic digital display test
- K. rotating display test;
- L. Capacitive touch screen testing (including touch button testing and handwriting line testing)

Display direction switching instructions:

Find the macro definition **USE\_HORIZONTAL** in **Icd.h** as shown below:

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USE\_HORIZONTAL 0 //0° Rotate USE\_HORIZONTAL 1 //90° Rotate USE\_HORIZONTAL 2 //180° Rotate USE\_HORIZONTAL 3 //270° Rotate

### 4. Demo Usage Instructions

#### Installing development tool software

Firstly, you need to install the development tool software. Keil5 and stc-isp software are used here, where Keil5 is used for code editing and compilation, and stc-isp is used for download. Please refer to the online download and installation methods for both software.

### ♦ Installing chip packages

After installing keil5, it is necessary to install the C51 chip package, otherwise the C51 chip cannot be found and the C51 project cannot be created.Please consult online for specific installation methods.

### ♦ Compiling Programs

After the development tool and chip package are successfully installed, open the **PROJECT** directory under the sample program, locate the **uvprojx** file, double-click to open the sample project, as shown in the following figure:

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文件(F) 组	编辑(E) 查看(V) 工具(T) 帮助(H)		
组织▼	包含到库中▼ 共享▼ 新建文件夹		:= • 🗌 🔞
•	名称	修改日期	类型
<b>N</b>	ceshi.m51	2023/5/29 11:57	M51文件
<b>a</b>	ceshi.uvgui.Administrator	2023/5/29 16:19	ADMINISTRATO
8	ceshi.uvgui.IBM	2014/12/15 17:08	IBM 文件
	🗋 ceshi.uvopt	2023/5/29 16:19	UVOPT 文件
	📓 ceshi.uvproj	含到库中 ▼ 共享 ▼ 新建文件夹       修改日期       类型       ●         弥       修改日期       类型       ●         ceshi.m51       2023/5/29 11:57       M51 文件       ●         ceshi.uvgui.Administrator       2023/5/29 16:19       ADMINISTRATO       ●         ceshi.uvgui.IBM       2014/12/15 17:08       IBM 文件       ●         ceshi.uvopt       2023/5/29 16:19       UVOPT 文件	
8	ctpiic.lst	2023/5/29 11:44	LST 文件
<b>Q</b> -		2023/5/29 11:44	LST 文件 ▼
	14 个对象		

After opening the sample project, you can make modifications to the project code (or not). After the modifications are completed, click the compile button to compile the code. The following prompt appears, indicating successful compilation, as shown in the following figure:

🔣 G:\project\2.8inch\2.8inch_common_spi_ctp\2.8inch_SPI_Module_ILI9341_MSP2833 💶 💷 📂	ζ
File Edit View Project Flash Debug Peripherals Tools SVCS Window Help	
□ 😂 🖬 🗿   ※ 🖣 🕲   ∽ 🗠   ← →   🥐 豫 豫 豫   澤 澤 //注 //沒   ⑳ HAL_LTDC_SetWind 💌 🗟 🥙	٩.
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Project 4 🖬 📋 main.c	×
Project: ceshi QD-TFT QD-TFT USER ✓ <p< td=""><td></td></p<>	
	L 💌
Build target 'QD-TFT' linking	
Program Size: data=15.1 xdata=187 code=31703 creating hex file from "\obj\ceshi" "\obj\ceshi" - 0 Error(s), 0 Warning(s). Build Time Elapsed: 00:00:01	Ŧ
🖅 Build Output 🛛 🙀 Find In Files 🛛 🔐 Browser	
	ati

### ♦ Download and Run Programs

A. Open the STC-ISP software for program download, first select the correct

microcontroller model and baud rate, and set them as shown in the following figure:

나机켚号 STC12C5A60S2 ▼ 引脚数 Aut, ▼	程序文件	EEPROM文件	串口	助手	Keil	仿真i	安置	选型/	价格/相	品	范例程序	; 波特率	4 )
串口号 COM6 ▼ 扫描	00000h	02 64 3	F 00	00 00	00	00 0	00 00	00	00 00	00 0	00 00	.d?	
低波特率 2400 ▼ 最高波特率 115200 ▼	00010h 00020h	00 04 0	4 04	04 04			04 00		00 14 3F 14		A OO		Ξ
始地址	00020h	00 00 00 0	-	04 18			06 0C		15 OF		0 00		-
☆0000 ▼清除代码缓冲区 打开程序文件	00040h	00 12 1	5 0D	0A 14	1 2C	2A 1	2 00	00	00 00	04 0	A OA		
	00050h	1E 15 1	5 09	36 00	00 0	00 0	02 02	01	00 00	00 0	00 00	6	
x0000 √ 清除EEPROM缓冲区 打开EEPROM文件	00060h	00 00 0	0 00	20 10		08 0	80 80	80	08 10	20 0	00 00		
硬件选项 脱机下载/U8/U7 程序加密后传输 ID4 🔹 🕨	00070h	02 04 0	8 08	08 08			04 02		00 00		4 15		
	00080h 00090h	OE OE 1		00 00			00 04	04	04 1F		4 04		
送择使用内部IRC时钟(不选为外部时钟)	00090h	00 00 0			00 00		00 00				0 00		
▼振荡器放大増益(12M以上建议选择)	000B0h	00 00 0		02 00					08 04		2 02		
<b>夏</b> 位脚用作I/0口	000C0h	02 01 0	0 00	00 OE	11	11 1	1 11	11	11 OE	00 0	00 00		
── RESET2脚的电平低于1.33V时芯片复位	000D0h	00 04 0	6 04	04 04	4 04	04 0	DE 00	00	00 00	0E 1	1 11		
✓ 上电复位使用较长延时	000E0h	08 04 0		1F 00					10 OC		.0 11		
	000F0h	0E 00 0					09 A				00 00		
上电复位时由硬件自动启动看门狗	00100h	00 1F 0	1 01	OF 10	5 10	11 0	DE UO	00	00 00	UE C	19 01		Ŧ
看门狗定时器分频系数 256 ▼	•				111							P.	
<ul> <li>✓ 空闲状态时停止看门狗计数</li> <li>● 下次冷启动时, P1.0/P1.1为0/0才可下载程序</li> </ul>	代码长度	6AE4H 🕴	验和	33F16	АН	区域	填充	]	腔区域	ŧ .	保存数据	E	
下次下载用户程序时擦除用户EEPROM区 -	芯片型号:	STC12C5A60	S2										
	关于此游点	的重要说明	61-H-	1.61-									E
下载/编程 停止 重复编程	副任版本	在v7 1及以 低于v7 1的	的心力	TEPROM	FROM	: 204	42节	(0000)	H-07FE	н) Н)			
检测MCU选项 注意/帮助 重复延时 3 秒 ▼													4
每次下载前都重新装载目标文件	E:\project	\3.2inch\QD	tech_3	3. 2inc	h_ILI	9341	SPI_V	1.0	. \cesh	i.hex			

B. Click to open the program file ->select the directory where the compiled hex

file is located ->select the hex file ->click the open button, as shown in the

单片机型号 STC12C5A60S2 ▼引脚数 Aut. ▼ 1 查找范围(	I): 📜 obj	- 0 🕫 🕫 🛛	
田口号 [008] ● 扫描     最低波特率 115200 ●     最低波特率 115200 ●     最低波特率 115200 ●     最近访问的亿     電流 200 ●     電	名称 Ceshi.hex Pile to be bur	ned	修改日期 2018-07-09 15:37
下次>倉店城村, P1.0/P1.1/20/0/可下载程序         マ           下次下载用户程序对排影用户EZEFX0回区         マ           下载//编程         停止         重買编程           检测www.b项         注意//索助         重買编封 3 秒 ▼           文每次下载前都重新装载目标文件         当目标文件变(化对自动装载并发送下载命令         支	∢ 文件名(N): 文件类型(T):	III ceshi.hex Intel Hex/Binary (*.hex; *.bin) □以只读方式打开(R)	▼ 打开(0) ▼ 取消

following figure:

C. Click the **download** button to power on the microcontroller again, and the program will be burned. When the "**Operation successful**" prompt appears, it indicates

下次1	- click to dov			固件版本 操作成功!			15:48	3:59)	þ	lown	load	succ	essfu	ıl				A 111 F
□下次/	状态时停止看门狗计数 ≶启动时,P1.0/P1.1为0/0才			代码长度	6AE4H	校	验和	33F1	6AH (	N	城填充		清空	区域		保存数据	4	
	向定时器分频系数 256			•					11								•	
	夏位时由硬件自动启动看门	狗		00100h	00	1F 01	01	0F 1	10 10	11	OE C	0 00	00	00 OE	09	01		Ŧ
✓ 上电复	夏位使用较长延时			OOOFOh		00 00			08 00		100							
RESET	2脚的电平低于1.33V时芯片	復位		000D0h	08 0	04 06		04 0	00 00			0 00 E 11	10					
	即用作I/0口			000COh	02				DE 11			1 11		0E 00				
	器放大增益(12M以上建议选	译)		000B0h	00	00 00	00	02 0	00 00			8 08			02	02		
	使用内部IRC时钟(不选为外)		^	000A0h	00		00		00 00			0 00						
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公司11211 x0000	▼ 清除代码缓冲区	打开程序	文件	00030h		12 15		04 1			12 0							
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低波特率	2400 ▼ 最高波	特室 11520	• •	00010h		04 04			04 04			0.00	00					=
串口号	USB-SERIAL CH340 (COM6)	•	扫描	00000h	02	64 3F	00	00 0	00 00	00	00 0	0 00	00	00 00	00	00	.d?	
-/10012-5	STC12C5A60S2	▼ 引脚数	Auti +	程序文件	EEPROM	XIF	市山	助于	Kei	11万具	设直	达结	2/10/1	音/科品	1 2	例程序	波特率	

successful burning. The operation is shown in the following figure:

D. If the display module displays characters and graphics normally, it indicates that

the program has run successfully.