1. Introduction to Testing Platform

Development Board : CH32F103C8T6 and CH32F203C8T6 Board

MCU : CH32F103C8T6 \ CH32F203C8T6

Frequency : 72MHz(F103) \ 144MHz(F203)

2. Pin connection instructions

The software IIC testing program of CH32F103C8T6 can be directly plugged into

the CH32F103C8T6 development board (see figure below).

The hardware IIC test program for CH32F103C8T6 or all test programs for

CH32F203C8T6 can only be connected using DuPont cables.

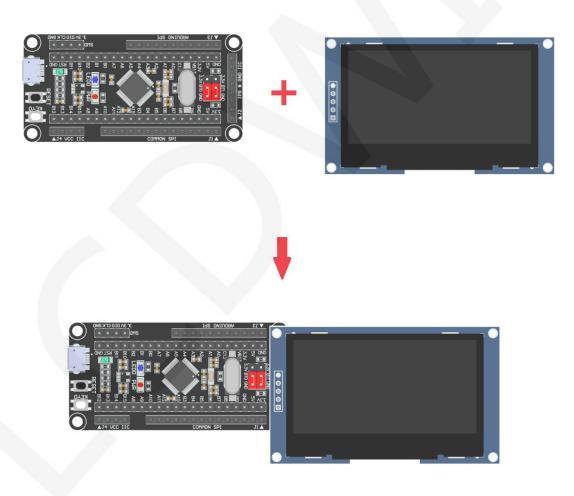


Figure 1: Module Inline CH32F103C8T6 Development Board

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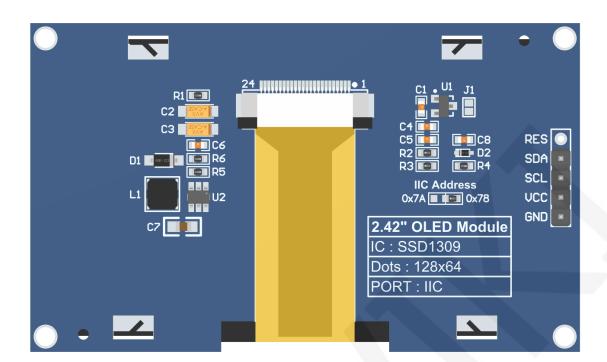


Figure 2 Module Back Pins

NOTE:

- A. The **IIC Address** resistor is used to select the IIC slave device address. If it is soldered on the 0x78 side, select the 0x78 slave device address. If it is soldered on the 0x7A side, select the 0x7A slave device address;
- B. The RES pin row is not soldered by default. If the reset function needs to be controlled in the program, it needs to be soldered;

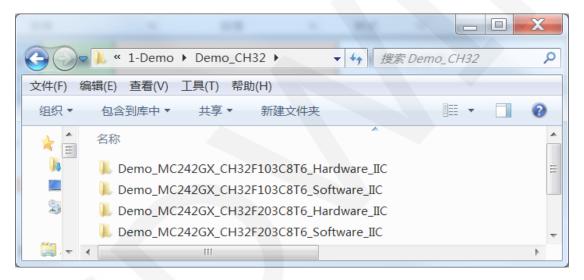
CH32F103C8T6/CH32F203C8T6 IIC Test Program Pin Di Insertion Instructions								
	Number	Module pins	Corresponding CH32F103/CH32F203 development board wiring pins Hardware Software		Remarks			
			liC	liC				
	1	GND	GN	ND	OLED screen power supply ground			
	2	VCC	5V/3.3V		OLED screen power supply positive			
	3	SCL	PB6	PA5	IIC bus clock signal			

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4	SDA	PB7	PA7	IIC bus data signal
5	RES	Not w	velded	The pin arrangement is not soldered by default. If the reset function needs to be controlled in the program, it needs to be soldered

3. Demo Function Description

This sample program includes two types of MCU programs, CH32F103C8T6 and CH32F203C8T6. Each MCU program also includes hardware IIC and software IIC functions, which are located in the **Demo_CH32** directory, as shown in the following figure:



♦ Description of sample program content

The sample program includes the following content:

- A. Home screen display;
- B. Single color screen brushing
- C. Rectangle drawing display;
- D. Circular drawing display;
- E. Triangle drawing display;
- F. English display;
- G. Display of numbers and symbols
- H. Chinese display;

- I. BMP monochrome image display;
- J. Menu simulation display;

♦ Example program display direction switching instructions

Found macro definition USE_HORIZONTAL and COLOR_STATE in

HARDWARE\OLED\oled.h file, as shown in the following:

#define	USE HORIZONTAL		设置显示方向:	0-正常,1-旋转180度	
#define	COLOR_STATE		设置显示模式:	0-正常显示,1-反色显示	

Modify USE_ HORIZONTAL and COLOR_ STATE macro according to the following definition:

#define	USE_HORIZONT	AL 0	//0 ° rotation	(Default value)
#define	USE_HORIZONT	AL 1	//180 ° rotatio	n
#define	COLOR_ STATE	0 //Black	background, r	monochrome display
		conter	nt(Default value	e)

#define COLOR_STATE 1 //Monochrome background, black display content

♦ Example program IIC slave device address modification instructions

The IIC slave device address has been modified in hardware, and corresponding modifications need to be made in software.First, locate the macro definition IIC_SLAVE_ADDR in the HARDWARE\IIC\iic.h file, as shown in the following

figure:

//定义IIC从设备地址 #define IIC SLAVE ADDR 0x78 //0x7A

Modify IIC_SLAVE_ADDR macro definition according to the following definition is sufficient to:

#define IIC_ SLAVE_ ADDR 0x78 //Slave device address is 0x78 (default value)
#define IIC_ SLAVE_ ADDR 0x7A //Slave device address is 0x7A

4. Demo Usage Instructions

♦ Installing development tool software

Firstly, you need to install the development tool software, which uses Keil5.

Please refer to the online download and installation methods for yourself.

♦ Installing Device Library

After installing the keil5 software, it is necessary to install the CH32 device library

(omitted if already installed), and the download address is as follows:

CH32F103C8T6: https://www.wch.cn/downloads/CH32F103EVT_ZIP.html

CH32F203C8T6: https://www.wch.cn/downloads/CH32F20xEVT_ZIP.html

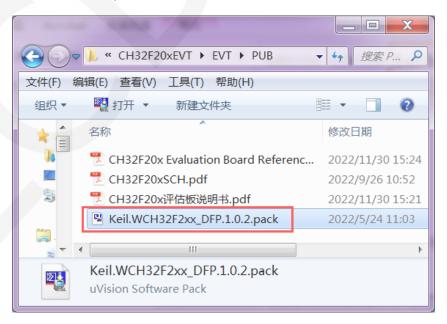
After downloading the official information package, unzip it and find the pack file in

the **EVT\PUB** directory, as shown in the following figure:

CH32F103C8T6's pack:



CH32F203C8T6's pack:



Double click on the pack file and follow the prompts to install.

♦ Compiling Programs

After the library installation is completed, 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:

	N 18 N	11.4 Kilot	1.0			X			
C → C → MC242GX_CH32F103C8T6_Hardware_IC → PROJECT → → 4 搜索 PROJECT >									
文件(F) 编辑(E) 查看(V) 工具(T) 帮助(H)									
组织 ▼	👿 打开 🔹 新建文件夹			•== •		0			
^ 🐉	名称	修改日期	类型	大小		•			
4	OLED-TEST.uvguix.Administrator	2023/8/2 19:06	ADMINISTRATO	175 KB					
See 10 € 10 € 10 € 10 € 10 € 10 € 10 € 10	OLED-TEST.uvoptx	2023/8/2 19:05	UVOPTX 文件	13 KB					
22	OLED-TEST.uvprojx	2023/6/29 11:01	礦ision5 Project	22 KB		Ш			
	startup_ch32f10x.lst	2023/8/2 19:05	LST 文件	41 KB		-			

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\2.42inch\2.42inch_OLED_SSD1309_IIC_Module_MC242GX_V1.0\1-Demo\De	x
File Edit View Project Flash Debug Peripherals Tools SVCS Window Help	
「 😂 🖬 🕼 み ங 🛍 め (> <= → 隆 🎕 🎕 🎕 導 薄 浦 //ミ //版 🞯 touch_flag 🛛 🔽 🗟 🥐 (- يە
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Project: OLED-TEST	/_
 □ OLED-TEST □ 2 //本程序只供学习使用,未经作者许可,不 3 //测试硬件:单片机CH32F103C8T6,F103C8T 	
USER4 //QDtech-TFT液晶驱动 for CH32 IO模拟	
E Proje 😚 Books 🚯 Func 🛛 🛶 Tem	•
Build Output	џ
*** Using Compiler 'V5.06 update 6 (build 750)', folder: 'D:\Keil_v5\ARM\ARMCC\Bin' Build target 'OLED-TEST'	-
"\OBJ\OLED-TEST.axf" - 0 Error(s), 0 Warning(s).	
Build Time Elapsed: 00:00:01	
4	
Build Output Find In Files	
	-11

♦ Download and Run Programs

The development board supports SWD download, USB download, and serial port

download

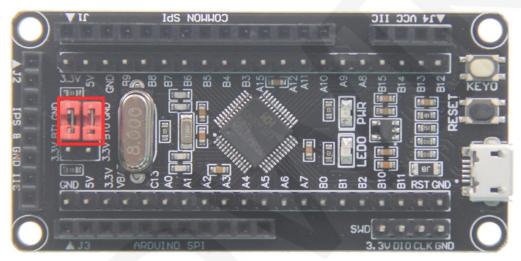
When downloading SWD, ST Link or WCH Link downloaders can be used.

Here is an introduction to SWD download. For other download methods, please refer to the documentation in the development board documentation package or consult the internet.

The steps for downloading SWD are as follows (using the CH32F103C8T6 development board as an example):

A. Firstly, ensure that the BT0 and BT1 pins of the MCU remain low, as shown in the following figure:

The BT0 and BT1 pins of CH32F103C8T6 are connected to GND using jump caps.

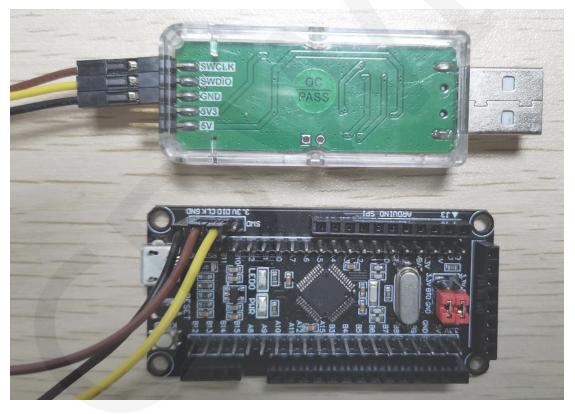


B. Find the SWD interface of the development board and connect it one by one with the pins of the emulator (theoretically, any emulator that supports the SWD protocol supports it), as shown in the following figure:

Connect to ST-Link:



Connect to WCH-Link:



C. Open the KEIL tool software and click the button shown in the following figure:

File Edit View Project Flash D	ebug Peripherals Tools SVCS Window Help
🗋 🗃 🗑 📓 👗 🖦 🛍 🗠 🤗	← ⇒ 巻 巻 巻 巻 譯 譯 ///////////////////////
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Project 🛛 🗜 🗵	▲
Project: TEMPLET	
🖃 🐖 TEMPLET	Click
🗉 🖳 USER	
HARDWARE	
🗈 📮 CORE	
🗉 🖳 FWLib	
🗉 💭 SYSTEM	
CMSIS	
🗄 🏶 Device	

D. Click the **Debug** button in the pop-up interface, and then select the emulator in

Use.

If using ST-Link, please select ST-LINK Debugger

If using WCH-Link, please select CMSIS-DAP Debugger

As shown in the following figure:

Using ST-Link:

Options for Target 'TEMPLET'			×	
Device Target Output Listing User C/C++ Asm	Linker Deb	ug Utilities		
C Use Simulator with restrictions Settings ☐ Limit Speed to Real-Time	Signur	nk Debugger m Systems JTAGjet (/ J-TRACE Cortex	✓ Settings	
Initialization File:	Load A ULINK Initializatio SiLab	Pro Cortex Debugger k Debugger s UDA Debugger	main()	
Restore Debug Session Settings Image: Constraint of the second	Restore Model PEMic I Bre ULINK TIXDS Watch Win	Tiewer		
CPU DLL: Parameter:	Driver DLL:	Parameter:		
SARMCM3.DLL -REMAP	SARMCM3.DLL			
Dialog DLL: Parameter:	Dialog DLL:	Parameter:		
DCM.DLL -pCM3	TCM.DLL	-pCM3		
Warn if outdated Executable is loaded Manage Component V	Warn if outdated Executable is loaded			
OK Ca	ncel De:	faults	Help	

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Using WCH-Link:

Options for Target 'TEMPLET'	
Device Target Output Listing User C/C++ Asm	Linker Debug Utilities
C Use Simulator with restrictions Settings □ Limit Speed to Real-Time	
✓ Load Application at Startup ✓ Run to main() Initialization File:	✓ Load A NULINK Pro Cortex Debugger NULink Debugger Initializatio SiLabs UDA Debugger SI-1 ink Debugger
Restore Debug Session Settings Seakpoints Vatch Windows & Performance Analyzer Memory Display System Viewer	CMSIS-DAP Debugger Edit Models Cortex-M Debugger PEMicro Debugger PEMicro Debugger TIXDS Debugger Watch Windows System Viewer
CPU DLL: Parameter:	Driver DLL: Parameter:
SARMCM3.DLL -REMAP	SARMCM3.DLL
Dialog DLL: Parameter:	Dialog DLL: Parameter:
DCM.DLL -pCM3	TCM.DLL -pCM3
Warn if outdated Executable is loaded	Warn if outdated Executable is loaded
Manage Component Vi	ewer Description Files
OK Car	ncel Defaults Help

E. Power on the development board and click the **Settings** button next to Use (as shown in the previous operation). The following interface will pop up, indicating that the emulator has successfully connected:

Debug Adapter Unit: <mark>ST-LINK/V2</mark> ▼	SW Device Mon SWDIO Device Name Mon SWDIO 0x1BA0 ARM CoreSight SW-DP Up
Serial 53FF71067766485259261681 Version: V2 FW: V2J31S7 V Check version on sta Target Com Port SW V Clock Req: 4 MHz Selecter 4 MHz	Automatic Detectic ID CODE: Manual Configuration Provide Name Add Delete Update IR len: AP:
Debug Connect & Reset Options Connect: Normal Veset: Autodet Reset after Conni Stop after	

ST-Link connection successful:

WCH-Link	connection	successful:
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CMSIS-DAP Cortex-M Target Driver Set	tup	- Jana Ji	tions panel (acto	X				
Debug Trace Flash Download Pack								
CMSIS-DAP - JTAG/SW Adapter SW Device								
WCH CMSIS-DAP		IDCODE	Device Name	Move				
Serial No: 0001A0000000	SWDIO (⊙ 0x2BA01477	ARM CoreSight SW-DP	Up				
Firmware Version: 2.0.0			+	Down				
Max Clock: 10MHz	C Auso Manu Add	AP: 0x00						
Debug Connect & Reset Options Cache Options Download Options Connect Normal Reset SYSRESETREQ (I Cache Code Cache Memory Verify Code Download Download to Flash Log Debug Accesses Stop after Reset								
	C	DK	Cancel	Help				

F. Click the Flash Download button to enter the flash settings interface, as shown in the following figure (if flash has been selected, this step can be omitted):
If you want the program to automatically run after successful download, you

need to check **Reset and Run**. Otherwise, after successful download, you need to press the reset button or power off to restart before running the program.

Cortex-M Target Driver Setup
Debug Trace Flash Download Download Function Erase Full C Verify Do not Erase Verify Programming Algorithm Frogramming Algorithm
Description Device Size Device Type Address Range
art: ize:

G. Click on the **Add** button (as shown in the above figure) to select flash. Generally, the first one is selected (the algorithm has already been processed), and once it

is selected, click on the Add button below to exit, as shown below:

Description	Flash Size	Device Type	Origin	
CH32F1xx_64 Flash	64k	On-chip Flash	Device Family Package	
STM32F10x Flash Options	16B	On-chip Flash	Device Family Package	
AM29x128 Flash	16M	Ext. Flash 16-bit	MDK Core	
K8P5615UQA Dual Flash	64M	Ext. Flash 32-bit	MDK Core	
LPC18xx/43xx MX25V803	8M	Ext. Flash SPI	MDK Core	
LPC18xx/43xx S25FL032	4M	Ext. Flash SPI	MDK Core	
LPC18xx/43xx S25FL064	8M	Ext. Flash SPI	MDK Core	
LPC407x/8x S25FL032 SP	4M	Ext. Flash SPI	MDK Core	
LPC5460x MT25QL128 S	16M	Ext. Flash SPI	MDK Core	
M29W640FB Flash	8M	Ext. Flash 16-bit	MDK Core	
MIMXRT105x EcoXiP Flash	4M	Ext. Flash SPI	MDK Core	
RC28F640J3x Dual Flash	16M	Ext. Flash 32-bit	MDK Core	
S29GL064N Dual Flash	16M	Ext. Flash 32-bit	MDK Core	
S29JL032H_BOT Flash	4M	Ext. Flash 16-bit	MDK Core	
S29JL032H_TOP Flash	4M	Ext. Flash 16-bit	MDK Core	
Selected Flash Algorithm File	e:			
d:\Keil_v5\ARM\PACK\Keil\V	VCH32F1xx_D	FP\1.0.0\Flash\CH3	32F1xx_64.FLM	-
		Add	Cancel	

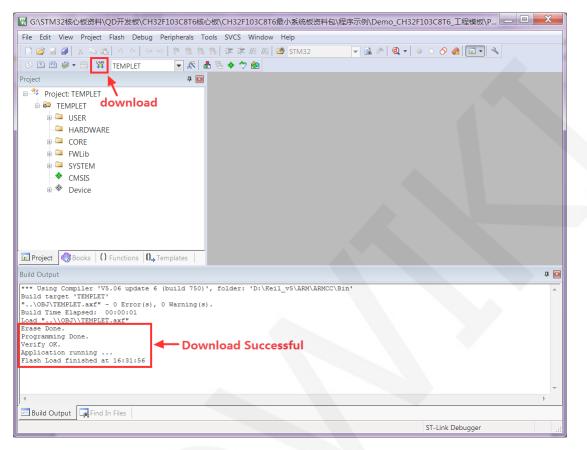
H. Click the OK button and the OK button to exit the settings interface, as shown in

the following figure:

Cortex-M Target Driver Setup
Download Function C Brase Full Cl I Program G Erase Sector: Verify C Do not Erase I Reset and Run RAM for Algorithm :art: 0x20000000 ize: 0x1000
Programming Algorithm
Description Device Size Device Type Address Range CH32F1xx_64 Flash 64k On-chip Flash 08000000H - 0800FFFFH
:art:ize:
Add Renove
· · · · · · · · · · · · · · · · · · ·
OK Cancel Defaults Help

I. Click the download button to download the program, and the following prompt

will appear, indicating successful download, as shown in the following figure:



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

the program has run successfully.