1. Introduction to Testing Platform

Development Board : CH32F103C8T6 and CH32F203C8T6 Board

MCU : CH32F103C8T6 \ CH32F203C8T6

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

2. Pin connection instructions

This module can be directly plugged into the CH32F103C8T6 and CH32F203C8T6 development boards, as shown in the following figure:
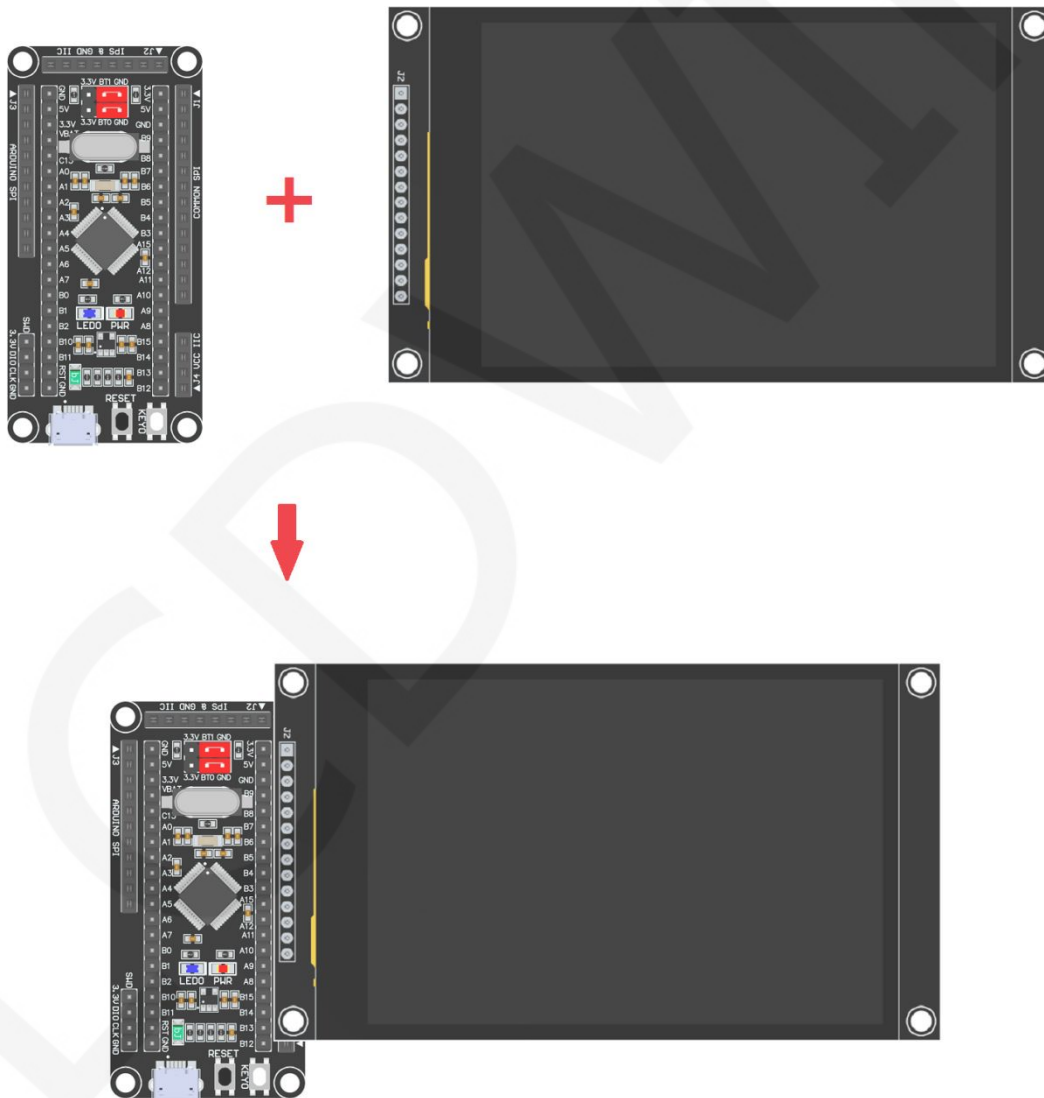

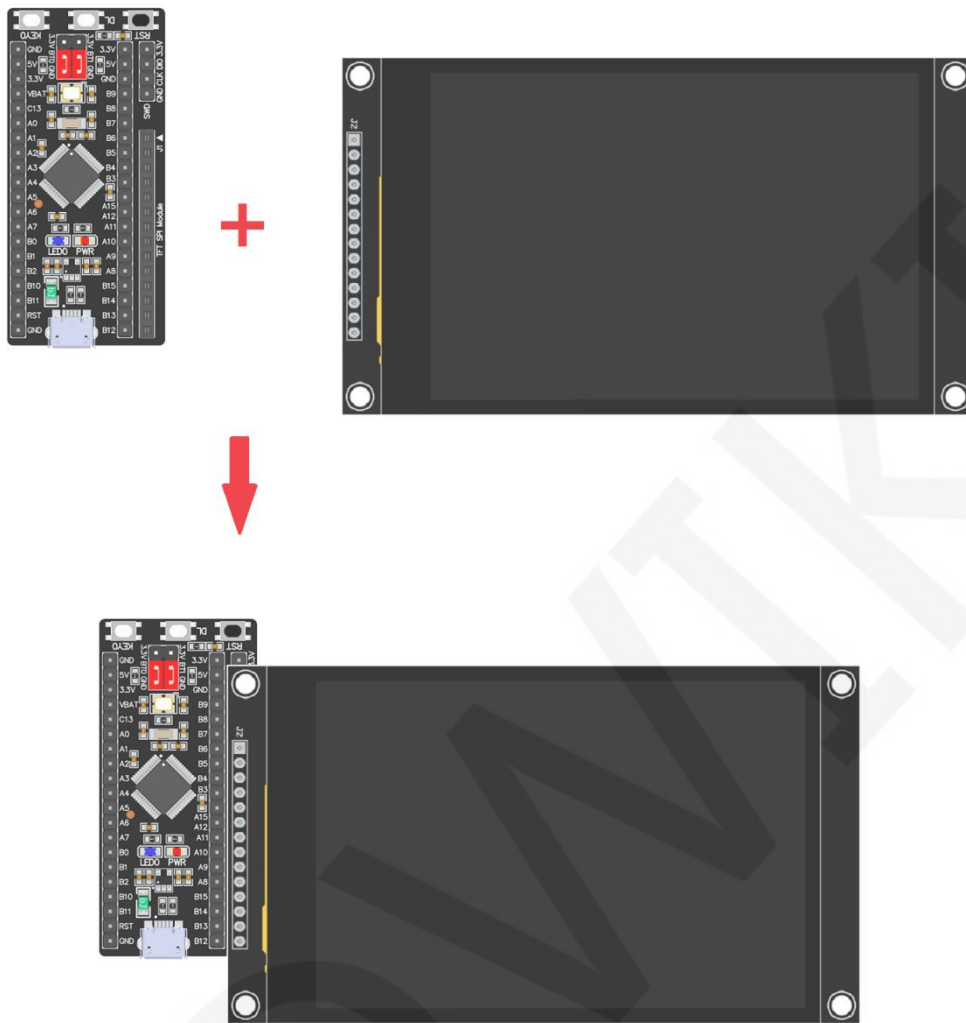**Figure 1: Module Inline CH32F103C8T6 Development Board**
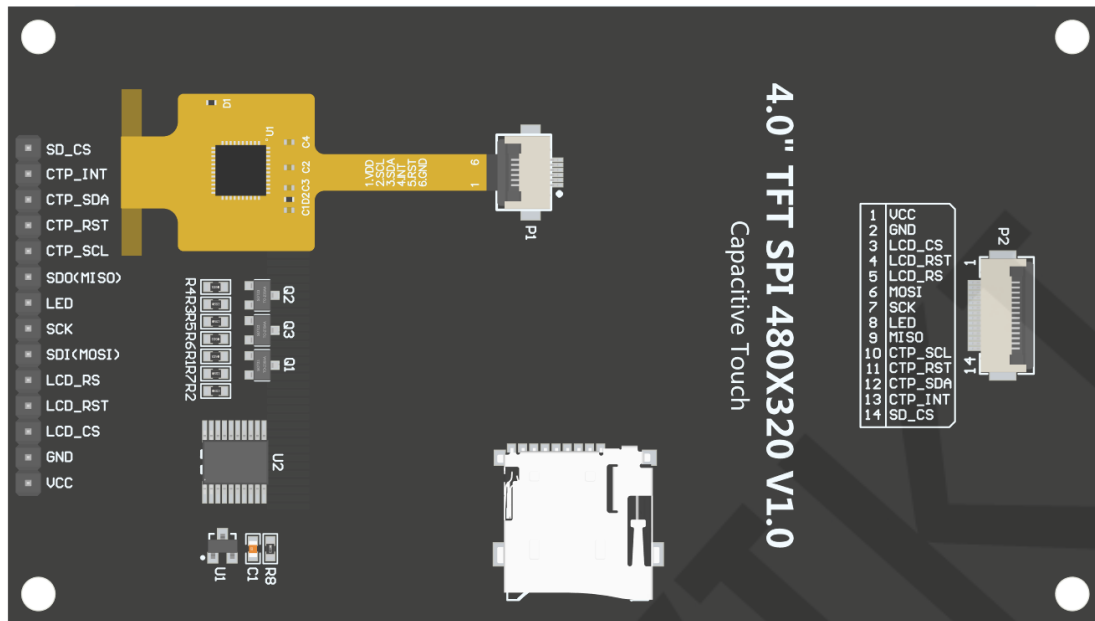
Figure 2: Module Inline CH32F203C8T6 Development Board

Figure 3 Module Back Pins

	CH32F103C8T6/CH32F203C8T6 Test Program Pin Direct Insertion		
Number	**Module pins**	**Corresponding CH32F103/CH32F203 development board wiring pins**	**Remarks**
1	**VCC**	5V	LCD power positive
2	**GND**	GND	LCD Power ground
3	**LCD_CS**	PB9	LCD selection control signal, Low level active
4	**LCD_RST**	PB8	LCD reset control signal, Low level reset
5	**LCD_RS**	PB7	LCD command / data selection control signal High level: data, low level: command
6	**SDI(MOSI)**	PA7	SPI bus write data signal(SD card and LCD screen used together)
7	**SCK**	PA5	SPI bus clock signal(SD card and LCD screen used together)
8	**LED**	PB6	LCD backlight control signal (If you need control, please connect the pins. If you don't need control, you can skip it)
9	**SDO(MISO)**	PA6	SPI bus read data signal (SD card and LCD screen used together)

10	CTP_SCL	PB5	Capacitive touch screen IIC bus clock signal (modules without touch screens do not need to be connected)
11	CTP_RST	PA10	Capacitor touch screen reset control signal, low-level reset (modules without touch screens do not need to be connected)
12	CTP_SDA	PA9	Capacitive touch screen IIC bus data signal (modules without touch screens do not need to be connected)
13	CTP_INT	PA8	Capacitor touch screen IIC bus touch interrupt signal, when generating touch, input low level to the main control (modules without touch screens do not need to be connected)
14	SD_CS	NC	SD card selection control signal, low level active (without SD card function, can be disconnected)

3. Demo Function Description

  This set of sample programs includes two types of MCU programs, CH32F103C8T6 and CH32F203C8T6. Each MCU program also includes hardware SPI programs and software SPI programs, which are located in Demo_ Under the CH32 directory, as shown in the following figure:
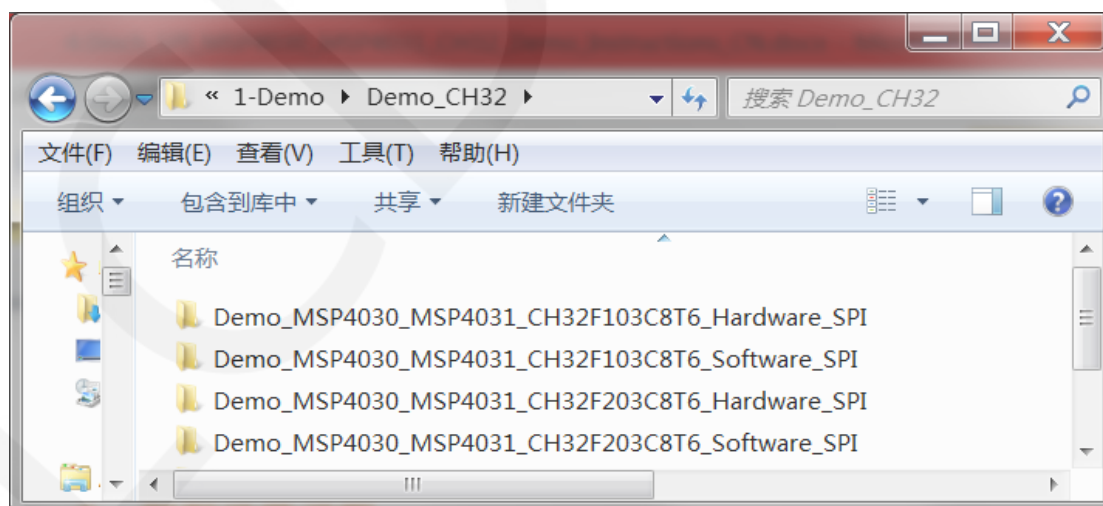
✧ **Description of sample program content**

  A. Main interface display;

B. Read the display screen ID and GRAM color values;

C. Simple screen swiping;

D. Drawing and filling of rectangles;

E. Draw and fill a circle;

F. Triangle drawing and filling;

G. English display;

H. Chinese display;

I. Image display;

J. Dynamic digital display;

K. Rotating display;

L. Capacitive touch screen (including touch buttons and handwritten lines);

✧ **Example program display direction switching instructions**

Found macro definition **USE_HORIZONTAL** in **LCD. h**, as shown in the following:

```
/////////////////////////////////////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

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:

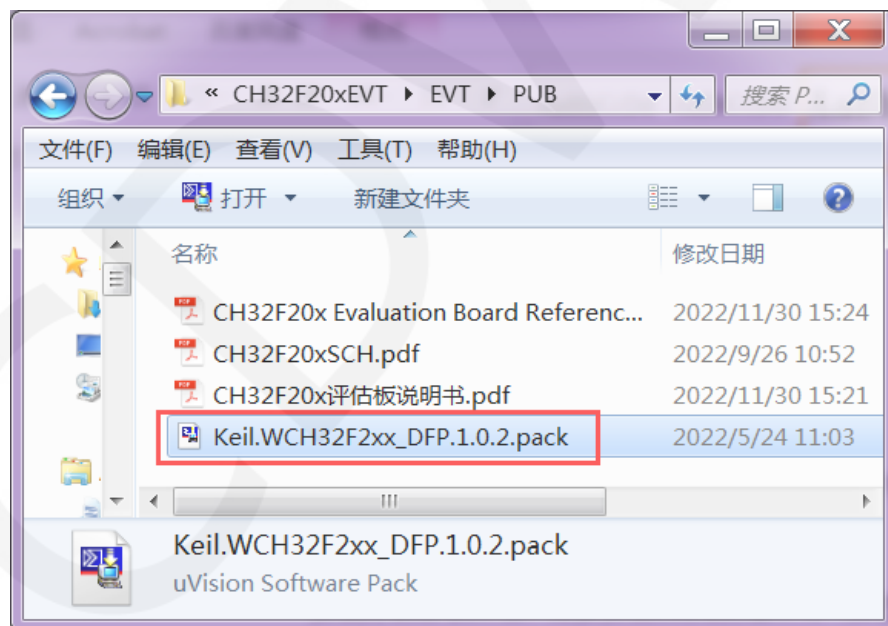CH32F103C8T6: https://www.wch.cn/downloads/CH32F103EVT_ZIP.html

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:
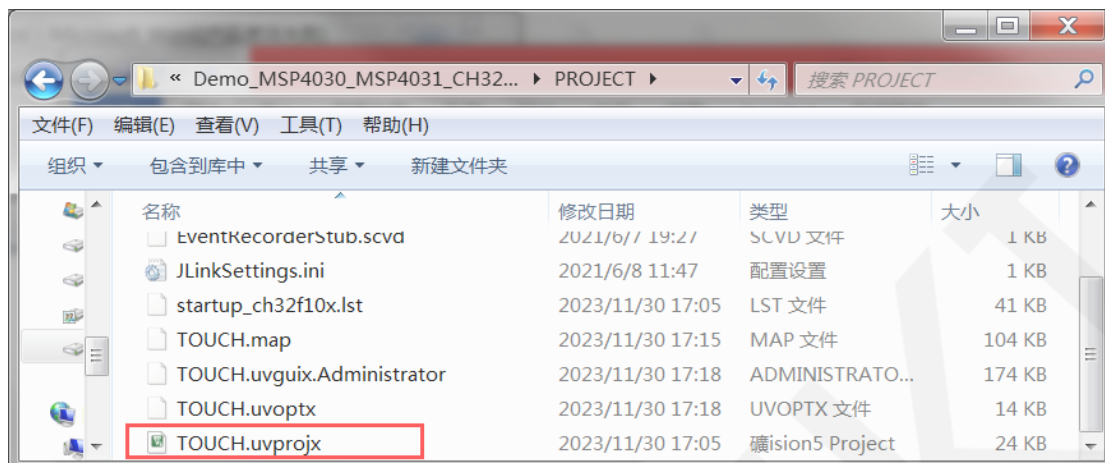
CH32F103C8T6's pack:
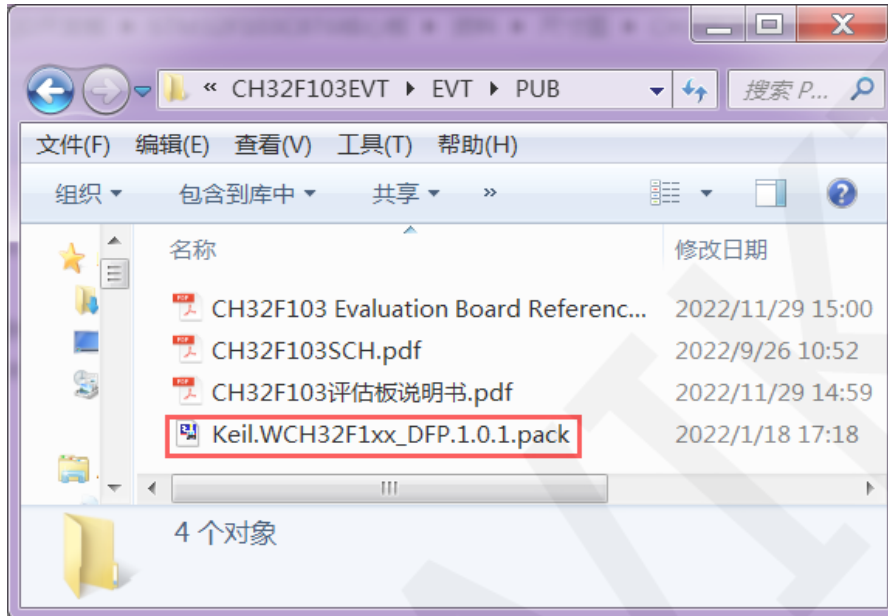
CH32F203C8T6's pack：

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
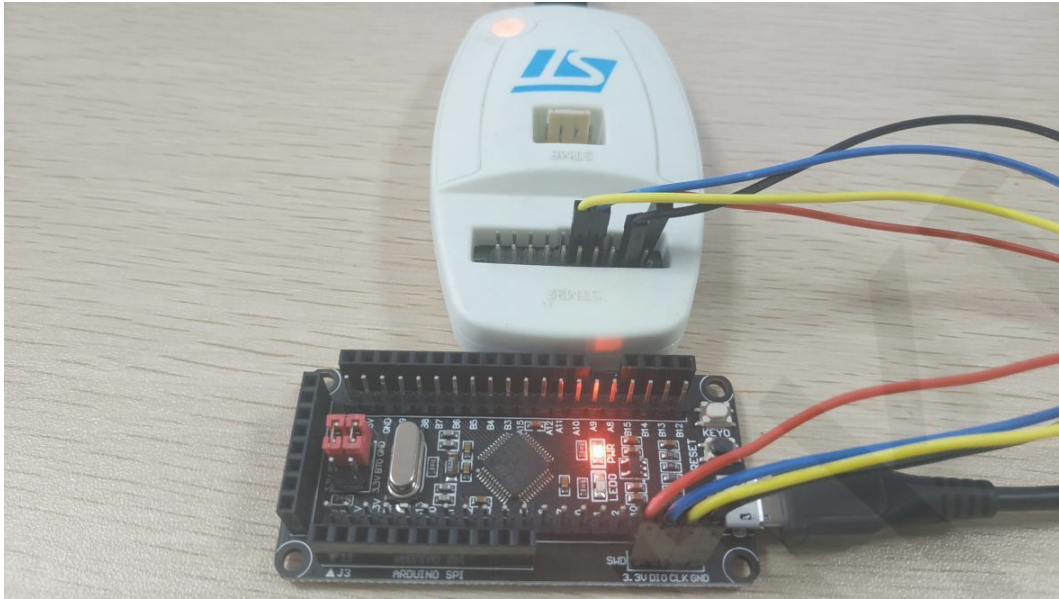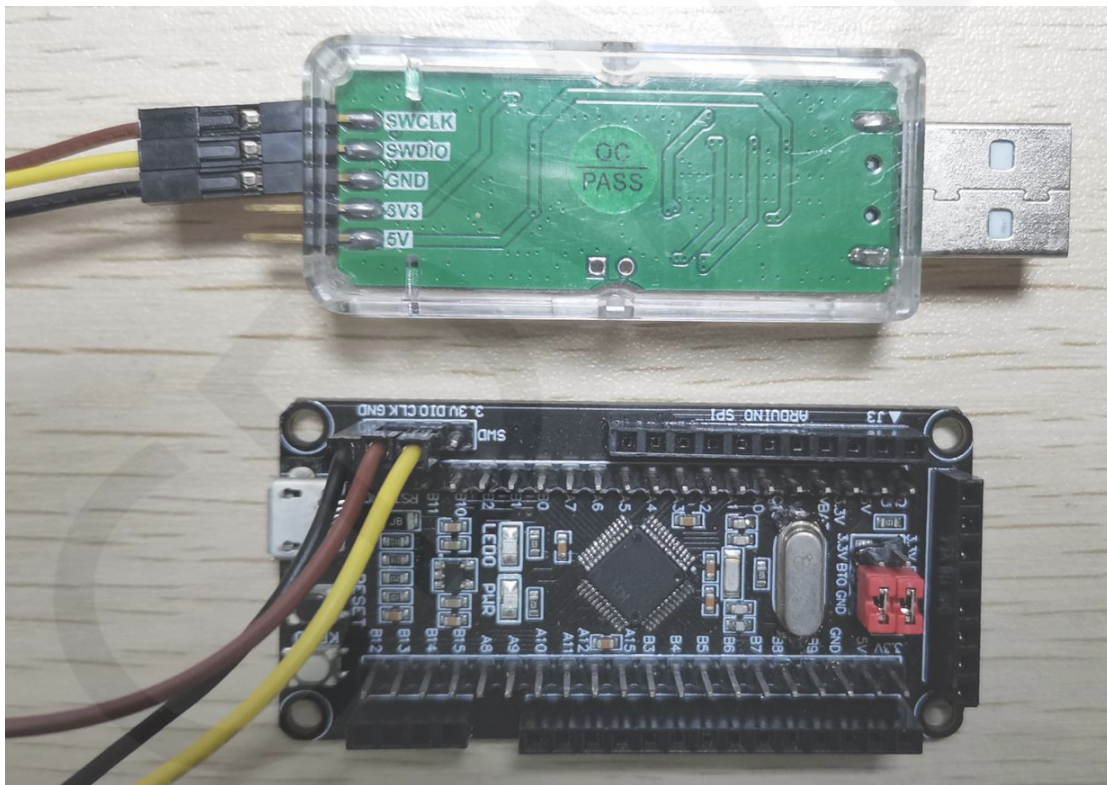
shown in the following figure:

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:
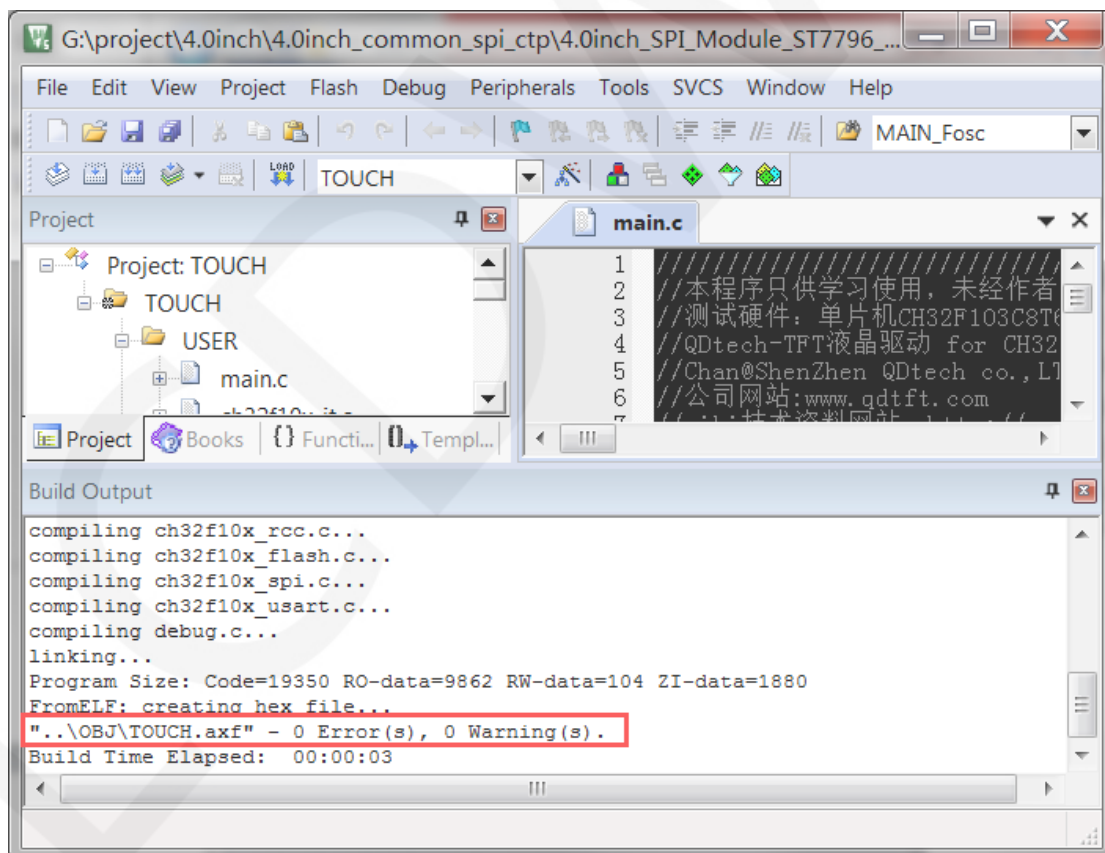

✧ **Download and Run Programs**

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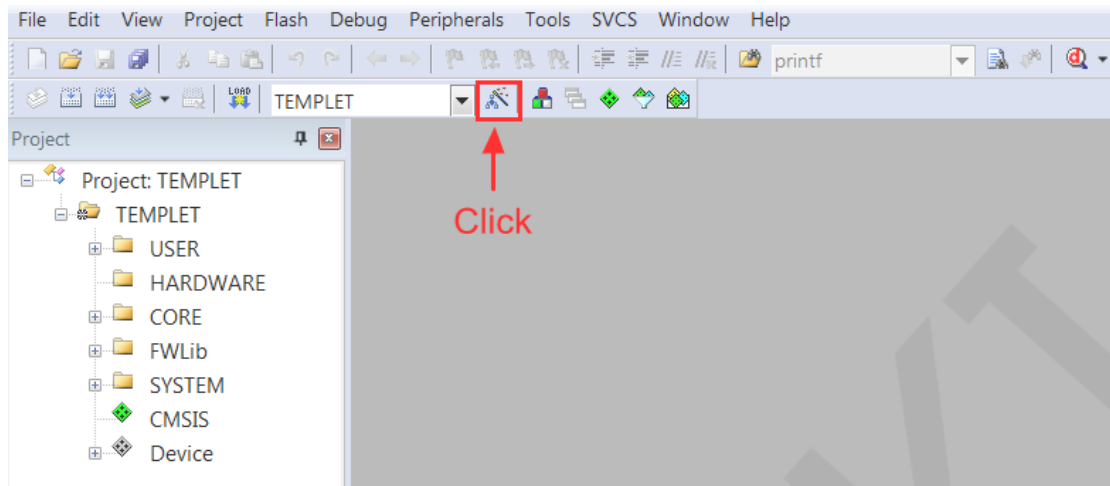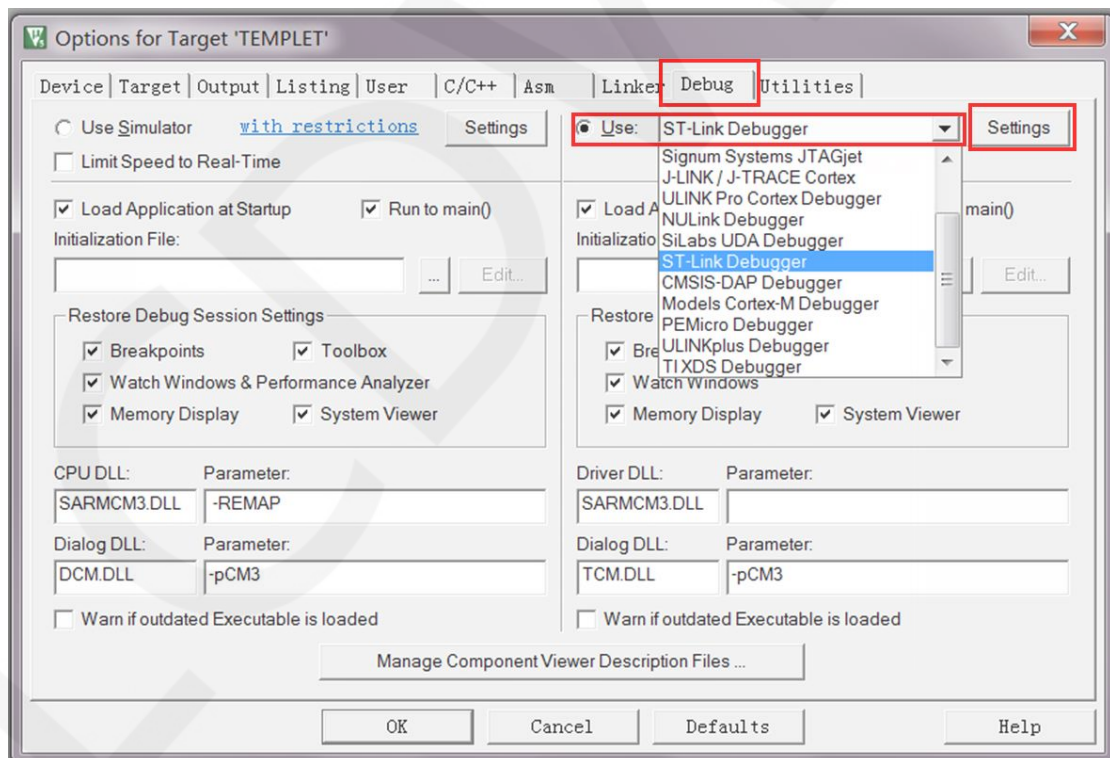
D. Click the **Debug** button in the pop-up interface, and then select the emulator in

Use.

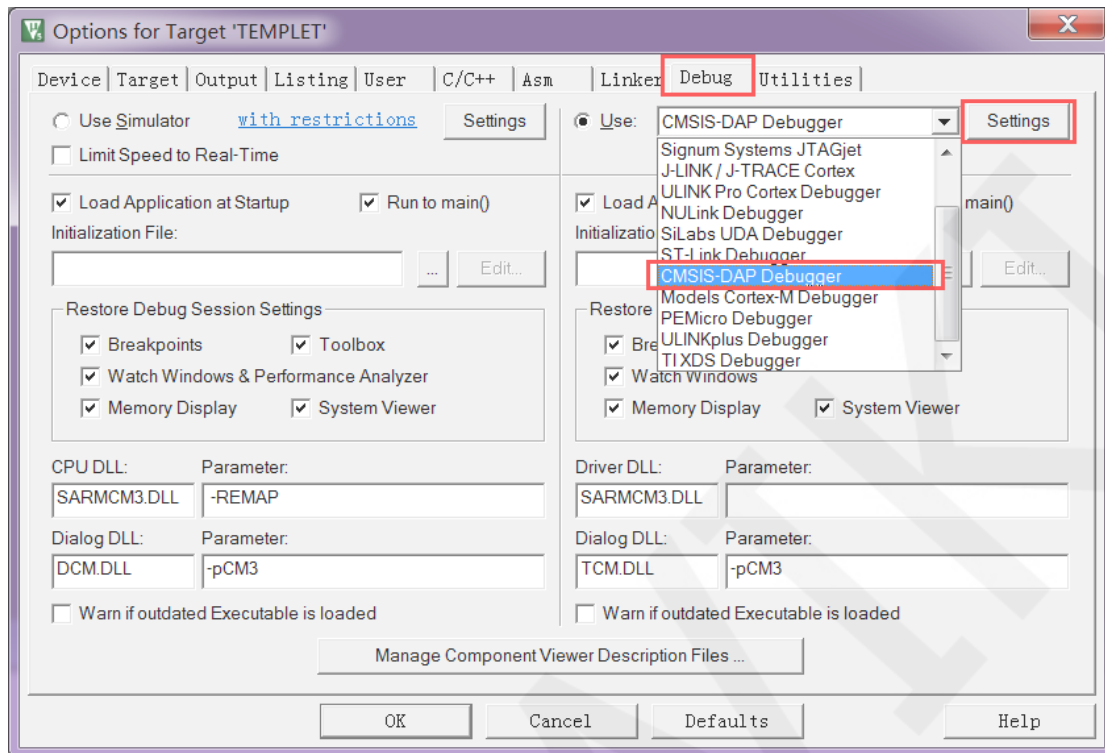If using **ST-Link**, please select **ST-LINK Debugger**

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

As shown in the following figure:
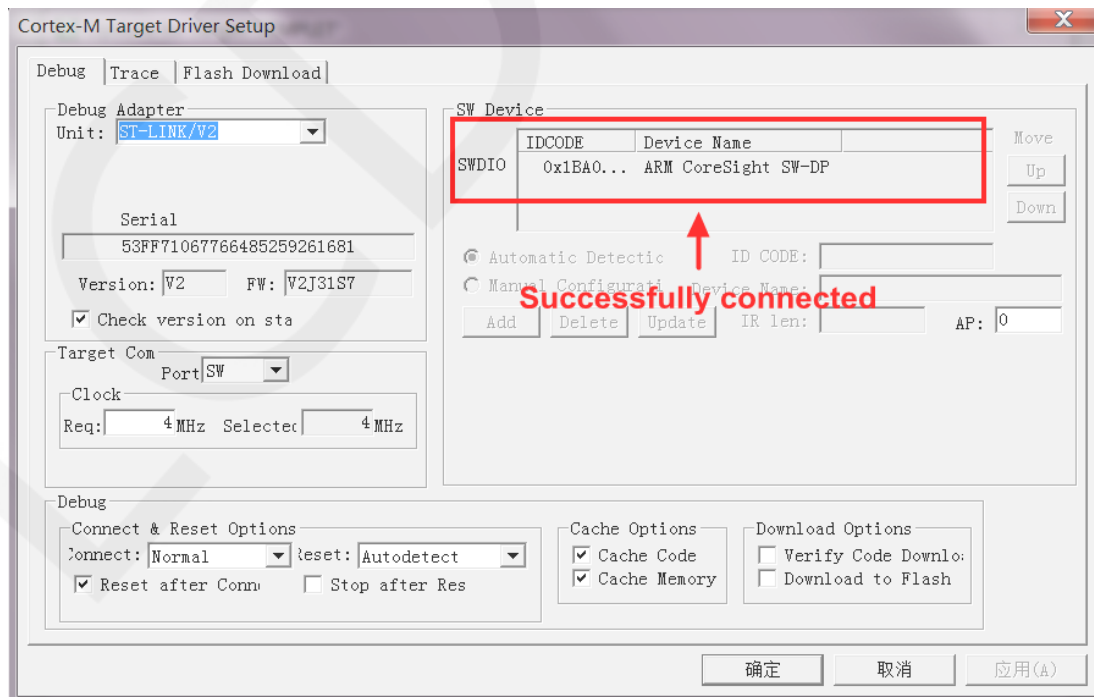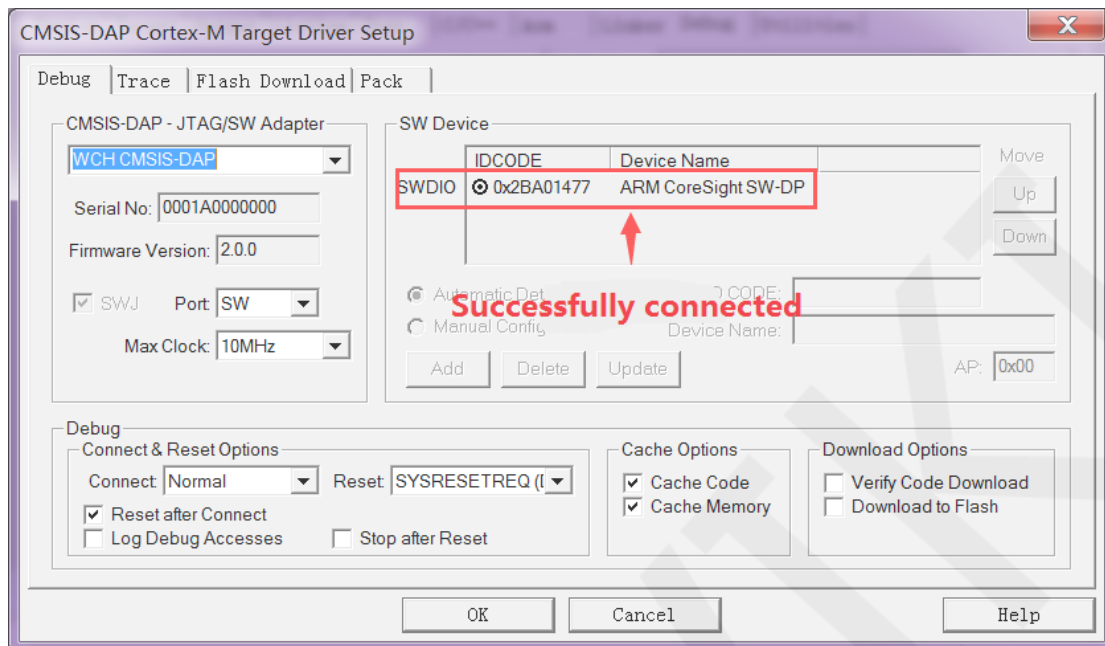
Using ST-Link:

Using WCH-Link:

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:

ST-Link connection successful:

WCH-Link connection successful:

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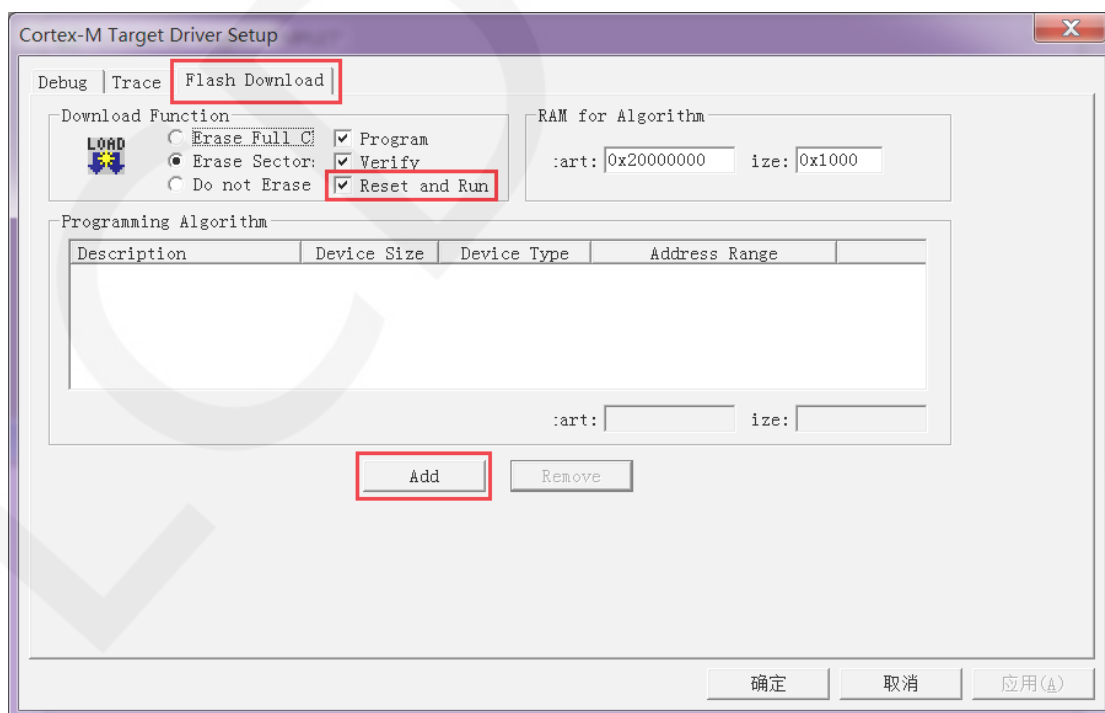
G. Click on the **Add** button (as shown in the above figure) to select flash. Generally, the first one is selected (the algorithm has already been processed), and once it is selected, click on the **Add** button below to exit, as shown below:
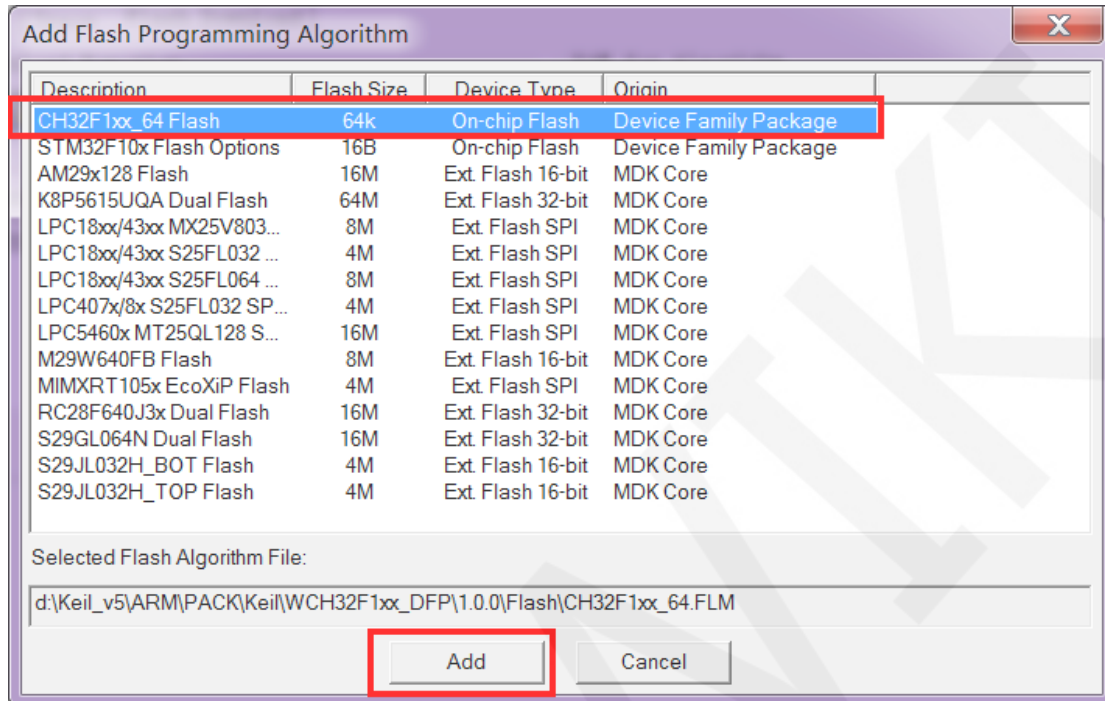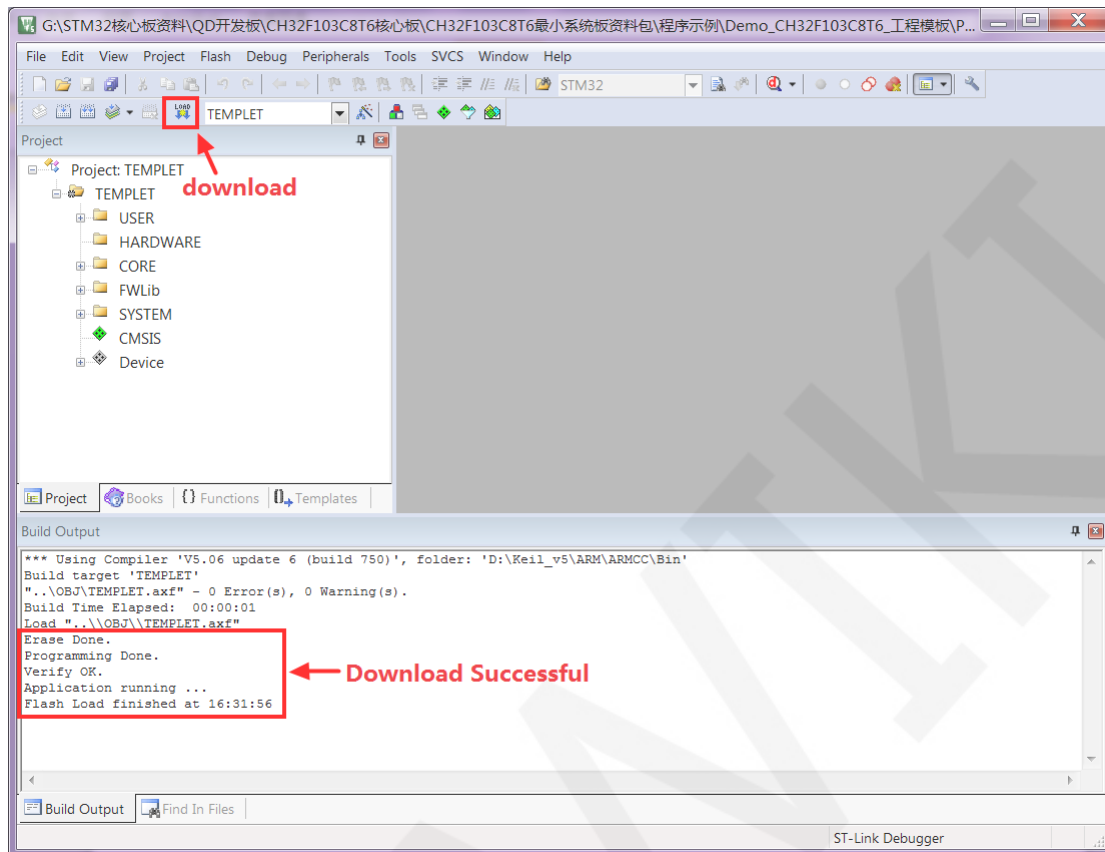

H. Click the **OK** button and the **OK** button to exit the settings interface, as shown in the following figure:
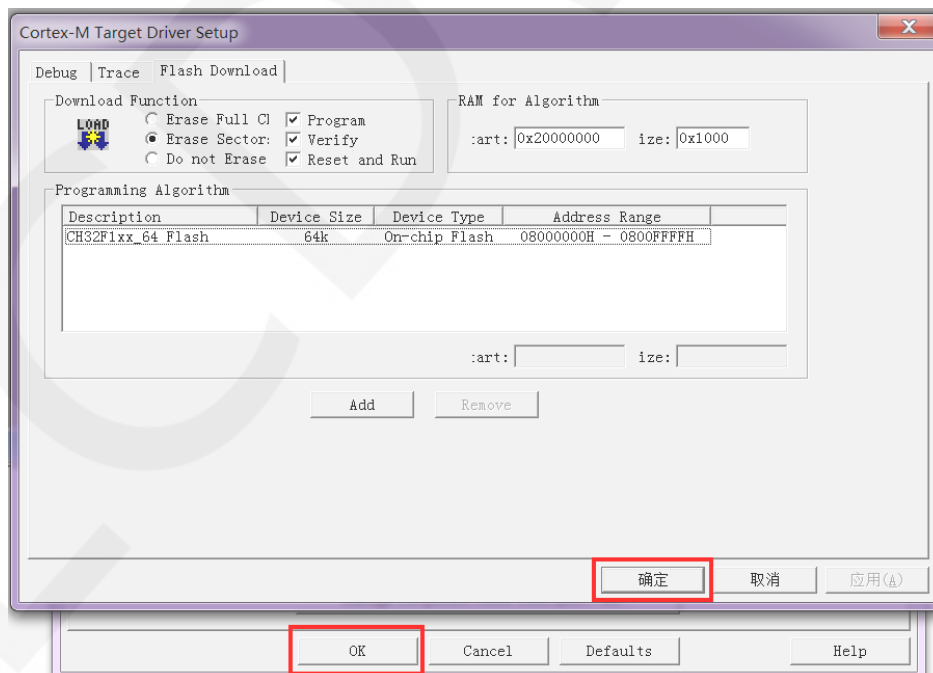
I. Click the **download** button to download the program, and the following prompt

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.