



Cortex-M

Emulator User Manual

Applicable products

This emulator supports chip models.

Seri es	Mod el
UW Semiconductors (HDSC) Cortex-M Series MCU Chips	-

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1. Introduction

The Cortex-M(CM) emulator is a debugging tool developed in compliance with ARM's CMSIS-DAP standard and supports all of UW Semiconductors' (HDSC) Cortex-M series MCU products. The purpose is to provide users with a small, portable, safe, reliable and low-cost emulator.

1.1 Overview

The CM emulator debugging block diagram is shown in Figure 1, which mainly consists of the CM emulator and the Communication Device Class (CDC) driver software.

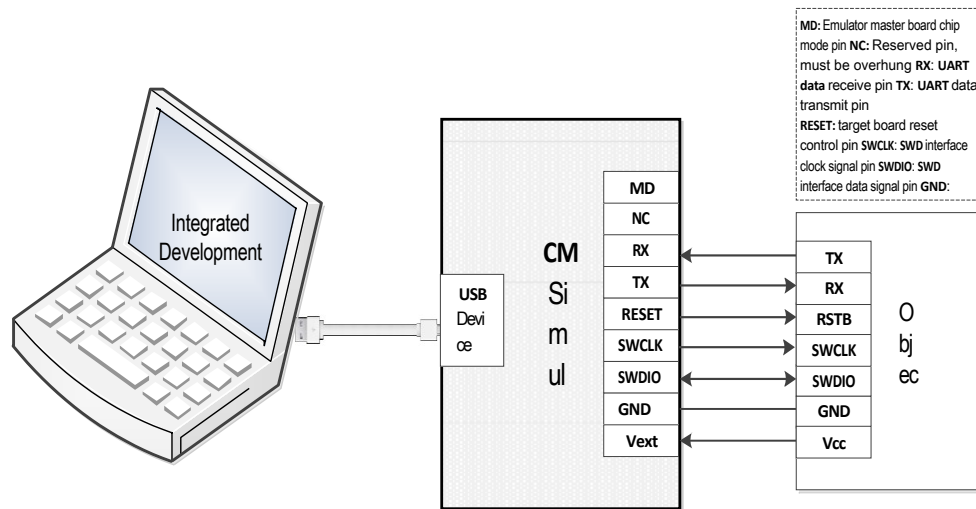


Figure 1 CM emulator debugging block diagram

1.1.1 CM Emulator Features

The CM emulator has the following features:

- 1) The function of online debugging
 - Support for target board 3.3V or 5V self-powered environments;
 - Plug-and-play, no driver installation, directly in Keil, IAR Embedded Workbench and other integrated development environments (Integrated Development Environment, IDE) for debugging;
 - Support Serial Wire Debug (SWD) interface.
- 2) USB to serial port function
 - Virtual serial port support using USB CDC combo devices;
 - Debugging and virtual serial port functionality with only one USB cable;
 - Configurable baud rate, parity, data bits and stop bits for the USB virtual serial port.

1.1.2 CM Emulator Appearance

The front of the CM emulator is shown in Figure 2 and contains mainly power and status indicators.



Figure 2 CM Emulator Front

The back of the CM emulator is shown in Figure 3, which mainly contains the emulator debug interface pinout information and product information.



Figure 3 Back of CM Emulator

The CM emulator debug interface pin descriptions are shown in Table 1.

Table 1 Debugging interface description

Debugging Interface Pin Designation	Function	Remarks
MD	CM Emulator Master MCU Mode Pins	MD input low, the emulator master MCU mode is working mode, and the emulator functions normally; MD input is high, emulator master MCU mode is serial Programming mode, this mode is used to upgrade the emulator firmware;
NC	Reserved Pins	Outputs 3.3V and leaves the pin dangling during debugging;
RXD	UART data receive pins	Connecting the target board MCU UART data transmitter pins;

TXD	UART data sending pins	Connecting the target board MCU UART data reception pins;
RESET	Target board MCU reset control pins	Connect the target MCU reset pin; Reset the target board MCU when RESET goes low;
SWCLK	SWD interface clock signal pins	Connection of the target board MCU serial line clock pins;
SWDIO	SWD interface data signal pins	Connection of the target board MCU serial line data input/output pins;
GND	ground	Connects the target board MCU ground pins;
Vext	Target board power signal pins	Connect the target board MCU power supply pins; voltage range: 3.3V~5V.

1.2 Getting Started Guide

This manual describes how to install the USB CDC driver software, test the virtual port functionality, and configure the IDE to complete debugging.

2. CM Emulator Virtual Port Function

This section describes how to install the USB CDC driver software and test the virtual port functionality.

To use the CM emulator virtual port function, you need to install the HDSC CDC driver software. <http://www.hdsc.com.cn> provides this driver software for Win XP/ Win7/ Win8/ Win10 operating systems. Please go to this page to download it according to your needs.

2.1 Install CM Emulator USB CDC Driver Software

This section describes the HDSC CDC driver software installation, mainly through Windows 7 (32-bit) operating system, in the following steps:

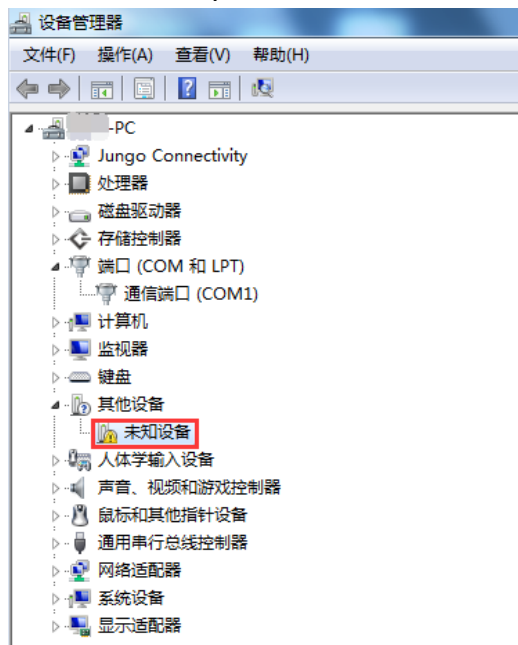
1. By right-clicking "My Computer" → "Properties", the system type is: Windows 7 (32-



bit) operating system.

Figure 4 Basic information about the operating system

2. Connect the CM emulator to the computer via USB cable; check the Device Manager and



find "Unknown Device" as shown in Figure 5.

Figure 5 Unknown Device View

- Right-click "Unknown Device" and then select "Update Driver" to bring up the prompt in Figure 6 and select "Browse Computer for Driver Software(R)".

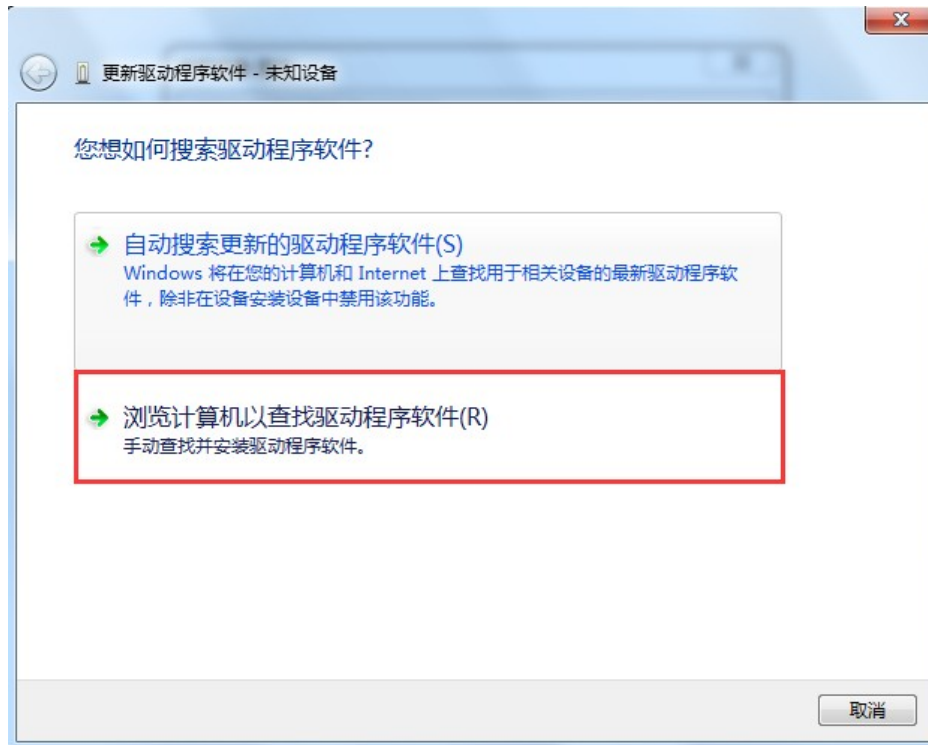
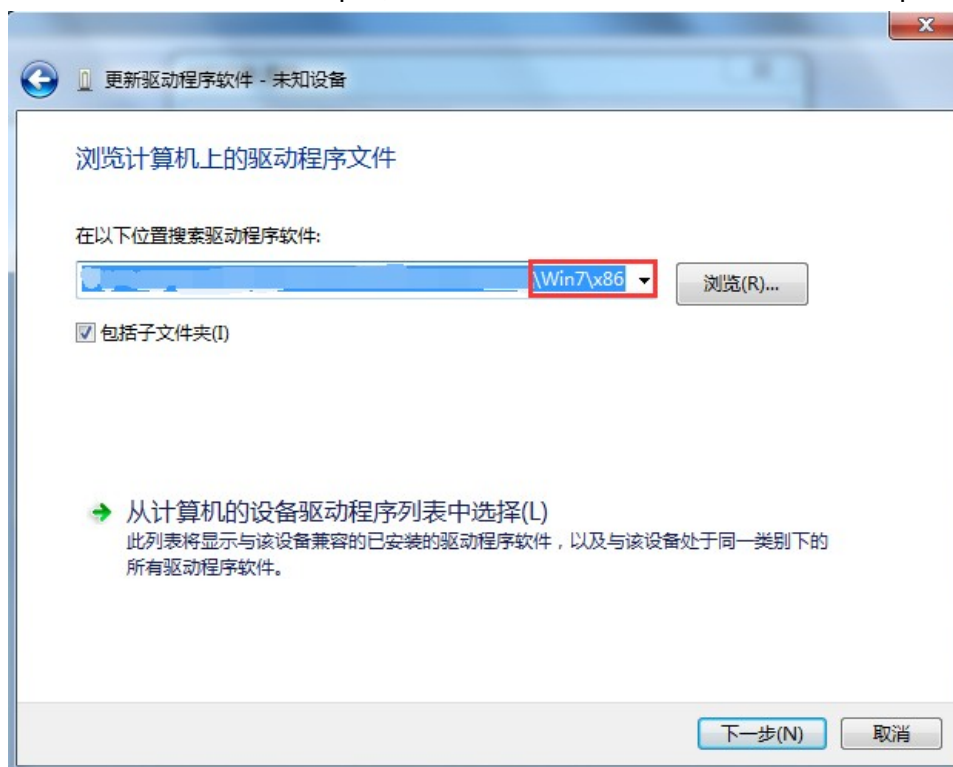


Figure 6 Driver software search method

- Based on the information in Step 1, select the driver software for the corresponding operating



system and click Next.

Figure 7 Drive software path settings

5. Refer to Figure 8 and select "Always install this driver software (I)".



Figure 8 Windows security prompt settings

6. The pop-up box in Figure 9 indicates that the installation is complete.



Figure 9 Driver installation completed

7. Referring to Figure 10, view the port through Device Manager and the CM Emulator virtual port appears (HDSC CMSIS-DAP Communications Port).

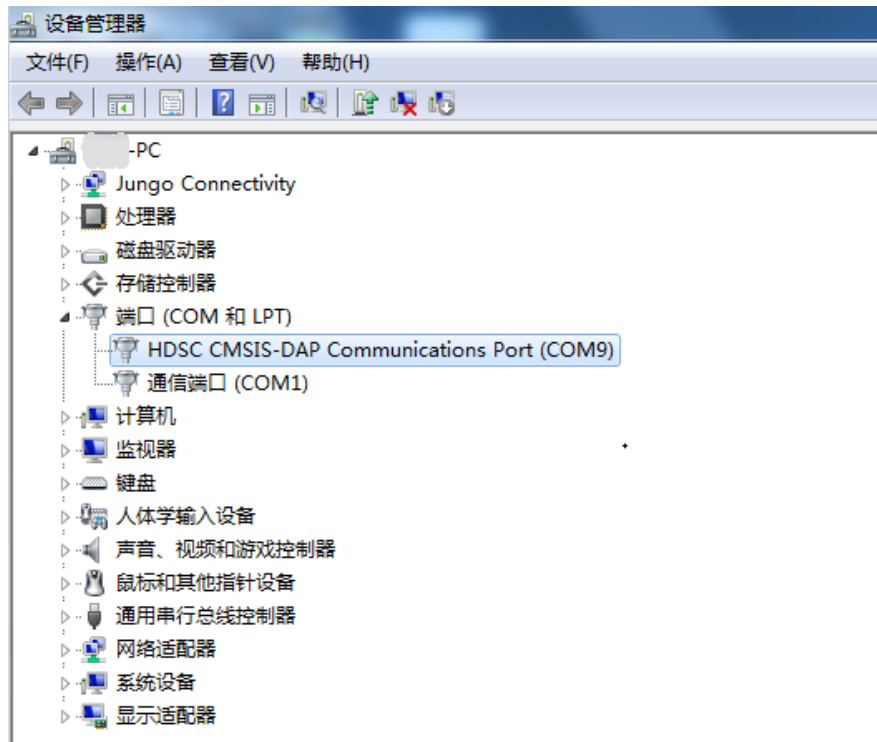


Figure 10 CM Emulator Virtual

Cautions:

- When installing the CDC driver on Windows OS, if it says "The service installation paragraph in INF is invalid", it means the system is missing the mdmcpq.inf and usbser.sys files.
- Please copy the file from another Windows version and reinstall the driver:
 - a) mdmcpq.inf Copy to system disk:\windows\inf.
 - b) Copy usbser.sys to the system disk:\windows\system32\drivers directory.

2.2 Test CM Emulator Virtual Port

1. Referring to Figure 11, connect the CM emulator RXD to TXD pins and NC to Vext pins, respectively:

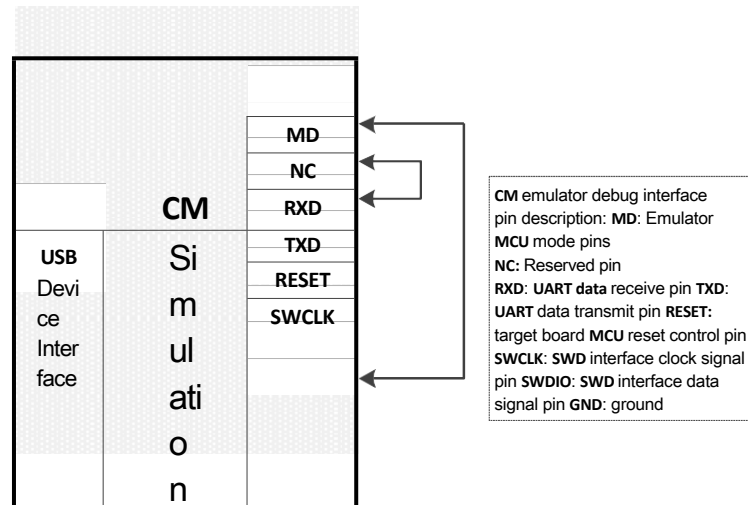


Figure 11 CM Emulator UART Pin Connections

2. Refer to Figure 12 to connect the CM emulator to the computer via the USB cable:

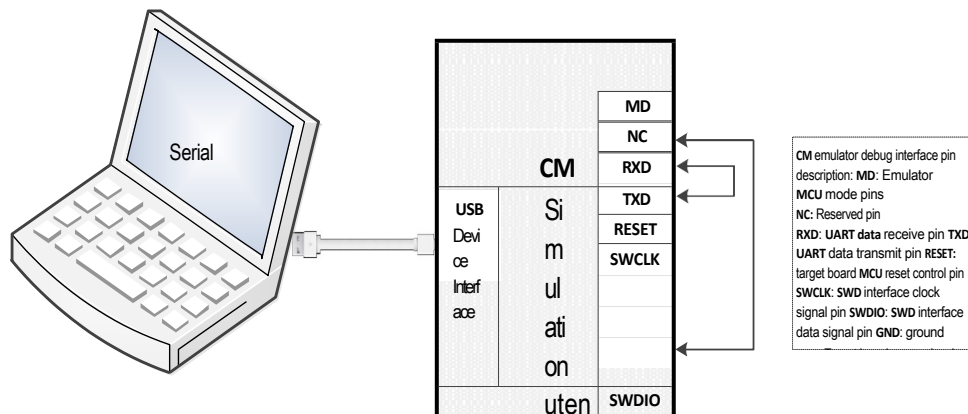


Figure 12 PC and CM Emulator Connection

3. View the CM Emulator virtual port number through Device Manager:HDSC CMSIS-DAP Communications Port (COM9)



Figure 13 CM Emulator Virtual Port Number

4. Run PuTTY, open the CM emulator virtual port COM9, and send data. If the window shows the same data sent and received, CM
The virtual port of the emulator functions properly.

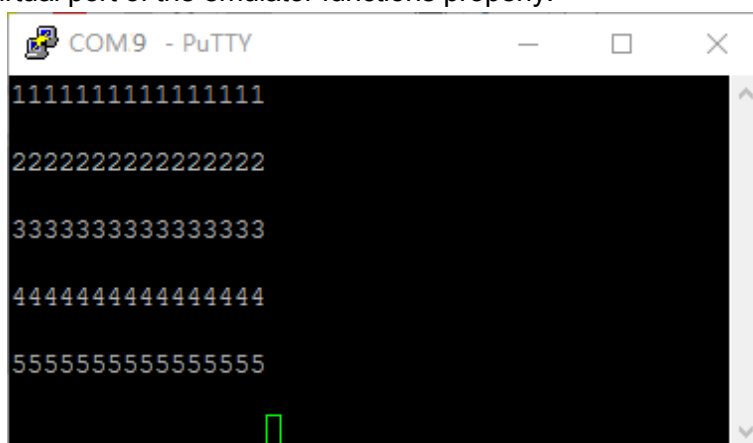


Figure 14 Serial Assistant sending/receiving data

3. Integrated Development Environment CMSIS -DAP Debugging

This section describes how to configure the IAR Embedded Workbench IDE to complete CM emulator debugging.

1. Refer to Figure 15 to connect the CM emulator, the target board and the PC;

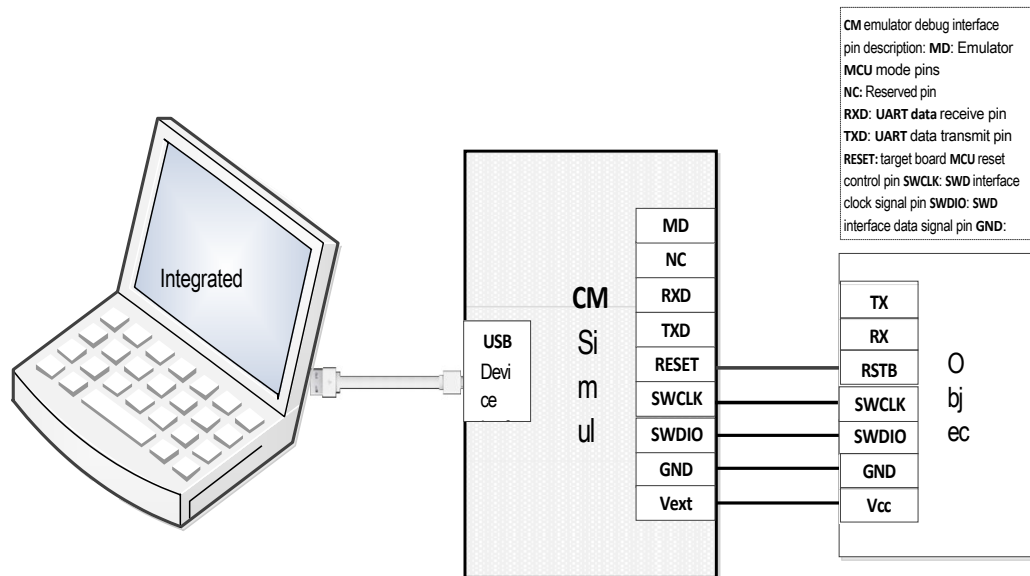
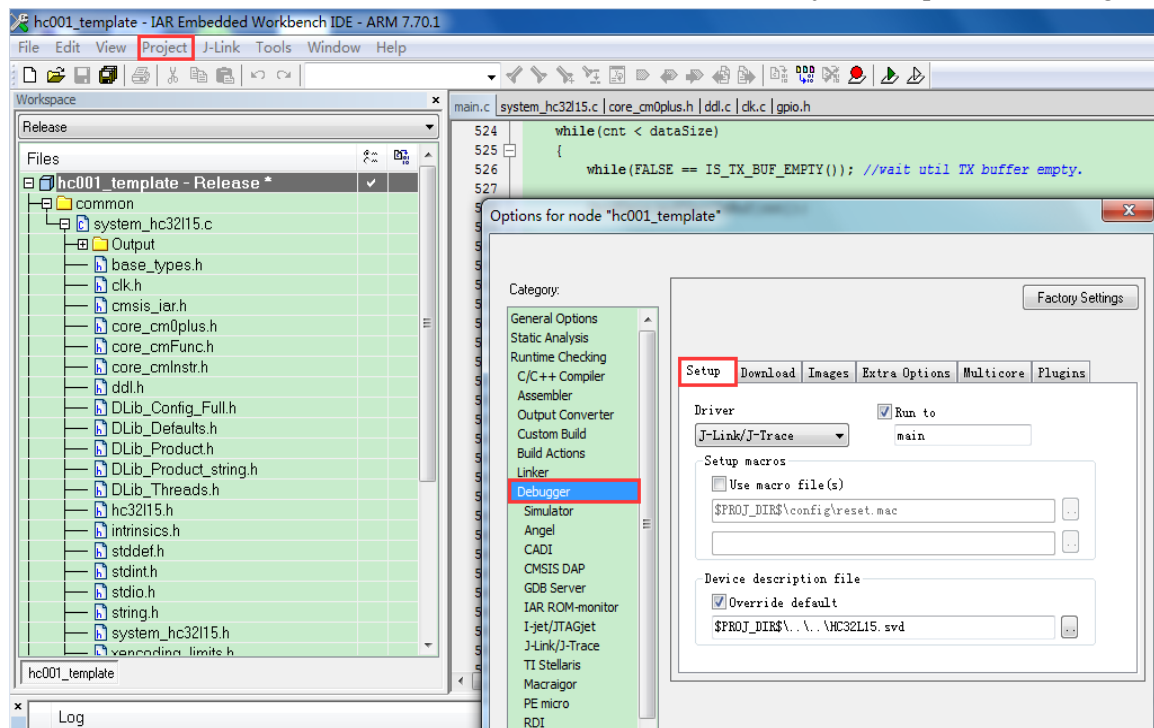


Figure 15 Debugging connections

2. Open the IAR Embedded Workbench IDE project, click on "Project"-">"Options"-">"Debug " ->



"Setup";

Figure 16 IAR IDE Debugger Options

3. Select CMSIS DAP for the "Driver" setting;

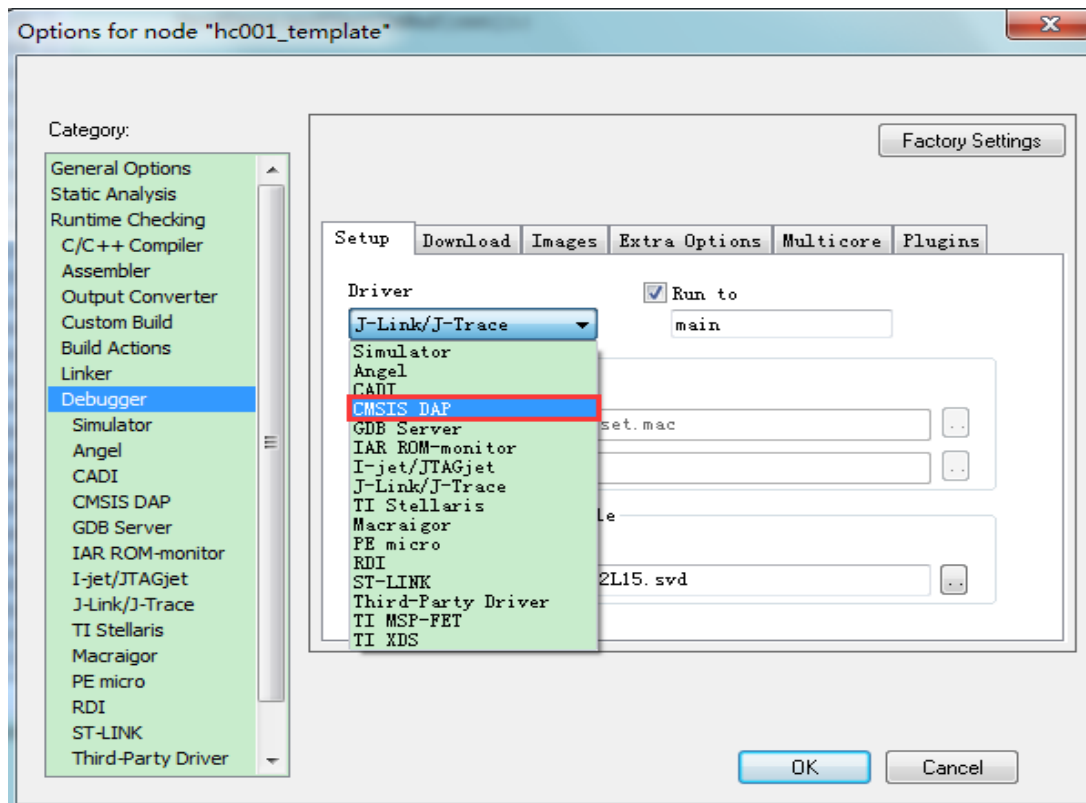


Figure 17 IAR IDE Debugger CMSIS-DAP Setup

4. Click on "CMSIS DAP" -> "Interface" and set the Interface to SWD;

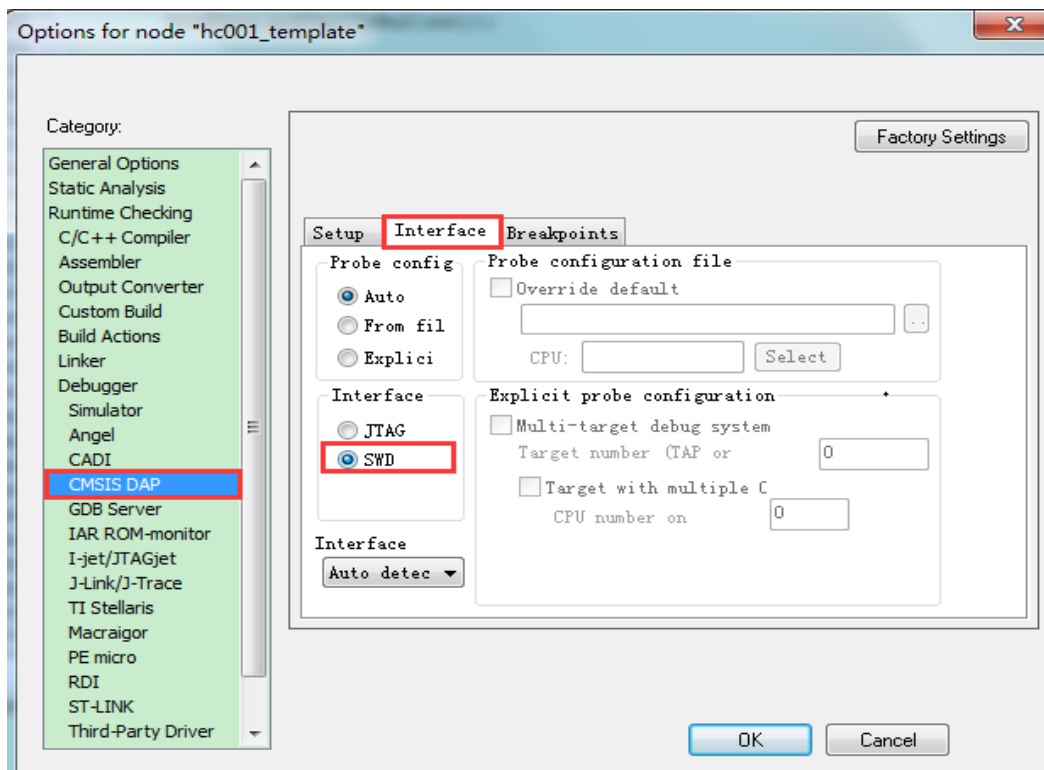


Figure 18 CMSIS-DAP Interface Settings

- Click on the main menu "CMSIS DAP" -> "Memory Configuration..." ;;

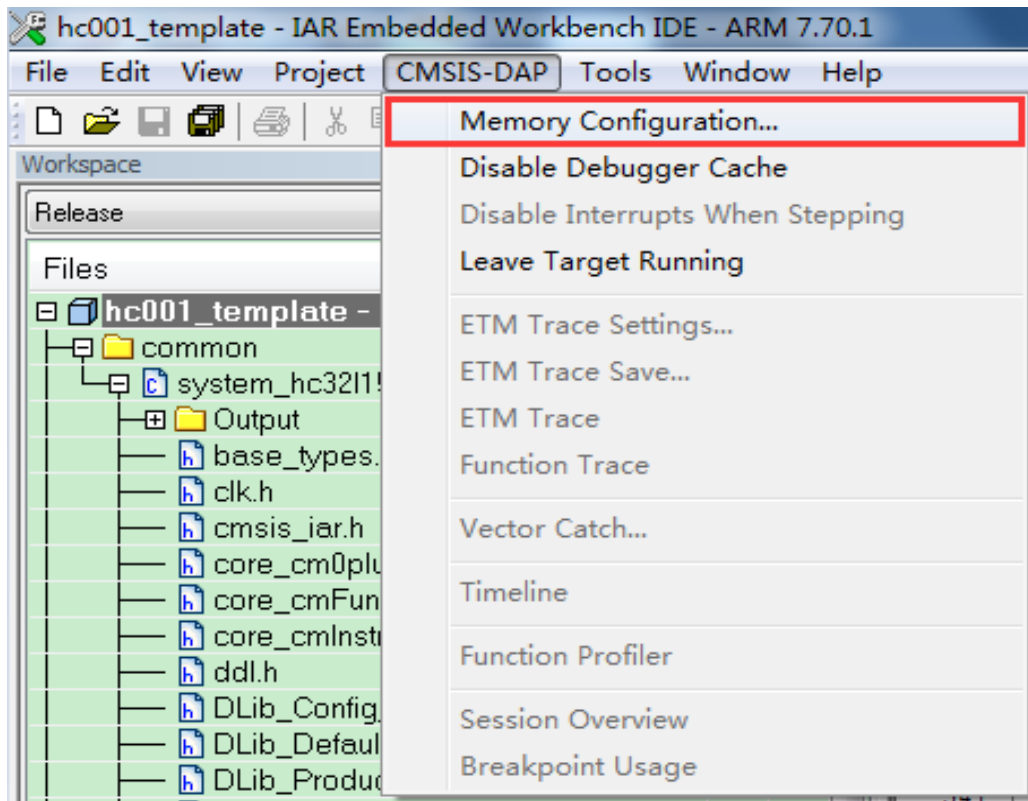


Figure 19 CMSIS-DAP Storage Configuration Options

- Configure "Memory Configuratoion..." according to the target MCU memory map ;;

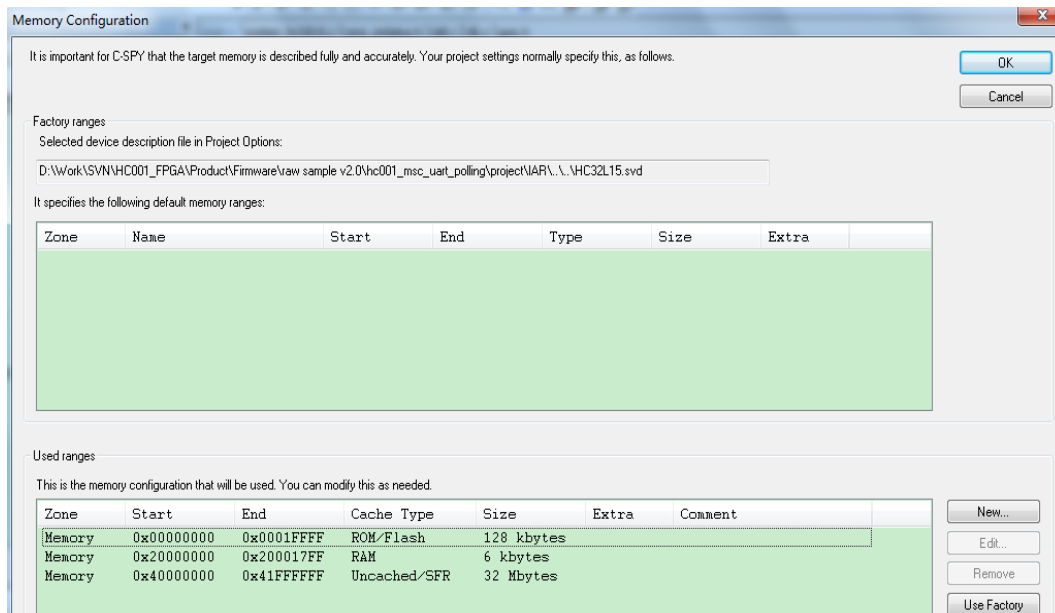


Figure 20 CMSIS-DAP Storage Configuration

- Click on "Download and debug" to enter the debugging state;

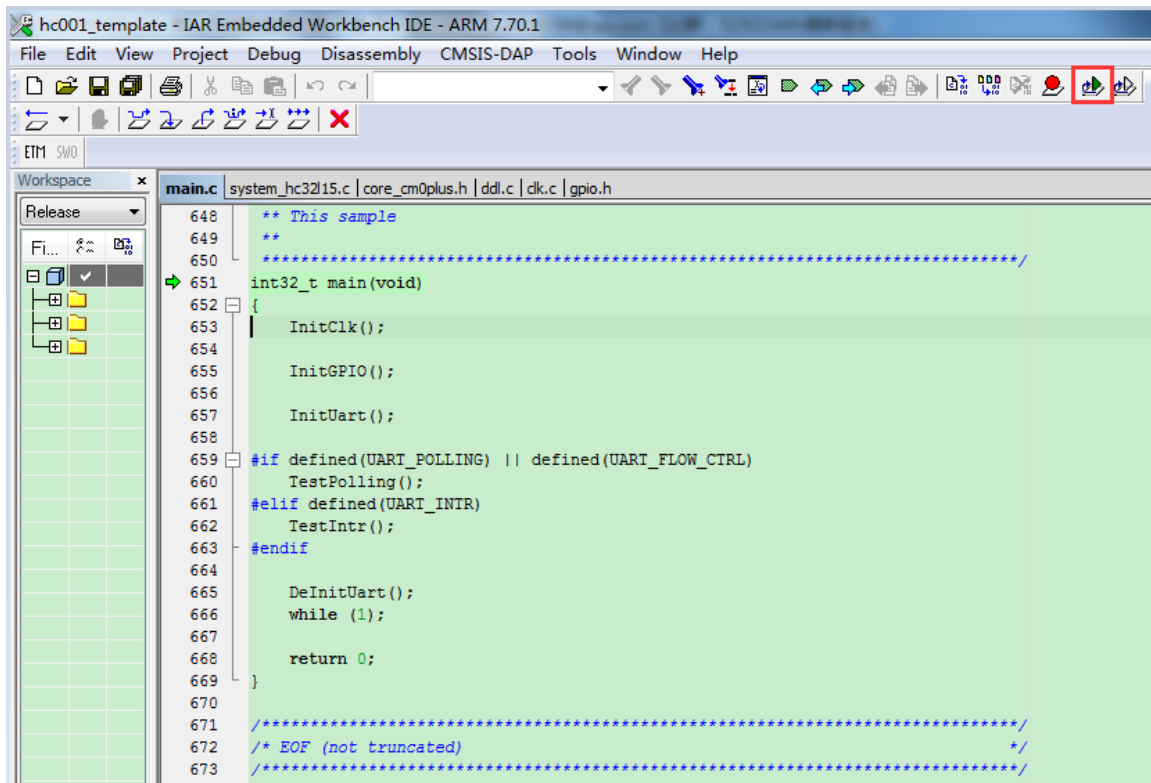


Figure 21 IAR Download and Debugging

- Performing single-step runs with normal commissioning status;

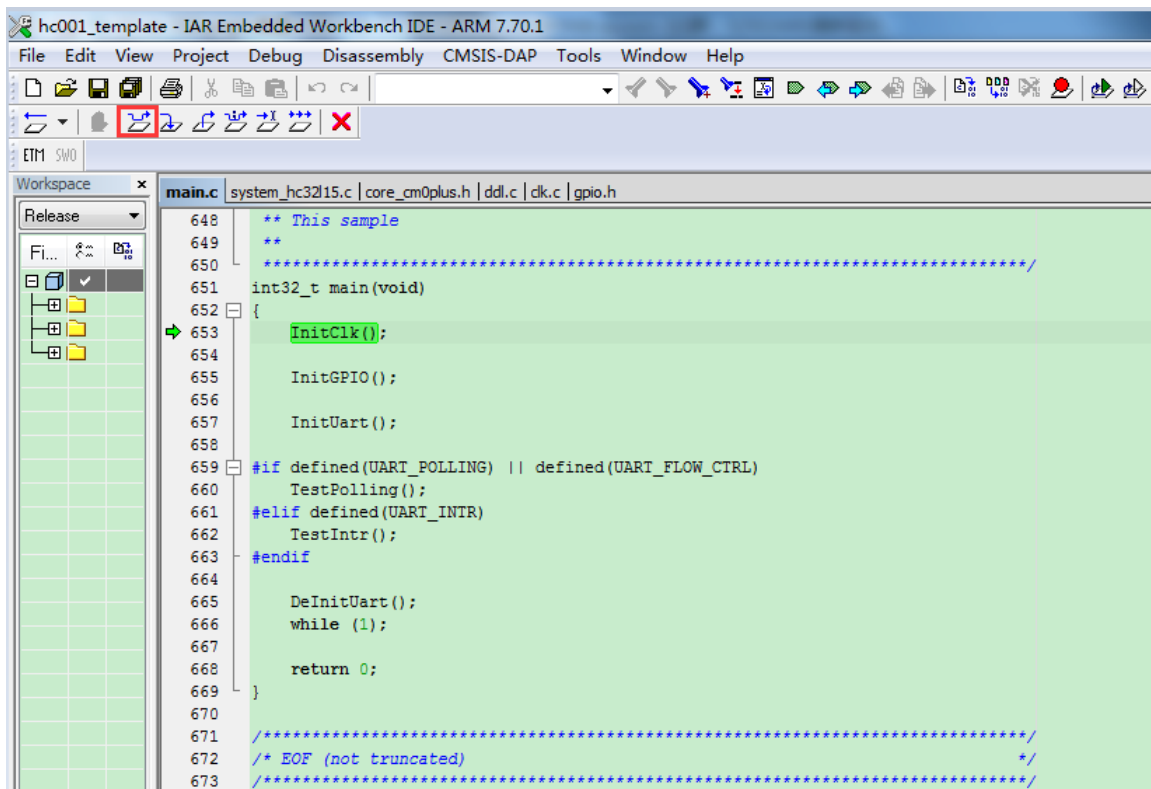


Figure 22 IAR single-step debugging

9. Execute full speed operation and commissioning status is normal.

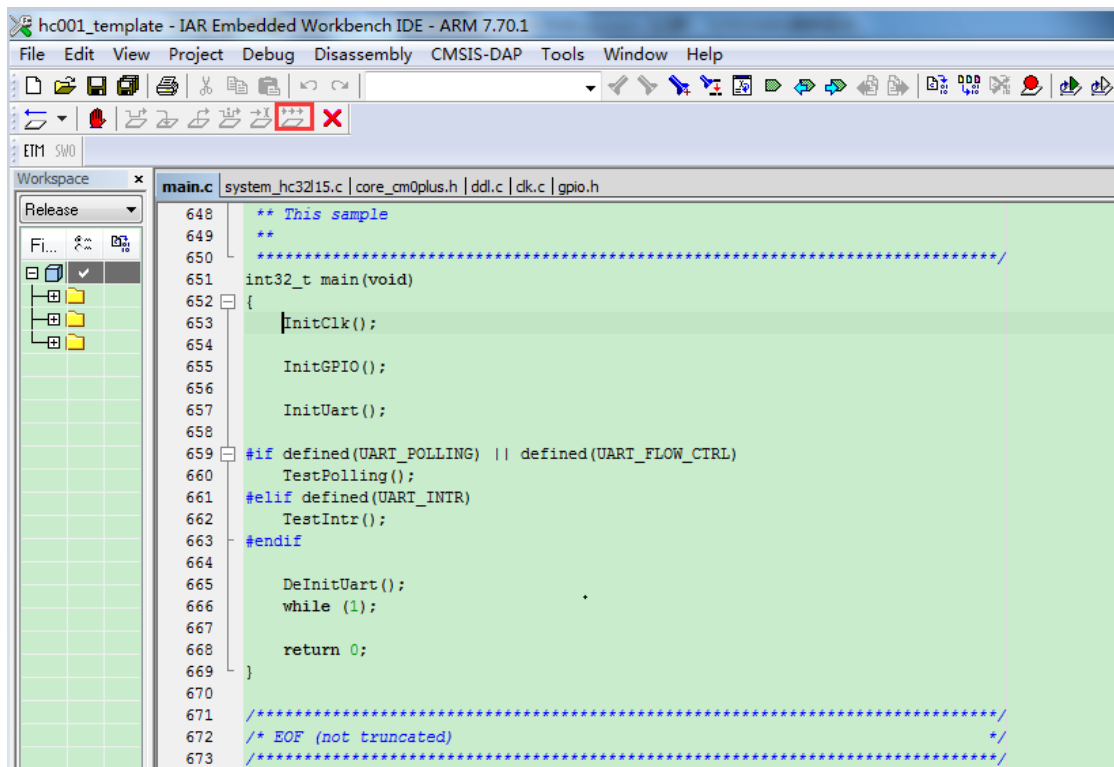


Figure 23 IAR running at full speed

4. Version Information

Date	Versions	Modify records
2017-11-10	Rev1.0	Cortex-M Series MCU Chip Emulator User's Manual First Edition Released



If you have any comments or suggestions in the process of purchase and use, please feel free to contact us.

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