



# Cortex-M

## Emulator User's Manual

Applicable products

This emulator supports the chip model.

| range  | model number |
|--|--------------|
| Huada Semiconductor<br>(HDSC) Cortex-M<br>Series MCU Chips | -            |

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# 1. summary

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

## 1.1 skim through

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

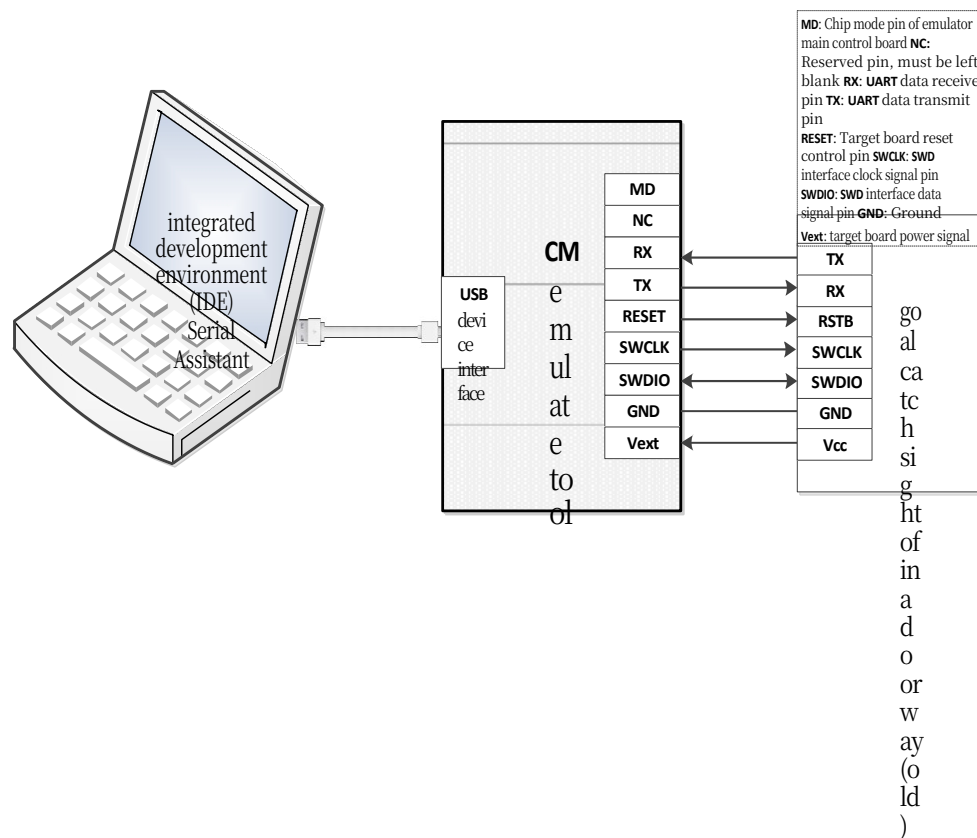


Fig. 1 Block diagram of CM emulator debugging

### 1.1.1 CM Emulator Features

The CM emulator has the following features:

#### 1) Functions for online debugging

- Supports 3.3V or 5V self-powered environments on target boards;
- Plug and play, no need to install drivers, can be directly in Keil, IAR Embedded Workbench and other IDEs.  
(Integrated Development Environment, IDE);
- Supports Serial Wire Debug (SWD) interface.

#### 2) USB to Serial Function

- Supports virtual serial ports with USB CDC combo devices;
- Debugging and virtualizing serial ports can be accomplished with a single 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 Side

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



Figure 3 CM Emulator Backside

The CM emulator debug interface pins are described in

Table 1.

Table 1 Description of the commissioning interface

| debugging interface pinout | functionality                    | note   |
|----------------------------|----------------------------------|--|
| MD                         | CM Emulator Master MCU Mode Pins | MD input is low, the emulator master MCU mode is working mode, the emulator function is used normally;<br>MD input goes high, emulator master MCU mode is serial.<br>Programming mode, this mode is used to upgrade the emulator firmware; |
| NC                         | Reserved Pins                    | Outputs a 3.3V voltage, leaving the pin dangling for debugging;  |
| RXD                        | UART Data Receive Pin            | Connect the target board MCU UART data transmit pin;   |
| TXD                        | UART Data Transmit Pin           | Connect the target board MCU UART data receive pin;  |

|       |                                    |   |
|-------|------------------------------------|---|
| RESET | Target Board MCU Reset Control Pin | Connect the target MCU reset pin;<br>When the RESET output goes low, the target board MCU is reset; |
| SWCLK | SWD interface clock signal pin     | Connect the target board MCU serial line clock pin;   |
| SWDIO | SWD interface data signal pin      | Connect the target board MCU serial line data input/output pins;                                    |
| GND   | ground                             | Connect the target board MCU ground pin;  |
| Vext  | Target Board Power Signal Pins     | Connect the MCU power supply pins of the target board; voltage range: 3.3V~5V.                      |

## 1.2 Getting Started

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

### 2.1 Installing the CM Emulator USB CDC Driver Software

This section describes how to install the HDSC CDC Driver software on Windows 7 (32-bit) operating system, following the steps below:

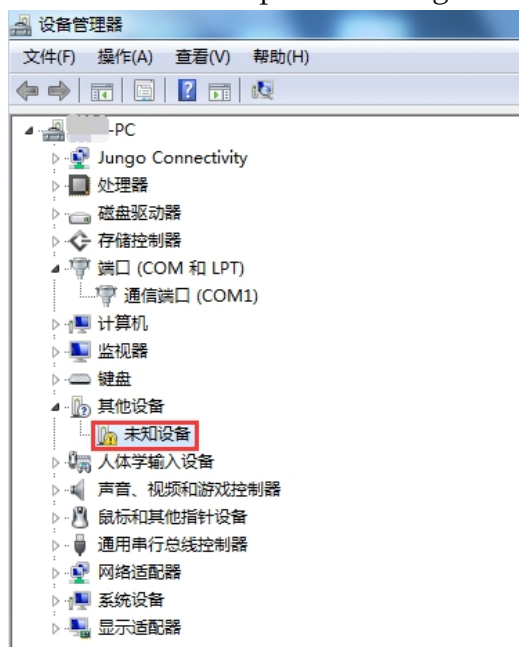
1. By right-clicking "My Computer" -> "Properties", the system type is: Windows 7



(32-bit) operating system.

Figure 4 Basic operating system information

2. Connect the CM emulator to the computer through the USB cable; check the





device manager and find "Unknown Device", as shown in Figure 5.

Figure 5 Unknown Device View

- Right-click on "Unknown Devices", then select "Update Driver", Figure 6 prompts, select " Browse your computer for driver software(R)".

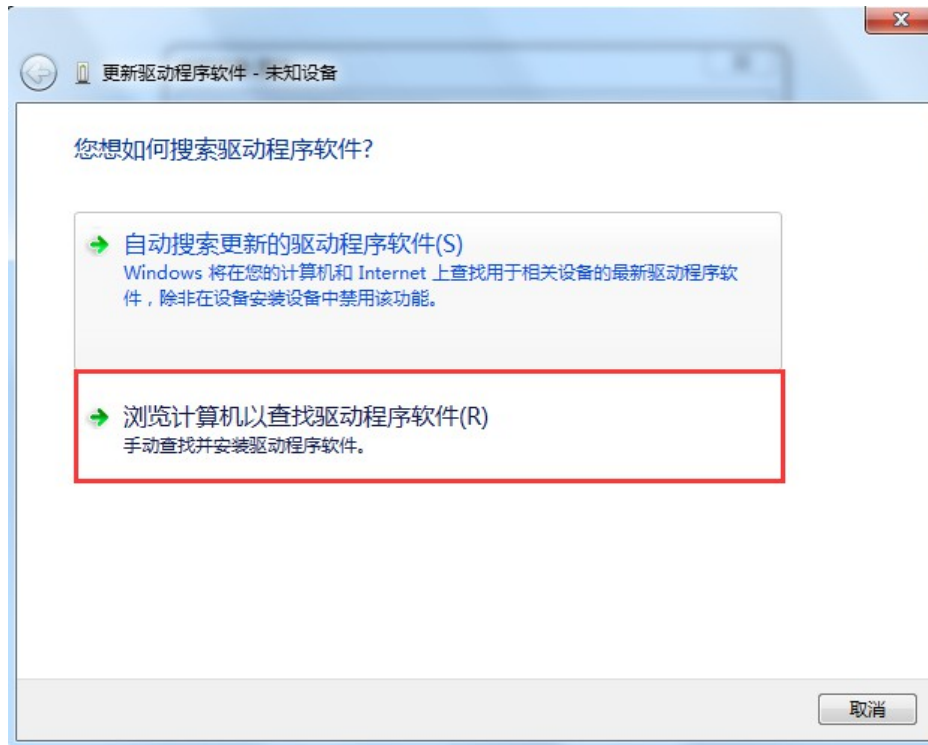
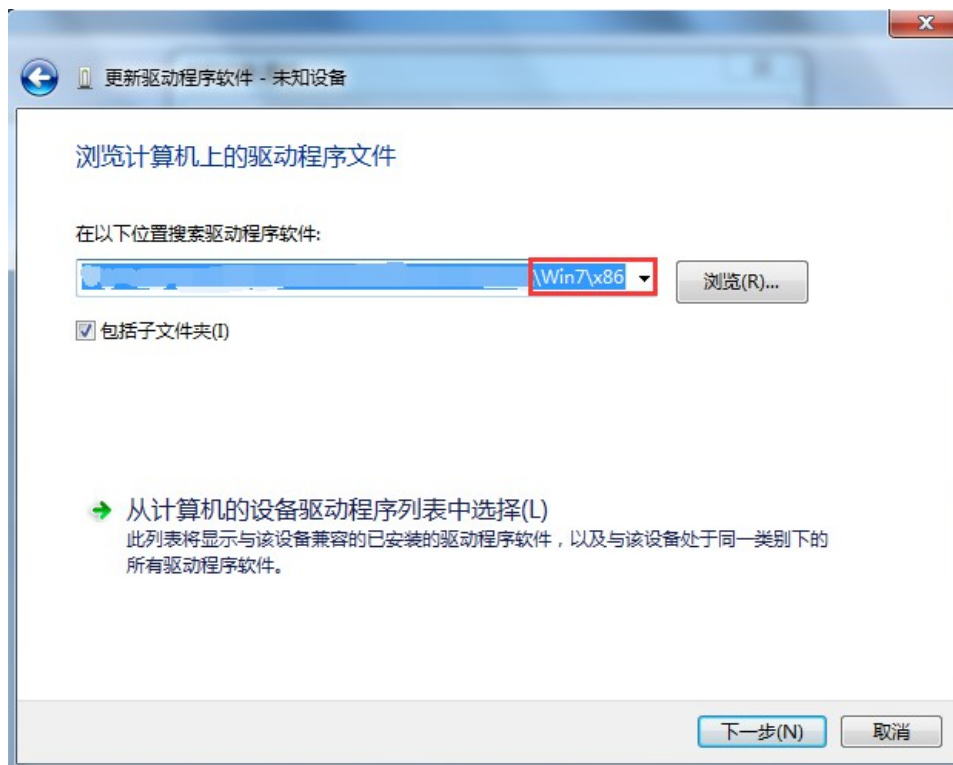


Figure 6 Driver Software Lookup Method

- Based on the information in step 1, select the driver software for your operating



system and click "Next".

Figure 7 Driver Software Path Settings

5. Referring to Figure 8, select "Always install this driver software (I)".



Figure 8 Windows Security Alert Settings

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



Figure 9 Driver Installation Complete

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



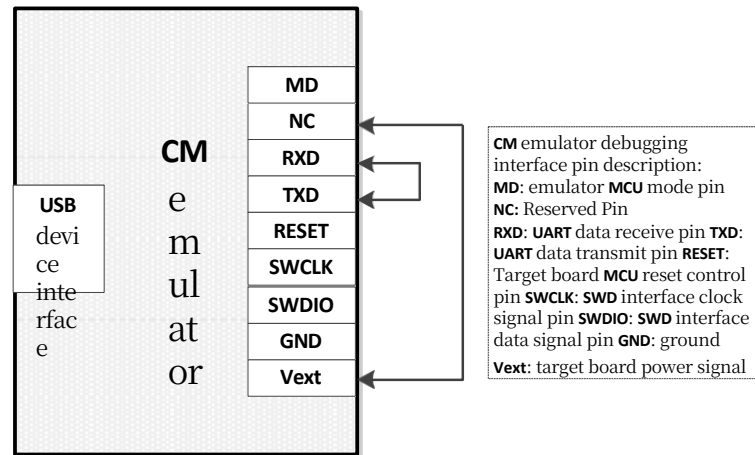
Figure 10 CM Emulator Virtual Serial Port

**Attention:**

- When installing the CDC driver on a Windows operating system, if you are prompted with the message "The service installation paragraph in INF is invalid", it means that the system lacks a CDC driver.  
Less mdmcpq.inf and usbser.sys files.
- Please copy the file from another Windows version and reinstall the driver:
  - a) Copy mdmcpq.inf into the system disk:\windows\inf.
  - b) Copy usbser.sys into the system disk:\windows\system32\drivers directory.

## 2.2 Testing CM Emulator Virtual Ports

1. Refer to Figure 11 and connect the CM emulator RXD and TXD pins, NC and



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:

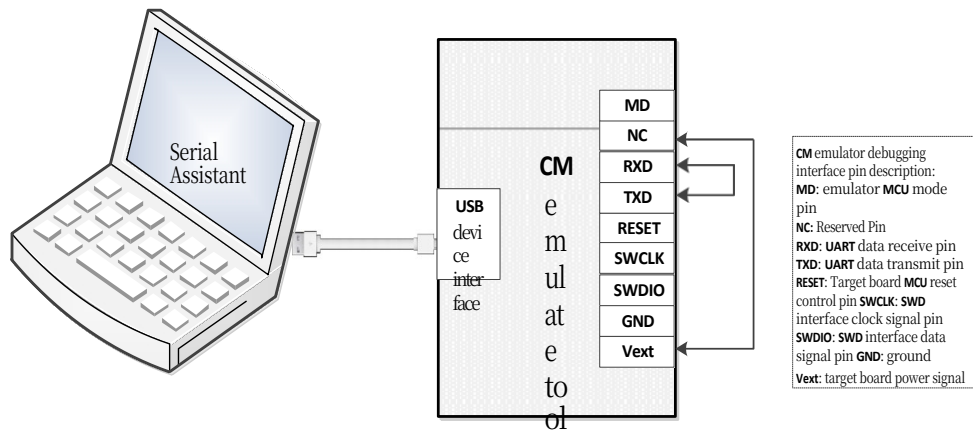


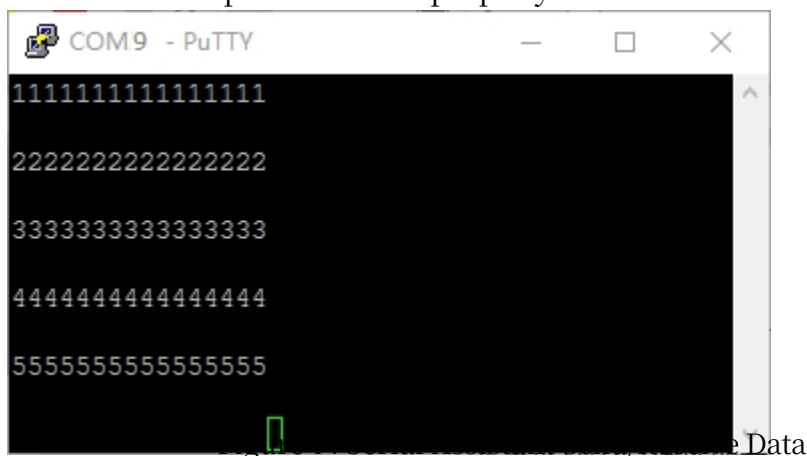
Fig. 12 Connecting a PC to the CM emulator

3. Via Device Manager, view the CM emulator virtual port number:HDSC CMSIS-DAP Communications Port (COM9)



Figure 13 CM Emulator Virtual Port Numbers

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



### 3. Integrated Development Environment CMSIS-DAP Debugging

This chapter describes how to configure the IAR Embedded Workbench IDE to accomplish CM emulator debugging.

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

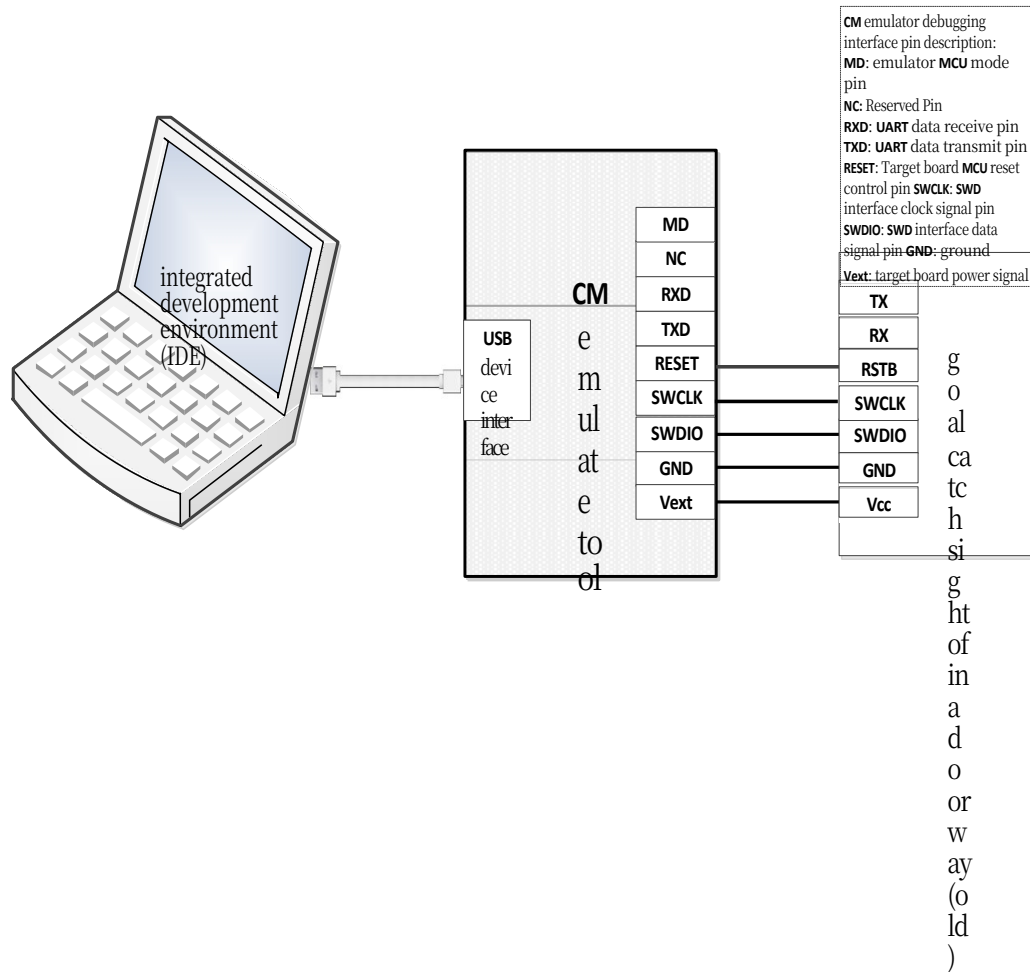
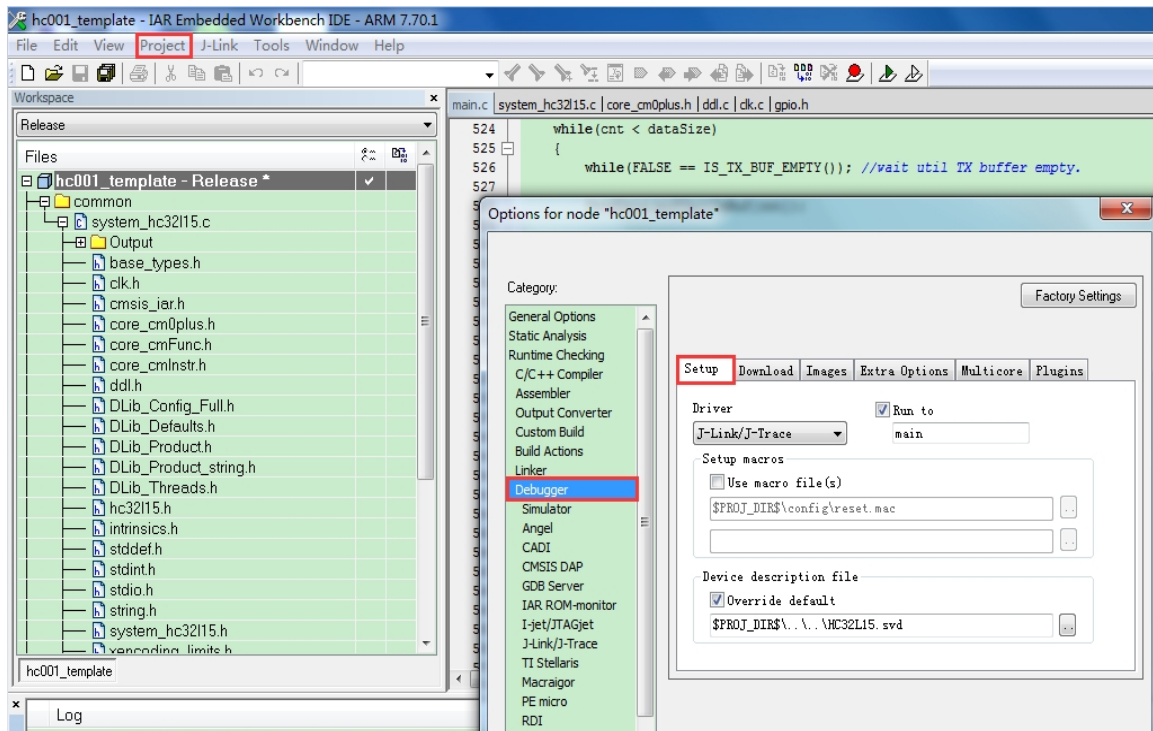


Figure 15 Debugging Connection

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



"Project"-">"Options"-">"Debug"-">"Setup";

Figure 16 IAR IDE Debugger Options



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

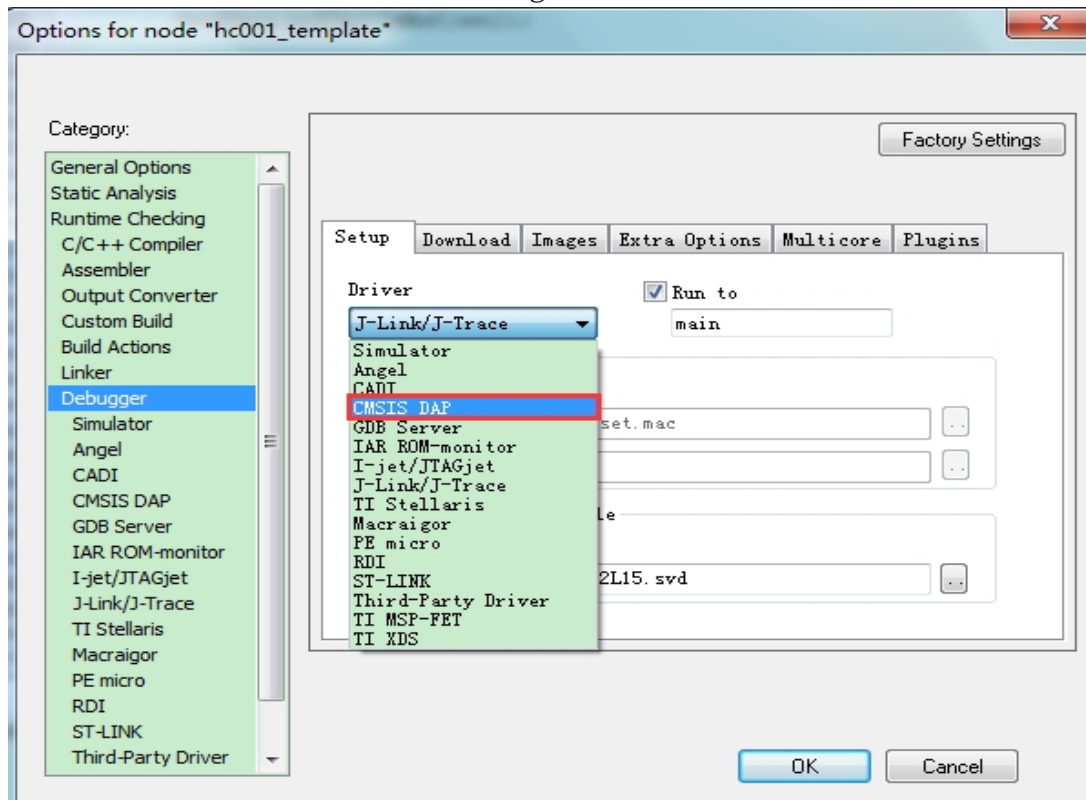


Figure 17 IAR IDE Debugger CMSIS-DAP Settings

4. Click "CMSIS DAP"->"Interface", set Interface to SWD;

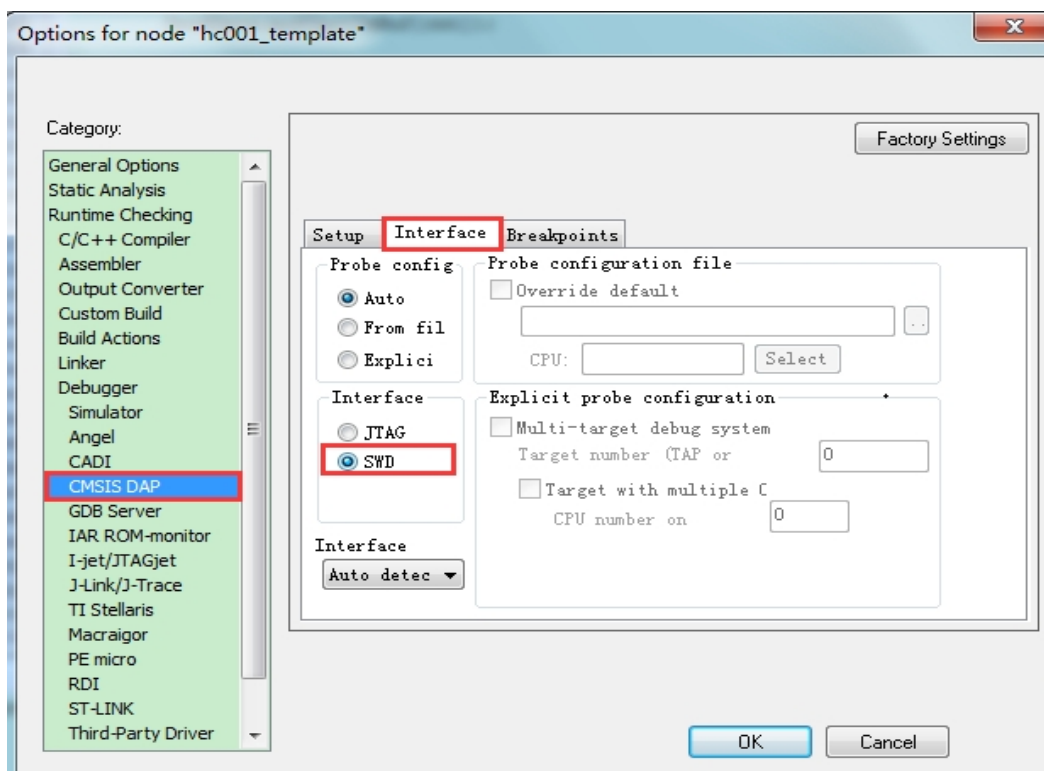


Figure 18 CMSIS-DAP Interface Settings

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

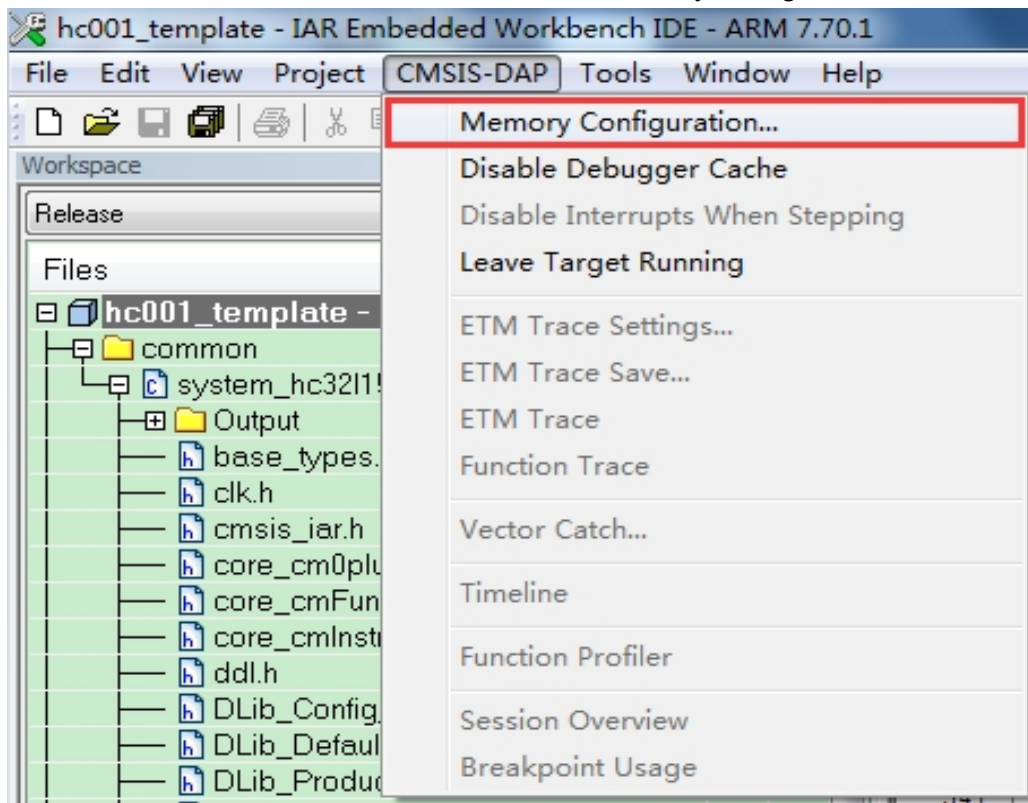


Figure 19 CMSIS-DAP Storage Configuration Options

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

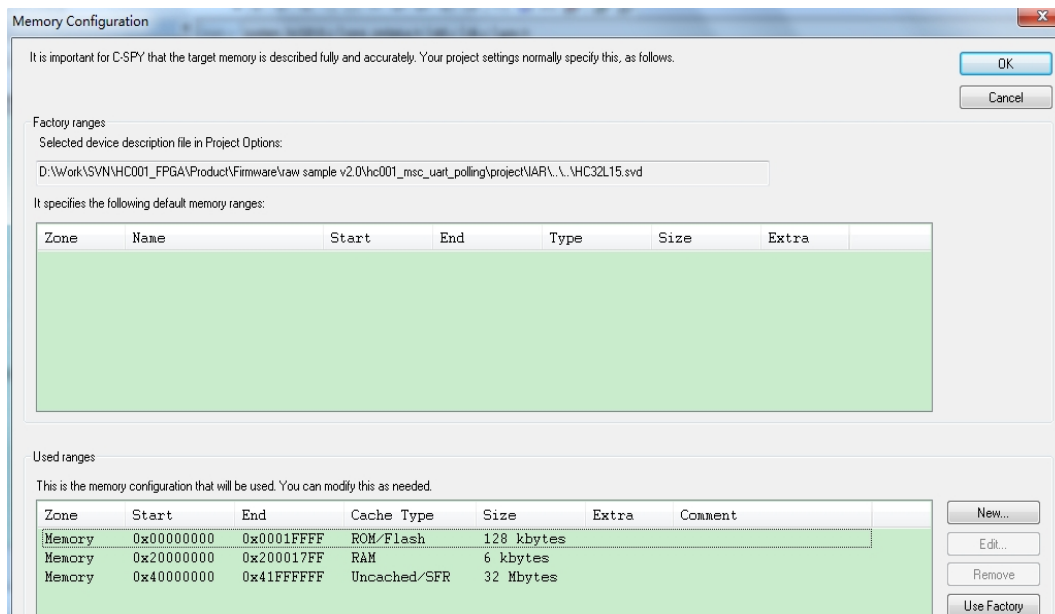


Figure 20 CMSIS-DAP Storage Configuration

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

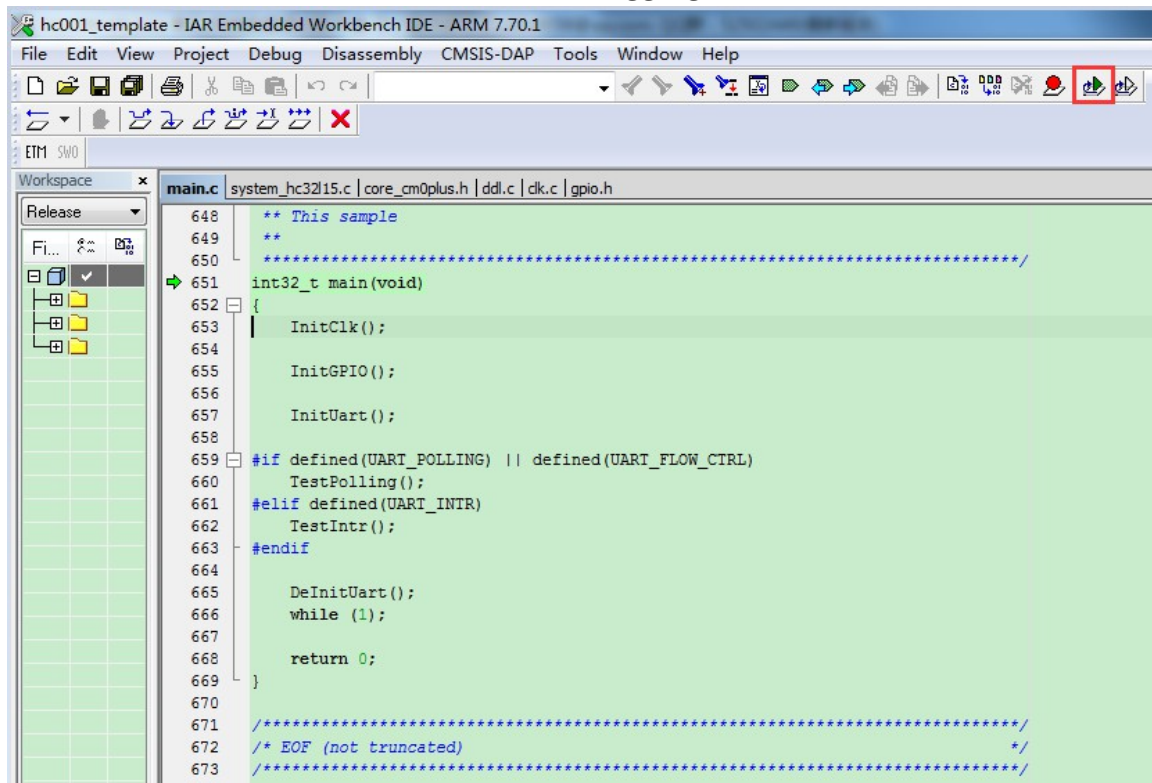


Figure 21 IAR Download and Debugging

- Execute a single-step run with normal debugging status;

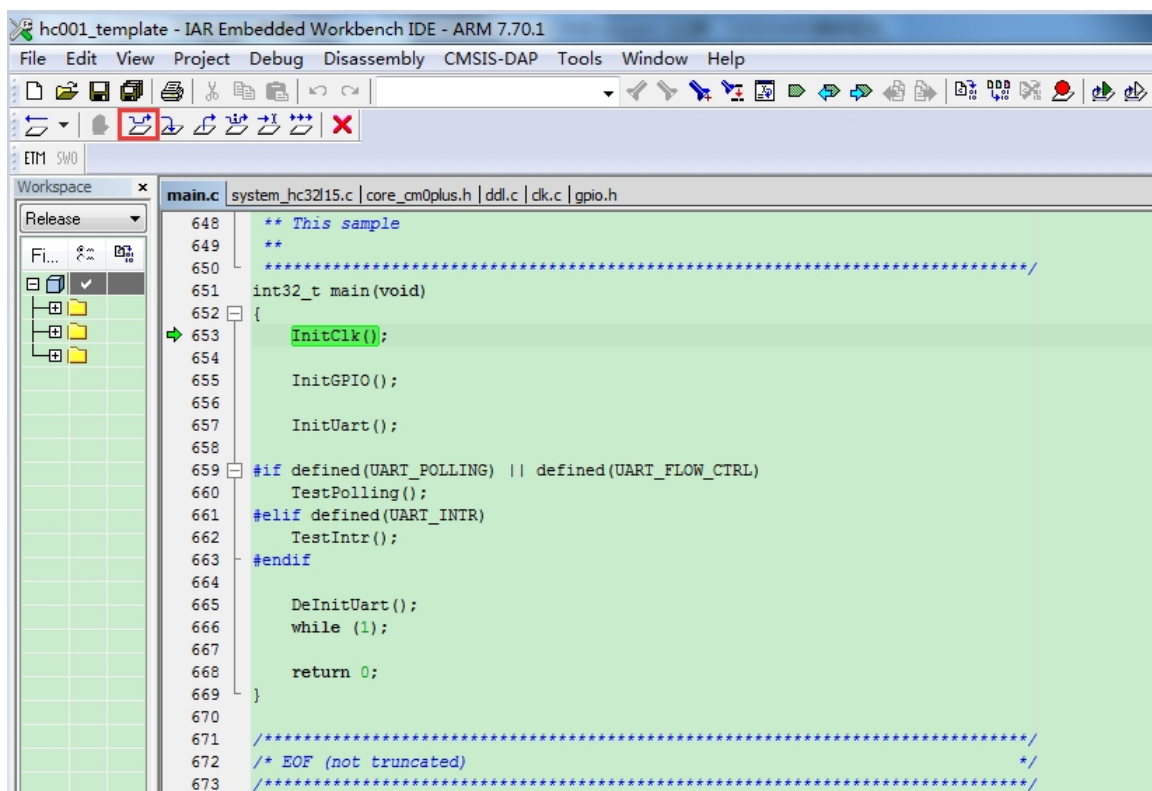


Figure 22 IAR Single-Step Debugging

9. Perform full speed operation, the commissioning status is normal.

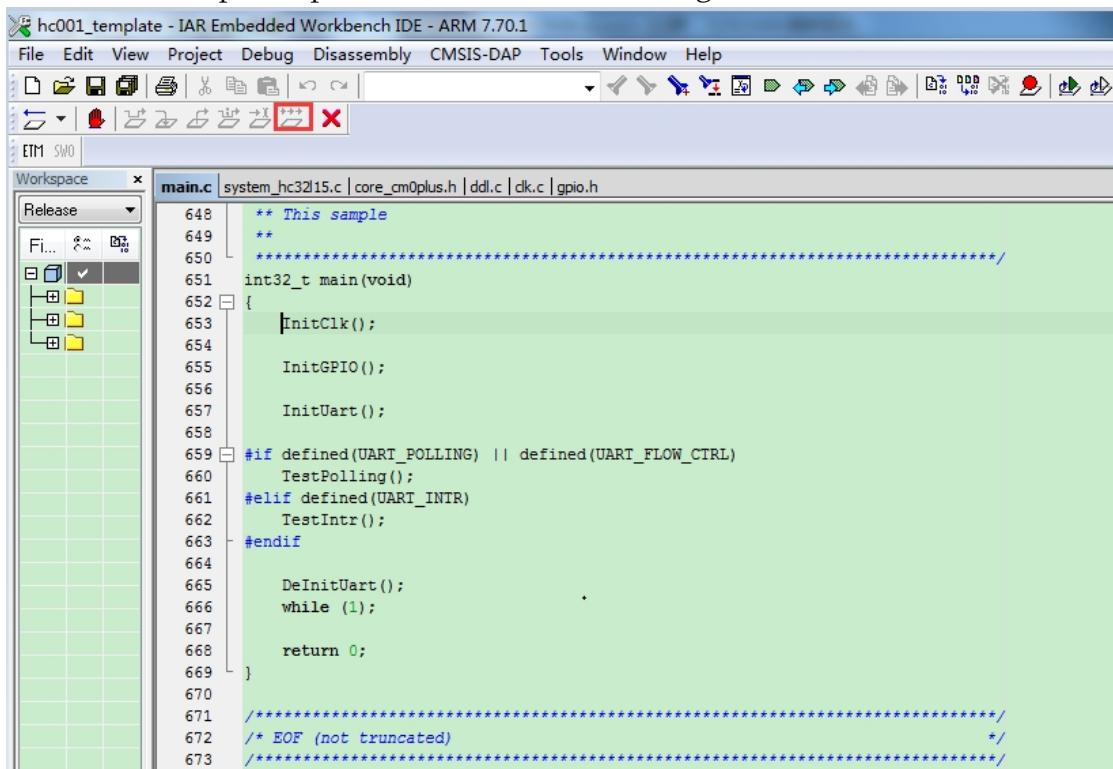


Figure 23 IAR running at full speed

## 4. version information

| dates      | releases | edit a record   |
|------------|----------|---|
| 2017-11-10 | Rev1.0   | Cortex-M Series MCU Chip Emulator User's Manual<br>First Edition Released |
|            |          |   |
|            |          |   |



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

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