

1 Introduction

This application note introduces how to set up environment for i.MX RT1170 CM4 primary core case.

It covers the following IDE:

- MCUXpresso
- IAR
- KEIL

By default, CM7 core is primary core on i.MX RT1170. By fusing 960 [12], we can switch to CM4 primary core and then the system boots from CM4 core.

i.MX RT1170 SDK only supports CM7 main core. This document is a supplement to provide basic environment for CM4 primary core case.

[AN13574SW](#) is tested by the tool version below:

- MCUXPRESSO 11.4.1
- IAR 9.20.2
- KEIL 5.36.0.0

2 Using MCUXpresso

For CM4 primary core in MCUXpresso, see [AN13574SW](#).

NOTE

MCUXpresso IDE needs an initial state of the board to work for CM4 primary core case.

To set the environment, put the board in serial download mode (Set **SW1** to OFF, OFF, OFF, OFF), connect USB cable to SDP port (USB1 port, J20), and execute *AN_SW1init_cm4_xip\program.bat*.

Switch to XIP boot mode (Set **SW1** to OFF, OFF, ON, OFF), and the information appears on the console as below:

```
-----  
This is the init image to setup CM4 primary core environment.  
-----
```

Perform the settings **only once** before using MCUXpresso for CM4 primary core application on a board.

2.1 By DAP LINK

To run CM4 primary core `hello world` example in MCUXpresso, perform the following steps:

1. Install the SDK attached with this application note into MCUXpresso.
2. Import the multicore example. It includes a CM7 slave project and a CM4 master project.

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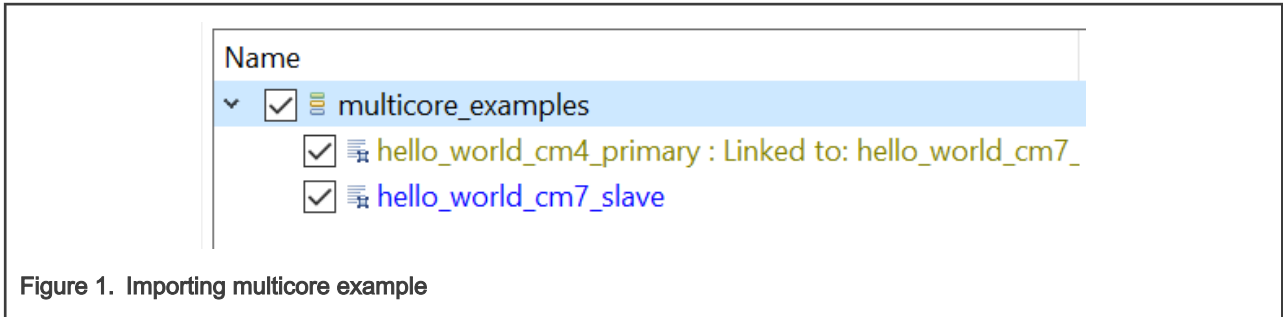



Figure 1. Importing multicore example

3. Build the CM7 slave project.
4. Build the CM4 master project.

5. To load the project, select CM4 master project and press .

Both CM4 and CM7 are detected, and CM4 core stops at `main`, as shown in [Figure 2](#).

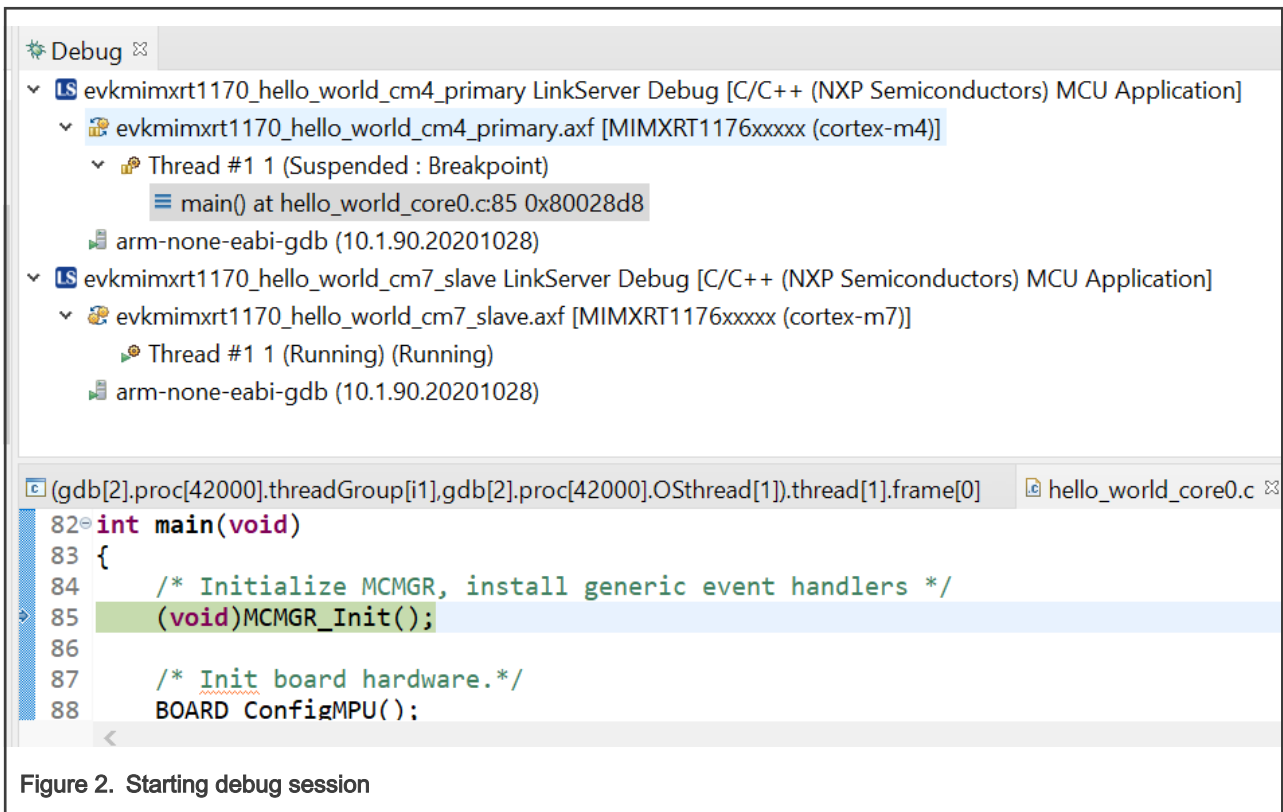

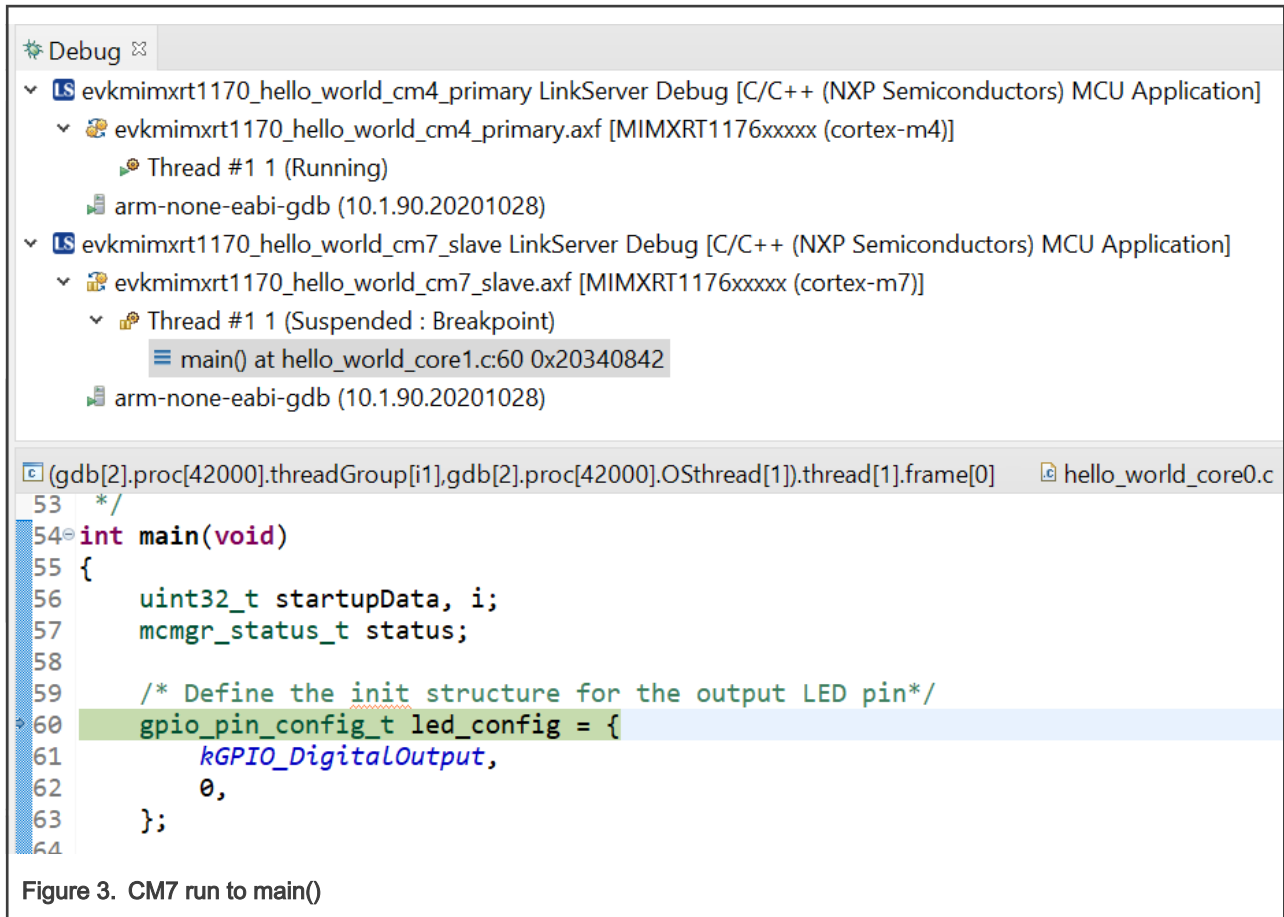


Figure 2. Starting debug session

6. To run CM4 core code, click . CM7 core stops at `main`, as shown in [Figure 3](#).



7. Select CM7 project and run. The log is shown in console as below:

```

Hello World from the Primary Core!
Starting Secondary core.
The secondary core application has been started.

```

2.2 By JLink

To use JLink, first remove the jumper **J6** and **J7** on board.

The SEGGER version tested in this application note is v7.54b. To set flashloader in SEGGER for i.MX RT1170 CM4 primary core, perform the following steps:

1. Go to `<segger installation directory>\JLink\Devices\NXP`.
2. Create a folder called **iMXRT117x**.
3. Copy `AN_SW\example_mcuxpresso\MIMXRT117x_QuadSPI_4KB_SEC_Alias.FLM` in [AN13574SW](#) to `<segger installation directory>\JLink\Devices\NXP\iMXRT117x`.
4. Add text below to `<segger installation directory>\JLink\JLinkDevices.xml`. `AN_SW\example_mcuxpresso\JLinkDevices.xml` in [AN13574SW](#).

```


<Device>
<ChipInfo      Vendor="NXP"
                Name="MIMXRT1176xxxxA_M4"
                Core="JLINK_CORE_CORTEX_M4"
                WorkRAMAddr="0x20000000"
                WorkRAMSize="0x00008000" />

```

```
<FlashBankInfo Name="QSPI Flash"
  BaseAddr="0x08000000"
  MaxSize="0x01000000"
  Loader="Devices/NXP/iMXRT117x/MIMXRT117x_QuadSPI_4KB_SEC_Alias.FLM"
  LoaderType="FLASH_ALGO_TYPE_OPEN" />
</Device>
```

For debugging, perform the following steps:

- Perform Step 1- 5 in [By DAP LINK](#).

- To exit debugging mode, click .
- Deselect **Reset before running**.

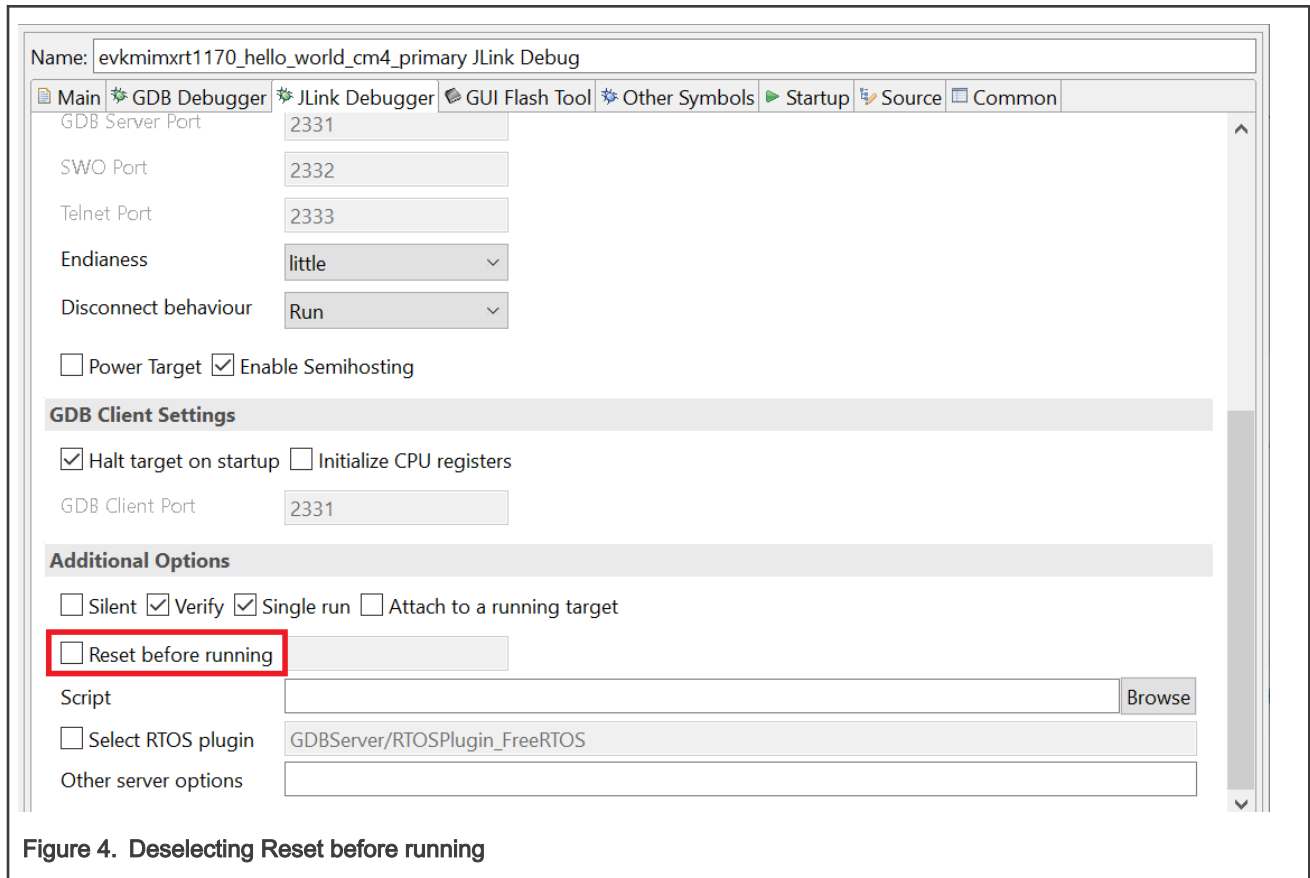



Figure 4. Deselecting Reset before running

- To start debugging again, press . As shown in [Figure 5](#), CM4 project is loaded and stops at `main()`.

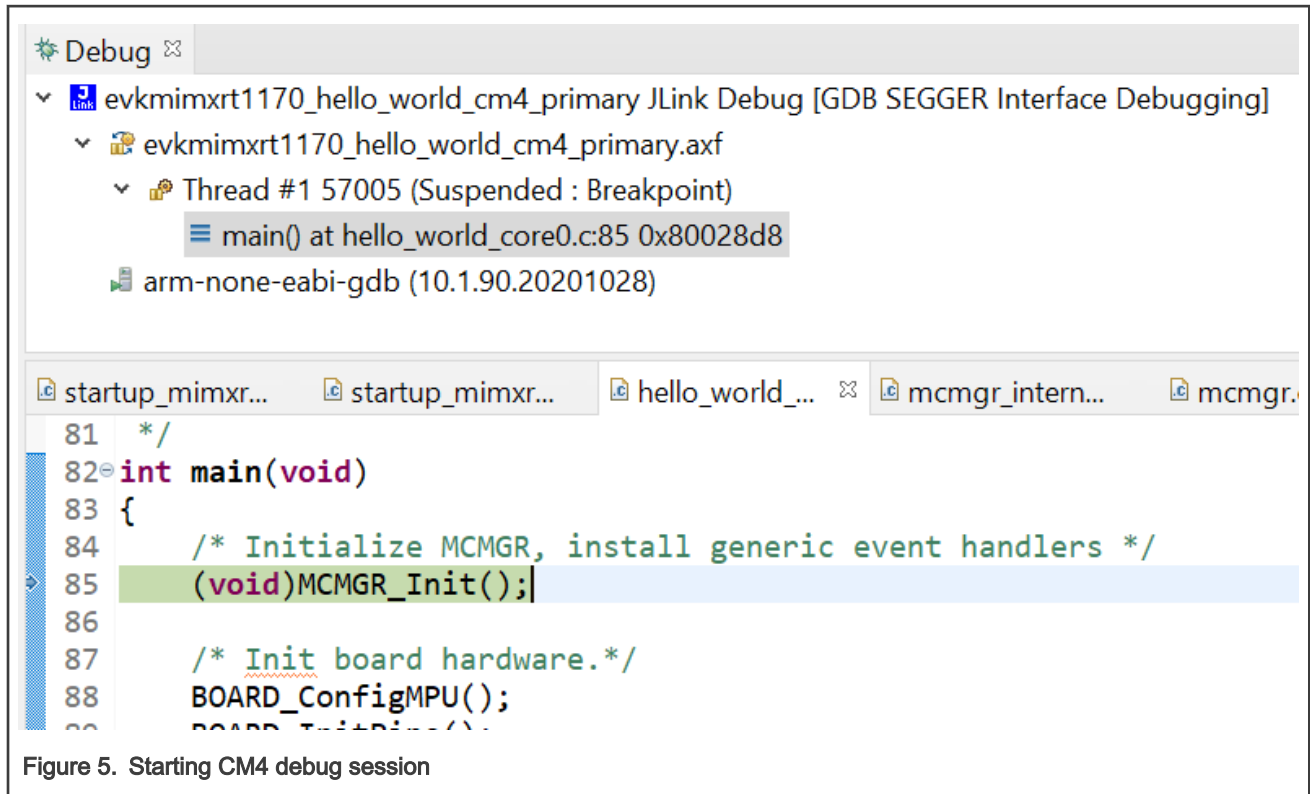




Figure 5. Starting CM4 debug session

- To run the code, press .
- To start debugging, select CM7 project and press . BY default, it works in attach mode. Both the two cores are in debugging.

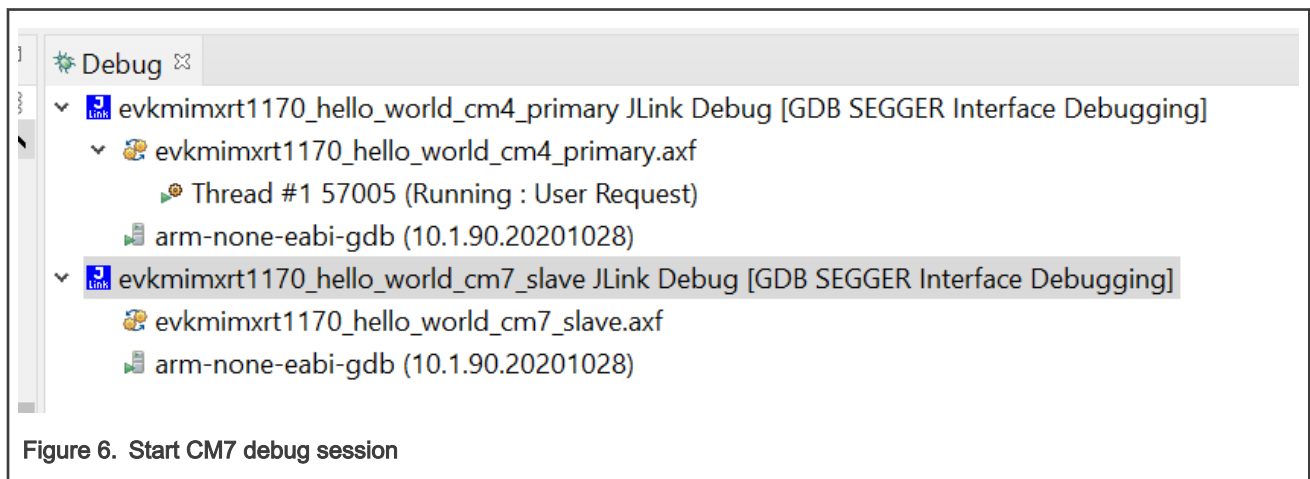



Figure 6. Start CM7 debug session

- To suspend debug session if necessary, press .

3 Using IAR

There is an example in [AN13574SW](#) for CM4 primary core in IAR. Use this example for the operation below.

3.1 By DAP LINK

To run CM4 primary core `hello world` example in IAR, perform the following steps:

1. Open and build CM7 slave project.
2. Open and build CM4 master project.
3. In `CM4_primary` project, launch the project. Both cores are detected and stop at `main()`.

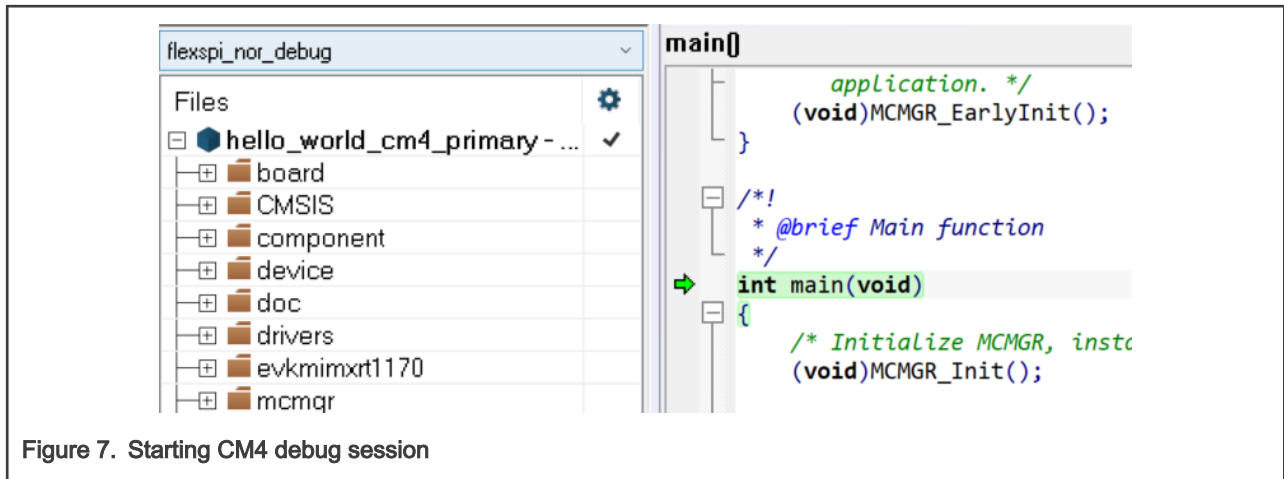


Figure 7. Starting CM4 debug session

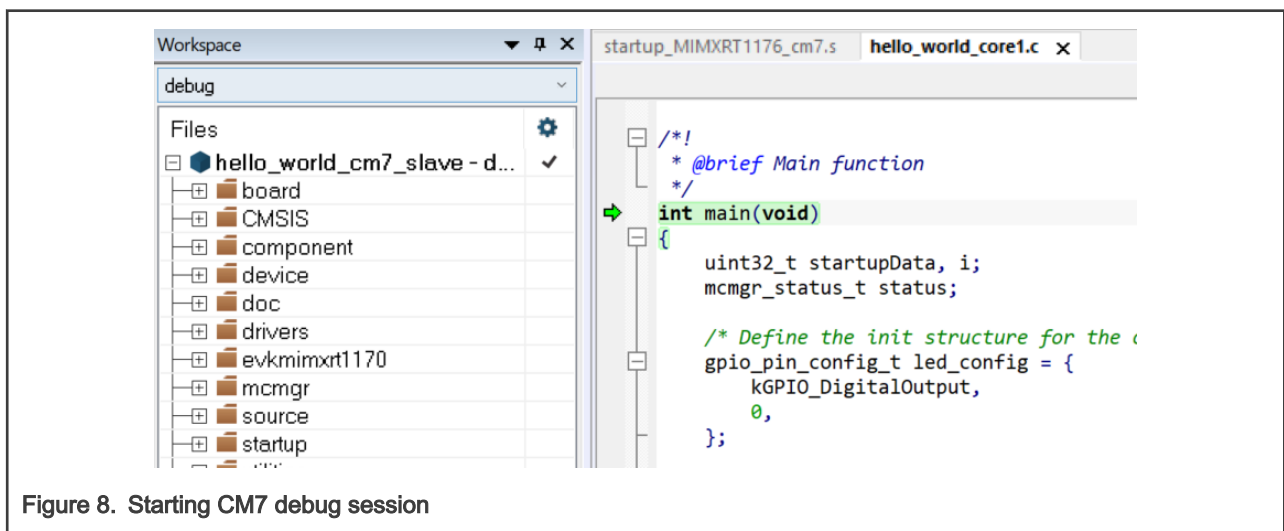


Figure 8. Starting CM7 debug session

4. Run CM4 project, and both cores start running.

3.2 By JLink

To use JLink, perform the following steps:

- Back up `iMXRT_1170.dmac` in `<IAR installation path>|arm\config\debugger\NXP`.
- Back up `FlashIMXRT1170_FlexSPI.mac` in `<IAR installation path>| arm\config\flashloader\NXP`.
- Copy `AN_SW\example_iar|iMXRT_1170.dmac` in [AN13574SW](#) to `<IAR installation path>|arm\config\debugger\NXP`.
- Copy `AN_SW\example_iar\FlashIMXRT1170_FlexSPI.mac` in [AN13573SW](#) to `<IAR installation path>| arm\config\flashloader\NXP`.

Perform the following steps:

1. Remove the jumper **J6** and **J7** on board.

2. Switch the debugger to be JLink in the example projects.
3. Build, download, and run CM4 project.
4. Build and attach CM7 project (from IAR -> Project).

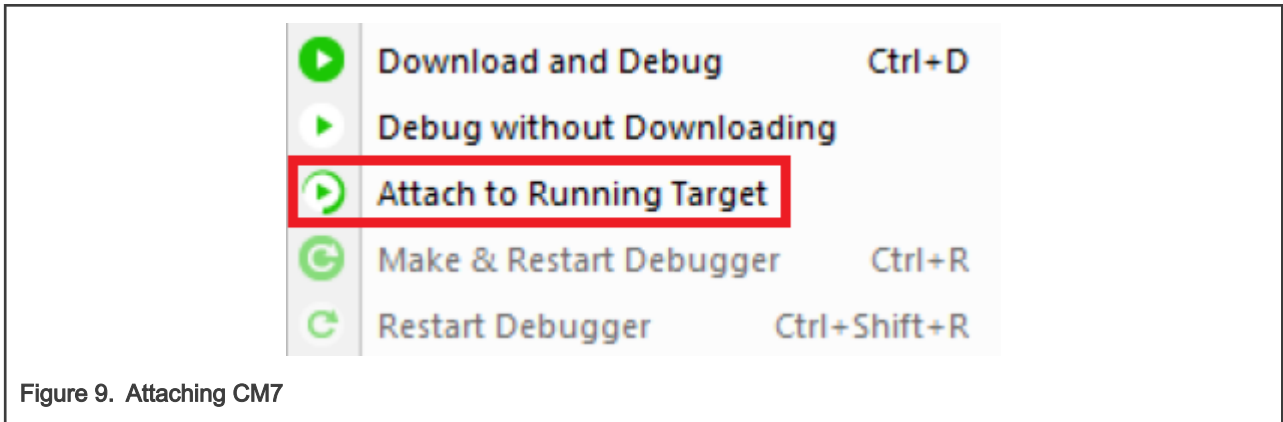



Figure 9. Attaching CM7

5. If necessary, press  and the code stop where it is running.

4 Using KEIL

There is an example in [AN13574SW](#) for CM4 primary core in KEIL. Use this example for the operation below. Keil also needs an initial board state for first image download. For details, see [Note](#) in [Using MCUXpresso](#).

4.1 By DAP LINK

1. Open and build CM7_slave project.
2. Open and build CM4_primary project.
3. Launch CM4_primary debug session and run the code. It stops at main().

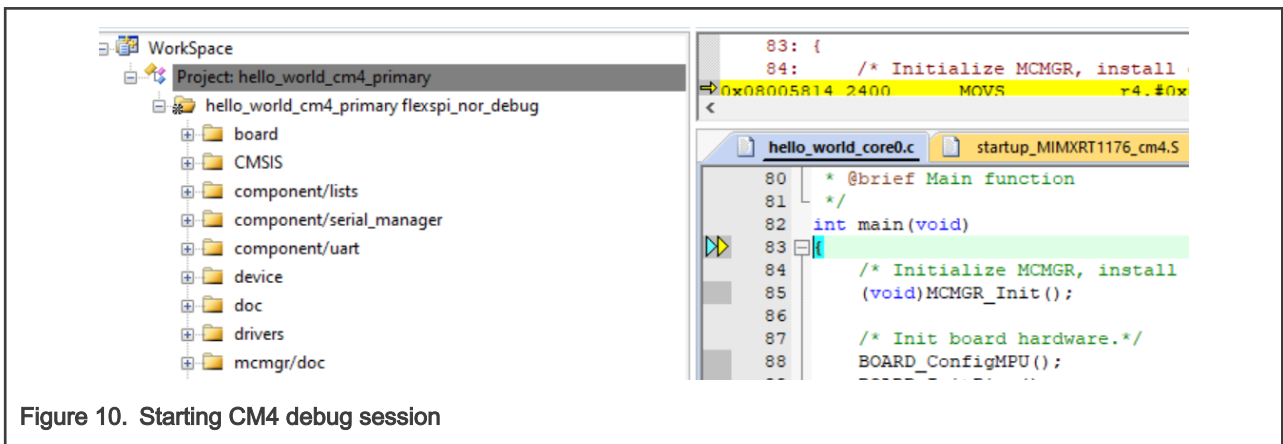


Figure 10. Starting CM4 debug session

4. To attach CM7_slave debug session, click .

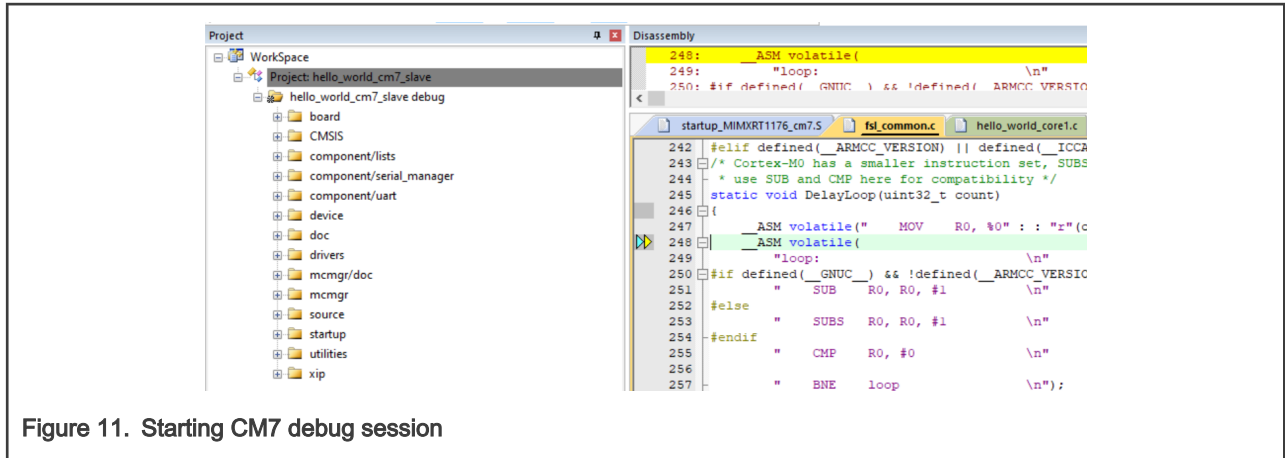


Figure 11. Starting CM7 debug session

4.2 By JLink

To use JLink, remove the jumpers **J6** and **J7** on board.

Switch the debugger setting in the example to be JLink.

For debugging, follow Steps 1 - 4 in [By DAP LINK](#).

5 Revision history

Rev.	Date	Description
0	24 February 2022	Initial release

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