Freescale Semiconductor
Application Note

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U-Boot Debug using CodeWarrior for QorIQ LS series – ARM V7 ISA

1. Introduction

This document describes the steps required for U-Boot debugging using the CodeWarrior for QorIQ LS series – ARM V7 ISA.

This document includes the following sections:

- Build the U-Boot sources.
- Perform U-Boot debug in CodeWarrior for QorIQ LS series – ARM V7 ISA.

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2. Preliminary background

The following are the steps required to compile LS1021A U-Boot for the LS1021AQDS board.

2.1. Downloads

Before U-Boot debug, following downloads are necessary:

- Linaro GCC 4.8 (Aarch32) 4.8-2013.12 toolchain
- U-Boot source code

You can gcc-linaro 4.8 (Aarch32) 4.8-2013.12 toolchain from http://www.linaro.org/downloads/ or you can use the one installed with Linux version of CodeWarrior for QorIQ LS series – ARM V7 ISA.

U-boot source code will be provided together with SDK for LS1021AQDS board.

2.2. Compiling U-Boot

To compile U-Boot, perform these steps (UBUNTU OS was used to build U-Boot):

1. Go to **U-Boot** folder
2. Set the `ARCH` and `CROSS_COMPILE` environmental variables and build the U-Boot:

   ```
   make  ARCH=arm CROSS_COMPILE=<path_to_toolchain>/arm-linux-
   gnueabihf- ls1021aqds_nor
   ```

   or

   ```
   export ARCH=arm
   export CROSS_COMPILE=<path_to_toolchain>/arm-linux-gnueabihf-
   make ls1021aqds_nor
   ```

3. U-Boot image and U-Boot binary will be placed in **U-Boot** folder.

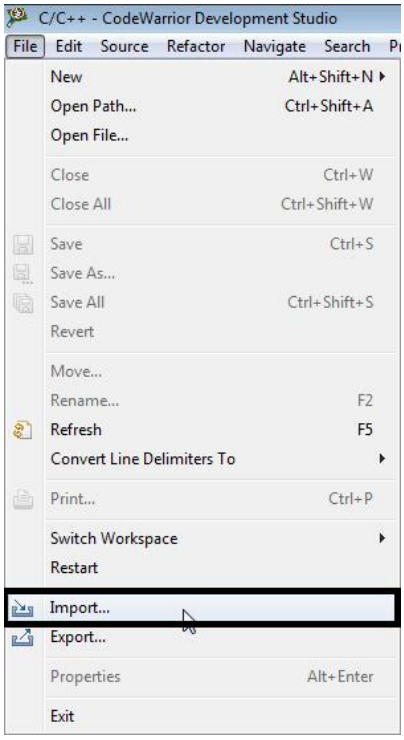
NOTE	Default U-Boot will be built with dwarf-2 debug format.

3. Create ARMv7 project

To create an ARMv7 bare metal project for U-Boot debug, follow these steps:

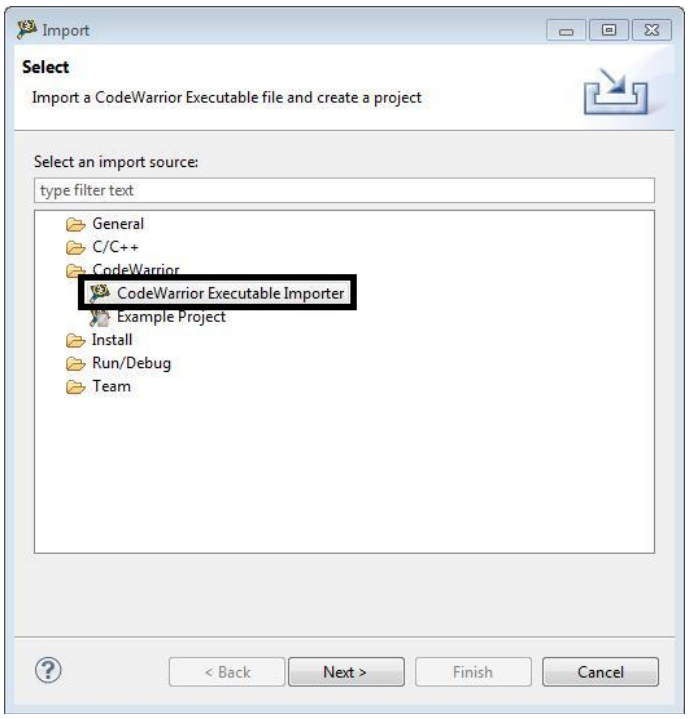
1. Start CodeWarrior for QorIQ LS series – ARM V7 ISA.
2. Choose **File** > **Import** to import the U-Boot executable file generated during the U-Boot compilation. It can be found in U-Boot folder.

Figure 1. CodeWarrior File menu



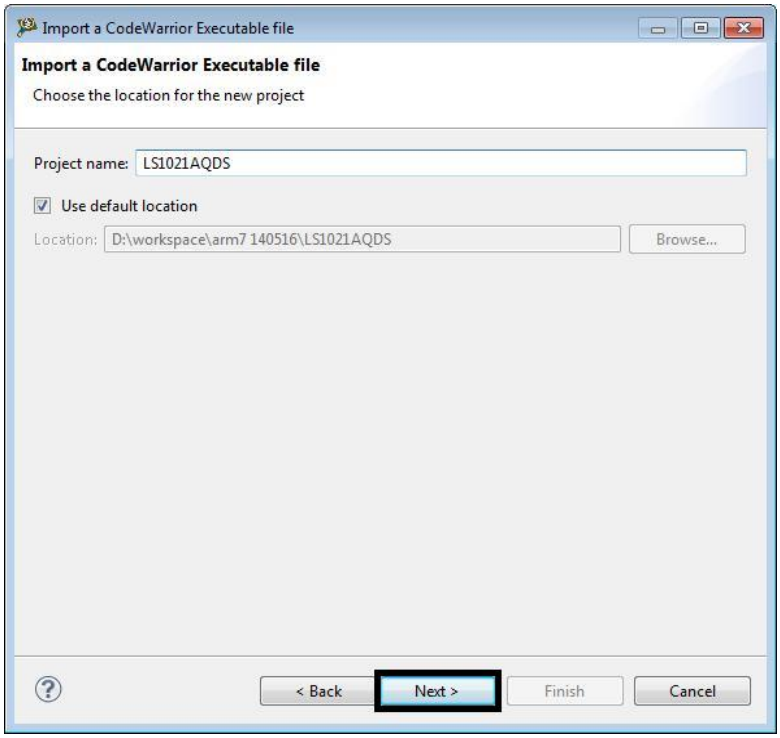
3. Choose the source to **Import** and select **Next**.

Figure 2. Importing dialog



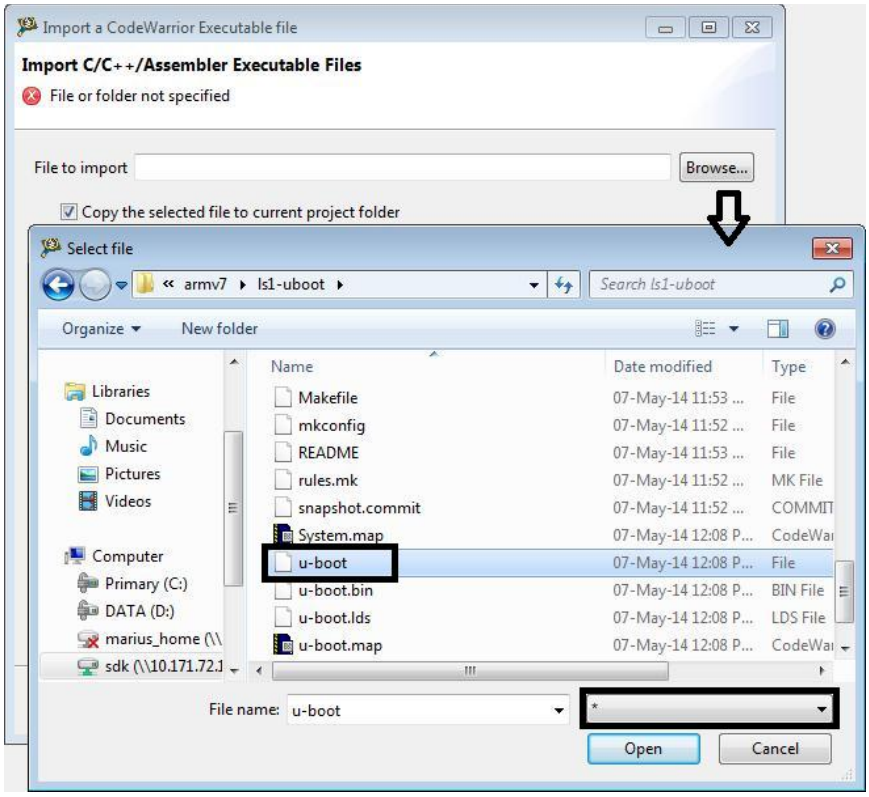
4. Specify **Project name** and **Location**, or use the default location and select **Next**.

Figure 3. Importing executable file dialog



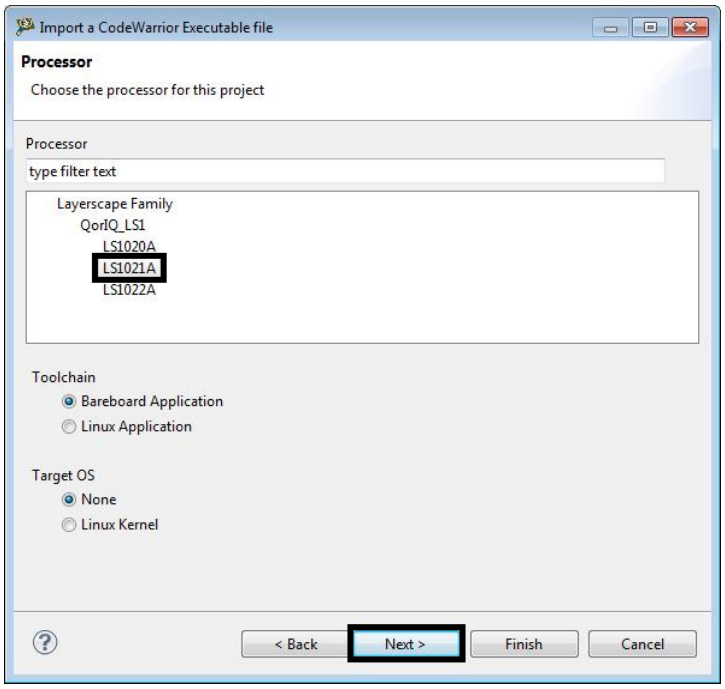
5. Browse to the U-Boot executable file and select O**pen**. By default, CodeWarrior looks for an `.elf` extension, so change the file type in the lower right corner of **Select File** dialog.

Figure 4. Select U-Boot executable file



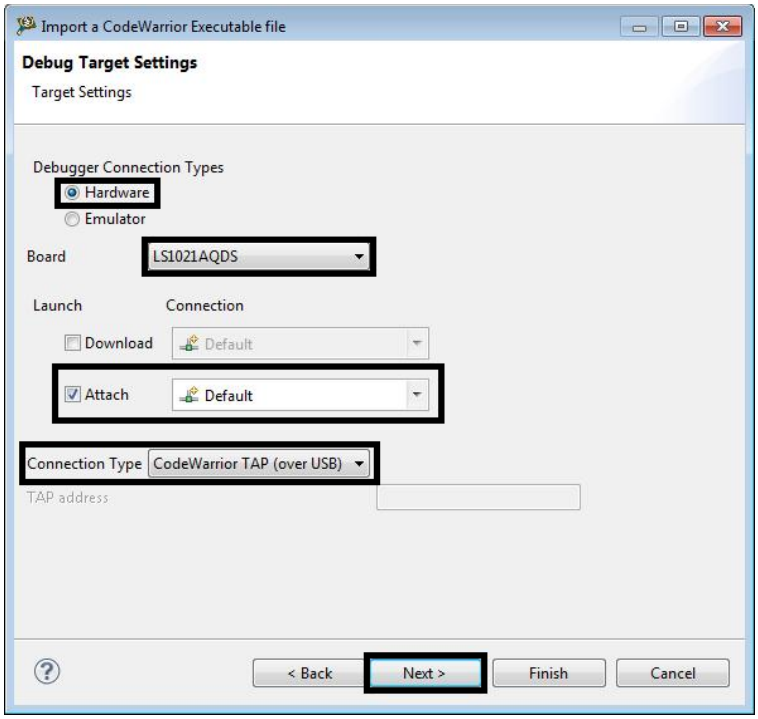
6. Select **Processor** type for the project and select **Next**.

Figure 5. Select Processor type



7. Select **Debugger Connection Types**, **Board**, **Launch**, **Connection Type** and select **Next**.

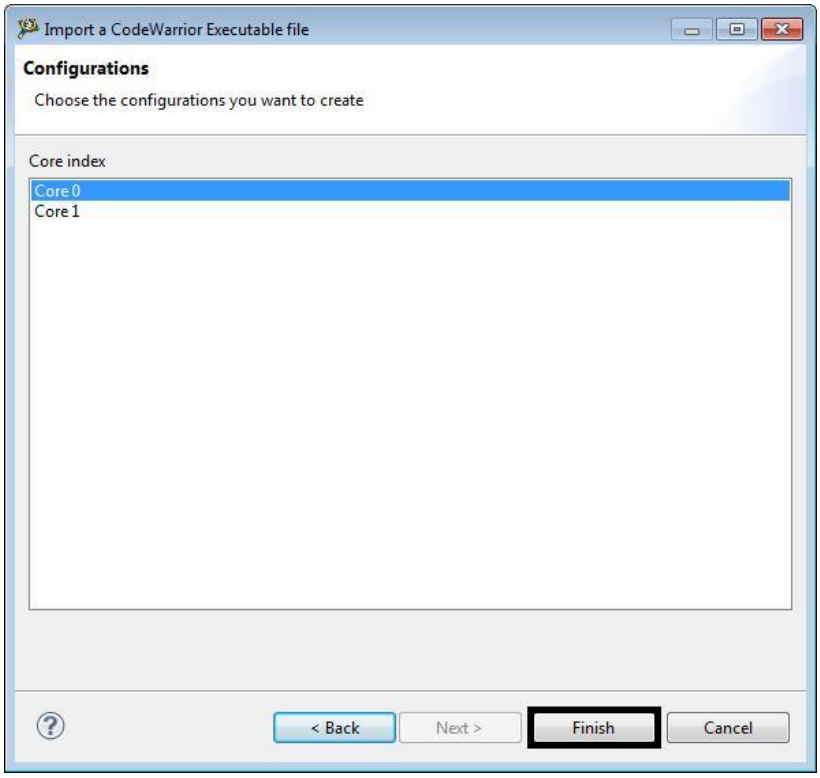
Figure 6. Target Settings dialog



NOTE	By default U-Boot will be generated as “Shared object file” and not as “Executable file”. Using Download Launch will not work in this case; Attach Launch will be used instead. If U-Boot is not available on target board, Flash Programmer should be used to program U-Boot on target board.

8. Select the **Configurations** that you want to create and then, select **Finish** to close the wizard.

Figure 7. Select Configurations dialog



4. U-Boot debug support

4.1. Debug environment

Use the following setup for U-Boot debugging on ARMv7 core:

- LS1021AQDS board.
- Compiled U-Boot for the NOR FLASH target.
- Flash U-Boot on the target board (for more information on how to program the U-Boot to NOR flash, see SDK documentation).
- Switches set for NOR boot (for more information on how to set switches, see SDK documentation).
- Latest release of CodeWarrior for QorIQ LS series – ARM V7 ISA.

- CWTAP probe.

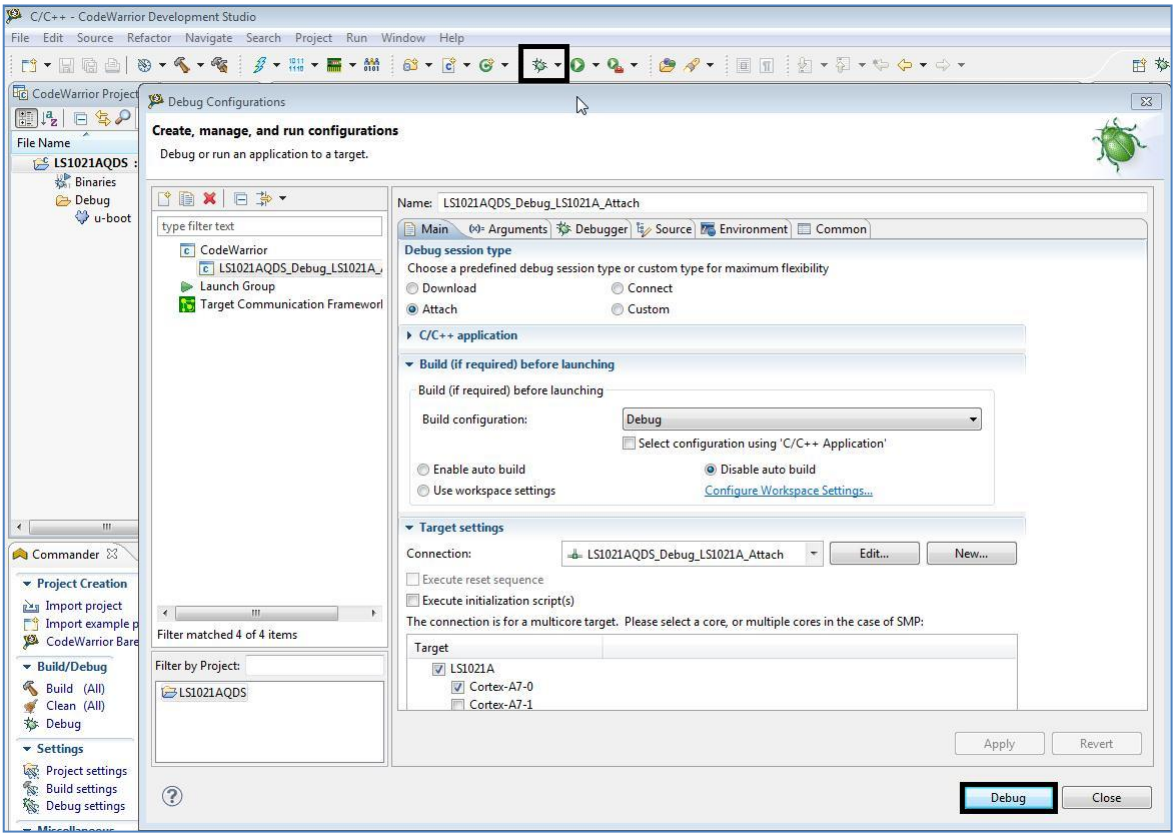
4.2. Start U-Boot debugging

The U-Boot executable file generated during the U-Boot compilation should be imported as CodeWarrior project (for more information, see Create ARMv7 project).

After the CodeWarrior project is created, perform these steps to start U-Boot debug:

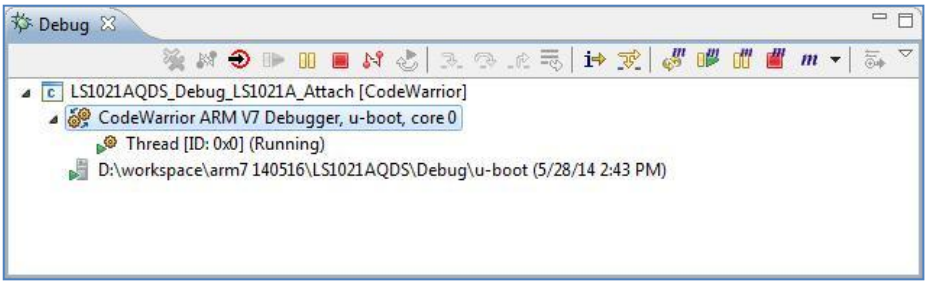
1. Choose **Run** > **Debug configurations**, to open **Debug configurations** dialog and select **Debug**.

Figure 8. Debug Configurations dialog



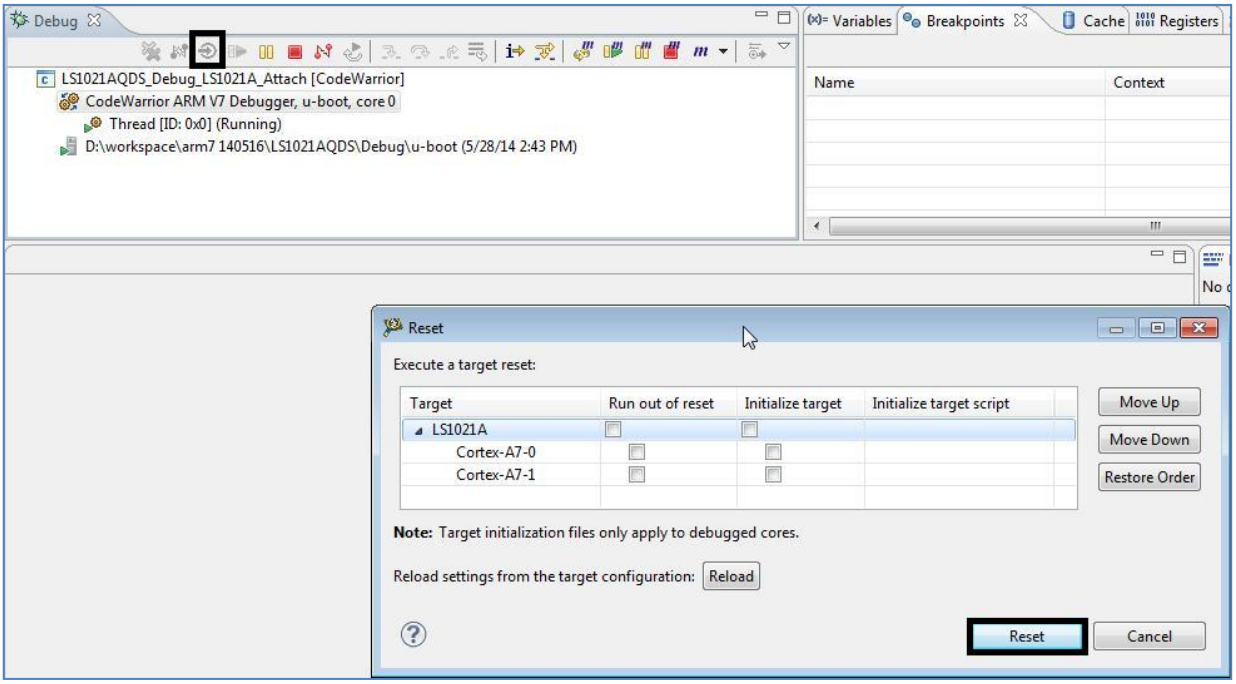
2. The connection initializes and configures the TAP, and then it will attach to board.

Figure 9. Debug view



3. To reinitialize the target from CodeWarrior, select **Reset** as shown in the figure.

Figure 10. Reset dialog



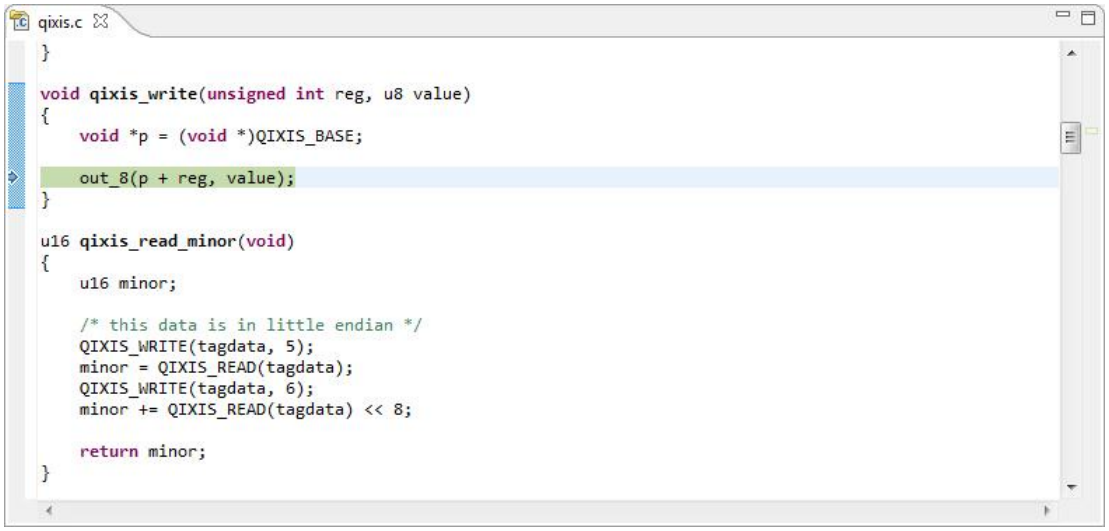
NOTE	Make sure no initialization file is selected.

4. After reset debugger will prompt for source location.

Figure 11. File location dialog

5. After the path is provided, source will become available in CodeWarrior.

Figure 12. File editor



6. Set a hardware breakpoint at `_start`, using **Debugger Shell** command `bp -hw _start`.

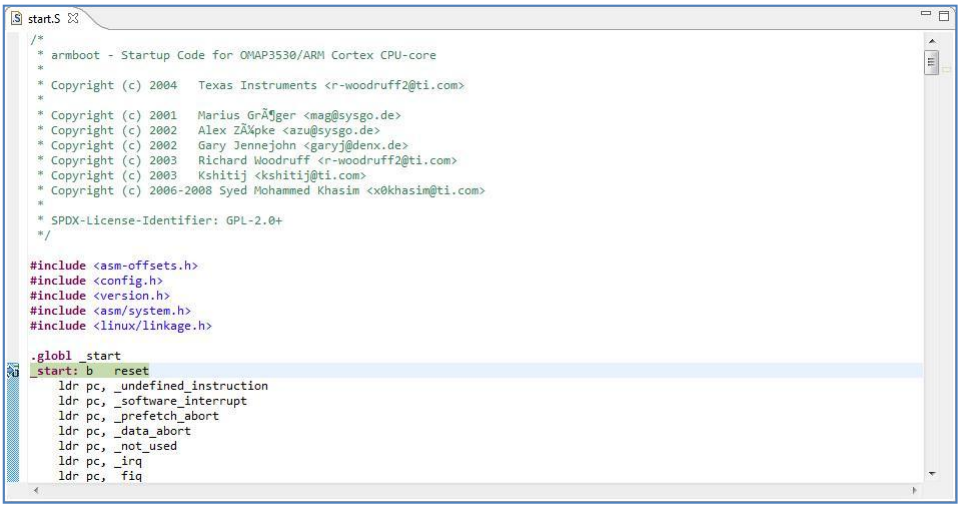
Figure 13. Debuger Shell view

7. **Resume** using F8 or **Debugger Shell** command `go`.

Figure 14. Debuger Shell view

8. Breakpoint will be hit and U-Boot debugging can be performed from `_start`.

Figure 15. File editor



9. Debugging (step, run, or breakpoint) can be done till the U-Boot boot up.

NOTE	If you encounter reset skid issue, the program will not stop at `_start` symbol. As a workaround you can set a hardware breakpoint at `_start` and move PC to `_start` symbol address. This issue has been resolved in FPGA v11 image.

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