NXP Semiconductors
User's Guide

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Getting Started with MCUXpresso SDK for FRDM-K32L2A4S

1 Overview

The MCUXpresso Software Development Kit (SDK) provides comprehensive software support for Kinetis and LPC Microcontrollers. The MCUXpresso SDK includes a flexible set of peripheral drivers designed to speed up and simplify development of embedded applications. Along with the peripheral drivers, the MCUXpresso SDK provides an extensive and rich set of example applications covering everything from basic peripheral use case examples to full demo applications. The MCUXpresso SDK contains FreeRTOS and various other middleware to support rapid development.

For supported toolchain versions, see *MCUXpresso SDK Release Notes for FRDM-K32L2A4S* (document MCUXSDKK32L2ASRN) .

For more details about MCUXpresso SDK, see the MCUXpresso SDK homepage MCUXpresso-SDK: Software Development Kit for MCUXpresso.

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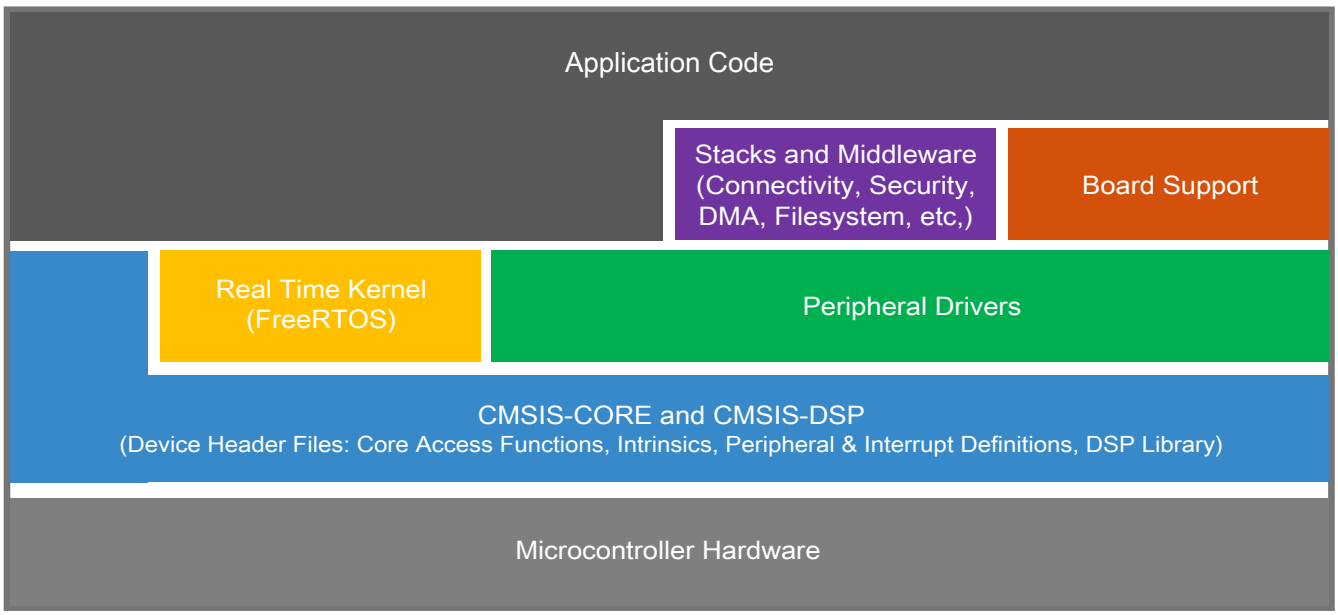

Figure 1. MCUXpresso SDK layers

2 Run a demo using MCUXpresso IDE

NOTE

Ensure that the MCUXpresso IDE toolchain is included when generating the MCUXpresso SDK Package.

This section describes the steps required to configure MCUXpresso IDE v11.1.1 to build, run, and debug example applications. The `hello_world` demo application targeted for the FRDM-K32L2A4S hardware platform is used as an example, though these steps can be applied to any example application in the MCUXpresso SDK.

2.1 Select the workspace location

Every time MCUXpresso IDE launches, it prompts the user to select a workspace location. MCUXpresso IDE is built on top of Eclipse which uses workspace to store information about its current configuration, and in some use cases, source files for the projects are in the workspace. The location of the workspace can be anywhere, but it is recommended that the workspace be located outside of the MCUXpresso SDK tree.

2.2 Build an example application

To build an example application, follow these steps.

1. Drag and drop the SDK zip file into the **Installed SDKs** view to install an SDK. In the window that appears, click **OK** and wait until the import has finished.

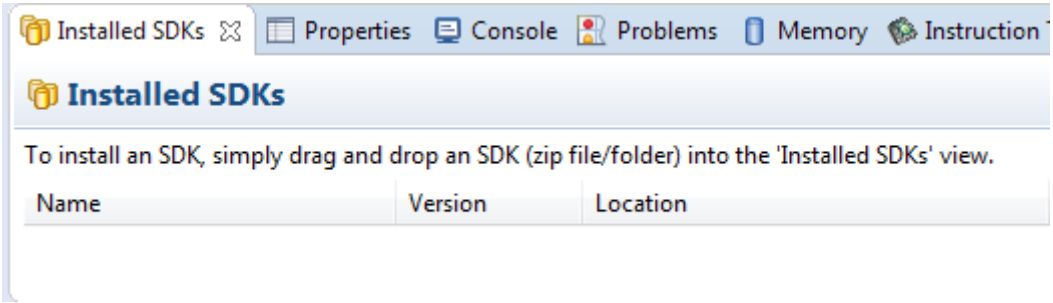

Figure 2. Installing an SDK

2. On the **Quickstart Panel**, click **Import SDK example(s)…**.

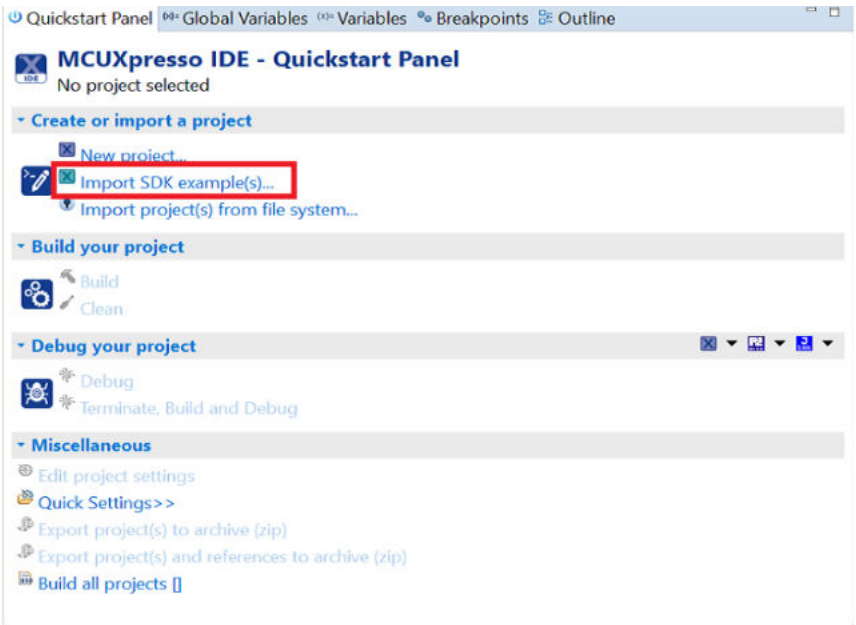

Figure 3. Importing an SDK example

3. In the window that appears, expand the **K32L2** folder and select **K32L2A41xxxxA**. Then, select **frdmk32l2a4s** and click **Next**.

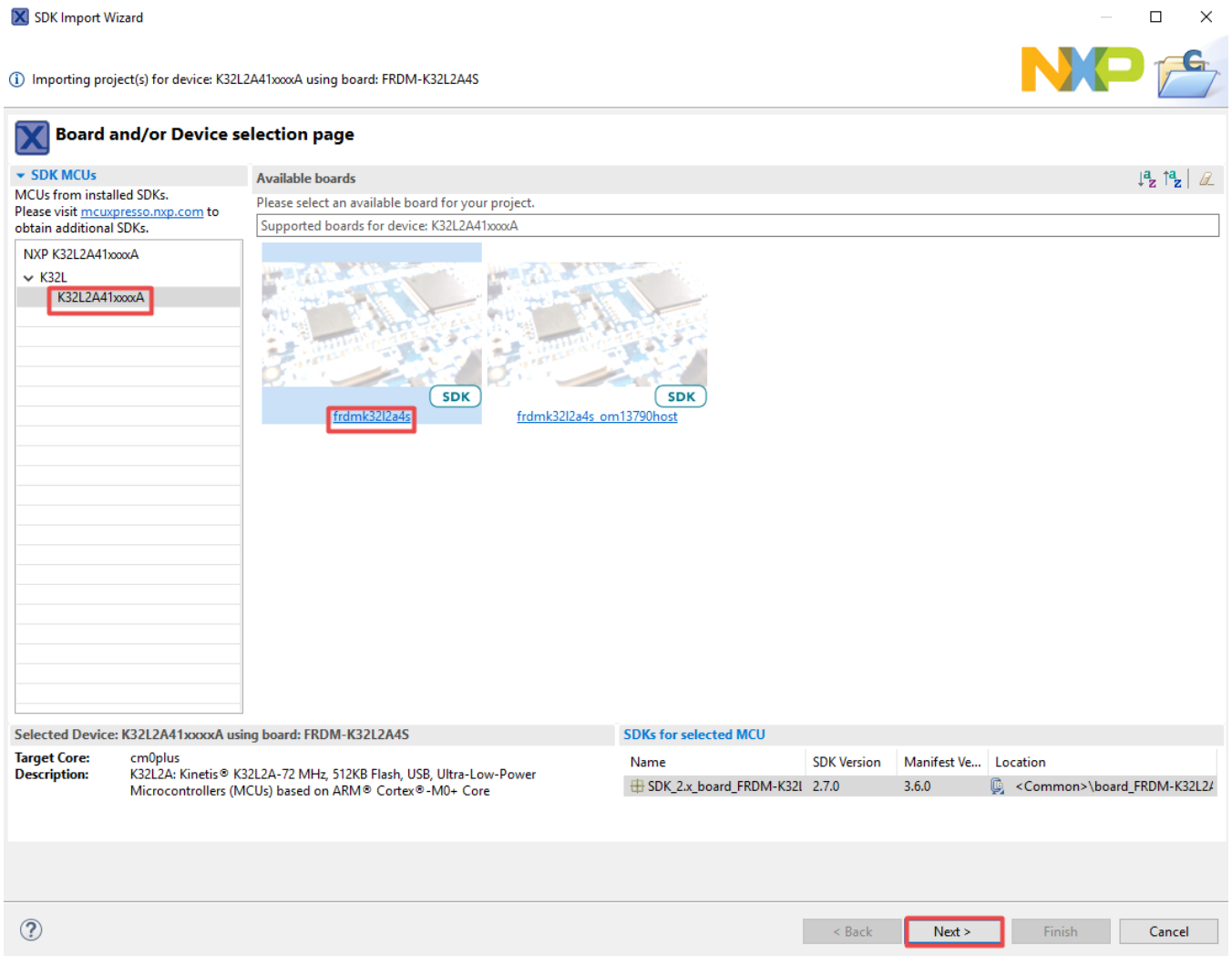

Figure 4. Selecting FRDM-K32L2A4S board

4. Expand the **demo_apps** folder and select **hello_world**. Then, click **Next**.

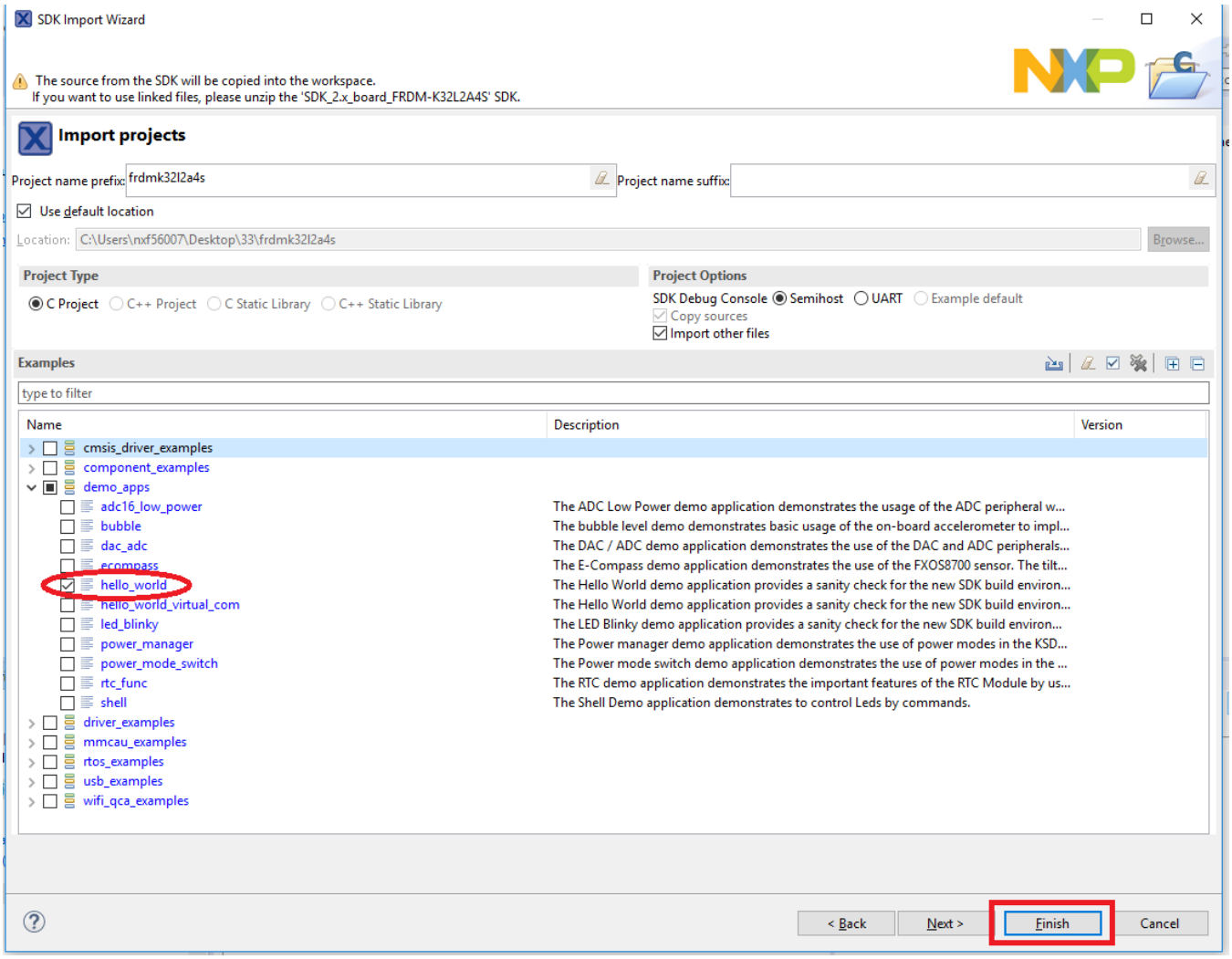

Figure 5. Selecting `hello_world`

5. Ensure the option of `Redlib: Use floating point version of printf` is selected if the cases' print floating point numbers are on the terminal for demo applications such as . Otherwise, it is not necessary to select this option. Then, click **Finish**.

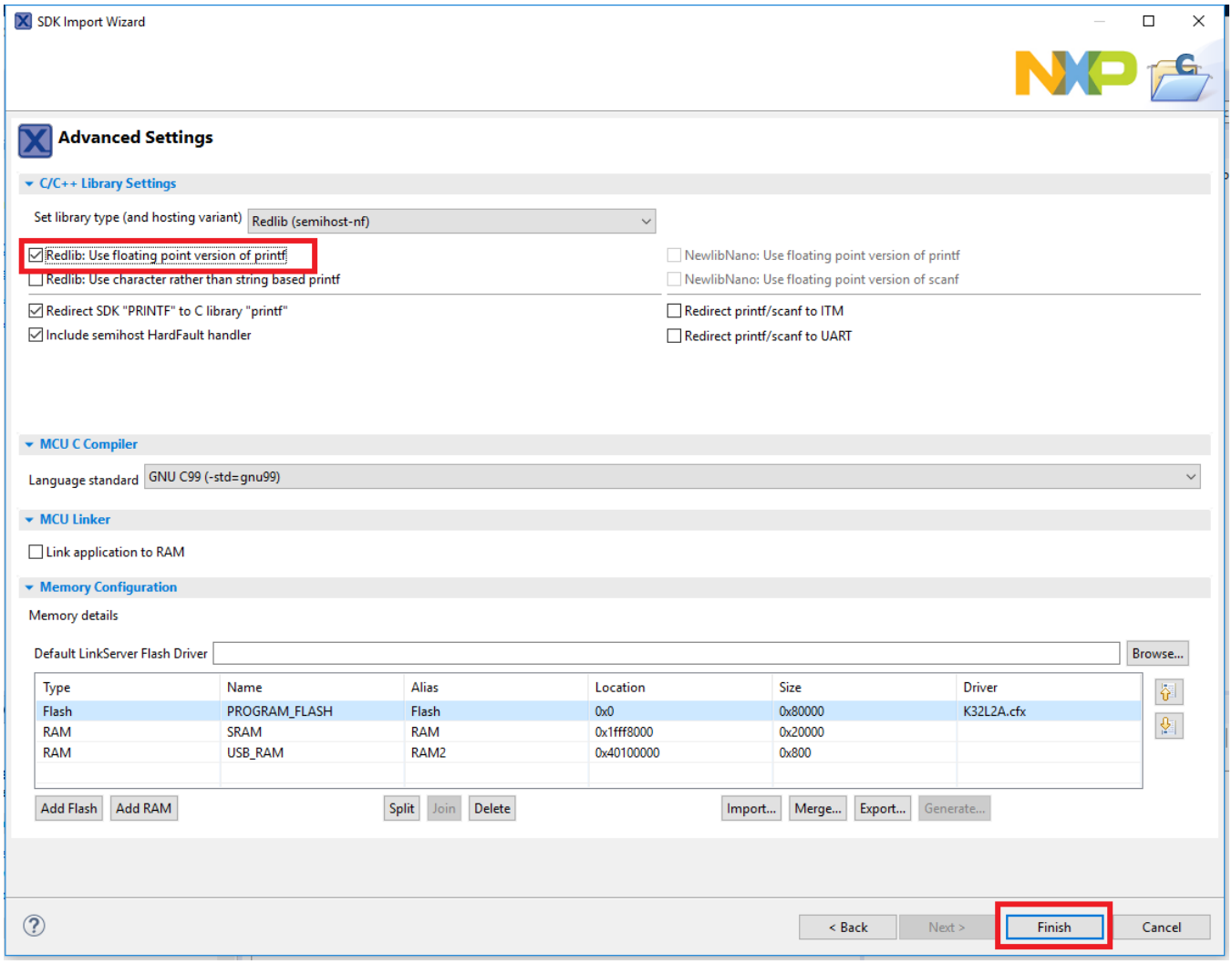

Figure 6. Selecting `User floating print version of printf`

2.3 Run an example application

For more information on debug probe support in the MCUXpresso IDE 11.1.1, visit community.nxp.com.

To download and run the application, perform these steps:

1. See Default debug interfaces to determine the debug interface that comes loaded on your specific hardware platform. For LPCXpresso boards, install the DFU jumper for the debug probe, then connect the debug probe USB connector.
   - For boards with a P&E Micro interface, visit www.pemicro.com/support/downloads_find.cfm and download and install the P&E Micro Hardware Interface Drivers package.
   - If using J-Link with either a standalone debug pod or OpenSDA, install the J-Link software (drivers and utilities) from www.segger.com/jlink-software.html.
   - For boards with the OSJTAG interface, install the driver from www.keil.com/download/docs/408.
2. Connect the development platform to your PC via USB cable.
3. Open the terminal application on the PC, such as PuTTY or TeraTerm, and connect to the debug serial port number (to determine the COM port number, see How to determine COM port). Configure the terminal with these settings:
   a. 115200 or 9600 baud rate, depending on your board (reference `BOARD_DEBUG_UART_BAUDRATE` variable in the `board.h` file)

b. No parity
c. 8 data bits
d. 1 stop bit

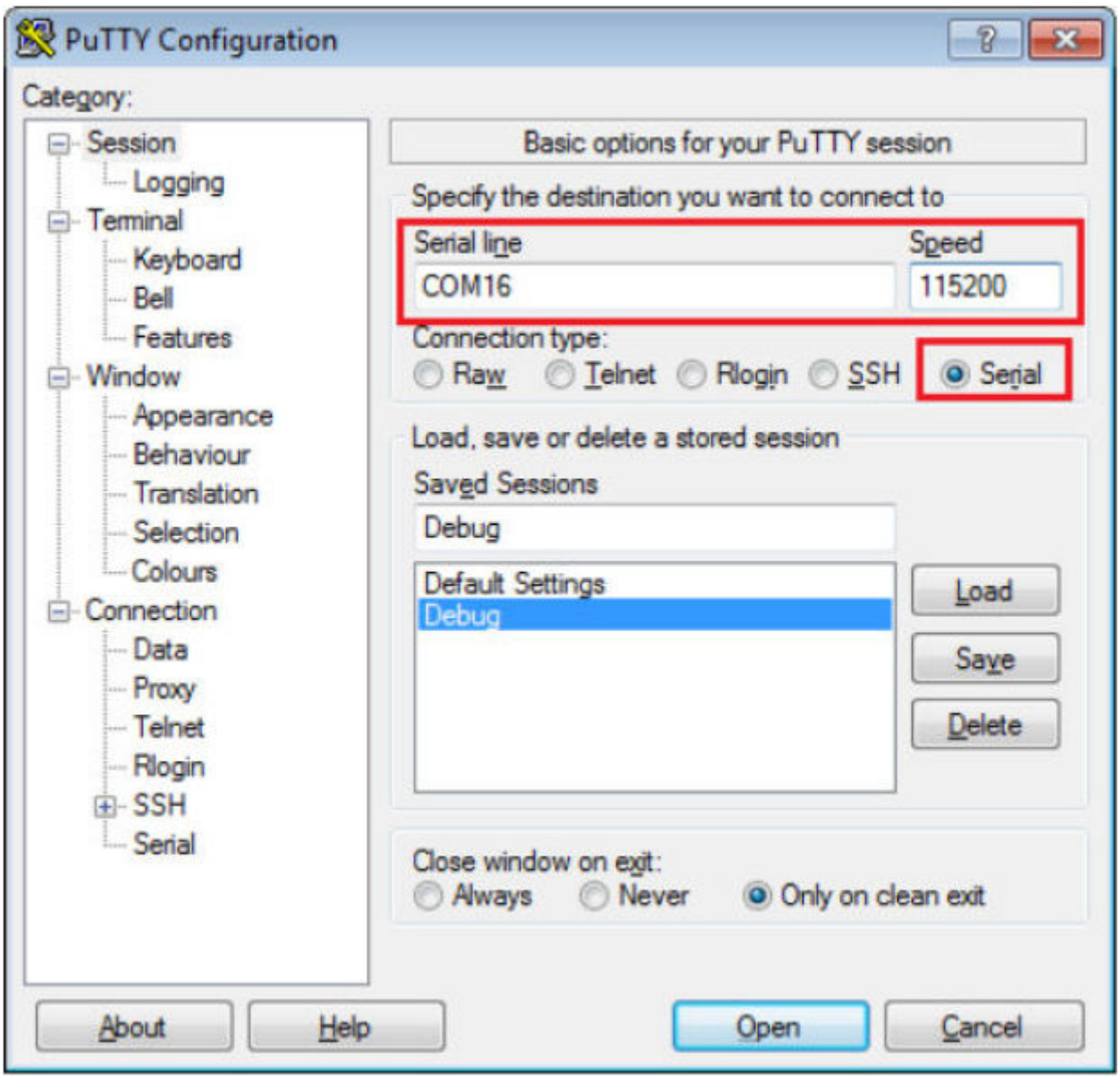

Figure 7. Terminal (PuTTY) configurations

4. On the **Quickstart Panel**, click on **Debug 'frdmk32l2a4s_demo_apps_hello_world' [Debug]**.

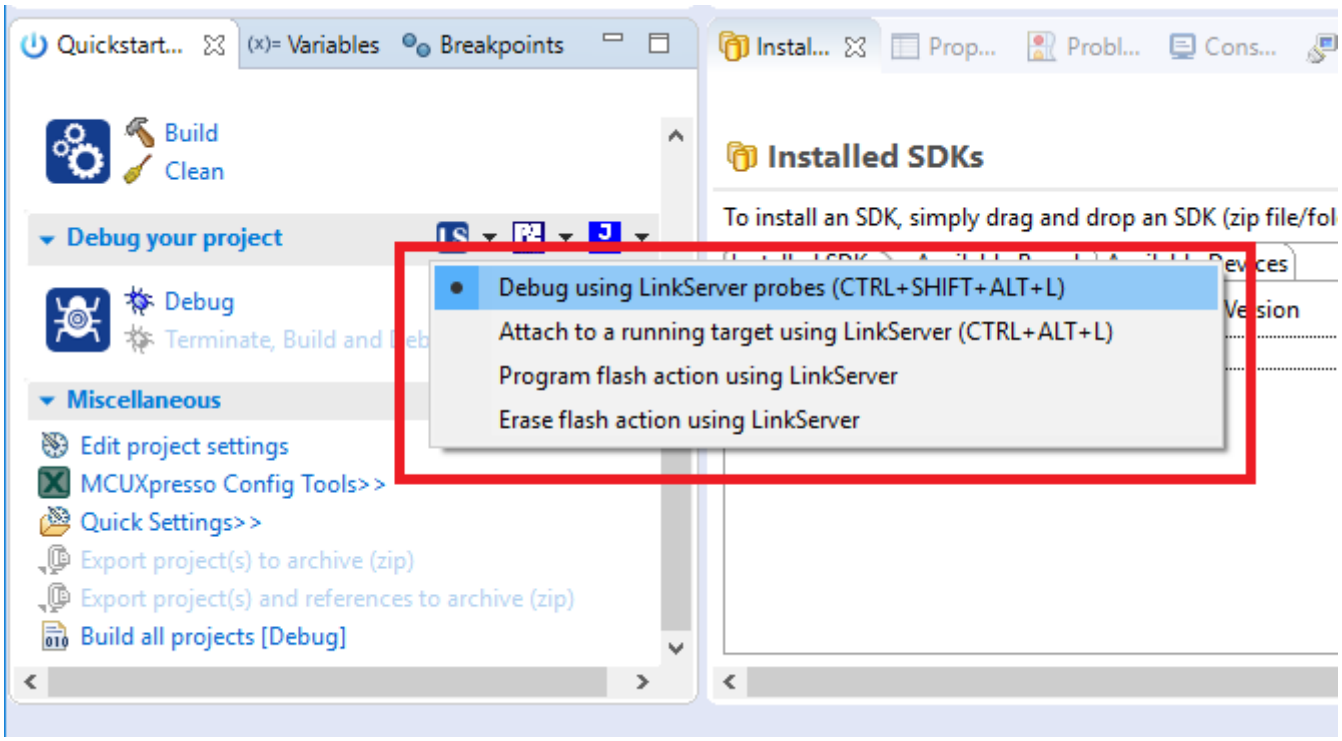

Figure 8. Debugging `hello_world` case

5. The first time you debug a project, the Debug Emulator Selection Dialog is displayed, showing all supported probes that are attached to your computer. Select the probe through which you want to debug and click the **OK** button. (For any future debug sessions, the stored probe selection is automatically used, unless the probe cannot be found.)

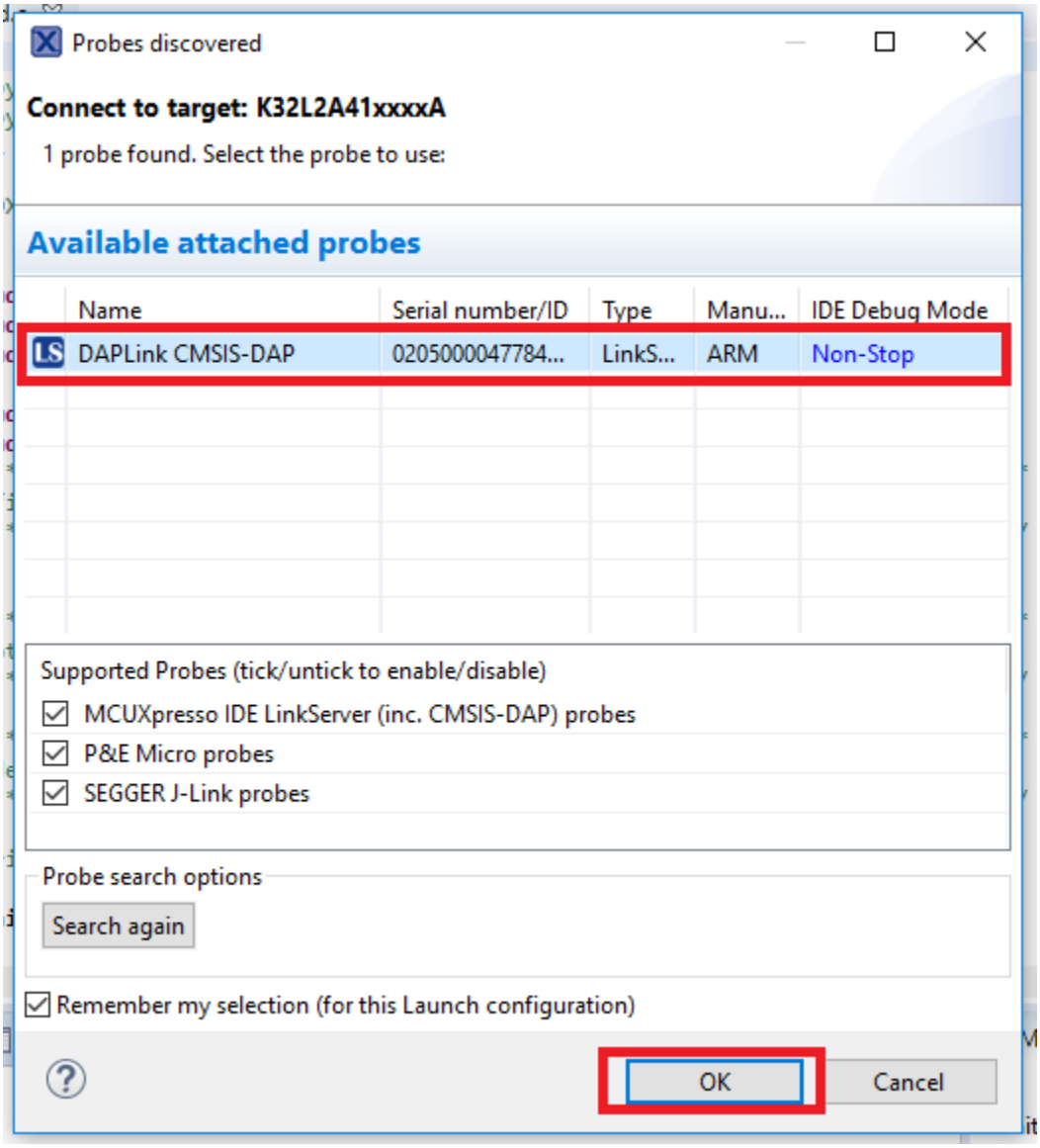

Figure 9. Attached Probes: debug emulator selection

6. The application is downloaded to the target and automatically runs to `main()`:

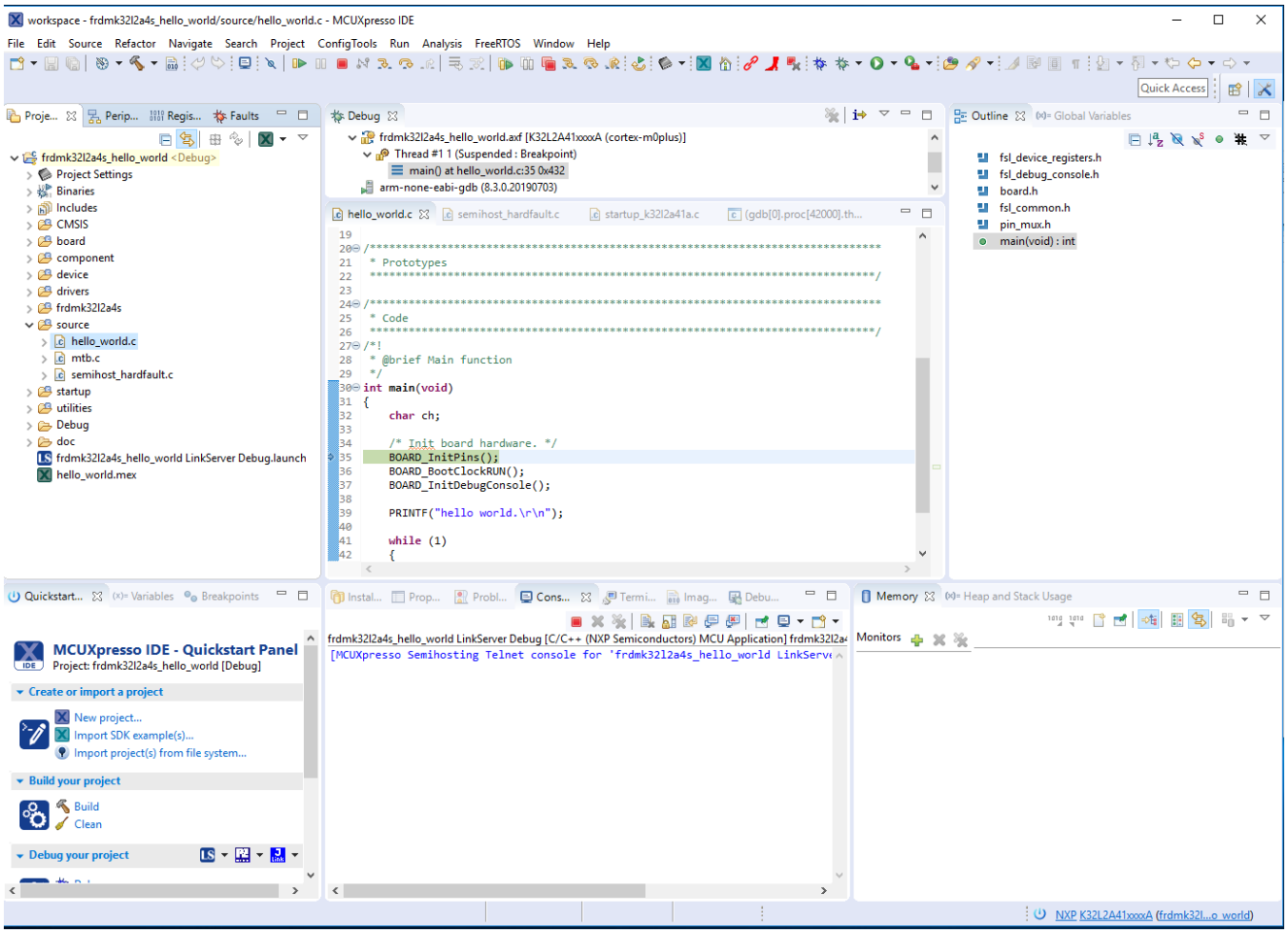

Figure 10. Stop at `main()` when running debugging

7. Start the application by clicking the **Resume** button.

Figure 11. Resume button

The `hello_world` application is now running and a banner is displayed on the terminal. If this is not the case, check your terminal settings and connections.

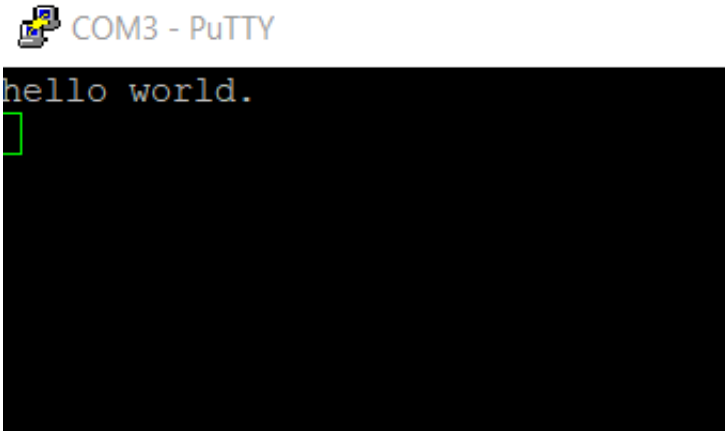

Figure 12. Text display of the `hello_world` demo

3 Run a demo application using IAR

This section describes the steps required to build, run, and debug example applications provided in the MCUXpresso SDK.

NOTE

IAR Embedded Workbench for Arm version 8.40.2 is used as an example to show below steps, and the IAR toolchain should correspond to the latest supported version, as described in the *MCUXpresso SDK Release Notes for FRDM-K32L2A4S* (document MCUXSDKK32L2A4SRN).

3.1 Build an example application

Perform the following steps to build the `hello_world` example application.

1. Open the desired demo application workspace. Most example application workspace files can be located using the following path:

   `<install_dir>/boards/<board_name>/<example_type>/<application_name>/iar`

   Using the FRDM-K32L2A4S hardware platform as an example, the `hello_world` workspace is located in:

   `<install_dir>/boards/frdmk32l2a4s/demo_apps/hello_world/iar/hello_world.eww`
2. Select the desired build target from the drop-down menu. For this example, select the **hello_world – debug** target.

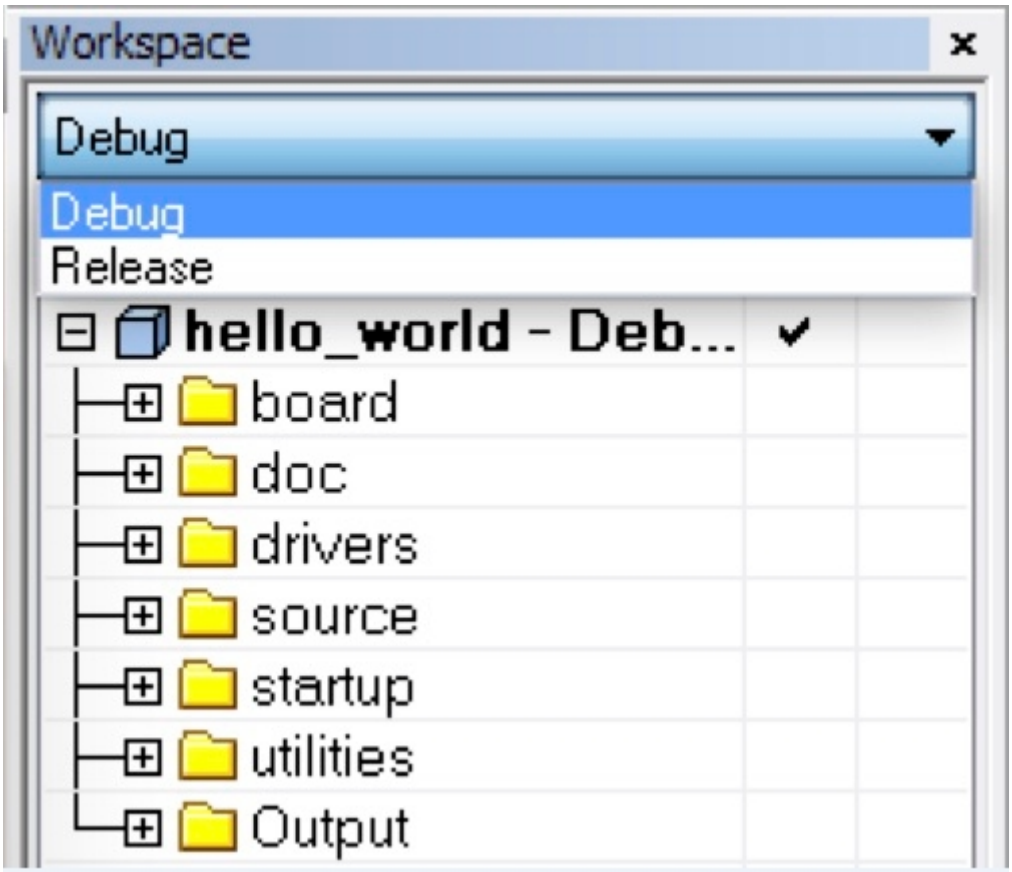

Figure 13. Demo build target selection

3. To build the demo application, click the **Make** button highlighted in red below.

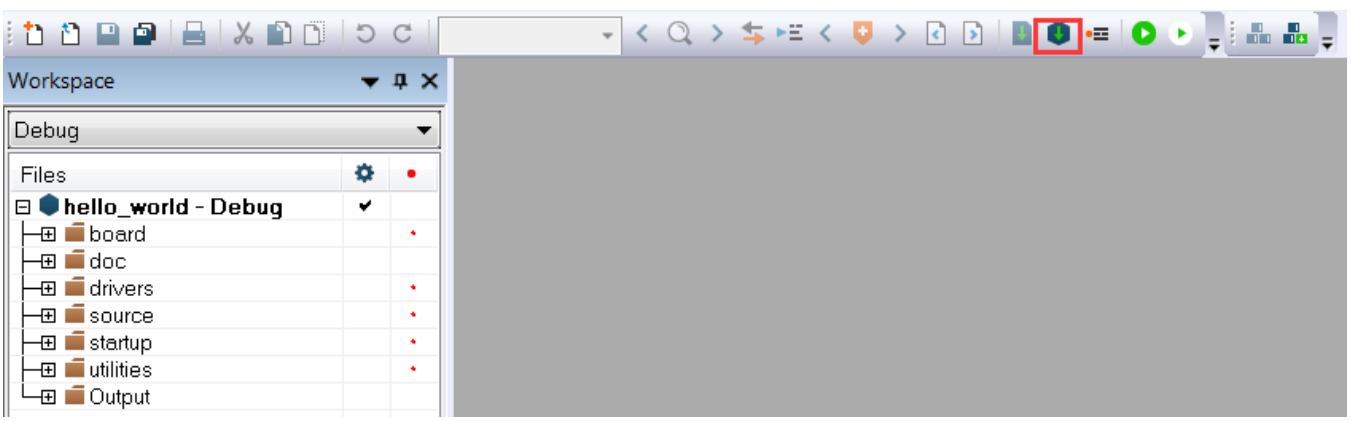

Figure 14. Building the demo application

4. The build completes without errors.

3.2 Run an example application

To download and run the application, perform these steps:

1. See the table in Default debug interfaces to determine the debug interface that comes loaded on your specific hardware platform.

- For boards with CMSIS-DAP/mbed/DAPLink interfaces, visit developer.mbed.org/handbook/Windows-serial-configuration and follow the instructions to install the Windows® operating system serial driver. If running on Linux® OS, this step is not required.
- The user should install LPCScrypt or MCUXpresso IDE to ensure LPC board drivers are installed.
- For boards with P&E Micro interfaces, visit www.pemicro.com/support/downloads_find.cfm and download the P&E Micro Hardware Interface Drivers package.

2. Connect the development platform to your PC via USB cable.
3. Open the terminal application on the PC, such as PuTTY or TeraTerm, and connect to the debug COM port (to determine the COM port number, see How to determine COM port). Configure the terminal with these settings:
   a. 115200 or 9600 baud rate, depending on your board (reference `BOARD_DEBUG_UART_BAUDRATE` variable in the `board.h` file)
   b. No parity
   c. 8 data bits
   d. 1 stop bit

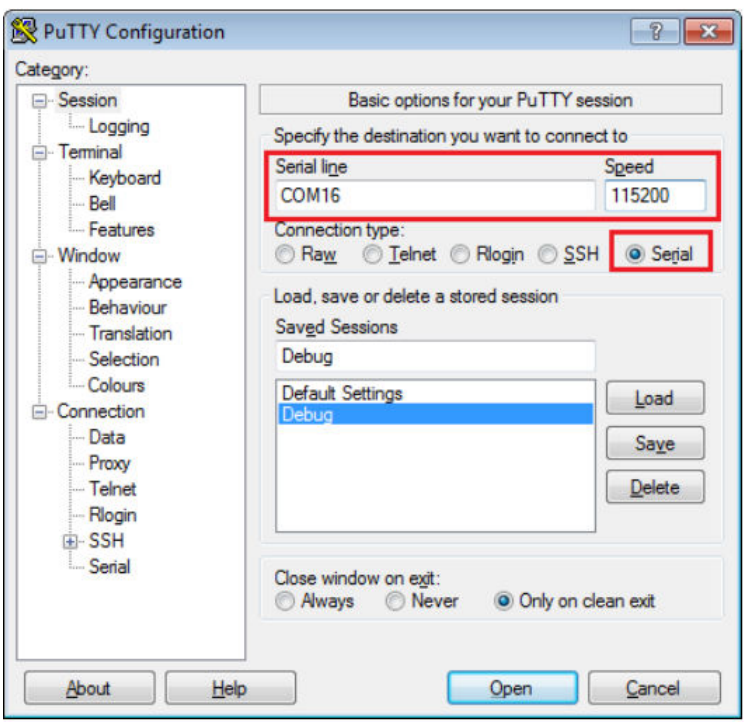

Figure 15. Terminal (PuTTY) configuration

4. In IAR, click the **Download and Debug** button to download the application to the target.

Figure 16. Download and Debug button

5. The application is then downloaded to the target and automatically runs to the `main()` function.

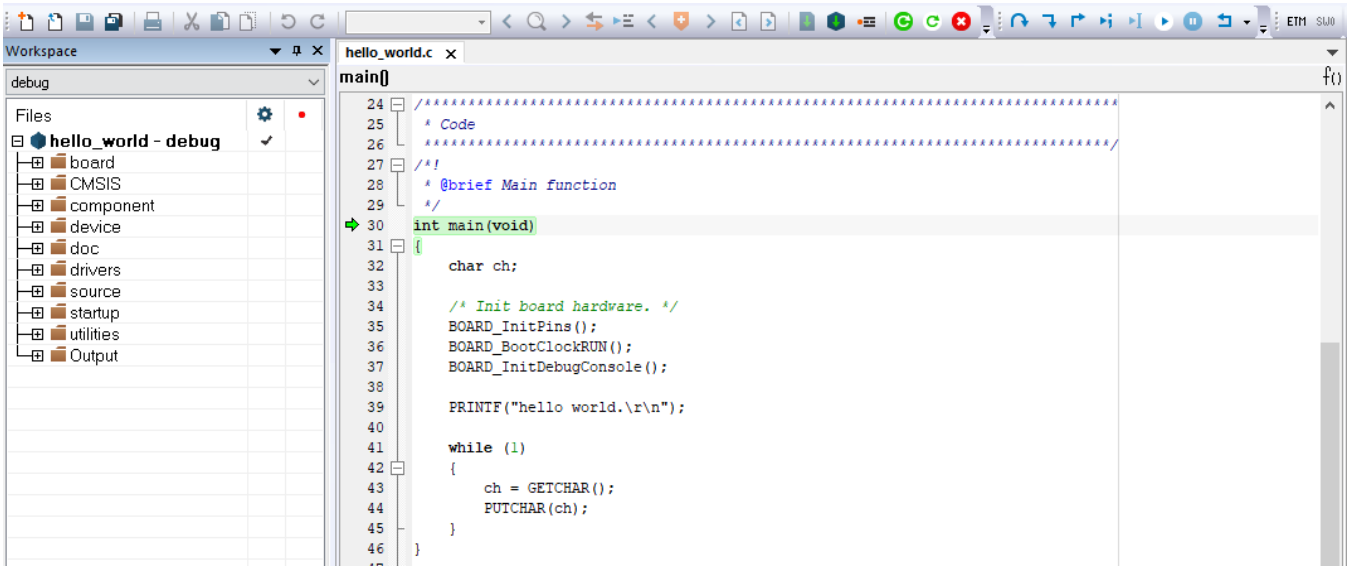

Figure 17. Stop at `main()` when running debugging

6. Run the code by clicking the **Go** button.

Figure 18. Go button

7. The `hello_world` application is now running and a banner is displayed on the terminal. If it does not appear, check your terminal settings and connections.

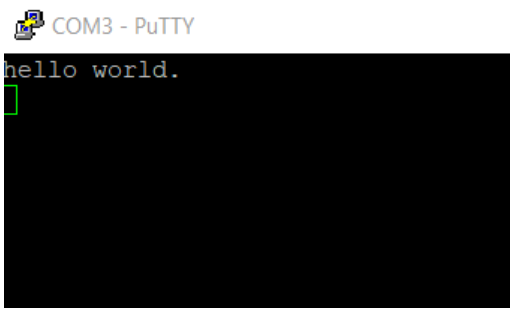

Figure 19. Text display of the `hello_world` demo

4 Run a demo using Keil® MDK/µVision

This section describes the steps required to build, run, and debug example applications provided in the MCUXpresso SDK. The `hello_world` demo application targeted for the FRDM-K32L2A4S hardware platform is used as an example, although these steps can be applied to any demo or example application in the MCUXpresso SDK.

4.1 Install CMSIS device pack

After the MDK tools are installed, Cortex® Microcontroller Software Interface Standard (CMSIS) device packs must be installed to fully support the device from a debug perspective. These packs include things such as memory map information, register definitions, and flash programming algorithms. Follow these steps to install the appropriate CMSIS pack.

1. Open the MDK IDE, which is called µVision. In the IDE, select the **Pack Installer** icon.

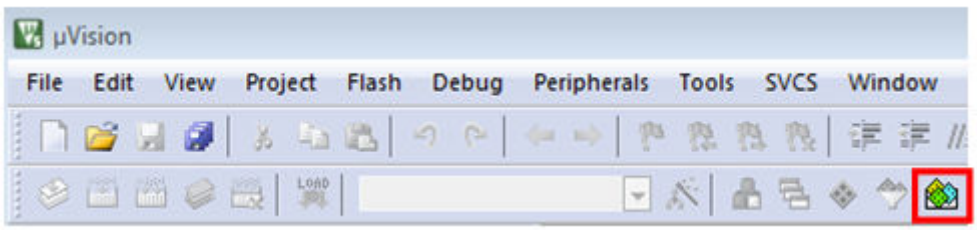

Figure 20. Launch the Pack Installer

2. After the installation finishes, close the Pack Installer window and return to the µVision IDE.

4.2 Build an example application

- Open the desired example application workspace in:

  `<install_dir>/boards/<board_name>/<example_type>/<application_name>/mdk`

  The workspace file is named <demo_name>.uvmpw, so for this specific example, the actual path is:

  `<install_dir>/boards/frdmk32l2a4s/demo_apps/hello_world/mdk/hello_world.uvmpw`
- To build the demo project, select the **Rebuild** button, highlighted in red.

Figure 21. Building the demo

- The build completes without errors.

4.3 Run an example application

To download and run the application, perform these steps:

1. See the table in Default debug interfaces to determine the debug interface that comes loaded on your specific hardware platform.
   - For boards with the CMSIS-DAP/mbed/DAPLink interface, visit mbed Windows serial configuration and follow the instructions to install the Windows operating system serial driver. If running on Linux OS, this step is not required.
   - The user should install LPCScrypt or MCUXpresso IDE to ensure LPC board drivers are installed.
   - For boards with a P&E Micro interface, visit www.pemicro.com/support/downloads_find.cfm and download and install the P&E Micro Hardware Interface Drivers package.
   - If using J-Link either a standalone debug pod or OpenSDA, install the J-Link software (drivers and utilities) from www.segger.com/jlink-software.html.
   - For boards with the OSJTAG interface, install the driver from www.keil.com/download/docs/408.
2. Connect the development platform to your PC via USB cable using OpenSDA USB connector.

3. Open the terminal application on the PC, such as PuTTY or TeraTerm and connect to the debug serial port number (to determine the COM port number, see How to determine COM port). Configure the terminal with these settings:
   a. 115200 or 9600 baud rate, depending on your board (reference `BOARD_DEBUG_UART_BAUDRATE` variable in the `board.h` file)
   b. No parity
   c. 8 data bits
   d. 1 stop bit

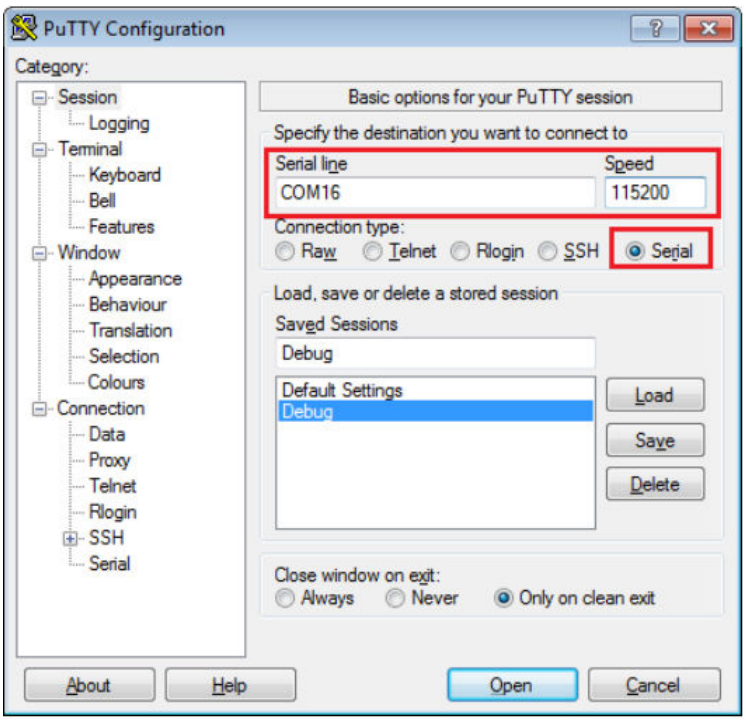

Figure 22. Terminal (PuTTY) configurations

4. In µVision, after the application is built, click the **Download** button to download the application to the target.

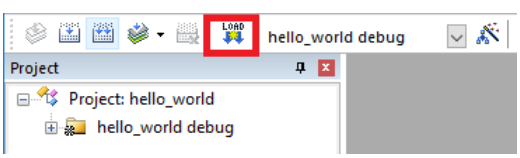

Figure 23. Download button

5. After clicking the **Download** button, the application downloads to the target and is running. To debug the application, click the **Start/Stop Debug Session** button highlighted in red.

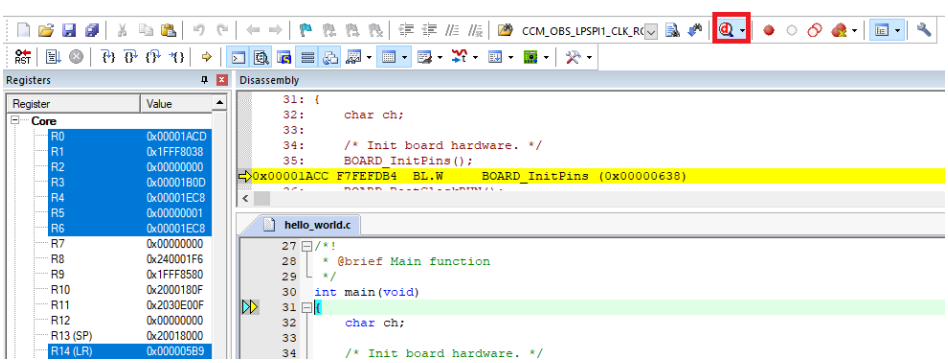

Figure 24. Stop at `main()` when run debugging

6. Run the code by clicking the **Run** button to start the application.

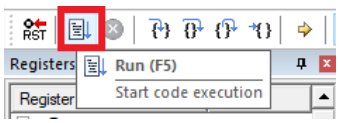

Figure 25. Go button

The `hello_world` application is now running and a banner is displayed on the terminal. If this does not appear, check your terminal settings and connections.

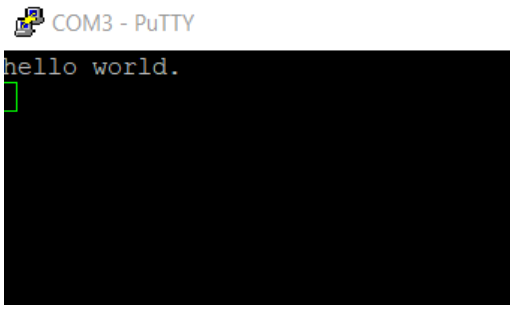

Figure 26. Text display of the `hello_world` demo

5 Run a demo using Arm® GCC

This section describes the steps to configure the command line Arm® GCC tools to build, run, and debug demo applications and necessary driver libraries provided in the MCUXpresso SDK. The `hello_world` demo application is targeted for the FRDM-K32L2A4S hardware platform which is used as an example.

NOTE

GCC ARM Embedded 8.2.1 is used as an example in this document. The latest GCC version for this package is as described in *MCUXpresso SDK Release Notes Supporting FRDM-K32L2A4S* (document MCUXSDKK32L2A4SRN).

5.1 Set up toolchain

This section contains the steps to install the necessary components required to build and run an MCUXpresso SDK demo application with the Arm GCC toolchain, as supported by the MCUXpresso SDK. There are many ways to use Arm GCC tools, but this example focuses on a Windows operating system environment.

5.1.1 Install GCC Arm Embedded tool chain

Download and run the installer from developer.arm.com/open-source/gnu-toolchain/gnu-rm. This is the actual toolset (in other words, compiler, linker, and so on). The GCC toolchain should correspond to the latest supported version, as described in *MCUXpresso SDK Release Notes for FRDM-K32L2A4S* (document MCUXSDKK32L2A4SRN).

5.1.2 Install MinGW (only required on Windows OS)

The Minimalist GNU for Windows (MinGW) development tools provide a set of tools that are not dependent on third-party C-Runtime DLLs (such as Cygwin). The build environment used by the MCUXpresso SDK does not use the MinGW build tools, but does leverage the base install of both MinGW and MSYS. MSYS provides a basic shell with a Unix-like interface and tools.

1. Download the latest MinGW mingw-get-setup installer from sourceforge.net/projects/mingw/files/Installer/.
2. Run the installer. The recommended installation path is `C:\MinGW`, however, you may install to any location.

NOTE

The installation path cannot contain any spaces.

3. Ensure that the **mingw32-base** and **msys-base** are selected under **Basic Setup**.

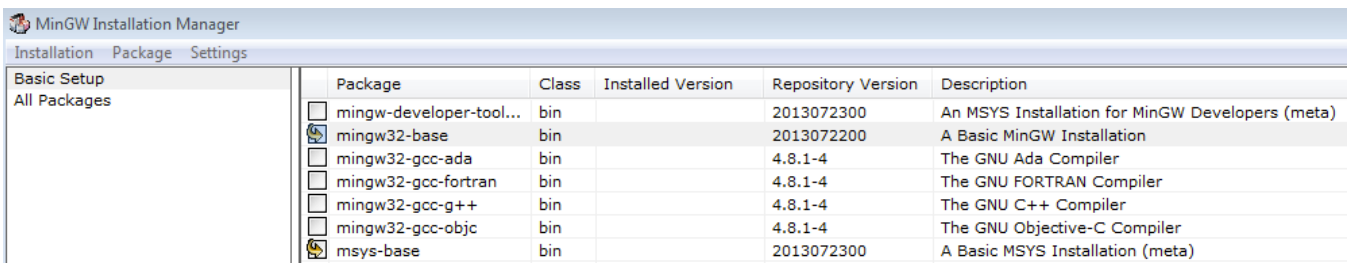

Figure 27. Set up MinGW and MSYS

4. In the **Installation** menu, click **Apply Changes** and follow the remaining instructions to complete the installation.

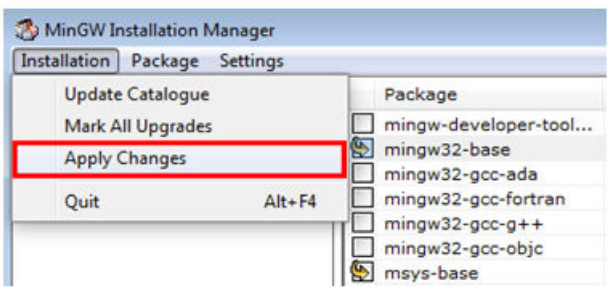

Figure 28. Complete MinGW and MSYS installation

5. Add the appropriate item to the Windows operating system path environment variable. It can be found under **Control Panel->System and Security->System->Advanced System Settings** in the **Environment Variables...** section. The path is:

   `<mingw_install_dir>\bin`

   Assuming the default installation path,`C:\MinGW`, an example is shown below. If the path is not set correctly, the toolchain will not not work.

NOTE

If you have `C:\MinGW\msys\x.x\bin` in your PATH variable (as required by Kinetis SDK 1.0.0), remove it to ensure that the new GCC build system works correctly.

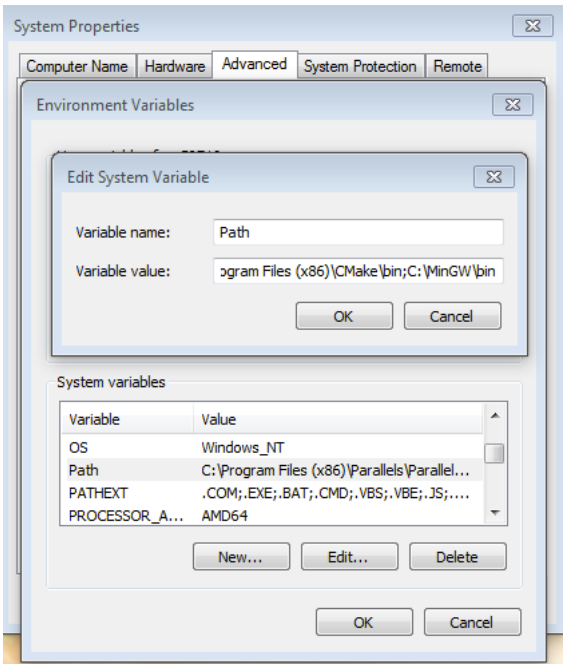

Figure 29. Add Path to systems environment

5.1.3 Add a new system environment variable for `ARMGCC_DIR`

Create a new *system* environment variable and name it as `ARMGCC_DIR`. The value of this variable should point to the Arm GCC Embedded tool chain installation path. For this example, the path is:

```
C:\Program Files (x86)\GNU Tools ARM Embedded\8 2018-q4-major
```

See the installation folder of the GNU Arm GCC Embedded tools for the exact path name of your installation.

Short path should be used for path setting, you could convert the path to short path by running command *"for %I in (.) do echo %~sI"* in above path.

```
C:\Program Files (x86)\GNU Tools Arm Embedded\8 2018-q4-major>for %I in (.) do echo %~sI

C:\Program Files (x86)\GNU Tools Arm Embedded\8 2018-q4-major>echo C:\PROGRA~2\GNUTOO~1\82018-~1
C:\PROGRA~2\GNUTOO~1\82018-~1
```

Figure 30. Convert path to short path

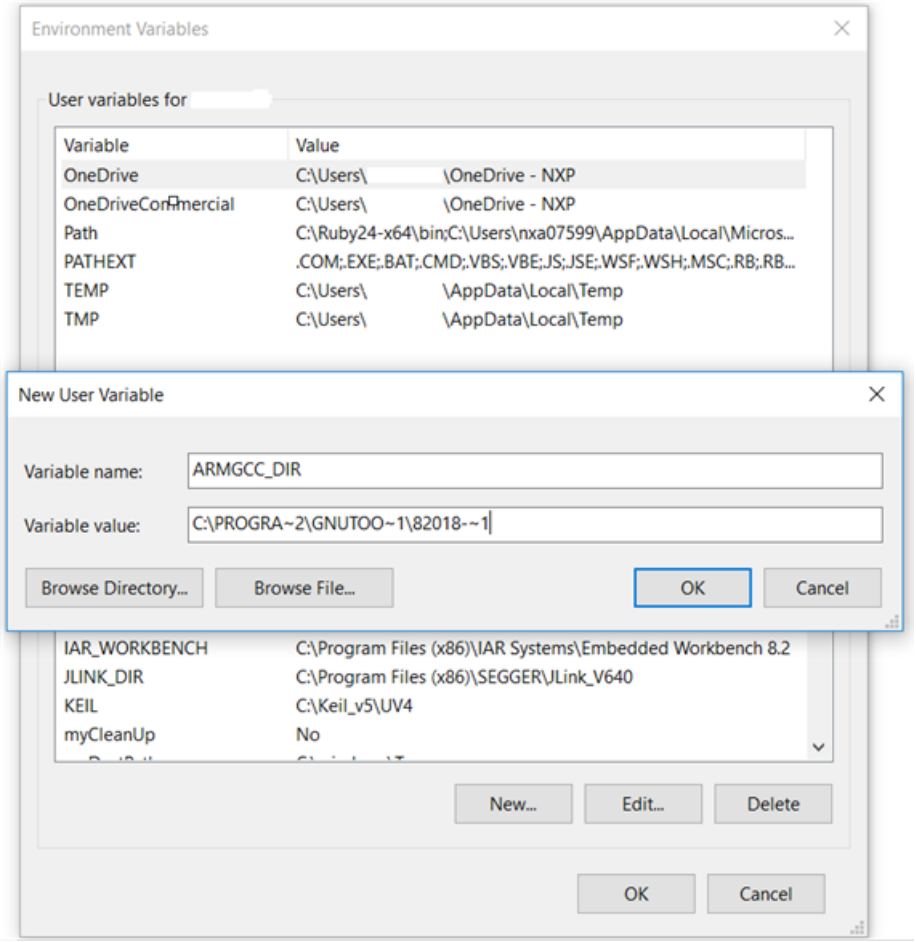

Figure 31. Add ARMGCC_DIR system variable

5.1.4 Install CMake

1. Download CMake 3.0.x from www.cmake.org/cmake/resources/software.html.
2. Install CMake, ensuring that the option **Add CMake to system PATH** is selected when installing. The user chooses to select whether it is installed into the PATH for all users or just the current user. In this example, it is installed for all users.

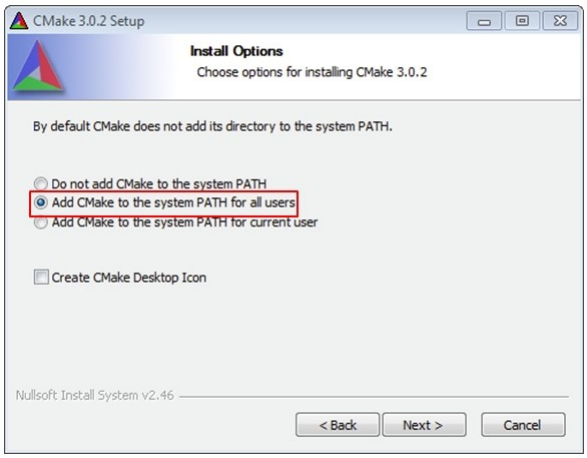

Figure 32. Install CMake

3. Follow the remaining instructions of the installer.
4. You may need to reboot your system for the PATH changes to take effect.
5. Make sure `sh.exe` is not in the Environment Variable PATH. This is a limitation of `mingw32-make`.

5.2 Build an example application

To build an example application, follow these steps.

1. Open a GCC Arm Embedded tool chain command window. To launch the window, from the Windows operating system Start menu, go to **Programs -> GNU Tools ARM Embedded <version>** and select **GCC Command Prompt**.

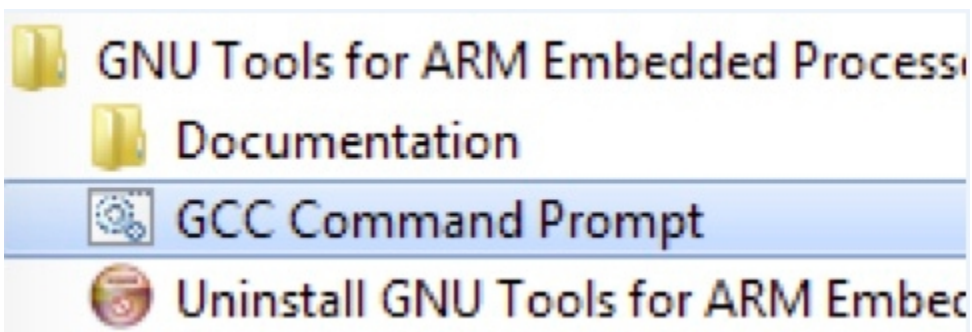

Figure 33. Launch command prompt

2. Change the directory to the example application project directory, which has a path similar to the following:

   ```
   <install_dir>/boards/<board_name>/<example_type>/<application_name>/armgcc
   ```

   For this example, the exact path is:

   ```
   <install_dir>/examples/frdmk32l2a4s/demo_apps/hello_world/armgcc
   ```

   NOTE

   To change directories, use the `cd` command.

3. Type **build_debug.bat** on the command line or double click on the `build_debug.bat` file in Windows Explorer to perform the build. The output is shown in this figure:

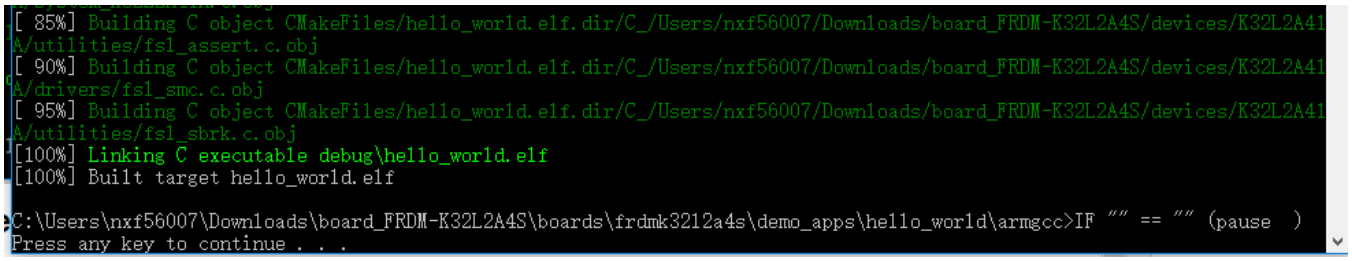

Figure 34. `hello_world` demo build successful

5.3 Run an example application

This section describes steps to run a demo application using J-Link GDB Server application. To perform this exercise, two things must be done:

- Make sure that either:
  - The OpenSDA interface on your board is programmed with the J-Link OpenSDA firmware. To determine if your board supports OpenSDA, see Default debug interfaces. For instructions on reprogramming the OpenSDA interface, see Updating debugger firmware. If your board does not support OpenSDA, a standalone J-Link pod is required.
  - You have a standalone J-Link pod that is connected to the debug interface of your board. Note that some hardware platforms require hardware modification in order to function correctly with an external debug interface.

After the J-Link interface is configured and connected, follow these steps to download and run the demo applications:

1. Connect the development platform to your PC via USB cable between the OpenSDA USB connector (may be named OSJTAG for some boards) and the PC USB connector. If using a standalone J-Link debug pod, also connect it to the SWD/JTAG connector of the board.
2. Open the terminal application on the PC, such as PuTTY or TeraTerm, and connect to the debug serial port number (to determine the COM port number, see How to determine COM port. Configure the terminal with these settings:
   a. 115200 or 9600 baud rate, depending on your board (reference `BOARD_DEBUG_UART_BAUDRATE` variable in the `board.h` file)
   b. No parity
   c. 8 data bits
   d. 1 stop bit

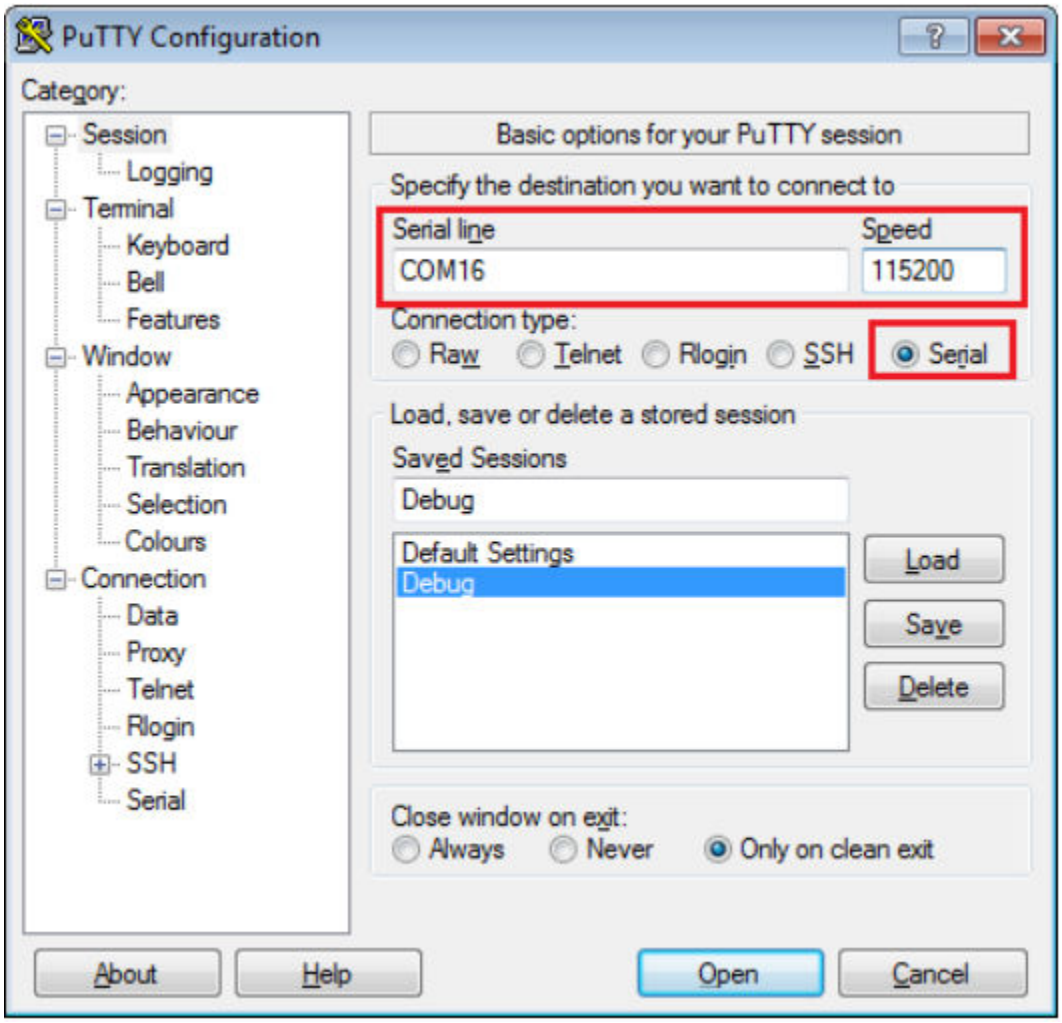

Figure 35. Terminal (PuTTY) configurations

3. Open the J-Link GDB Server application. Assuming the J-Link software is installed, the application can be launched by going to the Windows operating system Start menu and selecting **Programs** -> **SEGGER** -> **J-Link <version>** J-Link GDB Server.
4. Modify the settings as shown below. The target device selection chosen for this example is K32L2A41xxxxA.
5. After it is connected, the screen should resemble Figure 36 :

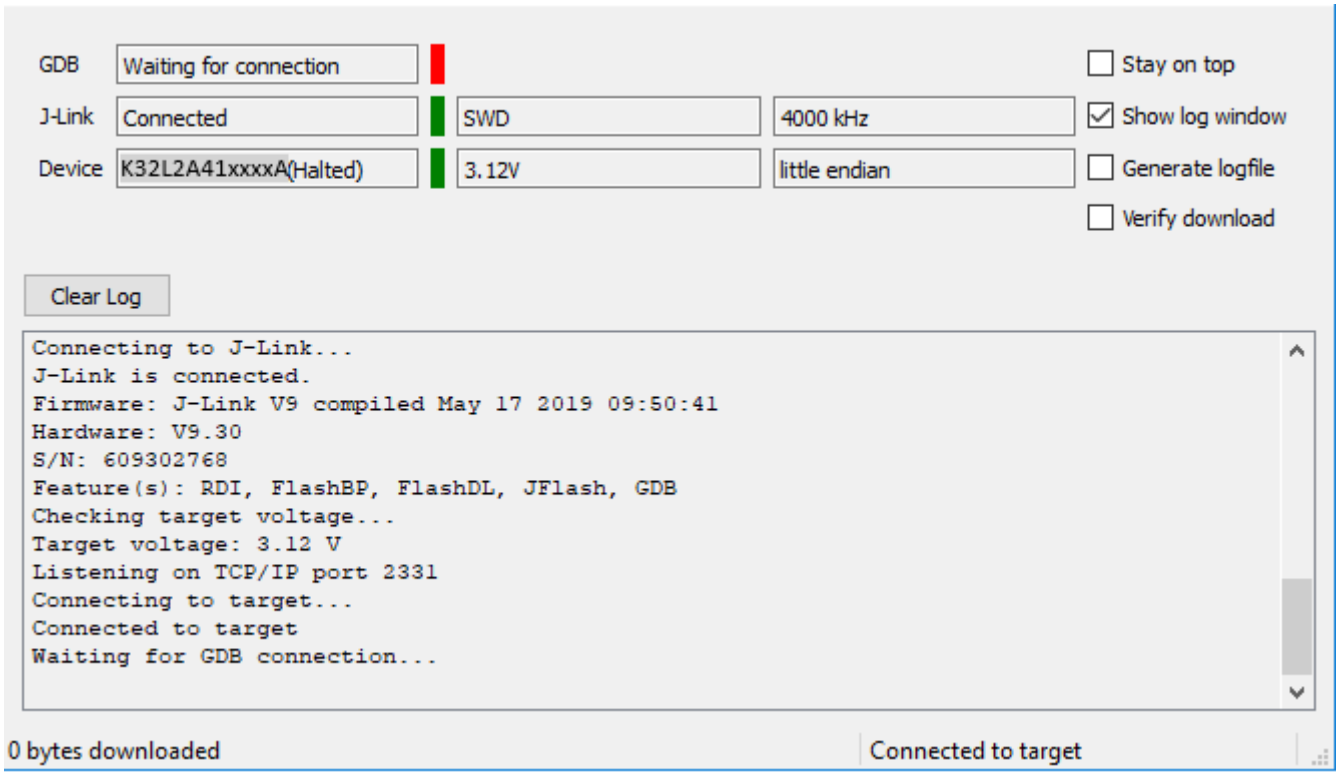

Figure 36. SEGGER J-Link GDB Server screen after successful connection

6. If not already running, open a GCC Arm Embedded tool chain command window. To launch the window, from the Windows operating system Start menu, go to **Programs -> GNU Tools Arm Embedded <version>** and select **GCC Command Prompt**.

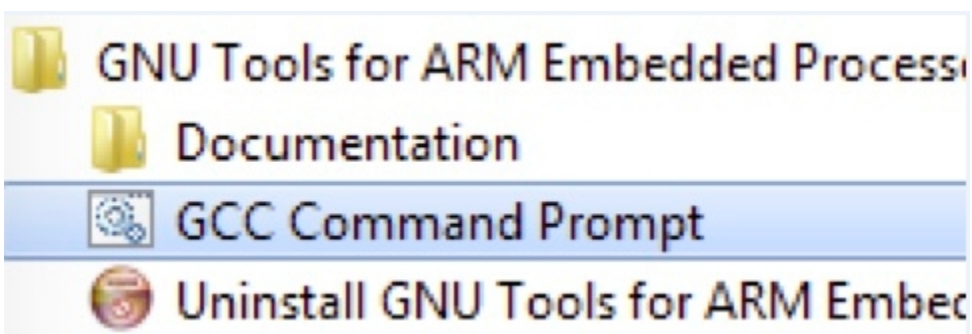

Figure 37. Launch command prompt

7. Change to the directory that contains the example application output. The output can be found in using one of these paths, depending on the build target selected:

   `<install_dir>/boards/<board_name>/<example_type>/<application_name>/armgcc/debug`

   `<install_dir>/boards/<board_name>/<example_type>/<application_name>/armgcc/release`

   For this example, the path is:

   `<install_dir>/boards/frdmk32l2a4s/demo_apps/hello_world/armgcc/debug`
8. Run the `arm-none-eabi-gdb.exe <application_name>.elf` command. For this example, it is `arm-none-eabi-gdb.exe hello_world.elf`.

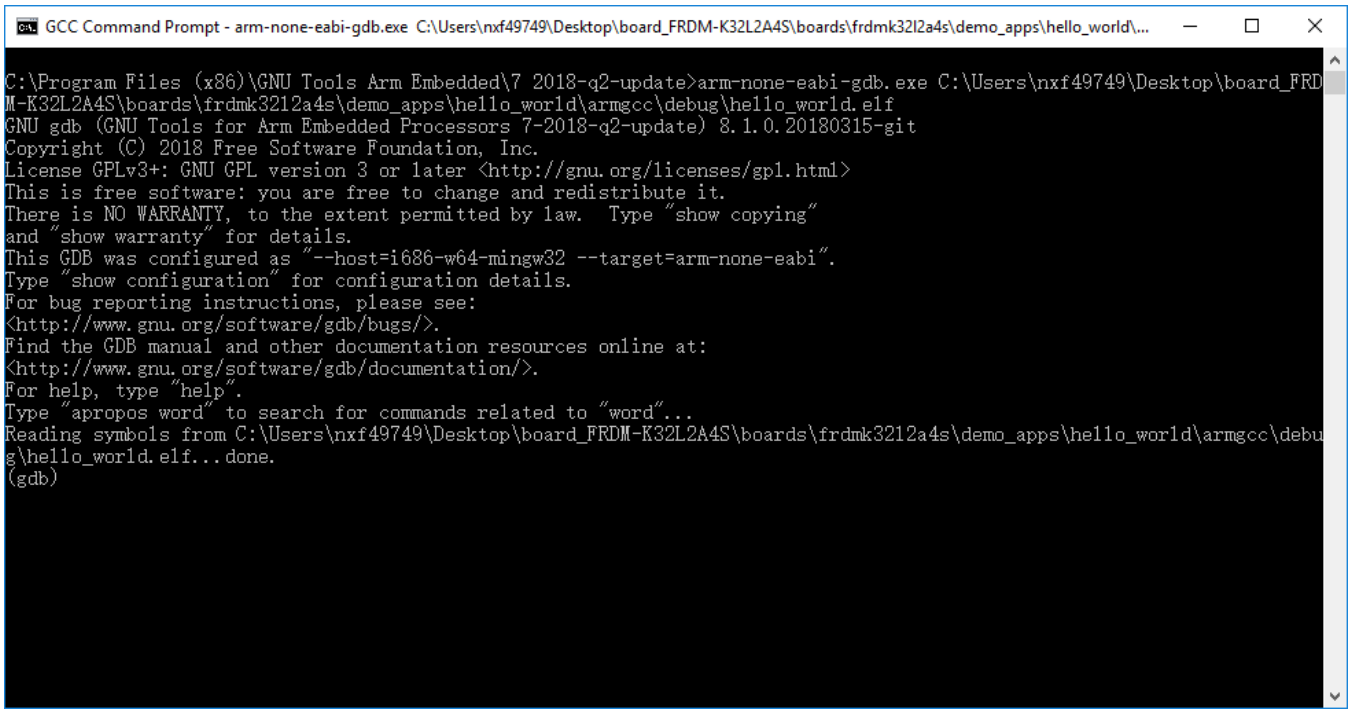

Figure 38. Running `arm-none-eabi-gdb`

9. Run these commands:
   a. `target remote localhost:2331`
   b. `monitor reset`
   c. `monitor halt`
   d. `load`
   e. `monitor reset`
10. The application is now downloaded and halted at the reset vector. Execute the `monitor go` command to start the demo application.

    The `hello_world` application is now running and a banner is displayed on the terminal. If this is not true, check your terminal settings and connections.

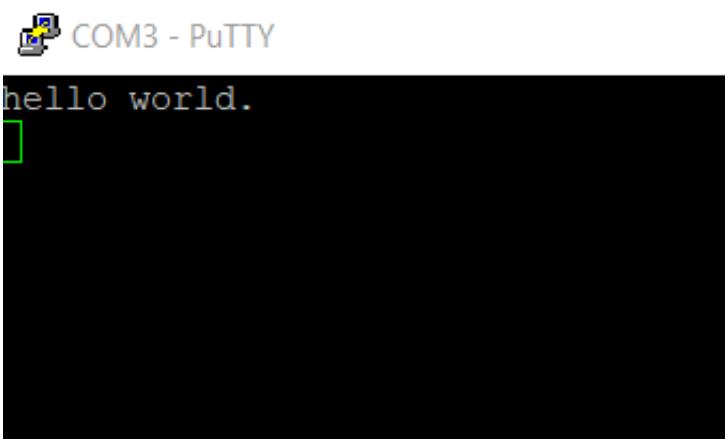

Figure 39. Text display of the hello_world demo

6 MCUXpresso Config Tools

MCUXpresso Config Tools can help configure the processor and generate initialization code for the on chip peripherals. The tools are able to modify any existing example project, or create a new configuration for the selected board or processor. The generated code is designed to be used with MCUXpresso SDK version 2.x.

Table 1 describes the tools included in the MCUXpresso Config Tools.

Table 1. MCUXpresso Config Tools

Config Tool	Description	Image
Pins tool	For configuration of pin routing and pin electrical properties.	
Clock tool	For system clock configuration	
Peripherals tools	For configuration of other peripherals	
TEE tool	Configures access policies for memory area and peripherals helping to protect and isolate sensitive parts of the application.	
Device Configuration tool	Configures Device Configuration Data (DCD) contained in the program image that the Boot ROM code interprets to setup various on-chip peripherals prior the program launch.	

MCUXpresso Config Tools can be accessed in the following products:

- **Integrated** in the MCUXpresso IDE. Config tools are integrated with both compiler and debugger which makes it the easiest way to begin the development.
- **Standalone version** available for download from www.nxp.com. Recommended for customers using IAR Embedded Workbench, Keil MDK µVision, or Arm GCC.
- **Online version** available on mcuxpresso.nxp.com. Recommended to do a quick evaluation of the processor or use the tool without installation.

Each version of the product contains a specific *Quick Start Guide* document MCUXpresso IDE Config Tools installation folder that can help start your work.

7 MCUXpresso IDE New Project Wizard

MCUXpresso IDE features a new project wizard. The wizard provides functionality for the user to create new projects from the installed SDKs (and from pre-installed part support). It offers user the flexibility to select and change multiple builds. The wizard also includes a library and provides source code options. The source code is organized as software components, categorized as drivers, utilities, and middleware.

To use the wizard, start the MCUXpresso IDE. This is located in the **QuickStart Panel** at the bottom left of the MCUXpresso IDE window. Select **New project**, as shown in Figure 40.

Figure 40. MCUXpresso IDE Quickstart Panel

For more details and usage of new project wizard, see the *MCUXpresso_IDE_User_Guide.pdf* in the MCUXpresso IDE installation folder.

Appendix A How to determine COM port

This section describes the steps necessary to determine the debug COM port number of your NXP hardware development platform. All NXP boards ship with a factory programmed, on-board debug interface, whether it's based on OpenSDA or the legacy P&E Micro OSJTAG interface. To determine what your specific board ships with, see Default debug interfaces.

1. **Linux**: The serial port can be determined by running the following command after the USB Serial is connected to the host:

   ```
   $ dmesg | grep "ttyUSB"
                       [503175.307873] usb 3-12: cp210x converter now attached to ttyUSB0
                       [503175.309372] usb 3-12: cp210x converter now attached to ttyUSB1
   ```

   There are two ports, one is Cortex-A core debug console and the other is for Cortex M4.

2. **Windows**: To determine the COM port open Device Manager in the Windows operating system. Click on the **Start** menu and type **Device Manager** in the search bar.

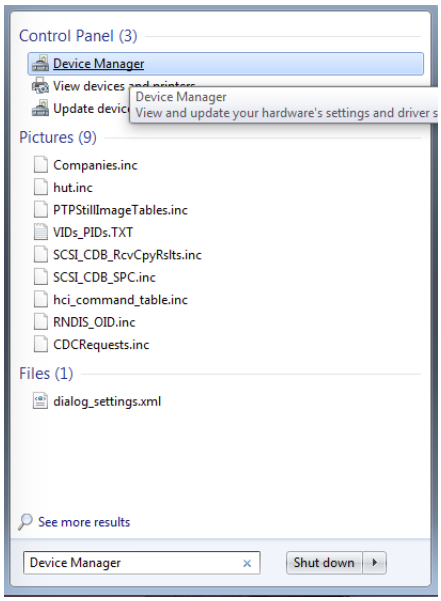

Figure A-1. Device Manager

3. In the Device Manager, expand the **Ports (COM & LPT)** section to view the available ports. The COM port names will be different for all the NXP boards.

   a. **OpenSDA – CMSIS-DAP/mbed/DAPLink** interface:

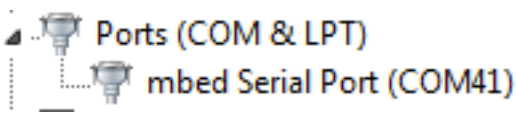

Figure A-2. OpenSDA – CMSIS-DAP/mbed/DAPLink interface

   b. **OpenSDA – P&E Micro**:

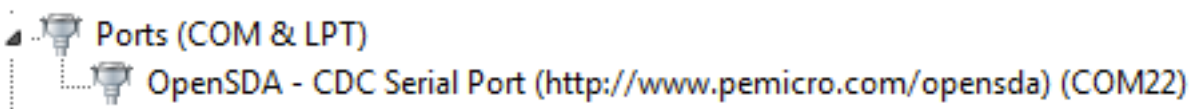

Figure A-3. OpenSDA – P&E Micro

   c. **OpenSDA – J-Link**:

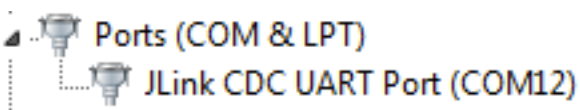

Figure A-4. OpenSDA – J-Link

   d. **P&E Micro OSJTAG**:

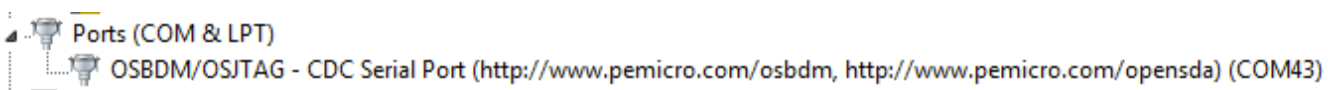

Figure A-5. P&E Micro OSJTAG

   e. **MRB-KW01**:

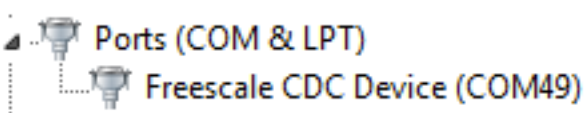

Figure A-6. MRB-KW01

Appendix B Default debug interfaces

The MCUXpresso SDK supports various hardware platforms that come loaded with a variety of factory programmed debug interface configurations. Table B-1 lists the hardware platforms supported by the MCUXpresso SDK, their default debug interface, and any version information that helps differentiate a specific interface configuration.

NOTE

The OpenSDA details column in Table B-1 is not applicable to LPC.

Table B-1. Hardware platforms supported by MCUXpresso SDK

Hardware platform	Default interface	OpenSDA details
EVK-MC56F83000	P&E Micro OSJTAG	N/A
EVK-MIMXRT595	CMSIS-DAP	N/A
EVK-MIMXRT685	CMSIS-DAP	N/A
FRDM-K22F	CMSIS-DAP/mbed/DAPLink	OpenSDA v2.1
FRDM-K28F	DAPLink	OpenSDA v2.1
FRDM-K32L2A4S	CMSIS-DAP	OpenSDA v2.1
FRDM-K32L2B	CMSIS-DAP	OpenSDA v2.1
FRDM-K32W042	CMSIS-DAP	N/A
FRDM-K64F	CMSIS-DAP/mbed/DAPLink	OpenSDA v2.0
FRDM-K66F	J-Link OpenSDA	OpenSDA v2.1
FRDM-K82F	CMSIS-DAP	OpenSDA v2.1
FRDM-KE15Z	DAPLink	OpenSDA v2.1
FRDM-KE16Z	CMSIS-DAP/mbed/DAPLink	OpenSDA v2.2
FRDM-KL02Z	P&E Micro OpenSDA	OpenSDA v1.0
FRDM-KL03Z	P&E Micro OpenSDA	OpenSDA v1.0
FRDM-KL25Z	P&E Micro OpenSDA	OpenSDA v1.0
FRDM-KL26Z	P&E Micro OpenSDA	OpenSDA v1.0
FRDM-KL27Z	P&E Micro OpenSDA	OpenSDA v1.0
FRDM-KL28Z	P&E Micro OpenSDA	OpenSDA v2.1
FRDM-KL43Z	P&E Micro OpenSDA	OpenSDA v1.0
FRDM-KL46Z	P&E Micro OpenSDA	OpenSDA v1.0
FRDM-KL81Z	CMSIS-DAP	OpenSDA v2.0
FRDM-KL82Z	CMSIS-DAP	OpenSDA v2.0
FRDM-KV10Z	CMSIS-DAP	OpenSDA v2.1
FRDM-KV11Z	P&E Micro OpenSDA	OpenSDA v1.0
FRDM-KV31F	P&E Micro OpenSDA	OpenSDA v1.0
FRDM-KW24	CMSIS-DAP/mbed/DAPLink	OpenSDA v2.1
FRDM-KW36	DAPLink	OpenSDA v2.2
FRDM-KW41Z	CMSIS-DAP/DAPLink	OpenSDA v2.1 or greater
Hexiwear	CMSIS-DAP/mbed/DAPLink	OpenSDA v2.0
HVP-KE18F	DAPLink	OpenSDA v2.2
HVP-KV46F150M	P&E Micro OpenSDA	OpenSDA v1

Table continues on the next page...

Table B-1. Hardware platforms supported by MCUXpresso SDK (continued)

Hardware platform	Default interface	OpenSDA details
HVP-KV11Z75M	CMSIS-DAP	OpenSDA v2.1
HVP-KV58F	CMSIS-DAP	OpenSDA v2.1
HVP-KV31F120M	P&E Micro OpenSDA	OpenSDA v1
JN5189DK6	CMSIS-DAP	N/A
LPC54018 IoT Module	N/A	N/A
LPCXpresso54018	CMSIS-DAP	N/A
LPCXpresso54102	CMSIS-DAP	N/A
LPCXpresso54114	CMSIS-DAP	N/A
LPCXpresso51U68	CMSIS-DAP	N/A
LPCXpresso54608	CMSIS-DAP	N/A
LPCXpresso54618	CMSIS-DAP	N/A
LPCXpresso54628	CMSIS-DAP	N/A
LPCXpresso54S018M	CMSIS-DAP	N/A
LPCXpresso55s16	CMSIS-DAP	N/A
LPCXpresso55s28	CMSIS-DAP	N/A
LPCXpresso55s69	CMSIS-DAP	N/A
MAPS-KS22	J-Link OpenSDA	OpenSDA v2.0
MIMXRT1170-EVK	CMSIS-DAP	N/A
TWR-K21D50M	P&E Micro OSJTAG	N/AOpenSDA v2.0
TWR-K21F120M	P&E Micro OSJTAG	N/A
TWR-K22F120M	P&E Micro OpenSDA	OpenSDA v1.0
TWR-K24F120M	CMSIS-DAP/mbed	OpenSDA v2.1
TWR-K60D100M	P&E Micro OSJTAG	N/A
TWR-K64D120M	P&E Micro OpenSDA	OpenSDA v1.0
TWR-K64F120M	P&E Micro OpenSDA	OpenSDA v1.0
TWR-K65D180M	P&E Micro OpenSDA	OpenSDA v1.0
TWR-K65D180M	P&E Micro OpenSDA	OpenSDA v1.0
TWR-KV10Z32	P&E Micro OpenSDA	OpenSDA v1.0
TWR-K80F150M	CMSIS-DAP	OpenSDA v2.1
TWR-K81F150M	CMSIS-DAP	OpenSDA v2.1
TWR-KE18F	DAPLink	OpenSDA v2.1
TWR-KL28Z72M	P&E Micro OpenSDA	OpenSDA v2.1
TWR-KL43Z48M	P&E Micro OpenSDA	OpenSDA v1.0
TWR-KL81Z72M	CMSIS-DAP	OpenSDA v2.0
TWR-KL82Z72M	CMSIS-DAP	OpenSDA v2.0
TWR-KM34Z75M	P&E Micro OpenSDA	OpenSDA v1.0
TWR-KM35Z75M	DAPLink	OpenSDA v2.2
TWR-KV10Z32	P&E Micro OpenSDA	OpenSDA v1.0
TWR-KV11Z75M	P&E Micro OpenSDA	OpenSDA v1.0

Table continues on the next page...

Table B-1. Hardware platforms supported by MCUXpresso SDK (continued)

Hardware platform	Default interface	OpenSDA details
TWR-KV31F120M	P&E Micro OpenSDA	OpenSDA v1.0
TWR-KV46F150M	P&E Micro OpenSDA	OpenSDA v1.0
TWR-KV58F220M	CMSIS-DAP	OpenSDA v2.1
TWR-KW24D512	P&E Micro OpenSDA	OpenSDA v1.0
USB-KW24D512	N/A External probe	N/A
USB-KW41Z	CMSIS-DAP\DAPLink	OpenSDA v2.1 or greater

Appendix C Updating debugger firmware

C.1 Updating OpenSDA firmware

Any NXP hardware platform that comes with an OpenSDA-compatible debug interface has the ability to update the OpenSDA firmware. This typically means switching from the default application (either CMSIS-DAP/mbed/DAPLink or P&E Micro) to a SEGGER J-Link. This section contains the steps to switch the OpenSDA firmware to a J-Link interface. However, the steps can be applied to restoring the original image also. For reference, OpenSDA firmware files can be found at the links below:

- J-Link: Download appropriate image from www.segger.com/opensda.html. Choose the appropriate J-Link binary based on the table in Appendix B. Any OpenSDA v1.0 interface should use the standard OpenSDA download (in other words, the one with no version). For OpenSDA 2.0 or 2.1, select the corresponding binary.
- CMSIS-DAP/mbed/DAPLink: DAPLink OpenSDA firmware is available at www.nxp.com/opensda.
- P&E Micro: Downloading P&E Micro OpenSDA firmware images requires registration with P&E Micro (www.pemicro.com).

Perform the following steps to update the OpenSDA firmware on your board for Windows and Linux OS users:

1. Unplug the board's USB cable.
2. Press the **Reset** button on the board. While still holding the button, plug the USB cable back into the board.
3. When the board re-enumerates, it shows up as a disk drive called **MAINTENANCE**.

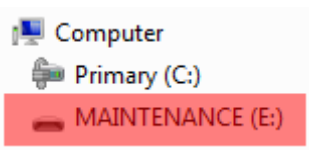

Figure C-1. MAINTENANCE drive

4. Drag and drop the new firmware image onto the MAINTENANCE drive.

NOTE

If for any reason the firmware update fails, the board can always re-enter maintenance mode by holding down **Reset** button and power cycling.

These steps show how to update the OpenSDA firmware on your board for Mac OS users.

1. Unplug the board's USB cable.
2. Press the **Reset** button of the board. While still holding the button, plug the USB cable back into the board.

3. For boards with OpenSDA v2.0 or v2.1, it shows up as a disk drive called **BOOTLOADER** in **Finder**. Boards with OpenSDA v1.0 may or may not show up depending on the bootloader version. If you see the drive in **Finder**, proceed to the next step. If you do not see the drive in Finder, use a PC with Windows OS 7 or an earlier version to either update the OpenSDA firmware, or update the OpenSDA bootloader to version 1.11 or later. The bootloader update instructions and image can be obtained from P&E Microcomputer website.
4. For OpenSDA v2.1 and OpenSDA v1.0 (with bootloader 1.11 or later) users, drag the new firmware image onto the BOOTLOADER drive in **Finder**.
5. For OpenSDA v2.0 users, type these commands in a Terminal window:

```
> sudo mount -u -w -o sync /Volumes/BOOTLOADER
> cp -X  <path to update file> /Volumes/BOOTLOADER
```

NOTE

If for any reason the firmware update fails, the board can always re-enter bootloader mode by holding down the **Reset** button and power cycling.

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