NXP Semiconductors
User's Guide

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Getting Started with MCUXpresso SDK for MEK-MIMX8QX

Contents

1 Overview

The MCUXpresso Software Development Kit (MCUXpresso SDK) provides bare metal source code to be executed in the i.MX 8QuadXPlus M4 core . The MCUXpresso SDK provides comprehensive software support for NXP i.MX 8QuadXPlus microcontrollers' M4 core . The MCUXpresso SDK includes a flexible set of peripheral drivers designed to speed up and simplify development of embedded applications which can be used standalone or collaboratively with the A cores running another Operating System (such as Linux® Kernel). 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 demo applications. The MCUXpresso SDK also contains FreeRTOS, and various other middleware to support rapid development.

For supported toolchain versions, see the *MCUXpresso SDK Release Notes for i.MX 8QuadXPlus* (document MCUXSDKIMX8QXRN).

For the latest version of this and other MCUXpresso SDK documents, see the MCUXpresso SDK homepage MCUXpresso-SDK: Software Development Kit for MCUXpresso.

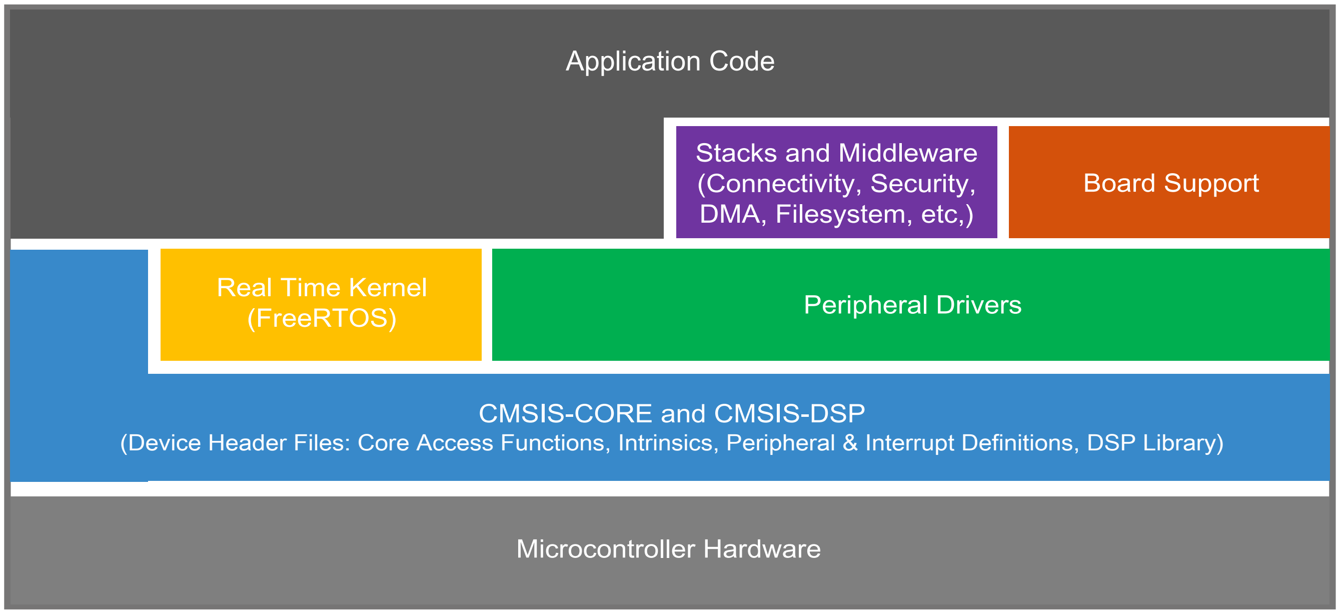

Application Code
Stacks and Middleware (Connectivity, Security, DMA, Filesystem, etc,)
Board Support
Real Time Kernel (FreeRTOS)
Peripheral Drivers
CMSIS-CORE and CMSIS-DSP
(Device Header Files: Core Access Functions, Intrinsics, Peripheral & Interrupt Definitions, DSP Library)
Microcontroller Hardware

Figure 1. MCUXpresso SDK layers

2 MCUXpresso SDK board support folders

MCUXpresso SDK board support provides example applications for NXP development and evaluation boards for Arm® Cortex®-M cores. Board support packages are found inside of the top level boards folder, and each supported board has its own folder (MCUXpresso SDK package can support multiple boards). Within each `<board_name>` folder there are various sub-folders to classify the type of examples they contain. These include (but are not limited to):

- `cmsis_driver_examples`: Simple applications intended to concisely illustrate how to use CMSIS drivers.
- `demo_apps`: Full-featured applications intended to highlight key functionality and use cases of the target MCU. These applications typically use multiple MCU peripherals and may leverage stacks and middleware.
- `driver_examples`: Simple applications intended to concisely illustrate how to use the MCUXpresso SDK's peripheral drivers for a single use case.
- `rtos_examples`: Basic FreeRTOS™ OS examples showcasing the use of various RTOS objects (semaphores, queues, and so on) and interfacing with the MCUXpresso SDK's RTOS drivers
- `multicore_examples`: Simple applications intended to concisely illustrate how to use middleware/multicore stack.
- `lwip_examples`: Demos to demonstrate support for LWIP TCP/IP stack.

2.1 Example application structure

This section describes how the various types of example applications interact with the other components in the MCUXpresso SDK. To get a comprehensive understanding of all MCUXpresso SDK components and folder structure, see *MCUXpresso SDK API Reference Manual*.

Each `<board_name>` folder in the boards directory contains a comprehensive set of examples that are relevant to that specific piece of hardware. Although we use the `hello_world` example (part of the `demo_apps` folder), the same general rules apply to any type of example in the `<board_name>` folder.

In the `hello_world` application folder you see the following contents:

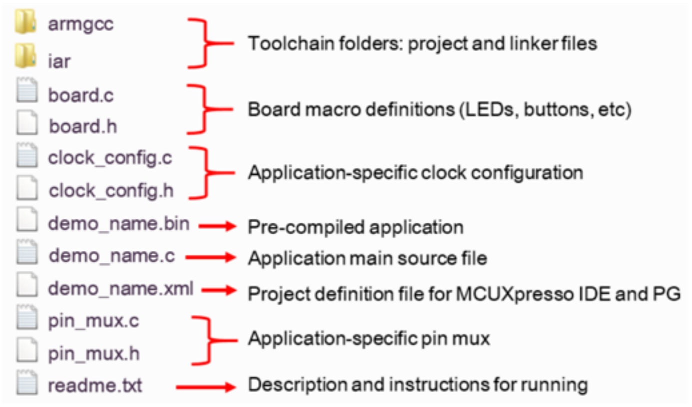

armgcc
iar
Toolchain folders: project and linker files
board.c
board.h
Board macro definitions (LEDs, buttons, etc)
clock_config.c
clock_config.h
Application-specific clock configuration
demo_name.bin
Pre-compiled application
demo_name.c
Application main source file
demo_name.xml
Project definition file for MCUXpresso IDE and PG
pin_mux.c
pin_mux.h
Application-specific pin mux
readme.txt
Description and instructions for running

Figure 2. Application folder structure

All files in the application folder are specific to that example, so it is easy to copy and paste an existing example to start developing a custom application based on a project provided in the MCUXpresso SDK.

2.2 Locating example application source files

When opening an example application in any of the supported IDEs, a variety of source files are referenced. The MCUXpresso SDK devices folder is the central component to all example applications. It means the examples reference the same source files and, if one of these files is modified, it could potentially impact the behavior of other examples.

The main areas of the MCUXpresso SDK tree used in all example applications are:

- `devices/<device_name>`: The device's CMSIS header file, MCUXpresso SDK feature file and a few other files
- `devices/<device_name>/drivers`: All of the peripheral drivers for your specific MCU
- `devices/<device_name>/<tool_name>`: Toolchain-specific startup code, including vector table definitions
- `devices/<device_name>/utilities`: Items such as the debug console that are used by many of the example applications
- `devices/<device_name>/scfw_api`: APIs to invoke SCFW calls, let SCU do service on clock, power, and resource permission
- `devices/<devices_name>/project` Project template used in CMSIS PACK new project creation

For examples containing middleware/stacks or an RTOS, there are references to the appropriate source code. Middleware source files are located in the `middleware` folder and RTOSes are in the `rtos` folder. The core files of each of these are shared, so modifying one could have potential impacts on other projects that depend on that file.

3 Toolchain introduction

The MCUXpresso SDK release for i.MX 8QuadXPlus includes the build system to be used with some toolchains. In this chapter, the toolchain support is presented and detailed.

3.1 Compiler/Debugger

The MCUXpresso SDK i.MX 8QuadXPlus release supports building and debugging with the toolchains listed in Table 1.

The user can choose the appropriate one for development.

- Arm GCC + SEGGER J-Link GDB Server. This is a command line tool option and it supports both Windows® OS and Linux® OS.
- IAR Embedded Workbench® for Arm and SEGGER J-Link software. The IAR Embedded Workbench is an IDE integrated with editor, compiler, debugger, and other components. The SEGGER J-Link software provides the driver for the J-Link Plus debugger probe and supports the device to attach, debug, and download.

Table 1. Toolchain information

Compiler/Debugger	Supported host OS	Debug probe	Tool website
ArmGCC/J-Link GDB server	Windows OS/Linux OS	J-Link Plus	developer.arm.com/open-source/gnu-toolchain/gnu-rm www.segger.com
IAR/J-Link	Windows OS	J-Link Plus	www.iar.com www.segger.com

Download the corresponding tools for the specific host OS from the website.

NOTE

To support i.MX 8QuadXPlus, the patch for IAR and Segger J-Link should be installed. The patch named iar_segger_support_patch_imx8qx.zip can be used with MCUXpresso SDK. See the `readme.txt` in the patch for additional information about patch installation.

3.2 Image creator

The i.MX 8QuadXPlus hardware is developed to only allow the boot if the SCFW firmware is properly installed. The `imx-mkimage` tool is used to combine the SCFW firmware with SDK images or U-Boot and to generate a binary to be used for i.MX 8QuadXPlus device. Currently, the tool can only be executed on Linux OS.

4 Run a demo application using IAR

This section describes the steps required to build, run, and debug example applications provided in the MCUXpresso SDK using IAR. The `hello_world` demo application targeted for the 8QuadXPlus MEK board is used as an example, although these steps can be applied to any example application in the MCUXpresso SDK.

4.1 Build an example application

Before using IAR, get the IAR and Segger J-Link patch, iar_segger_support_patch_imx8qx.zip. Install the i.MX8QX support patch following the guides in `readme.txt` located in the archive.

Do 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 i.MX 8QuadXPlus MEK board as an example, the `hello_world` workspace is located in:

`<install_dir>/boards/mekmimx8qx/demo_apps/hello_world/iar/hello_world.eww`

Other example applications may have additional folders in their path.

2. Select the desired build target from the drop-down menu.

   For this example, select **hello_world – debug**.

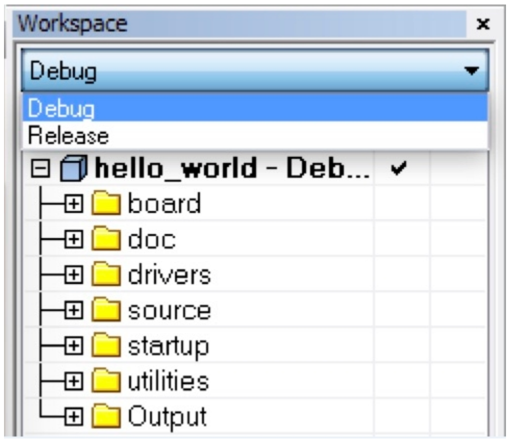


Figure 3. Demo build target selection

3. To build the demo application, click **Make**, highlighted in red in Figure 4.

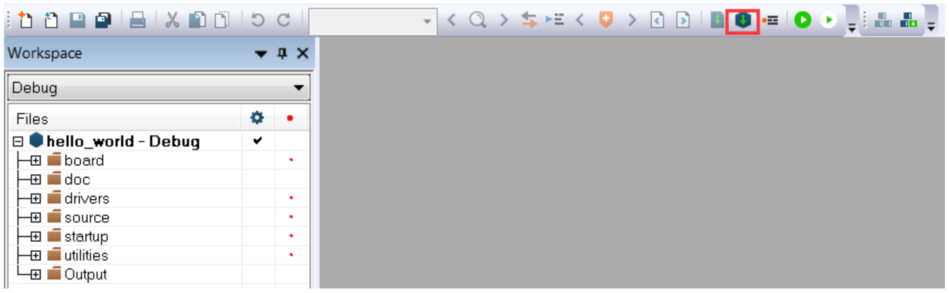


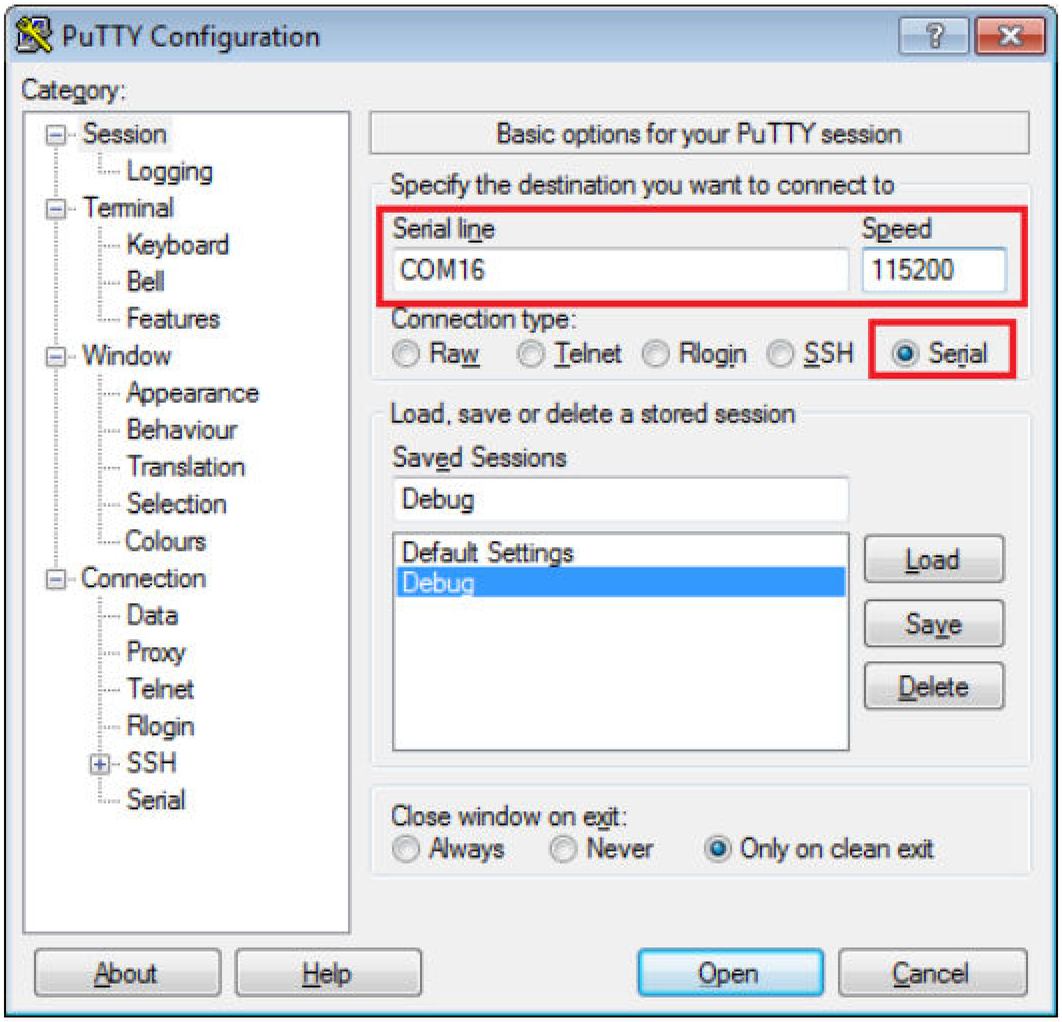
Figure 4. Build the demo application

4. The build completes without errors. There will be an elf file with `out` extension and a binary file with `bin` generated in the target directory.

4.2 Run an example application

Before running an example, a bootable SD card with the System Controller FirmWare (SCFW) image is needed. See Make a bootable SD card with System Controller Firmware (SCFW). To download and run the application, perform these steps:

1. This board supports the J-Link debug probe. Before using it, install SEGGER J-Link software, which can be downloaded from www.segger.com/jlink-software.html.
2. Connect the development platform to your PC via USB cable between the USB-UART Micro USB connector and the PC USB connector, then connect 12 V power supply and J-Link Plus to the hardware platform.
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 baud rate
   b. No parity
   c. 8 data bits
   d. 1 stop bit



PuTTY Configuration

Category:

- Session
  - Logging
- Terminal
  - Keyboard
  - Bell
  - Features
- Window
  - Appearance
  - Behaviour
  - Translation
  - Selection
  - Colours
- Connection
  - Data
  - Proxy
  - Telnet
  - Rlogin
  - SSH
  - Serial

Basic options for your PuTTY session

Specify the destination you want to connect to

Serial line: COM16

Speed: 115200

Connection type: Raw Telnet Rlogin SSH [✓ Serial]

Load, save or delete a stored session

Saved Sessions: Debug

Default Settings

Debug

Load Save Delete

Close window on exit: Always Never [✓ Only on clean exit]

About Help Open Cancel

Figure 5. Terminal (PuTTY) configuration

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

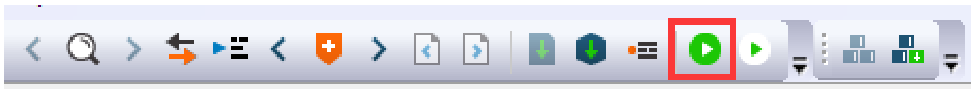
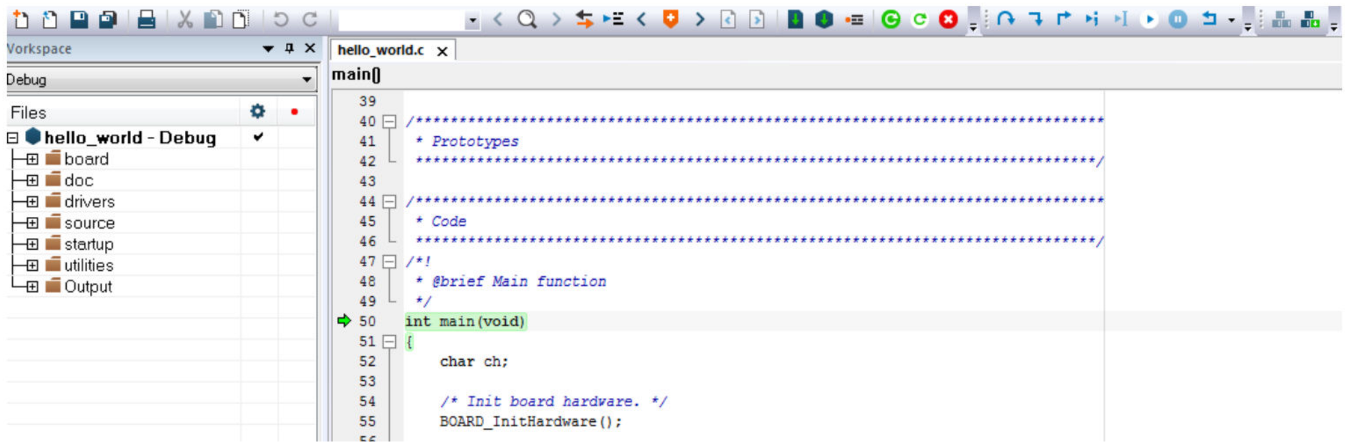


Figure 6. Download and Debug button

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



```
/*******************************************************************************
 * Prototypes
 ******************************************************************************/

/*******************************************************************************
 * Code
 ******************************************************************************/
/*!
 * @brief Main function
 */
int main(void)
{
    char ch;

    /* Init board hardware. */
    BOARD_InitHardware();
```

Figure 7. Stop at main() when running debugging

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

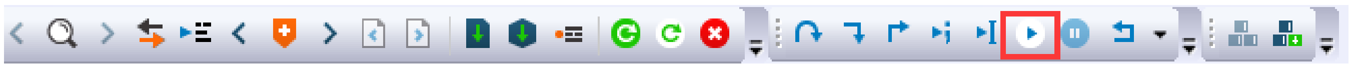
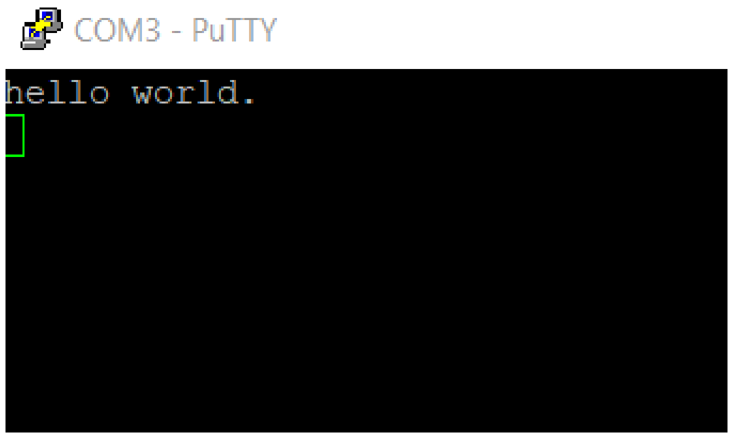


Figure 8. Go button

7. 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.



```
hello world.
```

Figure 9. Text display of the hello_world demo

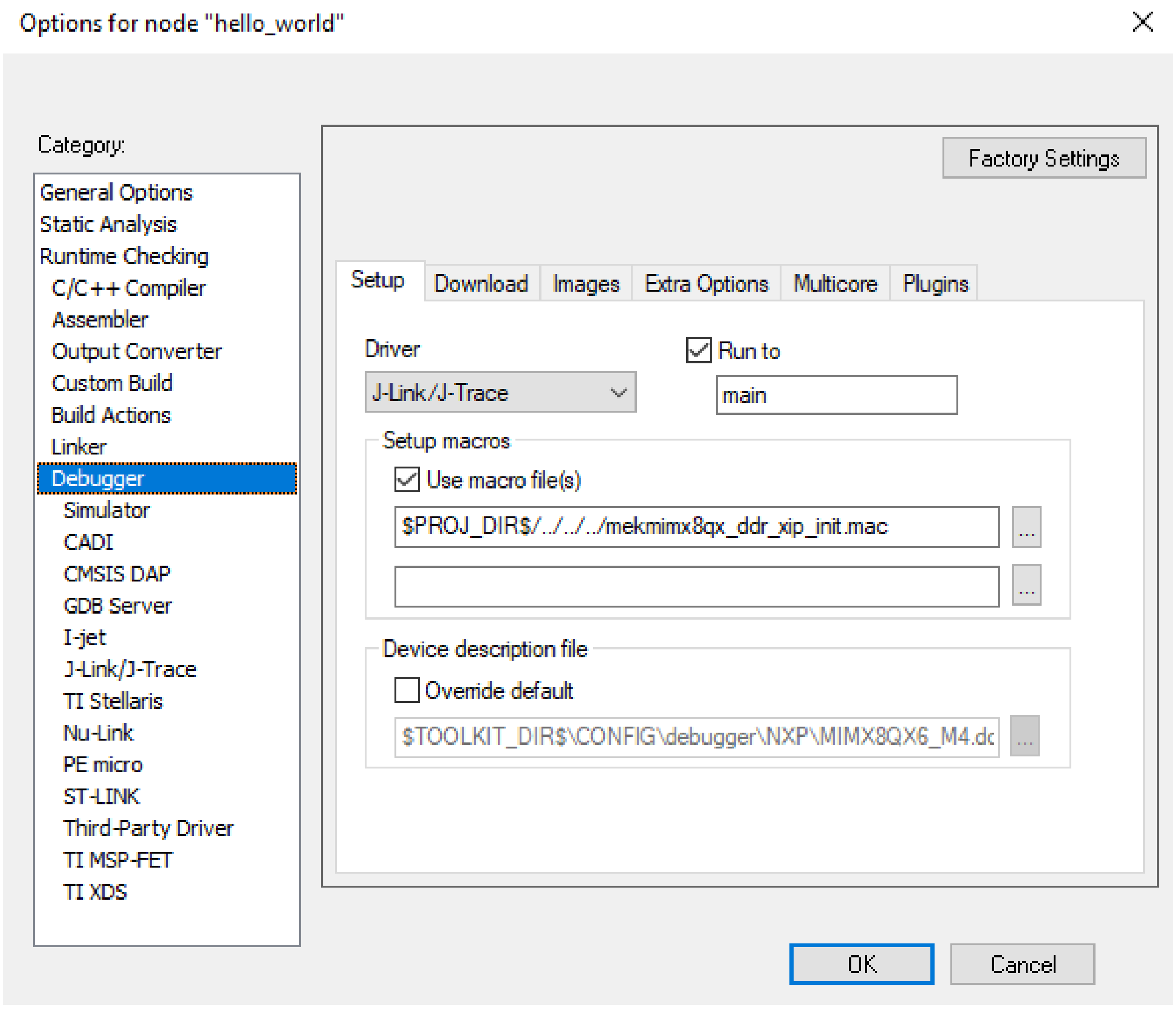
4.2.1 C-Spy macros for DDR Target

For `ddr_debug` and `ddr_release` target, the link address for `text` section is aliased from DDR memory map to XIP memory map. The purpose is to better utilize the Harvard bus architecture: use code bus to fetch instruction, meanwhile use system bus to fetch data, achieving a better overall performance.

The alias is achieved by setting **MCM_PID** to **0x7E**. The M4 startup code handles this so it is transparent when running the SDK demo from bootloader, see Run a demo using imx-mkimage.

But when using IAR to download and run the demo, IAR should be responsible to set the `MCM_PID`. It is achieved by C-Spy macros which is executed automatically before IAR download the image.

The C-Spy macros file is `boards\mekmimx8qx\mekmimx8qx_ddr_xip_init.mac`. The IAR project option will specify it in debugger setup settings as shown in Figure 10.



Options for node "hello_world"

Category:

- General Options
- Static Analysis
- Runtime Checking
  - C/C++ Compiler
  - Assembler
  - Output Converter
  - Custom Build
  - Build Actions
  - Linker
  - Debugger
    - Simulator
    - CADI
    - CMSIS DAP
    - GDB Server
    - I-jet
    - J-Link/J-Trace
    - TI Stellaris
    - Nu-Link
    - PE micro
    - ST-LINK
    - Third-Party Driver
    - TI MSP-FET
    - TI XDS

Driver: J-Link/J-Trace

[✓] Run to: main

Setup macros

[✓] Use macro file(s)

$PROJ_DIR$/../../../mekmimx8qx_ddr_xip_init.mac

Device description file

[ ] Override default

$TOOLKIT_DIR$\CONFIG\debugger\NXP\MIMX8QX6_M4.dc

Figure 10. C-Spy macros are specified in IAR project settings

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 targeted for i.MX8QX platform is used as an example, though these steps can be applied to any board, demo or example application in the MCUXpresso SDK.

NOTE

Before running a demo, make sure the SEGGER patch is installed. See Host Setup to know how to install the patch.

5.1 Linux OS host

The following sections provide steps to run a demo compiled with Arm GCC on Linux host.

5.1.1 Set up toolchain

This section contains the steps to install the necessary components required to build and run a MCUXpresso SDK demo application with the Arm GCC toolchain, as supported by the MCUXpresso SDK.

5.1.1.1 Install GCC Arm embedded tool chain

Download and run the installer from launchpad.net/gcc-arm-embedded. 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 the *MCUXpresso SDK Release Notes*. (document MCUXSDKRN).

NOTE

See Host setup for Linux OS before compiling the application.

5.1.1.2 Add a new system environment variable for ARMGCC_DIR

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

```
$ export ARMGCC_DIR=<path_to_GNUARM_GCC_installation_dir>
```

5.1.1.3 Download and install JLink software and documentation pack for Linux

It provides `JLinkGDBServer` which is used later.

5.1.2 Build an example application

To build an example application, follow these steps.

1. 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>/boards/mekmimx8qx/demo_apps/hello_world/armgcc`

2. Run the `build_debug.sh` script on the command line to perform the build. The output is shown as below:

```
$ ./build_debug.sh
-- TOOLCHAIN_DIR: /work/platforms/tmp/gcc-arm-none-eabi-5_4-2016q3
-- BUILD_TYPE: debug
-- TOOLCHAIN_DIR: /work/platforms/tmp/gcc-arm-none-eabi-5_4-2016q3
-- BUILD_TYPE: debug
-- The ASM compiler identification is GNU
-- Found assembler: /work/platforms/tmp/gcc-arm-none-eabi-5_4-2016q3/bin/arm-none-eabi-
gcc
-- Configuring done
-- Generating done
-- Build files have been written to:

/work/platforms/tmp/SDK_2.2_MEK_MIMX8QX/boards/mekmimx8qx/demo_apps/hello_world/armgcc
```

```
Scanning dependencies of target hello_world.elf

[ 4%] Building C object CMakeFiles/hello_world.elf.dir/work/platforms/tmp/
SDK_2.2_MEK_MIMX8QX/boards/mekmimx8qx/demo_apps/hello_world/board.c.obj
```

```
 < -- skipping lines -- >
[100%] Linking C executable debug/hello_world.elf
[100%] Built target hello_world.elf
```

5.1.3 Run an example application

This section describes steps to run a demo application using J-Link GDB Server application. To perform this exercise, follow these steps:

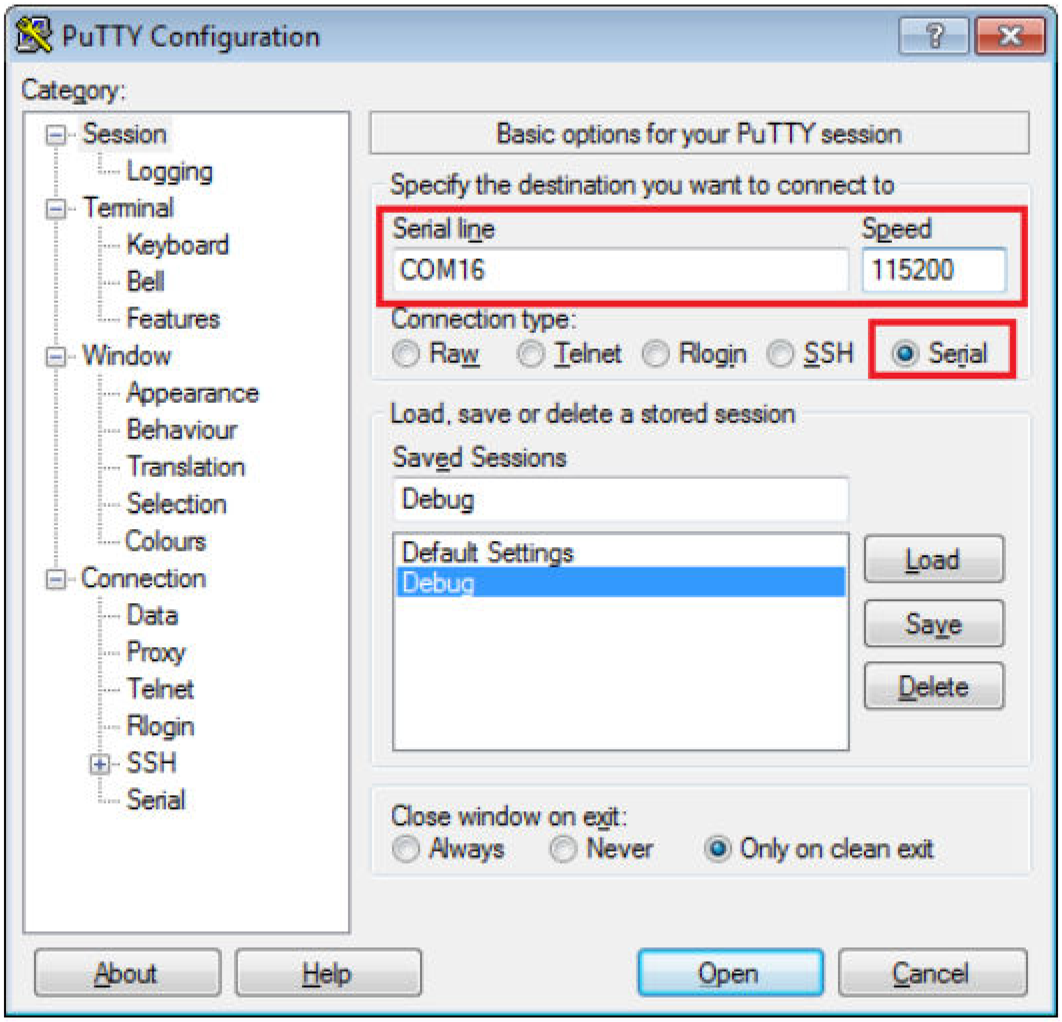
- Make a bootable SD card with the SCFW (System Controller Firmware) image. See Make a bootable SD card with System Controller Firmware (SCFW)
- A standalone J-Link probe that is connected to the debug interface of your board.

NOTE

The Segger J-Link software has to be patched with the patch for i.MX8QX from iar_segger_support_patch_8qx.zip.

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 USB-UART connector 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 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



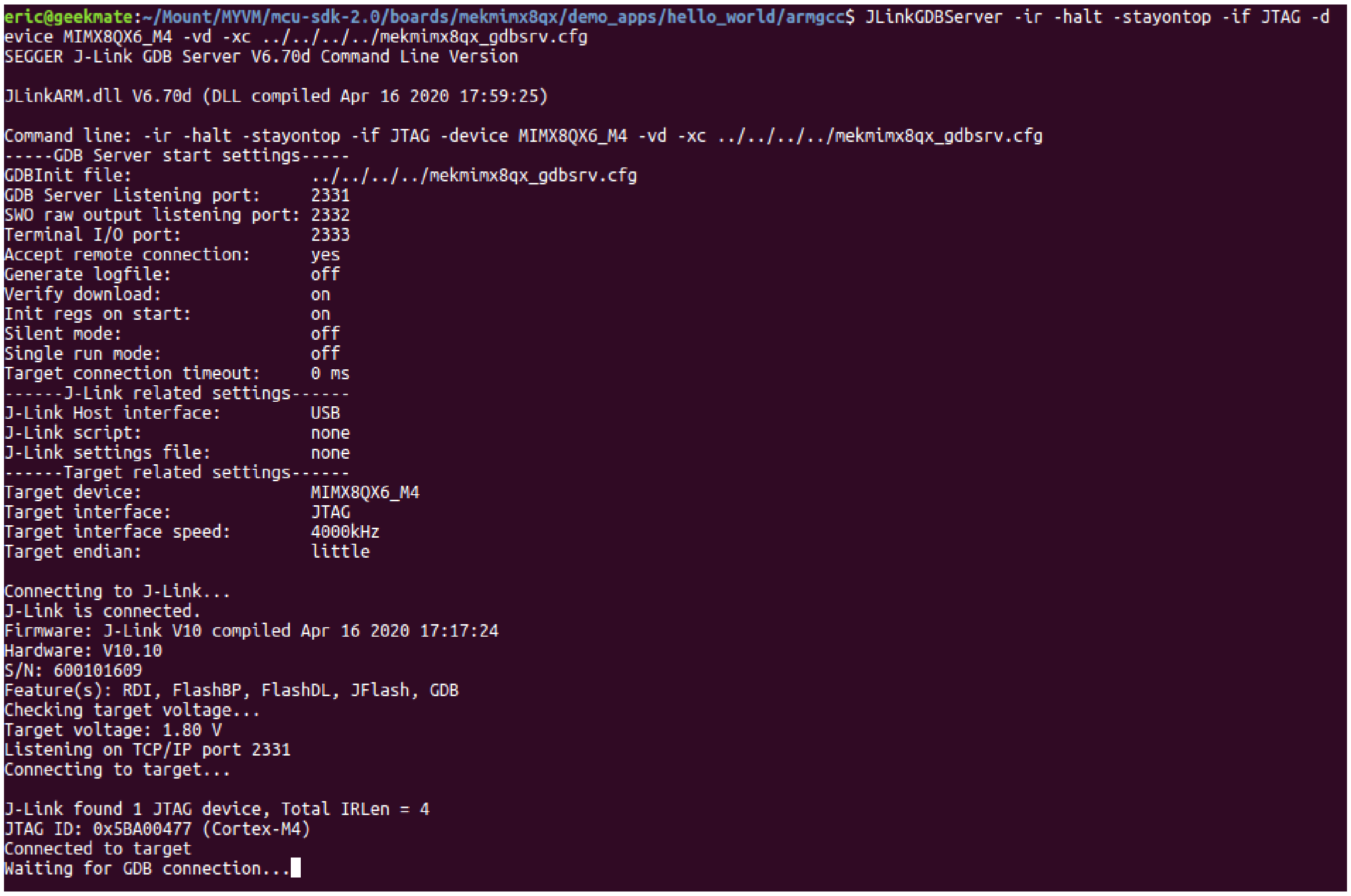
Serial line: COM16
Speed: 115200
Connection type: Raw Telnet Rlogin SSH [✓ Serial]
Saved Sessions: Debug
Default Settings
Debug
Close window on exit: Always Never [✓ Only on clean exit]

Figure 11. Terminal (PuTTY) configurations

3. Open the J-Link GDB Server application. Assuming the J-Link software is installed, the application can be launched from a new terminal for the MIMX8QX6_CM4 device:

   ```
   $ JLinkGDBServer -if JTAG -device MIMX8QX6_CM4 -vd -xc mekmimx8qx_gdbsrv.cfg
   ```

   `vd` configures gdbserver to verify data after every download. `-xc mekmimx8qx_gdbsrv.cfg` specify a gdbserver config file, the command sequence inside it will be executed every time a debugging session is created. The config file is located in `boards/mekmimx8qx/mekmimx8qx_gdbsrv.cfg`. For details, see GDBServer config file.



```
eric@geekmate:~/Mount/MYVM/mcu-sdk-2.0/boards/mekmimx8qx/demo_apps/hello_world/armgcc$ JLinkGDBServer -ir -halt -stayontop -if JTAG -d
evice MIMX8QX6_M4 -vd -xc ../../../../mekmimx8qx_gdbsrv.cfg
SEGGER J-Link GDB Server V6.70d Command Line Version

JLinkARM.dll V6.70d (DLL compiled Apr 16 2020 17:59:25)

Command line: -ir -halt -stayontop -if JTAG -device MIMX8QX6_M4 -vd -xc ../../../../mekmimx8qx_gdbsrv.cfg
-----GDB Server start settings-----
GDBInit file:                  ../../../../mekmimx8qx_gdbsrv.cfg
GDB Server Listening port:     2331
SWO raw output listening port: 2332
Terminal I/O port:             2333
Accept remote connection:      yes
Generate logfile:              off
Verify download:               on
Init regs on start:            on
Silent mode:                   off
Single run mode:               off
Target connection timeout:     0 ms
------J-Link related settings------
J-Link Host interface:         USB
J-Link script:                 none
J-Link settings file:          none
------Target related settings------
Target device:                 MIMX8QX6_M4
Target interface:              JTAG
Target interface speed:        4000kHz
Target endian:                 little

Connecting to J-Link...
J-Link is connected.
Firmware: J-Link V10 compiled Apr 16 2020 17:17:24
Hardware: V10.10
S/N: 600101609
Feature(s): RDI, FlashBP, FlashDL, JFlash, GDB
Checking target voltage...
Target voltage: 1.80 V
Listening on TCP/IP port 2331
Connecting to target...

J-Link found 1 JTAG device, Total IRLen = 4
JTAG ID: 0x5BA00477 (Cortex-M4)
Connected to target
Waiting for GDB connection...
```

Figure 12. GDB Server is ready for connection in Linux OS

4. 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`

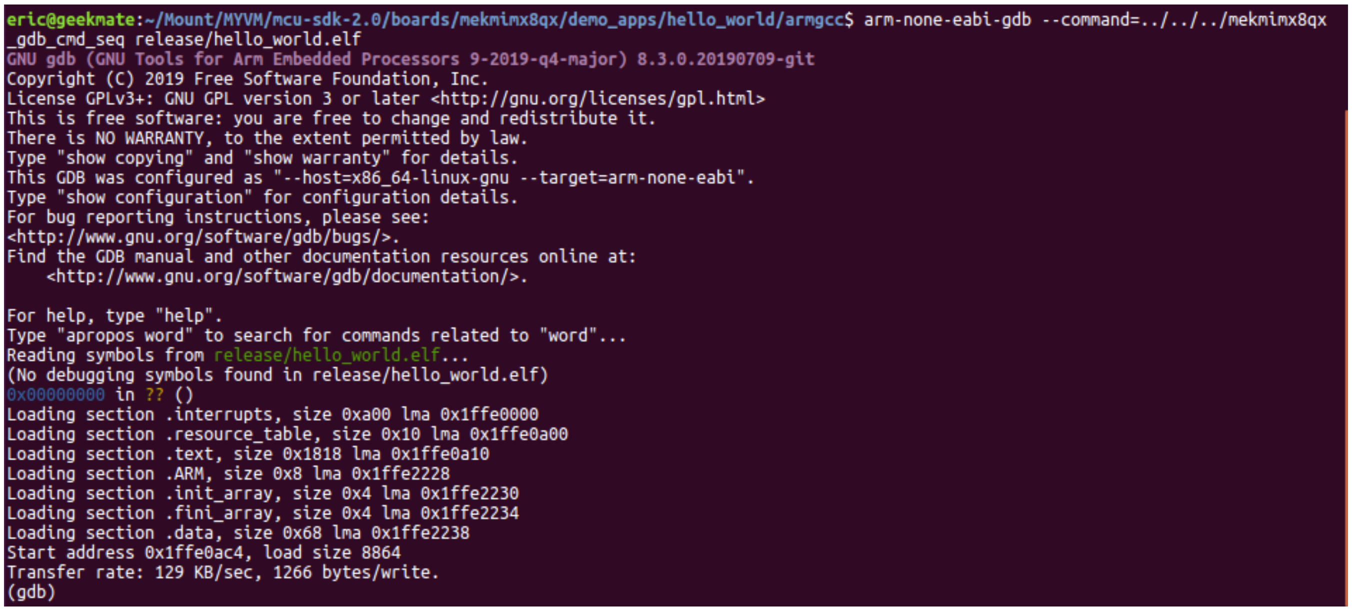
   `<install_dir>/boards/<board_name>/<example_type>/<application_name>/armgcc/release`

   For this example, the path is:

   `<install_dir>/boards/mekmimx8qx/demo_apps/hello_world/armgcc/debug`

5. Start the GDB client:

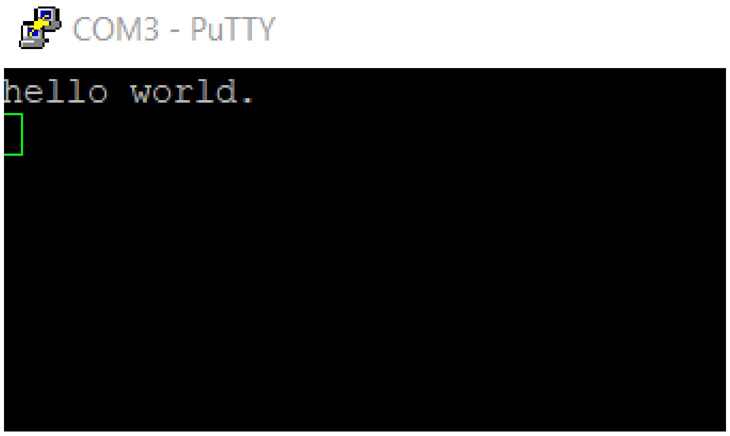
```
$ arm-none-eabi-gdb --command=mekmimx8qx_gdb_cmd_seq hello_world.elf
```



```
eric@geekmate:~/Mount/MYVM/mcu-sdk-2.0/boards/mekmimx8qx/demo_apps/hello_world/armgcc$ arm-none-eabi-gdb --command=../../../mekmimx8qx
_gdb_cmd_seq release/hello_world.elf
GNU gdb (GNU Tools for Arm Embedded Processors 9-2019-q4-major) 8.3.0.20190709-git
Copyright (C) 2019 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.
Type "show copying" and "show warranty" for details.
This GDB was configured as "--host=x86_64-linux-gnu --target=arm-none-eabi".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<http://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
    <http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from release/hello_world.elf...
(No debugging symbols found in release/hello_world.elf)
0x00000000 in ?? ()
Loading section .interrupts, size 0xa00 lma 0x1ffe0000
Loading section .resource_table, size 0x10 lma 0x1ffe0a00
Loading section .text, size 0x1818 lma 0x1ffe0a10
Loading section .ARM, size 0x8 lma 0x1ffe2228
Loading section .init_array, size 0x4 lma 0x1ffe2230
Loading section .fini_array, size 0x4 lma 0x1ffe2234
Loading section .data, size 0x68 lma 0x1ffe2238
Start address 0x1ffe0ac4, load size 8864
Transfer rate: 129 KB/sec, 1266 bytes/write.
(gdb)
```

Figure 13. GDB session connected and program get running in Linux OS

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.



```
hello world.
```

Figure 14. Text display of the hello_world demo

5.2 Windows OS host

The following sections provide steps to run a demo compiled with Arm GCC on Windows OS host.

5.2.1 Set up toolchain

This section contains the steps to install the necessary components required to build and run a MCUXpresso SDK demo application with the Arm GCC toolchain on Windows OS, as supported by the MCUXpresso SDK.

5.2.1.1 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*.

NOTE

See Host Setup for Windows OS before compiling the application.

5.2.1.2 Add a new system environment variable for ARMGCC_DIR

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

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

5.2.1.3 Download and install JLink software and documentation pack for Linux

It provides `JLinkGDBServer` which is used later.

5.2.2 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**.

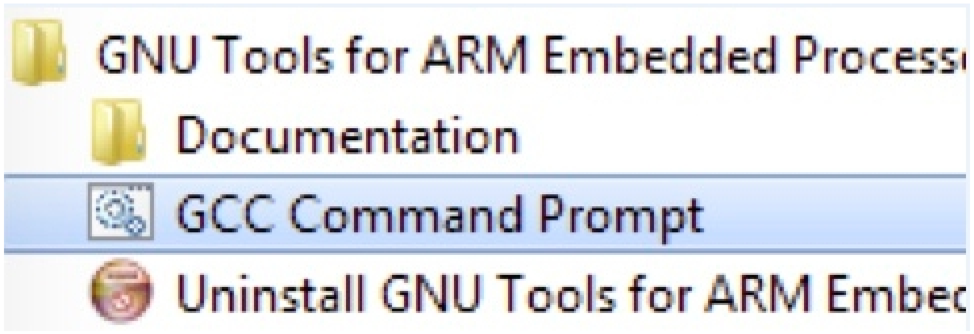

GNU Tools for ARM Embedded Process
Documentation
GCC Command Prompt
Uninstall GNU Tools for ARM Embec

Figure 15. Launch command prompt

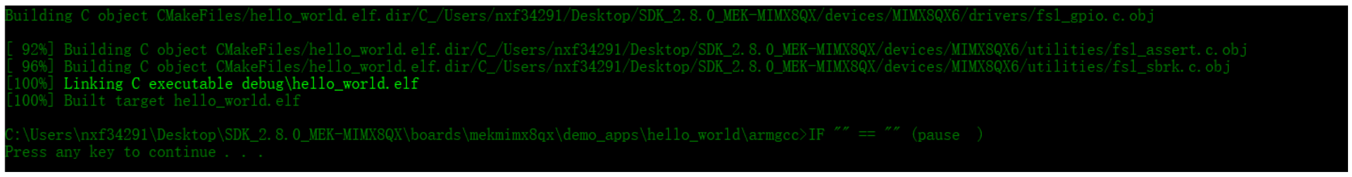
2. Change the directory to the example application project directory, which has a path similar to the following:

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

   For this example, the exact path is:

   ```
   <install_dir>/boards/mekmimx8qx/demo_apps/hello_world/armgcc/debug
   ```

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 as shown in Figure 16.



```
Building C object CMakeFiles/hello_world.elf.dir/C_/Users/nxf34291/Desktop/SDK_2.8.0_MEK-MIMX8QX/devices/MIMX8QX6/drivers/fsl_gpio.c.obj

[ 92%] Building C object CMakeFiles/hello_world.elf.dir/C_/Users/nxf34291/Desktop/SDK_2.8.0_MEK-MIMX8QX/devices/MIMX8QX6/utilities/fsl_assert.c.obj
[ 96%] Building C object CMakeFiles/hello_world.elf.dir/C_/Users/nxf34291/Desktop/SDK_2.8.0_MEK-MIMX8QX/devices/MIMX8QX6/utilities/fsl_sbrk.c.obj
[100%] Linking C executable debug\hello_world.elf
[100%] Built target hello_world.elf

C:\Users\nxf34291\Desktop\SDK_2.8.0_MEK-MIMX8QX\boards\mekmimx8qx\demo_apps\hello_world\armgcc>IF "" == "" (pause  )
Press any key to continue . . .
```

Figure 16. hello_world demo build successful

5.2.3 Run an example application

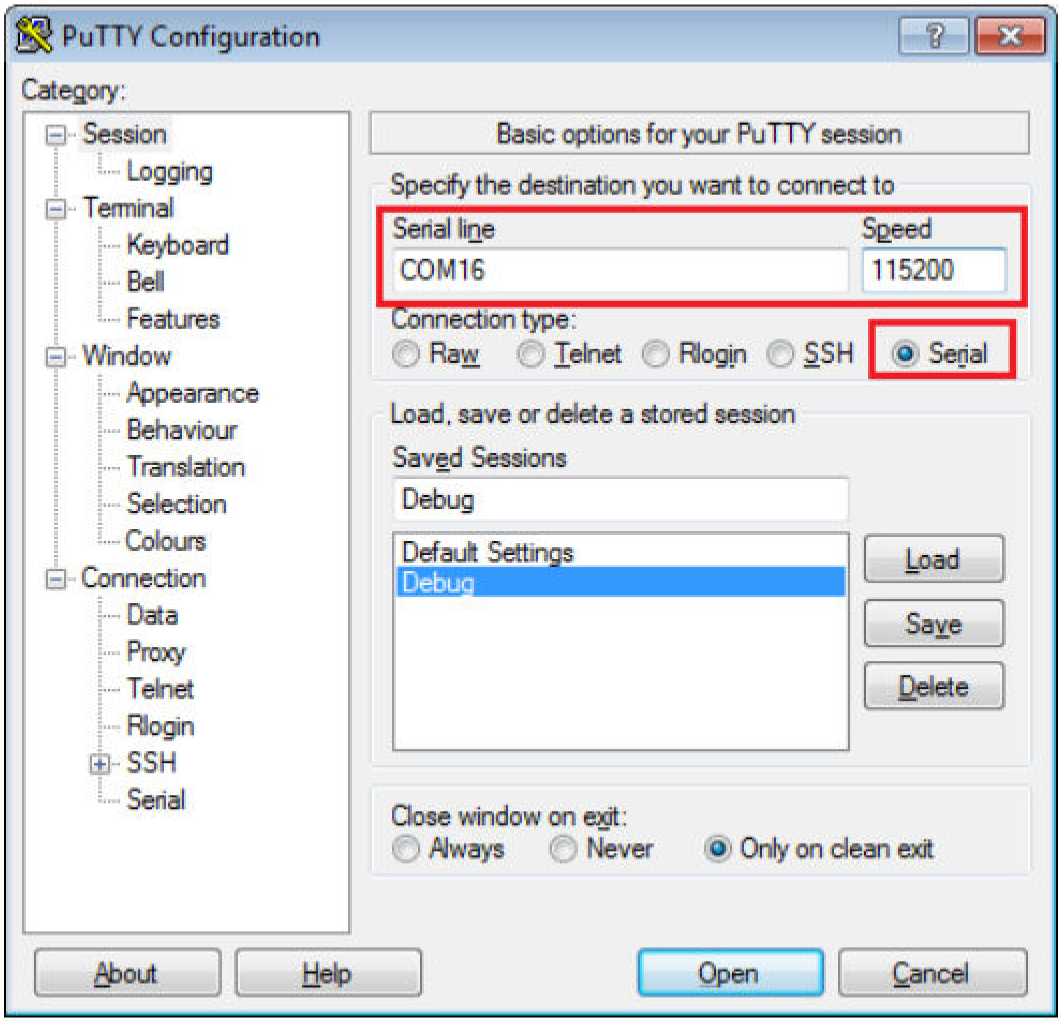
Running the Arm GCC built demo also requires J-Link support. Get the IAR and Segger J-Link patch, iar_segger_support_patch_8qx.zip. Install the i.MX8QX support patch following the guides in *readme.txt* located in the archive.

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

- Make a bootable SD card with the System Controller FirmWare (SCFW) image. See Make a bootable SD card with System Controller Firmware (SCFW). You have a standalone J-Link pod that is connected to the debug interface of your board.

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 USB-UART connector 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 baud rate
   b. No parity
   c. 8 data bits
   d. 1 stop bit



Specify the destination you want to connect to

Serial line: COM16
Speed: 115200

Connection type: Raw Telnet Rlogin SSH [✓ Serial]

Saved Sessions: Debug

Close window on exit: Always Never [✓ Only on clean exit]

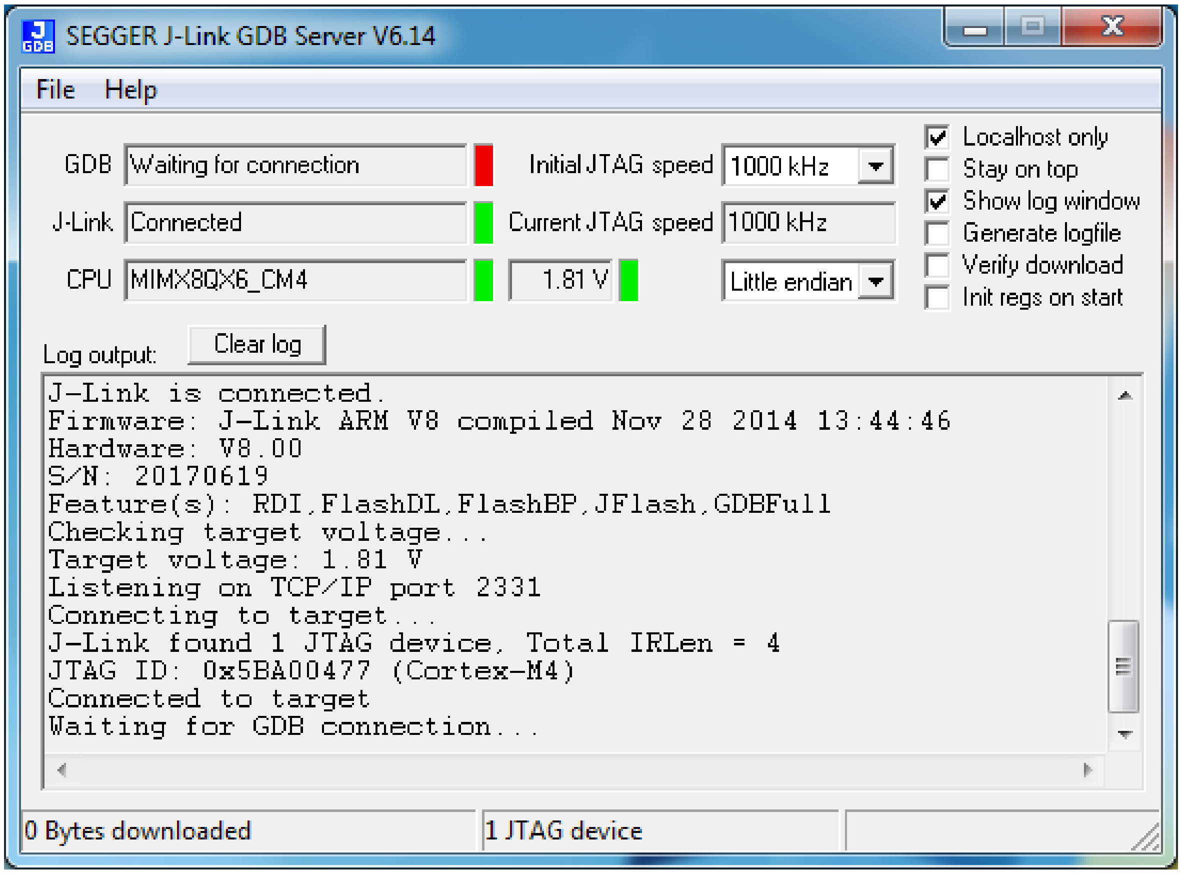
Figure 17. Terminal (PuTTY) configurations

3. Open the J-Link GDB Server application. Assuming the J-Link software is installed, the application can be launched from a new cmd window for the MIMX8QX_M4 device.

```
JLinkGDBServer -ir -halt -stayontop -if JTAG -device MIMX8QX6_M4 -vd -xc
mekmimx8qx_gdbsrv.cfg
```

`vd` configures gdbserver to verify data after every download. `-xc mekmimx8qx_gdbsrv.cfg` specify a gdbserver config file, the command sequence inside it will be executed every time a debugging session is created. The config file is located in `boards/mekmimx8qx/mekmimx8qx_gdbsrv.cfg`. For details, see GDBServer Config File.

4. After GDB server is running, the screen should resemble Figure 18 :



GDB: Waiting for connection
J-Link: Connected
CPU: MIMX8QX6_CM4
1.81 V
Initial JTAG speed: 1000 kHz
Current JTAG speed: 1000 kHz
Little endian
[✓] Localhost only
[ ] Stay on top
[✓] Show log window
[ ] Generate logfile
[ ] Verify download
[ ] Init regs on start

Log output:

```
J-Link is connected.
Firmware: J-Link ARM V8 compiled Nov 28 2014 13:44:46
Hardware: V8.00
S/N: 20170619
Feature(s): RDI,FlashDL,FlashBP,JFlash,GDBFull
Checking target voltage...
Target voltage: 1.81 V
Listening on TCP/IP port 2331
Connecting to target...
J-Link found 1 JTAG device, Total IRLen = 4
JTAG ID: 0x5BA00477 (Cortex-M4)
Connected to target
Waiting for GDB connection...
```

0 Bytes downloaded | 1 JTAG device

Figure 18. SEGGER J-Link GDB server screen after successful connection

5. 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**.

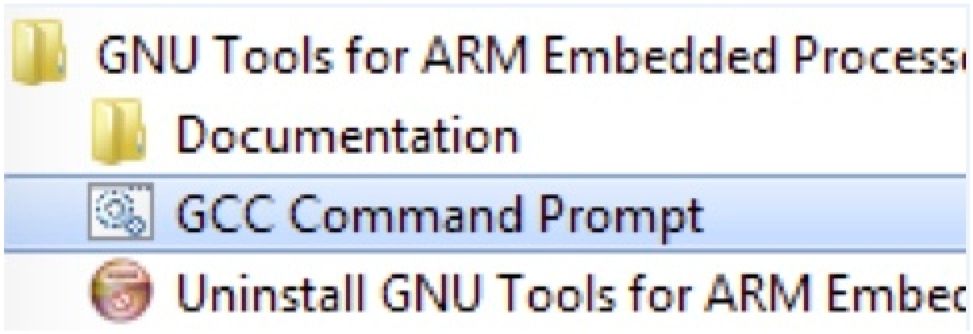

GNU Tools for ARM Embedded Process
Documentation
GCC Command Prompt
Uninstall GNU Tools for ARM Embec

Figure 19. Launch command prompt

6. 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/mekmimx8qx/demo_apps/hello_world/armgcc/debug
```

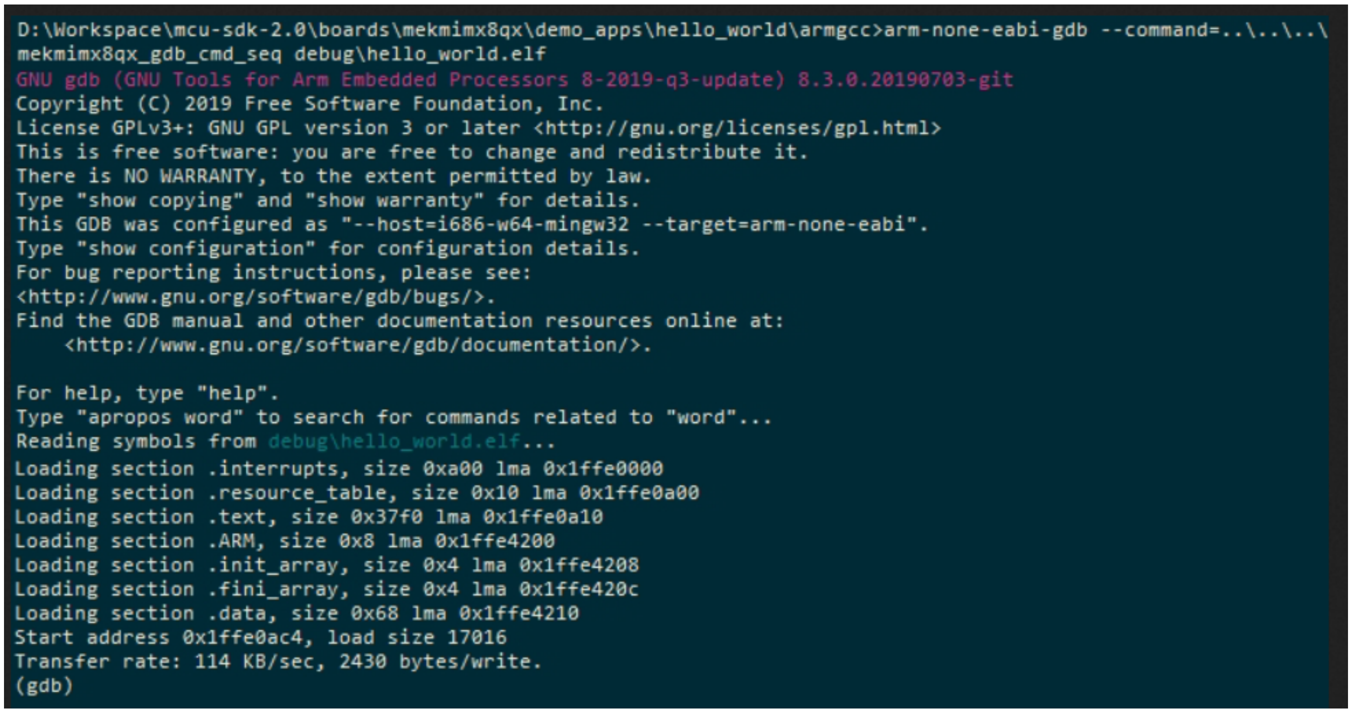
7. Run the following command:

```
arm-none-eabi-gdb --command=mekmimx8qx_gdb_cmd_seq
```

`mekmimx8qx_gdb_cmd_seq` specifies the initial gdb commands to be executed. The file is located in `boards/mekmimx8qx/mekmimx8qx_gdb_cmd_seq` The following commands are executed one by one as specified in this file:

```
target remote localhost:2331
load hello_world.elf
monitor go
```

The gdb console output is as Figure 20



```
D:\Workspace\mcu-sdk-2.0\boards\mekmimx8qx\demo_apps\hello_world\armgcc>arm-none-eabi-gdb --command=..\..\..\
mekmimx8qx_gdb_cmd_seq debug\hello_world.elf
GNU gdb (GNU Tools for Arm Embedded Processors 8-2019-q3-update) 8.3.0.20190703-git
Copyright (C) 2019 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.
Type "show copying" and "show warranty" for details.
This GDB was configured as "--host=i686-w64-mingw32 --target=arm-none-eabi".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<http://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
    <http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from debug\hello_world.elf...
Loading section .interrupts, size 0xa00 lma 0x1ffe0000
Loading section .resource_table, size 0x10 lma 0x1ffe0a00
Loading section .text, size 0x37f0 lma 0x1ffe0a10
Loading section .ARM, size 0x8 lma 0x1ffe4200
Loading section .init_array, size 0x4 lma 0x1ffe4208
Loading section .fini_array, size 0x4 lma 0x1ffe420c
Loading section .data, size 0x68 lma 0x1ffe4210
Start address 0x1ffe0ac4, load size 17016
Transfer rate: 114 KB/sec, 2430 bytes/write.
(gdb)
```

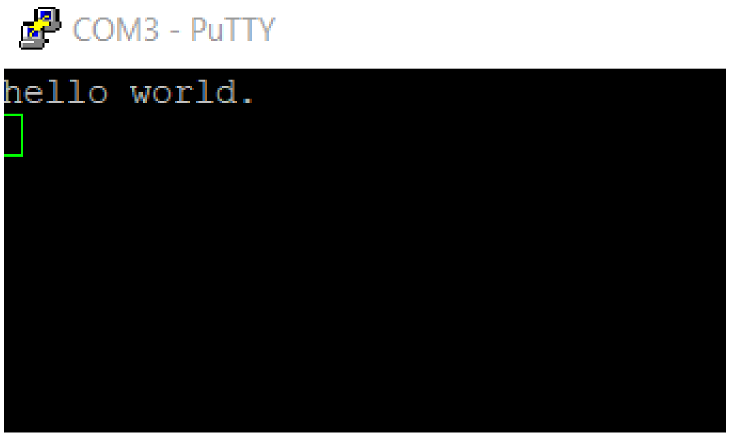
Figure 20. GDB session connected and program get running in Windows OS

- The first command creates a debug session with gdbserver.
- The second command loads the elf to the target device. Please give appropriate path for the specified elf.
- The last command lets the target device running.

NOTE

You can change the command sequence or execute other commands in gdb console after the initial commands get executed.

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.



```
hello world.
```

Figure 21. Text display of the hello_world demo

5.3 GDBServer config file

As mentioned earlier, `-xc mekmimx8qx_gdbsrv.cfg` specifies a gdb server config file which will get executed everytime a debugging session is created. It does target initialization in preparation for debugging session creation. In our example, two commands are specified.

```
// Reset the chip to get to a known state

halt


// Enable The Following Line to Support DDR XIP Alias Feature
// MemU32 0xE0080030 = 0x7E
```

As described in the comment, the first command simply put the M4 core to halt state. The second command is disabled by default. It should be enabled for DDR target to turn on DDR to XIP memory alias. For details, see C-Spy macros for DDR Target.

6 Run a demo using imx-mkimage

The `imx-mkimage` is used to combine various input images and generate the all-in-one boot image with the appropriate IVT (Image Vector Table) set. It can be directly flashed to boot medium, such as an SD card to boot various cores in the SOC. This includes SCU firmware, U-Boot for A core, and the M4 image for M core. Currently the imx-mkimage can only work on Linux OS. Use the following steps to prepare for working with imx-mkimage:

1. Clone the `imx-mkimage` from NXP public `git`.

   ```
   $ git clone https://source.codeaurora.org/external/imx/imx-mkimage
   ```
2. Check out the correct branch. The branch name is provided in corresponding Linux Release Notes document.

   ```
   $ git checkout [branch name]
   ```
3. Get the SCU firmware package with the link provided in corresponding Linux Release Notes doc. Then executing the following command:

   ```
     $ chmod a+x [bin package]
     $ sh [bin package]
   ```

   This extracts the SCU firmware. Rename `mx8qx-mek-scfw-tcm.bin` to `scfw_tcm.bin` and copy the file to `imx-mkimage/iMX8QX`.
4. Get the i.MX SECO firmware package with the link provided in corresponding Linux Release Notes doc.
5. Execute the following command:

```
$ chmod a+x [bin package]
$ sh [bin package]
```

This extracts the i.MX SECO firmware. Copy `firmware/seco/mx8qxb0-ahab-container.img and firmware/seco/mx8qxc0-ahab-container` to `imx-mkimage/iMX8QX`. b0 and c0 indicate that the firmware is used for B0 silicon and C0 silicon respectively.

6. Generate the `u-boot.bin`and `u-boot-spl.bin` from Linux release package and copy it to `imx-mkimage/iMX8QX`.
7. Generate the Arm Trusted Firmware `bl31.bin` from the Linux release package and copy it to `imx-mkimage/iMX8QX`.

6.1 Run an example application on the M4 core

1. Build the M4 demo application. Rename the generated binary file (`.bin` file) to `m4_image.bin`, and copy to this file to the `imx-mkimage/iMX8QX` folder.
2. In Linux OS, bash `cd` into the *imx-mkimage* installed directory, and run the following command to generate bootable image:

   ```
   $ make clean
   ```

   If the M4 image built is for TCM:

   ```
   $ make SOC=iMX8QX REV=C0 flash_cm4
   ```

   If the M4 image built is for DDR:

   ```
   $ make SOC=iMX8QX REV=C0 flash_cm4_ddr
   ```

   This generates the bootable image `flash.bin` under the **iMX8QX** folder.

   NOTE

   The `REV=C0` indicates the image is built for the **C0** silicon. For the **B0** silicon, use `REV=B0` instead.

3. Write the image into the SD card. Insert the SD card into the Linux PC, and run the following command in Linux bash with ROOT permission:

   ```
   dd if=./iMX8QX/flash.bin of=/dev/<SD Device> bs=1k seek=32
   ```

   The `<SD Device>` is the device node of your SD card such as `sdb`.

4. Insert the SD card to SD1 card slot and power on the board. See Run an example application for steps to connect the board with PC and configure debugging terminals. It can be observed that the M4 demo is running.

6.2 Make a bootable SD card with System Controller Firmware (SCFW)

When debugging or running MCUXpresso SDK with IAR and J-Link GDB Server, the bootable SD card with SCU firmware (SCFW) is required. The SCU handles setting the power, clock, pinmux, and so on for other cores, so the SCFW is a needed to run MCUXpresso SDK. To keep the peripherals in the chip at reset status, do not put the CM4 image in the booting image (`flash.bin`) when debugging or running CM4 cores with IAR and the J-Link GDB Server.

To make a bootable SD card with only SCFW, use the following command to generate a bootable image in `imx-mkimage.tool`:

```
$ make clean

$ make SOC=iMX8QX REV=C0 flash_scfw
```

Follow the steps described in Run an example application on the M4 core to write the generated `flash.bin` into the SD card.

6.3 Run example application on the M4 core together with U-Boot

When the **A** core and **M** core are running together, they need to run in two different partitions. This is achieved by the special target provided by `<em>mkimage</em>` facility.

1. Copy `u-boot.bin` and `u-boot-spl.bin` into `mx-mkimage/iMX8QX`.
2. Rename the M4 image to `m4_image.bin` and copy it into `imx-mkimage/iMX8QX`.
3. In Linux OS, bash cd into the `imx-mkimage` directory, and run the following command to generate bootable image:

   ```
   $ make clean
   ```

   If the M4 image is built for TCM:

   ```
   make SOC=iMX8QX REV=C0 flash_linux_m4
   ```

   If the M4 image is built for DDR:

   ```
   make SOC=iMX8QX REV=C0 flash_linux_m4_ddr
   ```

   This generates the bootable image `flash.bin` under the **iMX8QX** folder.

Follow the steps described in Make a bootable SD card with System Controller Firmware (SCFW) to write the generated `flash.bin` into the `emmc`.

7 Run a demo using facility provided by U-Boot

The *bootaux* command on U-Boot is obsolete because the **A** and **M** core must run on different partitions. We can no longer kick off M4 demo from U-Boot.

8 Run a flash target demo by UUU

This section describes the steps to use the UUU to build and run example applications provided in the MCUXpresso SDK. The `hello_world` demo application targeted for the i.MX 8QuadXPlus MEK hardware platform is used as an example, although these steps can be applied to any example application in the MCUXpresso SDK.

8.1 Set up environment

This section contains the steps to install the necessary components required to build and run a MCUXpresso SDK demo application, as supported by the MCUXpresso SDK.

8.1.1 Download the MfgTool

Run a flash target demo by UUU

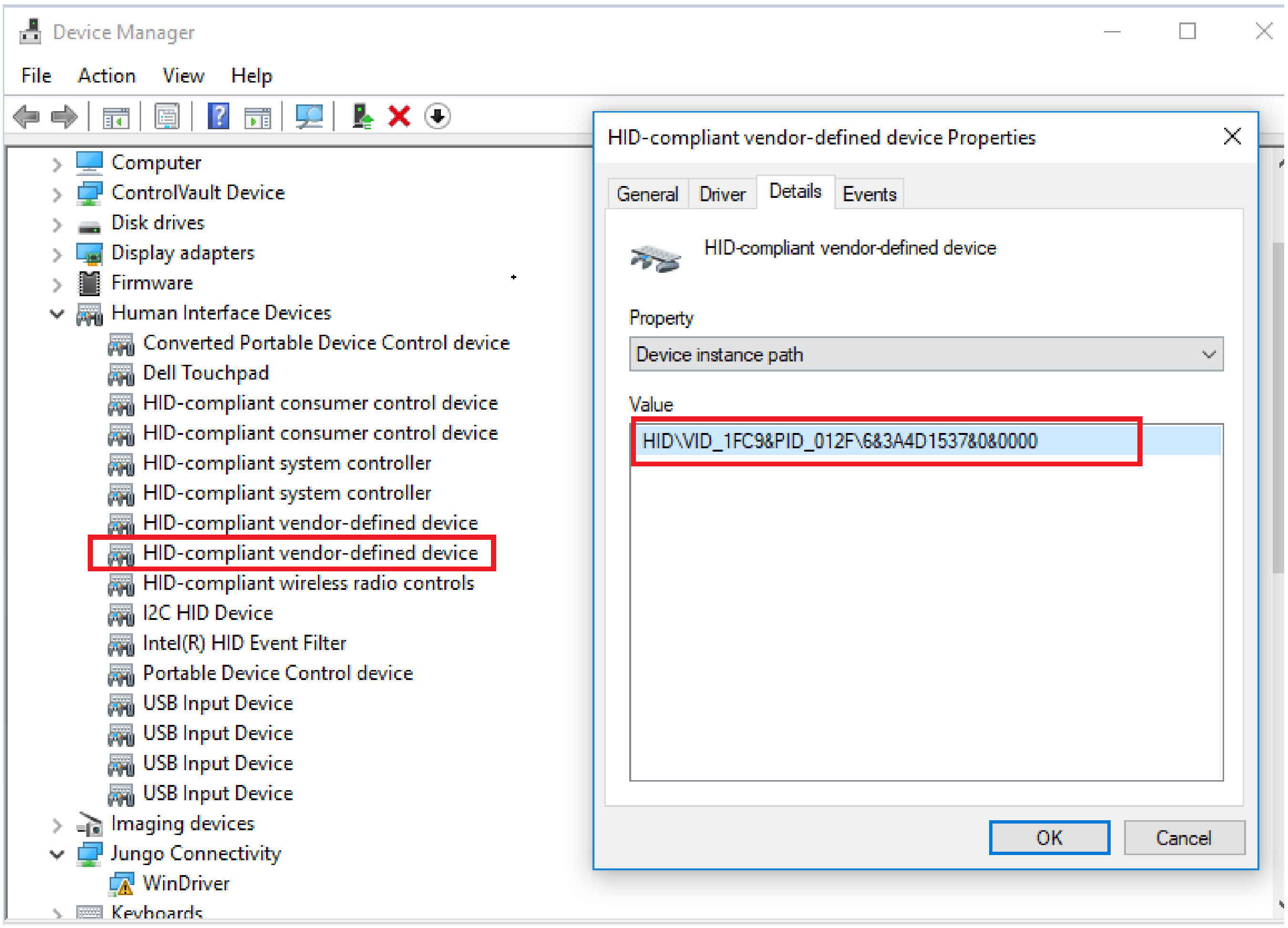
The Universal Upgrade Utility (UUU) is an upgraded version of MfgTool. It is a command line tool that aims at installing the bootloader to various storage including SD, QSPI, and so on, for i.MX series devices with ease.

The tool can be downloaded from github. Use version 1.3.96 or higher for full support for the M4 image. Download `uuu.exe` for Windows OS, or download UUU for Linux. Configure the path so that the executable can later be called anywhere in the command line.

8.1.2 Switch to SERIAL mode

The board needs to be in SERIAL mode for UUU to download images:

1. Set the board boot mode to SERIAL[b'0001] .
2. Connect the development platform to your PC via USB cable between the SERIAL port and the PC USB connector. The SERIAL port is J10 USB Type-C on the CPU board.
3. The PC recognizes the i.MX8QX device as (VID:PID)=(1FC9:012F) , as shown in Figure 22.


Device Manager
File
Action
View
Help
Computer
ControlVault Device
Disk drives
Display adapters
Firmware
Human Interface Devices
Converted Portable Device Control device
Dell Touchpad
HID-compliant consumer control device
HID-compliant consumer control device
HID-compliant system controller
HID-compliant system controller
HID-compliant vendor-defined device
HID-compliant vendor-defined device
HID-compliant wireless radio controls
I2C HID Device
Intel(R) HID Event Filter
Portable Device Control device
USB Input Device
USB Input Device
USB Input Device
USB Input Device
Imaging devices
Jungo Connectivity
WinDriver
Keyboards
HID-compliant vendor-defined device Properties
General
Driver
Details
Events
HID-compliant vendor-defined device
OK
Cancel

Property: Device instance path

Value: HID\VID_1FC9&PID_012F\6&3A4D1537&0&0000

Figure 22. Device as shown in Device Manager

8.2 Build an example application

The following steps guide you through opening the `rpmsg_pingpong` example application. These steps may change slightly for other example applications, as some of these applications may have additional layers of folders in their paths.

1. If not already done, 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 i.MX 8QuadXPlus MEK board as an example, the `rpmsg_pingpong` workspace is located in:

   ```
   <install_dir>/boards/mekmimx8qx/multicore_examples/rpmsg_lite_pingpong_rtos/
   linux_remote/iar/rpmsg_lite_pingpong_rtos_linux_remote.eww
   ```
2. Select the desired build target from the drop-down. For this example, select **rpmsg_lite_pingpong_rtos_linux_remote - flash_debug**.

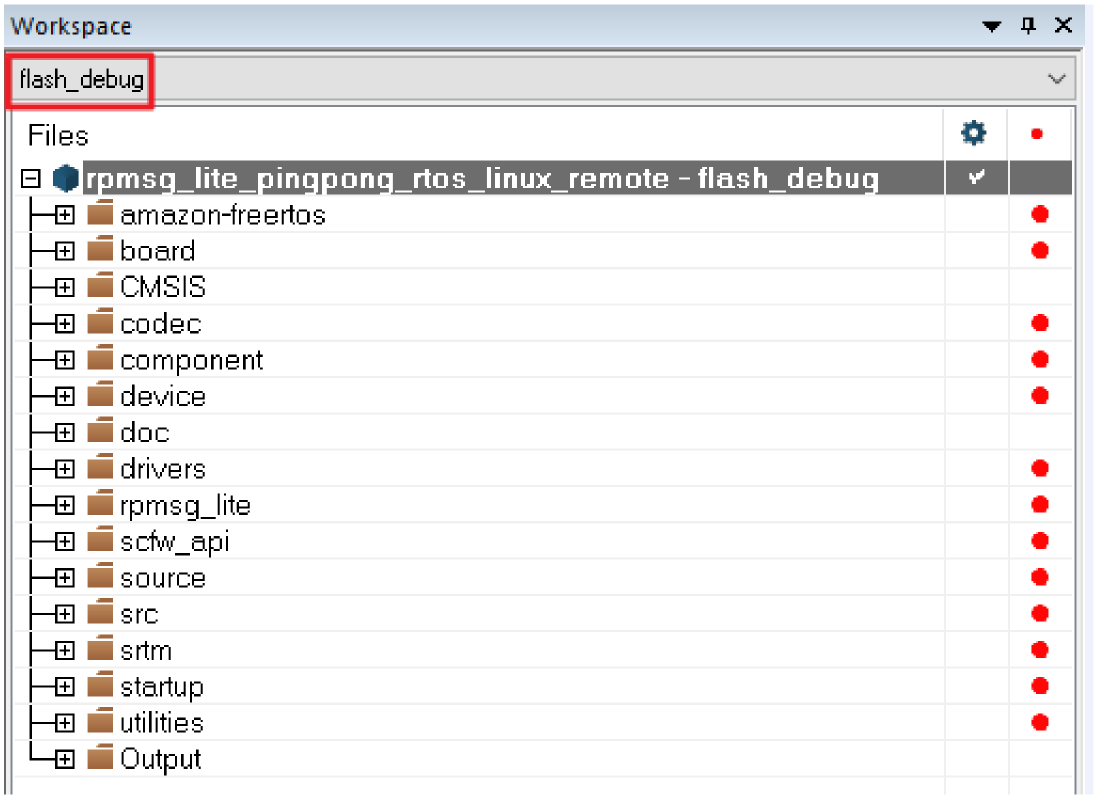


Figure 23. Demo build target selection

3. To build the demo application, click **Make**, highlighted in red in Figure 24.

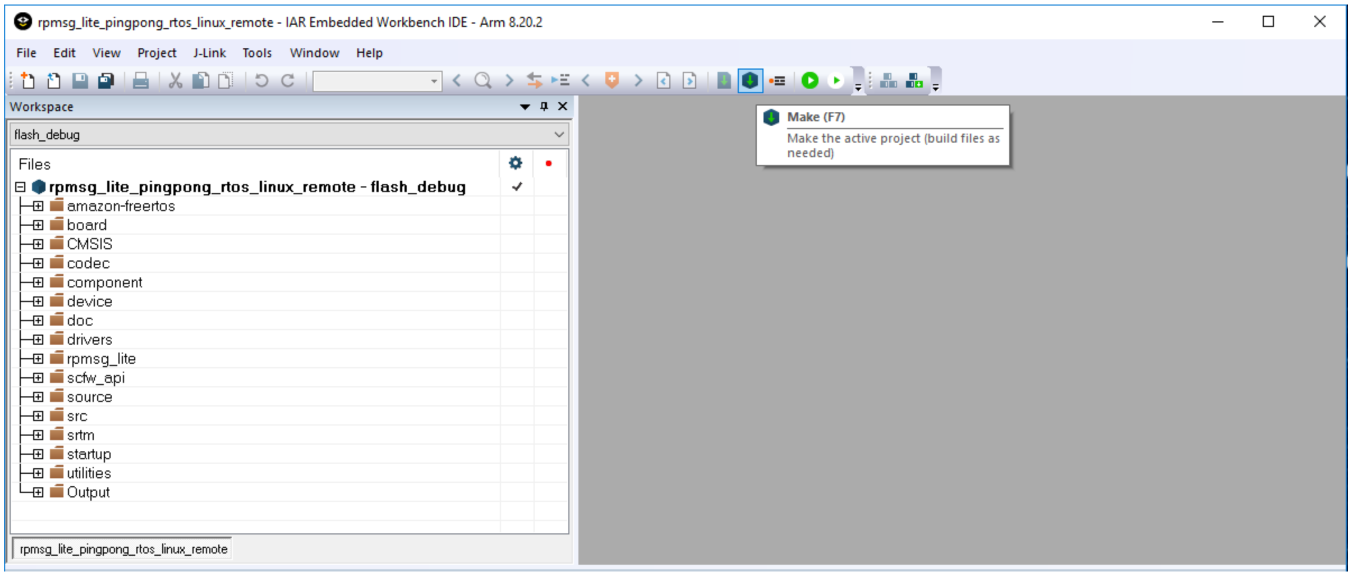

rpmsg_lite_pingpong_rtos_linux_remote - IAR Embedded Workbench IDE - Arm 8.20.2
File Edit View Project J-Link Tools Window Help
Workspace
flash_debug
Files
rpmsg_lite_pingpong_rtos_linux_remote - flash_debug
amazon-freertos
board
CMSIS
codec
component
device
doc
drivers
rpmsg_lite
scfw_api
source
src
srtm
startup
utilities
Output
rpmsg_lite_pingpong_rtos_linux_remote
Make (F7)
Make the active project (build files as needed)

Figure 24. Building the demo application

4. The build completes without errors.
5. Step 1-4 are used for IAR toolchain to build the flash target M4 demo. For ARMGCC toolchain, simply run the `build_flash_debug` or `build_flash_release` script to build the flash target M4 demo.
6. Rename the generated `rpmsg_lite_pingpong_rtos_linux_remote.bin` to `m4_image.bin`, then copy it to the `mkimage` tool under `imx-mkimg/iMX8QX`.
7. There are two targets to generate `flash.bin` which contains the XIP M4 target in `imx-mkimage`:

   - `flash_m4_xip`: To generate a `flash.bin` which only contains the M4 XIP image.
   - `flash_linux_m4_xip`: To generate a `flash.bin` which contains both M4 XIP and U-Boot.

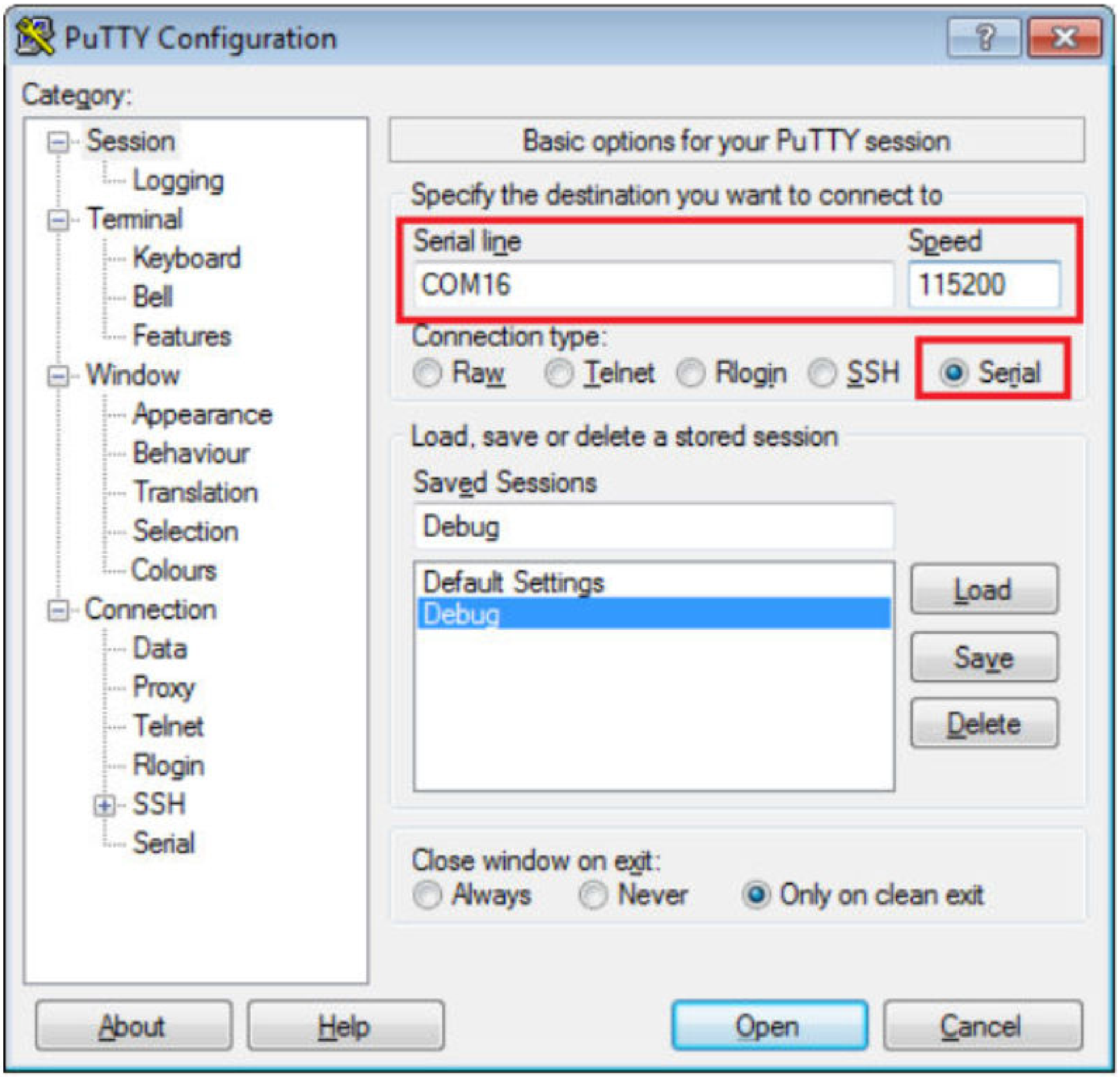
   Use `make SOC=iMX8QX REV=C0 flash_m4_xip` or `make SOC=iMX8QX REV=C0 flash_linux_m4_xip` to generate the desired `flash.bin`.

8. Use `make SOC=iMX8QX flash_flexspi` to generate a `flash.bin` which contains flexspi U-Boot. Rename this to `flash_uboot.bin` for future use.

8.3 Run an example application

To download and run the application via UUU, perform these steps:

1. Connect the development platform to your PC via USB cable between the J11 USB DEBUG connector and the PC. It provides console output while using UUU.
2. Connect the J10 USB Type-C connector and the PC. It provides the data path for UUU.
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 baud rate
   b. No parity
   c. 8 data bits
   d. 1 stop bit



Basic options for your PuTTY session

Specify the destination you want to connect to

Serial line: COM16

Speed: 115200

Connection type: Raw Telnet Rlogin SSH [✓ Serial]

Load, save or delete a stored session

Saved Sessions: Debug

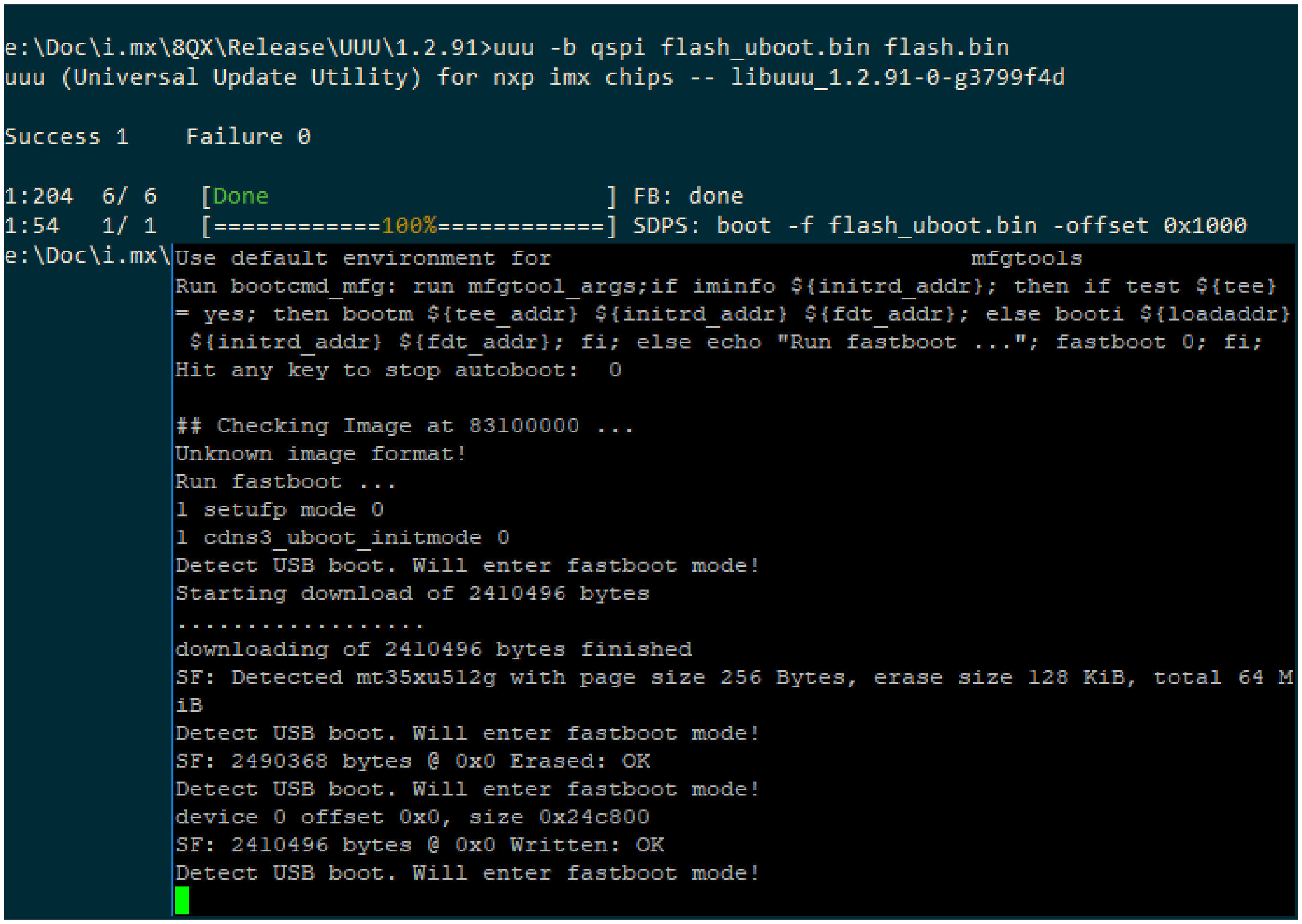
Default Settings
Debug

Close window on exit: Always Never [✓ Only on clean exit]

Figure 25. Terminal (PuTTY) configuration

4. In the command line, execute uuu with the *-b qspi* switch: `uuu -b qspi flash_uboot.bin flash.bin`

   The UUU puts the platform into fast boot mode and automatically flashes the target bootloader to QSPI. The command line and fast boot console is as shown in Figure 26.



```
e:\Doc\i.mx\8QX\Release\UUU\1.2.91>uuu -b qspi flash_uboot.bin flash.bin
uuu (Universal Update Utility) for nxp imx chips -- libuuu_1.2.91-0-g3799f4d

Success 1    Failure 0

1:204  6/ 6   [Done                          ] FB: done
1:54   1/ 1   [============100%============] SDPS: boot -f flash_uboot.bin -offset 0x1000
e:\Doc\i.mx\
```

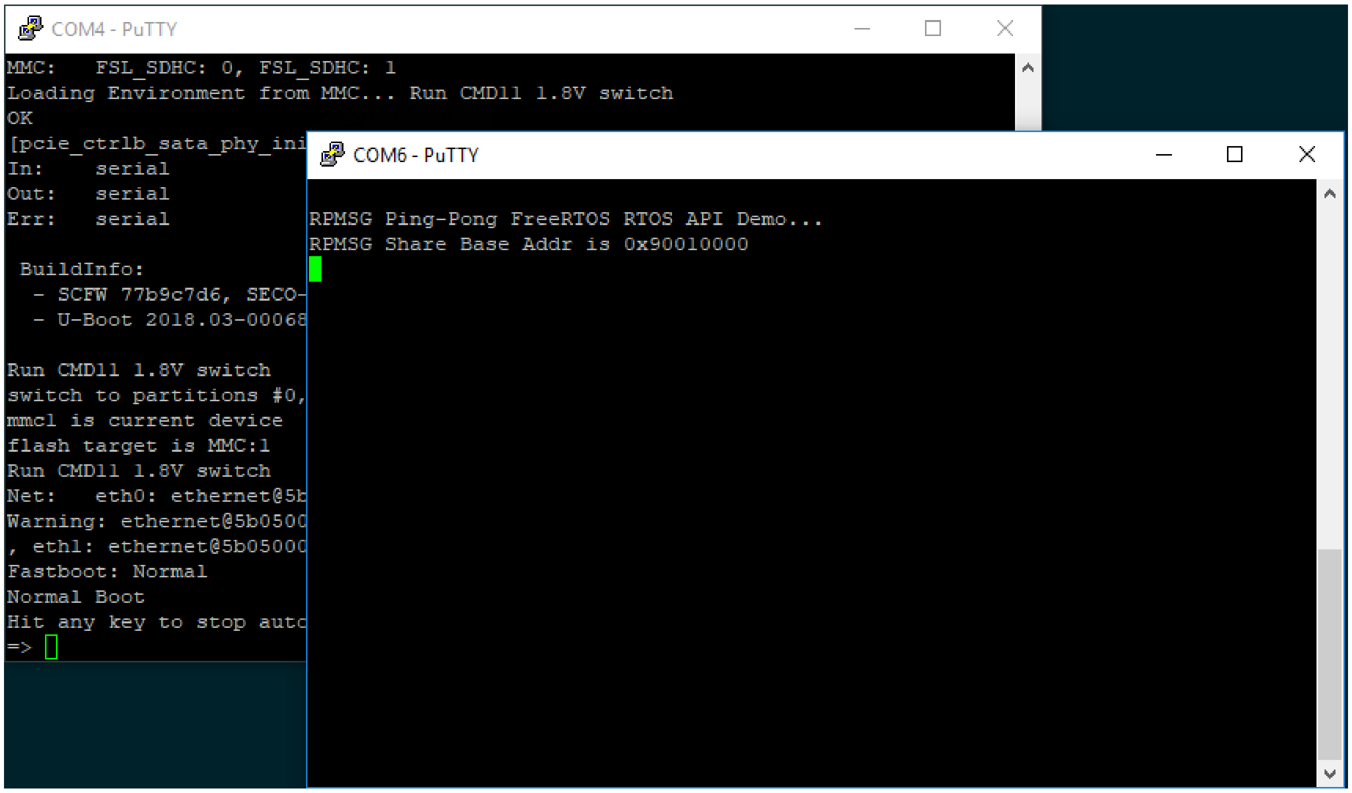
```
Use default environment for                              mfgtools
Run bootcmd_mfg: run mfgtool_args;if iminfo ${initrd_addr}; then if test ${tee}
= yes; then bootm ${tee_addr} ${initrd_addr} ${fdt_addr}; else booti ${loadaddr}
 ${initrd_addr} ${fdt_addr}; fi; else echo "Run fastboot ..."; fastboot 0; fi;
Hit any key to stop autoboot:  0

## Checking Image at 83100000 ...
Unknown image format!
Run fastboot ...
1 setufp mode 0
1 cdns3_uboot_initmode 0
Detect USB boot. Will enter fastboot mode!
Starting download of 2410496 bytes
..................
downloading of 2410496 bytes finished
SF: Detected mt35xu512g with page size 256 Bytes, erase size 128 KiB, total 64 M
iB
Detect USB boot. Will enter fastboot mode!
SF: 2490368 bytes @ 0x0 Erased: OK
Detect USB boot. Will enter fastboot mode!
device 0 offset 0x0, size 0x24c800
SF: 2410496 bytes @ 0x0 Written: OK
Detect USB boot. Will enter fastboot mode!
```

Figure 26. Command line and fast boot console output when executing UUU

In this example, the `flash.bin` is generated using the `flash_linux_m4_xip` target, which contains both M4 XIP and U-Boot.

5. Then, power off the board and change the boot mode to `QSPI[b'0110]` , and power on the board again. The two UART consoles display the U-Boot and M4 demo output respectively.
6. Use following command in U-Boot to kickoff m7:

```
sf probe
bootaux 0x8000000
```



```
MMC:   FSL_SDHC: 0, FSL_SDHC: 1
Loading Environment from MMC... Run CMD11 1.8V switch
OK
[pcie_ctrlb_sata_phy_ini
In:    serial
Out:   serial
Err:   serial

 BuildInfo:
  - SCFW 77b9c7d6, SECO-
  - U-Boot 2018.03-00068

Run CMD11 1.8V switch
switch to partitions #0,
mmc1 is current device
flash target is MMC:1
Run CMD11 1.8V switch
Net:   eth0: ethernet@5b
Warning: ethernet@5b050C
, eth1: ethernet@5b05000
Fastboot: Normal
Normal Boot
Hit any key to stop autc
=>
```

```
RPMSG Ping-Pong FreeRTOS RTOS API Demo...
RPMSG Share Base Addr is 0x90010000
```

Figure 27. Console output from QSPI Boot

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.

- **Linux:**

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

  ```
  $ dmesg | grep ttyUSB]
  [434269.853961] usb 2-2.1: FTDI USB Serial Device converter now attached to ttyUSB0
  [434269.857824] usb 2-2.1: FTDI USB Serial Device converter now attached to ttyUSB1
  ```

  There are two Ports. The first is the Cortex-A debug console, and the second is for the CM4 debug console.

- **Windows:**

  a. To determine the COM port, open the Windows operating system Device Manager. This can be achieved by going to the Windows operating system Start menu and typing **Device Manager** in the search bar, as shown in Figure A-1.

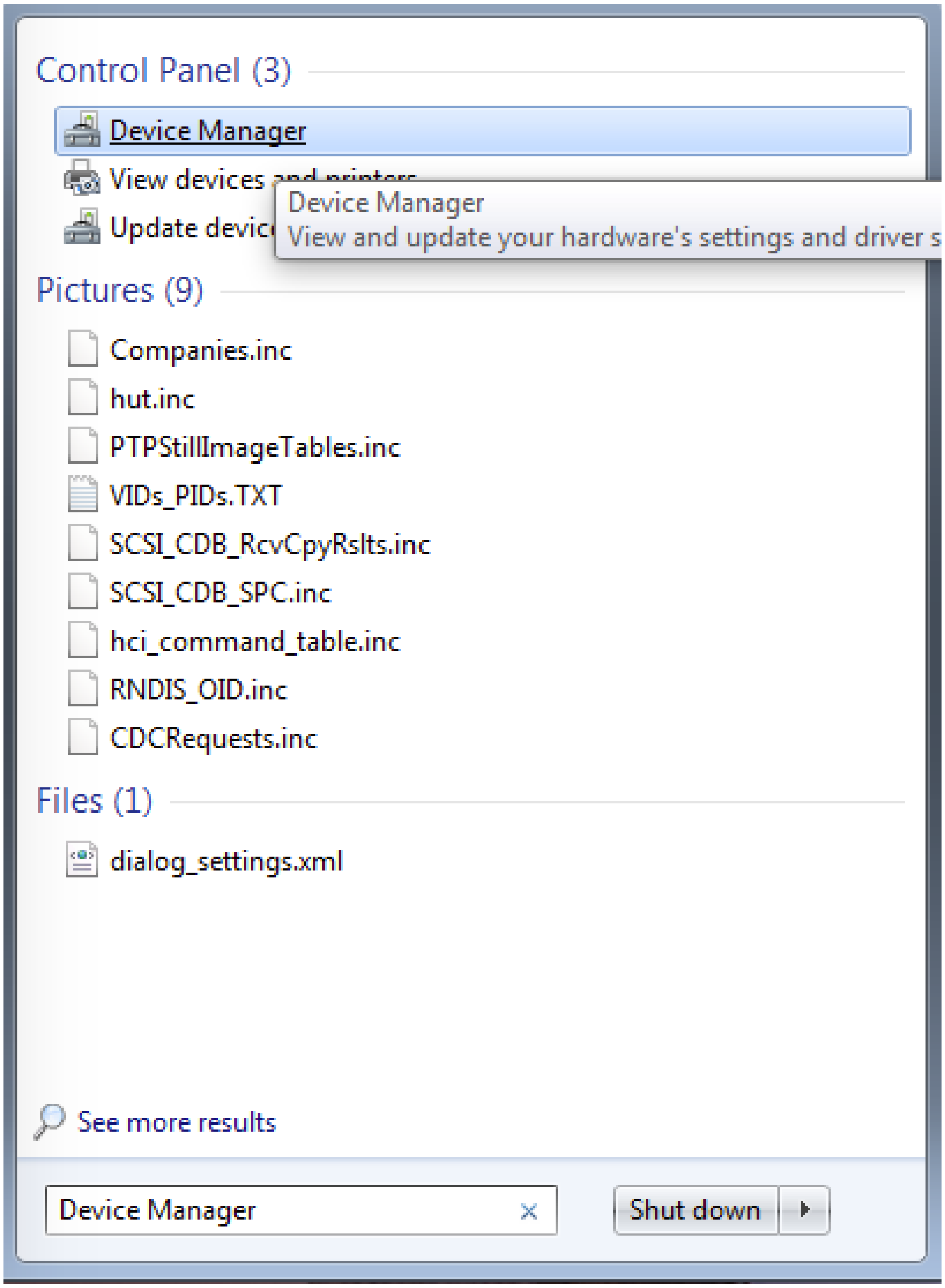
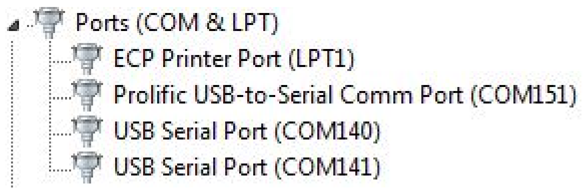


Figure A-1. Device manager

b. In the **Device Manager**, expand the **Ports (COM & LPT)** section to view the available ports.

   1. USB-UART interface



Ports (COM & LPT)
ECP Printer Port (LPT1)
Prolific USB-to-Serial Comm Port (COM151)
USB Serial Port (COM140)
USB Serial Port (COM141)

Figure A-2. USB-UART interface

There will be four ports. The first is the Cortex-A debug console, and the second is for the CM4 debug console.

Appendix B Host Setup

An MCU SDK build requires that some packages are installed on the Host. Depending on the used Host Operating System, the following tools should be installed.

- **Linux:**
  - Cmake

```
$ sudo apt-get install cmake
$ # Check the version >= 3.0.x
$ cmake --version
```

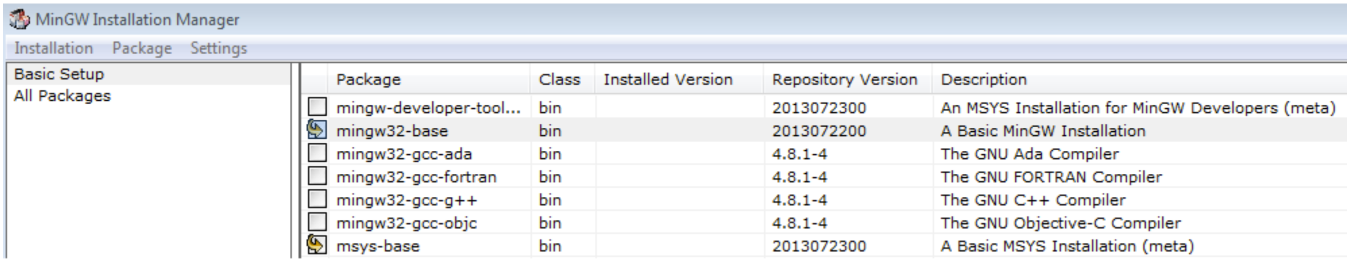
- **Windows:**
  - MinGW

    The Minimalist GNU for Windows OS (MinGW) development tools provide a set of tools that are not dependent on the third-party C-Runtime DLLs (such as Cygwin). The build environment used by the SDK does not utilize 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 the **Basic Setup**.



Package	Class	Installed Version	Repository Version	Description
☐ mingw-developer-tool...	bin		2013072300	An MSYS Installation for MinGW Developers (meta)
✓ mingw32-base	bin		2013072200	A Basic MinGW Installation
☐ mingw32-gcc-ada	bin		4.8.1-4	The GNU Ada Compiler
☐ mingw32-gcc-fortran	bin		4.8.1-4	The GNU FORTRAN Compiler
☐ mingw32-gcc-g++	bin		4.8.1-4	The GNU C++ Compiler
☐ mingw32-gcc-objc	bin		4.8.1-4	The GNU Objective-C Compiler
✓ msys-base	bin		2013072300	A Basic MSYS Installation (meta)

Figure B-1. Setup MinGW and MSYS

    4. Click **Apply Changes** in the **Installation** menu and follow the remaining instructions to complete the installation.

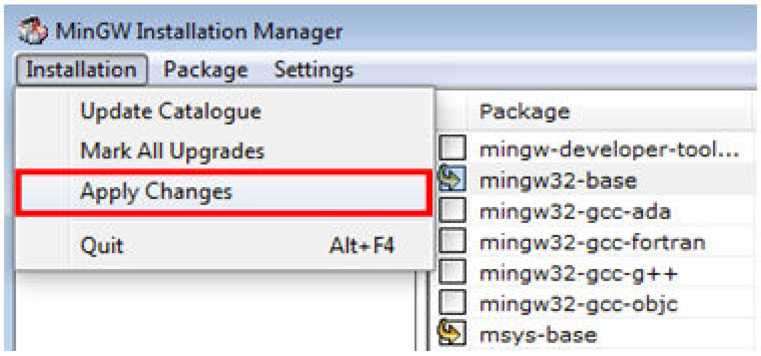


Figure B-2. Complete MinGW and MSYS installation

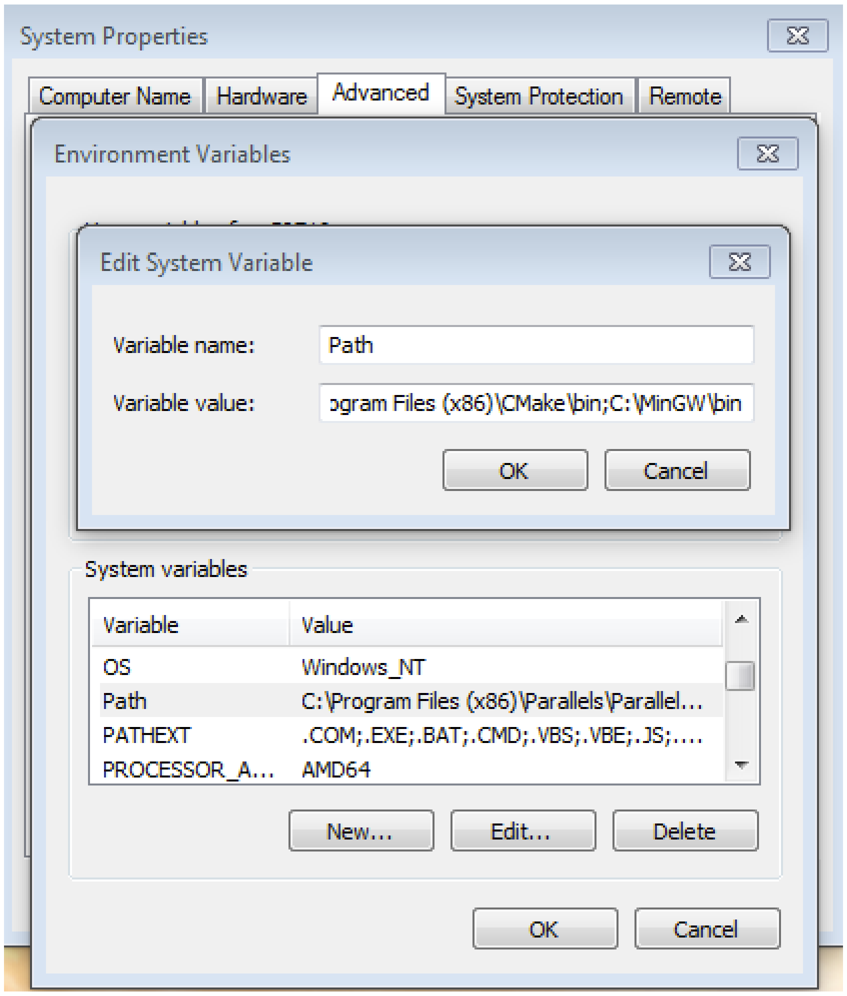
5. Add the appropriate item to the Windows operating system path environment variable. It can be found under **Control Panel** -> **System and Security** -> **System** -> **Advanced System Settings** in the **Environment Variables...** section. The path is:

   ```
   <mingw_install_dir>\bin
   ```

   Assuming the default installation path, *C:\MinGW*, an example is shown in Figure B-1. If the path is not set correctly, the toolchain does not work.

   NOTE

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



Variable name: Path

Variable value: ɔgram Files (x86)\CMake\bin;C:\MinGW\bin

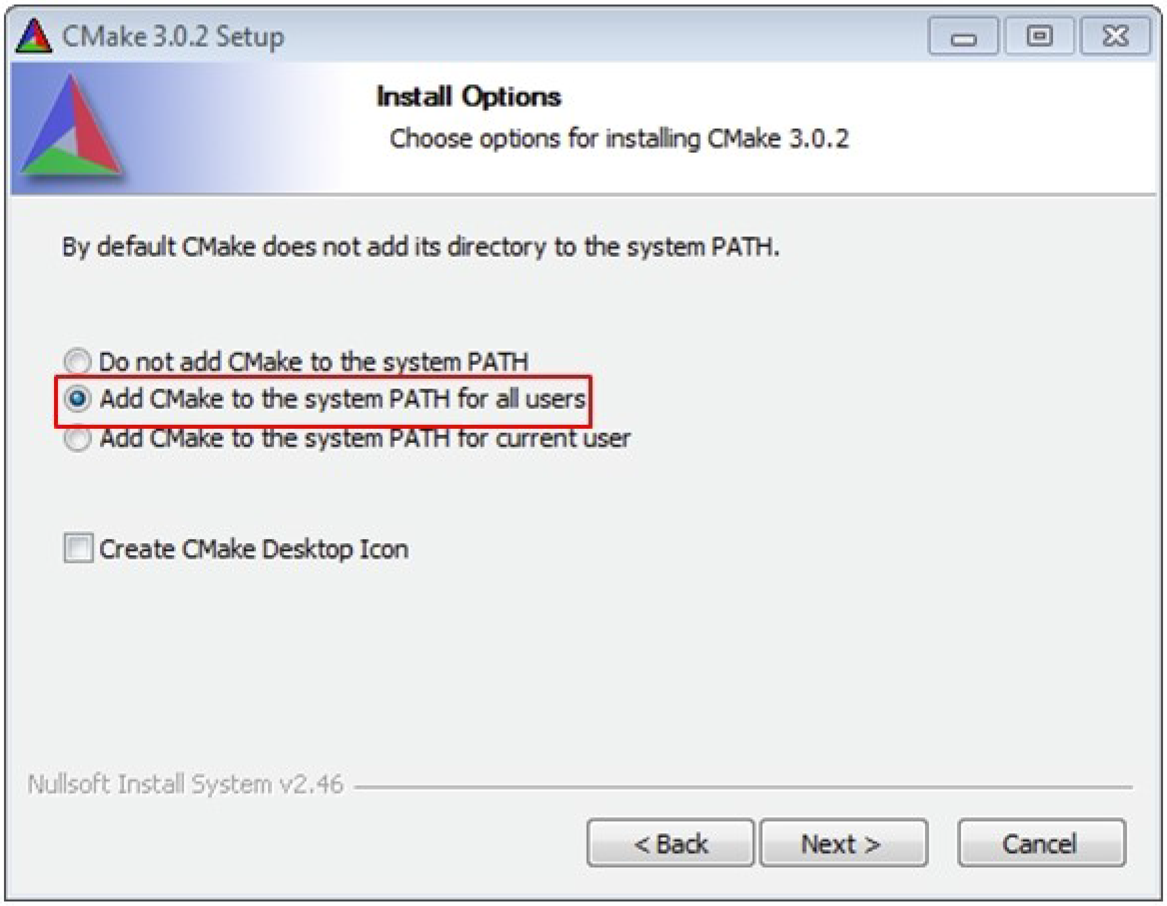
Variable	Value
OS	Windows_NT
Path	C:\Program Files (x86)\Parallels\Parallel...
PATHEXT	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;....
PROCESSOR_A...	AMD64

Figure B-3. Add Path to systems environment

- Cmake

  a. Download CMake 3.0.x from www.cmake.org/cmake/resources/software.html.

  b. Install CMake, ensuring that the option of **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.


CMake 3.0.2 Setup

Install Options

Choose options for installing CMake 3.0.2

By default CMake does not add its directory to the system PATH.

- ○ Do not add CMake to the system PATH
- ● Add CMake to the system PATH for all users
- ○ Add CMake to the system PATH for current user

☐ Create CMake Desktop Icon

Nullsoft Install System v2.46

Figure B-4. Install Cmake

c. Follow the remaining instructions of the installer.

d. You may need to reboot your system for the PATH changes to take effect.

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