BIOS-MCSDK

Getting Started Guide

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BIOS MCSDK 2.0 Getting Started Guide

BIOS Multicore Software Development Kit
Version 2.x
Getting Started Guide

Last updated: //

Introduction

The BIOS Multicore Software Development Kit (MCSDK) provides the core foundational building blocks that facilitate application software development on TI's high performance and multicore DSPs. The foundational components include:

- SYS/BIOS which is a light-weight real-time embedded operating system for TI devices
- Chip support libraries, drivers, and basic platform utilities
- Interprocessor communication for communication across cores and devices
- Basic networking stack and protocols
- Optimized application-specific and application non-specific algorithm libraries
- Debug and instrumentation
- Bootloaders and boot utilities
- Demonstrations and examples

Specifically, this *Getting Started Guide* provides information on installing the BIOS Multicore Software Development Kit, loading the EVM out-of-box demonstration application via JTAG, and running the out-of-box demonstration application. It is expected the user has gone through the EVM *Quick Start Guide* provided with their EVM and have booted the out-of-box demonstration application flashed on the device.

By the end of this *Getting Started Guide* the user should have:

- Installed CCS
- Installed latest Emulation Package
- Installed the BIOS-MCSDK Software
- Connected to the EVM via CCS/JTAG
- Loaded the out-of-box demonstration application onto the device via JTAG
- Executed the out-of-box demonstration application

Useful Tip

After completing the material in this *Getting Started Guide*, it is recommended the user continue on to the BIOS MCSDK User's Guide for additional information on the MCSDK software elements and to get started with development using the BIOS-MCSDK.

Acronyms and Definitions

The following acronyms are used throughout this document.

Acronym	Meaning
AMC	Advanced Mezzanine Card
CCS	Texas Instruments Code Composer Studio
CSL	Texas Instruments Chip Support Library
DDR	Double Data Rate
DHCP	Dynamic Host Configuration Protocol
DSP	Digital Signal Processor
DVT	Texas Instruments Data Analysis and Visualization Technology
EDMA	Enhanced Direct Memory Access
EEPROM	Electrically Erasable Programmable Read-Only Memory
EVM	Evaluation Module, hardware platform containing the Texas Instruments DSP
HUA	High Performance Digital Signal Processor Utility Application
HTTP	HyperText Transfer Protocol
IP	Internet Protocol
IPC	Texas Instruments Inter-Processor Communication Development Kit
JTAG	Joint Test Action Group
MCSA	Texas Instruments Multi-Core System Analyzer
MCSDK	Texas Instruments Multi-Core Software Development Kit
NDK	Texas Instruments Network Development Kit (IP Stack)
NIMU	Texas Instruments Network Interface Management Unit
PDK	Texas Instruments Programmers Development Kit
RAM	Random Access Memory
RTSC	Eclipse Real-Time Software Components
SRIO	Serial Rapid IO
TCP	Transmission Control Protocol
TI	Texas Instruments
UART	Universal Asynchronous Receiver/Transmitter
UDP	User Datagram Protocol

UIA	Texas Instruments Unified Instrumentation Architecture
USB	Universal Serial Bus

Note: We use the abbreviation TMS when referring to a specific TI device (processor) and the abbreviation TMD when referring to a specific platform that the processor is on. For example, TMS320C6678 refers to the C6678 DSP processor and TMDSEVM6678L refers to the actual hardware EVM that the processor is on.

Supported Devices/Platforms

This release supports the following Texas Instrument devices/platforms:

Platform Development Kit	Supported Devices	Supported EVM
C6657 [1]	TMS320C6657 [2]	TMDXEVM6657L [3], TMDXEVM6657LE [3]
C6670	TMS320C6670 [4], TMS320TCI6618 [5]	TMDSEVM6670L [6], TMDSEVM6670LE [6],TMDSEVM6670LXE [6], TMDSEVM6618LXE
C6678	TMS320C6678 [7], TMS320TCI6608 [8]	TMDSEVM6678L [9], TMDSEVM6678LE [9], TMDSEVM6678LXE [9]

What's in this Kit?

The kit contains:

- **EVM Board**: This board contains a Multicore System-on-Chip.
- **Universal Power Supply**: Both U.S. and European power specifications are supported.
- **Cables**: USB, Serial, and Ethernet cables are included to allow for host development.
- **Software DVD**: Software installers, documentation, factory images.
- **EVM Quick Start Guide**: Single page guide to get started run demos pre-flashed on board.

The Multicore EVM kit Software DVD includes:

- BIOS Multicore Software Development Kit installer
- Linux Multicore Software Development Kit tarball
- Code Composer Studio installer
- Factory image restoration process

The C66x EVMs will have the following content loaded in flash/EEPROM:

Note: The C6657 EVM has a 4 MB sized NOR.

Getting Started

This section will walk you through installing and using the BIOS Multicore Software Development Kit, including how to flash and run the out-of-box demonstration application, HUA. It is expected that you have gone through the EVM *Quick Start Guide* for your EVM and have booted the demonstration application flashed on the device.

The overall steps are:

1. Make sure your EVM hardware is set up
2. Install Code Composer Studio v5
3. Install latest emulation package
4. Install the BIOS-MCSDK 2.0
5. Use JTAG to load the application

6. Run the application

Hardware Setup

Follow instructions in one of the links below that correspond to the EVM that you are using

- TMDXEVM6657L EVM Hardware Setup [10] (use this link if you have a LE model)
- TMDSEVM6670L EVM Hardware Setup [11] (use this link if you have a LE or LXE model)
- TMDSEVM6678L EVM Hardware Setup [12] (use this link if you have a LE or LXE model)
- TMDSEVM6618LXE EVM Hardware Setup [13]

Installing Code Composer Studio

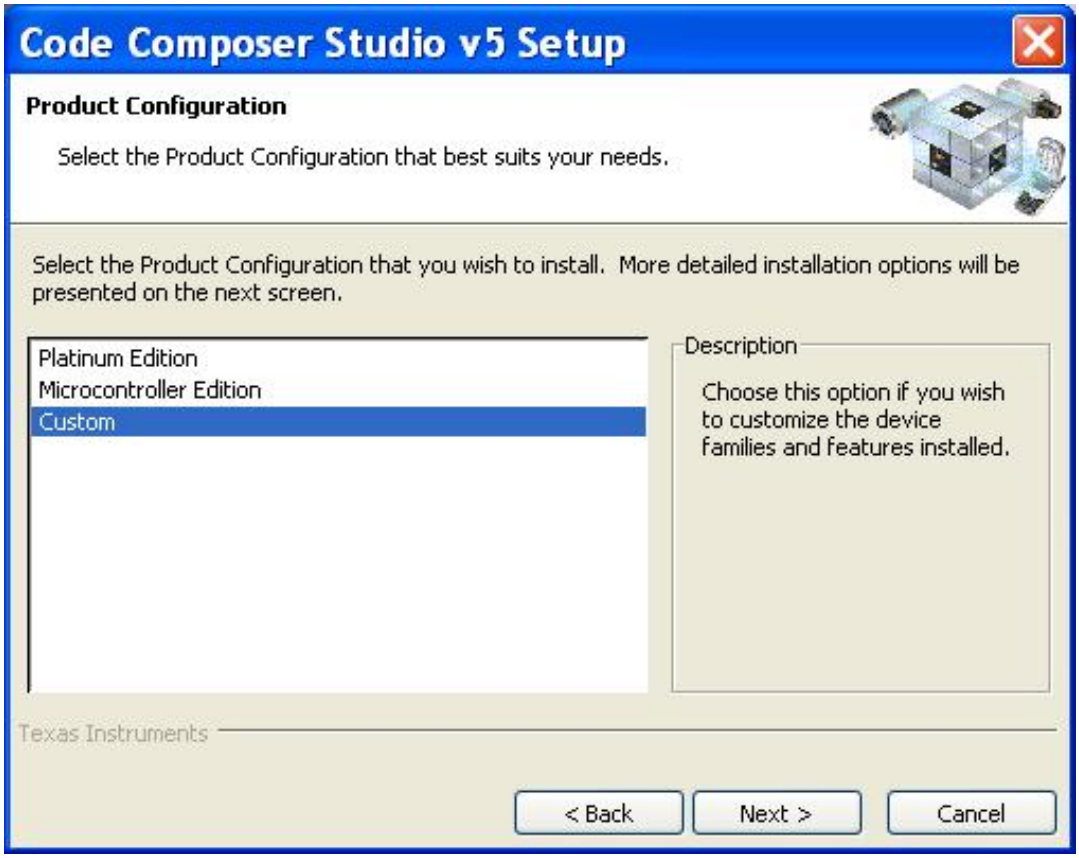
The BIOS-MCSDK 2.0 uses CCS v5. To install CCS please refer to the instructions provided in the CCSv5 Getting Started Guide [14].

When installing Code Composer Studio you can choose to control what is installed. For example, you may not want support for particular devices and ISA's. If you choose to do a custom installation, the following components must be installed to support the MCSDK:

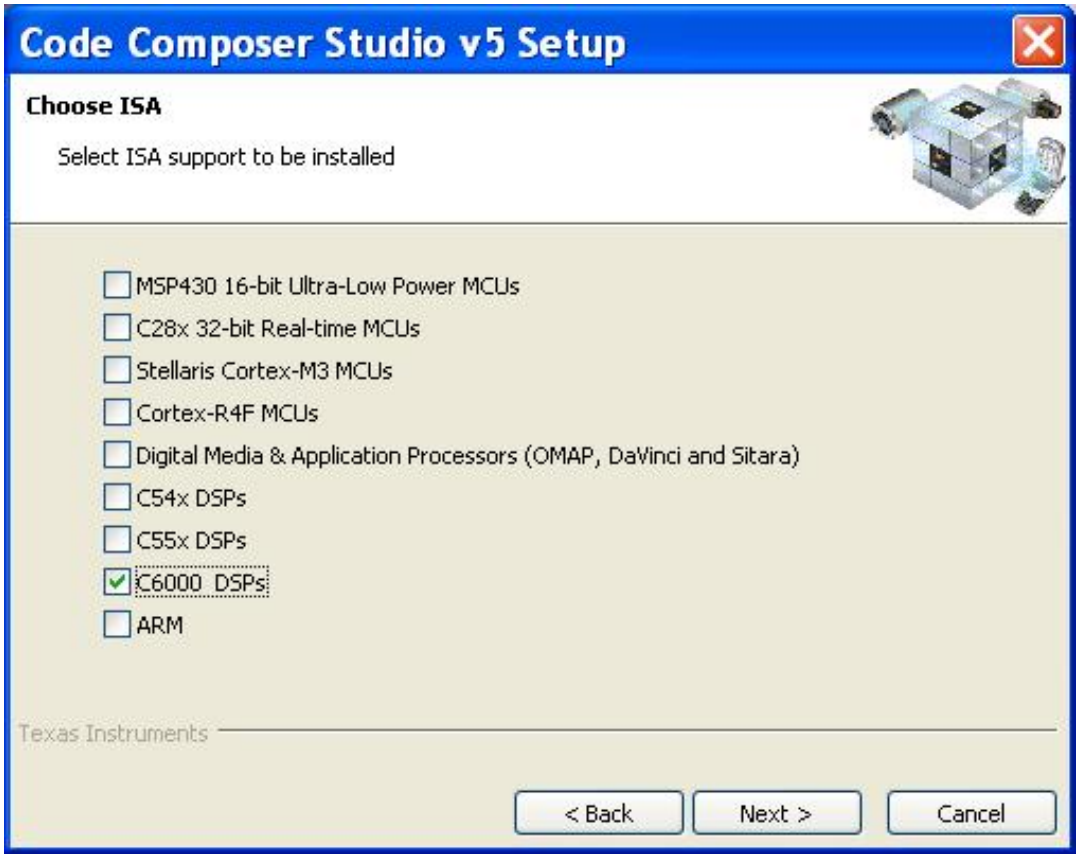
- SYS/BIOS 6
- IPC
- XDC
- All C6* DSP

Note: In Windows 7, install and run CCS/BIOS MCSDK in administrator mode, this will rule out issues with CCS start-up and RTSC component recognition

Sample Custom Installation snap shot:



Select C6000 DSPs during Choose ISA option



Installing Latest Emulation Package

The Emulation Package provides GEL files and XML files that are used to manually configure the EVM. It is needed if you are planning to use CCS to load an application. Ultimately, this configuration should come from the application itself.

The way to move to the latest version of the emulation package depends on the version of CCS that you are using:

- CCS 5.0.3 users:
  - Download the emupack zip file from the BIOS-MCSDK download page
  - Unzip to a temp directory (say c:\temp for windows OR ~/temp for Linux)
  - Please follow the instructions as per README.txt provided in the zip file.

Note: Please note that for CCS 5.0.3, there are no updates for the XML files needed.

- CCS 5.1 users:
  - Please install the emupack installer following the sequences as requested by the installer. This would update the necessary GEL files and the XML files needed to configure the EVM.

Installing the BIOS Multicore Software Development Kit

- After installing CCS, the next step is to install the BIOS-MCSDK. Please make sure CCS is closed before the installation of BIOS MCSDK. Some of the components installed by CCS may be updated by the BIOS-MCSDK installer; see the Release Notes for full details of components included in the installer. The development environment can be either Windows or Linux. The MCSDK installer allows you to choose the installation directory. The MCSDK install may include several sub-components as indicated in the Release Notes; all of the components will be installed in the same location.

Each software component comes as an *eclipse* plug-in. After installing BIOS-MCSDK, CCSv5 should recognize each of the plug-ins when it starts up. In CCSv5 window, Help->Help Contents will list all the available docs and

user can browse the docs from the help window.

Useful Tip

For CCS to discover the BIOS-MCSDK installation, install the BIOS-MCSDK package into one of the folders that CCS will be search by default. If any other directory outside these paths are selected for the installation, manually add that path into the tool discovery path in CCS, by using Window->Preferences menu in CCS. By default, CCS RTSC tool discovery paths are:

- C:/Program Files/Texas Instruments
- C:/[CCSv5_install_dir] (e.g.; *c:/TI*, if CCS is installed under *c:/TI* directory)

Getting the BIOS MCSDK

Please refer to Technical_Support_and_Product_Updates [15] link for getting the BIOS MCSDK software.

Note: Make sure CCS is closed before invoking the BIOS-MCSDK installer.

Run the Installer & Provide the installation path

On Windows OS

To install BIOS-MCSDK on your Windows PC run the MCSDK installer (bios_mcsdk_<version>_setupwin32.exe). It is recommended to keep the default installation paths for CCS and the other components (e.g., "C:\Program Files\Texas Instruments" and "C:\Program Files\Texas Instruments\ccsv5") or make sure that CCS and the other components are installed along the same path. This allows CCS to auto discover the components and generally makes things simpler.

On Linux OS

The instalation is tested on Ubuntu Linux distribution, but it expected to work on other Linux distributions as well. After downloading the Linux installer, (bios_mcsdk_<version>_setuplinux.bin), please change the attribute of the installer to executable and run the installer as shown below. `chmod +x bios_mcsdk_<version>_setuplinux.bin ./bios_mcsdk_<version>_setuplinux.bin`

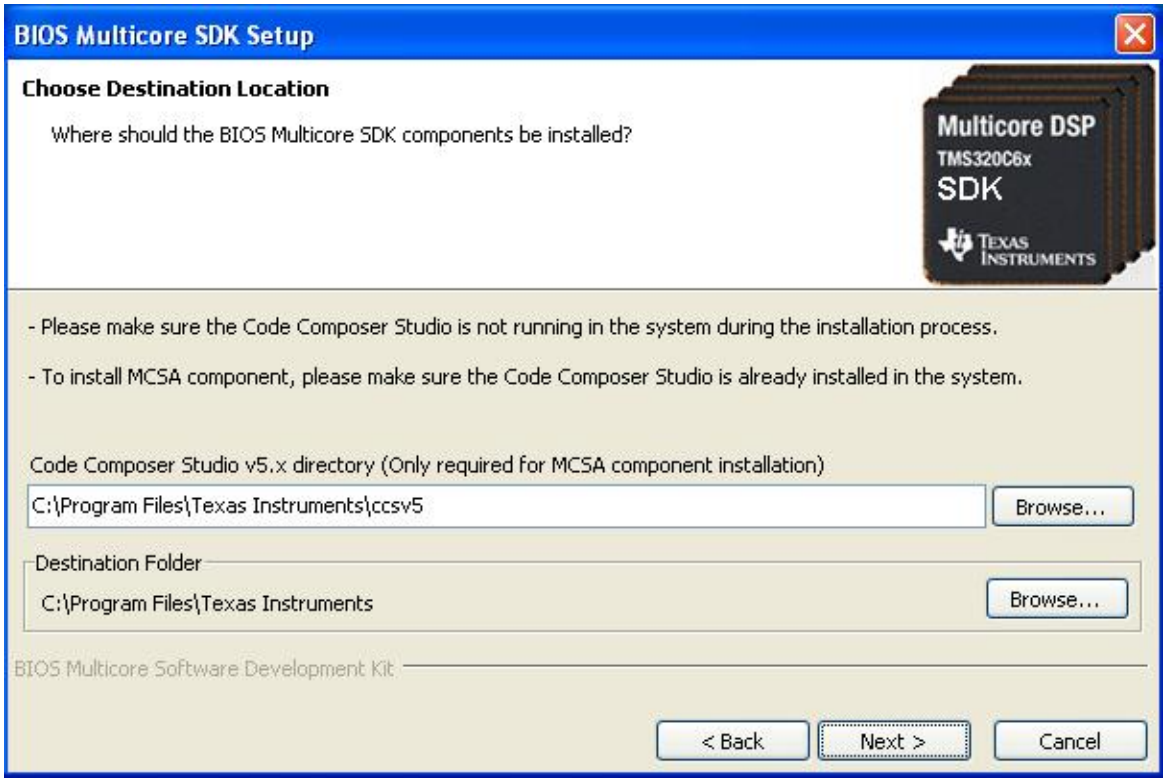
Note: If you are installing on a Windows 7 machine, modify the default path to "C:\Program Files\Texas Instruments". Otherwise, some of the CCS projects in the release may not build properly.

Note: MCSA (Multicore System Analyzer) which includes UIA + DVT will be installed under ccsv5 directory (for non CCSv5.1+ users only).

Note: The BIOS MCSDK installer might default to *C:\Program Files(x86)\Texas Instruments* for 64 bit machines. There are some projects in the BIOS MCSDK which assumes the default MCSDK installation directory to be *C:\Program Files\Texas Instruments*. The workaround would be to install BIOS MCSDK in *C:\Program Files\Texas Instruments* folder, then all the projects will re-compile without any change. If it is installed in *C:\Program Files(x86)\Texas Instruments* then minor tweaks might be required for few projects to re-compile.

The installer setup window would pop.

A sample setup window screen shot is shown as below.

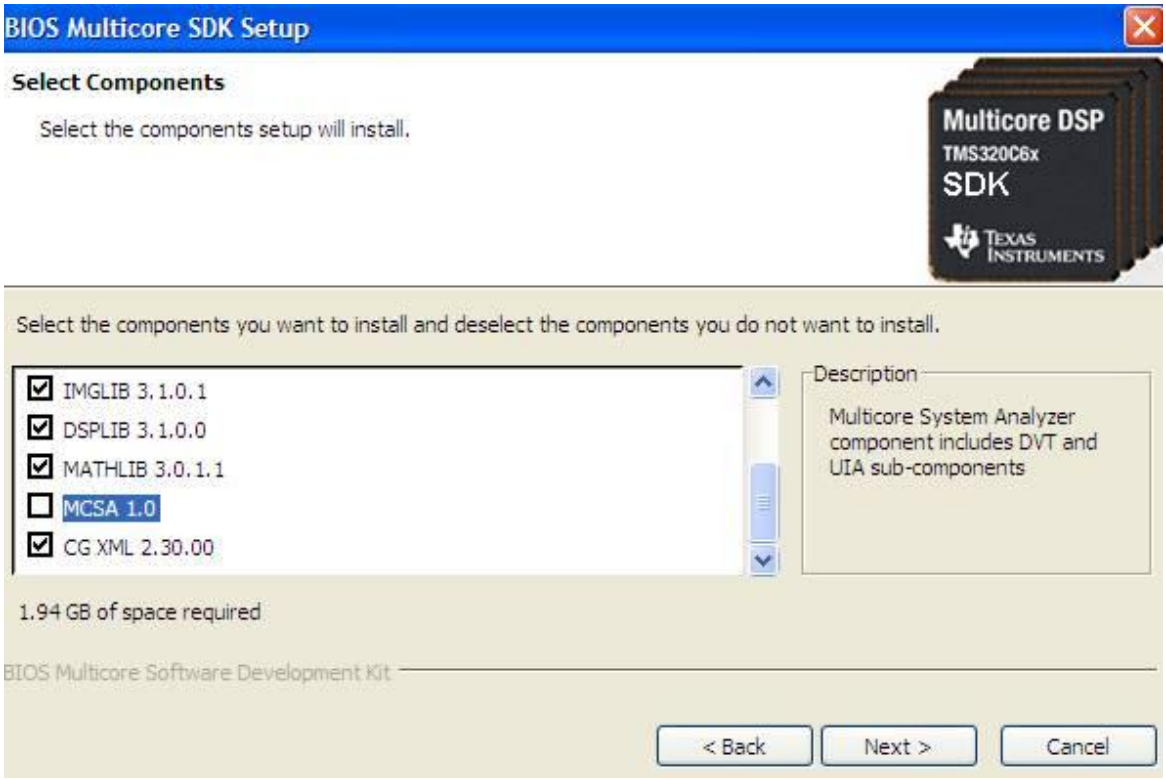


Please note that there are two paths that are asked to be entered:

1. CCSv5 installation path: This is *Not Applicable* for those who are using CCSv5.1+
2. BIOS-MCSDK Destination folder: This is the root directory where BIOS-MCSDK software will be installed. Please provide the install path to the PARENT ccsv5 directory to avoid manual RTSC discovery tool setup in CCSv5. If this cannot be done, see notes below to manually configure CCS to search for components in other directories.

Check/Uncheck MCSA depending on the CCS Version

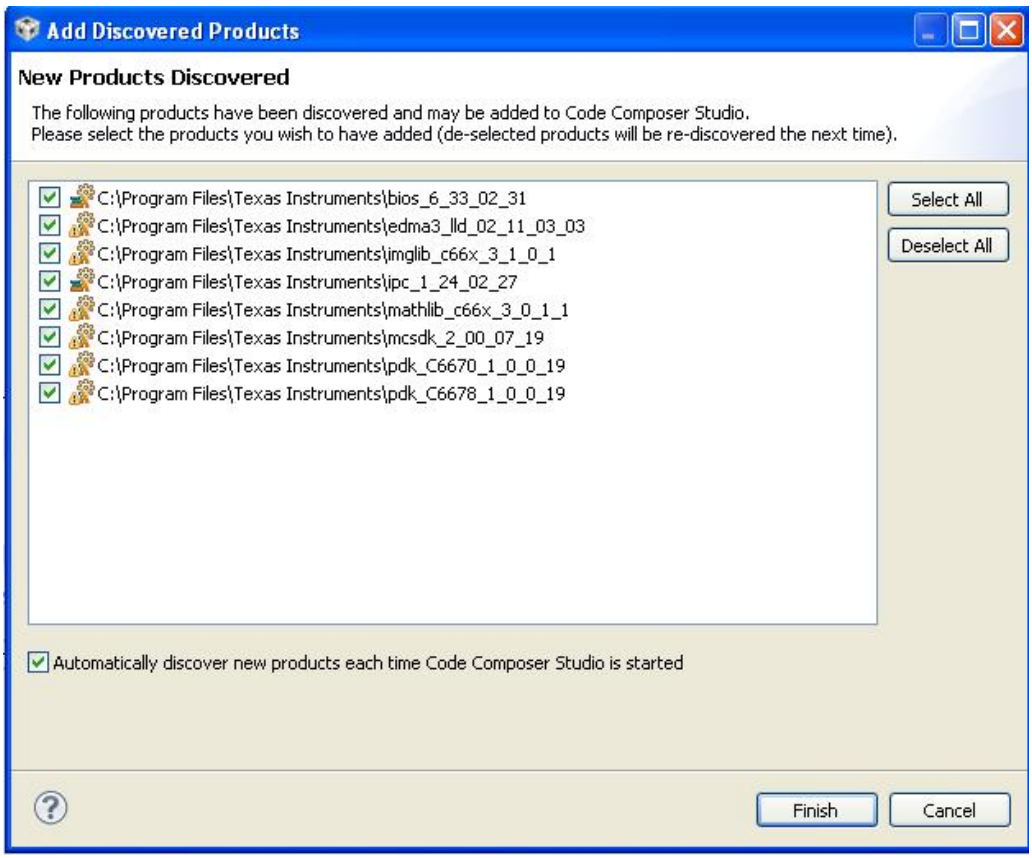
Due to a compatibility issue with CCS 5.1 [16], the MCSA component is not selected by default in the installer. If using CCS 5.0.3, please select this component to install it; starting from CCS 5.1, MCSA is included in the CCS installer.



Completing the Installation

After the installation of BIOS MCSDK, please invoke the CCSv5 and notice the new components that are installed by BIOS MCSDK are discovered by CCSv5. Please **check all the new discovered products and restart CCSv5**.

A sample screen shot in CCSv5 discovering new products is shown as below.

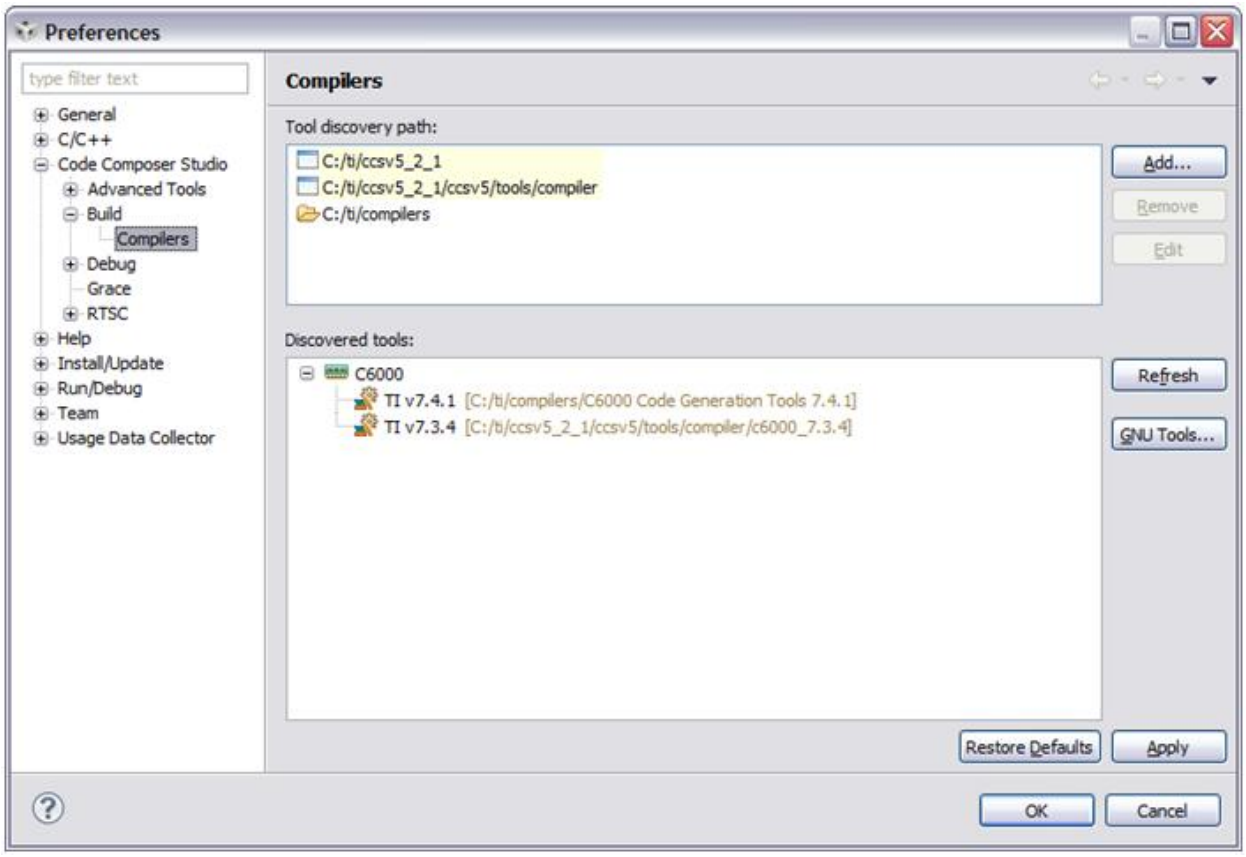


Please note that if you have installed MCSDK or/and the compiler in a path other than the default installation path, then you will need to tell CCS where to find these components.

The following instructions explain this process.

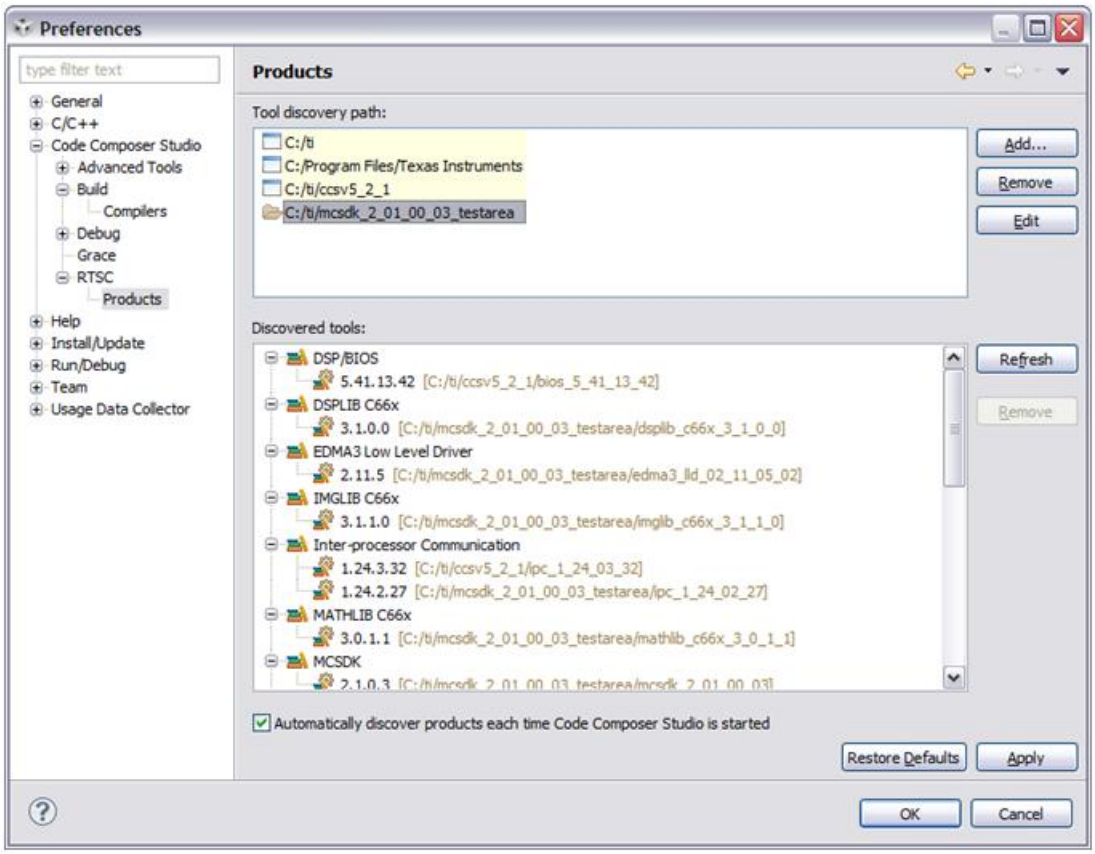
Instructions to Add Compiler Path to CCS

In CCS go to 'Window --> Preferences." This should bring up a window as shown in the snapshot below. Here go to 'Code Composer Studio --> Build --> Compilers' and add the path to where you installed the compiler. In this example, v7.3.4 was provided with CCS and v7.4.1 was subsequently installed. Once you add the path, CCS should show "TI v7.4.1" in the "Discovered tools" section.



Instructions to Add RTSC Products to CCS

In CCS go to 'Window --> Preferences." This should bring up a window as shown in the snapshot below. Here go to 'Code Composer Studio --> RTSC --> Products' and add the path to the parent folder where you installed MCSDK. Once you add the path, CCS should show the newly installed MCSDK software components in the "Discovered tools" sub-window.



If MCSDK components are still not recognized by CCS

If you are using Windows 7, and after doing the above steps CCS still does not recognize all MCSDK components, we'd recommend installing MCSDK from within CCS as follows:

a. Go to CCS, and select Help->Install New Software

b. Add the MCSDK repository (http:/ / software-dl. ti. com/ sdoemb/ sdoemb_public_sw/ bios_mcsdk/ eclipse/ mcsdk2x)

c. Choose SYS/BIOS MCSDK Features, and click Next.

d. Follow any instructions.

e. In the future to update components you can go to Help->Check for Updates, to automatically check this repository for new revisions

Sample Directory Structure after the installation

The BIOS-MCSDK install includes several sub-components, all of which (except for MCSA) will be installed in the same location. This location can be choosen using "Destination Folder". The BIOS-MCSDK installer also requires the location of an already installed CCSv5.0. This location is specified in "Code Composer Studio v5.0 Installation Directory" (this is the location to the "ccsv5" folder).

Once the installation is complete all the BIOS-MCSDK components will be installed in the specified installation directory. Each of the directories will be of the format <component_name>_<component version>. Please refer to individual components release notes for detailed information on the components or package.

A sample directory structure after a typical BIOS MCSDK default installation is shown below

```
+---bios_6_32_04_49
+---ccsv5
+---cg_xml
+---edma3_lld_02_11_02_04
+---imglib_c66x_3_0_1_0
+---ipc_1_23_01_26
+---mathlib_c66x_3_0_0_0
+---mcsdk_2_00_02_14
+---ndk_2_20_04_26
+---pdk_C6657_1_0_0_01
+---pdk_C6670_1_0_0_14
+---pdk_C6678_1_0_0_14
\---xdctools_3_22_01_21
```

Use JTAG to Load the Application

The following steps will guide you through connecting the JTAG to the EVM. These instructions are for the on-board XDS100 emulator on the TMDSEVMxxxxL EVM. For LE or LXE models, the procedure is similar except as noted. For more information on the emulators, see the respective page for XDS100 or XDS560. A Target Configuration File tells CCS how to connect to the EVM (they reference device specific files which have been supplied and contain information about the EVM, SoC and interface being used). Without one, you will not be able to load or debug applications over JTAG using CCS.

1. Set the EVM Boot Mode to "No Boot" and power on the EVM. See the respective EVM Hardware Setup [17] page listed above for the Boot Mode table.
2. First time CCSv5 users needs to follow the steps described in CCSv5_Running_for_the_first_time [18] page.
3. The above procedure will open up the CCSv5 GUI.
4. Create a New Target Configuration, by selecting the tab *File->New* and clicking *Target Configuration File*.
5. Enter a configuration file name (say "evmc6678l_xds100v1.ccxml") in the file name field and hit finish button (the procedure assumes you are using On-board XDS100-class USB emulation).
6. Select the connection type as "Texas Instruments XDS100v1 USB emulator" for XDS100 or "Blackhawk XDS560v2-USB Mezzanine Emulator" for XDS560 in the drop down list and enter device number in the *Device* search filed. Select the EVM device as specified in the Target Config figure and save the file by clicking *Save* button.
7. Click View->Target configurations to list the available target configurations. The configuration file (evmc6678l_xds100v1.ccxml) created above will be under "User Defined" section
8. Right click on the configuration file and select *Launch Selected Configuration*. This will launch the configuration and open the debug view.

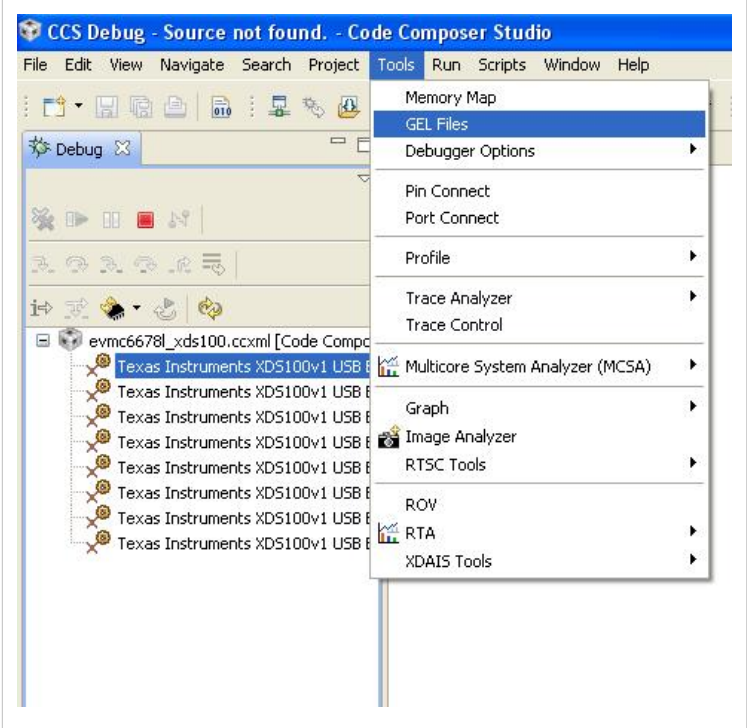
9. Right click on core0 and select *Connect Target* to connect to the target CPU. This step will require the board is powered up and the PC is connected to the board using USB.
10. Most of the development and debugging will require CCSv5. For more information on CCSv5 see the CCSv5 Getting Started Guide [14] page.

Loading and Setting up the EVM with the Gel file

Note: The same target GEL file is used for all different EVM models of the same processor (L, LE, LXE).

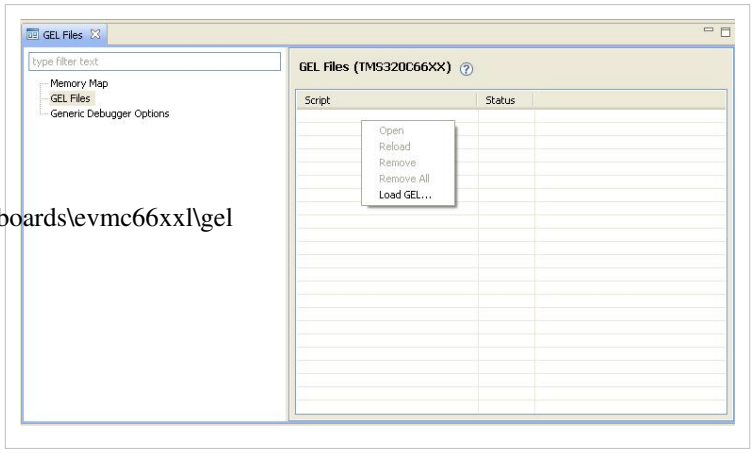
After the target configuration is launched, the GEL file can be set for each core. Before executing any application it is recommended to execute the GEL script *Global_Default_Setup* for the evmc66##l. The example below shows how to load and execute the GEL script from the GEL file for TMDSEVM6678xxx EVM.

1. Click on the core on which the GEL file needs to be loaded and select Tools->GEL Files from the Tools Menu. This is captured in the GEL Menu under CCSv5
2. Right-click on the first row of the empty list to get a Load GEL command

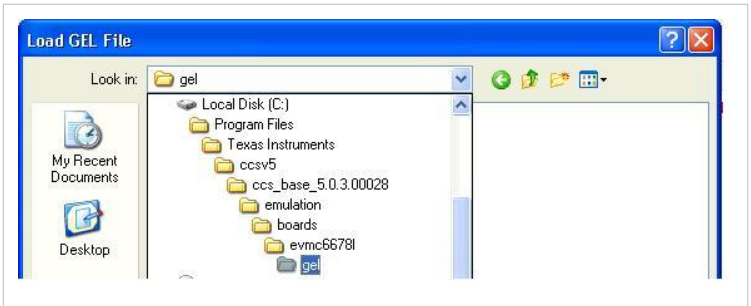


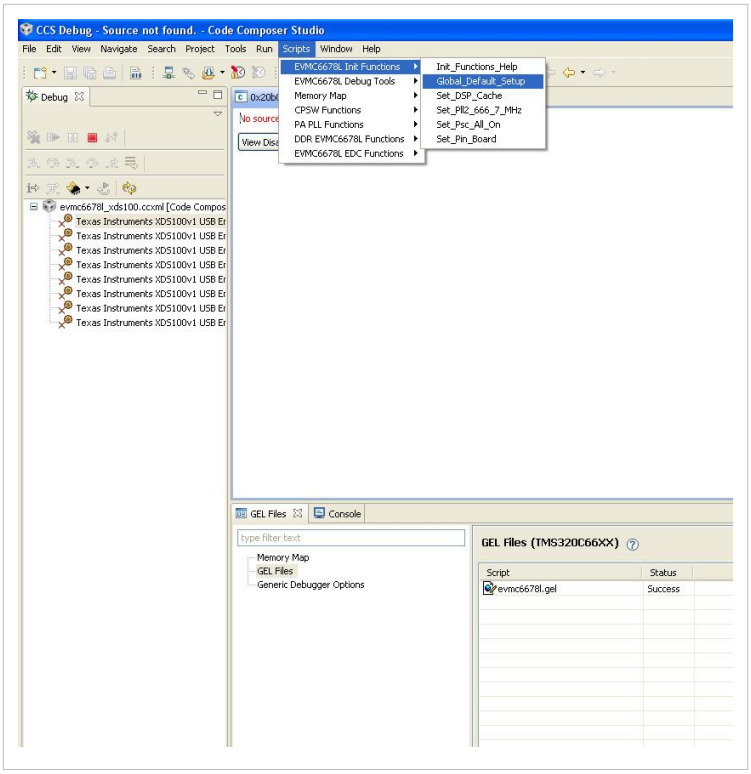
.

3. Execute the Load GEL command.
4. Browse & Open the GEL file. The evmc66xxl.gel GEL file is located under <CCS Installation Directory>\ccs_base_5.#.#.####\emulation\boards\evmc66xxl\gel directory.



5. Run Global_Default_Setup from the Scripts Menu.





Running the Demonstration Application

Demonstrations are pre-loaded on the EVM flash as indicated above [19]. The "out of box" demonstration is the High Performance DSP Utility Application (HUA). The following instructions use CCS to load the application via JTAG.

From a Windows PC

1. Enter the CCS debug view, select *Run->Load->Load Program*. The *Program File* field browse to *C:\Program Files\Texas Instruments\mcsdk_2_##_##_##\demos\hua\evmc66##l\Debug* and select *hua_evmc66##l.out* (this is the default location). It will load the program in the selected core.
2. Click on *Run->Resume* to run the demo on the target. In CCS 5.0, click on *Target->Run*.

From a Linux PC

1. Enter the CCS debug view, select *Run->Load->Load Program*. The *Program File* field browse to *$HOME/ti/mcsdk_2_##_##_##/demos/hua/evmc66##l/Debug* and select *hua_evmc66##l.out* (this is the default location). It will load the program in the selected core.
2. Click on *Run->Resume* to run the demo on the target. In CCS 5.0, click on *Target->Run*.

Note: The HUA demo runs in Static IP or DHCP mode depending on the User Switch 2. Please see the Hardware Setup section for information on switch settings and HUA Demonstration Guide for information on static IP configuration.

Note: The application will write messages simultaneously to the CCS console and the UART. Therefore you can use either the CCS Console or a serial port program to see them. When using DHCP this is the only way to get the IP address that was assigned to the unit (it will be displayed as Network Added: If-1 someip).

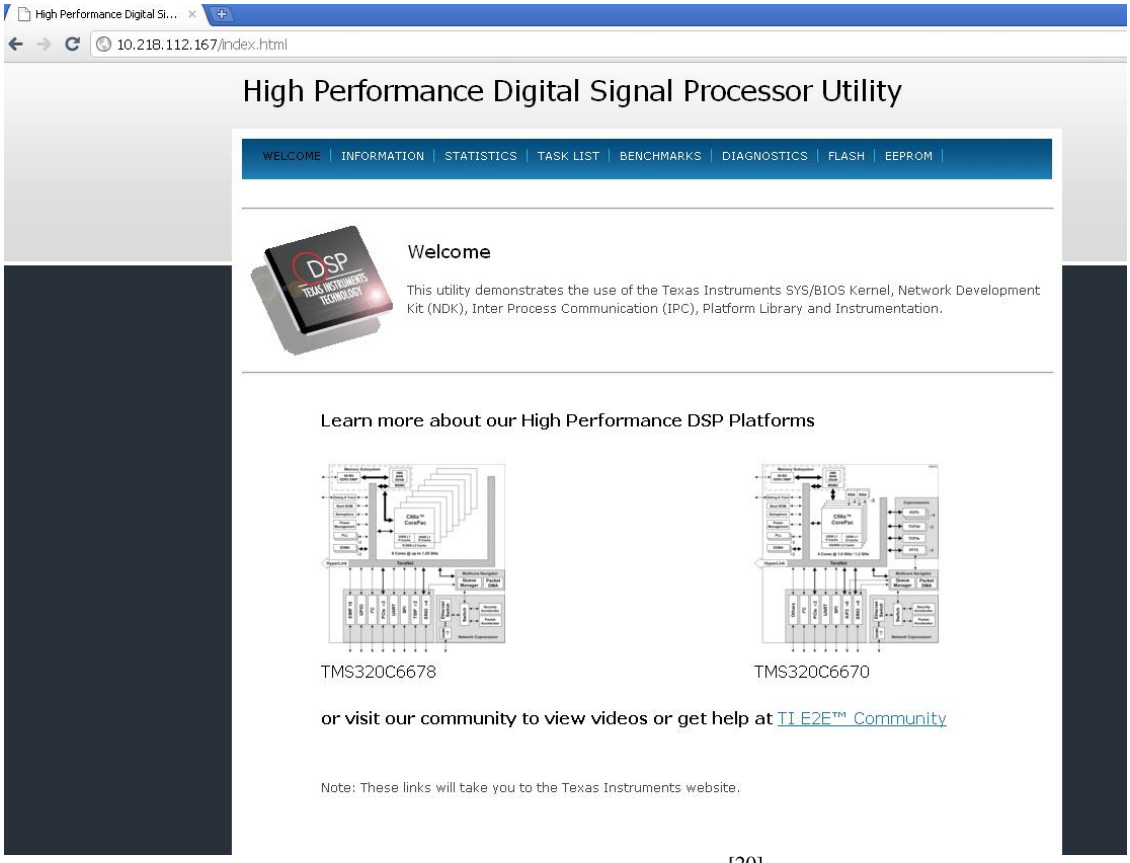
Settings for the serial port are

Baud Rate	115200
Data Bits	8
Stop Bits	1
Parity	None
Hardware Flow Control	None

After the application starts up you should see text similar to the following in the CCSv5 console and/or UART program window:

```
[C66xx_0] Start BIOS 6
[C66xx_0] HPDSPUA version 2.00.00.11
[C66xx_0] Configuring DHCP client
[C66xx_0] QMSS successfully initialized
[C66xx_0] CPPI successfully initialized
[C66xx_0] PASS successfully initialized
[C66xx_0] Ethernet subsystem successfully initialized
[C66xx_0] eventId : 48 and vectId : 7
[C66xx_0] Registration of the EMAC Successful, waiting for link up ..
[C66xx_0] Service Status: DHCPC    : Enabled  :          : 000
[C66xx_0] Service Status: THTTP    : Enabled  :          : 000
[C66xx_0] Service Status: DHCPC    : Enabled  : Running  : 000
[C66xx_0] Network Added: If-1:10.218.112.167
[C66xx_0] Service Status: DHCPC: Enabled: Running: 017
```

The IP address received through DHCP in this case is *10.218.112.167*. You can now open a web browser and in the address bar enter the IP address obtained. It will open up the HUA demo page.



For more information on HUA, see the HUA Demonstration Guide [20].

Technical Support and Product Updates

For technical discussions and issues, please visit

- **C66x Multicore forum**: http://e2e.ti.com/support/dsp/c6000_multi-core_dsps/f/639.aspx
- **BIOS Embedded Software forum**: http://e2e.ti.com/support/embedded/f/355.aspx
- **Code Composer Studio forum**: http://e2e.ti.com/support/development_tools/code_composer_studio/f/81/t/3131.aspx
- **TI C/C++ Compiler forum**: http://e2e.ti.com/support/development_tools/compiler/f/343/t/34317.aspx
- **Embedded Processors wiki**: http://processors.wiki.ti.com

For local support in China, please visit

- **China Support forum**: http://www.deyisupport.com

Note: When asking for help in the forum you should tag your posts in the Subject with “MCSDK”, the part number (e.g. “C6678”) and additionally the component (e.g. “NDK”).

For product updates,

- Visit **Multicore Software Development Kits**: http://focus.ti.com/docs/toolsw/folders/print/bioslinuxmcsdk.html
- Use the **CCS/Eclipse Update Manager** (see the User's Guide [15] for more information)

Note: The EVM comes with disks containing the MCSDK software and CCS. You can start with these or go to the MCSDK software download site listed above to check for the latest updates and version. The BIOS-MCSDK release download will also have pointers to applicable CCS and compiler release versions as well. Please review the release notes and software manifest before downloading and/or installing the software.

References

[1] http://processors.wiki.ti.com/index.php/Keystone_Device_Architecture
[2] http://www.ti.com/product/tms320c6657
[3] http://www.ti.com/tool/tmdxevm6657
[4] http://www.ti.com/product/tms320c6670
[5] http://www.ti.com/product/tms320tci6618
[6] http://www.ti.com/tool/tmdsevm6670
[7] http://www.ti.com/product/tms320c6678
[8] http://www.ti.com/product/tms320tci6608
[9] http://www.ti.com/tool/tmdsevm6678
[10] http://processors.wiki.ti.com/index.php/TMDSEVM6657L_EVM_Hardware_Setup
[11] http://processors.wiki.ti.com/index.php/TMDXEVM6670L_EVM_Hardware_Setup
[12] http://processors.wiki.ti.com/index.php/TMDXEVM6678L_EVM_Hardware_Setup
[13] http://processors.wiki.ti.com/index.php/TMDXEVM6618LXE_EVM_Hardware_Setup
[14] http://processors.wiki.ti.com/index.php/CCSv5_Getting_Started_Guide
[15] http://processors.wiki.ti.com/index.php/BIOS_MCSDK_2.0_User_Guide#Technical_Support_and_Product_Updates
[16] http://processors.wiki.ti.com/index.php/BIOS_MCSDK_2.0_User_Guide#Q:_Can_I_use_CCS_5.1_with_BIOS_MCSDK_2.0.3F
[17] http://processors.wiki.ti.com/index.php/BIOS_MCSDK_2.0_Getting_Started_Guide#Hardware_Setup
[18] http://processors.wiki.ti.com/index.php/GSG:CCSv5_Running_for_the_first_time
[19] http://processors.wiki.ti.com/index.php?title=BIOS_MCSDK_2.0_Getting_Started_Guide#What.27s_in_this_Kit.3F
[20] http://processors.wiki.ti.com/index.php/MCSDK_HUA_Demonstration_Guide

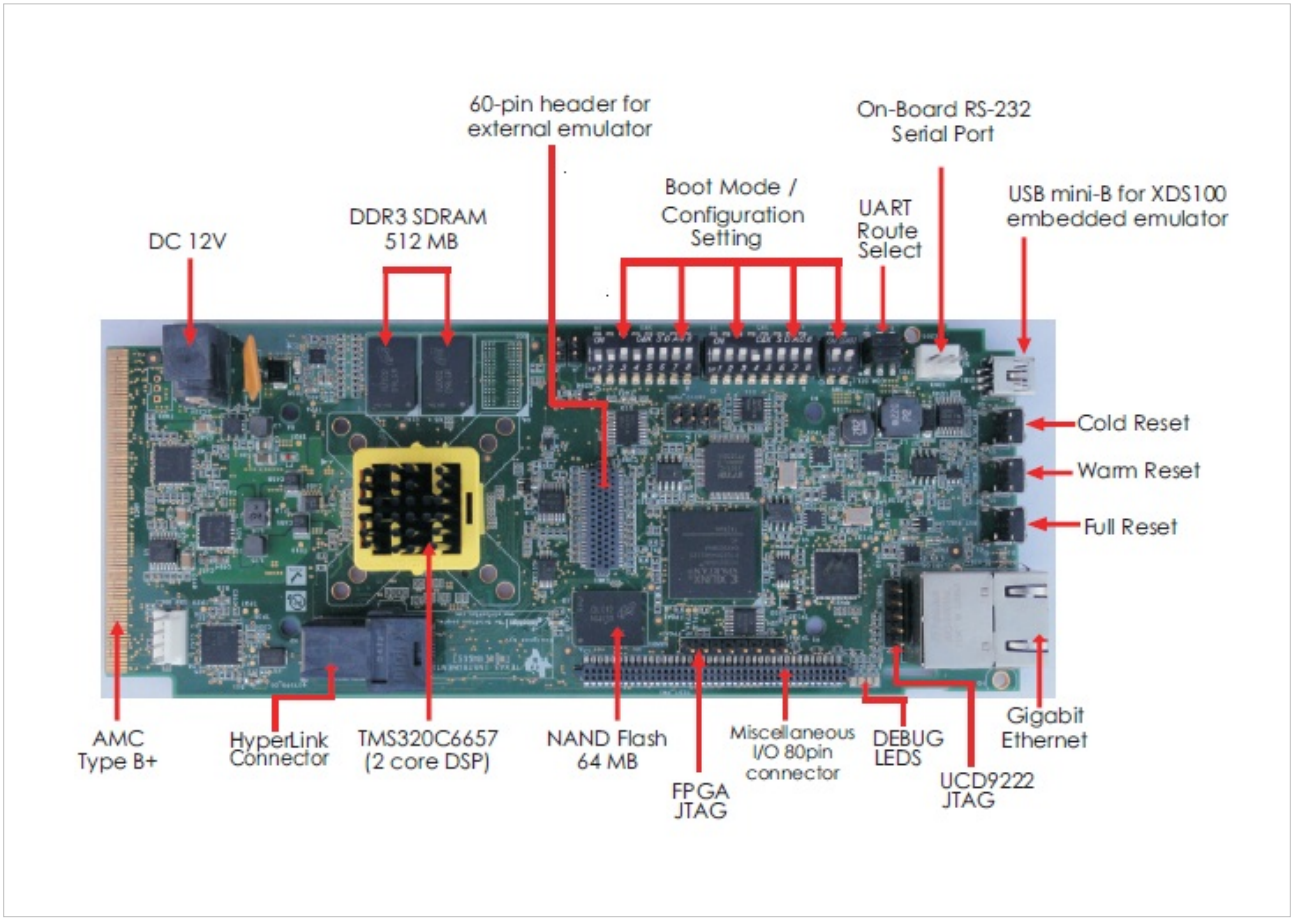
TMDSEVM6657L EVM Hardware Setup

This page will walk you through setting up your TMDXEVM6657L [1] Evaluation Module (EVM). These guidelines also apply to the L and LE EVM models.

Note: Some of the steps in this section have been updated from those used in the EVM *Quick Start Guide*.

Hardware Setup Overview

The picture below shows the TMDXEVM6657L EVM and the locations of relevant switches and connectors.



Hardware Setup Steps

Warning: The EVM board is sensitive to electrostatic discharges (ESD). Use a grounding strap or other device to prevent damaging the board. Be sure to connect communication cables before applying power to any equipment.

1. Attach the Ethernet cable

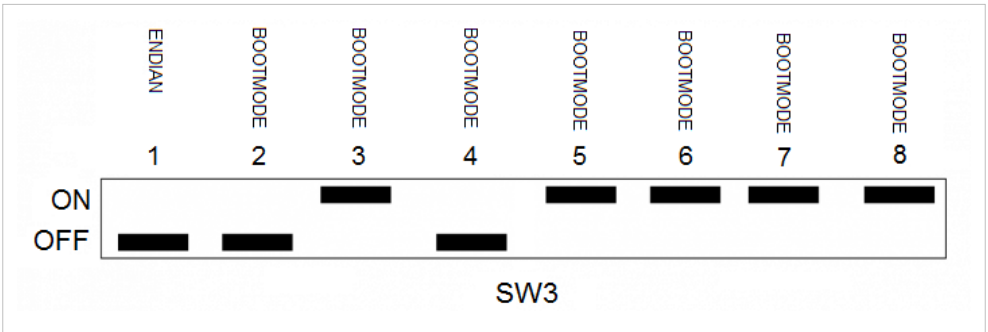
Using the Ethernet cable supplied, connect one end of the cable to the Ethernet port on the EVM and the other end to your PC.

2. Connect the JTAG interface

Use the USB to USB mini-B cable provided. Connect the USB mini-B connector to the USB mini-B interface on the EVM and the USB connector to your PC. This enables XDS-100 emulation and is directly useable by CCS. If you are using a different JTAG, connect it now.

3. Verify Endian mode in the SW3 settings

The Endian mode should be set to Little Endian. SW3 also contains the boot device settings.



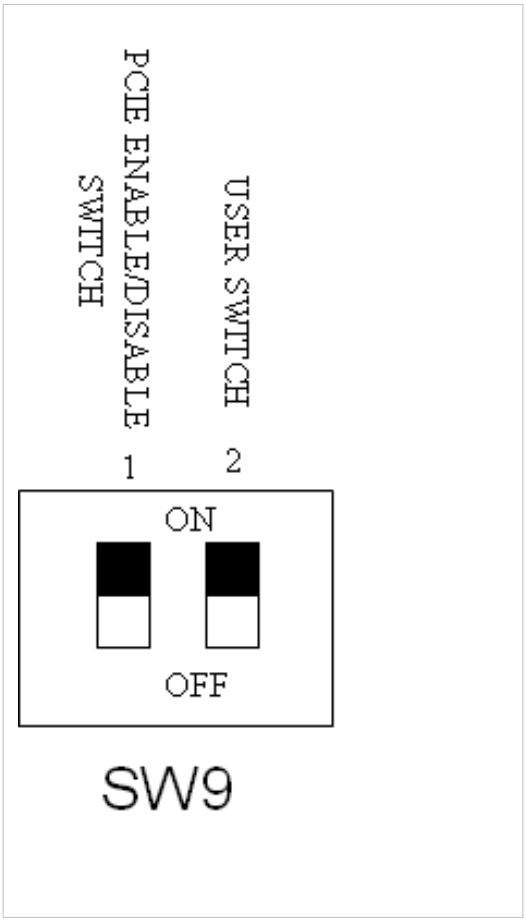
4. Verify boot mode in the SW3 and SW5 settings

The boot mode settings below enable NOR boot by loading the boot loader from EEPROM address 0x51.

5. Set User Switch for the demo application

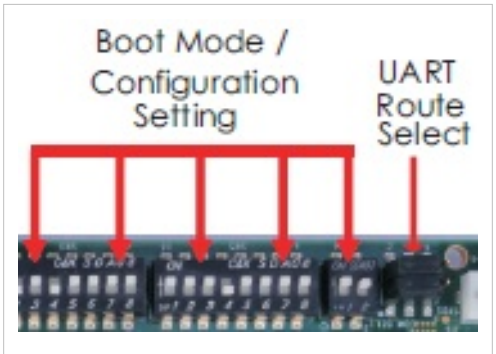
The application needs an IP address. It can use either a static IP address (pre-configured) or it can request one using DHCP. This is controlled by setting dip switch 2 of SW9.

User Switch 2 ON : DHCP
User Switch 2 OFF: Static IP



6. Attach the serial port cable

This EVM can use either a USB serial port or the standard DB-9 (use the cable shipped with the platform). By default the shunts which control this on the platforms are set to use the USB by default. We recommend changing them to use the DB-9 as there are no known issues with this approach.



Note: If the USB serial port output does not work, ensure that the cable is connected directly to a USB port on the PC/laptop rather than going through an extender or USB hub.

7. Connect the power cable

Connect the power cable to the EVM power jack on the board. To be ESD safe, plug in the other end of the power cable only after you have connected the power cord to the board. Then turn on the board.

Boot Mode Dip Switch Settings

The EVM supports booting image from various devices (EEPROM, NAND or NOR) via IBL (at I2C address 0x51), I2C EEPROM (at I2C address 0x50), and ROM Boot modes (such as Ethernet, SRIO, PCIe, SPI etc.) which address the boot source directly from the ROM code. Below is the table showing the boot mode dip switch settings for different boot mode that the EVM supports:

Boot Mode	DIP SW3 (Pin1, 2, 3, 4, 5, 6, 7, 8)	DIP SW5 (Pin1, 2, 3, 4, 5, 6, 7, 8)
IBL NOR boot on image 0 (default)	(off, off, on, off, on, on, on, on)[1,2,3]	(on, on, on, off, on, on, on, on)[4]
IBL NAND boot on image 0	(off, off, on, off, on, off, on, on)	(on, on, on, off, on, on, on, on)
IBL NAND boot on image 1	(off, off, on, off, off, off, on, on)	(on, on, on, off, on, on, on, on)
IBL TFTP boot	(off, off, on, off, on, on, off, on)	(on, on, on, off, on, on, on, on)
I2C POST boot	(off, off, on, off, on, on, on, on)	(on, on, on, on, on, on, on, on)
ROM SPI Boot[8]	(off, on, off, off, on, on, on, on)	(on, on, off, on, on, on, on, on)
ROM SRIO Boot[5]	(off, off, on, on, on, on, off, on)	(off, on, on, off, off, on, on, on)
ROM Ethernet Boot[6]	(off, on, off, on, on, on, on, off)	(on, off, on, off, off, on, on, on)
ROM PCIE Boot[7]	(off, on, on, off, on, on, on, on)	(on, on, on, off, off, on, on, on)
No boot	(off, on, on, on, on, on, on, on)	(on, on, on, on, on, on, on, on)

Note: : C6657 currently does not support Image 1 for NOR boot.

Footnotes:

1. Pin 1 of SW3 is the endian pin, by default, it is set to off (Little Endian)

2. Pin 2-4 of SW3 are the boot mode pins, by default it is set to I2C boot mode (off, on, off)

3. Pin 5-8 of SW3 and pin 1-2 of SW5 are the boot parameter index pins for I2C boot (paramter index 0/1 for NOR boot image 0/1, parameter index 2/3 for NAND boot image 0/1, parameter index 4 for TFTP boot). By default, image 0 is programmed to offset byte address 0x0 on NOR, and 0x20000 (block 1 start address) on NAND, image 1 is programmed to offset byte address 0x4000000 on NAND.

4. Pin 4 of SW5 is the I2C address pin (off: 0x51, on: 0x50) for I2C boot mode

5. This will set the board to boot from SRIO boot mode, with reference clock at 250 MHz, data rate at 3.125 GBs, and lane setup 4-1x ports and DSP System PLL at 100 MHz.

6. This will set the board to boot from Ethernet boot mode, with SerDes clock multiplier x 4, core PLL clock at 100 MHz.

7. This will set the board to boot form PCIE boot mode, with PCIE in end point mode and DSP System PLL at 100 MHz.

8. This will set the board to boot from SPI NOR via the ROM code, with boot-table contents expected in the NOR. 24bit addressing has been set.

Please refer to *Technical_Reference_Manual* for the boot mode switch settings on the board.

Return to BIOS MCSDK 2.0 Getting Started Guide [2]

References

[1] http://focus.ti.com/docs/toolsw/folders/print/tmdxevm6657.html

[2] http://processors.wiki.ti.com/index.php/BIOS_MCSDK_2.0_Getting_Started_Guide#1._Hardware_Setup

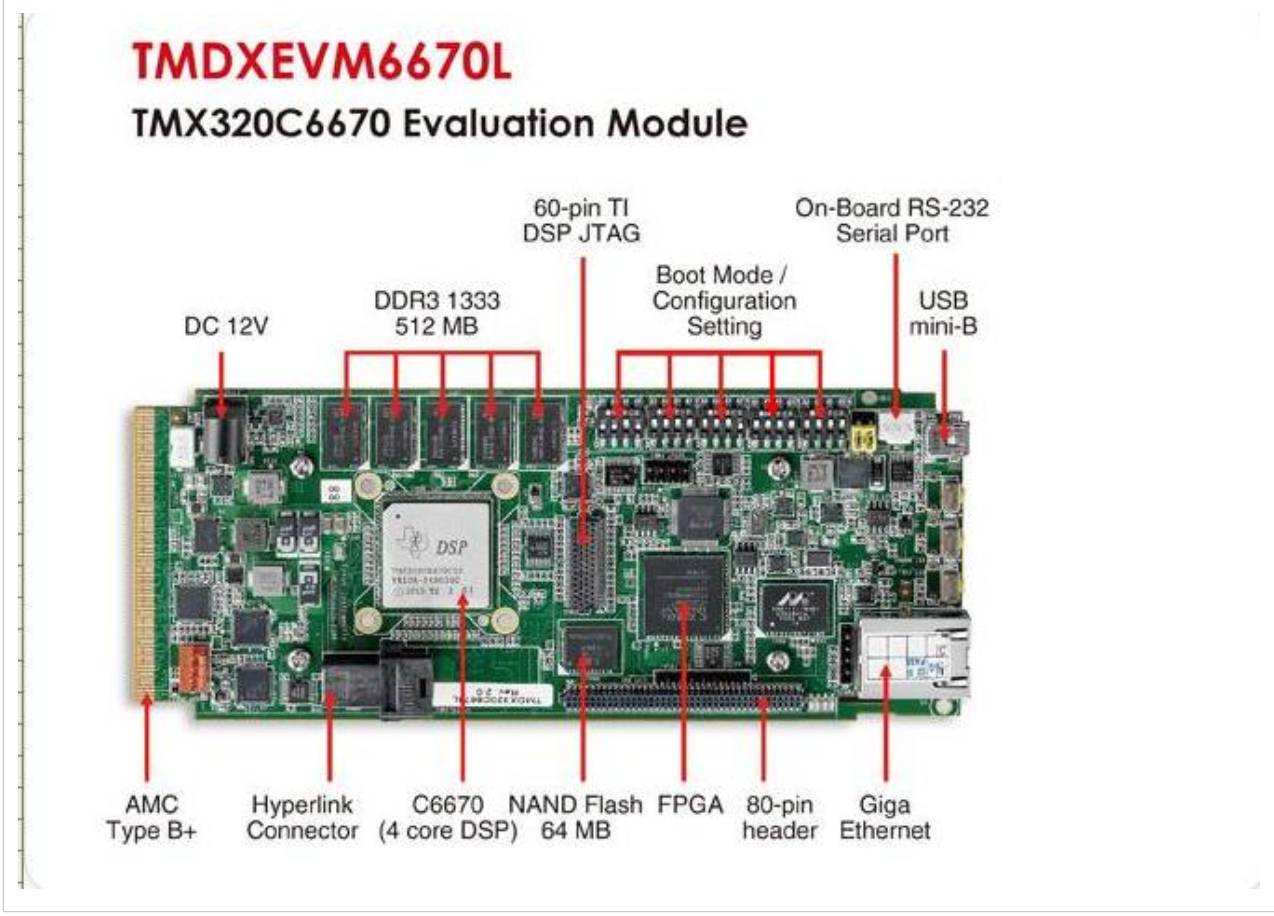
TMDXEVM6670L EVM Hardware Setup

This page will walk you through setting up your TMDXEVM6670L [1] Evaluation Module (EVM). These guidelines also apply to the LE and LXE EVM models.

Note: Some of the steps in this section have been updated from those used in the EVM *Quick Start Guide*.

Hardware Setup Overview

The picture below shows the TMDXEVM6670L EVM and the locations of relevant switches and connectors.



Hardware Setup Steps

Warning: The EVM board is sensitive to electrostatic discharges (ESD). Use a grounding strap or other device to prevent damaging the board. Be sure to connect communication cables before applying power to any equipment.

1. Attach the Ethernet cable

Using the Ethernet cable supplied, connect one end of the cable to the Ethernet port on the EVM and the other end to your PC.

2. Connect the JTAG interface

Use the USB to USB mini-B cable provided. Connect the USB mini-B connector to the USB mini-B interface on the EVM and the USB connector to your PC. This enables XDS-100 emulation and is directly useable by CCS. If you are using a different JTAG, connect it now.

3. Verify Endian mode in the SW3 settings

The Endian mode should be set to Little Endian. SW3 also contains the boot device settings.

4. Verify boot mode in the SW3 - SW6 settings

The boot mode settings below enable NOR boot by loading the boot loader from EEPROM address 0x51.

5. Set User Switch 2 for the demo application

The application needs an IP address. It can use either a static IP address (pre-configured) or it can request one using DHCP. This is controlled by setting User Switch 2 to ON for DHCP and OFF for Static. See SW9.

6. Attach the serial port cable

This EVM can use either a USB serial port or the standard DB-9 (use the cable shipped with the platform). By default the shunts which control this on the platforms are set to use the USB by default. We recommend changing them to use the DB-9 as there are no known issues with this approach.

To change the shunts refer to the picture below.

Note: If the USB serial port output does not work, ensure that the cable is connected directly to a USB port on the PC/laptop rather than going through an extender or USB hub.

7. Connect the power cable

Connect the power cable to the EVM power jack on the board. To be ESD safe, plug in the other end of the power cable only after you have connected the power cord to the board. Then turn on the board.

Boot Mode Dip Switch Settings

The EVM supports booting image from various devices (EEPROM, NAND or NOR) via IBL, it also supports ROM Boot modes, such as Ethernet, SRIO, PCIe, etc. Below is the table showing the boot mode dip switch settings for different boot mode that the EVM supports:

Boot Mode	DIP SW3 (Pin1, 2, 3, 4)	DIP SW4 (Pin1, 2, 3, 4)	DIP SW5 (Pin1, 2, 3, 4)	DIP SW6 (Pin1, 2, 3, 4)
IBL NOR boot on image 0 (default)	(off, off, on, off)[1,2]	(on, on, on, on)[3]	(on, on, on, off)[4]	(on, on, on, on)
IBL NOR boot on image 1	(off, off, on, off)	(off, on, on, on)	(on, on, on, off)	(on, on, on, on)
IBL NAND boot on image 0	(off, off, on, off)	(on, off, on, on)	(on, on, on, off)	(on, on, on, on)
IBL NAND boot on image 1	(off, off, on, off)	(off, off, on, on)	(on, on, on, off)	(on, on, on, on)
IBL TFTP boot	(off, off, on, off)	(on, on, off, on)	(on, on, on, off)	(on, on, on, on)
I2C POST boot	(off, off, on, off)	(on, on, on, on)	(on, on, on, on)	(on, on, on, on)
ROM SPI Boot[8]	(off, on, off, off)	(on, on, on, on)	(on, on, off, on)	(off, on, on, on)
ROM SRIO Boot[5]	(off, off, on, on)	(on, on, on, off)	(on, off, on, off)	(off, off, on, on)
ROM Ethernet Boot[6]	(off, on, off, on)	(on, on, on, off)	(on, off, on, off)	(off, off, on, on)
ROM PCIE Boot[7]	(off, on, on, off)	(on, on, on, on)	(on, on, on, off)	(off, on, on, on)
No boot	(off, on, on, on)	(on, on, on, on)	(on, on, on, on)	(on, on, on, on)

Footnotes:

1. Pin 1 of SW3 is the endian pin, by default, it is set to off (Little Endian)

2. Pin 2-4 of SW3 are the boot mode pins, by default it is set to I2C boot mode (off, on, off)

3. Pin 1-4 of SW4 and pin 1-2 of SW5 are the boot parameter index pins for I2C boot (paramter index 0/1 for NOR boot image 0/1, parameter index 2/3 for NAND boot image 0/1, parameter index 4 for TFTP boot). By default, image 0 is programmed to offset byte address 0x0 on NOR, and 0x4000 (block 1 start address) on NAND, image 1 is programmed to offset byte address 0xA00000 on NOR, and 0x2000000 on NAND.

4. Pin 4 of SW5 is the I2C address pin (off: 0x51, on: 0x50) for I2C boot mode

5. This will set the board to boot from SRIO boot mode, with reference clock at 250 MHz, data rate at 3.125 GBs, and lane setup 4-1x ports and DSP System PLL at 122.88 MHz.

6. This will set the board to boot from Ethernet boot mode, with SerDes clock multiplier x 5, DSP System PLL clock at 122.88 MHz.

7. This will set the board to boot form PCIE boot mode, with PCIE in end point mode and DSP System PLL at 100 MHz.

8. This will set the board to boot from SPI NOR via the ROM code, with boot-table contents expected in the NOR. 24bit addressing has been set.

Please refer to Technical_Reference_Manual [2] for the boot mode switch settings on the board.

Return to BIOS MCSDK 2.0 Getting Started Guide [2]

References

[1] http://focus.ti.com/docs/toolsw/folders/print/tmdxevm6670.html
[2] http://www.advantech.com/Support/TI-EVM/6670le_sd.aspx

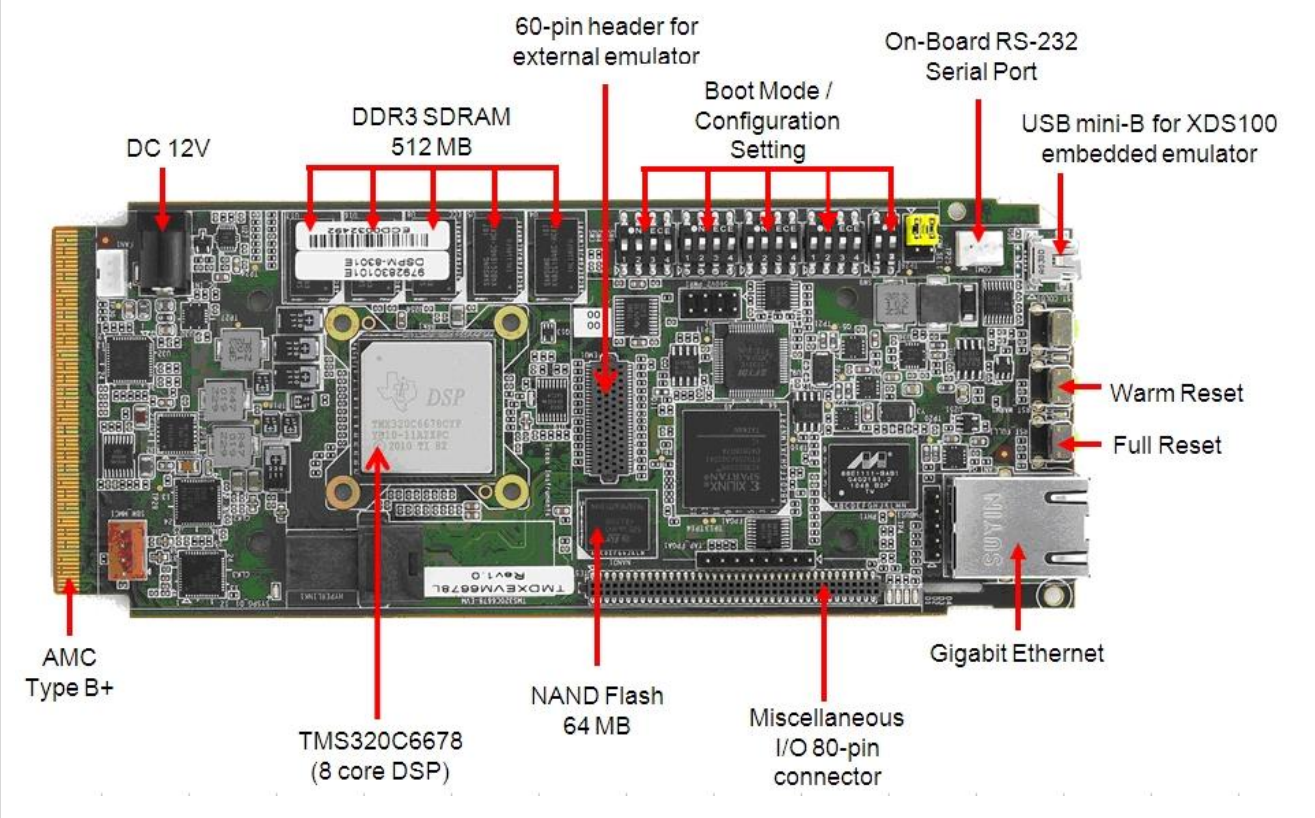
TMDXEVM6678L EVM Hardware Setup

This page will walk you through setting up your TMDXEVM6678L [1] Evaluation Module (EVM). These guidelines also apply to the LE and LXE EVM models.

Note: Some of the steps in this section have been updated from those used in the EVM *Quick Start Guide*.

Hardware Setup Overview

The picture below shows the TMDXEVM6678L EVM and the locations of relevant switches and connectors.



Note: Please refer to this picture [2] for the alpha/beta Lite EVM boards.

Hardware Setup Steps

Warning: The EVM board is sensitive to electrostatic discharges (ESD). Use a grounding strap or other device to prevent damaging the board. Be sure to connect communication cables before applying power to any equipment.

1. Attach the Ethernet cable

Using the Ethernet cable supplied, connect one end of the cable to the Ethernet port on the EVM and the other end to your PC.

2. Connect the JTAG interface

Use the USB to USB mini-B cable provided. Connect the USB mini-B connector to the USB mini-B interface on the EVM and the USB connector to your PC. This enables XDS-100 emulation and is directly useable by CCS. If you are using a different JTAG, connect it now.

3. Verify Endian mode in the SW3 settings

The Endian mode should be set to Little Endian. SW3 also contains the boot device settings.

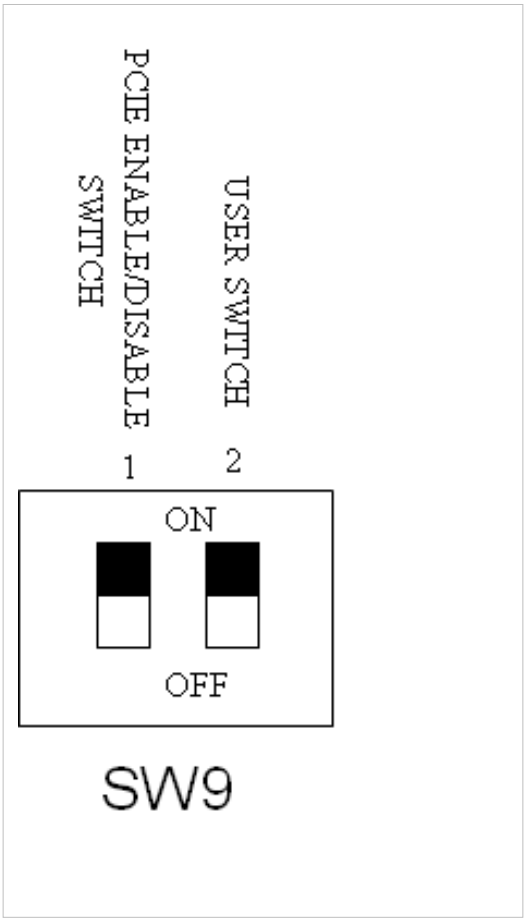
4. Verify boot mode in the SW3 - SW6 settings

The boot mode settings below enable NOR boot by loading the boot loader from EEPROM address 0x51.

5. Set User Switch for the demo application

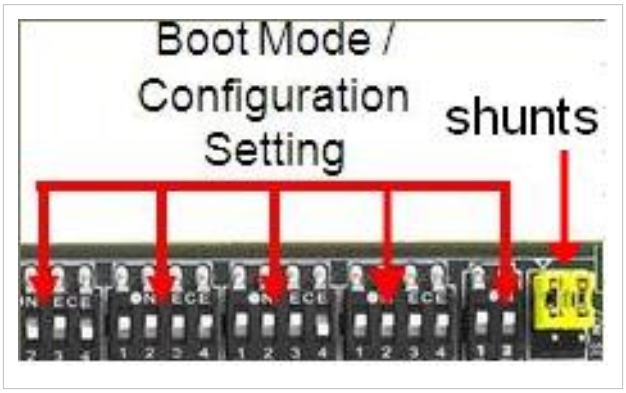
The application needs an IP address. It can use either a static IP address (pre-configured) or it can request one using DHCP. This is controlled by setting dip switch 2 of SW9.

User Switch 2 ON : DHCP
User Switch 2 OFF: Static IP



6. Attach the serial port cable

This EVM can use either a USB serial port or the standard DB-9 (use the cable shipped with the platform). By default the shunts which control this on the platforms are set to use the USB by default. We recommend changing them to use the DB-9 as there are no known issues with this approach.



Note: If the USB serial port output does not work, ensure that the cable is connected directly to a USB port on the PC/laptop rather than going through an extender or USB hub.

Note: Please refer to this picture [3] for the shunts on the alpha/beta Lite EVM.

7. Connect the power cable

Connect the power cable to the EVM power jack on the board. To be ESD safe, plug in the other end of the power cable only after you have connected the power cord to the board. Then turn on the board.

Boot Mode Dip Switch Settings

The EVM supports booting image from various devices (EEPROM, NAND or NOR) via IBL (at I2C address 0x51), I2C EEPROM (at I2C address 0x50), and ROM Boot modes (such as Ethernet, SRIO, PCIe, SPI etc.) which address the boot source directly from the ROM code. Below is the table showing the boot mode dip switch settings for different boot mode that the EVM supports:

Boot Mode	DIP SW3 (Pin1, 2, 3, 4)	DIP SW4 (Pin1, 2, 3, 4)	DIP SW5 (Pin1, 2, 3, 4)	DIP SW6 (Pin1, 2, 3, 4)
IBL NOR boot on image 0 (default)	(off, off, on, off)[1,2]	(on, on, on, on)[3]	(on, on, on, off)[4]	(on, on, on, on)
IBL NOR boot on image 1	(off, off, on, off)	(off, on, on, on)	(on, on, on, off)	(on, on, on, on)
IBL NAND boot on image 0	(off, off, on, off)	(on, off, on, on)	(on, on, on, off)	(on, on, on, on)
IBL NAND boot on image 1	(off, off, on, off)	(off, off, on, on)	(on, on, on, off)	(on, on, on, on)
IBL TFTP boot	(off, off, on, off)	(on, on, off, on)	(on, on, on, off)	(on, on, on, on)
I2C POST boot	(off, off, on, off)	(on, on, on, on)	(on, on, on, on)	(on, on, on, on)
ROM SPI Boot[8]	(off, on, off, off)	(on, on, on, on)	(on, on, off, on)	(on, on, on, on)
ROM SRIO Boot[5]	(off, off, on, on)	(on, on, on, off)	(on, off, on, off)	(off, on, on, on)
ROM Ethernet Boot[6]	(off, on, off, on)	(on, on, on, off)	(on, on, off, off)	(off, on, on, on)
ROM PCIE Boot[7]	(off, on, on, off)	(on, on, on, on)	(on, on, on, off)	(off, on, on, on)
No boot	(off, on, on, on)	(on, on, on, on)	(on, on, on, on)	(on, on, on, on)

Footnotes:

1. Pin 1 of SW3 is the endian pin, by default, it is set to off (Little Endian)

2. Pin 2-4 of SW3 are the boot mode pins, by default it is set to I2C boot mode (off, on, off)

3. Pin 1-4 of SW4 and pin 1-2 of SW5 are the boot parameter index pins for I2C boot (paramter index 0/1 for NOR boot image 0/1, parameter index 2/3 for NAND boot image 0/1, parameter index 4 for TFTP boot). By default, image 0 is programmed to offset byte address 0x0 on NOR, and 0x4000 (block 1 start address) on NAND, image 1 is programmed to offset byte address 0xA00000 on NOR, and 0x2000000 on NAND.

4. Pin 4 of SW5 is the I2C address pin (off: 0x51, on: 0x50) for I2C boot mode

5. This will set the board to boot from SRIO boot mode, with reference clock at 312.5 MHz, data rate at 3.125 GBs, and lane setup 4-1x ports and DSP System PLL at 100 MHz.

6. This will set the board to boot from Ethernet boot mode, with SerDes clock multiplier x 4, core PLL clock at 100 MHz.

7. This will set the board to boot form PCIE boot mode, with PCIE in end point mode and DSP System PLL at 100 MHz.

8. This will set the board to boot from SPI NOR via the ROM code, with boot-table contents expected in the NOR. 24bit addressing has been set.

Please refer to Technical_Reference_Manual [4] for the boot mode switch settings on the board.

Return to BIOS MCSDK 2.0 Getting Started Guide [2]

References

[1] http://focus.ti.com/docs/toolsw/folders/print/tmdxevm6678.html
[2] http://processors.wiki.ti.com/index.php/File:TMD6678L.jpg
[3] http://processors.wiki.ti.com/index.php/File:TMD6678LShunts.jpg
[4] http://www.advantech.com/Support/TI-EVM/6678le_sd.aspx

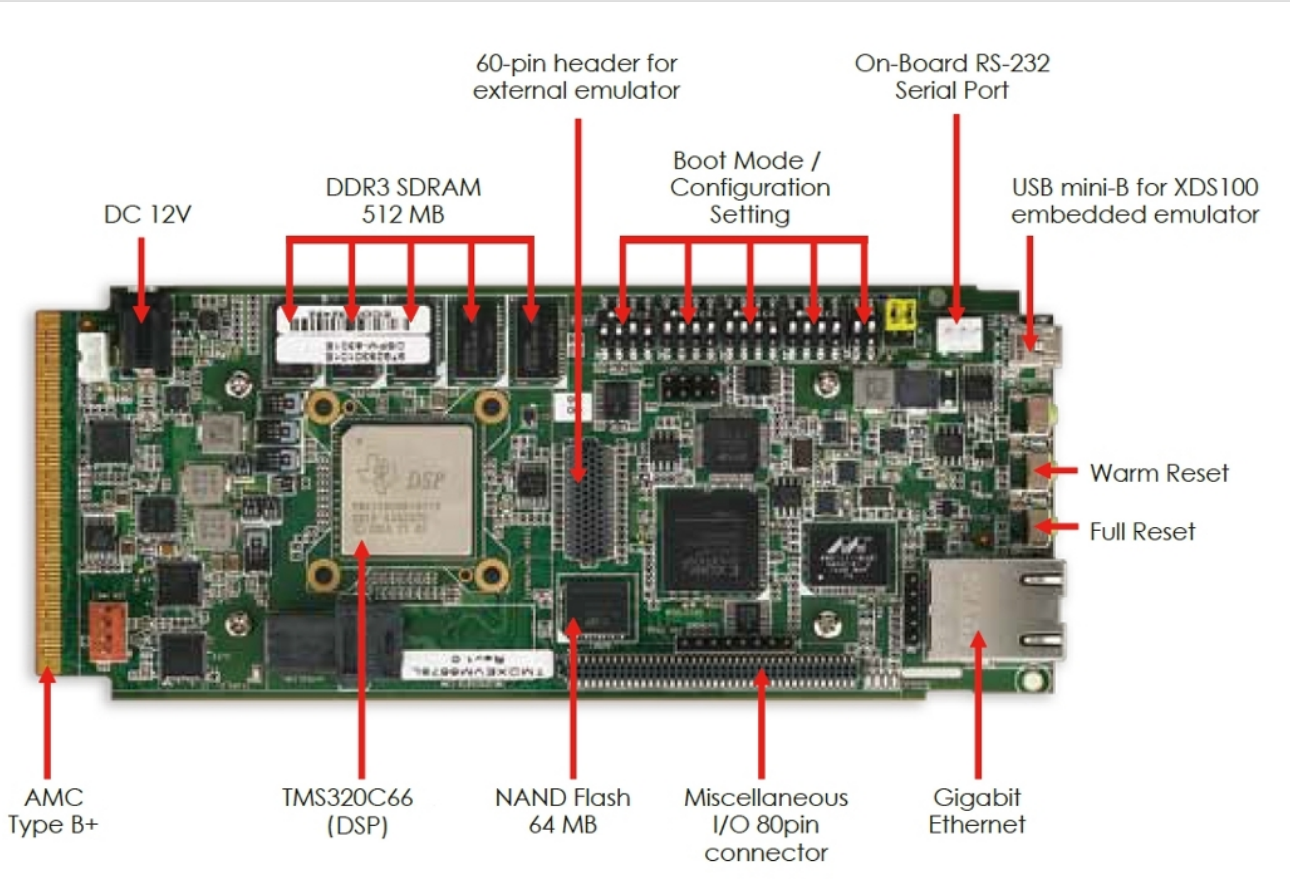
TMDXEVM6618LXE EVM Hardware Setup

This page will walk you through setting up your **TMDXEVM6618LXE** Evaluation Module (EVM).

Note: Some of the steps in this section have been updated from those used in the EVM *Quick Start Guide*.

Hardware Setup Overview

The picture below shows the TMDXEVM6618LXE EVM and the locations of relevant switches and connectors.



TMDXEVM6618LXE EVM

Hardware Setup Steps

Warning: The EVM board is sensitive to electrostatic discharges (ESD). Use a grounding strap or other device to prevent damaging the board. Be sure to connect communication cables before applying power to any equipment.

1. Attach the Ethernet cable

Using the Ethernet cable supplied, connect one end of the cable to the Ethernet port on the EVM and the other end to your PC.

2. Connect the JTAG interface

Use the USB to USB mini-B cable provided. Connect the USB mini-B connector to the USB mini-B interface on the EVM and the USB connector to your PC. This enables XDS-100 emulation and is directly useable by CCS. If you are using a different JTAG, connect it now.

3. Verify Endian mode in the SW3 settings

The Endian mode should be set to Little Endian. SW3 also contains the boot device settings.

4. Verify boot mode in the SW3 - SW6 settings

The boot mode settings below enable NOR boot by loading the boot loader from EEPROM address 0x51.

5. Set User Switch 2 for the demo application

The application needs an IP address. It can use either a static IP address (pre-configured) or it can request one using DHCP. This is controlled by setting User Switch 2 to ON for DHCP and OFF for Static. See SW9.

6. Attach the serial port cable

This EVM can use either a USB serial port or the standard DB-9 (use the cable shipped with the platform). By default the shunts which control this on the platforms are set to use the USB by default. We recommend changing them to use the DB-9 as there are no known issues with this approach.

To change the shunts refer to the picture below.

Note: If the USB serial port output does not work, ensure that the cable is connected directly to a USB port on the PC/laptop rather than going through an extender or USB hub.

7. Connect the power cable

Connect the power cable to the EVM power jack on the board. To be ESD safe, plug in the other end of the power cable only after you have connected the power cord to the board. Then turn on the board.

Boot Mode Dip Switch Settings

The EVM supports booting image from various devices (EEPROM, NAND or NOR) via IBL, it also supports ROM Boot modes, such as Ethernet, SRIO, PCIe, etc. Below is the table showing the boot mode dip switch settings for different boot mode that the EVM supports:

Boot Mode	DIP SW3 (Pin1, 2, 3, 4)	DIP SW4 (Pin1, 2, 3, 4)	DIP SW5 (Pin1, 2, 3, 4)	DIP SW6 (Pin1, 2, 3, 4)
NOR boot on image 0 (default)	(off, off, on, off)[1,2]	(on, on, on, on)[3]	(on, on, on, off)[4]	(on, on, on, on)
NOR boot on image 1	(off, off, on, off)	(off, on, on, on)	(on, on, on, off)	(on, on, on, on)
NAND boot on image 0	(off, off, on, off)	(on, off, on, on)	(on, on, on, off)	(on, on, on, on)
NAND boot on image 1	(off, off, on, off)	(off, off, on, on)	(on, on, on, off)	(on, on, on, on)
TFTP boot	(off, off, on, off)	(on, on, off, on)	(on, on, on, off)	(on, on, on, on)
POST boot	(off, off, on, off)	(on, on, on, on)	(on, on, on, on)	(on, on, on, on)
ROM SRIO Boot[5]	(off, off, on, on)	(on, on, on, off)	(on, off, on, off)	(off, off, on, on)
ROM Ethernet Boot[6]	(off, on, off, on)	(on, on, on, off)	(on, off, on, off)	(off, off, on, on)
ROM PCIE Boot[7]	(off, on, on, off)	(on, on, on, on)	(on, on, on, off)	(off, on, on, on)
No boot	(off, on, on, on)	(on, on, on, on)	(on, on, on, on)	(on, on, on, on)

Footnotes:

1. Pin 1 of SW3 is the endian pin, by default, it is set to off (Little Endian)

2. Pin 2-4 of SW3 are the boot mode pins, by default it is set to I2C boot mode (off, on, off)

3. Pin 1-4 of SW4 and pin 1-2 of SW5 are the boot parameter index pins for I2C boot (paramter index 0/1 for NOR boot image 0/1, parameter index 2/3 for NAND boot image 0/1, parameter index 4 for TFTP boot). By default, image 0 is programmed to offset byte address 0x0 on NOR, and 0x4000 (block 1 start address) on NAND, image 1 is programmed to offset byte address 0xA00000 on NOR, and 0x2000000 on NAND.

4. Pin 4 of SW5 is the I2C address pin (off: 0x51, on: 0x50) for I2C boot mode

5. This will set the board to boot from SRIO boot mode, with reference clock at 250 MHz, data rate at 3.125 GBs, and lane setup 4-1x ports and DSP System PLL at 122.88 MHz.

6. This will set the board to boot from Ethernet boot mode, with SerDes clock multiplier x 5, DSP System PLL clock at 122.88 MHz.

7. This will set the board to boot form PCIE boot mode, with PCIE in end point mode and DSP System PLL at 100 MHz.

Please refer to **TMDXEVM6618LXE** Technical_Reference_Manual for the boot mode switch settings on the board.

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