



# Zoom™ AM1808 EVM User Guide

Logic PD // Products  
Published: March 2011

This document contains valuable proprietary and confidential information and the attached file contains source code, ideas, and techniques that are owned by Logic PD, Inc. (collectively "Logic PD's Proprietary Information"). Logic PD's Proprietary Information may not be used by or disclosed to any third party except under written license from Logic PD, Inc.

Logic PD, Inc. makes no representation or warranties of any nature or kind regarding Logic PD's Proprietary Information or any products offered by Logic PD, Inc. Logic PD's Proprietary Information is disclosed herein pursuant and subject to the terms and conditions of a duly executed license or agreement to purchase or lease equipment. The only warranties made by Logic PD, Inc., if any, with respect to any products described in this document are set forth in such license or agreement. Logic PD, Inc. shall have no liability of any kind, express or implied, arising out of the use of the Information in this document, including direct, indirect, special or consequential damages.

Logic PD, Inc. may have patents, patent applications, trademarks, copyrights, trade secrets, or other intellectual property rights pertaining to Logic PD's Proprietary Information and products described in this document (collectively "Logic PD's Intellectual Property"). Except as expressly provided in any written license or agreement from Logic PD, Inc., this document and the information contained therein does not create any license to Logic PD's Intellectual Property.

The Information contained herein is subject to change without notice. Revisions may be issued regarding changes and/or additions.

© Copyright 2011, Logic PD, Inc. All Rights Reserved.

## Revision History

REV	EDITOR	DESCRIPTION	APPROVAL	DATE
A	JCA	Initial release	JCA	03/28/11

# Table of Contents

<b>1</b>	<b>Introduction.....</b>	<b>1</b>
1.1	Scope of Document.....	1
1.2	Requirements.....	1
<b>2</b>	<b>Application Baseboard .....</b>	<b>2</b>
2.1	Application Baseboard Features Diagram .....	2
2.2	Application Baseboard Ethernet Jack .....	2
2.3	DIP Switches .....	2
<b>3</b>	<b>User Interface (UI) Board .....</b>	<b>4</b>
3.1	UI Board Features Diagram .....	4
3.2	UI Board Feature Usage .....	5
3.3	UI Board Ethernet Jack .....	5
3.4	48-Character LCD Panel.....	5
3.5	NAND Flash Socket .....	5
3.6	NOR Flash .....	5
3.7	User Interface Buttons .....	5
<b>4</b>	<b>WLAN and Bluetooth Daughter Card.....</b>	<b>5</b>
<b>5</b>	<b>Removing the AM1808 SOM-M1.....</b>	<b>6</b>
<b>6</b>	<b>Connect Blackhawk Emulator.....</b>	<b>7</b>
<b>7</b>	<b>Installing Code Composer Studio.....</b>	<b>8</b>
<b>8</b>	<b>Running Board Support Library (BSL) Sample Programs .....</b>	<b>9</b>
8.1	Connect EVM to Host PC.....	9
8.2	Copy BSL Files to PC .....	9
8.3	Launch Code Composer Studio .....	9
8.4	Run Sample Test .....	12
	<b>Appendix A: Additional Documentation .....</b>	<b>17</b>

# 1 Introduction

This User Guide continues where the QuickStart Guide ended by providing additional hardware details about the Zoom AM1808 EVM, as well as introductory instructions for using Code Composer Studio and the included Board Support Library (BSL) files.

## 1.1 Scope of Document

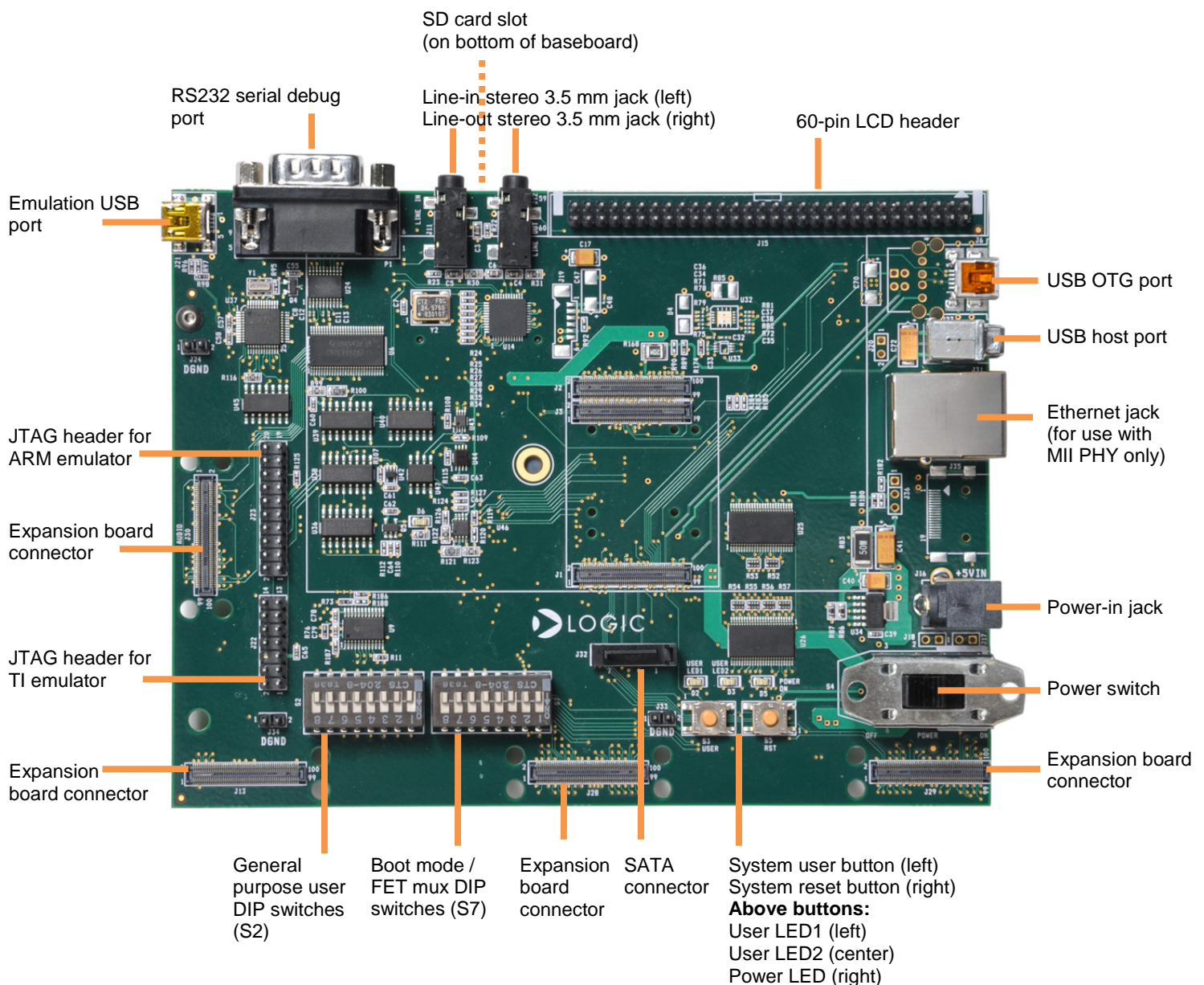
- This User Guide references specific connectors on the application baseboard and User Interface (UI) board. However, the discussion is limited to special use instructions; detailed information about the connectors should be referenced on the respective schematic and Bill of Material (BOM) documents. See Appendix A for links to these documents.
- This User Guide does not provide detailed instructions for the software included with the kits. Please refer to the specific User Guides for each respective software product for additional information. A list of additional documentation is available in Appendix A.

## 1.2 Requirements

- It is assumed that the QuickStart Guide has been read in its entirety. See Appendix A for link to the QuickStart Guide.
- A development PC with CD/DVD drive, USB port, and at least 2 GB of hard drive space.

## 2 Application Baseboard

### 2.1 Application Baseboard Features Diagram



### 2.2 Application Baseboard Ethernet Jack

The Ethernet jack located on the application baseboard is to only be used with the MII PHY; whereas the Ethernet jack located on the UI board is to be used only with the RMII PHY. The Ethernet controller on the CPU can only talk to one Ethernet PHY at a time. Which Ethernet PHY is being used is entirely controlled through software.

### 2.3 DIP Switches

There are two 8-position DIP switches located on the application baseboard at reference designators S2 and S7. By default, all of the switches are set to the "OFF" position.

The S2 DIP switch is reserved for user application general purpose. The S7 DIP switch controls the processor's boot mode and several FET muxes on the baseboard. Table 2.1 describes the function of each switch.

**Table 2.1: S7 DIP Switch Functions**

Switch	OFF Position	ON Position
S7:1*	Baseboard LCD drive enabled.	Baseboard LCD drive disabled.
S7:2	Baseboard audio enabled. Associated McASP lines connect to baseboard audio only.	Baseboard audio disabled. Associated McASP lines are available on audio expansion connector.
S7:3	AM1808 I/O runs at 3.3V	AM1808 I/O runs at 1.8V
S7:4	No connection	
S7:5	BOOT[1]	
S7:6	BOOT[2]	
S7:7	BOOT[3]	
S7:8	BOOT[4]	

**\*Note:** S7:1 indicates slide 1 on the S7 DIP switch, S7:2 indicates slide 2 on the S7 DIP switch, and so on.

A default boot mode has been defined by pulling all boot pins (BOOT[0:7]) to a default state on the SOM. The default boot mode is SPI1 Flash; all available boot modes are described in Table 2.2.

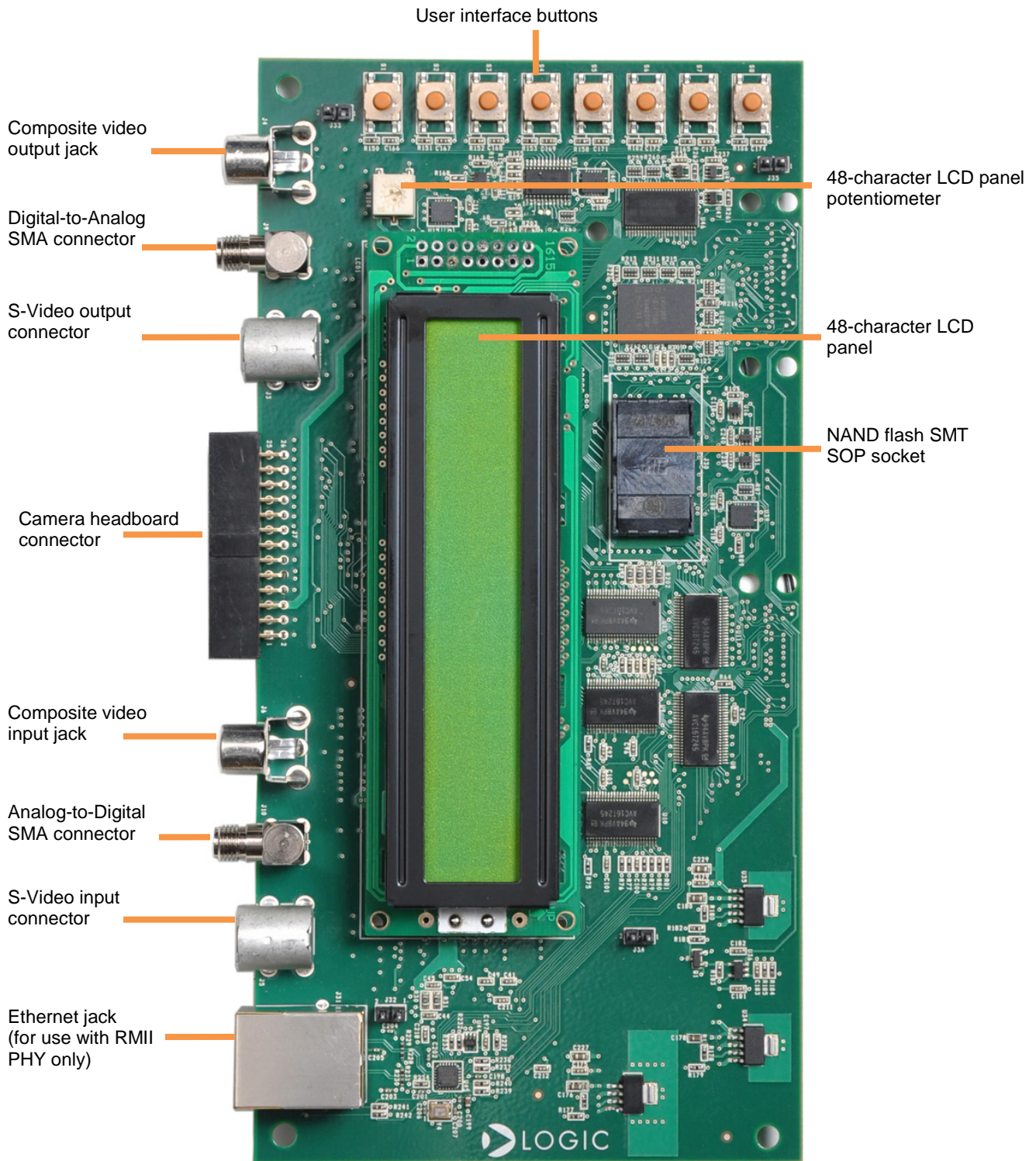
**Table 2.2: S7 DIP Switch Boot Modes**

		DIP Switch Setting—S7[5:8]			
		BOOT[4]	BOOT[3]	BOOT[2]	BOOT[1]
Boot Mode		S7:8	S7:7	S7:6	S7:5
	NOR EMIFA	OFF	ON	ON	ON
	NAND-8 EMIFA	OFF	OFF	OFF	ON
Default	SPI1 Flash	OFF	OFF	OFF	OFF
	UART2	ON	ON	OFF	OFF
	EMU Debug	ON	OFF	OFF	ON



### 3 User Interface (UI) Board

#### 3.1 UI Board Features Diagram



### 3.2 UI Board Feature Usage

The components on the UI board run off the same bus, so not every feature can be used at the same time. The following features are mutually exclusive of each other:

- ❑ 48-character LCD panel
- ❑ Analog-to-Digital Converter (ADC) and Digital-to-Analog Converter (DAC)
- ❑ Composite video and S-Video inputs
- ❑ Camera
- ❑ RMII Ethernet PHY

The ADC and DAC features may be used independently or at the same time as each other; however, they remain exclusive to the other features. Please refer to the UI board schematics for more information; a URL for where to download the schematics is available in Appendix A.

There are no hardware switches or jumpers that the user needs to interact with on the UI board; instead, the UI board features are controlled through software. This is something to take into consideration if intending to use the UI board with custom software for the SOM. The provided Board Support Library (BSL) files may be used as a reference for how software can control UI board features.

### 3.3 UI Board Ethernet Jack

The Ethernet jack located on the UI board is to be used only with the RMII PHY; whereas the Ethernet jack located on the application baseboard is to only be used with the MII PHY. The Ethernet controller on the CPU can only talk to one Ethernet PHY at a time. Which Ethernet PHY is being used is entirely controlled through software.

### 3.4 48-Character LCD Panel

The contrast of the 48-character LCD panel on the UI board is controlled through a potentiometer located at reference designator R104. This potentiometer is set for optimal viewing resolution during manufacture. However, if you are unable to view the readout on the LCD panel, try adjusting the potentiometer to set the desired contrast.

### 3.5 NAND Flash Socket

The UI board contains a NAND flash socket that allows for expandable flash memory and ships with a 512 MB chip already in the socket.

The Meritec SMT SOP socket must be opened and closed correctly to ensure that the NAND flash chip seats properly and that the socket doors do not break. Detailed instructions for opening and closing the socket are available on Meritec's website at the following URL:

[http://meritec.thomasnet.com/Asset/Application\\_Notes.pdf](http://meritec.thomasnet.com/Asset/Application_Notes.pdf)

### 3.6 NOR Flash

The UI board includes an onboard 8 MB NOR flash memory chip for customer use. This NOR flash is empty when the UI board ships.

### 3.7 User Interface Buttons

Eight user interface buttons are available on the UI board to interact with software. All of the buttons run through an I/O switch controlled by I2C.

## 4 WLAN and Bluetooth Daughter Card

The AM1808 EVM includes a WL1271 WLAN (802.11b/g/n) and Bluetooth 2.1 + EDR daughter card. Please refer to the *Zoom AM1808 EVM QuickStart Guide* for steps on how to connect the daughter card to the AM1808 EVM.



For other documentation relating to this daughter card, please refer to the Texas Instruments wiki page on the [AM18x wireless connectivity hardware package](http://processors.wiki.ti.com/index.php/AM18x_Wireless_Connectivity_Hardware_package).<sup>1</sup>

## 5 Removing the AM1808 SOM-M1

The following steps will walk you through removing the AM1808 SOM-M1 from the EVM baseboard and then reconnecting it. This may be necessary for troubleshooting purposes or if you purchase a different AM1808 SOM-M1 that is compatible with your EVM.

1. **IMPORTANT NOTE: A nylon screw keeps the LCD fastened to the baseboard during shipment. Remove this screw from the bottom side of the baseboard before attempting to eject the LCD.**

Eject the 4.3" LCD by pulling the LCD ejector levers away from the LCD. Remove the LCD from the baseboard and set aside.

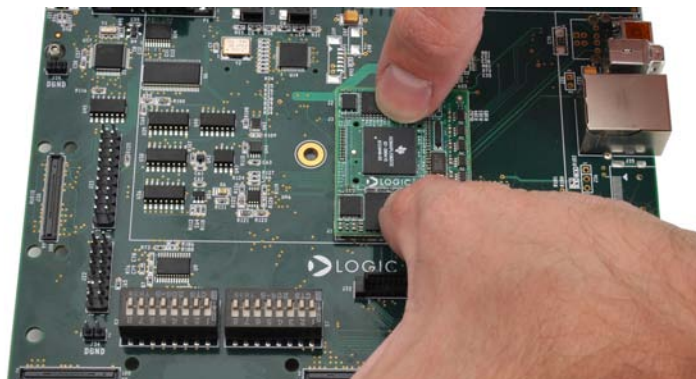


2. Taking care not to bend the PCB, remove the AM1808 SOM-M1 by applying even pressure beneath the PCB edges and pulling up.

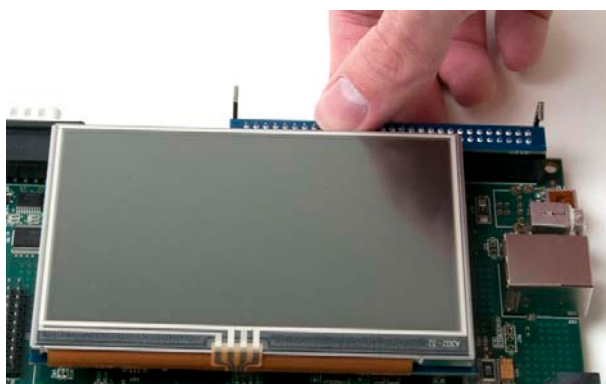


<sup>1</sup> [http://processors.wiki.ti.com/index.php/AM18x\\_Wireless\\_Connectivity\\_Hardware\\_package](http://processors.wiki.ti.com/index.php/AM18x_Wireless_Connectivity_Hardware_package)

3. To connect the AM1808 SOM-M1, align the SOM over the three board-to-board connectors. Using even pressure, press straight down over the connectors to mate boards. Visually verify that all three connectors have fully mated.



4. Connect the 4.3" LCD by inserting into the baseboard LCD connector and pushing down over the connector until the LCD ejector levers move to a vertical position. **CAUTION:** The solder points on the LCD connector PCB may be sharp; use caution when connecting the LCD.



## 6 Connect Blackhawk Emulator

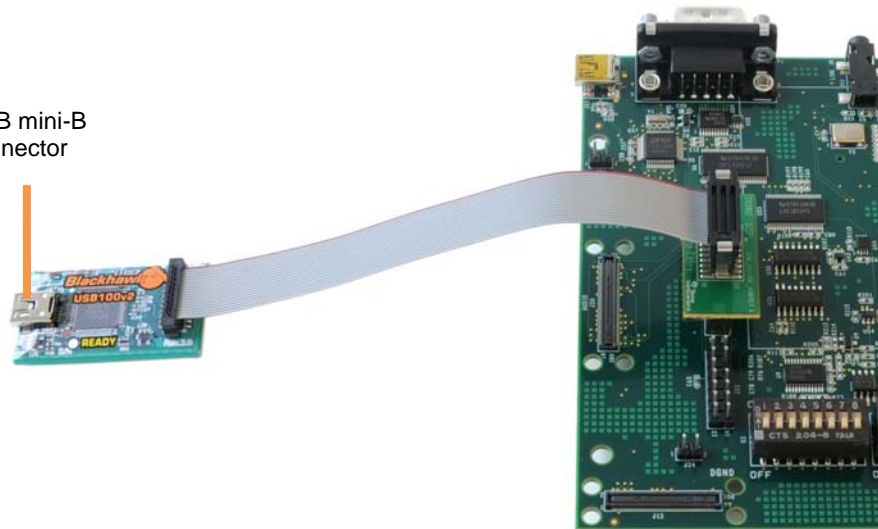
The AM1808 EVM includes a Blackhawk™ USB100v2 JTAG emulator.

1. **IMPORTANT NOTE: A nylon screw keeps the LCD fastened to the baseboard during shipment. Remove this screw from the bottom side of the baseboard before attempting to eject the LCD.**

If the 4.3" LCD is connected to the application baseboard, it must be removed prior to connecting the Blackhawk emulator. Pull back on the ejector levers until the LCD board connector moves up and disengages from the baseboard 60-pin LCD connector.

2. The Blackhawk emulator connects to the JTAG 20-pin header for ARM core on the application baseboard. See Section 2.1 for diagram pointing to the location of this header.
3. Position the emulator so the ribbon cable extends away from the application baseboard. See figure below.
4. Make sure all of the header pins line up with their respective holes on the PCB connector. Press straight-down on the PCB until the header and connector fully mate. (To assist with proper positioning of the emulator 20-pin connector, silkscreen printing on the bottom side of the PCB calls out the location of pins 1, 2, 19, and 20; these can be used to verify the connector holes matchup with their respective header pins on the application baseboard.)

USB mini-B  
connector

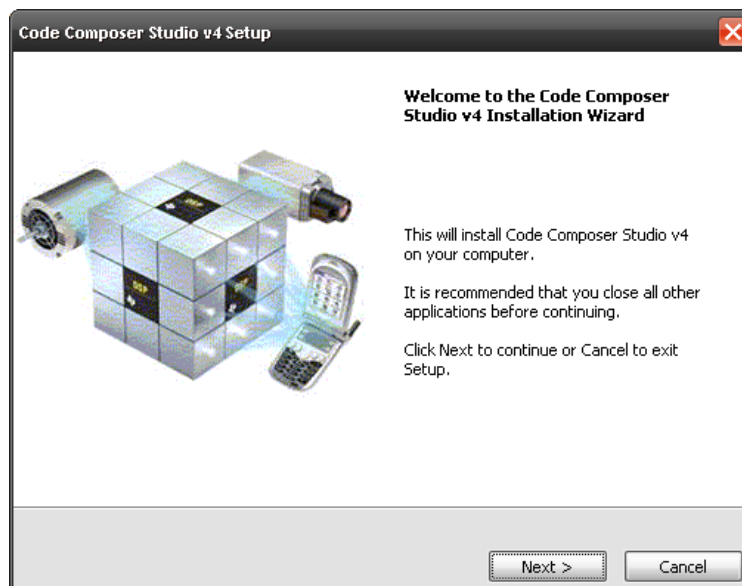


5. The 4.3" LCD can now be reconnected to the application baseboard.

## 7 Installing Code Composer Studio

The Zoom AM1808 EVM includes a software DVD containing Code Composer Studio (CCStudio).

1. Insert the Code Composer Studio v4 software DVD into your host PC.
2. Navigate to the DVD drive and open the files on the CCStudio DVD. Double-click on *setup\_CCS\_4.2.x.xxxxx.exe* and a splash screen similar to the image below will appear. Click the **Next** button.



3. Follow the on screen instructions until you arrive at the screen for Product Configuration, select **Platinum Edition**.
4. On the next screen, leave the default ISA items checked. Click the **Next** button.
5. Leave the default Component items checked. Click the **Next** button.

6. Click the **Next** button to start copying files.
7. Wait for CCStudio to finish installing; this process can take some time, so please be patient.
8. Click the **Finish** button when the installation is complete. You may eject the CCStudio DVD at this time.

## 8 Running Board Support Library (BSL) Sample Programs

The BSL sample programs are included to test the different features of the development kit and diagnose any potential problems. In order to run these tests, you first have to connect your development kit to a PC.

### 8.1 Connect EVM to Host PC

To communicate with the AM1808 EVM using CCStudio, you will need to connect the included USB A to mini-B cable to the USB mini-B connector on the Blackhawk emulator (see Section 6) and a USB A port on the host PC.

As soon as the USB cable connects to your host PC, Windows should automatically recognize that new hardware has been connected and install the necessary drivers. Power on your AM1808 EVM, move the S7 DIP switches 7 and 8 to the on position, and continue with the next section.

### 8.2 Copy BSL Files to PC

The Windows CE SD card included with the AM1808 EVM contains the GEL and BSL files. These files need to be copied to your host PC.

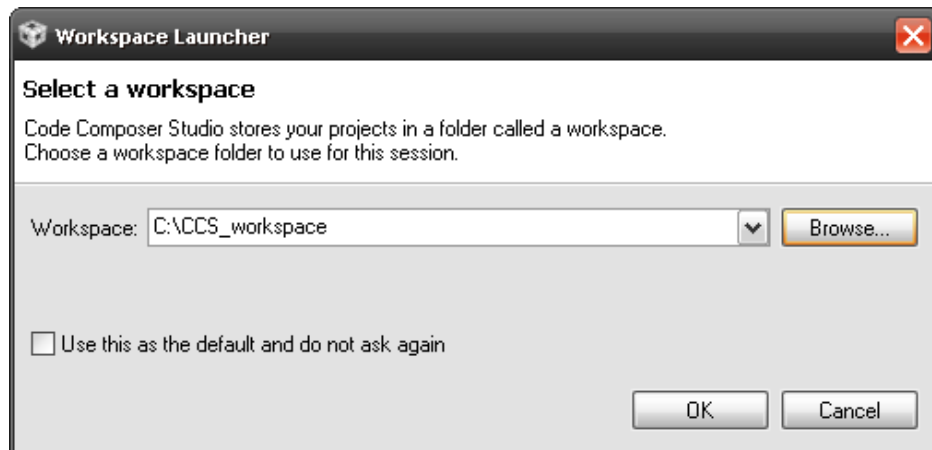
1. Insert the SD card into the USB card reader and insert the card reader into a USB port on your host PC.
2. Navigate into the SD card and locate the *BSL files* directory.
3. Extract the ZIP archive and save the files to your host PC. (**NOTE:** The files may be placed anywhere on your host PC; however, the original file structure must remain intact.)
4. For the instructions in this User Guide, it is assumed the files were copied to the root C:\ drive. For example:

`C:\AM1808_BSL`

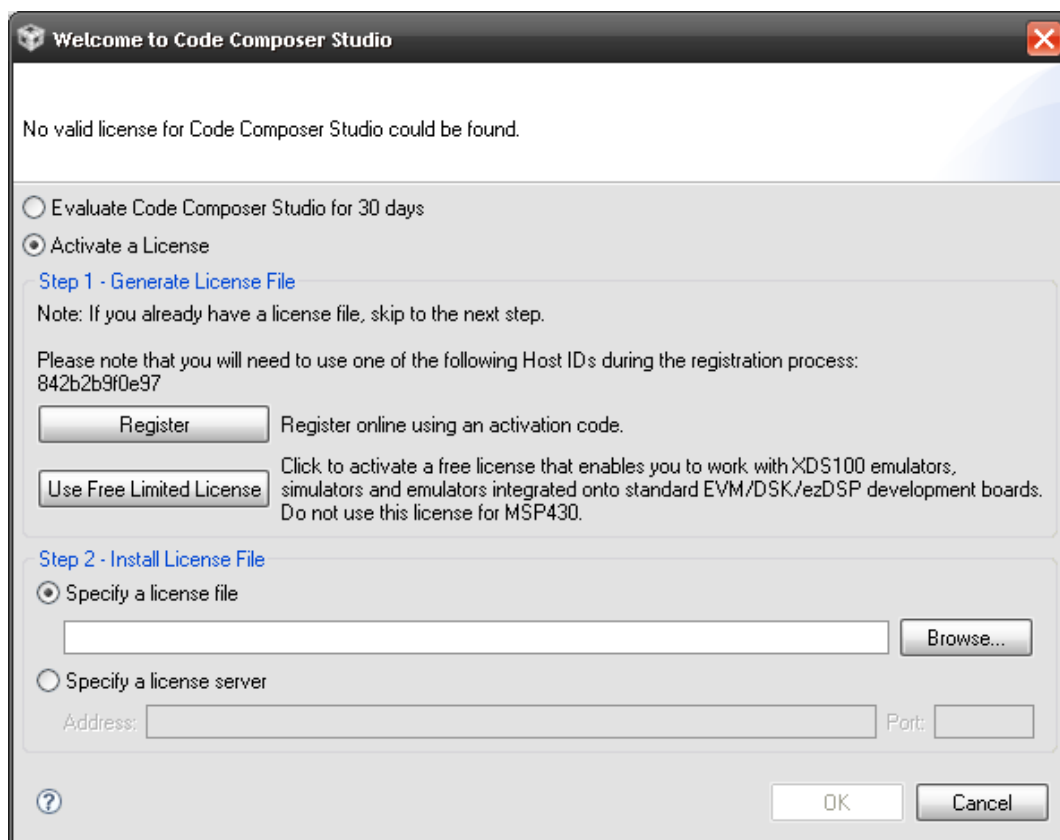
### 8.3 Launch Code Composer Studio

1. Launch Code Composer Studio by selecting **Start Menu > All Programs > Texas Instruments > Code Composer Studio v4.2.0 > Code Composer Studio v4.**

2. Select a workspace location and then click the **OK** button.



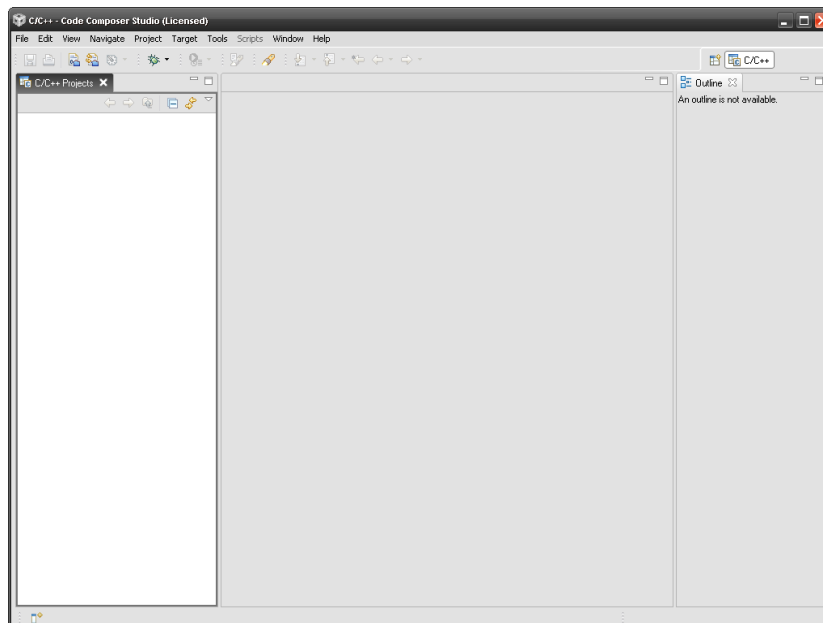
3. CCStudio will finish launching and a Welcome to Code Composer Studio window will open. (**NOTE:** If you do not have the latest Adobe Flash Player installed on your machine, you will be prompted to install. This is required for proper viewing of the Code Composer Studio Welcome screen.)
4. If you do not have a license, select the **Activate a License** option and click the **Use Free Limited License** button. (**NOTE:** If you do not have an active Internet connection, you can select to Evaluate Code Composer Studio for 30 days. At any time during that period, you can change to the Free Limited License by selecting **Help > License Options...** from the CCStudio menu bar and then following the onscreen instructions.)



5. You will be redirected to TI's website to login in with your myTI.com account. Follow all the online instructions. After completing the online instructions, you will receive an email containing an attachment that is your license file.
6. Save the license file to your host PC, then return to the Welcome to Code Composer Studio window and under *Step 2 - Install License File*, browse to where you saved the license file. Click the **OK** button.
7. You will then be presented with the Code Composer Studio Welcome screen. Click on the cube in the upper right-hand corner to go to the CCStudio workbench.



8. The CCStudio workbench will then appear.

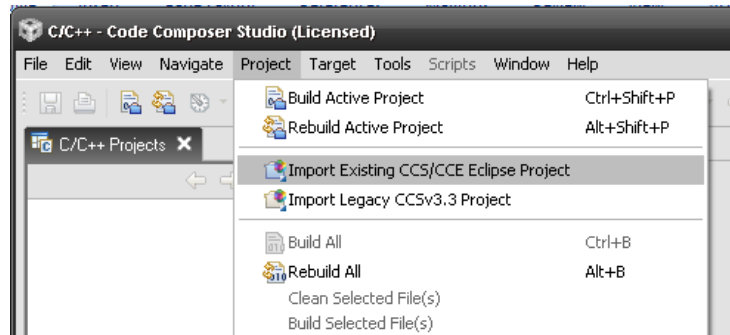




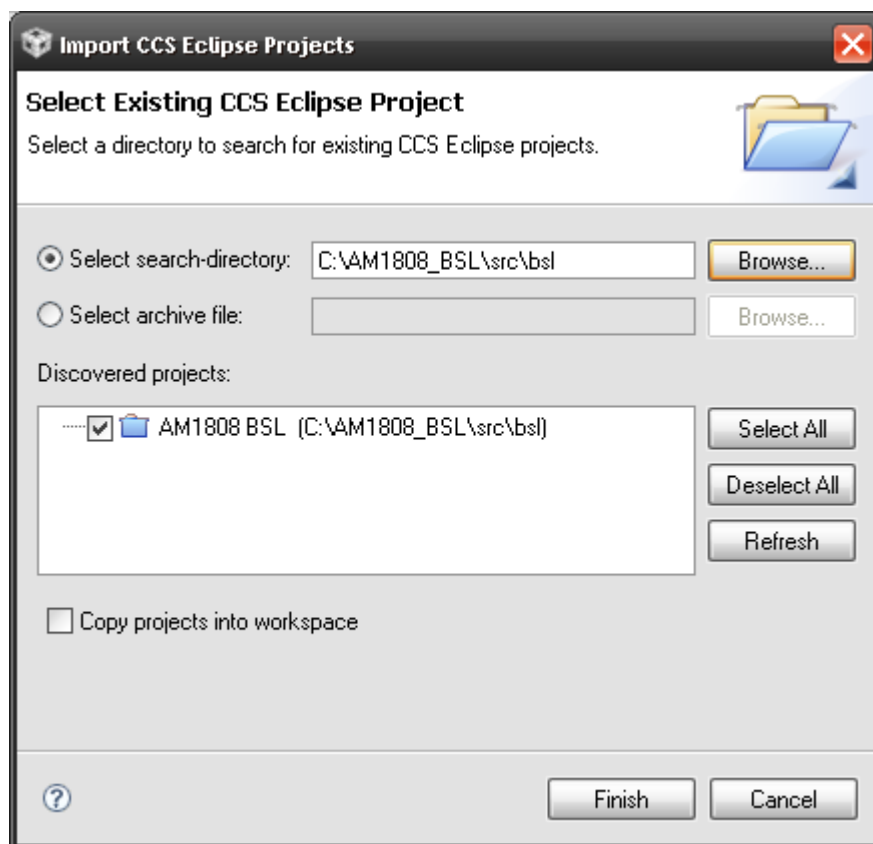
## 8.4 Run Sample Test

As an example, we will run one feature test. In order to run a test program, you will have to select the program, compile (or build) the program, and then load the compiled program. The following steps will walk you through that process.

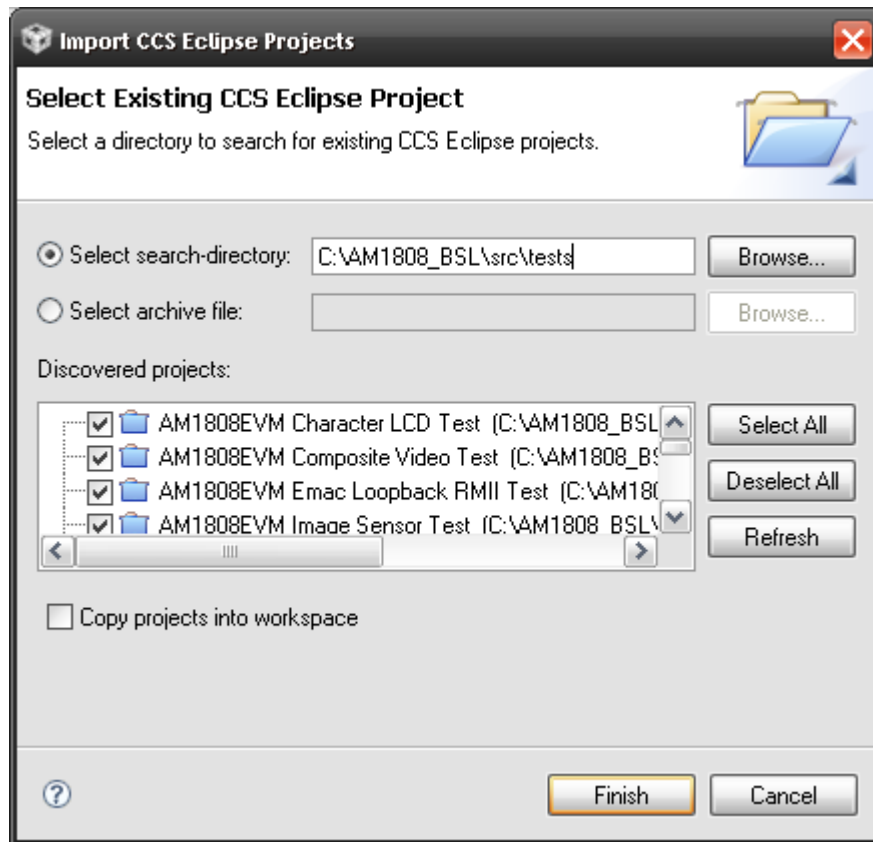
1. From the menu bar, select **Project > Import Existing CCS/CCE Eclipse Project**.



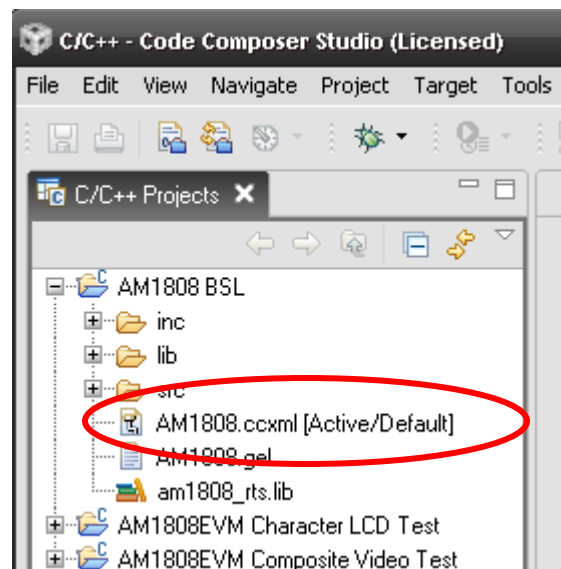
2. Browse to the location where you saved the BSL files on your host PC and down to the *AM1808\_BSL\src\bsl* directory. Click the **OK** button. Verify the correct project exists in the *Discovered projects:* window and then click the **Finish** button.



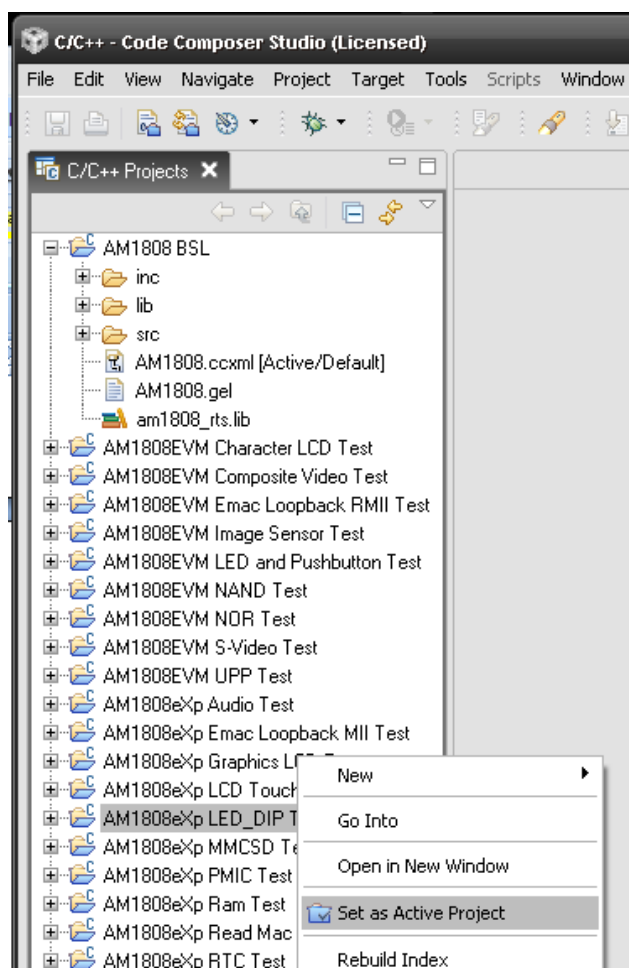
- Once again, select **Project > Import Existing CCS/CCE Eclipse Project**. This time browse to the tests folder, *AM1808\_BSL\src\tests*. Click the **OK** button. Verify the correct project exists in the *Discovered projects:* window and then click the **Finish** button.



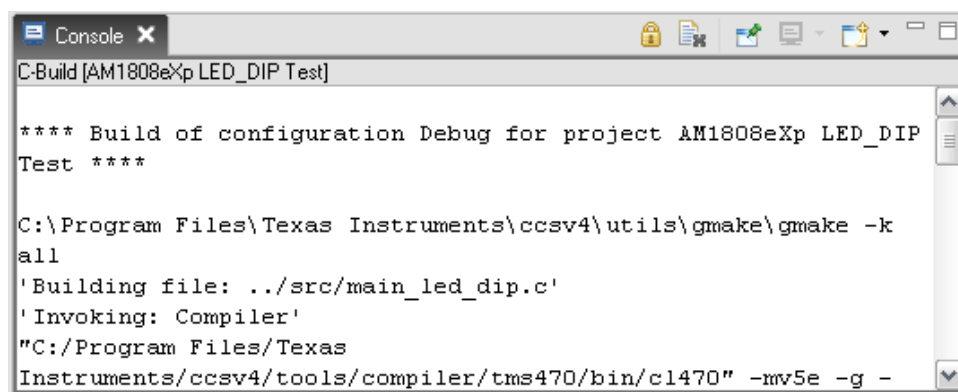
- In the Projects window on the left, expand the *AM1808 BSL* folder and verify the *.ccxml* file is set as Active/Default. If not, right-click on the *.ccxml* file name and select **Set as Active Target Configuration**, then repeat to also **Set as Default Target Configuration**.



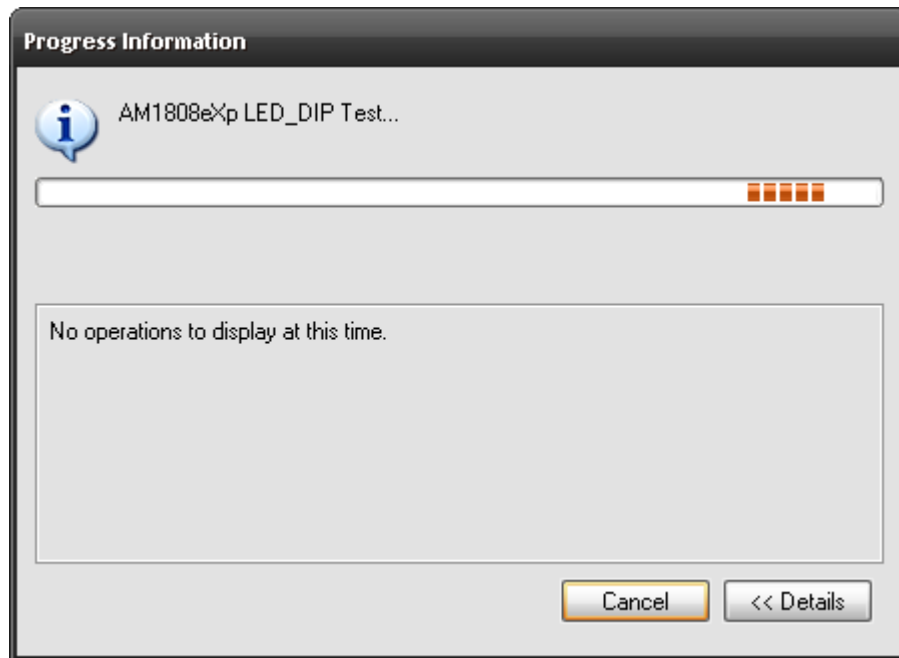
- Once again in the Projects window on the left, expand the *AM1808eXp LED\_DIP Test* project. Right-click on the file name and select **Set as Active Project**.



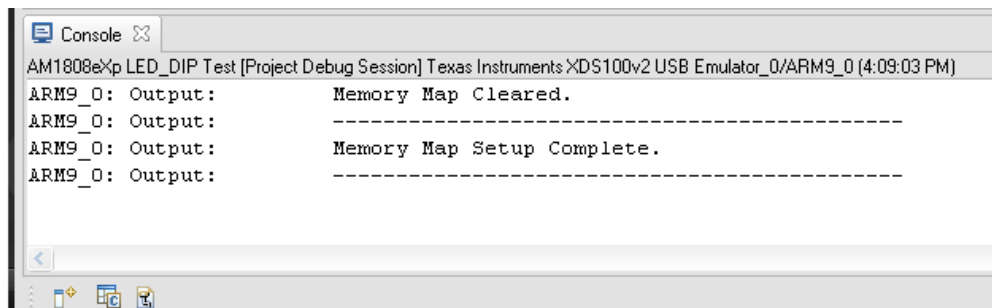
- The test must now be compiled; from the CCStudio menu bar select **Project > Build Active Project**.



7. Once the Console window prints the message “Build Complete,” select **Target > Debug Active Project** from the menu bar. (**NOTE:** If you receive a message stating “Error connecting to the target,” press the reset button on the baseboard and then click **Retry**.)

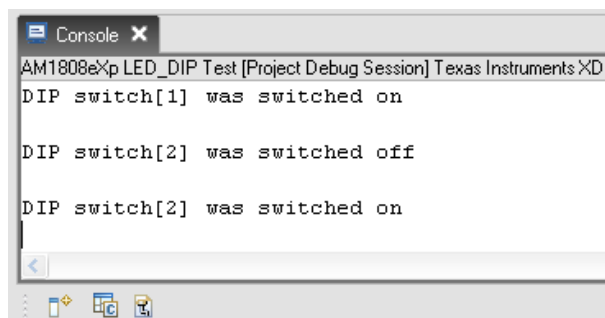


8. After the test finishes loading, you will see a message in the Console window stating “Memory Map Setup Complete.”



9. To run the program, select **Target > Run** from the menu bar. (**NOTE:** If you receive a message stating “Error during: Execution, Initialization, Control,” click **Cancel**, select **Target > Terminate All** from the menu bar, press the reset button on the baseboard, and repeat steps 7-9.)

10. The Console window provides a brief description of the test. If you move any of the S2 DIP switches, output text will print the switch that was moved and its new position (ON or OFF) and USER LED1 or USER LED2 will turn on or off in relation to the DIP switch position.



The steps in this section can be repeated to run any of the other tests for your EVM. (**NOTE:** All of the tests in the “experimenter” folder can be run on both the AM1808 EVM and eXperimenter Kit; the tests in the “evm” folder can only be run on the AM1808 EVM.)

## Appendix A: Additional Documentation

### Software Documentation

- The Windows CE SD card included with your AM1808 EVM includes Software Developer Guides for Windows CE. Please see the *setup.htm* files on the SD card for information.
- U-Boot documentation  
<http://www.denx.de/wiki/U-Boot/WebHome>
- TI Code Composer Studio documentation  
<http://focus.ti.com/dsp/docs/dspsupportatn.tsp?sectionId=3&tabId=415&familyId=44&toolTypeId=30>

### Hardware Documentation

All of the following links are also available on your “My Account” page on the Logic PD website (<http://support.logicpd.com/auth/>).

- Logic PD *Zoom AM1808 EVM QuickStart Guide*  
<http://support.logicpd.com/downloads/1293/>
- Logic PD Zoom AM1808 EVM Hardware Design Files (BOMs, Schematics, and Layout Files for all boards included in the EVM)  
<http://support.logicpd.com/downloads/1396/>
- Logic PD *AM1808 SOM-M1 Hardware Specification*  
<http://support.logicpd.com/downloads/1324/>