



Zoom™ AM3517 EVM and eXperimenter Development Kits User Guide

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Revision History

REV	EDITOR	DESCRIPTION	APPROVAL	DATE
A	JCA	-Initial release	KJH	01/24/11
B	JCA	-Section 2.3: Changed the default boot mode; default is now set to boot from the included SD cards	JCA	02/04/11
C	JA, SO	-Throughout: Added references to AM3517 eXperimenter Kit in order to make user guide applicable to both kits; -Section 3: Added section note; -Added Section 3.2; -Added Section 4; -Section 6: Removed references to BSL DVD and CodeSourcery DVD, as they are no longer provided with the kits; -Section 6.2: Updated with download link for BSL files, as they are no longer loaded on the SD card -Appendix A: Added links to AM3517 eXperimenter Kit documentation; added link to <i>AM3517 Linux User Guide</i> ; added information regarding SD card included in AM3517 eXperimenter Kit.	JA, KJH	11/21/11
D	SO	-Appendix A: Removed Windows CE SD card from SD cards included in AM3517 EVM Development Kit	KJH	02/10/12

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1 Introduction

This user guide continues where the QuickStart Guide ended by providing additional hardware details about the Zoom AM3517 EVM and eXperimenter Development Kits, as well as introductory instructions for using the included Board Support Library (BSL) files. The purpose of this document is to present information that may be useful after you've unpacked your kit, run through the demo, and are ready to begin development work. This document also points you to other resources depending upon your specific development needs.

1.1 Scope of Document

- This user guide references specific connectors on the baseboard and application 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 Nomenclature

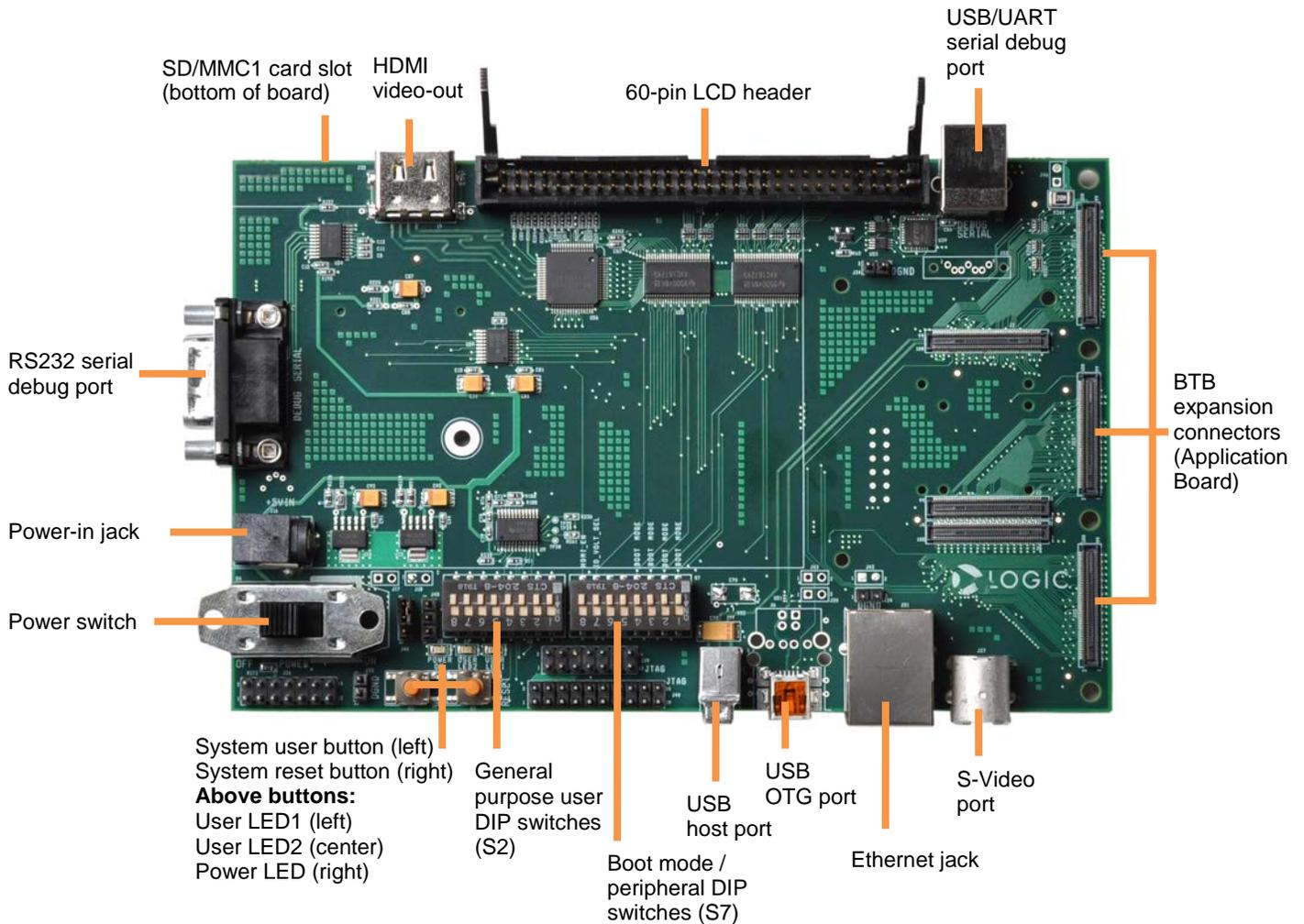
This user guide was written for both the Zoom AM3517 EVM Development Kit and the Zoom AM3517 eXperimenter Kit; therefore, AM3517 Development Kit is used throughout this document to refer to both kits. Where differences between the kits exist, a note within the text will explain the differences.

1.3 Requirements

- It is assumed that the associated QuickStart Guide has been read in its entirety. See Appendix A for links to the QuickStart Guides for each kit.
- A host PC with a USB port and at least 2 GB of hard drive space.

2 AM3517 Development Kit Baseboard

2.1 Baseboard Features Diagram



2.2 Baseboard Ethernet Jack

The Ethernet jack located on the baseboard is used with the RMI PHY on the AM3517 SOM-M2 and the Ethernet MAC built in to the AM3517 processor, whereas the Ethernet jacks located on the application board are completely independent. It is possible to use the baseboard Ethernet jack and the application board Ethernet jacks simultaneously if supported in software with multiple Ethernet drivers loaded.

2.3 DIP Switches

There are two 8-position DIP switches located on the baseboard at reference designators S2 and S7. By default, switches S7:1 and S7:4 are set to the ON position to enable booting from the SD cards included with the AM3517 Development Kit.

The S2 DIP switch is reserved for user application general purpose. The S7 DIP switch controls the processor's boot mode, IO voltage, and some peripherals 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		BOOT[0]
S7:2		BOOT[2]
S7:3		Reserved
S7:4		BOOT[5]
S7:5		Reserved
S7:6		Reserved
S7:7	AM3517 I/O runs at 3.3V	AM3517 I/O runs at 1.8V
S7:8	HDMI transmitter disabled	HDMI transmitter enabled

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 (SYS_BOOT[0:5]) to a default state on the AM3517 SOM-M2; all available boot modes are described in Table 2.2.

Table 2.2: S7 DIP Switch Boot Modes

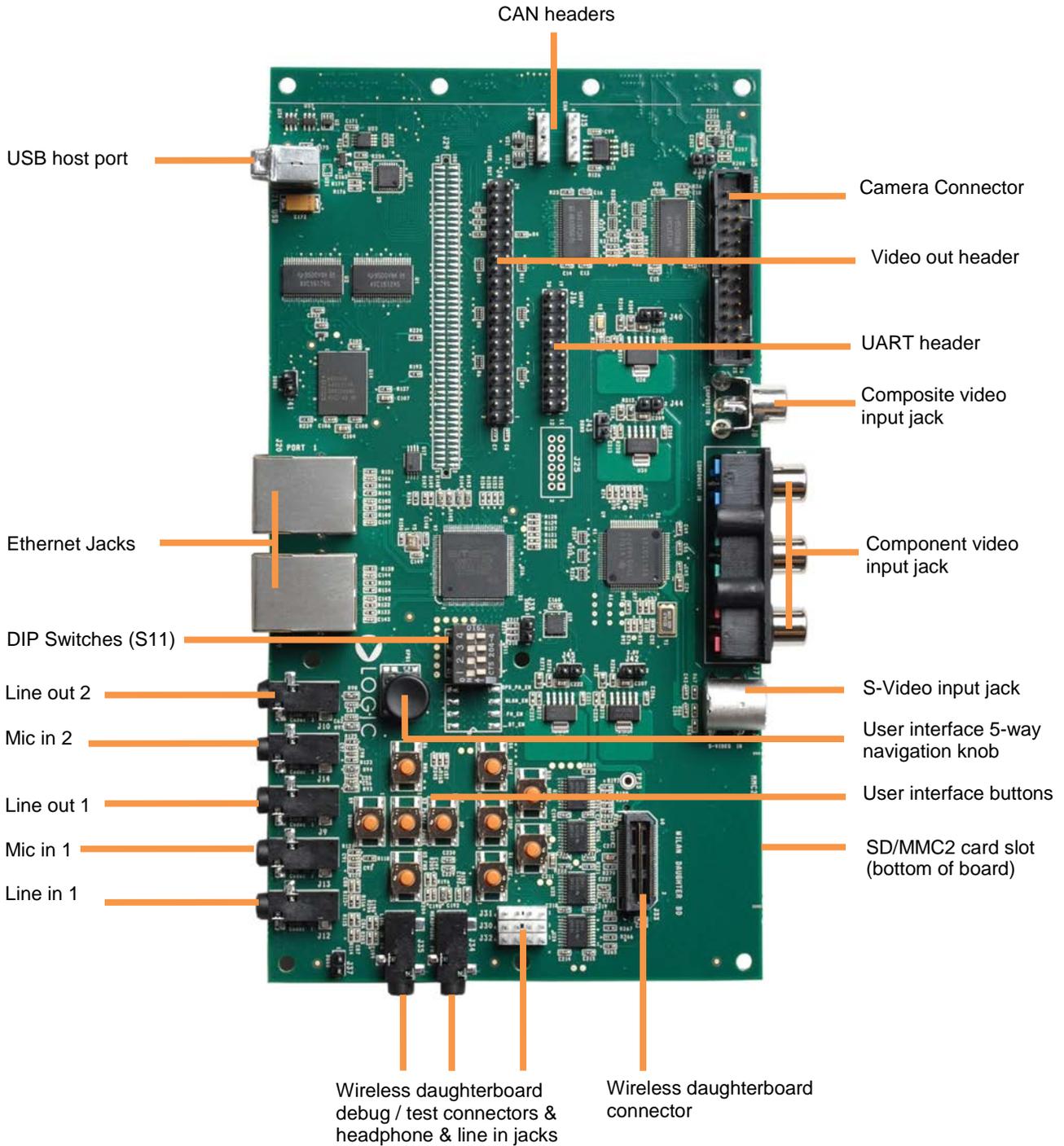
		BOOT[5]	BOOT[2]	BOOT[0]
Boot Sequence		S7:4	S7:2	S7:1
	NAND, EMAC, USB MMC1	OFF	OFF	OFF
	EMAC, USB, MMC1, NAND	ON	OFF	OFF
	XIP, USB, UART, MMC1	OFF	OFF	ON
Default	USB, UART, MMC1, XIP	ON	OFF	ON
	XDOC, EMAC, USB, EMAC	OFF	ON	OFF
	USB, XDOC	ON	ON	OFF
	MMC2, EMAC, USB, EMAC	OFF	ON	ON
	USB, MMC2	ON	ON	ON

3 Application Board

NOTE: This section only applies to the AM3517 EVM Development Kit.

The application board provides connectors to evaluate additional features beyond those built into the baseboard. It is only necessary to connect the application board when these additional features are required.

3.1 Application Board Features Diagram



3.2 Connect the Application Board

1. Make sure your AM3517 EVM Development Kit is powered off.
2. Align the application board over the three BTB expansion connectors on the AM3517 Development Kit Baseboard. Please refer to the diagram in Section 2.1 for the location of the connectors.
3. Press straight down on the application board, applying even pressure over the three baseboard BTB expansion connectors.
4. Visually verify that the BTB expansion connectors on the application board and baseboard have mated correctly.
5. Four screws and nuts are included with the kit to secure the application board to the baseboard; a Phillips #1 screwdriver is required (not included). Secure the screws through the board holes with the nuts on the bottom side of the boards. **IMPORTANT NOTE:** Only finger tighten the screws. Over-tightening the screws may permanently damage the boards.
6. To disconnect the application board: remove the screws holding the boards together and then pull up on the board above the BTB expansion connectors. Attempt to pull straight up and refrain from flexing the PCB to avoid damaging the application board.

3.3 Application Board Feature Usage

Some of the components on the AM3517 EVM Development Kit 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 since they share MMC2:

- SD/MMC2 card slot located on the application board
- Wireless daughterboard connector located on the application board
- Wi-Fi module located on the AM3517 SOM-M2

The wireless daughterboard interface can be enabled or disabled by switch S11:4 on the application board. The other features are controlled through software. This is something to take into consideration if intending to use the application board with custom software for the AM3517 SOM-M2.

In addition, the application board supports composite, component, and S-Video analog video inputs, as well as a camera digital input. All input devices may be connected simultaneously, but only one video input device may be selected at a time. The selection between any analog input and the camera input is made with switches S11:1 and S11:2 on the application board. The choice of analog input is controlled through software.

3.4 Application Board Ethernet Jacks

The Ethernet jacks located on the application board are connected to the SMSC LAN9311 Ethernet chip on the application board. This chip connects to the processor GPMC bus and is independent of the Ethernet jack located on the baseboard.

3.5 User Interface Buttons

Ten user interface buttons are available on the application board to interact with software. All of the buttons run through an I/O switch controlled by I2C. Five of the interface buttons are also connected in parallel with a five-way navigation knob.

4 Connect the Wi-Fi Antenna to the AM3517 SOM-M2

NOTE: This section only applies to the AM3517 EVM Development Kit.

The antenna included with the AM3517 EVM Development Kit provides reception for 802.11 b/g Ethernet or Bluetooth signals. Only connect the antenna if 802.11 Ethernet or Bluetooth is required for your demo or development efforts.

1. Insert the RF cable into the antenna and tighten the screw nut.



Figure 4.1: Assemble Antenna

2. Connect the antenna to the SOM-M2 reference designator J4 for 802.11 Ethernet and Bluetooth reception. See Figure 4.2 for the antenna connector location on the top of the AM3517 SOM-M2.

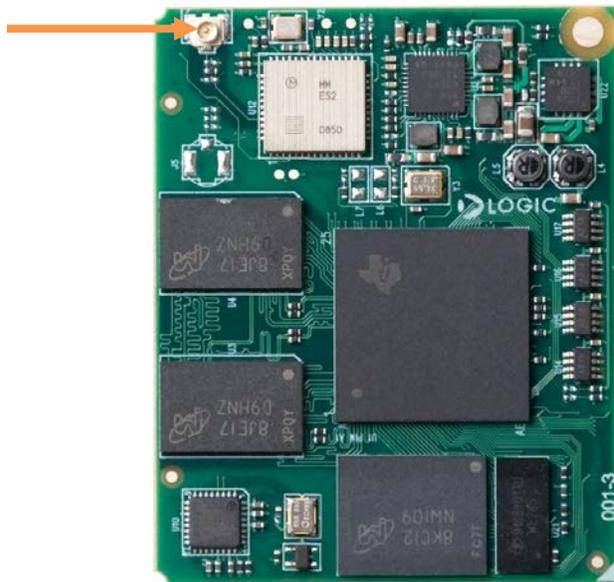


Figure 4.2: Antenna Connector Location on AM3517 SOM-M2

5 Using USB/UART Serial Debug Interface

If your computer is not equipped with a COM port, the baseboard allows for the option of using the USB/UART serial debug port as a virtual COM port (VCP). See Section 2.1 for the location of this port. In order to use this feature, you must first download and install the VCP chip driver on your computer.

Please review the [FTDI website](#)¹ to make sure your computer meets the recommended specifications for the FT232R device.

5.1 VCP Driver Installation

The following are brief instructions for installing the FT232R VCP driver. For more detailed instructions, please review the appropriate [installation guide](#)² provided by FTDI.

1. Download the [VCP driver](#)³ from the FTDI website. **NOTE:** There may be multiple drivers available on the FTDI website for this device; only the *VCP driver* is required.
2. The driver will be downloaded as a ZIP file which must be unzipped before the driver can be installed.
3. If running Windows XP SP1, please refer to the *Windows XP Installation Guide* located on the FTDI website for special precautions to observe while installing the driver.
4. Plug the USB cable into a USB port on your computer and the USB/UART serial debug port on the baseboard. The Windows XP *Found New Hardware Wizard* window will automatically appear.
5. When prompted to allow Windows to search for the driver, select **No not this time.**
 - Install from a list or specific location (advanced).
 - Browse to the location of the unzipped folder containing the driver.
 - The installation process should complete by itself with a message stating *USB Serial Converter successfully installed.*
6. A Windows XP *Found New Hardware Wizard* window will open for a second time. Follow the same procedures included in Step 5 above. This installation process should complete by itself with a message stating *USB Serial Port successfully installed.*
Your system should now recognize the new hardware.
7. If you encounter any problems during this installation, please refer to FTDI's website for troubleshooting recommendations.
8. Before using the VCP driver, go to the Device Manager on your computer to determine what COM port is associated with the USB/Serial Port.

5.1.1 Additional Notes

- When using this feature, the DB9 Serial Port on the baseboard is disabled whenever the USB cable is connected to the USB/UART serial debug port.
- The power supply included with the AM3517 Development Kit needs to be plugged into an electrical outlet for the USB device to be recognized by the computer. However, the development kit does not need to be powered on for the device to be recognized.

¹ <http://www.ftdichip.com/Products/FT232R.htm>

² <http://www.ftdichip.com/Documents/InstallGuides.htm>

³ <http://www.ftdichip.com/Drivers/VCP.htm>

5.2 Terminal Emulation Installation

The AM3517 Development Kit is designed to communicate with terminal emulation programs using the included null-modem serial cable or Ethernet cable. The terminal emulation program must support binary transfers in order to download software to the kit. Although Logic PD does not support any particular terminal emulation program, we suggest using Tera Term for Windows 2000 or XP (Tera Term is not available for Linux users). Tera Term can be downloaded for free from Logic PD's website. To install Tera Term:

1. Download the [Tera Term ZIP file](#)⁴ from Logic PD's website and extract the contents.
2. After extracting the contents, locate the `teraterm-x.xx.exe` file and double-click it.
3. Follow the on-screen instructions to install Tera Term.
4. Start the Tera Term program.
5. From the menu, select **Setup > Serial port**.
6. Select the appropriate COM port for your host PC and then change the port settings to:
 - a. Baud rate: **115200**
 - b. Data: **8 bit**
 - c. Parity: **None**
 - d. Stop: **1 bit**
 - e. Flow control: **None**

HINT: In Tera Term, you can save these serial port settings by selecting **Setup > Save setup** from the menu bar. After saving, these serial port settings will be in place every time you launch the Tera Term application.

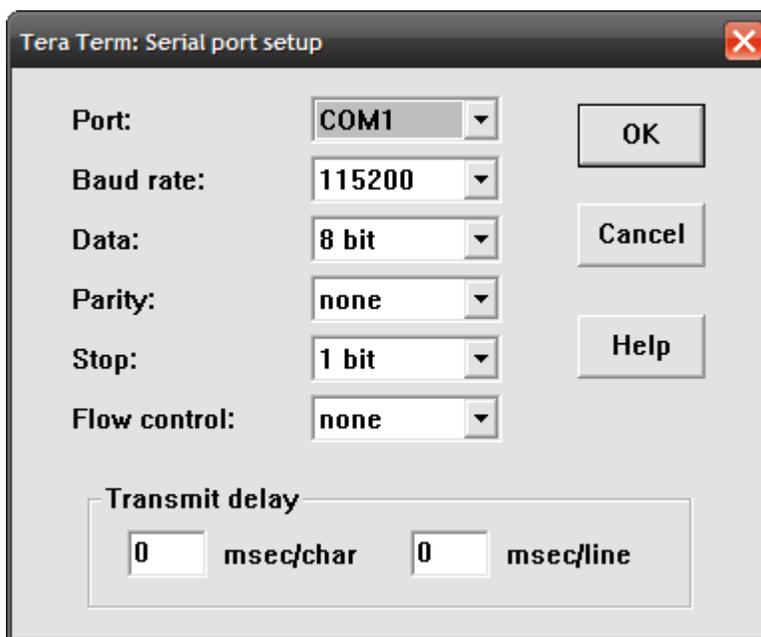


Figure 5.1: Serial Port Settings

6 Install Software

The AM3517 Development Kit includes a Board Support Library (BSL) that allows for interaction with the development kit and helps with diagnostics. The BSL is provided as a download for the

⁴ <http://support.logicpd.com/downloads/240/>

AM3517 Development Kit, as noted below in Section 6.2. The BSL works in conjunction with tool chains from CodeSourcery which must be installed on the host PC prior to using the BSL.

6.1 Install CodeSourcery

To follow the instructions within this user guide and to interact with the BSL, all that is required is a command-line tool. We will use CodeSourcery's free, command-line-only Lite Edition of Sourcery G++ for ARM EABI in these instructions.

1. Download [Sourcery G++ Lite for ARM EABI](#).⁵ **NOTE:** These instructions were tested with version 2010.09-51.
2. Locate the downloaded executable on your host PC and double-click to launch the installer.
3. Follow the on screen instructions. When you arrive at the screen for type of installation, select **Typical**.

6.2 Install AM35xx BSL

1. Download the [AM35xx BSL Files](#)⁶ from either the AM3517 EVM or eXperimenter Development Kit downloads page.
2. Copy the contents of the BSL folder to a directory of your choice on the host PC.
3. Read the *BSL_ReadMe.txt* file for documentation on the BSL.

7 Board Support Library Sample Programs

The BSL sample programs are included to test the different features of the AM3517 Development Kit and diagnose any potential problems. In order to run these tests, you first have to connect your development kit to a host PC.

7.1 Connect AM3517 Development Kit to Host PC

Connect the AM3517 Development Kit to your host PC by using the provided serial cable and following the instructions in the appropriate QuickStart Guide. You can also use a USB A-to-B cable and following the instructions in Section 5 of this document.

7.2 Run Test Menu

As an example, we will run the test menu for the AM3517 Development Kit. 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 this process.

1. Open a command prompt on your host PC and navigate to the `.ltests\test_menu\cs` folder, located in the directory where you installed the BSL.
2. Compile the program by typing `cs-make` at the command prompt.
3. This will create a `test_menu.raw` file in that same folder.
4. Open Tera Term and select the serial COM port connected to your AM3517 Development Kit.
5. Make sure one of the included software SD cards is inserted in the development kit and then power it on.
6. When prompted, press any key to stop the auto-boot process. This will bring up a bootloader prompt.
7. Load the test menu program by typing `loadb` at the bootloader prompt.

⁵ <http://www.codesourcery.com/sqpp/lite/arm/portal/subscription?@template=lite>

⁶ <http://support.logicpd.com/downloads/1258/>

8. If using Tera Term, transfer the file by selecting **File >Transfer > Kermit > Send** from the menu.
9. Navigate to the `.tests\test_menu\cs` folder and then select the `test_menu.raw` file. Click **Open** to send the file. **NOTE:** This requires Tera Term version 4.63. If you are not using TeraTerm, please read the documentation for your terminal emulator about using the Kermit protocol to transfer a file.
10. After the program finishes loading, type `go 0x82000000` and press **Enter**.
11. Run a test by typing in the test number and pressing **Enter**. For example, type 5 to run the LED, DIP Switch test. This test will flash LEDs in different patterns depending on the S2 switch moved and will output the switch number positions.

NOTE: All of the tests in the *experimenter* folder can be run on both the AM3517 EVM Development Kit and the AM3517 eXperimenter Kit; the tests in the *evm* folder can only be run on the AM3517 EVM Development Kit.

Appendix A: Additional Documentation

Documentation Overview Flowchart

- *AM3517 EVM Development Kit Documentation Overview*
<http://support.logicpd.com/downloads/1452/>
- *AM3517 eXperimenter Kit Documentation Overview*
<http://support.logicpd.com/downloads/1453/>

Software Documentation

- *AM3517 Linux User Guide*
<http://support.logicpd.com/downloads/1434/>
- The AM3517 EVM Development Kit includes SD cards with Software Developer Guides for Android and Linux. The AM3517 eXperimenter Kit only includes an SD card with a Software Developer Guide for Linux. Please see the *setup.htm* files on each SD card for information.
- U-Boot documentation
<http://www.denx.de/wiki/U-Boot/WebHome>

Hardware Documentation

- *Zoom AM3517 EVM QuickStart Guide*
<http://support.logicpd.com/downloads/1255/>
- *Zoom AM3517 eXperimenter Kit QuickStart Guide*
<http://support.logicpd.com/downloads/1256/>
- Zoom AM3517 EVM Development Kit Hardware Design Files (BOMs, schematics, and layout files for all boards included in the kit)
<http://support.logicpd.com/downloads/1377/>
- Zoom AM3517 eXperimenter Kit Hardware Design Files (BOMs, schematics, and layout files for all boards included in the kit)
<http://support.logicpd.com/downloads/1281/>
- *AM35x SOM-M2 Hardware Specification*
<http://support.logicpd.com/downloads/1257/>