

:: i.MX LITEKIT ::

ZNON



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User's Manual www.logicpd.com

REVISION HISTORY

REV	EDITOR	REVISION DESCRIPTION	APPROVAL	DATE
1	Jed Anderson	Internal Release	ELH	08/16/06
A	Jed Anderson	Updated introductory paragraph; Added Cover	JCA	08/30/06
B	Jed Anderson	Section 4.3: corrected item 9 to use 'exec' command instead of 'jump'; Section 5.1: clarified use of the 'info' command to access LogicLoader version; Throughout document: updated screenshots, general grammar and formatting changes	JCA	08/23/07

Please check www.logicpd.com for the latest revision of this manual, product change notifications, and additional application notes.

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1 Getting Started

Congratulations on your purchase of the Zoom™ i.MX LITEKIT Development Kit. The Zoom i.MX LITEKIT provides a product-ready software and hardware platform for evaluating the functionality of the Freescale™ i.MX processor and System on Module (SOM). Logic's embedded solutions fast forward product development and helps your company stay focused on your high-value core technologies.

1.1 Have you read the Zoom™ i.MX LITEKIT QuickStart Guide?



Figure 1.1 – Zoom i.MX LITEKIT QuickStart Guide

If the answer is yes, you are ready to proceed to “Section 2: Install Software Tools.”

If not, please familiarize yourself with the *Zoom i.MX LITEKIT QuickStart Guide* before you read this document. The latest version of the *Zoom i.MX LITEKIT QuickStart Guide* is available for download at <http://www.logicpd.com/auth/>.

1.2 Zoom i.MX LITEKIT QuickStart Guide Review

Thank you for reading the *Zoom i.MX LITEKIT QuickStart Guide* before proceeding through this document. Now you are familiar with the following:

- LITEKIT System Contents
- Development PC Requirements
- Peripheral Connectors
- JTAG Settings
- Terminal emulator and LogicLoader “Test Drive” Scenarios
- Product Notice and Registration Details
- Ordering Information
- Support Information

2 Install Software Tools

Before you begin, it is assumed that you have read and completed all steps described in the *Zoom i.MX LITEKIT QuickStart Guide*, located at <http://www.logicpd.com/auth/>.

2.1 Objective

The objective of this section is to provide step-by-step instructions for installing:

- Tera Term (Section 2.3)
- Cygwin (Section 2.4)
- GNU Toolchain (Section 2.5)

2.2 Prerequisites

- Zoom i.MX LITEKIT CD
- Windows® 2000 or later Host PC with access to the Internet
- Pentium® processor or equivalent
- 64 MB RAM
- 1 GB free hard disk space
- 115200 baud-capable RS-232 port (COM port) or USB port (please see the *Zoom i.MX LITEKIT QuickStart Guide*, Section 3.3: Connecting the Baseboard to your PC, for more information on using a USB port as a COM port).

2.3 Installing Tera Term

Tera Term is a software terminal emulator for Windows that can send and receive both binary and ASCII characters over system COM ports.

1. To begin installation, insert Logic's Zoom i.MX LITEKIT CD into your CD-ROM drive. A web browser window will open, displaying the contents of the CD. If this window does not launch automatically, double-click the 'index.html' file in your CD contents folder. (Alternatively, access the 'Software Development Tools' directory included on Logic's Zoom i.MX LITEKIT CD, open the 'Tera Term' folder, double-click the 'setup.exe' file, and then proceed to step 4.)

Your web browser will bring up the following screen. (The following screen shots may show a different Development Kit name than you have, however the page structure is the same.)

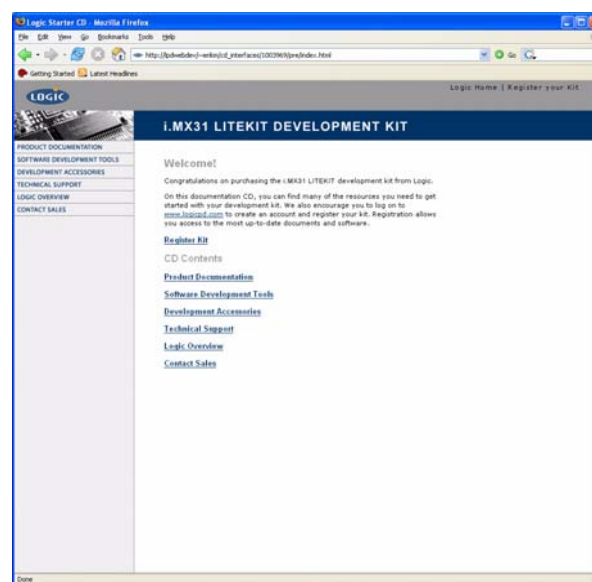


Figure 2.1 – Start page

2. On the Start Page, select 'Software Development Tools.'

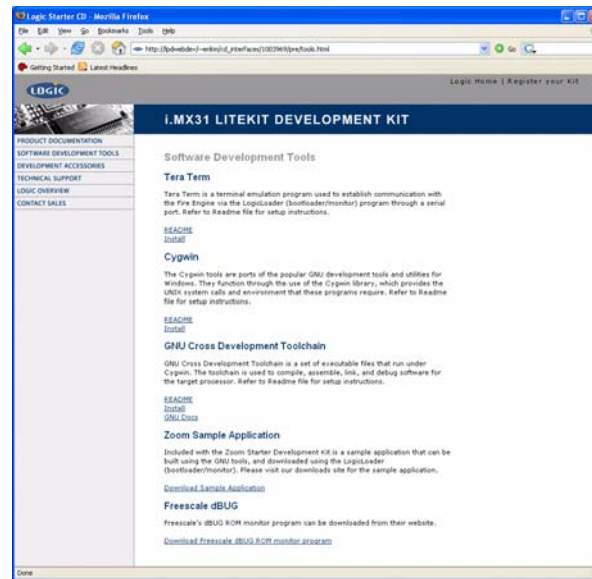


Figure 2.2 – Software Development Tools page

3. Option number one on the 'Software Development Tools' page is Tera Term. Click 'Install.'
4. Tera Term Pro Setup will begin. Follow these steps through the installation windows:
 - 4.1. Select a language, then click 'Continue.'
 - 4.2. If Tera Term is already running, close it, then click 'Continue.'

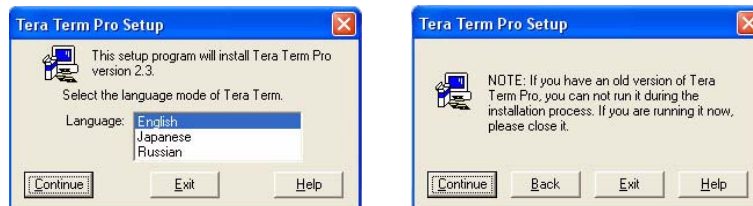


Figure 2.3 – Tera Term setup windows 1-2

- 4.3. Select a root directory for Tera Term. You can accept the default installation directory or enter an alternate path name in the 'Path' text field, then click 'Continue.'
- 4.4. Tera Term will install. Click the 'OK' button. Setup is now complete.

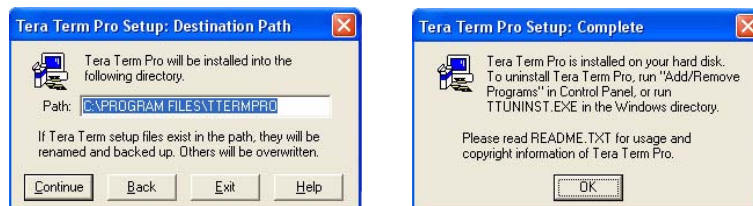


Figure 2.4 – Tera Term setup windows 3-4

2.4 Installing Cygwin

Cygwin is a UNIX® environment for Windows. It is a collection of tools that provides a Unix application program interface (API) emulator to allow compilation of sample source code.

1. To begin installation, insert Logic's Zoom i.MX LITEKIT CD into your CD-ROM drive. A web browser window will open, displaying the contents of the CD. If this window does not launch

automatically, double click the 'index.html' file in your CD contents folder.

Your web browser will bring up the following screen.

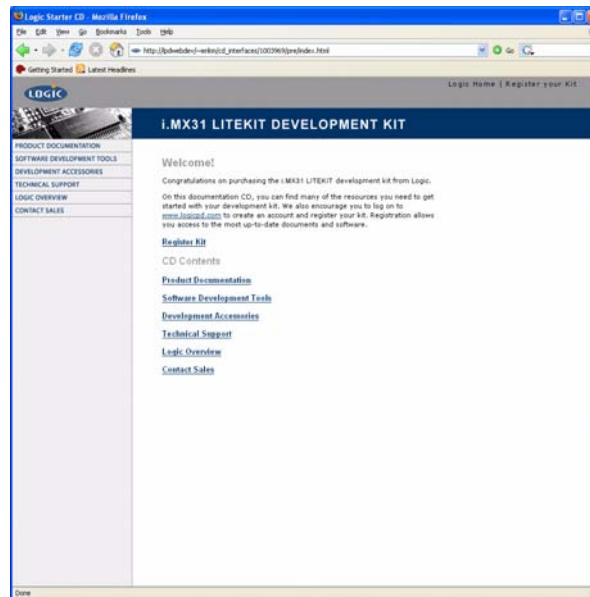


Figure 2.5 – Start page

2. On the Start Page, select 'Software Development Tools.'

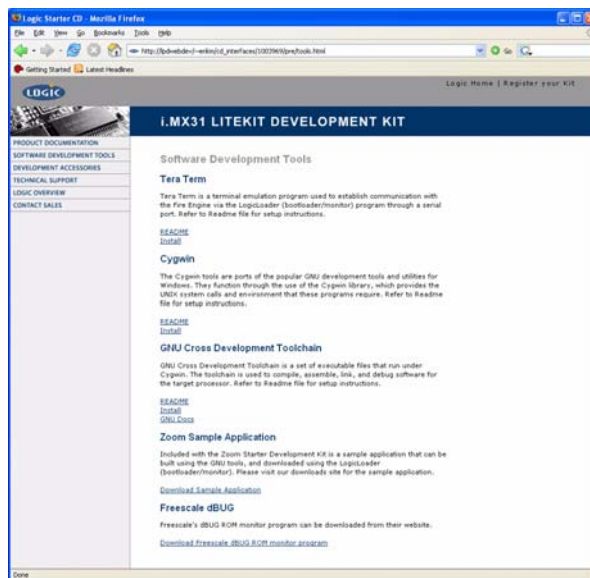


Figure 2.6 – Software Development Tools page

3. Option number two on the 'Software Development Tools' page is Cygwin. Click on the link to Logic's downloads site, enter your username and password, and then download the Cygwin.zip file. (If you have not registered your product—or do not have your registration information—please register at <http://www.logicpd.com/auth/>. You will receive an e-mail with your new username and password.)
4. Double-click on the 'setup.exe' file after unpacking the .zip file. A window containing 'Important Steps for Cygwin Installation' will be displayed. To continue, press any key.

5. Cygwin Setup will begin. Follow these steps through the installation windows:
 - 5.1. 'Cygwin Net Release Setup Program' window: click 'Next.'
 - 5.2. 'Choose A Download Source' window: select 'Install from Local Directory,' click 'Next.'

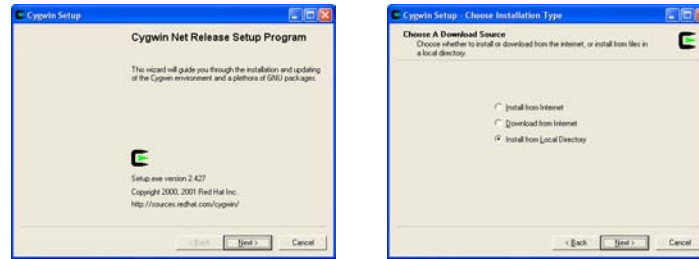


Figure 2.7 – Cygwin setup windows 1-2

- 5.3. 'Select Root Install Directory' window: select a root directory for Cygwin. You can accept the default installation directory or enter an alternate path name in the 'Root Directory' text field. Next, allow 'Install For' to default to 'All Users' unless you must restrict access. Also, allow 'Default Text File Type' to default to 'Unix.' Then click 'Next.'
- 5.4. 'Select Local Package Directory' window: this should point to the location of the unpacked contents of the .zip file. Click 'Next.'

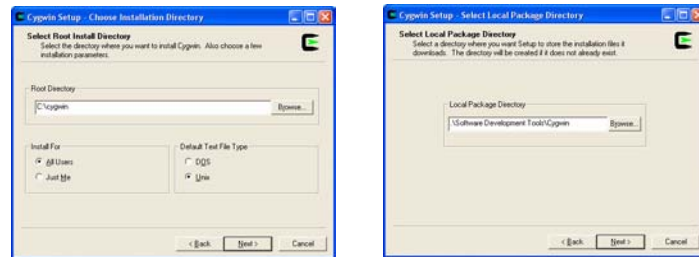


Figure 2.8 – Cygwin setup windows 3-4

- 5.5. 'Select Packages' window: verify that 'Default' is selected for each category. Click 'Next.'
- 5.6. Setup.exe will begin copying files. This may take several minutes. After the files have completed copying, the 'Create Icons' window will appear. Select your icon preference and click 'Finish.'
- 5.7. Cygwin will install. When the 'Installation Complete' window appears, click 'OK.' Setup is now complete.

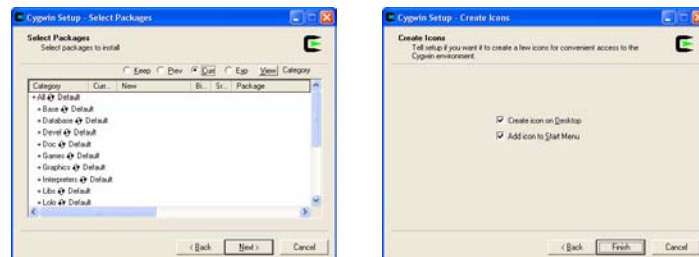


Figure 2.9 – Cygwin setup windows 5-6



Figure 2.10 – Cygwin setup: Installation complete window

2.5 Installing the GNU Cross Development Toolchain

The GNU Cross Development Toolchain is a collection of tools that allows for software source code compilation and linking to create object code for your target hardware.

Prerequisite

- You will need a complete installation of Cygwin on a local drive. For example: C:\cygwin or D:\cygwin.
1. To begin installation, insert Logic's Zoom i.MX LITEKIT CD into your CD-ROM drive. A web browser window will open, displaying the contents of the CD. If this window does not launch automatically, double-click the 'index.html' file in your CD contents folder.

Your web browser will bring up the following screen.

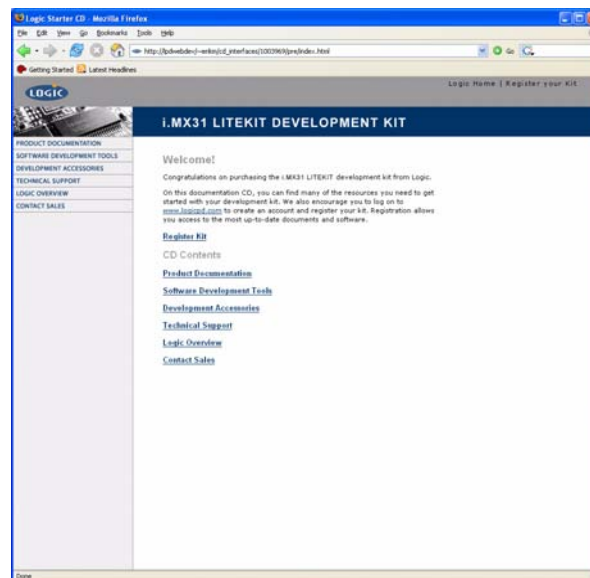


Figure 2.11 – Start page

- On the Start Page, select 'Software Development Tools.'

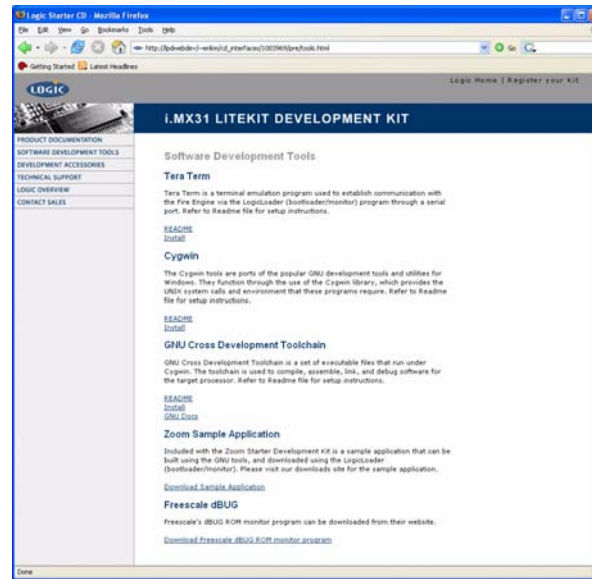


Figure 2.12 – Software Development Tools page

- Option number three on the 'Software Development Tools' page is GNU Cross Development Toolchain. Click on the link to Logic's downloads site, enter your username and password, and then download the GNU Cross Development Toolchain. (If you have not registered your product—or do not have your registration information—please register at <http://www.logicpd.com/auth/>. You will receive an e-mail with your new username and password.)
- Double-click on the downloaded 'gntools_install' icon. GNU Cross Development Toolchain Setup will begin. Follow these steps through the installation windows:
 - 'GNU Cross Development Toolchain Setup' window: click 'Next.'
 - 'Choose Components' window: select the type of install as 'ALL - All Supported Processors,' then click 'Install.'

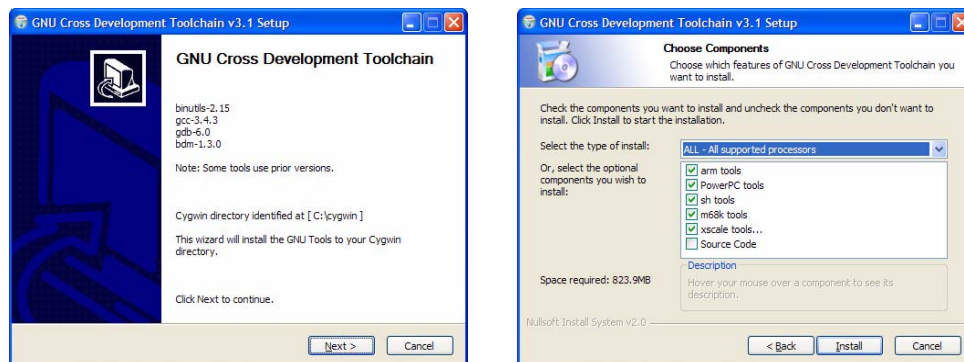


Figure 2.13 – GNU Cross Development Toolchain setup windows 1-2

- 4.3. Please wait while an 'Installing' window appears and the necessary files are copied to your Cygwin directory. When installation is complete, click 'Finish.' Upon completion, the installer automatically appends '/gnutools/bin' to the Cygwin PATH variable. Setup is now complete.

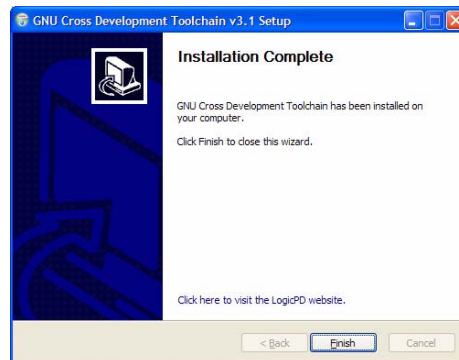


Figure 2.14 – GNU Cross Development Toolchain setup window 3

2.5.1 GNU Tools Documentation

A complete set of manuals for the GNU tools is contained in the Zoom i.MX LITEKIT CD in the following directory: \Tools\Documentation\GNU_Docs.

3 Build a Sample Application

3.1 Objective

The objective of this section is to explain how to build a sample application for the Zoom i.MX LITEKIT.

Background Information:

- This application is very simple and is only intended to serve as a starting point for software developers. The purpose of the sample application is to verify that the development tools (compiler, linker, etc.) have been correctly installed and are working properly.
- 'make' utility:
The build procedure in this section utilizes the 'make' utility in Cygwin—'make' is a utility common in Unix environments. Note that the files in the 'sample_app' directory tree are called makefiles. Makefiles contain rules that the 'make' utility follows when building an application. For additional info regarding 'make,' refer to the documentation on the Zoom i.MX LITEKIT CD at: \Tools\Documentation\GNU_Docs\Using_make\make.pdf.
- 'target' argument:
For the sample application, the user supplies a 'target' argument on the 'make' command line. For example: 'make sample_RAM' instructs 'make' to build a new target called 'sample_RAM.'

3.2 Prerequisites

- Base directory in which source code can be placed
- Cygwin with GNU Cross Development Tools installed
- Tera Term installed

3.3 Procedure

1. To begin installation, insert Logic's Zoom i.MX Development CD into your CD-ROM drive. A web browser window will open, displaying the contents of the CD. If this window does not launch automatically, double-click the 'index.html' file in your CD contents folder.

Your web browser will bring up the following screen.

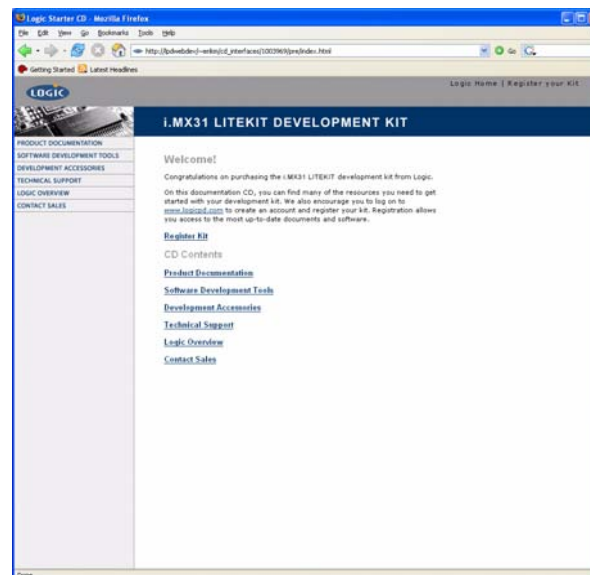


Figure 3.1 – Start page

2. On the Start Page, select 'Software Development Tools.'

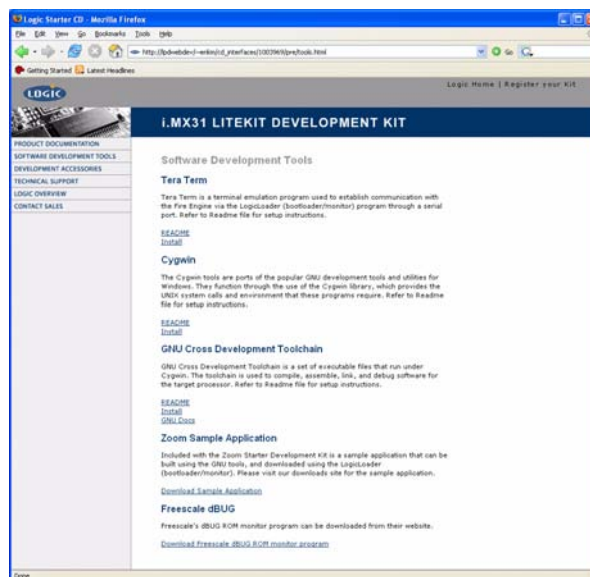


Figure 3.2 – Software Development Tools page

3. Option number four on the 'Software Development Tools' page is Zoom Sample Application. Click on the link to Logic's downloads site, enter your username and password, and then download the Sample Application Package. (If you have not registered your product—or do not have your registration information—please register at <http://www.logiccpd.com/auth/>. You will receive an e-mail with your new username and password.)
4. Double-click on the 'apps_install.exe' icon you downloaded and LogicLoader Sample Application Package Setup will begin. Follow these steps through the installation windows:
 - 4.1. 'LogicLoader Sample Application Package Setup' window: click 'Next.'
 - 4.2. 'Choose Components' window: click 'Next.'

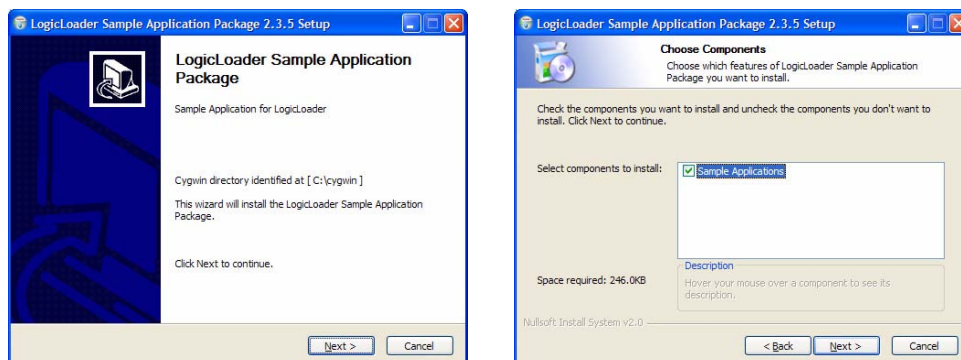


Figure 3.3 – LogicLoader Sample Applications Package setup windows 1-2

- 4.3. Select an install location for the LogicLoader Sample Application Package. You can accept the default installation directory or enter an alternate path name in the 'Destination Folder' field. Click 'Install' to begin installing files.

- 4.4. Please wait while an 'Installing' window appears and the necessary files are copied to your Cygwin directory. When installation is complete, click 'Finish.' Setup is now complete.

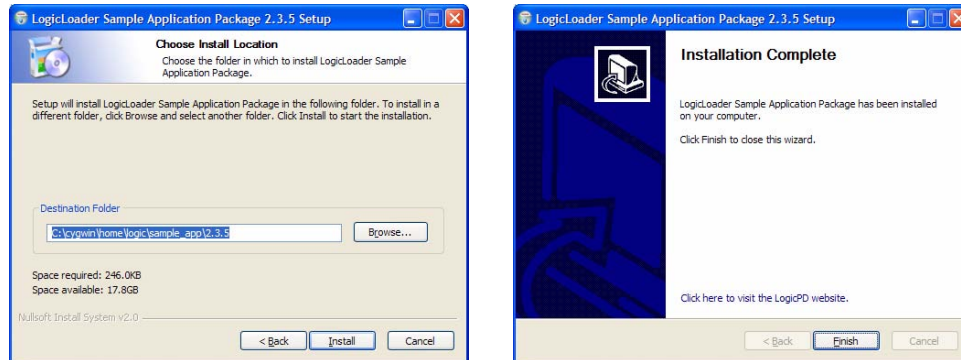


Figure 3.4 – LogicLoader Sample Applications Package setup windows 3-4

5. Next, open Cygwin. (Open Start | Programs to locate Cygwin, or double-click the Cygwin shortcut icon on your desktop, depending on where you saved the icon.) A Cygwin window will appear.
6. In your Cygwin window, type the following command:
`cd /home/logic/sample_app/2.3.5/led_flasher`. This will change the working directory to your sample_app folder. (**Note:** 2.3.5 is the version number of the Zoom Sample Application. Please note which version you have downloaded and edit the folder name as appropriate.)
7. Next, type `make clean` in your Cygwin window. This cleans previously built files, if any.
8. Next, type `make` in order to get the list of build file options. See Figure 3.5 below.

```

/home/logic/sample_app/2.3.5/led_flasher
jeda@LPD321 ~
$ cd /home/logic/sample_app/2.3.5/led_flasher
jeda@LPD321 /home/logic/sample_app/2.3.5/led_flasher
$ make clean
rm *.o arch/*.o api.lds
jeda@LPD321 /home/logic/sample_app/2.3.5/led_flasher
$ make
bash build.sh

-----
Sample Application Build Tool
-----

Select module:
1> MCF5474_10      8> LLH7a404_11    15> PXA270_10_416
2> MCF5484_10      9> LLH79520_10    16> PXA270_10_312
3> MCF5475_10     10> LLH79524_10   17> PXA270_10_1_520
4> MCF5485_10     11> LSH7727_20    18> PXA270_10_1_416
5> MCF5322_10     12> LSH7750_10   19> PXA270_10_1_312
6> MCF5373_10     13> LSH7760_10   20> IMX31_10
7> LLH7a400_10    14> PXA270_10_520
module?

```

Figure 3.5 – Building a Sample Application

9. Type the appropriate number that matches the SOM that you are building on. (**Note:** The list of modules on your screen may vary slightly from those shown in Figure 3.5.) Then select whether you want to build the application for flash or RAM.
10. When complete, your sample applications will be located under the directory: `home/logic/sample_app/2.3.5/led_flasher/<program_name>`. (**Note:** 2.3.5 is the version number of the Zoom Sample Application. Please note which version you have downloaded and edit the folder name as appropriate.)

4 Download a Sample Application

4.1 Objective

The objective of this section is to download the sample application that you built in “Section 3: Build a Sample Application” to your Zoom i.MX LITEKIT. This example demonstrates how to download the sample application with LogicLoader.

Background Information:

- The application ‘led_flasher.elf’ is linked to download and execute directly from RAM.
- LogicLoader is a bootloader/firmware-monitor program developed by Logic Product Development. Please refer to the *LogicLoader User’s Manual* for more information.

4.2 Prerequisites

- A successfully built sample application from “Section 3: Build a Sample Application”
- Cygwin and GNU Cross Development Tools installed
- Tera Term installed and running
- Zoom i.MX LITEKIT up and running
- Zoom i.MX LITEKIT connected to development computer via null modem serial cable or USB A-to-B cable (with proper drivers installed to use the USB device as an alternate COM port)

4.3 Procedure

1. Open a Tera Term shell. Click ‘Setup’ and then select ‘Serial port’ in order to verify that Tera Term is configured correctly.

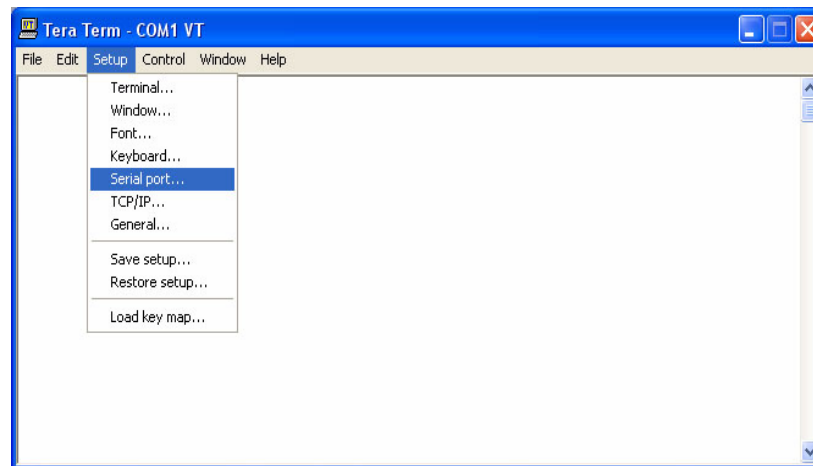


Figure 4.1 – Serial port menu selection

2. Verify the following settings: 'port' is the active port, 'baud-rate' is 115200, 'data' is 8-bit, 'parity' is none, 'stop' is 1-bit, and 'flow control' is none.

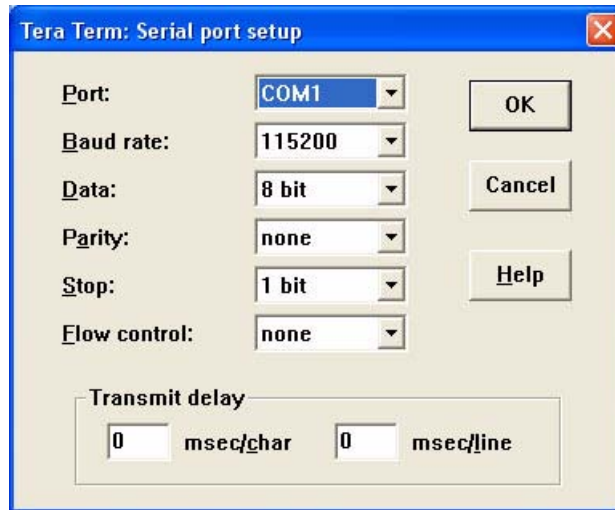


Figure 4.2 – Serial port settings

3. Next, press the Reset switch on the Zoom i.MX LITEKIT application board (with your SOM properly inserted) in order to reboot the kit. LogicLoader will appear in Tera Term.
4. Prepare LogicLoader to receive the sample application by typing `load elf` after the `losh>` prompt, then press 'Enter'. See Figure 4.3 below.



Figure 4.3 – Prepare LogicLoader to receive the Sample Application

5. Click 'File' and then select 'Send file' to send the sample application to the LITEKIT.

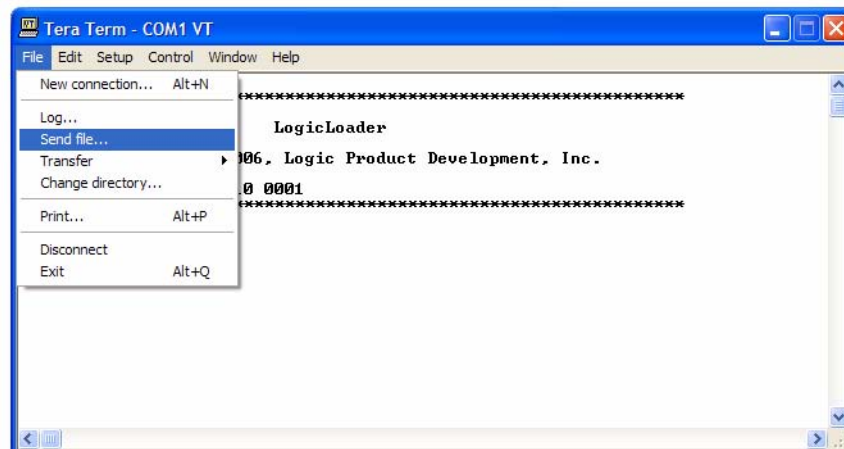


Figure 4.4 – Send file menu option

6. A 'Tera Term: Send file' window will open. Verify that the 'Binary' option is selected.
7. Locate the sample application file you built in Section 3, above. The default location is: `\cygwin\home\logic\sample_app\2.3.5\led_flasher`. See Figure 4.5 below.

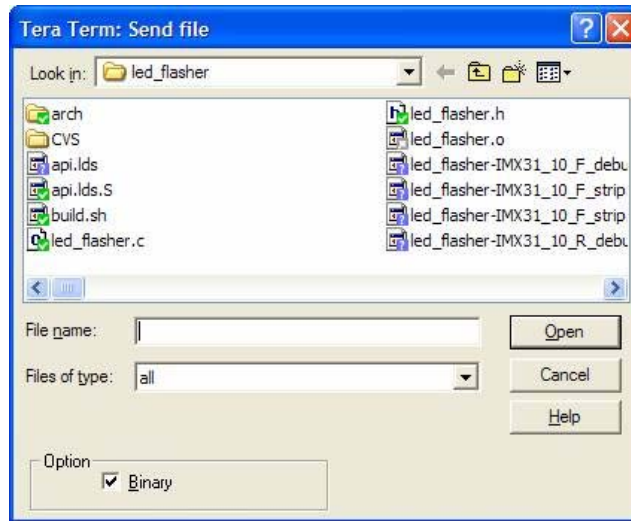


Figure 4.5 – Locate the Sample Application

8. Select your sample application file and click 'Open.' The image will download to the Zoom i.MX LITEKIT.
9. Now the sample application is ready to run. At the 'losh>' prompt, type `exec` to run the application. See Figure 4.6 below.

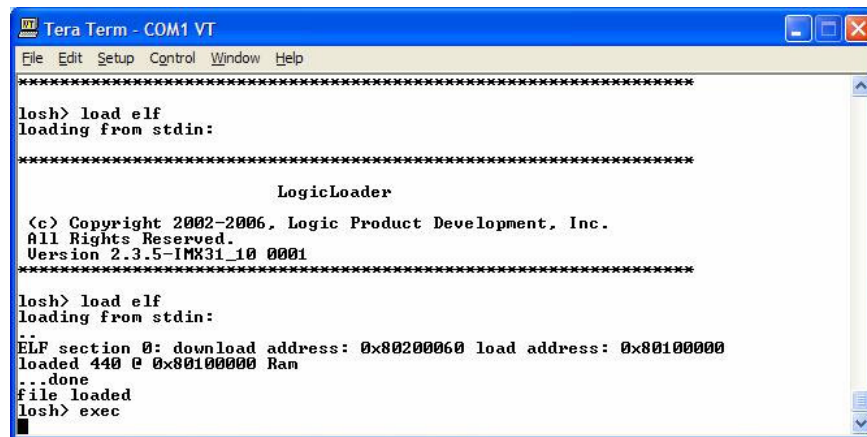


Figure 4.6 – Use 'exec' to run the application

The sample application will run on the Zoom i.MX LITEKIT. This application blinks LED1 on the baseboard until you reset the kit.

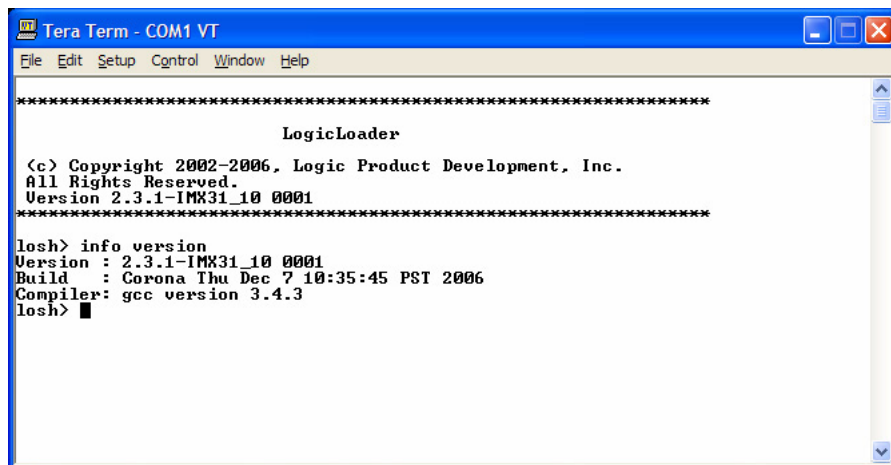
5 Download LogicLoader

5.1 Objective

The objective of this section is to download a new version of the LogicLoader (bootloader/firmware-monitor) to the Zoom i.MX LITEKIT.

Background Information:

- Logic Product Development SOMs come with the LogicLoader environment loaded into the flash memory resident on the platform. LogicLoader is capable of booting many different kinds of programs and operating systems. For further documentation, please refer to the *LogicLoader User's Manual*.
- The most current version of LogicLoader for your SOM hardware can be downloaded from Logic's product downloads page at <http://www.logicpd.com/auth/>.
- LogicLoader prints version information at the top of the menu as displayed in Figure 5.1 below. If the LogicLoader menu is not currently visible, the LogicLoader 'info' command may be used to display the current version information (i.e., type `info version` at the 'losh>' prompt to display current version information).



```

Tera Term - COM1 VT
File Edit Setup Control Window Help
*****
                        LogicLoader
<c> Copyright 2002-2006, Logic Product Development, Inc.
All Rights Reserved.
Version 2.3.1-IMX31_10 0001
*****
losh> info version
Version : 2.3.1-IMX31_10 0001
Build   : Corona Thu Dec 7 10:35:45 PST 2006
Compiler: gcc version 3.4.3
losh> █
  
```

Figure 5.1 – LogicLoader version info

Please use the steps below to update LogicLoader if you do not have the latest version as posted on Logic's downloads site.

5.2 Prerequisites

- A recent version of Internet Explorer, Firefox, or an FTP program
- Tera Term installed and running
- Zoom i.MX LITEKIT up and running
- Zoom i.MX LITEKIT connected to development computer via null modem serial cable or USB A-to-B cable (with proper drivers installed to use the USB device as an alternate COM port)

5.3 Procedure

1. Access Logic's download site at <http://www.logicpd.com/auth/> and enter your username and password. (If you have not registered your product—or do not have your registration information—please register at <http://www.logicpd.com/auth/>. You will receive an e-mail with your new username and password. Use this information to complete this step.)
2. Locate the most recent version of LogicLoader (under the "LogicLoader Bootloader/Monitor" heading) and download it to your hard drive.

- Next, open a Tera Term shell. Click 'Setup' and then select 'Serial port' in order to verify that Tera Term is configured correctly. Verify the following serial port settings: 'port' is the current active port, 'baud-rate' is 115200, 'data' is 8-bit, 'parity' is none, 'stop' is 1-bit, and 'flow control' is none. See Figure 5.2 below.

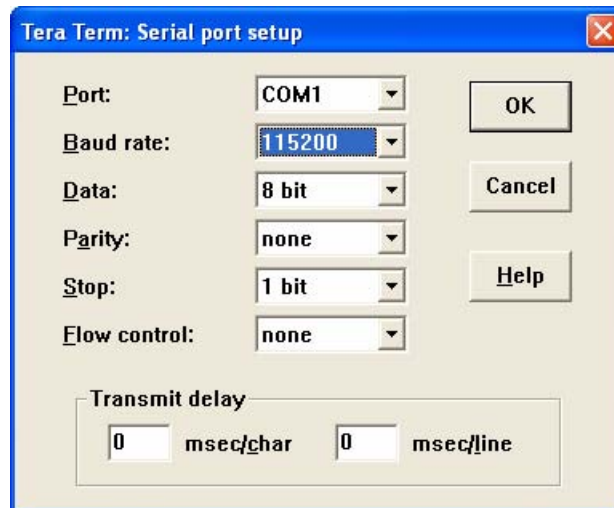


Figure 5.2 – Serial port settings

- Type `update` at the 'losh>' prompt.

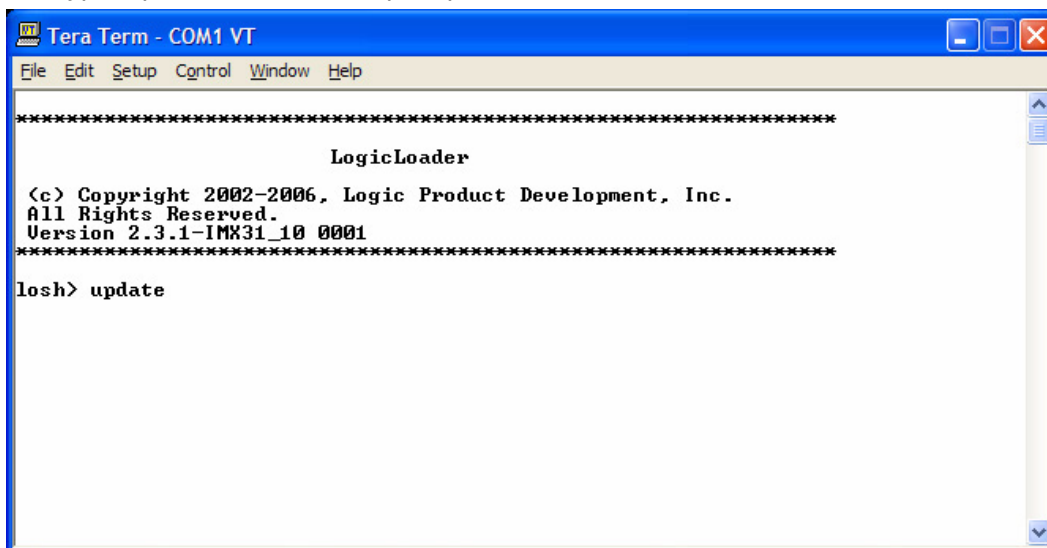


Figure 5.3 – Use the 'update' command

5. Send the new version via the serial port. Click 'File' and then select 'Send file' to send the new LogicLoader to your LITEKIT. Locate and select the LogicLoader file you downloaded to your hard drive from Logic's website in step 2. Also, verify that the 'Binary' option is selected. Then click 'Open' to download the new LogicLoader.

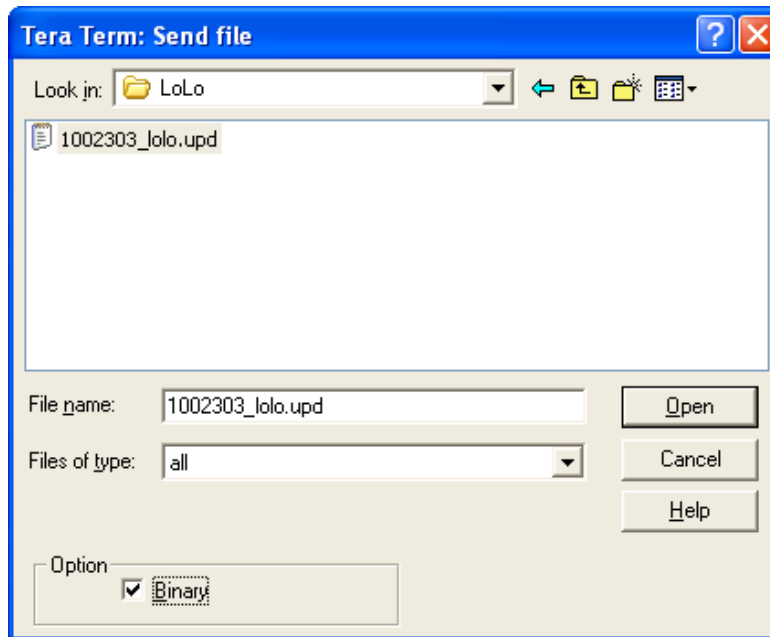


Figure 5.4 – Send new version file

6. The update is successful when the words “update done” are displayed.

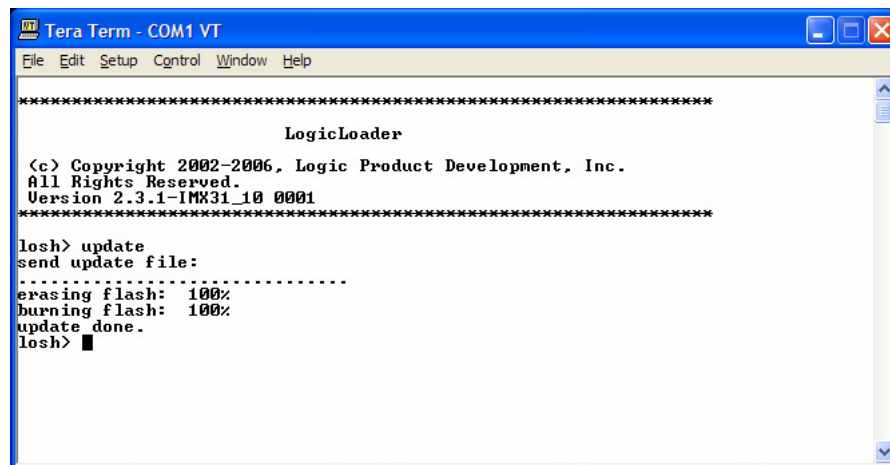
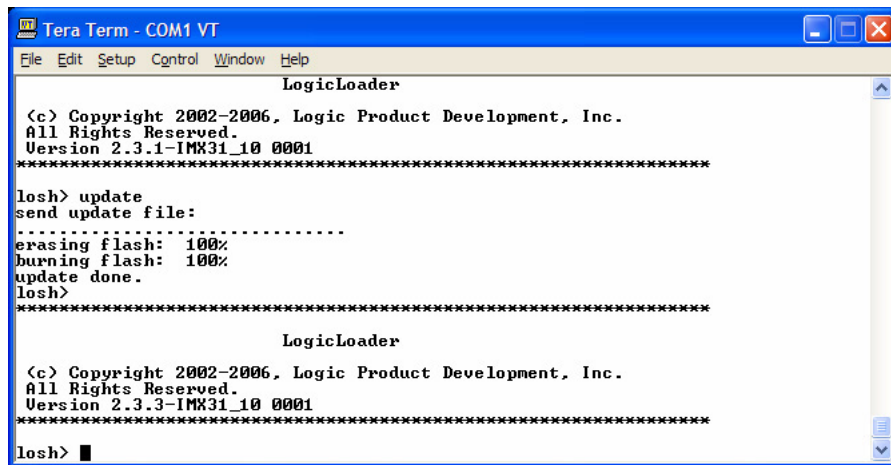


Figure 5.5 – Verify the update was successful

7. Reset the LITEKIT and verify the new LogicLoader version number appears.

The screenshot shows a Tera Term window titled "Tera Term - COM1 VT". The window has a menu bar with "File", "Edit", "Setup", "Control", "Window", and "Help". The main text area displays the following content:

```
LogicLoader

<C> Copyright 2002-2006, Logic Product Development, Inc.
All Rights Reserved.
Version 2.3.1-IMX31_10 0001
*****

losh> update
send update file:
.....
erasing flash: 100%
burning flash: 100%
update done.
losh>
*****

LogicLoader

<C> Copyright 2002-2006, Logic Product Development, Inc.
All Rights Reserved.
Version 2.3.3-IMX31_10 0001
*****

losh> █
```

Figure 5.6 – Verify new version number appears

6 Restore LogicLoader—Preliminary Steps

6.1 Objective

The intention of this section is to describe the preliminary steps necessary to restore LogicLoader if your Zoom i.MX LITEKIT will not boot up at the Tera Term window.

Background Information:

- This section is only applicable if your Zoom i.MX LITEKIT will not boot up at the Tera Term window.
- In order to restore LogicLoader to your system, you must have the most recent version of LogicLoader downloaded to your hard drive. You also must have a JTAG emulator which functions with your particular Zoom i.MX LITEKIT.

6.2 Prerequisites

- A recent version of Internet Explorer, Firefox, or an FTP program
- Tera Term installed and running
- Zoom i.MX LITEKIT
- Zoom i.MX LITEKIT connected to development computer via null modem serial cable or USB A-to-B cable (with proper drivers installed to use the USB device as an alternate COM port)
- JTAG debugger

6.3 Procedure

1. Access Logic's download site at <http://www.logicpd.com/auth/> and enter your username and password. (If you have not registered your product—or do not have your registration information—please register at <http://www.logicpd.com/auth/>. You will receive an e-mail with your new username and password. Use this information to complete this step.)
2. Locate the most recent version of LogicLoader, and then complete the steps for these files as outlined in "Section 5: Download LogicLoader," above.
3. Use a JTAG emulator that functions with your SOM to restore LogicLoader to your Zoom i.MX LITEKIT. Contact Logic's Support Services (<http://www.logicpd.com/support/>) if you need further information.

7 Warranty Statement

Refer to warranty card enclosed in LITEKIT.