



Zoom OMAP35x Development Kit

User Manual

Logic
Published: May 2008
Last revised: July 2008

This file contains source code, ideas, techniques, and information (the Information) which are Proprietary and Confidential Information of Logic Product Development. This information may not be used by or disclosed to any third party except under written license, and shall be subject to the limitations prescribed under license.

No warranties of any nature are extended by this document. Any product and related material disclosed herein are only furnished pursuant and subject to the terms and conditions of a duly executed license or agreement to purchase or lease equipments. The only warranties made by Logic, if any, with respect to the products described in this document are set forth in such license or agreement. Logic cannot accept any financial or other responsibility that may be the result of your use of the information in this document or software material, including direct, indirect, special or consequential damages.

Logic may have patents, patent applications, trademarks, copyrights, or other intellectual property rights covering the subject matter in this document. Except as expressly provided in any written agreement from Logic, the furnishing of this document does not give you any license to these patents, trademarks, copyrights, or other intellectual property.

The information contained herein is subject to change without notice. Revisions may be issued to advise of such changes and/or additions.

© Copyright 2008, Logic Product Development. All Rights Reserved.

REVISION HISTORY

REV	EDITOR	DESCRIPTION	APPROVAL	DATE
1	Jed Anderson	Initial release	JCA	05/18/08
2	Jed Anderson	Internal release	JCA	05/19/08
A	Jed Anderson	Official release	JCA	05/22/08
B	Jed Anderson	-Throughout: Updated LogicLoader version 2.4.2 references to 2.4.3; -Section 2.3.1: Updated instructions for copying files to SD card; -Section 3: Removed subsection about "Sample Show Image"; Updated Sample Development Image instructions for the Windows CE 6.0 Source BSP that is posted to the website; -Section 3.2.1: Corrected reference to CompactFlash slot, which should be SD card slot. -Section 4.8.2.1: Updated name of text file included with Logic's Windows CE Source BSP; -Section 5: Updated name of Logic's Windows CE Source BSP download to be lpd_omap35x_source_x_x_x.zip; -Section 8: Removed quizzes from individual Labs;	JCA	06/09/08
C	Jed Anderson	-Section 3: Updated headings to include "Windows CE"; -Added Section 4: Download Pre-built Linux Software; -Section 6.3, step 9: added requirement to run Sysgen after "Rebuild and Clean Sysgen" build; -Section 6.3.1: added "BSP registry changes have been made" to Usage column	BB & ME	07/29/08

Table of Contents

1	Introduction.....	1
1.1	Document Contents	1
2	Update Auto-boot Images on Pre-built SD Card	2
2.1	Background Information	2
2.2	Prerequisites	2
2.3	Procedure.....	2
2.3.1	Updating Pre-built Windows CE SD Card Image	2
2.3.2	Updating Pre-built Linux SD Card Image	3
3	Download Pre-Built Windows CE Software	4
3.1	Load Sample Windows CE Image via SD Card.....	4
3.1.1	Required Components.....	4
3.1.2	Logic's Sample NK.bins.....	4
3.2	Loading the Windows CE 6.0 Sample Development Image	4
3.2.1	Downloading the OS Image Binary	4
3.3	Load Windows CE Sample Image via CompactFlash Card	8
3.4	Load Windows CE Sample Image via Ethernet.....	8
4	Download Pre-Built Linux Software.....	11
4.1	Determine the MAC Address	11
4.2	Load Linux Sample Image via SD Card.....	11
4.2.1	Required Components.....	11
4.2.2	Download the Linux Pre-Built Image	11
4.3	Load Linux Sample Image via Ethernet (DHCP)	14
4.3.1	Required Components.....	14
4.3.2	Load the OS Image via DHCP.....	15
4.4	Load Linux Sample Image via Ethernet (Static IP)	17
4.4.1	Required Components.....	18
4.4.2	Load the OS Image via Static IP	18
4.5	Boot into the Linux Kernel	21
4.6	Mount an SD Card in Linux	23
4.7	Reset Environment Variables	25
5	Prepare your PC for Windows CE Development.....	28
5.1	Background Information	28
5.2	Prerequisites	28
5.3	Update Windows Operating System	28
5.4	Obtain Product Key(s).....	30
5.5	Install Visual Studio 2005.....	30
5.6	Install Visual Studio 2005 Service Pack 1.....	38
5.7	Install Platform Builder	40
5.8	Install Platform Builder Service Pack 1	48
5.8.1	Install the Windows Embedded CE 6.0 R2 Update.....	51
5.8.2	Use QFE Patches to Update Windows Embedded CE 6.0.....	58
5.8.3	Verify the QFE Patch Installations.....	66
6	Build Logic's Windows CE Source BSP	69
6.1	Prerequisites	69
6.2	Install Logic's Windows CE 6.0 Source BSP	69
6.3	Build Logic's Windows CE 6.0 Source BSP.....	71
6.3.1	Table Indicating the Proper Build Option to Use	76
6.4	Run Logic's Windows CE 6.0 Source BSP	76
6.4.1	Setup hardware	76
6.4.2	Download the Windows Embedded CE Image to the System on Module	77
6.5	Enable/Disable Drivers.....	85
7	Prepare for Linux Development	86
8	Build Logic's Linux Source BSP.....	87
9	LogicLoader Labs.....	88
9.1	Lab 1: Kit Communications	88

9.1.1	Abstract.....	88
9.1.2	What you will need	88
9.1.3	Basic instructions.....	88
9.1.4	Tera Term instructions.....	88
9.1.5	HyperTerminal instructions.....	90
9.1.6	Connect the Kit to your workstation.....	92
9.2	Lab 2: Learning the LogicLoader Help System.....	92
9.2.1	Abstract.....	92
9.2.2	What you will need	92
9.2.3	LogicLoader Interface.....	93
9.2.4	Help for Incorrect Commands.....	93
9.2.5	Using the 'help' command	95
9.3	Lab 3: Using the LogicLoader Command Line Editor.....	100
9.3.1	Abstract.....	100
9.3.2	What you will need	100
9.3.3	Instructions	100
9.4	Lab 4: Updating LogicLoader.....	102
9.4.1	Abstract.....	102
9.4.2	What you will need	102
9.4.3	Basic instructions.....	102
9.4.4	Connect the Kit to your workstation.....	103
9.4.5	Obtain a new version of LogicLoader.....	103
9.4.6	Download LogicLoader using the 'update' command	104
9.5	Lab 5: Network Connection.....	107
9.5.1	Abstract.....	107
9.5.2	What you will need	107
9.5.3	Basic instructions.....	107
9.5.4	Connect the Kit to your workstation.....	108
9.5.5	Connect the Kit to Ethernet	108
9.5.6	Kit Network Setup for Ethernet Cross-over Cable.....	108
9.5.7	Kit Network Setup for Standard Ethernet Cable.....	112
9.5.8	Using the 'ping' command	112
9.5.9	Use the 'ifmac' command to display and change the MAC address.....	113
9.6	Lab 6: File Systems.....	115
9.6.1	Abstract.....	115
9.6.2	What you will need	115
9.6.3	Basic instructions.....	115
9.6.4	FATFS (Fat File System).....	116
9.6.5	YAFFS (Yet Another Flash File System).....	118
9.7	Lab 7: Using Scripts.....	118
9.7.1	Abstract.....	118
9.7.2	What you will need	119
9.7.3	Basic instructions.....	119
9.7.4	Connect the kit to your workstation	119
9.7.5	Basic scripting guidelines	119
9.7.6	Launching a Script from an SD Card.....	123
9.7.7	Persistent Script Storage.....	125
10	Recover Corrupt Boot NAND Flash	128
10.1	Prerequisites	128
10.2	Recovery via SD Card Procedure.....	128

1. Introduction

This document continues where the *Zoom OMAP35x Development Kit QuickStart Guide* concluded. The purpose of this document is to present examples and usage instructions to get the most out of your OMAP35x Development Kit. Though we recommend proceeding through this document in order, you are welcome to look at the sections that are most applicable to you but be warned that the sections build upon each other and assume knowledge of the preceding sections.

1.1 Document Contents

The *OMAP35x Development Kit User Manual* contains the following sections:

- Section 2 explains how to update the pre-built OS images that are on the SD cards, which shipped with your OMAP35x Development Kit. If a new image is released, it will be posted to the Logic website. This section will describe how to take that image from the website and update it on your SD card.
- Section 3 explains how to download a pre-built Windows CE image from Logic's website and load it to your development kit. This pre-built image provides a quick example of the hardware and software's capabilities.
- Section 4 explains how to download a pre-built Linux image from Logic's website and load it to your development kit. This pre-built image provides a quick example of the hardware and software's capabilities.
- Section 5 describes how to prepare your PC for Windows CE development. This section will provide step-by-step instructions for installing Microsoft's Visual Studio 2005, Windows Embedded CE 6.0 Platform Builder, and the latest QFEs and updates.
- Section 6 describes how to build Logic's Windows CE source BSP, which is available for download from Logic's website. This section will take you step-by-step in using Visual Studio and Platform Builder to build an image and download it to your development kit via Ethernet.
- Section 7 will describe how to prepare your PC for Linux development. **NOTE:** Linux is still under development for the OMAP35x Development Kit. As that development continues, this section will be updated with the applicable information.
- Section 8 will describe how to build Logic's Linux source BSP. **NOTE:** Linux is still under development for the OMAP35x Development Kit. As that development continues, this section will be updated with the applicable information.
- Section 9 provides informal labs demonstrating and investigating how to get the most out of LogicLoader, the bootloader program that is shipped on your OMAP35x SOM-LV. These sections are the same that appear in the OMAP35x LogicLoader Labs that are available as their own stand-alone document: <http://www.logicpd.com/downloads/1096/>
- Section 10 describes how to recover corrupt boot NAND flash on your OMAP35x SOM-LV. If your SOM-LV no longer boots into LogicLoader, you will need to use the procedures in this section to burn a clean version of LogicLoader to the flash so your SOM will boot properly.

2 Update Auto-boot Images on Pre-built SD Card

This section describes how to update the demo OS image on the pre-built SD cards that were included with the OMAP35x Development Kit.

2.1 Background Information

- One or more pre-built OS image SD cards were included with the Zoom OMAP35x Development Kit.
- As the images for these pre-built OS image SD cards are updated, the most current version of the OS image will be posted to Logic's product downloads page.

2.2 Prerequisites

- OMAP35x Development Kit with LCD
- A recent version of Internet Explorer, Firefox, or an FTP program
- SD card provided with the development kit
- Host PC with an SD card reader
- Optional: connect the development kit to the host PC through serial port

2.3 Procedure

The process is different depending on the operating system desired. Proceed to section 2.3.1 to update Windows CE or section 2.3.2 for Linux.

2.3.1 Updating Pre-built Windows CE SD Card Image

1. Insert the SD card that came with the development kit into an SD card reader on the host PC.
2. Open the SD card drive in a new explorer window.
3. The SD card should contain a few files including: "MLO", "lboot.elf", "autoexec.iosh", and "NK_release.bin".
4. Access Logic's download site at <http://www.logicpd.com/auth/> and enter your username and password.
5. From the Account Summary page, find the "OMAP35x Zoom Development Kit" and click on the "All Downloads" link.
6. Locate the "Windows CE Sample Images" section. Download the latest "OMAP35x Windows CE Pre-built SD Image" .zip file.
7. Extract the .zip file and copy all the files from the downloaded file to the SD card, overwriting the previous files.
8. The SD card update procedure is complete. Eject the SD card from the reader on the host PC.
9. Power off the development kit.
10. Insert the SD card into the SD card socket on the development kit.

11. Power on the development kit.
12. The development kit should boot to the new Windows CE desktop after a few moments; the length of time is dependent on the size of the NK.bin image. If the development kit is connected to a host PC, the SOM will output text on the serial terminal while LogicLoader is loading and booting the Windows CE image.

2.3.2 Updating Pre-built Linux SD Card Image

IMPORTANT NOTE: The pre-built Linux SD card was not shipped with Pilot development kits, as the Linux demo OS image was not available. When the demo OS image is released, it will be posted to the Logic website. As such, the following instructions are currently for information purposes only.

1. Insert the SD card that came with the development kit into an SD card reader on the host PC.
2. Open the SD card drive in a new explorer window.
3. The SD card should contain a few files including: "MLO", "ulImage", and "rootfs.jffs2".
4. Rename the "ulImage" file on the SD card to "ulImage_original"
5. Rename the "rootfs.jffs2" file on the SD card to "rootfs.jffs2_original"
6. Access Logic's download site at <http://www.logicpd.com/auth/> and enter your username and password.
7. From the Account Summary page, find the "OMAP35x Zoom Development Kit" and click on the "All Downloads" link.
8. Locate the "Linux Sample Images" section. Download the latest "Sample Evaluation Image" .zip file.

Note: The Sample Evaluation Image .zip file contains many files that are used in different scenarios. Only two files will be used to update the SD card: the ulimage file and the rootfs.jffs2 file. These will be discussed in the following steps.

9. In the .zip file, find and extract the "ulImage" file to the root directory of the SD card keeping the filename and case exactly the same as: ulimage
10. In the .zip file, find and extract the "rootfs.jffs2" file to the SD card keeping the filename and case exactly the same as: rootfs.jffs2
11. The SD card update procedure is complete. Eject the SD card from the reader on the host PC.
12. Power off the development kit.
13. Insert the SD card into the SD card socket on the development kit.
14. Power on the development kit.
15. The development kit should boot to the new Linux graphical user interface after a few moments; the length of time which is dependent on the size of the rootfs.jffs2 image. If the development kit is connected to a host PC, the SOM will output text on the serial terminal while LogicLoader is loading and booting the Linux image.

3 Download Pre-Built Windows CE Software

3.1 Load Sample Windows CE Image via SD Card

This section describes how to load a Windows CE Sample Development Image on a Zoom Development Kit.

3.1.1 Required Components

1. Tera Term terminal emulator (or equivalent).
2. Windows CE 6.0 Source BSP for the OMAP35x SOM-LV—this can be found under the 'Windows CE Sample Images' category of the 'All Downloads' page.
3. A SD card with a capacity of at least 32 MB—this card must be large enough to store the sample Windows CE OS image binary file.

3.1.2 Logic's Sample NK.bins

Logic's sample NK.bins allow users to evaluate Logic's Binary BSP on the Zoom Development Kit. Logic's sample NK.bins are also useful for application development because each image includes helpful libraries and a variety of drivers.

3.1.2.1 Custom NK.bin Options

Logic's sample NK.bin images are not meant for production and should not be regarded as production-ready.

Logic offers these solutions to customers requiring a custom Windows CE image for a device:

- Contract Logic to provide a production-ready NK.bin that is custom suited to your project's needs.
- Use Logic's Binary BSP with Microsoft Platform Builder to create a custom image for your development.

3.1.2.2 Sample Development Image for Windows CE 6.0

The purpose of Logic's 'Sample Development Image' is to aid application development with the Windows CE source BSP.

A Sample Development Image (NK_release.bin) is included in the Windows CE 6.0 Source BSP .zip file under the "Binaries" directory. The .zip file is posted to the OMAP35x Zoom Development Kit downloads page under the 'Windows CE Sample Images' heading. Please make sure you have the following items:

1. A binary image (NK_release.bin),
2. A clean Windows CE 6.0 workspace that can be used to build the image,
3. lpd_omap35x_source_readme text file with detail revision information.

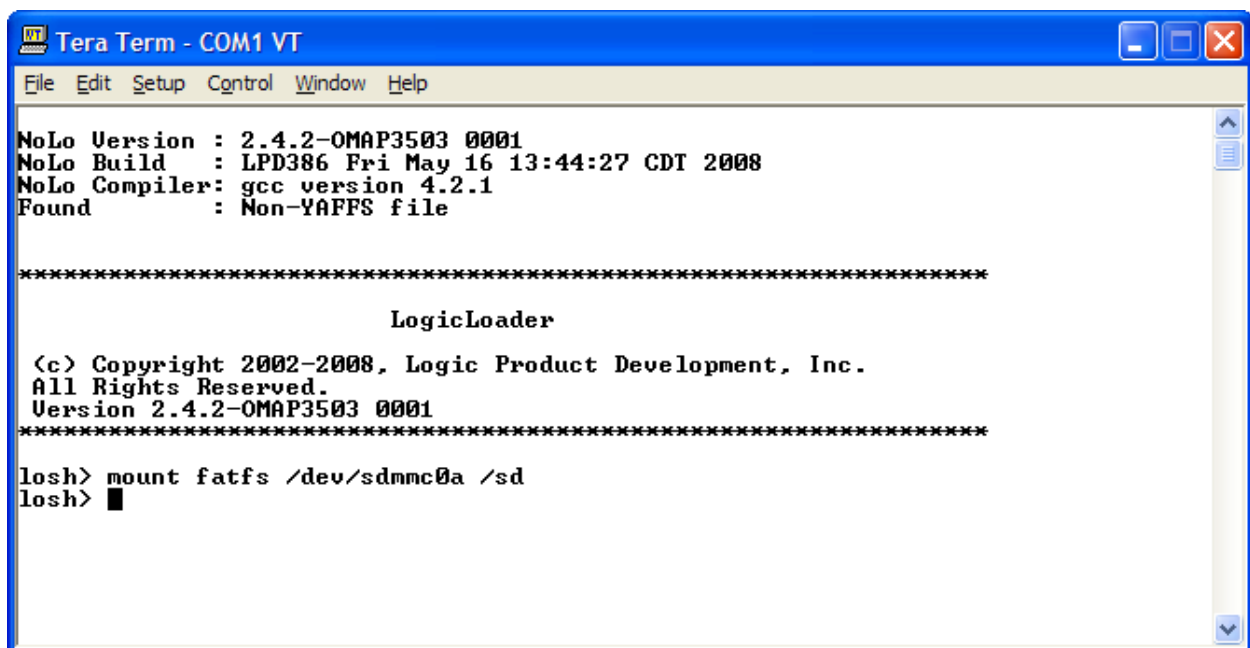
3.2 Loading the Windows CE 6.0 Sample Development Image

3.2.1 Downloading the OS Image Binary

This section describes how to download the OS image from an SD card in LogicLoader (LoLo).

The first step is to load the Windows CE 6.0 NK_release.bin image from the SD card in LogicLoader and successfully boot the image.

1. Download the Windows CE 6.0 Source BSP .zip file to your PC.
2. Extract the file and locate the "Binaries" directory and the NK_release.bin file within that directory.
3. Store the NK_release.bin file on an SD card.
4. Insert the SD card into the Zoom Development Kit's SD card slot.
5. Start a terminal emulator program on the development workstation and connect the serial cable, provided with the Development Kit, from the workstation to the Development Kit.
6. Power up the Development Kit and verify the LogicLoader prompt appears in the terminal emulator window.
7. Use the 'mount' command to mount the SD card in LogicLoader. Specifically, type:
mount fatfs /dev/sdmmc0a /sd



```
Tera Term - COM1 VT
File Edit Setup Control Window Help

NoLo Version : 2.4.2-OMAP3503 0001
NoLo Build   : LPD386 Fri May 16 13:44:27 CDT 2008
NoLo Compiler: gcc version 4.2.1
Found       : Non-YAFFS file

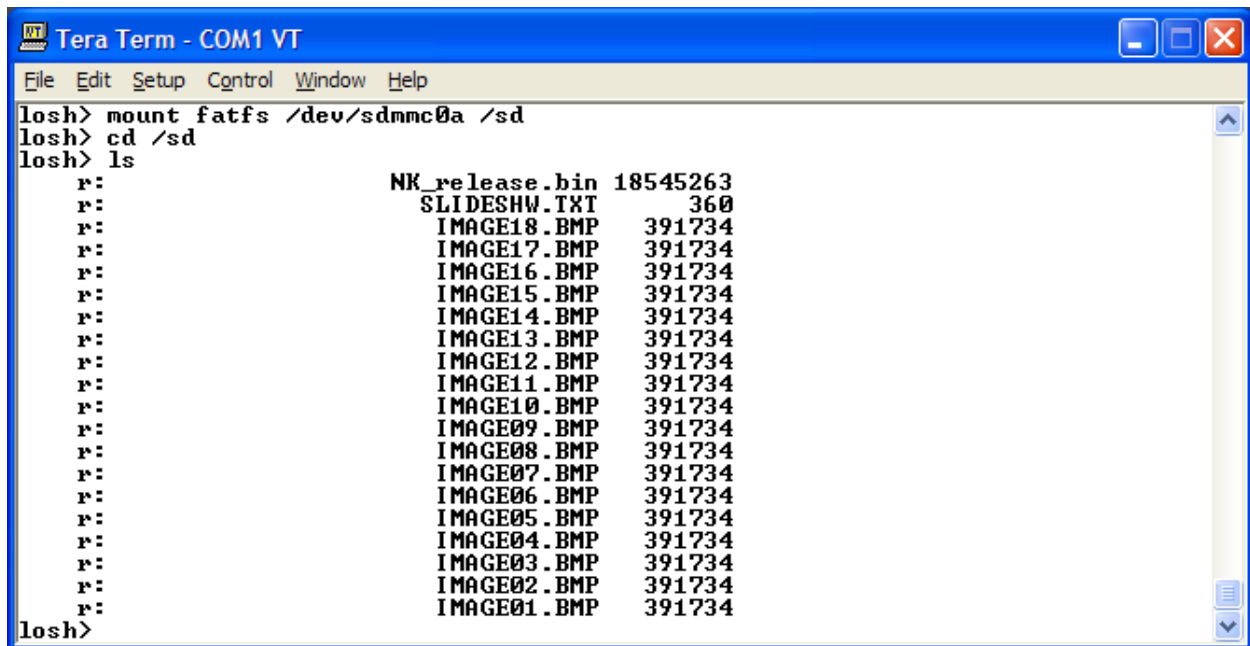
*****

                LogicLoader

(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****

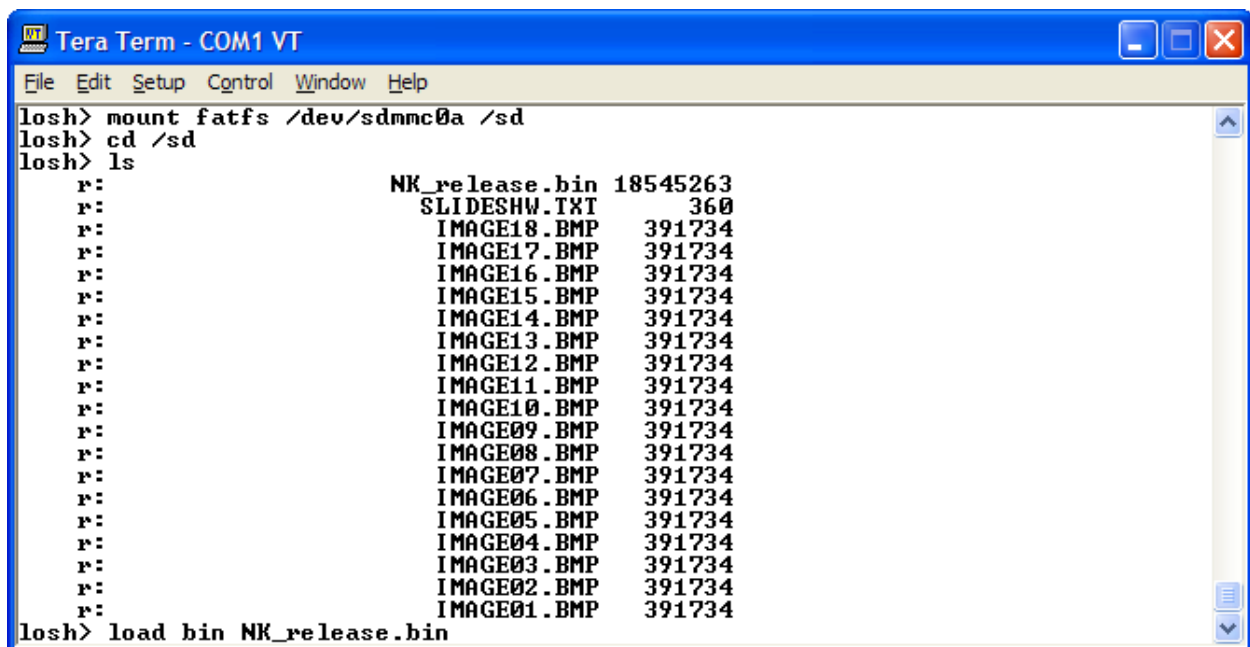
losh> mount fatfs /dev/sdmmc0a /sd
losh> █
```

8. Type **cd /sd** to change directories to the SD card.
9. They type **ls** to confirm that your card has been mounted and the NK_release.bin, contained in the downloaded .zip file, is on the card.



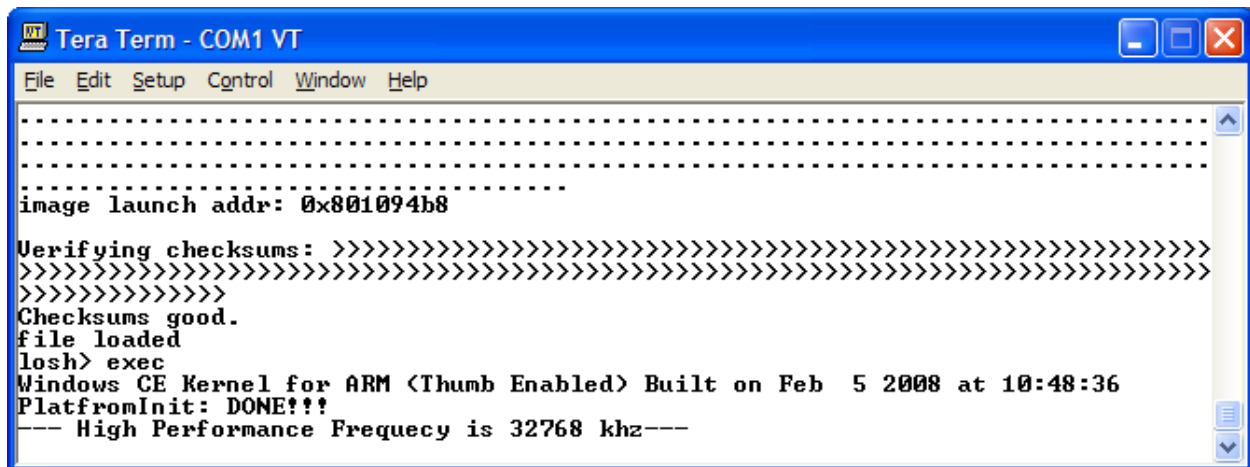
```
losh> mount fatfs /dev/sdmmc0a /sd
losh> cd /sd
losh> ls
r:      NK_release.bin 18545263
r:      SLIDESHW.TXT  360
r:      IMAGE18.BMP  391734
r:      IMAGE17.BMP  391734
r:      IMAGE16.BMP  391734
r:      IMAGE15.BMP  391734
r:      IMAGE14.BMP  391734
r:      IMAGE13.BMP  391734
r:      IMAGE12.BMP  391734
r:      IMAGE11.BMP  391734
r:      IMAGE10.BMP  391734
r:      IMAGE09.BMP  391734
r:      IMAGE08.BMP  391734
r:      IMAGE07.BMP  391734
r:      IMAGE06.BMP  391734
r:      IMAGE05.BMP  391734
r:      IMAGE04.BMP  391734
r:      IMAGE03.BMP  391734
r:      IMAGE02.BMP  391734
r:      IMAGE01.BMP  391734
losh>
```

10. Type **load bin NK_release.bin** to load the Windows CE 6.0 Sample Dev Image into RAM. Please note: LogicLoader is case sensitive, so be sure to type the file name the same way it appears in LogicLoader after using the 'ls' command.



```
losh> mount fatfs /dev/sdmmc0a /sd
losh> cd /sd
losh> ls
r:      NK_release.bin 18545263
r:      SLIDESHW.TXT  360
r:      IMAGE18.BMP  391734
r:      IMAGE17.BMP  391734
r:      IMAGE16.BMP  391734
r:      IMAGE15.BMP  391734
r:      IMAGE14.BMP  391734
r:      IMAGE13.BMP  391734
r:      IMAGE12.BMP  391734
r:      IMAGE11.BMP  391734
r:      IMAGE10.BMP  391734
r:      IMAGE09.BMP  391734
r:      IMAGE08.BMP  391734
r:      IMAGE07.BMP  391734
r:      IMAGE06.BMP  391734
r:      IMAGE05.BMP  391734
r:      IMAGE04.BMP  391734
r:      IMAGE03.BMP  391734
r:      IMAGE02.BMP  391734
r:      IMAGE01.BMP  391734
losh> load bin NK_release.bin
```


11. Type **exec** at the `losh>` prompt to load the `NK_release.bin`



12. After allowing time for the image to load, the display connected to your kit will ask you to calibrate the touchscreen by pressing a stylus to the center of a number of cross-hairs on the screen. Follow the on-screen instructions and the NK_release.bin will load and you will see the Windows Embedded CE 6.0 GUI displayed on your screen



3.3 Load Windows CE Sample Image via CompactFlash Card

The process for loading a sample image via CompactFlash card is very similar to the SD card.

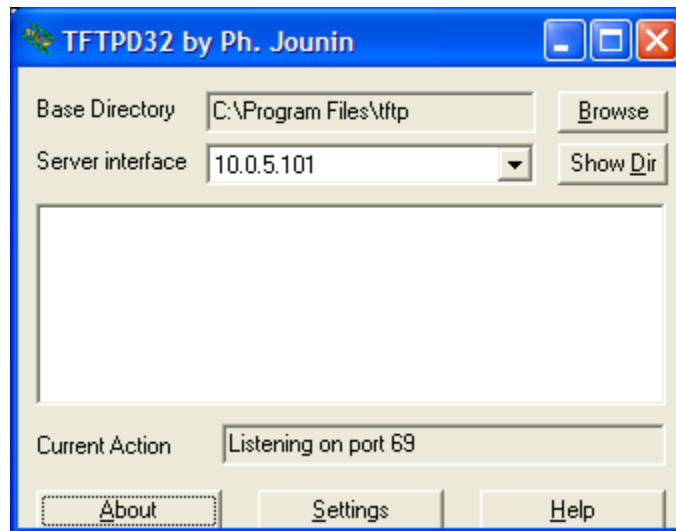
However, LogicLoader 2.4.3 does not support the CompactFlash interface. This functionality is under development and will be available in a future release of LogicLoader.

3.4 Load Windows CE Sample Image via Ethernet

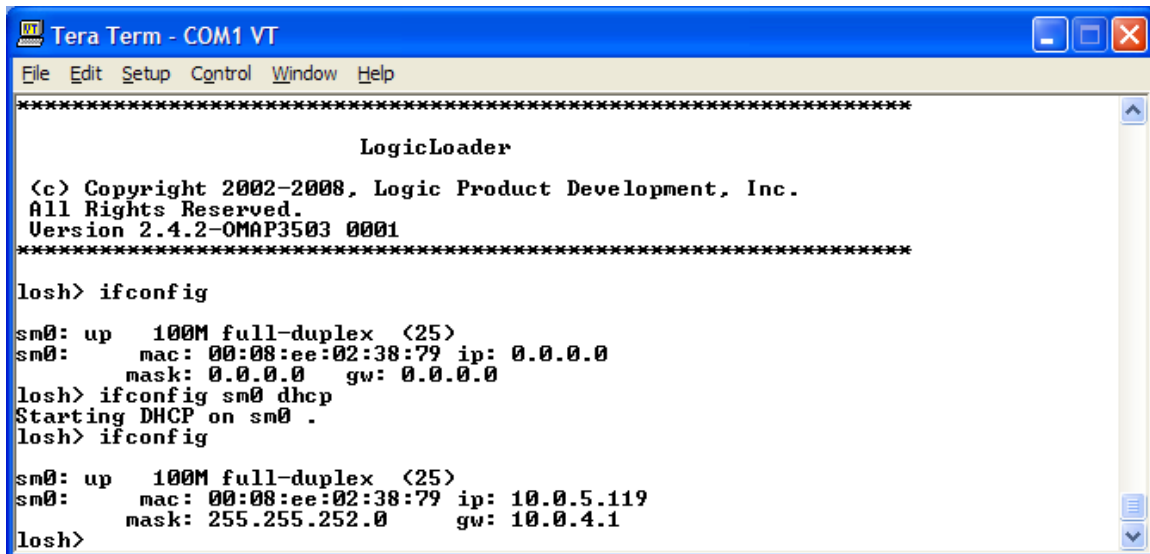
This section describes how to download the OS image via Ethernet in LogicLoader (LoLo). It is assumed that a TFTP program has been installed on your PC.

1. Place the NK_release.bin file in your TFTP folder.

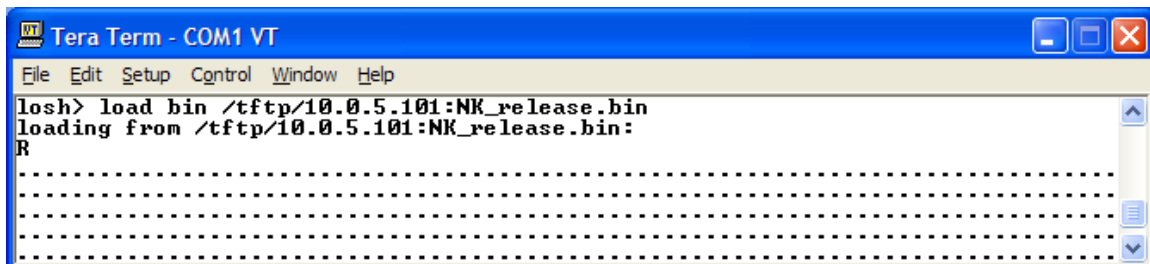
2. Launch your TFTP program.



3. Start Tera Term and initialize the Ethernet port, as described in detail in Section “LogicLoader Lab 5: Networking”. Type **ifconfig** and then type **ifconfig sm0 dhcp** to start DHCP. Finally type **ifconfig** again to obtain an IP address.



4. Type **load bin /tftp/10.0.5.101:NK_release.bin**. Please note that you will have to insert your own server IP address and the name of the file if they differ.



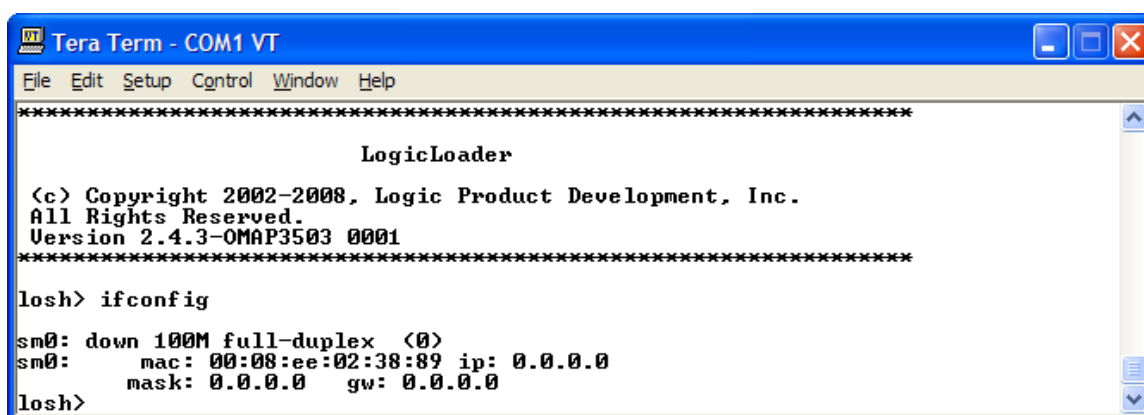
4 Download Pre-Built Linux Software

The following sections describe how to load a pre-built Linux sample image on the Zoom OMAP35x Development Kit. Section 4.2 describes how to load the sample image via an SD card; Section 4.3 describes how to load the sample image via Ethernet with a DHCP-obtained IP address; and Section 4.4 describes how to load the sample image via Ethernet with a static IP address. After reading Section 4.1 about the MAC address, feel free to jump to the section that best fits your development environment.

4.1 Determine the MAC Address

A future step in this process will ask you for the MAC address of your OMAP35x SOM-LV. This should appear on a sticker affixed to the top of your SOM. However, if you do not know which MAC address sticker represents the 10/100 wired Ethernet controller compared to the 802.11b/g wireless Ethernet controller, you can use a single LogicLoader command to determine which MAC address is active.

1. At the `losh>` prompt, type: **ifconfig**. Take note of which sticker on your SOM represents the MAC address displayed.



```
Tera Term - COM1 VT
File Edit Setup Control Window Help
*****
                        LogicLoader
(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.3-OMAP3503 0001
*****

losh> ifconfig

sm0: down 100M full-duplex <0>
sm0:      mac: 00:08:ee:02:38:89 ip: 0.0.0.0
      mask: 0.0.0.0   gw: 0.0.0.0
losh>
```

4.2 Load Linux Sample Image via SD Card

This section describes how to download the OS image from an SD card in LogicLoader (LoLo).

4.2.1 Required Components

1. Tera Term terminal emulator (or equivalent).
2. Linux pre-built sample image for the OMAP35x SOM-LV—this can be found under the 'Linux' category of the 'All Downloads' page.
3. An SD card with a capacity of at least 32 MB—this card must be large enough to store the sample Linux OS image binary file.

4.2.2 Download the Linux Pre-Built Image

The first step is to load the Linux development image from the SD card in LogicLoader and successfully boot the image.

1. Download the Linux pre-built image .zip file to your PC.
2. Extract the file and locate the OMAP-linux-xxxxxxx.elf file.

3. Store the OMAP-linux-xxxxxxx.elf file on an SD card.
4. Insert the SD card into the Zoom Development Kit's SD card slot.
5. Start a terminal emulator program on the development workstation and connect the serial cable, provided with the Development Kit, from the workstation to the Development Kit.
6. Power up the Development Kit and verify the LogicLoader prompt appears in the terminal emulator window.
7. Use the 'mount' command to mount the SD card in LogicLoader. Specifically, type:
mount fatfs /dev/sdmmc0a /sd

```

Tera Term - COM1 VT
File Edit Setup Control Window Help

NoLo Version : 2.4.3-OMAP3503 0001
NoLo Build  : LPD386 Thu May 29 13:28:12 CST 2008
NoLo Compiler: gcc version 4.2.1
Image type  : Non-File System
Boot Device  : NAND

*****

                LogicLoader

(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.3-OMAP3503 0001
*****

losh> mount fatfs /dev/sdmmc0a /sd
losh>

```

8. Type **cd /sd** to change directories to the SD card.
9. They type **ls** to confirm that your card has been mounted and the OMAP-linux-xxxxxxx.elf file, contained in the downloaded .zip file, is on the card.

```

Tera Term - COM1 VT
File Edit Setup Control Window Help

NoLo Version : 2.4.3-OMAP3503 0001
NoLo Build  : LPD386 Thu May 29 13:28:12 CST 2008
NoLo Compiler: gcc version 4.2.1
Image type  : Non-File System
Boot Device  : NAND

*****

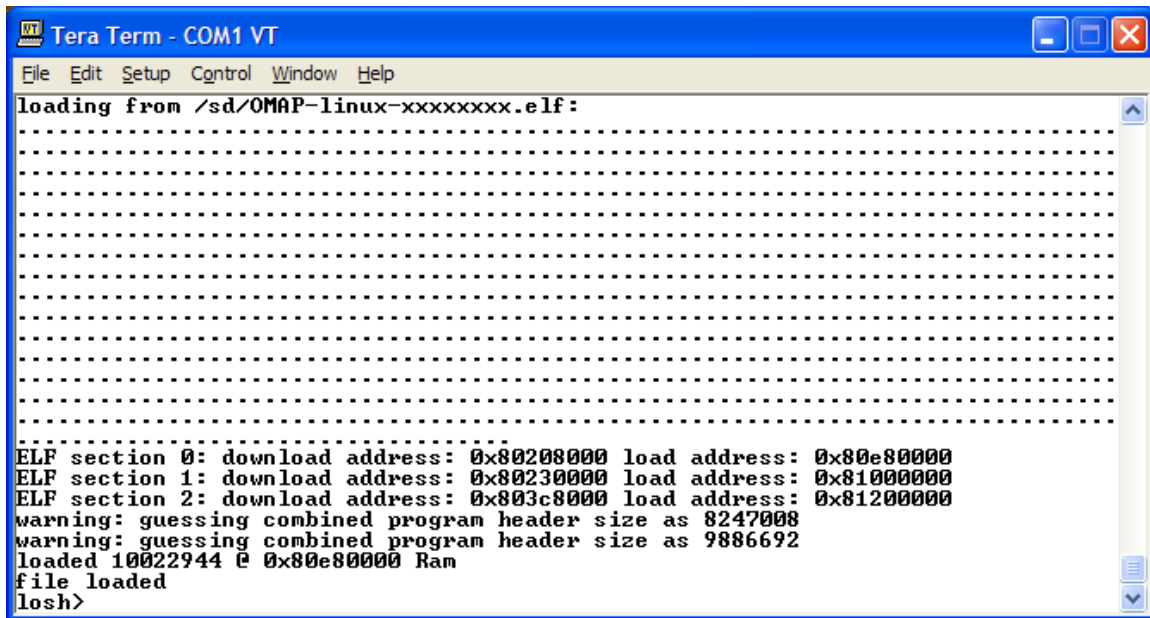
                LogicLoader

(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.3-OMAP3503 0001
*****

losh> mount fatfs /dev/sdmmc0a /sd
losh> cd /sd
losh> ls
r:                OMAP-linux-xxxxxxx.elf 10115340
losh> █

```


10. Type `load elf /sd/OMAP-linux-xxxxxxx.elf` to load the Linux Sample Dev Image into RAM. Please note: LogicLoader is case sensitive, so be sure to type the file name the same way it appears in LogicLoader after using the 'ls' command.

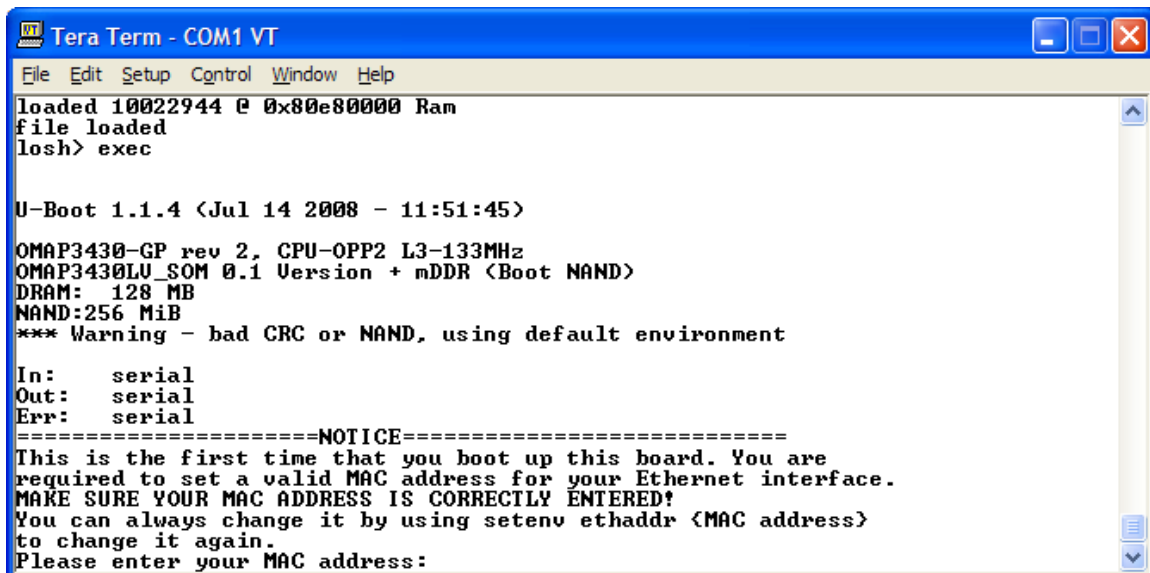


```
Tera Term - COM1 VT
File Edit Setup Control Window Help
loading from /sd/OMAP-linux-xxxxxxx.elf:
.....
ELF section 0: download address: 0x80208000 load address: 0x80e80000
ELF section 1: download address: 0x80230000 load address: 0x81000000
ELF section 2: download address: 0x803c8000 load address: 0x81200000
warning: guessing combined program header size as 8247008
warning: guessing combined program header size as 9886692
loaded 10022944 @ 0x80e80000 Ram
file loaded
losh>
```

When the `losh>` prompt returns after outputting `file loaded`, your `OMAP-linux-xxxxxxx.elf` file has been successfully loaded into system RAM and will be ready to run.

Please note that the sample Linux images provided on Logic's website are linked to run from system RAM and cannot be "burned" to system flash. Since the sample Linux images are volatile, they need to be loaded from a download mechanism (like an SD card) after every power cycle.

11. Type `exec` at the `losh>` prompt to load the `OMAP-linux-xxxxxxx.elf`



```
Tera Term - COM1 VT
File Edit Setup Control Window Help
loaded 10022944 @ 0x80e80000 Ram
file loaded
losh> exec

U-Boot 1.1.4 <Jul 14 2008 - 11:51:45>
OMAP3430-GP rev 2, CPU-OPP2 L3-133MHz
OMAP3430LV_SOM 0.1 Version + mDDR <Boot NAND>
DRAM: 128 MB
NAND:256 MiB
*** Warning - bad CRC or NAND, using default environment

In:    serial
Out:   serial
Err:   serial
=====NOTICE=====
This is the first time that you boot up this board. You are
required to set a valid MAC address for your Ethernet interface.
MAKE SURE YOUR MAC ADDRESS IS CORRECTLY ENTERED!
You can always change it by using setenv ethaddr <MAC address>
to change it again.
Please enter your MAC address:
```

12. If this is the first time you have booted into Linux, the default environment variables must be set. You will be asked to enter the MAC address of your OMAP35x SOM-LV and the display

number for the LCD panel you have connected to the development kit; the MAC address was determined in Section 4.1 above and the supported LCD panel numbers are listed in the Tera Term output. (If you do not have an LCD panel connected to your kit, please leave the field blank and press Enter.)

```
Tera Term - COM1 VT
File Edit Setup Control Window Help
DRAM: 128 MB
NAND:256 MiB
*** Warning - bad CRC or NAND, using default environment
In: serial
Out: serial
Err: serial
=====NOTICE=====
This is the first time that you boot up this board. You are
required to set a valid MAC address for your Ethernet interface.
MAKE SURE YOUR MAC ADDRESS IS CORRECTLY ENTERED!
You can always change it by using setenv ethaddr <MAC address>
to change it again.
Please enter your MAC address:0008EE023889
ethaddr=0008EE023889
Enter the display number of the LCD panel<none for no LCD panel>
Pick one of:
3 == LQ036Q1DA01 TFT QUGA <3.6> Sharp w/ASIC
5 == LQ064D343 TFT UGA <6.4> Sharp
7 == LQ10D368 TFT UGA <10.4> Sharp
15 == LQ043T1DG01 TFT WUGA <4.3> Sharp
MAKE SURE YOUR DISPLAY IS CORRECTLY ENTERED!
Please enter your LCD display number:15
```

13. After allowing time for the image to load (approximately 15 seconds), the LCD panel connected to your kit will display the Linux Penguin.



14. When you see the Linux Penguin displayed, you can proceed to Section 4.5 for instructions on booting into the Linux kernel.

4.3 Load Linux Sample Image via Ethernet (DHCP)

This section describes how to load the Linux image in LogicLoader via Ethernet with a DHCP-obtained IP address.

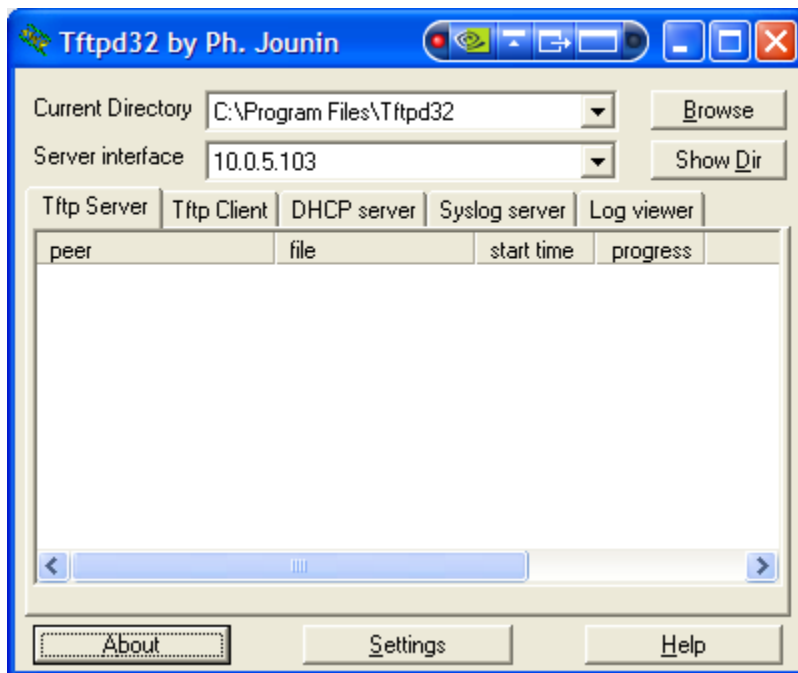
4.3.1 Required Components

1. Tera Term terminal emulator (or equivalent).

2. Linux pre-built sample image for the OMAP35x SOM-LV—this can be found under the 'Linux' category of the 'All Downloads' page.
3. A TFTP program installed on your computer.

4.3.2 Load the OS Image via DHCP

1. Place the OMAP-linux-xxxxxxx.elf file in your TFTP folder.
2. Launch your TFTP program.



3. Start Tera Term and initialize the Ethernet port, as described in detail in Section "LogicLoader Lab 5: Networking". Type **ifconfig** and then type **ifconfig sm0 dhcp** to start DHCP. Finally type **ifconfig** again to obtain an IP address.

```

Tera Term - COM1 VT
File Edit Setup Control Window Help
*****
                        LogicLoader
(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.3-OMAP3503 0001
*****

losh> ifconfig

sm0: up    100M half-duplex <15>
sm0:      mac: 00:08:ee:02:38:89 ip: 0.0.0.0
          mask: 0.0.0.0      gw: 0.0.0.0
losh> ifconfig sm0 dhcp
Starting DHCP on sm0 ...
losh> ifconfig

sm0: up    100M half-duplex <15>
sm0:      mac: 00:08:ee:02:38:89 ip: 10.0.5.70
          mask: 255.255.252.0   gw: 10.0.4.1
losh>

```

4. Type `load elf /tftp/10.0.5.140:OMAP-linux-xxxxxxx.elf`. Please note that you will have to insert your own server IP address and the name of the file if they differ from the example below.

```
Tera Term - COM1 VT
File Edit Setup Control Window Help
Version 2.4.3-OMAP3503 0001
*****
losh> ifconfig
sm0: up 100M half-duplex <15>
sm0: mac: 00:08:ee:02:38:89 ip: 0.0.0.0
      mask: 0.0.0.0 gw: 0.0.0.0
losh> ifconfig sm0 dhcp
Starting DHCP on sm0 ...
losh> ifconfig

sm0: up 100M half-duplex <15>
sm0: mac: 00:08:ee:02:38:89 ip: 10.0.5.70
      mask: 255.255.252.0 gw: 10.0.4.1
losh> load elf /tftp/10.0.5.140:OMAP-linux-xxxxxxx.elf
loading from /tftp/10.0.5.140:OMAP-linux-xxxxxxx.elf:
.....
```

```
Tera Term - COM1 VT
File Edit Setup Control Window Help
.....
ELF section 0: download address: 0x80208000 load address: 0x80e80000
ELF section 1: download address: 0x80230000 load address: 0x81000000
ELF section 2: download address: 0x803c8000 load address: 0x81200000
warning: guessing combined program header size as 8247008
warning: guessing combined program header size as 9886692
loaded 10022944 @ 0x80e80000 Ram
...done
file loaded
losh>
```

5. Type `exec`

```
Tera Term - COM1 VT
File Edit Setup Control Window Help
.....
ELF section 0: download address: 0x80208000 load address: 0x80e80000
ELF section 1: download address: 0x80230000 load address: 0x81000000
ELF section 2: download address: 0x803c8000 load address: 0x81200000
warning: guessing combined program header size as 8247008
warning: guessing combined program header size as 9886692
loaded 10022944 @ 0x80e80000 Ram
...done
file loaded
losh> exec
```

6. If this is the first time you have booted into Linux, the default environment variables must be set. You will be asked to enter the MAC address of your OMAP35x SOM-LV and the display number for the LCD panel you have connected to the development kit; the MAC address was determined in Section 4.1 above and the supported LCD panel numbers are listed in the Tera Term output. (If you do not have an LCD panel connected to your kit, please leave the field blank and press Enter.)

```
Tera Term - COM1 VT
File Edit Setup Control Window Help
DRAM: 128 MB
NAND:256 MiB
*** Warning - bad CRC or NAND, using default environment
In: serial
Out: serial
Err: serial
=====NOTICE=====
This is the first time that you boot up this board. You are
required to set a valid MAC address for your Ethernet interface.
MAKE SURE YOUR MAC ADDRESS IS CORRECTLY ENTERED!
You can always change it by using setenv ethaddr <MAC address>
to change it again.
Please enter your MAC address:0008EE023889
ethaddr=0008EE023889
Enter the display number of the LCD panel(none for no LCD panel)
Pick one of:
3 == LQ036Q1DA01 TFT QUGA <3.6> Sharp w/ASIC
5 == LQ064D343 TFT UGA <6.4> Sharp
7 == LQ10D368 TFT UGA <10.4> Sharp
15 == LQ043T1DG01 TFT WQUGA <4.3> Sharp
MAKE SURE YOUR DISPLAY IS CORRECTLY ENTERED!
Please enter your LCD display number:15
```

7. After allowing time for the image to load (approximately 15 seconds), the LCD panel connected to your kit will display the Linux Penguin.



8. When you see the Linux Penguin displayed, you can proceed to Section 4.5 for instructions on booting into the Linux kernel.

4.4 Load Linux Sample Image via Ethernet (Static IP)

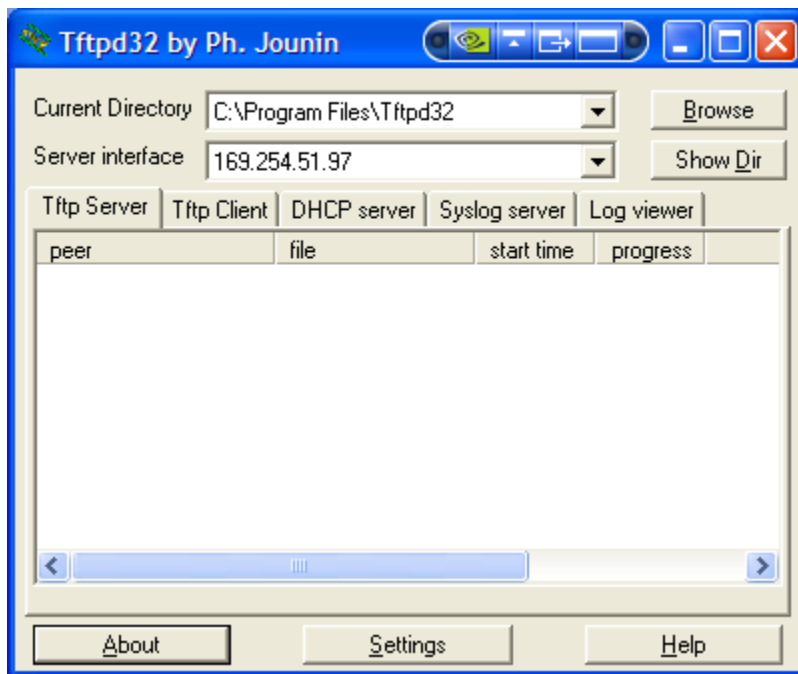
This section describes how to load the Linux image in LogicLoader via Ethernet with a static IP address.

4.4.1 Required Components

1. Tera Term terminal emulator (or equivalent).
2. Linux pre-built sample image for the OMAP35x SOM-LV—this can be found under the 'Linux' category of the 'All Downloads' page.
3. A TFTP program installed on your computer.

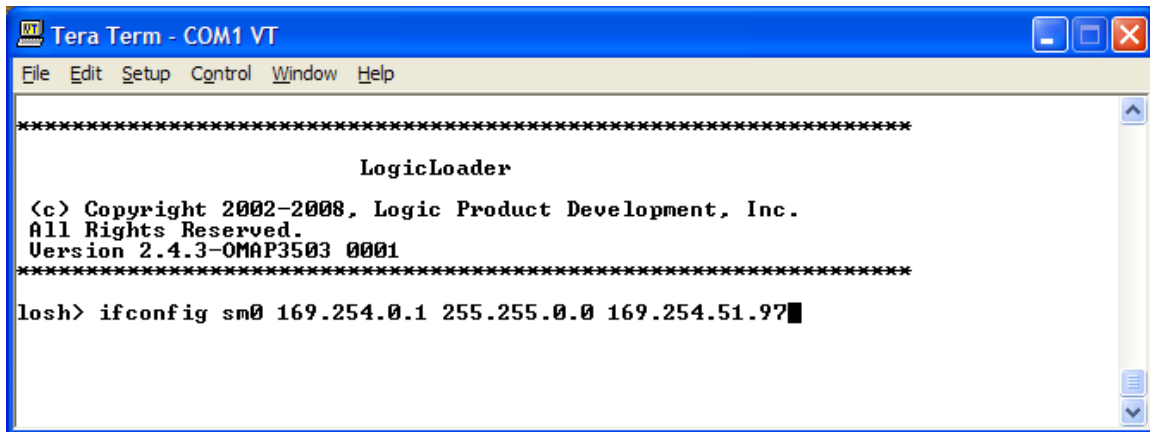
4.4.2 Load the OS Image via Static IP

1. Place the OMAP-linux-xxxxxxx.elf file in your TFTP folder.
2. Launch your TFTP program.



3. If you don't know the IP address of your workstation, go to Start -> Run and type **cmd**. Type **ipconfig /all** and locate the IP address for the Wired LAN connection that you are using. The IP address of the kit must match the IP address of your workstation for as many 255 number sets as there are in the subnet mask. For example, if your subnet mask is 255.255.0.0 then the first two number sets of the IP address must be the same on both devices.

4. Start Tera Term and initialize the Ethernet port, as described in detail in Section “LogicLoader Lab 5: Networking”, by using the full ‘ifconfig’ command: `ifconfig sm0 <kit IP address> <subnet mask> <workstation IP address>`.
Type: `ifconfig sm0 169.254.0.1 255.255.0.0 169.254.51.97` substituting the appropriate numbers for your situation.



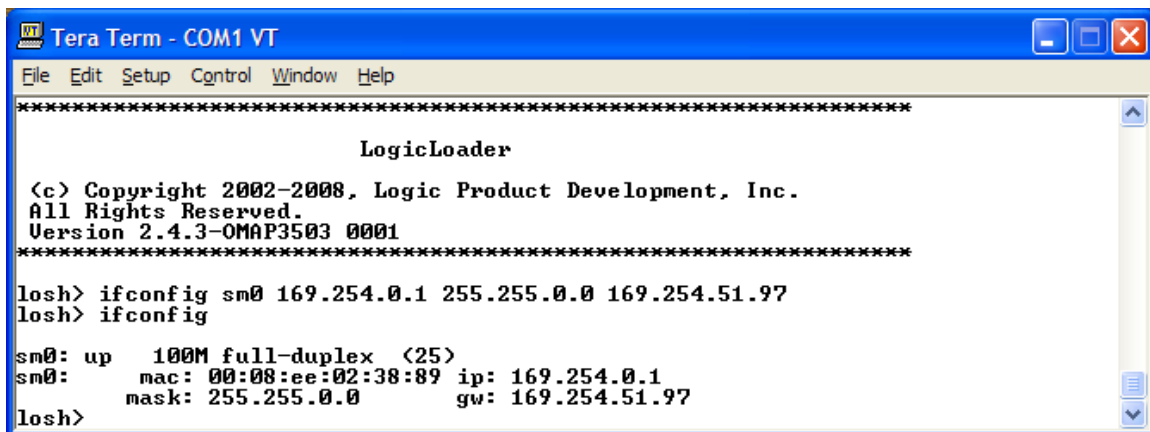
```
Tera Term - COM1 VT
File Edit Setup Control Window Help

*****
                        LogicLoader

(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.3-OMAP3503 0001
*****

losh> ifconfig sm0 169.254.0.1 255.255.0.0 169.254.51.97
```

5. Verify the networking parameters have been properly set; type: `ifconfig`



```
Tera Term - COM1 VT
File Edit Setup Control Window Help

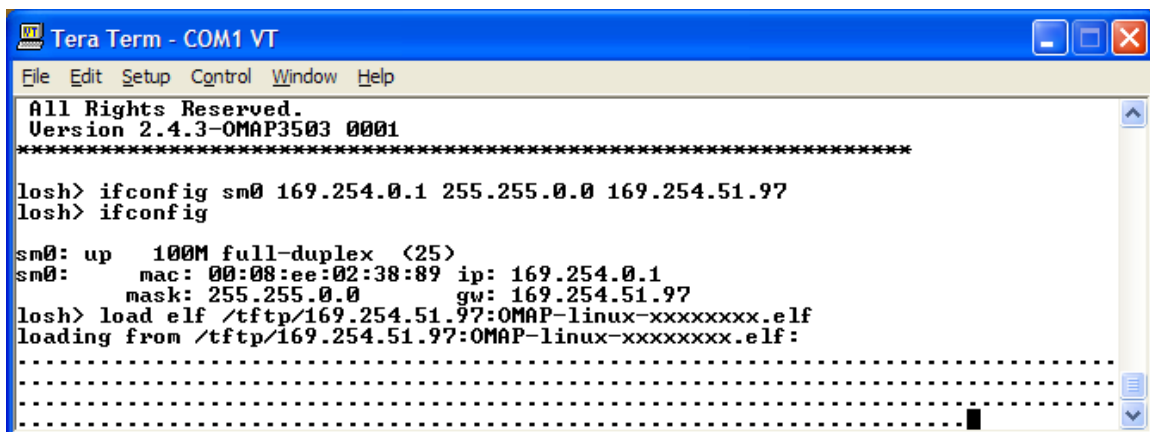
*****
                        LogicLoader

(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.3-OMAP3503 0001
*****

losh> ifconfig sm0 169.254.0.1 255.255.0.0 169.254.51.97
losh> ifconfig

sm0: up      100M full-duplex <25>
sm0:      mac: 00:08:ee:02:38:89 ip: 169.254.0.1
          mask: 255.255.0.0      gw: 169.254.51.97
losh>
```

6. Type `load elf /tftp/169.254.51.97:OMAP-linux-xxxxxxx.elf`. Please note that you will have to insert your own server IP address and the name of the file if they differ from the example below.



```
Tera Term - COM1 VT
File Edit Setup Control Window Help

All Rights Reserved.
Version 2.4.3-OMAP3503 0001
*****

losh> ifconfig sm0 169.254.0.1 255.255.0.0 169.254.51.97
losh> ifconfig

sm0: up      100M full-duplex <25>
sm0:      mac: 00:08:ee:02:38:89 ip: 169.254.0.1
          mask: 255.255.0.0      gw: 169.254.51.97
losh> load elf /tftp/169.254.51.97:OMAP-linux-xxxxxxx.elf
loading from /tftp/169.254.51.97:OMAP-linux-xxxxxxx.elf:
.....
.....
.....
.....
.....
```



```
Tera Term - COM1 VT
File Edit Setup Control Window Help
.....
ELF section 0: download address: 0x80208000 load address: 0x80e80000
ELF section 1: download address: 0x80230000 load address: 0x81000000
ELF section 2: download address: 0x803c8000 load address: 0x81200000
warning: guessing combined program header size as 8247008
warning: guessing combined program header size as 9886692
loaded 10022944 @ 0x80e80000 Ram
...done
file loaded
losh>
```

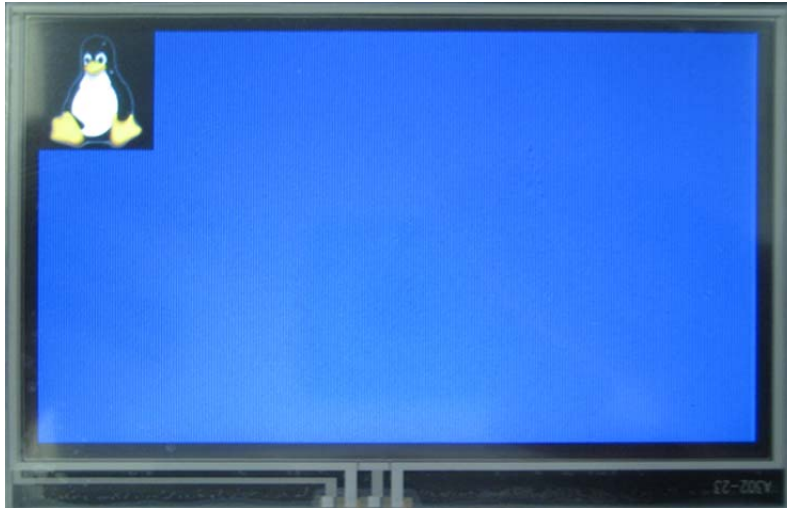
7. Type `exec`

```
Tera Term - COM1 VT
File Edit Setup Control Window Help
.....
ELF section 0: download address: 0x80208000 load address: 0x80e80000
ELF section 1: download address: 0x80230000 load address: 0x81000000
ELF section 2: download address: 0x803c8000 load address: 0x81200000
warning: guessing combined program header size as 8247008
warning: guessing combined program header size as 9886692
loaded 10022944 @ 0x80e80000 Ram
...done
file loaded
losh> exec
```

8. If this is the first time you have booted into Linux, the default environment variables must be set. You will be asked to enter the MAC address of your OMAP35x SOM-LV and the display number for the LCD panel you have connected to the development kit; the MAC address was determined in Section 4.1 above and the supported LCD panel numbers are listed in the Tera Term output. (If you do not have an LCD panel connected to your kit, please leave the field blank and press Enter.)

```
Tera Term - COM1 VT
File Edit Setup Control Window Help
DRAM: 128 MB
NAND:256 MiB
*** Warning - bad CRC or NAND, using default environment
In: serial
Out: serial
Err: serial
=====NOTICE=====
This is the first time that you boot up this board. You are
required to set a valid MAC address for your Ethernet interface.
MAKE SURE YOUR MAC ADDRESS IS CORRECTLY ENTERED!
You can always change it by using setenv ethaddr <MAC address>
to change it again.
Please enter your MAC address:0008EE023889
ethaddr=0008EE023889
Enter the display number of the LCD panel(none for no LCD panel)
Pick one of:
3 == LQ036Q1DA01 TFT QUGA <3.6> Sharp w/ASIC
5 == LQ064D343 TFT UGA <6.4> Sharp
7 == LQ10D368 TFT UGA <10.4> Sharp
15 == LQ043T1DG01 TFT WQUGA <4.3> Sharp
MAKE SURE YOUR DISPLAY IS CORRECTLY ENTERED!
Please enter your LCD display number:15
```


9. After allowing time for the image to load (approximately 15 seconds), the LCD panel connected to your kit will display the Linux Penguin.



10. When you see the Linux Penguin displayed, you can proceed to Section 4.5 for instructions on booting into the Linux kernel.

4.5 Boot into the Linux Kernel

1. In the Tera Term window, type **root** at the LogicOMAP3530 login: prompt.

A screenshot of a Tera Term window titled "Tera Term - COM1 VT". The window contains the following text:

```
Welcome to LogicPD OMAP3530 Embedded Linux Environment
(based on LTIB) running on OMAP3530 LU SOM SDK

!!!!!! WARNING !!!!!!!

The default password for the root account is: root
please change this password using the 'passwd' command
and then edit this message (/etc/issue) to remove this message

LogicOMAP3530 login: root
Password: █
```

2. Type **root** at the Password: prompt and you will be brought to the omap3530# prompt.

A screenshot of a Tera Term window titled "Tera Term - COM1 VT". The window contains the following text:

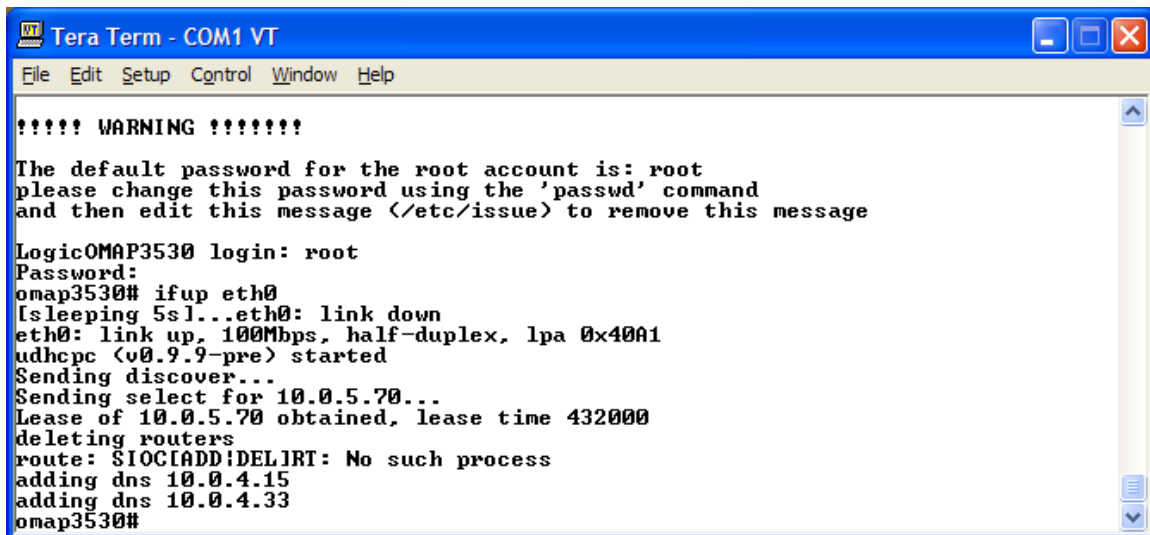
```
Welcome to LogicPD OMAP3530 Embedded Linux Environment
(based on LTIB) running on OMAP3530 LU SOM SDK

!!!!!! WARNING !!!!!!!

The default password for the root account is: root
please change this password using the 'passwd' command
and then edit this message (/etc/issue) to remove this message

LogicOMAP3530 login: root
Password:
omap3530#
```

3. To initialize Ethernet for DHCP IP addresses, type: **ifup eth0** at the omap3530# prompt.

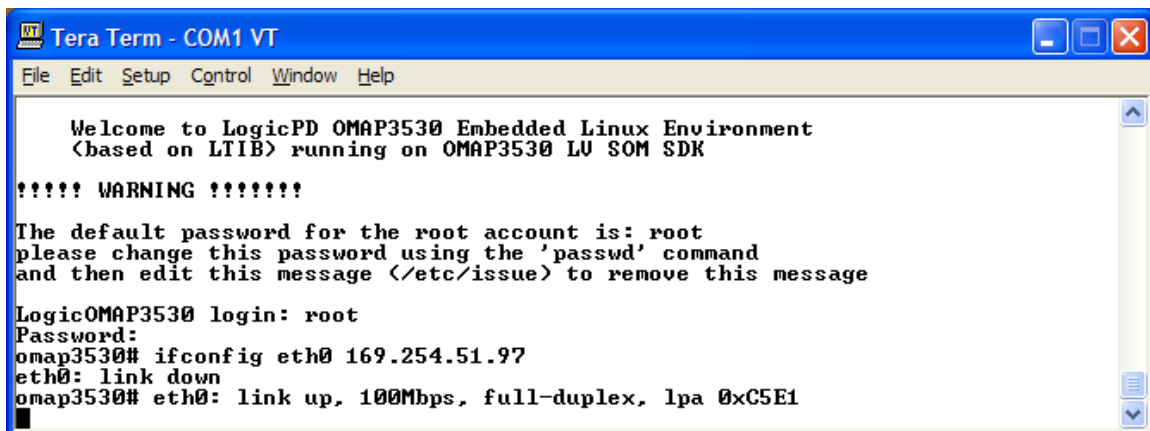


The screenshot shows a Tera Term window titled "Tera Term - COM1 VT". The terminal output displays a warning message about the root password, followed by the login process for root. The user enters the password and then runs the command `ifup eth0`. The terminal shows the network interface `eth0` coming up at 100Mbps in half-duplex mode. It also shows the `udhcpd` service starting and sending a select for the IP address 10.0.5.70. The lease time is 432000 seconds. The terminal also shows the deletion of routes and the addition of DNS servers 10.0.4.15 and 10.0.4.33.

```
!!!!!! WARNING !!!!!!!
The default password for the root account is: root
please change this password using the 'passwd' command
and then edit this message (/etc/issue) to remove this message

LogicOMAP3530 login: root
Password:
omap3530# ifup eth0
[sleeping 5s]...eth0: link down
eth0: link up, 100Mbps, half-duplex, lpa 0x40A1
udhcpd (v0.9.9-pre) started
Sending discover...
Sending select for 10.0.5.70...
Lease of 10.0.5.70 obtained, lease time 432000
deleting routers
route: $IOC[ADD|DEL]RT: No such process
adding dns 10.0.4.15
adding dns 10.0.4.33
omap3530#
```

4. To initialize Ethernet for static IP addresses, type: **ifconfig eth0 169.254.51.97** at the omap3530# prompt, substituting the IP address with the appropriate address for your network setup.



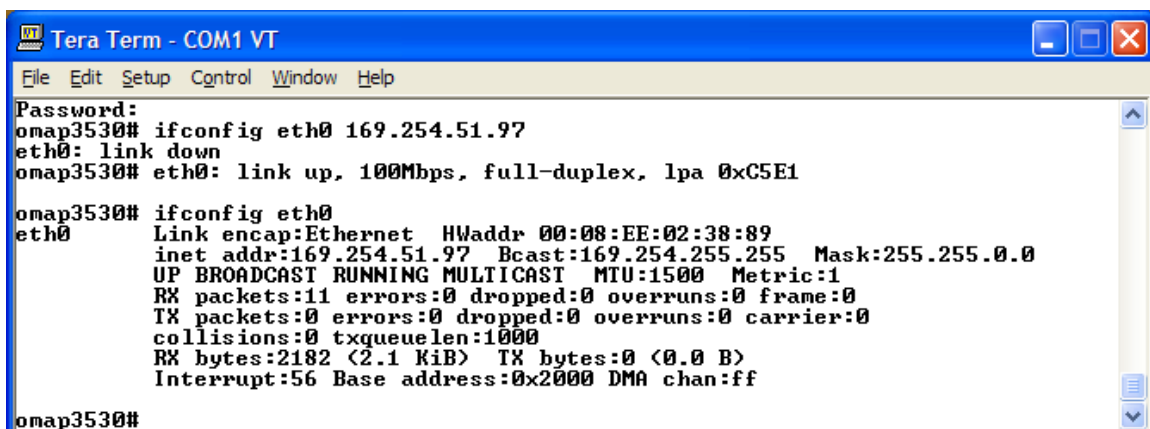
The screenshot shows a Tera Term window titled "Tera Term - COM1 VT". The terminal output displays a welcome message for the LogicPD OMAP3530 Embedded Linux Environment. The user runs the command `ifconfig eth0 169.254.51.97`. The terminal shows the network interface `eth0` coming up at 100Mbps in full-duplex mode.

```
Welcome to LogicPD OMAP3530 Embedded Linux Environment
(based on LTIB) running on OMAP3530 LU SOM SDK

!!!!!! WARNING !!!!!!!
The default password for the root account is: root
please change this password using the 'passwd' command
and then edit this message (/etc/issue) to remove this message

LogicOMAP3530 login: root
Password:
omap3530# ifconfig eth0 169.254.51.97
eth0: link down
omap3530# eth0: link up, 100Mbps, full-duplex, lpa 0xC5E1
```

5. To determine the kit IP address and the status of the Ethernet interface, type: **ifconfig eth0** at the omap3530# prompt.



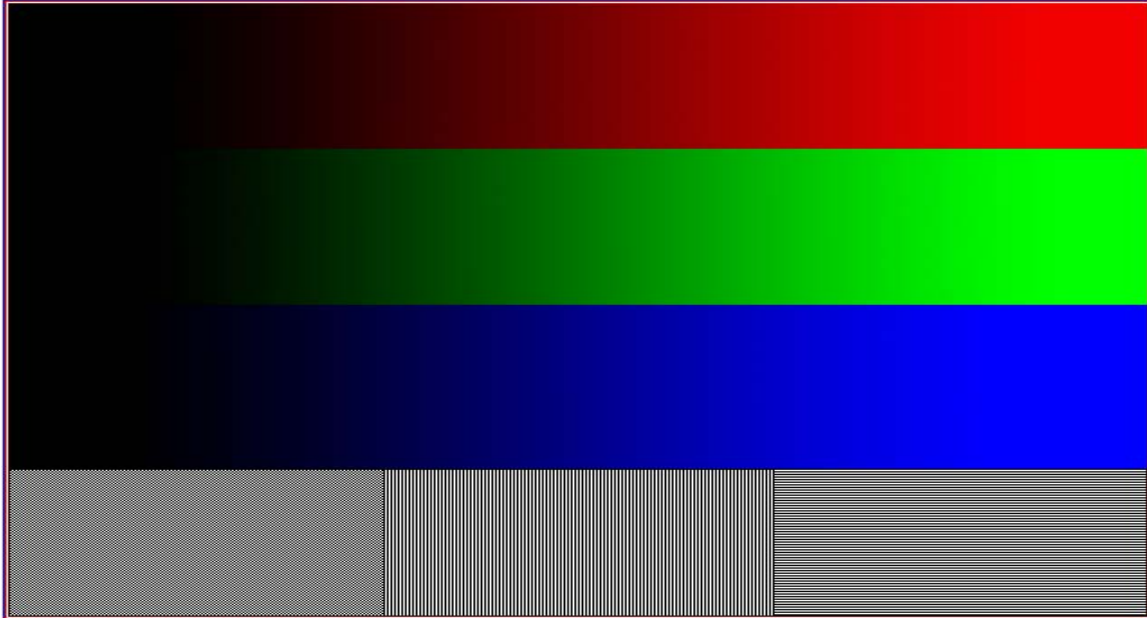
The screenshot shows a Tera Term window titled "Tera Term - COM1 VT". The terminal output displays the command `ifconfig eth0` and its output. The output shows the network interface `eth0` is up and running at 100Mbps in full-duplex mode. It also shows the IP address 169.254.51.97, the broadcast address 169.254.255.255, and the netmask 255.255.0.0. The output also shows the status of the interface, including the number of packets received and transmitted, and the number of errors and collisions.

```
Password:
omap3530# ifconfig eth0 169.254.51.97
eth0: link down
omap3530# eth0: link up, 100Mbps, full-duplex, lpa 0xC5E1

omap3530# ifconfig eth0
eth0
Link encap:Ethernet HWaddr 00:08:EE:02:38:89
inet addr:169.254.51.97 Bcast:169.254.255.255 Mask:255.255.0.0
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
RX packets:11 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:2182 (2.1 KiB) TX bytes:0 (0.0 B)
Interrupt:56 Base address:0x2000 DMA chan:ff

omap3530#
```

6. To perform a video test on an LCD panel connected to your kit, type: **draw-test** at the omap3530# prompt. Your LCD panel will display a pattern similar to what is shown below.



7. To shutdown the kernel and return to LogicLoader, type: **reboot** at the omap3530# prompt.

```
Tera Term - COM1 VT
File Edit Setup Control Window Help
omap3530# reboot
omap3530# Stopping inetd:
Unmounting filesystems
umount: tmpfs busy - remounted read-only
umount: Cannot open /proc/mounts
The system is going down NOW !!
Sending SIGTERM to all processes.
udhcpd[490]: Received SIGTERM
Please stand by while rebooting the system.
Restarting system.

NoLo Version : 2.4.3-OMAP3503 0001
NoLo Build   : LPD386 Thu May 29 13:28:12 CST 2008
NoLo Compiler: gcc version 4.2.1
Image type  : Non-File System
Boot Device  : NAND

*****

                        LogicLoader

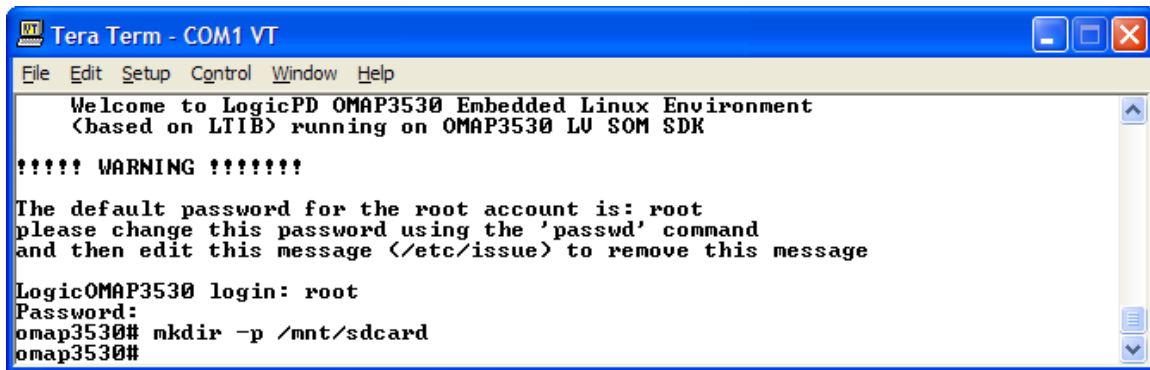
<c> Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.3-OMAP3503 0001
*****

losh> █
```

4.6 Mount an SD Card in Linux

The following steps describe how to properly mount and un-mount an SD card within Linux.

1. At the omap3530# prompt, type: **mkdir -p /mnt/sdcard**. This command makes sure that there is a mount point (i.e., a directory) to mount the card on.



```
Tera Term - COM1 VT
File Edit Setup Control Window Help

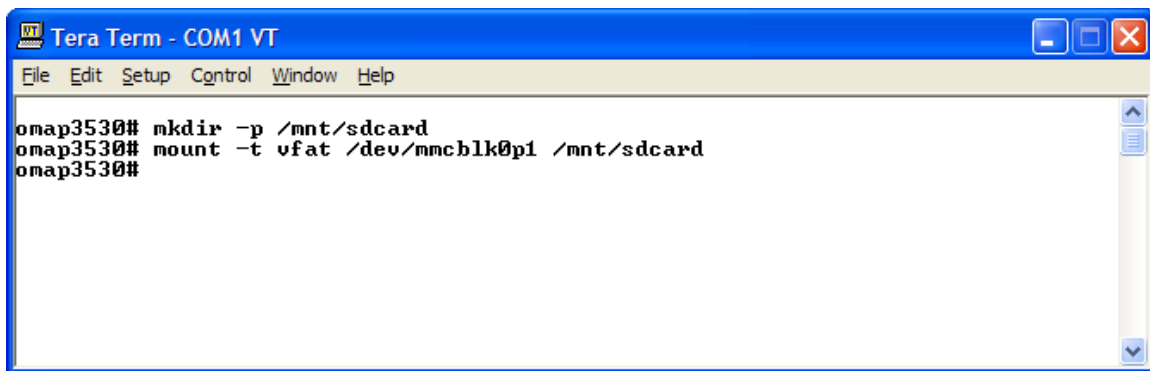
Welcome to LogicPD OMAP3530 Embedded Linux Environment
<based on LTIB> running on OMAP3530 LU SOM SDK

!!!!!! WARNING !!!!!!!

The default password for the root account is: root
please change this password using the 'passwd' command
and then edit this message </etc/issue> to remove this message

LogicOMAP3530 login: root
Password:
omap3530# mkdir -p /mnt/sdcard
omap3530#
```

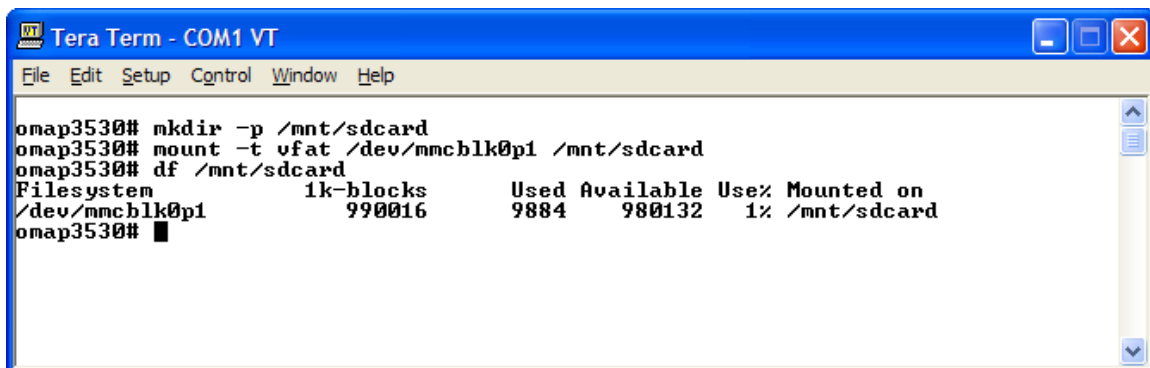
2. Type: **mount -t vfat /dev/mmcblk0p1 /mnt/sdcard** to mount the SD card.



```
Tera Term - COM1 VT
File Edit Setup Control Window Help

omap3530# mkdir -p /mnt/sdcard
omap3530# mount -t vfat /dev/mmcblk0p1 /mnt/sdcard
omap3530#
```

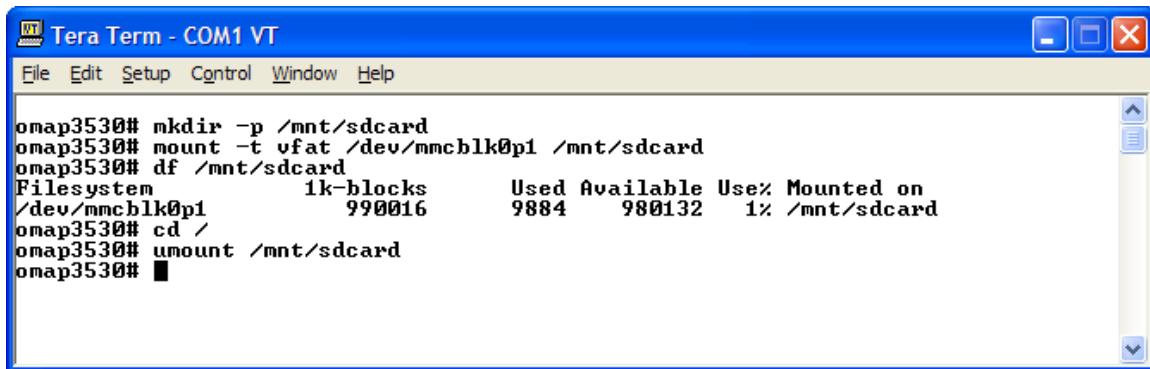
3. The 'disk free' command will show the SD card and its free space. At the omap3530# prompt, type: **df /mnt/sdcard**



```
Tera Term - COM1 VT
File Edit Setup Control Window Help

omap3530# mkdir -p /mnt/sdcard
omap3530# mount -t vfat /dev/mmcblk0p1 /mnt/sdcard
omap3530# df /mnt/sdcard
Filesystem            1k-blocks      Used Available Use% Mounted on
/dev/mmcblk0p1         990016        9884   980132   1% /mnt/sdcard
omap3530# █
```

4. To un-mount a mounted SD card, at the omap3530# prompt, type: **cd /** This command will make sure that no process is holding open a file or directory on the SD card. If a file or directory is open, then the un-mount will return a "device busy" message.
5. Type: **umount /mnt/sdcard** to un-mount the SD card.



```

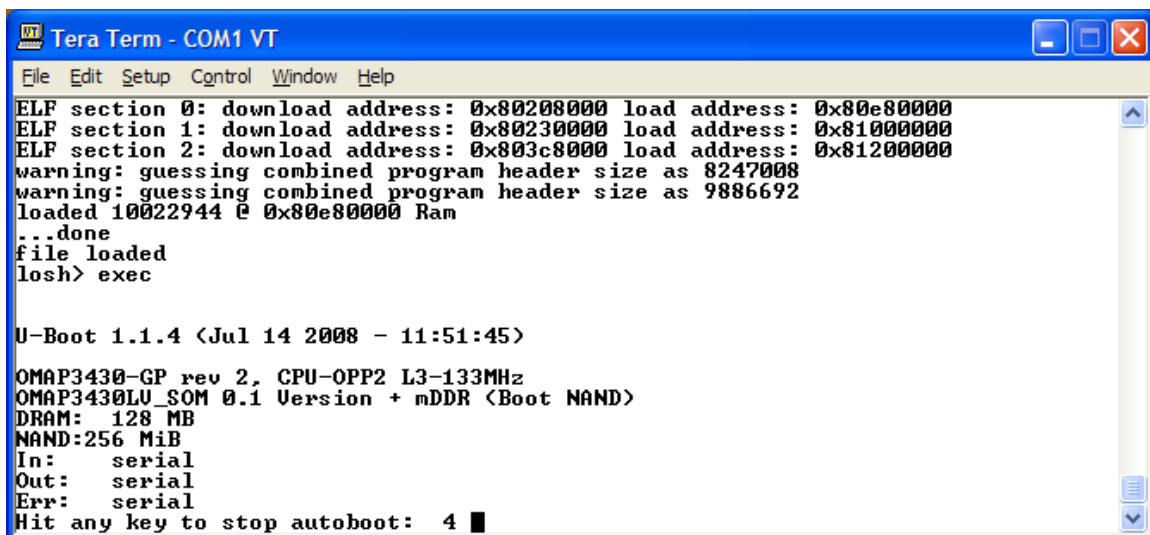
omap3530# mkdir -p /mnt/sdcard
omap3530# mount -t vfat /dev/mmcblk0p1 /mnt/sdcard
omap3530# df /mnt/sdcard
Filesystem            1k-blocks      Used Available Use% Mounted on
/dev/mmcblk0p1         990016       9884   980132   1% /mnt/sdcard
omap3530# cd /
omap3530# umount /mnt/sdcard
omap3530#

```

4.7 Reset Environment Variables

The first time the Linux kernel was booted on your kit, you were prompted to set certain default environment variables (MAC address and LCD panel type). If you would like to reset the environment variables, you will need to interrupt the autoboot process after executing the loaded image.

1. Perform the initial steps to load the .elf file, as described in the procedures above.
2. After you type **exec** to execute the image, wait until you see the message “Hit any key to stop autoboot” and then press the return key within 6 seconds to abort the boot process.



```

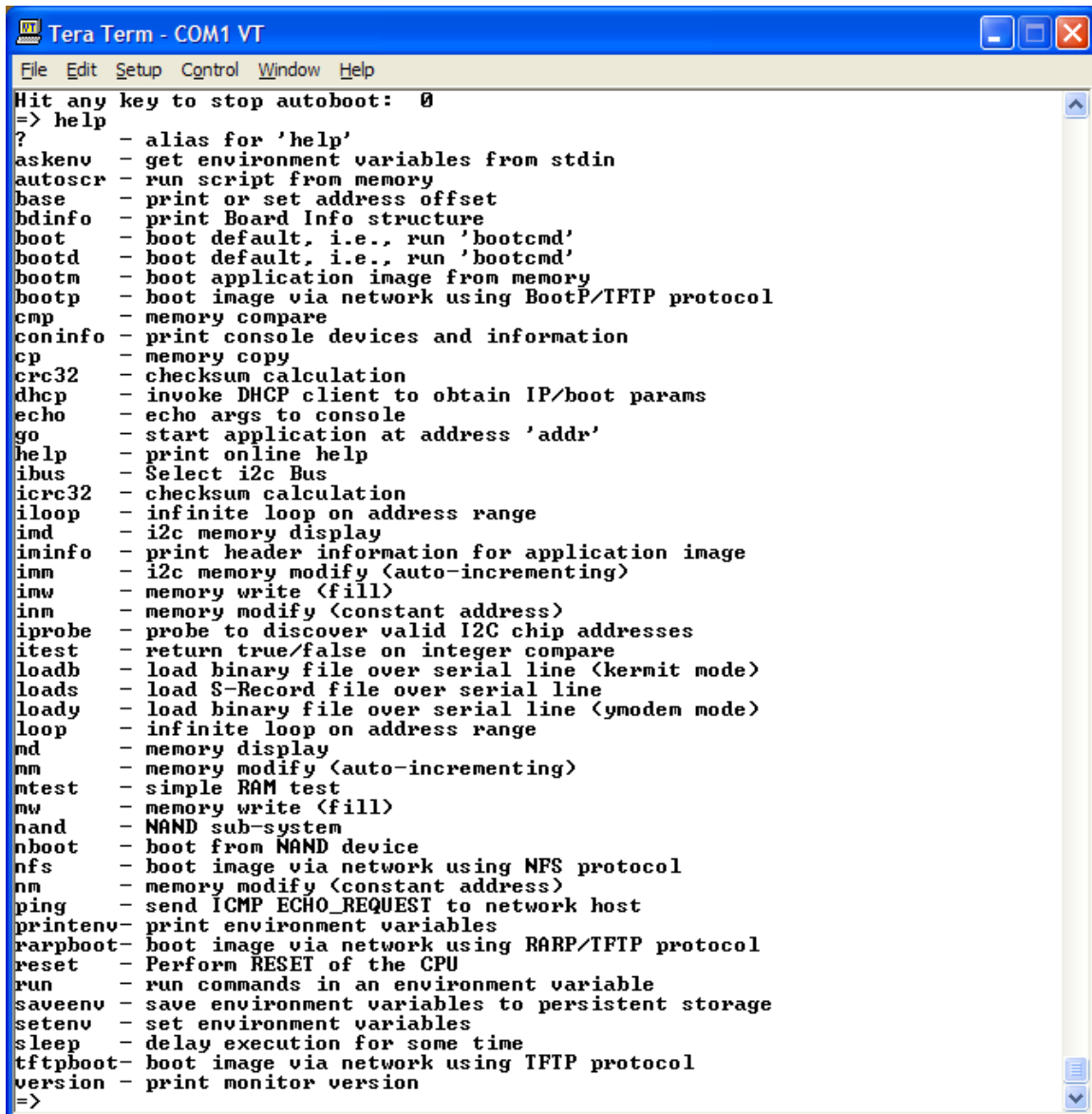
ELF section 0: download address: 0x80208000 load address: 0x80e80000
ELF section 1: download address: 0x80230000 load address: 0x81000000
ELF section 2: download address: 0x803c8000 load address: 0x81200000
warning: guessing combined program header size as 8247008
warning: guessing combined program header size as 9886692
loaded 10022944 @ 0x80e80000 Ram
...done
file loaded
losh> exec

U-Boot 1.1.4 <Jul 14 2008 - 11:51:45>

OMAP3430-GP rev 2, CPU-OPP2 L3-133MHz
OMAP3430LU_SOM 0.1 Version + mDDR <Boot NAND>
DRAM: 128 MB
NAND:256 MiB
In: serial
Out: serial
Err: serial
Hit any key to stop autoboot: 4

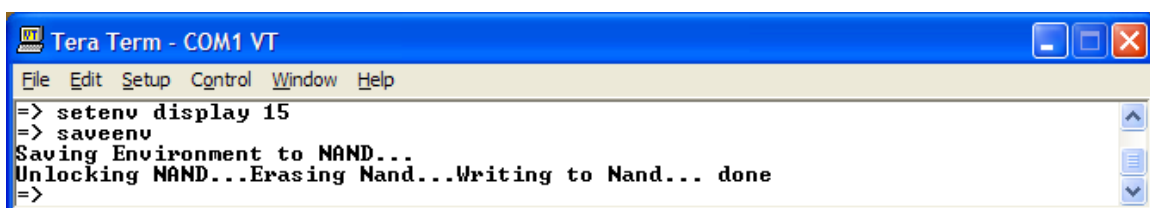
```

3. At the => prompt, type **help** to output a list of all the commands available from the => prompt.



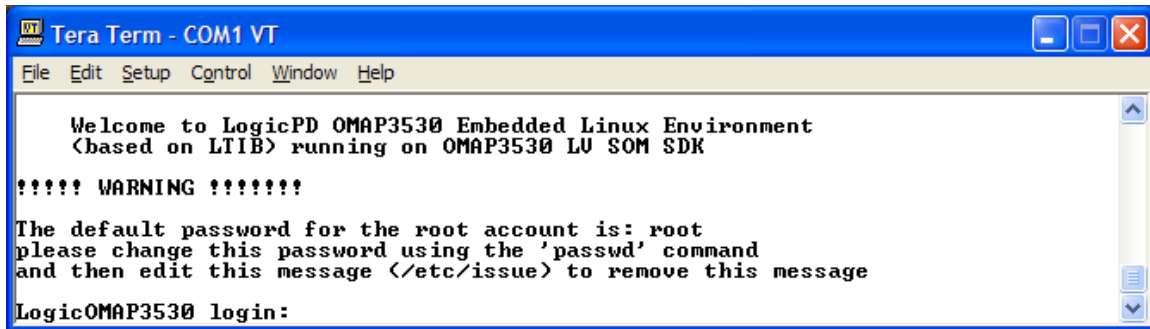
```
Hit any key to stop autoboot: 0
=> help
? - alias for 'help'
askenv - get environment variables from stdin
autoscr - run script from memory
base - print or set address offset
bdinfo - print Board Info structure
boot - boot default, i.e., run 'bootcmd'
bootd - boot default, i.e., run 'bootcmd'
bootm - boot application image from memory
bootp - boot image via network using BootP/TFTP protocol
cmp - memory compare
coninfo - print console devices and information
cp - memory copy
crc32 - checksum calculation
dhcp - invoke DHCP client to obtain IP/boot params
echo - echo args to console
go - start application at address 'addr'
help - print online help
ibus - Select i2c Bus
icrc32 - checksum calculation
iloop - infinite loop on address range
ind - i2c memory display
iminfo - print header information for application image
imm - i2c memory modify (auto-incrementing)
inw - memory write (fill)
inm - memory modify (constant address)
iprobe - probe to discover valid I2C chip addresses
itest - return true/false on integer compare
loadb - load binary file over serial line (kermit mode)
loads - load S-Record file over serial line
loady - load binary file over serial line (ymodem mode)
loop - infinite loop on address range
md - memory display
mm - memory modify (auto-incrementing)
mtest - simple RAM test
mw - memory write (fill)
nand - NAND sub-system
nboot - boot from NAND device
nfs - boot image via network using NFS protocol
nm - memory modify (constant address)
ping - send ICMP ECHO_REQUEST to network host
printenv - print environment variables
rarpboot - boot image via network using RARP/TFTP protocol
reset - Perform RESET of the CPU
run - run commands in an environment variable
saveenv - save environment variables to persistent storage
setenv - set environment variables
sleep - delay execution for some time
tftpboot - boot image via network using TFTP protocol
version - print monitor version
=>
```

4. The following is an example of an environment change: to set the LCD panel to the 4.3" WQVGA display that is included with the OMAP35x Development Kit, type **setenv display 15** at the => prompt.
5. To save the environment change, type **saveenv** at the => prompt.



```
=> setenv display 15
=> saveenv
Saving Environment to NAND...
Unlocking NAND...Erasing Nand...Writing to Nand... done
=>
```

6. After the environment variable has been saved, you can finish booting into the kernel by typing **boot** at the => prompt. You will then see the LogicOMAP3530 login: prompt to log into the Linux kernel.



The screenshot shows a Tera Term window titled "Tera Term - COM1 VT". The window contains the following text:

```
Welcome to LogicPD OMAP3530 Embedded Linux Environment
<based on LTIB> running on OMAP3530 LU SOM SDK

!!!!!! WARNING !!!!!!!

The default password for the root account is: root
please change this password using the 'passwd' command
and then edit this message (/etc/issue) to remove this message

LogicOMAP3530 login:
```

5 Prepare your PC for Windows CE Development

This section describes the steps required to prepare your PC for Windows CE development.

5.1 Background Information

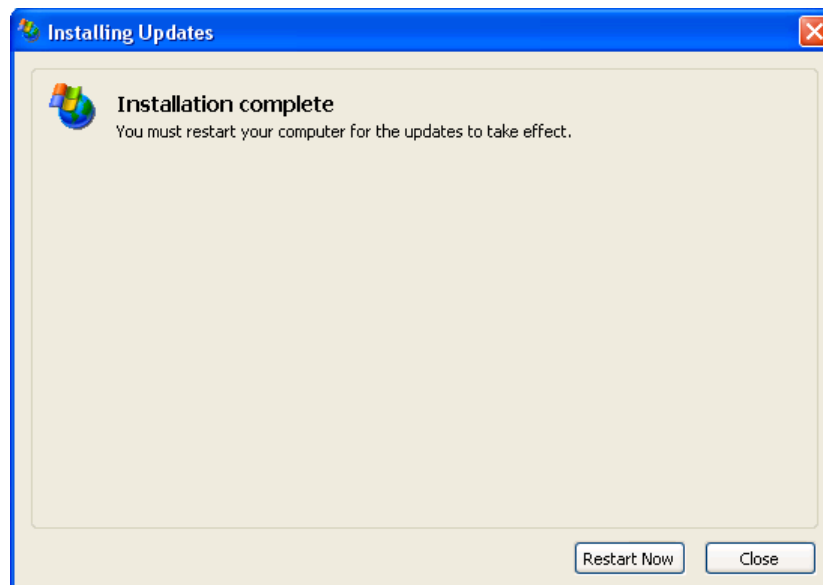
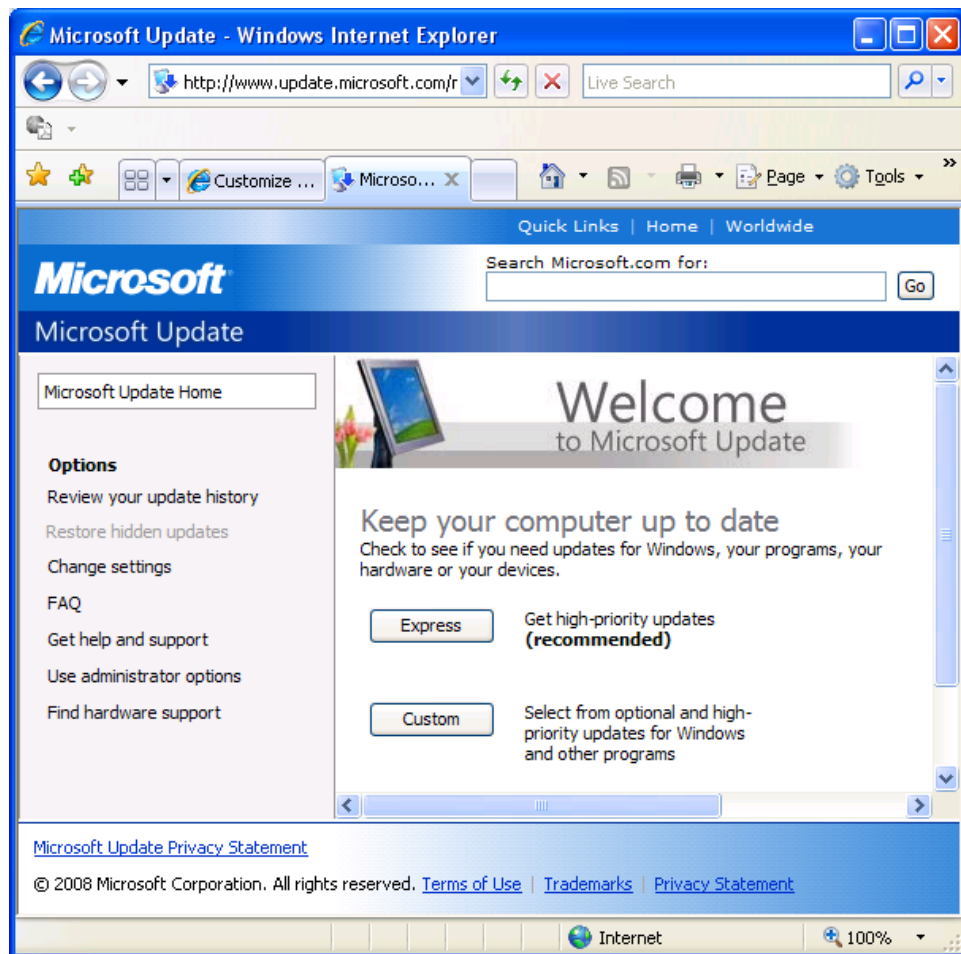
- This section will walk you through the recommended installation steps for Visual Studio 2005 and Platform Builder. The following is a high-level look at the installation process:
 1. Update your PC using Windows Update
 2. Install Visual Studio 2005 from the “Windows Embedded CE 6.0 180-Day Evaluation Kit” (provided with the OMAP35x Development Kit)
 3. Update Visual Studio from Windows Update website
 4. Install Platform Builder from the Evaluation Packet
 5. Update Platform Builder:
 - a. Windows Embedded CE 6.0 Platform Builder Service Pack 1
 - b. Windows Embedded CE 6.0 R2
 - c. Windows Embedded CE 6.0 Platform Builder – Cumulative Product Update Rollup Package (through 12/31/2007)
 - d. Windows Embedded CE 6.0 Monthly Update (January 2008) QFE
 - e. Windows Embedded CE 6.0 Monthly Update (February 2008) QFE
 - f. Windows Embedded CE 6.0 Monthly Update (March 2008) QFE
 - g. Windows Embedded CE 6.0 Monthly Update (April 2008) QFE
 6. Run Visual Studio 2005
 7. Run the QFE Check tool from Visual Studio 2005
- **IMPORTANT NOTE:** This document is written assuming the use of the Windows XP operating system. Other Windows operating systems, such as Vista, may require additional updates or installations. Please refer to the Microsoft website for necessary details.

5.2 Prerequisites

- Host PC with DVD drive
- A recent version of Internet Explorer, Firefox, or an FTP program and access to the Internet
- Windows Embedded CE 6.0 180-Day Evaluation Kit included with your OMAP35x Development Kit

5.3 Update Windows Operating System

Before beginning the installation of Visual Studio 2005, Platform Builder, or any Windows CE 6.0 components, make sure your Windows operating system has all of the most recent updates from Microsoft.



5.4 Obtain Product Key(s)

1. To obtain the Product Key for your Evaluation Kit, go to the URL specified on the sticker on the insider of your Evaluation Packet.
2. Under the “Product Key Registration” heading, click on the link for “Windows Embedded CE 6.0”.
3. Sign in with your Windows Live ID or sign up for a Windows Live ID. (**Note:** If you sign-up for a Windows Live ID during this step, an email will be sent to you to complete the activation process for your Windows Live ID. Complete this activation process before continuing with the next step.)
4. Fill in the online form and click the “Continue” button at the bottom of the page.
5. At the completion of the registration process, you will be presented with your Product Key(s) and you will also be emailed the Product Key(s). Have these available during the installation process below.

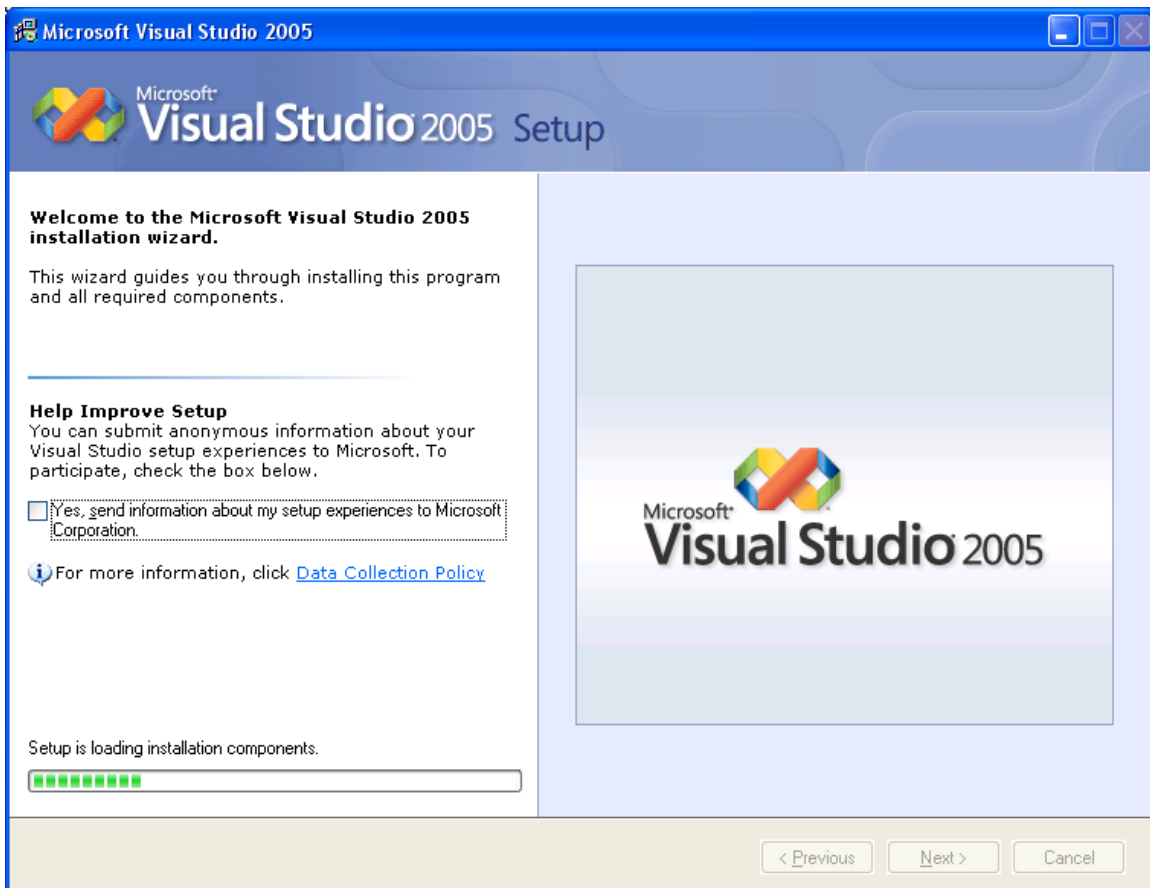
IMPORTANT NOTE: The emails sent from Microsoft in the steps above may get caught in any spam filter(s) associated with your email program. If the emails do not appear in your inbox, be sure to check your spam folders.

5.5 Install Visual Studio 2005

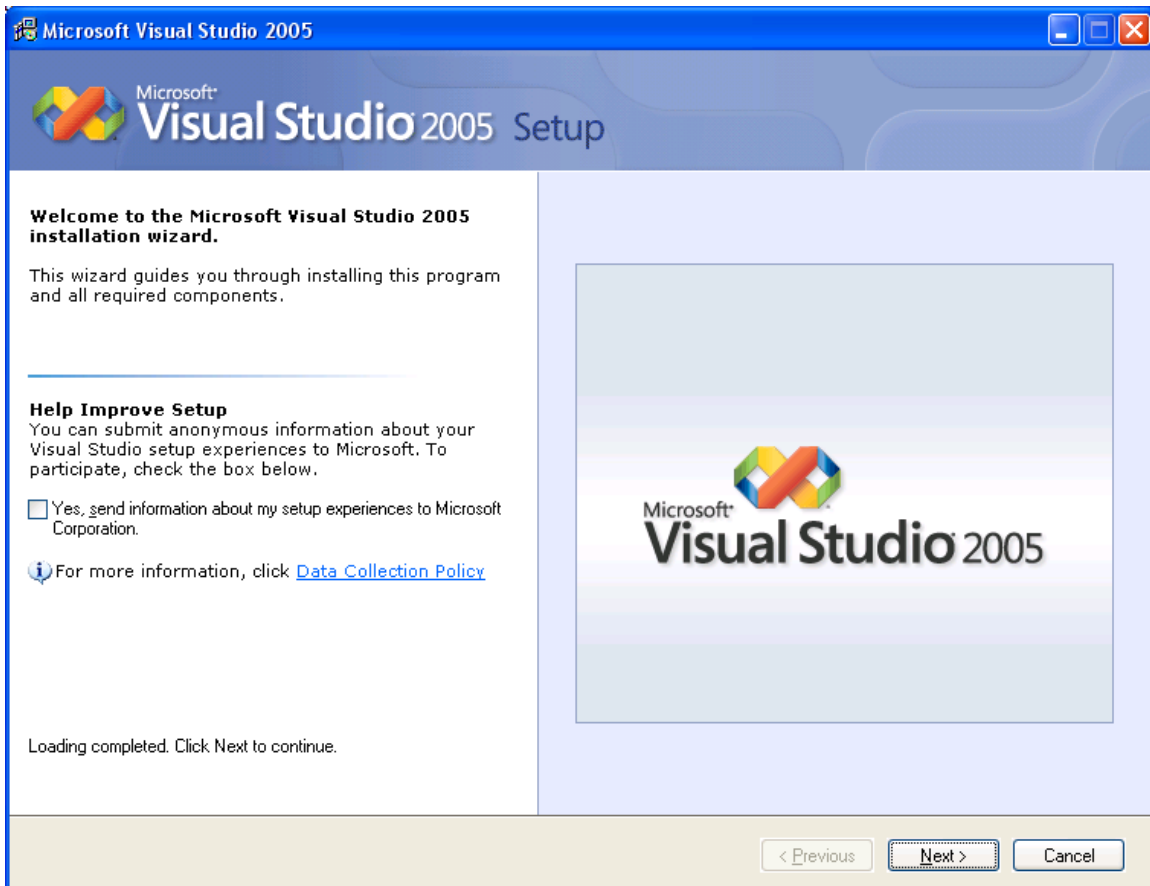
1. Insert the “Visual Studio 2005” DVD into your PC's DVD drive.
2. The “Visual Studio 2005 Setup” window will appear. Click on “Install Visual Studio 2005”.



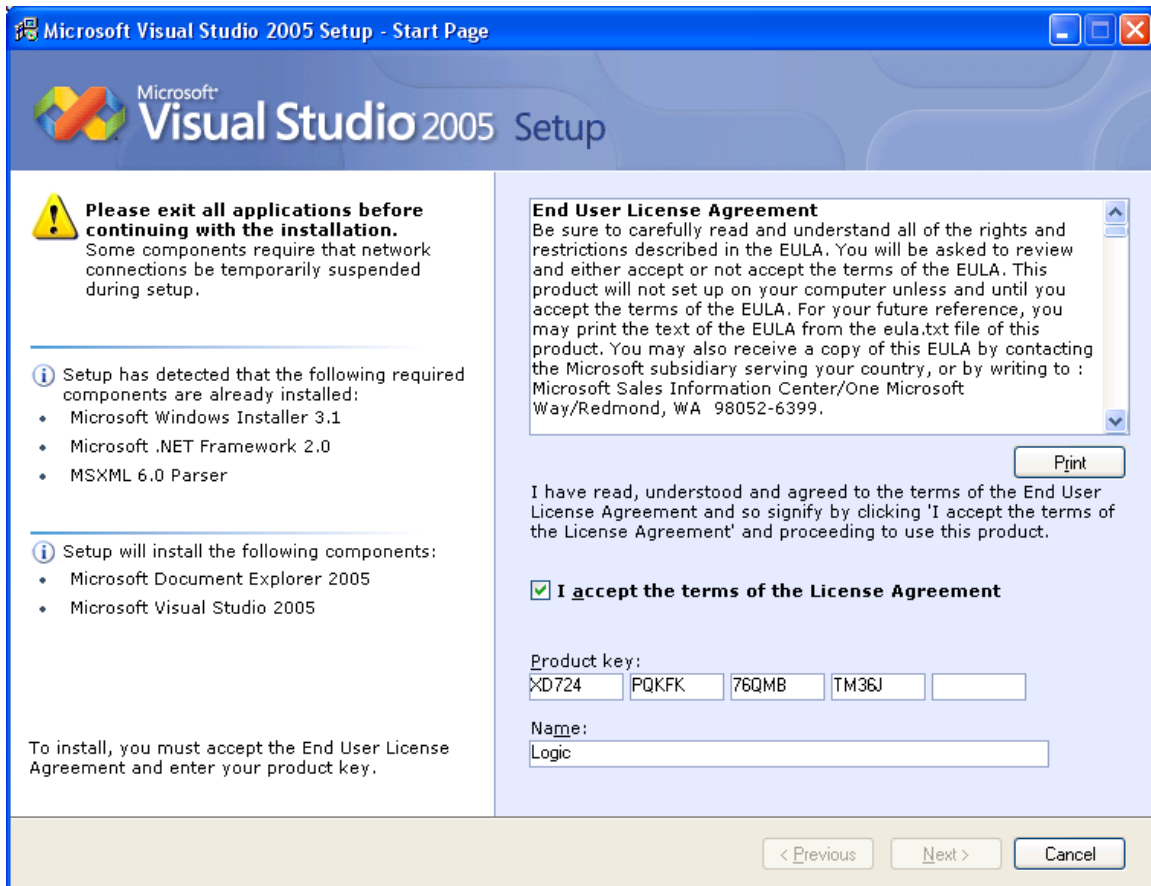
3. Visual Studio 2005 will begin loading installation components on your PC.



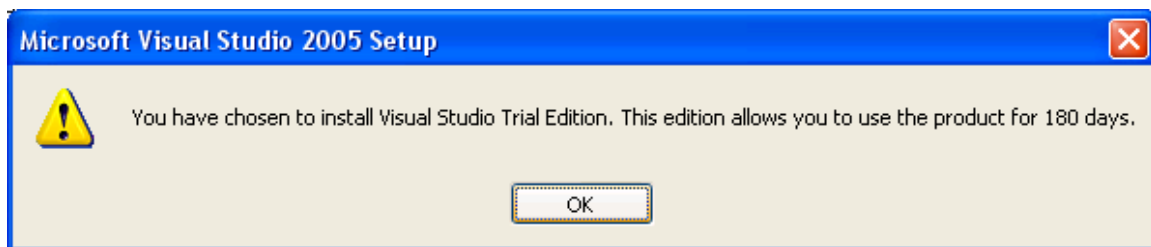
4. When the “Welcome to the Microsoft Visual Studio 2005 installation wizard” window appears, click the “Next>” button.



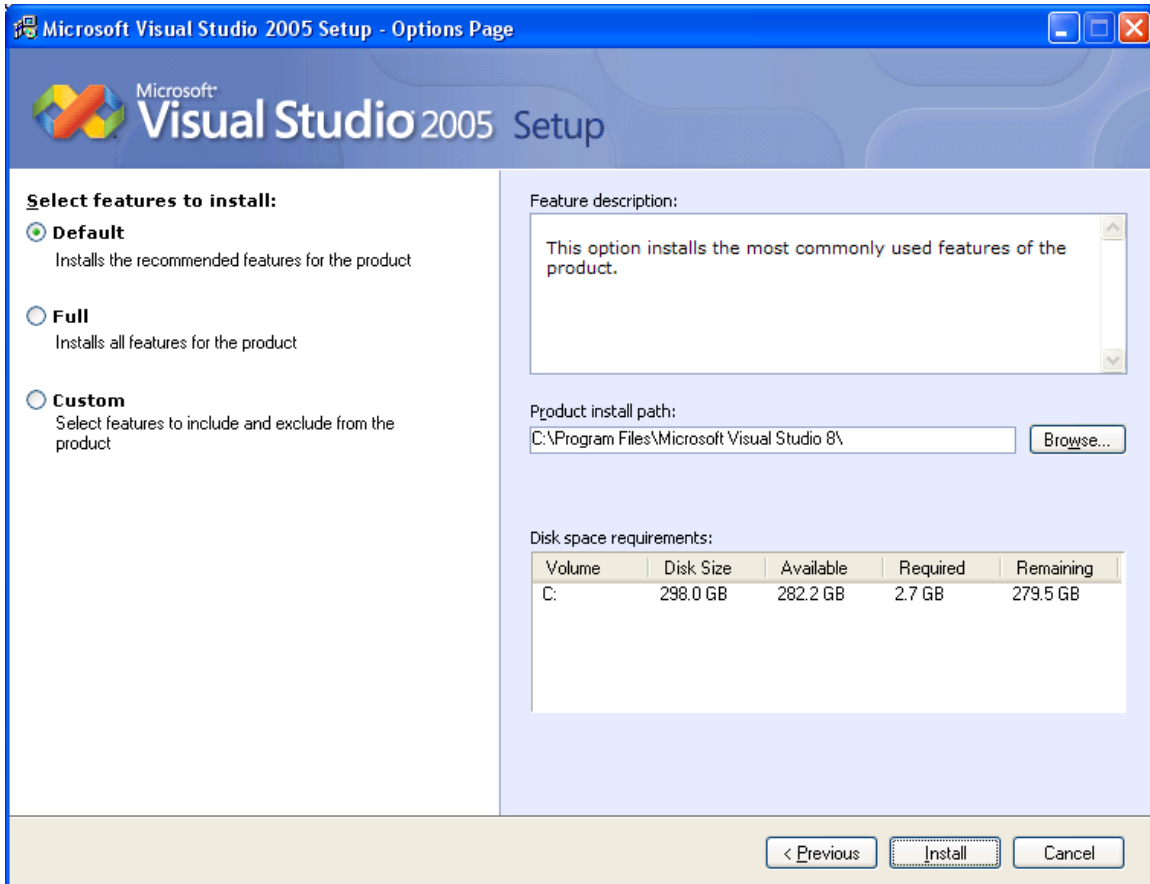
5. On the next screen, check the box to accept the terms of the License Agreement.
6. Enter the product key for your Visual Studio 2005 in the proper fields.
7. Enter your name in the proper field and then click the “Next>” button.



8. A warning prompt will open reminding you that you are installing a trial edition of Visual Studio. Click the “OK” button.



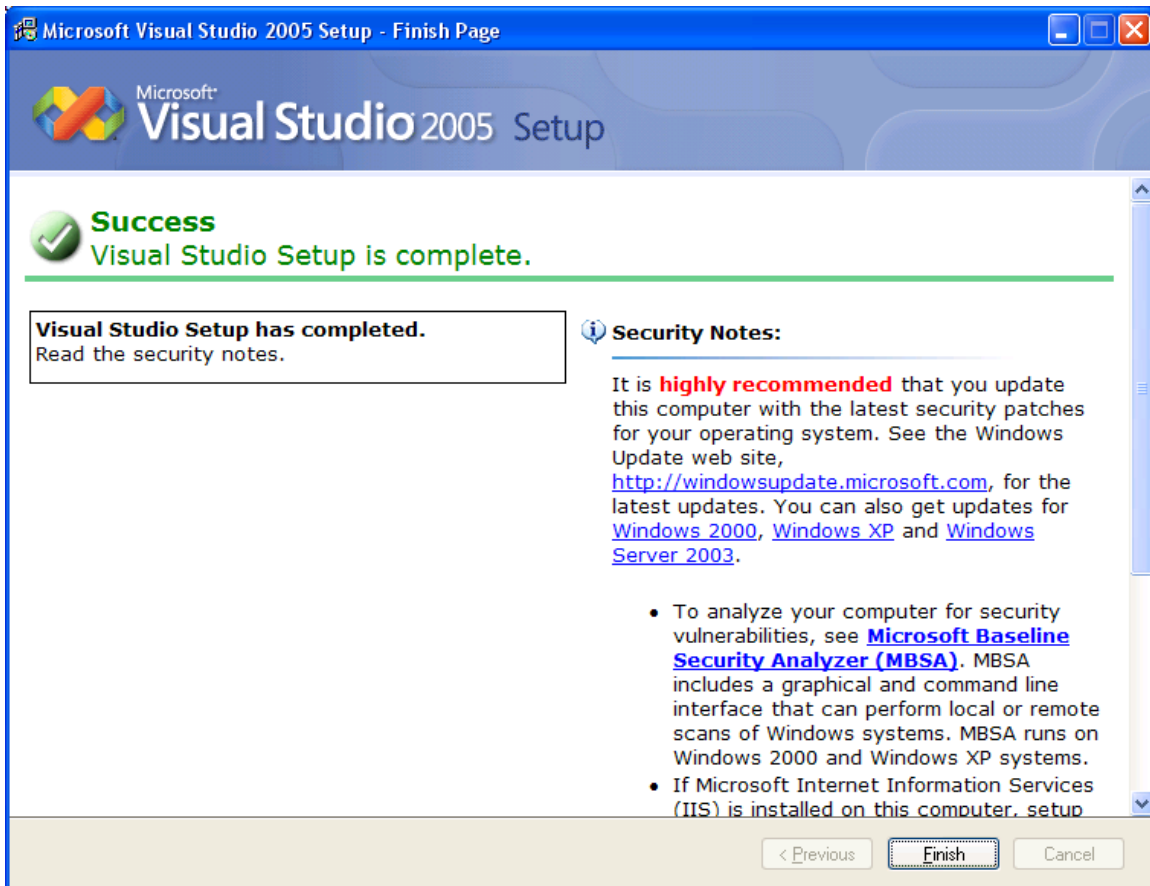
9. You will be asked to select which features to install. Select “Default”.
10. It is recommended to use the default “Product install path”. If this location is not appropriate for your PC, click the “Browse...” button and select a different install location.
11. Click the “Install” button.



12. Visual Studio 2005 will begin installing on your PC. This may take quite some time depending upon the performance capabilities of your PC.



13. You will receive a “Success” notification when the installation process has completed. Click the “Finish” button to return to the main “Visual Studio 2005 Setup” window.

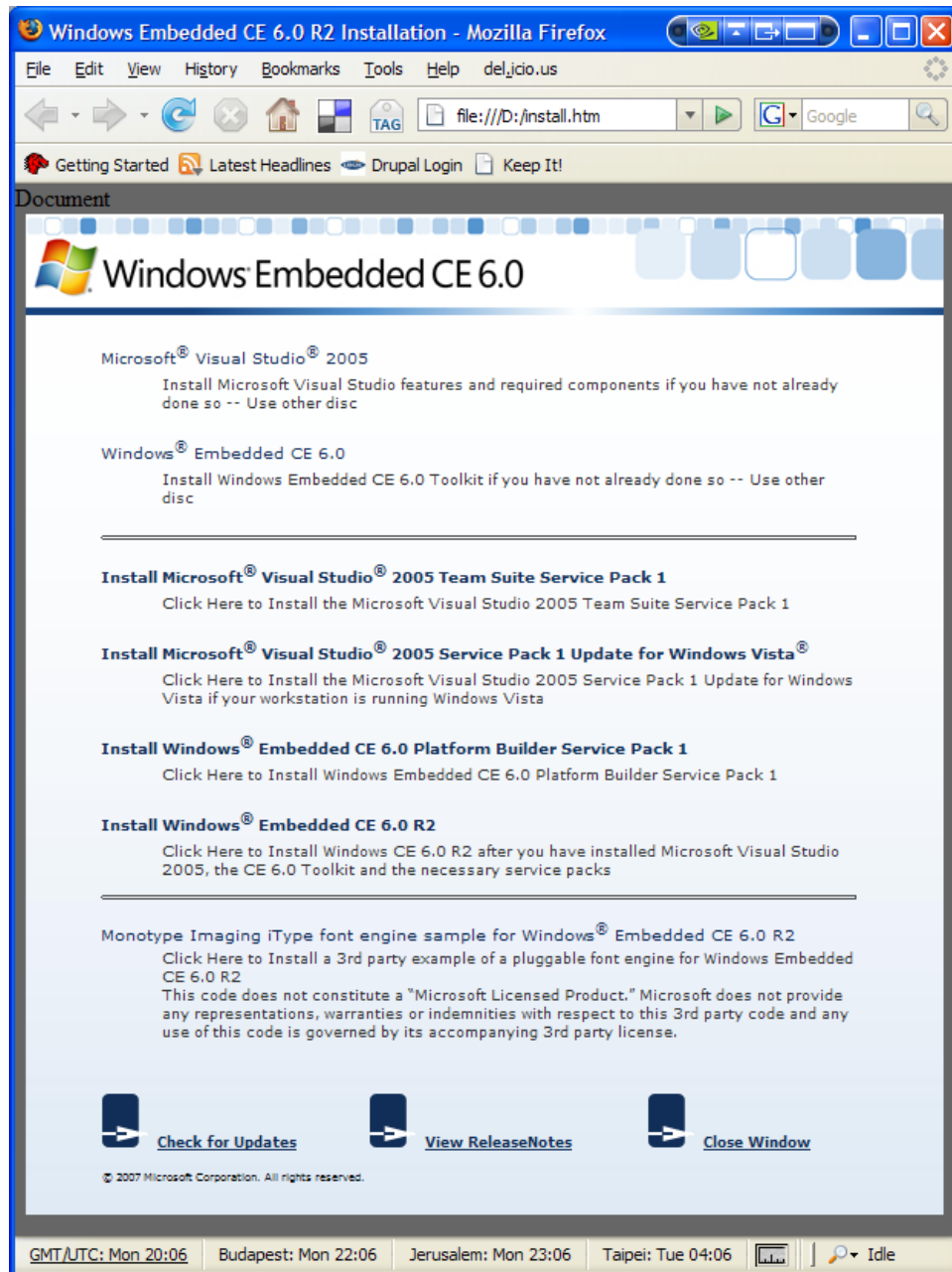


14. Click “Exit” and remove DVD from your PC.

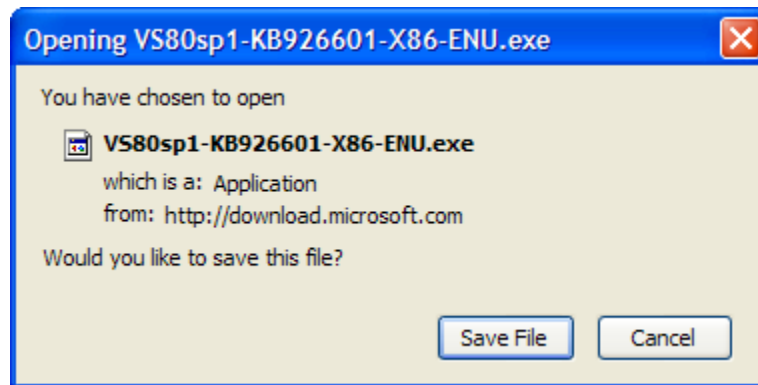


5.6 Install Visual Studio 2005 Service Pack 1

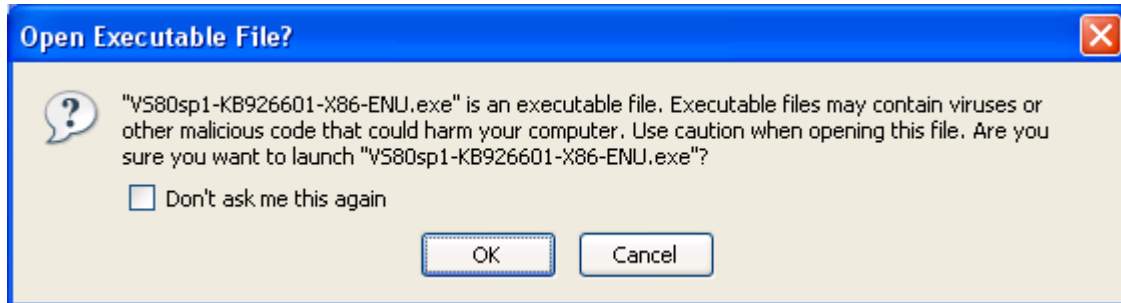
1. Insert the “Windows Embedded CE 6.0 R2” DVD into your PC.
2. A web browser window will open with the contents of the DVD.
3. Click on the line that states: “Click Here to Install the Microsoft Visual Studio 2005 Team Suite Service Pack 1”.



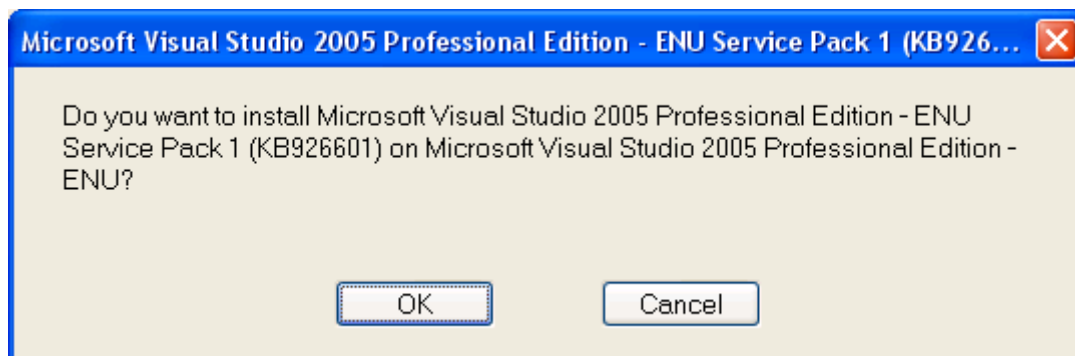
- Click the "Save File" button to save the download to your local drive.



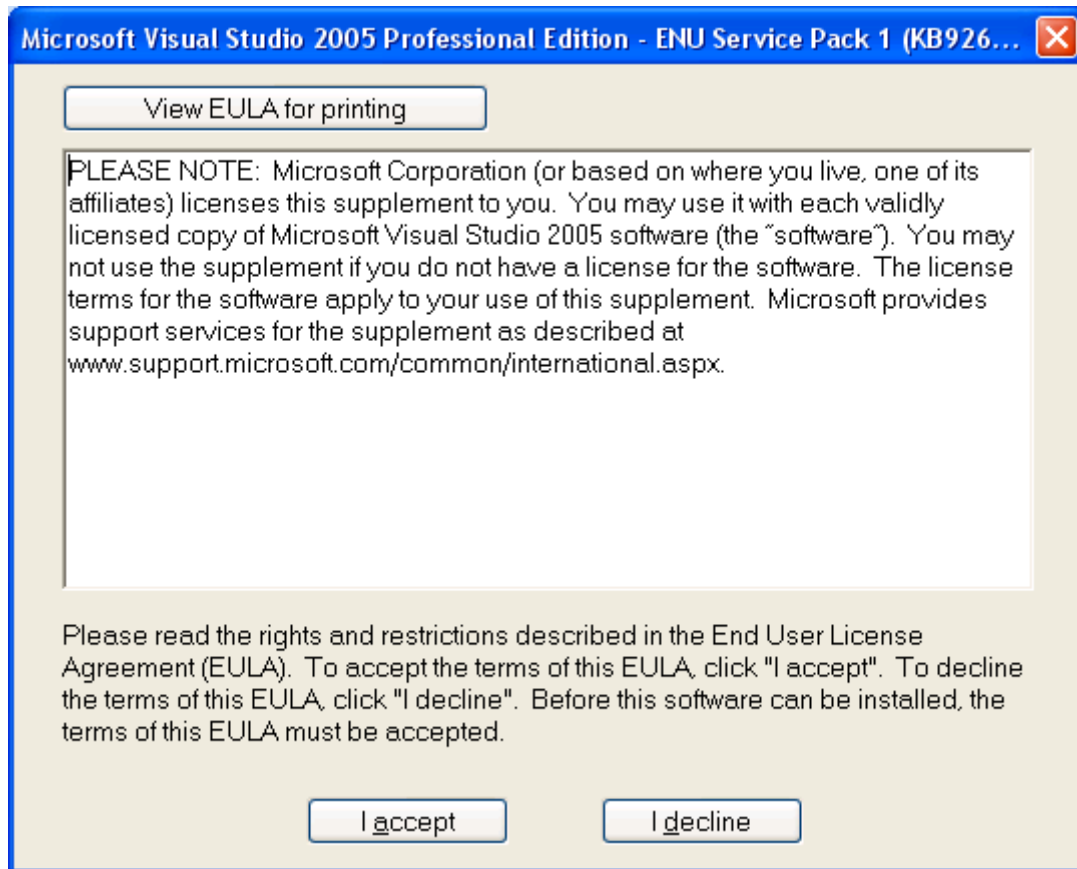
- After the download has completed, locate the .exe file on your local drive and double-click to open it.
- Click the "OK" button if warned about opening an executable file.



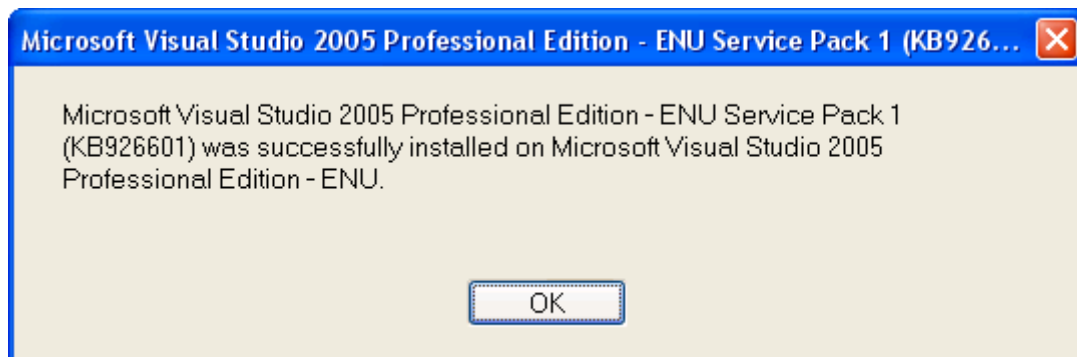
- The service pack update will extract itself and then ask if you want to install "ENU Service Pack 1". Click the "OK" button.



8. A window containing the End User License Agreement (EULA) will appear. Read the EULA and click the "I accept" button to continue.



9. ENU Service Pack 1 will install on your PC and you will receive a notification when installation has completed. Click the "OK" button to close the window.



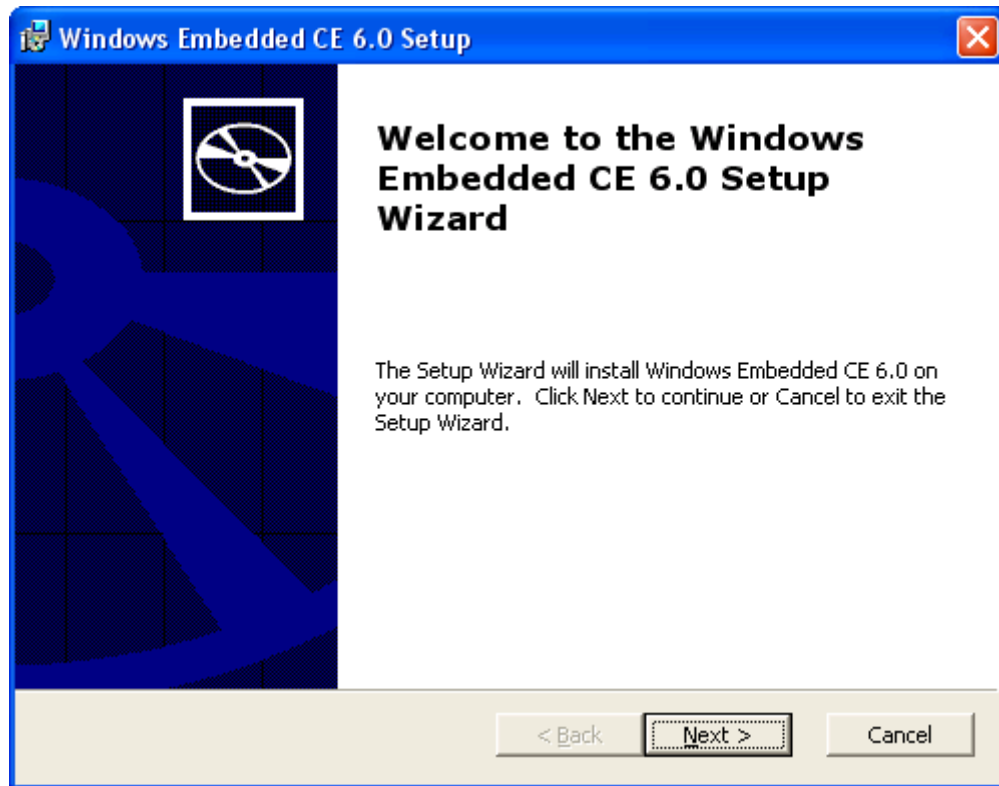
10. Remove the "Windows Embedded CE 6.0 R2" DVD from your PC's drive.

5.7 Install Platform Builder

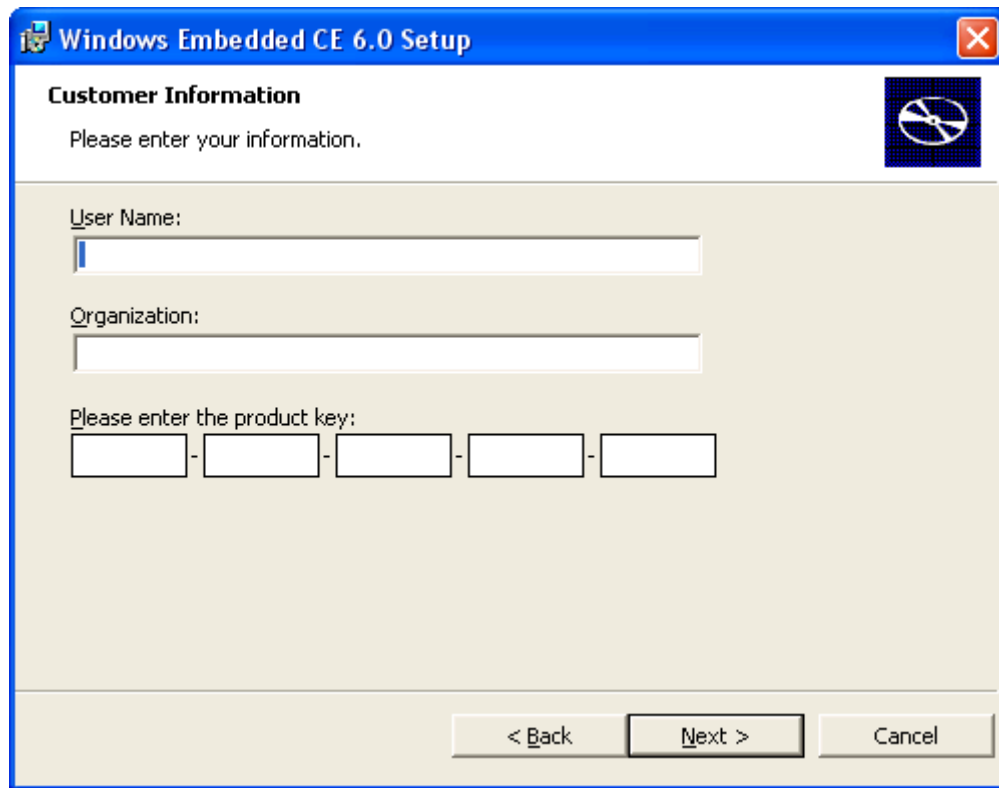
This section will describe how to install the Platform Builder Plug-in for Microsoft Visual Studio 2005.

1. Insert the DVD named "Windows Embedded CE 6.0" containing the "Platform Builder Plug-in for Microsoft Visual Studio 2005" into your PC's DVD drive.

2. When the "Welcome to the Windows Embedded CE 6.0 Setup Wizard" window appears, click the "Next>" button.



3. Enter your name and organization in the appropriate fields.
4. Enter the product key (obtained in Section 5.4 above) for Windows Embedded CE 6.0 in the appropriate fields.



The screenshot shows the 'Windows Embedded CE 6.0 Setup' window. The title bar is blue with the Windows logo and the text 'Windows Embedded CE 6.0 Setup'. The main area has a white background with the title 'Customer Information' and the instruction 'Please enter your information.' Below this are three input fields: 'User Name:', 'Organization:', and 'Please enter the product key:'. The product key field is a five-part box with hyphens. At the bottom are three buttons: '< Back', 'Next >', and 'Cancel'. A small icon of a CD-ROM is in the top right corner of the main area.

Windows Embedded CE 6.0 Setup

Customer Information

Please enter your information.

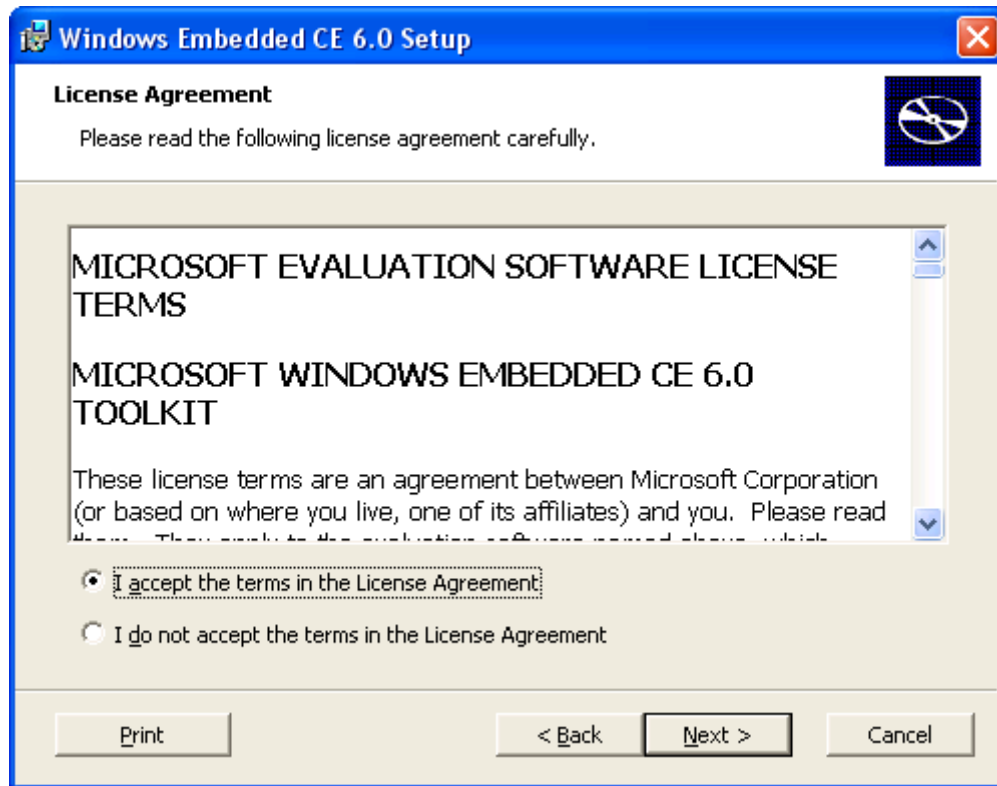
User Name:

Organization:

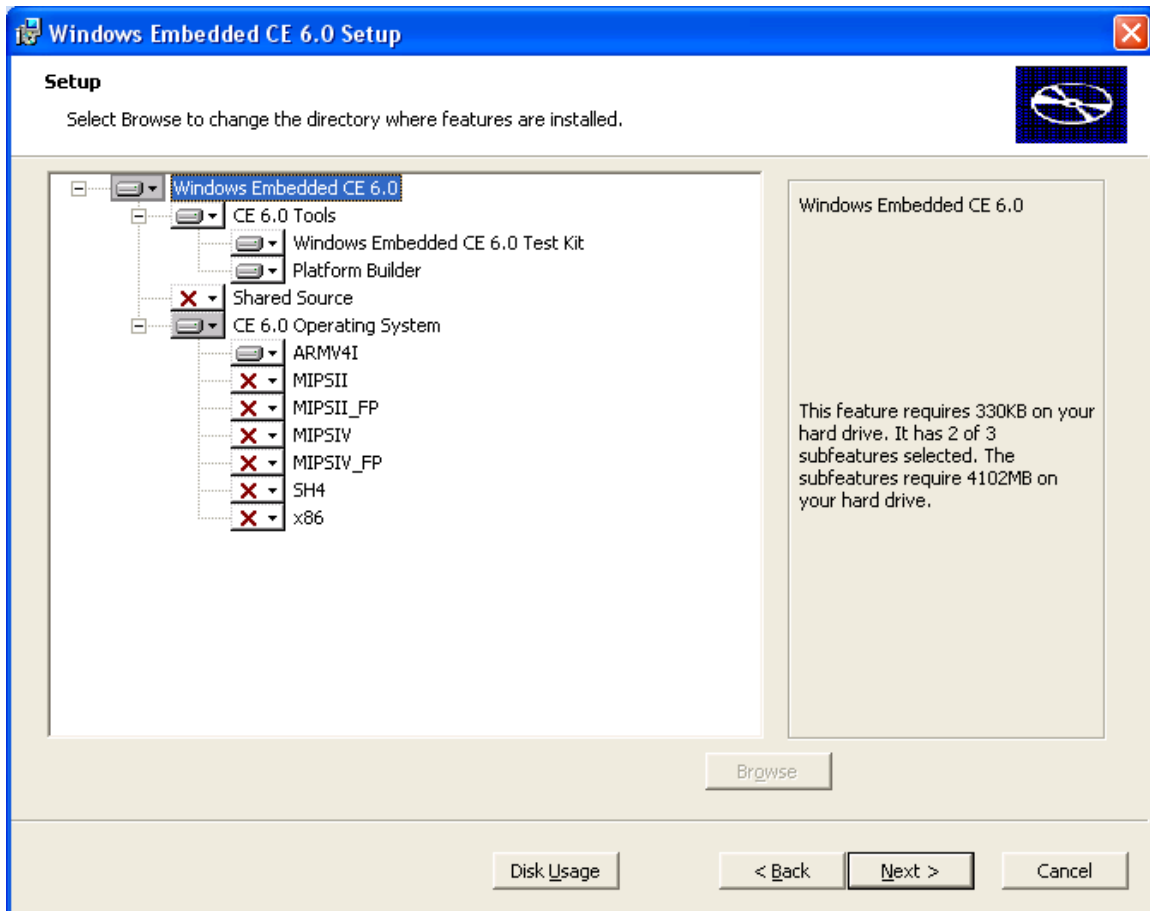
Please enter the product key:
 - - - -

< Back Next > Cancel

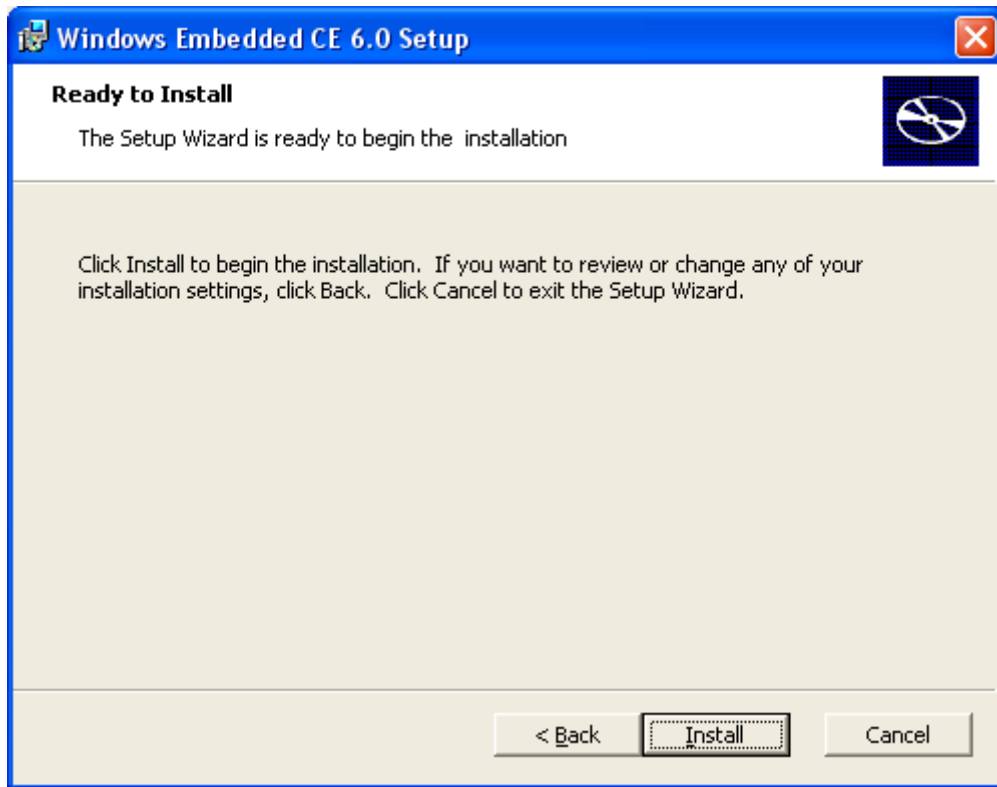
5. Read the License Agreement and select "I accept..." if you agree to the terms. Click the "Next>" button to continue.



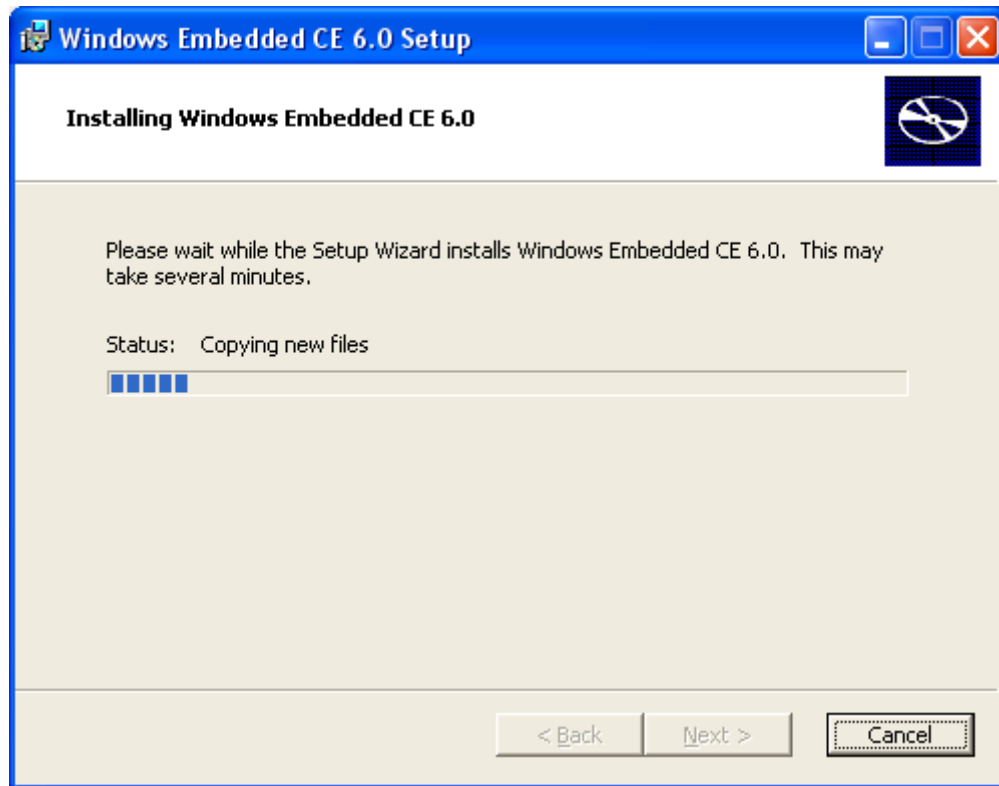
6. In the Setup window that appears, select the features that you want installed. By default, the "CE 6.0 Tools" ("Windows Embedded CE 6.0 Test Kit" and "Platform Builder") and the "CE 6.0 Operating System" for "ARMV4I" are selected. These default features are required for development.
7. Click the "Next>" button.



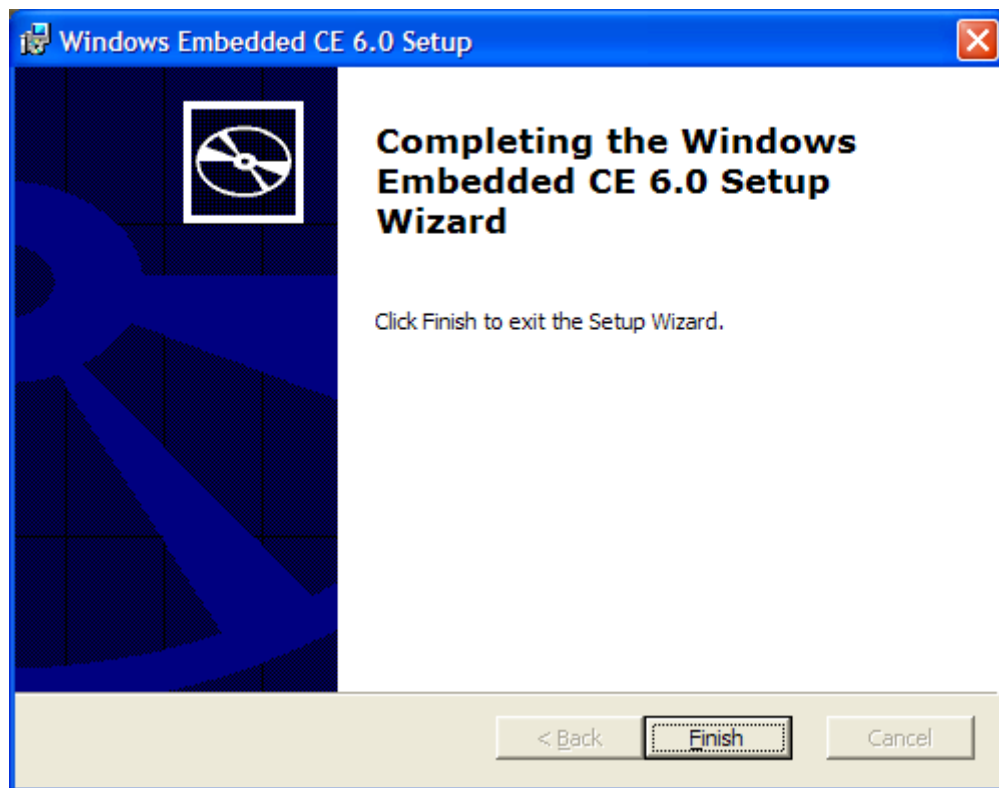
8. If your PC is missing any "Prerequisites" in order to complete the installation, a warning window will appear listing the missing components. Once your PC has all the prerequisites, a "Ready to Install" window will appear.
9. Click the "Install" button to begin the installation.



10. Windows Embedded CE 6.0 will begin installing on your PC. This may take quite some time depending upon the performance capabilities of your PC.



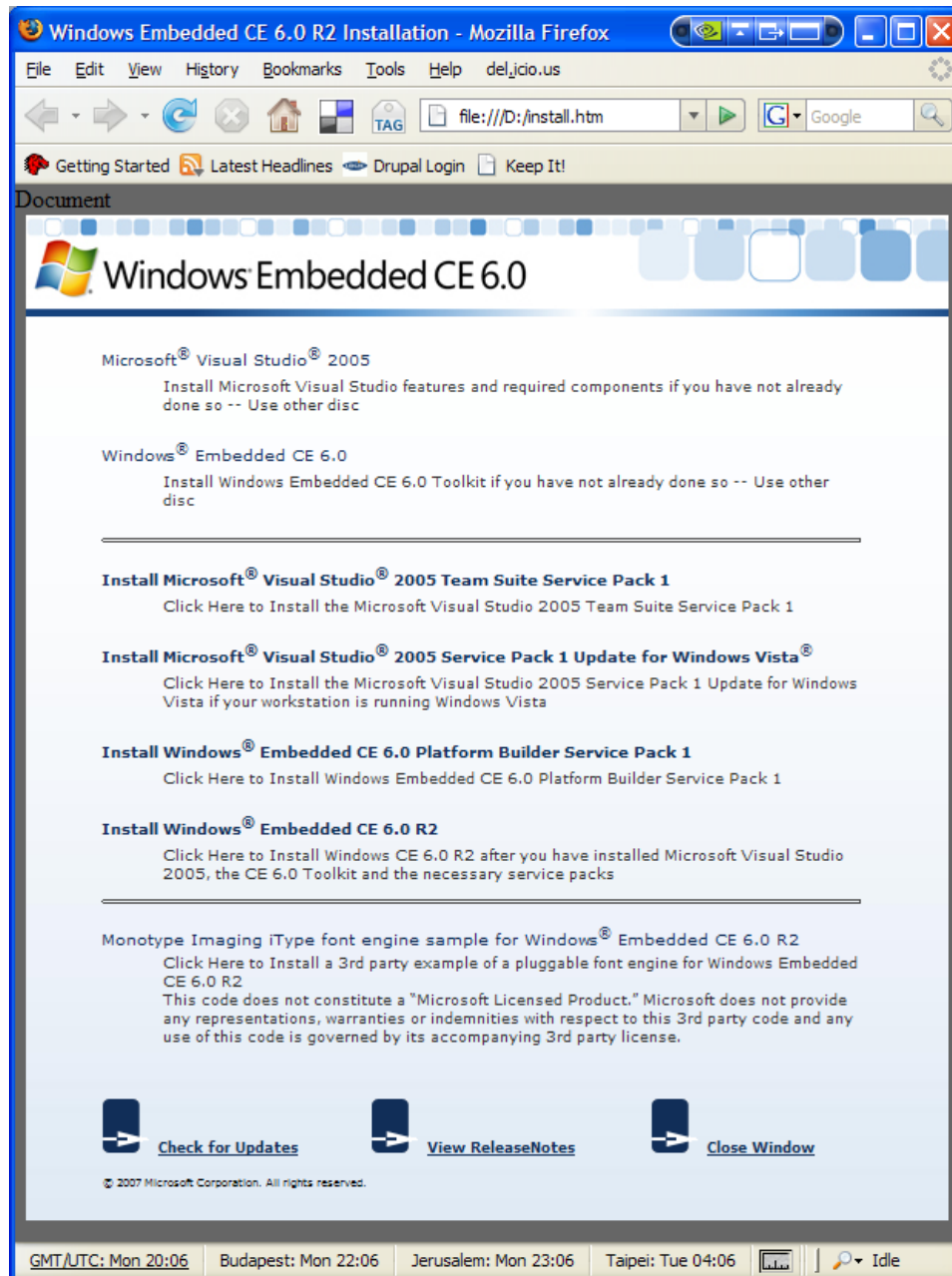
11. Click the "Finish" button to exit Windows Embedded CE 6.0 Setup.



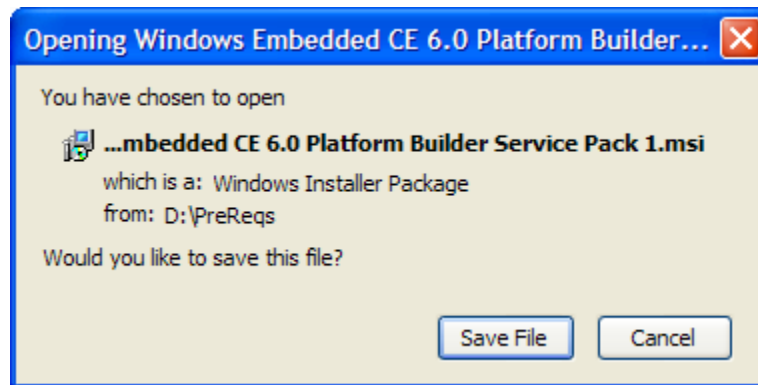
12. Remove the "Windows Embedded CE 6.0" DVD from your PC's drive.

5.8 Install Platform Builder Service Pack 1

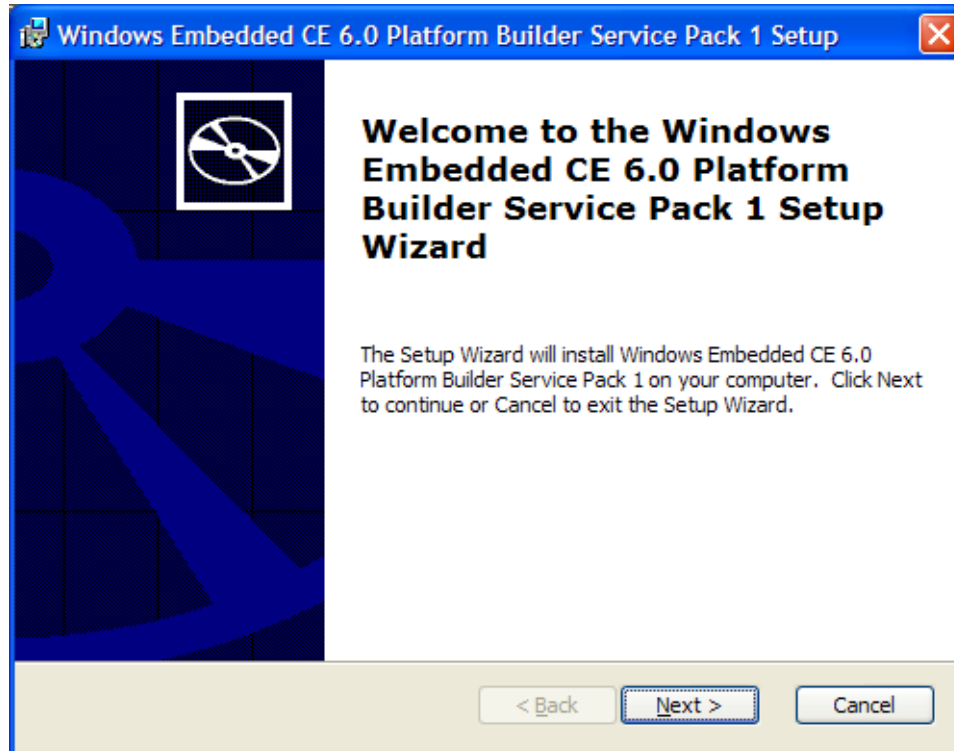
1. Once again, insert the "Windows Embedded CE 6.0 R2" DVD into your PC's drive.
2. A web browser window will open with the contents of the DVD.
3. Click on the line that states: "Click Here to Install Windows Embedded CE 6.0 Platform Builder Service Pack 1".



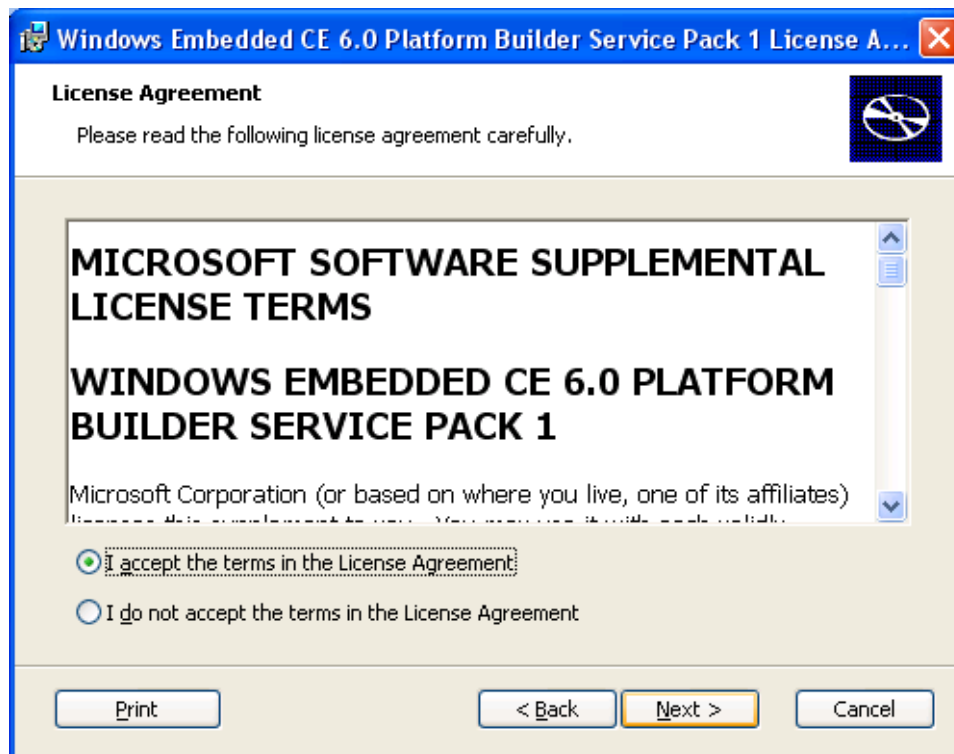
- Click the "Save File" button to save the download to your local drive.



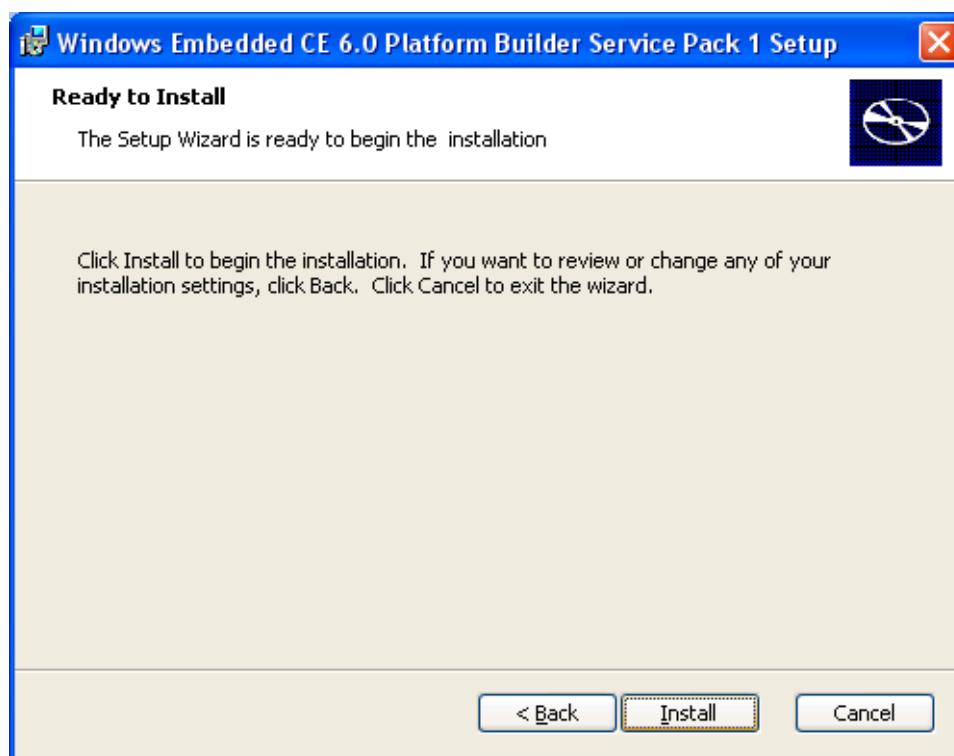
- After the download has completed, locate the .msi file on your local drive and double-click to open it.
- Click the "Next>" button to continue installation.



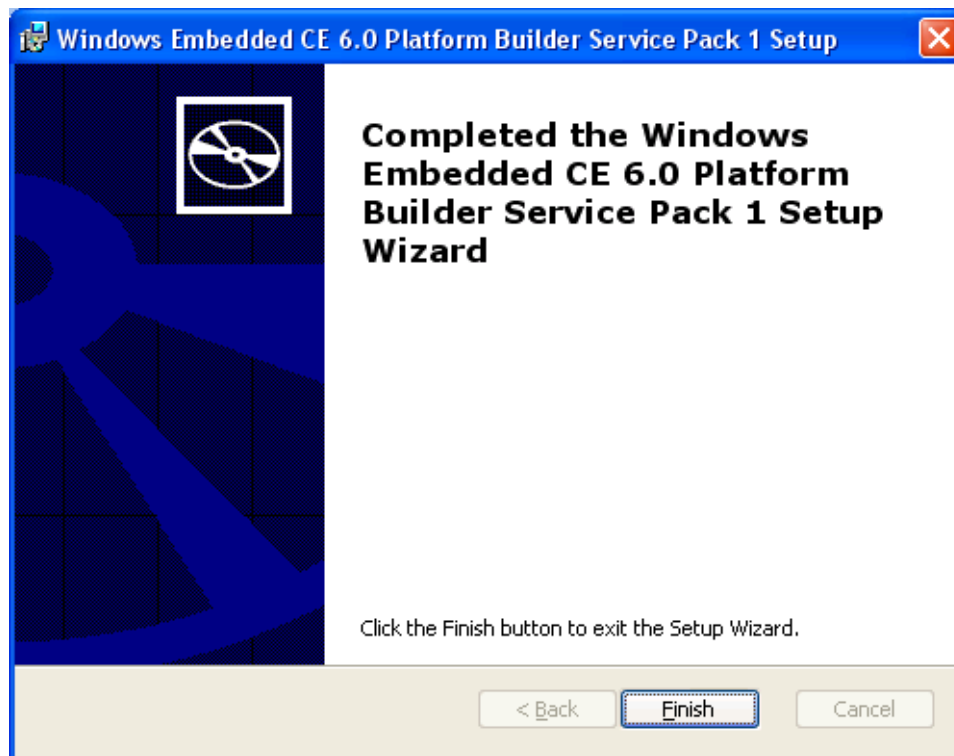
7. Read the License Agreement and select "I accept..." if you agree to the terms. Click the "Next>" button to continue.



8. Click the "Install" button to begin installing Platform Builder Service Pack 1.

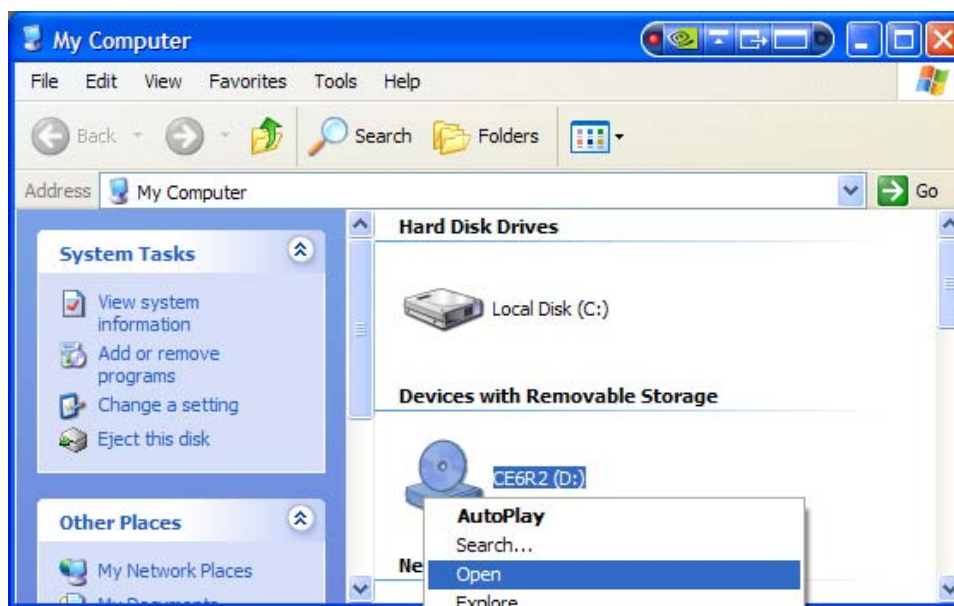


9. When the Service Pack has finished installing, you will see a “Completed” window. Click “Finish” to exit the Setup Wizard.

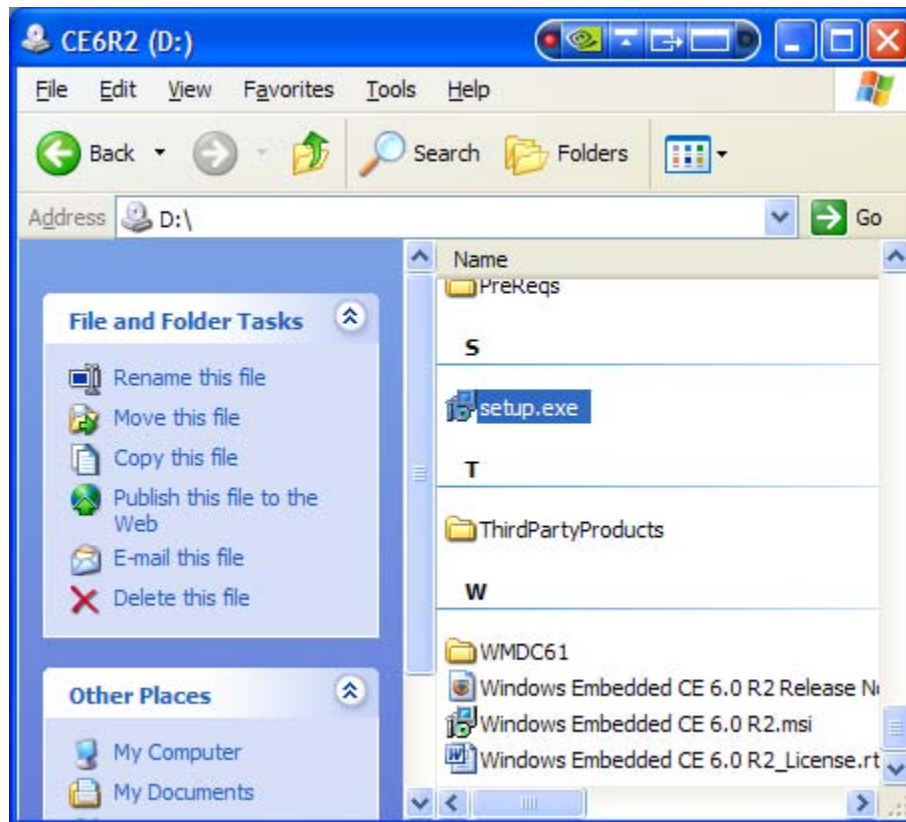


5.8.1 Install the Windows Embedded CE 6.0 R2 Update

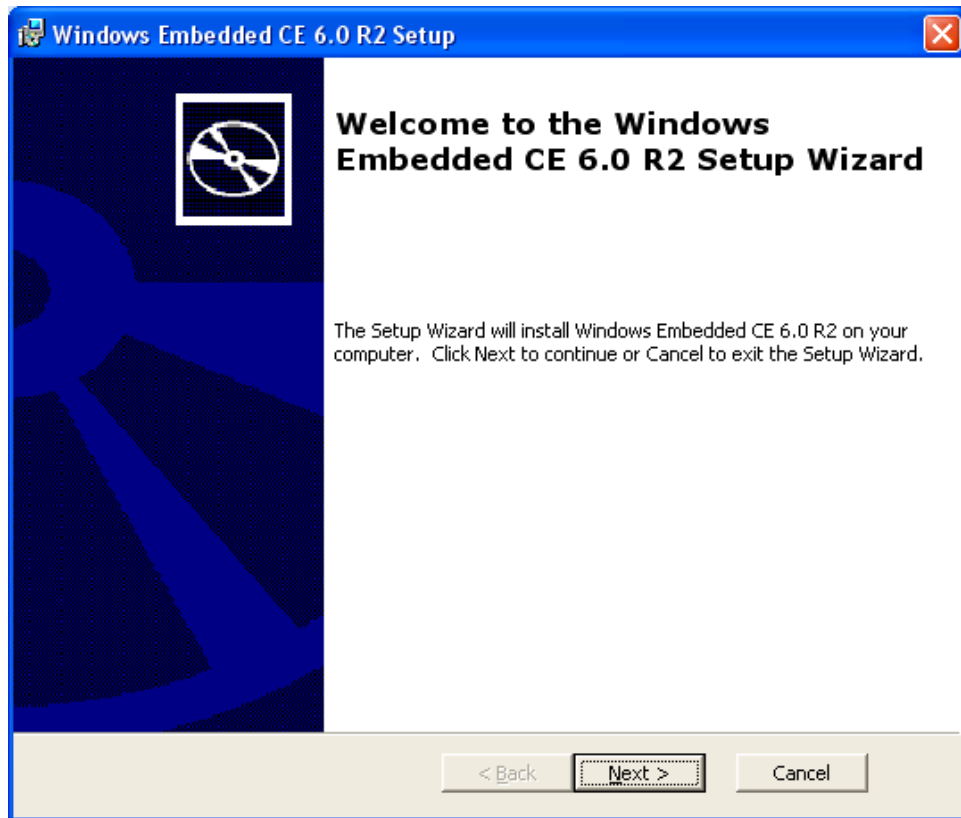
1. Navigate to “My Computer”. Right-click on DVD icon for “CE6R2” and select “Open” from the menu.



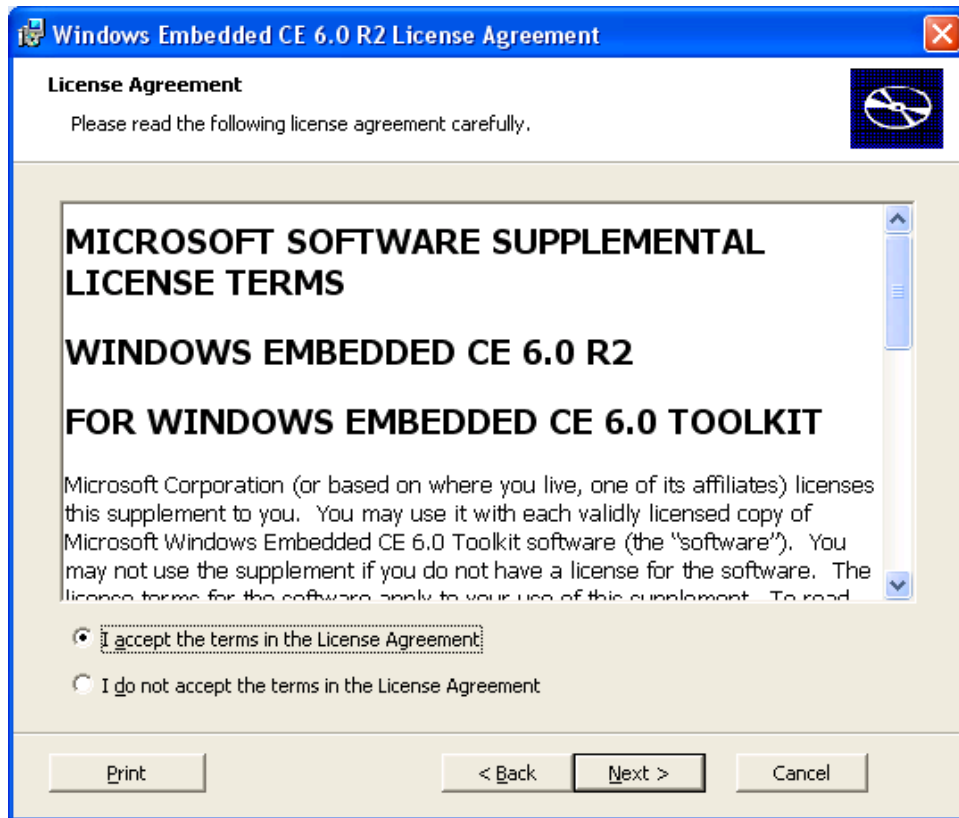
2. Locate the “setup.exe” file and double-click on it.



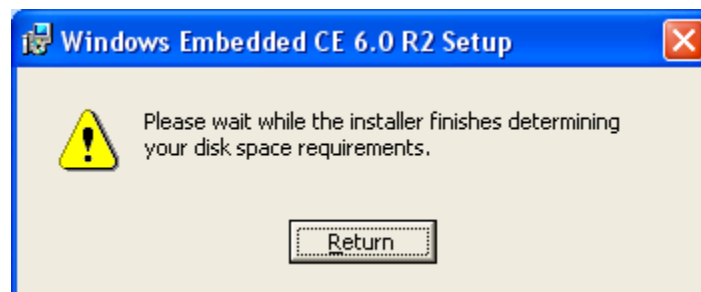
3. A "Welcome to the Windows Embedded CE 6.0 R2 Setup Wizard" window will appear. Click the "Next>" button to continue.



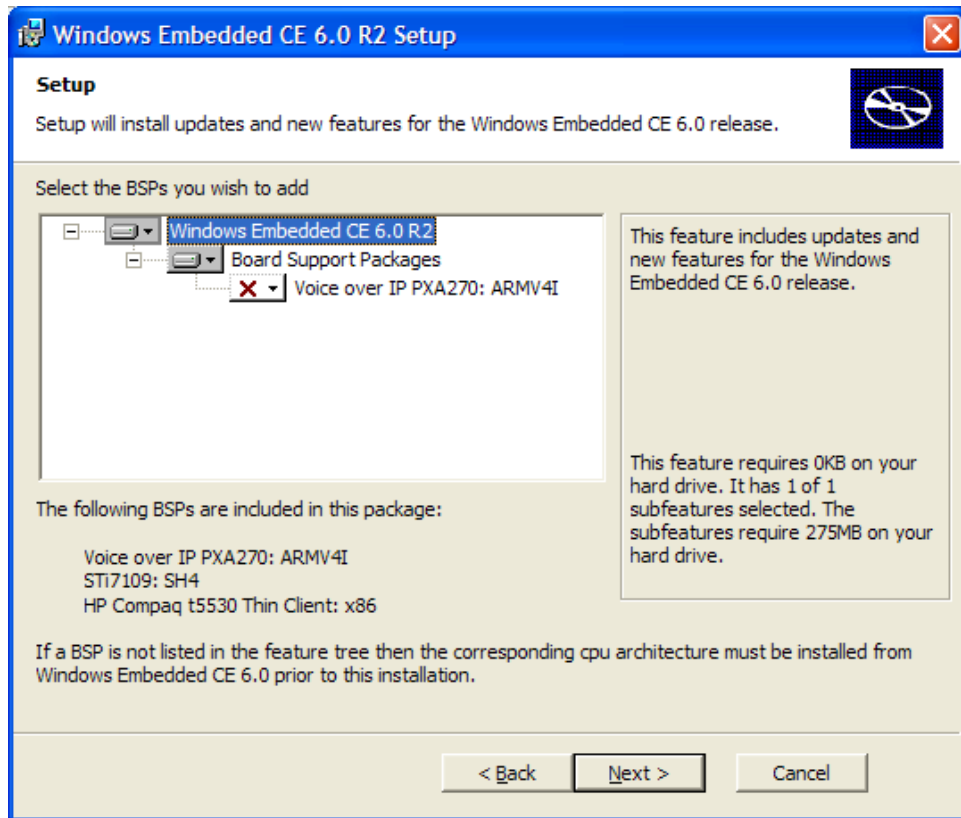
4. Read the License Agreement and check "I accept the terms in the License Agreement" if you agree to them. Click the "Next>" button to continue the setup process.



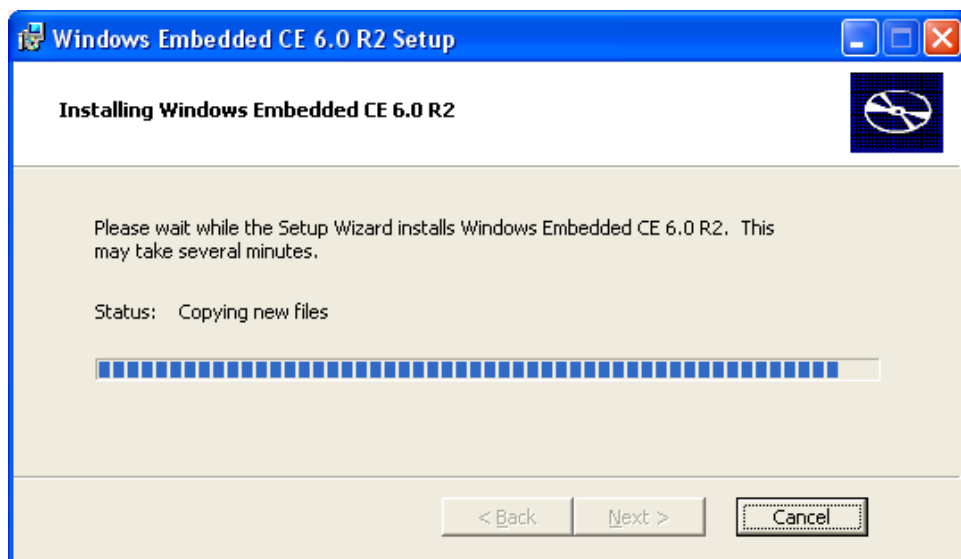
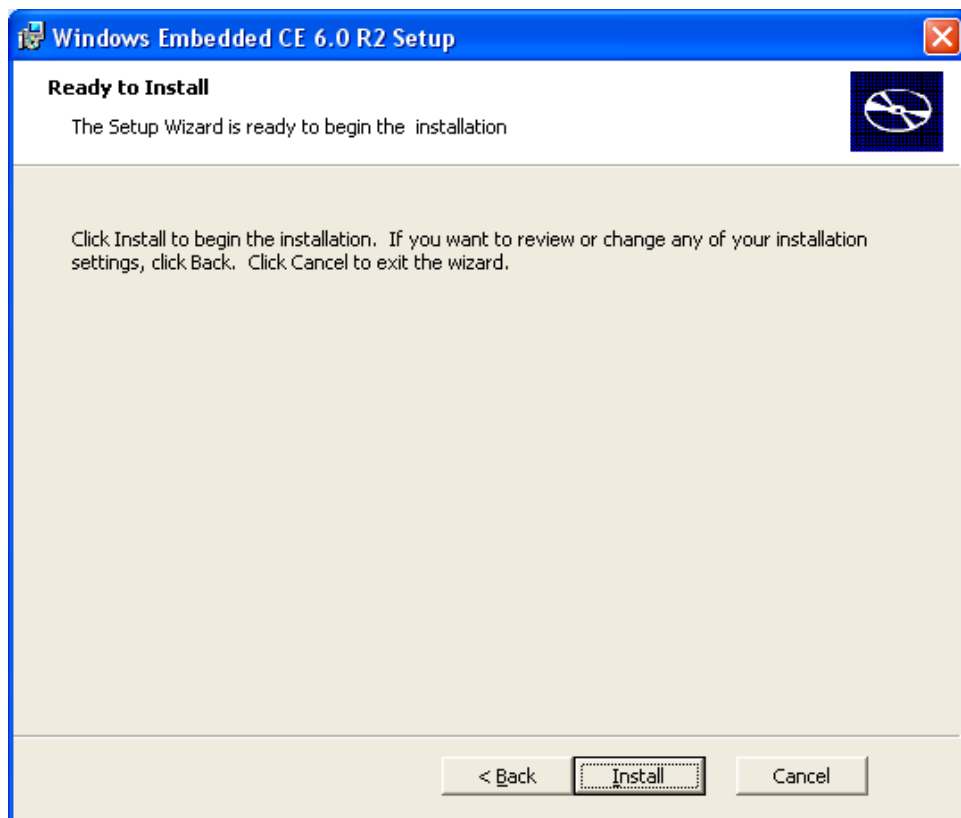
5. The Setup program has to determine the disk space requirements on your PC. There is no status window for this, so you may receive the following notice when you try to click "Next>".



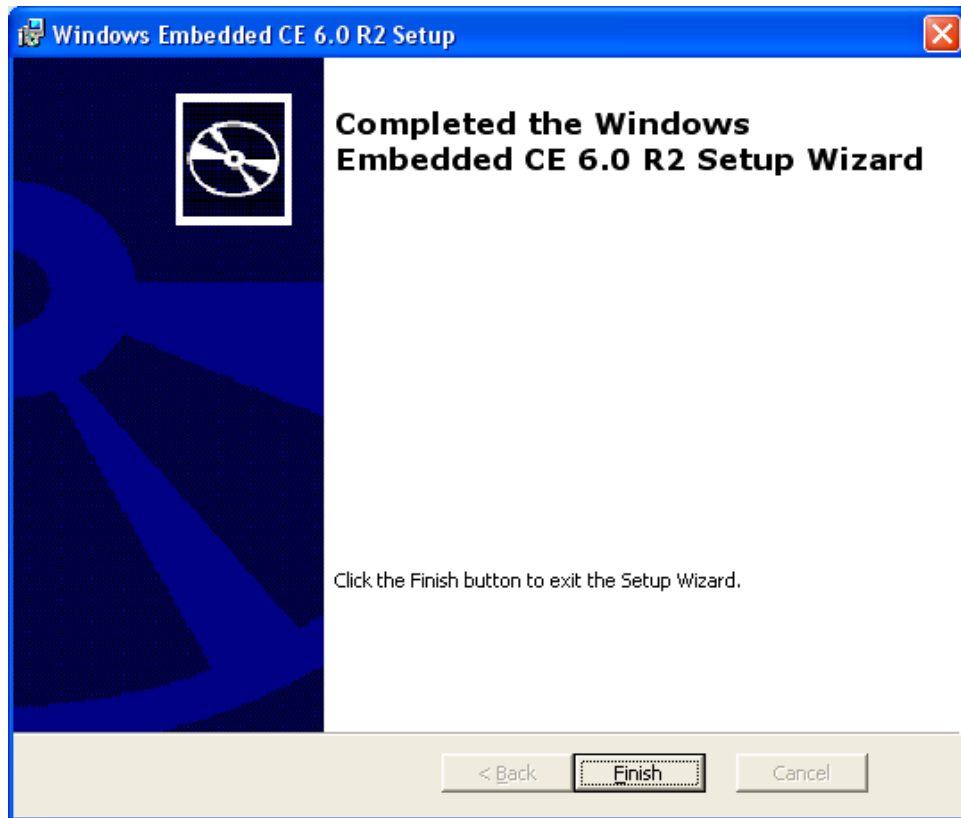
6. Eventually, the following screen will appear. Keep the defaults set as they are and click the "Next>" button.



7. Click the "Install" button to begin the installation process.



8. When the installation has concluded, a “Completed” window will appear. Click the “Finish” button to exit the Setup Wizard.

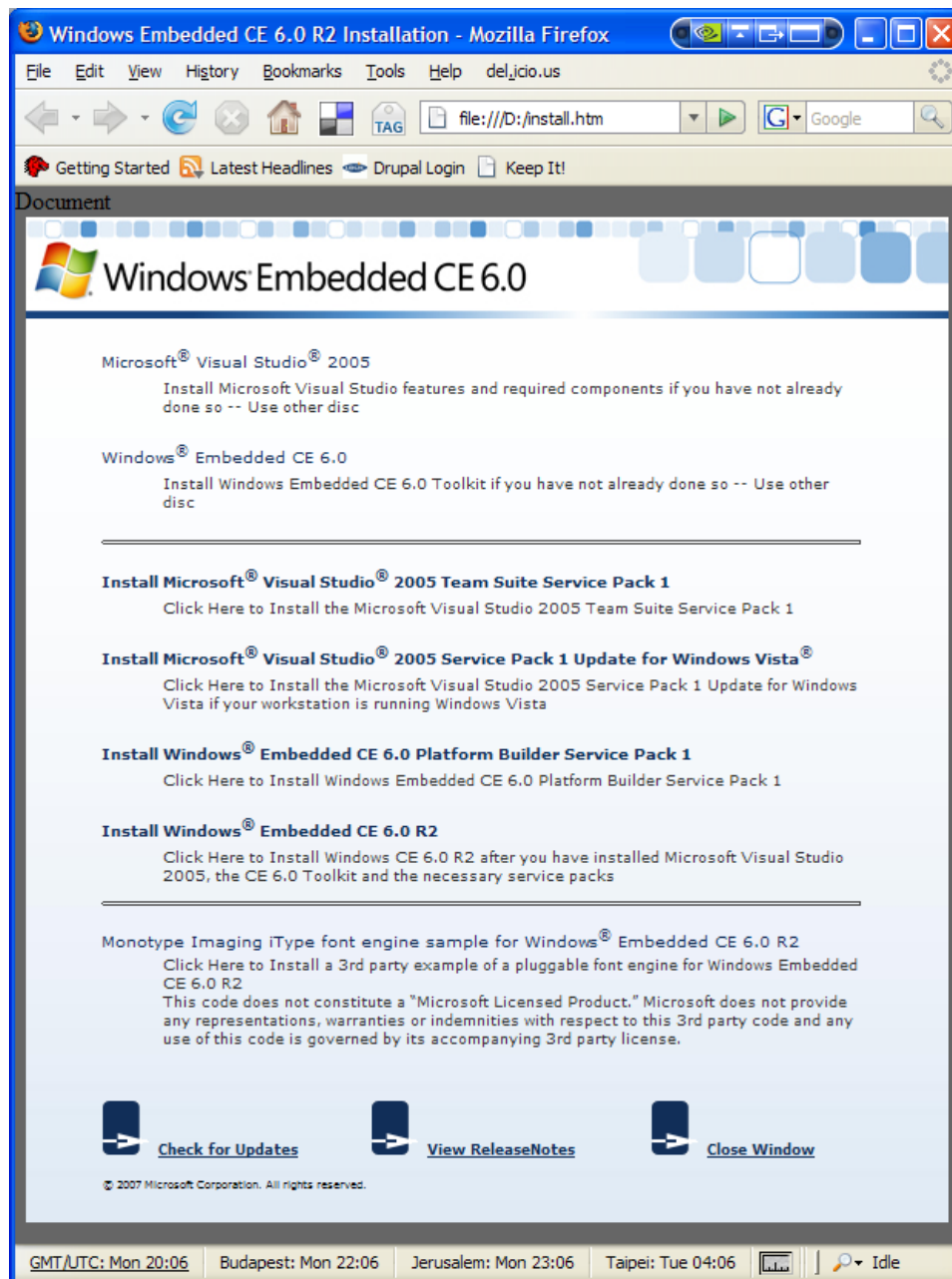


5.8.2 Use QFE Patches to Update Windows Embedded CE 6.0

This section will describe how to install Quick Fix Engineering (QFE) patches from Microsoft. Installing each QFE patch is a similar process, so we will only document the first patch and you can repeat the steps for each required QFE patch.

5.8.2.1 Download QFE Patches

1. Return to the web browser window that shows the contents of the DVD and click on the link to "Check for Updates".



2. You will be taken to Microsoft's Download Center website. Because there are several update files that will be required from Microsoft's website, we recommend that you

download all of the files to your local drive before actually running the updates. The following steps will explain the download process.

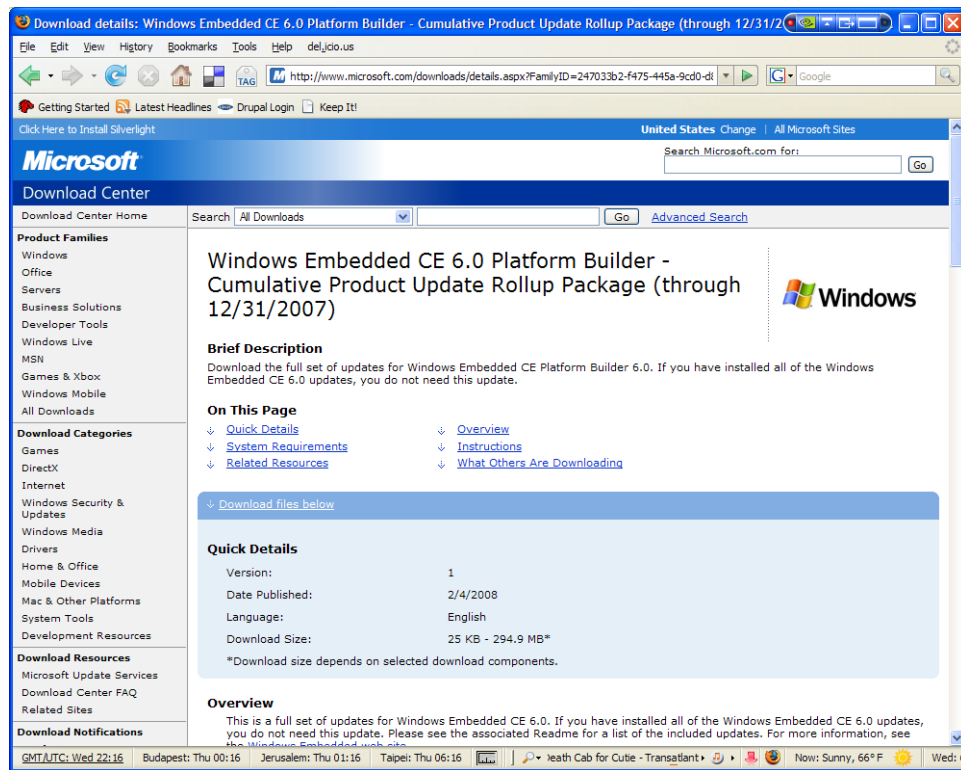
3. Locate “Windows Embedded CE 6.0 Platform Builder – Cumulative Product Update Rollup Package (through 12/31/2007)” and click on the link.

The screenshot shows the Microsoft Download Center search results for 'Windows Embedded CE 6.0 Platform Builder' in Mozilla Firefox. The browser window title is 'Microsoft Download Center Search Results - Mozilla Firefox'. The address bar shows the URL: 'http://www.microsoft.com/downloads/results.aspx?pcid=&freetext=windows%20ce%20'. The search results are displayed in a table with columns for the download name, release date, and download count.

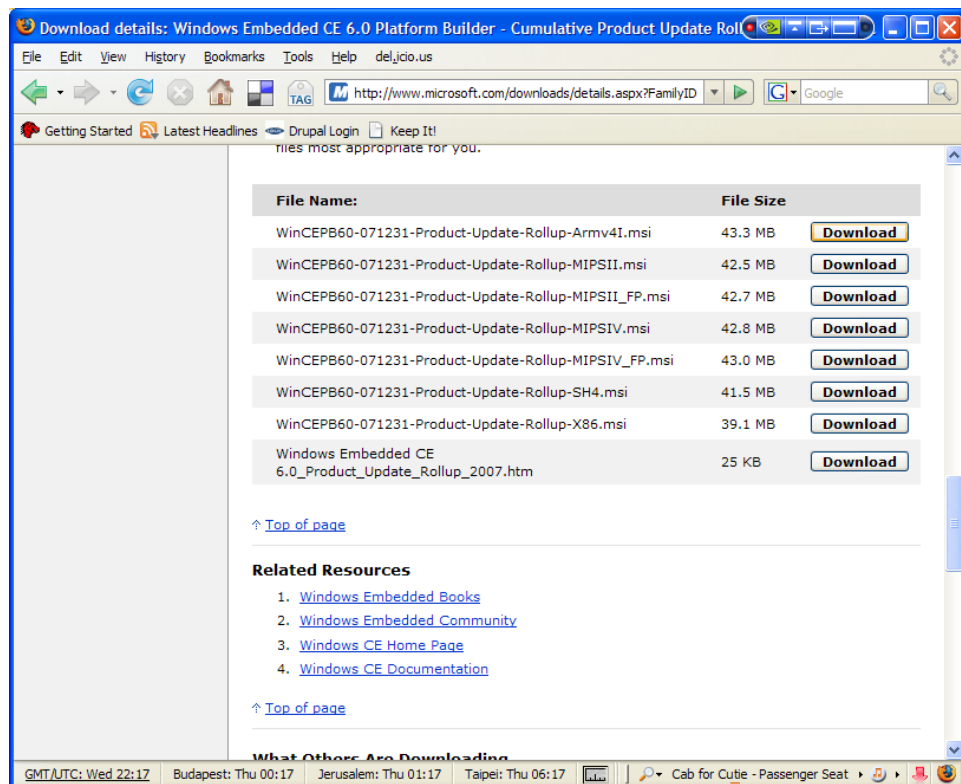
Download Name	Release Date	Download Count
Windows Embedded CE 6.0 Platform Builder Service Pack 1 The Windows Embedded CE 6.0 Platform Builder Service Pack 1 Tools helps address some areas of the Windows Embedded CE 6.0 toolkit impacted by Windows Vista™ enhancements and also helps improve other aspects of the toolkit.	4/30/2007	#1423
Windows Embedded CE 6.0 Monthly Update (March 2008) Download this set of updates for Windows Embedded CE 6.0 released during the period of March 1 - March 31, 2008. These updates are fixes for Windows Embedded CE operating system problems you run into during the development and maintenance of your custom platform.	4/8/2008	#2000
Windows Embedded CE 6.0 Platform Builder - Cumulative Product Update Rollup Package (through 12/31/2007) Download the full set of updates for Windows Embedded CE Platform Builder 6.0. If you have installed all of the Windows Embedded CE 6.0 updates, you do not need this update.	2/4/2008	#2244
Windows Embedded CE 6.0 Monthly Update (February 2008) Download this set of updates for Windows Embedded CE 6.0 released during the period of February 1 - February 29, 2008. These updates are fixes for Windows Embedded CE operating system problems you run into during the development and maintenance of your custom platform.	5/12/2008	#2555
Windows Embedded CE 6.0 Monthly Update (January 2008) Download this set of updates for Windows Embedded CE 6.0 released during the period of January 1 - January 31, 2008. These updates are fixes for Windows Embedded CE operating system problems you run into during the development and maintenance of your custom platform.	2/12/2008	#2689
Windows Embedded CE 6.0 Monthly Update (April 2008) Download this set of updates for Windows Embedded CE 6.0 released during the period of April 1 - April 30, 2008. These updates are fixes for Windows Embedded CE operating system problems you run into during the development and maintenance of your custom platform.	5/13/2008	#2783

The left sidebar contains links for 'Getting Started', 'Latest Headlines', 'Download Notifications', 'Worldwide Downloads', and 'Microsoft Dynamics'. The bottom status bar shows the time and date for various locations: GMT/UTC: Wed 22:14, Budapest: Thu 00:14, Jerusalem: Thu 01:14, Taipei: Thu 06:14, and a weather forecast for Sunny, 66°F.

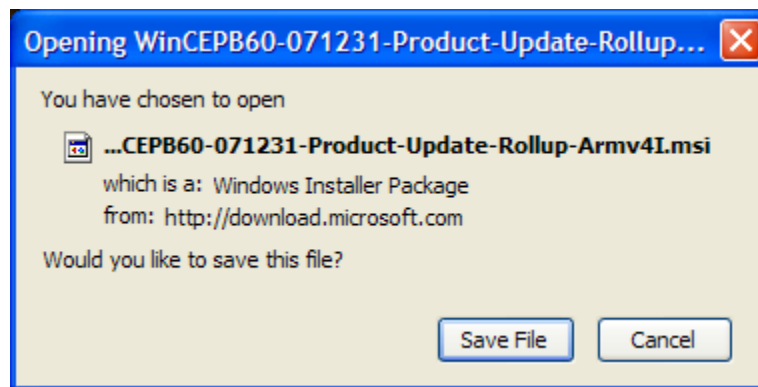
4. Click on the “Download files below” link.



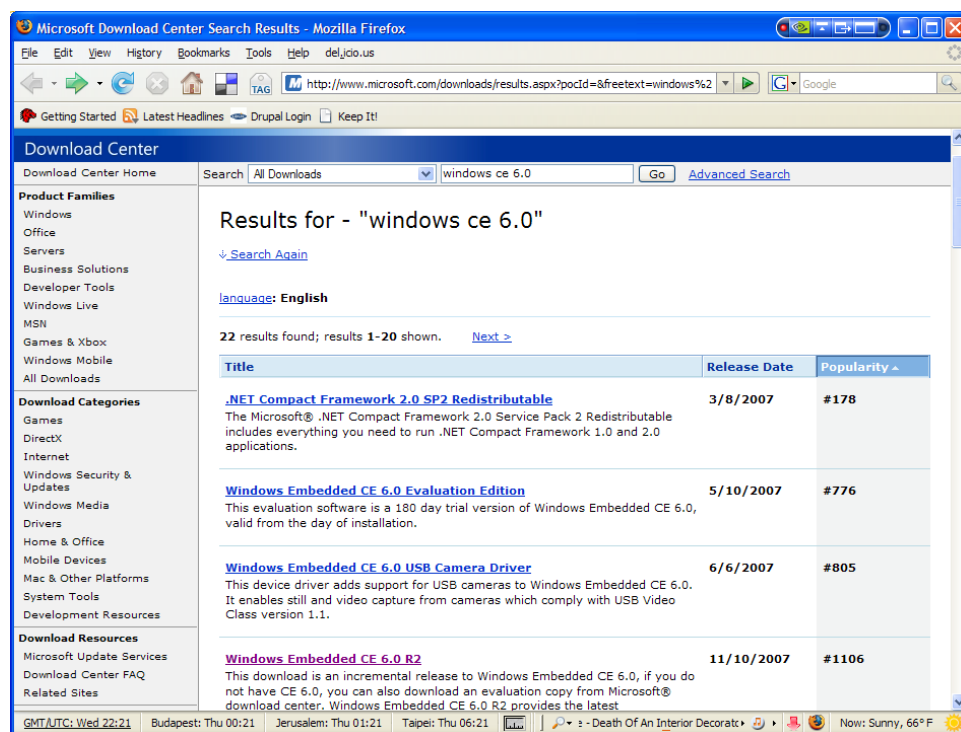
5. Locate the file named “WinCEPB60-071231-Product-Update-Rollup-Armv4I.msi” and click on the “Download” button next to the file name.



6. Click “Save File” to download the update file to your local drive.



7. Once that file has finished downloading, use the back button in your web browser to return to the Microsoft Download Center page with “Results for – ‘windows ce 6.0’” displayed.



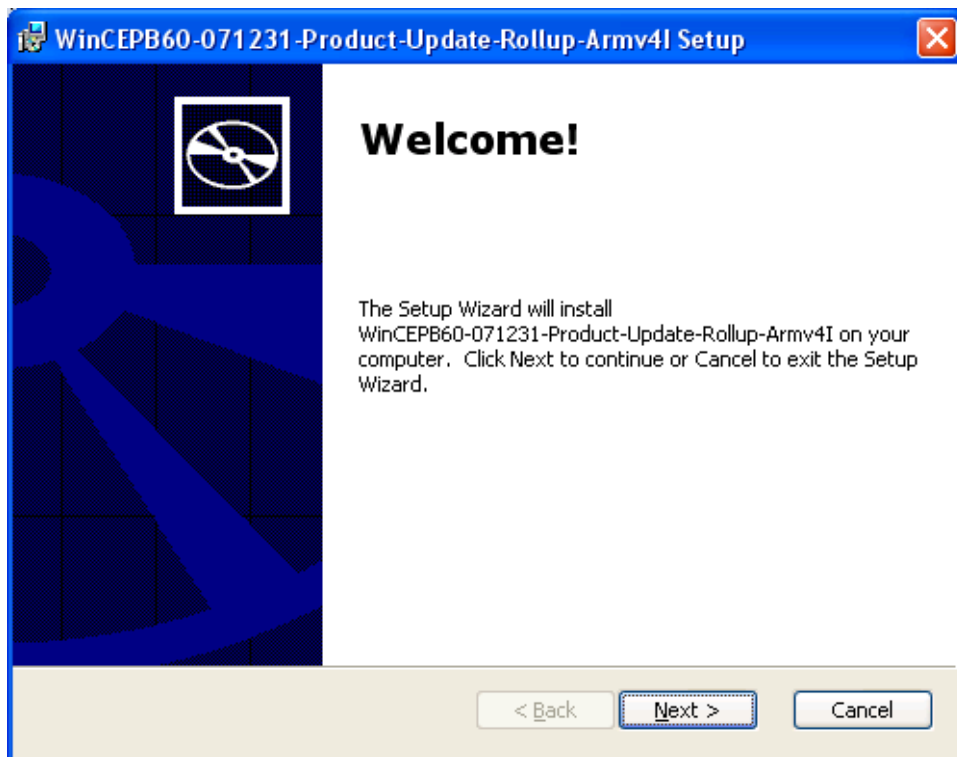
8. Repeat Steps 3 through 6 until all of the following update files have been downloaded to your local drive:
- Windows Embedded CE 6.0 Monthly Update (January 2008)
 - Click the “Download” button next to file name: WinCEPB60-080131-2008M01-Armv4I.msi
 - Windows Embedded CE 6.0 Monthly Update (February 2008)
 - Click the “Download” button next to file name: WinCEPB60-080229-2008M02-Armv4I.msi
 - Windows Embedded CE 6.0 Monthly Update (March 2008)
 - Click the “Download” button next to file name: WinCEPB60-080331-2008M03-Armv4I.msi

- Windows Embedded CE 6.0 Monthly Update (April 2008)
 - Click the “Download” button next to file name: WinCEPB60-080430-2008M04-Armv4I.msi

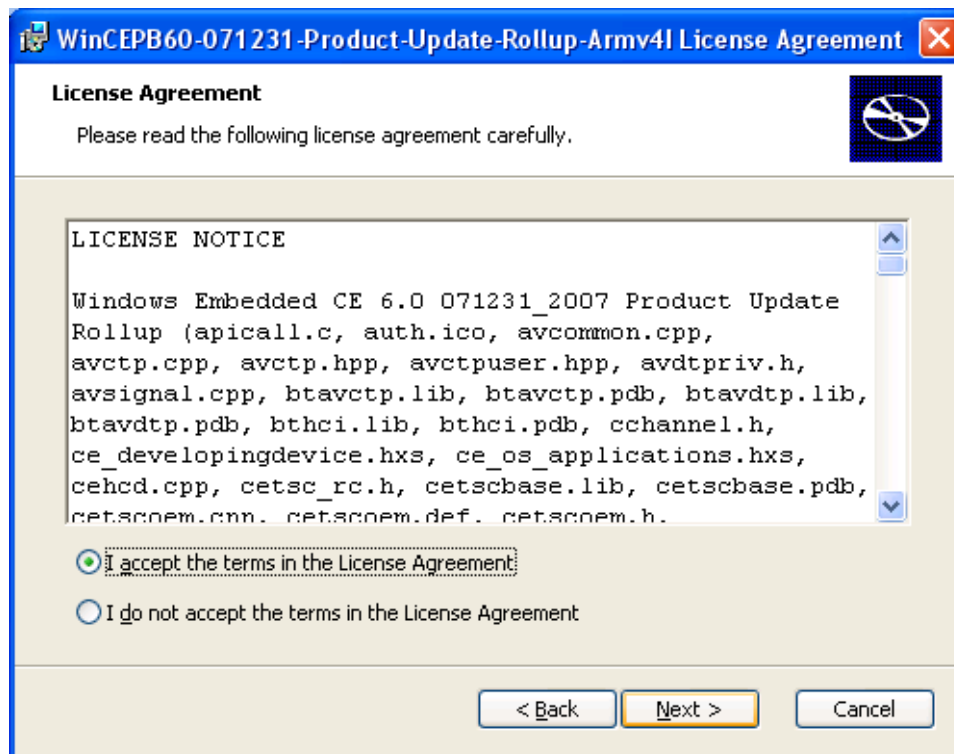
Important Note: More QFE patches may be required depending on the BSP source you are using. Please refer to the “lpd_omap35x_source_readme.txt” file included with Logic’s Windows CE source BSP download to see which QFE patches are required. More information about Logic’s Windows CE source BSP will be covered in the next section of this document.

5.8.2.2 Install the QFE Patches

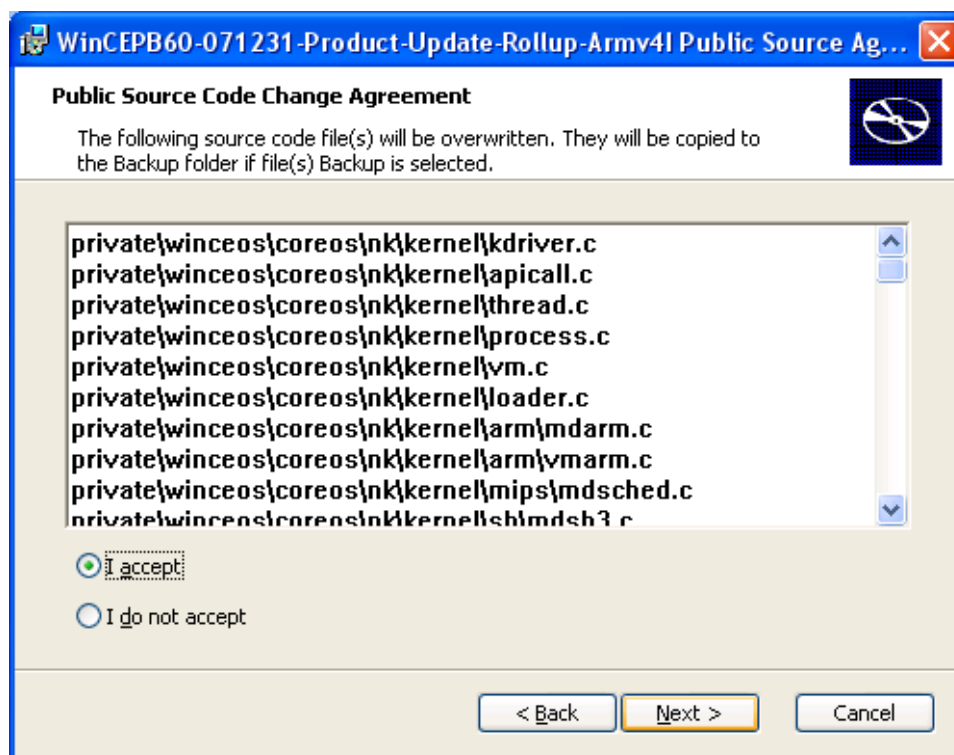
1. On your local drive where you saved all the downloads from Microsoft’s website, locate the “WinCEPB60-071231-Product-Update-Rollup-Armv4I.msi” file and double-click on it to begin installing the Cumulative Product Update Rollup for 2007.
2. Click the “Next>” button to continue.



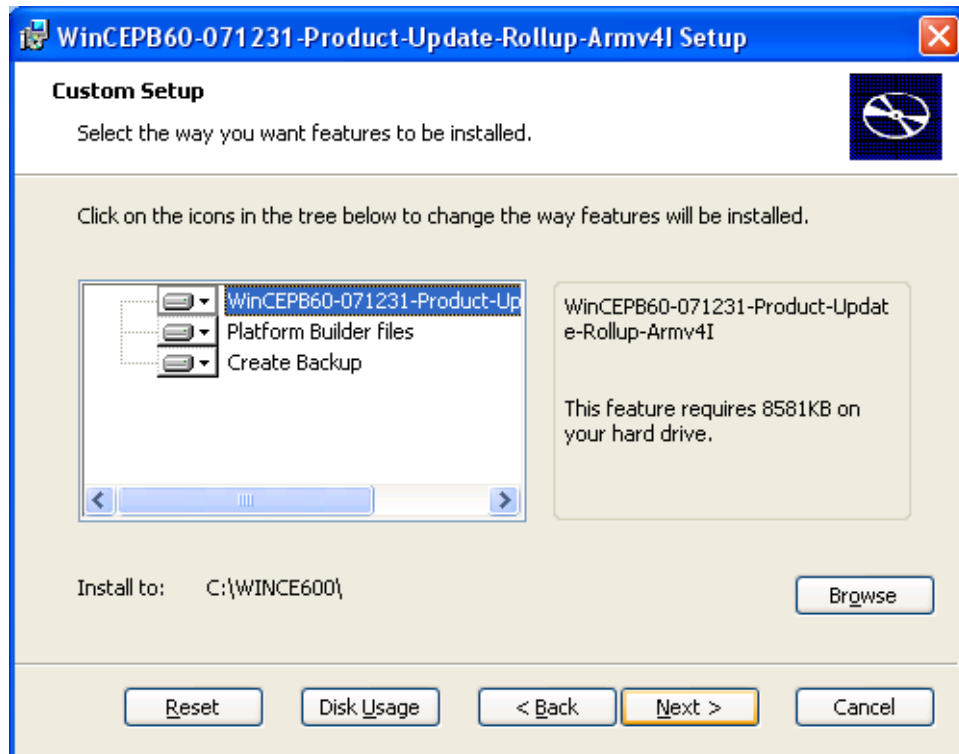
3. Read the License Agreement and check "I accept the terms of the License Agreement" if you agree. Click the "Next>" button to continue.



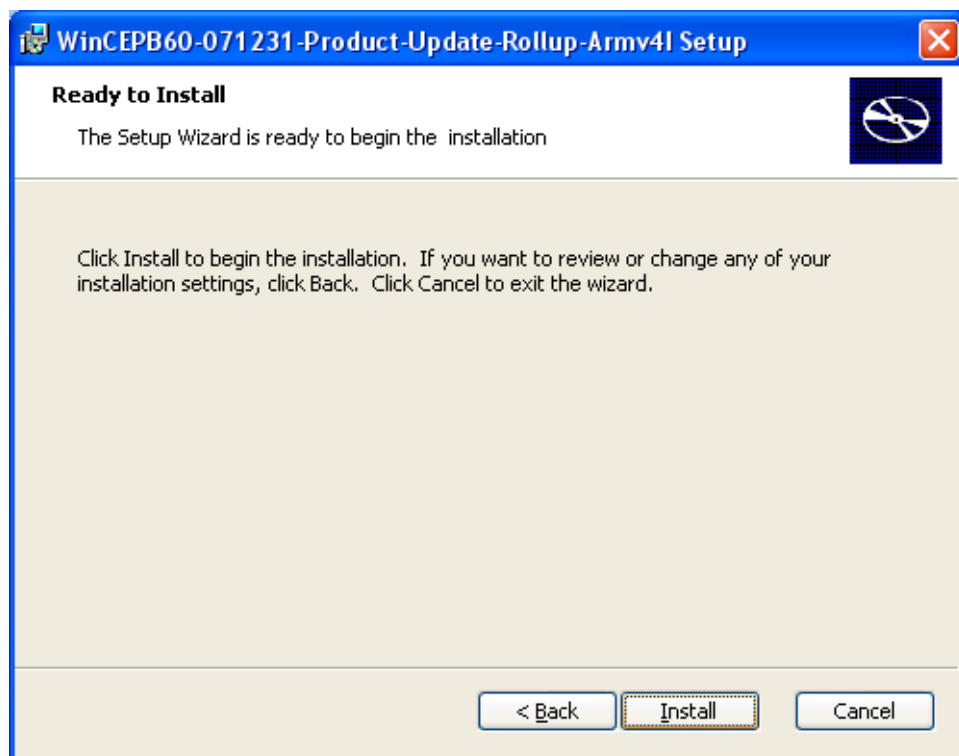
4. You will be notified of the source code files that will be overwritten during this installation process. Check "I accept" and click the "Next>" button to continue.

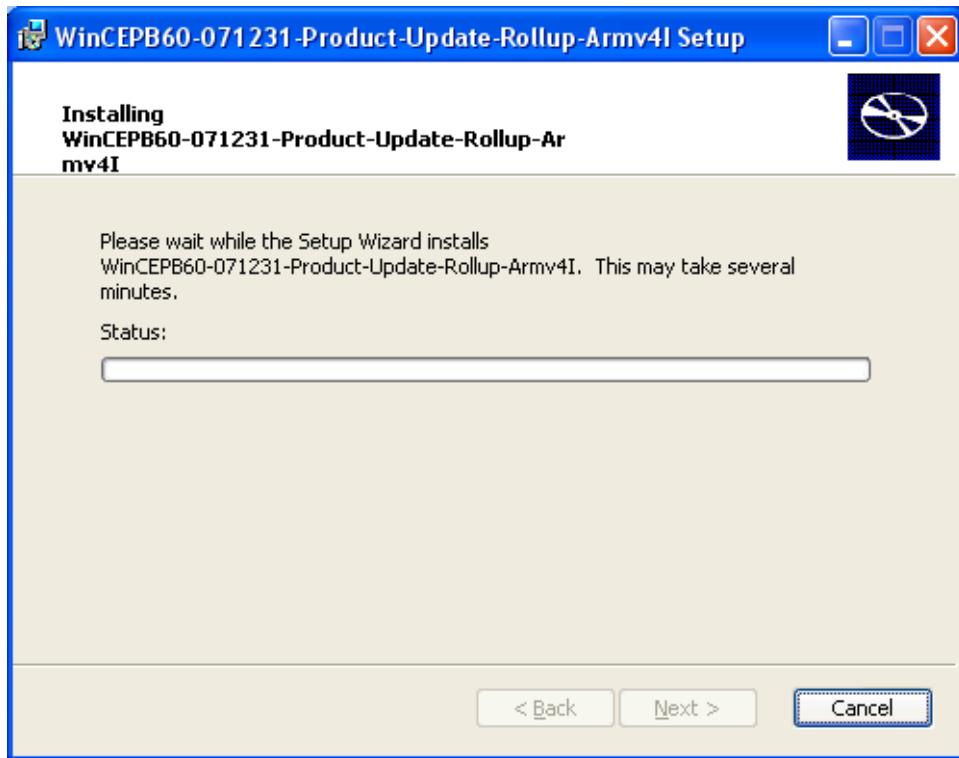


5. You will be presented with the option to customize the installation. We recommend you keep the defaults set as they are. Click the “Next>” button to continue.

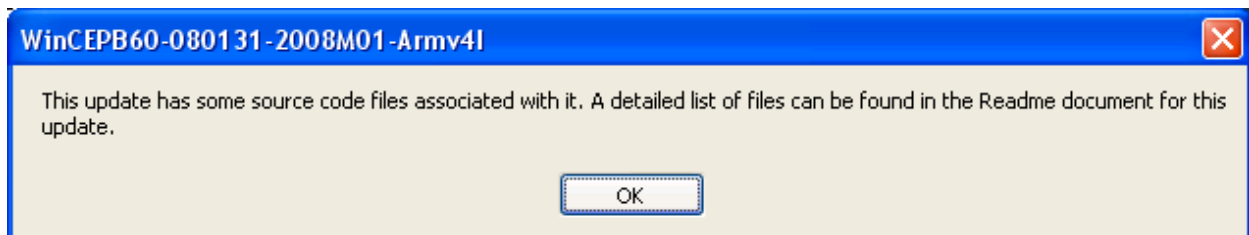


6. Click the “Install” button to begin the installation.

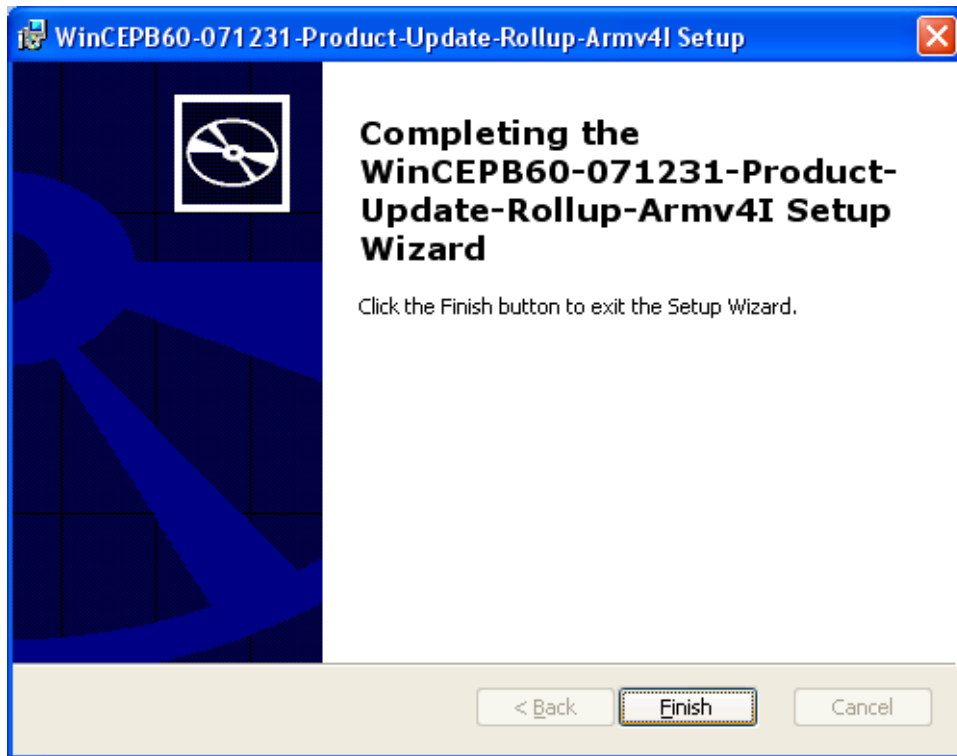




7. When the installation nears completion, you will see the following window explaining that the update has source code files associated with it. (Note: This window will often open behind the other windows on your desktop. If it appears that the installation process has stalled, see if this window is hiding behind the others.) Click the “OK” button and a web browser will open showing the associated Readme document.



8. The QFE patch has finished installing when you see the following window. Click the "Finish" button to exit the Setup Wizard.



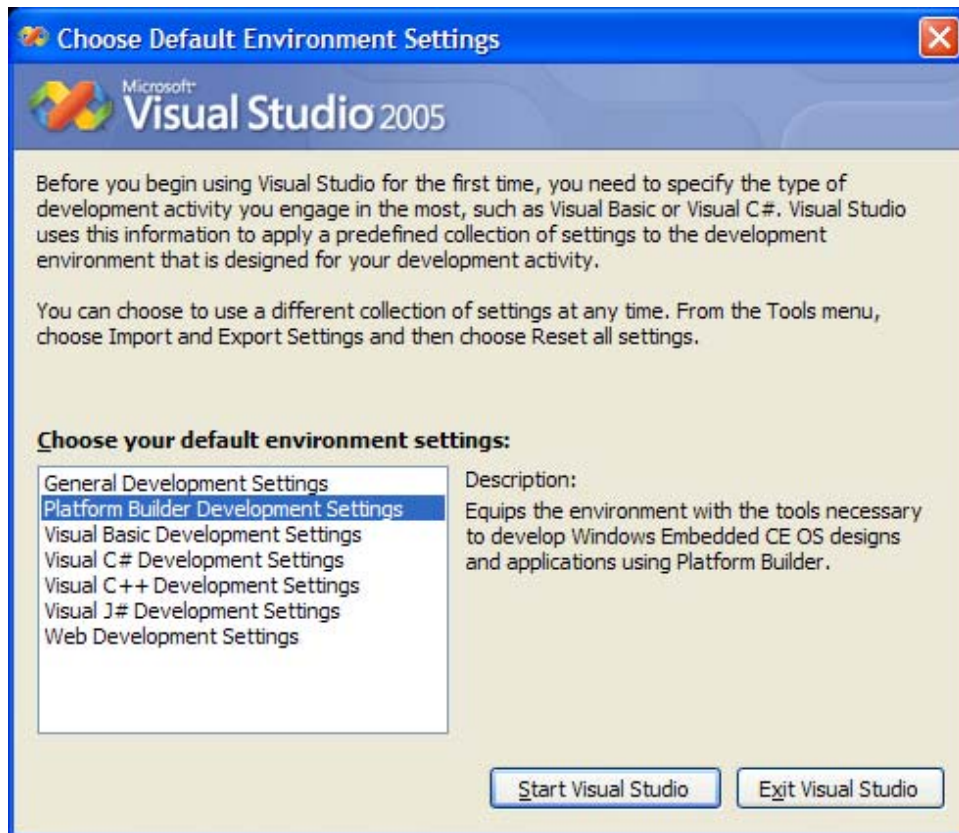
9. Repeat Steps 1 through 8 for each of the remaining QFE patches.

5.8.3 Verify the QFE Patch Installations

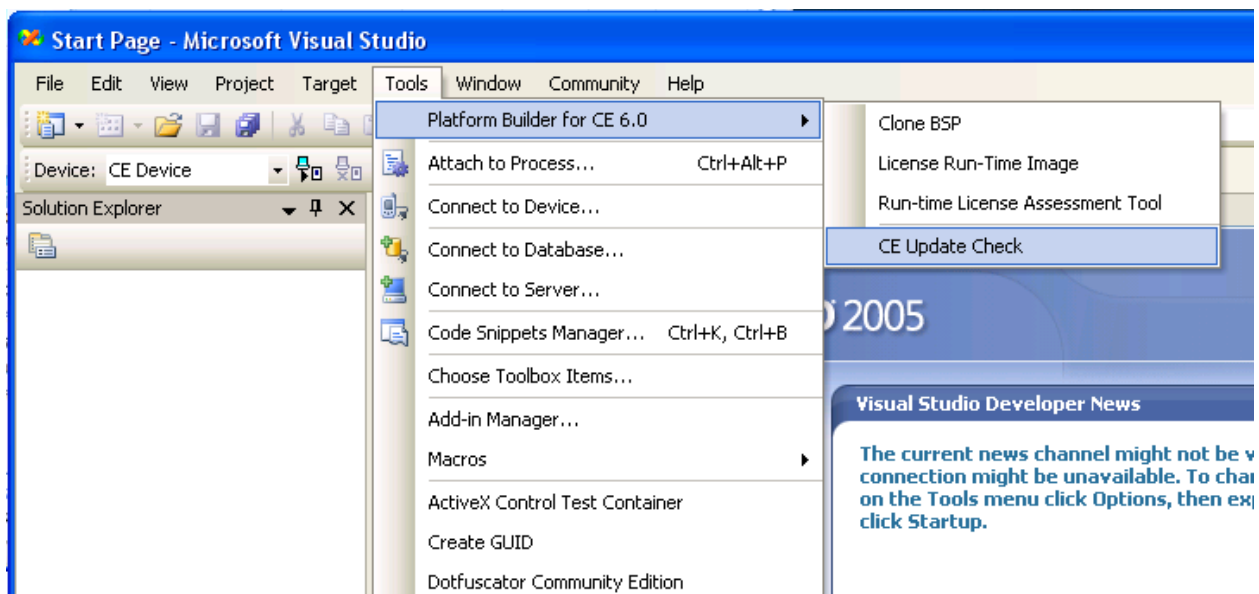
To verify that you have installed all the necessary QFE patches, you will have to launch the Visual Studio 2005 application.

1. Launch Visual Studio 2005 by going to: Start Menu -> All Programs -> Microsoft Visual Studio 2005 -> Microsoft Visual Studio 2005

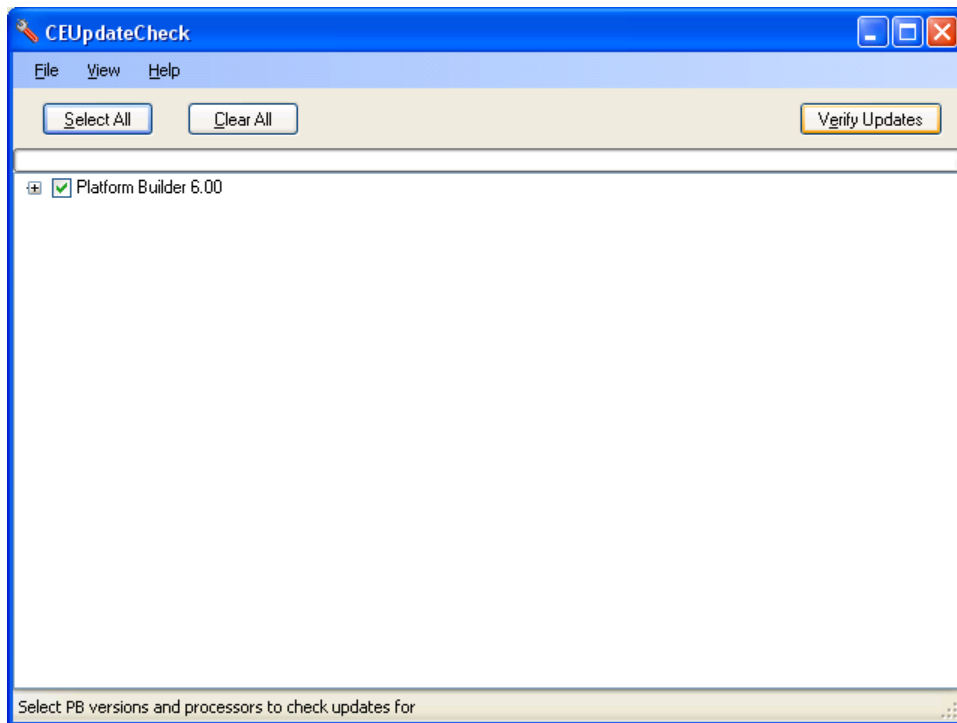
2. If this is the first time you've launched Visual Studio 2005, you will have to specify your default development environment. Click on "Platform Builder Development Settings" and then click the "Start Visual Studio" button to continue.



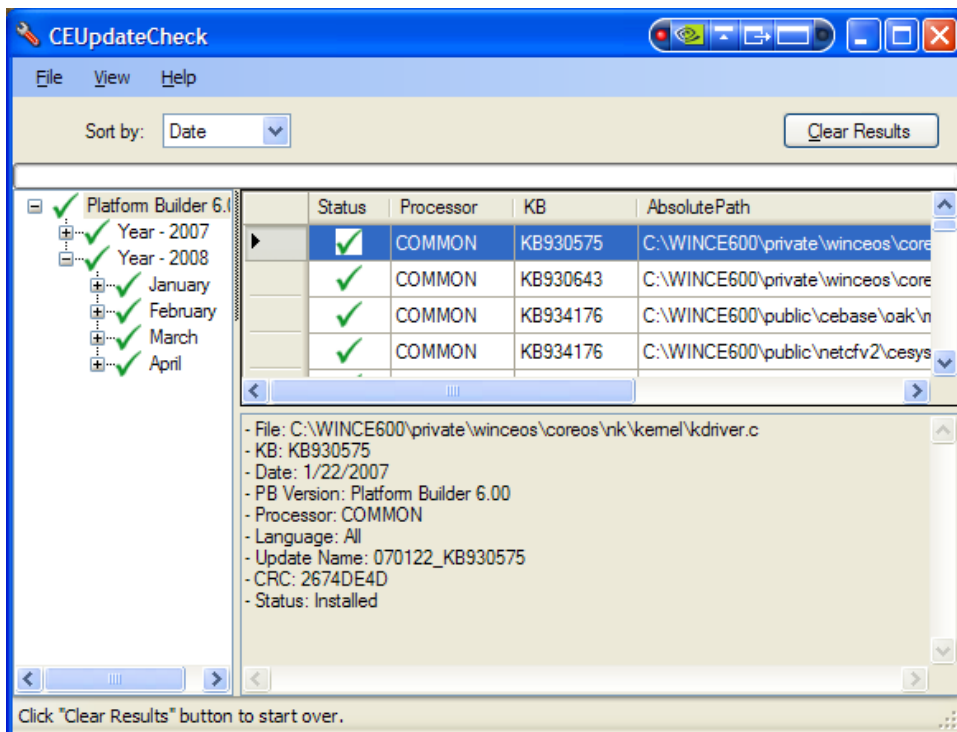
3. When Visual Studio 2005 has started, click on the "Tools" menu heading and select "Platform Builder for CE 6.0" and then select "CE Update Check".



4. In the CEUpdateCheck window, click the “Verify Updates” button.



5. CEUpdateCheck will tell you all of the updates that you have installed on your PC compared with the updates that have been released to date.



6. Your PC now has all the necessary tools to being Windows CE development.

6 Build Logic's Windows CE Source BSP

This section will describe how to begin Windows CE development with the OMAP35x Development Kit.

6.1 Prerequisites

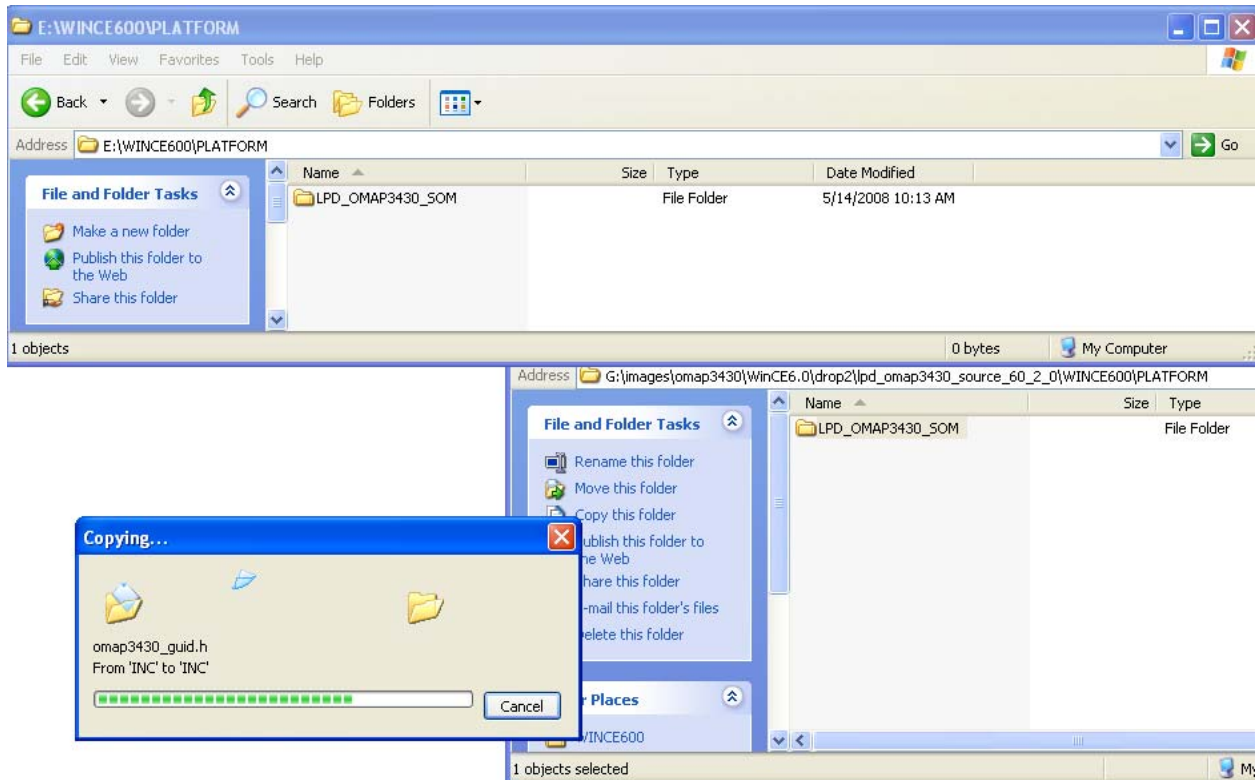
- Before installing Logic's Windows CE source board support package (BSP) software, please ensure that Visual Studio 2005 and Windows Embedded CE 6.0 Platform Builder are installed on your PC with all current QFE (Quick Fix Engineering) patches. This information is covered in-depth in the previous section of this document.
- Tera Term emulation program installed.
- Download the most recent Windows CE Source BSP software from Logic's downloads site (available under the 'Windows CE Sample Images' heading):
<http://www.logicpd.com/auth/downloads/OMAP35x%20Zoom%20Development%20Kit/>

6.2 Install Logic's Windows CE 6.0 Source BSP

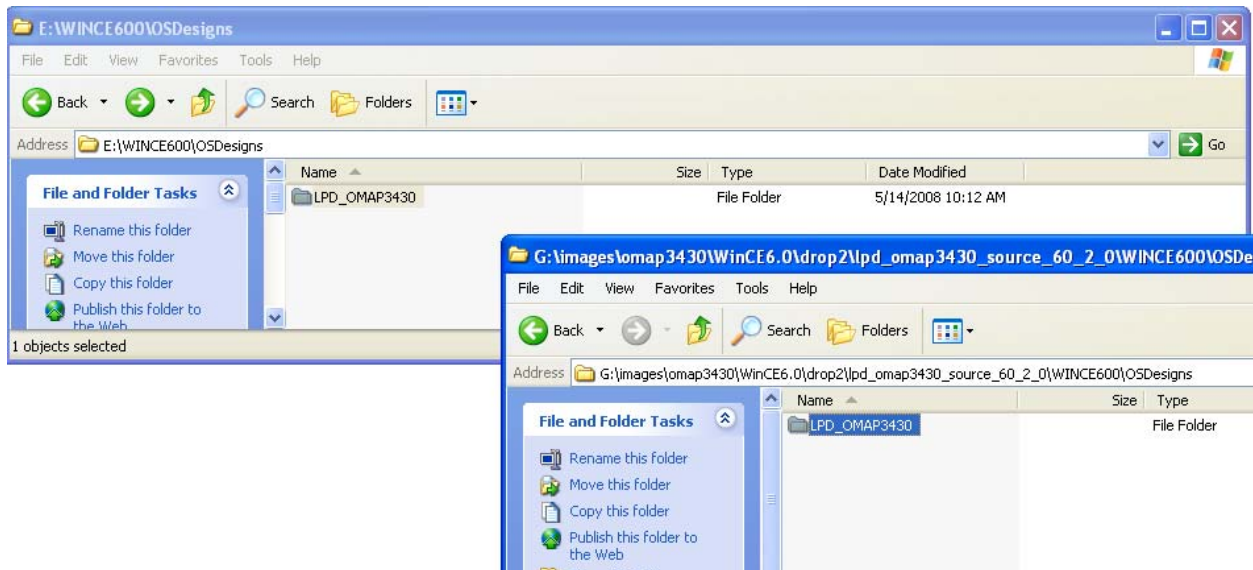
1. Locate the lpd_omap35x_source_x_x_x.zip file you downloaded from Logic's website.
2. Unzip the Windows CE 6.0 source BSP to a directory of your choice.
3. After unzipping lpd_omap35x_source_x_x_x.zip, visually verify that the following sub-directories and files have been created:

```
lpd_omap35x_source_readme.txt
.\Binaries
    \NK_debug.bin
    \NK_release.bin
.\DriverDocs
    Several Driver Description documents for specific components
.\WINCE600
    \OSDesigns
        \LPD_OMAP3430
            \omap3430.pbxml
            \omap3430.sln
    \PLATFORM
        \LPD_OMAP3430_SOM
            Several subfolders and files
```

4. Open the "lpd_omap35x_source_readme.txt" file and verify that you have all the QFE patches installed that are required for this source BSP. If you need to install new QFE patches, please do so before continuing onto the next step.
5. Copy the contents of the .PLATFORM\ directory to the x:\WINCE600\PLATFORM\ directory of the Windows CE installation. (**NOTE:** Remove or rename any pre-existing "LPD_OMAP3430_SOM" directories from prior BSP installations before copying the newer release of the "LPD_OMAP3430_SOM" BSP.)

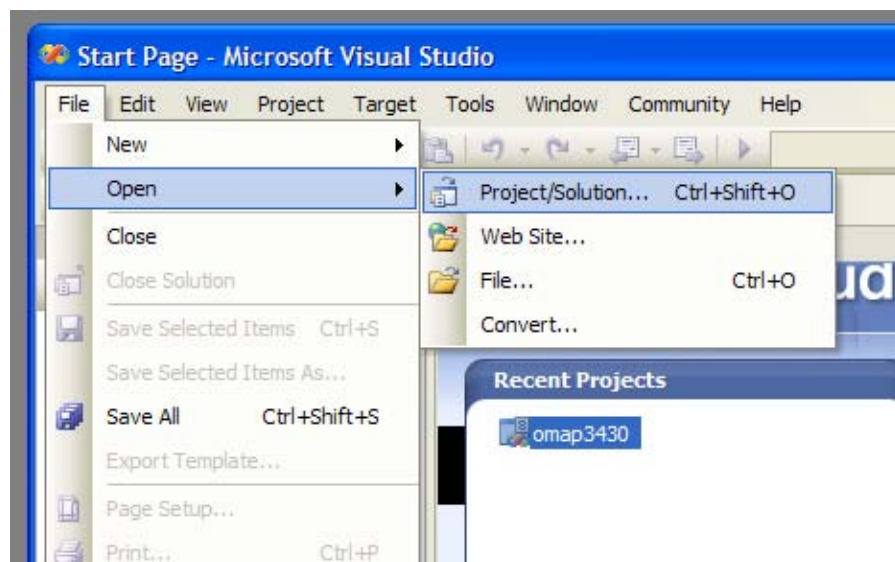


6. Copy the contents of the .\OSDesigns\ directory to the x:\WINCE600\OSDesigns\ directory of the Windows CE 6.0 installation. (**NOTE:** If an “OSDesigns” directory does not exist in the Windows CE installation directory, create one. Also, remove or rename any pre-existing “LPD_OMAP3430_SOM” directories from prior BSP installations before copying the newer release of the “LPD_OMAP3430_SOM” BSP.)

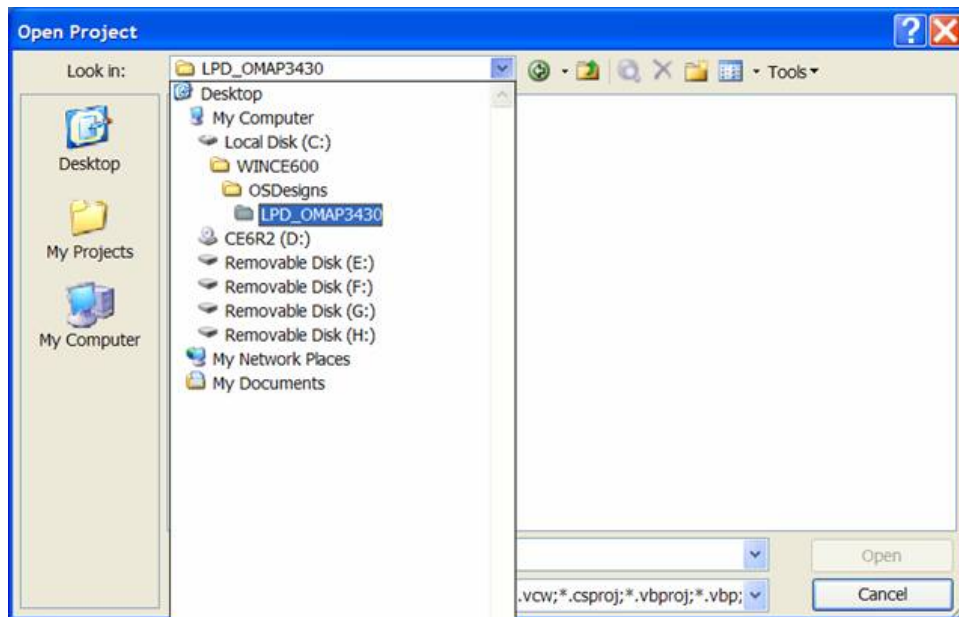


6.3 Build Logic's Windows CE 6.0 Source BSP

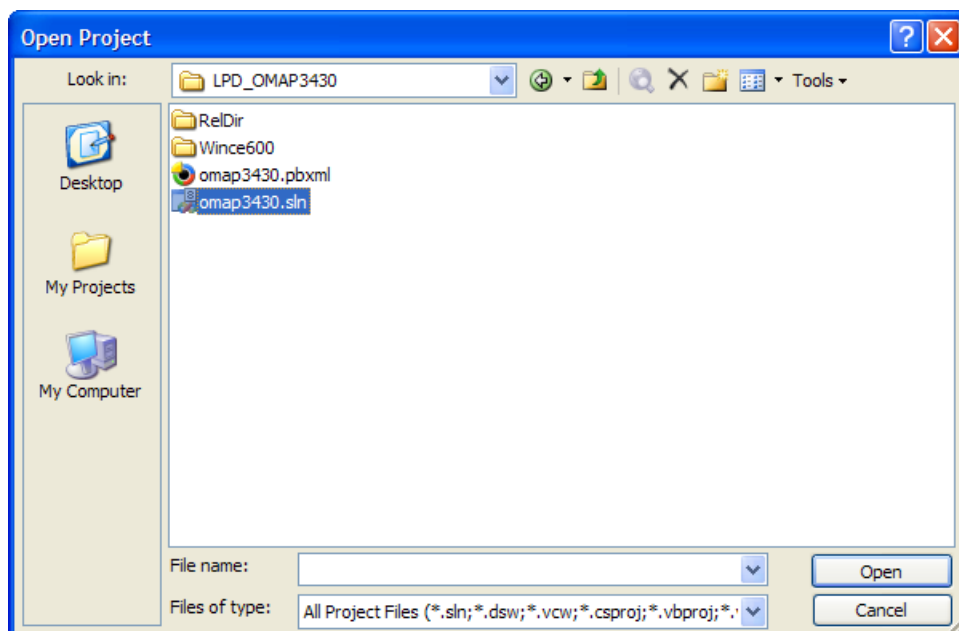
1. Launch the Visual Studio 2005 application. Click on the 'File' menu, select 'Open', and then select 'Project/Solution...'



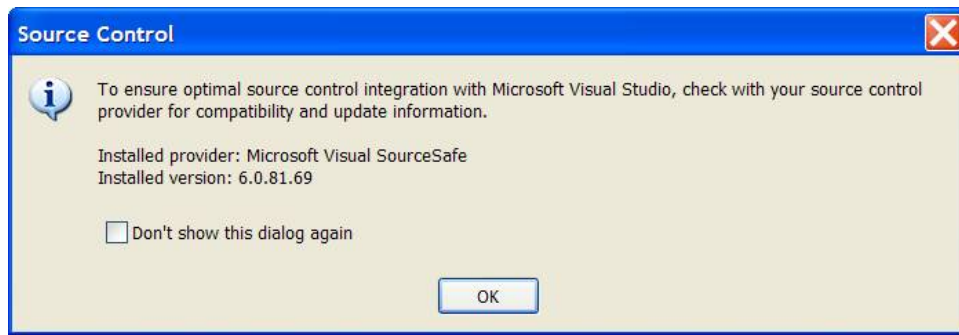
2. Browse to the .\WINCE600\OSDesigns\LPD_OMAP3430\ directory.



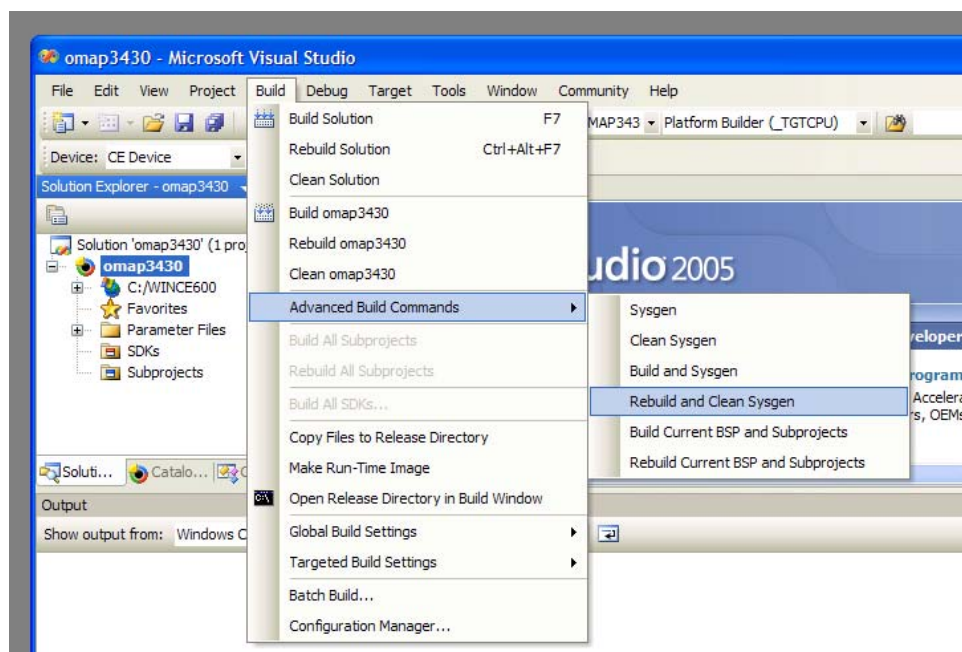
3. Select the "omap3430.sln" file and click the 'Open' button.



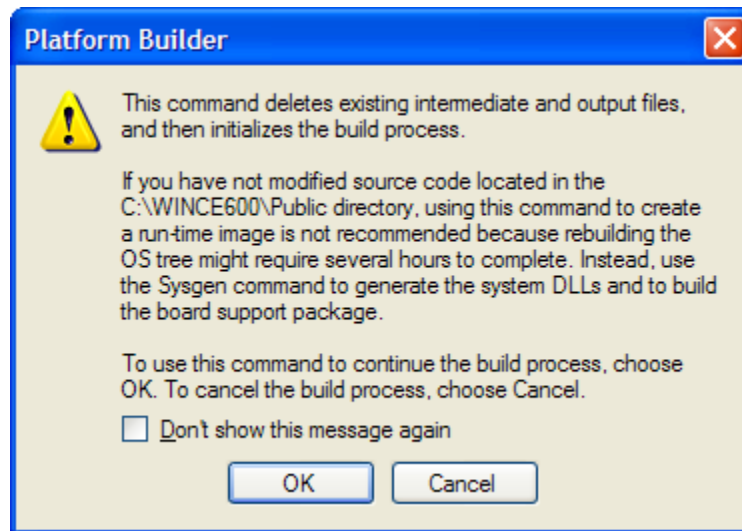
4. The following window may appear, if it does please click the “OK” button to continue.



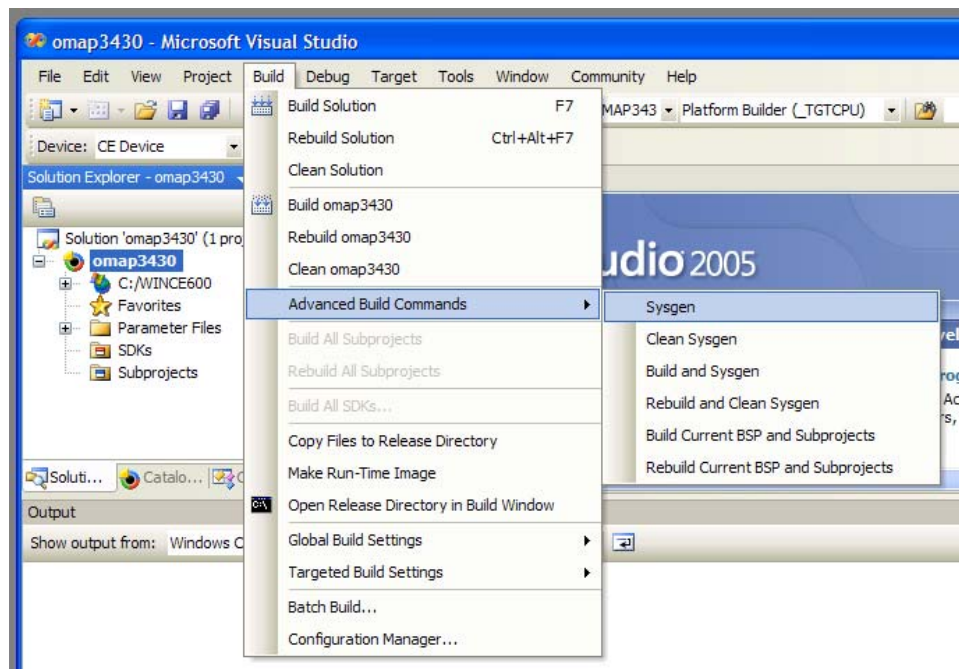
5. To build the a solution for the first time in Windows CE6.0, click on the 'Build' menu, then select 'Advanced Build Commands', and then select 'Rebuild and Clean Sysgen'.



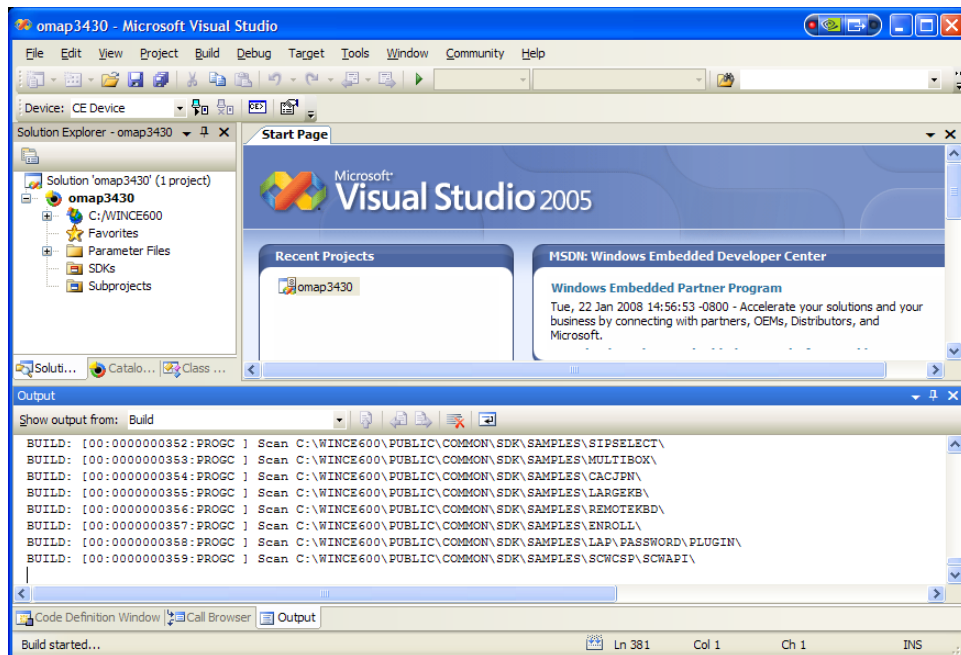
6. If the following window appears, click the “OK” button to continue.



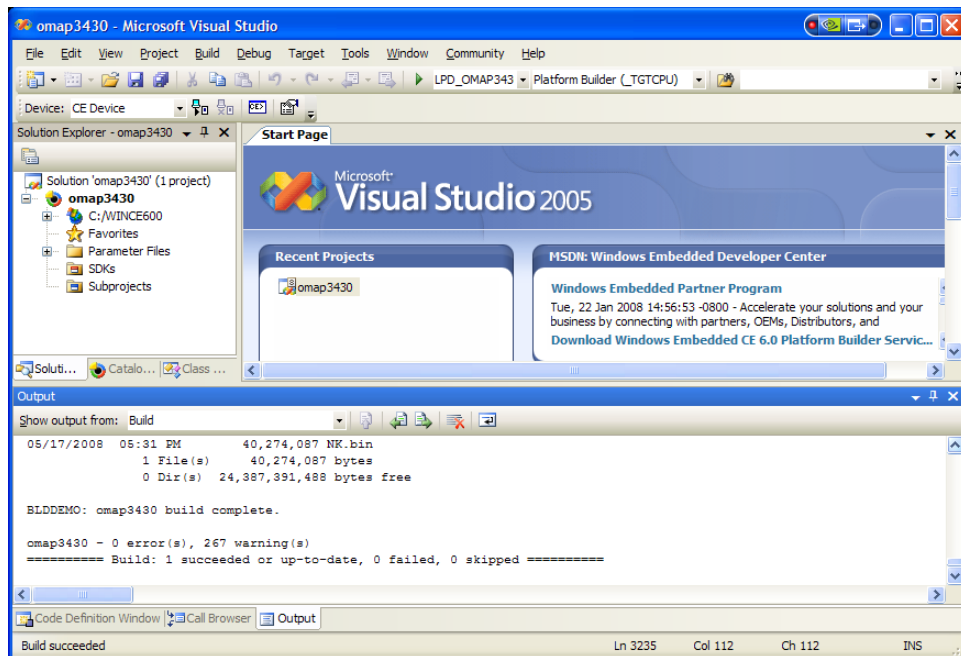
NOTE: Selecting 'Rebuild and Clean Sysgen' is only necessary the first time you build the solution using Windows CE 6.0 or immediately after installing a new QFE patch. After a complete Rebuild and Clean Sysgen has occurred, the first time builds of a new OSDesign only require selecting 'Sysgen'.



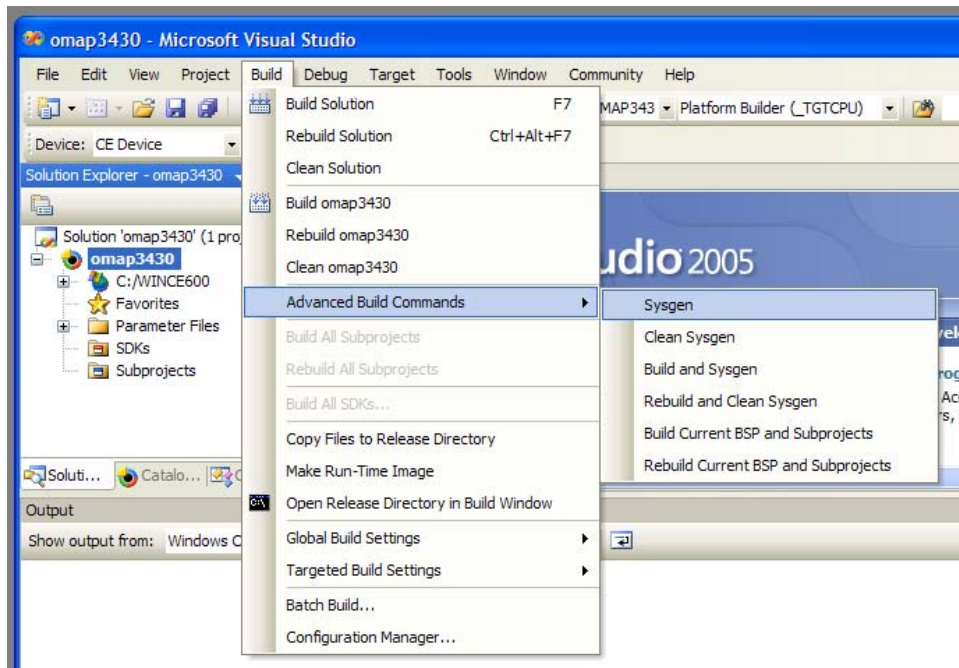
7. The build will start.



8. You know the build has finished when you see “Build succeeded” in the bottom status window and the words “build complete” in the Output window.



9. After the 'Rebuild and Clean Sysgen' you must perform a 'Sysgen' for your initial OSDesign build.



6.3.1 Table Indicating the Proper Build Option to Use

Build Options	Usage
Sysgen	Use when Microsoft components have been added or removed
	Selecting new BSP drivers may require additional Microsoft components
	Will also build the BSP source files
Clean Sysgen	Also performs a clean prior to Sysgen
Build and Sysgen	Use when any OS source files are modified
Rebuild and Clean Sysgen	Use immediately after installing new QFE package(s)
Build Current BSP and Subprojects	Use when any BSP source files are modified or BSP registry changes have been made
Rebuild Current BSP and Subprojects	Also performs a clean prior to "Build Current BSP and Subprojects"

Note: In the menu, click "Build" and select "Global Build Settings." In the window that appears, make sure that both "Copy Files to Release Directory" and "Make Run-Time Image" options are selected.

6.4 Run Logic's Windows CE 6.0 Source BSP

6.4.1 Setup hardware

For step-by-step instructions on how to setup your hardware, please see the LogicLoader Labs "Lab 1: Kit Communications" and "Lab 5: LogicLoader Networking" later in this document.

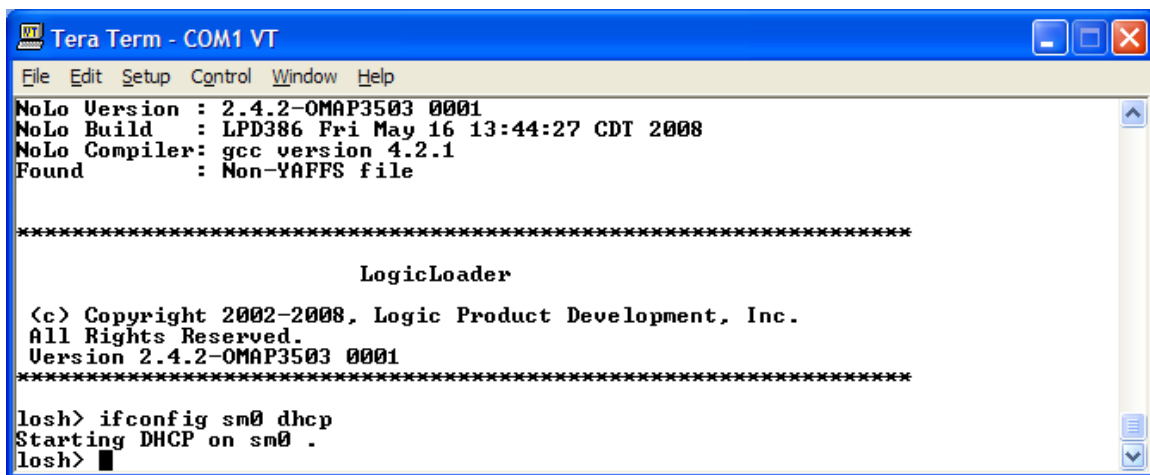
1. Connect the OMAP35x Development Kit to the Ethernet network.

2. Connect the Development Kit to your PC using the null-modem serial cable included with the kit.

6.4.2 Download the Windows Embedded CE Image to the System on Module

Please follow the steps below to download the newly created Windows Embedded CE image to your OMAP35x SOM-LV (the steps in this section assumes the download method is via Ethernet).

1. Launch the Tera Term application on your PC.
2. Power on your OMAP35x Development Kit.
3. Initialize LogicLoader's TCP/IP stack using the 'ifconfig' command. Type **ifconfig sm0 dhcp** to obtain an IP address from a DHCP server on the network.



```
Tera Term - COM1 VT
File Edit Setup Control Window Help
NoLo Version : 2.4.2-OMAP3503 0001
NoLo Build : LPD386 Fri May 16 13:44:27 CDT 2008
NoLo Compiler: gcc version 4.2.1
Found : Non-YAFFS file

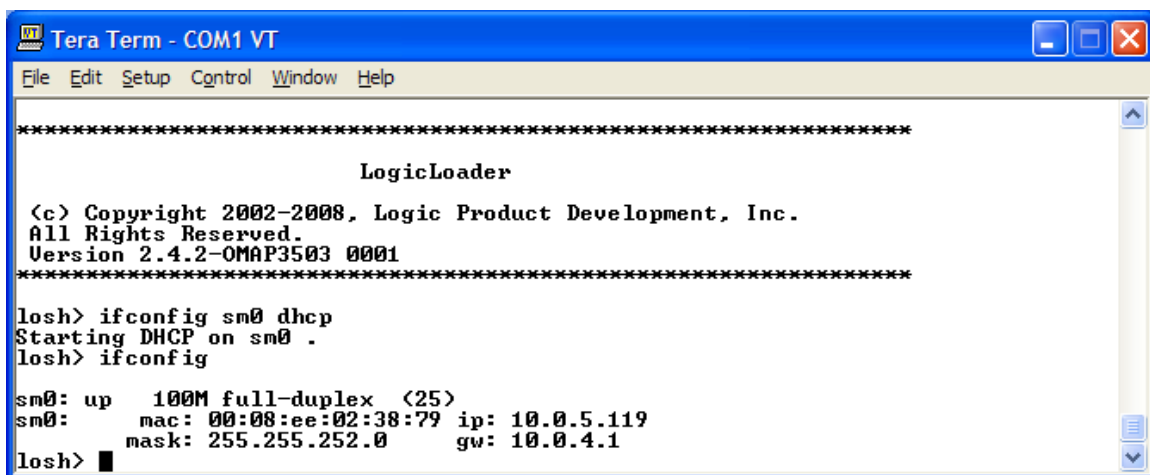
*****

                        LogicLoader

(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****

losh> ifconfig sm0 dhcp
Starting DHCP on sm0 .
losh> █
```

4. Verify the device received an IP address by typing **ifconfig** with no parameters. Note that the 'ifconfig' command also displays the system MAC address. Occasionally, there is a brief delay before a kit obtains an IP address. Please verify that your development kit has received a valid IP address before proceeding to the next step.



```
Tera Term - COM1 VT
File Edit Setup Control Window Help

*****

                        LogicLoader

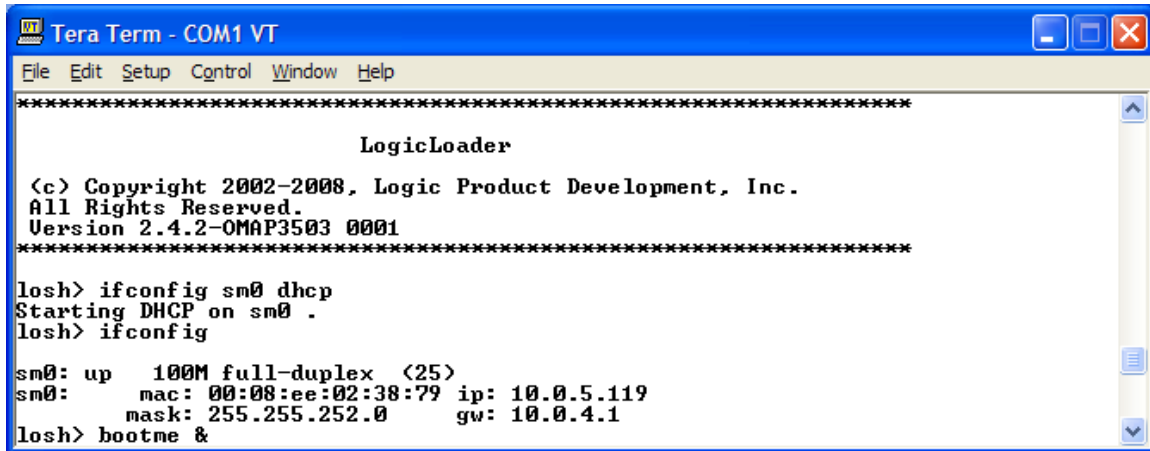
(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****

losh> ifconfig sm0 dhcp
Starting DHCP on sm0 .
losh> ifconfig

sm0: up      100M full-duplex <25>
sm0:      mac: 00:08:ee:02:38:79 ip: 10.0.5.119
          mask: 255.255.252.0    gw: 10.0.4.1
losh> █
```

5. Start the download process by typing: **bootme &**

The 'bootme &' command sends UDP packets over the LAN to a host computer. The packets are recognized by Microsoft Platform Builder as coming from a device waiting to download a Windows Embedded CE image. Technically, the command is simply 'bootme'. However, the & is needed to launch this command in the background so you may still interact with the LogicLoader shell.



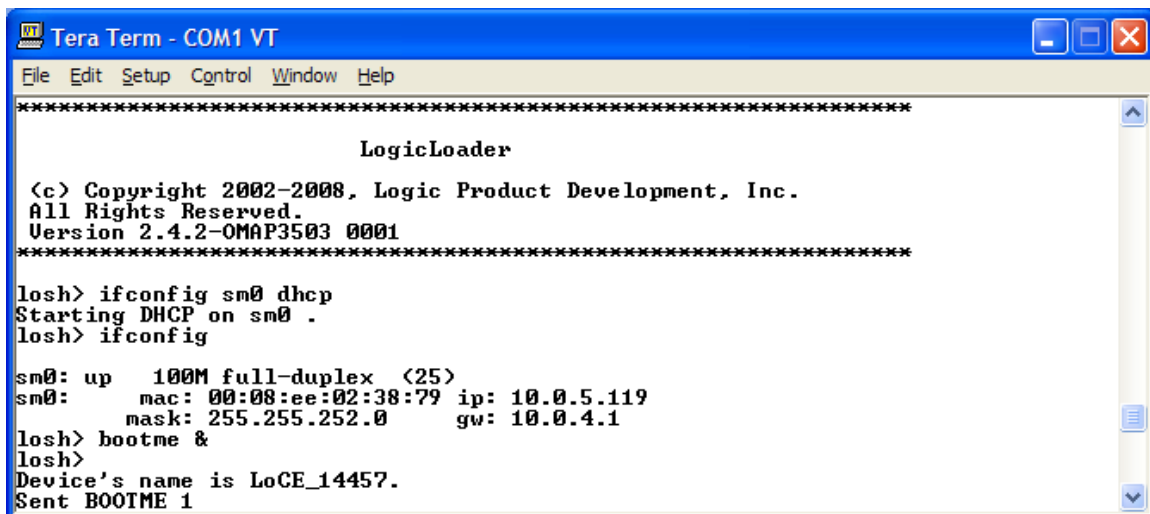
```
Tera Term - COM1 VT
File Edit Setup Control Window Help
*****
                        LogicLoader

(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****

losh> ifconfig sm0 dhcp
Starting DHCP on sm0 .
losh> ifconfig

sm0: up    100M full-duplex <25>
sm0:      mac: 00:08:ee:02:38:79 ip: 10.0.5.119
        mask: 255.255.252.0      gw: 10.0.4.1
losh> bootme &
```

6. The **bootme &** command outputs the name that the device will use to communicate with Platform Builder and then starts outputting network packets as shown in the figure below.



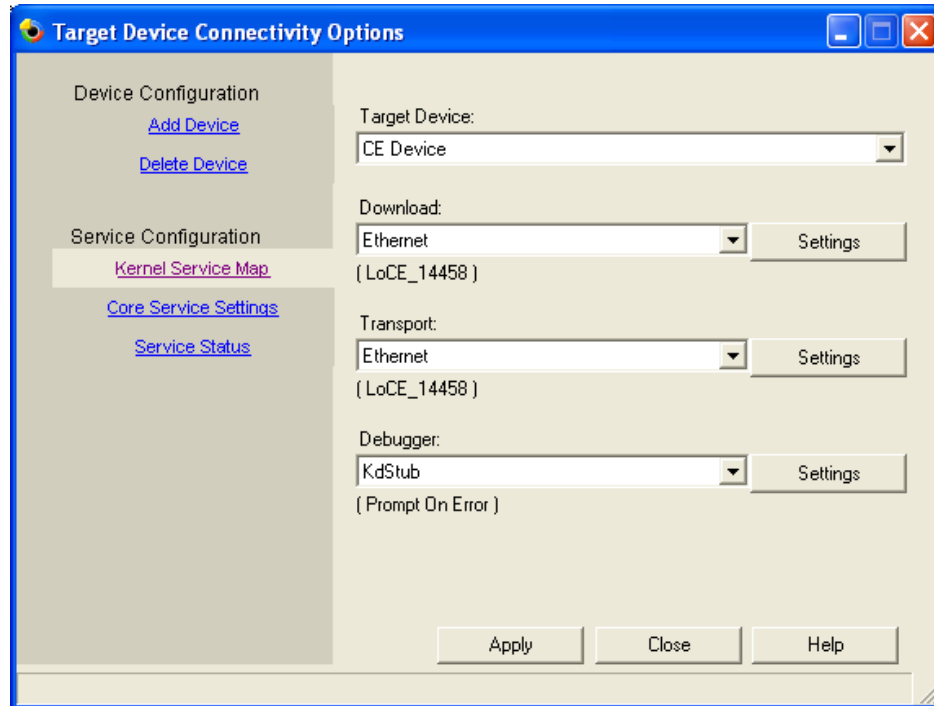
```
Tera Term - COM1 VT
File Edit Setup Control Window Help
*****
                        LogicLoader

(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****

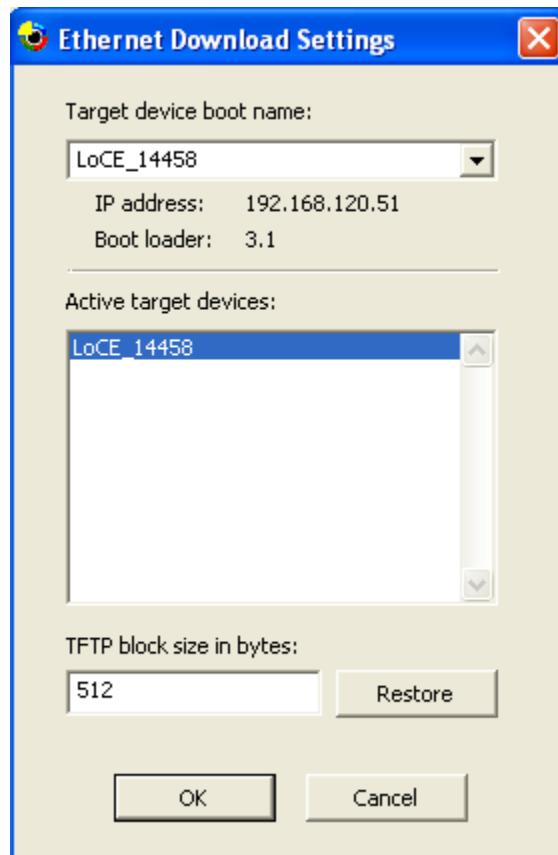
losh> ifconfig sm0 dhcp
Starting DHCP on sm0 .
losh> ifconfig

sm0: up    100M full-duplex <25>
sm0:      mac: 00:08:ee:02:38:79 ip: 10.0.5.119
        mask: 255.255.252.0      gw: 10.0.4.1
losh> bootme &
losh>
Device's name is LoCE_14457.
Sent BOOTME 1
```

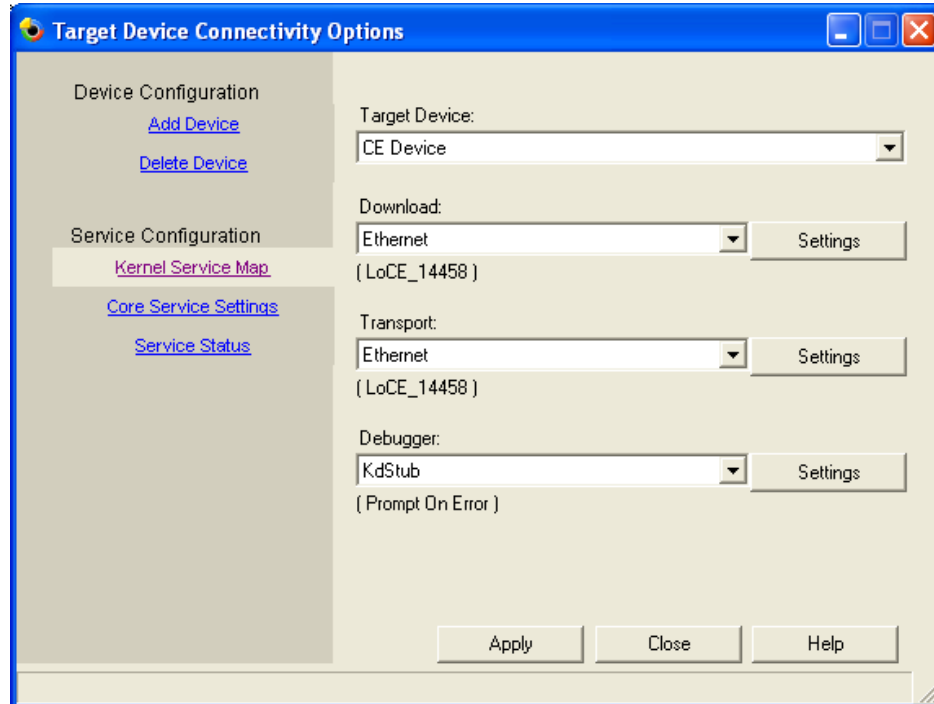
7. Switch to the Visual Studio 2005 application. Click the “Target” menu and select “Connectivity Options”. In the window that opens, select “Ethernet” in the drop-down boxes for both “Download:” and “Transport:”.
8. Click the “Settings” button next to “Download”.



9. Select the device's name that LogicLoader output in Step 6 above. It may take several seconds for the name to show up in the list of "Active target devices". When name appears, select it and then click the "OK" button.



10. Click the “Apply” button in the Target Device Connectivity Options window. Then click the “Close” button to close the window.

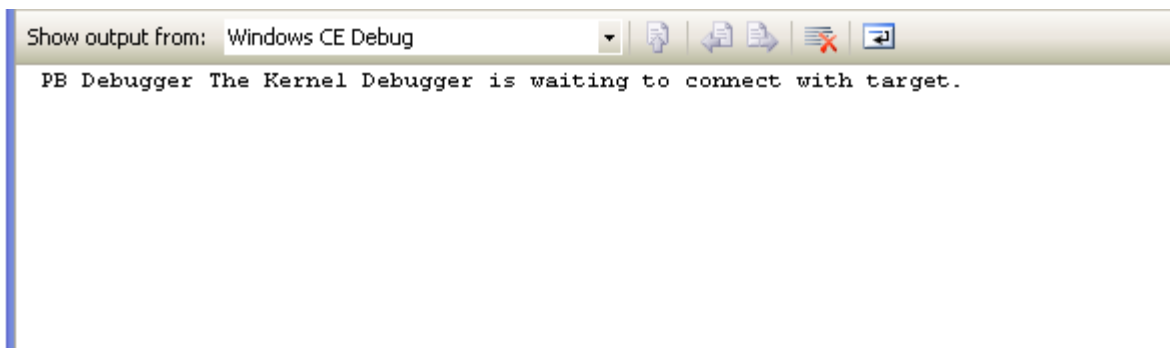


11. Click the “Target” menu and select “Attach Device” to download the Windows Embedded CE image to the device.

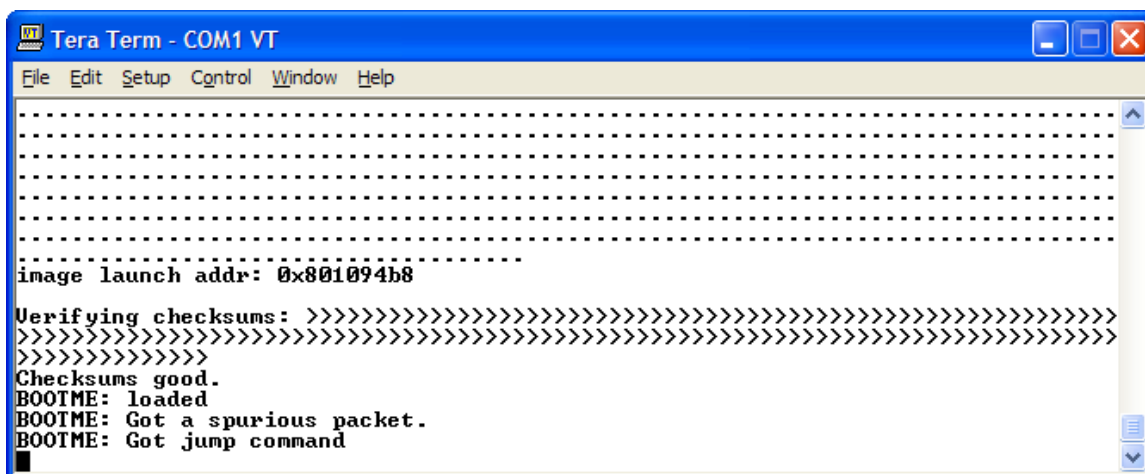


12. Platform Builder will download the new image to the device. Note this may take some time depending on the network.

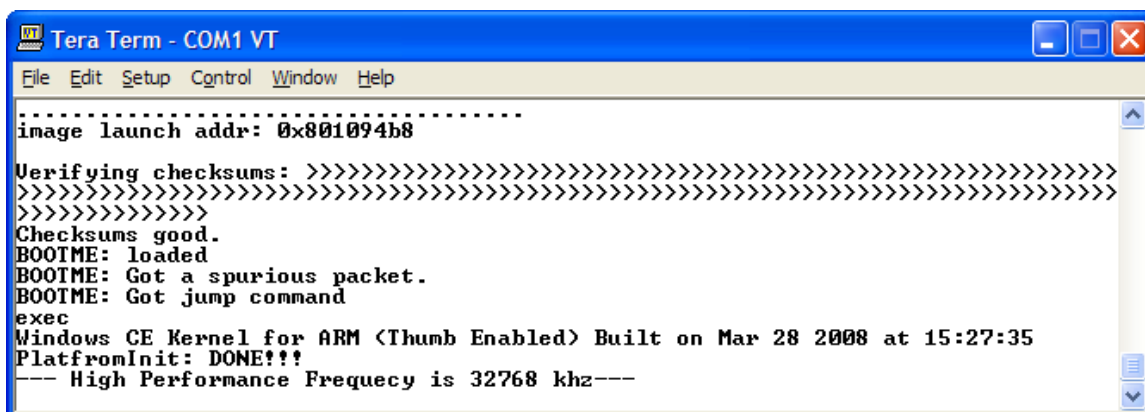
13. When the download is complete, Platform Builder will wait for LogicLoader to connect.



14. Once the image has been transferred, LogicLoader verifies the checksums and then returns to the `losh>` prompt.



15. Type **exec** and press the “Enter” key.



16. LogicLoader will boot the BSP. The output you see should look similar to the series of continuous screenshots presented in the figures below. Depending on the build options, you may see additional output; if not, wait for the image to boot and proceed with step 17 below.

```
Tera Term Web 3.1 - COM1 VT
File Edit Setup Web Control Window Help

.....
image launch addr: 0x80109a38

Verifying checksums: >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
Checksums good.
BOOTME: loaded
BOOTME: Got a spurious packet.
BOOTME: Got jump command
losh> exec
Windows CE Kernel for ARM (Thumb Enabled) Built on Feb  5 2008 at 10:49:03
ProcessorType=0c08 Revision=2
OEMAddressTable = 80109b14
PlatformInit: DONE!!!
--- High Performance Frequency is 32768 khz---
Changed KITL zone mask to 0x0000B003
+OALKitlStart
WARN: Boot arguments not found, use defaults
:OALKitlStart SMSC9211
+OALKitlInit(' s', 0x 8x - -2146265520/37/0x 8x, 0x 8x)
DeviceId..... LoCE_
pArgs->flags..... 0x25
pArgs->devLoc IfcType    0
```

```
Tera Term Web 3.1 - COM1 VT
File Edit Setup Web Control Window Help
DeviceId..... LoCE_
pArgs->flags..... 0x25
pArgs->devLoc.Ifctype.... 0
pArgs->devLoc.LogicalLoc. 0xC000000
pArgs->devLoc.PhysicalLoc 0x0
pArgs->devLoc.Pin..... 0
pArgs->ip4address..... 0
pDevice->Name..... s
pDevice->ifctype..... 0
pDevice->id..... 0xC000000
pDevice->resource..... 0
pDevice->type..... 2
pDevice->pDriver..... 0x8281B018
+OALKitlFindDevice(0/0/ 8x, 0x 8x)
-OALKitlFindDevice(pDevice = 0x 8x((II), PhysicalLoc = 0x 8x)
+OEMKitlInit(0x82859A20)
+OALKitlEthInit(' ', 'LoCE_', 0x 8x, 0x 8x)
xLAN921xInit: SMSC LAN9211 Ethernet controller is detected
Chip Id: 9211 Revision: 0

LAN921x: reset PHY...DONE
LAN921x: PHY id1: 7 id2: c0c3
+LAN921xAutoNegotiate: 0x1
LAN921x: Auto-negotiation complete!
LAN921x: Link is 100 Mbps full-duplex...
MAC Address: 0:8:ee:2:38:7a
-LAN921xInit(mac = 00:08:ee:02:38:7a, rc = 1)
+OALKitlCreateName(' s', 0x 4x, 0x 8x)
-OALKitlCreateName(pBuffer = ' s')
KITL: *** Device Name LoCE_14458 ***
KITL: using sysintr 0x12
KITL: DHCP get/renew device IP: 1
-OALKitlEthInit(rc = 1)
Shared ethernet is enabled!
Initializing VBridge.
VBridge:: built on [May 13 2008] time [11:44:16]
VBridgeInit()...TX = [16384] bytes -- Rx = [16384] bytes
Tx buffer [0xA2850EC0] to [0xA2854EC0].
Rx buffer [0xA2854EE0] to [0xA2858EE0].
VBridge:: NK add MAC: [0-8-EE-2-38-7A]
VBridge initialized. (800 2EE 7A38)
-OEMKitlInit(rc = 1)
Connecting to Desktop
+KitlEthGetDevCfg(0x 8x, 0x 8x->-2105175034)
-KitlEthGetDevCfg(rc = 1)
KITL: Connected host IP: 1 Port: 4147
KeyIndex 0 = -1
KeyIndex 1 = -1
KeyIndex 2 = -1
KeyIndex 3 = -1
KeyIndex 4 = -1
KeyIndex 5 = -4194305
KeyIndex 6 = -4194305
KeyIndex 7 = -1
+KITLRegisterDfltClient, service:0
+KITLRegisterDfltClient, service:1
-OALKitlInit(rc = 1)
-OALKitlStart(rc = 1)
```


17. The LCD screen connected to your development kit will ask you to calibrate the screen by using a stylus to touch the center of several crosshairs.
18. Once the screen has been calibrated, tap anywhere on the screen and the development kit will boot into Windows Embedded CE 6.0.



6.5 Enable/Disable Drivers

The information in the table below shows the available environment variable that can be set to enable or disable specific drivers within your BSP.

Environment Variable	Enable Driver	Disable Driver	Notes
Display	—	BSP_NODISPLAY	Change the registry entry "LcdType" in platform.reg as follows: "LcdType"=dword:3 for 3.6" display "LcdType"=dword:5 for 6.4" display "LcdType"=dword:9 for 4.3" display
Ethernet	BSP_SMSC_LAN921X	—	—
	BSP_SHARE_ETH=0	BSP_SHARE_ETH=1	Shared Ethernet function must be disabled by the BSP_SHARE_ETH environment variable. It will have to be set zero if you want to use a user-level Ethernet driver. If Ethernet sharing is enabled, the user-level driver will skip the initialization and the application layer will use the alternative Ethernet handler (for example, KITL Ethernet driver).
USBH	—	BSP_NOUSB	—
SDIO	—	BSP_NOSDHC1	—
Touch	—	BSP_NOTOUCH	—
UART	—	BSP_NOCOM BSP_NOCOM1 BSP_NOCOM2 BSP_NOCOM3	Disables all UART ports Disables UART1 Disables UART2 Disables UART3

7 Prepare for Linux Development

This section will describe how to prepare your PC for Linux development on the OMAP35x Development Kit.

Linux development is still under way for the OMAP35x Development Kit. When that development is concluded, content will be added to this section. If you would like an updated development schedule, please contact Logic Sales: product.sales@logicpd.com.

8 Build Logic's Linux Source BSP

This section will describe how to build a Linux image on the OMAP35x Development Kit using the BSP components available from Logic.

Linux development is still under way for the OMAP35x Development Kit. When that development is concluded, content will be added to this section. If you would like an updated development schedule, please contact Logic Sales: product.sales@logicpd.com.

9 LogicLoader Labs

These labs provide an informal introduction to the LogicLoader bootloader software. The step-by-step directions act as a means to discover how LogicLoader works.

9.1 Lab 1: Kit Communications

9.1.1 Abstract

This lab will teach you how to establish a serial connection to your OMAP35x Development Kit. A serial connection is the most basic form of communication between a development workstation computer and the development kit.

9.1.2 What you will need

- A Zoom OMAP35x Development Kit
- A development workstation (PC or laptop)
- An available serial port or USB-to-serial adapter
- A terminal emulation program such as HyperTerminal or Tera Term. **Note:** Logic recommends using Tera Term, a free program downloadable from the Internet.

9.1.3 Basic instructions

If you are familiar with serial communications and a terminal emulator program, open your terminal emulator and set the port settings to:

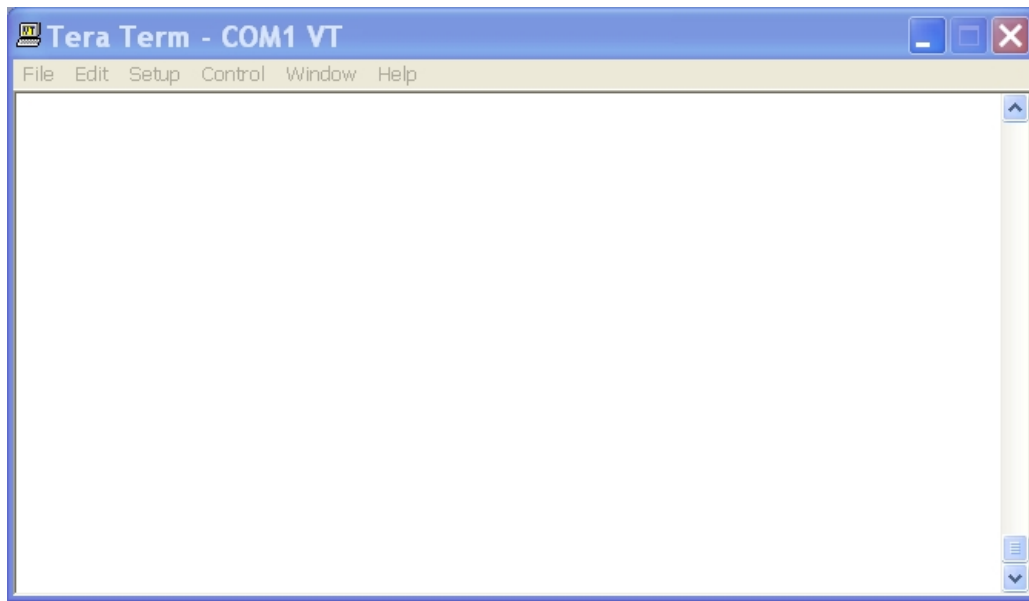
- 115200 BAUD rate
- 8 data-bits
- No parity
- No hardware flow control
- No software flow control

If you are not familiar with serial communications, follow the instructions below for the program you intend to use.

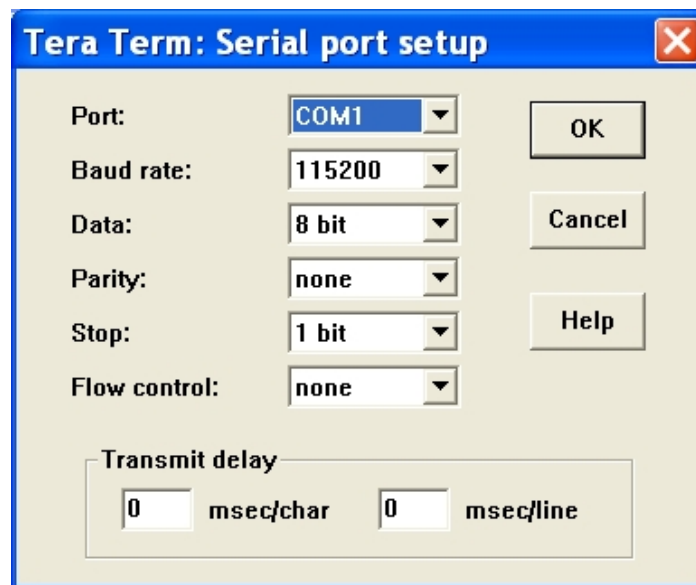
9.1.4 Tera Term instructions

Tera Term is a terminal emulation program available as a free download from the Internet. Logic recommends the use of Tera Term over HyperTerminal as it appears to be a more stable program. All Tera Term settings are controlled by a .ini file that you can modify as needed to make your time in Tera Term as efficient as possible. For example you can preset the port settings.

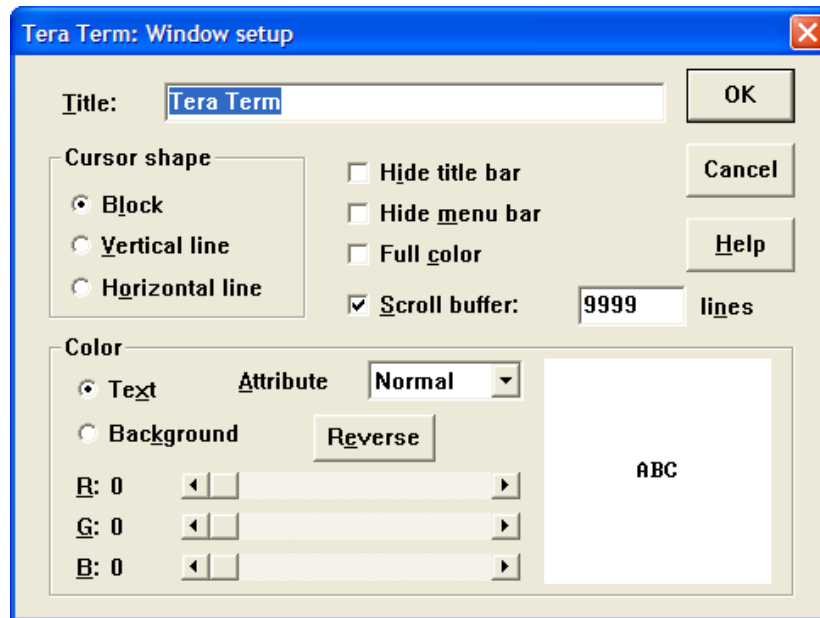
1. Start the Tera Term program



2. Select the 'Setup -> Serial port...' menu item
3. Select the appropriate COM port for your workstation
4. Change the Port Settings to:
 - ☐ Bits per second: 115200
 - ☐ Data bits: 8
 - ☐ Parity: None
 - ☐ Stop bits: 1
 - ☐ Flow control: None



5. Click 'OK'
6. Select the Setup -> Window... menu item
7. Click the box for scroll buffer and make the amount as big as you like, up to 9999.



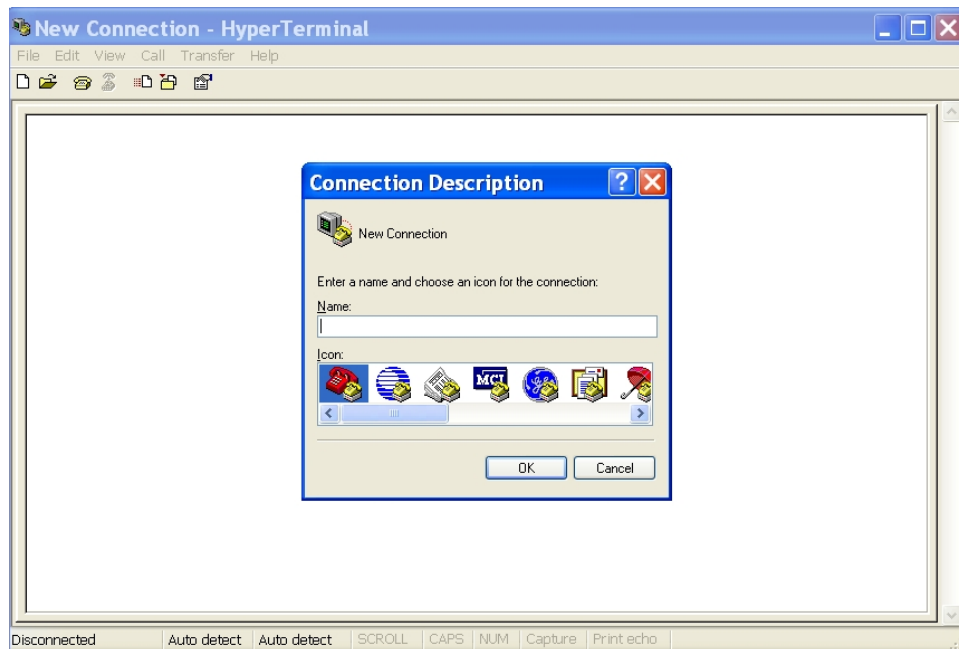
8. Select 'OK'

9.1.5 HyperTerminal instructions

HyperTerminal is a standard communications program available on most Microsoft workstations and laptops. You may use HyperTerminal; however, Logic recommends downloading and using the Tera Term program.

1. Start the HyperTerminal program using either of these methods:
 - Find the HyperTerminal icon using the Windows start menu. This is normally found under, 'All Programs -> Accessories -> Communications -> HyperTerminal.'

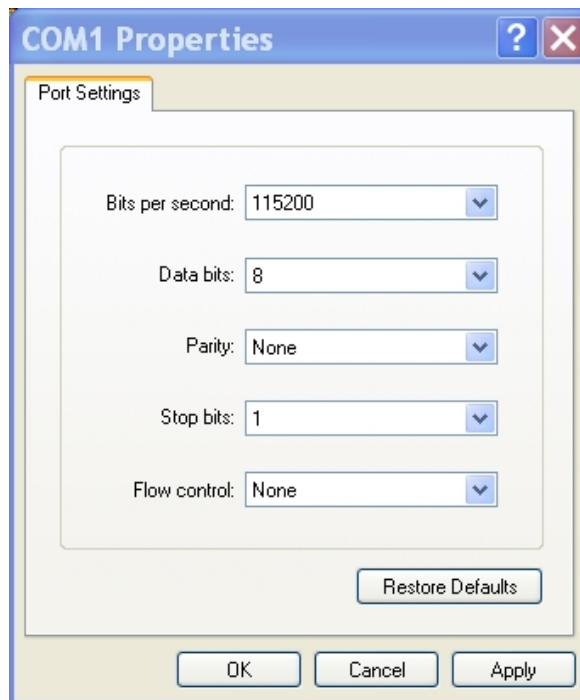
2. Name your new connection 'LPD' and press 'OK'



3. Using the drop-down menu, change the 'Connect using:' box to 'COM1' (or the appropriate COM port for your workstation)



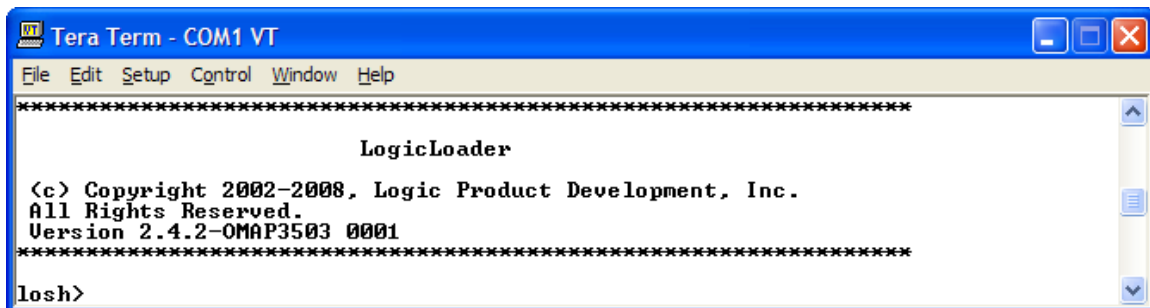
4. Click 'OK'
5. Change the Port Settings to:
 - Bits per second: 115200
 - Data bits: 8
 - Parity: None
 - Stop bits: 1
 - Flow control: None



6. Click 'OK'

9.1.6 Connect the Kit to your workstation

1. Use the gray serial cable marked "LOGIC" to connect the serial port on the kit to the appropriate port on your workstation.
2. Apply power to the kit and you should see the LogicLoader welcome prompt similar to the image below.



9.2 Lab 2: Learning the LogicLoader Help System

9.2.1 Abstract

This lab will teach you the basics of working with the LogicLoader (LoLo) built-in help system.

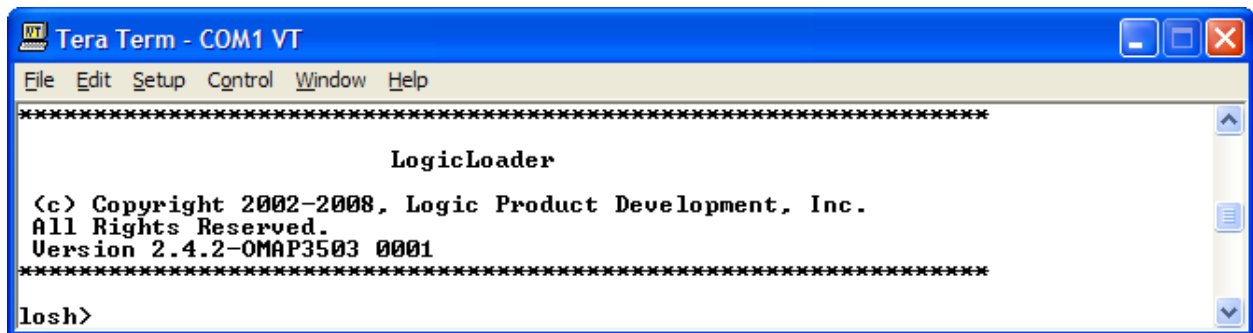
9.2.2 What you will need

- A Zoom OMAP35x Development Kit
- A development workstation (PC or laptop)
- A serial port communications connection between the workstation and the development kit

9.2.3 LogicLoader Interface

1. Start your terminal emulator program (Tera Term or HyperTerminal)
2. Ensure the null-modem serial cable provided with the kit is connected to both the kit and the development workstation
3. Power on the development kit.

Once the kit powers up, you should see the LogicLoader welcome prompt similar to the image below.



```
Tera Term - COM1 VT
File Edit Setup Control Window Help
*****
                        LogicLoader
(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****
losh>
```

Note the string Version 2.4.2-OMAP3503 0001 in the image above. This tells us that this kit is running revision 2.4.2 of the LogicLoader program and has been built specifically for the OMAP3503 platform. If you suspect you are having issues with LogicLoader, one of the first things a Logic Product Development support person will ask you for is the version of LoLo and what platform you are running it on.

The string `losh>` is the LogicLoader command shell waiting for you to type something in.

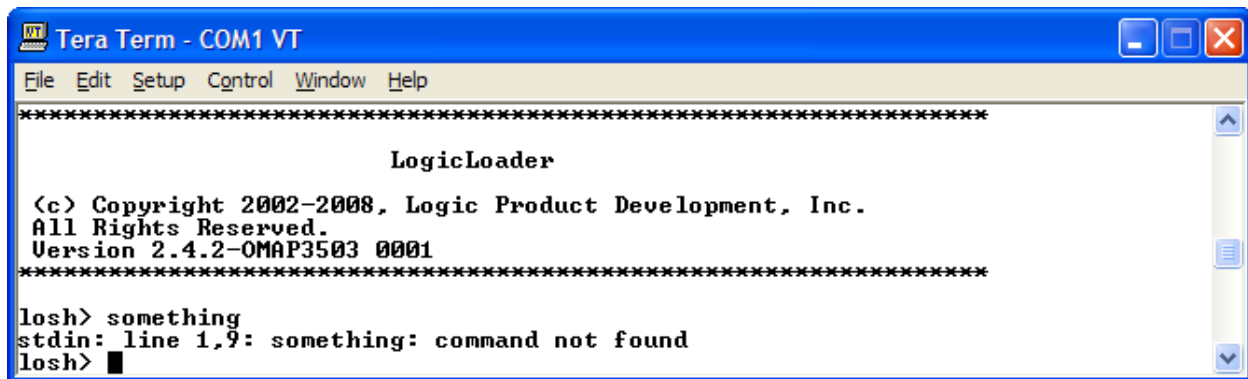
9.2.4 Help for Incorrect Commands

Type the word **something** at the `losh>` prompt and press the “Enter” key.



```
Tera Term - COM1 VT
File Edit Setup Control Window Help
*****
                        LogicLoader
(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****
losh> something
```

You should receive output similar to the image below.

A screenshot of 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 shows the following output:

```
*****
                        LogicLoader

(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****

losh> something
stdin: line 1,9: something: command not found
losh> █
```

That was a disappointment. Of course, this is because there is no actual command named “something” included with the LogicLoader program. However, let’s take a quick look at what was printed out. LoLo displayed the string

```
stdin: line 1,9: something: command not found
```

after we pressed the “Enter” key. There are actually four pieces of information contained in this string, each separated by colons (“:”).

The first piece of information is `stdin`. This is an abbreviation for the words “standard input.” If you’ve ever spent any time working with a UNIX or Linux computer, you will probably understand what this refers to. If you haven’t, don’t worry, we will explain it for you. LogicLoader is a program that you get to interact with. The program needs a way to receive information from you so it can try to do what you want it to. The manner in which a program receives input from users has traditionally been called “standard input,” or more briefly, “stdin.” On a desktop computer, you are probably used to using a keyboard and a mouse to interact with programs. The operating system (e.g., Microsoft Windows) collects the characters you type and information about where you moved and clicked your mouse and passes them to whatever program you are using. In the case of LogicLoader, there isn’t a mouse or a keyboard. LoLo collects the characters you send over your serial port via the terminal emulator program (Tera Term or HyperTerminal) and treats it as its “standard input.” So the first bit of information in the string

```
stdin: line 1,9: something: command not found
```

is telling you that whatever error LoLo encountered occurred when it tried to receive something from the “standard input,” which is the development kit’s serial port.

As a quick aside, “standard input” has a partner in crime named “standard output” or, simply, `stdout`. On your workstation, “standard output” is usually the display or monitor attached to the computer. On a Zoom Development Kit, “standard output” is also the kit’s serial port. So when LogicLoader has anything to say to you, it talks to you on its “standard output.” We will come back to the concept of “standard output” or “stdout” a bit later because sometimes it is useful to tell LoLo to send its information someplace other than “stdout.”

The next piece of information in the string is, `line 1,9`. This is LoLo telling you that whatever error it encountered occurred on the first line of data received on “stdin” between the first and ninth characters. If we look back at what we typed, we’ll notice that the word “something” has nine letters, therefore we can assume that LoLo had a problem with that particular word.

The next piece of information is the actual word `something`. This is LoLo printing out the input that caused the problem.

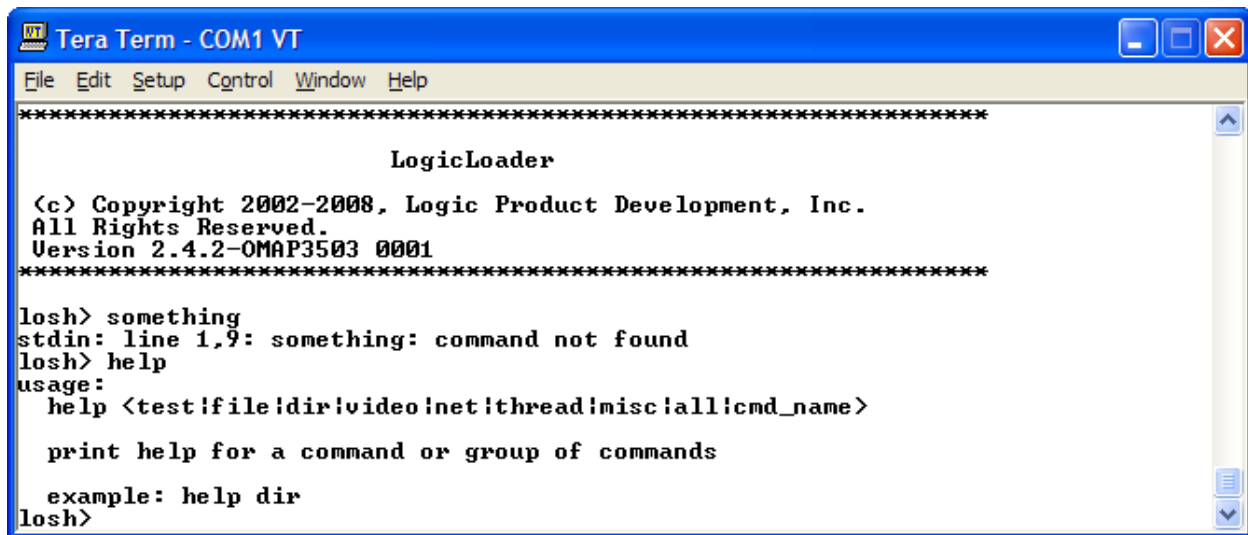
The final thing that the LogicLoader tells us is, command not found. This informs us that LoLo couldn't find a command named "something" to execute.

In general, if you make a mistake, LoLo will try to tell you what you did wrong. Don't worry about messing up or trying to type every command perfectly the first time. LoLo is a stable and forgiving program and you won't hurt your board by playing around with it.

Now that we have established that there isn't a command named "something," what sorts of commands are included in the LogicLoader?

9.2.5 Using the 'help' command

1. Type the word **help** at the `losh>` prompt and press the "Enter" key.

A screenshot of 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 shows the following output:

```
*****
                        LogicLoader
(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****

losh> something
stdin: line 1,9: something: command not found
losh> help
usage:
  help <test|file|dir|video|net|thread|misc|all|cmd_name>

  print help for a command or group of commands

example: help dir
losh>
```

Was that helpful? Maybe, maybe not, depending on how you expect a help system to work. Let's take a look at LoLo's help system. The first thing you should know is that LoLo interprets the word "help" as a command. The help command actually needs to be typed in conjunction with another word (its argument) to be a valid LoLo command. So by only typing "help," we typed an invalid LoLo command. We haven't done much right yet, have we?

It's okay that we made a mistake though, because LoLo recognized it and is trying to teach us how to use the "help" command. Let's look at what LoLo printed:

```
usage:

  help <test|file|dir|video|net|thread|misc|all|cmd_name>

  print help for a command or group of commands

example: help dir
```

The output above is known as a command's help topic. If you type a valid LoLo command, but don't use it in a valid manner, LoLo will print out the command's help topic to remind you of the command's proper format and use.

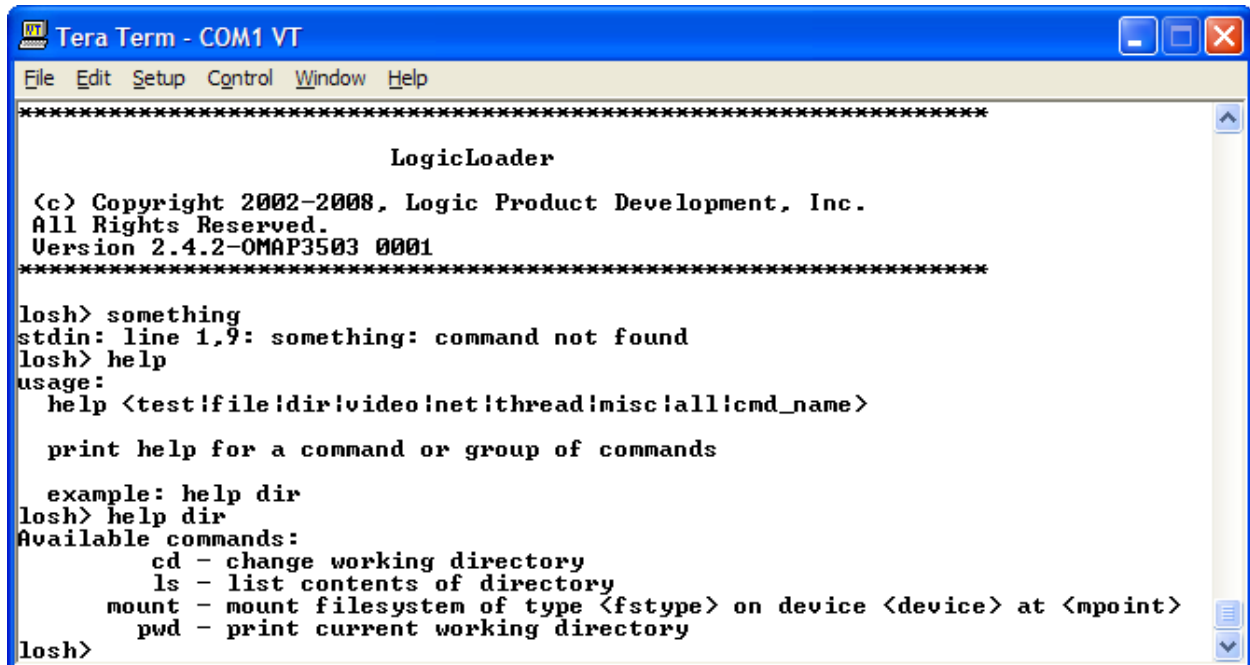
The string:

```
usage:

  help <test|file|dir|video|net|thread|misc|all|cmd_name>
```

is the command's usage string. It tells us how the command should be typed. Some commands need to be supplied with arguments to work correctly. If this is the case, the necessary arguments will be printed between angle bracket symbols "< >." If more than one option exists for an argument, the possible arguments will be listed and separated by the vertical bar symbol "|." The above usage string is telling us that the help command must be given an argument and that argument can be the word "test," or the word "file," or the word "dir," etc. The rest of the output simply tries to explain what a command does and provide an example of how to use the command. Let's follow LogicLoader's example and see what happens.

2. Type the words **help dir** at the `losh>` prompt and press the "Enter" key



```
Tera Term - COM1 VT
File Edit Setup Control Window Help
*****
                        LogicLoader

(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****

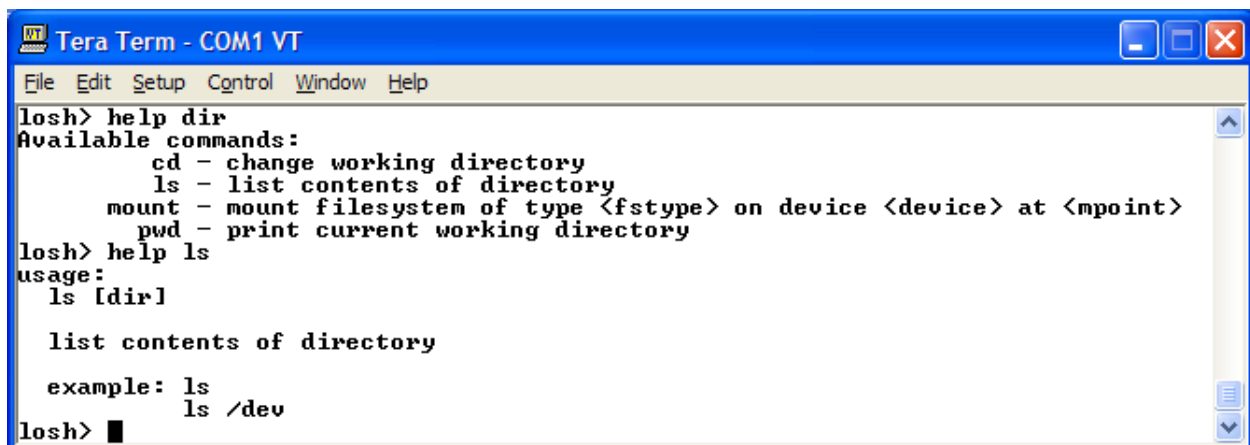
losh> something
stdin: line 1,9: something: command not found
losh> help
usage:
  help <test|file|dir|video|net|thread|misc|all|cmd_name>

  print help for a command or group of commands

  example: help dir
losh> help dir
Available commands:
    cd - change working directory
    ls - list contents of directory
    mount - mount filesystem of type <fstype> on device <device> at <mpoint>
    pwd - print current working directory
losh>
```

Now the help command is working for us. It printed a list of LogicLoader commands relating to directories along with a short summary of what each command does.

3. Type **help ls** at the `losh>` prompt and press the "Enter" key



```
Tera Term - COM1 VT
File Edit Setup Control Window Help

losh> help dir
Available commands:
    cd - change working directory
    ls - list contents of directory
    mount - mount filesystem of type <fstype> on device <device> at <mpoint>
    pwd - print current working directory
losh> help ls
usage:
  ls [dir]

  list contents of directory

  example: ls
           ls /dev
losh>
```

By using “ls” as the help command’s argument, we’ve asked the help command to print the help-topic for a specific LogicLoader command.

We’ve just learned three important things about LoLo’s “help” command. First, if you have completely forgotten how to use LoLo, just type “help” at the “losh>” prompt. Typing help will print the help-topic for the actual help command.

Second, the help command can print a summary group of commands relating to a specific topic. If you type “help dir” you will get a brief listing of all LoLo commands relating to directories. If you type “help file” you will get a listing of LoLo commands used when working with files.

Third, the help command will display the help-topic for a single command. If you know a command’s name but forgot how to use it, just type “help” followed by the name of the command and you will see the help-topic for that command.

Before we continue, let’s take a closer look at the “ls” command’s help-topic. It looks a little different than what we saw before. Notice the command’s usage string, reprinted below.

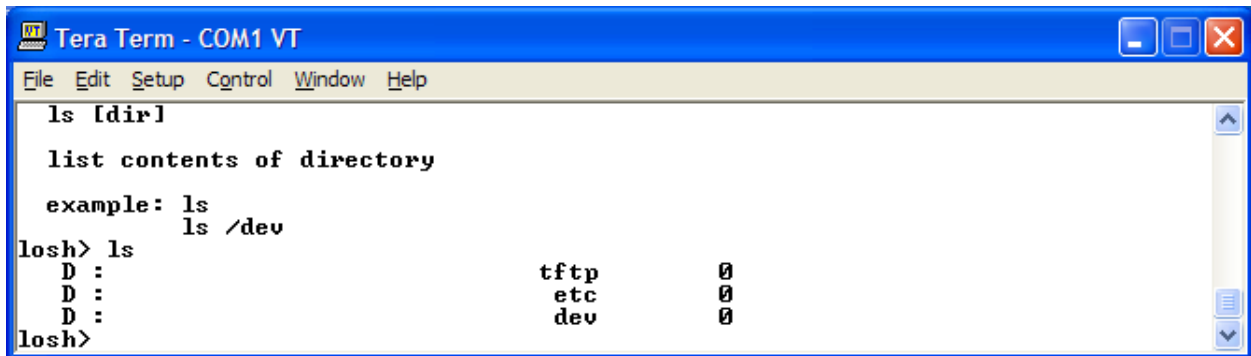
usage :

ls [dir]

There aren’t any angle bracket symbols (“< >”) on that line, but there is a pair of square brackets (“[]”) with the word “dir” in between them. Arguments that *must* be supplied with a given command are listed in angle brackets. Arguments that *may optionally* be used with a command are listed in square brackets. So the “ls” command’s usage string tells you that you can either just type the command alone or optionally type the command with the name of the directory whose contents you want to list.

Try both of the examples as listed by the “ls” command’s help topic.

4. Type the letters **ls** at the losh> prompt and press the “Enter” key



```
Tera Term - COM1 VT
File Edit Setup Control Window Help

ls [dir]

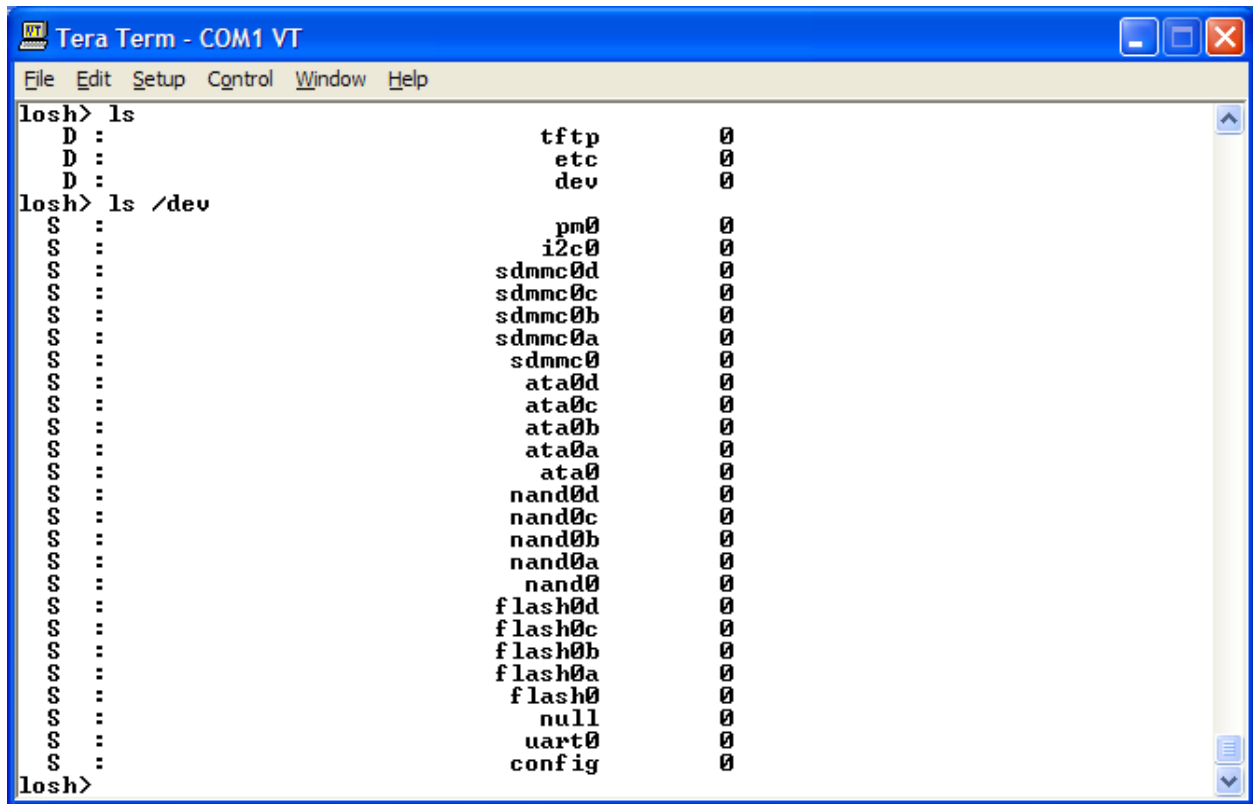
list contents of directory

example: ls
         ls /dev

losh> ls
D :      tftp      0
D :      etc       0
D :      dev       0
losh>
```

The first invocation of the “ls” command simply listed the contents of the current directory.

5. Type `ls /dev` at the `losh>` prompt and press the “Enter” key



```
losh> ls
D :          tftp          0
D :          etc           0
D :          dev           0
losh> ls /dev
$ :          pm0           0
$ :          i2c0          0
$ :          sdmmc0d       0
$ :          sdmmc0c       0
$ :          sdmmc0b       0
$ :          sdmmc0a       0
$ :          sdmmc0        0
$ :          ata0d         0
$ :          ata0c         0
$ :          ata0b         0
$ :          ata0a         0
$ :          ata0          0
$ :          nand0d        0
$ :          nand0c        0
$ :          nand0b        0
$ :          nand0a        0
$ :          nand0         0
$ :          flash0d       0
$ :          flash0c       0
$ :          flash0b       0
$ :          flash0a       0
$ :          flash0        0
$ :          null          0
$ :          uart0         0
$ :          config        0
losh>
```

The second invocation of the “ls” command listed the contents of the “/dev/” directory because we supplied the command with an optional argument. Before we leave the topic of LoLo’s help facility completely, let’s take a look at all of the available commands.

6. Type the words **help all** at the **losh>** prompt and press the “Enter” key



```
losh> help all
Available commands:
  bench-mark - time a loop of [increments] [reps] times
  bitmap     - draws a bitmap on the screen
  bootme     - starts a 'BOOTME' transfer with Platform Builder
  burn       - burns the already-loaded image into flash device [device]
  cache-flush - flush the processor's cache
  cache-off  - stop the processor's cache
  cache-on   - start the processor's cache
  cat        - print contents of a file to stdout
  cd         - change working directory
  config     - saves/displays configuration info in flash
  cp         - copies file <src> to new file <dest>
  cpu-freq   - sets the cpu frequency and voltage
  date       - display the number of seconds since boot
  dd         - copies from <if> to <of> <count> number of blocks.

  draw-test  - draws framed red, green, blue and stipple test patterns
  echo       - echo a string to stdout or write to [file]
  erase      - erase a section of non-volatile memory
  exec       - disable cache & ints, then jump to a loaded OS, or to [addr]
  help       - print help for a command or group of commands
  hd         - print a file to stdout in hex format
  ifconfig   - configure a network interface
  ifmac      - program/display the MAC address for a network interface
  info       - print information from chosen category
  jump       - jump to a loaded image, or to [addr]
  kill       - stop thread <thread_id> from executing
  load       - download a binary image
  ls         - list contents of directory
  md5sum     - calculate an MD5 hash on a file or memory chunk
  mem-cmp    - compare memory from <a> to <b> for <len>
  mem-copy   - copy memory <src> to <dst> for <count> in sizes of [bhw]
  mem-fill   - fill memory at <addr> for <count> with <value> in sizes of [bhw]
  mount      - mount filesystem of type <fstype> on device <device> at <mpoint>
  part-add   - set partition params on <device> from <start_block> with <length>
  for the given partition entry <a-d>
  part-write - Writes the partition table on the <device>
  part-rem   - Removes the partition <device>
  ping       - ping remote host at <ip-address> [reps] times
  ps         - display the list of currently executing threads
  pwd        - print current working directory
  reset      - resets the processor
  set        - print shell variables or set shell options
  setvar     - sets <varname> to value or incr/decr
  rm         - removes a file or files
  sleep      - sleep for <ms> number of milliseconds
  slide-show - displays a slide show of bitmaps on the screen
  source     - execute a series of losh commands from <file>
  test-dev   - open & call the test function for the specified device
  test-mem   - run a memory test. <v>erbose, <t>hreaded, just print <r>esults
  test-reg   - write & read a pattern into a reg 1M times, look for errors
  test-clock - make sure the clock functions work
  test-watch - md5sum read-only region of running lolo
  test-rtc   - starts or stops the rtc test and reports results
  tlb-flush  - flush the processor's tlb
  tsleep     - thread sleep for <ms> number of milliseconds
  unset      - print shell variables
  update     - load and install an update image for this Logic product
  video-clear - clear the default video screen
  video-close - turns off and disconnects the default video device
  video-fb   - sets or displays the video frame buffer address
  video-init - connect default video device but do not enable the controller
  video-off  - turns off an initialized display
  video-on   - turns on an initialized display
  video-open - open the default video device
  w          - write memory [of specified width, w is default] at addr
  x          - examine memory with [width][format] at an addr for a [len]

losh> █
```

Supplying the “help” command with the “all” argument lists the name of each command built into the version of LoLo running on your development kit along with a brief description of what the command does. Logic provides a *LogicLoader User's Manual* and a *LogicLoader Command Description Manual* on the downloads page for your specific development kit. You should download these documents now.

9.3 Lab 3: Using the LogicLoader Command Line Editor

9.3.1 Abstract

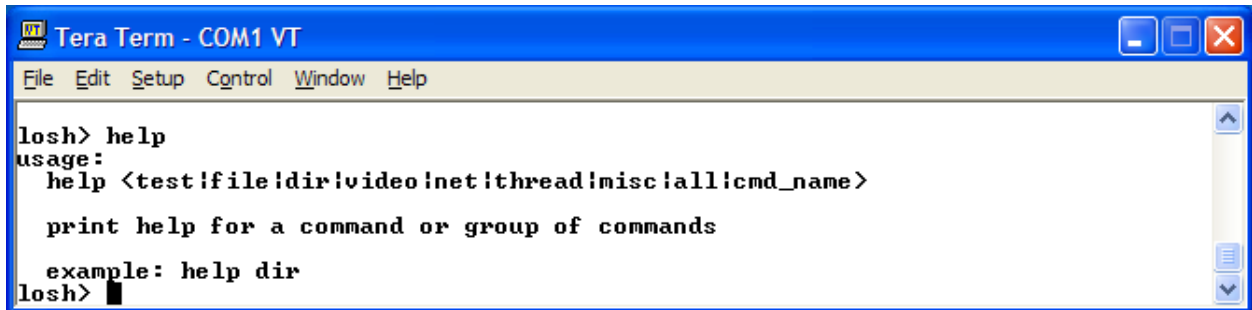
This lab will teach you how to work more efficiently with LogicLoader (LoLo) by learning its command line editing features.

9.3.2 What you will need

- A Zoom OMAP35x Development Kit
- A development workstation (PC or laptop)
- A serial port communications connection between the workstation and the development kit

9.3.3 Instructions

1. At the `losh>` prompt, type the `help` command



```
losh> help
usage:
  help <test!file!dir!video!net!thread!misc!all!cmd_name>

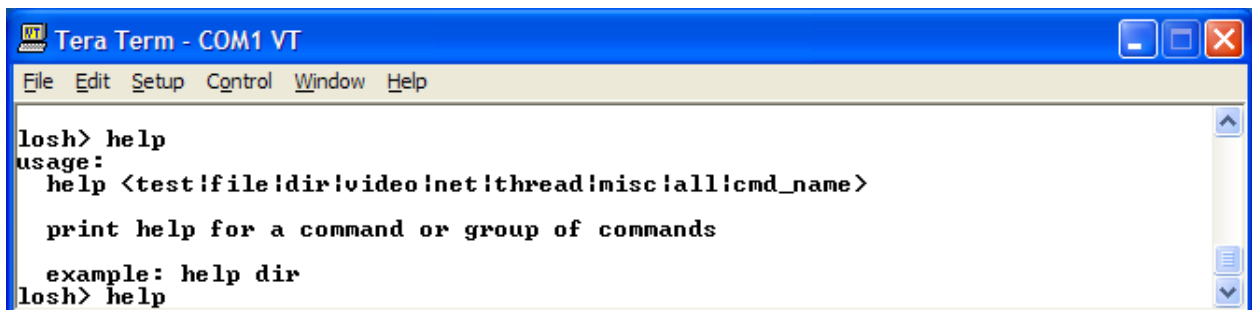
  print help for a command or group of commands

  example: help dir
losh>
```

As discussed in the “LogicLoader Help System” lab, the help command requires an argument. Therefore, just typing “help” prints out the commands usage string to remind us how the command should look.

Now that we’ve been reminded that the help command needs an argument, let’s pretend that we wanted to type “help video” because we wanted to see all of the commands that relate to a display. We *could* just type “help video” at the prompt and press the Enter key. But, there is an easier way.

2. At the `losh>` prompt, press the up-arrow key on your keyboard



```
losh> help
usage:
  help <test!file!dir!video!net!thread!misc!all!cmd_name>

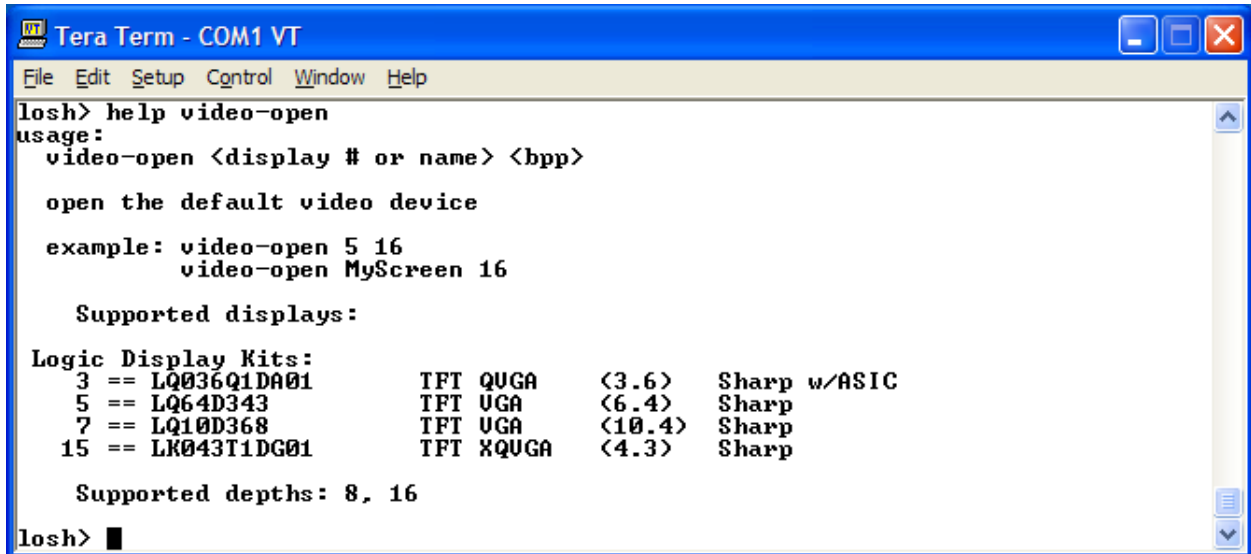
  print help for a command or group of commands

  example: help dir
losh> help
```


Notice how the help command reappears? The up-arrow cycles through the last several commands that you have typed—fifteen to be exact. Type a few more commands and then use the up-arrow and Enter key to find and repeat them.

The down-arrow works in the opposite way of the up-arrow. Using the arrows can save you quite a bit of typing if you need to repeat a command often. But what if you typed the command wrong to begin with?

3. At the `losh>` prompt type the command **help video-open** followed by the “Enter” key



```
losh> help video-open
usage:
  video-open <display # or name> <bpp>

  open the default video device

  example: video-open 5 16
           video-open MyScreen 16

  Supported displays:

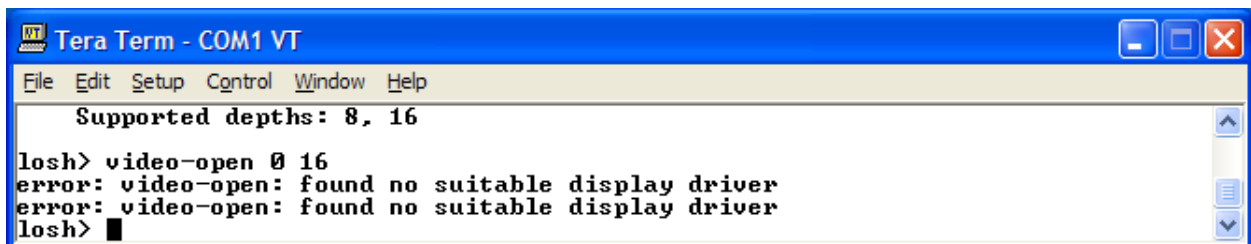
  Logic Display Kits:
  3 == LQ036Q1DA01      TFT QUGA    <3.6>   Sharp w/ASIC
  5 == LQ64D343         TFT UGA    <6.4>   Sharp
  7 == LQ10D368         TFT UGA    <10.4>  Sharp
  15 == LK043T1DG01     TFT XUGA   <4.3>   Sharp

  Supported depths: 8, 16

losh>
```

The “video-open” command is used to initialize LogicLoader’s display. We won’t go into much detail concerning the specifics of that command during this lab. However, by reading the command’s help-topic we can see that it takes two mandatory arguments: a display number and depths. By reading the output further, we can see that the version used during the writing of this lab accepted display numbers 3, 5, 7, and 15. We can also see that a display depth of 8 and 16 bits per pixel is supported.

4. At the `losh>` prompt type the command **video-open 0 16** followed by the “Enter” key



```
Supported depths: 8, 16

losh> video-open 0 16
error: video-open: found no suitable display driver
error: video-open: found no suitable display driver
losh>
```

Notice that we typed the command wrong and LoLo prompted us. The error was a result of us trying to initialize screen number zero, which our help-topic told us was not supported.

Instead of retyping the entire command line, let’s just fix the command we sent to LogicLoader.

1. Press the up-arrow to bring back the command previously entered;
2. Use the left-arrow to bring the curser to the right of the “0” character;

3. Use the “Backspace” key to delete the errant zero;
4. Type the number of a supported display (such as 15) in place of the zero;
5. Press the “Enter” key.

Notice how the command is correct now? Editing the command line instead of retyping the entire line cut our key presses in half.

For those of you familiar with traditional terminal emulators or using a program that doesn't properly send Backspace and arrow key presses, there is another series of key combinations that will move you around a command line. These are listed below:

- ☐ Control-a - move to beginning of the line
- ☐ Control-e - move to the end of the line
- ☐ Control-b - move backward (to the left) one character
- ☐ Control-f - move forward (to the right) one character
- ☐ Control-d - delete (remove) the character under the cursor

Go ahead and take some time to familiarize yourself with the above key combinations and command line editing.

9.4 Lab 4: Updating LogicLoader

9.4.1 Abstract

This lab will teach you how to download a new version of the LogicLoader (LoLo) to your Zoom OMAP35x Development Kit using the 'update' command.

9.4.2 What you will need

- A Zoom OMAP35x Development Kit
- A development workstation (PC or laptop)
- An available serial port or USB-to-serial adapter
- A terminal emulation program such as HyperTerminal or Tera Term. **Note:** Logic recommends using Tera Term, a free program downloadable from the Internet.

9.4.3 Basic instructions

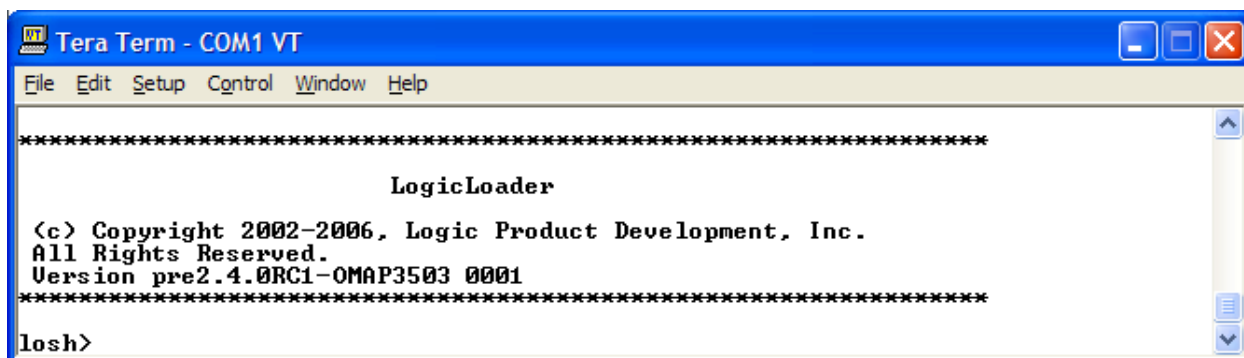
Using the same process you learned in “Lab 1: Kit Communications,” open your terminal emulator and set the port settings to:

- 115200 BAUD rate
- 8 data-bits
- No parity
- No hardware flow control
- No software flow control

9.4.4 Connect the Kit to your workstation

Use the gray serial cable marked “LOGIC” to connect the serial port on the kit to the appropriate port on your workstation

Apply power to the kit and you should see the LogicLoader welcome prompt similar to the image below

The image is a screenshot of a terminal window titled "Tera Term - COM1 VT". The window has a menu bar with "File", "Edit", "Setup", "Control", "Window", and "Help". The terminal content shows a welcome message for LogicLoader, enclosed in asterisks. The message reads: "LogicLoader", "(c) Copyright 2002-2006, Logic Product Development, Inc.", "All Rights Reserved.", "Version pre2.4.0RC1-OMAP3503 0001", and "*****". Below the message, the prompt "losh>" is visible. The terminal window has standard Windows-style window controls (minimize, maximize, close) in the top right corner.

Take note of what version number appears in this welcome prompt, as that piece of information will be required later on.

9.4.5 Obtain a new version of LogicLoader

The first step is to access Logic’s download site at <http://www.logicpd.com/auth/> and enter your username and password. This will bring you to your Account Summary page. Find the “OMAP35x Zoom Development Kit” name and click on the “All Downloads” link. On this page, scroll down to locate the most recent version of LogicLoader (under the “LogicLoader Bootloader/Monitor” heading) and download it to your development computer.

Now that you have downloaded the latest version of LogicLoader to your computer, you have to determine which method you can use to update LoLo on your development kit—using the ‘update’ command or using the ‘load elf’ command. Some versions of LogicLoader do not support the ‘update’ command and require using the ‘load elf’ command and the .elf file format of the LoLo download.

To determine which method is right for you, locate the .zip file containing the latest version of LogicLoader that you just downloaded. Extract the .zip file to your local drive. Within that file is a “Release_Notes” text file that will explain which versions require using the ‘load elf’ command. However, it is beneficial for you to know both of these methods, so make sure you read through both of the following sections even though you only need to perform the steps for the method that applies to you.

9.4.6 Download LogicLoader using the 'update' command

9.4.6.1 Procedure

1. Now that you have downloaded the version of LoLo that you want, you can open your terminal program and power up your Kit.
2. Type **update** and press the "Enter" key. Your screen should look similar to the figure below.



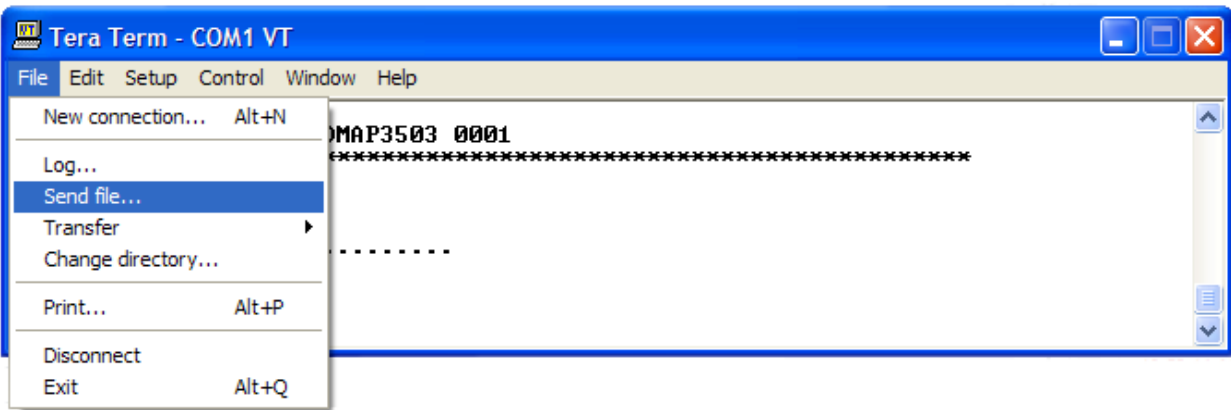
```
Tera Term - COM1 VT
File Edit Setup Control Window Help

LogicLoader

(c) Copyright 2002-2006, Logic Product Development, Inc.
All Rights Reserved.
Version pre2.4.0RC1-OMAP3503 0001
*****

losh> update
send update file:
```

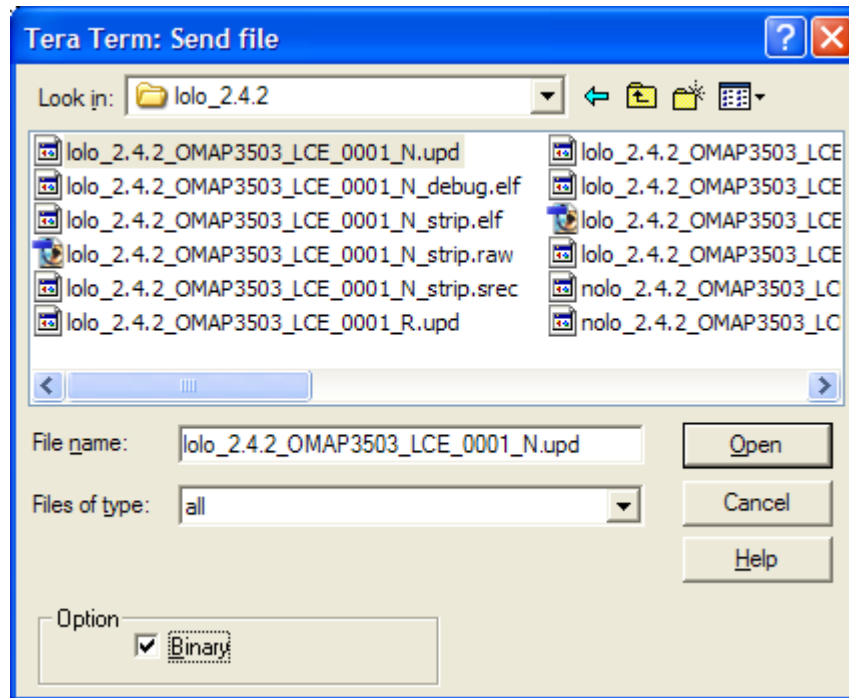
3. LoLo is waiting for you to send the new version over the serial port. Click 'File' and select 'Send file' to send the new LogicLoader to your kit.



```
Tera Term - COM1 VT
File Edit Setup Control Window Help
New connection... Alt+N
Log...
Send file...
Transfer
Change directory...
Print... Alt+P
Disconnect
Exit Alt+Q

OMAP3503 0001
*****
.....
```

4. Locate and select the lolo.upd file you downloaded to your hard drive. Also, verify that the 'Binary' option is selected. Then click 'Open' to download the new LogicLoader.



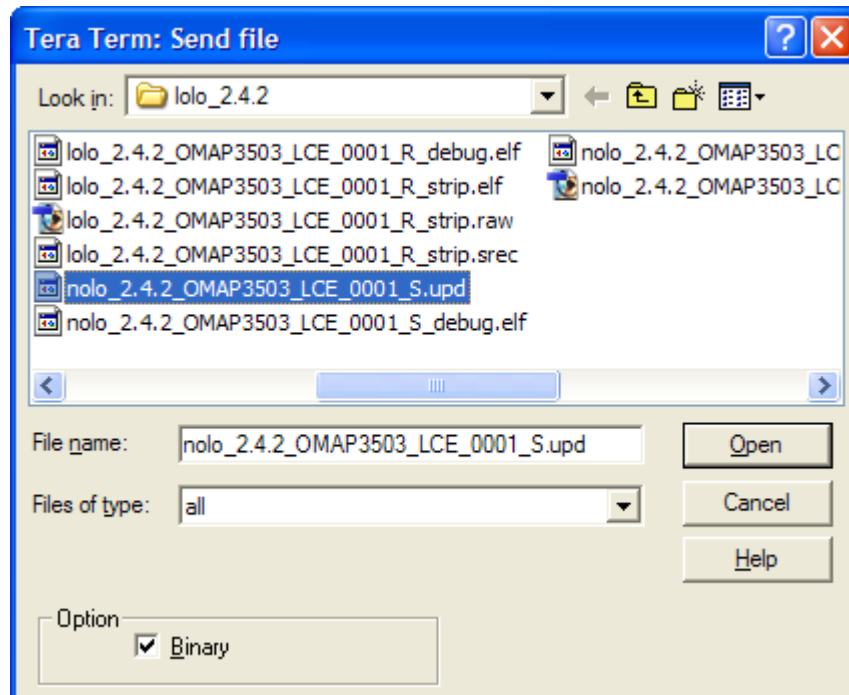
5. LoLo will erase flash and then it will burn the new LoLo into flash. Verify that the download was successful by waiting for an update done message to appear.

```
Tera Term - COM1 VT
File Edit Setup Control Window Help

<c> Copyright 2002-2006, Logic Product Development, Inc.
All Rights Reserved.
Version pre2.4.0RC1-OMAP3503 0001
*****

losh> update
send update file:
.....
update done.
losh> █
```

6. This version of LoLo has both a LoLo and a NoLo. Logic will update both files together, so you should always update your NoLo whenever you put a new version of LoLo on your SOM. Simply type **update** again and follow the same procedure to send a file, only this time pick the NoLo file.

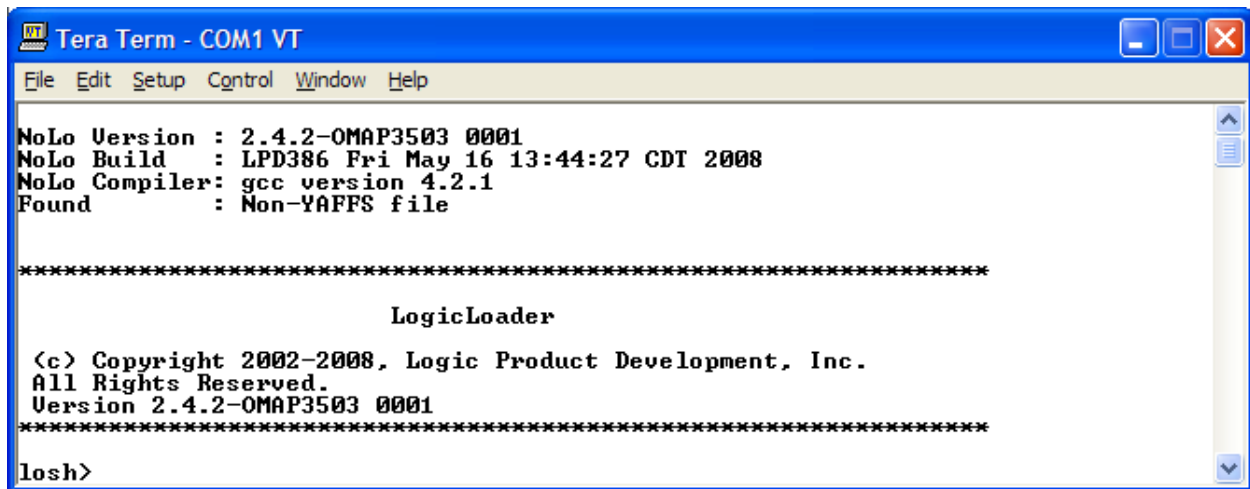


7. Wait for the update done message to appear and the update is complete.

```
Tera Term - COM1 VT
File Edit Setup Control Window Help
*****
                        LogicLoader
(c) Copyright 2002-2006, Logic Product Development, Inc.
All Rights Reserved.
Version pre2.4.0RC1-OMAP3503 0001
*****

losh> update
send update file:
.....
update done.
losh> update
send update file:
..
update done.
losh> █
```

8. Now you can reset the Kit and verify the new LogicLoader version number.



```
Tera Term - COM1 VT
File Edit Setup Control Window Help

NoLo Version : 2.4.2-OMAP3503 0001
NoLo Build   : LPD386 Fri May 16 13:44:27 CDT 2008
NoLo Compiler: gcc version 4.2.1
Found       : Non-YAFFS file

*****

                        LogicLoader

(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****

losh>
```

9. If the new version number is displayed, you now have the latest and greatest version of LogicLoader installed on your kit.

9.5 Lab 5: Network Connection

9.5.1 Abstract

This lab will teach you how to connect your workstation to the Zoom Development Kit via Ethernet.

9.5.2 What you will need

- A Zoom OMAP35x Development Kit
- A development workstation (PC or laptop)
- An available serial port or USB-to-serial adapter
- A terminal emulation program such as HyperTerminal or TeraTerm. **Note:** Logic recommends using TeraTerm, a free program downloadable from the Internet.

9.5.3 Basic instructions

Using the same process you learned in the “Kit Communication” lab, open your terminal emulator and set the port settings to:

- 115200 BAUD rate
- 8 data-bits
- No parity
- No hardware flow control
- No software flow control

9.5.4 Connect the Kit to your workstation

Use the gray serial cable marked "LOGIC" to connect the serial port on the kit to the appropriate port on your workstation

Apply power to the kit and you should see the LogicLoader welcome prompt similar to the image below

The image is a screenshot of 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 a welcome message for LogicLoader, enclosed in asterisks. The message reads: "LogicLoader", "<c> Copyright 2002-2008, Logic Product Development, Inc.", "All Rights Reserved.", "Version 2.4.2-OMAP3503 0001". At the bottom of the window, the prompt "losh>" is visible with a cursor. The window has standard Windows-style window controls (minimize, maximize, close) in the top right corner.

9.5.5 Connect the Kit to Ethernet

Use the yellow Ethernet cross-over cable to connect the Ethernet port on the kit to your workstation or a standard cable to connect to a switch

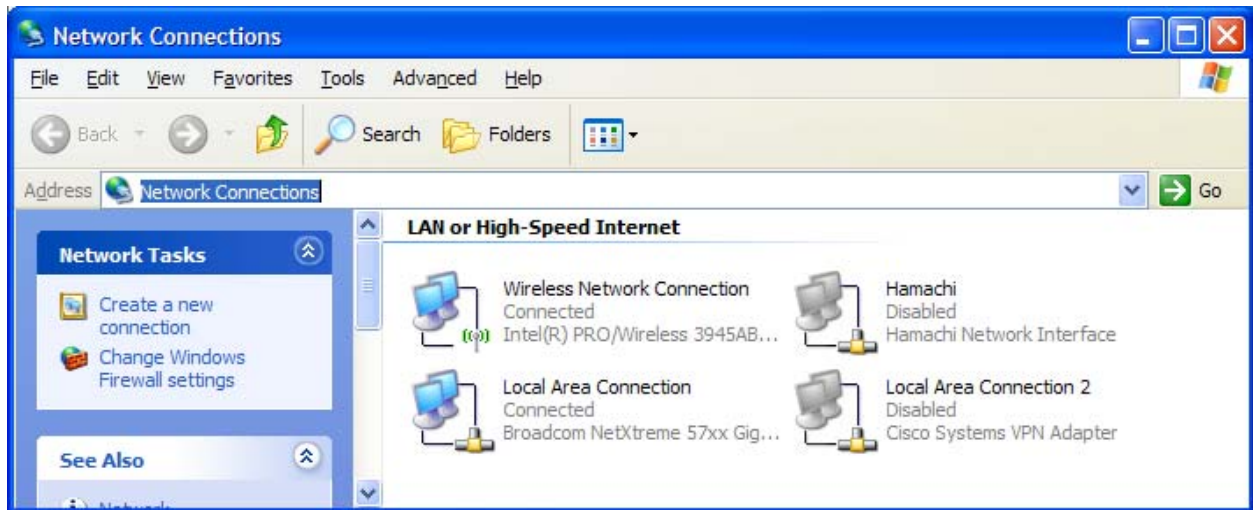
Adding Ethernet connectivity to your kit will make several procedures easier and is essential for connecting to Platform Builder. There are multiple ways to connect your kit to a workstation, we will discuss both a direct connection using a cross-over Ethernet cable and connecting through a network switch.

9.5.6 Kit Network Setup for Ethernet Cross-over Cable

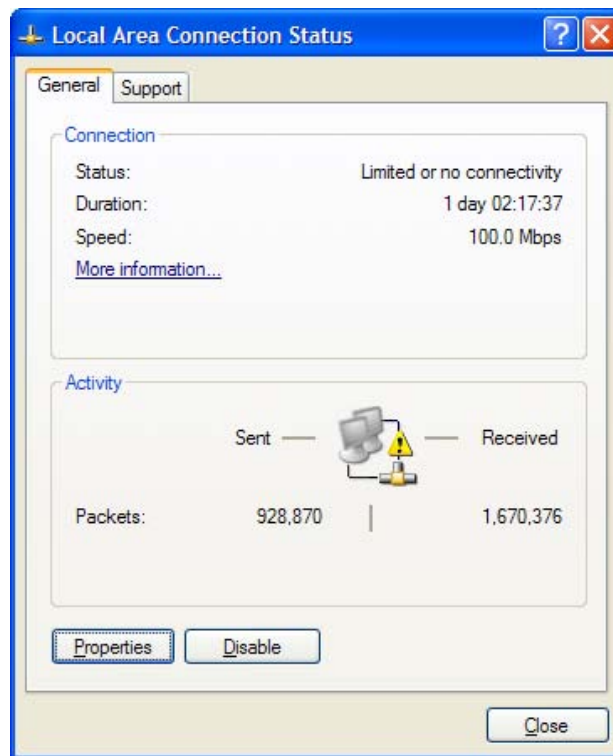
If you are using the Ethernet cross-over cable, you will need to setup the kit address using the full 'ifconfig' command. If you don't know the IP address of your workstation, go to Start -> Run and type **cmd**. Type **ipconfig /all** and locate the IP address for the Wired LAN connection that you are using.

The IP address of the kit must match the IP address of your workstation for as many 255 number sets as there are in the subnet mask. For example, if your subnet mask is 255.255.0.0 then the first two number sets of the IP address must be the same on both devices.

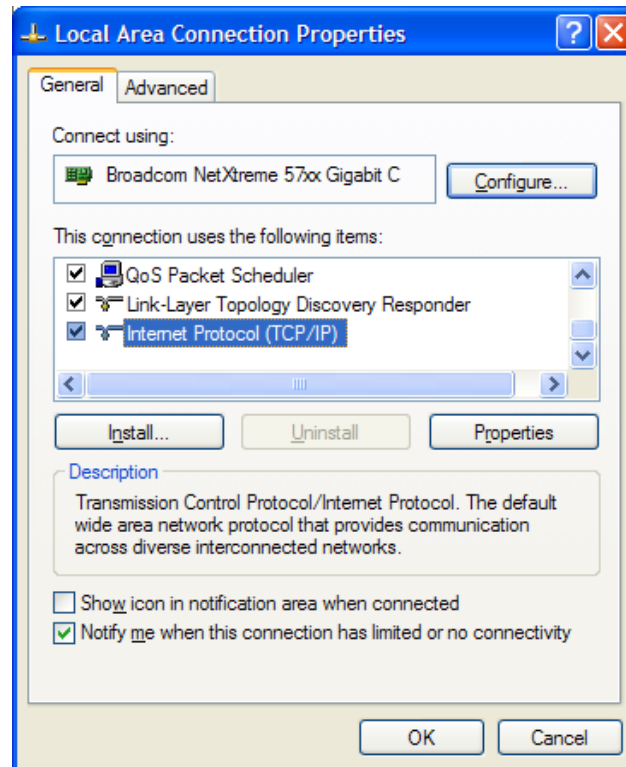
1. If you would like to set your IP address you can do so by going to:
Start -> Network Connections -> Local Area Connection.



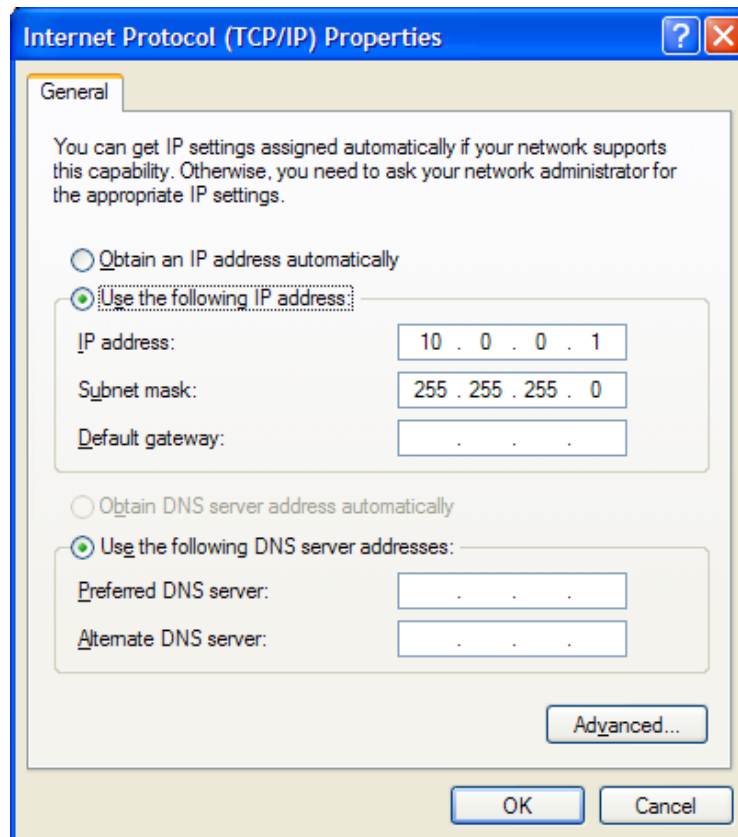
2. Double-click on the icon for your wired connection.



3. Click the “Properties” button. Scroll down until you see “Internet Protocol (TCP/IP)”. Click on the name to select it.



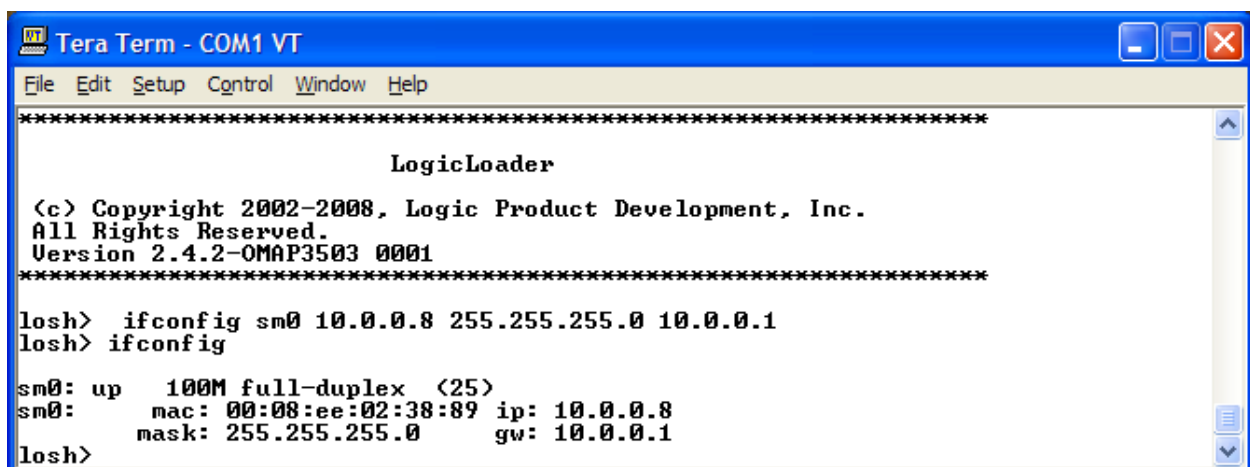
4. Click the “Properties” button.
5. Set your IP address and Subnet mask as desired. Then click the “OK” button.



6. Once you have the IP address and subnet mask of your workstation, return to your Tera Term window. Once there, you can use the following command line to set the networking parameters on the kit:

ifconfig sm0 <IP address of kit> <subnet mask> <IP address of workstation>

The figure below shows an example of the full 'ifconfig' command. Remember that your numbers will be different.

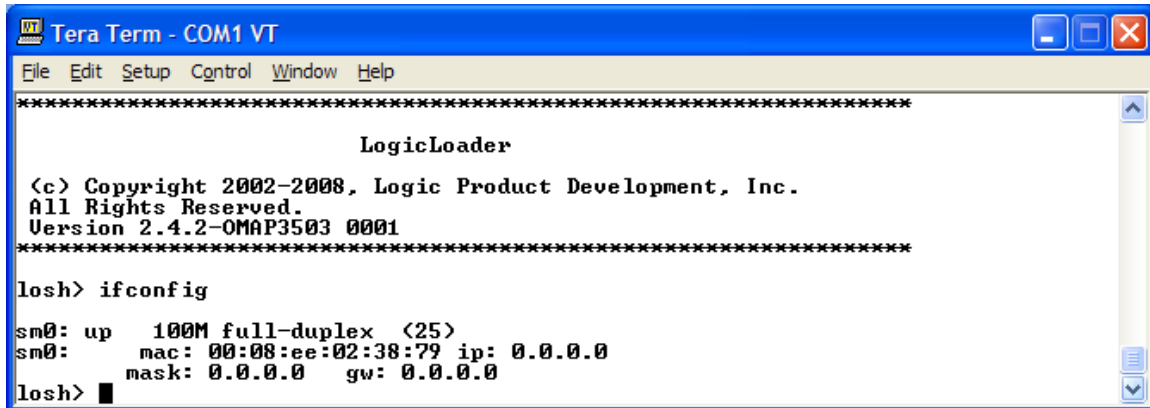


You now have setup your networking parameters and can skip to Section 9.5.8.

9.5.7 Kit Network Setup for Standard Ethernet Cable

If you have a network connection with DHCP you can use it to quickly set your network parameters.

1. From the `losh>` prompt, type **ifconfig**.



```
Tera Term - COM1 VT
File Edit Setup Control Window Help
*****
                        LogicLoader
<c> Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****

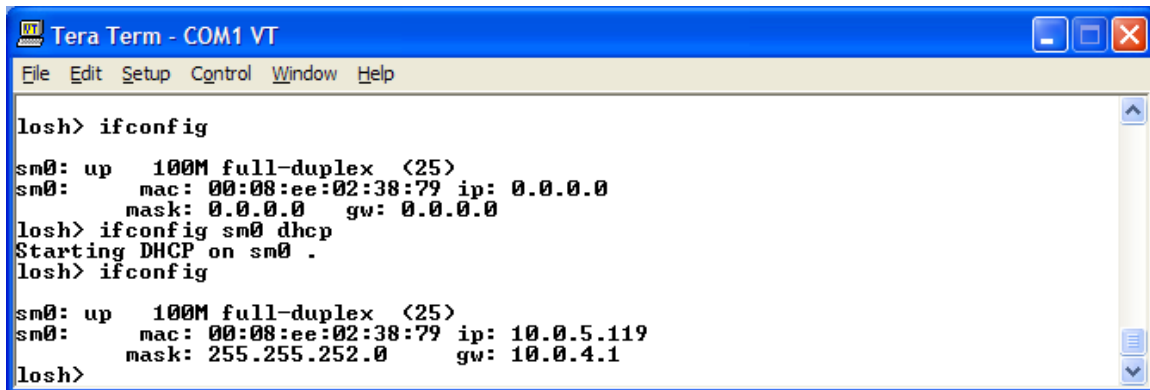
losh> ifconfig

sm0: up 100M full-duplex <25>
sm0: mac: 00:08:ee:02:38:79 ip: 0.0.0.0
mask: 0.0.0.0 gw: 0.0.0.0
losh>
```

You can see the interface information for sm0. The MAC address is 00:08:ee:02:38:79. The IP address, mask and gateway have not been set.

2. Type **ifconfig sm0 dhcp**

LoLo will start DHCP on sm0 and will set the IP address, mask and gateway parameters. To display the new values, type **ifconfig** again, as shown below.



```
Tera Term - COM1 VT
File Edit Setup Control Window Help

losh> ifconfig

sm0: up 100M full-duplex <25>
sm0: mac: 00:08:ee:02:38:79 ip: 0.0.0.0
mask: 0.0.0.0 gw: 0.0.0.0
losh> ifconfig sm0 dhcp
Starting DHCP on sm0 .
losh> ifconfig

sm0: up 100M full-duplex <25>
sm0: mac: 00:08:ee:02:38:79 ip: 10.0.5.119
mask: 255.255.252.0 gw: 10.0.4.1
losh>
```

9.5.8 Using the 'ping' command

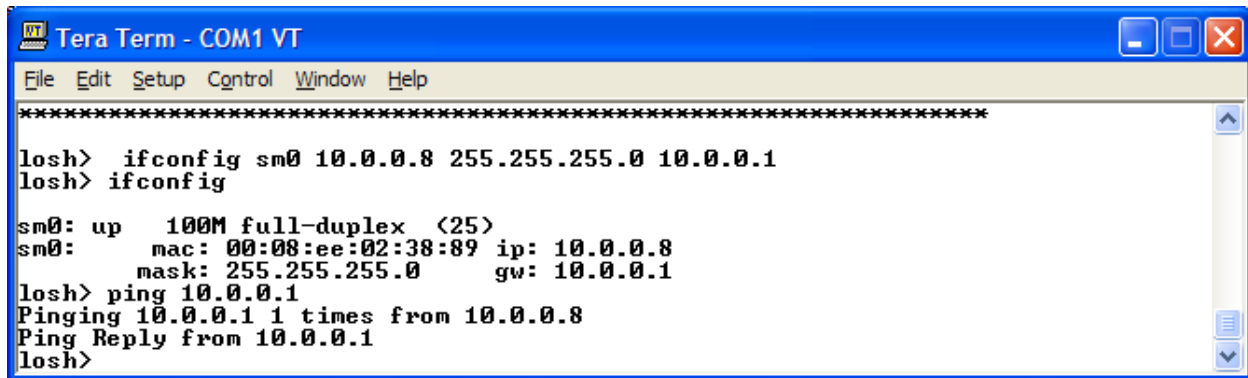
The 'ping' command can be used to check your connection to a specific workstation. You will need to have your kit connected via Ethernet and know the IP address of the target workstation.

9.5.8.1 Use the 'ping' command to check your connection

In the previous sections you used 'ifconfig' to initialize your Ethernet connection. Now you are going to use the 'ping' command to check the connection to a specific workstation. If you don't know the IP address of the target, go to Start -> Run and type **cmd**. Type **ipconfig /all** and locate the IP address for the connection you are using.

The 'ping' command can be used with just the IP address of the target workstation or with a number of different pings specified.

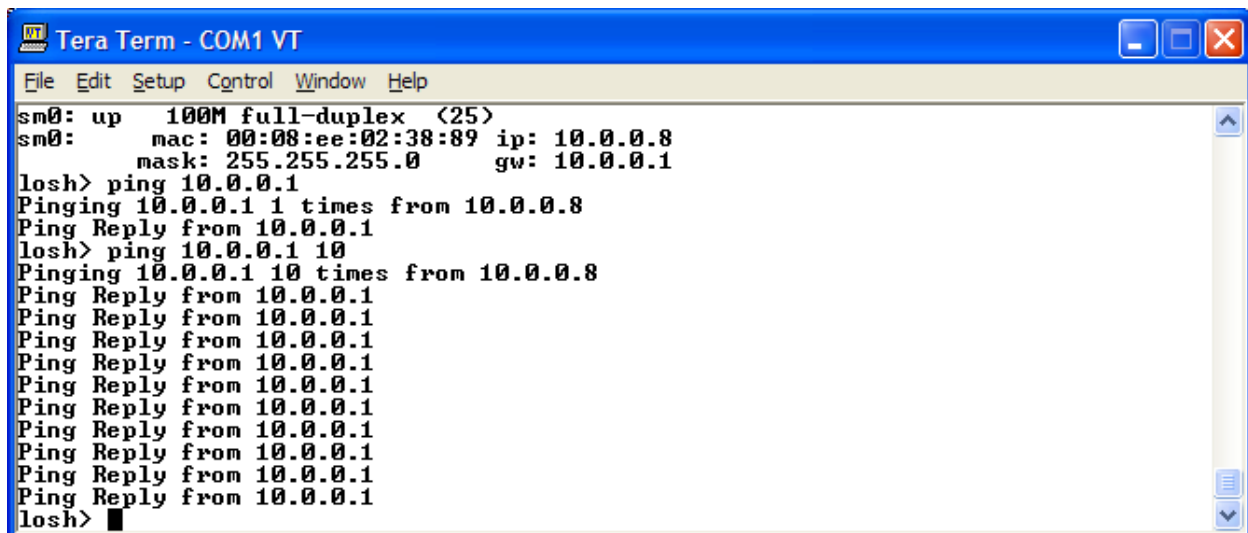
At the losh> prompt type **ping XXX.XXX.XXX.XXX** (fill in the X's with the IP address for your workstation).



```
Tera Term - COM1 VT
File Edit Setup Control Window Help
*****
losh> ifconfig sm0 10.0.0.8 255.255.255.0 10.0.0.1
losh> ifconfig

sm0: up 100M full-duplex <25>
sm0: mac: 00:08:ee:02:38:89 ip: 10.0.0.8
      mask: 255.255.255.0 gw: 10.0.0.1
losh> ping 10.0.0.1
Pinging 10.0.0.1 1 times from 10.0.0.8
Ping Reply from 10.0.0.1
losh>
```

This will ping your workstation one time. If you type **ping XXX.XXX.XXX.XXX 10** you will ping the target 10 times. An example is shown below (remember your IP address will be different than that in the example below).



```
Tera Term - COM1 VT
File Edit Setup Control Window Help
sm0: up 100M full-duplex <25>
sm0: mac: 00:08:ee:02:38:89 ip: 10.0.0.8
      mask: 255.255.255.0 gw: 10.0.0.1
losh> ping 10.0.0.1
Pinging 10.0.0.1 1 times from 10.0.0.8
Ping Reply from 10.0.0.1
losh> ping 10.0.0.1 10
Pinging 10.0.0.1 10 times from 10.0.0.8
Ping Reply from 10.0.0.1
Ping Reply from 10.0.0.1
Ping Reply from 10.0.0.1
Ping Reply from 10.0.0.1
Ping Reply from 10.0.0.1
Ping Reply from 10.0.0.1
Ping Reply from 10.0.0.1
Ping Reply from 10.0.0.1
Ping Reply from 10.0.0.1
Ping Reply from 10.0.0.1
losh>
```

Congratulations, you have confirmed the connection. This process can be used any time you need to set up a network connection between a kit and a workstation.

9.5.9 Use the 'ifmac' command to display and change the MAC address

The 'ifmac' command can be used with just the interface name to display the current MAC address of your kit by typing **ifmac sm0**. It will take LoLo a few seconds to get the MAC address the first time you use the 'ifmac' command. After the current MAC Address is displayed, the 'ifmac' command will display immediately.

```
Tera Term - COM1 VT
File Edit Setup Control Window Help
Ping Reply from 10.0.0.1
Ping Reply from 10.0.0.1
Ping Reply from 10.0.0.1
Ping Reply from 10.0.0.1
losh> ifmac sm0
      Current MAC Address: 00:08:ee:02:38:89
losh>
```

If you need to set your MAC address to something different than the current address, you can do so by adding the new address to the command. To change the address you can send bytes 4, 5, and 6. The first three bytes will default to Logic's 0x00:0x08:0xEE.

Type `ifmac sm0 0x00:0x0a:0xee`

LoLo will display the following message to confirm the change has taken place.

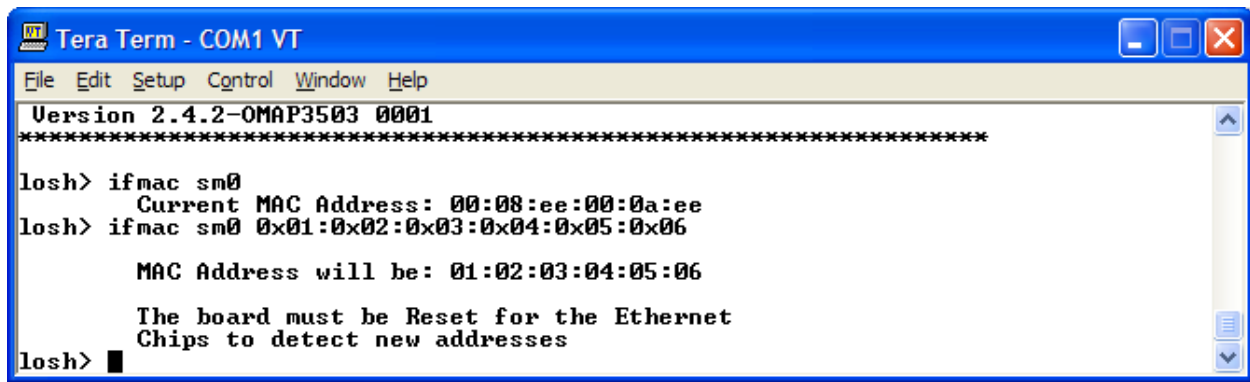
```
Tera Term - COM1 VT
File Edit Setup Control Window Help
losh> ifmac sm0
      Current MAC Address: 00:08:ee:02:38:89
losh> ifmac sm0 0x00:0x0a:0xee
      MAC Address will be: 00:08:ee:00:0a:ee
      The board must be Reset for the Ethernet
      Chips to detect new addresses
losh>
```

Reset your kit and type `ifmac sm0` to verify the new MAC address.

```
Tera Term - COM1 VT
File Edit Setup Control Window Help
*****
                        LogicLoader
(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****
losh> ifmac sm0
      Current MAC Address: 00:08:ee:00:0a:ee
losh>
```

If you prefer to set the whole address you can send all 6 bytes.

Type `ifmac sm0 0x01:0x02:0x03:0x04:0x05:0x06`



```
Tera Term - COM1 VT
File Edit Setup Control Window Help
Version 2.4.2-OMAP3503 0001
*****
losh> ifmac sm0
      Current MAC Address: 00:08:ee:00:0a:ee
losh> ifmac sm0 0x01:0x02:0x03:0x04:0x05:0x06
      MAC Address will be: 01:02:03:04:05:06
      The board must be Reset for the Ethernet
      Chips to detect new addresses
losh> █
```

Reset your kit and type `ifmac sm0`. The new MAC address will be displayed.



```
Tera Term - COM1 VT
File Edit Setup Control Window Help
*****
                        LogicLoader

(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****
losh> ifmac sm0
      Current MAC Address: 01:02:03:04:05:06
losh> █
```

9.6 Lab 6: File Systems

9.6.1 Abstract

This lab will teach you how to utilize file systems on the Zoom OMAP35x Development Kit.

9.6.2 What you will need

- A Zoom OMAP35x Development Kit
- A development workstation (PC or laptop)
- An available serial port or USB to serial adapter
- An SD card
- A terminal emulation program such as HyperTerminal or TeraTerm. **Note:** Logic recommends using TeraTerm, a free program downloadable from the Internet.

9.6.3 Basic instructions

Using the same process you learned in the “Kit Communications” lab, open your terminal emulation program and set the port settings to:

- 115200 BAUD rate
- 8 data-bits

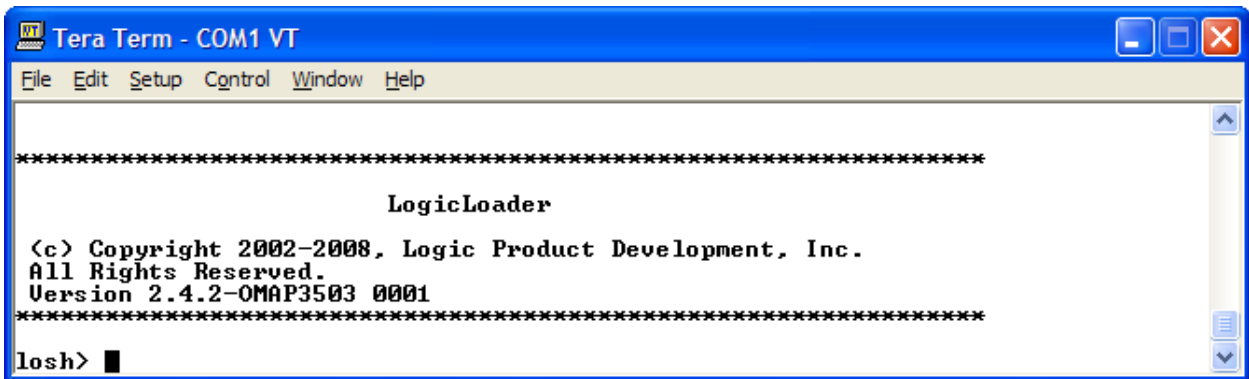
- No parity
- No hardware flow control
- No software flow control

9.6.4 FATFS (Fat File System)

9.6.4.1 Mount an SD Card

The first method of loading a file onto your kit that we will cover in this lab is to use a secure digital (SD) card. This section describes how to mount an SD card in LogicLoader.

1. Store a file on an SD card.
2. Insert the SD card into the Development Kit's SD card slot.
3. Start a terminal emulator program on the development workstation and connect the serial cable, provided with the Development Kit, from the workstation to the Development Kit.
4. Power up the Development Kit and verify the LogicLoader prompt appears in the terminal emulator window.

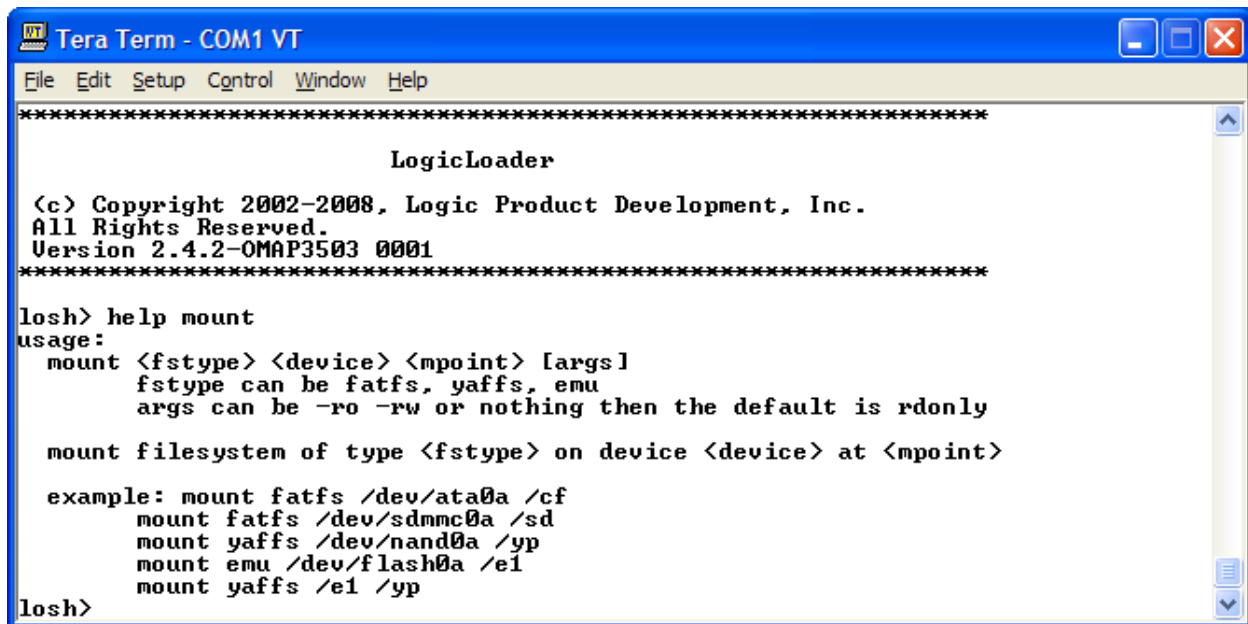


```

Tera Term - COM1 VT
File Edit Setup Control Window Help
*****
                        LogicLoader
(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****
losh> █

```


5. First let's look at the help command output for the mount command. Type **help mount**.



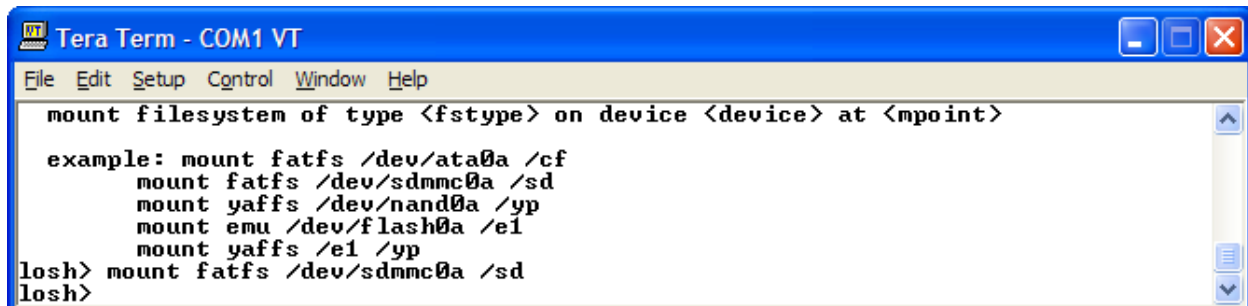
```
Tera Term - COM1 VT
File Edit Setup Control Window Help
*****
                        LogicLoader
(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****
losh> help mount
usage:
  mount <fstype> <device> <mpoint> [args]
      fstype can be fatfs, yaffs, emu
      args can be -ro -rw or nothing then the default is ronly

  mount filesystem of type <fstype> on device <device> at <mpoint>

example: mount fatfs /dev/ata0a /cf
         mount fatfs /dev/sdmmc0a /sd
         mount yaffs /dev/nand0a /yp
         mount emu /dev/flash0a /e1
         mount yaffs /e1 /yp
losh>
```

Remember that variables in the <> are required and variables in the [] are optional. Help usually gives the most frequently used options in the examples it provides.

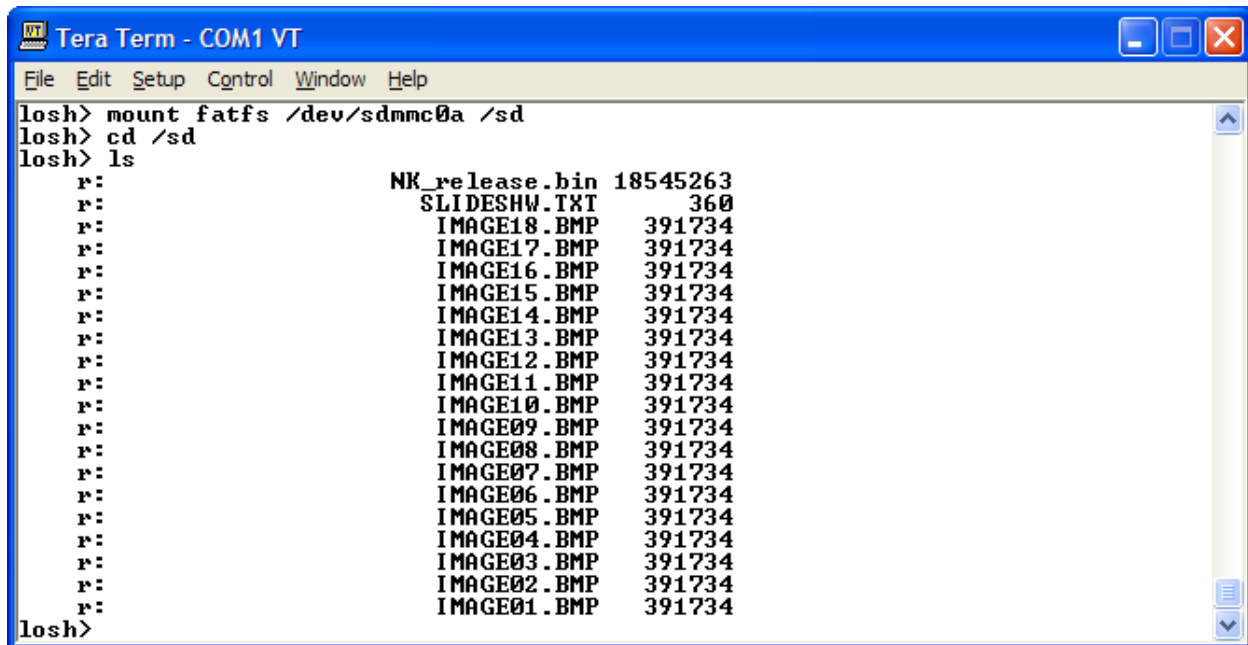
6. Type **mount fatfs /dev/sdmmc0a /sd**. The screen displayed should be similar to the one shown below.



```
Tera Term - COM1 VT
File Edit Setup Control Window Help
mount filesystem of type <fstype> on device <device> at <mpoint>

example: mount fatfs /dev/ata0a /cf
         mount fatfs /dev/sdmmc0a /sd
         mount yaffs /dev/nand0a /yp
         mount emu /dev/flash0a /e1
         mount yaffs /e1 /yp
losh> mount fatfs /dev/sdmmc0a /sd
losh>
```

- Now you can use the `cd /sd` command to change directories to the SD card, and then type `ls` to confirm that your card has been mounted and your file is on the card.



```
losh> mount fatfs /dev/sdmmc0a /sd
losh> cd /sd
losh> ls
r:      NK_release.bin 18545263
r:      SLIDESHW.TXT  360
r:      IMAGE18.BMP  391734
r:      IMAGE17.BMP  391734
r:      IMAGE16.BMP  391734
r:      IMAGE15.BMP  391734
r:      IMAGE14.BMP  391734
r:      IMAGE13.BMP  391734
r:      IMAGE12.BMP  391734
r:      IMAGE11.BMP  391734
r:      IMAGE10.BMP  391734
r:      IMAGE09.BMP  391734
r:      IMAGE08.BMP  391734
r:      IMAGE07.BMP  391734
r:      IMAGE06.BMP  391734
r:      IMAGE05.BMP  391734
r:      IMAGE04.BMP  391734
r:      IMAGE03.BMP  391734
r:      IMAGE02.BMP  391734
r:      IMAGE01.BMP  391734
losh>
```

- You now have access to the files on the SD card. If you don't want to use an SD card, you will need to store the file directly on the kit. We will cover one method for doing that in the next section.

9.6.4.2 Mount a CompactFlash Card

Mounting a CompactFlash card occurs in a similar manner to mounting an SD card.

IMPORTANT NOTE: CompactFlash is currently not supported in LogicLoader version 2.4.3. This feature is under development and will be added in a future release.

9.6.5 YAFFS (Yet Another Flash File System)

9.6.5.1 YAFFS Overview

The acronym YAFFS stands for the phrase "Yet Another Flash Filing System." YAFFS was developed by a company named Aleph One Limited and incorporated by Logic Product Development into the LogicLoader software program. The partition entries for YAFFS partitions are not persistent—they *must be restored on each boot*. However, the partitions and data remain persistent.

IMPORTANT NOTE: YAFFS is currently not supported in LogicLoader version 2.4.3. This feature is under development and will be added in a future release.

9.7 Lab 7: Using Scripts

9.7.1 Abstract

This lab will teach you how to use scripting to optimize your application on your Zoom OMAP35x Development Kit.

9.7.2 What you will need

- A Zoom OMAP35x Development Kit
- A development workstation (PC or laptop)
- An available serial port or USB-to-serial adapter
- An image to load onto your kit and boot with a script
- A terminal emulation program such as HyperTerminal or Tera Term. **Note:** Logic recommends using Tera Term, a free program downloadable from the Internet.

9.7.3 Basic instructions

Using the same process you learned in “Lab #1 Kit Communications,” open your terminal emulator and set the port settings to:

- 115200 BAUD rate
- 8 data-bits
- No parity
- No hardware flow control
- No software flow control

9.7.4 Connect the kit to your workstation

1. Use the gray serial cable marked “LOGIC” to connect the serial port on the kit to the appropriate port on your workstation
2. Apply power to the kit and you should see the LogicLoader welcome prompt similar to the image below.

The image shows a screenshot of a Tera Term terminal 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 a welcome message for "LogicLoader" enclosed in asterisks. The message includes copyright information for Logic Product Development, Inc. (2002-2008), version 2.4.2-OMAP3503 0001, and a "losh>" prompt with a cursor. The window has standard Windows-style window controls (minimize, maximize, close) in the top right corner.

```
Tera Term - COM1 VT
File Edit Setup Control Window Help
*****
                        LogicLoader
(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****
losh> █
```

9.7.5 Basic scripting guidelines

Scripts can be used to automate any command or command sequence that can be entered on the command line. Scripts can exist as a single text file containing the commands you want to execute separated by semicolons. They can also be a text file with each command on a separate line.

You can enter scripts using the same syntax you use at the `losh>` prompt. In fact, that is exactly what you are doing. You are setting up a list of LoLo commands to be executed one after the

other. By separating those commands by a semicolon or a new line, you are telling LoLo how to handle the script.

Launching scripts

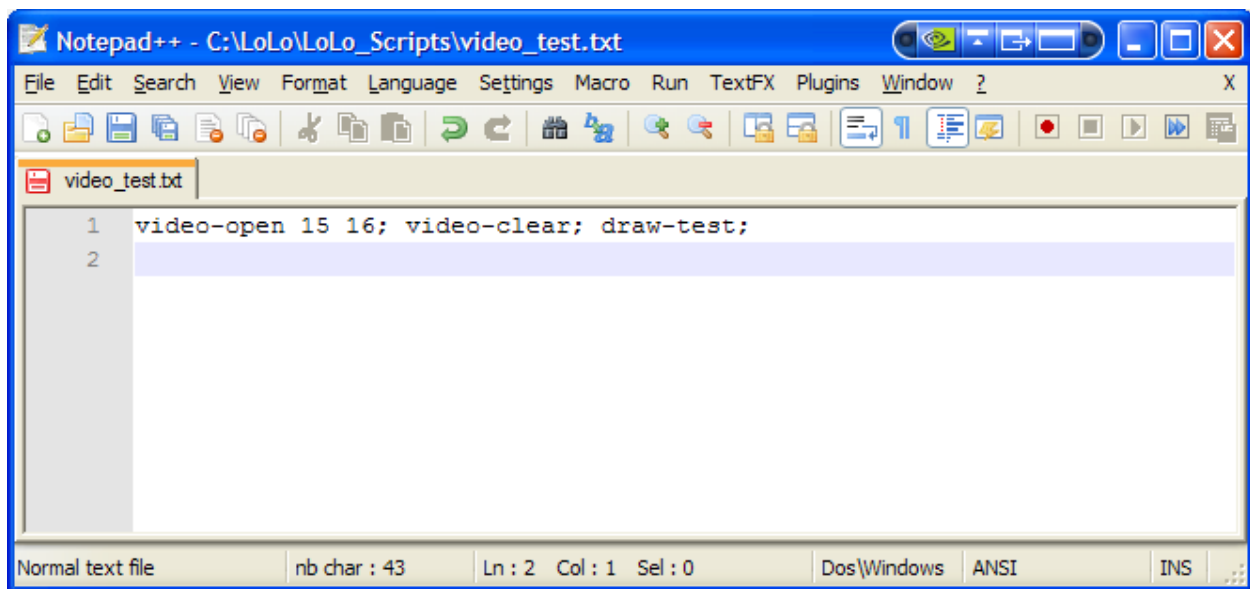
If your script is saved as a text file, you can run a script from Tera Term by using the 'Send | File' option when LoLo is waiting at the `losh>` prompt. Let's make a very simple script called `video_test` to open your display, clear the display, and run the `draw-test`.

The text file will look like: **`video-open 15 16; video-clear; draw-test;`**

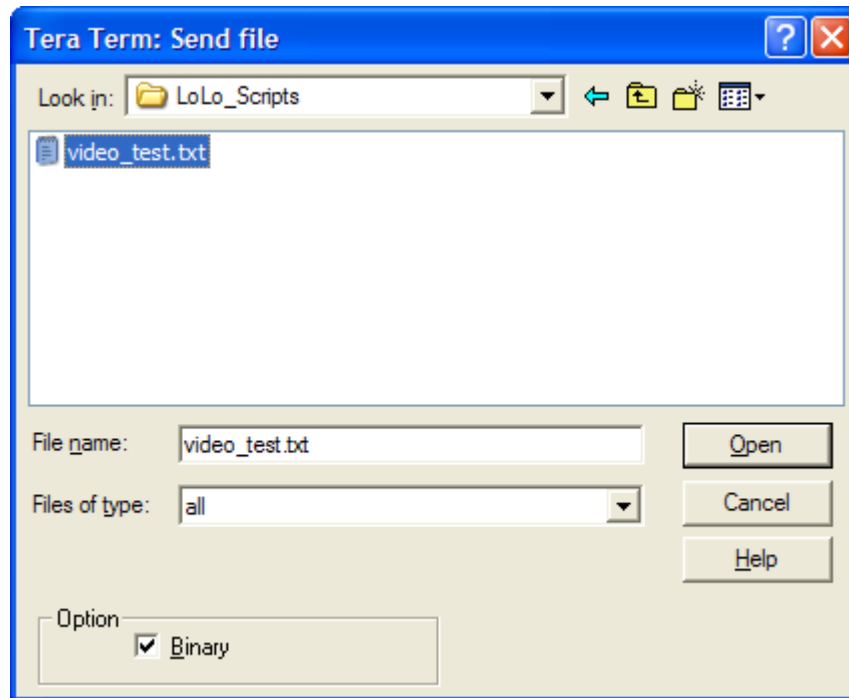
Or it can look like this: **`video-open 15 16`**
`video-clear`
`draw-test`

Be sure to place a carriage return after the last command to execute that last command, otherwise you'll have to press the "Enter" key to see the test pattern.

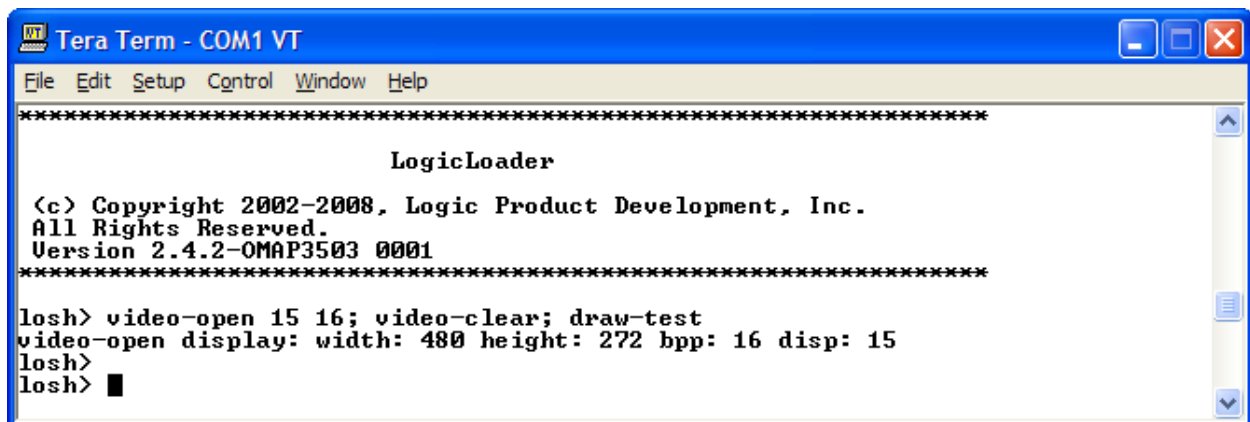
1. Open a text editor program and create a text file using commands above.
2. Save the file as: `video_test.txt`



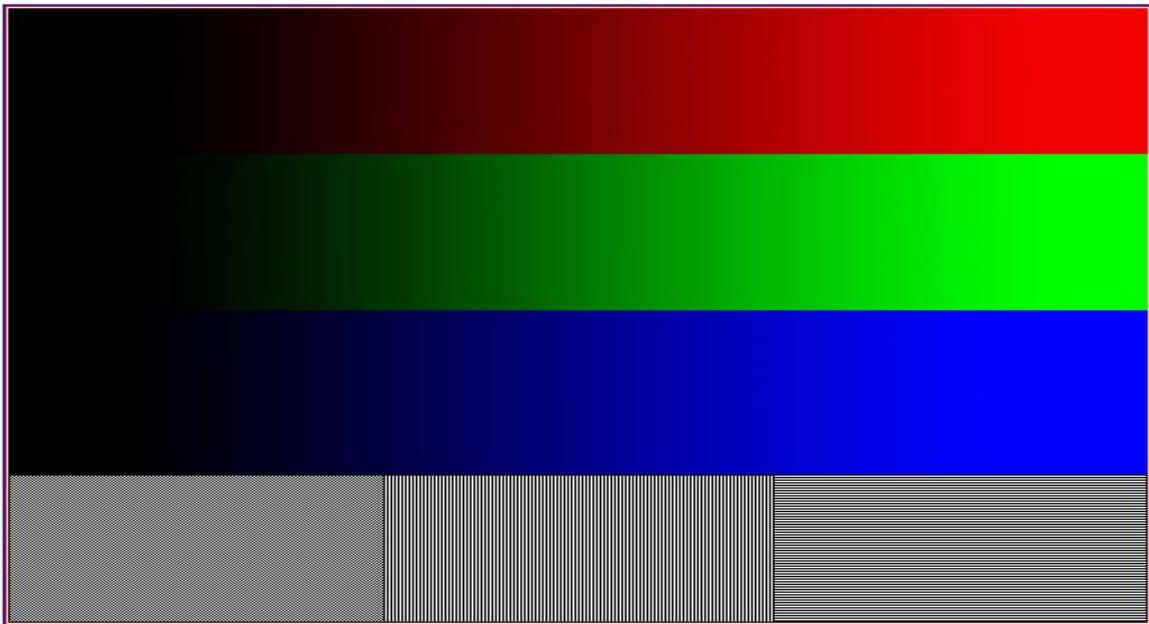
3. In Tera Term, click 'File' and select 'Send'. Then locate the "video_test.txt" file you just created. Click the "Open" button to send the script to your development kit.



4. The Tera Term window will display output information similar to what you see below.



5. And your LCD display will show the following:

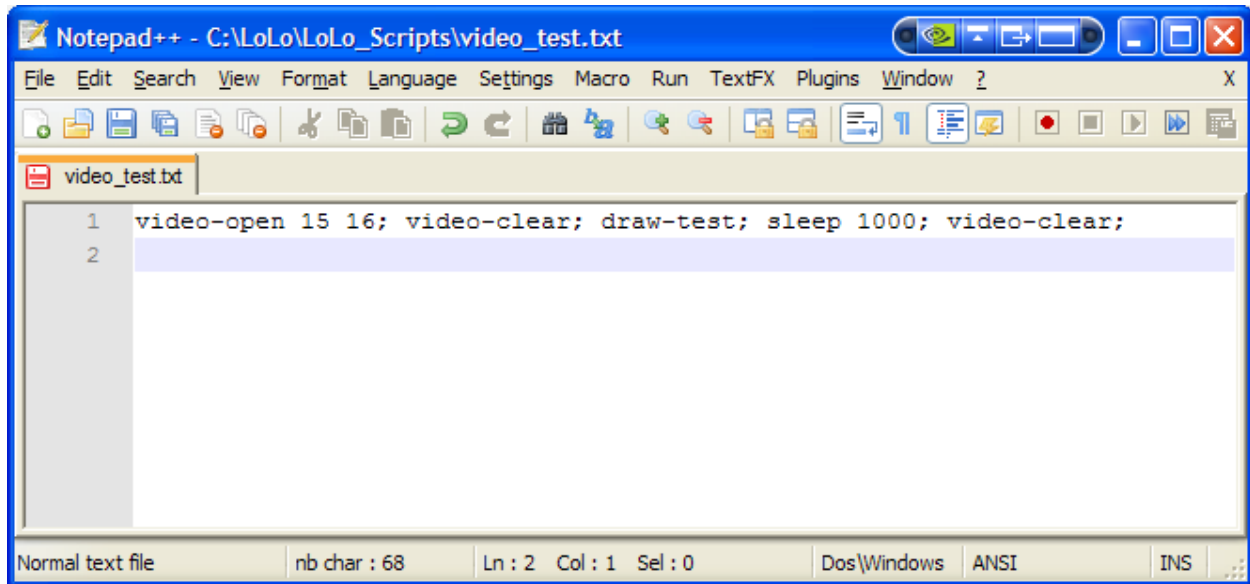


6. If you watched your screen when you sent the script, it should have flashed something and then gone to the test pattern. Let's put some time in between the commands, so we can see what is going on. Type **help sleep**

```
Tera Term - COM1 VT
File Edit Setup Control Window Help
losh> help sleep
usage:
  sleep <ms>

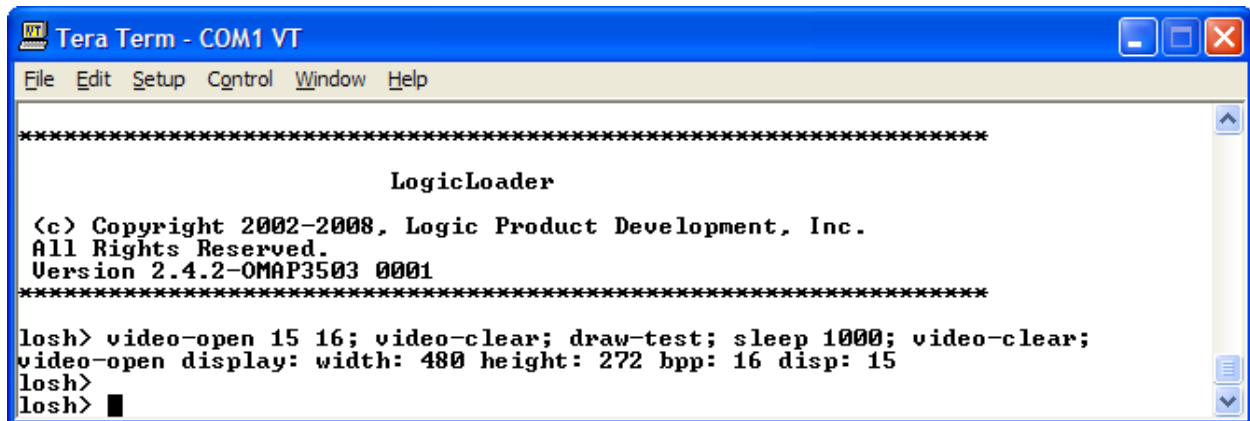
  sleep for <ms> number of milliseconds
example: sleep 1
losh> █
```

7. The help file lets us know we can make LoLo take a little nap by adding the sleep command between commands in our script. After each command, let's add **sleep 1000**; that should put 1 second in between each command. Let's also put another **video-clear**; at the end of the script so we can see the test pattern go away.
8. With these changes, your 'video_test.txt' file should look like this:



```
Notepad++ - C:\LoLo\LoLo_Scripts\video_test.txt
File Edit Search View Format Language Settings Macro Run TextFX Plugins Window ?
video_test.txt
1 video-open 15 16; video-clear; draw-test; sleep 1000; video-clear;
2
Normal text file nb char : 68 Ln : 2 Col : 1 Sel : 0 Dos\Windows ANSI INS
```

9. Save the text file and once again use 'Send | File' to send the script. Now you can actually see what the script is doing with each command.



```
Tera Term - COM1 VT
File Edit Setup Control Window Help
*****
                        LogicLoader
(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****
losh> video-open 15 16; video-clear; draw-test; sleep 1000; video-clear;
video-open display: width: 480 height: 272 bpp: 16 disp: 15
losh>
losh>
```

9.7.6 Launching a Script from an SD Card

If you have a script saved as a text file on an SD card or on your kit, you can use the source command to run the script. Let's add the necessary commands to mount the SD card and then run the script from the card. We will be using the commands you learned in "Lab #6 File Systems" to mount the SD card.

1. Using your PC and an SD card reader, save the video_test.txt file that you created to an SD card.
2. Type `mount fatfs /dev/sdmmc0a /sd`

```

mount filesystem of type <fstype> on device <device> at <mpoint>

example: mount fatfs /dev/ata0a /cf
         mount fatfs /dev/sdmmc0a /sd
         mount yaffs /dev/nand0a /yp
         mount emu /dev/flash0a /e1
         mount yaffs /e1 /yp
losh> mount fatfs /dev/sdmmc0a /sd
losh>

```

3. Then type `source /sd/video_test.txt`

```

*****
                        LogicLoader

(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****

losh> video-open 15 16; video-clear; draw-test; sleep 1000; video-clear;
video-open display: width: 480 height: 272 bpp: 16 disp: 15
losh>
losh> mount fatfs /dev/sdmmc0a /sd
losh> source /sd/video_test.txt

```

4. You should see the screen on your kit flash white, then see the test screen pattern, then return to white. Your LoLo output will look similar to the screen below.

```

(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****

losh> video-open 15 16; video-clear; draw-test; sleep 1000; video-clear;
video-open display: width: 480 height: 272 bpp: 16 disp: 15
losh>
losh> mount fatfs /dev/sdmmc0a /sd
losh> source /sd/video_test.txt
closing old display
video-open display: width: 480 height: 272 bpp: 16 disp: 15
losh> █

```

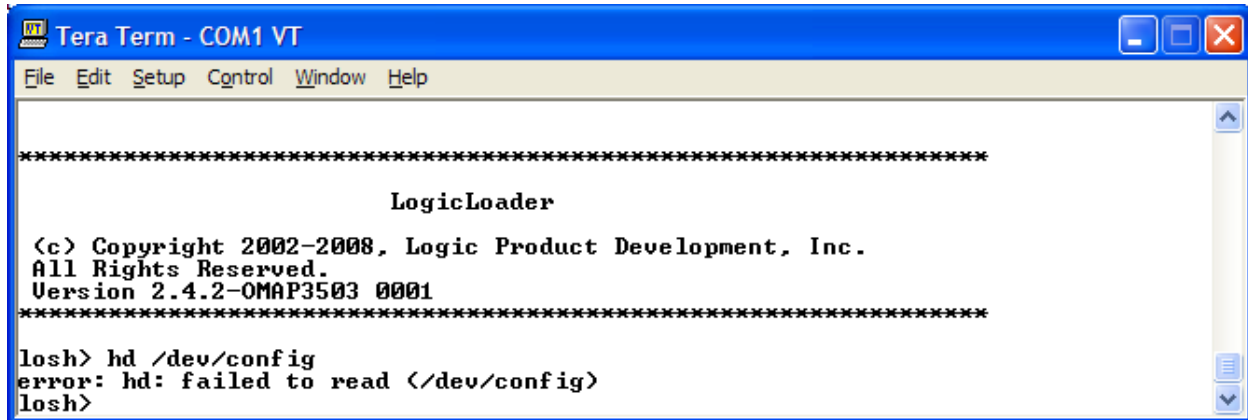
Note that the commands from the script on the SD card did not appear on the screen, but the test pattern did appear for 1 second and then was cleared. Nice work, but what happens when you reboot your kit? Nothing; you have to go through the commands all over again. To overcome this, we'll look at how to store a script so it runs every time you power-up your kit.

9.7.7 Persistent Script Storage

In order for a script to persist across power cycles, the script must be stored to a local, non-volatile memory device on the system. The primary script storage mechanisms supported by LogicLoader on the OMAP35x SOM-LV is the resident flash array (/dev/config).

9.7.7.1 Config Block Basics

1. Before we get started, let's look at what is currently in the config block.
Type **hd /dev/config**



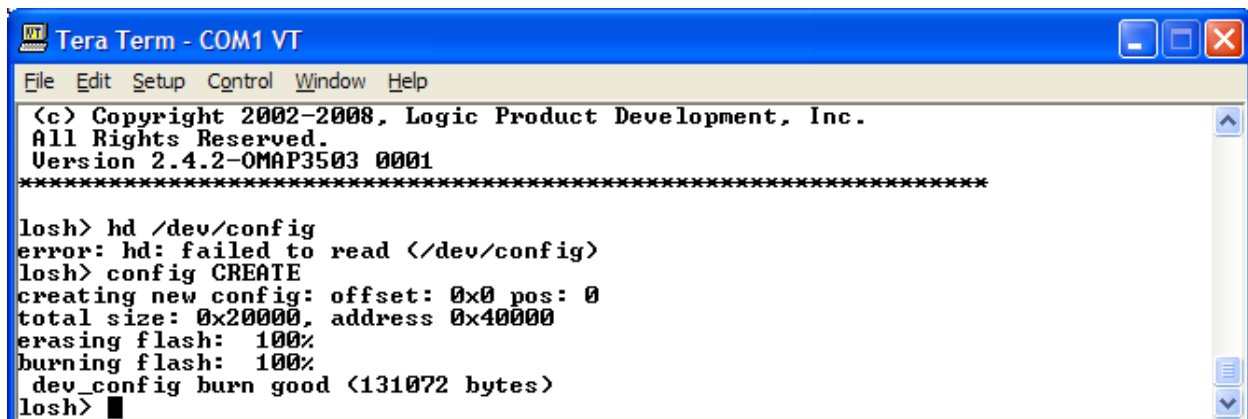
```
Tera Term - COM1 VT
File Edit Setup Control Window Help

*****
                        LogicLoader
(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****

losh> hd /dev/config
error: hd: failed to read </dev/config>
losh>
```

Hmm... not quite what we were looking for. It seems that this kit has never had the config block initialized. That's okay; you need to learn how to do that too. If you have a brand new kit you must use the 'config CREATE' command to initialize the config block. You can also use it to erase a config block to get back to a clean slate.

2. Type **config CREATE** at the **losh>** prompt.



```
Tera Term - COM1 VT
File Edit Setup Control Window Help

(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****

losh> hd /dev/config
error: hd: failed to read </dev/config>
losh> config CREATE
creating new config: offset: 0x0 pos: 0
total size: 0x20000, address 0x40000
erasing flash: 100%
burning flash: 100%
dev_config burn good <131072 bytes>
losh> █
```

- Now that we've cleared out the config block, let's take a look at it.
Type `hd /dev/config 256`

```

Tera Term - COM1 VT
File Edit Setup Control Window Help
losh> hd /dev/config 256
0x80052fb0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0x80052fc0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0x80052fd0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0x80052fe0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0x80052ff0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0x80053000 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0x80053010 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0x80053020 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0x80053030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0x80053040 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0x80053050 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0x80053060 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0x80053070 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0x80053080 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0x80053090 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0x800530a0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
losh>

```

A nice clean slate. Let's put a script in the config block that will run our video test from the SD card.

9.7.7.2 Persisting scripts with the 'echo' command

The 'echo' command can be used to store a script in the config block. To include a new line in the first argument to 'echo', it is necessary to enclose the whole argument in double-quotes "". Remember to end the script by inserting `\n` before the closing quotes to instruct the parser to stop parsing the file.

As we stated earlier, scripts are just a series of commands. They can do a whole lot more though with a simple word added to the beginning. If we start a script with the word **VOLO** it will execute at boot. Boot scripts can also start with **LOLO**... the difference is that a VOLO script talks to the debug serial port and a LOLO script doesn't—the V stands for Verbose.

- All on one line, type:
`echo "VOLOmount fatfs /dev/sdmmc0a /sd; source /sd/video_test.txt; \n" /dev/config`

```

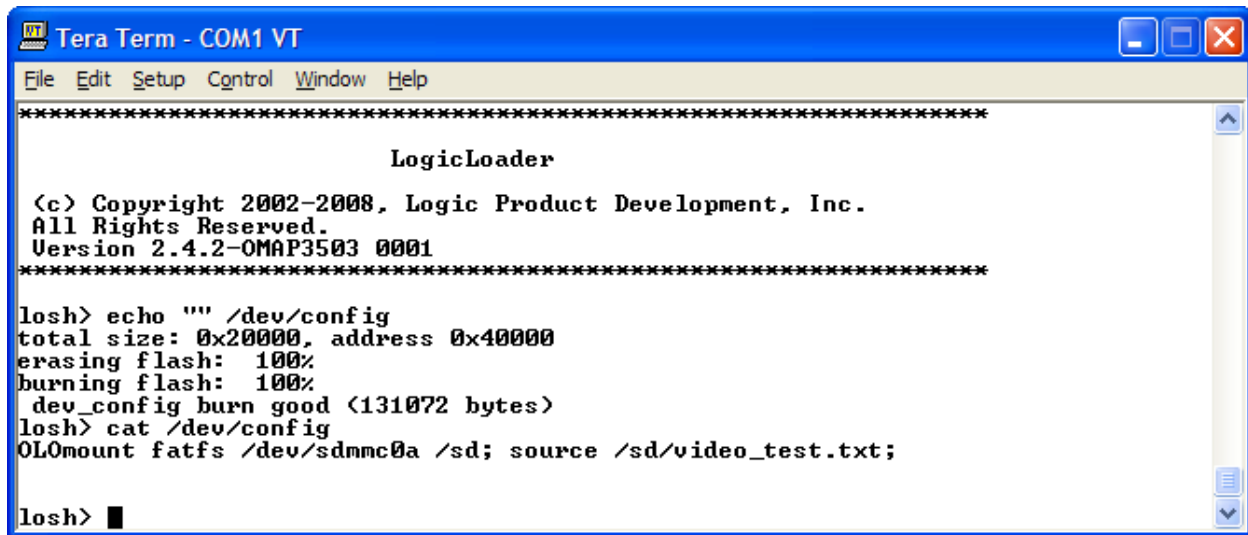
Tera Term - COM1 VT
File Edit Setup Control Window Help
0x80053070 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0x80053080 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0x80053090 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0x800530a0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
losh> echo "VOLOmount fatfs /dev/sdmmc0a /sd; source /sd/video_test.txt; \n" /dev/config
total size: 0x20000, address 0x40000
erasing flash: 100%
burning flash: 100%
dev_config burn good (131072 bytes)
losh>

```

2. If the video test script is on your SD card, you can reboot your kit and it should run the video test.
3. We know that we can write a script onto the kit with the 'echo' command and we know we can erase the script using the **config CREATE** command. What happens if we want to keep the script, but need to disable it? We can actually do that by writing a "" script.
4. Type **echo "" /dev/config**

We just changed the first character in the first command to a space - OLO. Now the kit will not recognize it as a boot script and will not run the script. We can use the 'cat' command to display what is in the config block without having to see all of the hex values in the memory locations.

5. Type **cat /dev/config**



```

Tera Term - COM1 VT
File Edit Setup Control Window Help
*****
                        LogicLoader
(c) Copyright 2002-2008, Logic Product Development, Inc.
All Rights Reserved.
Version 2.4.2-OMAP3503 0001
*****

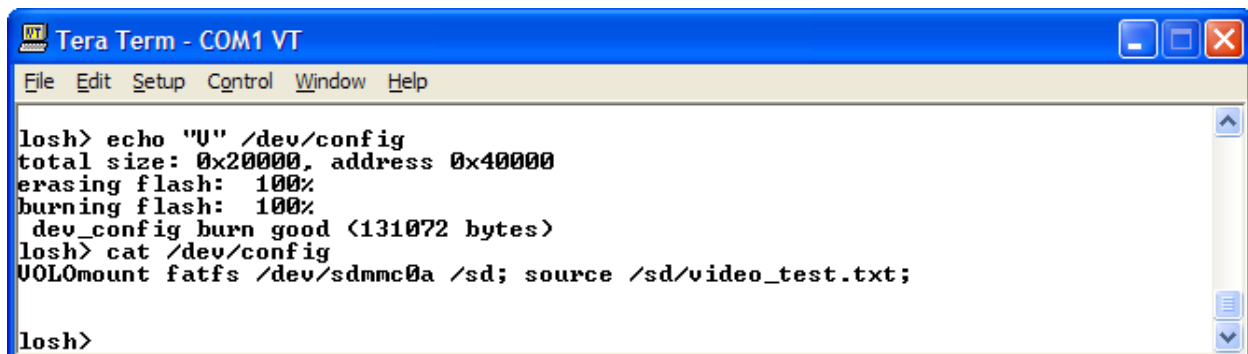
losh> echo "" /dev/config
total size: 0x20000, address 0x40000
erasing flash: 100%
burning flash: 100%
dev_config burn good (131072 bytes)
losh> cat /dev/config
OLOmount fatfs /dev/sdmmc0a /sd; source /sd/video_test.txt;

losh> █

```

It is the same as what was there before, but the V is missing. Since LoLo doesn't recognize OLO as a boot time script, it will just boot to the losh prompt. Let's put the V back in that boot script.

6. Type **echo "V" /dev/config** then use **cat /dev/config** to display the config block contents.



```

Tera Term - COM1 VT
File Edit Setup Control Window Help

losh> echo "V" /dev/config
total size: 0x20000, address 0x40000
erasing flash: 100%
burning flash: 100%
dev_config burn good (131072 bytes)
losh> cat /dev/config
VLOmount fatfs /dev/sdmmc0a /sd; source /sd/video_test.txt;

losh>

```

We put the V back into the script and re-enabled it.

10 Recover Corrupt Boot NAND Flash

This section describes how to recover corrupt boot NAND flash on the OMAP35x Development Kit.

10.1 Prerequisites

- A blank SD card
- A PC with an SD card reader
- OMAP35x Development Kit with the 4.3" LCD display kit plugged in

10.2 Recovery via SD Card Procedure

1. Insert the SD card into an SD card reader on the host PC.
2. Open the SD card drive in a new explorer window.
3. Access Logic's download site at <http://www.logicpd.com/auth/> and enter your username and password.
4. From the Account Summary page, find the "OMAP35x Zoom Development Kit" and click on the "All Downloads" link.
5. Locate the "LogicLoader Bootloader/Monitor" section. Download the latest "NAND flash Recovery for OMAP35x SOM-LV" .zip file to the computer.
6. Extract all the files contained in the .zip file to the SD card.
7. The SD card update procedure is complete. Eject the SD card from the host PC.
8. Power off the development kit.
9. Insert the SD card into the SD card socket on the development kit.
10. Connect the development kit serial port to the PC and start TeraTerm.
11. Power on the development kit.
12. The development kit shows an image on the 4.3" LCD display while the NAND flash is being reprogrammed.
13. When the process completes, the LCD display shows an updated image that indicates the process is complete.
14. Remove the SD card from the development kit and press the "Reset" button on the baseboard.
15. Your development kit should now boot from onboard NAND into LogicLoader properly.
16. If the process fails, copy the entire TeraTerm serial output and email the text to platformsupport@logicpd.com for further assistance.