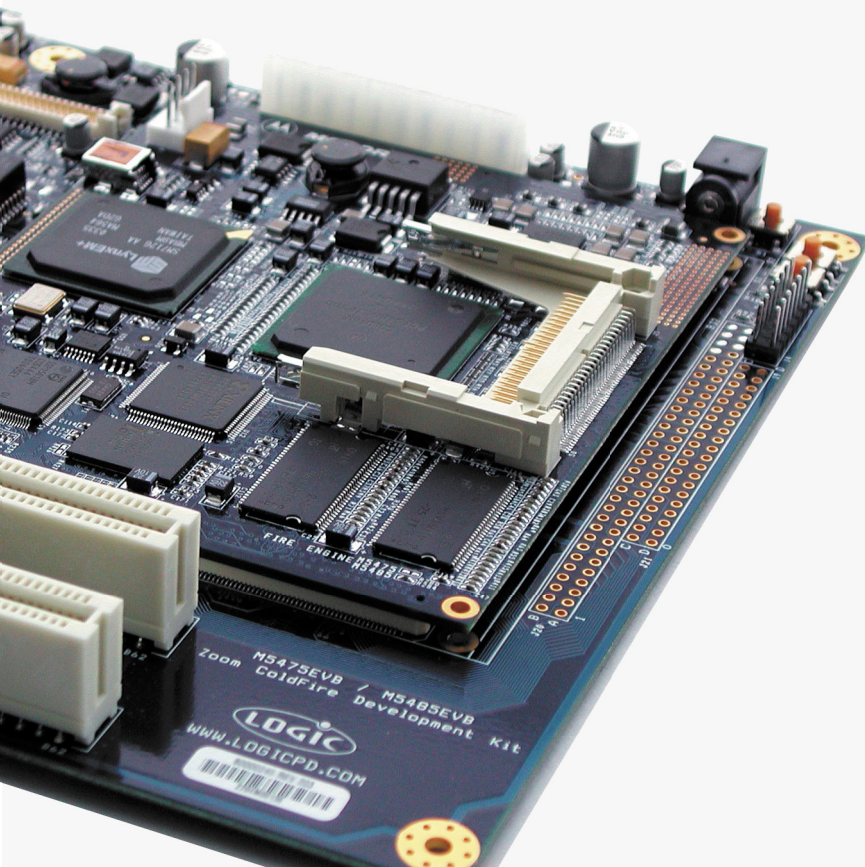


ZoomTM

ColdFire Development Kit

User's Manual



REVISION HISTORY

| REV | EDITOR | REVISION DESCRIPTION | APPROVAL | DATE |
|-----|-----------------------------------|---|----------|---------|
| A | Eric Harnisch; Robin Bhattacharya | Release | JAW | 8/6/04 |
| B | James Wicks | Document Edit; Removed QuickStart Guide section, added note to reference QuickStart Guide, replaced MCF5475/85 with 7x/8x | ELH | 9/21/04 |
| C | James Wicks | Document Edit; Updated 'Section 3: Build a Sample Application' | AJS | 4/05/05 |

Please check www.logicpd.com for the latest revision of this manual and additional applications.

This file contains source code, ideas, techniques, and information (the Information) which are Proprietary and Confidential Information of Logic Product Development, Inc. 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 Product Development, if any, with respect to the products described in this document are set forth in such license or agreement. Logic Product Development 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 Product Development 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 Product Development, 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 2002, Logic Product Development, Inc. All Rights Reserved.

Table of Contents

| | | |
|----------|---|-----------|
| 1 | Getting Started | 5 |
| 1.1 | Have you read the Zoom ColdFire Development Kit QuickStart Guide? | 5 |
| 1.2 | QuickStart Guide Review | 5 |
| 2 | Install Software Tools | 6 |
| 2.1 | Objective | 6 |
| 2.2 | Prerequisites | 6 |
| 2.3 | Installing Tera Term | 6 |
| 2.4 | Installing Cygwin | 8 |
| 2.5 | Installing the GNU Cross Development Toolchain | 10 |
| 2.5.1 | GNU Tools Documentation | 12 |
| 3 | Build a Sample Application | 13 |
| 3.1 | Objective | 13 |
| 3.2 | Prerequisites | 13 |
| 3.3 | Procedure | 14 |
| 4 | Download a Sample Application | 16 |
| 4.1 | Objective | 16 |
| 4.2 | Prerequisites | 16 |
| 4.3 | Procedure | 16 |
| 5 | LogicLoader Restore and Update Procedures | 19 |
| 6 | Warranty Statement | 19 |

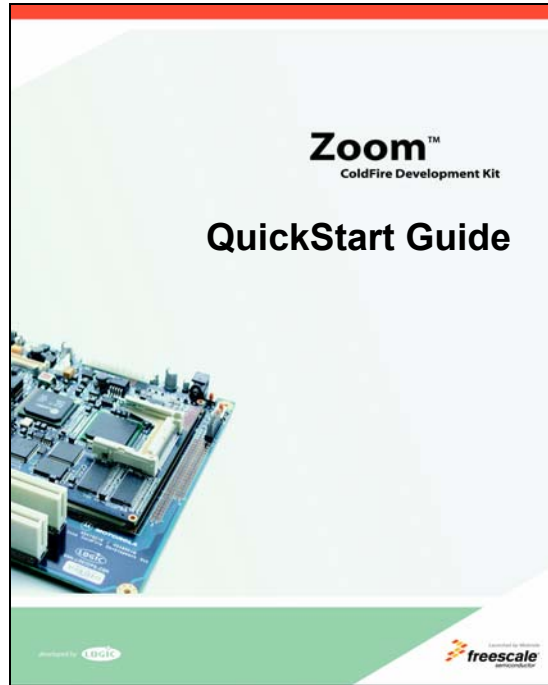
Table of Figures

| | |
|---|----|
| Figure 2.1: Start Page | 6 |
| Figure 2.2: Software Development Tools Page | 7 |
| Figure 2.3: Tera Term Setup Windows 1-2 | 7 |
| Figure 2.4: Tera Term Setup Windows 3-4 | 7 |
| Figure 2.5: Start Page | 8 |
| Figure 2.6: Software Development Tools Page | 8 |
| Figure 2.7: Cygwin Setup Windows 1-2 | 9 |
| Figure 2.8: Cygwin Setup Windows 3-4 | 9 |
| Figure 2.9: Cygwin Setup Windows 5-6 | 9 |
| Figure 2.10: Cygwin Setup: Installation Complete Window | 10 |
| Figure 2.11: Start Page | 10 |
| Figure 2.12: Software Development Tools Page | 11 |
| Figure 2.13: GNU Cross Development Toolchain Setup Windows 1-2 | 11 |
| Figure 2.14: GNU Cross Development Toolchain Setup Window 3 | 12 |
| Figure 3.1: LogicLoader API Sample Applications Package Setup Windows 1-2 | 14 |
| Figure 3.2: LogicLoader API Sample Applications Package Setup Windows 3-4 | 14 |
| Figure 3.3: Building A Sample Application | 15 |
| Figure 4.1: Select 'Setup' and click 'Serial port' | 16 |
| Figure 4.2: 'Serial port' Settings | 16 |
| Figure 4.3: Prepare LogicLoader to Receive the Sample Application | 17 |
| Figure 4.4: Select 'File' and Click 'Send file' | 17 |
| Figure 4.5: Locate the Sample Application | 18 |
| Figure 4.6: 'Hello World' Sample Program Screen | 18 |

Congratulations on your purchase of the Zoom™ ColdFire Development Kit. The Zoom ColdFire Development Kit provides a product-ready software and hardware platform for evaluating the functionality of the ColdFire processor and Fire Engine. This results in an embedded product development cycle with **less time, less cost, less risk... more innovation.**

1 Getting Started

1.1 Have you read the Zoom ColdFire Development Kit QuickStart Guide?



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

If not, *please familiarize yourself with the QuickStart Guide before you read this document.* The latest version of the QuickStart Guide is located at <http://www.logicpd.com/auth/login.php>.

1.2 QuickStart Guide Review

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

- ☐ CDK System Contents
- ☐ Development PC Requirements
- ☐ Peripheral Connectors
- ☐ Terminal emulator, Freescale dBUG Monitor, and LogicLoader “Test Drive” Scenarios
- ☐ Jumper/Switch Table
- ☐ Product Notice and Registration Details
- ☐ Ordering Information
- ☐ Support Information
- ☐ Fire Engine CPLD Important Notice

2 Install Software Tools

Important Note: It is assumed that you have read and completed all steps described in the QuickStart Guide, located at <http://www.logicpd.com/auth/login.php>, before you begin.

2.1 Objective

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

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

2.2 Prerequisites

- Zoom ColdFire Development Kit CD
- Windows 2000 or later Host PC
- Pentium® processor or equivalent
- 64 MB RAM
- 1 GB free hard disk space
- 115200 baud-capable RS-232 port (COM port)

2.3 Installing Tera Term

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

1. To begin installation, start Macromedia Flash by inserting Logic's Zoom ColdFire CD into your CD ROM drive, or double click the Macromedia Flash .exe file in your CD contents folder. (Alternatively, access the 'Software Development Tools' directory included on Logic's Zoom ColdFire CD, open the 'Tera Term' folder, double click the setup.exe file, and then proceed to step 4, below.)

Macromedia Flash will bring up the following screen.

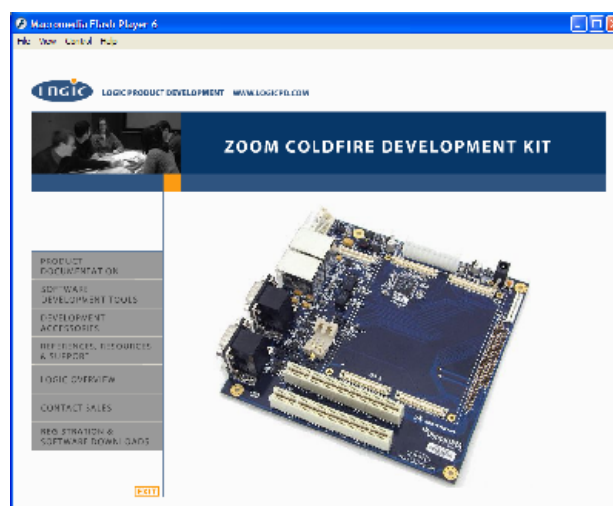


Figure 2.1: Start Page

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

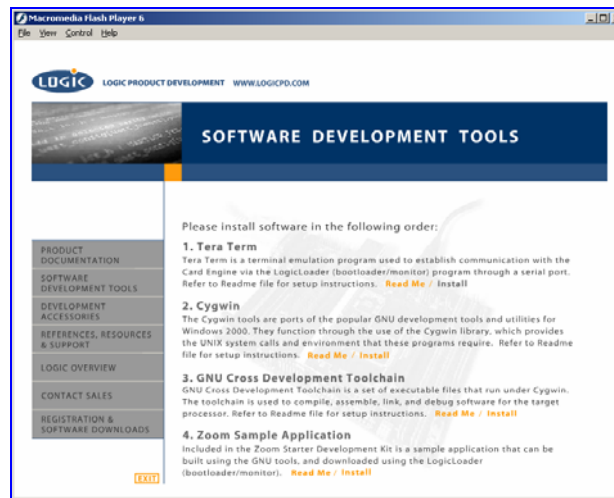


Figure 2.2: Software Development Tools Page

3. Option number one on the 'Software Development Tools' page is Tera Term. Click 'Install.'
4. Tera Term Pro Setup will begin. Follow these steps through the installation windows:

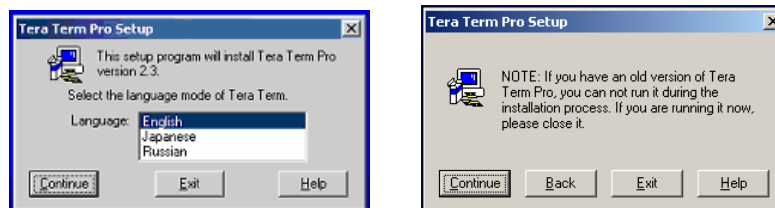


Figure 2.3: Tera Term Setup Windows 1-2

- 1. Select a language, then click 'Continue.'
- 2. If an existing version of Tera Term is running, close it, then click 'Continue.'



Figure 2.4: Tera Term Setup Windows 3-4

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

2.4 Installing Cygwin

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

1. To begin installation, start Macromedia Flash by inserting Logic's Zoom ColdFire CD into your CD ROM drive, or double click the Macromedia Flash .exe file in your CD contents folder. (Alternatively, access the 'Software Development Tools' directory included on Logic's Zoom ColdFire CD, open the 'Cygwin' folder, double click the setup.exe file, and then proceed to step 4, below.)

Macromedia Flash will bring up the following screen.

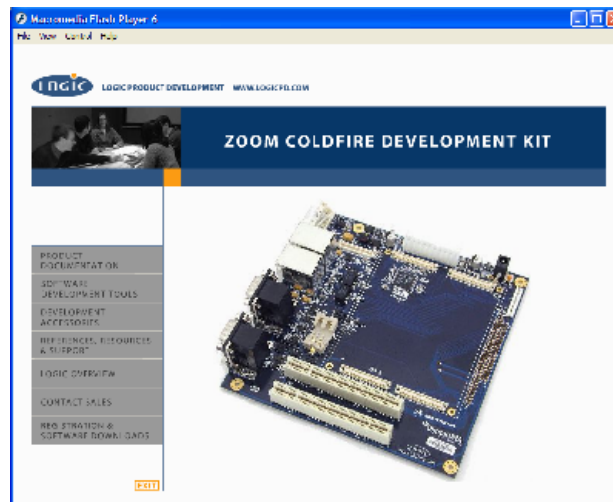


Figure 2.5: Start Page

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

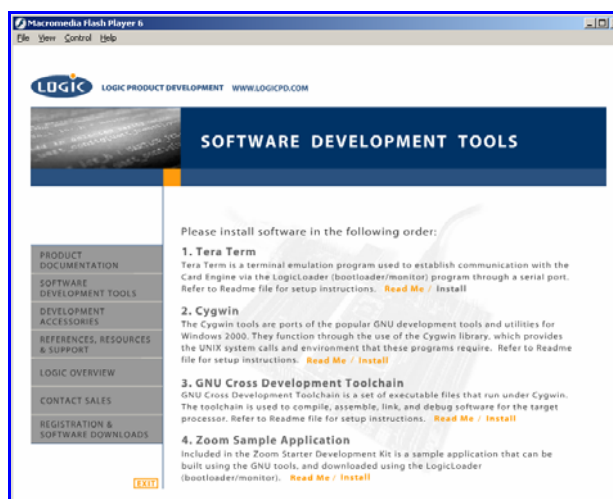


Figure 2.6: Software Development Tools Page

3. Option number two on the 'Software Development Tools' page is Cygwin. Click 'Install.'

4. A window containing 'Important Steps for Cygwin Installation' will be displayed. To continue, press any key.
5. Cygwin Setup will begin. Follow these steps through the installation windows:

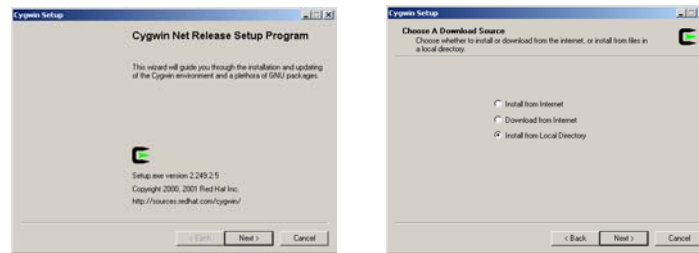


Figure 2.7: Cygwin Setup Windows 1-2

- 1. 'Cygwin Net Release Setup Program' window: click 'Next.'
- 2. 'Choose a Download Source' window: select 'Install from Local Directory,' click 'Next.'

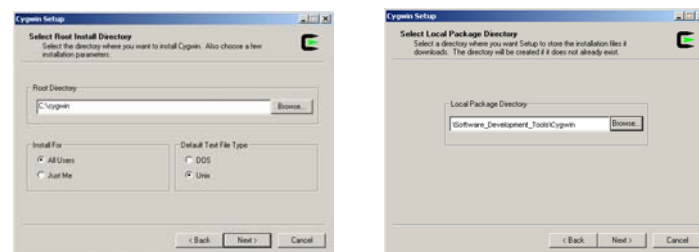


Figure 2.8: Cygwin Setup Windows 3-4

- 3. 'Select Root Install Directory' window: select a root directory for Cygwin. You can accept the default installation directory or enter an alternate path name in the 'Root Directory' text field. Next, allow 'Install For' to default to 'All Users' unless you must restrict access. Also, allow 'Default Text File Type' to default to 'Unix.' Then click 'Next.'
- 4. 'Select Local Package Directory' window: Type: '.\Software_Development_Tools\Cygwin' in the 'Local Package Directory' dialog box. (You must include The CD ROM drive letter.) Click 'Next.'

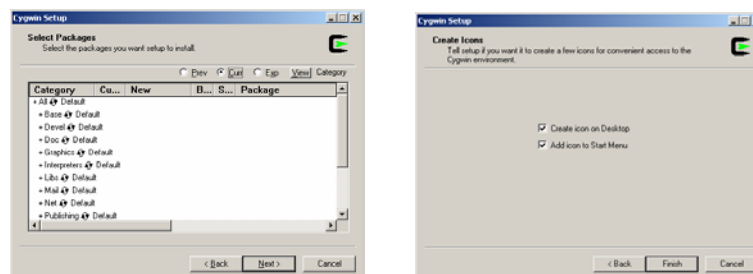


Figure 2.9: Cygwin Setup Windows 5-6

- 5. 'Select Packages' window: verify that 'Default' is selected for each category. Click 'Next.'
- 6. Setup.exe will begin copying files. This may take several minutes. After the files have completed copying, the 'Create Icons' window will appear. Select your icon preference and click 'Finish.'

- 7. Cygwin will install. When the 'Installation Complete' window appears, click 'OK.' Setup is now complete.

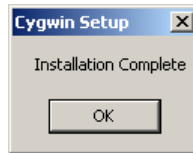


Figure 2.10: Cygwin Setup: Installation Complete Window

2.5 Installing the GNU Cross Development Toolchain

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

Prerequisite

- You will need a complete installation of Cygwin on a local drive. For example: C:\cygwin or D:\cygwin.

Note

- This installation is for host PC's running Windows 2000 or later host PC/Cygwin. For host PC's running Linux, see the readme file in the \Software Development Tools\Linux Tools directory (included on the Zoom ColdFire Development Kit CD) for installation instructions.
1. To begin installation, start Macromedia Flash by inserting Logic's Zoom ColdFire CD into your CD ROM drive, or double click the Macromedia Flash .exe file in your CD contents folder. (Alternatively, access the 'Software Development Tools' directory included on Logic's Zoom ColdFire CD, open the 'GNU Cross Development Toolchain' folder, double click the gnutools_install.exe file, and then proceed to Step 4, below.)

Macromedia Flash will bring up the following screen.

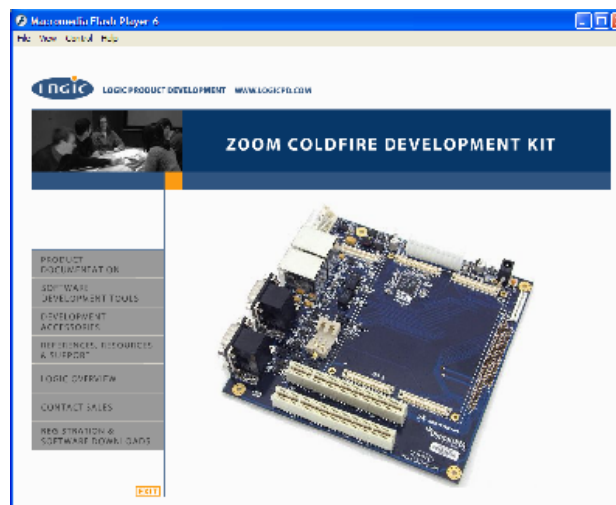


Figure 2.11: Start Page

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

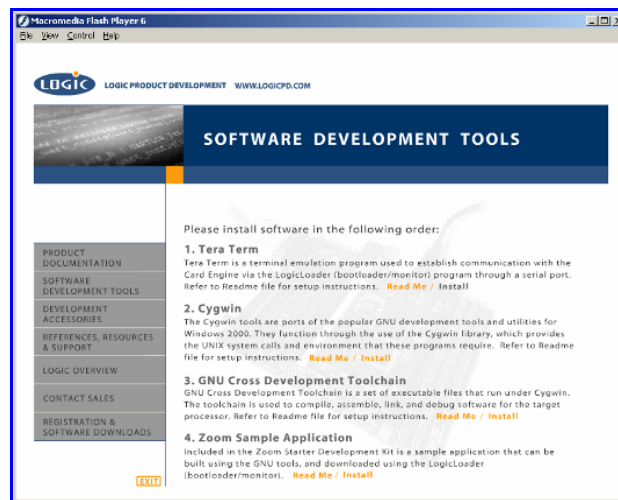


Figure 2.12: Software Development Tools Page

3. Option number three on the 'Software Development Tools' page is GNU Cross Development Toolchain. Click 'Install.'
4. GNU Cross Development Toolchain Setup will begin. Follow these steps through the installation windows:

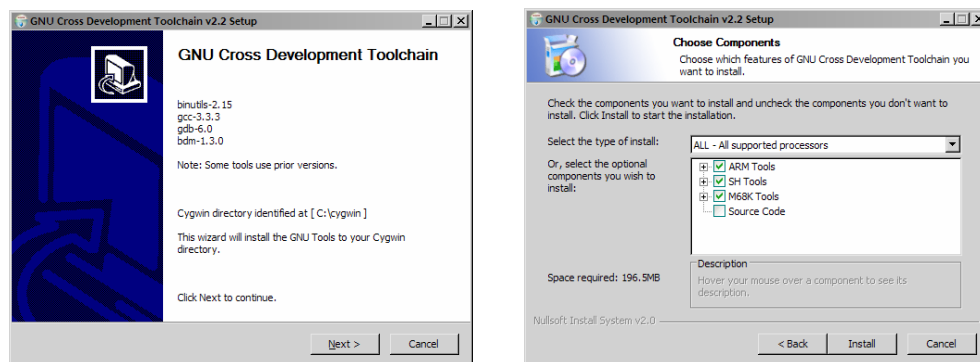


Figure 2.13: GNU Cross Development Toolchain Setup Windows 1-2

1. 'GNU Cross Development Toolchain v x.x Setup' window: click 'Next.'
2. 'Choose Components' window: select the type of install as 'ALL - All Supported Processors,' then click 'Install.'

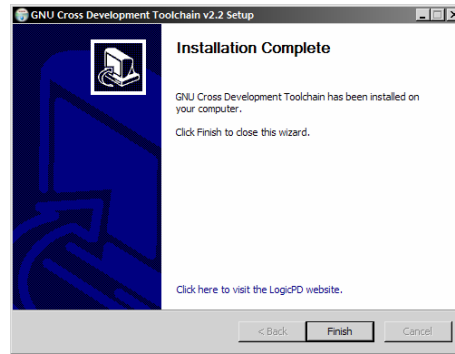


Figure 2.14: GNU Cross Development Toolchain Setup Window 3

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

2.5.1 GNU Tools Documentation

A complete set of manuals for the GNU tools is contained in the Zoom ColdFire Development Kit CD in the following directory: .\Software Development Tools\Documentation\GNU_Docs.

3 Build a Sample Application

3.1 Objective

The objective of this section is to build a sample application for the Zoom ColdFire Development Kit.

Background Information:

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

3.2 Prerequisites

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

3.3 Procedure

To begin installation, login to Logic's website at <https://www.logicpd.com/auth/login.php> in order to view your Fire Engine downloads page. Under the "Software Development Tools" heading, locate the "Zoom Sample Application" link.

1. Follow these steps through the installation windows:

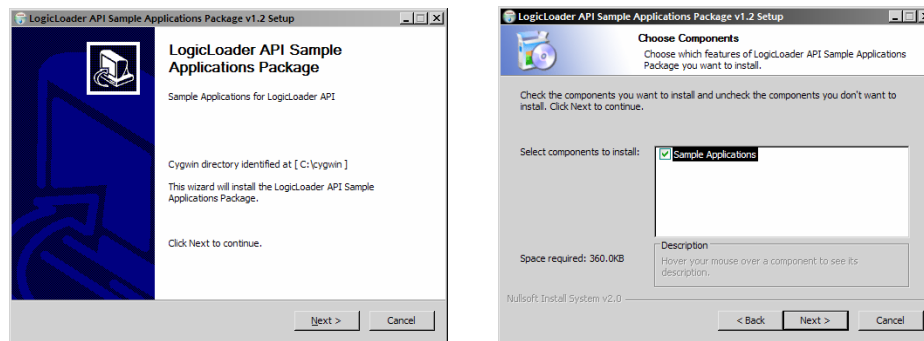


Figure 3.1: LogicLoader API Sample Applications Package Setup Windows 1-2

- 1. 'LogicLoader API Sample Applications Package v x.x.x Setup' window: click 'Next.'
- 2. 'Choose Components' window: click 'Next.'

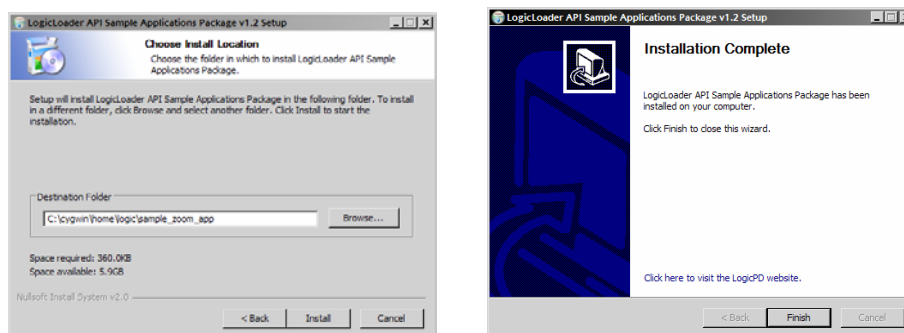
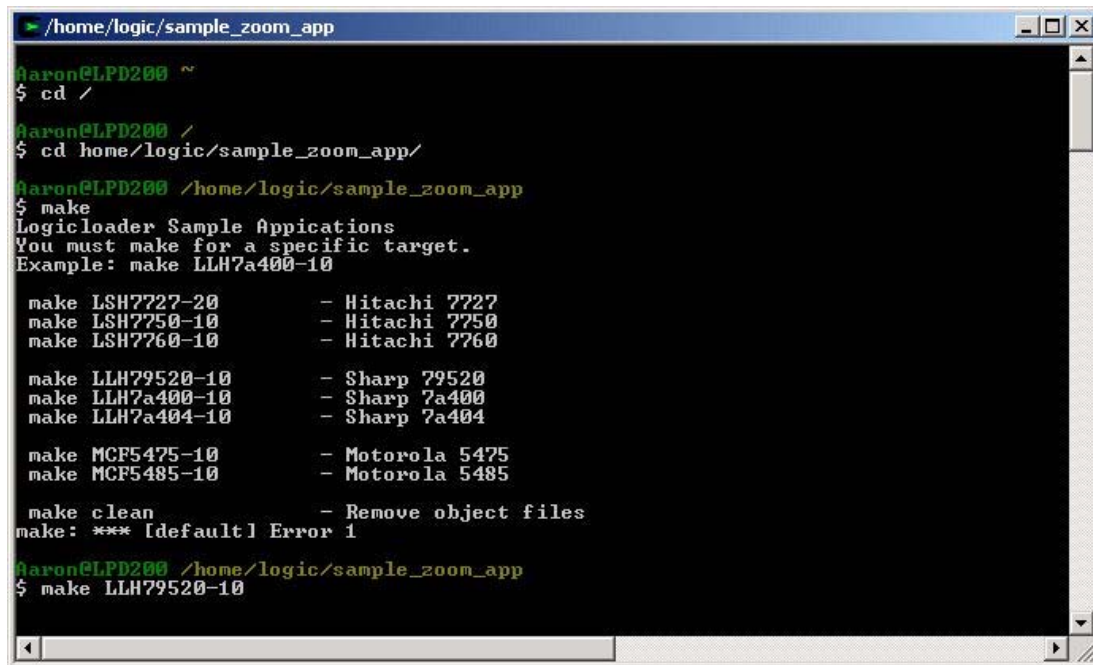


Figure 3.2: LogicLoader API Sample Applications Package Setup Windows 3-4

- 3. Select an install location for the LogicLoader API Sample Applications Package. You can accept the default installation directory or enter an alternate path name in the 'Destination Folder' field. Click 'Install' to begin installing files.
- 4. Please wait while an 'Installing' window appears and the necessary files are copied to your Cygwin directory. When installation is complete, click 'Finish.' Setup is now complete.

2. Next, open Cygwin. (Open **Start/ Programs** to locate Cygwin, or double-click the Cygwin shortcut icon on your desktop -- depending on where you saved the icon.) A Cygwin window will appear.
3. In your Cygwin window, type the following command:
'cd /home/logic/sample_zoom_app/x.x.x' This will change the working directory to your sample_zoom_app folder and version (for example: 1.6.2.).
4. Next, type 'make clean' in your Cygwin window. This cleans previously built files, if any.
5. Next, type 'make' in order to get the list of build file options. See figure below.



```

/home/logic/sample_zoom_app
Aaron@LPD200 ~
$ cd /

Aaron@LPD200 /
$ cd /home/logic/sample_zoom_app/

Aaron@LPD200 /home/logic/sample_zoom_app
$ make
Logicloader Sample Applications
You must make for a specific target.
Example: make LLH7a400-10

make LSH7727-20      - Hitachi 7727
make LSH7750-10      - Hitachi 7750
make LSH7760-10      - Hitachi 7760

make LLH79520-10     - Sharp 79520
make LLH7a400-10     - Sharp 7a400
make LLH7a404-10     - Sharp 7a404

make MCF5475-10      - Motorola 5475
make MCF5485-10      - Motorola 5485

make clean           - Remove object files
make: *** [default] Error 1

Aaron@LPD200 /home/logic/sample_zoom_app
$ make LLH79520-10
```

Figure 3.3: Building A Sample Application

6. Then type 'make' followed by the appropriate file name (matching the Fire Engine type that you are building on).

When complete, your sample applications will be located under the directory:
home/logic/sample_zoom_app/apps/<program_name>.

4 Download a Sample Application

4.1 Objective

The objective of this section is to download the sample application which you built in 'Section 3: Build a Sample Application' to your Zoom ColdFire Development Kit. This example describes how to download the sample application with LogicLoader (bootloader/monitor).

Background Information:

- The application 'helloworld.elf' is linked to download and execute directly from RAM.
- LogicLoader is the name given to the Zoom CDK's bootloader/monitor code module. Refer to the 'LogicLoader User's Manual' for further documentation.

4.2 Prerequisites

- A successfully built sample application from 'Section 3: Build a Sample Application,' above
- Cygwin and GNU Cross Development Tools installed
- Tera Term installed and running
- Zoom ColdFire Development Kit up and running
- Zoom ColdFire Development Kit connected to development computer via null modem serial cable

4.3 Procedure

1. Open a Tera Term shell. Select 'Setup' and click 'Serial port' in order to verify that Tera Term is configured correctly.

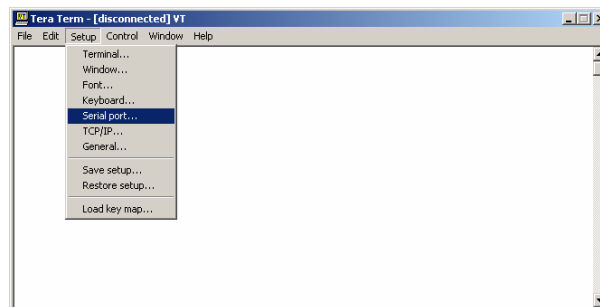


Figure 4.1: Select 'Setup' and click 'Serial port'

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

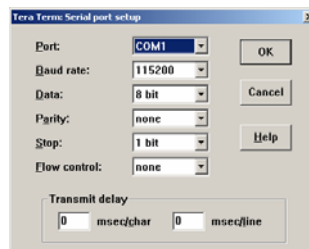


Figure 4.2: 'Serial port' Settings

- Next, press the Reset switch on the Zoom ColdFire Development Kit application board (with your Fire Engine properly inserted) in order to reboot the kit. LogicLoader will appear in Tera Term.
- Prepare LogicLoader to receive the sample application by typing 'load elf' after the 'losh>' prompt, then press 'Enter'. See figure below.

```

Tera Term - COM1 VT
File Edit Setup Control Window Help

*****
LogicLoader

r Copyright 2002-2003, Logic Product Development, Inc.
All Rights Reserved.
Version BBA_release_1-1/1.1.0.DUT
*****

Available commands:
  load - download a binary image of type 'elf', or 'srec'
  burn - burns the already-loaded image into flash device 'device'
  erase - erases 'device' from start_address for length bytes
  jump - jump to a loaded image, or [address]
  exec - disable cache & ints, then jump to a loaded OS, or to [addr]
  losh - execute a series of losh commands stored in <filename>
  w - write memory [of specified width] at addr
  x - examine memory with [width][format] at an addr for a [len]
  date - display the number of seconds since boot
  stats - display various system & lol stats
  version - print hardware and firmware version numbers
  cmds - list the commands available for a type of functionality

losh> load elf
loading from stdin: █

```

Figure 4.3: Prepare LogicLoader to Receive the Sample Application

- Then select 'File' and click 'Send file' to send the sample application to the development 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

*****
LogicLoader

r Copyright 2002-2003, Logic Product Development, Inc.
All Rights Reserved.
Version BBA_release_1-1/1.1.0.DUT
*****

Available commands:
  load - download a binary image of type 'elf', or 'srec'
  burn - burns the already-loaded image into flash device 'device'
  erase - erases 'device' from start_address for length bytes
  jump - jump to a loaded image, or [address]
  exec - disable cache & ints, then jump to a loaded OS, or to [addr]
  losh - execute a series of losh commands stored in <filename>
  w - write memory [of specified width] at addr
  x - examine memory with [width][format] at an addr for a [len]
  date - display the number of seconds since boot
  stats - display various system & lol stats
  version - print hardware and firmware version numbers
  cmds - list the commands available for a type of functionality

losh> load elf
loading from stdin: █

```

Figure 4.4: Select 'File' and Click 'Send file'

- A 'Tera Term: Send file' window will open. Verify that the 'Binary' option is selected.
- Locate the sample application file you built in Section 3, above. The default location is: Cygwin/home/logic/sample_zoom_app/apps/helloworld.

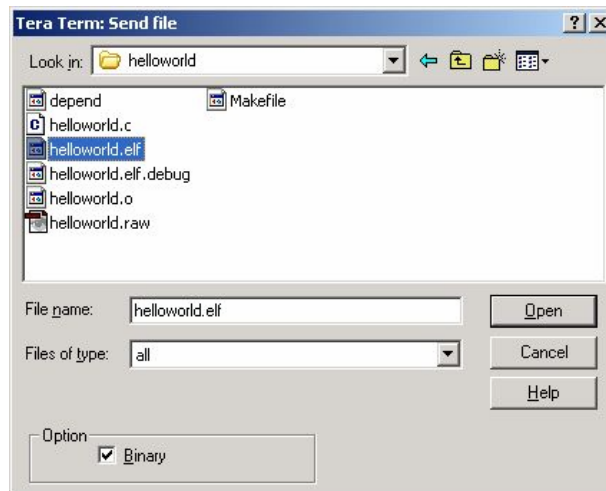


Figure 4.5: Locate the Sample Application

8. Select your sample application file and click 'Open.' The image will download to the Zoom CDK.
9. Now the sample application is ready to run. At the 'losh>' prompt, type 'jump' to run the application. See figure below.

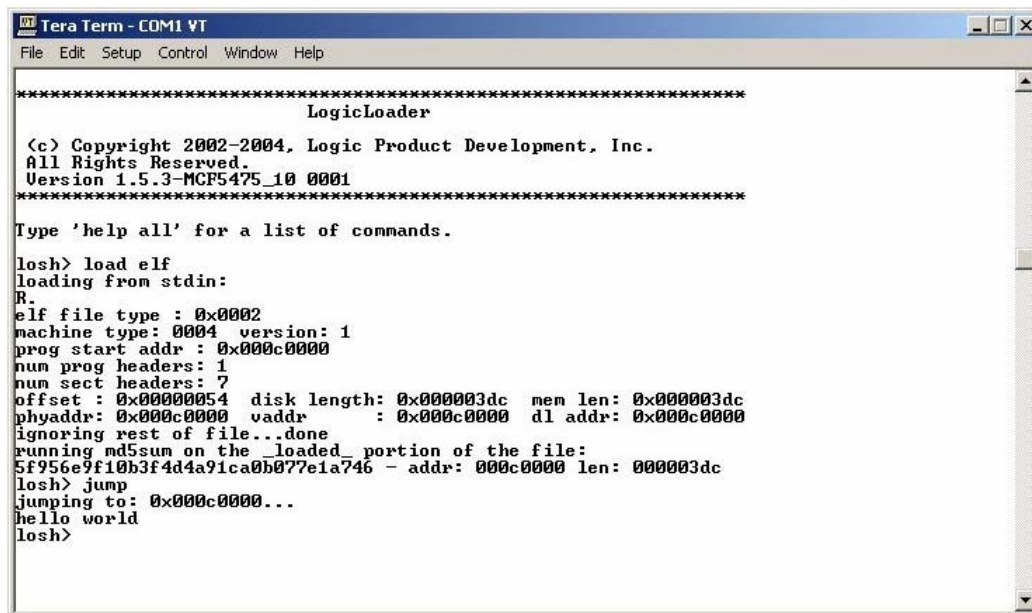


Figure 4.6: 'Hello World' Sample Program Screen

The sample application will run on the Zoom ColdFire Development Kit. The application should print 'Hello World' to the screen.

5 LogicLoader Restore and Update Procedures

For information on LogicLoader restore and update procedures, please see Logic's *Application Note 257: MCF54xx LogicLoader Procedures* at <https://www.logicpd.com/auth/login.php>. This document describes how to:

- Use S Record Files with BoLo/LoLo
- Use S Record Files with Freescale's m54xebup
- Use the 'lolo_XXX.srec' File with dBUG

6 Warranty Statement

Refer to warranty card enclosed in development kit.



Logic Product Development

411 Washington Ave, N. Suite 101
Minneapolis, MN 55401 USA
Tel. 612.672.9495
Fax. 612.672.9489
www.logicpd.com

(c) 2004 All rights reserved. Logic Product Development, Minneapolis MN USA

Logic Product Development makes no warranty for the use of its products. The Company assumes no responsibility for any errors which may appear in this document, reserves the right to change devices or specifications detailed herein at any time without notice, and does not make any commitment to update the information contained herein. The names of the sample source code files and the platform dependent environment variables may be subject to change without notice. Some steps and figures may vary between different versions of tools. No licenses to patents or other intellectual property of Logic are granted by the company in connection with the sale of Logic products, expressly or by implication.

Freescale is a registered trademark. Windows is a registered trademark of Microsoft Corporation. Marks bearing (TM) are trademarks of Logic Product Development. Terms and product names in this document may be trademarks of others.