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1 Introduction

Congratulations on your purchase of the Zoom™ ColdFire Development Kit. This Zoom Development Kit provides a product-ready hardware and software platform for evaluating the functionality of the Freescale ColdFire processor and the Logic System on Module. Logic's embedded solutions fast forward product development and help your company stay focused on your high-value core technologies.

1.1 Zoom ColdFire Development Kit Contents

Boards

- +ColdFire Fire Engine System on Module (SOM)
 - +SOM-ETX form factor
 - +114 mm long x 95 mm wide x 13.8 mm high
- +Mini-ITX form factor application baseboard
 - +170 mm long x 170 mm wide x 33 mm high

Cables and Accessories

- +Serial cable (null-modem)
- +5 volt power supply with US, UK, Japan, and Europe power adapters
- +Ethernet crossover cable
- +Parallel extension cable (for BDM interface)
- +BDM interface

1.2 Unpack the System

Once you have verified that all the development kit items are present, carefully remove the boards from their protective anti-static bags. Check the boards for any visible damage and ensure that there are no broken, damaged, or missing parts.

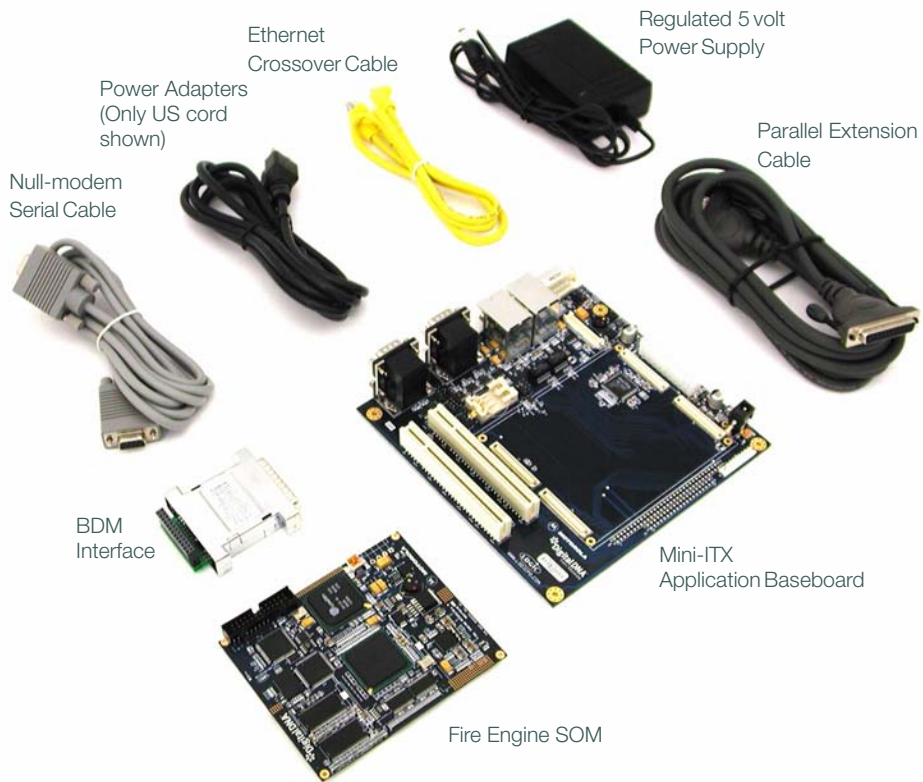
Note: Avoid touching the MOS devices. Static discharge can and will damage these devices.



Attention:

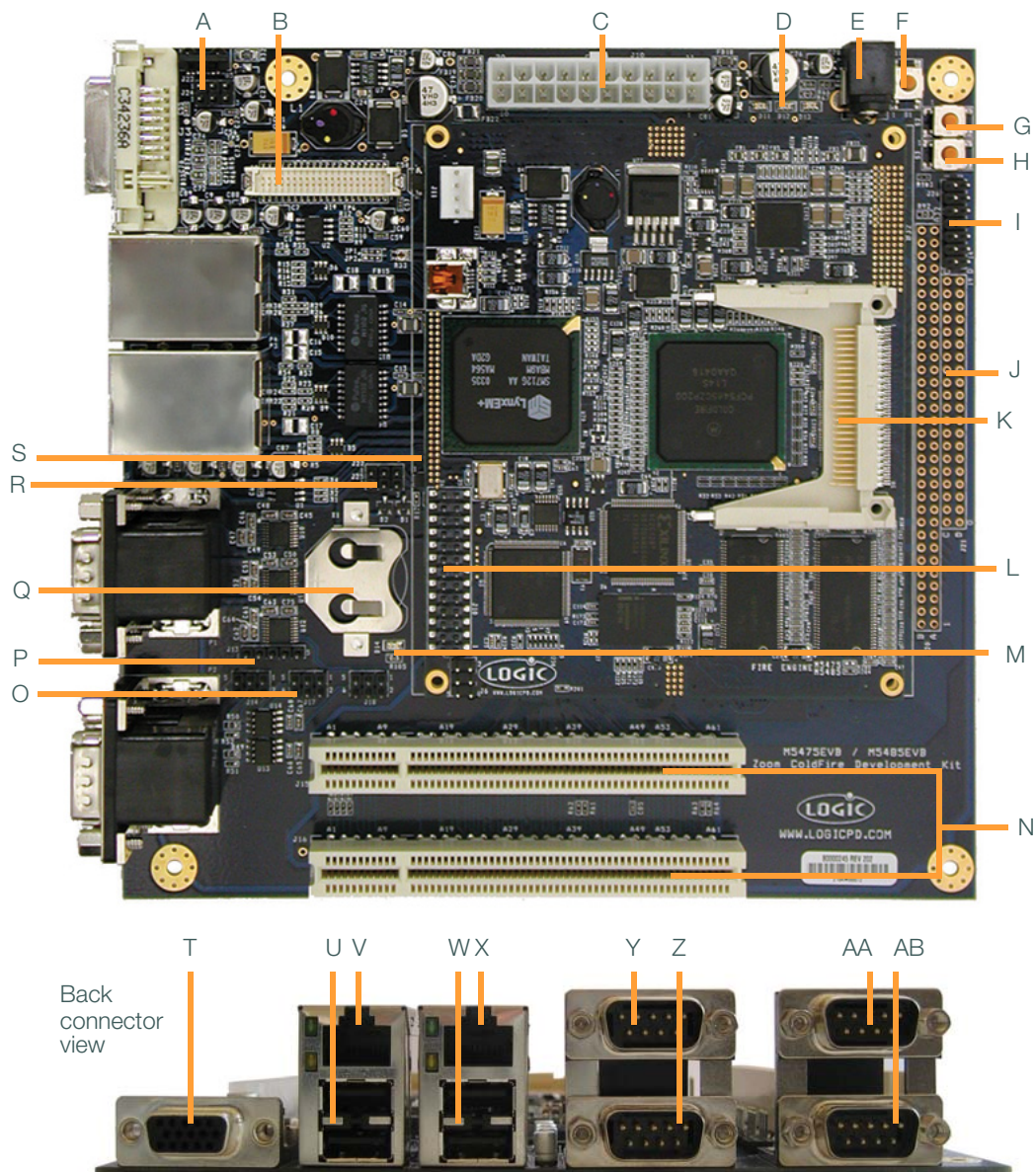
Circuit boards contain electrostatic sensitive devices. Observe precautions for handling. Handle boards by the edge and do not touch integrated circuits directly.

Figure 1.1 – Kit Hardware Contents



1.3 Baseboard Connection Diagram

Figure 1.2 – Connection Diagram for the Baseboard



Connection Diagram Details

- A – Infrared Transceiver Debug Headers
- B – 40-pin Integrated LCD Connector
- C – ATX Power Connector
- D – User LEDs
- E – 5V Power In - use appropriate power adaptor
- F – Reset Button
- G – Power Button
- H – Interrupt Button
- I – ITX Case Header
- J – PC104 Connector (not populated)
- K – CompactFlash Type 1 memory mode connector (requires CPLD code, see Section 7 for information)
- L – BDM Header
- M – Power On LED
- N – PCI Slots (2)
- O – CAN Debug Headers
- P – Serial Port Headers
- Q – Battery
- R – RTC Debug Headers
- S – Real Time Clock (slightly beneath Fire Engine)

Back Connector View Details

- T – VGA Connector
- U – USB Ports (Port 4 bottom, Port 3 top)
- V – RJ45 Ethernet Jack (Port 1)
- W – USB Ports (Port 2 bottom, Port 1 top)
- X – RJ45 Ethernet Jack (Port 0)
- Y – 115.2 kbps RS-232 Debug Serial Port 0
- Z – 115.2 kbps RS-232 Debug Serial Port 1
- AA – CAN Port 1
- AB – CAN Port 0

Important Note: The Mini-ITX baseboard is a common assembly board for all ColdFire Development Kits and may contain peripheral connectors that are not supported by the Fire Engine purchased

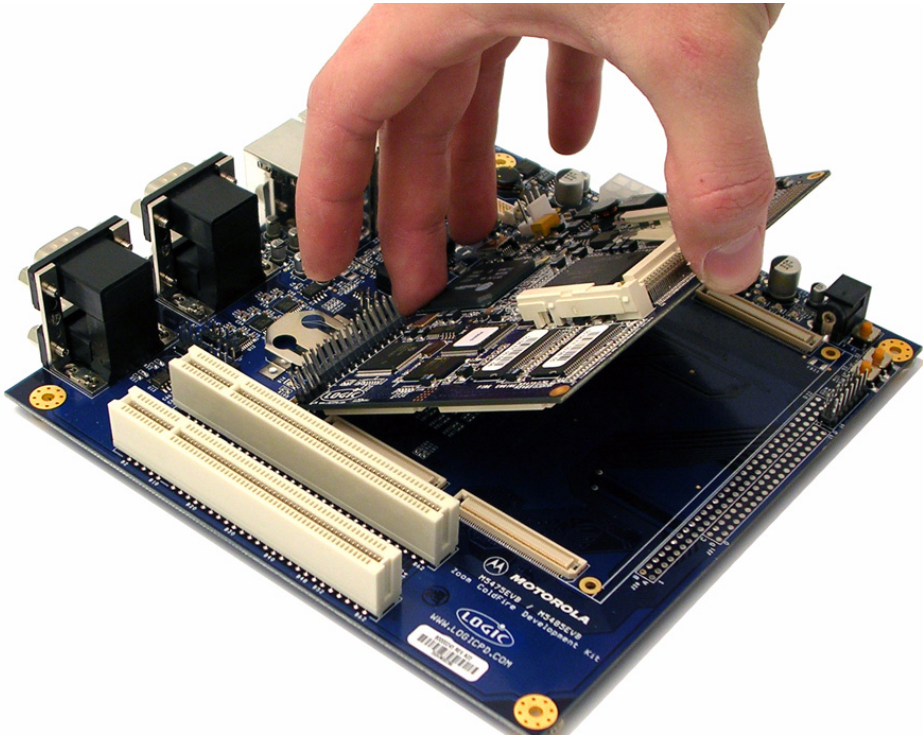
2 Development Kit Set-up

2.1 Connect the Fire Engine to the Mini-ITX Baseboard

Connect the Fire Engine to the Hirose connectors on the Mini-ITX baseboard.

1. Position the Fire Engine's four 100-pin Hirose connectors directly above the four mating Hirose connectors on the Mini-ITX baseboard (see Figure 2.1 below).
2. Firmly press the Fire Engine downward on each connector until it is fully seated.
3. Visually verify that the Hirose connectors on the Fire Engine and Mini-ITX baseboard have mated correctly.
4. To remove the Fire Engine, carefully pull upwards on any corner of the Fire Engine until one of the Hirose connectors on the baseboard releases. Repeat this motion on each corner until all four Hirose connectors are no longer mated to the ITX baseboard and the Fire Engine can be removed.

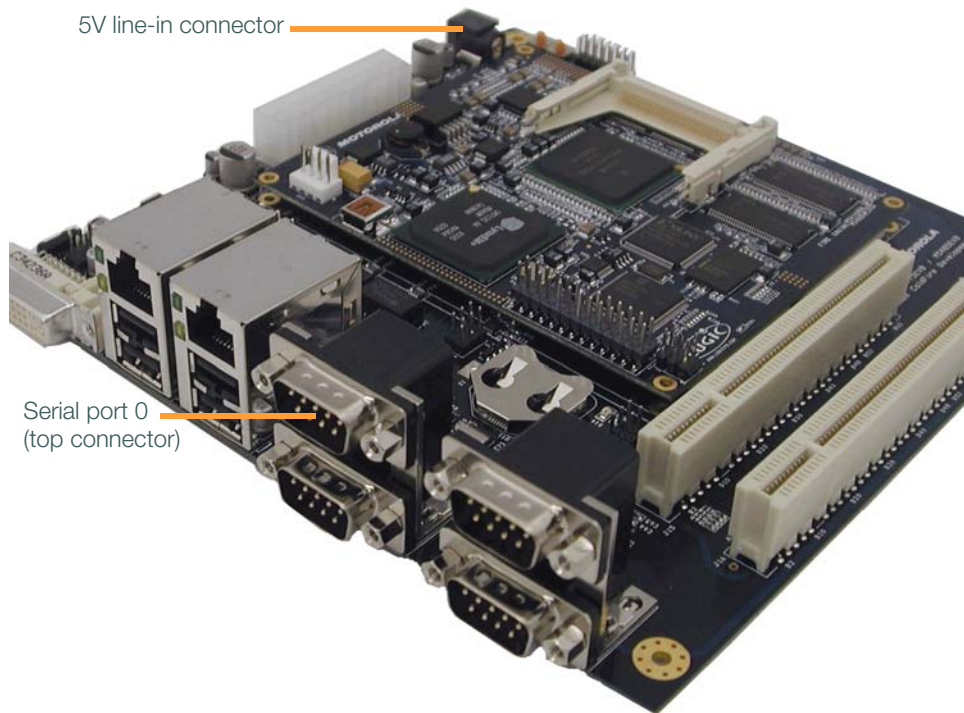
Figure 2.1 – Connect Fire Engine to Baseboard



2.2 Connect the Development Kit to PC

1. Connect the null-modem serial cable (supplied in the kit) to the serial port connector (serial port 0 top) on the baseboard and to a COM port on the host PC.
2. Connect the regulated 5V power supply to the appropriate power adapter. Plug the power adapter into a power outlet and the 5V line output connector into the line-in connector on the baseboard.

Figure 2.2 – Connect Development Kit to PC



2.3 Power Supply

The ColdFire Development Kit is equipped with two options for providing power:

- +J11 is a 2.1 mm barrel connector with a positive center tap
- +J10 is a receptacle for a standard ATX power Supply

Note: Do not connect more than one power supply at a time. The use of some PCI expansion cards may require a separate ATX power supply due to power requirements of the card. See the *Mini-ITX Hardware Specification* for J11 power supply rating.

3 Test Drive the Zoom ColdFire Development Kit

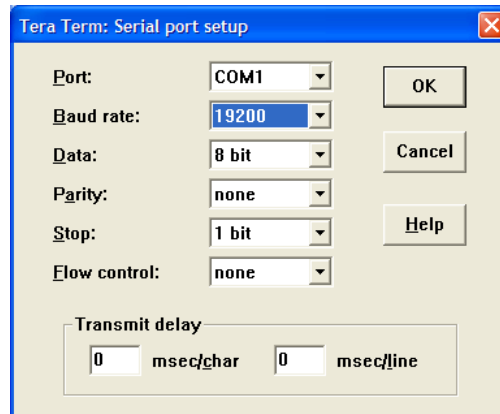
3.1 Terminal Emulation Installation

The Zoom ColdFire Development Kit is designed to communicate with terminal emulation programs via the included null-modem serial cable and using the following settings: 19200 baud, 8-data-bits, 1-stop-bit, no-parity, and no-flow-control. The terminal emulation program must support binary transfers in order to download software to the kit.

Although Logic does not support any particular terminal emulation program, we suggest using Tera Term Pro for Windows 2000 or XP. Tera Term Pro can be downloaded for free from Logic's website at the following location: www.logicpd.com/auth/. Tera Term Pro is not available for Linux users.

Once the terminal emulation program has been installed, open a new serial port connection using the port where the null-modem serial cable is connected. For example, using Tera Term, set the 'baud-rate' to 19200, 'data' to 8-bit, 'stop' to 1-bit, 'parity' to none, and 'flow control' to none.

Figure 3.1 – Tera Term: Serial port setup window



3.2 Power-up the Development Kit

The Zoom ColdFire Development Kit ships with both the Freescale and Logic bootloader(s) installed in resident Flash. The Freescale 'dBUG' ROM monitor is the default bootloader. LogicLoader can be accessed via dBUG ROM monitor, see Section 3.2.2.

LogicLoader provides the capability for loading operating systems and applications. In addition, it provides a full suite of commands for interfacing to the Fire Engine. These commands load operating systems, configure hardware platforms, bring-up hardware, customize applications, perform tests, and manage in-field devices.

3.2.1 dBUG ROM Monitor Power-up

When you start up your ColdFire Development Kit in Tera Term, the dBUG ROM Monitor will appear.

Accessing dBUG

Interface to dBUG using a terminal emulation program connected via a null-modem serial cable to serial port 0 on the development kit baseboard (see Figure 2.2 for serial port location). Use the following default terminal settings: 19200 baud, 8-data-bits, 1-stop-bit, no-parity, and no-flow-control.

1. Start a terminal program on the host computer (e.g., Tera Term, HyperTerminal).
2. Connect the included serial cable to the host computer and to serial port 0 on the development kit baseboard.
3. Power on the development kit.
4. In the terminal program you should now see a dBUG screen presenting text similar to this:

External Reset

ColdFire MCF548X on the M5485EVB
Firmware v4a.1a.1d (Built on Dec 6 2004 11:50:38)
Copyright 1995-2004 Freescale Semiconductor, Inc.

Enter 'help' for help.

dBUG>

Note: If the dBUG Monitor screen does not appear, please check the Tera Term serial settings, all cable connections, board connections, and then press the System Reset button on the baseboard.

5. Logic recommends that you immediately increase the baud rate for faster downloads and for ease of interfacing to LogicLoader. To do this, type 'set baud 115200' at the dBUG prompt. Then, adjust the baud rate setting on your terminal emulation program to 115200.

3.2.2 LogicLoader (bootloader/monitor) Power-up

The Fire Engine ships with a version of LogicLoader (bootloader/monitor) programmed into the boot flash device at an offset of 0x40000.

Accessing LogicLoader

Interface to LogicLoader using a terminal emulation program connected via a null-modem serial cable to serial port 0 on the development kit baseboard (see Figure 2.2 for serial port location). Use the following default terminal settings: 19200 baud, 8-data-bits, 1-stop-bit, no-parity, and no-flow-control.

1. Start a terminal program on the host computer (e.g., Tera Term, HyperTerminal).
2. Connect the included serial cable to the host computer and to serial port 0 on the development kit baseboard.
3. Power on the development kit. By default dBUG will appear.
4. If you have not already done so, change the baud rate of dBUG to 115200 as described in Section 3.2.1, Step 5 above.
5. At the dBUG prompt type 'go ff840000'. Press the Enter key.
6. In the terminal program you should now see a LogicLoader screen presenting text similar to the one below. Please refer to Section 7 for important information about the CPLD code

```
dBUG> go ff840000
```

```
*****
```

LogicLoader

```
(c) Copyright 2002-2005, Logic Product Development, Inc.  
All Rights Reserved.  
Version 2.0.8-MCF5485_10 0001
```

```
*****
```

```
losh>
```

3.3 Using the Development Kit with the P&E ColdFire BDM Interface

The Zoom ColdFire Development Kit includes a ColdFire BDM Interface from P&E Microcomputer Systems that can be used with a variety of development tools. The installation and use of the cable may vary between different development tool vendors.

In order to use the BDM with a particular toolset, please refer to the documentation included with each vendor's development tools for specific instructions. Also, refer to the P&E Microcomputer Systems website www.pemicro.com for information on configuring the BDM for use with your PC.

3.3.1 Using the BDM with the GNU Cross Development Toolchain

In order to use the BDM with the GNU cross development toolchain provided by Logic, jumper J1 must be moved to position 1–2 (labeled 'No' on the silkscreen) on the BDM.

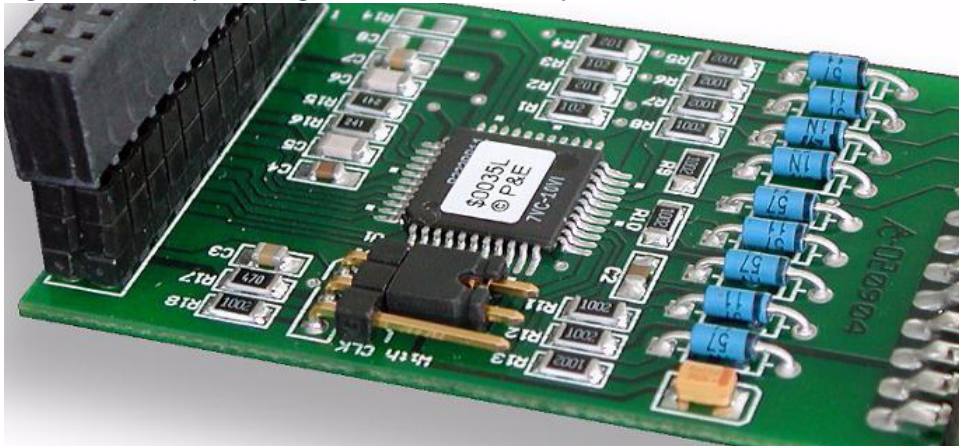
1. You must remove the BDM enclosure to change the jumper as shown in Figure 3.2 below.

Figure 3.2 – Remove BDM enclosure to change the jumper



2. Next, move the jumper to cover pins 1–2 as presented in Figure 3.3 below.

Figure 3.3 – Jumper setting for GNU Cross Development Toolchain

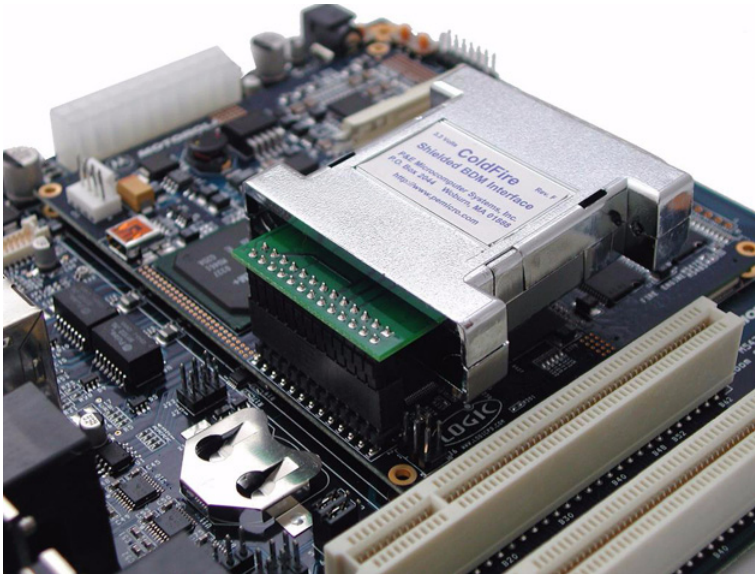


Connecting with the GDB Debugger

Please follow the steps below to connect your board with the GDB debugger.

1. Install Cygwin and the GNU Cross Development Tool Chain provided as a download on Logic's website at the following location:
<https://www.logicpd.com/auth/>.
2. Connect the BDM Interface to the Fire Engine board connector J10 being sure to line up pin 1 with pin 1.
3. Use the included parallel cable to connect the BDM interface to your PC.

Figure 3.4 – P&E BDM Interface Properly Connected to Fire Engine



4. Open a Cygwin window and at the Cygwin prompt, then launch GDB by typing:
`'m68k-bdm-elf-gdb' <enter>`.
5. Connect GDB to the BDM Interface by typing `'target bdem /dev/bdmcf0' <enter>`.
6. If you see the message 'error: could not access the GIVEIO device,' you must manually start the GIVEIO driver to give hardware access to GDB.

To manually start GIVEIO in Windows 2000, go to Device Manager and show hidden devices by selecting View -> Show Hidden Devices. Expand the Non-Plug and Play Drivers category and double click on GIVEIO. Click on the drivers tab. In the 'Current Status' section, click 'Start'. In the 'Startup' section, select 'Automatic'. Click OK. Retry Step 5 above.

7. Test the connection by typing 'frame 0' <enter>, 'info reg' <enter> to display system registers. If you see the list of system registers, you are successfully connected.

3.4 Sample Application

The Zoom ColdFire Development Kit comes with a sample application that can be found on Logic's website. For instructions, see the *Zoom ColdFire Development Kit User's Manual*.

4 Jumper Table

The following table describes the function of the jumpers on the Fire Engine.

Table 4.1 – Jumper Table

Jumper Settings		Function
JP17	Jump 2–4	CAN port 0 standby mode
	Jump 4–6	CAN port 0 normal/high-speed
JP17	Jump 1–3	CAN port 1 standby mode
	Jump 3–5	CAN port 1 normal/high-speed
JP14	Jump 2–4	CAN port 0 non-terminated data line
	Jump 4–6	CAN port 0 terminated data line
JP14	Jump 1–3	CAN port 1 non-terminated data line
	Jump 3–5	CAN port 1 terminated data line
JP25	Jump 1–2	RTC interrupt = IRQ-3
	Jump 2–3	No RTC interrupt
JP24	Jump 1–2	Infrared transceiver normal mode
	Jump 2–3	Infrared transceiver shutdown mode
JP23	Jump 1–2	Infrared transceiver low-speed mode
	Jump 2–3	Infrared transceiver high-speed mode

5 Product Notices

The Zoom ColdFire Development Kit being sold by Logic is intended for **ENGINEERING DEVELOPMENT OR EVALUATION PURPOSES ONLY**. As such, the goods being provided may not be complete in terms of required design, marketing, and/or manufacturing related protective considerations, including product safety measures typically found in the end product incorporating the goods. The user assumes all responsibility and liability for proper and safe handling of the Zoom ColdFire Development Kit.

ESD

Due to the open construction of the product, it is the user's responsibility to take any and all appropriate precautions with regard to electrostatic discharge. The various debug header pins are tied to actual lines on the Fire Engine and ITX baseboard. Some of them will reset the board if they are touched directly. Be aware of this situation. Logic's warranty does not cover product damaged by ESD.

Approvals

This product is compliant with emissions standard EN55022 level A, and may be operated in industrial areas as defined by national regulations. This product may require a special permit for operation at other locations. Cases of interference at such locations need to be handled according to the requirements of the national EMC legislation.

6 Product Registration

Registration provides you access to the latest revision of this manual, as well as other documentation and software tools. In addition to downloads access, registration provides future notifications when Logic releases documentation and software updates for your product.

1. To register, visit the Logic Support website at www.logicpd.com/support/ and click on "Create Account".
2. Fill in the on-screen form and click the "Submit" button.
3. You will receive an e-mail with a URL link to confirm account creation. Click on the link to finalize account creation.
4. You will be directed to a page on Logic's website that states "Account Activated". At this point you can register your product. Click on the link to "register your development kit and get access to downloads".
5. Fill in the on-screen form (all fields are required) and click the "Submit" button.
6. Your product is now registered. Click on the "Return to your Account Overview" link and you will see the list of registered products for your account.
7. Under the heading for your specific development kit, click the "All Downloads" link to access the downloads associated with your Zoom ColdFire Development Kit.

7 Fire Engine CPLD Important Notice

The CPLD device on the Fire Engine included in the Zoom ColdFire Development Kit does not contain any CPLD code. The CPLD is not required to run the microprocessor memory architecture or on-chip peripherals.

Logic has developed additional features in the CPLD that provide the following interfaces and functionality:

1. ISA-Like bus interface
2. Serial EEPROM Interface can be used for scripting.

Scripting is a method to execute losh commands automatically by listing them in a script file and using the command “source” to run the script in the file. This is useful for automating repetitive command line entries. For example, the command “source /cf_card/MYSCRIPT.TXT” will execute the script stored in the file “myscript.txt” on a mounted CompactFlash card. See the *LogicLoader User’s Manual* for more information about scripting.

3. CompactFlash Type 1 memory mode only interface

LogicLoader supports booting from the CompactFlash interface on the Fire Engine. This feature makes the CompactFlash interface available to other commands through the file system. If an ELF, BIN, RAW, or S-record image is stored on the CompactFlash card, that image may be loaded into memory.

4. Board Power Management features

These interfaces are supported in LogicLoader (bootloader/monitor). Other operating systems will need to develop drivers to support the interfaces.

The CPLD code is available free of charge for customers designing the Fire Engine into their final product or for purchase if implementing in a custom board solution. For more information on purchasing or licensing the CPLD VHDL code, please contact Logic sales at product.sales@logicpd.com and request a license agreement.

Fire Engines are available with CPLD code pre-loaded and can be ordered from Freescale. See the “Product Ordering Information” Section for details about where to find configuration and ordering information.

8 Product Ordering Information

Zoom ColdFire Development Kits and Fire Engine System on Modules (SOMs) are available from Freescale and their worldwide distributors. Please visit Logic's website for configuration options and ordering information:

- +Zoom ColdFire Development Kits
 - +www.logicpd.com/products/devkit/freescale/coldfire_evb
- +Fire Engine SOMs
 - +www.logicpd.com/products/som/freescale/mcf5475
 - +www.logicpd.com/products/som/freescale/mcf548x

8.1 Optional Zoom Display Kits

Zoom Display Kits are ideal for embedded solutions requiring a graphical user interface and are available in different display sizes and resolutions. Zoom Display Kits are sold separately. Contact Logic for other display requirements.

Visit Logic's website at www.logicpd.com/products/displaykits/ for a complete listing of Display Kits and specifications.

9 Troubleshooting

Q: My board does not respond with BDM interface connected, what can I do?

A: Try pressing the System Reset button (see Figure 1.2).

Q: My CompactFlash connector does not work, why?

A: See "Fire Engine CPLD Important Notice" Section regarding CompactFlash functionality.

Q: How do I use CPLD devices on the board?

A: See "Fire Engine CPLD Important Notice" Section for a list of functionality and options for obtaining CPLD code.

10 Support

The Zoom ColdFire Development Kit is a Freescale part number. Technical support should be handled as follows:

1. First, contact your local Freescale sales office if there are any issues or questions.
2. Second, use Freescale's Technical Information Center. See information card included with development kit.
3. Third, Logic has created an FAQ and Technical Discussion Group section on the Logic website to make it easier for our customers to find answers to their questions. For additional technical support, please see support packages below.

What support comes with the Zoom ColdFire Development Kit?

- +Freescale local FAEs and online support forum at www.freescale.com
- +Unlimited access to Logic's Technical Discussion Group and FAQs available at www.logicpd.com/support/

What is supported in the ColdFire Development Kit?

- +Zoom ColdFire Development Kit hardware
- +LogicLoader (Bootloader/Monitor)

What does Logic NOT support?

See respective third party solutions for technical support.

- +Freescale's dBUG ROM Monitor
- +GNU cross development toolchain (<http://www.gnu.org/>)
- +Tera Term
- +Cygwin (<http://www.cygwin.com/>)
- +IC Components (contact appropriate IC vendor)

10.1 Documentation and Software Downloads

Logic provides additional documentation and software resources for the Zoom ColdFire Development Kit. These additional resources are available as downloads from the "My Account" section of the Logic website. Click on the "Log In" link at the top of any logicpd.com web page and enter your username and password to access the downloads available for your product.

Additional downloads includes:

- +Product Documentation
 - +Fire Engine and Zoom ColdFire Development Kit product briefs
 - +Bill of Materials (.pdf format) for Fire Engine and Mini-ITX Baseboard

- +Schematics (.pdf format) for Fire Engine and Mini-ITX Baseboard
- +MCF5475/MCF5485 Fire Engine Hardware Specification
- +MCF5475/MCF5485 Fire Engine CPLD Specification, see Section 11
- +Zoom ColdFire User's Manual
- +Fire Engine Design Guideline Application Note
- +Zoom ColdFire Development Kit QuickStart Guide
- +LogicLoader User's Manual
- +Software Development Tools
 - +Tera-Term Serial Emulation Program
 - +Cygwin and GNU Cross Development Toolchain
 - +Sample Applications
- +References, Resources, and Support
 - +Freescale Technical Information Center (TIC) www.freescale.com
 - +Logic FAQ, Technical Discussion Group
 - +Support Packages

10.2 Frequently Asked Questions

Visit www.logicpd.com/support/ for FAQs regarding the Zoom ColdFire Development Kit and Fire Engine SOMs.

10.3 Technical Discussion Group

Visit www.logicpd.com/support/ to join our Technical Discussion Group (TDG) and share valuable information with other designers. Please note that the TDG site requires its own account creation that is separate from the account for the main Logic website.

10.4 Warranty Statement

Refer to the warranty card enclosed with the Zoom ColdFire Development Kit for warranty information.

10.5 Additional Support Services Available from Logic

Support Packages for Dedicated Technical Support

Visit www.logicpd.com/support/ for complete descriptions, prices, and purchase options.

Product Development Services

Logic offers product development and manufacturing services from initial product concept and design to volume production and fulfillment.

- +Industrial Design
- +Mechanical Engineering
- +Electrical Engineering
- +Systems & Software Engineering
- +PCB Design & Layout
- +FPGA/DSP Design
- +Manufacturing Services

Revision History

REV	EDITOR	REVISION DESCRIPTION	APPROVAL	DATE
1 PN 70000231	JW	Initial Beta Release	ELH	06/07/07
A PN 70000231	JW	Pilot Release	ELH	08/16/04
B PN 70000231	JW	Section 3.2.2: corrected LoLo command from 'go ffe40000' to 'go ff840000'	ELH	02/15/05
C PN 70000231	JW	Corrected CAN location in Figure 1.2 and display kit section	ELH	04/14/05
D PN 1010157	JCA	Removed mention of CD; Updated entire document for new format; Removed model numbers and configurations for SOMs and Zoom Display Kits	ME	06/02/08
E PN 1012588	JCA	Corrected serial port 0 location in Figure 2.2	RGL	01/31/09

Please check www.logicipd.com for the latest revision of this manual and other documentation.



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411 N. Washington Ave. Suite 400 Minneapolis, MN 55401

T : 612.672.9495 F : 612.672.9489 I : www.logicpd.com

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