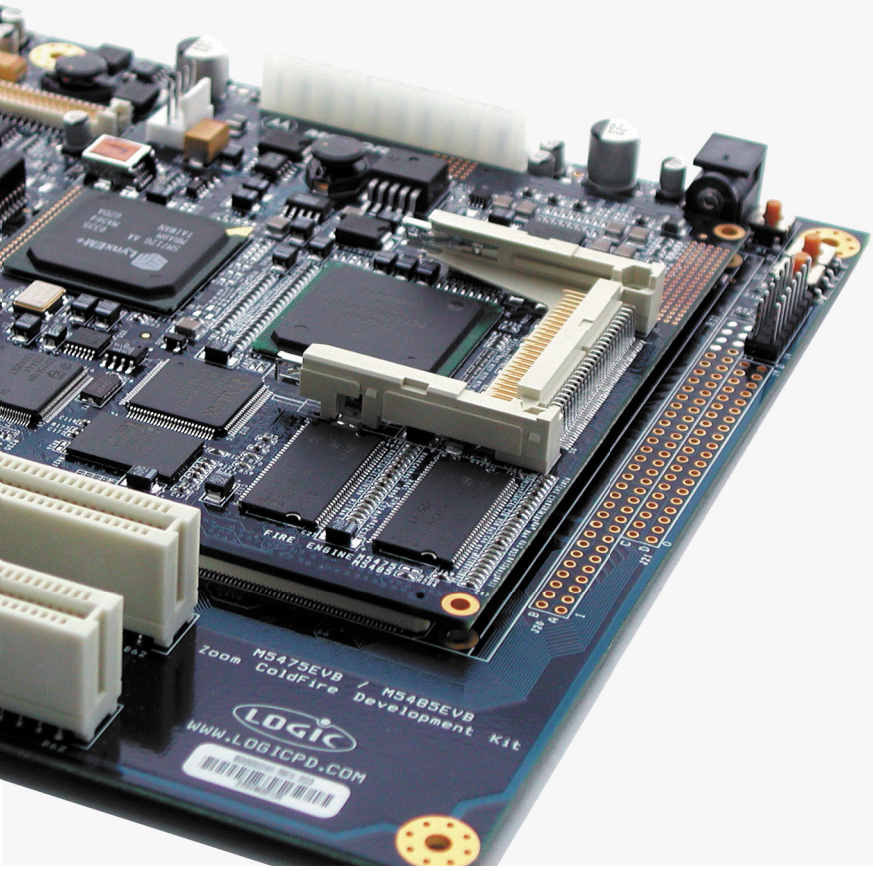
Zoom™

ColdFire Development Kit

ColdFire LITEKIT QuickStart Guide



developed by LOGIC

Launched by Motorola
freescale semiconductor

REVISION HISTORY

REV	EDITOR	REVISION DESCRIPTION	APPROVAL	DATE
A	Eric Harnisch James Wicks	Pilot Release	JAW	8/31/04
B	Nathan Kro James Wicks	Corrected 'Section 5: Jumper/ Switch Table'	ELH	4/11/05

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

Table of Contents

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

1 Introduction

1.1 Zoom ColdFire LITE Development Kit Features

- **Common Features**
  - **Fire Engine Included** (64MB DDR, 4MB Boot Flash)
  - **PC Card Expansion** One PCI 2.2 slot (32 Bit, 33 or 66MHz, 3.3V)
  - **Serial Ports** One 115.2kbps RS-232 serial ports; Two TTL serial ports
  - **Can 2.0b** One port (MCF5485 only)
  - **USB** USB 2.0 One High speed device (on Fire Engine)
  - **SPI**
  - **RTC**
  - **Network Support** One RJ45 Ethernet jack connectors (application/debug)
- **Cables**
  - Serial cable (null modem)
  - 5 volt power supply with power adapters
  - Ethernet Crossover
  - Parallel Extension Cable (for BDM interface)
- **BDM Interface**
- **Software**
  - LogicLoader™ (bootloader/monitor)
  - Freescale dBUG ROM Monitor
  - Third party development tools and software wrapped in individual CDs
  - Cygwin and GNU Cross Development Toolchain
- **Mechanical Mini-ITX**
  - 6.7” (170mm) long x 6.7” (170mm) wide x 1.3” (33mm) high

* Third Party Software available from Freescale

2 Getting Started

2.1 Unpacking the System

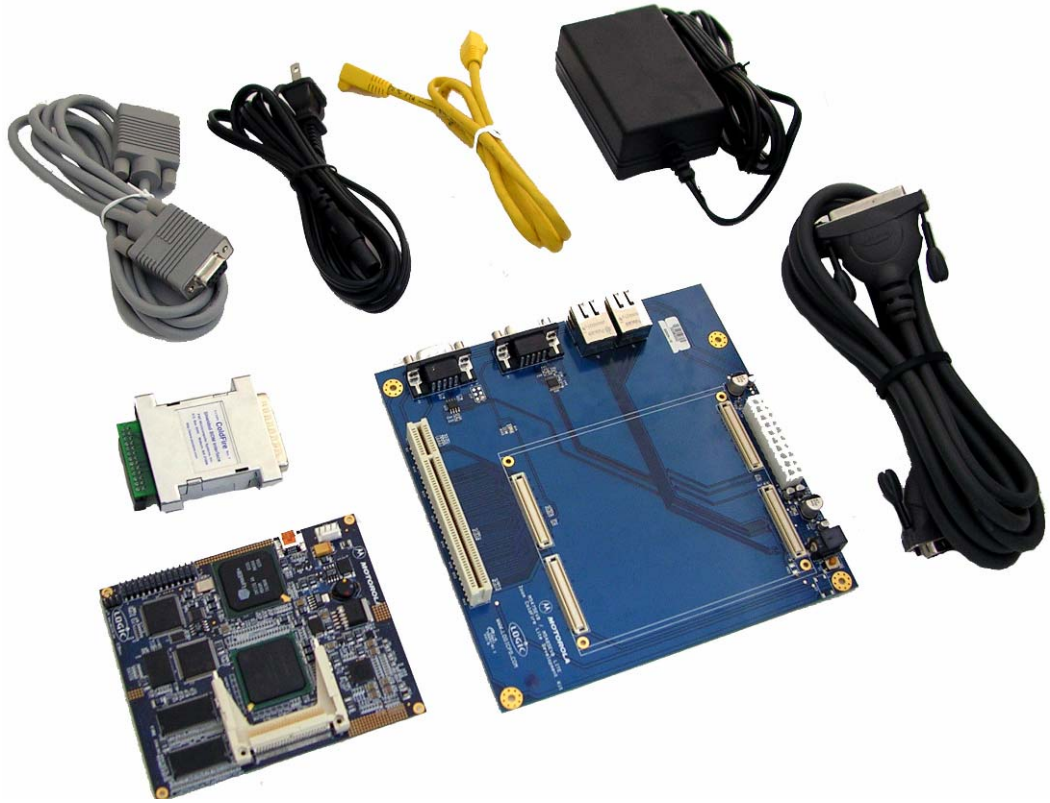
The Zoom ColdFire LITE Development Kit is comprised of the following items:

- Mini-ITX LITE Baseboard
- Fire Engine
- CD ROM (See CD ROM Contents Section)
- Serial Cable
- BDM Interface
- Ethernet crossover cable
- Parallel extension cable
- 5 volt power supply with power adapters (US, UK, EUR, and Japan)
- Warranty Card
- QuickStart Guide
- Packing List
- Third party development tools and software wrapped in individual CDs

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

Once you have verified that all the items are present, remove the board from its protective jacket and anti-static bag. Check the board for any visible damage and ensure that there are no broken, damaged, or missing parts.

Figure 2.1 – Kit Contents



2.2 CD-ROM Contents

- Product Documentation
  - Fire Engine and Zoom ColdFire LITE Development Kit product briefs
  - Bill of Materials (.pdf format) for Fire Engine and Mini-ITX LITE Baseboard
  - Schematics (.pdf format) for Fire Engine and Mini-ITX LITE Baseboard
  - MCF547x/MCF548x Fire Engine Hardware Specification
  - MCF547x/MCF548x Fire Engine CPLD Specification, see section 11
  - Zoom ColdFire LITE User's Manual
  - Fire Engine Design Guideline Application Note
  - Zoom ColdFire LITE 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
- Product Registration & Downloads

2.3 Development PC Requirements

- General
  - Pentium® processor or equivalent
  - 64 MB RAM minimum
  - 1 Gigabyte free hard disk space
  - 115200 baud capable RS-232 port (COM port)
  - Tera Term serial emulation program (or equivalent)

2.4 Mini ITX Lite Baseboard Connection Diagram

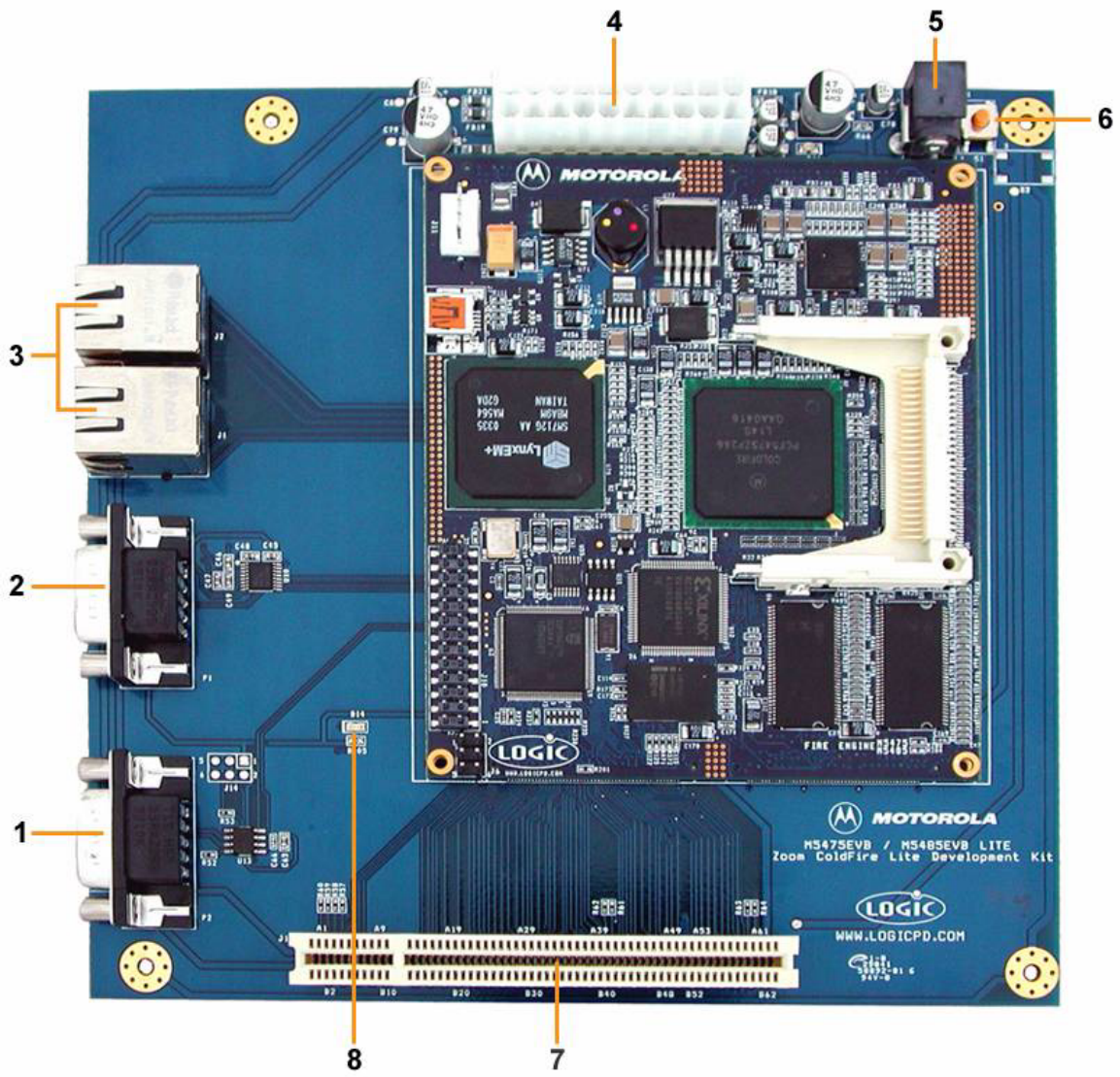


Figure 2.2 – Connection Diagram for the ITX Baseboard

Connection Diagram Details:

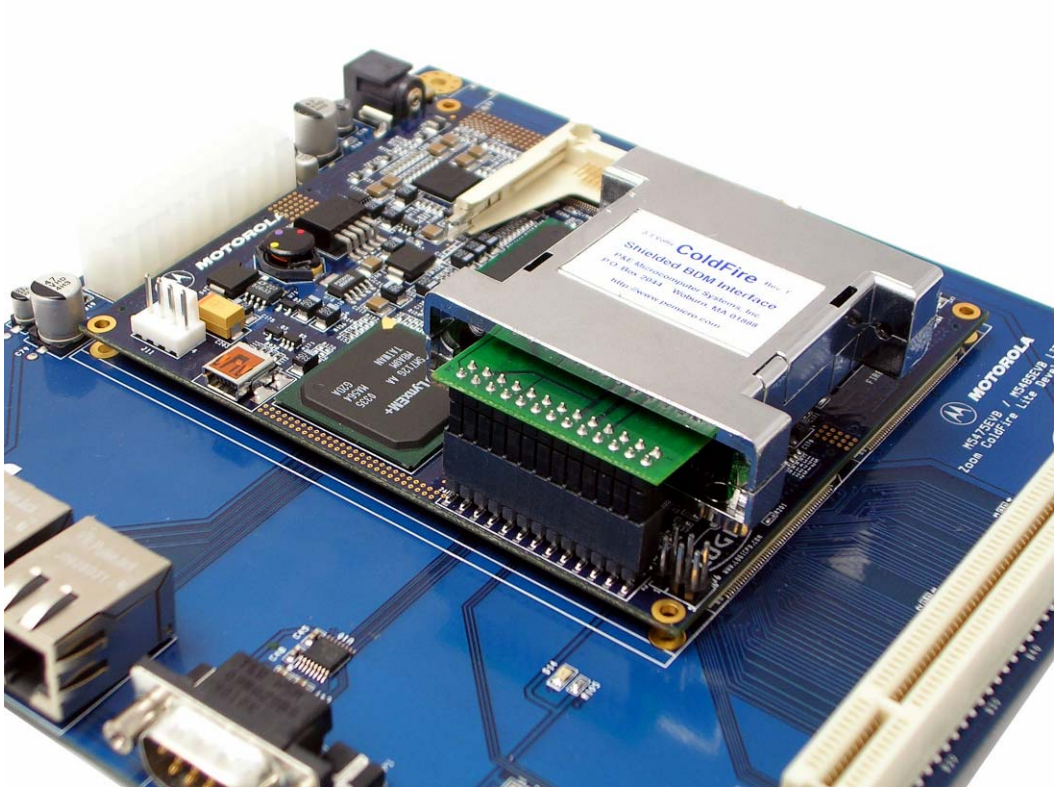
1. CAN Port
2. Serial Port
3. Ethernet Ports
   - Ethernet Port 1 (top in this image)
   - Ethernet Port 0 (bottom in this image)
4. ATX Power Connector
5. 5V Power In -- use appropriate power adaptor
6. System Reset Button
7. PCI Connector
8. Power On LED

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

2.5 P&E Shielded BDM Interface Connection Diagram

Please ensure that your P&E Shielded BDM Interface is properly connected.

Figure 2.3 – P&E Shielded BDM Interface Properly Connected to the Fire Engine



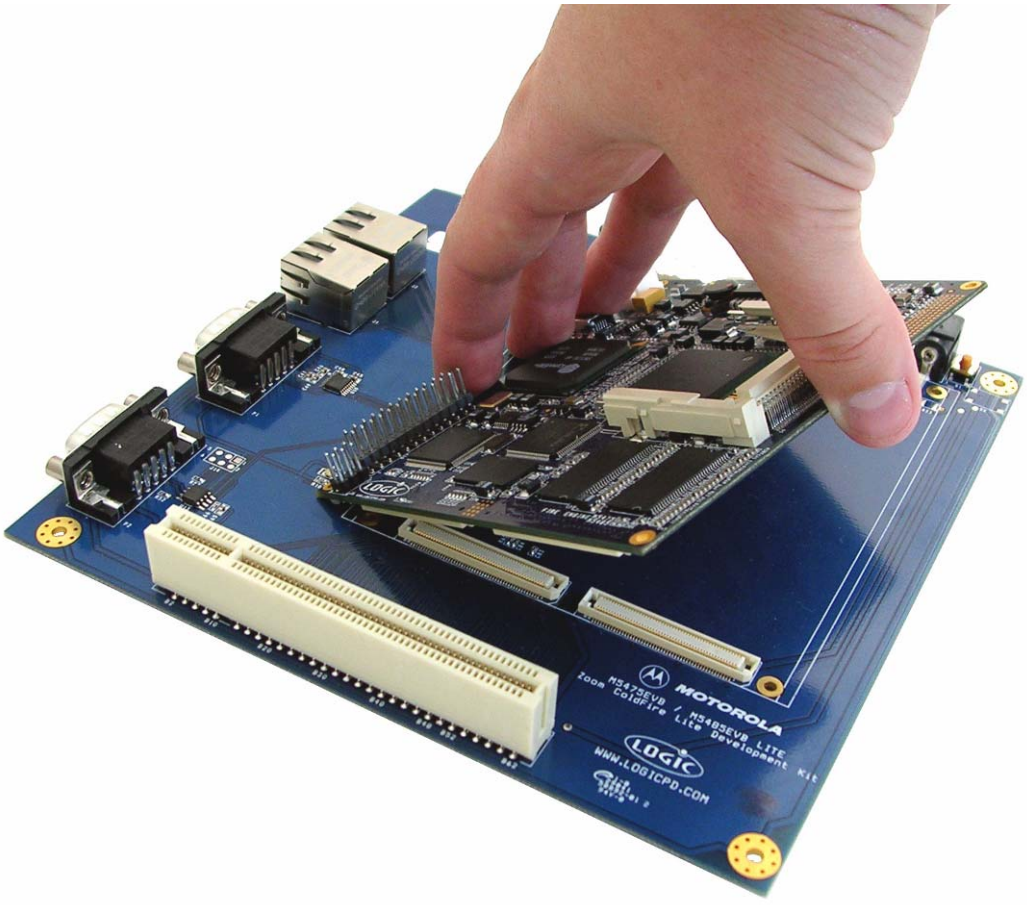
3 QuickStart

3.1 Inserting the Fire Engine into the Mini-ITX Lite Baseboard

Insert the Fire Engine into the Hirose connectors on the Mini-ITX Lite Baseboard.

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

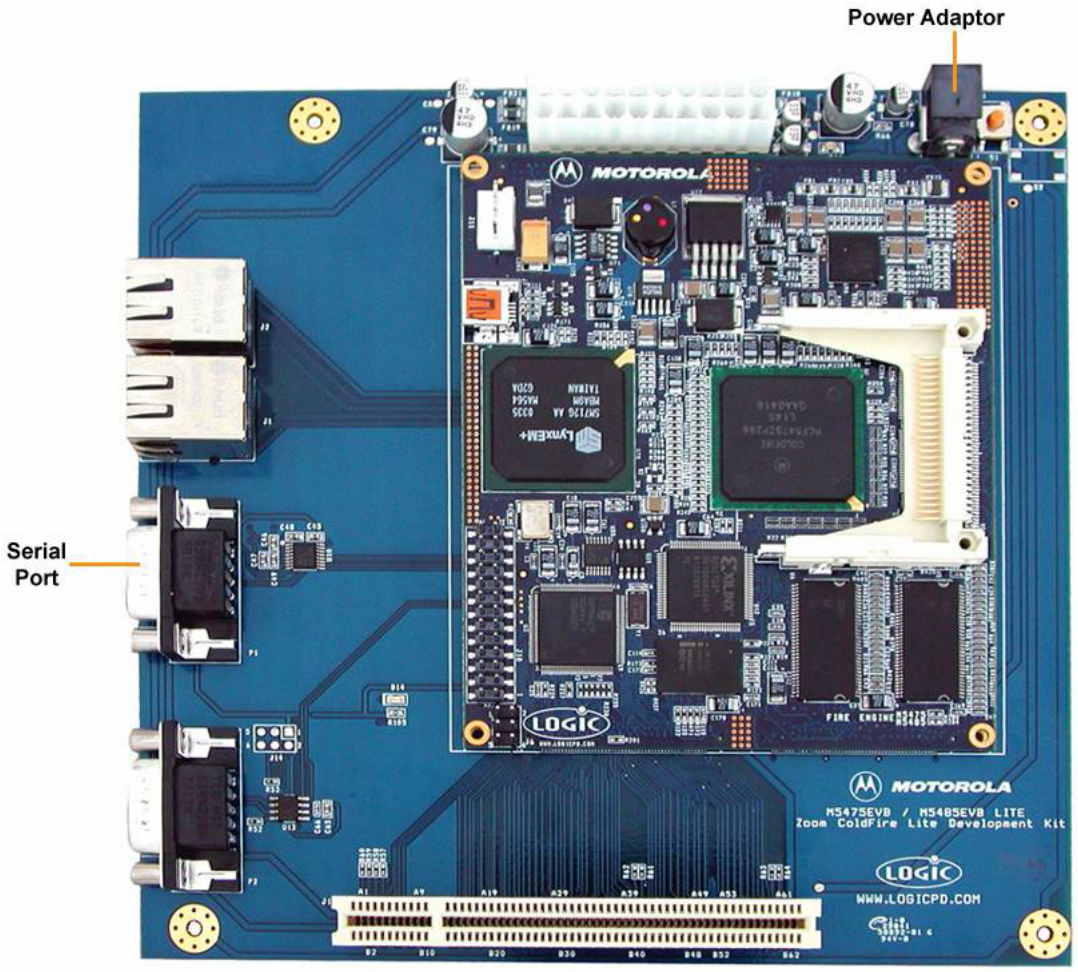
Figure 3.1 – Inserting the Fire Engine into the Mini- ITX Lite Baseboard



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

3.2 Connecting the Mini-ITX Lite Baseboard to your PC

Figure 3.2 – Connecting the Mini ITX Lite Baseboard to your PC



1. Connect the null-modem serial cable (**supplied in the kit)** to the serial port connector 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 the power outlet and the 5V line output connector into the power connector on the baseboard.

3.3 Power Supply

The Fire Engine is equipped with 2 options for providing power:

- 2.1 mm barrel connector with a positive center tap
- Standard ATX power supply receptacle

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 *Mini-ITX Lite Hardware Specification* for power supply rating

4 Test Drive the Zoom ColdFire LITE Development Kit

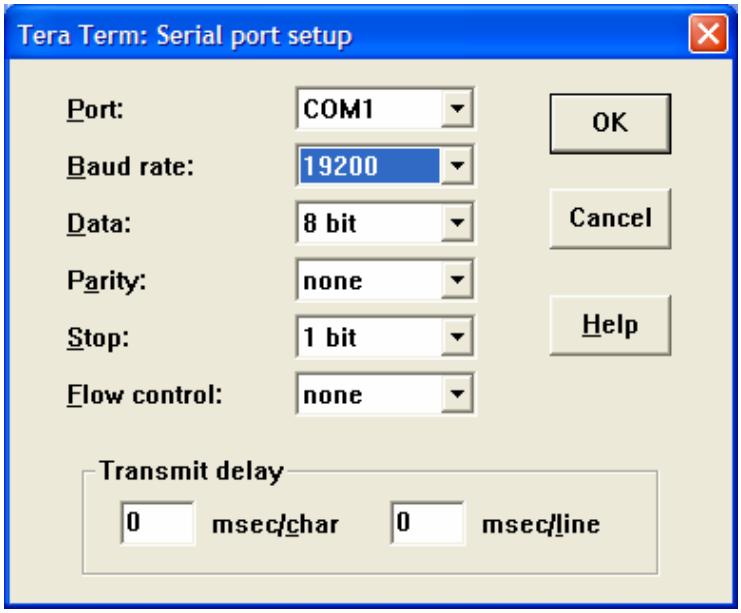
4.1 Terminal Emulation Installation

The Zoom ColdFire LITE Developer Kit is designed to communicate with terminal emulation programs via the null-modem serial cable included, 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 Product Development does not support any particular terminal emulation program, we suggest using Tera Term Pro for Windows 2000 or Windows XP. Tera Term Pro is provided on the CD-ROM or can be downloaded for free from Logic's website at the following location: https://www.logicpd.com/auth/login.php. Tera Term Pro is not available for Linux users. Logic Product Development does not guarantee or support any terminal emulation programs under Linux or Windows platforms.

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 4.1 - Tera Term: Serial port setup window



4.2 Power-up the Development Kit

The Zoom ColdFire LITE Development Kit will ship 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 4.2.2.

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.

4.2.1 dBUG ROM Monitor Power-up

When you start up your ColdFire LITE Development Kit in Tera Term, the dBUG ROM Monitor will appear. The dBUG ROM Monitor is programmed into the Fire Engine's boot Flash device.

Accessing dBUG

Interface to dBUG via a terminal emulation program connected via a null-modem serial cable to the "Terminal" port of Fire Engine (Serial Port 0, top on the baseboard). 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 (i.e. Tera Term, HyperTerminal, etc.).
2 Connect a serial cable to the host computer and to the Serial Port on the CDK.
3 Apply power to the Fire Engine.
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 v3b.1a.1a (Built on Jul 13 2004 13:22:36)
Copyright 1995-2004 Freescale Semiconductor, Inc.
Check ColdFire website for dBUG updates
Enter 'help' for help.

dBUG>

Note: If the dBUG Monitor screen does not appear, please check Tera Term serial settings, all cable connections, board connections, and press system reset.

5 Logic recommends that you immediately increase the baud rate for faster downloads and for ease of interfacing to LogicLoader. To do so, enter the command 'set baud 115200' at the dBUG prompt. Next, adjust the baud rate on your terminal emulation program to 115200. Then press System Reset and you should see the startup screen that you saw in step 4. Since the dBUG monitor program stores its settings in flash, the higher baud rate setting will remain in effect until the next time it is changed.

4.2.2 LogicLoader (bootloader/monitor) Power-up

The Fire Engine is shipped with a version of the LogicLoader (bootloader/monitor) programmed into the Boot Flash device at an offset of 0x40000.

Accessing LogicLoader

Interface to LogicLoader via a terminal emulation program connected via a null-modem serial cable to the "Terminal" port of Fire Engine (Serial Port on the CDK). If you did not change the baud rate, as suggested in step 5 of the previous section, 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 (i.e. Tera Term, HyperTerminal, etc.).
2 Connect a serial cable to the host computer and to the Serial Port on the CDK.
3 Apply power to the Fire Engine. By default dBUG will appear.
4 If you have not already done so, change the baud rate of dBUG to 115200 by following the steps outlined in Section 4.2.1, Step 5 (above).
5 At the dBUG prompt enter the command 'go ff840000'. Press Enter.

6 In the terminal program you should now see a LogicLoader screen presenting text similar to the one below. *Please refer to Section 11 for important information about the CPLD code.*

```
dBUG> go ff840000
spi not initialized: cpld code not detected.
serial eeprom not initialized: cpld code not detected.
CPLD not programmed.
video-set-default: unable to open '/dev/serial_eeprom'
no default screen

**********************************************************************
                    LogicLoader

 (c) Copyright 2002-2004, Logic Product Development, Inc.
 All Rights Reserved.
 Version 1.5.2-MCF5475_10 0001
**********************************************************************

Type 'help all' for a list of commands.

losh>
```

4.3 Using the Development Kit with the P&E ColdFire LITE BDM Interface

The Zoom ColdFire LITE Development Kit includes a ColdFire LITE 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 readme files included with each vendor's development tools for specific instructions.

The BDM Interface should be plugged into the ETX board connector J10 (see Figure 2.3). Use the included parallel cable included to connect the BDM to your PC's parallel port. Refer to the Pemicro website https://www.pemicro.com for the latest information on configuring the BDM for use with your PC.

4.3.1 Using the BDM with the GNU Cross Development Toolchain

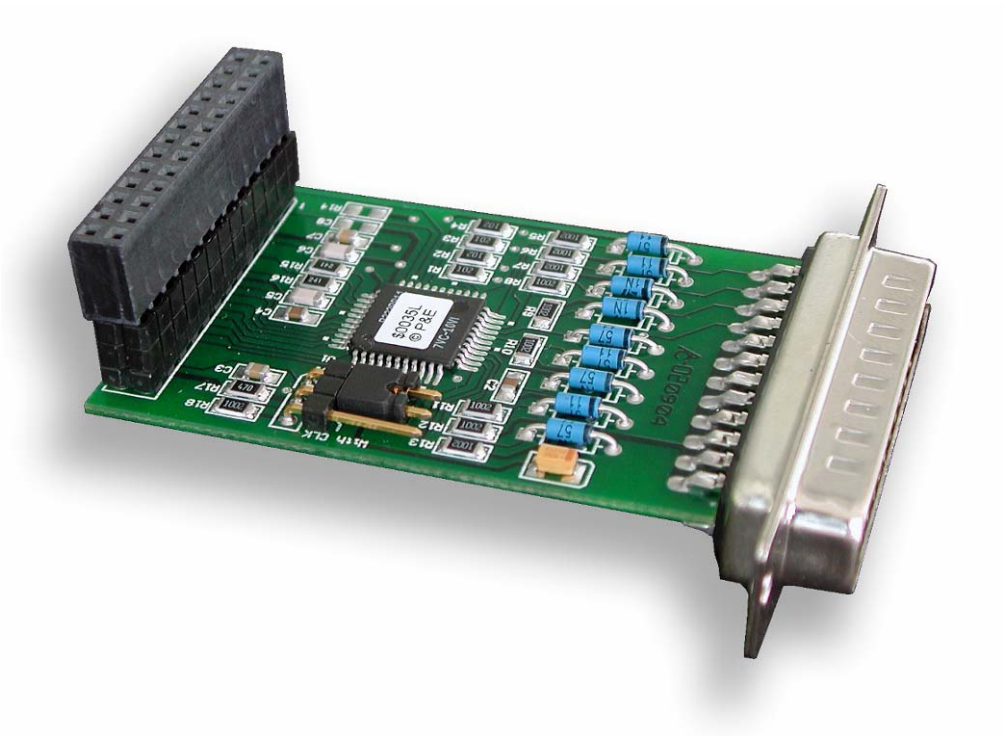
In order to use the BDM with the GNU cross development toolchain provided by Logic, jumper J1 must be moved to position 1-2 (Labeled 'No' in the silkscreen) on the BDM.

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

Figure 4.2 – Remove BDM Enclosure to change the Jumper

2. Next, configure your jumper as presented in the figure below.

Figure 4.3 – 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 on the CD-ROM or downloaded for free from Logic's website at the following location: https://www.logicpd.com/auth/login.php.
2 Connect the BDM Interface to the ETX board connector J10 and a parallel cable to PC.
3 Open a Cygwin window and at the Cygwin prompt, then launch GDB by typing: 'm68k-bdm-elf-gdb' <enter>.
4 Connect GDB to the BDM Interface by typing 'target bdm /dev/bdmcf0' <enter>.
5 If you see the text 'error: could not access the GiveIO device,' you must manually start the GIVEIO driver to give hardware access to GDB.
    a. 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 the drivers tab. In the 'Current Status' section, click 'Start'. In the 'Startup' section, select 'Automatic'. Click OK. Retry step 2 above.
6 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.

4.4 Sample Application

The Zoom CDK LITE comes with a sample application that can be found on the website. For instructions, see the Zoom CDK LITE User's Manual.

5 Jumper/Switch Table

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

Table 5.1: Jumper Switch Table

Jumper Settings		Function
J14	Jmp 2-4	CAN Port 1 Non-terminated data line
	Jmp 4-6	CAN Port 1 Terminated data line
J14	Jmp 1-3	CAN Port 1 Non-terminated data line
	Jmp 3-5	CAN Port 1 Terminated data line

6 Product Notices

The Zoom ColdFire LITE 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 LITE 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

7 Product Registration

In order to access the latest revision of this manual, product change notifications, application notes, schematics, and hardware specifications, please register your product online with a recent version of Internet Explorer or Netscape.

In addition, you will be notified when Logic releases updates to your product.

Go to the Log In section on the Logic website at http://www.logicpd.com/support/, and create a user account. You will receive an e-mail with your new username and password and additional instructions. At this point, log in and complete the product registration form to gain access to product download files.

8 Ordering Information

Zoom ColdFire LITE Development Kits, Fire Engines, and Display Kits are available direct from Freescale or their worldwide distributors.

8.1 Zoom ColdFire LITE Development Kits

M5474EVB includes M5475CFE Fire Engine
M5484EVB includes M5485CFE Fire Engine

8.2 Fire Engine Configurations

Freescale PN	DDR Mem	Nor Flash	Boot Flash	Graphics Ctrlr	USB *
MCF5475AFE	64	0	Y	-	-
MCF5475BFE	64	16	Y	-	-
MCF5475CFE**	64	16	Y	Y	Y
MCF5475DFE	64	0	Y	-	Y
MCF5475EFE	64	0	Y	Y	Y
MCF5475FFE	128	32	Y	Y	Y

* When ordering Fire Engines with USB Host PCI slot is locked at 33 MHz
** Denotes the Fire Engine Configuration on M5475EVB Zoom ColdFire LITE Development Kit

Freescale PN	DDR Mem	Nor Flash	Boot Flash	Graphics Ctrlr	USB *
MCF5485AFE	64	0	Y	-	-
MCF5485BFE	64	16	Y	-	-
MCF5485CFE**	64	16	Y	Y	Y
MCF5485DFE	64	0	Y	-	Y
MCF5485EFE	64	0	Y	Y	Y
MCF5485FFE	128	32	Y	Y	Y

* When ordering Fire Engines with USB Host PCI slot is locked at 25 MHz
** Denotes the Fire Engine Configuration on M5485EVB Zoom ColdFire LITE Development Kit

8.3 Zoom ColdFire LITE Display Kits

See section 10.

9 Support

The Zoom ColdFire LITE 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 enclosed information card in box. http:// freescale.com/semiconductors
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 LITE Development Kit?

- Freescale local FAEs and online support forum at www.freescale.com
- Unlimited access to Logic's technical discussion group and FAQ's available at http://www.logicpd.com/support/

What is supported in the ColdFire LITE Development Kit?

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

What does Logic Product Development 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)

Additional Support Services Available for Purchase

- **Product Development Services**
  - Industrial Design
  - Mechanical Engineering
  - Electrical Engineering
  - Systems & Software Engineering
  - PCB Design & Layout
  - FPGA/DSP Design
- **Support Packages**
  Visit http://www.logicpd.com/support/ for complete descriptions, price, and purchase.
  - Gold Support Package
  - Silver Support Package
  - Bronze Support Package
  - Hotline Incident

9.1 Frequently Asked Questions

Visit http://www.logicpd.com/support/ for a complete list of FAQ's for the Zoom ColdFire LITE Development Kit.

9.2 Technical Discussion Group

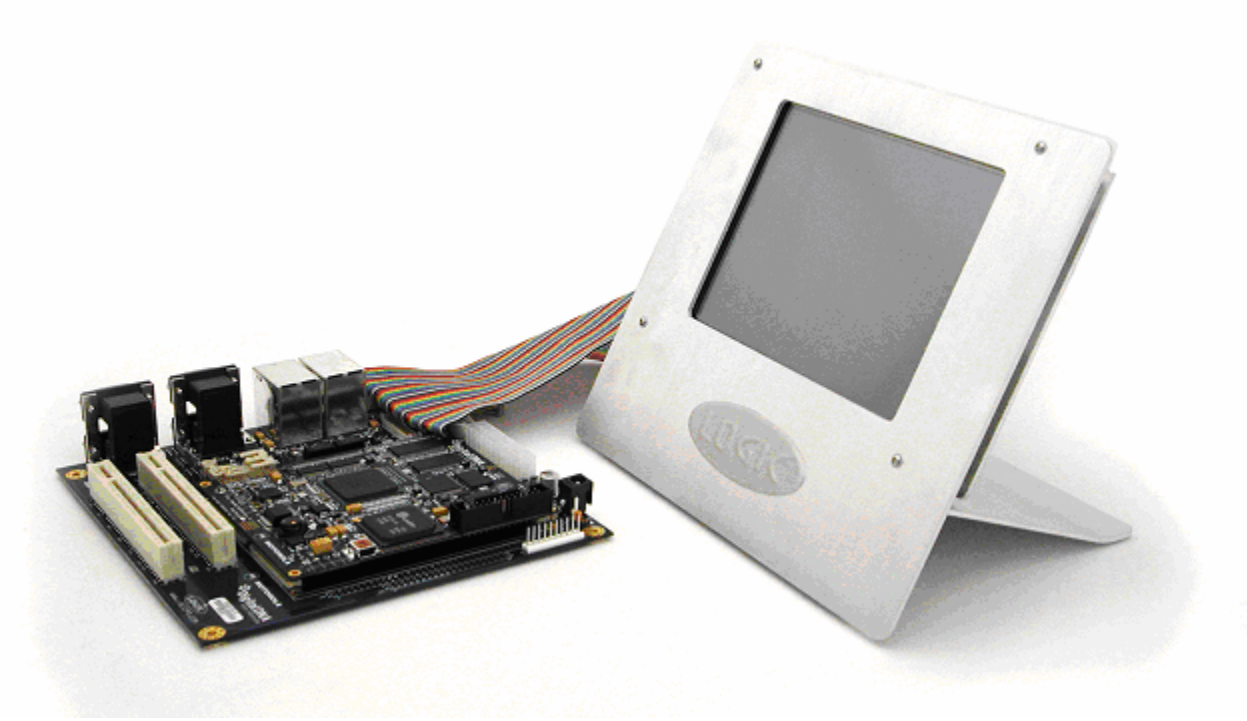
Visit http://www.logicpd.com/support/ to join our technical discussion group and share valuable information with other designers.

10 Zoom Display Kits

Display Kits are ideal for embedded solutions requiring a graphical user interface. Logic offers a variety of display sizes (3.5”, 6.4”, 12.1”), resolutions (QVGA, VGA, SVGA), and types (TFT, etc.). Zoom Display Kits are sold separately.

Visit Logic’s website at http://www.logicpd.com for a complete listing of Display Kits and accessories for the ColdFire LITE Development Kits.

Figure 10.1 – Zoom Display Kit plugged into a Zoom ColdFire LITE Development Kit



10.1 Zoom Display Kits Specification Table

Logic offers the following Display Kits for use with the Application Development Kits. Visit our website for current information on Zoom Display Kits.

Figure 10.2– Zoom Display Kits Specification Table

Logic Model	Sharp LCD P/N	Display Size Diagonal	Display Format	Type	Key Features
MQVGADK	LQ035Q7DB02	3.5 in.	QVGA (240x320)	Color TFT	Color, transreflective
MVGADK	LQ64D343	6.4 in.	VGA (640x480)	Color TFT	Color, transmissive
MSVGADK	LQ121S1DG41	12.1 in.	SVGA (800x600)	Color TFT	Color, transmissive

Important Notice: Please verify the selected processor supports the display kits. Please contact Logic for other display requirements.

11 Fire Engine CPLD Important Notice

The CPLD device on the Fire Engine included in the M547xEVB and M548xEVB development kits 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
  This 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.
3 CompactFlash Type 1 memory mode only interface
  The LogicLoader contains support for booting from the CompactFlash interface on the Fire Engine. This command makes that 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). For more information on LogicLoader, please see User's manual on CD-ROM. 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 using the following part number M547xxFE and M548xxFE, where 'xx' denotes configuration. See Fire Engine product brief for a complete list of configurations.

12 Troubleshooting

Q: My board does not respond with BDM interface connected, what can I do?
A: Try pressing the System Reset button (see Figure 2.2).

Q: My CompactFlash connector does not work, why?
A: See Section 11 regarding CompactFlash functionality.

Q: How do I use CPLD devices on the board?
A: See Section 11 for a list of functionality and options for obtaining CPLD code.

13 Warranty Statement

Refer to warranty card enclosed in development kit.