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1 Introduction

Congratulations on your purchase of the Zoom™ i.MX LITEKIT Development Kit. The Zoom i.MX LITEKIT provides a product-ready software and hardware platform for evaluating the functionality of the Freescale™ i.MX processor and 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 i.MX LITEKIT Features

Common Features

- +System on Module (SOM)
 - +SOM-LV form factor
- +LCD Display Connector
 - +Integrated LCD, touch, and backlight connector for Zoom Display Kits
- +Audio Stereo
 - +Input and output jacks
- +PC Card Expansion
 - +CompactFlash® Type I card
 - +MMC/SD Card Support
- +ATA Support
- +Serial Port
 - +RS-232 debug serial port
- +Expansion Headers
 - +Access to all SOM-LV signals via expansion breakout board that connects to the baseboard through two high-density board-to-board (BTB) socket connectors
 - +Standard 100 mil pitch on expansion board headers
- +USB
 - +One USB 2.0 high-speed host
 - +One USB 2.0 high-speed On-the-Go device
 - +One USB B debug device
- +Network Support
 - +One RJ45 Ethernet jack connector with magnetics (application/debug)

Cables

- +Serial cable (null-modem)
- +5 volt power supply with power adapters
- +Ethernet crossover cable
- +USB A to mini-B cable

Software

- +Sample Windows® Embedded CE binary images available from Logic
- +Windows Embedded CE BSP available from Logic
- +Linux BSP available from third-parties
- +LogicLoader™ (bootloader/monitor) installed in the SOM-LV flash

Application Development Tools

- +Cygwin, Tera Term, and GNU Cross Development Toolchain

Mechanical

- +LV-Baseboard form factor baseboard
 - +158.8 mm long x 146.1 mm wide x 17.1 mm high
- +i.MX31 SOM-LV Type I form factor SOM
 - +76.2 mm long x 59.1 mm wide x 7.9 mm high
- +i.MX27 SOM-LV Type II form factor SOM
 - +76.2 mm long x 50.8 mm wide x 7.9 mm high

2 Getting Started

2.1 Unpacking the System

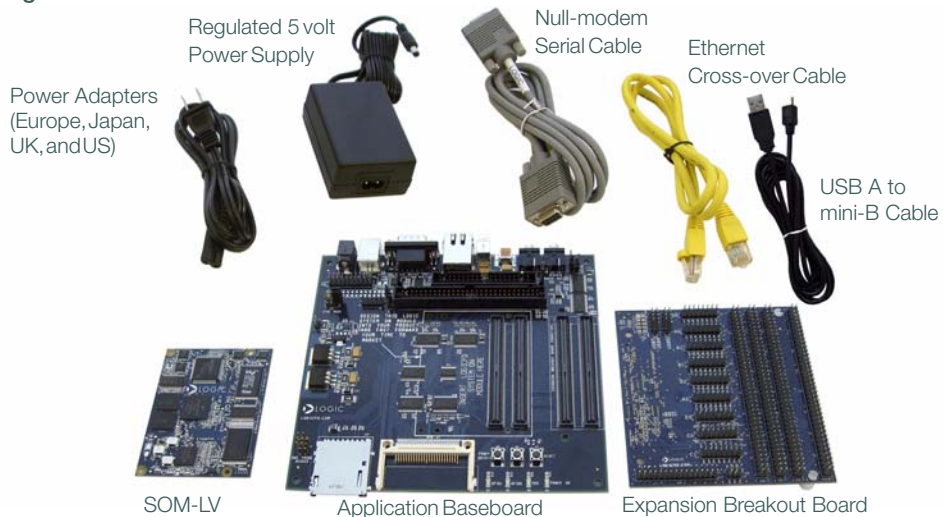
The Zoom i.MX LITEKIT includes the following items:

- +Application baseboard
- +SOM-LV
- +Expansion breakout board
- +Null-modem serial cable
- +Ethernet crossover cable
- +USB A to mini-B cable
- +5 volt power supply with power adapters (Europe, Japan, UK, and US)
- +End-User License Agreement
- +Warranty card
- +QuickStart Guide
- +Freescale TIC card

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 Hardware Contents



2.2 Documentation and Resources

Logic offers documentation, software, and other resources as downloadables from our website. Please create an account and register your product to access these documents and software tools: www.logicpd.com/auth/.

Product Documentation

- +SOM-LV and LITEKIT product briefs
- +Bill of Materials (.pdf format) for SOM-LV, application baseboard, and expansion breakout board
- +Schematics for SOM-LV (.pdf format), application baseboard (.pdf and .DSN formats), and expansion breakout board (.pdf and .DSN formats)
- +Layouts for SOM-LV (.pdf format), application baseboard (.pdf and .MAX formats), and expansion breakout board (.pdf and .DSN formats)
- +SOM-LV Hardware Specification
- +Zoom i.MX LITEKIT User's Manual
- +i.MX27/31 Reference Manuals available for download from Freescale's website www.freescale.com/iMX

Software Development Tools (Refer to each tool's readme file for instructions)

- +Tera Term
- +Cygwin
- +GNU cross development toolchain

References, Resources, and Support

- +FAQ
- +Technical Discussion Group (TDG)¹
- +How to get technical support (Ask a Question)
- +Support Packages

Product Registration & Software Downloads

2.3 Development PC Requirements

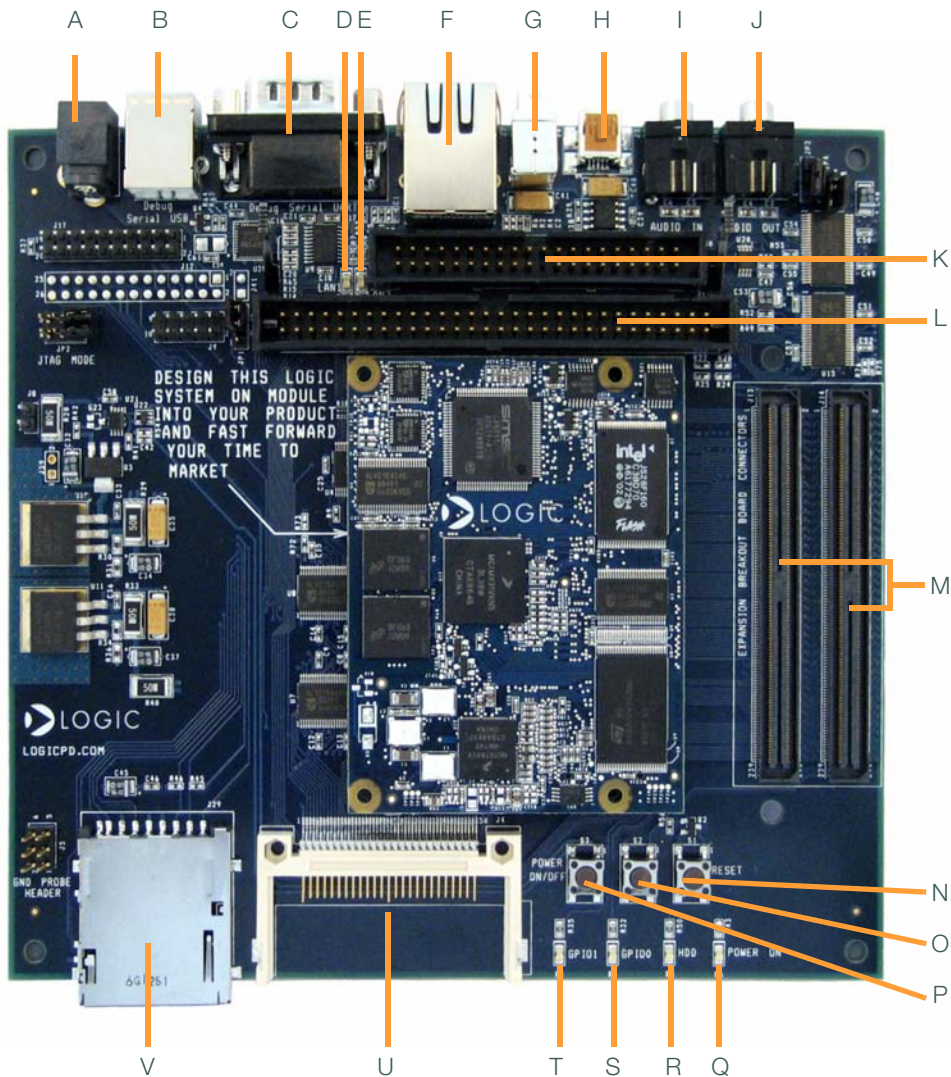
General

- +Windows 2000 or later host PC with access to the Internet
- +Pentium processor or equivalent
- +64 MB RAM minimum
- +115200 baud capable RS-232 port (COM port) or USB port (see "Connecting the Baseboard to your PC" Section)
- +Tera Term serial emulation program (or equivalent)

1. Please note that the TDG site requires its own account creation that is separate from the account used for the main Logic website.

2.4 Baseboard Connection Diagram

Figure 2.2 – Connection Diagram for the Baseboard



Connection Diagram Details

- A – Power-in from 5 volt regulated power supply
- B – USB B serial debug port¹
- C – Serial port— 115.2 kbps RS232 debug serial port
- D – Ethernet speed LED
- E – Ethernet link/activity LED
- F – RJ45 Ethernet jack with magnetics
- G – USB host
- H – USB On-the-Go mini-AB port
- I – Line-in stereo 3.5 mm jack
- J – Line-out stereo 3.5 mm jack
- K – 40-pin ATA header
- L – 60-pin header for integrated LCD, touch, backlight, connector power
- M – 240-pin BTB socket connectors for expansion breakout board
- N – System reset button
- O – System wake-up button
- P – System power on/off button
- Q – Power on LED
- R – ATA activity LED
- S – GPIO 0 LED
- T – GPIO 1 LED
- U – CompactFlash Type I card
- V – MMC/SD card

1. This USB B serial debug port is used to convert serial signals to USB for PCs without a DB9 COM port. See the "Connecting the Baseboard to your PC" Section for more information

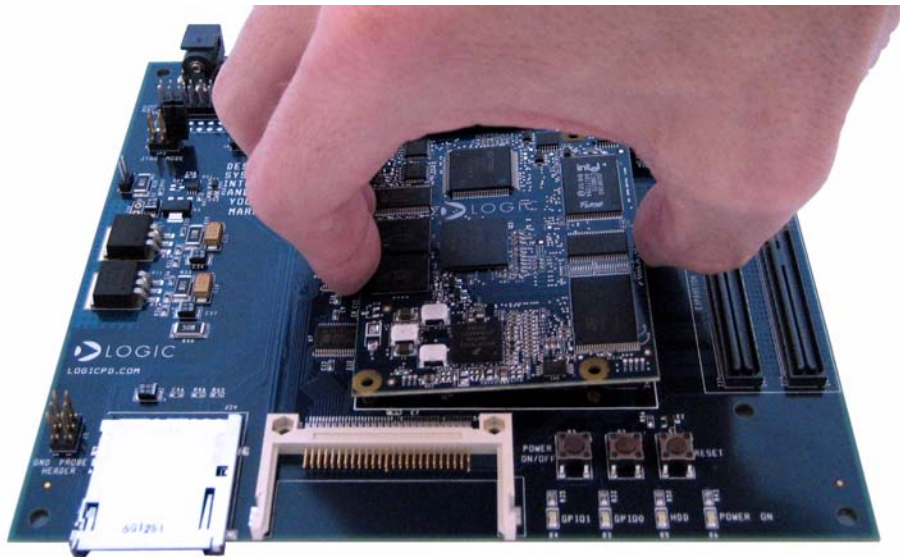
3 QuickStart

3.1 Connecting the SOM-LV to the Baseboard

The SOM-LV connects to the baseboard via two BTB socket connectors.

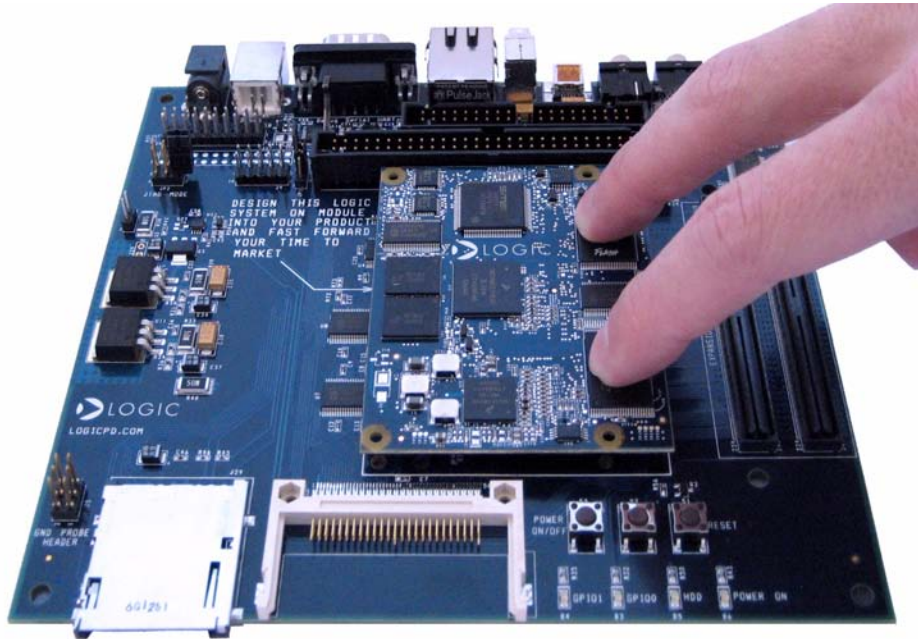
1. Align the SOM-LV over the two connectors farthest in from the edge of the board. See Figure 3.1. (There is an outline of the SOM-LV on the baseboard silkscreen to show proper placement.)
2. Press the SOM-LV straight down, applying even pressure, onto the two baseboard socket connectors. See Figure 3.2.
3. Verify that the socket connectors on the SOM-LV and baseboard have mated correctly. To remove the SOM-LV, pull up on the board above the socket connectors. Attempt to pull straight up and refrain from flexing the printed circuit board (PCB) to avoid damaging the SOM-LV.

Figure 3.1 – Aligning the SOM-LV over the Baseboard



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

Figure 3.2 – Connecting the SOM-LV to the Baseboard



3.2 Connecting the Expansion Breakout Board to the Baseboard

Use of the expansion header breakout board is required to access all of the SOM-LV's signals. The expansion header breakout board connects to the baseboard via two BTB connectors.

1. Align the breakout board over the two BTB connectors closest to the baseboard edge. See Figure 3.3. (There is an outline on the baseboard silkscreen that specifies the expansion breakout board connectors). When aligned correctly, the majority of the expansion breakout board will overhang the side of the baseboard.
2. Press the breakout board straight down, applying even pressure, onto the two baseboard socket connectors. See Figure 3.4.
3. Verify that the socket connectors on the breakout board and baseboard have mated correctly. To remove the breakout board, pull up on the board above the socket connectors. Attempt to pull straight up and refrain from flexing the PCB to avoid damaging the breakout board.

Figure 3.3 – Aligning the Breakout Board over the Baseboard

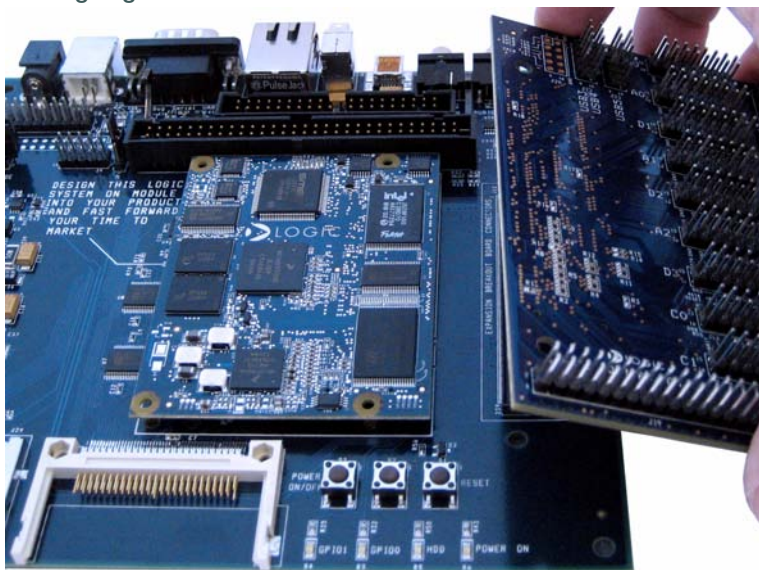
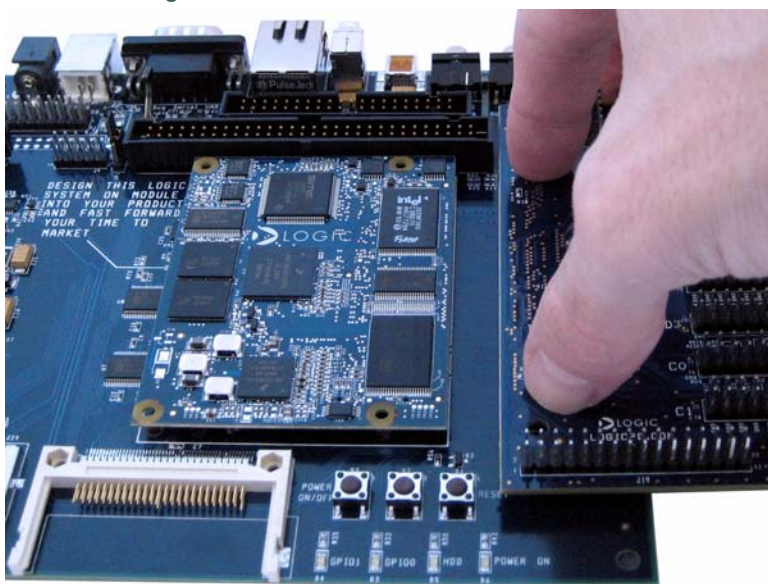


Figure 3.4 – Connecting the Breakout Board to the Baseboard



3.3 Connecting the 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. See Figure 3.5.

Note: If your computer does not contain a serial port, you can use the USB B device on the baseboard to connect to the USB port on your computer. See Figure 3.5. The application baseboard is equipped with an FTDI virtual COM port (VCP) chip that causes the USB device to appear to your computer as an additional COM port. Settings for the terminal emulation program will remain the same; however, a driver must be installed on your computer and a USB A-to-B cable must be purchased separately for proper operation. A link to the driver and instructions for using the FT232R VCP chip can be found under the “Software Development Tools” heading at: www.logicpd.com/auth/.

2. Confirm baseboard JTAG jumpers are set for normal operation with your specific SOM-LV, as shown in Figure 3.6.

Note: For proper JTAG operation, the jumpers should remain in the normal operation position.

3. Connect the regulated 5 V power supply to the appropriate power adapter. Plug the power adapter into an electrical outlet and the 5 V line output connector into the power connector on the baseboard.
4. Press the power on button to boot the LITEKIT. See Figure 3.5.

Figure 3.5 – Connecting the Baseboard to your PC

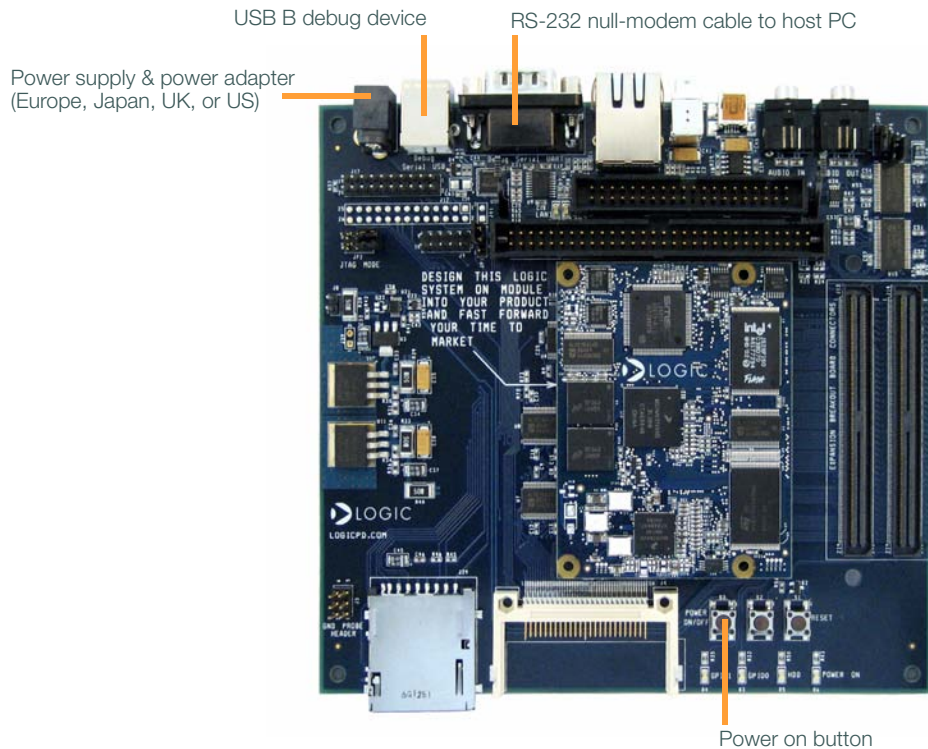
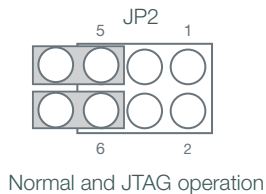


Figure 3.6 – Baseboard JTAG Settings for i.MX27/31 SOM-LV



4 Test Drive the Zoom i.MX LITEKIT

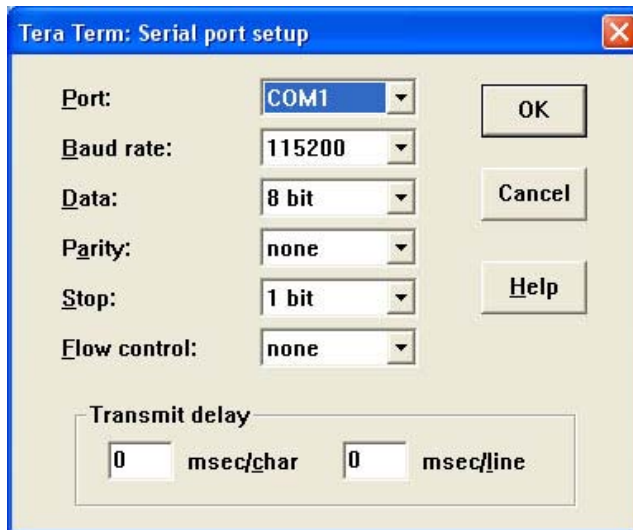
4.1 Terminal Emulation Installation

The Zoom i.MX LITEKIT is designed to communicate with terminal emulation programs using the included null-modem serial cable and the following settings: 115200 baud, 8-data-bits, no-parity, 1-stop-bit, 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: www.logicpd.com/downloads/240/. 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 COM port where the null-modem serial cable is connected to the host PC. Set the 'baud-rate' to 115200, 'data' to 8-bit, 'parity' to none, 'stop' to 1-bit, and 'flow control' to none. (**Hint:** In Tera Term, you can save these serial port settings by selecting 'Setup -> Save setup...' from the file menu. After saving, these serial port settings will be in place every time you launch the Tera Term application.)

Figure 4.1 – Tera Term: Serial Port Set-up Window



4.2 Power-up the LITEKIT

The Zoom i.MX LITEKIT is shipped with the Logic bootloader installed in resident flash. LogicLoader provides the capability for loading operating systems and applications. In addition, it provides a full suite of commands for interfacing to the SOM-LV. These commands load operating systems, configure hardware platforms, bring up hardware, customize applications, perform tests, and manage in-field devices.

4.2.1 LogicLoader (Bootloader/Monitor) Power-up

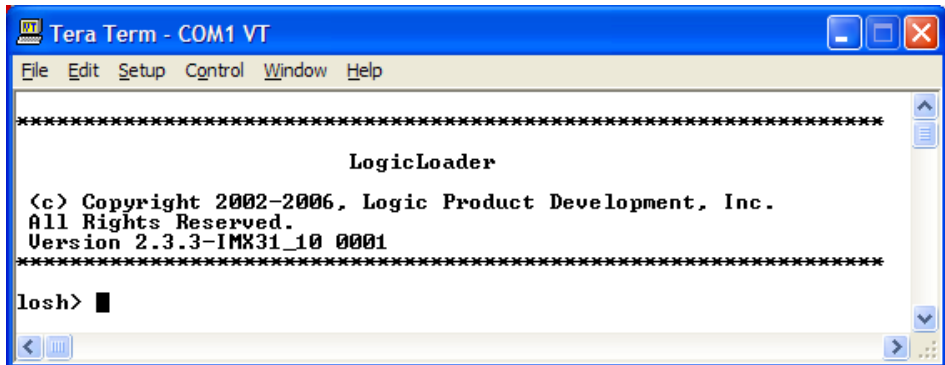
The SOM-LV is shipped with a version of LogicLoader (bootloader/monitor) programmed into the boot flash device at an offset of 0xA000_0000.

Accessing LogicLoader

Interface to LogicLoader via a terminal emulation program connected via a null-modem serial cable to the “Terminal” port of the SOM-LV (debug serial port on the baseboard). Use the following default terminal settings: 115200 baud, 8-data-bits, 1-stop-bit, no-parity, and no-flow-control.

1. Start a terminal program on the host PC (e.g., Tera Term, HyperTerminal).
2. Connect a serial cable to the host PC and to the serial port on the baseboard.
3. Connect power supply to the LITEKIT.
4. Press the power on button (see Figure 2.2 for button location).
5. In the terminal program you should see a LogicLoader screen similar to that below.

Figure 4.2 – LogicLoader losh> Prompt



4.3 Sample Application

The Zoom i.MX27 and i.MX31 LITEKITS come with a sample application that can be downloaded from the Logic website: www.logicpd.com/auth/. For instructions, see the *Zoom i.MX LITEKIT User's Manual* and the readme file that accompanies the downloaded sample application.

4.4 Board Support Packages (BSPs)

Logic offers various product-ready Board Support Packages (BSPs) in binary format for Zoom Development Kits. (Please visit Logic's website to learn what BSPs are available for your specific Development Kit: www.logicpd.com/.)

Logic provides sample Windows CE images (NK.bin files) to evaluate the Windows CE operating system and Logic's System on Module hardware. These images are posted to the downloads section of the Logic website and are to be used for evaluation purposes only; they are not intended for commercial use. Please read *Application Note 296: When to Use an NK.bin* (www.logicpd.com/downloads/724/), for information about the capabilities and intended use of Logic's binary OS images.

If your development effort requires the use of a BSP, Logic can provide a binary BSP contingent upon an approved, signed licensed agreement. Please read the *Windows CE BSP License Agreement* located at: www.logicpd.com/downloads/406/.

5 Jumper/Switch Functionality

5.1 Jumper Settings for Zoom i.MX LITEKIT

The following table describes the function of the jumpers on the application baseboard.

Table 5.1 – Jumper Switch Table

Jumper Settings		Function
JP2	Jmp 5 Jmp 6	Normal operation. An individual jumper is placed on each pin and not connected to another pin. (See Figure 3.6, earlier in this document.)
JP3	Jmp 2–3	ATA Operating Voltage. Default is when jumper is across pins 2 and 3.
JP4	Jmp 1	ATA Enable. When the jumper is placed only on pin 1 and not connected to another pin, ATA functionality is enabled for the board.

6 Product Notices

The Zoom i.MX LITEKIT being sold by Logic and Freescale 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 i.MX LITEKIT.

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 SOM-LV and baseboard. Some of them will reset the board if they are touched directly. Be aware of this situation. Logic's warranty does not cover products damaged by ESD.

Approvals



This product is compliant with radiated 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.

FCC Compliance



This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Product: Zoom i.MX27 LITEKIT
Model number: MCIMX27LITEKIT
Responsible party: Logic Product Development
411 Washington Ave N Suite 400
Minneapolis, MN 55401
612.672.9495

Product: Zoom i.MX31 LITEKIT
Model number: MCIMX31LITEKITC
Responsible party: Logic Product Development
411 Washington Ave N Suite 400
Minneapolis, MN 55401
612.672.9495

7 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.

Under the heading for your particular Zoom i.MX LITEKIT and SOM, click the “All Downloads” link to access the downloads associated with your product.

8 Product Ordering Information

Zoom i.MX LITEKITS and SOM-LVs are available direct from Freescale or their worldwide distributors. Please visit Logic's website for configuration options and ordering information:

- +Zoom i.MX LITEKITS

 - +www.logicpd.com/products/devkit/freescale/imx27_litekit

 - +www.logicpd.com/products/devkit/freescale/imx31_litekit

- +i.MX SOM-LVs

 - +www.logicpd.com/products/som/freescale/i.mx27

 - +www.logicpd.com/products/som/freescale/i.mx31

8.1 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 Support

The Zoom i.MX LITEKIT 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.
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 i.MX LITEKIT?

- +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 i.MX LITEKIT?

- +Zoom i.MX LITEKIT hardware
- +LogicLoader (Bootloader/Monitor)

What does Logic Product Development NOT support?

- See respective third-party solutions for technical support.
- +GNU cross development toolchain (www.gnu.org)
 - +Tera Term
 - +Cygwin (www.cygwin.com)
 - +IC Components (contact appropriate IC vendor)

Additional Support Services Available for Purchase

Support Packages for Dedicated Technical Support

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

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

9.1 Frequently Asked Questions

Visit www.logicpd.com/support/ for a complete list of FAQs for the Zoom i.MX LITEKIT and i.MX SOM-LVs.

9.2 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.

9.3 Warranty Statement

Refer to warranty card enclosed with the Zoom i.MX LITEKIT.

Revision History

REV	EDITOR	REVISION DESCRIPTION	APPROVAL	DATE
1 PN 1005947	Jed Anderson	Internal Release	ELH	08/16/06
A PN 1005947	Jed Anderson	Updated design and layout	ELH	08/30/06
B PN 1006770	Jed Anderson	Updated all images of the baseboard and references to newly added components; Added USB A to mini-B cable to kit contents; Added "Connecting the Expansion Breakout Board to the Baseboard" Section and other references to the breakout board; Added FCC compliance paragraph; Corrected 12.1" Sharp LCD PN; Added Linux BSP to "Zoom i.MX LITEKIT Features" Section; Specified exact VCP chip used on baseboard in "Connecting the Baseboard to your PC" Section	ME	02/12/07
C PN 1007500	Jed Anderson	Clarified JTAG operation instructions and jumper settings; Updated pictures; Section 2.4—Updated connection diagram for Pilot board spin; Changed to SOM-LV nomenclature throughout; General grammar and formatting changes	JCA	04/26/07
D PN 1008139	Jed Anderson	Removed configuration information for LITEKIT, SOM-LVs, and Display Kits; Combined Ordering Information section with Display Kit section; Added FCC note for i.MX27 LITEKIT; Added Hint for Tera Term settings; Clarified available BSP statements; General grammar and formatting changes	ME	10/03/07
E PN 1009760	Jed Anderson	Removed information about CD; Updated BSP section; Added note to USB B serial debug port in "Baseboard Connection Diagram" Section; Updated Product Registration section; Updated Product Ordering section; Updated inactive URL links	RGL	05/30/08

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



embedded product solutions

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