



ZOOM™ Geode™ Development Kit

Geode™ LX QuickStart Guide

REVISION HISTORY

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1 Introduction

Congratulations on your purchase of the Zoom™ Geode™ LX DB800 Development Kit. The Geode LX DB800 provides a product-ready software and hardware platform for evaluating the functionality of the AMD Geode LX processor. This results in an embedded product development cycle with less time, less cost, less risk... more innovation.

1.1 Development Board Features

Geode LX SOM-ETX Module Board Hardware Features

- AMD Geode LX 800@0.9W Processor*
 - 500 MHz processor clock
 - High performance 200 MHz DDR memory bus
 - Support for industry standard PC2100/PC2700/PC3200 DDR SODIMMs up to 512 MB
 - Integrated Graphics Controller
 - High performance 2D accelerator
 - Digital VOP (Video Output Port) (SD and HD) 480p, 480i, 720p, and 1080i of TFT outputs
 - CRT resolutions supported up to 1920x1440x32 bpp @ 85 Hz and 1600x1200x32 bpp @ 100 Hz
 - TTL level TFT LCD display header for display support up to 1600x1200x32 bpp @ 60 Hz
 - Supports down to 7.652 MHz Dot Clock (320x240 QVGA)
 - Analog graphics mode support up to 2048x1536x24 bpp @ 75 Hz (LVDS display support requires LVDS adapter)
 - Video Input Port (VIP)
 - VESA 1.1 and 2.0 compliant, 8 or 16-bit
 - VBI support: 8 or 16-bit 80 MHz SDTV or HDTV capable
 - GeodeLink™ PCI Bridge
 - PCI 2.2 and 3.0 compliant
 - 3.3V signaling and 3.3V I/Os
 - 32-bit, 33/66 MHz operation
 - Supports virtual PCI headers for GeodeLink devices
 - Security Block
 - Serial EEPROM interface for 2K bit unique ID and AES (Advanced Encryption Standard) hidden key storage
 - Electronic Code Book (ECB) or Cipher Block Chaining (CBC) 128-bit AES hardware support
 - True random number generator
- AMD Geode CS55336 Companion Device
 - Provides a PCI interface for GeodeLink devices
 - PCI specification v2.2 compliant
 - 32-bit, 33/66 MHz operation
 - ATA Controller
 - 66 MB/s IDE controller in Ultra DMA mode
 - Legacy and Enhanced PIO (Programmable I/O), MDMA (Multi DMA), and UDMA (Ultra DMA) modes
 - One IDE channel with support for two Ultra DMA-66 devices
 - Flash Interface
 - Multiplexed with IDE interface
 - Connects to array of industry standard NAND flash and/or NOR flash
 - USB Host Controller
 - Support for four USB 2.0 high speed (480 Mbit) host connections
 - USB 1.1 supported by one OHCI-based host controller
 - USB 2.0 supported by one EHCI-based host controller
 - USB port four can be configured as a USB 2.0 compliant device
 - Supports wake-up on USB event
 - LPC (Low Pin Count) Port
 - Based on LPC interface specification v1.0
 - Serial IRQ support
 - Serial DMA support (8-bit only)
 - External bus masters not supported

*The AMD Geode™ LX 800@0.9W processor operates at 500 MHz. Model numbers reflect performance as described here:
<http://www.amd.com/connectivitysolutions/geodelxbenchmark>.

- ❑ IR (Infrared) Communication Port
- ❑ System Management Bus (SMB) Controller
- ❑ Power Management Support
 - ACPI 2.0
 - Support for S1, S3, and S5 Sleep states
- Gigabit Ethernet Controller - Realtek RTL8110SB
 - ❑ Full Duplex 10/100/1000
 - ❑ Supports "Wake on LAN"
 - ❑ Optional population Realtek RLT8100C, 10/100
- AC97 Audio Controller interface – Realtek ALC203 audio codec
 - ❑ AC97 v2.3 compliance
 - ❑ 2-Channel audio
 - ❑ Line In/Mic In/Headphone Out
 - ❑ SPDIF In/Out
 - ❑ Optional population - Wolfson WM9712 audio codec
 - 4-Wire resistive touch panel support
- Optional population - LPC to ISA Bridge – Winbond W83626F
 - ❑ ISA Interface (limited)
 - ❑ All Software Transparent

Mini-ITX Baseboard Hardware Features

- LPC to SuperIO - Winbond W83627
 - ❑ Parallel port
 - ❑ Two Serial ports (1 via DB9 connector, 1 via header)
 - ❑ PS/2 keyboard/mouse
 - ❑ Supports Wake on event
 - ❑ IR port (via header)
 - ❑ FDD port
- Connector Back Plane
 - ❑ VGA port DB15
 - ❑ Serial port DB9
 - ❑ Parallel port DB25
 - ❑ PS/2 keyboard/mouse
 - ❑ Audio – Line In/MIC In/Headphone Out
 - ❑ SPDIF Out – In (via header)
 - ❑ 10/100/1000 RJ45
 - ❑ USB Host 3X
 - ❑ USB Host/Device
 - ❑ ATX power in connector
 - ❑ TFT standard output connector
 - ❑ VIP/VOP headers
 - ❑ Hardware Configuration header
 - ❑ FDD/HDD
 - ❑ CompactFlash connector

Software

- BIOS from General Software or Insyde Software
- Microsoft Windows® XP/XPe Drivers
- Linux and Microsoft Windows CE Board Support Packages (BSP) from AMD

Mechanical

- Geode LX SOM-ETX module - 4.5" (115mm) long x 3.75" (96mm) wide x 0.5" (12mm) high
- Mini-ITX baseboard - 6.693" (170mm) long x 6.693" (170mm) wide x 1.52" (38.61mm) high

2 Getting Started

2.1 Unpacking the System

The LX DB800 incorporates a Geode LX processor in a Mini-ITX SBC (Single Board Computer) form factor. The board is populated with one DDR (SODIMM) memory module. The development kit includes the board, development tools, software, and support documentation. Refer to the kit contents (or packaging list) shipped with the kit for a complete content description.

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 or connectors.

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

2.2 Required Equipment

- ATX compatible power supply with power cord. (ATX supply rated below 300W. Larger supplies may be underloaded.)
- Hard disk drive and CD-ROM or DVD-ROM drive.
- PS/2 or USB keyboard and mouse.
- VGA monitor.
- Optional Zoom Display Kits (see section at end of this QuickStart Guide).

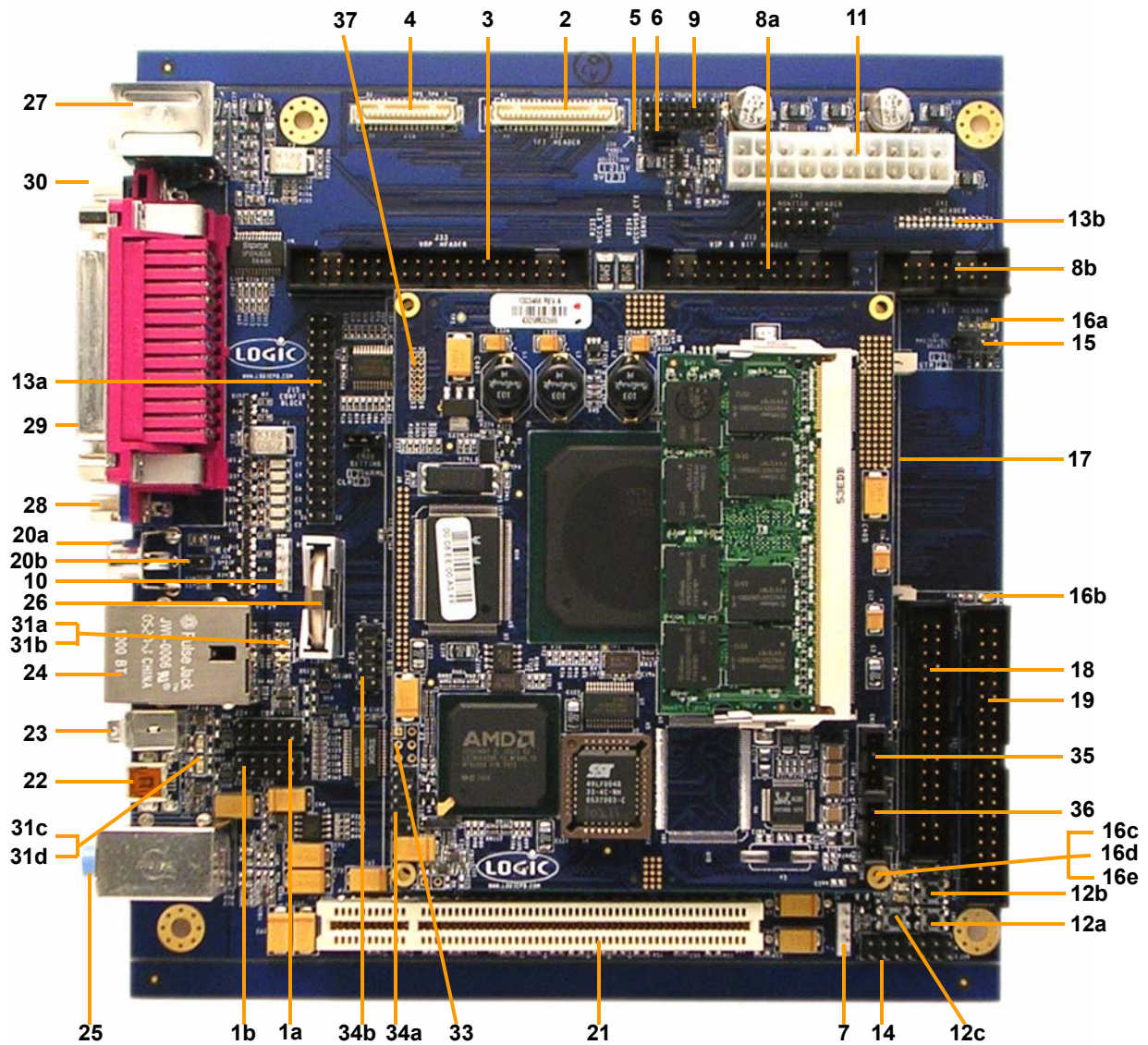
2.3 Development PC Requirements

The Geode LX DB800 development kit is a fully functional development board. However, a workstation is necessary for Windows CE and XP Embedded development.

For minimum system requirements for XP Embedded and Windows CE 5.0, see:

<http://msdn.microsoft.com/embedded/getstart/prodoverview/sysreq/ce/default.asp>

2.4 Connection Diagram



Note: Connector placement subject to change.

Figure 2.1 – Feature Diagram

Table 2.1 – Feature Diagram Description

Item Number	Description
1	a. Serial Port Header (COM2)
	b. Serial Port Header (COM3)
2	TFT Panel Connector (Standard TFT Interface Signals)
3	VOP Connector
4	TFT Panel Connector (Additional TFT Interface Signals)
5	LCD Signal Voltage Select 3.3V / 5V
6	Backlight Header
7	IR Header
8	a. VIP Connector (8 bit)
	b. VIP Connector (16 bit)
9	Touch Screen Header
10	Reset Header
11	ATX Power Connector
12	a. Reset Button
	b. Power Button
	c. Sleep Button
13	a. System Configuration Header
	b. System Debug Header
14	ATX Front Panel Header
15	Master/Slave for CompactFlash
16	a. CF
	b. UDMA
	c. 5V SB (Standby)
	d. Power
	e. Power Management
17	CompactFlash Connector (under ETX module)
18	Floppy Disk Connector
19	IDE Connector
20	a. SPDIF Out
	b. SPDIF In
21	PCI Slot
22	USB Host/Device
23	USB 2.0 Host
24	10/100/1000 Ethernet (top), 2 USB 2.0 Ports (below)
25	Audio Ports (3) Line In/Out, MIC
26	Battery
27	PS/2 Keyboard and Mouse Port
28	VGA Port

Table 2.1 – Feature Diagram Description (Continued)

Item Number	Description
29	Parallel Port
30	Serial Port (COM1)
31	a. USB0 Power
	b. USB1 Power
	c. USB2 Power
	d. USB3 Power
32	Battery Monitor Header
33	CPLD JTAG
34	a. USB Interconnect
	b. USB Interconnect
35	CD In
36	AUX In
37	LX Processor / CS5536 Companion Device JTAG Debug Header

3 QuickStart

3.1 Memory Module (SODIMM) Installation

The Zoom Geode LX DB800 development board provides one 184-pin DDR DIMM (Dual In-line Memory Module) slot.

CAUTION: The SODIMM only fits in one correct orientation. It will cause permanent damage to the development board and the SODIMM if the SODIMM is forced into the slot at the incorrect orientation.

- 1) Firmly insert the SODIMM at an angle into its slot on the Geode LX SOM-ETX module. Align the SODIMM on the slot such that the notch on the SODIMM matches the break on the slot.

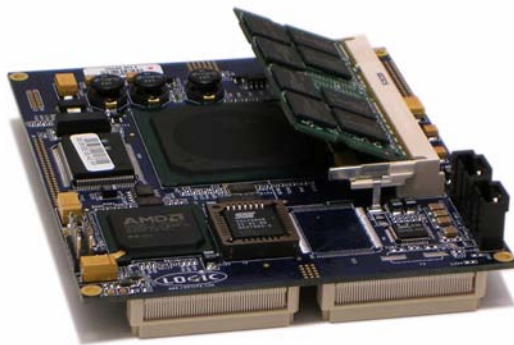


Figure 3.1 – Firmly Insert the SODIMM into the Slot

- 2) Press downwards on SODIMM until the retaining clips at both ends fully snap back in place and the SODIMM is properly seated.

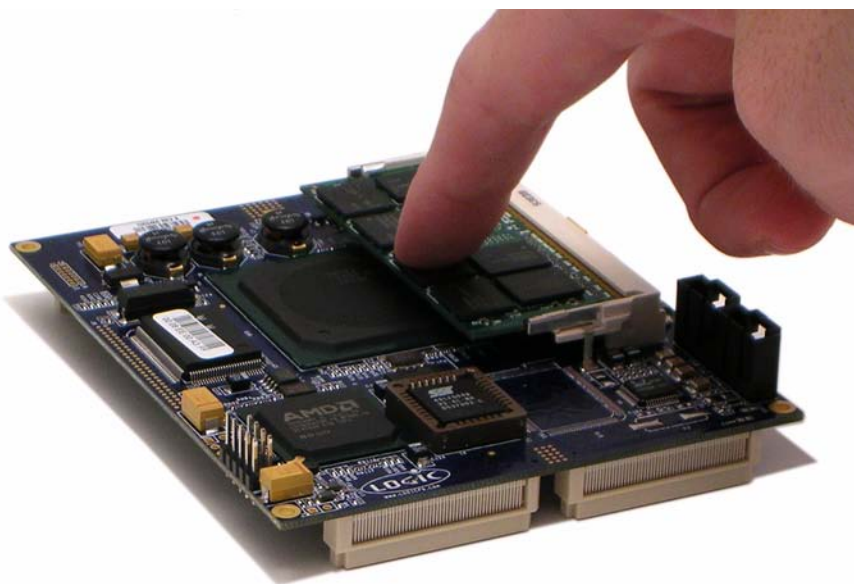


Figure 3.2 – Press the SODIMM Downwards until it is Fully Seated

3.2 Setup Procedure: Inserting the Geode LX SOM-ETX Module into the Mini-ITX Baseboard

3.2.1 Installing the Board

Insert the Geode LX SOM-ETX module into the Hirose connectors on the Mini-ITX baseboard.

- 1) Position the Geode LX SOM-ETX module's four white 100-pin Hirose connectors directly above the four mating Hirose connectors on the Mini-ITX baseboard (see Figure 3.3).
- 2) Firmly press the Geode LX SOM-ETX module downward on each connector until it is fully seated.
- 3) Verify that the Hirose connectors on the Geode LX SOM-ETX module and Mini-ITX baseboard have mated correctly. To remove the Geode LX SOM-ETX module, carefully pull upwards on any chosen corner of the Geode LX SOM-ETX module until one of the Hirose connectors on the Mini-ITX baseboard releases. Repeat this motion until all four Hirose connectors are no longer mated to the Mini-ITX baseboard and remove.

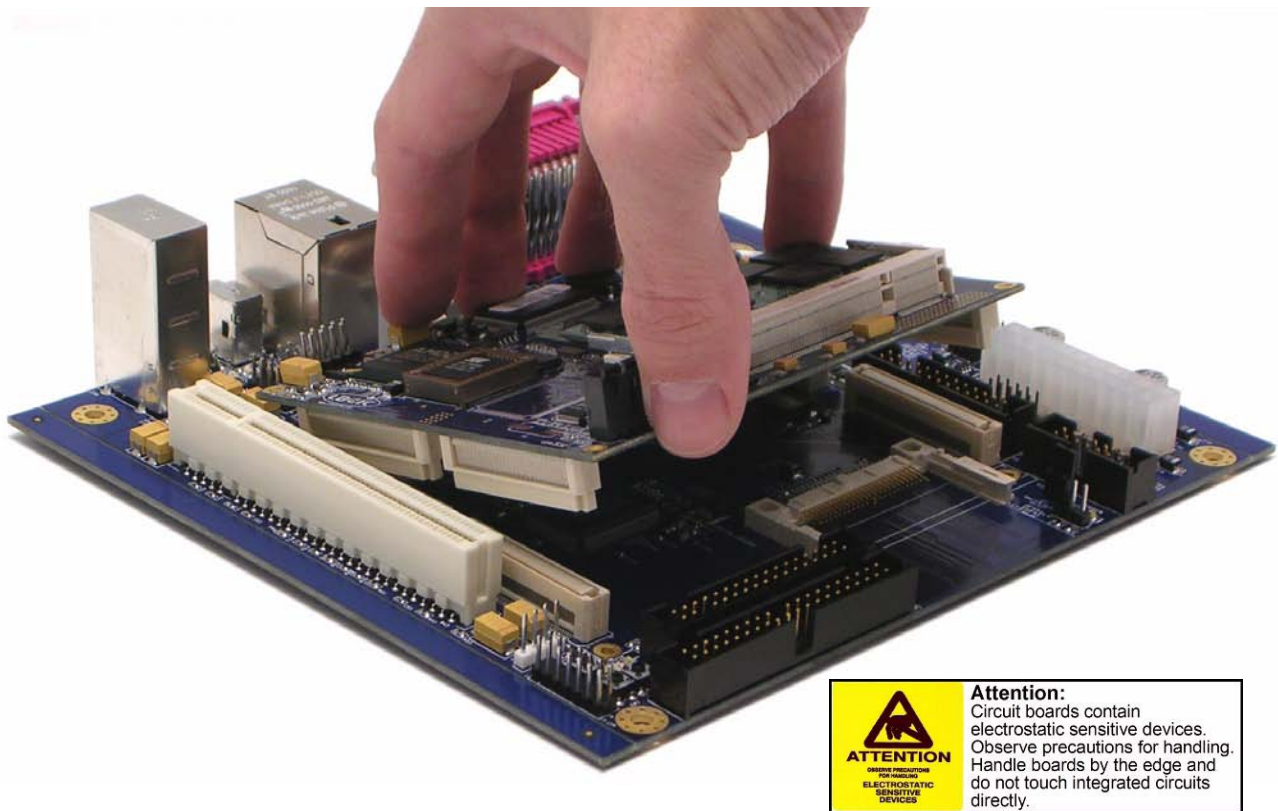


Figure 3.3 – Inserting the Geode LX SOM-ETX Module into the Mini-ITX Baseboard

3.2.2 Connect USB Interconnect

- 1) Connect one end of the USB interconnect cable to the Mini-ITX baseboard (see Figure 3.4).
- 2) Connect the other end of the USB interconnect cable to the LX SOM-ETX module (see Figure 3.5).

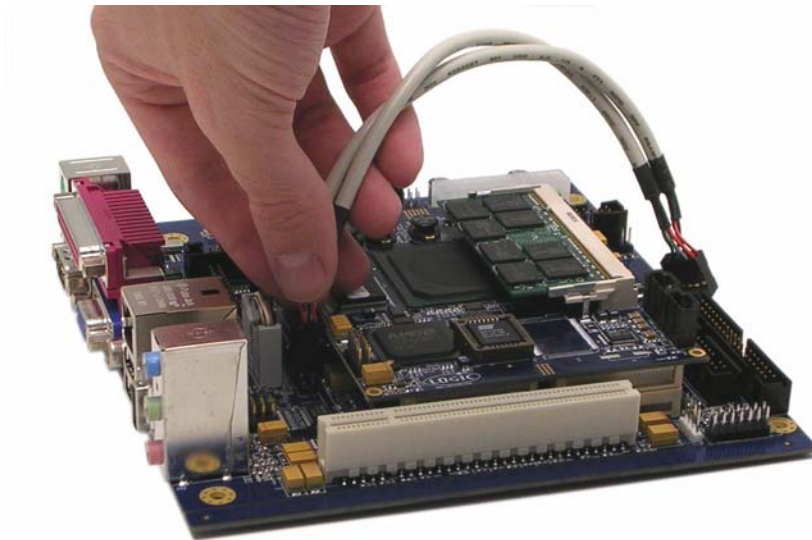


Figure 3.4 – Mini-ITX Baseboard

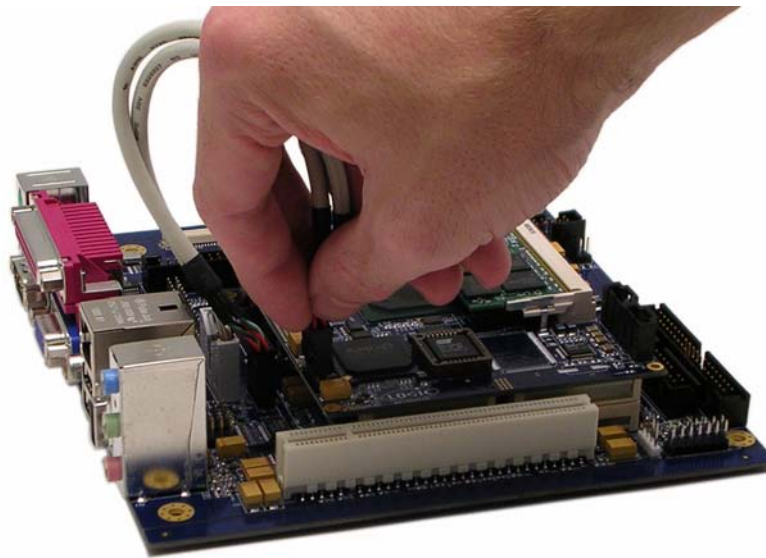


Figure 3.5 – LX SOM-ETX Module

3.3 Jumper Configurations

3.3.1 J1 (Geode LX SOM-ETX Module): JTAG Interface

One JTAG header is provided for debugging the Geode LX DB800 development board via an FS2 tool. This JTAG chain connects the Geode LX processor and companion device. Updated FS2 firmware and host software is required to recognize the CS5536.

An IEEE 1149.1 JTAG port is provided in this design to support software debugging. The connector is a 2-row, 14-position header (0.05" x 0.05" centerline) vertical mount connector. The even pins are on one side of the connector and the odd pins on the other side. A ribbon cable connects to the JTAG controller box from FS2. All signals are LVTTTL compatible (JEDEC standard JESD8-B), referenced between VIO (3.3V nominal) and GND.

JTAG interface features:

- Supports FS2 debugger
- Bi-directional system hard reset
- IDC connector wired as shown in Figure 3.6.

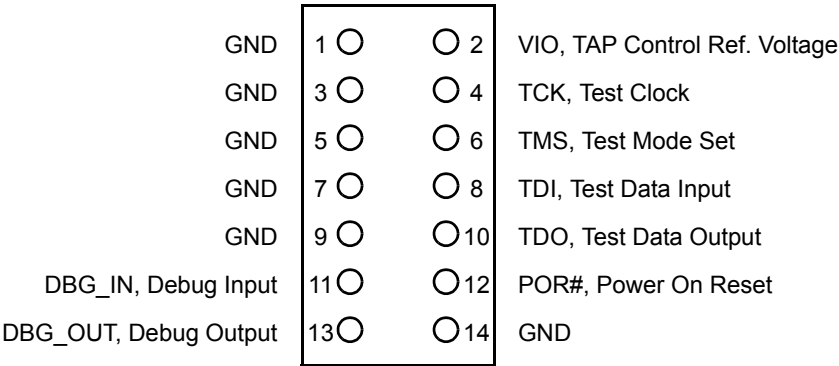


Figure 3.6 – J1 (Geode LX SOM-ETX Module) JTAG Jumper

3.3.2 J4 (Mini-ITX Baseboard): Clear CMOS

The CMOS jumper is used to clear the data in CMOS. The data in CMOS includes system setup information such as system password, date, time, and system setup parameters. Use the following procedure to clear the CMOS contents.

- 1) Turn off the power supply and unplug the power cord.
- 2) Use the jumper cap to short pins 2 and 3 for 3 seconds, as in Figure 3.7.
- 3) Place the jumper cap back on pins 1 and 2.
- 4) Plug in the power cord and turn on the power supply.



Figure 3.7 – J4 (Mini-ITX Baseboard) CMOS Jumper

3.4 Connecting Peripherals

- 1) **ATX Power Supply:** Make sure that the ATX power supply switch is in the OFF position before connecting a power cable from the ATX power supply.
- 2) **IDE Connector:** Connect the hard disk drive and CD-ROM (or DVD-ROM) drive using the provided 80-conductor IDE cable. The cables are polarized to prevent improper insertion. Configure the hard disk drive as the master device and the CD-ROM (or DVD-ROM) as the slave device.
- 3) **3.3V PCI Slot:** Install any desired 3.3V PCI devices into the available slot on the development board.
- 4) **Keyboard/Mouse Ports:** Connect a keyboard and mouse to the appropriate connectors on the I/O backplane of the development board.
- 5) **VGA Port:** Connect a VGA compatible monitor to the VGA connector on the I/O backplane of the development board.

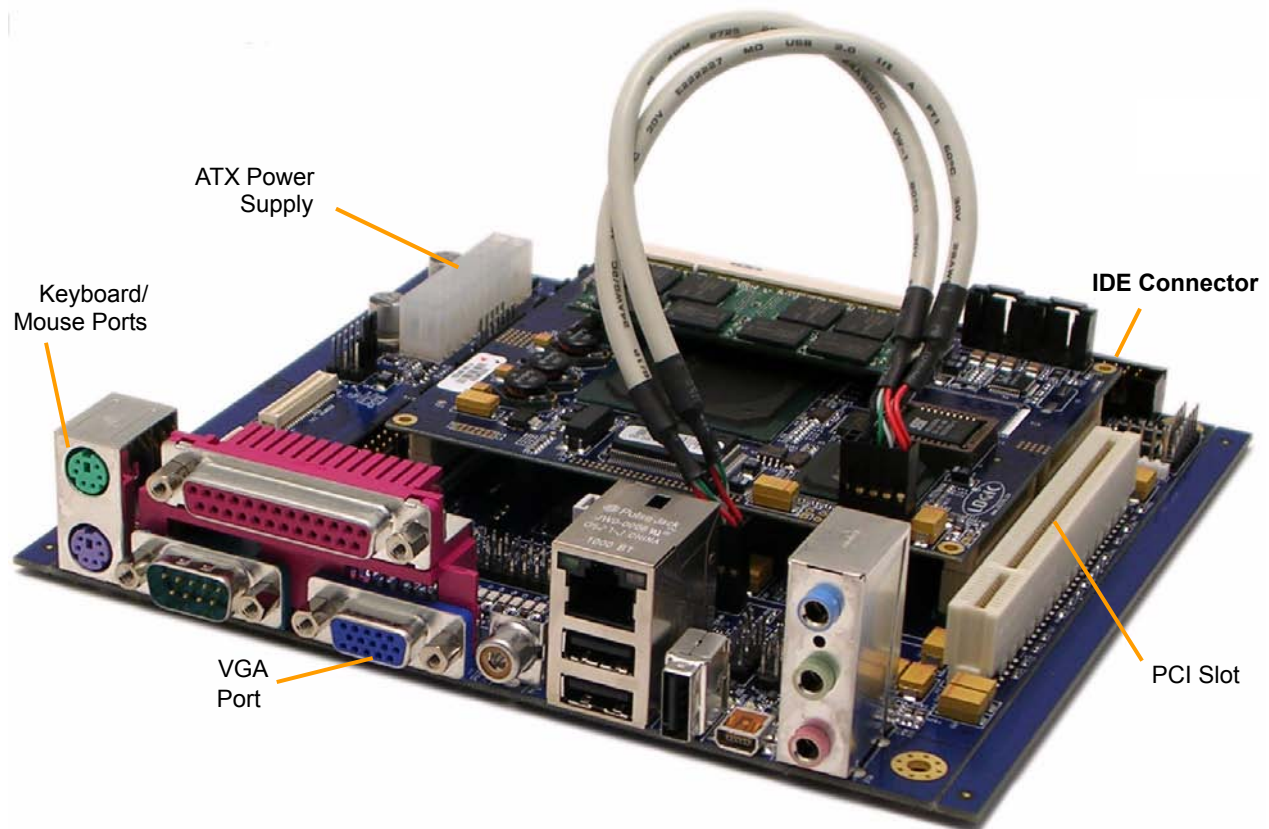


Figure 3.8 – Connecting Peripherals

4 Test Run

4.1 Power-up the Development Board

- 1) Plug the power cord for the monitor into an electrical outlet and turn its power switch ON.
- 2) Make sure that the switch on the ATX power supply is in the OFF position, and connect the ATX power supply to the development board ATX power connector.
- 3) Connect the AC power cord for the ATX power supply to the rear of the supply. Plug the other end of the cord into an electrical outlet and flip the switch on the ATX power supply to the ON position. The red LED (5VSB) on the development board should light up, indicating that Standby power is present. Press the Power Switch (SW1). The green LED should light up.

4.2 Configure the System for OS Installation

4.2.1 Configuring for the AMD Geode LX700@0.8W Processor

Refer to the *Zoom Geode LX User's Manual* for instructions on configuring the LX 800@0.9W processor* to emulate an LX 700@0.8W processor*.

4.2.2 Embedded BIOS

If this is the first time the platform has been powered up, or if the platform has not been registered, take a moment to register now.

Your platform must be registered to improve boot-time performance and to be authorized to receive technical support and information about this platform and any firmware upgrades from General Software.

Once the system is powered on, press <CNTL><C> to enter the register and setup screen.

Basic CMOS config:

- 1) Locate "Boot Order" in the center of the screen. Use the <UP> or <DOWN> arrows to select the setting to change. Once selected, use <PG-UP>, <PG-DWN>, <+>, or <-> to modify the setting.
- 2) When finished, press <ESC> to get to the main menu. Then select "Write to CMOS and exit", answer <Y> to save changes and exit.

4.2.3 XpressROM

- 1) Once the system is powered on, video will appear and the system will execute the Power-On Self-Test (POST) and begin detecting installed drives. During this time, press 'F1' on the keyboard to enter the BIOS setup program.
- 2) If loading an OS from a CD-ROM disk, the boot order in the BIOS setup will need to be changed. Navigate to the "C. Motherboard Device Configuration -> A. Drive Configuration ->" menu and select "Boot Order Configuration". Now set the boot order to:
 - 1st Boot Device [CDROM]
 - 2nd Boot Device [HDD]
 - 3rd Boot Device [Floppy Disk] or [None]
- 3) Save changes to the BIOS by hitting [Esc] twice then [X] to Save values and Exit, and the system will restart.
- 4) At this point the system has been properly configured and you may install the operating system of your choice. Continue to the next section.

*The LX 800@0.9W processor operates at 500 MHz. The LX 700@0.8W processor operates at 433 MHz. Model numbers reflect performance as described here: <http://www.amd.com/connectivitysolutions/geodelxbenchmark>.

4.3 Self-Test

Read through the following steps before beginning the procedure.

- 1) With the system powered on, insert the boot media provided with your software (CD-ROM or DVD disk) into the appropriate drive.
- 2) Press the Reset Switch (SW3). The system will reset and run the POST.

When the system has completed the POST, it scans the drives for bootable media in the order defined in the BIOS setup program (step 2, Section 4.2). The development board first scans the CD-ROM drive and then the hard disk for a bootable image.

Note: If you are using a hard disk that already contains a bootable image and you have a bootable CD inserted, the system will prompt you to 'Press any key to boot from CD.' You have 3 seconds to press any key if you wish to boot from the CD. Otherwise, the system will boot from the image on the hard disk.

- 3) Once the system detects the bootable media, it begins execution. A setup program for the OS should start. Follow the instructions provided with your OS manual.

Now that you have completed your test run, proceed to the *Zoom Geode LX DB800 Development Kit User's Manual*. The user's manual includes instructions for development, board installation, and BIOS information.

5 Product Notes

The Zoom Geode LX DB800 Development Kit 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 development board 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 (ESD). The various debug header pins are tied to actual lines on the development board. Some of them will reset the board if they are touched directly. Be aware of this situation.

6 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 using 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.

AMD also provides additional product information on their Developer's site. Create an account at <http://developer.amd.com/> to gain access to their product information.

7 Zoom Display Kits

Display Kits are ideal for embedded solutions requiring a graphical user interface. Logic offers a variety of display sizes (3.6", 6.4", 12.1", etc.), resolutions (QVGA, VGA, SVGA), and types (TFT). Zoom Display Kits are sold separately. Please verify the selected development board/processor supports the Display Kits. Contact Logic for other display requirements. Visit Logic's web site at <http://www.logicpd.com> for a complete listing of Display Kits.

7.1 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

Logic model number	Mfg	Mfg P/N	Display size diagonal	Display format	LCD interface type	Key features
LCD-3.6-QVGA-10	Sharp	LQ036Q1DA01	3.6 inch	QVGA (320 x 240)	TFT	Color, transmissive w/ HRTFT ASIC
LCD-5.7-QVGA-10	Sharp	LQ057Q3DC02	5.7 inch	QVGA (320 x 240)	TFT	Color, transmissive
LCD-6.4-VGA-10	Sharp	LQ64D343	6.4 inch	VGA (640 x 480)	TFT	Color, transmissive
LCD-10.4-VGA-10	Sharp	LQ10D368	10.4 inch	VGA (640 x 480)	TFT	Color, transmissive
LCD-12.1-SVGA-10	Sharp	LQ121S1DG41	12.1 inch	SVGA (800 x 600)	TFT	Color, transmissive

Table 7.1 – Zoom Display Kits Specification Table

*A custom cable (p/n LCDCABLE-AMDLX-10) is required to use Display Kits with Logic's Zoom Geode Development Kits.

Important Notice: Please verify the selected processor supports the display kits.

Please contact Logic with other display requirements.

8 Support

The Zoom Geode LX DB800 Development Kit is a low cost Development Kit. Logic has created a self-service (FAQ, Technical Discussion Groups, Ask A Question) technical support process to make it easier for our customers to find answers to their questions, which enables Logic to provide low cost Development Kits. For additional technical support, please see support packages below.

What support comes with the Zoom Geode Development Kit?

- Unlimited access to our technical discussion group and FAQs available at <http://www.logicpd.com/support/>
- One incident up to one hour of engineering support via e-mail (Ask A Question) at <http://www.logicpd.com/support/>

What is supported in the Geode Development Kit?

- Zoom Geode Development Kit hardware
- Operating System BSPs developed by AMD or Logic Product Development
- BIOS customization

Additional Support Services Available for Purchase

- Support Packages for Dedicated Technical Support
 - Visit <http://www.logicpd.com/support/> for complete descriptions, price, and purchase.
 - Gold Support Package
 - Silver Support Package
 - Bronze Support Package
 - Hotline Incident
- 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

8.1 Frequently Asked Questions

Visit <http://www.logicpd.com/support/> for a complete list of FAQs for the Zoom Geode Development Kit.

8.2 Technical Discussion Group

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



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