IEI Technology Corp.

WAFER-LX

3.5" SBC w/ AMD® Geode™ LX800 CPU, SATA, Audio, VGA/LVDS, & Dual-ported Ethernet

User Manual

RoHS Lead Free

Rev. 1.0 April, 2006

Revision History

Title	3.5" Profile WAFER-LX Embedded Board	
Revision Number	Description	Date of Issue
1.0	Initial release	April, 2006

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Safety Notice

Electrical shock hazards might occur while proceeding with the installation, repair and maintenance of this product.   Therefore, the following precaution measures should be carefully observed:

1.   All sorts of operations on this product must be carried out by certified technicians.
2.   The chassis into which the embedded board and its associated backplane are installed should provide stable power supply and be properly grounded.
3.   Power off the embedded board and unplug its power cord before handling.
4.   When handling the embedded board, avoid touching any metal leads or connectors.
5.   Please verify that the power supply is switched off before unplugging the power supply connector from the embedded board.

ESD Precautions

■   Observe all conventional anti-ESD methods while handling the embedded board.

■   The use of a grounded wrist strap and an anti-static work pad is recommended.

■   Avoid dust and debris or other static-accumulating materials in your work area.

Conventions Used in This Manual

 WARNING!

Warnings appear where overlooked details may cause damage to the equipment or result in personal injury.   Warnings should be taken seriously.   Warnings are easy to recognize. The word "warning" is written as "**WARNING**," both capitalized and bold and is followed by the warning message.

 CAUTION!

Cautionary messages should also be heeded to help you reduce the chance of losing data or damaging the system.   Cautions are easy to recognize. The word "caution" is written as "**CAUTION**," both capitalized and bold and is followed by the cautionary message.

 NOTE:

These messages inform the reader of essential but non-critical information. These messages should be read carefully as any directions or instructions contained therein can help you avoid making mistakes. Notes are easy to recognize. The word "note" is written as "**NOTE**," both capitalized and bold and is followed by the cautionary message.

Lists

Bulleted Lists: Bulleted lists are statements of non-sequential facts that can be read in any order. Each statement is preceded by a square or round black dot.

Numbered Lists: Numbered lists describe sequential steps you should follow in order.

Software Updates

Please contact your system vendor or visit IEI website (www.iei.com.tw) for the latest software or BIOS updates. *NOTE* that the BIOS version and associated drivers installed on your system should provide the complete functionality listed in the Datasheet/User Manual.

We provide special revisions for various application purposes. Therefore, DO NOT upgrade your BIOS unless you fully understand what a revision will do.

Problems that occur during the updating process may cause unrecoverable errors and system down time. Always consult qualified technicians before proceeding with any upgrade.

Chapter

1

Introduction

Product Overview

1.1 General Information

The WAFER-LX is a highly-integrated embedded computer specifically optimized for multi-media applications requiring minimum installation space. The WAFER-LX is particularly suitable for low power and fan-less applications. The WAFER-LEX supports a full range of functionality for an AT/ATX-compatible industrial computer in a space-saving 3.5" profile. The WAFER-LEX is equipped with a low-power consumption and high performance AMD Geode LX800 processor on board. It also contains an SDRAM SODIMM socket that supports up to 1GB memory in size.
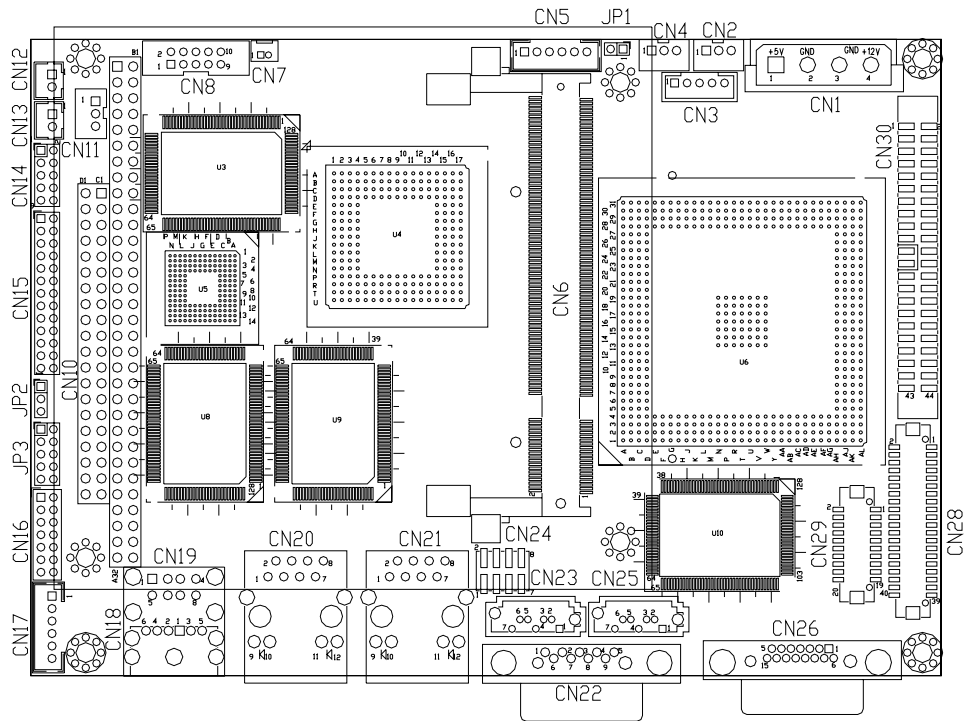
Figure 1-1 WAFER-LX Board Layout
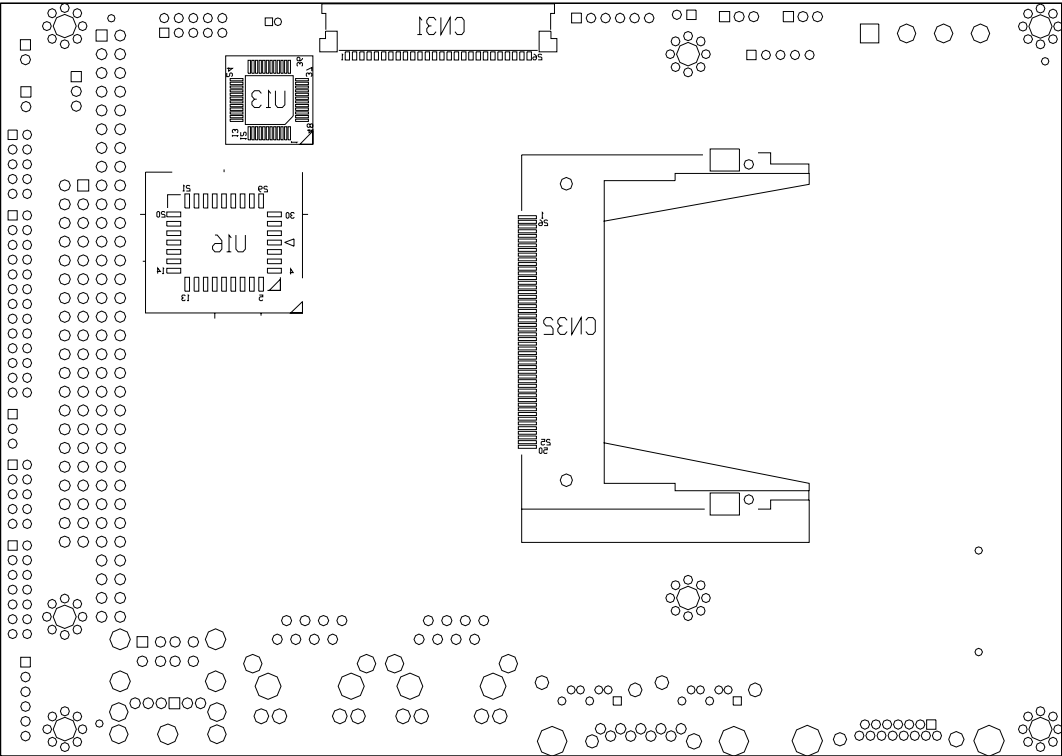
Figure 1-2   WAFER-LX Board Layout (Soldering Side)

Connectivity

The WAFER-LX provides the following interface connections:

Label	Function
CN1	4P power connector
CN2	3-pin PS-ON/ATX feature connector
CN3	5-pin Inverter control
CN4	3-pin CPU fan connector
CN5	5-pin External LED connector (to chassis LED control PCB)
CN6	144-pin SDRAM SO-DIMM socket
CN7	2-pin connector to the external Lithium 3V coin cell battery-
CN8	10-pin audio connector (to the external adapter cable kit which should provide phone jacks for Line_out, Line_in, and MIC_in connectivity)
CN9	4-pin Audio CD_IN connector
CN10	PC/104 connector (104-pin ISA bus)
CN11	3-pin external VCC (supplementary for PC/104) power connector
CN12	2-pin Reset button switch (to the chassis front panel)
CN13	2-pin Power switch button (to the chassis front panel)
CN14	10-pin general purpose I/Os connector
CN15	26-pin parallel port pin header
CN16	14-pin internal serial port pin header (COM2)
CN17	6-pin keyboard/mouse connector (a 6-pin-to-PS/2 adapter cable is required)
CN18	Not implemented
CN19	External USB1.1 connector (2 ports)
CN20	10/100BaseT Ethernet port
CN21	10/100BaseT Ethernet port
CN22	External D-SUB 9 serial port connector (COM1)
CN23	Serial ATA connector
CN24	8-pin internal USB header (an adapter cable required)
CN25	Serial ATA connector

CN26	D-SUB 15-pin VGA connector
CN27	5-pin IrDA connector
CN28	24-bit TFT LCD connector (DF13-40P-1.25V)
CN29	LCD panel single-channel 18-bit LVDS/TTL connector, 20 (2x10) pin header 1.25mm (DF13-20P-1.25V)
CN30	Primary IDE bus connector (44-pin 2.0mm)
CN31	FDC flat type floppy port (one floppy drive only)
CN32	Compact flash storage card socket

The WAFER-LX is built around an AMD Geode™ chipset which features highest performance per watt, an embedded graphics controller, and full set of functionality through the companion Geode CS5536 Southbridge. The WAFER-LX enables simultaneous dual-display operations by the 32-bit processing power, the 9GB/s bandwidth GeodeLink internal links, and the integrated FPUs operating enhanced Intel MMX and 3Dnow! technologies.

The built-in graphics controller supports both a CRT and an 18-bit LCD display simultaneously. It offers the resolutions of LCD screen up to 1920 x 1440 (CRT), and 1620 x 1200 (TFT) pixels, with 18-bit DSTN/TFT flat panel interface. The WAFER-LX's high efficiency design enables its use in a variety of multimedia applications combining the powerful Geode x86 engine, application-specific system-level peripherals, multi-input video processor, video input/output ports, core logic, and a Super I/O block. In addition, the architecture features advanced display interface support for audio, AC'97, and AMC97.

Other distinguished features include: PCI extension bus, USB interface, power management ACPI 1.0 compliance, long-term support, and built-in OS integration.

With a specially designed aluminum heatsink, this board can operate without a cooling fan at temperatures up to 60° C (140°F) and typically consumes low power watts while supporting numerous peripherals.

The embedded support for different OSes is revealed through the table of model options below:

Table 1-1   Models with Embedded OS Images

Part No.	Description
WAFER-LX-800-R10	3.5" SBC with AMD LX 800 processor, Audio, CRT, LCD/LVDS, dual Ethernet, and SATA connectors.
WAFER-LX-WINXPE	3.5" SBC with AMD LX 800 processor, 256MB DDR SO-DIMM memory, audio, CRT, LCD/LVDS, dual Ethernet, SATA, IFM 512MB and Windows® XP embedded image.
WAFER-LX-CENET050	3.5" SBC with AMD LX 800 processor, 256MB DDR SO-DIMM memory, audio, CRT, LCD/LVDS, dual Ethernet, SATA, IFM 32MB and Windows® CE 5.0 image.
WAFER-LX-CLIENT-XPE	3.5" SBC with AMD LX 800 processor, 256MB DDR SO-DIMM memory, audio, CRT, LCD/LVDS, dual Ethernet, SATA, IFM 512MB and Windows® XP embedded image and thin client package.
WAFER-LX-CLIENT-CENET 050	3.5" SBC with AMD LX 800 processor, 256MB DDR SO-DIMM memory, audio, CRT, LCD/LVDS, dual Ethernet, SATA, IFM 64MB and Windows® CE 5.0 image and thin client package.

For a more updated information of supported OSes, please check on IEI website or contact our technical support.

OS Packages:

A. Windows XPE SP2 (350MB image size stored in a 512MB CF card)

1. Advance Set Top Box:

The package includes the components required to create the advanced Set-Top Box (ASTB).   The package provides the functionality of the basic set-top box and also supports DVD playback, DVR, Web browsing, networking, universal serial bus (USB), terminal services, and Windows Media Player.

2. Internet Explorer.

3. Net Framework 1.1.

4. EWF (Enhanced Write Filter).

5. CMD - Windows Command Processor.

6. Device Manager and Task Manager.

7. Video / audio and other board chipset drivers.

8. PS/2 keyboard / mouse drivers.

9. IDE Compact Flash/HDD/Flash Disk/CD-ROM support

B. Windows CE 5.0 (around 22Mbyte, CF must > 32Mbyte)

1. Enterprise Web Pad (provides the starting point for a range of Web Pad-based devices.)

2. IE 6.0, Media Player, Excel Viewer, Image Viewer, PDF viewer, PowerPoint viewer, Word viewer, and WordPad.

3. Support hive-based registry.

4. SIP (Software-based Input Panel): SIP for Large Screens.

5. Microsoft Foundation Classes (MFC).

6. NET Compact Framework 2.0.

7. Standard SDK for Windows CE.

8. Transaction-Safe FAT File System (TFAT).

9. PCL Printer Driver.

10. Devices drivers: IDE, CF card, CD-ROM, USB host, USB keyboard/ mouse /storage, Ethernet, and serial ports.

1.2   WAFER-LX Board Overview

Component Side
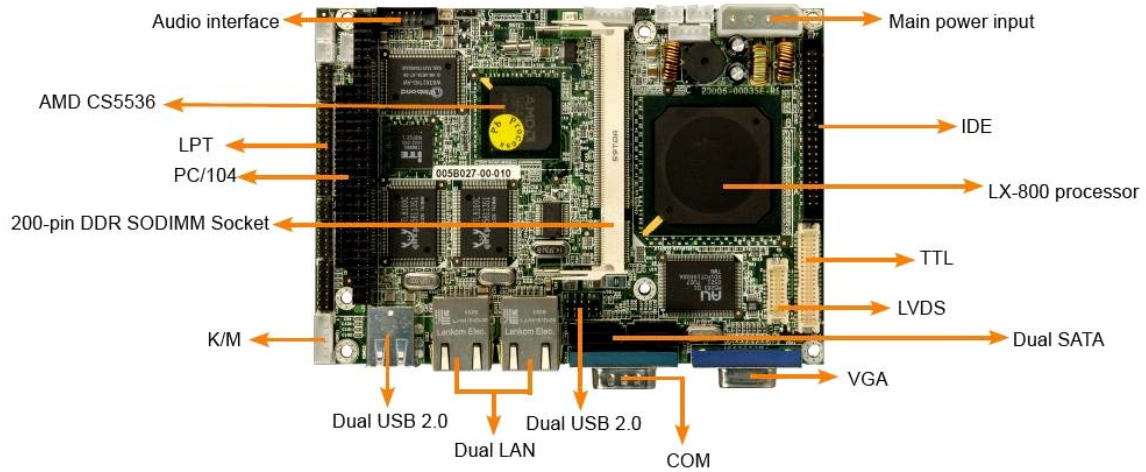
Figure 1-3   WAFER-LX Board Overview

Soldering Side
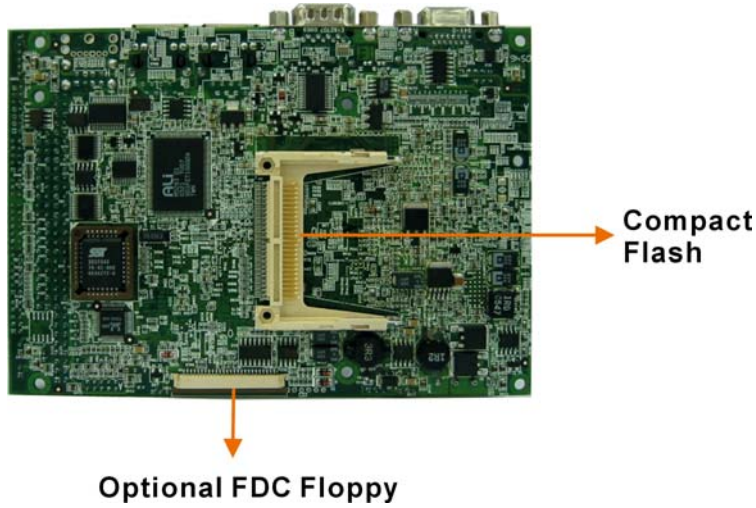
Figure 1-4   WAFER-LX Board Overview

1.3   Technical Specifications

Table 1-2 Technical Specifications

CPU	● Embedded AMD Geode LX800@0.9W processor at 500MHz frequency
Chipset	● Geode CS5536D as Southbridge
Memory	● One 64-bit PC 100/133 144-pin SODIMM socket that supports SDRAM memory up to 512MB
Display Controller	● Integrated ProSavage4 w/ 3D/2D/Video controller ● Supports AGP 4x performance ● Supports single cycle 128-bit 3D architecture ● 24-bit TTL/single-channel 18-bit DSTN/TFT flat panel interface ● Integrated 2-channel 110MHz LVDS interface ● Support for all resolutions up to 1024X768 pixels ● Hardware Suspend/Standby control
PCI Interface	● PCI 2.2 compliant, 32-bit 3.3V PCI interface w/ 5V tolerant inputs ● Up to 5 PCI masters ● PCI to system memory data streaming support
10/100Mbps Realtek8100C Ethernet Controller	● IEEE 802.3 10/100M Base-T standard auto-sensing interface to 10Mbps or 100Mbps networks through an onboard RJ-45 connector.
BIOS	● AMI 256KB Flash memory
Compact Flash Disk	● Runs in true IDE mode that simulates the operation of a physical IDE hard drive. It can be used with a passive adapter in a Type II socket in DMA mode.
IDE Interface	● Supports one ATA33/66/100 IDE channel with the connectivity to two hard disk drives
FDD Interface	● Supports one optional floppy disk drive, 3.5" (720KB or 1.44MB) by a 26-pin FPC connector cable.

Serial Ports	● Two RS-232 ports with 16C550 UART (or compatible) with 16-byte FIFO buffer. COM2 can support RS-422/485 through jumper setting.
Parallel Port	● One parallel port supports SPP/EPP/ECP mode
Audio Connector	● One 2x5 pin header supports AC'97 2.3 Line-in, Line-out, and Mic-in signals.
USB Interface	● Four (4) USB ports, Two external and two internal via pin header; USB 1.1 compliant.
Watchdog Timer	● Can be Set to 1 to 255 seconds period. Reset or NMI will be generated when CPU does not periodically trigger the timer.
PC/104 Interface	● Direct ISA DMA mode operation.
E2Key	● A non-volatile 1Kbit EEPROM is provided to retain application critical read/write data.
Power Supply	● +5V: 2.58A typical, CPU w/ 1x128MB PC-100/133 module ● +5V: 2.75A typical, 800MHz CPU w/ 1x128MB PC-100/133 module
Hardware Monitor	● System voltage detection ● CPU temperature detection
IrDA Port	● Supports Serial Infrared (SIR) and Amplitude Shift Keyed IR (ASKIR) interface
Operating Temperature	● 0° to 60°C
Form Factors	● 5.75"(L) x 4"(W) x 1"(H)

AC '97 interface	● Provides 10 Pin Audio header.
	● 16-bit, full-duplex AC'97 Rev. 2.3 compatible six-channel audio CODEC designed for PC multimedia systems, including host/soft audio and AMR/CNR-based designs.
	■ Meets performance requirements for audio on PC99/2001 systems
	■ Meets Microsoft WHQL/WLP 2.0 audio requirements
	■ 16-bit Stereo full-duplex CODEC with 48KHz sampling rate
	■ Compliant with AC'97 Rev 2.3 specifications
	  ➢ Front-Out, Surround-Out, MIC-In and LINE-In Jack Sensing
	  ➢ 14.318MHz -> 24.576MHz PLL to eliminate crystal
	  ➢ 12.288MHz BITCLK input
	  ➢ Integrated PCBEEP generator to save buzzer
	  ➢ Interrupt capability

Packing List

2xSATA cables	(P/N: 32000-062800-RS)
1xAudio adapter cable	(P/N: 32000-072100-RS)
1x4P-to-SATA power adapter cable	(P/N: 32100-088600-RS)
1xIDE flat cable 44p/40p/40p	(P/N: 32200-000061-RS)
1xsecond serial port (COM2) cable	(P/N: 32200-000009-RS)
1xKeyboard/ PS2 mouse cable	(P/N: 32000-000138-RS)
1xMini jumper pack	(P/N: 33100-000079-RS)
1xDriver and Utility CD	-
1xQIG (Quick Installation Guide)	(P/N: 51000-001109-RS)

System Monitoring

The WAFER-LX is capable of self-monitoring various aspects of its operating status:

● Vcore voltage, +3.3V, +5V, and +2.5V

● RPM of cooling fans (not implemented with this model)

● CPU and board temperatures (by the corresponding embedded sensors)

Chapter

2

Functional Description

This chapter provides a functional description of the WAFER-LX embedded board designed for the integration into a compact size chassis.   This chapter includes information about main processors, interface connectors, implementation options, and signal description.

2.1   CPU, Memory, and VIA Chipsets

CPU

The WAFER-LX comes with a soldered low power AMD Geode LX-800 processor. The AMD Geode design integrates high-performance graphics controller, VGA and Flat Panel display interfaces, with the burst and concurrent GeodeLink pipelining capability for fast data distribution among CPU, DRAM, and PCI buses.   CPU and the major functionalities are provided in a single processor package.   The CPU is accompanied by the Geode CS5536AD Southbridge featuring full-featured interfaces with integrated UltraDMA-66/100 IDE, USB, and a complete power management feature set.   The CS5536AD also provides hardware monitoring and super I/O functions (floppy disk drive and serial/parallel ports).

The CPU is passively cooled over a heatsink made in aluminum alloy and is ideal for small form factor computing applications with its low power consumption and minimum heat dissipation.

Shown below are some of the key features of the AMD Geode LX processor:

- x86/x87 compatible core.
- LX-800 with a processor frequency up to 500MHz.
- 64K I/64K D L1 cache & 128K L2 cache.
- Split I/D cache / TLB (Translation Look-aside Buffer).
- 64-bit DDR memory up to 400MHz (LX 800).
- Integrated FPU that supports the Intel MMX and AMD 3DNow! Technology instruction sets.
- 9GB/s internal GeodeLink Interface Unit (GLIU).
- High-resolution CRT and TFT outputs (simultaneous operation)
- Support for High Definition (HD) and standard Definition (SD) standards.
- 0.13 micron process.
- 1.3W Typical (3.1W TDP) @ 433MHz.
- GeodeLink active hardware power management.

- Hardware support for standard ACPI software power management.
- I/O companion SUSP#/SUSPA# power controls
- Low power I/O.
- Wakeup on SMI/INTR.

Memory

The WAFER-LX provides one (1) 144-pin SDRAM SODIMM socket without ECC support for building a buffer size up to 1GB.   The memory is automatically identified.   The memory interface supports DDR SODIMM modules at up to 400MHz frequency.

VGA/LCD Interface

Chipset: AMD Geode LX- series CPU with integrated Graphics 2D/3D/Video Accelerator

Interface: High-resolution CRT and TFT outputs (simultaneous operation)–Support for High Definition (HD) and Standard Definition (SD) standards–Support 1920x1440 in CRT mode and 1600x1200 in TFT mode

Audio

The AC'97 capabilities are provided by a Realtek ALC203 chip supporting digital audio outputs. The onboard ALC203 is a 20-bit DAC and 18-bit ADC supporting full-duplex AC'97 2.3 compatible stereo audio CODEC for multimedia, including host/soft audio, and AMR/CNR based designs.   It provides two pairs of stereo outputs with independent volume controls, a mono output, multiple stereo and mono inputs, along with flexible mixing, gain, and mute functions.

Block Diagram
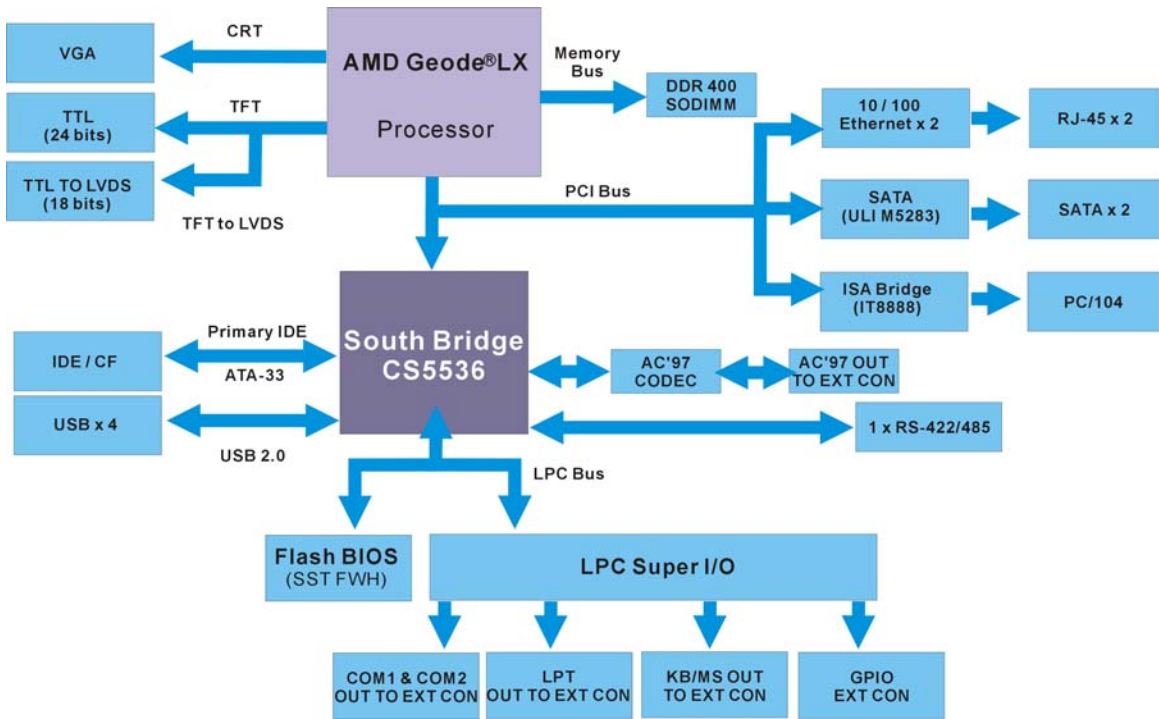
Figure 2-1   System Block Diagram

Important Features

Major functionalities provided by the WAFER-LX are listed below:

Table 2-1   Important Features

■ RoHS compliance.
■ AMD long term support product; embedded AMD processor.
■ PC/104 PCI-to-ISA extension slot for stack-up configurations ■ CF II socket (CF card behaves as an IDE boot device if no HDD is applied).
■ Embedded Graphics Controller with the support for VGA-interface and LVDS displays (simultaneous operation).
■ Supports one dual-channel 18-bit (36-bit) TFT, and with up to 1920 x 1440 resolutions
■ Aluminum alloy heatsink for optimum heat dissipation in fan-less installations. ■ Supports dual-channel 18-bit LVDS and/or 24-bit TFT LCD interface ■ System Memory: one 144-pin SODIMM socket for 64-bit, 400MHz memory modules ranging from 64MB to 1GB in size.
■ 64KB I/ 64KB D L1 cache and 128KB L2 cache for fast I/O turnarounds ■ Two serial ports, COM1 for RS-232, COM2/3 for RS-232/422/485
■ USB compliant with the USB rev. 2.0 standard ■ System Chipset: AMD Geode LX-800 + Geode CS5536AD Southbridge ■ Hardware Monitor: built-in to monitor CPU Vcore, VCC, CPU/System fan speed, and temperature detection functionalities.
■ Independent DMA audio engines
■ PXE LAN support with ATX power supply
■ Realtek® 8100C: Supports 10/100BaseT Ethernet, IEEE 802.3U compatible full duplex flow control ■ Audio: ALC203 AC"97 2.3 CODEC

- IrDA support: 115kbps, IrDA 1.1 compliant

- Watchdog Timer: 1-255 SEC ICP6629

- Operating temperature: 0 to 60°C

- Humidity: 0 to 95% relative humidity

- Power consumption: +5V @1.2A (AMD Geode LX-800with DDR400 1GB memory)

2.2   External Interfaces

For the locations of external interfaces, please refer to the diagram below:
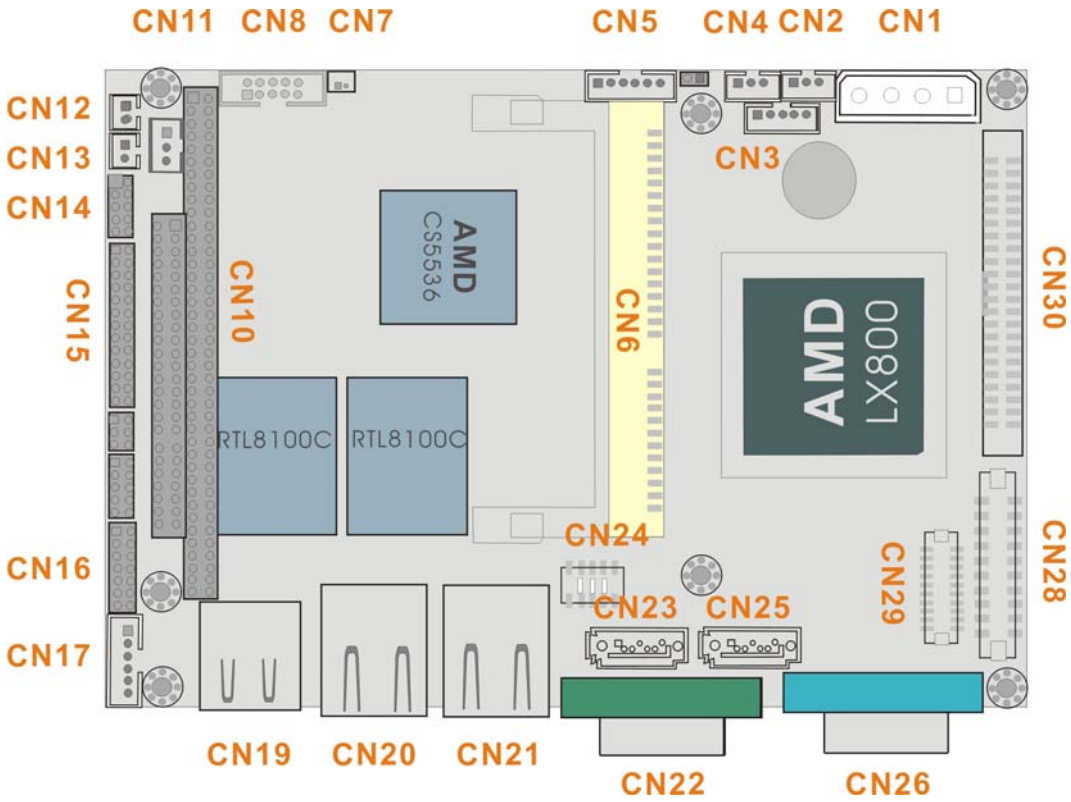
Figure 2-2   External Interfaces (Component Side)
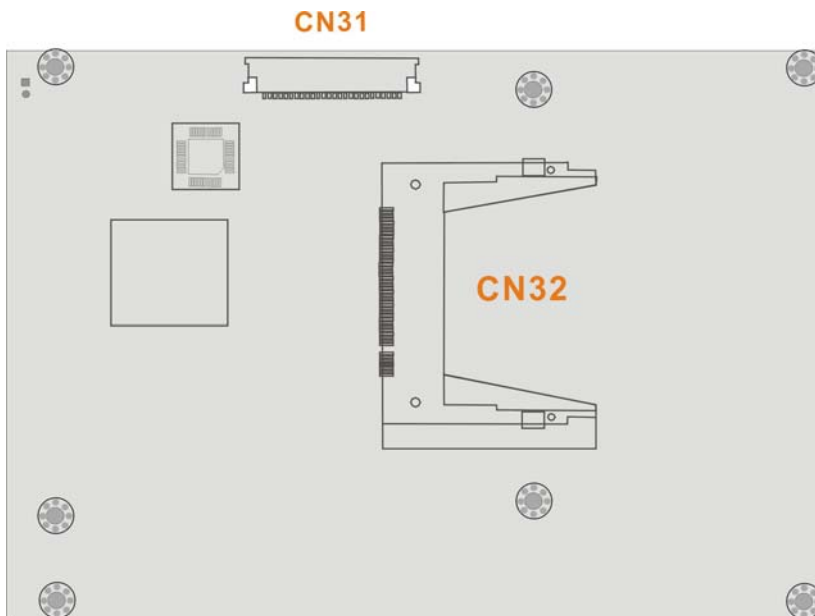
Figure 2-3   External Interfaces (Soldering Side)

![NOTE icon] **NOTE:**

1. The configuration options through jumper settings will be discussed in *Chapter 3: Installation.*

2. On the solder side, there are a CFII card socket and a FPC floppy connector.

Shown below is a diagram indicating the locations of configuration jumpers.
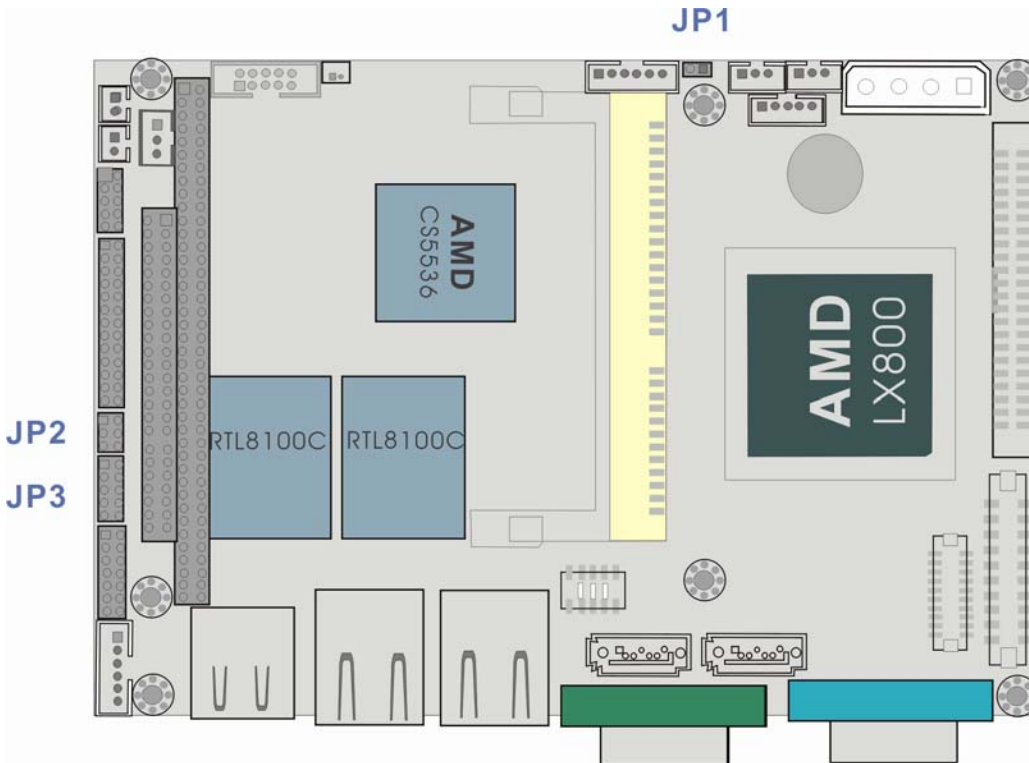
Figure 2-4 Locations of Configuration Jumpers

![NOTE icon] **NOTE:**

1. Only configuration jumpers are shown in the diagram above.

2. For more configuration details on jumper settings, please refer to *Chapter 3 Installation*.

Table 2-2   Interface Connectors

Label	Function
CN1	4P power connector
CN2	3-pin PS-ON/ATX feature connector/selector

⚠ **WARNING!**

A 20-pin-to-4P+3-pin adapter cable comes as an option for configurations using ATX power supply.   This adapter cable is different from the similar cables provided with the previous WAFER series models.   The "Ground" pin is removed from the 3-pin header of this cable; and, if a cable of the previous design is connected to CN2, serious damage to the embedded board will occur.

CN3	5-pin Inverter control
CN4	3-pin CPU fan connector
CN5	5-pin External LED connector (to chassis LED controller board)
CN6	144-pin SDRAM SO-DIMM socket
CN7	2-pin connector to the external Lithium 3V coin cell battery-
CN8	10-pin audio connector (to the external adapter cable kit which should provide phone jacks for Line_out, Line_in, and MIC_in connectivity)
CN9	Not implemented.
CN10	PC/104 connector (104-pin ISA bus)
CN11	3-pin external -VCC power connector． It is a peripheral power connector, provides a -5V and -12V sources as -VCC voltage that are supplementary to the PC/104 (CN10) connector.
CN12	2-pin Reset button switch (to the chassis front panel)
CN13	2-pin Power switch button (to the chassis front panel)
CN14	10-pin general purpose I/Os connector
CN15	26-pin parallel port pin header

CN16	14-pin 2.0mm internal serial port pin header (COM2)
CN17	6-pin keyboard/mouse connector (a 6-pin-to-PS/2 adapter cable is required)
CN18	Not implemented
CN19	External USB2.0 connector (2 ports)
CN20	10/100BaseT Ethernet port
CN21	10/100BaseT Ethernet port
CN22	External D-SUB 9 serial port connector (COM1)
CN23	Serial ATA connector
CN24	8-pin internal 2.0mm USB header (2 ports; an adapter cable is required)
CN25	Serial ATA connector
CN26	D-SUB 15-pin VGA connector
CN27	5-pin 2.54mm IrDA connector
CN28	24-bit TFT LCD connector (DF13-40P-1.25V)
CN29	LCD panel single-channel 18-bit LVDS/TTL connector, 20 (2x10) pin header 1.25mm (DF13-20P-1.25V)
CN30	Primary IDE bus connector (44-pin 2.0mm)
CN31	FPC flat type floppy port (one floppy drive only)
CN32	Compact flash storage card socket (behaves as an IDE device through BIOS setting)

2.2.1   Internal Connectors

1. CN1: Power 4P Connector

The WAFER-LX-R10 is equipped with an onboard external power connector, CN1.   You can connect power directly to CN1 or mount a PC/104 compact-size power supply module on top of the board through the PC/104 interface.

Table 2-3   CN1: Power 4P Connector

PIN	DESCRIPTION
1	+5V
2	GND
3	GND
4	+12V
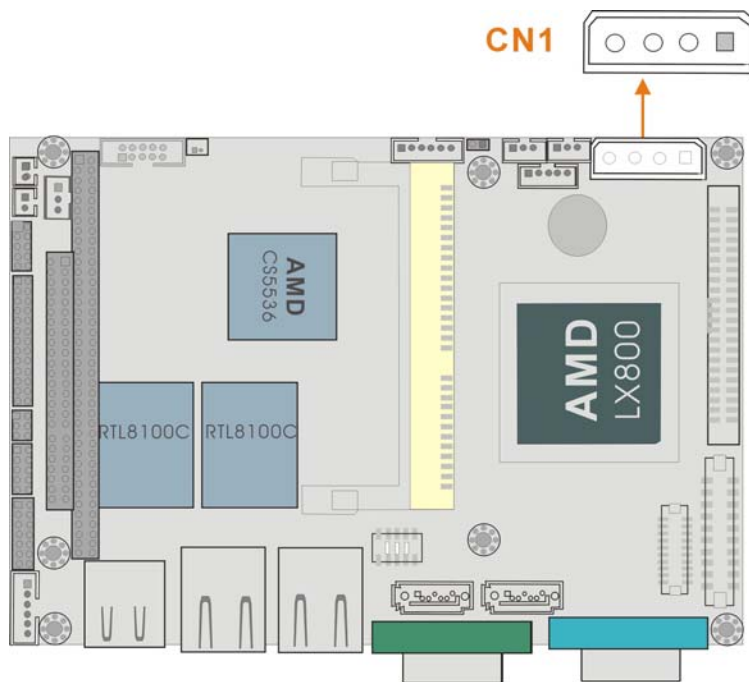
Figure 2-5   Power 4P Connector

2. CN2: SBVCC ATX Power Feature Connector

1x3 WAFER 2mm connector.

Using CN2 as a Power Feature Connector:

The SBVCC connector can support an advanced soft power switch function.   If an ATX power supply is used, connect an ATX-to-4P power cable between the SBVCC connector and ATX power source. Also connect a power on/off switch to the ATX ON/OFF switch previously mentioned.   Note that your ATX power supply should provide a 10mA load on the 5V source standby lead for this function to take effect.

IEI provides an ATX-to-4P adapter cable that comes with a 20-pin ATX connector, a 3-pin connector to the SBVCC (CN2) connector, and a 4P power connector.   *This board uses an adapter cable different from that provided with the previous WAFER models*, please refer to *Appendix B* for more information.

Using CN2 as a Configuration Jumper:

A jumper cap is installed on pins 1 and 2 as factory default (pin1=+5VSB; pin2=+5V).   If the WAFER-LX is connected to an AT power, let the jumper stay on pins 1 and 2.   If connected to an ATX power source, remove the jumper cap.

Table 2-4   CN2 SBVCC: ATX Power Feature Pinouts

PIN	DESCRIPTION
1	5VSB
2	+5V
3	GND
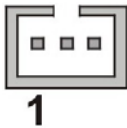
Figure 2-6 CN2 SBVCC ATX Power Feature

3. CN3: IVTC LCD Panel Inverter Backlight Control Connector

This connector comes as a 1x5 pin Wafer 2mm connector.

Table 2-5   CN3 IVTC Inverter Control Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC12	2	GROUND
3	VEEON	4	BLADJ
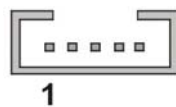
5	VCC5	

Figure 2-7

Inverter Backlight Control

4. CN4: CPU Fan Connector

FAN1 provides access to a +5V power source and a sensor pin for connecting a cooling fan.

Table 2-6   CN4 Fan Connector

PIN	DESCRIPTION
1	Fan Speed Detect
2	+5V
3	GND
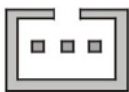
Figure 2-8 CN4 Fan Connector

5. CN5: Power and HDD LED Connector

This port provides the connectivity to the power and hard drive activity LEDs on the chassis front panel (may be so through an LED controller board on the chassis).   An adapter cable is required.

Table 2-7   CN5 Pinouts

PIN	DESCRIPTION
1	VCC5
2	GROUND
3	POWER LED+
4	POWER LED-(GND)
5	HDD LED+
6	HDD LED-

Figure 2-9   CN5 Power and HDD LED Connector

6. CN6: SDRAM 144-pin SODIMM Socket

This socket receives a DDR 333/400MHz SODIMM module.

7. CN7: Battery Connector

This 2-pin header connects to an externally mounted 3V, Lithium, cell coin battery (VARTA CR2032).   The life expectancy of the battery is approximately 7 years.   Depending on the working condition, the life expectancy may be shorter.

Replacing a battery is not a user operation.

If the battery starts to weaken and loses voltage, contact your vendor or IEI for a replacement module.   Dispose of the used battery properly.   You may contact your local waste disposal agency for disposal instructions.   Do not dispose of a used battery with normal household waste.

 WARNING!

1.   Keep a used battery away from children.

2.   Danger of explosion if the battery is incorrectly replaced. Only certified module from IEI can be used as a replacement.

3.   Do not expose the battery to excessive heat or fire.

4.   If the battery shows signs of leakage, contact your local vendor or IEI immediately.

8. CN8: 2x5 2.0mm Audio Pin Header

This port connects to AC'97 compatible audio devices through an adapter cable, e.g., that features a 10-pin header to audio phone jacks on a slot bracket.

Table 2-8   CN8 Audio Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	LINE OUT R	2	LINE IN R
3	GROUND	4	GROUND
5	LINE OUT L	6	LINE IN L
7	GROUND	8	GROUND
9	MIC IN	10	N/C
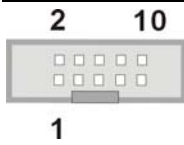
Figure 2-10   CN8 Audio Port

9. **CN9: -** functionality not implemented

10. CN10: PC/104 (104-pin ISA bus) Connector

The WAFER-LX features a PC/104 expansion bus that let you attach any kind of PC/104 modules. The PC/104 bus has already become the industrial embedded PC bus standard, so you can easily install over thousands of PC/104 modules from hundreds of vendors in the world. There are two PC-104 connectors on this board: PC/104-64 and PC/104-40.

A -5V/-12V (-VCC) connector is provided to supply -VCC voltage that is routed through the PC/104 64-pin connector.

Table 2-9   PC/104-64 Connector Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	IOCHECK#	33	GROUND
2	SD7	34	IRSTDRV
3	SD6	35	VCC
4	SD5	36	IRQ9
5	SD4	37	-5V
6	SD3	38	DRQ2
7	SD2	39	-12V
8	SD1	40	ZWS
9	SD0	41	+12V
10	IOCHRDY	42	GROUND
11	AEN	43	SMEMW#
12	LA19	44	SMEMR#
13	LA18	45	IOW#
14	LA17	46	IOR#
15	SA16	47	DACK3#
16	SA15	48	DRQ3
17	SA14	49	DACK1#
18	SA13	50	DRQ1
19	SA12	51	REFRESH#
20	SA11	52	SYSCLK
21	SA10	53	IRQ7
22	SA9	54	N/C
23	SA8	55	IRQ5

24	SA7	56	IRQ4
25	SA6	57	IRQ3
26	SA5	58	DACK2
27	SA4	59	TC
28	SA3	60	BALE
29	SA2	61	VCC
30	SA1	62	OSC
31	SA0	63	GROUND
32	GROUND	64	GROUND

Table 2-10   PC/104-40 Connector Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GROUND	21	GROUND
2	MCS16#	22	SBHE#
3	IOCS16#	23	LA23
4	IRQ10	24	LA22
5	IRQ11	25	LA21
6	IRQ12	26	LA20
7	IRQ15	27	LA19
8	IRQ14	28	LA18
9	DACK0#	29	LA17
10	DRQ0	30	MEMR#
11	DACK5#	31	MEMW#
12	DRQ5	32	SD8
13	DACK6#	33	SD9
14	DRQ6	34	SD10
15	DACK7#	35	SD11
16	DRQ7	36	SD12
17	VCC	37	SD13
18	MASTER#	38	SD14
19	GROUND	39	SD15
20	GROUND	40	GROUND

11. CN11: External –VCC Power Connector

Table 2-11   CN11 -VCC PC/104 Supplementary Power

PIN	DESCRIPTION
1	-5V
2	GND
3	-12V
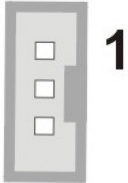
Figure 2-11   CN11 –VCC Power

12. CN12: Reset Button Connector

This connector connects to an externally implemented reset button through an adapter cable.

Table 2-12   CN12 Reset Button Connector Pinouts

PIN	DESCRIPTION
1	RST_SW
2	GND

Figure 2-12   CN12 Reset Button Connector

13. CN13: AT Power ON/OFF Button Connector

This connector is used to connect a chassis power On/Off button using an adapter cable. This connector is closely related to JP1 configuration. The use of this connector is briefed as follows:

1. Using **ATX** power: CN13 connects to a power switch, and the JP1 jumper should be left open.

2. Using **AT** power: The pins on JP1 are shorted by a jumper cap.   The reason why JP1 should be shorted is because the AMD Southbridge is designed without the consideration for a power button signal and the shorted JP1 provides a hardware feedback to initiate the system.

Table 2-13   CN13 Power ON/OFF Button Connector Pinouts

PIN	DESCRIPTION
1	PWR_BTN#
2	GND

Figure 2-13   CN13 Power ON/OFF Button Connector

14. CN14: Digital I/O Connector

This Digital I/O port is managed through AMD CS5536AD Southbridge.   The first table below shows the CN14 port pinouts.   The second table shows the Digital I/O port assembly codes.

Table 2-14   CN14 Digital I/O Connector Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	2	+5V
3	DIO_IN0	4	DIO_OUT0
5	DIO_IIN1	6	DIO_OUT1

| 7 | DIO_IN2 | 8 | DIO_OUT2 |
| 9 | DIO_IN3 | 10 | DIO_OUT3 |

Table 2-15   Digital Input/Output Definition Options

I/O Address	DESCRIPTION
6F08	Reads DIO port data, and returns AL DIO input data. The boot-up default input correspondence is DIO –DI3 => Bit0 – Bit3. *Configuration example:* MOV AX, 6F08h INT 15h When executed, the AL contents include DIO input data. Masking required on user applications for those non-input bits.

6F09	Outputs data to DIO port. The BL contents include output data.
	The boot-up default correspondence is DO0 – DO3 => Bit4 – Bit7.
	Configuration example:
	MOV AX, 6F09h
	MOV BL, 19h
	INT 15h
	
	If set as the boot-up default, DO0 =1, DO1 – DO3 = 0

6F0A	Defines DIO port (8 bits) as input or output. Each of 8 bits in the BL register represents one DIO signal.
	
	If set to "1," the DIO becomes input signal.
	If set to "0," the DIO port carries output signal.
	If the boot-up default is set to 0Fh, with 4 inputs and 4 outputs.
	
	Configuration example:
	Move AX, 6F0Ah
	MOV BL, 00h
	INT 15h
	When executed, 8 DIO signals become output signals.

15. CN15: Parallel Port Connector

2x13 pin header 2mm connector

CN15 is an IEEE1284 compatible interface.   Usually, the parallel port connects to a printer. This port is provided as a 26-pin 2.0mm pin header.

An adapter cable is required, e.g., IEI's 32200-000050 (2x13 pin header-to-parallel D-SUB w/ screws for securing to a chassis panel)

Table 2-16   CN15 Parallel Port Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	STROBE#	14	AUTO FORM FEED#
2	DATA0	15	ERROR#
3	DATA1	16	INITIALIZE
4	DATA2	17	PRINTER SELECT LN#
5	DATA3	18	GROUND
6	DATA4	19	GROUND
7	DATA5	20	GROUND
8	DATA6	21	GROUND
9	DATA7	22	GROUND
10	ACK-	23	GROUND
11	BUSY	24	GROUND
12	PAPER EMPTY	25	GROUND
13	PRINTER SELECT	26	N/C
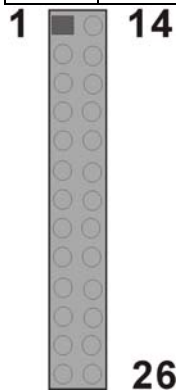
Figure 2-14   CN15 Parallel Port

16. CN16: COM2 RS-232/422/485 Serial Port Header

Table 2-17 CN16: 14 (2x7) Pin 2.0mm Connector Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	DCD1	2	DSR2
3	RXD2	4	RTS2
5	TXD2	6	CTS2
7	DTR2	8	COM_RI2
9	GND	10	GND
11	TXD485+	12	TXD485#
13	RXD485+	14	RXD485#
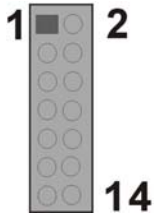
Figure 2-15   COM2 Connector

The part number of the IEI COM2 serial port adapter cable is 32200-012100.
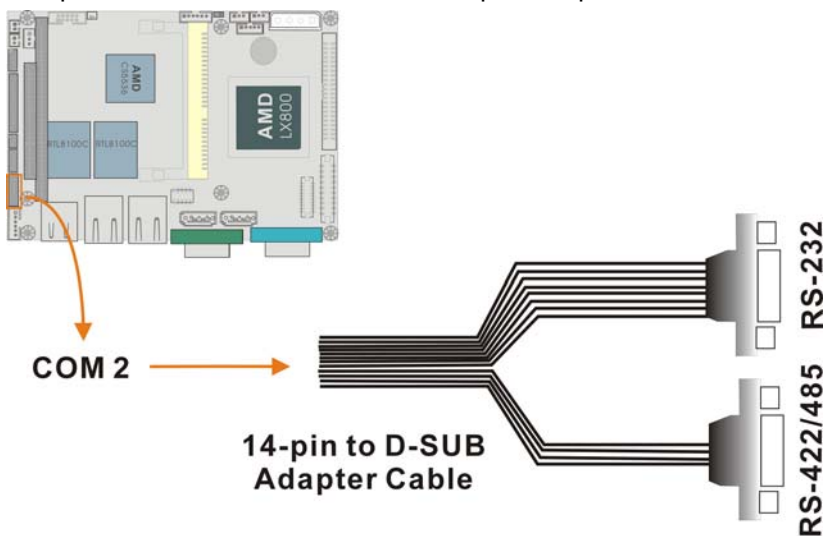
Figure   2-16   COM2 Adapter Cable

⚠ **NOTE:**

1. If you want to use the RS485 mode, just connect to TX2-, TX2+. If you want to use the RS422, please connect to TX2-, TX2+, RX2+, and RX2-.

2. Please refer to *Chapter 3* for details on serial port operation modes.

17. CN17: Keyboard/Mouse Pin Header

This port connects to a PS/2 keyboard or mouse using a 6-pin-to-PS/2 adapter cable.   An adapter cable, 6-pin-to-two PS/2, is required (IEI part no.: 32200-000052)

Table 2-18 CN17 Keyboard/Mouse Header Pinouts

PIN	DESCRIPTION
1	+5V
2	MS_DATA
3	MS_CLK
4	KB_DATA
5	KB_CLK
6	GND

Figure 2-17   CN17 Keyboard/Mouse Pin Header

18. CN18:

This functionality is not implemented.

19. CN19, CN20, CN21, CN22, and CN26: Front Panel Connectors

These are front panel connectors.   Please refer to the next section for details.

20. CN23 & CN25: Serial ATA Disk Drive Connectors

These 7-pin standard Serial ATA ports connect to SATA I-compatible hard disk drives. SATA drives are managed by the ALi chipset onboard.

Table 2-19   Serial ATA Port Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	2	STXP
3	STXN	4	GND
5	SRXN	6	SRXP
7	GND		
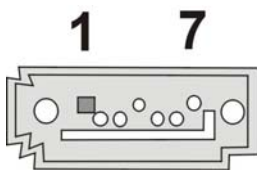
Figure 2-18   Serial ATA Port

21. CN24: Internal USB Header (Two Ports)

USB2/3: 2x4 8-pin Header.

This header provides the connectivity to additional USB devices through an adapter cable. Various adapters may come with USB ports on a slot bracket or ports that can be attached to D-SUB openings on a chassis.

Table 2-20 CN24 USB Port Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	+5V	8	GND
2	USBDT2N	7	USBDT3P
3	USBDT2P	6	USBDT3N
4	GND	5	+5V
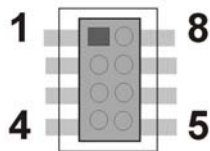
Figure 2-19   CN24 USB (1.1) Port

22. CN27: IrDA Port

This pin header allows you to connect external Infrared devices through an adapter cable.

The IrDA port supports either a Serial Infrared (SIR) or an Amplitude Shift Keyed IR(ASKIR) interface. The header comes as a 1x5 pin 2.54mm pin header.

Table 2-21 CN27 IrDA Interface Port Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	+5V	2	N/C
3	IR-RX	4	GROUND
5	IR-TX		

Figure 2-20

CN27 IrDA Interface Port

23. CN28: Flat Panel Display Connector

TFT LCD (24-bit one channel; DF13-40DP-1.25V)

Table 2-22 CN28 Flat Panel Connector Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
2	LCD5V	1	LCD5V
4	GROUND	3	GROUND
6	LCD3V	5	LCD3V
8	GROUND	7	N/C
10	FPD1	9	FPD0
12	FPD3	11	FPD2
14	FPD5	13	FPD4
16	FPD7	15	FPD6
18	FPD9	17	FPD8
20	FPD11	19	FPD10
22	FPD13	21	FPD12
24	FPD15	23	FPD14
26	FPD17	25	FPD16
28	FPD19	27	FPD18
30	FPD21	29	FPD20
32	FPD23	31	FPD22
34	GROUND	33	GROUND
36	FPVS	35	FPCLK
38	FPHS	37	FPDEN
40	ENVEE	39	N/C
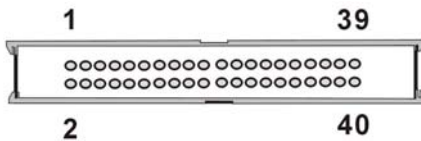
Figure 2-21   CN28 TFT Panel Display Connector

24. CN29: LVDS Panel Display Connector

LVDS LCD (18-bit) 2x15 pin header 1.25mm (DF13-20DP-1.25V)

Table 2-23 CN29 LVDS Connector Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
2	GND	1	GND
4	LVD0-	3	LVD0+
6	LVD1-	5	LVD1+
8	LVD2-	7	LVD2+
10	LVDCK-	9	LVDCK+
12	N/C	11	N/C
14	GROUND	13	GROUND
16	N/C	15	N/C
18	LVD_VCC5	17	LVD_VCC5
20	LVD_VCC3	19	LVD_VCC3
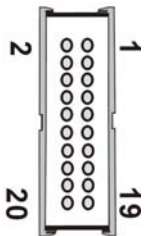
Figure 2-22   CN29 LVDS Panel Display Connector

25. CN30: IDE Connector

One IDE connector can connect to one (1) IDE cable, and the single IDE cable can then connect to two IDE devices.   An optional IDE adapter cable from IEI is available; the part number is 32200-008800.

Table 2-24 CN30 IDE Connector Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	RESET#	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	SIGNAL GND	20	(KEY)
21	HDD 0	22	GROUND
23	IO WRITE	24	GROUND
25	IO READ	26	GROUND
27	HD READY	28	N/C
29	HDACK 0	30	GROUND
31	IRQ14	32	N/C
33	ADDR 1	34	N/C
35	ADDR 0	36	ADDR 2
37	HDD SELECT 0	38	HDD SELECT 1
39	IDE ACTIVE#	40	GROUND
41	VCC	42	VCC
43	GROUND	44	N/C
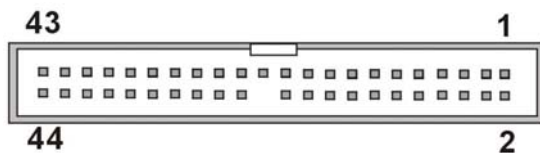
Figure 2-23   IDE Connector

26. CN31: Optional Floppy Connector (On the Soldering Side)

A 26-pin FPC connector cable is required for connecting to the optional floppy port. You can connect one (1) 3.5"(720 KB, 1.44 MB, and 2.88 MB) drive to this port.

Table 2-25 CN31: Optional Floppy Connector

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC	14	STEP#
2	INDEX#	15	GROUND
3	VCC	16	WDATA#
4	DISKSEL0#	17	GROUND
5	VCC	18	WGATE#
6	DSKCHG#	19	GROUND
7	N/C	20	TRAK0#
8	N/C	21	GROUND
9	N/C	22	WRTPRT#
10	MTR0#	23	GROUND
11	N/C	24	RDATA#
12	DIR#	25	GROUND
13	N/C	26	HDSEL#

Figure 2-24

CN31 Floppy Port

27. CN32: Compact Flash Connector)

The CN32 socket allows you to attach a Compact Flash Disk that occupies the secondary IDE channel.   The CN32 socket supports both the TYPE II and TYPE I modules.

Table 2-26 CN32 Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GROUND	26	VCC-IN CHECK1
2	DATA3	27	DATA11
3	DATA4	28	DATA12
4	DATA5	29	DATA13
5	DATA6	30	DATA14
6	DATA7	31	DATA15
7	HDC_CS0#	32	HDC_CS1
8	N/C	33	N/C
9	GROUND	34	IOR#
10	N/C	35	IOW#
11	N/C	36	VCC_COM
12	N/C	37	IRQ15
13	VCC_COM	38	VCC_COM
14	N/C	39	CSEL
15	N/C	40	N/C
16	N/C	41	HDD_RESET
17	N/C	42	IORDY
18	SA2	43	SDREQ
19	SA1	44	SDACK#
20	SA0	45	HDD_ACTIVE#
21	DATA0	46	PDIAG
22	DATA1	47	DATA8
23	DATA2	48	DATA9
24	N/C	49	DATA10
25	VCC-IN CHECK2	50	GROUND

2.2.2 Front Panel Connectors
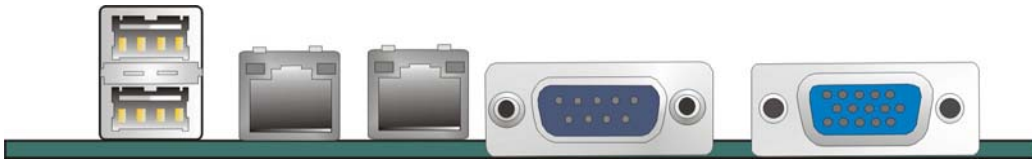
Figure 2-25 Front Panel Connectors

CN19: USB Combo Connector (2 Ports)

The combo connector provides two USB ports.   These two USB ports connect to USB1.1 devices.

CN20 & CN21: 10/100BaseT Ethernet (RJ-45) Ports

These RJ-45 connectors provide 10/100BaseT Ethernet connection to a local or internet network. Refer to the table below for the Ethernet port LED indication.

Figure 2-26   10/100BaseT Ethernet (RJ-45) Port

Table 2-27   Ethernet Port Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	TX-	5	N/C
2	N/C	6	RX-
3	TX-	7	N/C
4	RX+	8	N/C

Ethernet Port LED Indicators

Table 2-28   Ethernet Port LED Indications

ACTIVITY LED		LINK LED	
Status	Description	Status	Description
GREEN	Activity	YELLOW	Linked

CN22: Serial Port COM1

This serial port is defined as COM1 and provides serial connection in the RS-232 mode.

Table 2-29   Serial Port COM1 Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	NRLSD1	6	NDSR1
2	NRX1	7	NRTS1
3	NTX1	8	NCTS1
4	NDTR1	9	COM_RI1
5	GND		

CN26: VGA Port

This 15-pin D-SUB VGA port connects to a CRT or LCD display monitor.

Table 2-30   VGA Port Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VGA_R	9	N/C
2	VGA_G	10	GND
3	VGA_B	11	N/C
4	N/C	12	SSDA
5	GND	13	VGA_HS
6	GND	14	VGA_VS
7	GND	15	SSCL
8	GND		

Chapter

3

Installation

3.1 Considerations Prior to Installation

Preparing Your Embedded Board

The embedded board contains numerous delicate electronic circuits and components, which can become damaged as a result of electrostatic discharge (ESD). Thus, prior to installation, please follow the instructions below:

1. Please turn off the computer and unplug its power cord.
2. When handling the board, avoid touching any metal leads or connectors.
3. It is best to wear an electrostatic discharge (ESD) cuff when handling electronic components (CPU, RAM).
4. Prior to installing the electronic components, please have these items on top of an anti-static pad or within an electrostatic shielding container.
5. Please verify that the power supply is switched off before unplugging the power supply connector from the motherboard.

Installation Notices

1. Prior to installation, please do not remove the stickers on the system board. These stickers are required for warranty validation.
2. Prior to the installation of the system board or any hardware, please first carefully read the information in the provided manual.
3. Before using the product, please verify that all cables and power connectors are connected.
4. To prevent damage to the PCB board, please do not allow screws to come in contact with the PCB circuit, connector pins, or its components.
5. Please make sure there are no leftover screws or metal components placed on the PCB board or within the computer casing.
6. Please do not place the computer system on an uneven surface.
7. Turning on the computer power during the installation process can lead to damage to system components as well as physical harm to the user.
8. If you are uncertain about any installation steps or have a problem related to the use of the product, please consult a certified computer technician.

Airflow Consideration

Although the embedded board can operate without active cooling, it is still necessary to install the board in a chassis with ventilation holes on the sides allowing airflow to travel through the heatsink surface.   In a system with an individual power supply unit, the cooling fan of a power supply can also help generate airflow through the board surface.

Unpacking Precautions

Some components on the WAFER-LX are very sensitive to static electric charges and can be damaged by a sudden rush of power. To protect it from unintended damage, be sure to follow these precautions:

- Ground yourself to remove any static charge before touching your PCB. You can do so by using a grounded wrist strap at all times or by frequently touching any conducting materials that is connected to the ground.
- Handle your PCB by its edges. Do not touch IC chips, leads or circuitry if not necessary.
- Do not plug or unplug any connector or jumper while the power is on.
- Do not place a PCB on top of an anti-static bag.   Only the inside of the bag is safe from static discharge.

Memory Module

DDR 333/400, 256MB, 512MB, or 1GB, 144-pin SODIMM modules recommended.

3.2 Mechanical Diagrams

- TBD -

Figure 3-1   Board Dimensions and Mounting Hole Locations

![NOTE icon] **NOTE:**

Use the mounting holes on the four corners of the PCB for securing within a chassis.

Holes in the middle of the board are used for securing a heatsink.

3.3   Jumper Settings

 NOTE:

A jumper is a metal bridge that is used to close an electrical circuit.   It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the ins to connect them.   To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.
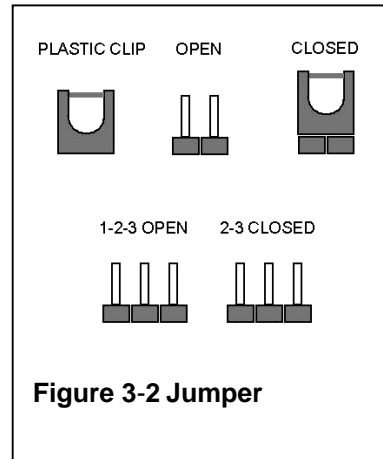

PLASTIC CLIP   OPEN   CLOSED

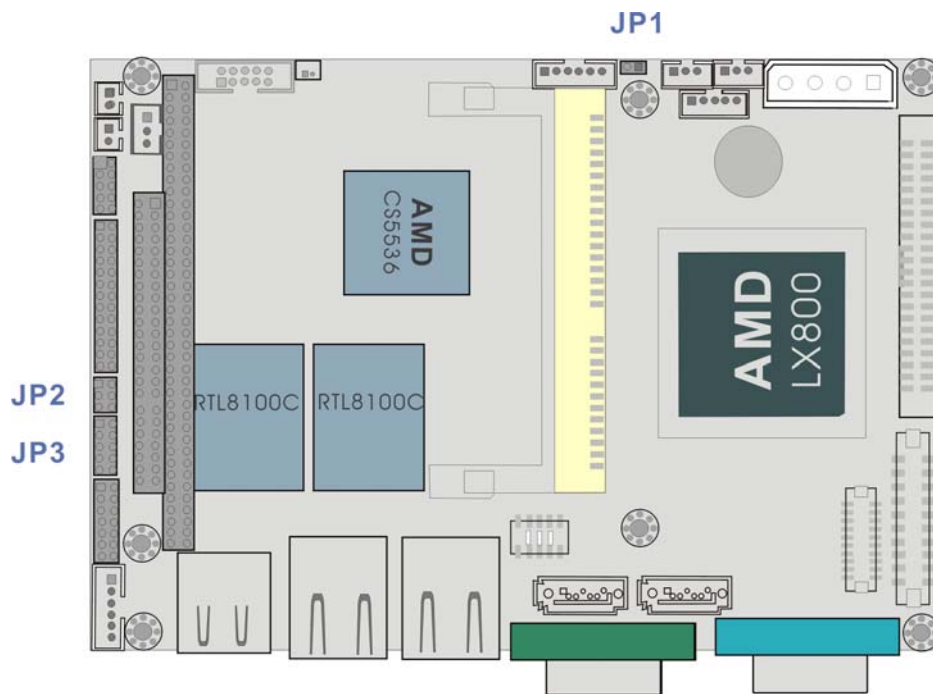1-2-3 OPEN   2-3 CLOSED

Figure 3-2 Jumper

Figure 3-3   Locations of Configuration Jumpers

JP1 (AT/ATX Mode Selector)

This jumper block controls the way you connect to a power supply

The CN13 connector is used to connect a chassis power On/Off button using an adapter cable. The CN13 connector is configured through the JP1 jumper. The use of this connector is briefed as follows:

1. Using **ATX** power: CN13 connects to an externally implemented power switch, and the JP1 jumper should be left open.

2. Using **AT** power: The pins on JP1 are shorted by a jumper cap. The reason why JP1 should be shorted is because the AMD Southbridge is designed without the consideration for a power button signal and the shorted JP1 provides a hardware feedback to initiate the system. The power on/off function is then managed by the AT power switch button.

JP1 Pin Configuration

Table 3-1 JP1 Pin Configuration

JP1	Power Mode Selector
1	AUTO_SW#
2	PWRBTN#

JP2: COM3 Serial Port Operation Mode Selector

This jumper block allows you to select an operation mode for the COM2 serial port (Default: 1-2).

Table 3-2 JP2 Pinouts

PIN COMBINATION	DESCRIPTION
1-2	RS-422 (default)
2-3	RS-485

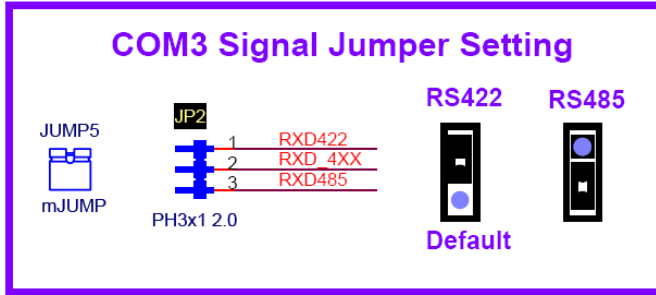**Figure 3-4 JP2 Pinouts**

JP3: COM1 and COM Ports Power Selector

Table 3-3   JP3 COM2 Signal Selector

COM1 Pin-9 Signal Selection		COM2 Pin-8 Signal Selection	
PIN COMBINATION	DESCRIPTION	PIN COMBINATION	DESCRIPTION
1-3	12V	2-4	12V
3-5	5V	4-6	5V
5-7	5V	6-8	5V
7-9	RI1	8-10	RI2
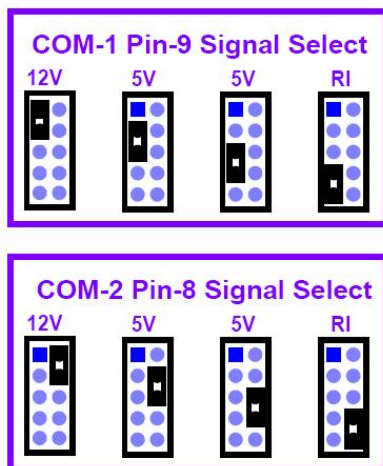
Figure 3-5   JP3 Pin Configurations

3.4   Installation
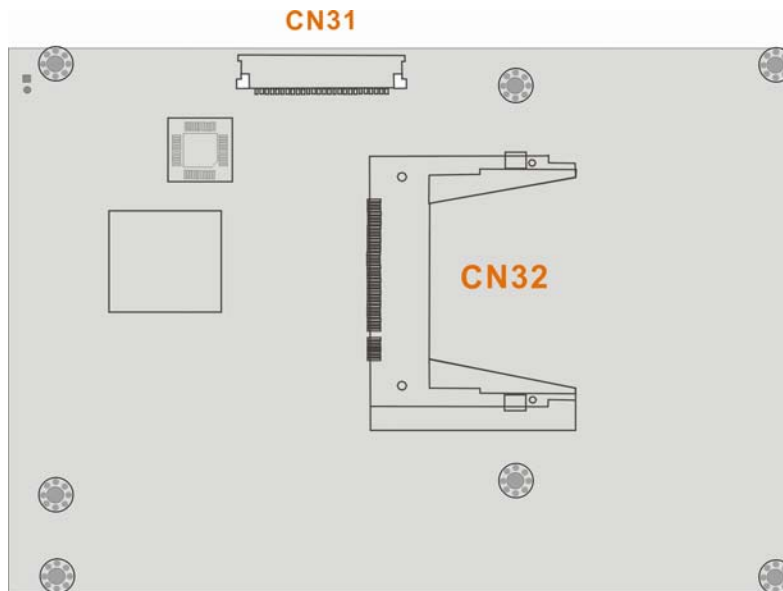
Figure 3-6   Soldering Side Sockets

IDE Disk Drive and CDROM Connector

The WAFER-LX provides 1 IDE channel which allows the connection to two Enhanced Integrated Device Electronics hard disk drives or CD/DVD-ROM.   The IDE controller is attached to a PCI interface. The advanced IDE controller supports PIO mode 3, mode 4 and up to UDMA/100 in transfer speed.

Connecting Hard Disk Drives

IDE bus devices are daisy-chained using a standard 44-pin IDE cable.   Connection is made by connecting one end of the cable to the CN30 IDE connector.   The connector has a keyed pin which prevents you from inserting the connector in a wrong direction.   The read wire corresponds to pin 1 on the connector.

Plug the other end of the cable into the Enhanced IDE hard drive, with pin 1 on the cable corresponding to pin 1 on the hard drive.

Note that when connecting two IDE disk drives you will have to configure one as the master and the other the slave.   The configuration is done by setting the jumpers on the disk drives.

Optional Floppy Drive Connector (CN31)

This connector provides access to one (1) externally mounted floppy drive (3.5"-profile, 720 KB, 1.44 MB, and 2.88 MB types floppy drive).

A 26-pin FPC connector cable is required for the connection to floppy drives.   The cable should come with a 26-pin FPC-cable connector and floppy disk drive connector on the other end.

Connecting the Floppy Drive

1. Plug the 26-pin FPC-cable connector into CN31. Make sure that the red wire corresponds to pin one on the connector.

2. Attach the appropriate connector on the other end of the cable to the floppy drive. You can use only one connector in the set.

Compact Flash Disk

When appropriately formatted, a compact Flash disk can serve as a bootable hard drive in applications where installation space is limited.   The Compact Flash card occupies a secondary IDE channel.   Configuration options can be found through the BIOS configuration utility.

Parallel Port Connector (CN15)

Parallel port connects to a printer. The WAFER-LX comes with a multi-mode (ECP/EPP/SPP) parallel port.   The CN15 parallel port interface features a 26-pin flat-cable connector that requires an adapter cable if a traditional DB-25 connector is preferred.   The parallel interface can be re-assigned to LPT2 or LPT3 through the BIOS configuration utility.

The default interrupt channel is IRQ7.   Select ECP or EPP DMA mode using the BIOS configuration utility.

Audio Interface

Audio Connector

AC'97 Audio signals are interfaced through a 10-pin flat-cable connector. These signals include Microphone line-in, line-in stereo, and line-out stereo. An audio 10-pin-to-phone-jack adapter kit is required.

COM Port Connectors [COM1(CN22), COM2/COM3(CN16)]

The WAFER-LX provides two serial ports (COM1: RS-232; COM2: RS-232/422/485) interfaced through one DB-9 connector (COM1) and one 14-pin male header. These serial ports facilitate the connection to serial devices or a communication network, e.g., terminal console.

LCD Panel Connection (CN26, CN28, and CN29)

The PCI SVGA interface on the WAFER-LX connects conventional CRT displays and flat panel displays including passive LCD and active LCD displays. There are three (3) connectors onboard for the connection to the three (3) display types:

1. CRT VGA monitors
2. TFT flat panel displays
3. LVDS type LCD panels

One CRT display connector (CN26) is provided as a 15-pin, female D-SUB to connect conventional CRT displays. Pin assignments can be found in *Chapter 2 Functional Description*.

Flat Panel Display Connector (CN28):

CN28 is a 40-pin connector, Hirose DF13A-40DP-1.25V, which can support a 24-bit LCD panel. A bias control signal, ENVEE, active high on CN28, controls the LCD bias voltage. The LCD bias voltage shall not be applied until the +5V or +3.3V logical supply and panel video signals become stable. When powered on, the control signal remains low until receiving the flat panel signals. CN28 connects up to 24-bit TFT LCD.

LVDS Connector (CN29):

CN29 is a 20-pin connector, Hirose DF13A-20DP-1.25V.   The CN29 connects an 18-bit LCD panel.

Adapter cables are required for connecting the display connectors.

Ethernet Connection (CN20 & CN21)

The onboard 32-bit PCI-bus Ethernet interface is fully compliant with IEEE 802.3U 10/100Mbps CSMA/CD standards.   The 10/100BaseT connector connections are made via standard RJ-45 connectors on the front edge.

PXE: Pre-Boot Execution Environment

PXE is an open industry standard developed by a number of software and hardware vendors. IEI BIOS PXE feature allows a workstation to boot from a server on a network by receiving a pre-OS agent prior to booting the operating system on the local hard drive.
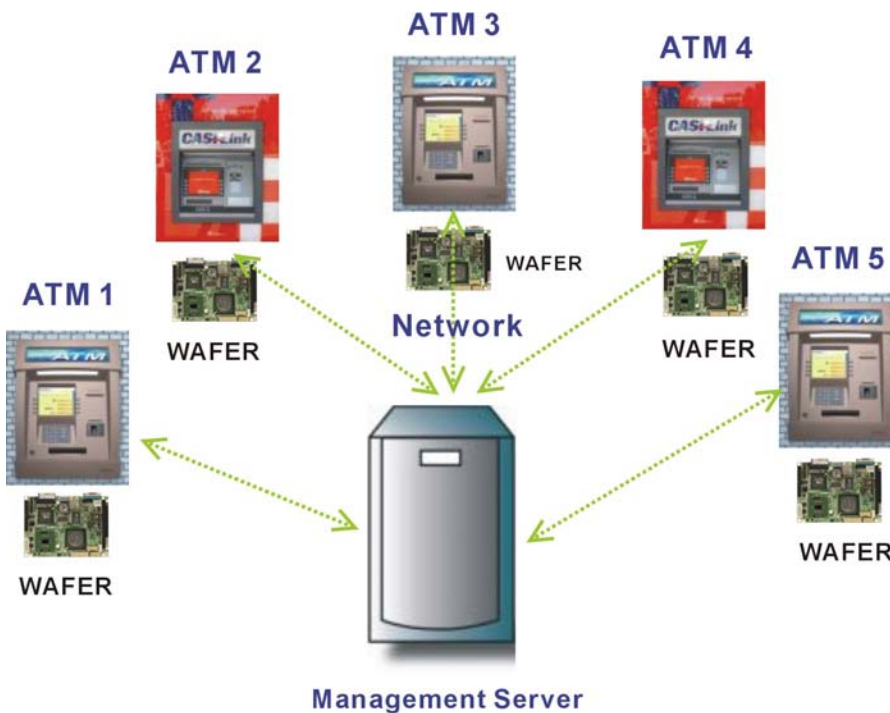
Figure 3-7   PXE Central Management

USB Connection (CN24 and CN19)

The combo USB header (CN24) provides the connectivity of up to two (2) USB (Universal Serial Bus) ports.   The USB interface features complete Plug and Play, and hot attach/detach for up to 127 external devices, compliance with USB specification Rev. 1.1.   An adapter 10-pin-to-USB cable is required for connecting to CN24.   The USB interface is accessed through two 5 x 2-pin connectors, USB01.   The adapter cable has one (1) 5x2-pin connector on one end and a standard USB connector on the other.

Accessories Included in Kit

IEI provides the following cables to facilitate connections to your peripheral devices. For more information on the locations of the connectors, please refer to *Chapter 2*.   Cables not included in kit are the user supplied items and should be separately purchased.

Table 3-4   Cables and Accessories Included in Kit

No.	Type
1	IDE flat cable 44p/44p (P/N: 32200-000009-RS)
2	SATA cable (P/N: 32000-0628000-RS)
1	SATA power cable (P/N: 32100-086600-RS)
1	PS/2 KB/MS cable (P/N: 32000-000138-RS)
1	Audio adapter cable (P/N: 32000-072100-RS)
1	COM2 serial port cable (RS-232/422/485 compatible; P/N: 32200-000061-RS)

Chapter

4

Award BIOS Setup

Introduction

A licensed copy of Phoenix Award BIOS is preprogrammed into the ROM BIOS. The BIOS setup program allows users to modify the basic system configuration.   This chapter describes how to access the BIOS setup program and the configuration options you may change.

1.1.1   Starting Setup

The Phoenix Award BIOS is activated when you turn on the computer. The setup program can be activated in one of two ways.

> 1. Press the DELETE key as soon as the system is turned on or
> 2. Press the DELETE key when the "**Press Del to enter SETUP**" message appears on the screen.

If the message disappears before you respond, you must restart your computer and try again.

1.1.2   Using Setup

Use the arrow keys to highlight items, press ENTER to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press ESC to quit. Navigation keys are shown in.

Key	Function
Up arrow	Move to the item above
Down arrow	Move to the item below
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
+/Page up	Increase the numeric value or make changes
-/Page down	Decrease the numeric value or make changes
Esc	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
F1	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2	Item help
F5	Previous values for the page menu items
F6	Fail-safe defaults for the current page menu items
F7	Optimized defaults for the current page menu items

| F9 | Menu in BIOS |
| F10 | Save changes and Exit BIOS |

Table 4-1: BIOS Navigation Keys

1.1.3   Getting Help

When you press **F1** a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

1.1.4   Unable to Reboot After Configuration Changes

If you are unable to boot your computer after you have made changes to the system configuration, you must restore the CMOS defaults. Use the jumper described in **Chapter** Error! Reference source not found., **Section** Error! Reference source not found..

1.1.5   Main BIOS Menu

Once the BIOS opens, the main menu in **BIOS Menu 1** appears.
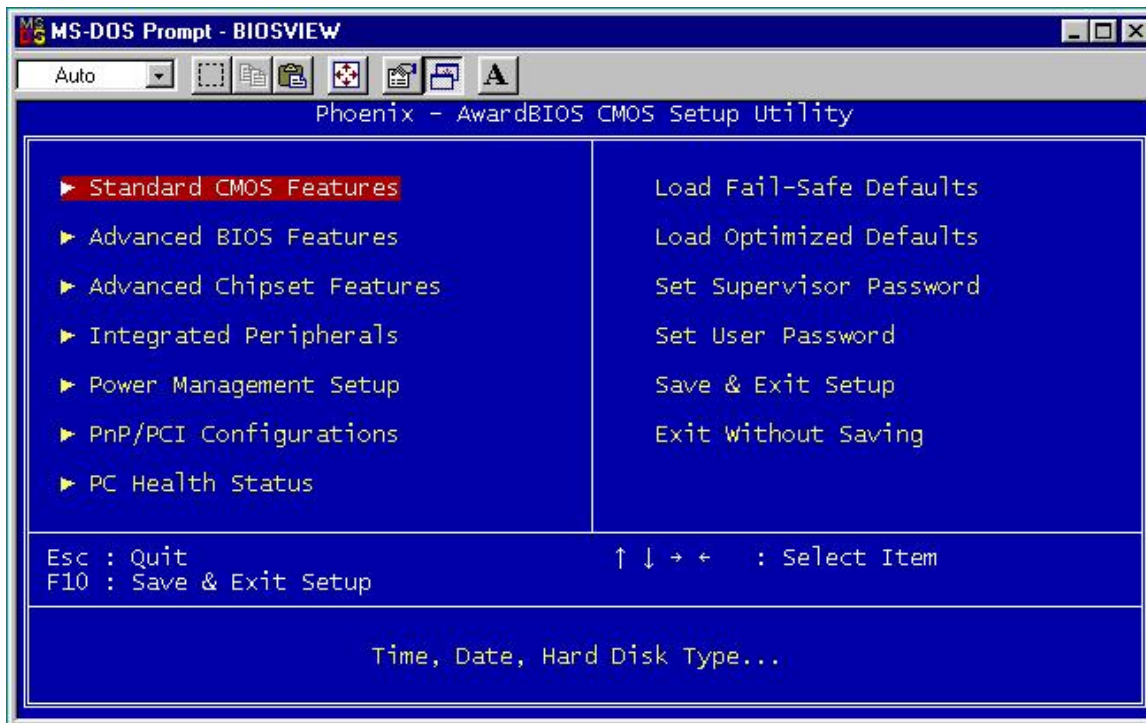
BIOS Menu 1: Award BIOS CMOS Setup Utility

✅ NOTE:

The following sections will completely describe the menus listed below and the configuration options available to users.

The following menu options are seen in **BIOS Menu 1**.

1. **Standard CMOS Features:** Changes the basic system configuration.
2. **Advanced BIOS Features:** Changes the advanced system settings.
3. **Advanced Chipset Features:** Changes the chipset configuration features
4. **Integrated Peripherals:** Changes the settings for integrated peripherals
5. **Power Management Setup:** Allows you to configure power saving options
6. **PCIPnP:** Changes the advanced PCI/PnP Settings
7. **PC Health Status:** Menu that monitors essential system parameters

The following user configurable options are also available in the BIOS Main Menu

➔ **Load Fail-Safe Defaults**

This option allows you to load failsafe default values for each of the parameters on the Setup menus. **F6 key can be used for this operation on any page.**

➔ **Load Optimized Defaults**

This option allows you to load optimal default values for each of the parameters on the Setup menus. **F7 key can be used for this operation on any page.**

➔ **Set Supervisor Password**

By default no **Supervisor Password** is set. If you wish to install a supervisor password, select this field and enter the password. After this option has been selected, a red dialogue box with **"Enter Password: "** will appear. You will be asked to confirm your password. Retype the original password into the **"Confirm Password: "** dialogue box and press enter.

➔ **Change User Password**

By default no **User Password** is set. If you wish to install a user password, select this field and enter the password. After this option has been selected, A red dialogue box with **"Enter**

Password: " will appear. You will be asked to confirm your password. Retype the original password into the **"Confirm Password: "** dialogue box and press enter.

➔ **Save & Exit Setup**

If you have finished making the configuration changes and wish to save them and exit the BIOS menus, select this option.

➔ **Exit Without Saving**

If you have finished making configuration changes but do not want to save them and you want to exit the BIOS menus, select this option.

Standard CMOS Features

When you enter the **Standard CMOS Features** BIOS menu **BIOS Menu 2** appears. The **Standard CMOS Features** menu allows you to set basic BIOS configuration options.
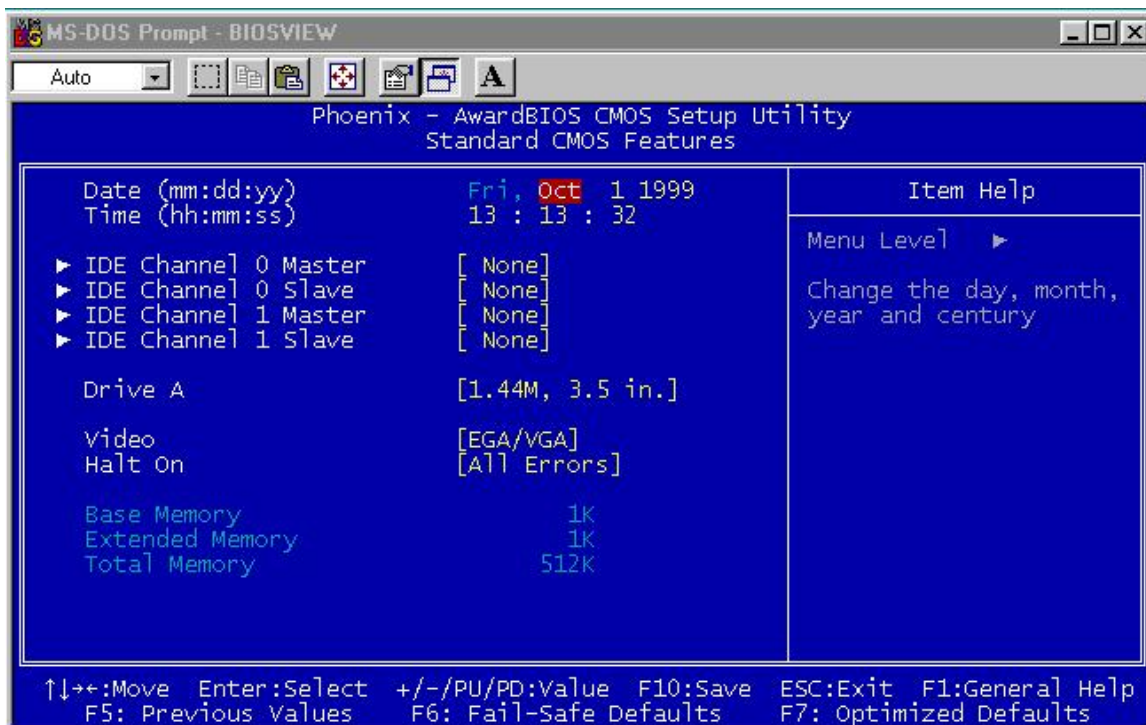
BIOS Menu 2: Standard CMOS Features

The **Standard CMOS Features** menu allows you to set both the date and the time field:

1. **Date [mm:dd:yy]**: Allows you to set the system date.

2. **Time [Day hh/mm/ss]:** Allows you to set the system time.

➔ **IDE Master and IDE Slave**

When entering setup, BIOS auto detects the presence of IDE devices. This displays the status of the auto detected IDE devices. The following IDE devices will be detected and are shown in the **Standard CMOS Features** menu:

1. Primary IDE Master
2. Primary IDE Slave
3. Secondary IDE Master
4. Secondary IDE Slave

The IDE Configuration menu (**BIOS Menu 3**) allows you to set or change the configurations for the IDE devices installed in the system. If an IDE device is detected, and one of the above listed four BIOS configuration options are selected, the IDE configuration options shown in **Section 1.1.6** appear.

➔ **Drive A [1.44M, 3.5in]**

The **Drive A** configuration option determines the type of floppy drive installed in the system. The floppy drive configuration options are listed below.

1. None
2. 1.44M, 3.5 in (DEFAULT)

➔ **Halt On**

The **Halt On** category allows users to determine whether the computer will stop if an error is detected during power up.

➔ **All Errors**	(DEFAULT)	Whenever BIOS detects a non-fatal error the system will be stopped and you will be prompted.
➔ **No Errors**		The system boot will not be stopped for any errors that may be detected
➔ **All, But Keyboard**		The system boot will not stop for a keyboard error; it will stop for all other errors.
➔ **All, But Diskette**		The system boot will not stop for a disk error; it will stop for all other errors.

➜   **All, But Disk/Key**   The system boot will not stop for a keyboard or a disk error; it will stop for all other errors.

➜   **Base Memory:**

The **Base Memory** is NOT user configurable. The POST will determine the amount of base (or conventional) memory is installed in the system. The value of the base memory is typically 512K for systems with 512K memory installed on the CPU card or 640K for systems with 640K or more memory installed on the motherboard.

➜   **Extended Memory**

The **Extended Memory** is NOT user configurable. The BIOS determines how much extended memory is present during the POST. This is the amount of memory above 1MB located in the memory address map of the CPU.

➜   **Total Memory**

The **Total Memory** is NOT user configurable.

1.1.6   IDE Channel Master

The **IDE Channel Master** menu (**BIOS** Menu 3) allows you to set or change the configurations for the master and slave IDE devices for both channel 0 and channel 1.
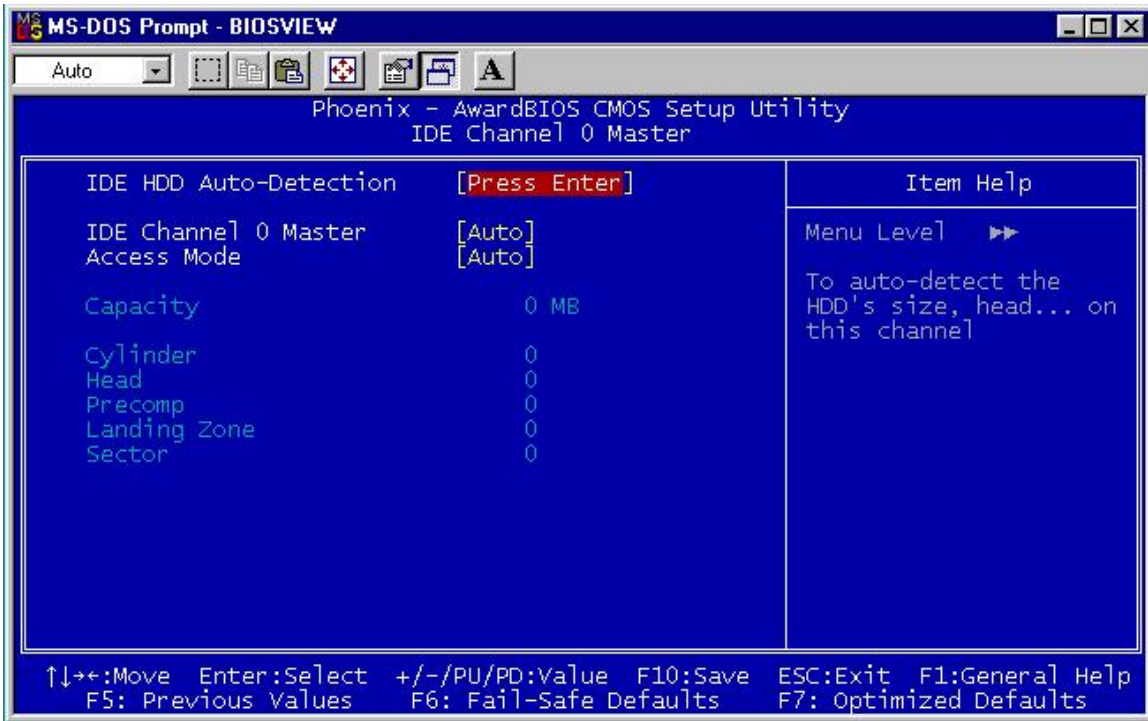
BIOS Menu 3: IDE Channel Master

➔ **IDE HDD Auto-Detection [Press Enter]**

Selecting **IDE HDD Auto-Detection** option and pressing the "**ENTER**" key will enable the BIOS to automatically detect the HDD type. Do not set this option manually.

➔ **IDE Channel 0/1 Master/Slave [Auto]**

The **IDE Channel** option allows you to activate or deactivate the following drive channels:

1. Channel 0 Master
2. Channel 0 Slave

➔ **None**   If you have no drives connected to the IDE channel select this option. Once set, this IDE channel will become inaccessible and any drives attached to it undetected.

➔ **Auto**   (DEFAULT)   Setting this option allows the device to be automatically detected by the BIOS

➔ **Manual**   Selecting this option allows you to manually configure the device on the IDE channel in BIOS.

➔ **Access Mode [Auto]**

The **Access Mode** option allows you to determine the hard disk BIOS translation modes. Most systems now use hard drives with large capacities and therefore either the LBA translation mode or auto should be selected.

➔ **CHS**   Select this mode if the HDD capacity is less than 504MB.

➔ **LBA**   Select this mode if the HDD capacity is more than 8.4GB.

➔ **Large**   This mode is an extended ECHS mode and while it supports HDDs larger than 504MB, it is not recommended.

➔ **Auto**   (DEFAULT)   If you are unsure of what access mode to set, select this option

➔ **Capacity**

The **Capacity** specification tells the user the storage capacity of the HDD installed in the system.

➔ **Cylinder**

The **Cylinder** specification tells the user how many cylinders (tracks) are on the HDD installed in the system.

➔ **Head**

The **Head** specification tells the user how many logical heads are on the HDD installed in the system.

➔ **Precomp**

The **Precomp** specification tells the user on what track the write precompensation begins.

➔ **Landing Zone**

The **Landing Zone** specification tells the user where the disk head will park itself after the system powers off.
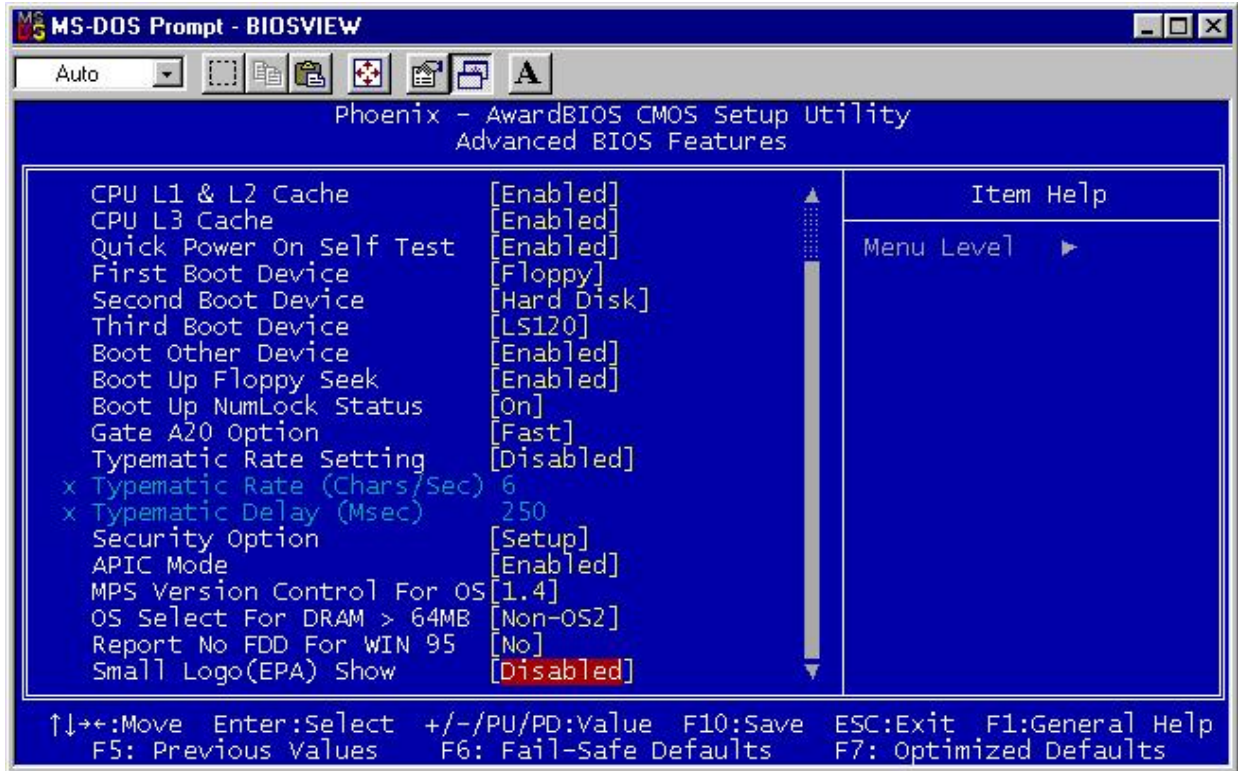
➔ **Sector**

The **Sector** specification tells the user how many logical sectors the HDD has been divided into.

Advanced BIOS Features

The **Advanced BIOS Features** menu (**BIOS Menu 4**) allows you to access CPU and peripheral device configuration options.
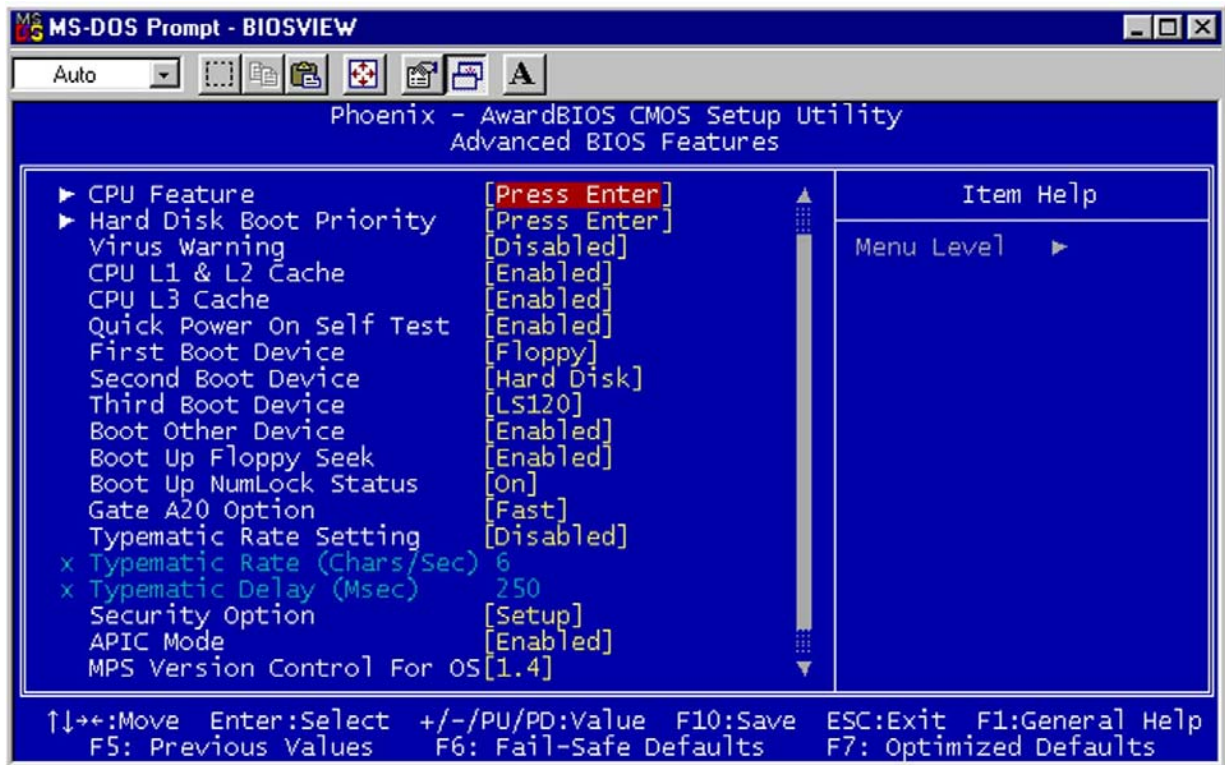
BIOS Menu 4: Advanced BIOS Features

Once the **Advanced BIOS Features** menu is selected, two menu options and a host of configuration options are available. The two menu options are:

1. CPU Feature
2. Hard Disk Boot Priority

To access these menus, use the arrow keys to select the menu option and press the "**ENTER**" button. The menu will appear. The menus are discussed fully in **Section 1.1.7 : CPU Feature** and **Section 1.1.8 : Hard Disk Boot Priority** below.

➜ **Virus Warning [Disabled]**

When this item is enabled, the BIOS will monitor the boot sector and partition table of the HDD for any attempt at modification. If an attempt is made, the BIOS will halt the system and an error message will appear. Afterwards, if necessary, you will be able to run an anti-virus program to locate and remove the problem before any damage is done.

➔ **Enabled**   Activates automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector or HDD partition table.

➔ **Disabled** (Default)   No warning message will appear when anything attempts to access the boot sector or HDD partition table.

NOTE:

Many disk diagnostic programs can cause the above warning message to appear when the program attempts to access the boot sector table. If you will be running such a program, it is recommended that you first disable the virus protection function before hand.

➔ **CPU Internal (L1 & L2) Cache [Enabled]**

The **CPU L1 & L2 Cache** option allows users to select whether the CPU primary cache (L1) and secondary cache (L2) will be turned on or off.

➔ **Enabled** (DEFAULT)   The L1 and L2 CPU caches are both turned on

➔ **Disabled**   The L1 and L2 CPU caches are both turned off

➔ **Boot From LAN Control**

This allows you to utilize the boot-from-LAN feature.

➔ **SATA Boot ROM Control**

When enabled, the ALi or ULi SATA ROM management utility will provide the access to RAID configuration utility during the POST stage and allow you to boot from SATA disk drives.   You may refer to *Appendix C* for more details.   .

➔ **Boot Device**

There are three **Boot Device** configuration options. They are:

1. **First Boot Device** [DEFAULT: Floppy]
2. **Second Boot Device** [DEFAULT: Hard Disk]

3.   **Third Boot Device** [DEFAULT: LS120]

The **Boot Device** configuration options allow you to select the order of devices the computer will boot from. Using the default values, the system will first look for a FDD to boot from. If it cannot find an FDD it will use an HDD to boot from. If both a FDD and a HDD are unavailable then the system will boot from a LS120 (Super Disk) drive.

Boot Device configuration options are:

1.   Floppy
2.   LS120
3.   HDD-0
4.   SCSI
5.   CDROM
6.   HDD-1
7.   ZIP100
8.   USB-FDD
9.   USB-ZIP
10.   USB-CDROM
11.   USB-HDD
12.   LAN
13.   Disabled

➔   **Boot Other Device [Enabled]**

The **Boot Other Device** option determines whether the CPU card will use a second or third boot device if the first boot device is not found.

➔   **Enabled**   (DEFAULT)   The system will look for second and third boot devices if the first one is not found.

➔   **Disabled**   The system will not look for second and third boot device if the first one is not found.

➔   **Swap Floppy Drive [Disabled]**

This option should not avail because FPC interface only allows the connection to one floppy drive.

➔   **Boot Up Floppy Seek [Enabled]**

During the POST, BIOS will determine if the floppy disk drive installed has 40 or 80 tracks. 360K FDDs have 40 tracks while 760K, 1.2M and 1.44M FDDs all have 80 tracks

➔ **Enabled**   BIOS searches for a FDD to determine if it has 40 or 80 tracks. Note that BIOS cannot tell the difference between 720K, 1.2M or 1.44M drives as they all have 80 tracks.

➔ **Disabled**   (DEFAULT)   BIOS will not search for the type of FDD drive by track number. Note that there will not be any warning message if the drive installed is 360K.

➔ **Boot Up Numlock Status [On]**

The **Boot Up Numlock Status** option allows you to determine the default state of the numeric keypad.

➔ **Off**   The keys on the keypad will be arrow keys

➔ **On**   (DEFAULT)   The keys on the keypad will be number keys

➔ **Typematic Rate Setting [Disabled]**

Disabling the **Typematic Rate Setting** configuration option only allows one character to appear onto the screen if a key is continuously held down. In other words, the BIOS will only report the key is down. When this option is enabled, the BIOS will report as before, but it will then wait a moment, and, if the key is still down, it will begin to report that the key has been depressed repeatedly. Such a feature would be used to accelerate cursor movements with the arrow keys.

➔ **Disabled**   (DEFAULT)   Disables the typematic rate

➔ **Enabled**   Enables the typematic rate

➔ **x Typematic Rate (Chars/sec) [6]**

The **Typematic Rate** can only be configured if the **Typematic Rate Setting** is Enabled. The **Typematic Rate** configuration field determines the rate keys are accelerated.

➔ **6**   (DEFAULT)   6 characters per second
➔ **8**   8 characters per second
➔ **10**   10 characters per second
➔ **12**   12 characters per second
➔ **15**   15 characters per second
➔ **20**   20 characters per second

➔　**24**　　　　　　　　24 characters per second

➔　**30**　　　　　　　　30 characters per second

➔　**x Typematic Delay (Msec) [250]**

The **Typematic Delay** can only be configured if the **Typematic Rate Setting** is enabled. The **Typematic Delay** configuration field allows you to select the delay between when the key was first depressed and when the acceleration begins.

➔　**250**　　　(DEFAULT)　250 milliseconds
➔　**500**　　　　　　　500 milliseconds
➔　**750**　　　　　　　750 milliseconds
➔　**1000**　　　　　　1000 milliseconds

➔　**Gate A20 Option**

This option determines the Gate A20 control options.　This option only avails in older, DOS, or 16-/32-bit operating systems.　For systems running newer, protected or real mode, operating systems, this option should never be changed.

➔　**Security Option [Setup]**

The **Security Option** configuration option allows you to limit access to the system and Setup or just to the Setup.

➔　**Setup**　(DEFAULT)　The system will not boot and access to Setup will be denied if the correct password is not entered at the prompt.
➔　**System**　　　　The system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.

NOTE:

To disable security, select the password setting in the **Main Menu**. When asked to enter a password, do not type anything, press, "**ENTER**" and the security is disabled. Once the security is disabled, the system will boot and you can enter Setup freely.

➔ **OS Select For DRAM > 64MB [Non-OS2]**

The **OS Select For DRAM > 64MB** option allows you to specify the operating system you are using.

➔ **Enabled**　　　　　　Only select this if you are using the OS/2 operating
　　　　　　　　　　　　　system

➔ **Disabled**　(DEFAULT)　If you are not using the OS/2 operating system then
　　　　　　　　　　　　　disable this function.

➔ **Video BIOS For DRAM [Disabled]**

When enabled, the video BIOS is copied to the system RAM for quicker access.　Shadowing boosts BIOS turnaround speed for that BIOS is accessed by CPU through the memory bus rather than the original 8-bit X bus.

➔ **Small Logo (EPA) Show [Disabled]**

The **Small Logo (EPA) Show** option determines if the Environmental Protection Agency (EPA) logo will appear during the system boot-up process. If it is enabled then the boot up process may be delayed.

➔ **Enabled**　　　　　　EPA logo will appear during the boot up process.

➔ **Disabled**　(DEFAULT)　EPA logo will not appear during the boot up process.

➔ **Delay For HDD (Secs) [3]**

A large number can be applied for slowly-initiated (longer spin-up time) hard drives depending on the specifications provided by your hard drive vendors.

➔ **Cyrix 6x86/MII CPPUID [Enabled]**

This option determines whether to use the function of controlling or accessing the Cyrix 6x86/MII CPU ID.

1.1.7   CPU Feature

The **CPU Feature** menu (**BIOS** Menu 5) shows CPU configuration options.
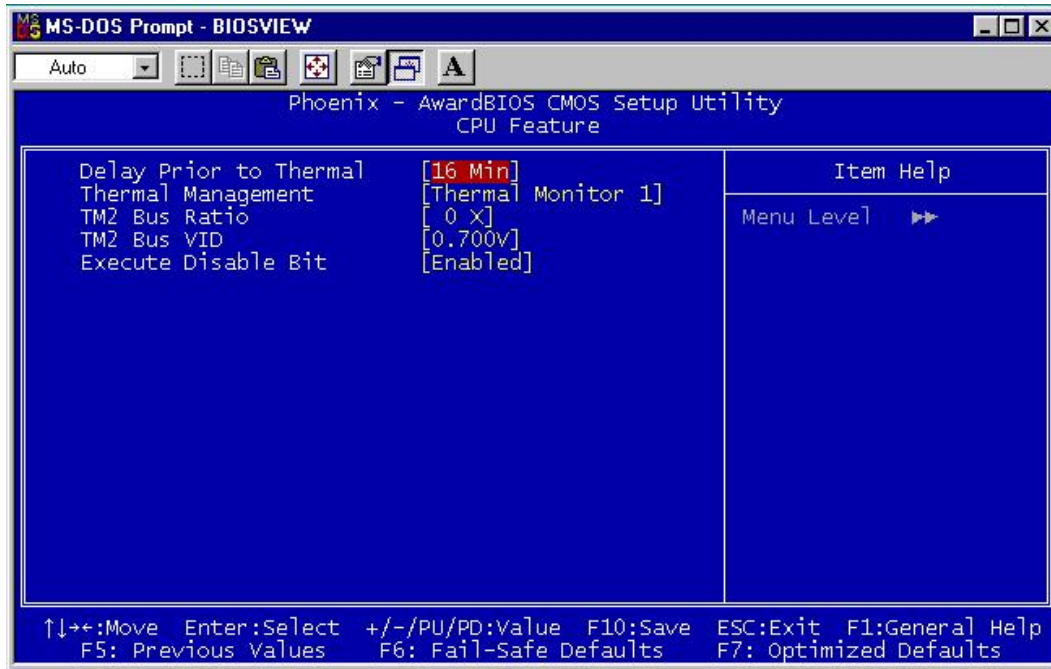
BIOS Menu 5: CPU Feature

➔   **CPU Frequency [500 MHz]**

This option allows you to change the CPU FSB frequency.   Setting this value too high may damage your embedded board.

➔   **Memory Frequency [333 MHz]**

This option allows you to manually change the operating frequency of your system memory. Setting this value too high may damage your embedded board.

➔   **CAS Latency [Auto]**

This controls the time delay (in clock cycles - CLKs) that passes before the SDRAM starts to carry

out a read command after receiving it. This also determines the number of CLKs for the

completion of the first part of a burst transfer. In other words, the lower the latency, the faster the

transaction.   Note that some SDRAM modules may not be able to handle the lower latency and

will become unstable and lose data.

➔ **Interleave Select [LOI]**

The **Interleave Select** BIOS feature controls the timing for reading the next bank of data when the DRAM interleave or SDRAM bank interleave is enabled. The lower the option, the faster the DRAM modules can interleave and as the result, the better performance.

➔ **Video Memory Size [8 M]**

This option selects the size of the graphics aperture. The aperture is a portion of the PCI memory address range dedicated as graphics memory address space. Host cycles that hit the aperture range are forwarded to the graphics controller without need for translation. This size also determines the maximum amount of system RAM that can be allocated to the graphics card for texture storage.

➔ **Output Display [Panel & CRT]**

This option allows you to select either one of the display types (Flat Panel & CRT) or both of the display types connected to the embedded board.

➔ **Flat Panel Configuration [Press Enter]**

The **Flat Panel** configuration provides access to fine-tune the flat panel display characteristics. The options include:

1. LVDS, TFT, or auto-detect the LCD display connection.

2. Resolutions ranging from 320x420 to 1600x1200.

3. 9-24 bits, 1 ppc or 18, 24 bits, 2ppc.

4. Refresh Rate ranging from 60 to 100Hz.

5. HSYNC Polarity value to High or Low.

6. VSYNC Polarity value to High or Low.

7. SHFCLK Active Period time to Active Only or Free running.

8. LP Active Period time to Active Only or Free Running.

➔ **Onboard Audio [Enabled]**

The **Onboard Audio** configuration option enables or disables the Realtek AC'97 CODEC onboard.
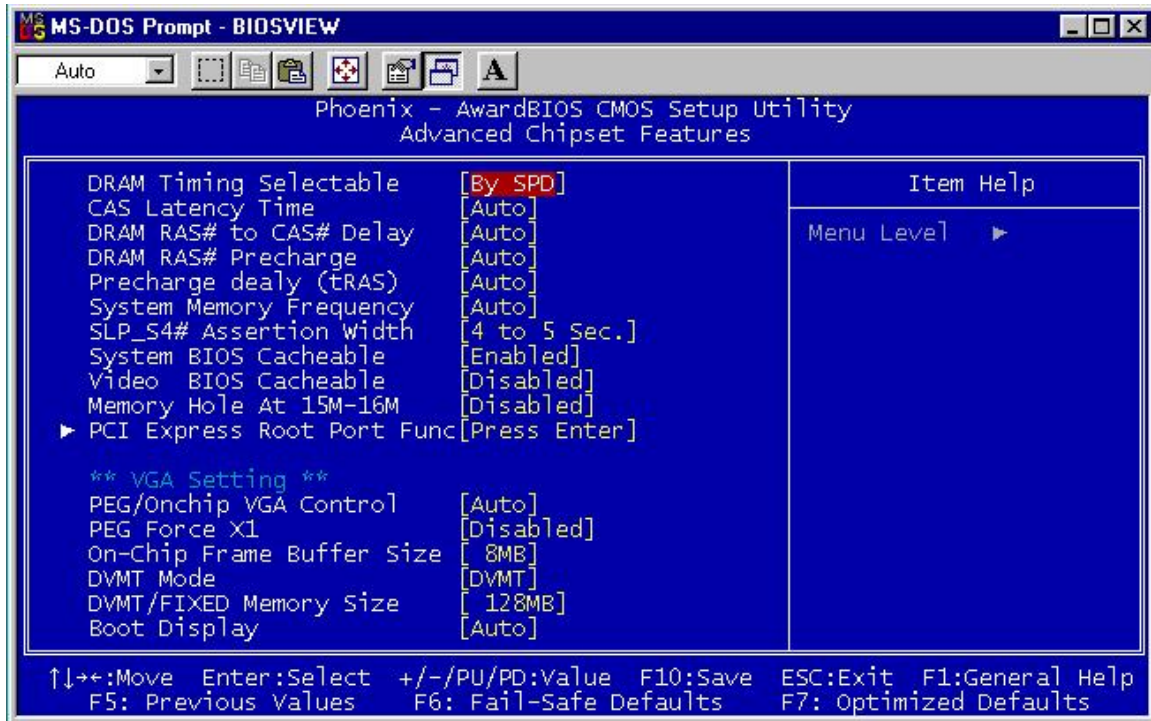
1.1.8 Hard Disk Boot Priority

The **Hard Disk Boot Priority** menu (**BIOS Menu 6**) is shown below.
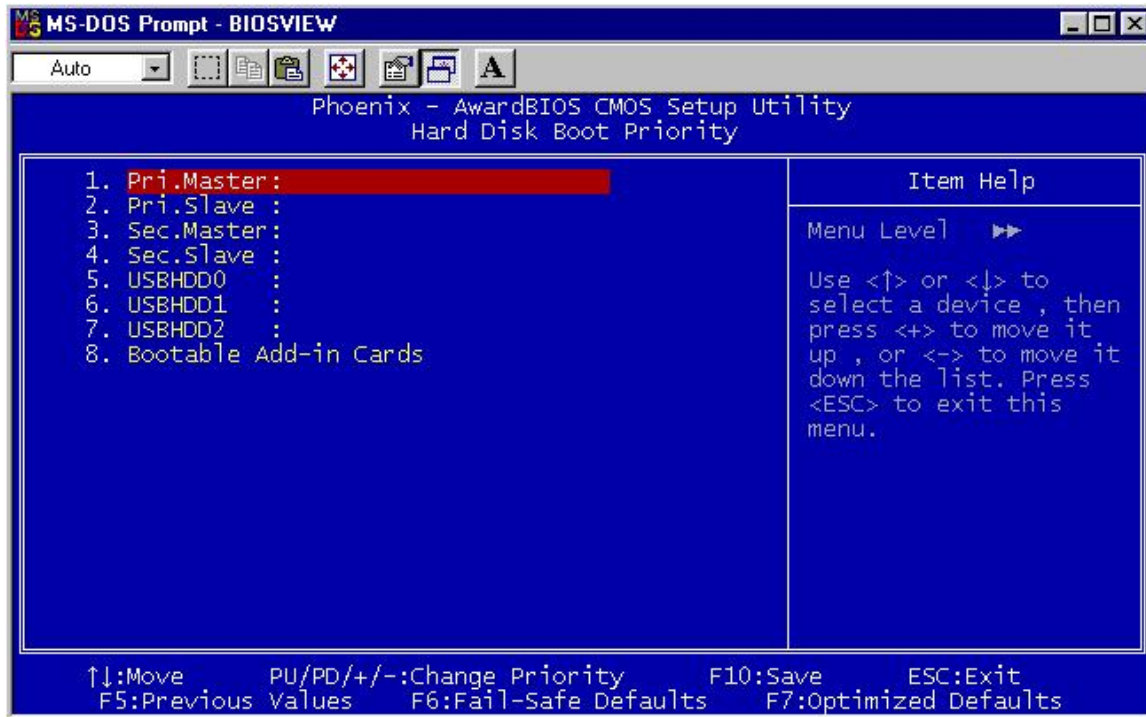
BIOS Menu 6: Hard Disk Boot Priority

Advanced Chipset Features

The **Advanced Chipset Features** menu (**BIOS Menu 7**) allows you to change the configuration for the chipset configuration options.

BIOS Menu 7: Advanced Chipset Features

➜ **DRAM Latency Timing [By SPD]**

The **DRAM Latency Timing** configuration option allows you to select whether the manufacturer recommended settings for the following DRAM configuration options are automatically detected by the BIOS or if you manually select the DRAM settings. The DRAM configuration options are:

1. CAS Latency Time [4]
2. DRAM RAS# to CAS# Delay [4]
3. DRAM RAS# Precharge [4]
4. Precharge Delay (tRAS) [12]
5. System Memory Frequency [533MHz]

➔ **Manual** You set the above configuration options manually

➔ **By SPD** (DEFAULT) The BIOS automatically detects the settings recommended by the manufacturer

➔ **CAS Latency Time [4]**

The **CAS Latency Time** configuration option refers to the Column Address Strobe (CAS) delay time. (To be able to change this configuration option the **DRAM Latency Timing** configuration option must be set to "**Manual**") The following configuration options are available

1. 5 nanoseconds
2. 4 nanoseconds (DEFAULT)
3. 3 nanoseconds
4. Auto

➔ **DRAM RAS# to CAS# Delay [4]**

The **DRAM RAS# to CAS# Delay** refers to the Row Address Strobe (RAS) to CAS delay time. (To be able to change this configuration option the **DRAM Latency Timing** configuration option must be set to "**Manual**") The following configuration options are available

1. 2 nanoseconds
2. 3 nanoseconds
3. 4 nanoseconds (DEFAULT)
4. 5 nanoseconds
5. Auto

➔ **DRAM RAS# Precharge [4]**

The **DRAM RAS# Precharge** option indicates how fast your RAM can terminate the access of one row and start accessing another. (To be able to change this configuration option the **DRAM RAS# Precharge** configuration option must be set to "**Manual**") The following configuration options are available

1. 2 nanoseconds
2. 3 nanoseconds
3. 4 nanoseconds (DEFAULT)
4. 5 nanoseconds
5. Auto

➔ **Precharge dealy (tRAS) [12]**

The **Precharge Dealy** option allows you to set the time it takes for the RAS to start retrieving the actual data after a request has been issued to the memory module. (To be able to change this configuration option the **DRAM RAS# Precharge** configuration option must be set to "**Manual**") The following configuration options are available,

1.   Auto
2.   2 nanoseconds
3.   3 nanoseconds
4.   4 nanoseconds
5.   5 nanoseconds
6.   6 nanoseconds
7.   7 nanoseconds
8.   8 nanoseconds
9.   9 nanoseconds
10.   10 nanoseconds
11.   11 nanoseconds
12.   12 nanoseconds (DEFAULT)
13.   13 nanoseconds
14.   14 nanoseconds
15.   15 nanoseconds

➔ **System Memory Frequency**

The **System Memory Frequency** configuration option allows you to manually select the speed of the installed memory module. The default value is 533MHz. If you are not certain of what value to select, select "**Auto**" and the BIOS will automatically detect the speed. (To be able to change this configuration option the **DRAM RAS# Precharge** configuration option must be set to "**Manual**") The following configuration options are available,

1.   Auto
2.   333MHz
3.   400MHz
4.   533MHz (DEFAULT)

➔ **SLP_S4# Assertion Width [4 to 5 sec]**

The following configuration options are available,

1.   4 to 5 sec (DEFAULT)
2.   3 to 4 sec
3.   2 to 3 sec
4.   1 to 2 sec

➔   **System BIOS Cacheable [Enabled]**

The **System BIOS Cacheable** option allows the system BIOS to be cached in the L2 cache.

➔   **Disabled**   System BIOS is not cached in the L2 cache
➔   **Enabled**   (DEFAULT)   System BIOS is cached in the L2 cache

➔   **Video BIOS Cacheable [Disabled]**

The **Video BIOS Cacheable** option allows the video BIOS to be cached in the L2 cache.

➔   **Disabled**   Video BIOS is not cached in the L2 cache
➔   **Enabled**   (DEFAULT)   Video BIOS is cached in the L2 cache

➔   **Memory Hole At 15M – 16M [Disabled]**

The **Memory Hole At 15M – 16M** reserves the memory space between 15MB and 16MB for ISA expansion cards that require a specified area of memory to work properly. If you are using older ISA expansion cards, please refer to the documentation that came with the card to see if it is necessary to reserve the space.

➔   **Disabled**   (DEFAULT)   Memory is not reserved for ISA expansion cards
➔   **Enabled**   Memory is reserved for ISA expansion cards

➔ **PCI Express Root Port Func. [Press Enter]**

When you select this option the **PCI Express Port Functions** menu (**BIOS Menu 7**) appears:
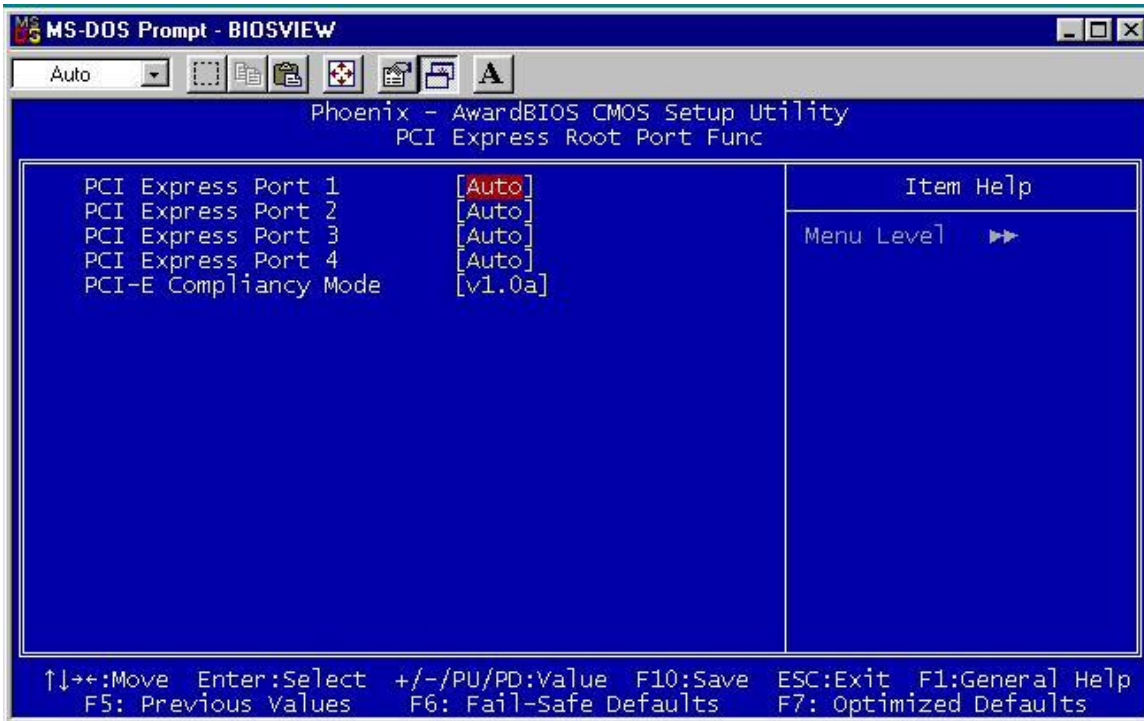
BIOS Menu 8: PCI Express Port Functions

➔ **PEG/Onchip VGA Control [Auto]**

The **PEG/Onchip VGA Control** option is found on motherboards that have a built-in graphics processor as well as a PCI-E port. It allows you to select whether to use the onboard graphics processor or the PCI-E card.

|		
➔ **On-Chip VGA**		The system will boot up using the on-chip graphics processor regardless of whether or not a PCI graphics card is installed.
➔ **PEG Port**		The system will boot up using the installed PCI graphics card.
➔ **Auto**	(DEFAULT)	During the boot process, the BIOS will automatically detect to see if there is a PCI graphics card

installed. If no card is installed then the system will
automatically boot using the on-chip graphics
processor.

➔ **On-Chip Frame Buffer Size [8MB]**

The **On-Chip Frame Buffer Size** option allows you to allocate a predetermined amount of system
memory to the graphics processor when the system boots up.

➔ **1MB**   1MB of system memory is allocated to the graphics
                           processor
➔ **8MB**   (DEFAULT) 8MB of system memory is allocated to the graphics
                           processor

➔ **DVMT Mode [DVMT]**

The **DVMT Mode** option allows you to control Intel's Dynamic Video Memory Technology (DVMT).
The key idea in DVMT is to improve the efficiency of the memory allocated to either system or

➔ **Fixed**   A fixed amount of memory is allocated as graphics
                           memory to ensure that the graphics memory will always
                           be sufficient. Once the memory has been allocated as
                           graphics memory it cannot be accessed by the system.
➔ **DVMT**   (DEFAULT) The graphics chip assesses the system and graphics
                           memory requirement and dynamically allocates
                           memory either as graphics memory or system memory
                           according to the predetermined needs.
➔ **Both**   A fixed amount of memory will be set as graphics
                           memory but if more graphics memory is required, more
                           memory will be allocated to meet the graphics memory
                           needs.

➔ **DVMT/FIXED Memory Size [128MB]**

The **DVMT/FIXED Memory Size** option allows you to determine the maximum amount of memory
that may be allocated as fixed graphics memory.

➔ **64MB**   The maximum amount of fixed memory allocated to
                           graphics memory is 64MB
➔ **128MB**   (DEFAULT) The maximum amount of fixed memory allocated to

graphics memory is 128MB

➔ **Boot Display [Auto]**

The **Boot Display** option allows you to select the display device the system will boot with.

➔ **Auto** (DEFAULT) The system will automatically determine the display
device type.

➔ **CRT** The display device type will be set as CRT

➔ **TV** The display device type will be set as TV

➔ **EFP** The display device type will be set as EFP

Integrated Peripherals

The **Integrated Peripherals** menu (**BIOS Menu 9**) allows you to change the configuration option for peripheral devices.
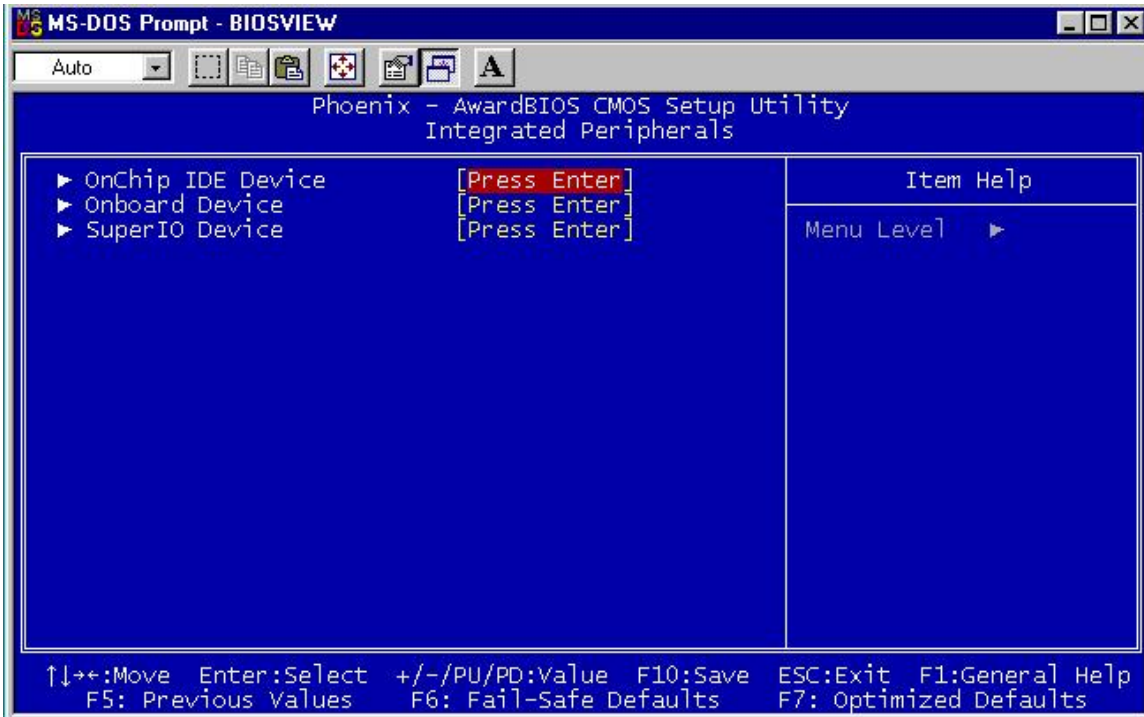
BIOS Menu 9: Integrated Peripherals

The **Integrated Peripherals** menu (**BIOS Menu 9**) has three options listed below:

1.   Master Drive PIO Mode

2.   Slave Drive PIO Mode

3.   IDE Primary Master UDMA

4.   IDE Primary Slave UDMA

5.   IDE DMA transfer access

6.   IDE HDD Block Mode

7.   Onboard FDC Controller

8.   Onboard Serial Port 1

9.   Onboard Serial Port 2

10.   Onboard Serial Port 3

11.   Onboard Parallel Port

12.   Parallel Port Mode

Select the menu you wish to configure.

1.1.9   OnChip IDE Device

The **OnChip IDE Device** menu (**BIOS Menu 10**) allows you to change the IDE device configurations.
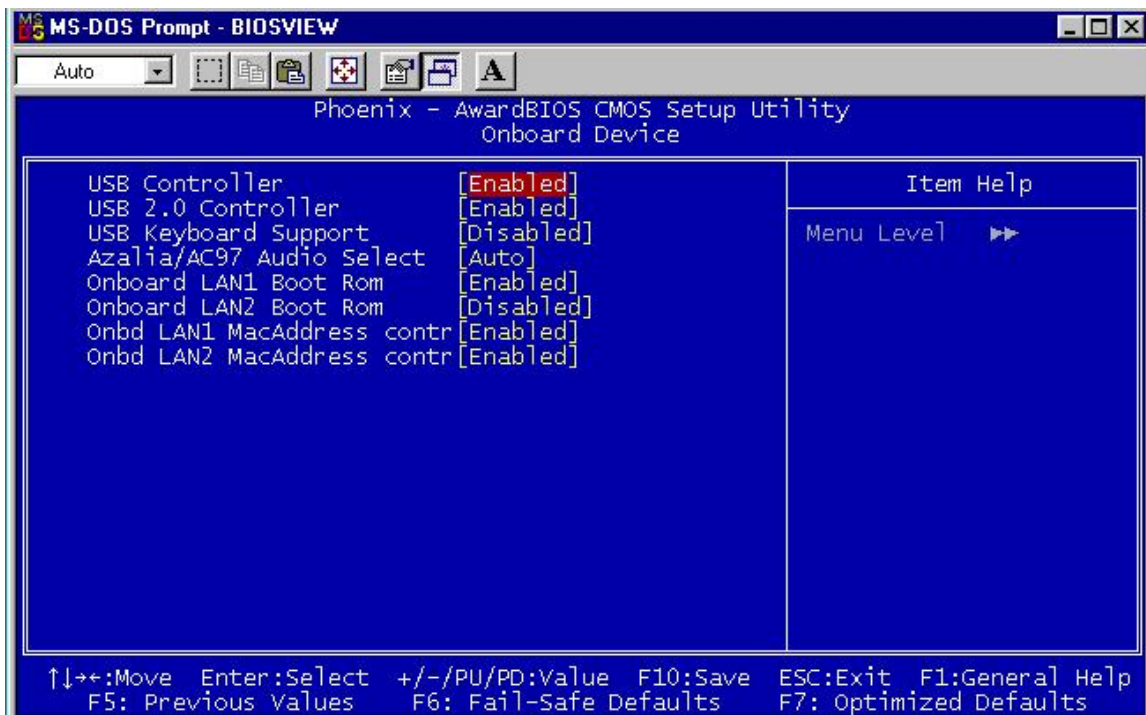
BIOS Menu 10: Integrated Peripherals

➔ **Master/Slave Drive PIO Mode [Auto]**

PIO means Programmed Input/Output.   Instead of constantly issuing BIOS commands to facilitate I/O transfers to and from the hard disk drives, the PIO mode allows the BIOS to issue I/O requests and let CPU and IDE controller to fulfill the requests.   Four modes from 0 to 4 are supported.

    1.   IDE Primary Master PIO

    2.   IDE Primary Slave PIO

    3.   IDE Secondary Master PIO

    4.   IDE Secondary Slave PIO

➔ **Auto** (DEFAULT)   Allows the computer to select the correct mode

➔ **0**   PIO mode 0 selected with a maximum transfer rate of 3.3MBps

  1   PIO mode 1 selected with a maximum transfer rate of 5.2MBps

  2   PIO mode 2 selected with a maximum transfer rate of 8.3MBps

  3   PIO mode 3 selected with a maximum transfer rate of 11.1MBps

  4   PIO mode 4 selected with a maximum transfer rate of 16.6MBps

➔ **IDE Primary Master/Slave UDMA [Auto]**

The Ultra DMA (UDMA) mode for the following HDDs can all be selected.

    1.   IDE Primary Master UDMA

    2.   IDE Primary Slave UDMA

    3.   IDE Secondary Master UDMA

    4.   IDE Secondary Slave UDMA

➔ **Auto** (DEFAULT)   Allows the computer to select the correct UDMA

➔ **Disabled**   Disables the UDMA for the HDD device

➔ **IDE DMA transfer access [Enabled]**

The **IDE DMA transfer access** option allows you to determine whether or not the IDE device installed in the system will have a DMA device.

➔ **Disabled**   The IDE HDD installed in the system will not have DMA transfer access

➔ **Enabled** (DEFAULT) The IDE HDD installed in the system will have DMA transfer access

➔ **IDE HDD Block Mode [Enabled]**

The **IDE HDD Block Mode** option should only be enabled if your IDE HDD device supports block mode. Please refer to the documentation that came with your IDE HDD device to check the compatibility.

➔ **Disabled** The BIOS will not detect block data transfers.

➔ **Enabled** (DEFAULT) The optimal number of block read/writes per sector the drive can support will be automatically detected.

➔ **Onboard FDC Controller [Enabled]**

The **Onboard FDC Controller** option allows you to enable or disable the Floppy Drive controller. .

➔ **Onboard Serial Port # [Auto]**

These options are used to select the port address for specific on-board serial port. The options are 3F8H, 2F8H, 3E8H, 2E8H, Auto and Disable. Port 1 is COM1, Port 2 is Com2 and so on. The operating mode of COM2/COM3 can be selected through jumpers on the embedded board.

➔ **Onboard Parallel Port [378/IRQ7]**

These options are used to select the port address for specific on-board serial port. The options are 378/IRQ7, 278/IRQ5, 3BC/IRQ7, and Disable.

➔ **SPP** (DEFAULT) The parallel port will operate in the standard parallel port (SPP) mode. This parallel port mode will work with most parallel port devices but is slow.

➔ **EPP** The parallel port will operate in the enhanced parallel port mode (EPP). The EPP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the SPP mode.

➔ **ECP** The parallel port will operate in the extended capabilities port (ECP) mode. The ECP mode supports bi-directional communication between the system and

		the parallel port device and the transmission rates between the two are much faster than the SPP mode.
➔	**ECP+EPP**	The parallel port will be compatible with both ECP and EPP devices
➔	**Normal**	

➔ **Parallel Port Mode [SPP]**

These options are used to select the parallel port operating mode. The options are SPP, EPP, ECP, ECP+EPP, and Normal.   Two specific options avail when either of the ECP or EPP modes is selected: **EPP Mode Select** and **ECP Mode Use DMA**.

If the **EPP mode** is selected in the **Parallel Port Mode** configuration option, you will be able to configure the **EPP Mode Select** option. The EPP parallel port mode has two standards, EPP 1.7 and EP 1.9. This selection allows you to choose the standard the parallel port will operate in. Please refer to the parallel device that your system will be connected to and select the EPP mode accordingly.

| ➔ | **EPP1.9** | | EPP 1.9 is selected as the EPP standard |
| ➔ | **EPP1.7** | (DEFAULT) | EPP 1.7 is selected as the EPP standard |

➔ **x ECP Mode Use DMA [3]**

If the **ECP mode** is selected in the **Parallel Port Mode** configuration option, you will be able to configure the **ECP Mode Use DMA** option. This option determines the DMA channel the parallel port uses when it is in the ECP mode.

| ➔ | 1 | | Parallel port uses DMA Channel 1 in the ECP mode |
| ➔ | 3 | (DEFAULT) | Parallel port uses DMA Channel 3 in the ECP mode |

Power Management Setup

The **Power Management Setup** menu (**BIOS Menu 9**) allows you to set the power management and saving features in the BIOS.
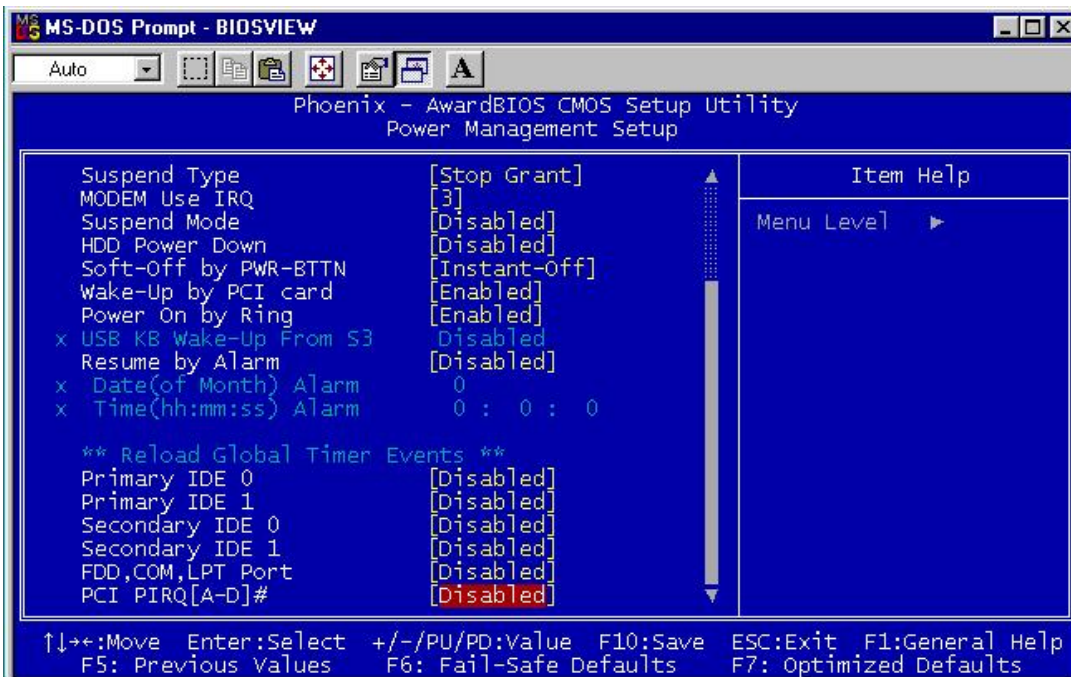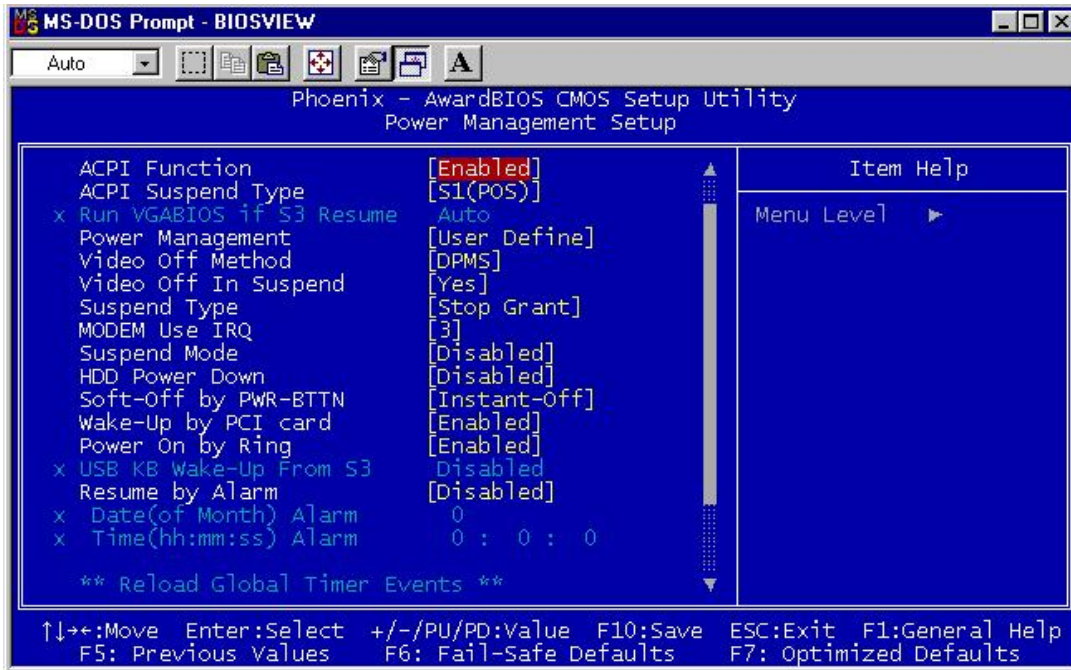
BIOS Menu 11: Power Management Setup

➔ **ACPI Function [Enabled]**

The **ACPI Function** option allows you to enable or disable the ACPI function.

    ➔ **Disabled**   The ACPI function is enabled

    ➔ **Enabled**   (DEFAULT)   The ACPI function is disabled

➔ **ACPI Suspend Type [S1(POS)]**

The **ACPI Suspend Type** option allows you to select the suspend state your computer will go into during the power conservation mode.

    ➔ **S1(POS)**   (DEFAULT)   System appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode.

➔ **Power Management [User Define]**

The **Power Management** option allows you to manually define the **Suspend Mode** and the **HDD Power Down** options. BIOS has preset minimum and maximum values for the **Suspend Mode** and the **HDD Power Down** options.

    ➔ **User Define**   (DEFAULT)   The user defines the **Suspend Mode** time and the **HDD Power Down** time.

    ➔ **Min. Saving**   BIOS automatically sets the **Suspend Mode** time and the **HDD Power Down** time for minimum power saving.

    ➔ **Max. Saving**   BIOS automatically sets the **Suspend Mode** time and the **HDD Power Down** time for maximum power saving.

The minimum and maximum power settings are shown below:

	Suspend Mode	HDD Power Down
Min. Saving	1 hour	15 minutes
Max. Saving	1 minute	1 minute

➔ **Standby Mode**

Defines the continuous idle time before the system enters Standby Mode. If any item defined is enabled & active Standby timer will be reloaded.   The standby mode turns screen and hard drives off

➔ **Suspend Mode**

Defines the timeout before the system enters the Suspend Mode.   The suspend mode powers down the system and keeps a trickle of power.   If an interrupt to RTC reaches, the system wakes up.

➔ **Video Off In Suspend [Yes]**

The **Video Off In Suspend** option allows you to specify whether the display monitor is turned off or remains on when the systems enters a suspend state.

➔ **No**   The display monitor will remain on when the system is in suspend mode.

➔ **Yes**   (DEFAULT)   The display monitor will be turned off when the system is in suspend mode.

➔ **Suspend Type [Stop Grant]**

The **Suspend Type** option allows you to determine what suspend state the CPU will go into when the system is in the suspend state.

➔ **Stop Grant**   (DEFAULT)   When the CPU is in the stop grant state the bus clock (BCLK) continues to run. Snoops and interrupts are also allowed in the stop grant state. Thus, the CPU can operate in a lower power state yet can respond to snoops and interrupts.

➔ **PwrON Suspend**

➔ **MODEM Use IRQ [3]**

The **MODEM Use IRQ** option tells the power management which IRQ it should monitor for modem wakeup. The following options can be selected.

1. N/A
2. 3 (DEFAULT)
3. 4
4. 5
5. 7
6. 9
7. 10
8. 11

➔ **Suspend Mode [Disabled]**

The **Suspend Mode** option allows you to specify how long the computer must wait for no activity before it goes into a suspend mode. If you disable this option the system will not go into a suspend mode. Note that if you selected max. or min. as the setting for the **Power Management** option, you will not be able to configure this setting. The following settings can be made.

1. Disable (DEFAULT)
1   Min
2   Min
3   Min
4   Min
2. 8 Min
3. 12 Min
4. 20 Min
5. 30 Min
6. 40 Min
1   Hour

➔ **HDD Power Down [Disabled]**

The **HDD Power Down** option allows you to specify how long the computer must wait for no activity before the HDD powers down. If you disable this option the HDD will not power down. Note

that if you selected max. or min. as the setting for the **Power Management** option, you will not be able to configure this setting. The following settings can be made.

Disable (DEFAULT)
1 Min
2 Min
3 Min
4 Min
5 Min
6 Min
7 Min
8 Min
9 Min
10 Min
11 Min
12 Min
13 Min
14 Min
15 Min

➔ **Soft –Off by PWR-BTTN [Instant-Off]**

The **Soft –Off by PWR-BTTN** option allows you to define how the system responds when the power button is pushed. You may choose to allow the system to be either turned off completely or enter into a suspend mode.

➔ **Instant-Off**   (DEFAULT)   The system will be turned off as soon as the power button is pressed.

➔ **Delay 4 Sec**   The power button must be pressed for more than four seconds before it is turned off. If it is pressed for less than four seconds the system will enter a suspend state.

➔ **Wake-Up by PCI Card [Enabled]**

The **Wake-Up by PCI Card** option allows users to wake a system in a suspended state through a network. A wakeup signal from a network can be routed directly through the PCI card.

➔ **Disabled**   The system cannot be woken from a suspend state

through the network via a PCI card

➔ **Enabled** (DEFAULT) The system can be woken from a suspend state through the network via a PCI card

➔ **Power On by Ring [Enabled]**

The **Power On by Ring** option allows users to determine whether or not the system can be roused from a suspend state when the modem rings.

➔ **Disabled** The system will not be woken from a suspend state when the modem rings

➔ **Enabled** (DEFAULT) The system will be woken from a suspend state when the modem rings

➔ **USB KB Wake-Up From S3 [Disabled]**

If you selected either the S3(STR) or the S1&S3 option in the **ACPI Suspend Type** option, you will be able to configure the **USB KB Wake-Up From S3**. This option allows you to wake the system from an S3 suspend state using the keyboard.

➔ **Disabled** (DEFAULT) Keyboard cannot be used to rouse the system from the S3 suspend state

➔ **Enabled** Keyboard can be used to rouse the system from the S3 suspend state

➔ **Resume by Alarm [Disabled]**

The **Resume by Alarm** option allows you tell the computer when it should be roused from a suspend state.

➔ **Disabled** (DEFAULT) No time is specified for when the computer should be roused from a suspend state

➔ **Enabled** The date and time the computer must be roused from a suspend state is specified

➔ **x Date(of Month) Alarm [0]**

The **Date(of Month) Alarm** option can only be configured if the **Resume by Alarm** option has been enabled. When you select this option you will be asked to enter a number between 0 and 31 to specify the date of the current month that you would like the system to be roused.

➔ **x Time(hh:mm:ss) Alarm [0 : 0 : 0]**

The **Time(hh:mm:ss) Alarm** option can only be configured if the **Resume by Alarm** option has been enabled. You will have to set the time you wish the computer to be roused. You will see three zeroes side by side. The first zero is for the hour, the second zero for the minutes and the third zero for the seconds.

1. Hour (first zero): Select a number between 0 and 23
2. Minute (second zero): Select a number from 0 to 59
3. Second (third zero): Select a number from 0 to 59

➔ **Reload Global Timer Events**

The **Reload Global Timer Events** field has the following BIOS configuration options

1. Primary IDE 0
2. Primary IDE 1
3. Secondary IDE 0
4. Secondary IDE 1
5. FDD, COM, LPT Port
6. PCI PIRQ[A-D]

All the above options have "**Disabled**" as their default value. When disabled, if any activity occurs on these devices during a suspended state, the system will not be roused.

If "**Enabled**" is selected for any of the above devices, and if activity is recorded on an enabled device in the above list the system will be roused from its suspended state.

1.1.10 Onboard Device

The **OnBoard Device** menu (**BIOS Menu 12**) allows you to change the USB and LAN device configurations.
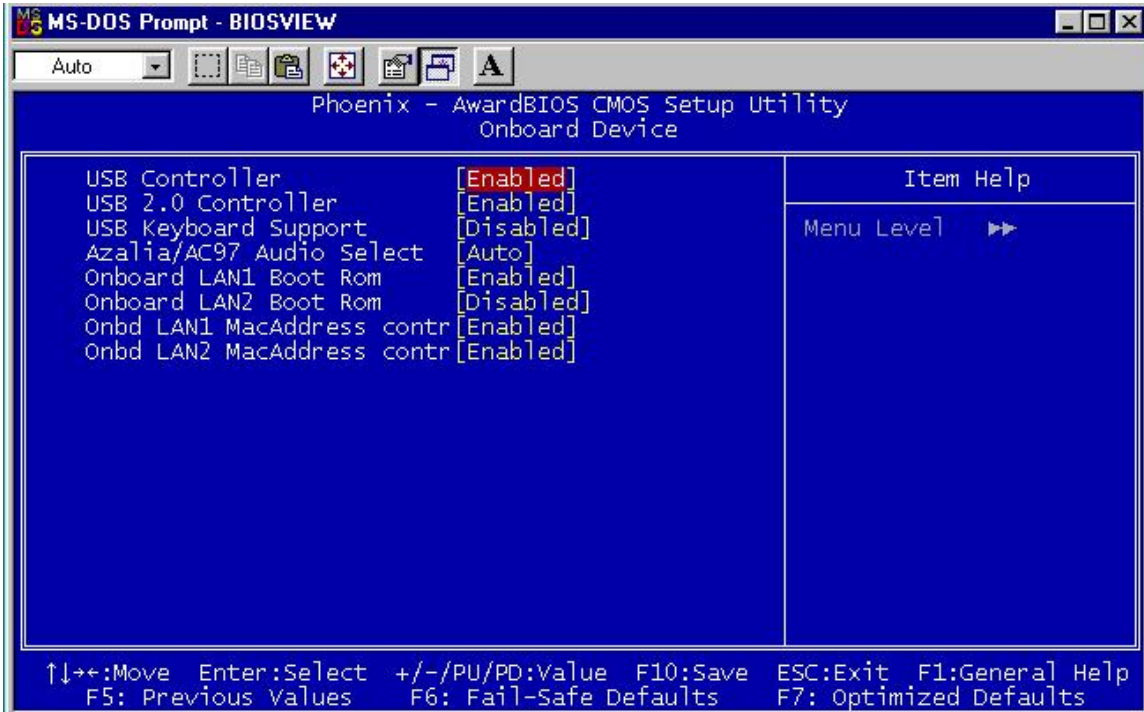
BIOS Menu 12: OnBoard Device [Integrated Peripherals]

➔ **USB Controller [Enabled]**

The **USB Controller** option allows you to activate or deactivate the onboard USB controller.

> ➔ **Enabled** (DEFAULT) The USB controller is activated
>
> ➔ **Disabled** The USB controller is deactivated

➔ **USB 2.0 Controller [Enabled]**

The **USB 2.0 Controller** option allows you to activate or deactivate the onboard EHCI controller.

> ➔ **Enabled** (DEFAULT) The EHCI controller is activated
>
> ➔ **Disabled** The EHCI controller is deactivated

➔ **USB Keyboard Support [Disabled]**

The **USB Keyboard Support** is only applicable if you are using a USB keyboard. Some OSes do not support USB keyboards. Enabling this option in BIOS will allow users using an OS that does not support USB keyboard to implement a USB keyboard.

> ➔ **Disabled** (DEFAULT) USB keyboard support no provided by BIOS
>
> ➔ **Enabled** USB keyboard support is provided by BIOS

➔   **Onboard LAN1/2 Boot Rom [Enabled]**

The **Onboard LAN Boot Rom** allows you to boot your system from a LAN server. For this to be possible the LAN card installed on your system must have boot ROM. If you choose to boot your system from a server using the LAN boot ROM functionality, you do not need a boot disk installed on the system.

➔   **Disabled**   If disabled, you will not be able to boot your system

from a server.

➔   **Enabled**   (DEFAULT)   You will be able to boot your system from a server if the

LAN card installed in the system has boot ROM

➔   **Onboard LAN1/2 MacAddress contr [Enabled]**

➔   **Disabled**

➔   **Enabled**   (DEFAULT)

1.1.11   Super I/O Device

The **SuperIO Device** menu (**BIOS Menu 13**) allows you to change the super IO device configurations.
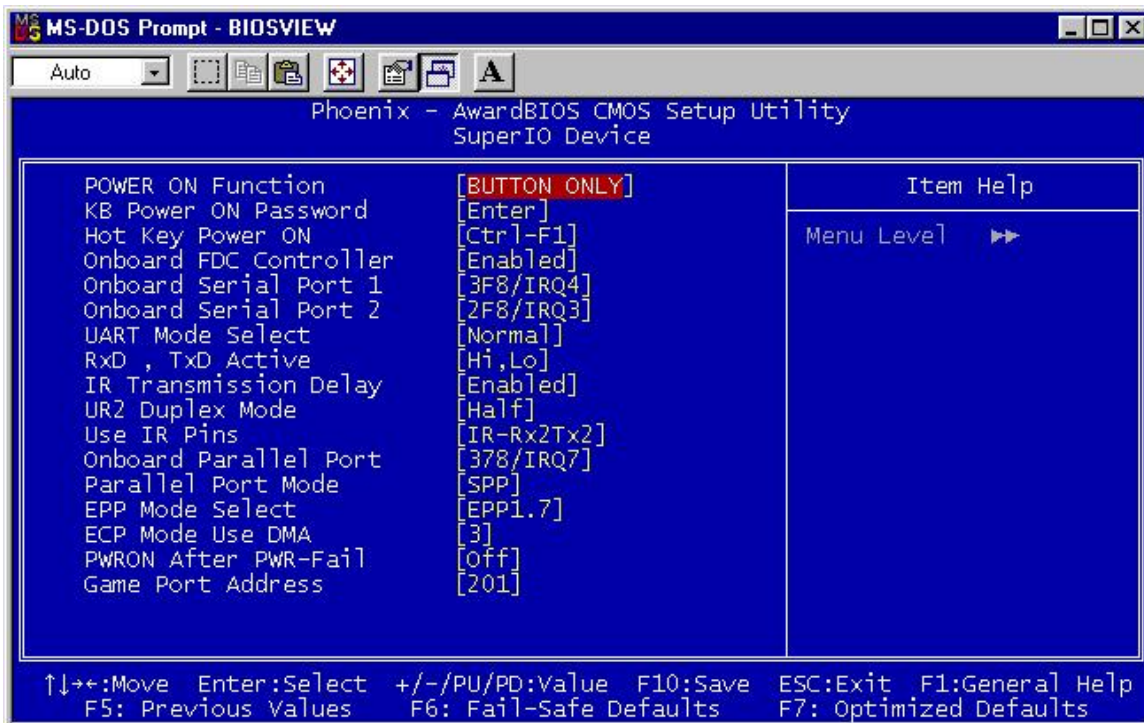
BIOS Menu 13: Super I/O Device [Integrated Peripherals]

➔ **POWER ON Function [BUTTON ONLY]**

The **POWER ON Function** option allows you to select the method you use to turn on the system.

➔ **Password**   When you turn on the computer you will be prompted for a password (see the **KB Power ON Password option below**)

➔ **Hot KEY**   You can use a pre-specified hot key to turn on your computer (see the **Hot Key Power ON** option below)

➔ **Mouse Left**   Click the left mouse button to turn the system on

➔ **Mouse Right**   Click the right mouse button to turn the system on

➔ **Any KEY**   Click any key to turn the system on

➔ **BUTTON ONLY**   (DEFAULT)   The computer can only be turned on with the power button

➔ **Keyboard 98**   If you are using Windows 98 or better and have the appropriate keyboard, you can use the keyboard's wake-up or power-on button to start up the computer.

➔ **x KB Power ON Password [Enter]**

The **KB Power ON Password** option can only be specified if you have selected the **Password** as the **POWER ON Function** option. To set the password, place the cursor on the password option and click "**ENTER**." You will be prompted to enter a password. Select you password and press "**ENTER**." You will be asked to confirm the password. Confirm it and then press "**ENTER**" and the password will be set.

➔ **x Hot Key Power ON [Ctrl-F1]**

The **Hot Key Power ON** option can only be specified if you have selected the **Hot KEY** as the **POWER ON Function** option. The following key combinations can be selected as the hot keys that will turn your computer on.

1.   Ctrl-F1
2.   Ctrl-F2

3.   Ctrl-F3

4.   Ctrl-F4

5.   Ctrl-F5

6.   Ctrl-F6

7.   Ctrl-F7

8.   Ctrl-F8

9.   Ctrl-F9

10.   Ctrl-F10

11.   Ctrl-F11

12.   Ctrl-F12

➔   **Onboard Serial Port 1 [3F8/IRQ4]**

The **Onboard Serial Port 1** option allows you to select the I/O address and IRQ for the onboard serial port. The serial port can be disabled or the I/O address and the IRQ can be automatically selected by the BIOS. The options are listed below:

1.   Disabled

2.   3F8/IRQ4 (DEFAULT)

3.   2F8/IRQ3

4.   3E8/IRQ4

5.   2E8/IRQ3

6.   Auto

➔   **Onboard Serial Port 2 [3F8/IRQ4]**

The **Onboard Serial Port 2** option allows you to select the I/O address and IRQ for the onboard serial port. The serial port can be disabled or the I/O address and the IRQ can be automatically selected by the BIOS. The options are listed below:

1.   Disabled

2.   3F8/IRQ4

3.   2F8/IRQ3 (DEFAULT)

4.   3E8/IRQ4

5.   2E8/IRQ3

6.   Auto

➔ **UART Mode Select**

The **UART Mode Select** option allows you to select the UART mode for the system.

➔ **IrDA**   IrDA is set as the IR serial mode. If this option is selected, COM2 will be disabled.

➔ **ASKIR**   ASKIR is set as the IR serial mode. If this option is selected, COM2 will be disabled.

➔ **Normal**   (DEFAULT)   COM2 is enabled and the IR device disabled

➔ **x RxD, TxD Active [Hi,Lo]**

The **RxD, TxD Active** BIOS option allows you to set the infra-red reception (RxD) and transmission (TxD) polarity. (This option can only be selected if the UART is set in IrDA mode or ASKIR mode.) The following configuration options are available,

       1.   Hi, Hi
       2.   Hi, Lo (DEFAULT)
       3.   Lo, Hi
       4.   Lo, Lo

➔ **x IR Transmission Delay [Enabled]**

    ➔ **Disabled**
    ➔ **Enabled**   (DEFAULT)

➔ **UR2 Duplex Mode [Half]**

    ➔ **Full**
    ➔ **Half**   (DEFAULT)

➔ **Use IR Pins [IR-Rx2Tx2]**

    ➔ **RxD2, TxD2**
    ➔ **IR-Rx2Tx2**   (DEFAULT)

➔ **Parallel Port Mode [SPP]**

The **Parallel Port Mode** selection allows you to select the mode the parallel port will operate in.

➔ **x EPP Mode Select**

➔ **PWRON After PWR-Fail [Off]**

This **PWRON After PWR-Fail** option allows you to select the state the system will return to if there is a power failure or power to the system is suddenly cut off.

➔ **Off**   (DEFAULT)   After the power returns the system will remain off.

➔ **On**   After the power returns, the system will turn on

➔ **Former-Sts**   After the power returns the system will return to its original state. If it was off, it will remain off. If it was on, it will turn on again.

➔   **Game Port Address [201]**

The Game Port Address configuration option allows you to specify the game port address.

➔ **Disabled**   When disabled, the onboard game port will be unable to access any system resources and will in effect be inaccessible.

➔ **201**   (DEFAULT)   The game board address is set to 201

➔ **209**   The game board address is set to 209

PnP/PCI Configurations

The **PnP/PCI Configurations** menu (**BIOS Menu 9**) allows you to set the plug and play, and PCI options.
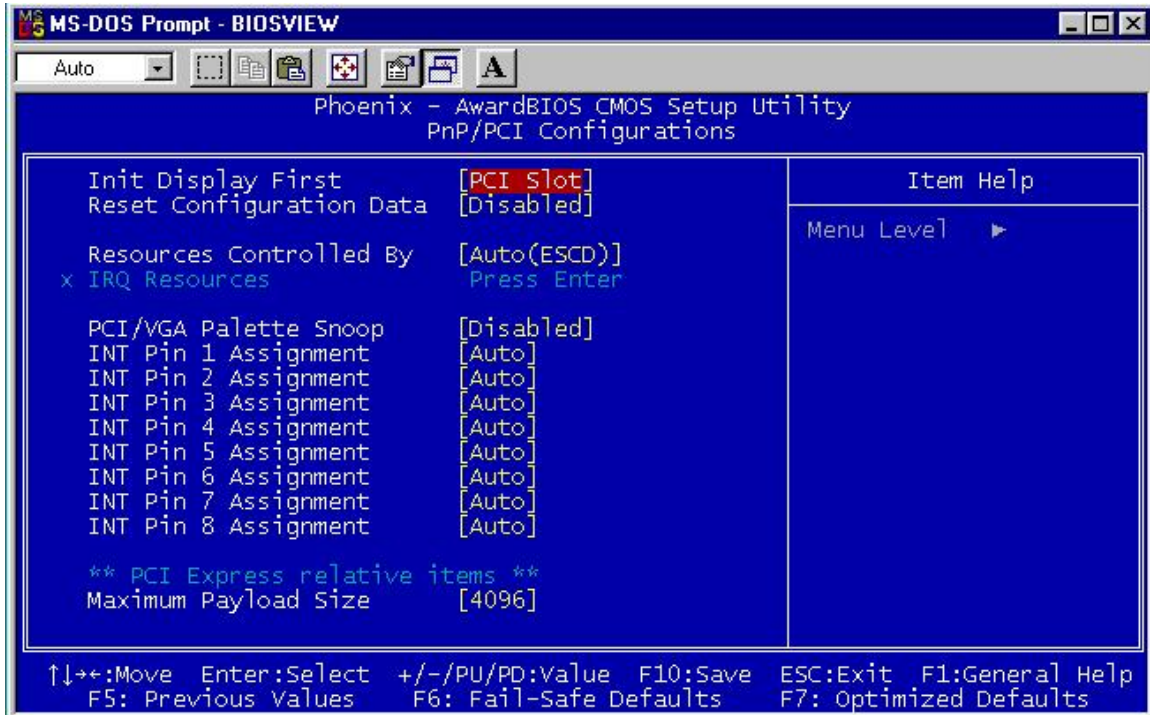
BIOS Menu 14: PnP/PCI Configurations

➔ **Init Display First [PCI Slot]**

The **Init Display First** option allows you to determine what display device to boot with.

➔ **PCI Slot** (DEFAULT) The system will boot using the PCI graphic card

➔ **Onboard** The system will boot using the preinstalled onboard graphics device

➔ **Reset Configuration Data [Disabled]**

The **Reset Configuration Data** option allows you to reset the Extended System Configuration Data (ESCD) when you exit setup if you have problems booting the system up after you have installed a new add-on.

➔   **Disabled**   (DEFAULT)   ESCD will not be reconfigured

➔   **Enabled**   ESCD will be reconfigured after you exit setup

➔   **Resources Controlled By [Auto (ESCD)]**

The **Resources Controlled By** option gives you the option of manually configuring all the boot
and plug and play devices, or allowing BIOS to configure these devices automatically. If you allow
BIOS to configure it automatically you will not be able to select the IRQs, DMA and memory base
address fields because BIOS will automatically assign them.

➔   **Auto(ESCD)**   (DEFAULT)   BIOS automatically configures plug and play devices as
                                 well as boot devices.

➔   **Manual**   You manually configure the plug and play devices and
                                 any other boot devices

➔   **x IRQ Resources [Press Enter]**

If you select manual in the **Resources Controlled By** option then you will be able to configure the
IRQ Resources. To do this, select **IRQ Resources** and press **ENTER**. A new menu will appear.
(See **BIOS Menu 15**)

BIOS Menu 15: IRQ Resources

The menu will have the following 12 BIOS configuration options:

1.   IRQ-3 assigned to
2.   IRQ-4 assigned to
3.   IRQ-5 assigned to
4.   IRQ-6 assigned to
5.   IRQ-7 assigned to
6.   IRQ-8 assigned to
7.   IRQ-9 assigned to
8.   IRQ-10 assigned to
9.   IRQ-11 assigned to
10. IRQ-12 assigned to
11. IRQ-13 assigned to
12. IRQ-14 assigned to
13. IRQ-15 assigned to

The above options all have the same default and the same options. These are listed below.

➨ **PCI Device** (DEFAULT) The IRQ is assigned to legacy ISA for devices compliant
with the original PC AT bus specification, PCI/ISA PNP for
devices compliant with the Plug and Play standard
whether designed for PCI or ISA bus architecture.
➨ **Reserved** The IRQ is reserved by BIOS

➨ **PCI/VGA Palette Snoop [Disabled]**

The **PCI/VGA Palette Snoop** option allows you determine whether or not some special VGA cards,
high-end hardware MPEG decoders and other similar devices are allowed to look at the VGA
palette on the video card so these devices can determine what colors are in use. This option is
only *very* rarely needed. It should be left at "Disabled" unless a video device specifically requires
the setting enabled upon installation.

➨ **Disabled** (DEFAULT) Does not allow the graphics devices to examine the VGA
palette on the graphics card
➨ **Enabled** Does allow the graphics devices to examine the VGA palette
on the graphics card

➨ **INT Pin # Assignment [Auto]**

The **INT Pin # Assignment** allows you to customize the IRQs for the specified devices assigned
to the **INT Pin #**. IRQs for the following **INT Pin #** can be assigned.

1. INT Pin 1 Assignment
2. INT Pin 2 Assignment
3. INT Pin 3 Assignment
4. INT Pin 4 Assignment
5. INT Pin 5 Assignment
6. INT Pin 6 Assignment
7. INT Pin 7 Assignment
8. INT Pin 8 Assignment

Each **INT Pin # Assignment** has the following configuration options:

1. Auto (DEFAULT)
2. 3
3. 4
4. 5

5.　　6

6.　　7

7.　　10

8.　　11

9.　　12

10.　14

11.　15

When any **INT Pin # Assignment** is selected in the BIOS, the devices using that INT will be shown in the right side window along with the following parameters:

1.　　Bus

2.　　Dev

3.　　Func

➔ **Maximum Payload Size [4096]**

The **Maximum Payload Size** option allows you to set the maximum transaction layout packet (TLP) payload sized for the PCI-E devices.

➔ **128**　　　　　　The maximum TLP payload size is 128 bytes

➔ **256**　　　　　　The maximum TLP payload size is 256 bytes

➔ **512**　　　　　　The maximum TLP payload size is 512 bytes

➔ **1024**　　　　　The maximum TLP payload size is 1024 bytes

➔ **2048**　　　　　The maximum TLP payload size is 2048 bytes

➔ **4096** (DEFAULT)　The maximum TLP payload size is 4096 bytes

PC Health Status

The **PC Health Status** menu (**BIOS Menu 16**) is a passive menu where you cannot alter any BIOS configurations. This menu shows system operating parameters that are essential to the stable operation of your system.
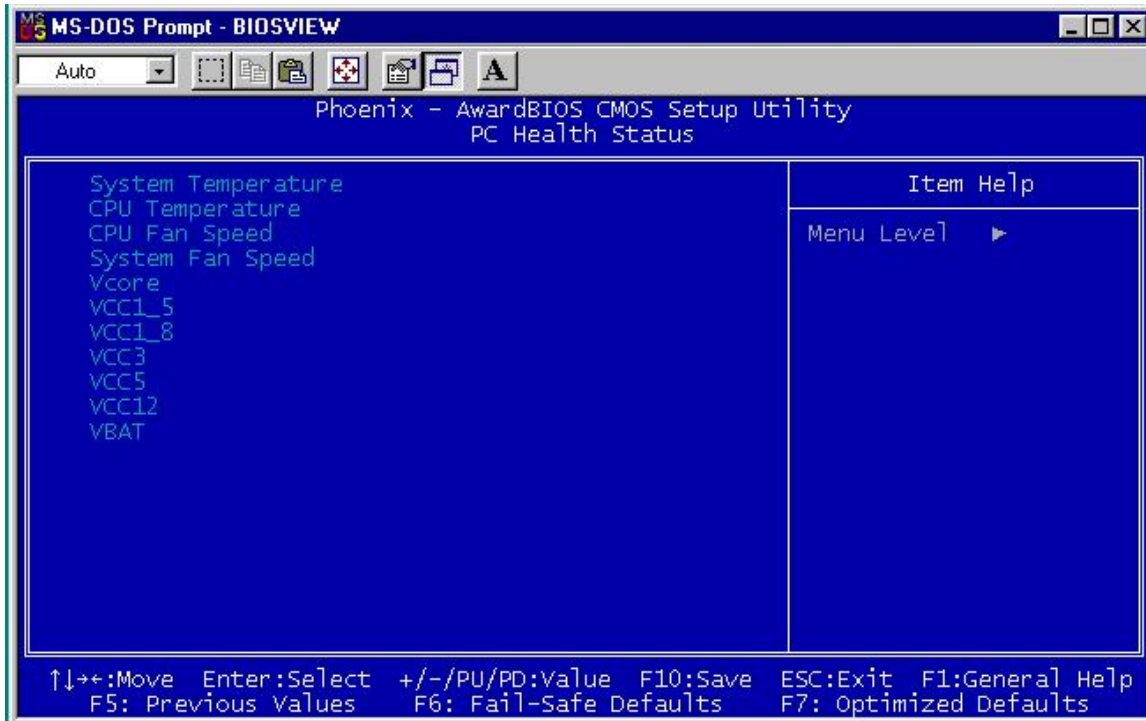
BIOS Menu 16: PC Health Status

The following system parameters are monitored by the **PC Health Status** menu (**BIOS Menu 16**).

➔ **Temperature**

The following temperatures are monitored:

1. System Temperature
2. CPU Temperature

➔ **Fan Speeds**

The following fan speeds are monitored:

1. CPU an Speed
2. System Fan Speed

➔ **Voltages**

The following voltages are monitored

    1. Vcore
    2. VCC1_5

3. VCC1_8

4. VCC3

5. VCC5

6. VCC12

7. VBAT

Frequency/Voltage

The **Frequency/Voltage** menu (**BIOS Menu 16**) can be used to set the **Spread Spectrum** parameters.

TBD

BIOS Menu 17: Frequency/Voltage

➔ **Spread Spectrum**

The **Spread Spectrum** option allows you to reduce the EMI of your board by modulating the signals it generates so that the spikes are reduced to flatter curves. It achieves this by varying the frequency slightly so that the signal does not use any particular frequency for more than a moment. The spread spectrum has the following configuration options

Default

0.80 Down

1.00 Down

1.25 Down

1.50 Down

1.75 Down

2.00 Down

2.50 Down

3.00 Down

0.30 center

0.40 center

0.50 center

0.60 center

0.80 center

1.00 center

1.25 center

Appendix

A

Watchdog Timer

NOTE:

The following discussion applies to DOS environment.   It is recommended you contact IEI support or visit our website for specific drivers for more sophisticated operating systems, e.g., Windows and Linux.

The Watchdog Timer is a device to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash.   This condition may have occurred by EMI or a software bug.   When the CPU stops working normally, hardware on the board will perform hardware reset (cold boot) to bring the system back to a known state.

Three I/O ports control the Watchdog Timer:

443	Write	Set Watchdog time period
443 (hex)	Read	Enable the refresh to the Watchdog Timer
043/843 (hex)	Read	Disable the Watchdog Timer

Table -1   I/O Ports to Watchdog Timer

Prior to enable the Watchdog Timer, users have to define the Timer first.   The output data is a value of time interval and the range of the value is from 01 (hex) to FF (hex) and the range for time interval ranges from 1 second to 255 seconds.

DATA	TIME INTERVAL
01	1 sec
02	2 sec
03	3 sec
04	4 sec
- - -	- - -
FF	255 sec

Table -2   Watchdog Timer Output Data

This will enable and activate the countdown timer which eventually time out and reset the CPU to ensure that this reset condition does not occur; the Watchdog Timer must be periodically refreshed by reading the same I/O port 043/843H and 443H.   This must be done within the time

out period that is selected by software, please refer to the example program.

A tolerance of at least 5% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/Os that can be very time consuming. Therefore, if the timeout period has been set to 10 seconds, the I/O port 443H must be read within 7 seconds.

 NOTE:

> When exiting a program it is necessary to disable the Watchdog Timer,
> otherwise the system will reset.

Example Assembly Program:

TIMER_PORT = 443H
TIMER_START = 443H
TIMER_STOP = 843H

;;INITIAL TIME PERIOD COUNTER
MOV DX, TIME_PORT
MOV AL, 8: ;;8 SECONDS
OUT DX, AL

;;ADD YOUR APPLICATION HERE
MOV DX, TIMER START
IN AL, DX.   ;;START COUNTER

ADD YOUR APPLICATION HERE
W_LOOP:
MOV DX, TIMER_START
IN AL, DX.   ;RESTART COUNTER

;ADD YOUR APPLICATION HERE
CMP EXIT_AP, 0
JNEW_LOOP
MOV DX, TIMER_STOP

IN AL, DX

;;EXIT AP

Appendix

B

Connecting ATX

Power Supply

The following notes show how to connect ATX Power Supply to the embedded board.

1. Using ATX Power Switch

Step 1. Disconnect the AC cord of the Power Supply from the AC source to prevent sudden electric surge to the board.

Step 2. Properly configure the JP1 jumper. Remove the jumper cap from JP1 and CN2.
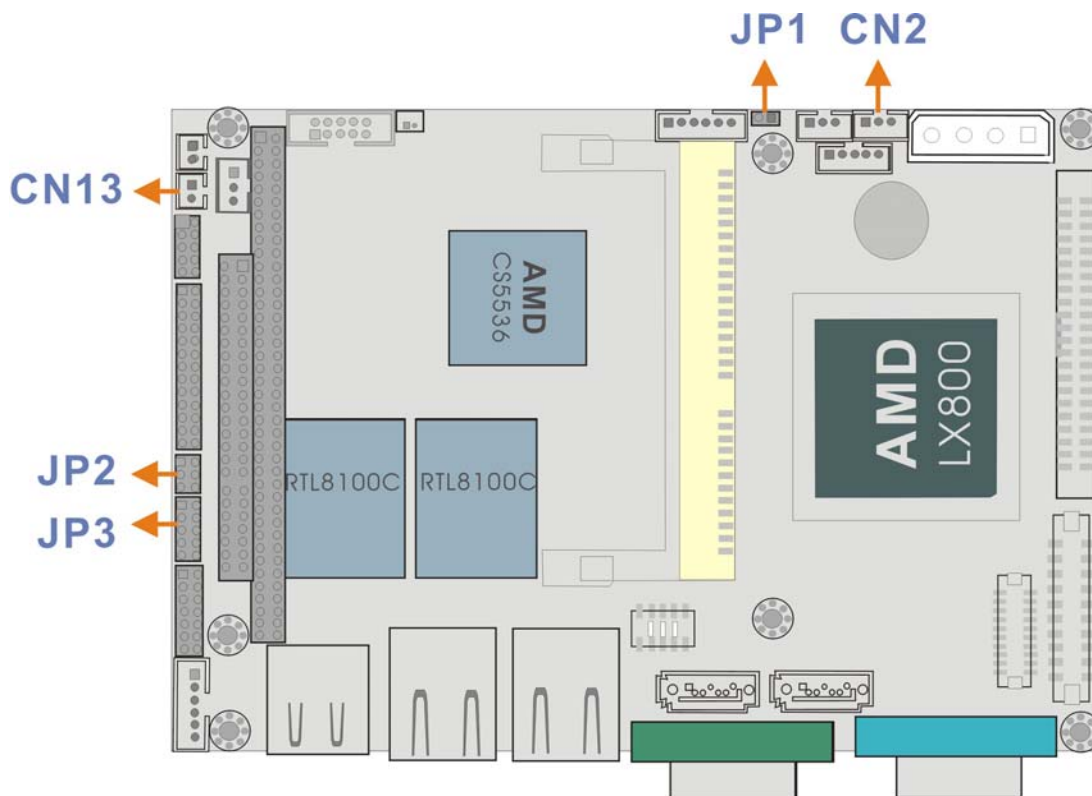
Figure B-1   ATX Power Connection

⚡ WARNING!

The new power adapter cable for the WAFER-LX has its "Ground" pin removed from the 3-pin ATX feature connector. If you connect the power feature connector cable previously provided by IEI, you will destroy the WAFER-LX board.

Step 3. Connect an ATX power button switch (see the diagram above) to the ATX

ON/OFF switch connector (power button). And connect the power cable from 20-pin ATX power supply to the CN1 4P and the CN2 SBVCC ATX feature connectors. The connection can be done using IEI's adapter (ATX-to-4P) cable.
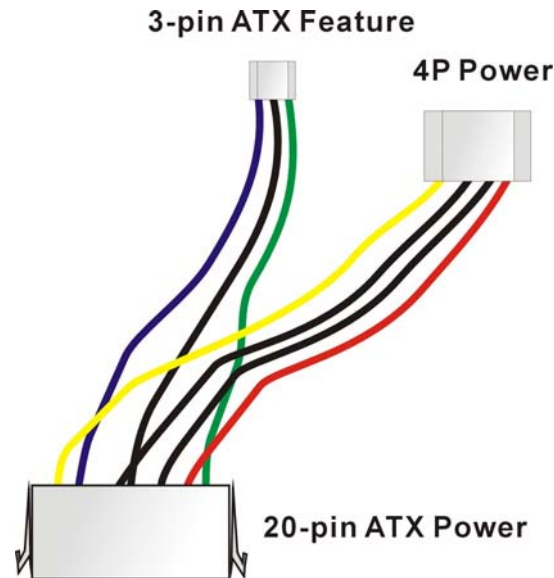
Figure -2   ATX Power Adapter Cable

Step 4.   Connect CN13 to a power button switch.

Step 5.   To turn on the system press the button once. To turn off the power supply press the ATX power switch button for about 4 seconds.

2.   Using AT Power Supply

The connection to an AT power supply is as simple as connecting a 4P power connector to CN1. Power on or off is controlled by the power switch on the AT power supply.   Let the jumper caps stay on JP1 and CN2.

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IEI® Technology, Corp.

Appendix

C

ALi® RAID for SATA

1. Introduction

The ALi M5283 is a highly integrated disk drive controller that is capable of managing Parallel-ATA and Serial-ATA interface hard disk drives.   The ALi controller supports PATA UDMA transfer mode up to mode 6 and SATA 1.0 disk drives.   The ALi M5283 also comes with cost-effective RAID functionalities that can be used to increase data read/write speed and to provide protection to data by distributing mirrored duplicates of data onto two disk drives (RAID1).

⚠ **CAUTION!**

You must properly configure the associated BIOS settings before the Ctlr+A key combination can take effect.   Please refer to *Chapter 4 Award BIOS Setup,* the discussions of the associated configurations for more details. SATA disk drive support must be initiated under the following two BIOS sub-menus.

1.   **Boot -> Onboard SATA ROM**
2.   **Chipset -> Southbridge Chipset Configuration**

You will not be able to access the ALi configuration utility unless you have properly initiated the SATA disk drive support in the Award BIOS configuration utility.

⚠ **CAUTION!**

A configured RAID volume (which may consist of multiple hard drives) appears to an operating system as a contiguous storage space.   Your operating system will not be able to distinguish the physical disk drives contained in a RAID configuration.

Precautions:

1.   One key benefit a RAID configuration brings you is that a single hard drive can fail within a RAID array without damaging your data.   With RAID1 array, you can replace a failed drive and restore your RAID configuration.

However, if you replace the wrong drive when you are trying to remove a failed one, irrecoverable data loss will occur! It is therefore strongly recommended to mark the physical connections of all of your SATA disk drives. If a drive member of a RAID array should fail, you will then be able to correctly locate a failed drive.
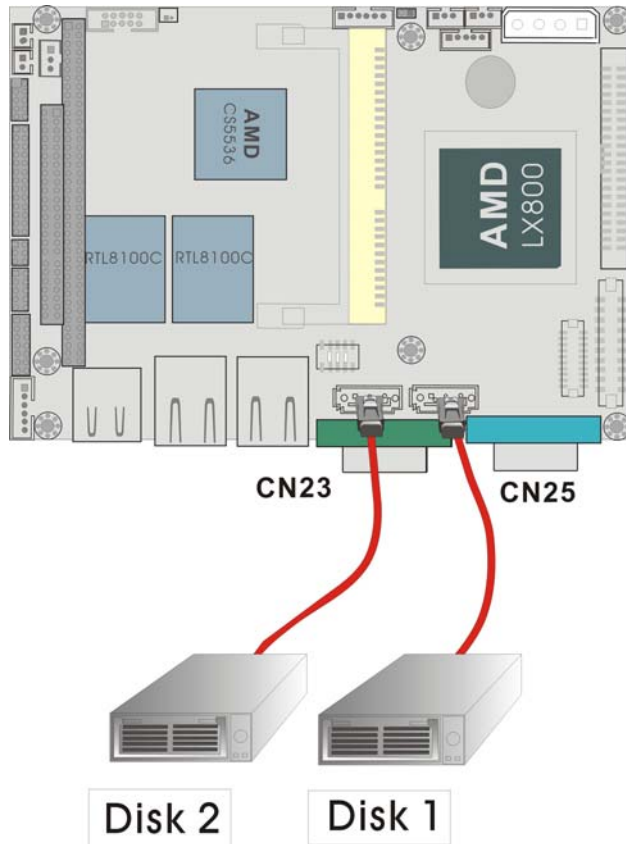
For example, you may specify the drive locations by attaching stickers to the drive bays. You need a reminder if the cabling does not match the physical locations of hard drives.

2. It is also crucial that you do not accidentally disconnect the SATA drive cables. Carefully route your cables within the chassis to avoid system down time.

2. Features and Benefits

- Supports RAID levels 0, 1, and JBOD.
- Supports the connectivity to two disk drives.
- The supported Operating Systems include: Windows 98/Me, Windows 2000, and Windows XP.
- Windows-based software for RAID management.

3. SATA-ALi RAID Driver

⚠️ **CAUTION!**

> Because of the inherent limitations by system chipset, the ALi M5283 SATA and RAID controller is implemented as a device that requires you to provide device driver during the Windows installation process.   To successfully install the device driver, please carefully read the following instructions.

The ALi driver is especially required if SATA drives are the only hard disk drives in your system. Otherwise the Windows installation program may fail to locate your hard drives whether you configure your SATA disk drives into RAID volumes or use them as individual disk drives.

The system BIOS can identify SATA disk drives, but cannot control their operation. The separately installed driver therefore is necessary.

ALi SATA Controller Driver Installation Steps

- During Windows XP Installation

Step 1. Enable SATA ROM using the BIOS configuration utility.   The SATA ROM option is provided in the ALi BIOS menu.

Step 2. Locate the ALi installation driver folder within the Utility CD that came with your motherboard.

Step 3. Copy files under a sub-directory named "SATA50XX" (taking Windows XP installation as the example) to the root directory of floppy diskette (labeled driver diskette).   The file names are listed below:

- disk1
- 5283096D.bin
- txtsetup.oem

Also copy the OS option directory "win98_me", "win_nt", or "win_xp", and related driver files in each directory.

Step 4. Boot from Windows installation CD-ROM (this requires you to set CD-ROM as the 1st Boot Device), when the Windows XP Setup blue screen appears and prompts users to Press F6 if you need to install third-party SCSI or RAID driver, please press the F6 key.

Step 5. The setup program will continue, later when the setup program prompts users to specify additional adapters, please press the S key.

Step 6. Then the setup program will prompt user to insert the driver diskette. Please insert the driver diskette your prepared previously, and then press ENTER to continue.

Step 7. The follow-up window will list out the installation choices, please select ALi SATA/RAID Controller for Windows XP and press ENTER to continue.

Step 8. The follow-up window will list out the devices to be installed, in which selected ALi controller(s) should be included.

Step 9. Repeat **step 5**, but select ALi ATA/RAID Controller at **step 7**. If both controllers are installed, go to next step.

Step 10. If users want to install other devices, please operate at this time. If all devices have been successfully installed, please go to next step.

Step 11. Press Enter to continue Windows XP setup.

Installation Steps under Existing Windows XP

After Windows XP is started, Windows system will automatically find the newly installed adapter and prompt user to install its driver. Please follow these steps to install the driver:

Step1. When the Found New Hardware Wizard windows appear (Mass Storage Controller), select Install from a list or specify location (Advanced) and click Next to continue.

Step 2. In the follow-up window, please select "Don't search, I will choose the driver to install", then click Next to continue.

Step 3. In the follow-up window, please select SCSI and RAID controllers, and then click Next

to continue.

Step 4.   In the follow-up window, click Have Disk..., then insert the driver diskette and type in the driver location: e.g., a CD-ROM, then click OK to continue.

Step 5.   In the follow-up window, select ALi SATA/RAID Controller, then click Next to continue.

Step 6.   Confirm the follow-up windows and click the Finish button to continue.

Step 7.   Please "confirm" the Digital Signature Not Found window when it appears, when finished, please restart the computer.

Step 8.   Repeat step 1, but select ALi ATA/RAID Controller at step 4.

4. Accessing the ALi RAID Utility

If the SATA ROM configuration options in system BIOS have been properly configured, the RAID BIOS version and disk drive information should appear after system POST screen.

The BIOS disk drive information should look like the following:

ALi RAID BIOS V1.XX
(c) ALi Corporation 2005, All Rights Reserved.
Identifying IDE drives…

Channel 1 Master: Maxtor xxxxxx
Channel 2 Master: Maxtor xxxxxx

Press Ctrl-A to enter ALi RAID BIOS setup utility

To enter the RAID configuration utility, press 'Ctrl' and 'A' keys simultaneously.

1.   **RAID BIOS Setup Menu:**

The Serial ATA RAID volume may be configured using the RAID Configuration utility stored within the ALi RAID controller ROM. The BIOS configuration screen is divided into three major functional areas: Main Functional Menu, Drive Selection Menu, and a list for the configured RAID arrays.
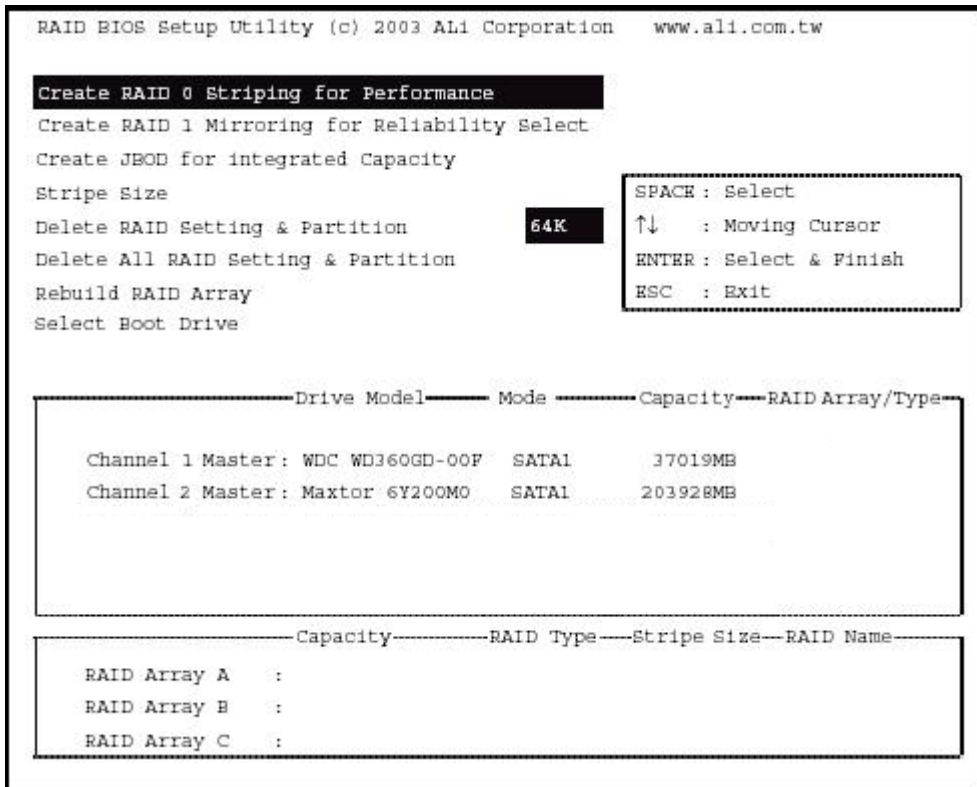
2.   **RAID Options:**

2.1   **Create RAID0 Striping for Performance**

   Step 1.   To create a RAID0 array, use your arrow keys to highlight and press Enter to activate this item.   An 'S' flashing character will appear at the Drive Selection Menu where you can choose the member drives to be included in the RAID0 array.

   Step 2.   Use the Space key to select members of the RAID0 RAID configuration. The flashing cursor should change to a lower case 's' character once any of the connected disk drives has been selected.   Follow the same method to select another member drive.

Step 3. You should then be prompted by a "Create RAID0(Y/N)" confirm box.

Step 4. Press Y and then some necessary information will be written to the selected disk drives.

⚠ **WARNING!**

All data previously stored on the member drives of a RAID configuration will be destroyed during the RAID initialization process. If you use "used" drives to create a RAID array, make you have moved or backed up your data before creating a RAID array out of these disk drives.

Step 5. Next you will be prompted to enter a nickname for the created array. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for naming an array.

Step 6. Once an array is successfully created, it will be listed in the list of the configured arrays.

NOTE:

1. To reduce the chance of losing data, ALi imposed certain limitations on the RAID configuration options.   For example, Parallel-ATA drives connected on the same IDE channel cannot be selected as the members of a RAID0 array.   Mixing Parallel- and Serial-ATA disk drives in a RAID0 array should also be avoided.

2. Always use disk drives of the same capacity to create a RAID array.   The excessive capacity of a larger disk drive cannot be utilized because data stripes are equally distributed across all members of a RAID array.   The operational concept is diagrammed below.
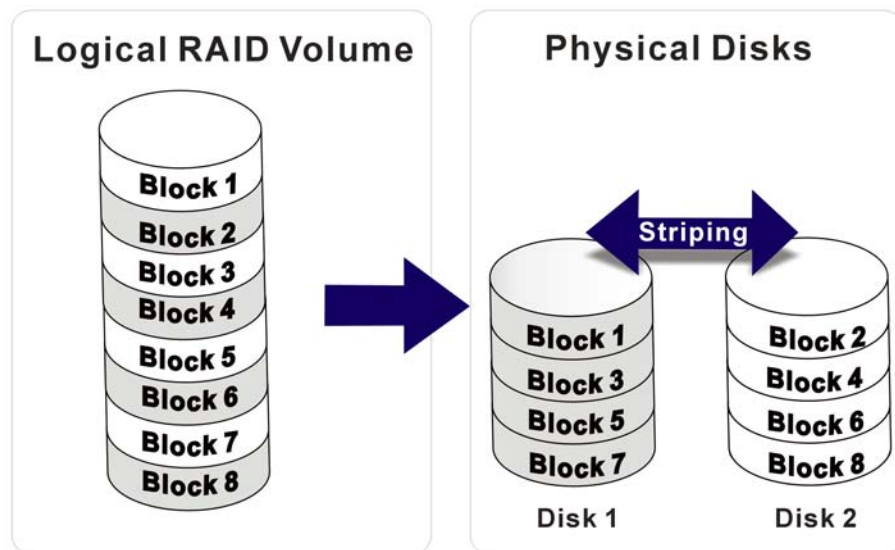
2.2 Create RAID1 Mirroring for Reliability

Step 1. To create a RAID1 array, use your arrow keys to highlight and press Enter to activate this item. An 'M' flashing character will appear at the Drive Selection Menu where you can choose the member drives to be included in the RAID1 array.

Step 2. Use the Space key to select members of the RAID1 RAID configuration. The flashing cursor should change to a lower case 'm' character once any of the connected disk drives has been selected. Follow the same method to select another member drive.

Step 3. You should then be prompted by a "Create RAID1(Y/N)" confirm box.

Step 4. Press Y and then some necessary information will be written to the selected disk drives.

WARNING!

All data previously stored on the member drives of a RAID configuration will be destroyed during the RAID initialization process. If you use "used" drives to create a RAID array, make you have moved or backed up your data before creating a RAID array out of these disk drives.

Step 5. Next you will be prompted to provide a nickname for the created array. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for naming an array.

Step 6. Once an array is successfully created, it will be listed in the list of the configured arrays.

Step 7. Lastly a prompt will require you to proceed with drive copy. The Source and Destination drives will be indicated as "M" and "m" in the Drive Selection Menu.

⚠ **NOTE:**

1. To reduce the chance of losing data, ALi imposed limitations on the RAID configuration options. For example, Parallel-ATA drives connected on the same IDE channel cannot be selected as the members of a RAID1 array. Mixing Parallel- and Serial-ATA disk drives in a RAID1 array should also be avoided.

2. Always use disk drives of the same capacity to create a RAID array. The excessive capacity of a larger disk drive cannot be utilized because data mirrors are equally distributed across corresponding members of drive pairs within a RAID array. The operational concept is diagrammed below.
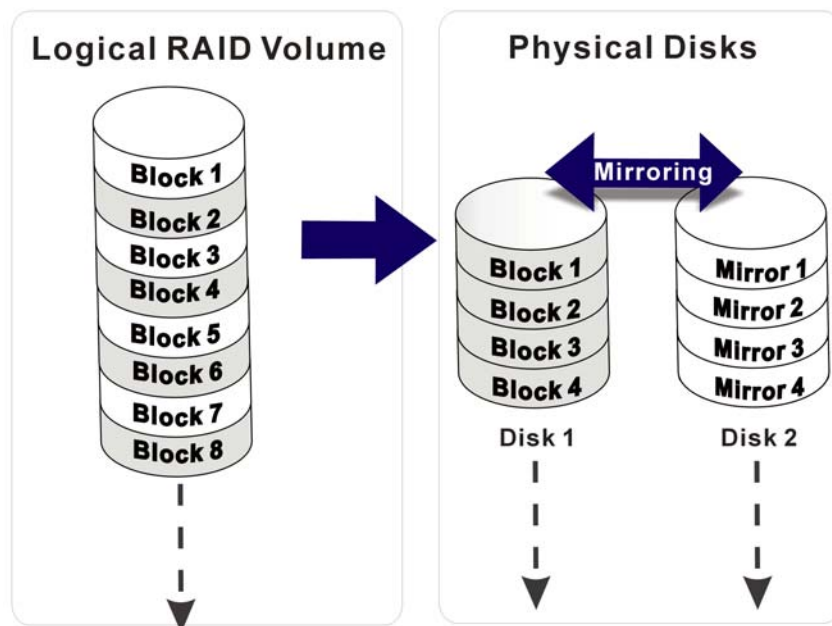
2.3 Create JBOD for Integrated Capacity

Step 1. JBOD stands for "Just a Bunch of Drives." JBOD provides neither performance gains nor data redundancy. To create a JBOD array, use your arrow keys to highlight and press Enter to activate this item. A 'J'

flashing character will appear at the Drive Selection Menu where you can choose the member drives to be included in the JBOD.

Step 2. Use the Space key to select members of the JBOD configuration. The flashing cursor should change to a lower case 'j' character once any of the connected disk drives has been selected. Follow the same method to select another member drive. The maximum number of member drives in a JBOD is four and the minimum is two.

Step 3. You should then be prompted by a "Create RAID1(Y/N)" confirm box.

Step 4. Press Y and then some necessary information will be written to the selected disk drives.

WARNING!

All data previously stored on the member drives of a RAID configuration will be destroyed during the RAID initialization process. If you use "used" drives to create a RAID array, make you have moved or backed up your data before creating a RAID array out of these disk drives.

Step 5. Next you will be prompted to provide a nickname for the created array. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for naming an array.

Step 6. Once an array is successfully created, it will be listed in the list of the configured arrays.

⚠️ **NOTE:**

> To reduce the chance of losing data, ALi imposed limitations on the RAID configuration options. For example, Parallel-ATA drives connected on the same IDE channel cannot be selected as the members of a RAID1 array. Mixing Parallel- and Serial-ATA disk drives in a RAID1 array should also be avoided.

2.4 Stripe Size

The change to stripe size takes effect on RAID0 arrays. Configurable options are: 64K (default), 32K, 16K, 8K, and 4K. If you can be certain that your I/Os to the hard drives are small and randomly occurred, you can select a small stripe size. If your I/Os are mostly large and come in sequential orders, e.g., A/V playback and editing applications, choose a larger stripe size.

The default value, 64K, should be appropriate for most applications.

2.5 Delete RAID Setting & Partition

Step 1. To delete an existing RAID configuration, use your arrow keys to highlight and press Enter to activate this item. An 'E' flashing character will appear at the Drive Selection Menu where you can choose the member drives to be removed from an existing configuration.

Step 2. You should then be prompted by "Data on RAID drives will be erased (Y/N)?".

Step 3. Press Y and then the RAID configuration will be invalidated.

WARNING!

If you delete a RAID configuration, all data previously stored on the member drives of the RAID configuration will be destroyed.

2.6   Delete All RAID Setting & Partition

Step 1.   To delete all existing RAID configurations, use your arrow keys to highlight and press Enter to activate this item.

Step 2.   You should then be prompted by "Data on RAID drives will be erased (Y/N)?".

Step 3.   Press Y and then all existing RAID configurations will be invalidated.

WARNING!

If you delete a RAID configuration, all data previously stored on the member drives of the RAID configuration will be destroyed.

2.7   Rebuild RAID Array

This function allows you to rebuild a RAID array if a member of a RAID configuration should fail.   Neither RAID0 nor JBOD provides data redundancy.   Therefore, this option only applies to RAID1 arrays.   This item takes effect when a member of a RAID1 configuration has failed.

Step 1.   To delete all existing RAID configurations, use your arrow keys to highlight and press Enter to activate this item.

Step 2.   An "R" flashing character should appear at the list of existing arrays.

Step 3.   The source and destination drives will be displayed.

Step 4.   Press Y to begin the rebuild process.

Step 5.   During the rebuild process, the rebuild progress will be indicated by a status bar.   Rebuild consumes considerable system resources and the time required for rebuilding a RAID array may vary depending on the size of stored data, disk drive capacity, and drive performance.

2.8   Select Boot Drive

Step 1.   To select a Boot drive, use your arrow keys to highlight and press Enter to activate this item.

Step 2.   An "A" flashing character should appear at the Drive Selection Menu.

Step 3.   Press Enter or the Space key to finish the configuration.

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