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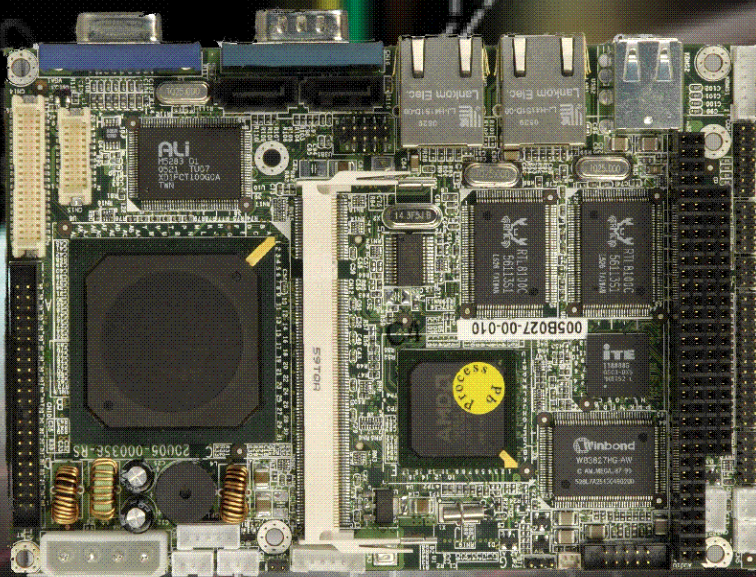**IEI Technology Corp.**

WAFER-LX

3.5"Low Power AMD Geode-LX 800 Platform

CRT, LCD/LVDS, Dual LAN and SATA

User Manual

Rev.1.1 December, 2006

REVISION HISTORY

Title	WAFER-LX AMD Geode LX 800	
Revision Number	**Description**	**Date of Issue**
1.0	Initial release	September 2006
1.1	Modified Section 2.4	December 2006

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Glossary

AC '97	Audio Codec 97	HDD	Hard Disk Drive
ACPI	Advanced Configuration and Power Interface	IDE	Integrated Data Electronics
		I/O	Input/Output
APM	Advanced Power Management	ICH4	I/O Controller Hub 4
ARMD	ATAPI Removable Media Device	L1 Cache	Level 1 Cache
ASKIR	Shift Keyed Infrared	L2 Cache	Level 2 Cache
ATA	Advanced Technology Attachments	LCD	Liquid Crystal Display
		LPT	Parallel Port Connector
BIOS	Basic Input/Output System	LVDS	Low Voltage Differential Signaling
CFII	Compact Flash Type 2	MAC	Media Access Controller
CMOS	Complementary Metal Oxide Semiconductor	OS	Operating System
		PCI	Peripheral Connect Interface
CPU	Central Processing Unit	PIO	Programmed Input Output
Codec	Compressor/Decompressor	PnP	Plug and Play
COM	Serial Port	POST	Power On Self Test
DAC	Digital to Analog Converter	RAM	Random Access Memory
DDR	Double Data Rate	SATA	Serial ATA
DIMM	Dual Inline Memory Module	S.M.A.R.T	Self Monitoring Analysis and Reporting Technology
DIO	Digital Input/Output		
DMA	Direct Memory Access	SPD	Serial Presence Detect
EIDE	Enhanced IDE	S/PDI	Sony/Philips Digital Interface
EIST	Enhanced Intel SpeedStep Technology	SDRAM	Synchronous Dynamic Random Access Memory
FDD	Floppy Disk Drive	SIR	Serial Infrared
FDC	Floppy Disk Connector	UART	Universal Asynchronous Receiver-transmitter
FFIO	Flexible File Input/Output		
FIFO	First In/First Out	USB	Universal Serial Bus
FSB	Front Side Bus	VGA	Video Graphics Adapter
IrDA	Infrared Data Association		

Chapter

1

Introduction

1.1 WAFER-LX Overview

The 3.5" WAFER-LX AMD LX-800 low power single board computer (SBC) is fully equipped with advanced multi-mode I/Os. The WAFER-LX is designed for system manufacturers, integrators, and VARs that want performance, reliability, and quality at a reasonable price.

1.1.1 WAFER-LX Models

The WAFER-LX series has five models:

- WAFER-LX-800-R10
- WAFER-LX-WINXPE
- WAFER-LX-CENET050
- WAFER-LX-CLIENT-XPE
- WAFER-LX-CLIENT-CENET050

The specifications for the four models are show in **Table 1-1**.

WAFER-LX-	800-R10	WINXPE	CENET050	CLIENT-XPE	CLIENT-CENET050
AMD LX-800 CPU	YES	YES	YES	YES	YES
SO-DIMM Memory*	NO	YES	YES	YES	YES
CRT	YES	YES	YES	YES	YES
LCD/LVDS	YES	YES	YES	YES	YES
Dual LAN	YES	YES	YES	YES	YES
SATA	YES	YES	YES	YES	YES
Audio	YES	YES	YES	YES	YES
IFM	NO	512MB	32MB	512MB	64MB
WinXPE Image	NO	YES	NO	YES	NO
WinCE Image	NO	NO	YES	NO	YES
Thin Client Package	NO	NO	NO	YES	YES

Table 1-1: WAFER-LX Model Specifications

* The preinstalled memory is a 256MB DDR SO-DIMM memory module.

1.1.2 WAFER-LX Applications

The WAFER-LX is designed for applications in the following areas:

- Kiosks and Point of Sales
- Restaurants
- Human Machine Interface (HMI) applications
- Marine, GPS and transportation applications
- Financial, retail and kiosk applications

1.1.3 WAFER-LX Benefits

Some of the WAFER-LX benefits include:

- Reduced hardware costs
- Reduced software costs
- Reduced maintenance costs
- Client crash prevention
- Central resource control
- Security protection

1.1.4 WAFER-LX Features

Some of the WAFER-LX features are listed below:

- 3.5" form factor
- RoHS compliant
- AMD LX-800 processor installed
- Dual-independent display functionality
- Low power consumption (6 Watts)
- Two high performance 10/100 megabit Ethernet controllers on-board
- Two SATA channels with transfer rates up to 150MB/s on-board
- Four USB 2.0 devices on-board
- Integrated audio

1.2 WAFER-LX Overview
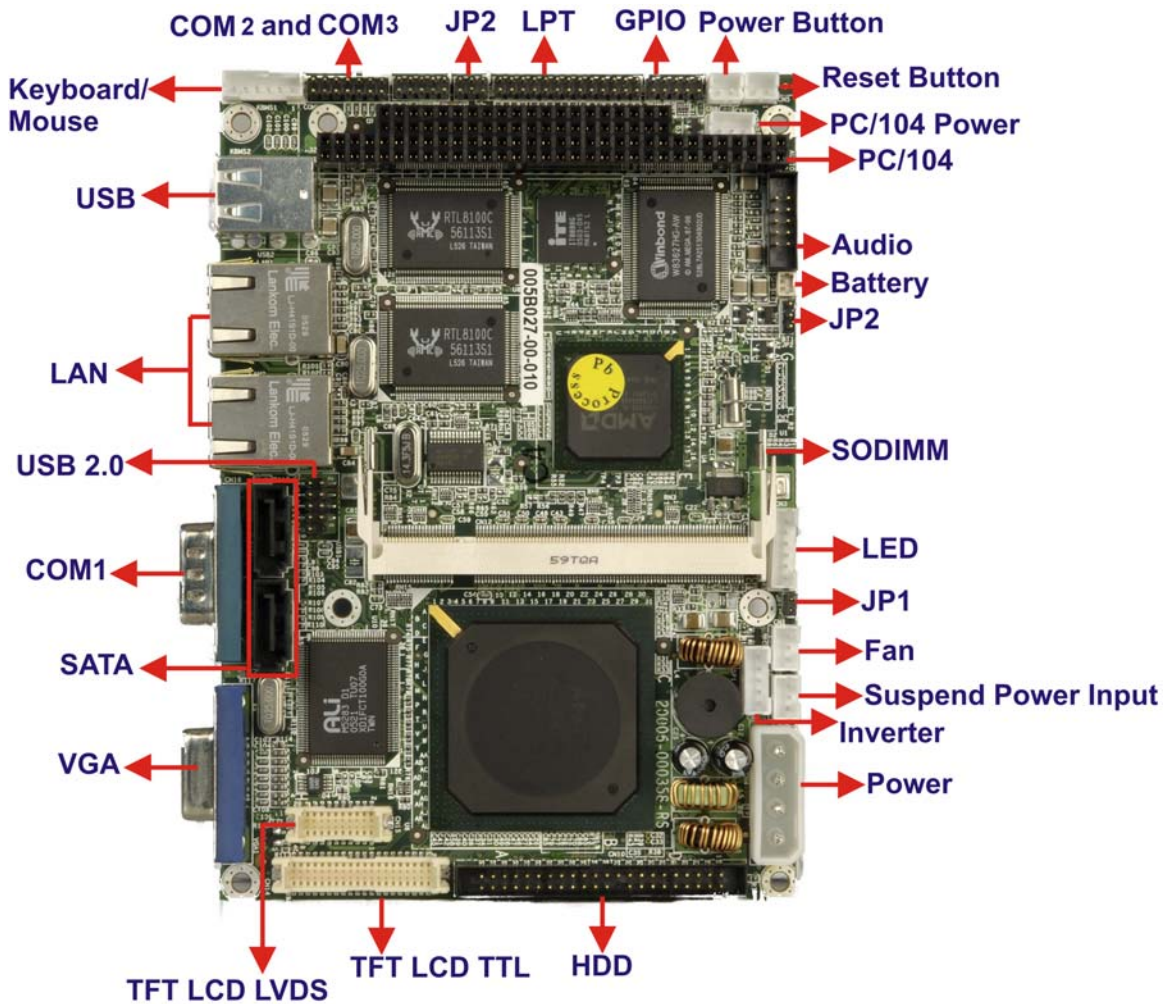
Figure 1-1: WAFER-LX Overview

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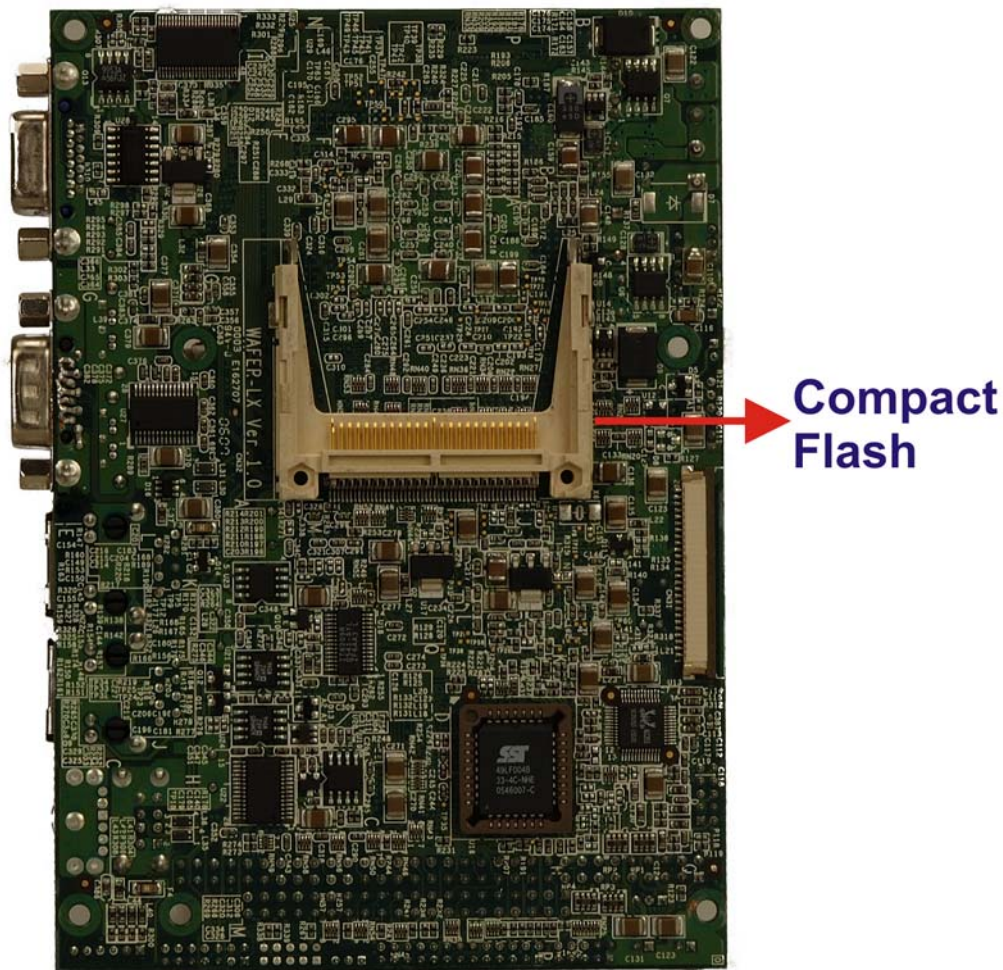
Figure 1-2: WAFER-LX Solder Side Overview

1.2.1 WAFER-LX Connectors

The WAFER-LX has the following connectors on-board:

- 1 x AT power connector
- 1 x ATX power function connector
- 1 x Audio connector
- 1 x Battery connector
- 1 x Compact Flash (CF) connector (solder side)
- 1 x External LED connector
- 1 x Fan connector
- 1 x Floppy disk drive (FDD) connector

- 1 x General purpose input/output (GPIO) connector
- 1 x IDE Interface connectors (44-pin)
- 1 x Inverter power connector
- 1 x Keyboard/mouse connector
- 1 x Parallel port connector
- 1 x PC/104 slot
- 1 x PC/104 power connector
- 1 x Reset button connector
- 1 x RS-232/422/485 serial port connector
- 2 x SATA connectors
- 1 x Suspend power input connector
- 1 x TFT LCD LVDS interface connector
- 1 x TFT LCD TFT interface connector
- 1 x USB connector
- 1 x SO-DIMM socket

The WAFER-LX has the following connectors on the board rear panel:

- 2 x Ethernet connectors
- 1 x Dual USB connector
- 1 x Serial port connector
- 1 x VGA connector

The WAFER-LX has the following on-board jumpers:

- AT power select jumper
- COM3 function select jumper

1.2.2 Technical Specifications

WAFER-LX technical specifications are listed in **Table 1-2**. Detailed descriptions of each specification can be found in **Chapter 2 Detailed Specifications**.

Specification	WAFER-LX
Form Factor	3.5" form factor
CPU	AMD® Geode™ LX 800 500Mhz
Southbridge Chipset	AMD® Geode™ CS5536
Display	CRT integrated in AMD® Geode™ LX800
TTL/LVDS	18-bit single channel TFT LCD
Memory	Supports one 1GB DDR 333/400 200-pin SO-DIMM SDRAM module
BIOS	Award BIOS
SSD	Compact Flash (CF)
Super I/O	W83627EHG
Audio	AC'97 Codec Realtek ALC203
LAN	10/100 Base-T dual RTL8100C
COM	Two RS-232 One RS-422/485
USB2.0	Four USB 1.1 or USB 2.0 devices supported
IDE	One 44-pin IDE connects to two Ultra ATA33/66/100 devices
Floppy	One floppy disk drive connector
Parallel Port	One LPT port connector
SATA	Two SATA connectors with transfer rates up to 150Mb/sec

KB/MS	One on-board keyboard/mouse connector
Watchdog Timer	Software programmable 1-255 sec. by supper I/O
Digital I/O	One GPIO connector
Fan connector	One CPU fan connector
Expansion	One PC/104 slot
Power Supply	+5V ± 5% AT/ATX power support
Temperature	0ºC - 60ºC
Humidity (operating)	5%~95% non-condensing
Dimensions	145mm x 102mm
Weight (GW/NW)	670g/230g

Table 1-2: Technical Specifications

1.3 Operating System Packages

1.3.1 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

1.3.2 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.

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Chapter

2

Detailed Specifications

2.1 Overview

This chapter describes the specifications and on-board features of the WAFER-LX in detail.

2.2 Dimensions

2.2.1 Board Dimensions

The dimensions of the board are listed below:

- **Length**:   146.06mm
- **Width**:   102mm
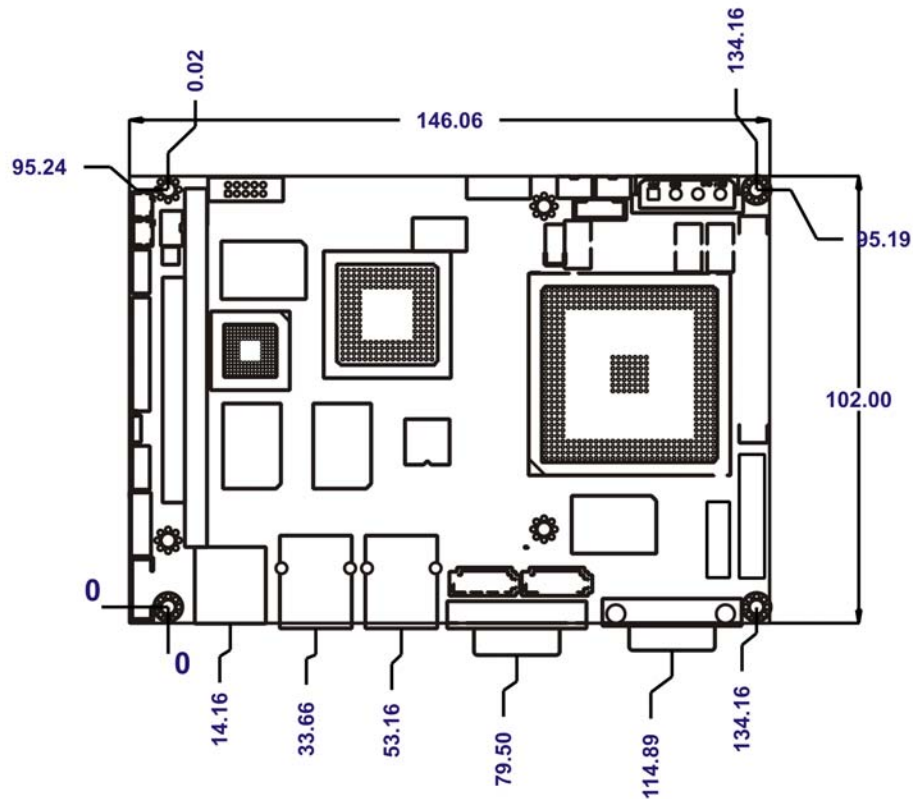
Figure 2-1: WAFER-LX Dimensions (mm)

2.2.2 External Interface Panel Dimensions

External interface panel dimensions are shown in Figure 2-2.
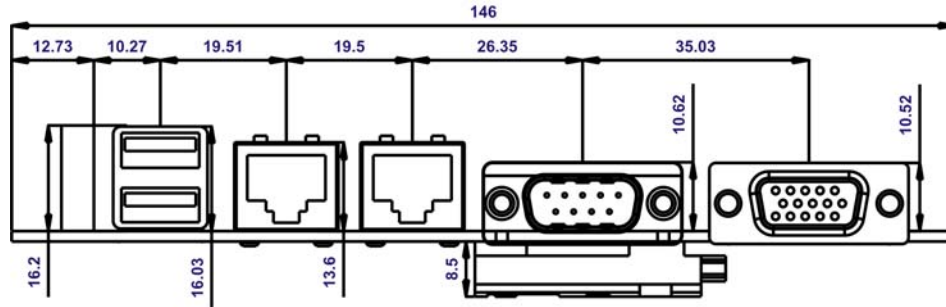
Figure 2-2: External Interface Panel Dimensions (mm)

2.3 CPU Support

The WAFER-LX series motherboards all come with a preinstalled AMD® Geode™ LX 800 500MHz CPU.

2.3.1 AMD® Geode™ LX 800 500MHz Specifications

The specifications for the 500MHz AMD® Geode™ LX 800 are listed below

- x86/x87-compatible core
- Processor frequency up to 500 MHZ
- 64K I/64K D L1 cache and 128K L2 cache
- Split I/D cache/TLB (Translation Look-Aside Buffer)
- 64-bit DDR Memory interface up to 400MHz (LX 800), up to 333MHz (LX 700)
- Integrated FPU that supports the Intel MMX® and AMD 3DNow!™ Technology instruction sets
- 9 GB/s internal GeodeLink™ Interface Unit (GLIU)
- Security Block
  - o 128-bit AES (CBC/ECB)
  - o True Random Number Generator
- High-resolution CRT and TFT outputs (simultaneous operation)
  - o Support for High Definition (HD) and Standard Definition (SD) standards
  - o Support 1920x1440 in CRT mode and 1600x1200 in TFT mode

- VESA 1.1 and 2.0 VIP/VDA support
- 0.13 micron process
- 481-terminal PBGA (Plastic Ball Grid Array) with internal heatspreader

2.3.2 AMD® Geode™ LX 800 500MHz Power Management

The power management for the 500MHz AMD® Geode™ LX 800 is listed below:

- 1.8W Typical (3.9W TDP) @ 500MHz
- GeodeLink active hardware power management
- Hardware support for standard ACPI software power management
- I/O companion SUSP#/SUSPA# power controls
- Lower power I/O
- Wakeup on SMI/INTR

2.4 System Chipset

The WAFER-LX series motherboards all have a preinstalled AMD® Geode™ CS5536 system chipset. The system chipset features are listed below.

- **GeodeLink™ Interface Unit**
  - 64-bit, 66MHz operation
  - PCI VSM (Virtual System Module) that makes the interface transparent to applications software and BIOS
  - Programmable routing descriptors, use and activity monitors, and SSMI (Synchronous System Management Interrupt)
- **ATA-6 Controller**
  - 100 MB/second IDE Controller in UDMA mode per the ATA-6 specification
  - 5V interface
- **Flash Interface**
  - Multiplexed with IDE interface Connects to an array of industry standard NAND Flash and/or NOR Flash
- **USB Controller**
  - 4 USB ports
  - Supports both USB 1.1 and USB 2.0

- **Audio Codec 97 (AC97) Controller**
  - ○ AC97 specification v2.3 compliant interface to multiple audio codecs:
    Serial In, Serial Out, Sync Out, Bit Clock In
  - ○ Legacy "PC Beep" support
- **Diverse Device**
  - ○ 82xx Legacy Devices
  - ○ IR Communication Port
  - ○ System Management Bus (SMB) Controller
  - ○ LPC (Low Pin Count) Port
  - ○ General Purpose I/Os (GPIOs)
  - ○ 8 Multi-Function General Purpose Timers (MFGPTs)
  - ○ Real-Time Clock (RTC) with CMOS RAM
  - ○ Power Management Controller
  - ○ ACPI v2.0 compliant

2.5 Data Flow

Figure 2-3 shows the data flow between the two on-board chipsets and other components installed on the motherboard and described in the following sections of this chapter.
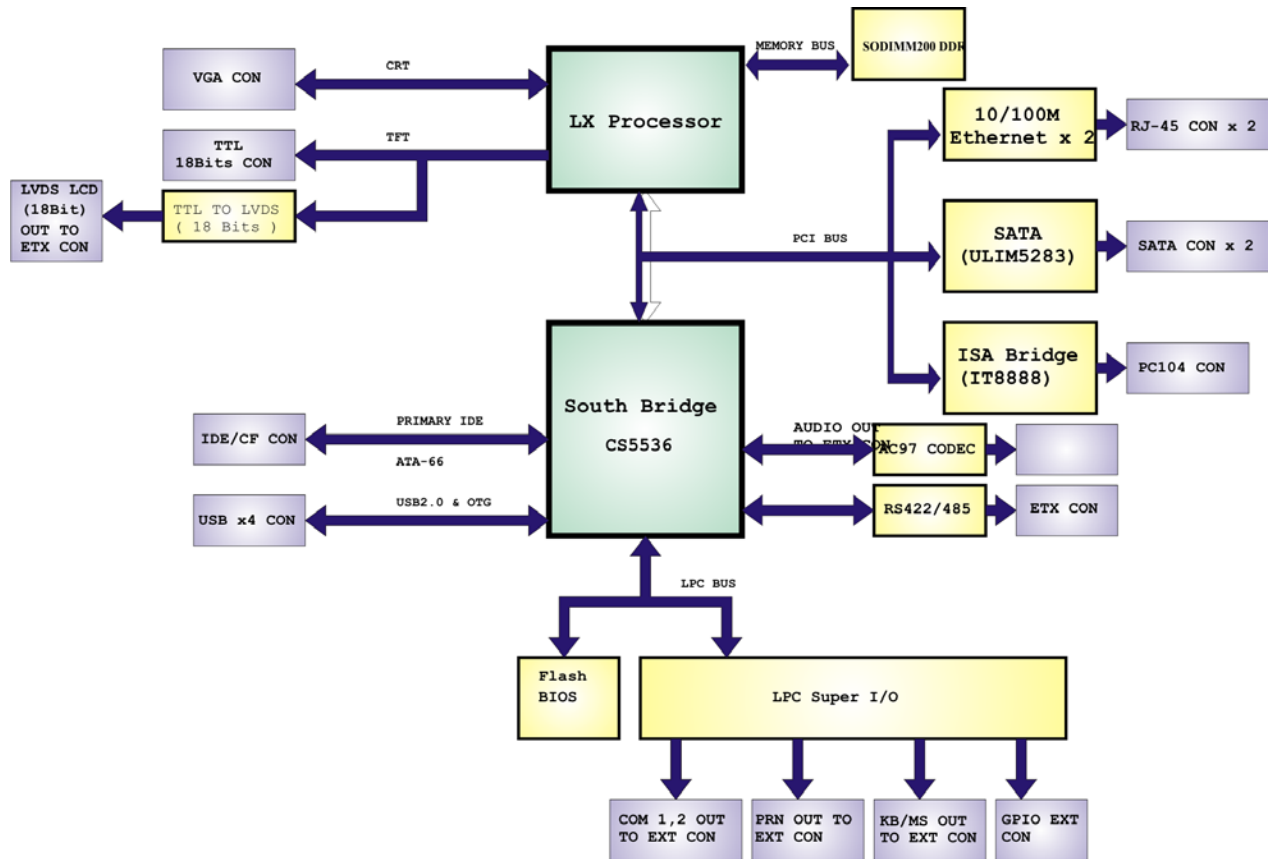
Figure 2-3: Data Flow Block Diagram

2.6 Graphics Support

The Geode LX processor's Graphics Processor is a BitBLT/vector engine that supports pattern generation, source expansion, pattern/source transparency, 256 ternary raster operations, alpha blenders to support alpha- BLTs, incorporated BLT FIFOs, a GeodeLink interface and the ability to throttle BLTs according to video timing. New features added to the Graphics Processor include:

- Command buffer interface
- Hardware accelerated rotation BLTs
- Color depth conversion
- Paletized color
- Full 8x8 color pattern buffer
- Separate base addresses for all channels
- Monochrome inversion

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Table 2-1: Geode LX Graphics Features lists a complete list of Geode LX graphics features. For more details, please refer to the AMD website or the Geode LX series data book available from AMD.

Feature	AMD Geode™ LX Processor
Color Depth	8, 16, 32 bpp (A) RGB 4 and 8-bit indexed
ROPs	256 (2-src, dest and pattern)
BLT Buffers	FIFOs in Graphics Processor
BLT Splitting	Managed by hardware
Video Synchronized BLT/Vector	Throttle by VBLANK
Bresenham Lines	Yes
Patterned (stippled) Lines	Yes
Screen to Screen BLT	Yes
Screen to Screen BLT with mono expansion	Yes
Memory to Screen BLT	Yes (throttled rep movs writes)
Accelerated Text	No
Pattern Size (Mono)	8x8 pixels
Pattern Size (Color)	8x8 pixels
Monochrome Pattern	Yes (with inversion)
Dithered Pattern (4 color)	No
Color Pattern	8, 16, 32 bpp
Transparent Pattern	Monochrome
Solid Fill	Yes
Pattern Fill	Yes
Transparent Source	Monochrome
Color Key Source Transparency	Y with mask
Variable Source Stride	Yes
Variable Destination Stride	Yes
Destination Write Bursting	Yes
Selectable BLT Direction	Vertical and Horizontal
Alpha BLT	Yes (constant α, α/pix, or sep. α channel)
VGA Support	Decodes VGA Register
Pipeline Depth	Unlimited
Accelerated Rotation BLT	8, 16, 32 bpp

Color Depth Conversion	5:6:5, 1:5:5:5, 4:4:4:4, 8:8:8:8

Table 2-1: Geode LX Graphics Features

2.7 Memory Support

The WAFER-LX has one 200-pin DDR SO-DIMM SDRAM socket that supports one 333 MHz or 400MHz DDR SO-DIMM memory module with a maximum capacity of 1GB.

2.8 PCI Bus Interface Support

The PCI bridge on the WAFER-LX has the following features:

- 33MHz Revision 2.2 is implemented
- Maximum throughput: 133MB/sec
- PCI and GLIU interface control
- Read and write FIFOs
- PCI

2.9 Ethernet Controller Specifications

2.9.1 Overview

The Realtek RTL8100C(L) is a highly integrated and cost-effective single-chip Fast Ethernet controller. It is enhanced with an ACPI (Advanced Configuration Power Interface) management function for PCI in order to provide efficient power management for advanced operating systems with OSPM (Operating System Directed Power Management).

The RTL8100C(L) also supports remote wake-up (including AMD Magic Packet™ and Microsoft® Wake-up frame) to increase cost-efficiency in network maintenance and management. It is an ideal solution for notebook/motherboard-embedded network designs.

2.9.2   Features

- Integrates Fast Ethernet MAC, physical chip, and transceiver onto a single chip

- 10Mbps and 100Mbps operation
- Supports 10Mbps and 100Mbps N-way auto-negotiation
- Supports 25MHz Crystal or 25MHz OSC as the internal clock source
- Complies with PC99/PC2001 standards
- Supports ACPI power management
- Provides PCI bus master data transfer
- Provides PCI memory space or I/O space mapped data transfer
- Supports PCI clock speed of 16.75MHz-40MHz
- Advanced power saving mode
- Supports Wake-on-LAN and remote wake-up (AMD Magic Packet™, Link Change, and Microsoft® Wake-up frame)
- Half/Full duplex capability
- Supports Full Duplex Flow Control (IEEE 802.3x)
- Provides interface to 93C46 EEPROM to store resource configuration and ID parameters
- Provides PCI clock run pin
- Provides LED pins for network operation status indication
- 2.5/3.3V power supply with 5V tolerant I/Os

2.10 Drive Interfaces

The WAFER-LX can support the following drive interfaces.

- 2 x SATA drives
- 2 x IDE devices
- 1 x FDD
- 1 x CF I or CF II card

2.10.1 SATA Drives

The WAFER-LX supports two, first generation SATA drives with transfer rates of up to 150Mb/s

2.10.2 IDE HDD Interfaces

The WAFER-LX system chipset IDE controller supports up to two HDDs with the following specifications:

- Supports PIO IDE transfers up to 16MB/s
- Supports the following Ultra ATA devices:
  - **Ultra ATA/100**, with data transfer rates up to 100MB/s
  - **Ultra ATA/66**, with data transfer rates up to 66MB/s
  - **Ultra ATA/33**, with data transfer rates up to 33MB/s

2.10.3 Floppy Disk Drive (FDD)

The WAFER-LX supports a single FDD. The following FDD formats are compatible with the board.

- 5.25": 360KB and 1.2MB
- 3.5": 720KB, 1.44MB and 2.88MB

2.10.4 Compact Flash Support

A standard CF I or CF II card can be inserted into the compact flash slot on the solder side of the WAFER-LX PCB.

2.11 Serial Ports

The WAFER-LX has two high-speed UART serial ports, configured as COM1 and COM2. The serial ports have the following specifications.

- 16C550 UART with 16-byte FIFO buffer
- 115.2Kbps transmission rate

COM2 can be configured as RS-232, RS-422 or RS-485.

2.12 Real Time Clock

256-byte battery backed CMOS RAM

2.13 System Monitoring

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

- CPU, chipset, and battery voltage, +3.3V, +5V, and +12V

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- RPM of cooling fans
- CPU and board temperatures (by the corresponding embedded sensors)

2.14 USB Interfaces

The WAFER-LX has four USB interfaces, two internal (on one pin header connector) and two external. The USB interfaces support USB 2.0.

2.15 BIOS

The WAFER-LX uses a licensed copy of AWARD BIOS. The features of the flash BIOS used are listed below:

- SMIBIOS (DMI) compliant
- Console redirection function support
- PXE (**P**re-Boot E**x**ecution **E**nvironment) support
- USB booting support

2.16 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the WAFER-LX are listed below.

- Minimum Operating Temperature: 0ºC (32°F)
- Maximum Operating Temperature: 60°C (140°F)

A cooling fan and heat sink must be installed on the CPU. Thermal paste must be smeared on the lower side of the heat sink before it is mounted on the CPU. Heat sinks are also mounted on the northbridge and southbridge chipsets to ensure the operating temperature of these chips remain low.

2.17 Audio Codec

The WAFER-LX has an integrated RealTek ALC203 codec. The RealTek ALC203 is a 20-bit DAC and 18-bit ADC full-duplex AC'97 2.3 compatible stereo audio CODEC designed for PC multimedia systems, including host/soft audio, and AMR/CNR based designs. The codec meets performance requirements for audio on PC99/2001 systems

- Single chip with high S/N ratio (>100 dB)

- Meets performance requirements for audio on PC2001 systems
- Meets Microsoft WHQL/WLP 2.0 audio requirements
- 20-bit DAC and 18-bit ADC resolution
- 18-bit Stereo full-duplex CODEC with independent and variable sampling rate
- Complies with AC'97 2.3 specifications

  o LINE/HP-OUT, MIC-IN and LINE-IN sensing

  o 14.318MHz -> 24.576MHz PLL saves crystal

  o 12.288MHz BITCLK input can be consumed

  o Integrated PCBEEP generator to save buzzer

  o Interrupt capability

  o Page registers and Analog Plug & Play

- Support of S/PDIF out is fully compliant with AC'97 rev2.3 specifications
- Three analog line-level stereo inputs with 5-bit volume control: LINE_IN, CD, AUX
- High quality differential CD input
- Two analog line-level mono input: PCBEEP, PHONE-IN
- Supports double sampling rate (96KHz) of DVD audio playback
- Two software selectable MIC inputs
- +6/12/20/30dB boost preamplifier for MIC input
- Stereo output with 6-bit volume control
- Mono output with 5-bit volume control
- Headphone output with 50mW/20Ohm amplifier
- 3D Stereo Enhancement
- Multiple CODEC extension capability
- External Amplifier Power Down (EAPD) capability
- Power management and enhanced power saving features
- Stereo MIC record for AEC/BF application
- DC Voltage volume control
- Auxiliary power to support Power Off CD
- Adjustable VREFOUT control
- 2 GPIO pins with smart GPIO volume control
- 2 Universal Audio Jacks (UAJ)® for front panel
- Supports 32K/44.1K/48K/96KHz S/PDIF output
- Supports 32K/44.1K/48KHz S/PDIF input
- Power support: Digital: 3.3V; Analog: 3.3V/5V
- Standard 48-Pin LQFP Package

- EAX™ 1.0 & 2.0 compatible
- Direct Sound 3D™ compatible
- A3D™ compatible
- I3DL2 compatible
- HRTF 3D Positional Audio
- Sensaura™ 3D Enhancement (optional)
- 10 Bands of Software Equalizer
- Voice Cancellation and Key Shifting in Kareoke mode
- AVRack® Media Player

2.18 Power Consumption

Table 2-2 shows the power consumption parameters for the WAFER-LX when an AMD Geode LX 800 processor is running with one 1GB DDR400 memory module and running 3D Mark.

Voltage	Current
+5V	2.5A

Table 2-2: Power Consumption

2.19 Packaged Contents and Optional Accessory Items

2.19.1 Package Contents

The WAFER-LX is shipped with the following components.

- 1x WAFER-LX800 single board computer
- 1 x Mini jumper pack
- 1 x IDE flat cable 44P/44P
- 2 x SATA cables
- 1 x SATA power cable
- 1 x Audio cable
- 1 x KB/MS cable
- 1 x USB cable
- 1 x RS-232 cable

- 1x Utility CD
- 1x Quick Installation Guide

2.19.2 Optional Accessory Items

The items shown in the list below are optional accessory items are purchased separately.

- LPT cable

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Chapter

3

Connectors and Jumpers

3.1 Peripheral Interface Connectors

Section 3.1.2 shows peripheral interface connector locations. Section 3.1.2 lists all the peripheral interface connectors seen in Section 3.1.2.

3.1.1 WAFER-LX Layout

Figure 3-1 shows the on-board peripheral connectors, rear panel peripheral connectors and on-board jumpers.
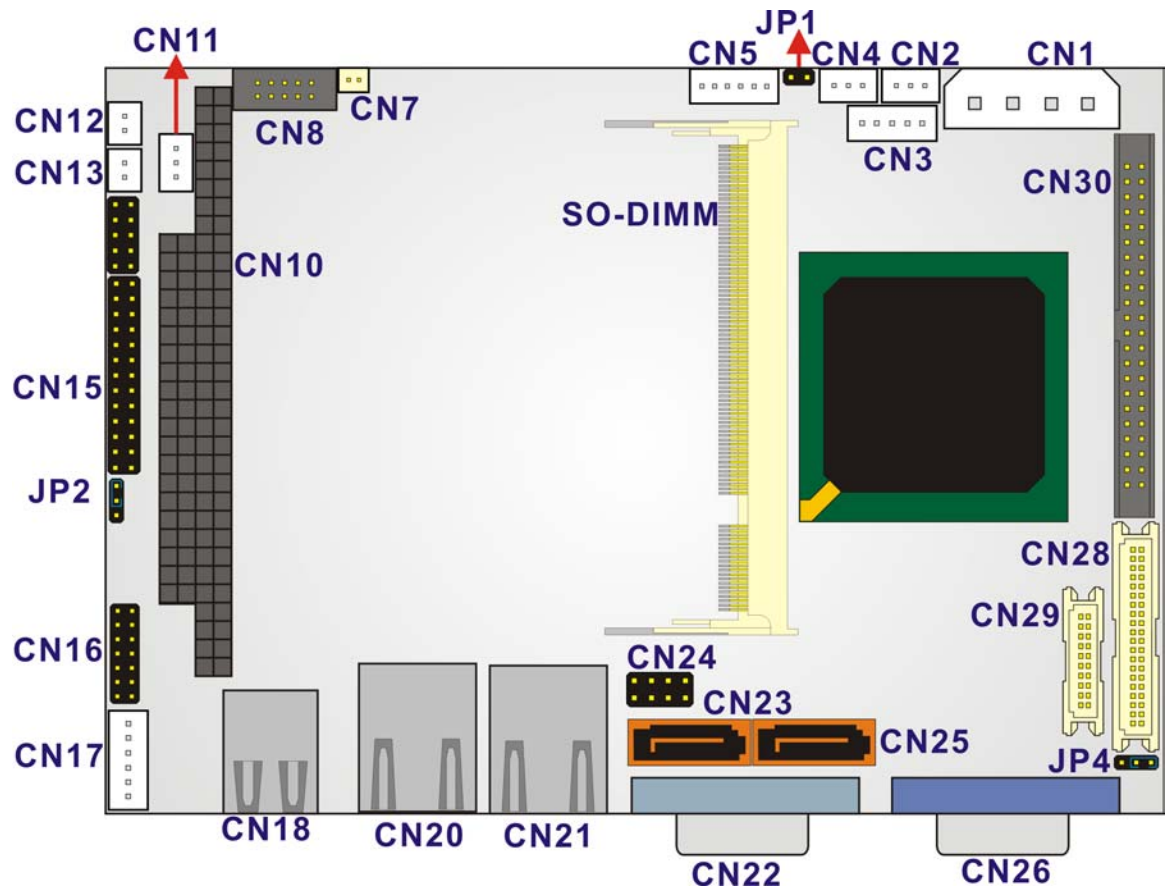
Figure 3-1: Connector and Jumper Locations

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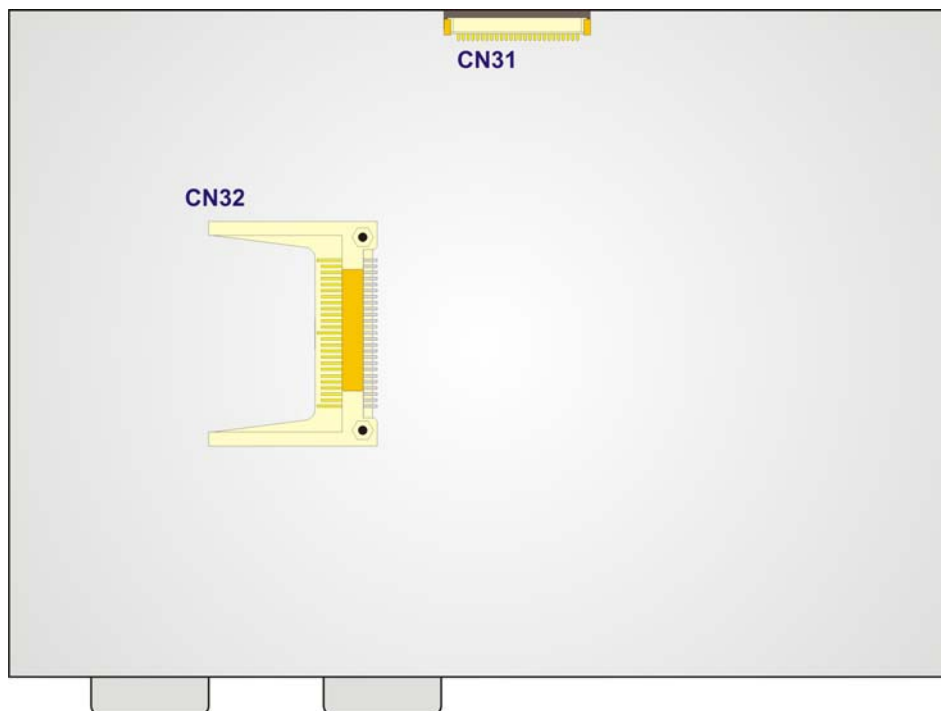
Figure 3-2: Connector and Jumper Locations (Solder Side)

3.1.2 Peripheral Interface Connectors

Table 3-1 shows a list of the peripheral interface connectors on the WAFER-LX. Detailed descriptions of these connectors can be found in **Section 0** on **page 43**.

Connector	Type	Label
AT power connector	4-pin header	CN1
ATX power function connector	3-pin header	CN2
ATX power button connector	2-pin header	CN13
Audio connector	10-pin header	CN8
Battery connector	2-pin header	CN7
Compact Flash (CF) connector	50-pin header	CN32
Fan connector	3-pin header	CN4
Floppy Disk connector	26-pin header	CN31

GPIO connector	10-pin header	CN14
IDE Interface connector	44-pin header	CN30
Inverter power connector	5-pin header	CN3
Keyboard/Mouse connector	6-pin header	CN17
LED connector	6-pin header	CN5
Parallel port connector	26-pin header	CN15
PC/104 power input connector	3-pin header	CN11
PC/104 slot	104-pin slot	CN10
Reset button connector	2-pin header	CN12
RS-232/422/485 serial port connector	14-pin header	CN16
SATA drive connector (150MB/s)	7-pin SATA connector	CN23
SATA drive connector (150MB/s)	7-pin SATA connector	CN25
TFTLCD LVDS connector	20-pin header	CN29
TFT LCD TTL connector	40-pin header	CN28
USB connector (USB 1.1 and USB 2.0)	8-pin header	CN24

Table 3-1: Peripheral Interface Connectors

3.1.3 External Interface Panel Connectors

Table 3-2 lists the rear panel connectors on the WAFER-LX. Detailed descriptions of these connectors can be found in **Section 3.3** on **page 71**.

Connector	Type	Label
Ethernet connector	RJ-45	CN20
Ethernet connector	RJ-45	CN21
RS-232 serial port connector	9-pin male	CN22

| USB port | USB port | CN19 |
| VGA port connector | 15-pin female | CN26 |

Table 3-2: Rear Panel Connectors

3.1.4 On-board Jumpers

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 pins 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.
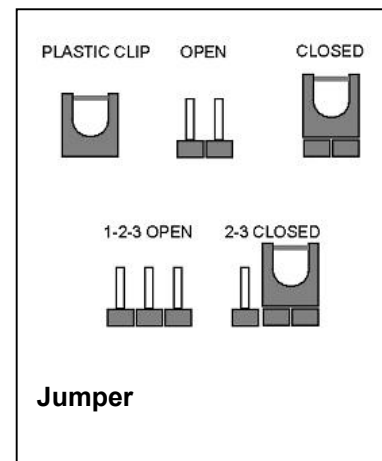
Jumper

Table 3-3 lists the on-board jumpers. Detailed descriptions of these jumpers can be found in **Section 4.5** on page **84**.

Description	Label	Type
AT power select	JP1	2-pin header
COM 2 mode setup	JP2	3-pin header
Clear CMOS	CN7	2-pin header

Table 3-3: On-board Jumpers

3.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the motherboard and are only accessible when the motherboard is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the WAFER-LX.

3.2.1 AT Power Connector

CN Label:	**CN1**
CN Type:	4-pin AT power connector (1x4)
CN Location:	See **Figure 3-3**
CN Pinouts:	See **Table 3-4**

The AT power connector is connected to an AT power source that powers the system.
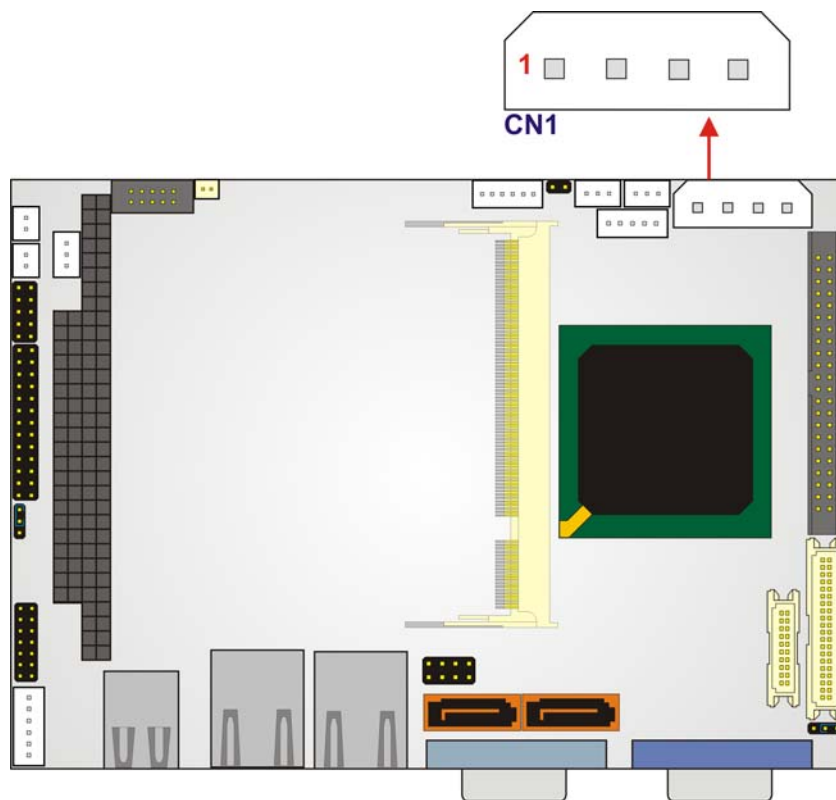
Figure 3-3: AT Power Connector Location

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PIN NO.	DESCRIPTION
1	+5V
2	GND
3	GND
4	+12V

Table 3-4: AT Power Connector Pinouts

3.2.2 ATX Power Connector

CN Label: CN2

CN Type: 3-pin header (1x3)

CN Location: See **Figure 3-4**

CN Pinouts: See **Table 3-5**

The ATX Power connector (CN2) connects an ATX or AT power supply connector.
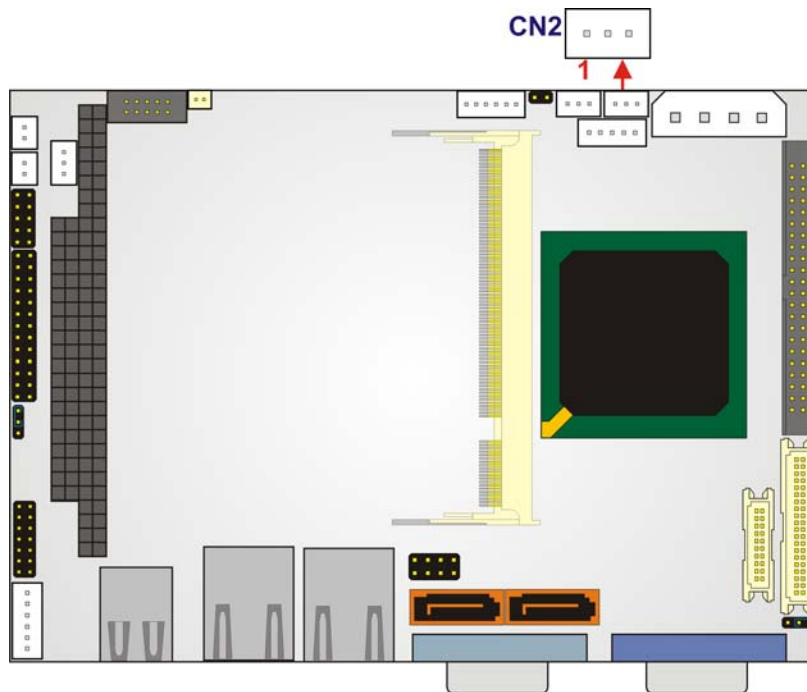
Figure 3-4: ATX Power Connector Location

PIN NO.	DESCRIPTION
1	+5V_SB
2	NC (v1.10)
3	PS_ON

Table 3-5: ATX Power Connector Pinouts

3.2.3 ATX Power Button Connector

CN Label: CN13

CN Type: 1-pin header (1x2)

CN Location: See Figure 3-5

CN Pinouts: See Table 3-6

The ATX power button connector to a power switch installed on the system chassis.
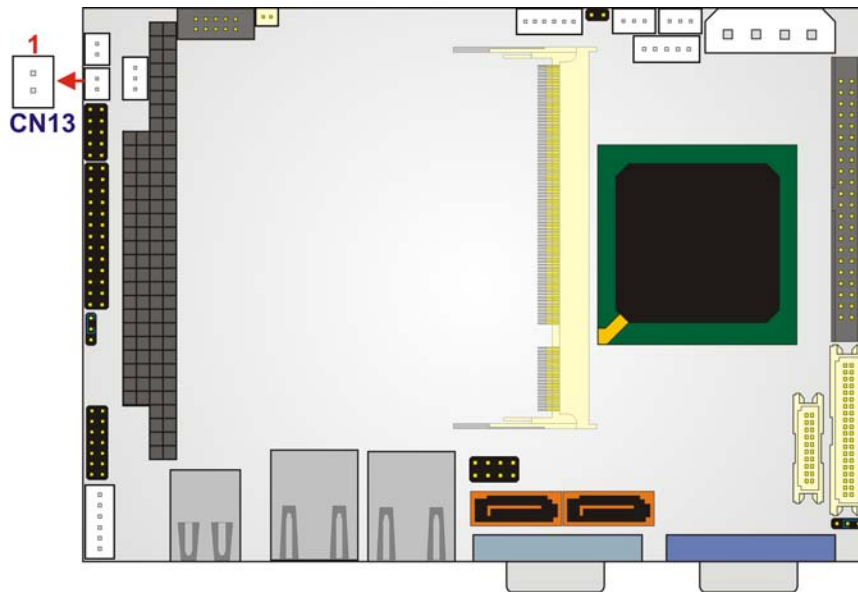
Figure 3-5: ATX Power Button Connector

PIN NO.	DESCRIPTION
1	PWRBTN#
2	GND

Table 3-6: ATX Power Button Connector Pinouts

3.2.4 Audio Connector

CN Label: **CN8**

CN Type: 10-pin header (2x5)

CN Location: See **Figure 3-6**

CN Pinouts: See **Table 3-7**

The audio connector is connected to an on-board codec. An external audio connector kit can be connected to the connector to provide sound input and output.
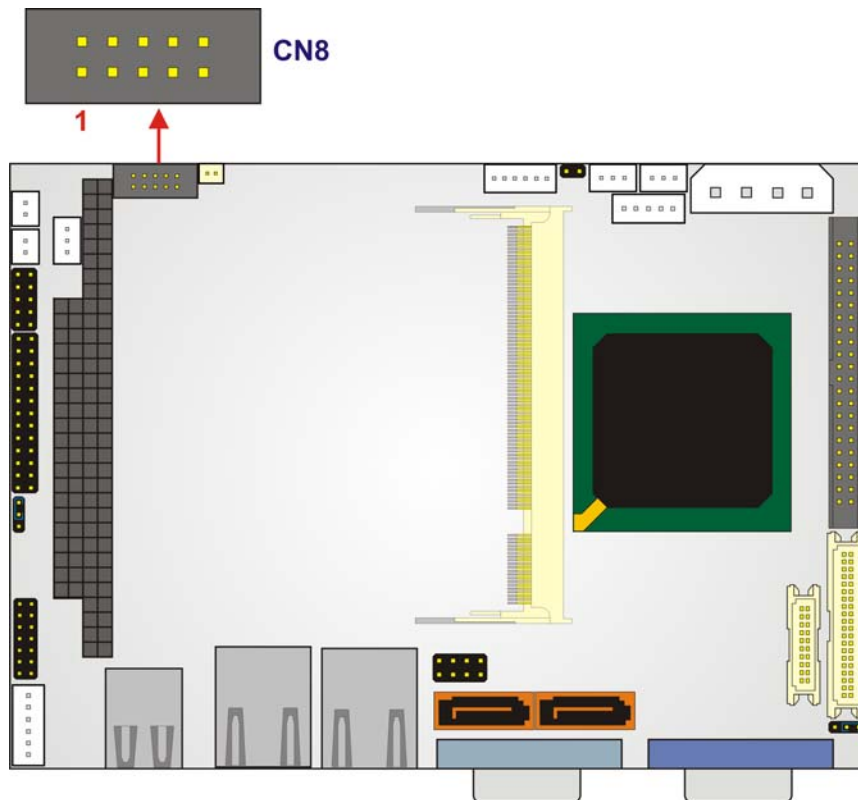
Figure 3-6: Audio Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Line Out Right	2	Line In Right
3	GND	4	GND
5	Line Out Left	6	Line In Left
7	GND	8	GND
9	MIC In	10	N/C

Table 3-7: Audio Connector Pinouts

3.2.5 Battery Connector

CN Label: CN7

CN Type: 2-pin header (1x2)

CN Location: See **Figure 3-7**

CN Pinouts: See **Table 3-8**

The battery connector is connected to a backup battery. The battery connector is also used to reset the CMOS memory if the incorrect BIOS settings have been made and the system cannot boot up.
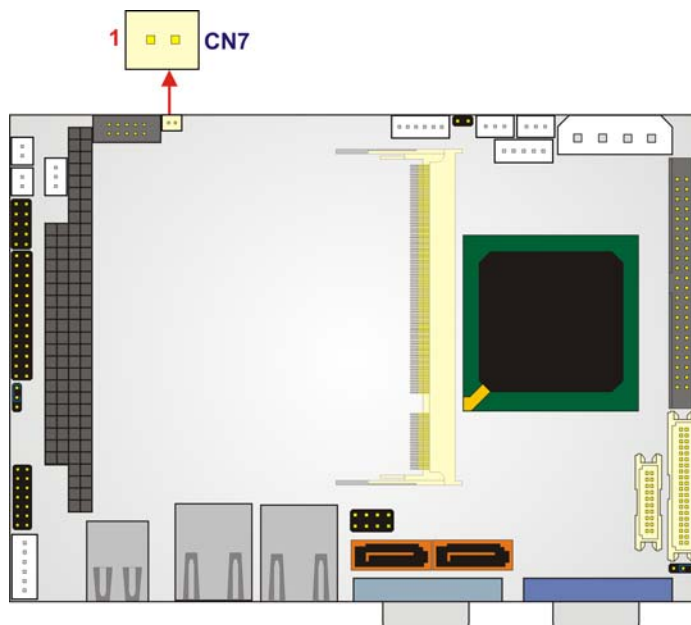
Figure 3-7: Battery Connector Location

PIN NO.	DESCRIPTION
1	Battery+
2	Ground

Table 3-8: Battery Connector Pinouts

3.2.6 Compact Flash Connector

CN Label: **CN32** (solder side)

CN Type: 50-pin header (2x25)

CN Location: See **Figure 3-8**

CN Pinouts: See **Table 3-9**

A compact flash memory module is inserted to the Compact Flash 2 connector (J2). Jumper 2 (JP2) configures the compact flash drive as either a slave or master device.
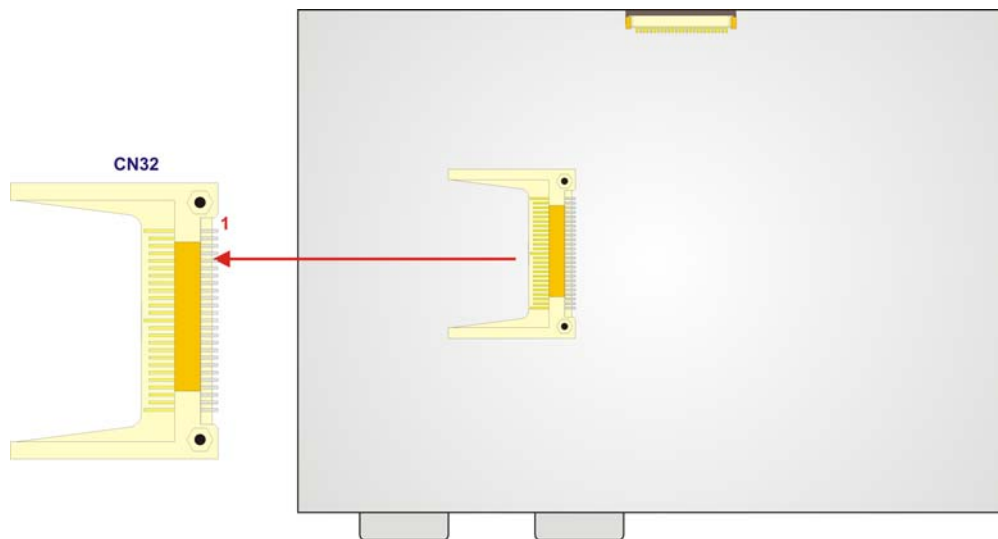
Figure 3-8: Compact Flash Connector Location (Solder Side)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	26	VCC-IN CHECK1
2	DATA 3	27	DATA 11
3	DATA 4	28	DATA 12
4	DATA 5	29	DATA 13
5	DATA 6	30	DATA 14
6	DATA 7	31	DATA 15
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	DATA 0	46	66DET
22	DATA 1	47	DATA 8
23	DATA 2	48	DATA 9
24	N/C	49	DATA 10
25	VCC-IN CHECK2	50	GROUND

Table 3-9: Compact Flash Connector Pinouts

3.2.7 Fan Connector

CN Label: CN4

CN Type: 3-pin header

CN Location: See **Figure 3-9**

CN Pinouts: See **Table 3-10**

The cooling fan connector provides a 12V, 500mA current to a system cooling fan. The connector has a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.
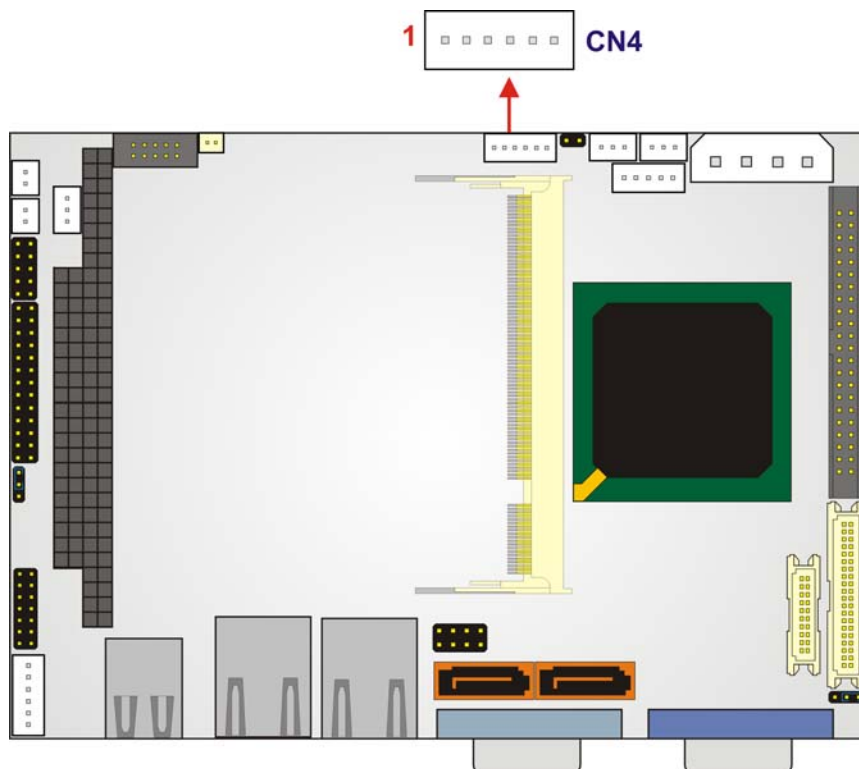
Figure 3-9: Fan Connector Location

PIN NO.	DESCRIPTION
1	Fan Speed Detect
2	+5V
3	GND

Table 3-10: Fan Connector Pinouts

3.2.8 Floppy Disk Connector

CN Label: **CN31** (solder side)

CN Type: 26-pin header (1 x 26)

CN Location: See **Figure 3-10**

CN Pinouts: See **Table 3-11**

The floppy disk connector (FDD1) is connected to a floppy disk drive.
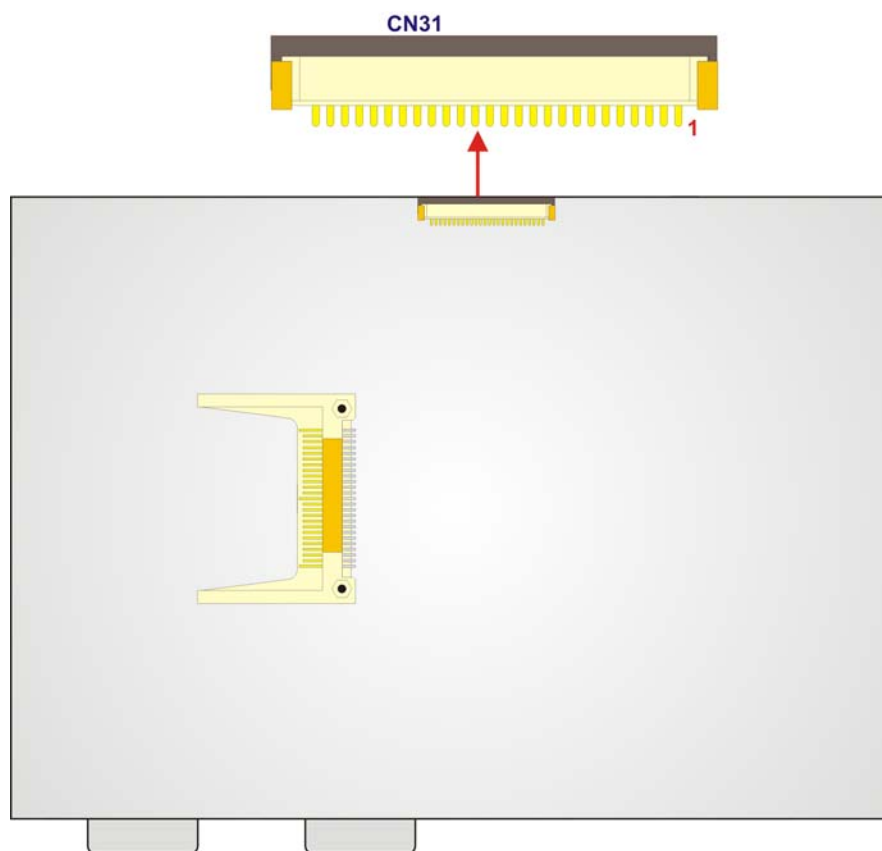
Figure 3-10: FDD Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	14	STEP#
2	INDEX#	15	GND
3	+5V	16	WDATA#

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4	DSA#	17	GND
5	+5V	18	WGATE#
6	DSKCHG#	19	GND
7	NC	20	TRACK0#
8	NC	21	GND
9	NC	22	WP#
10	MOTO0#	23	GND
11	NC	24	RDATA#
12	DIR#	25	GND
13	NC	26	HEAD#

Table 3-11: FDD Connector Pinouts

3.2.9 GPIO Connector

CN Label: **CN14**

CN Type: 10-pin header (2x5)

CN Location: See **Figure 3-11**

CN Pinouts: See **Table 3-12**

The General Purpose Input Output (GPIO) connector can be connected to external I/O control devices including sensors, lights, alarms and switches.
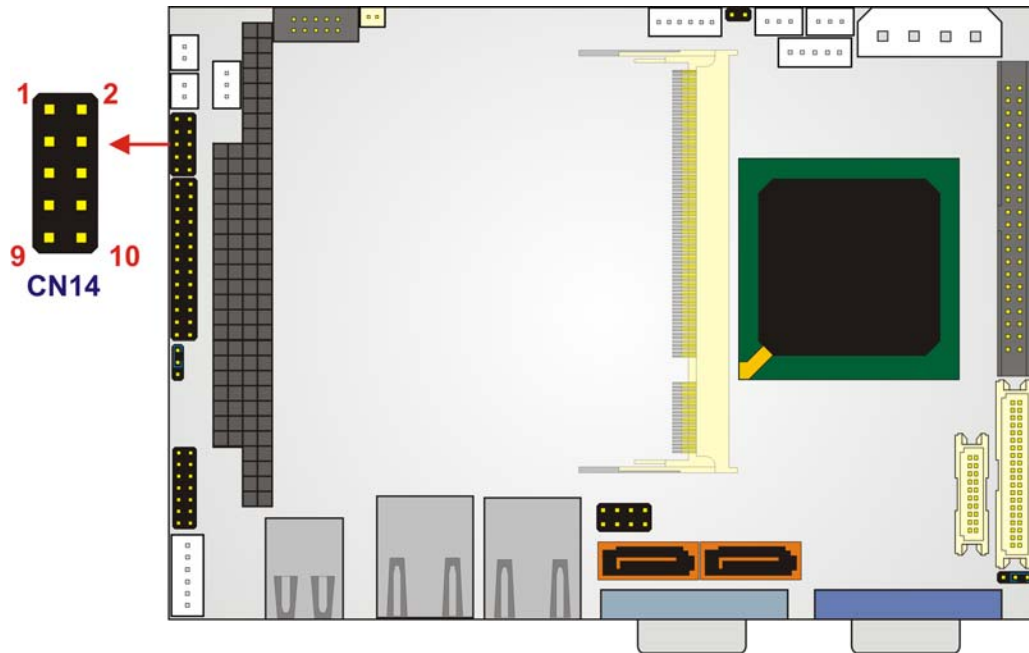
Figure 3-11: GPIO Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	5V
3	GPO0	4	GPO1
5	GPO2	6	GPO3
7	GPI0	8	GPI1
9	GPI2	10	GPI3

Table 3-12: GPIO Connector Pinouts

3.2.10 IDE Connector

CN Label:	CN30
CN Type:	44pin header (2x22)
CN Location:	See **Figure 3-12**
CN Pinouts:	See **Table 3-13**

One 44-pin IDE device connector on the WAFER-LX motherboard supports connectivity to Ultra ATA/33/66/100 IDE devices with data transfer rates up to 100MB/s.
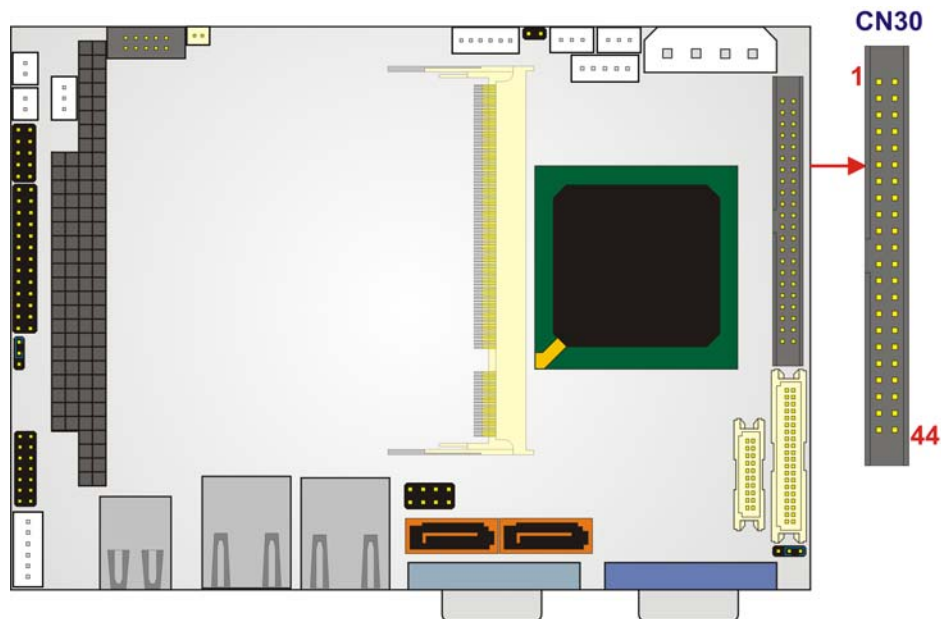
Figure 3-12: IDE Device Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	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	GROUND	20	N/C
21	IDE DRQ	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	IDE CHRDY	28	GROUND
29	IDE DACK	30	GROUND−DEFAULT
31	INTERRUPT	32	N/C
33	SA1	34	N/C
35	SA0	36	SA2

37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND
41	VCC	42	VCC
43	GROUND	44	N/C

Table 3-13: Secondary IDE Connector Pinouts

3.2.11 Inverter Power Connector

CN Label: **CN3**

CN Type: 5-pin header (1x5)

CN Location: See **Figure 3-13**

CN Pinouts: See **Table 3-14**

The inverter connector is connected to the LCD backlight.
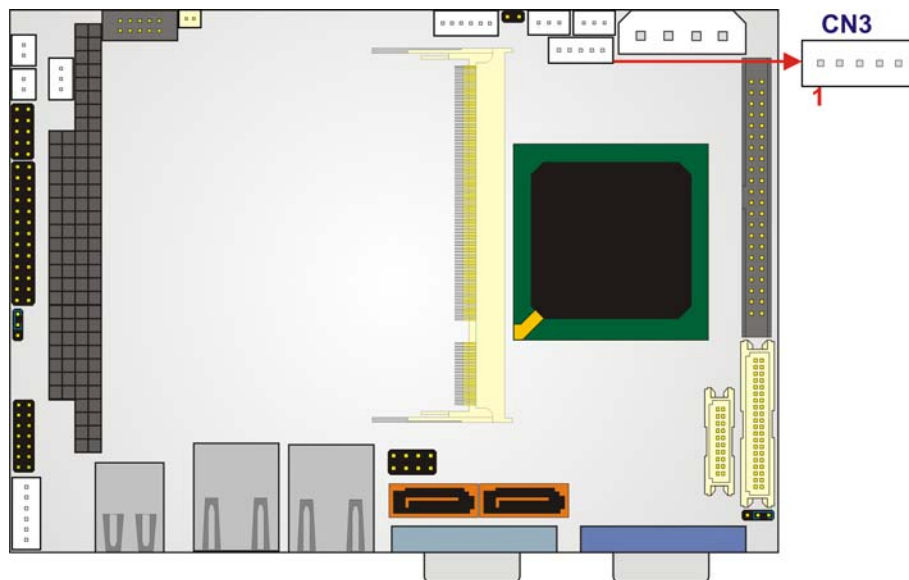
Figure 3-13: Inverter Connector Locations

PIN NO.	DESCRIPTION
1	ADJ (Def: GND)
2	GND
3	12V

4	GND
5	BL_EN

Table 3-14: Inverter Power Connector Pinouts

3.2.12 Keyboard/Mouse Connector

CN Label: **CN17**

CN Type: 6-pin header (1x6)

CN Location: See **Figure 3-14**

CN Pinouts: See **Table 3-15**

The keyboard and mouse connector can be connected to a standard PS/2 cable or PS/2 Y-cable to add keyboard and mouse functionality to the system.
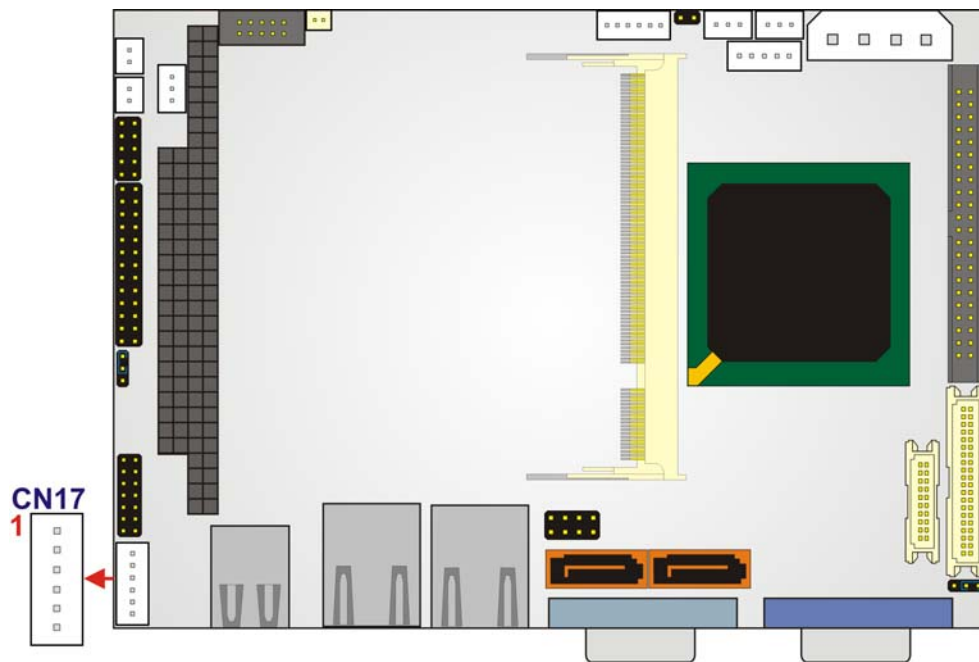
Figure 3-14: Keyboard/Mouse Connector Location

PIN NO.	DESCRIPTION
1	+5V
2	MS DATA

3	MS CLK
4	KB DATA
5	KB CLK
6	GND

Table 3-15: Keyboard/Mouse Connector Pinouts

3.2.13 LED Connector

CN Label: **CN5**

CN Type: 6-pin header (1x6)

CN Location: See **Figure 3-15**

CN Pinouts: See **Table 3-16**

The LED connector (CN5) connects to an HDD indicator LED and a power LED on the system chassis to inform the user about HDD activity and the power on/off status of the system.
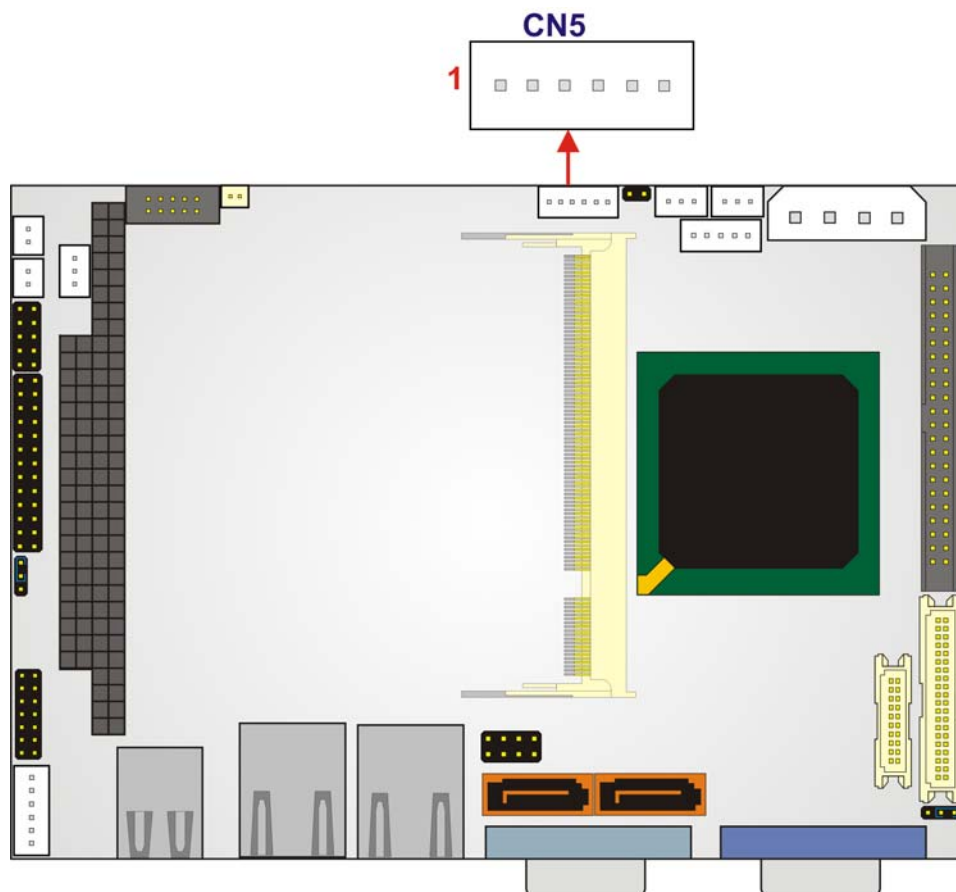
Figure 3-15: LED Connector Locations

PIN NO.	DESCRIPTION
1	+5V
2	GND
3	Power LED+
4	Power LED-
5	HDD LED+
6	HDD LED-

Table 3-16: LED Connector Pinouts

3.2.14 Print Port Connector

CN Label: **CN15**

CN Type: 26-pin header (2 x 13)

CN Location: See **Figure 3-16**

CN Pinouts: See **Table 3-17**

The WAFER-LX has one print port connector that can be connected directly to a printer.
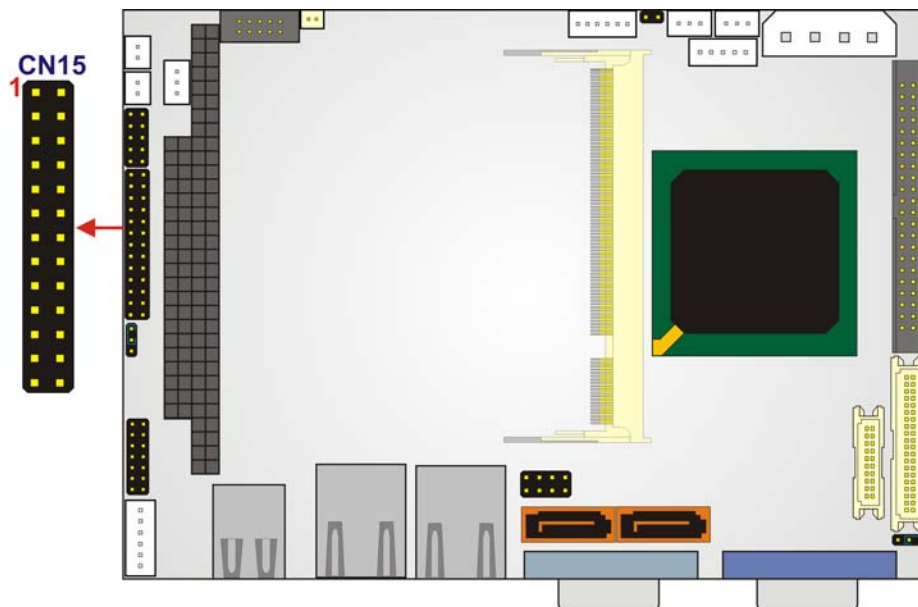
Figure 3-16:Print Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	STB#	2	AFD#
3	PD0	4	ERR#
5	PD1	6	INIT#
7	PD2	8	SLIN#
9	PD3	10	GND
11	PD4	12	GND
13	PD5	14	GND
15	PD6	16	GND

17	PD7	18	GND
19	ACK#	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	N/C

Table 3-17: Parallel Port Connector Pinouts

3.2.15 PC/104 Power Input Connector

CN Label: **CN11**

CN Type: 3-pin header (1x3)

CN Location: See **Figure 3-17**

CN Pinouts: See **Table 3-18**

The PC/104 power input connector provides power to the PC/104 expansion module installed on the PC/104 slot.
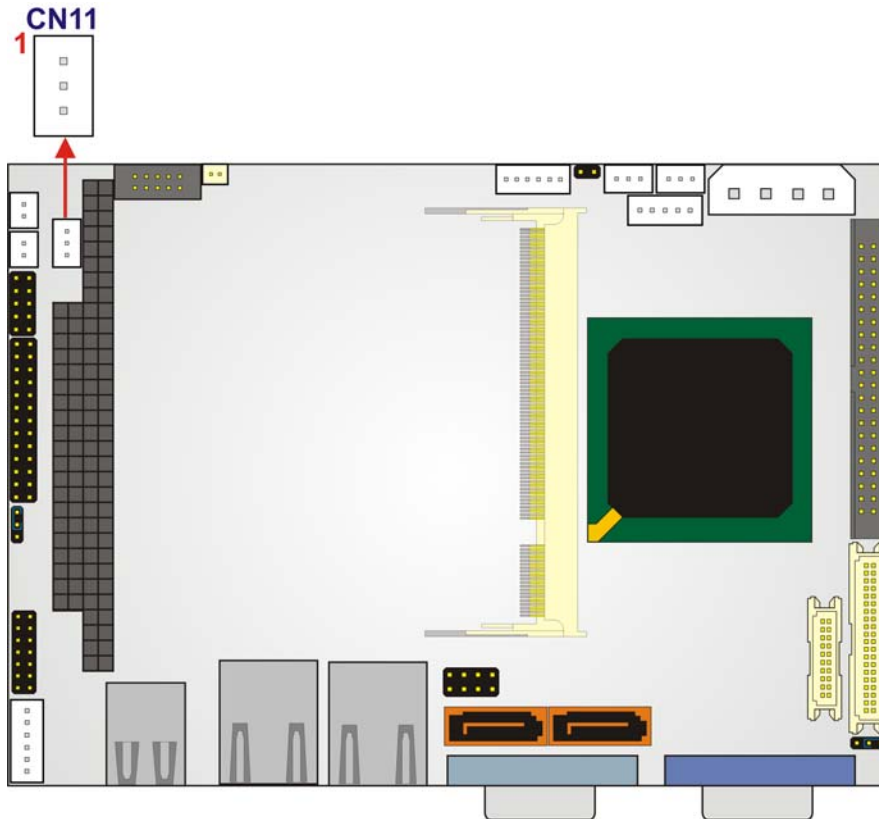
Figure 3-17: PC/104 Power Input Connector Pinouts

PIN NO.	DESCRIPTION
1	–5V
2	GND
3	–12V

Table 3-18: PC/104 Power Input Connector Pinouts

3.2.16 PC/104 Slot

CN Label: **CN10**

CN Type: 104-pin PC/104 slot

CN Location: See **Figure 3-18**

CN Pinouts: See **Table 3-19**

The PC/104 slot enables a PC/104 compatible expansion module to be connected to the board.
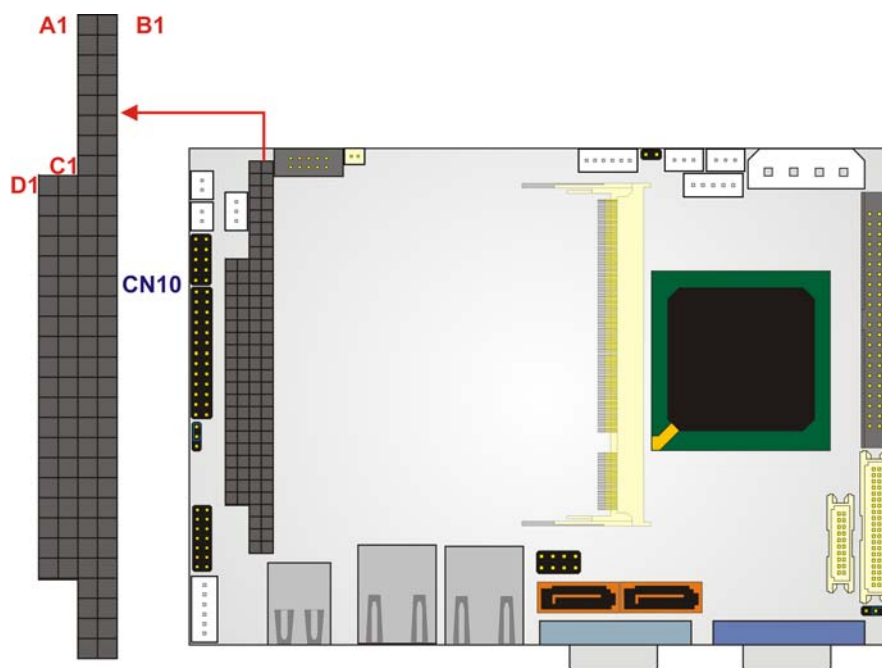
Figure 3-18: PC/104 Slot Location

Pin No.	Column A	Column B	Column C	Column D
1	IOCHK-	GROUND	GROUND	GROUND
2	SD7	RSTDRV	SBHE-	MCS16-
3	SD6	+5V	SA23	IOCS16-
4	SD5	IRQ9	SA22	IRQ10
5	SD4	-5V	SA21	IRQ11
6	SD3	DREQ2	SA20	IRQ12
7	SD2	-12V	SA19	IRQ15
8	SD1	ZWS-	SA18	IRQ14
9	SD0	+12V	SA17	DACK0-
10	IOCHRDY	GROUND	MEMR-	DREQ0
11	AEN	SMEMW-	MEMW-	DACK5-
12	SA19	SMEMR-	SD8	DRREQ5
13	SA18	IOW-	SD9	DACK6-

14	SA17	IOR-	SD10	DREQ6
15	SA16	DACK3-	SD11	DACK7-
16	SA15	DREQ3	SD12	DREQ7
17	SA14	DACK1-	SD13	+5V
18	SA13	DREQ1	SD14	MASTER-
19	SA12	REFRESH-	SD15	GROUND
20	SA11	ISACLK	NC	GROUND
21	SA10	IRQ7		
22	SA9	IRQ6		
23	SA8	IRQ5		
24	SA7	IRQ4		
25	SA6	IRQ3		
26	SA5	DACK2-		
27	SA4	TC		
28	SA3	BALE		
29	SA2	+5V		
30	SA1	ISA_OSC		
31	SA0	GROUND		
32	GROUND	GROUND		

Table 3-19: PC/104 Slot Connector Pinouts

3.2.17 Reset Button Connector

CN Label: **CN12**

CN Type: 2-pin header (1x2)

CN Location: See **Figure 3-19**

CN Pinouts: See **Table 3-20**

The reset button connector is connected to the reset button on the external chassis.
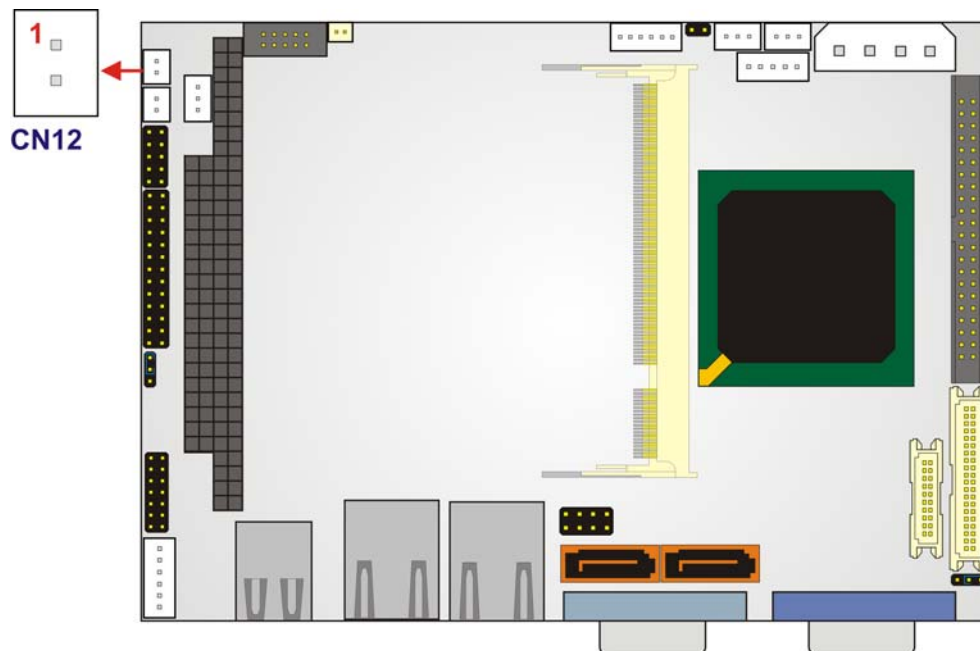
Figure 3-19: Reset Button Connector Locations

PIN NO.	DESCRIPTION
1	Reset+
2	Ground

Table 3-20: Reset Button Connector Pinouts

3.2.18 RS-232/422/485 Cable Connectors

CN Label: **CN16**

CN Type: 14-pin header (2x7)

CN Location: See **Figure 3-20**

CN Pinouts: See **Table 3-21**

The COM2/COM3 serial port combination connectors connect to RS-232 serial port devices. The COM2 port is located on pin 1 to pin 10 and the COM3 is located on pin 11 to pin 14 of CN16.
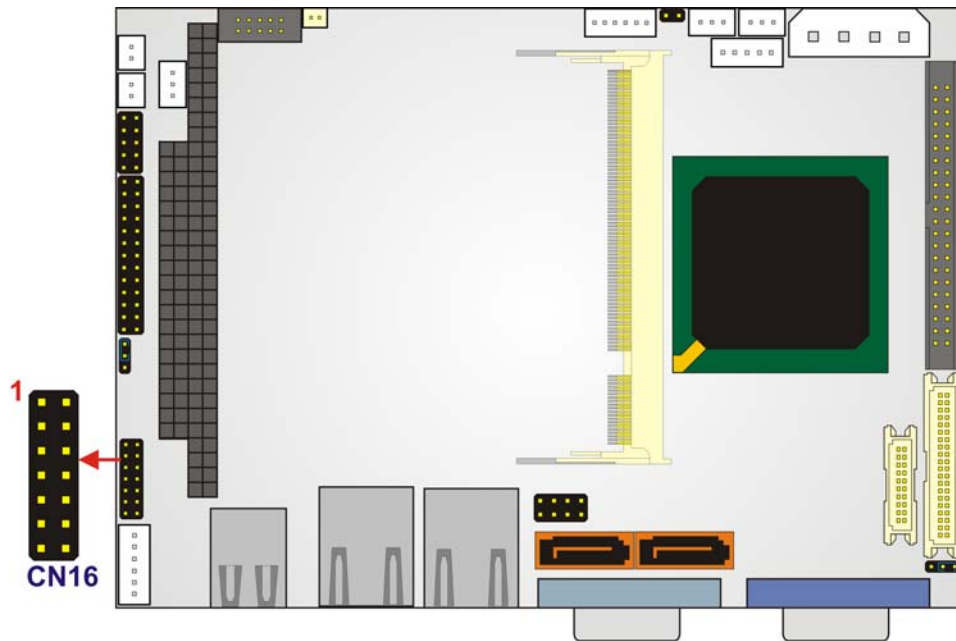
Figure 3-20: RS-232 Serial Port Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD#	2	DSR#
3	RXD	4	RTS#
5	TXD	6	CTS#
7	DTR#	8	RI#/Vout
9	GND	10	GND
11	TxD485+	12	TxD485-
13	RxD485+	14	RxD485-

Table 3-21: RS-232/422/485 Serial Port Connector Pinouts

3.2.19 SATA Drive Connectors

CN Label: **CN23** and **CN25**

CN Type: 7-pin SATA drive connectors

CN Location: See **Figure 3-24**

CN Pinouts: See **Table 3-25**

The two SATA drive connectors are connected to two first generation SATA drives. First generation SATA drives transfer data at speeds as high as 150MB/s.
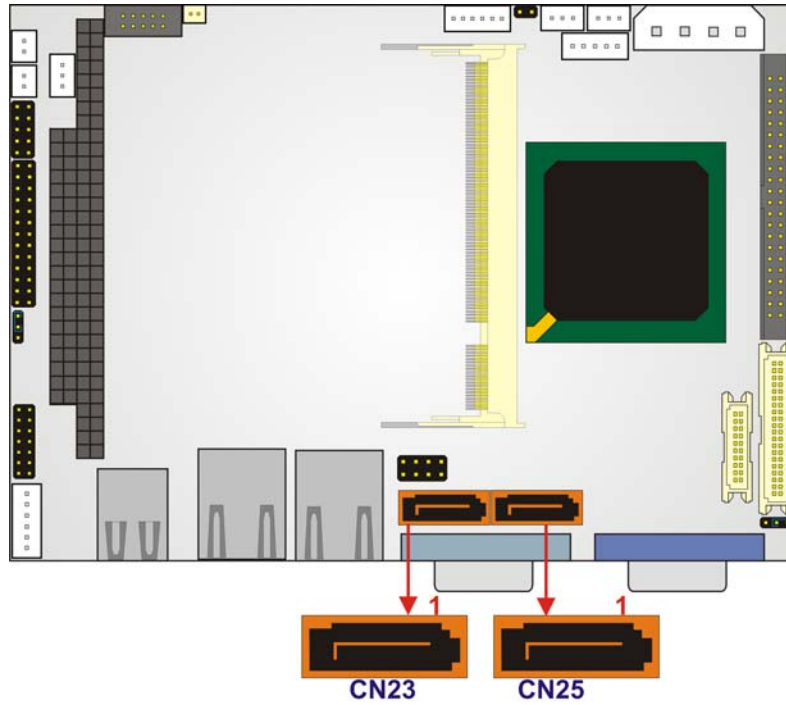
Figure 3-21: SATA Drive Connector Locations

PIN NO.	DESCRIPTION
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

Table 3-22: SATA Drive Connector Pinouts

3.2.20 TFT LCD LVDS Connector

CN Label:	**CN29**
CN Type:	20-pin header (2x10)
CN Location:	See **Figure 3-22**
CN Pinouts:	See **Table 3-23**

The TFT LCD LVDS can be connected to a TFT LCD screen directly.
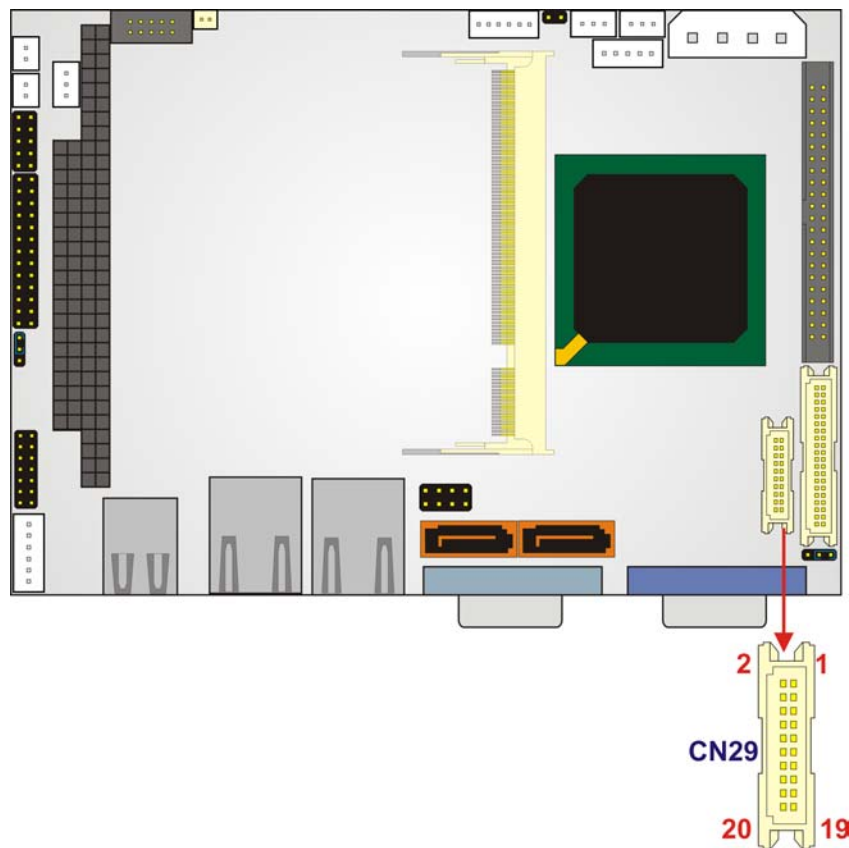
Figure 3-22: TFT LCD LVDS Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND
3	D0+	4	D0-
5	D1+	6	D1-

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7	D2+	8	D2-
9	CLK+	10	CLK-
11	NC	12	NC
13	GND	14	GND
15	NC	16	NC
17	LCD_Vcc	18	LCD_Vcc
19	LCD_Vcc	20	LCD_Vcc

Table 3-23: TFT LCD LVDS Port Connector Pinouts

3.2.21 TFT LCD TTL Connector

CN Label: CN28

CN Type: 40-pin header (2x20)

CN Location: See **Figure 3-23**

CN Pinouts: See **Table 3-24**

The TFT LCD LVDS can be connected to a TFT LCD screen directly.
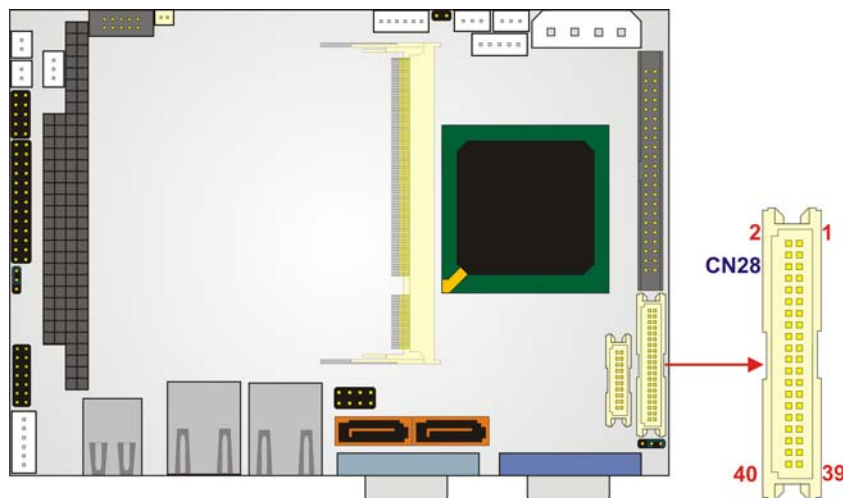
Figure 3-23: TFT LCD TTL Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LCD_Vcc	2	LCD_Vcc

3	GND	4	GND
5	LCD_Vcc	6	LCD_Vcc
7	NC	8	GND
9	B0	10	B1
11	B2	12	B3
13	B4	14	B5
15	B6	16	B7
17	G0	18	G1
19	G2	20	G3
21	G4	22	G5
23	G6	24	G7
25	R0	26	R1
26	R2	28	R3
29	R4	30	R5
31	R6	32	R7
33	GND	34	GND
35	CLK	36	VSYNC
37	LCD_EN	38	HSYNC
39	NC	40	DISP_EN

Table 3-24: TFT LCD TTL Port Connector Pinouts

3.2.22 Internal USB Connectors

CN Label: CN24

CN Type: 8-pin header (2x4)

CN Location: See **Figure 3-24**

CN Pinouts: See **Table 3-25**

The 2x4 USB pin connector provides connectivity to two USB 2.0 devices. The USB ports are used for I/O bus expansion.
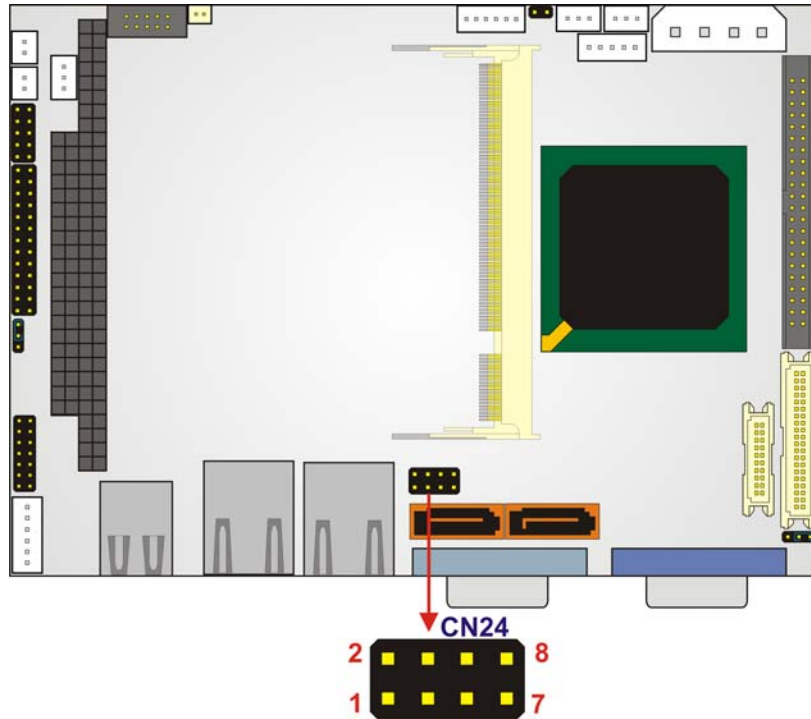
Figure 3-24: USB Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC_USB	2	GND
3	DATA3-	4	DATA4+
5	DATA3+	6	DATA4-
7	GND	8	VCC_USB

Table 3-25: USB Port Connector Pinouts

3.3 External Interface Connectors

3.3.1 External Interface Connector Overview

Figure 3-25 shows the WAFER-LX motherboard external interface connectors. The WAFER-LX on-board external interface connectors are listed below and shown in **Figure 3-25**:

- 1 x USB combo port
- 2 x Ethernet connector
- 1 x Serial communications port

■   1 x VGA port
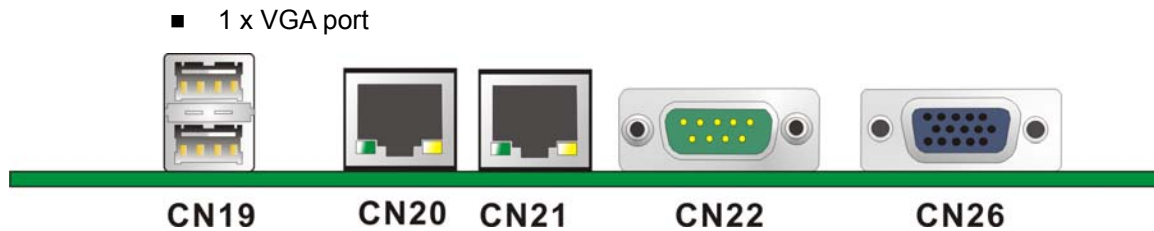
Figure 3-25: WAFER-LX On-board External Interface Connectors

3.3.2 USB Combo Port

CN Label:	CN19
CN Type:	USB Combo port
CN Location:	See **Figure 3-25**
CN Pinouts:	See Table 3-26

The USB combo port provides 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. USB devices connect directly to the USB connectors on the rear panel.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC_USB	5	VCC_USB
2	DATA1-	6	DATA2-
3	DATA1+	7	DATA2+
4	GND	8	GND

Table 3-26: CN19 Connector Pinouts

3.3.3 Ethernet Connector

CN Label:	**CN20** and **CN 21**
CN Type:	RJ-45
CN Location:	See **Figure 3-25**
CN Pinouts:	See Table 3-27

A 10/100 Megabit connection can be made between the Ethernet connector and a Local Area Network (LAN) through a network hub.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	TX+	2	TX-
3	RX+	4	NC
5	NC	6	RX-
7	NC	8	NC

Table 3-27: J7 Connector Pinouts
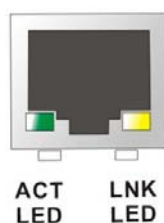
Figure 3-26: J7 Connector

The RJ-45 Ethernet connector has two status LEDs, one green and one yellow. The green LED indicates activity on the port and the yellow LED indicates the port is linked.

SPEED LED		LINK LED	
Status	Description	Status	Description
GREEN	ON: 100MB OFF: 10MB	YELLOW	ON: Linked Flashing: Activity

Table 3-28: J7 Connector LEDs

3.3.4 Serial Communications COM 1 and COM2 Connector

CN Label: CN22

CN Type: RS-232 serial connector

CN Location: See **Figure 3-25**

CN Pinouts: See **Table 3-29** and **Figure 3-27**

The RS-232 serial connector provides serial connection in the RS-232 mode.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	DCD1	2	RXD1
3	TXD1	4	DTR1
5	GND	6	DSR1
7	RTS1	8	CTS1
9	COM_RI1		

Table 3-29: COM1 Pinouts
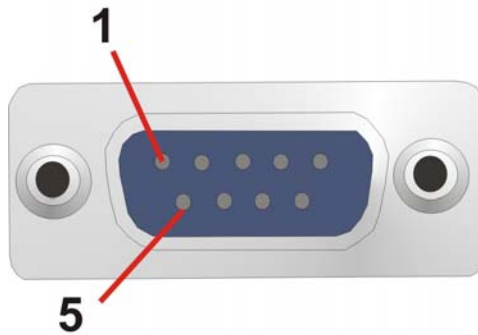
Figure 3-27: COM1 Pinout Locations

3.3.5 VGA Connector

CN Label: **CN26**

CN Type: See VGA Connector

CN Location: See **Figure 3-25**

CN Pinouts: See **Figure 3-28** and **Table 3-30**

The standard 15-pin female VGA connector connects to a CRT or LCD monitor.

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PIN	DESCRIPTION	PIN	DESCRIPTION	PIN	DESCRIPTION
1	RED	6	GROUND	11	NC
2	GREEN	7	GROUND	12	DDCDAT
3	BLUE	8	GROUND	13	HSYNC
4	NC	9	NC	14	VSYNC
5	GROUND	10	GROUND	15	DDCCLK

Table 3-30: VGA1 Connector Pinouts
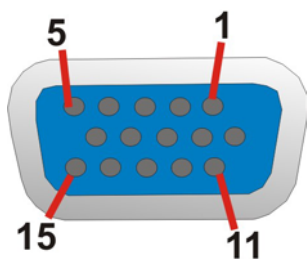
Figure 3-28: VGA1 Connector

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Chapter

4

Installation and Configuration

4.1 Anti-static Precautions

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the WAFER-LX. (Dry climates are especially susceptible to ESD.) It is therefore critical that whenever the WAFER-LX (or any other electrical component) is handled, the following anti-static precautions are strictly adhered to.

- *Wear an anti-static wrist band*: - Wearing a simple anti-static wrist band can help to prevent ESD from damaging the board.
- *Self-grounding*:- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.

4.2 Installation Considerations

NOTE:

The following installation notices and installation considerations should be read and understood before the motherboard is installed. All installation notices pertaining to the installation of the motherboard should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the motherboard and injury to the person installing the motherboard.

4.2.1 Installation Notices

Before and during the installation of the WAFER-LX, please **do** the following:

- Read the user manual:
  ○ The user manual provides a complete description of the WAFER-LX, installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
  ○ Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Place the motherboard on an antistatic pad:

o   When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.

■   Turn off all power to the WAFER-LX:

o   When working with the motherboard, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the WAFER-LX **DO NOT:**

■   remove any of the stickers on the PCB board. These stickers are required for warranty validation.

■   use the product before verifying all the cables and power connectors are properly connected.

■   allow screws to come in contact with the PCB circuit, connector pins, or its components.

4.3 Unpacking

 NOTE:

If any of the items listed below are missing when the WAFER-LX is unpacked, do not proceed with the installation and contact the WAFER-LX reseller or vendor.

4.3.1 Unpacking Precautions

Before installing the WAFER-LX, unpack the motherboard. Some components on WAFER-LX are very sensitive to static electricity and can be damaged by a sudden rush of power. To protect it from being damaged, follow these precautions:

■   The user should ground them self to remove any static charge before touching the WAFER-LX. To do so wear a grounded wrist strap at all times or frequently touch any conducting materials that is connected to the ground.

■   Handle the WAFER-LX by its edges. Do not touch the IC chips, leads or circuitry if not necessary.

Do not place a PCB on top of an anti-static bag. Only the inside of the bag is safe from static discharge.

4.3.2 Checklist

When unpacking the WAFER-LX, please make sure that the package contains the following items.

- 1x WAFER-LX800 single board computer
- 1 x Mini jumper pack
- 1 x IDE flat cable 44P/44P
- 2 x SATA cables
- 1 x SATA power cable
- 1 x Audio cable
- 1 x KB/MS cable
- 1 x USB cable
- 1 x RS-232 cable
- 1x Utility CD
- 1x Quick Installation GuideIf one or more of these items are missing, please

contact the reseller or vendor the WAFER-LX was purchased from and do not proceed any further with the installation.

4.4 WAFER-LX Motherboard Installation

  WARNING!

1. Never run the motherboard without an appropriate heatsink and cooler that can be ordered from IEI Technology or purchased separately.
2. Be sure to use the CPU 12V power connector (CN10007) for the CPU power.

WARNING!

> Please note that the installation instructions described in this manual should be carefully followed in order to avoid damage to the motherboard components and injury to the user.

WARNING!

> When installing electronic components onto the motherboard always take the anti-static precautions listed above in order to prevent ESD damage to the motherboard and other electronic components like the CPU and DIMM modules

The following components must be installed onto the motherboard or connected to the motherboard during the installation process.

NOTE:

> Some WAFER-LX models already have preinstalled CPUs. If the motherboard has a preinstalled CPU then the following section on CPU installation can be skipped.

- DIMM modules
- Peripheral device connection

4.4.1   DIMM Module Installation

4.4.1.1 Purchasing the Memory Module

When purchasing SO-DIMM modules, the following considerations should be taken into account:

- The SO-DIMM socket can support a memory chip with a maximum size of 1GB
- The SO-DIMM socket supports SDRAM DIMM speeds of 333MHz and 400MHz

4.4.1.2 DIMM Module Installation

The WAFER-LX motherboard has two DDR SDRAM DIMM sockets. To install the DIMM modules, follow the instructions below.

Step 1:   Locate the SO-DIMM module connector.

Step 2:   Push the SO-DIMM chip into the socket at an angle. (See **Figure 4-1**)

Step 3:   Gently pull the arms of the SO-DIMM socket out and push the rear of the SO-DIMM module down. (See **Figure 4-1**)

Step 4:   Release the arms on the SO-DIMM socket. They clip into place and secure the SO-DIMM module in the socket.
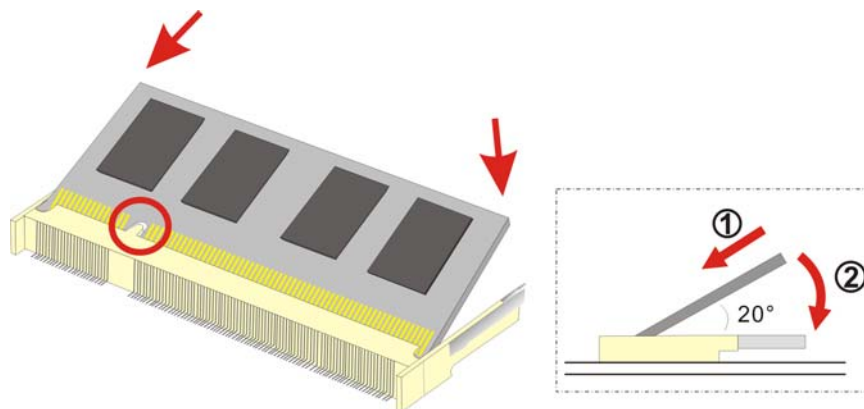
Figure 4-1: SO-DIMM Module Installation

4.4.2 Peripheral Device Connection

Cables provided by IEI that connect peripheral devices to the motherboard are listed in **Table 4-1**. Cables not included in the kit must be separately purchased.

Quantity	Type
1	Audio cable
1	IDE flat cable 44P/44P
2	SATA cables
1	SATA power cable
1	RS-232 cable
1	USB cable

Table 4-1: IEI Provided Cables

4.4.2.1 IDE Disk Drive Connector (IDE1)

The cable used to connect the ,otherboard to the IDE HDD is a standard 44-pin ATA 66/100 flat cable. To connect an IDE HDD to the motherboard, follow the instructions below.

Step 1: Find the ATA 66/100 flat cable in the kit that came with the motherboard.

Step 2: Connect one end of the cable to the PIDE1 connector on the motherboard. A keyed pin on the IDE connectors prevents it from being connected incorrectly.

Step 3: Locate the red wire on the other side of the cable that corresponds to the pin 1 connector.

Step 4: Connect the other side of the cable to the HDD making sure that the pin 1 cable corresponds to pin 1 on the connector.

  NOTE:

When two EIDE disk drives are connected together, back-end jumpers on the drives must be used to configure one drive as a master and the other as a slave.

4.5 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 pins 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.
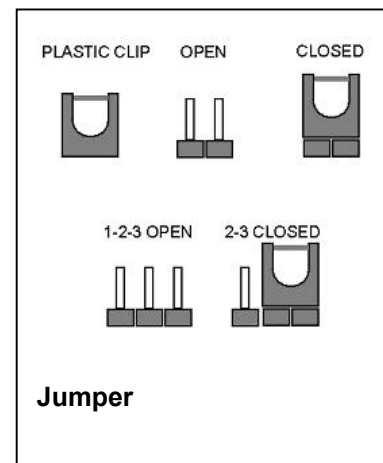
Jumper

Before the WAFER-LX is installed in the system, the jumpers must be set in accordance with the desired configuration. The WAFER-LX motherboard has six on-board jumpers. The jumpers are described in **Table 4-2** and shown in **Figure 4-2**.

Description	Label	Type
AT Power Select	JP1	2-pin header
COM 2 mode setup	JP2	3-pin header
Clear CMOS Memory	CN7	2pin header

Table 4-2: Jumpers

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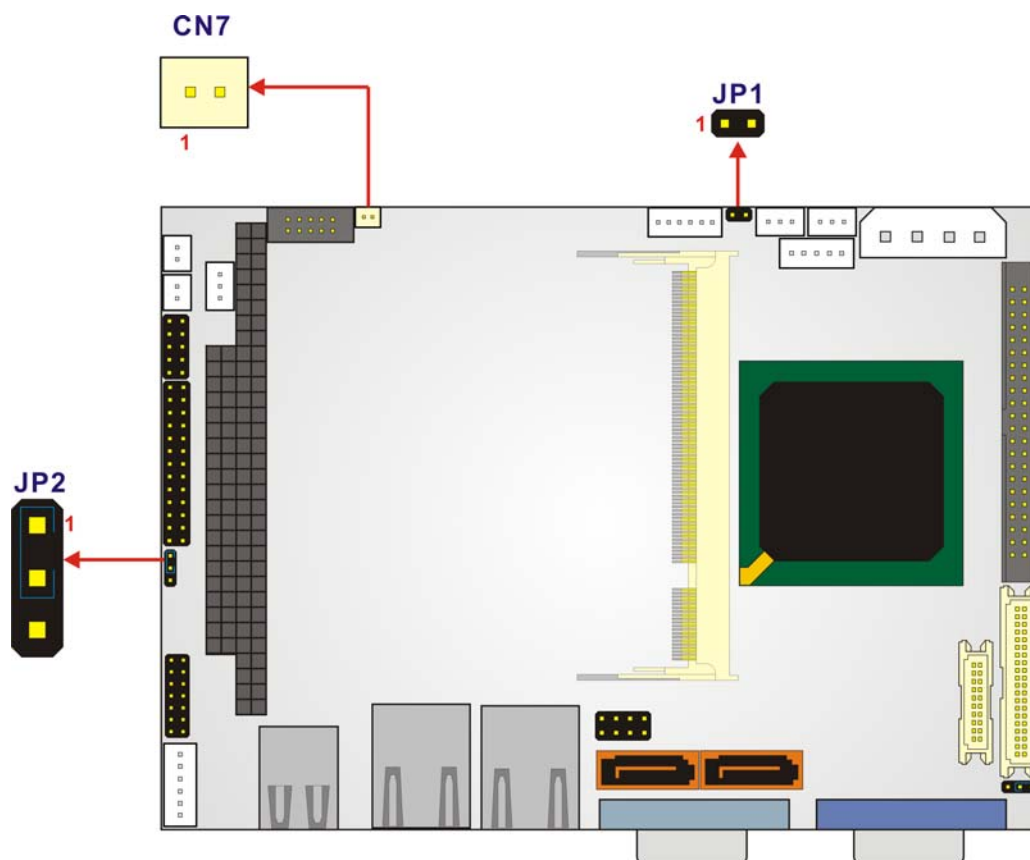
Figure 4-2: Jumper Locations

4.5.1 Clear CMOS Jumper

NOTE:

The battery connector (CN7) is used as the clear CMOS jumper on the

WAFER-LX.

Jumper Label:	CN7
Jumper Type:	2-pin header
Jumper Settings:	See **Table 4-3**
Jumper Location:	See **Figure 4-2**

If the WAFER-LX fails to boot due to improper BIOS settings, use this connector to clear the CMOS data and reset the system BIOS information.   To do this, disconnect CN7 and keep it disconnected for at least five seconds. After five seconds has elapsed, reinsert the connector.

If the "CMOS Settings Wrong" message is displayed during the boot up process, the fault may be corrected by pressing the F1 to enter the CMOS Setup menu.   Do one of the following:

- Enter the correct CMOS setting
- Load Optimal Defaults
- Load Failsafe Defaults.

After having done one of the above, save the changes and exit the CMOS Setup menu.

Clear CMOS	DESCRIPTION
Closed	Keep CMOS Setup
Open	Clear CMOS Setup

Table 4-3: Clear CMOS Jumper Settings

4.5.2 AT Power Select Jumper Settings

Jumper Label:	**JP1**
Jumper Type:	2-pin header
Jumper Settings:	See **Table 4-4**
Jumper Location:	See **Figure 4-2**

The AT/ATX Power Mode Select jumper specifies the systems power mode. Jumper settings are shown in **Figure 4-2**.

AT Power Select	Description	
Short	Use AT power	Default
Open	Use ATX power	

Table 4-4: AT Power Select Jumper Settings

4.5.3 COM3 Setup Jumper Settings

Jumper Label: **JP2**

Jumper Type: 3-pin header

Jumper Settings: See **Table 4-5**

Jumper Location: See **Figure 4-2**

The WAFER-LX COM3 serial port setup jumper settings are shown in **Figure 4-2**. The COM3 port can be configured as an RS-422 serial port or as an RS-485 serial port.

COM 2 Setup	Description	
Short Pin 1 ~ Pin 2	RS-422	Default
Short Pin 2 ~ Pin 3	RS-485	

Table 4-5: COM3 Setup Jumper Settings

4.6 Chassis Installation

After the CPU, the cooling kit, and the DIMM modules have been installed and after the internal peripheral connectors have been connected to the peripheral devices and the jumpers have been configure, the motherboard can be mounted into chassis.

To mount the motherboard into a chassis please refer to the chassis user guide that came with the product.

4.7 Rear Panel Connectors

4.7.1 LCD Panel Connection

The conventional CRT monitor connector, VGA1, is a 15-pin, female D-SUB connector. Pin assignments can be seen in that can be connected to external monitors.

4.7.2 Ethernet Connection

The rear panel RJ-45 connectors can be connected to an external LAN and communicate with data transfer rates up to 1Gb/s.

4.7.3 USB Connection

The rear panel USB connectors provide easier and quicker access to external USB devices. The rear panel USB connector is a standard connector and can easily be connected to other USB devices.

4.7.4 Keyboard and Mouse Connection

A PS/2 keyboard and a PS/2 mouse can be connected to the appropriate PS/2 connector on the rear panel.

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Chapter

5

Award BIOS Setup

5.1 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 that may be changed.

5.1.1 Starting Setup

The Phoenix Award BIOS is activated when the computer is turned on. 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, restart the computer and try again.

5.1.2 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 below.

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 do 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 5-1: BIOS Navigation Keys

5.1.3 Getting Help

When **F1** is pressed 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.

5.1.4 Unable to Reboot After Configuration Changes

If the system cannot be booted after changes are made, restore the CMOS defaults. The CPU card should come with a restore CMOS settings jumper. Refer to **Section ??** for more information.

5.1.5 Main BIOS Menu

Once the BIOS opens, the main menu (**BIOS Menu 1**) appears.

```
            Phoenix - AwardBIOS CMOS Setup Utility

   ▶ Standard CMOS Features          Load Fail-Safe Defaults

   ▶ Advanced BIOS Features          Load Optimized Defaults

   ▶ Advanced Chipset Features       Set Supervisor Password

   ▶ Integrated Peripherals          Set User Password

   ▶ Power Management Setup          Save & Exit Setup

   ▶ PnP/PCI Configurations          Exit Without Saving

   ▶ PC Health Status


   Esc : Quit      F9 : Menu in BIOS      ↑ ↓ → ←   : Select Item
   F10 : Save & Exit Setup

                 Time, Date, Hard Disk Type...
```

BIOS Menu 1: Award BIOS CMOS Setup Utility

![NOTE icon] **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.

- **Standard CMOS Features**: Changes the basic system configuration.
- **Advanced BIOS Features**: Changes the advanced system settings.
- **Advanced Chipset Features**: Changes the chipset configuration features.
- **Integrated Peripherals**: Changes the settings for integrated peripherals.
- **Power Management Setup**: Configures power saving options.
- **PnP/PCI Configurations**: Changes the advanced PCI/PnP settings.
- **PC Health Status**: Monitors essential system parameters.

The following user configurable options are also available in **BIOS Menu 1**:

➔ **Load Fail-Safe Defaults**

Use the **Load Fail-Safe Defaults** option to load failsafe default values for each BIOS parameter in the setup menus. Press **F6** for this operation on any page.

➔ **Load Optimized Defaults**

Use the **Load Optimized Defaults** option to load optimal default values for each BIOS parameter in the setup menus. Press **F7** for this operation on any page.

➔ **Set Supervisor Password**

Use the **Set Supervisor Password** option to set the supervisor password. By default, no supervisor password is set. To install a supervisor password, select this field and enter the password. After this option is selected, a red dialogue box appears with "**Enter Password:** ". Type the password and press **ENTER**. Retype the original password into the "**Confirm Password:** " dialogue box and press **ENTER**. To disable the password, simply press **ENTER** in the "**Enter Password:** " dialogue box, then press any key in the "**Password Disabled !!!**" dialogue box.

➔ **Set User Password**

Use the **Set User Password** option to set the user password. By default no user password is set. To install a user password, select this field and enter the password. After this option is selected, a red dialogue box appears with "**Enter Password:** ". Type the password and press **ENTER**. Retype the original password into the "**Confirm Password:** " dialogue box and press **ENTER**. To disable the password, simply press **ENTER** in the "**Enter Password:** " dialogue box, then press any key in the "**Password Disabled !!!**" dialogue box.

➔ **Save & Exit Setup**

Use the **Save & Exit Setup** option to save any configuration changes made and exit the BIOS menus.

➔ **Exit Without Saving**

Use the **Exit Without Saving** option to exit the BIOS menus without saving any configuration changes.

5.2 Standard CMOS Features

Use the Standard CMOS Features BIOS menu (BIOS Menu 2) to set basic BIOS configuration options.

```
              Phoenix - AwardBIOS CMOS Setup Utility
                      Standard CMOS Features
   Date (mm:dd:yy)          Sun, Aug 29 1999         Item Help
   Time (hh:mm:ss)          14 : 20 : 59
                                                  Menu Level    ▶
 ▶ IDE Primary Master
 ▶ IDE Primary Slave                              Change the day, month,
                                                  year and century
   Drive A                  [None]
   Halt On                  [All , But Keyboard]

   Base Memory                   1K
   Extended Memory               1K
   Total Memory                512K




↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
    F5: Previous Values    F6: Fail-Safe Defaults   F7: Optimized Defaults
```

BIOS Menu 2: Standard CMOS Features

➔ **Date [Day mm:dd:yyyy]**

Use the **Date** option to set the system date.

➔ **Time [hh/mm/ss]**

Use the **Time** option to set the system time.

➔ **IDE Master and IDE Slave**

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

- ◼ IDE Primary Master
- ◼ IDE Primary Slave
- ◼ IDE Secondary Master

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■   IDE Secondary Slave

IDE device configurations are changed or set in the IDE Configuration menu. If an IDE device is detected, and one of the above listed two BIOS configuration options is selected, the IDE configuration options shown in **Section 5.2.1** appear.

➔ **Drive A [None]**

Use the **Drive A/B** configuration to specify the floppy drive type installed in the system. The floppy drive configuration options are:

■   None
■   360K, 5.25 in.
■   1.2M, 5.25 in.
■   720K, 3.5 in.
■   1.44M, 3.5in (Default)
■   2.88M, 3.5 in.

➔ **Halt On [All, But Keyboard]**

Use the **Halt On** option to specify what errors detected during the power up process stop the system.

➔ **All Errors**   Whenever BIOS detects a non-fatal error the system is stopped and the user prompted.

➔ **No Errors**   The system boot is not stopped for any errors that may be detected.

➔ **All, But Keyboard**   (Default)   The system boot does not stop for a keyboard error; it stops for all other errors.

➔ **All, But Diskette**   The system boot does not stop for a disk error; it stops for all other errors.

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

➔ **Base Memory:**

The **Base Memory** is NOT user configurable. The POST determines the amount of base (or conventional) memory installed in the system. The value of the base memory is typically 512K for systems with 512K memory installed, or 640K for systems with 640K or more memory installed.

➔ **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.

5.2.1 IDE Primary Master/Slave

Use the IDE Primary Master/Slave menu to set or change the master/slave IDE configurations.

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

Use the **IDE HDD Auto-Detection** option to enable BIOS to automatically detect the IDE settings. Select **IDE HDD Auto-Detection** and press **ENTER.** BIOS automatically detects the HDD type. Do not set this option manually.

➔ **IDE Primary Master [Auto]**

Use the **IDE Primary Master** option to activate or deactivate the following drive channels:

- Channel 0 Master
- Channel 0 Slave
- Channel 1 Master
- Channel 0 Slave

➔   **None**   If no drives are connected to the IDE channel select this

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option. Once set, this IDE channel becomes inaccessible and any drives attached to it are undetected.

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

➔ **Manual** Selecting this option allows manual configuration of the device on the IDE channel in BIOS.

➔ **Access Mode [Auto]**

The **Access Mode** option can only be configured if the BIOS configuration option is set to either **Manual** or **Auto**.. Use the **Access Mode** option 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 mode 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 indicates the storage capacity of the HDD installed in the system.

➔ **Cylinder**

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

➜ **Head**

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

➜ **Precomp**

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

➜ **Landing Zone**

The **Landing Zone** specification indicates where the disk head will park itself after the system powers off.

➜ **Sector**

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

5.3 Advanced BIOS Features

Use the **Advanced BIOS Features** menu (**BIOS Menu 3**) to configure the CPU and peripheral device configuration options.

```
                    Phoenix - AwardBIOS CMOS Setup Utility
                             Advanced BIOS Features
┌──────────────────────────────────────────────────┬─────────────────────────┐
│  Virus Warning            [Disabled]              │       Item Help         │
│  CPU Internal Cache       [Enabled]               ├─────────────────────────┤
│  Quick Power On Self Test [Enabled]               │ Menu Level   ▶          │
│  Boot From Lan Control    [Disabled]              │                         │
│  SATA Boot Rom Control    [Disabled]              │ Allows you to choose    │
│  First Boot Device        [Floppy]                │ the VIRUS warning       │
│  Second Boot Device       [HDD-0]                 │ feature for IDE Hard    │
│  Third Boot Device        [LS120]                 │ Disk boot sector        │
│  Boot Other Device        [Enabled]               │ protection. If this     │
│  Boot Up Floppy Seek      [Enabled]               │ function is enabled      │
│  Boot Up NumLock Status   [On]                    │ and someone attempt to  │
│  Gate A20 Option          [Fast]                  │ write data into this    │
│  Typematic Rate Setting   [Disabled]              │ area ,  BIOS will show  │
│ x Typematic Rate (Chars/Sec) 6                    │ a warning message on    │
│ x Typematic Delay (Msec)     250                  │ screen and alarm beep   │
│  Security Option          [Setup]                 │                         │
│  OS Select For DRAM > 64MB [Non-OS2]              │                         │
│  Delay For HDD (Secs)     [ 3]                    │                         │
│  Small Logo(EPA) Show     [Disabled]              │                         │
├──────────────────────────────────────────────────┴─────────────────────────┤
│ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help│
│    F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults   │
└──────────────────────────────────────────────────────────────────────────────┘
```

BIOS Menu 3: Advanced BIOS Features

➔ **Virus Warning [Disabled]**

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 are running such a program, it is recommended that the virus protection function be disabled beforehand.

Use the **Virus Warning** option to enable BIOS to monitor the boot sector and partition table of the HDD for any attempted modification. If a modification attempt is made, the BIOS halts the system and an error message appears. If necessary, an anti-virus program can then be run to locate and remove the virus 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 appears when there is an attempt to access the boot sector or HDD partition table.

➔ **CPU Internal Cache [Enabled]**

Use the **CPU Internal Cache** option to enable or disable the internal CPU cache.

➔ **Disabled** The internal CPU cache is disabled.

➔ **Enabled** (Default) The internal CPU cache is enabled.

➔ **Quick Power On Self Test [Enabled]**

Use the **Quick Power On Self Test** option to speed up the POST after the computer is turned on. If enabled, BIOS shortens or skips some POST check items.

➔ Disabled Normal POST occurs after the computer is turned on.

➔ Enabled (Default) Quick POST occurs after the computer is turned on.

➔ **Boot From LAN Control [Disabled]**

Use the **BOOT From LAN Control** option to enable the system to be booted from a remote system.

➔ **Disabled** (Default) The system cannot be booted from a remote system through the LAN.

➔ **Enabled** The system can be booted from a remote system through the LAN.

➔ **SATA Boot ROM Control [Disabled]**

Use the **SATA Boot ROM Control** option to configure SATA IDE use in DOS mode.

➔ **Disabled** (Default) Disables SATA IDE use in DOS mode.

➔ **Enabled** Enables SATA IDE use in DOS mode.

➔ **Boot Device**

Use the **Boot Device** options to select the order of the devices the system boots from. There are three boot device configuration options:

- **First Boot Device** [Default: HDD-0]
- **Second Boot Device** [Default: CDROM]
- **Third Boot Device** [Default: SCSI]

Using the default values, the system first looks for a HDD to boot from. If it cannot find an HDD, it boots from a CD-ROM. If both The HDD and the CD-ROM are unavailable, the system boots from a SCSI drive.

Boot Device configuration options are:

- Floppy
- LS120
- HDD-0
- SCSI
- CDROM
- HDD-1
- HDD-2
- HDD-3
- ZIP100
- USB-FDD
- USB-ZIP
- USB-CDROM
- USB-HDD
- LAN
- Disabled

➔ **Boot Other Device [Enabled]**

Use the **Boot Other Device** option to determine whether the system uses a second or third boot device if the first boot device is not found.

➔ **Disabled**   The system does not look for second and third boot

devices if the first one is not found.

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

➔   **Boot Up Floppy Seek [Disabled]**

Use the **Boot Up Floppy Seek** option to enable the BIOS to determine if the floppy disk drive installed has 40 or 80 tracks during the POST. 360K FDDs have 40 tracks while 760K, 1.2M and 1.44M FDDs all have 80 tracks.

➔ **Disabled**   (Default)   BIOS does not search for the type of FDD drive by track number. Note that there is no warning message if the drive installed is 360K.

➔ **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.

➔   **Boot Up Numlock Status [On]**

Use the **Boot Up Numlock Status** option to specify the default state of the numeric keypad.

➔ **Off**   The keys on the keypad are not activated.

➔ **On**   (Default)   Activates the keys on the keypad.

➔   **Gate A20 Option [Fast]**

Use the **Gate A20 Option** option to set if the keyboard controller or the chipset controls the Gate A20 switching.

➔ **Normal**   The keyboard controller does the switching.

➔ **Fast**   (Default)   The chipset does the switching.

➔ **Typematic Rate Setting [Disabled]**

Use the **Typematic Rate Setting** configuration option to specify if only one character is allowed to appear on the screen if a key is continuously held down. When this option is enabled, the BIOS reports as before, but it then waits a moment, and, if the key is still held down, it begins to report that the key has been pressed repeatedly. This feature accelerates cursor movement with the arrow keys.

➔ **Disabled** (Default) Disables the typematic rate.

➔ **Enabled** Enables the typematic rate.

➔ **Typematic Rate (Chars/sec) [6]**

The **Typematic Rate** option can only be configured if the **Typematic Rate Setting** is enabled. Use the **Typematic Rate** option to specify 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

➔ **Typematic Delay (Msec) [250]**

The **Typematic Rate** option can only be configured if the **Typematic Rate Setting** is enabled. Use the **Typematic Delay** option to specify the delay time between when a key is first pressed and when the acceleration begins.

➔ **250** (Default) 250 milliseconds

➔ **500** 500 milliseconds

➔ **750** 750 milliseconds

➔ **1000** 1000 milliseconds

➔ **Security Option [Setup]**

Use the **Security Option** to limit access to both the system and Setup, or just Setup.

➔ **Setup** (Default) The system does not boot and access to Setup is denied if the correct password is not entered at the prompt.

➔ **System** The system boots, but access to Setup is 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, don't type anything, press ENTER and the security is disabled. Once the security is disabled, the system boots and Setup can be accessed.

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

Use the **OS Select For DRAM > 64MB** option to specify the operating system.

➔ **Enabled** Specifies the operating system used as OS/2.

➔ **Disabled** (Default) Select this option when not using the OS/2 operating system.

➔ **Video BIOS Shadow [Enabled]**

Use the **Video Bios Shadow** option to enable video BIOS to be copied to RAM.

IEI® Technology, Corp.

➔ **Disabled**   Video BIOS is not copied to RAM.

➔ **Enabled** (Default)   Video BIOS is copied to RAM.

➔ **Delay for HDD (secs) [3]**

Use the **Delay for HDD** option to specify the period of time the system should wait before the HDD is identified. If selected, the user is asked to enter a number between 0 and 15. The number specified is the number of seconds the system waits before the HDD is identified.

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

Use the **Small Logo (EPA) Show** option to specify if the Environmental Protection Agency (EPA) logo appears during the system boot-up process. If enabled, the boot up process may be delayed.

➔ **Disabled** (Default)   EPA logo does not appear during boot up.

➔ **Enabled**   EPA logo appears during boot up.

5.4 Advanced Chipset Features

Use the Advanced Chipset Features menu (BIOS Menu 4) to change chipset configuration options.

```
          Phoenix - AwardBIOS CMOS Setup Utility
                 Advanced Chipset Features
    CPU Frequency            [500 MHz]           Item Help
    Memory Frequency         [DDR 333]
    CAS Latency              [Auto]         Menu Level    ▶
    Interleave Select        [LOI]
    Video Memory Size        [   8 M]

    Output display           [CRT]
  x Flat Panel Configuration   Press Enter

    Onboard Audio            [Enabled]




↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
    F5: Previous Values    F6: Fail-Safe Defaults   F7: Optimized Defaults
```

BIOS Menu 4: Advanced Chipset Features

➔ **CPU Frequency [500MHz]**

Use the **CPU Frequency** option to set the CPU frequency. The **CPU Frequency** options are:

- Auto
- 200MHz
- 333MHz
- 400MHz
- 433MHz
- 500MHz (Default)

➔ **Memory Frequency [333MHz]**

Use the **Memory Frequency** option to set the frequency of the installed DRAM modules. The **Memory Frequency** options are:

- 200MHz
- 266MHz
- 333MHz (Default)
- 400MHz

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➔ **CAS Latency [Auto]**

Use the **CAS Latency Time** option to set the Column Address Strobe (CAS) delay time. The **CAS Latency Time** options are:

- Auto (Default)
- 1.5 nanoseconds
- 2.0 nanoseconds
- 2.5 nanoseconds
- 3.0 nanoseconds
- 3.5 nanoseconds

➔ **Interleave Select [LOI]**

Use the **Interleave Select** option to specify how the cache memory is interleaved.

➔ **LOI**   (Default)   Low order interleaving (LOI) of memory occurs.

➔ **HOI**   High order interleaving (HOI) of memory occurs.

➔ **Video Memory Size [8M]**

Use the **Video Memory Size** option to determine how much memory is allocated to the video graphics device. The **Video Memory Size** options are:

- None
- 8M (Default)
- 16M
- 32M
- 64M
- 128M
- 254M

➔ **Output Display [Panel & CRT]**

Use the **Output Display** configuration to specify the display devices the system is connected to. The **Output Display** options are:

- Flat Panel

■ CRT

■ Panel & CRT (Default)

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

Use the Flat Panel Configuration option to open the Flat Panel Configuration menu. The Flat Panel Configuration options are shown in Section 5.4.1.

➔ **OnBoard Audio [Enabled]**

Use the **OnBoard Audio** option to enable or disable the onboard codec.

➔ **Disabled** The onboard codec is disabled.

➔ **Enabled** (Default) The onboard codec is detected and enabled.

5.4.1 Flat Panel Configuration

Use the **Flat Panel Configuration** menu (**BIOS Menu 5**) to set the configuration settings for the flat panel screen connected to the system.

```
          Phoenix - AwardBIOS CMOS Setup Utility
                   Flat Panel Configuration
   Resolution              [ 800 X  600]              Item Help
   Data Bus Type           [ 9-24 bits, 1 ppc]
   Refresh Rate            [ 60 Hz]             Menu Level   ▶▶
   HSYNC Polarity          [High]
   VSYNC Polarity Active   [Low]                Configure the panel
   SHFCLK Active Period    [Free running]       resolution
   LP Active Period        [Free running]




   ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
      F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```

BIOS Menu 5: Flat Panel Configuration

➔ **Resolution [800 x 600]**

The **Resolution** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **Resolution** option to set the resolution of the flat panel screen connected to the system. The **Resolution** options are:

- 320 x 240
- 640 x 480
- 800 x 600 (Default)
- 1024 x 768
- 1152 x 864
- 1280 x 1024
- 1600 x 1200

→ **Data Bus Type [9 – 24 bits, 1 ppc]**

The **Data Bus Type** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **Data Bus Type** option to set the bus type and the data bus width used to transfer data between the system and the flat panel screen connected to the system. The **Data Bus Type** options are:

- 9-24 bits, 1 ppc (Default)
- 18, 24 bits, 2 ppc

→ **Refresh Rate [60Hz]**

The **Refresh Rate** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **Refresh Rate** option to set the screen refresh rate required by the panel connected to the system. Check the documentation that came with the panel before setting this option. The **Refresh Rate** options are:

- 60Hz (Default)
- 70Hz
- 72Hz
- 75Hz
- 85Hz
- 90Hz
- 100Hz

➔ **HSYNC Polarity [High]**

The **HSYNC Polarity** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **HSYNC Polarity** option to set the polarity of the HSYNC signal to the panel. The **HSYNC Polarity** options are:

- ■ High
- ■ Low (Default)

➔ **VSYNC Polarity Active [Low]**

The **VGSYNC Polarity Active** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **VGSYNC Polarity Active** option to set the polarity of the VSYNC signal to the panel. The **VGSYNC Polarity Active** options are:

- ■ High
- ■ Low (Default)

➔ **SHFCLK Active Period [Free Running]**

Use the **SHFCLK Active Period** option to set the SHFCLK. The **SHFCLK Active Period** options are:

- ■ Active Only
- ■ Free running (Default)

➔ **LP Active Period [Free Running]**

Use the **LP Active Period** option to set the LDE/MOD signal to the panel. The **LP Active Period** options are:

- ■ Active Only
- ■ Free running (Default)

5.5 Integrated Peripherals

Use the Integrated Peripherals menu (BIOS Menu 6) to change the configuration options for the attached peripheral devices.

```
              Phoenix - AwardBIOS CMOS Setup Utility
                       Integrated Peripherals
     On-Chip IDE Channel 1    [Enabled]              Item Help
     Master Drive PIO Mode     [Auto]
     Slave  Drive PIO Mode     [Auto]          Menu Level   ▶
     IDE Primary Master UDMA   [Auto]
     IDE Primary Slave  UDMA   [Auto]
     IDE DMA transfer access   [Enabled]
   ▶ IT8888 ISA Decode IO      [Press Enter]
   ▶ IT8888 ISA Decode Memory  [Press Enter]
     IDE HDD Block Mode        [Enabled]
     Onboard FDC Controller    [Enabled]
     Onboard Serial Port 1     [3F8/IRQ4]
     Onboard Serial Port 2     [2F8/IRQ3]

     Onboard Serial Port 3     [Disabled]
     Onboard Parallel Port     [378/IRQ7]
     Parallel Port Mode        [SPP]
     EPP Mode Select           [EPP1.7]
     ECP Mode Use DMA          [1]

  ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
      F5: Previous Values     F6: Fail-Safe Defaults    F7: Optimized Defaults
```

BIOS Menu 6: Integrated Peripherals

➔ **On-Chip IDE Channel 1 [Enabled]**

Use the **On-Chip IDE Channel 1** option to specify if the system uses the integrated primary IDE channel or not.

➔ **Disabled**   The primary IDE channel is not used.

➔ **Enabled**   (Default)   The primary IDE channel is used.

➔ **Drive PIO Mode [Auto]**

Use the **Drive PIO Mode** options below to select the Programmed Input/Output (PIO) mode for the following HDDs:

■ Master Drive PIO Mode
■ Slave Drive PIO Mode

➔ **Auto**   (Default)   The computer selects the correct mode.

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

➔ **Mode 1**   PIO mode 1 selected with a maximum transfer rate of 5.2MBps.

➔ **Mode 2**   PIO mode 2 selected with a maximum transfer rate of 8.3MBps.

➔ **Mode 3**   PIO mode 3 selected with a maximum transfer rate of 11.1MBps.

➔ **Mode 4**   PIO mode 4 selected with a maximum transfer rate of 16.6MBps.

➔ **Mode 5**   PIO mode 5 selected with a maximum transfer rate of 22.2MBps.

➔ **IDE UDMA [Auto]**

Use the **IDE UDMA** option below to select the Ultra DMA (UDMA) mode for the following HDDs:

■ IDE Primary Master UDMA
■ IDE Primary Slave UDMA

➔ **Auto**   (Default)   The computer selects the correct UDMA.

➔ **Disabled**   The UDMA for the HDD device is disabled.

➔ **IT8888 ISA Decode IO**

Use the IT8888 ISA Decode IO menu (**BIOS Menu 7**) to set the IO memory range for the onboard ISA. See **Section 0**.

➔ **IT8888 ISA Decode Memory**

Use the **IT8888 ISA Decode Memory** (**BIOS Menu 8**) to set the resources for the onboard ISA bus. See **Section 5.5.2**.

➔ **IDE HDD Block Mode [Enabled]**

If the drive connected to the system supports block mode, use the **IDE HDD Block Mode** option to enable the system to detect the optimal number of block read/writes per sector the system IDE drive can support. Block mode is also called block transfer, multiple commands, or multiple sector read/write.

➔ **Disabled**   Block mode is not supported.

➔ **Enabled**   (Default)   Block mode is supported.

➔ **Onboard FDC Controller [Disabled]**

Use the **Onboard FDC Controller** option to enable or disable the onboard floppy controller. If the system is not connected to a floppy disk or uses an adapter for the FDD, this option can be disabled.

➔ **Disabled**   (Default)   The FDD controller is disabled.

➔ **Enabled**   The FDD controller is enabled.

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

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

- Disabled
- 3F8/IRQ4 (Default)
- 2F8/IRQ3
- 3E8/IRQ4
- 2E8/IRQ3
- Auto

➔ **Onboard Serial Port 2 [2F8/IRQ3]**

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

- Disabled
- 3F8/IRQ4
- 2F8/IRQ3 (Default)
- 3E8/IRQ4
- 2E8/IRQ3

- Auto

➔ **Onboard Serial Port 3 [Disabled]**

Use the **Onboard Serial Port 3** option to select the I/O address and IRQ for the onboard serial port 2. The serial port can be disabled or the I/O address and the IRQ can be automatically selected by the BIOS. The **Onboard Serial Port 3** options are:

- Disabled (Default)
- 3F8/IRQ4
- 2F8/IRQ3
- 3E8/IRQ4
- 2E8/IRQ3
- Auto

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

Use the **Onboard Parallel Port** option to specify a logical LPT port address and corresponding interrupt for the physical parallel port. The **Onboard Parallel Port** options are:

- Disabled
- 378/IRQ7 (Default)
- 278/IRQ5
- 3BC/IRQ7

➔ **Parallel Port Mode [SPP]**

Use the **Parallel Port Mode** option to select parallel port operation mode.

➔ **SPP** (Default) The parallel port operates in the standard parallel port (SPP) mode. This parallel port mode works with most parallel port devices but is slow.

➔ **EPP** The parallel port operates 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 operates 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 is compatible with both ECP and EPP devices.

➔ **Normal**

➔ **EPP Mode Select [EPP1.7]**

The **EPP Mode Select** option is only available if the **Parallel Port Mode** option is set to EPP mode. Use the **EPP Mode Select** option to select the parallel port mode standard for the parallel port.

➔ **EPP1.9**   EPP 1.9 is selected as the EPP standard.

➔ **EPP1.7**   (Default)   EPP 1.7 is selected as the EPP standard.

➔ **ECP Mode Use DMA [1]**

The **ECP Mode Use DMA** option is only available if the **Parallel Port Mode** option is set to ECP mode. Use the **ECP Mode Use DMA** option to specify the DMA channel the parallel port must use in the ECP mode.

➔ **1**   The parallel port uses DMA Channel 1 in ECP mode.

➔ **3**   (Default)   The parallel port uses DMA Channel 3 in ECP mode.

5.5.1 IT8888 ISA Decode IO

NOTE:

Five PCI-104 devices can be stacked onto the WAFER-LX motherboard. If

these devices are stacked onto the board, the ISA bus space should be

enabled. If no PCI-104 devices are being used, disable all the buses. Disabling

these buses frees up system resources that can be allocated to other system

applications.

Use the IT8888 ISA Decode IO menu (**BIOS Menu 7** to set the IO memory range for the
onboard ISA.

```
                Phoenix - AwardBIOS CMOS Setup Utility
                        IT8888 ISA Decode IO
   Decode I/O Space 0          [Enabled]           ▲        Item Help
   Decode I/O Speed 0          [Fast Speed]
   Decode I/O Addr. 0 [15:0]   [0100]                   Menu Level    ►►
   Decode I/O Size  0          [ 64 Bytes]
   Decode I/O Space 1          [Enabled]
   Decode I/O Speed 1          [Fast Speed]
   Decode I/O Addr. 1 [15:0]   [0180]
   Decode I/O Size  1          [ 64 Bytes]
   Decode I/O Space 2          [Enabled]
   Decode I/O Speed 2          [Fast Speed]
   Decode I/O Addr. 2 [15:0]   [0200]
   Decode I/O Size  2          [128 Bytes]
   Decode I/O Space 3          [Enabled]
   Decode I/O Speed 3          [Fast Speed]
   Decode I/O Addr. 3 [15:0]   [03E0]
   Decode I/O Size  3          [  2 Bytes]
   Decode I/O Space 4          [Enabled]
   Decode I/O Speed 4          [Fast Speed]
   Decode I/O Addr. 4 [15:0]   [0300]           ▼
 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
    F5: Previous Values     F6: Fail-Safe Defaults    F7: Optimized Defaults
```

BIOS Menu 7: IT8888 ISA Decode IO

The IT8888 ISA Decode IO menu has the following common options:

- Decode I/O Space N
- Decode I/O Speed N
- Decode I/O Addr. N [15:0]
- Decode I/O Size N

Where N is an integer in the set [1, 2, 3, 4, 5] and represents a set for the PCI-104 devices that are attached to the system.

➔ **Decode IO Space N [Enabled]**

Use the **Decode IO Space N** option to allocate system resources to the ISA bridge and to enable the Nth PCI-104 to function correctly.

➔ **Disabled**   The Nth IO set is disabled and the system resources are reallocated to other applications.

➔ **Enabled** (Default) The Nth IO set is enabled and dedicated system resources are allocated to the Nth ISA bus.

➔ **Decode IO Speed N [Fast Speed]**

Use the **Decode IO Speed N** option to specify the speed of the Nth ISA bus. The following options are available:

- Fast Speed
- Middle Speed
- Slow Speed
- Subtractive Speed

➔ **Decode IO Address N 0:15 [xx]**

Use the **Decode IO Address N 0:15** option to allocate an address to the ISA bus. The address may range from **0001** to **FFFF**.

➔ **Decode IO Size N [Fast Speed]**

Use the **Decode IO Size N** option to specify the size of the ISA bus. The following options are available:

- 1 Byte
- 2 Bytes
- 4 Bytes
- 8 Bytes
- 16 Bytes
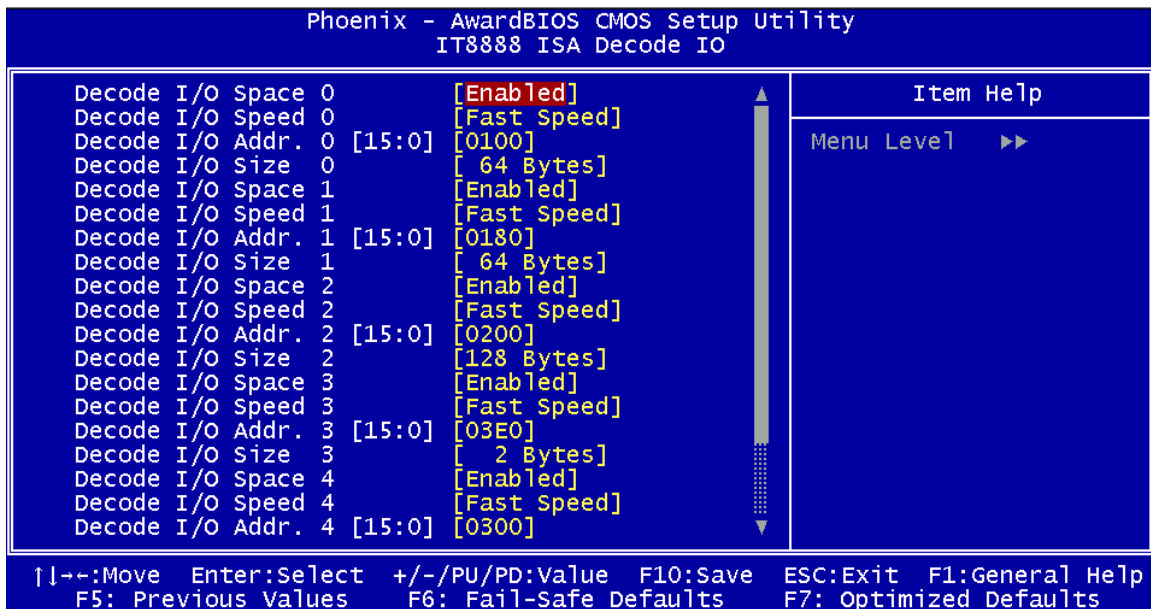- 32 Bytes
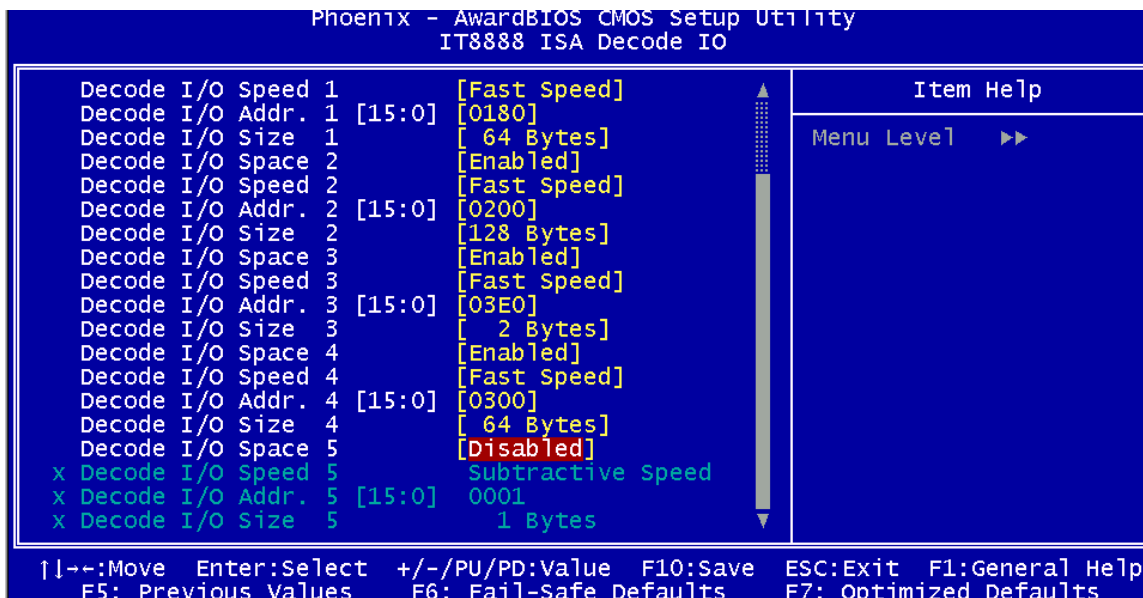- 64 Bytes
- 128 Bytes

5.5.2 IT8888 ISA Decode Memory

NOTE:

Five PCI-104 devices can be stacked onto the WAFER-LX motherboard. If
these devices are stacked onto the board, the ISA memory should be enabled.
If no PCI-104 devices are being used, disable all the memory allocations for
these buses. Disabling the memory allocations frees up system resources that
can be allocated to other system applications.

Use the IT8888 ISA Decode Memory (**BIOS Menu 8**) to set the resources for the onboard
ISA bus.

```
                  Phoenix - AwardBIOS CMOS Setup Utility
                        IT8888 ISA Decode Memory
     Decode Memory Space 0      [Enabled]                    Item Help
     Decode Memory Speed 0      [Fast Speed]
     Decode Memory Addr. 0      [D00]             Menu Level   ▶▶
     Decode Memory Size  0      [ 64 KB]
     Decode Memory Space 1      [Disabled]
   x Decode Memory Speed 1       Subtractive Speed
   x Decode Memory Addr. 1       000
   x Decode Memory Size  1        16 KB
     Decode Memory Space 2      [Disabled]
   x Decode Memory Speed 2       Subtractive Speed
   x Decode Memory Addr. 2       000
   x Decode Memory Size  2        16 KB
     Decode Memory Space 3      [Disabled]
   x Decode Memory Speed 3       Subtractive Speed
   x Decode Memory Addr. 3       000
   x Decode Memory Size  3        16 KB

↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
   F5: Previous Values    F6: Fail-Safe Defaults   F7: Optimized Defaults
```

BIOS Menu 8: IT8888 ISA Decode Memory

The IT8888 ISA Decode IO menu has the following common options:

- Decode Memory Space N
- Decode Memory Speed N
- Decode Memory Addr. N [15:0]
- Decode Memory Size N

WAFER-LX

Where N is an integer in the set [1, 2, 3, 4, 5] and represents a memory set for the PCI-104 devices that are attached to the system.

➔ **Decode Memory Space N [Enabled]**

Use the **Decode IO Memory N** option to allocate memory resources to the ISA bridge and to enable the PCI-104 to function correctly.

➔ **Disabled**   The Nth memory set is disabled and the system memory resources are reallocated to other applications.

➔ **Enabled**   (Default)   The Nth memory set is enabled and dedicated system memory resources are allocated to the ISA bus.

➔ **Decode Memory Speed N [Fast Speed]**

Use the **Decode Memory Speed N** option to specify the memory speed of the ISA bus. The following options are available:

- Fast Speed
- Middle Speed
- Slow Speed
- Subtractive Speed

➔ **Decode Memory Address N [xx]**

Use the **Decode Memory Address N** option to allocate an address to the memory of the ISA bus. The address may range from **0001** to **FFFF**.

➔ **Decode Memory Size N [xx]**

Use the Decode Memory **Size N** option to specify the memory size of the ISA bus. The following options are available:

- 16 KB
- 32 KB
- 64 KB
- 128 KB

- 256 KB

- 512 KB

- 1 MB

- 2 MB

5.6 Power Management Setup

Use the **Power Management Setup** menu (BIOS Menu 9) to set the BIOS power management and saving features.

```
              Phoenix - AwardBIOS CMOS Setup Utility
                       Power Management Setup
 x ACPI Function              Disabled           Item Help
   ACPI Suspend Type         [S1&S3]
   Power Management          [APM]           Menu Level   ▶

          ** PM Timers **
 x Standby Mode               Disabled
 x Suspend Mode               Disabled
   Soft-Off by PWR-BTTN      [Instant-Off]




↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
   F5: Previous Values     F6: Fail-Safe Defaults   F7: Optimized Defaults
```

BIOS Menu 9: Power Management Setup

➔ **ACPI Function [Disabled]**

Use the **ACPI Function** to enable the ACPI (Advanced Configuration and Power Interface) function.

Disabled   ACPI function disabled.

Enabled   (Default)   ACPI function enabled.

➔ **ACPI Suspend Type [S1(POS)]**

Use the **ACPI Suspend Type** BIOS option to specify the sleep state the system enters when not being used.

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

- ➔ **S3 (STR)** System appears off. The CPU has no power; RAM is in slow refresh; the power supply is in a reduced power mode.

- ➔ **S1 & S3** Both suspend modes are implemented

➔ **Power Management [ACPI]**

Use the **Power Management** option to set the power management type used by the system.

- ➔ **Disabled** All power management options are turned off. The only user configurable options are the power button and alarm settings.

- ➔ **Legacy** Standby and suspend modes can be set.

- ➔ **APM** (Default) Advanced power management (APM) is activated

   ACPI Advanced Configuration and Power Interface (ACPI) is activated.

➔ **x Standby Mode [Disabled]**

The **Standby Mode** option can only be selected if the **Power Management** option is set to Legacy. The **Standby Mode** specifies the amount of time the system can be inactive before the system enters standby mode. The **Standby Mode** options are:

- ■ Disabled (Default)

- 1 Sec
- 5 Sec
- 10 Sec
- 15 Sec
- 30 Sec
- 45 Sec
- 1 Min
- 5 Min
- 10 Min
- 15 Min
- 30 Min
- 45 Min
- 60 Min
- 90 Min
- 120 Min

➔ x Suspend Mode [Disabled]

The **Suspend Mode** option can only be selected if the **Power Management** option is set to Legacy. The **Suspend Mode** specifies the amount of time the system can be inactive before the system enters suspend mode. The **Suspend Mode** options are:

- Disabled (Default)
- 1 Sec
- 5 Sec
- 10 Sec
- 15 Sec
- 30 Sec
- 45 Sec
- 1 Min
- 5 Min
- 10 Min
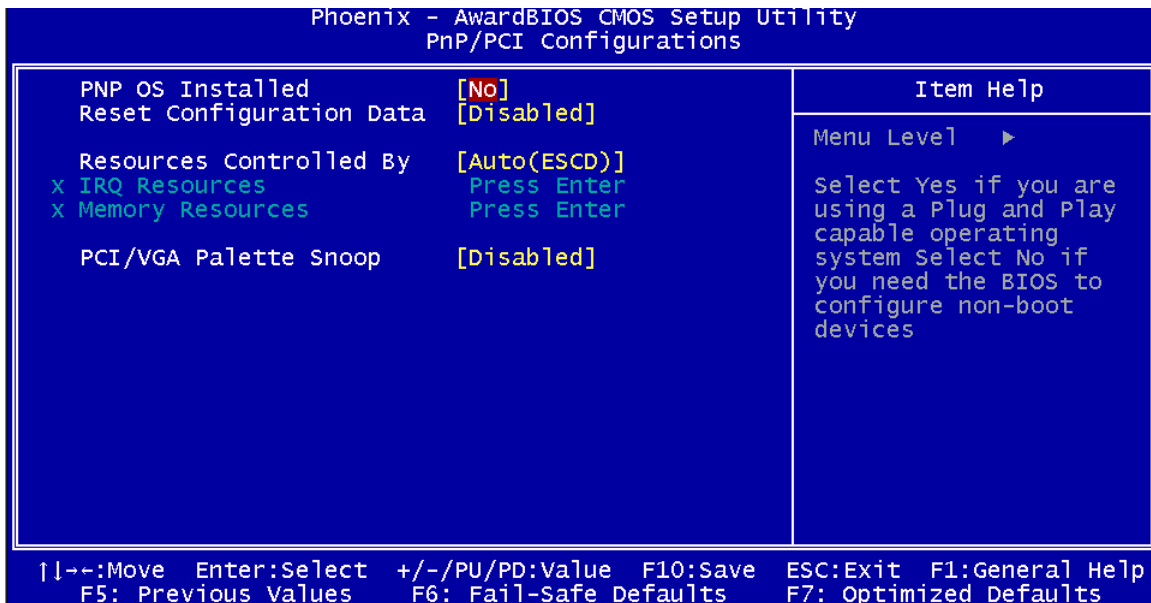- 15 Min
- 30 Min
- 45 Min
- 60 Min

- 90 Min
- 120 Min

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

Use the **Soft-Off by PWR-BTTN** option to enabled the system to enter a very low-power-usage state when the power button is pressed.

➔ **Instant-Off**   (Default)   When the power button is pressed, the system is immediately shutdown.

➔ **Delay 4-sec**   To shutdown the system the power button must be held down longer than four seconds otherwise the system enters a low power usage state.

5.7 PnP/PCI Configurations

Use the PnP/PCI Configurations menu (BIOS Menu 10) to set the plug and play, and PCI options.

```
             Phoenix - AwardBIOS CMOS Setup Utility
                    PnP/PCI Configurations
  ┌─────────────────────────────────────────┬──────────────────────────┐
  │ PNP OS Installed        [No]             │        Item Help         │
  │ Reset Configuration Data [Disabled]      │                          │
  │                                          │ Menu Level   ▶           │
  │ Resources Controlled By [Auto(ESCD)]     │                          │
  │ x IRQ Resources          Press Enter     │ Select Yes if you are    │
  │ x Memory Resources       Press Enter     │ using a Plug and Play    │
  │                                          │ capable operating        │
  │ PCI/VGA Palette Snoop    [Disabled]      │ system Select No if      │
  │                                          │ you need the BIOS to     │
  │                                          │ configure non-boot       │
  │                                          │ devices                  │
  │                                          │                          │
  │                                          │                          │
  │                                          │                          │
  │                                          │                          │
  ├──────────────────────────────────────────┴──────────────────────────┤
  │ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help │
  │   F5: Previous Values     F6: Fail-Safe Defaults   F7: Optimized Defaults     │
  └───────────────────────────────────────────────────────────────────────────┘
```

BIOS Menu 10: PnP/PCI Configurations

➔ **PNP OS Installed [No]**

The **PNP OS Installed** option determines whether the Plug and Play devices connected to the system are configured by the operating system or the BIOS.

➔ **No** (Default) If the operating system does not meet the Plug and Play specifications, BIOS configures all the devices in the system.

➔ **Yes** Set this option if the system is running Plug and Play aware operating systems. The operating system changes the interrupt, I/O, and DMA settings.

➔ **Reset Configuration Data [Disabled]**

Use the **Reset Configuration Data** option to reset the Extended System Configuration Data (ESCD) when exiting setup if booting problems occur after a new add-on is installed.

➔ **Disabled** (Default) ESCD will not be reconfigured
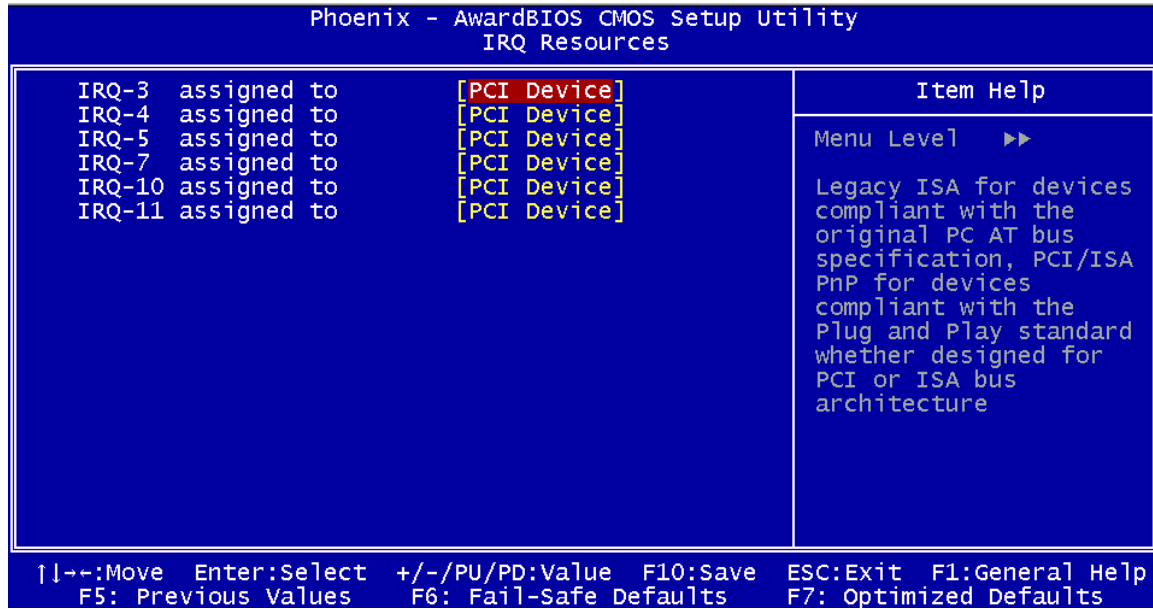
➔ **Enabled** ESCD will be reconfigured after you exit setup

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

Use the **Resources Controlled By** option to either manually configure all the boot and plug and play devices, or allow BIOS to configure these devices automatically. If BIOS is allowed to configure the devices automatically IRQs, DMA and memory base address fields cannot be set manually.

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

➔ **Manual** Manually configure the plug and play devices and any other boot devices.

➔   x IRQ Resources [Press Enter]

The IRQ Resources option (BIOS Menu 11) can only be selected if the Resources Controlled By option is set to Manual.

```
              Phoenix - AwardBIOS CMOS Setup Utility
                           IRQ Resources
   ┌──────────────────────────────────────────┬─────────────────────────┐
   │ IRQ-3  assigned to        [PCI Device]    │        Item Help        │
   │ IRQ-4  assigned to        [PCI Device]    │                         │
   │ IRQ-5  assigned to        [PCI Device]    │ Menu Level   ▶▶         │
   │ IRQ-7  assigned to        [PCI Device]    │                         │
   │ IRQ-10 assigned to        [PCI Device]    │ Legacy ISA for devices  │
   │ IRQ-11 assigned to        [PCI Device]    │ 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            │
   │                                           │                         │
   │                                           │                         │
   │                                           │                         │
   │                                           │                         │
   ├──────────────────────────────────────────┴─────────────────────────┤
   │ ↑↓→←:Move   Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help │
   │    F5: Previous Values      F6: Fail-Safe Defaults   F7: Optimized Defaults    │
   └─────────────────────────────────────────────────────────────────────┘
```

BIOS Menu 11: IRQ Resources

The **IRQ Resources** menu has the following options:

- IRQ-3 assigned to
- IRQ-4 assigned to
- IRQ-5 assigned to
- IRQ-7 assigned to
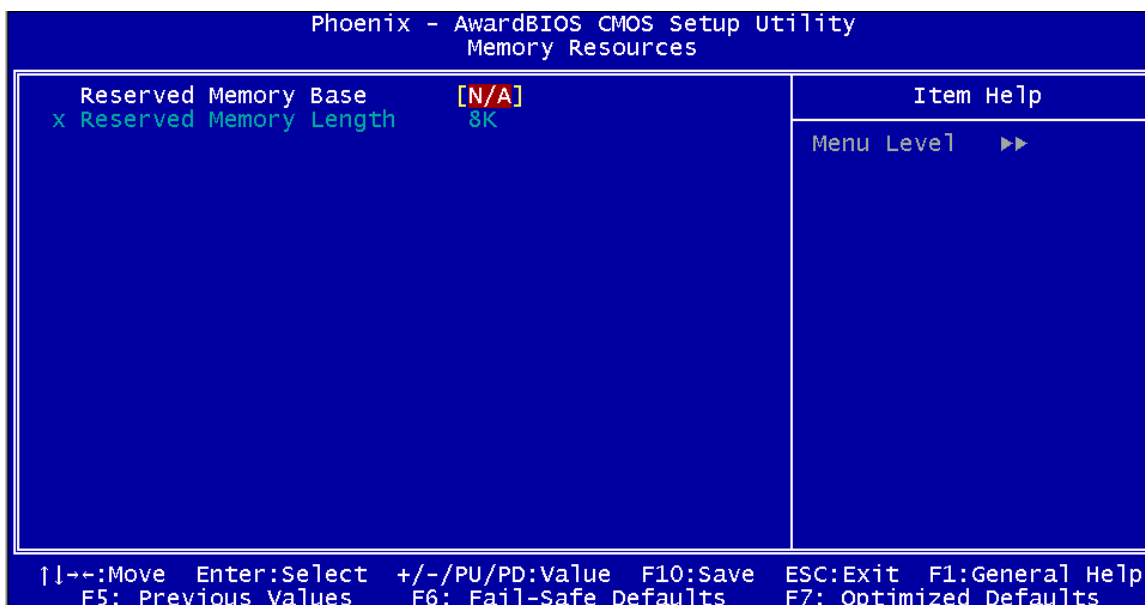- IRQ-10 assigned to
- IRQ-11 assigned to

The above options all have the following default options.

➔   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.

➔ **x Memory Resources [Press Enter]**

The Memory Resources menu (BIOS Menu 12) can only be accessed if the Resources Controlled By option is set to Manual. Use Memory Resources to select a base address and the length for the memory area used by a peripheral that requires high memory.

```
            Phoenix - AwardBIOS CMOS Setup Utility
                        Memory Resources
   ┌────────────────────────────────────────┬────────────────────────┐
   │  Reserved Memory Base      [N/A]        │       Item Help        │
   │ x Reserved Memory Length    8K          ├────────────────────────┤
   │                                         │  Menu Level    ▶▶      │
   │                                         │                        │
   │                                         │                        │
   │                                         │                        │
   │                                         │                        │
   │                                         │                        │
   │                                         │                        │
   │                                         │                        │
   │                                         │                        │
   │                                         │                        │
   │                                         │                        │
   └─────────────────────────────────────────────────────────────────┘
   ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
      F5: Previous Values     F6: Fail-Safe Defaults  F7: Optimized Defaults
```

BIOS Menu 12: Memory Resources

The menu has two configurable options:

■ Reserved Memory Base
■ Reserved Memory Length

➔ **Reserved Memory Base [N/A]**

The **Reserved Memory Base** option specifies the base address for the peripheral device. The **Reserved Memory Base** options are:

■ N/A (Default)
■ C800
■ CC00
■ D000

- D400
- D800
- DC00

➔ **x Reserved Memory Length [8K]**

The **Reserved Memory Length** option can only be accessed if the **Reserved Memory Base** option is not set to **N/A**. The **Reserved Memory Length** specifies the amount of memory reserved for the peripheral device. The **Reserved Memory Length** options:

- 8K (Default)
- 16K
- 32K
- 64K

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

Use the **PCI/VGA Palette Snoop** option to enable the system to 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 needed *very* rarely and should be left "Disabled" unless a video device specifically requires the setting to be enabled upon installation.

➔ **Disabled**   (Default)   Does not allow the graphics devices to examine the VGA palette on the graphics card.

➔ **Enabled**   Allows the graphics devices to examine the VGA palette on the graphics card.

5.8 PC Health Status

The **PC Health Status** menu (**BIOS Menu 13**) has no user configurable options, but shows system operating parameters that are essential to the stable operation of the system.

```
                  Phoenix - AwardBIOS CMOS Setup Utility
                            PC Health Status
┌────────────────────────────────────────────────┬─────────────────────────┐
│  Shutdown Temperature      [60°C/140°F]          │        Item Help        │
│  CPU Warning Temperature   [Disabled]            │                         │
│  Current CPU Temperature                         │  Menu Level    ▶        │
│  Current Fan Speed                               │                         │
│  Vcore                                           │                         │
│  +3.3V                                           │                         │
│  VccMem                                          │                         │
│  +5V                                             │                         │
│  +12V                                            │                         │
│  VBAT (V)                                        │                         │
│                                                  │                         │
│                                                  │                         │
│                                                  │                         │
│                                                  │                         │
│                                                  │                         │
│                                                  │                         │
├──────────────────────────────────────────────── ┴─────────────────────────┤
│  ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help │
│     F5: Previous Values    F6: Fail-Safe Defaults  F7: Optimized Defaults   │
└─────────────────────────────────────────────────────────────────────────┘
```
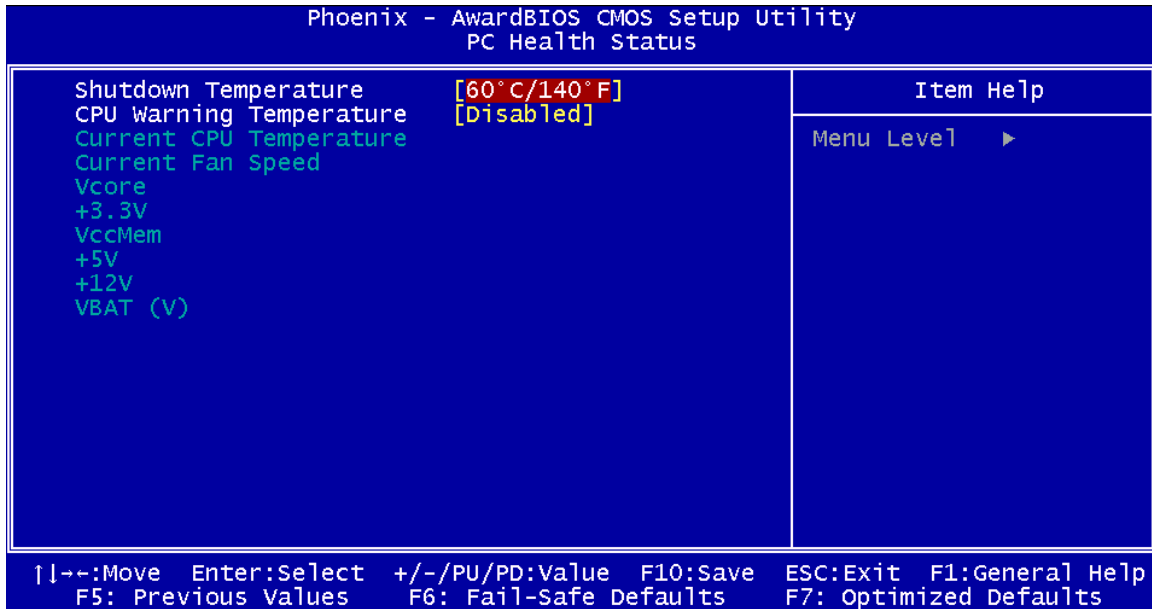
BIOS Menu 13: PC Health Status

The following system parameters are monitored by the **PC Health Status** menu.

➔ **Shutdown Temperature**

Use the Shutdown Temperature option to set the temperature when the system should automatically shutdown.

➔ **CPU Warning Temperature [Disabled]**

Use the CPU Warning Temperature option to set the CPU temperature that would automatically generate a warning.

➔ **Disabled**   (Default)   No warning is issued

➔ **Enabled**   When the CPU reaches a certain temperature, a new warning is issued

➔ **System Temperature**

The following temperatures are monitored:

■   Current CPU Temperature

➔ **System Fan**

The following system fans are monitored:

- Current System Fan

➔ **Voltages**

The following voltages are monitored:

- Vcore
- +3.3 V
- VccMem
- +5 V
- +12 V
- VBAT(V)

Chapter

6

Software Drivers

6.1 Available Software Drivers

NOTE:

> The content of the CD may vary throughout the life cycle of the product and is subject to change without prior notice. You may visit the IEI website or contact technical support for the latest updates.

There are five software drivers for the WAFER-LX motherboard installed in the subsystem:

- VGA Driver
- Audio Driver
- LAN Driver
- SATA/RAID Driver
- ISA Driver

All five drivers can be found on the CD that came with the CPU card. To install the drivers please follow the instructions in the sections below.

Insert the CD into the system that contains the WAFER-LX CPU card.

NOTE:

> If your system does not run the "autorun" program when the CD is inserted, click the **Start** button, select **Run**, then type **X:\autorun.exe** (replace **X** with the actual drive letter for your CD-ROM) to access the **IEI Driver CD** main menu.

Step 1: From the AMD LX/GX Driver CD main menu (**Figure 6-1**), click **WAFER-LX**.

Figure 6-1: AMD LX/GX CD Main Menu

Step 2:   A window appears listing the drivers available for installation (**Figure 6-2**).
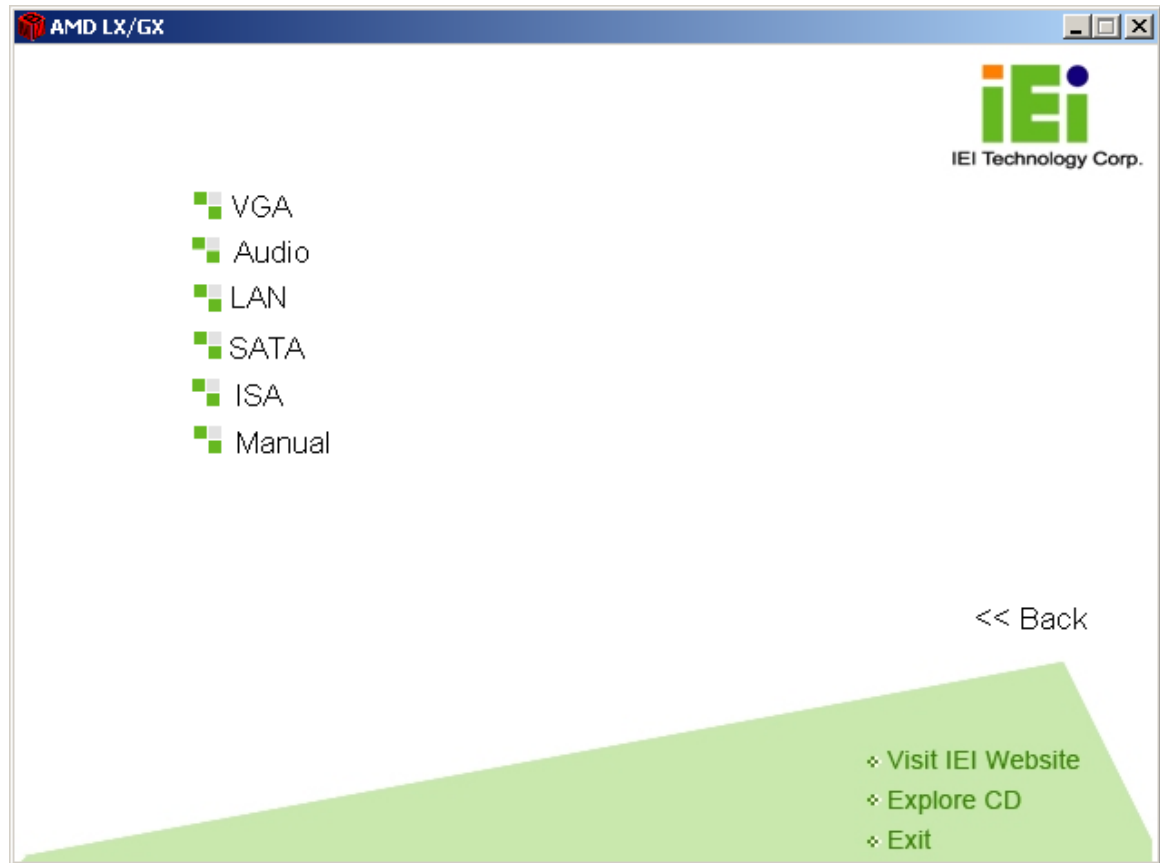
Figure 6-2: AMD LX/GX CD Driver Menu

Step 3: Select any item from the list to view more information on the driver installation, or select Manual to navigate to the WAFER-LX user manual.

The following sections fully describe the driver installation procedures for the WAFER-LX CPU card.

6.2 VGA Driver

To install the VGA driver please follow the steps below.

Step 1: Open **Windows Control Panel** (**Figure 6-3**).
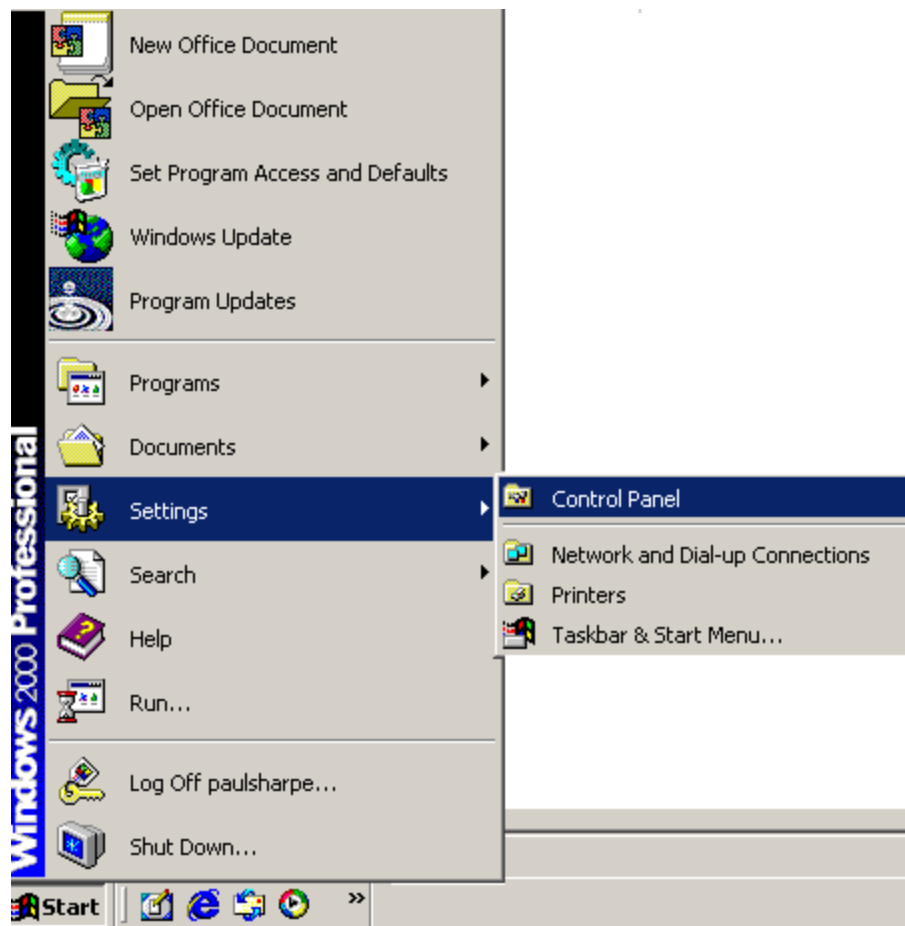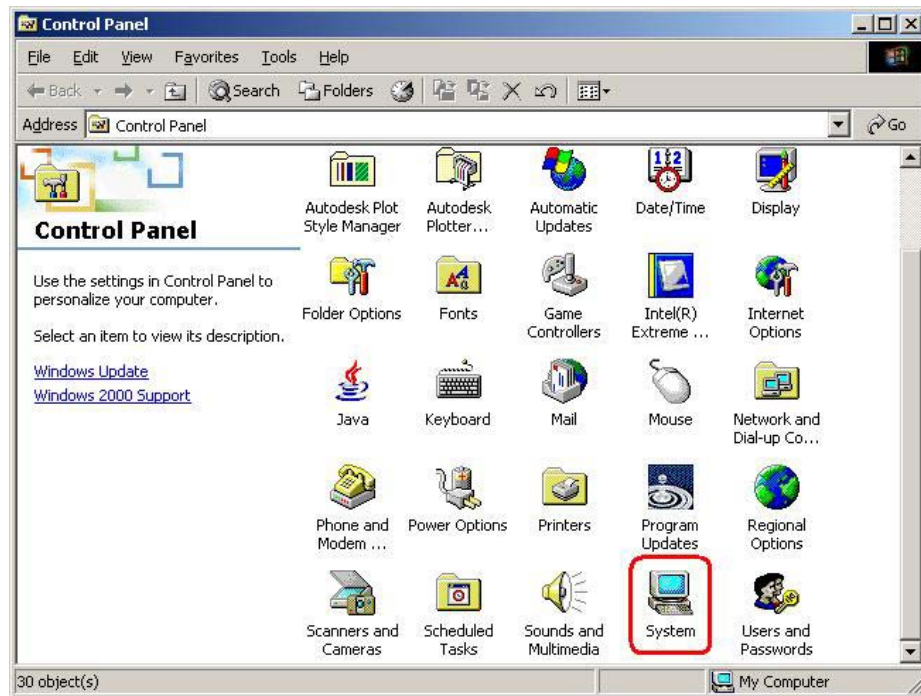
Figure 6-3: Access Windows Control Panel

Step 2: Double click the **System** icon (**Figure 6-4**).

Figure 6-4: Double Click the System Icon

Step 3: Double click the **Device Manager** tab (**Figure 6-5**).

Figure 6-5: Double Click the Device Manager Tab

Step 4: A list of system hardware devices appears (**Figure 6-6**).
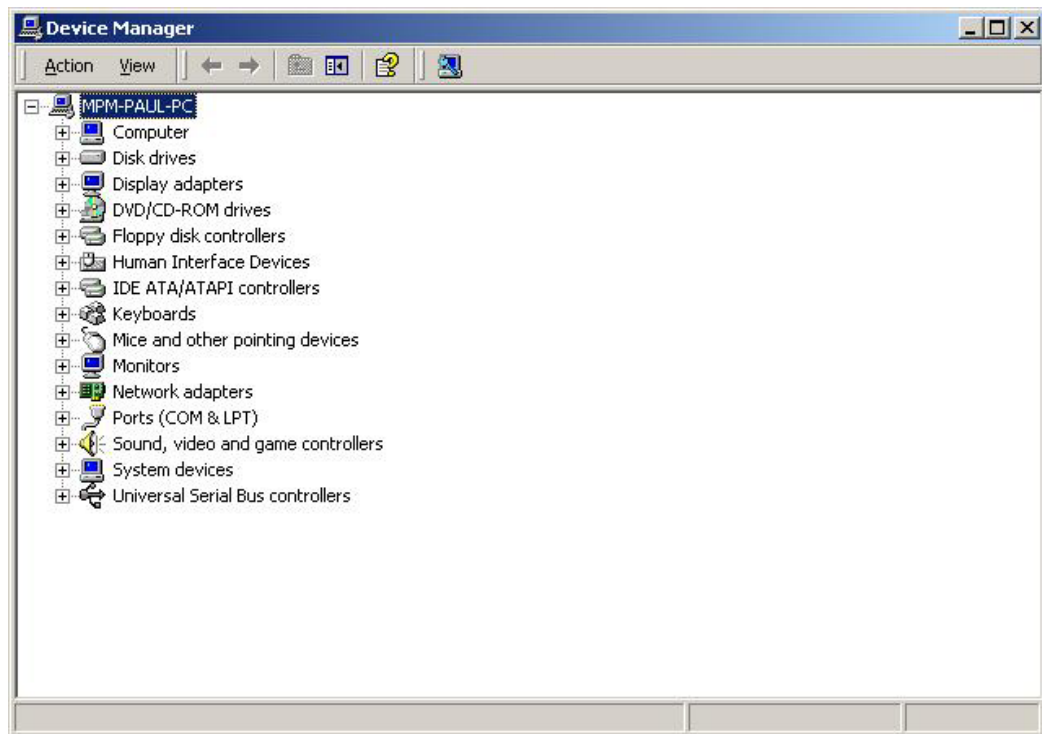
Figure 6-6: Device Manager List

Step 5: Expand the **Display Adapters** category (**Figure 6-7**). Right click the adapter and select **Properties**.

NOTE:

If the **Display Adapters** category is not available, navigate to **X:\VGA\LX800\XP\VGA 2.01.05** (where **X:** is the system CD drive) and read the **ReleaseNotes.txt** file for further information on installing the VGA driver.
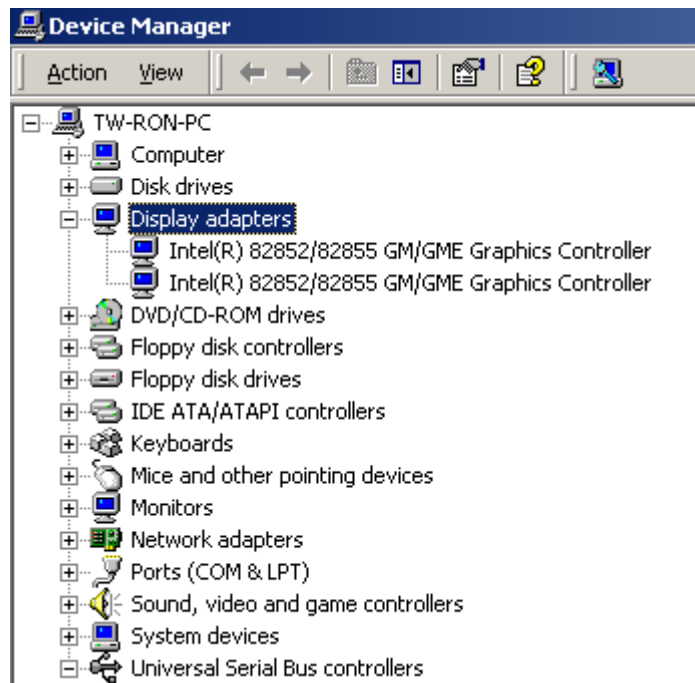
Figure 6-7: Expand the Display Adapters Category

Step 6: From the **Driver** tab of the **Properties** window, click **Update Driver** (**Figure 6-8**) or, click **Reinstall Driver** if **Update Driver** is not seen.

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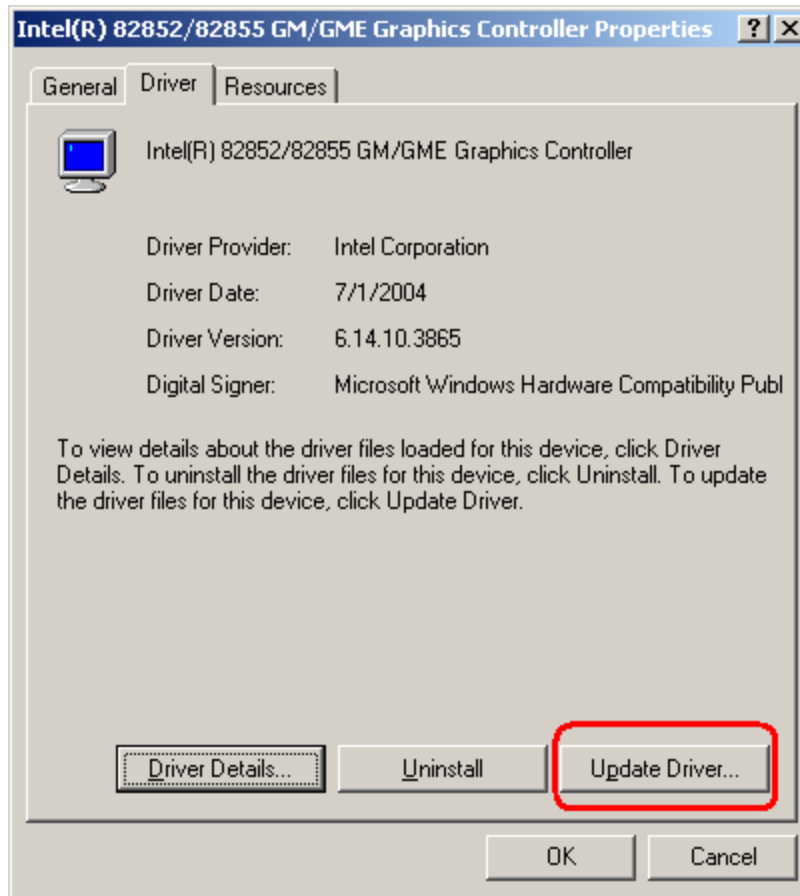
Figure 6-8: Update Driver

Step 7: The **Upgrade Device Driver Wizard** appears (**Figure 6-9**). Click **NEXT** to continue.

Figure 6-9: Upgrade Device Driver Wizard

Step 8: The **Install Hardware Device Driver** screen appears (**Figure 6-10**). Select the

Search for a suitable driver for my device radio button and click **NEXT** to

continue.

Figure 6-10: Search for Suitable Driver

Step 9: Select **Specify a Location** in the **Locate Driver Files** window (**Figure 6-11**).

Click **NEXT** to continue.
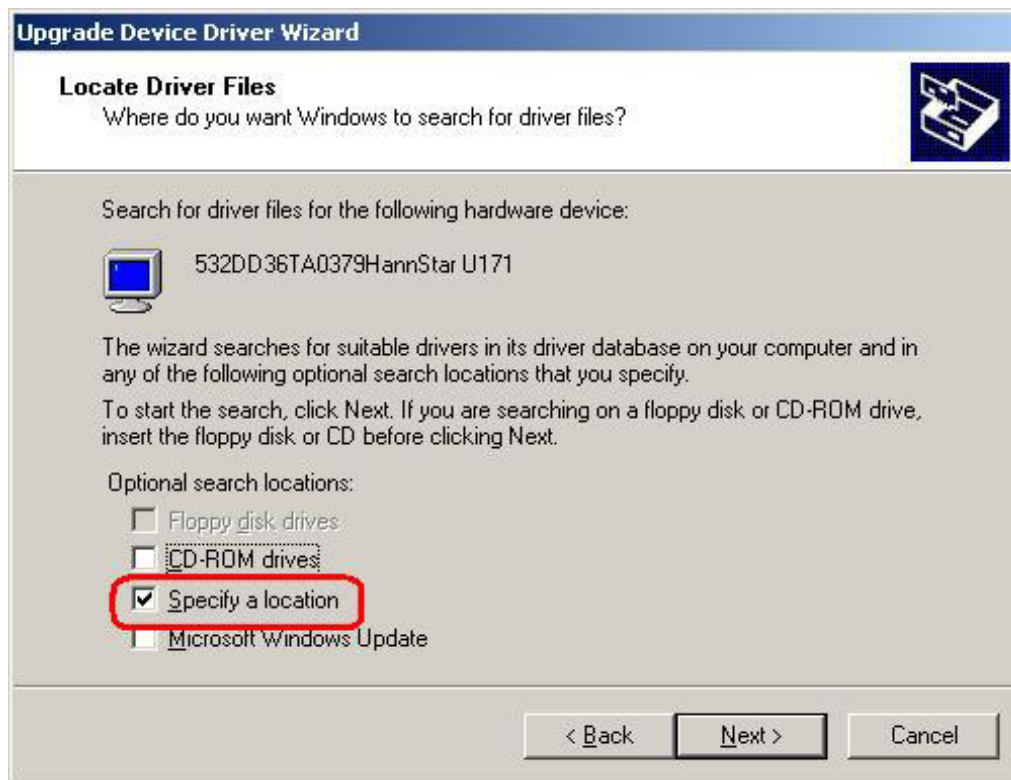
Figure 6-11: Locate Driver Files

Step 10: Click **Browse** and navigate to the **X:\AMD\LX800\XP\VGA 2.01.05** directory,

where "**X:"** is the system CD drive (**Figure 6-12**).
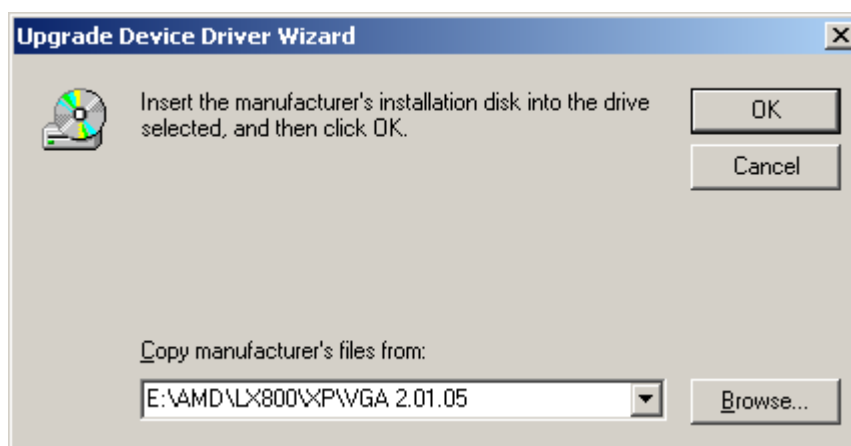
Figure 6-12: Location Browsing Window

Step 11: Click **OK** to continue.

Step 12: A driver files location menu window appears. Click **NEXT** to continue. The driver

is installed.

6.3 Audio Driver Installation

To install the audio driver please follow the steps below.

Step 1: Open **Windows Control Panel (Figure 6-13)**.
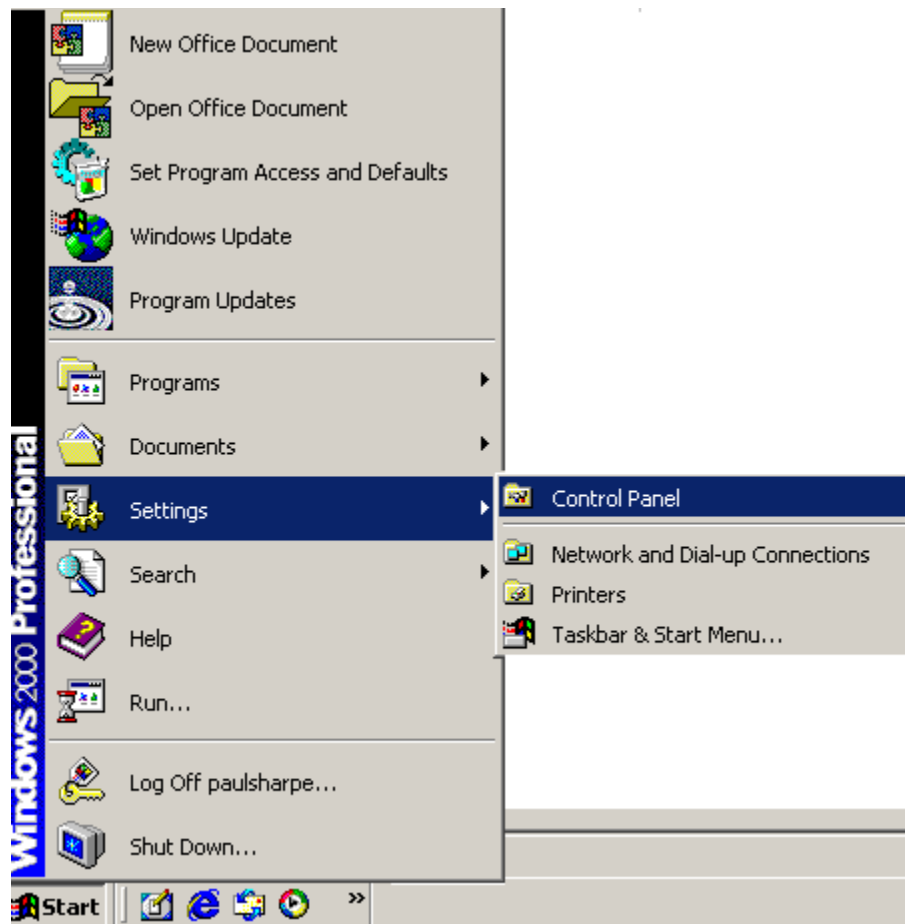
Figure 6-13: Access Windows Control Panel

Step 2: Double click the **System** icon (**Figure 6-14**).

Figure 6-14: Double Click the System Icon

Step 3: Double click the **Device Manager** tab (**Figure 6-15**).

Figure 6-15: Double Click the Device Manager Tab

Step 4: A list of system hardware devices appears (**Figure 6-16**).
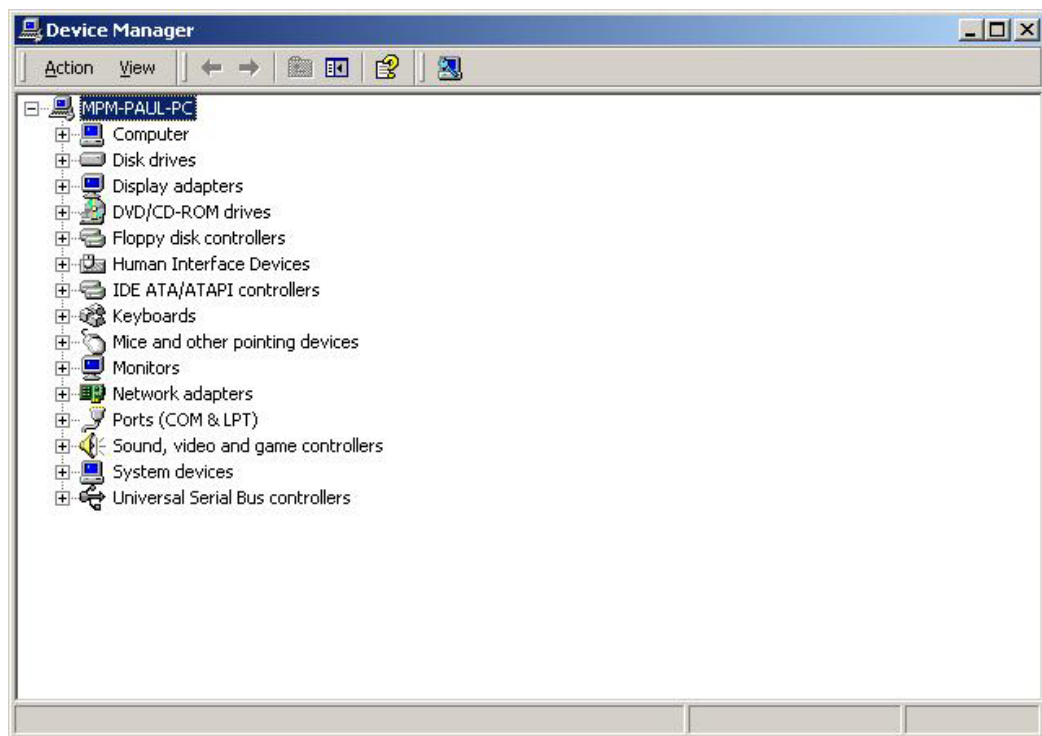
Figure 6-16: Device Manager List

Step 5: Double click the listed device that has question marks next to it. (This means

Windows does not recognize the device).

Step 6: The **Device Driver Wizard** appears (**Figure 6-17**). Click **NEXT** to continue.

Figure 6-17: Search for Suitable Driver

Step 7: Select "**Specify a Location**" in the **Locate Driver Files** window (**Figure 6-18**).

Click **NEXT** to continue.
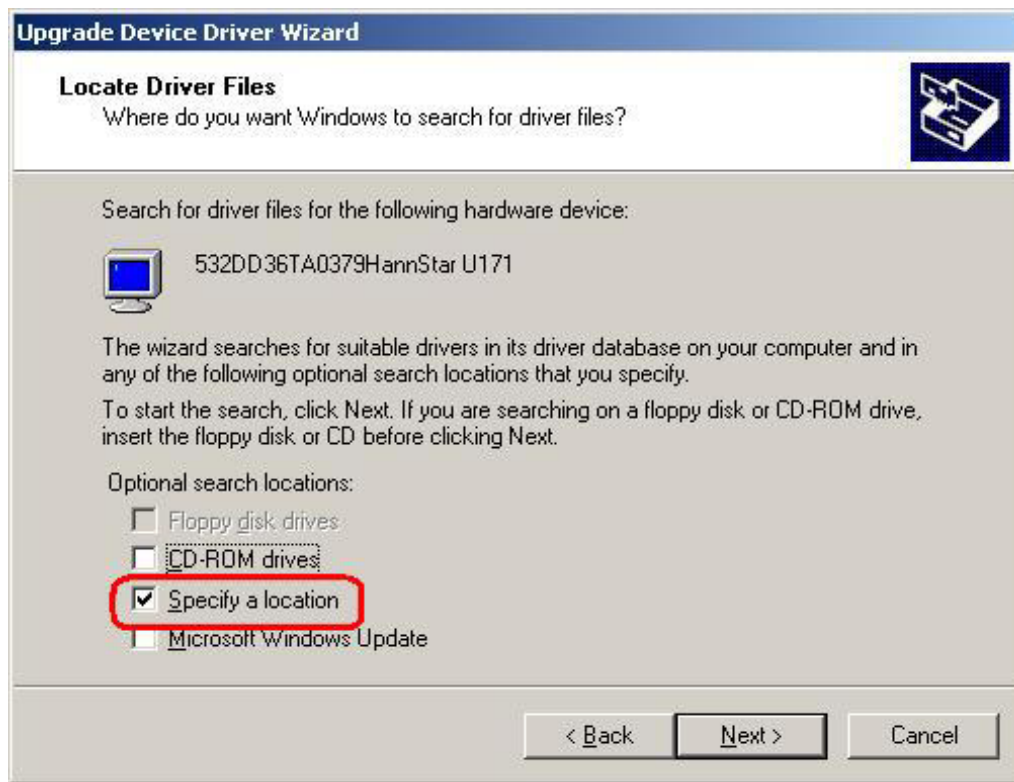
Figure 6-18: Locate Driver Files

Step 8: Select "**X:\ Audio\GeodeLX_XP_XPe_WDM_Audio_v2.03.00**" directory in the location browsing window, where "**X:**" is the system CD drive (**Figure 6-19**).
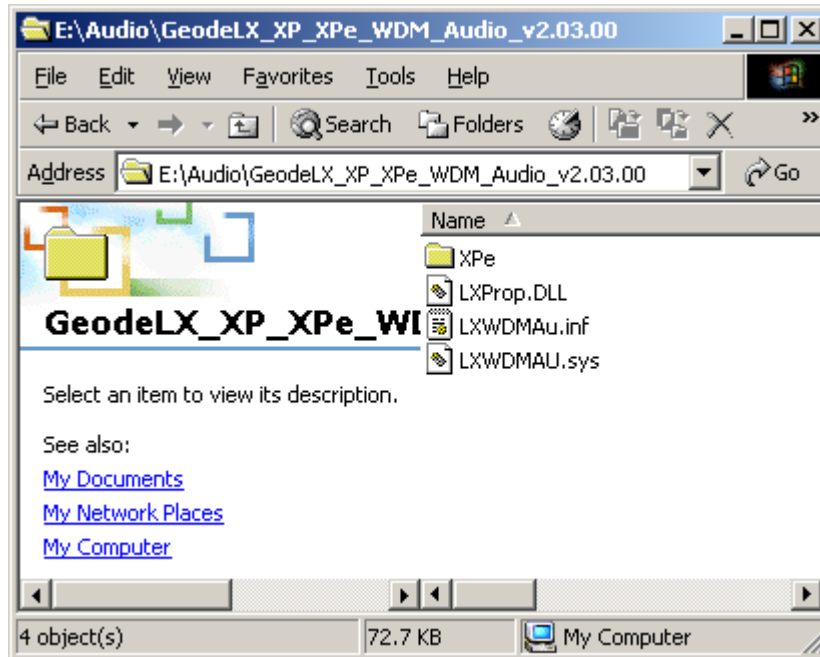
Figure 6-19: Location Browsing Window

Step 9:   Click **OK** to continue. A driver files location menu window appears. Select the

LXWDMAu.inf file and click **OPEN** to continue. The driver is installed.

6.4 LAN Driver

To install the LAN driver, please follow the steps below.

Step 1:   Click **LAN** from the **AMD LX/GX CD Driver Menu** to open a window to the

X:\LAN\Realtek (where **X:** is the system CD drive) folder on the driver CD.

Step 2:   Open the **RTL8100C** folder.

Step 3:   Locate the **Setup** program icon (**Figure 6-20**).

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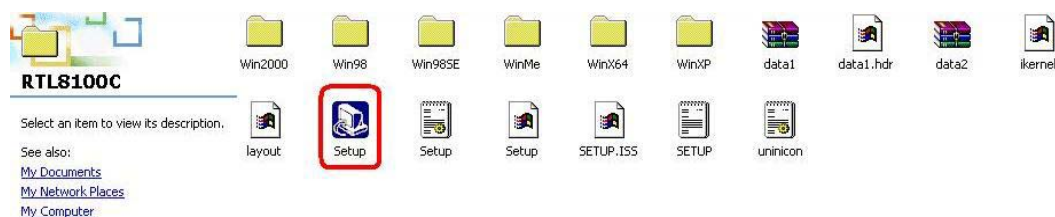
Figure 6-20: Locate the Setup Program Icon

Step 4: Double click the **Setup** program icon in **Figure 6-20**.

Step 5: The **Install Shield Wizard** is prepared to guide the user through the rest of the

process (**Figure 6-21**).
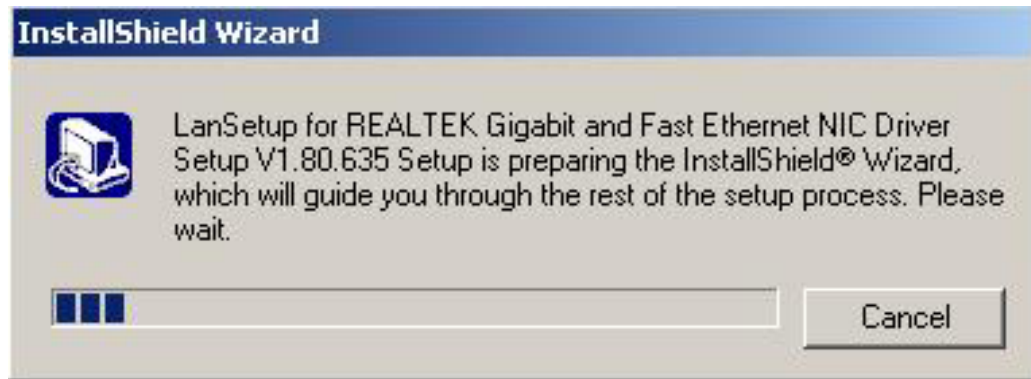
Figure 6-21: Preparing Setup Screen

Step 6: Once initialized, the **Install Wizard** welcome screen appears (**Figure 6-22**).
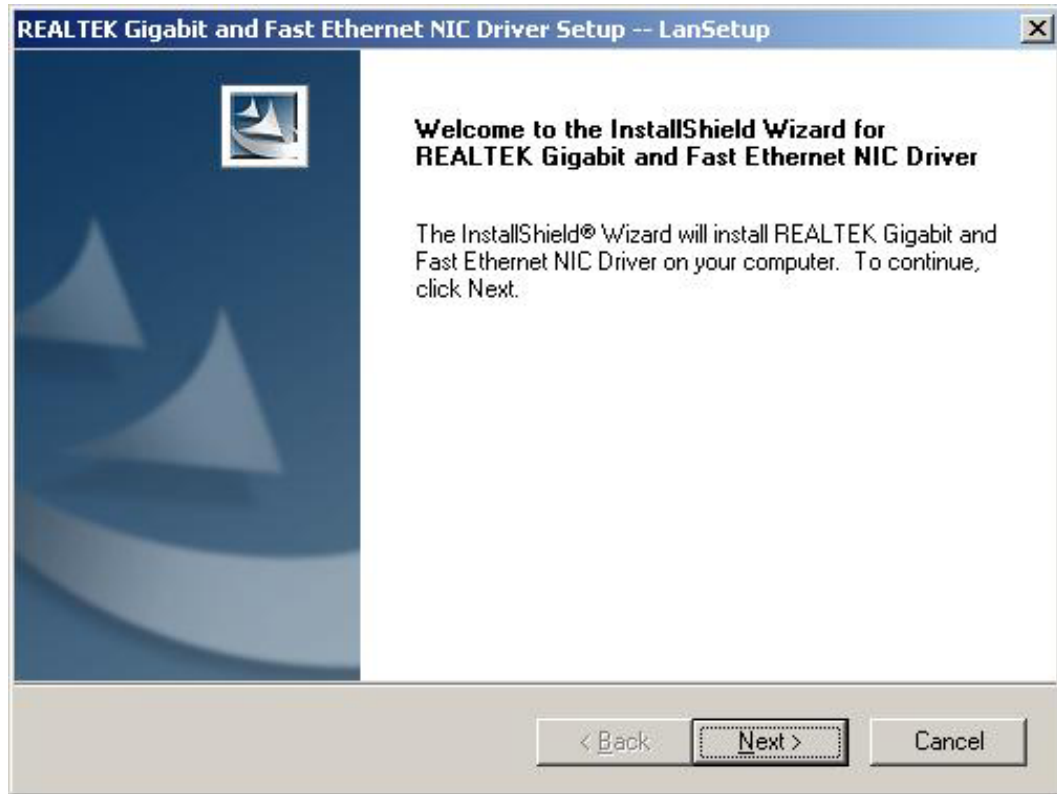
**Figure 6-22: Install Wizard Welcome Screen**

Step 7: Click NEXT to continue the installation or CANCEL to stop the installation.

**Step 8:** The **Install Wizard** starts to install the LAN driver.

Step 9: Once the installation is complete, the **InstallShield Wizard Complete** screen

appears (**Figure 6-23**).
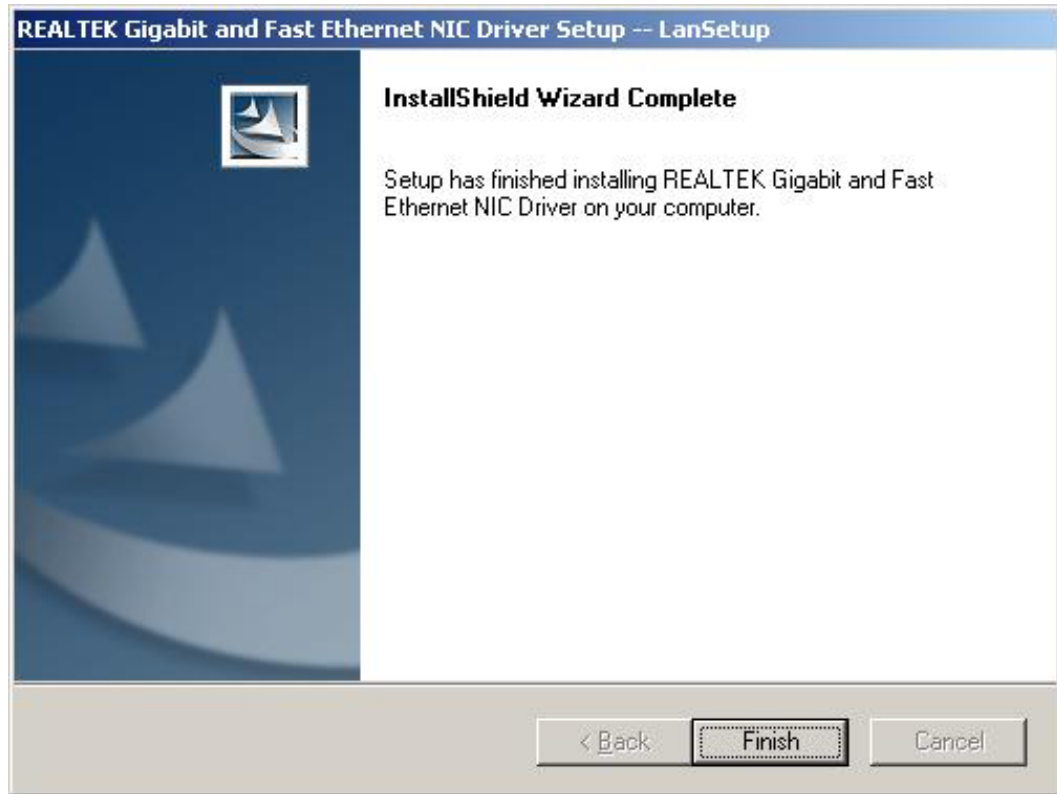
Figure 6-23: Installing Screen

Step 10: Click **FINISH** to complete the installation and exit the **Install Shield Wizard**.

Step 11: Once the installation process is complete, the computer may be restarted immediately or later. Select the preferred option and click **FINISH** to complete the installation process and exit the **Install Shield Wizard** (**Figure 6-24**).

Figure 6-24: Restart the Computer

6.5 SATA/RAID Driver

To install the ALi SATA/RAID driver, please follow the steps below.

Step 1: Click **SATA** from the **AMD LX/GX CD Driver Menu** to open a window to the

X:\ALi_SATA_M5283 (where **X:** is the system CD drive) folder on the driver

CD.

Step 2: Locate the **Setup** program icon (**Figure 6-25**).
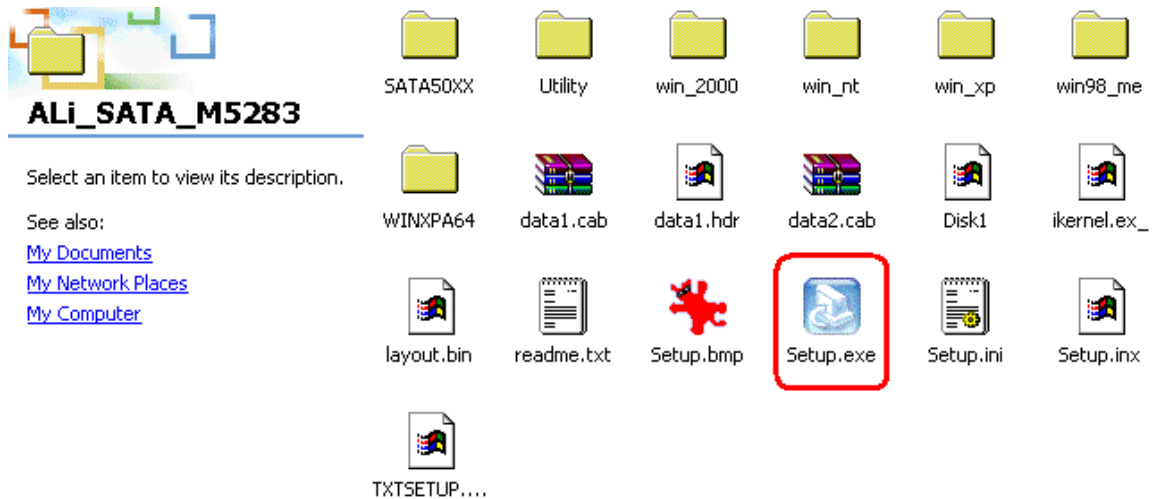
Figure 6-25: Locate the Setup Program Icon

Step 3: The **Install Shield Wizard** (**Figure 6-26**) is prepared to guide the user through the rest of the process.
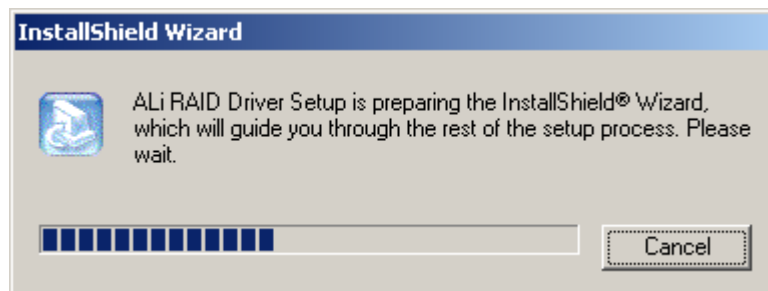
Figure 6-26: Preparing Setup Screen

Step 4: Once initialized, the **Install Wizard** welcome screen appears (**Figure 6-27**).
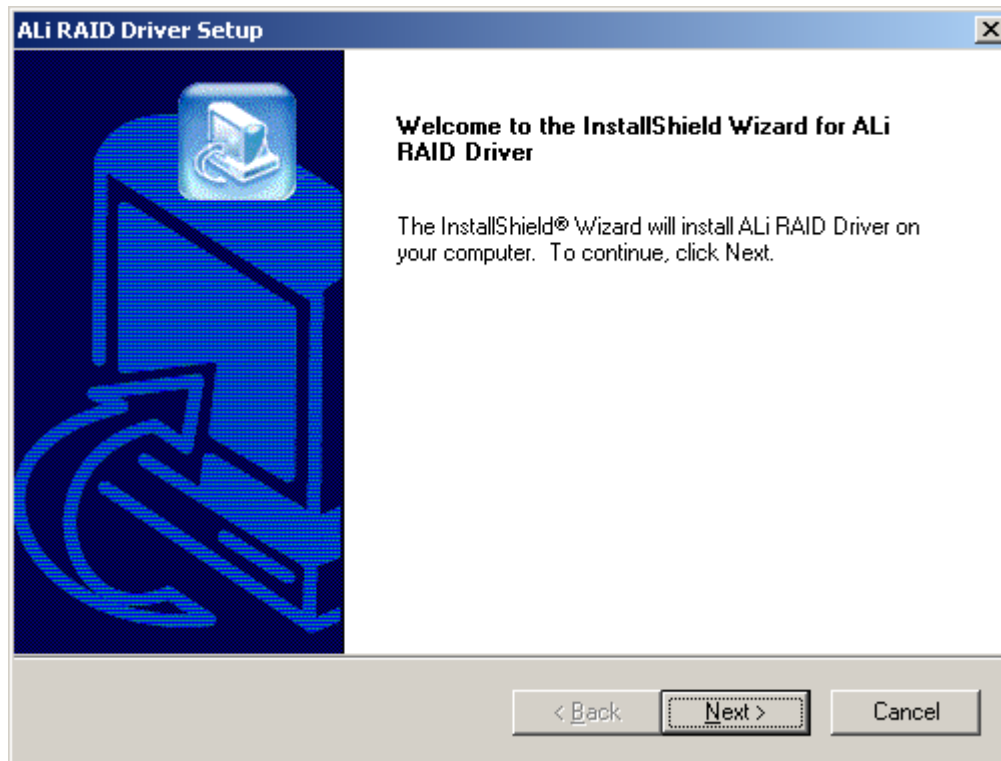
Figure 6-27: Install Wizard Welcome Screen

Step 5: Click **NEXT** to continue the installation or **CANCEL** to stop the installation.

Step 6: The **Install Wizard** starts to install the driver (**Figure 6-28**).
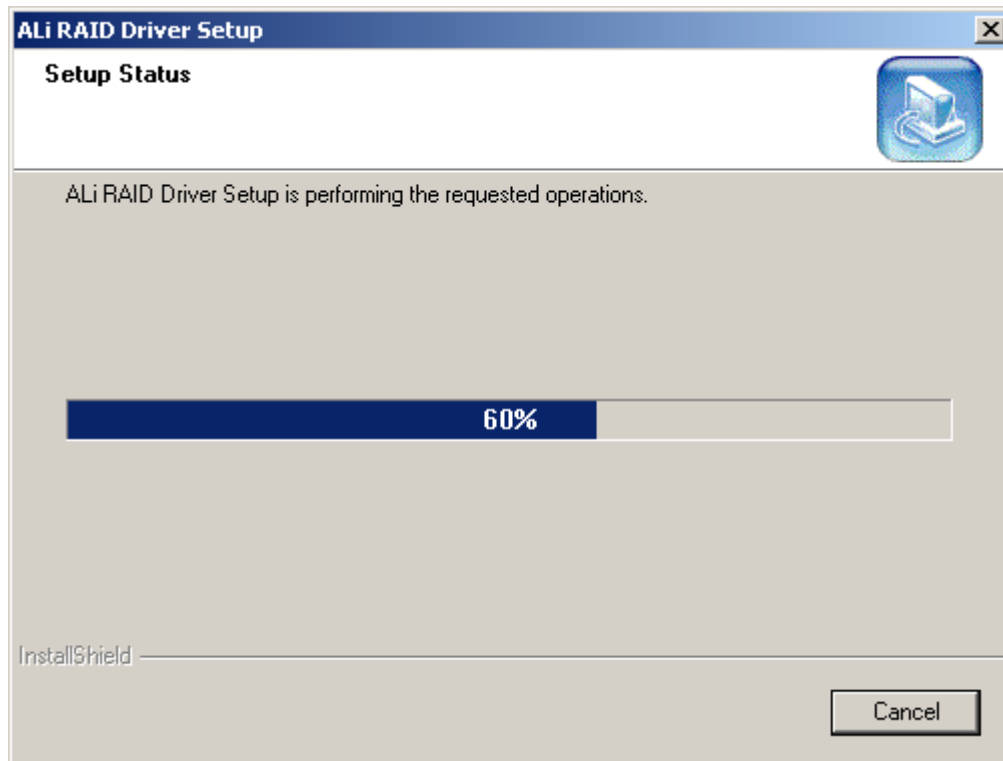
Figure 6-28: Installing Screen

Step 7: A "**Digital Signal Not Found**" screen appears (**Figure 6-29**). Click **YES** to continue the installation process.
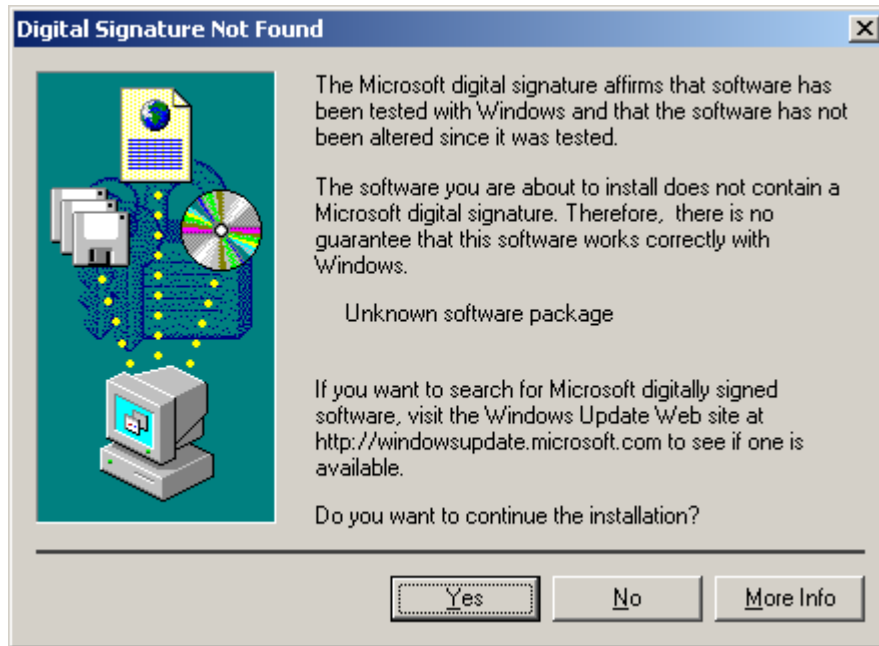
Figure 6-29: RAID Driver Digital Signal

Step 8:   Once the installation is complete, the **InstallShield Wizard Complete** screen

appears (**Figure 6-30**).
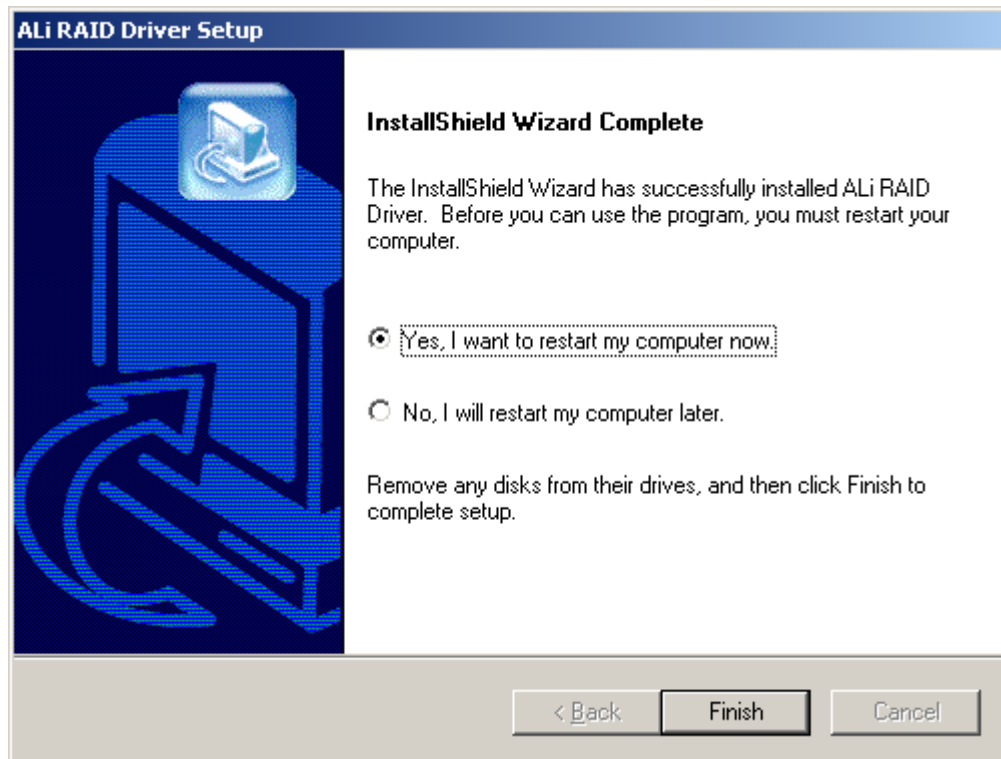
Figure 6-30: InstallShield Wizard Complete Screen

Step 9: Once the installation process is complete, the computer may be restarted
immediately or later. Select the preferred option and click **FINISH** to complete the
installation process and exit the **Install Shield Wizard**.

6.6 ISA Driver

To install the IT8888 ISA Bridge driver please follow the steps below:

Step 1: Open **Windows Control Panel** (**Figure 6-31**).
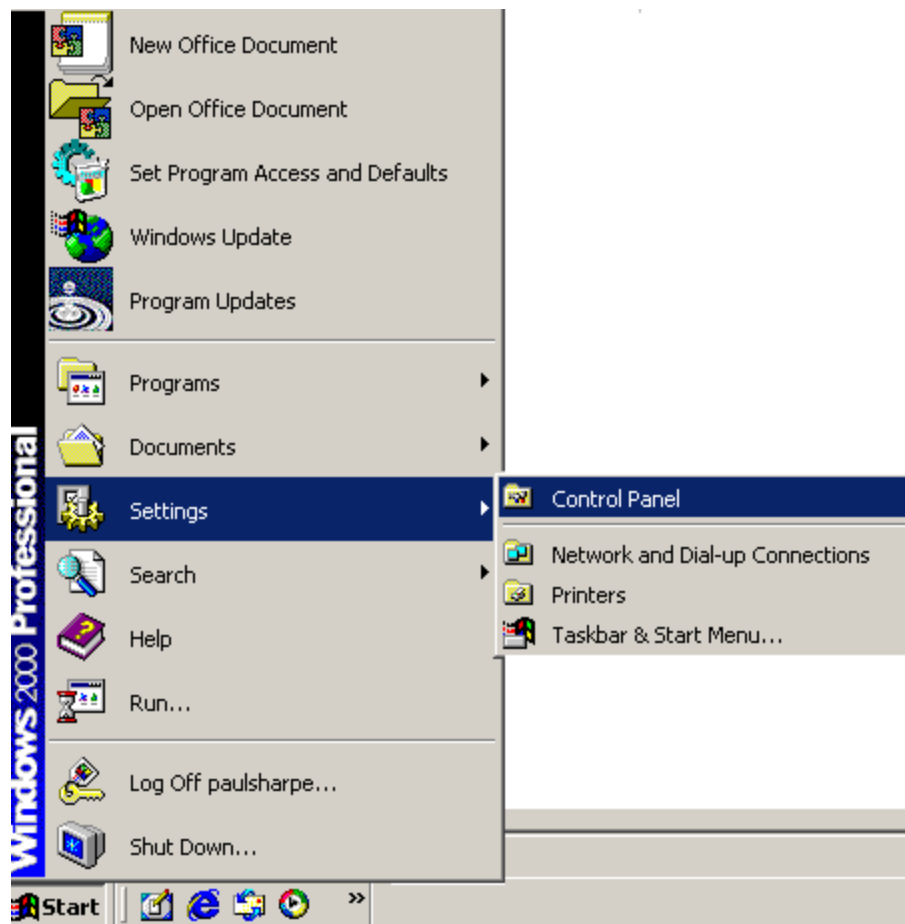
Figure 6-31: Access Windows Control Panel

Step 2: Double click the **System** icon (**Figure 6-32**).
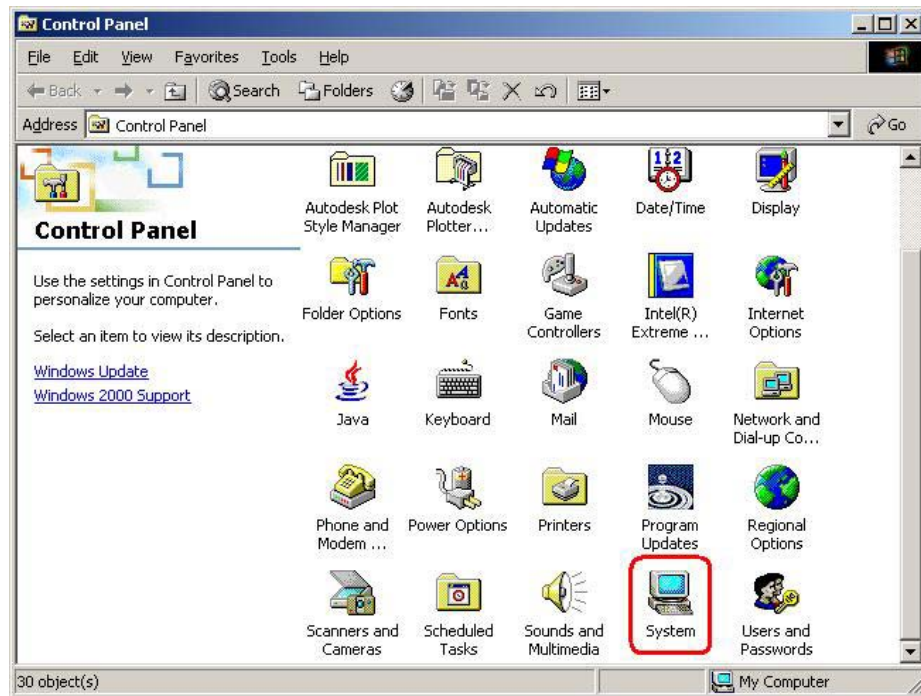
Figure 6-32: Double Click the System Icon

Step 3:   Double click the **Device Manager** tab (**Figure 6-33**).

Figure 6-33: Double Click the Device Manager Tab

Step 4:   A list of system hardware devices appears (**Figure 6-34**).
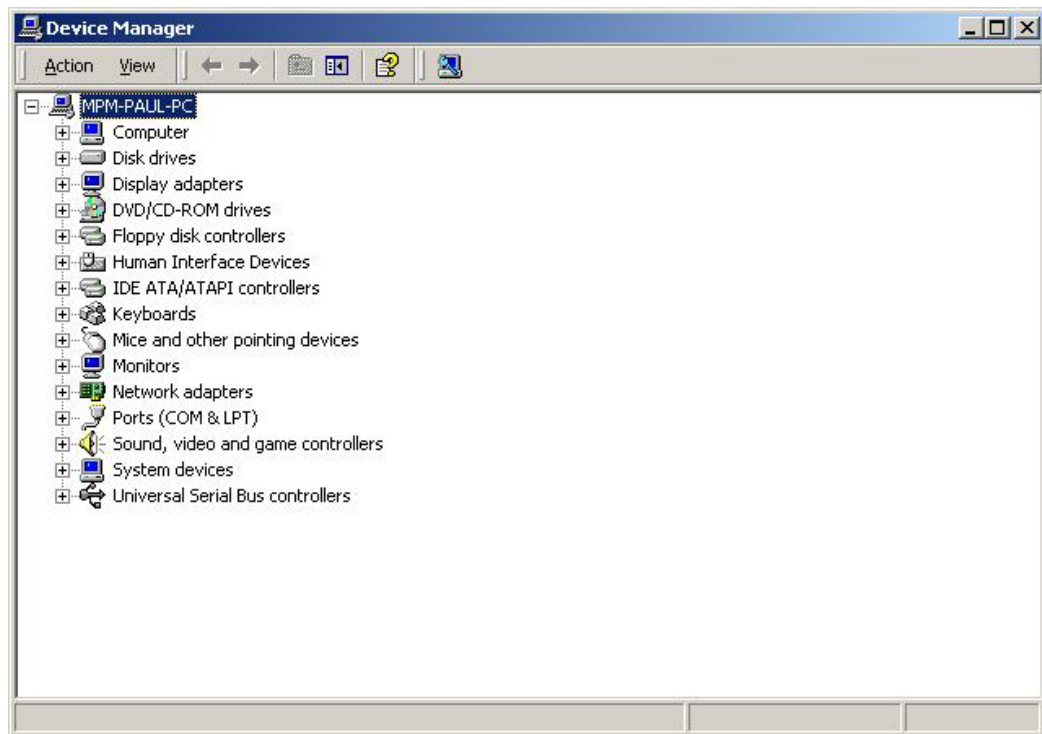
Figure 6-34: Device Manager List

Step 5:   Double click the listed device that has question marks next to it. (This means

Windows does not recognize the device).

Step 6:   The **Device Driver Wizard** appears (**Figure 6-35**). Click **NEXT** to continue.

Figure 6-35: Search for Suitable Driver

Step 7: Select "**Specify a Location**" in the **Locate Driver Files** window (**Figure 6-36**).

Click **NEXT** to continue.
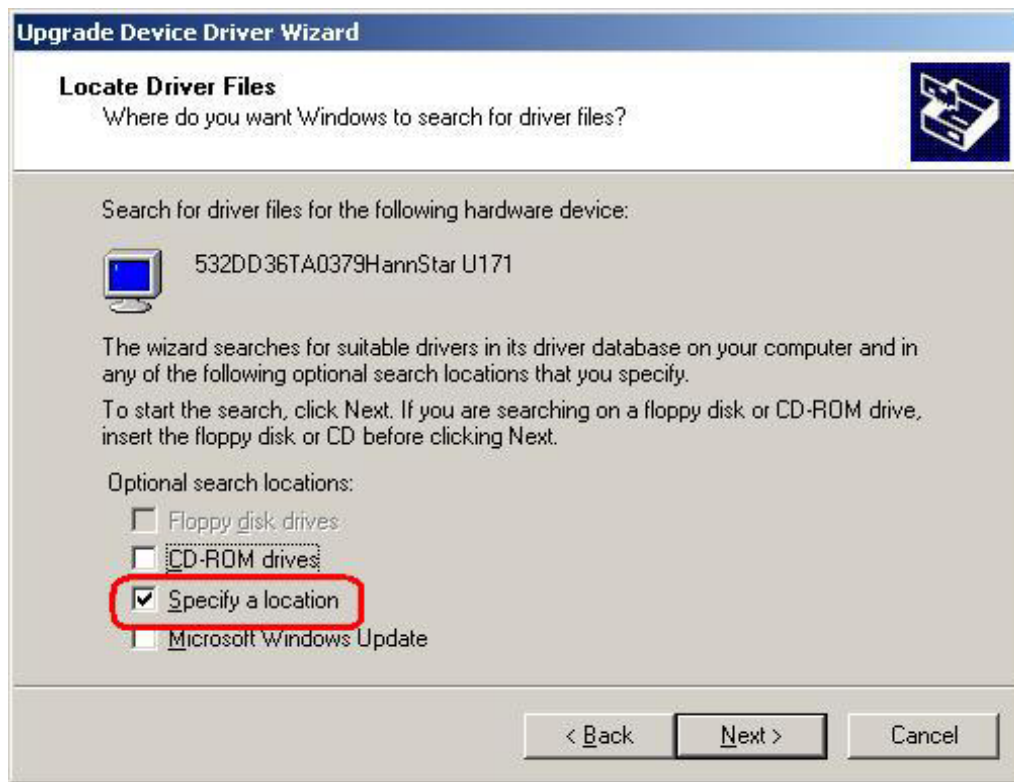
Figure 6-36: Locate Driver Files

Step 8: Select "**X:\IT8888**" directory in the location browsing window, where "**X:**" is the

system CD drive (**Figure 6-37**).
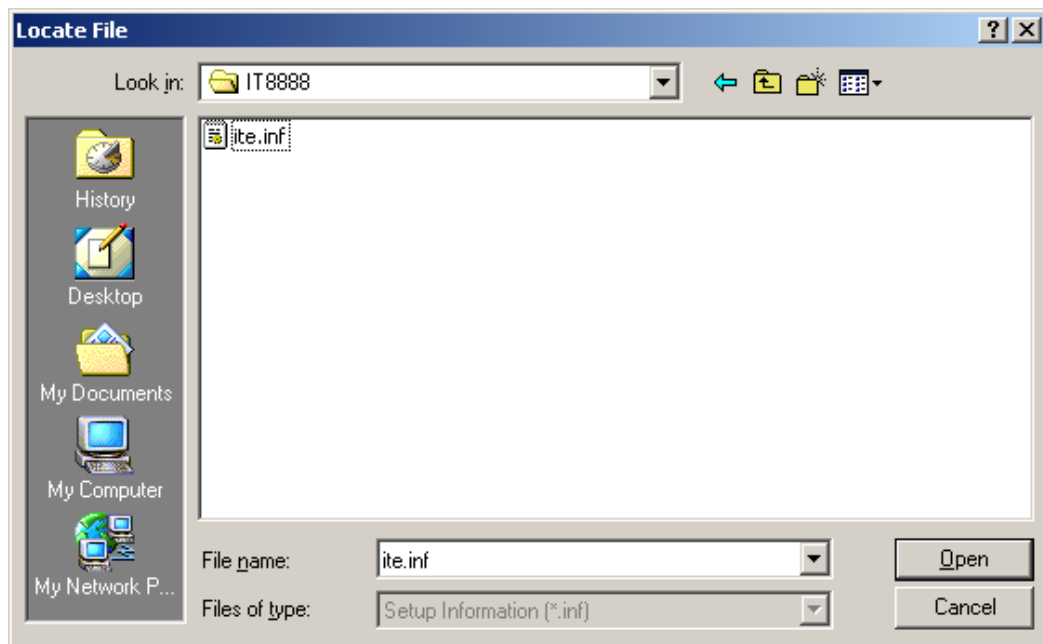
Figure 6-37: Location Browsing Window

Step 9: Click **OK** to continue. A driver files location menu window appears. Select the

ite.inf file and click **OPEN** to continue. The driver is installed.

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Appendix

A

BIOS Configuration Options

A.1 BIOS Configuration Options

Below is a list of BIOS configuration options described in **Chapter 5**.

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Appendix

B

Watchdog Timer

![NOTE icon] **NOTE:**

> The following discussion applies to DOS environment. IEI support is contacted or the IEI website visited for specific drivers for more sophisticated operating systems, e.g., Windows and Linux.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMI or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer:

INT 15H:

AH – 6FH Sub-function:	
AL – 2:	Sets the Watchdog Timer's period.
BL:	Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

Table B-1: AH-6FH Sub-function

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. While the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the Watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

 NOTE:

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

Example program:

; **INITIAL TIMER PERIOD COUNTER**

;

W_LOOP:

```
    MOV    AX, 6F02H        ;setting the time-out value
    MOV    BL, 30           ;time-out value is 48 seconds
    INT      15H
;
```

; **ADD THE APPLICATION PROGRAM HERE**

;

```
    CMP      EXIT_AP, 1     ;is the application over?
    JNE        W_LOOP       ;No, restart the application

    MOV    AX, 6F02H        ;disable Watchdog Timer
    MOV    BL, 0            ;
    INT      15H
;
```

; **EXIT** ;

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Appendix

C

Address Mapping

C.1 IO Address Map

I/O address Range	Description
000-01F	DMA Controller
020-021	Interrupt Controller
040-043	System time
060-06F	Keyboard Controller
070-07F	System CMOS/Real time Clock
080-09F	DMA Controller
0A0-0A1	Interrupt Controller
0C0-0DF	DMA Controller
0F0-0FF	Numeric data processor
1F0-1F7	Primary IDE Channel
2F8-2FF	Serial Port 2 (COM2)
378-37F	Parallel Printer Port 1 (LPT1)
3B0-3BB	AMD Graphics Controller
3C0-3DF	AMD Graphics Controller
3F6-3F6	Primary IDE Channel
3F7-3F7	Standard floppy disk controller
3F8-3FF	Serial Port 1 (COM1)

Table C-1: IO Address Map

C.2 1st MB Memory Address Map

Memory address	Description
00000-9FFFF	System memory
A0000-BFFFF	VGA buffer
F0000-FFFFF	System BIOS
1000000-	Extend BIOS

Table C-2: 1st MB Memory Address Map

C.3 IRQ Mapping Table

IRQ0	System Timer	IRQ8	RTC clock
IRQ1	Keyboard	IRQ9	ACPI
IRQ2	Available	IRQ10	LAN
IRQ3	COM2	IRQ11	LAN/USB2.0/SATA
IRQ4	COM1	IRQ12	PS/2 mouse
IRQ5	SMBus Controller	IRQ13	FPU
IRQ6	FDC	IRQ14	Primary IDE
IRQ7	Available	IRQ15	Secondary IDE

Table C-3: IRQ Mapping Table

C.4 DMA Channel Assignments

Channel	Function
0	Available
1	Available
2	Floppy disk (8-bit transfer)
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

Table C-4: IRQ Mapping Table

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Appendix

D

External AC'97 Audio CODEC

D.1 Introduction

The motherboard comes with an on-board Realtek ALC655 CODEC. Realtek ALC655 is a 16-bit, full duplex AC'97 Rev. 2.3 compatible audio CODECwith a sampling rate of 48KHz.

D.1.1 Accessing the AC'97 CODEC

The CODEC is accessed through a connector on the WAFER-LXG motherboard. Connect the audio kit to the connector.

D.1.2 Driver Installation

The driver installation has been described in **Chapter 6**

After rebooting the sound effect configuration utility appears in the Windows Control Panel (see **FigureeD-1**). If the peripheral speakers are properly connected, sound effects should be heard.
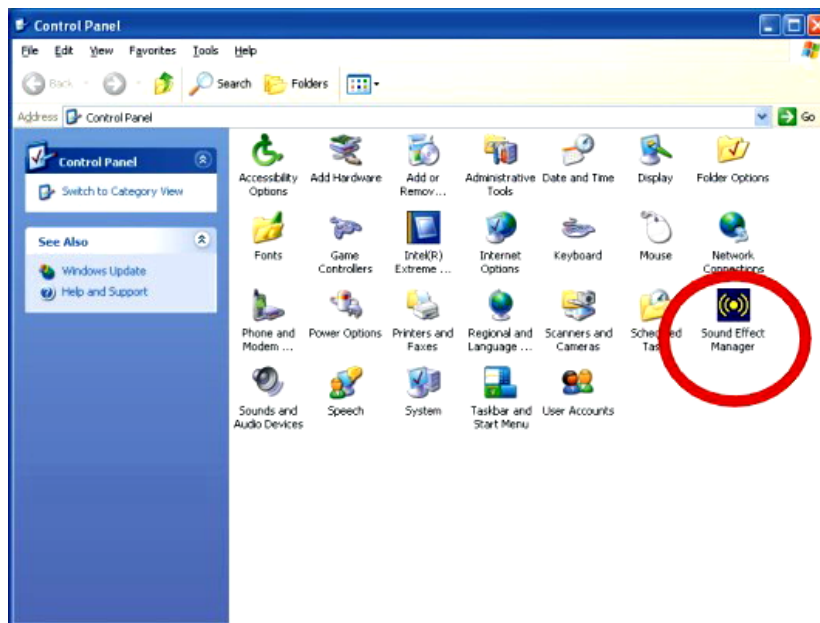
Figure   : Sound Effect Manager Control Panel

D.2 Sound Effect Configuration

D.2.1 Accessing the Sound Effects Manager

To access the **Sound Effects Manager**, please do the following:

Step 1: Install the audio CODEC driver.

Step 2: Click either:

- The Sound Effect Manager icon in the Notification Area of the system task bar (see **FigureeD-2**), or
- The Sound Effect Manager icon in the Control Panel (**FigureeD-3**).

Figure   : Sound Effect Manager Icon [Task Bar]
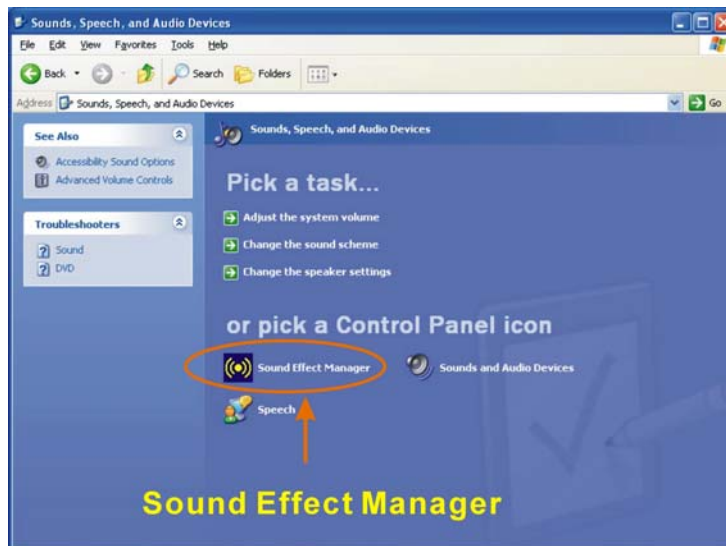
Figure   : Sound Effect Manager Icon [Control Panel]

Step 3: The sound effect manager appears. (See **FigureeD-4**)
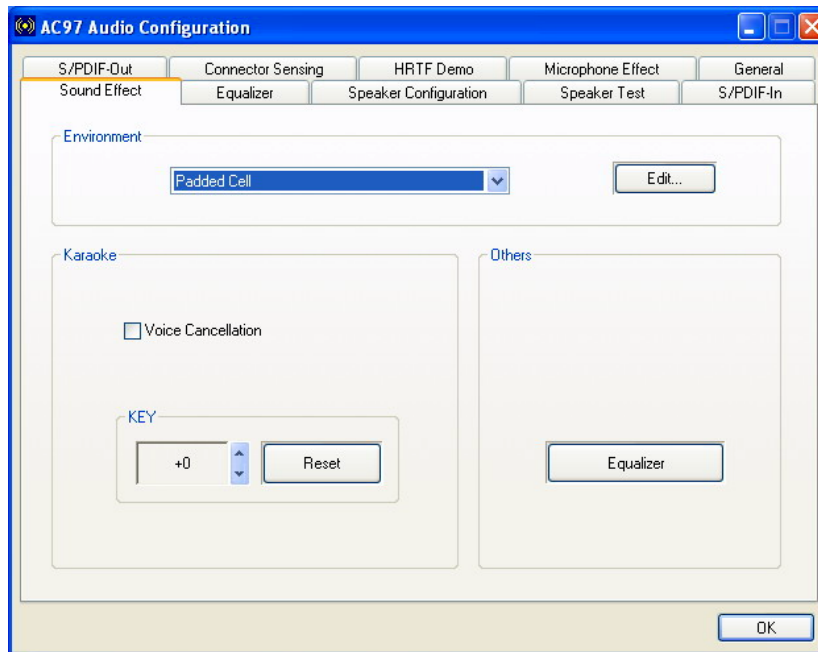
Figure   : Sound Effects Manager (ALC655)

 NOTE:

The Sound Effect Manager shown in Error! Reference source not found. is
for the RealTek ALC655 audio CODEC. Different CODECs may have
different sound manager appearances.

The following section describes the different configuration options in the Sound Effect
Manager.

D.2.2 Sound Effect Manager Configuration Options

The **Sound Effects Manager** enables configuration of the items listed below. To configure
these items click the corresponding menu tab in the **Sound Effects Manager** in Error!
Reference source not found..

NOTE:

The **Karaoke Mode** is configured in the **Sound Effect** menu. To access Karaoke configuration settings, click on the **Sound Effect** menu tab.

- Sound Effect
- Karaoke Mode
- Equalizer
- Speaker Configuration
- Speaker Test
- S/PDIF-In
- S/PDIF-Out
- Connector Sensing
- HRTF Demo
- Microphone Effect
- General

NOTE:

Not all RealTek **Sound Effect Managers** have all the above listed options. The Sound Effect Manager loaded onto the system may only have some of the options listed above.

Below is a brief description of the available configuration options in the **Sound Effects Manager**.

- *Sound Effect*:- Select a sound effect from the 23 listed options in the drop down menu. Selected sound effect properties can be edited. To edit the sound effect click "EDIT."
- *Karaoke Mode*:- The **Karaoke Mode** is accessed in the Sound Effect window. The **Voice Cancellation** disables the vocal part of the music being played. The **Key adjustment** up or down arrow icons enables users to define a key

that fits a certain vocal range.

■ *Equalizer Selection*:- Preset equalizer settings enable easy audio range settings. Ten frequency bands can be configured.

■ *Speaker Configuration*:- Multi-channel speaker settings are configured in this menu. Configurable options include:
   o Headphone
   o Channel mode for stereo speaker output
   o Channel mode for 4 speaker output
   o Channel mode for 5.1 speaker output
   o Synchronize the phonejack switch with speakers settings

■ *Speaker Test*:- Each speaker connected to the system is tested individually to see if the 4-channel or 6-channel audio operates properly.

■ *S/PDIF-In & S/PDIF-Out*:- These functions are currently not supported.

■ *Connector Sensing*:- Realtek ALC655 detects if an audio device is plugged into the wrong connector. If an incorrect device is plugged in a warning message appears.

■ *HRTF Demo*:- Adjust HRTF (Head Related Transfer Functions) 3D positional audio here before running 3D applications.

■ *Microphone Effect*:- Microphone noise suppression is enabled in this menu.

■ *General*:- General information about the installed AC'97 audio configuration utility is listed here.

Appendix

E

Ali RAID

6.7 Introduction

The ALi M5283 SATA RAID chipset can control parallel ATA (PATA) and serial ATA (SATA) disks. The ALi controller supports PATA UDMA transfer mode up to mode 6 and SATA 1 disk drives. The ALi M5283 also has a cost-effective RAID functionality that can increase the data read/write speed and provide protection to data by distributing mirrored duplicates of data onto two disk drives (RAID 1).

⚠ CAUTION!

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

A.1.1 Precautions

One key benefit a RAID configuration brings is that a single hard drive can fail within a RAID array without damaging data. With RAID1 array, a failed drive can be replaced and the RAID configuration restored.

⚡ WARNING!

Irrecoverable data loss occurs if a working drive is removed when trying to remove a failed drive. It is strongly recommended to mark the physical connections of all SATA disk drives. Drive locations can be identified by attaching stickers to the drive bays. If a drive member of a RAID array should fail, the failed drive can then be correctly identified.

⚠ CAUTION!

Do not accidentally disconnect the SATA drive cables. Carefully route the

cables within the chassis to avoid system down time.

A.2 Features and Benefits

■ Supports RAID levels 0, 1, and JBOD

■ Supports connectivity to two disk drives

■ Supported Operating Systems include: Windows 98/Me, Windows 2000 and Windows XP

■ Windows-based software for RAID management

A.3 Accessing the ALi RAID Utility

To access the **Ali RAID Utility**, please follow the steps below:

Step 4: **Connect SATA drives to the system**. Connect two SATA drives to the system. Make sure the drives have the same capacity, are the same type and have the same speed.

NOTE:

Make sure the SATA drives are EXACTLY the same when they are configured in a RAID configuration (JBOD, RAID 0 or RAID 1). If they are not the same size, disk drive capacity is sacrificed and overall performance affected.

Step 5: **Enable SATA drives in BIOS**. Start the computer and access the **AMI BIOS** setup program. Next, open the **Advanced CMOS Setup** menu. Enable the **SATA ROM Support BIOS** option. (See **Section** Error! Reference source not found.)

Step 6: **Save and Exit BIOS**. After the **SATA ROM Support BIOS** option is enabled, save and exit the **BIOS**.

Step 7: **Reboot the system**. Reboot the system after saving and exiting the **BIOS**.

Step 8: **Press Ctrl-A**. When the screen in **FigureeE-1** appears press **Ctrl-A** to enter the
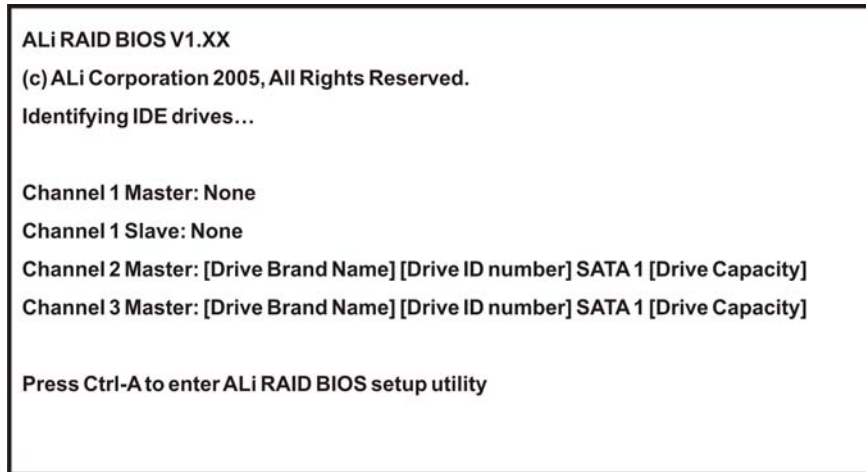
ALi RAID BIOS setup program.

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


Channel 1 Master: None
Channel 1 Slave: None
Channel 2 Master: [Drive Brand Name] [Drive ID number] SATA 1 [Drive Capacity]
Channel 3 Master: [Drive Brand Name] [Drive ID number] SATA 1 [Drive Capacity]


Press Ctrl-A to enter ALi RAID BIOS setup utility
```

Figure   : Accessing ALi RAID BIOS Utility

Step 9:   Delete RAID settings and partitions. The **RAID BIOS Setup Utility** in

FigureeE-2 appears. Before configuring the array select the "**Delete All RAID**

Setting & Partition".

```
RAID BIOS Setup Utility     © 2006 ALi Corporation     www.ali.com.tw
Create RAID 0 Striping for Performance
Create RAID 1 Mirroring for Reliability         SPACE : Select
Create JBOD for integrate Capacity
Stripe Size                        16K             : Moving Cursor
Delete RAID Settings and Partition
Delete All RAID Settings and Partition          Enter : Finish
Rebuild RAID Array                              ESC   : Exit

                 Drive Model              Mode — Capacity        RAID Array/Type
Channel 1 Master:   None
Channel 1 Slave:    None
Channel 2 Master:   [Drive Brand Name]  [Drive ID number]  SATA 1  [Drive Capacity]
Channel 3 Master:   [Drive Brand Name]  [Drive ID number]  SATA 1  Drive Capacity]

            Capacity            RAID Type — Stripe Size       RAID Name
RAID Array A:
RAID Array B:
RAID Array C:
```
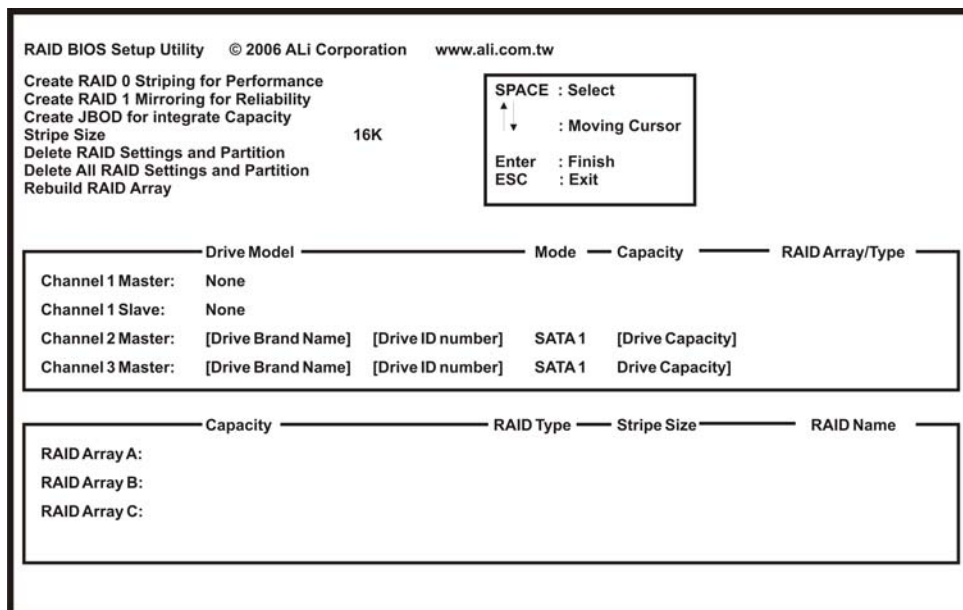
Figure E-2: RAID BIOS Setup Utility

Step 10: Configure the RAID settings. Use the **RAID BIOS Setup Utility** in Error! Reference source not found. to configure the RAID array. Brief descriptions are given below.

Step 11: Install the OS. After the RAID array has been configured (see below) install the OS. To do this, please refer to the documentation that came with the OS.

A.4 RAID Options:

A.4.1 Create RAID 0 Striping for Performance

WARNING!

All data previously stored on the member drives of a RAID configuration **are destroyed** during the RAID initialization process. If "used" drives are used to create a RAID array, make sure the data has been moved or backed up before creating a RAID array out of the disk drives.

Step 1: Select "**Create RAID 0 Striping for Performance"**. Use the arrow keys to highlight **Create RAID0 Striping for Performance** and press ENTER. A flashing 'S' appears on the **Drive Menu** where the member drives to be included in the RAID 0 array can be chosen.

Step 2: Select RAID array drive members. Use the space bar to select members of the RAID array. The flashing cursor changes to a lower case 's' once any of the connected disk drives has been selected. Follow the same method to select another member drive.

**Step 3: Confirm**. The **Create RAID0(Y/N)** confirm box appears. Press **Y**.

Step 4: Name the array. Enter a nickname for the created array. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for

naming an array.

⚡ NOTE:

1. To reduce the chance of losing data, ALi imposes certain limitations on the RAID configuration options. PATA drives connected on the same IDE channel cannot be selected as the members of a RAID 0 array. Avoid mixing PATA and SATA disk drives in a RAID 0 array.

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.
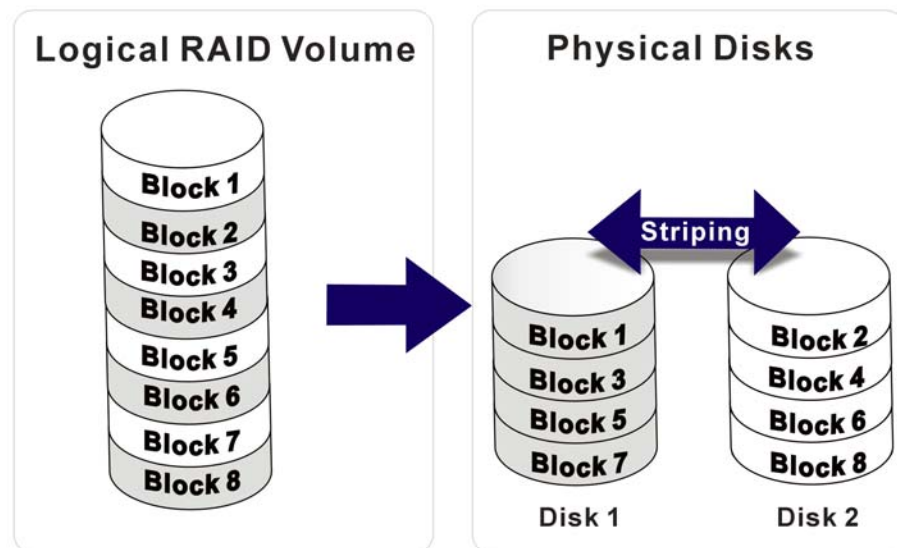
A.4.2 Create RAID 1 Mirroring for Reliability

⚡ WARNING!

All data previously stored on the member drives of a RAID configuration **is destroyed** during the RAID initialization process. If "used" drives are used to create a RAID array, make sure the data has been moved or backed up before creating a RAID array out of the disk drives.

Step 1: **Select** "**Create RAID 1 Striping for Reliability"**. Use the arrow keys to highlight

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> **Create RAID 1 Striping for Reliability** and press **ENTER**. A flashing 'S' appears on the **Drive Menu** where the member drives to be included in the RAID 0 array can be chosen.

Step 2: **Select RAID array drive members**. Use the space bar to select members of the RAID array. The flashing cursor changes to a lower case 's' once any of the connected disk drives has been selected. Follow the same method to select another member drive.

Step 3: **Confirm**. The **Create RAID0(Y/N)** confirm box appears. Press **Y**.

Step 4: **Name the array**. 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 5: **View the array**. A prompt appears to proceed with drive copy. The **Source** and **Destination** drives are indicated as "M" and "m" in the **Drive Menu**.

⚡ NOTE:

1. To reduce the chance of losing data, ALi imposes certain limitations on the RAID configuration options. PATA drives connected on the same IDE channel cannot be selected as the members of a RAID 1 array. Avoid mixing PATA and SATA disk drives in a RAID 1 array.

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.
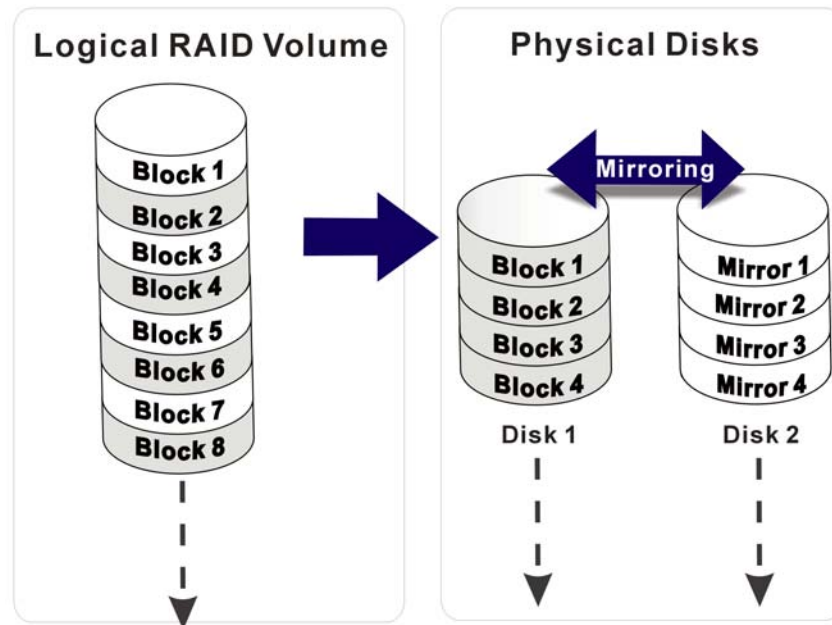
A.4.3 Create JBOD for Integrated Capacity

JBOD is defined as "Just a Bunch of Drives." JBOD provides neither performance gains nor data redundancy.

⚠ **WARNING!**

> All data previously stored on the member drives of a RAID configuration **is destroyed** during the RAID initialization process. If "used" drives are used to create a RAID array, make sure the data has been moved or backed up before creating a RAID array out of the disk drives.

Step 1: **Select** "**Create JBOD for Integrated Capacity"**. Use the arrow keys to highlight **Create JBOD for Integrated Capacity** and press ENTER. A flashing 'J' appears on the **Drive Menu** where the member drives to be included in the JBOD array can be chosen.

Step 2: **Select RAID array drive members**. Use the space bar to select members of the RAID array. The flashing cursor changes to a lower case 's' once any of the

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connected disk drives has been selected. Follow the same method to select another member drive.

Step 3: **Confirm**. The **Create RAID 0 (Y/N)** confirm box appears. Press **Y**.

Step 4: **Name the array**. Enter a nickname for the created array. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for naming an array

NOTE:

To reduce the chance of losing data, ALi imposes certain limitations on the RAID configuration options. Parallel-ATA drives connected on the same IDE channel cannot be selected as the members of a RAID1 array. Avoid mixing Parallel-ATA and Serial-ATA disk drives in a RAID1 array.

A.4.4 Stripe Size

Changing the stripe size effects RAID 0 arrays. Configurable options are:

- 64K (default)
- 32K
- 16K
- 8K
- 4K

Select a small stripe size if the I/Os to the hard drives are small and occur randomly. Choose a larger stripe size if the I/Os are mostly large and come in sequential orders, e.g., A/V playback and editing applications. The default value should be appropriate for most applications.

A.4.5 Delete RAID Setting & Partition

WARNING!

If a RAID configuration is deleted, all data previously stored on the member

drives of the RAID configuration will also be deleted.

Step 1: **Delete a RAID setting**. Use the arrow keys to highlight **Delete RAID Setting & Partition** and press ENTER. A flashing 'E' appears at the **Drive Menu** where the member drives to be removed can be chosen.

Step 2: **Confirm Delete**. The **Data on RAID drives will be erased (Y/N)** confirm box appears. Press **Y**.

A.4.6 Delete All RAID Setting & Partition

WARNING!

If a RAID configuration is deleted, all data previously stored on the member drives of the RAID configuration will also be deleted.

Step 1: **Delete RAID Settings**. Use the arrow keys to highlight **Delete All RAID Setting & Partition** and press ENTER.

Step 2: **Confirm delete**. The **Data on RAID drives will be erased (Y/N)** confirm box appears. Press **Y**.

A.4.7 Rebuild RAID Array

The **Rebuild RAID Array** option can rebuild a RAID array if a member of a RAID configuration should fail. Neither RAID 0 nor JBOD provides data redundancy. The **Rebuild RAID Array** option only applies to RAID1 arrays and is applicable when a member of a RAID1 configuration has failed.

Step 1: **Select Rebuild Array**. Use the arrow keys to highlight **Rebuild RAID Array** and press ENTER. A flashing 'R' appears in the list of existing arrays. The source and destination drives will be displayed.

Step 2: **Confirm rebuild array**. Press **Y** to begin the rebuild process.

![NOTE icon] **NOTE:**

A status bar will indicate the rebuild progress. 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.

A.4.8 Select Boot Drive

Step 1: **Select the Boot Drive**. Use the arrow keys to highlight **Select Boot Drive** and press **ENTER**. A flashing 'A' appears at the **Drive Menu** where the boot drive can be chosen.

Step 2: **Press ENTER**. Press **ENTER** or the space bar to finish the configuration.

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