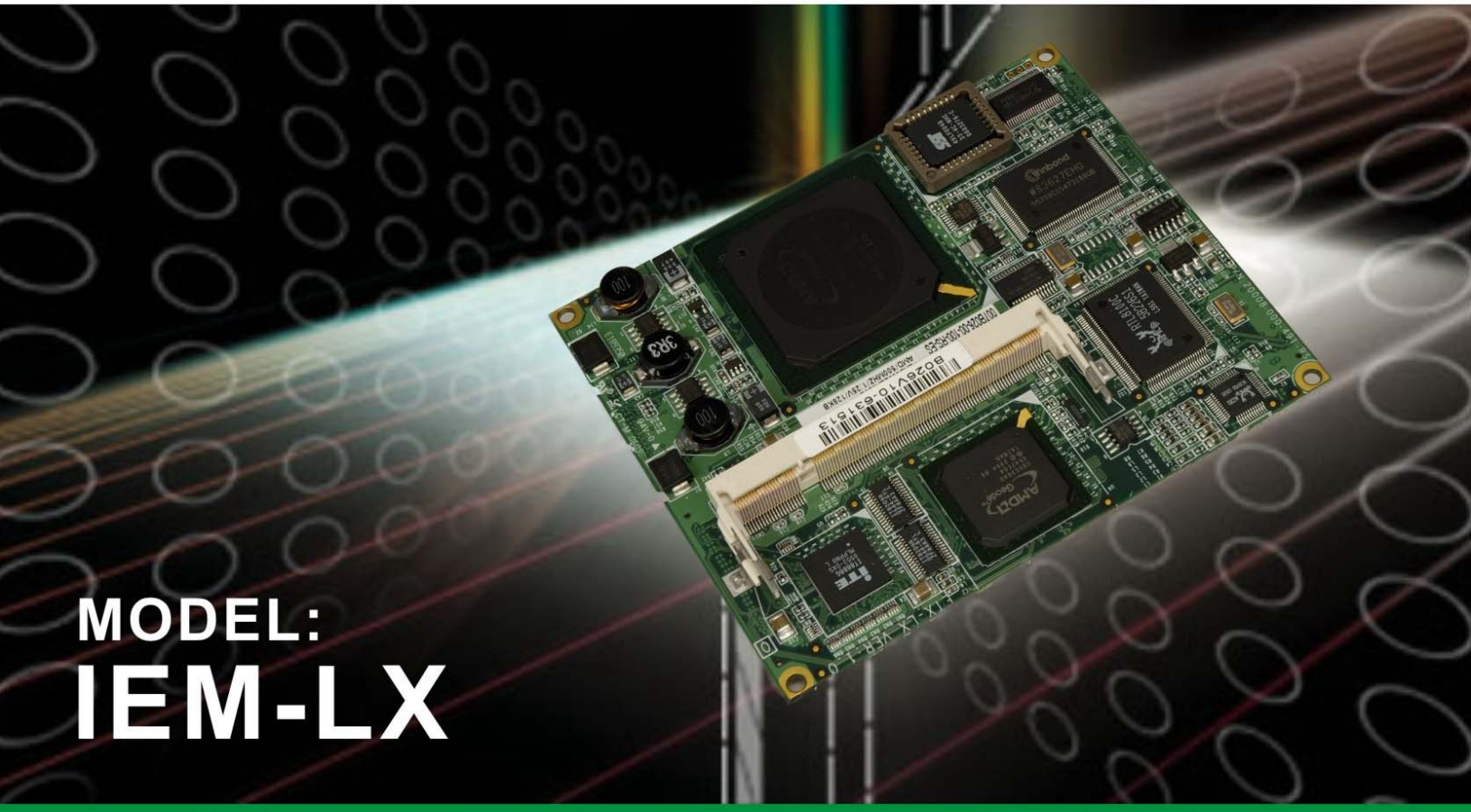
IEI Technology Corp.



MODEL:

IEM-LX

ETX Form Factor CPU Module with AMD LX 800 CPU
USB 2.0, LAN & Audio Supported

User Manual

Rev. 1.00 May 2007

RoHS Lead Free

Revision

MODEL	IEM-LX-800 AMD Geode LX 800 CPU module	
Revision Number	**Description**	**Date of Issue**
1.00	Initial release	May 2007

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Packing List

NOTE:

If any of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the IEM-LX-800 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

The items listed below should all be included in the IEM-LX-800 package.

- 1 x IEM-LX-800 CPU module
- 1 x Mini jumper pack
- 1 x Utility CD
- 1 x QIG (quick installation guide)

Images of the above items are shown in **Chapter 3**.

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Glossary

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

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Chapter

1

Introduction

1.1 IEM-LX-800-R10 Overview

The ETX (Embedded Technology eXtended) form factor IEM-LX-800-R10 (IEM-LX) embedded module is fully equipped with an AMD Geode LX 800 CPU and with advanced multi-mode I/Os. The IEM-LX embedded module is designed for flexible integration by system developers into customized platform devices.

1.1.1 IEM-LX Applications

The IEM-LX is designed for being embedded in customized baseboards for flexible applications.

1.1.2 IEM-LX Benefits

Some of the IEM-LX embedded platform benefits include:

- Low power, high performance
- Easy integration into customized baseboards
- Easy upgrading
- Easy maintenance
- Easy design compatibility
- Low cost product development

1.1.3 IEM-LX Features

Some of the IEM-LX features are listed below:

- Complies with ETX form factor
- Complies with RoHS
- Embedded AMD Geode LX 800 CPU
- CPU and Northbridge integrated into single chip
- Supports up to 1GB of 333MHz or 400MHz of DDR memory
- Comes with two high performance gigabit Ethernet (GbE) controller
- Support for four USB 2.0 devices
- Support for one IDE device and one compact flash module

1.2 IEM-LX Overview

An overview of the IEM-LX embedded module can be seen in **Figure 1-1** and **Figure 1-2**.

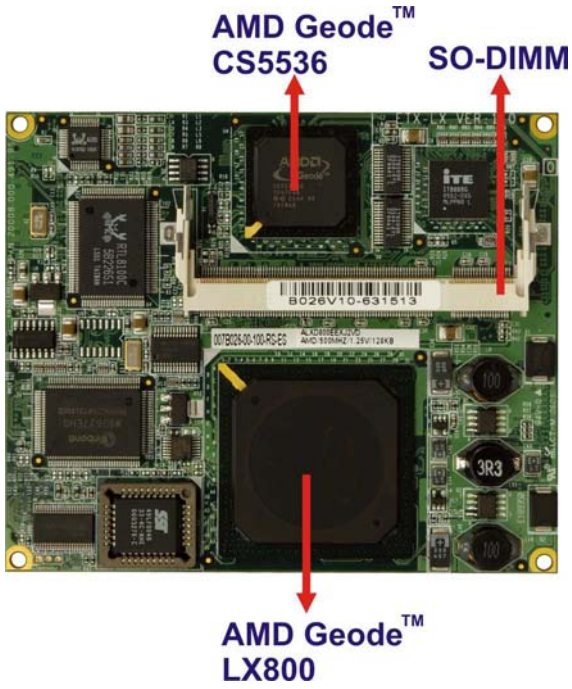

Figure 1-1: IEM-LX Overview (Front Side)

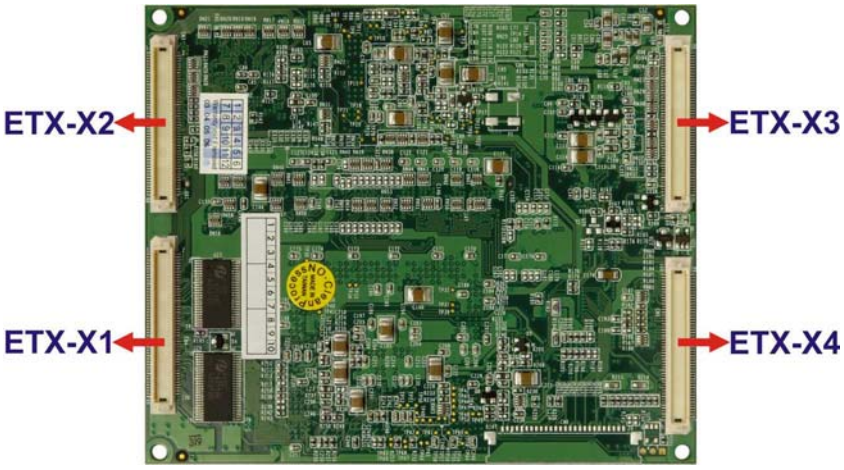

Figure 1-2: IEM-LX Overview (Reverse Side)

1.2.1 IEM-LX Connectors

The IEM-LX has the following interface connectors on-board:

- 1 x ETX-X1 connector (reverse side)
- 1 x ETX-X2 connector (reverse side)
- 1 x ETX-X3 connector (reverse side)
- 1 x ETX-X4 connector (reverse side)
- 1 x SO-DIMM socket (front side)

1.2.2 IEM-LX IO Interface Support

The IEM-LX embedded module supports the following IO interfaces on the baseboard:

- 4 x USB 2.0
- 1 x LPT
- 1 x CF Type II
- 1 x IDE
- Multi COM ports supported by baseboard

1.2.3 Technical Specifications

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

SPECIFICATION	
CPUs Supported	AMD® Geode LX 800
Cache Memory	64K I/ 64k D L1 cache, 128K L2 cache
System Chipset	AMD® CS5536
I/O Controller	AMD® CS5536
Memory	One 200-pin DDR 333/400MHz SO-DIMM SDRAM with a maximum size of 1GB.
PCI Bus Interface	Revision 2.2

Super IO	W83627EHG
Display	CRT integrated in AMD® Geode LX 800
TTL/ LVDS	24 bit TTL integrated in AMD Geode LX 800 18 bit LVDS
HDD Interface	Two IDE channels supports four Ultra ATA 100/66/33 devices
Power Support	AT/ATX power supported
Power Consumption	+5V @ 0.92A (DDR333 256MB)
Watchdog Timer	Software programmable supports 1~255 sec. system reset
I/O Interfaces	4 x USB 2 .0 1 x LPT 1 x CFII 1 x IDE
Ethernet	10/100BASE-T RTL8100C
BIOS	AWARD
Physical Dimensions	95mm x 114mm
Weight	GW:0.65kg; NW: 0.25kg
Operating Temperature	Minimum: 0°C (32°F) Maximum: 60°C (140°F)
Audio Interfaces	AC'97 Codec Realtek ALC203

Table 1-1: Technical Specifications

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Chapter

2

Detailed Specifications

2.1 Overview

This chapter describes the specifications and on-board features of the IEM-LX-800 in detail.

2.2 Dimensions

2.2.1 Board Dimensions

The dimensions of the board are listed below:

- **Length**: 114mm
- **Width**: 95mm

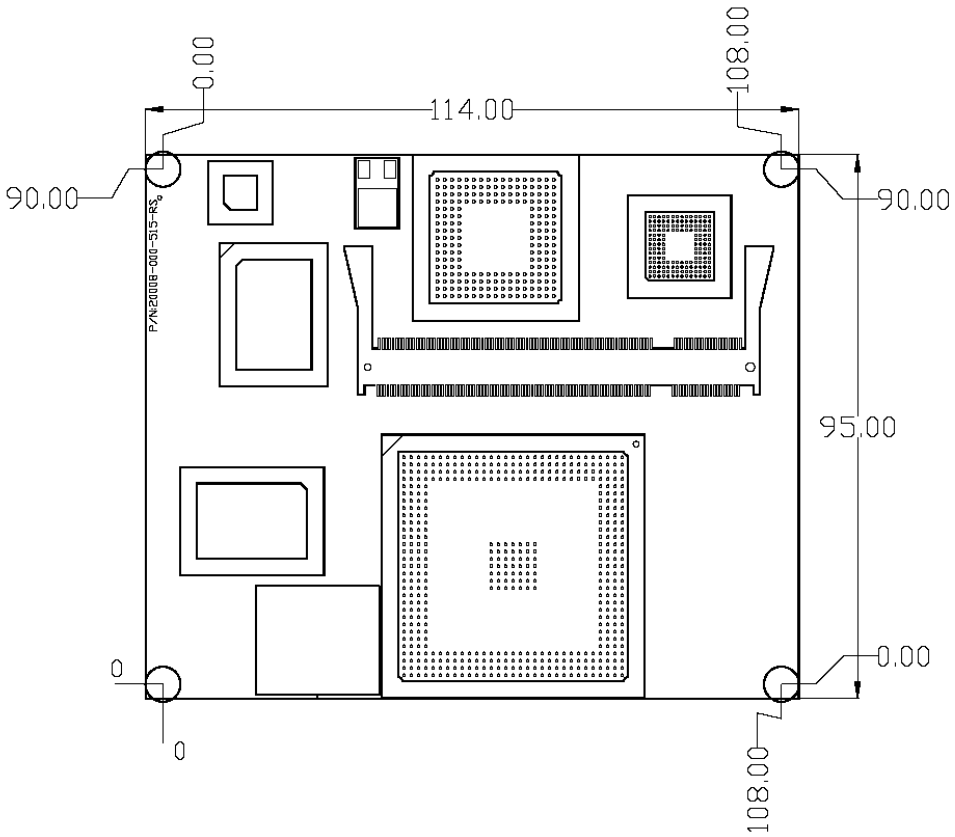

Figure 2-1: IEM-LX Dimensions (millimeters)

2.3 Data Flow

The IEM-LX-800 CPU module comes with an AMD® Geode™ LX 800 CPU and an AMD® Geode™ CS5536 linked together by the GeodeLink™ Interface Unit. **Figure 2-2** shows the data flow between the system chipset, the CPU and other components installed on the CPU module.

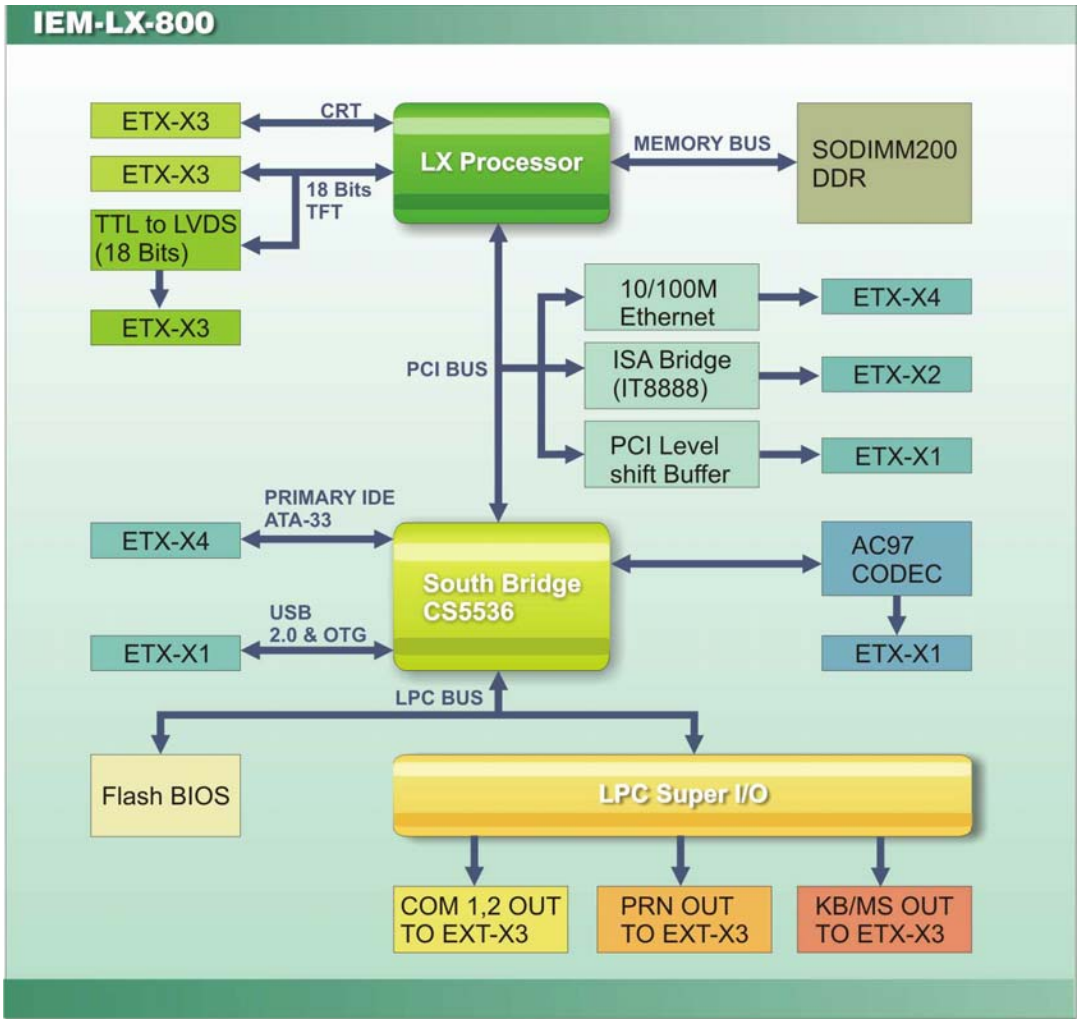

Figure 2-2: Data Flow Block Diagram

2.4 CPU Support

The IEM-LX-800 CPU module comes with a preinstalled AMD® Geode™ LX 800 500MHz CPU.

2.4.1 AMD® Geode™ LX 800 500MHz Overview

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)
- Integrated FPU that supports the Intel MMX® and AMD 3DNow!™ Technology instruction sets
- 9 GB/s internal GeodeLink™ Interface Unit (GLIU)
- Security Block
  - 128-bit AES (CBC/ECB)
- True Random Number Generator

2.4.2 AMD® Geode™ LX 800 Memory Support

The AMD® Geode™ LX 800 supports 64-bit DDR memory modules with frequencies up to 400MHz. The IEM-LX-800 has one 200-pin DDR SO-DIMM SDRAM socket that supports one 64-bit 333 MHz or 400MHz DDR SO-DIMM memory module with a maximum capacity of 1GB.

2.4.3 AMD® Geode™ LX 800 500MHz Display Support

The AMD® Geode™ LX 800 supports both CRT and TFT in a dual display mode. The following display specifications.

- Supported Standards
  - High Definition (HD)
  - Standard Definition (SD)
- Supported Resolution
  - 1920x1440 in CRT mode

- 1600x1200 in TFT mode
- VESA 1.1 and 2.0 VIP/VDA support

2.4.4 AMD® Geode™ LX 800 500MHz Graphics processor

The AMD® Geode™ LX 800 BitBLT/vector engine graphics processor 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

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

2.4.5 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

2.5 System Chipset

The IEM-LX-800 CPU module has a preinstalled AMD® Geode™ CS5536 system chipset. The system chipset features are listed below.

- 82xx Legacy Devices
- System Management Bus (SMB) Controller
- 8 Multi-Function General Purpose Timers (MFGPTs)
- Power Management Controller
- ACPI v2.0 compliant

2.5.1 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)

2.5.2 AMD® Geode™ CS5536 ATA-6 Controller

The single IEM-LX-800 IDE connector supports two ATA-6 HDDs. An ATA-6 (Ultra ATA/100) compliant IDE controller on the AMD® Geode™ CS5536 has a maximum transfer rate of 100MB/s. ATA-6 includes advancements in error checking and ATA-6 drives are compatible with future interface additions.

The on-board ATA-6 controller is able to support the following IDE HDD:

- **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

Specification	Ultra ATA/100	Ultra ATA/66	Ultra ATA/33
IDE devices	2	2	2
PIO Mode	0 – 4	0 – 4	0 – 4
PIO Max Transfer Rate	16.6 MB/s	16.6 MB/s	16.6 MB/s
DMA/UDMA designation	UDMA 3 - 4	UDMA 3 – 4	UDMA 2
DMA/UDMA Max Transfer	100MB/s	66MB/s	33MB/s
Controller Interface	5V	5V	5V

Table 2-2: Supported HDD Specifications

2.5.3 AMD® Geode™ CS5536 Audio Codec 97 (AC'97) Controller

The AC'97 specification v2.3 compliant controller on the chipset is interfaced to a 20-bit DAC and 18-bit ADC full-duplex AC'97 2.3 stereo RealTek ALC203 codec. The codec meets performance requirements for audio on PC99/2001 systems. Some of the codec features are listed below.

- 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
  - LINE/HP-OUT, MIC-IN and LINE-IN sensing
  - 14.318MHz -> 24.576MHz PLL saves crystal
  - 12.288MHz BITCLK input can be consumed
  - Integrated PCBEEP generator to save buzzer
  - Interrupt capability
  - 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

2.5.4 AMD® Geode™ CS5536 Flash Interface

The IEM-LX-800 supports standard CF Type II card socket on the baseboard. The chipset flash interface is multiplexed with an IDE interface and can be connected to an array of industry standard NAND Flash or NOR Flash devices.

2.5.5 AMD® Geode™ CS5536 USB Controller

The ETX-X1 connector on the IEM-LX-800 board supports four external USB ports which are interfaced to the chipset USB controller. Four USB 1.1 or USB 2.0 devices can be connected simultaneously to the IEM-LX-800. The chipset USB controller has the following specifications:

- 4 USB ports
- USB 1.1 and USB 2.0 compliant
- 3 host ports
- 1 host/device

2.5.6 AMD® Geode™ CS5536 Serial Communications

Two high-speed UART RS-232 serial port connectors are connected to the system chipset low pin count (LPC) port via the LPC bus. The specifications for the serial ports are listed below.

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

2.5.7 AMD® Geode™ CS5536 Real Time Clock

The system chipset has a battery backed up 256-byte real-time clock (RTC) with CMOS RAM.

2.5.8 BIOS

The BIOS flash memory chip on the IEM-LX-800 has a licensed copy of AWARD BIOS loaded onto it. The BIOS flash memory chip is connected to the chipset via the LPC bus. The flash BIOS features are listed below:

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

2.6 GeodeLink™ PCI Bridge

2.6.1 Overview

The GeodeLink™ PCI Bridge (GLPCI) module provides a PCI interface for GeodeLink Interface Unit-based designs. The GLPCI module is composed of six major blocks:

- GeodeLink Interface
- FIFO/Synchronization
- Transaction Forwarding
- PCI Bus Interface
- PCI Arbiter

The GeodeLink and PCI Bus Interface blocks provide adaptation to the respective buses. The Transaction Forwarding block provides bridging logic. Some of the features of the GeodeLink™ PCI Bridge are listed below:

- PCI Version 2.2 compliance
- 32-bit, 66 MHz PCI bus operation
- Target support for fast back-to-back transactions
- Arbiter support for three external PCI bus masters
- Write gathering and write posting for in-bound write requests
- Virtual PCI header support
- Delayed transactions for in-bound read requests
- Zero wait state operation within a PCI burst
- Dynamic clock stop/start support for GLIU and PCI clock domains (this is not CLKRUN support)
- Capable of handling out of bound transactions immediately after reset

2.6.2 10/100M Ethernet

A highly integrated and cost-effective single-chip, fast RealTek RTL8100C 10/100M Ethernet controller is interfaced through first the PCI bus and then through the GeodeLink™ PCI Bridge to the CPU and system chipset. The RealTek RTL8100C controller provides 10Mbps or 100Mbps Ethernet connectivity to the IEM-LX-800. Some of the features of the RealTek RTL8100C are listed below.

- 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

2.6.3 PCI to ISA Bridge

An ITE IT8888G PCI to ISA bridge single function device connects the on-board IEM-LX-800 ISA bus ETX-X2 connector to the GeodeLink™ PCI bridge. The IT8888G has a PCI specification v2.1 compliant 32-bit PCI bus interface and supports both PCI Bus master and slave. The PCI interface supports both programmable positive and full subtractive decoding schemes. Some of the features of the IT8888G PCI to ISA bridge are listed below.

- PCI Interface
- Programmable PCI Address Decoders
- PC/PCI DMA Controller
- Distributed DMA Controller
- ISA Interface
- SM Bus
- 1 analog line-level mono output: MONO_OUT

- Power-on Serial Bus Configuration
- Serial IRQ
- Versatile power-on strapping options
- Supports NOGO function
- Single 33 MHz Clock Input
- +3.3V PCI I/F with +5V tolerant I/O buffers
- +5V ISA I/F and core Power Supply

2.7 Environmental and Power Specifications

2.7.1 System Monitoring

The IEM-LX-800 is capable of self-monitoring various aspects of its operating status including:

- CPU, chipset, and battery voltage, +3.3V, +5V, and +12V
- RPM of cooling fans
- CPU and board temperatures (by the corresponding embedded sensors)

2.7.2 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the IEM-LX-800 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.

2.8 Power Consumption

Table 2-3 shows the power consumption parameters for the IEM-LX when an AMD Geode LX 800 CPU is running with a 333MHz, 256MB DDR RAM module.

Voltage	Current
+5V	0.92A

Table 2-3: Power Consumption

Chapter

3

Unpacking

3.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the IEM-LX-800 may result in permanent damage to the IEM-LX-800 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the IEM-LX-800. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the IEM-LX-800, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband***: Wearing a simple anti-static wristband 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.
- ***Use an anti-static pad***: When configuring the IEM-LX-800, place it on an antic-static pad. This reduces the possibility of ESD damaging the IEM-LX-800.
- ***Only handle the edges of the PCB***: When handling the PCB, hold the PCB by the edges.

3.2 Unpacking

3.2.1 Unpacking Precautions

When the IEM-LX-800 is unpacked, please do the following:

- Follow the anti-static precautions outlined in **Section 3.1**.
- Make sure the packing box is facing upwards so the IEM-LX-800 does not fall out of the box.
- Make sure all the components shown in **Section 3.3** are present.

3.3 Unpacking Checklist

NOTE:

If some of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the IEM-LX-800 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

3.3.1 Package Contents

The IEM-LX-800 is shipped with the following components:

Quantity	Item	Image
1	IEM-LX-800	
1	Mini jumper Pack	
1	Quick Installation Guide	
1	Utility CD	

Table 3-1: Package List Contents

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Chapter

4

Interface Connectors

4.1 Peripheral Interface Connectors

Section 4.1.1 shows interface connector locations. **Section 4.1.2** lists all the interface connectors seen in **Section 4.1.1**.

4.1.1 IEM-LX Layout

Figure 4-1 shows the on-board peripheral connectors, backplane peripheral connectors and on-board jumpers.

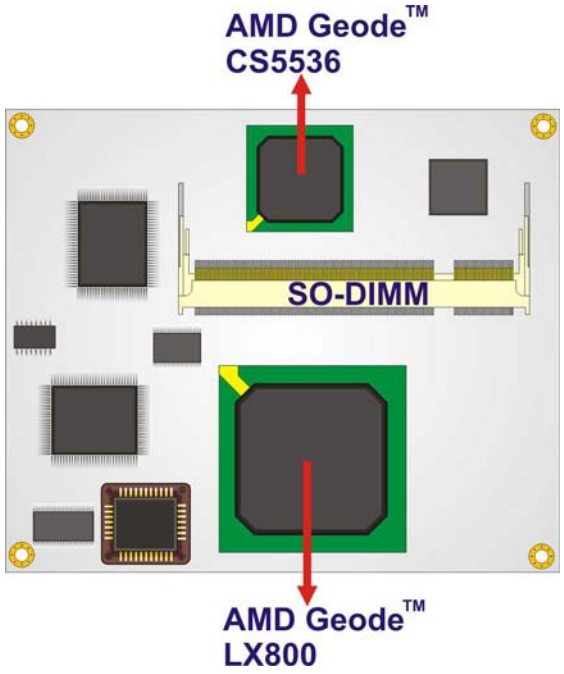


Figure 4-1: Connector and Jumper Locations (Front Side)

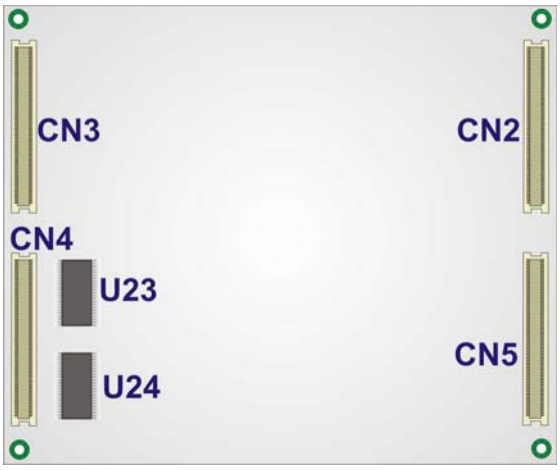


Figure 4-2: Connector and Jumper Locations

4.1.2 Peripheral Interface Connectors

Table 4-1 shows a list of the interface connectors on the IEM-LX Detailed descriptions of these connectors can be found in **Section 4.2**.

Connector	Type	Label
ETX-X1 connector	100-pin ETXconnector	CN4
ETX-X2 connector	100-pin ETX connector	CN3
ETX-X3 connector	100-pin ETX connector	CN2
ETX-X4 connector	100-pin ETX connector	CN5
SO-DIMM connector	200-pin SO-DIMM socket	CN1

Table 4-1: IEM-LX Interface Connectors

4.2 ETX Interface Connectors

The IEM-LX embedded module has standard four standard ETX interface connectors on the reverse side of the board. The location of the pins and the pinout descriptions are given below.

4.2.1 ETX-X1 Connector

CN Label: CN4

CN Type: 100-pin ETX connector

CN Location: See Figure 4-3

CN Pinouts: See Table 4-2

The standard ETX-X1 connector locations and pinouts are shown below.

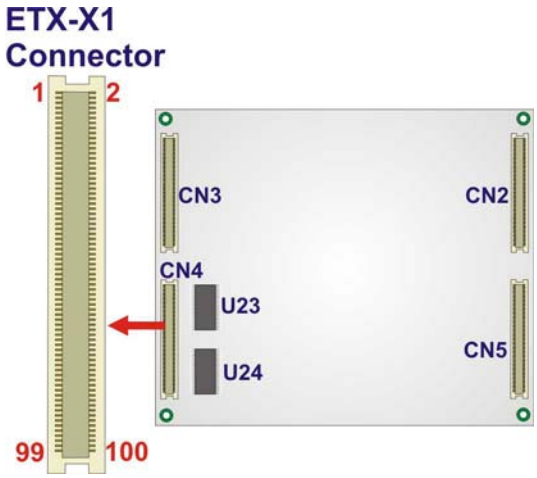


Figure 4-3: ETX-X1 Connector Pinouts

Pin	Description	Pin	Description	Pin	Description	Pin	Description
1	GND	2	GND	51	VCC5	52	VCC5
3	PCICLK3	4	PCICLK4	53	PAR	54	SERR#
5	GND	6	GND	55	PERR#	56	RESERVED
7	PCICLK1	8	PCICLK2	57	PME#	58	USB2#

9	REQ3#	10	GNT3#	59	LOCK#	60	DEVSEL#
11	GNT2#	12	VCC3	61	TRDY#	62	USB3#
13	REQ2#	14	GNT1#	63	IRDY#	64	STOP#
15	REQ1#	16	VCC3	65	FRAME#	66	USB2
17	GNT0#	18	RESERVED	67	GND	68	GND
19	VCC5	20	VCC5	69	AD16	70	CBE2#
21	SERIRQ	22	REQ0#	71	AD17	72	USB3
23	AD0	24	VCC3	73	AD19	74	AD18
25	AD1	26	AD2	75	AD20	76	USB0#
27	AD4	28	AD3	77	AD22	78	AD21
29	AD6	30	AD5	79	AD23	80	USB1#
31	CBE0#	32	AD7	81	AD24	82	CBE3#
33	AD8	34	AD9	83	VCC5	84	VCC5
35	GND	36	GND	85	AD25	86	AD26
37	AD10	38	AUX-L	87	AD28	88	USB0
39	AD11	40	MIC	89	AD27	90	AD29
41	AD12	42	AUX-R	91	AD30	92	USB1
43	AD13	44	ASVCC	93	PCIRST#	94	AD31
45	AD14	46	SNDL	95	INTC#	96	INTD#
47	AD15	48	ASGND	97	INTA#	98	INTB#
49	CBE1#	50	SNDR	99	GND	100	GND

Table 4-2: ETX-X1 Connector Pinouts

4.2.2 ETX-X2 Connector

CN Label: CN3

CN Type: 100-pin ETX connector

CN Location: See Figure 4-4

CN Pinouts: See Table 4-3

The standard ETX-X2 connector locations and pinouts are shown below.

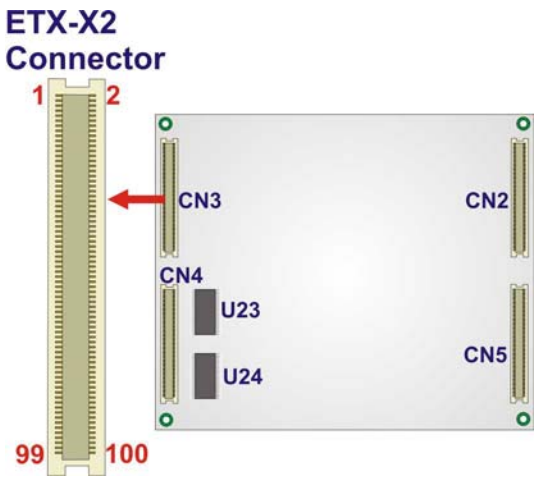


Figure 4-4: CF Flash Pinout Locations

Pin	Description	Pin	Description	Pin	Description	Pin	Description
1	GND	2	GND	51	VCC5	52	VCC5
3	SD14	4	SD15	53	SA6	54	IRQ5
5	SD13	6	MASTER#	55	SA7	56	IRQ6
7	SD12	8	DREQ7	57	SA8	58	IRQ7
9	SD11	10	DACK7#	59	SA9	60	SYSCLK
11	SD10	12	DREQ6	61	SA10	62	REFRESH#
13	SD9	14	DACK6#	63	SA11	64	DREQ1
15	SD8	16	DREQ5	65	SA12	66	DACK1#
17	MEMW#	18	DACK5#	67	GND	68	GND
19	MEMR#	20	DREQ0	69	SA13	70	DREQ3
21	LA17	22	DACK0#	71	SA14	72	DACK3#
23	LA18	24	IRQ14	73	SA15	74	IOR#
25	LA19	26	IRQ15	75	SA16	76	IOW#
27	LA20	28	IRQ12	77	SA18	78	SA17
29	LA21	30	IRQ11	79	SA19	80	SMEMR#
31	LA22	32	IRQ10	81	IORDY	82	AEN
33	LA23	34	IOCS16#	83	VCC5	84	VCC5
35	GND	36	GND	85	SD0	86	SMEMW#

37	SBHE#	38	MEMCS16#	87	SD2	88	SD1
39	SA0	40	OSC	89	SD3	90	0WS#
41	SA1	42	ALE#	91	DREQ2	92	SD4
43	SA2	44	TC	93	SD5	94	IRQ9
45	SA3	46	DACK2#	95	SD6	96	SD7
47	SA4	48	IRQ3	97	IOCHK#	98	RSTDRV
49	SA5	50	IRQ4	99	GND	100	GND

Table 4-3: ETX-X2 Connector Pinouts

4.2.3 ETX-X3 Connector

CN Label: CN2

CN Type: 100-pin ETX connector

CN Location: See Figure 4-5

CN Pinouts: See Table 4-4

The standard ETX-X3 connector locations and pinouts are shown below.

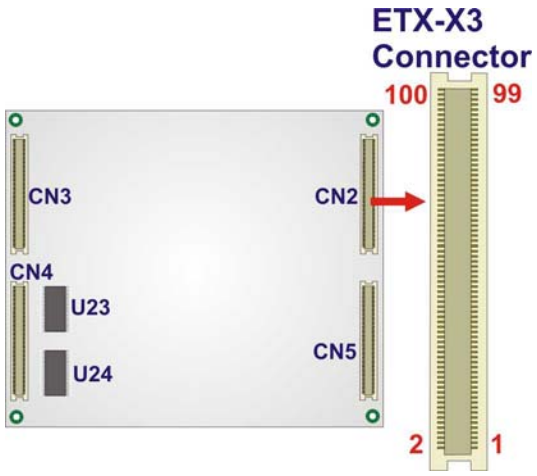


Figure 4-5: Fan Connector Pinout Locations

Pin	Description	Pin	Description	Pin	Description	Pin	Description
1	GND	2	GND	51	LPT(High)	52	NC
3	VGA_R	4	VGA_B	53	VCC5	54	GND
5	HSYNC	6	VGA_G	55	PRN_STB#	56	PRN_AFD#
7	VSYNC	8	DDCK	57	NC	58	PRN_D7
9	NC	10	DDDA	59	IR_RXD	60	PRN_ERR#
11	TTL_B6	12	DOTCLK	61	IR_TXD	62	PRN_D6
13	TTL_B7	14	LCD_EN	63	RXD2	64	PRN_INIT#
15	GND	16	GND	65	GND	66	GND
17	TTL_B3	18	TTL_B5	67	RTS2#	68	PRN_D5
19	TTL_B2	20	TTL_B4	69	DTR2#	70	PRN_SLIN#
21	GND	22	GND	71	DCD2#	72	PRN_D4
23	TTL_G4	24	TTL_G7	73	DSR2#	74	PRN_D3
25	TTL_G5	26	TTL_G6	75	CTS2#	76	PRN_D2
27	GND	28	GND	77	TXD2	78	PRN_D1
29	TTL_R6/LVD2-	30	TTL_G3/LVDCK+	79	RI2#	80	PRN_D0
31	TTL_R7/LVD2+	32	TTL_G2/LVDCK-	81	VCC5	82	VCC5
33	GND	34	GND	83	RXD1	84	PRN_ACK#
35	TTL_R3/LVD0+	36	TTL_R5/LVD1+	85	RTS1#	86	PRN_BUSY
37	TTL_R2/LVD0-	38	TTL_R4/LVD1-	87	DTR1#	88	PRN_PE
39	VCC5	40	VCC5	89	DCD1#	90	PRN_SLCT
41	JILI_DAT	42	GPIO	91	DSR1#	92	MSCLK
43	JILI_CLK	44	BL_ON#	93	CTS1#	94	MSDAT
45	NC	46	VDD_EN	95	TXD1	96	KBCLK
47	NC	48	NC	97	RI1#	98	KBDAT
49	NC	50	NC	99	GND	100	GND

Table 4-4: ETX-X3 Connector Pinouts

4.2.4 ETX-X4 Connector

CN Label: CN5

CN Type: 100-pin ETX connector

CN Location: See Figure 4-6

CN Pinouts: See Table 4-5

The standard ETX-X4 connector locations and pinouts are shown below.

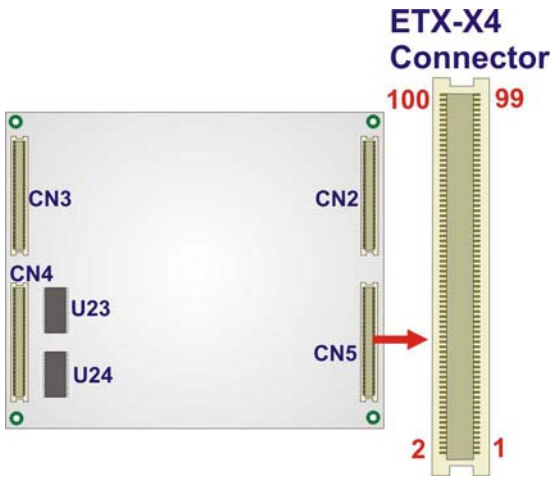


Figure 4-6: ETX-X4 Connector Pinout Locations

Pin	Description	Pin	Description	Pin	Descripti	Pin	Descriptio
1	GND	2	GND	51	NC	52	IDE_IOR
3	5VSB	4	SYS_RST#	53	NC	54	IDE_IOW
5	PSON#	6	PCBEEP	55	NC	56	IDE_DRQ
7	PWRBTN#	8	VBAT	57	NC	58	IDE_D15
9	NC	10	LILED#	59	NC	60	IDE_D0
11	RSMRST#	12	ACTLED#	61	NC	62	IDE_D14
13	NC	14	SPEEDLED#	63	NC	64	IDE_D1
15	NC	16	I2CLK	65	GND	66	GND
17	VCC5	18	VCC5	67	NC	68	IDE_D13

19	USB_OC#	20	NC	69	NC	70	IDE_D2
21	NC	22	I2DAT	71	NC	72	IDE_D12
23	SMBCLK	24	SMBDATA	73	NC	74	IDE_D3
25	NC	26	NC	75	NC	76	IDE_D11
27	NC	28	NC	77	NC	78	IDE_D4
29	NC	30	IDE_CS1#	79	NC	80	IDE_D10
31	NC	32	IDE_CS0#	81	VCC5	82	VCC5
33	GND	34	GND	83	NC	84	IDE_D5
35	NC	36	IDE_A2	85	NC	86	IDE_D9
37	NC	38	IDE_A0	87	NC	88	IDE_D6
39	NC	40	IDE_A1	89	RING#	90	CBLID
41	BATLOW#	42	NC	91	LAN_RX-	92	IDE_D8
43	NC	44	IDE_IRQ	93	LAN_RX+	94	NC
45	NC	46	IDE_ACK	95	LAN_TX-	96	IDE_D7
47	NC	48	IDE_RDY	97	LAN_TX+	98	HDRST#
49	VCC5	50	VCC5	99	GND	100	GND

Table 4-5: ETX-X4 Connector Pinouts

Chapter

5

Installation

5.1 Installation Considerations

NOTE:

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

5.1.1 Installation Notices

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

- Read the user manual
  - The user manual provides a complete description of the IEM-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 CPU module on an antistatic pad
  - When installing or configuring the CPU module, place it on an antistatic pad. This helps to prevent potential ESD damage.
- Turn off all power to the IEM-LX
  - When working with the CPU module, 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 IEM-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.

5.2 Unpacking

NOTE:

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

5.2.1 Unpacking Precautions

Before installing the IEM-LX, unpack the CPU module. Some components on IEM-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 IEM-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 IEM-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.

5.2.2 Checklist

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

- 1 x IEM-LX embedded module
- 1 x Mini jumper pack

- 1 x Utility CD
- 1 x QIG

If one or more of these items are missing, please contact the reseller or vendor the IEM-LX was purchased from and do not proceed any further with the installation.

5.3 IEM-LX Embedded Module Installation

WARNING!

Never run the embedded module without an appropriate heat sink.

WARNING!

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

WARNING!

When installing electronic components onto the embedded module or installing the embedded module onto the baseboard, always take anti-static precautions in order to prevent ESD damage to the CPU module and other electronic components like the CPU and SO-DIMM module.

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

NOTE:

The IEM-LX embedded module already has a preinstalled AMD CPU.

- SO-DIMM module
- Mount the embedded module onto a baseboard

5.3.1 SO-DIMM Installation

WARNING:

Using incorrectly specified SO-DIMM may cause permanently damage the IEM-LX-800. Please make sure the purchased SO-DIMM complies with the memory specifications of the IEM-LX-800. SO-DIMM specifications compliant with the IEM-LX-800 are listed in **Chapter 2**.

To install a SO-DIMM into a SO-DIMM socket, please follow the steps below and refer to **Figure 5-1**.

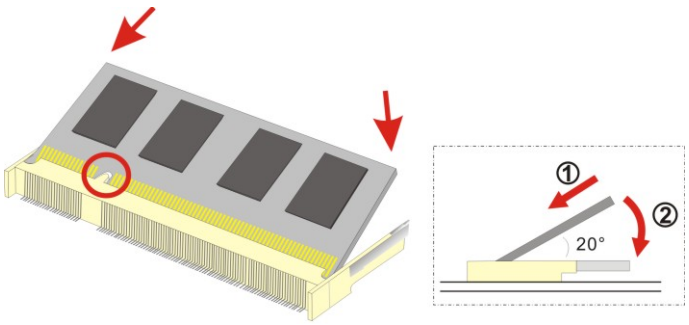


Figure 5-1: SO-DIMM Installation

Step 1: **Locate the SO-DIMM socket**. Place the IEM-LX-800 on an anti-static pad.

Step 2: **Align the SO-DIMM with the socket**. The SO-DIMM must be oriented in such a way that the notch in the middle of the SO-DIMM must be aligned with the plastic bridge in the socket.

Step 3: **Insert the SO-DIMM**. Push the SO-DIMM chip into the socket at an angle. (See **Figure 5-1**)

Step 4: **Open the SO-DIMM socket arms**. Gently pull the arms of the SO-DIMM socket

out and push the rear of the SO-DIMM down. (See **Figure 5-1**)

Step 5: **Secure the SO-DIMM**. Release the arms on the SO-DIMM socket. They clip into place and secure the SO-DIMM in the socket.

5.3.2 Mounting the IEM-LX Embedded Module

The IEM-LX embedded module has four standard ETX connectors on the reverse side. Align these ETX connectors (ETX-X1, ETX-X2, ETX-X3 and ETX-X4) with the corresponding connectors on a compatible baseboard. Gently push the embedded module down to ensure the connectors are properly connected.

Baseboard can be designed by the end user, customized by IEI, or purchased from IEI. For more information visit the IEI webstie (www.ieiworld.com) or contact an IEI sales representative.

Chapter

6

Award BIOS Setup

6.1 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.

6.1.1 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.

6.1.2 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 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 6-1: BIOS Navigation Keys

6.1.3 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.

6.1.4 Unable to Reboot After Configuration Changes

If the system cannot be booted after changes are made, restore the CMOS defaults. The baseboard should come with a restore CMOS settings jumper. Refer to the documentation that came with the baseboard for more information.

6.1.5 Main BIOS Menu

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

BIOS Menu 1: Award BIOS CMOS Setup Utility

NOTE:

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

The following menu options are seen in BIOS Menu 1.

- **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:** Allows you to configure power saving options
- **PnP/PCI Configuration:** Changes the advanced PCI/PnP Settings
- **PC Health Status:** Menu that monitors essential system parameters

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

➔ **Load Fail-Safe Defaults**

Select this option to load failsafe default values for each BIOS parameter in the setup menus. F6 key can be used for this operation on any page.

➔ **Load Optimized Defaults**

Select this option to load optimal default values for each BIOS parameter in the setup menus. F7 key can be used for this operation on any page.

➔ **Set 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 with “Enter Password: ” appears. The user is then asked to confirm the password. Retype the original password into the “Confirm Password: ” dialogue box and press ENTER.

➔ **Set 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 with “Enter Password: ” appears. The user is then asked to confirm the password. Retype the original password into the “Confirm Password: ” dialogue box and press ENTER.

➔ **Save & Exit Setup**

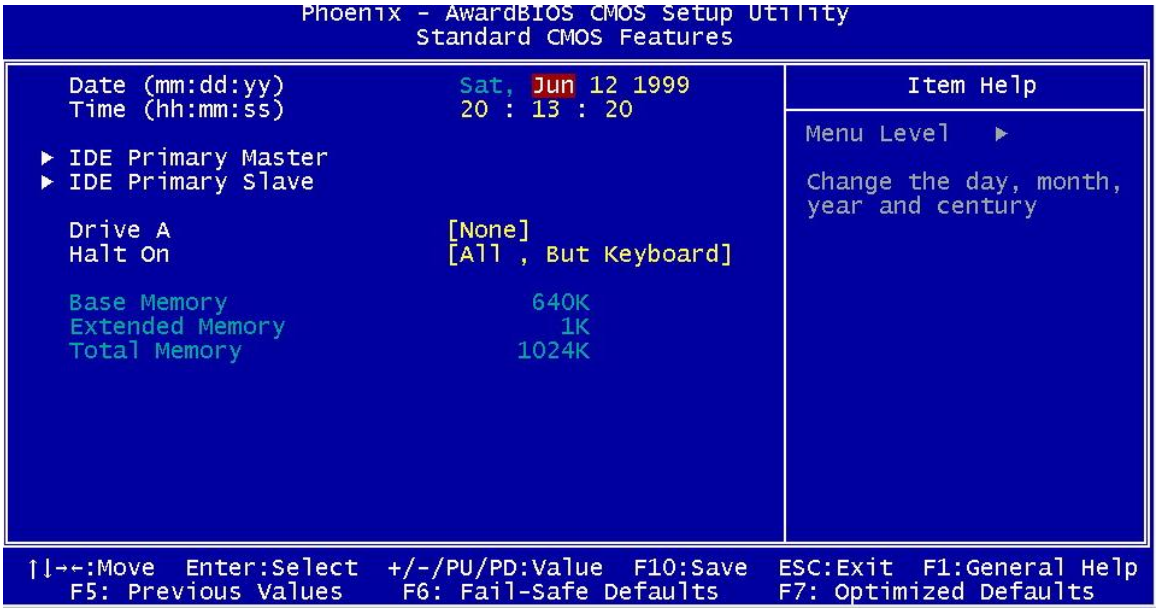
If the configuration changes are complete, select this option to save the changes and exit the BIOS menus.

➔ **Exit Without Saving**

If the configuration changes are complete, select this option exit the BIOS menus without saving the new BIOS settings.

6.2 Standard CMOS Features

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



BIOS Menu 2: Standard CMOS Features

The system date and system time is set in the Standard CMOS Features menu.

- **Date [mm:dd:yy]**: Sets the system date.
- **Time [Day hh/mm/ss]:** Sets 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:

- Primary IDE Master
- Primary IDE Slave

IDE device configurations are changed or set in the IDE Configuration menu (BIOS Menu 3). If an IDE device is detected, and one of the above listed two BIOS configuration options are selected, the IDE configuration options shown in Section 6.2.1 appear.

➔ **Drive A [None]**

Use the Drive A configuration to specify the floppy drive type installed in the system. The floppy drive configuration options are listed below.

- None (DEFAULT)
- 1.44M, 3.5in

➔ **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**

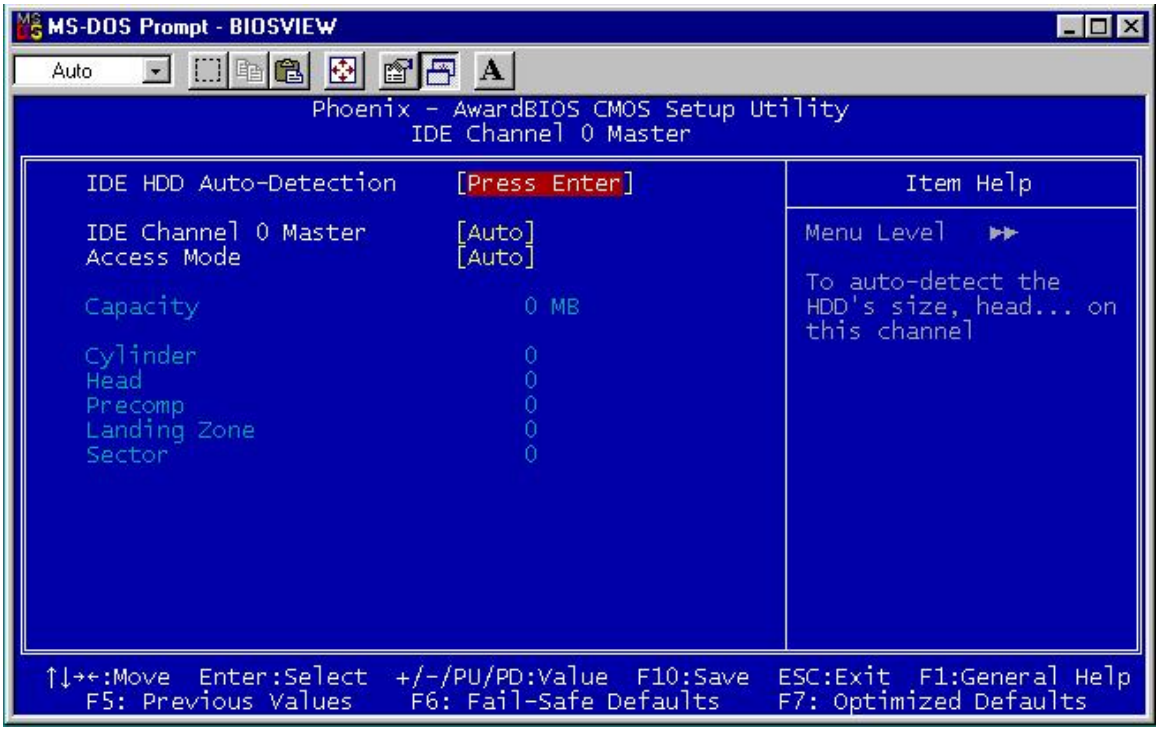
The Extended Memory is NOT user configurable. The BIOS determines how much extended memory is present during the POST. This is the amount of memory above 1MB located in the memory address map of the CPU.

➔ **Total Memory**

The Total Memory is NOT user configurable.

6.2.1 IDE Primary Master/Slave

Use the **IDE Primary Master/Slave** menu (**BIOS Menu 3**) to set or change the master/slave IDE configurations.



BIOS Menu 3: IDE Channel Master

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

Use the **IDE Channel** 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 option. Once set, this IDE channel becomes inaccessible and any drives attached to it undetected.
➔ **Auto**	(Default)	Setting this option allows the device to be automatically detected by the BIOS
➔ **Manual**		Selecting this option allows manual configuration of the device on the IDE channel in BIOS.

➔ **Access Mode [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 should be selected.

➔ **CHS**	Select this mode if the HDD capacity is less than 504MB.
➔ **LBA**	Select this mode if the HDD capacity is more than 8.4GB.

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

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

➔ **Capacity**

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

➔ **Cylinder**

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

➔ **Head**

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

➔ **Precomp**

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

➔ **Landing Zone**

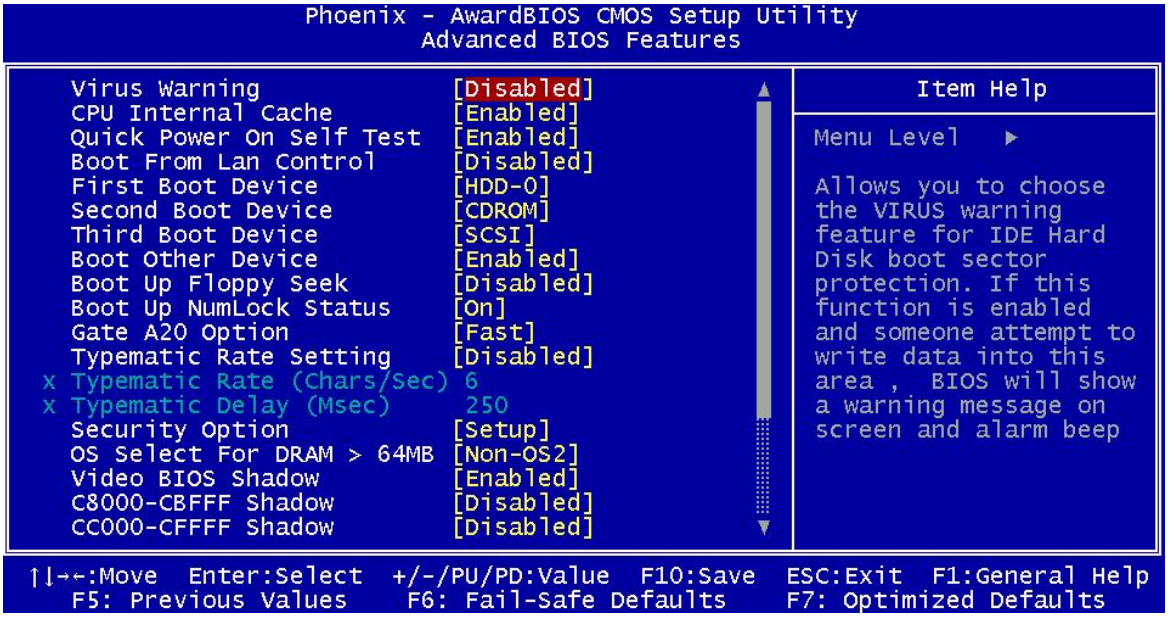
The Landing Zone specification tells the user where the disk head will park itself after the system powers off.

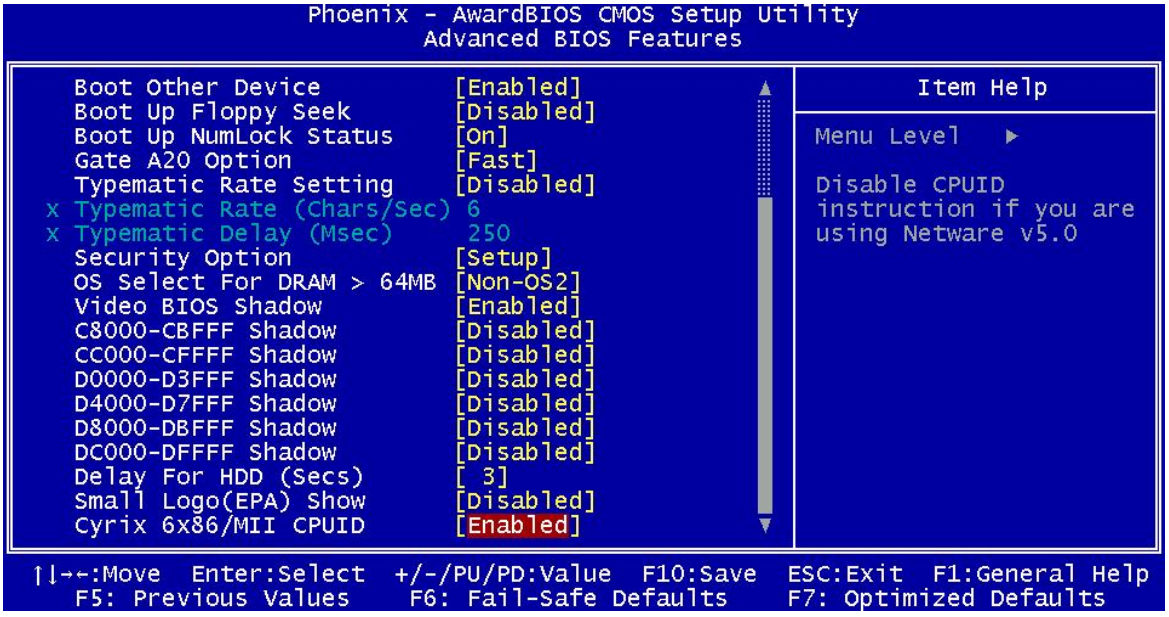
➔ **Sector**

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

6.3 Advanced BIOS Features

CPU and peripheral device configuration options are accessed in **the Advanced BIOS Features** menu (BIOS Menu 4).





BIOS Menu 4: 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 is disabled before hand.

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. Afterwards, if necessary, an anti-virus program can be run to locate and remove the problem before any damage is done.

➔ **Enabled**		Activates automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector or HDD partition table.
➔ **Disabled**	(Default)	No warning message 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

➔ **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. They are:

- **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 uses a CD-ROM to boot from. 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

- 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 arrow keys
➔ **On**	(Default)	The keys on the keypad are number keys

➔ **Gate A20 Option**

Use the **Gate A20 Option** option to 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 onto the screen if a key is continuously held down. In other words, the BIOS only reports the key is down. When this option is enabled, the BIOS reports as before, but it then waits a moment, and, if the key is still down, it begins to report that the key has been depressed repeatedly. Such a feature would be used to accelerate cursor movements with the arrow keys.

➔ **Disabled**	(Default)	Disables the typematic rate
➔ **Enabled**		Enables the typematic rate

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

Use **Typematic Rate** option to specify the rate keys are accelerated. (The Typematic Rate can only be configured if the Typematic Rate Setting is Enabled.)

➔ **6**	(Default)	6 characters per second

- **8** 8 characters per second
- **10** 10 characters per second
- **12** 12 characters per second
- **15** 15 characters per second
- **20** 20 characters per second
- **24** 24 characters per second
- **30** 30 characters per second

➔ **x Typematic Delay (Msec) [250]**

Use the **Typematic Delay** to specify the delay time between when the key was first depressed and when the acceleration begins. (The Typematic Delay can only be configured if the Typematic Rate Setting is Enabled.)

- **250** (Default) 250 milliseconds
- **500** 500 milliseconds
- **750** 750 milliseconds
- **1000** 1000 milliseconds

➔ **Security Option [Setup]**

Use the **Security Option** option to limit access to both the system and Setup or just to the 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 entered. Once the security is disabled, the system boots and Setup can be freely.

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

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

- ➔ **Enabled** Only select this if you are using the OS/2 operating system
- ➔ **Disabled** (Default) If you are not using the OS/2 operating system then disable this function.

➔ **Video BIOS Shadow [Enabled]**

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

- ➔ **Disabled** Video BIOS is not copied to RAM.
- ➔ **Enabled** (Default) Video BIOS is copied to RAM.

➔ **XXXXX-YYYYY Shadow [Disabled]**

Use the **XXXXX-YYYYY Shadow** option to write the contents of the ROM area XXXXX-YYYYY to the same address in the system RAM.

- ➔ **Disabled** (Default) Contents from ROM area XXXXX-YYYYY is not written to the RAM.
- ➔ **Enabled** Contents from ROM area XXXXX-YYYYY is written to the

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.

➔ **Cyrix 6x86/MII CPUID [Enabled]**

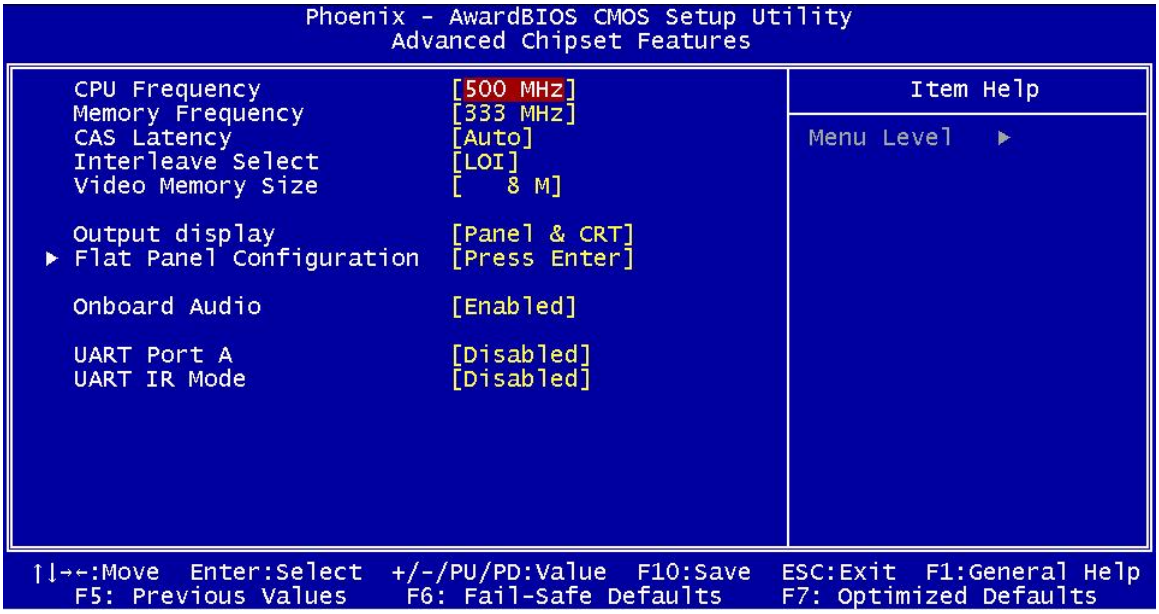
Use the **Cyrix 6x86/MII CPUID** option to determine if the system checks to see if a Cyrix CPU is installed.

➔ **Disabled** (Default) The system doesn't look for a Cyrix CPU

➔ **Enabled** The system looks for a Cyrix CPU

6.4 Advanced Chipset Features

Use the **Advanced Chipset Features** menu (**BIOS Menu 5**) to change chipset configuration options.



BIOS Menu 5: Advanced Chipset Features

➔ **CPU Frequency [500MHz]**

Use the **CPU Frequency** option to set the CPU frequency. Configuration options are listed below.

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

➔ **Memory Frequency [333MHz]**

Use the **Memory Frequency** option to set the frequency of the installed DRAM modules. Configuration options are listed below.

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

➔ **CAS Latency [Auto]**

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

- 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 configuration options are listed below.

- 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 following configuration options are available

- Flat Panel
- CRT
- Panel & CRT (Default)

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

Use the **Flat Panel Configuration** to open the **Flat Panel Configuration** menu. These options are shown in **Section 6.4.1**.

➔ **OnBoard Audio [Enabled]**

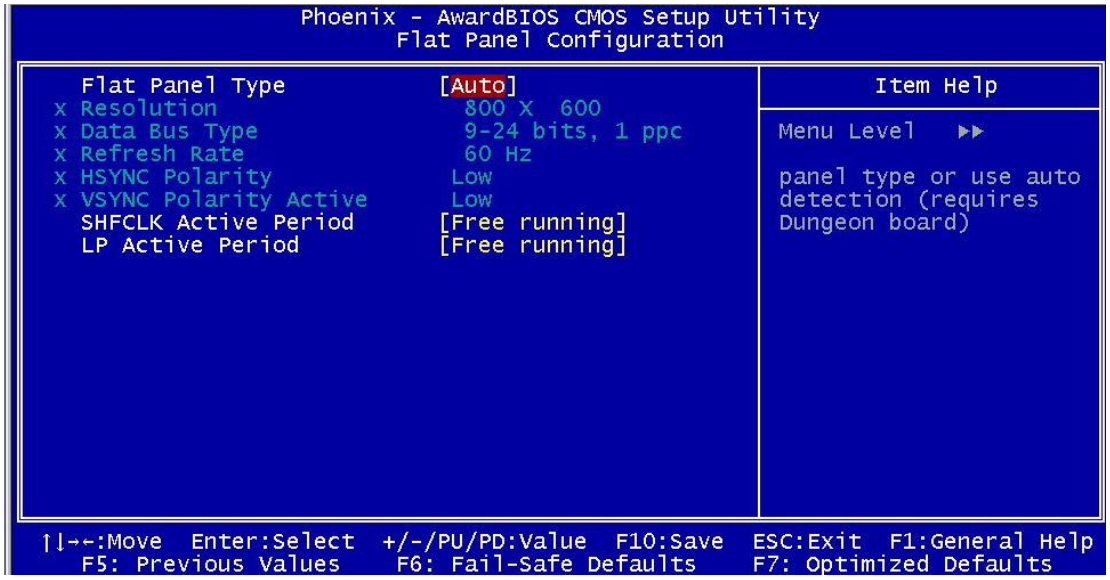
Use the **OnBoard Audio** option to enable or disable the on-board codec.

➔ **Disabled** The on-board codec is disabled

➔ **Enabled** (Default) The on-board codec is detected and enabled

6.4.1 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.



BIOS Menu 6: PCI Express Port Functions

➔ **Flat Panel Type [Auto]**

Use the **Flat Panel Type** option to specify the type of flat panel screen is connected to the system.

➔ **TFT**		The system is connected to a TFT display
➔ **Auto**		The system detects the display type and the display settings
➔ **Auto**	(Default)	The system detects the display type and the display settings

➔ **Resolution [800 x 600]**

Use the **Resolution** option to set the resolution of the flat panel screen connected to the system. Configuration options are listed below:

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

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

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. Configuration options are listed below.

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

➔ **Refresh Rate [60Hz]**

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. Configuration options are listed below.

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

➔ **HSYNC Polarity [Low]**

Use the **HSYNC Polarity** option to set the polarity of the HSYNC signal to the panel. Configuration options are listed below.

- High
- Low (Default)

➔ **VSYNC Polarity Active [Low]**

Use the **VGSYNC Polarity Active** option to set the polarity of the VSYNC signal to the panel. Configuration options are listed below.

- High
- Low (Default)

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

Use the **SHFCLK Active Period** option to set the SHFCLK. Configuration options are listed below.

- Active Only
- Free running (Default)

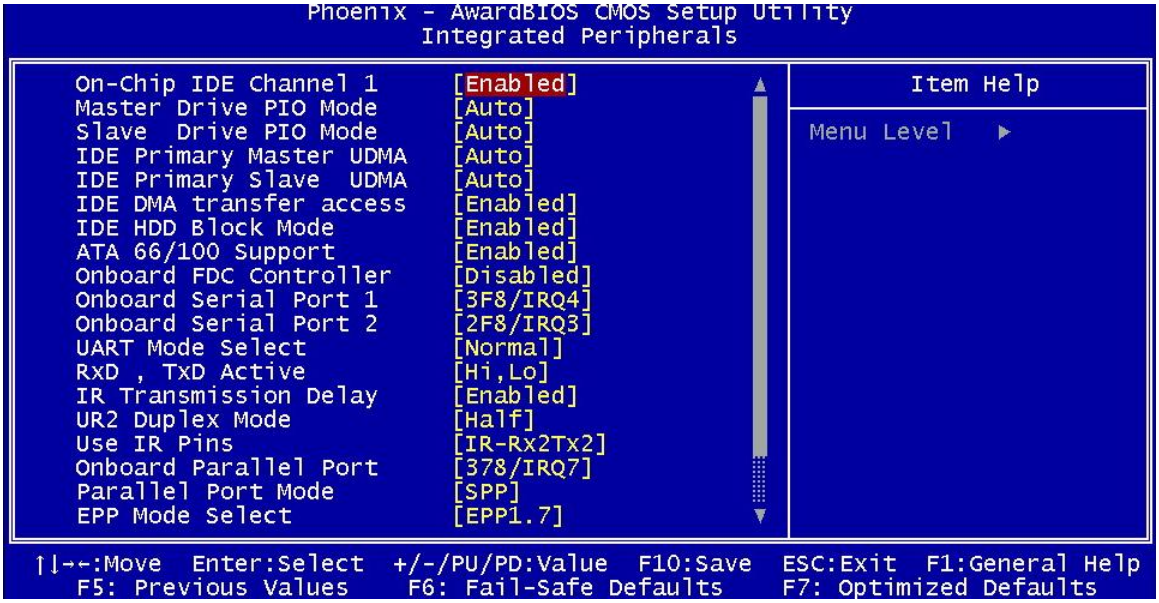
➔ **LP Active Period [Free Running]**

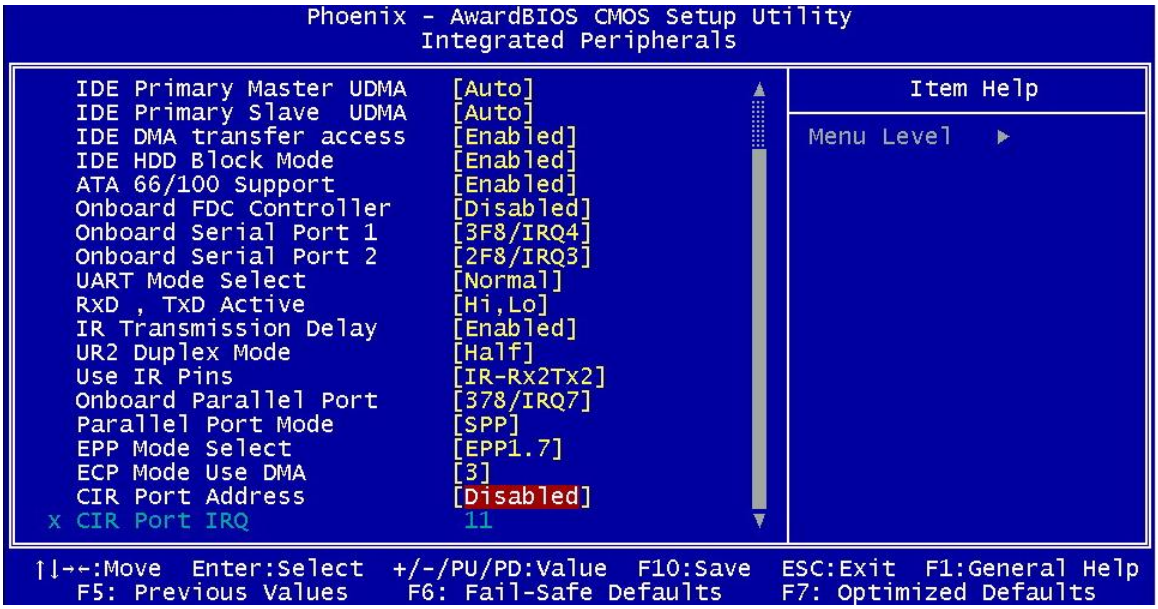
Use the **LP Active Period** option to set the LDE/MOD signal to the panel. Configuration options are listed below.

- Active Only
- Free running (Default)

6.5 Integrated Peripherals

Use the **Integrated Peripherals** menu (**BIOS Menu 7**) to change the attached peripheral devices configuration options.





BIOS Menu 7: Integrated Peripherals

➔ **On-Chip IDE Channel 1 [Enabled]**

The **On-Chip IDE Channel 1** determines if the IEM-LX-800 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 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

➔ **IDE UDMA [Auto]**

Use the **IDE UDMA** option 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.

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

Use the **IDE DMA transfer access** option to enable or disable DMA support for IDE devices connected to the system.

- **Disabled** All IDE drive DMA transfers are disabled. The IDE drives use PIO mode transfers.
- **Enabled** (Default) All IDE drive DMA transfers are enabled.

➔ **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

➔ **ATA 66/100 Support [Enabled]**

Use the **ATA 66/100** option to enable or disable support for ATA/66 and ATA/100 IDE devices.

➔ **Disabled**		ATA/66 and ATA/100 IDE devices not supported
➔ **Enabled**	(Default)	ATA/66 and ATA/100 IDE devices supported

➔ **Onboard FDC Controller [Disabled]**

Use the **Onboard FDC Controller** option to enable or disable the on-board 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 on-board 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 configuration options are listed below:

- Disabled

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

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

Use the **Onboard Serial Port 2** option to select the I/O address and IRQ for the on-board 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 configuration options are listed below:

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

➔ **UART Mode Select [Normal]**

Use the **UART Mode Select** to select the UART mode for the system.

➔ **IrDA**		IrDA is set as the IR serial mode. If this option is selected, COM2 will be disabled.
➔ **ASKIR**		ASKIR is set as the IR serial mode. If this option is selected, COM2 will be disabled.
➔ **Normal**	(Default)	COM2 is enabled and the IR device disabled

➔ **RxD, TxD Active [Hi,Lo]**

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

- Hi, Hi
- Hi, Lo (Default)
- Lo, Hi
- Lo, Lo

➔ **IR Transmission Delay [Enabled]**

Use the **IR Transmission Delay** option to enable or disable IR transmission delays.

➔ **Disabled**		IR transmission are not delayed
➔ **Enabled**	(Default)	IR transmission are delayed

➔ **UR2 Duplex Mode [Half]**

Use the **UR2 Duplex Mode** option to specify the transmission mode for the IR port device.

➔ **Full**		Simultaneous bi-directional transmission occurs
➔ **Half**	(Default)	Transmission only occurs in one direction at a time

➔ **Use IR Pins [IR-Rx2Tx2]**

Use the Use IR Pins options to specify how the IR pins respond. The configuration options are below.

- RxD2, TxD2
- IR-Rx2, Tx2 (Default)

➔ **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 configuration options are listed below.

- 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]**

Use the **EPP Mode Select** option to select the parallel port mode standard the parallel port must operate in. (This option is only available if the EPP mode is selected in the Parallel Port Mode configuration option).

➔ **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 [3]**

Use the **ECP Mode Use DMA** option to specify the DMA channel the parallel port must use in the ECP mode. (This option is only available if the ECP mode is selected in the Parallel Port Mode configuration option).

➔ **1** Parallel port uses DMA Channel 1 in the ECP mode

➔ **3** (Default) Parallel port uses DMA Channel 3 in the ECP mode

➔ **CIR Port Address**

Use the **CIR Port Address** option to enable the CIR port and set the CIR port base address. The configuration options are listed below.

- Disabled (Default)
- 3F8
- 2F8
- 3E8
- 2E8

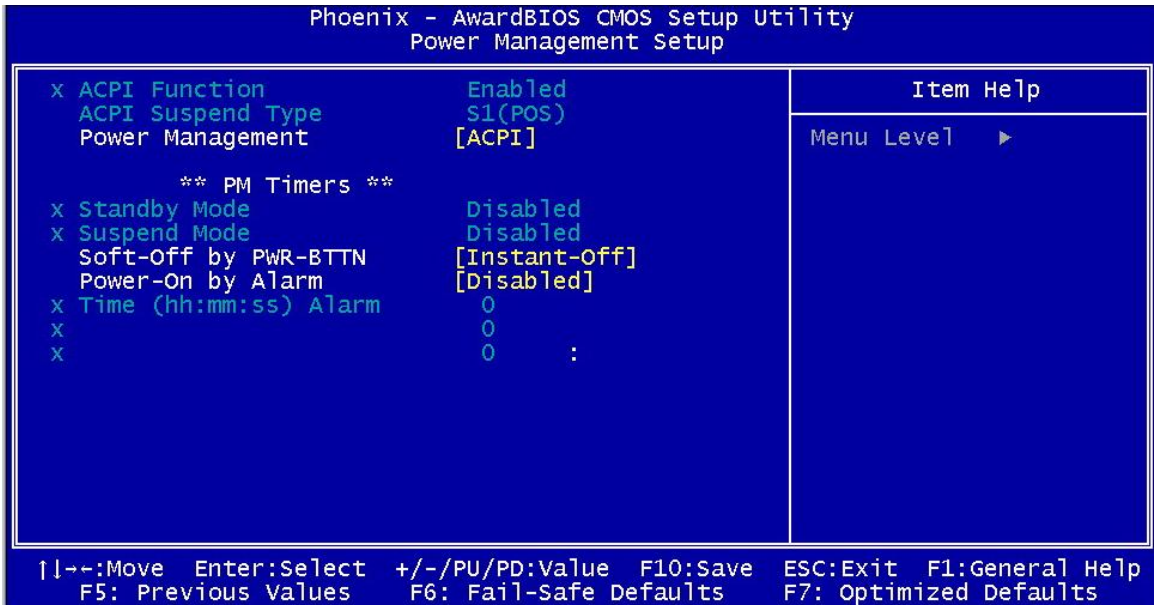
➔ **xCIR Port IRQ**

Use the **CIR Port IRQ** option to specify an interrupt address for the CIR port. The configuration options are listed below.

- 11 (Default)
- 5

6.6 Power Management Setup

Use the **Power Management Setup** menu (**BIOS Menu 7**) to set the BIOS power management and saving features.



BIOS Menu 8: Power Management Setup

➔ **ACPI Function [Enabled]**

The **ACPI Function** has been enabled and cannot be changed.

➔ **ACPI Suspend Type [S1(POS)]**

The **ACPI Suspend Type** has already been set as [S1(POS)]. When the system is in the [S1(POS)] suspend state, the system appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode.

➔ **Power Management [ACPI]**

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

➔ **Disabled**	All the power management options are turned off. All the user can configure is the power button and the alarm settings
➔ **Legacy**	Standby and suspend modes can be set

APM		Advanced power management (APM) is activated
ACPI	(Default)	Advanced Configuration and Power Interface (ACPI) is activated

➔ **Standby Mode [Disabled]**

Use the **Standby Mode** option to set the time it takes without activity on the system for the system to enter standby mode. Configuration options are listed below. This option is only available if **Legacy** option was selected in the **Power Management** option.

- 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

➔ **Suspend Mode [Disabled]**

Use the **Suspend Mode** option to set the time it takes without activity on the system for the system to enter suspend mode. Configuration options are listed below. This option is only available if **Legacy** option was selected in the **Power Management** option.

- 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

➔ **Power-On by Alarm [Disabled]**

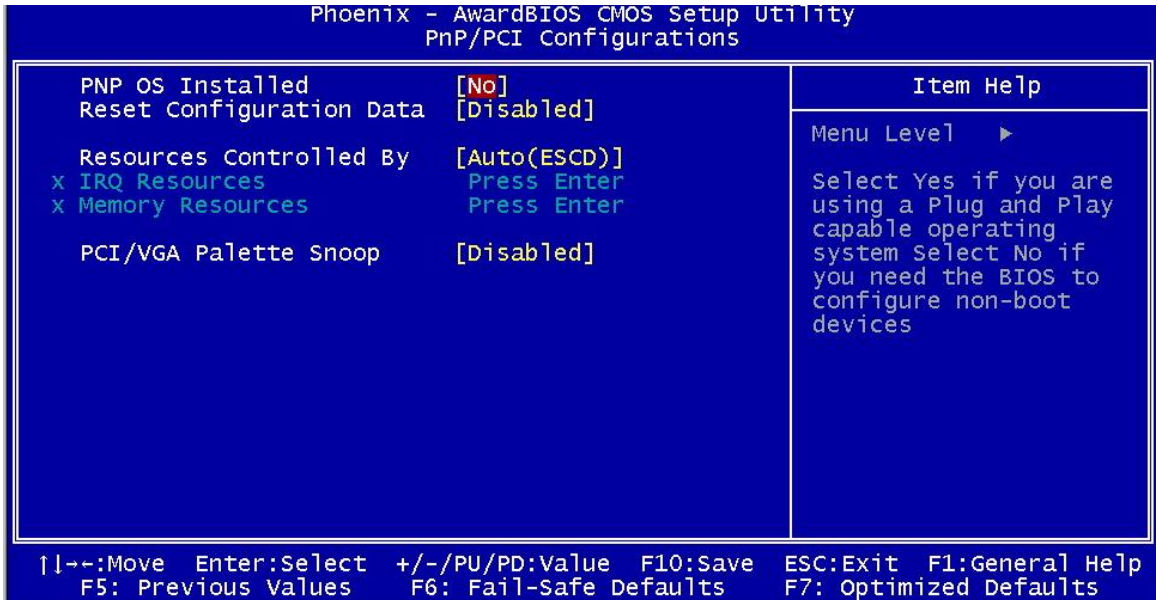
Use the **Power-On by Alarm** to set the time for when the system should automatically be turned on.

➔ **Disabled** (Default) The real time clock (RTC) cannot generate a wake event

➔ **Enabled** If selected, the tune (hh:mm:ss) options can be set to specify the exact time the system must be roused.

6.7 PnP/PCI Configurations

Use the **PnP/PCI Configurations** menu (**BIOS Menu 7**) to set the plug and play, and PCI options.



BIOS Menu 9: PnP/PCI Configurations

➔ **PNP OS Installed [No]**

Use the **PNP OS Installed** option to specify whether or not a plug and play capable operating system.

➔ **No** (Default) The system OS does not support PnP and the BIOS must configure non-boot devices

➔ **Yes** The system OS is PnP capable

➔ **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

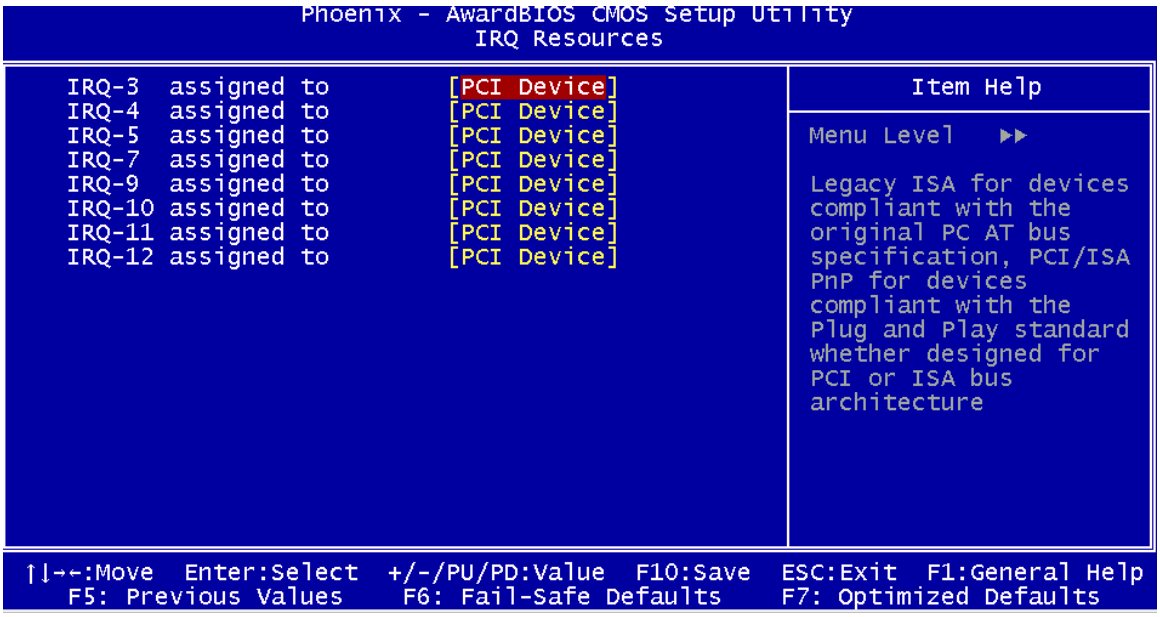
➔ **Resources Controlled By [Auto (ESCD)]**

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 because BIOS automatically assigns them.

➔ **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]**

If **Manual** is selected in the **Resources Controlled By** option then a user can configure the **IRQ Resources**. To do this, select IRQ Resources and press **ENTER**. A new menu appears. (See **BIOS Menu 10**)



BIOS Menu 10: IRQ Resources

The menu will has the following 10 BIOS configuration options:

- IRQ-3 assigned to
- IRQ-4 assigned to
- IRQ-5 assigned to
- IRQ-6 assigned to
- IRQ-7 assigned to
- IRQ-8 assigned to
- IRQ-9 assigned to
- IRQ-10 assigned to
- IRQ-11 assigned to
- IRQ-12 assigned to
- IRQ-13 assigned to

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

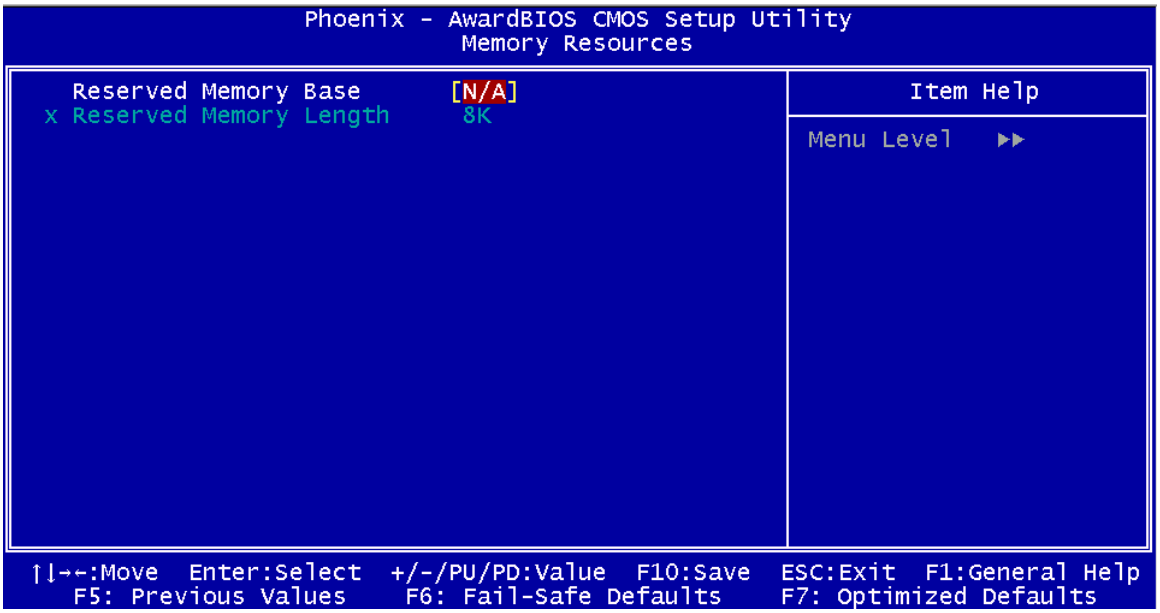
➔ **PCI Device** (Default) The IRQ is assigned to legacy ISA for devices compliant with the original PC AT bus specification, PCI/ISA PNP for

devices compliant with the Plug and Play standard whether designed for PCI or ISA bus architecture.

➔ **Reserved** The IRQ is reserved by BIOS

➔ **x IRQ Resources [Press Enter]**

If **Manual** is selected in the **Resources Controlled By** option then a user can configure the **Memory Resources**. Use **Memory Resources** to select a base address and the length for the memory area used by a peripheral that requires high memory. To do this, select **Memory Resources** and press **ENTER**. A new menu appears. (See **BIOS Menu 11**)



BIOS Menu 11: Memory Resources

The menu has two configuration options:

- Reserved Memory Base
- Reserved Memory Length

➔ **Reserved Memory Base**

Use the **Reserved Memory Base** to specify the base address for the peripheral device. The following configuration options are available.

- N/A (Default)
- C800
- CC00
- D000
- D400
- D800
- DC00

➔ **Reserved Memory Length**

Use the **Reserved Memory Length** to specify the amount of memory reserved for the peripheral device. The following configuration options are available.

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

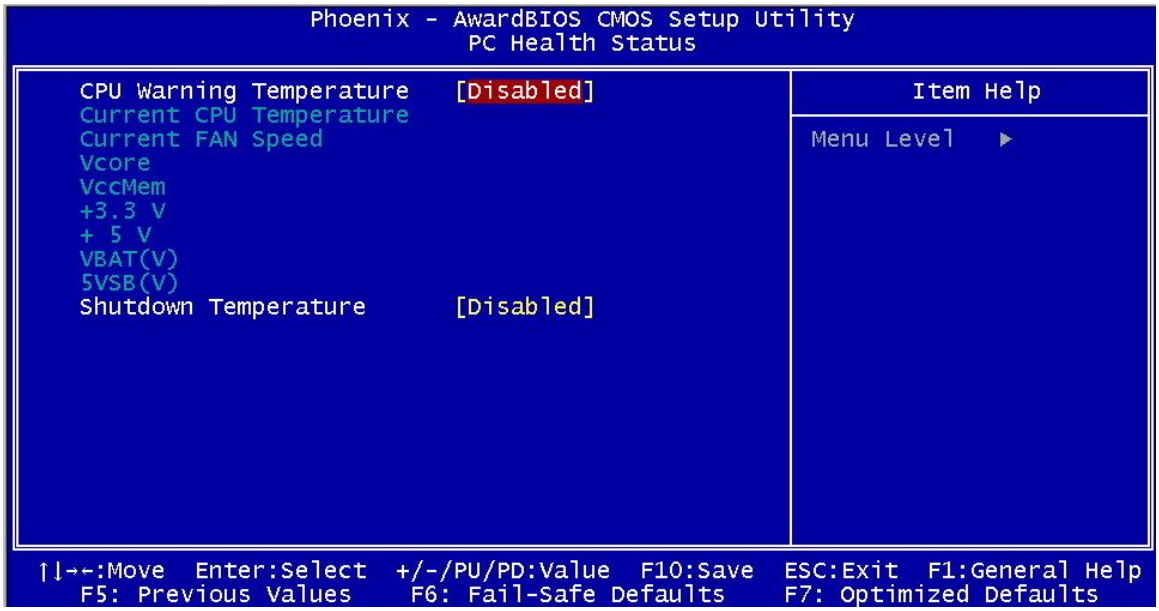
➔ **PCI/VGA Palette Snoop [Disabled]**

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 only *very* rarely needed. It should be left at "Disabled" unless a video device specifically requires the setting enabled upon installation.

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

6.8 PC Health Status

The **PC Health Status** menu (**BIOS Menu 12**) is a passive menu where you cannot alter any BIOS configurations. This menu shows system operating parameters that are essential to the stable operation of your system.



BIOS Menu 12: PC Health Status

➔ **CPU Warning Temperature**

Use the **CPU Warning Temperature** to specify a CPU operating temperature threshold that, when reached, generates a warning signal. Configuration options are listed below.

- Disabled (Default)
- 50°C/122°F
- 53°C/127°F
- 56°C/133°F
- 60°C/140°F
- 63°C/145°F
- 66°C/151°F
- 70°C/158°F

➔ **Temperature**

The following temperatures are monitored:

- Current CPU Temperature

➔ **Fan Speeds**

The following fan speeds are monitored:

- Current Fan Speed

➔ **Voltages**

The following voltages are monitored

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

➔ **Shutdown Temperature**

Use the **Shutdown Temperature** to specify a CPU operating temperature threshold that, when reached, would shutdown the system. . Configuration options are listed below.

- Disabled (Default)
- 60°C/140°F
- 65°C/149°F
- 70°C/158°F
- 75°C/167°F

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Chapter

7

Software Drivers

7.1 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. Visit the IEI website or contact technical support for the latest updates.

The IEM-LX CPU module has six software drivers:

- LAN driver
- AMD chipset driver
- Audio driver
- IT8888 driver

All four drivers can be found on the CD that came with the embedded module. To install the drivers please follow the instructions in the sections below

7.2 LAN Driver

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

Step 1: Insert the CD into the system that contains the IEM-LX.

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

Step 3: Open the **Realtek** folder.

Step 4: Open the **RTL8100C** folder.

Step 5: Locate the **Setup** program icon. (See **Figure 7-1**)

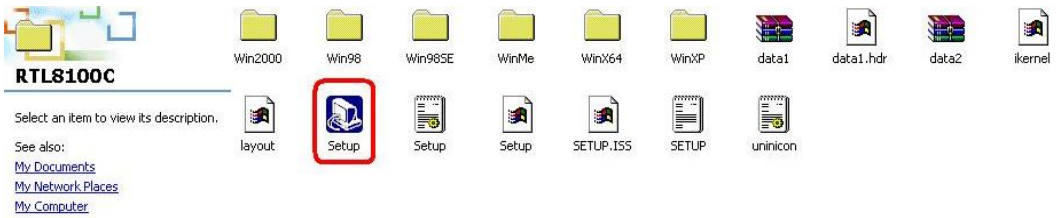

Figure 7-1: Locate the Setup Program Icon

Step 6: Double click the **Setup** program icon in **Figure 7-1**.

Step 7: The **Install Shield Wizard** is prepared to guide the user through the rest of the process (**See Figure 7-2**)

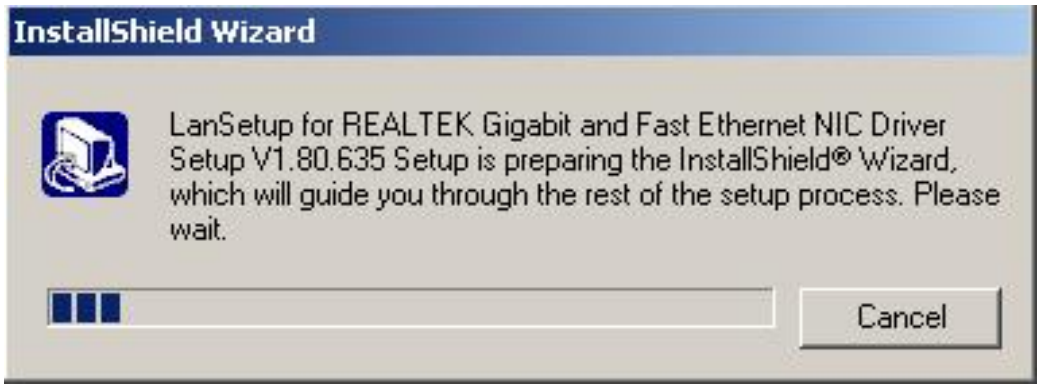

Figure 7-2: Preparing Setup Screen

Step 8: Once initialized, the **Install Wizard** welcome screen appears. (See **Figure 7-3**)

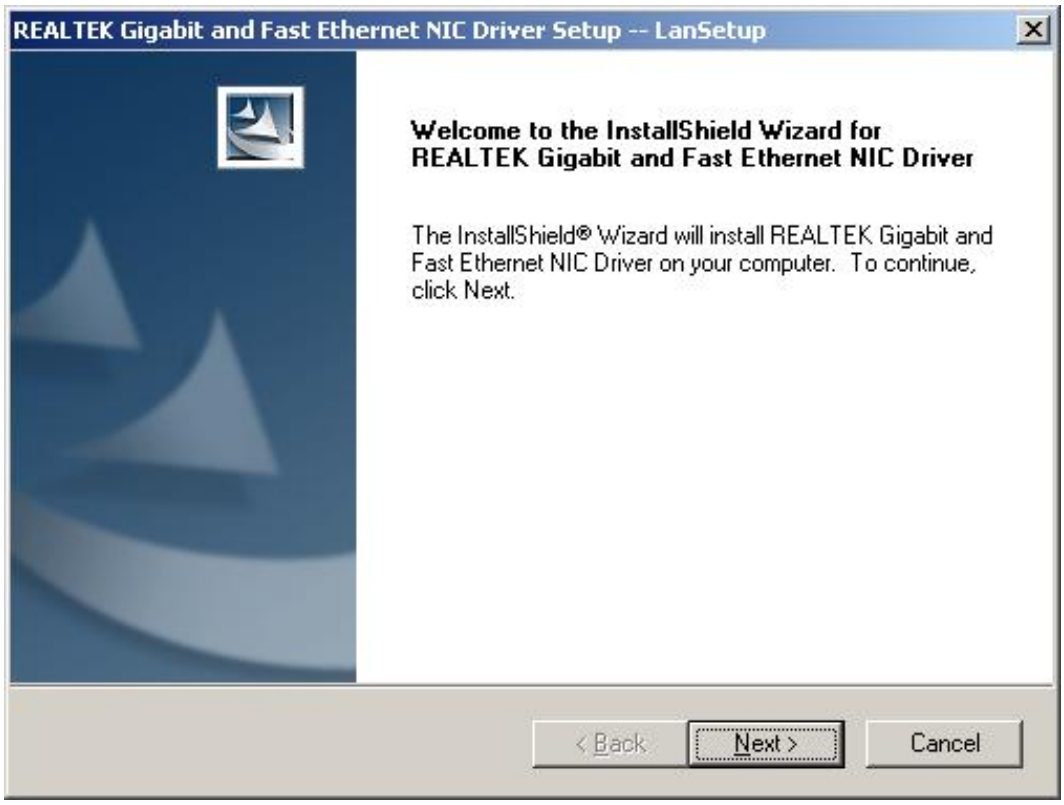

Figure 7-3: Install Wizard Welcome Screen

Step 9: Click **NEXT** to continue the installation or **CANCEL** to stop the installation.

Step 10: The **Install Wizard** starts to install the LAN driver.

Step 11: Once the installation is complete, the **InstallShield Wizard Complete** screen appears. (See **Figure 7-4**)

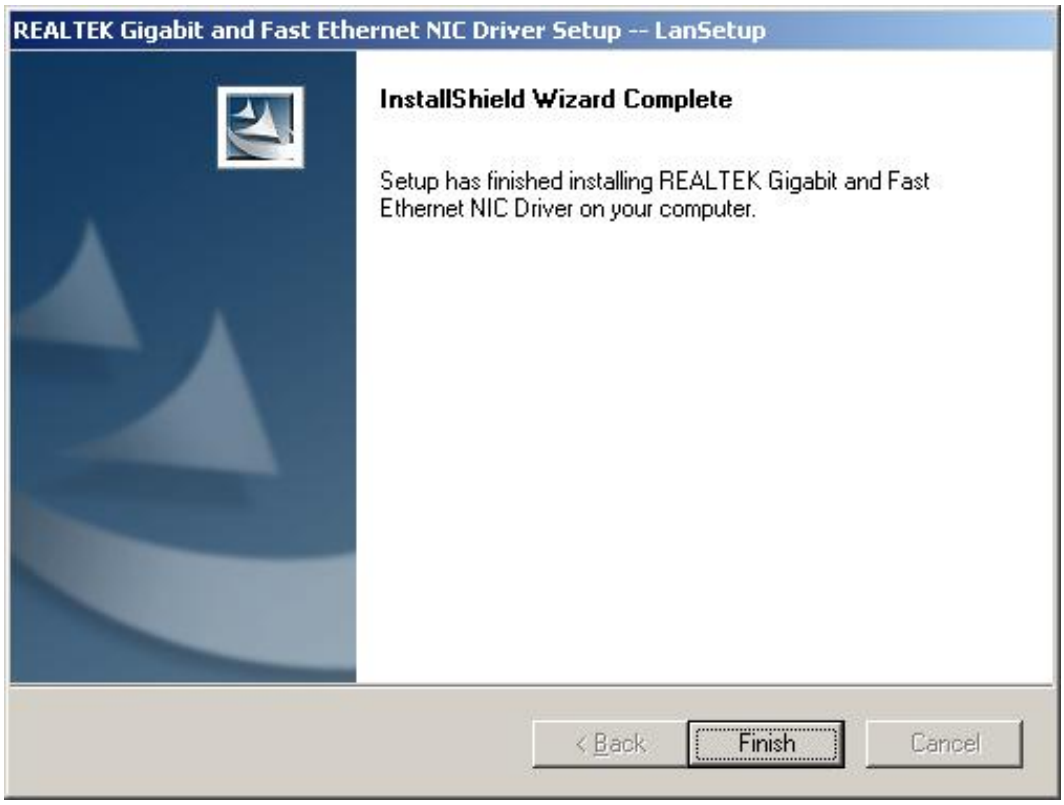

Figure 7-4: Installing Screen

Step 12: Click **FINISH** to complete the installation and exit the **Install Shield Wizard**.

Step 13: Once the installation process is complete, the computer may be restarted now or in the future. (See **Figure 7-5**). Select the preferred option and click "**FINISH**" to complete the installation process.

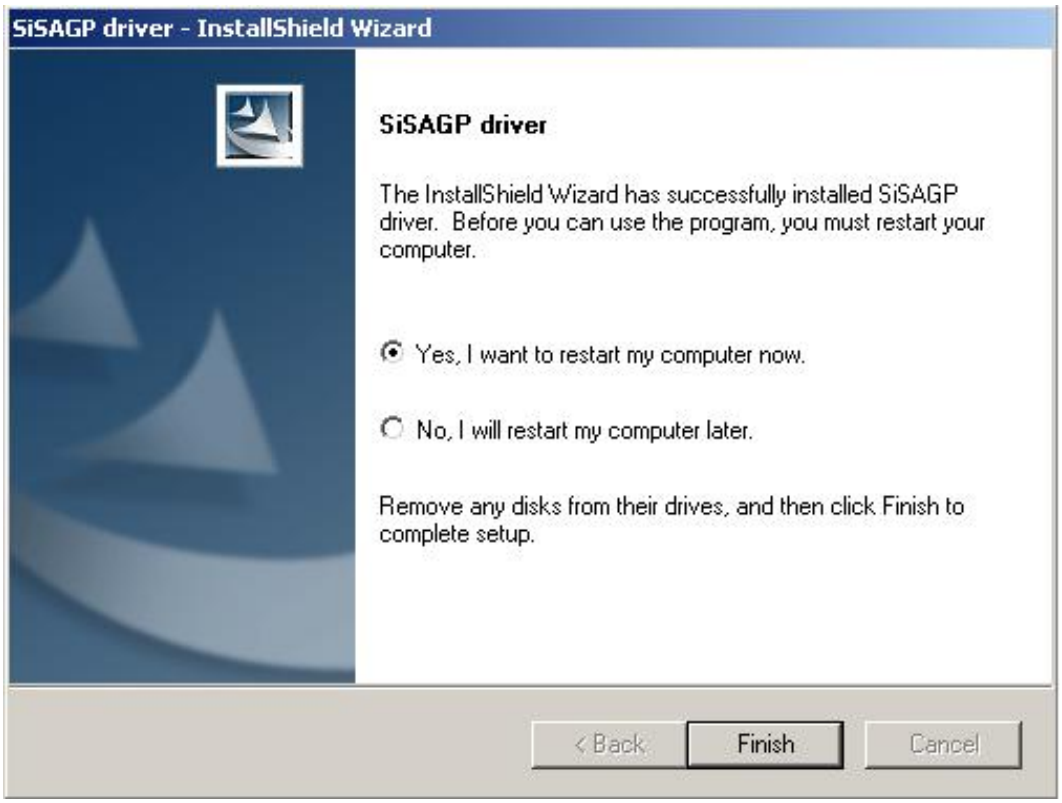

Figure 7-5: Restart the Computer

7.3 RealTek Audio Driver Installation

To install the RealTek AC'97 Audio driver, please follow the steps below:

Step 1: Insert the CD into the system that contains the IEM-LX.

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

Step 3: Open the **Realtek** folder.

Step 4: Open the **AC97C** folder.

Step 5: Locate the **Setup** program icon. (See **Figure 7-6**)

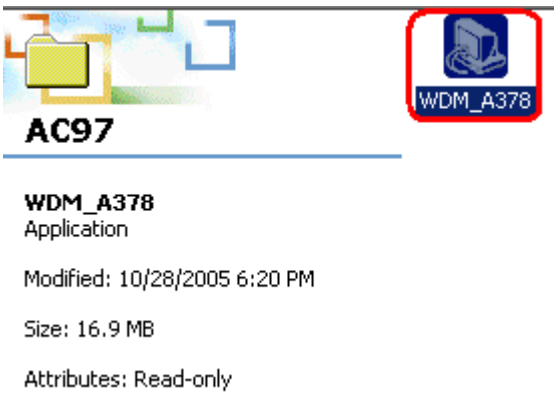

Figure 7-6: Audio Driver Setup Icon

Step 6: Installation files are extracted. (See **Figure 7-7**)

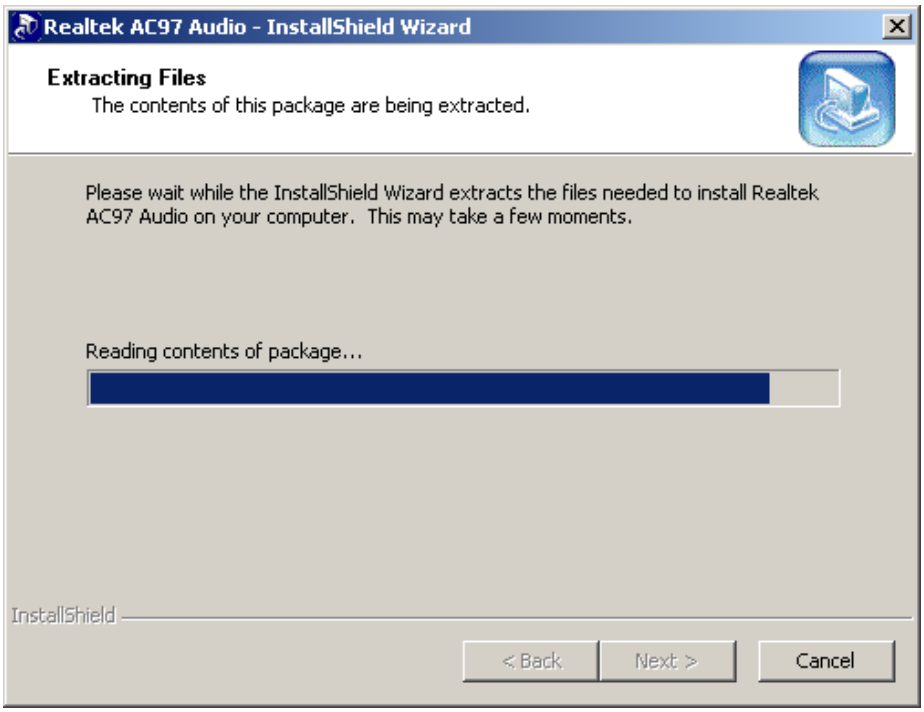

Figure 7-7: Audio Driver Installation File Extraction

Step 7: The **InstallShield** is activated. (See **Figure 7-8**.)

Figure 7-8: Audio Driver Install Shield Wizard Starting

Step 8: The RealTek Audio Setup welcome screen appears. (See **Figure 7-9**) To continue the installation, click **NEXT**.

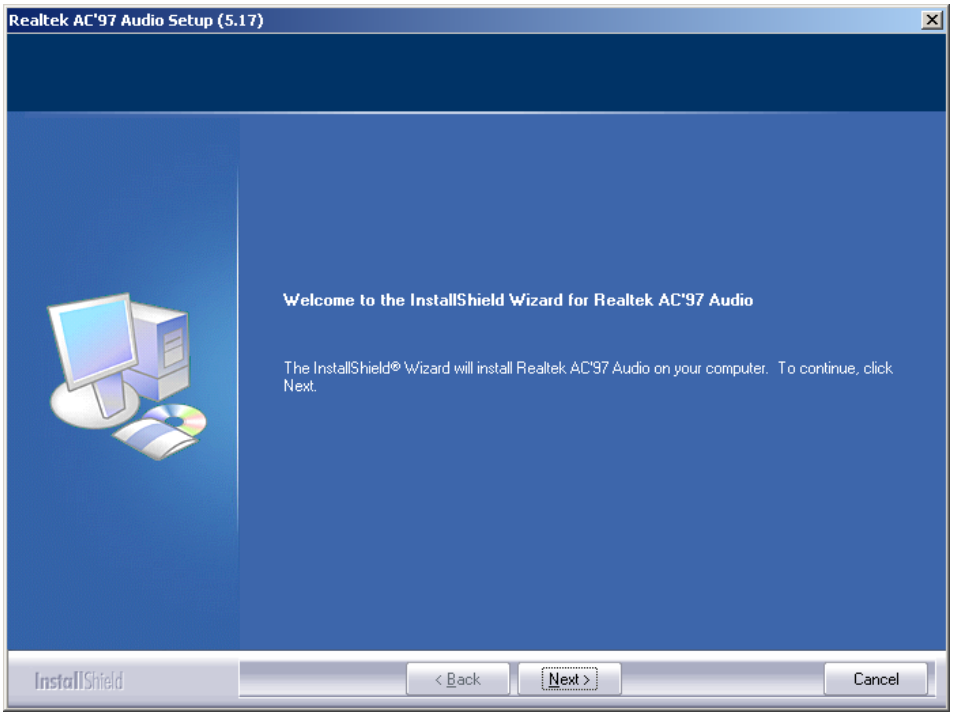

Figure 7-9: Audio Driver Setup Preparation

Step 9: The **InstallShield** configures the new software installation. (See **Figure 7-10**)

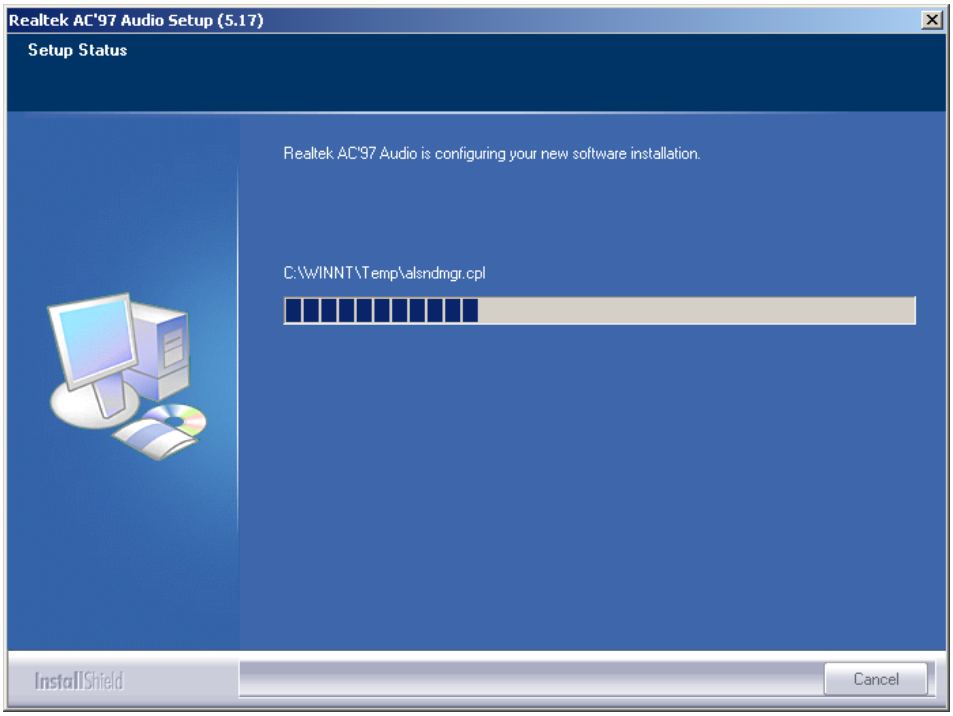

Figure 7-10: Audio Driver Software Configuration

Step 10: A "**Digital Signal Not Found**" screen appears. (See **Figure 7-11**) Click **YES** to continue the installation process.

Figure 7-11: Audio Driver Digital Signal

Step 11: Driver installation begins. (See **Figure 7-12**)

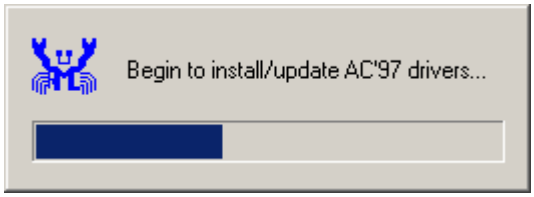

Figure 7-12: Audio Driver Installation Begins

Step 12: When the installation is complete, choose when to restart the computer, now or later. (See **Figure 7-13**)

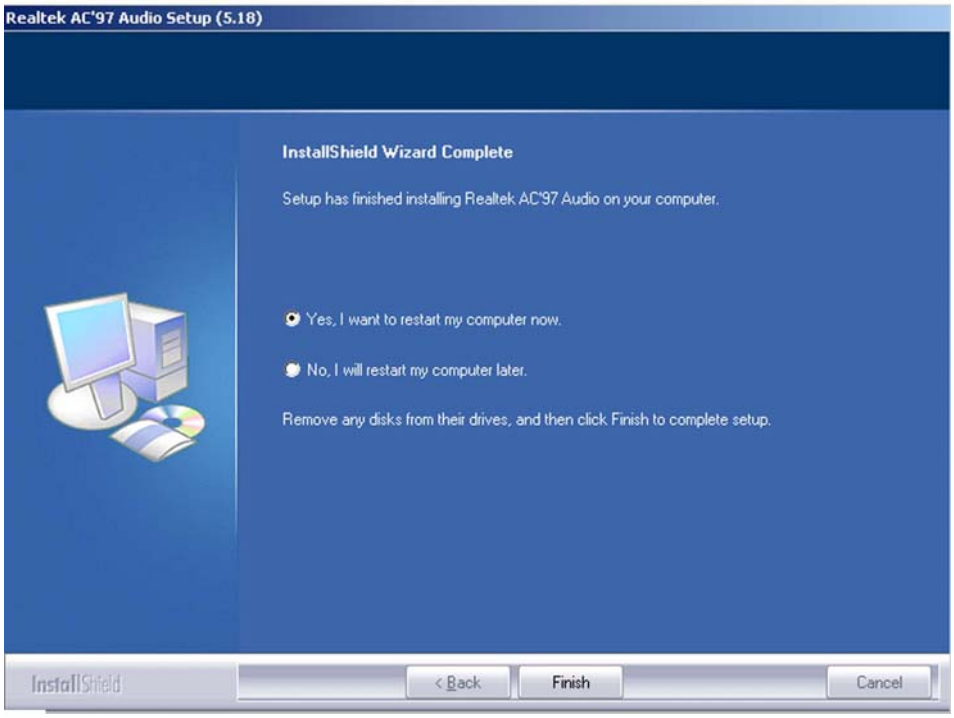

Figure 7-13: Audio Driver Installation Complete

Step 13: Click **FINISH** to complete the installation.

7.4 AMD VGA Driver

To install the AMD VGA driver please follow the steps below:

Step 1: Insert the CD into the system that contains the IEM-LX.

Step 2: Open **Windows Control Panel**. (See **Figure 7-14**)

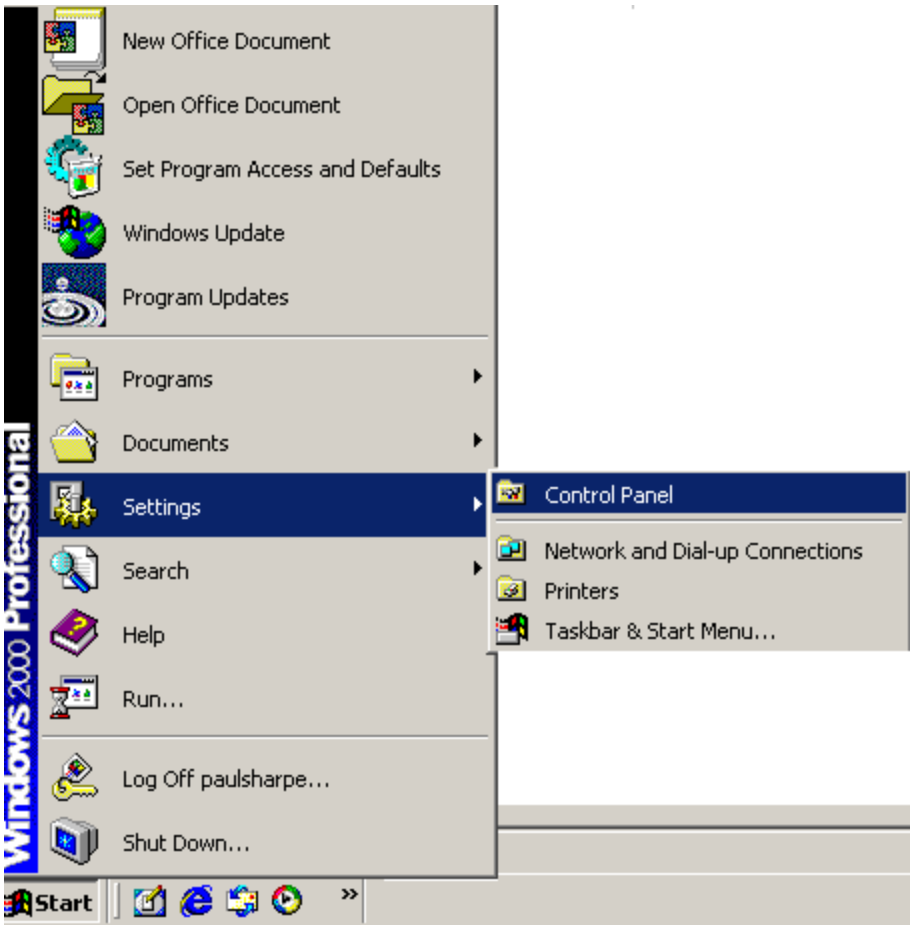

Figure 7-14: Access Windows Control Panel

Step 3: Double click the System icon. (See **Figure 7-15**)

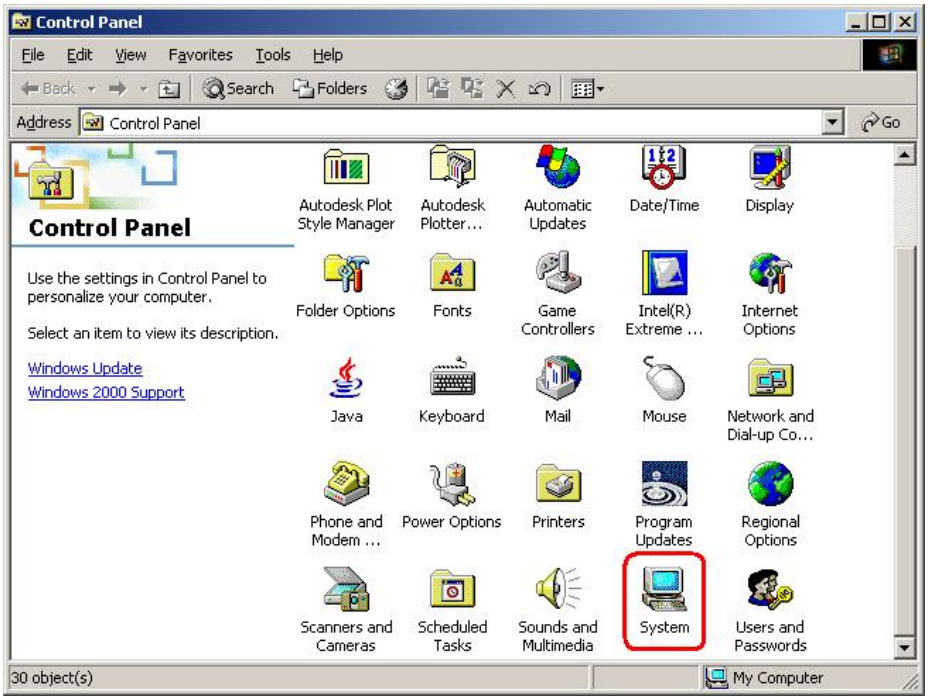

Figure 7-15: Double Click the System Icon

Step 4: Double click the **Device Manager** tab. (See **Figure 7-16**)

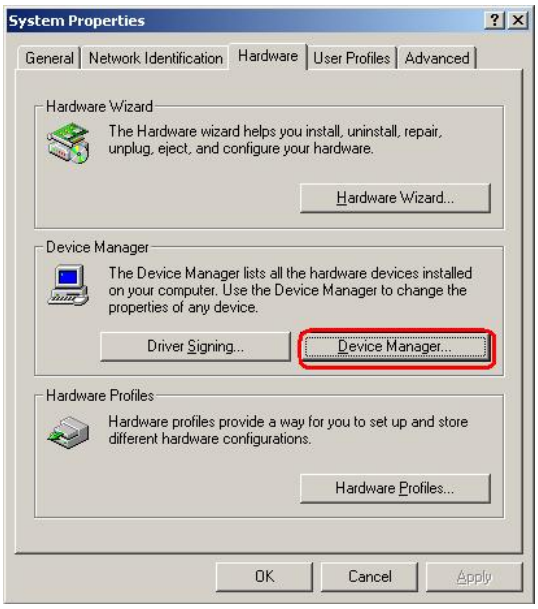

Figure 7-16: Double Click the Device Manager Tab

Step 5: A list of system hardware devices appears. (See **Figure 7-17**)

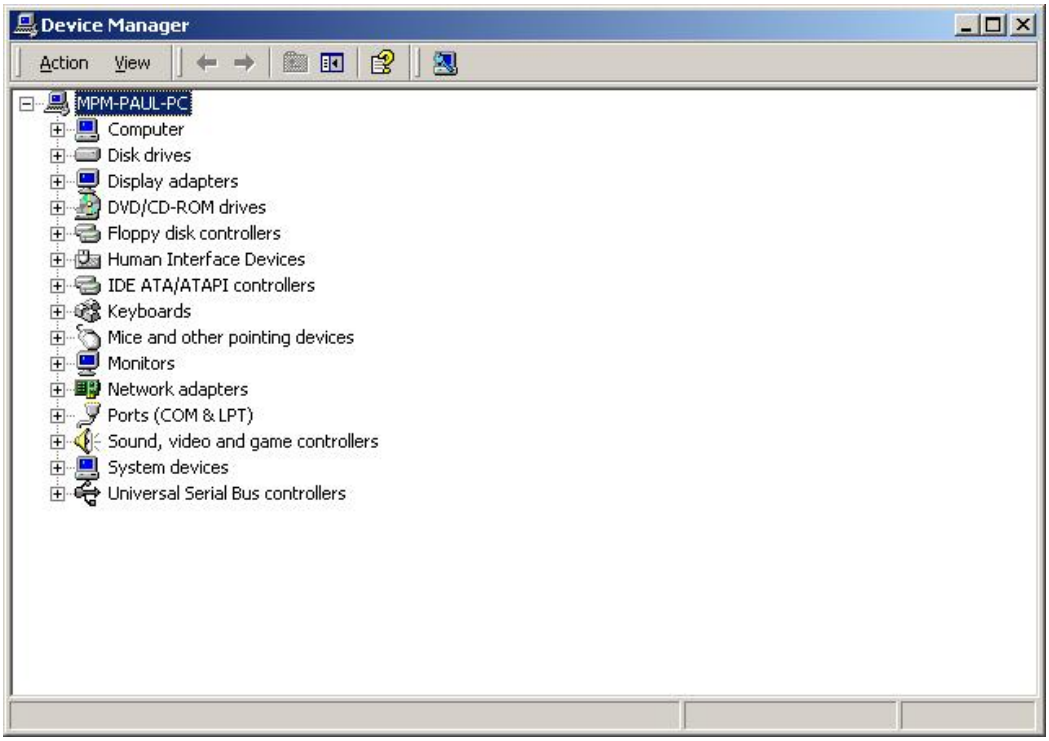

Figure 7-17: Device Manager List

Step 6: Double click the listed device that has question marks next to it. (This means Windows does not recognize the device).

Step 7: The **Device Driver Wizard** appears. (See **Figure 7-18**) Click **NEXT** to continue.

Figure 7-18: Search for Suitable Driver

Step 8: Select "**Specify a Location**" in the **Locate Driver Files** window. Click **NEXT** to continue.

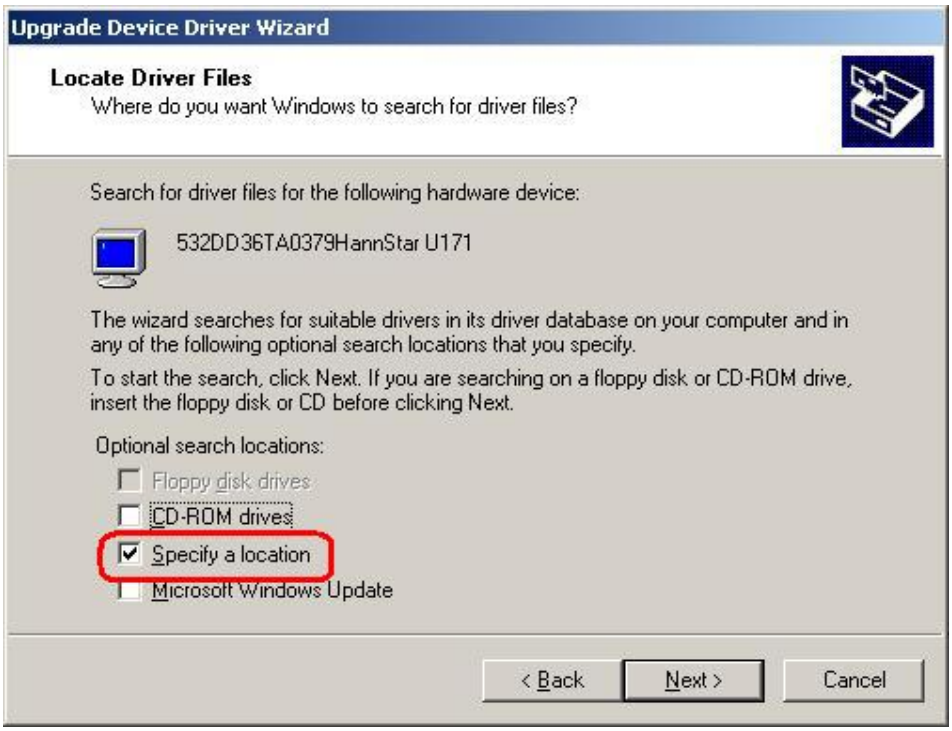

Figure 7-19: Locate Driver Files

Step 9: Select "**E\VGA**" directory in the location browsing window.

Figure 7-20: Location Browsing Window

Step 10: Click **OK** to continue. A driver files location menu window appears. Click "**NEXT**" 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 6**.

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Appendix

B

Watchdog Timer

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 CPU module comes with an on-board Realtek ALC203 CODEC. Realtek ALC203 is a 16-bit, full duplex AC'97 Rev. 2.3 compatible audio CODEC with a sampling rate of 48KHz.

D.1.1 Accessing the AC'97 CODEC

The CODEC is accessed through three phone jacks on the rear panel of the CPU module. The phone jacks include:

3. A LINE input shared with surround output
4. A MIC input shared with Center and LFE output
5. A LINE output
6. A MIC input line

D.1.2 Driver Installation

The driver installation has been described in **Chapter 7**, **Section 7.3**.

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

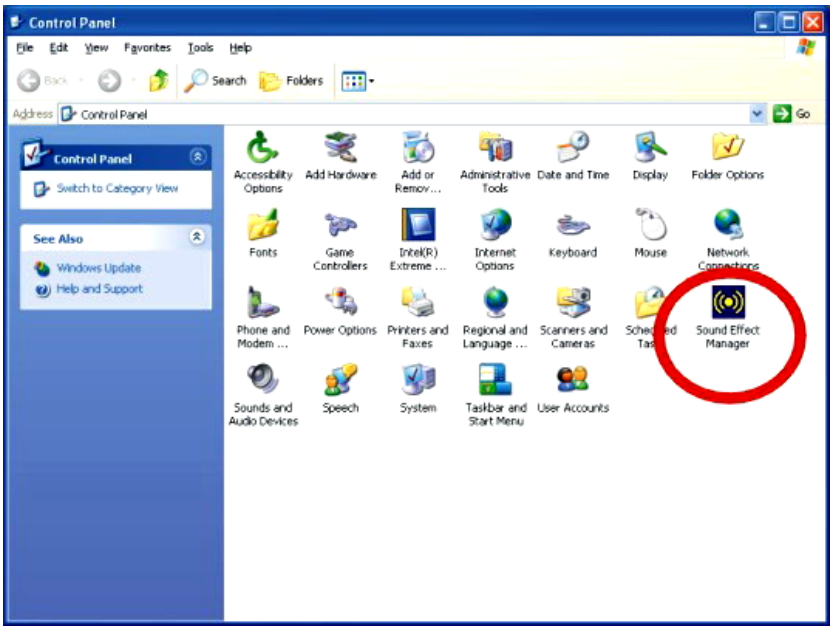

Figure D-1: Sound Effect Manager con

D.2 Sound Effect Configuration

D.2.1 Accessing the Sound Effects Manager

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

Step 11: Install the audio CODEC driver.

Step 12: Click either:

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

Figure D-2: Sound Effect Manager Icon [Task Bar]

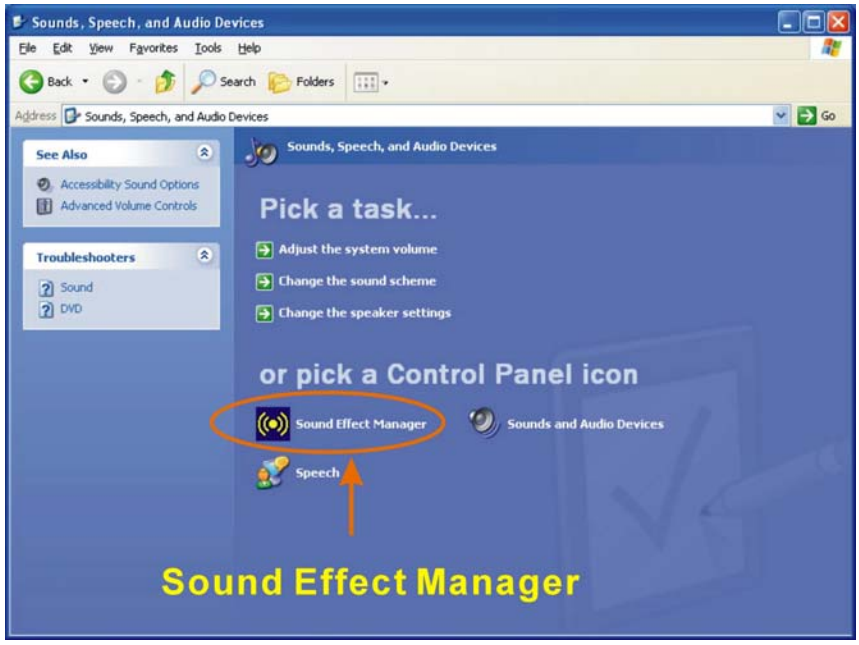

Figure D-3: Sound Effect Manager Icon [Control Panel]

Step 13: The sound effect manager appears. (See **Figure D-4**)

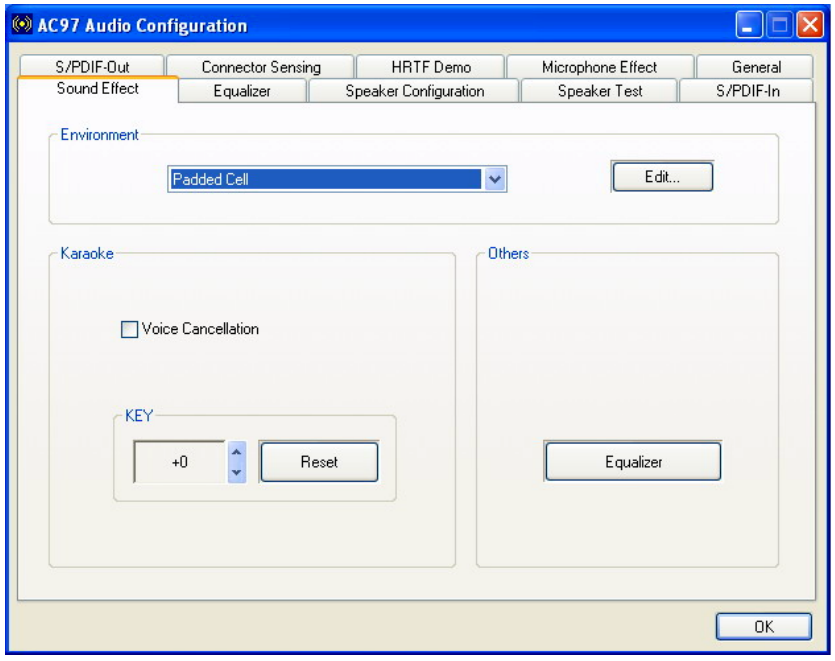

Figure D-4: Sound Effects Manager (ALC655)

NOTE:

The Sound Effect Manager shown in **Figure D-4** 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 M**anager in **Figure D-4.**

NOTE:

The Karaoke Mode is configured in the **Sound Effect** menu. To access Karaoke configuration settings, click on the **Sound E**ffect 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:
  - Headphone
  - Channel mode for stereo speaker output
  - Channel mode for 4 speaker output
  - Channel mode for 5.1 speaker output
  - 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.

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