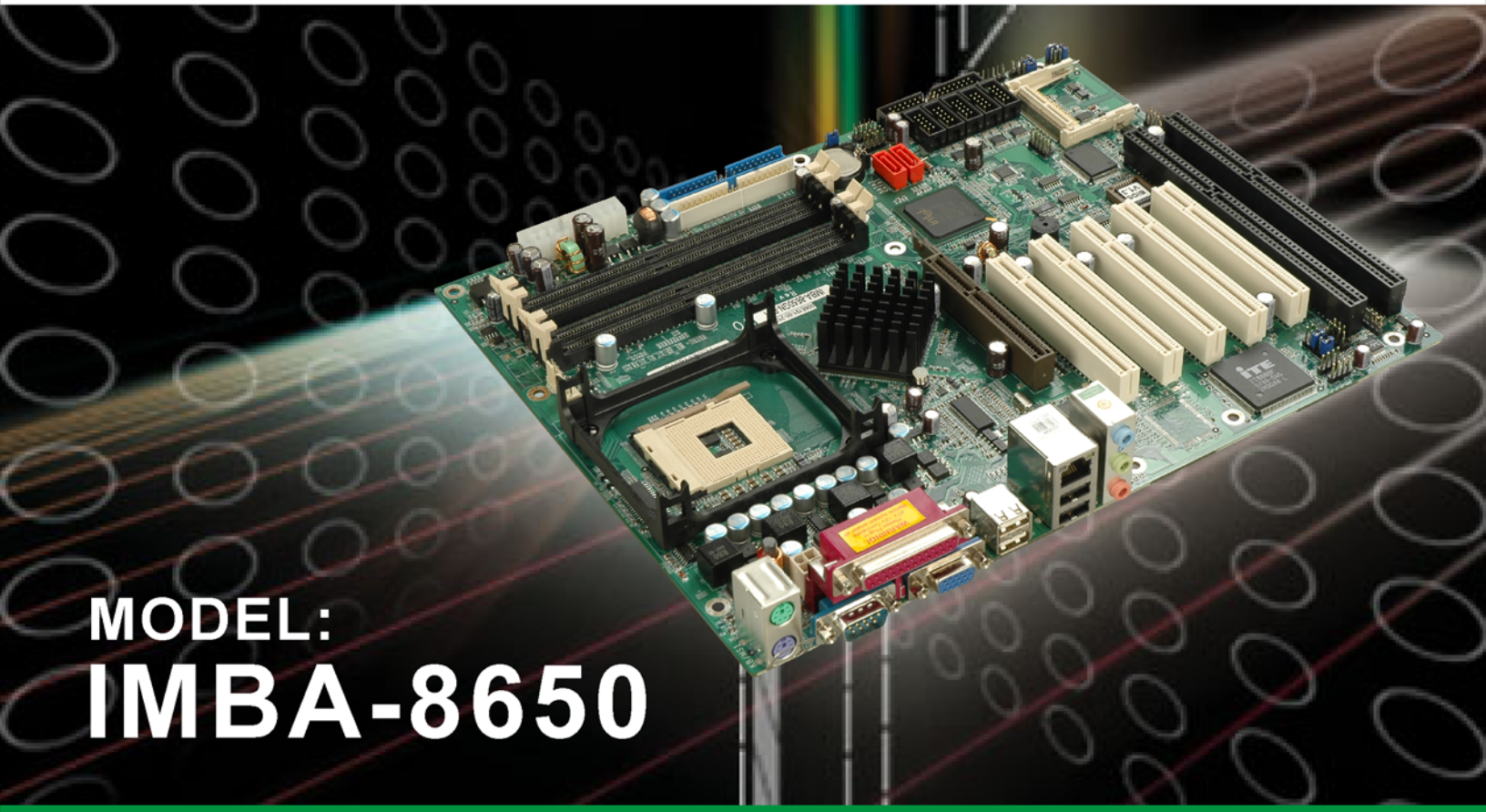
IEI Technology Corp.



MODEL:

IMBA-8650

ATX Motherboard, Intel® Pentium® 4 Processor with VGA, Dual SATA, Eight USB 2.0, Six COM, AGP, Five PCI, Two ISA, Gigabit Ethernet and CompactFlash®

User Manual

Rev. 2.20 – 22 December, 2008

RoHS Lead Free

Revision

Date	Version	Changes
22 December, 2008	2.20	RAID disabled ICH5R changed to ICH5
31 August, 2008	2.10	Changed Super I/O to Winbond W83627HF Added Digital I/O
31 January, 2008	1.00	Initial release

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Manual Conventions

WARNING!

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

WARNING:

This is an example of a warning message. Failure to adhere to warning messages may result in permanent damage to the IMBA-8650 or personal injury to the user. Please take warning messages seriously.

CAUTION!

Cautionary messages should also be heeded to help reduce the chance of losing data or damaging the IMBA-8650. Cautions are easy to recognize. The word “caution” is written as “**CAUTION**,” both capitalized and bold and is followed. The text is the cautionary message. A caution message is shown below:

CAUTION:

This is an example of a caution message. Failure to adhere to cautions messages may result in permanent damage to the IMBA-8650. Please take caution messages seriously.

NOTE:

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

NOTE:

This is an example of a note message. Notes should always be read. Notes contain critical information about the IMBA-8650. Please take note messages seriously.

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 IMBA-8650 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 IMBA-8650 package.

- 1 x IMBA-8650 Single Board Computer
- 2 x IDE Cable (P/N: 32200-000052-RS)
- 2 x RS-232 Cable (400 mm cable) (P/N: 32200-004101-RS)
- 1 x RS-232 Cable (500 mm cable) (P/N: 32200-029400-RS)
- 1 x RS-422/485 Cable (P/N: 19800-000063-RS)
- 2 x SATA Cable (P/N: 32000-062800-RS)
- 1 x SATA Power Cable (P/N: 32100-088600-RS)
- 1 x I/O Shielding (P/N: 45002-0804C0-00-RS)
- 1 x Mini Jumper Pack (P/N: 33100-000079-RS)
- 1 x Utility CD (P/N: IEI-7B000-000102-RS)
- 1 x QIG (Quick Installation Guide) (P/N: 51000-022313-RS)

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

Table of Contents

List of Figures

List of Tables

BIOS Menus

Chapter

1

Introduction

1.1 Introduction

Figure 1-1: IMBA-8650

The IMBA-8650 motherboard is a Socket 478 Intel® Pentium® 4/Intel® Celeron® CPU platform with an Intel® 865G Express Northbridge and Intel® I/O Controller Hub 5 (ICH5) Southbridge. The IMBA-8650 has a maximum front side bus (FSB) frequency of 800 MHz, supporting up to 4 GB of dual channel 266/333/400 MHz DDR RAM. Input/Output options include AGP, VGA, PS/2 keyboard/mouse, COM ports, parallel port, audio interfaces and a Realtek or Intel® GbE. The IMBA-8650 supports up to two serial ATA (SATA) hard disk drives and up to eight USB 2.0 devices.

1.2 Benefits

Some of the IMBA-8650 benefits are listed below.

- High-speed graphics card options with an AGP expansion slot
- Expansion capabilities enabled by five PCI slots
- Backwards compatibility through two legacy ISA slots
- Multiple storage options with CompactFlash®, IDE and SATA interfaces
- Enhanced network speeds enabled by the Gigabit Ethernet chipset

1.3 Features

Some of the IMBA-8650 features are listed below.

- RoHS compliant

- Support for the following CPUs:
  - Intel® Pentium® 4
  - Intel® Celeron®
  - Intel® Celeron® D
- Integrated Intel® Extreme Graphics 2 graphics engine
- Maximum FSB of 800 MHz
- Four 184-pin dual channel 333/400 MHz DDR SDRAM DIMMs support up to 4 GB of memory
- High performance Realtek or Intel® Gigabit Ethernet chipset
- Two SATA 1.5 Gb/s drives supported
- Four Ultra ATA 100, Ultra ATA 66 or Ultra ATA 33 IDE HDDs supported
- Eight USB 2.0 devices supported
- ATX power only
- Realtek ALC655 chipset with AC ’97 CODEC
- Expansion:
  - 1 x AGP 8X slot
  - 5 x PCI expansion slots
  - 2 x ISA expansion slots

1.4 Overview

The IMBA-8650 has a wide variety of internal and external peripheral connectors. The peripheral connectors are connected to devices including storage devices, display devices and parallel communications devices. A labeled photo of the peripheral connectors is shown in **Figure 1-2**.

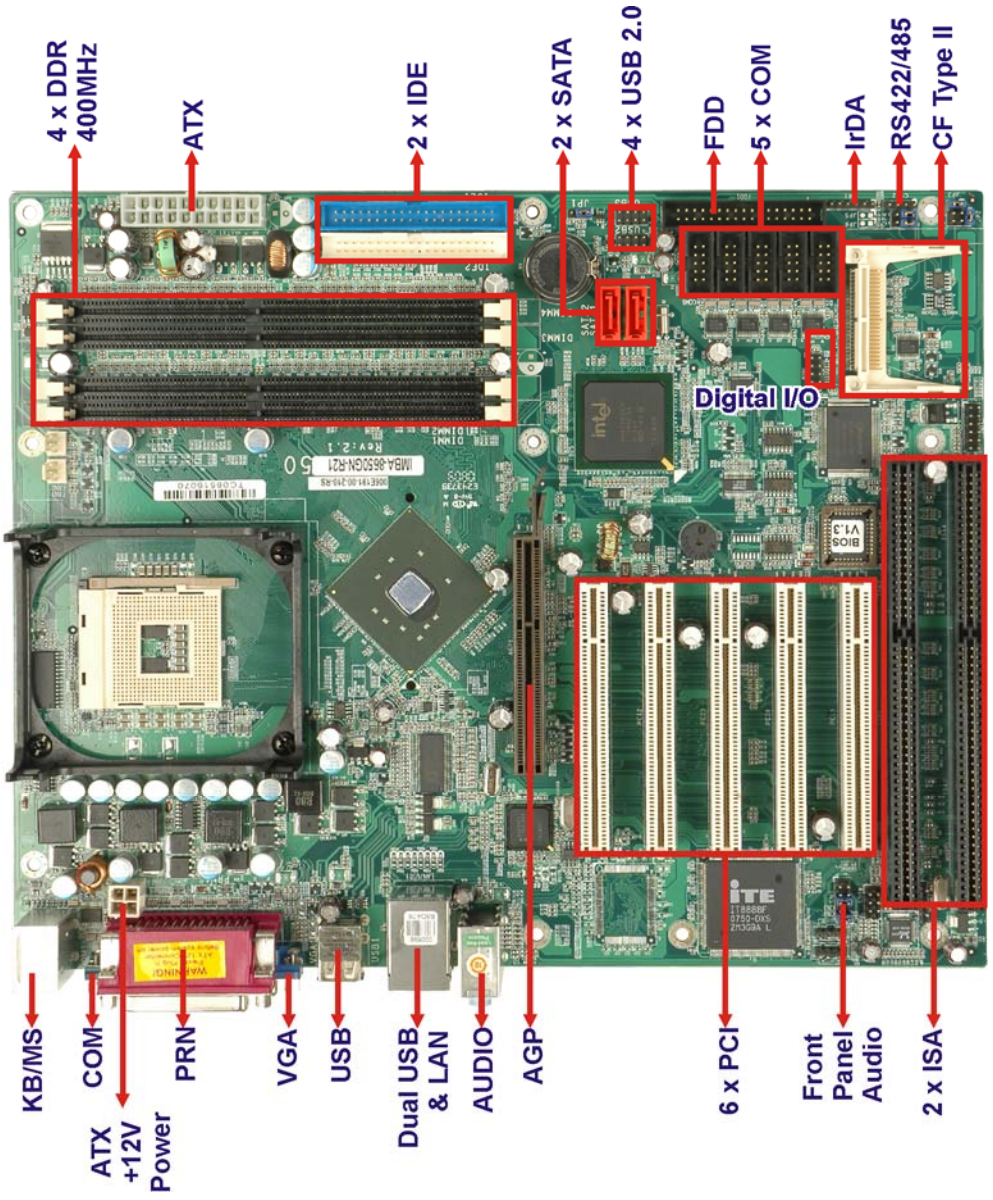


Figure 1-2: IMBA-8650 Overview

1.5 Peripheral Connectors and Jumpers

The IMBA-8650 has the following on-board connectors:

- 1 x 12 V power connector
- 1 x AGP slot
- 1 x ATX power connector
- 1 x Audio connector
- 1 x Aux. Audio connector
- 1 x CD-in connector
- 1 x CompactFlash slot
- 4 x DDR DIMM slots
- 1 x DIO connector
- 2 x Fan connectors
- 1 x Floppy disk connector
- 1 x Front panel connector
- 2 x IDE disk drive connectors
- 1 x Infrared interface connector
- 5 x PCI slots
- 2 x ISA slots
- 2 x Serial ATA (SATA) drive connectors
- 5 x Serial port connectors
- 1 x SPDIF connector
- 4 x USB connectors

The IMBA-8650 has the following external peripheral interface connectors on the board rear panel:

- 1 x PS/2 dual keyboard/mouse connector
- 1 x parallel port connector
- 1 x serial port connector
- 1 x VGA connector
- 1x Ethernet connectors
- 4 x USB connectors
- 3 x audio connectors

The IMBA-8650 has the following on-board jumpers:

- CF Master/Slave Selection
- Clear CMOS
- COM3 RS-422/485 Selection

1.6 Technical Specifications

IMBA-8650 technical specifications are listed in **Table 1-1**. Detailed descriptions of each specification can be found in Chapter 2.

Specification	IMBA-8650
Form Factor	ATX motherboard
System CPU	Intel® Pentium® 4 Extreme Edition (3.2Ghz and 3.4GHz) Intel® Pentium® 4 (up to 3.4GHz) Intel® Celeron® (up to 2.8GHz) Intel® Celeron® D (up to 3.2GHz)
Front Side Bus	533 MHz or 800 MHz
System Chipset	Northbridge: Intel® 865G Express Southbridge: Intel® ICH5
Memory	Four 184-pin DDR DIMM slots support up to four 1 GB 266/333/400 MHz DDR SDRAM DIMMs
Display	Intel integrated graphics accelerator
BIOS	AWARD BIOS
Audio	Realtek ALC655 with AC'97 codec
LAN	Intel® 82541 GbE chipset with ASF2.0 support (IMBA-8650GN) Realtek 8110SC GbE chipset (IMBA-8650GR)
COM	Five on-board RS-232 serial ports One on-board RS-232/422/485 serial port (by jumper setting)
USB 2.0	Eight USB 2.0 devices supported
IDE	Two 40-pin IDE connects up to four Ultra ATA33/66/100 devices

Specification	IMBA-8650
Floppy Disk	One FDD connector supports one floppy disk drive
SATA	Two SATA 1.5 Gb/s drives supported
Keyboard/mouse	One PS/2 connector supports mouse and keyboard connectivity
Watchdog Timer	Software programmable 1-255 sec. by super I/O
Power Supply	0.46 A @ 3.3 V, 5.79 A @ 5 V, 9.96 A @ 12 V, 0.5 A @ 5 VSB (Intel® Pentium® 4 SL7E6 3.4 GHz with 800 MHz FSB and 2.0 GB DDR)
Temperature	0ºC ~ 60ºC (32ºF ~140ºF)
Humidity (operating)	5%~95% non-condensing
Dimensions	305 mm x 244 mm
Weight (GW/NW)	1.2kg/0.6kg

Table 1-1: Technical Specifications

Chapter

2

Detailed Specifications

2.1 Overview

This chapter describes the specifications and on-board features of the IMBA-8650 in detail.

2.2 Dimensions

2.2.1 Board Dimensions

The dimensions of the board are listed and shown below.

- **Length**: 305 mm
- **Width**: 244 mm

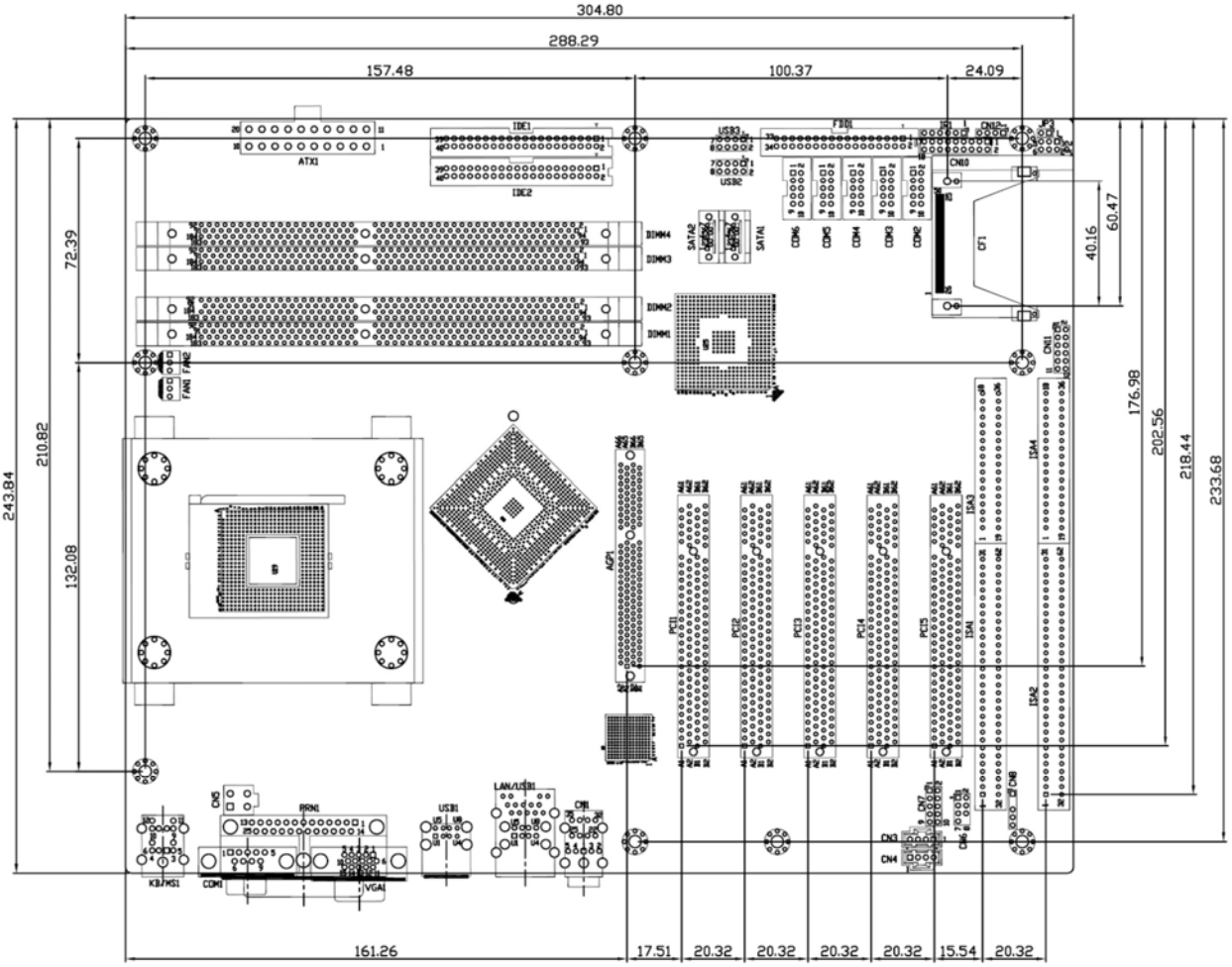


Figure 2-1: IMBA-8650 Dimensions (mm)

2.2.2 External Interface Panel Dimensions

External peripheral interface connector panel dimensions are shown in **Figure 2-2**.

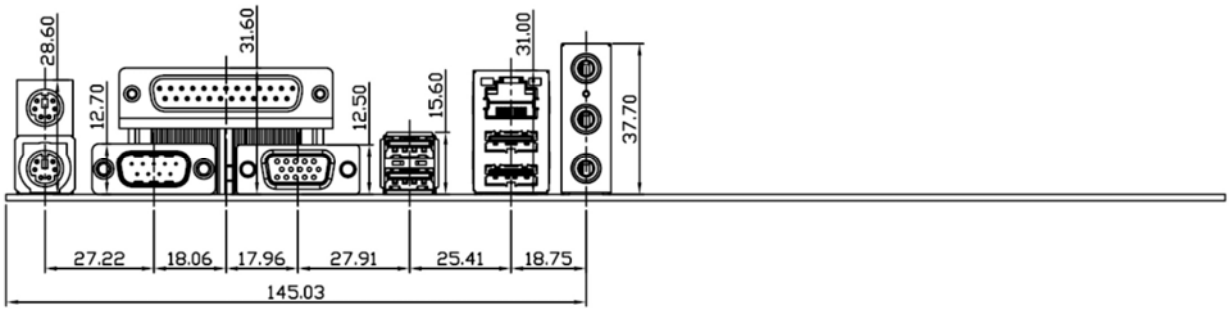


Figure 2-2: External Interface Panel Dimensions (mm)

2.3 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.

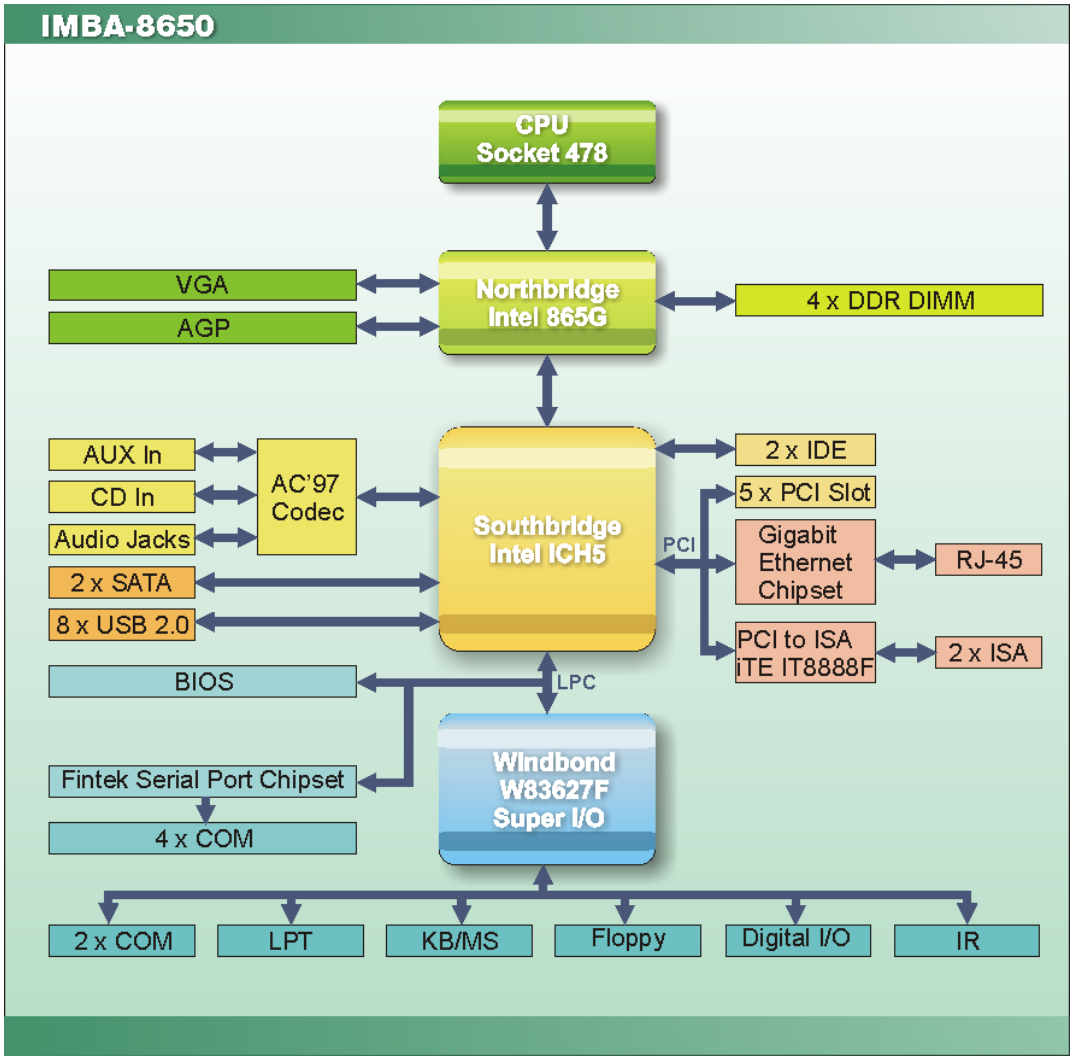


Figure 2-3: Data Flow Block Diagram

2.4 Compatible Processors

The IMBA-8650 supports the following Intel® Socket 478 processors.

- Intel® Pentium 4 EE
- Intel® Pentium 4
- Intel® Celeron

- Intel® Celeron D

All the above processors utilize Intel® Extended Memory 64 Technology (Intel® EMT64T) and Quad Data Rate for data transfer on the Front Side Bus (FSB).

Figure 2-4: CPU

2.5 Intel® 865G Northbridge Chipset

The Intel® 865G Northbridge chipset consists of a graphics and memory controller hub (GMCH).

Figure 2-5: Intel® 865G Northbridge

The GMCH on the Intel® 865G is interfaced to the Intel® I/O Controller Hub 5 (ICH5) through a Hub Interface (HI) chip-to-chip connection. Some of the features of the Intel® 865G are listed below.

- Host Interface Support
  - Intel® Pentium® 4 processors with 512-KB L2 cache on 0.13 micron process / Pentium 4 processor on 90 nm process

- 64-bit FSB frequencies of 400 MHz (100 MHz bus clock), 533 MHz (133 MHz bus clock), and 800 MHz (200 MHz bus clock). Maximum theoretical BW of 6.4 GB/s.
- FSB Dynamic Bus Inversion on the data bus
- 32-bit addressing for access to 4 GB of memory space
- Hyper-Threading Technology

- System Memory Controller Support
  - Dual-channel (128 bits wide) DDR memory interface
  - Single-channel (64 bits wide) DDR operation supported
  - Symmetric and asymmetric memory dual-channel upgrade supported
  - 128-Mb, 256-Mb, 512-Mb technologies implemented as x8, x16 devices
  - Up to 4 GB system memory
  - Supports up to 16 simultaneously-open pages (four per row) in dual-channel mode and up to 32 open pages in single-channel mode
  - DDR (Double Data Rate type 1) Support

    Supports maximum of two DDR DIMMs per channel, single-sided and/or double-sided

    Supports DDR266, DDR333, DDR400 DIMM modules

    Supports DDR channel operation at 266 MHz, 333 MHz and 400 MHz with a Peak BW of 2.1 GB/s, 2.7 GB/s, and 3.2 GB/s respectively per channel
- Communication Streaming Architecture (CSA) Interface
  - Gigabit Ethernet (GbE) communication devices supported on the CSA interface
  - Supports 8-bit Hub Interface 1.5 electrical/transfer protocol
  - 266 MB/s point-to-point connection
  - 1.5 V operation
- Hub Interface (HI)
  - Supports Hub Interface 1.5 electrical/transfer protocol
  - 266 MB/s point-to-point connection to the ICH5
  - 66 MHz base clock
  - 1.5 V operation
- AGP Interface Support
  - A single AGP device

- AGP 3.0 with 4X / 8X AGP data transfers and 4X / 8X fast writes, respectively
- 32-bit 4X/8X data transfers and 4X/8X fast writes
- Peak BW of 2 GB/s.
- AGP 2.0 1X/4X AGP data transfers and 4X fast writes

- Integrated Graphics
  - Core Frequency of 266 MHz
  - VGA/UMA Support
  - High Performance 3D Setup and Render Engine
  - 2D Graphics
  - Video DVD/PC-VCR
  - Video Mixer Render Supported (VMR)
  - Bi-Cubic Filter Support
- Display Interfaces
  - AGP signals multiplexed with two DVO ports (ADD card supported)
  - Multiplexed Digital Display Channels (Supported with ADD Card)
- Analog Display Support
  - 350 MHz Integrated 24-bit RAMDAC
  - Up to 2048x1536 @ 75 Hz refresh
  - Simultaneous Display options with digital display

2.5.1 Intel® 865GMemory Support

The Intel® 865G supports four, 1 GB, 333/400 MHz dual channel DDR SDRAM DIMMs. Four 184-pin memory sockets on the IMBA-8650 enable a maximum of 4 GB of memory to be installed on the system. The memory sockets are shown in **Figure 2-6**.

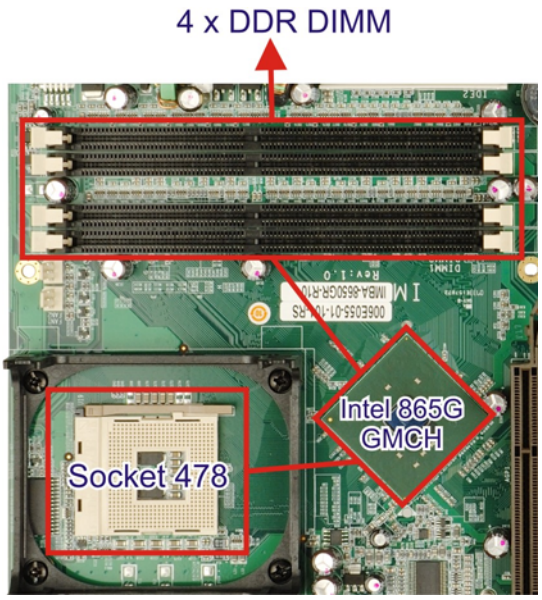


Figure 2-6: 184-pin DIMM Sockets

2.5.2 Intel® 865GIntegrated Graphics

Graphics capabilities are integrated into the Intel® 865G chipset.

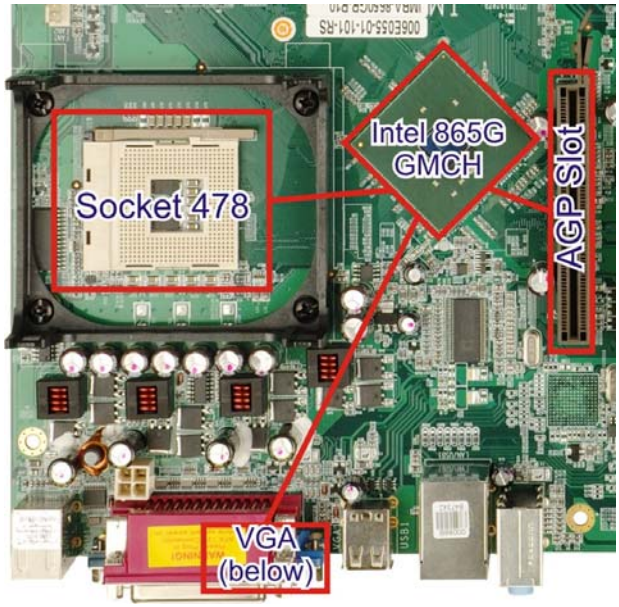


Figure 2-7: Integrated Graphics

Some of the features of the Intel® 865G integrated graphics accelerator are listed below.

- Core Frequency of 266 MHz
- VGA/UMA Support
- High Performance 3D Setup and Render Engine
  - Setup matching processor geometry delivery rates
  - Triangle Lists, Strips and Fans Support
  - Indexed Vertex and Flexible Vertex Formats
  - Vertex Cache
  - Pixel Accurate Fast Scissoring and Clipping Operation
  - Backface Culling Support
  - Supports D3D and OGL Pixelization Rules
  - Anti-aliased Lines Support
  - Sprite Points Support
- High-Quality/Performance Texture Engine
  - Per Pixel Perspective Corrected Texture Mapping

- Single Pass Quad Texture Compositing
- Enhanced Texture Blending Functions
- 12 Level of Detail MIP Map Sizes from 1x1 to 2Kx2K
- All texture formats including 32-bit RGBA and 8-bit palettes
- Alpha and Luminance Maps
- Texture Color-keying/ChromaKeying
- Bilinear, Trilinear and Anisotropic MIP-Mapped Filtering
- Cubic Environment Reflection Mapping
- Embossed and DOT3 Bump-Mapping
- DXTn Texture Decompression
- FXT1 Texture Compression
- Non-power of 2 Texture
- Render to Texture

- 2D Graphics
  - Optimized 256-bit BLT Engine
  - Alpha Stretch Blitter
  - Anti-aliased Lines
  - 32-bit Alpha Blended Cursor
  - Color Space Conversion
  - Programmable 3-Color Transparent Cursor
  - 8-, 16- and 32-bit Color
  - ROP Support
- 3D Graphics Rendering Enhancements
  - Flat and Gouraud Shading
  - Color Alpha Blending For Transparency
  - Vertex and Programmable Pixel Fog and Atmospheric Effects
  - Color Specular Lighting
  - Z Bias Support
  - Dithering
  - Line and Full-scene Anti-aliased
  - 16- and 24-bit Z Buffering
  - 16- and 24-bit W Buffering
  - 8-bit Stencil Buffering
  - Double and Triple Render Buffer Support
  - 16- and 32-bit Color

- Destination Alpha
- Vertex Cache
- Maximum 3D Resolution Supported: 1600x1200x32 @ 85Hz
- Fast Clear Support

- Video DVD/PC-VCR
  - Hardware Motion Compensation for MPEG2
  - Dynamic Bob and Weave Support for Video Streams
  - Synclock Display and TV-out to video source
  - Source Resolution up to 1280x720 with 3-vertical taps and 1920x1080 with 2-vertical taps
  - Software DVD At 30 fps, Full Screen
  - Supports 720x480 DVD Quality Encoding at low processor Utilization for PC-VCR or home movie recording and editing
  - Video Overlay
  - Single High Quality Scalable Overlay
  - Multiple Overlay Functionality provided via Stretch Blitter (PIP, Video Conferencing, etc.)
  - 5-tap Horizontal, 3-tap Vertical Filtered Scaling
  - Independent Gamma Correction
  - Independent Brightness/Contrast/Saturation
  - Independent Tint/Hue Support
  - Destination Color-keying
  - Source ChromaKeying
  - Maximum Source Resolution: 720x480x32
  - Maximum Overlay Display Resolution: 2048x1536x32
- Video Mixer Render Supported (VMR)
- Bi-Cubic Filter Support

2.6 Intel® ICH5 Southbridge Chipset

Figure 2-8: Intel® ICH5 Southbridge

The ICH5 Southbridge chipset on the IMBA-8650 has the features listed below.

- PCI Local Bus Specification, Revision 2.3 with support for 33 MHz PCI operations.
- PCI slots (supports up to 6 Req/Gnt pairs)
- ACPI power management logic support
- Enhanced DMA controller, interrupt controller, and timer functions
- Integrated IDE controller supports Ultra ATA100/66/33
- Integrated SATA controller
- USB host interface with support for eight USB ports; four UHCI host controllers; one EHCI high-speed USB 2.0 host controller
- Integrated LAN controller
- Integrated ASF controller
- System Management Bus (SMBus) Specification, Version 2.0 with additional support for I2C devices
- Supports Audio Codec ‘97 Component Specification, Version 2.3 (also known as AC ’97 v2.3 Specification) link for audio and telephony codecs (up to seven channels)
- Low Pin Count (LPC) interface
- Firmware Hub (FWH) interface support

2.6.1 Audio Codec ’97 Controller

The Audio Codec ’97 (AC’97) controller integrated into the ICH5 complies with AC’97 Component Specification, Version 2.3.

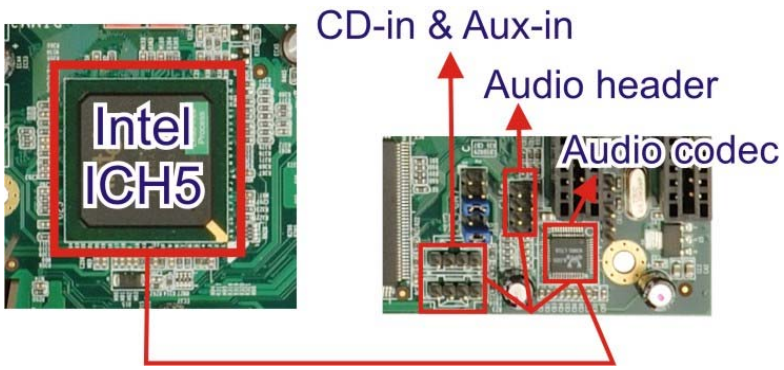


Figure 2-9: Onboard Audio

The AC’97 controller is connected to the onboard audio codec chipset, which is connected to the phone jacks on the back panel. The AC’97 controller supports up to six PCM audio output channels. The IMBA-8650 has the following audio jacks:

- Line In
- Line Out
- Mic
- CD In
- Aux In

2.6.2 IDE Interface

The integrated IDE interface on the ICH5 Southbridge supports up to four IDE hard disks and ATAPI devices, PIO IDE transfers up to 16 MB/s and Ultra ATA transfers up to 100 MB/s. The IDE interface also connects to the CompactFlash® slot.

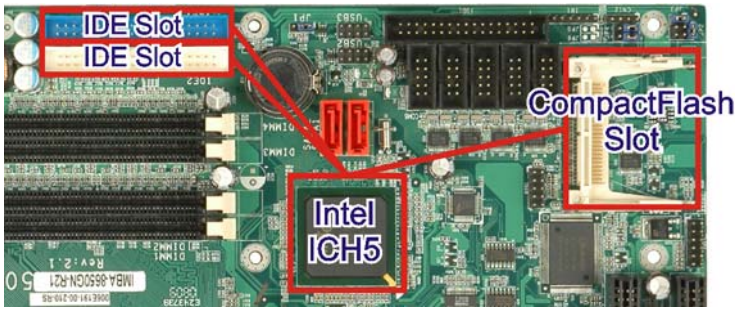


Figure 2-10: IDE Interface

The integrated IDE interface is able to support the following IDE HDDs:

- **Ultra ATA/100**, with data transfer rates up to 100 MB/s
- **Ultra ATA/66**, with data transfer rates up to 66 MB/s
- **Ultra ATA/33**, with data transfer rates up to 33 MB/s

Table 2-1 shows the supported HDD specifications.

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 5	UDMA 4	UDMA 2
DMA/UDMA Max Transfer	100 MB/s	66 MB/s	33 MB/s
Controller Interface	5 V	5 V	5 V

Table 2-1: Supported HDD Specifications

2.6.3 Low Pin Count (LPC) Interface

The ICH5 LPC interface complies with the LPC 1.1 specifications.

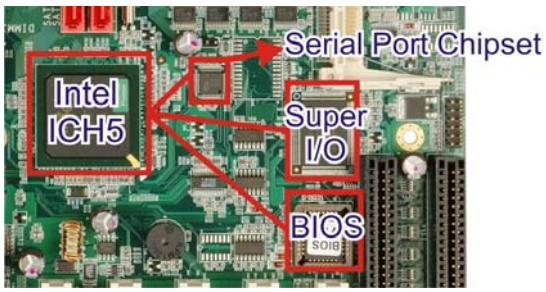


Figure 2-11: LPC Interface

The LPC bus from the ICH5 is connected to the following components:

- BIOS chipset
- Super I/O chipset
- Fintek serial port chipset

2.6.4 PCI Interface

The PCI interface on the ICH5 is compliant with the PCI Revision 2.3 implementation.

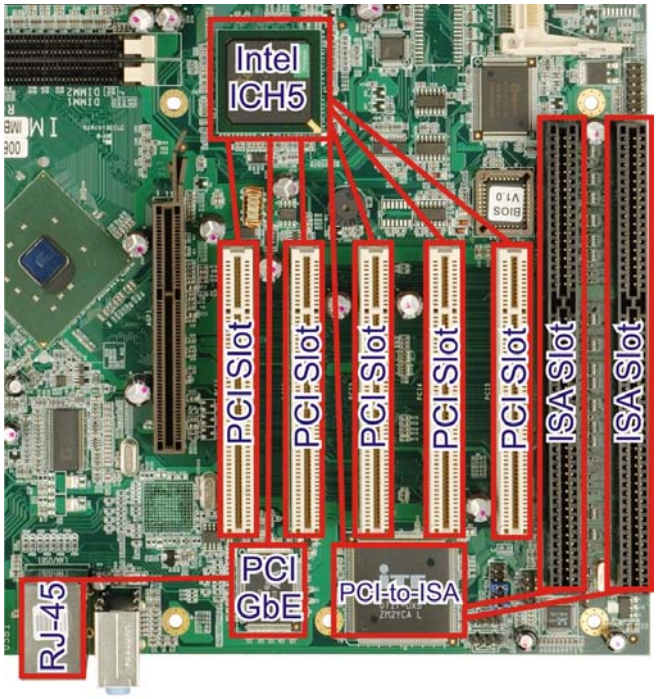


Figure 2-12: PCI Interface

Some of the features of the PCI interface are listed below.

- PCI Revision 2.3 compliant
- 33 MHz
- 5 V tolerant PCI signals (except PME#)
- Integrated PCI arbiter supports up to seven PCI bus masters

The seven PCI bus masters are interfaces to the following onboard components:

- PCI expansion slots
- PCI Ethernet interface
- ITE PCI-to-ISA bridge interface

2.6.5 Real Time Clock

256 bytes of battery backed RAM is provided by the Motorola MC146818 A real time clock (RTC) integrated into the ICH5. The RTC operates on a 3 V battery and 32.768 KHz crystal. The RTC keeps track of the time and stores system data even when the system is turned off.

2.6.6 SATA Controller

The integrated SATA controller on the ICH5 Southbridge supports two SATA drives with independent DMA operations.

Figure 2-13: SATA

SATA controller specifications are listed below.

- Supports two SATA drives
- Supports 1.5 Gb/s data transfer speeds
- Supports Serial ATA Specification

2.6.7 USB Controller

Up to eight high-speed, full-speed or low-speed USB devices are supported by the ICH5.

Figure 2-14: USB

High-speed USB 2.0, with data transfers of up to 480 MB/s, is enabled with the ICH5 integrated Enhanced Host Controller Interface (EHCI) compliant host controller. USB full-speed and low-speed signaling is supported by the four ICH5 integrated Universal Host Controller Interface (UHCI) controller.

2.7 PCI Bus Components

The PCI bus controller on the ICH5 Southbridge is compliant with PCI Revision 2.3 specifications and has a 33 MHz PCI clock.

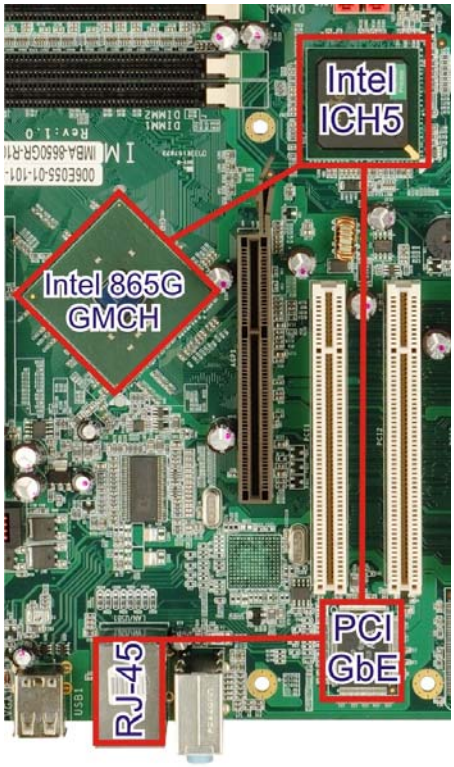


Figure 2-15: Gigabit Ethernet

The components listed below are all connected to the PCI bus:

- PCI slots on the motherboard
- GbE chipset
- PCI-to-ISA bridge chip

2.7.1 Intel® 82541PI PCI Gigabit Ethernet Controller

The Intel® 82541PI PCI Gigabit Ethernet controller is a 10/100/1000BASE-T Ethernet LAN controller. Some of the Intel® 82541PI controller's features are listed below:

- 1000BASE-T, 100BASE-TX and 10BASE-T
- Less than 1.0 W power consumption at gigabit speeds
- Low power of 300 mW in active transmit mode
- Reduced power of less than 50 mW in "unplugged mode"
- IEEE 802.3ab automatic speed negotiation
- Automatic switching to 100 Mb/s or 10 Mb/s when no signal is present

- Power save mode switches to 100 Mb/s or 10 Mb/s
- Wake on LAN (WoL) without software configuration
- Jumbo frame support up to 16 KB
- Complies with PCI Power Management v1.1 and ACPI v2.0
- TCP segmentation (LSO), TCP and UDP checksum off-loading
- 3.3 V device

The PCI Ethernet controller is connected to an RJ-45 connector on the IMBA-8650.

2.7.2 Realtek GbE Controller

The Realtek 8110SC GbE controller is a 10/100/1000BASE-T Ethernet LAN controller. The Realtek 8110SC combines a triple-speed IEEE 802.3 compliant Media Access Controller (MAC) with a triple-speed Ethernet transceiver, a 32-bit PCI bus controller, and embedded memory.

Some of the Realtek RTL8110SC controller features are listed below:

- Integrated 10/100/1000 transceiver
- Auto-Negotiation with Next Page capability
- Supports PCI rev.2.3, 32-bit, 33/66 MHz
- Supports CLKRUNB and Mini PCI vl.0
- Supports pair swap/polarity/skew correction
- Crossover Detection & Auto-correction
- Wake-on-LAN and remote wake-up support
- Microsoft NDIS5 Checksum Offload (IP, TCP, UDP) and largesend offload support
- Supports Full Duplex flow control (IEEE 802.3x)
- Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab
- Supports IEEE 802. IP Layer 2 Priority Encoding
- Supports IEEE 802. IQ VLAN tagging
- Serial EEPROM
- 3.3 V signaling, 5 V PCI I/O tolerant
- Transmit/Receive FIFO support
- Supports power down/link down power saving
- Supports PCI Message Signaled Interrupt (MSI)

2.7.3 ITE IT8888F PCI-to-ISA Bridge Chipset

An ITE IT8888F PCI to ISA bridge single function device enables legacy ISA card expansion on the backplane. The PCI to ISA bridge is shown in **Figure 2-16**.

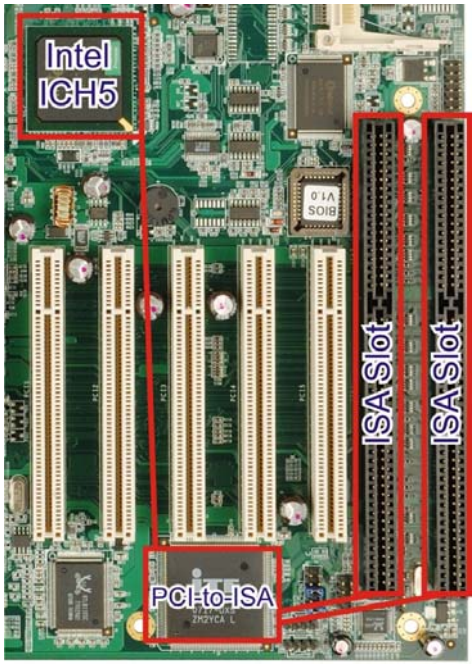


Figure 2-16: PCI-to-ISA Bridge

The IT8888F 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 IT8888F PCI to ISA bridge are listed below.

- PCI Interface
- Programmable PCI Address Decoders
- PC/PCI DMA Controller
- Distributed DMA Controller
- ISA Interface
- SM Bus
- Serial IRQ
- Supports NOGO function
- Single 33 MHz Clock Input

- +3.3 V PCI I/F with +5 V tolerant I/O buffers
- +5 V ISA I/F and core Power Supply

2.8 LPC Bus Components

The LPC bus is connected to components listed below:

- BIOS chipset
- Super I/O chipset
- Fintek serial port chipset

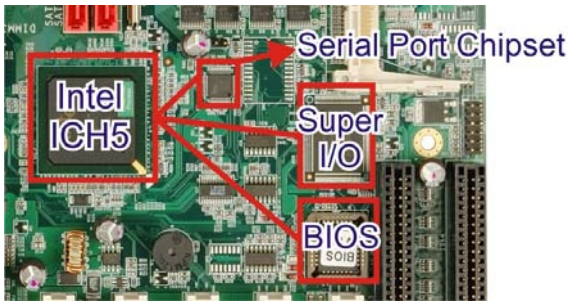


Figure 2-17: LPC Bus

2.8.1 BIOS Chipset

The BIOS chipset has a licensed copy of AWARD BIOS installed on the chipset.

Figure 2-18: BIOS

Some of the BIOS features are listed below:

- AWARD Flash BIOS
- SMIBIOS (DMI) compliant
- Console redirection function support

- PXE (Pre-boot Execution Environment) support
- USB booting support

2.8.2 Super I/O chipset

The Winbond W83627HF-AW Super I/O chipset is connected to the ICH5 Southbridge through the LPC bus.

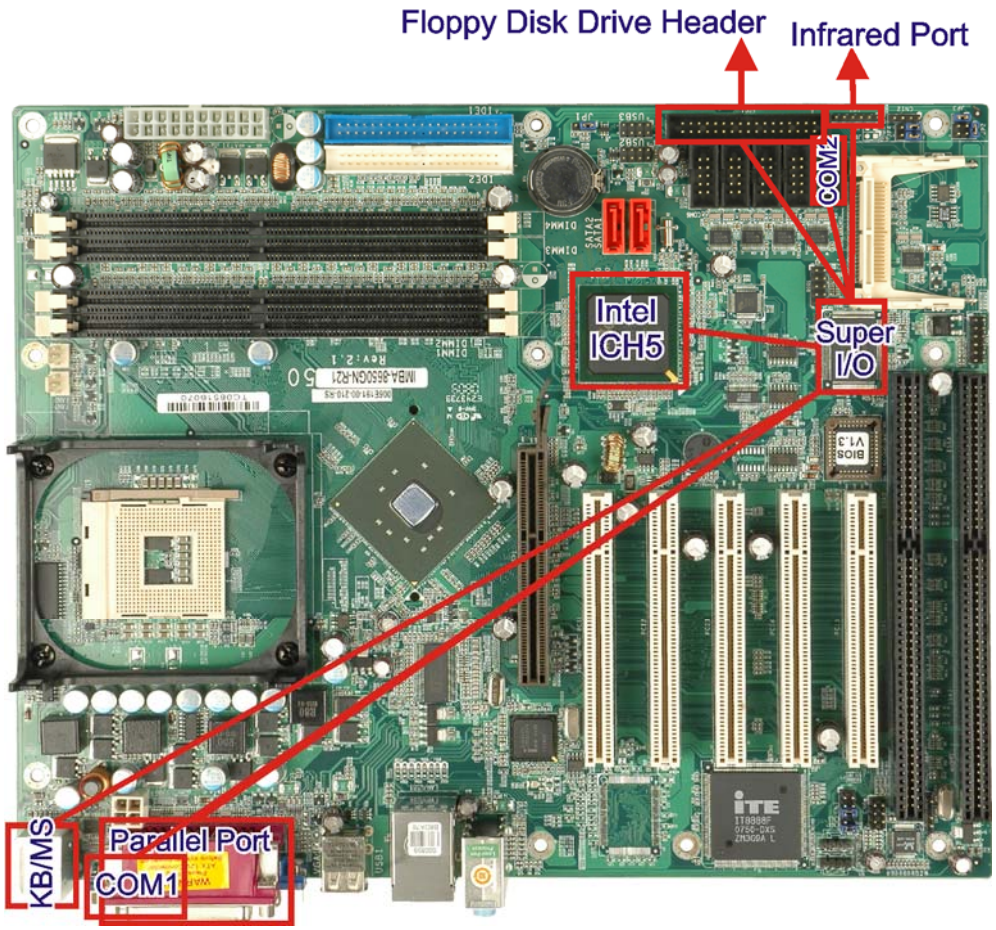


Figure 2-19: Super I/O

The Winbond W83627HF-AW is an LPC interface-based Super I/O device that comes with Environment Controller integration. Some of the features of the W83627HF-AW chipset are listed below:

- LPC Interface
- PC98/99, DPM and ACPI Compliant

- Hardware Monitor
- Fan Speed Controller
- Two 16C550 UARTs for serial port control
- One IEEE 1284 Parallel Port
- Floppy Disk Controller
- Supports IrDA and ASKIR protocols
- Watchdog Timer
- Serial IRQ Support
- Vbat & Vcch Support
- Single +5 V Power Supply

Some of the Super I/O features are described in more detail below:

2.8.2.1 Super I/O LPC Interface

The LPC interface on the Super I/O complies with the Intel® Low Pin Count Specification Rev. 1.0. The LPC interface supports both LDRQ# and SERIRQ protocols as well as PCI PME# interfaces.

2.8.2.2 Super I/O 16C550 UARTs

The on-board Super I/O has two integrated 16C550 UARTs that can support the following:

- Two standard serial ports
- IrDA 1.0 and ASKIR protocols
- SPP, BPP, EPP and ECP compatible parallel port
- 48 programmable general purpose I/O ports

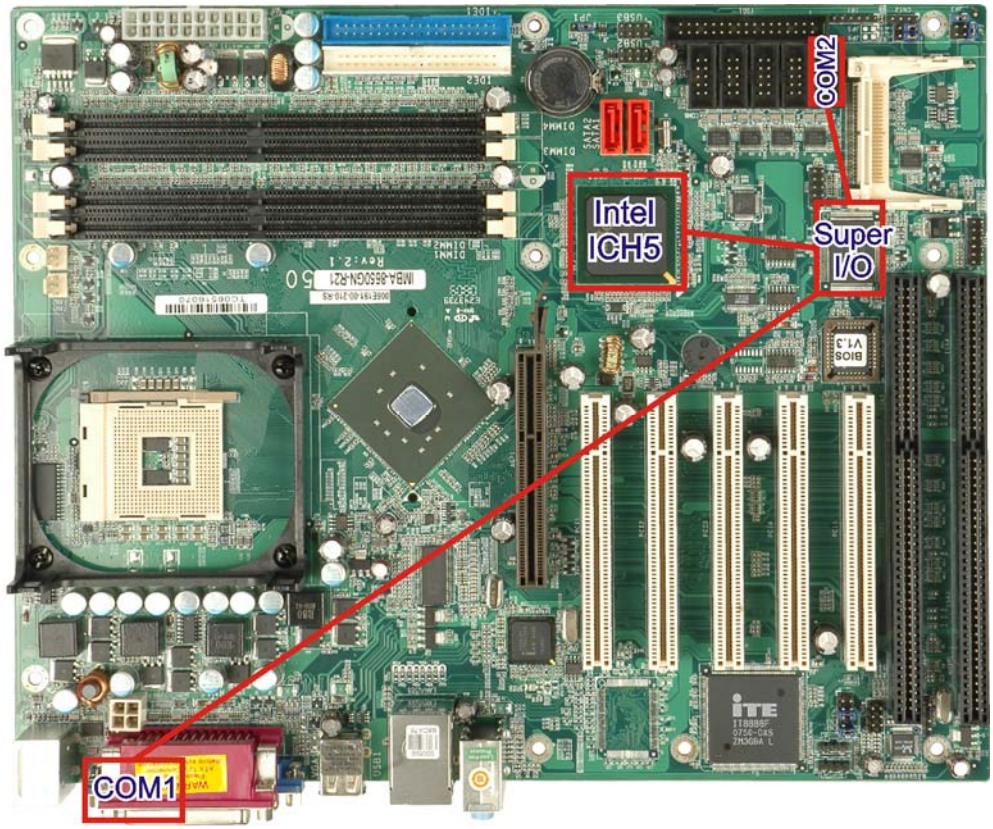


Figure 2-20: Super I/O Serial Ports

2.8.2.3 Super I/O Hardware Monitor

The Super I/O Hardware Monitor monitors two thermal inputs, VBAT internally, and six voltage monitor inputs. These hardware parameters are reported in the BIOS and can be read from the BIOS Hardware Health Configuration menu.

2.8.2.4 Super I/O Fan Speed Controller

The Super I/O fan speed controller enables the system to monitor the speed of the fan. One of the pins on the fan connector is reserved for fan speed detection and interfaced to the fan speed controller on the Super I/O. The fan speed is then reported in the BIOS.

2.8.2.5 Super I/O Parallel Port

The Super I/O parallel port (LPT) supports standard mode, enhanced mode and high-speed mode parallel port devices.

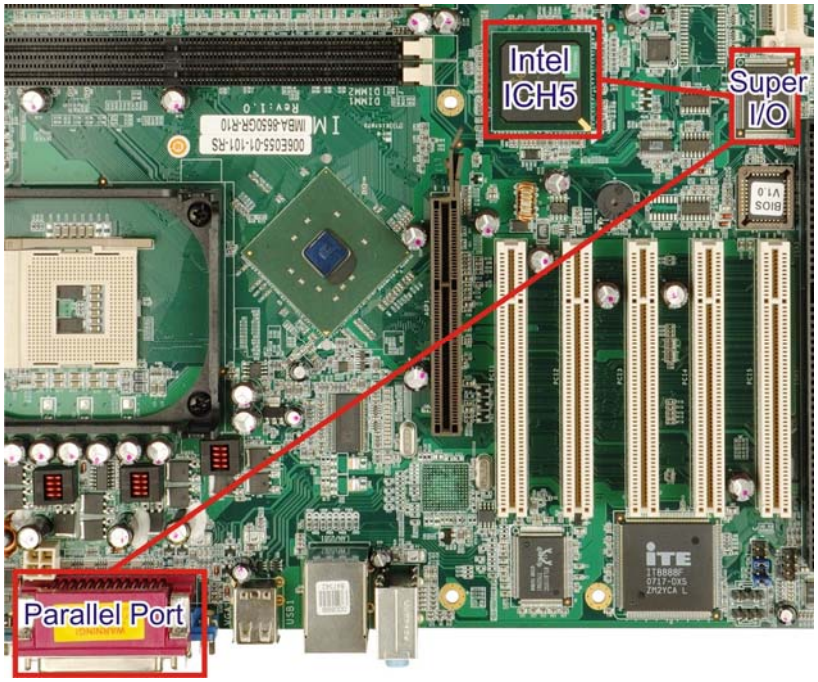


Figure 2-21: Super I/O Parallel Port

The LPT is compliant with the following LPT modes.

- Standard mode
  - Bi-directional SPP compliant
- Enhanced mode
  - EPP, IEEE 1284 compliant
- High-speed mode
  - ECP, IEEE 1284 compliant

2.8.2.6 Super I/O Infrared

The onboard Super I/O supports the following infrared specifications:

- IrDA version 1.0 SIR protocol with a maximum baud rate up to 115.2 Kb/s

The IR controller on the super I/O is interfaced through the board-to-board connectors on the IMBA-8650 to an IrDA pin-header on a backplane.

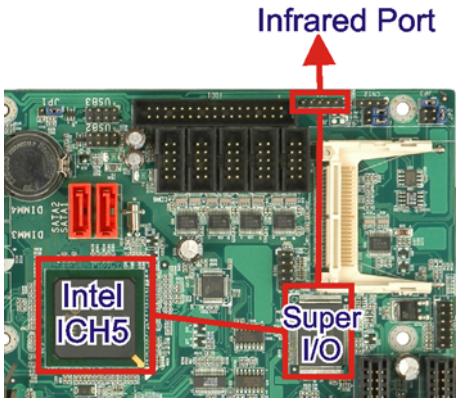


Figure 2-22: Super I/O Infrared Port

2.8.2.7 Super I/O Floppy Disk Drive (FDD) Controller

The Super I/O FDD controller is compatible with the following specifications.

- IBM PC AT disk drive compatible
- Variable write pre-compensation with track selectable capability
- Vertical recording format supported
- DMA logic enabled
- 16-byte data FIFOs
- Overrun and under run conditions detected
- Built-in address mark detection circuitry to simplify the read electronics
- FDD anti-virus functions with software write protect and FDD write enable signal
- Supports 3.5-inch or 5.25-inch FDD
- Compatible with industry standard 82077
- Supported capacities:
  - 360K
  - 720K
  - 1.2M
  - 1.44M
  - 2.88M

- Supported transfer rates
  - 250 Kb/s
  - 300 Kb/s
  - 500 Kb/s
  - 1 Mb/s
  - 2 Mb/s
- 3-mode FDD and Win95/98 driver supported

The FDD controller is interfaced to a FDD connected to the backplane through the board-to-board connectors.

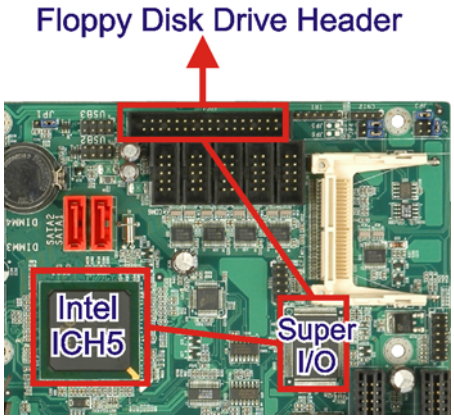


Figure 2-23: Super I/O Floppy Disk Drive Controller

2.8.2.8 Super I/O Keyboard and Mouse Controller

The Super I/O keyboard and mouse controller is compatible with the following specifications.

- 8042 compatible
- Asynchronous access to two data registers and one status register
- Compatible with 8042 software
- PS/2 mouse supported
- Port 92 supported
- Interrupt and polling modes supported
- Fast Gate A20 and Hardware Keyboard Reset
- 8-bit timer/counter

The keyboard and mouse controller is interfaced to a keyboard and mouse connected to the backplane through the board-to-board connectors.

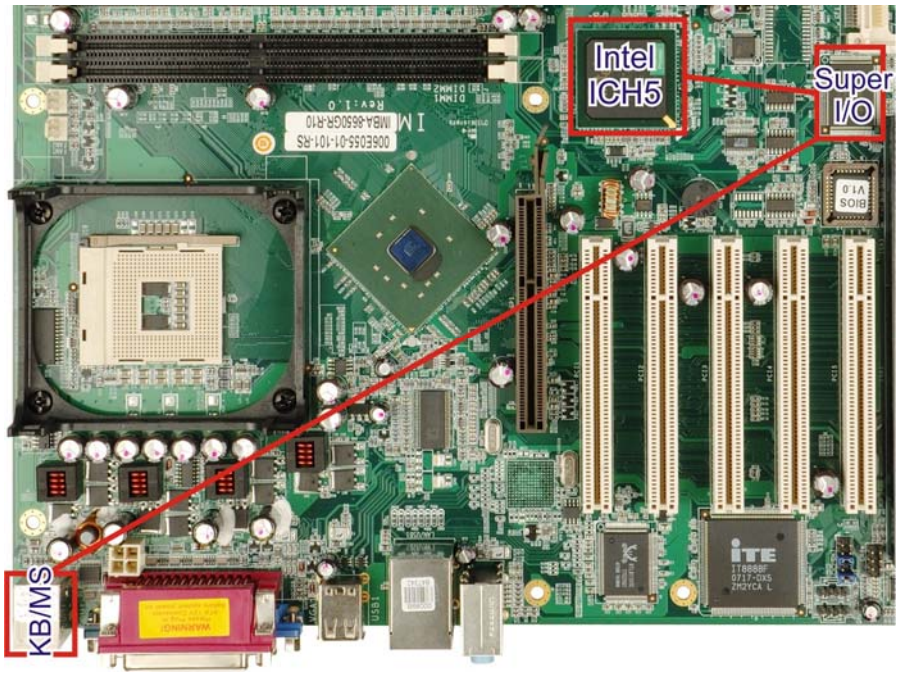


Figure 2-24: Super I/O Keyboard and Mouse Controller

2.8.3 Fintek F81216DG LPC Serial Port Chipset

The IMBA-8650 has a Fintek F81216DG chipset onboard enabling four additional serial ports (COM3, COM4, COM5 and COM6). UART includes 16-byte send/receive FIFO. The Fintek serial port chipset is interfaced to the Southbridge chip through the LPC bus.

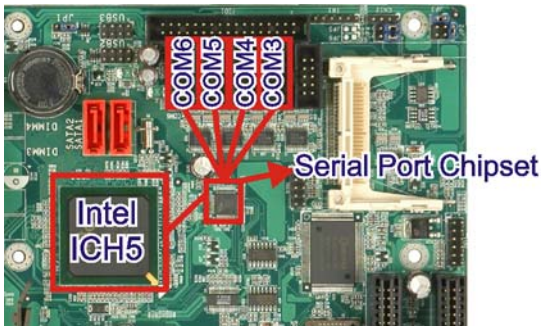


Figure 2-25: Fintek Serial Port Chipset

Some of the features of the Fintek chip are listed below:

- Supports LPC interface
- Totally provides 4 UART (16550 asynchronous) ports
  - 3 x Pure UART
  - 1 x UART+IR
- One Watch dog timer with WDTOUT# signal
- One Frequency input 24/48 MHz
- Powered by 3 Vcc

2.9 Environmental and Power Specifications

2.9.1 System Monitoring

Three thermal inputs on the IMBA-8650 Super I/O Enhanced Hardware Monitor the following temperatures:

- CPU Temperature
- System Temperature

Seven voltage inputs on the IMBA-8650 Super I/O Enhanced Hardware Monitor the following voltages:

- Vcore (From VID)
- Vcore
- +1.50 V
- +3.30 V
- +5.00 V
- +12.0 V
- -12.0 V

The IMBA-8650 Super I/O Enhanced Hardware Monitor also monitors the following voltages internally:

- VBAT

The IMBA-8650 Super I/O Enhanced Hardware Monitor also monitors the following fan speeds:

- Fan1 speed

- Fan2 speed

The values for the above environmental parameters are all recorded in the BIOS Hardware Health Configuration menu.

2.9.2 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the IMBA-8650 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.

2.9.3 Power Consumption

Table 2-2 shows the power consumption parameters for the IMBA-8650 running a 3.4 GHz Intel® Pentium® 4 SL7E6 with 800 MHz FSB and 2.0 GB of DDR memory.

Voltage	Current
3.3 V	0.46 A
5 V	5.79 A
12 V	9.96 A
5 VSB	0.5 A

Table 2-2: Power Consumption

Chapter

3

Unpacking

3.1 Anti-static Precautions

WARNING!

Failure to take ESD precautions during the installation of the IMBA-8650 may result in permanent damage to the IMBA-8650 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the IMBA-8650. Dry climates are especially susceptible to ESD. It is critical that the following anti-static precautions are strictly adhered to whenever handling the IMBA-8650 or any other electrical component.

- ***Wear an anti-static wristband*** - Wearing a simple anti-static wristband can help to prevent ESD from damaging the IMBA-8650.
- ***Self-grounding*** - Touch a grounded conducting material before handling and periodically while handling the IMBA-8650.
- ***Use an anti-static pad*** - When configuring the IMBA-8650, place it on an antic-static pad to reduce the possibility of ESD damage.
- ***Only handle the edges of the IMBA-8650*** - When handling the IMBA-8650, hold it by its edges.

3.2 Unpacking

3.2.1 Unpacking Precautions

When the IMBA-8650 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 IMBA-8650 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 any components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the IMBA-8650 was purchased from or contact an IEI sales representative directly by sending an email to sales@iei.com.tw.

3.3.1 Package Contents

The IMBA-8650 is shipped with the following components:

Quantity	Item and Part Number	Image
1	IMBA-8650	
2	ATA 66/100 flat cable (P/N: 32200-000052-RS)	
2	Dual RS-232 cable (P/N: 32200-004101-RS)	
1	RS-232 cable (P/N: 32200-029400-RS)	
1	RS-422/485 cable with bracket (P/N: 19800-000063-RS)	

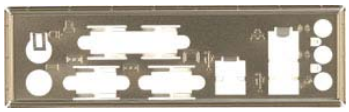
Quantity	Item and Part Number	Image
2	SATA cables (P/N: 32000-062800-RS)	
1	SATA power cable (P/N: 32100-088600-RS)	
1	I/O Shielding (P/N: 45002-0804C0-00-RS)	
1	Mini jumper Pack (P/N: 33100-000079-RS)	
1	Quick Installation Guide (P/N 51000-022313-RS)	
1	Utility CD (P/N: IEI-7B000-000102-RS)	

Table 3-1: Package List Contents

3.3.2 Optional Components

The following optional components are available from IEI.

Item and Part Number	Image
CPU cooler (**P/N**: CF-478 A-RS)	

Item and Part Number	Image
CPU cooler (**P/N**: CF-478B-RS)	
CPU cooler (**P/N**: CF-514-RS)	
CPU cooler (**P/N**: CF-519-RS)	
FDD cable (P/N: 32200-0000-17-RS)	
Dual USB cable (P/N: CB-USB02-RS)	
4 USB cable (**P/N**: CB-USB14-RS)	

Table 3-2: Optional Components

Chapter

4

Connector Pinouts

4.1 Peripheral Interface Connectors

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

4.1.1 IMBA-8650 Layout

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

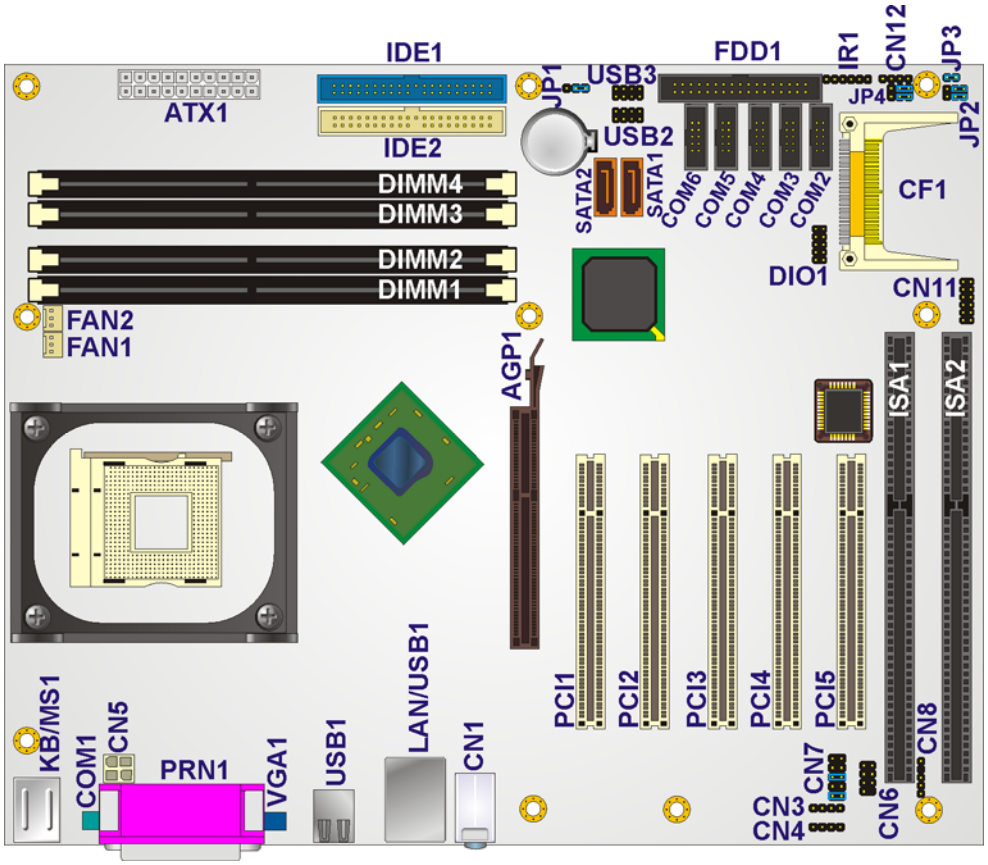


Figure 4-1: Connector and Jumper Locations

4.1.2 Peripheral Interface Connectors

Table 4-1 shows a list of the peripheral interface connectors on the IMBA-8650. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
+12 V ATX power connector	4-pin header	CN5
AGP slot	132-pin AGP 8X slot	AGP1
ATX power connector	20-pin header	ATX1
Audio connector	7-pin header	CN6
Auxiliary audio connector	4-pin header	CN3
CD-in connector	4-pin header	CN4
CompactFlash connector	50-pin CF slot	CF1
Digital I/O	10-pin header	DIO1
Fan connector	3-pin wafer	FAN1
Fan connector	3-pin wafer	FAN2
Floppy disk drive connector	34-pin box header	FDD1
Front panel connector	12-pin header	CN11
IDE Interface connector	40-pin box header	IDE1
IDE Interface connector	40-pin box header	IDE2
ISA slot	98-pin ISA slot	ISA1
ISA slot	98-pin ISA slot	ISA2
Infrared connector	6-pin header	IR1
PCI slot	124-pin PCI slot	PCI1
PCI slot	124-pin PCI slot	PCI2
PCI slot	124-pin PCI slot	PCI3
PCI slot	124-pin PCI slot	PCI4
PCI slot	124-pin PCI slot	PCI5
SATA drive connector	7-pin SATA	SATA1
SATA drive connector	7-pin SATA	SATA2
Serial port connector (RS-232)	10-pin box header	COM2
Serial port connector (RS-232)	10-pin box header	COM4

Connector	Type	Label
Serial port connector (RS-232)	10-pin box header	COM5
Serial port connector (RS-232)	10-pin box header	COM6
Serial port connector (RS-232/422/485)	10-pin box header	COM3
Serial port connector (RS-422/485)	4-pin header	CN12
SPDIF connector	5-pin header	CN8
USB connector	8-pin header	USB2
USB connector	8-pin header	USB3

Table 4-1: Peripheral Interface Connectors

4.1.3 External Peripheral Interface Panel Connectors

Table 4-2 lists the external peripheral interface panel connectors on the IMBA-8650. Detailed descriptions of these connectors can be found in.

Connector	Type	Label
Keyboard/Mouse	PS/2	KB/MS1
Parallel port connector	DB-25 (female)	PRN1
VGA connector	DB-15 (female)	VGA1
Serial connector	DB-9 (male)	COM1
USB connector	Dual USB port connector	USB1
Ethernet/USB connector	RJ-45/USB port combo connector	LAN/USB1
Audio connector	3 x Audio jacks	CN1

Table 4-2: External Peripheral Interface Panel Connectors

4.2 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 IMBA-8650.

4.2.1 ATX Power Supply Connector (4-pins)

CN Label: **CN5**

CN Type: 4-pin ATX power connector (1x4)

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

CN Pinouts: See **Table 4-3**

The 4-pin ATX power supply connector is connected to a +12 V ATX power supply.

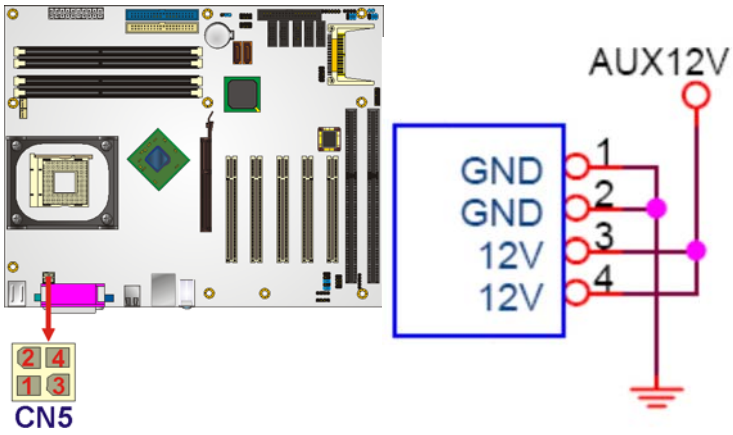


Figure 4-2: ATX Power Supply Connector (4-pins) Location

PIN	DESCRIPTION
1	GND
2	GND
3	+12 V
4	+12 V

Table 4-3: ATX Power Supply Connector (4-pins) Pinouts

4.2.2 AGP Connector (132-pins)

CN Label: **AGP1**

CN Type: 132-pin AGP slot

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

CN Pinouts: See **Table 4-4**

Use the 132-pin AGP slot to connect an AGP 3.0 compliant graphics card.

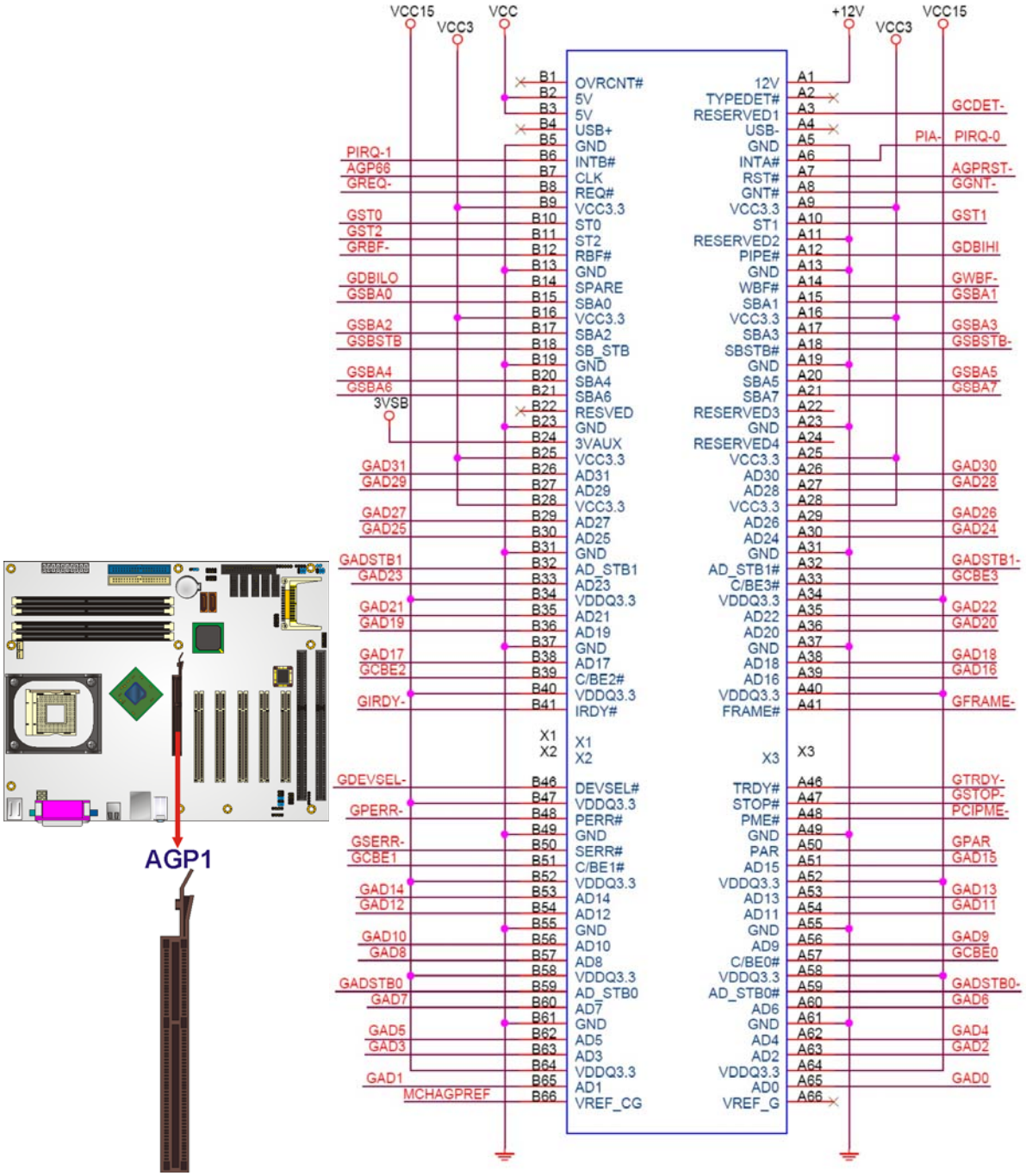


Figure 4-3: AGP Slot Location

PIN	B	A	PIN	B	A
1	OVRCNT#	12 V	34	VDDQ3.3	VDDQ3.3

PIN	B	A	PIN	B	A
2	5.0 V	TYPEDET#	35	AD21	AD22
3	5.0 V	RESERVED	36	AD19	AD20
4	USB+	USB-	37	GND	GND
5	GND	GND	38	AD17	AD18
6	INTB#	INTA#	39	C/BE2#	AD16
7	CLK	RST#	40	VDDQ3.3	VDDQ3.3
8	REQ#	GNT#	41	IRDY#	FRAME#
9	VCC3.3	VCC3.3	42	KEY	KEY
10	ST0	ST1	43	KEY	KEY
11	ST2	RESERVED	44	KEY	KEY
12	RBF#	PIPE#	45	KEY	KEY
13	GND	GND	46	DEVSEL#	TRDY#
14	SPARE	WBF#	47	VDDQ3.3	STOP#
15	SBA0	SBA1	48	PERR#	PME#
16	VCC3.3	VCC3.3	49	GND	GND
17	SBA2	SBA3	50	SERR#	PAR
18	SB_STB	SBSTB#	51	C/BE1#	AD15
19	GND	GND	52	VDDQ3.3	VDDQ3.3
20	SBA4	SBA5	53	AD14	AD13
21	SBA6	SBA7	54	AD12	AD11
22	RESERVED	RESERVED	55	GND	GND
23	GND	GND	56	AD10	AD9
24	3.3 V AUX	RESERVED	57	AD8	C/BE0#
25	VCC3.3	VCC3.3	58	VDDQ3.3	VDDQ3.3
26	AD31	AD30	59	AD_STB0	AD_STB0#
27	AD29	AD28	60	AD7	AD6
28	VCC3.3	VCC3.3	61	GND	GND
29	AD27	AD26	62	AD5	AD4
30	AD25	AD24	63	AD3	AD2
31	GND	GND	64	VDDQ3.3	VDDQ3.3
32	AD_STB1	AD_STB1#	65	AD1	AD0

PIN	B	A	PIN	B	A
33	AD23	C/BE3#	66	VREF_CG	VREF_G

Table 4-4: AGP Slot Pinouts

4.2.3 ATX Power Supply Connector (20-pins)

CN Label: **ATX1**

CN Type: 20-pin ATX power connector (2x10)

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

CN Pinouts: See **Table 4-5**

The 24-pin ATX power supply connector is connected to a ATX power supply.

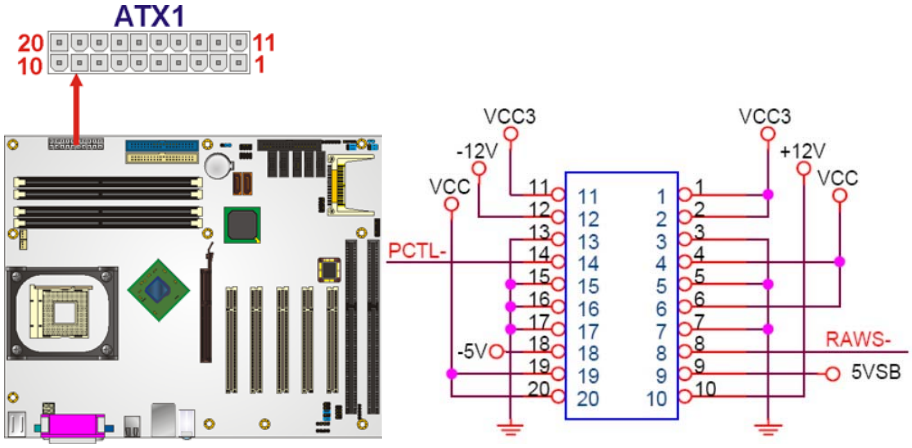


Figure 4-4: ATX Power Connector Location

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC3	11	VCC3
2	VCC3	12	-12 V
3	GND	13	GND
4	VCC	14	PCTL-
5	GND	15	GND
6	VCC	16	GND
7	GND	17	GND
8	RAWS-	18	-5 V

PIN	DESCRIPTION	PIN	DESCRIPTION
9	5 VSB	19	VCC
10	+12 V	20	VCC

Table 4-5: ATX Power Connector Pinouts

4.2.4 Audio Connector (7-pin)

CN Label: **CN6**

CN Type: 7-pin header (2x4)

CN Location: See **Figure 4-5**

CN Pinouts: See **Table 4-6**

The 8-pin audio connector is connected to external audio devices including speakers and microphones for the input and output of audio signals to and from the system.

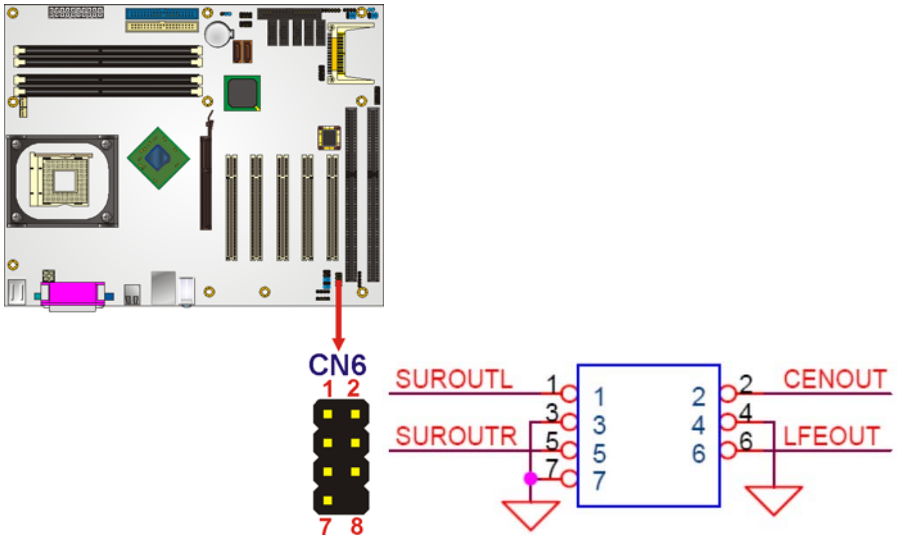


Figure 4-5: Audio Connector Location (7-pin)

PIN	DESCRIPTION	PIN	DESCRIPTION
1	SUROUTL	2	CENOUT
3	GND	4	GND
5	SUROUTR	6	LFEOUT

PIN	DESCRIPTION	PIN	DESCRIPTION
7	GND		

Table 4-6: Audio Connector Pinouts (8-pin)

4.2.5 Auxiliary Audio Connector (4-pin)

CN Label: **CN3**

CN Type: 4-pin header

CN Location: See **Figure 4-6**

CN Pinouts: See **Table 4-7**

The 4-pin auxiliary audio connector provides a second audio input to the system.

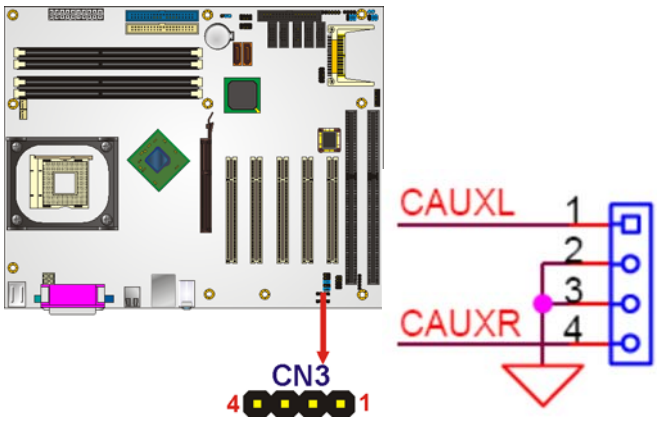


Figure 4-6: Auxiliary Audio Connector Location (4-pin)

PIN	DESCRIPTION
1	CAUXL
2	GND
3	GND
4	CAUXR

Table 4-7: Auxiliary Audio Connector Pinouts (4-pin)

4.2.6 CD-In Connector

CN Label: **CN4**

CN Type: 4-pin header

CN Location: See **Figure 4-7**

CN Pinouts: See **Table 4-8**

The 4-pin CD-in connector enables an audio CD to be played on an older CD-ROM.

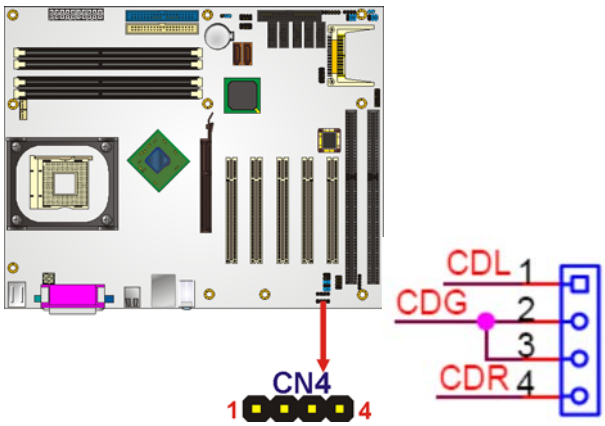


Figure 4-7: CD-In Connector

PIN	DESCRIPTION
1	CDL
2	GND
3	GND
4	CDR

Table 4-8: CD-In Connector

4.2.7 Compact Flash Socket

CN Label: **CF1**

CN Type: 50-pin header (2x25)

CN Location: See **Figure 4-8**

CN Pinouts: See **Table 4-9**

A CompactFlash® Type I or Type II memory card inserts into the CF socket on the motherboard.

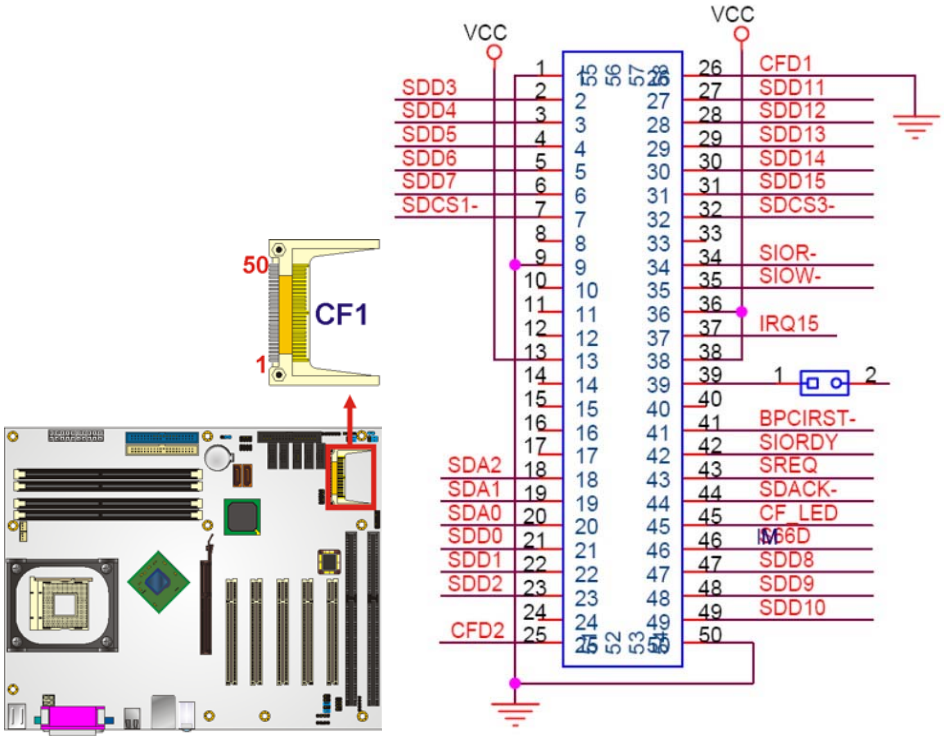


Figure 4-8: CF Card Socket Location

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	26	CFD1
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	SDCS3-
8	N/C	33	N/C
9	GND	34	SIOR-
10	N/C	35	SIOW-
11	N/C	36	VCC
12	N/C	37	IRQ15
13	VCC_COM	38	VCC
14	N/C	39	CSEL
15	N/C	40	N/C

PIN	DESCRIPTION	PIN	DESCRIPTION
16	N/C	41	BPCIRST-
17	N/C	42	SIORDY
18	SDA2	43	SREQ
19	SDA1	44	SDACK-
20	SDA0	45	CF_LED
21	DATA 0	46	S66D
22	DATA 1	47	DATA 8
23	DATA 2	48	DATA 9
24	N/C	49	DATA 10
25	CFD2	50	GND

Table 4-9: CF Card Socket Pinouts

4.2.8 Digital Input/Output (DIO) Connector

CN Label: **DIO1**

CN Type: 10-pin header (2x5)

CN Location: See **Figure 4-9**

CN Pinouts: See **Table 4-10**

The digital input/output connector is managed through a Super I/O chip. The DIO connector pins are user programmable.

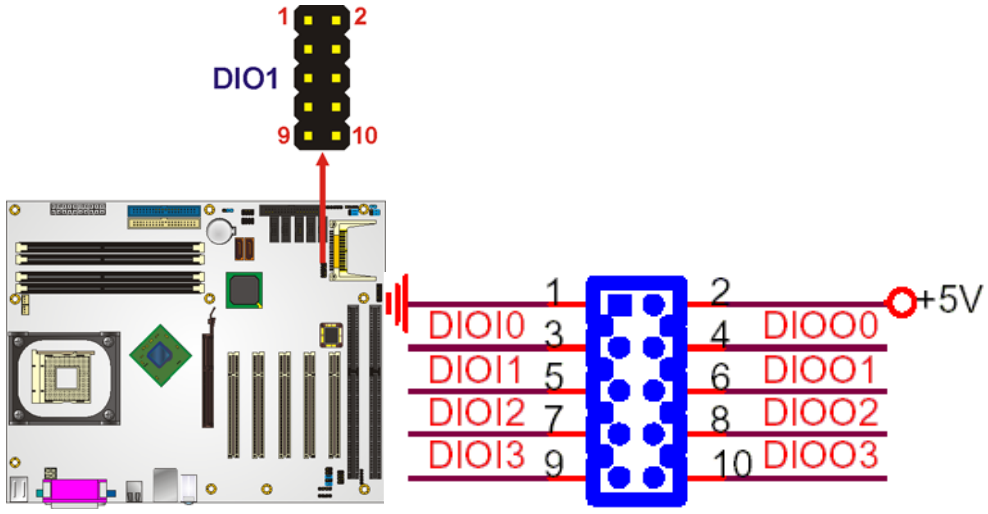


Figure 4-9: DIO Connector Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Ground	2	5 V
3	Input 0	4	Output 0
5	Input 1	6	Output 1
7	Input 2	8	Output 2
9	Input 3	10	Output 3

Table 4-10: DIO Connector Pinouts

4.2.9 Fan Connectors

CN Label: **FAN1, FAN2**

CN Type: 3-pin wafer connector

CN Location: See **Figure 4-10**

CN Pinouts: See **Table 4-11**

The FAN1 and FAN2 cooling fan connectors provide a 12 V current to the cooling fans. The connector has a "rotation" pin to get rotation signals from the fan and notify the system so the system BIOS can recognize the fan speed. Please note that only certain fans can issue the rotation signals.

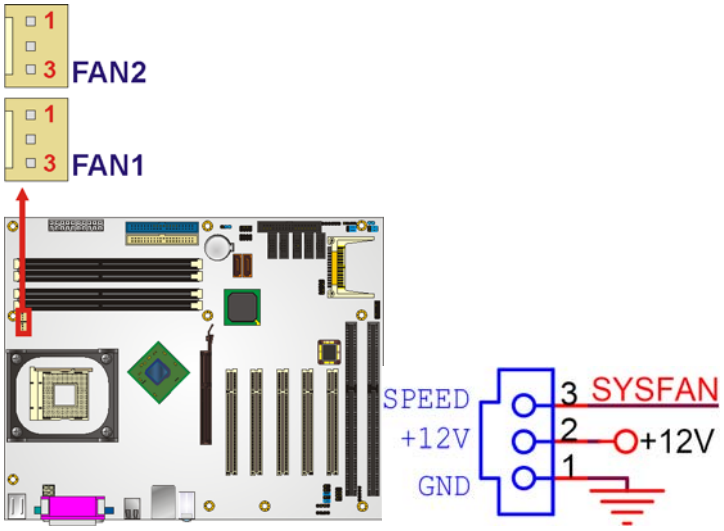


Figure 4-10: Fan Connectors Locations

PIN	CPU_FAN1
1	GND
2	+12 V
3	Rotation Signal

Table 4-11: Fan Connectors Pinouts

4.2.10 Floppy Disk Connector

CN Label: **FDD1**

CN Type: 34-pin header (2x17)

CN Location: See **Figure 4-11**

CN Pinouts: See **Table 4-12**

The floppy disk connector is connected to a floppy disk drive.

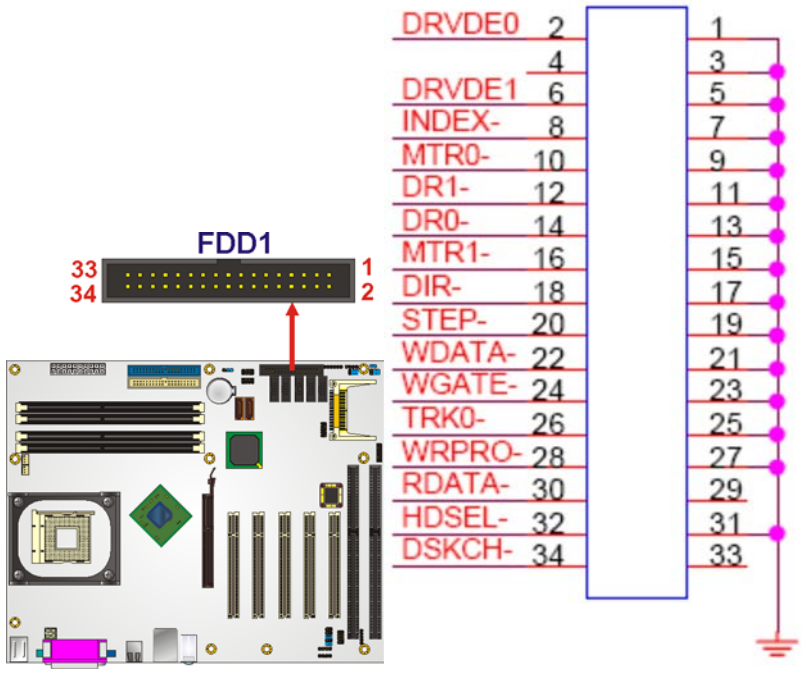


Figure 4-11: FDC Connector Location

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	2	DRIVE DETECT A
3	GND	4	N/C
5	GND	6	DRIVE DETECT B
7	GND	8	INDEX#
9	GND	10	MOTOR ENABLE A#
11	GND	12	DRIVE SELECT B#
13	GND	14	DRIVE SELECT A#
15	GND	16	MOTOR ENABLE B#
17	GND	18	DIRECTION#
19	GND	20	STEP#
21	GND	22	WRITE DATA#
23	GND	24	WRITE GATE#
25	GND	26	TRACK 0#
27	GND	28	WRITE PROTECT#
29	GND	30	READ DATA#
31	GND	32	SIDE 1 SELECT#

PIN	DESCRIPTION	PIN	DESCRIPTION
33	GND	34	DISK CHANGE#

Table 4-12: FDC Connector Pinouts

4.2.11 Front Panel Connector (12-pin)

CN Label: **CN11**

CN Type: 12-pin header (2x6)

CN Location: See **Figure 4-12**

CN Pinouts: See **Table 4-13**

The front panel connector connects to external switches and indicators to monitor and controls the motherboard. These indicators and switches include:

- Power button
- Reset button
- Speaker
- Power LED
- HDD LED

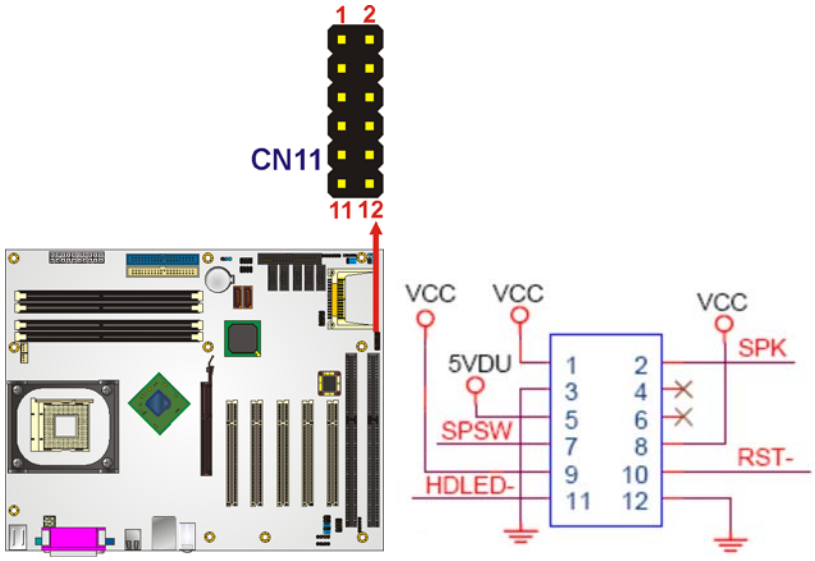


Figure 4-12: Front Panel Connector Pinout Locations

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC	2	SPK
3	GND	4	N/C
5	5 VDU	6	N/C
7	SPSW	8	VCC
9	VCC	10	RST-
11	HDLED-	12	GND

Table 4-13: Front Panel Connector Pinouts

4.2.12 IDE Connector (40-pin)

CN Label: **IDE1, IDE2**

CN Type: 40-pin box header (2x20)

CN Location: See **Figure 4-13**

CN Pinouts: See **Table 4-14**

One 40-pin IDE device connector on the IMBA-8650 supports connectivity to two hard disk drives.

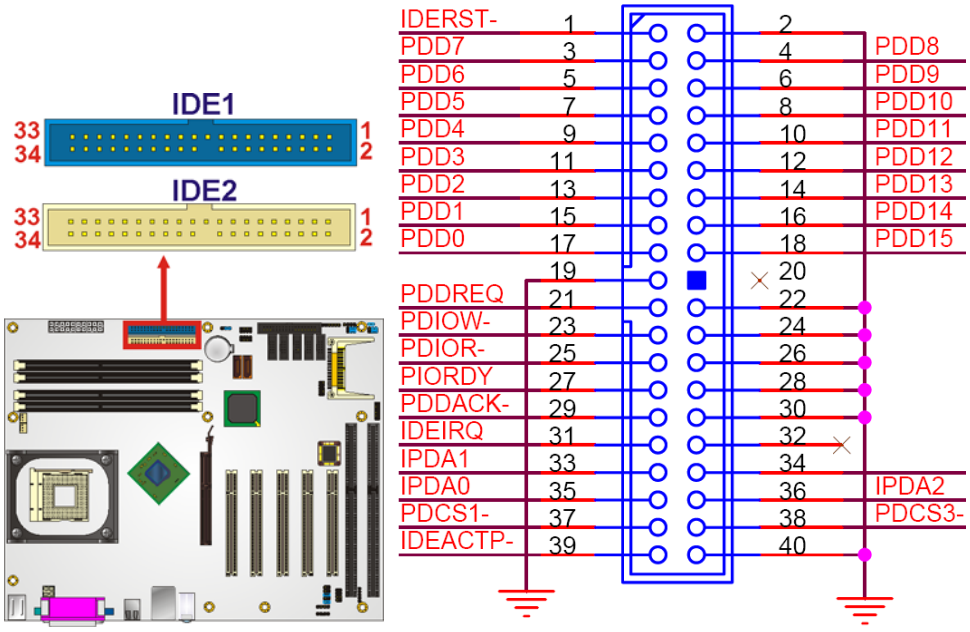


Figure 4-13: IDE Device Connector Locations

PIN	DESCRIPTION	PIN	DESCRIPTION
1	RESET#	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	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

Table 4-14: IDE Connector Pinouts

4.2.13 ISA Slot

CN Label: **ISA1, ISA2**

CN Type: ISA Slot

CN Location: See **Figure 4-14**

CN Pinouts: See **Table 4-17**

The ISA slot enables an ISA expansion module to be connected to the board.

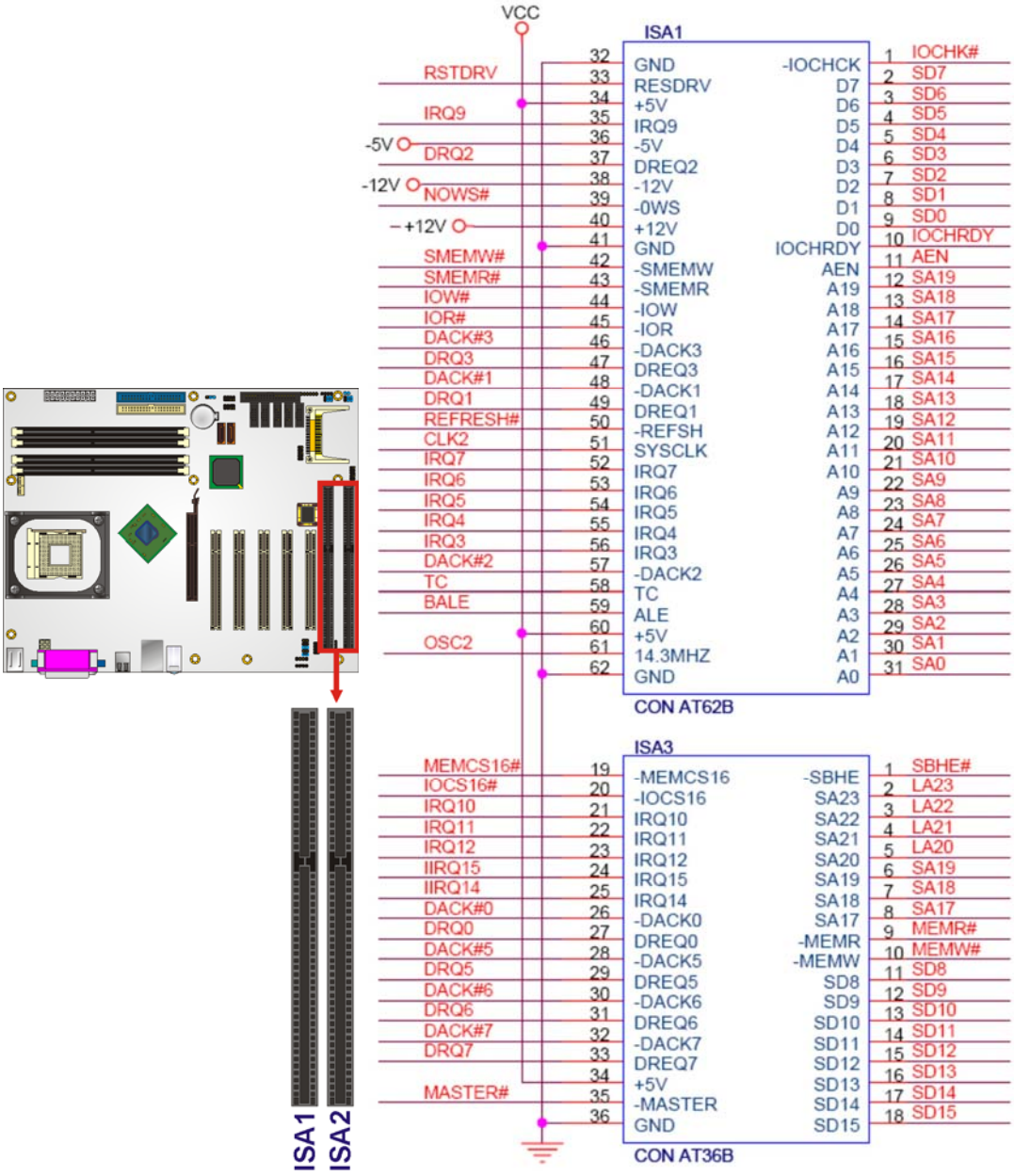


Figure 4-14: ISA Slot Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	IOCHK#	32	GND
2	SD7	33	RSTDRV
3	SD6	34	VCC
4	SD5	35	IRQ9
5	SD4	36	-5 V

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
6	SD3	37	DRQ2
7	SD2	38	-12 V
8	SD1	39	NOWS#
9	SD0	40	+12 V
10	IOCHRDY	41	GND
11	AEN	42	SMEMW#
12	SA19	43	SMEMR#
13	SA18	44	IOW#
14	SA17	45	IOR#
15	SA16	46	DACK#3
16	SA15	47	DRQ3
17	SA14	48	DACK#1
18	SA13	49	DRQ1
19	SA12	50	REFRESH#
20	SA11	51	CLK2
21	SA10	52	IRQ7
22	SA9	53	IRQ6
23	SA8	54	IRQ5
24	SA7	55	IRQ4
25	SA6	56	IRQ3
26	SA5	57	CACK#2
27	SA4	58	TC
28	SA3	59	BALE
29	SA2	60	VCC
30	SA1	61	OSC2
31	SA0	62	GND
1	SBHE#	19	MEMCS16#
2	LA23	20	IOCS16#
3	LA22	21	IRQ10
4	LA21	22	IRQ11
5	LA20	23	IRQ12

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
6	SA19	24	IIRQ15
7	SA18	25	IIRQ14
8	SA17	26	DACK#0
9	MEMR#	27	DRQ0
10	MEMW#	28	DACK#5
11	SD8	29	DRQ5
12	SD9	30	DACK#6
13	SD10	31	DRQ6
14	SD11	32	DACK#7
15	SD12	33	DRQ7
16	SD13	34	VCC
17	SD14	35	MASTER#
18	SD15	36	GND

Table 4-15: PCI Slot

4.2.14 Infrared Interface Connector (6-pin)

CN Label: **IR1**

CN Type: 6-pin header (1x5)

CN Location: See **Figure 4-15**

CN Pinouts: See **Table 4-16**

The infrared interface connector supports both Serial Infrared (SIR) and Amplitude Shift Key Infrared (ASKIR) interfaces.

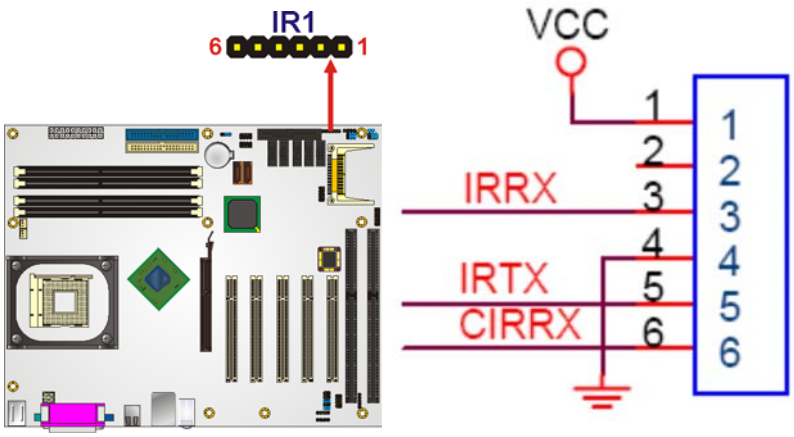


Figure 4-15: Infrared Connector Pinout Locations

PIN	DESCRIPTION
1	VCC
2	NC
3	IRRX
4	GND
5	IRTX
6	CIRRX

Table 4-16: Infrared Connector Pinouts

4.2.15 PCI Slot

CN Label: **PCI1 to PCI5**

CN Type: PCI Slot

CN Location: See **Figure 4-16**

CN Pinouts: See **Table 4-17**

The PCI slot enables a PCI expansion module to be connected to the board.

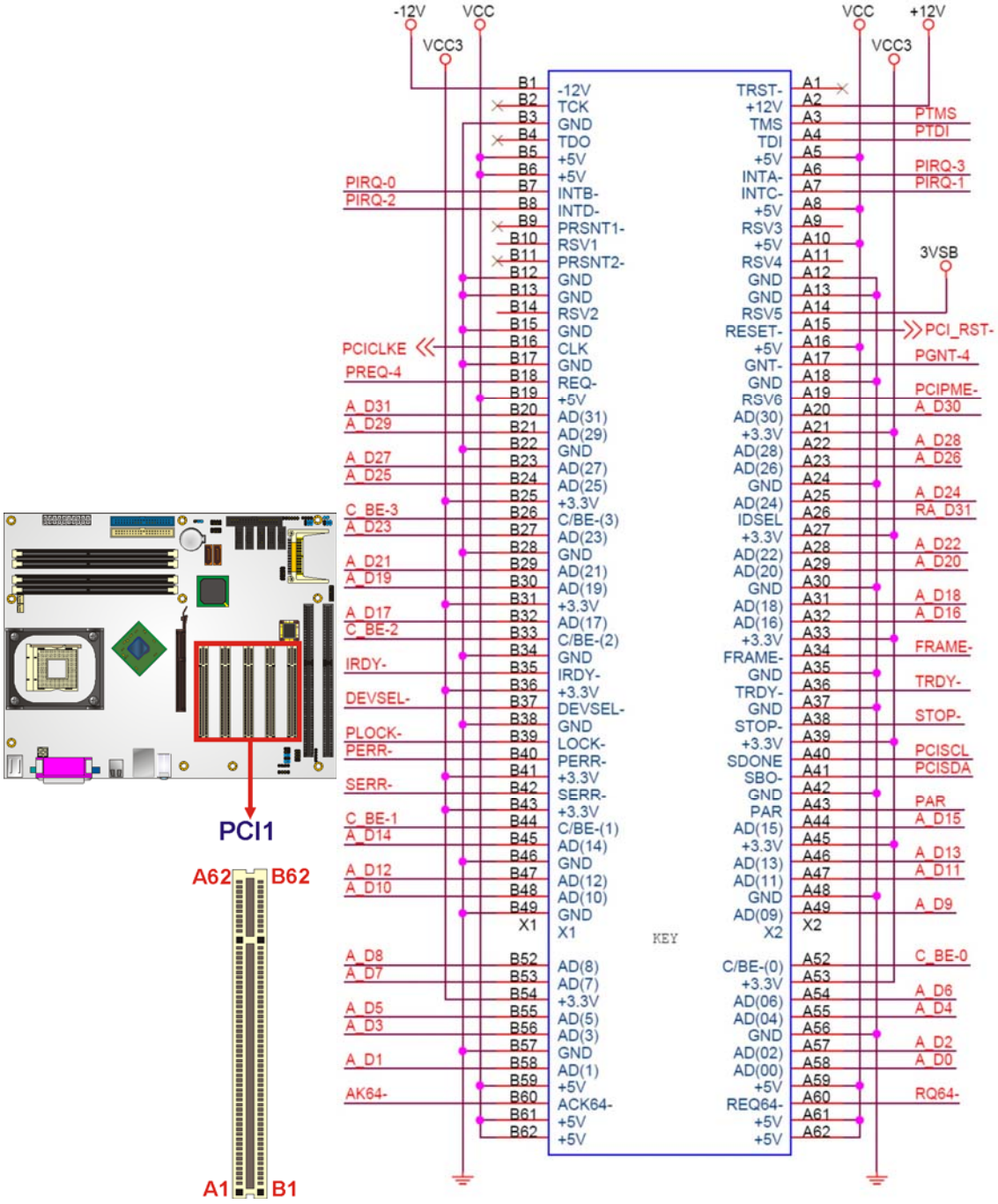


Figure 4-16: PCI Slot Location

PIN	DESCRIPTION	PIN	DESCRIPTION
A1	TRST-	B1	-12 V
A2	+12 V	B2	TCK

PIN	DESCRIPTION	PIN	DESCRIPTION
A3	TMS	B3	GND
A4	TDI	B4	TDO
A5	+5 V	B5	+5 V
A6	INTA-	B6	+5 V
A7	INTC-	B7	INTB
A8	+5 V	B8	INTD
A9	RESERVED3	B9	PRSNT1
A10	+5 V	B10	RESERVED1
A11	RESERVED4	B11	PRSNT2
A12	GND	B12	GND
A13	GND	B13	GND
A14	RSV5	B14	RESERVED2
A15	RST-	B15	GND
A16	+5 V	B16	CLK
A17	GNT-	B17	GND
A18	GND	B18	REQ
A19	RSV6	B19	+5 V
A20	AD30	B20	AD31
A21	+3.3 V	B21	AD29
A22	AD28	B22	GND
A23	AD26	B23	AD27
A24	GND	B24	AD25
A25	AD24	B25	+3.3 V
A26	IDSEL	B26	C/BE3
A27	+3.3 V	B27	AD23
A28	AD22	B28	GND
A29	AD20	B29	AD21
A30	GND	B30	AD19
A31	AD18	B31	+3.3 V
A32	AD16	B32	AD17
A33	+3.3 V	B33	C/BE2
A34	FRAME-	B34	GND

PIN	DESCRIPTION	PIN	DESCRIPTION
A35	GND	B35	IRDY
A36	TRDY-	B36	+3.3 V
A37	GND	B37	DEVSEL
A38	STOP-	B38	GND
A39	+3.3 V	B39	LOCK
A40	SDONE	B40	PERR
A41	SBO-	B41	+3.3 V
A42	GND	B42	SERR
A43	PAR	B43	+3.3 V
A44	AD15	B44	C/BE1
A45	+3.3 V	B45	AD14
A46	AD13	B46	GND
A47	AD11	B47	AD12
A48	GND	B48	AD10
A49	AD9	B49	GND
A50	KEY	B50	KEY
A51	KEY	B51	KEY
A52	C/BE0	B52	AD8
A53	+3.3 V	B53	AD7
A54	AD6	B54	+3.3 V
A55	AD4	B55	AD5
A56	GND	B56	AD3
A57	AD2	B57	GND
A68	AD0	B68	AD1
A59	+5 V	B59	+5 V
A60	REQ64	B60	ACK64
A61	+5 V	B61	+5 V
A62	+5 V	B62	+5 V

Table 4-17: PCI Slot

4.2.16 SATA Drive Connectors

CN Label:	**SATA1, SATA2**
CN Type:	7-pin SATA drive connectors
CN Location:	See **Figure 4-17**
CN Pinouts:	See **Table 4-18**

The SATA drive connectors are connected to SATA 1.5 Gb/s disk drives that transfer data at speeds as high as 1.5 Gb/s.

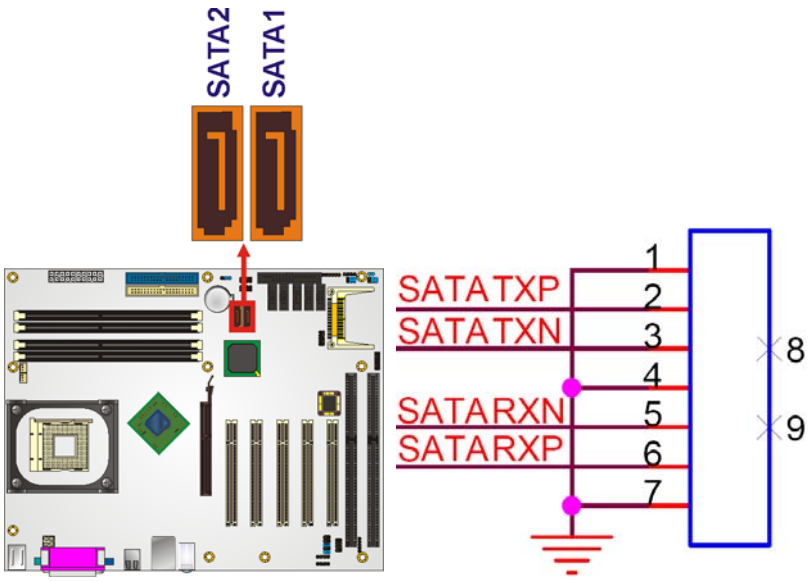


Figure 4-17: SATA Drive Connector Locations

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

Table 4-18: SATA Drive Connector Pinouts

4.2.17 Serial Port Connectors

CN Label:	**RS-232: COM2, COM4, COM5, COM6** **RS-232/422/485: COM3 (by jumper)**
CN Type:	10-pin box header (2x5)
CN Location:	See **Figure 4-18**
CN Pinouts:	See **Table 4-19**

The 10-pin COM2, COM4, COM5 and COM6 serial port connectors provide RS-232 serial communications channels that can be connected to external RS-232 serial port devices. The RS-232/422/485 COM3 signal type is controlled via the JP2 jumper and is shared with the CN12 connector. If jumpers JP2 and JP4 are set to RS-232, COM3 is used, if jumpers JP2 and JP4 are set to RS-422/485, CN12 is used.

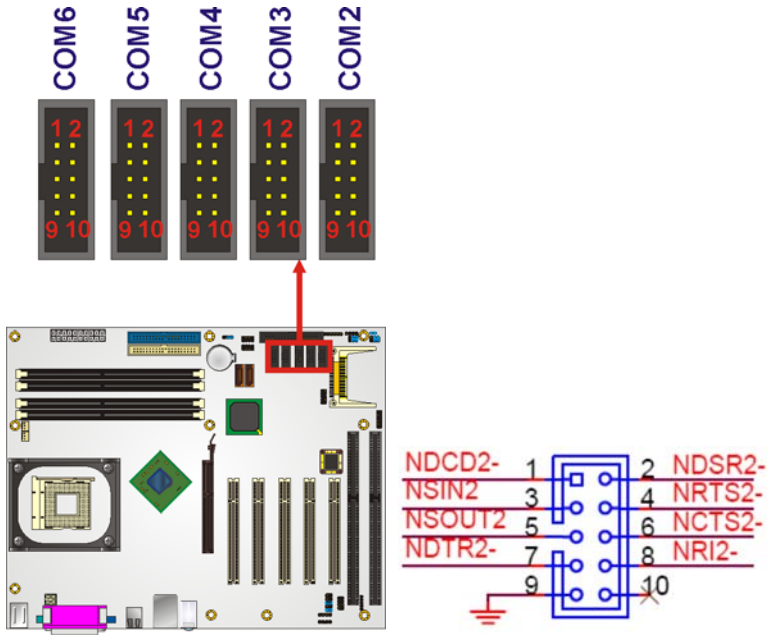


Figure 4-18: Serial Port Connector Pinout Locations

PIN	DESCRIPTION	PIN	DESCRIPTION
1	DCD-	2	DSR-
3	SIN	4	RTS-
5	SOUT	6	CTS-

PIN	DESCRIPTION	PIN	DESCRIPTION
7	DTR-	8	RI
9	GND	10	N/C

Table 4-19: Serial Port Connector Pinouts

4.2.18 Serial Port Connector (RS-422/485)

CN Label: **CN12**

CN Type: 4-pin header

CN Location: See **Figure 4-19**

CN Pinouts: See **Table 4-20**

The 4-pin serial port connector provides RS-422/485 serial communications channels that can be connected to external RS-422/485 serial port devices. The port is shared with the COM3 port. If jumpers JP2 and JP4 are set to RS-232, COM3 is used, if jumpers JP2 and JP4 are set to RS-422/485, CN12 is used.

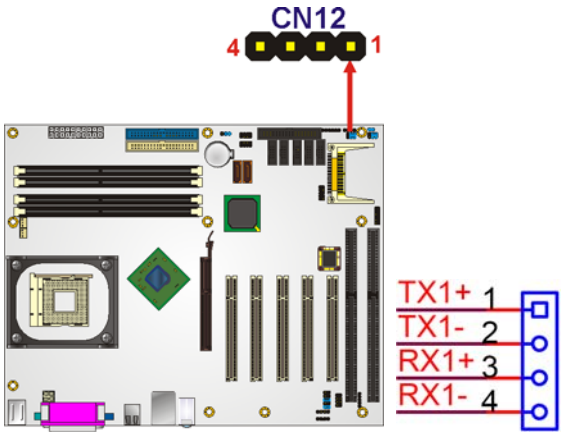


Figure 4-19: Serial Port Connector (RS-422/485) Pinout Locations

PIN	DESCRIPTION
1	TX1+
2	TX1-
3	RX1+

PIN	DESCRIPTION
4	RX1-

Table 4-20: Serial Port Connector (RS-422/485) Pinouts

4.2.19 SPDIF Connector

CN Label: **SPDIF1**

CN Type: 5-pin header

CN Location: See **Figure 4-20**

CN Pinouts: See **Table 4-21**

Use the SPDIF connector to connect digital audio devices to the system.

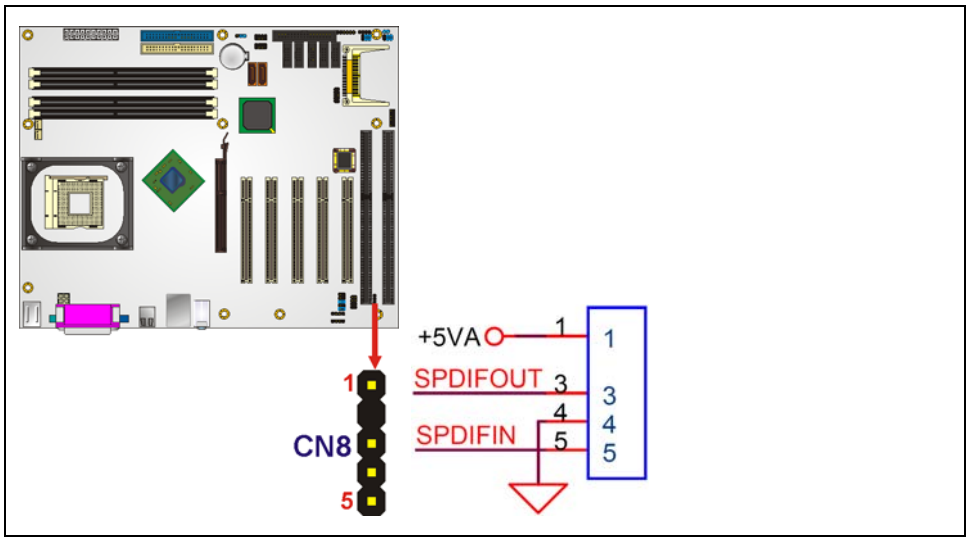


Figure 4-20: SPDIF Connector Pinout Locations

PIN	DESCRIPTION
1	VCC AUDIO
2	NC
3	SPDIF OUT
4	GND AUDIO
5	SPDIF IN

Table 4-21: SPDIF Connector Pinouts

4.2.20 USB Connectors (Internal)

CN Label:	**USB2, USB3**
CN Type:	8-pin header (2x4)
CN Location:	See **Figure 4-21**
CN Pinouts:	See **Table 4-22**

The 2x4 USB pin connectors each provide connectivity to two USB 1.1 or two USB 2.0 ports. Each USB connector can support two USB devices. Additional external USB ports are found on the rear panel. The USB ports are used for I/O bus expansion.

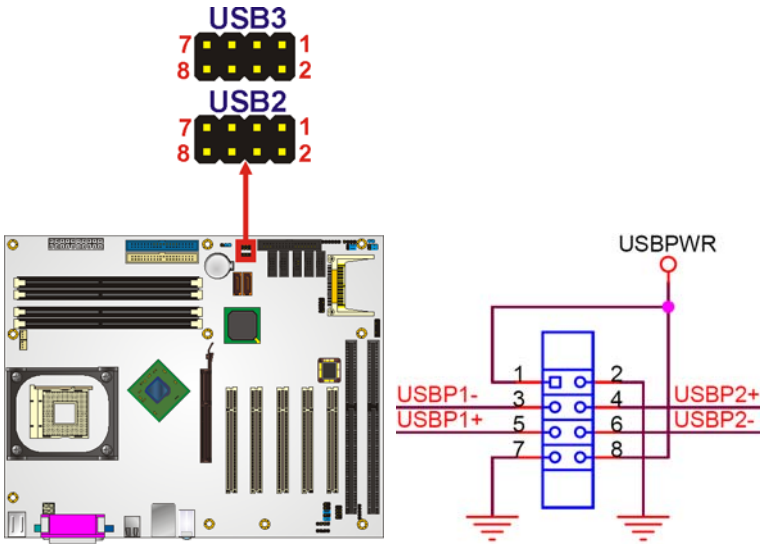


Figure 4-21: USB Connector Pinout Locations

PIN	DESCRIPTION	PIN	DESCRIPTION
1	PWR (+5 V)	2	GND
3	USBPA-	4	USBPB+
5	USBPA+	6	USBPB-
7	GND	8	PWR (+5 V)

Table 4-22: USB Port Connector Pinouts

4.3 External Peripheral Interface Connectors

The external peripheral interface connectors on the back panel are connected to devices externally when the IMBA-8650 is installed in a chassis. The peripheral connectors on the rear panel are:

- 1 x Keyboard/mouse connector
- 1 x Parallel port connector
- 1 x Serial port connector
- 1 x VGA connector
- 4 x USB 2.0 connectors
- 1 x RJ-45 Ethernet connector
- 3 x Audio jacks

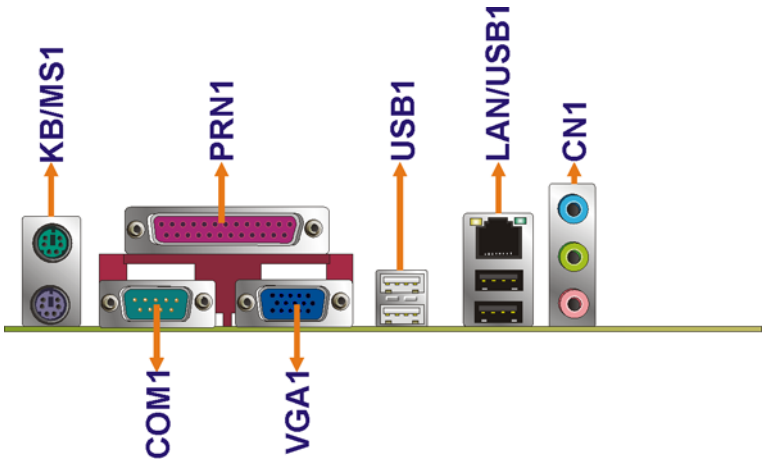


Figure 4-22: IMBA-8650 External Interface Connectors

4.3.1 Keyboard/Mouse Connector

CN Label:	**KB/MS1**
CN Type:	PS/2 connector
CN Location:	See **Figure 4-22**
CN Pinouts:	See **Figure 4-23** and **Table 4-23**

The IMBA-8650 keyboard and mouse connectors are standard PS/2 connectors.

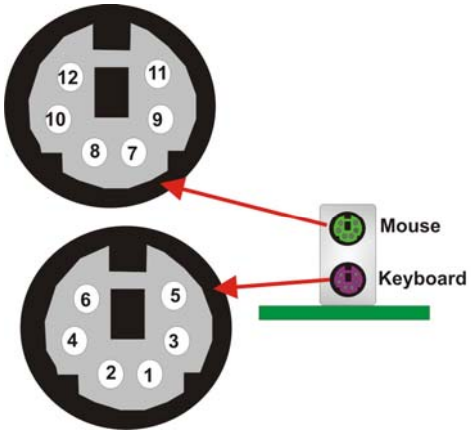


Figure 4-23: PS/2 Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	KBDA	7	MDA
2	N/C	8	N/C
3	GND	9	GND
4	5 V	10	5 V
5	KBCL	11	MCL
6	NC	12	NC

Table 4-23: PS/2 Connector Pinouts

4.3.2 Parallel Port Connector

CN Label: **PRN1**

CN Type: DB-25

CN Location: See **Figure 4-22**

CN Pinouts: See **Figure 4-24** and **Table 4-24**

These ports are usually connected to a printer. IMBA-8650 includes one on-board parallel ports accessed through one 25-pin D-type female connector.

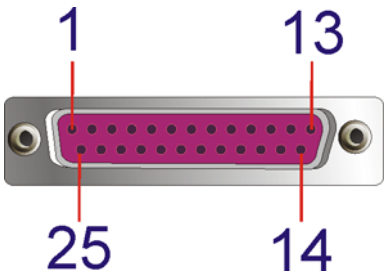


Figure 4-24: Parallel Port Connector Pinout Locations

PIN	Description	PIN	Description
1	STROBE#	2	DATA 0
3	DATA 1	4	DATA 2
5	DATA 3	6	DATA 4
7	DATA 5	8	DATA 6
9	DATA 7	10	ACKNOWLEDGE
11	BUSY	12	PAPER EMPTY
13	PRINTER SELECT	14	AUTO FORM FEED #
15	ERROR#	16	INITIALIZE
17	PRINTER SELECT LN#	18	GND
19	GND	20	GND
21	GND	22	GND
23	GND	24	GND
25	GND		

Table 4-24: Parallel Port Connector Pinouts

4.3.3 USB Connectors

CN Label: **USB1 and LAN/USB1**

CN Type: Dual USB port

CN Location: See **Figure 4-22**

CN Pinouts: See **Figure 4-25** and **Table 4-25**

USB devices connect directly to the USB connectors on the external peripheral connector panel.

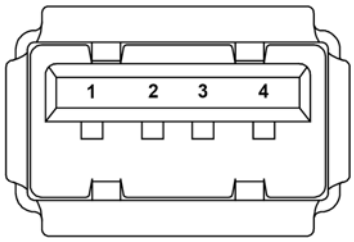


Figure 4-25: USB Connector Pinout Locations

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC	5	VCC
2	USBD0-	6	USBD0-
3	USBD0+	7	USBD0+
4	GND	8	GND

Table 4-25: USB Connector Pinouts

4.3.4 Ethernet Connector

CN Label: **LAN/USB1**

CN Type: RJ-45 ports

CN Location: See **Figure 4-22**

CN Pinouts: See **Figure 4-26**, **Table 4-26** and **Table 4-27**

A 1 Gb connection can be made between the Ethernet connectors and a Local Area Network (LAN) through a network hub.

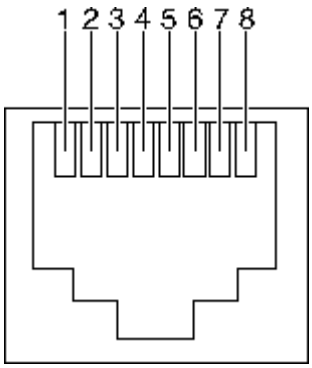


Figure 4-26: Ethernet Connector Pinout Locations

PIN	DESCRIPTION	PIN	DESCRIPTION
1	TX0+	7	TX3+
2	TX0-	8	TX3-
3	TX1+	9	Active +
4	TX1-	10	Active -
5	TX2+	11	LINK +
6	TX2-	12	LINK -

Table 4-26: Ethernet Connector Pinouts

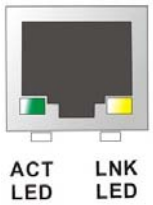


Figure 4-27: Ethernet Connector

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 (**Table 4-27**).

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

Table 4-27: Ethernet Connector LEDs

4.3.5 Audio Connectors

CN Label: **CN1**

CN Type: Audio jack

CN Location: See **Figure 4-22**

CN Pinouts: See **Table 4-28**

- **Line In port (Light Blue):** Connects a CD-ROM, DVD player, or other audio devices.
- **Speaker Out port (Lime):** Connects to a headphone or a speaker. With multi-channel configurations, this port can also connect to front speakers.
- **Microphone (Pink):** Connects a microphone.

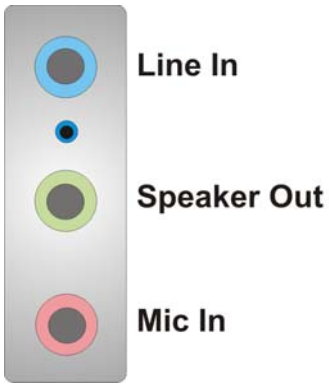


Figure 4-28: Audio Connector

4.3.6 VGA Connector

CN Label: **VGA1**

CN Type: HD-D-sub 15 Female connector

CN Location: See **Figure 4-22** (labeled 6)

CN Pinouts: See **Figure 4-29** and **Table 4-28**

The standard HD-D-sub 15 female connector connects to a CRT or LCD monitor.

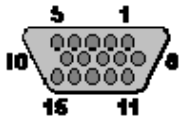


Figure 4-29: VGA Connector

PIN	Description	PIN	Description
1	RED	2	GREEN
3	BLUE	4	N/C
5	GND	6	GND
7	GND	8	GND

PIN	Description	PIN	Description
9	VCC	10	GND
11	N/C	12	DDC DAT
13	HSYNC	14	VSYNC
15	DDC CLK		

Table 4-28: VGA Connector Pinouts

4.3.7 Serial Communications Connector

CN Label: **COM1**

CN Type: D-sub 9 Male connector

CN Location: See **Figure 4-22**

CN Pinouts: See **Figure 4-30** and **Table 4-29**

The serial connector on the external interface panel provides serial connection in the RS-232 mode.

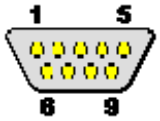


Figure 4-30: Serial Communications Connector Pinout Locations

PIN	DESCRIPTION
1	DATA CARRIER DETECT (DCD)
2	RECEIVE DATA (RXD)
3	TRANSMIT DATA (TXD)
4	DATA TERMINAL READY (DTR)
5	GROUND (GND)
6	DATA SET READY (DSR)
7	REQUEST TO SEND (RTS)
8	CLEAR TO SEND (CTS)
9	RING INDICATOR (RI)

Table 4-29: COM1 RS-232 Mode Connector Pinouts

4.4 On-board Jumpers

The IMBA-8650 has three on-board jumpers. Refer to **Section 5.3.4** for jumper configuration settings.

Chapter

5

Installation

5.1 Anti-static Precautions

WARNING!

Failure to take ESD precautions during the installation of the IMBA-8650 may result in permanent damage to the IMBA-8650 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the IMBA-8650. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the IMBA-8650, 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 IMBA-8650, place it on an antic-static pad. This reduces the possibility of ESD damage.
- ***Only handle the edges of the PCB***: When handling the PCB, hold it by its edges.

5.2 Installation Considerations

NOTE:

The following installation notices and installation considerations should be read and understood before the IMBA-8650 is installed. All installation notices pertaining to the installation of the IMBA-8650 should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the IMBA-8650 and injury to the person installing the motherboard.

5.2.1 Installation Notices

WARNING!

The installation instructions described in this manual should be carefully followed in order to prevent damage to the IMBA-8650 and injury to the user.

Before and during the installation please DO the following:

- **Read the user manual**:
  - The user manual provides a complete description of the IMBA-8650 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 IMBA-8650 on an antistatic pad**:
  - 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 IMBA-8650**:
  - When working with the IMBA-8650, 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 IMBA-8650 **DO NOT** do the following:

- **DO NOT** remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- **DO NOT** use the product before verifying all the cables and power connectors are properly connected.
- **DO NOT** allow screws to come in contact with the PCB circuit, connector pins, or its components.

5.2.2 Installation Checklist

The following checklist is provided to ensure the IMBA-8650 is properly installed.

- All the items in the packing list are present (see **Chapter 3**)
- A CPU is installed
- A CPU cooling kit is properly installed
- Compatible memory modules are properly inserted into the memory slots
- The IMBA-8650 is installed into a chassis with adequate ventilation
- The correct power supply is being used
- The following devices (if applicable) are properly connected
  - IDE devices
  - SATA drives
  - Floppy disk drive
  - System front panel connector
  - Audio kit
  - Power supply
  - USB cable
  - Serial port cable
  - Parallel port cable
  - Keyboard/mouse cable
  - COM port cables
  - AGP card
- The following external peripheral devices (if applicable) are properly connected to the chassis:
  - VGA screen
  - Keyboard
  - Mouse
  - USB devices
  - LAN
  - Audio jacks

5.3 CPU, CPU Cooling Kit and DIMM Installation

WARNING!

A CPU should never be turned on without the specified cooling kit being installed. If the cooling kit (heat sink and fan) is not properly installed and the system turned on, permanent damage to the CPU and other electronic components attached to the system may be incurred. Running a CPU without a cooling kit may also result in injury to the user.

The CPU, CPU cooling kit and DIMM are the most critical components of the IMBA-8650. If any of these components is not installed, the IMBA-8650 cannot operate.

5.3.1 Socket 478 CPU Installation

WARNING:

CPUs are expensive and sensitive components. When installing the CPU please be careful not to damage it in anyway. Make sure the CPU is installed properly and ensure the correct cooling kit is properly installed.

To install a socket 478 CPU onto the IMBA-8650, follow the steps below:

WARNING:

Hold the CPU by the sides. DO NOT touch the pins at the bottom of the CPU. Electrostatic discharge between pins could destroy the CPU.

Step 1: **Inspect the CPU socket.** Make sure there are no bent pins and make sure the socket contacts are free of foreign material. If any debris is found, remove it with compressed air.

Step 2: **Open the CPU socket lever**. Disengage the load lever by pressing the lever down and slightly outward to clear the retention tab. Rotate the load lever to a fully open position. See **Figure 5-1**.

Step 3: **Orientate the CPU properly**. Make sure the IHS (Integrated Heat Sink) side is facing upward. See **Figure 5-1**.

Step 4: **Correctly position the CPU.** Match the Pin 1 mark with the cut edge on the CPU socket. See **Figure 5-1**.

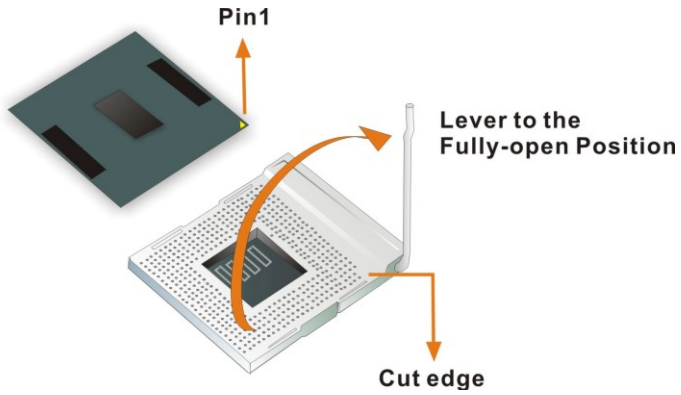


Figure 5-1: Install the CPU

Step 5: **Insert the CPU.** Gently insert the CPU into the socket. If the CPU pins are properly aligned, the CPU should slide into the CPU socket smoothly

Step 6: **Close the CPU socket.** Re-engage the load lever by pushing it back to its original position. Secure the load lever under the retention tab on the side of CPU socket.

5.3.2 Socket 478 Cooling Kit Installation

An IEI Socket 478 CPU cooling kit can be purchased separately. (See **Section** 3.3.2) The cooling kit comprises a CPU heat sink and a cooling fan.

WARNING:

Do not wipe off (accidentally or otherwise) the layer of thermal paste on the bottom of the heat sink. The thermal paste between the CPU and the heat sink is important for optimum heat dissipation.

To install the cooling kit, please follow the steps below.

Step 1: **Install the cooling kit bracket**. A cooling kit bracket is installed on the rear of the CPU card. Align the bracket with the four retention holes at the back of the CPU card. Once properly aligned, insert four retention screws from the front of the CPU card.

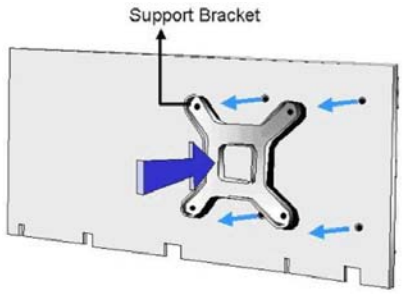


Figure 5-2: Cooling Kit Support Bracket

Step 2: **Open the lever at the top of the heat sink**. Lift the lever at the top of the cooling kit to loosen the cooling kit clamps.

Step 3: **Secure the cooling kit**. Gently place the heat sink and cooling kit onto the CPU. Make sure the hooks are properly secured to the bracket. To secure the cooling kit, close the top levers.

Step 4: **Connect the fan cable**. Connect the cooling kit fan cable to the fan connector on the IMBA-8650. Carefully route the cable and avoid heat generating chips and fan blades.

5.3.3 DIMM Installation

WARNING!

Using incorrectly specified DIMM may cause permanently damage the IMBA-8650. Please make sure the purchased DIMM complies with the memory specifications of the IMBA-8650. DIMM specifications compliant with the IMBA-8650 are listed in Chapter 2.

To install a DIMM into a DIMM socket, please follow the steps below and refer to **Figure 5-3**.

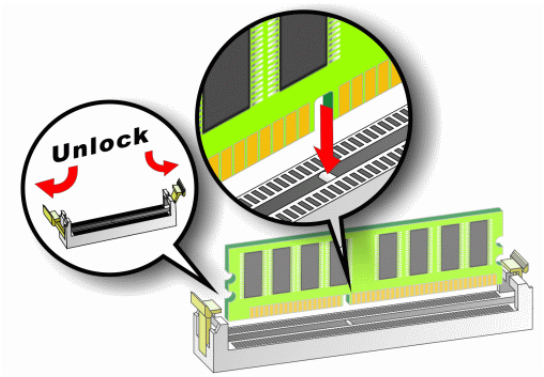


Figure 5-3: Installing a DIMM

Step 1: Open the DIMM socket handles. The DIMM socket has two handles that secure the DIMM into the socket. Before the DIMM can be inserted into the socket, the handles must be opened. See **Figure 5-3**.

Step 2: Align the DIMM with the socket. The DIMM must be oriented in such a way that the notch in the middle of the DIMM must be aligned with the plastic bridge in the socket. See **Figure 5-3**.

Step 3: Insert the DIMM. Once properly aligned, the DIMM can be inserted into the socket. As the DIMM is inserted, the white handles on the side of the socket will close automatically and secure the DIMM to the socket. See **Figure 5-3**.

Step 4: Removing a DIMM. To remove a DIMM, push both handles outward. The memory module is ejected by a mechanism in the socket.

5.3.4 CF Card Installation

NOTE:

The IMBA-8650 can support both CF Type I cards and CF Type II cards. For the complete specifications of the supported CF cards please refer to Chapter 2.

To install the a CF card (Type 1 or Type 2) onto the IMBA-8650, please follow the steps below:

Step 1: **Locate the CF card socket**. Place the IMBA-8650 on an anti-static pad with the solder side facing up. Locate the CF card.

Step 2: **Align the CF card**. Make sure the CF card is properly aligned with the CF socket.

Step 3: **Insert the CF card**. Gently insert the CF card into the socket making sure the socket pins are properly inserted into the socket. See **Figure 5-4**.

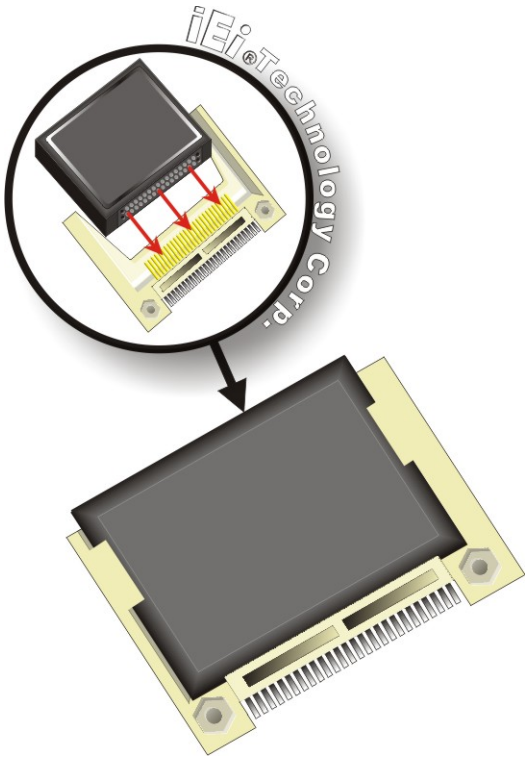


Figure 5-4: CF Card Installation

5.4 Jumper Settings

NOTE:

A jumper is a metal bridge used to close an electrical circuit. It consists of two or three 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.

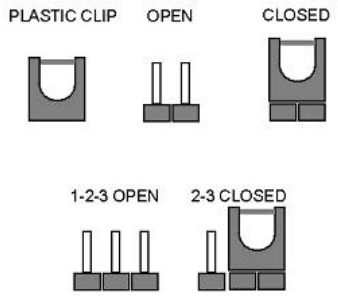


Figure 5-5: Jumper Locations

Before the IMBA-8650 is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the IMBA-8650 are listed in **Table 5-1**.

Description	Label	Type
CF Master/Slave Selection	JP3	2-pin header
Clear CMOS	JP1	3-pin header
COM3 RS-232/422/485 Selection	JP2	6-pin header
COM3 RS-422/485 Selection	JP4	6-pin header

Table 5-1: Jumpers

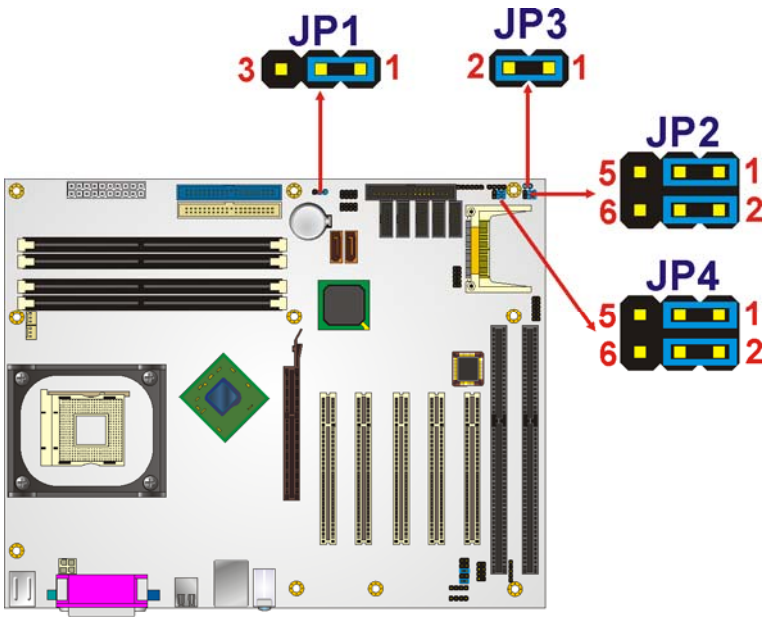


Figure 5-6: Jumper Locations

5.4.1 CF Master/Slave Selection

Jumper Label: **JP3**

Jumper Type: 2-pin header

Jumper Settings: See **Table 5-2**

Jumper Location: See **Figure 5-6**

The CF Master/Slave Selection jumper sets the CF Type I card or CF Type II cards as either the slave device or the master device. CF Master/Slave Selection jumper settings are shown in **Table 5-2**.

Pins	Description	
Open	Slave	
Short	Master	Default

Table 5-2: CF Master/Slave Selection Settings

5.4.2 Clear CMOS Jumper

Jumper Label: **JP1**

Jumper Type: 3-pin header

Jumper Settings: See **Table 5-3**

Jumper Location: See **Figure 5-6**

If the IMBA-8650 fails to boot due to improper BIOS settings, the clear CMOS jumper clears the CMOS data and resets the system BIOS information. To do this, use the jumper cap to close pins 2 and 3 for a few seconds then reinstall the jumper clip back to pins 1 and 2.

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.

The clear CMOS jumper settings are shown in **Table 5-3**.

Pins	Description	
Short 1 - 2	Keep CMOS Setup	Default

Pins	Description	
Short 2 – 3	Clear CMOS Setup	

Table 5-3: Clear CMOS Jumper Settings

5.4.3 COM3 RS-232/422/485 Selection

To set the communication protocol for COM3, both jumpers should be set to the required communication mode.

5.4.3.1 COM3 RS-232/422/485 Jumper

Jumper Label: **JP2**

Jumper Type: 6-pin header

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

Jumper Location: See **Figure 5-6**

This jumper selects the COM3 communication protocol. The COM3 jumper settings are shown in **Table 5-4**.

Pins	Description	
1-2	RS-232	Default
3-4	RS-422	
5-6	RS-485	

Table 5-4: COM3 RS-232/422/485 Selection

5.4.3.2 COM3 RS-422/485 Jumper

Jumper Label: **JP4**

Jumper Type: 6-pin header

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

Jumper Location: See **Figure 5-6**

When RS-422 or RS-485 is selected. This jumper selects the COM3 communication protocol. The COM3 jumper settings are shown in **Table 5-5**.

Pins	Description	
1-3, 2-4	RS-422	Default
3-5, 4-6	RS-485	

Table 5-5: COM3 RS-422/485 Selection

5.5 Chassis Installation

5.5.1 Airflow

WARNING!

Airflow is critical to the cooling of the CPU and other onboard components. The chassis into which the IMBA-8650 is placed must have air vents to allow proper airflow to cool the system components.

The IMBA-8650 must be installed in a chassis with ventilation holes on the sides allowing airflow to travel over the heat sink surface. In a system with an individual power supply unit, the cooling fan of a power supply can also help generate airflow over the board surface.

NOTE

IEI has a wide range of chassis available. Please contact your IMBA-8650 vendor, reseller or an IEI sales representative at sales@iei.com.tw or visit the IEI website (http://www.ieiworld.com.tw) to find out more about available chassis.

5.6 Internal Peripheral Device Connections

5.6.1 Peripheral Device Cables

The cables listed in **Table 5-6** are shipped with the IMBA-8650.

Quantity	Type
1	ATA 66/100 flat cable
2	Dual RS-232 cables
1	Single RS-232 cable
1	Dual RS-422/485 cable
2	SATA drive cables
1	SATA drive power cable

Table 5-6: IEI Provided Cables

5.6.2 ATA Flat Cable Connection

The ATA 66/100 flat cable connects to an IDE device. Follow the instructions below to connect an IDE HDD to the IMBA-8650.

Step 4: Locate the IDE connector. The locations of the IDE device connectors are shown in Chapter 3.

Step 5: Insert the connector. Connect the IDE cable connector to the onboard connector. See **Figure 5-7**. A key on the front of the cable connector ensures it can only be inserted in one direction.

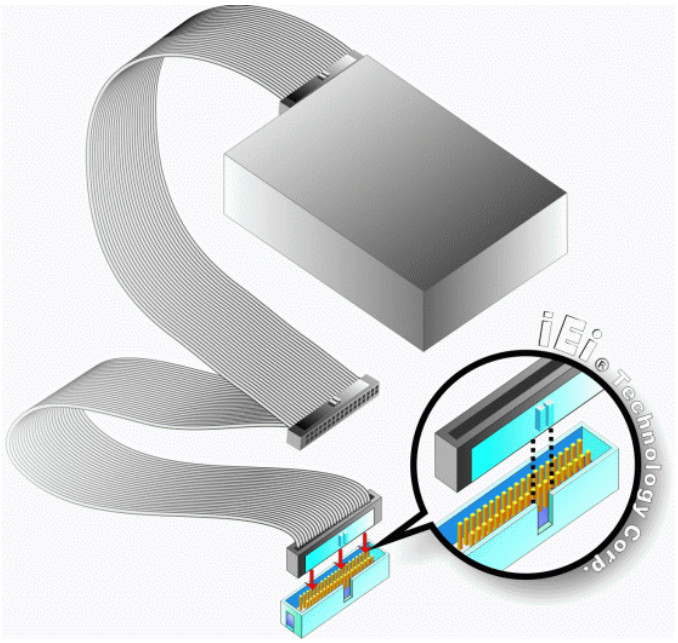


Figure 5-7: IDE Cable Connection

Step 6: Connect the cable to an IDE device. Connect the two connectors on the other side of the cable to one or two IDE devices. Make sure that pin 1 on the cable corresponds to pin 1 on the connector

5.6.3 Dual RS-232 Cable with Slot Bracket

The dual RS-232 cable consists of two serial port connectors attached to a serial communications cable that is then attached to two bracket mounted D-sub 9 male connectors. To install the dual RS-232 cable, please follow the steps below.

Step 1: Locate the connector. The location of the RS-232 connector is shown in Chapter 3.

Step 2: Insert the cable connector. Insert the connectors into the serial port box headers. See **Figure 5-8**. A key on the front of the cable connectors ensures the connectors can only be installed in one direction.

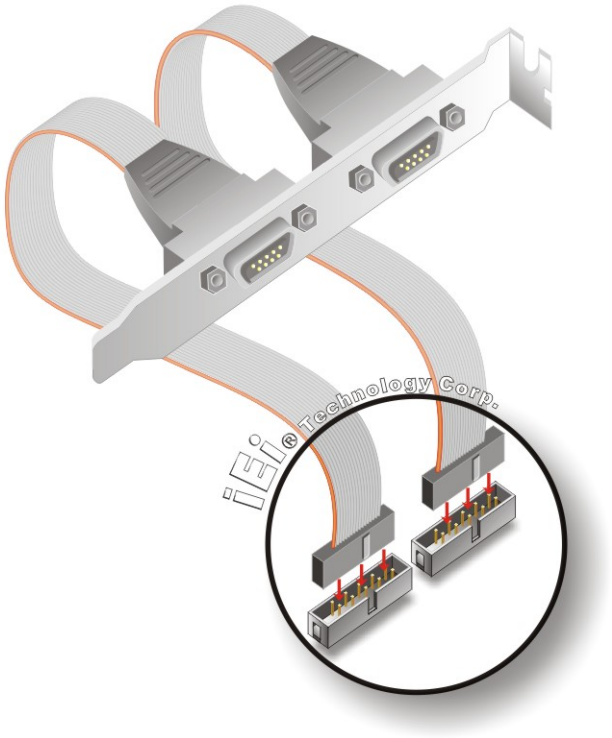


Figure 5-8: Dual RS-232 Cable Installation

Step 3: Secure the bracket. The dual RS-232 connector has two D-sub 9 male connectors secured to a bracket. To secure the bracket to a chassis please refer to the reference material that came with the chassis.

5.6.4 Single RS-232 Cable with Slot Bracket

The single RS-232 cable consists of one serial port connectors attached to a serial communications cable that is then attached to a D-sub 9 male connector that is mounted onto a bracket. To install the single RS-232 cable, please follow the steps below.

Step 1: **Locate the connector**. The location of the RS-232 connector is shown in **Chapter 3**.

Step 2: **Insert the cable connector**. Insert the connector into the serial port box header. See **Figure 5-8**. A key on the front of the cable connectors ensures the connector can only be installed in one direction.

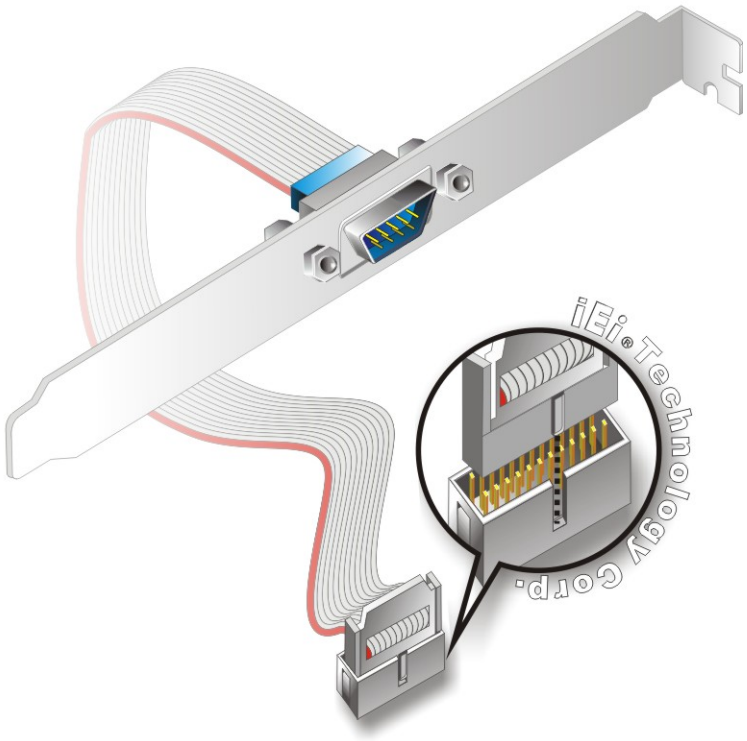


Figure 5-9: Single RS-232 Cable Installation

Step 3: **Secure the bracket**. The single RS-232 connector has one D-sub 9 male connector secured to a bracket. To secure the bracket to the chassis please refer to the reference material that came with the chassis

5.6.5 FDD Cable Connection

The FDD flat cable connects to the IMBA-8650 to one FDD device. To connect an FDD to the IMBA-8650 please follow the instructions below.

Step 1: **Locate the FDD connector**. The location of the FDD device connector is shown in **Chapter 3**.

Step 2: **Insert the connector**. Connect the FDD cable connector to the on-board connector. See **Figure 5-10**. A key on the front of the cable connector ensures it can only be inserted in one direction.

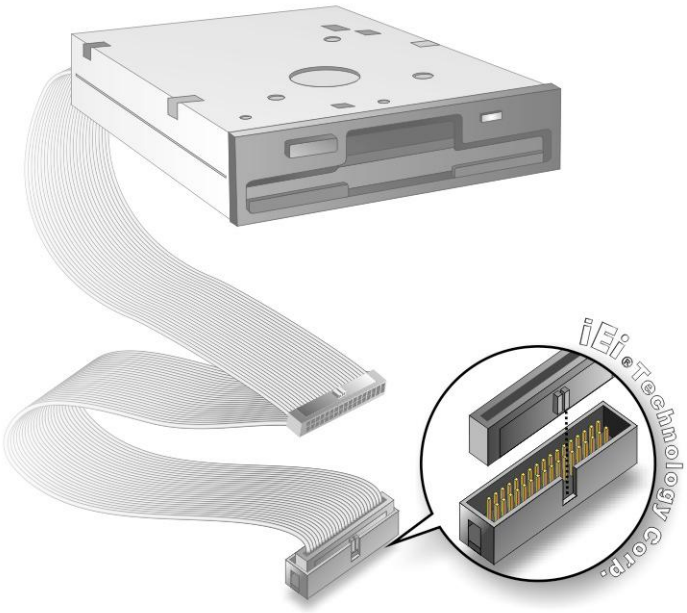


Figure 5-10: FDD Cable Connection

Step 3: **Connect the cable to an FDD device**. Connect the connector at the other end of the cable to an FDD device. Make sure that pin 1 on the cable corresponds to pin 1 on the connector.

5.6.6 SATA Drive Connection

The IMBA-8650 is shipped with SATA drive cables and SATA drive power cable. Follow the steps below to connect the SATA drives to the motherboard.

Step 1: Locate the connectors. The locations of the SATA drive connectors are shown in Chapter 3.

Step 2: Insert the cable connector. Press the clip on the connector at the end of the SATA cable and insert the cable connector into the onboard SATA drive connector. See **Figure 5-11**.

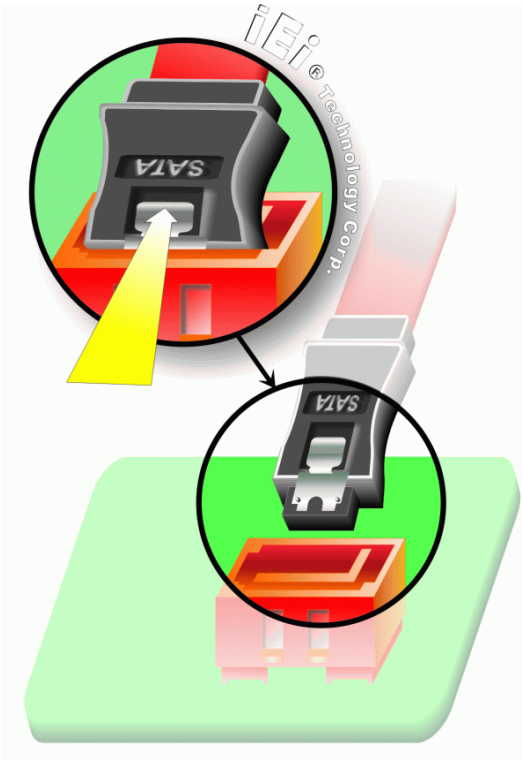


Figure 5-11: SATA Drive Cable Connection

Step 3: Connect the cable to the SATA disk. Connect the connector on the other end of the cable to the connector at the back of the SATA drive. See **Figure 5-12**.

Step 4: Connect the SATA power cable. Connect the SATA power connector to the back of the SATA drive. See **Figure 5-12**.

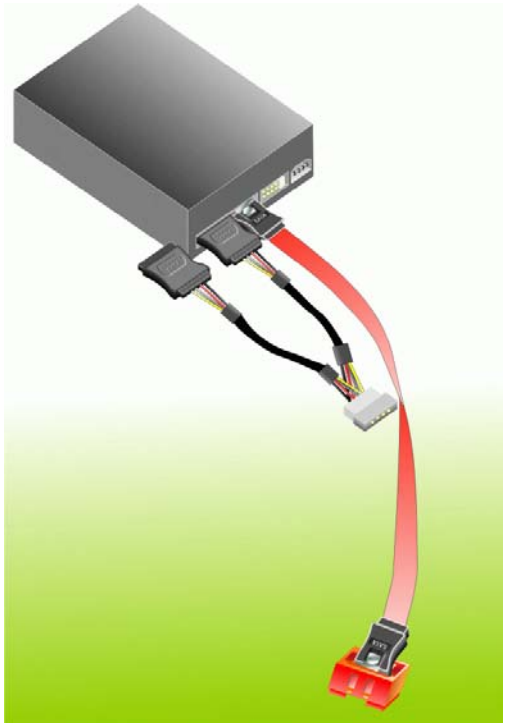


Figure 5-12: SATA Power Drive Connection

5.6.7 USB Cable (Dual Port) with Slot Bracket

The IMBA-8650 is shipped with a dual port USB 2.0 cable. To connect the USB cable connector, please follow the steps below.

Step 5: **Locate the connectors**. The locations of the USB connectors are shown in **Chapter 3**.

WARNING:

If the USB pins are not properly aligned, the USB device can burn out.

Step 6: **Align the connectors**. The cable has two connectors. Correctly align pin 1on each cable connector with pin 1 on the IMBA-8650 USB connector.

Step 7: **Insert the cable connectors** Once the cable connectors are properly aligned with the USB connectors on the IMBA-8650, connect the cable connectors to the onboard connectors. See **Figure 5-13**.

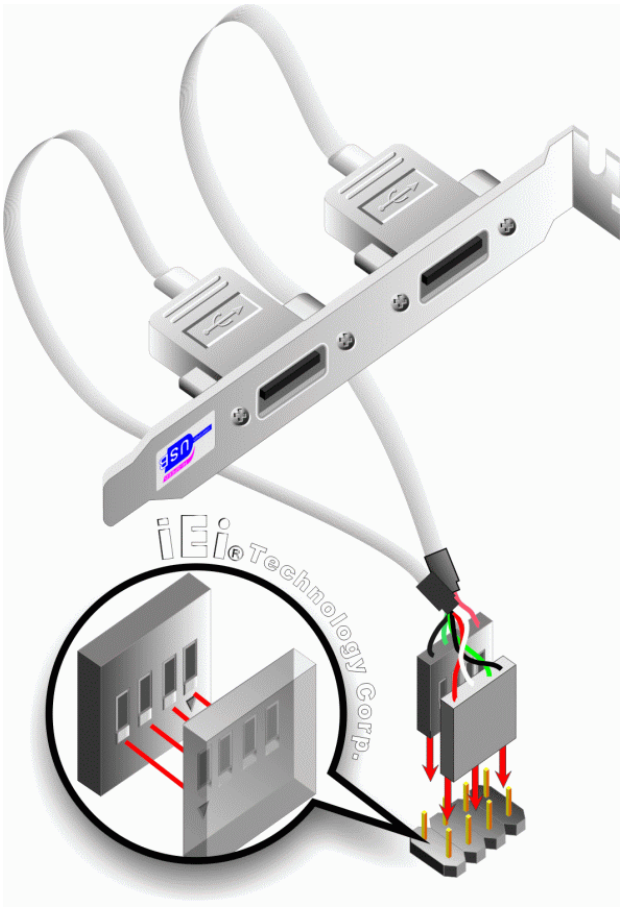


Figure 5-13: Dual USB Cable Connection

Step 8: **Attach the bracket to the chassis**. The USB 2.0 connectors are attached to a bracket. To secure the bracket to the chassis please refer to the installation instructions that came with the chassis.

5.7 External Peripheral Interface Connection

The following external peripheral devices can be connected to the external peripheral interface connectors.

- Mouse and keyboard

- Parallel devices
- RJ-45 Ethernet cable connectors
- USB devices
- Audio devices
- VGA monitor
- Serial devices

To install these devices, connect the corresponding cable connector from the actual device to the corresponding IMBA-8650 external peripheral interface connector making sure the pins are properly aligned.

5.7.1 PS/2 Keyboard/Mouse Connection

The IMBA-8650 has a dual PS/2 connector on the external peripheral interface panel. The dual PS/2 connector is used to connect to a keyboard and mouse to the system. Follow the steps below to connect a keyboard and mouse to the IMBA-8650.

Step 1: Locate the dual PS/2 connector. The location of the dual PS/2 connector is shown in Chapter 3.

Step 2: Insert the keyboard/mouse connector. Insert a PS/2 keyboard or mouse connector into the appropriate PS/2 connector on the external peripheral interface connector. See **Figure 5-14**.

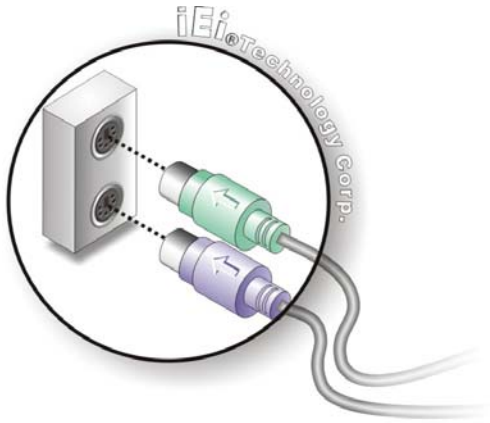


Figure 5-14: PS/2 Keyboard/Mouse Connector

5.7.2 Parallel Device Connection

The IMBA-8650 has a single female DB-25 connector on the external peripheral interface panel for parallel devices. Follow the steps below to connect a parallel device to the IMBA-8650.

Step 3: Locate the DB-25 connector. The location of the DB-25 connector is shown in **Chapter 3**.

Step 4: Insert the DB-25 connector. Insert the DB-25 connector of a parallel device into the DB-25 connector on the external peripheral interface. See **Figure 5-15**.

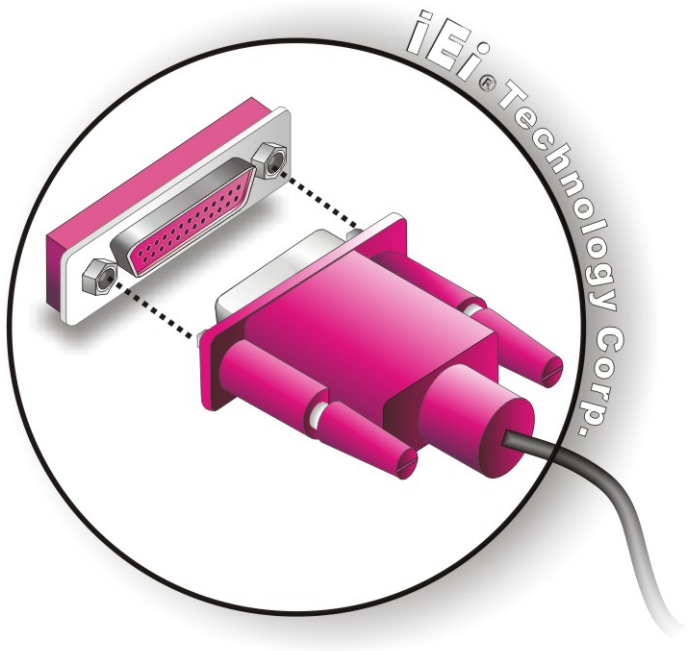


Figure 5-15: Parallel Device Connector

Step 5: Secure the connector. Secure the DB-25 connector to the external interface by tightening the two retention screws on either side of the connector.

5.7.3 RJ-45 Ethernet Connection

The IMBA-8650 has one RJ-45 Ethernet connector on the external peripheral interface panel for LAN communications. Follow the steps below to connect an RJ-45 Ethernet connector to the IMBA-8650.

Step 1: Locate the RJ-45 connector. The location of the RJ-45 connector is shown in **Chapter 3**.

Step 2: Insert an RJ-45 plug. Insert the RJ-45 plug of a LAN into the RJ-45 receptacle on the external peripheral interface. See **Figure 5-16**.

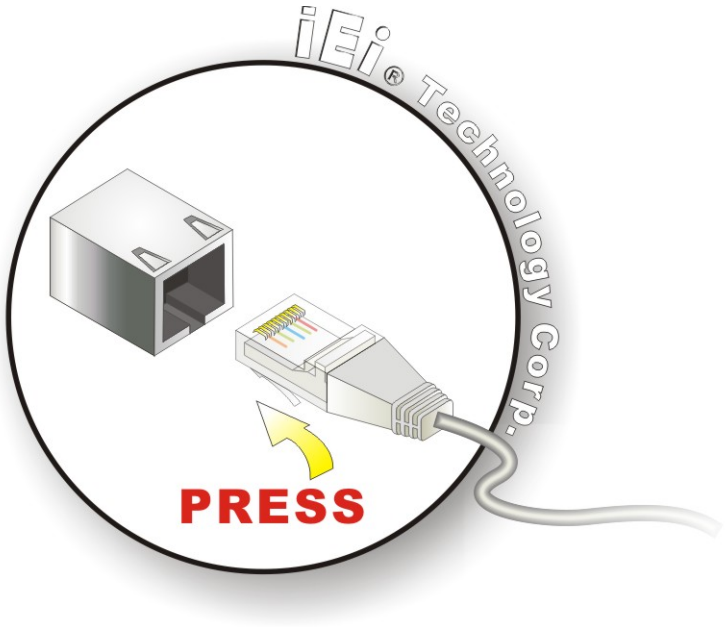


Figure 5-16: RJ-45 Ethernet Connector

5.7.4 USB Connection

The external USB Series "A" receptacle connectors provide easier and quicker access to external USB devices. Follow the steps below to connect USB devices to the IMBA-8650.

Step 3: Locate the USB Series "A" receptacle connectors. The location of the USB Series "A" receptacle connectors are shown in **Chapter 3**.

Step 4: Insert a USB Series "A" plug. Insert the USB Series "A" plug of a device into the USB Series "A" receptacle on the external peripheral interface. See **Figure 5-17**.

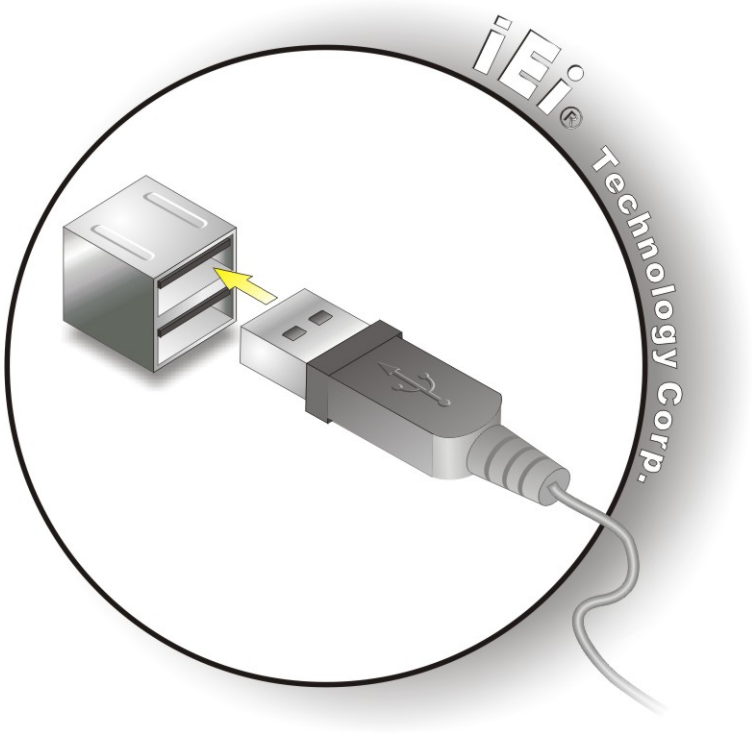


Figure 5-17: USB Connector

5.7.5 Audio Connection

Audio signals are interfaced through three phone jack connections. The red phone jack is for Mic In, blue is for Line In and green is for Speaker Out. Follow the steps below to connect audio devices to the IMBA-8650.

Step 5: Locate the audio phone jacks. The location of the audio phone jacks are shown in **Chapter 3**.

Step 6: Insert audio phone jack plugs. Insert audio phone jack plugs into the audio phone jacks on the external peripheral interface. See **Figure 5-18**.

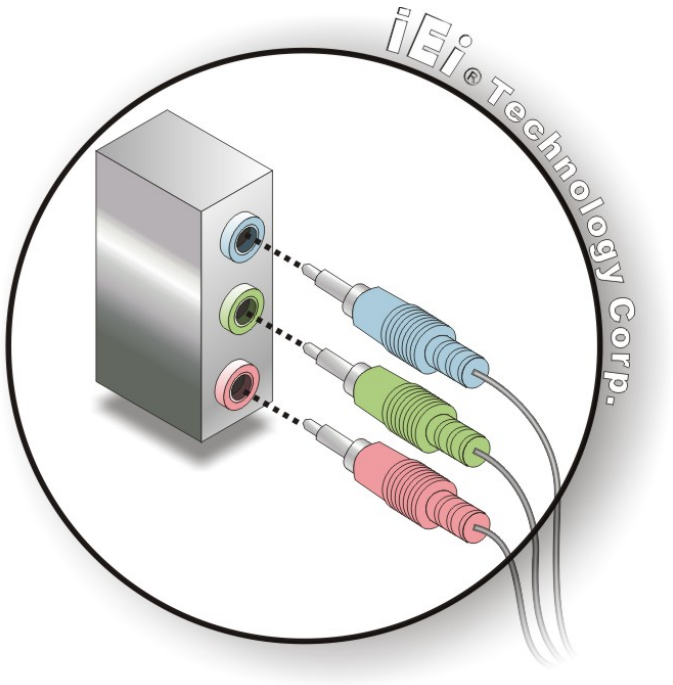


Figure 5-18: Audio Connectors

5.7.6 VGA Monitor Connection

The IMBA-8650 has a single female DB-15 connector on the external peripheral interface panel for a VGA monitor. Follow the steps below to connect a VGA monitor to the IMBA-8650.

Step 7: Locate the DB-15 connector. The location of the DB-15 connector is shown in **Chapter 3**.

Step 8: Insert the VGA connector. Insert the DB-15 connector of a VGA monitor into the DB-15 connector on the external peripheral interface. See **Figure 5-19**.

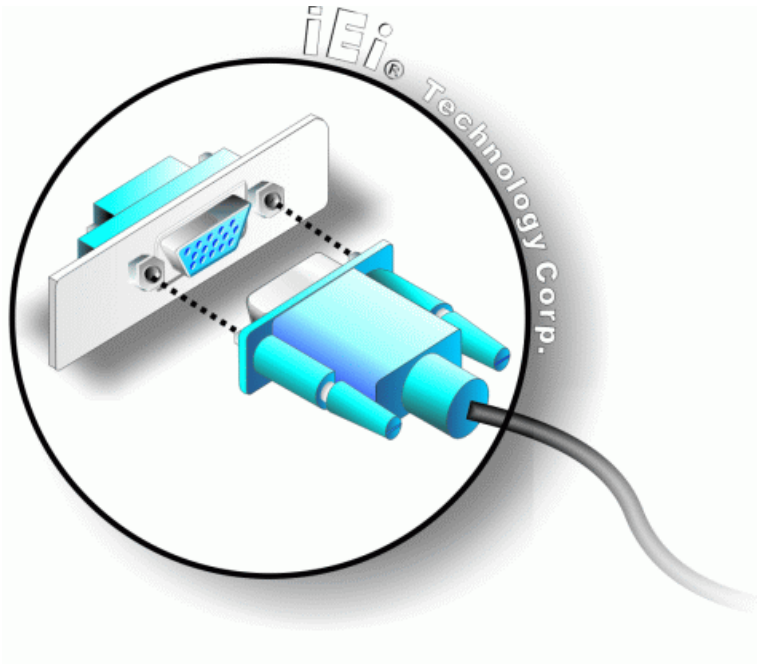


Figure 5-19: VGA Connector

Step 9: Secure the connector. Secure the VGA connector to the external interface by tightening the two retention screws on either side of the connector.

5.7.7 Serial Device Connection

The IMBA-8650 has a single female DB-9 connector on the external peripheral interface panel for a serial device. Follow the steps below to connect a serial device to the IMBA-8650.

Step 1: Locate the DB-9 connector. The location of the DB-9 connector is shown in **Chapter 3**.

Step 2: Insert the serial connector. Insert the DB-9 connector of a serial device into the DB-9 connector on the external peripheral interface. See **Figure 5-20**.

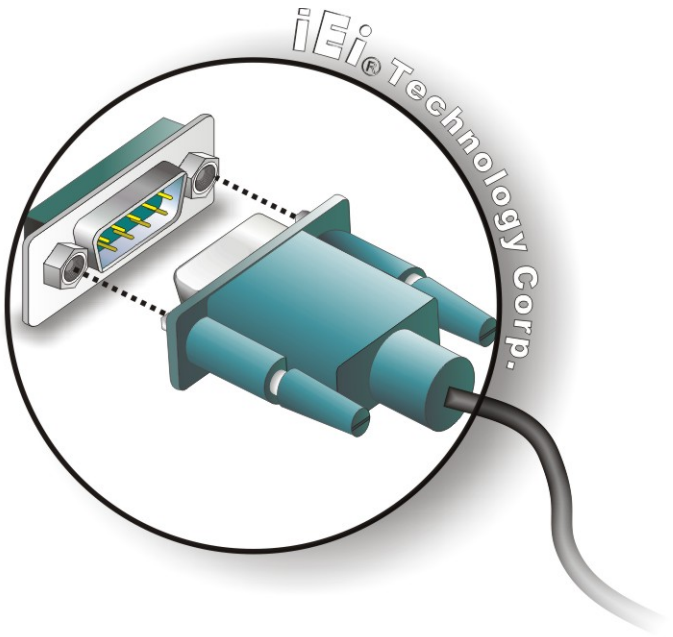


Figure 5-20: Serial Device Connector

Step 3: Secure the connector. Secure the serial device connector to the external interface by tightening the two retention screws on either side of the connector.

Chapter

6

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 do not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu

Key	Function
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

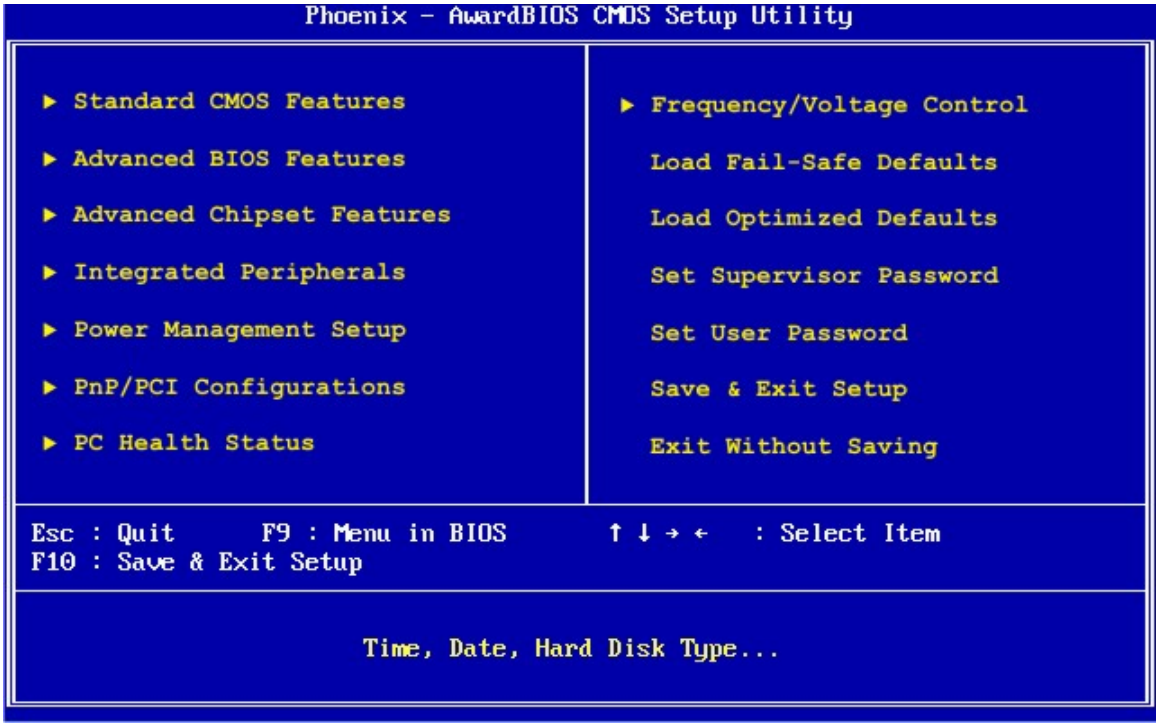
When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

6.1.4 Unable to Reboot After Configuration Changes

If the system cannot be booted after changes are made, restore the CMOS defaults. The CPU card should come with a restore CMOS settings jumper. Refer to **Section 5.4.2** for more information.

6.1.5 Main BIOS Menu

Once the BIOS opens, the **Main Menu** (**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**: Configures power saving options.
- **PnP/PCI Configurations**: Changes the advanced PCI/PnP settings.
- **PC Health Status**: Monitors essential system parameters.

- **Frequency/Voltage Control**: Changes voltage and frequency 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 Password**

Use the **Set Password** option to set the password. By default, no password is set. To install a 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**

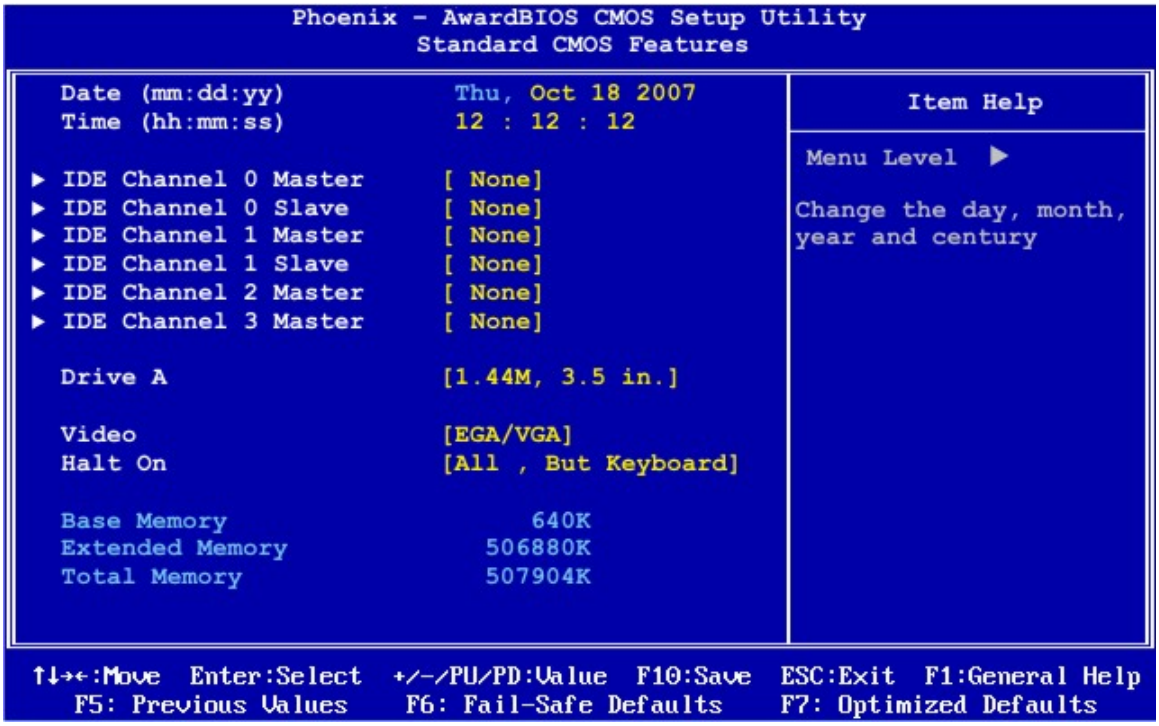
Use the **Save & Exit Setup** option to save any configuration changes made and exit the BIOS menus.

- **Exit Without Saving**

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

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

- **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 Channel x**

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 Channel 0 Master

- IDE Channel 0 Slave
- IDE Channel 1 Master
- IDE Channel 1 Slave
- IDE Channel 2 Master
- IDE Channel 3 Master

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 BIOS configuration options is selected, the IDE configuration options shown in **Section 6.2.1** appear.

- **Drive A/B [1.44M, 3.5 in.]**

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

- None (Default for Drive B)
- 360K, 5.25 in.
- 1.2M, 5.25 in.
- 720K, 3.5 in.
- 1.44M, 3.5in (Default for Drive A)
- 2.88M, 3.5 in.

- **Video [EGA/VGA]**

Use the **Video** option to specify what type of monitor is attached to the VGA port.

➔	**EGA/VGA**	**DEFAULT**	The screen is an EGA/VGA monitor
➔	**CGA 40**		The screen is a CGA 40 monitor
➔	**CGA 80**		The screen is a CGA 80 monitor
➔	**MONO**		The screen is a monochrome monitor

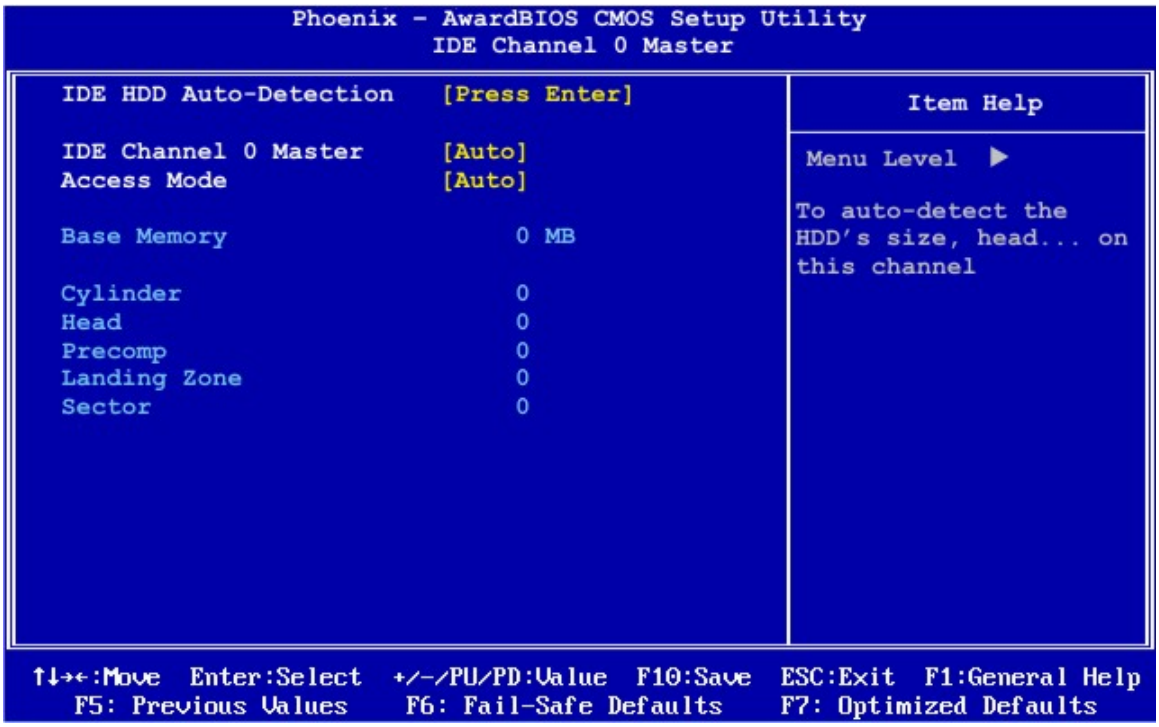
- **Halt On [All, But Keyboard]**

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.

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 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 1 Slave
- Channel 2 Master
- Channel 3 Master

➔ **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 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 504 MB.

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

➔ **Large** This mode is an extended ECHS mode and while it supports HDDs larger than 504 MB, 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**

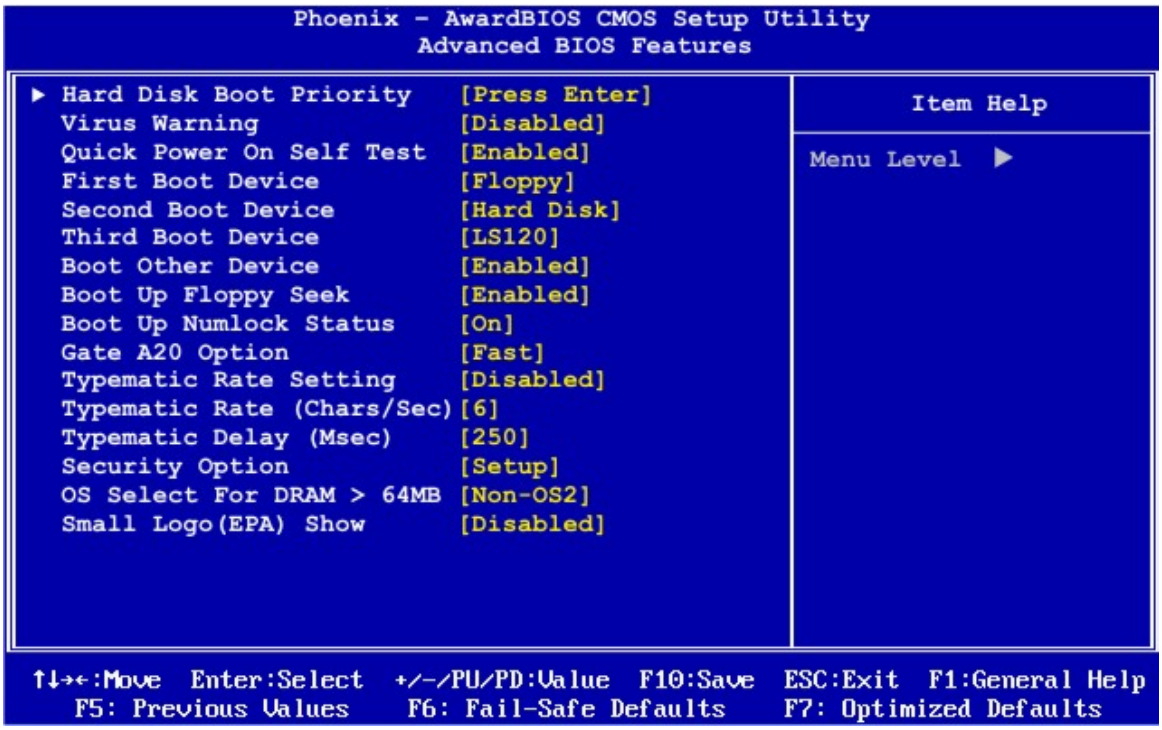
The **Landing Zone** specification indicates where the disk head will park itself after the system powers off.

- **Sector**

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

6.3 Advanced BIOS Features

Use the **Advanced BIOS Features** menu (**BIOS Menu 4**) to configure the CPU and peripheral device configuration options.



BIOS Menu 4: Advanced BIOS Features

- **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 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: Floppy]
- **Second Boot Device** [Default: HDD-0]
- **Third Boot Device** [Default: LS-120]

Using the default values, the system first looks for a FDD to boot from. If it cannot find an FDD, it boots from a HDD. If both the FDD and the HDD are unavailable, the system boots from a LS-120 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 [Enabled]**

The **Boot Up Floppy Seek** option enables testing of the floppy drives to determine if they have 40 or 80 tracks.

➔ **Disabled**		Floppy drives are not tested
➔ **Enabled**	**DEFAULT**	Floppy drives are tested

- **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]**

The **Gate A20 Option** BIOS option is a legacy option for choosing how Gate A20 is controlled.

➔ **Fast**	**DEFAULT**	The chipset controls Gate A20
➔ **Normal**		A pin in the keyboard controller controls Gate A20

- **Typematic Rate Setting [Disabled]**

The **Typematic Rate Setting** adjusts the repeat rate and repeat delay of the keyboard when a key is pressed.

➔ **Disabled**	**DEFAULT**	The keyboard repeat and delay rates cannot be adjusted, but can be set within the operating system.
➔ **Enabled**		The keyboard repeat and delay rates can be adjusted in the BIOS.

If the **Typematic Rate Setting** is enabled the following options can be set.

  - **Typematic Rate (Chars/Sec)** [6]

- **Typematic Delay (Msec)** [250]

- **Security Option [Setup]**

The **Security Option** limits 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.

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

Use the **OS Select For DRAM > 64 MB** for systems using the OS2 operating system and more than 64 MB of RAM.

➔ **Non-OS2** **DEFAULT** Select this option for all operating systems except OS2 operating systems with more than 64 MB of RAM

➔ **OS2** Select this option for an OS2 operating system with more than 64 MB of RAM

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

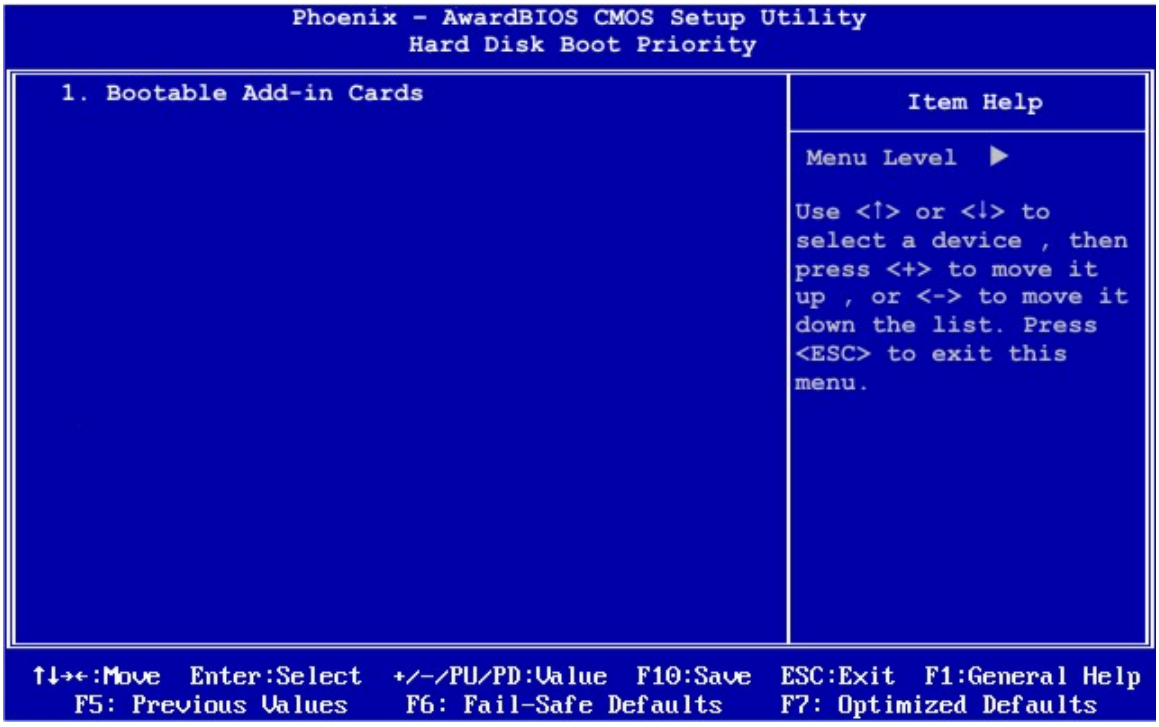
Use the **Small Logo(EPA) Show** BIOS option to control the display of the EPA logo.

➔ **Enabled** The EPA logo is displayed on the bootup screen

➔ **Disabled** **DEFAULT** The EPA is not displayed on the bootup screen

6.3.1 Hard Disk Boot Priority

Use the **Hard Disk Boot Priority** menu (**BIOS Menu 5**) to set the priority of the hard disks connected to the system.

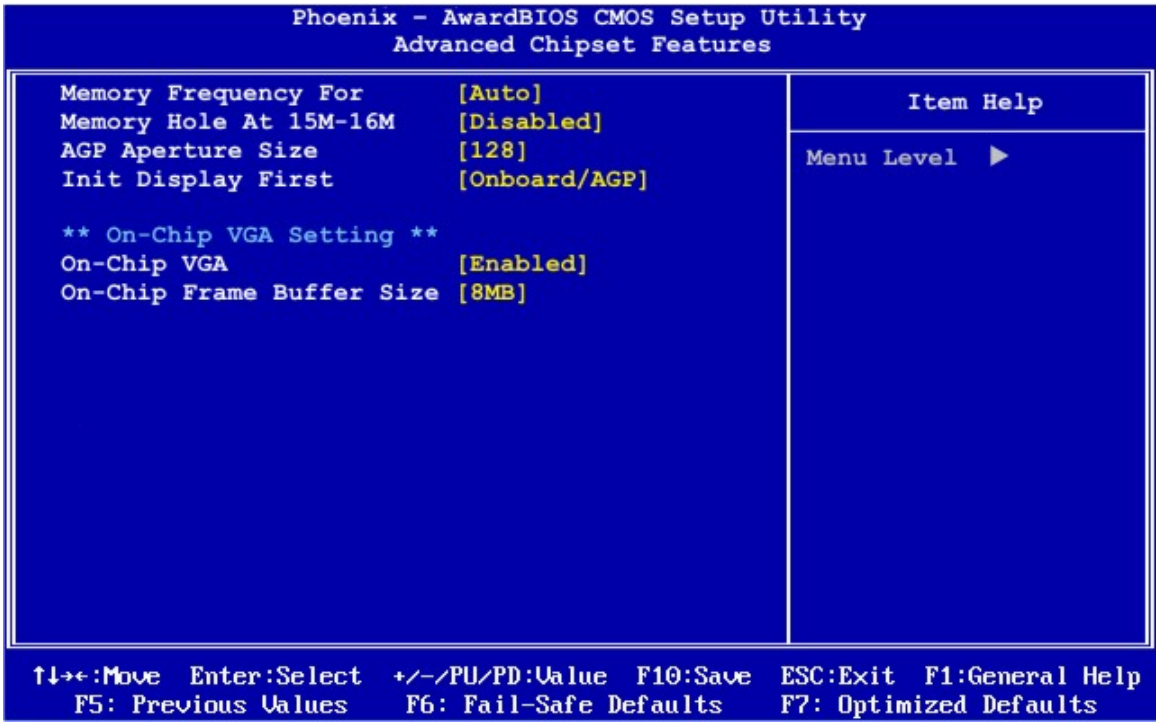


BIOS Menu 5: Hard Disk Boot Priority

Use the Up and Down keys to highlight an item and use the + and – keys to move the highlighted item up or down the list.

6.4 Advanced Chipset Features

Use the **Advanced Chipset Features** menu (**BIOS Menu 6**) to change chipset configuration options.



BIOS Menu 6: Advanced Chipset Features

- **Memory Frequency For [Auto]**

The **DRAM Frequency** option specifies the DRAM frequency or allows the system to automatically detect the DRAM frequency.

➔	**266 MHz**		Sets the DRAM frequency to 266 MHz
➔	**320 MHz**		Sets the DRAM frequency to 320 MHz
➔	**400 MHz**		Sets the DRAM frequency to 400 MHz
➔	**Auto**	**DEFAULT**	Automatically selects the DRAM frequency

- **Memory Hole at 15M-16M [Disabled]**

The **Memory Hole at 15M-16M** option reserves 1 MB or memory from the 15th to 16th megabyte for use by an ISA card. Most ISA cards to not need this option set. Only enable if it is absolutely required by an ISA card attached to the system.

➔	**Enabled**		1 MB of RAM is reserved for an ISA card
➔	**Disabled**	**DEFAULT**	No RAM is reserved for an ISA card

- **AGP Aperture Size [128 MB]**

The **AGP Aperture Size** option selects the size of the AGP aperture. The aperture is a portion of the PCI memory address range dedicated as graphics memory address space.

➔	**4 MB**		Graphics aperture size set as 4 MB
➔	**8 MB**		Graphics aperture size set as 8 MB
➔	**16 MB**		Graphics aperture size set as 16 MB
➔	**32 MB**		Graphics aperture size set as 32 MB
➔	**64 MB**		Graphics aperture size set as 64 MB
➔	**128 MB**	**DEFAULT**	Graphics aperture size set as 128 MB
➔	**256 MB**		Graphics aperture size set as 256 MB

- **Init. Display First [PCI Slot]**

The **Init. Display First** option selects the graphics controller the system uses as a primary boot device. The options are:

  - PCI Slot
  - Onboard/AGP
  - AGP

- **On-Chip VGA [Enabled]**

Use the **On-Chip VGA** option to enable or disable the VGA function of the system chipset.

➔ **Enabled** **DEFAULT** The onboard VGA is enabled.

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

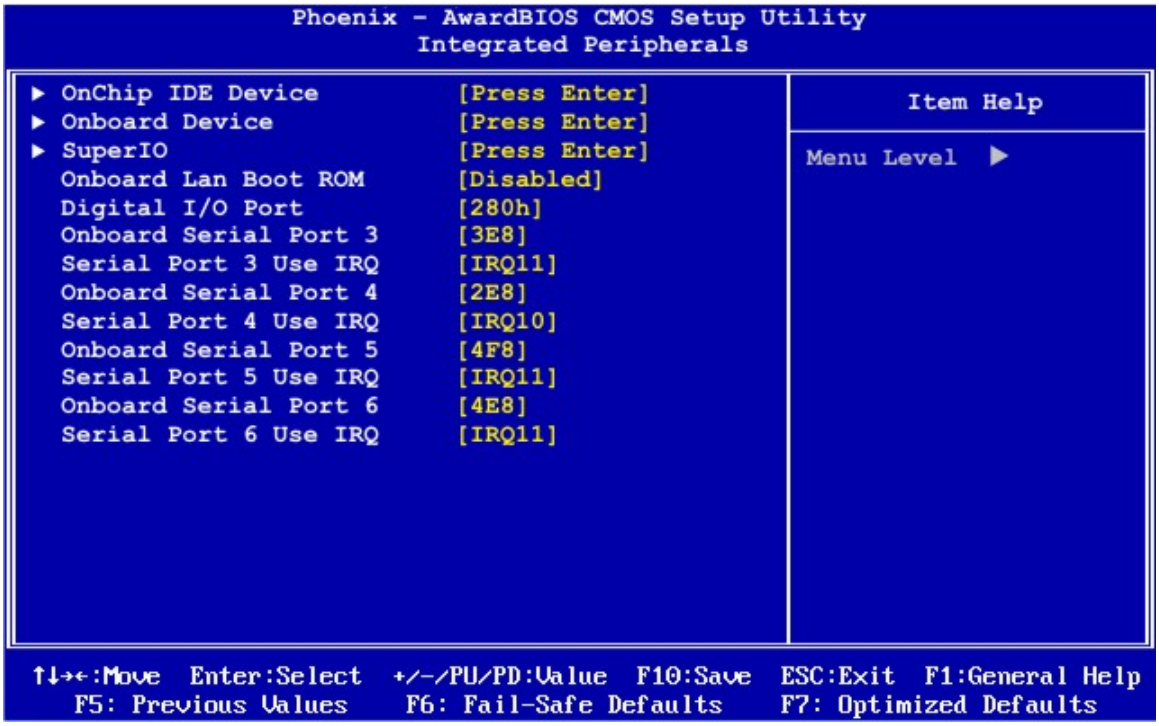
- **On-Chip Frame Buffer Size [8 MB]**

The **On-Chip Frame Buffer Size** option selects how much system memory is allocated to the onboard graphics controller. The options are:

- 1 MB
- 8 MB (Default)
- 16 MB

6.5 Integrated Peripherals

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



BIOS Menu 7: Integrated Peripherals

Three menu options allow configuration of the onboard chipsets. The three options are:

- OnChip IDE Device
- Onboard Device
- SuperIO

- **Onboard LAN Boot ROM [Disabled]**

The **BOOT From LAN Support** option enables the system to be booted from a remote system.

➔ **Disabled**	**DEFAULT**	Cannot be booted from a remote system through the LAN
➔ **Enabled**	**DEFAULT**	Can be booted from a remote system through the LAN

- **Onboard Serial Port 3 [3E8]**

This option allows BIOS to select the base addresses for Serial Port 3

➔ **Disabled**		No base address is assigned to Serial Port 3
➔ **3F8**		Serial Port 3 base address is 3F8
➔ **2F8**		Serial Port 3 base address is 2F8
➔ **3E8**	**DEFAULT**	Serial Port 3 base address is 3E8
➔ **2E8**		Serial Port 3 base address is 2E8

- **Serial Port 3 Use IRQ [IRQ11]**

The Serial Port 3 IRQ selection sets the serial port 3 interrupt address

➔ **IRQ3**	IRQ3 is assigned as the serial port 3 interrupt address
➔ **IRQ4**	IRQ4 is assigned as the serial port 3 interrupt address
➔ **IRQ5**	IRQ5 is assigned as the serial port 3 interrupt address
➔ **IRQ9**	IRQ9 is assigned as the serial port 3 interrupt address
➔ **IRQ10**	IRQ10 is assigned as the serial port 3 interrupt address

→ **IRQ11** **DEFAULT** IRQ11 is assigned as the serial port 3 interrupt address

- **Onboard Serial Port 4 [2E8]**

This option allows BIOS to select the base addresses for Serial Port 4

→ **Disabled** No base address is assigned to Serial Port 4

→ **3F8** Serial Port 4 base address is 3F8

→ **2F8** Serial Port 4 base address is 2F8

→ **3E8** Serial Port 4 base address is 3E8

→ **2E8** **DEFAULT** Serial Port 4 base address is 2E8

- **Serial Port 4 Use IRQ [IRQ10]**

The Serial Port 4 IRQ selection set the serial port 4 interrupt address

→ **IRQ3** IRQ3 is assigned as the serial port 4 interrupt address

→ **IRQ4** IRQ4 is assigned as the serial port 4 interrupt address

→ **IRQ5** IRQ5 is assigned as the serial port 4 interrupt address

→ **IRQ9** IRQ9 is assigned as the serial port 4 interrupt address

→ **IRQ10** **DEFAULT** IRQ10 is assigned as the serial port 4 interrupt address

→ **IRQ11** IRQ11 is assigned as the serial port 4 interrupt address

- **Onboard Serial Port 5 [4F8]**

This option allows BIOS to select the base addresses for Serial Port 5

→ **Disabled** No base address is assigned to Serial Port 5

→ **4F8** **DEFAULT** Serial Port 5 base address is 4F8

→ **4E8** Serial Port 5 base address is 4E8

- **Serial Port 5 Use IRQ [IRQ11]**

  The Serial Port 5 IRQ selection sets the serial port 5 interrupt address

➔ **IRQ3**		IRQ3 is assigned as the serial port 5 interrupt address
➔ **IRQ4**		IRQ4 is assigned as the serial port 5 interrupt address
➔ **IRQ5**		IRQ5 is assigned as the serial port 5 interrupt address
➔ **IRQ9**		IRQ9 is assigned as the serial port 5 interrupt address
➔ **IRQ10**		IRQ10 is assigned as the serial port 5 interrupt address
➔ **IRQ11**	**DEFAULT**	IRQ11 is assigned as the serial port 5 interrupt address

- **Onboard Serial Port 6 [4E8]**

  This option allows BIOS to select the base addresses for Serial Port 6

➔ **Disabled**		No base address is assigned to Serial Port 6
➔ **4F8**		Serial Port 6 base address is 4F8
➔ **4E8**	**DEFAULT**	Serial Port 6 base address is 4E8

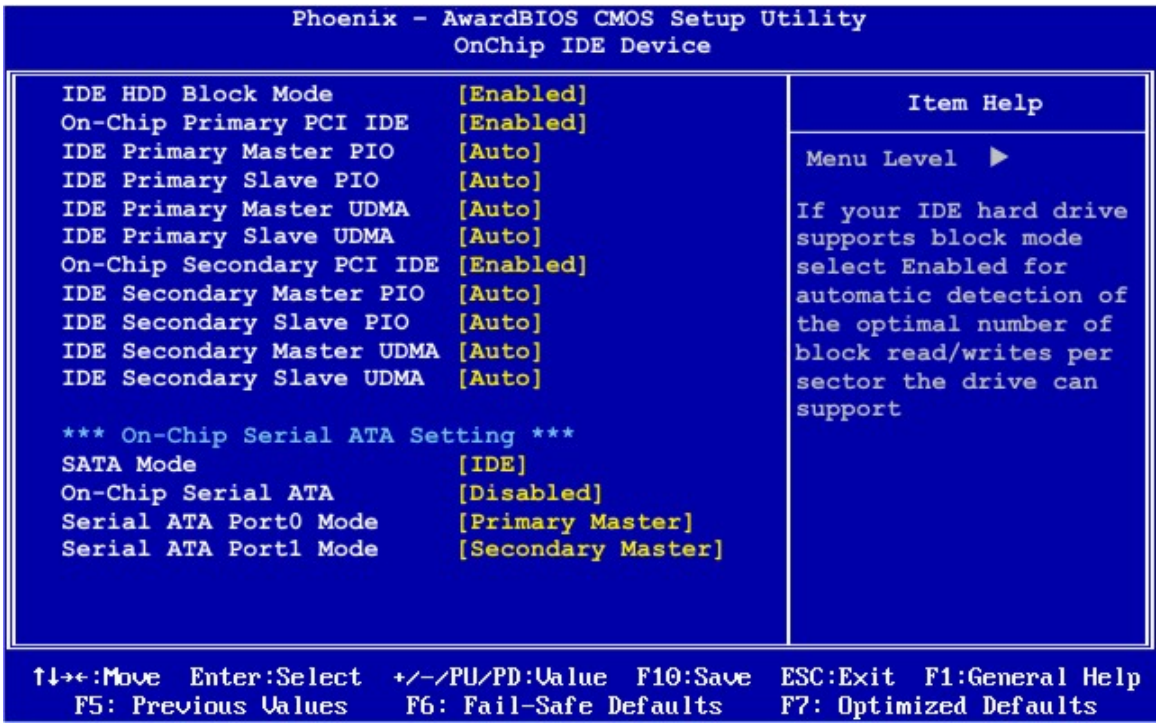
- **Serial Port 6 IRQ [IRQ10]**

  The Serial Port 6 IRQ selection set the serial port 6 interrupt address

➔ **IRQ3**		IRQ3 is assigned as the serial port 6 interrupt address
➔ **IRQ4**		IRQ4 is assigned as the serial port 6 interrupt address
➔ **IRQ5**		IRQ5 is assigned as the serial port 6 interrupt address
➔ **IRQ9**		IRQ9 is assigned as the serial port 6 interrupt address
➔ **IRQ10**	**DEFAULT**	IRQ10 is assigned as the serial port 6 interrupt address
➔ **IRQ11**		IRQ11 is assigned as the serial port 6 interrupt address

6.5.1 OnChip IDE Device

Use the **OnChip IDE Device** menu to change the settings of the OnChip IDE Device.



BIOS Menu 8: OnChip IDE Device

- **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.

- **On-Chip Primary/Secondary IDE [Enabled]**

The **On-Chip Primary/Secondary IDE** option enables or disables the IDE controller on the system chipset.

➔ **Enabled** **DEFAULT** The IDE channel is enabled

➔ **Disabled** The IDE channel is disabled

- **IDE Primary/Secondary Master/Slave PIO [Auto]**

The **IDE Primary/Secondary Master/Slave PIO** option configures which Programmed I/O mode to use if Programmed I/O is in use.

➔ **Auto** **DEFAULT** The fastest PIO speed is automatically chosen

➔ **Mode 0** Maximum transfer speed of 3.3 MB/s

➔ **Mode 1** Maximum transfer speed of 5.2 MB/s

➔ **Mode 2** Maximum transfer speed of 8.3 MB/s

➔ **Mode 3** Maximum transfer speed of 11.1 MB/s

➔ **Mode 4** Maximum transfer speed of 16.7 MB/s

- **SATA Mode [IDE]**

The **SATA Mode** option selects the mode of the onboard SATA. This setting cannot be changed.

➔ **IDE** **DEFAULT** The operating system does not load SATA ACHI functions and uses the native IDE driver.

- **On-Chip Serial ATA [Auto]**

The **On-Chip Serial ATA** option configures the serial ATA settings for the onboard SATA controller.

➔ **Auto** **DEFAULT** SATA drives are detected and arranged automatically by the BIOS

➔ **Disabled** The SATA controller is disabled

Combined Mode	The SATA controller takes on the role of the Primary or Secondary IDE channel and that IDE channel is disabled. This setting allows a maximum of 4 drives on the system.
Enhanced Mode	The SATA controller and both IDE channels are enabled, allowing up to 6 drives on the system. This option will not work with certain legacy Operating Systems.
SATA Only	Only the SATA controller is enabled. Each SATA drive takes on the role of an IDE channel master.

- **Serial ATA Port x Mode [Primary Master]**

The **Serial ATA Port x Mode** option configures the mode of the SATA ports. The following ports are configurable:

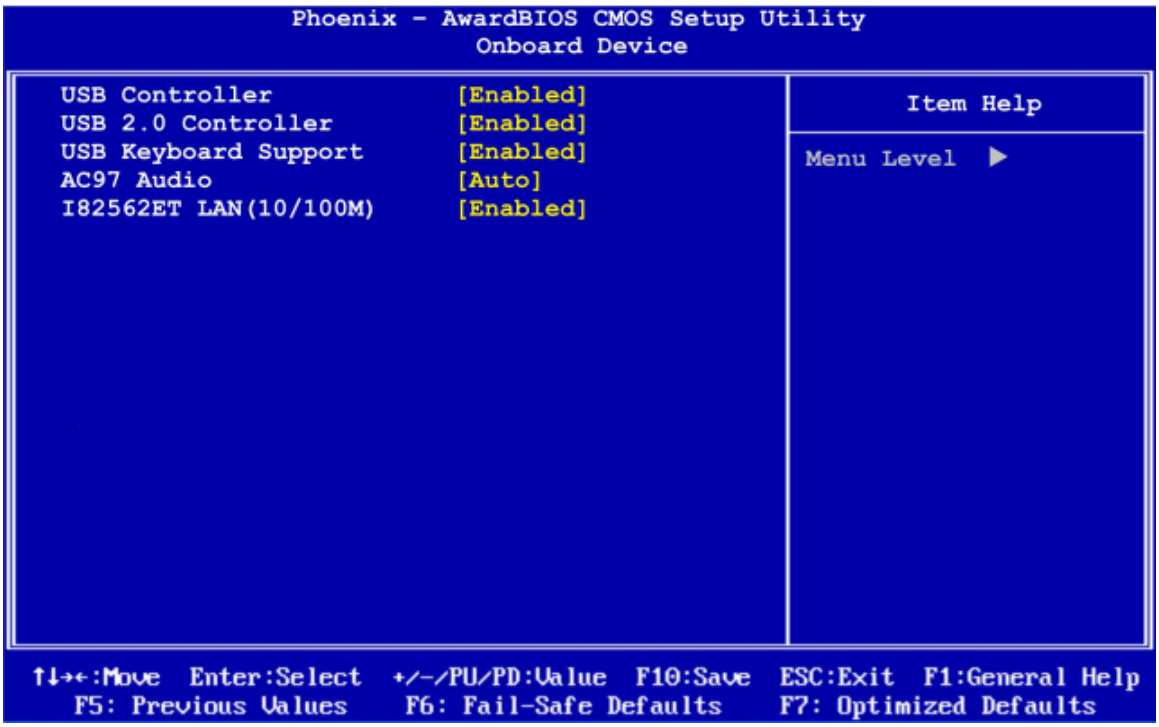
- SATA Port 0
- SATA Port 1

Certain options are available, according to the **On-Chip Serial ATA** setting. The following options are available for these ports:

➔ **Primary Master**	**DEFAULT**	The chosen SATA drive is the Primary Master
➔ **Primary Slave**		The chosen SATA drive is the Primary Slave
➔ **Secondary Master**		The chosen SATA drive is the Secondary Master
➔ **Secondary Slave**		The selected SATA drive is the Secondary Slave
➔ **SATA0 Master**		The selected SATA drive is SATA0
➔ **SATA1 Master**		The selected SATA drive is SATA1

6.5.2 Onboard Device

Use the **Onboard Device** menu to configure USB, audio and LAN controller settings.



BIOS Menu 9: Integrated Peripherals

- **USB Controller [Enabled]**

Use the **USB Controller** option to enable or disable the chipset USB controller.

➔ **Enabled** **DEFAULT** Chipset USB 1.1 controller enabled

➔ **Disabled** Chipset USB 1.1 controller disabled

- **USB 2.0 Controller [Enabled]**

Use the **USB 2.0 Controller** option to enable or disable the chipset USB controller.

➔ **Enabled** **DEFAULT** Chipset USB 2.0 controller enabled

➔ **Disabled** Chipset USB 2.0 controller disabled

- **USB Keyboard Support [Enabled]**

Use the **USB Keyboard Support** option to enable or disable support for a USB keyboard.

➔ **Enabled**	**DEFAULT**	USB keyboard support is enabled
➔ **Disabled**		USB keyboard support is disabled

- **AC97 Audio [Auto]**

Use the **AC97 Audio** option to enable or disable the onboard audio controller.

➔ **Auto**	**DEFAULT**	The onboard audio chipset is automatically detected and enabled
➔ **Disabled**		The onboard audio chipset is disabled

- **AC97 Modem [Auto]**

Use the **AC97 Modem** option to enable or disable the onboard audio controller.

➔ **Auto**	**DEFAULT**	The onboard audio chipset is automatically detected and enabled
➔ **Disabled**		The onboard audio chipset is disabled

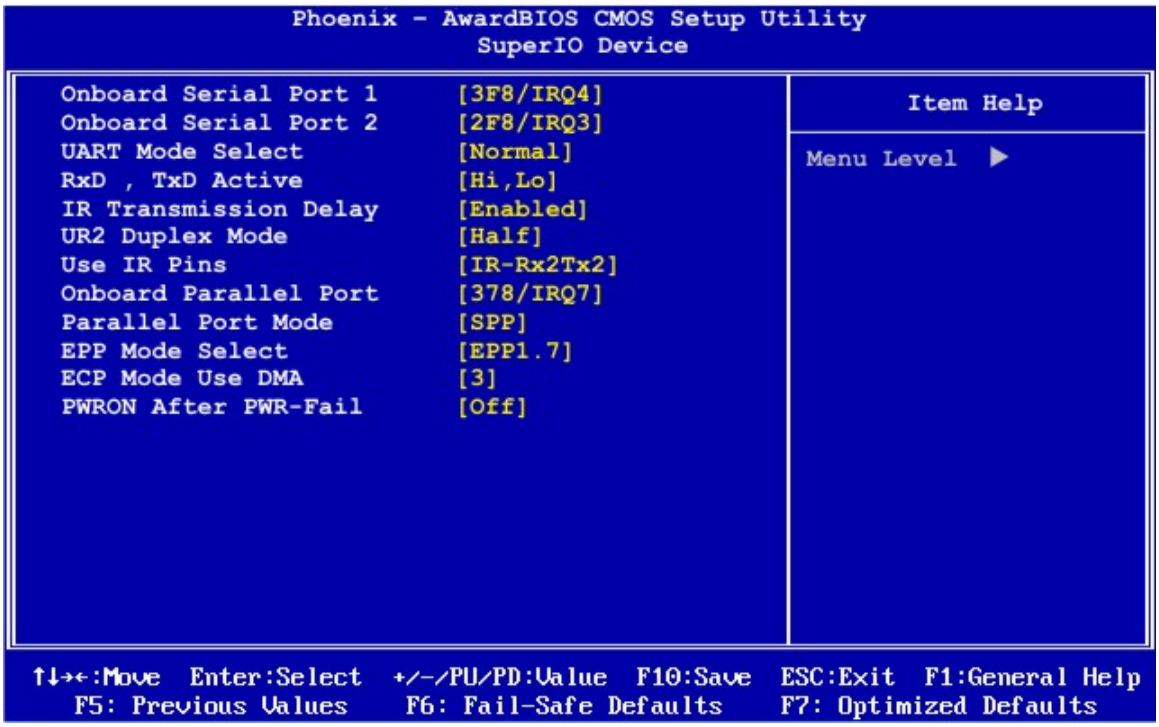
- **Onboard LAN Device [Enabled]**

Use the Onboard LAN Device option to enable or disable the onboard Ethernet controller.

➔ **Enabled**	**DEFAULT**	The onboard Ethernet controller is enabled
➔ **Disabled**		The onboard Ethernet controller is disabled

6.5.3 Super I/O Device

Use the **Super I/O Device** menu to configure the settings of the super I/O chipset.



BIOS Menu 10: Super I/O Device

- **Onboard Serial Port1 [3F8/IRQ4]**

Use the **Onboard Serial Port1** option to select the Serial Port 1 base address.

➔ **Disabled**		No base address is assigned to Serial Port 1
➔ **3F8/IRQ4**	**DEFAULT**	Serial Port 1 I/O port address is 3F8 and the interrupt address is IRQ4
➔ **3E8/IRQ4**		Serial Port 1 I/O port address is 3E8 and the interrupt address is IRQ4
➔ **2E8/IRQ3**		Serial Port 1 I/O port address is 2E8 and the interrupt address is IRQ3

- **Onboard Serial Port2 [2F8/IRQ3]**

Use the **Onboard Serial Port2** option to select the Serial Port 2 base address.

➔ **Disabled**		No base address is assigned to Serial Port 2
➔ **2F8/IRQ3**	**DEFAULT**	Serial Port 2 I/O port address is 3F8 and the interrupt address is IRQ3
➔ **3E8/IRQ4**		Serial Port 2 I/O port address is 3E8 and the interrupt address is IRQ4
➔ **2E8/IRQ3**		Serial Port 2 I/O port address is 2E8 and the interrupt address is IRQ3

- **UART Mode Select [Normal]**

Use the **UART Mode Select** option to select the Serial Port2 operational mode.

➔ **Normal**	**DEFAULT**	Serial Port 2 mode is normal
➔ **IrDA**		Serial Port 2 mode is IrDA
➔ **ASK IR**		Serial Port 2 mode is ASK IR

- **RxD, TxD Active [Hi, Lo]**

Use the **RxD, TxD Active [Hi, Lo]** option to select the correct settings of RxD and TxD according to your infrared peripheral device.

➔ **Hi, Lo**	**DEFAULT**	Reception polarity set to Hi, transmission polarity set to Lo
➔ **Lo, Hi**		Reception polarity set to Lo, transmission polarity set to Hi
➔ **Lo, Lo**		Reception and transmission polarity are both set to Lo
➔ **Hi, Hi**		Reception and transmission polarity are both set to Hi

- **IR Transmission Delay [Enabled]**

Use the **IR Transmission Delay** option to specify whether or not there should be a delay for the IR transmission.

➔ **Enabled** **DEFAULT** There is a transmission delay.

➔ **Disabled** There is no transmission delay.

- **UR2 Duplex Mode [Normal]**

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

➔ **Half** **DEFAULT** Half-duplex mode allows transmission in one direction at a time only.

➔ **Full** Full-duplex mode allows transmission in both directions at the same time.

- **Use IR Pins [IR-Rx2Tx2]**

Use the **Use IR Pins** option to select which pins should be used for infrared.

  - **IR-Rx2Tx2 (Default)**
  - **RxD2,TxD2**

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

Use the **Onboard Parallel Port** option to select the parallel port base address.

➔ **Disabled** No base address is assigned to the Parallel Port

➔ **378/IRQ7** **DEFAULT** Parallel Port I/O port address is 378 and the interrupt address is IRQ7

➔ **278/IRQ5** Parallel Port I/O port address is 278 and the interrupt address is IRQ5

➔ **3BC/IRQ7** Parallel Port I/O port address is 3BC and the interrupt address is IRQ7

- **Parallel Port Mode [SPP]**

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

➔	**SPP**	Standard parallel port outputs are 8-bits long. Inputs are accomplished by reading 4 of the 8 bits on the status register.
➔	**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.
➔	**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.
➔	**ECP+EPP**	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. The parallel port is also compatible with EPP devices described above

- **EPP Mode Select [EPP1.7]**

Use the **EPP Mode Select** option to select the EPP mode for the parallel port. EPP1.9 is backward compatible with EPP1.7, but some EPP1.7 devices don't work with EPP1.9.

➔	**EPP1.7**	**DEFAULT**	EPP1.7 mode is enabled
➔	**EPP1.9**		EPP1.9 mode is enabled

- **ECP Mode Use DMA [3]**

Use the **ECP Mode USE DMA** option to select which DMA to use. The following DMA options are available:

➔	**3**	**DEFAULT**	DMA 3 is selected
➔	**1**		DMA 1 is selected

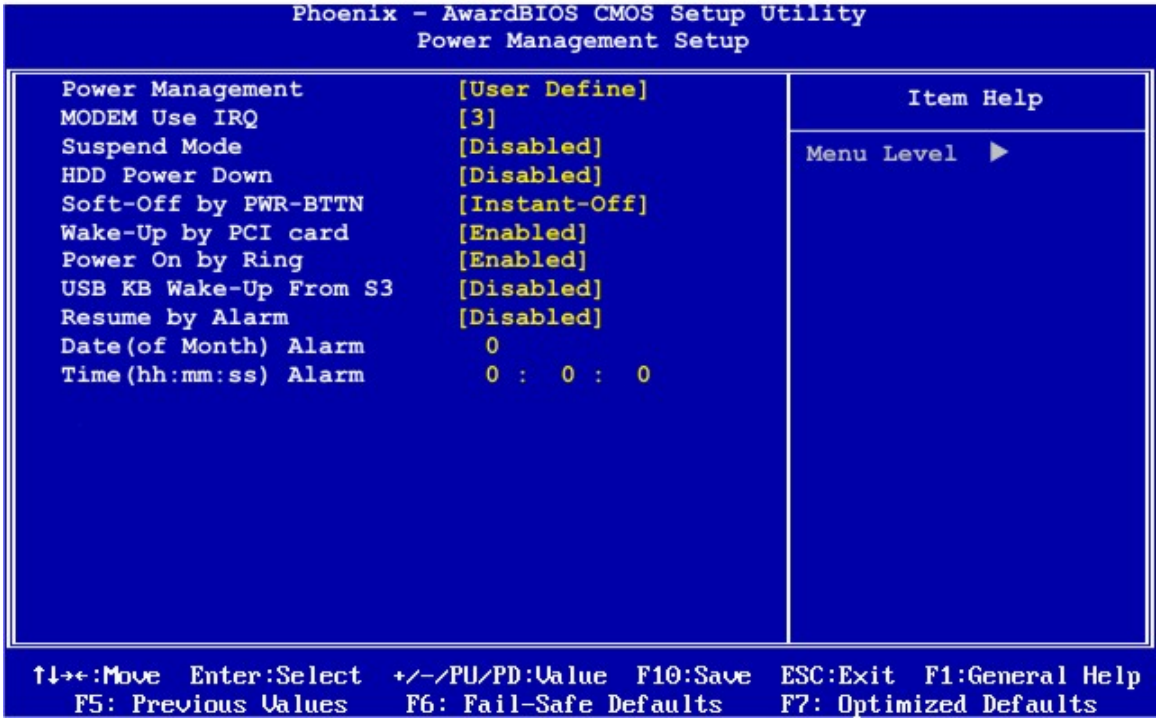
- **PWRON After PWR-Fail [Off]**

Use the **PWRON After PWR-Fail** option to select which what state the computer will return to after a power cut. The following DMA options are available:

➔ **Off**	**DEFAULT**	The system remains off, even when power is restored
➔ **On**		The system turns on after power is restored
➔ **Former-Sts**		The system returns to the state it was before power was cut. If the system was off when power was cut, it remains off. If the system was on when the power was cut, the system turns on when power is restored.

6.6 Power Management Setup

Use the **Power Management Setup** menu (**BIOS Menu 11**) to set the BIOS power management and saving features.



BIOS Menu 11: Power Management Setup

- **Power Management [User Define]**

The **Power Management** option allows the user to set the power saving scheme for the system.

➔	**User Define** **DEFAULT**	The user manually enters values for the **Suspend Mode** and **HDD Power Down** power management options
➔	**Min Saving**	Sets the **Suspend Mode** for 1 Hour and **HDD Power Down** for 15 minutes
➔	**Max Saving**	Sets the **Suspend Mode** and **HDD Power Down** for 1 minute

- **MODEM Use IRQ [3]**

Use the **MODEM Use IRQ** option to set the IRQ used by the modem. This is the IRQ that will be sensed for the **Power On by Ring** setting.

- 3 **DEFAULT**
- 4
- 5
- 7
- 9
- 10
- 11

- **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 **User Define** option was selected in the **Power Management** option.

- Disabled **DEFAULT**
- 1 Min
- 2 Min
- 4 Min
- 8 Min
- 12 Min

- 20 Min
- 30 Min
- 40 Min
- 1 Hr

- **HDD Power Down [Disabled]**

  Use the **HDD Power Down** 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 **User Define** option was selected in the **Power Management** option.

  - Disabled **DEFAULT**
  - 1 Min
  - 2 Min
  - 3 Min
  - 4 Min
  - 5 Min
  - 6 Min
  - 7 Min
  - 8 Min
  - 9 Min
  - 10 Min
  - 11 Min
  - 12 Min
  - 13 Min
  - 14 Min
  - 15 Min

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

  Use the **Soft-Off by PWR-BTTN** option to configure the behavior of the power button.

  ➔ **Instant-off** **DEFAULT** The system is immediately powered off when the power button is pressed

➔ **Delay 4 Sec.** The system will power off when the power button is pressed for more than 4 seconds. The system enters standby mode if pressed for less than 4 seconds.

- **Wake-Up by PCI card [Enabled]**

Use the **Wake-Up by PCI card** option to enable the system to be roused from a suspended or standby state when a wake-up signal is sent to a PCI card.

➔ **Enabled** **DEFAULT** The system is roused by a signal from the PCI card

➔ **Disabled** The system is not roused by a signal from the PCI card

- **Power on by Ring [Enabled]**

Use the **Power on Ring** option to enable the system to be roused from a suspended or standby state when there is activity on the RI (ring in) modem line. That is, the system is roused by an incoming call on a modem.

➔ **Disabled** **DEFAULT** Wake event not generated by an incoming call

➔ **Enabled** Wake event generated by an incoming call

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

The **USB KB Wake-Up From S3** option enables or disables a USB keyboard to bringing the system out of an S3 power saving state.

➔ **Disabled** **DEFAULT** A USB keyboard cannot bring the system out of an S3 power savings state.

➔ **Enabled** A USB keyboard can bring the system out of an S3 power savings state.

- **Resume by Alarm [Disabled]**

Use the **Resume by Alarm** option to specify the time the system should be roused from a suspended state.

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

➔ **Enabled** If selected, the following appears with values that can be selected:

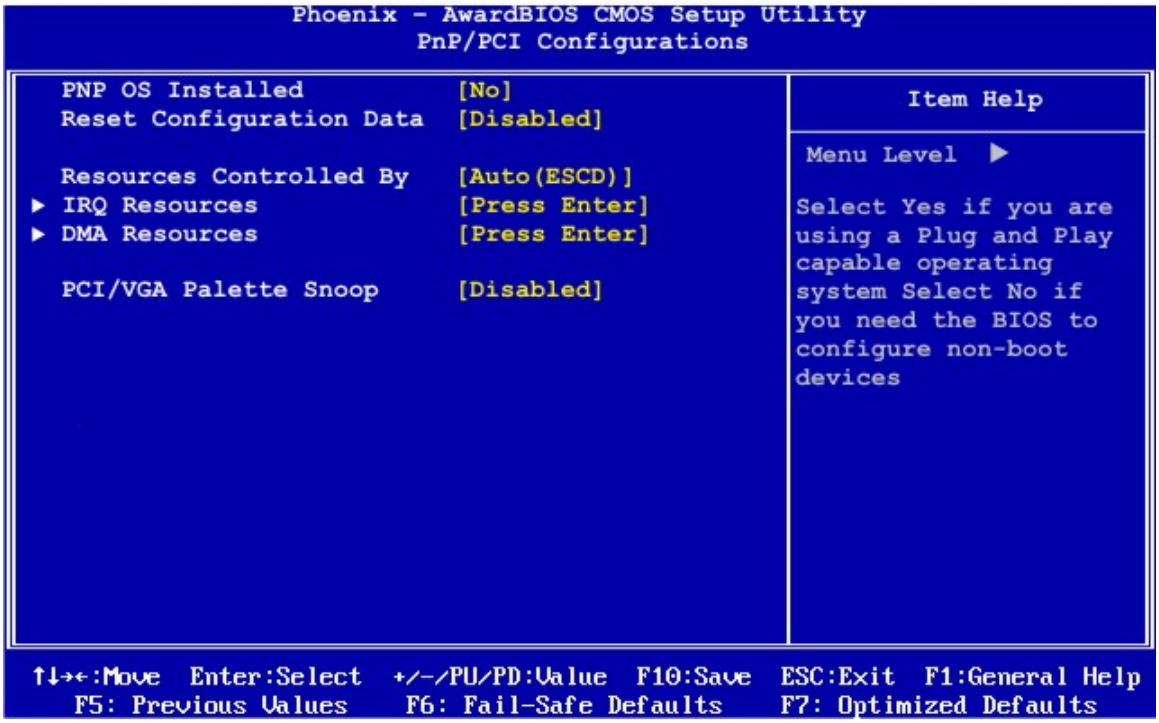
Date (of month) Alarm (Days)

Time (hh:mm:ss) Alarm

After setting the alarm, the computer turns itself on from a suspend state when the alarm goes off.

6.7 PnP/PCI Configurations

Use the **PnP/PCI Configurations** menu (**BIOS Menu 12**) to set the plug and play, and PCI options.



BIOS Menu 12: PnP/PCI Configurations

- **PNP OS Installed [No]**

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

➔ **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

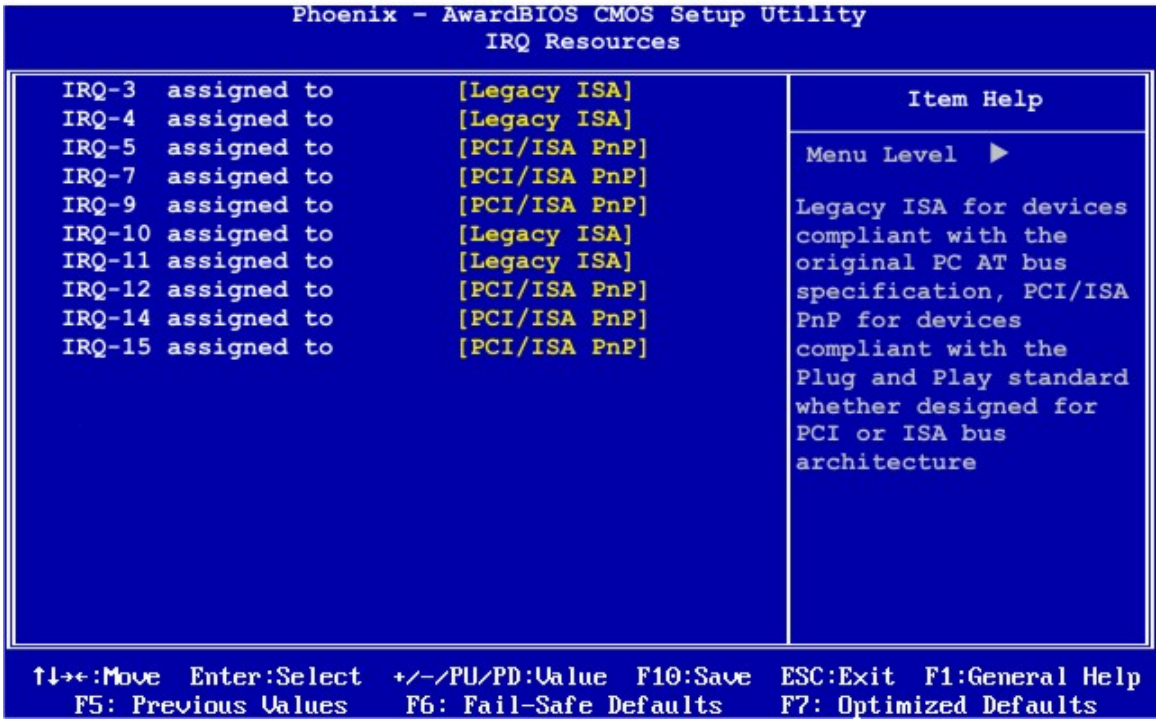
- **Resources Controlled By [Auto (ESCD)]**

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.

➔ **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.

- **IRQ Resources [Press Enter]**

The **IRQ Resources** option (**BIOS Menu 13**) can only be selected if the **Resources Controlled By** option is set to **Manual**.



BIOS Menu 13: IRQ Resources

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

- IRQ-3 assigned to **[Legacy ISA]**
- IRQ-4 assigned to **[Legacy ISA]**
- IRQ-5 assigned to **[PCI/ISA PnP]**
- IRQ-7 assigned to **[PCI/ISA PnP]**
- IRQ-9 assigned to **[PCI/ISA PnP]**
- IRQ-10 assigned to **[Legacy ISA]**
- IRQ-11 assigned to **[Legacy ISA]**
- IRQ-12 assigned to **[PCI/ISA PnP]**
- IRQ-14 assigned to **[PCI/ISA PnP]**
- IRQ-15 assigned to **[PCI/ISA PnP]**

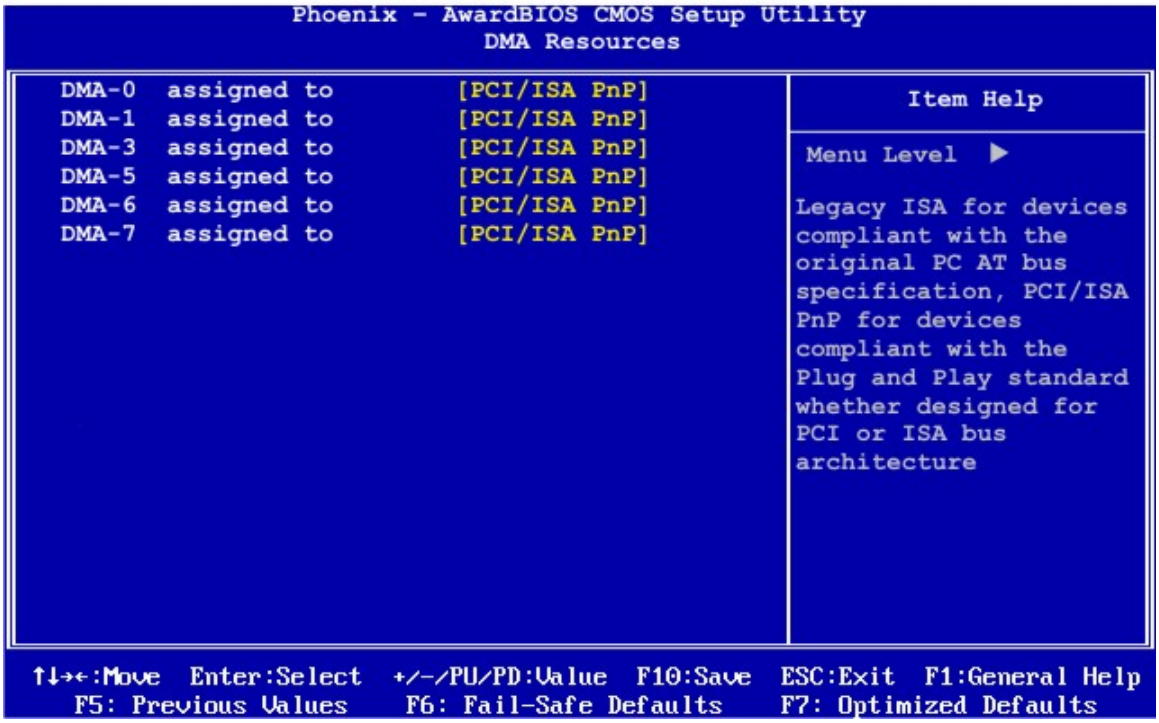
The above options all have the following options.

➔ **PCI/ISA PnP** The IRQ is reserved by BIOS for PCI and ISA PnP devices.

➔ **Legacy ISA** 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.

- **Memory Resources [Press Enter]**

The **Memory Resources** menu (**BIOS Menu 14**) 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.



BIOS Menu 14: Memory Resources

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

- DMA-0 assigned to
- DMA-1 assigned to
- DMA-3 assigned to

- DMA-5 assigned to
- DMA-6 assigned to
- DMA-7 assigned to

The above options all have the following default options.

➔ **PCI/ISA PnP** **DEFAULT** The DMA is reserved by BIOS for PCI and ISA PnP devices.

➔ **Legacy ISA** The DMA 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.

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

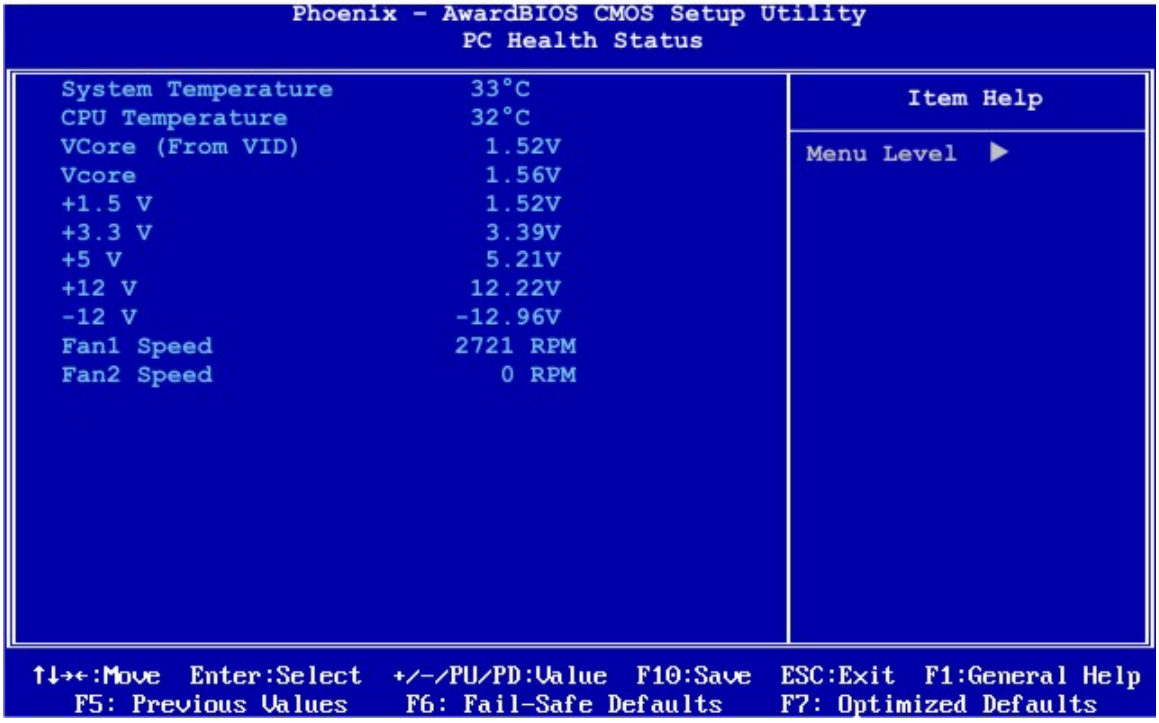
The **PCI/VGA Palette Snoop** option enables or disables the palette snooping function.

➔ **Disabled** **DEFAULT** Unless the VGA card manufacturer requires palette snooping to be enabled, this option should be disabled.

➔ **Enabled** PCI devices are informed that an ISA based Graphics device is installed in the system so the ISA based Graphics card will function correctly. This does not necessarily indicate a physical ISA adapter card. The graphics chipset can be mounted on a PCI card. Always check with the adapter card manual first, before modifying the default settings in the BIOS.

6.8 PC Health Status

The **PC Health Status** menu (**BIOS Menu 15**) has no user configurable options, but shows operating parameters that are essential to the stable operation of the system.



BIOS Menu 15: PC Health Status

- **System Temperature**

The following temperatures are monitored:

- Current CPU Temperature
- Current System Temperature

- **Voltages**

The following voltages are monitored:

- Vcore (From VID)
- CPU Vcore
- +1.5 V
- +3.3 V

- +5 V
- +12 V
- -12 V
- Fan1 Speed
- Fan2 Speed

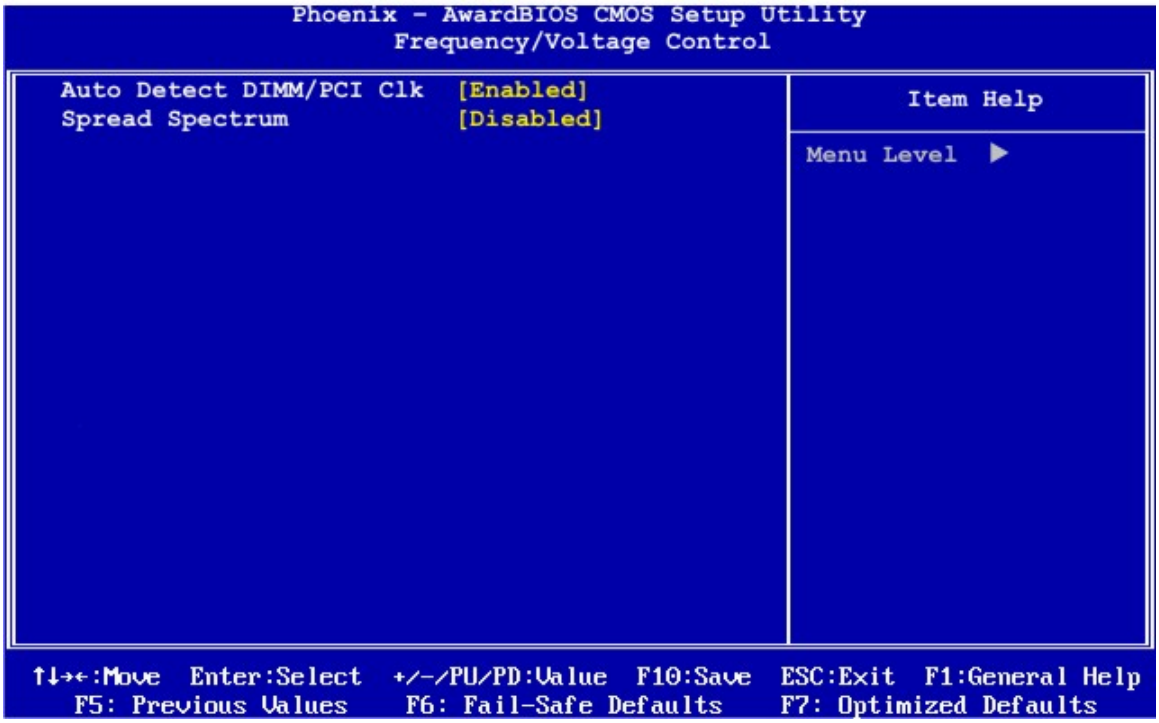
- **Fan Speed**

  The following fan speeds are monitored:

  - Fan1 Speed
  - Fan2 Speed

6.9 Frequency / Voltage Control

The Frequency / Voltage Control menu is for setting



BIOS Menu 16: Frequency / Voltage Control

- **Auto Detect DIMM/PCI Clk [Enabled]**

The **Auto Detect DIMM/PCI Clk** BIOS option enables the system to automatically set the DIMM and PCI clock frequency or make these settings to be set manually.

➔ **Disabled**	**DEFAULT**	DIMM and PCI frequencies are manually selected
➔ **Enabled**		System automatically detects the DIMM and PCI frequencies

- **Spread Spectrum [Disabled]**

The **Spread Spectrum** BIOS option can help to improve CPU EMI issues.

➔ **Disabled**	**DEFAULT**	The clock spread spectrum is disabled
➔ **Enabled**		The clock spread spectrum is enabled

Chapter

7

Driver Installation

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 following drivers can be installed on the system:

- Chipset driver
- VGA driver
- LAN driver
- Audio driver

Installation instructions are given below.

7.2 Driver CD Auto-run

All the drivers for the IMBA-8650 are on the CD that came with the system. To install the drivers, please follow the steps below.

Step 1: Insert the CD into a CD drive connected to the system.

NOTE:

If the system does not initiate the "autorun" program when the CD is inserted, click the Start button, select Run, then type X:\autorun.exe (where X:\ is the system CD drive) to access the IEI Driver CD main menu.

Step 2: The driver main menu appears (**Figure 7-1**).

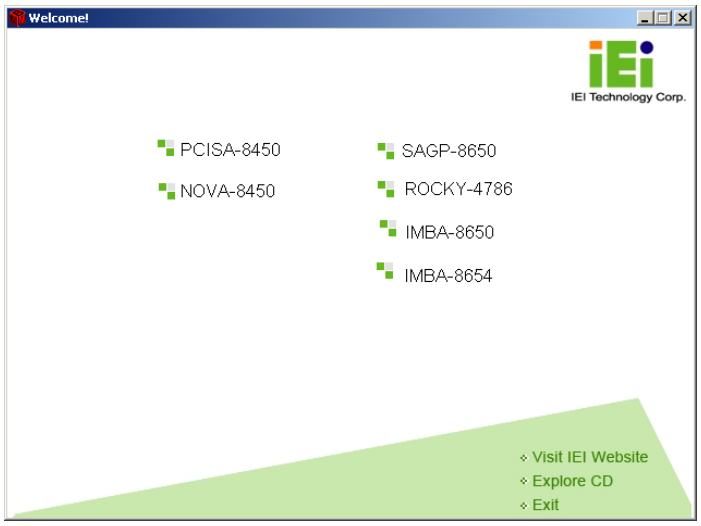


Figure 7-1: Introduction Screen

Step 3: Click IMBA-8650.

Step 4: A new screen with a list of available drivers appears (**Figure 7-2**).

Figure 7-2: Available Drivers

Step 5: Select the driver to install from the list in **Figure 7-2**. Detailed driver installation instructions follow below.

7.3 Chipset Driver Installation

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

Step 6: Select **INF** from the list in **Figure 7-2**.

Step 7: A new window opens (**Figure 7-3**).

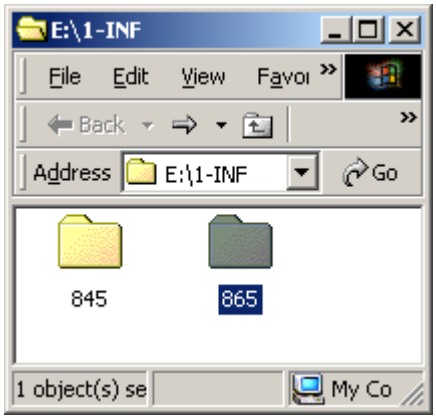


Figure 7-3: Chipset Folder

Step 8: Select **865** from the list in **Figure 7-3**.

Step 9: A new window opens (**Figure 7-4**).

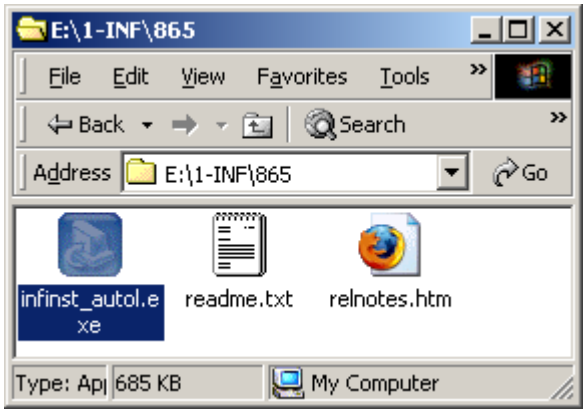


Figure 7-4: Chipset Driver Installation Program

Step 10: Double-click the **infinst_autol.exe** icon.

Step 11: The welcome screen in **Figure 7-5** appears.

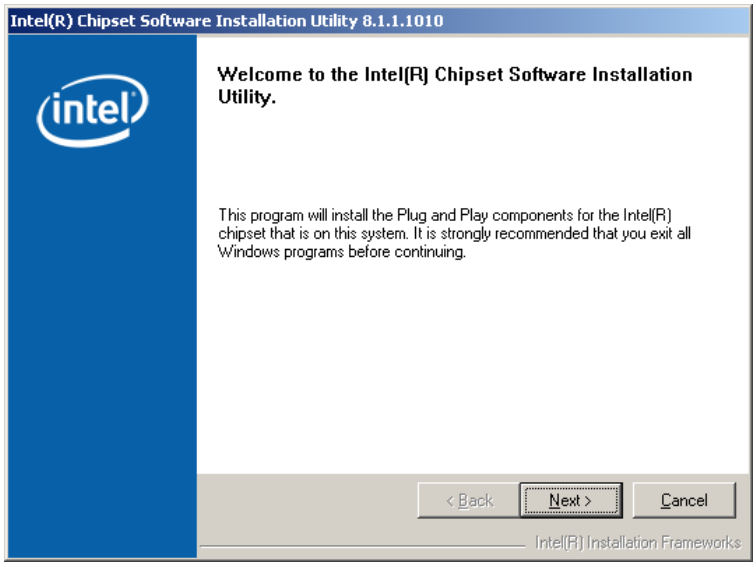


Figure 7-5: Chipset Driver Installation Welcome Screen

Step 12: Click **NEXT** to continue the installation process.

Step 13: The license agreement in **Figure 7-6** appears.

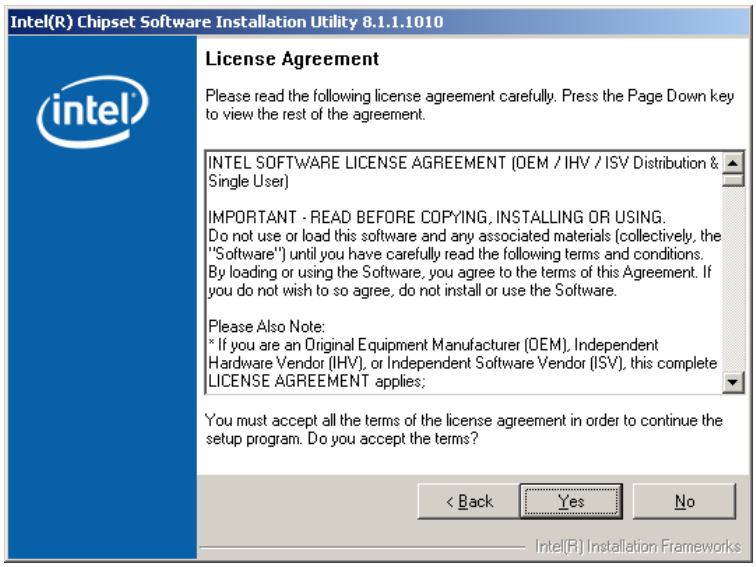


Figure 7-6: Chipset Driver Installation License Agreement

Step 14: Read the license agreement. To accept the terms and conditions stipulated in the agreement, click **YES**.

Step 15: The **Readme** file in **Figure 7-7** appears.

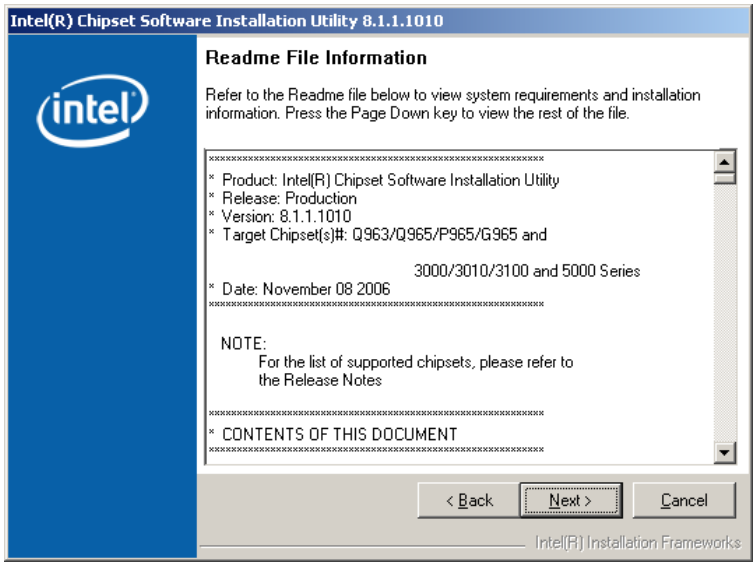


Figure 7-7: Chipset Driver Readme File Information

Step 16: Read the Readme file information and then click **NEXT** to start the driver installation.

Step 17: After the driver installation process is complete, a confirmation screen appears (**Figure 7-8**).

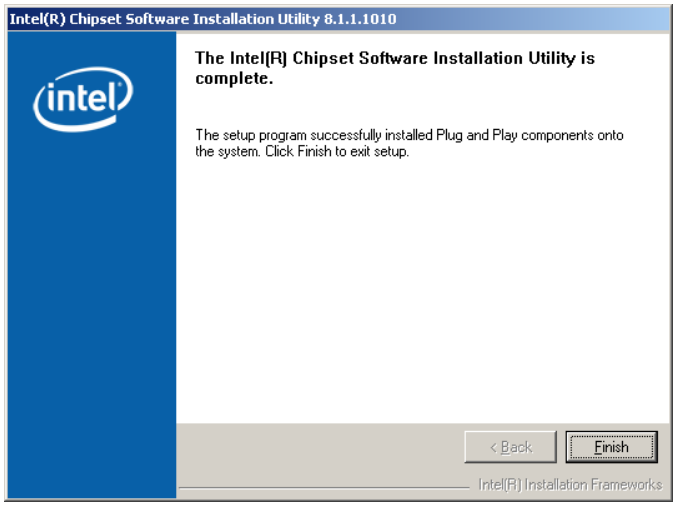


Figure 7-8: Chipset Driver Installation Complete

Step 18: Click **FINISH** to complete the driver installation.

7.4 Intel Graphics Media Accelerator Driver

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

Step 1: Select the **VGA** driver from the list in **Figure 7-2**.

Step 2: A new window opens (**Figure 7-9**).

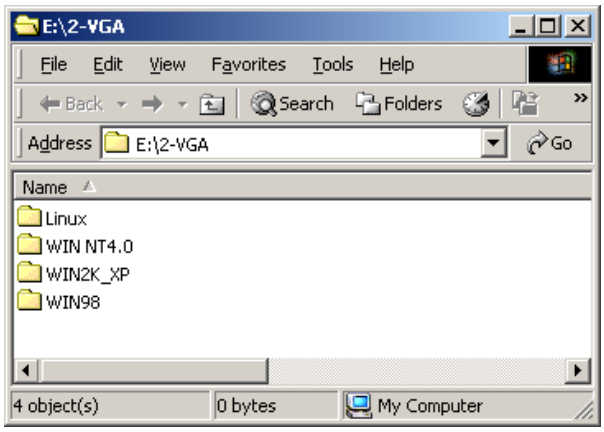


Figure 7-9: VGA OS Folders

Step 3: Double-click the appropriate operating system folder.

Step 4: A new window appears (**Figure 7-10**).

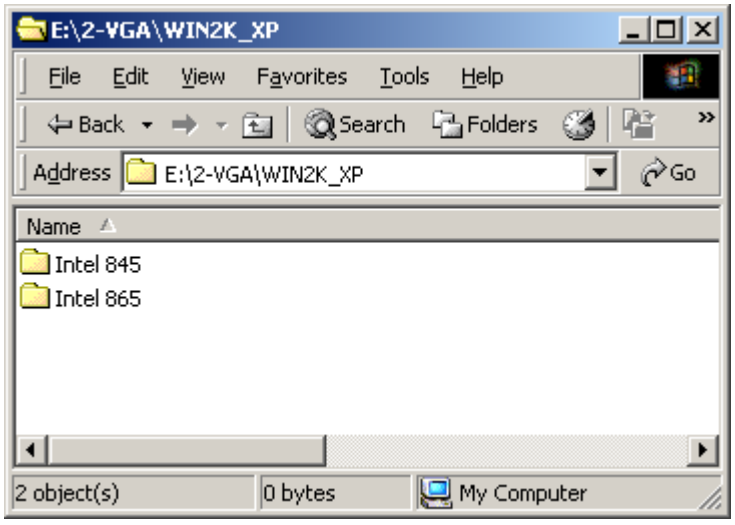


Figure 7-10: VGA Chipset Folder

Step 5: Double-click the **Intel 865** folder.

Step 6: A new window appears (**Figure 7-13**).

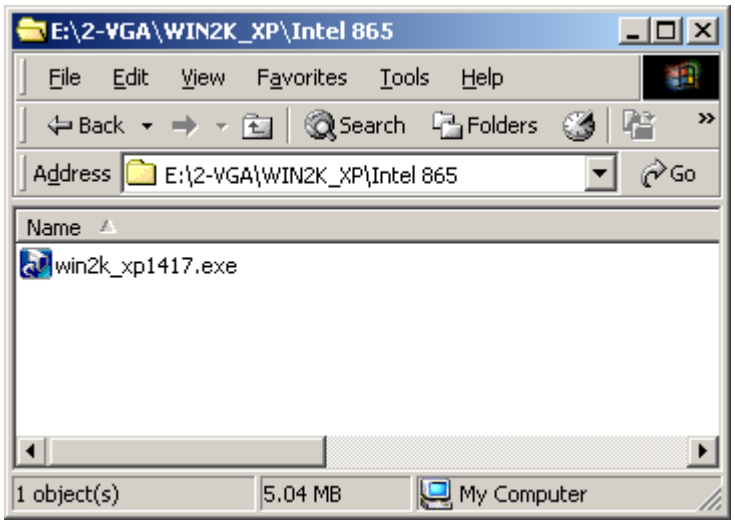


Figure 7-11: VGA Driver File

Step 7: Double-click the installation program icon to continue the installation process.

Step 8: The **Readme** information file shown in **Figure 7-12** appears.

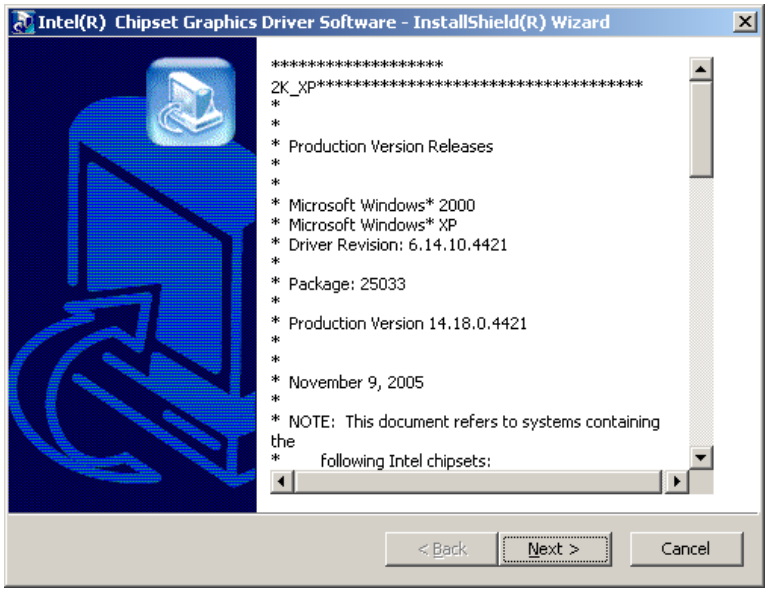


Figure 7-12: Intel® Graphics Media Accelerator InstallShield Wizard

Step 9: Read the Readme file information and click **NEXT** to begin extracting files (**Figure 7-13**).

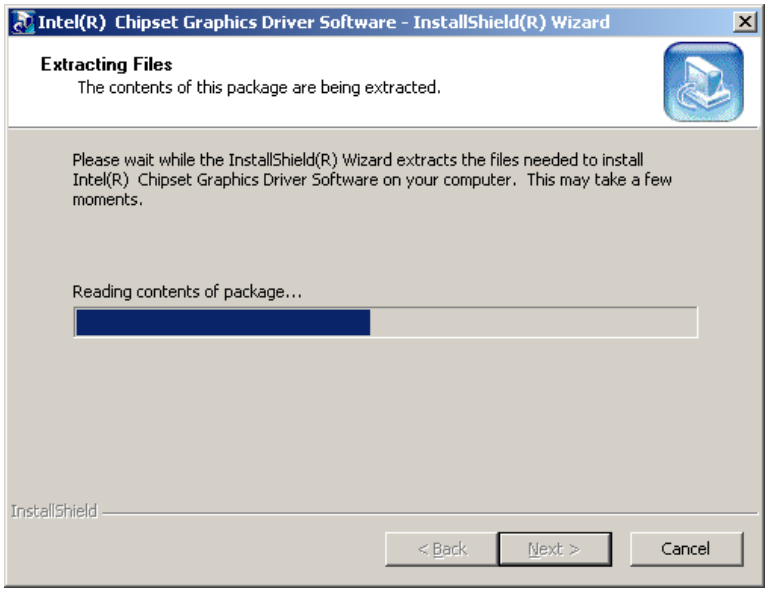


Figure 7-13: InstallShield Wizard Extracting Files

Step 10: The **Graphics Media Accelerator Driver Welcome** screen appears (**Figure 7-14**).

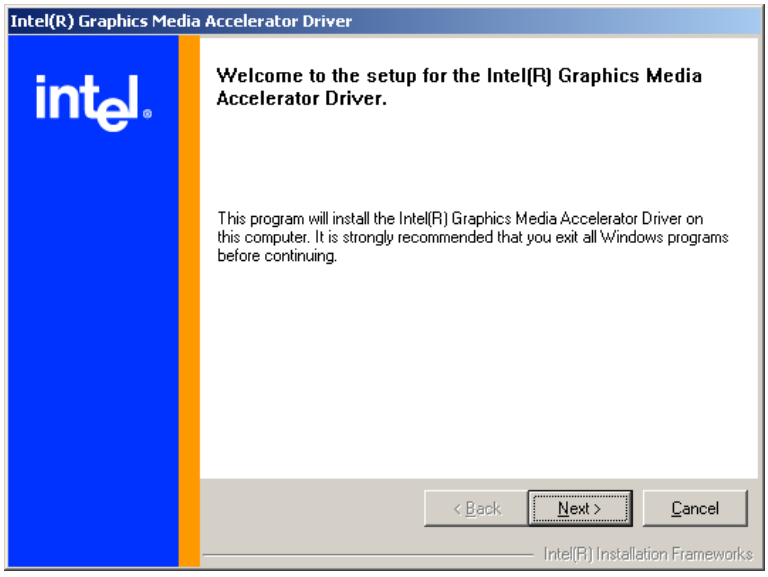


Figure 7-14: Intel® Graphics Media Accelerator Driver Welcome Screen

Step 11: Click **NEXT** and a license agreement appears (**Figure 7-15**).

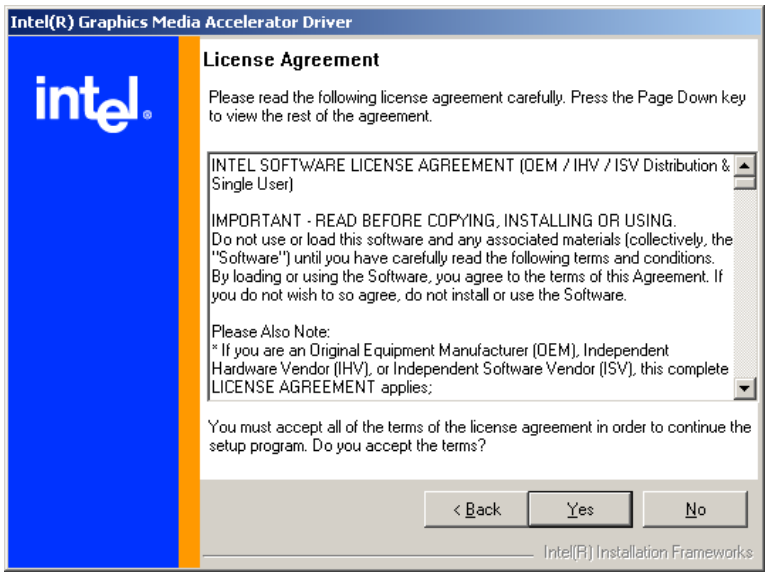


Figure 7-15: Intel® Graphics Media Accelerator Driver License Agreement

Step 12: Read the license agreement. To accept the terms and conditions stipulated in the license agreement shown, click **YES** and the installation notice appears (**Figure 7-16**) as the driver is installed.

Figure 7-16: Intel® Graphics Media Accelerator Driver Installing Notice

Step 13: After the driver installation process is complete, a confirmation screen appears (**Figure 7-17**).

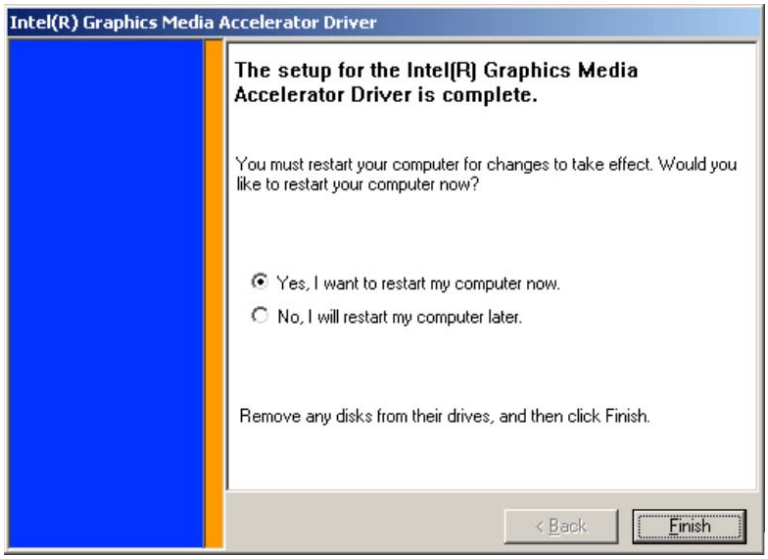


Figure 7-17: Intel® Graphics Media Accelerator Installation Complete

Step 14: The confirmation screen offers the option of restarting the computer now or later. For the settings to take effect, the computer must be restarted. Click **FINISH** to restart the computer.

7.5 Gigabit Ethernet Driver Installation

There are two IMBA-8650 models, each model requires a different Gigabit Ethernet driver.

- IMBA-8650GN – Intel® Network Adapter
- IMBA-8650GR – Broadcom Network Adapter

7.5.1 Intel® Network Adapter Installation (IMBA-8650GN)

To install the Intel® Network Adapter, please follow the steps below.

Step 1: Select the **LAN** driver from the list in **Figure 7-2**.

Step 2: A new window opens (**Figure 7-18**).

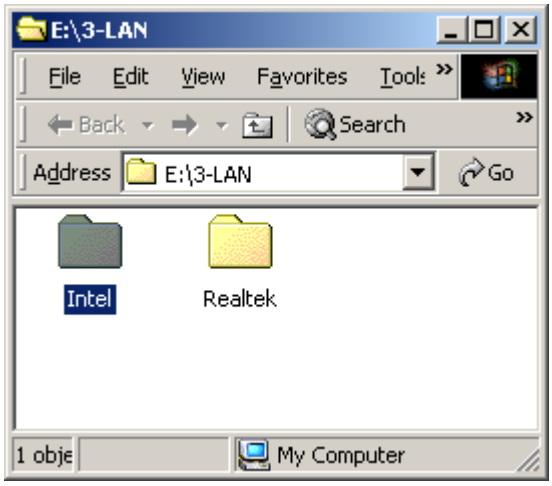


Figure 7-18: Select the Driver Folder

Step 3: Double-click the **Intel** folder.

Step 4: A new window appears (**Figure 7-19**).

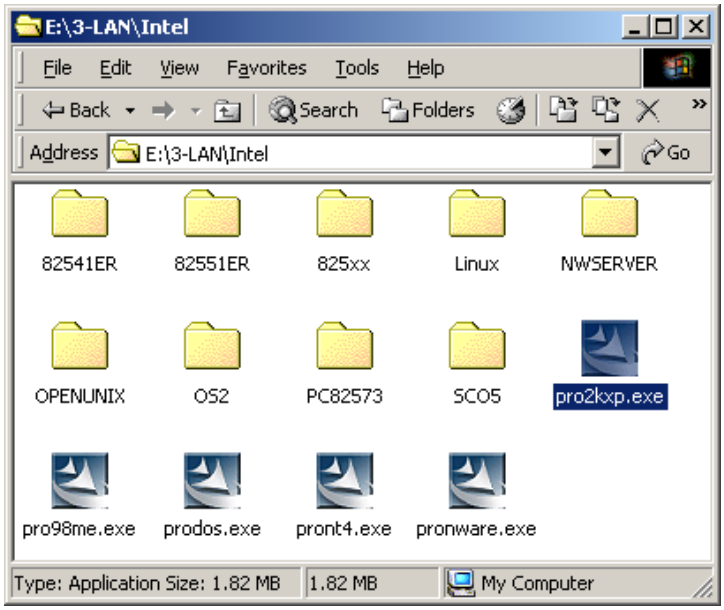


Figure 7-19: Select the Driver

Step 5: Double-click the appropriate installation program icon to continue the installation process.

Step 6: The license agreement in **Figure 7-20** appears.

Figure 7-20: Network Adapter License Agreement

Step 7: Read the license agreement. To accept the terms and conditions stipulated in the agreement, select "**I accept the terms…**" and click **NEXT**.

Step 8: The Location to Save Files window (**Figure 7-21**) appears.

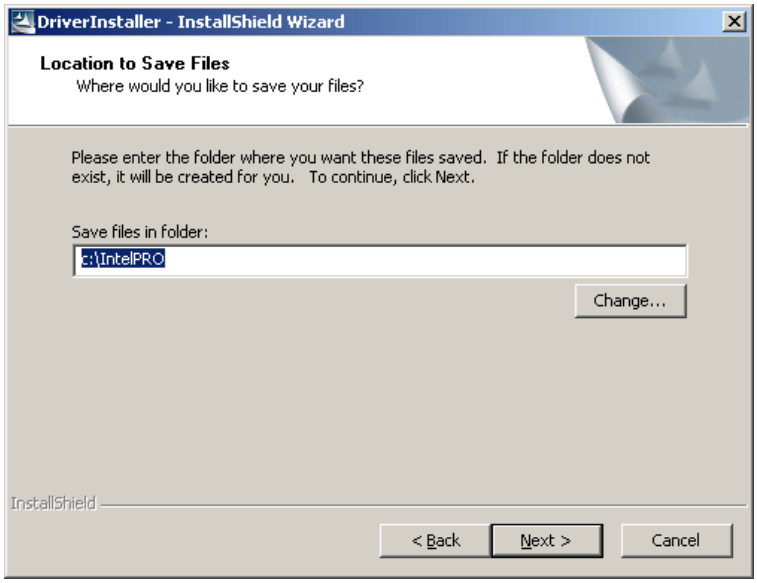


Figure 7-21: Location to Save Files

Step 9: Click **NEXT** to accept the default folder and begin extracting files (**Figure 7-22**).

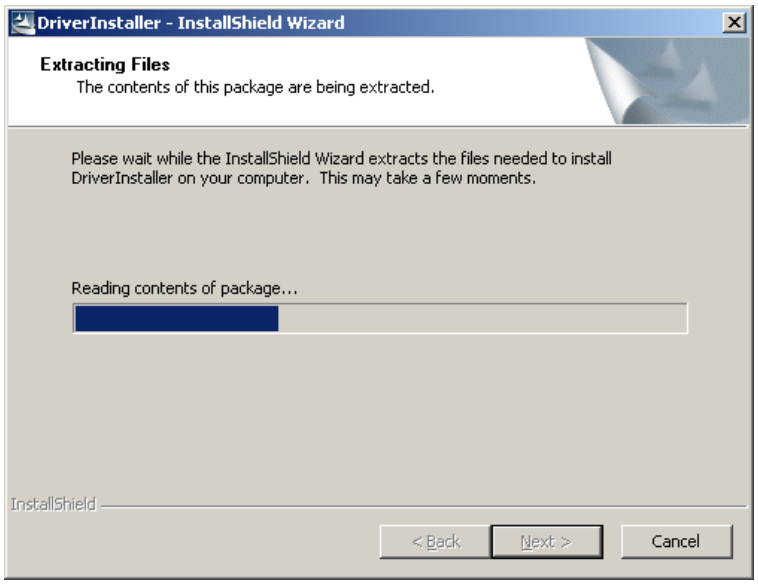


Figure 7-22: InstallShield Wizard Extracting Files

Step 10: If the **Overwrite Protection** window appears (**Figure 7-23**), make the appropriate choice to either continue the installation process or not.

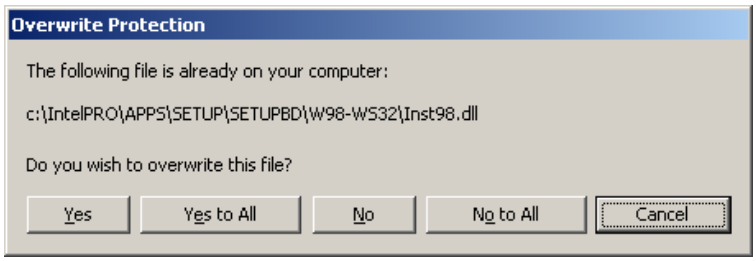


Figure 7-23: Overwrite Protection

Step 11: File extraction continues (**Figure 7-24**).

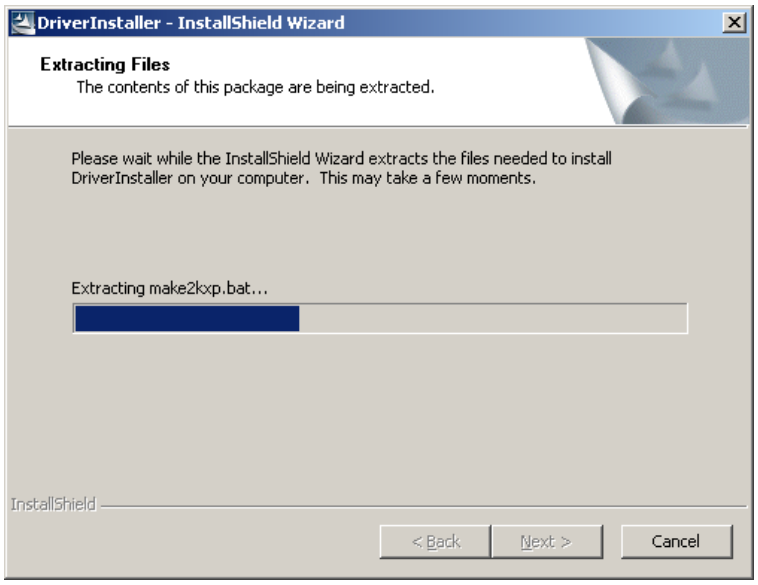


Figure 7-24: File Extraction Continues

Step 12: The **Intel® Pro Network Connections** window appears (**Figure 7-25**).

Figure 7-25: Intel® Pro Network Connections

Step 13: Click Install **Base Driver** and an installation notice appears (**Figure 7-26**) as the driver is installed.

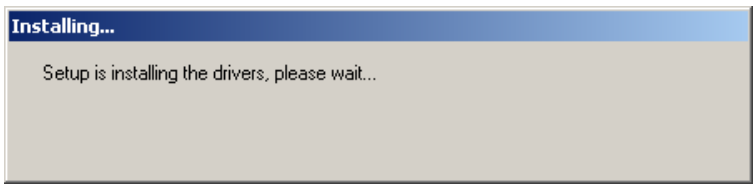


Figure 7-26: Intel® Pro Network Connections Driver Installation Notice

Step 14: After the driver is installed click **EXIT** in the **Intel® Pro Network Connections** window to exit the program.

7.5.2 Realtek RTL8110SC GbE LAN Installation (IMBA-8650GR)

To install the Realtek RTL8110SC GbE LAN driver, please follow the steps below.

Step 1: Select **LAN** from the list in **Figure 7-2**.

Step 2: A new window opens (**Figure 7-27**).

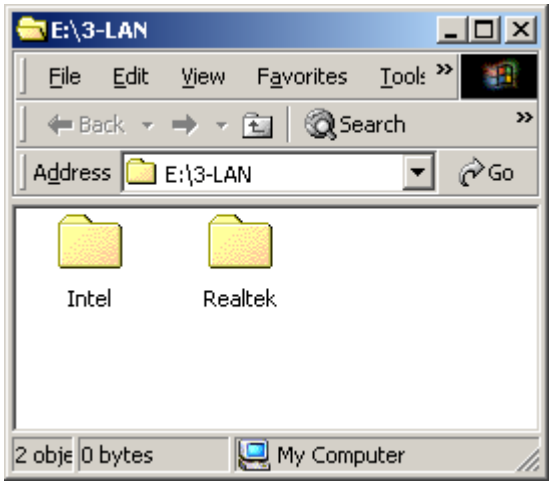


Figure 7-27: LAN Window

Step 3: Double-click the **Realtek** folder and a new window opens (**Figure 7-28**).

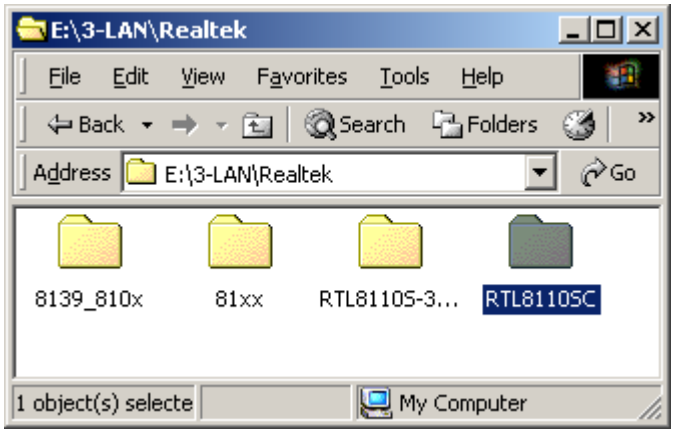


Figure 7-28: Realtek Folder

Step 4: Double-click the **Realtek** folder and a new window opens (**Figure 7-29**).

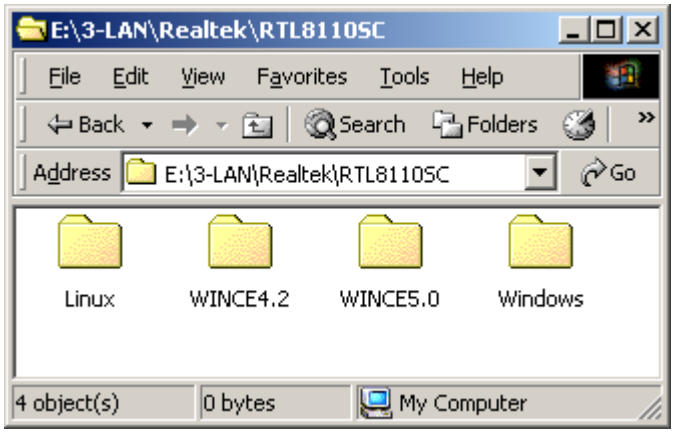


Figure 7-29: RTL8110SC Folder

Step 5: Double-click the appropriate OS folder and a new window opens (**Figure 7-30**).

NOTE:

The remainder of this installation assumes the use of Windows XP as the operating system.

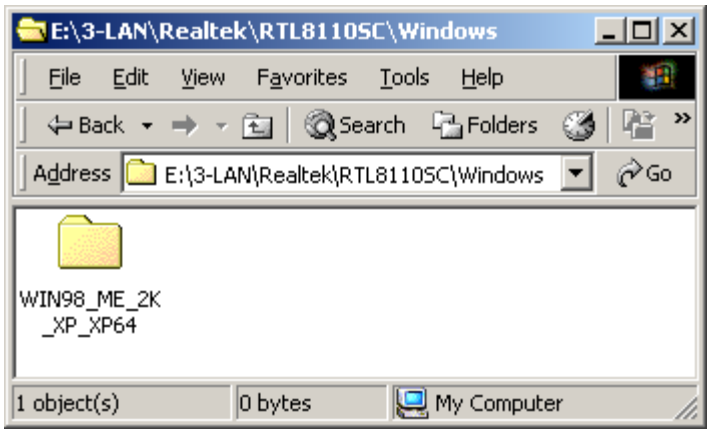


Figure 7-30: Windows Folder

Step 6: Double-click the **WIN98_ME_2K_XP_XP64** folder and a new window opens (**Figure 7-31**).

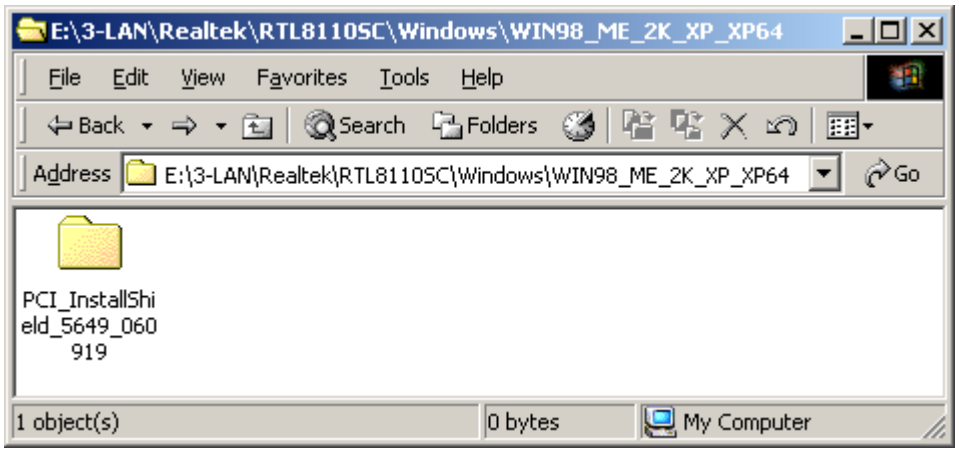


Figure 7-31: WIN98_ME_2K_XP_XP64 Folder

Step 7: Double-click the **PCI_InstallShield_5649_060_919** folder and a new window opens (**Figure 7-32**).

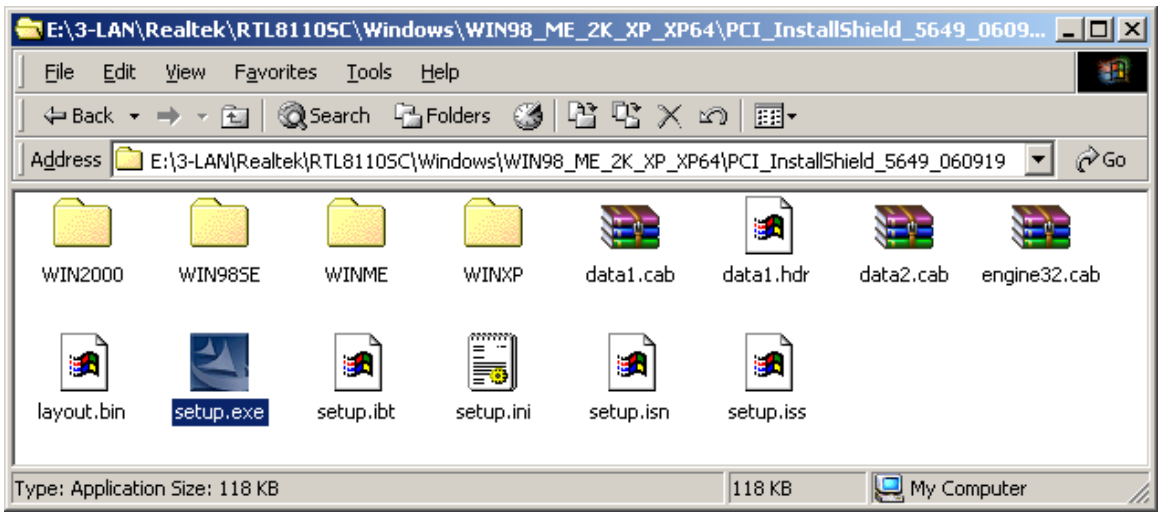


Figure 7-32: PCI_InstallShield_5649_060_919 Folder

Step 8: Double-click the **setup.exe** program icon.

Step 9: The **InstallShield Wizard** is prepared to guide the user through the rest of the process (**Figure 7-33**).

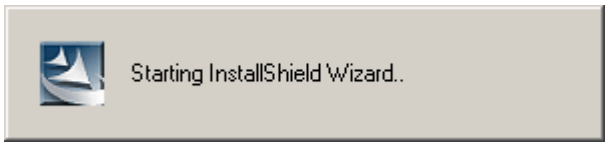


Figure 7-33: RTL8110SC InstallShield Wizard

Step 10: The **InstallShield Wizard** continues (**Figure 7-34**).

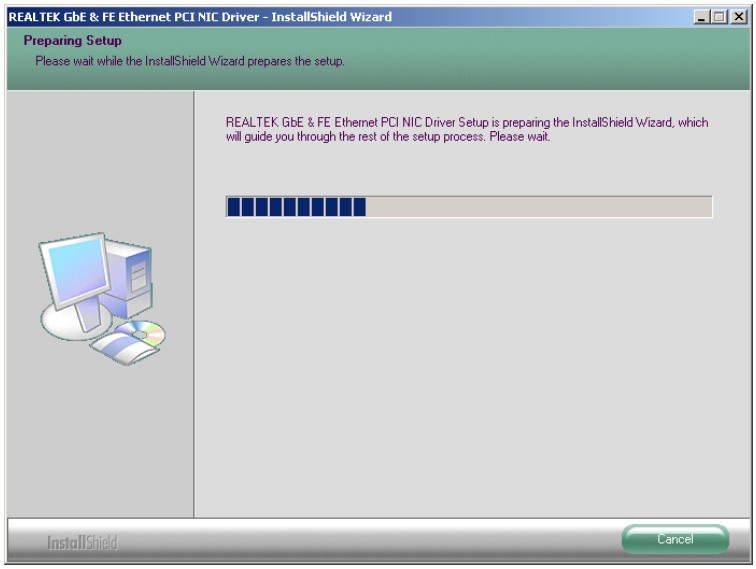


Figure 7-34: RTL8110SC InstallShield Wizard Continues

Step 11: Once initialized, the **InstallShield Wizard** welcome screen appears (**Figure 7-35**).

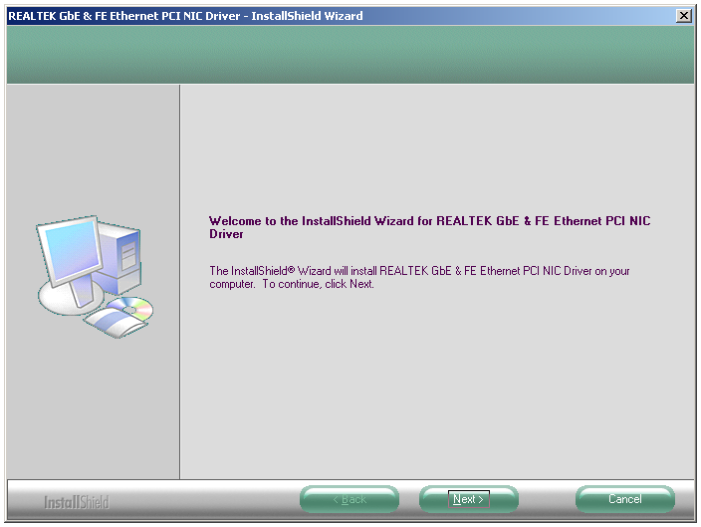


Figure 7-35: RTL8110SC InstallShield Wizard Welcome Screen

Step 12: Click **NEXT** to continue the installation.

Step 13: The **InstallShield Wizard** is ready to install the driver (**Figure 7-36**).

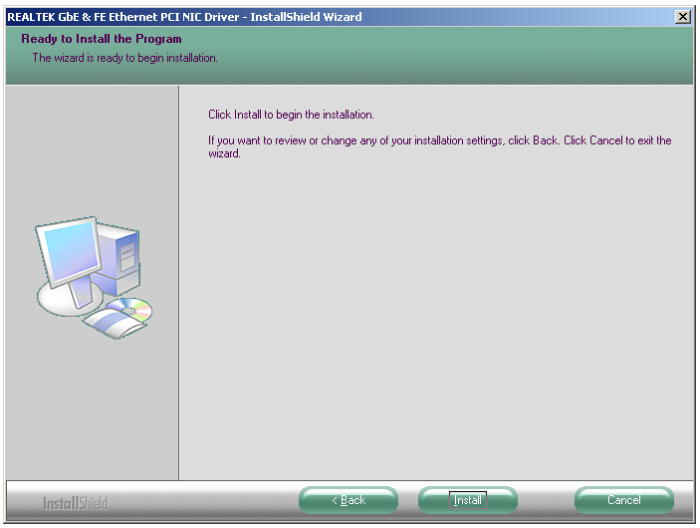


Figure 7-36: RTL8110SC Driver Ready Screen

Step 14: Click **INSTALL** to continue the installation process.

Step 15: **InstallShield** starts to install the new software (**Figure 7-37**).

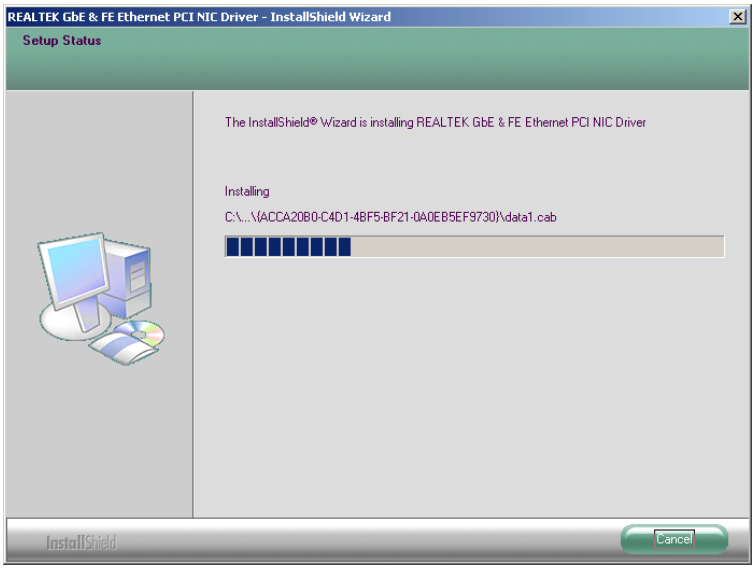


Figure 7-37: RTL8110SC Drivers Installing

Step 16: The **InstallShield Wizard** continues (**Figure 7-38**).

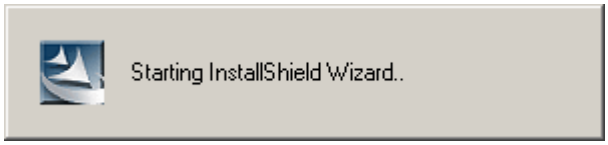


Figure 7-38: RTL8110SC InstallShield Wizard

Step 17: After the driver installation process is complete, a confirmation screen appears (**Figure 7-39**).

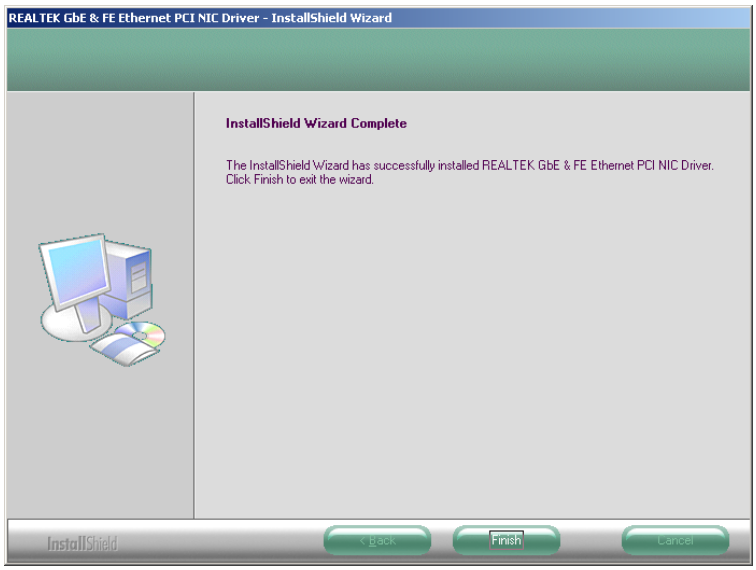


Figure 7-39: RTL8110SC Driver Installation Complete

Step 18: Click **FINISH** to exit the program.

7.6 Realtek AC`97 Audio Driver (ALC665) Installation

To install the Realtek AC `97 audio driver, please follow the steps below.

7.6.1 BIOS Setup

Step 1: Enter the BIOS setup. To do this, reboot the system and press **DEL** during POST.

Step 2: Go to the Southbridge Configuration menu. Set the Audio Controller option to [AC`97].

Step 3: Press **F10** to save the changes and exit the BIOS setup. The system reboots.

7.6.2 Driver Installation

To install the audio driver please follow the steps below.

Step 1: Select **AUDIO** from the list in **Figure 7-2**.

Step 2: A new window opens (**Figure 7-40**).

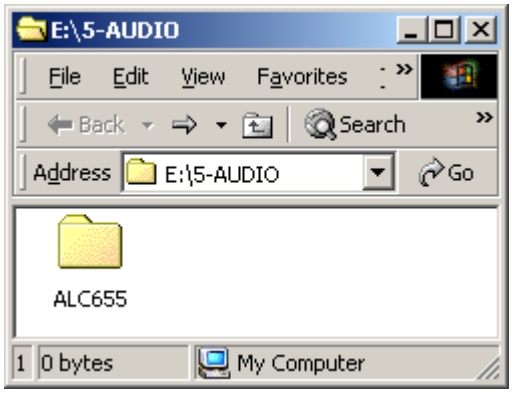


Figure 7-40: Open the ALC655 Folder

Step 3: Double-click the **ALC665** folder.

Step 4: A new window opens (**Figure 7-41**).

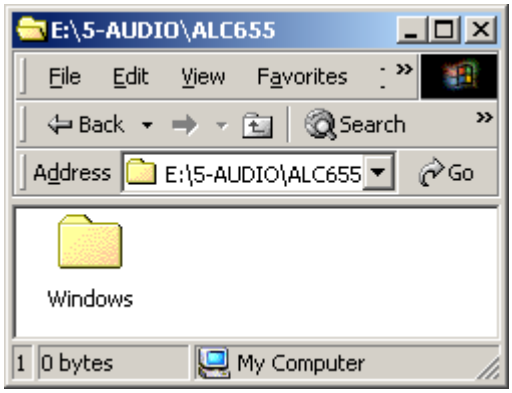


Figure 7-41: Open the Windows Folder

Step 5: Double-click the **Windows** folder.

Step 6: A new window opens (**Figure 7-42**).

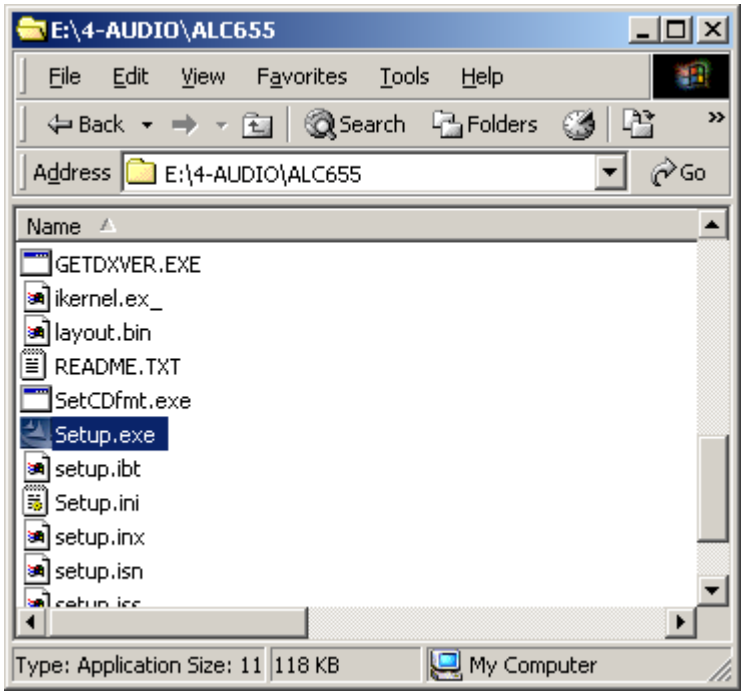


Figure 7-42: Locate the Setup Program Icon

Step 7: Double-click the **Setup.exe** program icon in **Figure 7-42**.

Step 8: The **InstallShield Wizard** is prepared to guide the user through the rest of the process (**Figure 7-43**).

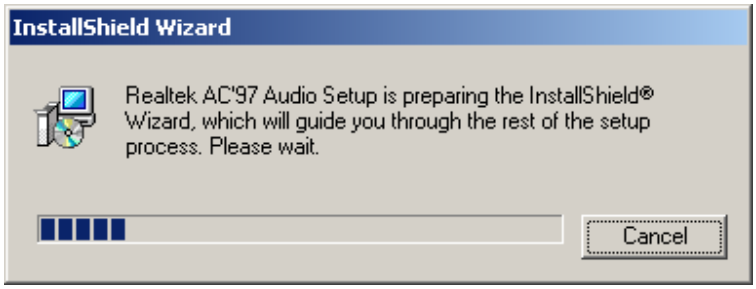


Figure 7-43: Preparing Setup Screen

Step 9: Once initialized, the **InstallShield Wizard** welcome screen appears (**Figure 7-44**).

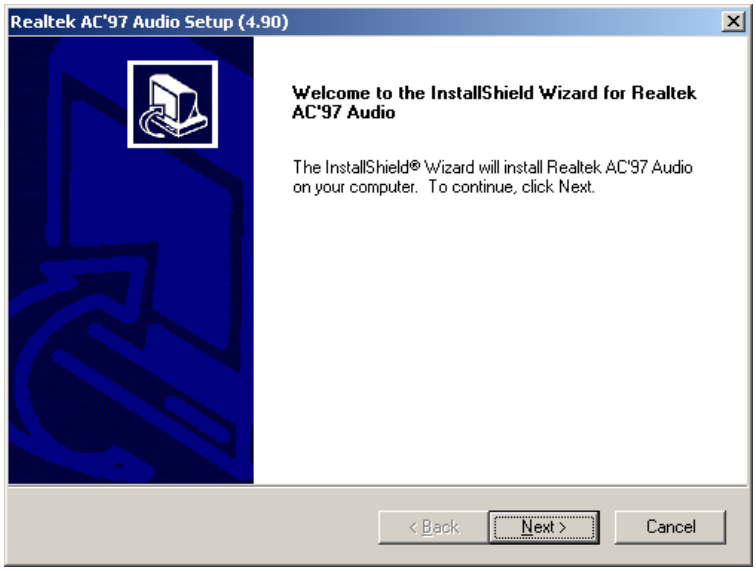


Figure 7-44: InstallShield Wizard Welcome Screen

Step 10: Click **NEXT** to continue the installation.

Step 11: **InstallShield** starts to install the new software as shown in **Figure 7-45**.

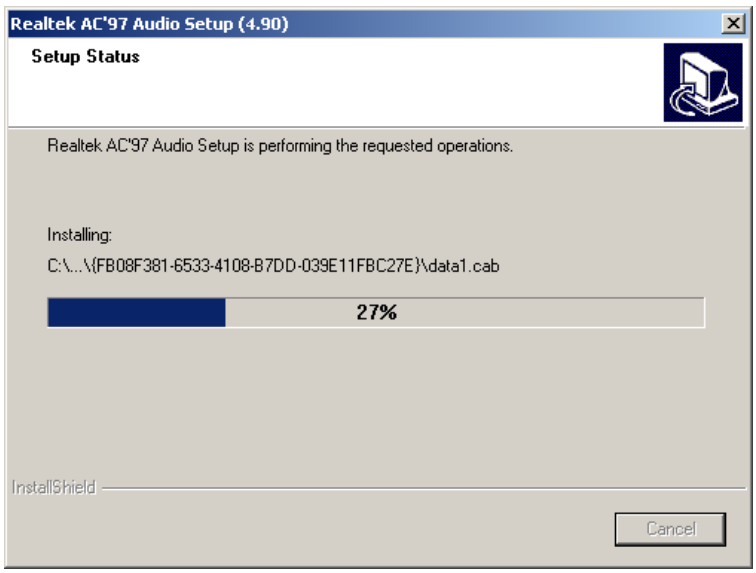


Figure 7-45: Audio Driver Software Configuration

Step 12: At this stage the **Digital Signature Not Found** screen shown in **Figure 7-46** appears.

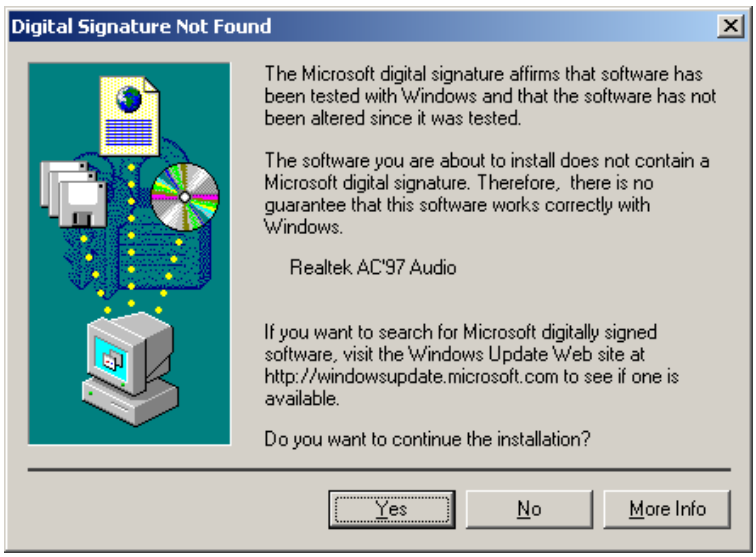


Figure 7-46: Audio Driver Digital Signature

Step 13: Click **YES** and the driver installation begins (**Figure 7-47**).

Figure 7-47: Audio Driver Installation

Step 14: After the driver installation process is complete, a confirmation screen appears (**Figure 7-48**).

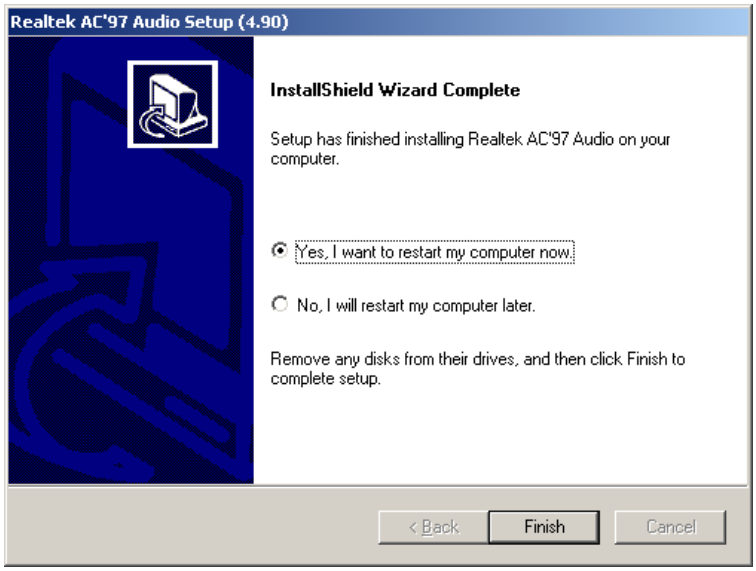


Figure 7-48: Restart the Computer

Step 15: The confirmation screen offers the option of restarting the computer now or later. For the settings to take effect, the computer must be restarted. Click **FINISH** to restart the computer.

Appendix

A

BIOS Options

Below is a list of BIOS configuration options in the BIOS chapter.

Appendix

B

Terminology

AC '97	Audio Codec 97 (AC'97) refers to a codec standard developed by Intel® in 1997.
ACPI	Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.
AHCI	Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.
ATA	The Advanced Technology Attachment (ATA) interface connects storage devices including hard disks and CD-ROM drives to a computer.
ARMD	An ATAPI Removable Media Device (ARMD) is any ATAPI device that supports removable media, besides CD and DVD drives.
ASKIR	Amplitude Shift Keyed Infrared (ASKIR) is a form of modulation that represents a digital signal by varying the amplitude ("volume") of the signal. A low amplitude signal represents a binary 0, while a high amplitude signal represents a binary 1.
BIOS	The Basic Input/Output System (BIOS) is firmware that is first run when the computer is turned on and can be configured by the end user
CODEC	The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.
CompactFlash®	CompactFlash® is a solid-state storage device. CompactFlash® devices use flash memory in a standard size enclosure. Type II is thicker than Type I, but a Type II slot can support both types.
CMOS	Complimentary metal-oxide-conductor is an integrated circuit used in chips like static RAM and microprocessors.
COM	COM refers to serial ports. Serial ports offer serial communication to expansion devices. The serial port on a personal computer is usually a male DB-9 connector.
DAC	The Digital-to-Analog Converter (DAC) converts digital signals to analog signals.
DDR	Double Data Rate refers to a data bus transferring data on both the rising and falling edges of the clock signal.

DMA	Direct Memory Access (DMA) enables some peripheral devices to bypass the system processor and communicate directly with the system memory.
DIMM	Dual Inline Memory Modules are a type of RAM that offer a 64-bit data bus and have separate electrical contacts on each side of the module.
DIO	The digital inputs and digital outputs are general control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.
EHCI	The Enhanced Host Controller Interface (EHCI) specification is a register-level interface description for USB 2.0 Host Controllers.
EIDE	Enhanced IDE (EIDE) is a newer IDE interface standard that has data transfer rates between 4.0 MB/s and 16.6 MB/s.
EIST	Enhanced Intel® SpeedStep Technology (EIST) allows users to modify the power consumption levels and processor performance through application software. The application software changes the bus-to-core frequency ratio and the processor core voltage.
FSB	The Front Side Bus (FSB) is the bi-directional communication channel between the processor and the Northbridge chipset.
GbE	Gigabit Ethernet (GbE) is an Ethernet version that transfers data at 1.0 Gb/s and complies with the IEEE 802.3-2005 standard.
GPIO	General purpose input
HDD	Hard disk drive (HDD) is a type of magnetic, non-volatile computer storage device that stores digitally encoded data.
ICH	The Input/Ouput Controll Hub (ICH) is an Intel® Southbridge chipset.
IrDA	Infrared Data Association (IrDA) specify infrared data transmission protocols used to enable electronic devices to wirelessly communicate with each other.
L1 Cache	The Level 1 Cache (L1 Cache) is a small memory cache built into the system processor.
L2 Cache	The Level 2 Cache (L2 Cache) is an external processor memory cache.

LCD	Liquid crystal display (LCD) is a flat, low-power display device that consists of two polarizing plates with a liquid crystal panel in between.
LVDS	Low-voltage differential signaling (LVDS) is a dual-wire, high-speed differential electrical signaling system commonly used to connect LCD displays to a computer.
POST	The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.
RAM	Random Access Memory (RAM) is volatile memory that loses data when power is lost. RAM has very fast data transfer rates compared to other storage like hard drives.
SATA	Serial ATA (SATA) is a serial communications bus designed for data transfers between storage devices and the computer chipsets. The SATA bus has transfer speeds up to 1.5 Gb/s and the SATA II bus has data transfer speeds of up to 3.0 Gb/s.
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology (S.M.A.R.T) refers to automatic status checking technology implemented on hard disk drives.
UART	Universal Asynchronous Receiver-transmitter (UART) is responsible for asynchronous communications on the system and manages the system's serial communication (COM) ports.
UHCI	The Universal Host Controller Interface (UHCI) specification is a register-level interface description for USB 1.1 Host Controllers.
USB	The Universal Serial Bus (USB) is an external bus standard for interfacing devices. USB 1.1 supports 12 Mb/s data transfer rates and USB 2.0 supports 480 Mb/s data transfer rates.
VGA	The Video Graphics Array (VGA) is a graphics display system developed by IBM.

Appendix

C

Digital I/O Interface

C.1 Introduction

The DIO connector on the IMBA-8650 is interfaced to GPIO ports on the Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.

NOTE:

For further information, please refer to the datasheet for the Super I/O chipset.

C.2 DIO Connector Pinouts

The following table describes how the DIO connector pins are connected to the Super I/O GPIO port 1.

Pin	Description	Super I/O Pin	Super I/O Pin Description
1	Ground	N/A	N/A
2	5 V	N/A	N/A
3	Input 0	128	GP10
4	Output 0	124	GP14
5	Input 1	127	GP11
6	Output 1	123	GP15
7	Input 2	126	GP12
8	Output 2	122	GP16
9	Input 3	125	GP13
10	Output 3	121	GP17

C.3 Assembly Language Samples

C.3.1 Enable the DIO Input Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O input functions is listed below.

MOV	**AX, 6F08H**	Sets the digital port as input
INT	**15H**	Initiates the INT 15H BIOS call

C.3.2 Enable the DIO Output Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O output functions is listed below.

MOV	**AX, 6F09H**	Sets the digital port as output
MOV	**BL, 09H**	
INT	**15H**	Initiates the INT 15H BIOS call

Appendix

D

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 EMIs 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 D-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. When 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 ;
```

Appendix

E

Address Mapping

E.1 Direct Memory Access (DMA)

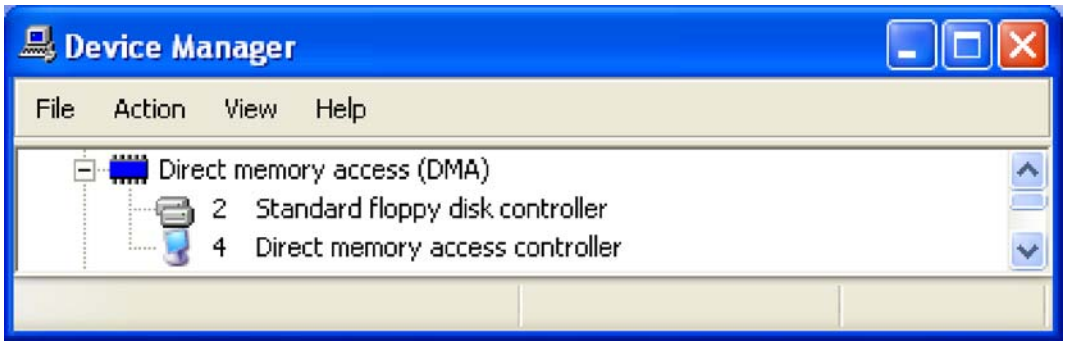


Figure E-1: Direct Memory Access (DMA)

E.2 Input/Output (IO)

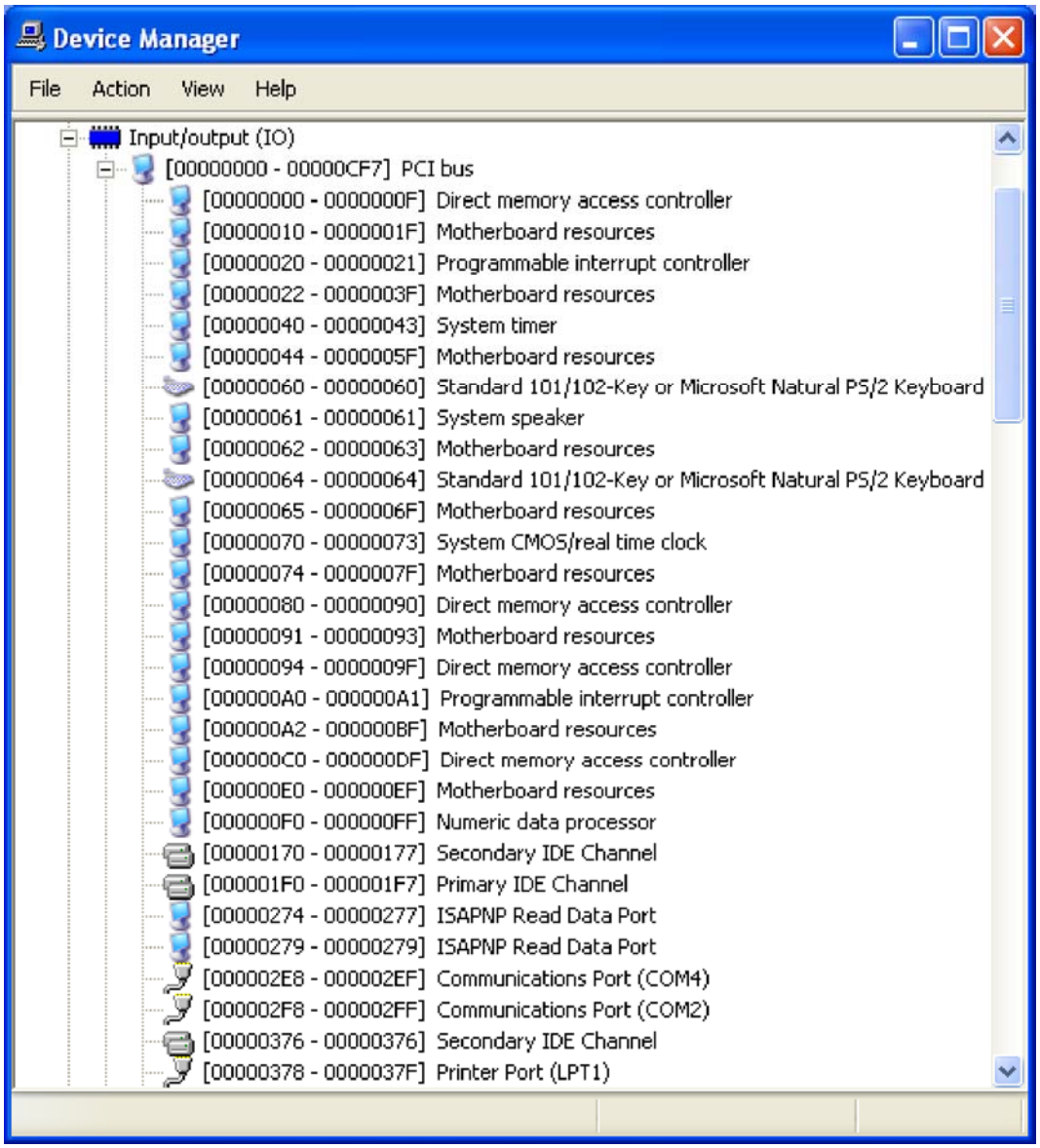


Figure E-2: Input/Output (IO) (1 of 2)

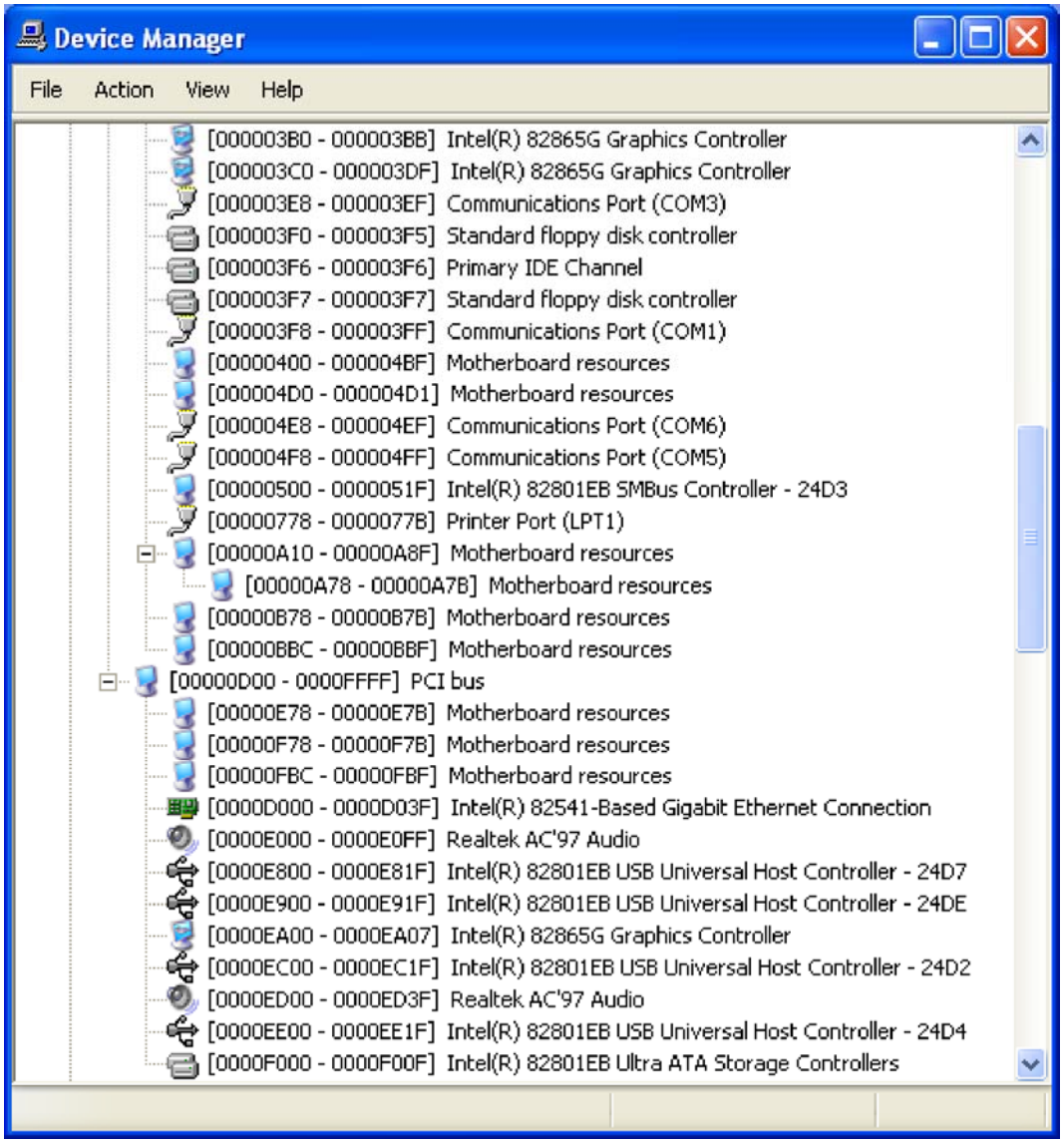


Figure E-3: Input/Output (IO) (2 of 2)

E.3 Interrupt Request (IRQ)

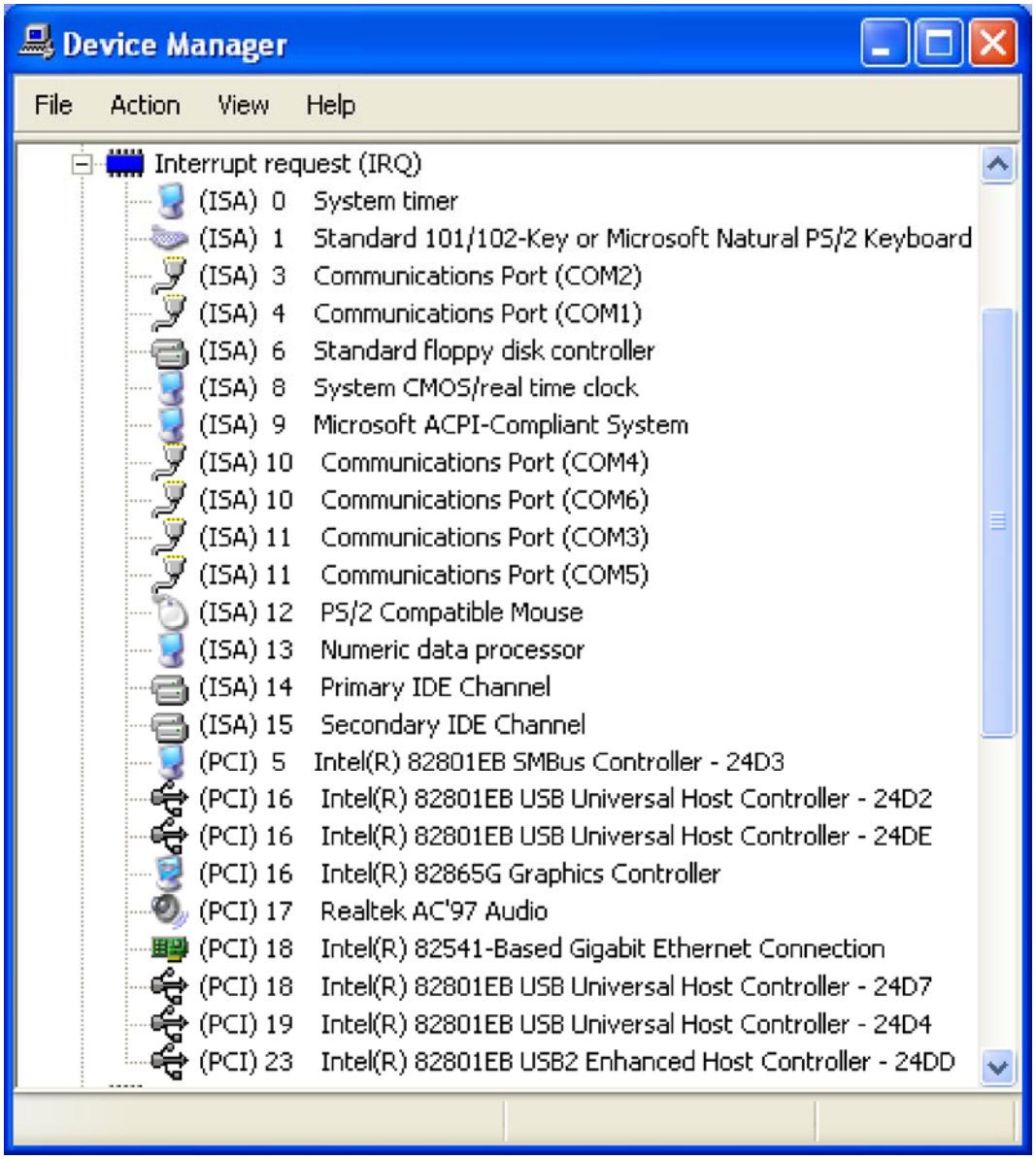


Figure E-4: Interrupt Request (IRQ)

E.4 Memory

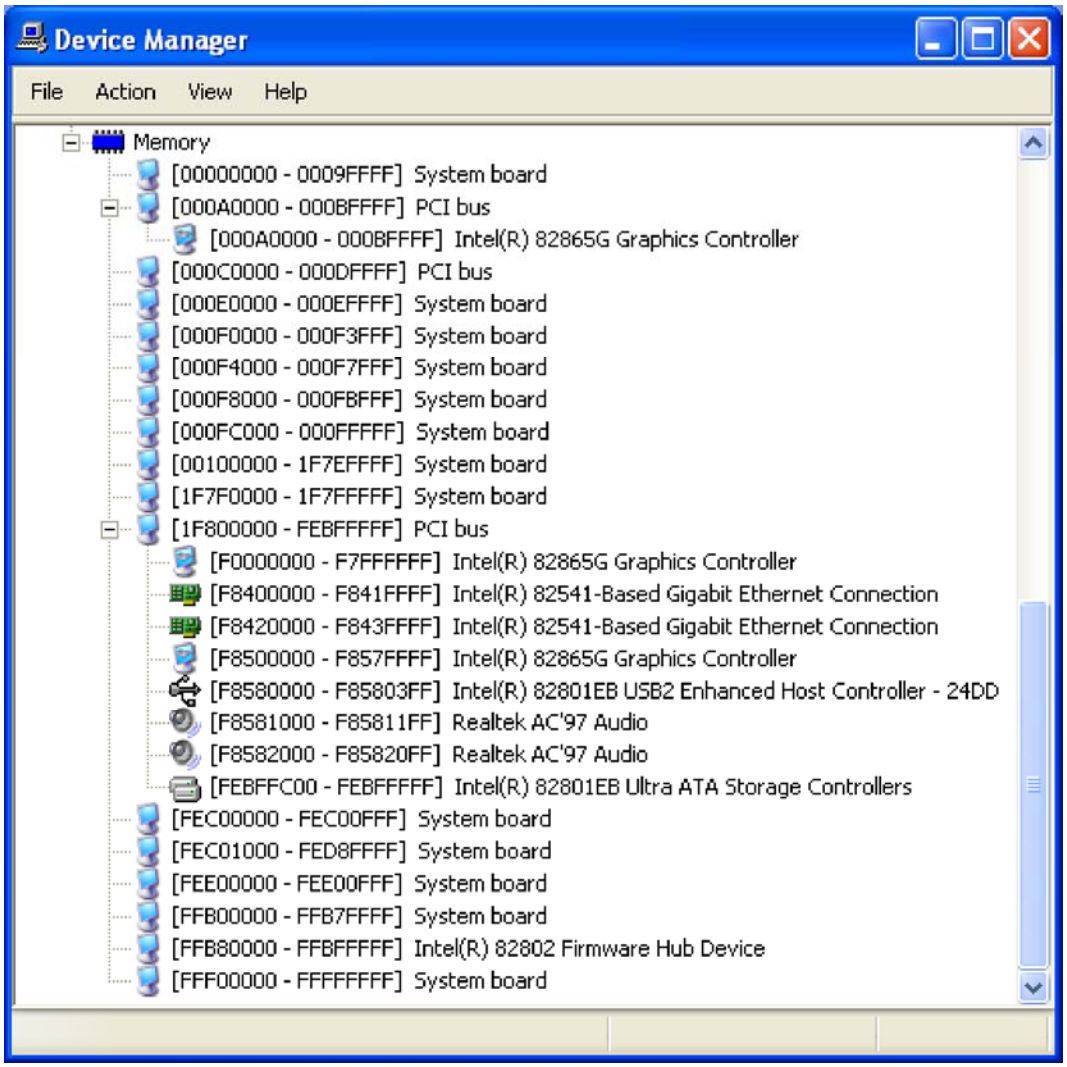


Figure E-5: Memory

Appendix

F

Compatibility

NOTE:

The compatible items described here have been tested by the IEI R&D team and found to be compatible with the IMBA-8650

F.1 Compatible Operating Systems

The following operating systems have been successfully run on the IMBA-8650.

- Microsoft® Windows 2000 SP4
- Microsoft® Windows Server 2003
- Microsoft® Windows XP SP2
- Microsoft® Windows XPE-POS
- Microsoft® Windows Vista Ultimate
- Mandriva 2008
- Red Hat 9.0
- OpenSuSE 10.3
- Fedora 8

F.2 Compatible Processors

The following Intel® Socket 478 processors have been successfully tested on the IMBA-8650

Model	CPU	FSB	Frequency	Socket
SL7E6	Intel® Pentium 4	800 MHz	3.4 GHz	Socket 478
SL7C5	Intel® Celeron® D	533 MHz	2.53 GHz	Socket 478
SL6 WJ	Intel® Pentium 4	800 MHz	2.8 GHz	Socket 478
SL6S5	Intel® Pentium 4	533 MHz	3.06 GHz	Socket 478
SL6K6	Intel® Pentium 4	533 MHz	2.8 GHz	Socket 478
SL7AA	Intel® Pentium 4	800 MHz	3.2 GHz	Socket 478

F.3 Compatible Memory Modules

NOTE:

The memory modules listed below have been tested on the IMBA-8650 other memory modules that comply with the specifications may also work on the IMBA-8650 but have not been tested.

The following memory modules have been successfully tested on the IMBA-8650.

Manufacturer	Model No.	Capacity	Speed	Type
Transcend	TS32MLD64 V4F	256 MB	400 MHz	DDR
Transcend	TS64MLD64 V4F3	512 MB	400 MHz	DDR
Transcend	TS128MLD64 V4J	1.0 GB	400 MHz	DDR
Transcend	TS64MLD64 V4J	512 MB	400 MHz	DDR
Kingston	KVR400X64C3A/512	512 MB	400 MHz	DDR
Kingston	KVR400X64C3A/1G	1.0 GB	400 MHz	DDR
Apacer	77.10736.19G	512 MB	400 MHz	DDR
KINGMAX	MPXB62D-38KT3B	256 MB	400 MHz	DDR
KINGMAX	MPXC22F-D8HT4B	512 MB	400 MHz	DDR
KINGSTEK	KSTDXC22D 38DT4R	512 MB	400 MHz	DDR
Hynix	HY5DU28822AT-J	128 MB	400 MHz	DDR
KINGSTEK	KSTDXB62D 38DT4R	256 MB	400 MHz	DDR

Appendix

G

Hazardous Materials Disclosure

G.1 Hazardous Materials Disclosure Table for IPB Products Certified as RoHS Compliant Under 2002/95/EC Without Mercury

The details provided in this appendix are to ensure that the product is compliant with the Peoples Republic of China (China) RoHS standards. The table below acknowledges the presences of small quantities of certain materials in the product, and is applicable to China RoHS only.

A label will be placed on each product to indicate the estimated “Environmentally Friendly Use Period” (EFUP). This is an estimate of the number of years that these substances would “not leak out or undergo abrupt change.” This product may contain replaceable sub-assemblies/components which have a shorter EFUP such as batteries and lamps. These components will be separately marked.

Please refer to the table on the next page.

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	X	O	O	O	O	X
Display	X	O	O	O	O	X
Printed Circuit Board	X	O	O	O	O	X
Metal Fasteners	X	O	O	O	O	O
Cable Assembly	X	O	O	O	O	X
Fan Assembly	X	O	O	O	O	X
Power Supply Assemblies	X	O	O	O	O	X
Battery	O	O	O	O	O	O

O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in SJ/T11363-2006

X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有"环境友好使用期限"的标签，此期限是估算这些物质"不会有泄漏或突变"的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	X	O	O	O	O	X
显示	X	O	O	O	O	X
印刷电路板	X	O	O	O	O	X
金属螺帽	X	O	O	O	O	O
电缆组装	X	O	O	O	O	X
风扇组装	X	O	O	O	O	X
电力供应组装	X	O	O	O	O	X
电池	O	O	O	O	O	O
O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。 X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。						

Appendix

H

AC'97 Audio Codec

H.1 Introduction

The motherboard comes with an onboard Realtek ALC655 CODEC. The ALC655 is a 16-bit, full-duplex AC'97 Rev. 2.3 compatible six-channel audio CODEC that provides three pairs of stereo outputs with 5-bit volume control, a mono output, and multiple stereo and mono inputs, along with flexible mixing, gain, and mute functions.

H.1.1 Accessing the AC'97 CODEC

The CODEC is accessed through the phone jacks on the rear panel of the motherboard. The phone jacks include:

- LINE IN
- LINE OUT
- MIC IN

H.1.2 Driver Installation

The driver installation has been described in the installation section.

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

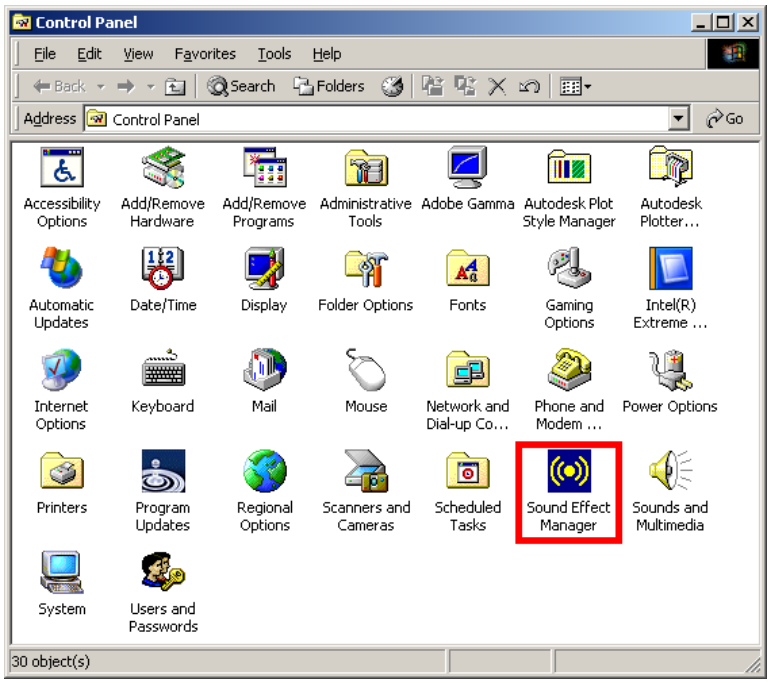


Figure H-1: Control Panel Sound Effect Manager

H.2 Sound Effect Configuration

H.2.1 Accessing the Sound Effects Manager

Follow the steps below to access the **Sound Effect Manager**.

Step 1: Install the ALC655 audio CODEC driver.

Step 2: Click the Sound Effect Manager icon in the system task bar (**Figure H-2**).

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

Step 3: The sound effect manager appears (**Figure H-3**).

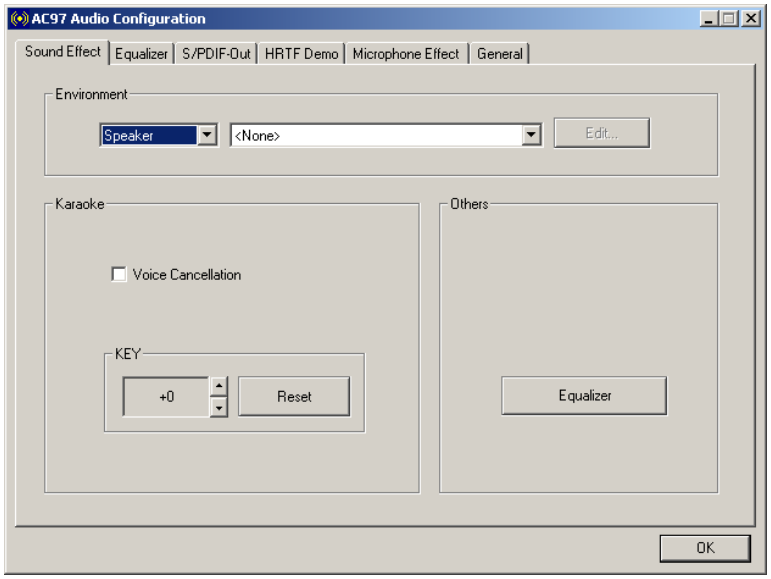


Figure H-3: Sound Effects Manager (ALC655)

NOTE:

The Sound Effect Manager shown in **Figure H-3** 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.

H.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** (**Figure H-3)**.

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. Click **EDIT** to edit the sound effect.
- ***Karaoke Mode*** - **Karaoke Mode** is accessed in the Sound Effect tab. The **Voice Cancellation** disables the vocal part of the music being played. The **Key adjustment** up or down arrow icons enable 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 phone jack 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*** - S/PDIF is used to transmit digital and analog audio signals with either a 48 or 44.1 KHz sample rate.
- ***HRTF Demo*** - Adjust HRTF (Head Related Transfer Functions) 3D positional audio 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.

Index

+

A

B

C

D

E

F

G

H

I

J

K

L

M

N

P

R

S

T

U

V

W