MODEL: IMBA-9454ISA

Intel® Core 2 Duo, Pentium® 4, Pentium® D or Celeron® D ATX Motherboard with 533 MHz, 800 MHz or 1066 MHZ FSB and Supports Dual-channel DDR2, VGA, PCIe x16, ISA FDD, LPT, SATA II, USB 2.0 and PCIe GbE

User Manual

Rev. 1.00 MAY 2008
# Revision

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<thead>
<tr>
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<th>Version</th>
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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:

This is an example of a warning message. Failure to adhere to warning messages may result in permanent damage to the IMBA-9454ISA 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-9454ISA. Cautions are easy to recognize. The word “caution” is written as “CAUTION,” both capitalized and bold and is followed. The italicized text is the cautionary message. A caution message is shown below:
CAUTION:

This is an example of a caution message. Failure to adhere to caution messages may result in permanent damage to the IMBA-9454ISA. 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-9454ISA. 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-9454ISA 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-9454ISA package.

- 1 x IMBA-9454ISA single board computer
- 2 x Dual RS-232 cable
- 1 x ATA 66/100 flat cable
- 1 x I/O Shielding
- 2 x SATA cables
- 1 x SATA power cables
- 1 x Mini jumper Pack
- 1 x Quick Installation Guide
- 1 x Utility CD

Images of the above items are shown in Chapter 3.
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Introduction
1.1 Overview

The IMBA-9454ISA ATX form factor motherboard is a LGA775 Intel® Core™2 Duo, Pentium® 4 or Celeron® D platform with a 533 MHz, 800 MHz or 1066 MHz front side bus (FSB). Up to 4.0 GB of DDR2 SDRAM and up to four SATA II hard disk drives (HDD) are supported. High-performance PCI Express (PCIe) Gigabit Ethernet (GbE) connectivity is integrated into the system. Four or five PCI slots, two or one ISA slots and eight USB 2.0 connectors (four external and four internal) provide flexible expansion options. Added system security is provided with Trusted Platform Module (TPM v1.2) support. An external VGA connector and three audio-jacks facilitate multi-media applications.

1.1.1 IMBA-9454ISA Features

Some of the IMBA-9454ISA features are listed below.

- Supports LGA775 Intel® CPUs including:
  - Intel® Core™2 Duo
  - Intel® Pentium® 4
  - Intel® Celeron® D
Maximum FSB of 1066 MHz
- Supports four 240-pin 533 MHz or 667 MHz 1.0 GB (max.) DDR2 memory modules
- Added security with support for TPM v1.2
- Expansion slots include:
  - Five PCI slots
  - Two ISA slots
- Four SATA II drives with transfer rates of 3.0 Gbps supported
- Eight USB 2.0 devices supported
- Dual PCIe GbE Ethernet connectors
- ATX form factor
- RoHS compliant
- Supports ATX power supplies

1.2 IMBA-9454ISA Overview

1.2.1 IMBA-9454ISA Overview Photo

The IMBA-9454ISA has a wide variety of peripheral interface connectors. Figure 1-2 is a labeled photo of the peripheral interface connectors on the IMBA-9454ISA.
1.2.2 IMBA-9454ISA Peripheral Connectors and Jumpers

The IMBA-9454ISA has the following connectors on-board:

- 1 x ATX +12V power connector
- 1 x ATX power connector
- 1 x Audio auxiliary in connector
- 1 x Audio CD In connector
- 1 x Audio connector (front panel)
- 1 x Audio connector
1x CF card Type II socket
1 x CPU cooling fan connector
2 x System cooling fan connectors
1 x Digital input/output (DIO) connector
1 x Floppy disk connector
1 x Front panel connector
1 x IDE connector
1 x Infrared connector
2 x ISA sockets
5 x PCI sockets
4 x RS-232 serial port connectors
1 x RS-232/422/485 serial port connector
4 x Serial ATA drive connectors
1 x Serial port (COM2) select RS-232/422/485
1 x SPDIF connector
1 x TPM connector
2 x USB connectors

The IMBA-9454ISA has the following external peripheral interface connectors on the board rear panel

3 x Audio jacks
2 x Ethernet connectors
1 x Parallel port connector
2 x PS/2 connectors
1 x Serial port connector
4 x USB 2.0 port connectors
1 x VGA connector

The IMBA-9454ISA has the following on-board jumpers:

AT power select
Clear CMOS
CF card setting
Select RS-232/422/485 for COM2
1.3 Technical Specifications

IMBA-9454ISA technical specifications are listed in Table 1-1. See Chapter 2 for details.

<table>
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<tr>
<th>Specification</th>
<th>IMBA-9454ISA</th>
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<td>Form Factor</td>
<td>ATX</td>
</tr>
<tr>
<td>System CPU</td>
<td>LGA775 Intel® Core™ 2 Duo</td>
</tr>
<tr>
<td></td>
<td>LGA775 Intel® Pentium® 4</td>
</tr>
<tr>
<td></td>
<td>LGA775 Intel® Celeron® D</td>
</tr>
<tr>
<td>Front Side Bus</td>
<td>533 MHz, 800 MHz or 1066 MHz</td>
</tr>
<tr>
<td>System Chipset</td>
<td>Northbridge: Intel® 945</td>
</tr>
<tr>
<td></td>
<td>Southbridge: Intel® ICH7</td>
</tr>
<tr>
<td>Memory</td>
<td>Four dual channel 240-pin DDR2 DIMM sockets support</td>
</tr>
<tr>
<td></td>
<td>four 533 MHz or 667 MHz 1.0 GB (max.) DIMM. A maximum</td>
</tr>
<tr>
<td></td>
<td>of 4.0 GB of DDR2 is supported.</td>
</tr>
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<tr>
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<td>One 20-pin connector TPM v1.2 module</td>
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<td>Expansion Options</td>
<td>Five PCI slots</td>
</tr>
<tr>
<td></td>
<td>Two ISA slots</td>
</tr>
<tr>
<td>Infrared (IrDA)</td>
<td>One infrared interface</td>
</tr>
<tr>
<td>LAN</td>
<td>Dual Broadcom BCM5787M PCIe GbE chipsets with ASF</td>
</tr>
<tr>
<td></td>
<td>2.0 support</td>
</tr>
<tr>
<td>SuperIO</td>
<td>ITE IT8712F</td>
</tr>
<tr>
<td>SSD</td>
<td>CF Type II</td>
</tr>
<tr>
<td>Feature</td>
<td>Specification</td>
</tr>
<tr>
<td>--------------------------</td>
<td>----------------------------------------------------</td>
</tr>
<tr>
<td>Digital I/O</td>
<td>8-bit digital I/O, 4-bit input/4-bit output</td>
</tr>
<tr>
<td>COM</td>
<td>Five RS-232 serial ports (four internal, one external)</td>
</tr>
<tr>
<td></td>
<td>One RS-232, RS-422 or RS-485 serial port (internal)</td>
</tr>
<tr>
<td>USB 2.0</td>
<td>Eight USB 2.0 devices supported</td>
</tr>
<tr>
<td>IDE</td>
<td>One 40-pin IDE connector connects to two Ultra ATA33/66/100 devices</td>
</tr>
<tr>
<td>SATA</td>
<td>Four 3.0 Gbps SATA II drives supported</td>
</tr>
<tr>
<td>Keyboard/mouse</td>
<td>Two PS/2 connectors for keyboard and mouse</td>
</tr>
<tr>
<td>Parallel Port</td>
<td>One external parallel port connects to parallel communications device (e.g. printer)</td>
</tr>
<tr>
<td>Watchdog Timer</td>
<td>Software programmable 1-255 sec. by super I/O</td>
</tr>
<tr>
<td>Power Supply</td>
<td>ATX power only</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>5 V @ 4.25 A, 12 V @ 10.17 A and 3.3 V @ 6.07 A</td>
</tr>
<tr>
<td></td>
<td>(Intel® Pentium® 4 3.73GHz, 1066MHz FSB CPU and 1GB 667MHz DDR2)</td>
</tr>
<tr>
<td>Temperature</td>
<td>0ºC – 60ºC (32ºF - 140ºF)</td>
</tr>
<tr>
<td>Humidity (operating)</td>
<td>5%~95% non-condensing</td>
</tr>
<tr>
<td>Dimensions (LxW)</td>
<td>305 mm x 244 mm</td>
</tr>
<tr>
<td>Weight (GW/NW)</td>
<td>1200g/650g</td>
</tr>
</tbody>
</table>

Table 1-1: Technical Specifications
Chapter 2

Detailed Specifications
2.1 Dimensions

2.1.1 Board Dimensions

The dimensions of the board are listed below:

- **Length**: 304.80mm
- **Width**: 243.84mm

![Figure 2-1: IMBA-9454ISA Dimensions (mm)](image)

2.1.2 External Interface Panel Dimensions

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

![Figure 2-2: External Interface Panel Dimensions (mm)](image)
2.2 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
2.3 Compatible Processors

The IMBA-9454ISA supports the following LGA775 processors:

- Intel® Core™2 Duo
- Intel® Pentium® 4
- Intel® Celeron® D

All of the above processors are interfaced with an Intel® 945G northbridge chipset through the front side bus (FSB).

Figure 2-4: LGA775 CPU Socket

Features of the supported processors are listed in sections below.
2.3.1 Intel® Core™2 Duo Features

Intel® Core™2 Duo features include:

- Two processing cores
- Up to 8MB of shared L2 cache
- Up to 1066 MHz FSB
- Intel® Wide Dynamic Execution
- Intel® Intelligent Power Capability Intel® Smart Memory Access
- Intel® Advanced Smart Cache
- Intel® Advanced Digital Media Boost

2.3.2 Intel® Pentium® 4 Features

Intel® Pentium® 4 features include:

- Hyper-Threading Technology
- Enhanced Intel SpeedStep® Technology
- Intel® Extended Memory 64 Technology
- Execute Disable Bit

2.3.3 Intel® Celeron® D Features

Intel® Celeron® D features include:

- Intel® Extended Memory 64 Technology
- 512KB Level 2 cache
- 533MHz FSB
- Execute Disable Bit
- Streaming SIMD solutions

2.4 Intel® 945G Northbridge Chipset

2.4.1 Intel® 945G Overview

The Intel® 945G graphics and memory controller hub (GMCH) is interfaced to the Intel® I/O Controller Hub 7 (ICH7) through a high speed Direct Media Interface (DMI) chip-to-chip connection. The high-speed DMI integrates priority based servicing that
allows for concurrent traffic and true isochronous transfer capabilities. Some of the features of the Intel® 945G are listed below.

- Support 533/800/1066MHz FSB
- Supports four, 1GB, 400/533/667MHz dual channel DDR SDRAM DIMMs
- Integrated VGA and SDVO (Serial Digital Video Output) outputs
- Integrated Intel® Graphics Media Accelerator 950 (Intel® GMA 950)
- 2.0GB/s concurrent DMI bandwidth maximizes chipset communications
- PCI Express x16 Graphics Interface with a raw bit rate on data pins of 2Gb/s
- Integrated Intel® High Definition Audio
- Integrated Intel® Matrix Storage Technology
- Integrated Intel® Active Management Technology
- Integrated Intel® Flex Memory Technology

2.4.2 Intel® 945G Memory Support

The Intel® 945G supports four, 1.0 GB, 400/533/667MHz dual channel DDR2 SDRAM DIMMs. Four 240-pin memory sockets on the IMBA-9454ISA enable a maximum of 4GB of DDR2 memory to be installed on the system. The memory sockets are shown in Figure 2-1.
2.4.3 Intel® 945G Integrated Graphics Media Accelerator 950

The Intel® 945G has the Intel® GMA 950 integrated into the chipset. Some of the features of the GMA 950 are listed below.

- Intel GMA 950 Graphics Core
  - 400MHz 256-bit graphics core
  - Up to 10.6 GB/sec memory bandwidth with DDR2 667 MHz system memory
  - 1.6 GPixels/sec and 1.6 GTexels/sec fill rate
  - 192 MB maximum video memory
  - 2048x1536 at 75 Hz maximum resolution
  - Dynamic Display Modes for flat-panel, wide-screen and Digital TV support
Operating systems supported: Microsoft Windows® XP, Windows® XP 64-bit, Media Center Edition, Windows 2000; Linux-compatible (Xfree86 source available)

- High Performance 3D
  - Up to 4 pixels per clock rendering
  - Microsoft® DirectX® 9 Hardware Acceleration Features: Pixel Shader 2, Volumetric Textures, Shadow Maps, Slope Scale Depth Bias, Two-Sided Stencil
  - Microsoft® DirectX® 9 Vertex Shader 3.0 and Transform and Lighting supported in SW through highly optimized Processor Specific Geometry Pipeline (PSGP)
  - Texture Decompression for DirectX® and OpenGL®
  - OpenGL® 1.4 support with ARB extensions

- Advanced Display Technology
  - Consumer Electronic display (Digital TV) support
  - Two Serial Digital Video Out (SDVO) ports for flat-panel monitors via ADD2 cards
  - Multiple display types (LVDS, DVI-I, DVI-D, CRT)
  - Dual screen support via ADD2 digital video devices
  - HDTV 720p and 1080i display resolution support
  - Interlaced Display output support

- High Quality Media Support
  - High Definition Hardware Motion Compensation to support HD hi-bitrate MPEG2 media playback
  - Up and Down Scaling of Video Content
  - HD Content Decode – up to two stream support
  - 5x3 Overlay Filtering

2.4.4 Intel® 945G PCIe x16

The Intel® 945G northbridge chipset has a dedicated 16-lane PCIe port for an external PCIe x16 graphics card. The PCIe x16 graphics card is installed in the on-board PCIe x16 slot shown in Figure 2-6.
Some of the PCIe x16 bus specifications are listed below.

- Compliant with the current PCI Express Base Specification base PCIe frequency of 2.5GHz
- Raw bit rate on the pins is 250Gb/s
- Maximum theoretical bandwidth of 4GB/s in each direction resulting in an 8GB/s bandwidth when in PCIe x16 mode
- 100MHz differential reference clock
- PCIe power management support
- L0, L1, L2/L3 ready, L3
- Hierarchical PCI compliant configuration mechanism for downstream components
- PCIe extended configuration space
- PCIe enhanced addressing mechanism

Figure 2-6: PCIe x16 Socket

2.4.4.1 PCIe x16 Bus Specifications
2.4.5 Intel® 945G Integrated Graphics

The Intel® 945G northbridge chipset has an Intel® Gen. 3.5 integrated graphics engine that supports CRT display devices. A DB-15 VGA connector on the external peripheral interface connector panel is interfaced to the Intel® 945GM graphics engine. The Intel® 945GM internal graphics engine, with an integrated 400MHz RAMDAC and hot plug CRT support, supports analog CRT monitors up to QXGA.

2.4.6 Intel® 945G Direct Media Interface (DMI)

Intel® 945G northbridge GMCH is connected to the Intel® ICH7 Southbridge Chipset through the chip-to-chip Direct Media Interface (DMI). Features of the Intel® 945GM DMI are listed below:

- 2GB/s (1GB/s in each direction) bus speed
- 32-bit downstream address

2.5 Intel® ICH7 Southbridge Chipset

2.5.1 Intel® ICH7 Overview

The ICH7 southbridge chipset on the IMBA-9454ISA has the features are listed below.

- Complies with PCI Express Base Specification, Revision 1.0a
- Complies with PCI Local Bus Specification, Revision 2.3 and supports 33MHz PCI operations
- Supports ACPI Power Management Logic
- Contains:
  - Enhanced DMA controller
  - Interrupt controller
  - Timer functions
- Integrated SATA host controller with DMA operations on four ports with data transfer rates up to 3.0 Gb/s
Integrated IDE controller supports Ultra ATA 100/66/33
Supports eight USB 2.0 devices with four UHCI controllers and one EHCI controller
Complies with System Management Bus (SMBus) Specification, Version 2.0
Supports Audio Codec '97 (AC'97) Revision 2.3
Supports Intel® High Definition Audio
Contains Low Pin Count (LPC) interface
Supports Firmware Hub (FWH) interface
Serial Peripheral Interface (SPI) for Serial and Shared Flash
1.05 V Core Voltage
Intel® High Definition Audio Interface
Intel® Active Management Technology
Intel® Quick Resume Technology Support

2.5.2 Intel® ICH7 Audio Codec '97 Controller

NOTE:

The onboard audio connector and the audio jacks cannot be used concurrently. If the audio jacks are being used, the jumper headers inserted on the onboard audio connector must remain in place. If the onboard audio connector is used, the jumper headers must be removed and the audio jack functions are disabled.

The Audio Codec '97 (AC'97) controller integrated into the ICH7 complies with AC'97 Component Specification, Version 2.3. The AC’97 controller is interfaced to a RealTek ALC655 AC’97 codec which is in turn connected to the following audio connectors:

- CD-In connector (pin header)
- Audio connector (pin header)
- Auxiliary audio connector (pin header)
- SPDIF connector (pin header)
- Surround sound speaker connector (pin header)
- Audio jacks (phone jacks)
  - Mic-In
  - Line-In
  - Line-Out

Figure 2-7: Audio Connectors

Some of the features of the RealTek ALC655 are listed below:

- Meets performance requirements for audio on PC99/2001 systems
- Meets Microsoft WHQL/WLP 2.0 audio requirements
- 16-bit Stereo full-duplex CODEC with 48KHz sampling rate
- Compliant with AC'97 Rev 2.3 specifications
  - Front-Out, Surround-Out, MIC-In and LINE-In Jack Sensing
  - 14.318MHz -> 24.576MHz PLL to eliminate crystal
  - 12.288MHz BITCLK input
- Integrated PCBEEP generator to save buzzer
- Interrupt capability
- Three analog line-level stereo inputs with 5-bit volume control, LINE_IN, CD, AUX
- High-quality differential CD input
- Two analog line-level mono inputs: PCBEEP, PHONE-IN
- Two software selectable MIC inputs
- Dedicated Front-MIC input for front panel applications (software selectable)
- Boost preamplifier for MIC input
- LINE input shared with surround output; MIC input shared with Center and LFE output
- Built-in 50mW/20ohm amplifier for both Front-out and Surround-Out
- External Amplifier Power Down (EAPD) capability
- Power management and enhanced power saving features
- Supports Power-Off CD function
- Adjustable VREFOUT control
- Supports 48KHz S/PDIF output, complying with AC'97 Rev 2.3 specifications
- Supports 32K/44.1K/48KHz S/PDIF input
- Power support: Digital: 3.3V; Analog: 3.3V/5V
- Standard 48-pin LQFP package
- EAX™ 1.0 & 2.0 compatible
- Direct Sound 3D™ compatible
- A3D™ compatible
- I3DL2 compatible
- HRTF 3D positional audio 10-band software equalizer

2.5.3 Intel® ICH7 IDE Interface

The integrated IDE interface on the ICH7 southbridge supports two IDE hard disks and ATAPI devices, PIO IDE transfers up to 16MB/s and Ultra ATA transfers of 100MB/s. The integrated IDE interface is able to support the following IDE HDDs:

- **Ultra ATA/100**, with data transfer rates up to 100MB/s
- **Ultra ATA/66**, with data transfer rates up to 66MB/s
- **Ultra ATA/33**, with data transfer rates up to 33MB/s
Table 2-1 shows the supported HDD specifications.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Ultra ATA/100</th>
<th>Ultra ATA/66</th>
<th>Ultra ATA/33</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDE devices</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>PIO Mode</td>
<td>0 – 4</td>
<td>0 – 4</td>
<td>0 – 4</td>
</tr>
<tr>
<td>PIO Max Transfer Rate</td>
<td>16.6 MB/s</td>
<td>16.6 MB/s</td>
<td>16.6 MB/s</td>
</tr>
<tr>
<td>DMA/UDMA designation</td>
<td>UDMA 3 - 4</td>
<td>UDMA 3 – 4</td>
<td>UDMA 2</td>
</tr>
<tr>
<td>DMA/UDMA Max Transfer</td>
<td>100MB/s</td>
<td>66MB/s</td>
<td>33MB/s</td>
</tr>
<tr>
<td>Controller Interface</td>
<td>5V</td>
<td>5V</td>
<td>5V</td>
</tr>
</tbody>
</table>

Table 2-1: Supported HDD Specifications

The IDE connector is shown below
2.5.4 Intel® ICH7 Low Pin Count (LPC) Interface

The ICH7 LPC interface complies with the LPC 1.1 specifications. The LPC bus from the ICH7 is connected to the following components:

- BIOS chipset
- Super I/O chipset
- Serial port controller
2.5.5 Intel® ICH7 PCI Interface

NOTE:

PCI and ISA slots can only be used in the following configuration:

- Five PCI slots and one ISA slot OR
- Four PCI slots and two ISA slots can be

The five PCI slots cannot be used with two ISA slots concurrently.

The PCI interface on the ICH7 is compliant with the PCI Revision 2.3 implementation. Some of the features of the PCI interface are listed below.

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

Five of the six PCI bus masters are interfaced to five PCI slots. The remaining PCI bus master is interfaced to an ITE IT8888G PCI-to-ISA bridge, which is then connected to two ISA slots.
2.5.5.1 PCI-to-ISA Bridge

The IT8888G has a PCI specification v2.1 compliant 32-bit PCI bus interface and supports both PCI Bus master and slave. The PCI interface supports both programmable positive and full subtractive decoding schemes. The ISA bridge and sockets are shown below.
Some of the features of the IT8888G PCI to ISA bridge are listed below.

- PCI Interface
- Programmable PCI Address Decoders
- PC/PCI DMA Controller
- Distributed DMA Controller
- ISA Interface
- SM Bus
- 1 analog line-level mono output: MONO_OUT
- Power-on Serial Bus Configuration
- Serial IRQ
- Versatile power-on strapping options
- Supports NOGO function
- Single 33 MHz Clock Input
2.5.6 PCI Express Gigabit Ethernet

Two of the PCIe x1 root ports on the Intel® ICH7 are interfaced to two Broadcom BCM5787M PCI Express (PCIe) GbE controllers. The Broadcom BCM5787M PCIe Express (PCIe) GbE controller is a 10/100/1000BASE-T Ethernet LAN controller. The BCM5787M combines a triple-speed IEEE 802.3 compliant Media Access Controller (MAC) with a triple-speed Ethernet transceiver, a PCIe bus interface, and an on-chip buffer memory.

Figure 2-11: PCIe GbE

Some of the BCM5787 controller features are listed below:
- Integrated 10/100/1000BASE-T transceiver
- Automatic MDI crossover function
- PCIe v1.0a
- 10/100/1000BASE-T full/half-duplex MAC
- Wake on LAN support meeting the ACPI requirements
- Statistics for SNMP MIB II, Ethernet-like MIB, and Ethernet MIB (802.3z, clause 30)
- Serial EEPROM or serial flash support
- JTAG support

2.5.7 Intel® ICH7 Real Time Clock

256 bytes of battery backed RAM is provided by the Motorola MC146818A real time clock (RTC) integrated into the ICH7. The RTC operates on a 3V battery and 32.768KHz crystal. The RTC keeps track of the time and stores system data even when the system is turned off.

2.5.8 Intel® ICH7 SATA Controller

The integrated SATA controller on the ICH7 southbridge supports four SATA drives with independent DMA operations. SATA controller specifications are listed below.

- Supports four SATA drives
- Supports 3.0Gb/s data transfer speeds
- Supports Serial ATA Specification, Revision 1.0a and supports several optional sections of the Serial ATA II: Extensions to Serial ATA 1.0 Specification, Revision 1.0 (AHCI support is required for some elements).
2.5.9 Intel® ICH7 USB Controller

Up to eight high-speed, full-speed or low-speed USB devices are supported by the ICH7 on the IMBA-9454ISA. High-speed USB 2.0, with data transfers of up to 480MB/s, is enabled with the ICH7 integrated Enhanced Host Controller Interface (EHCI) compliant host controller. USB full-speed and low-speed signaling is supported by the ICH7 integrated Universal Host Controller Interface (UHCI) controllers.

Four of the USB ports are accessed through two 4-pin pin headers. The remaining four USB ports are external USB connectors.
2.6 LPC Bus Components

2.6.1 LPC Bus Overview

The LPC bus is connected to components listed below:

- BIOS chipset
- Super I/O chipset
- Serial port chipset
2.6.2 BIOS Chipset

The BIOS chipset has a licensed copy of AMI BIOS installed on the chipset. Some of the BIOS features are listed below:

- AMI Flash BIOS
- SMIBIOS (DMI) compliant
- Console redirection function support
- PXE (Pre-boot Execution Environment) support
- USB booting support

Figure 2-14: LPC Bus Components
2.6.3 Super I/O chipset

The iTE IT8712F Super I/O chipset is connected to the ICH8DO southbridge through the LPC bus. The iTE IT8712F is an LPC interface-based Super I/O device that comes with Environment Controller integration. Some of the features of the iTE IT8712F chipset are listed below:

- PC98/99/2001, ACPI and LANDesk Compliant
- Enhanced Hardware Monitor
- Fan Speed Controller
- Single +5V Power Supply
- Two 16C550 UARTs for serial port control
- One IEEE 1284 Parallel Port
- Keyboard Controller
- Watchdog Timer
- Serial IRQ Support
- Vbat & Vcch Support
- Single +5V Power Supply

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

2.6.3.1 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.

2.6.3.2 Super I/O Digital Input/Output

The input mode supports switch debouncing or programmable external IRQ routing. The output mode supports two sets of programmable LED blinking periods.

2.6.3.3 Super I/O 16C550 UARTs

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

- Two standard serial ports (COM1 and COM2)
IrDa 1.0 and ASKIR protocols

Another two chipsets connected to the LPC bus provided connectivity to another four serial port connectors

2.6.3.4 Super I/O Enhanced Hardware Monitor

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

2.6.3.5 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.

2.6.3.6 Super I/O Floppy Disk Controller

The Super I/O floppy disk controller has the following specifications:

- Supports floppy drives with the following capacity:
  - 360K
  - 720K
  - 1.2M
  - 1.44M
  - 2.88M

2.6.3.7 Super I/O Keyboard/Mouse Controller

The Super I/O keyboard/mouse controller can execute the 8042 instruction set. Some of the keyboard controller features are listed below:

- The 8042 instruction is compatible with a PS/2 keyboard and PS/2 mouse
- Gate A20 and Keyboard reset output
- Supports multiple keyboard power on events
- Supports mouse double-click and/or mouse move power on events
2.6.3.8 Super I/O Parallel Port

The multi-mode high-performance parallel port supports the bi-directional Standard Parallel Port (SPP), the Enhanced Parallel Port (EPP) and the Extended Capabilities Port (ECP) modes.

2.6.4 Fintek F81216DG LPC Serial Port Chipset

The Fintek F81216DG chipset enables the addition of four additional UART serial ports (COM3, COM4, COM5 and COM6). UART includes 16-byte send/receive FIFO. The Fintek serial port chipset is interfaced to the Southbridge chipset through the LPC bus. Some of the features of the Fintek chipset 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 24/48MHz
- Powered by 3Vcc

2.7 Environmental and Power Specifications

2.7.1 System Monitoring

Three thermal inputs on the IMBA-9454ISA Super I/O Enhanced Hardware Monitor monitor the following temperatures:

- CPU temperature
- System Temperature 1
- System Temperature 2

All three fan speeds are monitored and can be seen in the BIOS as:

- CPI Fan Speed
- System Fan 1 Speed
- System Fan 2 Speed
Eight voltage inputs on the IMBA-9454ISA Super I/O Enhanced Hardware Monitor monitor the following voltages:

- CPU Core
- DRAM Vcc
- +3.30V
- +5.00V
- +12.0V
- FSB VCC +1.2V
- +1.5V

The IMBA-9454ISA Super I/O Enhanced Hardware Monitor also monitors the following voltages internally:

- VBAT

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

### 2.7.2 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the IMBA-9454ISA are listed below.

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

### 2.7.3 Power Consumption

*Table 2-2* shows the power consumption parameters for the IMBA-9454ISA running with a 1066 MHz FSB 3.73 GHz Intel® Pentium® 4 processor with 1 GB of 667 MHz DDR2 memory.
<table>
<thead>
<tr>
<th>Voltage</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>+3.3 V</td>
<td>6.07 A</td>
</tr>
<tr>
<td>+5 V</td>
<td>4.25 A</td>
</tr>
<tr>
<td>+12 V</td>
<td>10.17 A</td>
</tr>
</tbody>
</table>

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-9454ISA may result in permanent damage to the IMBA-9454ISA and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the IMBA-9454ISA. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the IMBA-9454ISA, 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-9454ISA, place it on an antic-static pad. This reduces the possibility of ESD damaging the IMBA-9454ISA.
- **Only handle the edges of the PCB**: When handling the PCB, hold the PCB by the edges.

3.2 Unpacking

3.2.1 Unpacking Precautions

When the IMBA-9454ISA 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-9454ISA does not fall out of the box.
- Make sure all the components shown in Section 3.3 are present.
3.3 Unpacking Checklist

NOTE:

If some of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the IMBA-9454ISA from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

3.3.1 Package Contents

The IMBA-9454ISA is shipped with the following components:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item and Part Number</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IMBA-9454ISA</td>
<td><img src="image1.png" alt="IMBA-9454ISA Image" /></td>
</tr>
<tr>
<td>2</td>
<td>Dual RS-232 cable</td>
<td><img src="image2.png" alt="Dual RS-232 cable Image" /></td>
</tr>
<tr>
<td></td>
<td>(P/N: 32200-004101-RS)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>ATA 66/100 flat cable</td>
<td><img src="image3.png" alt="ATA 66/100 flat cable Image" /></td>
</tr>
<tr>
<td></td>
<td>(P/N: 32200-000052-RS)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Part Number</td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>I/O Shielding</td>
<td>(P/N: 45002-450903-00-RS)</td>
</tr>
<tr>
<td>2</td>
<td>SATA cables</td>
<td>(P/N: 32000-062800-RS)</td>
</tr>
<tr>
<td>1</td>
<td>SATA power cables</td>
<td>(P/N: 32100-088600-RS)</td>
</tr>
<tr>
<td>1</td>
<td>Mini jumper Pack</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Quick Installation Guide</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Utility CD</td>
<td></td>
</tr>
</tbody>
</table>

Table 3-1: Package List Contents
### 3.4 Optional Items

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-port USB cable (w bracket)</td>
<td>P/N: CB-USB02-RS</td>
</tr>
<tr>
<td>4-port USB cable</td>
<td>P/N: CB-USB14-RS</td>
</tr>
<tr>
<td>CPU cooling kit</td>
<td>P/N: CF-520-RS</td>
</tr>
<tr>
<td>CPU cooling kit</td>
<td>P/N: CF-775A-RS</td>
</tr>
<tr>
<td>Dual RS-232/422/485 cable</td>
<td>P/N: 32200-000063-RS</td>
</tr>
<tr>
<td>FDD cable</td>
<td>P/N: 32200-000017-RS</td>
</tr>
<tr>
<td>PCIe x16 VGA output SDVO card with dual display support</td>
<td>P/N: SDVO-100VGA-R10</td>
</tr>
<tr>
<td><strong>PCIe x16 DVI output SDVO card with dual display support</strong></td>
<td><img src="image1" alt="PCIe x16 DVI output SDVO card with dual display support" /></td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>(P/N: SDVO-100DVI-R10)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Infineon TPM module</strong></td>
<td><img src="image2" alt="Infineon TPM module" /></td>
</tr>
<tr>
<td><strong>(P/N: TPM-IN01-R10)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Winbond TPM module</strong></td>
<td><img src="image3" alt="Winbond TPM module" /></td>
</tr>
<tr>
<td><strong>(P/N: TPM-WI01-R10)</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Table 3-2: Package List Contents**
Chapter 4

Connector Pinouts
4.1 Peripheral Interface Connectors

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

4.1.1 IMBA-9454ISA 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-9454ISA. Detailed descriptions of these connectors can be found below.

<table>
<thead>
<tr>
<th>Connector</th>
<th>Type</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATX +12V power connector</td>
<td>4-pin ATX</td>
<td>CPU12V1</td>
</tr>
<tr>
<td>ATX power connector</td>
<td>24-pin ATX</td>
<td>PWR1</td>
</tr>
<tr>
<td>Audio auxiliary in</td>
<td>4-pin header</td>
<td>AUX1</td>
</tr>
<tr>
<td>Audio CD In</td>
<td>4-pin header</td>
<td>CD_IN1</td>
</tr>
<tr>
<td>Audio connector (front panel)</td>
<td>10-pin header</td>
<td>CN3</td>
</tr>
<tr>
<td>Audio connector</td>
<td>8-pin header</td>
<td>CN4</td>
</tr>
<tr>
<td>CF card Type II socket</td>
<td>50-pin socket</td>
<td>CF1</td>
</tr>
<tr>
<td>Cooling fan connector, CPU</td>
<td>4-pin wafer</td>
<td>FAN1</td>
</tr>
<tr>
<td>Cooling fan connector, system</td>
<td>3-pin wafer</td>
<td>FAN2</td>
</tr>
<tr>
<td>Cooling fan connector, system</td>
<td>3-pin wafer</td>
<td>FAN3</td>
</tr>
<tr>
<td>Digital input/output connector</td>
<td>10-pin header</td>
<td>DIO1</td>
</tr>
<tr>
<td>Floppy disk connector</td>
<td>17-pin box header</td>
<td>FDC1</td>
</tr>
<tr>
<td>Front panel connector</td>
<td>14-pin header</td>
<td>CN2</td>
</tr>
<tr>
<td>IDE connector</td>
<td>40-pin box header</td>
<td>IDE1</td>
</tr>
<tr>
<td>Infrared (IrDA) connector</td>
<td>5-pin header</td>
<td>IR1</td>
</tr>
<tr>
<td>ISA socket</td>
<td>98-pin ISA slot</td>
<td>ISA1</td>
</tr>
<tr>
<td>ISA socket</td>
<td>98-pin ISA slot</td>
<td>ISA2</td>
</tr>
<tr>
<td>PCI socket</td>
<td>124-pin PCI slot</td>
<td>PCI1</td>
</tr>
<tr>
<td>PCI socket</td>
<td>124-pin PCI slot</td>
<td>PCI2</td>
</tr>
</tbody>
</table>
### Table 4-1: Peripheral Interface Connectors

<table>
<thead>
<tr>
<th>Connector Type</th>
<th>Connector Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCI socket</td>
<td>124-pin PCI slot</td>
<td>PCI3</td>
</tr>
<tr>
<td>PCI socket</td>
<td>124-pin PCI slot</td>
<td>PCI4</td>
</tr>
<tr>
<td>PCI socket</td>
<td>124-pin PCI slot</td>
<td>PCI5</td>
</tr>
<tr>
<td>Serial ATA drive connector</td>
<td>7-pin SATA</td>
<td>SATA1</td>
</tr>
<tr>
<td>Serial ATA drive connector</td>
<td>7-pin SATA</td>
<td>SATA2</td>
</tr>
<tr>
<td>Serial ATA drive connector</td>
<td>7-pin SATA</td>
<td>SATA3</td>
</tr>
<tr>
<td>Serial ATA drive connector</td>
<td>7-pin SATA</td>
<td>SATA4</td>
</tr>
<tr>
<td>Serial ATA drive connector</td>
<td>7-pin SATA</td>
<td>SATA5</td>
</tr>
<tr>
<td>Serial ATA drive connector</td>
<td>7-pin SATA</td>
<td>SATA6</td>
</tr>
<tr>
<td>Serial port (COM2) (RS-232/422/485)</td>
<td>4-pin header</td>
<td>CN1</td>
</tr>
<tr>
<td>Serial port connector (COM2) (RS-232/422/485)</td>
<td>14-pin box header</td>
<td>COM2</td>
</tr>
<tr>
<td>Serial port connector (COM3) (RS-232)</td>
<td>10-pin box header</td>
<td>COM3</td>
</tr>
<tr>
<td>Serial port connector (COM4) (RS-232)</td>
<td>10-pin box header</td>
<td>COM4</td>
</tr>
<tr>
<td>Serial port connector (COM5) (RS-232)</td>
<td>10-pin box header</td>
<td>COM5</td>
</tr>
<tr>
<td>Serial port connector (COM6) (RS-232)</td>
<td>10-pin box header</td>
<td>COM6</td>
</tr>
<tr>
<td>SPDIF connector</td>
<td>5-pin header</td>
<td>CN5</td>
</tr>
<tr>
<td>TPM connector</td>
<td>20-pin header</td>
<td>TPM1</td>
</tr>
<tr>
<td>USB connectors</td>
<td>8-pin header</td>
<td>USB3</td>
</tr>
<tr>
<td>USB connectors</td>
<td>8-pin header</td>
<td>USB4</td>
</tr>
</tbody>
</table>

#### 4.1.3 External Interface Panel Connectors

Table 4-2 lists the rear panel connectors on the IMBA-9454ISA. Detailed descriptions of these connectors can be found in Section 4.3 on page 79.
Table 4-2: Rear Panel Connectors

<table>
<thead>
<tr>
<th>Connector</th>
<th>Type</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio connector</td>
<td>3 x audio jacks</td>
<td>CN6</td>
</tr>
<tr>
<td>Keyboard and mouse connector</td>
<td>Dual PS/2</td>
<td>KBMS1</td>
</tr>
<tr>
<td>Parallel port connector</td>
<td>D-Sub 25-pin female</td>
<td>3IN1 DSUB1</td>
</tr>
<tr>
<td>Serial port connector (RS-232)</td>
<td>D-Sub 9-pin male</td>
<td>3IN1 DSUB1</td>
</tr>
<tr>
<td>Dual USB and LAN Combo</td>
<td>Dual USB ports and RJ-45</td>
<td>LAN/USB1</td>
</tr>
<tr>
<td>Dual USB and LAN Combo</td>
<td>Dual USB ports and RJ-45</td>
<td>LAN/USB 2</td>
</tr>
<tr>
<td>VGA port connector</td>
<td>D-Sub 15-pin female</td>
<td>3IN1 DSUB1</td>
</tr>
</tbody>
</table>

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-9454ISA.

4.2.1 ATX +12V Power Connector

**CN Label:** CPU12V1

**CN Type:** 4-pin ATX power connector (2x2)

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

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

The 4-pin ATX power connector is connected to an ATX power supply.
### 4.2.2 ATX Power Connector

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>+12V</td>
</tr>
<tr>
<td>4</td>
<td>+12V</td>
</tr>
</tbody>
</table>

**Table 4-3: ATX Power Connector Pinouts**

The ATX connector is connected to an external ATX power supply. Power is provided to the system, from the power supply through this connector.
**Figure 4-3: ATX Power Connector Pinout Locations**

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+3.3V</td>
<td>13</td>
<td>+3.3V</td>
</tr>
<tr>
<td>2</td>
<td>+3.3V</td>
<td>14</td>
<td>-12V</td>
</tr>
<tr>
<td>3</td>
<td>GROUND</td>
<td>15</td>
<td>GROUND</td>
</tr>
<tr>
<td>4</td>
<td>+5V</td>
<td>16</td>
<td>PS-ON</td>
</tr>
<tr>
<td>5</td>
<td>GROUND</td>
<td>17</td>
<td>GROUND</td>
</tr>
<tr>
<td>6</td>
<td>+5V</td>
<td>18</td>
<td>GROUND</td>
</tr>
<tr>
<td>7</td>
<td>GROUND</td>
<td>19</td>
<td>GROUND</td>
</tr>
<tr>
<td>8</td>
<td>POWER GOOD</td>
<td>20</td>
<td>GND</td>
</tr>
<tr>
<td>9</td>
<td>5VSB</td>
<td>21</td>
<td>+5V</td>
</tr>
<tr>
<td>10</td>
<td>+12V</td>
<td>22</td>
<td>+5V</td>
</tr>
<tr>
<td>11</td>
<td>+12V</td>
<td>23</td>
<td>+5V</td>
</tr>
<tr>
<td>12</td>
<td>+3.3V</td>
<td>24</td>
<td>GND</td>
</tr>
</tbody>
</table>

**Table 4-4: ATX Power Connector Pinouts**
4.2.3 Auxiliary Audio Connector (4-pin)

- **CN Label:** AUX1
- **CN Type:** 4-pin header
- **CN Location:** See Figure 4-4
- **CN Pinouts:** See Table 4-5

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

![Figure 4-4: Auxiliary Audio Connector Location (4-pin)]

<table>
<thead>
<tr>
<th>PIN</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CAUXL</td>
</tr>
<tr>
<td>2</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>CAUXR</td>
</tr>
</tbody>
</table>

Table 4-5: Auxiliary Audio Connector Pinouts (4-pin)

4.2.4 Audio CD In Connector (4-pin)

- **CN Label:** CD_IN1
CN Type: 10-pin header
CN Location: See Figure 4-5
CN Pinouts: See Table 4-6

The 4-pin audio CD in connector is connected to an external audio CD device for the input and output of audio signals from a CD player to the system.

Figure 4-5: Audio CD In Connector Pinouts (4-pin)

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CD Signal In (Left)</td>
</tr>
<tr>
<td>2</td>
<td>Ground</td>
</tr>
<tr>
<td>3</td>
<td>Ground</td>
</tr>
<tr>
<td>4</td>
<td>CD Signal In (Right)</td>
</tr>
</tbody>
</table>

Table 4-6: Audio CD In Connector Pinouts

4.2.5 Audio Connector

CN Label: CN3
CN Type: 10-pin header (2x5)
CN Location: See Figure 4-6
**CN Pinouts:** See Table 4-7

---

**NOTE:**

This connector is an alternative audio connector to the audio jacks on the external peripheral interface connector panel. To use this connector the jumper caps must be removed. When this connector is used, the audio jacks are disabled and can no longer be used.

The 10-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.

![Audio Connector Location (10-pin)](image)

**Figure 4-6: Audio Connector Location (10-pin)**

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MIC In</td>
<td>2</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>MIC Bias</td>
<td>4</td>
<td>+5V</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Line Out (Right)</td>
<td></td>
<td>Line Out (Right) Return</td>
</tr>
<tr>
<td>---</td>
<td>------------------</td>
<td>---</td>
<td>-------------------------</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>N/C</td>
<td>8</td>
<td>N/C</td>
</tr>
<tr>
<td>9</td>
<td>Line Out (Left)</td>
<td>10</td>
<td>Line Out (Left) Return</td>
</tr>
</tbody>
</table>

Table 4-7: Audio Connector Pinouts

4.2.6 CompactFlash® Socket

CN Label: CF1
CN Type: 50-pin header (2x25)
CN Location: See Figure 4-7
CN Pinouts: See Table 4-8

A CF Type I or Type II memory card is inserted to the CF socket on the solder side of the IMBA-9454ISA.
Figure 4-7: CF Card Socket Location

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GROUND</td>
<td>26</td>
<td>VCC-IN CHECK1</td>
</tr>
<tr>
<td>2</td>
<td>DATA 3</td>
<td>27</td>
<td>DATA 11</td>
</tr>
<tr>
<td>3</td>
<td>DATA 4</td>
<td>28</td>
<td>DATA 12</td>
</tr>
<tr>
<td>4</td>
<td>DATA 5</td>
<td>29</td>
<td>DATA 13</td>
</tr>
<tr>
<td>5</td>
<td>DATA 6</td>
<td>30</td>
<td>DATA 14</td>
</tr>
<tr>
<td>PIN NO.</td>
<td>DESCRIPTION</td>
<td>PIN NO.</td>
<td>DESCRIPTION</td>
</tr>
<tr>
<td>---------</td>
<td>--------------</td>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>6</td>
<td>DATA 7</td>
<td>31</td>
<td>DATA 15</td>
</tr>
<tr>
<td>7</td>
<td>HDC_CS0#</td>
<td>32</td>
<td>HDC_CS1</td>
</tr>
<tr>
<td>8</td>
<td>N/C</td>
<td>33</td>
<td>N/C</td>
</tr>
<tr>
<td>9</td>
<td>GROUND</td>
<td>34</td>
<td>IOR#</td>
</tr>
<tr>
<td>10</td>
<td>N/C</td>
<td>35</td>
<td>IOW#</td>
</tr>
<tr>
<td>11</td>
<td>N/C</td>
<td>36</td>
<td>VCC_COM</td>
</tr>
<tr>
<td>12</td>
<td>N/C</td>
<td>37</td>
<td>IRQ15</td>
</tr>
<tr>
<td>13</td>
<td>VCC_COM</td>
<td>38</td>
<td>VCC_COM</td>
</tr>
<tr>
<td>14</td>
<td>N/C</td>
<td>39</td>
<td>CSEL</td>
</tr>
<tr>
<td>15</td>
<td>N/C</td>
<td>40</td>
<td>N/C</td>
</tr>
<tr>
<td>16</td>
<td>N/C</td>
<td>41</td>
<td>HDD_RESET</td>
</tr>
<tr>
<td>17</td>
<td>N/C</td>
<td>42</td>
<td>IORDY</td>
</tr>
<tr>
<td>18</td>
<td>SA2</td>
<td>43</td>
<td>SDREQ</td>
</tr>
<tr>
<td>19</td>
<td>SA1</td>
<td>44</td>
<td>SDACK#</td>
</tr>
<tr>
<td>20</td>
<td>SA0</td>
<td>45</td>
<td>HDD_ACTIVE#</td>
</tr>
<tr>
<td>21</td>
<td>DATA 0</td>
<td>46</td>
<td>66DET</td>
</tr>
<tr>
<td>22</td>
<td>DATA 1</td>
<td>47</td>
<td>DATA 8</td>
</tr>
<tr>
<td>23</td>
<td>DATA 2</td>
<td>48</td>
<td>DATA 9</td>
</tr>
<tr>
<td>24</td>
<td>N/C</td>
<td>49</td>
<td>DATA 10</td>
</tr>
<tr>
<td>25</td>
<td>VCC-IN CHECK2</td>
<td>50</td>
<td>GROUND</td>
</tr>
</tbody>
</table>

Table 4-8: CF Card Socket Pinouts

### 4.2.7 Digital Input/Output (DIO) Connector

**CN Label:** DIO1  
**CN Type:** 10-pin header (2x5)  
**CN Location:** See Figure 4-8  
**CN Pinouts:** See Table 4-9

The digital input/output connector is managed through a Super I/O chip. The DIO connector pins are user programmable.
4.2.8 Fan Connector (+12V) (CPU Cooling Fan)

**CN Label:** FAN1

**CN Type:** 4-pin wafer

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

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

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

![Fan Connector Diagram]

Figure 4-9: +12V Fan Connector Location

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>+12V</td>
</tr>
<tr>
<td>3</td>
<td>Rotation Signal</td>
</tr>
<tr>
<td>4</td>
<td>Control</td>
</tr>
</tbody>
</table>

Table 4-10: +12V Fan Connector Pinouts

4.2.9 Fan Connector (+12V) (System Cooling Fans)

CN Label: FAN2, FAN3

CN Type: 3-pin header

CN Location: See Figure 4-9

CN Pinouts: See Table 4-10

Two system cooling fan connectors provide a 12V, 500mA current to two system cooling fans. The connectors have a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.
Figure 4-10: +12V Fan Connector Location

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>+12V</td>
</tr>
<tr>
<td>3</td>
<td>Fan Speed Detect</td>
</tr>
</tbody>
</table>

Table 4-11: +12V Fan Connector Pinouts

4.2.10 Floppy Disk Connector (34-pin)

- **CN Label:** FDC1
- **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: 34-pin FDD Connector Location

<table>
<thead>
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<th>DESCRIPTION</th>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
</tr>
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<tbody>
<tr>
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<td>2</td>
<td>REDUCE WRITE</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td>4</td>
<td>N/C</td>
</tr>
<tr>
<td>5</td>
<td>N/C</td>
<td>6</td>
<td>N/C</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
<td>8</td>
<td>INDEX#</td>
</tr>
<tr>
<td>9</td>
<td>GND</td>
<td>10</td>
<td>MOTOR ENABLE A#</td>
</tr>
<tr>
<td>11</td>
<td>GND</td>
<td>12</td>
<td>DRIVE SELECT B#</td>
</tr>
<tr>
<td>13</td>
<td>GND</td>
<td>14</td>
<td>DRIVE SELECT A#</td>
</tr>
<tr>
<td>15</td>
<td>GND</td>
<td>16</td>
<td>MOTOR ENABLE B#</td>
</tr>
<tr>
<td>17</td>
<td>GND</td>
<td>18</td>
<td>DIRECTION#</td>
</tr>
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<td>19</td>
<td>GND</td>
<td>20</td>
<td>STEP#</td>
</tr>
<tr>
<td>21</td>
<td>GND</td>
<td>22</td>
<td>WRITE DATA#</td>
</tr>
<tr>
<td>23</td>
<td>GND</td>
<td>24</td>
<td>WRITE GATE#</td>
</tr>
<tr>
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<td>GND</td>
<td>26</td>
<td>TRACK 0#</td>
</tr>
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<td>GND</td>
<td>28</td>
<td>WRITE PROTECT#</td>
</tr>
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<td>29</td>
<td>GND</td>
<td>30</td>
<td>READ DATA#</td>
</tr>
<tr>
<td>31</td>
<td>GND</td>
<td>32</td>
<td>SIDE 1 SELECT#</td>
</tr>
<tr>
<td>33</td>
<td>GND</td>
<td>34</td>
<td>DISK CHANGE#</td>
</tr>
</tbody>
</table>
### 4.2.11 Front Panel Connector (14-pin)

- **CN Label:** CN2
- **CN Type:** 14-pin header (2x7)
- **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 LED
- Power button
- Beeper
- Reset
- HDD LED

![Figure 4-12: Front Panel Connector Pinout Locations (14-pin)](image)
### Table 4-13: Front Panel Connector Pinouts (14-pin)

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>PIN</th>
<th>DESCRIPTION</th>
<th>FUNCTION</th>
<th>PIN</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power LED</td>
<td>1</td>
<td>LED+</td>
<td>Buzzer</td>
<td>2</td>
<td>Beeper Power</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>N/C</td>
<td></td>
<td>4</td>
<td>N/C</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>LED-</td>
<td></td>
<td>6</td>
<td>N/C</td>
</tr>
<tr>
<td>Power Button</td>
<td>7</td>
<td>Power Button</td>
<td></td>
<td>8</td>
<td>PC Beeper</td>
</tr>
<tr>
<td>HDD LED</td>
<td>9</td>
<td>GND</td>
<td>Reset</td>
<td>10</td>
<td>N/C</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>IDE LED+</td>
<td></td>
<td>12</td>
<td>Reset</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>IDE LED-</td>
<td></td>
<td>14</td>
<td>GND</td>
</tr>
</tbody>
</table>

One 40-pin IDE device connector on the IMBA-9454ISA supports connectivity to two hard disk drives.
**Figure 4-13: IDE Device Connector Locations**

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
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<th>DESCRIPTION</th>
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<td>RESET#</td>
<td>2</td>
<td>GROUND</td>
</tr>
<tr>
<td>3</td>
<td>DATA 7</td>
<td>4</td>
<td>DATA 8</td>
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<tr>
<td>5</td>
<td>DATA 6</td>
<td>6</td>
<td>DATA 9</td>
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<tr>
<td>7</td>
<td>DATA 5</td>
<td>8</td>
<td>DATA 10</td>
</tr>
<tr>
<td>9</td>
<td>DATA 4</td>
<td>10</td>
<td>DATA 11</td>
</tr>
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<td>DESCRIPTION</td>
<td>PIN NO.</td>
<td>DESCRIPTION</td>
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<tr>
<td>---------</td>
<td>-------------</td>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>11</td>
<td>DATA 3</td>
<td>12</td>
<td>DATA 12</td>
</tr>
<tr>
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<td>DATA 2</td>
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<td>DATA 0</td>
<td>18</td>
<td>DATA 15</td>
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<td>GROUND</td>
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<td>N/C</td>
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<td>IDE DRQ</td>
<td>22</td>
<td>GROUND</td>
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<td>23</td>
<td>IOW#</td>
<td>24</td>
<td>GROUND</td>
</tr>
<tr>
<td>25</td>
<td>IOR#</td>
<td>26</td>
<td>GROUND</td>
</tr>
<tr>
<td>27</td>
<td>IDE CHRDY</td>
<td>28</td>
<td>GROUND</td>
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<td>29</td>
<td>IDE DACK</td>
<td>30</td>
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<td>37</td>
<td>HDC CS0#</td>
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<td>HDC CS1#</td>
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<tr>
<td>39</td>
<td>HDD ACTIVE#</td>
<td>40</td>
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</tr>
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</table>

Table 4-14: IDE Connector Pinouts

4.2.13 Infrared Interface Connector (5-pin)

**CN Label:** IR1

**CN Type:** 5-pin header (1x5)

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

**CN Pinouts:** See Table 4-15

The infrared interface connector supports both Serial Infrared (SIR) and Amplitude Shift Key Infrared (ASKIR) interfaces.
Figure 4-14: Infrared Connector Pinout Locations

<table>
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</tr>
<tr>
<td>2</td>
<td>NC</td>
</tr>
<tr>
<td>3</td>
<td>IR-RX</td>
</tr>
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<td>4</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>IR-TX</td>
</tr>
</tbody>
</table>

Table 4-15: Infrared Connector Pinouts

4.2.14 PCI Slot

- **CN Label:** PCI1, PCI2, PCI3, PCI4, PCI5
- **CN Type:** PCI Slot
- **CN Location:** See Figure 4-15
- **CN Pinouts:** See Table 4-16

The PCI slot enables a PCI expansion module to be connected to the board.
<table>
<thead>
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<th>PIN NO.</th>
<th>DESCRIPTION</th>
</tr>
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<td>B1</td>
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<tr>
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<td>+12V</td>
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<td>TCK</td>
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<tr>
<td>A3</td>
<td>TMS</td>
<td>B3</td>
<td>GND</td>
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<tr>
<td>A4</td>
<td>TDI</td>
<td>B4</td>
<td>TDO</td>
</tr>
<tr>
<td>A5</td>
<td>+5V</td>
<td>B5</td>
<td>+5V</td>
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<tr>
<td>A6</td>
<td>INTA</td>
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</tr>
<tr>
<td>A7</td>
<td>INTC</td>
<td>B7</td>
<td>INTB</td>
</tr>
<tr>
<td>A8</td>
<td>+5V</td>
<td>B8</td>
<td>INTD</td>
</tr>
<tr>
<td>A9</td>
<td>RESERVED3</td>
<td>B9</td>
<td>PRSNT1</td>
</tr>
<tr>
<td>A10</td>
<td>+5V</td>
<td>B10</td>
<td>RESERVED1</td>
</tr>
<tr>
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<td>------</td>
<td>------</td>
<td>-----------</td>
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<td>A11</td>
<td>RESERVED4</td>
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<td>PRSNT2</td>
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<td>GND</td>
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<td>GND</td>
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<td>GND</td>
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<td>RESERVED2</td>
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<td>GND</td>
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<td>B17</td>
<td>GND</td>
</tr>
<tr>
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<td>GND</td>
<td>B18</td>
<td>REQ</td>
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<td>PME</td>
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<td>A20</td>
<td>AD30</td>
<td>B20</td>
<td>AD31</td>
</tr>
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<td>AD29</td>
</tr>
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<td>AD28</td>
<td>B22</td>
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<td>AD24</td>
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<td>B28</td>
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<td>AD18</td>
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<td>AD16</td>
<td>B32</td>
<td>AD17</td>
</tr>
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<td>+3.3V</td>
<td>B33</td>
<td>C/BE2</td>
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<td>+3.3V</td>
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<td>LOCK</td>
</tr>
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<td>B41</td>
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### Table 4-16: PCI Slot

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<td>AD15</td>
<td>B44</td>
<td>C/BE1</td>
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<td>A45</td>
<td>+3.3V</td>
<td>B45</td>
<td>AD14</td>
</tr>
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<td>A46</td>
<td>AD13</td>
<td>B46</td>
<td>GND</td>
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<td>AD11</td>
<td>B47</td>
<td>AD12</td>
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<td>GND</td>
<td>B48</td>
<td>AD10</td>
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<td>A49</td>
<td>AD9</td>
<td>B49</td>
<td>GND</td>
</tr>
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<td>C/BE0</td>
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<td>AD8</td>
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<td>+3.3V</td>
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<td>AD7</td>
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<td>A54</td>
<td>AD6</td>
<td>B54</td>
<td>+3.3V</td>
</tr>
<tr>
<td>A55</td>
<td>AD4</td>
<td>B55</td>
<td>AD5</td>
</tr>
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<td>+5V</td>
<td>B61</td>
<td>+5V</td>
</tr>
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<td>+5V</td>
<td>B62</td>
<td>+5V</td>
</tr>
</tbody>
</table>

### 4.2.15 PCI Express x16 Slot

- **CN Label:** PCIe2
- **CN Type:** 164-pin PCIe x16 slot
- **CN Location:** See Figure 4-26
- **CN Pinouts:** See Table 4-17 (Side A) Table 4-18 (Side B)

PCIe x16 expansion devices can be inserted into the PCIe x16 slot.
Figure 4-16: PCIe x16 Connector Location

<table>
<thead>
<tr>
<th>PIN</th>
<th>NAME</th>
<th>PIN</th>
<th>NAME</th>
<th>PIN</th>
<th>NAME</th>
<th>PIN</th>
<th>NAME</th>
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</thead>
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<td>Name</td>
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<td>A43</td>
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<td>HSIp(11)</td>
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<td>A44</td>
<td>HSIp(6)</td>
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<td>HSIp(11)</td>
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</tr>
<tr>
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<td>+12v</td>
<td>A2</td>
<td>4</td>
<td>A45</td>
<td>GND</td>
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</tr>
<tr>
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<td>+12v</td>
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<td>HSIp(2)</td>
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<td>GND</td>
<td>A67</td>
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<td>GND</td>
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<td>HSIp(2)</td>
<td>A47</td>
<td>HSIp(7)</td>
<td>A68</td>
<td>HSIp(12)</td>
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<td>JTAG2</td>
<td>A2 7</td>
<td>GND</td>
<td>A48</td>
<td>HSIp(7)</td>
<td>A69</td>
<td>HSIp(12)</td>
</tr>
<tr>
<td>A7</td>
<td>JTAG3</td>
<td>A2 8</td>
<td>GND</td>
<td>A49</td>
<td>GND</td>
<td>A70</td>
<td>GND</td>
</tr>
<tr>
<td>A8</td>
<td>JTAG4</td>
<td>A2 9</td>
<td>HSIp(3)</td>
<td>A50</td>
<td>RSVD</td>
<td>A71</td>
<td>GND</td>
</tr>
<tr>
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<td>JTAG5</td>
<td>A3 0</td>
<td>HSIp(3)</td>
<td>A51</td>
<td>GND</td>
<td>A72</td>
<td>HSIp(13)</td>
</tr>
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<td>A3 1</td>
<td>GND</td>
<td>A52</td>
<td>HSIp(8)</td>
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<td>HSIp(13)</td>
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<td>RSVD</td>
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<td>HSIp(8)</td>
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<td>GND</td>
</tr>
<tr>
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<td>PWRGD</td>
<td>A3 3</td>
<td>RSVD</td>
<td>A54</td>
<td>GND</td>
<td>A75</td>
<td>GND</td>
</tr>
<tr>
<td>A1 3</td>
<td>GND</td>
<td>A3 4</td>
<td>GND</td>
<td>A55</td>
<td>GND</td>
<td>A76</td>
<td>HSIp(14)</td>
</tr>
<tr>
<td>A1 4</td>
<td>REFCLK+</td>
<td>A3 5</td>
<td>HSIp(4)</td>
<td>A56</td>
<td>HSIp(9)</td>
<td>A77</td>
<td>HSIp(14)</td>
</tr>
<tr>
<td>A1 5</td>
<td>REFCLK-</td>
<td>A3 6</td>
<td>HSIp(4)</td>
<td>A57</td>
<td>HSIp(9)</td>
<td>A78</td>
<td>GND</td>
</tr>
<tr>
<td>A1 6</td>
<td>GND</td>
<td>A3 7</td>
<td>GND</td>
<td>A58</td>
<td>GND</td>
<td>A79</td>
<td>GND</td>
</tr>
<tr>
<td>A1 7</td>
<td>HSIp(0)</td>
<td>A3 8</td>
<td>GND</td>
<td>A59</td>
<td>GND</td>
<td>A80</td>
<td>HSIp(15)</td>
</tr>
<tr>
<td>A1 8</td>
<td>HSIp(0)</td>
<td>A3 9</td>
<td>HSIp(5)</td>
<td>A60</td>
<td>HSIp(10)</td>
<td>A81</td>
<td>HSIp(15)</td>
</tr>
<tr>
<td>A1 9</td>
<td>GND</td>
<td>A4 0</td>
<td>HSIp(5)</td>
<td>A61</td>
<td>HSIp(10)</td>
<td>A82</td>
<td>GND</td>
</tr>
<tr>
<td>A2 0</td>
<td>RSVD</td>
<td>A4 1</td>
<td>GND</td>
<td>A62</td>
<td>GND</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4-17: PCIe x16 Side A Pinouts

<table>
<thead>
<tr>
<th>PIN</th>
<th>NAME</th>
<th>PIN</th>
<th>NAME</th>
<th>PIN</th>
<th>NAME</th>
<th>PIN</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>+12v</td>
<td>B2</td>
<td>GND</td>
<td>B4</td>
<td>GND</td>
<td>B64</td>
<td>GND</td>
</tr>
<tr>
<td>B2</td>
<td>+12v</td>
<td>B2</td>
<td>GND</td>
<td>B4</td>
<td>GND</td>
<td>B65</td>
<td>GND</td>
</tr>
<tr>
<td>B3</td>
<td>RSVD</td>
<td>B2</td>
<td>HSOp(2)</td>
<td>B4</td>
<td>HSOp(7)</td>
<td>B66</td>
<td>HSOp(1 2)</td>
</tr>
<tr>
<td>B4</td>
<td>GND</td>
<td>B2</td>
<td>GND</td>
<td>B4</td>
<td>GND</td>
<td>B67</td>
<td>HSOn(1 2)</td>
</tr>
<tr>
<td>B5</td>
<td>SMCLK</td>
<td>B2</td>
<td>GND</td>
<td>B4</td>
<td>GND</td>
<td>B68</td>
<td>GND</td>
</tr>
<tr>
<td>B6</td>
<td>SMDAT</td>
<td>B2</td>
<td>HSOp(3)</td>
<td>B4</td>
<td>PRSNT# 2</td>
<td>B69</td>
<td>GND</td>
</tr>
<tr>
<td>B7</td>
<td>GND</td>
<td>B2</td>
<td>HSOn(3)</td>
<td>B4</td>
<td>GND</td>
<td>B70</td>
<td>HSOp(1 3)</td>
</tr>
<tr>
<td>B8</td>
<td>+3.3v</td>
<td>B2</td>
<td>GND</td>
<td>B5</td>
<td>HSOp(8)</td>
<td>B71</td>
<td>HSOn(1 3)</td>
</tr>
<tr>
<td>B9</td>
<td>JTAG1</td>
<td>B3</td>
<td>RSVD</td>
<td>B5</td>
<td>HSOn(8)</td>
<td>B72</td>
<td>GND</td>
</tr>
<tr>
<td>B1</td>
<td>3.3Vaux</td>
<td>B3</td>
<td>PRN#2</td>
<td>B5</td>
<td>GND</td>
<td>B73</td>
<td>GND</td>
</tr>
<tr>
<td>B1</td>
<td>WAKE#</td>
<td>B3</td>
<td>GND</td>
<td>B5</td>
<td>GND</td>
<td>B74</td>
<td>HSOp(1 4)</td>
</tr>
<tr>
<td>B1</td>
<td>RSVD</td>
<td>B3</td>
<td>HSOp(4)</td>
<td>B5</td>
<td>HSOp(9)</td>
<td>B75</td>
<td>HSOn(1 4)</td>
</tr>
<tr>
<td>B1</td>
<td>GND</td>
<td>B3</td>
<td>HSOn(4)</td>
<td>B5</td>
<td>HSOn(9)</td>
<td>B76</td>
<td>GND</td>
</tr>
<tr>
<td>B1</td>
<td>HSOp(0)</td>
<td>B3</td>
<td>GND</td>
<td>B5</td>
<td>GND</td>
<td>B77</td>
<td>GND</td>
</tr>
</tbody>
</table>
Table 4-18: PCIe x16 Side B Pinouts

4.2.16 SATA Drive Connectors

- **CN Label:** SATA1, SATA2, SATA3, SATA4
- **CN Type:** 7-pin SATA drive connectors
- **CN Location:** See Figure 4-17
- **CN Pinouts:** See Table 4-19

The six SATA drive connectors are each connected to a second generation SATA drive. Second generation SATA drives transfer data at speeds as high as 300Mb/s. The SATA drives can be configured in a RAID configuration.
4.2.17 Serial Port Connectors (RS-232)

- **CN Label:** COM3, COM4, COM5 and COM6
- **CN Type:** 10-pin header (2x5)
- **CN Location:** See Figure 4-18
- **CN Pinouts:** See Table 4-20

**Table 4-20: SATA Drive Connector Pinouts**

<table>
<thead>
<tr>
<th>PIN NO</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>TX+</td>
</tr>
<tr>
<td>3</td>
<td>TX-</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>RX-</td>
</tr>
<tr>
<td>6</td>
<td>RX+</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
</tr>
</tbody>
</table>
The four 10-pin serial port connectors provide four additional RS-232 serial communications channels. The four internal RS-232 serial port connectors can be connected to external RS-232 serial port devices.

![RS-232 COM Connector Pinout Locations](image)

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Data Carrier Direct (DCD)</td>
<td>2</td>
<td>Data Set Ready (DSR)</td>
</tr>
<tr>
<td>3</td>
<td>Receive Data (RXD)</td>
<td>4</td>
<td>Request To Send (RTS)</td>
</tr>
<tr>
<td>5</td>
<td>Transmit Data (TXD)</td>
<td>6</td>
<td>Clear To Send (CTS)</td>
</tr>
<tr>
<td>7</td>
<td>Data Terminal Ready (DTR)</td>
<td>8</td>
<td>Ring Indicator (RI)</td>
</tr>
<tr>
<td>9</td>
<td>Ground (GND)</td>
<td>10</td>
<td>N/C</td>
</tr>
</tbody>
</table>

Table 4-20: RS-232 COM Connector Pinouts

4.2.18 Serial Port Connector (COM 2)(RS-232, RS-422 or RS-485)

CN Label: COM2

CN Type: 14-pin header (2x7)
CN Location: See Figure 4-19

CN Pinouts: See Table 4-21

The 14-pin serial port connector connects to the COM 2 serial communications channels. COM 2 is a multi function channel. In default mode COM 2 is an RS-232 serial communication channel but, with the COM 2 function select jumper, can be configured as either an RS-422 or RS-485 serial communications channel.

Figure 4-19: RS-232/422/485 Serial Port Connector Location

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DCD</td>
<td>2</td>
<td>DSR</td>
</tr>
<tr>
<td>3</td>
<td>RXD</td>
<td>4</td>
<td>RTS</td>
</tr>
<tr>
<td>5</td>
<td>TXD</td>
<td>6</td>
<td>CTS</td>
</tr>
<tr>
<td>7</td>
<td>DTR</td>
<td>8</td>
<td>RI</td>
</tr>
<tr>
<td>9</td>
<td>GND</td>
<td>10</td>
<td>GND</td>
</tr>
<tr>
<td>11</td>
<td>TX+</td>
<td>12</td>
<td>TX-</td>
</tr>
<tr>
<td>13</td>
<td>RX+</td>
<td>14</td>
<td>RX-</td>
</tr>
</tbody>
</table>

Table 4-21: RS-232/RS-485 Serial Port Connector Pinouts

4.2.19 Serial Port Connector (COM 2)( RS-422 or RS-485 only)

CN Label: CN1

CN Type: 4-pin header (1 x 4)
NOTE:

This connector and the RS-422/485 pins on the COM2 connector cannot be used at the same time. For RS-422/485 serial communications, either this connector can be used or the pins on the COM2 connector can be used.

The 4-pin serial port connector connects to the COM 2 RS-422 and RS-485 serial communications channels. The RS-422/485 only COM2 connector can be used instead of the 14-pin COM2 connector when RS-422/485 communication protocols are implemented. To use this connector the COM 2 function select jumper must be configured in the RS-422/RS-485 serial communications mode.

Figure 4-20: RS-422/485 Serial Port Connector Location

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TXD+</td>
</tr>
<tr>
<td>2</td>
<td>TXD-</td>
</tr>
<tr>
<td>3</td>
<td>RXD+</td>
</tr>
<tr>
<td>4</td>
<td>RXD-</td>
</tr>
</tbody>
</table>
Table 4-22: RS-422/485 Serial Port Connector Pinouts

4.2.20 SPDIF Connector

<table>
<thead>
<tr>
<th>PIN</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VCC AUDIO</td>
</tr>
<tr>
<td>2</td>
<td>NC</td>
</tr>
<tr>
<td>3</td>
<td>SPDIF OUT</td>
</tr>
<tr>
<td>4</td>
<td>GND AUDIO</td>
</tr>
<tr>
<td>5</td>
<td>SPDIF IN</td>
</tr>
</tbody>
</table>
Table 4-23: SPDIF Connector Pinouts

4.2.21 Trusted Platform Module (TPM) Connector

CN Label: TPM1
CN Type: 20-pin header (2x10)
CN Location: See Figure 4-22
CN Pinouts: See Table 4-24

The Trusted Platform Module (TPM) connector secures the system on bootup.

Figure 4-22: TPM Connector Pinout Locations

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LCLK</td>
<td>2</td>
<td>GND2</td>
</tr>
<tr>
<td>3</td>
<td>LFRAME#</td>
<td>4</td>
<td>KEY</td>
</tr>
<tr>
<td>5</td>
<td>LRESET#</td>
<td>6</td>
<td>+5V</td>
</tr>
<tr>
<td>7</td>
<td>LAD3</td>
<td>8</td>
<td>LAD2</td>
</tr>
<tr>
<td>9</td>
<td>+3.4V</td>
<td>10</td>
<td>LAD1</td>
</tr>
<tr>
<td>11</td>
<td>LAD0</td>
<td>12</td>
<td>GND3</td>
</tr>
<tr>
<td>13</td>
<td>SCL</td>
<td>14</td>
<td>SDA</td>
</tr>
</tbody>
</table>
Table 4-24: TPM Connector Pinouts

<table>
<thead>
<tr>
<th>15</th>
<th>SB3.3V</th>
<th>16</th>
<th>SERIRQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>GND1</td>
<td>18</td>
<td>GLKRUN#</td>
</tr>
<tr>
<td>19</td>
<td>LPCPD#</td>
<td>20</td>
<td>LDRQ#</td>
</tr>
</tbody>
</table>

4.2.22 USB Connectors (Internal)

- **CN Label:** USB3, USB4
- **CN Type:** 8-pin header (2x4)
- **CN Location:** See Figure 4-23
- **CN Pinouts:** See Table 4-25

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 4-23: USB Connector Pinout Locations
4.3 External Peripheral Interface Connectors

The external peripheral interface connectors on the back panel are connected to devices externally when the IMBA-9454ISA is installed in a chassis. The peripheral connectors on the rear panel are:

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

Table 4-25: USB Port Connector Pinouts

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
<th>PIN NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VCC</td>
<td>2</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>DATAN-</td>
<td>4</td>
<td>DATAM+</td>
</tr>
<tr>
<td>5</td>
<td>DATAN+</td>
<td>6</td>
<td>DATAN-</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
<td>8</td>
<td>VCC</td>
</tr>
</tbody>
</table>

Figure 4-24: IMBA-9454ISA External Interface Connectors
4.3.1 Keyboard/Mouse Connector

CN Label: KBMS1
CN Type: PS/2 connector
CN Location: See Figure 4-24
CN Pinouts: See Figure 4-25 and Table 4-26

The IMBA-9454ISA keyboard and mouse connectors are standard PS/2 connectors.

Figure 4-25: PS/2 Pinouts

<table>
<thead>
<tr>
<th>PIN</th>
<th>DESCRIPTION</th>
<th>PIN</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>L_KDAT</td>
<td>7</td>
<td>L_MDAT</td>
</tr>
<tr>
<td>2</td>
<td>NC</td>
<td>8</td>
<td>NC</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td>9</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>5V</td>
<td>10</td>
<td>5V</td>
</tr>
<tr>
<td>5</td>
<td>L_KCLK</td>
<td>11</td>
<td>L_MCLK</td>
</tr>
<tr>
<td>6</td>
<td>NC</td>
<td>12</td>
<td>NC</td>
</tr>
</tbody>
</table>

Table 4-26: PS/2 Connector Pinouts
4.3.2 Parallel Port Connector

CN Label: LPT1
CN Type: DB-25
CN Location: See Figure 4-24
CN Pinouts: See Figure 4-26 and Table 4-27

These ports are usually connected to a printer. IMBA-9454ISA includes one on-board parallel ports accessed through one 25-pin D-type female connector.

Figure 4-26: Parallel Port Connector Pinout Locations

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

Table 4-27: Parallel Pinouts
4.3.3 Audio Connectors

- **CN Label:** CN2
- **CN Type:** Audio jack
- **CN Location:** See Figure 4-24
- **CN Pinouts:** See Figure 4-27
  - **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.

![Audio Connectors Diagram](image)

Figure 4-27: Audio Connector

4.3.4 LAN Connectors

- **CN Label:** LAN/USB1, LAN/USB2
- **CN Type:** RJ-45
- **CN Location:** Figure 4-24
- **CN Pinouts:** Table 4-28

The IMBA-9454ISA is equipped with two built-in RJ-45 Ethernet controllers. The controllers can connect to the LAN through two RJ-45 LAN connectors. There are two LEDs on the connector indicating the status of LAN. The pin assignments are listed in the following table:
PIN DESCRIPTION | PIN DESCRIPTION
--- | ---
1 TXA+ | 5 TXC-
2 TXA- | 6 TXB-
3 TXB+ | 7 TXD+
4 TXC+ | 8 TXD-

Table 4-28: LAN Pinouts

**Activity Linked**

![RJ-45 Ethernet Connector](image)

Figure 4-28: RJ-45 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. See Table 4-29.

<table>
<thead>
<tr>
<th>STATUS</th>
<th>DESCRIPTION</th>
<th>STATUS</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>YELLOW</td>
<td>Activity</td>
<td>GREEN</td>
<td>Linked</td>
</tr>
</tbody>
</table>

Table 4-29: RJ-45 Ethernet Connector LEDs

### 4.3.5 USB Connectors

- **CN Label:** USB/LAN1, USB/LAN2
- **CN Type:** Dual USB port
- **CN Location:** See Figure 4-24
- **CN Pinouts:** See Figure 4-29 and Table 4-30

USB devices connect directly to the USB connectors on the external peripheral connector panel.
Table 4-30: USB Connector Pinouts

<table>
<thead>
<tr>
<th>PIN</th>
<th>DESCRIPTION</th>
<th>PIN</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VCC</td>
<td>5</td>
<td>VCC</td>
</tr>
<tr>
<td>2</td>
<td>USBD0-</td>
<td>6</td>
<td>USBD0-</td>
</tr>
<tr>
<td>3</td>
<td>USBD0+</td>
<td>7</td>
<td>USBD0+</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
<td>8</td>
<td>GND</td>
</tr>
</tbody>
</table>

4.3.6 VGA Connector

CN Label: VGA
CN Type: HD-D-sub 15 Female connector
CN Location: See Figure 4-24 (labeled 6)
CN Pinouts: See Figure 4-30 and Table 4-31

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

Table 4-30: VGA Connector

<table>
<thead>
<tr>
<th>PIN</th>
<th>Description</th>
<th>PIN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RED</td>
<td>2</td>
<td>GREEN</td>
</tr>
<tr>
<td>3</td>
<td>BLUE</td>
<td>4</td>
<td>N/C</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>6</td>
<td>GND</td>
</tr>
</tbody>
</table>
### 4.3.7 Serial Communications Connector

**CN Label:** COM1  
**CN Type:** D-sub 9 Male connector  
**CN Location:** See Figure 4-24 (labeled 7)  
**CN Pinouts:** See Figure 4-31 and Table 4-32

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

**Figure 4-31: Serial Communications Connector Pinout Locations**

<table>
<thead>
<tr>
<th>PIN</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DATA CARRIER DETECT (DCD)</td>
</tr>
<tr>
<td>2</td>
<td>RECEIVE DATA (RXD)</td>
</tr>
<tr>
<td>3</td>
<td>TRANSMIT DATA (TXD)</td>
</tr>
<tr>
<td>4</td>
<td>DATA TERMINAL READY (DTR)</td>
</tr>
<tr>
<td>5</td>
<td>GROUND (GND)</td>
</tr>
<tr>
<td>6</td>
<td>DATA SET READY (DSR)</td>
</tr>
<tr>
<td>7</td>
<td>REQUEST TO SEND (RTS)</td>
</tr>
<tr>
<td>8</td>
<td>CLEAR TO SEND (CTS)</td>
</tr>
</tbody>
</table>
## Table 4-32: COM1 RS-232 Mode Connector Pinouts

<table>
<thead>
<tr>
<th>PIN</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>RING INDICATOR (RI)</td>
</tr>
</tbody>
</table>

Table 4-32: COM1 RS-232 Mode Connector Pinouts
Chapter 5

Installation
5.1 Anti-static Precautions

**WARNING:**

Failure to take ESD precautions during the installation of the IMBA-9454ISA may result in permanent damage to the IMBA-9454ISA and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the IMBA-9454ISA. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the IMBA-9454ISA, 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-9454ISA, place it on an anti-static pad. This reduces the possibility of ESD damaging the IMBA-9454ISA.
- **Only handle the edges of the PCB:** When handling the PCB, hold the PCB by the edges.
5.2 Installation Considerations

NOTE:

The following installation notices and installation considerations should be read and understood before the IMBA-9454ISA is installed. All installation notices pertaining to the installation of the IMBA-9454ISA should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the IMBA-9454ISA 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-9454ISA, IMBA-9454ISA components 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-9454ISA 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-9454ISA on an antistatic pad:
  - When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- Turn all power to the IMBA-9454ISA off:
When working with the IMBA-9454ISA, 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-9454ISA DO NOT:

- Remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- Use the product before verifying all the cables and power connectors are properly connected.
- Allow screws to come in contact with the PCB circuit, connector pins, or its components.

5.2.2 Installation Checklist

The following checklist is provided to ensure the IMBA-9454ISA is properly installed.

- All the items in the packing list are present
- The CPU is installed
- The CPU cooling kit is properly installed
- A compatible memory module is properly inserted into the slot
- The CF Type I or CF Type II card is properly installed into the CF socket
- The jumpers have been properly configured
- The IMBA-9454ISA is inserted into a chassis with adequate ventilation
- The correct power supply is being used
- The following devices are properly connected
  - Primary and secondary IDE device
  - SATA drives
  - Power supply
  - USB cables
  - Serial port cables
  - I/O Shielding
- The following external peripheral devices are properly connected to the chassis:
  - VGA screen
  - Keyboard
  - Mouse
5.3 Unpacking

5.3.1 Unpacking Precautions

When the IMBA-9454ISA is unpacked, please do the following:

- Follow the anti-static precautions outlined in Section 5.1.
- Make sure the packing box is facing upwards so the IMBA-9454ISA does not fall out of the box.
- Make sure all the components in the checklist shown in Chapter 3 are present.

NOTE:

If some of the components listed in the checklist in Chapter 3 are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the IMBA-9454ISA from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.
5.4 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, IMBA-9454ISA 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-9454ISA. If one of these components is not installed the IMBA-9454ISA cannot run.

5.4.1 LGA775 CPU Installation

**NOTE:**

Enabling Hyper-Threading Technology on your system requires meeting all of the platform requirements listed below:

- **CPU:** An Intel® Pentium 4 Processor with HT Technology must be installed
- **Chipset:** An Intel® Chipset that supports HT Technology (that has been met by the IMBA-9454ISA)
- **OS:** An operating system that has optimizations for HT Technology
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.

The LGA775 socket is shown in Figure 5-1.

![Figure 5-1: Intel LGA775 Socket](image)

To install a socket LGA775 CPU onto the IMBA-9454ISA, follow the steps below:

**WARNING:**

When handling the CPU, only hold it on the sides. DO NOT touch the pins at the bottom of the CPU.

**Step 1:** Remove the protective cover. Remove the black protective cover by prying it off the load plate. To remove the protective cover, locate the “REMOVE” sign and use your fingernail to pry the protective cover off. See Figure 5-2.
Figure 5-2: Remove the CPU Socket Protective Shield

**Step 2:** Open the socket. 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. Then rotate the load plate towards the opposite direction. See Figure 5-3.

Figure 5-3: Open the CPU Socket Load Plate

**Step 3:** 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 4:** Orientate the CPU properly. Make sure the IHS (Integrated Heat Sink) side is facing upward.

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

**Step 6:** **Align the CPU pins.** Locate pin 1 and the two orientation notches on the CPU. Carefully match the two orientation notches on the CPU with the socket alignment keys.

**Step 7:** **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. See **Figure 5-4**.

![Figure 5-4: Insert the Socket LGA775 CPU](image)

**Step 8:** **Close the CPU socket.** Close the load plate and 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.

**Step 9:** **Connect the CPU 12V cable.** After the cooling kit is installed connect the CPU cable to the CPU 12V power connector.
5.4.2 LGA775 Cooling Kit Installation

**WARNING:**

It is strongly recommended that you DO NOT use the original heat sink and cooler provided by Intel on the IMBA-9454ISA.

IEI’s cooling kits include a support bracket that is combined with the heat sink mounted on the CPU to counterweigh and balance the load on both sides of the PCB.

![Figure 5-5: IEI CF-520 Cooling Kit](image1)

![Figure 5-6: IEI CF-775A-RS Cooling Kit](image2)

Two optional, separately purchased LGA775 IEI CPU cooling kits are available. The IEI CF-520 is shown in **Figure 5-5** and the CF-775A-RS is shown **Figure 5-6** can be purchased separately. The cooling kit comprises a CPU heat sink and a cooling fan.
**WARNING:**

Do not wipe off (accidentally or otherwise) the pre-sprayed layer of thermal paste on the bottom of the [Fan model#] heat sink. The thermal paste between the CPU and the heat sink is important for optimum heat dissipation.

To install the cooling kit follow the instructions below.

**Step 1:** Place the cooling kit onto the socket LGA775 CPU. Make sure the CPU cable can be properly routed when the cooling kit is installed.

**Step 2:** Properly align the cooling kit. Make sure the four spring screw fasteners can pass through the pre-drilled holes on the PCB.

**Step 3:** Mount the cooling kit. Gently place the cooling kit on top of the CPU. Make sure the four threaded screws on the corners of the cooling kit properly pass through the predrilled holes on the bottom of the PCB.

**Step 4:** Secure the cooling kit. From the solder side of the PCB, align the support bracket to the screw threads on heat sink that were inserted through the PCB holes. (See Figure 5-7)
Step 5: **Tighten the screws.** Use a screwdriver to tighten the four screws. Tighten each nut a few turns at a time and do not over-tighten the screws.

Step 6: **Connect the fan cable.** Connect the cooling kit fan cable to the fan connector on the IMBA-9454ISA. Carefully route the cable and avoid heat generating chips and fan blades.

### 5.4.3 DIMM Installation

**WARNING:**

Using incorrectly specified DIMM may cause permanently damage the IMBA-9454ISA. Please make sure the purchased DIMM complies with the memory specifications of the IMBA-9454ISA. DIMM specifications compliant with the IMBA-9454ISA are listed in Chapter 2.
To install a DIMM into a DIMM socket, please follow the steps below and refer to Figure 5-8.

**Figure 5-8: 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 5-8.

**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 5-8.

**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 5-8.

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

⚠️ NOTE:

The IMBA-9454ISA 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-9454ISA, please follow the steps below:

Step 1: Locate the CF card socket. Place the IMBA-9454ISA 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 5-9.
### 5.5 Jumper Settings

**NOTE:**

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

<table>
<thead>
<tr>
<th>PLASTIC CLIP</th>
<th>OPEN</th>
<th>CLOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Jumper" /></td>
<td><img src="image" alt="Jumper" /></td>
<td><img src="image" alt="Jumper" /></td>
</tr>
</tbody>
</table>

![Jumper](image)
Before the IMBA-9454ISA is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the IMBA-9454ISA are listed in Table 5-1.

<table>
<thead>
<tr>
<th>Description</th>
<th>Label</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT/ATX power select</td>
<td>JP3</td>
<td>3-pin header</td>
</tr>
<tr>
<td>CF card setup</td>
<td>JP2</td>
<td>3-pin header</td>
</tr>
<tr>
<td>Clear CMOS</td>
<td>JP1</td>
<td>3-pin header</td>
</tr>
<tr>
<td>COM 2 function select</td>
<td>JP4</td>
<td>3-pin header</td>
</tr>
</tbody>
</table>

Table 5-1: Jumpers

5.5.1 AT Power Select Jumper Settings

- **Jumper Label:** JP3
- **Jumper Type:** 2-pin header
- **Jumper Settings:** See Table 5-2
- **Jumper Location:** See Figure 5-10

The AT Power Select jumper specifies the systems power mode as AT or ATX. AT Power Select jumper settings are shown in Table 5-2.

<table>
<thead>
<tr>
<th>AT Power Select</th>
<th>Description</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Short 1 - 2</td>
<td>Use ATX power</td>
<td>Default</td>
</tr>
<tr>
<td>Open 2 - 3</td>
<td>Use AT power</td>
<td></td>
</tr>
</tbody>
</table>

Table 5-2: AT Power Select Jumper Settings

The location of the AT Power Select jumper is shown in Figure 5-10 below.
5.5.2 CF Card Setup

**Jumper Label:** JP2

**Jumper Type:** 3-pin header

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

**Jumper Location:** See Figure 5-11

The CF Card Setup jumper sets the CF Type I card or CF Type II cards as either the slave device or the master device. CF Card Setup jumper settings are shown in **Table 5-3**.

<table>
<thead>
<tr>
<th>CF Card Setup</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short</td>
<td>Master</td>
<td></td>
</tr>
<tr>
<td>Open</td>
<td>Slave</td>
<td></td>
</tr>
</tbody>
</table>

**Table 5-3: CF Card Setup Jumper Settings**

The CF Card Setup jumper location is shown in **Figure 5-11**.
5.5.3 Clear CMOS Jumper

- **Jumper Label:** JP1
- **Jumper Type:** 3-pin header
- **Jumper Settings:** See Table 5-4
- **Jumper Location:** See Figure 5-12

If the IMBA-9454ISA 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 5-4.

<table>
<thead>
<tr>
<th>AT Power Select</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short 1 - 2</td>
<td>Keep CMOS Setup</td>
<td>Default</td>
</tr>
<tr>
<td>Short 2 - 3</td>
<td>Clear CMOS Setup</td>
<td></td>
</tr>
</tbody>
</table>

Table 5-4: Clear CMOS Jumper Settings

The location of the clear CMOS jumper is shown in Figure 5-12 below.

Figure 5-12: Clear CMOS Jumper

5.5.4 COM 2 Function Select Jumper

**Jumper Label:** JP4

**Jumper Type:** 3-pin header

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

**Jumper Location:** See Figure 5-13

The COM 2 Function Select jumper sets the communication protocol used by the second serial communications port (COM 2) as RS-232, RS-422 or RS-485. The COM 2 Function Select settings are shown in Table 5-5.
<table>
<thead>
<tr>
<th>COM 2 Function Select</th>
<th>Description</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short 1-2</td>
<td>RS-232</td>
<td></td>
</tr>
<tr>
<td>Short 2-3</td>
<td>RS-422/RS-485</td>
<td></td>
</tr>
</tbody>
</table>

Table 5-5: COM 2 Function Select Jumper Settings

The COM 2 Function Select jumper location is shown in Figure 5-13.

![Figure 5-13: COM 2 Function Select Jumper Location](image)

5.6 Chassis Installation

5.6.1 Airflow

⚠️ WARNING:

Airflow is critical to the cooling of the CPU and other onboard components. The chassis in which the IMBA-9454ISA must have air vents to allow cool air to move into the system and hot air to move out.

The IMBA-9454ISA must be installed in a chassis with ventilation holes on the sides allowing airflow to travel through 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 through the board surface.
NOTE:

IEI has a wide range of backplanes available. Please contact your IMBA-9454ISA 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 the available chassis.

5.7 Internal Peripheral Device Connections

5.7.1 Peripheral Device Cables

The cables listed in Table 5-6 are shipped with the IMBA-9454ISA.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ATA flat cable</td>
</tr>
<tr>
<td>1</td>
<td>Dual RS-232 cable</td>
</tr>
<tr>
<td>2</td>
<td>SATA drive cables</td>
</tr>
<tr>
<td>1</td>
<td>SATA drive power cables</td>
</tr>
<tr>
<td>1</td>
<td>I/O shielding</td>
</tr>
</tbody>
</table>

Table 5-6: IEI Provided Cables

Separately purchased optional IEI items that can be installed are listed below:

- FDD cable
- 2-port USB cable
- 4-port USB cable
- RS-232/422/485 cable
- PCIe x16 VGA output SDVO card
- PCIe x16 DVI output SDVO card
- TPM module
For more details about the items listed above, please refer to Chapter 3. Installation of the accessories listed above are described in detail below.

5.7.2 ATA Flat Cable Connection

The ATA 66/100 flat cable connects to the IMBA-9454ISA to one or two IDE devices. To connect an IDE HDD to the IMBA-9454ISA please follow the instructions below.

**Step 1:** Locate the IDE connector. The location/s of the IDE device connector/s is/are shown in Chapter 3.

**Step 2:** Insert the connector. Connect the IDE cable connector to the on-board connector. See Figure 5-14. A key on the front of the cable connector ensures it can only be inserted in one direction.

![IDE Cable Connection](image)

**Figure 5-14: IDE Cable Connection**

**Step 3:** 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.

5.7.3 FDD Cable Connection (Optional)

The FDD flat cable connects to the IMBA-9454ISA to one FDD device. To connect an FDD to the IMBA-9454ISA 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 5-15. A key on the front of the cable connector ensures it can only be inserted in one direction.

![Figure 5-15: FDD Cable Connection](image)

**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.
5.7.4 Dual RS-232 Cable with Slot Bracket

The dual RS-232 cable slot connector consists of two connectors attached to two independent cables. Each cable is then attached to a D-sub 9 male connector that is mounted onto a slot. To install the dual RS-232 cable, please follow the steps below.

**Step 1:** **Locate the connectors.** The locations of the RS-232 connectors are shown in Chapter 3.

**Step 2:** **Insert the cable connectors.** Insert one connector into each serial port box headers. See **Figure 5-16.** A key on the front of the cable connectors ensures the connector can only be installed in one direction.

![Figure 5-16: Dual RS-232 Cable Installation](image)

**Step 3:** **Secure the bracket.** The dual RS-232 connector has two D-sub 9 male connectors secured on a bracket. To secure the bracket to the chassis please refer to the reference material that came with the chassis.
5.7.5 Dual RS-232/422/485 Cables (Optional Cable)

The IMBA-9454ISA is shipped with one RS-232/422/485 dual serial port connector cable. The dual serial port connector cable connects the serial port connectors on the cable to the RS-232/422/485 serial port connectors on the IMBA-9454ISA. Follow the steps below to connect the dual serial port connector cable.

**Step 1:** Locate the serial port connector. The location of the RS-232/422/485 serial port connector is shown in Chapter 3.

**Step 2:** Align the connectors. Correctly align pin 1 on the cable connector with pin 1 on the IMBA-9454ISA COM2 serial port connector.

**Step 3:** Insert the cable connectors. Once the cable connector is properly aligned with the COM2 serial port connector on the IMBA-9454ISA, connect the cable connector to the onboard connectors. See Figure 5-17.

**Step 4:** Attach DB-9 serial port connectors to the chassis. The dual DB-9 serial port connectors can be inserted into dual preformed holes in the chassis. Once, inserted the DB-9 connectors should be secured to the chassis with retention screws.
5.7.6 SATA Drive Connection

The IMBA-9454ISA is shipped with six SATA drive cables and three SATA drive power cables. To connect the SATA drives to the connectors, please follow the steps below.

**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 5-18.

**Figure 5-18: 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 5-19.

**Step 4:** Connect the SATA power cable. Connect the SATA power connector to the back of the SATA drive. See Figure 5-19.
5.7.7 USB Cable (Dual Port) (Optional)

The IMBA-9454ISA is shipped with a dual port USB 2.0 cable. To connect the USB cable connector, please follow the steps below.

**Step 1:** 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 2:** Align the connectors. The cable has two connectors. Correctly align pin 1 on each cable connector with pin 1 on the IMBA-9454ISA USB connector.

**Step 3:** Insert the cable connectors. Once the cable connectors are properly aligned with the USB connectors on the IMBA-9454ISA, connect the cable connectors to the onboard connectors. See Figure 5-20.
Step 4: 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.

5.7.8 USB Cable (Four Port) (Optional)

Four port USB 2.0 cables can be separately purchased from IEI. To install a four port USB cable onto the IMBA-9454ISA, please follow the steps below.

Step 1: Locate the connectors. The locations of the USB connectors are shown in Chapter 4.
WARNING:

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

Step 2: **Align the connectors.** Each cable has two connectors. Correctly align pin 1 on each cable connector with pin 1 on the IMBA-9454ISA USB connectors.

Step 3: **Insert the cable connectors.** Once the cable connectors are properly aligned with the USB connectors on the IMBA-9454ISA, connect the cable connectors to the onboard connectors. See **Figure 5-20**.

**Figure 5-21: Four Port USB Cable Connection**

Step 4: **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.

### 5.8 External Peripheral Interface Connection

The following external peripheral devices can be connected to the external peripheral interface connectors.
To install these devices, connect the corresponding cable connector from the actual device to the corresponding IMBA-9454ISA external peripheral interface connector making sure the pins are properly aligned.

5.8.1 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-9454ISA.

Step 1: Locate the audio phone jacks. The location of the audio phone jacks are shown in Chapter 3.

Step 2: Insert audio phone jack plugs. Insert audio phone jack plugs into the audio phone jacks on the external peripheral interface. See Figure 5-22.
5.8.2 LAN Connection

There are two external RJ-45 LAN connectors for PCIe GbE connection. The RJ-45 connectors enable connection to an external network. To connect a LAN cable with an RJ-45 connector, please follow the instructions below.

**Step 1:** Locate the RJ-45 connectors. The locations of the USB connectors are shown in Chapter 4.

**Step 2:** Align the connectors. Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the IMBA-9454ISA. See Figure 5-23.

![Figure 5-23: LAN Connection](image)

**Step 3:** Insert the LAN cable RJ-45 connector. Once aligned, gently insert the LAN cable RJ-45 connector into the onboard RJ-45 connector.

5.8.3 Parallel Device Connection

A single female DB-25 connector on the external peripheral interface panel connects to parallel communications devices. Follow the steps below to connect a parallel device.
Step 1: Locate the DB-25 connector. The location of the DB-25 connector is shown in Chapter 3.

Step 2: 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 5-24.

Step 3: Secure the connector. Secure the DB-25 connector to the external interface by tightening the two retention screws on either side of the connector.

5.8.4 PS/2 Keyboard and Mouse Connection

The IMBA-9454ISA 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-9454ISA.

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 5-25.

![PS/2 Keyboard/Mouse Connector](image)

Figure 5-25: PS/2 Keyboard/Mouse Connector

5.8.5 Serial Device Connection

The IMBA-9454ISA 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-9454ISA.

**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 5-26.
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.

5.8.6 USB Connection (Dual Connector)

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-9454ISA.

Step 1: Locate the USB Series "A" receptacle connectors. The location of the USB Series "A" receptacle connectors are shown in Chapter 3.

Step 2: 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 5-27.
5.8.7 VGA Monitor Connection

The IMBA-9454ISA has a single female DB-15 connector on the external peripheral interface panel. The DB-15 connector is connected to a CRT or VGA monitor. To connect a monitor to the IMBA-9454ISA, please follow the instructions below.

**Step 1:** Locate the female DB-15 connector. The location of the female DB-15 connector is shown in Chapter 3.

**Step 2:** Align the VGA connector. Align the male DB-15 connector on the VGA screen cable with the female DB-15 connector on the external peripheral interface.

**Step 3:** Insert the VGA connector. Once the connectors are properly aligned with the insert the male connector from the VGA screen into the female connector on the IMBA-9454ISA. See Figure 5-28.
Figure 5-28: VGA Connector

**Step 4:** Secure the connector. Secure the DB-15 VGA connector from the VGA monitor to the external interface by tightening the two retention screws on either side of the connector.
Chapter 6

BIOS Screens
6.1 Introduction

A licensed copy of AMI 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 AMI 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 before the **DELETE** key is pressed, 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 in.

<table>
<thead>
<tr>
<th>Key</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up arrow</td>
<td>Move to previous item</td>
</tr>
<tr>
<td>Down arrow</td>
<td>Move to next item</td>
</tr>
<tr>
<td>Left arrow</td>
<td>Move to the item on the left hand side</td>
</tr>
<tr>
<td>Right arrow</td>
<td>Move to the item on the right hand side</td>
</tr>
<tr>
<td>Esc key</td>
<td>Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu Exit current page and return to Main Menu</td>
</tr>
<tr>
<td>Page Up key</td>
<td>Increase the numeric value or make changes</td>
</tr>
<tr>
<td>Page Dn key</td>
<td>Decrease the numeric value or make changes</td>
</tr>
<tr>
<td>Key</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>F1 key</td>
<td>General help, only for Status Page Setup Menu and Option Page Setup Menu</td>
</tr>
<tr>
<td>F2 /F3 key</td>
<td>Change color from total 16 colors. F2 to select color forward.</td>
</tr>
<tr>
<td>F10 key</td>
<td>Save all the CMOS changes, only for Main Menu</td>
</tr>
</tbody>
</table>

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 computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the jumper described in Chapter Chapter 5.

6.1.5 BIOS Menu Bar

The menu bar on top of the BIOS screen has the following main items:

- **Main** Changes the basic system configuration.
- **Advanced** Changes the advanced system settings.
- **PCIPnP** Changes the advanced PCI/PnP Settings
- **Boot** Changes the system boot configuration.
- **Security** Sets User and Supervisor Passwords.
- **Chipset** Changes the chipset settings.
- **Power** Changes power management settings.
- **Exit** Selects exit options and loads default settings

The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.
6.2 Main

The **Main BIOS menu (BIOS Menu 1)** appears when the **BIOS Setup** program is entered. The **Main** menu gives an overview of the basic system information.

![BIOS Setup Utility](attachment:image)

**BIOS Menu 1: Main**

- **System Overview**

  The **System Overview** lists a brief summary of different system components. The fields in **System Overview** cannot be changed. The items shown in the system overview include:

  - **AMI BIOS**: Displays auto-detected BIOS information
    - **Version**: Current BIOS version
    - **Build Date**: Date the current BIOS version was made
    - **ID**: Installed BIOS ID
Processor: Displays auto-detected CPU specifications
- Type: Names the currently installed processor
- Speed: Lists the processor speed
- Count: The number of CPUs on the motherboard

System Memory: Displays the auto-detected system memory.
- Size: Lists memory size

The System Overview field also has two user configurable fields:

- System Time [xx:xx:xx]
  Use the System Time option to set the system time. Manually enter the hours, minutes and seconds.

- System Date [xx/xx/xx]
  Use the System Date option to set the system date. Manually enter the day, month and year.

6.3 Advanced

Use the Advanced menu (BIOS Menu 2) to configure the CPU and peripheral devices through the following sub-menus:

WARNING:

Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.

- CPU Configuration (see Section 6.3.1)
- IDE Configuration (see Section 6.3.2)
- Floppy Configuration (See Section )
- SuperIO Configuration (see Section 6.3.3)
- Hardware Health Configuration (see Section 6.3.5)
- Power Configuration (see Section 6.3)
- Remote Access Configuration (see Section 6.3.7)
- Trusted Computing (see Section 6.3.8)
- USB Configuration (see Section 6.3.7)

**BIOS Menu 2: Advanced**

### 6.3.1 CPU Configuration

Use the CPU Configuration menu (BIOS Menu 3) to view detailed CPU specifications and configure the CPU.
BIOS Menu 3: CPU Configuration

The CPU Configuration menu (BIOS Menu 3) lists the following CPU details:

- **Manufacturer**: Lists the name of the CPU manufacturer
- **Frequency**: Lists the CPU processing speed
- **FSB Speed**: Lists the FSB speed
- **Cache L1**: Lists the CPU L1 cache size
- **Cache L2**: Lists the CPU L2 cache size
- **Ratio Actual Value**:

  ➔ **Intel (R) SpeedStep (tm) tech. [Enabled]**

Use the **Intel (R) SpeedStep (tm) tech.** option to enable or disable GV3. GV3 technology is a power-saving scheme where the OS optimizes overall power consumption by dynamically changing CPU frequency based on demand.
Disabled
Disables SpeedStep i.e. GV3

Enabled DEFAULT Enables SpeedStep i.e. GV3

6.3.2 IDE Configuration

Use the IDE Configuration menu (BIOS Menu 4) to change and/or set the configuration of the IDE devices installed in the system.

BIOS Menu 4: IDE Configuration

- ATA/IDE Configurations [Compatible]

Use the ATA/IDE Configurations option to configure the ATA/IDE controller.

- Disabled
Disables the on-board ATA/IDE controller.
Compatible

Configures the on-board ATA/IDE controller to be in compatible mode. In this mode, a SATA channel will replace one of the IDE channels. This mode supports up to 4 storage devices.

Enhanced DEFAULT

Configures the on-board ATA/IDE controller to be in Enhanced mode. In this mode, IDE channels and SATA channels are separated. This mode supports up to 6 storage devices. Some legacy OS do not support this mode.

Configure SATA as [IDE]

Use the Configure SATA as option to configure SATA devices as normal IDE devices.

IDE DEFAULT

Configures SATA devices as normal IDE device.

AHCI

Configures SATA devices as an AHCI device.

Configure SATA Channels [Behind PATA]

Use the Configure SATA Channels option to determine how SATA channels and PATA channels are ordered.

Before PATA DEFAULT

Puts SATA channels before PATA channels.

Behind PATA

Puts SATA channels behind PATA channels.

IDE Master and IDE Slave

When entering setup, BIOS auto detects the presence of IDE devices. BIOS displays the status of the auto detected IDE devices. The following IDE devices are detected and are shown in the IDE Configuration menu:

- Primary IDE Master
- Primary IDE Slave
The IDE Configuration menu (BIOS Menu 4) allows changes to the configurations for the IDE devices installed in the system. If an IDE device is detected, and one of the above listed four BIOS configuration options are selected, the IDE configuration options shown in Section 6.3.2.1 appear.

6.3.2.1 IDE Master, IDE Slave

Use the IDE Master and IDE Slave configuration menu to view both primary and secondary IDE device details and configure the IDE devices connected to the system.
Auto-Detected Drive Parameters

The "grayed-out" items in the left frame are IDE disk drive parameters automatically detected from the firmware of the selected IDE disk drive. The drive parameters are listed as follows:

- **Device**: Lists the device type (e.g. hard disk, CD-ROM etc.)
- **Type**: Indicates the type of devices a user can manually select
- **Vendor**: Lists the device manufacturer
- **Size**: List the storage capacity of the device.
- **LBA Mode**: Indicates whether the LBA (Logical Block Addressing) is a method of addressing data on a disk drive is supported or not.
- **Block Mode**: Block mode boosts IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per interrupt if block mode is not used. Block mode allows transfers of up to 64 KB per interrupt.
- **PIO Mode**: Indicates the PIO mode of the installed device.
- **Async DMA**: Indicates the highest Asynchronous DMA Mode that is supported.
- **Ultra DMA**: Indicates the highest Synchronous DMA Mode that is supported.
- **S.M.A.R.T.**: Indicates whether or not the Self-Monitoring Analysis and Reporting Technology protocol is supported.
- **32Bit Data Transfer**: Enables 32-bit data transfer.

**Type [Auto]**

Use the **Type** BIOS option select the type of device the AMIBIOS attempts to boot from after the Power-On Self-Test (POST) is complete.

**Not Installed**: BIOS is prevented from searching for an IDE disk drive on the specified channel.

**Auto** **DEFAULT**: The BIOS auto detects the IDE disk drive type attached to the specified channel. This setting should be used if an IDE hard disk drive is attached to the
The CD/DVD option specifies that an IDE CD-ROM drive is attached to the specified IDE channel. The BIOS does not attempt to search for other types of IDE disk drives on the specified channel.

This option specifies an ATAPI Removable Media Device. These include, but are not limited to:

- **ZIP**
- **LS-120**

Use the LBA/Large Mode option to disable or enable BIOS to auto detects LBA (Logical Block Addressing). LBA is a method of addressing data on a disk drive. In LBA mode, the maximum drive capacity is 137 GB.

- **Disabled**
  - BIOS is prevented from using the LBA mode control on the specified channel.
- **Auto** DEFAULT
  - BIOS auto detects the LBA mode control on the specified channel.

Use the Block (Multi Sector Transfer) option to disable or enable BIOS to auto detect if the device supports multi-sector transfers.

- **Disabled**
  - BIOS is prevented from using Multi-Sector Transfer on the specified channel. The data to and from the device occurs
one sector at a time.

- **Auto** (Default)  
  BIOS auto detects Multi-Sector Transfer support on the drive on the specified channel. If supported, the data transfer to and from the device occurs multiple sectors at a time.

- **PIO Mode [Auto]**

  Use the **PIO Mode** option to select the IDE PIO (Programmable I/O) mode program timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases.

  - **Auto** (Default)  
    BIOS auto detects the PIO mode. Use this value if the IDE disk drive support cannot be determined.

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

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

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

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

  - **4**  
    PIO mode 4 selected with a maximum transfer rate of 16.6MBps  
    (This setting generally works with all hard disk drives manufactured after 1999. For other disk drives, such as IDE CD-ROM drives, check the specifications of the drive.)

- **DMA Mode [Auto]**

  Use the **DMA Mode** BIOS selection to adjust the DMA mode options.

  - **Auto** (Default)  
    BIOS auto detects the DMA mode. Use this value if the IDE disk drive support cannot be determined.
<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWDMA0</td>
<td>Single Word DMA mode 0 selected with a maximum data transfer rate of 2.1MBps</td>
</tr>
<tr>
<td>SWDMA1</td>
<td>Single Word DMA mode 1 selected with a maximum data transfer rate of 4.2MBps</td>
</tr>
<tr>
<td>SWDMA2</td>
<td>Single Word DMA mode 2 selected with a maximum data transfer rate of 8.3MBps</td>
</tr>
<tr>
<td>MWDMA0</td>
<td>Multi Word DMA mode 0 selected with a maximum data transfer rate of 4.2MBps</td>
</tr>
<tr>
<td>MWDMA1</td>
<td>Multi Word DMA mode 1 selected with a maximum data transfer rate of 13.3MBps</td>
</tr>
<tr>
<td>MWDMA2</td>
<td>Multi Word DMA mode 2 selected with a maximum data transfer rate of 16.6MBps</td>
</tr>
<tr>
<td>UDMA1</td>
<td>Ultra DMA mode 0 selected with a maximum data transfer rate of 16.6MBps</td>
</tr>
<tr>
<td>UDMA1</td>
<td>Ultra DMA mode 1 selected with a maximum data transfer rate of 25MBps</td>
</tr>
<tr>
<td>UDMA2</td>
<td>Ultra DMA mode 2 selected with a maximum data transfer rate of 33.3MBps</td>
</tr>
<tr>
<td>UDMA3</td>
<td>Ultra DMA mode 3 selected with a maximum data transfer rate of 44MBps</td>
</tr>
<tr>
<td>UDMA4</td>
<td>Ultra DMA mode 4 selected with a maximum data transfer rate of 66.6MBps</td>
</tr>
<tr>
<td>UDMA5</td>
<td>Ultra DMA mode 5 selected with a maximum data transfer rate of 88.8MBps</td>
</tr>
</tbody>
</table>

(To use this mode, it is required that an 80-conductor ATA cable is used.)
rate of 99.9MBps (To use this mode, it is required that an
80-conductor ATA cable is used.)

➤ S.M.A.R.T [Auto]

Use the S.M.A.R.T option to auto-detect, disable or enable Self-Monitoring Analysis and
Reporting Technology (SMART) on the drive on the specified channel. S.M.A.R.T predicts
impending drive failures. The S.M.A.R.T BIOS option enables or disables this function.

➤ Auto DEFAULT BIOS auto detects HDD SMART support.
➤ Disabled Prevents BIOS from using the HDD SMART feature.
➤ Enabled Allows BIOS to use the HDD SMART feature

➤ 32Bit Data Transfer [Enabled]

Use the 32Bit Data Transfer BIOS option to enables or disable 32-bit data transfers.

➤ Disabled Prevents the BIOS from using 32-bit data transfers.
➤ Enabled DEFAULT Allows BIOS to use 32-bit data transfers on supported
hard disk drives.

6.3.3 Floppy Configuration

Use the Floppy Configuration menu to configure the floppy disk drive connected to the
system.
### Floppy Configuration

**Floppy A**  [1.44 MB 3½”]

Select the type of floppy drive connected to the system.

- Select Screen
- Select Item
- Change Option
- F1: General Help
- F10: Save and Exit
- ESC: Exit

**BIOS Menu 6: IDE Master and IDE Slave Configuration**

- **Floppy A**

  Use the Floppy A/B option to configure the floppy disk drive. Options are listed below:

  - Disabled
  - 360 KB 5¼”
  - 1.2 MB 5¼”
  - 720 KB 3½”
  - 1.44 MB 3½”
  - 2.88 MB 3½”
6.3.4 Super IO Configuration

Use the **Super IO Configuration** menu (BIOS Menu 7) to set or change the configurations for the FDD controllers, parallel ports and serial ports.

**BIOS Menu 7: Super IO Configuration**

- **Serial Port1 Address [3F8/IRQ4]**
  
  Use the **Serial Port1 Address** 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
Serial Port 1 I/O port address is 3E8 and the interrupt address is IRQ4

Serial Port 1 I/O port address is 2E8 and the interrupt address is IRQ3

Serial Port1 Mode [Normal]
Use the Serial Port1 Mode option to select the Serial Port1 operational mode.

Normal DEFAULT Serial Port 1 mode is normal
IrDA Serial Port 1 mode is IrDA
ASK IR Serial Port 1 mode is ASK IR

Serial Port2 Address [2F8/IRQ3]
Use the Serial Port2 Address 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

Serial Port2 Mode [Normal]
Use the Serial Port2 Mode 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

Parallel Address [378]

The Parallel Port Address BIOS option assigns the I/O port address of the parallel port. The following address options are available:

- Disabled: No I/O port address is assigned to the parallel port
- 378 (Default): Parallel Port I/O port address is 378
- 278: Parallel Port I/O port address is 278
- 3BC: Parallel Port I/O port address is 3BC

Parallel Port Mode [Normal]

The Parallel Port Mode selection selects the mode the parallel port operates in.

- Normal (Default): The normal parallel port mode is the standard mode for parallel port operation.
- EPP: The parallel port operates in the enhanced parallel port mode (EPP). The EPP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the Normal mode.
- ECP: The parallel port operates in the extended capabilities port (ECP) mode. The ECP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster.
than the SPP mode.

- **EPP + ECP**
  
  The parallel port operates in the extended capabilities port (ECP) mode. The ECP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the Normal mode.

  The parallel port becomes compatible with EPP devices described above.

- **Parallel Port IRQ [IRQ7]**

  The **Parallel Port Address** BIOS option assigns the parallel port interrupt address. The following address options are available.

  - **IRQ5**  
    Parallel port interrupt address is IRQ5
  - **IRQ7**  
    (Default) Parallel port interrupt address is IRQ7

- **Serial Port3 Address [3E8]**

  Use the **Serial Port Address** option to select the base addresses for serial port 3.

  - **Disabled**  
    No base address is assigned to serial port 3
  - **3E8**  
    **DEFAULT**  
    Serial port 3 I/O port address is 3E8
  - **2E8**  
    Serial port 3 I/O port address is 2E8
  - **2F0**  
    Serial port 3 I/O port address is 2F0
  - **2E0**  
    Serial port 3 I/O port address is 2E0

- **Serial Port4 Address [2E8]**

  Use the **Serial Port4 IRQ** option to select the interrupt address for serial port 4.
Serial Port 4 Address [2E0]

Use the **Serial Port4 IRQ** option to select the interrupt address for serial port 4.

- **Disabled**  
  No base address is assigned to serial port 4
- **3E8**  
  Serial port 4 I/O port address is 3E8
- **2E8**  
  Serial port 4 I/O port address is 2E8
- **2F0**  
  Serial port 4 I/O port address is 2F0
- **2E0**  
  Serial port 4 I/O port address is 2E0

Serial Port 5 Address [2E0]

Use the **Serial Port5 IRQ** option to select the interrupt address for serial port 5.

- **Disabled**  
  No base address is assigned to serial port 5
- **3E8**  
  Serial port 6 I/O port address is 3E8
- **2E8**  
  Serial port 6 I/O port address is 2E8
- **2F0**  
  Serial port 6 I/O port address is 2F0
- **2E0**  
  Serial port 6 I/O port address is 2E8

Serial Port 6 Address [2D8]

Use the **Serial Port6 IRQ** option to select the interrupt address for serial port 6.

- **Disabled**  
  No base address is assigned to serial port 6
- **3E8**  
  Serial port 6 I/O port address is 3E8
- **2E8**  
  Serial port 6 I/O port address is 2E8
- **2F0**  
  Serial port 6 I/O port address is 2F0
- **2E0**  
  Serial port 6 I/O port address is 2E8
6.3.5 Hardware Health Configuration

The Hardware Health Configuration menu (BIOS Menu 8) shows the operating temperature, fan speeds and system voltages.

 BIOS Menu 8: Hardware Health Configuration

- **FAN Mode Setting [Full On Mode]**

  Use the **FAN Mode Setting** option to configure the fan mode options for the following fans:

  - CPU Fan
  - System Fan 1
  - System Fan 2
The fan mode setting options are listed below.

- **Full On Mode**  DEFAULT  Fan is on all the time
- **Automatic mode**  Fan is off when the temperature is low enough. Parameters must be set by the user.

When the **FAN Mode Setting** option is in the **Automatic Mode**, the following parameters can be set:

- CPU Temp. Limit of OFF
- CPU Temp. Limit of Start
- CPU Fan Start PWM
- Slope PWM 1

**CPU Temp. Limit of OFF [000]**

**WARNING:**

Setting this value too high may cause the fan to stop when the CPU is at a high temperature and therefore cause the system to be damaged.

The **CPU Temp. Limit of OFF** option can only be set if the CPU FAN Mode Setting option is set to **Automatic Mode**. Use the **CPU Temp. Limit of OFF** option to select the CPU temperature at which the cooling fan should automatically turn off. To select a value, select the **CPU Temp. Limit of OFF** option and enter a decimal number between 000 and 127. The temperature range is specified below:

- Minimum Value: 0°C
- Maximum Value: 127°C
CPU Temp. Limit of Start [020]

**WARNING:**

Setting this value too high may cause the fan to start only when the CPU is at a high temperature and therefore cause the system to be damaged.

The **CPU Temp. Limit of Start** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **CPU Temp. Limit of Start** option to select the CPU temperature at which the cooling fan should automatically turn on. When the fan starts, it rotates using the starting pulse width modulation (PWM) specified in the **Fan 3 Start PWM** option below. To select a value, select the **CPU Temp. Limit of Start** option and enter a decimal number between 000 and 127. The temperature range is specified below.

- Minimum Value: 0°C
- Maximum Value: 127°C

CPU Fan Start PWM [070]

The **Fan 3 Start PWM** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **Fan 3 Start PWM** option to select the PWM mode the fan starts to rotate with after the temperature specified in the **Temperature 3 Limit of Start** is exceeded. The Super I/O chipset supports 128 PWM modes. To select a value, select the **Fan 3 Start PWM** option and enter a decimal number between 000 and 127. The temperature range is specified below.

- PWM Minimum Mode: 0
- PWM Maximum Mode: 127

Slope PWM 1 [1 PWM]

The **Slope PWM 1** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **Slope PWM 1** option to select the linear rate at which the PWM
mode increases with respect to an increase in temperature. A list of available options is shown below:

- 0 PWM
- 1 PWM
- 2 PWM
- 4 PWM
- 8 PWM
- 16 PWM
- 32 PWM
- 64 PWM

The following system parameters and values are shown. The system parameters that are monitored are:

- **System Temperatures**: The following system temperatures are monitored
  - CPU Temperature
  - System Temperature 1
  - System Temperature 2

- **Fan Speeds**: The CPU cooling fan speed is monitored.
  - CPU Fan Speed
  - System Fan 1 Speed
  - System Fan 2 Speed

- **Voltages**: The following system voltages are monitored
  - CPU Core
  - DRAM Vcc
  - +3.30V
  - +5.00V
  - +12.0V
  - FSB Vcc +1.2V
  - +1.5V
  - VBAT
6.3.6 Power Configuration

Use the Power Configuration menu (BIOS Menu 9) to configure the AHCI and APM options.

**BIOS Menu 9: Power Configuration**

- **Power Supply Type [H/W]**
  
  Use the **Power Supply Type** BIOS option to select the power supply that is connected to the system.

  - **AT**
    An AT power supply is connected to the system
  
  - **ATX**
    An ATX power supply is connected to the system
  
  - **By H/W**
    **DEFAULT**

The remaining two options in the Power Configuration menu (BIOS Menu 9) are submenus. These options include:
6.3.6.1 ACPI Configuration

The **ACPI Configuration** menu (**BIOS Menu 10**) configures the Advanced Configuration and Power Interface (ACPI) and Power Management (APM) options.

### BIOS Menu 10: ACPI Configuration

- **Suspend Mode [S1(POS)]**

  The **Suspend Mode** BIOS option specifies the sleep state your system will enter when it is not being used.

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

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

### 6.3.6.2 APM Configuration

The APM Configuration menu (BIOS Menu 11) allows the advanced power management options to be configured.

**BIOS Menu 11: Advanced Power Management Configuration**

- **Power Button Mode [On/Off]**

  Use the Power Button Mode BIOS to specify how the power button functions.
On/Off  (Default) When the power button is pressed the system is either turned on or off

Suspend When the power button is pressed the system goes into suspend mode

Restore on AC Power Loss [Power Off]
Use the Restore on AC Power Loss BIOS option to specify what state the system returns to if there is a sudden loss of power to the system.

Power Off  (Default) The system remains turned off

Power On The system turns on

Last State The system returns to its previous state. If it was on, it turns itself on. If it was off, it remains off.

Resume on Keyboard/Mouse [Disabled]
Use the Resume on Keyboard/Mouse BIOS option to enable activity on either the keyboard or mouse to rouse the system from a suspend or standby state. That is, the system is roused when the mouse is moved or a button on the keyboard is pressed.

Disabled  (Default) Wake event not generated by activity on the keyboard or mouse

Enabled Wake event generated by activity on the keyboard or mouse

Resume on Ring [Disabled]
Use the Resume on Ring BIOS option to enable activity on the RI (ring in) modem line to rouse the system from a suspend or standby state. That is, the system will be roused by an incoming call on a modem.
### Resume on PME#

The Resume on PME# BIOS option enables activity on the PCI PME (power management event) controller to rouse the system from a suspend or standby state.

- **Disabled** *(Default)*: Wake event not generated by PCI PME controller activity
- **Enabled**: Wake event generated by PCI PME controller activity

### Resume on PCI-Express WAKE#

The Resume on PCI-Express WAKE# BIOS option specifies if the system is roused from a suspended or standby state when there is activity on the PCI-Express bus.

- **Disabled**: Wake event not generated by PCI-Express activity
- **Enabled**: Wake event generated by PCI-Express activity

### Resume On RTC Alarm

Use the Resume On RTC Alarm to specify when the computer is roused from a suspended state.

- **Disabled** *(Default)*: The real time clock (RTC) cannot generate a wake event
- **Enabled**: If selected, the following will appear with values that can be selected:
  - **RTC Alarm Date (Days)**
  - **System Time**
After setting the alarm, the computer will turn itself on from a suspend state when the alarm goes off.

6.3.7 Remote Access Configuration

Use the Remote Access Configuration menu (BIOS Menu 12) to configure remote access parameters. The Remote Access Configuration is an AMIBIOS feature and allows a remote host running a terminal program to display and configure the BIOS settings.

BIOS Menu 12: Remote Access Configuration [Advanced]

- Remote Access [Disabled]

Use the Remote Access option to enable or disable access to the remote functionalities of the system.

- Disabled DEFAULT Remote access is disabled.
- Enabled Remote access configuration options shown below
Serial Port Number [COM1]

Use the Serial Port Number option to select the serial port used for remote access.

- **COM1** (DEFAULT)  System is remotely accessed through COM1
- **COM2**  System is remotely accessed through COM2
- **COM3**  System is remotely accessed through COM3
- **COM4**  System is remotely accessed through COM4
- **COM5**  System is remotely accessed through COM5
- **COM6**  System is remotely accessed through COM6

**NOTE:** Make sure the selected COM port is enabled through the Super I/O configuration menu.

Base Address, IRQ [3F8h,4]

The Base Address, IRQ option cannot be configured and only shows the interrupt address of the serial port listed above.
Serial Port Mode [115200 8,n,1]

Use the Serial Port Mode option to select baud rate through which the console redirection is made. The following configuration options are available:

- 115200 8,n,1 DEFAULT
- 57600 8,n,1
- 38400 8,n,1
- 19200 8,n,1
- 9600 8,n,1

NOTE:

Identical baud rate setting musts be set on the host (a management computer running a terminal software) and the slave.

Flow Control [None]

Use the Flow Control option to report the flow control method for the console redirection application.

- None DEFAULT No control flow,
- Hardware Hardware is set as the console redirection
- Software Software is set as the console redirection

Redirection After BIOS POST [Always]

Use the Redirection After BIOS POST option to specify when console redirection should occur.

- Disabled The console is not redirected after POST
- Boot Loader Redirection is active during POST and during Boot
Loader

- Always **DEFAULT**
  Redirection is always active (Some OSes may not work if set to Always)

**Terminal Type [ANSI]**

Use the **Terminal Type BIOS** option to specify the remote terminal type.

- ANSI **DEFAULT**
  The target terminal type is ANSI
- VT100
  The target terminal type is VT100
- VT-UTF8
  The target terminal type is VT-UTF8

**VT-UTF8 Combo Key Support [Disabled]**

Use the **VT-UFT8 Combo Key Support** option to enable additional keys that are not provided by VT100 for the PC 101 keyboard.

The VT100 Terminal Definition is the standard convention used to configure and conduct emergency management tasks with UNIX-based servers. VT100 does not support all keys on the standard PC 101-key layout, however. The VT-UTF8 convention makes available additional keys that are not provided by VT100 for the PC 101 keyboard.

- Disabled
  Disables the VT-UTF8 terminal keys
- Enabled **DEFAULT**
  Enables the VT-UTF8 combination key. Support for ANSI/VT100 terminals

**Sredir Memory Display Delay [Disabled]**

Use the **Sredir Memory Display Delay** option to select the delay before memory information is displayed. Configuration options are listed below

- No Delay **DEFAULT**
- Delay 1 sec
6.3.8 Trusted Computing

Use the **Trusted Computing** menu (BIOS Menu 13) to configure settings related to the Trusted Computing Group (TCG) Trusted Platform Module (TPM).

### BIOS Menu 13: Trusted Computing

- **TCG/TPM Support [Yes]**

Use the **TCG/TPM Support** option to configure support for the TPM.

- **No** **DEFAULT**  
  TPM support is disabled.

- **Yes**  
  TPM support is enabled.
Clearing the TPM [Press Enter]

Use the Clearing the TPM option to clear the information stored in the TPM.

6.3.9 USB Configuration

Use the USB Configuration menu (BIOS Menu 14) to read USB configuration information and configure the USB settings.

<table>
<thead>
<tr>
<th>USB Configuration</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module Version - 2.24.3-13.4</td>
<td></td>
</tr>
<tr>
<td>USB Devices Enabled:</td>
<td>2 Drives</td>
</tr>
<tr>
<td>USB Functions</td>
<td>[Enabled]</td>
</tr>
<tr>
<td>USB 2.0 Controller</td>
<td>[Enabled]</td>
</tr>
<tr>
<td>Legacy USB Support</td>
<td>[Enabled]</td>
</tr>
<tr>
<td>USB 2.0 Controller Mode</td>
<td>[HiSpeed]</td>
</tr>
</tbody>
</table>

USB Mass Storage Device Configuration

BIOS Menu 14: USB Configuration

USB Functions [Enabled]

Use the USB Function BIOS option to enable or disable USB function support.

Disabled

USB function support disabled
USB function support enabled

USB 2.0 Controller [Enabled]

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

- **Disabled**
  - USB 2.0 controller disabled

- **Enabled**
  - USB 2.0 controller enabled

Legacy USB Support [Enabled]

Use the Legacy USB Support BIOS option to enable USB mouse and USB keyboard support.

Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB driver loaded onto the system.

- **Disabled**
  - Legacy USB support disabled

- **Enabled**
  - Legacy USB support enabled

- **Auto**
  - Legacy USB support disabled if no USB devices are connected

USB2.0 Controller Mode [HiSpeed]

Use the USB2.0 Controller Mode option to set the speed of the USB2.0 controller.

- **FullSpeed**
  - The controller is capable of operating at 12Mb/s

- **HiSpeed**
  - The controller is capable of operating at 480Mb/s
6.3.9.1 USB Mass Storage Device Configuration

Note:

This option is only available if a USB drive is inserted into the USB port.

Use the USB Mass Storage Device Configuration menu (BIOS Menu 15) to configure USB mass storage class devices.

BIOS SETUP UTILITY

**Advanced**

<table>
<thead>
<tr>
<th>USB Mass Storage Device Configuration</th>
<th>Number of seconds POST waits for the USB mass storage device after start unit command.</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB Mass Storage Reset Delay [20 Sec]</td>
<td></td>
</tr>
<tr>
<td>Device #1 JetFlash TS16JF110</td>
<td></td>
</tr>
<tr>
<td>Emulation Type [Auto]</td>
<td></td>
</tr>
</tbody>
</table>

---

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BIOS Menu 15: USB Mass Storage Device Configuration
USB Mass Storage Reset Delay [20 Sec]

Use the **USB Mass Storage Reset Delay** option to set the number of seconds POST waits for the USB mass storage device after the start unit command.

- **10 Sec**
  POST waits 10 seconds for the USB mass storage device after the start unit command.
- **20 Sec** **DEFAULT**
  POST waits 20 seconds for the USB mass storage device after the start unit command.
- **30 Sec**
  POST waits 30 seconds for the USB mass storage device after the start unit command.
- **40 Sec**
  POST waits 40 seconds for the USB mass storage device after the start unit command.

Device ##

The **Device##** field lists the USB devices that are connected to the system.

Emulation Type [Auto]

Use the **Emulation Type** BIOS option to specify the type of emulation BIOS has to provide for the USB device.

**NOTE:**

Please note that the device’s formatted type and the emulation type provided by the BIOS must match for a device to boot properly. If both types do not match then device’s behavior is undefined. To make sure both types match, format the device using BIOS INT13h calls after selecting the proper emulation option in BIOS setup. The FORMAT utility provided by Microsoft® MS-DOS®, Microsoft® Windows® 95, and Microsoft® Windows® 98 can be used for this purpose.
6.4 PCI/PnP

Use the PCI/PnP menu (BIOS Menu 16) to configure advanced PCI and PnP settings.

⚠️ WARNING:

Setting wrong values for the BIOS selections in the PCIPnP BIOS menu may cause the system to malfunction.
**BIOS Menu 16: PCI/PnP Configuration**

- **IRQ# [Available]**

  Use the **IRQ#** address to specify what IRQs can be assigned to a particular peripheral device.

  - **Available** DEFAULT The specified IRQ is available to be used by PCI/PnP devices
  - **Reserved** The specified IRQ is reserved for use by Legacy ISA devices

Available IRQ addresses are:

- IRQ3
- IRQ4
- IRQ5
- IRQ7
- IRQ9
- IRQ10
- IRQ 11
- IRQ 14
- IRQ 15

⇒ DMA Channel# [Available]

Use the DMA Channel# option to assign a specific DMA channel to a particular PCI/PnP device.

⇒ Available  DEFAULT  The specified DMA is available to be used by PCI/PnP devices

⇒ Reserved  The specified DMA is reserved for use by Legacy ISA devices

Available DMA Channels are:

- DM Channel 0
- DM Channel 1
- DM Channel 3
- DM Channel 5
- DM Channel 6
- DM Channel 7

⇒ Reserved Memory Size [Disabled]

Use the Reserved Memory Size BIOS option to specify the amount of memory that should be reserved for legacy ISA devices.

⇒ Disabled  DEFAULT  No memory block reserved for legacy ISA devices
6.5 Boot

Use the Boot menu (BIOS Menu 17) to configure system boot options.

6.5.1 Boot Settings Configuration

Use the Boot Settings Configuration menu (BIOS Menu 17) to configure advanced system boot options.
## BIOS Menu 18: Boot Settings Configuration

### Quick Boot [Enabled]

Use the **Quick Boot** BIOS option to make the computer speed up the boot process.

- **Disabled**
  
  No POST procedures are skipped

- **Enabled**  DEFAULT
  
  Some POST procedures are skipped to decrease the system boot time

### Quiet Boot [Disabled]

Use the **Quiet Boot** BIOS option to select the screen display when the system boots.

- **Disabled**  DEFAULT
  
  Normal POST messages displayed
Enabled
OEM Logo displayed instead of POST messages

AddOn ROM Display Mode [Force BIOS]
Use the AddOn ROM Display Mode option to allow add-on ROM (read-only memory) messages to be displayed.

Force BIOS  DEFAULT
The system forces third party BIOS to display during system boot.

Keep Current
The system displays normal information during system boot.

Bootup Num-Lock [On]
Use the Bootup Num-Lock BIOS option to specify if the number lock setting must be modified during boot up.

Off
Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.

On  DEFAULT
Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit.

Boot From LAN Support [Disabled]
Use the BOOT From LAN Support option to enable 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

6.5.2 Boot Device Priority

Use the Boot Device Priority menu (BIOS Menu 19) to specify the boot sequence from the available devices. Possible boot devices may include:

- 1st FLOPPY DRIVE
- HDD
- CD/DVD

BIOS SETUP UTILITY

Boot Device Priority

1st Boot Device
2nd Boot Device

IUSB: USB FLASH DRIV

1st FLOPPY DRIVE

Specifies the boot sequence from the available devices.

A device enclosed in parenthesis has been disabled in the corresponding type menu.

+ Select Screen
+ Select Item
+ Change Option
F1 General Help
F10 Save and Exit
ESC Exit

BIOS Menu 19: Boot Device Priority Settings
6.5.3 Removable Drives

Use the Removable Drives menu (BIOS Menu 20) to specify the boot sequence of the available FDDs. When the menu is opened, the FDDs connected to the system are listed as shown below:

- 1st Drive       [1st FLOPPY DRIVE]
- 2nd Drive       [2nd FLOPPY DRIVE]

![NOTE:]

Only the drives connected to the system are shown. For example, if only one FDD is connected only “1st Drive” is listed.

The boot sequence from the available devices is selected. If the “1st Drive” option is selected a list of available FDDs is shown. Select the first FDD the system boots from. If the “1st Drive” is not used for booting this option may be disabled.
BIOS Menu 20: Removable Drives

6.5.4 USB Drives

Use the USB Drives menu (BIOS Menu 21) to specify the boot sequence of the available USB devices. When the menu is opened, the USB devices connected to the system are listed as shown below:

- 1st Drive [1st USB DRIVE]
- 2nd Drive [2nd USB DRIVE]

NOTE:

Only the drives connected to the system are shown. For example, if
only one USB drive is connected only “1st Drive” is listed.

The boot sequence from the available devices is selected. If the “1st Drive” option is selected a list of available USB drives is shown. Select the first USB drive the system boots from. If the “1st Drive” is not used for booting this option may be disabled.

**BIOS Menu 21: USB Drives**

**6.6 Security**

Use the Security menu (BIOS Menu 22) to set system and user passwords.
BIOS Menu 22: Security

➔ Change Supervisor Password

Use the Change Supervisor Password to set or change a supervisor password. The default for this option is Not Installed. If a supervisor password must be installed, select this field and enter the password. After the password has been added, Install appears next to Change Supervisor Password.

➔ Change User Password

Use the Change User Password to set or change a user password. The default for this option is Not Installed. If a user password must be installed, select this field and enter the password. After the password has been added, Install appears next to Change User Password.
Clear User Password

Use the **Clear User Password** to clear a user’s password. The default for this option is **Not Installed**. If a user password must be cleared, use this option.

6.7 Chipset

Use the **Chipset** menu (**BIOS Menu 23**) to access the NorthBridge and SouthBridge configuration menus.

---

**WARNING!**

Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.

---
6.7.1 **NorthBridge Configuration**

Use the NorthBridge Configuration menu (BIOS Menu 23) to configure the northbridge chipset.
### BIOS Menu 24: NorthBridge Chipset Configuration

- **Memory Hole**
  
  Use the **Memory Hole** option to reserve memory space between 15MB and 16MB for ISA expansion cards that require a specified area of memory to work properly. If an older ISA expansion card is used, please refer to the documentation that came with the card to see if it is necessary to reserve the space.

- **Disabled**  
  **DEFAULT**  
  Memory is not reserved for ISA expansion cards

- **15MB – 16MB**  
  Between 15MB and 16MB of memory is reserved for ISA expansion cards
➔ **Initiate Graphic Adapter**

Use the **Initiate Graphic Adapter** option to select the graphics controller used as the primary boot device. Select either an integrated graphics controller (IGD) or a combination of PCI graphics controller, a PCI express (PEG) controller or an IGD. Configuration options are listed below:

- IGD
- PEG/IGD
- PEG/PCI **DEFAULT**
- PCI/PEG
- PCI/IGD

➔ **Internal Graphics Mode Select [Enable, 32MB]**

Use the **Internal Graphic Mode Select** option to specify the amount of system memory that can be used by the Internal graphics device.

- **Disable**
- **Enable, 1MB**
  1MB of memory used by internal graphics device
- **Enable, 8MB** **DEFAULT**
  8MB of memory used by internal graphics device

➔ **DVMT Mode Select**

Use the **DVMT Mode Select** option to select the Intel Dynamic Video Memory Technology (DVMT) operating mode.

- **Fixed Mode** **DEFAULT**
  A fixed portion of graphics memory is reserved as graphics memory.
- **DVMT Mode**
  Graphics memory is dynamically allocated according to the system and graphics needs.
- **Combo Mode**
  A fixed portion of graphics memory is reserved as graphics memory. If more memory is needed,
graphics memory is dynamically allocated according to the system and graphics needs.

➤ **DVMT/FIXED Memory**

Use the **DVMT/FIXED Memory** option to specify the maximum amount of memory that can be allocated as graphics memory. This option can only be configured for if **DVMT Mode** or **Fixed Mode** is selected in the **DVMT Mode Select** option. If **Combo Mode** is selected, the maximum amount of graphics memory is 128MB. Configuration options are listed below.

- 64MB
- 128MB Default

**6.7.2 SouthBridge Configuration**

The **SouthBridge Configuration** menu (BIOS Menu 25) the southbridge chipset to be configured.
**BIOS Menu 25: SouthBridge Chipset Configuration**

- **ASF Support [Enabled]**

  Use the **ASF Support** BIOS option to control the system's ability to connect to a remote management server.

- **Disabled**

  The system will not communicate with a remote management server.

- **Enabled  DEFAULT**

  The Alert Standard Format (ASF) controller is activated and can communicate with a remote management server.
Spread Spectrum Mode [Enabled]

Use the Spread Spectrum Mode option to reduce the EMI. Excess EMI is generated when the system clock generator pulses have extreme values. Spreading the pulse spectrum modulates changes in the extreme values from spikes to flat curves, thus reducing the EMI. This benefit may in some cases be outweighed by problems with timing-critical devices, such as a clock-sensitive SCSI device.

- Disabled EMI not reduced
- Enabled DEFAULT EMI reduced

Audio Controller [AC'97 Audio]

The Audio Controller option enables or disables the audio controller.

- AC'97 Audio DEFAULT The on-board AC'97 audio controller is enabled.
- All Disabled The on-board audio controller is disabled.

OnBoard LAN1 [Enabled]

The OnBoard LAN1 option enables or disables the onboard LAN1.

- Disabled Onboard LAN1 device manually disabled
- Enabled DEFAULT The onboard LAN1 device automatically detected and enabled

OnBoard LAN2 [Enabled]

The OnBoard LAN2 option enables or disables the onboard LAN1.

- Disabled Onboard LAN2 device manually disabled
- Enabled DEFAULT The onboard LAN2 device automatically detected and enabled
6.8 Exit

Use the Exit menu (BIOS Menu 26) to load default BIOS values, optimal failsafe values and to save configuration changes.

BIOS Menu 26: Exit

⇒ Save Changes and Exit

Use the Save Changes and Exit option to save the changes made to the BIOS options and to exit the BIOS configuration setup program.
Discard Changes and Exit

Use the Discard Changes and Exit option to exit the BIOS configuration setup program without saving the changes made to the system.

Discard Changes

Use the Discard Changes option to discard the changes and remain in the BIOS configuration setup program.

Load Optimal Defaults

Use the Load Optimal Defaults option to load the optimal default values for each of the parameters on the Setup menus. F9 key can be used for this operation.

Load Failsafe Defaults

Use the Load Failsafe Defaults option to load failsafe default values for each of the parameters on the Setup menus. F8 key can be used for this operation.
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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:

- Intel® Chipset driver
- VGA driver (Intel® Graphics Media Accelerator Driver)
- Audio driver (Realtek HD Audio Driver (ALC883))
- SATA driver (Intel® Matrix Storage Manager)
- IDE controller (IT8211)
- LAN Driver

Installation instructions are given below.

7.2 Driver CD Auto-run

All the drivers for the IMBA-9454ISA 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](image1)

Step 3: Click IMBA-9454ISA.

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

![Figure 7-2: Available Drivers](image2)

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 1: Select INF from the list in Figure 7-2.

Step 2: A new window opens (Figure 7-3).

Step 3: Double-click the infinst_Autol.exe icon.

Step 4: The welcome screen in Figure 7-4 appears.

Step 5: Click NEXT to continue the installation process.
Step 6: The license agreement in Figure 7-5 appears.

Figure 7-5: Chipset Driver Installation License Agreement

Step 7: Read the license agreement. To accept the terms and conditions stipulated in the agreement, click Yes.

Step 8: The Readme file in Figure 7-6 appears.

Figure 7-6: Chipset Driver Readme File Information

Step 9: Read the Readme file information and then click Next to start the driver
Step 10: After the driver installation process is complete, a confirmation screen appears (Figure 7-7).

![Figure 7-7: Chipset Driver Installation Complete](image)

Step 1: Click **Finish** to complete the driver installation.

### 7.4 Intel Graphics Media Accelerator Driver Installation

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

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

Step 3: A new window opens (**Figure 7-8**).
Step 4: Double-click the appropriate operating system folder.

Step 5: A new window appears (Figure 7-9).

Step 6: Double-click the installation program icon to continue the installation process.

Step 7: The Readme information file shown in Figure 7-10 appears.
Step 8: Read the Readme file information and click **NEXT** to begin extracting files (Figure 7-11).

Step 9: The **Graphics Media Accelerator Driver Welcome** screen appears (Figure 7-12).
Step 10: Click **NEXT** and a license agreement appears (**Figure 7-13**).

**Figure 7-13: Intel® Graphics Media Accelerator Driver License Agreement**

Step 11: Read the license agreement. To accept the terms and conditions stipulated in the license agreement shown, click **YES** and the installation notice appears (**Figure 7-14**) as the driver is installed.
Step 12: After the driver installation process is complete, a confirmation screen appears (Figure 7-15).

Figure 7-15: Intel® Graphics Media Accelerator Installation Complete

Step 13: 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 Broadcom LAN Driver (for GbE LAN) Installation

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

Step 1: Open Windows Control Panel (Figure 7-16).
Figure 7-16: Windows Control Panel

**Step 2:** Double-click the **System** icon (Figure 7-17).
Figure 7-17: System Icon

Step 3:  Click the **Device Manager** tab (Figure 7-18).

Figure 7-18: Device Manager Tab

Step 4:  A list of system hardware devices appears (Figure 7-19).
Figure 7-19: Device Manager List

**Step 5:** Double-click the listed device that has question marks next to it (this means Windows does not recognize the device).

**Step 6:** The **Device Driver Wizard** appears (Figure 7-20).
Step 7: Select "Search for a suitable driver for my device (recommended)," and click NEXT to continue.

Step 8: Select "Specify a Location" in the Locate Driver Files window (Figure 7-21).

Step 9: Click NEXT to continue.

Step 10: The Locate File window appears (Figure 7-22).
Step 11: Select the proper OS folder under the “\3-LAN\BROADCOM BCM57xx Drivers” directory in the Locate File window, where “\” is the system CD drive.

Step 12: Click OPEN and the driver is installed.

7.6 Realtek HD Audio Driver (ALC883) Installation

To install the Realtek High Definition (HD) 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 [Azalia].

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 7-23).
Figure 7-23: Select the Audio CODEC

**Step 3:** Double-click the ALC883 folder.

**Step 4:** Double-click the appropriate operating system folder *(Figure 7-24).*
Step 5: Double-click the appropriate operating system version folder (Figure 7-25).

Step 6: Double-click the Setup.exe program icon in Figure 7-26.
Step 7: The InstallShield Wizard starts (Figure 7-27).

Step 8: The InstallShield Wizard is prepared to guide the user through the rest of the process (Figure 7-28).
Step 9: Once initialized, the InstallShield Wizard welcome screen appears (Figure 7-29).

Figure 7-29: 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 7-30.
Step 12: The Installation Wizard updates the system as shown in Figure 7-31.

Step 13: After the driver installation process is complete, a confirmation screen appears (Figure 7-32).
Figure 7-32: Restart the Computer

**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.

7.7 SATA RAID Driver Installation

To install the Intel® Matrix Storage Manager driver, please follow the steps below:

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

**Step 2:** A new window opens (Figure 7-33).
Step 3: Double-click the **INTEL** folder.

Step 4: Double-click the **iata62_cd.exe** program icon in **Figure 7-34**.
Step 5: Figure 7-35 shows the InstallShield Wizard preparing to guide the user through the rest of the process.

Step 6: Figure 7-36 shows the Matrix Storage Manager software configuring the installation process.
Step 7: Figure 7-37 shows the **Matrix Storage Manager** welcome screen.

![Matrix Storage Manager Setup Screen](image)

Figure 7-36: Matrix Storage Manager Setup Screen

**Step 8:** Click **Next** and a warning appears (**Figure 7-38**). Read the warning carefully and decide whether or not to continue the installation process.

![Matrix Storage Manager Welcome Screen](image)

Figure 7-37: Matrix Storage Manager Welcome Screen
Figure 7-38: Matrix Storage Manager Warning Screen

**Step 9:** Click **NEXT** and a license agreement appears (Figure 7-39).

Figure 7-39: Matrix Storage Manager License Agreement

**Step 10:** Read the license agreement. To accept the terms and conditions stipulated in the license agreement shown, click **YES** and the Readme information file shown in Figure 7-40 appears.
Figure 7-40: Matrix Storage Manager Readme File

Step 11: Read the Readme file information and click NEXT.

Step 12: After the driver installation process is complete, a confirmation screen appears (Figure 7-41).

Figure 7-41: Matrix Storage Manager Setup Complete

Step 13: 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
The following is a list of the BIOS options that are available on this board.

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Appendix

B

Terminology
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<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC ’97</td>
<td>Audio Codec 97 (AC’97) refers to a codec standard developed by Intel® in 1997.</td>
</tr>
<tr>
<td>ACPI</td>
<td>Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.</td>
</tr>
<tr>
<td>AHCI</td>
<td>Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.</td>
</tr>
<tr>
<td>APM</td>
<td>The Advanced Power Management (APM) application program interface (API) enables the inclusion of power management in the BIOS.</td>
</tr>
<tr>
<td>ARMD</td>
<td>An ATAPI Removable Media Device (ARMD) is any ATAPI device that supports removable media, besides CD and DVD drives.</td>
</tr>
<tr>
<td>ASKIR</td>
<td>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.</td>
</tr>
<tr>
<td>BIOS</td>
<td>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.</td>
</tr>
<tr>
<td>CODEC</td>
<td>The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.</td>
</tr>
<tr>
<td>CMOS</td>
<td>Complimentary metal-oxide-conductor is an integrated circuit used in chips like static RAM and microprocessors.</td>
</tr>
<tr>
<td>COM</td>
<td>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.</td>
</tr>
<tr>
<td>DAC</td>
<td>The Digital-to-Analog Converter (DAC) converts digital signals to analog signals.</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>DDR</td>
<td>Double Data Rate refers to a data bus transferring data on both the rising and falling edges of the clock signal.</td>
</tr>
<tr>
<td>DMA</td>
<td>Direct Memory Access (DMA) enables some peripheral devices to bypass the system processor and communicate directly with the system memory.</td>
</tr>
<tr>
<td>DIMM</td>
<td>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.</td>
</tr>
<tr>
<td>DIO</td>
<td>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.</td>
</tr>
<tr>
<td>EHCI</td>
<td>The Enhanced Host Controller Interface (EHCI) specification is a register-level interface description for USB 2.0 Host Controllers.</td>
</tr>
<tr>
<td>EIDE</td>
<td>Enhanced IDE (EIDE) is a newer IDE interface standard that has data transfer rates between 4.0 MBps and 16.6 MBps.</td>
</tr>
<tr>
<td>EIST</td>
<td>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.</td>
</tr>
<tr>
<td>FSB</td>
<td>The Front Side Bus (FSB) is the bi-directional communication channel between the processor and the Northbridge chipset.</td>
</tr>
<tr>
<td>GbE</td>
<td>Gigabit Ethernet (GbE) is an Ethernet version that transfers data at 1.0 Gbps and complies with the IEEE 802.3-2005 standard.</td>
</tr>
<tr>
<td>GPIO</td>
<td>General purpose input</td>
</tr>
<tr>
<td>HDD</td>
<td>Hard disk drive (HDD) is a type of magnetic, non-volatile computer storage device that stores digitally encoded data.</td>
</tr>
<tr>
<td>ICH</td>
<td>The Input/Output Control Hub (ICH) is an Intel® Southbridge chipset.</td>
</tr>
</tbody>
</table>
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.

MAC
The Media Access Control (MAC) protocol enables several terminals or network nodes to communicate in a LAN, or other multipoint networks.

PCIe
PCI Express (PCIe) is a communications bus that uses dual data lines for full-duplex (two-way) serial (point-to-point) communications between the SBC components and/or expansion cards and the SBC chipsets. Each line has a 2.5 Gbps data transmission rate and a 250 MBps sustained data transfer rate.

POST
The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.

QVGA
Quarter Video Graphics Array (QVGA) refers to a display with a resolution of 320 x 240 pixels.

RAID
Redundant Array of Inexpensive Disks (RAID) refers to redundantly backing up data on multiple disks to ensure that if one disk fails, the data is not lost and can be restored from the remaining disks in the array.

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 Gbps and the SATA II bus has data transfer speeds of up to 3.0 Gbps.

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 12Mbps data transfer rates, while USB 2.0 supports 480Mbps data transfer rates.

VGA
The Video Graphics Array (VGA) is a graphics display system developed by IBM.
Appendix C

DIO Interface
C.1 DIO Interface Introduction

The DIO connector on the IMBA-9454ISA is interfaced to GIO ports on the iTE 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 iTE 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.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Super I/O Pin</th>
<th>Super I/O Pin Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ground</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2</td>
<td>VCC</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>3</td>
<td>Output 0</td>
<td>GP27</td>
<td>General purpose I/O port 2 bit 7.</td>
</tr>
<tr>
<td>4</td>
<td>Output 1</td>
<td>GP26</td>
<td>General purpose I/O port 2 bit 6.</td>
</tr>
<tr>
<td>5</td>
<td>Output 2</td>
<td>GP25</td>
<td>General purpose I/O port 2 bit 5.</td>
</tr>
<tr>
<td>6</td>
<td>Output 3</td>
<td>GP24</td>
<td>General purpose I/O port 2 bit 4.</td>
</tr>
<tr>
<td>7</td>
<td>Input 0</td>
<td>GP23</td>
<td>General purpose I/O port 2 bit 3.</td>
</tr>
<tr>
<td>8</td>
<td>Input 1</td>
<td>GP22</td>
<td>General purpose I/O port 2 bit 2</td>
</tr>
<tr>
<td>9</td>
<td>Input 2</td>
<td>GP21</td>
<td>General purpose I/O port 2 bit 1</td>
</tr>
<tr>
<td>10</td>
<td>Input 3</td>
<td>GP20</td>
<td>General purpose I/O port 2 bit 0</td>
</tr>
</tbody>
</table>
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 EMI or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

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

**INT 15H:**

<table>
<thead>
<tr>
<th>AH – 6FH Sub-function:</th>
</tr>
</thead>
<tbody>
<tr>
<td>AL – 2:</td>
</tr>
<tr>
<td>BL:</td>
</tr>
</tbody>
</table>

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

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

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

Example program:

; INITIAL TIMER PERIOD COUNTER

; W_LOOP:

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

; ADD THE APPLICATION PROGRAM HERE

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

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

; EXIT ;
Appendix

E

Address Mapping
### E.1 Address Map

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

Table E-1: IO Address Map

### E.2 1st MB Memory Address Map

<table>
<thead>
<tr>
<th>Memory address</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>00000-9FFFF</td>
<td>System memory</td>
</tr>
<tr>
<td>A0000-BFFFFF</td>
<td>VGA buffer</td>
</tr>
<tr>
<td>F0000-FFFFF</td>
<td>System BIOS</td>
</tr>
<tr>
<td>1000000-</td>
<td>Extend BIOS</td>
</tr>
</tbody>
</table>

Table E-2: 1st MB Memory Address Map
E.3 IRQ Mapping Table

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

Table E-3: IRQ Mapping Table

E.4 DMA Channel Assignments

<table>
<thead>
<tr>
<th>Channel</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Available</td>
</tr>
<tr>
<td>1</td>
<td>Available</td>
</tr>
<tr>
<td>2</td>
<td>Floppy disk (8-bit transfer)</td>
</tr>
<tr>
<td>3</td>
<td>Available</td>
</tr>
<tr>
<td>4</td>
<td>Cascade for DMA controller 1</td>
</tr>
<tr>
<td>5</td>
<td>Available</td>
</tr>
<tr>
<td>6</td>
<td>Available</td>
</tr>
<tr>
<td>7</td>
<td>Available</td>
</tr>
</tbody>
</table>

Table E-4: IRQ Mapping Table
Compatibility
NOTE:

The compatible items described here have been tested by the IEI R&D team and found to be compatible with the IMBA-9454ISA

### F.1 Compatible Operating Systems

The following operating systems have been successfully run on the IMBA-9454ISA.

- Windows 2000
- Windows Server 2003 (32-bit)
- Windows Server 2003 (64-bit)
- Windows XP (32-bit)
- Windows XP (64-bit)
- Windows XP Embedded
- Windows Vista (32-bit)
- Windows Vista (64-bit)
- Mandriva 2008
- Fedora Core 8

### F.2 Compatible Processors

The following Socket 775 (LGA775) processors have been successfully tested on the IMBA-9454ISA

<table>
<thead>
<tr>
<th>Processor</th>
<th>Model</th>
<th>Clock Speed</th>
<th>L2 Cache</th>
<th>Bus Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel® Core™2 Duo</td>
<td>E6700</td>
<td>2.66 GHz</td>
<td>4.0 MB</td>
<td>1066 MHz</td>
</tr>
<tr>
<td>Intel® Core™2 Duo</td>
<td>E6600</td>
<td>2.4 GHz</td>
<td>4.0 MB</td>
<td>1066 MHz</td>
</tr>
<tr>
<td>Intel® Core™2 Duo</td>
<td>E6420</td>
<td>2.13 GHz</td>
<td>4.0 MB</td>
<td>1066 MHz</td>
</tr>
<tr>
<td>Intel® Core™2 Duo</td>
<td>E6400</td>
<td>2.13 GHz</td>
<td>2.0 MB</td>
<td>1066 MHz</td>
</tr>
<tr>
<td>Intel® Core™2 Duo</td>
<td>E6300</td>
<td>1.86 GHz</td>
<td>2.0 MB</td>
<td>1066 MHz</td>
</tr>
</tbody>
</table>
## Processor Specifications

<table>
<thead>
<tr>
<th>Processor Model</th>
<th>Model</th>
<th>Clock Speed</th>
<th>L2 Cache</th>
<th>Bus Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel® Core™2 Duo</td>
<td>E4400</td>
<td>2.0 GHz</td>
<td>2.0 MB</td>
<td>800 MHz</td>
</tr>
<tr>
<td>Intel® Core™2 Duo</td>
<td>E4300</td>
<td>1.80 GHz</td>
<td>2.0 MB</td>
<td>800 MHz</td>
</tr>
<tr>
<td>Intel® Core™2 Duo</td>
<td>E2160</td>
<td>1.80 GHz</td>
<td>2.0 MB</td>
<td>800 MHz</td>
</tr>
<tr>
<td>Intel® Pentium® 4 Extreme Edition</td>
<td>960</td>
<td>3.6GHz</td>
<td>4.0 MB</td>
<td>800 MHz</td>
</tr>
<tr>
<td>Intel® Pentium® D</td>
<td>840</td>
<td>3.2GHz</td>
<td>2.0 MB</td>
<td>800 MHz</td>
</tr>
<tr>
<td>Intel® Pentium® 4</td>
<td>651</td>
<td>3.4GHz</td>
<td>2.0 MB</td>
<td>800 MHz</td>
</tr>
<tr>
<td>Intel® Pentium® 4</td>
<td>670</td>
<td>3.8GHz</td>
<td>2.0 MB</td>
<td>800 MHz</td>
</tr>
<tr>
<td>Intel® Pentium® 4</td>
<td>661</td>
<td>3.6GHz</td>
<td>2.0 MB</td>
<td>800 MHz</td>
</tr>
<tr>
<td>Intel® Pentium® 4</td>
<td>560</td>
<td>3.6GHz</td>
<td>1.0 MB</td>
<td>800 MHz</td>
</tr>
<tr>
<td>Intel® Pentium® 4</td>
<td>530</td>
<td>3.0GHz</td>
<td>1.0 MB</td>
<td>800 MHz</td>
</tr>
<tr>
<td>Intel® Pentium® 4</td>
<td>520</td>
<td>2.8GHz</td>
<td>1.0 MB</td>
<td>800 MHz</td>
</tr>
<tr>
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<td>506</td>
<td>2.66GHz</td>
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<tr>
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<td>352</td>
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<tr>
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<td>346</td>
<td>3.06GHz</td>
<td>256 KB</td>
<td>533 MHz</td>
</tr>
</tbody>
</table>

### F.3 Compatible Memory Modules

**NOTE:**

The memory modules listed below have been tested on the IMBA-9454ISA. Other memory modules that comply with the specifications may also work on the IMBA-9454ISA but have not been tested.

The following memory modules have been successfully tested on the IMBA-9454ISA.
<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Memory Type</th>
<th>Model No.</th>
<th>Capacity</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-DATA</td>
<td>DDR2</td>
<td>M20AD6H3J4171Q1E52</td>
<td>2.0 GB</td>
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<tr>
<td>Apacer</td>
<td>PC2-5300</td>
<td>ELPIDA ES108AG-6E-E</td>
<td>1.0 GB</td>
<td>667 MHz</td>
</tr>
<tr>
<td>Apacer</td>
<td>PC2-6400</td>
<td>Apacer AM4B5708CHPS8E</td>
<td>512 MB</td>
<td>800 MHz</td>
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<tr>
<td>CORSAIR</td>
<td>DDR2</td>
<td>CM2X1024-6400C4G</td>
<td>1.0 GB</td>
<td>800 MHz</td>
</tr>
<tr>
<td>CORSAIR</td>
<td>DDR2</td>
<td>CORSAIR 64M8CFEG EL1000617</td>
<td>512 MB</td>
<td>667 MHz</td>
</tr>
<tr>
<td>CORSAIR</td>
<td>DDR2</td>
<td>CORSAIR 64M8CFEG PS0900702</td>
<td>1.0 GB</td>
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<tr>
<td>CORSAIR</td>
<td>DDR2</td>
<td>MICRON 7KE11 D9HNL</td>
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<tr>
<td>KINGMAX</td>
<td>DDR2</td>
<td>ELPIDA ES108AE-6E-E</td>
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<tr>
<td>Kingston</td>
<td>DDR2</td>
<td>KHXS400D2K2/1G</td>
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<td>667 MHz</td>
</tr>
<tr>
<td>Kingston</td>
<td>DDR2</td>
<td>KHXS400D2K2/2G</td>
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<tr>
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<td>KVR667D2N5/2G</td>
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<td>667 MHz</td>
</tr>
<tr>
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<td>DDR2</td>
<td>KVR800D2N5</td>
<td>1.0 GB</td>
<td>800 MHz</td>
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<tr>
<td>Transcend</td>
<td>DDR2</td>
<td>Hynix HY5PS12821A</td>
<td>512 MB</td>
<td>667 MHz</td>
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<tr>
<td>Transcend</td>
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<td>Twinmos</td>
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<td>KINGSTEK KST648533-612LA</td>
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</table>
Appendix

G

Intel® Matrix Storage Manager
G.1 Introduction

The Intel® ICH8DO chipset can provide data protection for serial ATA (SATA) disks via the Intel® Matrix Storage Manager using one of three fault-tolerant RAID levels: RAID 1, 5 or 10. When using two hard drives, matrix RAID allows RAID 0 and RAID 1 functions to be combined, where critical files can be stored on RAID 1, and RAID 0 can be used for non-critical items such as software. RAID 5 and RAID 0 can be combined to provide higher performance, capacity, and fault tolerance.

---

**CAUTION!**

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

---

G.1.1 Precautions

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

---

**WARNING!**

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

Do not accidentally disconnect the SATA drive cables. Carefully route the cables within the chassis to avoid system down time.

G.2 Features and Benefits

- Supports RAID levels 0, 1, 5 and 10
- Supports connectivity to two or more disk drives
- Supported Operating Systems include: Windows XP, Windows Server 2003 and Windows Vista

G.3 Accessing the Intel® Matrix Storage Manager

To access the Intel® Matrix Storage Manager, please follow the steps below.

**Step 1:** Connect SATA drives to the system. Connect two or more SATA drives to the system. Make sure the drives have the same capacity, are the same type and have the same speed.

**NOTE:**

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

**Step 2:** Enable SATA drives in BIOS. Start the computer and access the BIOS setup program. Enable SATA support for all IDE devices. Refer to the applicable BIOS configuration section in this user manual.
Step 3: **Save and Exit BIOS.** After the SATA support option is enabled, save and exit the BIOS.

Step 4: **Reboot the system.** Reboot the system after saving and exiting the BIOS.

Step 5: **Press Ctrl+I.** During the system boot process, press Ctrl+I when prompted to enter the RAID configuration software.

Step 6: **Configure the RAID settings.** Use the Intel® Matrix Storage Manager to configure the RAID array. Brief descriptions of configuration options are given below.

Step 7: **Install the OS.** After the RAID array has been configured, install the OS. To do this, please refer to the documentation that came with the OS.

---

**G.4 RAID Configuration**

**G.4.1 Creating a RAID Volume**

---

**WARNING!**

All data previously stored on the member drives of a RAID configuration are destroyed during the RAID initialization process. If “used” drives are used to create a RAID array, make sure the data has been moved or backed up before creating a RAID array out of the disk drives.
Step 1: Select “Create RAID Volume.” Use the arrow keys to highlight Create RAID Volume and press ENTER. See Figure G-1.

![Matrix Storage Manager Main Menu](image)

Figure G-1: Matrix Storage Manager Main Menu

Step 2: Name the RAID volume. Enter a name for the RAID volume, or press ENTER to accept the default volume name. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for naming an array. See Figure G-2.

![Create RAID Volume Name](image)

Figure G-2: Create RAID Volume Name
Step 3: **Choose the RAID level.** Select a RAID level from the list. RAID levels include RAID 0, 1, 5 and 10. See Figure G-3.

**NOTE:**

RAID 0 and RAID1 levels require a minimum of two hard drives.

RAID 10 level requires a minimum of four hard drives.

RAID5 level requires a minimum of three hard drives.

![Figure G-3: Choose the Raid Level](image_url)
Step 4: **Select the Stripe Size.** Select a stripe size from the list. See Figure G-4.

**Figure G-4: Select the Stripe Size**

Step 5: **Enter the Volume Capacity.** Enter the volume capacity, or press Enter to accept the default capacity. See Figure G-5.

**Figure G-5: Enter the Volume Capacity**
Step 6: Create the RAID Volume. Press ENTER to create the RAID volume as specified. See Figure G-6.

Figure G-6: Create the RAID Volume

Step 7: Create RAID Volume Verification. After reading the warning, press Y to create the RAID volume as specified, or N to return to the Create RAID Volume menu. See Figure G-7. Step 0:

Figure G-7: Create RAID Volume Verification
G.4.2 Deleting a RAID Volume

**WARNING!**

All data stored on the member drives of a RAID volume are destroyed during the RAID deletion process. Make sure any data to be saved has been moved or backed up before deleting a RAID volume.

**Step 1:** Select "Delete RAID Volume." Use the arrow keys to highlight **Delete RAID Volume** and press **ENTER**. See Figure G-8.

![Figure G-8: Delete RAID Volume Menu](image_url)

Figure G-8: Delete RAID Volume Menu
Step 2: Select RAID Volume to be Deleted. Use the arrow keys to highlight the RAID volume to be deleted and press ENTER. See Figure G-9.

![Figure G-9: Select RAID Volume to be Deleted](image)

Step 3: Delete Volume Verification. After reading the warning, press Y to delete the specified RAID volume, or N to return to the Delete Volume menu. See Figure G-10.

![Figure G-10: Delete Volume Verification](image)
Step 4: Non-RAID Disks. After deleting the RAID volume, the disks belonging to the volume will be shown as non-RAID disks. See Figure G-11. Step 0:

![Image of RAID configuration menu]

**Figure G-11: Non-RAID Disks**

**G.4.3 Resetting a Disk to Non-RAID**

**WARNING!**

All data stored on the disk drive of a RAID volume is destroyed when resetting it to non-RAID. Make sure any data to be saved has been moved or backed up before resetting a disk to non-RAID.
**Step 1:** Select "Reset Disk to Non-RAID." Use the arrow keys to highlight Reset Disk to Non-RAID and press ENTER. See Figure G-12.

![Figure G-12: Reset Disk to Non-RAID Menu](image)

**Step 2:** Select Disks to Reset. Use the arrow keys to scroll through the disk drives and press SPACE to select which drives are to be reset as non-RAID. After all the disks to be reset have been chosen, press ENTER. See Figure G-13.

![Figure G-13: Select Disk to Reset](image)
Step 3: **Reset Disk Verification.** After reading the warning, press Y to reset the selected disks as non-RAID, or N to return to the Reset RAID Data menu.

See Figure G-14.

**Figure G-14: Reset Disk Verification**

Step 4: **Disk Drive and RAID Volume Status.** After the disk drives have been reset, the Matrix Storage Manager Main menu is shown indicating the status of the RAID volumes and disk drives. See Figure G-15.

**Figure G-15: Disk Drive and RAID Volume Status**
G.4.4 Exiting the Matrix Storage Manager

**Step 1:** Select "Exit." Use the arrow keys to highlight **Exit** and press **ENTER**.

See Figure G-16.

![Figure G-16: Exit Menu](image)

**Step 2:** Exit Verification. Press **Y** to exit the **Matrix Storage Manager**, or **N** to return to the **Main** menu. See Figure G-17.

![Figure G-17: Exit Verification](image)
Appendix

Hazardous Materials Disclosure
H.1 Hazardous Material 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.
<table>
<thead>
<tr>
<th>Part Name</th>
<th>Toxic or Hazardous Substances and Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lead (Pb)</td>
</tr>
<tr>
<td>Housing</td>
<td>X</td>
</tr>
<tr>
<td>Display</td>
<td>X</td>
</tr>
<tr>
<td>Printed Circuit Board</td>
<td>X</td>
</tr>
<tr>
<td>Metal Fasteners</td>
<td>X</td>
</tr>
<tr>
<td>Cable Assembly</td>
<td>X</td>
</tr>
<tr>
<td>Fan Assembly</td>
<td>X</td>
</tr>
<tr>
<td>Power Supply Assemblies</td>
<td>X</td>
</tr>
<tr>
<td>Battery</td>
<td>O</td>
</tr>
</tbody>
</table>

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。

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<thead>
<tr>
<th>部件名称</th>
<th>有毒有害物质或元素</th>
<th>铅 (Pb)</th>
<th>汞 (Hg)</th>
<th>镉 (Cd)</th>
<th>六价铬 (CR(VI))</th>
<th>多溴联苯 (PBB)</th>
<th>多溴二苯醚 (PBDE)</th>
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<td>壳体</td>
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<td>X 检测结果</td>
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<td>O</td>
<td>X 检测结果</td>
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<tr>
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<td>O</td>
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<td>O</td>
<td>X 检测结果</td>
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<td>X 检测结果</td>
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<td>O 检测结果</td>
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</table>

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。
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