integration with integrity

2807940 User's Manual

Micro ATX Motherboard with LGA 775 Socket

Version 1.0

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 **WARNING!**

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

 **WARNING:**

> This is an example of a warning message. Failure to adhere to warning messages may result in permanent damage to the 2807940 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 2807940. 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 cautions messages may result in permanent damage to the 2807940. 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 2807940. 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. Please contact the Global American, Inc. at (800) 833-8999 or link to Technical Support.

The items listed below should all be included in the 2807940 package.

- 1 x 2807940 single board computer
- 3 x SATA power cables
- 6 x SATA cables
- 1 x Dual RS-232 cable
- 1 x USB cable
- 1 x Mini jumper pack
- 1 x Utility CD
- 1 x IO shielding
- 1 x QIG (quick installation guide)

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

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Introduction

1.1 Overview

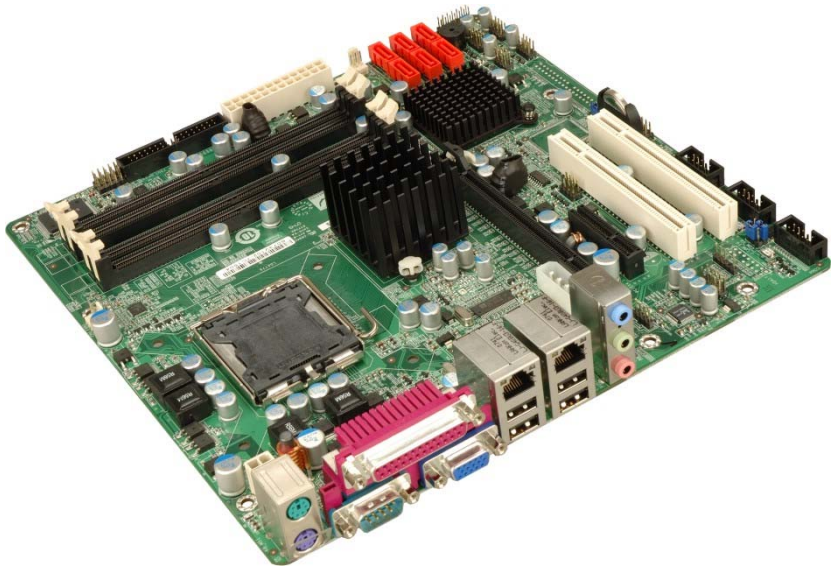


Figure 1-1: 2807940 uATX Motherboard

The 2807940 uATX form factor motherboard (**Figure 1-1**) is an LGA775 Intel® Core™2 Quad, Intel® Core™2 Duo or Intel® Celeron® CPU processor platform. Both 45nm core (Wolfdale, Yorkfield) and 65nm core (Conroe) processors are supported. (For a full list of supported processors please refer to **Section 2.3**)

Up to four 2.0 GB 667 MHz or 800 MHz un-buffered DDR2 SDRAM DIMM are supported by the Intel® Q35 graphics memory controller hub (GMCH). The Intel® Q35 GMCH also has a single PCI Express x16 (PCIe x16) expansion lane for a PCIe x16 graphics card.

The integrated Intel® ICH9DO I/O controller hub (ICH) supports six SATA II drives with data transfer speeds of 3.0 Gbps with SATA RAID configuration support. Twelve USB 2.0 channels, one expansion PCIe x4 channel and two expansion PCI channels provide flexible expansion options. Support for a (optional) trusted platform module (TPM) provides additional system security during system boot-up.

1.1.1 2807940 Features

Some of the 2807940 features are listed below.

- Supports the following Intel® LGA775 processors:
  - Intel® Core™2 Duo (45nm and 65nm)
  - Intel® Core™2 Quad (45nm and 65nm)
  - Intel® Celeron® (65nm)
- Supports four 240-pin 2 GB 667 MHz or 800 MHz DDR2 DIMMs
- Six SATA II drives with transfer rates of 3.0 Gbps supported
- Twelve USB 2.0 devices supported (eight onboard and four on the rear panel)
- Dual GbE Ethernet connectors
- uATX form factor
- RoHS compliant
- Supports ATX power supplies

1.2 2807940 Overview

1.2.1 2807940 Overview Photo

The 2807940 has a wide variety of peripheral interface connectors. **Figure 1-2** is a labeled photo of the peripheral interface connectors on the 2807940.

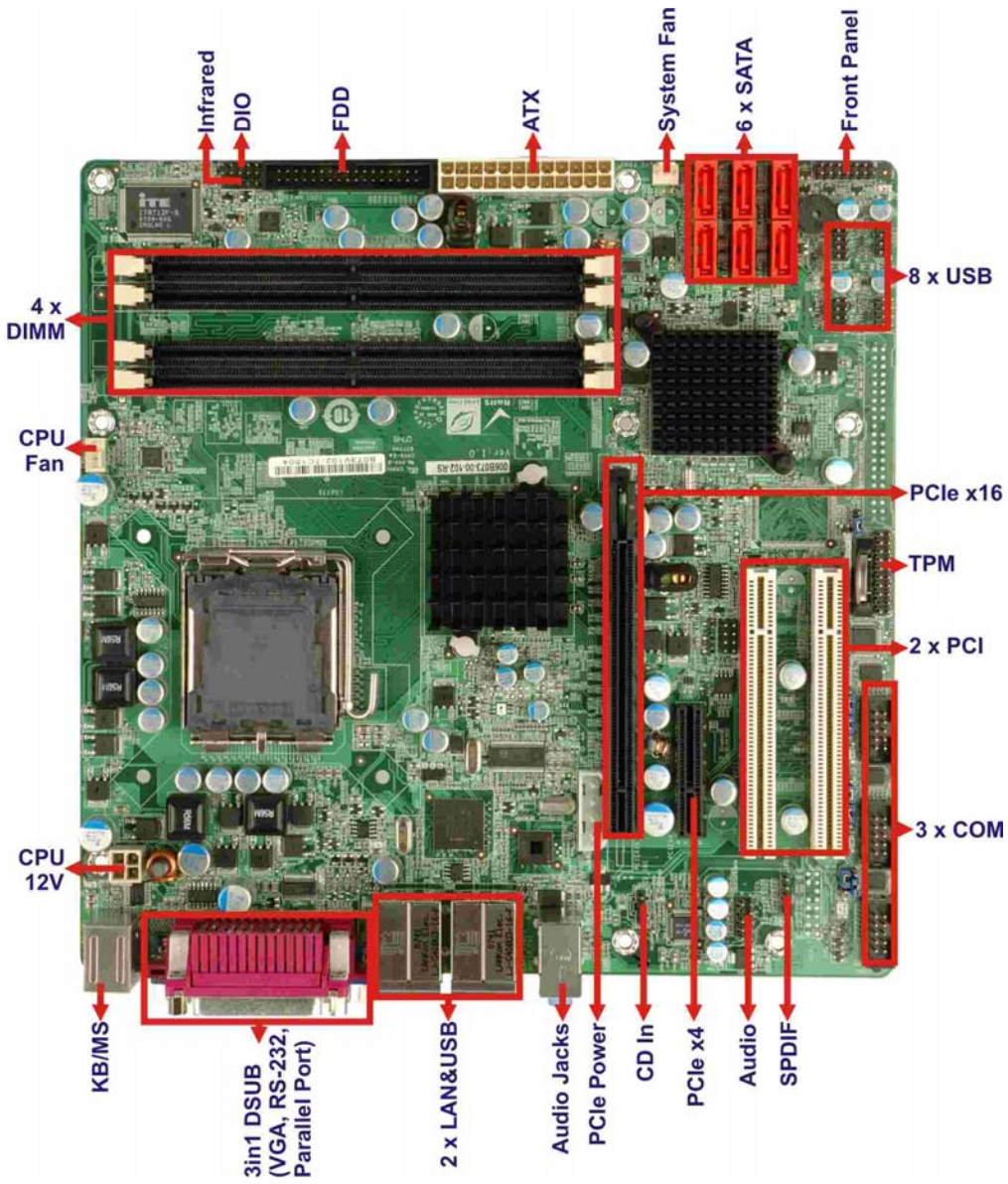


Figure 1-2: 2807940 Overview [Front View]

1.2.2 2807940 Peripheral Connectors and Jumpers

The 2807940 has the following connectors on-board:

- 1 x ATX power connector
- 1 x Audio connector
- 1 x CD in connector
- 1 x Cooling fan connector, CPU

- 1 x Cooling fan connector, System
- 1 x CPU power connector
- 1 x Digital input/output connector
- 4 x DIMM sockets
- 1 x Floppy drive connector
- 1 x Front panel connector
- 1 x Infrared (IrDA) connector
- 2 x PCI slots
- 1 x PCIe x16 slots
- 1 x PCIe x4 slots
- 1 x PCIe power connector
- 6 x Serial ATA drive connectors
- 3 x Serial port connectors
- 1 x SPDIF connector
- 1 x SPI flash connector
- 1 x TPM connector
- 4 x USB connectors (support eight USB devices)

The 2807940 has the following external peripheral interface connectors on the board rear panel.

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

The 2807940 has the following on-board jumpers:

- Clear CMOS
- COM port pin 9 setting
- COM port pin 9 voltage setting

1.2.3 Technical Specifications

2807940 technical specifications are listed in **Table 1-1**. See **Chapter 2** for details.

Specification	2807940
Form Factor	uATX
System CPU	LGA775 Intel® Core™2 Quad LGA775 Intel® Core™2 Duo LGA775 Intel® Celeron®
Front Side Bus (FSB)	800 MHz, 1066 MHz or 1333 MHz
System Chipset	**Northbridge**: Intel® Q35 Express Chipset **Southbridge**: Intel® ICH9DO
Memory	Four 240-pin DDR2 DIMM sockets support 2.0 GB 667 MHz or 800 MHz DDR2 DIMMs
Super I/O	ITE IT8712F Rev. I
Display	Analog VGA display through external DB-15 connector
BIOS	AMI BIOS label SPI EEPROM 4.0 MB
Audio	RealTek ALC883 codec.
LAN	One Intel® 82566DM (PHY) and Intel® ICH9DO (MAC) One PCIe x1 Intel® 82573L (MAC and PHY)
COM	Four RS-232 serial ports ■ Three by onboard pin-headers ■ One by external connector
USB2.0	Twelve USB 2.0 devices supported: ■ Eight by onboard pin-headers

	■ Four by external connectors
SATA	Six 3.0 Gb/s SATA II drives supported
SATA RAID Levels	RAID 0, RAID 1, RAID 5 and RAID 10
Keyboard/mouse	By external PS/2 connector through the ITE IT8712F super I/O
Digital I/O	One 8-bit digital input/output connector; 4-bit input/4-bit output through the ITE IT8712F super I/O
Watchdog Timer	Software programmable 1-255 sec. through the ITE IT8712F super I/O
Infrared	One IrDA connector through the ITE IT8712F super I/O.
Power Supply	ATX power supply
TPM	Supports TPM v1.2 with 20-pin onboard pin-header
Fan Connector	Three pin system fan pin-header Four pin CPU fan pin-header
Buzzer	Yes
Power Consumption	3.3V@2.41A, 5V@5.71A, +12V@3.69A (3Dmark® 2001) and 5VSB@0.13A (3.0 GHz E6850 Intel® Core™2 Duo CPU with four 2.0 GB, 800 MHz DDR2 DIMM running 3Dmark® 2001)
Temperature	0ºC – 60ºC (32ºF - 140ºF)
Humidity (operating)	5%~95% non-condensing
Dimensions (LxW)	244 mm x 244 mm
Weight (GW)	1.1 kg

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**: 243.84mm
- **Width**: 243.84mm

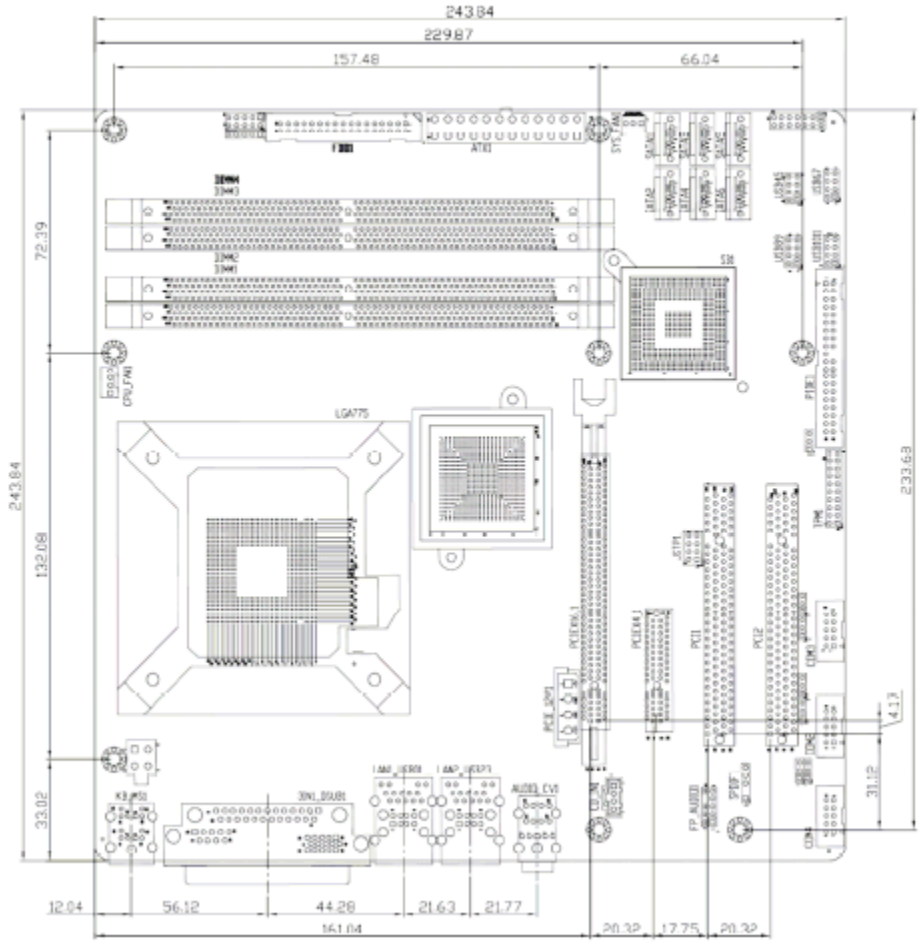


Figure 2-1: 2807940 Dimensions (mm)

2.1.2 External Interface Panel Dimensions

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

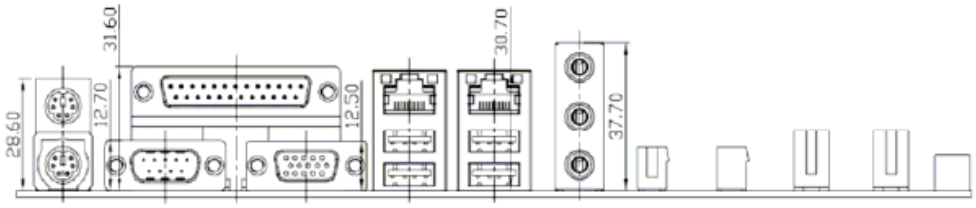


Figure 2-2: External Interface Panel Dimensions (mm)

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.

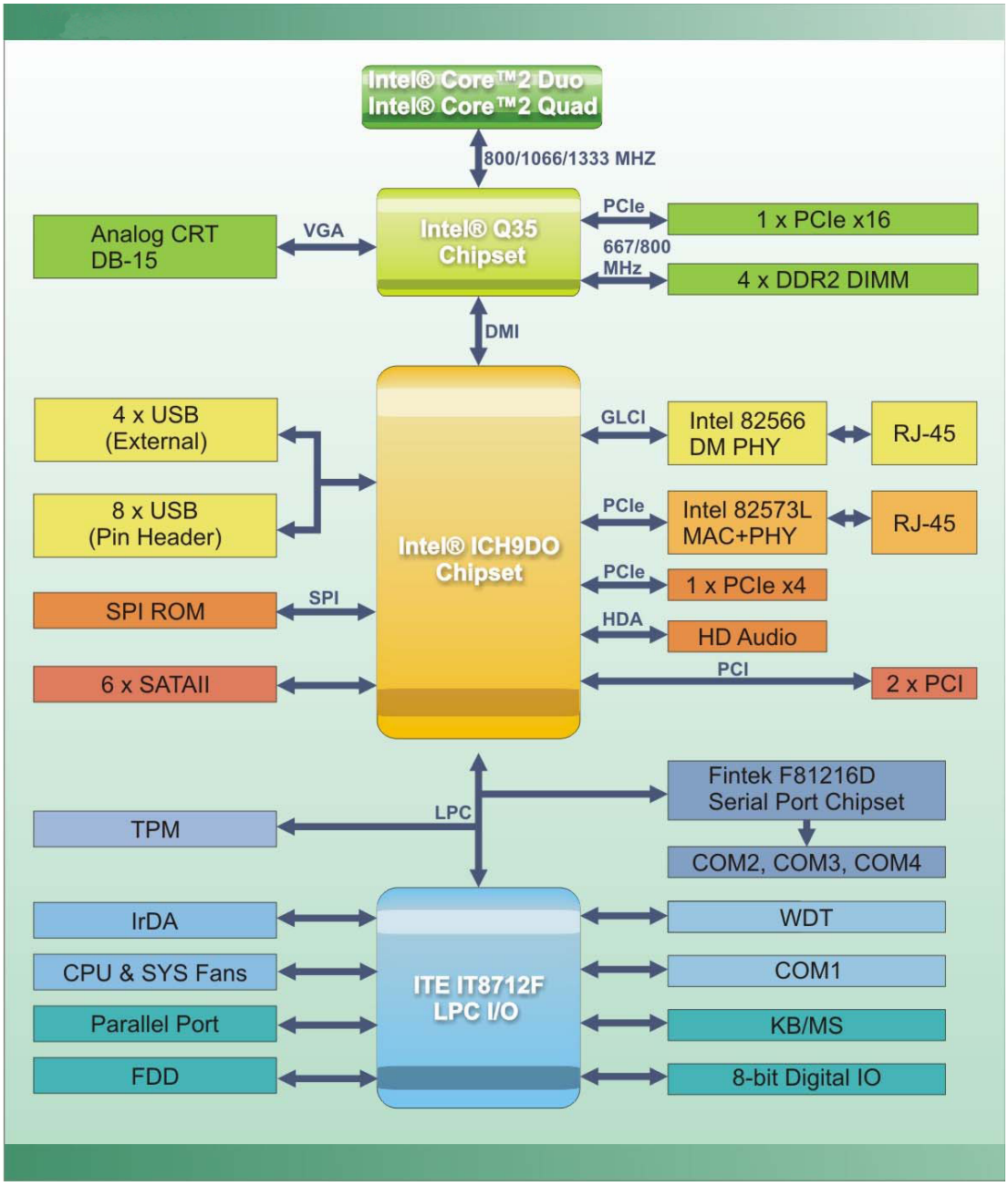


Figure 2-3: Data Flow Block Diagram

2.3 Compatible Processors

2.3.1 Supported Processors Overview

The 2807940 supports the following Intel® LGA775 processors

- Intel® Core™2 Quad (Yorkfield)
- Intel® Core™2 Duo (Wolfdale)
- Intel® Core™2 Duo (Conroe)
- Intel® Celeron® (Conroe)

2.3.2 Supported Intel® Core™2 Quad (Yorkfield) Processors

The Yorkfield core Intel® Core™2 Quad CPU is a 45nm LGA775 processor.

NOTE:

As of the date of writing this manual (December, 2007), Intel® has not released Intel® Core™2 Quad (Yorkfield) processor numbers that are supported by the Intel® Northbridge. As soon as processor numbers are released, the manual will be updated.

For further details about supported Intel® Core™2 Quad (Yorkfield) processors, please contact Intel® directly.

2.3.3 Supported Intel® Core™2 Duo (Wolfdale) Processors

The Wolfdale core Intel® Core™2 Duo CPU is a 45nm LGA775 processor.

NOTE:

As of the date of writing this manual (December, 2007), Intel® has not released Wolfdale core Intel® Core™2 Duo processor numbers that are supported by the Intel® Q35 Northbridge. As soon as processor numbers are released, the manual will be updated.

For further details about supported Intel® Core™2 Duo (Wolfdale) processors, please contact Intel® directly.

2.3.4 Supported Intel® Core™2 Duo (Conroe) Processors

Table 2-1 lists the Conroe core Intel® Core™2 Duo processors supported on the 2807940. All the processors in Table 2-1 are 65nm LGA775 processors with the following features:

- Enhanced Halt State (C1E)
- Enhance Intel® Speedstep® Technology
- Execute Disable Bit
- Intel® 64
- Intel® Thermal Monitor 2
- Intel® Virtualization Technology
- Intel® Dual Core Technology

Processor #	CPU Speed	FSB Speed	Cache Size
E6850	3.0 GHz	1333 MHz	4 MB

Table 2-1: Supported Intel® Core™2 Duo (Conroe) Processors

2.3.5 Supported Intel® Celeron® (Conroe) Processors

Table 2-1 lists the Conroe core Intel® Celeron® processors supported on the 2807940. All the processors in Table 2-1 are 65nm LGA775 processors with the following features:

- Execute Disable Bit
- Intel® 64

Processor #	CPU Speed	FSB Speed	Cache Size
440	2.0 GHz	800 MHz	512kB

Table 2-2: Supported Intel® Celeron® Processors

2.4 Intel® Q35 Northbridge Chipset

2.4.1 Intel® Q35 Northbridge Chipset

The Intel® Q35 Northbridge chipset is an advanced Graphics and Memory Controller Hub (GMCH) that supports a range of Intel® processors including 45nm Wolfdale dual core and Yorkfield quad core and 65nm Conroe core processors. The Intel® Q35 Northbridge supports 1333 MHz, 1066 MHz, or 800 MHz FSB and up to 8.0 GB of 667 MHz or 800 MHz DDR2 SDRAM. The Intel® Q35 Northbridge is interfaced to an Intel® ICH9DO Southbridge chipset through a Direct Media Interface (DMI) communications link.

2.4.2 Intel® Q35 Front Side Bus (FSB) Support

The Intel® Q35 Northbridge supports processors with the following FSB speeds:

- 800 MHz
- 1066 MHz

- 1333 MHz

The LGA775 socket, Intel® Q35 Northbridge and the FSB are shown in **Figure 2-4**.

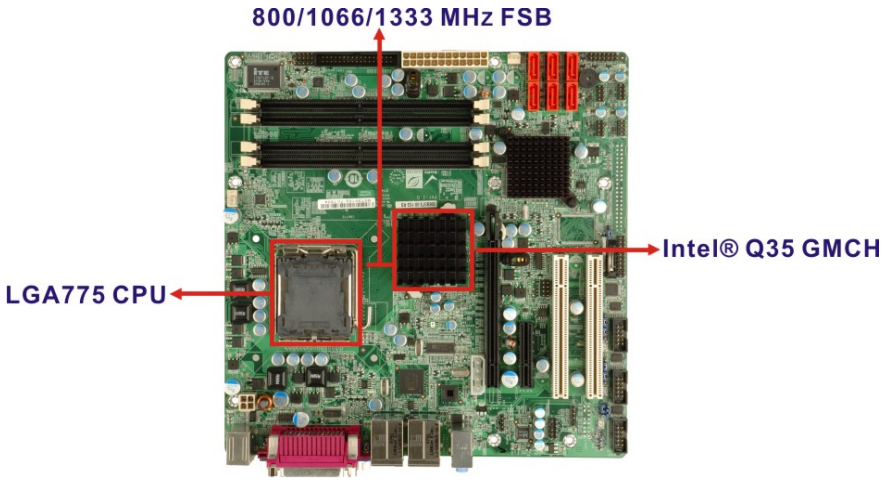


Figure 2-4: Front Side Bus (FSB)

2.4.3 Intel® Q35 Memory Controller

The memory controller on the Intel® Q35 Northbridge can support up to 8.0 GB of DDR2 SDRAM. Four DDR2 SDRAM DIMM sockets on the 2807940 are interfaced to the Intel® Q35 Northbridge memory controller. The DDR2 sockets are shown in **Figure 2-5.**

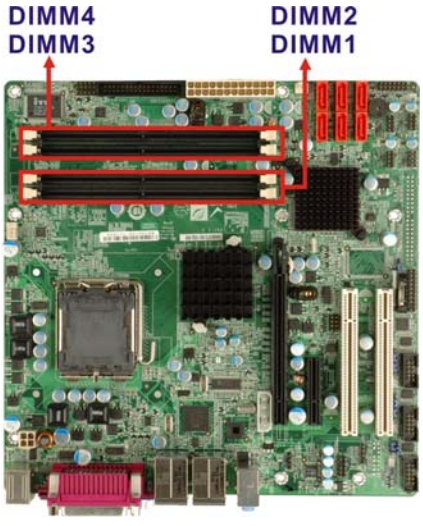


Figure 2-5: DDR2 DIMM Sockets

 **CAUTION:**

If more than one DDR2 DIMM is being installed in the system, please purchase two DIMM that have the same capacity and operating frequency.

Each DIMM socket can support DIMMs with the following specifications:

- DDR2 only
- Un-buffered only
- 667 MHz or 800 MHz
- 2.0 GB maximum capacity per DIMM (8.0 GB supported with four DIMM)
- Memory bandwidth:
  - 6.4 GBps in single-channel or dual-channel asymmetric mode
  - 12.8 GBps in dual-channel interleaved mode assuming DDR2 800MHz

2.4.4 Intel® Q35 PCIe x16 Interface

The Intel® Q35 PCIe bus is compliant with the PCI Express 1.1a Specifications has the following PCIe lanes:

- One PCIe x16 graphics interface
- PCIe frequency of 1.25 GHz (2.5 Gbps in each direction)

For further details on the PCIe interfaces, please refer to **Section 2.6.2** on **page 27**.

2.4.5 Intel® Q35 Graphics and Display Features

NOTE:

The Intel® Q35 Graphics and Display Features can be configured in the Northbridge BIOS configuration screen. Please refer to **Section** Error! Reference source not found. on **page** Error! Bookmark not defined..

The Intel® Q35 GMCH integrated graphics device (IGD) has 3D, 2D and video capabilities. The Unified Memory Architecture (UMA) uses up to 256 MB of Dynamic Video Memory Technology (DVMT) for graphics memory. External graphics accelerators on the PCIe graphics (PEG) port are supported but cannot work simultaneously with the IGD.

2.4.6 Intel® Q35 Analog Display Capability

A single external female DB-15 (VGA) connector interfaces an analog display to an analog CRT port on the Intel® Q35 GMCH. The VGA connector is shown in **Figure 2-6**.

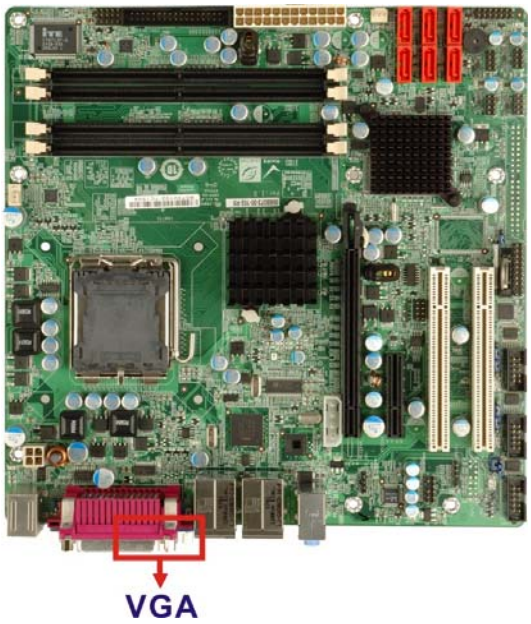


Figure 2-6: VGA Connector

Some of the capabilities of the Intel® Q35 analog CRT port are listed below:

- 400 MHz Integrated 24-bit RAMDAC
- Up to 2048x1536 @ 75 Hz refresh
- Hardware Color Cursor Support
- DDC2B Compliant Interface

2.4.7 Intel® Q35 Direct Media Interface (DMI)

The Direct Media Interface (DMI) is the communication bus between the Intel® Q35 GMCH and the ICH9DO I/O controller hub (ICH). The DMI is a high-speed interface that integrates advanced priority-based servicing and allows for concurrent traffic and true isochronous transfer capabilities. The DMI is shown in **Figure 2-7**.

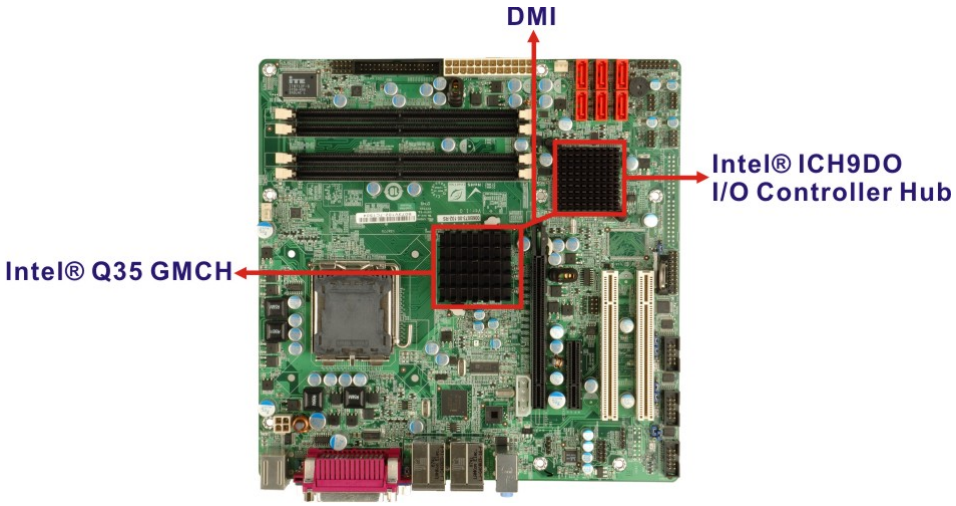


Figure 2-7: DMI Chip-to-Chip Connection

Some of the features of the DMI include:

- 2.0 GBps point-to-point DMI to ICH9DO (1.0 GBps in each direction)
- 100 MHz reference clock (shared with PCI Express* Graphics Attach)
- 32-bit downstream addressing
- APIC and MSI interrupt messaging support

- Message Signaled Interrupt (MSI) messages
- SMI, SCI and SERR error indication

2.5 Intel® ICH9DO Southbridge Chipset

2.5.1 Intel® ICH9DO Overview

Intel® ICH9DO Southbridge is an advanced I/O controller hub (ICH) connected to the Intel® Q35 Northbridge through a DMI connection. The Intel® ICH9DO has six PCIe x1 ports, supports up to twelve USB 2.0 devices, six 3.0 Gbps SATA II drives with Intel® Matrix Storage Technology (ACHI, RAID 0, RAID 1, RAID 5 or RAID 10). A High-Definition audio (HDA) controller can be connected to an HDA codec. The PCI Masters provide PCI expansion capabilities through the two PCI slots on the motherboard.

2.5.2 Intel® ICH9DO Features

The ICH9DO Southbridge chipset on the 2807940 has the features listed below.

- Complies with PCI Express Base Specification, Revision 1.1
- 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 six ports with data transfer rates up to 3.0 Gbps
- Supports twelve USB 2.0 devices with six UHCI controllers and two EHCI controller
- Complies with System Management Bus (SMBus) Specification, Version 2.0
- Supports Intel® High Definition Audio
- Supports Intel® Matrix storage technology
- Contains Low Pin Count (LPC) interface
- Serial Peripheral Interface (SPI) for Serial and Shared Flash

2.5.3 Intel® ICH9DO High Definition Audio Implementation

A RealTek ALC883 High Definition Audio (HDA) codec is interfaced through the Intel® High Definition Audio serial link to the HDA controller integrated on the Intel® ICH9DO. The audio connector is shown in **Figure 2-8**.

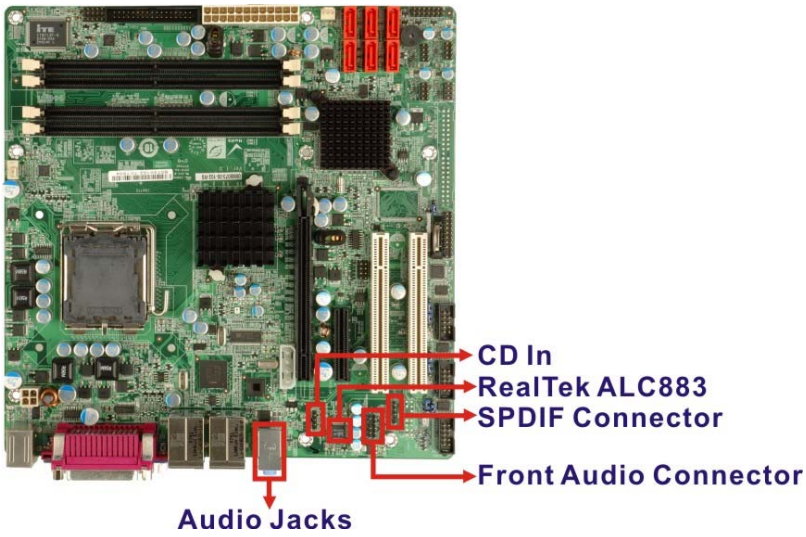


Figure 2-8: Audio Connectors

2.5.4 Intel® ICH9DO Ethernet Controller

NOTE:

Gigabit Ethernet (1000 Mbps) is only supported in S0.

The Intel® ICH9DO Southbridge integrated GbE controller is interfaced to an Intel® 82566DM Gigabit LAN connect device through the Gigabit LAN Connect Interface (GLCI) and LAN Connect Interface (LCI). The GLCI is shared with the PCIe x1 port 6. The Intel®

82566DM connects the Intel® ICH9DO Southbridge integrated GbE controller to an external RJ-45 Ethernet LAN connector to provide GbE access.

NOTE:

To enable the Intel® ICH9DO GbE Wake-on LAN function, the Wake-on LAN function must be enabled in the BIOS. Please refer to **Section** Error! Reference source not found. (the Error! Reference source not found. menu) on **page** Error! Bookmark not defined..

Some of the features of the Intel® ICH9DO GbE controller are listed below.

- Supports multi speeds including 10 Mbps, 100 Mbps and 1000 Mbps
- Can operate in full-duplex mode at all supported speeds
- Can operate at half-duplex at 10 MBps and 100 MBps
- Adheres to the IEEE 802.3x Flow Control Specification.
- 64-bit address master support for system using more than 4 GB of physical memory.
- Configurable receive and transmit data FIFO, programmable in 1 KB increments.
- Intelligent interrupt generation to enhance driver performance.
- Compliance with Advanced Configuration and Power Interface
- Compliance with PCI Power Management standards.
- ACPI register set and power down functionality supporting D0 & D3 states.
- Full wake-up support (ACPI).
- Magic Packet wake-up enable with unique MAC address.
- Fragmented UDP checksum off load for package reassembly.
- Jumbo frames supported.

2.5.4.1 Intel® 82566DM Gigabit LAN Connect Device

One of the external RJ-45 Ethernet LAN connectors is interfaced to an Intel® 82566DM Gigabit LAN connect device. The Intel® 82566DM is a compact, single-port integrated physical layer (PHY) device interfaced directly to the Intel® ICH9DO Ethernet controller

through the GLCI and LCI. The Intel® ICH9DO Ethernet controller has its own Media Access Controller (MAC). The Intel® 82566DM Gigabit LAN connect device is shown in **Figure 2-9**.

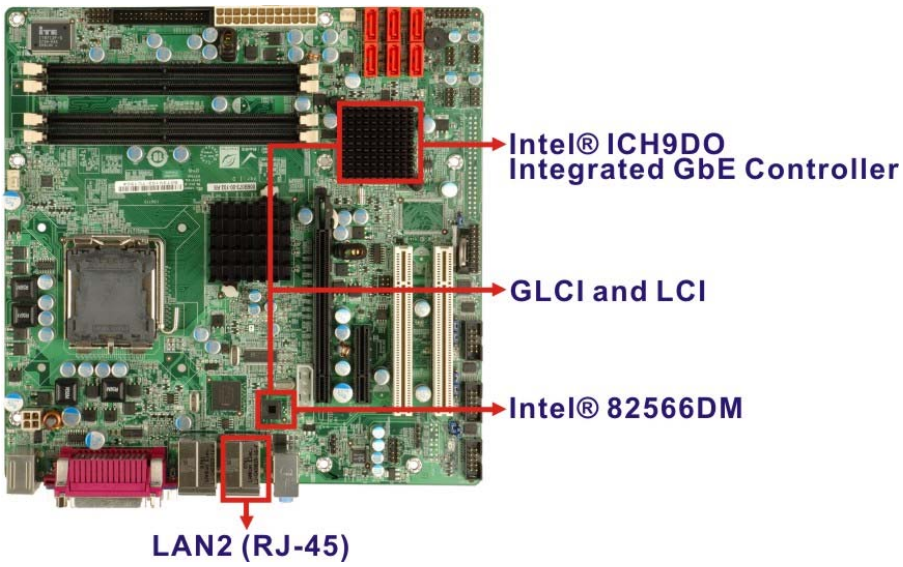


Figure 2-9: Intel® 82566DM Gigabit LAN Connect Device

Some of the features of the Intel® 82556DM are listed below:

- 10 Mbps, 100 Mbps, or 1000 Mbps
- Supports Intel® Active Management Technology
- Supports Intel® Virtualization Technology through the Intel® Virtual Gigabit Network Connection.
- Can support legacy ASF2.0.
- Shared SPI flash with system BIOS
- Integrated linear voltage regulator
- TCP/UDP checksum and segmentation offload
- Receive side scaling
- Dual TX and RX queues
- 802.1p and 802.1q

2.5.5 Intel® ICH9DO Low Pin Count (LPC) Interface

The ICH9DO LPC interface complies with the LPC 1.1 specifications. The LPC bus from the ICH9DO is connected to the following components:

- BIOS chipset
- Super I/O chipset
- Trusted Platform Module (TPM) connector

2.5.6 Intel® ICH9DO PCI Interface

The PCI interface on the ICH9DO 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 four PCI bus masters

The PCI bus masters are interfaced to the following onboard components:

- Two PCI sockets

2.5.7 Intel® ICH9DO PCIe x4 Bus

The Intel® ICH9DO Southbridge chipset has six PCIe x1 lanes. The four PCIe lanes are interfaced to one PCIe x4 slot on the 2807940 motherboard.

One of the remaining PCIe x1 lanes is connected to an Intel® 82566DM GbE controller and the other PCIe x1 lane is connected to an Intel® 82573L GbE controller.

For more detailed information, please refer to **Section 2.6.3**.

2.5.8 Intel® ICH9DO Real Time Clock

256 bytes of battery backed RAM is provided by the Motorola MC146818B real time clock (RTC) integrated into the ICH9DO. 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.

2.5.9 Intel® ICH9DO SATA Controller

NOTE:

That SATA drive mode is set in the BIOS. Please refer to the **Section** Error! Reference source not found. on **IDE Configuration** on **page** Error! Bookmark not defined. and **Section** Error! Reference source not found.on **AHCI Configuration** on **page** Error! Bookmark not defined..

The ICH9DO SATA supports three modes of operation:

- ***Native IDE enabled operating system***: Two controllers enable all six ports on the bus. Controller 1 supports Port 0, Port 1, Port 2 and Port 3. Controller 2 supports Ports 4 and Port 5.
- ***Legacy operating system is used***: One controller is enabled and only supports Port 0, Port 1, Port 2 and Port 3.
- ***AHCI or RAID mode***: One controller supports all six ports including, Port 0, Port 1, Port 2, Port 3, Port 4 and Port 5.

In the AHCI or RAID mode, 3.0 Gbps data transfer speeds are supported. The SATA drive connectors are shown in **Figure 2-10**.

Figure 2-10: SATA Drive Connectors

2.5.10 Intel® ICH9DO Serial Peripheral Interface (SPI) BIOS

The SPI is connected to an SPI BIOS chip. A licensed copy of AMI BIOS is preinstalled on the SPI BIOS chip.

2.5.11 Intel® ICH9DO USB Controller

2.5.11.1 Intel® ICH9DO USB Controller Overview

The ICH9DO comprises six full/low speed USB controllers that support the standard Universal Host Controller Interface (UHCI) Revision 1.1. Each controller supports two USB devices ensuring up to twelve USB 1.1 devices can be connected to the 2807940.

The ICH9DO also comprises two high-speed Enhanced Host Controller Interface (EHCI) controllers. Each EHCI controller supports six USB 2.0 devices ensuring twelve USB 2.0 devices can be connected to the 2807940. EHCI controllers facilitate data transfer speeds of 480 Mbps

Port routing logic on the ICH9DO determines whether a UHCI or an EHCI controller controls a USB port.

2.5.11.2 2807940 USB Implementation

All twelve of the Intel® ICH9DO USB ports are implemented on the 2807940. Four USB ports (USB Port 1 to USB Port 4) are connected to four external connectors and eight USB ports (USB Port 5 to USB Port 12) are connected to four 8-pin onboard pin-headers. See **Figure 2-11**.

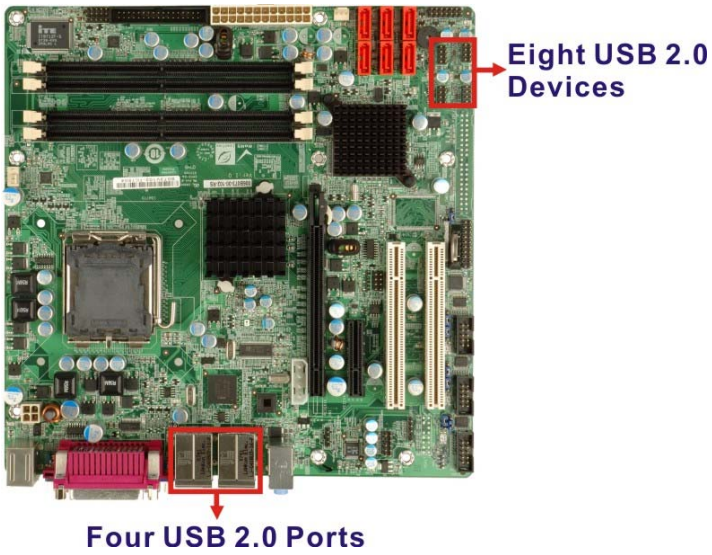


Figure 2-11: Onboard USB Implementation

2.6 2807940 PCIe Bus Components

2.6.1 PCIe Bus Overview

The 2807940 has one PCIe x16 channel from the Intel® Q35 Northbridge and six PCIe x1 lanes from the Intel® ICH9DO Southbridge. The PCIe bus lanes are interfaced to the following devices.

- One PCIe x16 lane is connected to one PCIe x16 graphics card
- Four PCIe x1 lanes are connected to one PCIe x4 expansion card
- One PCIe x1 lane are connected to one Intel® PCIe GbE device
- One PCIe x1 is shared with the Intel® ICH9DO Gigabit LAN Connect Interface (GLCI), which is connected to a Intel® 82566DM Gigabit platform LAN connect device

2.6.2 PCIe x16 Slot

The Intel® Q35 Northbridge chipset has one PCIe x16 port reserved for a PCIe x16 graphics card. The PCIe x16 lane is interfaced to a PCIe x16 slot on the 2807940 motherboard. The PCIe x16 graphics card is then installed on the PCIe x16 slot on the motherboard. The PCIe x16 edge connector is shown in **Figure 2-12**.

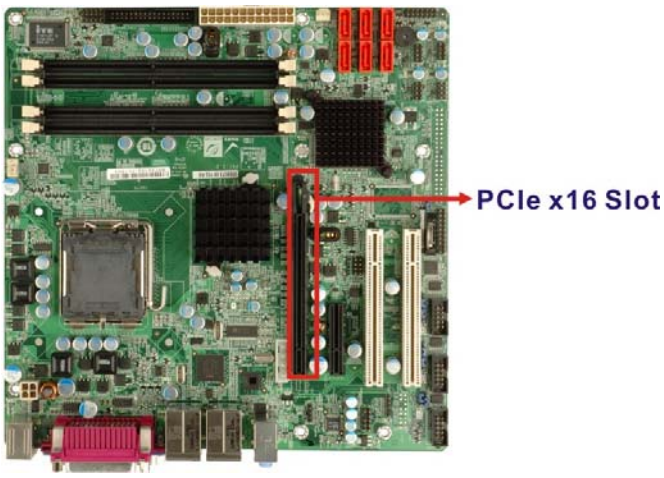


Figure 2-12: PCIe x16 Slot

2.6.3 PCIe x4 Slot

Four of the six PCIe x1 expansion channels on the 2807940 are interfaced to one PCIe x4 slot on the 2807940 motherboard. The PCIe x4 slot is shown in **Figure 2-13**.

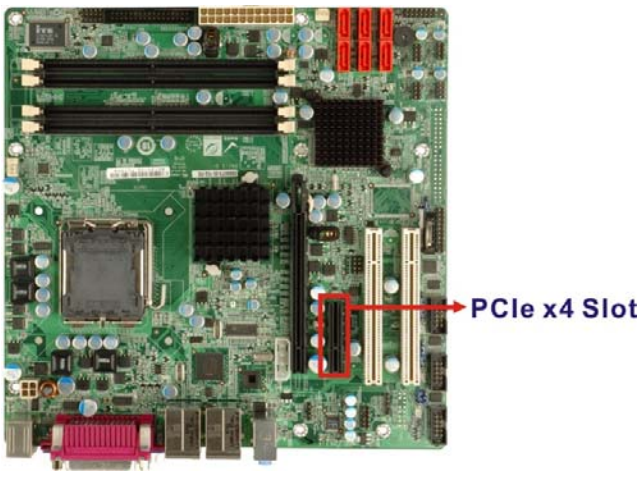


Figure 2-13: PCIe x4 Slot

2.6.4 Intel® 82573L PCIe GbE Controller

An RJ-45 Ethernet LAN connector is interfaced directly to an Intel® 82573L PCIe GbE controller. The Intel® 82573L PCIe GbE controller is a compact, single-port integrated physical layer (PHY) device with its own Memory Access Controller (MAC) and interfaced to the Intel® ICH9DO Southbridge through a PCIe x1 lane. The Intel® 82573L GbE controllers is shown in **Figure 2-14** below.

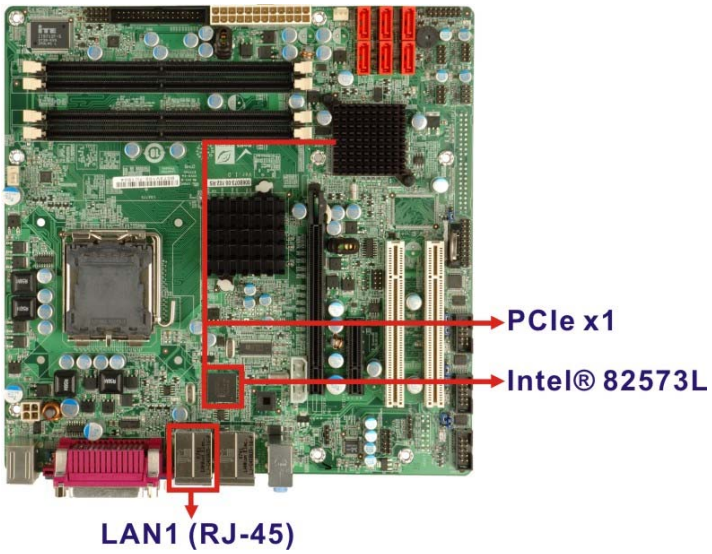


Figure 2-14: Intel® 82573L PCIe GbE Controller

Some of the features of the Intel® 82573L are listed below:

- 2 Gbps peak bandwidth per direction
- PCI Express Rev 1.0a specification
- High bandwidth density per pin
- Wide,pipelined internal data path architecture
- Optimized transmit (Tx) and receive (Rx) queues
- 32 KB configurable Rx and Tx first-in/first-out (FIFO)
- IEEE 802.3x*-compliant flow-control support with software controllable pause times and threshold values

- Programmable host memory Rx buffers (256 B-16 KB)
- Descriptor ring management hardware for Tx and Rx
- Mechanism for reducing interrupts from Tx/Rx operations
- Integrated PHY for 10/100/1000 Mbps (full- and half-duplex)
- IEEE 802.3ab* auto-negotiation support
- IEEE 802.3ab PHY compliance and compatibility
- Tx/Rx IP,TCP,and UDP checksum offloading
- Tx TCP segmentation
- IEEE 802.1q* Virtual Local Area Network (VLAN) support with VLAN tag insertion, stripping, and packet filtering for up to 4096 VLAN tags
- Boot ROM Preboot eXecution Environment (PXE) Flash interface support
- SDG 3.0,WfM 3.0 and PC2001 compliant
- Wake on LAN support

2.7 PCI Bus Components

2.7.1 PCI Bus Overview

The PCI bus is connected to the components listed below:

- Two PCI slots

The PCI bus complies with PCI Local Bus Specification, Revision 2.3 and supports 33MHz PCI operations.

2.7.2 PCI Slots

The Intel® ICH9DO Southbridge integrates a PCI arbiter that supports up to four PCI Masters thereby enabling the 2807940 to support an additional two PCI bus Masters. The PCI bus on the 2807940 is interfaced to two PCI slots thereby connecting the PCI expansion boards to the Intel® ICH9DO Southbridge. The PCI slots are shown in **Figure 2-15**.

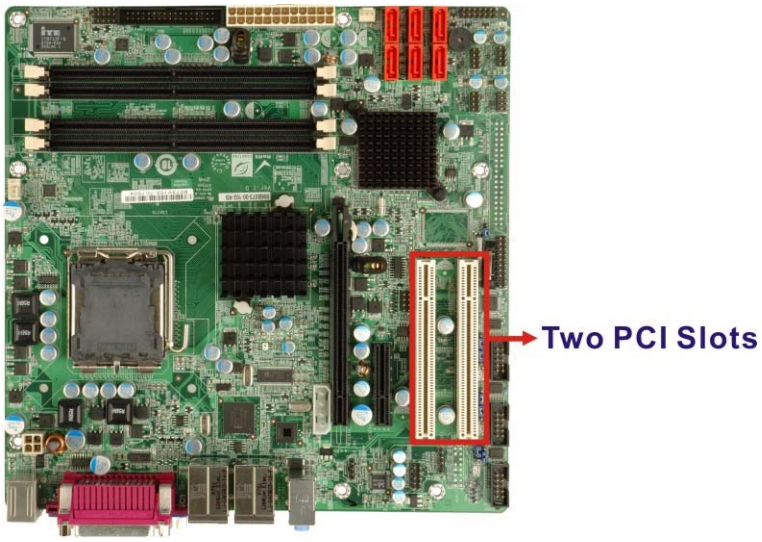


Figure 2-15: PCI Slots

2.8 LPC Bus Components

2.8.1 LPC Bus Overview

The LPC bus is connected to components listed below:

- TPM module connector
- Super I/O chipset
- Fintek F81216DG LPC Serial Port Chipset

2.8.2 TPM Module

A TPM connector on the 2807940 is interfaced to the Intel® ICH9DO Southbridge through the LPC bus. The TPM connector is shown in **Figure 2-16** below.

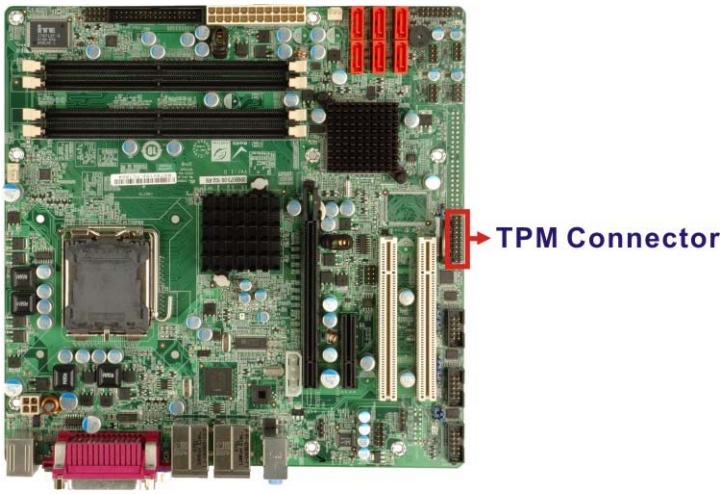


Figure 2-16: TPM Connector

The Intel® ICH9DO Southbridge supports TPM version 1.1 and TPM version 1.2 devices for enhanced security. Three TPM are available from GAI. The three GAI TPM are listed below:

- Infineon TPM module
- Sinosun TPM module
- Winbond TPM module

For more information about these modules please refer to **Chapter 3** or contact the Global American, Inc.

2.8.3 Super I/O chipset

The ITE IT8712F Super I/O chipset is connected to the Intel® ICH9DO Southbridge through the LPC bus. ITE IT8712F Super I/O chipset is shown in **Figure 2-17** below.

Figure 2-17: ITE IT8712F Super I/O

The ITE IT8712F is an LPC interface-based Super I/O device that comes with an integrated Environment Controller. 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:

2.8.3.1 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.

2.8.3.2 Super I/O 16C550 UARTs

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

- one standard serial port (COM1)
- IrDa 1.0 and ASKIR protocols(IR1)

The Fintek F81216DG LPC Serial Port chipset connected to the LPC bus provided connectivity to another three serial port connectors (COM2, COM3 and COM4). For further details on the Fintek F81216DG serial port controller, please refer to **Section 2.8.4**.

2.8.3.3 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.

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

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

- Enhanced digital data separator
- Supports automatic write protection via software
- Supported capacities:
  - 360K
  - 720K
  - 1.2M
  - 1.44M
  - 2.88M
- 3-mode FDD supported

The FDD controller is interfaced to a FDD connected to the FDD connector on the 2807940.

2.8.3.5 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.

2.8.3.6 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.

2.8.3.7 Super I/O GPIO Ports

The Super I/O has 48 programmable GPIO ports of which 8 are implemented on the 2807940. The GPIO connector has 8 programmable bits, 4-bit input and 4-bit output.

2.8.3.8 Super I/O Infrared

The Super I/O has dedicated infrared (IrDA) pins that are interfaced to an IrDA connector. The IrDA connector is compatible with the following standards:

- ASKIR
- SIR

2.8.3.9 Super I/O Parallel Port

The Super I/O parallel port (LPT) is compatible with the following LPT specifications.

- SPP compatible bi-directional parallel port

- Enhanced Parallel Port (EPP) mode supported. Compatible with IEEE 1284 specifications
- Extended Capability Port (ECP) mode supported. Compatible with IEEE 1284 specifications
- Enhanced printer port back-drive current reduction
- Printer power-on damage reduction
- Supports POST (Power-On Self Test) Data Port

The parallel port controller is connected to an external DB-26 LPT connector.

2.8.3.10 Super I/O Watchdog Timer

The super I/O watchdog timer has a maximum time resolution of 1 minute or 1 second with a maximum or either 65,535 minutes or 65,535 seconds.

2.8.4 Fintek F81216DG LPC Serial Port Chipset

The Fintek F81216DG chipset enables the addition of three additional UART serial ports (COM2,COM3 and COM4). 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 48MHz
- Powered by 3Vcc

2.9 Ethernet LAN Controllers

The 2807940 motherboard has two GbE controllers. The 2807940 LAN connections are shown in **Figure 2-18**.

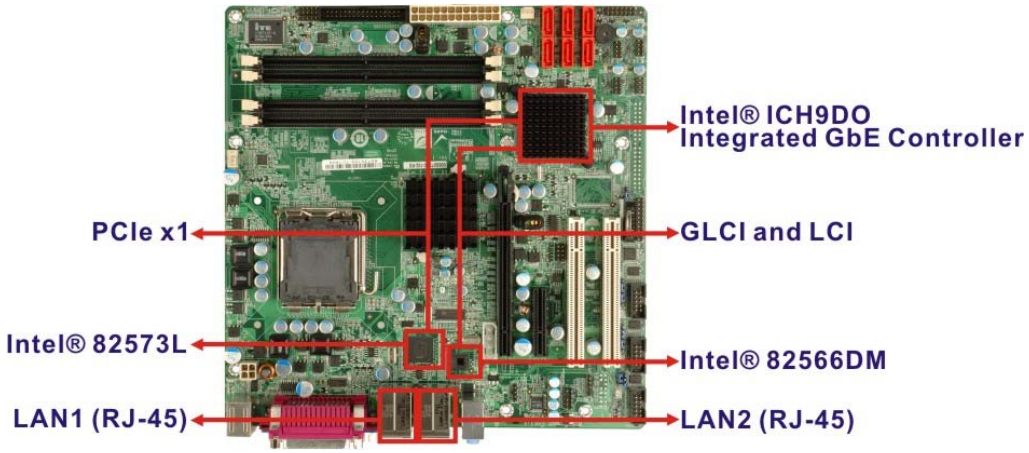


Figure 2-18: LAN Connections

The first GbE controller, is an Intel® 82537L PCIe GbE controller and is the interface between the Intel® ICH9DO Southbridge controller and the LAN1 RJ-45 Ethernet connector.

The second GbE controller is integrated on the Intel® ICH9DO Southbridge and interfaced to the LAN2 RJ-45 Ethernet LAN connector through an Intel® 82566DM Gigabit Platform LAN Connect device. The Intel® 82566DM is connected directly to the GbE controller on the Intel® ICH9DO Southbridge through the GLCI and LCI, which is shared with the PCIe x1 port 6.

Both of these Ethernet controllers have been described in detail in earlier sections. For further details please refer to the relevant sections:

- Intel® ICH9DO Ethernet controller (**Section 2.5.4**)
- Intel® 82566DM Gigabit Platform LAN Connect device (**Section 2.5.4.1**)
- Intel® 82537L PCIe GbE controller (**Section 2.6.4**)

2.10 Environmental and Power Specifications

2.10.1 System Monitoring

Three thermal inputs on the 2807940 Super I/O Enhanced Hardware Monitor monitor the following temperatures:

- System Temperature #1
- System Temperature #2

Five voltage inputs on the 2807940 Super I/O Enhanced Hardware Monitor monitors the following voltages:

- CPU Core
- DDR2 1.8V
- +3.3V
- +5V
- +12V
- FSB 1.2V
- +1.5V
- +1.25V
- VBAT

The 2807940 Super I/O Enhanced Hardware Monitor also monitors the following fan speeds:

- CPU Fan Speed
- System Fan Speed

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

2.10.2 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the 2807940 are listed below.

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

- Maximum Operating Temperature: 60°C (140°F)

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

2.10.3 Power Consumption

Table 2-3 shows the power consumption parameters for the 2807940 running 3D Mark® 2001 SE330 with a 3.0 GHz E6850 Intel® Core™2 Duo processor with four 2.0 GB 800MHz DDR2 DIMMs.

Voltage	Current
+3.3V	2.41A
+5.0V	5.71A
+12V	3.69A
5Vsb	0.13A

Table 2-3: Power Consumption

Chapter

3

Unpacking

3.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the 2807940 may result in permanent damage to the 2807940 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the 2807940. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the 2807940, 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 2807940, place it on an antic-static pad. This reduces the possibility of ESD damaging the 2807940.
- ***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 2807940 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 2807940 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 Global American, Inc. at (800) 833-8999.

3.3.1 Package Contents

The 2807940 is shipped with the following components:

Quantity	Item and Part Number	Image
1	2807940 motherboard	
1	Dual RS-232 cable	
6	SATA cables	
3	SATA power cables	

1	Mini jumper Pack	
1	Quick Installation Guide	
1	Utility CD	

Table 3-1: Package List Contents

3.4 Optional Items

CPU cooling kit (**P/N**: 2107695)	
Infineon TPM module (**P/N**: 1007790)	
Sinosun TPM module (**P/N**: 1007800)	
Winbond TPM module (**P/N**: 1007810)	

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 2807940 Layout

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

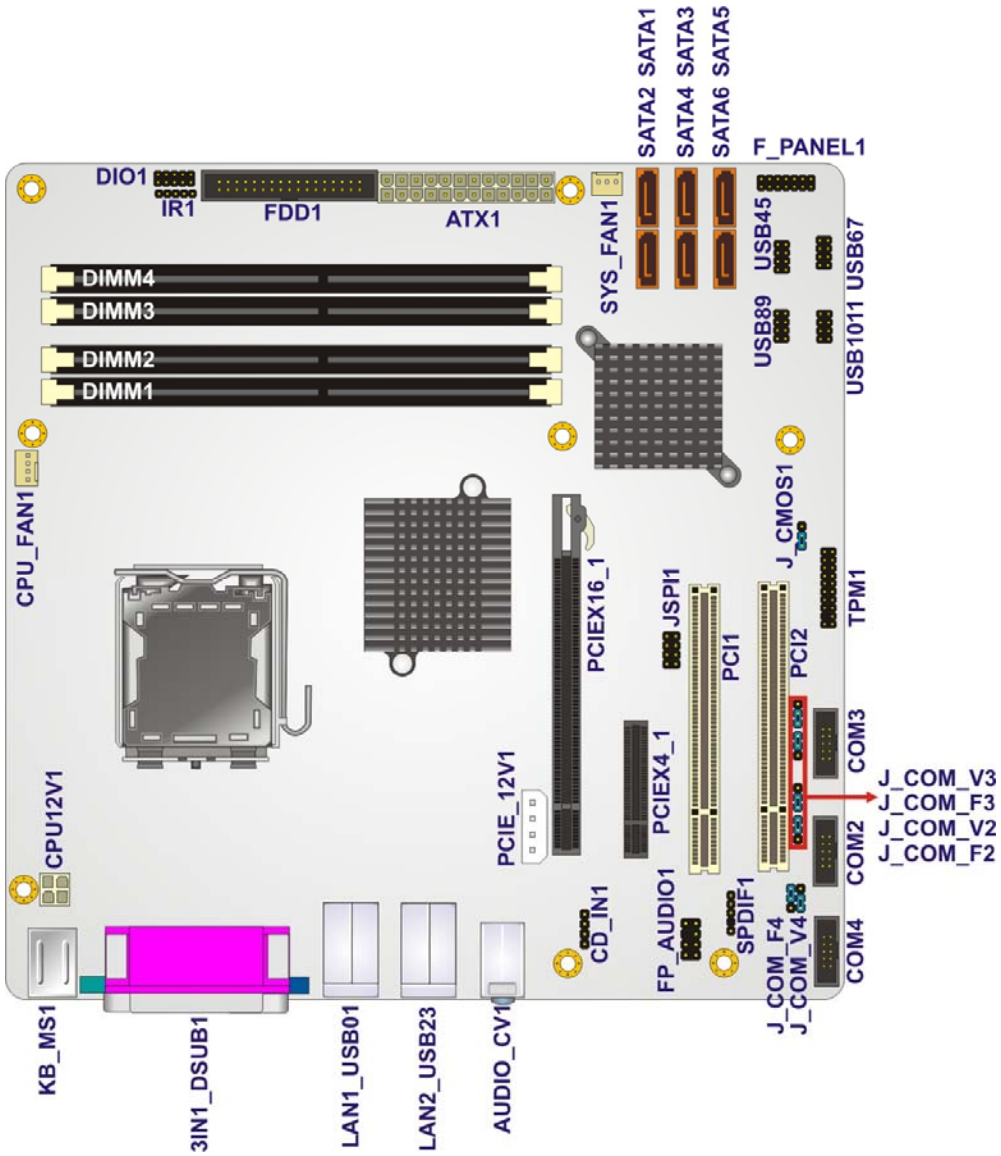


Figure 4-1: Connector and Jumper Locations

4.1.2 Peripheral Interface Connectors

Table 4-1 shows a list of the peripheral interface connectors on the 2807940. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
ATX power connector	24-pin ATX connector	ATX1
CD in connector	4-pin header	CD_IN1
Cooling fan connector, CPU	4-pin wafer	CPU_FAN1
Cooling fan connector, System	3-pin wafer	SYS_FAN1
CPU power connector	4-pin wafer	CPU12V1
Digital input/output connector	10-pin header	DIO1
DIMM socket	240-pin socket	DIMM1
DIMM socket	240-pin socket	DIMM2
DIMM socket	240-pin socket	DIMM3
DIMM socket	240-pin socket	DIMM4
Floppy drive connector	34-pin box header	FDD1
Front audio connector	10-pin header	FP_AUDIO1
Front panel connector	14-pin header	F_PANEL1
Infrared (IrDA) connector	5-pin header	IR1
PCI socket	120-pin slot	PCI1
PCI socket	120-pin slot	PCI2
PCIe x16 socket	164-pin slot	PCIEX16
PCIe x4 socket	64-pin slot	PCIEX4
PCIe power connector	4-pin wafer	PCIE_12V1

Serial ATA drive connector	7-pin SATA	SATA1
Serial ATA drive connector	7-pin SATA	SATA2
Serial ATA drive connector	7-pin SATA	SATA3
Serial ATA drive connector	7-pin SATA	SATA4
Serial ATA drive connector	7-pin SATA	SATA5
Serial ATA drive connector	7-pin SATA	SATA6
Serial port connector (COM2)	10-pin box header	COM2
Serial port connector (COM3)	10-pin box header	COM3
Serial port connector (COM4)	10-pin box header	COM4
SPDIF connector	5-pin header	SPDIF1
SPI flash connector	8-pin header	JSPI1
TPM connector	20-pin header	TPM1
USB connector	8-pin header	USB45
USB connector	8-pin header	USB67
USB connector	8-pin header	USB89
USB connector	8-pin header	USB1011

Table 4-1: Peripheral Interface Connectors

4.1.3 External Interface Panel Connectors

Table 4-2 lists the rear panel connectors on the 2807940. Detailed descriptions of these connectors can be found in **Section 4.3**.

Connector	Type	Label
Audio connector	Audio jack	AUDIO_CV1
Ethernet and dual USB combo connector	RJ-45 and two USB	LAN1_USB01
Ethernet and dual USB combo connector	RJ-45 and two USB	LAN2_USB23
Mouse or keyboard connector	PS/2	KB_MS1
Parallel port, serial port and VGA combo connector	DB-25, DB-9 and DB-15	3IN1_DSUB1

Table 4-2: Rear Panel Connectors

4.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the motherboard and are only accessible when the motherboard is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the 2807940.

4.2.1 ATX Power Connector

CN Label: **ATX1**

CN Type: 24-pin ATX (2x12)

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

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

The ATX connector is connected to an external ATX power supply. Power is provided to the system, from the power supply through this connector.

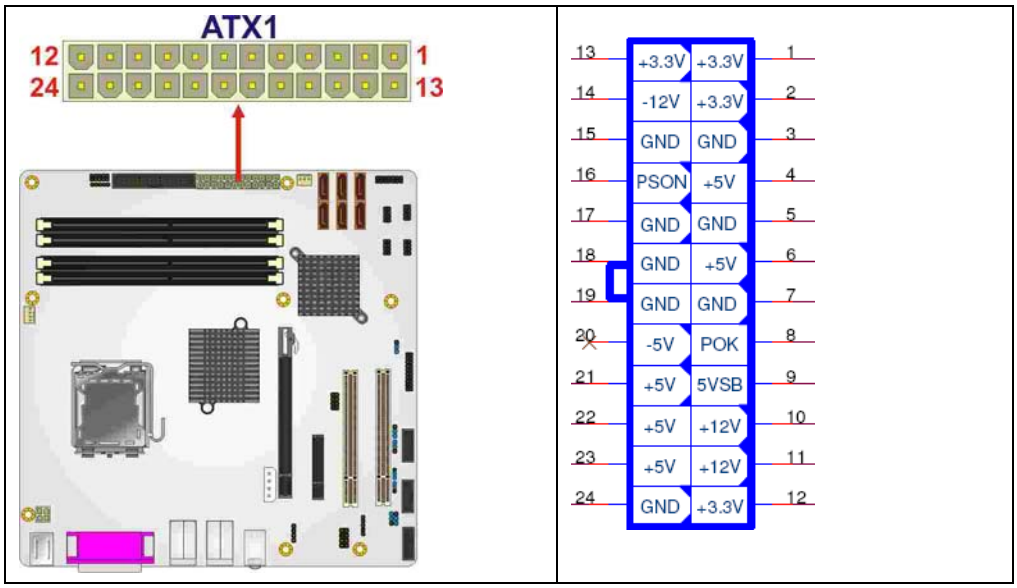


Figure 4-2: ATX Power Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	3.3V	13	3.3V
2	3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	Power good	20	-5V
9	5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	3.3V	24	GND

Table 4-3: ATX Power Connector Pinouts

4.2.2 Audio CD In Connector

CN Label: **CD_IN1**

CN Type: 4-pin header

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

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

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.

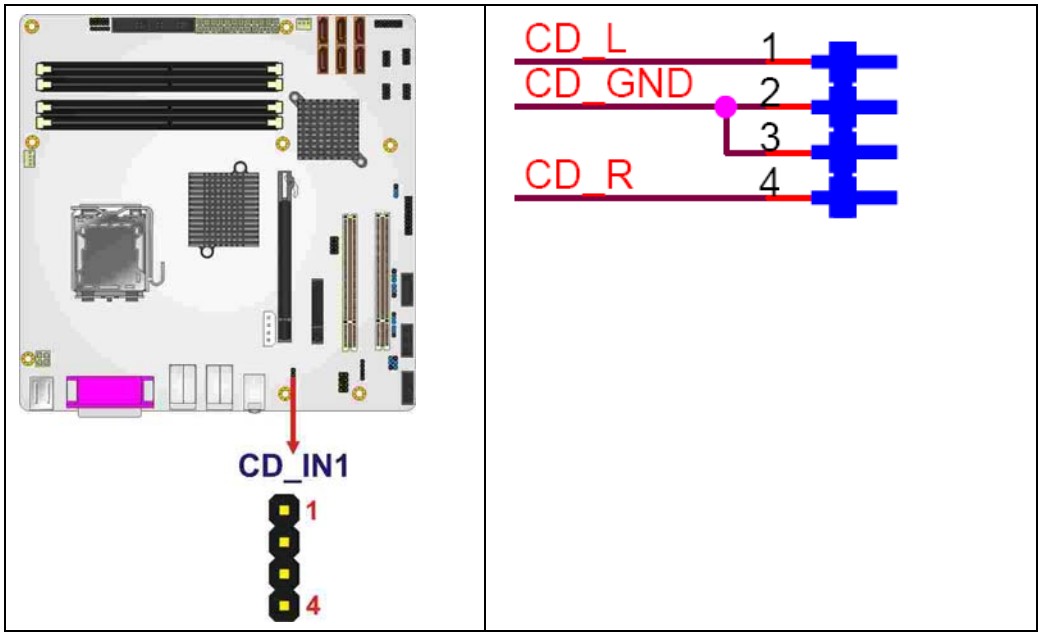


Figure 4-3: Audio CD In Connector Pinouts (4-pin)

PIN NO.	DESCRIPTION
1	CD Signal (Left)
2	Ground
3	Ground
4	CD Signal (Right)

Table 4-4: Audio CD In Connector Pinouts

4.2.3 CPU Power Connector

CN Label: **CPU12V1**

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

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

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

The 4-pin CPU power connector is connected to an ATX power supply and powers the CPU.

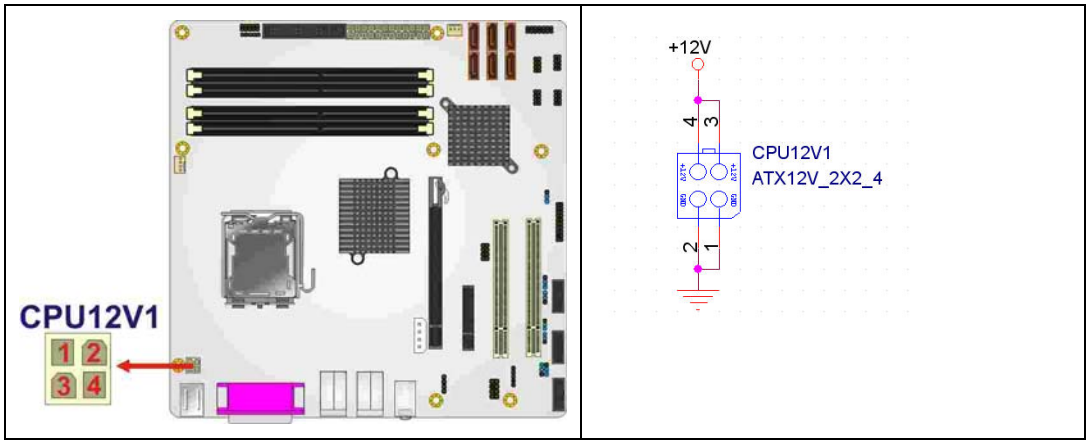


Figure 4-4: CPU Power Connector Location

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

Table 4-5: CPU Power Connector Pinouts

4.2.4 Digital Input/Output (DIO) Connector

CN Label: **DIO1**

CN Type: 10-pin header (2x5)

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

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

The digital input/output connector is managed through a Super I/O chip. The DIO connector pins are user programmable. To see details on how to program the DIO chip, please refer to **Appendix B**.

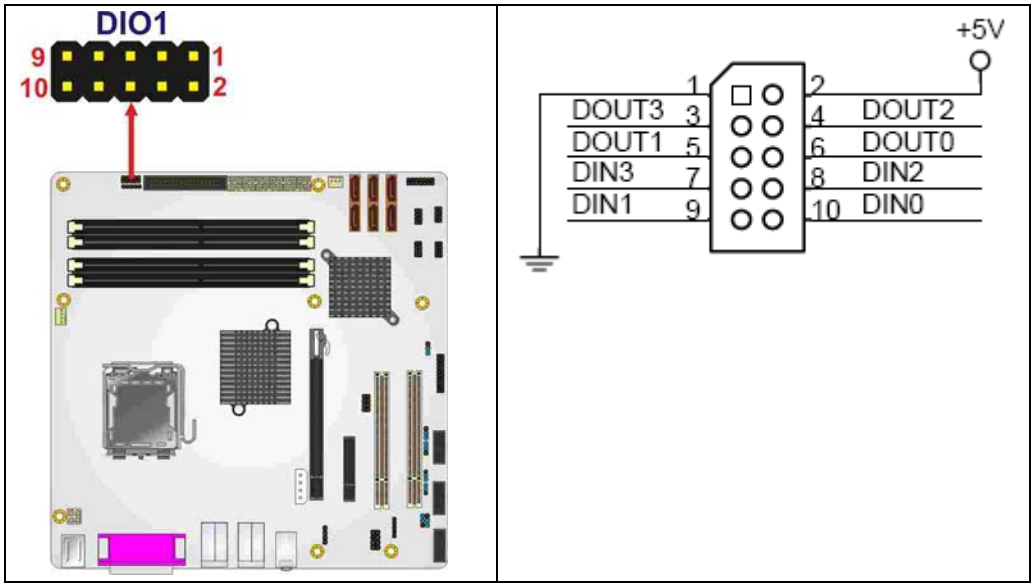


Figure 4-5: DIO Connector Location

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

Table 4-6: DIO Connector Pinouts

4.2.5 Fan Connector, CPU (12V, 4-pin)

CN Label: **CPU_FAN1**

CN Type: 4-pin header (1x4)

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

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

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.

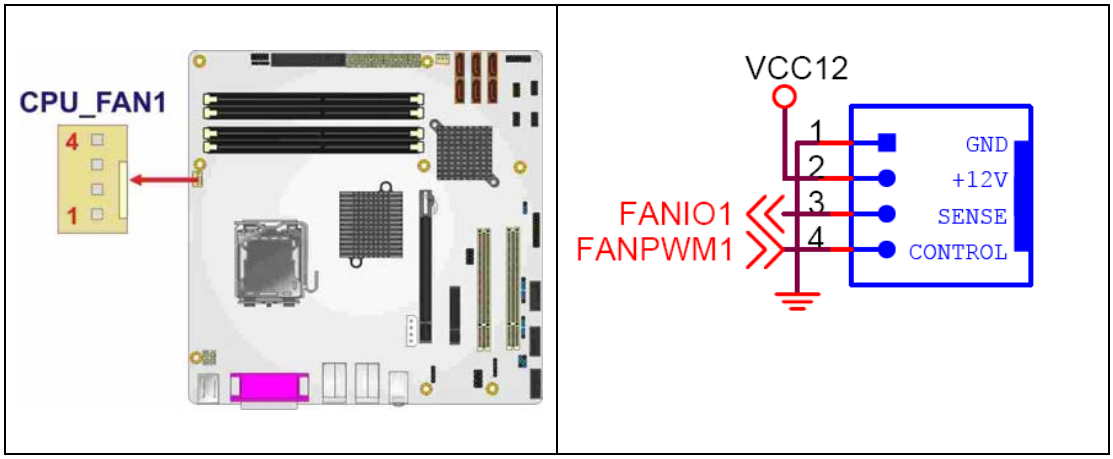


Figure 4-6: +12V Fan Connector Location

PIN NO.	DESCRIPTION
1	GND
2	+12VCC
3	Rotation Signal
4	Control

Table 4-7: +12V Fan Connector Pinouts

4.2.6 Fan Connector, System (+12V, 3-pin)

CN Label: **SYS_FAN1**

CN Type: 3-pin header (1x3)

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

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

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

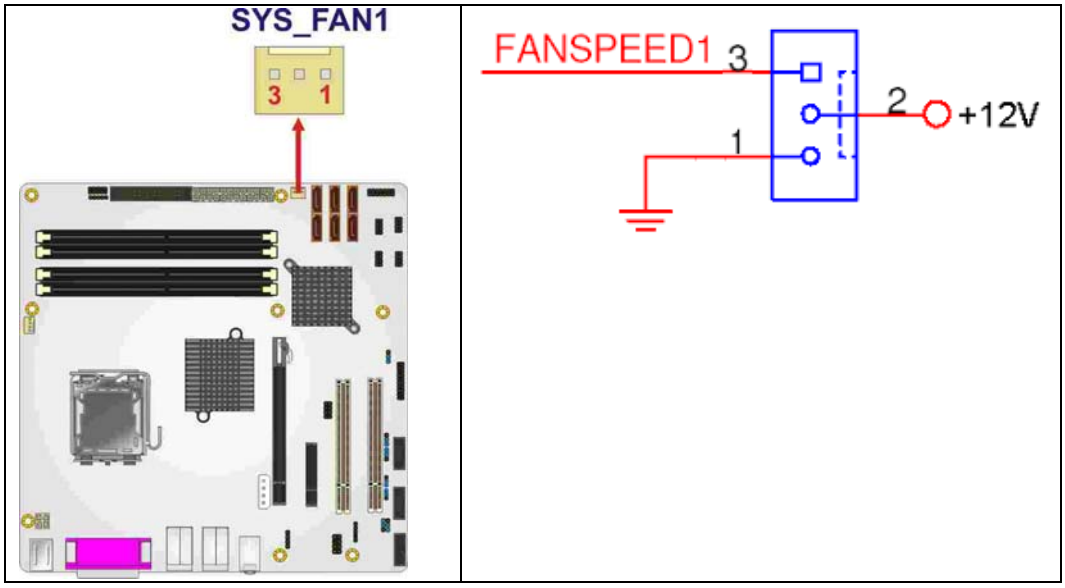


Figure 4-7: +12V Fan Connector Location

PIN NO.	DESCRIPTION
1	GND
2	+12V
3	Rotation Signal

Table 4-8: +12V Fan Connector Pinouts

4.2.7 Floppy Disk Connector (34-pin)

CN Label: **FDD1**

CN Type: 34-pin header (2x17)

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

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

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

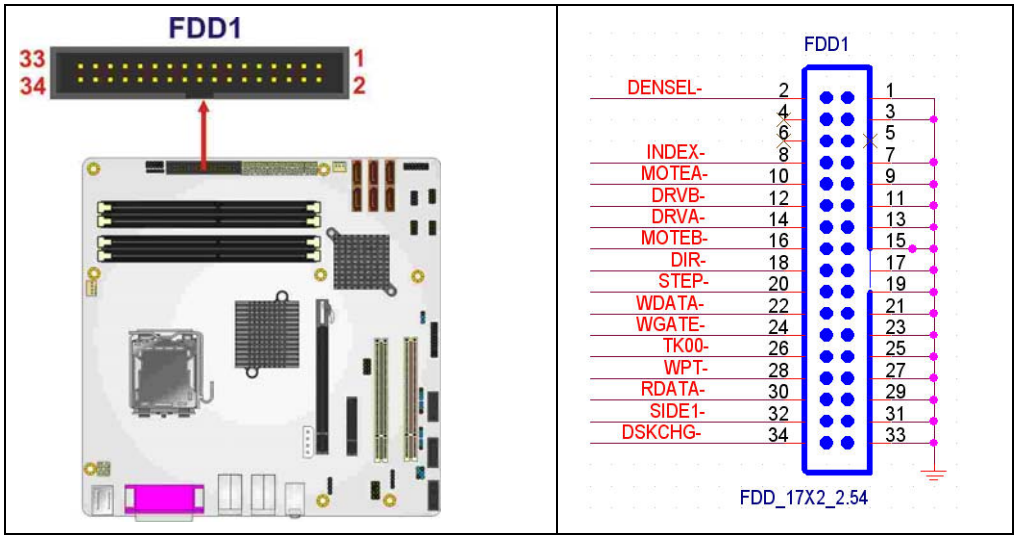


Figure 4-8: 34-pin FDD Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	Density Select#
3	GND	4	N/C
5	N/C	6	N/C
7	GND	8	INDEX#
9	GND	10	MOTOR ENABLE A#
11	GND	12	DRIVE ENABLE B#
13	GND	14	DRIVE ENABLE A#
15	GND	16	MOTOR ENABLE B#
17	GND	18	DIRECTION#

19	GND	20	STEP#
21	GND	22	WRITE DATA#
23	GND	24	WRITE GATE#
25	GND	26	TRACK 0#
27	GND	28	WRITE PROTECT#
29	GND	30	READ DATA#
31	GND	32	SIDE 1 SELECT#
33	GND	34	DISK CHANGE#

Table 4-9: 34-pin FDD Connector Pinouts

4.2.8 Front Audio Connector

CN Label: **FP_AUDIO1**

CN Type: 10-pin header (2x5)

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

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

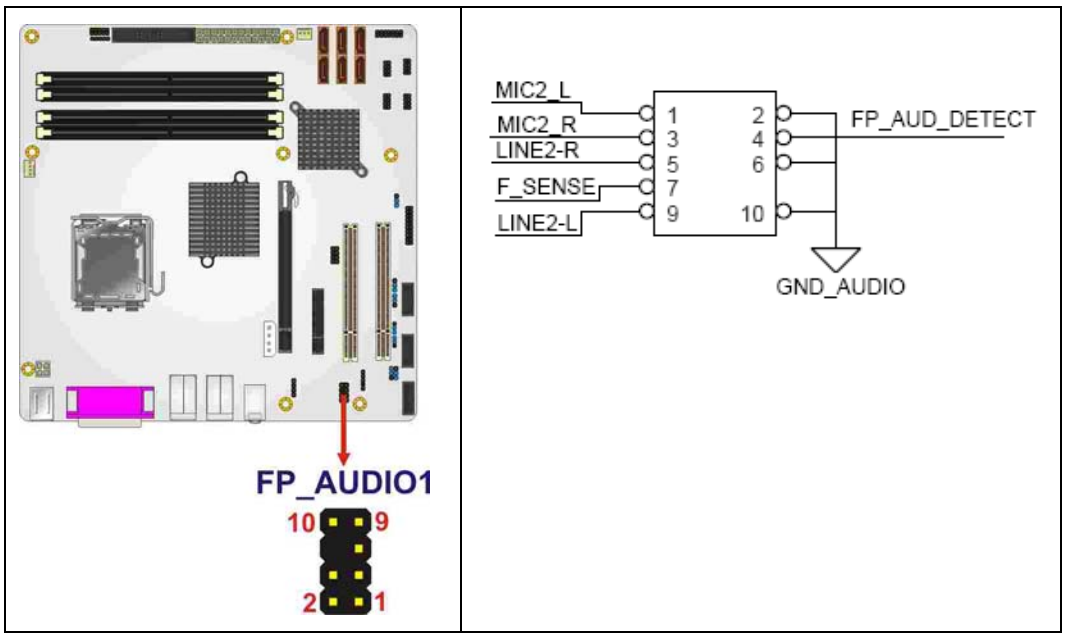


Figure 4-9: Front Audio Connector Location (10-pin)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	MIC_L	2	GND
3	MIC_R	4	Audio Detect
5	LINE2-R	6	GND
7	Jack Detection	8	N/C
9	LINE2-L	10	GND

Table 4-10: Front Audio Connector Pinouts

4.2.9 Front Panel Connector

CN Label: **F_PANEL1**

CN Type: 14-pin header (2x7)

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

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

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

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

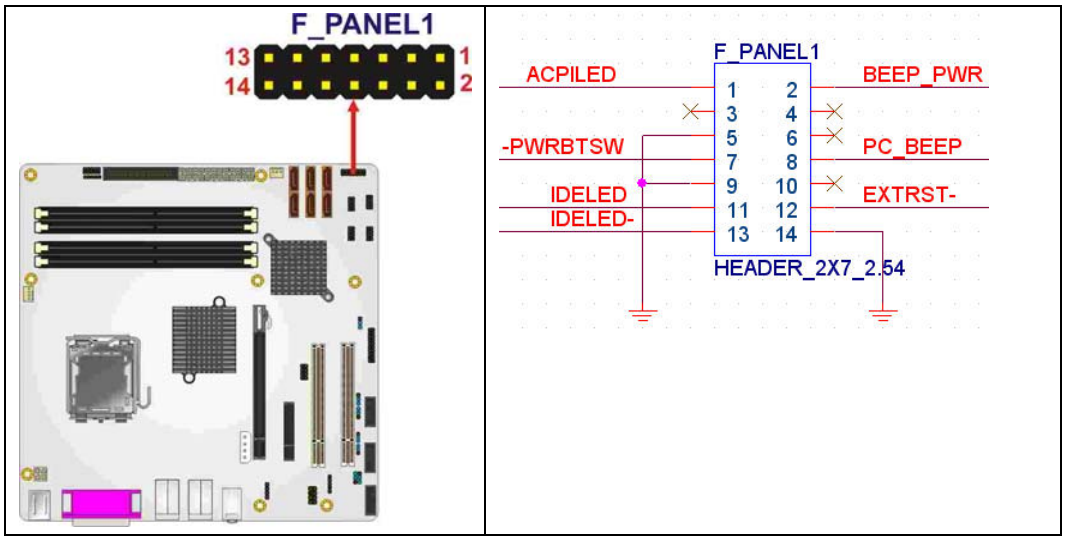


Figure 4-10: Front Panel Connector Pinout Locations (14-pin)

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power LED	1	+5V	Speaker	2	+5V
	3	N/C		4	N/C
	5	GROUND		6	N/C
Power	7	PWRBTN+		8	SPEAKER
Button	9	PWRBTN-	Reset	10	N/C
HDD LED	11	+5V		12	RESET-
	13	IDE LED-		14	GROUND

Table 4-11: Front Panel Connector Pinouts (14-pin)

4.2.10 Infrared Interface Connector

CN Label: **IR1**

CN Type: 5-pin header (1x5)

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

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

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

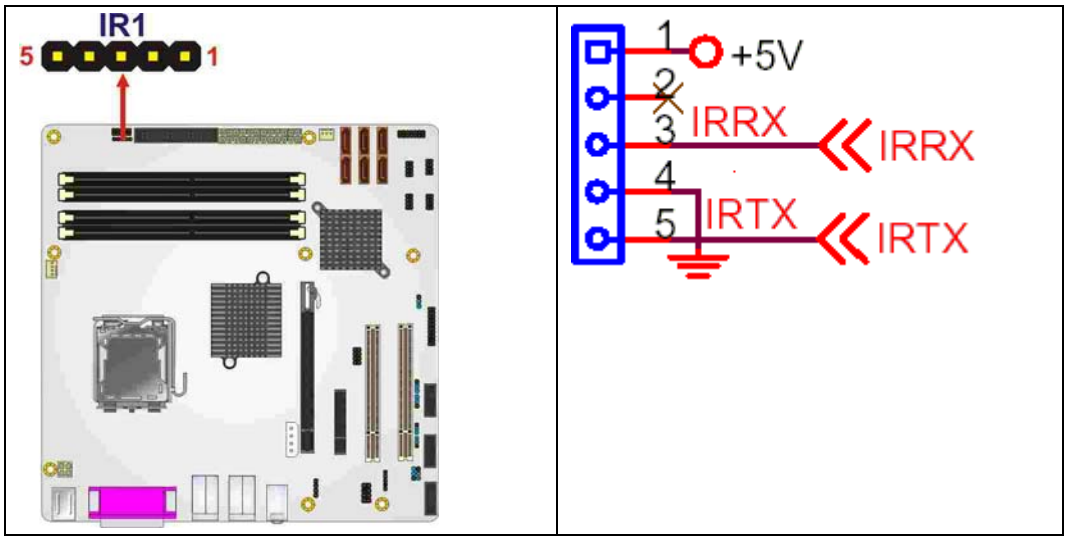


Figure 4-11: Infrared Connector Location

PIN NO.	DESCRIPTION
1	VCC
2	NC
3	IR-RX
4	GND
5	IR-TX

Table 4-12: Infrared Connector Pinouts

4.2.11 PCIe Power Connector

CN Label: **PCIE_12V1**

CN Type: 4-pin wafer (1x4)

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

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

The 4-pin PCIe power connector is connected to a power supply to power the PCIe expansion card.

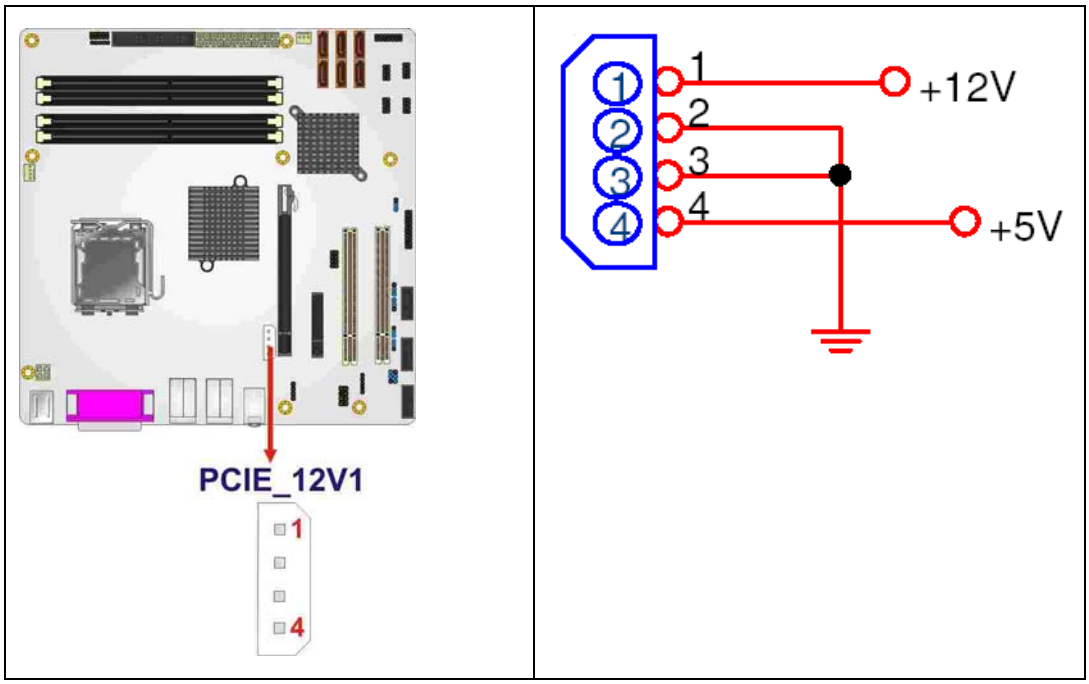


Figure 4-12: PCIe Power Connector Location

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

Table 4-13: PCIe Power Connector Pinouts

4.2.12 SATA Drive Connectors

CN Label: **SATA1**, **SATA2**, **SATA3**, **SATA4**, **SATA5** and **SATA6**

CN Type: 7-pin SATA drive connectors (1x7)

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

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

The six SATA drive connectors are each connected to second generation SATA drives. Second generation SATA drives transfer data at speeds as high as 3.0 Gbps. The SATA drives can be configured in a RAID configuration.

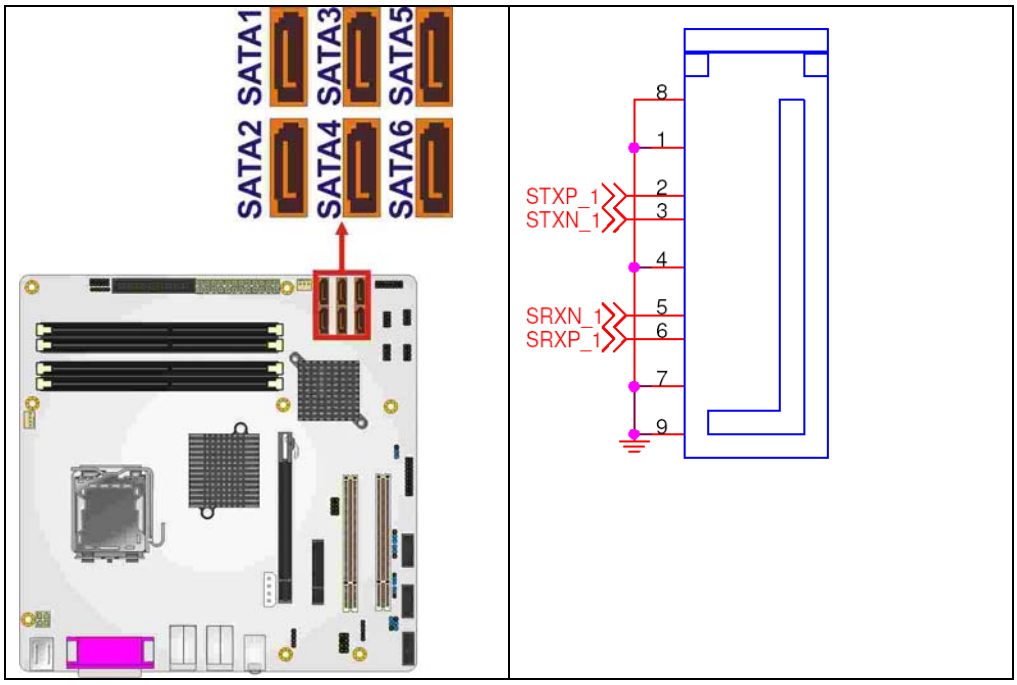


Figure 4-13: SATA Drive Connector Locations

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

Table 4-14: SATA Drive Connector Pinouts

4.2.13 Serial Port Connector (COM2, COM 3 and COM4)

CN Label: **COM2**, **COM3** and **COM4**

CN Type: 10-pin header (2x5)

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

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

The 10-pin serial port connector provides a second RS-232 serial communications channel. The serial port connectors can be connected to external RS-232 serial port devices.

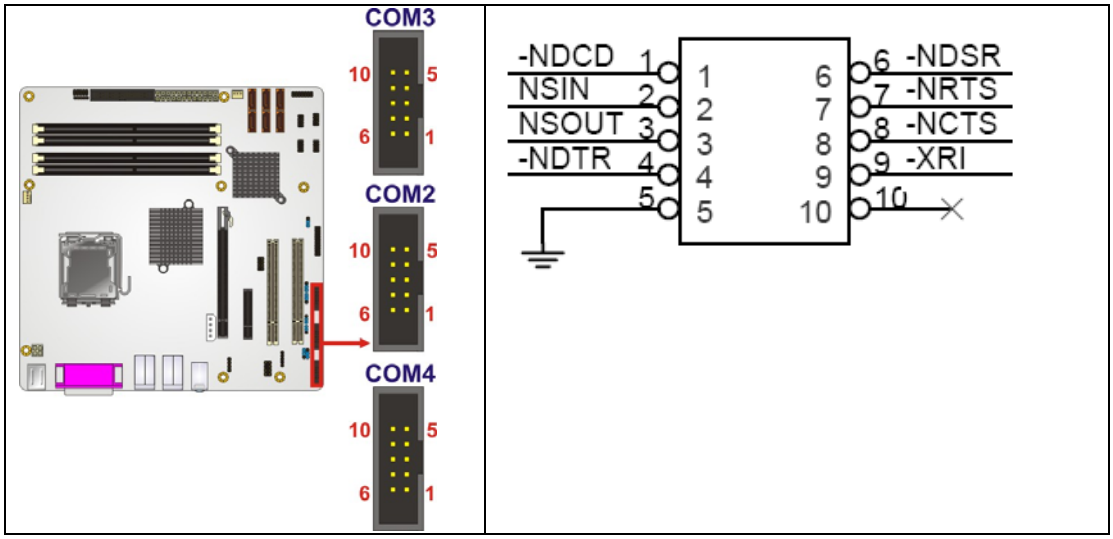


Figure 4-14: Serial Connector Location

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

Table 4-15: Serial Connector Pinouts

4.2.14 SPDIF Connector

CN Label: **SPDIF1**

CN Type: 5-pin header (1x5)

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

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

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

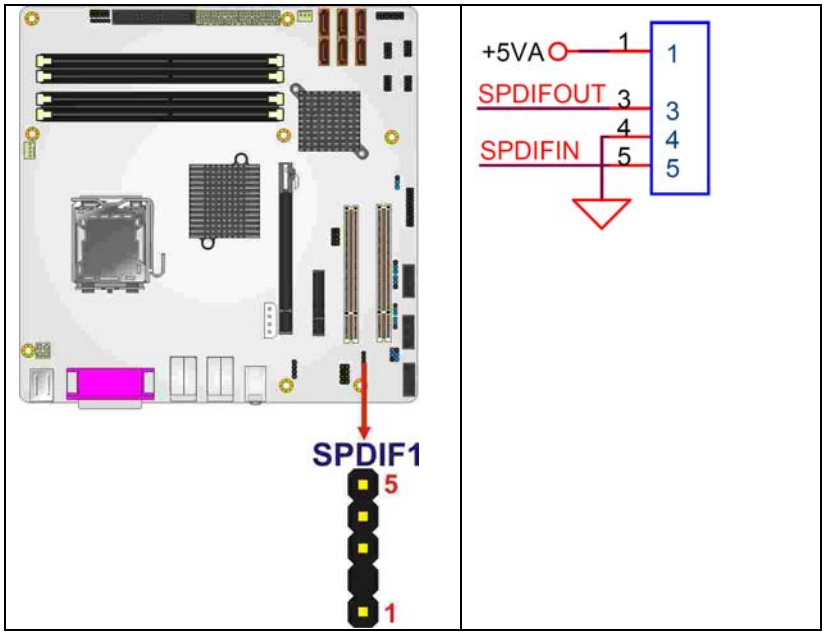


Figure 4-15: SPDIF Connector Location

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

Table 4-16: SPDIF Connector Pinouts

4.2.15 Trusted Platform Module (TPM) Connector

CN Label: **TPM1**

CN Type: 40-pin header (2x20)

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

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

The Trusted Platform Module (TPM) connector secures the system on bootup. An optional TPM (see packing list in **Chapter 3**) can be connected to the TPM connector.

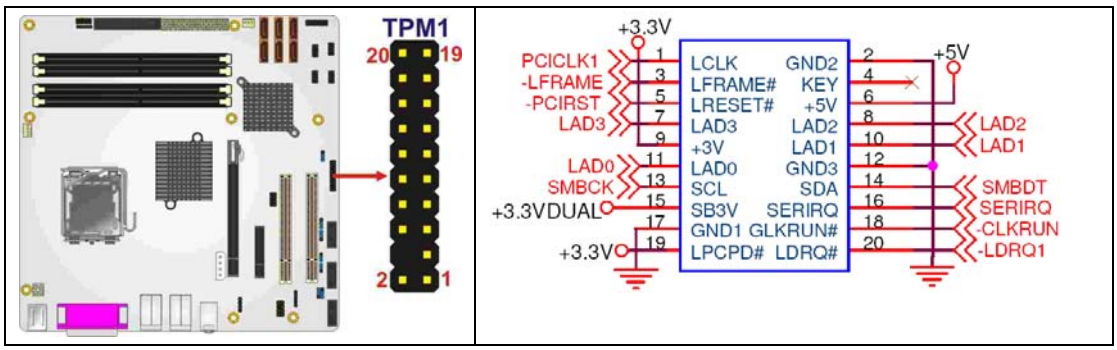


Figure 4-16: TPM Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	FWHPCLK	2	GND
3	LFRAME#	4	KEY
5	PCIRST#	6	VCC
7	LAD3	8	LAD2
9	VCC3	10	LAD1
11	LAD0	12	GND
13	SMBCLK	14	SMBDATA
15	3VDUAL	16	SERIRQ
17	GND	18	CLKRUN#
19	LPCPD#	20	LDRQ#

Table 4-17: TPM Connector Pinouts

4.2.16 USB Connectors (Internal)

CN Label: **USB45**, **USB67**, **USB89** and **USB1011**

CN Type: 8-pin header (2x4)

CN Location: See **Figure 4-17**

CN Pinouts: See **Table 4-18**

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.

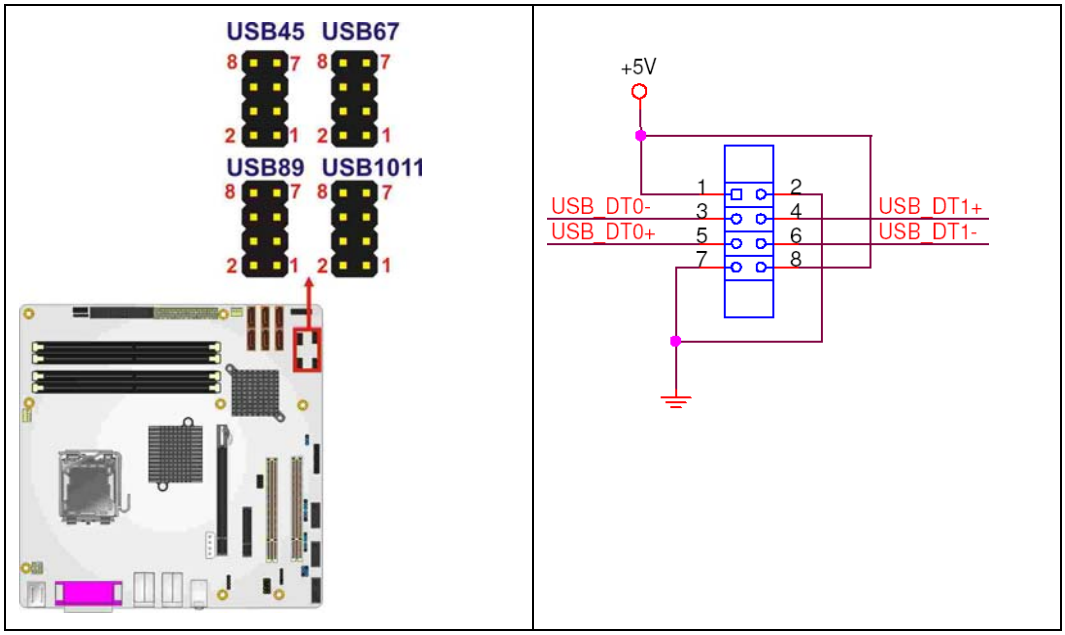


Figure 4-17: USB Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	GND
3	DATA-	4	DATA+
5	DATA+	6	DATA-
7	GND	8	VCC

Table 4-18: USB Port Connector Pinouts

4.3 External Peripheral Interface Connector Panel

Figure 4-18 shows the 2807940 external peripheral interface connector (EPIC) panel. The 2807940 EPIC panel consists of the following:

- 3 x Audio jacks
- 1 x Parallel port
- 2 x PS/2 keyboard/mouse connectors
- 2 x RJ-45 LAN connectors
- 1 x Serial port connector
- 4 x USB 2.0 ports
- 1 x VGA connector

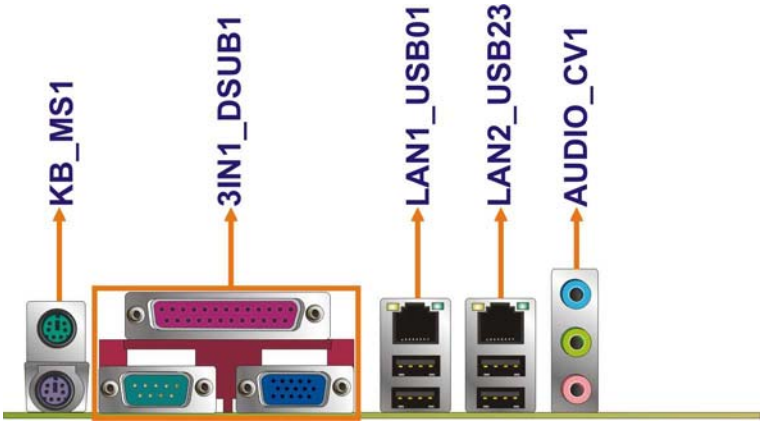


Figure 4-18: 2807940 External Peripheral Interface Connector

4.3.1 Audio Connectors

CN Label: **AUDIO_CV1**

CN Type: 3 x audio jacks

CN Location: See **Figure 4-18**

The three audio jacks on the external audio connector enable the 2807940 to be connected to external audio devices as specified below.

- **Line In port (Light Blue):** Connects a CD-ROM, DVD player, or other audio

devices.

- **Line Out port (Lime):** Connects to a headphone or a speaker. With multi-channel configurations, this port can also connect to front speakers.
- **Microphone (Pink):** Connects a microphone.

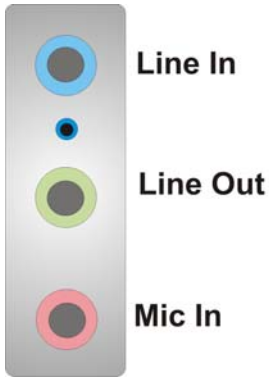


Figure 4-19: Audio Connector

4.3.2 Keyboard/Mouse Connector

CN Label:	**KB_MS1**
CN Type:	Dual PS/2
CN Location:	See **Figure 4-18**
CN Pinouts:	See **Figure 4-20** and **Table 4-19**

The 2807940 keyboard and mouse connectors are standard PS/2 connectors.

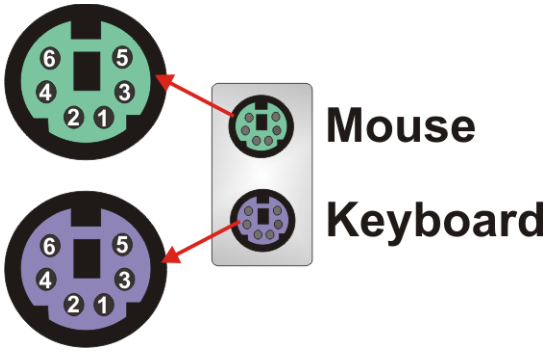


Figure 4-20: PS/2 Pinouts

PIN	DESCRIPTION
1	DATA
2	NC
3	GND
4	VCC5
5	CLK
6	NC

Table 4-19: PS/2 Connector Pinouts

4.3.3 LAN and Dual USB Combo Connectors

CN Label: **LAN1_USB01** and **LAN2_USB23**

CN Type: RJ-45

CN Location: See **Figure 4-18**

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

The 2807940 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	MDIA3-	5	MDIA1+
2	MDIA3+	6	MDIA2+-
3.	MDIA2-	7	MDIA0-
4.	MDIA1-	8	MDIA0+

Table 4-20: LAN Pinouts

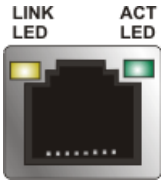


Figure 4-21: RJ-45 Ethernet Connector

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 4-21**.

LINK LED		Activity LED	
Status	**Description**	**Status**	**Description**
Off	Not linked	**Off**	10 Mbps
Yellow	Linked	**Green**	100 Mbps
Blinking	Data activity	**Orange**	1 GbE

Table 4-21: RJ-45 Ethernet Connector LEDs

The 2807940 has four external USB 2.0 ports. The ports are integrated into two dual USB and LAN combo connectors. The ports connect to both USB 2.0 and USB 1.1 devices.

PIN NO.	DESCRIPTION
1	VCC
2	DATA-
4	DATA+
4	GROUND

Table 4-22: USB Port Pinouts

4.3.4 Parallel Port, Serial Port and VGA Combo Connector

CN Label: **3IN1_DSUB1**

CN Type: DB-25, DB-9 and DB-15

CN Location: See **Figure 4-18**

CN Pinouts: See **Table 4-23, Table 4-24** and **Table 4-25**

A 25-pin parallel port connector, a male DB-9 serial port (COM1) and a female DB-15 VGA connector are integrated into a single EPIC connector as shown in **Figure 4-18**.

The 2807940 includes one on-board parallel port accessed through one 25-pin D-type female connector. The parallel port is usually connected to a printer. The connector is show in **Figure 4-22** and the pinouts are shown in **Table 4-23**.

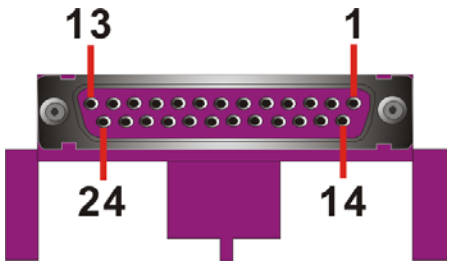


Figure 4-22 Parallel Port Connector Pinout Locations

PIN	Description	PIN	Description
1	STROBE#	2	DATA 0
3	DATA 1	4	DATA 2
5	DATA 3	6	DATA 4
7	DATA 5	8	DATA 6
9	DATA 7	10	ACKNOWLEDGE
11	BUSY	12	PAPER EMPTY
13	PRINTER SELECT	14	AUTO FORM FEED #
15	ERROR#	16	INITIALIZE

17	PRINTER SELECT LN#	18	GND
19	GND	20	GND
21	GND	22	GND
23	GND	24	GND
25	GND		

Table 4-23: Parallel Port Connector Pinouts

The male DB-9 COM 1 serial port connector is connected to RS-232 serial communications devices. The connector is show in **Figure 4-23** and the pinouts are shown in **Table 4-24**.

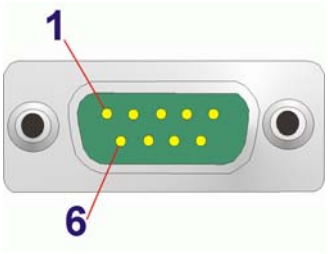


Figure 4-23: COM1 Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	6	DSR
2	RX	7	RTS
3	TX	8	CTS
4	DTR	9	RI
5	GND		

Table 4-24: RS-232 Serial Port (COM 1) Pinouts

The female DB-15 VGA connector connects to standard VGA displays. The connector is show in **Figure 4-24** and the pinouts are shown in **Table 4-25**.

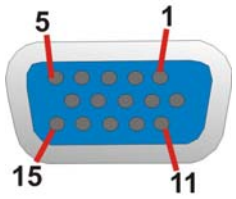


Figure 4-24: VGA Connector

PIN	DESCRIPTION	PIN	DESCRIPTION
1	RED	2	GREEN
3	BLUE	4	NC
5	GND	6	GND
7	GND	8	GND
9	VCC / NC	10	GND
11	NC	12	DDC DAT
13	HSYNC	14	VSYNC
15	DDCCLK		

Table 4-25: VGA Connector Pinouts

Chapter

5

Installation

5.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the 2807940 may result in permanent damage to the 2807940 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the 2807940. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the 2807940, 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 2807940, place it on an antic-static pad. This reduces the possibility of ESD damaging the 2807940.
- ***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 2807940 is installed. All installation notices pertaining to the installation of the 2807940 should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the 2807940 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 2807940, 2807940 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 2807940 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 2807940 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 2807940 off:

- When working with the 2807940, 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 2807940 **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 2807940 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 jumpers have been properly configured
- The 2807940 is inserted into a chassis with adequate ventilation
- The correct power supply is being used
- The following devices are properly connected
  - SATA drives
  - Power supply
  - USB cable
  - Serial port cable
- The following external peripheral devices are properly connected to the chassis:
  - Keyboard/Mouse
  - VGA screen
  - USB devices
  - LAN

5.3 Unpacking

5.3.1 Unpacking Precautions

When the 2807940 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 2807940 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 Global xAmerican, Inc. at (800) 833-8999.

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, 2807940 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 2807940. If one of these components is not installed the 2807940 cannot run.

5.4.1 Socket LGA775 CPU Installation

NOTE:

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

- **CPU**: An Intel® Processor with HT Technology must be installed
- **Chipset**: An Intel® Chipset that supports HT Technology (that has been met by the 2807940)
- **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**.

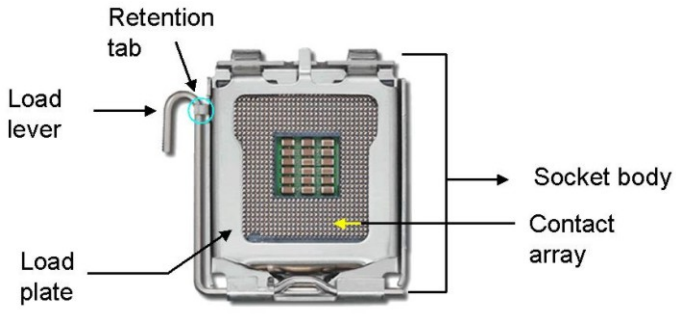


Figure 5-1: Intel® LGA775 Socket

To install a socket LGA775 CPU onto the 2807940, 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**.

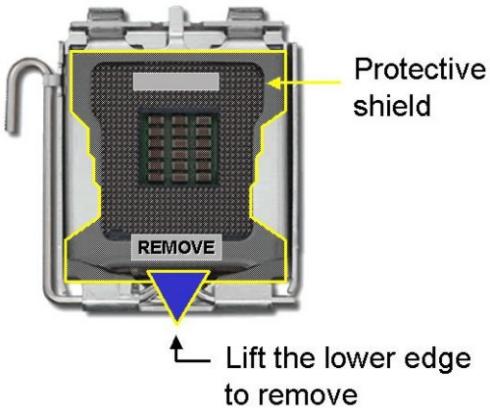


Figure 5-2: Remove the CPU Socket Protective Shield

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**.

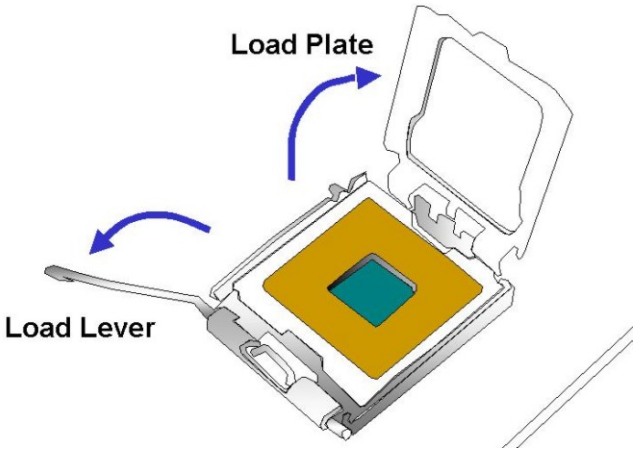


Figure 5-3: Open the CPU Socket Load Plate

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**.

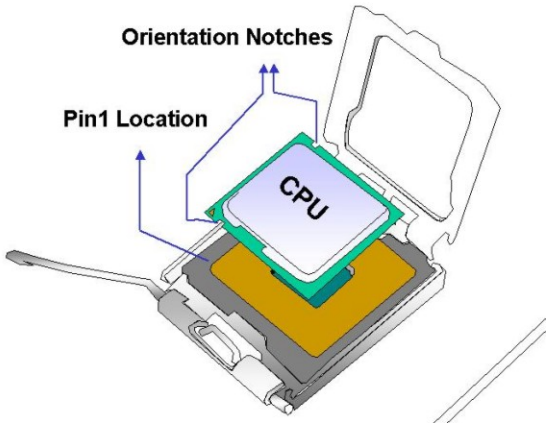


Figure 5-4: Insert the Socket LGA775 CPU

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 to the 12V power.** After the cooling kit is installed connect the CPU cable to the CPU 12V power connector.

5.4.2 Socket LGA775 2107695 Cooling Kit Installation

WARNING:

It is strongly recommended that you DO NOT use the original heat sink and cooler provided by Intel® on the 2807940.

GAI's cooling kit (2107695) includes 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: GAI 2107695 Cooling Kit

An GAI Socket LGA775 CPU cooling kit shown in **Figure 5-5** 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 2107695 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 5-6**)

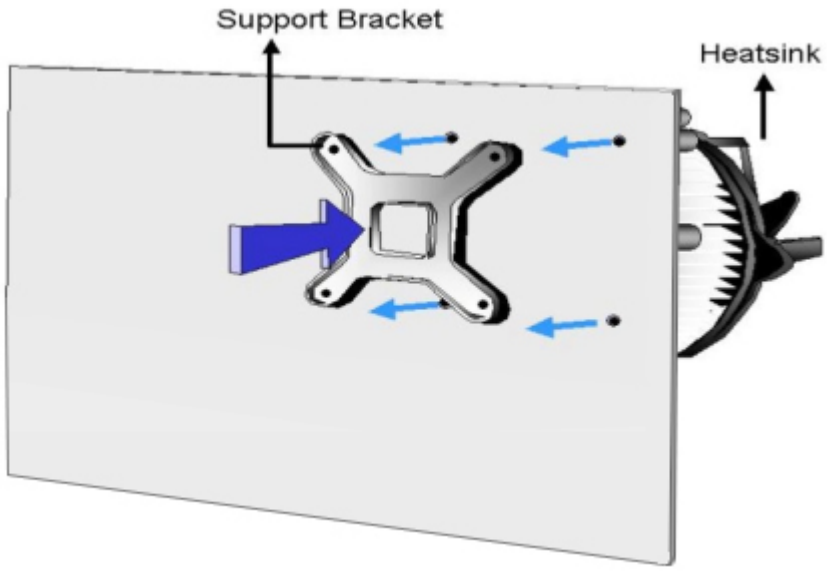


Figure 5-6: Securing the Heat sink to the PCB Board

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 2807940. 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 2807940. Please make sure the purchased DIMM complies with the memory specifications of the 2807940. DIMM specifications compliant with the 2807940 are listed in **Chapter 2**.

5.4.3.1 DIMM Purchasing Guidelines

WARNING:

Only use DDR2 DIMMs. If DDR DIMMs are used the system may be irreparably damaged.

When purchasing the DDR2 DIMM, please follow the guidelines below:

- ONLY purchase DDR2 DIMM
- Have a frequency of 667 MHz or 800 MHz
- Have a maximum capacity of 2.0 GB
- If more than one DDR2 DIMM is being installed in the system, please purchase DIMM that have the same capacity and operating frequency.

5.4.3.2 DIMM Installation Order

There are two 64-bit wide DDR2 channels on the Intel® Q35 Northbridge, Channel A and Channel B. DDR2 Channel A and DDR2 Channel B are shown in **Figure 5-7** below.

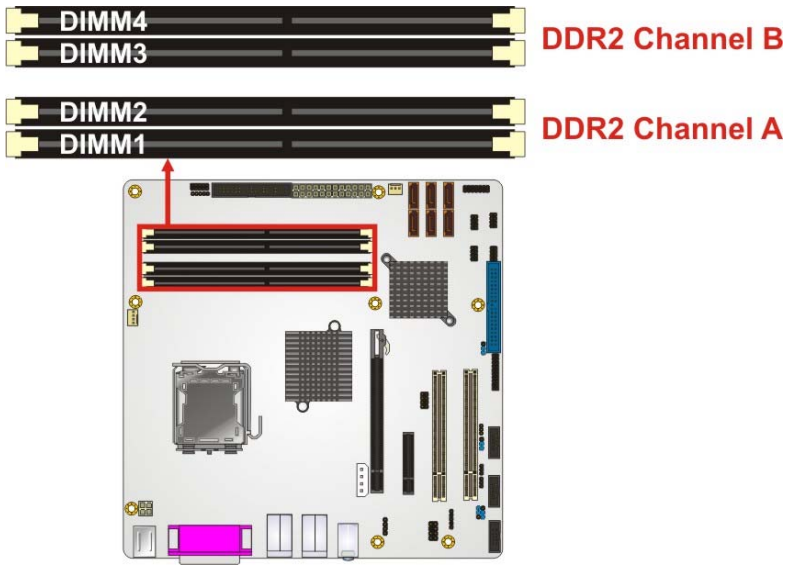


Figure 5-7: DDR2 Channels

On the 2807940, each channel is interfaced to two 240-pin DIMM sockets in the following order (see **Figure 5-7** above):

- **Channel A**: DIMM1 and DIMM2
- **Channel B**: DIMM3 and DIMM4

When populating the DDR2 DIMM sockets, populate them in the following order to optimize the memory performance:

Step 1: **DIMM1**. Install the first DDR2 DIMM into the DIMM1 DDR2 DIMM socket.

Step 2: **DIMM3**. Install the second DDR2 DIMM into the DIMM3 DDR2 DIMM socket.

Step 3: **DIMM2**. Install the third DDR2 DIMM into the DIMM2 DDR2 DIMM socket.

Step 4: **DIMM4**. Install the fourth DDR2 DIMM into the DIMM4 DDR2 DIMM socket.

5.4.3.3 DIMM Installation Guidelines

To install a DIMM into a DIMM socket, please follow the steps below and refer to **Figure 5-8**.

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**.

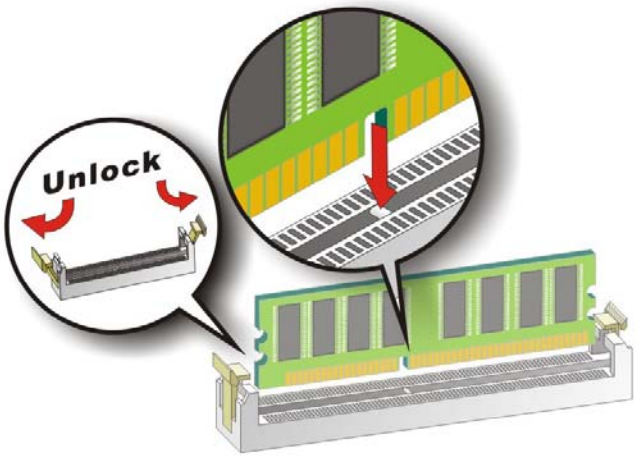


Figure 5-8: Installing a DIMM

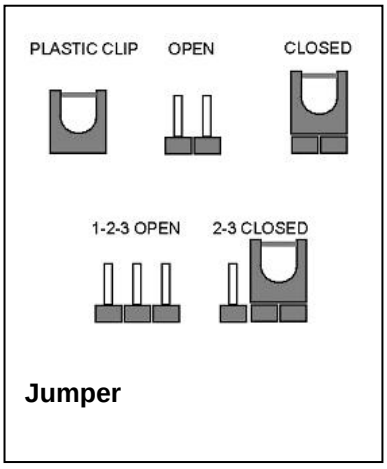
Step 3: **Insert the DIMM**. Once properly aligned, the DIMM can be inserted into the socket. As the DIMM is inserted, the white handles on the side of the socket will close automatically and secure the DIMM to the socket. See **Figure 5-8**.

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

5.5 Jumper Settings

NOTE:

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



Jumper

Before the 2807940 is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the 2807940 are listed in **Table 5-1**.

Description	Label	Type
Clear CMOS	J_CMOS1	3-pin header
COM2 pin 9 setting	J_COM_F2	3-pin header
COM3 pin 9 setting	J_COM_F3	3-pin header
COM4 pin 9 setting	J_COM_F4	3-pin header
COM2 pin 9 voltage setting	J_COM_V2	3-pin header
COM3 pin 9 voltage setting	J_COM_V3	3-pin header
COM4 pin 9 voltage setting	J_COM_V4	3-pin header

Table 5-1: Jumpers

5.5.1 Clear CMOS Jumper

Jumper Label: **J_CMOS1**

Jumper Type: 3-pin header

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

Jumper Location: See **Figure 5-9**

If the 2807940 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

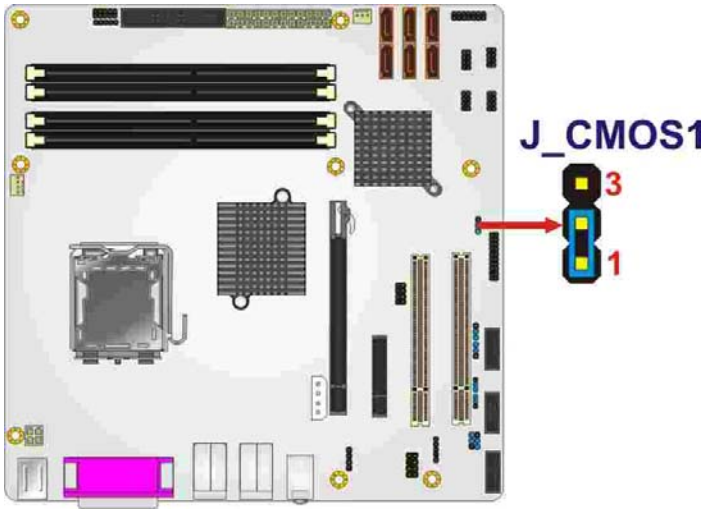
- Load Failsafe Defaults.

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 5-2**.

Clear CMOS	Description	
Short 1 - 2	Keep CMOS Setup	Default
Short 2 - 3	Clear CMOS Setup	

Table 5-2: Clear CMOS Jumper Settings

The location of the clear CMOS jumper is shown in **Figure 5-9** below.



Step 1: Figure 5-9: Clear CMOS Jumper

5.5.2 COM Port Pin 9 Setting Jumpers

Jumper Label: **J_COM_F2**, **J_COM_F3** and **J_COM_F4**

Jumper Type: 3-pin header

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

Jumper Location: See **Figure 5-10**

The COM Port Pin 9 Setting jumpers configure pin 9 on COM 2/COM 3/COM 4 as either a +5V, +12V power source (see **Section 5.5.3** to setup) or as a ring-in (RI) line. The COM Port Pin 9 Setting jumpers selection options are shown in **Table 5-3**.

J_COM_F2	Description	
Short 1 – 2	COM 2 RI Pin use voltage	
Short 2 – 3	COM 2 RI Pin use RI	Default
J_COM_F3	Description	
Short 1 – 2	COM 3 RI Pin use voltage	
Short 2 – 3	COM 3 RI Pin use RI	Default
J_COM_F4	Description	
Short 1 – 2	COM 4 RI Pin use voltage	
Short 2 – 3	COM 4 RI Pin use RI	Default

Table 5-3: COM Port Pin 9 Setting Jumper Settings

The COM Port Pin 9 Setting jumper locations are shown in **Figure 5-10** below.

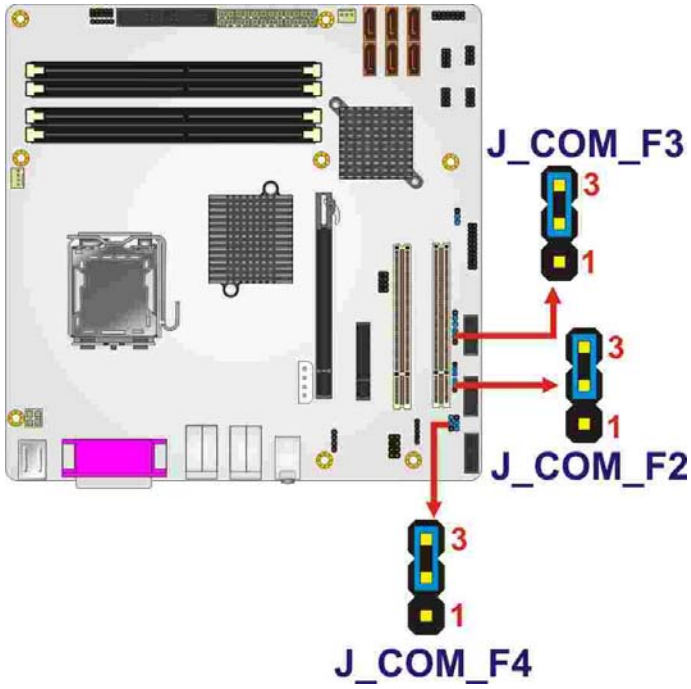


Figure 5-10: COM Port Pin 9 Setting Jumper Locations

5.5.3 COM Port Pin 9 Voltage Setting Jumpers

Jumper Label: **J_COM_V2**, **J_COM_V3** and **J_COM_V4**

Jumper Type: 3-pin header

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

Jumper Location: See **Figure 5-10**

The COM Port Pin 9 Voltage Setting jumpers configure pin 9 on COM 2/COM 3/COM 4 as either a +5V or +12V power source. The COM Port Pin 9 Voltage Setting jumpers selection options are shown in **Table 5-3**.

J_COM_V2	Description	
Short 1 – 2	COM 2 RI Pin use +5V	Default
Short 2 – 3	COM 2 RI Pin use +12V	
J_COM_V3	Description	
Short 1 – 2	COM 3 RI Pin use +5V	Default
Short 2 – 3	COM 3 RI Pin use +12V	
J_COM_V4	Description	
Short 1 – 2	COM 4 RI Pin use +5V	Default
Short 2 – 3	COM 4 RI Pin use +12V	

Table 5-4: COM Port Pin 9 Voltage Setting Jumper Settings

The COM Port Pin 9 Voltage Setting jumper locations are shown in **Figure 5-10** below.

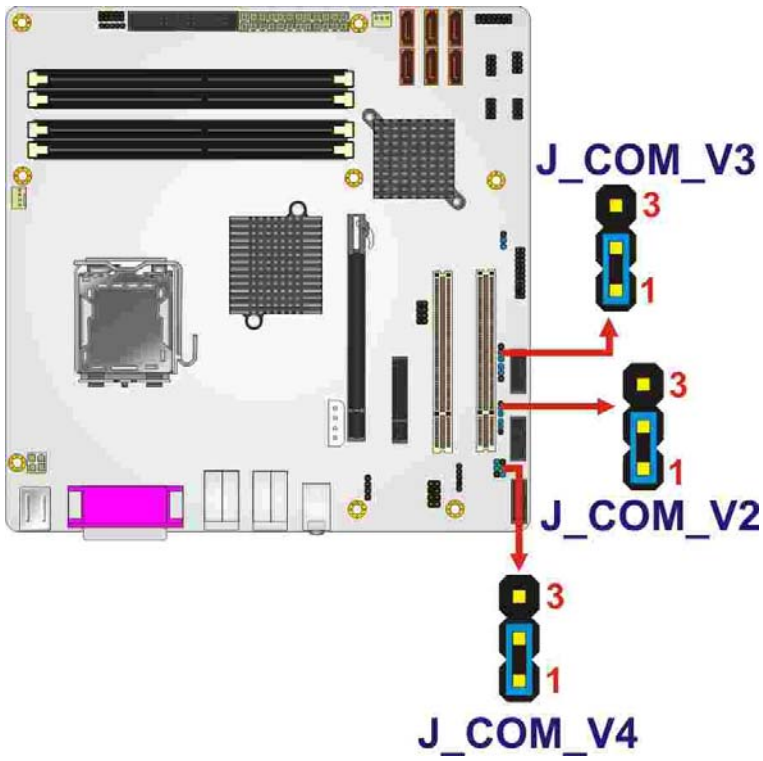


Figure 5-11: COM Port Pin 9 Voltage Setting Jumper Locations

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 2807940 must have air vents to allow cool air to move into the system and hot air to move out.

The 2807940 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.

5.6.2 Motherboard Installation

To install the 2807940 motherboard into the chassis please refer to the reference material that came with the chassis.

5.7 Internal Peripheral Device Connections

5.7.1 Peripheral Device Cables

The cables listed in **Table 5-5** are shipped with the 2807940.

Quantity	Type
1	Dual RS-232 cable
6	SATA drive cables
3	SATA drive power cables
1	USB cable

Table 5-5: GAI Provided Cables

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

- 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 Dual RS-232 Cable Connection

The dual RS-232 cable 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 bracket. To install the dual RS-232 cable, please follow the steps below.

Step 2: **Locate the connectors**. The locations of the RS-232 connectors are shown in **Chapter 3**.

Step 3: **Insert the cable connectors**. Insert one connector into each serial port box

headers. See **Figure 5-12**. A key on the front of the cable connectors ensures the connector can only be installed in one direction.

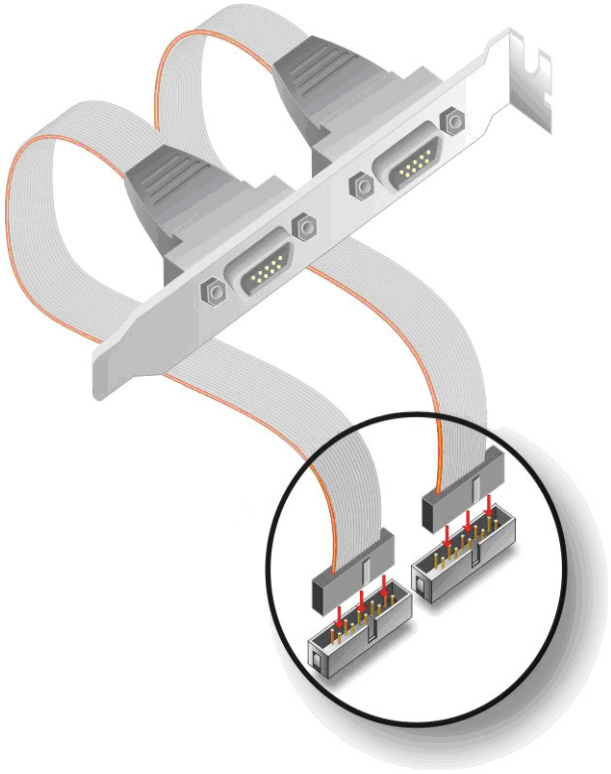


Figure 5-12: Dual RS-232 Cable Installation

Step 4: **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

5.7.3 SATA Drive Connection

The 2807940 is shipped with two SATA drive cables and one SATA drive power cable. 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 5-13**.

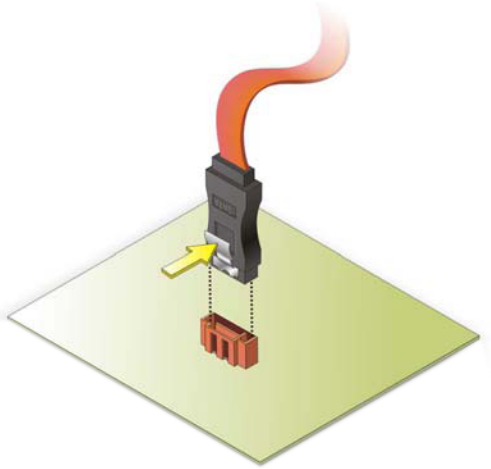


Figure 5-13: SATA Drive Cable Connection

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 5-14**.

Step 4: **Connect the SATA power cable**. Connect the SATA power connector to the back of the SATA drive. See **Figure 5-14**.

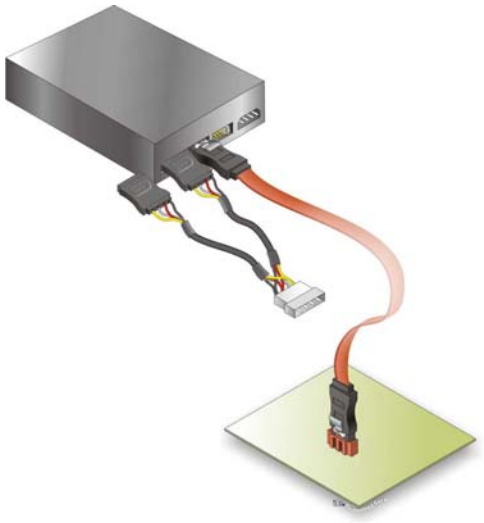


Figure 5-14: SATA Power Drive Connection

5.7.4 USB Cable (Dual Port)

The 2807940 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 1on each cable connector with pin 1 on the 2807940 USB connector.

Step 3: **Insert the cable connectors**. Once the cable connectors are properly aligned with the USB connectors on the 2807940, connect the cable connectors to the onboard connectors. See **Figure 5-15**.

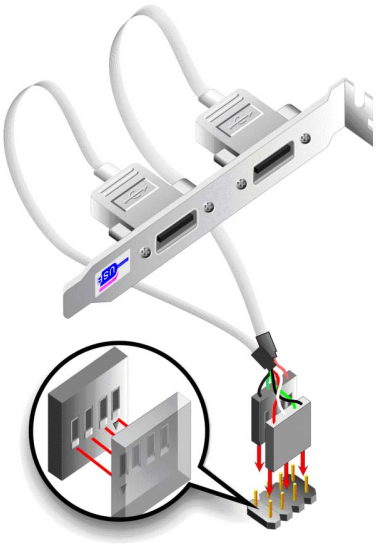


Figure 5-15: Dual USB Cable Connection

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.

5.7.5 PCIe x16 Expansion Card Installation

A PCIe x16 expansion card can be installed on the 2807940 using the PCIe x16 expansion slot. To install a PCIe expansion card into the PCIe socket, please follow the steps below and refer to **Figure 5-16**.

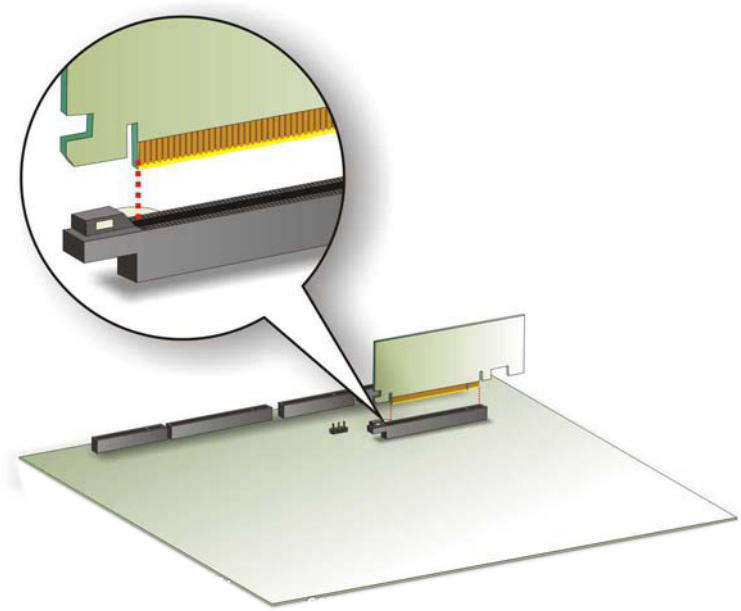


Figure 5-16: PCIe x16 Installation

Step 1: **Locate the PCIe x16 socket**. Place the 2807940 on an anti-static pad with the solder side facing up.

Step 2: **Align the PCIe x16 card with the socket**. The PCIe x16 card must be aligned so the notch on the PCIe x16 card aligns with the plastic bridge in the socket.

Step 3: **Insert the PCIe x16 card**. Push the PCIe x16 card into the socket, perpendicular to the 2807940.

Step 4: **Secure the PCI x16 card**. Push the PCIe x16 card down until the clip engages,

securing the card in place.

5.8 External Peripheral Interface Connection

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

- Audio devices
- RJ-45 Ethernet cable connectors
- Parallel port device
- Keyboard/mouse
- Serial port devices
- USB devices
- VGA monitors

To install these devices, connect the corresponding cable connector from the actual device to the corresponding 2807940 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 2807940.

Step 1: **Locate the audio phone jacks**. The locations 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 5-17**.

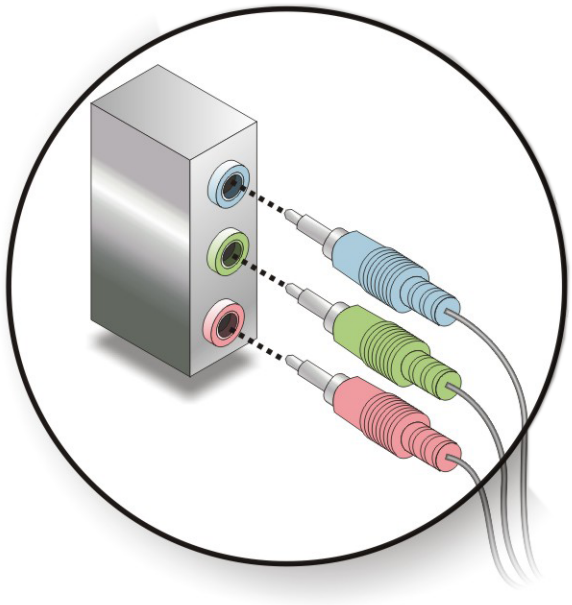


Figure 5-17: Audio Connectors

5.8.2 LAN Connection (Single Connector)

There are two external RJ-45 LAN connectors. 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 2807940. See **Figure 5-18**.

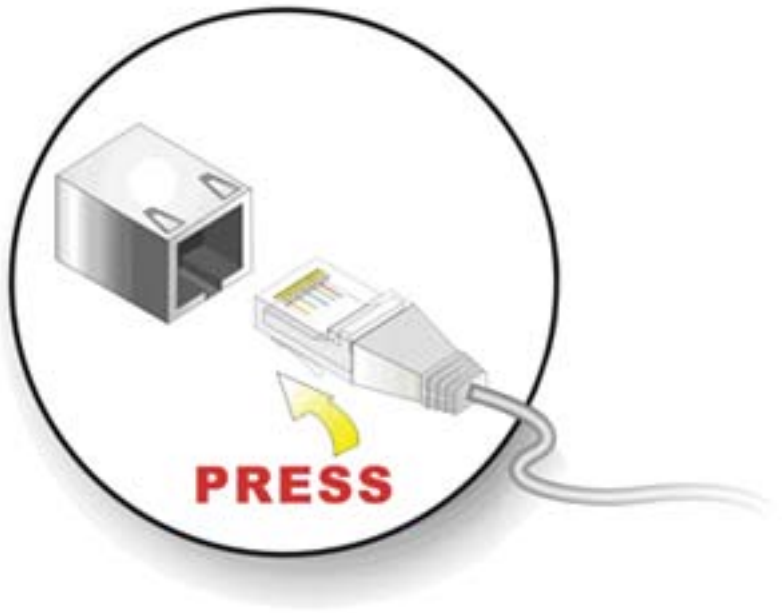


Figure 5-18: LAN Connection

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

The 2807940 has a single female DB-25 connector on the external peripheral interface panel for parallel devices. Follow the steps below to connect a parallel device to the 2807940.

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 5-19**.

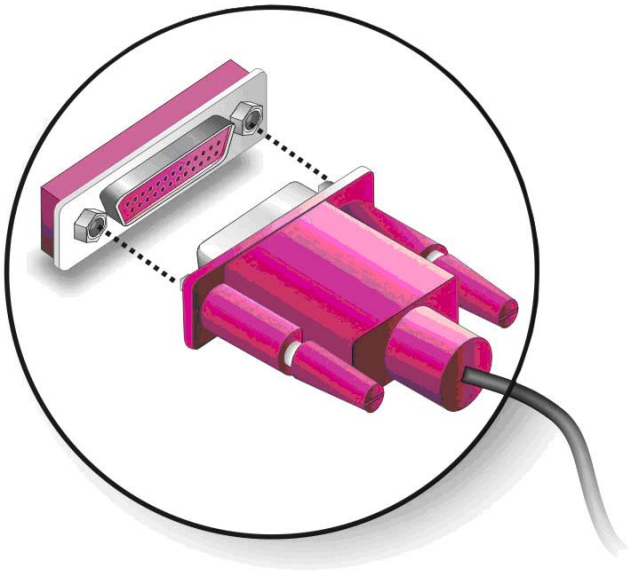


Figure 5-19: Parallel Device Connector

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 2807940 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 2807940.

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 5-20**.

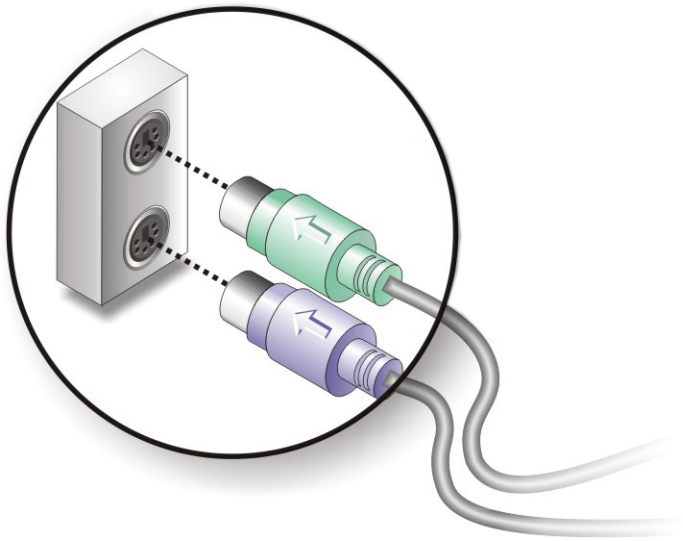


Figure 5-20: PS/2 Keyboard/Mouse Connector

5.8.5 Serial Device Connection

The 2807940 has a single male DB-9 connector on the external peripheral interface panel for a serial device. Follow the steps below to connect a serial device to the 2807940.

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 5-21**.

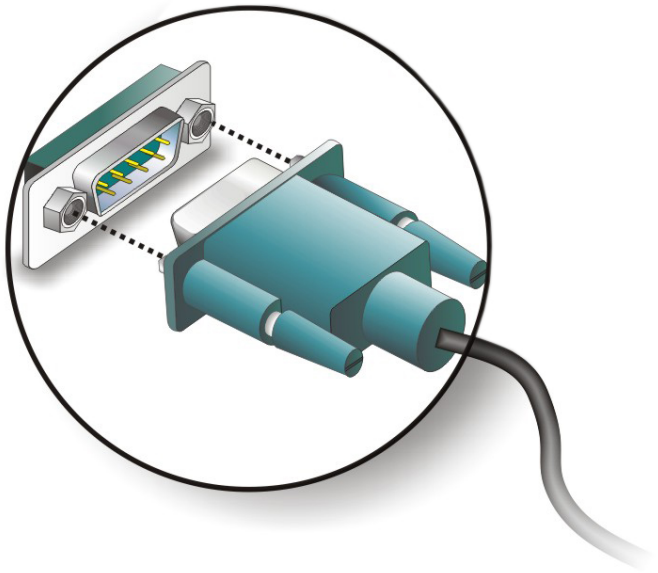


Figure 5-21: Serial Device Connector

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

5.8.6 USB Device Connection

There are two external USB 2.0 connectors. Both connectors are perpendicular to the 2807940. To connect a USB 2.0 or USB 1.1 device, please follow the instructions below.

Step 1: **Located the USB connectors**. The locations of the USB connectors are shown in **Chapter 4**.

Step 2: **Align the connectors.** Align the USB device connector with one of the connectors on the 2807940. See **Figure 5-22**.

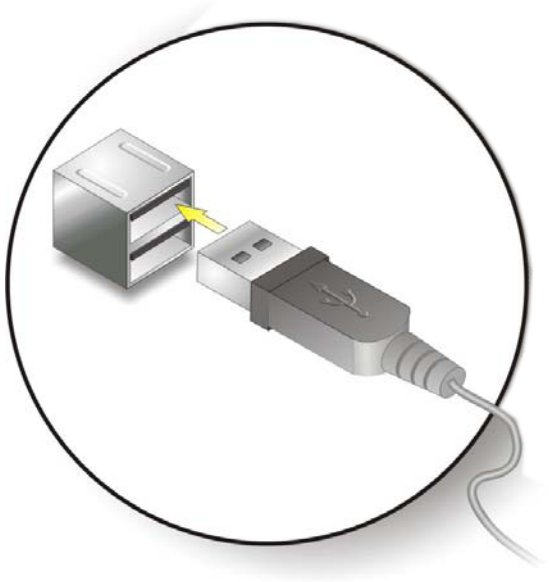


Figure 5-22: USB Device Connection

Step 3: **Insert the device connector.** Once aligned, gently insert the USB device connector into the onboard connector.

5.8.7 VGA Monitor Connection

The 2807940 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 2807940, 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 2807940. See **Figure 5-23**.

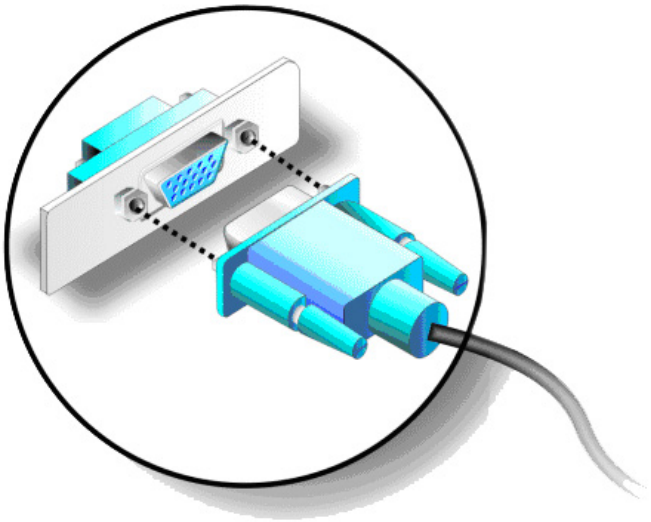


Figure 5-23: VGA Connector

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

8

Intel® AMT Configuration

6.1 Intel® AMT Setup Procedure

The 2807940 is featured with the Intel® Active Management Technology (AMT) 3.0. To enable the Intel® AMT function, follow the steps below.

Step 1: Make sure the **DIMM1** socket is installed with one DDR2 DIMM.

Step 2: Connect an Ethernet cable to the RJ-45 connector labeled **LAN2_USB23**.

Step 3: The AMI BIOS options regarding the Intel® ME or Intel® AMT must be enabled, including:

- Intel® AMT Configuration [Advanced] (see **Section** Error! Reference source not found.)
- ME Subsystem Configuration [Advanced] (see **Section** Error! Reference source not found.)

Step 4: Configure the Intel® Management Engine BIOS extension (MEBx) (see **Section 6.2** below)

Step 5: Properly install the Intel® AMT drives. Make sure to install both HECI and LMS_SOL drivers from the iAMT Driver & Utility directory in the driver CD (see **Section** Error! Reference source not found.).

Step 6: The following dialog window is displayed after the OS is loaded to show the Intel® AMT status on the 2807940 is enabled.

Figure 6-1: Intel® Active Management Technology Status Dialog

Step 1:

Step 2:

Step 3:

6.2 Intel® Management Engine BIOS Extension

This section describes the essential steps for using the Intel® Management Engine BIOS extension (MEBx).

Step 4: A screen prompts the user to press <Ctrl+P> after a single beep during boot-up process. To get into the Intel® MEBx settings, press <**Ctrl+P**>.

Step 5: Enter the Intel® current ME password as it requires (**Figure 6-2**). Enter the GAI factory ME password: **Abab12!@** (the Intel® default password is **admin**).

NOTE:

The default Intel® ME password is **admin**. The GAI has reset the password to **Abab12!@** in quality control process. After clearing the CMOS, the ME password bound to Intel® default password (admin). Use Intel® default password to enter the Intel® ME BIOS and change the password (refer to **Step 3** below) to be able to configure the Intel® AMT and ME options.

Figure 6-2: Intel® Current ME Password

Step 6: To change the password, select **Change Intel® ME Password**. Enter a new password following the strong password rule (containing at least one upper case letter, one lower case letter, one digit and one special character, and be at least eight characters). (**Figure 6-3**)

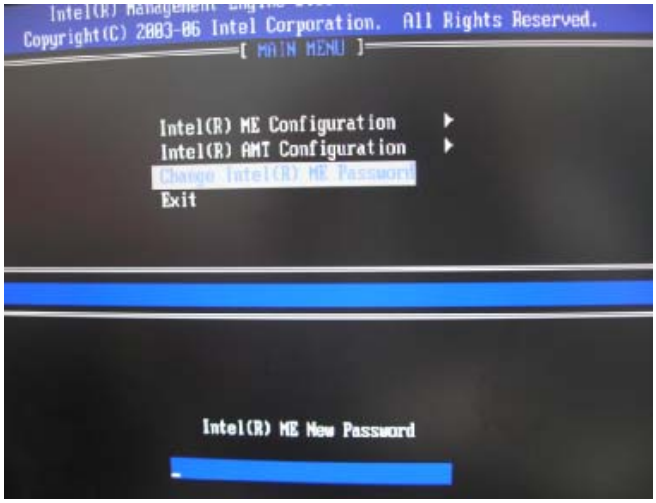


Figure 6-3: Change Intel® ME Password

Step 7: Verify the new password by entering again (Figure 6-4).

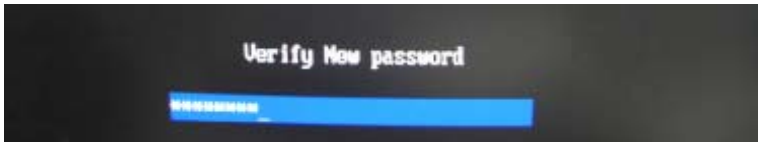


Figure 6-4: Verify New Password

Step 8: Select Intel® AMT Configuration and press Enter (Figure 6-5).

Figure 6-5: Intel® AMT Configuration

Step 9: Select Provision Model and press Enter. (Figure 6-6)

Figure 6-6: Provision Model

Step 10: When the screen in Figure 6-7 prompts, enter N and press Enter.

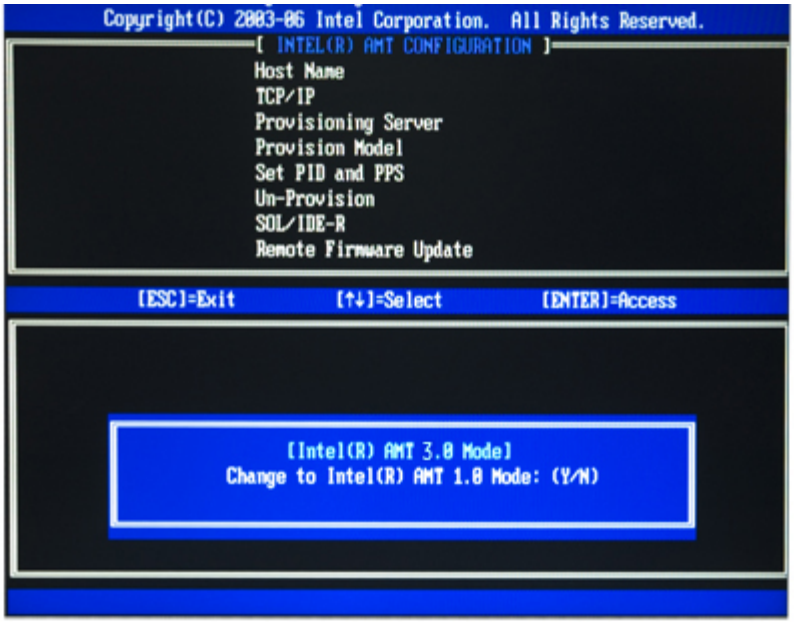


Figure 6-7: Intel® AMT 3.0 Mode

Step 11: A message prompts to confirm to Change to Small Business (**Figure 6-8**). Enter **Y** and press **Enter**.

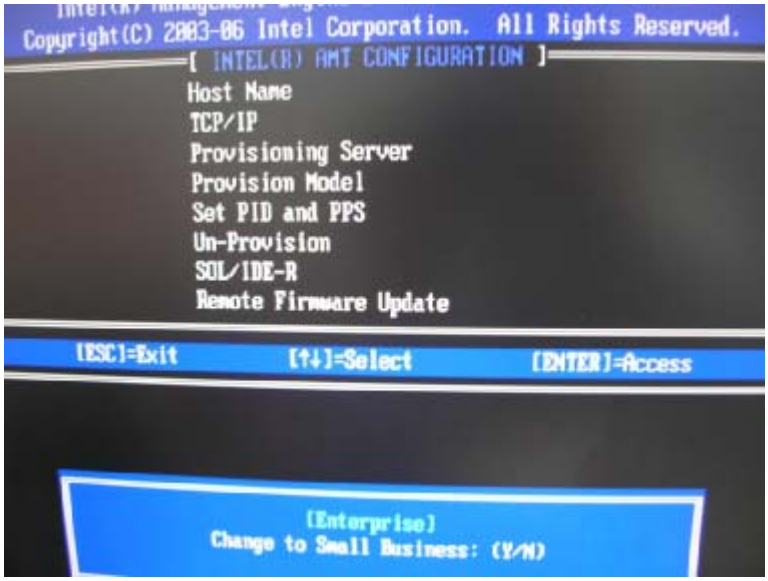


Figure 6-8: Enterprise

Step 12: Select TCP/IP (in Intel AMT Configuration) and press **Enter**. A message prompts

for disabling network interface. Enter **N** to enable network interface.

Figure 6-9: Enable Network Interface

Step 13:

Step 14: Enable or disable DHCP. DHCP is enabled by default. If DHCP is disabled, enter the following TCP/IP settings:

- Static TCP/IP address (the static TCP/IP address and Intel® AMI Host Name must be different from those configured in the operating system)
- Subnet mask
- Default Gateway address (optional)
- Preferred Domain Naming Services (DNS) serer address (optional)
- Alternate DNS server address (optional)
- Domain name (optional)

Step 15: Make other necessary settings in the Intel® MEBx depending on users' need.

Step 16: To exit the Intel® MEBx, return to the main menu and select **Exit**. (**Figure 6-10**)

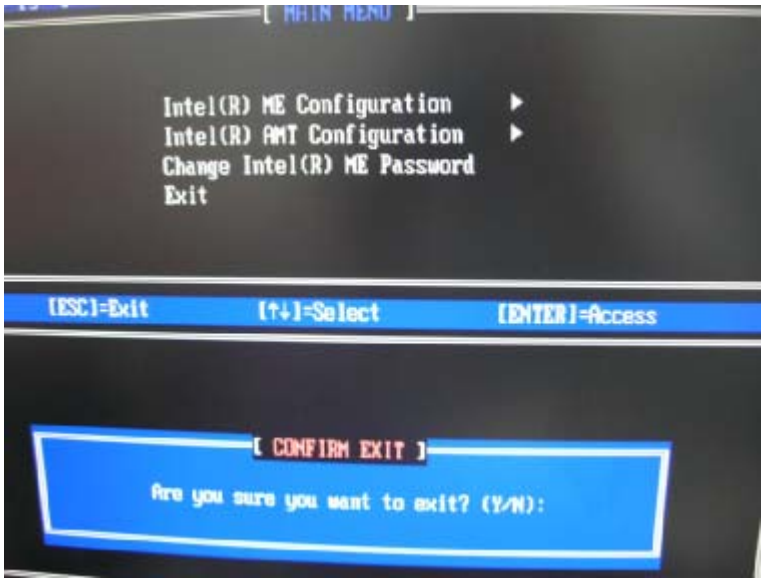


Figure 6-10: Exit

6.3 Using the Intel® AMT Web Interface

NOTE:

Prior to use the Intel® AMT web interface, please make sure the Intel® AMT drivers are properly installed in the 2807940 and the Intel® AMT enabled confirmation dialog window displays after boot-up.

To access an Intel® AMT client system from a remote console, follow the steps below.

Step 1: Obtain the IP address of the client system.

Step 2: On the remote management console, open a web browser.

Step 3: If DHCP is enabled in the TCP/IP menu of the Intel® ME BIOS (**Section 6.2**, **Step 10**), get the client system IP address in the MS DOS. Enter the client system IP address and the port number in the web browser:

http://*ip_address*:16992 Example: http://192.168.1.7:16992 (**Figure 6-11**)

Or simply enter the defined host name: http://*host_name*:16992

Example: http://AMTsystem:16992

Figure 6-11: Intel® AMT Web Address

Step 4: If a static IP address is defined for the Intel® AMT client system, enter the defined client system IP address and the port number in the web browser.

Step 5: A login window prompts (Figure 6-12).

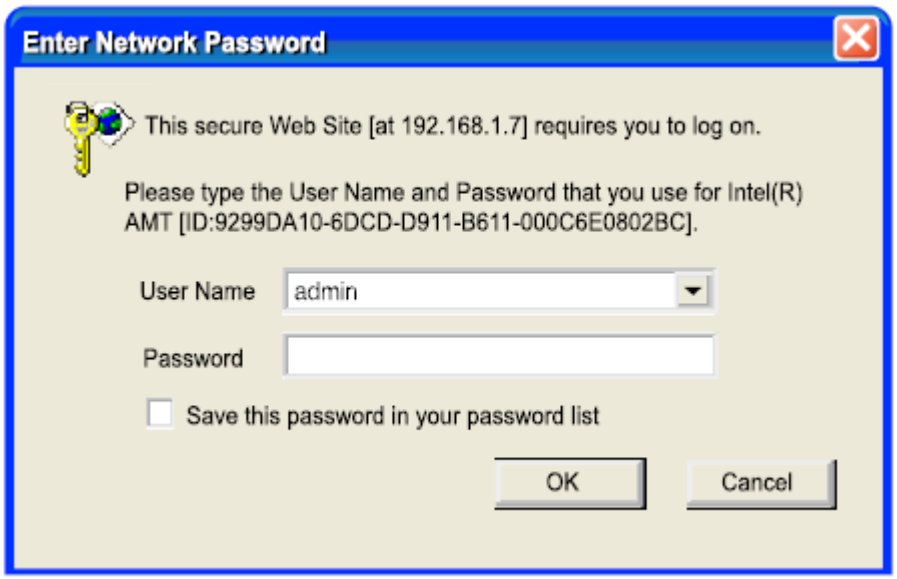


Figure 6-12: Intel® AMT Web Login Dialog

Step 6: Enter admin as the user name (Figure 6-12).

Step 7: Enter the password changed in the Intel® MEBx configuration (**Section 6.2**, **Step 3**). If the password remained as default, enter Abab12!@

Step 8: Press **OK** and the Intel® AMT web interface appears (**Figure 6-13**).

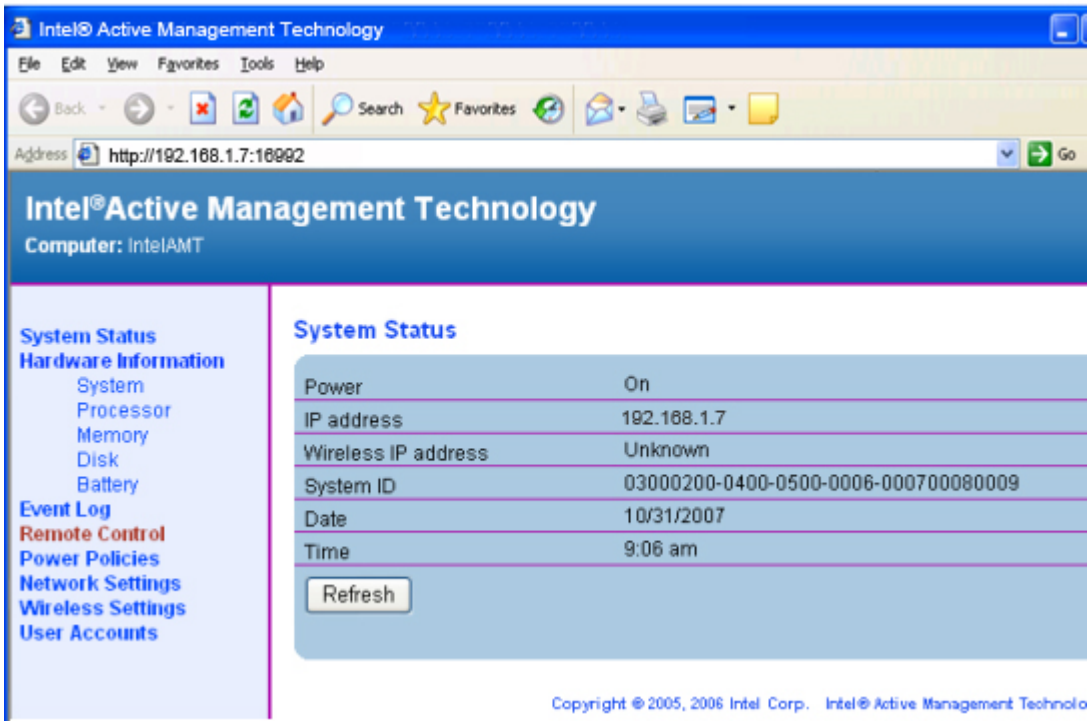


Figure 6-13: Intel® AMT Web Interface

Step 1:

NOTE:

To enhance the platform manageability of the 2807940, work with the Independent Software Vendors (ISV) to implement the Intel® AMT management utility on the system.

Step 2:

Appendix

A

Terminology

ACPI	Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.
AHCI	Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.
ATA	The Advanced Technology Attachment (ATA) interface connects storage devices including hard disks and CD-ROM drives to a computer.
APM	The Advanced Power Management (APM) application program interface (API) enables the inclusion of power management in the BIOS.
ARMD	An ATAPI Removable Media Device (ARMD) is any ATAPI device that supports removable media, besides CD and DVD drives.
ASKIR	Amplitude Shift Keyed Infrared (ASKIR) is a form of modulation that represents a digital signal by varying the amplitude (“volume”) of the signal. A low amplitude signal represents a binary 0, while a high amplitude signal represents a binary 1.
BIOS	The Basic Input/Output System (BIOS) is firmware that is first run when the computer is turned on and can be configured by the end user
CODEC	The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.
CMOS	Complimentary metal-oxide-conductor is an integrated circuit used in chips like static RAM and microprocessors.
COM	COM refers to serial ports. Serial ports offer serial communication to expansion devices. The serial port on a personal computer is usually a male DB-9 connector.
DAC	The Digital-to-Analog Converter (DAC) converts digital signals to analog signals.
DDR	Double Data Rate refers to a data bus transferring data on both the rising

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

L2 Cache	The Level 2 Cache (L2 Cache) is an external processor memory cache.
LCD	Liquid crystal display (LCD) is a flat, low-power display device that consists of two polarizing plates with a liquid crystal panel in between.
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.
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

B

DIO Interface

B.1 DIO Interface Introduction

The DIO connector on the 2807940 is interfaced to GPIO ports on the ITE IT8712F 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 IT8712F Super I/O chipset.

B.2 DIO Connector Pinouts

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

Pin	Description	Super I/O Pin	Super I/O Pin Description
1	Ground	N/A	N/A
2	VCC	N/A	N/A
3	Output 3	GP27	General purpose I/O port 2 bit 7.
4	Output 2	GP26	General purpose I/O port 2 bit 6.
5	Output 1	GP25	General purpose I/O port 2 bit 5.
6	Output 0	GP24	General purpose I/O port 2 bit 4.
7	Input 3	GP23	General purpose I/O port 2 bit 3.
8	Input 2	GP22	General purpose I/O port 2 bit 2
9	Input 1	GP21	General purpose I/O port 2 bit 1
10	Input 0	GP20	General purpose I/O port 2 bit 0

B.3 Assembly Language Samples

B.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
```

B.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

C

Watchdog Timer

NOTE:

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

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

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

INT 15H:

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

Table C-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

D

Address Mapping

D.1 Address Map

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

Table D-1: IO Address Map

D.2 1st MB Memory Address Map

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

Table D-2: 1st MB Memory Address Map

D.3 IRQ Mapping Table

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

Table D-3: IRQ Mapping Table

D.4 DMA Channel Assignments

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

Table D-4: IRQ Mapping Table

Appendix

E

Compatibility

NOTE:

The compatible items described here have been tested by the GAI R&D team and found to be compatible with the 2807940.

E.1 Compatible Operating Systems

The following operating systems have been successfully run on the 2807940.

- Microsoft Windows XP (SP2)
- Fedora Core 7

E.2 Compatible Processors

The following Intel® LGA775 processors have been successfully tested on the 2807940.

CPU	Model Number	Frequency	FSB
65nm Intel® Core™ 2 Duo	E6850	3.0 GHz	1333 MHz
65nm Intel® Core™ 2 Duo	E6750	2.66 GHz	1333 MHz

E.3 Compatible Memory Modules

NOTE:

The memory modules listed below have been tested on the 2807940 other memory modules that comply with the specifications may also work on the 2807940 but have not been tested.

The following memory modules have been successfully tested on the 2807940.

Manufacturer	Model No.	Capacity	Speed
Twinmos	8D25JK-TT	512 MB	800 MHz
UMAX	RMUMX-512DDR667C	512 MB	667 MHz

Appendix

F

Intel® Matrix Storage Manager

F.1 Introduction

The Intel® ICH9DO 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.

F.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.

F.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

F.3 Accessing the Intel® Matrix Storage Manager

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

Step 3: **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 4: **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 5: **Save and Exit BIOS**. After the **SATA** support option is enabled, save and exit the **BIOS**.

Step 6: **Reboot the system**. Reboot the system after saving and exiting the **BIOS**.

Step 7: **Press Ctrl+I**. During the system boot process, press **Ctrl+I** when prompted to enter the RAID configuration software.

Step 8: **Configure the RAID settings**. Use the Intel® Matrix Storage Manager to configure the RAID array. Brief descriptions of configuration options are given below.

Step 9: **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.

F.4 RAID Configuration

F.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 F-1.

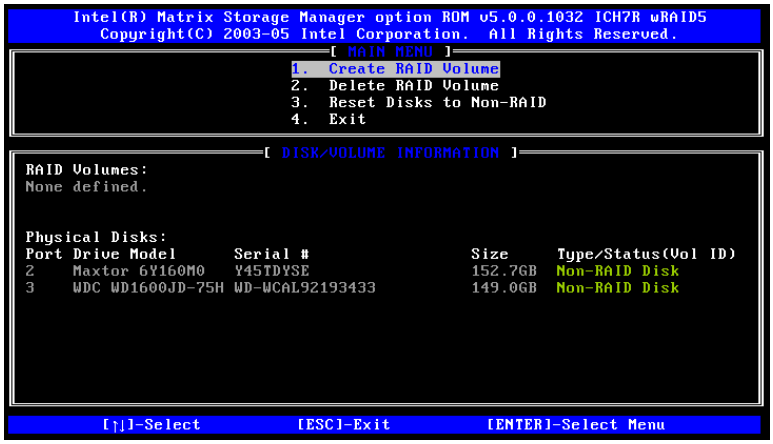


Figure F-1: Matrix Storage Manager Main Menu

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 F-2**.

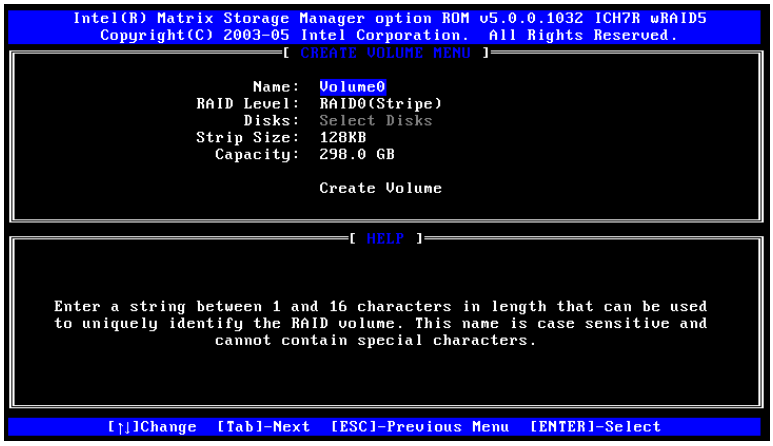


Figure F-2: Create RAID Volume Name

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

NOTE:

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

RAID5 level requires a minimum of three hard drives.

RAID10 level requires a minimum of four hard drives.

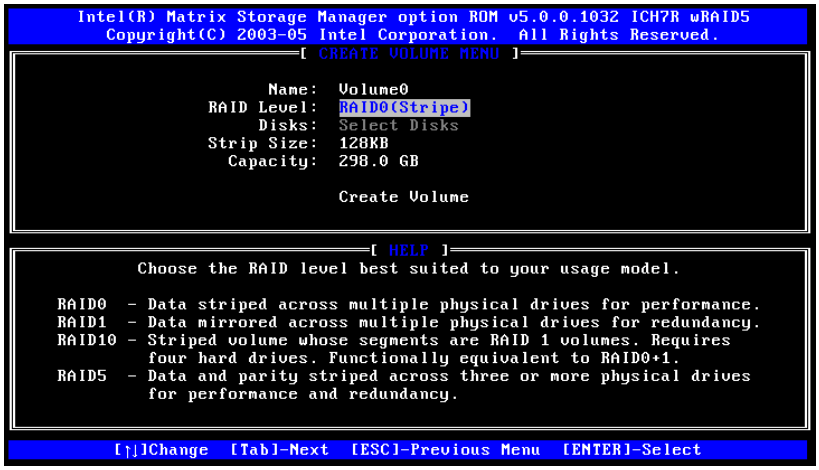


Figure F-3: Choose the Raid Level

Step 4: Select the Stripe Size. Select a stripe size from the list. See Figure F-4.

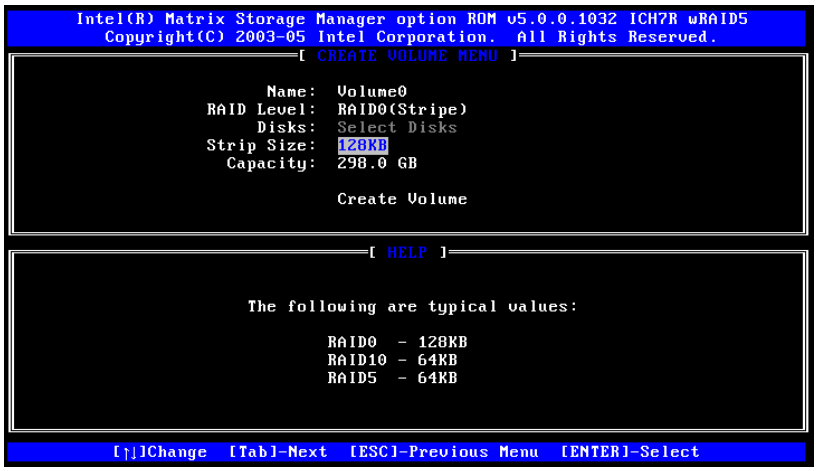


Figure F-4: Select the Stripe Size

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

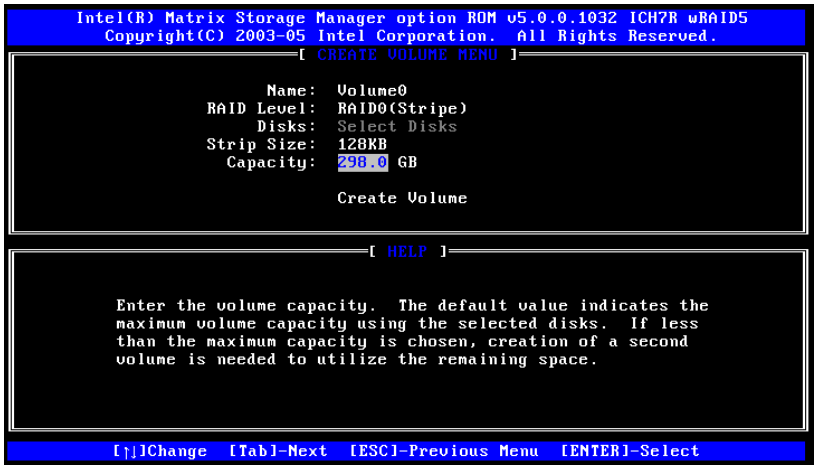


Figure F-5: Enter the Volume Capacity

Step 6: Create the RAID Volume. Press ENTER to create the RAID volume as specified. See Figure F-6.

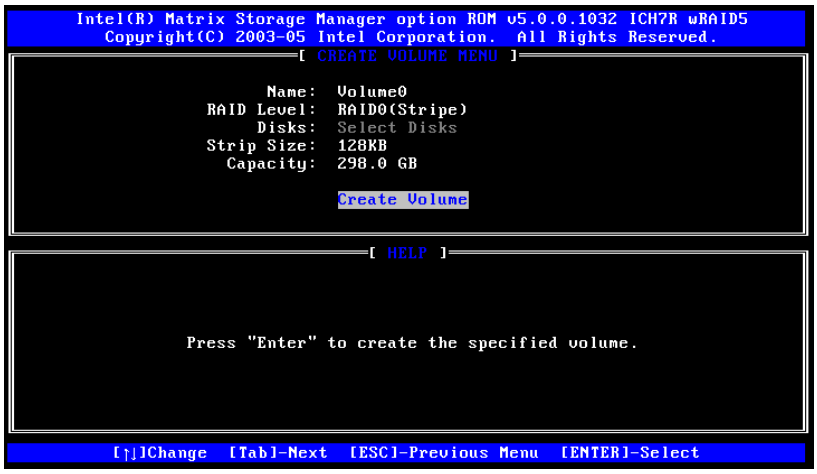


Figure F-6: Create the RAID Volume

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 F-7**.

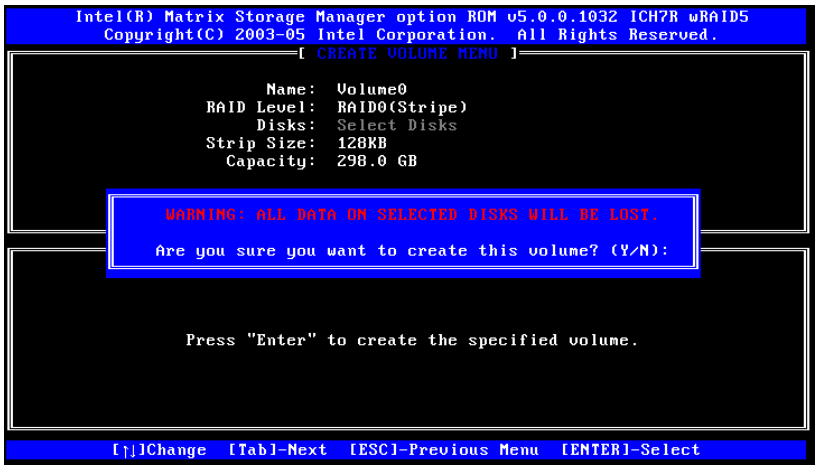


Figure F-7: Create RAID Volume Verification

F.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 F-8.

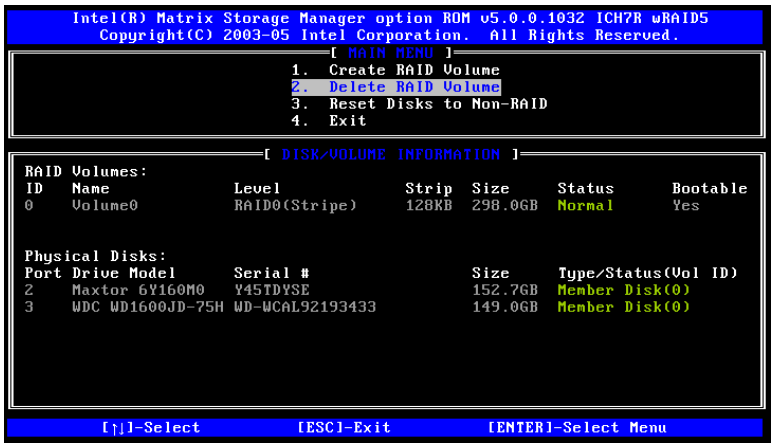


Figure F-8: Delete RAID Volume Menu

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 F-9.

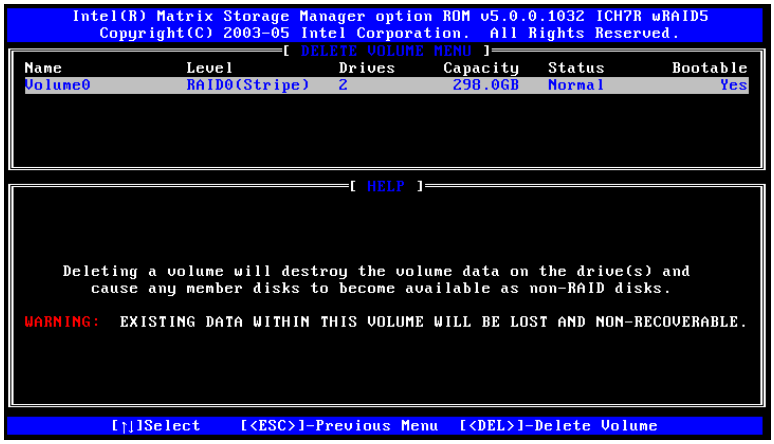


Figure F-9: Select RAID Volume to be Deleted

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 F-10**.

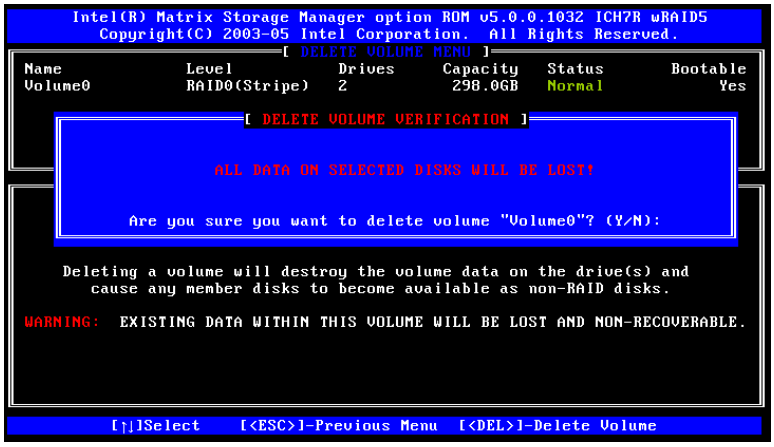


Figure F-10: Delete Volume Verification

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 F-11**.

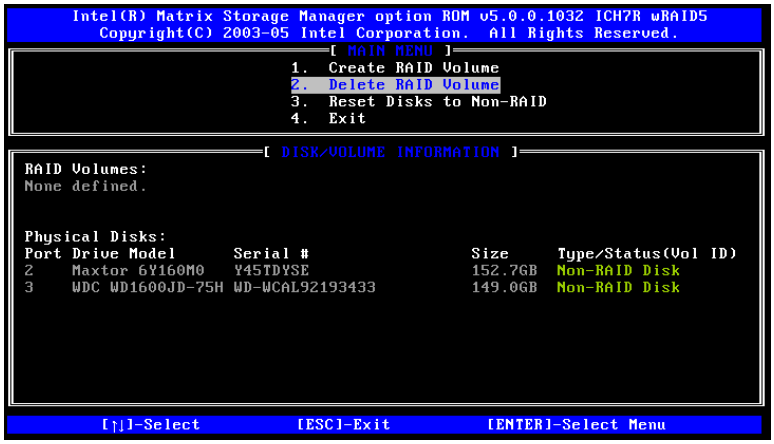


Figure F-11: Non-RAID Disks

F.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 F-12.

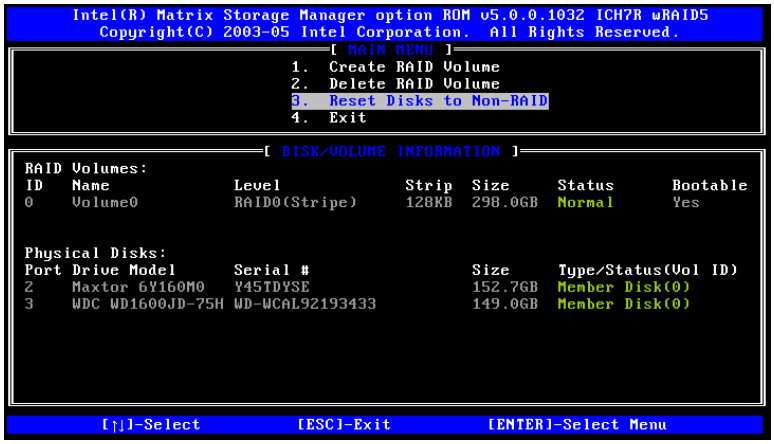


Figure F-12: Reset Disk to Non-RAID Menu

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 F-13**.

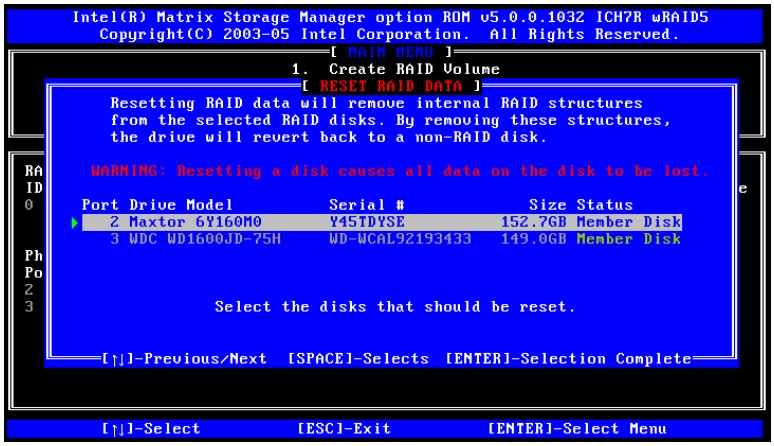


Figure F-13: Select Disk to Reset

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 F-14**.

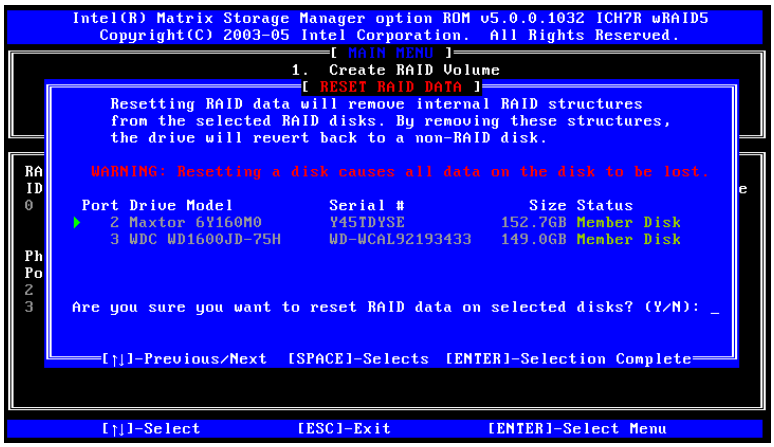


Figure F-14: Reset Disk Verification

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 F-15**.

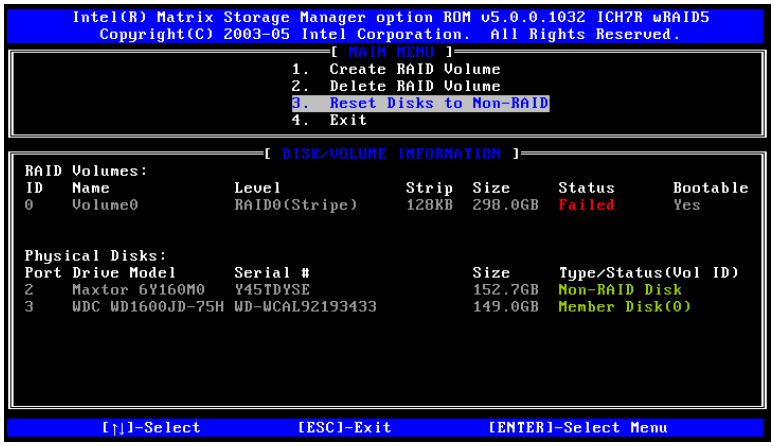


Figure F-15: Disk Drive and RAID Volume Status

F.4.4 Exiting the Matrix Storage Manager

Step 1: Select “Exit.” Use the arrow keys to highlight Exit and press ENTER.

See Figure F-16.

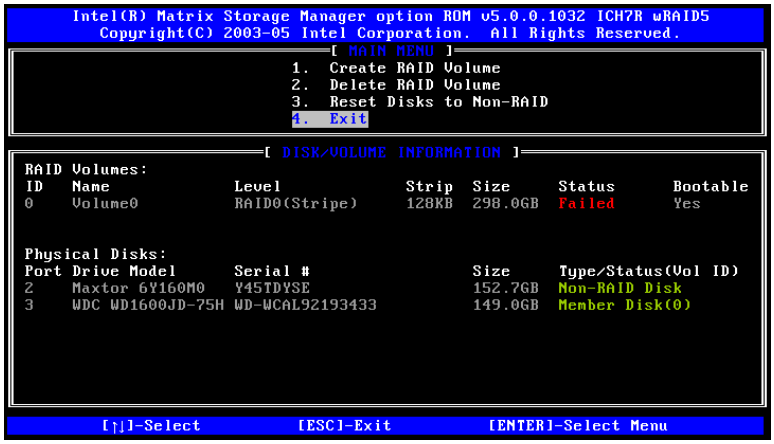


Figure F-16: Exit Menu

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

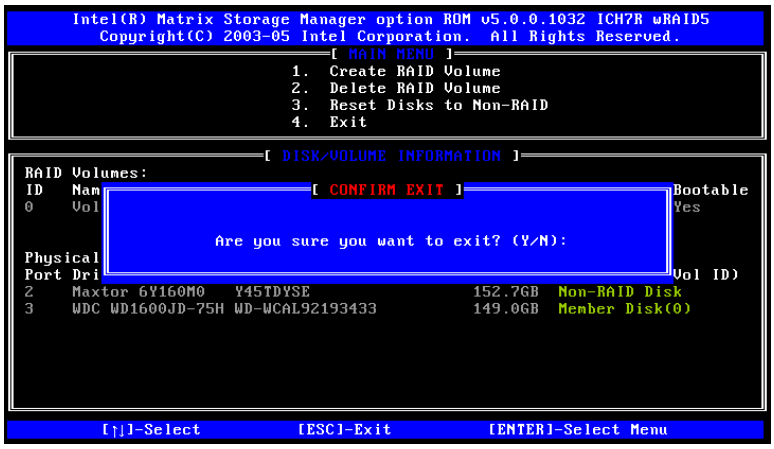


Figure F-17: Exit Verification

Appendix

G

Hazardous Materials Disclosure

G.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.

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

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

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

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Any advice or comments about our products and service, or anything we can help you with please don't hesitate to contact with us. We will do our best to support your products, projects and business.

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