



integration with integrity

User's Manual

PICMG 1.0 SBC with LGA 775 Socket 3308150

Version 1.0, April 2008

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# Revision

Date	Version	Changes
2008-04	1.00	Initial release

# Manual Conventions



## **WARNING!**

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

---



## **WARNING:**

This is an example of a warning message. Failure to adhere to warning messages may result in permanent damage to the 3308150 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 3308150. 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 3308150. 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 3308150. Please take note messages seriously.

---

# Packing List

---



**NOTE:**

If any of the components listed in the checklist below are missing, please do not proceed with the installation. Contact GAI or vendor you purchased the 3308150 from or contact a GAI sales representative directly. To contact a GAI sales representative, please send an email to

---

The items listed below should all be included in the 3308150 package.

- 1 x 3308150 single board computer
- 3 x SATA power cables
- 6 x SATA cables
- 1 x Dual RS-232 cable
- 1 x KB/MS Y cable
- 1 x USB cable
- 1 x Mini jumper pack
- 1 x Utility CD
- 1 x QIG (quick installation guide)

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

# Table of Contents

<b>1</b>	<b>INTRODUCTION.....</b>	<b>1</b>
1.1	OVERVIEW.....	2
1.1.1	<i>3308150 Features .....</i>	<i>2</i>
1.2	3308150 OVERVIEW.....	3
1.2.1	<i>3308150 Overview Photo.....</i>	<i>3</i>
1.2.2	<i>3308150 Peripheral Connectors and Jumpers .....</i>	<i>3</i>
1.2.3	<i>Technical Specifications.....</i>	<i>4</i>
<b>2</b>	<b>DETAILED SPECIFICATIONS .....</b>	<b>7</b>
2.1	DIMENSIONS.....	8
2.1.1	<i>Board Dimensions.....</i>	<i>8</i>
2.1.2	<i>External Interface Panel Dimensions .....</i>	<i>9</i>
2.2	DATA FLOW .....	10
2.3	COMPATIBLE PROCESSORS .....	11
2.3.1	<i>Supported Processors Overview .....</i>	<i>11</i>
2.3.2	<i>Supported Intel® Core™2 Quad (Yorkfield) Processors .....</i>	<i>11</i>
2.3.3	<i>Supported Intel® Core™2 Duo (Wolfdale) Processors.....</i>	<i>11</i>
2.3.4	<i>Supported Intel® Core™2 Duo (Conroe) Processors.....</i>	<i>12</i>
2.3.5	<i>Supported Intel® Celeron® (Conroe) Processors.....</i>	<i>12</i>
2.4	INTEL® Q35 NORTHBRIDGE CHIPSET.....	13
2.4.1	<i>Intel® Q35 Northbridge Chipset .....</i>	<i>13</i>
2.4.2	<i>Intel® Q35 Front Side Bus (FSB) Support .....</i>	<i>13</i>
2.4.3	<i>Intel® Q35 Memory Controller .....</i>	<i>14</i>
2.4.4	<i>Intel® Q35 Analog Display Capability .....</i>	<i>15</i>
2.4.5	<i>Intel® Q35 Direct Media Interface (DMI) .....</i>	<i>15</i>
2.5	INTEL® ICH9R SOUTHBRIDGE CHIPSET .....	16
2.5.1	<i>Intel® ICH9R Overview.....</i>	<i>16</i>
2.5.2	<i>Intel® ICH9R High Definition Audio Implementation .....</i>	<i>17</i>
2.5.3	<i>Intel® ICH9R Real Time Clock .....</i>	<i>18</i>
2.5.4	<i>Intel® ICH9R SATA Controller.....</i>	<i>18</i>
2.5.5	<i>Intel® ICH9R PCI Interface.....</i>	<i>19</i>

2.5.6 Intel® ICH9R ISA Interface.....	19
2.5.7 Intel® ICH9R Serial Peripheral Interface (SPI) BIOS .....	19
2.5.8 Intel® ICH9R USB Controller.....	20
2.5.8.1 Intel® ICH9R USB Controller Overview.....	20
2.5.8.2 3308150 USB Implementation .....	20
2.6 PCI BUS COMPONENTS .....	20
2.6.1 PCI Bus Overview.....	20
2.6.2 PCI Interface Golden Finger.....	21
2.6.3 Winbond PCI-to-ISA Bridge Interface .....	21
2.7 LPC BUS COMPONENTS .....	22
2.7.1 LPC Bus Overview.....	22
2.7.2 TPM Module .....	22
2.7.3 Super I/O chipset.....	23
2.7.3.1 Super I/O LPC Interface .....	24
2.7.3.2 Super I/O 16C550 UARTs .....	24
2.7.3.3 Super I/O Enhanced Hardware Monitor .....	24
2.7.3.4 Super I/O Floppy Disk Drive (FDD) Controller.....	24
2.7.3.5 Super I/O Fan Speed Controller.....	25
2.7.3.6 Super I/O Keyboard/Mouse Controller.....	25
2.7.3.7 Super I/O GPIO Ports .....	25
2.7.3.8 Super I/O Infrared.....	25
2.7.3.9 Super I/O Parallel Port .....	26
2.7.3.10 Super I/O Watchdog Timer .....	26
2.8 ENVIRONMENTAL AND POWER SPECIFICATIONS .....	26
2.8.1 System Monitoring .....	26
2.8.2 Operating Temperature and Temperature Control.....	27
2.8.3 Power Consumption.....	27
<b>3 UNPACKING .....</b>	<b>28</b>
3.1 ANTI-STATIC PRECAUTIONS .....	29
3.2 UNPACKING.....	29
3.2.1 Unpacking Precautions.....	29
3.3 UNPACKING CHECKLIST .....	30
3.3.1 Package Contents.....	30
3.4 OPTIONAL ITEMS .....	31

<b>4</b>	<b>CONNECTOR PINOUTS.....</b>	<b>33</b>
4.1	PERIPHERAL INTERFACE CONNECTORS.....	34
4.1.1	<i>3308150 Layout</i> .....	34
4.1.2	<i>Peripheral Interface Connectors</i> .....	34
4.1.3	<i>External Interface Panel Connectors</i> .....	36
4.2	INTERNAL PERIPHERAL CONNECTORS .....	36
4.2.1	<i>Audio Connector</i> .....	36
4.2.2	<i>CPU Power Connector</i> .....	37
4.2.3	<i>Digital Input/Output (DIO) Connector</i> .....	39
4.2.4	<i>Fan Connector, CPU (12V, 4-pin)</i> .....	40
4.2.5	<i>Floppy Disk Connector (34-pin)</i> .....	41
4.2.6	<i>Front Panel Connector</i> .....	42
4.2.7	<i>Infrared Interface Connector</i> .....	44
4.2.8	<i>IDE Connector (40-pin)</i> .....	45
4.2.9	<i>Keyboard Connector</i> .....	47
4.2.10	<i>Parallel Port Connector</i> .....	48
4.2.11	<i>SATA Drive Connectors</i> .....	49
4.2.12	<i>Serial Port Connector (COM 1 and COM2)</i> .....	51
4.2.13	<i>Trusted Platform Module (TPM) Connector</i> .....	52
4.2.14	<i>USB Connectors (Internal)</i> .....	53
4.3	EXTERNAL PERIPHERAL INTERFACE CONNECTOR PANEL .....	54
4.3.1	<i>Keyboard/Mouse Connector</i> .....	55
4.3.2	<i>LAN and Dual USB Combo Connectors</i> .....	56
4.3.3	<i>USB Connector</i> .....	57
4.3.4	<i>VGA Connector</i> .....	57
<b>5</b>	<b>INSTALLATION .....</b>	<b>59</b>
5.1	ANTI-STATIC PRECAUTIONS .....	60
5.2	INSTALLATION CONSIDERATIONS.....	61
5.2.1	<i>Installation Notices</i> .....	61
5.2.2	<i>Installation Checklist</i> .....	62
5.3	UNPACKING.....	63
5.3.1	<i>Unpacking Precautions</i> .....	63
5.4	CPU, CPU COOLING KIT AND DIMM INSTALLATION .....	63
5.4.1	<i>Socket LGA775 CPU Installation</i> .....	64

5.4.2	<i>Socket LGA775 2107695 Cooling Kit Installation</i>	67
5.4.3	<i>DIMM Installation</i>	69
5.4.3.1	<i>DIMM Purchasing Guidelines</i>	70
5.4.3.2	<i>DIMM Installation Order</i>	70
5.4.3.3	<i>DIMM Installation Guidelines</i>	71
5.5	<b>JUMPER SETTINGS</b>	72
5.5.1	<i>Clear CMOS Jumper</i>	73
5.6	<b>CHASSIS INSTALLATION</b>	74
5.6.1	<i>Airflow</i>	74
5.6.2	<i>CPU Card Installation</i>	75
5.7	<b>INTERNAL PERIPHERAL DEVICE CONNECTIONS</b>	75
5.7.1	<i>Peripheral Device Cables</i>	75
5.7.2	<i>Dual RS-232 Cable Connection</i>	76
5.7.3	<i>SATA Drive Connection</i>	77
5.7.4	<i>USB Cable (Dual Port)</i>	78
5.7.5	<i>7.1 Channel Audio Kit Installation</i>	79
5.8	<b>EXTERNAL PERIPHERAL INTERFACE CONNECTION</b>	81
5.8.1	<i>LAN Connection (Single Connector)</i>	81
5.8.2	<i>PS/2 Keyboard and Mouse Connection</i>	82
5.8.3	<i>USB Device Connection</i>	83
5.8.4	<i>VGA Monitor Connection</i>	84
<b>A</b>	<b>TERMINOLOGY</b>	<b>86</b>
<b>B</b>	<b>DIO INTERFACE</b>	<b>91</b>
B.1	<b>DIO INTERFACE INTRODUCTION</b>	92
B.2	<b>DIO CONNECTOR PINOUTS</b>	92
B.3	<b>ASSEMBLY LANGUAGE SAMPLES</b>	93
B.3.1	<i>Enable the DIO Input Function</i>	93
B.3.2	<i>Enable the DIO Output Function</i>	93
<b>C</b>	<b>WATCHDOG TIMER</b>	<b>94</b>
<b>D</b>	<b>ADDRESS MAPPING</b>	<b>97</b>
D.1	<b>ADDRESS MAP</b>	98
D.2	<b>1ST MB MEMORY ADDRESS MAP</b>	98
D.3	<b>IRQ MAPPING TABLE</b>	99

D.4 DMA CHANNEL ASSIGNMENTS .....	99
<b>E COMPATIBILITY .....</b>	<b>100</b>
E.1 COMPATIBLE OPERATING SYSTEMS.....	101
E.2 COMPATIBLE PROCESSORS .....	101
E.3 COMPATIBLE MEMORY MODULES .....	102
<b>F INTEL® MATRIX STORAGE MANAGER .....</b>	<b>103</b>
F.1 INTRODUCTION.....	104
<i>F.1.1 Precautions .....</i>	<i>104</i>
F.2 FEATURES AND BENEFITS .....	105
F.3 ACCESSING THE INTEL® MATRIX STORAGE MANAGER.....	105
F.4 RAID CONFIGURATION .....	106
<i>F.4.1 Creating a RAID Volume.....</i>	<i>106</i>
<i>F.4.2 Deleting a RAID Volume .....</i>	<i>111</i>
<i>F.4.3 Resetting a Disk to Non-RAID .....</i>	<i>113</i>
<i>F.4.4 Exiting the Matrix Storage Manager .....</i>	<i>115</i>
<b>G HAZARDOUS MATERIALS DISCLOSURE .....</b>	<b>117</b>
G.1 HAZARDOUS MATERIAL DISCLOSURE TABLE FOR IPB PRODUCTS CERTIFIED AS ROHS COMPLIANT UNDER 2002/95/EC WITHOUT MERCURY .....	118
<b>H INDEX.....</b>	<b>120</b>

# List of Figures

Figure 1-1: 3308150 PICMG 1.0 CPU Card .....	2
Figure 1-2: 3308150 Overview [Front View] .....	3
Figure 2-1: 3308150 Dimensions (mm).....	8
Figure 2-2: External Interface Panel Dimensions (mm).....	9
Figure 2-3: Data Flow Block Diagram.....	10
Figure 2-4: Front Side Bus (FSB).....	13
Figure 2-5: DDR2 DIMM Sockets.....	14
Figure 2-6: VGA Connector .....	15
Figure 2-7: DMI Chip-to-Chip Connection.....	16
Figure 2-8: SATA Drive Connectors .....	19
Figure 2-9: Onboard USB Implementation.....	20
Figure 2-10: PCI Slots .....	21
Figure 2-11: PCI-to-ISA Bridge and ISA Slot Connector .....	22
Figure 2-12: TPM Connector.....	22
Figure 2-13: ITE IT8718F Super I/O .....	23
Figure 4-1: Connector and Jumper Locations.....	34
Figure 4-2: Audio Connector Pinouts (4-pin).....	37
Figure 4-3: CPU Power Connector Location.....	38
Figure 4-4: DIO Connector Location.....	39
Figure 4-5: +12V Fan Connector Location .....	40
Figure 4-6: 34-pin FDD Connector Location.....	41
Figure 4-7: Front Panel Connector Pinout Locations (14-pin).....	43
Figure 4-8: Infrared Connector Location.....	44
Figure 4-9: IDE Device Connector Locations .....	46
Figure 4-10: Keyboard Connector Location .....	48
Figure 4-11: Parallel Port Connector Location .....	49
Figure 4-12: SATA Drive Connector Locations .....	50



Figure 4-13: Serial Connector Location .....	51
Figure 4-14: TPM Connector Location .....	52
Figure 4-15: USB Connector Locations .....	54
Figure 4-16: 3308150 External Peripheral Interface Connector .....	55
Figure 4-17: PS/2 Pinouts .....	55
Figure 4-18: RJ-45 Ethernet Connector.....	56
Figure 4-19: VGA Connector .....	58
Figure 5-1: Intel® LGA775 Socket.....	64
Figure 5-2: Remove the CPU Socket Protective Shield.....	65
Figure 5-3: Open the CPU Socket Load Plate.....	66
Figure 5-4: Insert the Socket LGA775 CPU.....	67
Figure 5-5: GAI 2107695 Cooling Kit .....	68
Figure 5-6: Securing the Heat sink to the PCB Board .....	69
Figure 5-7: DDR2 Channels .....	70
Figure 5-8: Installing a DIMM.....	72
Figure 5-9: Clear CMOS Jumper .....	74
Figure 5-10: Dual RS-232 Cable Installation .....	76
Figure 5-11: SATA Drive Cable Connection.....	77
Figure 5-12: SATA Power Drive Connection.....	78
Figure 5-13: Dual USB Cable Connection .....	79
Figure 5-14: 7.1 Channel Audio Kit.....	80
Figure 5-15: LAN Connection .....	82
Figure 5-16: PS/2 Keyboard/Mouse Connector .....	83
Figure 5-17: USB Device Connection .....	84
Figure 5-18: VGA Connector .....	85

# List of Tables

Table 1-1: Technical Specifications.....	6
Table 2-1: Supported Intel® Core™2 Quad (Yorkfield) Processors.....	11
Table 2-2: Supported Intel® Core™2 Quad (Yorkfield) Processors.....	11
Table 2-3: Supported Intel® Core™2 Duo (Conroe) Processors.....	12
Table 2-4: Supported Intel® Celeron® Processors.....	12
Table 2-5: Power Consumption.....	27
Table 3-1: Package List Contents.....	31
Table 3-2: Package List Contents.....	32
Table 4-1: Peripheral Interface Connectors.....	36
Table 4-2: Rear Panel Connectors.....	36
Table 4-3: Audio Connector Pinouts.....	37
Table 4-4: CPU Power Connector Pinouts.....	38
Table 4-5: DIO Connector Pinouts.....	40
Table 4-6: +12V Fan Connector Pinouts.....	41
Table 4-7: 34-pin FDD Connector Pinouts.....	42
Table 4-8: Front Panel Connector Pinouts (14-pin).....	43
Table 4-9: Infrared Connector Pinouts.....	44
Table 4-10: IDE Connector Pinouts.....	47
Table 4-11: Keyboard Connector Pinouts.....	48
Table 4-12: Parallel Port Connector Pinouts.....	49
Table 4-13: SATA Drive Connector Pinouts.....	50
Table 4-14: Serial Connector Pinouts.....	52
Table 4-15: TPM Connector Pinouts.....	53
Table 4-16: USB Port Connector Pinouts.....	54
Table 4-17: PS/2 Connector Pinouts.....	56
Table 4-18: LAN Pinouts.....	56
Table 4-19: RJ-45 Ethernet Connector LEDs.....	57

<b>Table 4-20: USB Port Pinouts.....</b>	<b>57</b>
<b>Table 4-21: VGA Connector Pinouts.....</b>	<b>58</b>
<b>Table 5-1: Jumpers.....</b>	<b>73</b>
<b>Table 5-2: Clear CMOS Jumper Settings.....</b>	<b>74</b>
<b>Table 5-3: GAI Provided Cables .....</b>	<b>75</b>

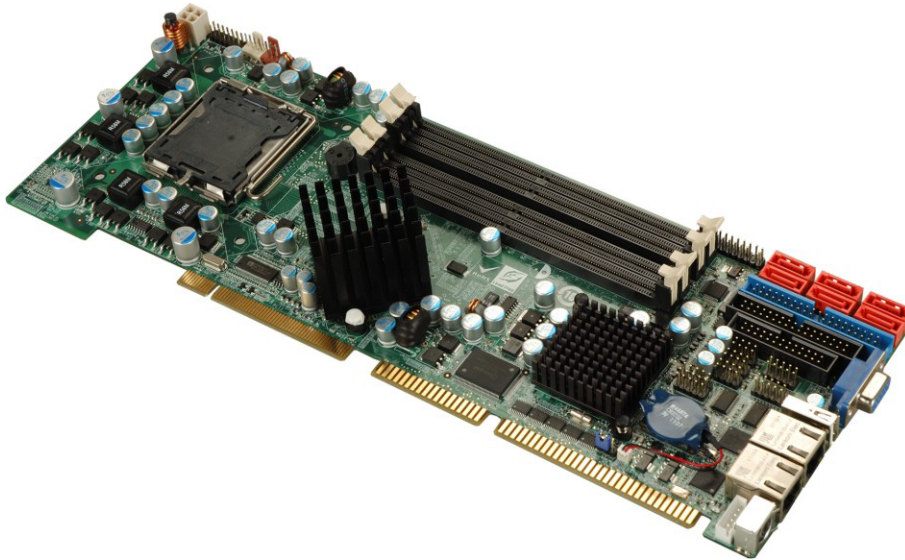


Chapter

1

# Introduction

## 1.1 Overview



**Figure 1-1: 3308150 PICMG 1.0 CPU Card**

The 3308150 also comes with dual PCI Express (PCIe) Gigabit Ethernet (GbE) and has flexible storage options including support for six second-generation serial ATA (SATA) with SATA RAID configuration, two IDE HDD and a floppy disk drive (FDD). The 3308150 provides additional connectivity for one parallel, two RS-232 serial and up to seven USB 2.0 devices. Support for a (optional) trusted platform module (TPM) provides additional system security during system boot-up.

### 1.1.1 3308150 Features

Some of the 3308150 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
- Seven USB 2.0 devices supported (six onboard and one on the rear panel)
- Dual GbE Ethernet connectors

- PICMG 1.0 form factor
- RoHS compliant
- Supports ATX power supplies

## 1.2 3308150 Overview

### 1.2.1 3308150 Overview Photo

The 3308150 has a wide variety of peripheral interface connectors. **Figure 1-2** is a labeled photo of the peripheral interface connectors on the 3308150.

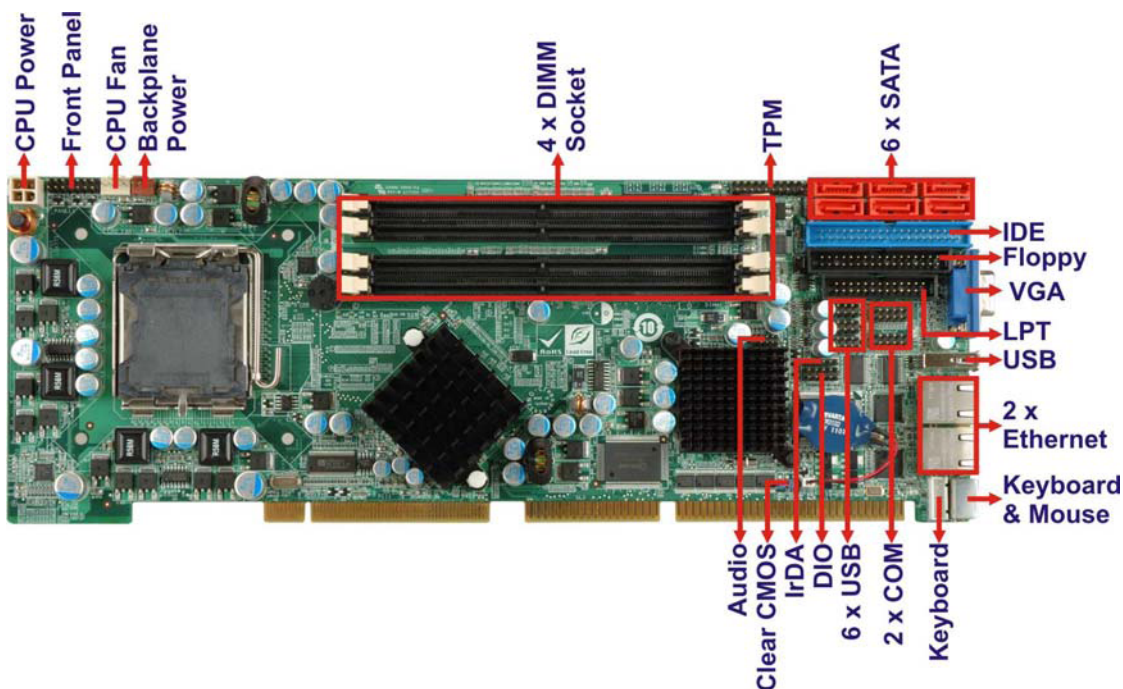


Figure 1-2: 3308150 Overview [Front View]

### 1.2.2 3308150 Peripheral Connectors and Jumpers

The 3308150 has the following connectors on-board:

- 1 x Backplane to mainboard connector
- 1 x Cooling fan connector, CPU
- 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 IDE connector
- 1 x Infrared (IrDA) connector
- 1 x Keyboard connector
- 1 x Parallel port connector
- 6 x Serial ATA drive connectors
- 2 x Serial port connectors
- 1 x TPM connector
- 3 x USB connectors (support six USB devices)

The 3308150 has the following external peripheral interface connectors on the board rear panel.

- 1 x Keyboard/mouse connectors
- 2 x RJ-45 Ethernet connectors
- 1 x USB 2.0 connectors
- 1 x VGA connector

The 3308150 has the following on-board jumpers:

- Clear CMOS

### 1.2.3 Technical Specifications

3308150 technical specifications are listed in **Table 1-1**. See **Chapter 2** for details.

Specification	3308150
Form Factor	PICMG 1.0
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



<b>System Chipset</b>	<b>Northbridge:</b> Intel® Q35 Express Chipset <b>Southbridge:</b> Intel® ICH9R
<b>Memory</b>	Four 240-pin DDR2 DIMM sockets support 2.0 GB 667 MHz or 800 MHz DDR2 DIMMs
<b>Super I/O</b>	ITE IT8718F Rev. I
<b>Display</b>	Analog VGA display through external DB-15 connector
<b>BIOS</b>	AMI BIOS label SPI EEPROM 8.0 MB
<b>Audio</b>	10-pin header supports 7.1 channel HD Audio by GAI audio kit (1007760)
<b>LAN</b>	Dual Broadcom BCM5787M GbE controllers with ASF 2.0
<b>COM</b>	Two RS-232 serial connectors (onboard pin-headers)
<b>USB2.0</b>	Seven USB 2.0 devices supported: <ul style="list-style-type: none"> <li>■ Six by onboard pin-headers</li> <li>■ One by external connectors</li> </ul>
<b>SATA</b>	Six 3.0 Gb/s SATA II drives supported
<b>SATA RAID Levels</b>	RAID 0, RAID 1, RAID 5 and RAID 10
<b>Keyboard/mouse</b>	One external PS/2 keyboard/mouse connector One onboard 5-pin header for keyboard
<b>Digital I/O</b>	One 8-bit digital input/output connector; 4-bit input/4-bit output through the ITE IT8718F super I/O
<b>Watchdog Timer</b>	Software programmable 1-255 sec. through the ITE IT8718F super I/O
<b>Infrared</b>	One IrDA connector through the ITE IT8718F super I/O.

<b>Power Supply</b>	ATX power supply
<b>TPM</b>	Supports TPM v1.2 with 20-pin onboard pin-header
<b>Fan Connector</b>	4-pin CPU fan connector
<b>Buzzer</b>	Yes
<b>Power Consumption</b>	3.3V@0.03A, 5V@8.62A, +12V@0.1A , Vcore@2.29 and 5VSB@0.11A (E8400 Intel® Core™2 Duo CPU with four 2.0 GB, 800 MHz DDR2 DIMM running 3Dmark® 2001SE)
<b>Temperature</b>	0°C – 60°C (32°F - 140°F)
<b>Humidity (operating)</b>	5%~95% non-condensing
<b>Dimensions (LxW)</b>	338 mm x 126 mm
<b>Weight (GW)</b>	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: 338 mm
- Width: 126 mm

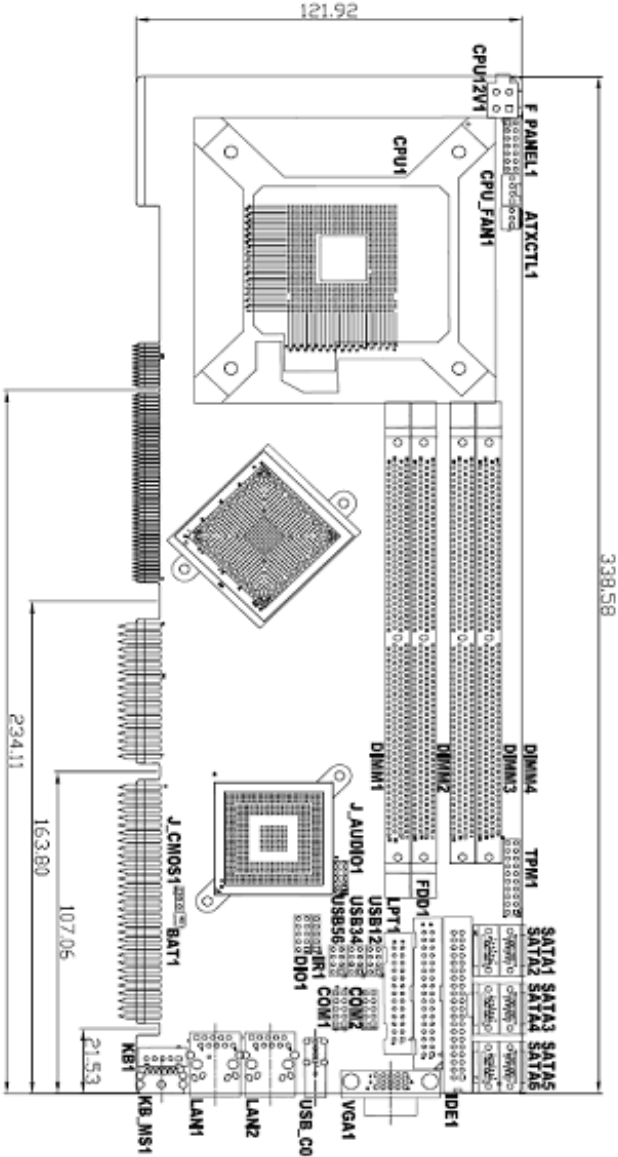


Figure 2-1: 3308150 Dimensions (mm)

### 2.1.2 External Interface Panel Dimensions

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

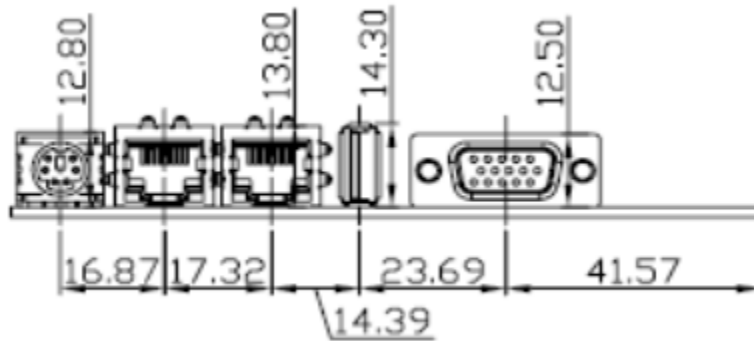


Figure 2-2: External Interface Panel Dimensions (mm)

## 2.2 Data Flow

Figure 2-3 shows the data flow between the two on-board chipsets and other components installed on the CPU card and described in the following sections of this chapter.

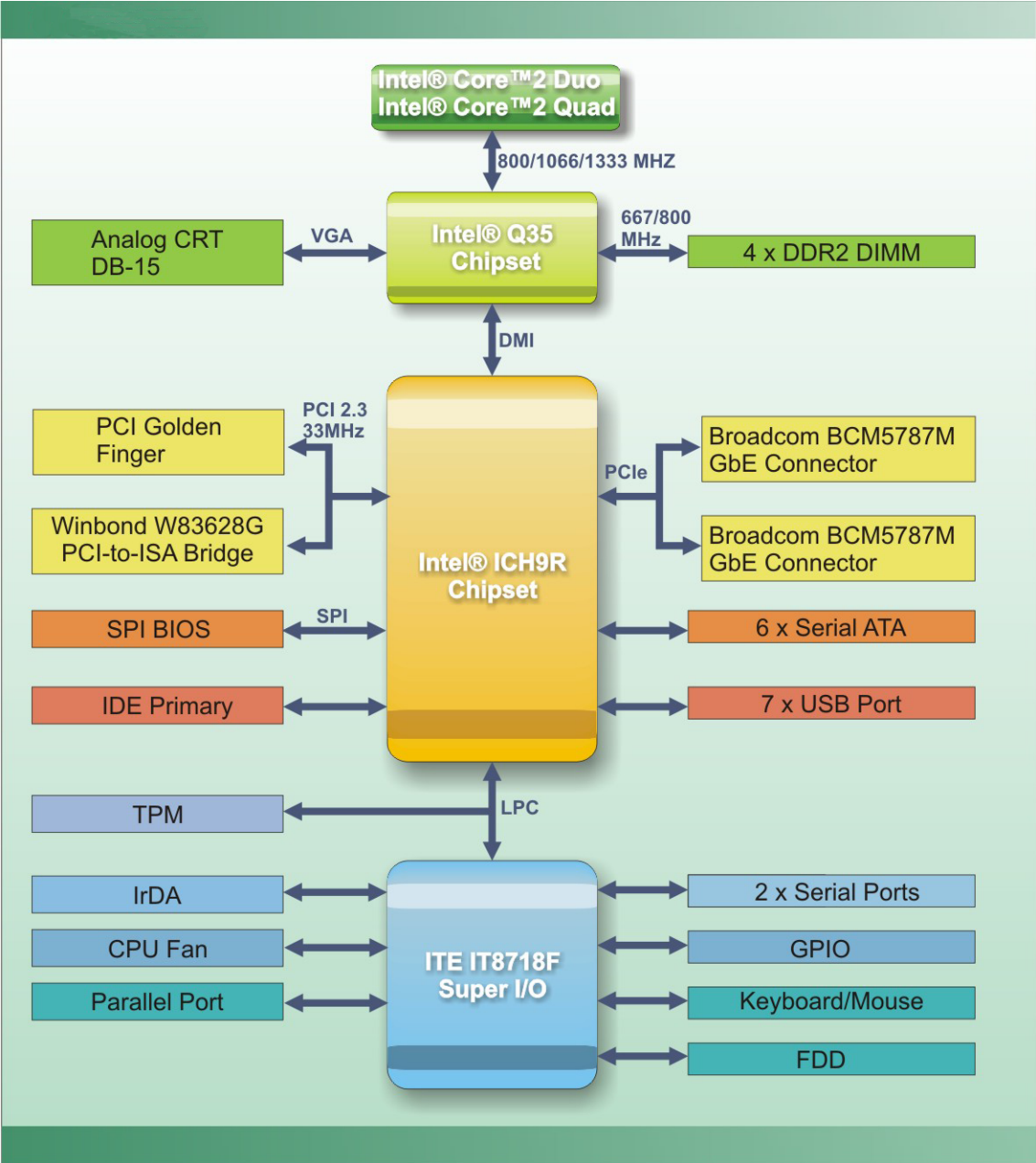


Figure 2-3: Data Flow Block Diagram

## 2.3 Compatible Processors

### 2.3.1 Supported Processors Overview

The 3308150 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

**Table 2-3** lists the Yorkfield core Intel® Core™2 Quad processors supported on the 3308150. All the processors in **Table 2-3** are 45nm LGA775 processors.

Processor #	CPU Speed	FSB Speed	Cache Size
Q9550	2.83 GHz	1333 MHz	12 MB
Q9450	2.66 GHz	1333 MHz	12 MB
Q9300	2.50 GHz	1333 MHz	6 MB

**Table 2-1: Supported Intel® Core™2 Quad (Yorkfield) Processors**

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

**Table 2-3** lists the Wolfdale core Intel® Core™2 Duo processors supported on the 3308150. All the processors in **Table 2-3** are 45nm LGA775 processors.

Processor #	CPU Speed	FSB Speed	Cache Size
E8500	3.16 GHz	1333 MHz	6 MBb L2
E8400	3.00 GHz	1333 MHz	6 MB L2
E8200	2.66 GHz	1333 MHz	6 MB L2
E8190	2.66 GHz	1333 MHz	6 MB L2

**Table 2-2: Supported Intel® Core™2 Quad (Yorkfield) Processors**

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

**Table 2-3** lists the Conroe core Intel® Core™2 Duo processors supported on the 3308150. All the processors in Table 2-3 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 2-3: Supported Intel® Core™2 Duo (Conroe) Processors**

### 2.3.5 Supported Intel® Celeron® (Conroe) Processors

**Table 2-3** lists the Conroe core Intel® Celeron® processors supported on the 3308150. All the processors in Table 2-3 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 2-4: Supported Intel® Celeron® Processors**



## 2.4 Intel® Q35 Northbridge Chipset

### 2.4.1 Intel® Q35 Northbridge Chipset

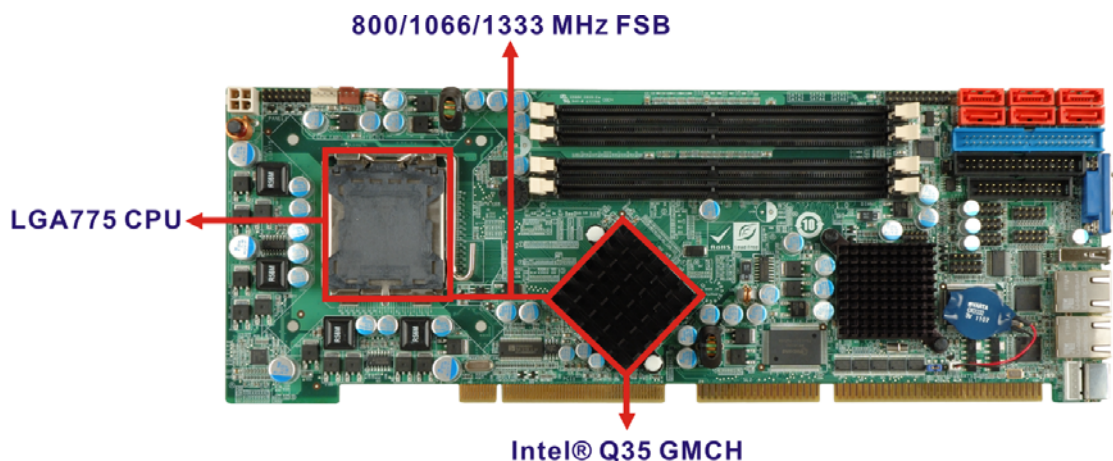
The Intel® Q35 Northbridge chipset is an advanced Graphics and Memory Controller Hub (GMCH) that supports a range of Intel® processors including 45nm Wolfdale dual core and Yorkfield quad core and 65nm Conroe core processors. The Intel® Q35 Northbridge supports 1333 MHz, 1066 MHz, or 800 MHz FSB and up to 8.0 GB of 667 MHz or 800 MHz DDR2 SDRAM. The Intel® Q35 Northbridge is interfaced to an Intel® ICH9R 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

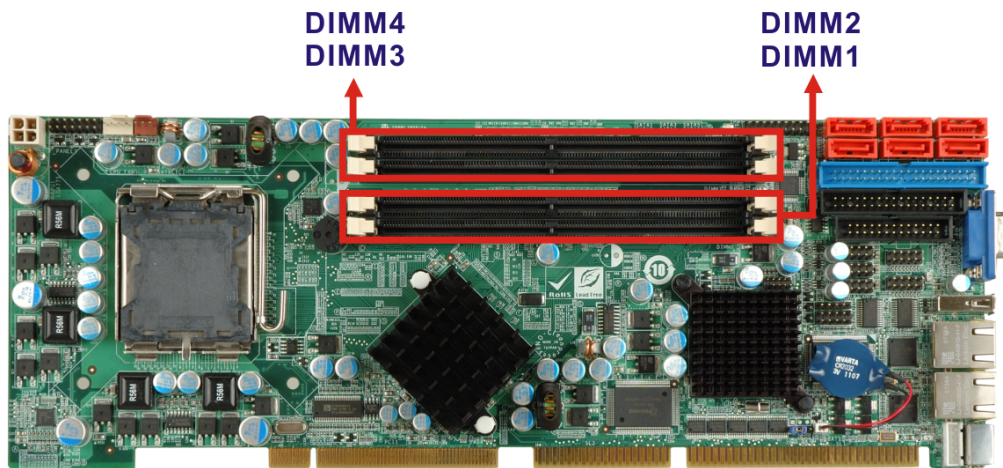
The LGA775 socket, Intel® Q35 Northbridge and the FSB are shown in **Figure 2-4**.



**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 3308150 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 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**.



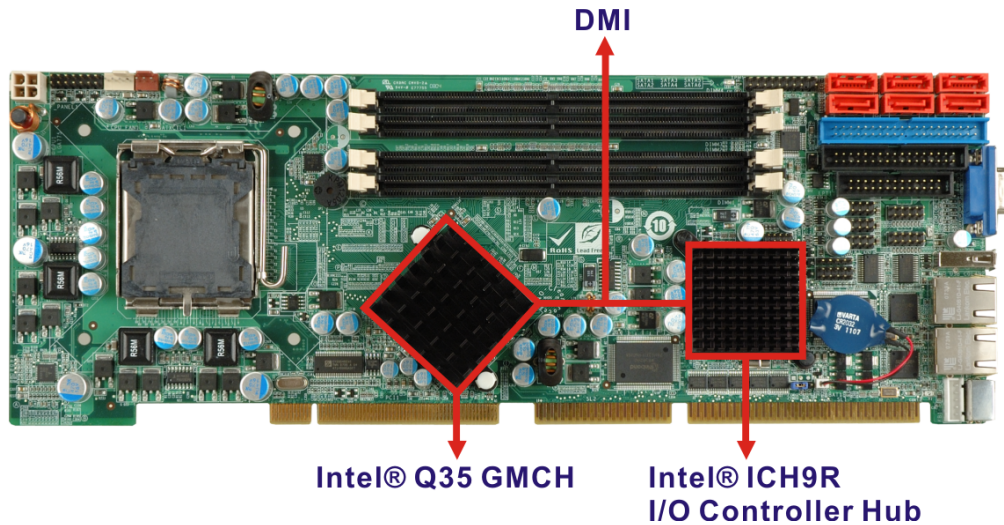
**Figure 2-6: VGA Connector**

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

### 2.4.5 Intel® Q35 Direct Media Interface (DMI)

The Direct Media Interface (DMI) is the communication bus between the Intel® Q35 GMCH and the ICH9R 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 ICH9R (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® ICH9R Southbridge Chipset

### 2.5.1 Intel® ICH9R Overview

The Intel® ICH9R Southbridge chipset is connected to the Intel® Q35 GMCH through the chip-to-chip Direct Media Interface (DMI). The ICH9R Southbridge chipset on the 3308150 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 seven USB 2.0 devices
- 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

### 2.5.2 Intel® ICH9R High Definition Audio Implementation

The Intel® High Definition Audio controller integrated into the ICH9R is connected to the on-board audio connector. The audio connector is connected to an optional 7.1 channel (ALC-KIT883HD) High Definition Audio codec. The audio controllers support up to six PCM audio output channels. Complete surround sound requires six-channel audio consisting of:

- Front left
- Front right
- Back left
- Back right
- Center
- Subwoofer

In addition to the basic surround sound features, the High Definition audio kit also features multi-streaming functionality.

### 2.5.3 Intel® ICH9R Real Time Clock

256 bytes of battery backed RAM is provided by the Motorola MC146818B real time clock (RTC) integrated into the ICH9R. 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.

### 2.5.4 Intel® ICH9R SATA Controller

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**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..

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The ICH9R 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 2-8**.



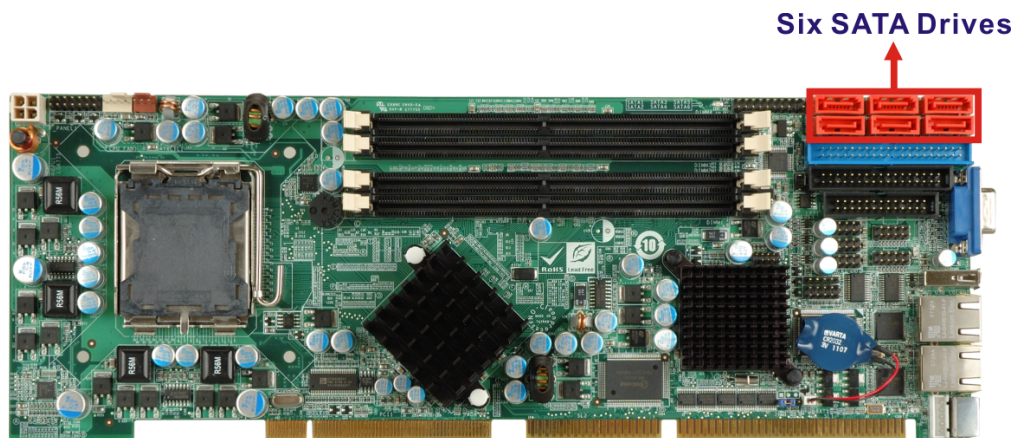


Figure 2-8: SATA Drive Connectors

### 2.5.5 Intel® ICH9R PCI Interface

The PCI interface on the ICH9R 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 seven external PCI bus masters

The PCI bus is connected to an interface gold finger on the bottom of the CPU card. For more detailed information, please refer to **Section 2.6.2**.

### 2.5.6 Intel® ICH9R ISA Interface

The ISA bus is connected to an interface gold finger on the bottom of the CPU card. ISA signals are routed to the Intel® ICH9R Southbridge through the Winbond W83628G PCI-to-ISA bridge chip. For more detailed information, please refer to **Section 2.6.3**.

### 2.5.7 Intel® ICH9R 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.

## 2.5.8 Intel® ICH9R USB Controller

### 2.5.8.1 Intel® ICH9R USB Controller Overview

Up to twelve high-speed, full-speed or low-speed USB devices are supported by the ICH9R on the 3308150. High-speed USB 2.0, with data transfers of up to 480MB/s, is enabled with the ICH9R integrated Enhanced Host Controller Interface (EHCI) compliant host controller. USB full-speed and low-speed signaling is supported by the ICH9R integrated Universal Host Controller Interface (UHCI) controllers.

### 2.5.8.2 3308150 USB Implementation

Seven of the Intel® ICH9R USB ports are implemented on the 3308150. One USB port (USB Port 0) is connected to one external connector and six USB ports (USB Port 1 to USB Port 6) are connected to three 8-pin onboard pin-headers. See **Figure 2-9**.

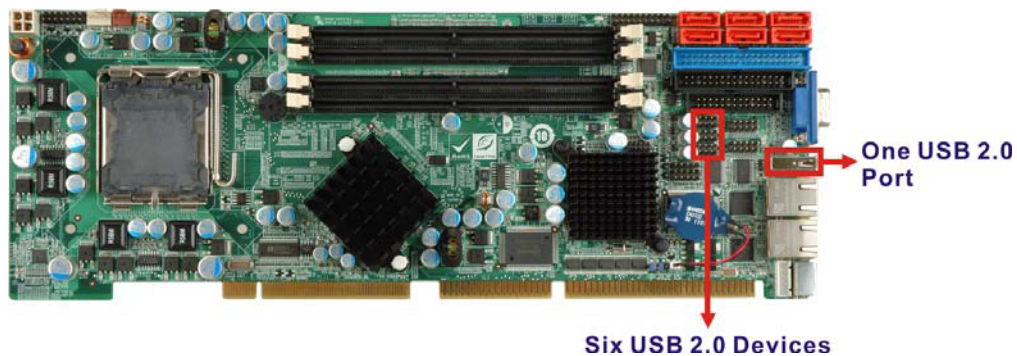


Figure 2-9: Onboard USB Implementation

## 2.6 PCI Bus Components

### 2.6.1 PCI Bus Overview

The PCI bus is connected to the components listed below:

- One PCI interface golden finger
- One ISA bus golden finger



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

### 2.6.2 PCI Interface Golden Finger

The PCI interface golden finger is connected to the PCI bus on the backplane and connects the PCI backplane expansion boards with connectivity to the Intel® ICH9R. The PCI bus golden finger is shown in **Figure 2-10**.



**Figure 2-10: PCI Slots**

### 2.6.3 Winbond PCI-to-ISA Bridge Interface

The Winbond PCI-to-ISA Bridge (**Figure 2-11**) enables legacy ISA expansion devices to be installed on the backplane and connected to the system through the ISA connector (**Figure 2-11**) on the bottom of the CPU card.

Some of the features of the Winbond PCI-to-ISA Bridge are listed below:

- Full ISA bus support including ISA masters
- 5V ISA and 3.3V PCI interfaces
- Supports three ISA compatible slots without buffering
- External BIOS ROM address decode output

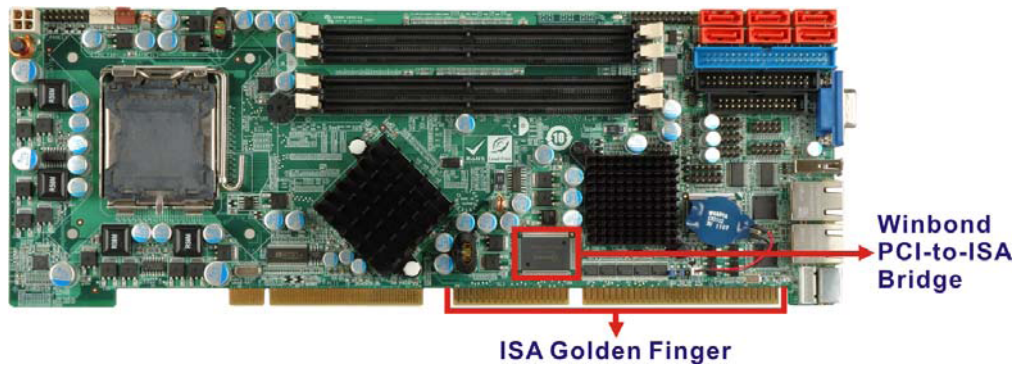


Figure 2-11: PCI-to-ISA Bridge and ISA Slot Connector

## 2.7 LPC Bus Components

### 2.7.1 LPC Bus Overview

The LPC bus is connected to components listed below:

- TPM module connector
- Super I/O chipset

### 2.7.2 TPM Module

A TPM connector on the 3308150 is interfaced to the Intel® ICH9R Southbridge through the LPC bus. The TPM connector is shown in **Figure 2-12** below.

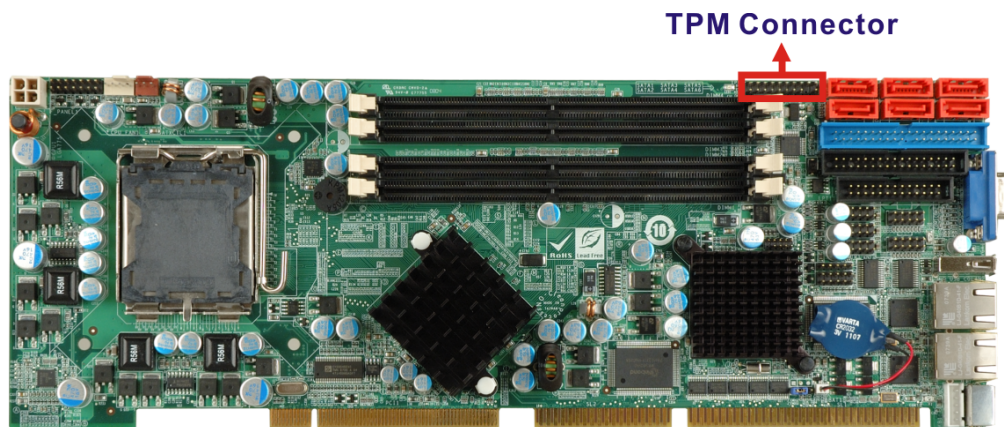


Figure 2-12: TPM Connector

The Intel® ICH9R Southbridge supports TPM version 1.1 and TPM version 1.2 devices for enhanced security. Two TPM are available from GAI. The two GAI TPM are listed below:

- Infineon TPM module
- Winbond TPM module

For more information about these modules please refer to **Chapter 3** or contact the 3308150 reseller or vendor. Alternatively, please contact GAI at [salesinfo@globalamericaninc.com](mailto:salesinfo@globalamericaninc.com).

### 2.7.3 Super I/O chipset

The ITE IT8718F Super I/O chipset is connected to the Intel® ICH9R Southbridge through the LPC bus. ITE IT8718F Super I/O chipset is shown in **Figure 2-13** below.



**Figure 2-13: ITE IT8718F Super I/O**

The ITE IT8718F is an LPC interface-based Super I/O device that comes with an integrated Environment Controller. Some of the features of the ITE IT8718F 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:

### **2.7.3.1 Super I/O LPC Interface**

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

### **2.7.3.2 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 and COM2)
- IrDa 1.0 and ASKIR protocols(IR1)

### **2.7.3.3 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.

### **2.7.3.4 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 3308150.

### 2.7.3.5 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.

### 2.7.3.6 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.

### 2.7.3.7 Super I/O GPIO Ports

The Super I/O has 48 programmable GPIO ports of which 8 are implemented on the 3308150. The GPIO connector has 8 programmable bits, 4-bit input and 4-bit output.

### 2.7.3.8 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

### **2.7.3.9 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.

### **2.7.3.10 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 of either 65,535 minutes or 65,535 seconds.

## **2.8 Environmental and Power Specifications**

### **2.8.1 System Monitoring**

Three thermal inputs on the 3308150 Super I/O Enhanced Hardware Monitor monitor the following temperatures:

- CPU Temperature
- System Temperature

Five voltage inputs on the 3308150 Super I/O Enhanced Hardware Monitor monitors the following voltages:

- CPU Core
- +1.25V
- +3.3V
- +12V
- 5VSB



- VBAT

The 3308150 Super I/O Enhanced Hardware Monitor also monitors the following fan speeds:

- CPU Fan Speed

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

### 2.8.2 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the 3308150 are listed below.

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

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

### 2.8.3 Power Consumption

**Table 2-5** shows the power consumption parameters for the 3308150 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	0.03 A
+5.0V	8.62 A
+12V	0.1 A
5Vsb	0.11 A

**Table 2-5: Power Consumption**



# Unpacking



## 3.1 Anti-static Precautions

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### WARNING:

Failure to take ESD precautions during the installation of the 3308150 may result in permanent damage to the 3308150 and severe injury to the user.

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Electrostatic discharge (ESD) can cause serious damage to electronic components, including the 3308150. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the 3308150, 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 3308150, place it on an anti-static pad. This reduces the possibility of ESD damaging the 3308150.
- **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 3308150 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 3308150 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 a GAI sales representative directly. To contact a GAI sales representative, please send an email to [salesinfo@globalamericaninc.com](mailto:salesinfo@globalamericaninc.com).

#### 3.3.1 Package Contents

The 3308150 is shipped with the following components:

Quantity	Item	Image
1	3308150 CPU card	
1	Dual RS-232 cable	
1	KB/MS PS/2 Y-cable	
6	SATA cables	







3	SATA power cables	
1	Mini jumper Pack	
1	USB cable	
1	Quick Installation Guide	
1	Utility CD	

Table 3-1: Package List Contents

### 3.4 Optional Items

7.1 channel HD audio kit with Realtek ALC883 supports dual audio streams (P/N: 1007760)	
CPU cooling kit (P/N: 2107695)	
Infineon TPM module (P/N: 1007790)	


<p>Winbond TPM module (P/N: 1007810)</p>	 A photograph of a Winbond TPM module. It is a small green printed circuit board (PCB) with a central black integrated circuit (chip). The board has several gold-plated pins along its bottom edge, which are used for connection to a system board. There are also some smaller components and markings on the board.
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Table 3-2: Package List Contents



# 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 3308150 Layout

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

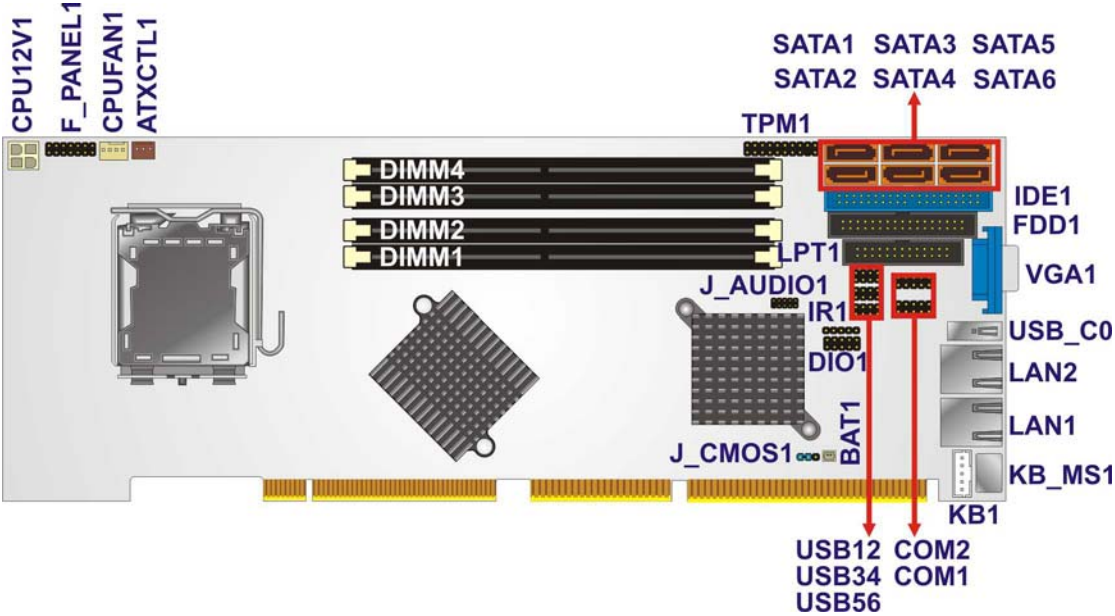


Figure 4-1: Connector and Jumper Locations

#### 4.1.2 Peripheral Interface Connectors

Table 4-1 shows a list of the peripheral interface connectors on the 3308150. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
Audio connector	10-pin header	J_AUDIO1
Backplane power connector	3-pin wafer	ATXCTL1
Cooling fan connector, CPU	4-pin wafer	CPU_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 panel connector	14-pin header	F_PANEL1
IDE connector	40-pin box header	IDE1
Infrared (IrDA) connector	5-pin header	IR1
Keyboard connector	5-pin wafer	KB1
Parallel port connector	26-pin box header	LPT1
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 (COM1)	10-pin box header	COM1
Serial port connector (COM2)	10-pin box header	COM2
TPM connector	20-pin header	TPM1
USB connector	8-pin header	USB12
USB connector	8-pin header	USB34
USB connector	8-pin header	USB56

**Table 4-1: Peripheral Interface Connectors**

### 4.1.3 External Interface Panel Connectors

Table 4-2 lists the rear panel connectors on the 3308150. Detailed descriptions of these connectors can be found in **Section 4.3**.

Connector	Type	Label
Ethernet connector	RJ-45	LAN1
Ethernet connector	RJ-45	LAN2
Mouse or keyboard connector	PS/2	KB_MS1
USB connector	USB	USB_C0
VGA connector	DB-15	VGA1

**Table 4-2: Rear Panel Connectors**

## 4.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the CPU card and are only accessible when the CPU card is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the 3308150.

### 4.2.1 Audio Connector

<b>CN Label:</b>	<b>J_AUDIO1</b>
<b>CN Type:</b>	10-pin header
<b>CN Location:</b>	See <b>Figure 4-2</b>
<b>CN Pinouts:</b>	See <b>Table 4-3</b>

Optional module can be connected to the 10-pin audio connector to provide the system with a High Definition Audio codec that provides a complete integrated audio solution.



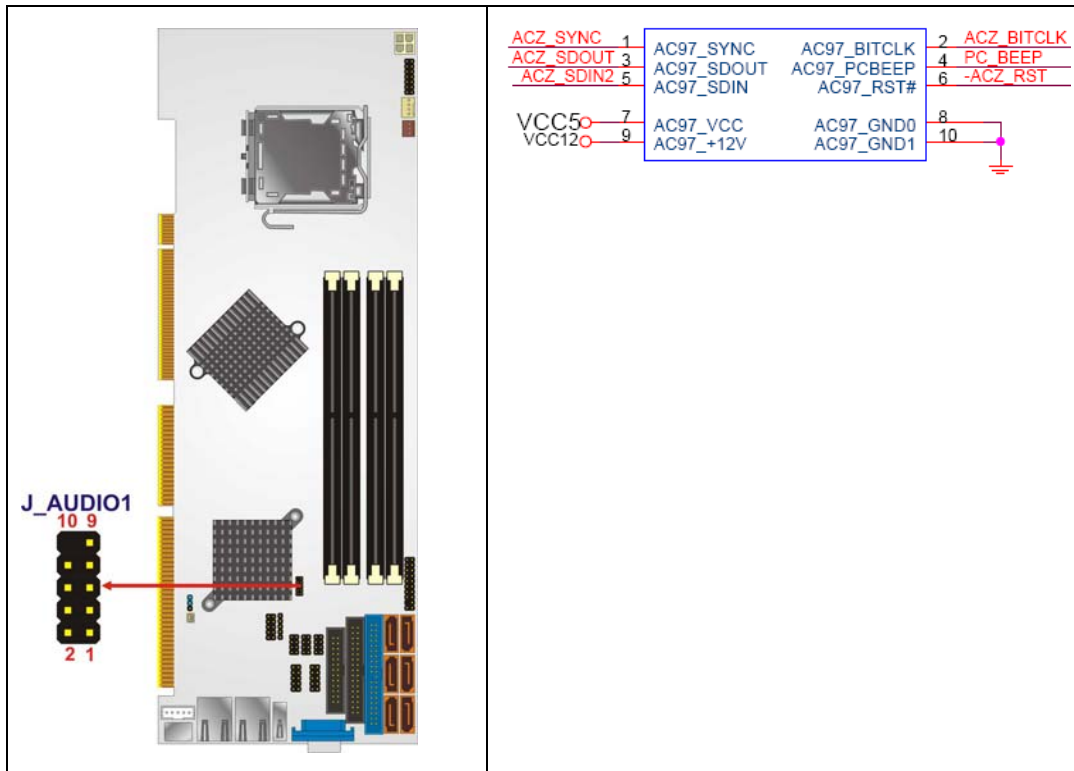


Figure 4-2: Audio Connector Pinouts (4-pin)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	ACZ_SYNC	2	ACZ_BITCLK
3	ACZ_SDOUT	4	ACZ_PCBEEP
5	ACZ_SDIN	6	ACZ_RST#
7	ACZ_VCC	8	ACZ_GND
9	ACZ_12V	10	ACZ_GND

Table 4-3: Audio Connector Pinouts

#### 4.2.2 CPU Power Connector

- CN Label:** CPU12V1
- CN Type:** 4-pin power connector (1x4)
- CN Location:** See **Figure 4-3**

CN Pinouts: See Table 4-4

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

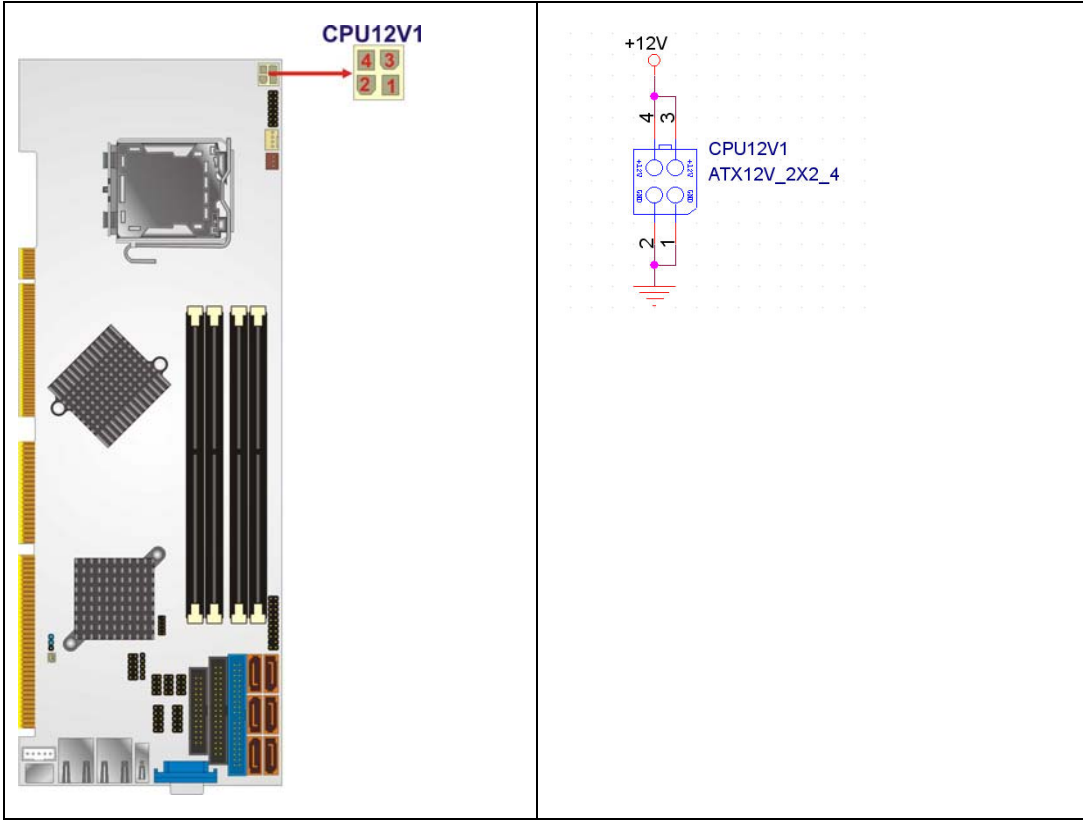


Figure 4-3: CPU Power Connector Location

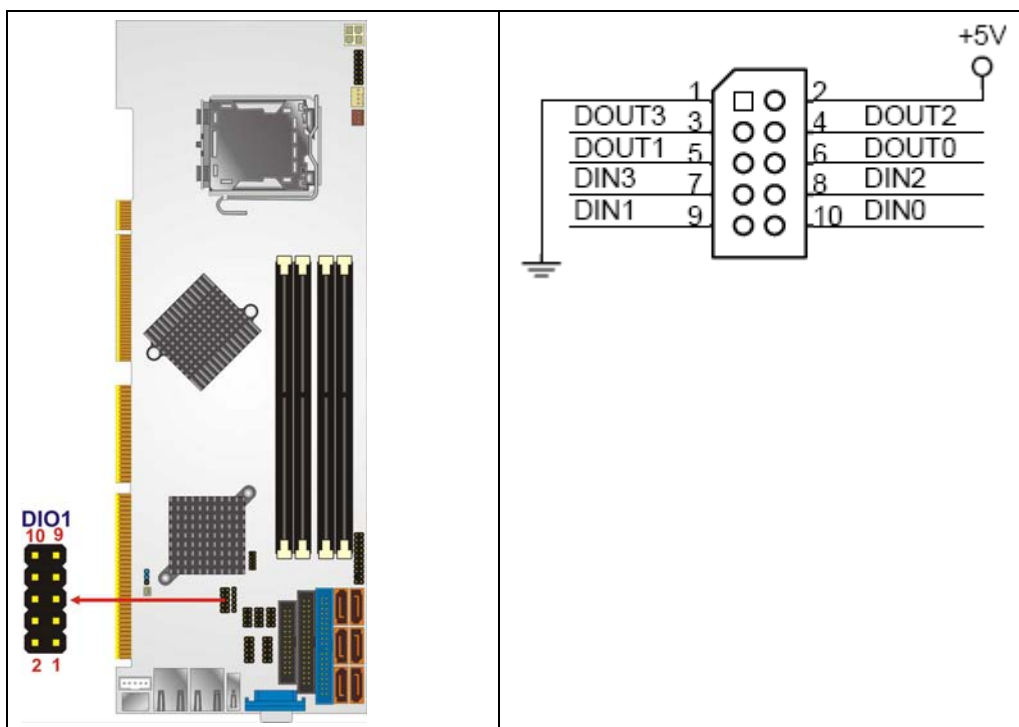
PIN NO.	DESCRIPTION
1	GND
2	GND
3	+12V
4	+12V

Table 4-4: CPU Power Connector Pinouts

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

- CN Label:** DIO1
- CN Type:** 10-pin header (2x5)
- CN Location:** See **Figure 4-4**
- CN Pinouts:** See **Table 4-5**

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 4-4: 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 4-5: DIO Connector Pinouts

### 4.2.4 Fan Connector, CPU (12V, 4-pin)

- CN Label:** CPU\_FAN1
- CN Type:** 4-pin header (1x4)
- CN Location:** See Figure 4-5
- CN Pinouts:** See Table 4-6

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.

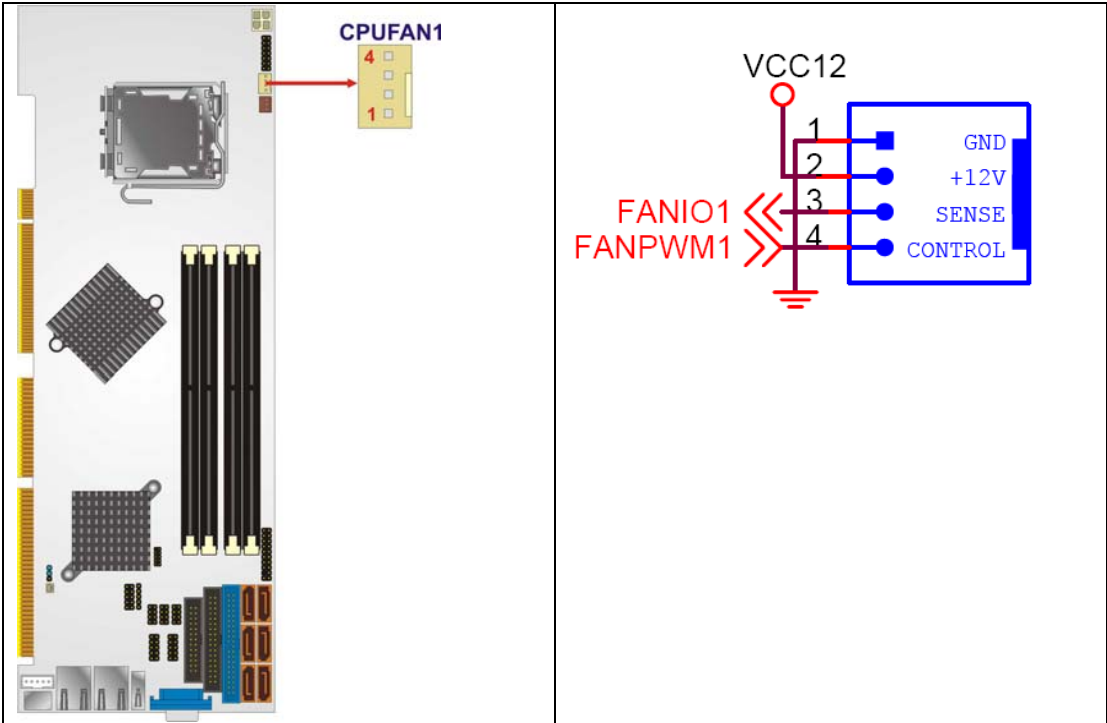


Figure 4-5: +12V Fan Connector Location

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

Table 4-6: +12V Fan Connector Pinouts

### 4.2.5 Floppy Disk Connector (34-pin)

- CN Label:** FDD1
- CN Type:** 34-pin header (2x17)
- CN Location:** See Figure 4-6
- CN Pinouts:** See Table 4-7

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

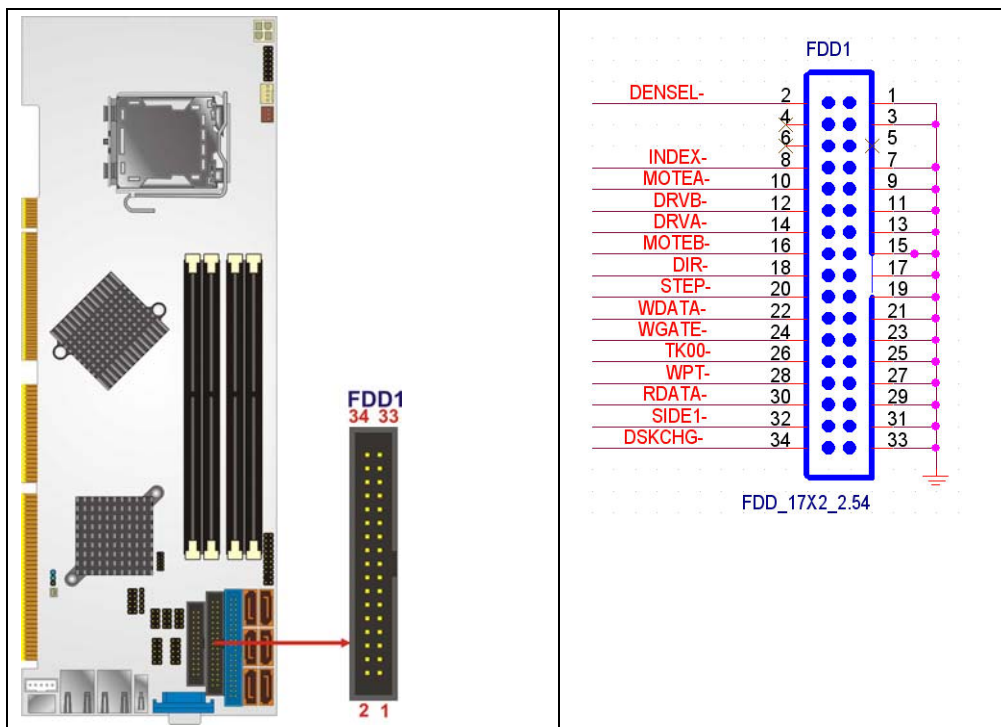


Figure 4-6: 34-pin FDD Connector Location

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 4-7: 34-pin FDD Connector Pinouts

#### 4.2.6 Front Panel Connector

**CN Label:** F\_PANEL1

**CN Type:** 14-pin header (2x7)

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

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

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

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

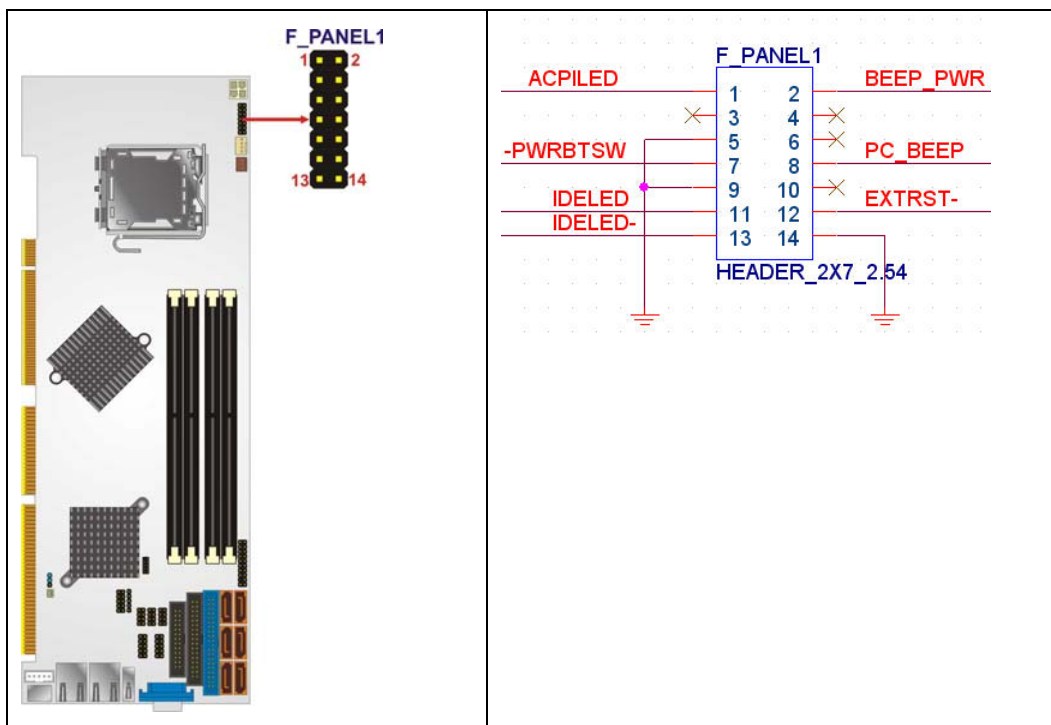


Figure 4-7: Front Panel Connector Pinout Locations (14-pin)

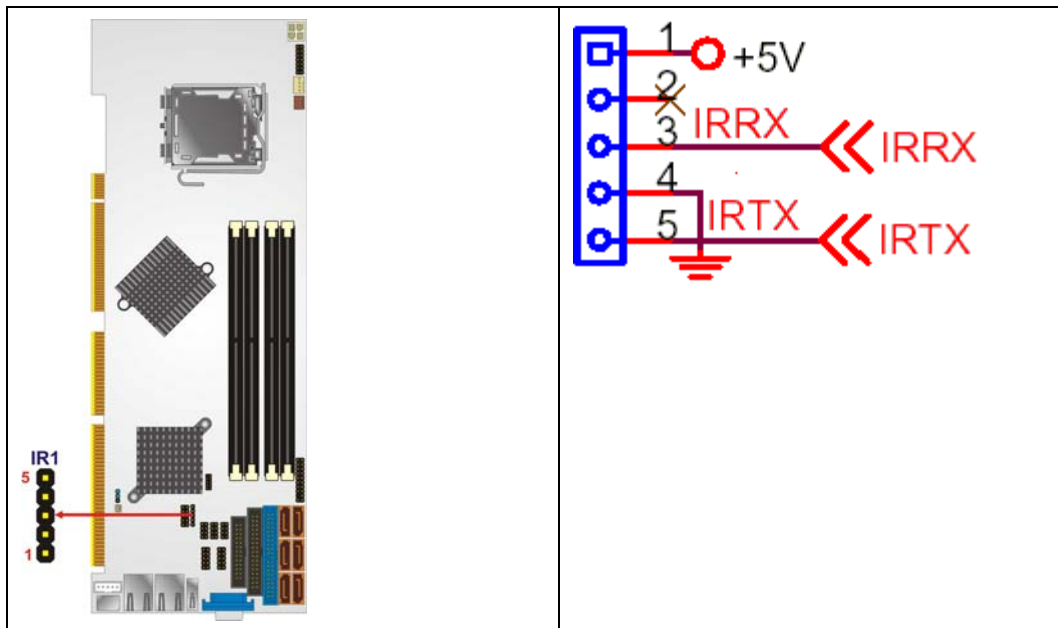
FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power LED	1	+5V	Speaker	2	+5V
	3	N/C		4	N/C
	5	GROUND		6	N/C
Power Button	7	PWRBTN+	8	SPEAKER	
	9	PWRBTN-	Reset	10	N/C
HDD LED	11	+5V		12	RESET-
	13	IDE LED-		14	GROUND

Table 4-8: Front Panel Connector Pinouts (14-pin)

## 4.2.7 Infrared Interface Connector

<b>CN Label:</b>	<b>IR1</b>
<b>CN Type:</b>	5-pin header (1x5)
<b>CN Location:</b>	See <b>Figure 4-8</b>
<b>CN Pinouts:</b>	See <b>Table 4-9</b>

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



**Figure 4-8: Infrared Connector Location**

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

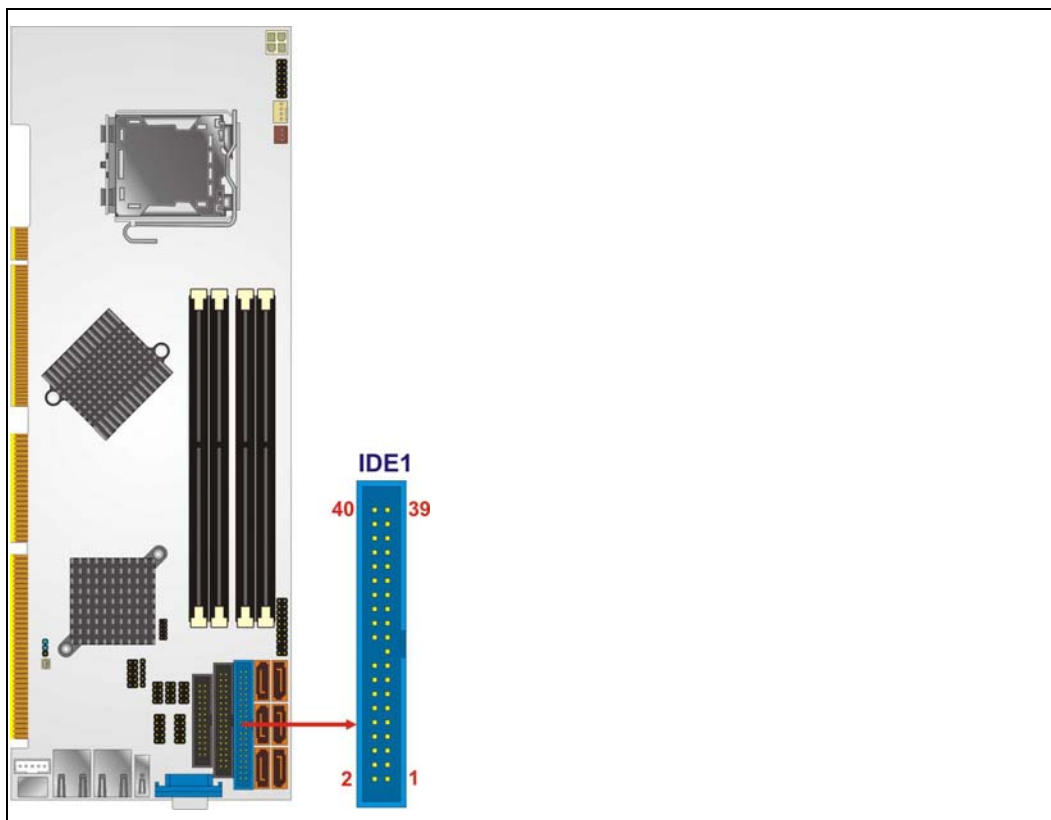
**Table 4-9: Infrared Connector Pinouts**



#### 4.2.8 IDE Connector (40-pin)

- CN Label:** IDE1
- CN Type:** 40-pin header (2x20)
- CN Location:** See **Figure 4-9**
- CN Pinouts:** See **Table 4-10**

One 40-pin IDE device connector on the 3308150 supports connectivity to two hard disk drives.



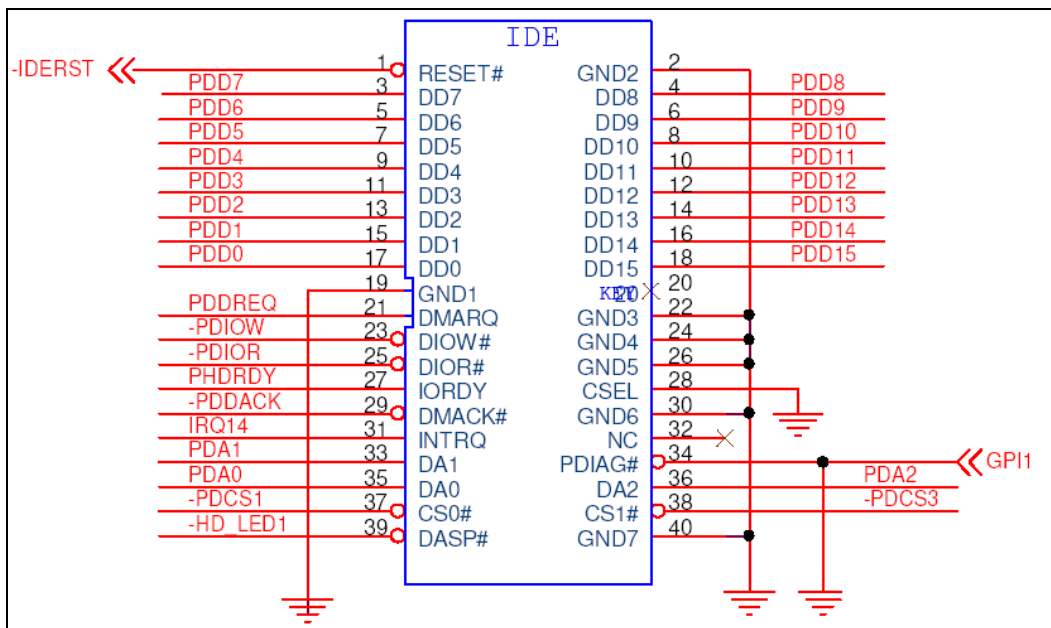


Figure 4-9: IDE Device Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RESET#	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GROUND	20	N/C
21	IDE DRQ	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	IDE CHRDY	28	GROUND
29	IDE DACK	30	GROUND-DEFAULT
31	INTERRUPT	32	N/C

33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND

Table 4-10: IDE Connector Pinouts

### 4.2.9 Keyboard Connector

- CN Label:** KB1
- CN Type:** 5-pin header (1x5)
- CN Location:** See **Figure 4-10**
- CN Pinouts:** See **Table 4-11**

The keyboard connector can be connected to a standard PS/2 cable or PS/2 cable to add keyboard and mouse functionality to the system.

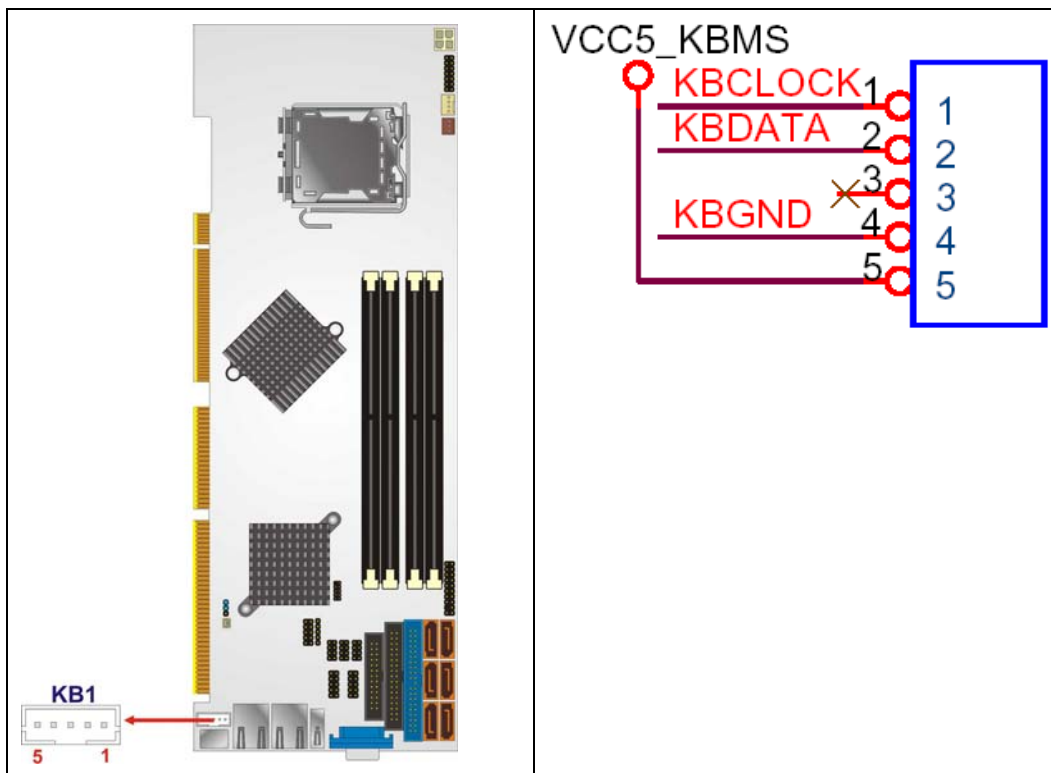


Figure 4-10: Keyboard Connector Location

PIN NO.	DESCRIPTION
1	KEYBOARD CLOCK
2	KEYBOARD DATA
3	N/C
4	GROUND
5	VCC

Table 4-11: Keyboard Connector Pinouts

### 4.2.10 Parallel Port Connector

- CN Label:** LPT1
- CN Type:** 26-pin box header
- CN Location:** See Figure 4-11
- CN Pinouts:** See Table 4-12

The 26-pin parallel port connector connects to a parallel port connector interface or some other parallel port device such as a printer.

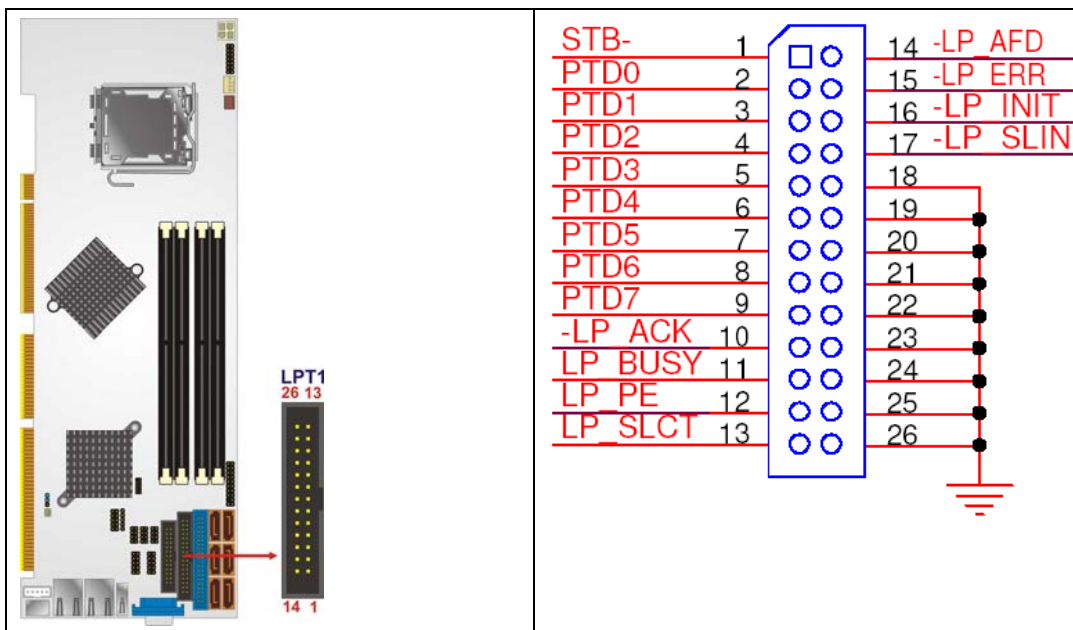


Figure 4-11: Parallel Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	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	GROUND
19	GROUND	20	GROUND
21	GROUND	22	GROUND
23	GROUND	24	GROUND
25	GROUND	26	NC

Table 4-12: Parallel Port Connector Pinouts

#### 4.2.11 SATA Drive Connectors

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

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

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

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

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.

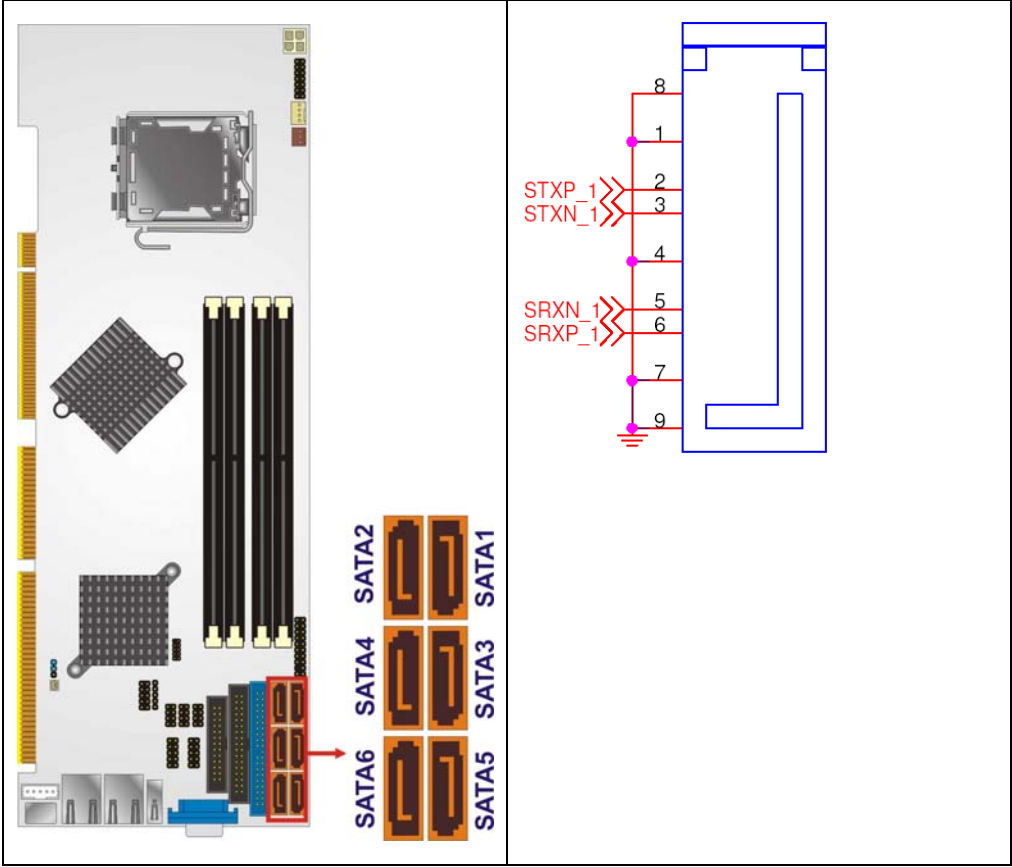


Figure 4-12: SATA Drive Connector Locations

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

Table 4-13: SATA Drive Connector Pinouts

### 4.2.12 Serial Port Connector (COM 1 and COM2)

- CN Label:** COM1 and COM2
- CN Type:** 10-pin header (2x5)
- CN Location:** See Figure 4-13
- CN Pinouts:** See Table 4-14

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.

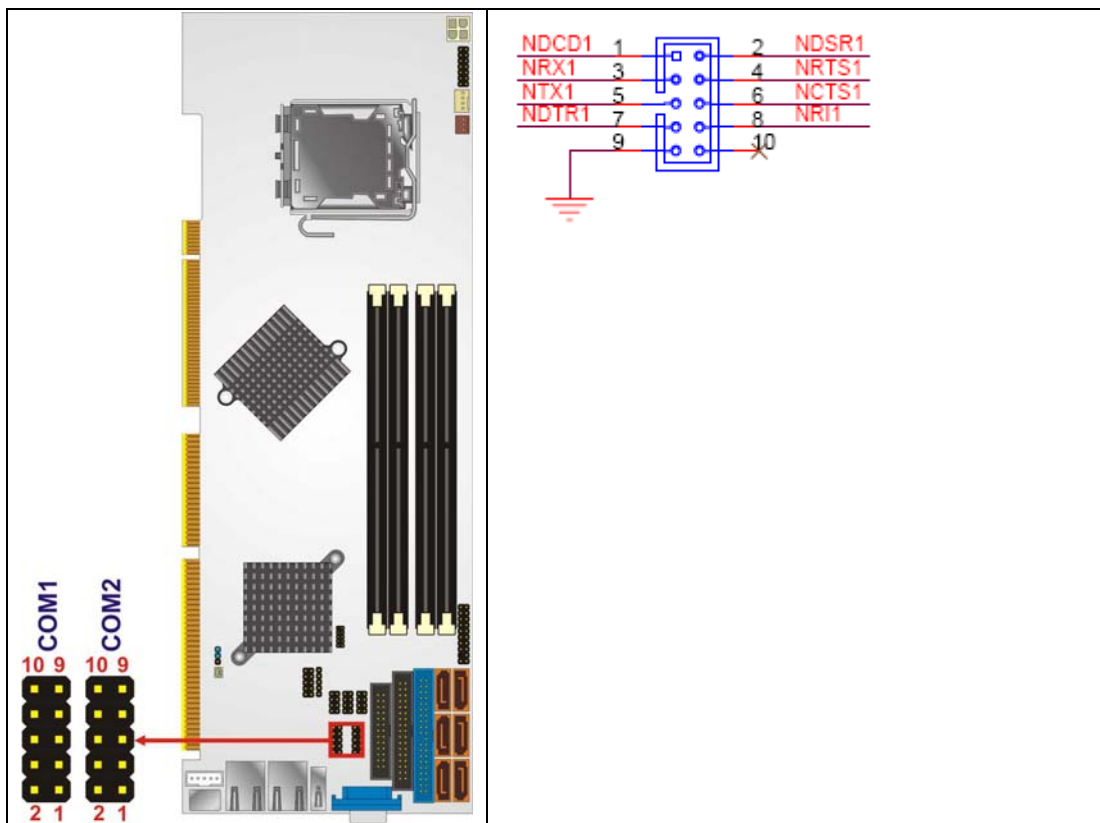


Figure 4-13: Serial Connector Location

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 4-14: Serial Connector Pinouts

4.2.13 Trusted Platform Module (TPM) Connector

- CN Label:** TPM1
- CN Type:** 40-pin header (2x20)
- CN Location:** See Figure 4-14
- CN Pinouts:** See Table 4-15

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.

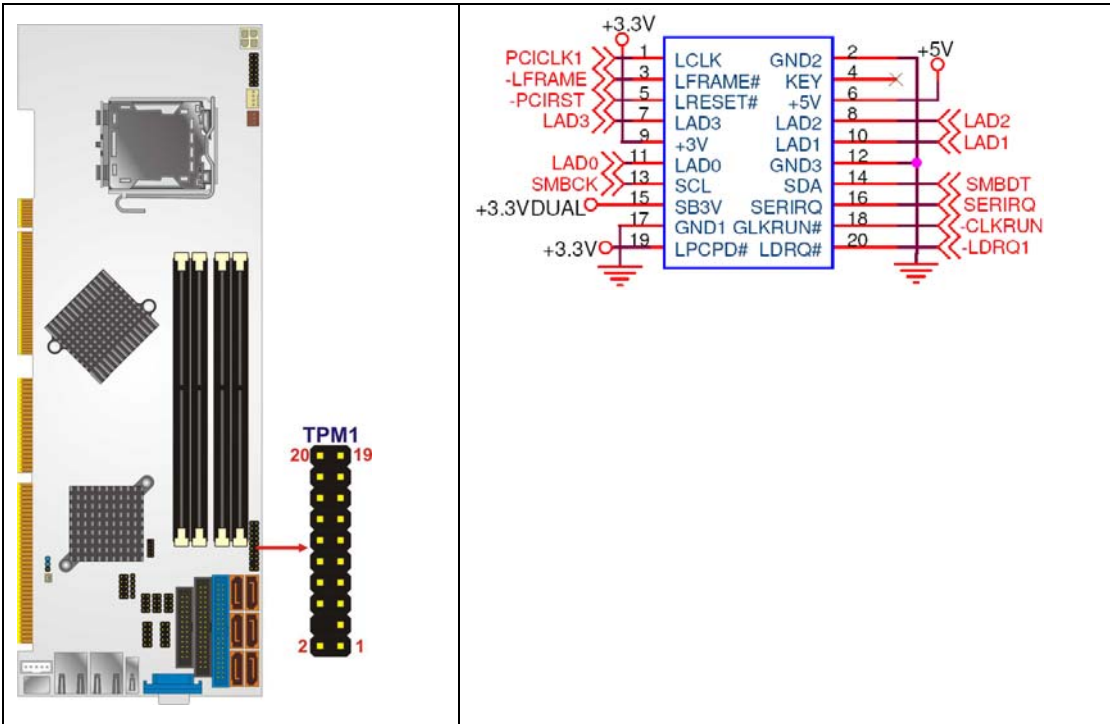


Figure 4-14: TPM Connector Location



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 4-15: TPM Connector Pinouts

#### 4.2.14 USB Connectors (Internal)

**CN Label:** USB12, USB34 and USB56

**CN Type:** 8-pin header (2x4)

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

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

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.

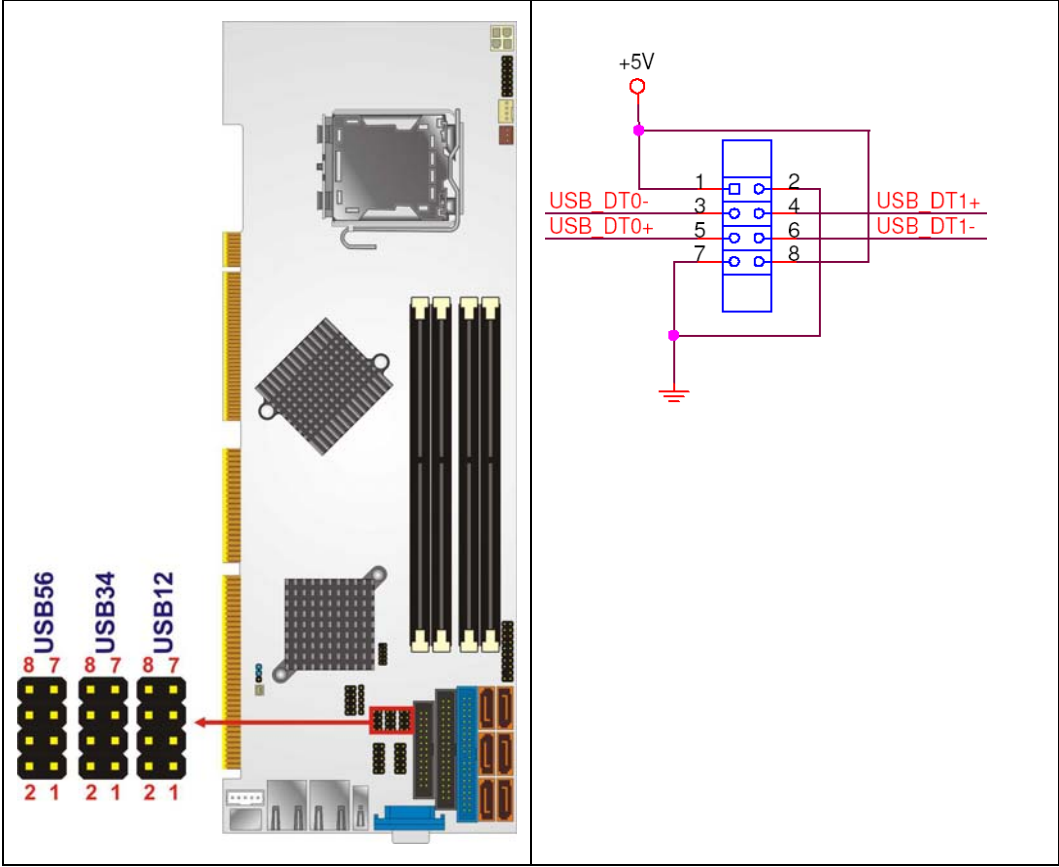


Figure 4-15: USB Connector Locations

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

Table 4-16: USB Port Connector Pinouts

### 4.3 External Peripheral Interface Connector Panel

Figure 4-16 shows the 3308150 external peripheral interface connector (EPIC) panel. The 3308150 EPIC panel consists of the following:

- 1 x PS/2 keyboard/mouse connector
- 2 x RJ-45 LAN connectors

- 1 x USB 2.0 ports
- 1 x VGA connector

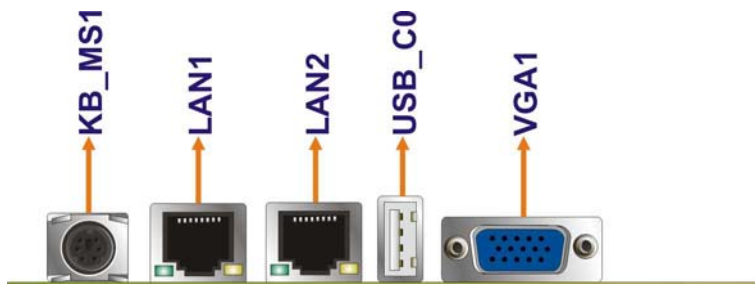


Figure 4-16: 3308150 External Peripheral Interface Connector

### 4.3.1 Keyboard/Mouse Connector

- CN Label:** KB\_MS1
- CN Type:** PS/2
- CN Location:** See Figure 4-16
- CN Pinouts:** See Figure 4-17 and Table 4-17

The 3308150 keyboard and mouse connector is a standard PS/2 connector.

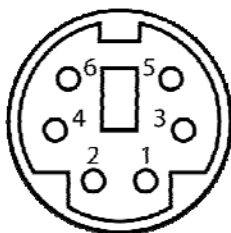


Figure 4-17: PS/2 Pinouts

PIN	DESCRIPTION
1	DATA
2	NC
3	GND

4	VCC5
5	CLK
6	NC

Table 4-17: PS/2 Connector Pinouts

### 4.3.2 LAN and Dual USB Combo Connectors

**CN Label:** LAN1 and LAN2

**CN Type:** RJ-45

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

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

The 3308150 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 4-18: LAN Pinouts

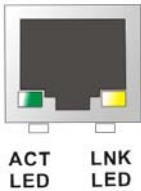


Figure 4-18: RJ-45 Ethernet Connector

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 4-19**.

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 4-19: RJ-45 Ethernet Connector LEDs**

### 4.3.3 USB Connector

<b>CN Label:</b>	<b>USB_C0</b>
<b>CN Type:</b>	USB port
<b>CN Location:</b>	See <b>Figure 4-16</b>
<b>CN Pinouts:</b>	See <b>Table 4-20</b>

The 3308150 has one external USB 2.0 ports. The port connects to both USB 2.0 and USB 1.1 devices.

PIN NO.	DESCRIPTION
1	VCC
3	DATA-
5	DATA+
7	GND

**Table 4-20: USB Port Pinouts**

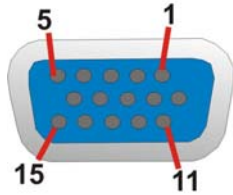
### 4.3.4 VGA Connector

<b>CN Label:</b>	<b>VGA1</b>
<b>CN Type:</b>	15-pin Female

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

**CN Pinouts:** See **Figure 4-19** and **Table 4-21**

The 3308150 has a single 15-pin female connector for connectivity to standard display devices.



**Figure 4-19: 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 4-21: VGA Connector Pinouts**

Chapter

5

# Installation

## 5.1 Anti-static Precautions

---



### WARNING:

Failure to take ESD precautions during the installation of the 3308150 may result in permanent damage to the 3308150 and severe injury to the user.

---

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the 3308150. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the 3308150, 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 3308150, place it on an anti-static pad. This reduces the possibility of ESD damaging the 3308150.
- ***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 3308150 is installed. All installation notices pertaining to the installation of the 3308150 should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the 3308150 and injury to the person installing the CPU card.

---

### 5.2.1 Installation Notices

---



### WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the 3308150, 3308150 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 3308150 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 3308150 on an antistatic pad:
  - When installing or configuring the CPU card, place it on an antistatic pad. This helps to prevent potential ESD damage.
- Turn all power to the 3308150 off:

- When working with the 3308150, 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 3308150 **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 3308150 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 3308150 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 3308150 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 3308150 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 a GAI sales representative directly. To contact a GAI sales representative, please send an email to [salesinfo@globalamericaninc.com](mailto:salesinfo@globalamericaninc.com).

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## 5.4 CPU, CPU Cooling Kit and DIMM Installation

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#### 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, 3308150 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 3308150. If one of these components is not installed the 3308150 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:

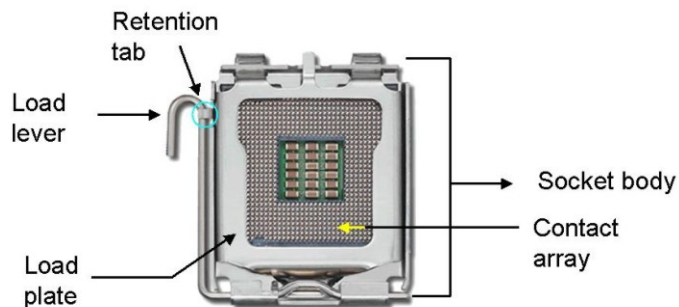
- **CPU:** An Intel® Processor with HT Technology must be installed
- **Chipset:** An Intel® Chipset that supports HT Technology (that has been met by the 3308150)
- **OS:** An operating system that has optimizations for HT Technology



#### 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 3308150, follow the steps below:

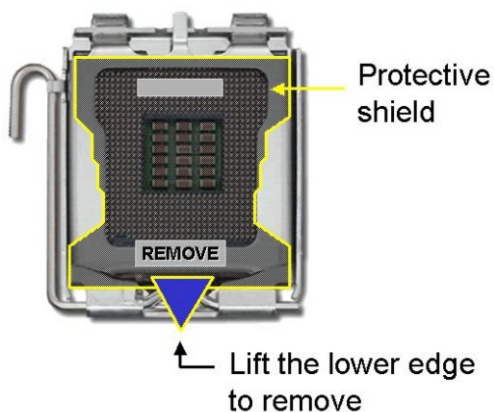


**WARNING:**

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

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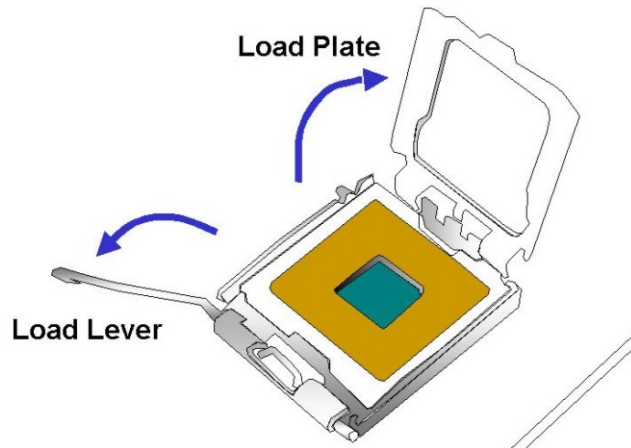
**Step 1: Remove the protective cover.** Remove the black protective cover by prying it off the load plate. To remove the protective cover, locate the “REMOVE” sign and use your fingernail to pry the protective cover off. See **Figure 5-2**.



**Figure 5-2: Remove the CPU Socket Protective Shield**

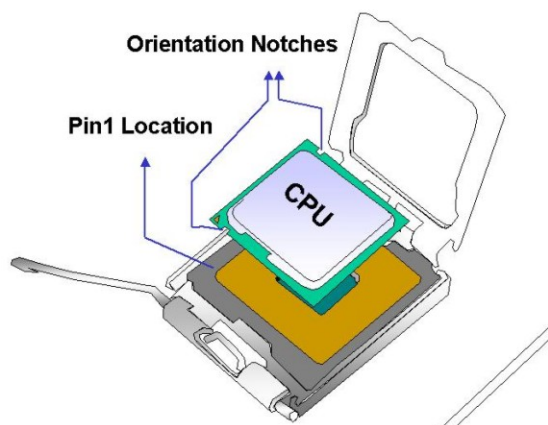
**Step 2: Open the socket.** Disengage the load lever by pressing the lever down and slightly outward to clear the retention tab. Rotate the load lever to a fully open position. Then rotate the load plate towards the opposite direction.

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 3308150.

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.

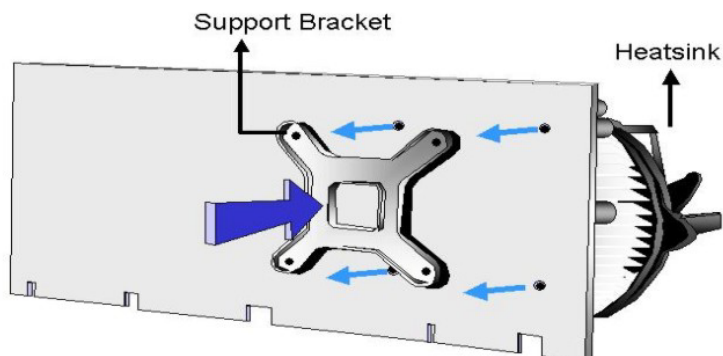
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To install the cooling kit, follow the instructions below.

- 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 3308150. Carefully route the cable and avoid heat generating chips and fan blades.

### 5.4.3 DIMM Installation



**WARNING:**

Using incorrectly specified DIMM may cause permanent damage to the 3308150. Please make sure the purchased DIMM complies with the memory specifications of the 3308150. DIMM specifications compliant with the 3308150 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.

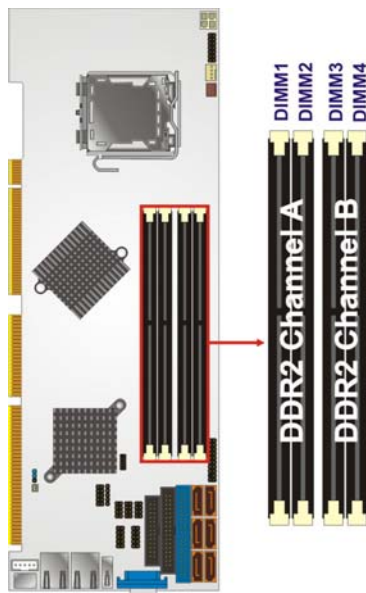


Figure 5-7: DDR2 Channels

On the 3308150, 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**.

**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**.

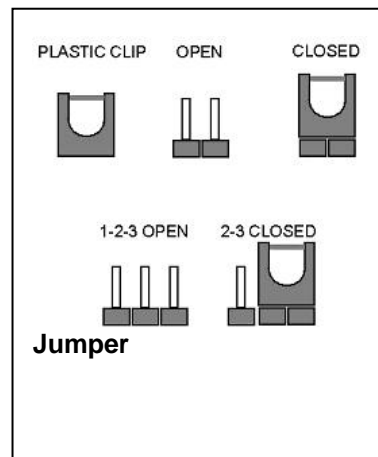
**Step 4: Removing a DIMM.** To remove a DIMM, push both handles outward. The memory module is ejected by a mechanism in the socket.

## 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.



Before the 3308150 is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumper on the 3308150 is listed in **Table 5-1**.

Description	Label	Type
Clear CMOS	J_CMOS1	3-pin header

**Table 5-1: Jumpers**

### 5.5.1 Clear CMOS Jumper

<b>Jumper Label:</b>	<b>J_CMOS1</b>
<b>Jumper Type:</b>	3-pin header
<b>Jumper Settings:</b>	See <b>Table 5-2</b>
<b>Jumper Location:</b>	See <b>Figure 5-9</b>

If the 3308150 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.

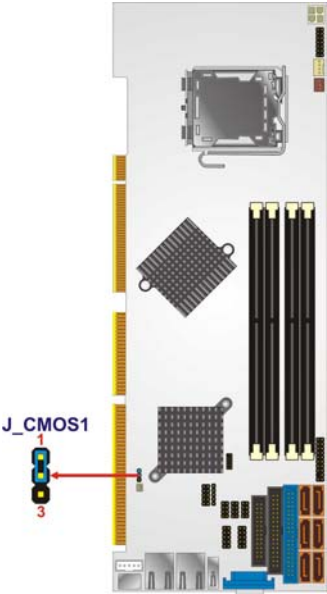


Figure 5-9: Clear CMOS Jumper

## 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 3308150 must have air vents to allow cool air to move into the system and hot air to move out.

The 3308150 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 CPU Card Installation

To install the 3308150 CPU card onto the backplane, carefully align the CPU card interface connectors with the corresponding socket on the backplane. To do this, please refer to the reference material that came with the backplane. Next, secure the CPU card to the chassis. To do this, 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 5-3** are shipped with the 3308150.

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

**Table 5-3: GAI Provided Cables**

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

- Audio kit
- Keyboard/mouse cable with bracket
- 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 1: Locate the connectors.** The locations of the RS-232 connectors are shown in **Chapter 3**.

**Step 2: Insert the cable connectors.** Insert one connector into each serial port box headers. See **Figure 5-10**. A key on the front of the cable connectors ensures the connector can only be installed in one direction.

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



### 5.7.3 SATA Drive Connection

The 3308150 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

**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.

**Step 4: Connect the SATA power cable.** Connect the SATA power connector to the back of the SATA drive.

**Figure 5-12: SATA Power Drive Connection**

### 5.7.4 USB Cable (Dual Port)

The 3308150 is shipped with a dual port USB 2.0 cable. To connect the USB cable connector, please follow the steps below.

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



**WARNING:**

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

---

**Step 2: Align the connectors.** The cable has two connectors. Correctly align pin 1 on each cable connector with pin 1 on the 3308150 USB connector.

**Step 3: Insert the cable connectors.** Once the cable connectors are properly aligned with the USB connectors on the 3308150, connect the cable connectors to the onboard connectors. See **Figure 5-13**.

**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 7.1 Channel Audio Kit Installation



**NOTE:**

This is an optional item that must be ordered separately. For further information please contact the nearest 3308150 distributor, reseller or vendor or contact an GAI sales representative directly. Send any queries to [salesinfo@globalamericaninc.com](mailto:salesinfo@globalamericaninc.com).

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The optional 7.1 channel audio kit connects to the 10-pin audio connector on the 3308150. The audio kit consists of five audio jacks. One audio jack, Mic In, connects to a microphone. The remaining four audio jacks, Line-In, Front-Out, Rear-Out, and Center Subwoofer, connect to speakers. To install the audio kit, please refer to the steps below:

**Step 1: Connect the audio kit cable.** The audio kit is shipped with a cable that

connects the audio kit to the 3308150. Connect the cable to the connector on the back of the audio kit. Make sure the pins are properly aligned (i.e. pin 1 connects to pin 1).

- Step 2: Locate the audio connector.** The location of the 10-pin audio connector is shown in **Chapter 3**.
- Step 3: Align pin 1.** Align pin 1 on the on-board connector with pin 1 on the audio kit cable connector. Pin 1 on the audio kit cable connector is indicated with a white dot. See **Error! Reference source not found.**
- Step 4: Mount the audio kit onto the chassis.** Once the audio kit is connected to the 3308150, secure the audio kit bracket to the system chassis.
- Step 5: Connect the audio devices.** Connect one speaker to the line-in audio jack, one speaker to the line-out audio jack and a microphone to the mic-in audio jack.
- Step 6: Install the driver.** If the 5.1 channel audio kit is used, the ALC883 Realtek codec driver must be installed. Refer to **Chapter 7** for driver installation instructions.

## 5.8 External Peripheral Interface Connection

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

- RJ-45 Ethernet cable connectors
- Keyboard/mouse
- USB devices
- VGA monitors

To install these devices, connect the corresponding cable connector from the actual device to the corresponding 3308150 external peripheral interface connector making sure the pins are properly aligned.

### 5.8.1 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 3308150. See **Figure 5-15**.

**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.

### **5.8.2 PS/2 Keyboard and Mouse Connection**

The 3308150 has a single PS/2 connector on the external peripheral interface panel. The 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 3308150.

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

**Step 2: Insert the keyboard/mouse connector.** Insert the PS/2 connector on the end of the PS/2 y-cable into the external PS/2 connector. See **Figure 5-16**.

### **5.8.3 USB Device Connection**

There are two external USB 2.0 connectors. Both connectors are perpendicular to the 3308150. 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 3308150. See **Figure 5-17**.

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

### 5.8.4 VGA Monitor Connection

The 3308150 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 3308150, 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 3308150. See **Figure 5-18**.

**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.

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/Output Control 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 3308150 is interfaced to GPIO ports on the ITE IT8718F 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 IT8718F 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.

<b>MOV</b>	<b>AX, 6F08H</b>	Sets the digital port as input
<b>INT</b>	<b>15H</b>	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.

<b>MOV</b>	<b>AX, 6F09H</b>	Sets the digital port as output
<b>MOV</b>	<b>BL, 09H</b>	
<b>INT</b>	<b>15H</b>	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:**

<b>AH – 6FH Sub-function:</b>	
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-FFFFFF	System BIOS
1000000-	Extend BIOS

Table D-2: 1<sup>st</sup> 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 3308150.

---

## E.1 Compatible Operating Systems

The following operating systems have been successfully run on the 3308150.

- Microsoft Windows XP (SP2)
- Microsoft Windows 2000 (SP4)
- Microsoft Windows Vista Business (32-bit English version)
- Microsoft Windows Vista Business (64-bit English version)
- Linux Mandriva 2008
- Linux Fedora Core 8

## E.2 Compatible Processors

The following Intel® LGA775 processors have been successfully tested on the 3308150.

CPU	Model Number	Frequency	FSB
45nm Intel® Core™ 2 Quad	Q9300	2.50 GHz	1333 MHz
45nm Intel® Core™ 2 Duo	E8500	3.16 GHz	1333 MHz
65nm Intel® Core™ 2 Duo	E6850	3.00 GHz	1333 MHz
65nm Intel® Core™ 2 Duo	E6700	2.66 GHz	1066 MHz
65nm Intel® Core™ 2 Duo	E6550	2.33 GHz	1333 MHz
65nm Intel® Core™ 2 Duo	E2180	2.00 GHz	800 MHz

## E.3 Compatible Memory Modules



### NOTE:

The memory modules listed below have been tested on the 3308150 other memory modules that comply with the specifications may also work on the 3308150 but have not been tested.

The following memory modules have been successfully tested on the 3308150.

Manufacturer	Model No.	Capacity	Speed
ADATA	DDR2 667(5) 512MX8	512 MB	667 MHz
Apacer	AU512E800C5KBGC	512 MB	800 MHz
DSL	512MB DDRII 800MHz CL5	512 MB	800 MHz
Kingston	KVR800D2N5/512	512 MB	800 MHz
Kingbox	512MB 800MHz	512 MB	800 MHz
PK	512MB DDR2 800MHz	512 MB	800 MHz
Transcend	512MB DDR2 667	512 MB	667 MHz
Transcend	512MB DDR2 800	512 MB	800 MHz
Twinmos	8DP25JK5MTETP	512 MB	800 MHz
Unigen	512MB DDR2 667	512 MB	667 MHz
UMAX	DIMM, 512MB, DDRII800, 64X8	512 MB	800 MHz



Appendix

F

# Intel<sup>®</sup> Matrix Storage Manager

## F.1 Introduction

The Intel® ICH9R 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<sup>®</sup> Matrix Storage Manager

To access the Intel<sup>®</sup> Matrix Storage Manager, please follow the steps below.

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

---



### NOTE:

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

---

**Step 2: Enable SATA drives in BIOS.** Start the computer and access the **BIOS** setup program. Enable **SATA** support for all IDE devices. Refer to the applicable BIOS configuration section in this user manual.

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

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

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

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

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

## 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**.

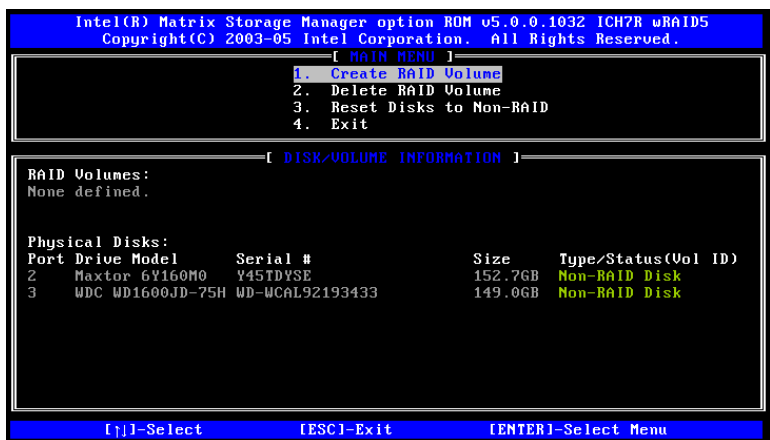


Figure F-1: Matrix Storage Manager Main Menu

**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.

```
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.
-----[ CREATE VOLUME MENU ]-----
      Name: Volume0
      RAID Level: RAID0(Stripe)
      Disks: Select Disks
      Strip Size: 128KB
      Capacity: 298.0 GB

      Create Volume

-----[ HELP ]-----
Choose the RAID level best suited to your usage model.

RAID0 - Data striped across multiple physical drives for performance.
RAID1 - Data mirrored across multiple physical drives for redundancy.
RAID10 - Striped volume whose segments are RAID 1 volumes. Requires
four hard drives. Functionally equivalent to RAID0+1.
RAID5 - Data and parity striped across three or more physical drives
for performance and redundancy.

[ ]Change [Tab]-Next [ESC]-Previous Menu [ENTER]-Select
```

**Figure F-3: Choose the Raid Level**

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

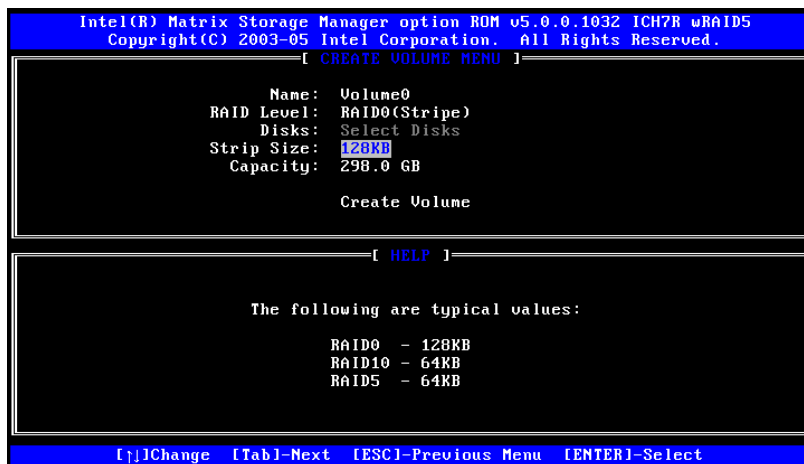


Figure F-4: Select the Stripe Size

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

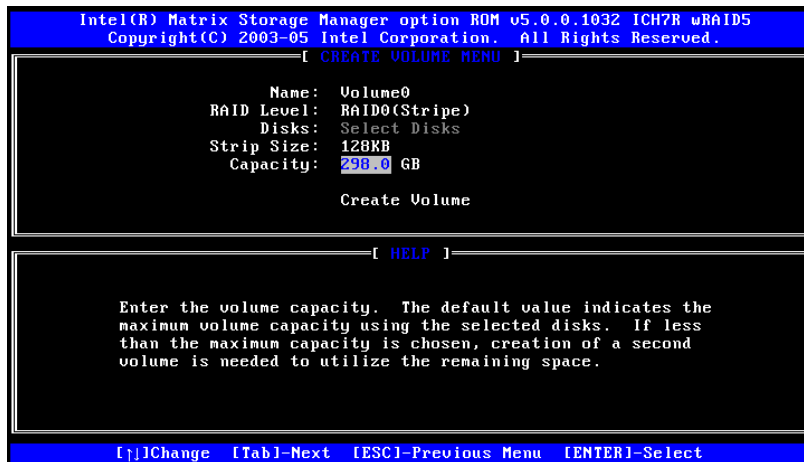


Figure F-5: Enter the Volume Capacity

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

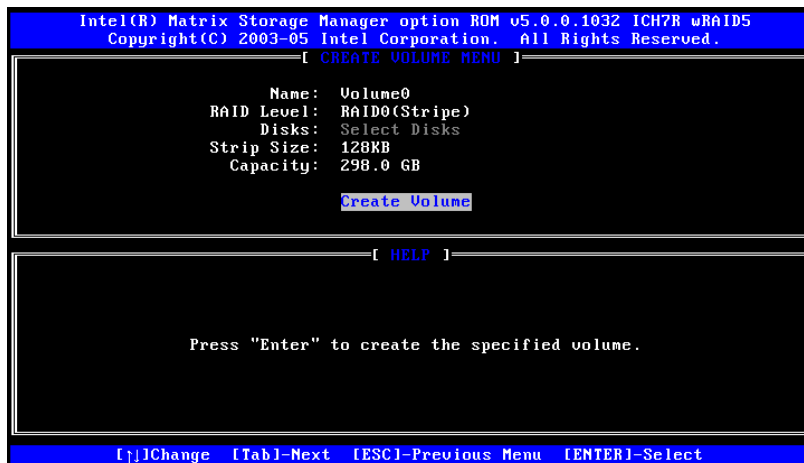


Figure F-6: Create the RAID Volume

**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.

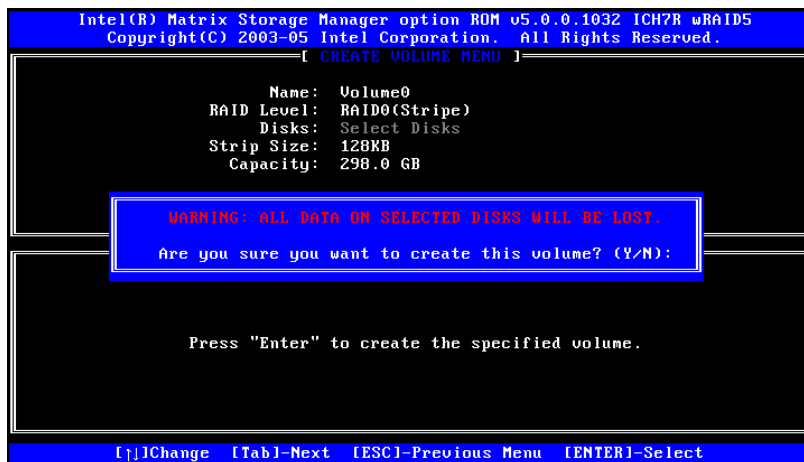


Figure F-7: Create RAID Volume Verification



## 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**.

```
Intel(R) Matrix Storage Manager option ROM v5.0.0.1032 ICH7R wRAID5
Copyright(C) 2003-05 Intel Corporation. All Rights Reserved.

[ MAIN MENU ]
1. Create RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Exit

[ DISK/VOLUME INFORMATION ]

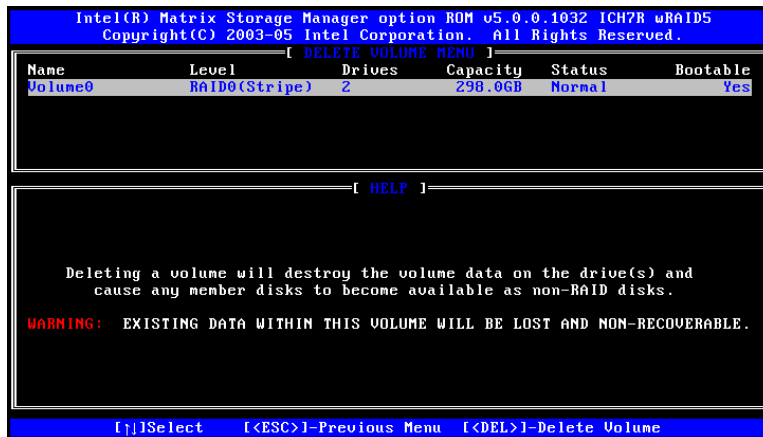
RAID Volumes:
ID Name Level Strip Size Status Bootable
0 Volume0 RAID0(Stripe) 128KB 298.0GB Normal Yes

Physical Disks:
Port Drive Model Serial # Size Type/Status(Vol ID)
2 Maxtor 6Y160M0 Y45TDYSE 152.7GB Member Disk(0)
3 WDC WD1600JD-75H WD-WCAL92193433 149.0GB Member Disk(0)

[↑] Select [ESC] Exit [ENTER] Select Menu
```

Figure F-8: Delete RAID Volume Menu

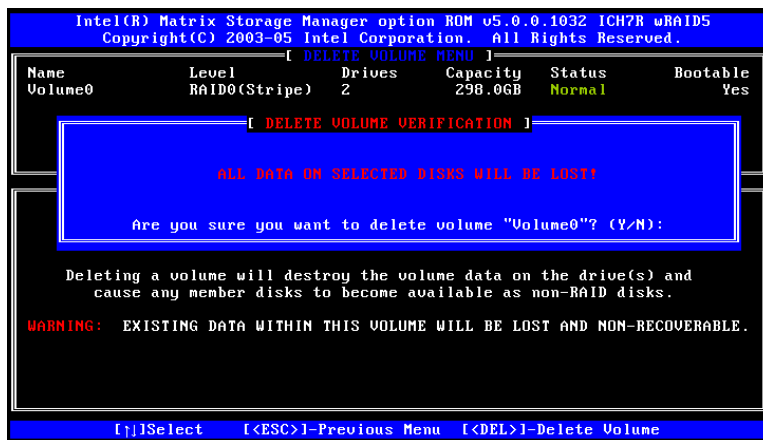
**Step 2: Select RAID Volume to be Deleted.** Use the arrow keys to highlight the RAID volume to be deleted and press **ENTER**. See **Figure F-9**.



**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**.

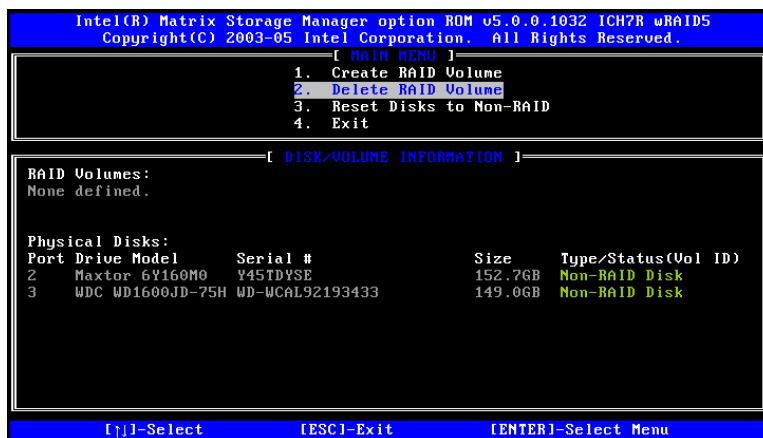


Figure F-11: Non-RAID Disks

### 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**.

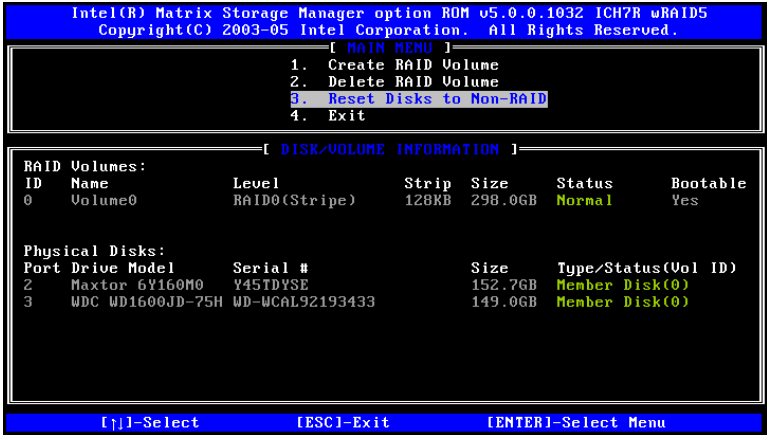


Figure F-12: Reset Disk to Non-RAID Menu

**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.

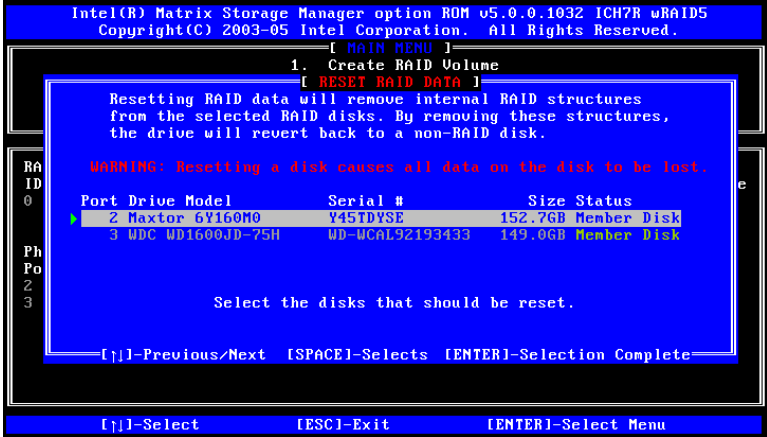


Figure F-13: Select Disk to Reset

**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.

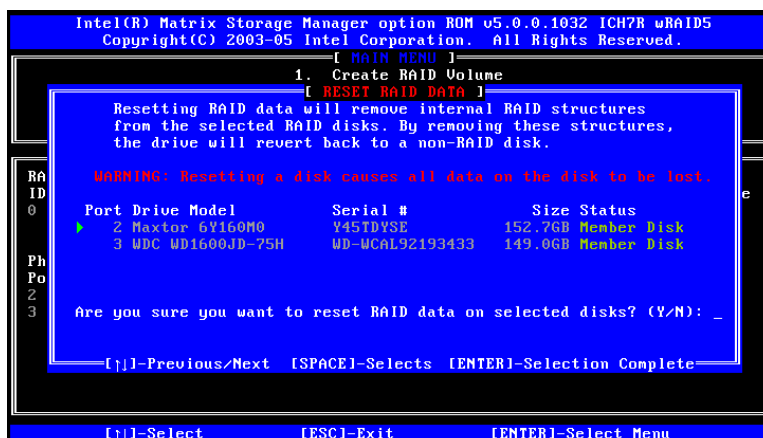


Figure F-14: Reset Disk Verification

**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**.

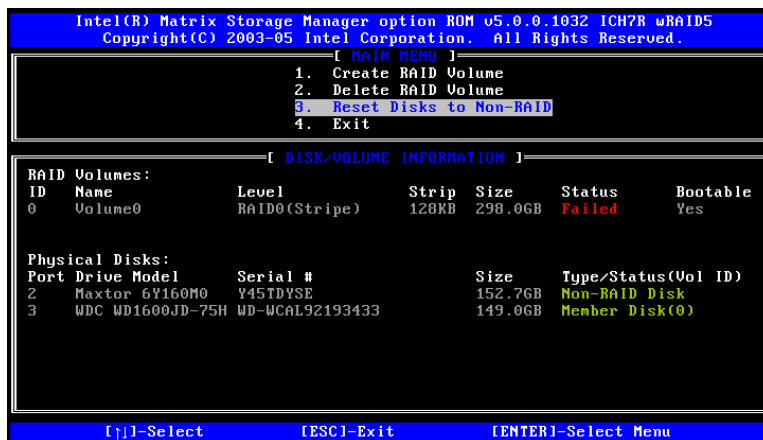


Figure F-15: Disk Drive and RAID Volume Status

#### 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**.

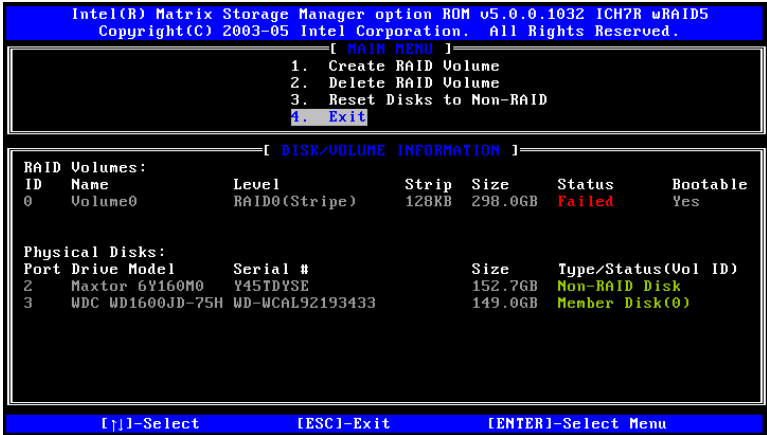


Figure F-16: Exit Menu

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

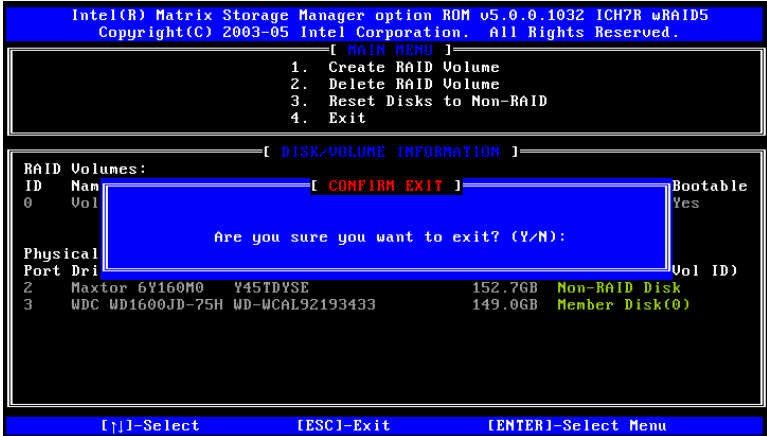


Figure F-17: Exit Verification

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

# Index

**A**

airflow ..... 74  
 anti-static precautions ..... 29, 60  
     anti-static pad ..... 29, 60  
     anti-static wristband ..... 29, 60  
     handling ..... 29, 60  
     self-grounding ..... 29, 60  
 ASKIR interface ..... 44  
 AT power connector ..... 38  
     location and pinouts ..... 38  
 ATA flat cable ..... 79

**C**

cables ..... 75  
     dual port USB ..... 31, 78  
     dual RS-232 ..... 30, 76  
     SATA drive ..... 30, 77  
     SATA drive power ..... 31, 77  
 chassis ..... 74, 75  
     installation ..... 74  
 chipset ..... 16  
     southbridge ..... 16  
 clear CMOS jumper ..... 4, 73  
     location ..... 74  
     settings ..... 73  
 CMOS ..... 73  
     clear CMOS jumper ..... 73  
 connectors, external  
     keyboard PS/2 connector ..... 55  
     LAN connector ..... 56

mouse PS/2 connector ..... 55  
 RJ-45 connector ..... 56  
 USB port ..... 57  
 connectors, pinouts and location  
     audio ..... 36  
     CPU fan ..... 40  
     CPU power ..... 37  
     Digital Input/Output ..... 39  
     fan ..... 40  
     floppy disk ..... 41  
     front panel ..... 42  
     IDE ..... 45  
     infrared interface ..... 44  
     keyboard ..... 47  
     parallel port ..... 48  
     SATA ..... 49  
     serial ports ..... 51  
     trusted platform module (TPM) ..... 52  
     USB (internal) ..... 53  
 cooling ..... 74  
     airflow ..... 74  
     cooling fan ..... 40, 68  
 cooling kit installation ..... 67  
 CPU  
     cooling fan ..... 68  
     heat sink ..... 68  
     installation ..... 64  
 CPU card ..... 75  
     installation ..... 75  
 CPU cooling fan ..... 40  
 CPU fan connector ..... 40  
     location and pinouts ..... 40

**D**

DB-15 connector ..... 84  
 digital input/output connector ..... 39  
     location and pinouts ..... 39  
 dimensions ..... 8  
     board ..... 8  
     external peripheral interface connector  
         panel ..... 9  
 DIMM ..... 69  
     installation ..... 69  
     specifications ..... 69  
 dual port USB cable ..... 78

**E**

electrostatic discharge ..... 29, 60  
 Enhanced Hardware Monitor ..... 24  
 Ethernet connector, external ..... 56  
 Ethernet controllers ..... 56  
 external indicators ..... 42  
 external peripheral interface ..... 81  
     connection ..... 81  
     connectors ..... 81  
 external switches ..... 42

**F**

fan connector ..... 40  
     location and pinouts ..... 40  
 fan speed controller ..... 25  
 floppy disk connector ..... 41  
     location and pinouts ..... 41

floppy disk drive ..... 41  
 front panel connector ..... 42  
     location and pinouts ..... 42

**H**

hard disk drives  
     SATA ..... 49  
 heat sink ..... 68  
 HT technology ..... 64  
     system requirements ..... 64  
 hyper-threading technology ..... 64  
     system requirements ..... 64

**I**

IDE connector, 40-pin ..... 45  
     location and pinouts ..... 45  
 IDE device ..... 79, 80  
     ATA flat cable ..... 79  
     connector ..... 80  
 infrared interface ..... 44  
     Amplitude Shift Key Infrared ..... 44  
     ASKIR ..... 44  
     Serial Infrared ..... 44  
     SIR ..... 44  
 infrared interface connector ..... 44  
     location and pinouts ..... 44  
 installation checklist ..... 62

**J**

jumper ..... 72, 73

clear CMOS ..... 73  
 jumper configuration..... 73  
 jumper settings ..... 72

**K**

keyboard..... 47  
 keyboard connector ..... 55  
 keyboard connector ..... 47  
   location and pinouts ..... 47  
 keyboard controller ..... 25

**L**

LAN connection..... 81  
 LAN connector..... 56  
 LPC bus..... 22  
 LPC interface ..... 24

**M**

memory module installation ..... 69  
 mouse connector ..... 55

**P**

parallel port ..... 26  
 parallel port connector ..... 48  
   location and pinouts ..... 48  
 PCI bus..... 20  
 peripheral connectors ..... 36  
 peripheral device cables ..... 75  
 power button ..... 43

power supply ..... 38  
   AT power supply ..... 38  
 PS/2 cable ..... 47  
 PS/2 connector ..... 55  
 PS/2 keyboard and mouse  
   connection ..... 82

**R**

RAID..... 49  
 real time clock..... 18  
 RJ-45 connection ..... 81  
   single connector ..... 81  
 RJ-45 connector ..... 56  
 RJ-45 connector ..... 57  
 RJ-45 LAN connector ..... 56  
 RS-232 ..... 51, 76  
   cable connection..... 76  
   COM 2 location and pinouts ..... 51  
   connector location and pinouts ..... 51  
   dual cable ..... 76  
   serial port devices ..... 51  
 RS-232 serial port devices ..... 51

**S**

Safety Precautions..... 101  
 SATA drive ..... 77  
   cables ..... 77  
   connection ..... 77  
   power cable ..... 77  
 SATA drive connector ..... 49  
   location and pinouts ..... 49  
 SATA drives ..... 49

serial port connector..... 51  
     location and pinouts ..... 51  
 serial ports..... 24  
 SIR interface ..... 44  
 socket LGA775 CPU  
     cooling kit ..... 67  
     cooling kit installation..... 67  
     installation..... 64  
 southbridge chipset ..... 16  
 Super I/O chipset..... 23

**T**

technical specifications ..... 4  
 trusted platform module ..... 52  
 trusted platform module (TPM)  
     connector..... 52  
     location and pinouts ..... 52

**U**

unpacking..... 29, 63  
     unpacking checklist..... 30  
     unpacking precautions ..... 29, 63  
 USB..... 53, 54, 78  
     cable  
         dual port ..... 78  
     cable ..... 78  
     cable ..... 78

cable connection..... 78  
 connectors ..... 78  
 devices ..... 53  
 external USB device connection..... 83  
     port ..... 53  
         USB 1.1..... 53  
         USB 2.0..... 53  
 USB 1.1..... 53  
 USB 2.0..... 53  
 USB 2.0 port ..... 57  
 USB cable  
     dual port ..... 78  
 USB connector, internal ..... 53  
     location and pinouts ..... 53  
 USB device connection..... 83  
     single connector ..... 83  
 USB port ..... 57

**V**

VGA..... 84  
 VGA connector ..... 4, 58  
 VGA monitor ..... 84  
     connection..... 84

**W**

warranty validation ..... 62

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# 3308150

## Quick Installation Guide

### Package Contents

3308150 package includes the following items:

- 1x 3308150 single board computer
  - 1x ATA 66/100 flat cable
  - 1x Dual RS-232 cable
  - 1x KB/MS Y cable
  - 1x USB cable
  - 3x SATA power cable
  - 6x SATA cable
  - 1 x mini jumper pack
  - 1 x Utility CD
  - 1 x QIG (Quick Installation Guide)
-

---

## Specifications

- CPU: LGA775 45nm Intel® Core™2 Quad(Yorkfield),Core™2Duo (Wolfdale), Core™2 Duo, Celeron at FSB800/1066/1333MHz processors
  - System Chipset: Intel® Q35+ICH9R
  - BIOS: AMI BIOS Label  
8Mb SPI EEPROM
  - System memory: 4 x 240pin socket dual channel DDRII at 800/667MHz up to 8GB
  - Ethernet: Dual Broadcom GbE with ASF2.0
  - I/O  
I/O Interface:  
2 x RS-232  
7 x USB2.0(1 on bracket,6 on board by pin header)  
6 x SATA II support RAID 0,1,10,5  
1 x IDE  
1 x FDD  
2 x LPT  
1 x IrDA  
1 x Keyboard and mouse(PS/2)  
1 x 5-pin on-board header for KB  
  
Super I/O: ITE IT8718F  
Digital I/O: 8-bit Digital I/O, 4-bit input / 4-bit output
  - Display: VGA integrated in Intel® Q35
  - Audio: 10-pin on-board header support 7.1 channel HD Audio w/optional 1007760 Cable Kit
  - TPM1.2: 1x 20-pin on-board header for TPM(Trusted Platform Module)
  - Watchdog timer: Software programable 1-255 sec. by super I/O
  - Power supply: ATX
  - Power Consumption:  
● 3.3V @0.03A, 5V @8.62A, 5Vsb @0.11A, 12V @0.1A , Vcore @2.29A (Intel® core™ 2 Duo E8400,DDR2 800MHz 2GB x 4) 3D Mark 2001SE
  - Temperature: 0 ~ 60°C( 32 ~ 140°F)
-



---

## Ordering Information

3308150

PICMG1.0 CPU Card support Intel® LGA 775 Core™2 Duo CPU in 45nm process at FSB800/1066/1333MHz, Intel® Q35&ICH9R,VGA, Dual GbE, 6 SATA II with RAID,IDE,FDD,LPT,USB2.0

Optional:

1007760

7.1Channel HD Audio kit with Realtek ALC883 support dual audio streams

## Jumpers setting and Connectors

<b>J_CM OS1 : Clear CMOS Setup</b>	
<b>JSPI_SEL1</b>	<b>DESCRIPTION</b>
1-2	Normal(Default)
2-3	Clear CMOS Data

<b>JLAN_PWR1 : WOL enable jumper(Optional)</b>	
	<b>DESCRIPTION</b>
<b>1-3</b>	<b>LAN 2 WOL Enable(Default)</b>
<b>2-4</b>	<b>LAN 1 WOL Enable(Default)</b>
<b>3-5</b>	<b>LAN 2 WOL Disable</b>
<b>4-6</b>	<b>LAN 1 WOL Disable</b>

---

<b>KB1 : 5-pin Keyboard Connector</b>	
<b>PIN</b>	<b>DESCRIPTION</b>
1	KEYBOARD CLOCK
2	KEYBOARD DATA
3	N/C
4	GROUND
5	VCC

<b>COM1, COM2 : External Serial Port Connector</b>			
<b>PIN</b>	<b>DESCRIPTION</b>	<b>PIN</b>	<b>DESCRIPTION</b>
1	DCD#	2	DSR#
3	RXD	4	RTS#
5	TXD	6	CTS#
7	DTR#	8	RI#
9	GND	10	NC

<b>USB01, USB23, USB45: Internal USB Connector</b>			
<b>PIN</b>	<b>DESCRIPTION</b>	<b>PIN</b>	<b>DESCRIPTION</b>
1	VCC	2	GND
3	DATA-	4	DATA+
5	DATA+	6	DATA-
7	GND	8	VCC

<b>ATXCTL1 : Backplane Power Connector</b>	
<b>PIN</b>	<b>DESCRIPTION</b>
1	Ground
2	PS_ON
3	5V Dual

<b>IR1: IrDA connector</b>	
<b>PIN</b>	<b>DESCRIPTION</b>
1	VCC
2	NC
3	IR-RX
4	GND
5	IR-TX

<b>J_AUDIO1 : Audio Source Connector</b>			
<b>PIN</b>	<b>DESCRIPTION</b>	<b>PIN</b>	<b>DESCRIPTION</b>
1	ACZ_SYNC	2	ACZ_BITCLK
3	ACZ_SDOUT	4	ACZ_PCBEAP
5	ACZ_SDIN	6	ACZ_RST#
7	ACZ_VCC(+5V)	8	ACZ_GND
9	ACZ_12V	10	ACZ_GND

<b>TPM1: Trusted Platform Module connector</b>			
<b>PIN</b>	<b>DESCRIPTION</b>	<b>PIN</b>	<b>DESCRIPTION</b>
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#

<b>CPU_FAN1 : CPU Fan Connector</b>	
<b>PIN</b>	<b>DESCRIPTION</b>
1	Ground
2	+12V
3	Rotation Signal
4	Control

<b>DIO1 : Digital Input / Output Connector</b>			
<b>PIN</b>	<b>DESCRIPTION</b>	<b>PIN</b>	<b>DESCRIPTION</b>
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

<b>F_PANEL1 : External Switches and Indicators panel</b>					
	<b>PIN</b>	<b>DESCRIPTION</b>	<b>PIN</b>	<b>DESCRIPTION</b>	
Power LED	1	+5V	2	+5V	Speaker
	3	N/C	4	N/C	
	5	GROUND	6	N/C	
PWRBTN	7	PWRBTN+	8	Speaker	RESET
	9	PWRBTN-	10	N/C	
HDDLED	11	+5V	12	Reset-	
	13	HDLED-	14	GND	

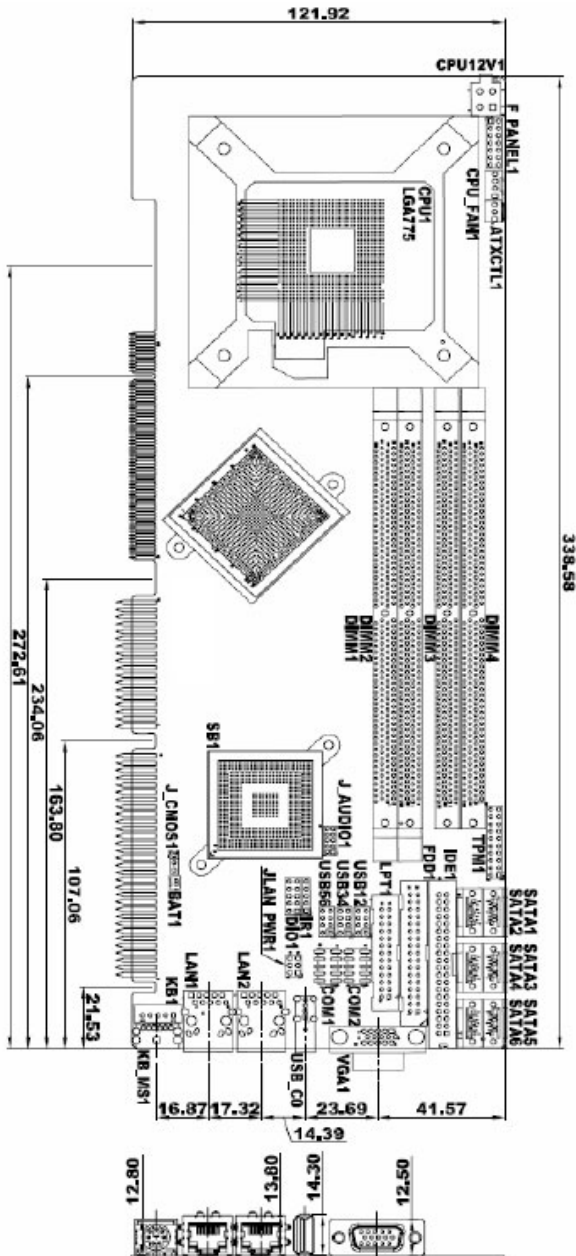
---

**CPU12V1: ATX-12V1 (CPU)**

<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	GND
3	+12V	4	+12V

---

# Board Layout: Jumper and Connector Locations



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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