Global AMERICAN

integration with integrity

User's Manual

Single Board Computer 3307690

Version 1.0, December 2006

Copyrights

This manual is copyrighted and all rights are reserved. It does not allow any non authorization in copied, photocopied, translated or reproduced to any electronic or machine readable form in whole or in part without prior written consent from the manufacturer.

In general, the manufacturer will not be liable for any direct, indirect, special, incidental or consequential damages arising from the use of inability to use the product or documentation, even if advised of the possibility of such damages. The manufacturer keeps the rights in the subject to change the contents of this manual without prior notices in order to improve the function design, performance, quality and reliability. The author assumes no responsibility for any errors or omissions, which may appear in this manual, nor does it make a commitment to update the information contained herein.

Trademarks

Intel is a registered trademark of Intel Corporation.
Award is a registered trademark of Award Software, Inc.

All other trademarks, products and or product's name mentioned herein are mentioned for identification purposes only, and may be trademarks and/or registered trademarks of their respective companies or owners.

Table of Contents

List of Figures

List of Tables

Glossary

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

Chapter

1

Introduction

1.1 3307690 CPU Card Overview

The PICMG 1.0 form factor 3307690 CPU card with Intel® Pentium® D processor platform is fully equipped with the latest technology and advanced multi-mode I/Os. The 3307690 is designed for system manufacturers, integrators, and VARs that want performance, reliability, and quality at a reasonable price.

1.1.1 3307690 Model Variations

The 3307690 has two model variations shown in **Table 1-1:**.

Model Name	SATA II	Digital Video Interface (DVI)
3307690A	Four	None
3307690B	Four	One

Table 1-1: 3307690 Model Variations

1.1.2 3307690 CPU Card Applications

The 3307690 CPU card has been designed for use in industrial applications where board expansion is critical and operational reliability is essential.

1.1.3 3307690 CPU Card Benefits

Some of the 3307690 CPU card benefits include:

- „ Dual-core Intel® processor support
  - o Two physical cores in a package share the system load
  - o Each core has its own L1 cache and shares the L2 cache to enhance the processing speed
  - o High performance levels especially in 3D graphic and multimedia application
- „ Enhanced Intel SpeedStep® Technology support ensures better power consumption management

„ Intel® EMT64 Technology supports 64-bit computing for improved performance, allowing systems to address more than 4GB of both virtual and physical memory

„ providing access to multiple PCI and ISA expansion slots for easy system expansion

„ operating reliably in harsh industrial environments with ambient temperatures as high as 60°C

„ rebooting automatically if the BIOS watchdog timer detects that the system is no longer operating

1.1.4 3307690 CPU Card Features

Some of the 3307690 CPU card features are listed below:

„ PICMG 1.0 compliant

„ RoHS compliant

„ Supports Intel® Core™2 Duo / Pentium® 4 / Pentium® D / Celeron® D CPUs

„ Supports a maximum front side bus (FSB) speed up to 1066MHz

„ Supports up to 4GB of 400/533/667MHz of DDR2 memory

„ Comes with two high performance PCI Express Gigabit Ethernet (PCI-E GbE) controllers

„ Supports SATA II channels with transfer rates up to 300Mb/s (see **Table 1-1:**)

„ Supports up to seven USB 2.0 devices

„ Analog display supported

„ One DVI interface with resolution from VGA to UXGA supported by one model (see **Table 1-1:**)

1.2 3307690 CPU Card Overview
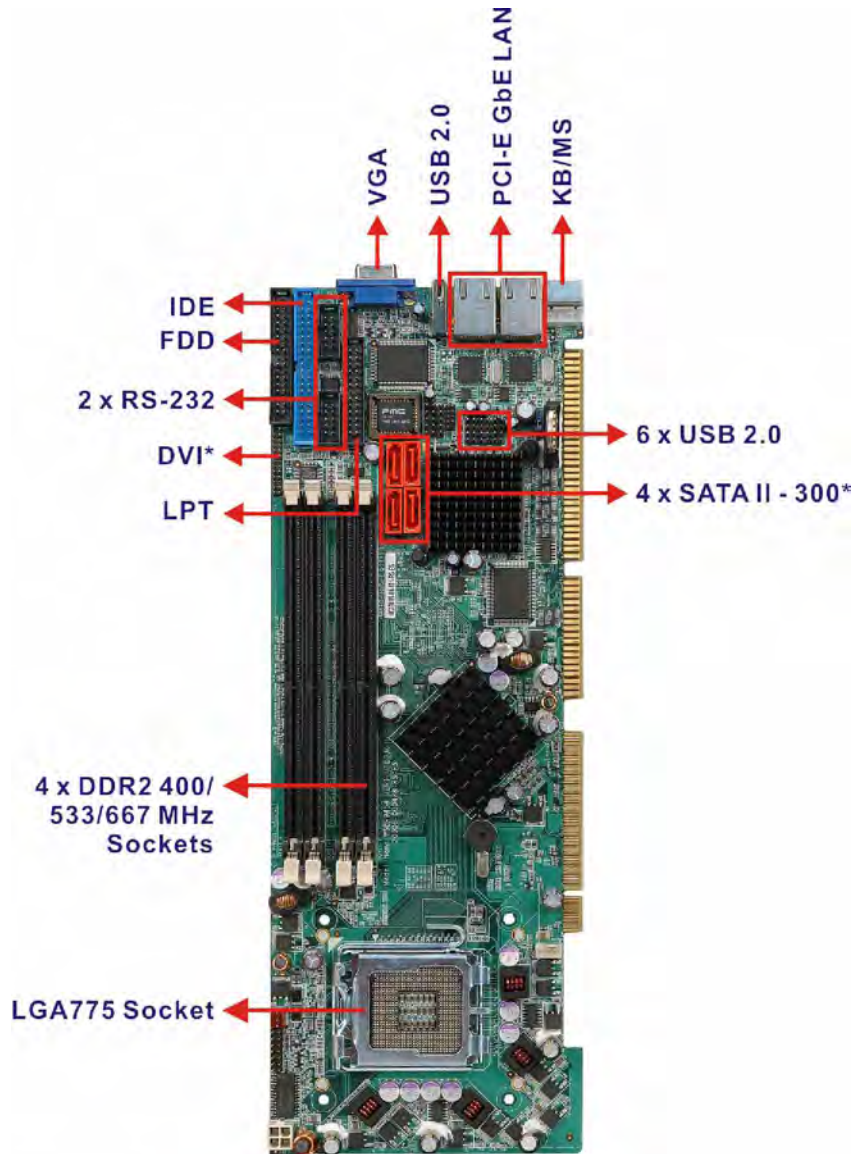
* See Table 1-1: for model variations.

Table 1-2: 3307690 CPU Card Overview

1.2.1 3307690 CPU Card Connectors

The 3307690 CPU card has the following connectors on-board:

- „ 1 x ATX-12V connector
- „ 1 x Audio module connector
- „ 1 x Backplane to mainboard power connector
- „ 1 x CPU fan connector
- „ 4 x DDR2 DIMM sockets
- „ 1 x Digital I/O connector
- „ 1 x Digital Visual Interface (DVI) Connector (see **Table 1-1:**)
- „ 1 x FDD connector
- „ 1 x Front panel connector
- „ 1 x 40-pin IDE connector
- „ 1 x IrDA connector
- „ 1 x Keyboard/mouse connector
- „ 1 x Parallel port connector
- „ 2 x RS-232 Serial port connectors
- „ 4 x SATA II connectors (see **Table 1-1:**)
- „ 6 x USB connectors

The location of these connectors on the CPU card can be seen in **Figure 1-1**. These connectors are fully described in **Chapter 3**.

1.2.2 Technical Specifications

3307690 CPU card technical specifications are listed in **Table 1-3:**. Detailed descriptions of each specification can be found in **Chapter 2**.

SPECIFICATION	
Supported CPUs	Intel® Core™ 2 Duo Intel® Pentium® 4 Intel® Pentium® D Intel® Celeron® D
Front Side Bus	533/800/1066MHz
Socket	LGA775
Chipsets	Northbridge: Intel® 945G Express Chipset o Intel® 82945G Graphics and Memory Controller Hub (GMCH) Southbridge: Intel® ICH7 I/O Controller Hub (ICH)
Graphics Support	Intel® Graphics Media Accelerator 950 (GMA 950) integrated in the Northbridge o One VGA Silicon Image SiI1362 o One DVI (See **Table 1-1:**)
Memory	Four 400/533/667 MHz DDR2 memory modules (Max. 4GB)
PCI Bus Interface	33MHz, Revision 2.3

SPECIFICATION	DESCRIPTION
ISA Bus Interface	Supports three fully compatible ISA slots without buffering **ISA DMA and ISA Bus Master function are not supported**
Serial ATA (SATA)	Four SATA II channels with 300Mb/s transfer rates (see **Table 1-1:**)
HDD Interface	One IDE channel supports two Ultra ATA 100/66/33 devices (see **Table 1-1:**)
Floppy Disk Drive (FDD)	Supports FDD
USB Interfaces	Six internal USB 2.0 connectors and one external USB port support seven USB devices
Serial Ports	Two RS-232 serial port connectors (COM1 and COM2)
Real Time Clock	256-byte battery backed CMOS RAM
Hardware Monitoring	Cooling fans, temperature and system voltages
Power Management	Supports Advanced Configuration and Power Interface (ACPI) Specifications Revision 2.0
Power Consumption	5V @ 6.75A, +12V @ 7.24A (Intel$^®$ Pentium$^®$ 4 3.0GHz, DDR2 533MHz 1GB*4) -3D MARK)
Infrared Support	One Infrared Data Association (IrDA) interface
Ethernet	Two PCI Express Gigabit Ethernet (PCI-E GbE) channels
BIOS	AMI BIOS

SPECIFICATION	DESCRIPTION
Physical Dimensions	12.2cm x 34.1cm (width x length)
Operating Temperature	Minimum: 0ºC (32°F) Maximum: 60°C (140°F)
Operating Humidity	Minimum: 5% Maximum: 95%
Optional Audio Interface	5.1 Channel audio kit with Realtek ALC655 AC `97 codec

Table 1-3: Technical Specifications

Chapter

2

Detailed Specifications

2.1 Compatible Backplanes

The 3307690 CPU card is compatible with PICMG1.0 backplanes. For more information on these backplanes, visit the Global American, Inc. (GAI) website or contact your CPU card reseller or vendor.

2.2 CPU Support

Table 2-1 lists the CPUs supported by the 3307690 board.

Model	Clock Speed	L2 Cache	Max. FSB	Socket
Intel® Core™ 2 Duo	1.86 to 2.66 GHz	2 to 4 MB	1066 MHz	LGA775
Intel® Pentium® Processor Extreme Edition	3.2 GHz	2 x 1 to 2 MB	1066 MHz	LGA775
Intel® Pentium® D	2.80 to 3.60 GHz	2 x 1 to 2 MB	800 MHz	LGA775
Intel® Pentium® 4	2.66 to 3.80 GHz	1 to 2 MB	800 MHz	LGA775
Intel® Celeron® D	2.13 to 3.46 GHz	256 to 512 KB	533 MHz	LGA775

Table 2-1: Supported CPUs

2.2.1 Intel® Core™ Duo

The Intel® Core™ Duo processor comes with the following features:

- „ Two complete execution cores in one processor package provide advancements in simultaneous computing
- „ Dual-core processing efficiently delivers performance while balancing power requirements
- „ Two execution cores share a high-performance, power-optimized 667 MHz front-side bus (FSB) to access the same chipset memory.
- „ Enhanced Intel SpeedStep® technology allows a system to dynamically adjust processor voltage and core frequency, decreasing average power consumption and average heat production

- Intel® Smart Cache Design allows two execution cores to share 2 MB of L2 cache, reducing FSB traffic and enhancing system responsiveness
- Intel® Advanced Thermal Manager supports new digital temperature sensors and thermal monitors on each execution core to enhance thermal monitoring accuracy
- Streaming SIMD Extensions 3 (SSE3) provides significant performance enhancement for multi-media applications
- Embedded lifecycle support protects system investment by enabling extended product availability for embedded and communications customers

2.2.2 Intel® Pentium® D

The Intel® Pentium® D processor comes with the following features:

- The two full processing cores make it easy to handle multiple applications, multimedia entertainment and digital photo editing simultaneously
- Intel® Extended Memory 64 Technology (Intel® EM64T) enables the processor to execute operating systems and applications written to take advantage of the Intel EM64T.
- Intel Speedstep® technology allows tradeoffs to be made between performance and power consumption.
- The Execute Disable Bit feature allows memory to be marked as executable or non-executable.

2.2.3 Intel® Pentium® 4

The Intel® Pentium® 4 processor comes with the following features:

- Hyper-Threading Technology improves system responsiveness and increases productivity and efficiency.
- Improved Power Management with Enhanced Intel SpeedStep® Technology
- Improved performance by allowing the system to address more than 4 GB of both virtual and physical memory.
- Execute Disable Bit prevent certain classes of malicious "buffer overflow" attacks when combined with a supporting operating system.

2.2.4 Intel® Celeron® D

The Intel® Celeron® D processor comes with the following features:

- „ Intel® Extended Memory 64 Technology provides 64-bit computing support and extends virtual and physical memory, giving the processor platform access to larger amounts of memory
- „ 512K L2 cache gives the processor core faster access to larger amounts of data used most often
- „ Intel® Streaming SIMD Extensions accelerates 3D graphics performance
- „ Execute Disable Bit Technology prevents certain classes of malicious "buffer overflow" attacks when combined with a supporting operating system.

2.3 On-board Chipsets

2.3.1 Northbridge and Southbridge Chipsets

The following chipsets are preinstalled on the board:

- „ **Northbridge**: Intel® 945G
- „ **Southbridge**: Intel® ICH7

The following two sections (**Section 2.3.2** and **Section 2.3.3**) lists some of the features of the Intel® 945G and the Intel® ICH7 chipsets. For more information on these two chipsets refer to the Intel website.

2.3.2 Intel® 945G Northbridge Chipset

The Intel® 945G Northbridge chipset comes with the following features:

- „ Supports Intel® Viiv™ Technology
- „ Dual-channel DDR2 Memory support
- „ Intel® Graphics Media Accelerator 950 delivers richer visual color and picture clarity without the need for additional discrete grahics cards.

2.3.3 Intel® ICH7 Southbridge Chipset

The Intel® ICH7 Southbridge chipset comes with the following features:

- „ Integrated serial ATA host controller with data transfer rates up to 3.0 Gb/s
- „ Integrated IDE
  - o Independent timing of up to two dirves
  - o Ultra ATA/100/66/33, BMIDE and PIC modes
  - o Tri-state modes to enable swap bay
- „ AC-Link for audio and telephony CODECs
- „ Intel Matrix Storage Technology
  - o Protection against data loss from a hard drive failure
- „ High-speed SATA II storage interface with 3.0 Gb/s transfer rate
- „ Power management logic
  - o Supports ACPI 3.0
  - o PCI PME# support
- „ SMBus
  - o Provides independent manageability bus through SMLink interface
  - o Support SMBus 2.0 Specification

2.4 Graphics Support

2.4.1 Intel® GMA 950

The Intel® GMA 950 integrated on the Intel® 945G chipset has the following features.

- „ Intel® GMA 950 Graphics Core
  - o 400MHz 256-bit graphics core
  - o Up to 10.6 GB/sec memory bandwidth with DDR2 667 MHz system memory
  - o 1.6 GPixels/sec and 1.6 GTexels/sec fill rate
  - o 192 MB maximum video memory
  - o 2048 x 1536 at 75 Hz maximum resolution
  - o Operating systems supported: Microsoft® Windows® XP, Windows® XP 64-bit, Media Center Edition, Windows 2000; Linux-compatible (Xfree86 source available)
- „ High Performance 3D
  - o Up to 4 pixels per clock rendering
  - o Microsoft® DirectX® 9 Hardware Acceleration Features:
  - o Pixel Shader 2, Volumetric Textures, Shadow Maps,
  - o Slope Scale Depth Bias, Two-Sided Stencil
  - o Microsoft® DirectX® 9 Vertex Shader 3.0 and Transform and Lighting supported in SW through highly optimized
  - o Processor Specific Geometry Pipeline (PSGP)
  - o Texture Decompression for DirectX® and OpenGL®
  - o OpenGL® 1.4 support with ARB extensions
- „ Advanced Display Technology
  - o Interlaced Display output support

2.4.2 Analog VGA

The on-board analog VGA has the following features.

- „ Supports 400MHz, 24-bit RAMDAC (RAM digital to analog converter)
- „ Supports displays with resolutions up to 2048x1536 pixels

2.4.3 Digital Visual Interface (DVI)

The DVI interface on the 3307690B is controlled by the Silicon Image SiI362 chip and has the following features.

- „ Incorporates the latest PanelLink® technology with support display resolutions ranging from VGA to UXGA (1600x1200) in a single link interface.
- „ Supports Intel® Serial Digital Video Output (SDVO) technology
- „ I2C slave interface for access to internal registers
- „ Dual I2C pass-through interfaces for host I2C access of EDID (via DDC) and configuration EEPROM (on ADD2 Card)
- „ Low-voltage input signaling interface: 175mV to 1.2V
- „ Monitor detection supported through Hot Plug or Receiver Sense
- „ Cable distance support greater than 10 meters
- „ DVI 1.0 compliant, with significantly greater margin than competitive solutions
- „ 48-pin LQFP package without EEPROM interface (motherboard applications)

2.5 Data Flow

Figure 2-1 shows the data flow between the user-installed CPU, the two on-board chipsets, and other components installed on the CPU card.
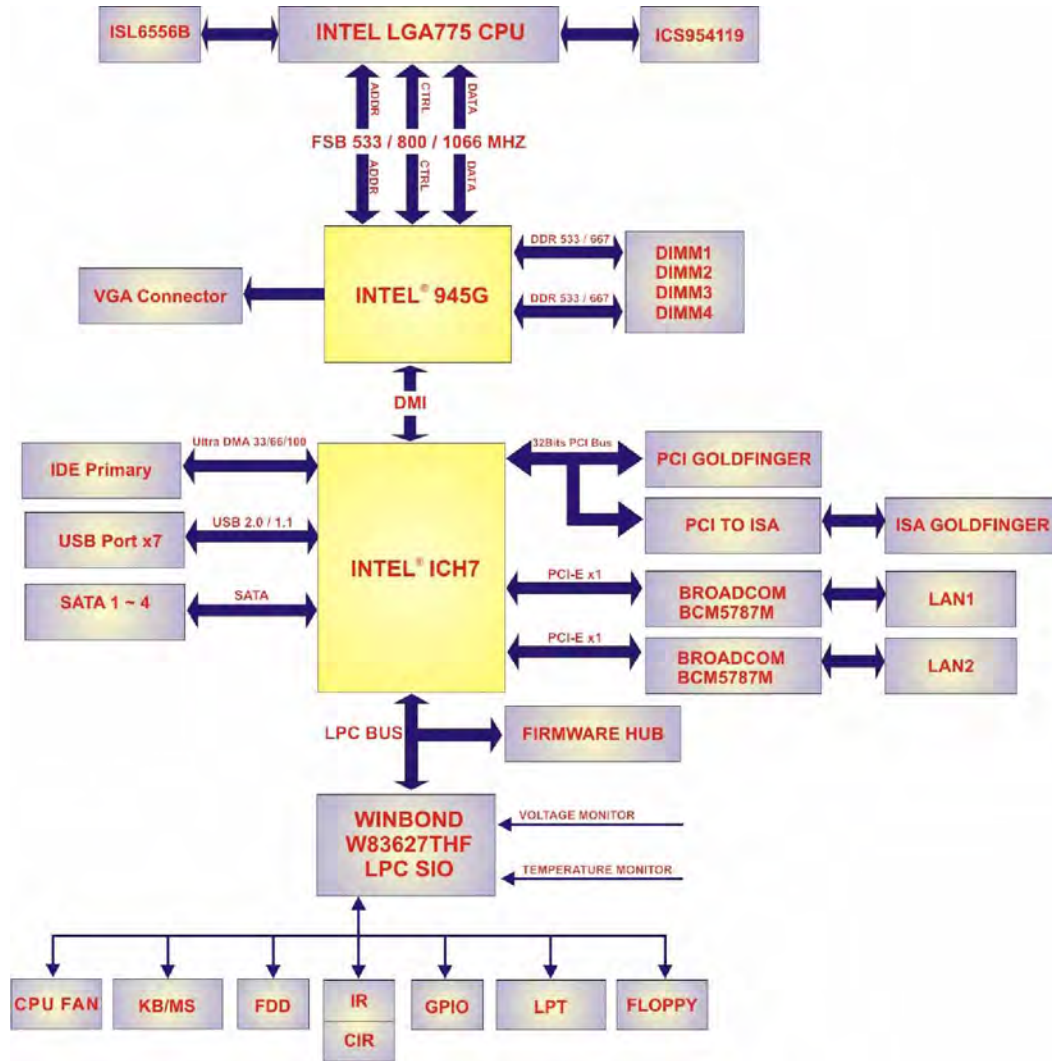
Figure 2-1: Data Flow Block Diagram

2.6 Memory Support

The 3307690 CPU card has two 240-pin dual inline memory module (DIMM) sockets that support up to two unbuffered DDR2 DIMMs with the following specifications:

- „ **Maximum RAM**: 2GB (1GB module in each slot)
- „ **DIMM Transfer Rates**: 667MHz, 533MHz, 400MHz
- „ Up to 10.6 GB/sec memory bandwidth

2.7 PCI Bus Interface Support

The PCI bus on the 3307690 CPU card has the following features:

NOTE:

The 3307690 does not support ISA DMA and ISA Bus Master function. Before purchasing your ISA device, please confirm with your vendor that your ISA card is supported by the CPU board.

- „ 33MHz Revision 2.3 is implemented
- „ Up to four external bus masters are supported
- „ 2.X ISA bus interface supported
- „ Three fully compatible ISA slots without buffering supported

2.8 GbE Ethernet Connection

The two GbE controllers (Broadcom BCM5787) on the 3307690 CPU card connect to two 10/100/1000Mb/s Ethernet RJ-45 LAN ports on the rear panel. The BCM5787 is a seventh generation 10/100/1000BASE-T Ethernet LAN controller solution for high performance network applications. The device combines a triple-speed IEEE 802.3 compliant Media Access Controller (MAC) with a triple-speed Ethernet transceiver, PCIe bus interface, and on-chip buffer memory in a single device. The device is fabricated in a

1.2V CMOS process providing a low-power system solution. The GbE controllers come with the following features:

- „ Integrated 10/100/1000 transceiver
- „ 10/100/1000 full/half-duplex MAC
- „ Automatic MDI crossover function
- „ Supports PCIe v1.0a
- „ Wake-on-LAN support meeting the ACPI requirements
- „ Statistics for SNMP MIB II, Ethernet-like MIB and Ethernet MIB (802.3z, clause 30)
- „ Serial EEPROM or serial flash supported
- „ JTAG supported
- „ 196-FBGA package

2.9 Drive Interfaces

The 3307690A model supports the following drive interfaces:

- „ 2 x SATA II drives
- „ 1 x IDE channel supports two Ultra ATA 100/66/33 devices
- „ 1 x FDD

The 3307690B model supports the following drive interfaces:

- „ 4 x SATA II drives
- „ 1 x IDE channel supports two Ultra ATA 100/66/33 devices
- „ 1 x FDD

2.9.1 SATA Drives

The 3307690 supports the SATA II drive interfaces with transfer rates up to 300Mb/s with the ICH7 Southbridge chipset.

2.9.2 IDE HDD Interfaces

The IDE controller on the ICH7 Southbridge chipset integrated on the CPU card supports two HDDs with the following specifications:

- „ Supports PIO IDE transfers up to 16MB/s
- „ Supports the following Ultra ATA devices:
    - o **Ultra ATA/33**, with data transfer rates up to 33MB/s
    - o **Ultra ATA/66**, with data transfer rates up to 66MB/s
    - o **Ultra ATA/100**, with data transfer rates up to 100MB/s

2.9.3 Floppy Disk Drive (FDD)

The 3307690 CPU card supports a single FDD. The following FDD formats are compatible with the board.

- „ 5.25": 360KB and 1.2MB
- „ 3.5": 720KB, 1.44MB and 2.88MB

2.10   Serial Ports

The 3307690 CPU card has two high-speed UART serial ports, configured as COM1 and COM2. The serial ports have the following specifications.

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

2.11 Real Time Clock

256-byte battery backed CMOS RAM

2.12 System Monitoring

The 3307690 CPU card is capable of self-monitoring various aspects of its operating status including:

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

2.13 Infrared Data Association (IrDA) Interface

The 3307690 CPU card IrDA supports the following interfaces.

- „   Serial Infrared (SIR)
- „   Amplitude Shift Keyed Infrared (ASKIR)

If you want to use the IrDA port, you have to configure SIR or ASKIR mode in the BIOS under **Super IO devices**. The normal RS-232 COM2 will be disabled.

2.14 USB Interfaces

The 3307690 CPU card has seven USB interfaces, six internal and one external. The USB interfaces support USB 2.0.

2.15 BIOS

The 3307690 CPU card uses a licensed copy of AMI BIOS. The features of the flash BIOS used are listed below:

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

2.16 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the 3307690 CPU card are listed below.

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

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

2.17 Optional Audio Interface

The 3307690 CPU card does not have a built-in AC'97 audio codec. If your system needs audio then this connector must be connected to an external audio module (1007750) with Realtek ALC655.

2.18 Power Consumption

Table 2-2 shows the power consumption parameters for the 3307690 CPU card when a 3GHz Intel® Pentium® 4 processor is running with four 1GB, DDR2 533MHz SDRAM memory modules.

Voltage	Current
5V	6.75A
+12V	7.24A

Table 2-2: Power Consumption

2.19 Packaged Contents and Optional Accessory Items

2.19.1 Package Contents

When you unpack the 3307690 CPU card you should find the following components.

- „ 1 x 3307690 single board computer
- „ 1 x Mini jumper pack
- „ 1 x ATA 66/100 flat cable
- „ 1 x Dual RS-232 cable
- „ 2 x SATA cables
- „ 1 x SATA power cable
- „ 1 x Keyboard/ PS2 mouse Y cable
- „ 1 x USB cable
- „ 1 x Utility CD
- „ 1 x QIG (quick installation guide)

2.19.2 Special Items

The following additional items are shipped with the 3307690B CPU card models.

- „ 2 x SATA cables
- „ 1 x SATA power cable

2.19.3 Optional Accessory Items

The items shown in the list below are separately purchased optional accessory items.

- „ DVI cable
- „ Audio kit
- „ CPU cooler
- „ FDD cable
- „ LPT cable

THIS PAGE IS INTENTIONALLY LEFT BLANK

Chapter

3

Connectors and Jumpers

3.1 Peripheral Interface Connectors

The location of the peripheral interface connectors are shown in **Section 3.1.1**. A complete list of all the peripheral interface connectors can be seen in **Section 3.2**.

3.1.1 3307690 CPU Card Layout

Figure 3-1 shows the on-board peripheral connectors, backplane peripheral connectors and on-board jumpers.
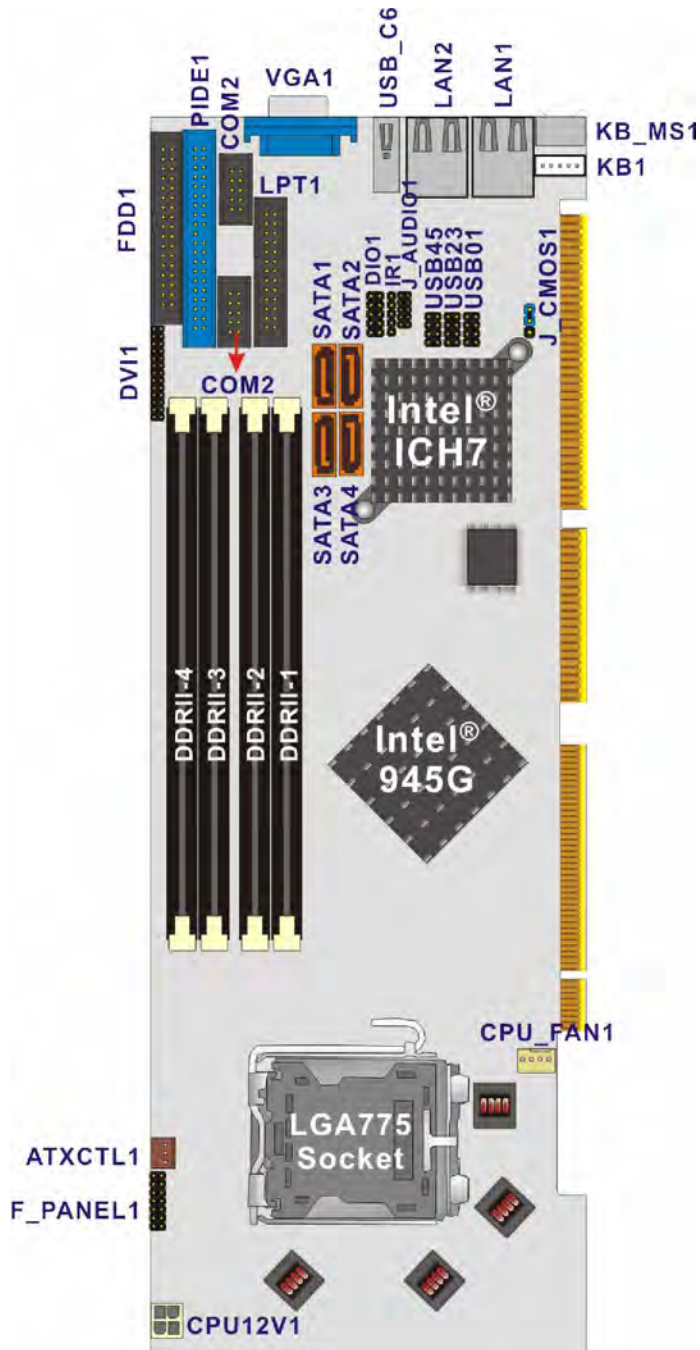
Figure 3-1: Connector and Jumper Locations

3.1.2 Peripheral Interface Connectors

Table 3-1 lists the peripheral interface connectors on the 3307690 CPU card. Detailed descriptions of these connectors can be found in **Section 3.2**.

Label	Connector	Type
CPU12V1	ATX-12V CPU Power Source	4-pin terminal block
J_AUDIO1	Audio Module Connector	9-pin header
ATXCTL1	Backplane to Mainboard Power Connector	3-pin wafer connector
CPU_FAN1	CPU Fan Connector	4-pin wafer connector
DIO1	Digital I/O Connector	10-pin header
DVI1	Digital Visual Interface Connector	25-pin header
FDD1	FDD Connector	34-pin box header
F_PANEL1	Front Panel Connector	14-pin header
PIDE1	IDE Connector	40-pin box header
IR1	IrDA Infrared Interface Connector	5-pin header
KB1	Keyboard Connector	4-pin wafer connector
LPT1	Parallel Port Connector	25-pin box header
COM1 COM2	RS-232 Serial Port Connectors	10-pin box header

SATA1		7-pin SATA connector
SATA2	Serial ATA Connectors	
SATA3		
SATA4		
USB01		8-pin header
USB23	USB Connectors	
USB45		

Table 3-1: Peripheral Interface Connectors

3.1.3 External Peripheral Interface Connectors

Table 3-2 lists the external peripheral interface connectors on the 3307690. Detailed descriptions of these connectors can be found in **Section 3.3**.

Connector	pe	
Ethernet connectors	RJ-45 connector	LAN1
		LAN2
Keyboard/mouse connector	MINI-DIN connector	KB_MS1
USB connector	USB 2.0 connector	USB_C6
VGA connector	HD-D-sub 15 female connector	VGA1

Table 3-2: External Peripheral Interface Connectors

3.1.4 On-board Jumper

Table 3-3 lists the on-board jumper. Detailed descriptions of this jumper can be found in **Section 4.6**.

Label	Connector	Type
J_CMOS1	CMOS state setting	3-pin header

Table 3-3: On-board Jumper

3.2 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 3307690 CPU card.

3.2.1 ATX-12V Power Source Connector

CN Label: **CPU12V1**

CN Type: 4-pin terminal block

CN Location: See **Figure 3-2**

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

This connector supports the ATX-12V power supply.
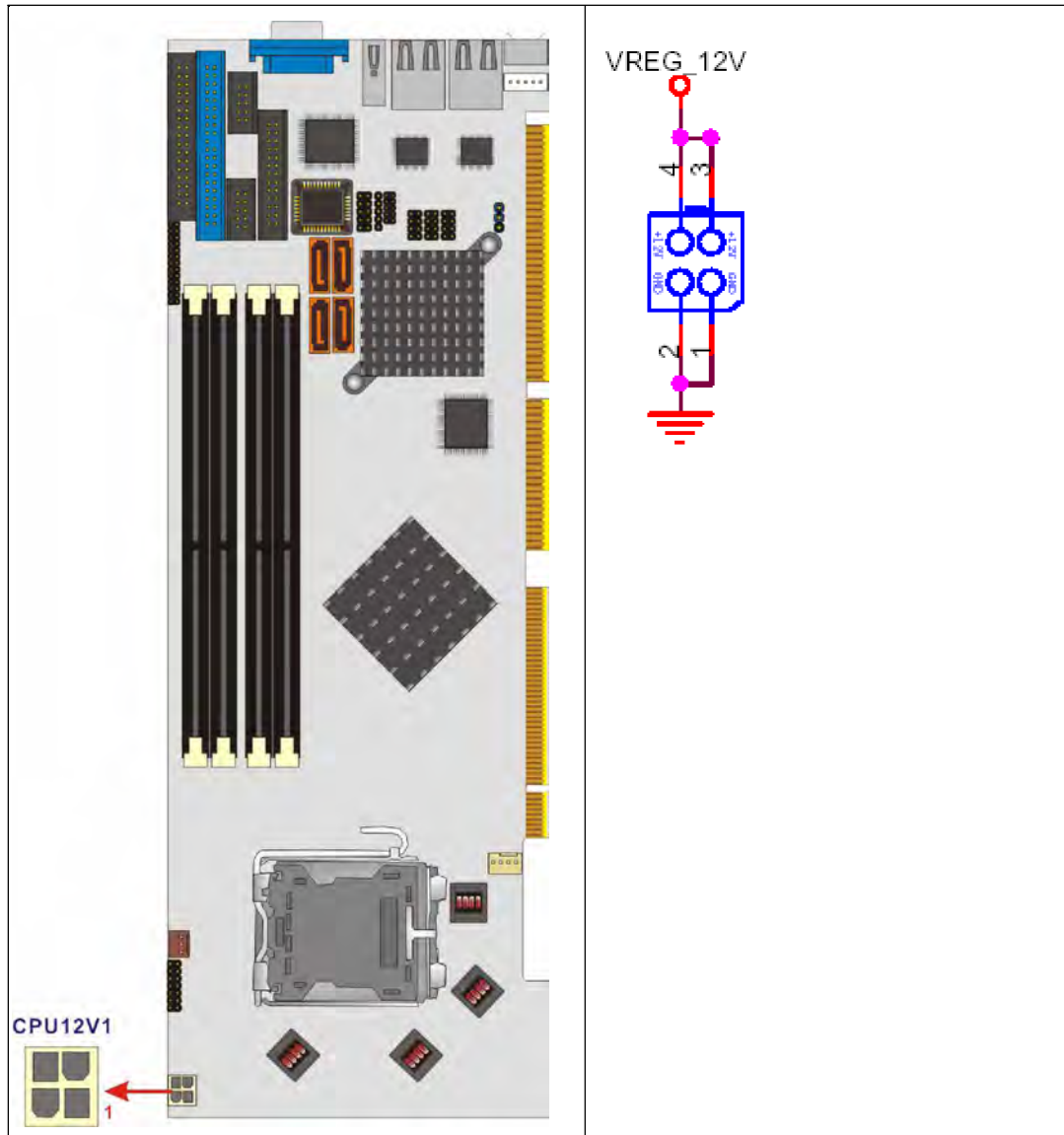
Figure 3-2: ATX–12V Connector Location

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

Table 3-4: ATX–12V Connector Pinouts

3.2.2 Audio Module Connector

CN Label: J_AUDIO1

CN Type: 10- pin header

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

CN Pinouts: See **Table 3-5**

The 3307690 CPU card does not have a built-in AC'97 audio codec. If your system needs audio then this connector must be connected to an external audio module (1007750).
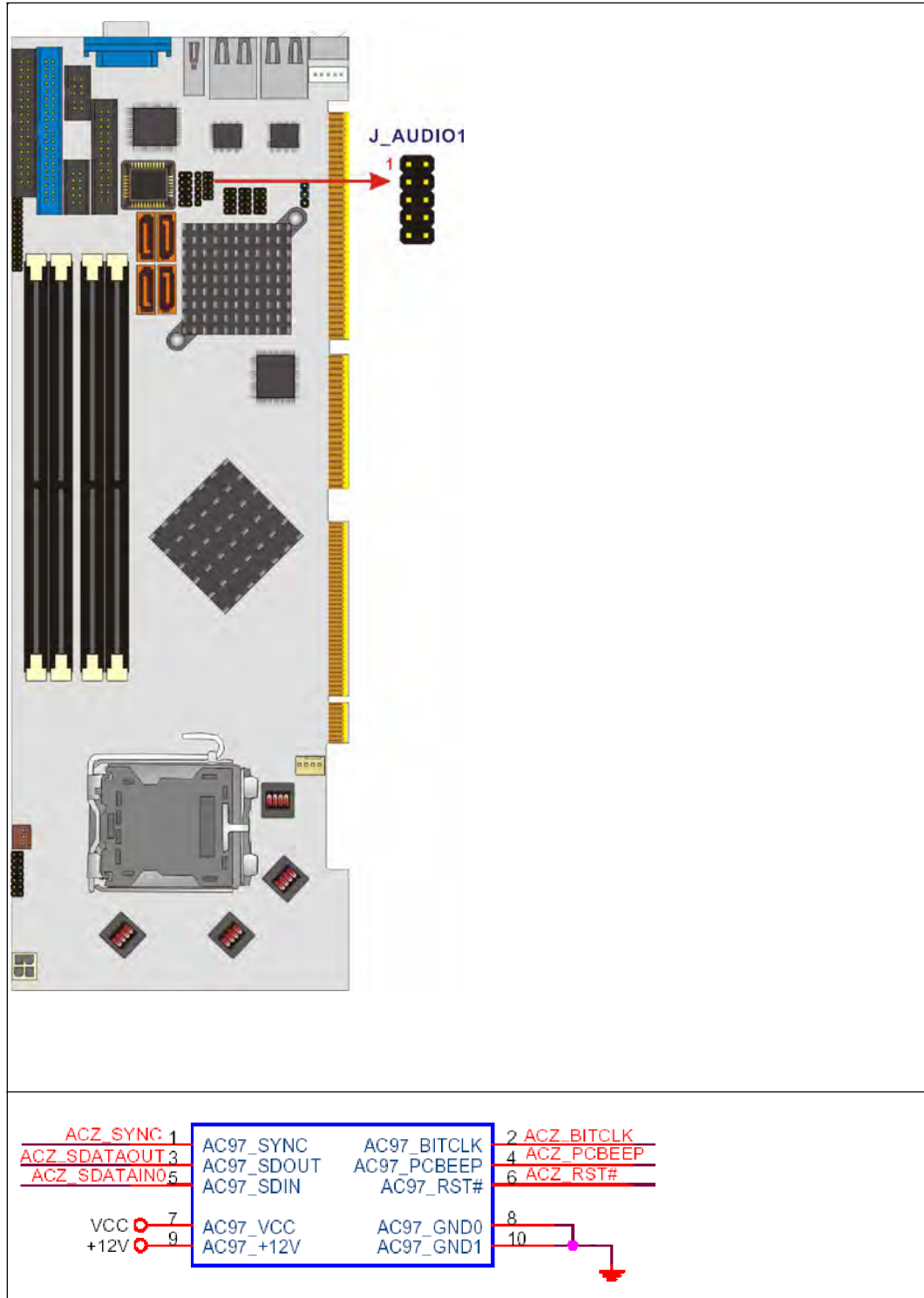
Figure 3-3: Audio Module Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	SYNC	2	BITCLK
3	SDOUT	4	PCBEEP
5	SDIN	6	RST#
7	VCC	8	GND
9	+12V		

Table 3-5: Audio Module Connector Pinouts

3.2.3 Backplane to Mainboard Power Connector

CN Label: **ATXCTL1**

CN Type: 3-pin wafer connector

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

CN Pinouts: See **Table 3-6**

Connects a power source from a backplane with an ATX Connector.
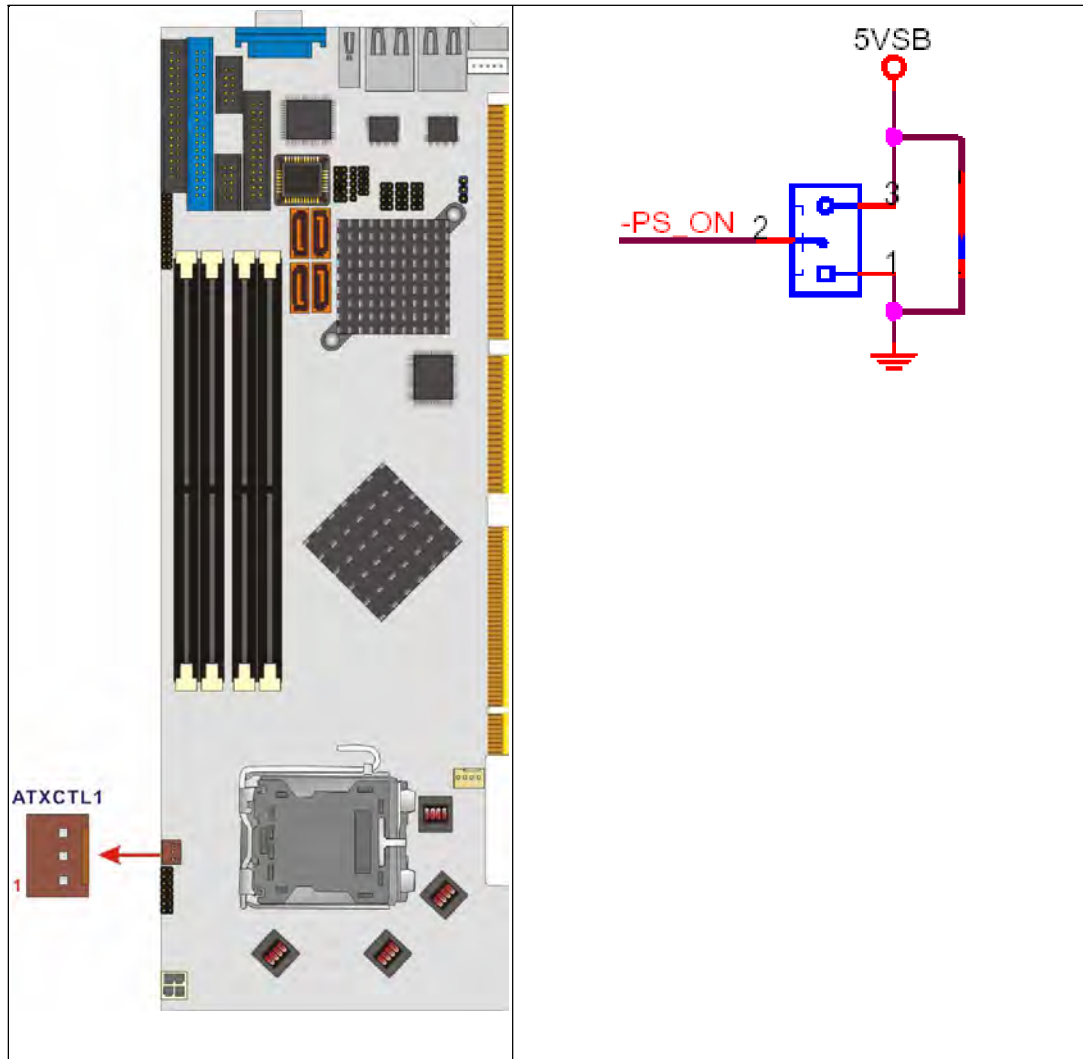
Figure 3-4: Backplane to Mainboard Power Connector Location

PIN NO.	DESCRIPTION
1	**GND**
2	**ATX-ON**
3	**5VSB**

Table 3-6: Backplane to Mainboard Power Pinouts

3.2.4 CPU Fan Connector

CN Label: **CPU_FAN1**

CN Type: 4-pin wafer connector

CN Location: See **Figure 3-5**

CN Pinouts: See **Table 3-7**

The 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.
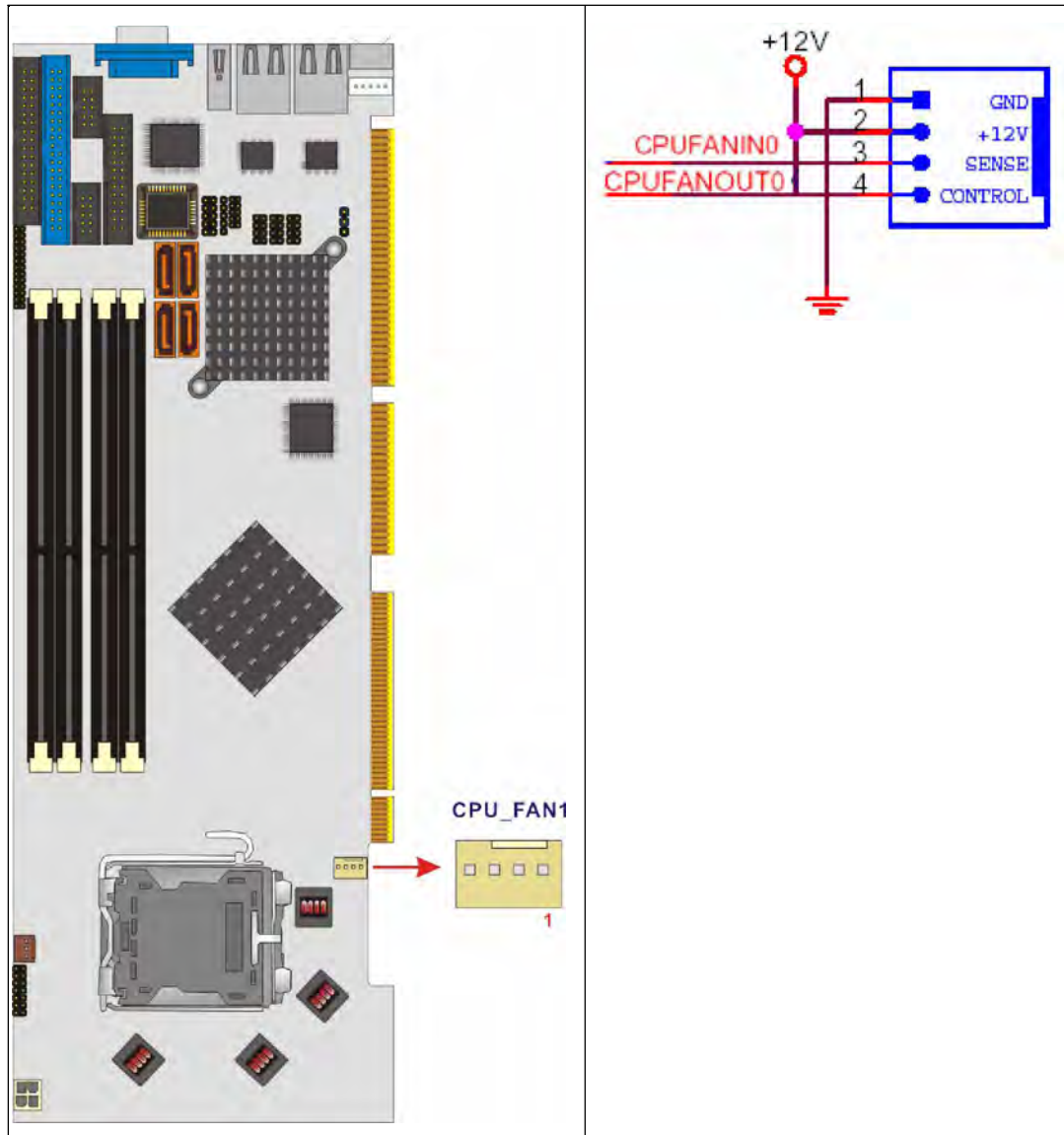
Figure 3-5: CPU Fan Connector Location

PIN	DESCRIPTION
1	Ground
2	+12V
3	Rotation Signal
4	Control

Table 3-7: CPU Fan Connector Pinouts

3.2.5 Digital Input/Output (DIO) Connector

CN Label: **DIO1**

CN Type: 10-pin header

CN Location: See **Figure 3-6**

CN Pinouts: See **Table 3-8**

The DIO connector is managed through a Super I/O chip. The DIO connector pins are user programmable. Refer to **Appendix B** for details.
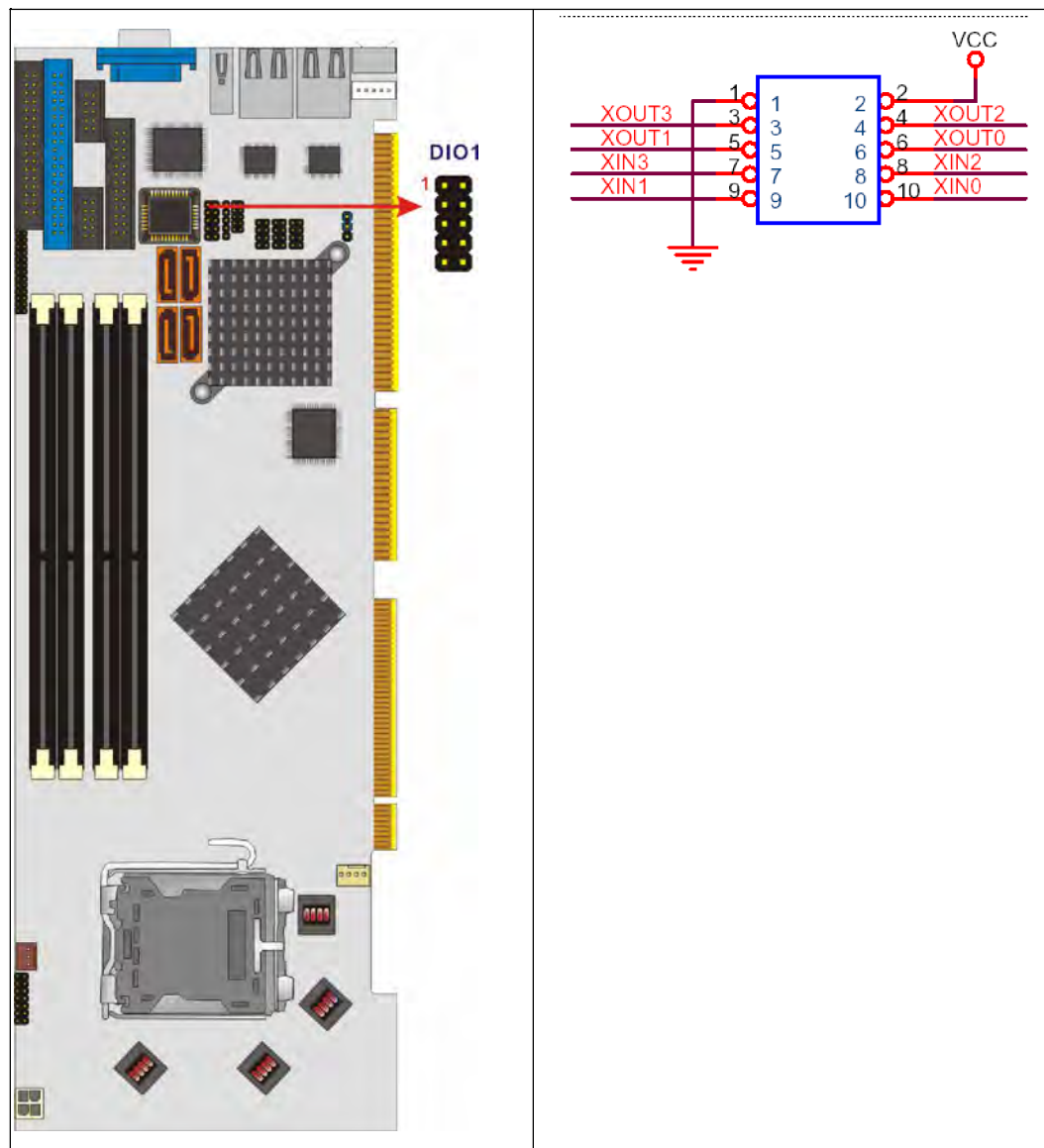
Figure 3-6: DIO Connector Location

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

Table 3-8: DIO Connector Pinouts

3.2.6 DVI (Digital Visual Interface) Connector

CN Label: **DVI1**

CN Type: 25-pin header

CN Location: See **Figure 3-7**

CN Pinouts: See **Table 3-9**

The 3307690B model provides a digital visual interface for digital display. Optional accessory modules can be selected to connect to external DVI devices.
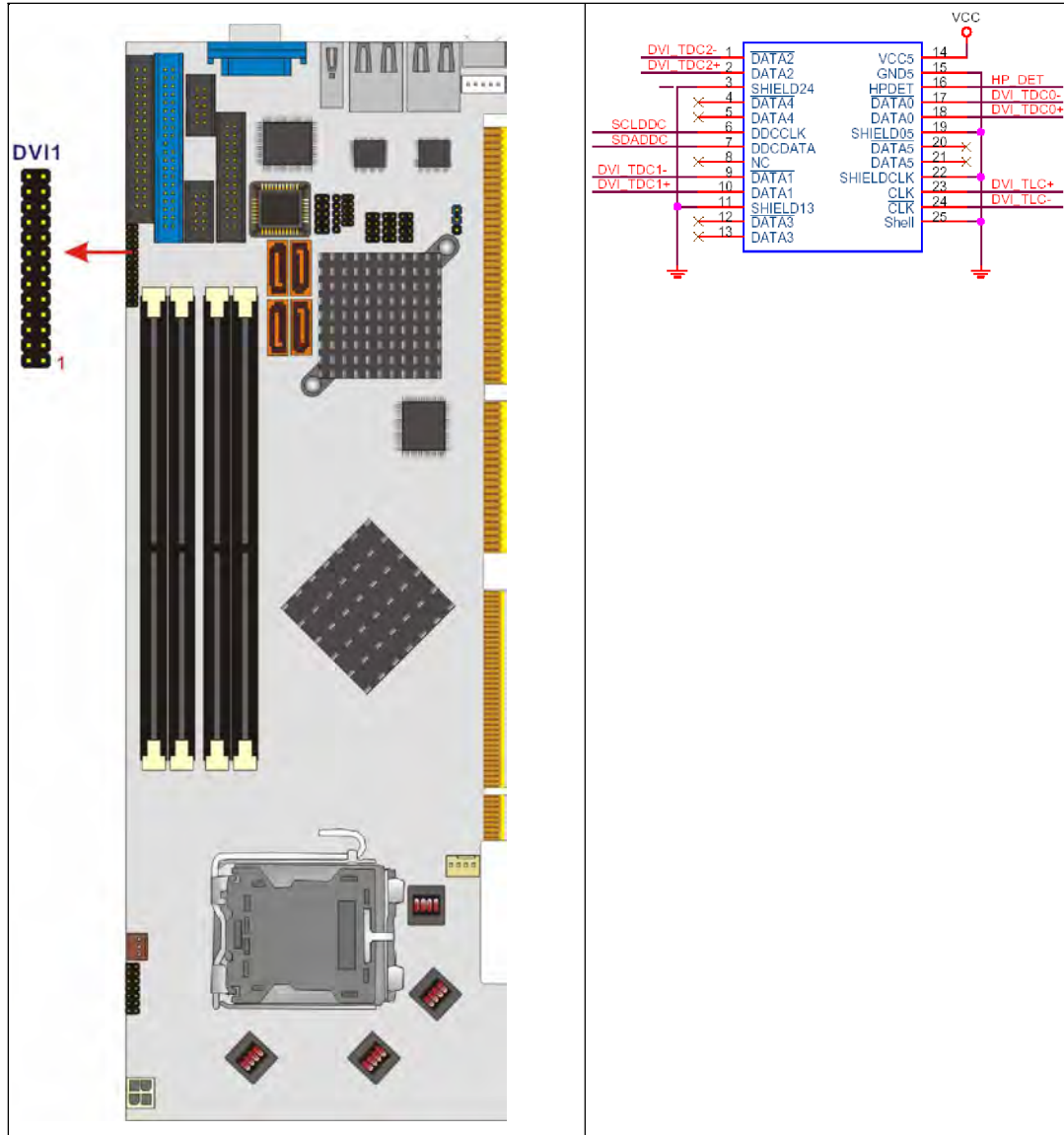
Figure 3-7: DVI Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Data 2-	14	VCC
2	Data 2+	15	GND
3	GND	16	Hot Plug Detect.
4	N/C	17	Data 0-
5	N/C	18	Data 0+
6	DDC Clock	19	GND

7	DDC Data	20	N/C
8	N/C	21	N/C
9	Data 1-	22	GND
10	Data 1+	23	Clock +
11	GND	24	Clock -
12	N/C	25	GND
13	N/C		

Table 3-9: DVI Connector Pinouts

3.2.7 FDD Connector

CN Label: **FDD1**

CN Type: 34-pin header

CN Location: See **Figure 3-8**

CN Pinouts: See **Table 3-10**

The 3307690 is shipped with a 34-pin daisy-chain drive connector cable. This cable can be connected to the FDD connector.
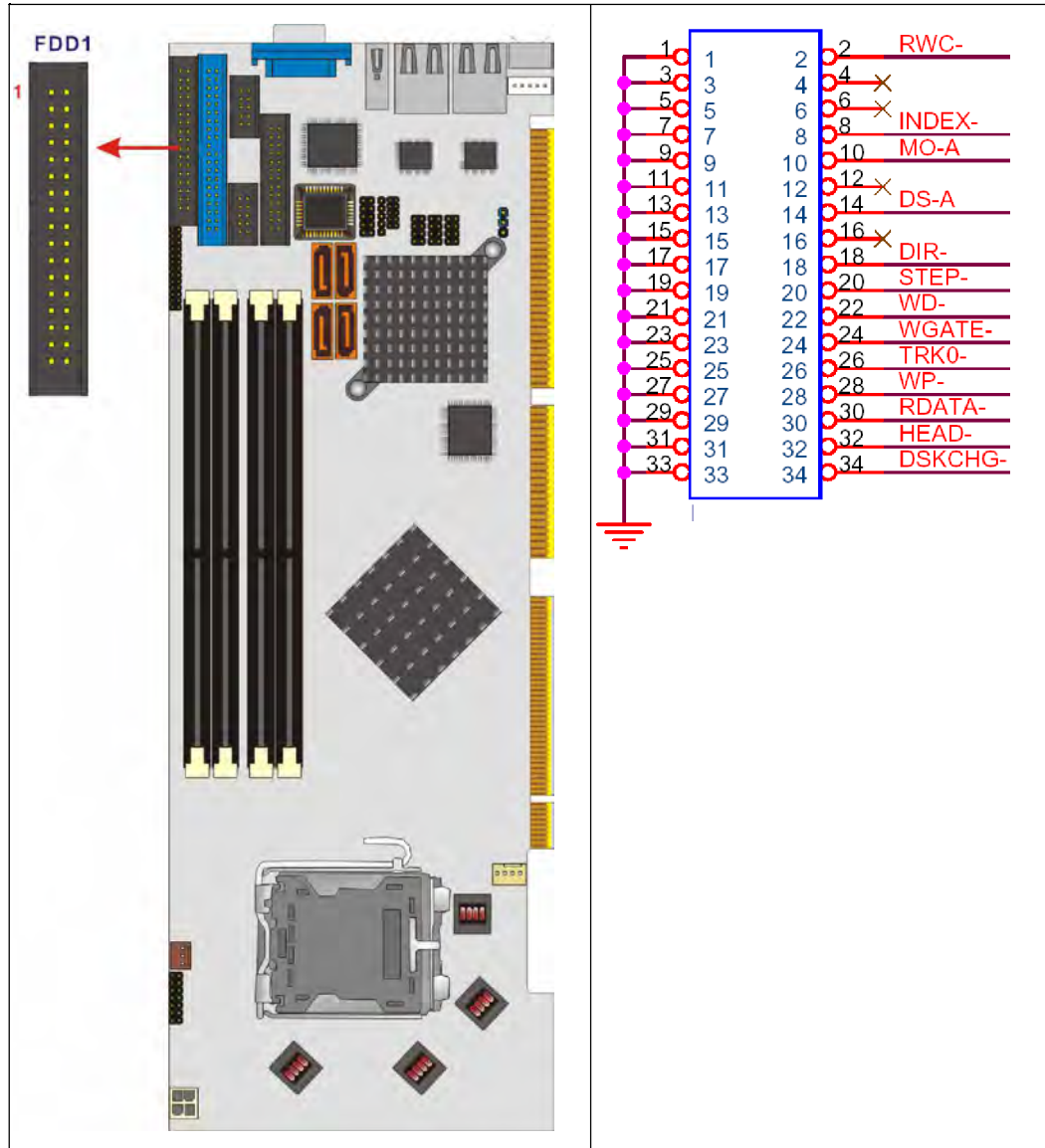
Figure 3-8: FDD Connector Location

PIN	DESCRIPTION	PIN	
1	GND	2	REDUCE WRITE
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 SELECT B#
13	GND	14	DRIVE SELECT A#
15	GND	16	MOTOR ENABLE B#
17	GND	18	DIRECTION#
19	GND	20	STEP#
21	GND	22	WRITE DATA#
23	GND	24	WRITE GATE#
25	GND	26	TRACK 0#
27	GND	28	WRITE PROTECT#
29	GND	30	READ DATA#
31	GND	32	SIDE 1 SELECT#
33	GND	34	DISK CHANGE#

Table 3-10: FDD Connector Pinouts

3.2.8 Front Panel Connector

CN Label: **F_PANEL1**

CN Type: 14-pin header

CN Location: See **Figure 3-9**

CN Pinouts: See **Table 3-11**

The system front panel connector connects to:

- „   the system chassis front panel LEDs
- „   the chassis speaker
- „   the power switch
- „   the reset button
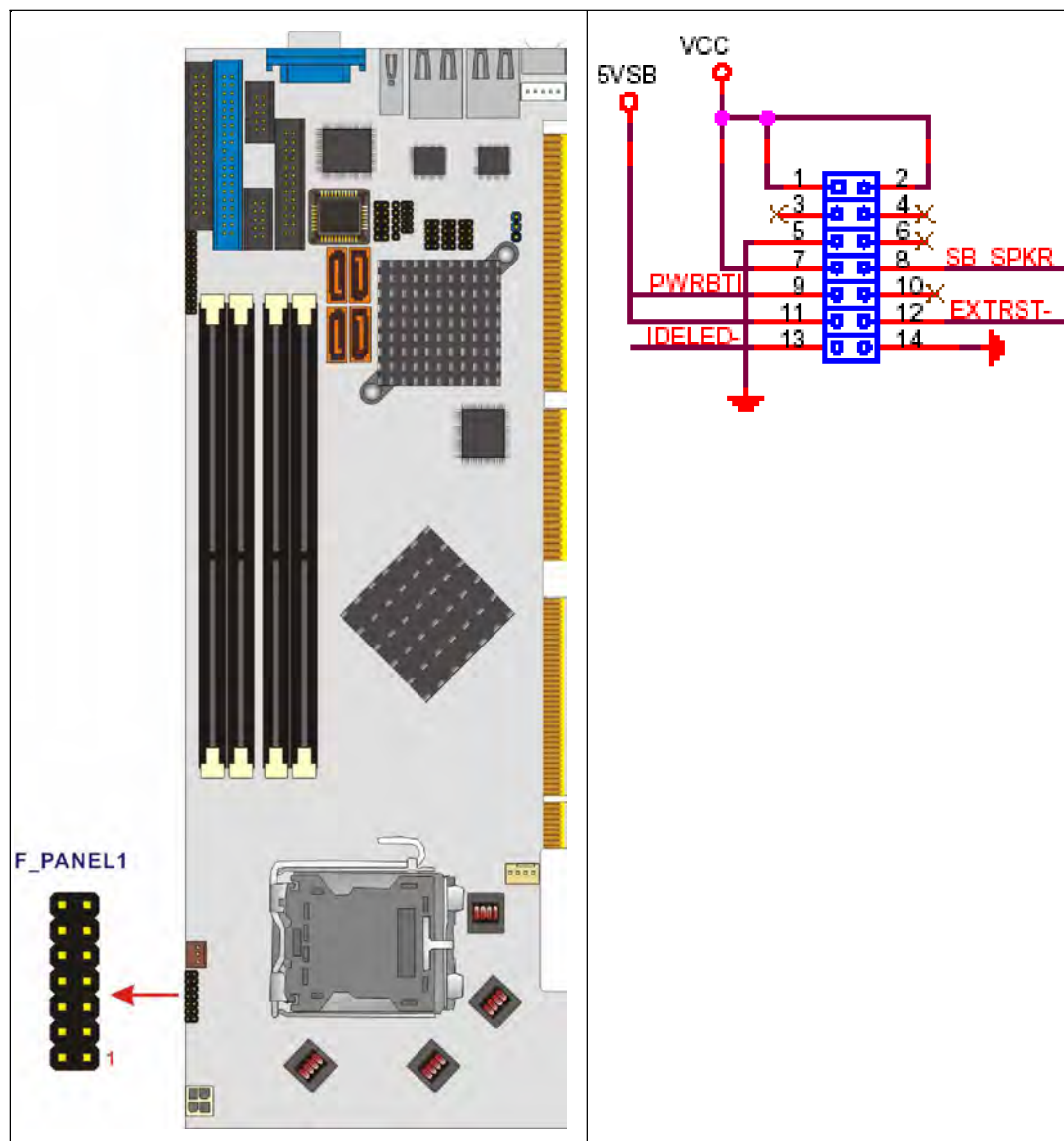
Figure 3-9: Front Panel Connector Location

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power LED	1	PWR_LED+	Speaker	2	SPKR+
	3	N/C		4	N/C
	5	PWR_LED-		6	N/C
PWRBTN	7	PWR_BTN+		8	SPKR-
	9	PWR_BTN-	RESET	10	N/C
HDDLED	11	HDD_LED+		12	RESET+
	13	HDD_LED-		14	RESET-

Table 3-11: Front Panel Connector Location

3.2.9 IDE Connector

CN Label: **PIDE1**

CN Type: 40-pin box header

CN Location: See **Figure 3-10**

CN Pinouts: See **Table 3-12**

One IDE connector provides connectivity for two IDE devices.
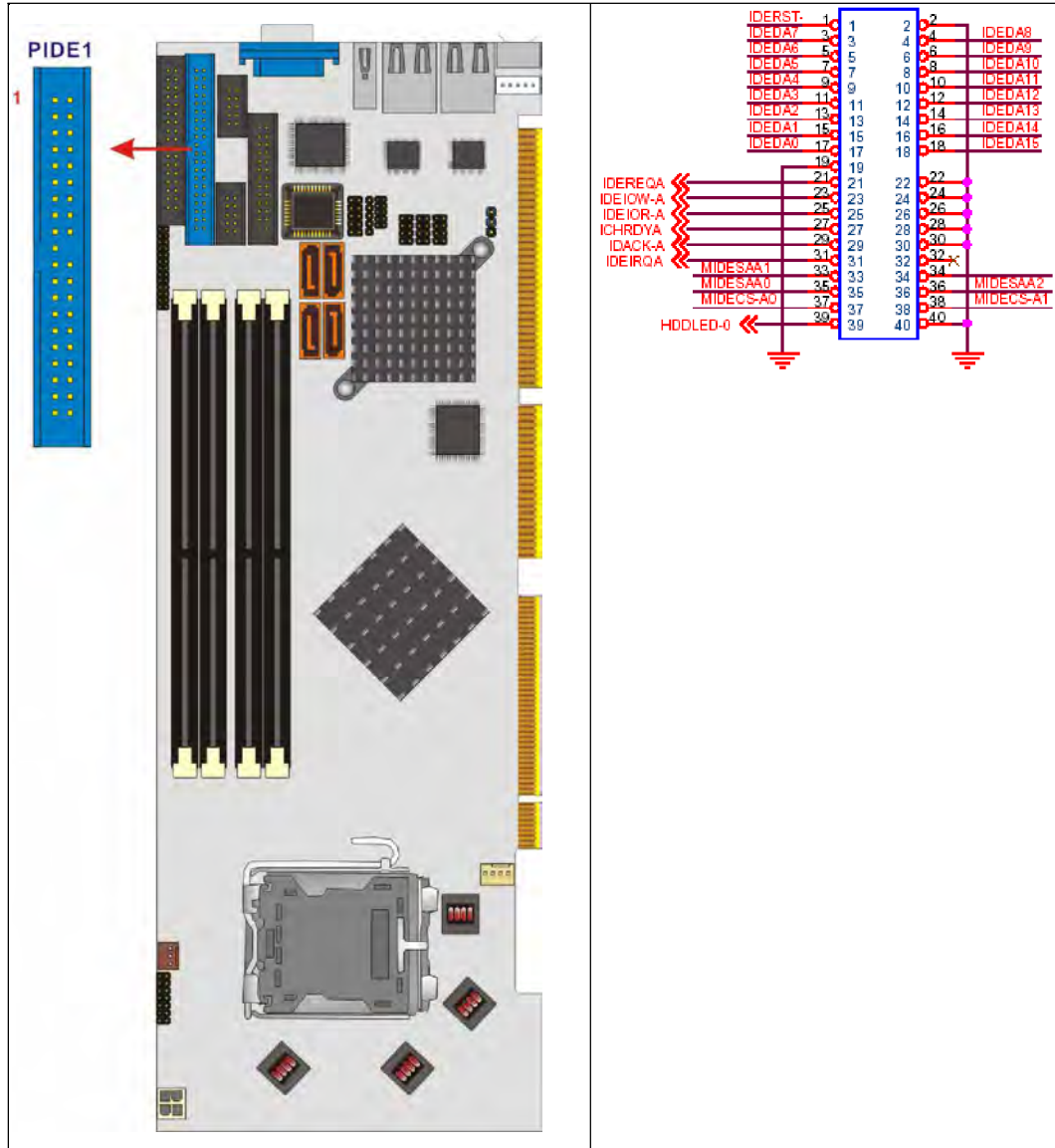
Figure 3-10: IDE Connector Location
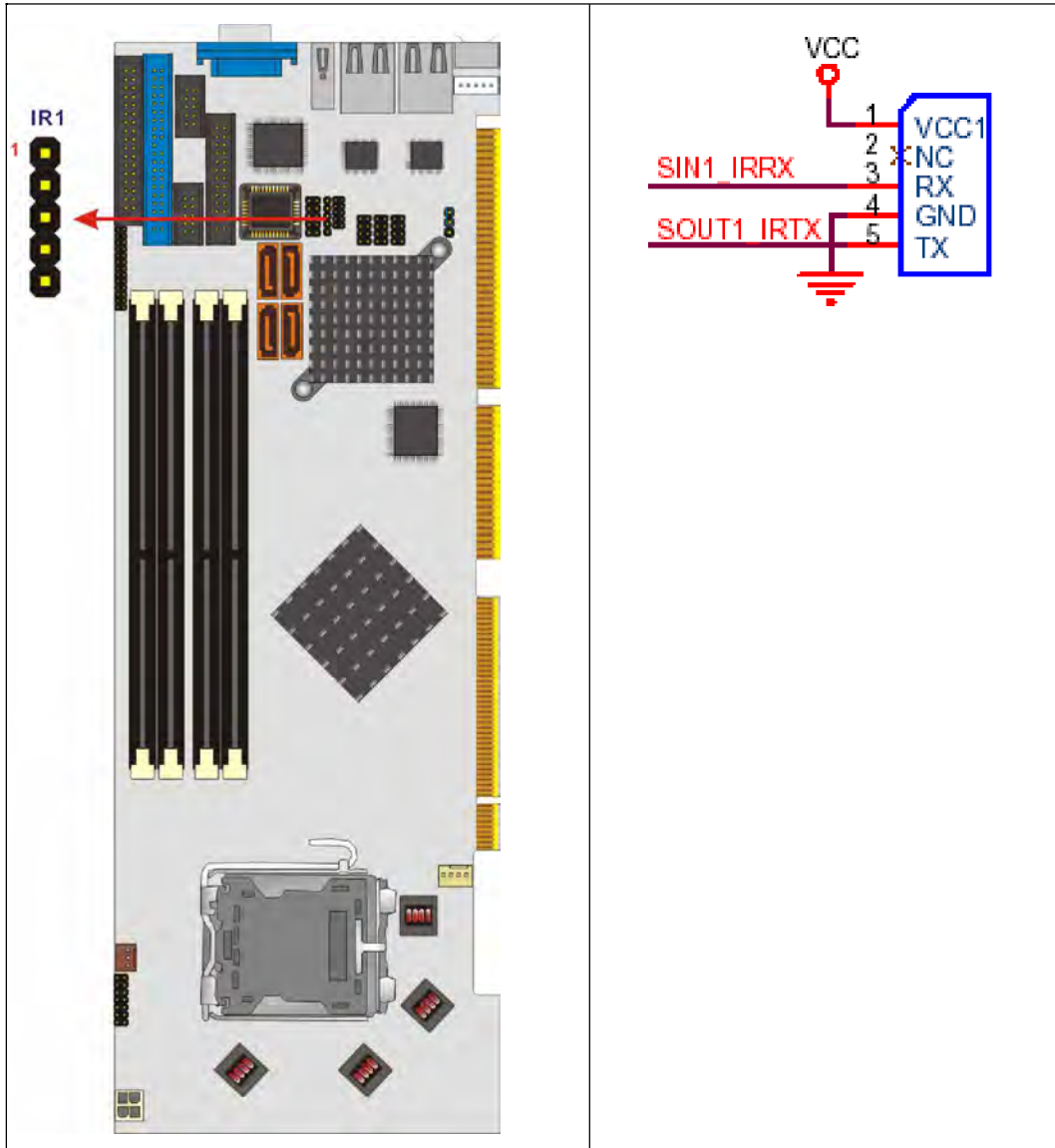
Figure 3-11: IrDA Interface Connector Location

3.2.10 IrDA Interface Connector

CN Label: **IR1**

CN Type: 5-pin header

CN Location: See **Figure 3-11**

CN Pinouts: See **Table 3-13**

The integrated IrDA interface connector supports both the SIR and ASKIR infrared protocols.
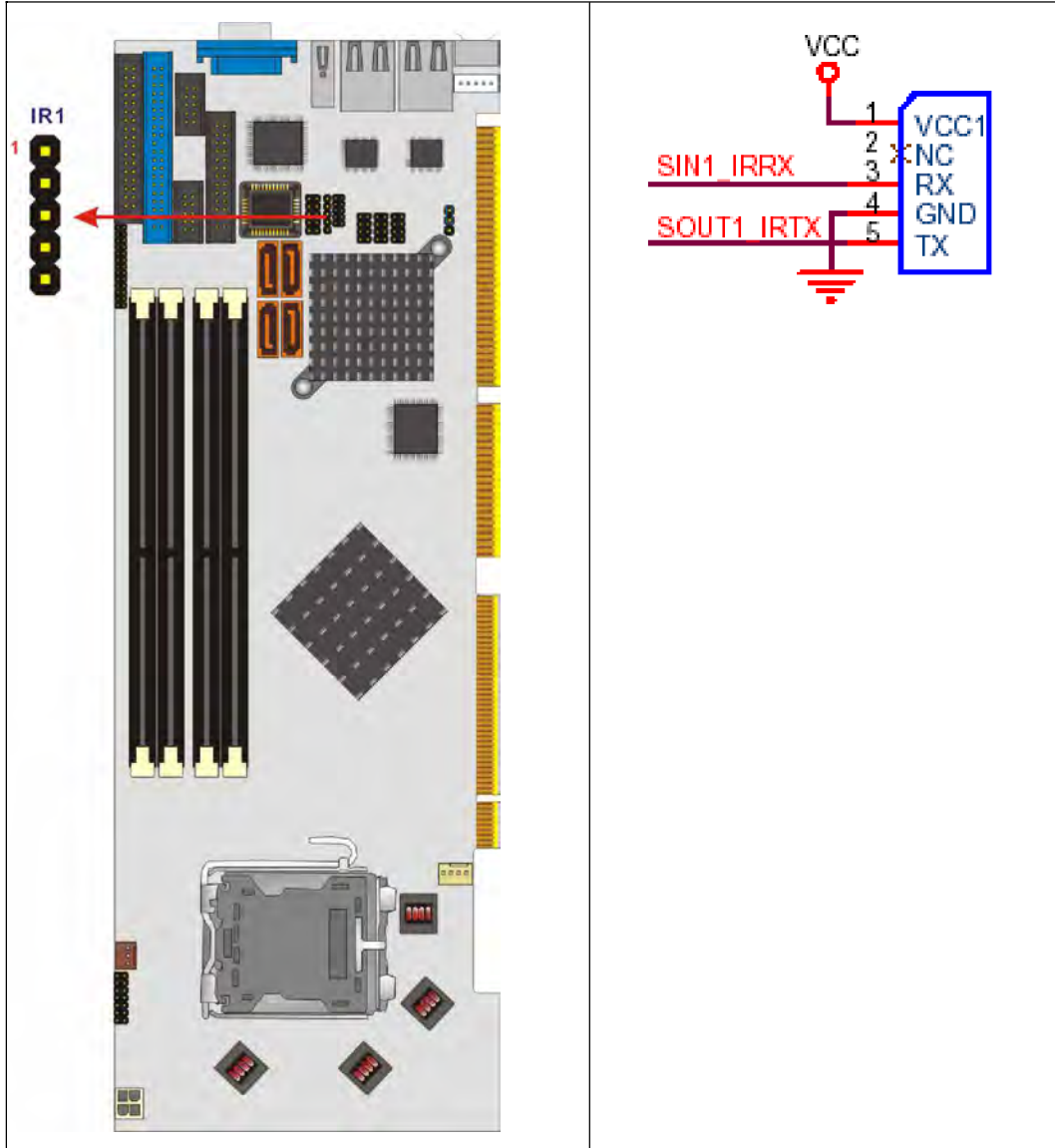
PIN	DESCRIPTION
1	VCC
2	NC
3	SIN1_IRRX
4	GND
5	SOUT1_IRTX

Table 3-13: IrDA Interface Connector Pinouts

3.2.11 Keyboard Connector

CN Label: **KB1**

CN Type: 4-pin wafer

CN Location: See **Figure 3-12**

CN Pinouts: See **Table 3-14**

For alternative application, a keyboard pin header connector is also available on board.

This connector requires a special adapter cable.
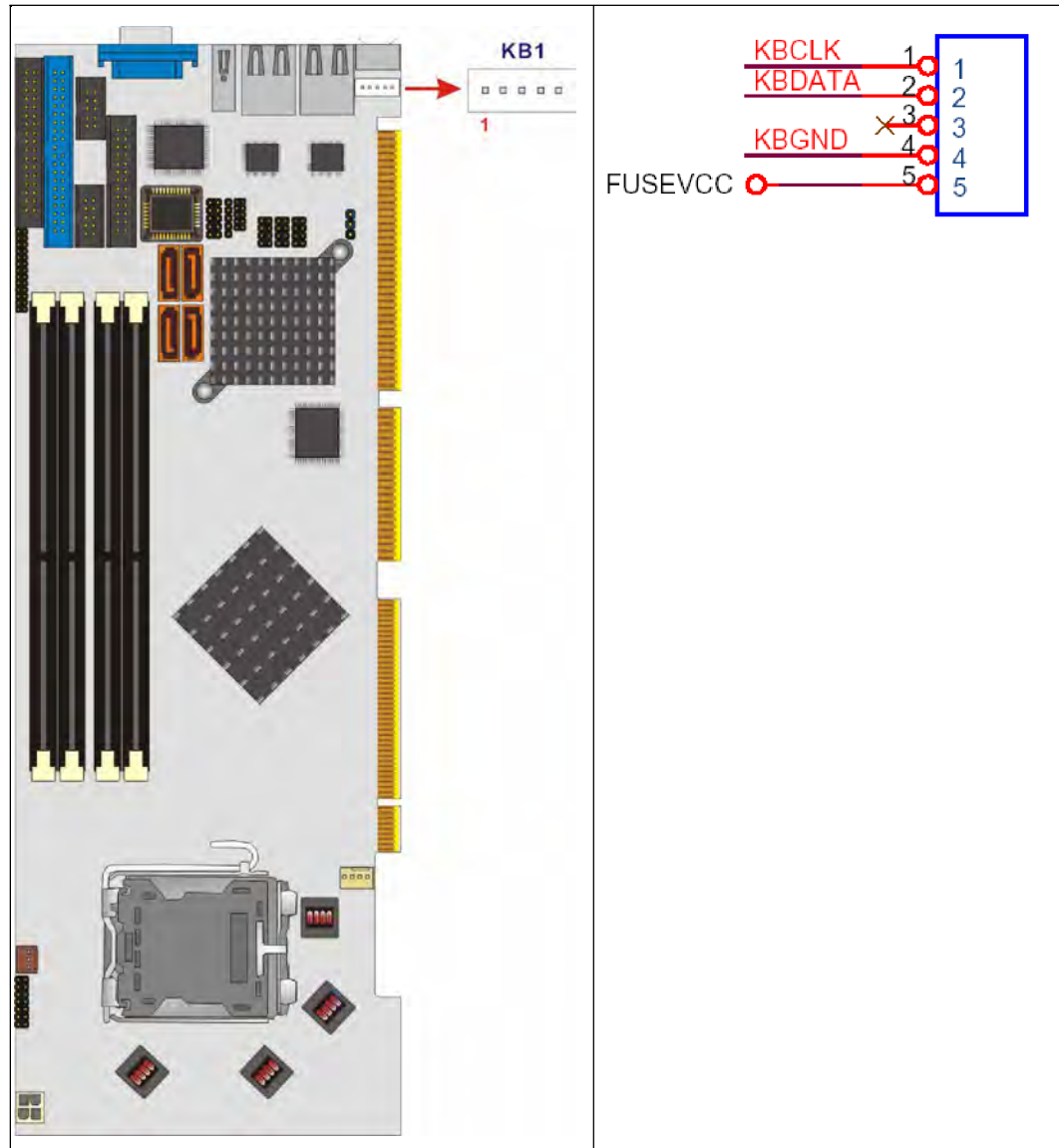
Figure 3-12: Keyboard Connector Location

PIN	DESCRIPTION
1	Keyboard Clock
2	Keyboard Data
3	NC
4	GND
5	VCC

Table 3-14: KB1 Connector Pinouts

3.2.12 Parallel Port Connector

CN Label: **LPT1**

CN Type: 25-pin box header

CN Location: See **Figure 3-13**

CN Pinouts: See **Table 3-15**

The parallel port connector is usually connected to a printer or other parallel device with a 26-pin flat-cable connector.
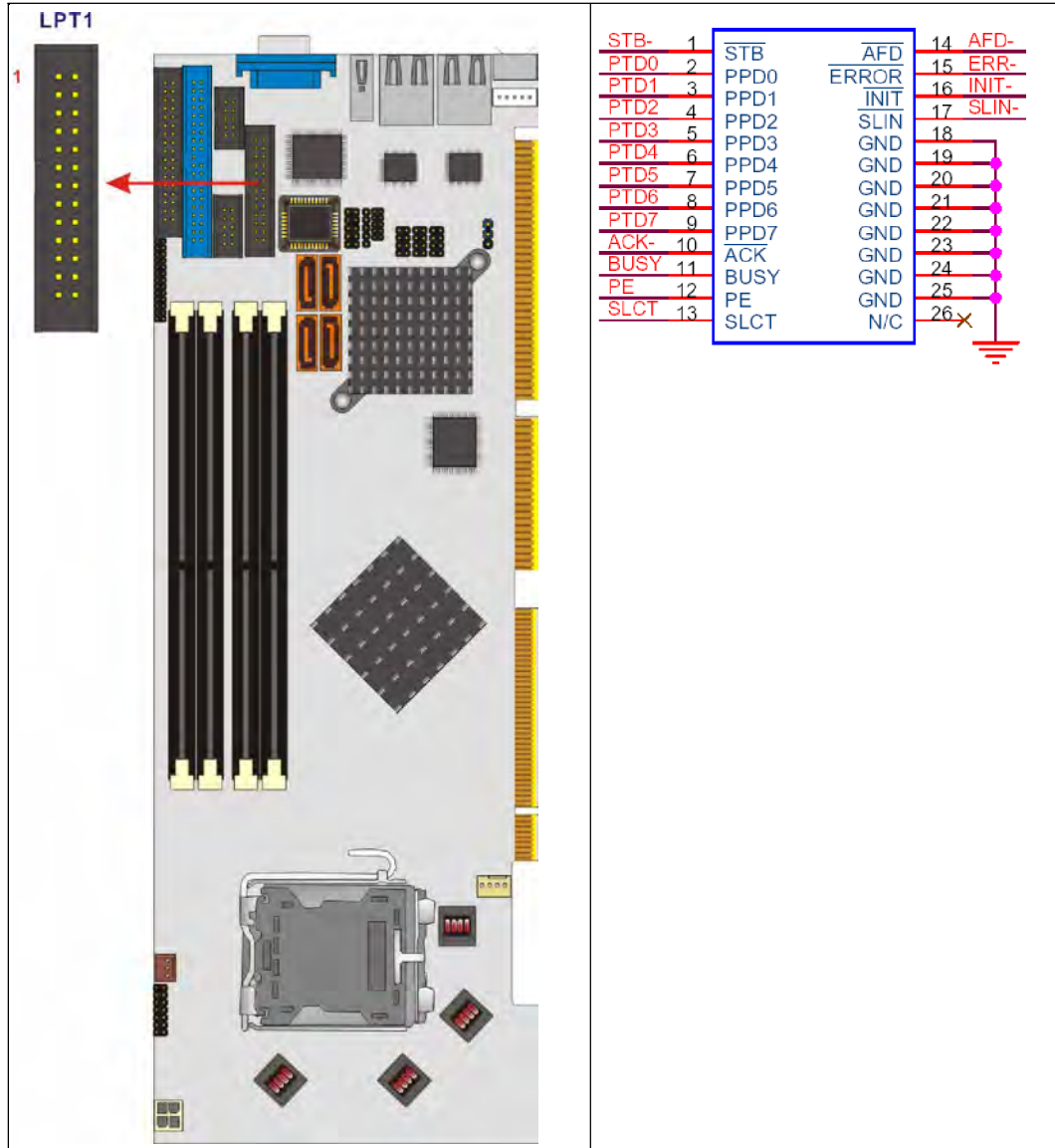
Figure 3-13: Parallel Port Connector Location

PIN	DESCRIPTION	PIN	DESCRIPTION
1	STROBE#	14	AUTO FORM FEED #
2	DATA0	15	ERROR#
3	DATA1	16	INITIALIZE#
4	DATA2	17	PRINTER SELECT LN#
5	DATA3	18	GND
6	DATA4	19	GND

7	DATA5	20	GND
8	DATA6	21	GND
9	DATA7	22	GND
10	ACKNOWLEDGE#	23	GND
11	BUSY	24	GND
12	PAPER EMPTY	25	GND
13	PRINTER SELECT		

Table 3-15: Parallel Port Connector Pinouts

3.2.13 RS-232 Serial Port Connectors

CN Label: **COM1, COM2**

CN Type: 10-pin box header

CN Location: See **Figure 3-14**

CN Pinouts: See **Table 3-16**

The 3307690 CPU card has two internal high-speed UART connectors accessed through a 10-pin cable connector.
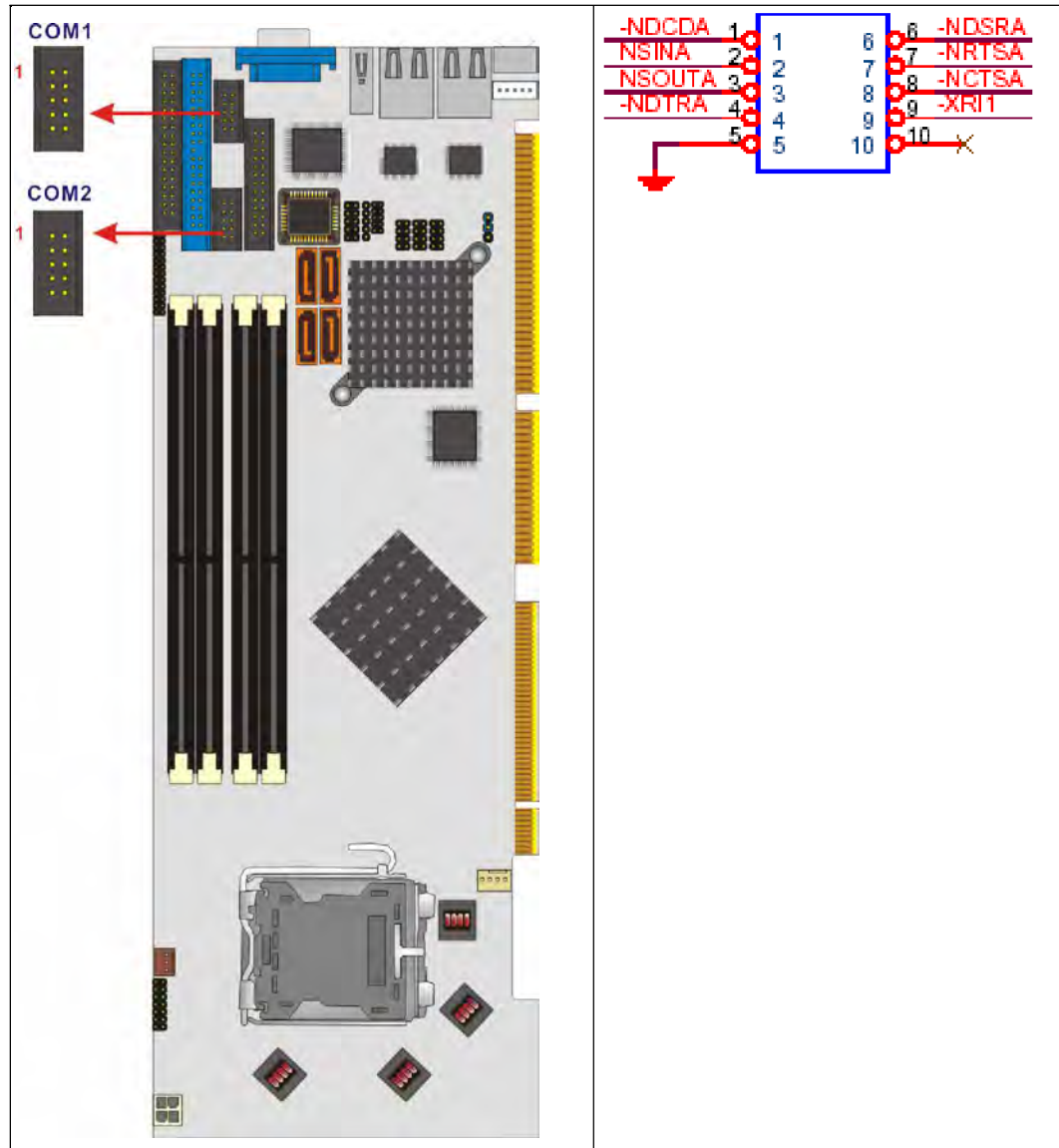
Figure 3-14: RS-232 Serial Port Connectors Location

PIN	DESCRIPTION		
1	DATA CARRIER DETECT (DCD)	6	DATA SET READY (DSR)
2	RECEIVE DATA (RXD)	7	REQUEST TO SEND (RTS)
3	TRANSMIT DATA (TXD)	8	CLEAR TO SEND (CTS)
4	DATA TERMINAL READY (DTR)	9	RING INDICATOR (RI)
5	GND (GND)	10	GND (GND)

Table 3-16: RS-232 Serial Port Connectors Pinouts

3.2.14 SATA Drive Connectors

CN Label: **SATA1, SATA2, SATA3, SATA4**

CN Type: 7-pin SATA drive connector

CN Location: See **Figure 3-15**

CN Pinouts: See **Table 3-17**

The SATA drive ports are connect to SATA HDDs with SATA signal cables. The SATA II connectors provide connectivity with a maximum data transfer rate of 300Mb/s.

The SATA3 and SATA4 connectors are found only on the 3307690B.
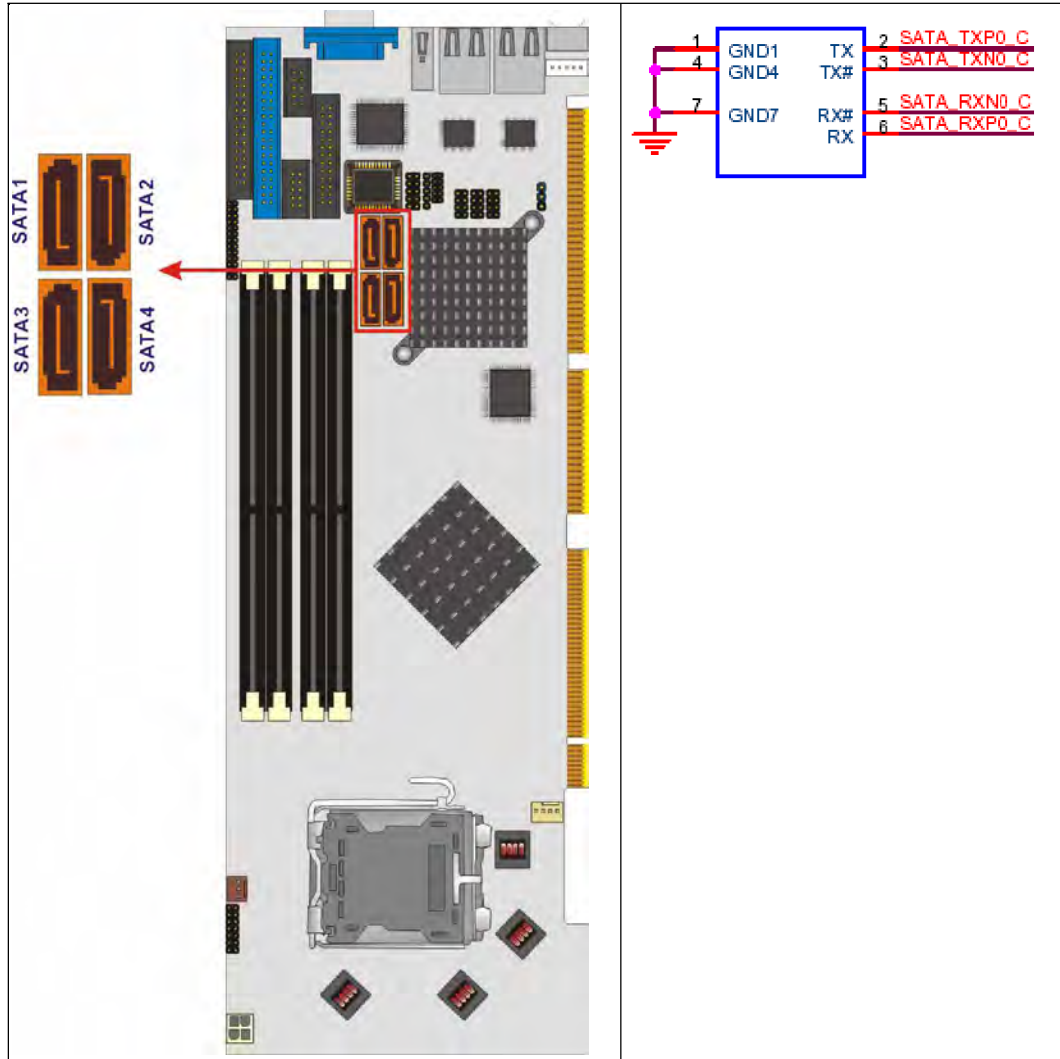
Figure 3-15: SATA Connectors Location

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	5	RX-
2	TX+	6	RX+
3	TX-	7	GND
4	GND	8	N/C

Table 3-17: SATA Connectors Pinouts

CAUTION:

Your SATA hard drives may come with both a 4P power connector and a SATA power interface. Attach either the 4P connector or the included SATA power cable to your SATA hard drives. *DO NOT* attach both the power connectors to your SATA hard drives at the same time! Doing so will cause damage.

NOTE:

1. SATA is supported by:
    - Windows® 2000 SP4
    - Windows® XP SP1
    - Windows® 2003, or later versions
2. Older OSes, such as Windows® 98SE or Me, do not support the SATA interface.

3.2.15 USB Connectors

CN Label: **USB01, USB23, USB45**

CN Type: 8-pin header

CN Location: See **Figure 3-16**

CN Pinouts: See **Table 3-18**

Three 2x4 pin connectors provide connectivity to six USB 2.0 ports. An additional USB port is found on the rear panel. The USB ports are used for I/O bus expansion.
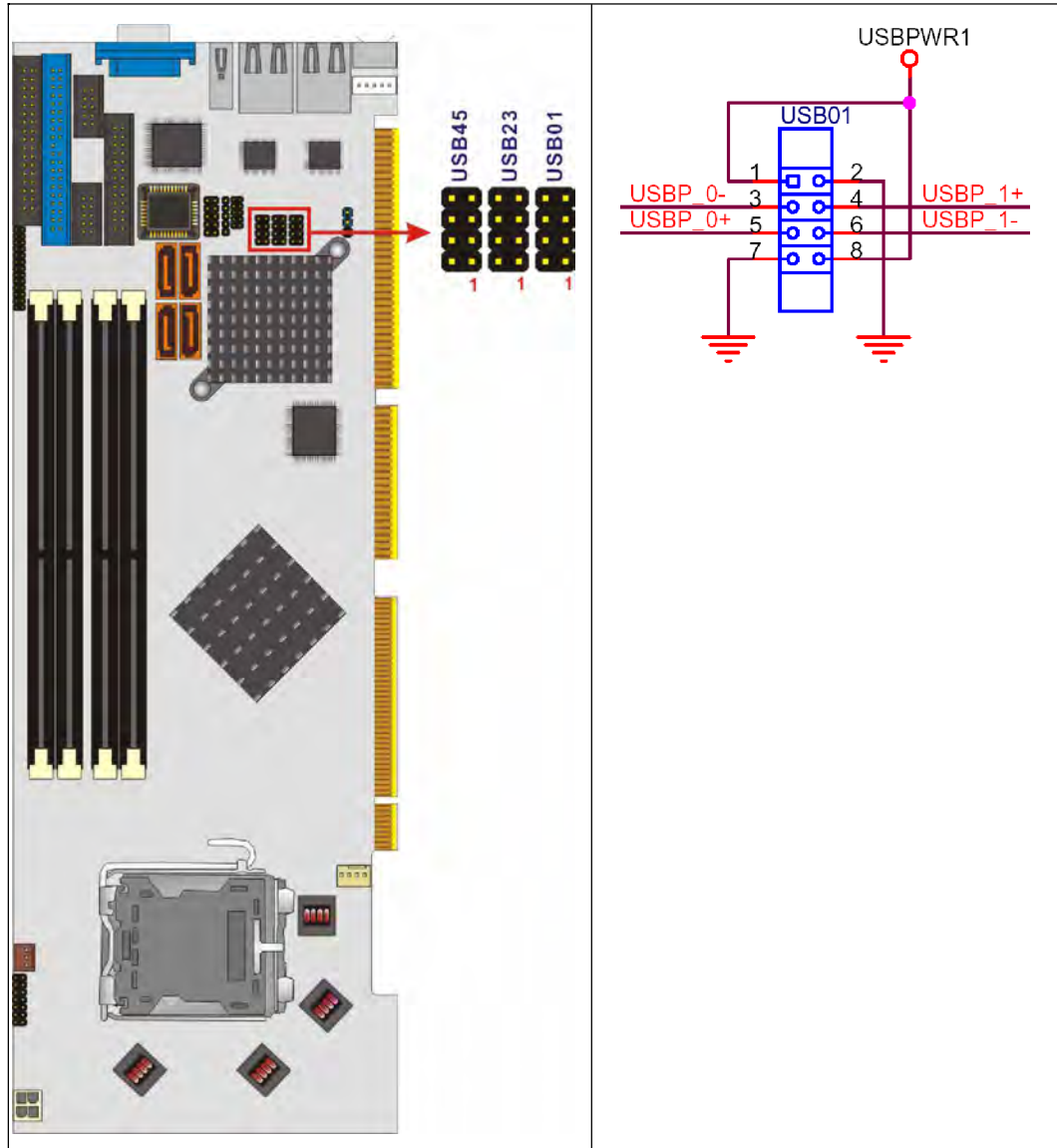
Figure 3-16: USB Port Connector Location

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

Table 3-18: USB Port Connector Pinouts

3.3 External Peripheral Interface Connectors

Figure 3-17 shows the 3307690 CPU card rear panel. The peripheral connectors on the back panel can be connected to devices externally when the CPU card is installed in a chassis. The peripheral connectors on the rear panel are:

- „ 1 x PS/2 keyboard connector
- „ 1 x USB connectors
- „ 2 x RJ-45 GbE connectors
- „ 1 x VGA connector
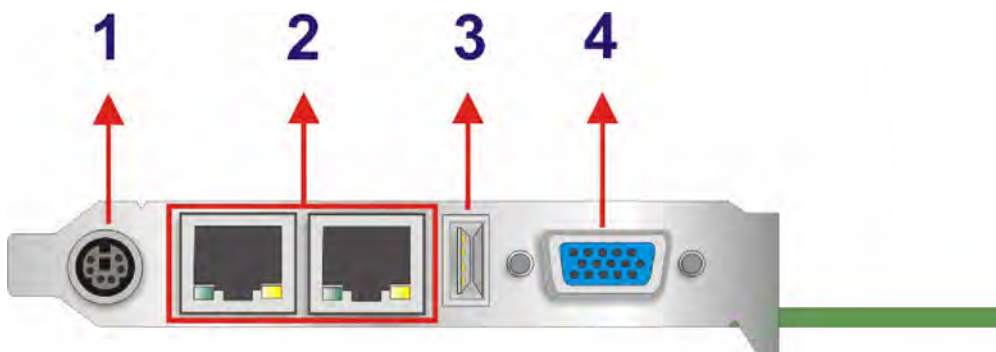
Figure 3-17: External Peripheral Interface Connector Panel

3.3.1 LAN Connectors

CN Label: **LAN1** and **LAN2**

CN Type: RJ-45

CN Location: See **Figure 3-17** (labeled number 2)

CN Pinouts: See **Table 3-19**

The 3307690 is equipped with two built-in GbE 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 NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	MDIA3-	MDIA1+	MDIA1+
2	MDIA3+	MDIA2+-	MDIA2+-
3	MDIA2-	MDIA0-	MDIA0-
4	MDIA1-	MDIA0+	MDIA0+

Table 3-19: LAN Pinouts

Figure 3-18: 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 3-20**.

STAT		STATUS	
GREEN	Activity	YELLOW	Linked

Table 3-20: RJ-45 Ethernet Connector LEDs

3.3.2 Mini-DIN 6 PS/2 Connector

CN Label: **KB_MS1**

CN Type: Mini-DIN 6 PS/2

CN Location: See **Figure 3-17** (labeled number 1)

CN Pinouts: See **Table 3-21**

The 3307690CPU card has a mini-DIN 6 PS/2 connector on the mounting bracket for easy connection to a PS/2 keyboard or PS/2 mouse. The card comes with a cable to convert the mini-DIN 6 PS/2 into two mini-DIN 6 PS/2 connectors for keyboard and mouse connection.

Figure 3-19: Mini-DIN 6 PS/2 Connector

PIN NO.	DESCRIPTION
1	Keyboard Data
2	Mouse Data
3	GND
4	VCC
5	Keyboard Clock
6	Mouse Clock

Table 3-21: Mini-DIN 6 PS/2 Connector

3.3.3 USB Connector

CN Label: **USB_C6**

CN Type: USB port

CN Location: See **Figure 3-17** (labeled number 3)

CN Pinouts: See **Table 3-22**

The 3307690 has one rear panel USB port. This port connects to both USB 2.0 and USB 1.1 devices.

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

Table 3-22: USB Port Pinouts

3.3.4 VGA connector

CN Label: **VGA1**

CN Type: HD-D-sub 15 female connector

CN Location: See **Figure 3-17** (labeled number 4)

CN Pinouts: See **Table 3-23**

A 15-pin VGA connector connects to standard displays.
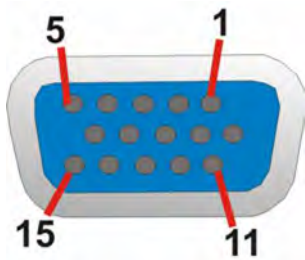
Figure 3-20: VGA Connector

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RED	2	GREEN
3	BLUE	4	NC
5	GND	6	GND
7	GND	8	GND
9	VCC	10	GND
11	NC	12	DDCDAT
13	HSYNC	14	VSYNC
15	DDCCLK		

Table 3-23: VGA Connector Pinouts

Chapter

4

Installation and Configuration

4.1 Anti-static Precautions

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the 3307690. (Dry climates are especially susceptible to ESD.) It is therefore critical that whenever the 3307690 (or any other electrical component) is handled, the following anti-static precautions are strictly adhered to.

- „ *Wear an anti-static wrist band:* Wearing a simple anti-static wrist band 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.

4.2 Installation Considerations

NOTE:

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

4.2.1 Installation Notices

Before and during the installation of the 3307690 CPU card, please **do** the following:

- „ Read the user manual
  - o The user manual provides a complete description of the 3307690 CPU card, installation instructions and configuration options.

- „ Wear an electrostatic discharge cuff (ESD)
    - o Electronic components are easily damaged by ESD. Wearing an ESD cuff will remove ESD from your body and help to prevent ESD damage to the CPU card.
- „ Place the CPU Card on an antistatic pad
    - o When you are installing or configuring the CPU Card, place it on an antistatic pad. This will help to prevent potential ESD damage.
- „ Turn off all power to the 3307690 CPU card
    - o When working with the CPU card, 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 3307690 CPU card **DO NOT:**

- „ remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- „ use the product before you have verified that all cables and power connectors are properly connected.
- „ allow screws to come in contact with the PCB circuit, connector pins, or its components.

4.3 Unpacking

 NOTE:

If any of the items listed below are missing when you unpack the 3307690   CPU card, do not proceed with the installation and contact the reseller or vendor you purchased the CPU card from.

4.3.1 Unpacking Precautions

Before you install the 3307690 CPU card, you must unpack the CPU card. Some components on 3307690 are very sensitive to static electricity and can be damaged by a sudden rush of power. To protect it from being damage, follow these precautions:

    „   Ground yourself to remove any static charge before touching your 3307690 . You can do so by wearing a grounded wrist strap at all times or by frequently touching any conducting materials that is connected to the ground.

    „   Handle your 3307690 by its edges. Do not touch the IC chips, leads or circuitry if not necessary.

Do not place a PCB on top of an anti-static bag. Only the inside of the bag is safe from static discharge.

4.3.2 Checklist

When you unpack the 3307690, please make sure that your package contains the following items.

    „   1 x 3307690 single board computer

    „   1 x Mini jumper pack

    „   1 x ATA 66/100 flat cable

    „   1 x Dual RS-232 cable

    „   2 x SATA cables

    „   1 x SATA power cable

    „   1 x Keyboard/ PS2 mouse Y cable

    „   1 x USB cable

    „   1 x Utility CD

    „   1 x QIG (quick installation guide)

If one or more of these items are missing, please contact the reseller or vendor you purchased the 3307690 CPU card from and do not proceed any further with the installation.

4.4 3307690 CPU Card Installation

⚠ **WARNING:**

Never run the CPU card without an appropriate heatsink and cooler that can be ordered from Global American, Inc. or purchased separately.

Be sure to use the CPU 12V power connector (CPU12V1) for the CPU power.

⚠ **WARNING:**

Please note that the installation instructions described in this manual must be carefully followed in order to avoid damage to the CPU card components and injury to you.

⚠ **WARNING:**

When installing electronic components onto the CPU card always follow the previously outlined anti-static precautions in order to prevent ESD damage to your board and other electronic components like the CPU and DIMM modules

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

- „ CPU
- „ CPU cooling kit

    „   DDR2 memory modules

    „   Peripheral devices

4.5 Socket LGA775 CPU Installation

4.5.1 CPU Selection: HT Functionality Requirements

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

    „   **CPU**: An Intel® Pentium 4 Processor with HT Technology must be installed

    „   **Chipset**: An Intel® Chipset that supports HT Technology (that has been met by the 3307690)

    „   **OS**: An operating system that has optimizations for HT Technology

4.5.1.1 CPU Installation

WARNING:

CPUs are expensive and sensitive components. When installing the CPU please be careful not to damage it in anyway. Make sure the CPU is installed properly and ensure that a heat sink and CPU cooling fan are properly installed before the 3307690 is run.

If a heat sink and cooling fan are not properly installed both the CPU and the board may be damaged.

The LGA775 socket is shown in **Figure 4-1**.
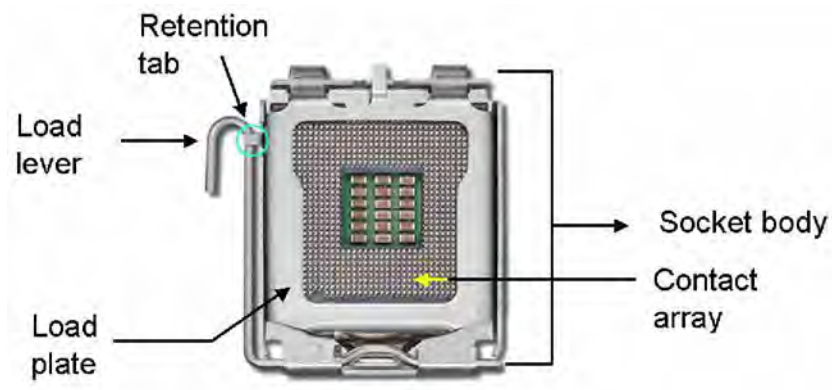
Figure 4-1: Intel® LGA775 Socket

⚠️ **WARNING:**

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

To install Socket LGA775 CPU onto the 3307690, follow the steps below:

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 the fingernail to pry the protective cover off. (See **Figure 4-2**)
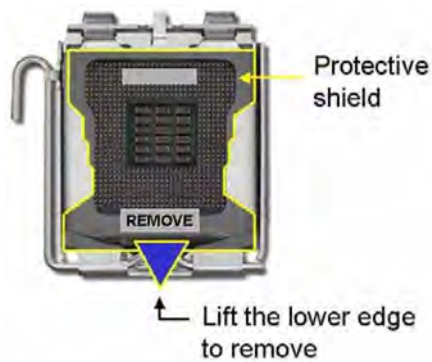
Figure 4-2: Remove the CPU Socket Protective Shield

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 4-3**)
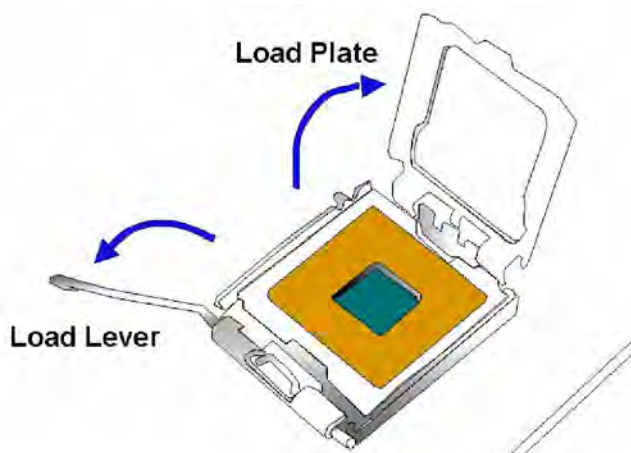
Figure 4-3: Open the CPU Socket Load Plate

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 4-4**.
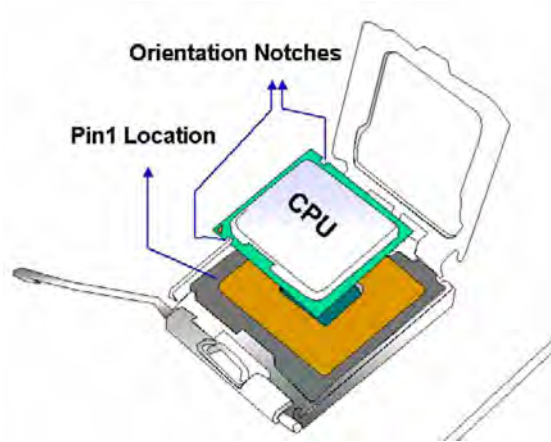
Figure 4-4: Insert the Socket LGA775 CPU

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 power connector.** Connect the CPU 12V cable to the CPU 12V power connector after the cooling kit is installed.

4.5.2 Socket LGA775 Cooling Kit (2107695) Installation

⚠️ **WARNING:**

It is strongly recommended that you DO NOT use the original heat sink and cooler provided by Intel on the 3307690.

The 3307690 is vertically mounted on a horizontal backplane. Intel's heat sink does not come with a support bracket on the soldering side, so the PCB may be bent by the weight of the cooling kit.

The 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.

2107695

Figure 4-5: LGA-775 Cooling Kit

The LGA775 CPU cooling kit shown in **Figure 4-5** comprises a CPU heat sink and a cooling fan.

NOTE:

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

To install the cooling kit, 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 4-6**)
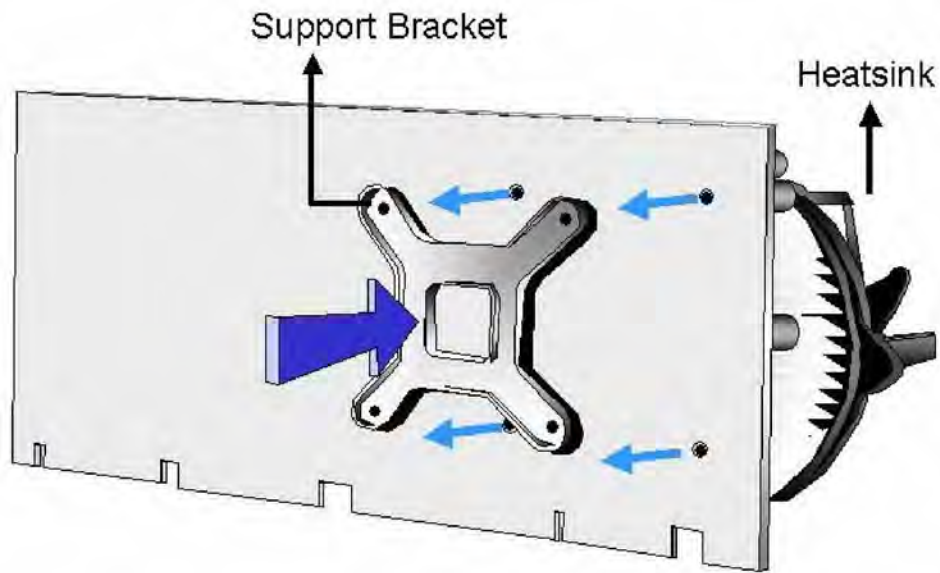
Figure 4-6: Securing the Heat sink to the PCB

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 3307690. Carefully route the cable and avoid heat generating chips and

fan blades.

4.5.3 DIMM Module Installation

4.5.3.1 Purchasing the Memory Module

WARNING:

When purchasing the DIMM modules, make sure the modules are compatible with the DIMM slot specified in **Section 2.6 Memory Support**.

WARNING:

The board supports DDR2 DIMM modules only. DDR1 and DDR2 are not compatible. If a DDR1 DIMM module is installed, the system may be damaged and become inaccessible. Please only use DDR2 DIMM modules.

When you purchase your DIMM modules, the following considerations should be taken into account:

- „   Each DIMM socket can support DIMM modules with a maximum size of 1GB
- „   Only use DDR2 memory chips in the DIMM slots
- „   It is recommended that you use memory modules of identical brand, size, chips, and speed.
- „   DIMMs must use the same density memory chips
- „   Both DIMMs must use the same DRAM bus width
- „   Both DIMMs must be either single-sided or dual-sided

4.5.3.2 DIMM Module Installation

The 3307690 CPU card has four 240-pin DDR2 SDRAM DIMM sockets. To install the DIMM modules, follow the instructions below.

Step 1: Make sure the two handles of the DIMM socket are in the "open" position, leaning outward (**Figure 4-7**).
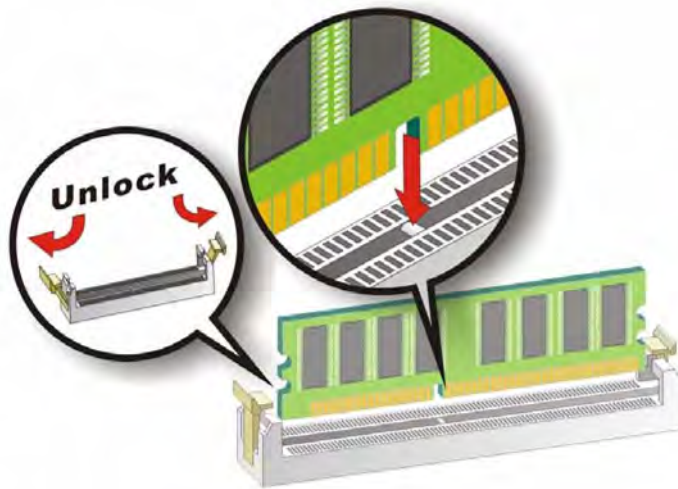
Figure 4-7: Installing the DIMM Module

Step 2: Slowly slide the DIMM module along the plastic guides on both ends of the socket. Press the DIMM module down into the socket until it clicks into position and the two handles have automatically locked the memory module into place.

Step 3: To remove the memory module, push both handles outward, and the memory module is ejected by the mechanism in the socket.

4.5.4 Peripheral Device Connection

Cables provided by GAI that connect peripheral devices to the CPU Card are listed in **Table 4-1**. Cables not included in the kit must be separately purchased.

Quantity	Type
1	ATA 66/100 flat cable
2	SATA cables
1	SATA power cable
1	Keyboard/ PS2 mouse Y cable
1	RS-232 cable
1	USB cable

Table 4-1: Provided Cables

4.5.4.1 IDE Drive Connector (PIDE1)

The cable used to connect the motherboard to the IDE device is a standard 40-pin ATA/100 flat cable. To connect an IDE device to the motherboard, follow the instructions below.

Step 1: Find the IDE flat cable in the kit that came with the motherboard.

Step 2: Connect one end of the cable to the IDE connector on the motherboard. A keyed pin on the IDE connector prevents it from being connected incorrectly.

Step 3: Locate the red wire on the other side of the cable that corresponds to the pin 1 connector.

Step 4: Connect the other side of the cable to the IDE device making sure that the pin 1 cable corresponds to pin 1 on the connector.
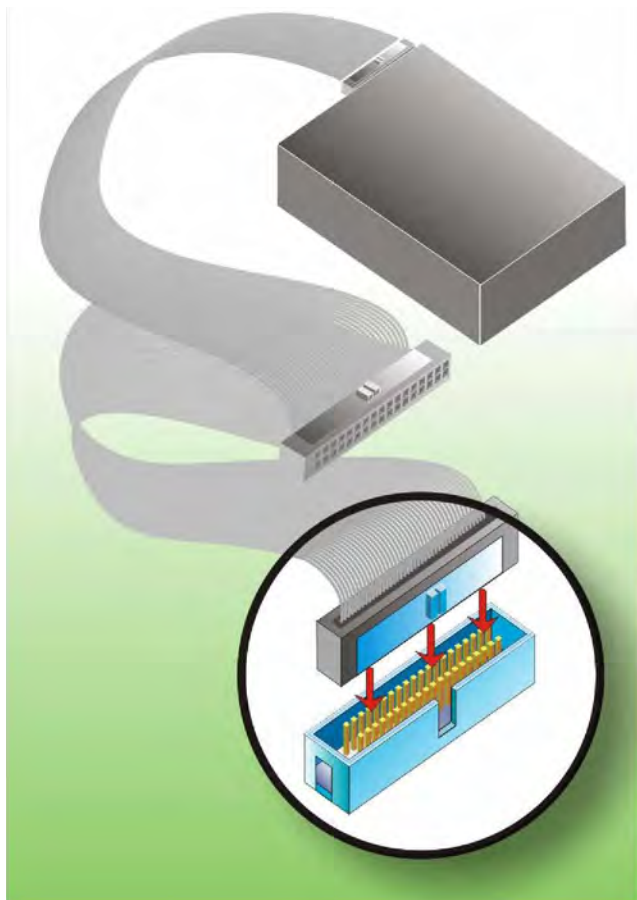
Figure 4-8: Connection of IDE Connector

![NOTE icon] **NOTE:**

When two IDE disk drives are connected together, back-end jumpers on the drives must be used to configure one drive as a master and the other as a slave.

4.5.4.2 Floppy Drive Connector (FDD1)

This connector provides access to an externally mounted 3.5" floppy drive. To connect the CPU Card to a FDD, follow the instructions below.

Step 1: Insert one side of the cable into the FDC making sure that the red wire on the cable corresponds to pin 1 on the connector.

Step 2: Attach the connector on the other side of the cable to the floppy drive(s). You can only use one connector in the set. The connection sequence determines which of the two connected floppy drives is drive A: and which is drive B.

4.5.4.3 SATA Drive Connection

The CPU card has on-board SATA drive connectors. Refer to **Table 1-1:** for model variations supporting two or four SATA II connectors. To connect the SATA drives to the connectors, follow the steps below.

Step 1: Locate the SATA drive connector on the board.

Step 2: Press the clip on the connector at the end of the SATA cable and insert the cable connector into the on-board SATA drive connector (**Figure 4-9**).
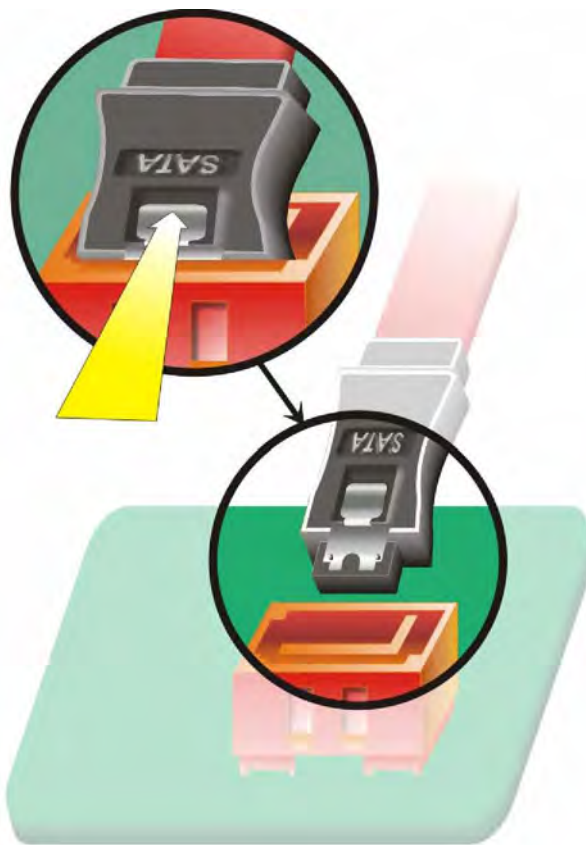
Figure 4-9: SATA Drive Cable Connection

Step 3: Connect the connector on the other end of the cable to the connector at the back of the SATA drive (**Figure 4-10**).

Step 4: Connect the SATA power connector to the back of the SATA drive (**Figure 4-10**).

Figure 4-10: SATA Drive Connection

4.5.4.4 Installing the RS-232 Cable

A dual RS-232 cable consisting of two cables attached to two D-sub 9 male connectors that are mounted onto a bracket can be connected to the COM1 and COM2 RS-232 connectors. To install an RS-232 cable, follow the steps below.

Step 1: Locate the two RS-232 serial port connectors.

Step 2: Insert the two small connectors on the cables into the serial port box headers on the CPU card (**Figure 4-11**).
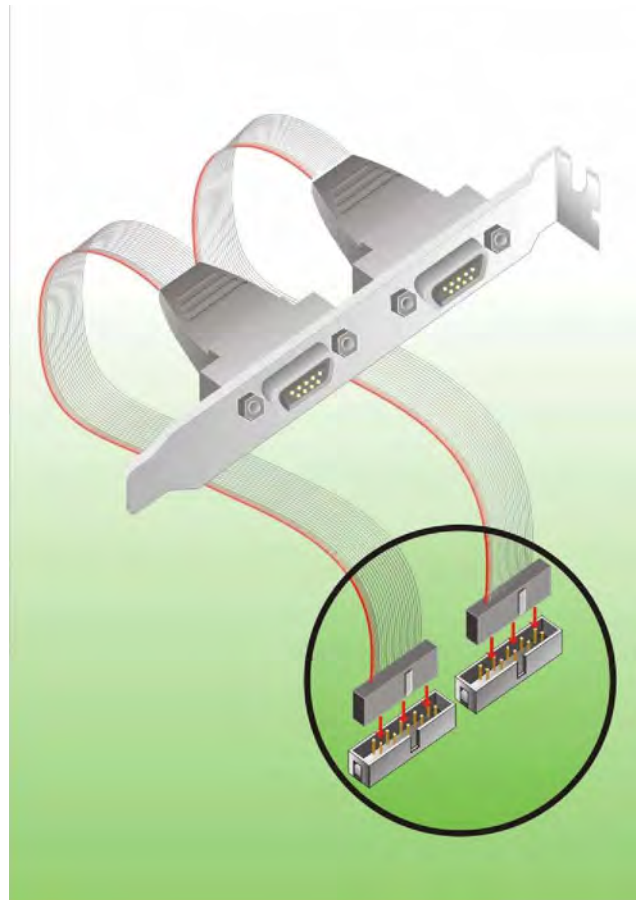
Figure 4-11: Dual RS-232 Cable Installation

Step 3: Secure the bracket supporting the two D-sub 9 male connectors to the chassis.
To do this, refer to the chassis manual.

4.5.4.5 USB 2.0 Cable Connection

The CPU card is shipped with a dual USB cable. The dual USB cable consists of two connectors attached to two independent cables. Each cable is then attached to a USB port connector that is mounted on a bracket. To install the USB cable, follow the steps below.

Step 1: Install a USB module supporting two USB ports to the chassis. Secure the USB module bracket following the instructions in the documentation that came with the USB module and the chassis.

Step 2: Insert the two 4-pin connectors from the module into the USB pin headers on the

CPU card. (**Figure 4-12**)
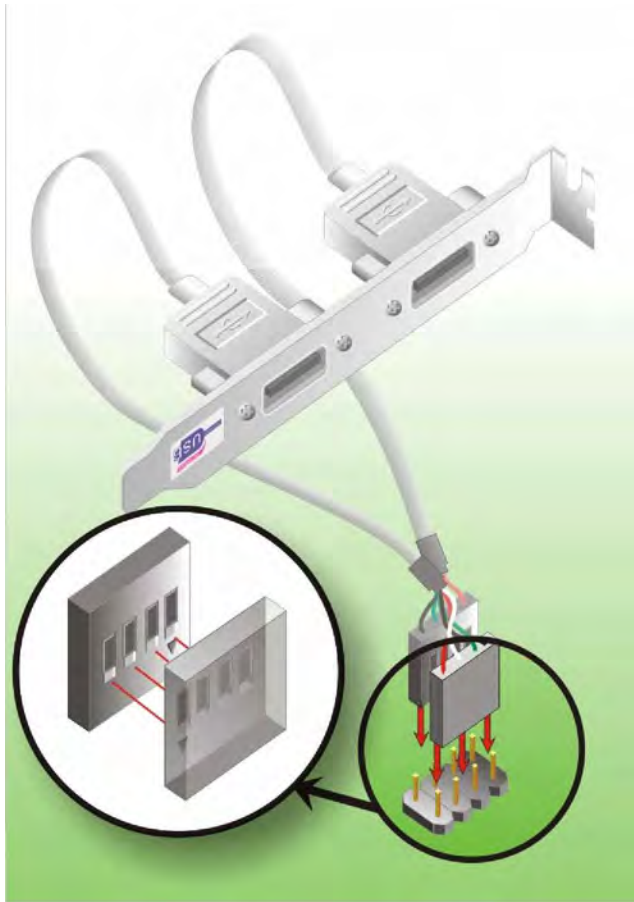
Figure 4-12: USB Cable Installation

4.6 On-board Jumper

 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.
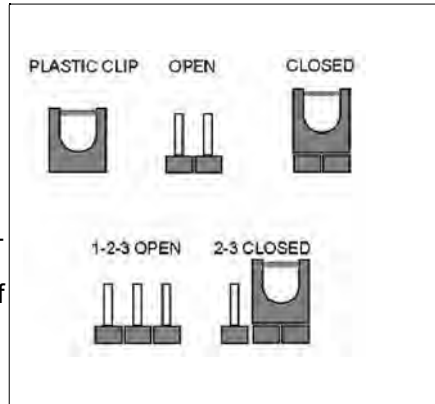
Figure 4-13 Jumper

The CPU card one on-board jumper. The jumper is described in **Table 4-2**.

Label	Connector	Type
J_CMOS1	CMOS state setting	3-pin header

Table 4-2: On-board Jumpers
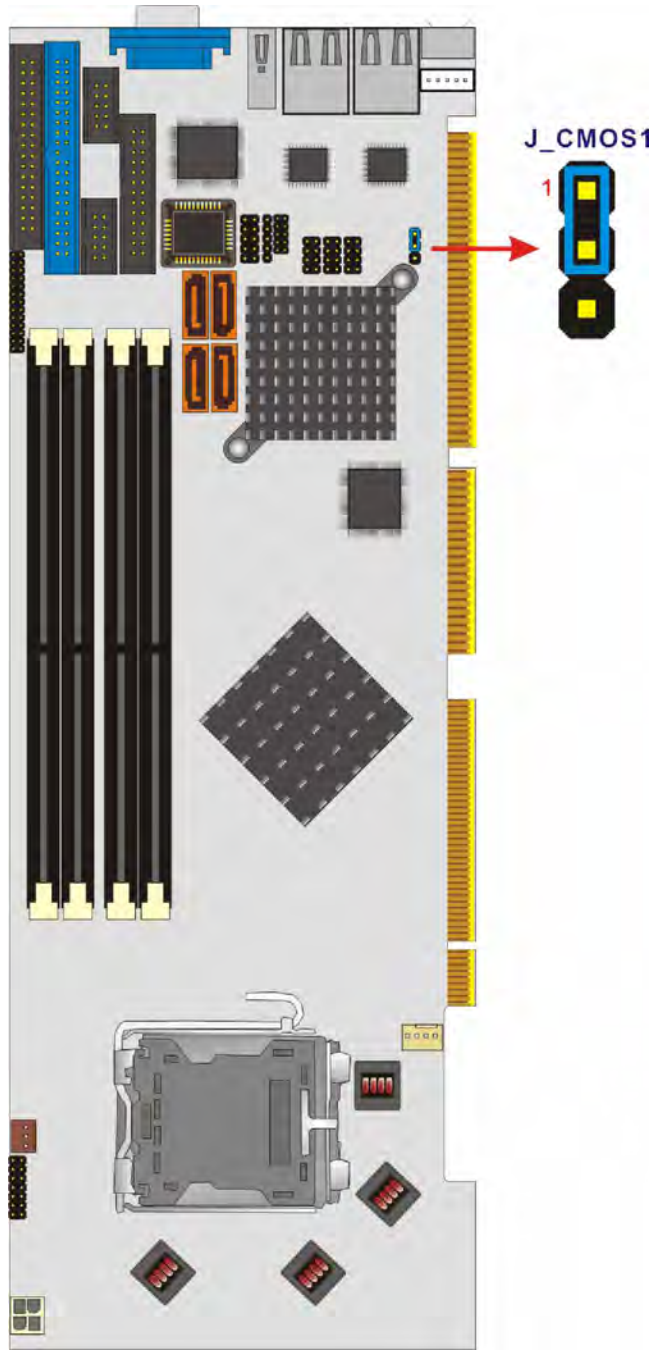
Figure 4-14: Jumper Locations

4.6.1 Clear CMOS Jumper

Jumper Label:	**J_CMOS1**
Jumper Type:	3-pin header
Jumper Settings:	See **Table 4-3**
Jumper Location:	See **Figure 4-14**

If the CPU card fails to boot due to improper BIOS settings, use this jumper to clear the CMOS data and reset 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.

J_CMOS1	DESCRIPTION
Short 1-2 (Default)	Normal Operation
Short 2-3	Clear CMOS Setup

Table 4-3: Clear CMOS Jumper Settings

4.7 Chassis Installation

After the CPU, the cooling kit, and the DIMM modules have been installed and after the internal peripheral connectors have been connected to the peripheral devices and the jumpers have been configure, the CPU card can be mounted into a chassis.

To mount the CPU card into a chassis please refer to the chassis user guide that came with the product.

4.8 Rear Panel Connectors

4.8.1 Keyboard and Mouse Connection

A PS/2 keyboard and a PS/2 mouse can be connected to the appropriate PS/2 connector on the rear panel.

4.8.2 VGA Port Installation

The cable used to connect the motherboard to a VGA port is a 10-pin header to female HD-D-sub 15 connector. To connect a VGA port to the motherboard, follow the instructions below.

Step 1: Connect a standard male HD-D-sub 15 connector end to the VGA connector on the rear panel.

Step 2: Connect the other end to a display device.

4.8.3 Ethernet Connection

The rear panel RJ-45 connectors can be connected to an external LAN and communicate with data transfer rates up to 1Gb/s.

4.8.4 USB Connection

The rear panel USB connector provides easier and quicker access to external USB devices. The rear panel USB connector is a standard connector and can easily be connected to other USB devices.

Appendix

A

DIO Connector

A.1 DIO Interface Introduction

The DIO connector on the 3307690 is interfaced to GIO ports on the Winbond W83627EHG 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 Winbond datasheet for the Winbond W83627EHG Super I/O chipset.

A.2 DIO Connector Pinouts

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

Pin No	Description	Super I/O Pin	Super I/O Pin Descripton
1	Ground	N/A	N/A
2	VCC	N/A	N/A
3	Output 0	GP14	General purpose I/O port 1 bit 4.
4	Output 1	GP15	General purpose I/O port 1 bit 5.
5	Output 2	GP16	General purpose I/O port 1 bit 6.
6	Output 3	GP17	General purpose I/O port 1 bit 7.
7	Input 0	GP10	General purpose I/O port 1 bit 0.
8	Input 1	GP11	General purpose I/O port 1 bit 1
9	Input 2	GP12	General purpose I/O port 1 bit 2
10	Input 3	GP13	General purpose I/O port 1 bit 3

A.3 Assembly Language Samples

A.3.1 Enable the DIO Input Function

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

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

A.3.2 Enable the DIO Output Function

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

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

Appendix

B

Watchdog Timer

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 been caused by a software bug. When the CPU stops working correctly, hardware on the board will perform a hardware reset (cold boot) to bring the system back to a known state.

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

- **INT 15H:**

AH – 6FH
Sub-function:
AL – 2   : Sets the Watchdog Timer's time-out 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

Sub-function 2 must be called to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer will start counting down. When the timer value reaches zero, the system will reset. To ensure that this reset condition does not occur, the Watchdog Timer must be periodically refreshed by calling sub-function 2. Note that the Watchdog timer will be 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:

For inquiries, refer to the original datasheets or contact the GAI Sales Department.

 NOTE:

When exiting a program, it is necessary to disable the Watchdog Timer;

otherwise, the system will reset.

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 YOUR APPLICATION PROGRAM HERE**

;

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

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

;

; EXIT

;

Appendix

C

Address Mapping

C.1 IO Address Map

I/O address Range	Description
000-01F	DMA Controller
020-021	Interrupt Controller
040-043	System time
060-06F	Keyboard Controller
070-07F	System CMOS/Real time Clock
080-09F	DMA Controller
0A0-0A1	Interrupt Controller
0C0-0DF	DMA Controller
0F0-0FF	Numeric data processor
1F0-1F7	Primary IDE Channel
2F8-2FF	Serial Port 2 (COM2)
378-37F	Parallel Printer Port 1 (LPT1)
3B0-3BB	Intel(R) 945G Graphics Controller
3C0-3DF	Intel(R) 945G Graphics Controller
3F6-3F6	Primary IDE Channel
3F7-3F7	Standard floppy disk controller
3F8-3FF	Serial Port 1 (COM1)

Table C-1: IO Address Map

C.2 1st MB Memory Address Map

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

Table D-2: 1st MB Memory Address Map

C.3 IRQ Mapping Table

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

Table D-3: IRQ Mapping Table

C.4 DMA Channel Assignments

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

Table C-4: IRQ Mapping Table

Appendix

D

External AC'97 Audio CODEC

D.1 Introduction

The audio functionalities of the 3307690 CPU card can be implemented using a separately purchased audio module, the 3307690B. The audio kit is powered by Realtek ALC655, a 16-bit, full duplex AC'97 2.3 compatible audio CODEC with 48KHz sampling rate. The audio kit functionalities are interfaced through three (3) phone jack connectors and two (2) pin headers including:

1. A LINE input shared with surround output
2. A MIC input shared with Center and LFE output
3. A LINE output
4. Analog line-level stereo inputs with 5-bit volume control: CDIN1 and AUXIN1.

Both Front_out and Surround_out are equipped with a built-in 50mW/20ohm amplifier. The ALC655 supports host/soft audio from Intel® ICHx chipsets as well as audio controller based VIA/SIS/Ali/ATI chipset with bundled Windows® series drivers (XP/ME/2000/98/NT), EAX/Direct Sound 3D/I3DL2/A3D compatible sound effect utilities supporting Karaoke, 26 kinds of environment sound emulations with 10-band equalizer, and HRTF 3D positional audio. The audio kit provides an excellent entertainment package sufficient for today's multimedia systems.

Figure D-1: Audio Functionalities via the Audio Kit

D.2 Physical Connection
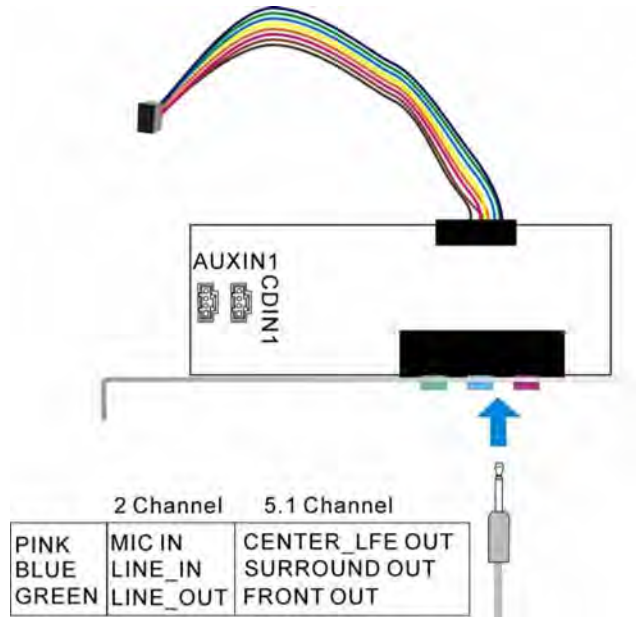
Figure D-2: Audio Kit Connectors

The audio kit comes with a PCI slot bracket for the installation into a PC case or rackmount chassis.   Connect the 10-pin header to the J_AUDIO1 header as shown above, and if necessary, connect the CDIN1 and AUXIN1 to optical drives or other audio sources, e.g., an MPEG card, using a 4-pin cable.   Note that depending on the devices you connect to, the phone jacks have different functions with different audio installation modes (2 channel or 5.1 channel modes).

D.3 Driver Installation

The driver installation has been described in **Chapter 6**.

After reboot, you should be able to find the sound effect configuration utility in Windows Control Panel (see **Figure D-3**); and if peripheral speakers have been properly connected, hear the sound effects.
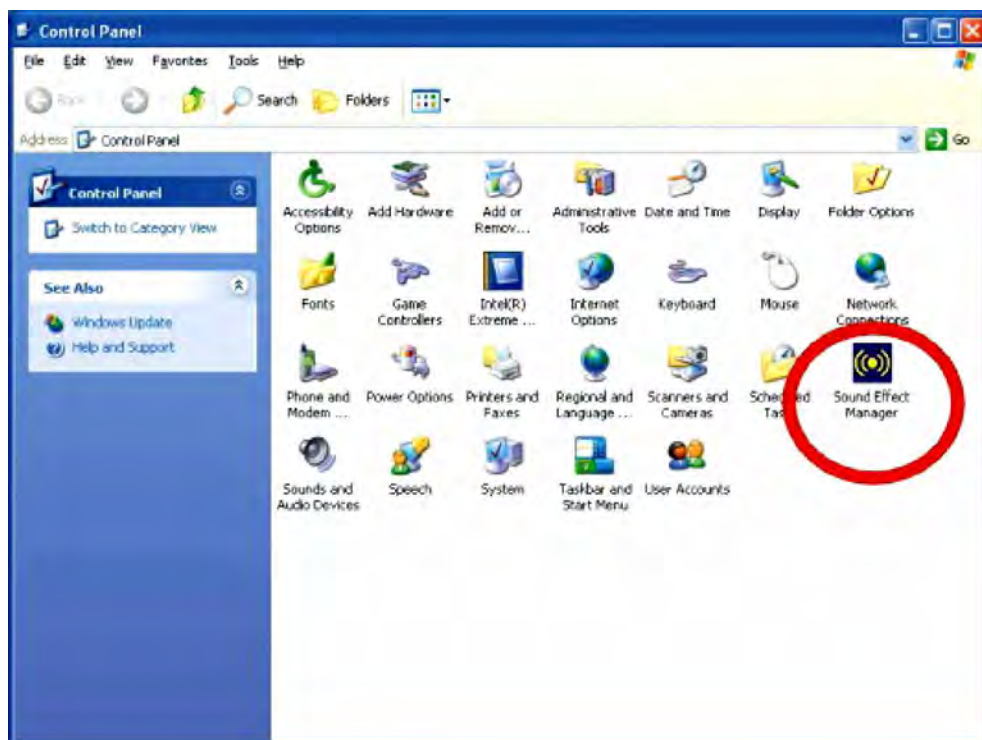
Figure D-3: Sound Effect Manager Icon

D.4 Sound Effect Configuration

After installing the audio CODEC driver, you should be able to use the multi-channel audio features now. Click the audio icon from the Notification Area from system task bar (see **Figure E-5**). The shortcut to the configuration utility is also available through the **Sound Effect Manager** icon in the **Control Panel** (**Figure E-4**).
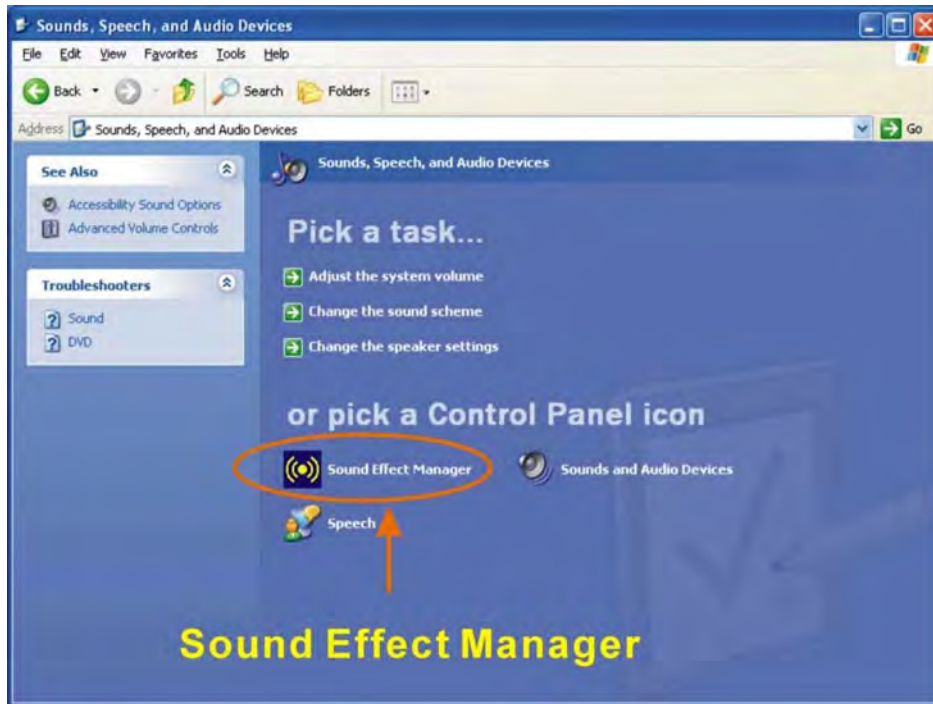

Figure D-4: Sound Effect Manager Icon [Control Panel]
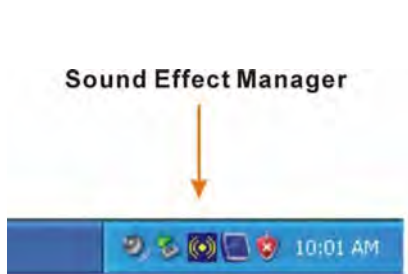

Figure D-5: Sound Effect Manager Icon [Task Bar]

D.5 Sound Effect

You may select a pre-configured sound environment setting with the preset equalizer settings.   You may also load an equalizer setting or make a new equalizer setting using the "**Load EQ Setting**" and "**Save Preset**" button.   (See **Figure D-7**)
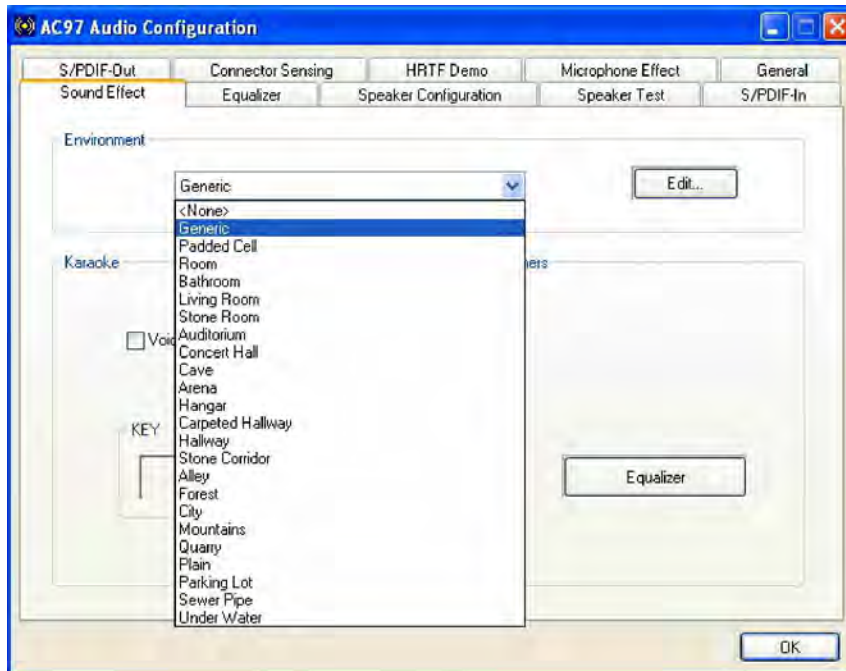

Figure D-6: Setting Sound Effects

D.6 Environment Simulation

This is the default screen whenever the configuration utility is opened.

You may select different sound environment modes by a single click on the Environment pull-down list. There are a total of 23 preset environment modes (see **Figure D-7**).   You may also fine-tune the environment setting by clicking the **Edit** button on the right, which displays an editor window. Select a preset mode you want to edit. Select a preset mode, and then select one the property value from the list below by a single click. Use the scroll bar below to adjust properties setting. When the adjustment is done, click the **Save** button to proceed.
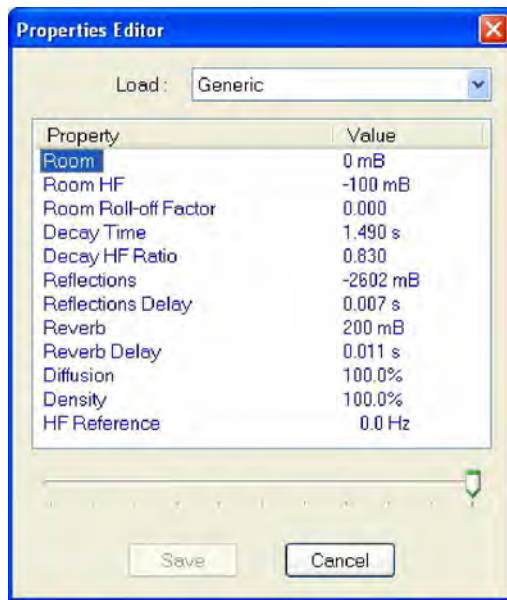
Figure D-7: Sound Effects Properties Editor

D.7 Karaoke Mode

Figure D-8: Karaoke Mode

The Karaoke mode shown in **Figure D-8** allows you to eliminate the vocal of the music you play or adjust the key to accommodate your range.

The configuration options that come with the Karaoke function include:

1. **Voice Cancellation**: This checkbox, when selected, disables the vocal part of the music your play in your computer while the background music remains.

2. **Key adjustment**: Use the Up or Down arrow icons to find a key that fits your vocal range.

> **NOTE:**
>
> The Equalizer button on the default display brings you to the same configuration window as the Equalizer function tab on top of the window.

D.8 Equalizer Selection
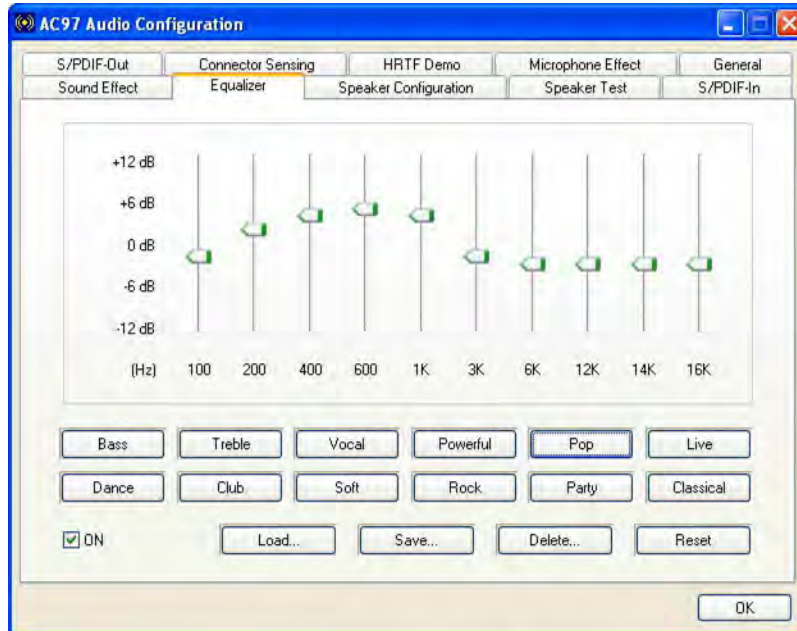
Figure D-9: Equalizer Settings

The equalizer in **Figure D-9** allows users to change sound effect parameters. The default screen shows equalized values. You may also select preset modes from the buttons below. The configurable values include 10 bands of equalizer ranging from 100Hz to 16KHz. Use the scroll bar to fine-tune, and use the **Load**, **Save**, **Delete**, and **Reset** buttons to edit your settings.
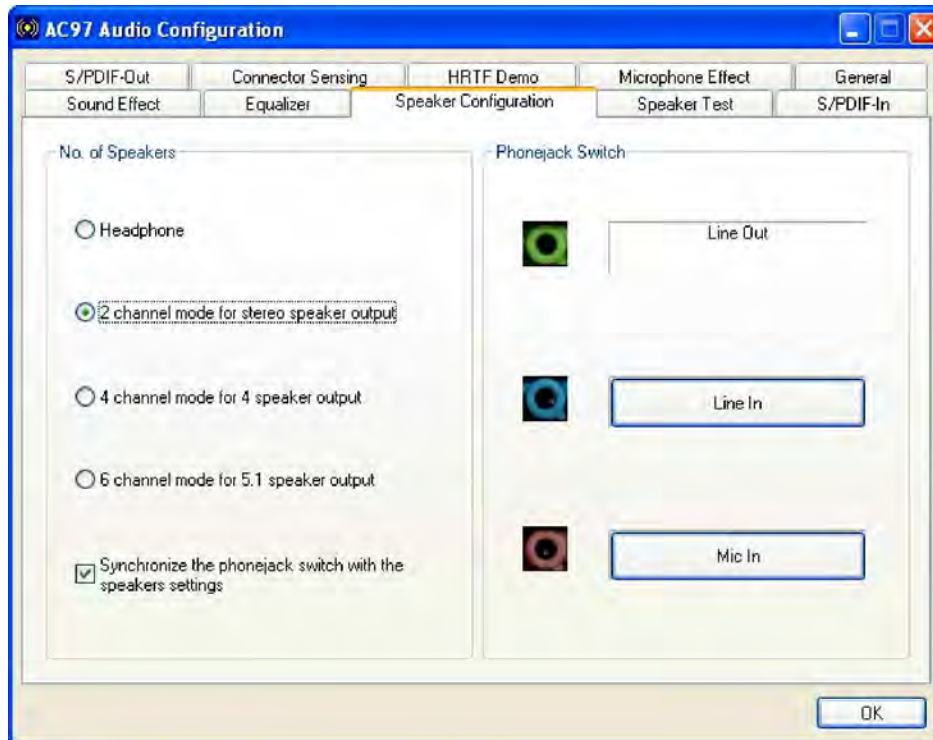
D.9 Speaker Configuration

Figure D-10: Speaker Configuration

In this functional window, you can configure your multi-channel speaker settings.

Select the audio configuration from the **No. of Speakers** section on the left by clicking on one of the check circles.

The configurable options are:

1. Headphone

2. Channel mode for stereo speaker output

3. Channel mode for 4 speaker output

4. Channel mode for 5.1 speaker output

5. Synchronize the phonejack switch with speakers settings

Select a speaker configuration by selecting its check circle, and then click **OK** to apply the configuration change.

Connect your speakers to the corresponding phonejacks.   It is recommended you write down your configuration, power off the system, and then complete the physical connections.

Select from the **Phonejack Switch** section if you want to re-define the phonejacks.   Click the specific phonejack button for several times to change its input/output functionality.

D.10 Speaker Test

Figure D-11: Audio Configuration

The audio configuration window in **Figure D-11** allows you to test each connected speaker to see if your 4-channel or 6-channel audio operates properly.   If any speaker malfunctions, you should then check the cabling or replace the malfunctioning parts.

Select each specific speaker to test its functionality. The speaker you select will be highlighted and sound should be generated.

NOTE:

1. The test scenario that appears in the **Speaker Test** window corresponds to the number of speakers you selected in the **Sound Effect** window.

2. You should select and deselect the **Swap Center/Subwoofer Output** check box to see if these two devices properly work.

D.11 S/PDIF-In & S/PDIF-Out

These functions are currently not supported.

D.12 Connector Sensing

Figure D-12: Connector Sensing

Realtek ALC655/883 supports Jack Sensing functionality. If an audio device is plugged into the wrong connector, a warning message will display informing users to correct the physical connections.

Click the Start button in **Figure D-12** to start the sensing. Please remember to close all running audio-related programs before executing the sensing operation.

The EZ-Connection screen in **Figure D-13** shows the result of sensing test.
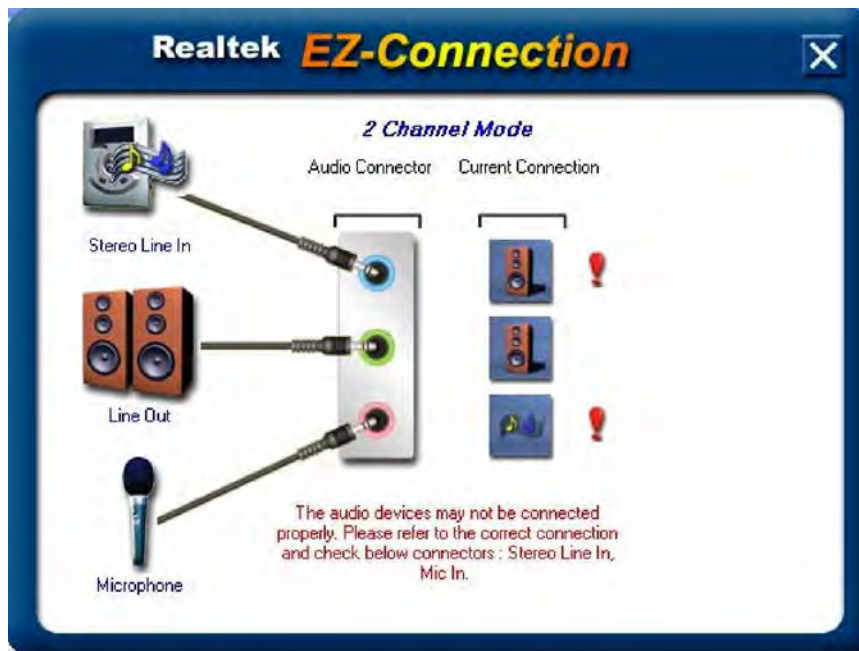
Figure D-13: EX Connection

The "Audio Connector" column shows the settings used in the "Speaker Configuration" window.

The "Current Connection" column shows the types of devices detected during test.   If the result does not match the physical connection, an exclamation mark will appear. (See **Figure D-14**)

Figure D-14: Connector Sensing Test Result

After closing the EZ-Connector screen, the following window should appear showing the latest connection status.
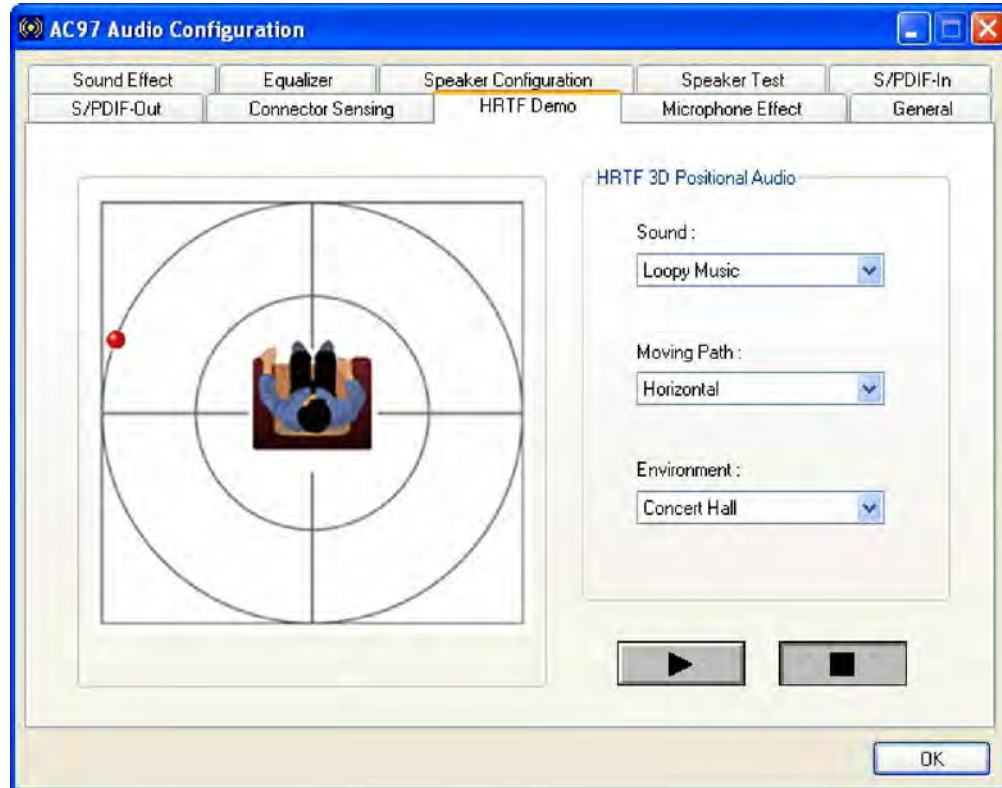
D.13 HRTF Demo

Figure D-15: HRTF Demo

The HRTF window in **Figure D-15** allows you to adjust your HRTF (Head Related Transfer Functions) 3D positional audio before playing 3D applications. Select a preferred **Environment** mode and/or different **Sound** and **Moving Path** settings.

D.14 Microphone Effect

This window provides an option, Noise Suppression. Select its check box to enable this functionality.

D.15 General

The general window in **Figure D-16** provides information about this AC'97 audio configuration utility including **Audio Driver** version, **DirectX** version, **Audio Controller**, and **AC'97 Codec**. You may also change the language of this utility through the **Language** pull-down menu.
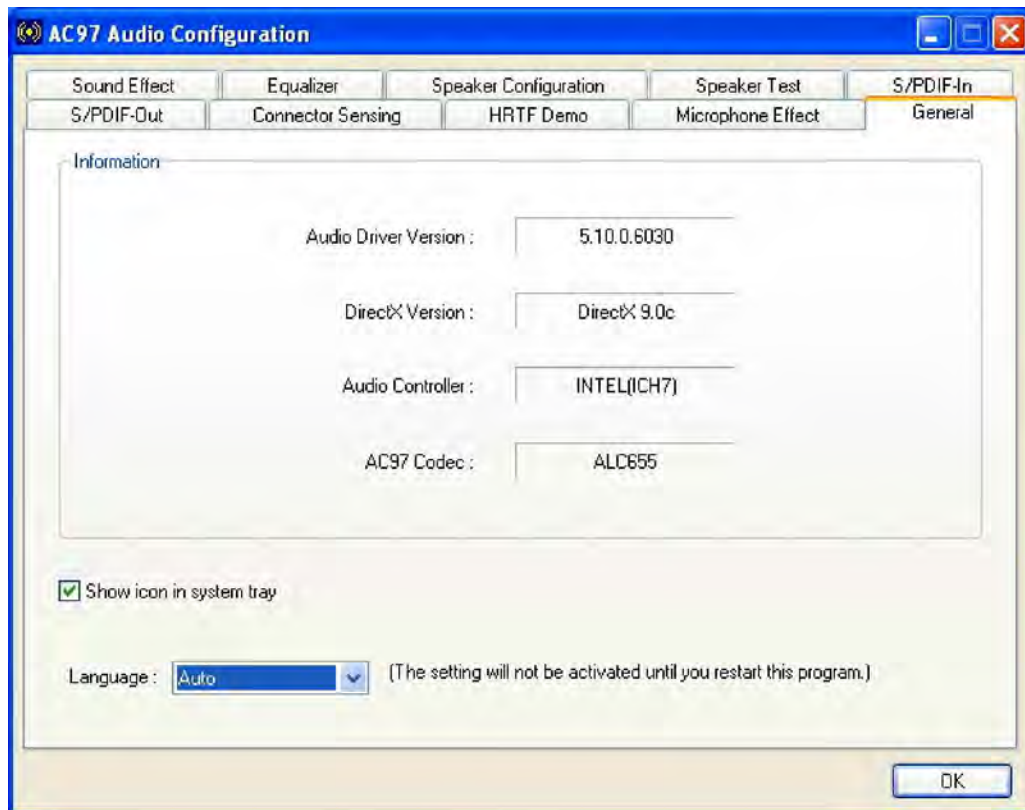
Figure D-16: General

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.

Address:	Global American, Inc.
	17 Hampshire Drive
	Hudson, NH 03051
Telephone:	Toll Free U.S. Only (800) 833-8999
	(603) 886-3900
FAX:	(603) 886-4545
Website:	http://www.globalamericaninc.com
Support:	Technical Support at Global American