integration with integrity

User's Manual

Single Board Computer 3302020

Version 1.0, November 2006

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Glossary

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

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Chapter

1

Introduction

1.1 3302020 CPU Card Overview

The PICMG 1.0 form factor 3302020 CPU card with Intel® Core™2 Duo/ Intel® Core™ Duo/ Intel® Core™ Solo / Intel® Celeron® M processor platform is fully equipped with the latest technology and advanced multi-mode I/Os. The 3302020 is designed for system manufacturers, integrators, and VARs that want performance, reliability, and quality at a reasonable price.

1.1.1 3302020 Model Variations

The 3302020 has four model variations shown in **Table 1-1**.

Model Name	SATA II	IDE	Digital Video Interface (DVI)
3302020A	Two	One	None
3302020C	Four	Two	None
3302020B	Two	One	One
3302020D	Four	Two	One

Table 1-1: 3302020 Model Variations

1.1.2 3302020 CPU Card Applications

The 3302020 CPU card has been designed for use in industrial applications where board expansion is critical and operational reliability is essential.

1.1.3 3302020 CPU Card Benefits

Some of the 3302020 CPU card benefits include:

- Dual-core Intel® processor support
  - Two physical cores in a package share the system load
  - Each core has its own L1 cache and shares the L2 cache to enhance the processing speed
  - High performance levels especially in 3D graphic and multi media application

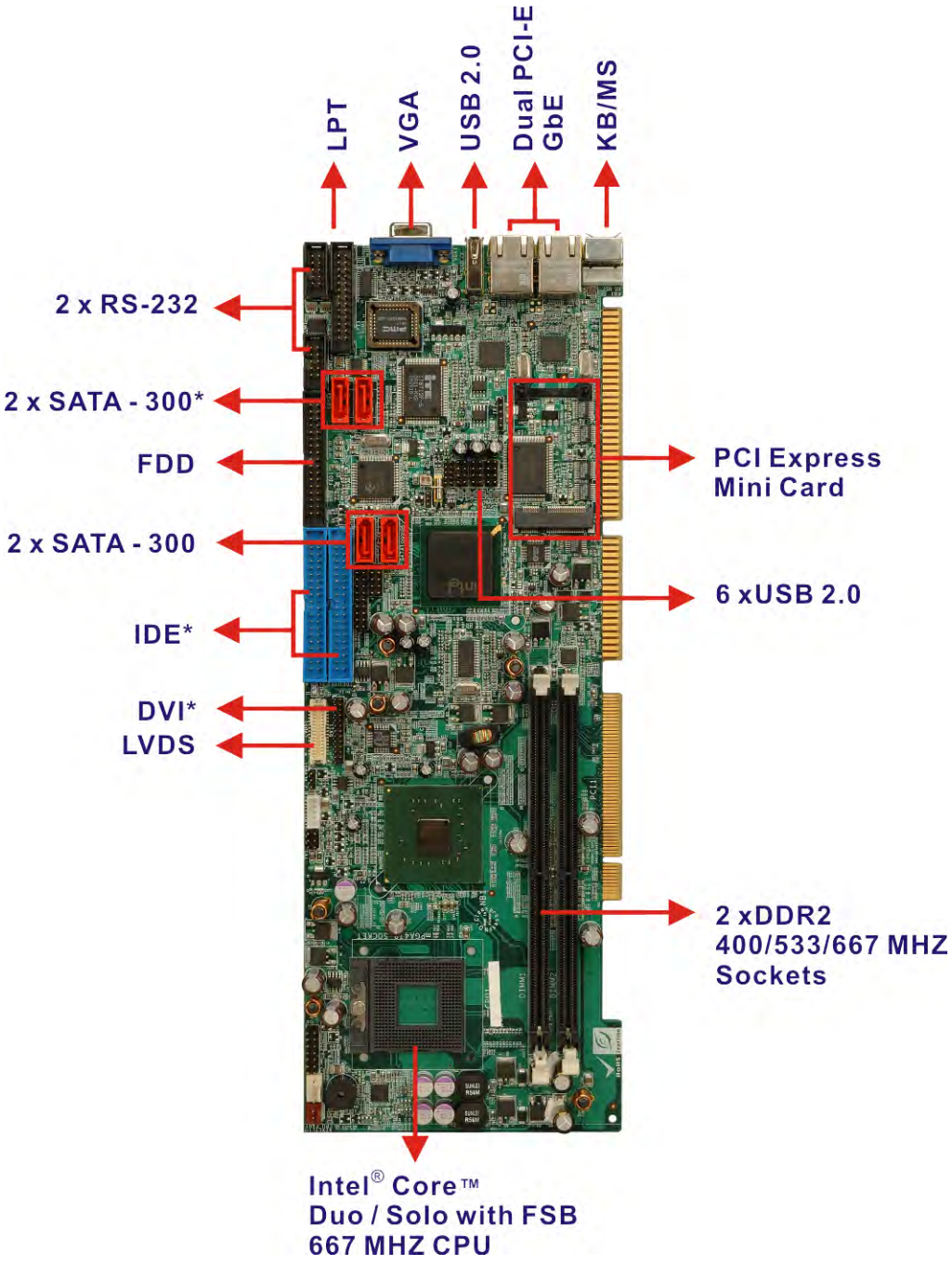
- PCI Express® Mini Card support
  - Small form factor (half the size of a mini-PCI card) allows easy integration and addresses system manufacturers' needs for build-to-order (BTO) and configure-to-order (CTO) applications
- providing access to multiple PCI and ISA expansion slots for easy system expansion
- 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 3302020 CPU Card Features

Some of the 3302020 CPU card features are listed below:

- PICMG 1.0 compliant
- RoHS compliant
- Intel® Core™2 Duo/ Intel® Core™ Duo/ Intel® Core™ Solo / Intel® Celeron® M CPUs supported
- PCI Express® Mini Card supported
- Maximum front side bus (FSB) speed of 667MHz supported
- Up to 2GB of 400/533/667MHz dual channel DDR2 memory supported
- Analog display supported
- One dual channel 18-bit LVDS port
- One DVI interface with resolution from VGA to UXGA supported by two models (see **Table 1-1**)
- Two high performance PCI Express Gigabit Ethernet (PCI-E GbE) controllers supported
- SATA II channels with transfer rates up to 300Mb/s are supported (see **Table 1-1**)
- Supports up to seven USB 2.0 devices
- RAID 0 and RAID 1 functionalities (SATA3 and SATA4 only) supported (see **Table 1-1**)

1.2 3302020 CPU Card Overview



*** See Table 1-1 for supported models.**

Figure 1-1: 3302020 CPU Card Overview

1.2.1 3302020 CPU Card Connectors

The 3302020 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 Battery connector
- 1 x CPU fan connector
- 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
- 2 x 40-pin IDE connectors (see **Table 1-1**)
- 1 x Inverter connector
- 1 x IrDA connector
- 1 x Keyboard connector
- 1 x LVDS connector
- 1 x Parallel port connector
- 1 x PCI Express® Mini Card connector
- 2 x RS-232 Serial port connectors
- 4 x SATA II connectors (see **Table 1-1**)
- 1 x TPM connector
- 1 x TV out connector
- 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

3302020 CPU card technical specifications are listed in **Table 1-3**. Detailed descriptions of each specification can be found in **Chapter 2**.

SPECIFICATION	DESCRIPTION
Supported CPUs	Intel® Core™2 Duo Intel® Core™ Duo Intel® Core™ Solo Intel® Celeron® M
Socket	478-pin Micro-FCPGA
Chipsets	Northbridge: Intel® 945GM Southbridge: Intel® ICH7-M
Graphics Support	Intel® Graphics Media Accelerator 950 (GMA 950) o One VGA o One DVI (See **Table 1-1**) o One LVDS
Memory	Two 400/533/667 MHz DDR2 memory modules (Max. 2GB)
PCI Bus Interface	33MHz, Revision 2.3
ISA Bus Interface	Supports three fully compatible ISA slots without buffering **ISA DMA and ISA Bus Master function are not supported**
Serial ATA (SATA)	Two SATA II channels with 300Mb/s transfer rates (see **Table 1-1**) Four SATA II channels with 300Mb/s transfer rates and

SPECIFICATION	DESCRIPTION
	RAID 0, RAID 1 functions (SATA3 and SATA4) (see **Table 1-1**)
SPECIFICATION	**DESCRIPTION**
HDD Interface	One IDE channel supports two Ultra ATA 100/66/33 devices (see **Table 1-1**) Two IDE channels support four 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 @ 4.15A, +12V @ 1.29A (Intel® Core™ Duo 2GHz, DDR2 667MHz 1GB * 2)
Infrared Support	One Infrared Data Association (IrDA) interface
Ethernet	Two PCI Express Gigabit Ethernet (PCI-E GbE) channels
BIOS	AMI BIOS
Physical Dimensions	12.2cm x 34.1cm (width x length)
Operating Temperature	Minimum: 0ºC (32°F) Maximum: 60°C (140°F)

SPECIFICATION	DESCRIPTION
Operating Humidity	Minimum: 5% Maximum: 95%
Optional Audio Interface	Realtek ALC655/883 with AC `97 / HD Audio

Table 1-3: Technical Specifications

Chapter

2

Detailed Specifications

2.1 Compatible GAI Backplanes

The 3302020 CPU card is compatible with most GAI PICMG1.0 backplanes. For more information on these backplanes, contact Global American Inc.

2.2 CPU Support

Model	Capacity	Interface	FSB
Intel® Core™2 Duo T7600	2.33GHz	478	667MHz
Intel® Core™ Duo T2700	2.33GHz	478	533/667MHz
Intel® Core™ Solo T1400	1.83GHz	478	533/667MHz
Intel® Celeron® M 450	2.0GHz	478	533 MHz

Table 2-1: Supported CPUs

2.2.1 Intel® Core™2 Duo

The Intel® Core™2 Duo processor comes with the following features:

- Dual core processor with enhanced performance
- Intel® 64 architecture
- Supports Intel® Architecture with Dynamic Execution
- On-die, primary 32kB instruction cache and 32kB write-back data cache per core
- On-die, up to 4MB second level shared cache with Advanced Transfer Cache Architecture
- Data Prefetch Logic
- 667MHz, Source-Synchronous FSB for Standard Voltage processors
- Advanced Power Management features including Enhanced Intel SpeedStep® Technology
- Intel® Enhanced Deeper Sleep state and Dynamic Cache Sizing

2.2.2 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

2.2.3 Intel® Core™ Solo

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

- Supports Intel Architecture with Dynamic Execution
- On-die, primary 32-KB instruction cache and 32-KB write-back data cache
- On-die, 2-MB second level cache with Advanced Transfer Cache Architecture
- Streaming SIMD Extensions 2 (SSE2) and Streaming SIMD Extensions 3 (SSE3)
- Advanced power management features including Enhanced Intel SpeedStep® technology

- Execute Disable Bit support for enhanced security
- Intel® Virtualization Technology enhances virtualization robustness and performance

2.2.4 Intel® Celeron® M

The Intel® Celeron® M CPU comes with the following features:

- Processor low-power states C1, C2 and C3 (Deep Sleep) lowers CPU power consumption/dissipation to conserve battery life
- Micro FCPGA packaging technology optimized for a range of thinner, lighter designs, including <1" thick
- Support for Intel® Mobile Voltage Positioning (Intel® MVP IV) dynamically lowers voltage based on processor activity to lower thermal design power, enabling smaller notebooks
- Lower core voltage – 1.356 V low-voltage operation and 24.5W thermal design power lower thermal dissipation enabling thinner notebooks
- 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® 945GM
- **Southbridge**: Intel® ICH7-M

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

2.3.2 Intel® 945GM Northbridge Chipset

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

- System Memory Support
  - Supports single/dual-channel DDR2 SDRAM
  - 64-bit wide per channel
  - 256MB, 512MB and 1GB memory technologies supported
  - Support for DDR2 On-Die Termination (ODT)
  - Support for 2N timings only
- Internal Graphics
  - Intel® Gen 3.5 Integrated Graphics Engine
  - 250 MHz core render clock and 200 MHz core display clock at 1.05 V core voltage
  - Supports TV-Out, LVDS, CRT and SDVO
- DMI
  - Chip-to-chip interface between (G)MCH and ICH
  - Configurable as x2 or x4 DMI lanes
  - DMI lane reversal support
  - 32-bit downstream address
- Power Management
  - ACPI S0, S3, S4, S5
  - CPU States C0, C1, C2, C3, C4 states
  - Rapid Memory Power Management

2.3.3 Intel ICH7-M Southbridge Chipset

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

- PCI Local Bus Specification, Revision 2.3 support for 33MHz PCI operations (supports up to six Req/Gnt pairs)
- ACPI Power Management Logic support
- Enhanced DMA controller, interrupt controller, and timer functions
- Integrated Serial ATA host controller with independent DMA operation on two ports and AHCI
- Integrated IDE controller supports Ultra ATA 100/66/33
- USB host interface with support for eight USB ports; four UHCI host controller; one EHCI high-speed USB 2.0 Host controller
- Supports Audio Codec ’97, Revision 2.3 Specification
- Supports Intel® High Definition Audio

- Supports Intel® Matrix Storage Technology
- Supports Intel® Active Management Technology
- Low Pint Count (LPC) interface
- Firmware Hub (FWH) interface support
- Serial Peripheral Interface (SPI) support

2.4 Graphics Support

2.4.1 Intel® GMA 950

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

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

- Two Serial Digital Video Out (SDVO) ports for flat-panel monitors and/or TV-out support via ADD2 cards
- Support for Intel Media Expansion Cards, providing TV out and PVR capability
- Interlaced Display output support

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

2.4.2 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 LVDS

The on-board digital LVDS has the following features.

- Supports dual channel LVDS 2x18 bpp for TFT Panels up to UXGA/WUXGA
- Compliant with ANSI/TIA/EIA-644-2001 SPEC.

2.4.4 Digital Visual Interface (DVI)

The DVI interface on supported models (see **Table 1-1**) has the following features.

- Supports DVI 1.0 up to UXGA with Silcon Image PanelLink® Technology

2.5 Data Flow

Figure 2-1 shows the data flow between the user-installed socket 478 CPU, the two on-board chipsets and other components installed on the CPU card are described in the following sections of this chapter.

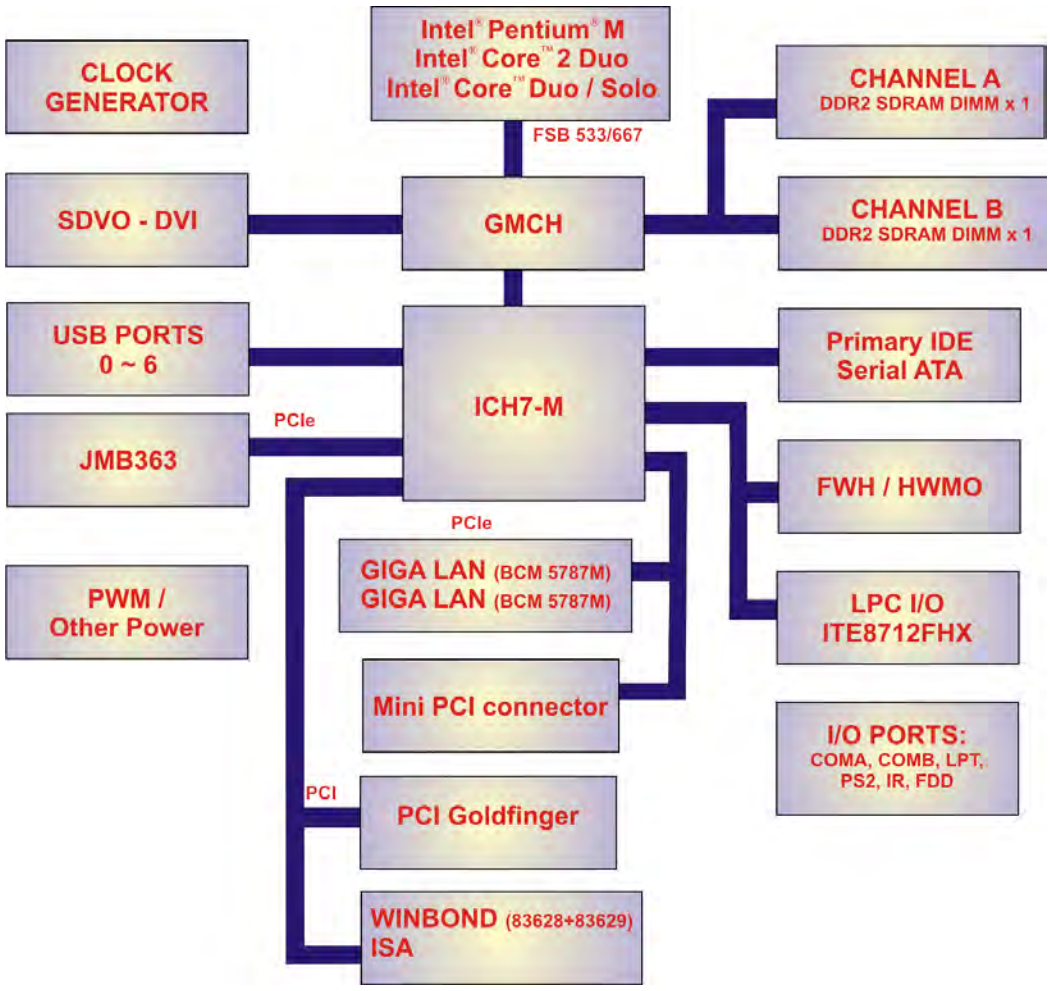


Figure 2-1: Data Flow Block Diagram

2.6 Memory Support

The 3302020 CPU 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 3302020 CPU card has the following features:

NOTE:

The 3302020 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 3302020 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 3302020A and 3302020B models support 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 3302020C and 3302020D models support the following drive interfaces:

- 4 x SATA II drives (Jmicron JMB363 chipset supports SATA3/SATA4 with RAID 0, RAID 1, and JBOD configurations)
- 2 x IDE channels support four Ultra ATA 100/66/33 devices
- 1 x FDD

2.9.1 SATA Drives

The 3302020A and 3302020B models support the following SATA drive interfaces:

- 2 x SATA II drives with transfer rates up to 300Mb/s with the ICH7-M Southbridge chipset

The 3302020C and 3302020D models support the following SATA drive interfaces:

- 2 x SATA II drives with transfer rates up to 300Mb/s with the ICH7-M Southbridge chipset
- 2 x SATA II drives with transfer rates up to 300Mb/s with the Jmicron JMB363 chipset

2.9.2 IDE HDD Interfaces

The IDE controller on the ICH7-M Southbridge chipset integrated on the CPU card supports two HDDs (3302020A and 3302020B models) or four HDDs (3302020C and 3302020D models) with the following specifications:

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

2.9.3 Floppy Disk Drive (FDD)

The 3302020 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 SATA II and RAID Functionality (SATA3 and SATA4 only)

Two SATA II channels and their associated RAID functionality are only available on the 3302020C and 3302020D models. These models come with an on-board Jmicron JMB363 PCI-E to two-port SATA II and one-port parallel ATA (PATA) host controller. The Jmicron JMB363 supports the following SATA II / PATA features:

- Two-port 3.0Gbps SATA II interface
- Two independent SATA II channels (separate logic and FIFO)
- Native Command Queue (NCQ) on SATA II port
- Hot Plugging like USB on SATA II port
- SATA II Gen1m and Gen2m (External SATA Connection, eSATA)
- Port Multiplier with Command-based Switching on SATA II port
- Up to UDMA6 PATA transfer mode
- Up to four storage device connection
- RAID 0, 1, 0+1, JBOD configuration

2.11 Serial Ports

The 3302020 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

2.12 Real Time Clock

256-byte battery backed CMOS RAM

2.13 System Monitoring

The 3302020 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)

2.14 Infrared Data Association (IrDA) Interface

The 3302020 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.

2.15 USB Interfaces

The 3302020 CPU card has seven USB interfaces, six internal and one external. The USB interfaces support USB 2.0.

2.16 BIOS

The 3302020 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

2.17 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the 3302020 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.

2.18 Optional Audio Interface

The 3302020 CPU card does not come with an on-board Codec but the Intel® ICH7-M chipset has an Audio Codec (AC'97 / HDA) controller. A connector on the CPU card can be used to connect the ICH7-M audio controllers to an external Codec.

2.19 Power Consumption

Table 2-2 shows the power consumption parameters for the 3302020 CPU card when a 2GHz Intel® Core™ Duo processor is running with two 1GB, DDR2 667MHz SDRAM memory modules.

Voltage	Current
5V	4.15A
+12V	1.29A

Table 2-2: Power Consumption

2.20 Packaged Contents and Optional Accessory Items

2.20.1 Package Contents

When you unpack the 3302020 CPU card you should find the following components.

- 1 x 3302020 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)

2.20.2 Special Items

The following additional items are shipped with the 3302020C and 3302020D CPU card models.

- 2 x SATA cables
- 1 x SATA power cable

2.20.3 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

Chapter

3

Connectors and Jumpers

3.1 Peripheral Interface Connectors

The locations 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 3302020 CPU card Layout

Figure 3-0 shows the on-board peripheral connectors, backplane peripheral connectors and on-board jumpers.

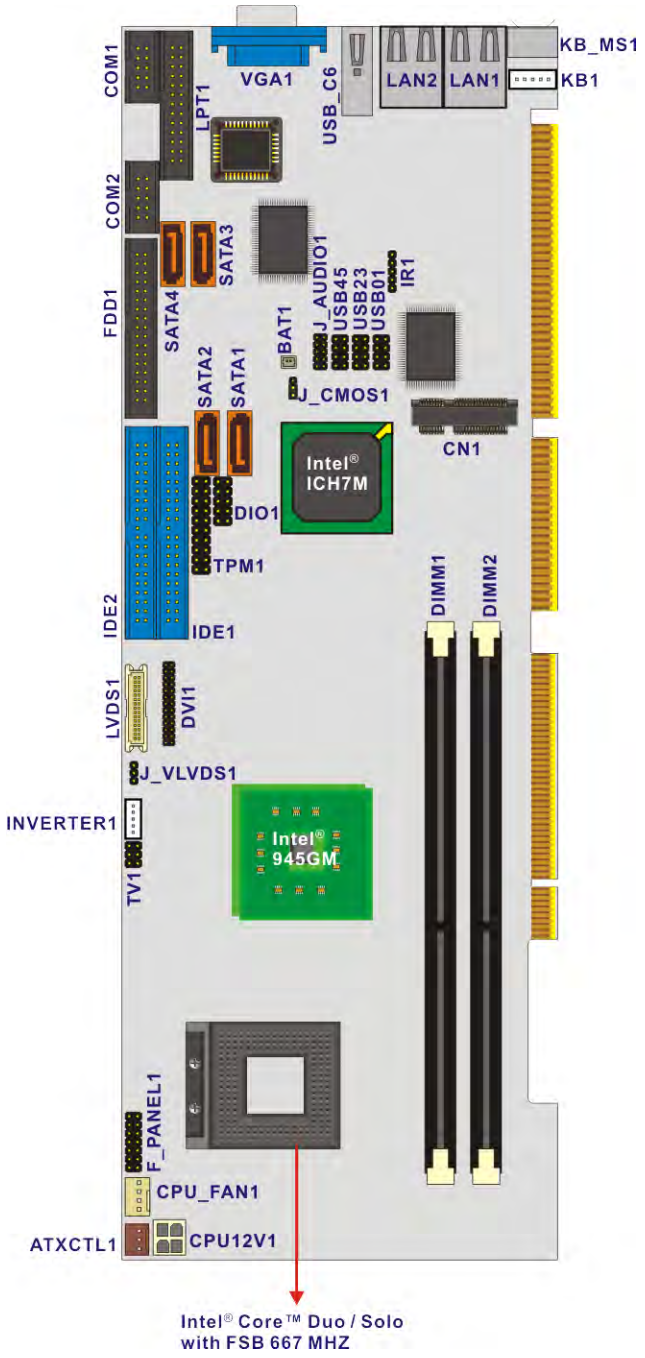


Figure 3-0: Connector and Jumper Locations

3.1.2 Peripheral Interface Connectors

Table 3-2 lists the peripheral interface connectors on the 3302020 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	10-pin header
ATXCTL1	Backplane to Mainboard Power Connector	3-pin wafer connector
BAT1	Battery Connector	2-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
IDE1, IDE2	IDE Connectors (Primary)	40-pin box header
INVERTER1	Inverter Connector	5-pin wafer connector
IR1	IrDA Infrared Interface Connector	5-pin header
KB1	Keyboard Connector	4-pin wafer connector
LVDS1	LVDS Panel Connector	30-pin crimp connector
LPT1	Parallel Port Connector	25-pin box header
CN1	PCI-Express Mini Card	52-pin PCI-E Mini Card slot
COM1 COM2	RS-232 Serial Port Connectors	10-pin box header

SATA1 SATA2 SATA3 SATA4	Serial ATA Connectors	7-pin SATA connector
TPM1	Trusted Platform Module Connector	20-pin header
TV1	TV Out Connector	6-pin header
USB01 USB23 USB45	USB Connectors	8-pin header

Table 3-2: Peripheral Interface Connectors

3.1.3 External Peripheral Interface Connectors

Table 3-3 lists the external peripheral interface connectors on the 3302020. Detailed descriptions of these connectors can be found in **Section 3.3**.

Connector	Type	Label
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 3-3: External Peripheral Interface Connectors

3.1.4 On-board Jumpers

Table 3-4 lists the on-board jumpers. Detailed descriptions of these jumpers can be found in **Section 4.5**.

Label	Connector	Type
J_CMOS1	CMOS state setting	3-pin header
J_LVDS1	L CD Voltage Selector	3-pin header

Table 3-4: On-board Jumpers

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 3302020 CPU card.

3.2.1 ATX-12V Power Source Connector

CN Label: **CPU12V1**

CN Type: 4-pin terminal block

CN Location: See **Figure 3-1**

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

This connector supports the ATX-12V power supply.

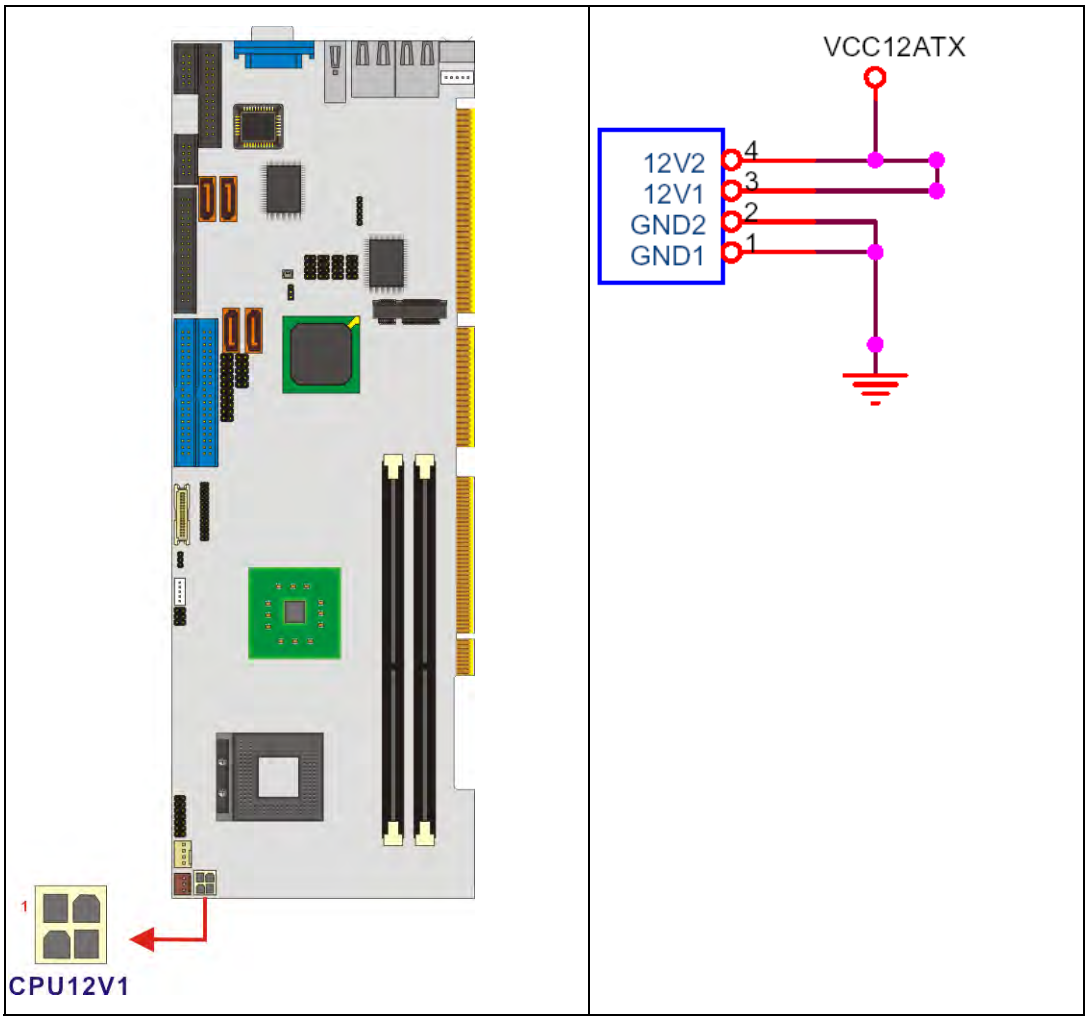


Figure 3-1: ATX–12V Connector Location

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

Table 3-5: ATX–12V Connector Pinouts

3.2.2 Audio Module Connector

CN Label: **J_AUDIO1**

CN Type: 10-pin header

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

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

The 3302020 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).

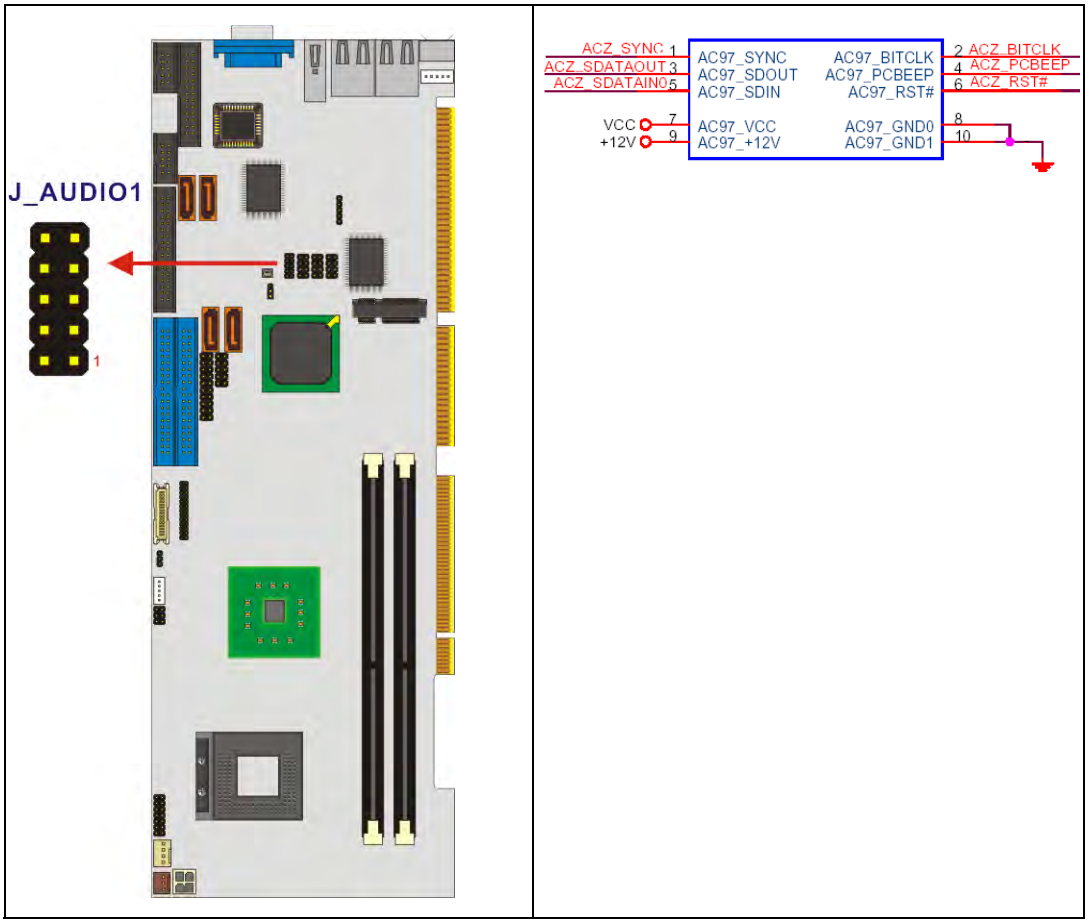


Figure 3-2: Audio Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	AC97_SYNC	2	AC97_BITCLK
3	AC97_SDOUT	4	AC97_PCBEEP
5	AC97_SDIN	6	AC97_RST#
7	AC97_VCC	8	AC97_GND
9	AC97_12V	10	AC97_GND

Table 3-6: Audio Connector Pinouts

3.2.3 Backplane to Mainboard Power Connector

CN Label: **ATXCTL1**

CN Type: 3-pin wafer connector

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

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

Connects a power source from a backplane with an ATX Connector.

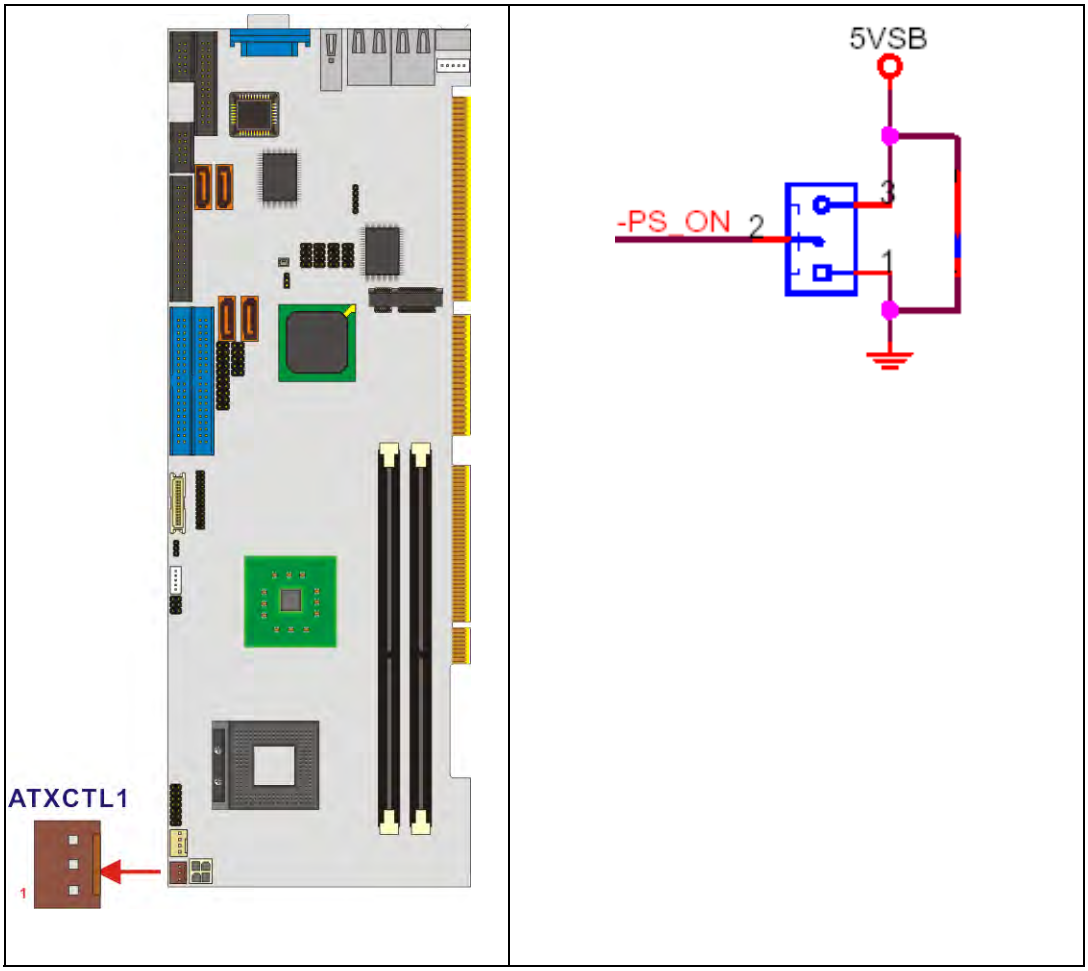


Figure 3-3: Backplane to Mainboard Power Connector Location

PIN NO.	DESCRIPTION
1	Ground
2	PS_ON
3	5V Dual

Table 3-7: Backplane to Mainboard Power Pin Outs

3.2.4 Battery Connector

CN Label: **BAT1**

CN Type: 2-pin wafer connector

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

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

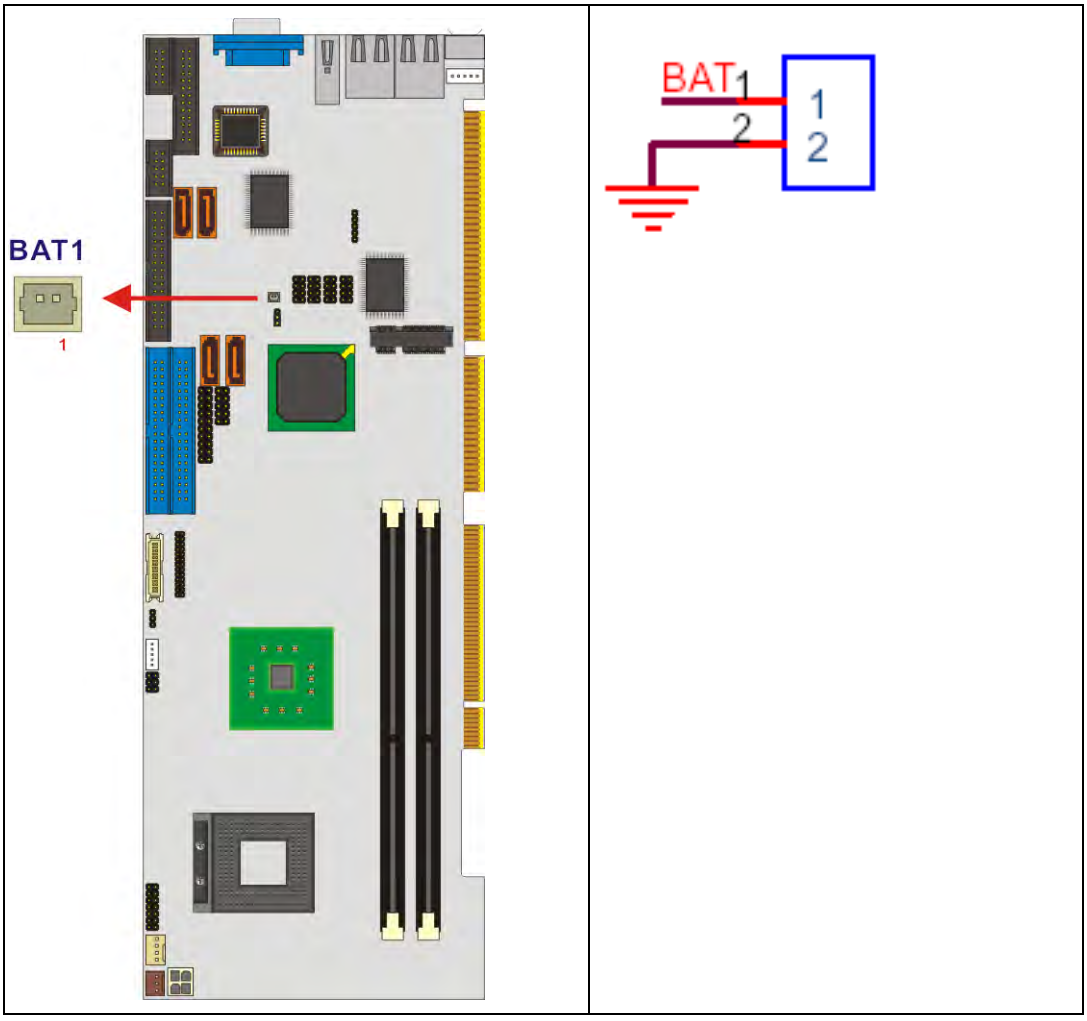


Figure 3-4: Battery Connector Location

PIN NO.	DESCRIPTION
1	BAT
2	GND

Table 3-8: Battery Connector Pinouts

3.2.5 CPU Fan Connector

CN Label: **CPU_FAN1**

CN Type: 4-pin wafer connector

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

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

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.

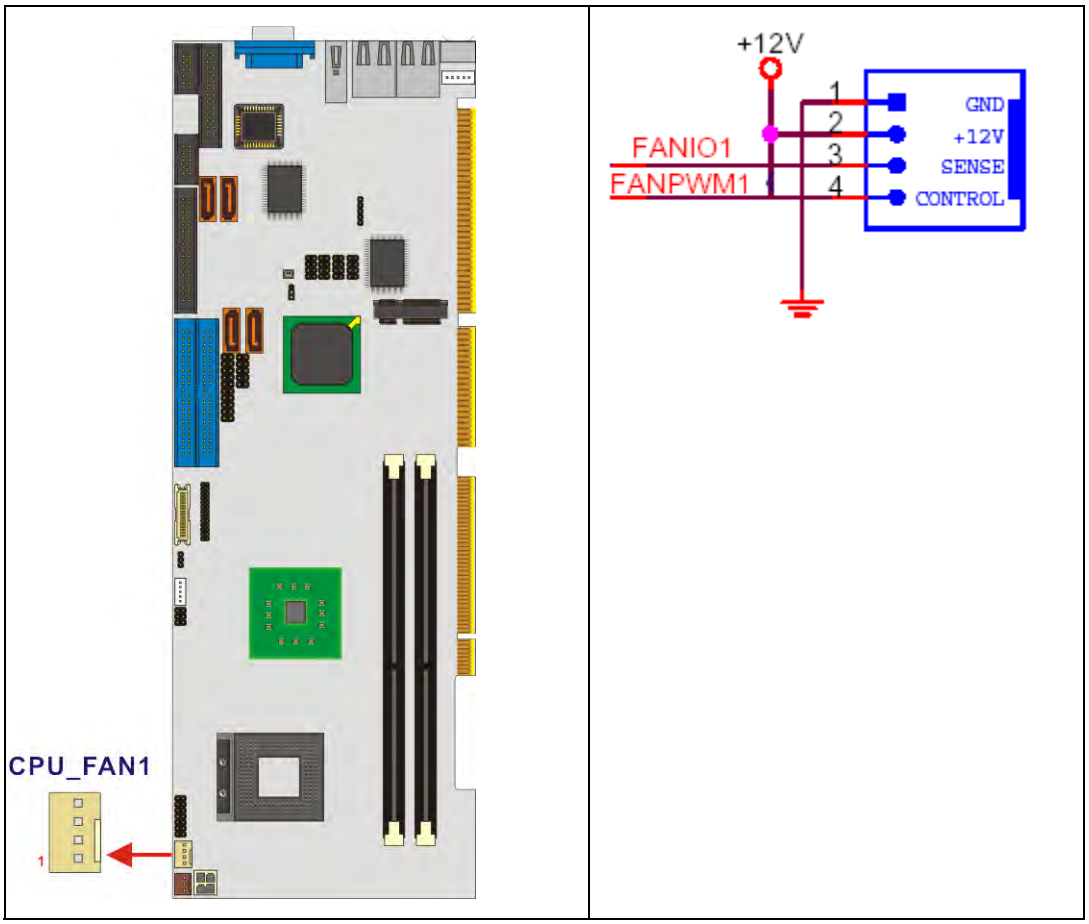


Figure 3-5: CPU Fan Connector Location

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

Table 3-9: CPU Fan Connector Pinouts

3.2.6 Digital Input/Output (DIO) Connector

CN Label: **DIO1**

CN Type: 10-pin header

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

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

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

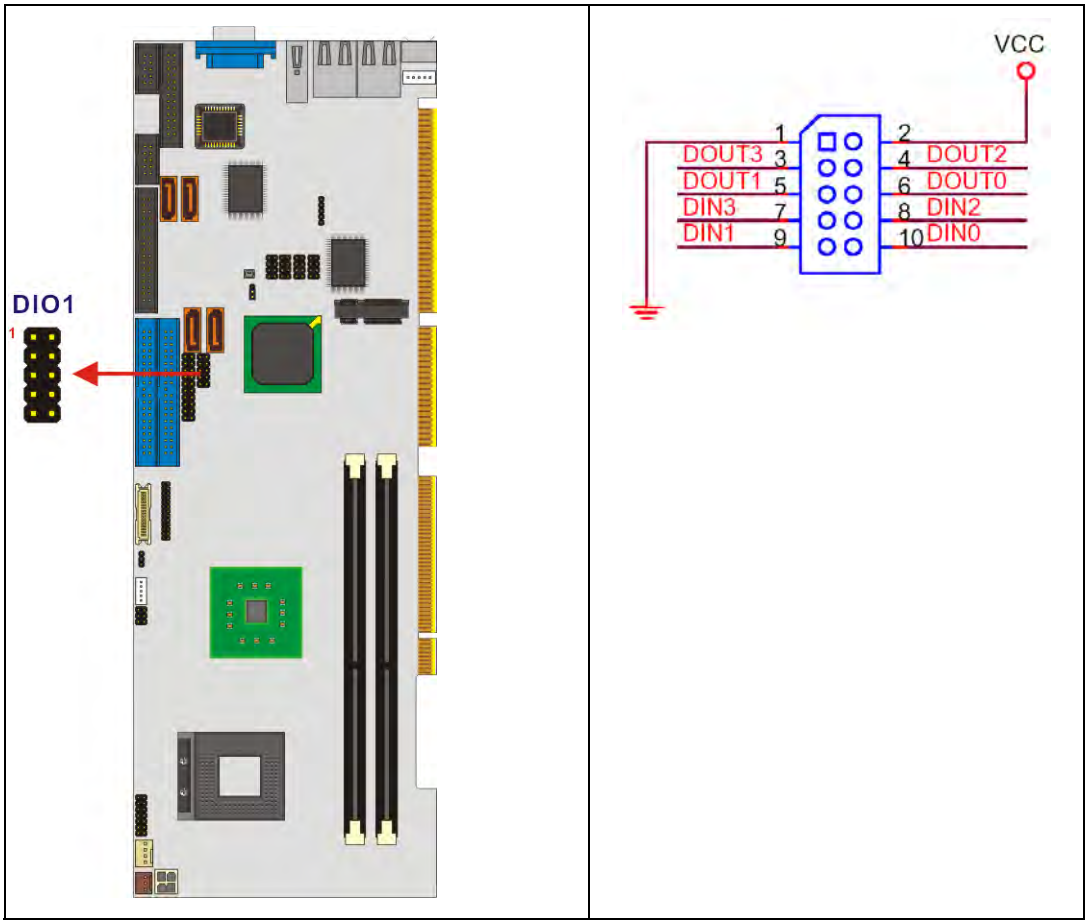


Figure 3-6: DIO Connector Location

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 3-10: DIOConnector Pinouts

3.2.7 DVI (Digital Visual Interface) Connector

CN Label: **DVI1**

CN Type: 25-pin header

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

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

The 3302020B and 3302020D models provide a digital visual interface for digital display and includes Accessory P/N 1008060 DVI Bracket with 4 USB Ports to connect to external DVI devices.

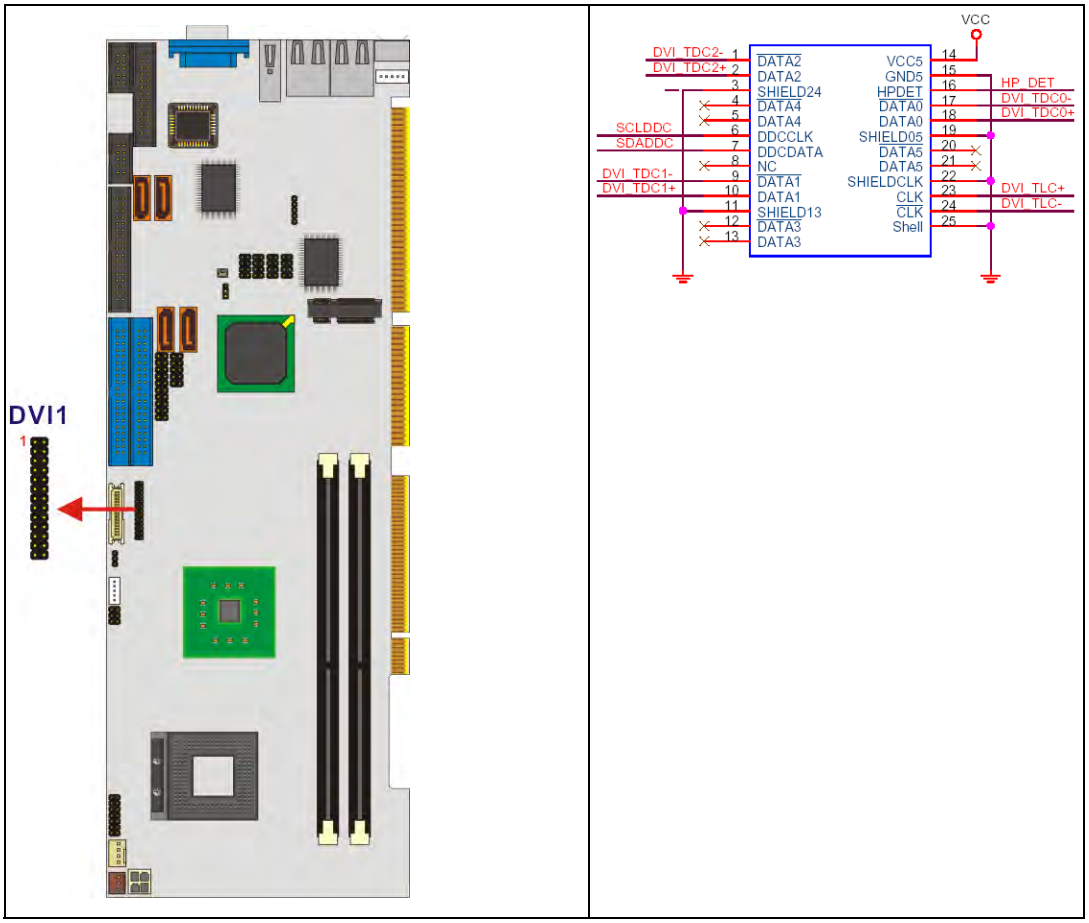


Figure 3-7: DVI Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Data 2-	14	+5V Power
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 3-11: DVI Connector Pinouts

3.2.8 FDD Connector

CN Label: **FDD1**

CN Type: 34-pin header

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

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

The 3302020 is shipped with a 34-pin daisy-chain drive connector cable. This cable can be connected to the FDD connector.

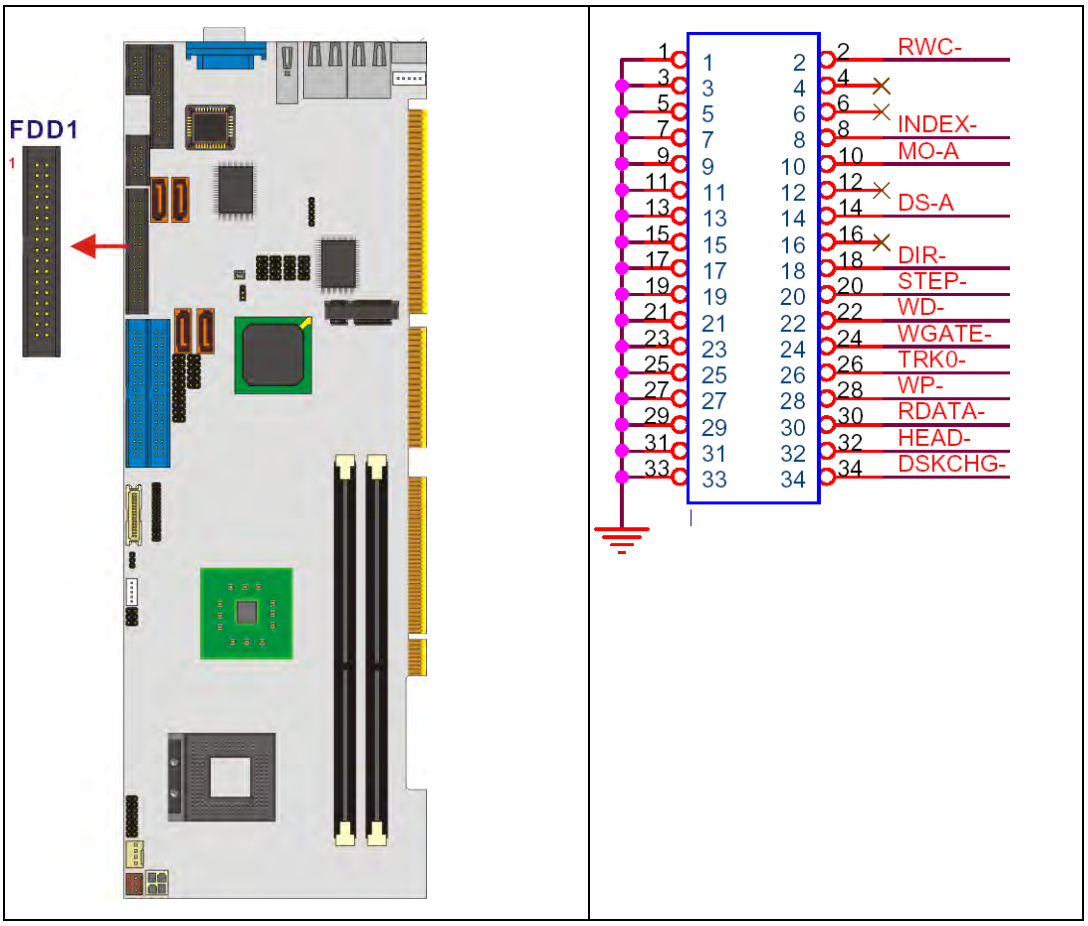


Figure 3-8: FDD Connector Location

PIN	DESCRIPTION	PIN	DESCRIPTION
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 3-12: FDD Connector Pinouts

3.2.9 Front Panel Connector

CN Label: **F_PANEL1**

CN Type: 14-pin header

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

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

The system front panel connector connects to:

- the system chassis front panel LEDs
- the chassis speaker
- the power switch
- the reset button

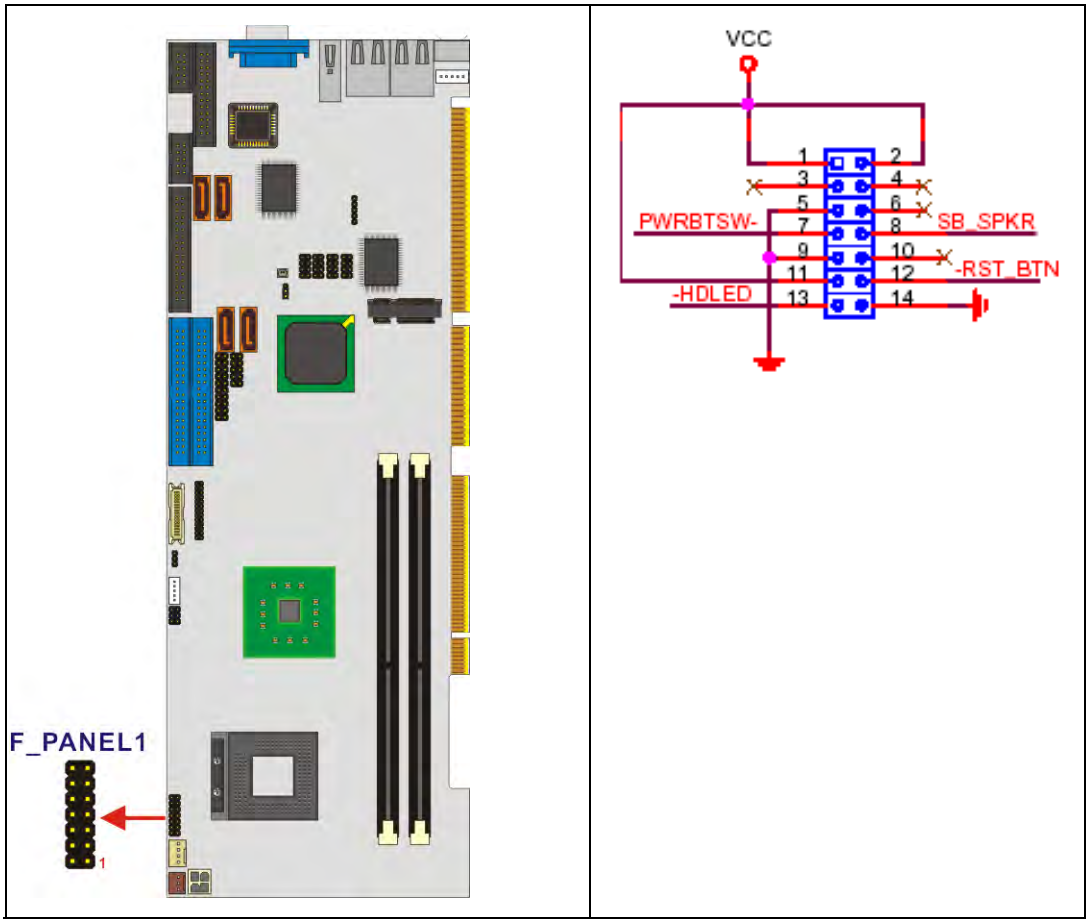


Figure 3-9: Front Panel Connector Location

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

Table 3-13: Front Panel Connector Location

3.2.10 IDE Connectors

CN Label: **IDE1, IDE2**

CN Type: 40-pin box header

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

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

One IDE connector provides connectivity for two IDE devices. 3302020A and 3302020B models have one IDE connector. 3302020C and 3302020D models have two IDE connectors.

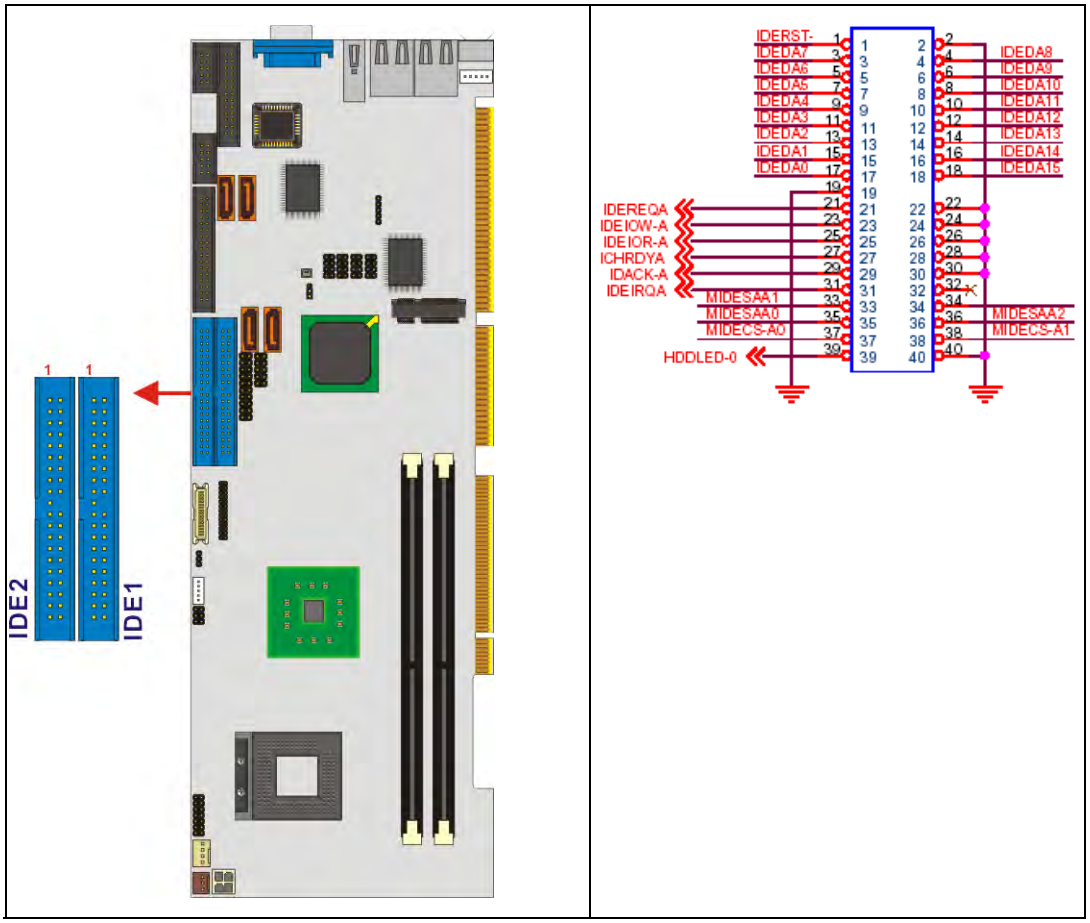


Figure 3-10: IDE Connectors Location

	DESCRIPTION	PIN	DESCRIPTION
1	RESET#	2	GND
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	GND	20	N/C
21	IDE DRQ	22	GND
23	IOW#	24	GND
25	IOR#	26	GND
27	IDE CHRDY	28	BALE – DEFAULT
29	IDE DACK	30	GND
31	INTERRUPT	32	N/C
33	SA1	34	PDIAG#
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GND

Table 3-14: IDE Connector Pinouts

3.2.11 Inverter Connector

CN Label: **INVERTER1**

CN Type: 5-pin wafer connector

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

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

The inverter control connector enables power on/off backlight during the power saving mode.

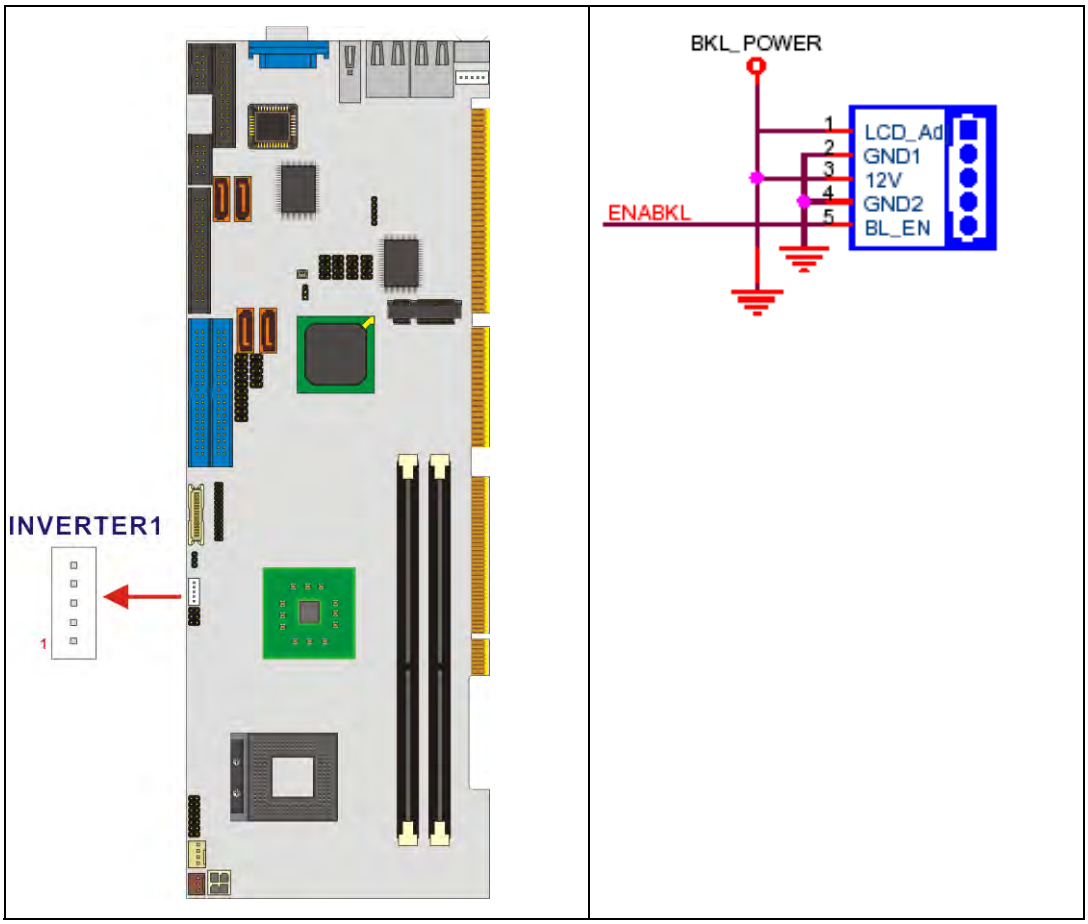


Figure 3-11: Inverter Connector Location

PIN	DESCRIPTION
1	BRIGHTNESS
2	GND1
3	12V
4	GND2
5	BL_EN

Table 3-15: Inverter Connector Pinouts

3.2.12 IrDA Interface Connector

CN Label: **IR1**

CN Type: 5-pin header

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

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

The integrated IrDA interface connector supports both the SIR and ASKIR infrared protocols.

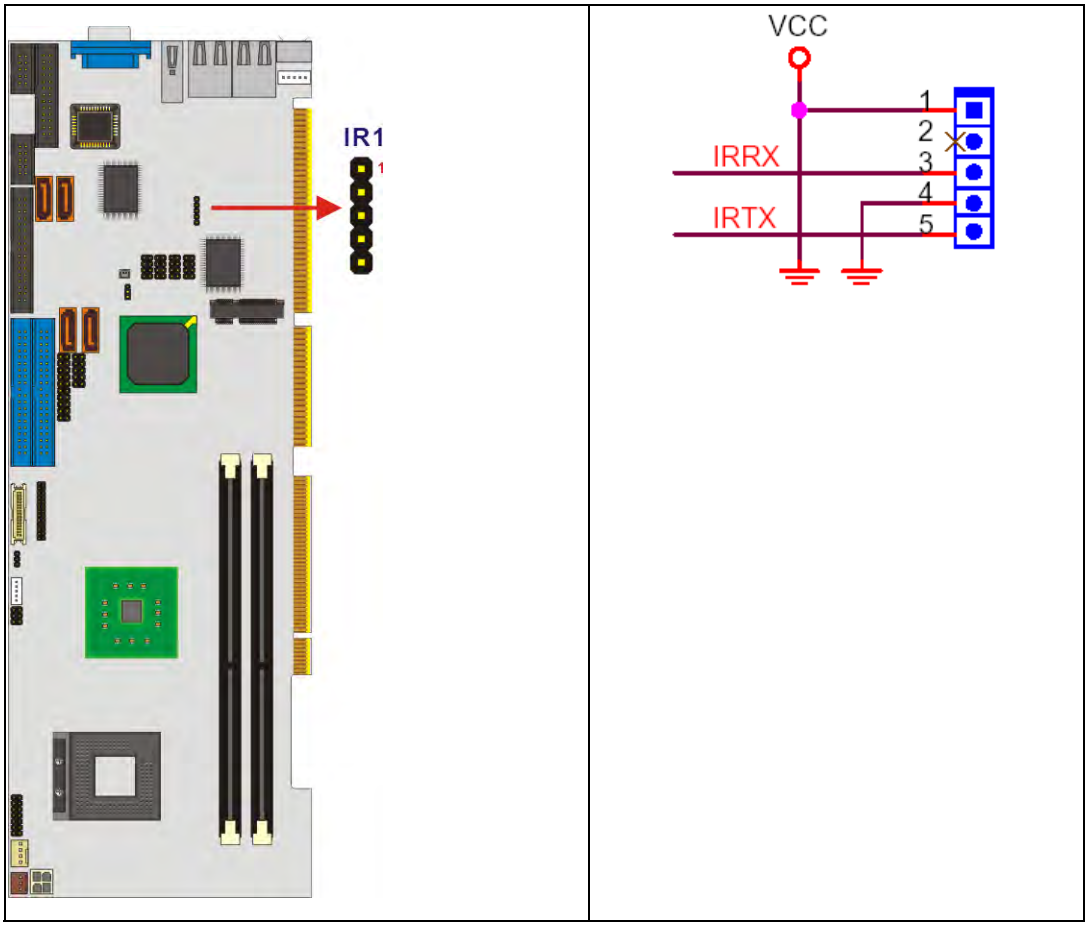


Figure 3-12: IrDA Interface Connector Location

PIN	DESCRIPTION
1	VCC
2	NC
3	IR-RX
4	GND
5	IR-TX

Table 3-16: IrDA Interface Connector Pinouts

3.2.13 Keyboard Connector

CN Label: **KB1**

CN Type: 4-pin wafer

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

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

For alternative application, a keyboard pin header connector is also available on board. This connector requires a special adapter cable.

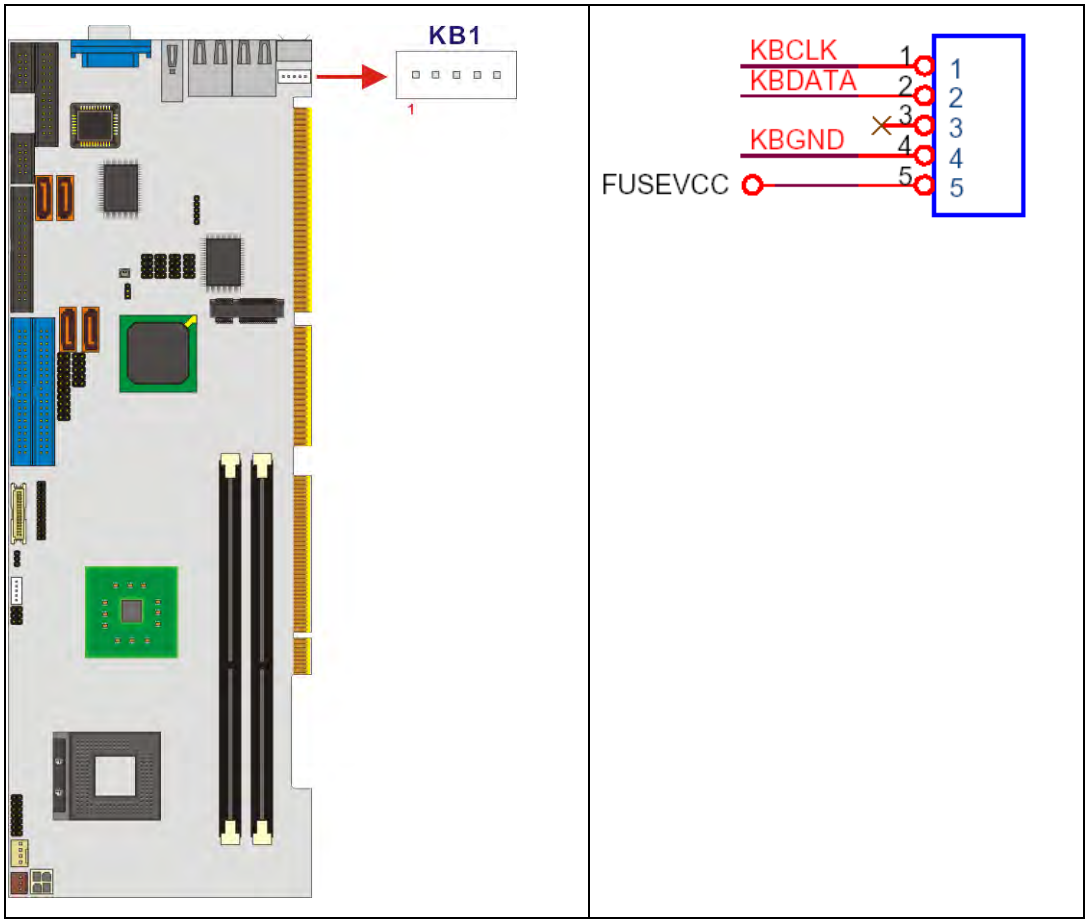


Figure 3-13: Keyboard Connector Location

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

Table 3-17: KB1 Connector Pinouts

3.2.14 LVDS Connector

CN Label: **LVDS1**

CN Type: 30-pin crimp connector

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

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

The LVDS connector allows for an 18-bit, dual-channel, low noise, low power, and low amplitude high-speed data connection between the CPU card and LCD panel.

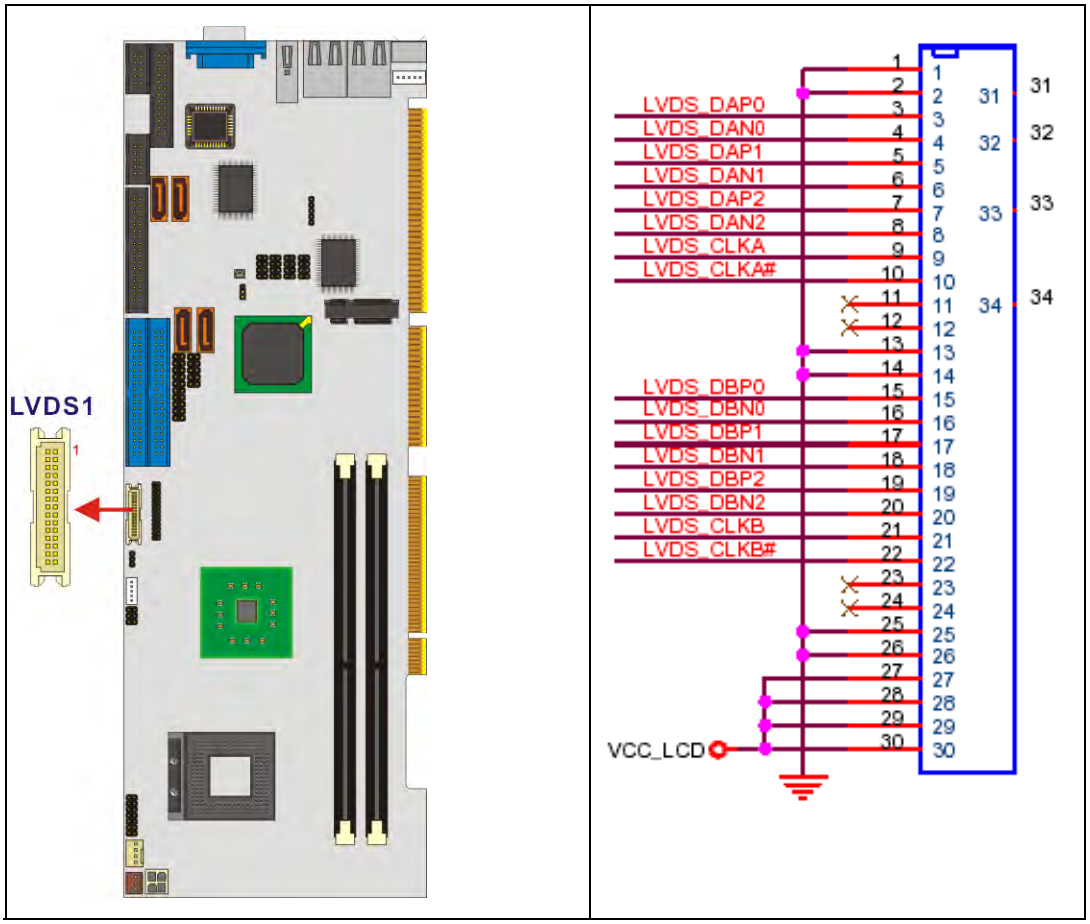


Figure 3-14: LVDS Connector Location

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND1	2	GND2
3	A_Y0	4	A_Y0#
5	A_Y1	6	A_Y1#
7	A_Y2	8	A_Y2#
9	A_CK	10	A_CK#
11	A_Y3	12	A_Y3#
13	GND3	14	GND4
15	B_Y0	16	B_Y0#
17	B_Y1	18	B_Y1#
19	B_Y2	20	B_Y2#
21	B_CK	22	B_CK#
23	B_Y3	24	B_Y3#
25	GND5	26	GND6
27	VCC1	28	VCC2
29	VCC3	30	VCC4

Table 3-18: LVDS Connector Pinouts

3.2.15 Parallel Port Connector

CN Label: **LPT1**

CN Type: 25-pin box header

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

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

The parallel port connector is usually connected to a printer or other parallel device with a 26-pin flat-cable connector.

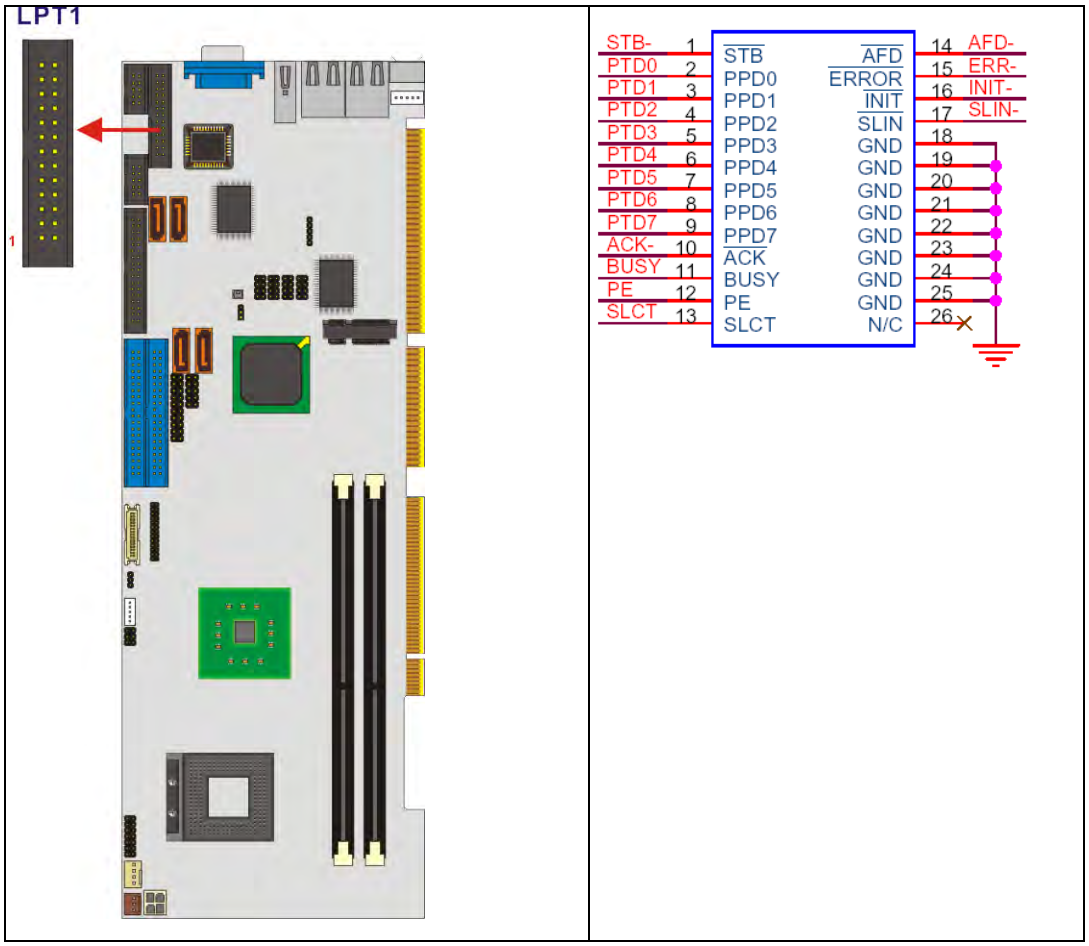


Figure 3-15: Parallel Port Connector Location

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 3-19: Parallel Port Connector Pinouts

3.2.16 PCI Express Mini Card Connector

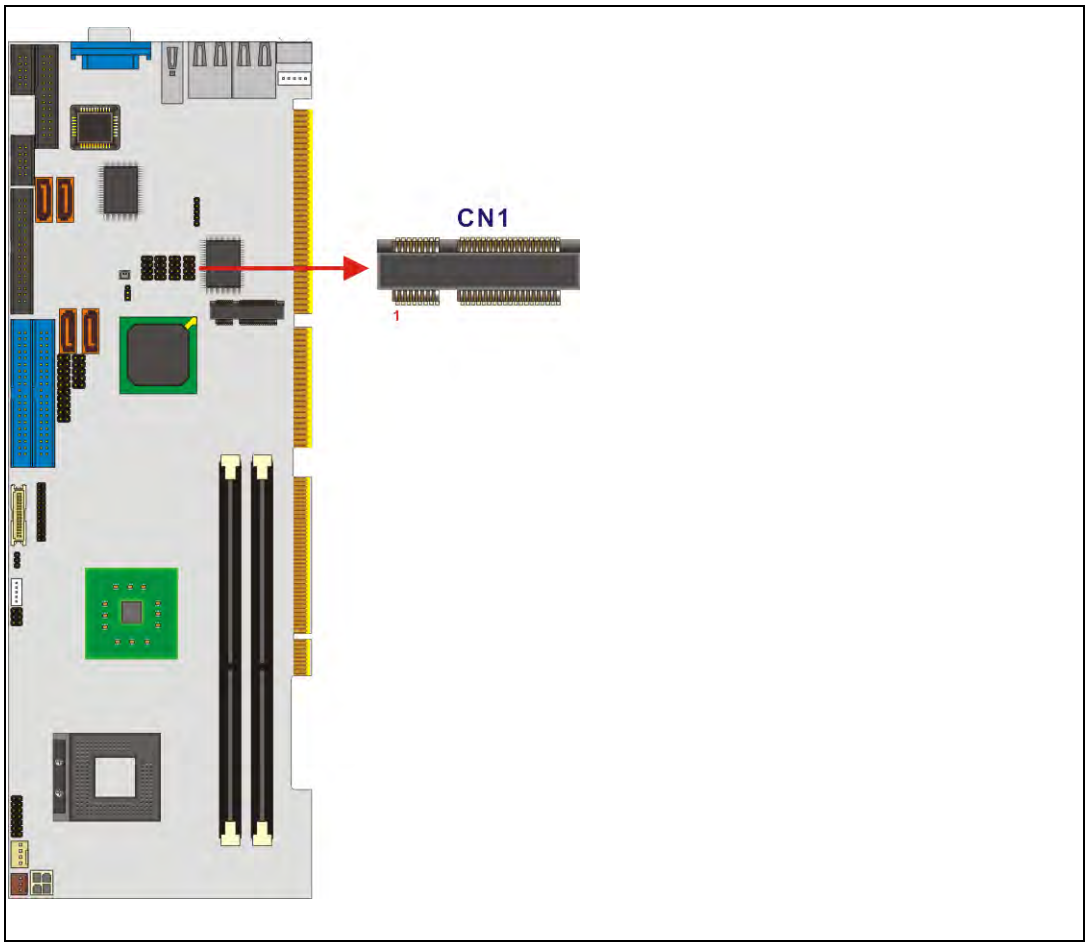
CN Label: **CN1**

CN Type: 52-pin PCI-E Mini Card slot

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

CN Pinouts: See **Table 3-20**

The CPU card is equipped with a PCI-E Mini Card connector to support the latest PCI-E extension cards such as wireless LAN card or other compatible devices.


CN1
1

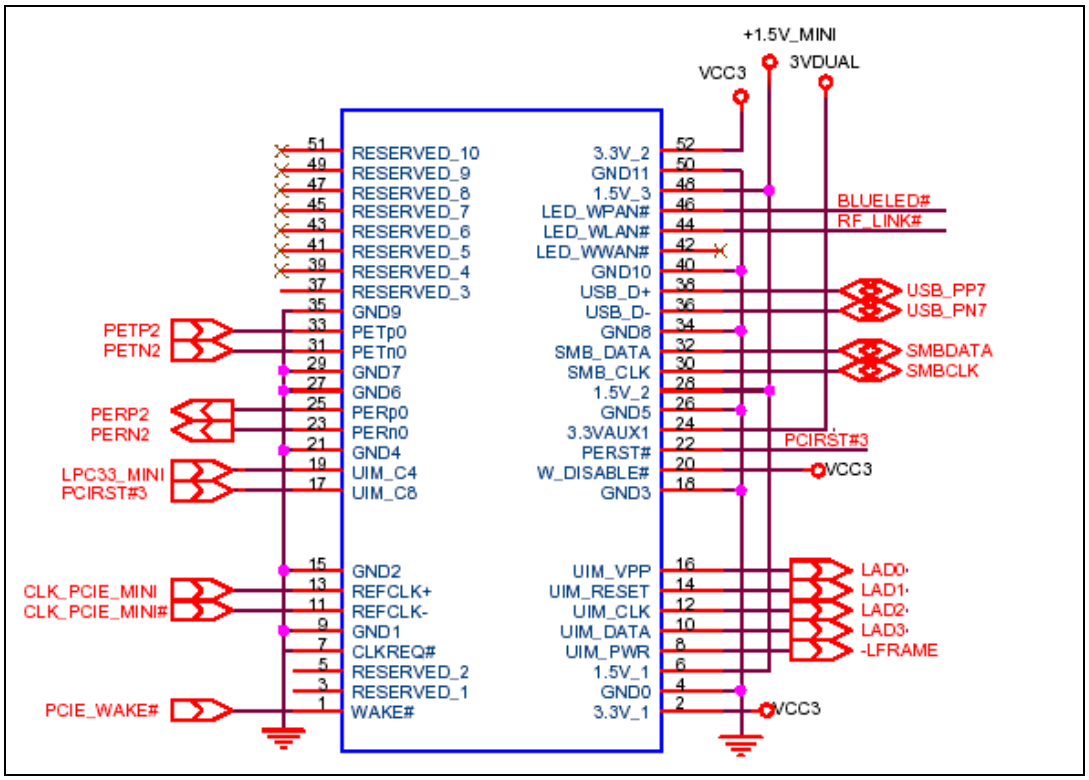


Figure 3-16: PCI Express Mini Card Connector Location

PIN	DESCRIPTION	PIN	DESCRIPTION
1	PCIE_WAKE#	2	VCC3
3	N/C	4	GND
5	N/C	6	1.5V
7	CLKREQ#	8	LFRAME#
9	GND	10	LAD3
11	CLK-	12	LAD2
13	CLK+	14	LAD1
15	GND	16	LAD0
17	PCIRST#	18	GND
19	LPC	20	VCC3
21	GND	22	PCIRST#
23	PERN2	24	3VDual
25	PERP2	26	GND
27	GND	28	1.5V

29	GND	30	SMBCLK
31	PETN2	32	SMBDATA
33	PETP2	34	GND
35	GND	36	USBD-
37	N/C	38	USBD+
39	N/C	40	GND
41	N/C	42	N/C
43	N/C	44	RF_LINK#
45	N/C	46	BLUELED#
47	N/C	48	1.5V
49	N/C	50	GND
51	N/C	52	VCC3

Table 3-20: PCI Express Mini Card Connector Pinouts

3.2.17 RS-232 Serial Port Connectors

CN Label: **COM1, COM2**

CN Type: 10-pin box header

CN Location: See **Figure 3-17**

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

The 3302020 CPU card has two internal high-speed UART connectors accessed through a 10-pin cable connector.

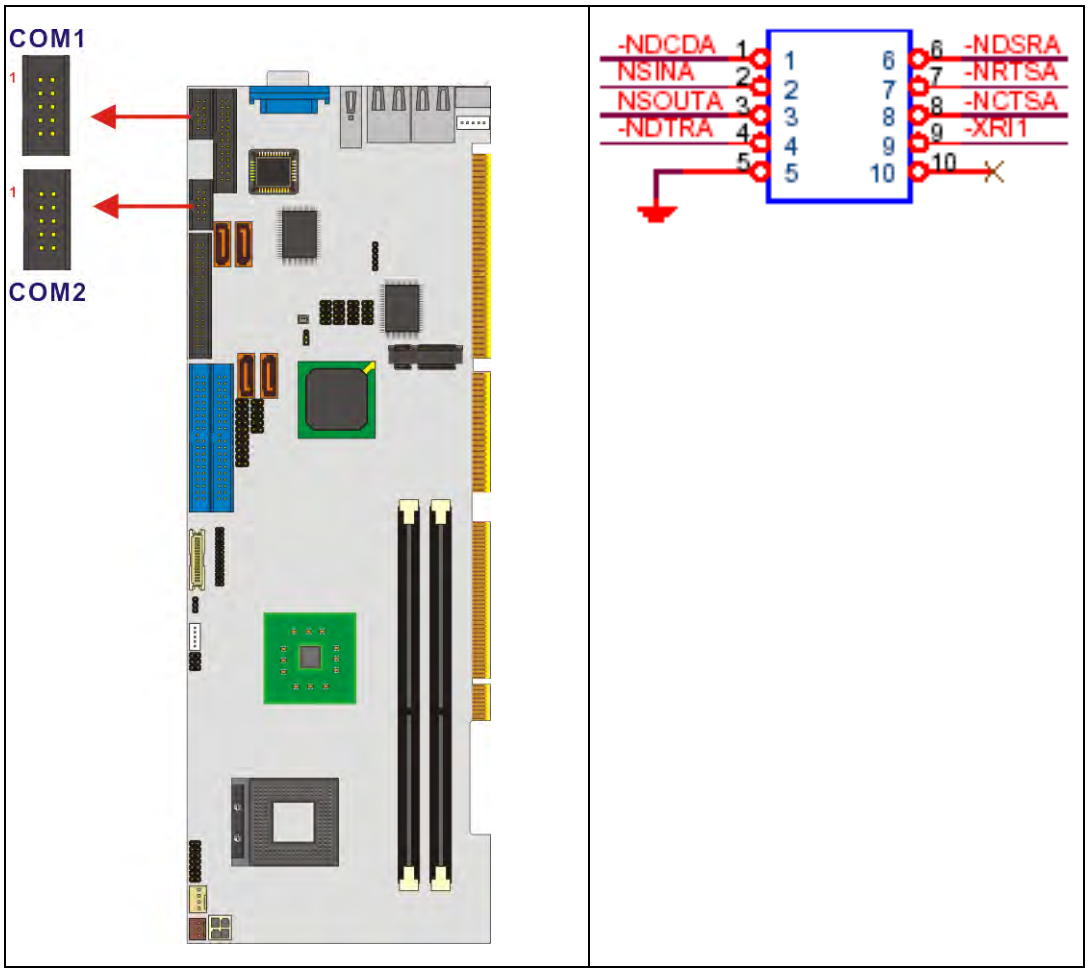


Figure 3-17: RS-232 Serial Port Connector Location

PIN	DESCRIPTION	PIN	DESCRIPTION
1	DATA CARRIER DETECT (DCD1)	6	DATA SET READY (DSR1)
2	RECEIVE DATA (RXD1)	7	REQUEST TO SEND (RTS1)
3	TRANSMIT DATA (TXD1)	8	CLEAR TO SEND (CTS1)
4	DATA TERMINAL READY (DTR1)	9	RING INDICATOR (RI1)
5	GND (GND1)	10	N/C

Table 3-21: RS-232 Serial Port Connector Pinouts

3.2.18 SATA Drive Connectors

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

CN Type: 7-pin SATA drive connector

CN Location: See **Figure 3-18**

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

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 3302020C and 3302020D.

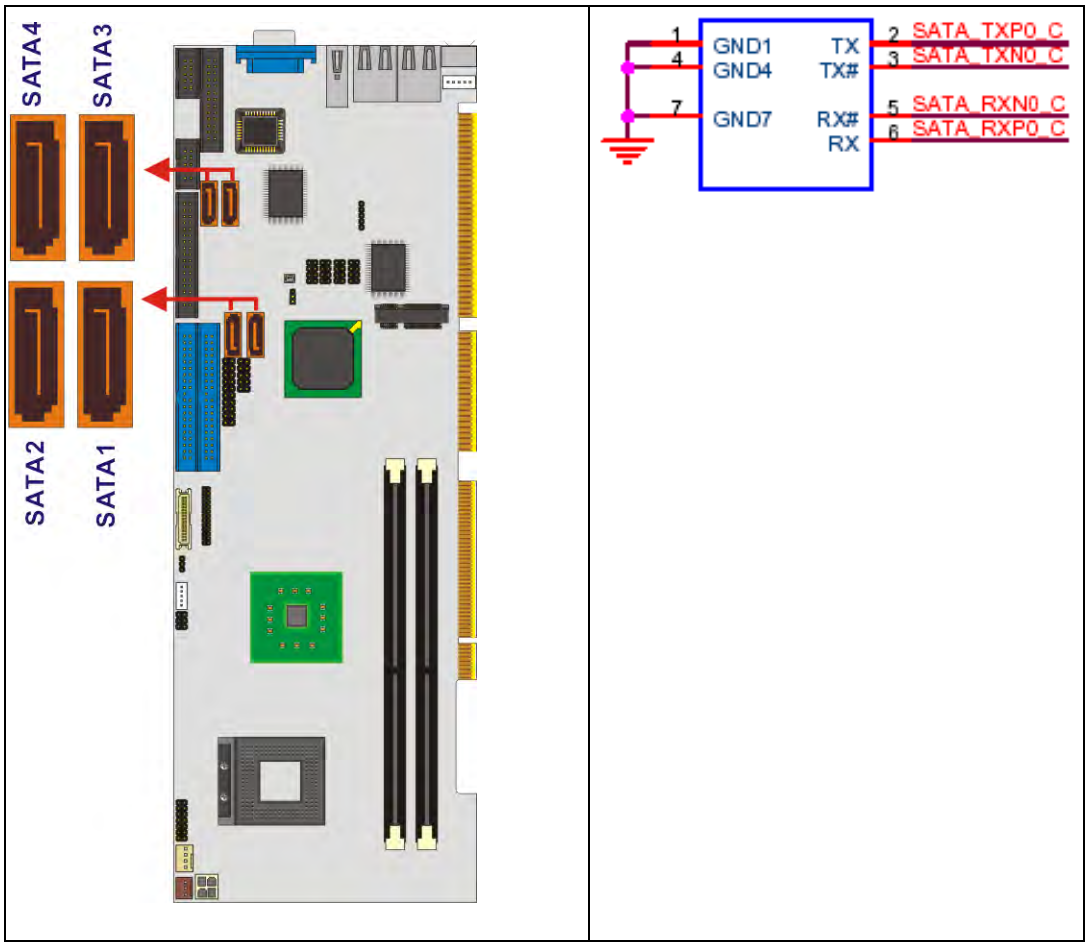


Figure 3-18: SATA Connectors Location

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

Table 3-22: 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.

3.2.19 Trusted Platform Module Connector

CN Label:	**TPM1**
CN Type:	20-pin header
CN Location:	See **Figure 3-19**
CN Pinouts:	See **Table 3-23**

The TPM connector is a trusted platform module connector used to secure the system on bootup.

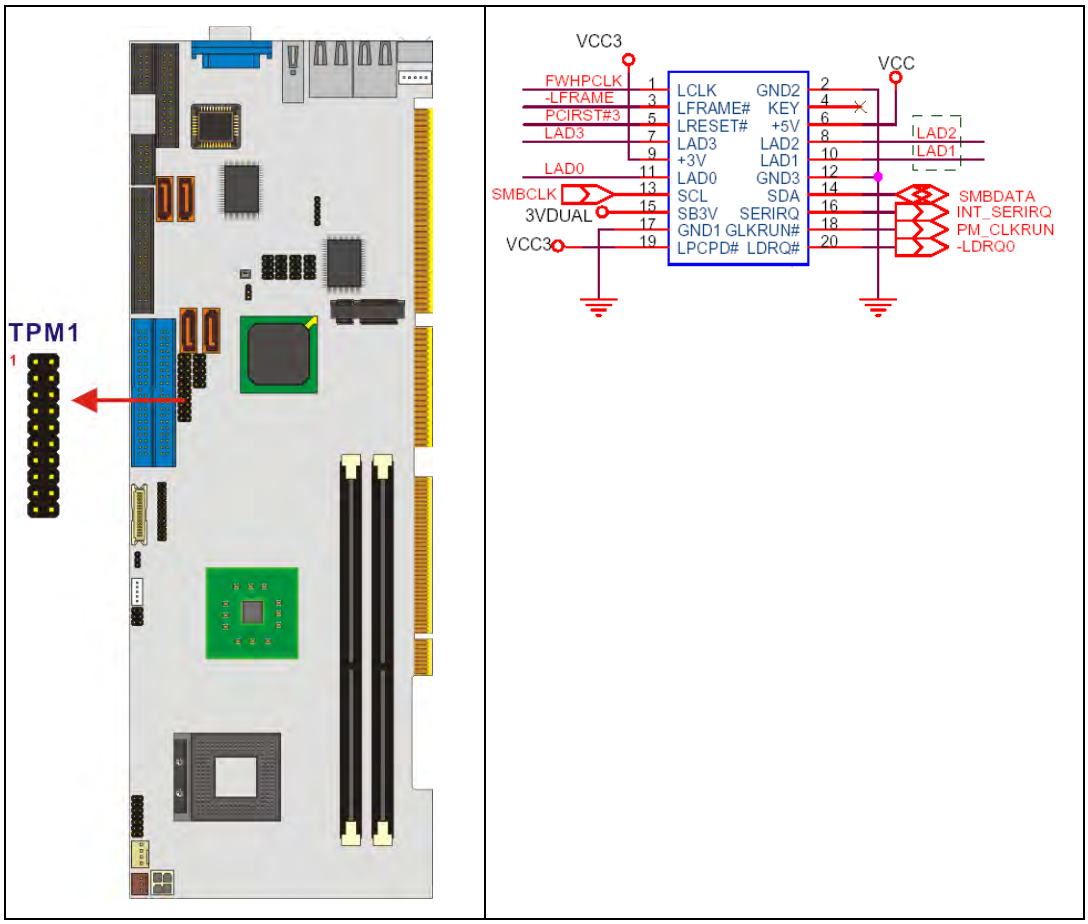


Figure 3-19: TPM Connector Location

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 3-23: TPM Connector Pinouts

3.2.20 TV Out Connector

CN Label: **TV1**

CN Type: 6-pin header

CN Location: See **Figure 3-20**

CN Pinouts: See **Table 3-24**

The 2x3 pin TV out connector connects to a TV.

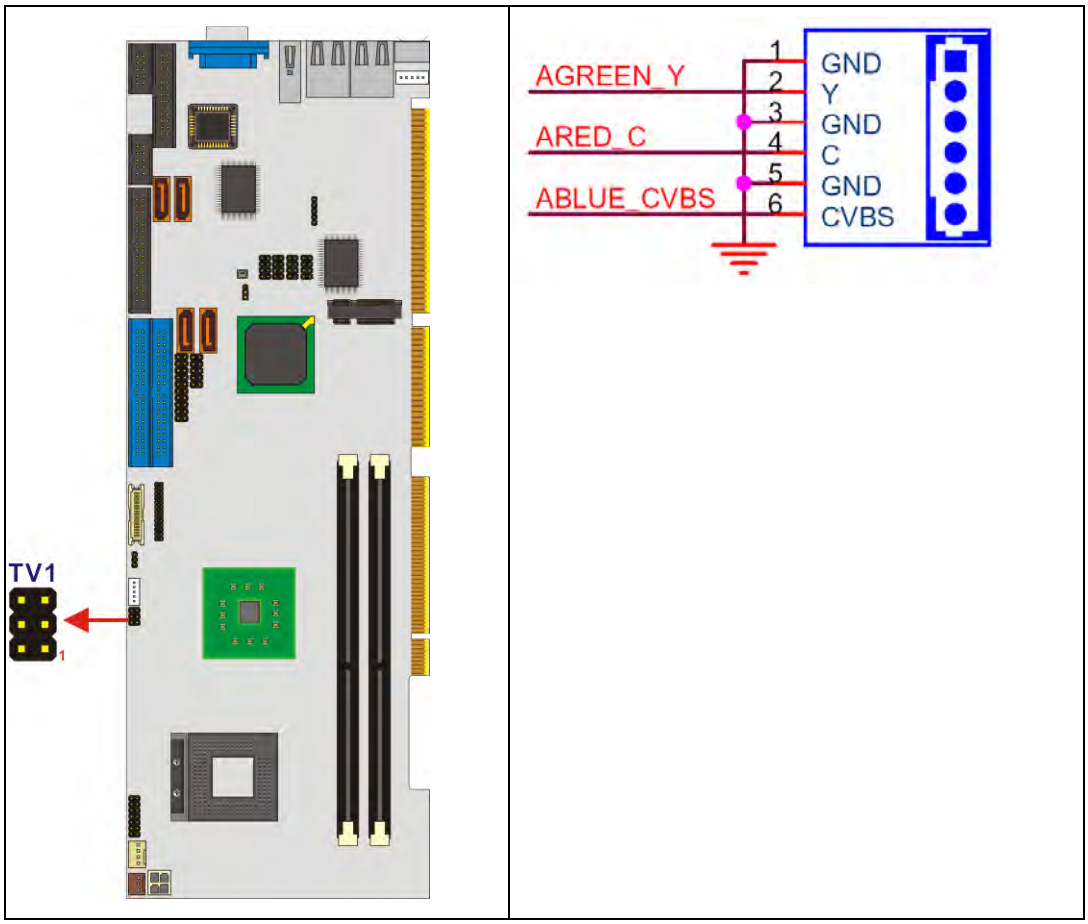


Figure 3-20: TV Out Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	AGREEN_Y
3	GND	4	ARED_C
RCA Connector (only video signal)			
5	GND	6	ABLUE_CVBS

Table 3-24: TV Out Connector Pinouts

3.2.21 USB Connectors

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

CN Type: 8-pin header

CN Location: See **Figure 3-21**

CN Pinouts: See **Table 3-25**

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.

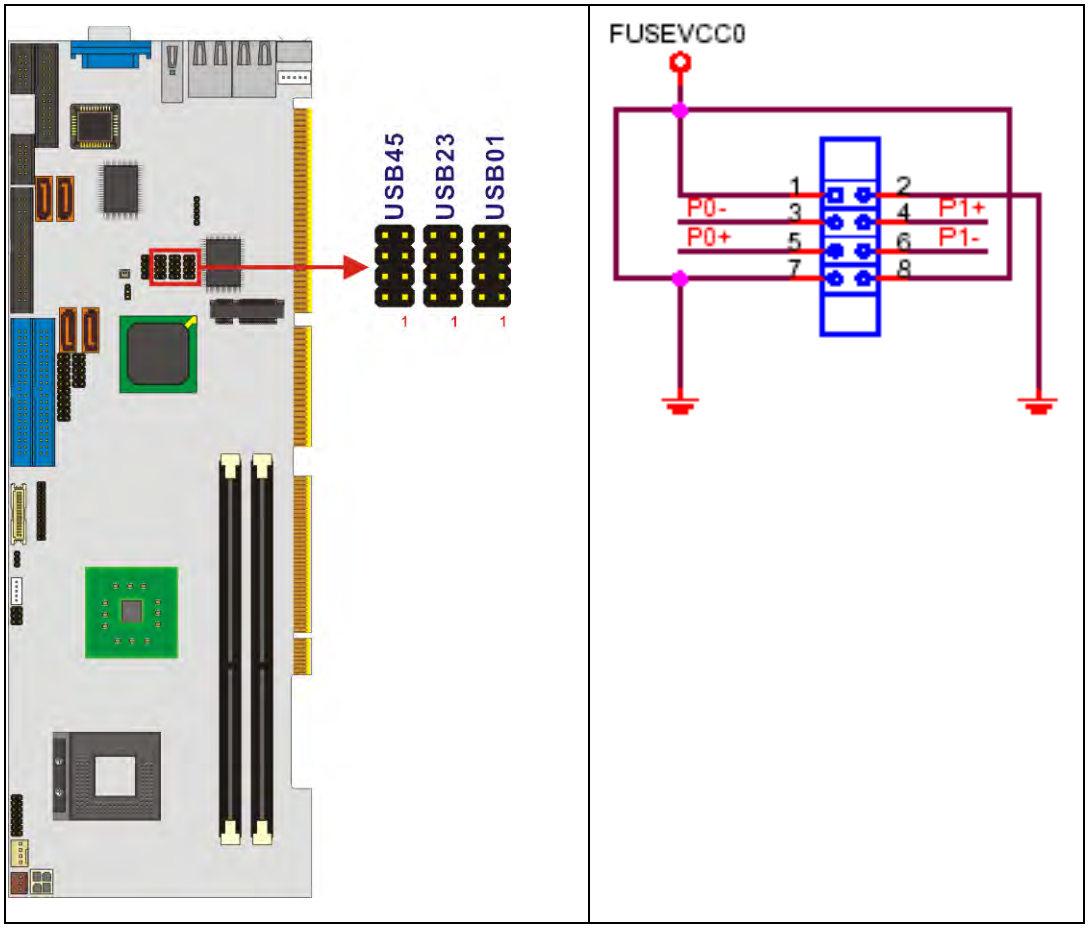


Figure 3-21: USB Port Connector Location

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

Table 3-25: USB Port Connector Pinouts

3.3 External Peripheral InterfaceConnectors

Figure 3-22 shows the 3302020 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

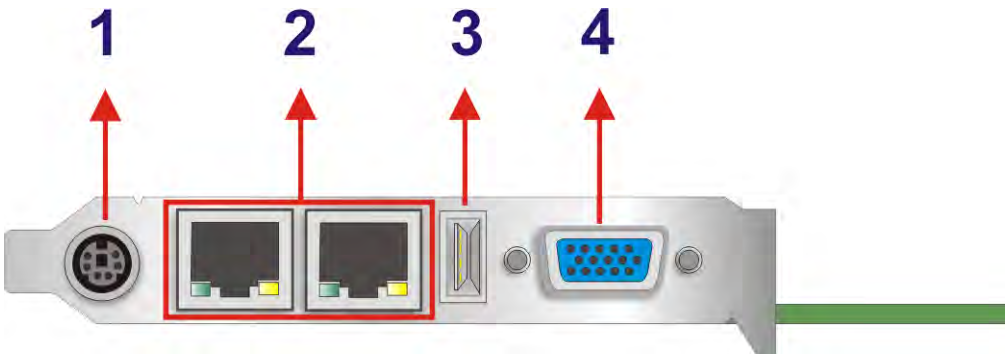


Figure 3-22: External Peripheral Interface Connector Panel

3.3.1 LAN Connectors

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

CN Type: RJ-45

CN Location: See **Figure 3-22** (labeled number 2)

CN Pinouts: See **Table 3-26**

The 3302020 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	DESCRIPTION	PIN	DESCRIPTION
1	MDIA3-	5	MDIA1+
2	MDIA3+	6	MDIA2+-
3.	MDIA2-	7	MDIA0-
4.	MDIA1-	8	MDIA0+

Table 3-26: Ethernet Connector Pinouts

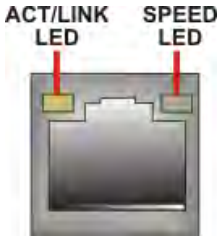


Figure 3-23: RJ-45 Ethernet Connector

The RJ-45 Ethernet connector has two status LEDs, one green / orange and one yellow. The green / orange LED indicates the speed and the yellow LED indicates activity or is linked on the port. See **Table 3-27**.

SPEED LED		ACT/LINK LED	
STATUS	**DESCRIPTION**	**STATUS**	**DESCRIPTION**
GREEN	100Mbps connection	YELLOW	Linked
ORANGE	1Gbps connection	BLINKING	Data Activity

Table 3-27: 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 3-22** (labeled number 1)

CN Pinouts: See **Table 3-28**

The 3302020 CPU 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 3-24: 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 3-28: Mini-DIN 6 PS/2 Connector

3.3.3 USB Connector

CN Label: **USB_C6**

CN Type: USB port

CN Location: See **Figure 3-22** (labeled number 3)

CN Pinouts: See **Table 3-29**

The 3302020 has a 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 3-29: USB Port Pinouts

3.3.4 VGA connector

CN Label: **VGA1**

CN Type: HD-D-sub 15 female connector

CN Location: See **Figure 3-22** (labeled number 4)

CN Pinouts: See **Table 3-30**

A 15-pin VGA connector connects to standard displays.

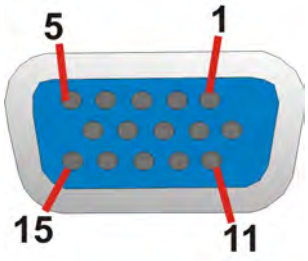


Figure 3-25: VGA Connector

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 3-30: VGA Connector Pinouts

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Chapter

4

Installation and Configuration

4.1 Anti-static Precautions

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the 3302020. (Dry climates are especially susceptible to ESD.) It is therefore critical that whenever the 3302020 (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 3302020 CPU card, please **do** the following:

- Read the user manual
  - The user manual provides a complete description of the 3302020 CPU card, installation instructions and configuration options.

- Wear an electrostatic discharge cuff (ESD)
  - 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
  - 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 3302020 CPU card
  - 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 3302020 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 3302020 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 3302020 CPU card, you must unpack the CPU card. Some components on 3302020 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 3302020 . 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 3302020 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 3302020, please make sure that your package contains the following items.

- 1 x 3302020 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 3302020 CPU card from and do not proceed any further with the installation.

4.4 3302020 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

4.4.1 Socket 478 CPU Installation

WARNING:

CPUs are expensive and sensitive components. When installing the CPU please be careful not to damage it in anyway. Make sure the CPU is installed properly and ensure that a heat sink and CPU cooling fan are properly installed before the 3302020 board is run.

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

To install Socket 478-pin CPU onto the 3302020 board, follow the steps below:

WARNING:

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

Step 1: **Is the CPU retention screw in an unlocked position?** When shipped, the retention screw of the CPU socket should be in the unlocked position. If it is not in the unlocked position, use a screwdriver to position it in an unlocked position. (See **Figure 4-1**)

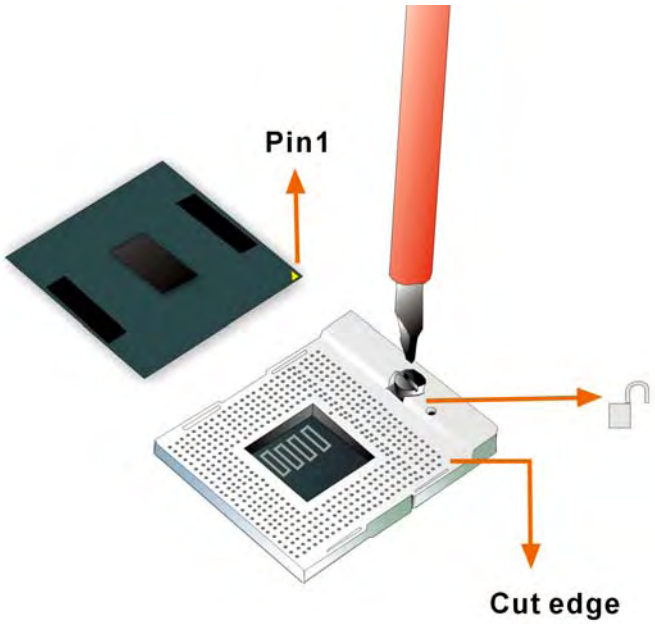

Figure 4-1: Make sure the CPU socket retention screw is unlocked

Step 2: **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 3: **Correctly position the CPU.** Make sure the pin 1 mark matches the cut edge on the CPU socket. Carefully place the CPU on top of the socket. When properly placed, the CPU should be easily inserted into the socket.

Step 4: **Insert the CPU.** To insert the CPU into the socket, hold the CPU by its edges and follow the instructions below:

Step 5: Correctly orientate the CPU with the IHS (Integrated Heat Sink) side facing upward.

Step 6: Locate the pin 1 mark on the CPU.

Step 7: Gently insert the CPU into the socket.

Step 8: Rotate the retention screw into the locked position. (See **Figure 4-2**)

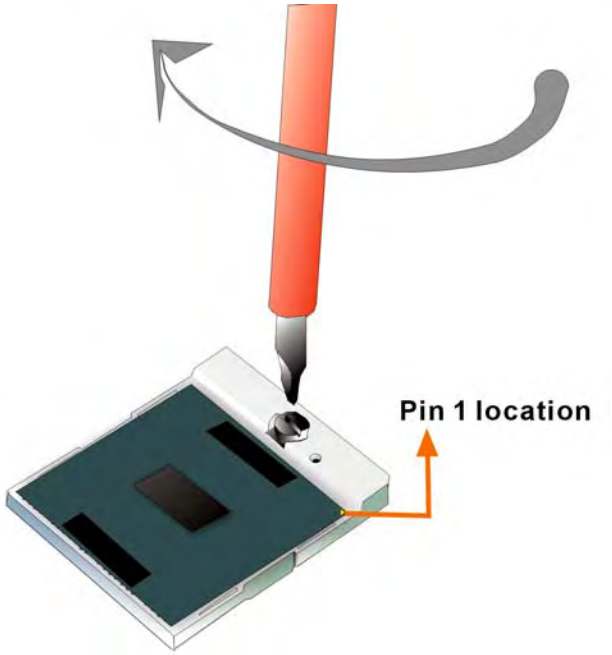

Figure 4-2: Lock the CPU Socket Retention Screw

4.4.2 Cooling Kit (2107703) Installation

Figure 4-3: GAI 2107703 Cooling Kit

GAI provides a cooling kit designed for socket 478 CPUs. (See **Figure 4-3**) The cooling kit is comprised of a CPU heat sink and a cooling fan.

NOTE:

The 2107703 heat sink comes with a sprayed layer of thermal paste. Make sure the paste is not accidentally wiped during the unpacking or installation of the heat sink. Thermal paste between the CPU and the heat sink is important for optimum heat dissipation.

To install the 2107703 cooling kit, please follow the steps below.

Step 9: **Place the cooling kit onto the CPU**. Make sure the CPU cable can be properly routed when the cooling kit is installed.

Step 10: **Properly align the cooling kit.** Make sure its four spring screw fasteners can pass through the pre-drilled holes on the PCB.

Step 11: **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 4-4**)

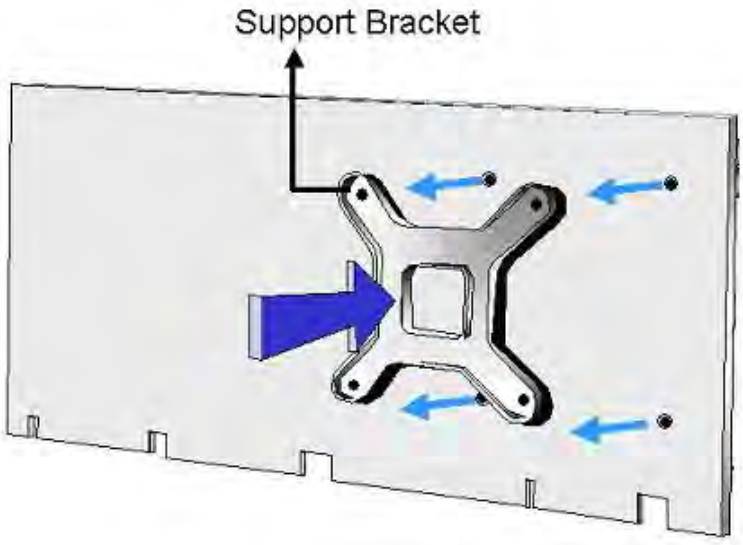

Figure 4-4: Securing the Cooling Kit

Step 12: **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 13: **Connect the fan cable**. Connect the cooling kit fan cable to the fan connector on the motherboard. Carefully route the cable and avoid heat generating chips and fan blades. (See **Figure 4-5**)

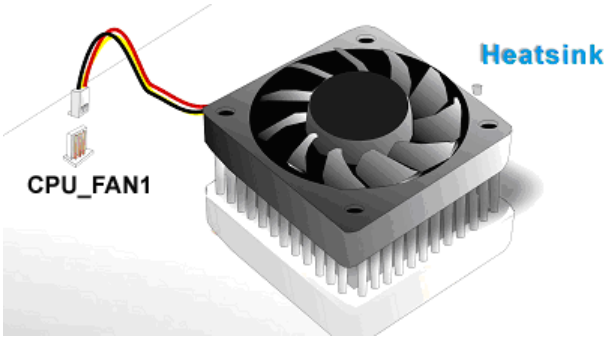

Figure 4-5: Connect the cooling fan cable

4.4.3 DIMM Module Installation

4.4.3.1 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

4.4.3.2 DIMM Module Installation

The 3302020 CPU card has two 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 4-6**).

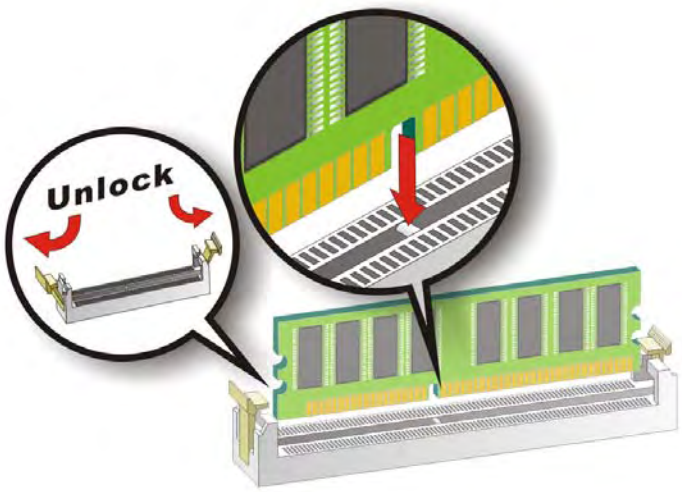

Figure 4-6: Installing the DIMM Module

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.

4.4.4 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: GAI Provided Cables

4.4.4.1 IDE Disk Drive Connectors (IDE1, IDE2)

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.

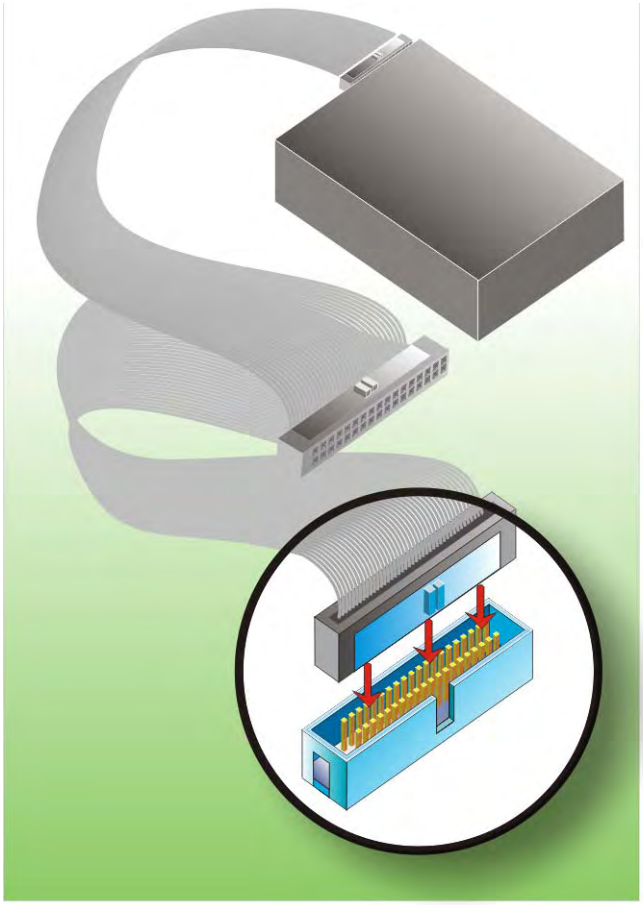

Figure 4-7: Connection of IDE Connector

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.

4.4.4.2 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.

4.4.5 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 4-8**).

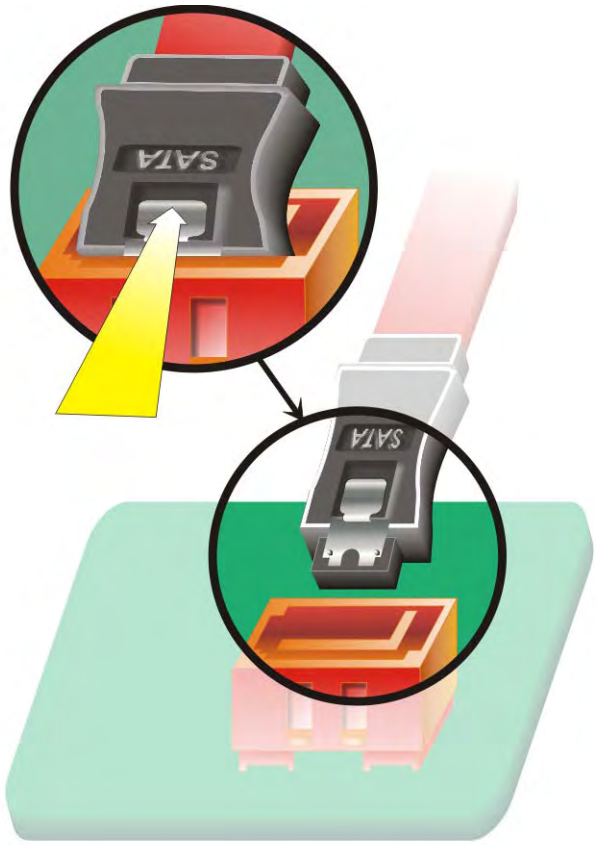

Figure 4-8: SATA Drive Cable Connection

Step 3: Connect the connector on the other end of the cable to the connector at the back of the SATA drive (**Figure 4-9**).

Step 4: Connect the SATA power connector to the back of the SATA drive (**Figure 4-9**).

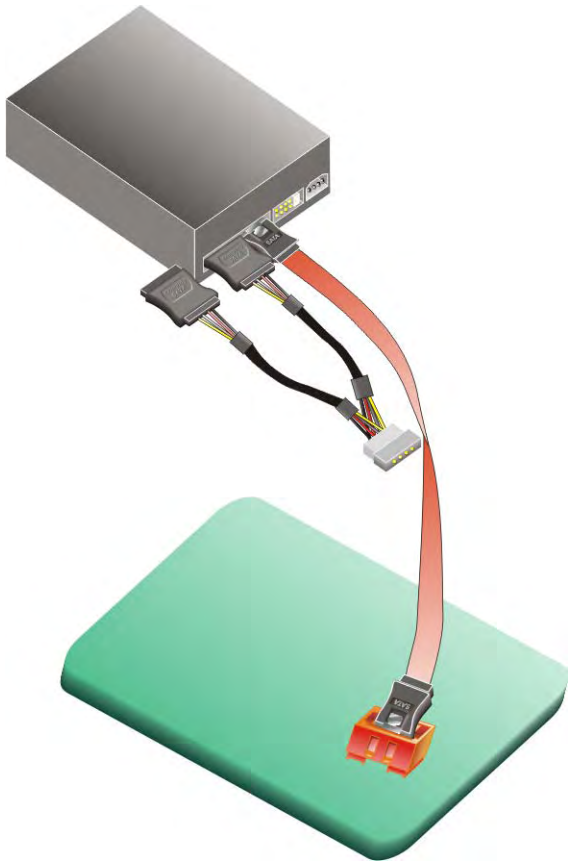

Figure 4-9: SATA Drive Connection

4.4.6 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 4-10**).

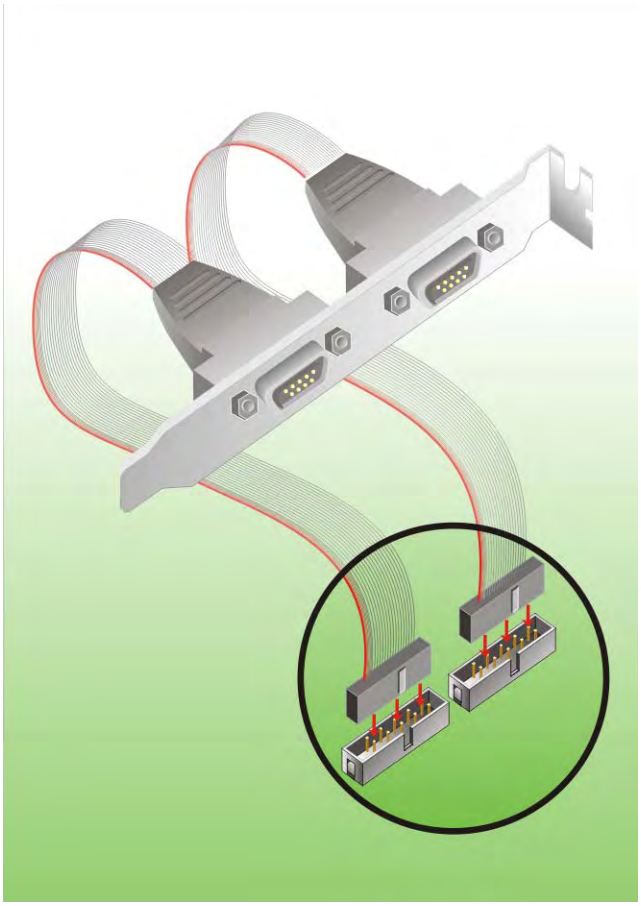

Figure 4-10: Dual RS-232 Cable Installation

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

4.4.7 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 4-11**)

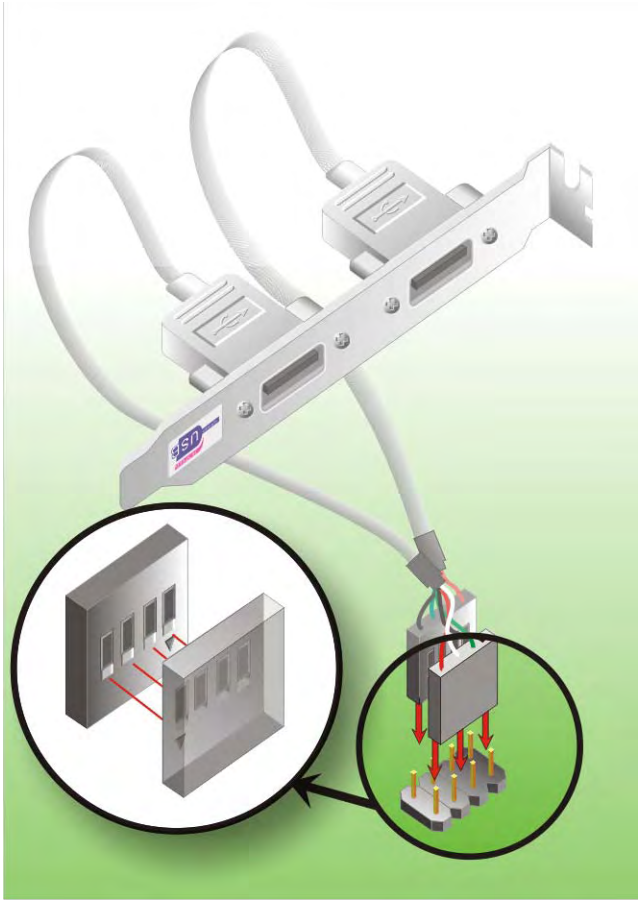

Figure 4-11: USB Cable Installation

4.5 On-board Jumpers

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.

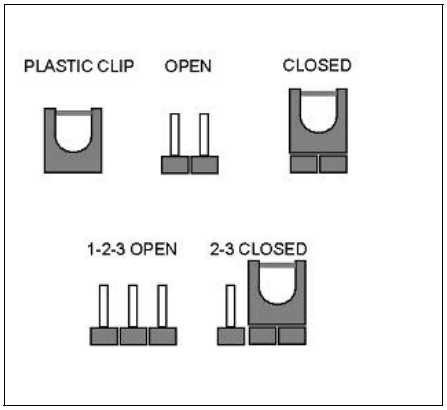

Figure 4-12 Jumper

The CPU card two on-board jumpers. The jumpers are described in **Table 4-2**.

Label	Connector	Type
J_CMOS1	CMOS state setting	3-pin header
J_LVDS1	L CD Voltage Selector	3-pin header

Table 4-2: On-board Jumpers

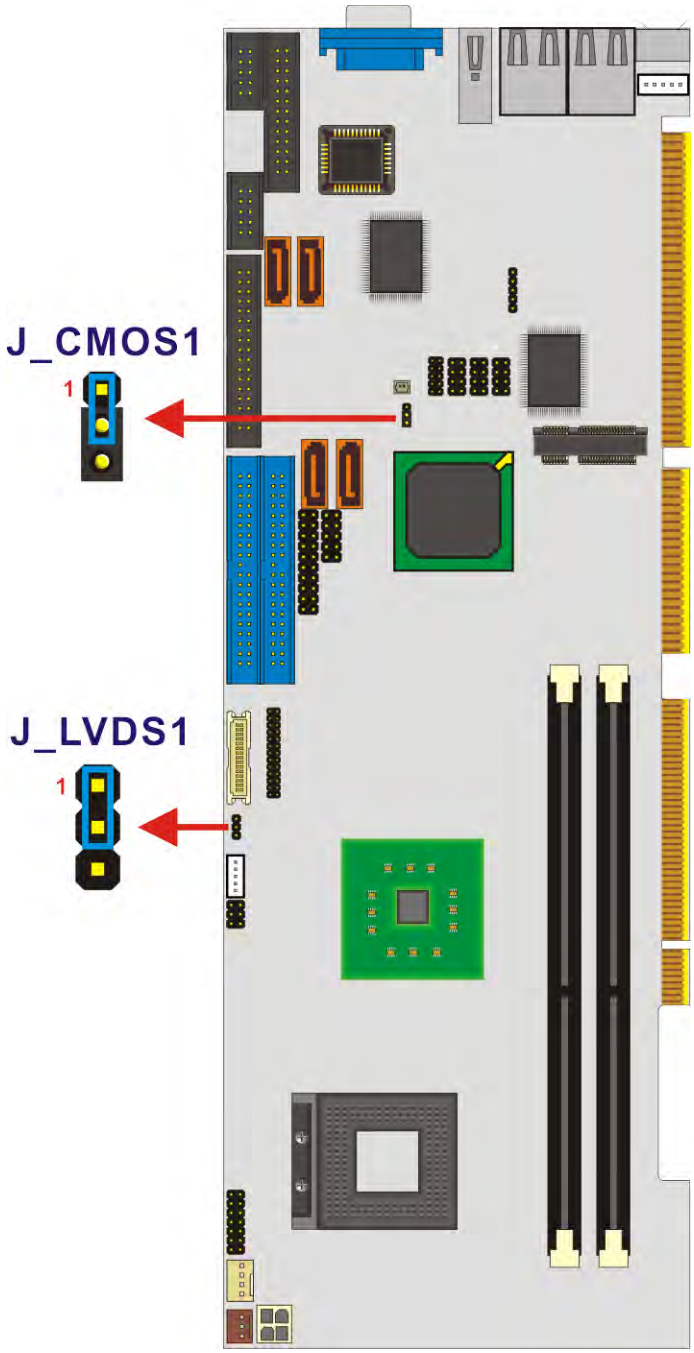

Figure 4-13: Jumper Locations

4.5.1 Clear CMOS Jumper

Jumper Label: **J_CMOS1**

Jumper Type: 3-pin header

Jumper Settings: See **Table 4-3**

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

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

4.5.2 LVDS LCD Voltage Selection

WARNING:

Making the wrong setting on this jumper may cause irreparable damage to both the motherboard and the LCD screen connected to the on-board connector.

Jumper Label: **J_LVDS1**

Jumper Type: 3-pin header

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

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

This jumper allows the user to set the voltage for the LCD panel. Before setting this jumper please refer to the LCD panel user guide to determine the required voltage. After the required voltage is known, make the necessary jumper setting in accordance with the settings shown in **Table 4-4**.

J_LVDS1	DESCRIPTION
Short 1-2 (Default)	Set The Voltage Level of Panel to VCC3
Short 2-3	Set The Voltage Level of Panel to VCC

Table 4-4: LVDS LCD Voltage Selection Jumper Settings

4.6 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.

4.7 Rear Panel Connectors

4.7.1 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.

4.7.2 VGA Port Installation

The conventional CRT monitor connector is a 15-pin, female D-SUB connector. Pin assignments can be seen in that can be connected to external monitors.

4.7.3 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.

4.7.4 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

Watchdog Timer

NOTE:

The following discussion applies to DOS environment. It is recommended you contact GAI support 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 will either perform a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

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

INT 15H:

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

Table A-1: AH-6FH Sub-function

You have to 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 will start counting down. While the timer value reaches zero, the system will reset. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the Watchdog timer will be disabled if you set the time-out value to be 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 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 ;
```

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Appendix

B

Address Mapping

B.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) 945GM Graphics Controller
3C0-3DF	Intel(R) 945GM Graphics Controller
3F6-3F6	Primary IDE Channel
3F7-3F7	Standard floppy disk controller
3F8-3FF	Serial Port 1 (COM1)

Table B-1: IO Address Map

B.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 B-2: 1st MB Memory Address Map

B.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 B-3: IRQ Mapping Table

B.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 B-4: IRQ Mapping Table

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Appendix

C

External AC'97 Audio CODEC

C.1 Introduction

The audio functionalities of the 3302020 CPU card can be implemented using a separately purchased audio module, the 1007750. The audio kit is powered by Realtek ALC655/883, 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 C-1: Audio Functionalities via the Audio Kit

C.2 Physical Connection

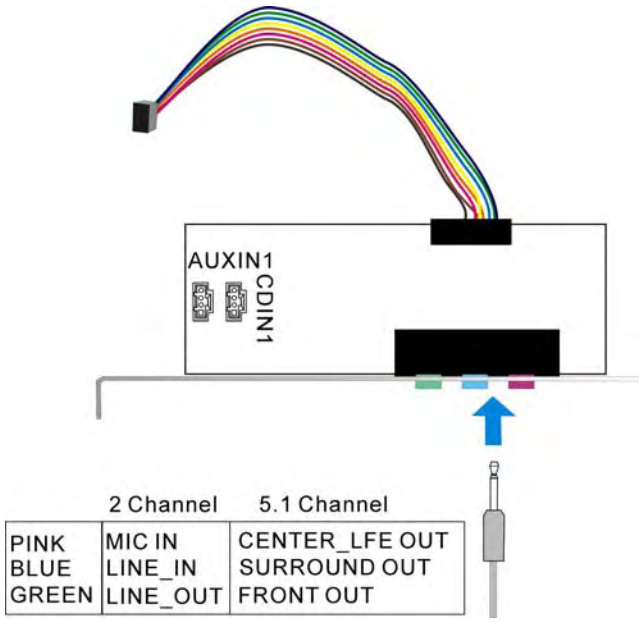


Figure C-2: Audio Kit Connectors

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).

C.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 C-3**); and if peripheral speakers have been properly connected, hear the sound effects.

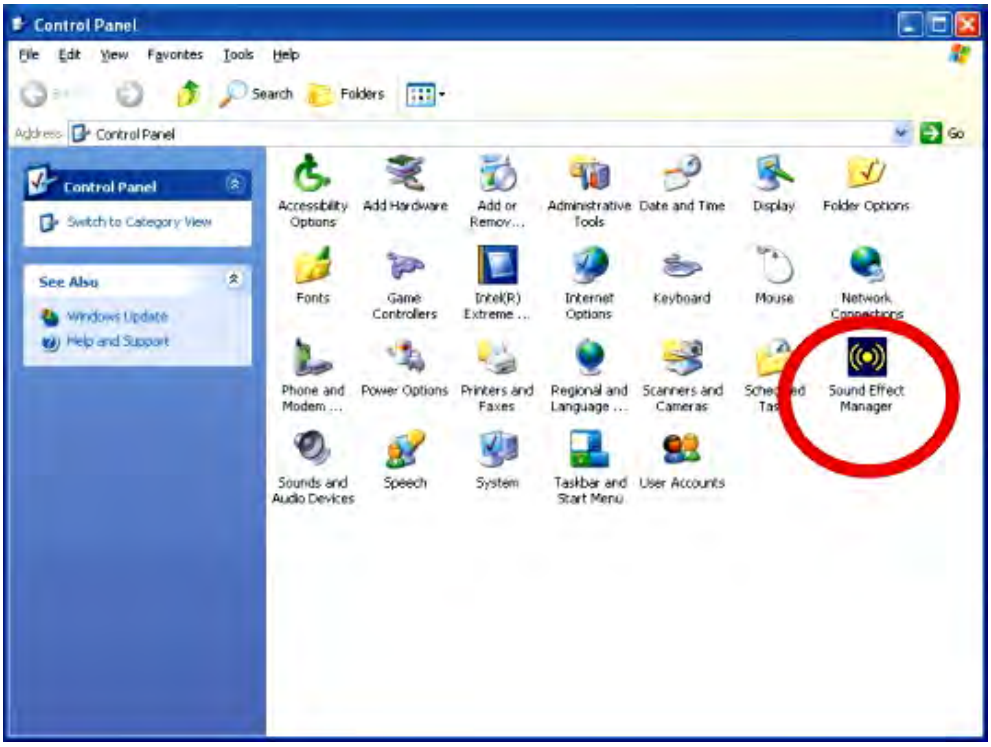


Figure C-3: Sound Effect Manager Icon

C.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 C-5**). The shortcut to the configuration utility is also available through the **Sound Effect Manager** icon in the **Control Panel** (**Figure C-4**).

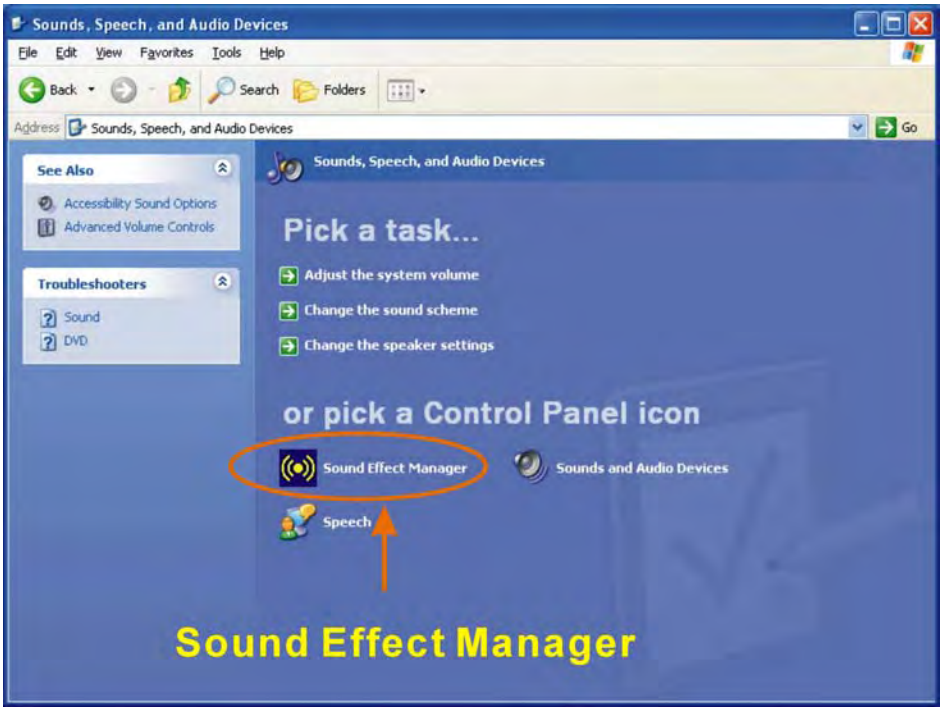


Figure C-4: Sound Effect Manager Icon [Control Panel]

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

C.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 C-7**)

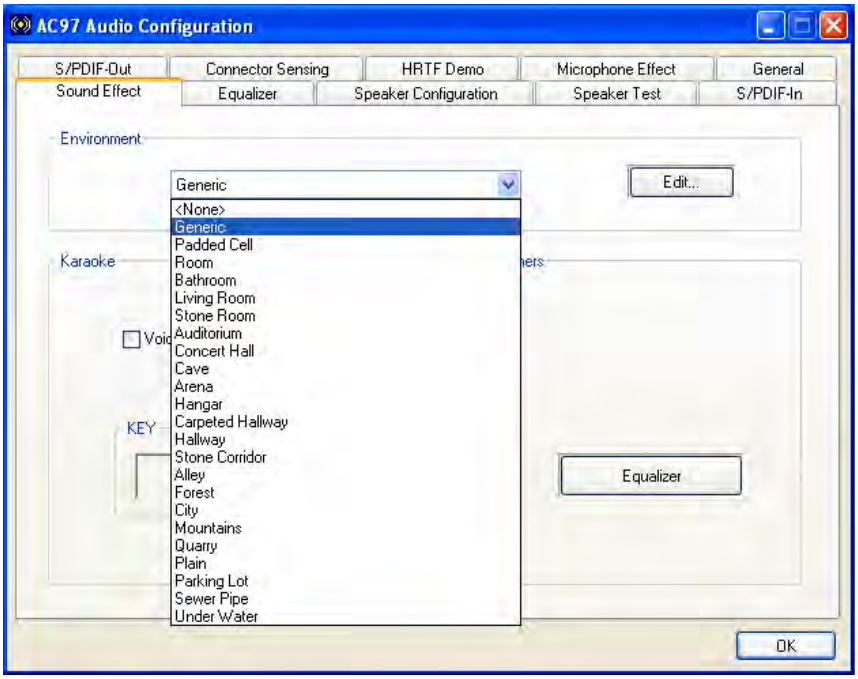


Figure C-6: Setting Sound Effects

C.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 C-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.

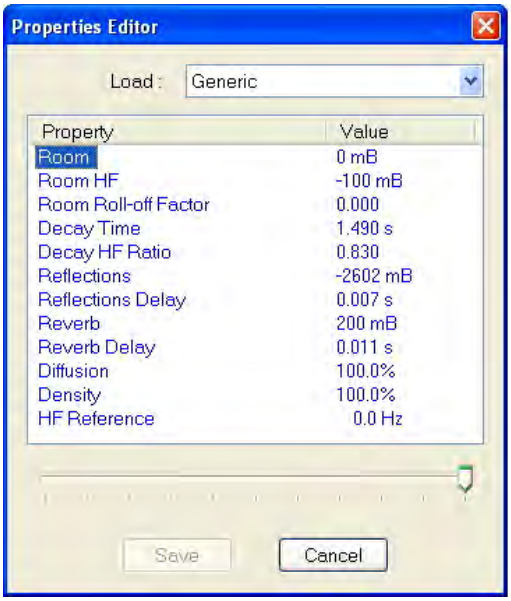


Figure C-7: Sound Effects Properties Editor

C.7 Karaoke Mode

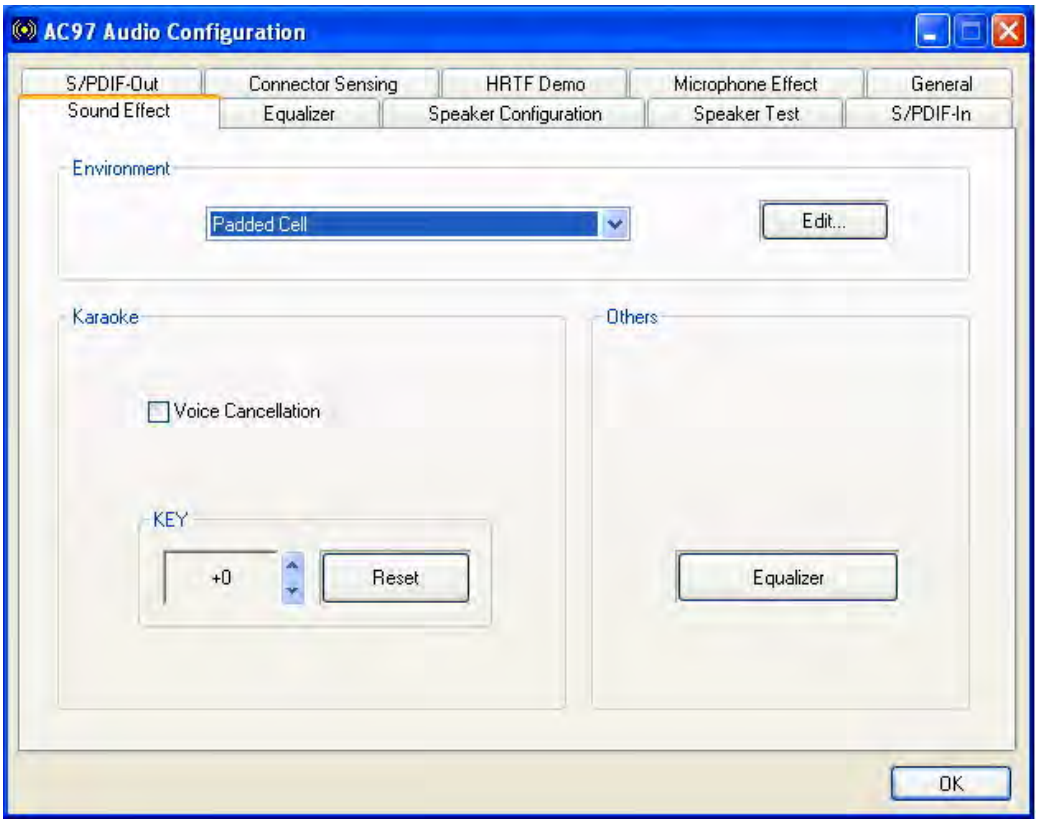


Figure C-8: Karaoke Mode

The Karaoke mode shown in **Figure C-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.

C.8 Equalizer Selection

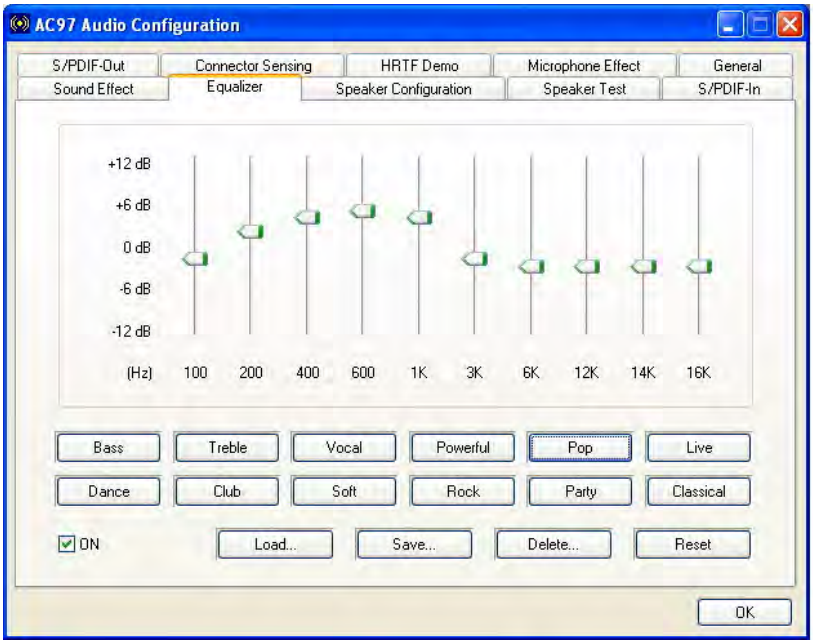


Figure C-9: Equalizer Settings

The equalizer in **Figure C-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.

C.9 Speaker Configuration

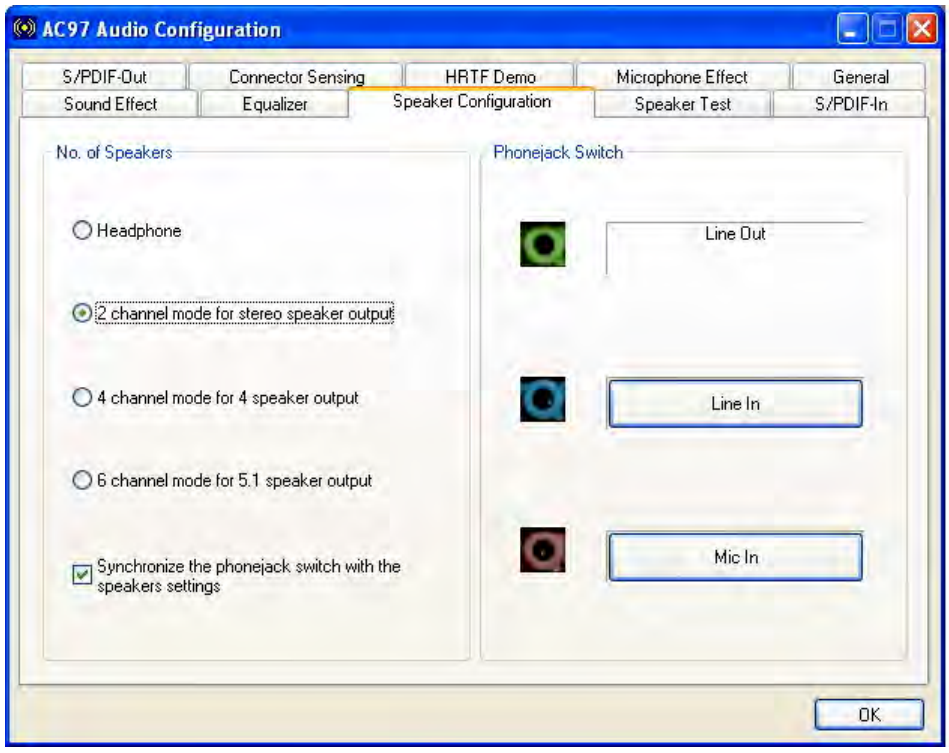


Figure C-10: Speaker Configuration

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.

C.10 Speaker Test

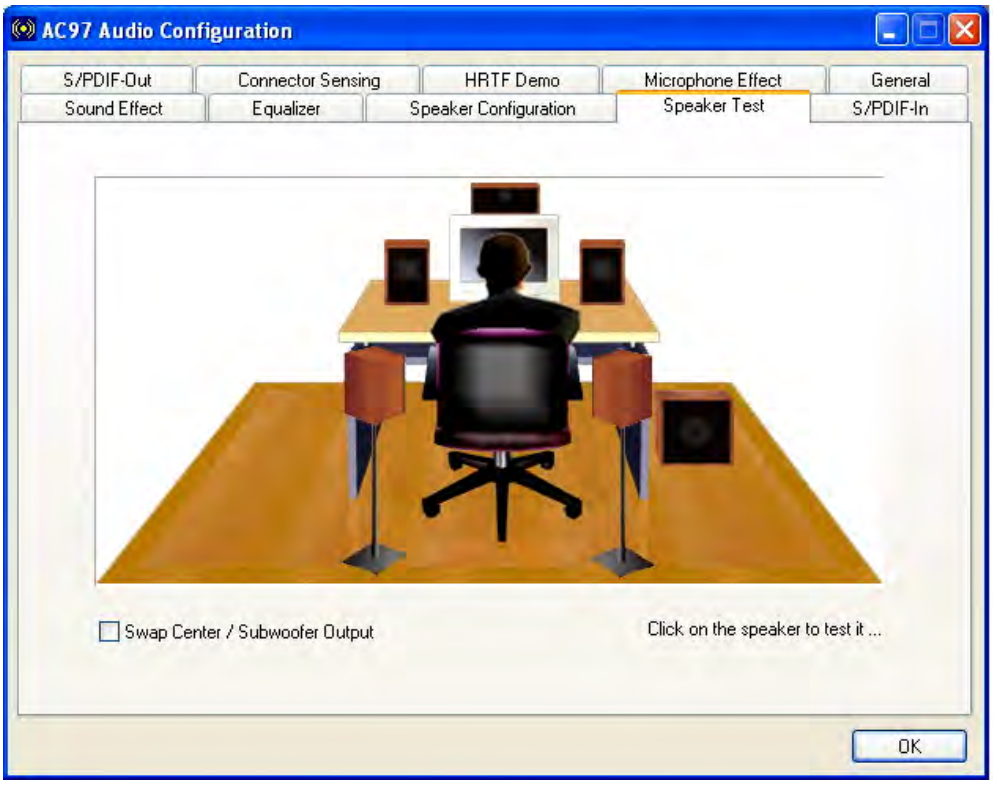


Figure C-11: Audio Configuration

The audio configuration window in **Figure C-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.

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

These functions are currently not supported.

C.12 Connector Sensing

Figure C-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 C-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 C-13** shows the result of sensing test.

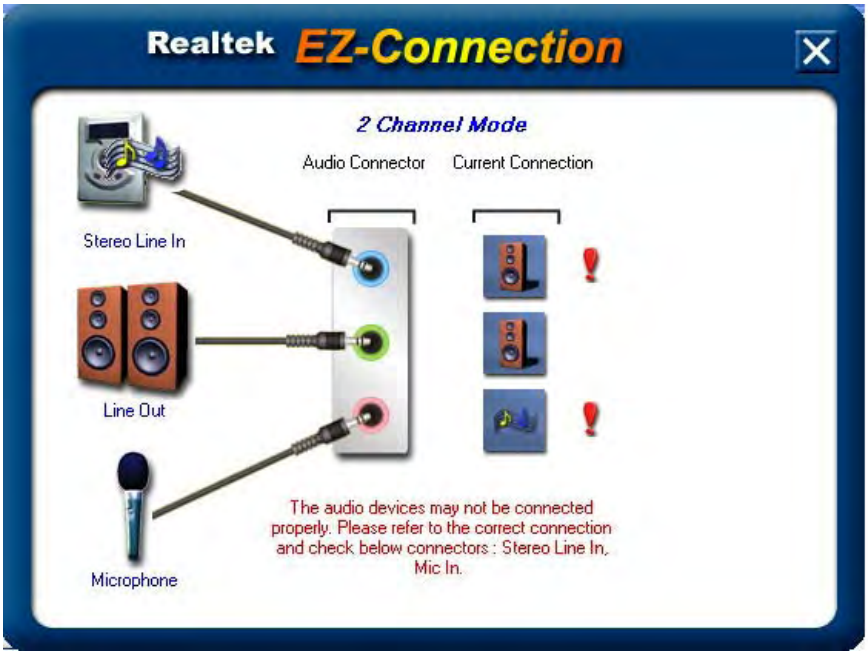


Figure C-13: EX Connection

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 C-14**)

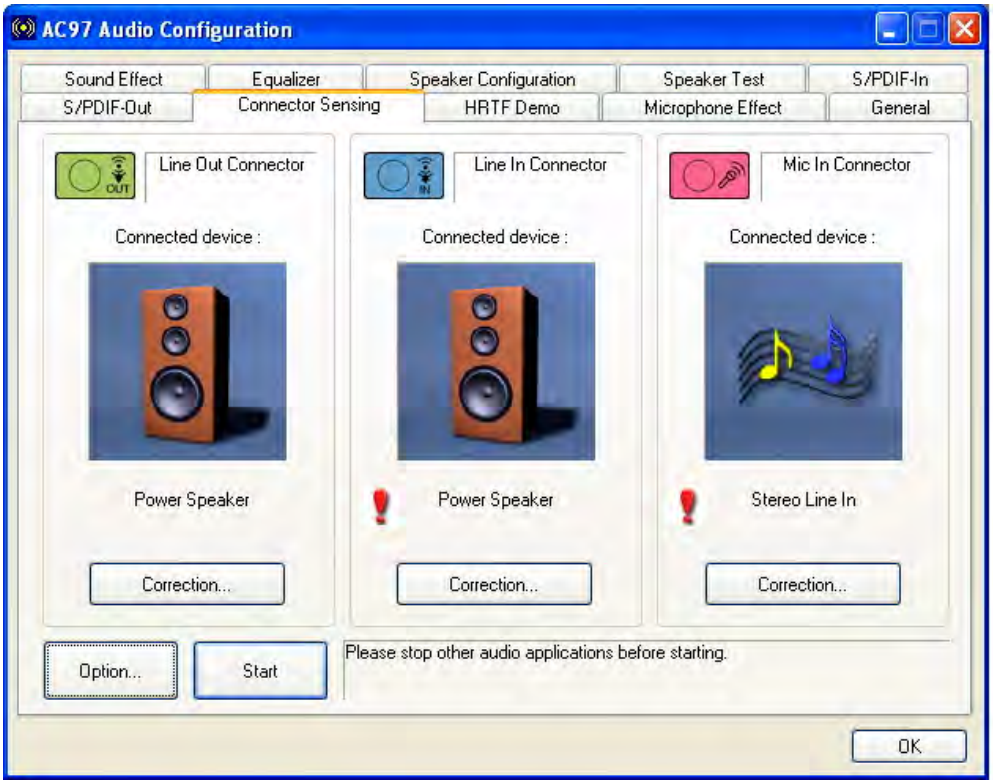


Figure C-14: Connector Sensing Test Result

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

C.13 HRTF Demo

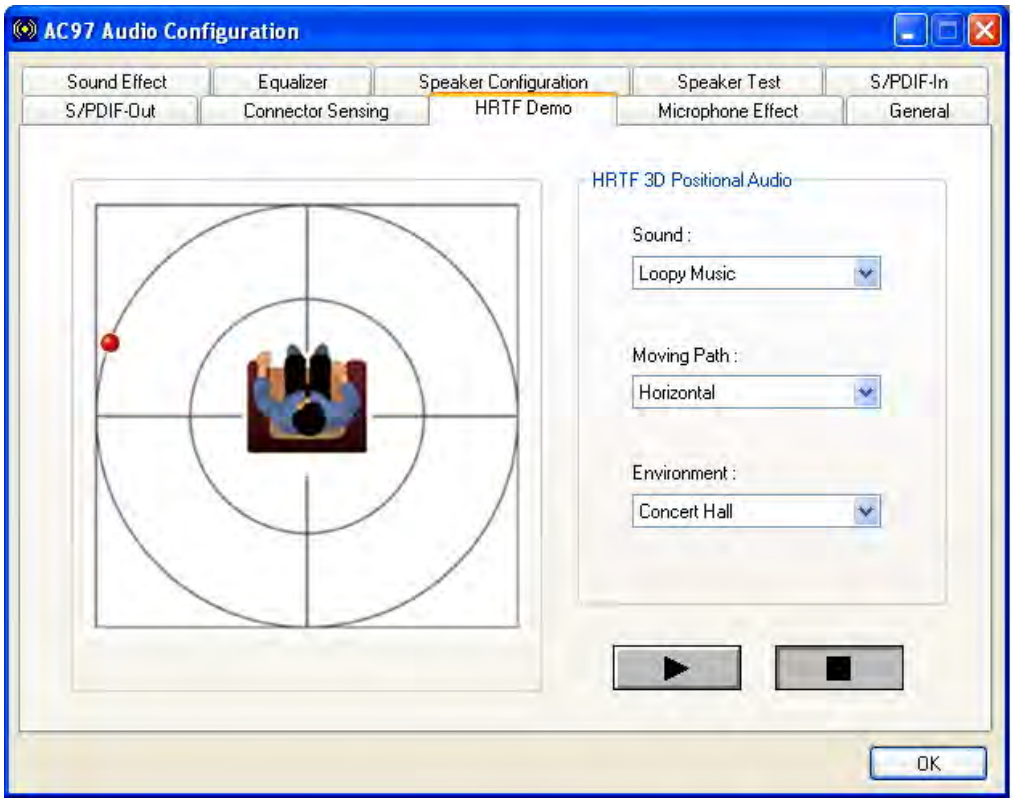


Figure C-15: HRTF Demo

The HRTF window in **Figure C-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.

C.14 Microphone Effect

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

C.15 General

The general window in **Figure C-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.

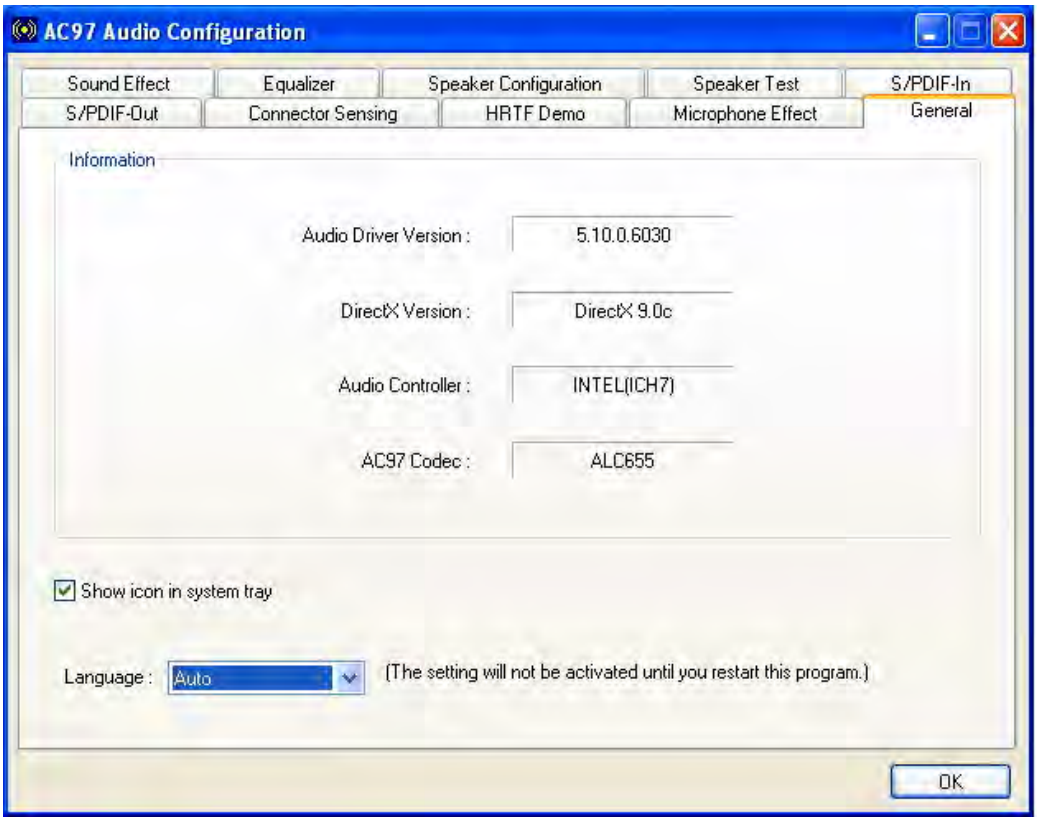


Figure C-16: General

Appendix

D

Jmicron RAID Setup

D.1 Introduction

D.1.1 RAID Support

The Jmicron JMB363 chipset integrated controller in 3302020C and 3302020D models supports the following RAID configurations on the SATA3 and SATA4 connectors.

- JBOD
- RAID0
- RAID1

D.1.2 What is RAID

RAID, or redundant array of inexpensive disks, is a method of saving data on multiple disks so that if one of the disks is damaged or destroyed, the data on the disks is not lost. Only the three RAID levels listed above can be implemented on your system

- **JBOD** stands for Just a Bunch Of Disks. This is not a RAID level. If any thing happens to one hard drive, all the information on that drive is lost.
- **RAID0** refers to disk striping. Data is distributed (striped) over multiple disks. This increases the overall disk performance but the data is not redundantly stored and therefore any damage to the system disks will result in a loss of information.
- **RAID1** refers to disk mirroring. The information on one disk is completely mirrored onto a second disk. The effective storage capacity of the hard disks is halved but the data on the disks is safe. If one of the disks is destroyed or damaged in any way the information on that disk is retrievable from the second disk.

D.2 RAID Setup

D.2.1 Introduction

To setup the RAID, the following procedures must be completed.

Step 1: Two SATA drives, preferably with the same model and capacity, must be installed onto the system. Refer to **Section 4.4.5**.

Step 2: The RAID BIOS must be configured.

D.2.2 Install SATA Drives

To implement the on-chip RAID function, two SATA drives must be connected to the system. Use the SATA drive cables that came with the system to connect the SATA drives. Refer to **Section 4.4.5**.

D.2.3 Configure the SATA Controller in BIOS

To configure the RAID BIOS, follow the steps below:

Step 1: Turn on the motherboard and enter the BIOS setup utility. Do this by pressing **DELETE** when the system boots up.

Step 2: Select the **Advanced Settings** menus.

Step 3: Select the **IDE Configuration** sub-menu.

Step 4: In the **IDE Configuration** sub-menu, select the **ATA/IDE Configuration** option. Make sure it is set to the default setting [Compatible]. Keep the default setting of the **Legacy IDE Channels** option [SATA Pri, PATA Sec].

Step 5: Select the **Chipset** menu.

Step 6: Select the **Southbridge** sub-menu.

Step 7: Set the **SATA Controller Mode Select** option to [RAID].

Step 8: Press **F10** to save the changes and exit the BIOS setup utility.

D.2.4 Configure the RAID BIOS

The next step is to configure the RAID BIOS. To do this, follow the steps below.

Step 1: Restart the system.

Step 2: During POST, the system prompts the user to press <**CTRL**> and <**J**> to enter the RAID Setup Utility (**Figure E-1**).

Figure D-1: Enter the RAID Setup Utility

Step 3: The main RAID Setup Utility menu opens (**Figure E-2**). To move from one window to another, press the **Tab** key. Below is a brief description of each window.

- **Main Menu** – This window lists the different actions you can perform in the RAID Setup Utility.
- **Hard Disk Drive List** – This window lists the SATA disk drives installed and the following information about the disks:
  - Model name
  - Capacity
  - Type/Status (RAID or non-RAID)
- **RAID Disk Drive List** – This window is empty if no RAID volume is configured. If a RAID volume is configured, the following information is displayed:
  - Model name (user-defined RAID volume name)
  - RAID level
  - Capacity
  - Status
  - Member disks' corresponding numbers

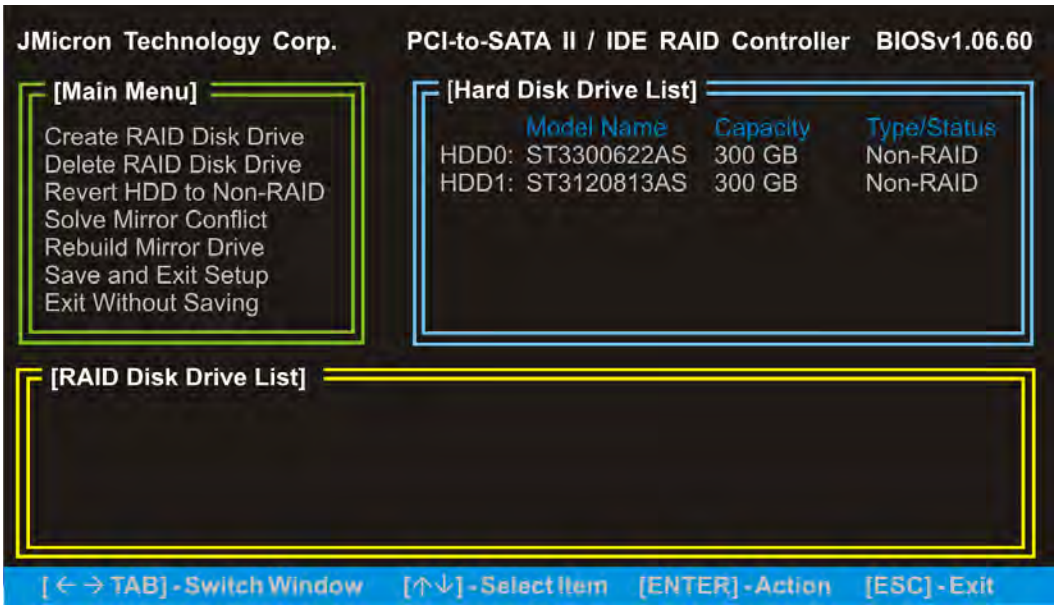


Figure D-2: Enter the RAID Setup Utility

D.2.4.1 Create a RAID volume

Step 1: In the RAID Setup Utility main menu, highlight **Create RAID Disk Drive** (**Figure D-3**). Press **ENTER**.

Figure D-3: Create RAID Disk Drive

Step 2: The **Create New RAID** window opens. The **Name** item is highlighted (**Figure D-4**). Enter a name made up of one to 16 characters for the RAID volume to be created, then press **ENTER**.

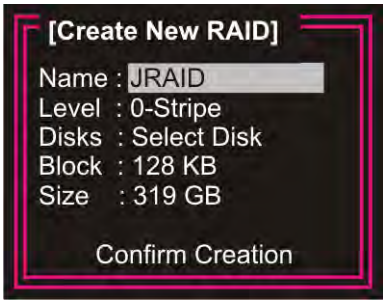
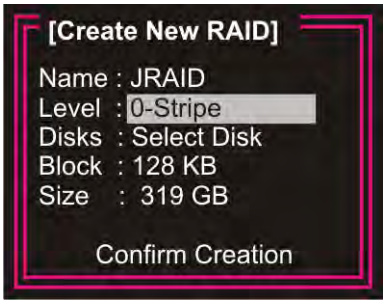
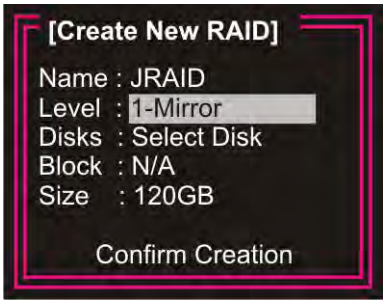


Figure D-4: Create RAID Name

Step 3: The **Level** item is then highlighted (Figure E-5). Press the ↑ or ↓ key to select the RAID level to create on the SATA drives, then press **ENTER**. Refer to **Section D.1.1** for supported configurations. Refer to **Section D.1.2** for RAID definitions.





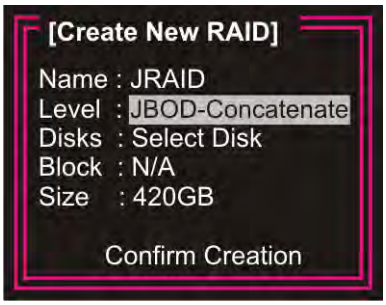


Figure D-5: Set the RAID Level

Step 4: The utility automatically selects the SATA drives installed. The selected disks are marked with a ▶ (**Figure D-6**).

Figure D-6: Select disks

Step 5: Set the stripe block size for the RAID 0 set (**Figure D-7**). This parameter defines the size of the stripe written to each disk. If RAID 1 or JBOD was configured, **N/A** appears after this item. Choose from the following stripe size options:

- 4KB
- 8KB
- 16KB
- 32KB
- 64KB
- 128KB (DEFAULT)

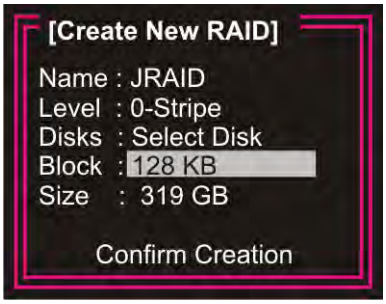


Figure D-7: Set the stripe block size for RAID 0

Step 6: The **Size** item is then highlighted (**Figure D-8**). Enter the RAID volume size. The default value is the maximum volume size allowed.

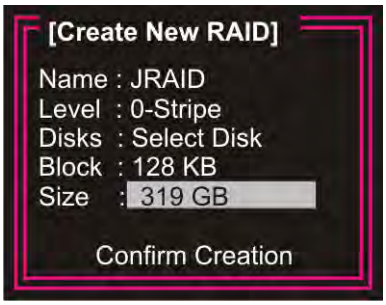


Figure D-8: Set the RAID volume size

Step 7: After the **ENTER** key is pressed, the **Confirm Creation** item is highlighted, and a confirmation message appears (**Figure D-9**). Press **Y** to confirm the creation of the RAID volume.

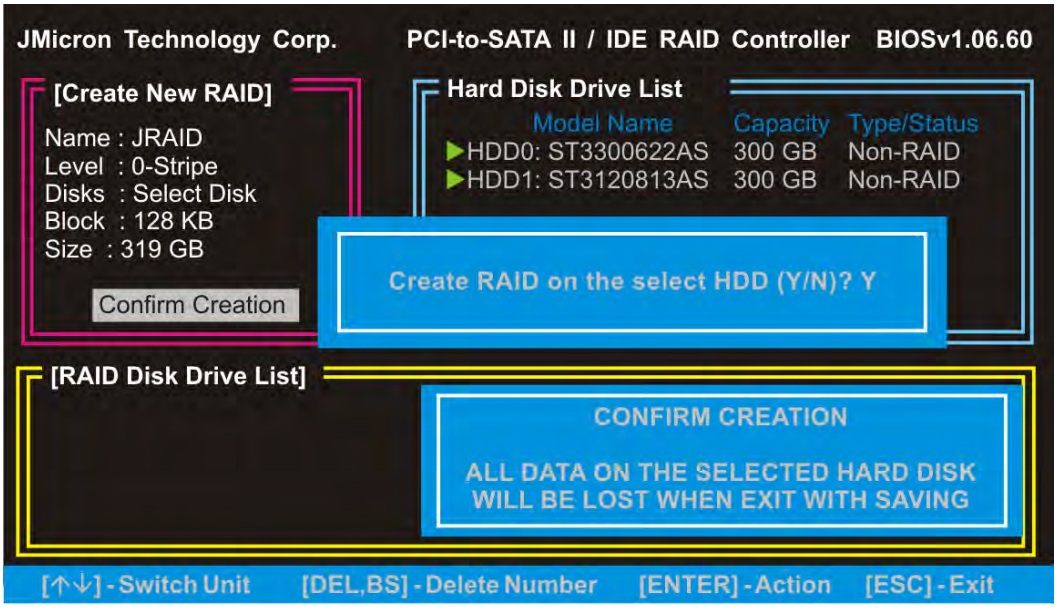


Figure D-9: Confirm creation

WARNING:

Pressing **Y** to confirm creation of the RAID volume destroys all the data in the SATA drives.

Step 8: Information about the created RAID volume appears in the RAID Disk Drive List window (**Figure D-10**).

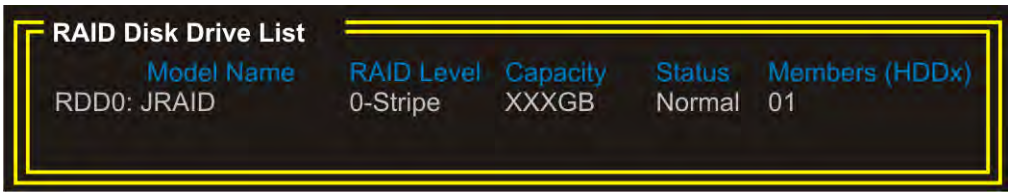


Figure D-10: RAID Disk Drive List

D.2.4.2 Delete a RAID volume

Step 1: In the RAID Setup Utility main menu, highlight **Delete RAID Disk Drive** (**Figure D-11**). Press **ENTER**.

Figure D-11: Delete RAID Disk Drive

Step 2: The RAID volume in the RAID Disk Drive List is highlighted (**Figure D-12**).

Figure D-12: RAID volume

Step 3: Press the space bar to select the RAID volume. The selected RAID volume is marked with a ▶. Press the **Delete** key to delete the RAID volume**.**

Step 4: A confirmation message appears (**Figure D-13**). Press **Y** to confirm the deletion of the RAID volume.

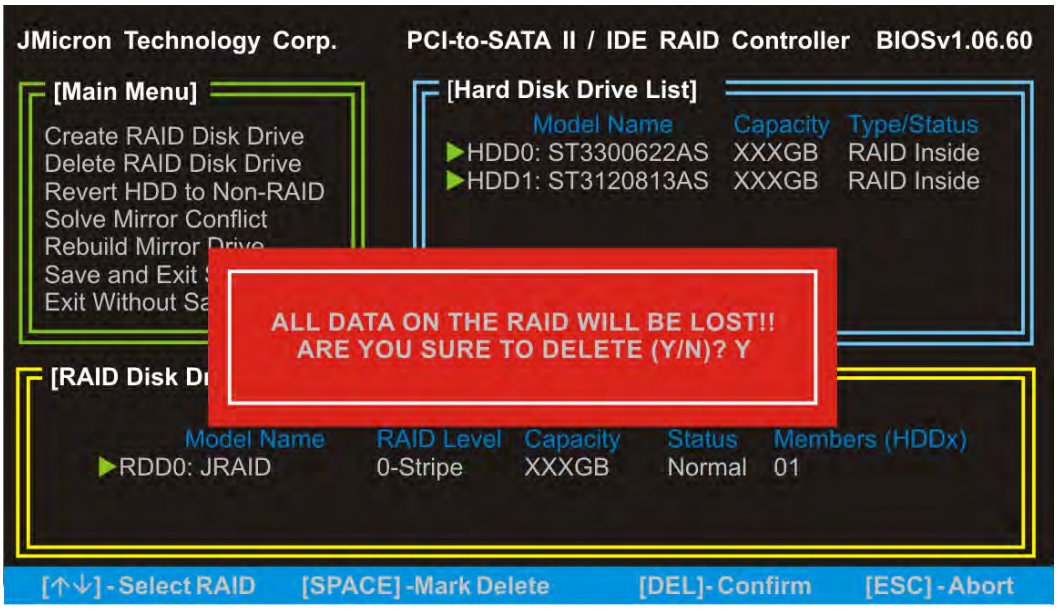


Figure D-13: Delete RAID volume

WARNING:

Pressing **Y** to confirm deletion of the RAID volume converts the SATA drives to non-RAID and destroys all the data in the drives.

D.2.4.3 Revert an HDD to Non-RAID

An HDD that had been part of another RAID volume may still be used as a member of the RAID volume to be created. The HDD must first be reverted to non-RAID. Follow these steps to revert an HDD to non-RAID.

WARNING:

Reverting an HDD to non-RAID destroys all the data and previous RAID configurations in the HDD.

Step 1: In the RAID Setup Utility main menu, highlight **Revert HDD to Non-RAID (Figure D-14**). Press **ENTER**.

Figure D-14: Revert HDD to non-RAID

Step 2: Press the ↑ or ↓ key to select the HDD to be reverted to non-RAID, then press the spacebar to mark the HDD. The selected HDD is marked with a ▶.

Step 3: A confirmation message appears (**Figure D-15**). Press **Y** to confirm the action.

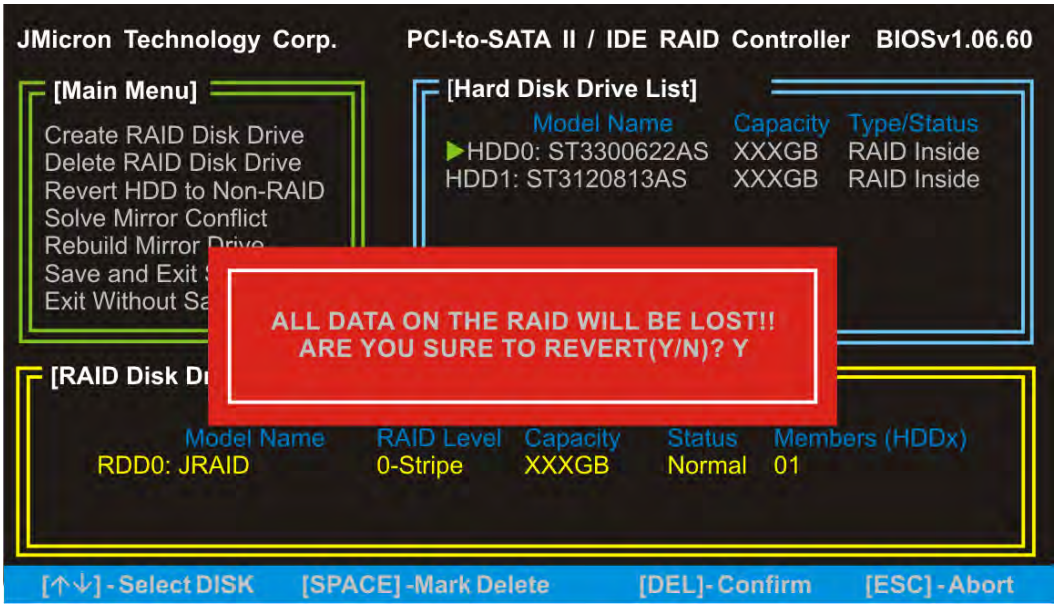


Figure D-15: Confirm revert HDD to non-RAID

Step 4: The reverted HDD is now listed as non-RAID (**Figure D-16**).

Figure D-16: Reverted HDD

D.2.4.4 Solve Mirror Conflict

A mirror conflict occurs when an HDD in a RAID 1 volume is unplugged from the system, then plugged in again. The system is unable to identify the source disk from which data will be mirrored. Use the **Solve Mirror Conflict** option to set the source disk and rebuild the mirror drive.

Step 1: In the RAID Setup Utility main menu, highlight **Solve Mirror Conflict** (**Figure D-17**). Press **ENTER**.

Figure D-17: Solve Mirror Conflict

Step 2: Press the ↑ or ↓ key to select the source disk, then press the spacebar to mark the HDD. The selected HDD is marked with a ▶.

Step 3: Press the **Tab** key to go to the RAID Disk Drive list window.

Step 4: Press the spacebar to mark the RAID volume to be rebuilt.

Step 5: Press **ENTER** key to begin the rebuild process. A progress bar appears at the bottom of the screen to indicate the status of the rebuild process.

D.2.4.5 Rebuild Mirror Drive

A RAID 1 volume is broken when a member HDD fails. Use the **Rebuild Mirror** option to rebuild a RAID 1 volume after the faulty HDD is replaced.

Step 1: In the RAID Setup Utility main menu, highlight **Rebuild Mirror Drive** (**Figure D-18**). Press **ENTER**.

Figure D-18: Rebuild Mirror Drive

Step 2: Press the ↑ or ↓ key to select the source disk, then press the spacebar to mark the HDD. The selected HDD is marked with a ▶.

Step 3: Press the **Tab** key to go to the RAID Disk Drive list window.

Step 4: Press the spacebar to mark the RAID volume to be rebuilt.

Step 5: Press **ENTER** to begin the rebuild process. A progress bar appears at the bottom of the screen to indicate the status of the rebuild process.

D.2.4.6 Save and Exit Setup

After the RAID configuration is complete, save the changes and exit the RAID configuration utility.

Step 1: In the RAID Setup Utility main menu, highlight **Save and Exit Setup** to effect all changes made (**Figure D-19**), then press **ENTER**.

Figure D-19: Save and Exit Setup

D.2.4.7 Exit without Saving

Step 1: To exit the RAID Setup Utility without saving the changes made, highlight **Exit without Saving** (**Figure D-20**), then press **ENTER**.

Figure D-20: Exit without Saving

D.2.5 Install the OS

Install the OS onto the SATA drives. To do this, follow the steps below.

Step 1: Insert the OS installation CD into the CD drive attached to the IDE device.

Step 2: Restart the system.

Step 3: When prompted, press **F6** to install the RAID controller device. Next, press **F2** to continue the installation.

Step 4: A message informs the user the OS is unable to determine the mass storage device installed on the system. At this point, insert the FDD with the copied RAID driver files into the FDD drive. The OS accesses the SATA drives through this disk.

Step 5: Next, select the driver for the OS being installed into the system. Once selected, press **ENTER**.

Step 6: The OS and the RAID drivers are then installed into the system. The SATA drives are configured as RAID drives as stipulated in the above selection.

The OS continues to be installed and the RAID on the SATA drives configured.

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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Support: Technical Support at Global American