



integration with integrity

User's Manual

Single Board Computer 3301540

Version 1.0, May 2006

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Glossary

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

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Chapter

1

1 Introduction

1.1 3301540 CPU Board Overview

The PICMG 1.0 form factor 3301540 socket 478 Pentium 4 CPU platform is fully equipped with a high performance processor and advanced multi-mode I/Os. The 3301540 is designed for system manufacturers, integrators, and VARs that want performance, reliability, and quality at a reasonable price.

1.1.1 3301540 CPU Board Applications

The 3301540 CPU board has been designed for use in industrial applications where board expansion is critical and operational reliability is essential.

1.1.2 3301540 CPU Board Benefits

Some of the 3301540 CPU board benefits include,

- * 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

1.1.3 3301540 CPU Board Features

Some of the 3301540 CPU board features are listed below:

- * Complies with PICMG 1.0
- * Complies with RoHS
- * Supports socket 478 Intel® Pentium 4 CPUs
- * Supports a maximum front side bus (FSB) speed up to 800MHz
- * Supports up to 2GB of 333MHz or 400MHz single channel DDR memory
- * Comes with one high performance gigabit Ethernet (GbE) controller
- * Supports two SATA channels with transfer rates up to 150MB/s
- * Supports eight USB 2.0 connectors

1.2 3301540 CPU Board Overview

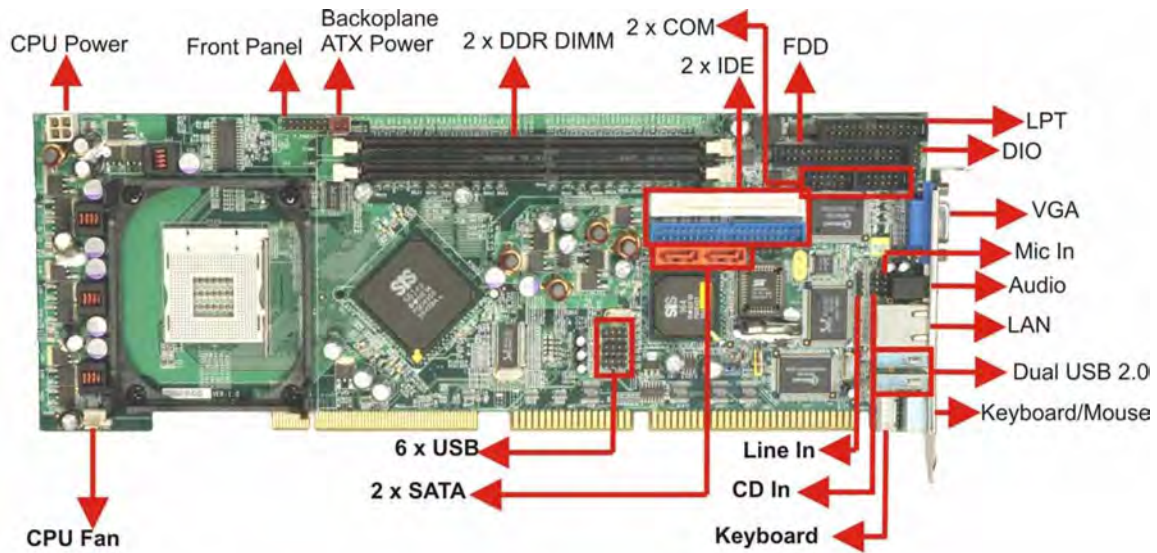


Figure 1-1: 3301540 CPU Board Overview

1.2.1 3301540 CPU Board Connectors

The 3301540 CPU board has the following connectors onboard:

- * 1 x ATX 12V connector
- * 1 x CPU cooling fan connector
- * 1 x IrDA connector
- * 2 x IDE device connectors
- * 1 x FDD connector
- * 2 x RS-232 connectors
- * 1 x Parallel port connector
- * 1 x Front panel connector
- * 1 x ATX backplane power connector
- * 2 x SATA connectors
- * 6 x USB connectors
- * 1 x DIO connector
- * 1 x LINE_IN connector
- * 1 x CD_IN connector
- * 1 x MIC_IN connector
- * 1 x Keyboard connector

The 3301540 CPU board has the following connectors on the board rear panel:

- * 1 x PS/2 connector
- * 1 x VGA connector
- * 1 x LINE_OUT connector
- * 1 x RJ-45 Ethernet connector
- * 2 x USB ports

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

3301540 CPU board technical specifications are listed in **Table 1-1**. Detailed descriptions of each specification can be found in **Chapter 2 Detailed Specifications**.

SPECIFICATION	
CPUs Supported	Intel® Pentium® 4 Intel® Celeron® D
Chipsets	Northbridge: SIS 661CX Southbridge: SIS 964
I/O Controller	SIS 964
Graphics Support	SiS Mirage™ Graphic Engine
Memory	Two DDR memory modules (Max. 2GB)
PCI Bus Interface	33MHz, Revision 2.3
Serial ATA (SATA)	Two SATA channels with 150MB/s transfer rates
HDD Interface	Two IDE channels supports four Ultra ATA 100/66/33 devices
Floppy Disk Drive (FDD)	Supports FDD
USB Interfaces	Eight USB 2.0 connectors supported

Serial Ports	Two COM ports
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
Infrared Support	One Infrared Data Association (IrDA) interface
Ethernet	Gigabit Ethernet (GbE)
BIOS	AMI flash BIOS
Physical Dimensions	12.2cm x 34.1cm (width x length)
Operating Temperature	Minimum: 0°C (32°F) Maximum: 60°C (140°F)
Audio Interfaces	One Audio Codec '97 (AC'97) version 2.3 connector

Table 1-1: Technical Specifications

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Chapter

2

2 Detailed Specifications

2.1 Compatible GAI Backplanes

The 3301540 CPU card is compatible with all GAI PICMG1.0 backplanes. For more information on these backplanes, please visit the GAI website or contact your CPU card reseller or vendor.

2.2 CPU Support

Table 2-1 lists the CPUs supported by the 3301540 CPU board.

Mfg.	Model	Max. Speed	L2 Cache	Max. FSB	Socket
Intel®	Pentium® 4 (P4) Prescott	3.80GHz	2MB	800MHz	478
Intel®	Celeron D	3.33GHz	256KB	533MHz	478

Table 2-1: Supported CPUs

2.2.1 P4 Prescott

The P4 Prescott CPU comes with the following features:

- * Hyper-Threading Technology (HT Technology) ensures greater performance
- * SpeedStep® Technology improves overall system power management
- * Execute Disable Bit technology prevents certain classes of malicious "buffer overflow" attacks when combined with a supporting operating system.

2.2.2 Celeron D

The socket 478 Celeron D CPU comes with the following features:

- * Advanced Dynamic Execution Technology keeps the execution units executing instructions
- * 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 Onboard Chipsets

2.3.1 Northbridge and Southbridge Chipsets

The following chipsets are preinstalled on the board:

- * **Northbridge:** SiS661CX
- * **Southbridge:** SiS964

The following two sections (**Section 2.3.2** and **Section 2.3.3**) list some of the features of the SiS661CX and the SiS964 chipsets. For more information on these two chipsets please refer to the SiS website.

2.3.2 SiS661CX Northbridge Chipset

The SiS661CX northbridge chipset comes with the following features:

- * **Host Interface**
 - Intel® Pentium® 4 Hyper-Threading processor support
 - FSB 800MHz w/ 2X Address and 4X Data Rate
 - 12 Outstanding Transactions support
 - Quasi-Synchronous/Asynchronous Host/DRAM Timing support
 - Supports 2M/4M/8M/16M TSEG SMRAM
 - Supports Dynamic Bus Inversion.
- * **DRAM Controller**
 - DDR400/DDR333/DDR266 supported
 - Up to two un-buffered DIMMs DDR400 supported
 - Up to 1GB per DIMM with 512Mb tech.
 - Dynamic Clock Enable (CKE) control placing the Memory into Suspend to DRAM state.
- * **SiS MuTIOL® 1G Delivering 1GB/s Bandwidth**
 - Proprietary Interconnect between Northbridge and Southbridge
 - Bi-Directional 16 bit Data Bus at 800MHz Operating Frequency

2.3.3 SiS964 Southbridge Chipset

The SiS964 southbridge chipset comes with the following features:

- * **SiS MuTIOL® 1G Delivering 1GB/s Bandwidth**
 - Proprietary Interconnect between SiS north bridge and SiS964 southbridge
 - Bi-Directional 16 bit Data Bus at 533MHz Operating Frequency
- * **Integrated Serial Host Controller**
 - Provides 2 independent ports for SATA, compliant with Serial ATA 1.0 specification with transfer rate 150MB/s
 - Supports RAID 0, 1 and JBOD
- * **USB 2.0/1.1 Host Controller**
 - One EHCI USB 2.0 controller
 - Supports Total 8 USB 2.0 ports
 - Supports USB 2.0 High-Speed Device @480 Mb/s transfer rates
- * **Fast Ethernet Controller with MII Interface**
 - Supports 10/100Mb Fast Ethernet with External PHY
- * **Supports six channels AC'97 Rev.2.3 Audio and V.90 Software Modem**
- * **Advanced Power Management: ACPI 1.0b and APM 1.2 Compliant**
- * **Dual IDE channels with ATA 133/100**
- * **Supports up to six PCI Masters**
- * **LPC 1.1 Interface**
- * **Integrated Keyboard/PS2 Mouse Controller**

2.4 Data Flow

Figure 2-1 shows the data flow between the two onboard chipsets and other components installed on the CPU board and described in the following sections of this chapter.

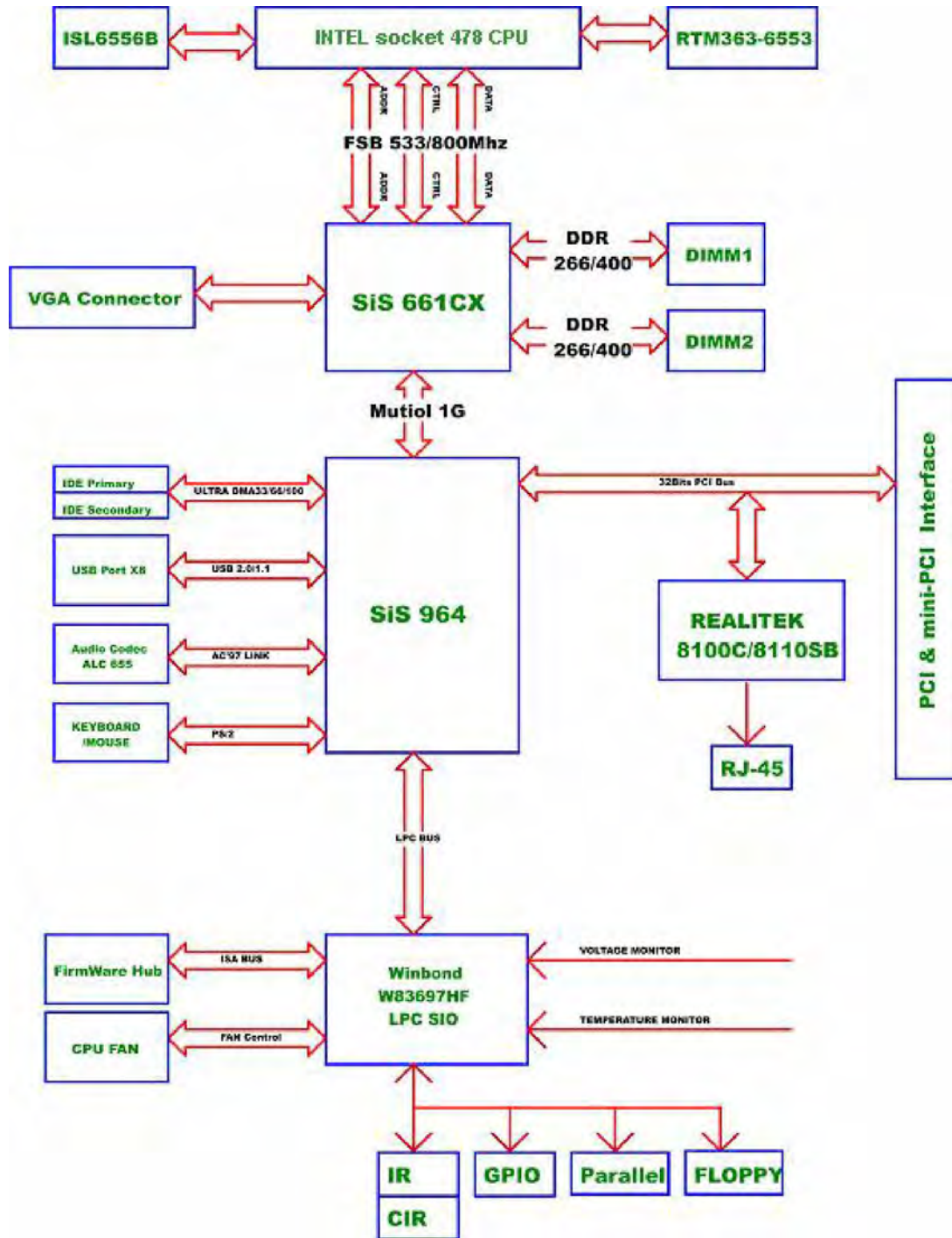


Figure 2-1: Data Flow Block Diagram

2.5 Graphics Support

The graphics features listed below are all integrated on the SiS661CX northbridge chipset.

- * **AGP 3.5 and AGP 2.0 Compliant**
 - AGP 8X/4X mode support
 - Fast Write support
 - 1.5V interface support only
- * **DX9 S/W Compliant**
- * **High performance 256Bit 3D/128Bit 2D Graphic Engine**
 - 2 pixel rendering pipelines and 4 texture units per cycle (2P4T)
 - Up to 200 MHz ECLK
- * **SiS Ultra-AGP™ Technology w/ up to 3.2GB/s Data Transfer Rate**
 - Successor of Ultra-AGP™ Technology and doubles the bandwidth up to 3.2GB/s with DDR400
 - AGP 8X equivalent bandwidth for 3D/2D/Video
- * **Advanced Hardware Acceleration for DVD playback**
- * **Dual 12-bit DDR Digital Interface for Digital LCD/TV-OUT support**
 - NTSC/PAL TV-OUT
 - LCD Monitor
 - Dual view function support for LCD-TV, LCD-CRT or CRT-TV
- * **Built-in high performance 333MHz RAMDAC**
- * **Graphics support mode**
 - CRT highest resolution mode: 2048x1536x32@75NI
 - LCD highest resolution mode: 1600x1200x32@ 60NI
 - TV highest resolution mode: 1024x768x32@60NI

2.6 Memory Support

The 3301540 CPU has two 240-pin dual inline memory module (DIMM) sockets and supports up to two un-buffered DDR DIMMs with the following specifications:

- * **Maximum RAM:** 2GB (1GB module in each slot)
- * **DIMM Transfer Rates:** 400MHz, 333MHz

2.7 PCI Bus Interface Support

The PCI bus on the 3301540 CPU Board has the following features:

- * 33MHz Revision 2.3 is implemented
- * Up to six external bus masters are supported
- * Maximum throughput: 133MB/sec
- * Master devices: Maximum of six with three implemented
- * One PCI REQ/GNT pair can be given higher arbitration priority (intended for external 1394 host controller)
- * 44-bit addressing using the DAC protocol supported

2.8 GbE Ethernet

The Realtek RTL8110SB GbE controller combines a triple-speed IEEE 802.3 compliant Media Access Controller (MAC) with a triple-speed Ethernet transceiver, 32-bit PCI bus controller, and embedded memory. The controller has state-of-the-art DSP technology and mixed-mode signal technology and it offers high-speed transmission over CAT 5 UTP cables or CAT 3 UTP (10Mbps only) cables. The GbE controller specifications are below.

- * Integrated 10/100/1000 transceiver
- * Auto-Negotiation with Next Page capability
- * Supports PCI rev.2.3, 32-bit, 33/66MHz
- * Supports pair swap/polarity/skew correction
- * Crossover Detection & Auto-Correction
- * Wake-on-LAN and remote wake-up support
- * Microsoft® NDIS5 Checksum Offload (IP, TCP, UDP) and largesend offload support
- * Supports Full Duplex flow control (IEEE 802.3x)
- * Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab
- * Supports IEEE 802.1P Layer 2 Priority Encoding
- * Supports IEEE 802.1Q VLAN tagging
- * Serial EEPROM
- * 3.3V signaling, 5V PCI I/O tolerant
- * Transmit/Receive FIFO (8K/64K) support
- * Supports power down/link down power saving

-
- * Supports PCI Message Signaled Interrupt (MSI)

2.9 Drive Interfaces

The 3301540 can support the following drive interfaces.

- * 2 x SATA drives
- * 4 x IDE devices
- * 1 x FDD

2.9.1 SATA Drives

The 3301540 CPU Board supports the following SATA drives:

- * 2 x first generation SATA drives with transfer rates up to 150MB/s

2.9.2 IDE HDD Interfaces

The 3301540 southbridge chipset IDE controller supports up to two HDDs with the following specifications:

- * Supports PIO IDE transfers up to 16MB/s
- * Supports the following Ultra ATA devices:
 - **Ultra ATA/133**, with data transfer rates up to 133MB/s
 - **Ultra ATA/100**, with data transfer rates up to 100MB/s

2.9.3 Floppy Disk Drive (FDD)

The 3301540 CPU Board supports a single FDD. The following FDD formats are compatible with the board.

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

2.10 Serial Ports

The 3301540 CPU Board has two high-speed UART serial ports, configured as COM1 and COM2. The serial ports have the following specifications.

- * 16C550 UART with 16-byte FIFO buffer

- * 115.2Kbps transmission rate

2.11 Real Time Clock

256-byte battery backed CMOS RAM

2.12 System Monitoring

The 3301540 CPU board is capable of self-monitoring various aspects of its operating status including:

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

2.13 Infrared Data Association (IrDA) Interface

The 3301540 CPU Board IrDA supports the following interfaces.

- * Serial Infrared (SIR)
- * 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**. Then the normal RS-232 COM 2 will be disabled.

2.14 USB Interfaces

The 3301540 CPU board has eight USB interfaces, six internal and two external. The USB interfaces support USB 2.0.

2.15 BIOS

The 3301540 CPU Board 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 (Pre-Boot Execution Environment) support

-
- * USB booting support

2.16 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the 3301540 CPU Board are listed below.

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

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

2.17 Audio Codec

The 3301540 has an integrated REALTEK ALC655 CODEC. The ALC655 CODEC is a 16-bit, full-duplex AC'97 Rev. 2.3 compatible six-channel audio CODEC designed for PC multimedia systems, including host/soft audio and AMR/CNR-based designs. Some of the features of the codec are listed below.

- * Meets performance requirements for audio on PC99/2001 systems
- * Meets Microsoft WHQL/WLP 2.0 audio requirements
- * 16-bit Stereo full-duplex CODEC with 48KHz sampling rate
- * Compliant with AC'97 Rev 2.3 specifications
- * Front-Out, Surround-Out, MIC-In and LINE-In Jack Sensing
- * 14.318MHz -> 24.576MHz PLL to eliminate crystal
- * 12.288MHz BITCLK input
- * Integrated PCBEEP generator to save buzzer
- * Interrupt capability
- * Three analog line-level stereo inputs with 5-bit volume control, LINE_IN, CD, AUX
- * High-quality differential CD input
- * Two analog line-level mono inputs: PCBEEP, PHONE-IN
- * Two software selectable MIC inputs
- * Dedicated Front-MIC input for front panel applications (software)

- selectable)
- * Boost preamplifier for MIC input
 - * LINE input shared with surround output; MIC input shared with Center and LFE output
 - * Built-in 50mW/20ohm amplifier for both Front-out and Surround-Out
 - * External Amplifier Power Down (EAPD) capability
 - * Power management and enhanced power saving features
 - * Supports Power-Off CD function
 - * Adjustable VREFOUT control
 - * Supports 48KHz S/PDIF output, complying with AC'97 Rev 2.3 specifications
 - * Supports 32K/44.1K/48KHz S/PDIF input
 - * Power support: Digital: 3.3V; Analog: 3.3V/5V
 - * Standard 48-pin LQFP package
 - * EAX™ 1.0 & 2.0 compatible
 - Direct Sound 3D™ compatible
 - A3D™ compatible
 - I3DL2 compatible
 - HRTF 3D positional audio
 - 10-band software equalizer
 - Voice cancellation and key shifting in Karaoke mode
 - * AVRack® Media Player
 - * Configuration Panel for improved user convenience

2.18 Power Consumption

Table 2-2 shows the power consumption parameters for the 3301540 CPU board when a Pentium 4 processor with a clock speed of 3.4GHz, an L2 cache of 2MB and a FSB 800MHz is running with a 2GB DDR400 module.

Voltage	Current
+5V	4.28
+12V	6.14

Table 2-2: Power Consumption

2.19 Packaged Contents and Optional Accessory Items

2.19.1 Package Contents

When you unpack the 3301540 CPU board you should find the following components.

- * 1 x 3301540 single board computer
- * 1 x mini jumper pack
- * 1 x ATA 66/100 flat cable (P/N: 32200-000052-RS)
- * 2 x SATA cables (P/N: 32000-062800-RS)
- * 1 x SATA power cable (P/N: 32100-088600-RS)
- * 1 x Keyboard/ PS2 mouse Y cable (P/N: 32000-000138-RS)
- * 1 X RS-232 cable (P/N: 19800-000051-RS)
- * 1 x USB cable (P/N: CB-USB02-RS)
- * 1 x Utility CD (P/N)
- * 1 x QIG (quick installation guide)

2.19.2 Optional Accessory Items

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

- * Audio cable (P/N: AC-KIT08R)
- * CPU Cooler (P/N: CF-520-RS)
- * FDD cable (P/N: 32200-000017-RS)
- * LPT cable (P/N: 19099-000049-RS)

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 3.1.2**.

3.1.1 3301540 CPU Board Layout

Figure 3-1 shows the onboard peripheral connectors, backplane peripheral connectors and onboard jumpers.

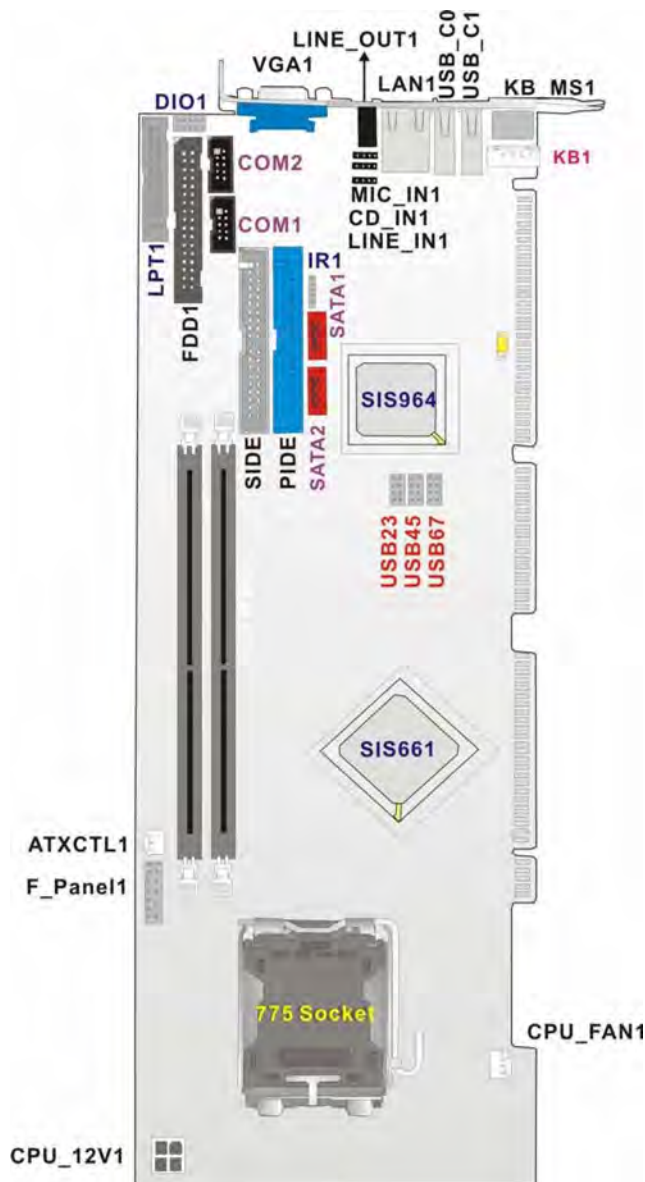


Figure 3-1: Connector and Jumper Locations

3.1.2 Peripheral Interface Connectors

Table 3-1 shows a list of the peripheral interface connectors on the 3301540 CPU board. Detailed descriptions of these connectors can be found in **Section 3.2** on **page 35**.

Label	Connector	Type
FDD1	FDD connector	34-pin header
PIDE1	Primary HDD connector	40-pin header
SIDE1	Secondary HDD connector	40-pin header
COM1	Serial communications connector	5-pin header
COM2	Serial communications connector	5-pin header
LPT1	Parallel port connector	26-pin header
SATA 1	SATA drive port (150MB/s)	SATA disk drive port
SATA 2	SATA drive port (150MB/s)	SATA disk drive port
DIO1	Digital Input Output connector	10-pin header
CPU12V1	ATX 12V connector	4-pin header
CPU_FAN1	CPU cooling fan connector	3-pin header
USB23	USB connector for 2 USB devices	8-pin header
USB45	USB connector for 2 USB devices	8-pin header
USB67	USB connector for 2 USB devices	8-pin header
IR1	Infrared	5-pin header
F_PANEL1	Front Panel connector connects to chassis front panel power and reset buttons as status LEDs	12-pin header
ATXCTL1	Connects the CPU board to the backplane	3-pin header
LINE_IN1		4-pin header

CD_IN1		4-pin header
MIC_IN1		4-pin header
KB1	Keyboard connector	5-pin header

Table 3-1: Peripheral Interface Connectors

3.1.3 Rear Panel Connectors

Table 3-2 lists the rear panel connectors on the 3301540 CPU card. Detailed descriptions of these connectors can be found in Section 3.3 on page 54.

Label	Connector	Type
KB/MS_C1	Keyboard or Mouse connector	PS/2
LAN_C1	Ethernet connector	RJ-45
LAN_C2	Ethernet connector	RJ-45
USB_C1	USB Connector	USB Port
CN2	VGA Connector	15-pin VGA connector

Table 3-2: Peripheral Interface Connectors

3.1.4 Onboard Jumpers

Table 3-3 lists the onboard jumpers. Detailed descriptions of these jumpers can be found in Section 3.4 on page 58.

Label	Connector	Type
JP2	Clear CMOS	3-pin header

Table 3-3: Onboard Jumpers

3.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the CPU card and are only accessible when the CPU board is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the 3301540 CPU board.

3.2.1 FDD Connector

CN Label:	FDD1
CN Type:	2x17 pin header
CN Location:	See Figure 3-2
CN Pinouts:	See Table 3-4

The 3301540 is shipped with a 34-pin daisy-chain drive connector cable. This cable can be connected to the FDD connector.

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 3-4: FDD Connector Pinouts

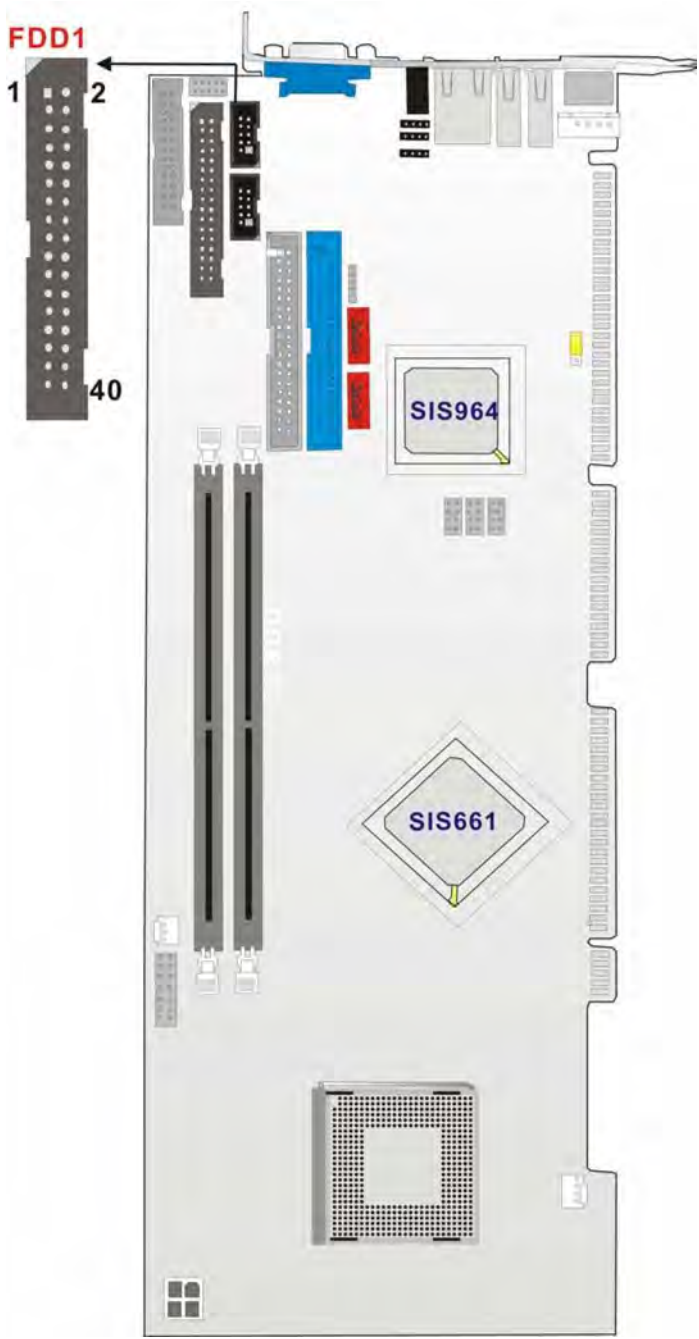


Figure 3-2: FDD Connector Location

3.2.2 IDE Connectors

CN Label: PIDE1 and SIDE2

CN Type: 2x20 pin header

CN Location: See Figure 3-3

CN Pinouts: See Table 3-5

Two IDE connectors provide connectivity for four IDE devices.

PIN NO.	DESCRIPTION		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 3-5: IDE Connector Pinouts

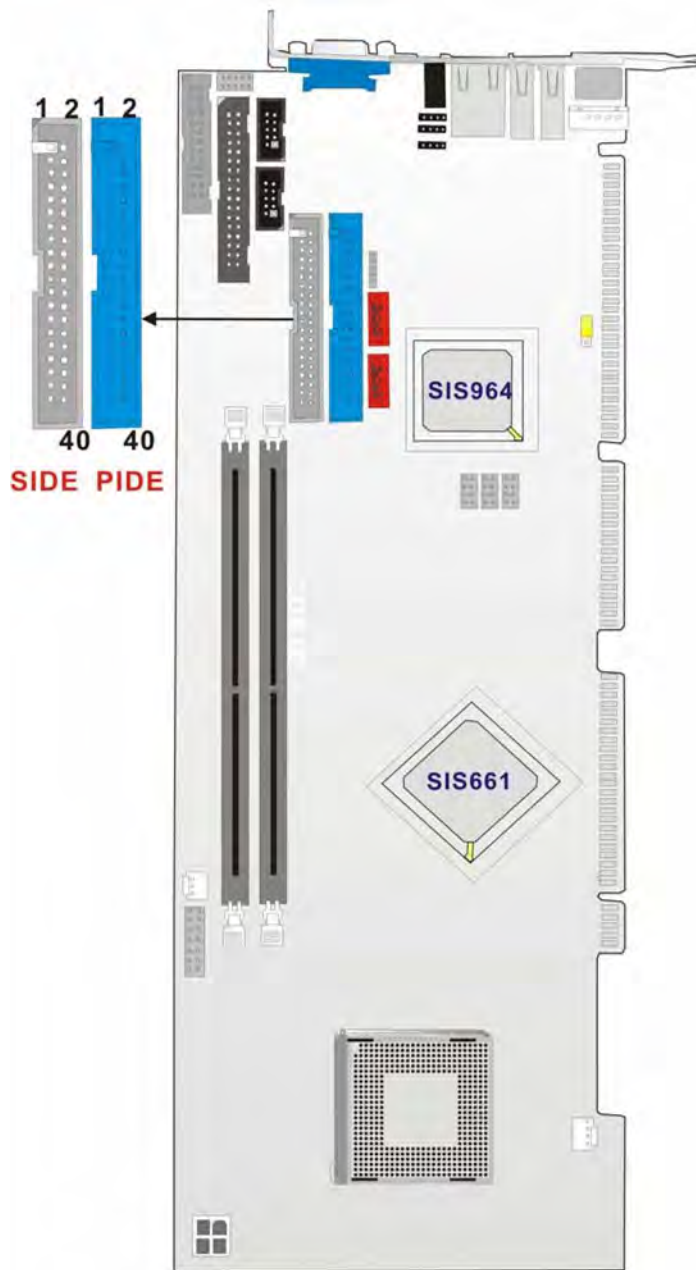


Figure 3-3: IDE Connector Location

3.2.3 COM Ports

- CN Label: COM1, COM2
- CN Type: 2x5 pin headers
- CN Location: See Figure 3-4

CN Pinouts: See Table 3-6

The 3301540 CPU board has two internal high-speed UART connectors accessed through a 10-pin cable connector.

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

Table 3-6: Internal COM Port Connector Pinouts

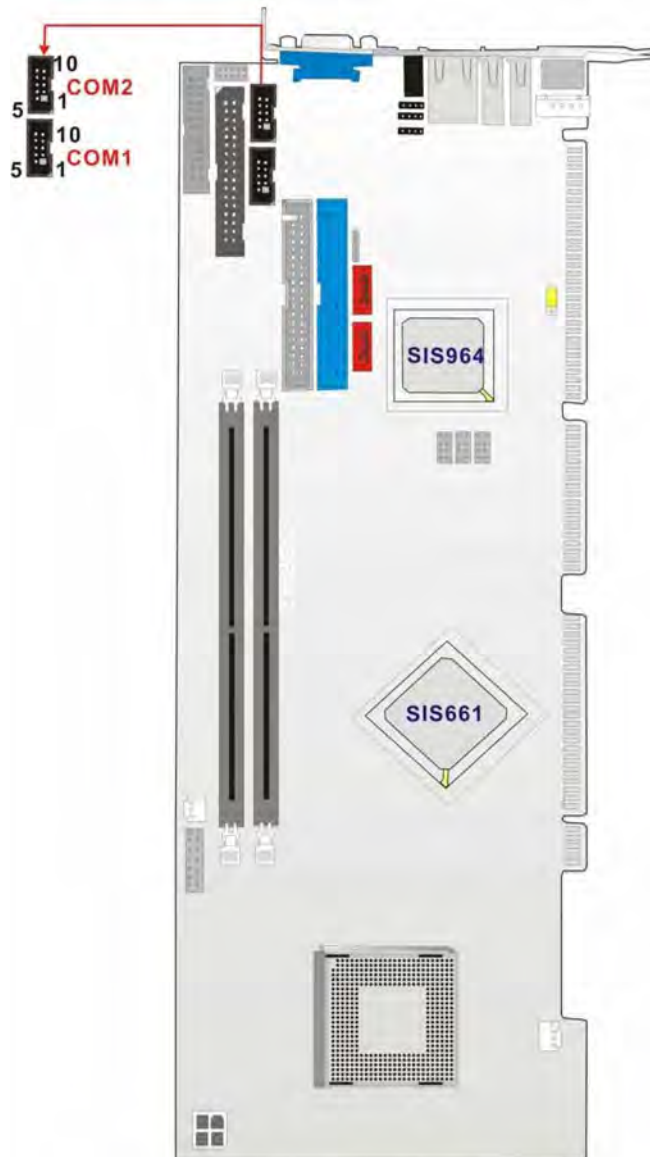


Figure 3-4: COM Port Locations

3.2.4 Parallel Port

CN Label:	LPT1
CN Type:	2x13 pin header
CN Location:	See Figure 3-5
CN Pinouts:	See Table 3-7

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

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 3-7: LPT Connector Pinouts

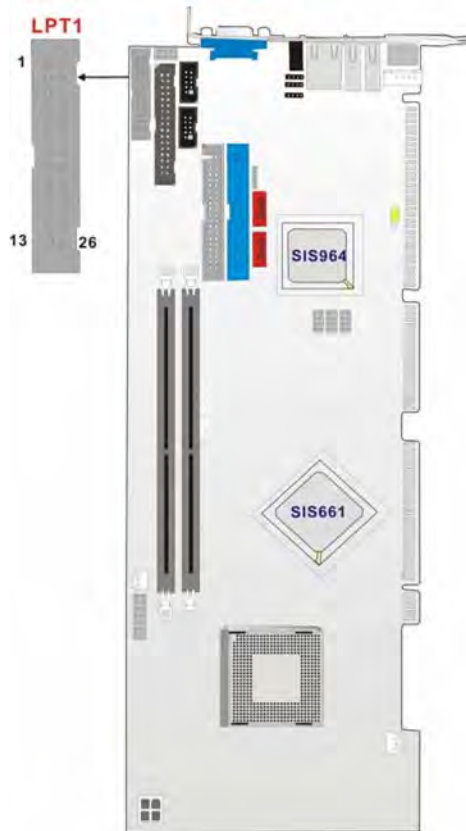


Figure 3-5: LPT Connector Location

3.2.5 Internal USB Connectors

CN Label: USB23, USB45, USB67

CN Type: 2x4 pin header

CN Location: See Figure 3-6

CN Pinouts: See Table 3-8

Three 2x4 pin connectors provide connectivity to six USB 2.0 ports. Two additional USB ports are found on the rear panel. The USB ports are used for I/O bus expansion.

PIN	DESCRIPTION		
1	USB Power	2	GND
3	USBPX-	4	USBPX-
5	USBPX+	6	USBPX+

7	GND	8	USB Power
---	-----	---	-----------

Table 3-8: USB Port Connector Pinouts

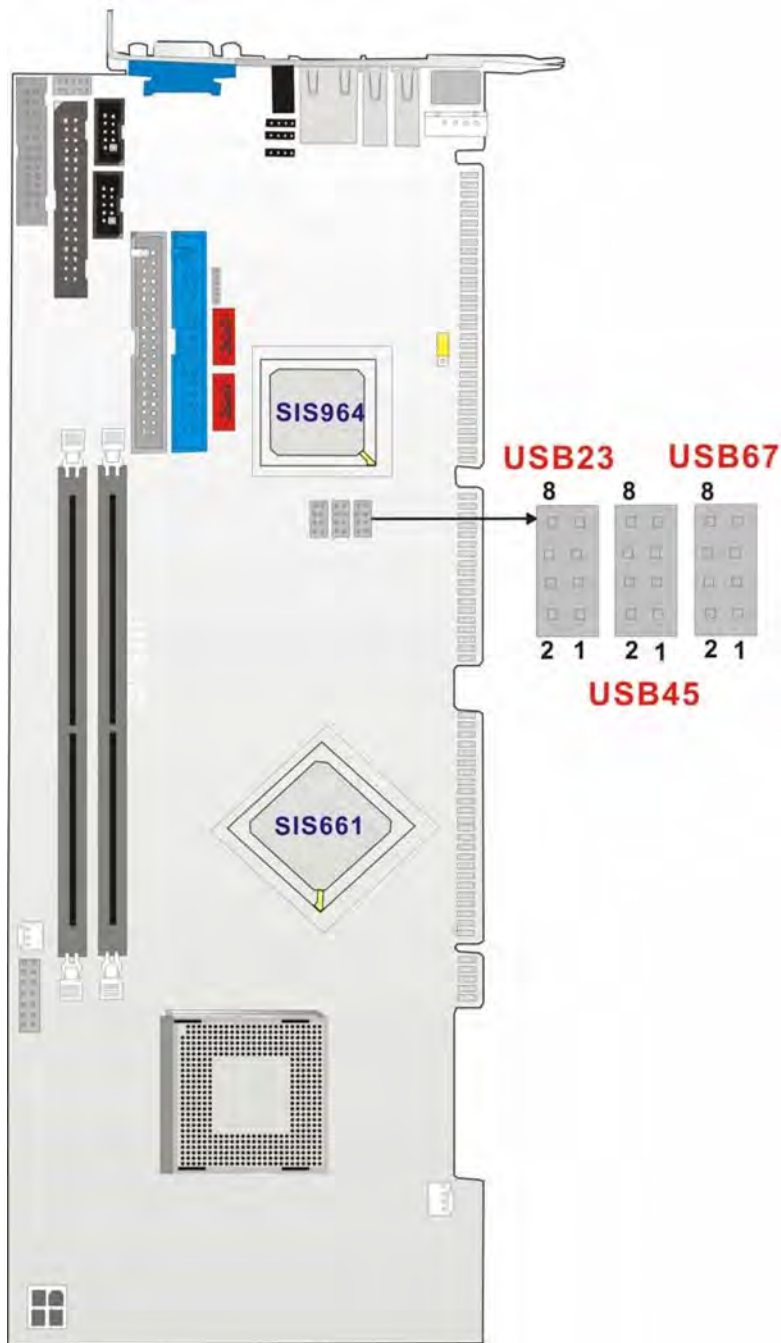


Figure 3-6: USB Port Connector Location

3.2.6 Cooling Fan Connector

- CN Label:** CPU_FAN1
- CN Type:** 1x3 pin header
- CN Location:** See Figure 3-7
- CN Pinouts:** See Table 3-9

The CPU_FAN1 CPU cooling fan connector provides a 12V, 500mA current to the 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 certain fans can issue the rotation signals.

PIN	DESCRIPTION
1	Sense Pulse
2	+12V
3	GND

Table 3-9: Cooling Fan Connector Pinouts

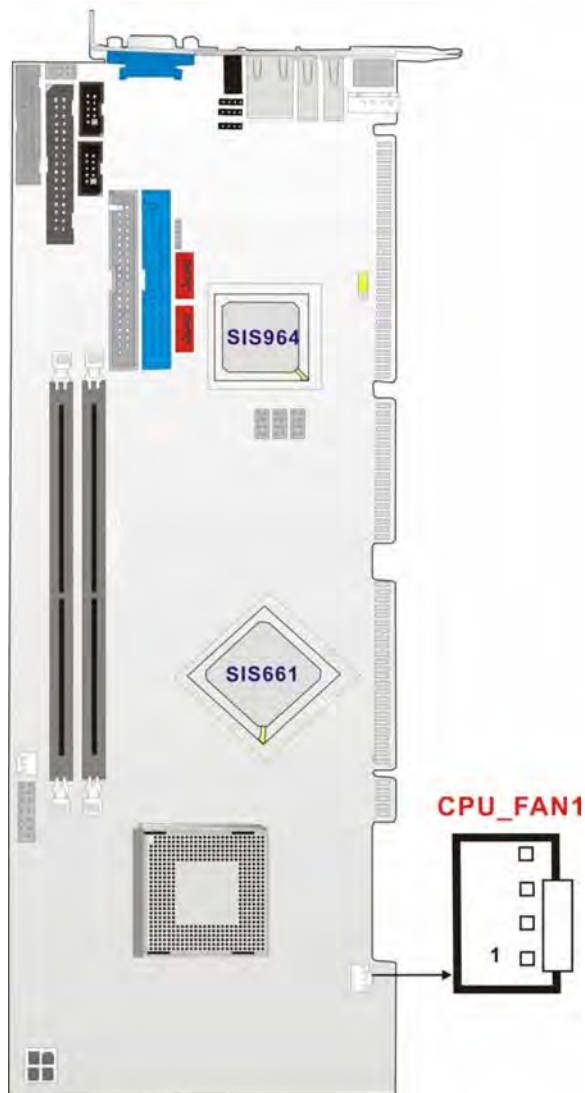


Figure 3-7: Cooling Fan Connector Locations

3.2.7 Backplane to Mainboard ATX Connector

CN Label:	ATXCTL1
CN Type:	1x3 pin header
CN Location:	See Figure 3-8
CN Pinouts:	See Table 3-10

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

PIN NO.	DESCRIPTION
1	GND
2	PSON#
3	5VSB

Table 3-10: CN7 Connector Pin Outs



Figure 3-8: ATXCTL1 Connector Locations

3.2.8 System Front Panel Connector

CN Label: F_PANEL1

CN Type: 2x7 pin header

CN Location: See Figure 3-9

CN Pinouts: See Table 3-11

The system panel connector connects to:

- * the system chassis front panel LEDs
- * the chassis speaker

- * the power switch
- * the reset button.

PIN	DESCRIPTION		
1	VCC5	2	VCC5
3	N/C	4	N/C
5	GND	6	N/C
7	Power Button	8	SPK
9	GND	10	N/C
11	VCC5	12	SYS_RST#
13	HD_LED (-)	14	GND

Table 3-11: System Panel Connector Pinouts

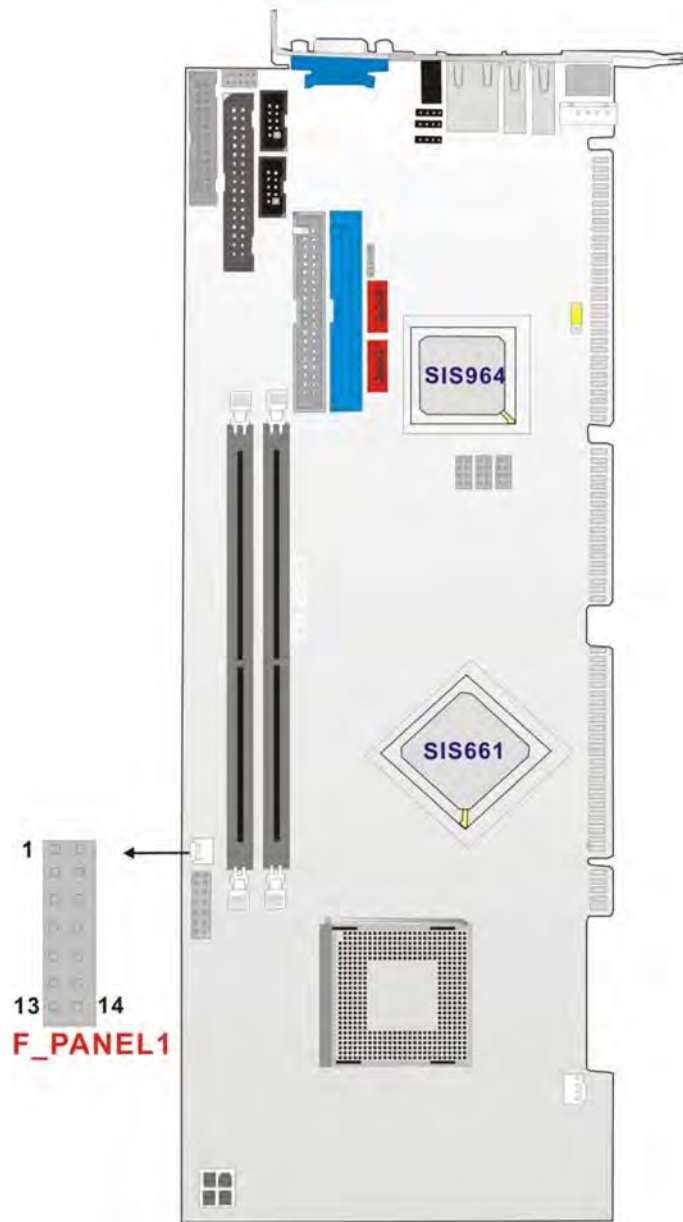


Figure 3-9: System Panel Connector Location

3.2.9 IrDA Connector

CN Label:	IR1
CN Type:	1x6 pin header
CN Location:	See Figure 3-10
CN Pinouts:	See Table 3-12

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

PIN	DESCRIPTION
1	VCC5
2	NC
3	IR-RX
4	GND
5	IR-TX
6	CIRRX

Table 3-12: IrDA Connector Pinouts

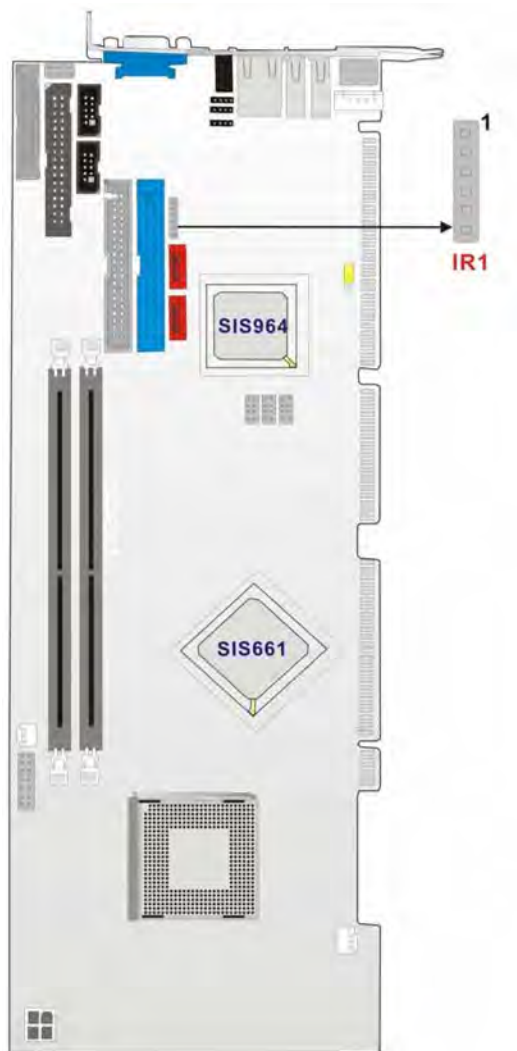


Figure 3-10: IrDA Connector Location

3.2.10 SATA Drive Connectors

- CN Label:** SATA1, SATA2
- CN Type:** 1x7 pin port
- CN Location:** See Figure 3-11
- CN Pinouts:** See Table 3-13

The SATA drive ports provide connectivity to SATA drives with a maximum data transfer rate of 150MB/s.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	5	RX-
2	TX+	6	RX+
3	TX-	7	GND
4	GND		

Table 3-13: SATA Connector 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.

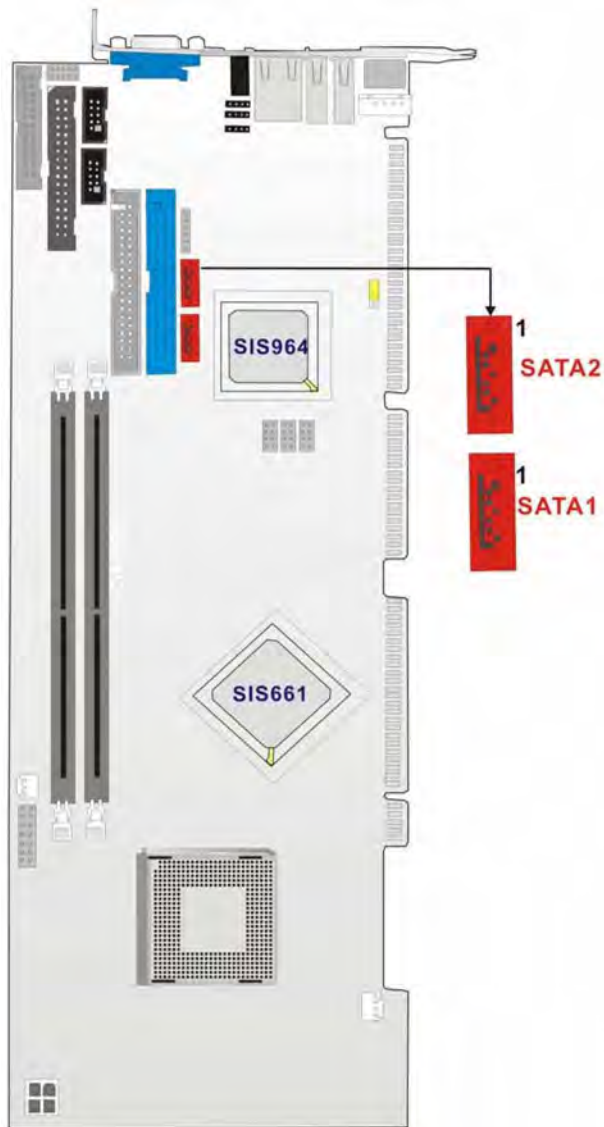


Figure 3-11: SATA Connector Locations



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.

3.2.11 Keyboard Connector

CN Label: KB1
CN Type: 1x5 pin header
CN Location: See Figure 3-12
CN Pinouts: See Table 3-14

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

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

Table 3-14: KB1 Connector Pinouts



Figure 3-12: KB1 Connector Location

3.2.12 ATX-12V Power Source Connector

CN Label:	CPU12V
CN Type:	2x2 pin header
CN Location:	See Figure 3-13
CN Pinouts:	See Table 3-15

This connector supports the ATX-12V power supply.

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

Table 3-15: CN100 Connector Pinouts



Figure 3-13: ATX Connector Location

3.3 External (Rear Panel) Connectors

Figure 3-14 shows the 3301540 CPU board 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
- * 2 x USB connectors
- * 1 x RJ-45 GbE connector
- * 1 x VGA connector
- * 1 x Line-out connector

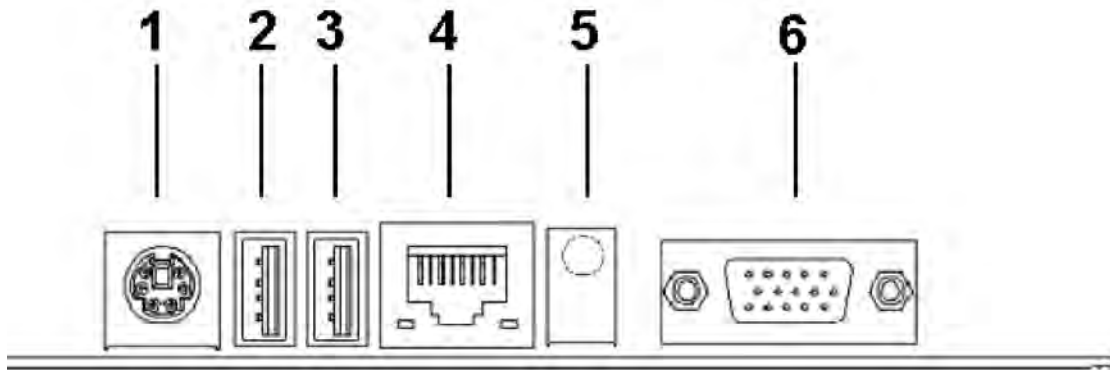


Figure 3-14: 3301540 CPU Board Rear Panel

3.3.1 PS/2 Connector

CN Label: KB_MS1

CN Type: PS/2

CN Location: See Figure 3-14 (labeled number 1)

CN Pinouts: See Table 3-16

Figure 3-15 shows PS/2 Pinout locations

The PS/2 mouse and keyboard connectors are connected to a mouse and keyboard

PIN	DESCRIPTION	PIN	DESCRIPTION
1	KB Data	2	N/C
3	GND	4	+5V
5	Clock	6	N/C

Table 3-16: PS/2 Pinouts



Figure 3-15: PS/2 Pinout locations

3.3.2 USB Connectors

- CN Label:** USB_C0, USB_C1
- CN Type:** USB port
- CN Location:** See Figure 3-14 (labeled number 2 and 3)
- CN Pinouts:** See Table 3-17

USB devices can be connected directly to the USB connectors on the rear panel.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	+5V	2	DATA-
3	DATA+	4	GND

Table 3-17: USB Connectors

3.3.3 Ethernet Connectors

- CN Label:** LAN1
- CN Type:** RJ-45
- CN Location:** See Figure 3-14 (labeled number 4)
- CN Pinouts:** See Table 3-18

One 1Gb connections can be made between the Ethernet connector and a Local Area Network (LAN) through a network hub. An RJ-45 Ethernet connector is shown in **Figure 3-16**.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	TXD+	8	GND
2	TXD-	9	GRN+
3	RXD+	10	GRN-
4	CT_TXD	11	YEL-
5	CT_RXD	12	YEL+
6	RXD-	13	S GND

7	N/C	14	S GND
---	-----	----	-------

Table 3-18: RJ-45 Ethernet Connector Pinouts

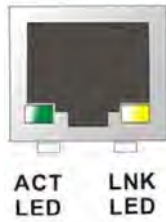


Figure 3-16: RJ-45 Ethernet Connector

The RJ-45 Ethernet connector has two status LEDs, one green and one yellow. The green LED indicates activity on the port and the yellow LED indicates the port is linked. See **Table 3-19**.

STATUS	DESCRIPTION	STATUS	
GREEN	Activity	YELLOW	Linked

Table 3-19: RJ-45 Ethernet Connector LEDs

3.3.4 VGA Connector

CN Label: VGA1

CN Type: 15-pin

CN Location: See Figure 3-14 (labeled number 7)

The standard 15-pin VGA connector connects to a CRT or LCD display monitor.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	Red	9	No Connect
2	Green	10	Ground
3	Blue	11	No Connect
4	No Connect	12	DDC DAT
5	Ground	13	Horizontal Synchronization

6	Ground	14	Vertical Synchronization
7	Ground	15	DDC Clock
8	Ground		

Table 3-20: VGA Connector Pinouts

3.4 Onboard 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.

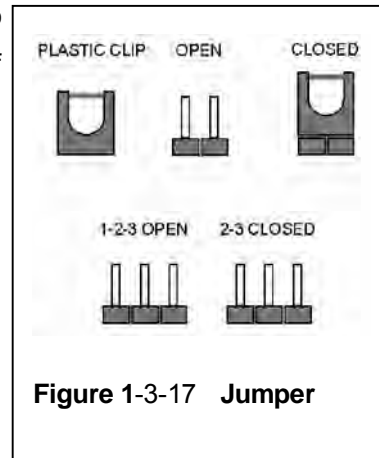


Figure 1-3-17 Jumper

The 3301540 CPU Board one onboard jumper, “**Clear CMOS.**”

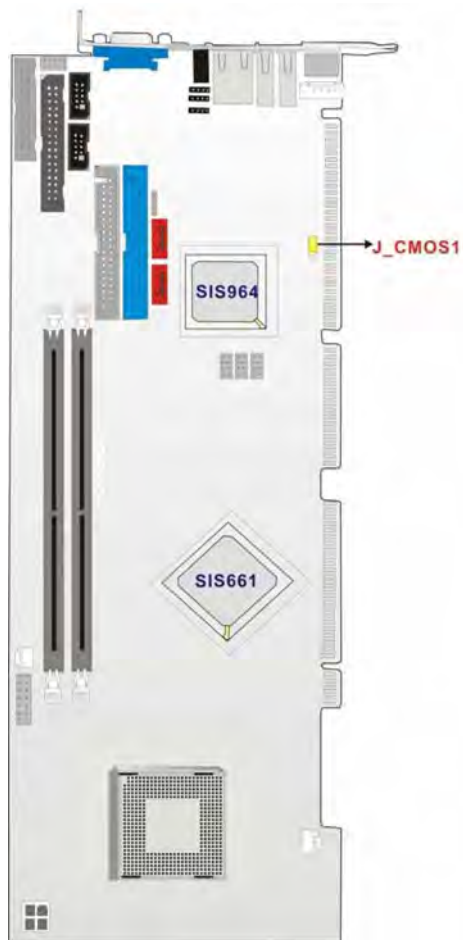


Figure 3-18: Jumper Locations

3.4.1 Reset CMOS Jumper

Jumper Label:	J_CMOS1
Jumper Type:	3 pin header
Jumper Settings:	See Table 3-21
Jumper Location:	See Figure 3-18

If the CPU Card fails to boot due to improper BIOS setting, 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 displays during the boot up process, you may then try to correct the fault by pressing the F1 to enter the CMOS Setup menu. You may then do one of the following:

- * Enter the correct CMOS setting
- * Load Optimal Defaults
- * Load Failsafe Defaults.

After you have done one of the above, save your changes and exit the CMOS Setup menu.

J_CMOS1	CLEAR CMOS
1-2 closed	Normal (default)
2-3 closed	Clear CMOS

Table 3-21: JP2 Jumper Settings

Chapter

4

4 Installation and Configuration

4.1 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.

4.1.1 Installation Notices

Before and during the installation of the 3301540 CPU Board, please **do** the following:

- * **Read the user manual**
 - The user manual provides a complete description of the 3301540 CPU board, 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.
- * **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 3301540 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 3301540 CPU Board **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.

4.2 Unpacking



NOTE:

If any of the items listed below are missing when you unpack the 3301540 CPU card, do not proceed with the installation and contact the reseller or vendor you purchased the CPU card from.

4.2.1 Unpacking Precautions

Before you install the 3301540 CPU card, you must unpack the CPU card. Some components on 3301540 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 3301540 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 3301540 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.

4.2.2 Checklist

When you unpack the 3301540 , please make sure that your package contains the following items.

-
- * 1 x 3301540 single board computer
 - * 1 x mini jumper pack
 - * 1 x ATA 66/100 flat cable
 - * 2 x SATA cables
 - * 1 x SATA power cable
 - * 1 x Keyboard/ PS/2 mouse Y cable
 - * 1 X RS-232 cable
 - * 1 x ATX-12V cable
 - * 1 x USB cable
 - * 1 x Utility CD
 - * 1 x QIG

If one or more of these items are missing, please contact the reseller or vendor you purchased the 3301540 CPU card from and do not proceed any further with the installation.

4.3 3301540 CPU Card Installation



WARNING!

1. Never run the CPU board without an appropriate heatsink and cooler that can be ordered from Global American, Inc or purchased separately.
 2. Be sure to use the CPU 12V power connector (CN10007) for the CPU power.
-



WARNING!

Please note that the installation instructions described in this manual should 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 take the following 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
- * DIMM modules
- * Peripheral device connection

4.3.1 CPU Installation

**WARNING!**

CPUs are expensive and sensitive components. When you install the CPU please be careful not to damage it in anyway. Make sure you install it properly and ensure that a heatsink and CPU cooling fan is properly installed before you run the CPU Card or else both the CPU and the board will be damaged.

To install Intel 478-pin CPU onto your motherboard, follow the steps below:

- Step 1:** **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 2:** **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 3:** **Insert the CPU.** To insert the CPU into the socket, first open the lever on the side of the CPU socket (See **Figure 4-1**) and then follow the instructions below:
-

-
- a. Correctly orientate the CPU with the IHS (Integrated Heat Sink) side facing upward.
 - b. Locate the pin 1 mark on the CPU.
 - c. Gently insert the CPU into the socket.
 - d. Rotate the retention screw into the locked position. **Step 0:**

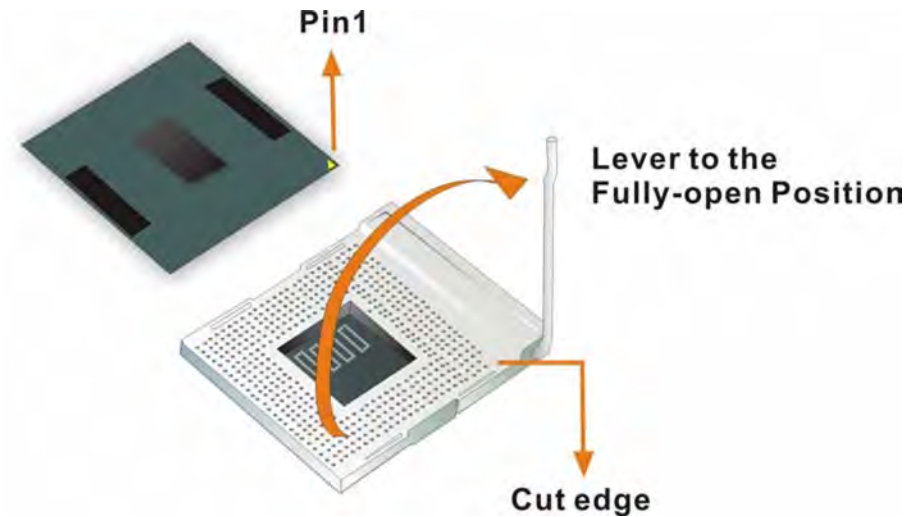


Figure 4-1: Lock the CPU Socket Retention Screw

4.3.2 Cooling Kit (2107702) Installation

GAI provides a cooling kit designed for socket 478 CPUs. The cooling kit is comprised of a CPU heatsink and a cooling fan.



NOTE:

The 2107702 heatsink comes with a sprayed layer of thermal paste. Make sure you do not accidentally wipe away the thermal paste while unpacking or installing the heatsink. Thermal paste between the CPU and the heatsink is important for optimum heat dissipation.

To install the 2017702 cooling kit, please follow the steps below.

Step 1: Install the cooling kit bracket. A cooling kit bracket is installed on the rear of

the CPU card. Align the bracket with the four retention holes at the back of the CPU card. Once properly aligned, insert four retention screws from the front of the CPU card.

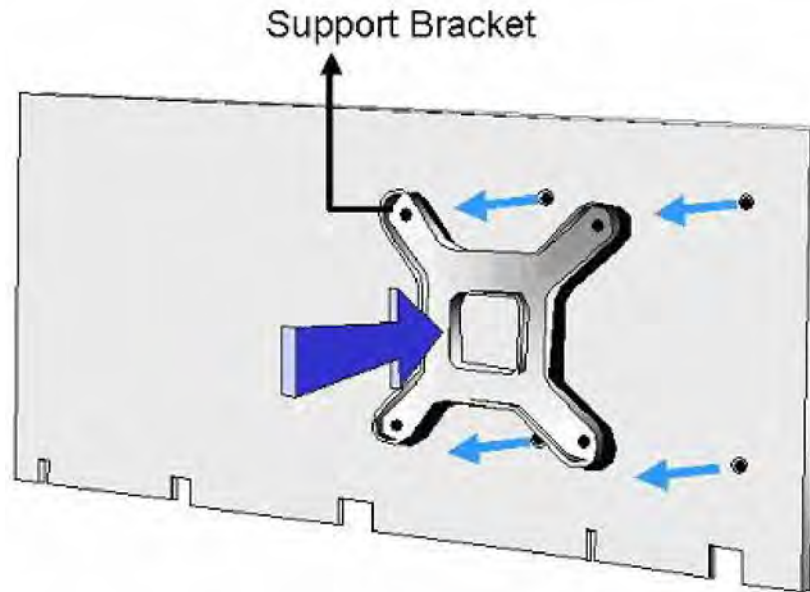


Figure 4-2: Cooling Kit Support Bracket

- Step 2:** **Open the lever at the top of the heat sink.** Lift the lever at the top of the cooling kit to loosen the cooling kit clamps.
- Step 3:** **Secure the cooling kit.** Gently place the heat-sink and cooling kit onto the CPU. Make sure the hooks are properly secured to the bracket. To secure the cooling kit close the top lever.

4.3.3 DIMM Module Installation

4.3.3.1 Purchasing the Memory Module



WARNING!

The DDR2 architecture is not compatible with DDR1 modules. If your system is installed with DDR1 modules, damage might occur and you will not be able to boot up your system.

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

- * Each DIMM module can support a memory chip with a maximum size of 1GB
- * 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.

4.3.3.2 DIMM Module Installation

The 3301540 CPU Board has two DDR SDRAM DIMM sockets. To install the DIMM modules, follow the instructions below.

- Step 4:** Pull the two white handles on either side of the DIMM socket down.
- Step 5:** Align the DIMM module with the DIMM socket making sure the matching pins are correctly aligned.
- Step 6:** Insert the DIMM module slowly. Once you are sure it is correctly inserted, push down firmly. The white handles on either side of the socket will move back up and lock the module into the socket. **Step 0:**

4.3.4 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	pe
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

4.3.4.1 IDE Disk Drive Connector (IDE1)

The cable used to connect the CPU card to the IDE HDD is a standard 44-pin ATA 66/100 flat cable. To connect an IDE HDD to the CPU Card, follow the instructions below.

- Step 1:** Find the ATA 66/100 flat cable in the kit that came with the CPU Card.
- Step 2:** Connect one end of the cable to the PIDE1 connector on the CPU card. A keyed pin on the IDE connectors 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 HDD making sure that the pin 1 cable corresponds to pin 1 on the connector.
- Step 0:**



NOTE:

When two EIDE 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.

4.3.4.2 Floppy Drive Connector (FDD1)

This connector provides access to two externally mounted 3.5" floppy drives. 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 one 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. **Step 0:**

4.4 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 configured, the CPU Card can be mounted into chassis.

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

4.5 Rear Panel Connectors

4.5.1 LCD Panel Connection

The conventional CRT monitor connector, VGA1, is a 15-pin, female D-SUB connector. Pin assignments can be seen in that can be connected to external monitors.

4.5.2 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.

4.5.3 USB Connection

The rear panel USB connectors provide 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.

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Appendix

A

Watchdog Timer

**NOTE:**

The following discussion applies to DOS environment. It is recommended you contact GAI support or visit our website 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) 82915 Graphics Controller
3C0-3DF	Intel(R) 82915 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-FFFFFF	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 3301540 CPU come with an onboard Realtek ALC655 16-bit, full duplex AC'97 2.3 compatible audio CODEC with 48KHz sampling rate. The CODEC is accessed through one phone jack connector and two three 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. A MIC input line.

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.

C.2 Driver Installation

After reboot, you should be able to find the sound effect configuration utility in Windows Control Panel (see **Figure C-1**); and if peripheral speakers have been properly connected, hear the sound effects.



Figure C-1: Sound Effect Manager Icon

C.3 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-3**). The shortcut to the configuration utility is also available through the **Sound Effect Manager** icon in the **Control Panel** (**Figure C-2**).

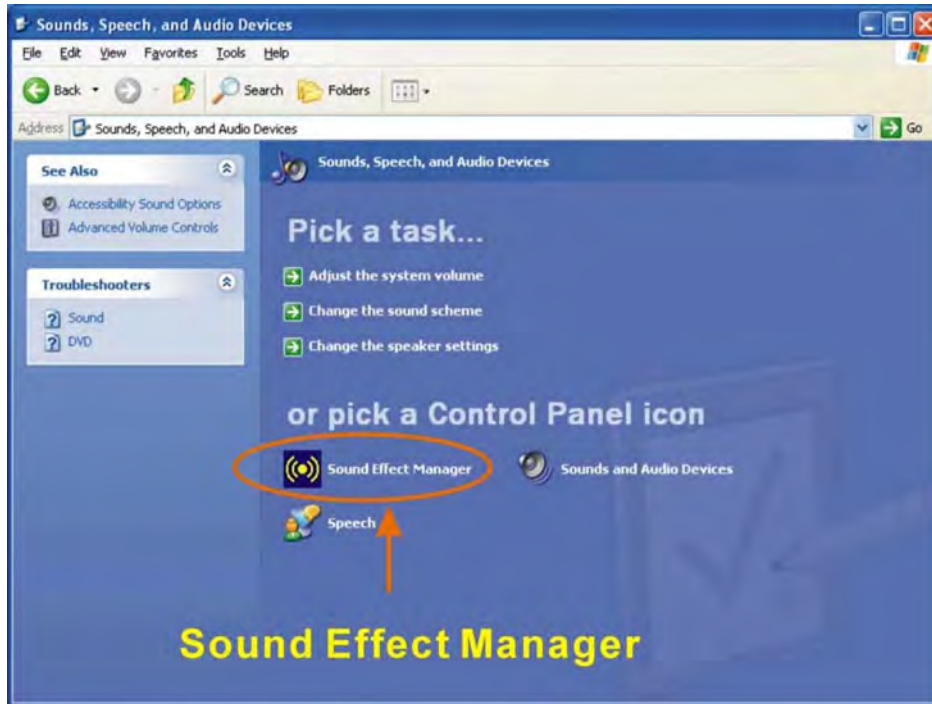


Figure C-2: Sound Effect Manager Icon [Control Panel]



Figure C-3: Sound Effect Manager Icon [Task Bar]

C.4 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-5**)

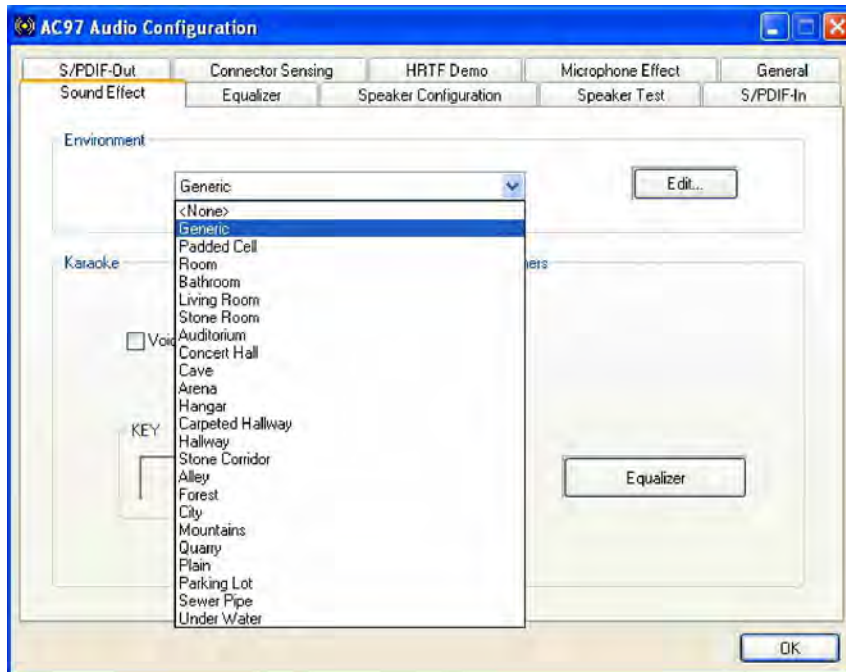


Figure C-4: Setting Sound Effects

C.5 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-5**). 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.

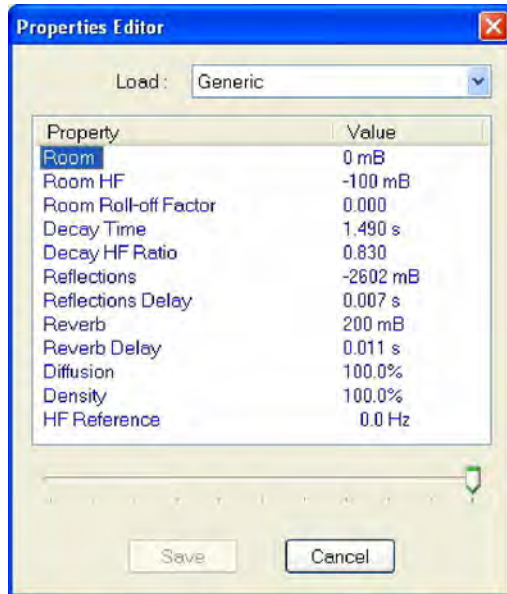


Figure C-5: Sound Effects Properties Editor

C.6 Karaoke Mode

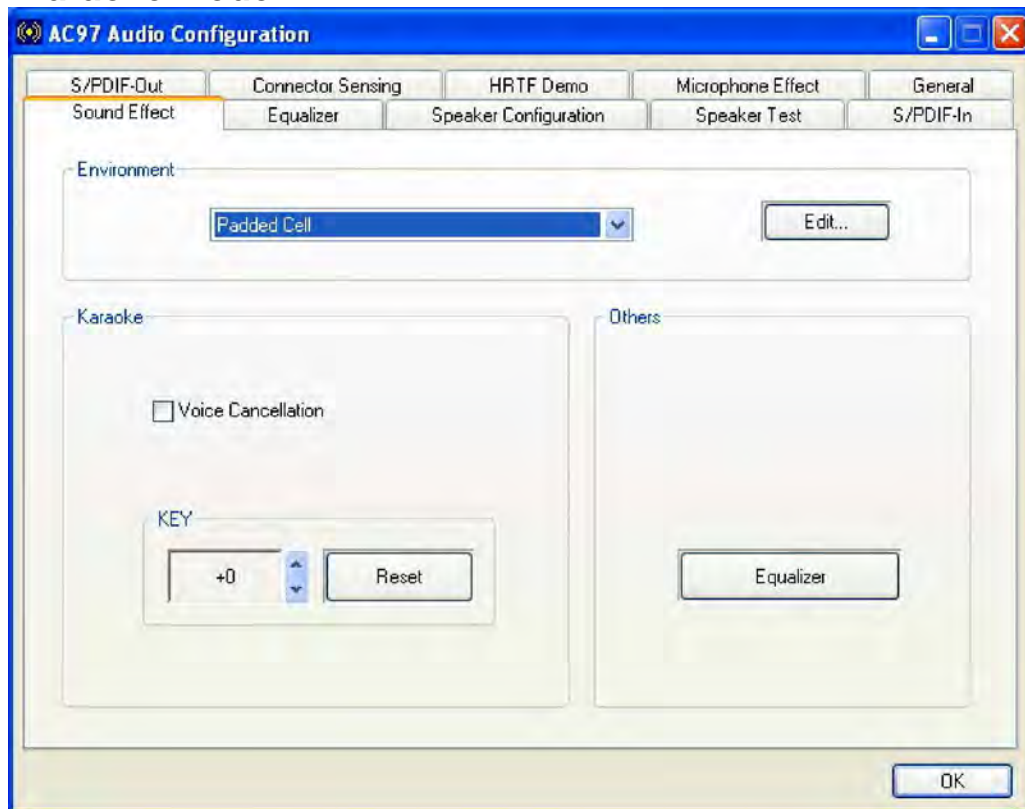


Figure C-6: Karaoke Mode

The Karaoke mode shown in **Figure C-6** 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:

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

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.7 Equalizer Selection

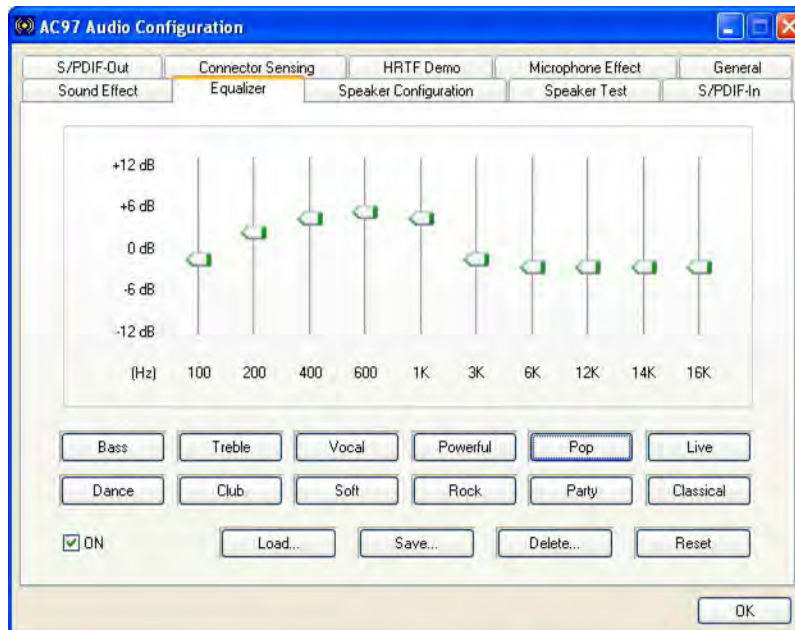


Figure C-7: Equalizer Settings

The equalizer in **Figure C-7** 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.8 Speaker Configuration

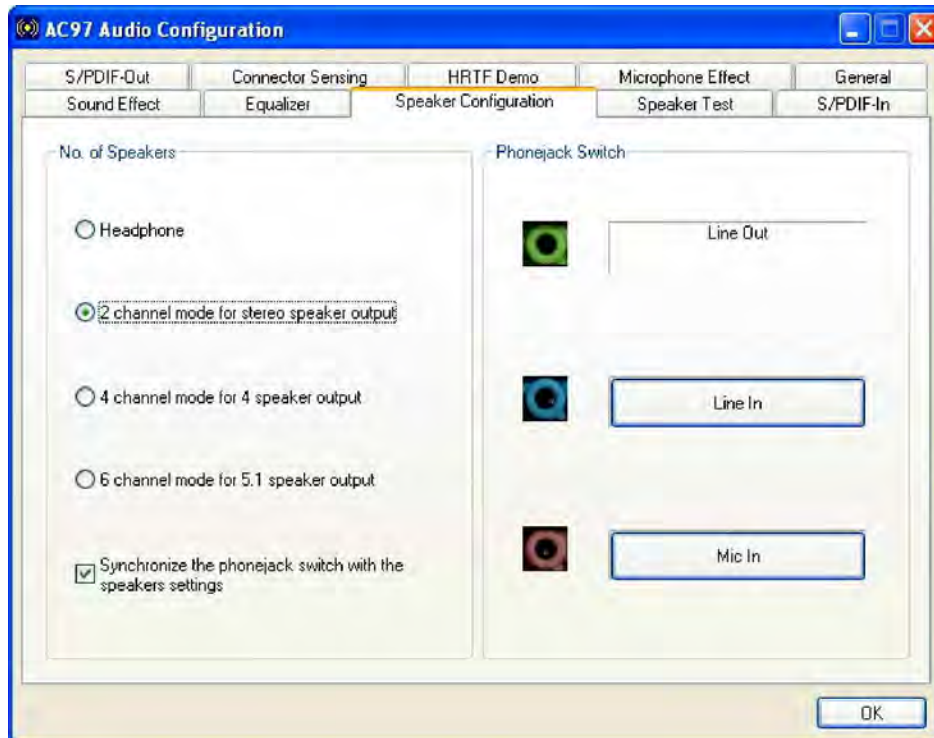


Figure C-8: Speaker Configuration

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:

- * Headphone
- * Channel mode for stereo speaker output
- * Channel mode for 4 speaker output

- * Channel mode for 5.1 speaker output
- * 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.9 Speaker Test

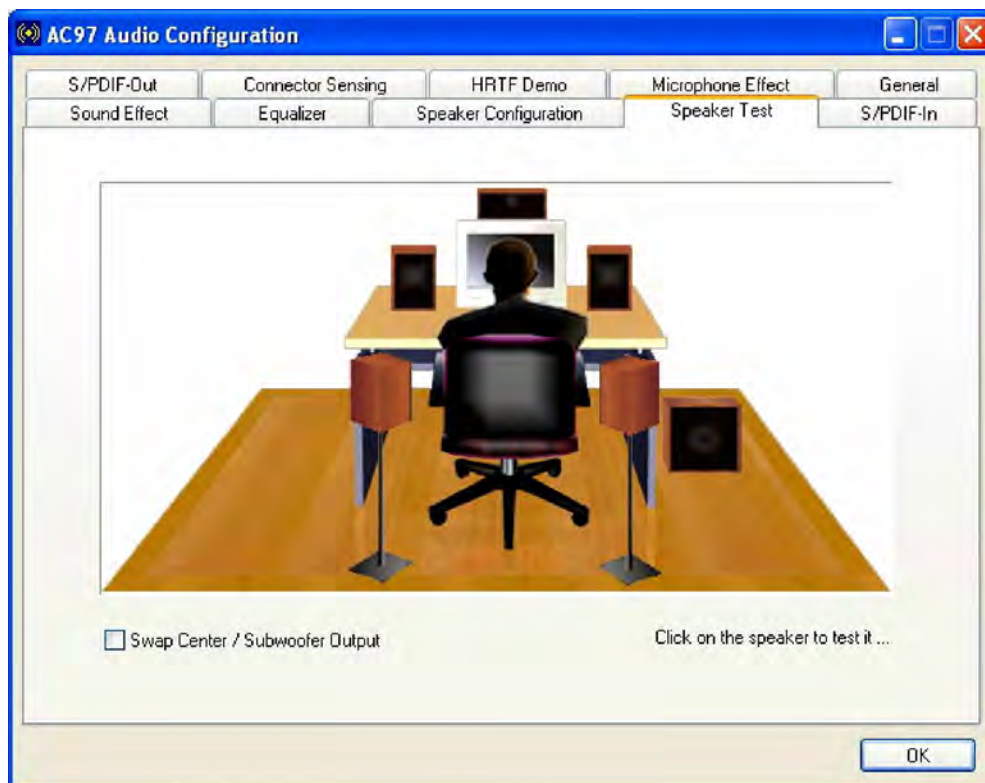


Figure C-9: Audio Configuration

The audio configuration window in **Figure C-9** 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.10 S/PDIF-In & S/PDIF-Out

These functions are currently not supported.

C.11 Connector Sensing



Figure C-10: Connector Sensing

Realtek ALC655 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-10** 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-11** shows the result of sensing test.

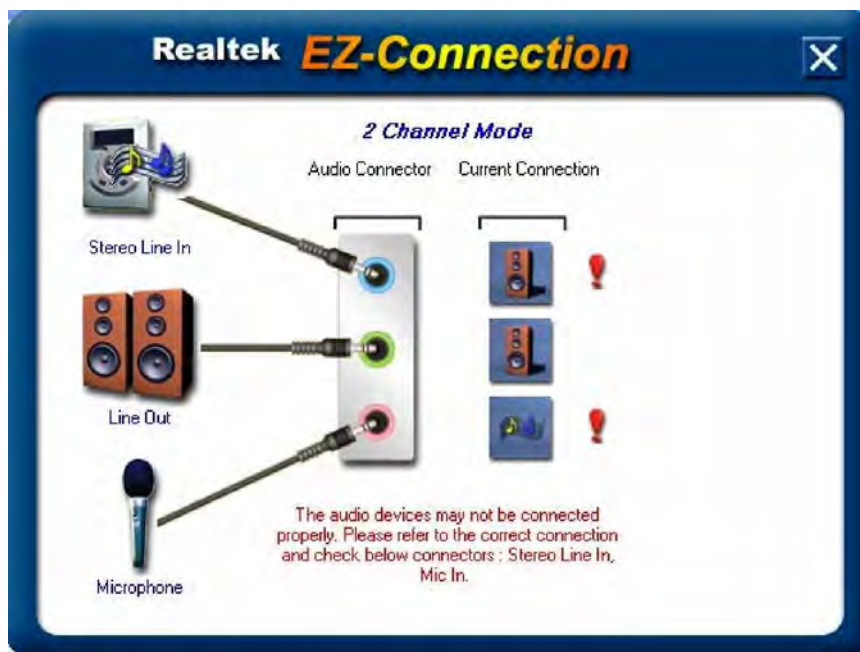


Figure C-11: EX Connection

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-12**)



Figure C-12: Connector Sensing Test Result

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

C.12 HRTF Demo

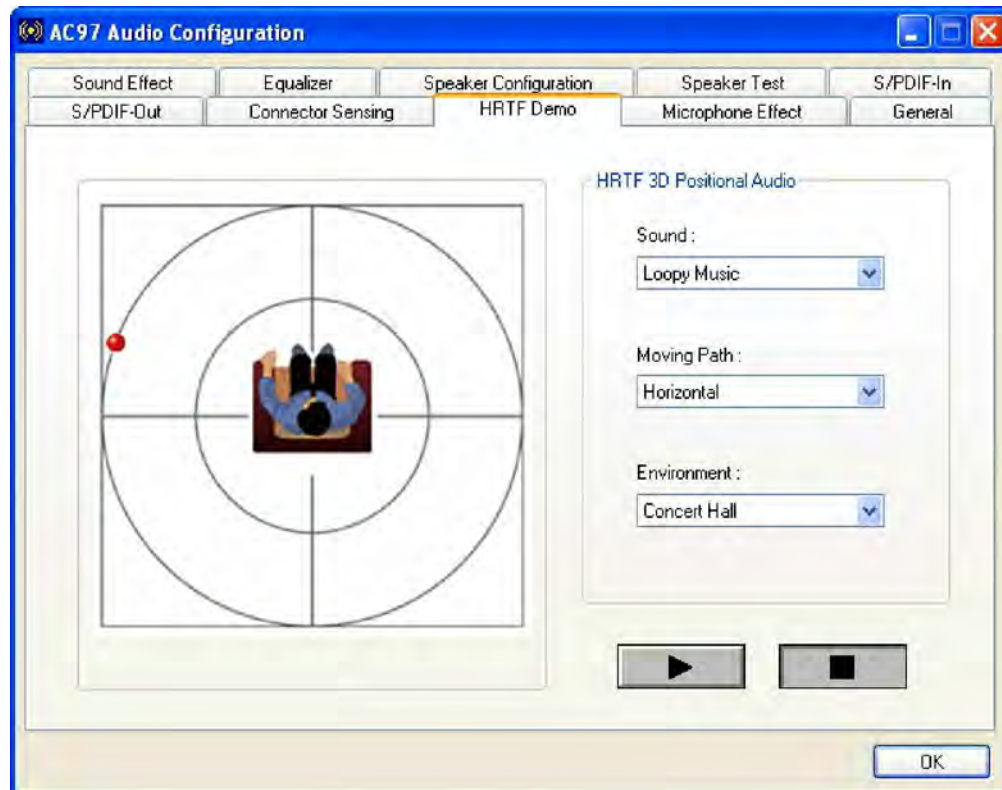


Figure C-13: HRTF Demo

The HRTF window in **Figure C-13** 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.13 Microphone Effect

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

C.14 General

The general window in **Figure C-14** 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.

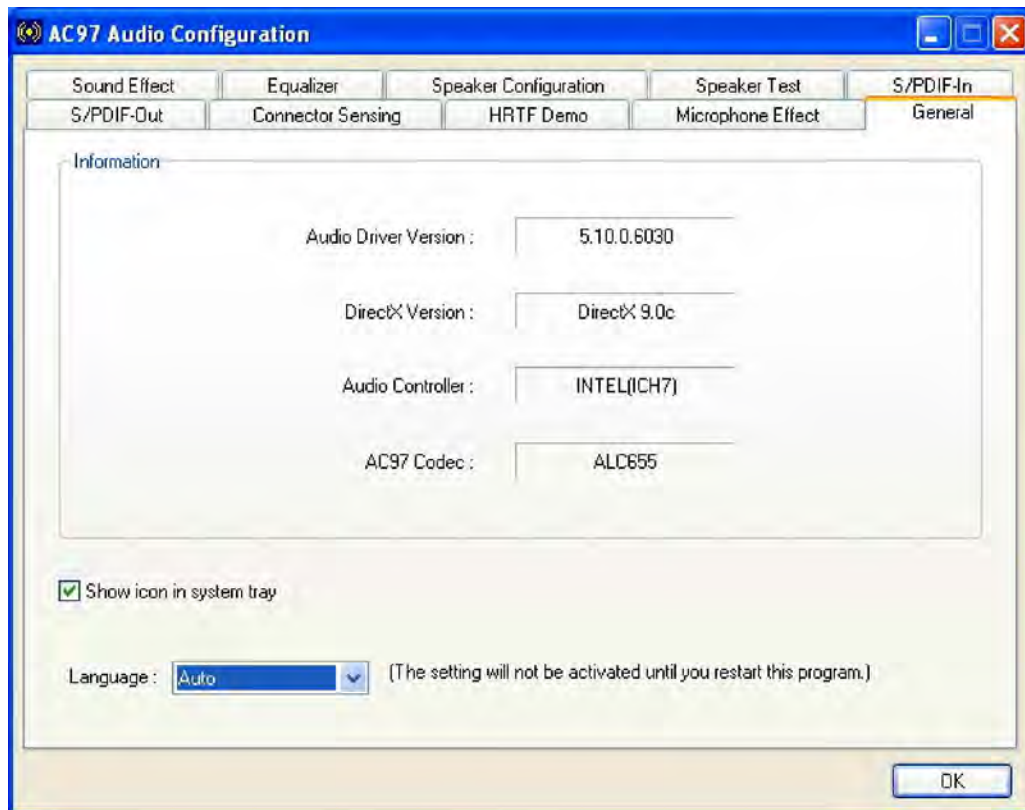


Figure C-14: General

Appendix

D

RAID Setup

D.1 Introduction

D.1.1 RAID Support

The SiS964 southbridge chipset integrated controller supports the following three SATA RAID levels:

- * 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 will not be lost. Although there are more RAID levels than those mentioned above, only the three RAID levels mentioned above can be implemented on your system

- * JBOD stands for Just a Bunch Of Disks. This is not a RAID level and if any thing happens to one hard drive, all the information on that drive will be lost.
- * RAID0 refers to disk striping. That is, 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. That means the effective storage capacity of your 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 can be retrieved 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 must be installed onto the system.

Step 2: The RAID BIOS must be configured.

Step 3: RAID drivers must be copied onto a floppy disk. **Step 0:**

D.2.2 Copy the RAID Driver

Before you attempt to configure the RAID on your system, you must copy the RAID driver from the driver CD that came with your system onto a floppy disk.

D.2.3 Install SATA Drives

To implement the on-chip RAID function, two SATA drives must be connected to the system. To do this use the SATA drive cables that came with your system to connect the SATA drives.

D.2.4 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 clicking **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 “**Onboard PCI S-ATA Controller**” option.
- Step 5:** Set the “**Onboard PCI S-ATA Controller**” option to the “**Raid Mode**” and hit **ENTER**.
- Step 6:** Save your changes and exit the BIOS setup utility. To do this, hit the escape key and select the **Exit** menu from the top menu bar in the BIOS utility setup.
- Step 7:** When you enter the **Exit** menu, select the “**Save Changes and Exit**” menu option. **Step 0:**

D.2.5 Configure the RAID BIOS

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

- Step 1:** Restart your system. Wait for the POST to be complete.
- Step 2:** You will be prompted to press **<CTRL>** and **<S>** to enter the BIOS RAID Setup Utility (see **Figure D-4**).

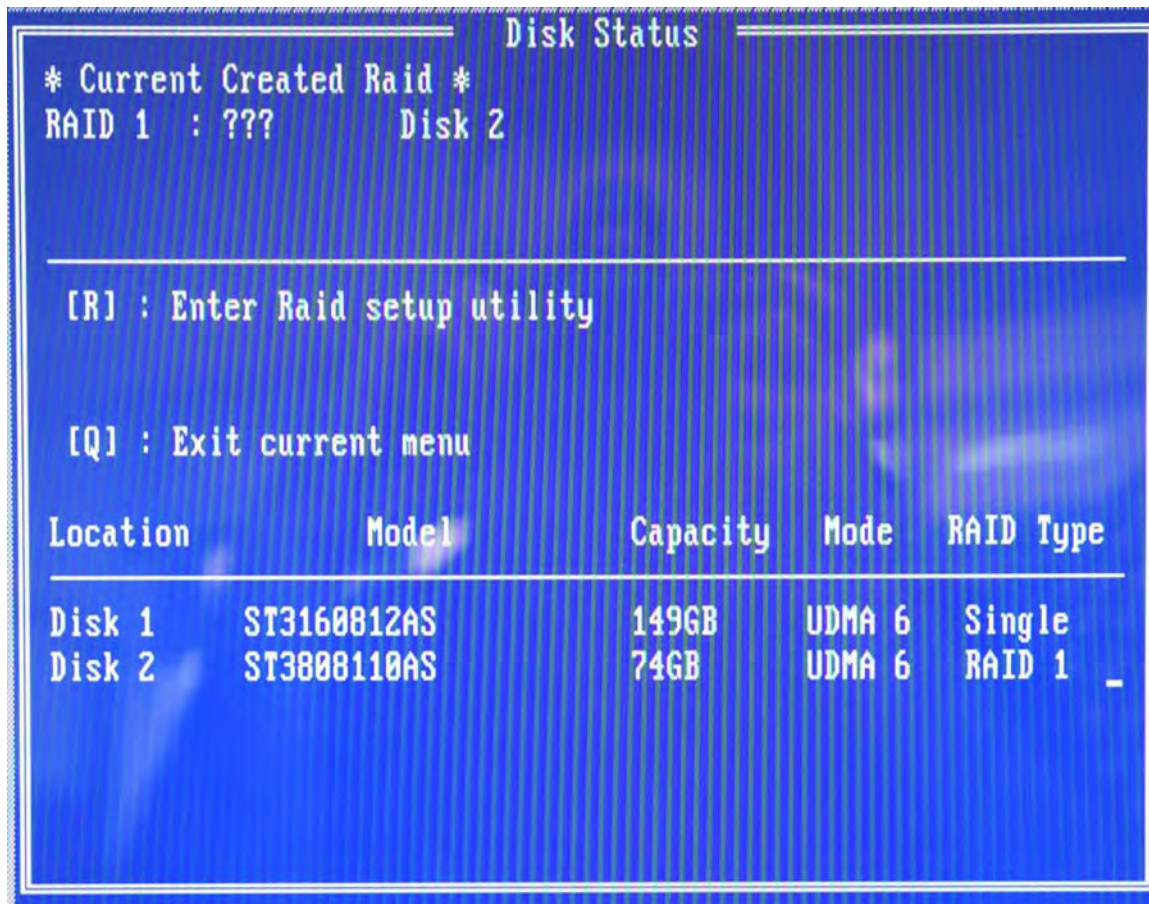


Figure D-4: BIOS RAID Utility

Step 3: To setup the RAID, press "R." The RAID setup screen will appear (see **Figure D-5**).

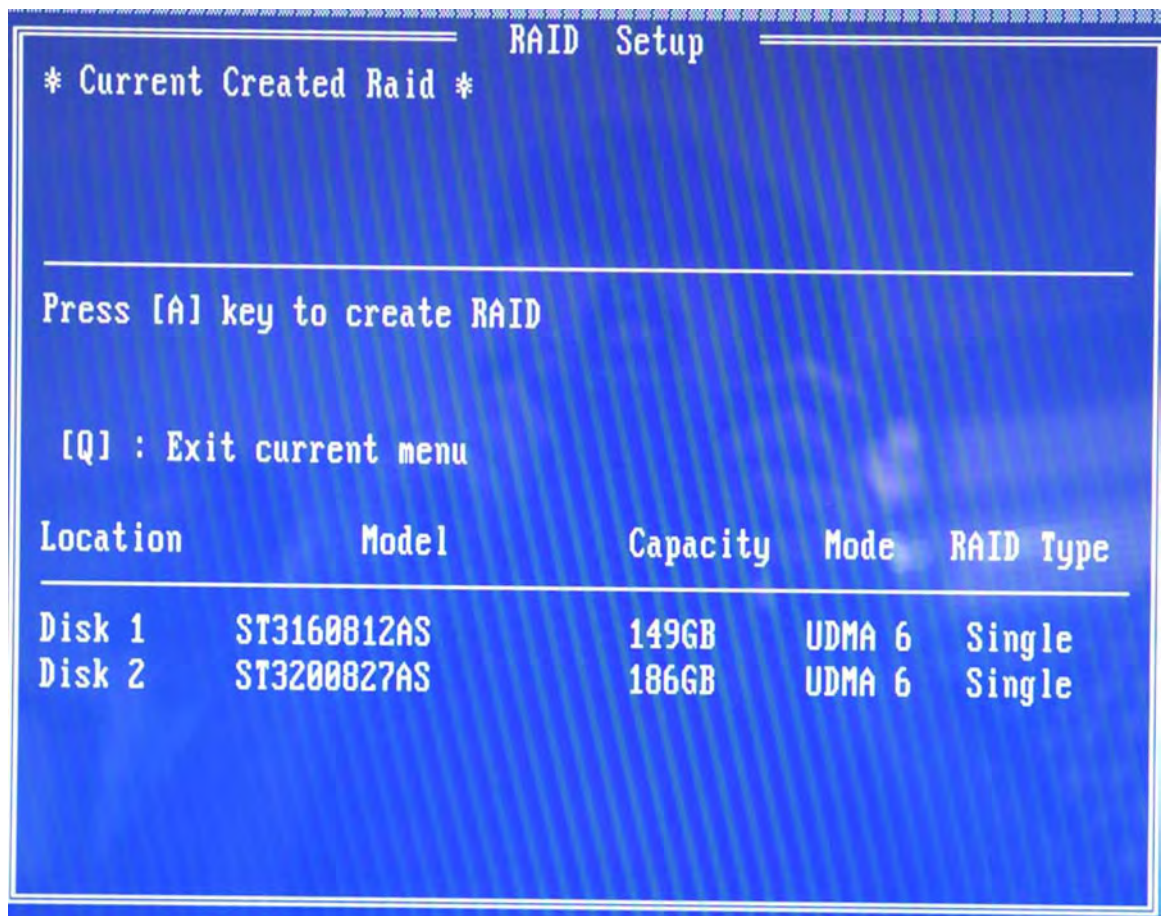


Figure D-5: Create RAID

- Step 4:** Click "A" to setup the RAID(see **Figure D-5**).
- Step 5:** You will then be prompted to select the RAID configuration type you wish to install. JBOD, RAID0 or RAID1. Select the RAID configuration you want to use (see **Figure D-6**).

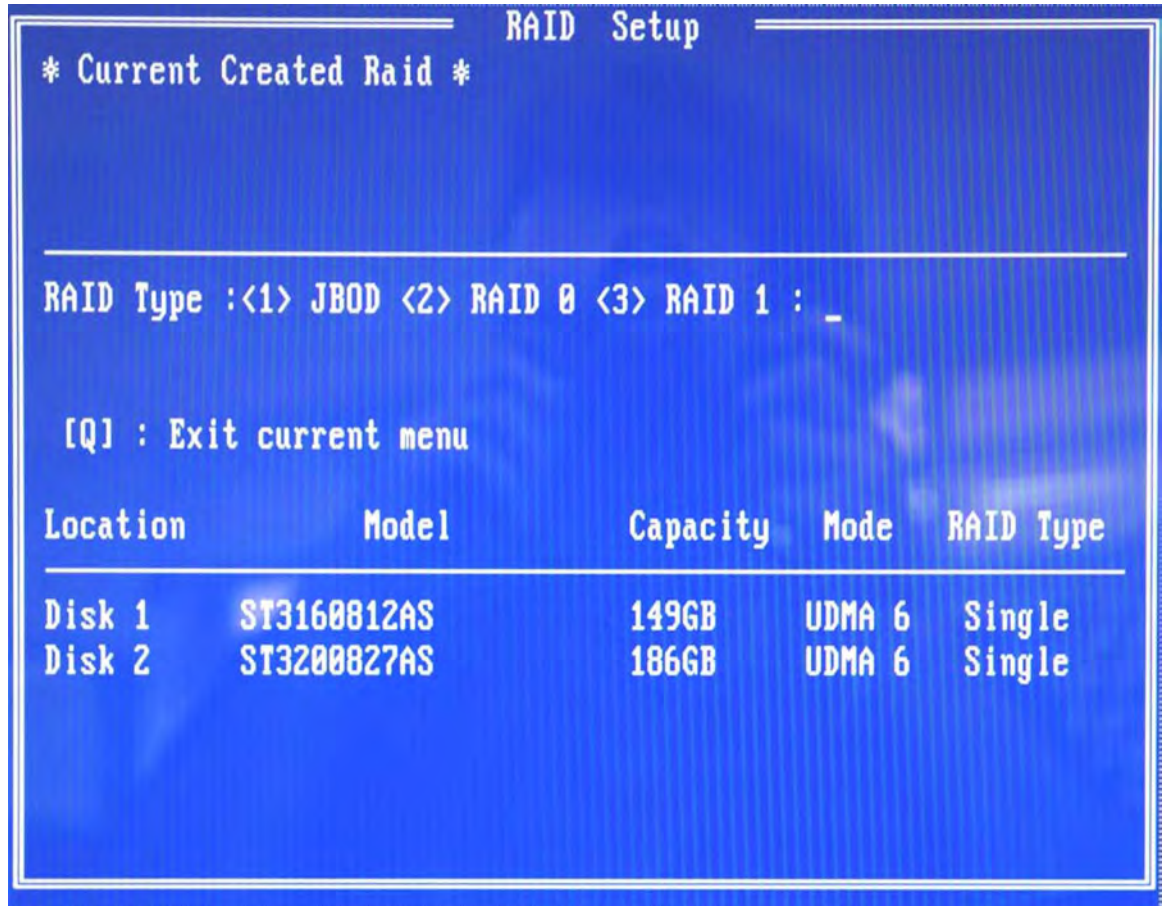


Figure D-6: Create RAID

Step 6: You will then be prompted to "Auto Create" or "Manual Create" (see Figure D-7).

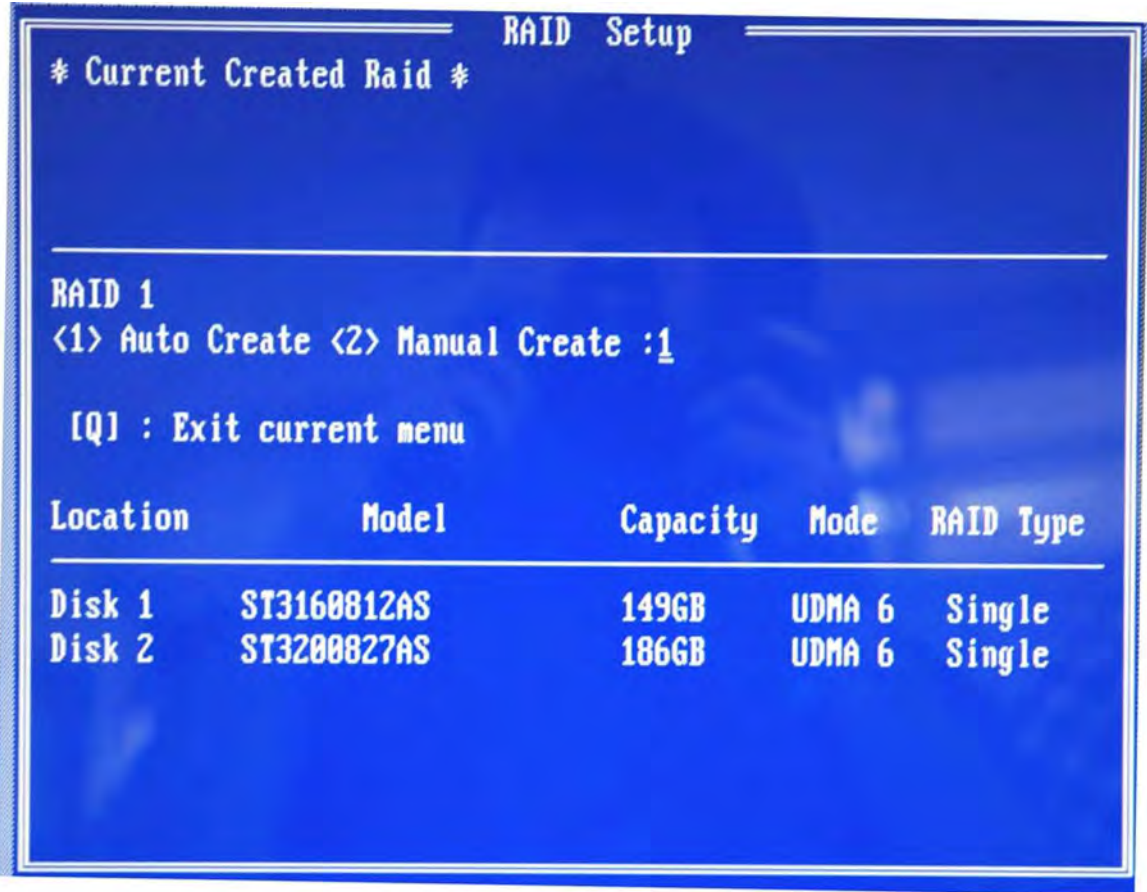


Figure D-7: Select "Auto"

Step 7: You will then be prompted to **Auto Create** or **Manual Create**. Select **Auto Create** (see Figure D-8).

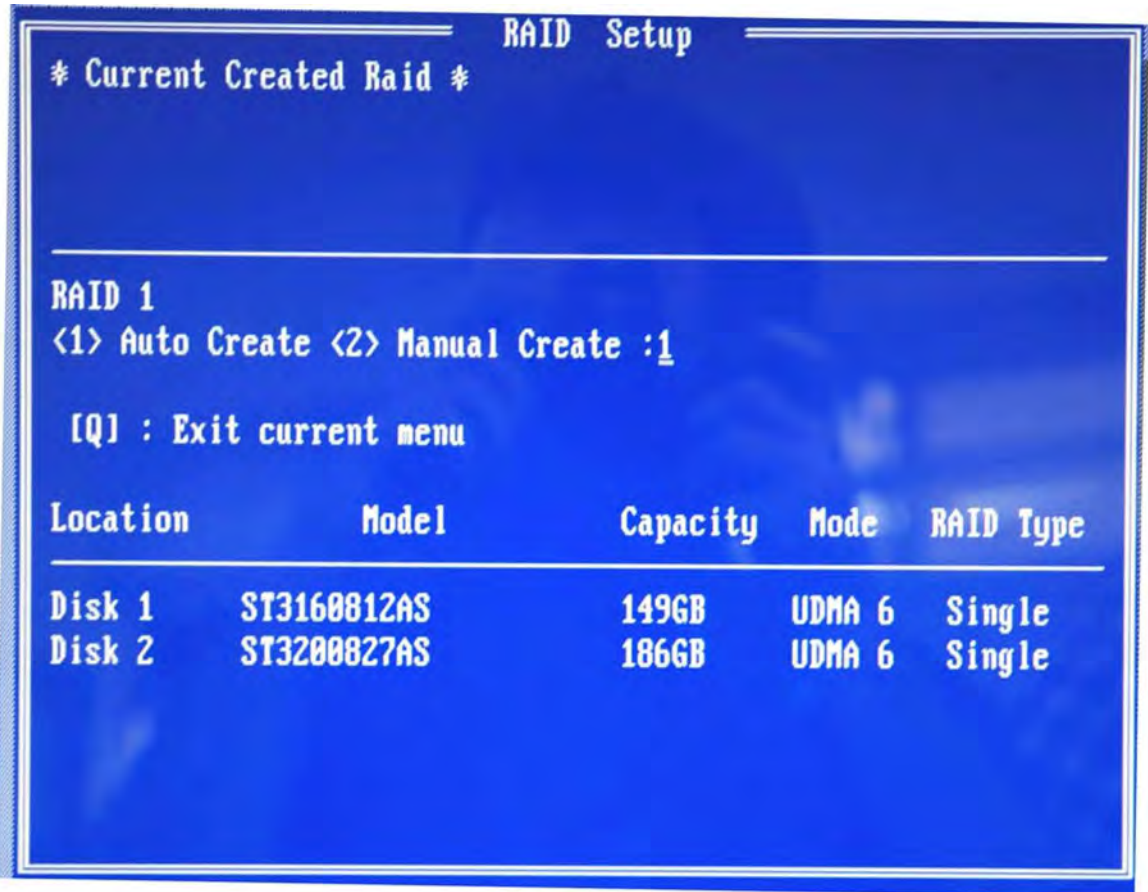


Figure D-8: Select “Auto”

- Step 8: You will then be asked to **Auto create** or **manual create**. Select **Auto create**.
- Step 9: After the RAID configuration is complete, save your change and exit the RAID configuration utility. **Step 0:**

D.2.6 Install the OS

Now you will 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 your IDE device.
- Step 2: Restart the system.
- Step 3: You will be prompted to press “**F6**” to install the RAID controller device. You will then be prompted to press “**F2**” to continue the installation.
- Step 4: You will receive a message informing you that the OS is unable to determine the

mass storage device installed on your system. At this point, insert the FDD with the copied RAID driver files into the FDD drive. The OS will access the SATA drives through this disk.

- Step 5:** Next, select the driver for the OS you are busy installing into the system. Once selected, press Enter.
- Step 6:** The OS will start to be installed into the system with the RAID drivers and the SATA drives will be configured as RAID drives as stipulated in the above selection.
- Step 7:** The OS will continue 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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