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# User's Manual

## Single Board Computer 3301530

Version 1.0, April 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 | Shift Keyed Infrared |
| ATA | Advanced Technology Attachments |
| BIOS | Basic Input/Output System |
| CFII | Compact Flash 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 |
| 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 |
| VGA | Video Graphics Adapter |

Chapter

1

# Introduction

## 1.1 3301530 CPU Board Overview

The PICMG 1.0 form factor 3301530 LGA775 Pentium 4 CPU platform is fully equipped with a high performance processor and advanced multi-mode I/Os. The 3301530 is designed for system manufacturers, integrators, and VARs that want performance, reliability, and quality at a reasonable price.

### 1.1.1 3301530 CPU Board Applications

The 3301530 CPU board has been designed for use in industrial applications where board expansion is critical and operational reliability is essential.

### 1.1.2 3301530 CPU Board Benefits

Some of the 3301530 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 3301530 CPU Board Features

Some of the 3301530 CPU board features are listed below:

* Complies with PICMG 1.0
* Complies with RoHS
* Supports LGA775 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 3301530 CPU Board Overview

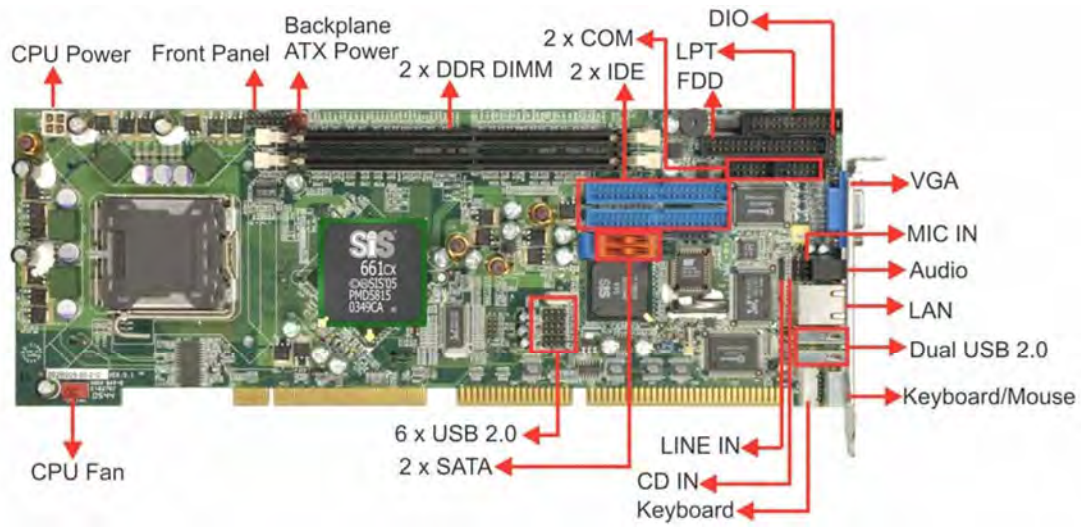


**Figure 1-1: 3301530 CPU Board Overview**

### 1.2.1 3301530 CPU Board Connectors

The 3301530 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 3301530 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

3301530 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<br>Intel® Celeron® D |
| Chipsets | Northbridge: SIS 661CX<br>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: 0ºC (32°F)**<br>**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

# Detailed Specifications

## 2.1 Compatible GAI Backplanes

The 3301530 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 3301530 CPU board.

| Mfg. | Model | Max. Speed | L2 Cache | Max. FSB | Socket |
|---|---|---|---|---|---|
| Intel® | Pentium® 4 (P4) Prescott | 3.80GHz | 2MB | 800MHz | LGA 775 |
| Intel® | Celeron D | 3.33GHz | 256KB | 533MHz | LGA 775 |

**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 LGA 775 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.

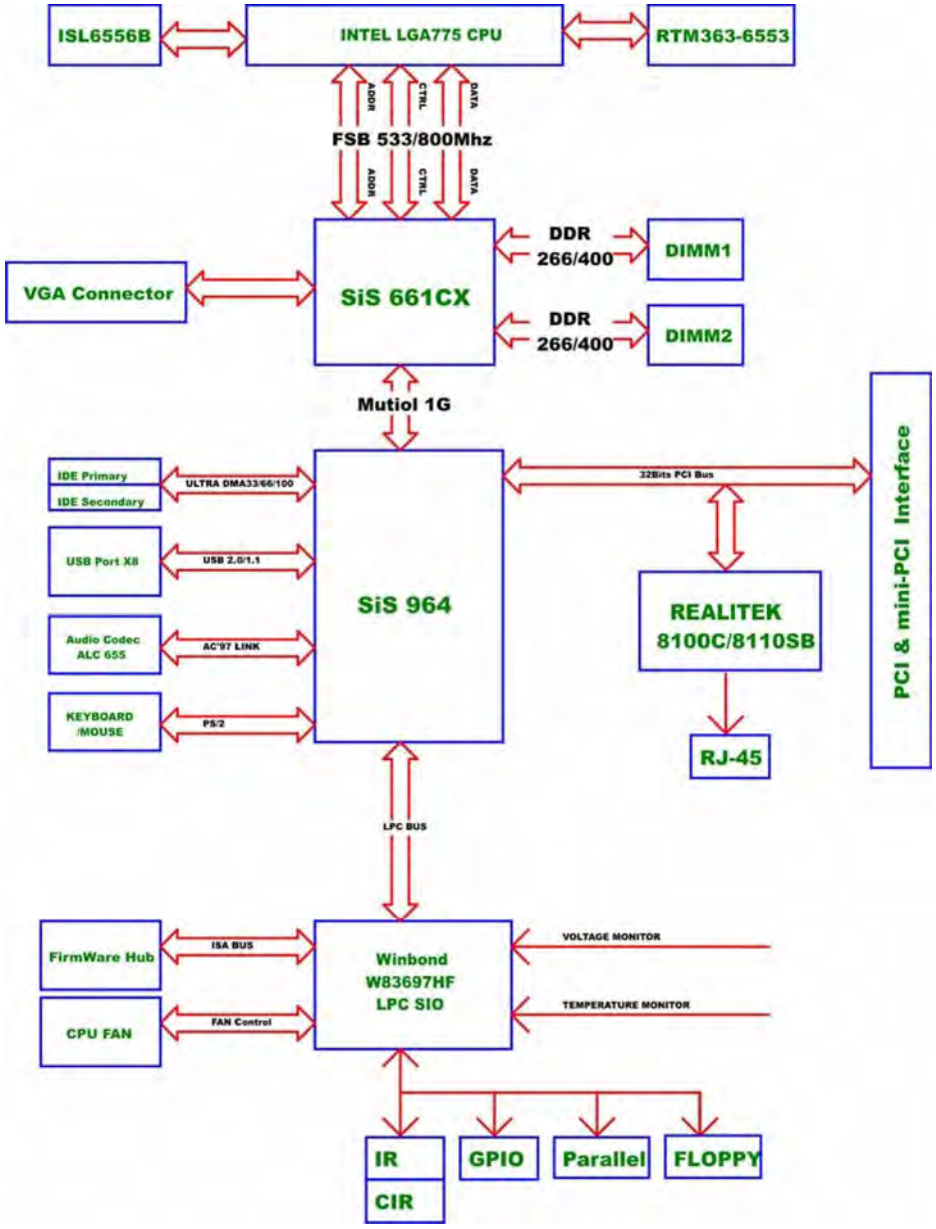


**Figure 2-1: Data Flow Block Diagram**

## 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-AGPII™ Technology w/ up to 3.2GB/s Data Transfer Rate**
  - Successor of Ultra-AGPII™ 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 3301530 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 3301530 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 3301530 can support the following drive interfaces.

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

### 2.9.1 SATA Drives

The 3301530 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 3301530 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 3301530 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 3301530 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 3301530 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)

**[PKS1]:** Check this

## 2.13 Infrared Data Association (IrDA) Interface

The 3301530 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 3301530 CPU board has eight USB interfaces, six internal and two external. The USB interfaces support USB 2.0.

## 2.15 BIOS

The 3301530 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 (**P**re-Boot E**x**ecution **E**nvironment ) support

* USB booting support

## 2.16 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the 3301530 CPU Board are listed below.

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

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

## 2.17 Audio Codec

The 3301530 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 3301530 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 3301530 CPU board you should find the following components.

* 1 x 3301530 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/ PS2 mouse Y cable
* 1 X RS-232 cable
* 1 x USB cable (P/N: 1207793)
* 1 x Utility CD
* 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: 1007750)
* CPU Cooler (P/N: 2107965)
* FDD cable (P/N: 1207764)
* 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 3.1.2**.

### 3.1.1 3301530 CPU Board Layout

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

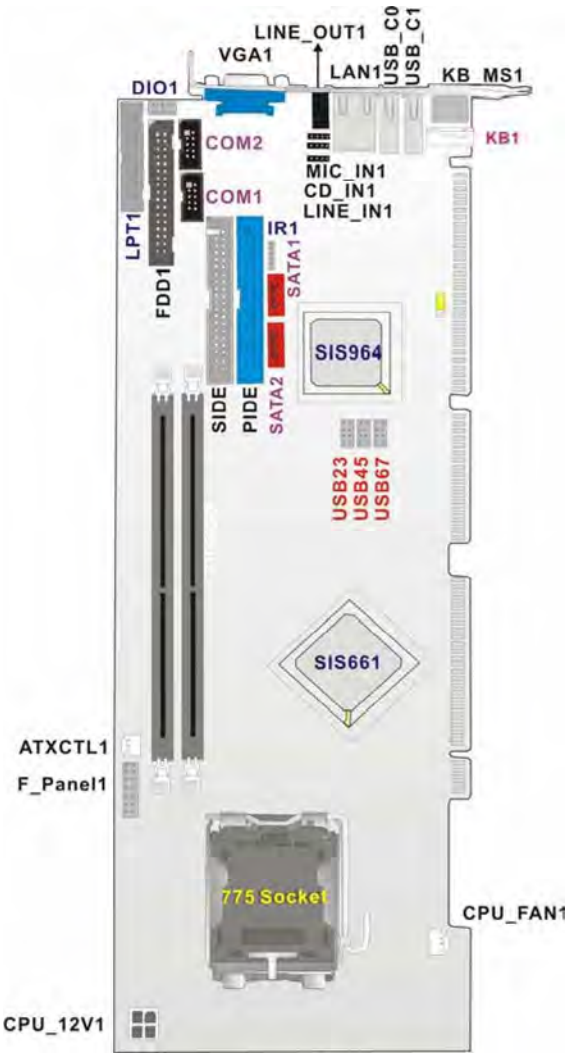


**Figure 3-1: Connector and Jumper Locations**

### 3.1.2 Peripheral Interface Connectors

**Table 3-1** shows a list of the peripheral interface connectors on the 3301530 CPU board. Detailed descriptions of these connectors can be found in **Section 3.2** on **page 36**.

| 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 3301530 CPU card. Detailed descriptions of these connectors can be found in Section 3.3 on page 52.

| 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 55**.

| 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 3301530 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 3301530 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**

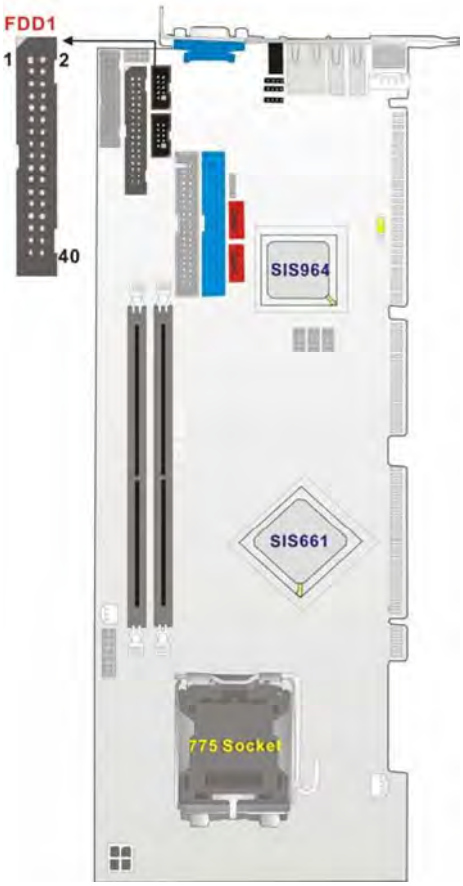


**Figure 3-2: FDD Connector Location**

### 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 | PIN NO. | 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**

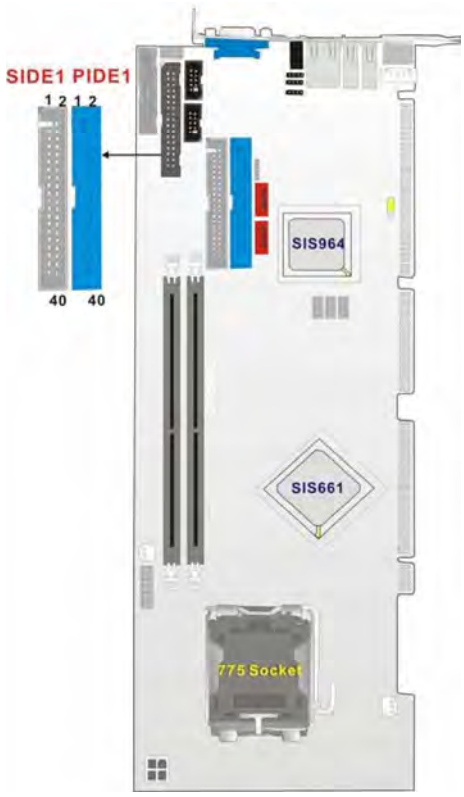


**Figure 3-3: IDE Connector Location**

### 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 3301530 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 | 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**

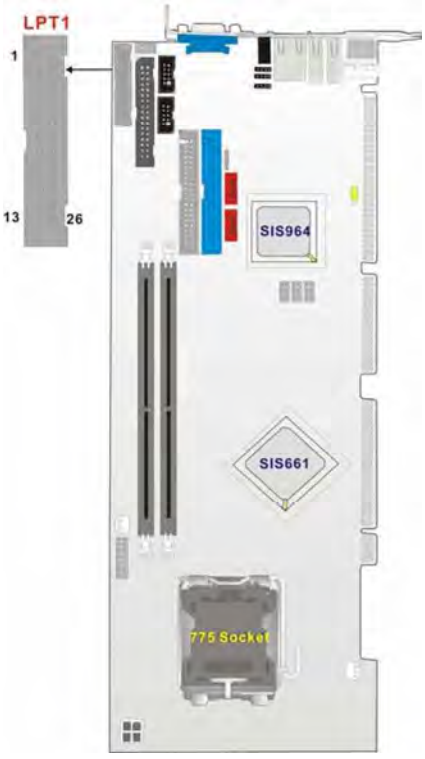


**Figure 3-5: LPT Connector Location**

### 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 | 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**

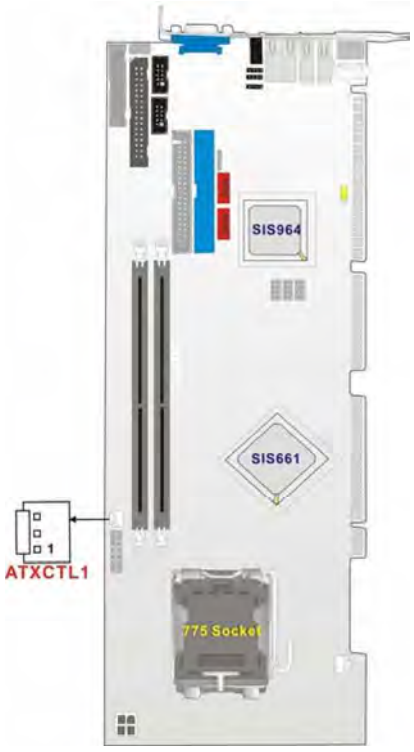


**Figure 3-8: ATXCTL1 Connector Locations**

### 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 | 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**

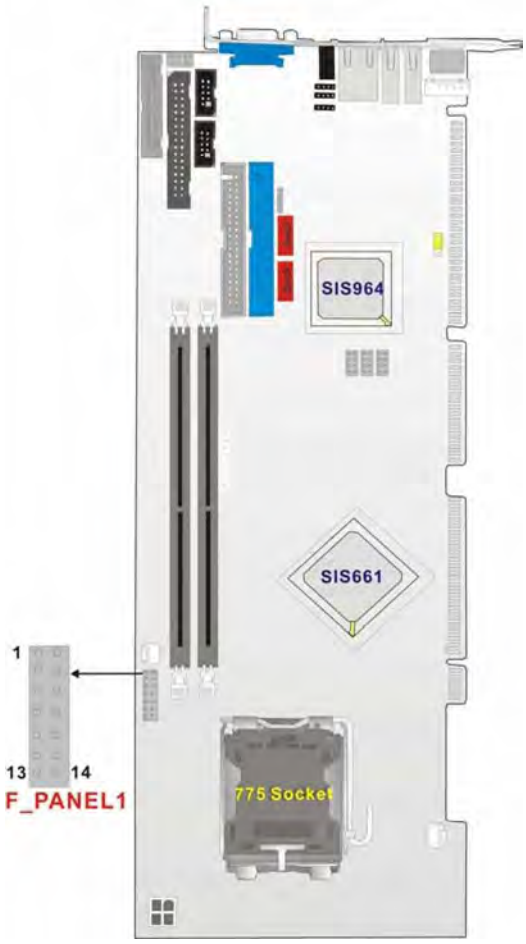


**Figure 3-9: System Panel Connector Location**

### 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.

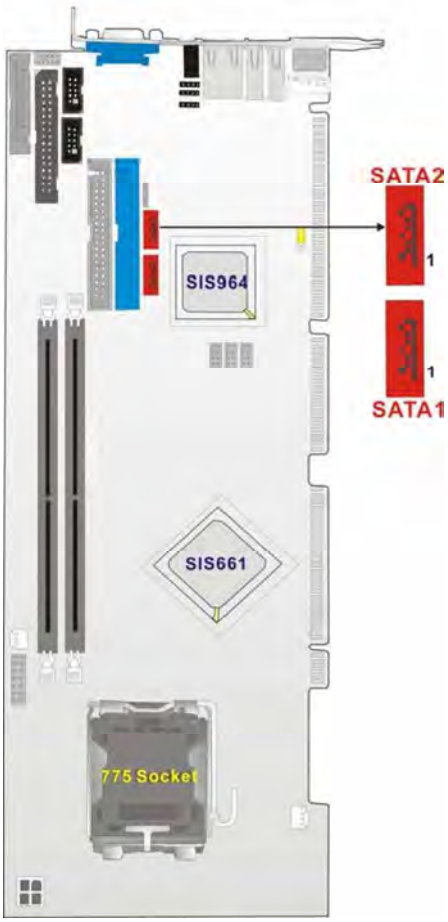


**Figure 3-11: SATA Connector Locations**

**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 3301530 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

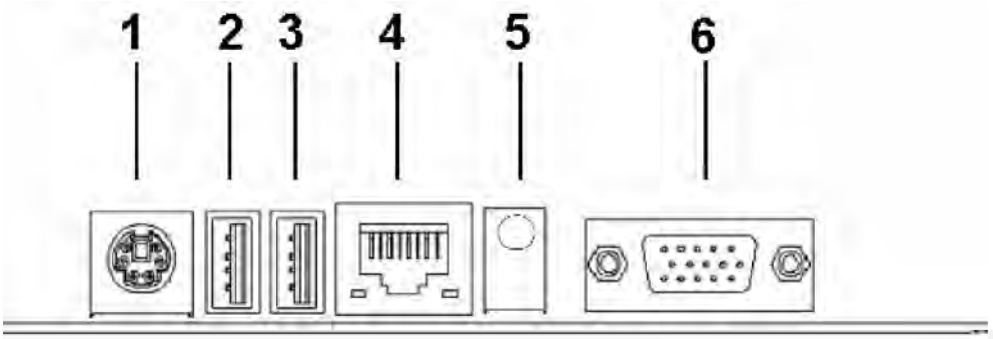


**Figure 3-14: 3301530 CPU Board Rear Panel**

### 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 | DESCRIPTION |
|---|---|---|---|
| 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.

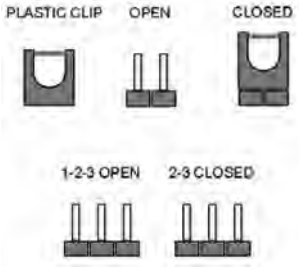


**Figure 1**-3-17 **Jumper**

The 3301530 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

# 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 3301530 CPU Board, please **do** the following:

* **Read the user manual**
  - The user manual provides a complete description of the 3301530 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 3301530 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 3301530 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 3301530 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 3301530 CPU card, you must unpack the CPU card. Some components on 3301530 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 3301530 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 3301530 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 3301530 , please make sure that your package contains the following items.

* 1 x 3301530 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 3301530 CPU card from and do not proceed any further with the installation.

## 4.3 3301530 CPU Card Installation

**WARNING!**

1. Never run the CPU board without an appropriate heatsink and cooler that can be ordered from GAI 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

#### 4.3.1.1 CPU Selection: HT Functionality Requirements

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

* CPU: An Intel® Pentium 4 Processor with HT Technology must be installed
* Chipset: A chipset that supports HT Technology (that has been met by the 3301530)
* OS: An operating system that has optimizations for HT Technology

#### 4.3.1.2 CPU Installation

**WARNING:**

CPUs are expensive and sensitive components. When you install the CPU 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.

The LGA775 socket is shown in Figure 4-1.

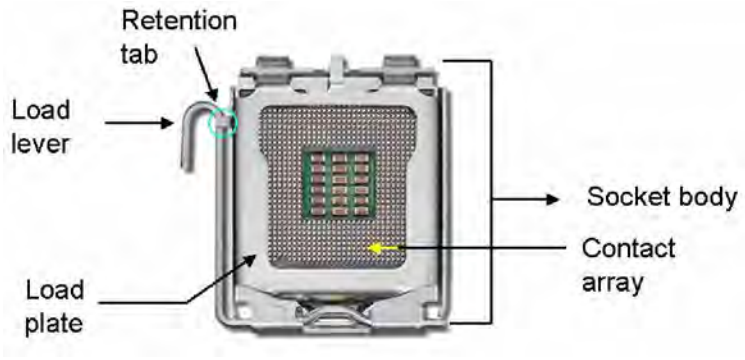


**Figure 4-1: Intel LGA775 Socket**

To install Intel LGA775 socket CPU onto your CPU Card, follow the steps below:

**Step 1:** **Remove the protective cover.** Remove the black protective cover by prying it off the load plate. The protective cover is used to protect the delicate pins on the LGA775 socket. To remove the protective cover, locate the "**REMOVE**" sign and use your fingernail to pry the protective cover off. (See **Figure 4-2**)

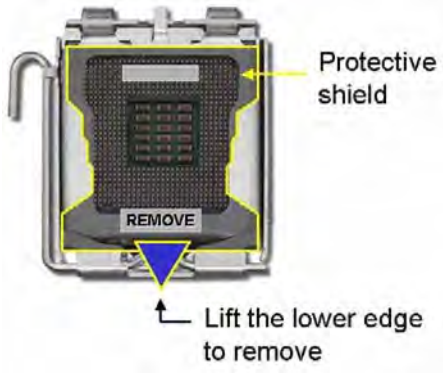


**Figure 4-2: Remove the CPU Socket Protective Shield**

**Step 2:** **Open the socket**. To open the socket, disengage the load lever by pressing the lever down and slightly outward to clear the retention tab. Rotate the load lever to a fully open position. Then rotate the load plate towards the opposite direction. (See **Figure 4-3**)

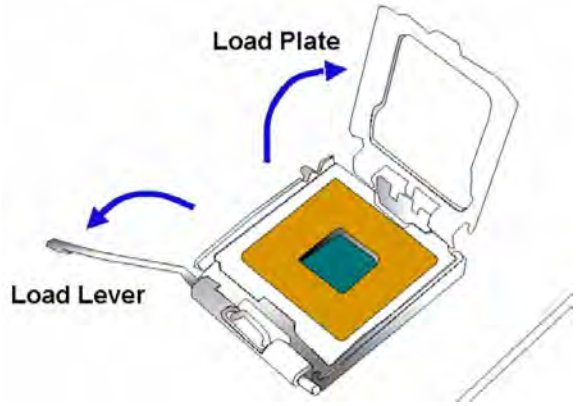


**Figure 4-3: Open the CPU Socket Load Plate**

**Step 3:** **Inspect the CPU and the socket**. Make sure that the pins on the CPU are not bent. Also make sure socket contacts are free of foreign material. If you see any debris in the socket remove it using compressed air.

**Step 4:** **Insert the 775-pin CPU**. To insert the CPU refer to **Figure 4-4** and follow the five steps below.

1. Hold the CPU by the LGA edges marked by back lines.
2. Orient the CPU with the IHS (Integrated Heat Sink) side facing upward.
3. Locate pin 1 and the two orientation notches on the CPU.
4. Carefully match the two orientation notches on the CPU with the alignment keys of the socket.
5. Carefully place the CPU into the socket with a gentle and vertical motion.
0.

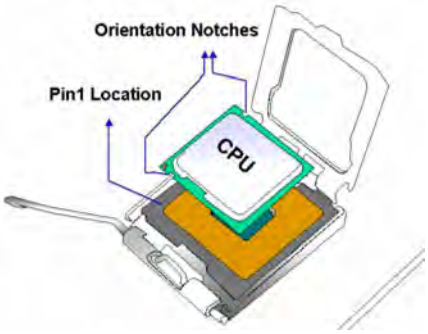


**Figure 4-4: Insert the CPU**

**Step 5:** **Close the CPU socket.** Close the load plate and engage the load lever by pushing it back to its original position. Secure the load lever under the retention tab on the side of CPU socket.

**Step 6:** **After the cooling kit is installed** (see **Section 4.3.2**), connect the CPU cable to the CPU 12V power connector.**Step 0:**

### 4.3.2 Cooling Kit (2107695) Installation

**WARNING:**

**It is strongly recommended that you DO NOT use the original heatsink and cooler provided by Intel on the 3301530.**

The CPU board is vertically mounted on a horizontal backplane, and Intel's heatsink does not come with a support bracket on the soldering side, the PCB may be bent by the weight of the cooling kit.

Cooling kit includes a support bracket that is combined with the heatsink mounted on the CPU to counterweigh and balance the load on both sides of the PCB.

**Figure 4-5: Cooling Kit**

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

**CAUTION:**

The heatsink has a layer of thermal paste sprayed on the lower surface. Do not accidentally wipe the thermal paste away when you unpack or install the heatsink. Thermal paste between the CPU and the heatsink is important for optimal heat dissipation.

To install the cooling kit, follow the instructions below.

**Step 1:** Place the heatsink onto the socket. Make sure that the CPU cable can be properly routed when the heatsink is installed.

**Step 2:** Align the heatsink so that its fourspring screw fasteners can pass through the pre-drilled holes on the PCB.

**Step 3:** From the other side of the PCB, align the support bracket to the screw threads on heatsink that were inserted through the PCB holes.

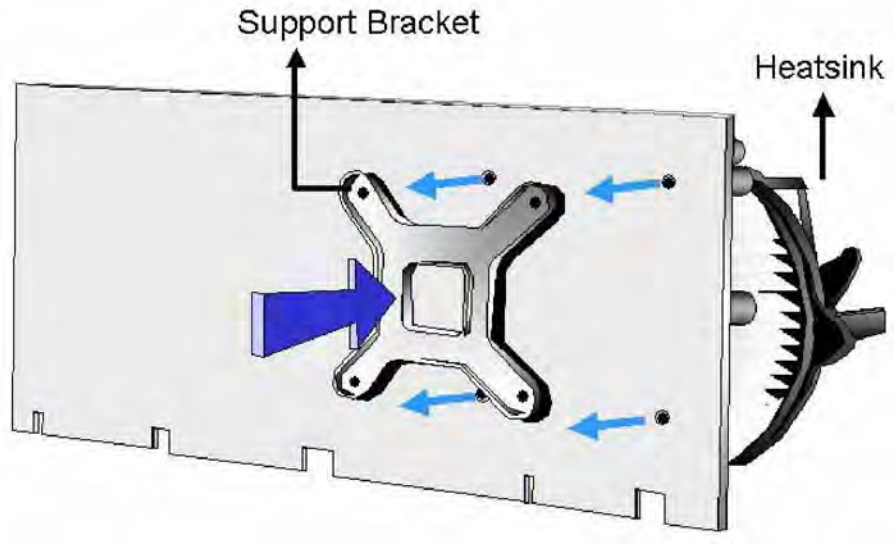


**Figure 4-6: Securing the heatsink to the PCB board**

**Step 4:** Use the screwdriver to tighten the four screws. Tighten each nut a few turns at a time and do not over-tighten the screws.

**Step 5:** Connect the fan cable on the cooler fan to the CPU fan connector on the CPU card. Make sure the fan cable does not touch any heat generating chips and fan blades. **Step 0:**

### 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 3301530 CPU Board has two DDR SDRAM DIMM sockets. To install the DIMM modules, follow the instructions below.

**Step 1:** Pull the two white handles on either side of the DIMM socket down.

**Step 2:** Align the DIMM module with the DIMM socket making sure the matching pins are correctly aligned.

**Step 3:** 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 | 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**

#### 4.3.4.1 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:**

**[PS2]:** Be consistent in your procedure numbering. Earlier it was step 1,step 2…etc. Now it is1, 2,…

## 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 configure, 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 B-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-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 3301530 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

The driver installation has been described in **Chapter 6**, **Section 6.3**.

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.

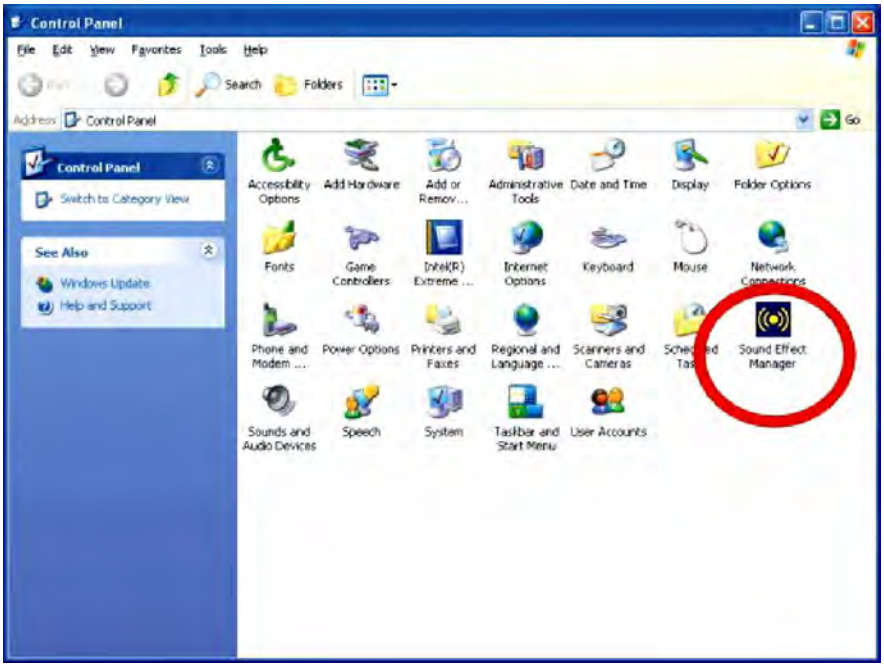


**Figure C-1: Sound Effect Manager Icon**

## 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**).

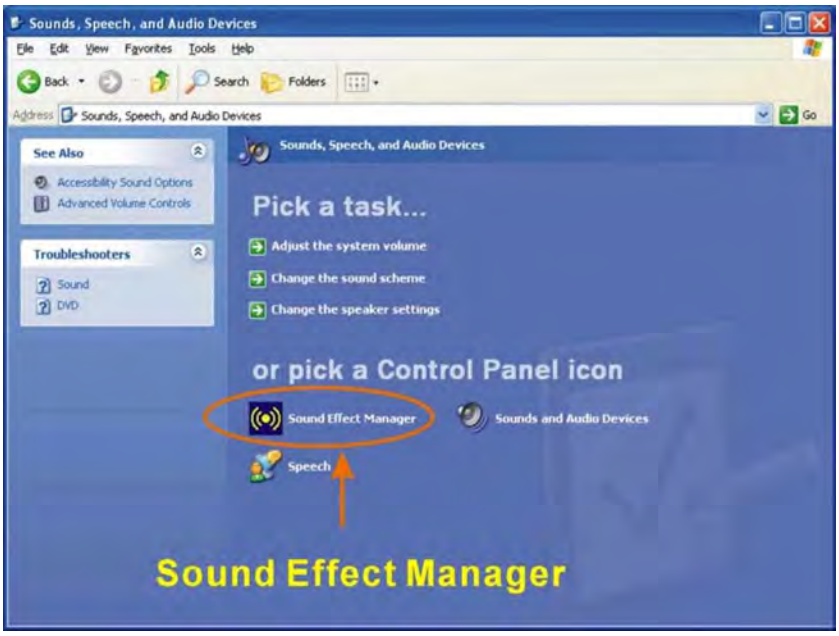


**Figure C-2: Sound Effect Manager Icon [Control Panel]**


**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**)

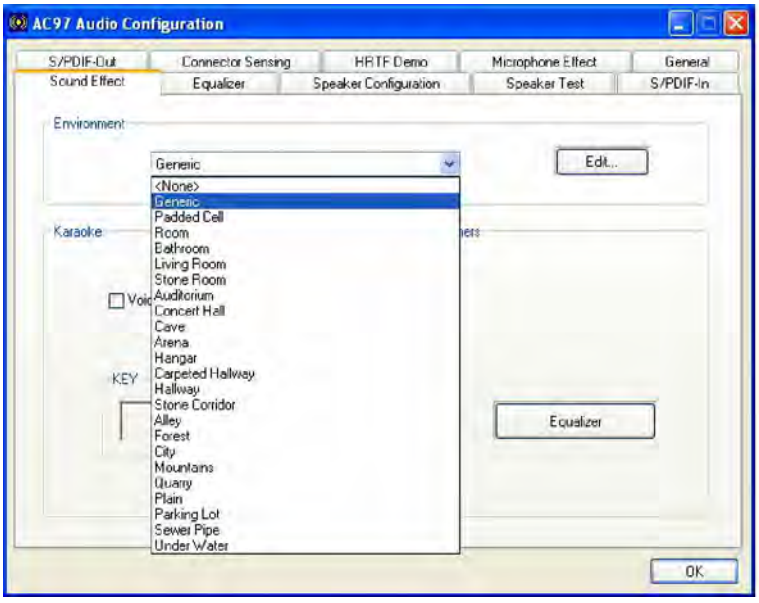


**Figure C-4: Setting Sound Effects**

## 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.

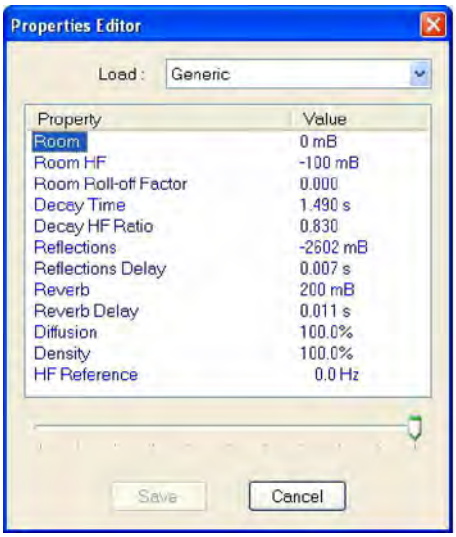


**Figure C-5: Sound Effects Properties Editor**

## C.6 Karaoke Mode

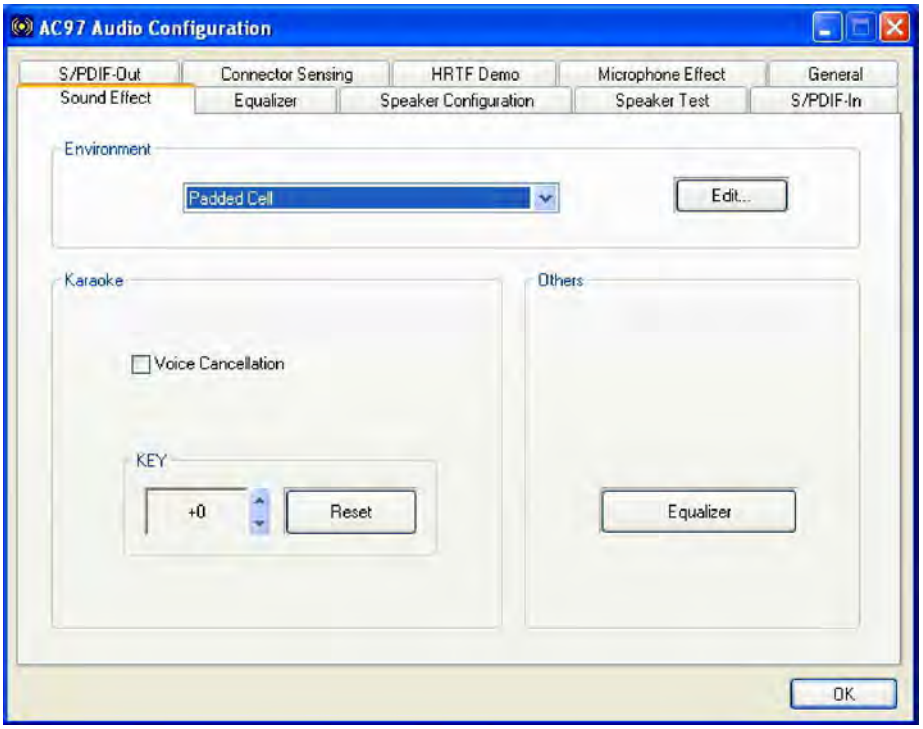


**Figure C-6: Karaoke Mode**

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

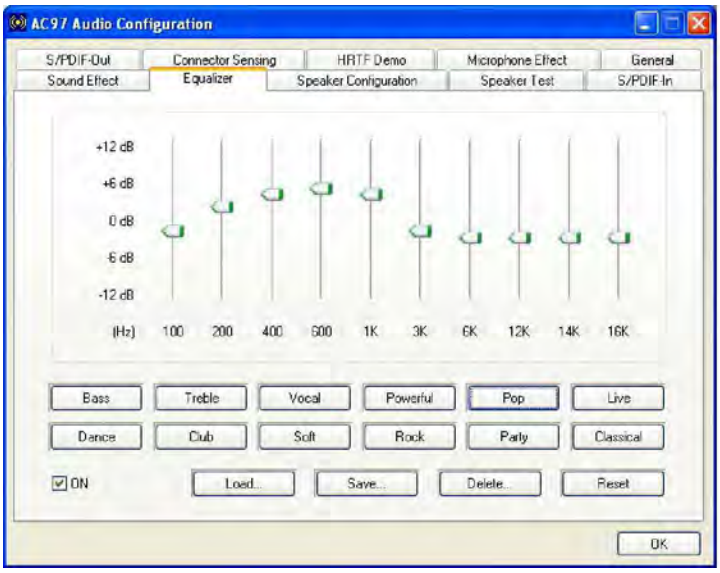


**Figure C-7: Equalizer Settings**

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

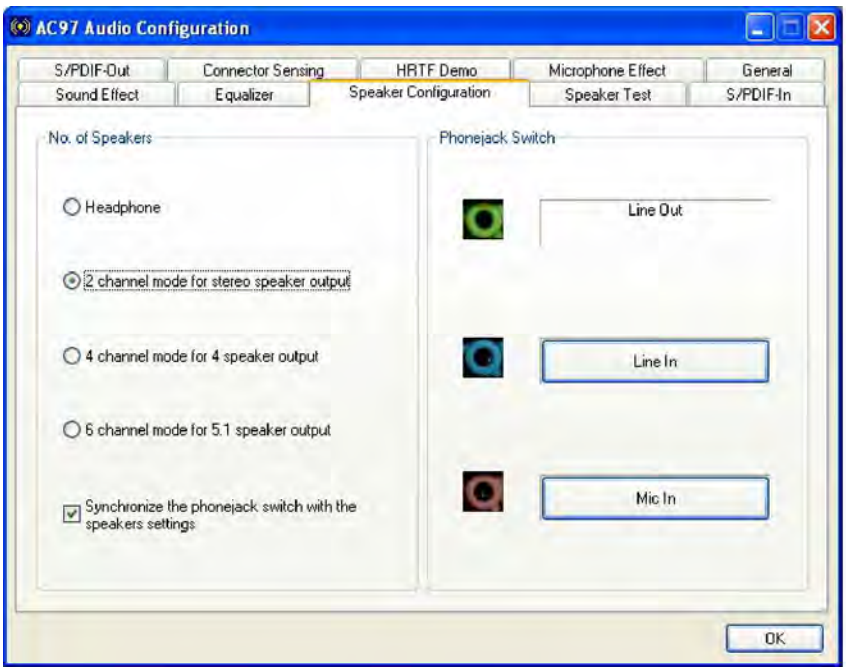


**Figure C-8: Speaker Configuration**

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

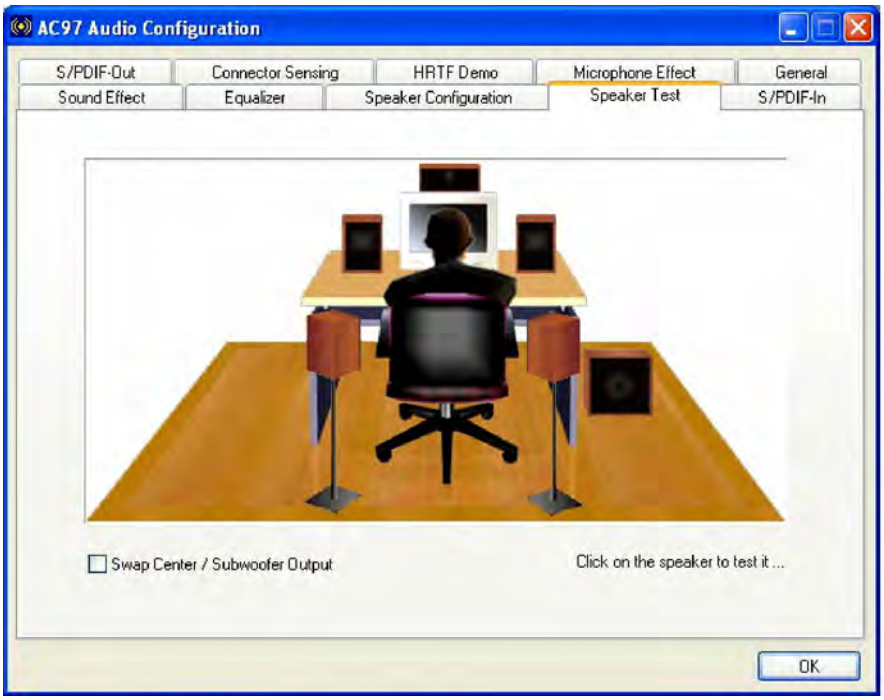


**Figure C-9: Audio Configuration**

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.

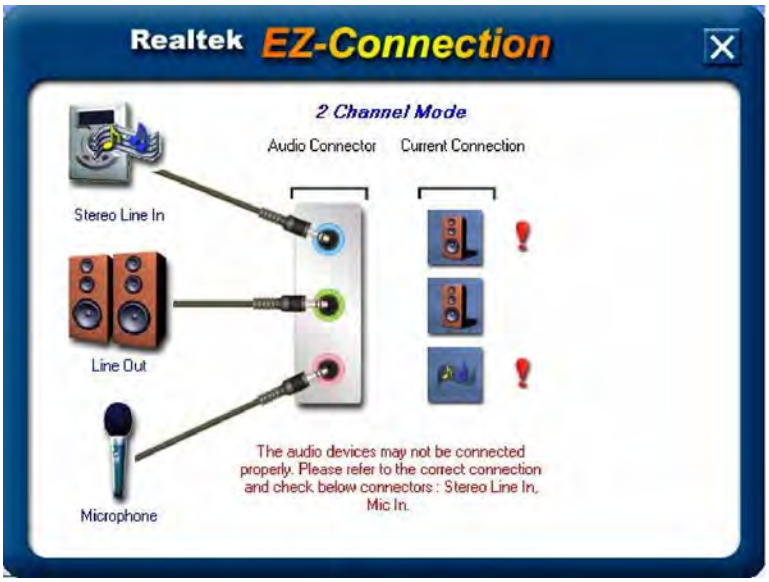


**Figure C-11: EX Connection**

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

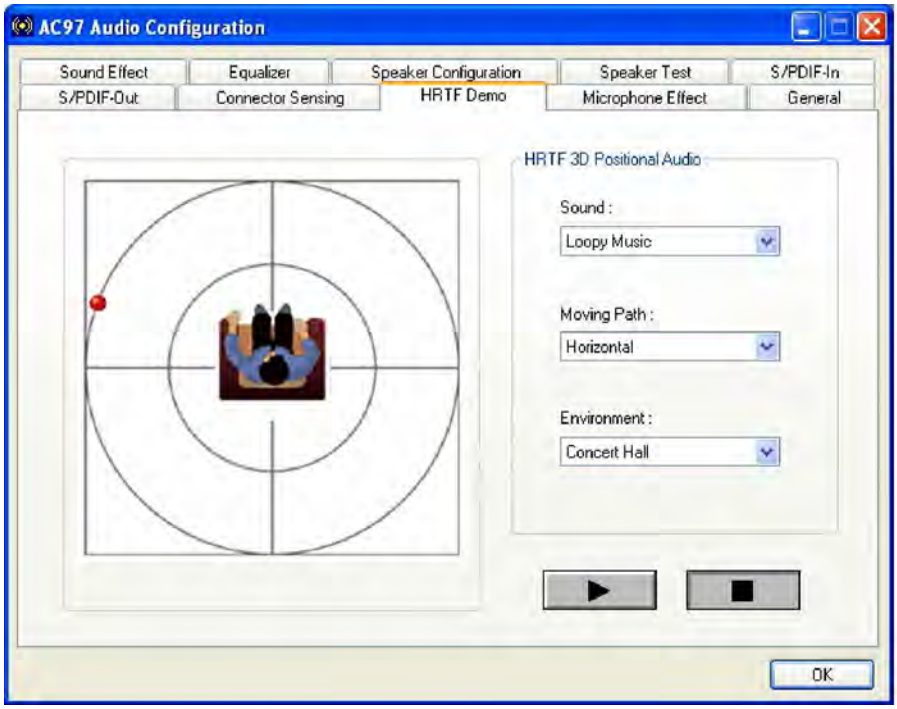


**Figure C-13: HRTF Demo**

The HRTF window in **Figure D-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.

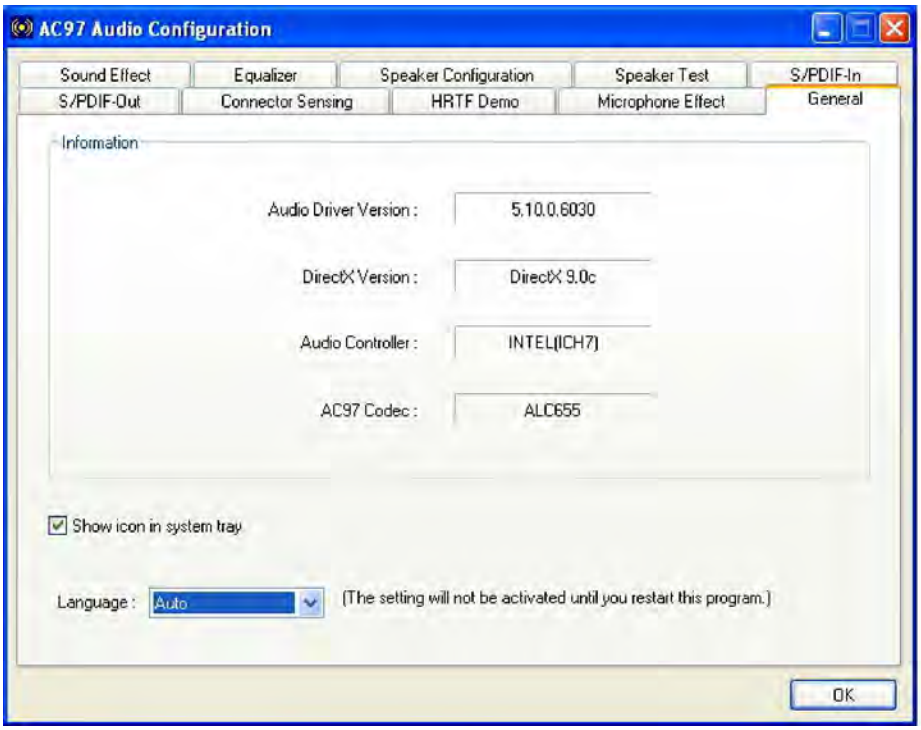


**Figure C-14: General**

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

### 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 (see **Section 5.3.2** on **BIOS IDE Configuration** on page 82).

**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 E-4**).

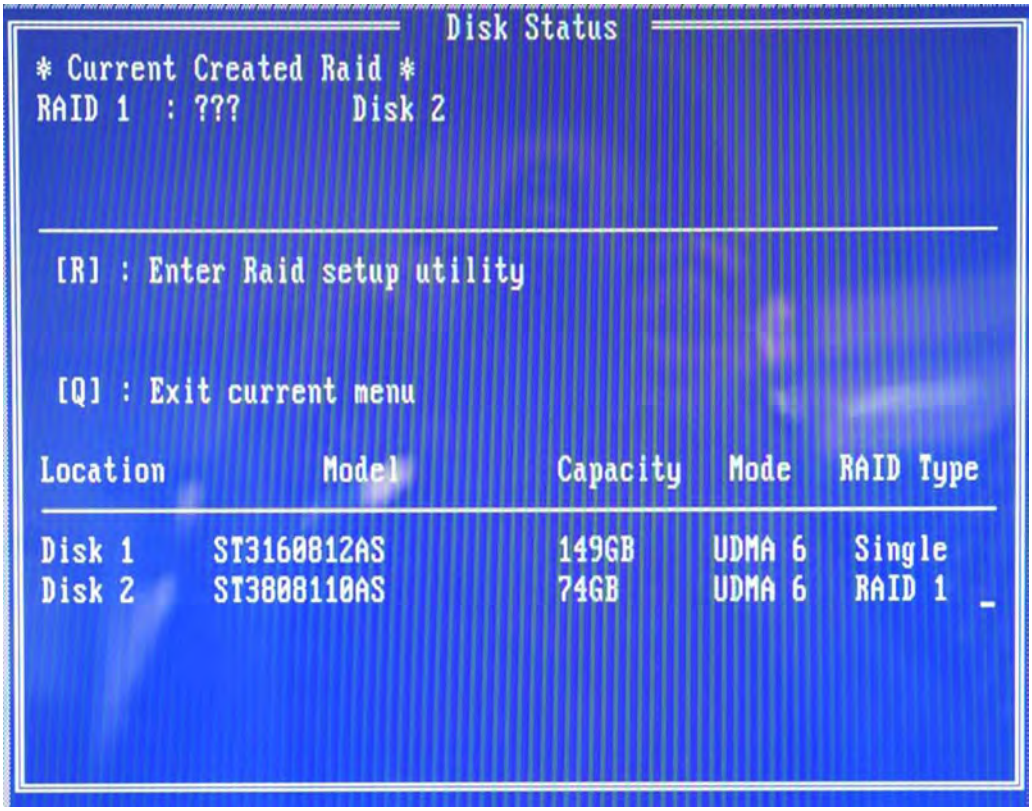


**Figure D-4: BIOS RAID Utility**

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

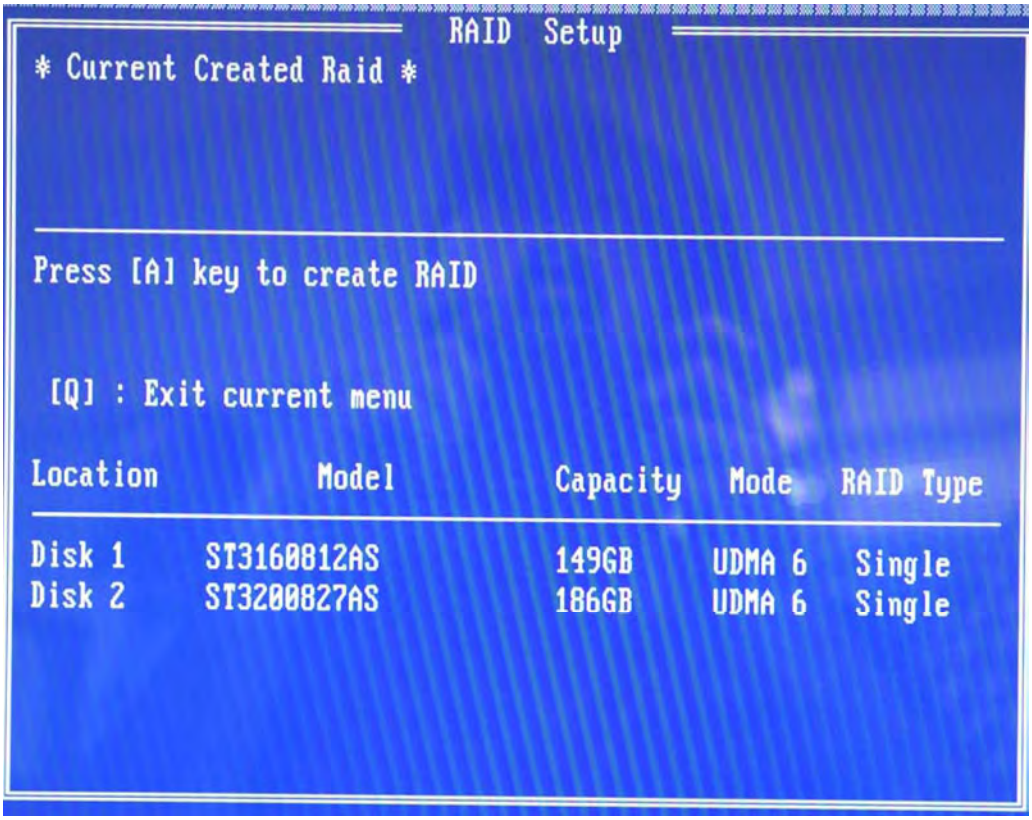


**Figure D-5: Create RAID**

**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**).

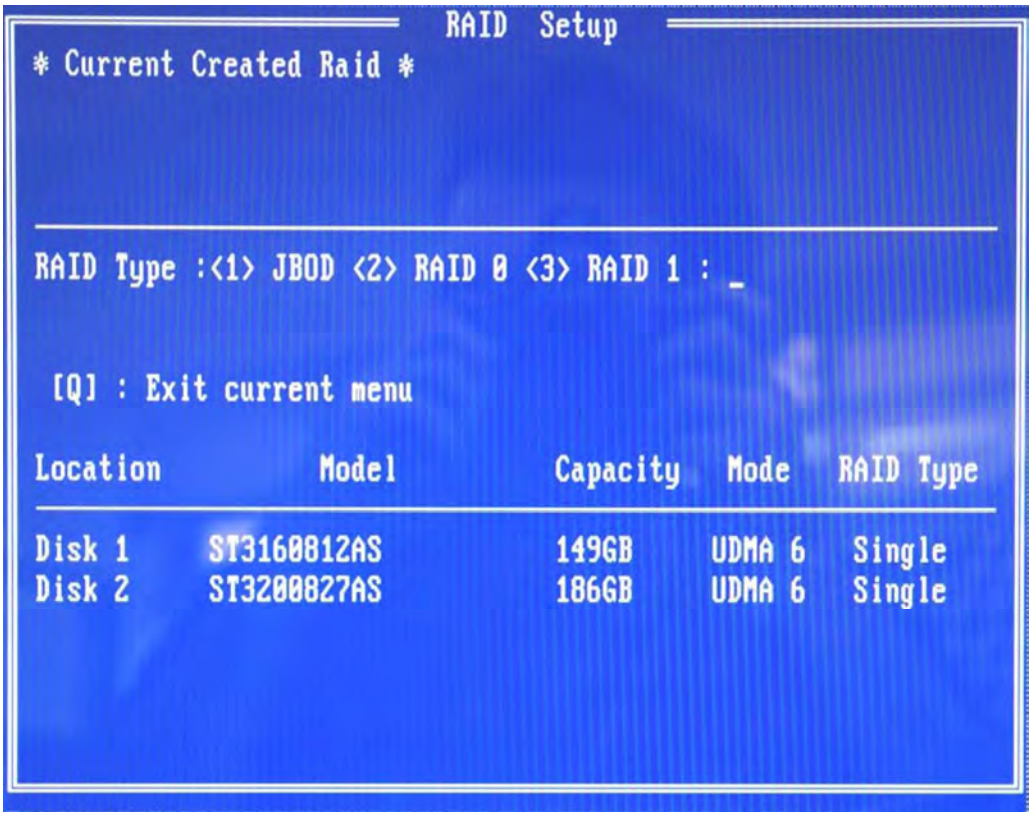


**Figure D-6: Create RAID**

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

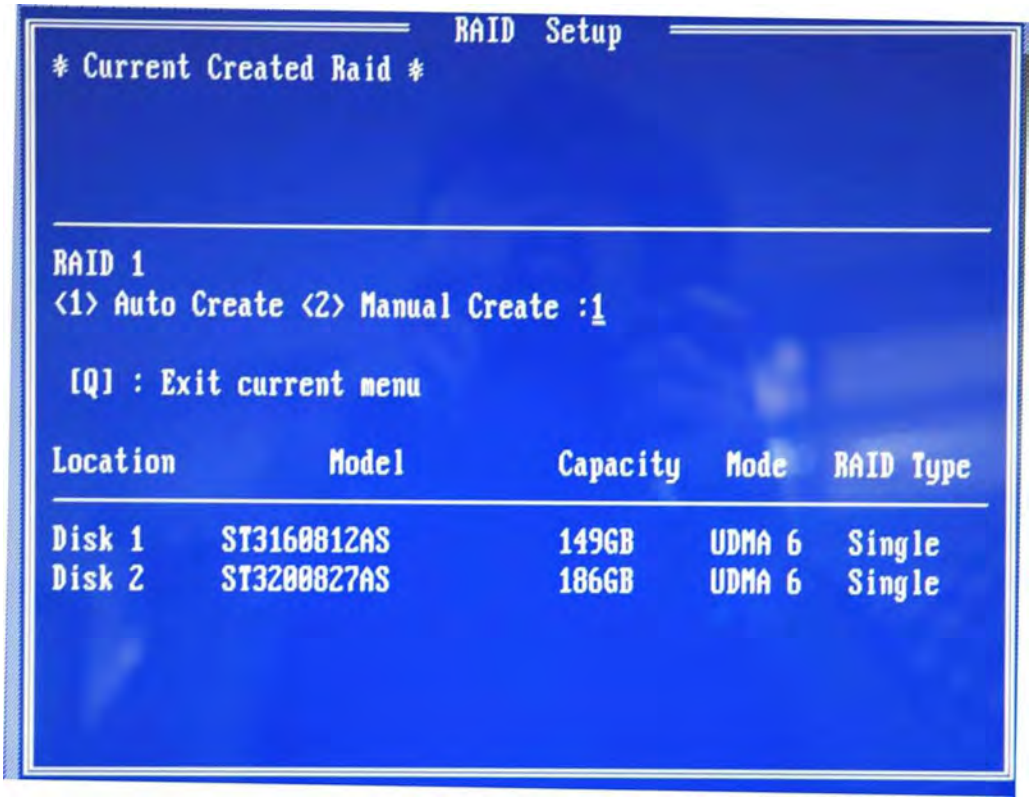


**Figure D-7: Select "Auto"**

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

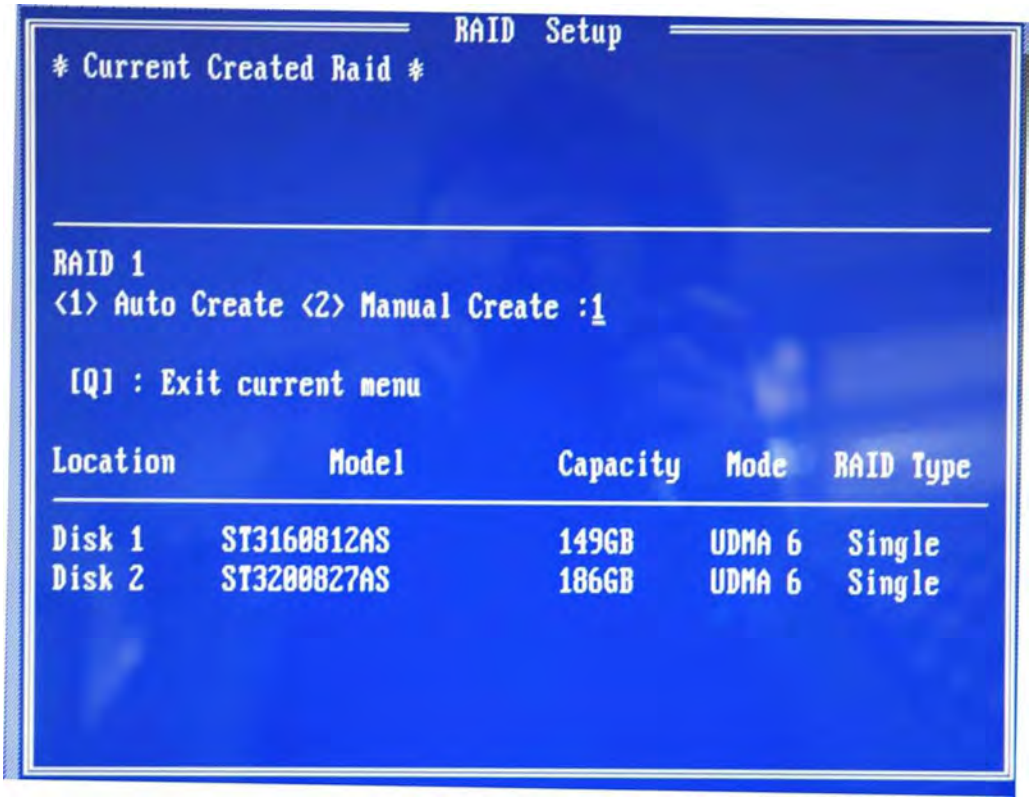


**Figure D-8: Select "Auto"**

**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.


Address: Global American, Inc.
17 Hampshire Drive
Hudson, NH 03051

Telephone: Toll Free U.S. Only (800) 833-8999
(603) 886-3900

FAX: (603) 886-4545

Website: http://www.globalamericaninc.com

Support: Technical Support at Global American