User's Manual

3302160

Version 1.0

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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   3302160 Overview

The EPIC form factor 3302160 socket 479 Pentium M and Celeron M CPU platform is fully equipped with advanced multi-mode I/Os. The 3302160 is designed for system manufacturers, integrators, and VARs that want performance, reliability, and quality at a reasonable price.

1.1.1 3302160 Applications

The 3302160 is designed for applications in the following areas:

- ƒ   Industrial PC applications
- ƒ   Human Machine Interface (HMI) applications
- ƒ   Marine, GPS and transportation applications
- ƒ   Financial, retail and kiosk applications

1.1.2 3302160 Benefits

Some of the 3302160 benefits include:

- ƒ   Low power, high performance
- ƒ   Flexible internal graphics features including
  - o   Advanced hardware acceleration for DVD playback
  - o   Dual link LVDS for WUXGA and NTSC/PAL TV function
  - o   Bi-linear scaling to scale VGA low resolution mode
- ƒ   Multiple storage option integration including
  - o   40 Pin IFM or 3.5" HDD
  - o   44 Pin IFM or 2.5" HDD
  - o   Dual SATA ports with RAID 0 and RAID 1 support
  - o   Optional CFII support
  - o   Optional floppy disk drive (FDD) support
- ƒ   Data security SATA RAID support

1.1.3 3302160 Features

Some of the 3302160 features are listed below:

- ƒ   Complies with EPIC form factor

- ƒ Complies with RoHS
- ƒ Supports socket 479 Intel® Pentium M CPUs
- ƒ Supports a maximum front side bus (FSB) speed up to 533MHz
- ƒ Supports up to 1GB of 333MHz or 400MHz of DDR memory
- ƒ Comes with a high performance gigabit Ethernet (GbE) controller
- ƒ Supports two SATA channels with transfer rates up to 150MB/s
- ƒ Supports six USB 2.0 devices

1.2   3302160 Board Overview
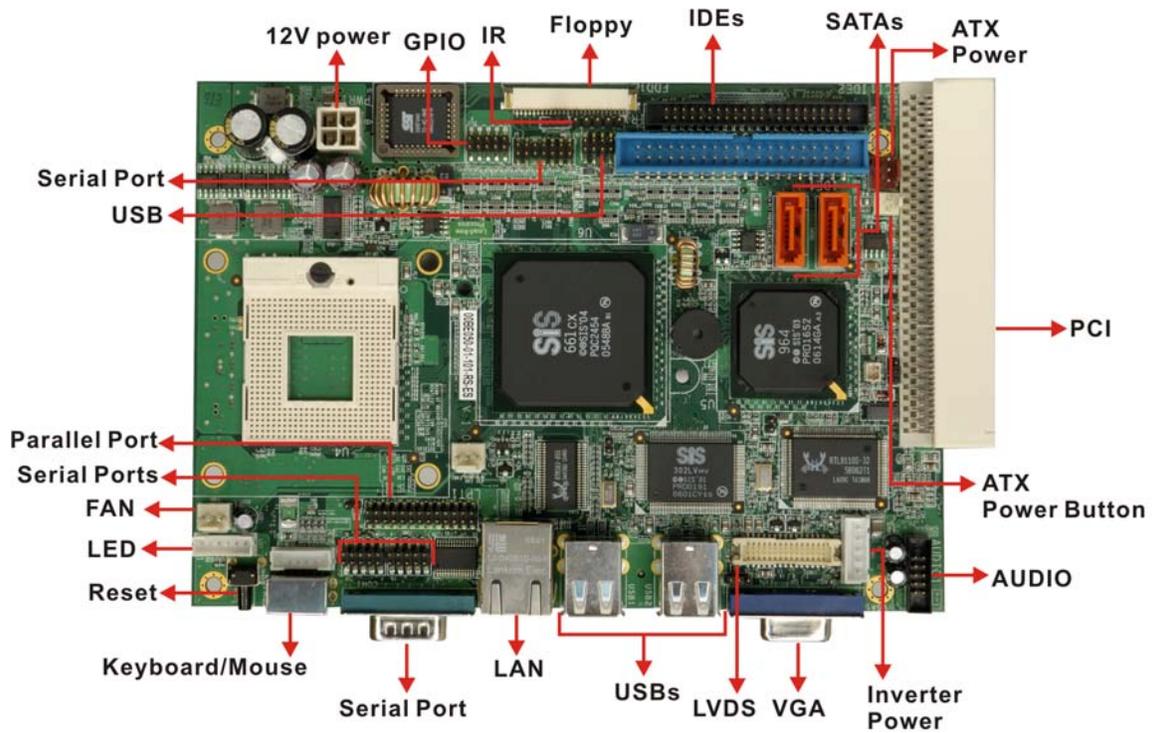
Figure 1-1: 3302160 Board Overview (Top View)
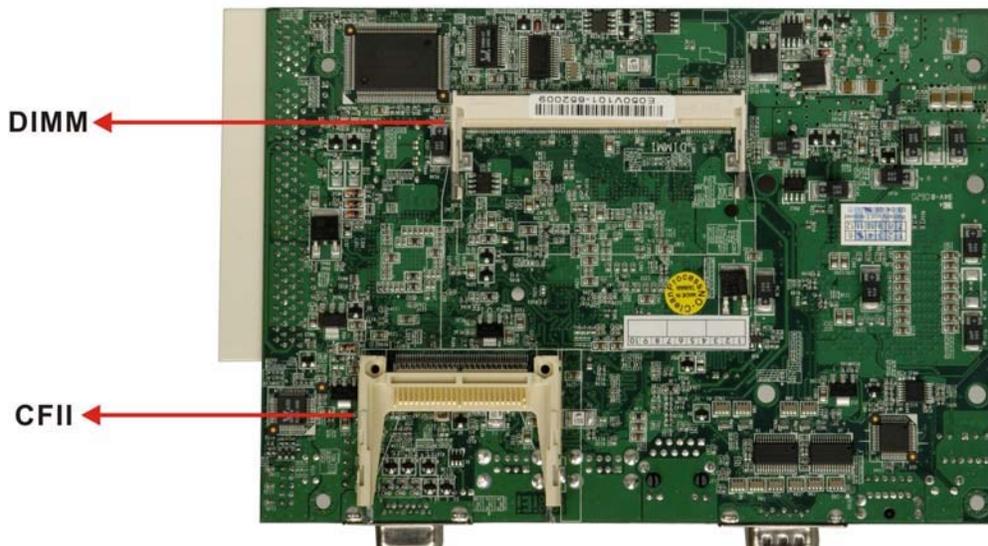
Figure 1-2: 3302160 Board Overview (Bottom View)

1.2.1 3302160 Connectors

The 3302160 has the following connectors onboard:

- ƒ 1 x 12V power connector
- ƒ 1 x ATX power button connector
- ƒ 1 x ATX power connector
- ƒ 1 x Audio connector
- ƒ 1 x Compact Flash (CF) connector (reverse side)
- ƒ 1 x DDR SODIMM slot
- ƒ 2 x Fan connectors
- ƒ 1 x Floppy disk connector
- ƒ 1 x GPIO connector
- ƒ 2 x IDE Interface connectors (40-pin and 44-pin)
- ƒ 1 x Inverter power connector
- ƒ 1 x IR interface connector
- ƒ 1 x Keyboard/mouse connector
- ƒ 1 x LCD LVDS interface Connector
- ƒ 1 x LED connector
- ƒ 1 x Parallel port connector
- ƒ 1 x PCI slot
- ƒ 2 x Serial port connectors
- ƒ 1 x RS-232/485 serial port connector
- ƒ 2 x Serial ATA connectors
- ƒ 1 x USB connector

The 3302160 has the following connectors on the board rear panel:

- ƒ 1 x CRT connector
- ƒ 1 x Ethernet connector
- ƒ 1 x PS/2 keyboard/mouse connector
- ƒ 1 x RS-232 serial port connector
- ƒ 4 x USB connectors

The 3302160 has the following onboard jumpers:

- ƒ Clear CMOS

ƒ   CPU FSB setting

ƒ   CPU frequency setting

ƒ   CF card setup

ƒ   LCD voltage setup

ƒ   COM2 setup (RS-232/422)

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

1.2.2 Technical Specifications

3302160 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® M** **Intel® Celeron® M**
Chipsets	**Northbridge: SIS 661CX** **Southbridge: SIS 964**
I/O Controller	**SIS 964**
Graphics Support	**SiS Mirage™ Graphic Engine**
Memory	**One DDR memory modules (Max. 1GB)**
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 133/100/66/33 devices**
Floppy Disk Drive (FDD)	**Supports FDD**
USB Interfaces	**Six USB 2.0 connectors supported**
Serial Ports	**Four 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	**185mm x 123mm (width x length)**
Operating Temperature	**Minimum: 0ºC (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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Detailed Specifications

2.1   CPU Support

Table-2-1 lists the CPUs supported by the 3302160 board.

CPU Type	Intel® Pentium® M / Intel® Celeron® M
Max. FSB	400 / 533 MHz
L2 Cache	512KB / 1MB / 2MB
CPU process	130nm / 90nm
Package	FCPGA

Table-2-1: Supported CPUs

2.2   Onboard Chipsets

2.2.1 Northbridge and Southbridge Chipsets

The following chipsets are preinstalled on the board:

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

The following two sections (**Section 2.2.2** and **Section 2.2.3**) 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.

2.2.2 SiS661CX Northbridge Chipset

The SiS661CX northbridge chipset comes with the following features:

- ƒ Host Interface
  - o 12 Outstanding Transactions support
  - o Quasi-Synchronous/Asynchronous Host/DRAM Timing support
  - o Supports 2M/4M/8M/16M TSEG SMRAM
  - o Supports Dynamic Bus Inversion.
- ƒ DRAM Controller
  - o DDR400/DDR333/DDR266 supported

- o Up to two un-buffered DIMMs DDR400 supported

- o Up to 1GB per DIMM with 512Mb tech.

- o Dynamic Clock Enable (CKE) control placing the Memory into Suspend to DRAM state.

- ƒ SiS MuTIOL® 1G Delivering 1GB/s Bandwidth

  - o Proprietary Interconnect between Northbridge and Southbridge

  - o Bi-Directional 16 bit Data Bus at 533MHz Operating Frequency

2.2.3 SiS964 Southbridge Chipset

The SiS964 southbridge chipset comes with the following features:

- ƒ SiS MuTIOL® 1G Delivering 1GB/s Bandwidth

  - o Proprietary Interconnect between SiS north bridge and SiS964 southbridge

  - o Bi-Directional 16 bit Data Bus at 533MHz Operating Frequency

- ƒ Integrated Serial Host Controller

  - o Provides 2 independent ports for SATA, compliant with Serial ATA 1.0 specification with transfer rate 150MB/s

  - o Supports RAID 0, 1 and JBOD

- ƒ USB 2.0/1.1 Host Controller

  - o One EHCI USB 2.0 controller

  - o Supports Total 8 USB 2.0 ports

  - o Supports USB 2.0 High-Speed Device @480 Mb/s transfer rates

- ƒ Fast Ethernet Controller with MII Interface

  - o Supports 10/100Mb Fast Ethernet with External PHY

- ƒ Supports six channels AC'97 Rev.2.3 Audio and V.90 Software Modem

- ƒ Advanced Power Management: ACPI 1.0b and APM 1.2 Compliant

- ƒ Dual IDE channels with ATA 133/100

- ƒ Supports up to six PCI Masters

- ƒ LPC 1.1 Interface

- ƒ Integrated Keyboard/PS2 Mouse Controller

2.3 Data Flow

Figure 2-1 shows the data flow between the two onboard chipsets and other components installed on the motherboard and described in the following sections of this chapter.
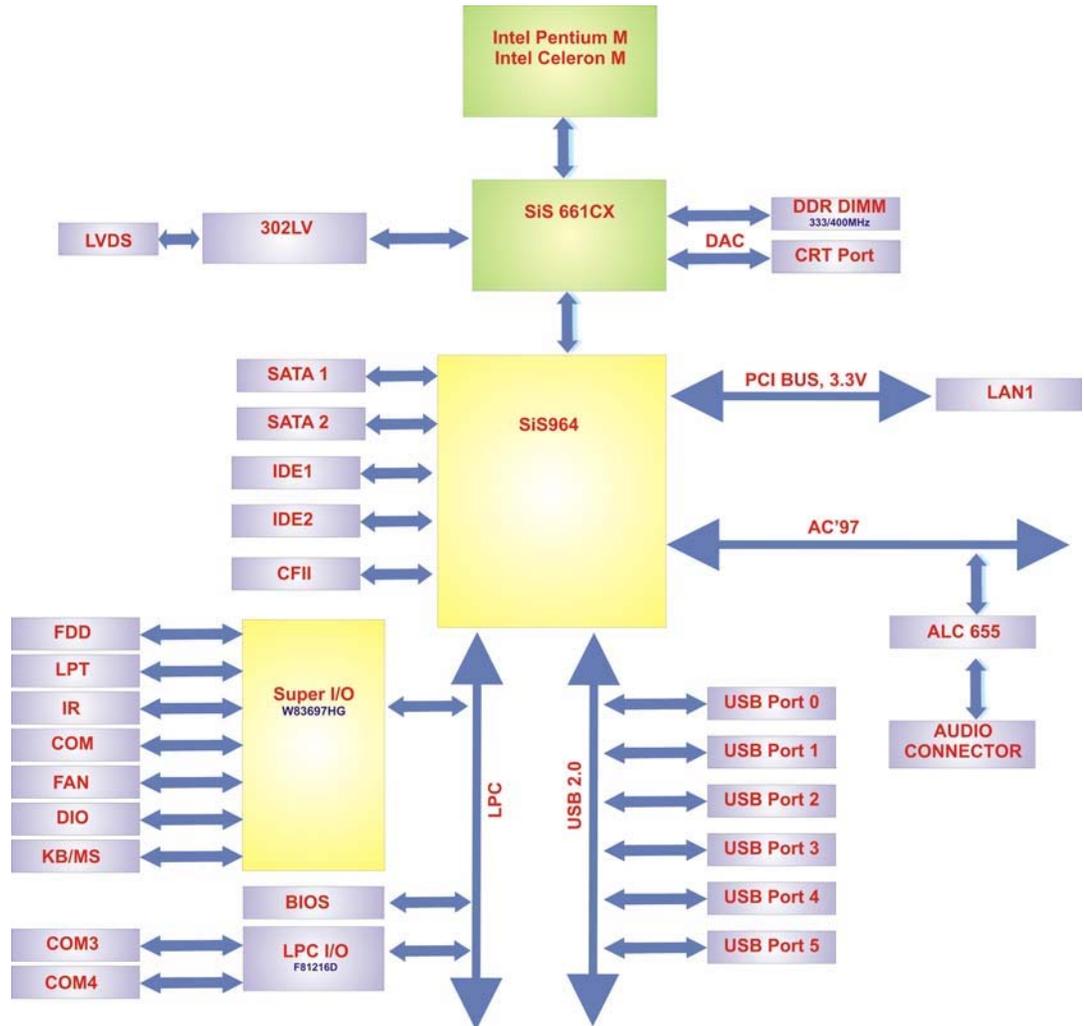
Figure 2-1: Data Flow Block Diagram

2.4　Graphics Support

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

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

2.5　Memory Support

The 3302160 supports one 200-pin 400MHz, 333MHz or 266MHz DDR SDRAM SODIMM with a maximum capacity of 1GB.

2.6   PCI Bus Interface Support

The PCI bus on the 3302160 has the following features:

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

2.7   GbE Ethernet

The Realtek RTL8110S 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.

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

2.8   Drive Interfaces

The 3302160 can support the following drive interfaces.

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

2.8.1 SATA Drives

The 3302160 supports two, first generation SATA drives with transfer rates of up to 150MB/s

2.8.2 IDE HDD Interfaces

The 3302160 southbridge chipset IDE controller supports up to two HDDs with the following specifications:

- ƒ   Supports PIO IDE transfers up to 16MB/s
- ƒ   Supports the following Ultra ATA devices:
  - o   **Ultra ATA 133**, with data transfer rates up to 133MB/s
  - o   **Ultra ATA 100**, with data transfer rates up to 100MB/s
  - o   **Ultra ATA 66**, with data transfer rates up to 66MB/s
  - o   **Ultra ATA 33**, with data transfer rates up to 33MB/s

2.8.3 Floppy Disk Drive (FDD)

The 3302160 supports a single FDD. The following FDD formats are compatible with the board.

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

2.9   Serial Ports

The 3302160 has four high-speed UART serial ports, configured as COM1, COM2, COM3 and COM4. The serial ports have the following specifications.

- ƒ   16C550 UART with 16-byte FIFO buffer

ƒ   115.2Kbps transmission rate

2.10   Real Time Clock

256-byte battery backed CMOS RAM

2.11   System Monitoring

The 3302160 is capable of self-monitoring various aspects of its operating status including:

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

2.12   Infrared Data Association (IrDA) Interface

The 3302160 IrDA supports the following interfaces.

ƒ   Serial Infrared (SIR)
ƒ   Shift Keyed Infrared (ASKIR)

If an IrDA port is need, COM4 must be configured as either SIR or ASKIR mode in the BIOS under **Super IO devices**. Normal RS-232 COM4 is then disabled.

2.13   USB Interfaces

The 3302160 has six USB interfaces, two internal and four external. The USB interfaces support USB 2.0.

2.14   BIOS

The 3302160 uses a licensed copy of AMI BIOS. The features of the flash BIOS used are listed below:

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

ƒ   USB booting support

2.15 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the 3302160 are listed below.

ƒ   Minimum Operating Temperature: 0ºC (32°F)
ƒ   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.

2.16 Audio Codec

The 3302160 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.

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

- ƒ Boost preamplifier for MIC input
- ƒ LINE input shared with surround output; MIC input shared with Center and LFE output
- ƒ Built-in 50mW/20ohm amplifier for both Front-out and Surround-Out
- ƒ External Amplifier Power Down (EAPD) capability
- ƒ Power management and enhanced power saving features
- ƒ Supports Power-Off CD function
- ƒ Adjustable VREFOUT control
- ƒ Supports 48KHz S/PDIF output, complying with AC'97 Rev 2.3 specifications
- ƒ Supports 32K/44.1K/48KHz S/PDIF input
- ƒ Power support: Digital: 3.3V; Analog: 3.3V/5V
- ƒ Standard 48-pin LQFP package
- ƒ EAX™ 1.0 & 2.0 compatible

  Direct Sound 3D™ compatible

  A3D™ compatible
- ƒ I3DL2 compatible
- ƒ HRTF 3D positional audio
- ƒ 10-band software equalizer
- ƒ Voice cancellation and key shifting in Karaoke mode
- ƒ AVRack® Media Player
- ƒ Configuration Panel for improved user convenience

2.17 Power Consumption

Table 2-2 shows the power consumption parameters for the 3302160 when a Pentium M processor with a clock speed of 1.8GHz and a FSB 400MHz is running with a 256MB DDR400 module.

Voltage	Current
+12V	3.32A

Table 2-2: Power Consumption

2.18 Packaged Contents and Optional Accessory Items

2.18.1 Package Contents

The 3302160 is shipped with the following components.

- ƒ 1 x 3302160 single board computer
- ƒ 1 x ATA 66/100 flat cable
- ƒ 2 x SATA cables
- ƒ 1 x SATA power cable
- ƒ 2 x RS232 cables
- ƒ 1 x Keyboard/ PS2 mouse Y cable
- ƒ 1 x Audio cable
- ƒ 1 x ATX 12V Power Cable
- ƒ 1 x mini jumper pack
- ƒ 1 x Utility CD
- ƒ 1 x Quick Installation Guide

2.18.2 Optional Accessory Items

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

- ƒ CPU cooler
- ƒ USB cable
- ƒ RS232/422/485 cable
- ƒ ATA-33 flat cable
- ƒ LPT cable

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Connectors and Jumpers

3.1   Peripheral Interface Connectors

Section 3.1.1 shows peripheral interface connector locations. **Section 3.1.2** lists all the peripheral interface connectors seen in **Section 3.1.1**.

3.1.1 3302160 Layout

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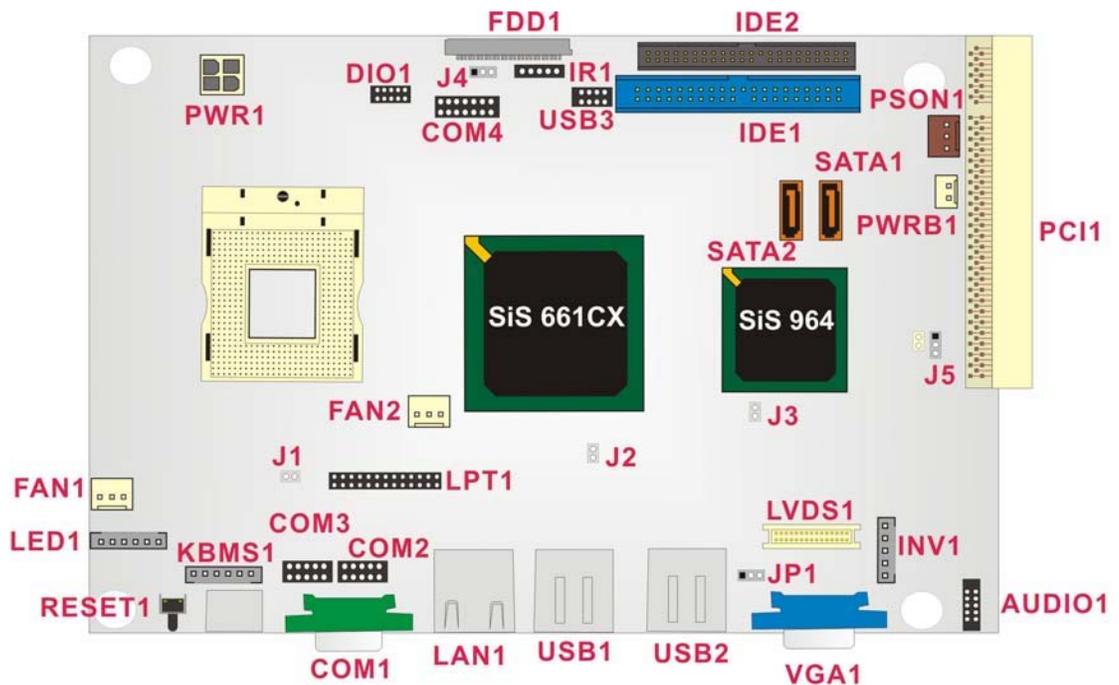
Figure 3-1: Connector and Jumper Locations

3.1.2 Peripheral Interface Connectors

Table 3-1 shows a list of the peripheral interface connectors on the 3302160. Detailed descriptions of these connectors can be found in **Section 3.2** on **page 39**.

Connector	Type	Label
12V power connector	4-pin header	PWR1
ATX power button connector	2-pin header	PWRB1
ATX power connector	3-pin header	PSON1
Audio connector	10-pin header	AUDIO1
Compact Flash (CF) connector	50-pin header	CF1
DDR SODIMM slot	200-pin slot	DIMM1
Fan connector (1)	3-pin header	FAN1
Fan connector (2)	3-pin header	FAN2
Floppy Disk connector	26-pin header	FDD1
GPIO connector	10-pin header	DIO1
IDE Interface connector (Primary)	40-pin header	IDE1
IDE Interface connector (Secondary)	44-pin header	IDE2
Inverter Power connector	5-pin header	INV1
IR Interface connector	5-pin header	IR1
Keyboard/Mouse connector	6-pin header	KBMS1
LCD LVDS Interface Connector	30-pin header	LVDS1
LED connector	6-pin header	LED1
Parallel port connector	26-pin header	LPT1
PCI connector	120-pin PCI slot	PCI1
Serial port2 connector	10-pin header	COM2

Serial port3 connector	10-pin header	COM3
RS-232/485 serial port connector	14-pin header	COM4
SATA drive connector (150MB/s)	7-pin SATA connector	SATA1
SATA drive connector (150MB/s)	7-pin SATA connector	SATA1
USB connector (USB and USB)	8-pin header	USB3

Table 3-1: Peripheral Interface Connectors

3.1.3 Rear Panel Connectors

Table 3-2 lists the rear panel connectors on the 3302160. Detailed descriptions of these connectors can be found in **Section 3.3** on **page 65**.

Connector	Type	Label
CRT connector	15-pin female connector	VGA1
Ethernet connector	RJ-45	LAN1
Keyboard/mouse connector	PS/2	KB/MS1
RS-232 serial port connector	10-pin connector	COM1
USB connector	USB port	USB1
USB connector	USB port	USB2

Table 3-2: Rear Panel 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 70**.

Description	Label	Type
Clear CMOS	J5	3-pin header
CPU FSB setting	J2	2-pin header

CPU frequency setting	**J1**	**2-pin header**
CF card setup	**J3**	**2-pin header**
LCD voltage setup	**JP1**	**3-pin header**
COM2 setup (RS-232/422)	**J4**	**3-pin header**

Table 3-3: Onboard Jumpers

3.2   Internal Peripheral Connectors

Internal peripheral connectors are found on the motherboard and are only accessible when the motherboard is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the 3302160.

3.2.1 12V Power Connector

CN Label: **PWR1**

CN Type: **4-pin header (2x2)**

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

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

Connects a power source from a power supply unit (PSU) to the 3302160.
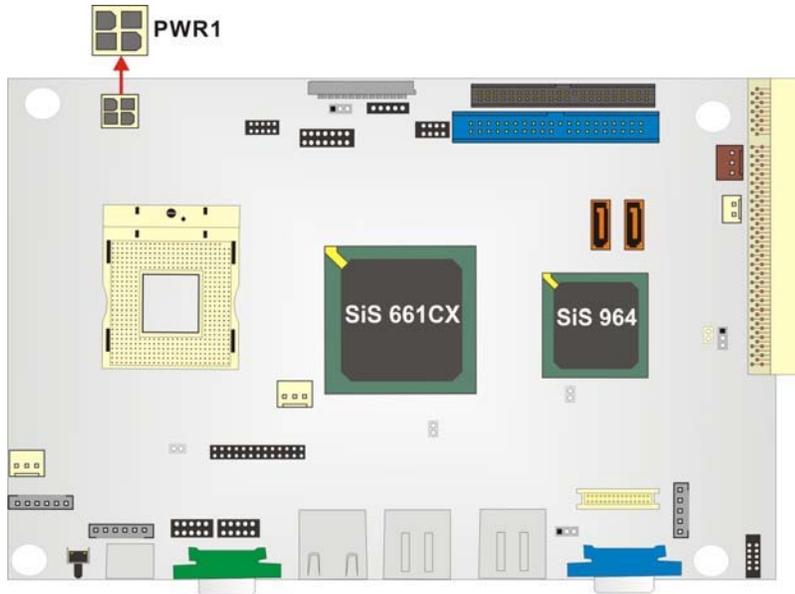
Figure 3-2: 12V Power Connector Location

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

Table 3-4: 12V Power Connector Pinouts

3.2.2 ATX Power Button Connector

CN Label: **PWRB1**

CN Type: **2-pin headers**

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

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

The ATX power button connector supports ATX power switch and enables power on/off from the chassis.
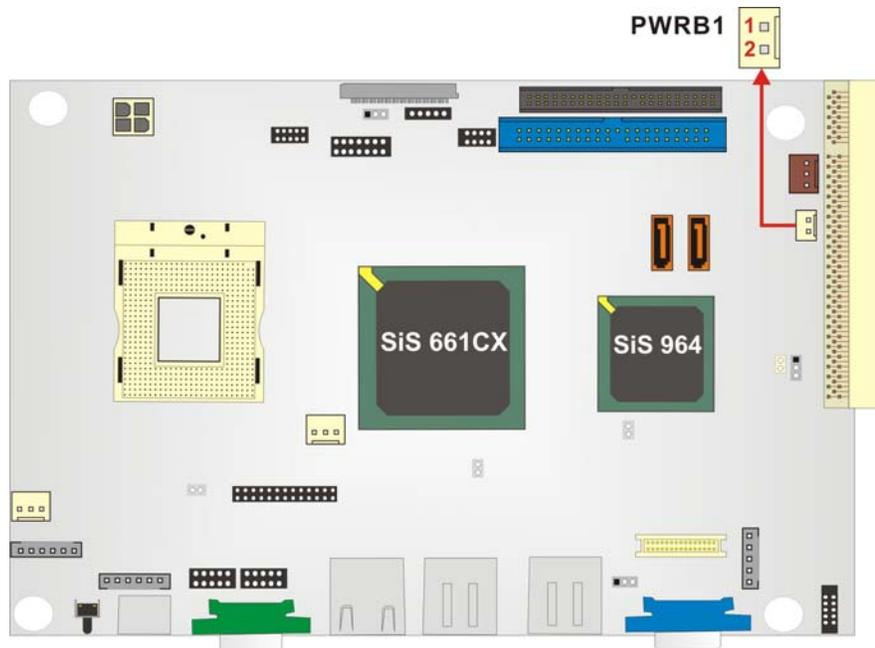
Figure 3-3: ATX Power Button Connector Location

PIN NO.	DESCRIPTION
1	PWRBTN#
2	GND

Table 3-5: ATX Power Button Connector Pinouts

3.2.3 ATX Power Connector

CN Label: PSON1

CN Type: 3-pin header (1x3)

CN Location: See Figure 3-4

CN Pinouts: See Table 3-6

The ATX Power connector (PW1) connects an ATX or AT power supply connector.
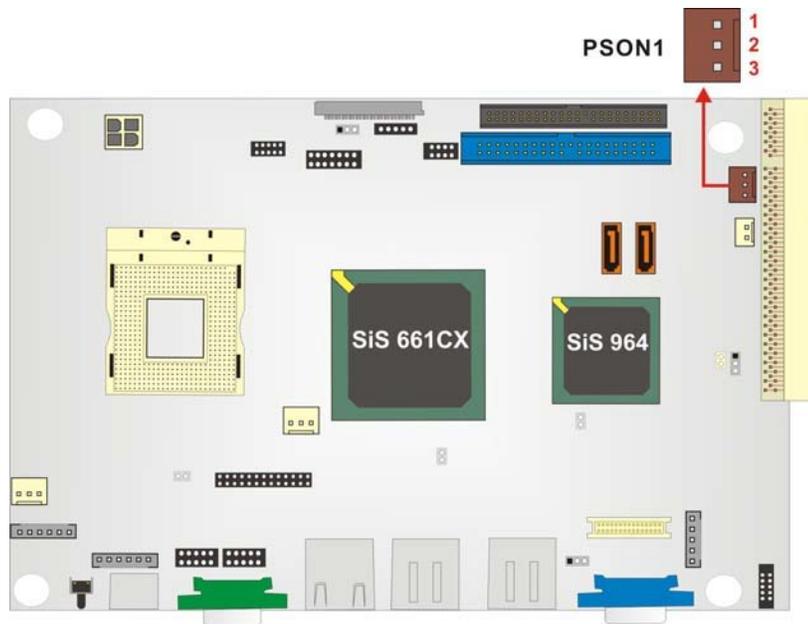
Figure 3-4: ATX Power Connector Pinouts

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

Table 3-6: ATX Power Connector Pinouts

3.2.4 Audio Connector

CN Label: **AUDIO1**

CN Type: **10-pin headers (2x5)**

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

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

The 3302160 has a built-in AC '97 AUDIO CODEC connector directly connected to the MIC-IN, LINE-IN and LINE-OUT.
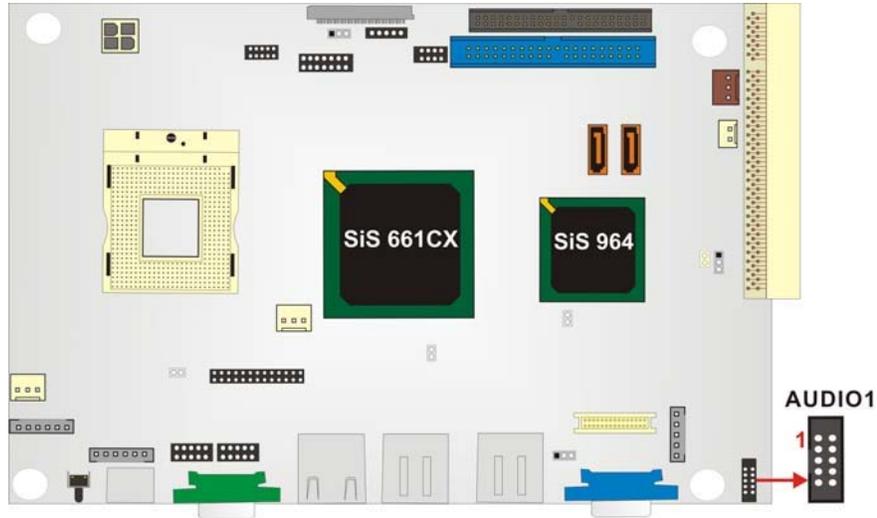
Figure 3-5: Audio Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	ROUT_L	2	LINR_L
3	GND	4	GND
5	LOUT_L	6	LINL_L
7	GND	8	GND
9	MICIN	10	

Table 3-7: Audio Connector Pinouts

3.2.5 Compact Flash Connector

CN Label: **CF1 (solder side of the motherboard)**

CN Type: **50-pin header (2x25)**

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

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

A compact flash memory module is inserted to the Compact Flash connector (CF1). Jumper 3 (J3) configures the compact flash drive as either a slave or master device.

Figure 3-6: CF Flash Socket Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	26	VCC-IN CHECK1
2	DATA 3	27	DATA 11
3	DATA 4	28	DATA 12
4	DATA 5	29	DATA 13
5	DATA 6	30	DATA 14
6	DATA 7	31	DATA 15
7	HDC_CS0#	32	HDC_CS1
8	N/C	33	N/C
9	GROUND	34	IOR#
10	N/C	35	IOW#
11	N/C	36	VCC_COM
12	N/C	37	IRQ15
13	VCC_COM	38	VCC_COM
14	N/C	39	CSEL
15	N/C	40	N/C
16	N/C	41	HDD_RESET
17	N/C	42	IORDY
18	SA2	43	SDREQ
19	SA1	44	SDACK#
20	SA0	45	HDD_ACTIVE#

21	DATA 0	46	66DET
22	DATA 1	47	DATA 8
23	DATA 2	48	DATA 9
24	N/C	49	DATA 10
25	VCC-IN CHECK2	50	GROUND

Table 3-8: CFII Socket Pinouts

3.2.6 DDR SODIMM Socket

CN Label: **DIMM1**

CN Type: **200 Pin DDR-SDRAM SODIMM Socket**

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

A 200 pin DDR-SDRAM SODIMM socket is located on the rear side of the 3302160 board. The SODIMM socket can support 266MHz DDR SODIMM SDRAM of up to 1GB

Figure 3-7: SODIMM Socket Location (Solder Side)

3.2.7 Fan Connector

CN Label: **FAN1 and FAN2**

CN Type: **3-pin header**

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

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

The cooling fan connector provides a 12V, 500mA current to a system cooling fan. The connector has a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.
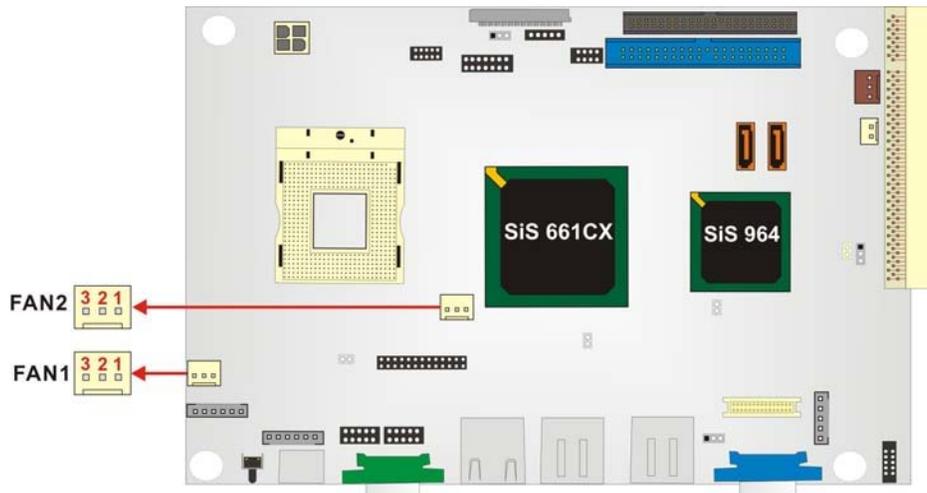
Figure 3-8: Fan Connector Locations

PIN NO.	DESCRIPTION
1	Fan Speed Detect
2	+12V
3	GND

Table 3-9: Fan Connector Pinouts

3.2.8 Floppy Disk Connector

CN Label: **FDD1**

CN Type: **26-pin header (1x26)**

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

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

The floppy disk connector (FDD1) is connected to a floppy disk drive.
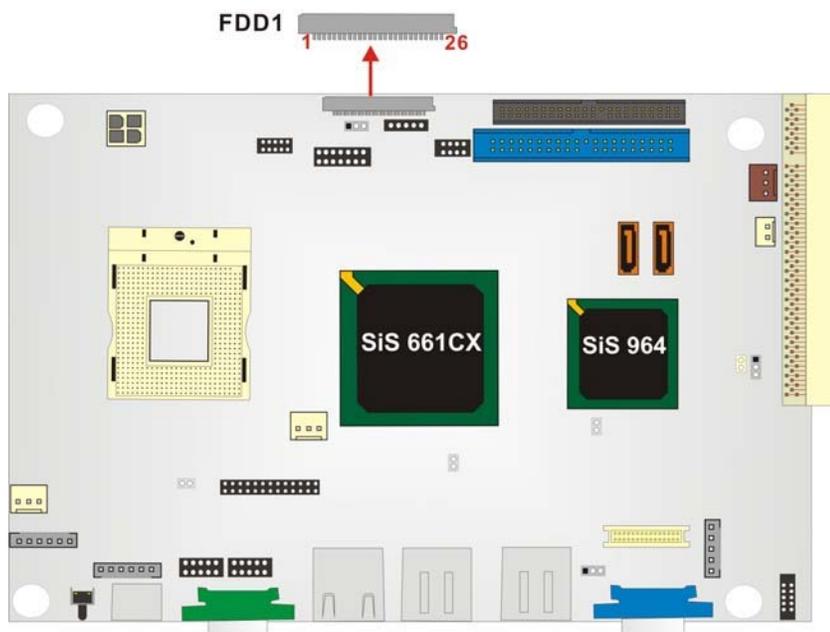
Figure 3-9: FDD Pinout Locations

PIN NO.	DESCRIPTION
1	5V
2	-INDEX
3	5V
4	-DSA
5	5V
6	-DSKCHG
7	NC
8	NC

9	NC
10	-MOA
11	NC
12	-DIR
13	NC
14	-STEP
15	GND
16	-WDATA
17	GND
18	-PWE
19	GND
20	-TRK0
21	GND
22	-WPT
23	GND
24	-RDATA
25	GND
26	-HDSEL

Table 3-10: FDD Connector Pinouts

3.2.9 GPIO Connector

CN Label: **DIO1**

CN Type: **10-pin header (2x5)**

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

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

The General Purpose Input Output (GPIO) connector can be connected to external I/O control devices including sensors, lights, alarms and switches.
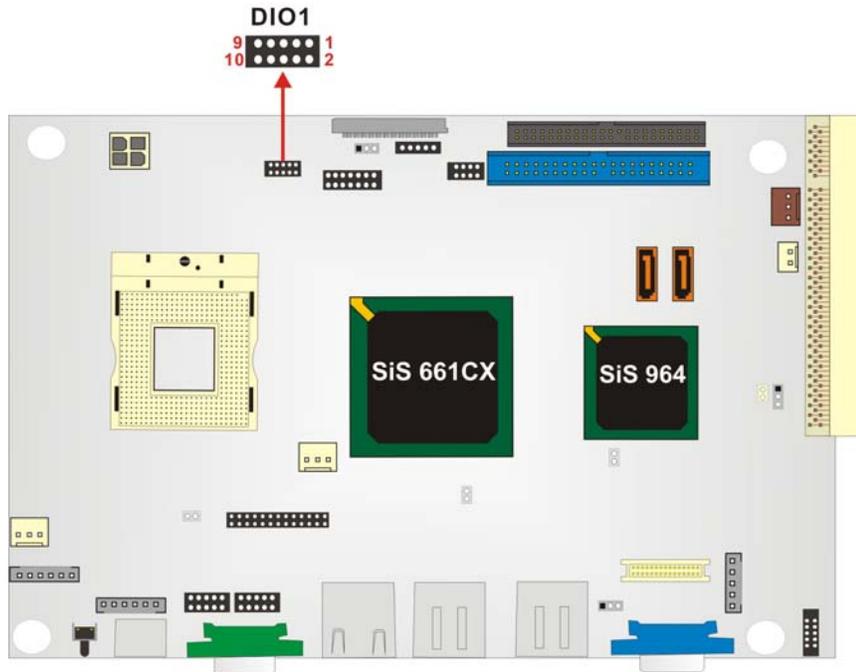
Figure 3-10: GPIO Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	5V
3	GPO0	4	GPO1
5	GPO2	6	GPO3
7	GPI0	8	GPI1
9	GPI2	10	GPI3

Table 3-11: GPIO Connector Pinouts

3.2.10 IDE Connector (Primary)

CN Label: **IDE1**

CN Type: **40-pin header (2x20)**

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

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

One primary 40-pin primary IDE device connector on the 3302160 motherboard supports connectivity to ATA 33/66/100/133 IDE devices with data transfer rates up to 133MB/s.
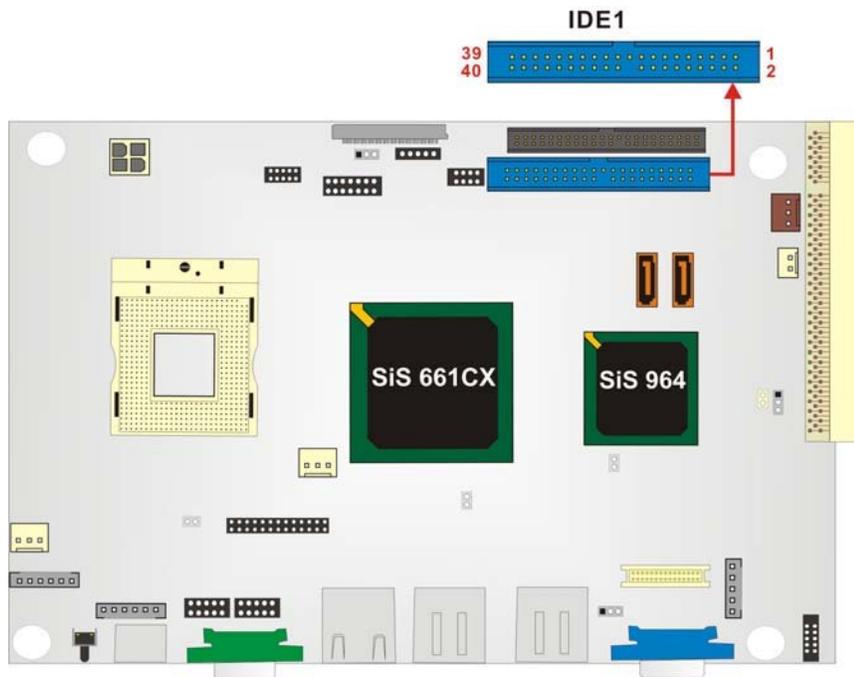
Figure 3-11: Primary IDE Device Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RESET#	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GROUND	20	N/C
21	IDE DRQ	22	GROUND
23	IOW#	24	GROUND

25	IOR#	26	GROUND
27	IDE CHRDY	28	GROUND
29	IDE DACK	30	GROUND–DEFAULT
31	INTERRUPT	32	N/C
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND

Table 3-12: Primary IDE Connector Pinouts

3.2.11 IDE Connector (Secondary)

CN Label: **IDE2**

CN Type: **44pin header (2x22)**

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

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

One primary 44-pin secondary IDE device connector on the 3302160 motherboard supports connectivity to ATA 33/66/100/133 IDE devices with data transfer rates up to 133MB/s.
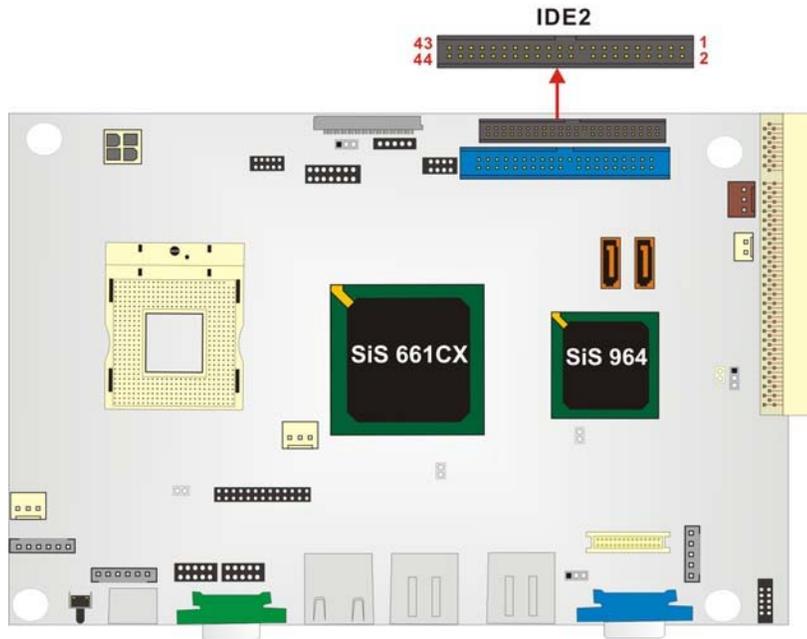
Figure 3-12: Secondary IDE Device Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RESET#	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GROUND	20	N/C
21	IDE DRQ	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	IDE CHRDY	28	GROUND
29	IDE DACK	30	GROUND–DEFAULT
31	INTERRUPT	32	N/C
33	SA1	34	N/C

35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND
41	VCC	42	VCC
43	GROUND	44	N/C

Table 3-13: Secondary IDE Connector Pinouts

3.2.12 Inverter Power Connector

CN Label: **INV1**

CN Type: **5-pin header (1x5)**

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

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

The inverter connector is connected to the LCD backlight.
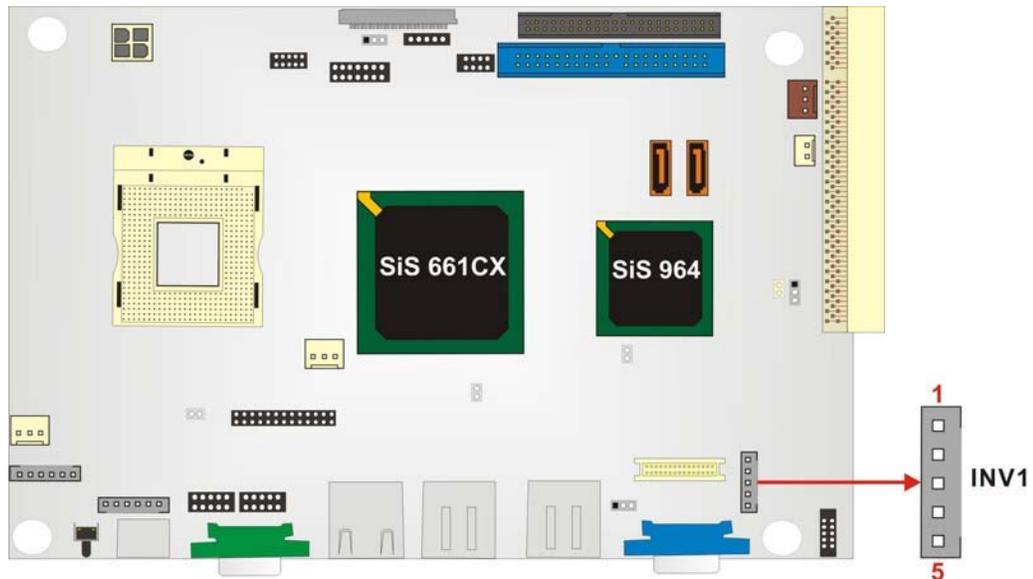
Figure 3-13: Inverter Connector Location

PIN NO.	DESCRIPTION
1	NC
2	GND
3	12V
4	GND
5	EN_BL

Table 3-14: Inverter Power Connector Pinouts

3.2.13 IR Interface Connector

CN Label: **IR1**

CN Type: **5-pin header (1x5)**

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

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

The integrated infrared (IrDA) connector supports both Serial Infrared (SIR) and Amplitude Shift Key Infrared (ASKIR) interfaces.
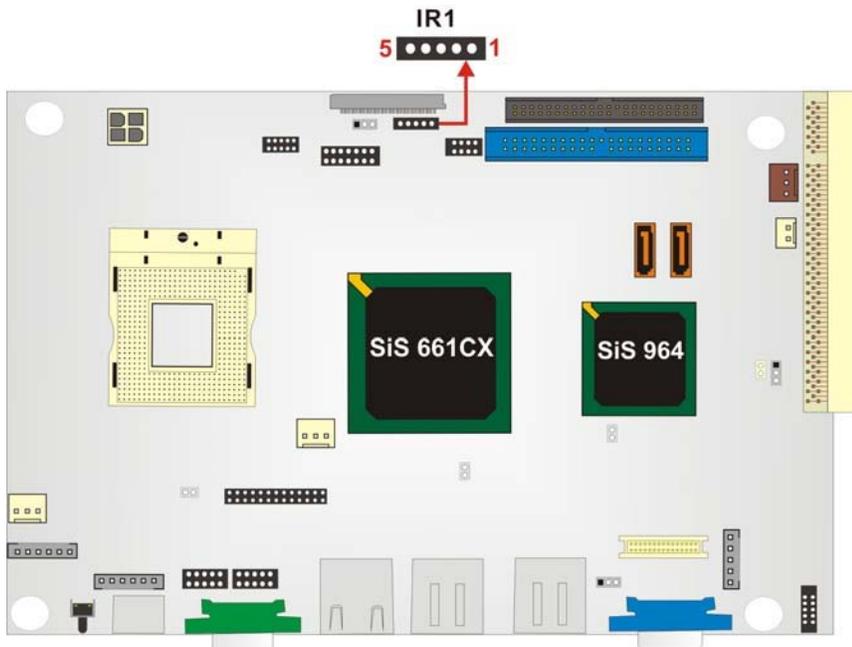
Figure 3-14: IR Connector Location

PIN NO.	DESCRIPTION
1	5V
2	NC
3	IRRX
4	GND
5	IRTX

Table 3-15: IR Connector Pinouts

3.2.14 Keyboard/Mouse Connector

CN Label: **KBMS1**

CN Type: **6-pin header (1x6)**

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

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

The Keyboard/PS2 mouse cable shipped with the 3302160 board is connected to the keyoard/mouse connector.
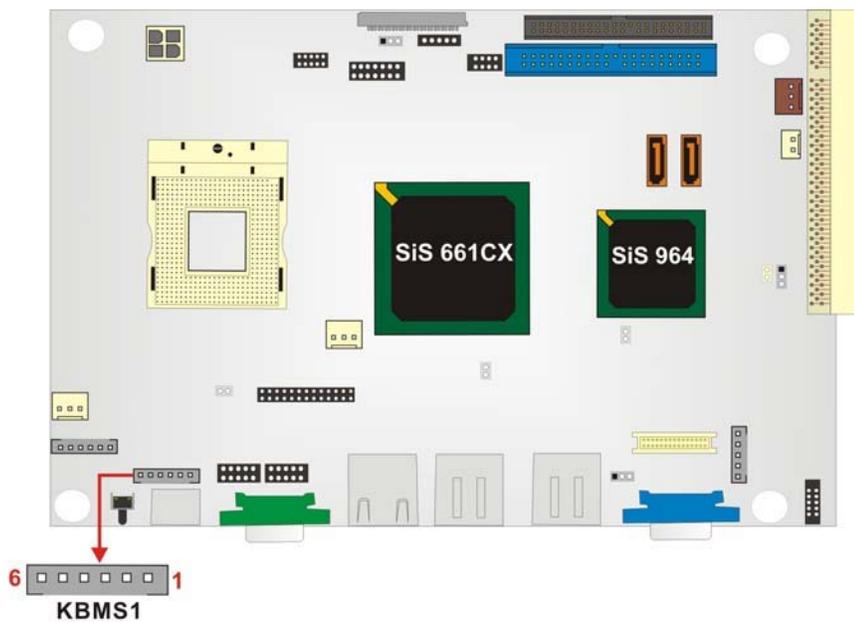
Figure 3-15: KB/MS Connector Locations

PIN NO.	DESCRIPTION
1	GND
2	L_KDAT
3	L_KCLK
4	L_MDAT
5	L_MCLK
6	+5V

Table 3-16: KB/MS Connector Pinouts

3.2.15 LCD LVDS Connector

CN Label: **LVDS1**

CN Type: **30-pin header (2x15)**

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

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

The LCD LVDS   connector (LVDS1) connects to a one or two channel (18-bit or 24-bit) LVDS panel.
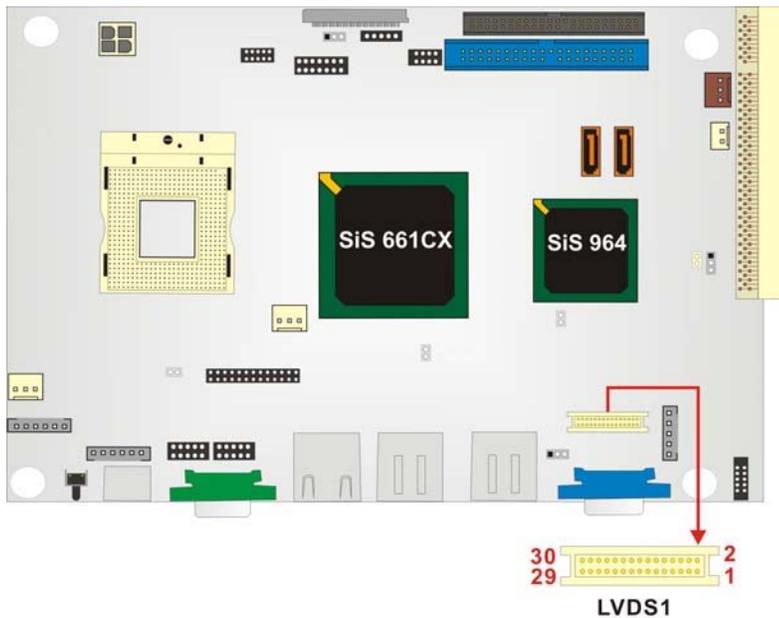
Figure 3-16: LCD LVDS Connector Pinout Locations

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	2	GND
3	A0P	4	A0M
5	A1P	6	A1M
7	A2P	8	A2M
9	CLK1P	10	CLK1M
11	A3P	12	A3M
13	GND	14	GND
15	A4P	16	A4M
17	A5P	18	A5M
19	A6P	20	A6M
21	CLK2P	22	CLK2M
23	A7P	24	A7M
25	GND	26	GND
27	LCD_VDD	28	LCD_VDD
29	LCD_VDD	30	LCD_VDD

Table 3-17: LCD LVDS Connector Pinouts

3.2.16 LED Connector

CN Label: **LED1**

CN Type: **6-pin header (1x6)**

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

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

This connector connects to the LED lights indicating the hard drive activity and the power status.
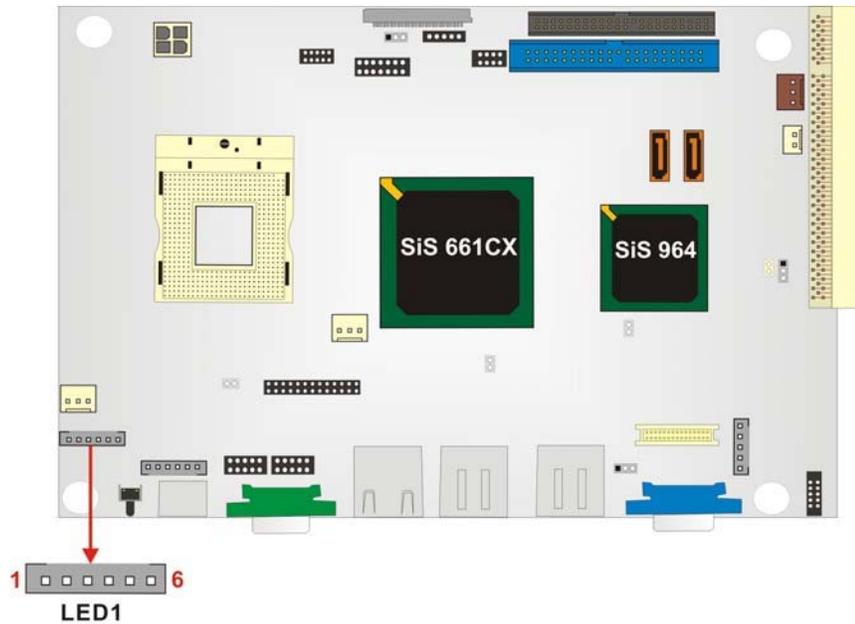
Figure 3-17: LED Connector Pinout Locations

PIN NO.	DESCRIPTION
1	+5V
2	GND
3-4	PWR_LED
5-6	HDD_LED

Table 3-18: LED Connector Pinouts

3.2.17 Parallel Port Connector

CN Label: **LPT1**

CN Type: **26-pin header (2x13)**

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

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

The parallel port connector is usually connected to a printer. A 26-pin flat-cable connector is used to connect the parallel port with a printer or other parallel communication devices.
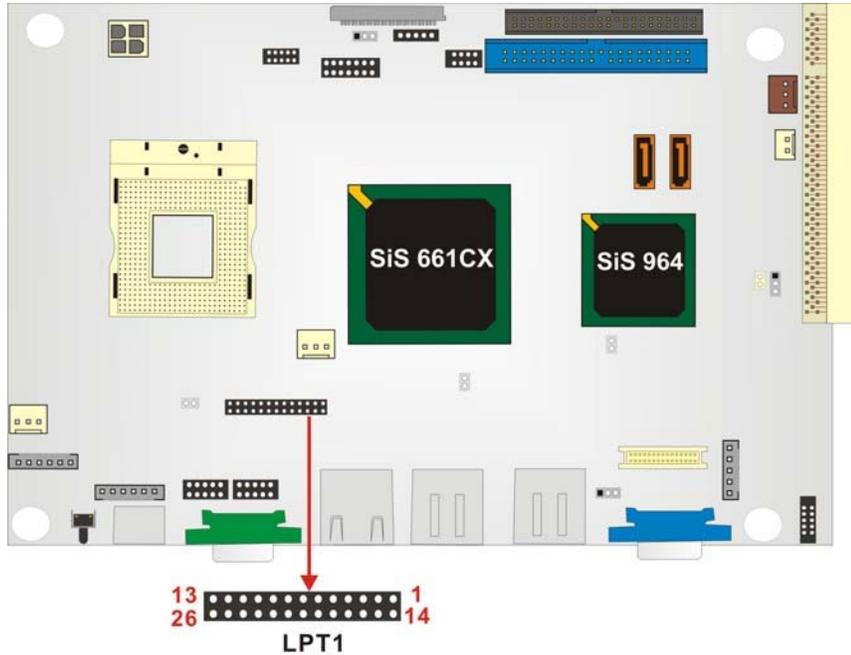
Figure 3-18: Parallel Port Connector Location

PIN	DESCRIPTION	PIN	DESCRIPTION
1	STROBE#	14	AUTO FORM FEED #
2	DATA0	15	ERROR#
3	DATA1	16	INITIALIZE#
4	DATA2	17	PRINTER SELECT LN#
5	DATA3	18	GND
6	DATA4	19	GND
7	DATA5	20	GND
8	DATA6	21	GND
9	DATA7	22	GND
10	ACKNOWLEDGE#	23	GND
11	BUSY	24	N/C
12	PAPER EMPTY	25	GND
13	PRINTER SELECT		

Table 3-19: Parallel Port Connector Pinouts

3.2.18 Serial Port2 Connector

CN Label: **COM2**

CN Type: **10-pin header (2x5)**

CN Location: **See Figure 3-19**

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

The COM2 serial ports connectors connect to RS-232 or RS-422 serial port device. Use J4 jumper to select the setting (refer to **Section 3.4.6**).
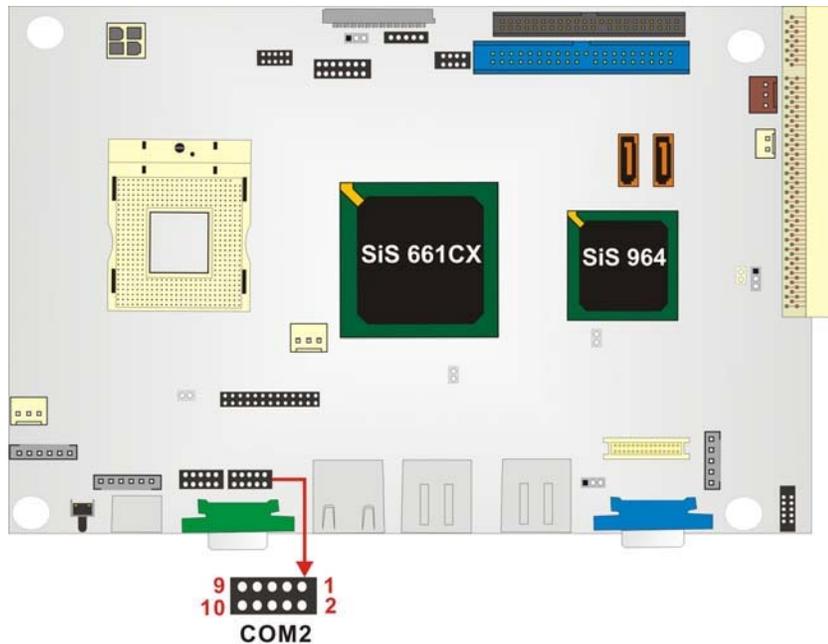
Figure 3-19: Serial Port2 Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	NDCD3	2	NDSR3
3	NRX3	4	NRTS3
5	NTX3	6	NCTS3
7	NDTR3	8	NRI3
9	GND	10	GND

Table 3-20: Serial Port2 Connector Pinouts

3.2.19 Serial Port3 Connector

CN Label: **COM3**

CN Type: **10-pin header (2x5)**

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

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

The COM3 serial port connector connects to an RS-232 serial port devices.
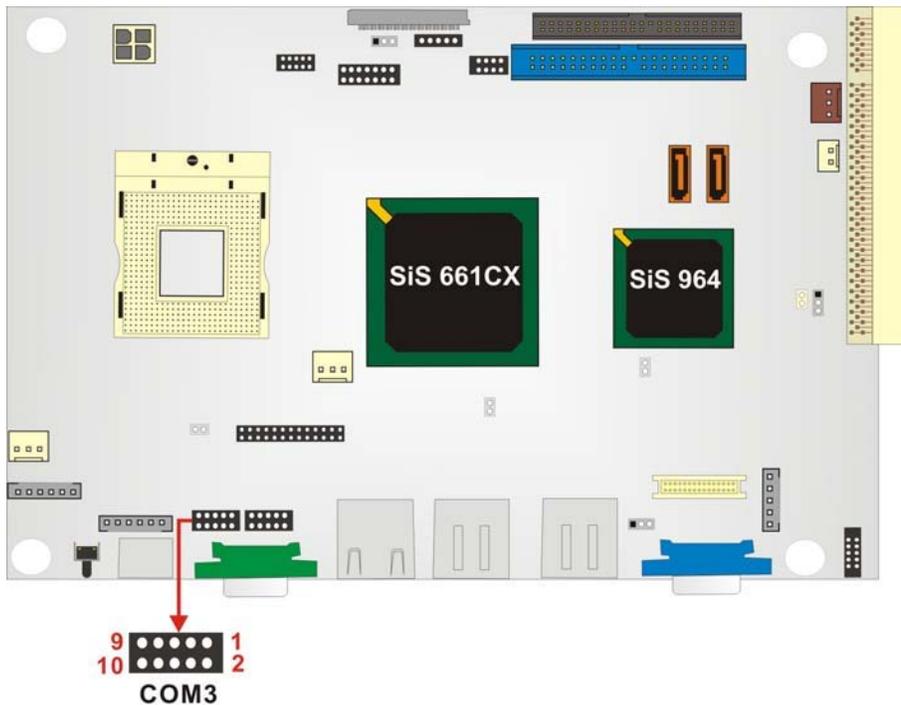
Figure 3-20: Serial Port3 Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	NDCD4	2	NDSR4
3	NRX4	4	NRTS4
5	NTX4	6	NCTS4
7	NDTR4	8	NRI4
9	GND	10	GND

Table 3-21: Serial Port3 Connector Pinouts

3.2.20 RS-232/RS-485 Serial Port Connector

CN Label: **COM4**

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

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

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

The COM4 serial port connector connects to an RS-232 or RS-485 serial port devices.
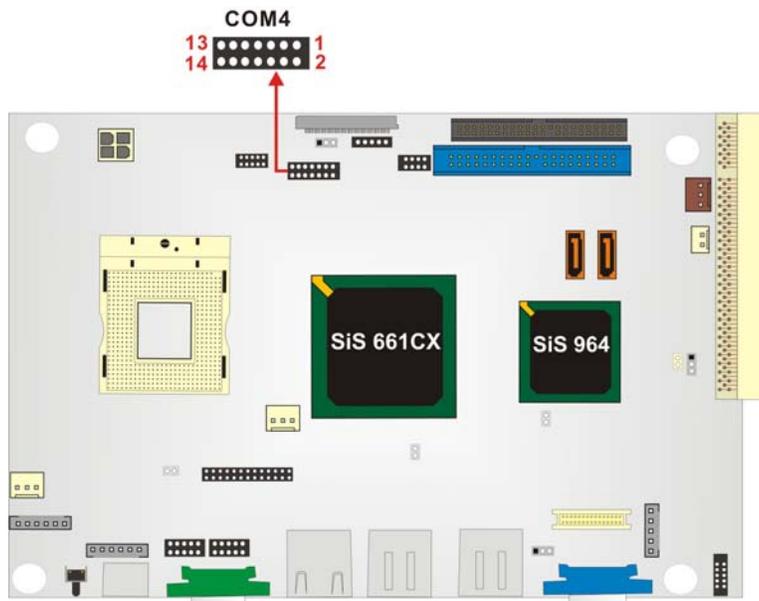
Figure 3-21: RS-232/RS-485 Serial Port Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	NDCD2	2	NDSR2
3	NRX2	4	NRTS2
5	NTX2	6	NCTS2
7	NDTR2	8	NRI2
9	GND	10	GND
11	TX2+	12	TX2-
13	RX2+	14	RX2-

Table 3-22: RS-232/RS-485 Serial Port Connector Pinouts

3.2.21 SATA Drive Connectors

CN Label: **SATA1 and SATA2**

CN Type: **1x7 pin SATA drive connectors**

CN Location: **See Figure 3-22**

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

The two SATA drive connectors are connected to two first generation SATA drives. First generation SATA drives transfer data at speeds as high as 150MB/s.
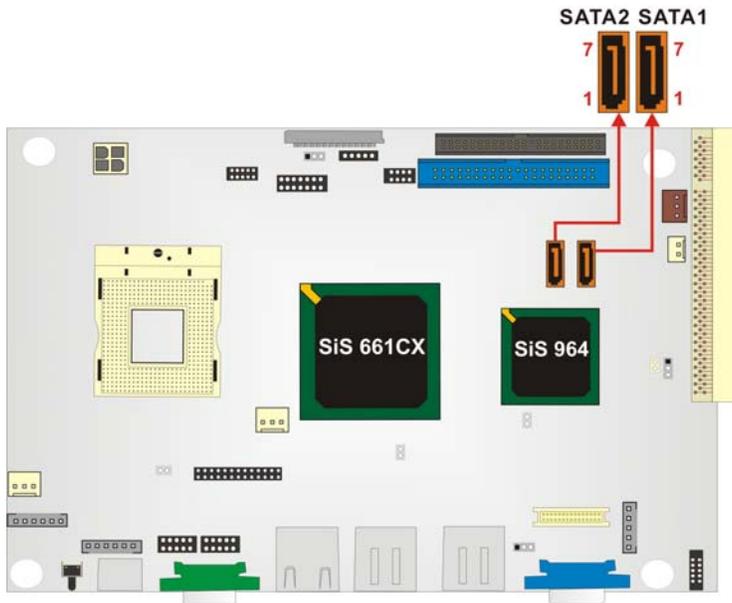
Figure 3-22: SATA Drive Connector Pinout Locations

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

Table 3-23: SATA Drive Connector Pinouts

3.2.22 Internal USB Connector

CN Label: **USB3**

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

CN Location: **See Figure 3-23**

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

One 2x4 pin connector provides connectivity to two USB 2.0 ports. Four additional USB ports are found on the rear panel. The USB ports are used for I/O bus expansion.
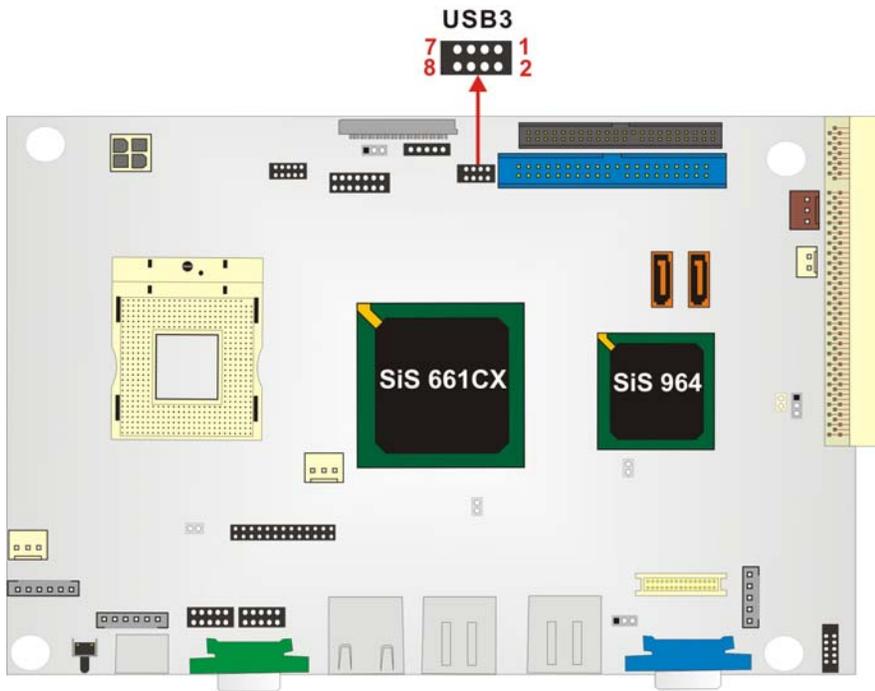
Figure 3-23: USB Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	USBV3L 5V	2	GND
3	USBP4N	4	USBP5P
5	USBP4P	6	USBP5N
7	GND	8	USBV3L 5V

Table 3-24: USB Port Connector Pinouts

3.3 External (Rear Panel) Connectors

Figure 3-24 shows the 3302160 rear panel. The peripheral connectors on the back panel are connected to devices externally when the 3302160 is installed in a chassis. The peripheral connectors on the rear panel are:

- ƒ 1 x Reset button
- ƒ 1 x PS/2 keyboard and mouse connector
- ƒ 1 x Serial port connector
- ƒ 1 x RJ-45 GbE connector
- ƒ 4 x USB connectors
- ƒ 1 x VGA connector
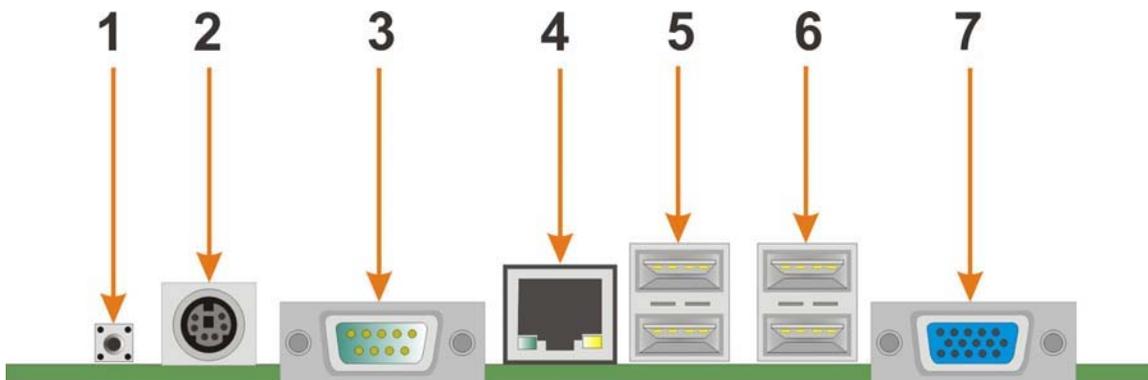
Figure 3-24: 3302160 CP Rear Panel

3.3.1 Keyboard/Mouse Connector

CN Label: **KB/MS1**

CN Type: PS/2

CN Location: See Figure 3-24 (labeled number 2)

The 3302160 keyboard and mouse connectors are standard PS/2 connectors.

3.3.2 VGA connector

CN Label: VGA1

CN Type: 15-pin Female

CN Location: See Figure 3-24 (labeled number 7)

CN Pinouts: See Table 3-25

A 15-pin VGA connector connects to standard displays.
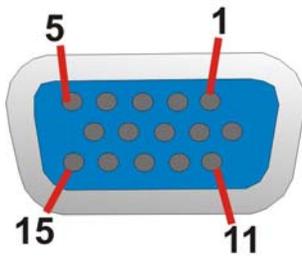
Figure 3-25: VGA Connector

PIN	DESCRIPTION	PIN	DESCRIPTION
1	RED	9	NC
2	GREEN	10	GROUND
3	BLUE	11	NC
4	NC	12	DDCDAT
5	GROUND	13	HSYNC
6	GROUND	14	VSYNC
7	GROUND	15	DDCCLK
8	GROUND		

Table 3-25: VGA Connector Pinouts

3.3.3 Serial Port Connector

CN Label: **COM1**

CN Type: **D-SUB Serial Port Connector**

CN Location: **See Figure 3-24 (labeled number 3)**

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

The 3302160 has an RS-232 serial port on the rear panel.
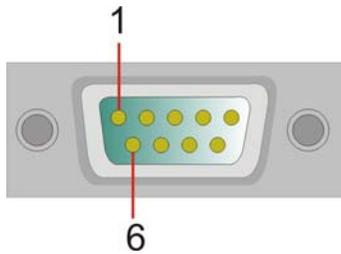
Figure 3-26: COM1 Serial Port Connector

COM1 pinouts are shown below.

PIN	Description	PIN	Description
1	DCD1	6	DSR1
2	RXD1	7	RTS1
3	TXD1	8	CTS1
4	DTR1	9	RI1
5	GND	10	GND

Table 3-26: COM1 Pinouts

3.3.4 LAN Connectors

CN Label: **LAN1**

CN Type: **RJ-45**

CN Location: **See Figure 3-24 (labeled number 4)**

CN Pinouts: See Table 3-27

The 3302160 is equipped with one built-in GbE Ethernet controllers. The controllers can connect to the LAN through one RJ-45 LAN connectors. There are two LEDs on the connector indicating the status of LAN. The pin assignments are listed in the following table:

PIN	DESCRIPTION	PIN	DESCRIPTION
1	+2.5VCC	2	TX0+
3	TX0-	4	TX1+
5	TX1-	6	TX2+
7	TX2-	8	TX3+
9	TX3-	10	GND
11	LINK-	12	LINK+
13	ACTIVE-	14	ACTIVE+

Table 3-27: LAN Pinouts

ACT   LNK
LED   LED
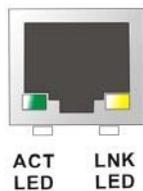
Figure 3-27: RJ-45 Ethernet Connector

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 3-28**.

STATUS	DESCRIPTION	STATUS	DESCRIPTION
GREEN	Activity	YELLOW	Linked

Table 3-28: RJ-45 Ethernet Connector LEDs

3.3.5 USB Connector (1)

CN Label: **USB1**

CN Type: **USB port**

CN Location: **See Figure 3-24 (labeled number 5)**

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

The 3302160 has a four rear panel USB 2.0 ports. These ports connect to both USB 2.0 and USB 1.1 devices.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	USBV0L	2	DATA0_N
3	DATA0_P	4	GND
5	USBV0L	6	DATA1_N
7	DATA1_P	8	GND

Table 3-29: USB1 Port Pinouts

3.3.6 USB Connector (2)

CN Label: **USB2**

CN Type: **USB port**

CN Location: **See Figure 3-24 (labeled number 6)**

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

The 3302160 has a four rear panel USB 2.0 ports. These ports connect to both USB 2.0 and USB 1.1 devices.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	USBV1L	2	DATA2_N
3	DATA2_P	4	GND
5	USBV1L	6	DATA3_N
7	DATA3_P	8	GND

Table 3-30: USB2 Port 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.
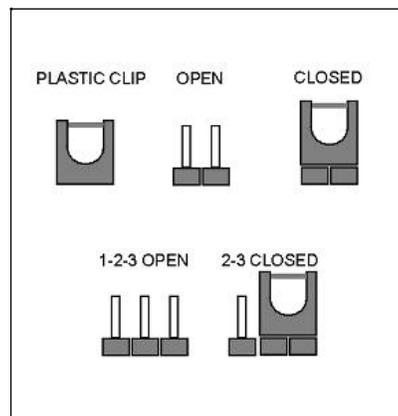
Figure 3-28 Jumper

The 3302160 motherboard has six onboard jumpers. The jumpers are described in **Table 3-31**.

Description	Label	Type
Clear CMOS	**J5**	**3-pin header**
CPU FSB setting	**J2**	**2-pin header**
CPU frequency setting	**J1**	**2-pin header**
CF card setup	**J3**	**2-pin header**
LCD voltage setup	**JP1**	**3-pin header**
COM2 setup (RS-232/422)	**J4**	**3-pin header**

Table 3-31: Onboard Jumpers

3.4.1 Clear CMOS Jumper

Jumper Label: **J5**

Jumper Type: **3 pin header**

Jumper Settings: **See Table 3-32**

Jumper Location: **See Figure 3-29**

If the 3302160 fails to boot due to improper BIOS settings, use this jumper to clear the CMOS data and reset the system BIOS information. To do this, use the jumper cap to close pins 2 and 3 for a few seconds then reinstall the jumper clip back to pins 1 and 2.

If the "CMOS Settings Wrong" message is displayed during the boot up process, the fault may be corrected by pressing the F1 to enter the CMOS Setup menu. Do one of the following:

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

After having done one of the above, save the changes and exit the CMOS Setup menu.

Clear CMOS	DESCRIPTION
1-2 (Default)	Keep CMOS Setup
2-3	Clear CMOS Setup

Table 3-32: Clear CMOS Jumper Settings

The clear CMOS jumper is located in **Figure 3-29**.
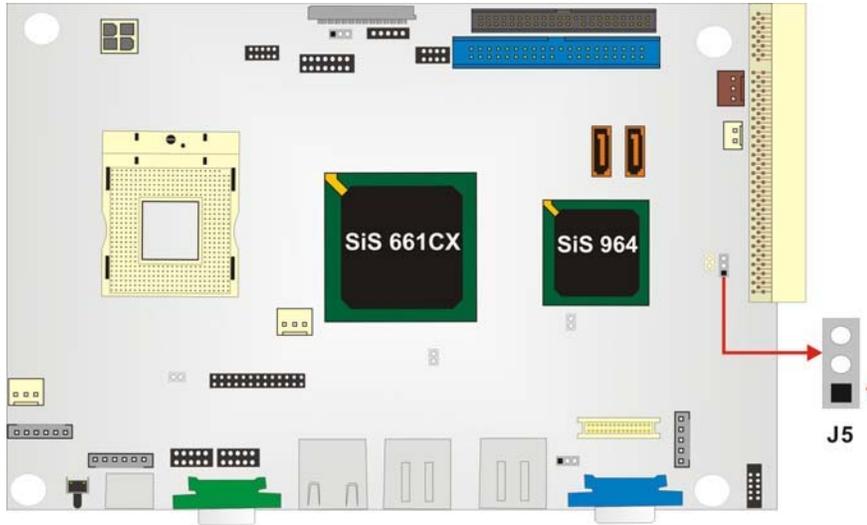
Figure 3-29: CLR_CMOS Pinout Locations

3.4.2 CPU FSB Settings Jumper

Jumper Label:	**J2**
Jumper Type:	**2-pin header**
Jumper Settings:	**See Table 3-33**
Jumper Location:	**See Figure 3-30**

The CPU FSB Settings jumper allows the user to select the front side bus frequency between the CPU and the northbridge.

J2	DESCRIPTION
OPEN (Default)	
CLOSE	FSB 533MHz

Table 3-33: FSB Selection Jumper Settings

The CPU FSB Settings jumper is location is shown in **Figure 3-30**.
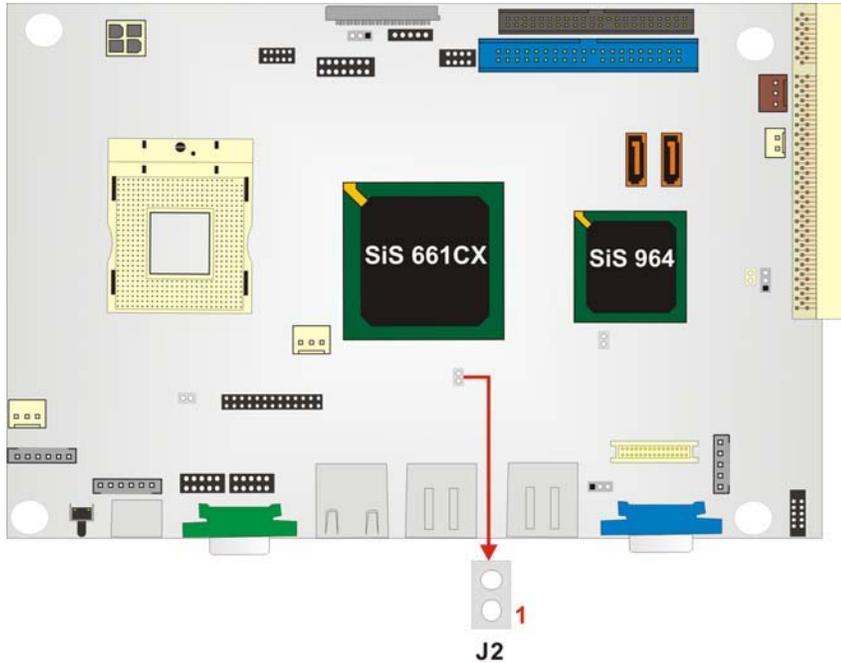
Figure 3-30: J2 Location

3.4.3 CPU Frequency Setting Jumper

Jumper Label:	**J1**
Jumper Type:	**2-pin header**
Jumper Settings:	**See Figure 3-31**
Jumper Location:	**See Table 3-34**

The CPU Frequency Setting jumper allows the user to select the CPU operating speed.

J1	DESCRIPTION
OPEN (Default)	100MHz
CLOSE	133MHz

Table 3-34: CPU Frequency Jumper Settings

The CPU Frequency Setting jumper is location is shown in **Figure 3-31**.
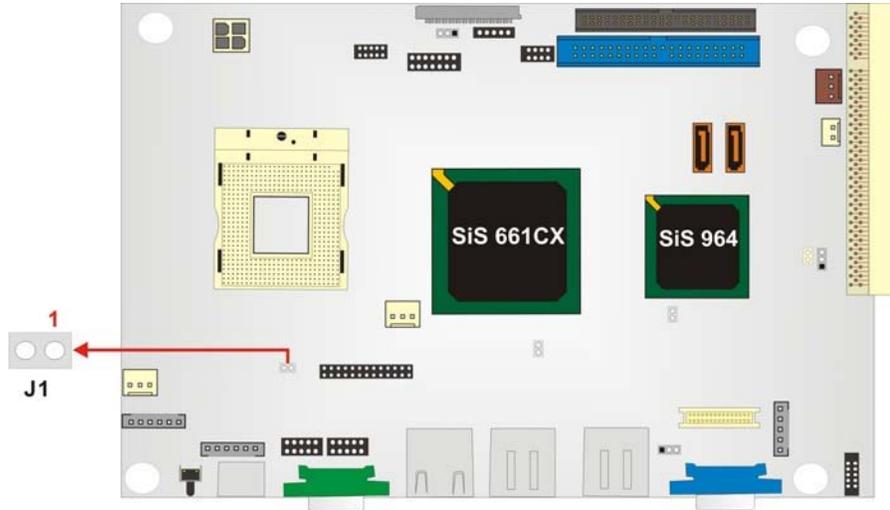
Figure 3-31: J1 Location

3.4.4 CF Card Setup

    Jumper Label: **J3**

    Jumper Type: **2-pin header**

    Jumper Settings: **See Figure 3-32**

    Jumper Location: **See Table 3-35**

The CF Card Setup jumper sets the compact flash card as either the slave device or the master device.

J3	DESCRIPTION
OPEN (Default)	Slave
CLOSE	Master

Table 3-35: CF Card Setup Jumper Settings

The CF Card Setup jumper location is shown in **Figure 3-32**.
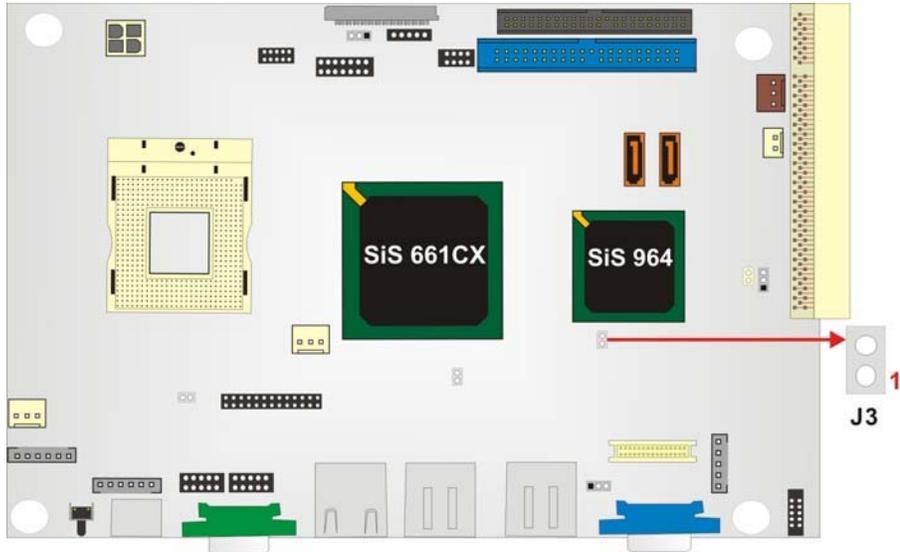
Figure 3-32: J3 Pinout Locations

3.4.5 LCD Voltage Setup Jumper

 WARNING:

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

Jumper Label:	**JP1**
Jumper Type:	**3-pin header**
Jumper Settings:	**See Figure 3-33**
Jumper Location:	**See Table 3-36**

This jumper allows the user to set the voltage for the LCD panel. Before setting this jumper please refer to the LCD panel user guide to determine the required voltage. After the required voltage is known, make the necessary jumper setting in accordance with the settings shown in **Table 3-36**.

JP1	DESCRIPTION
Short 1-2 (Default)	3V
Short 2-3	5V

Table 3-36: JP1 Jumper Settings

The LCD Voltage Setup jumper location is shown in **Figure 3-33** below.
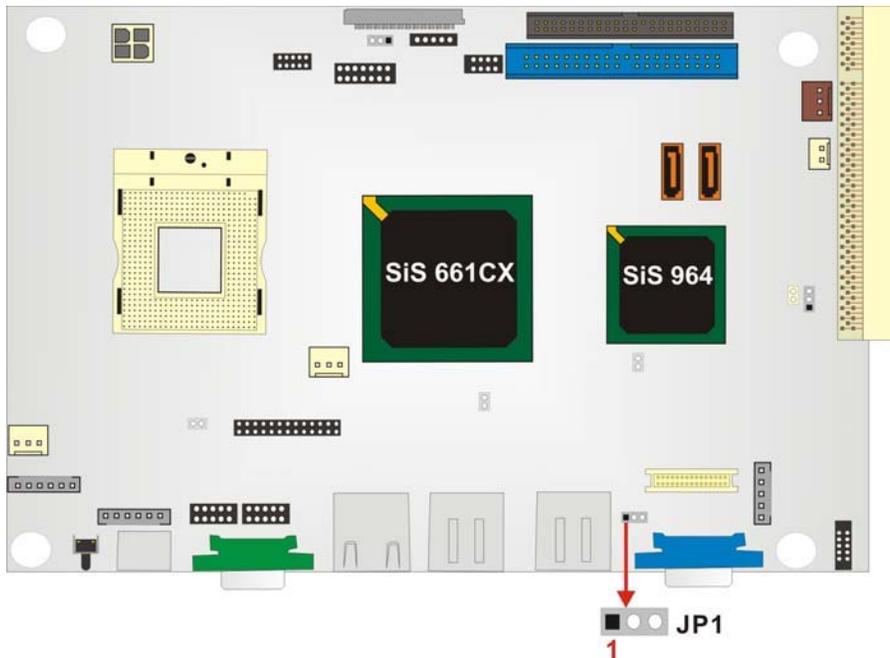
Figure 3-33: JP1 Pinout Locations

3.4.6 COM2 Setup Jumper

    Jumper Label: **J4**

    Jumper Type: **3-pin header**

    Jumper Settings: **See Figure 3-34**

    Jumper Location: **See Table 3-37**

This jumper configures the COM2 connector as an RS-232 serial port or as an RS-422 serial port. The selection options are shown in **Table 3-37**.

J4	DESCRIPTION
Short 1 – 2 (Default)	RS-232
Short 2 – 3	RS-422

Table 3-37: COM2 Setup Jumper Settings

The COM2 Setup jumper location is shown in **Figure 3-34** below.
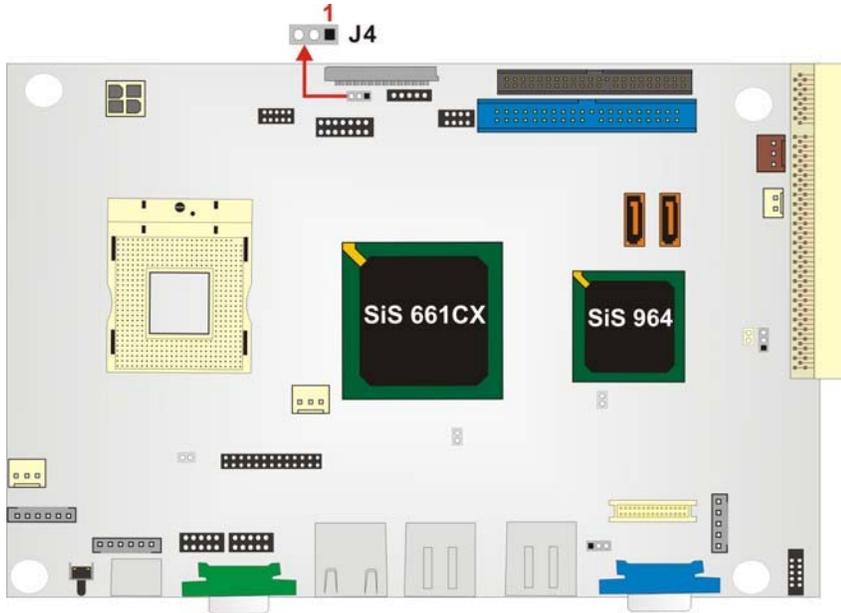
Figure 3-34: J4 Pinout Locations

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Installation and Configuration

4.1   Installation Considerations

 NOTE:

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

4.1.1 Installation Notices

Before and during the installation of the 3302160, please **do** the following:

- ƒ   Read the user manual
  - o   The user manual provides a complete description of the 3302160, installation instructions and configuration options.
- ƒ   Wear an electrostatic discharge cuff (ESD)
  - o   Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- ƒ   Place the motherboard on an antistatic pad
  - o   When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- ƒ   Turn off all power to the 3302160
  - o   When working with the motherboard, 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 3302160 **DO NOT:**

- ƒ   remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- ƒ   use the product before verifying all the cables and power connectors are

properly connected.

ƒ   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 the 3302160 is
unpacked, do not proceed with the installation and contact the 3302160
reseller or vendor.

4.2.1 Unpacking Precautions

Before installing the 3302160, unpack the motherboard. Some components on
3302160 are very sensitive to static electricity and can be damaged by a sudden rush of
power. To protect it from being damaged, follow these precautions:

ƒ   The user should ground them self to remove any static charge before
     touching the 3302160. To do so wear a grounded wrist strap at all
     times or frequently touch any conducting materials that is connected to
     the ground.

ƒ   Handle the 3302160 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 unpacking the 3302160, please make sure that the package contains the
following items.

ƒ   1 x 3302160 single board computer

- ƒ   1 x ATA 66/100 flat cable
- ƒ   2 x SATA cables
- ƒ   1 x SATA power cable
- ƒ   2 x RS232 cables
- ƒ   1 x Keyboard/ PS2 mouse Y cable
- ƒ   1 x Audio cable
- ƒ   1 x ATX 12V Power Cable
- ƒ   1 x mini jumper pack
- ƒ   1 x Utility CD
- ƒ   1 x Quick Installation Guide

If one or more of these items are missing, please contact the reseller or vendor the 3302160 was purchased from and do not proceed any further with the installation.

4.3   3302160 Motherboard Installation

⚠ WARNING!

1. Never run the motherboard without an appropriate heatsink and cooler that can be ordered from Global American, Inc. (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 motherboard components and injury to the user.

![Warning icon] **WARNING!**

When installing electronic components onto the motherboard always take the following anti-static precautions in order to prevent ESD damage to the motherboard and other electronic components like the CPU and DIMM modules

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

- ƒ CPU
- ƒ CPU cooling kit
- ƒ DIMM modules
- ƒ Peripheral device connection

4.3.1 CPU Installation

![Warning icon] **WARNING!**

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

To install an Intel 479-pin CPU onto the motherboard, follow the steps below:

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

(See **Figure 4-1**)

Pin1

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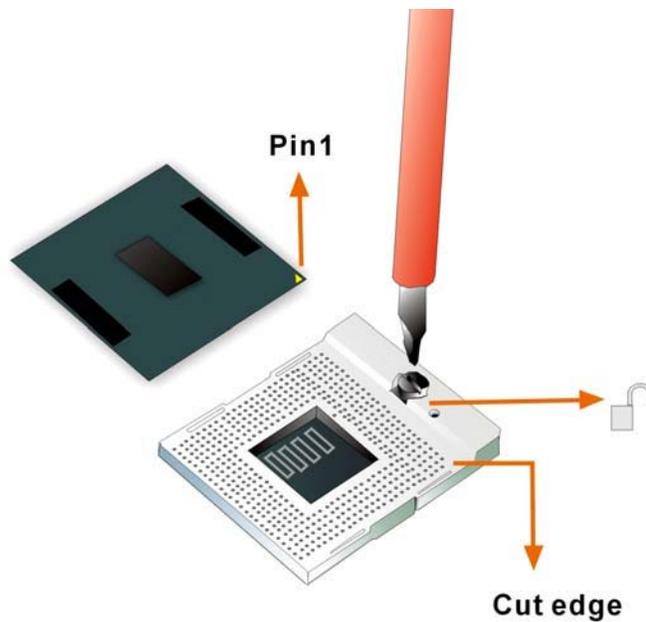
Figure 4-1: Make sure the CPU socket retention screw is unlocked

Step 2:   **Inspect the CPU socket.** Make sure there are no bent pins and make sure the socket contacts are free of foreign material. If any debris is found, remove it with compressed air.

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

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

   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. (See **Figure 4-2**)
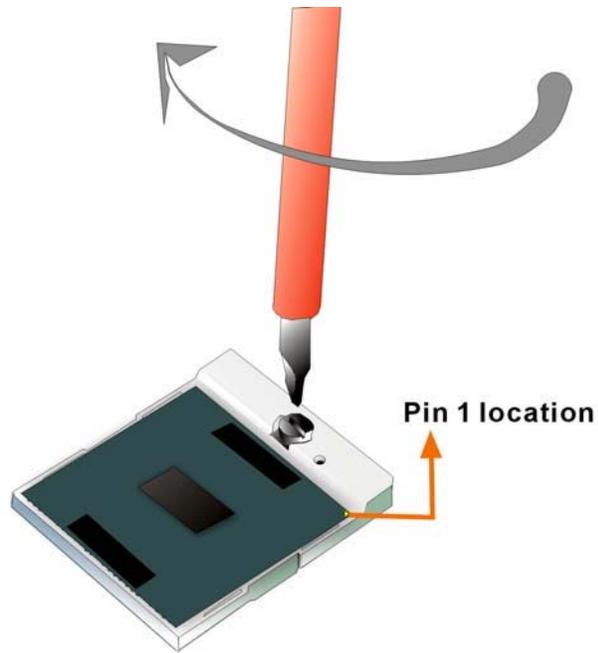
Figure 4-2: Lock the CPU Socket Retention Screw

4.3.2 Cooling Kit Installation

Figure 4-3: Cooling Kit

GAI provides a cooling kit designed for socket 479 CPUs. (See **Figure 4-3**)   The cooling kit is comprised of a CPU heatsink and a cooling fan.

![NOTE icon] **NOTE:**

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

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

Step 1: **Place the cooling kit onto the CPU**.   Make sure the CPU cable can be properly routed when the cooling kit is installed.

Step 2: **Properly align the cooling kit**. Make sure its four threaded screw fasteners can pass through the pre-drilled holes on the PCB.

Step 3: **Secure the cooling kit**. From the solder side of the PCB, align the provided nut caps to the heatsink screw threads that protrude through the PCB holes. Without over tightening the nut caps, insert them onto the protruding screw threads to secure the cooling kit to the PCB board. (See **Figure 4-4**)
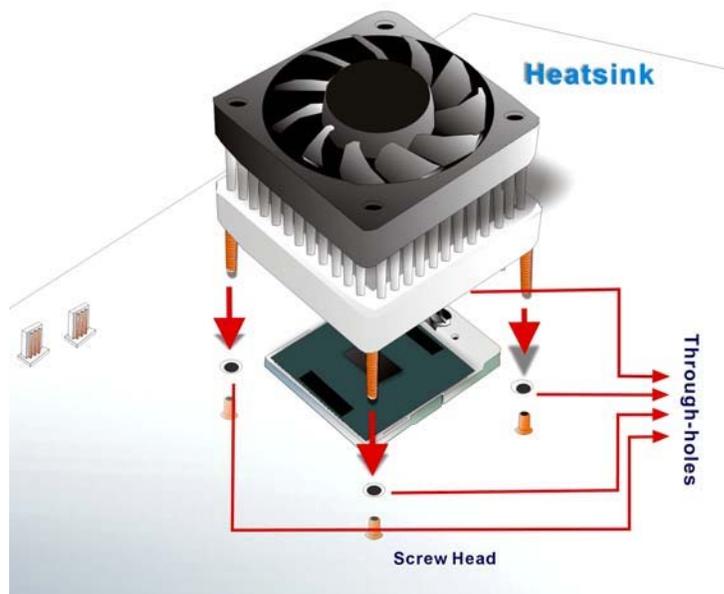
Figure 4-4: Securing the Cooling Kit

Step 4: **Connect the fan cable**. Connect the cooling kit fan cable to the FAN2 connector

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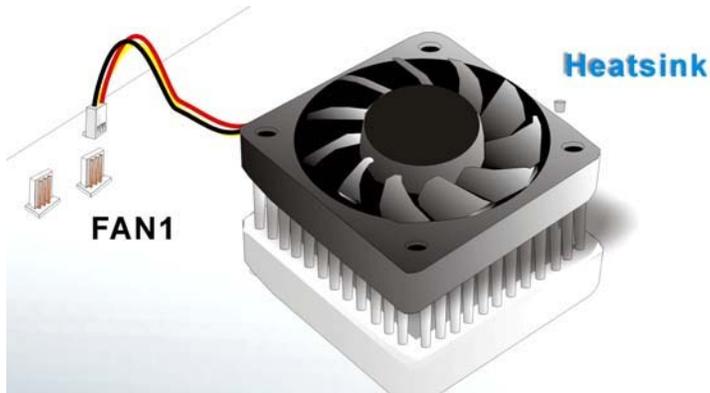
Figure 4-5: Connect the cooling fan cable

4.3.3 DIMM Module Installation

4.3.3.1 Purchasing the Memory Module

WARNING!

The DDR2 architecture is not compatible with DDR1 modules.   If   the system is installed with DDR1 modules, damage might occur and may become inaccessible

When purchasing the SODIMM modules, the following considerations should be taken into account:

- ƒ   The maximum SODIMM capacity supported is 1GB
- ƒ   The maximum SODIMM frequency supported is 266MHz.
- ƒ   The SODIMM chip must be a 200-pin memory chip

4.3.3.2 DIMM Module Installation

The 3302160 board has one 200-pin SODIMM socket. To install the SODIMM module, follow the instructions below.

Step 1:   Turn the 3302160 over so that the SODIMM socket is facing up.

Step 2: Push the SODIMM chip into the socket at an angle.

Step 3: Gently pull the arms of the SODIMM socket out and push the rear of the SODIMM module down.

Step 4: Release the arms on the SODIMM socket. They clip into place and secure the SODIMM module in the socket.

4.3.4 Peripheral Device Connection

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

Quantity	Type
1	ATA 66/100 flat cable
1	ATX 12V power cable
1	Audio Cable
1	Keybaord/PS2 mouse Y cable
2	SATA cables
1	SATA power cable
2	RS-232 cables

Table 4-1: Provided Cables

4.3.4.1 IDE Disk Drive Connector (IDE1)

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

Step 1: Find the ATA 66/100 flat cable in the kit that came with the motherboard.

Step 2: Connect one end of the cable to the IDE1 connector on the motherboard. 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.

NOTE:

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

4.4   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 motherboard can be mounted into chassis.

To mount the motherboard 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.

4.5.4 Keyboard and Mouse Connection

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

Watchdog Timer

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMI or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

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

INT 15H:

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

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. While the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the Watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

> When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system resets.

Example program:

```
; INITIAL TIMER PERIOD COUNTER
;
W_LOOP:

        MOV     AX, 6F02H           ;setting the time-out value
        MOV     BL, 30              ;time-out value is 48 seconds
        INT     15H
;
; ADD THE APPLICATION PROGRAM HERE
;
        CMP     EXIT_AP, 1          ;is the application over?
        JNE     W_LOOP          ;No, restart the application

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

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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
2E8-2EF	Serial Port 4 (COM4)
2F8-2FF	Serial Port 2 (COM2)
378-37F	Parallel Printer Port 1 (LPT1)
3B0-3BB	SiS661CX Graphics Controller
3C0-3DF	SiS661CX Graphics Controller
3E8-3EF	Serial Port 3 (COM3)
3F6-3F6	Primary IDE Channel
3F7-3F7	Standard floppy disk controller
3F8-3FF	Serial Port 1 (COM1)

Table C-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	COM 4
IRQ3	COM2	IRQ11	COM 3
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: DMA Channel Assignments

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Appendix

C

External AC'97 Audio
CODEC

C.1 Introduction

The motherboard comes with an onboard Realtek ALC655 CODEC. Realtek ALC655 is a 16-bit, full duplex AC'97 Rev. 2.3 compatible audio CODECwith a sampling rate of 48KHz.

C.1.1 Accessing the AC'97 CODEC

The CODEC is accessed through three phone jacks on the rear panel of the motherboard. The phone jacks include:

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.

C.1.2 Driver Installation

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

After rebooting the sound effect configuration utility appears in the Windows Control Panel (see **Figure 6-25**). If the peripheral speakers are properly connected, sound effects should be heard.
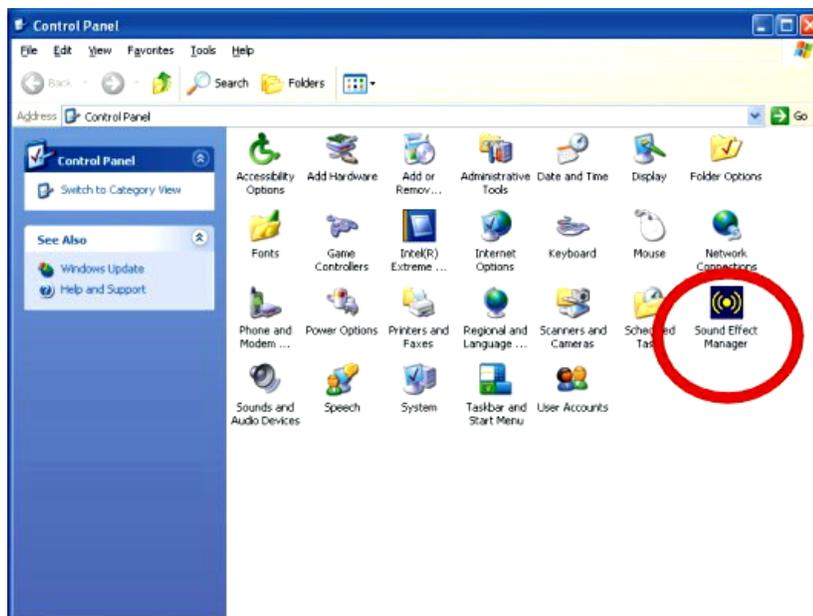
Figure 6-25: Sound Effect Manager con

C.2 Sound Effect Configuration

C.2.1 Accessing the Sound Effects Manager

To access the **Sound Effects Manager**, please do the following:

Step 1: Install the audio CODEC driver.

Step 2: Click either:

ƒ The Sound Effect Manager icon in the Notification Area of the system task bar (see Figure 6-26), or

ƒ The Sound Effect Manager icon in the Control Panel (Figure 6-27).
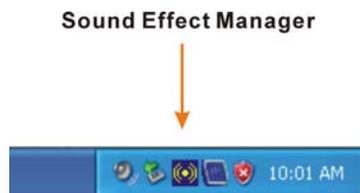
Figure 6-26: Sound Effect Manager Icon [Task Bar]
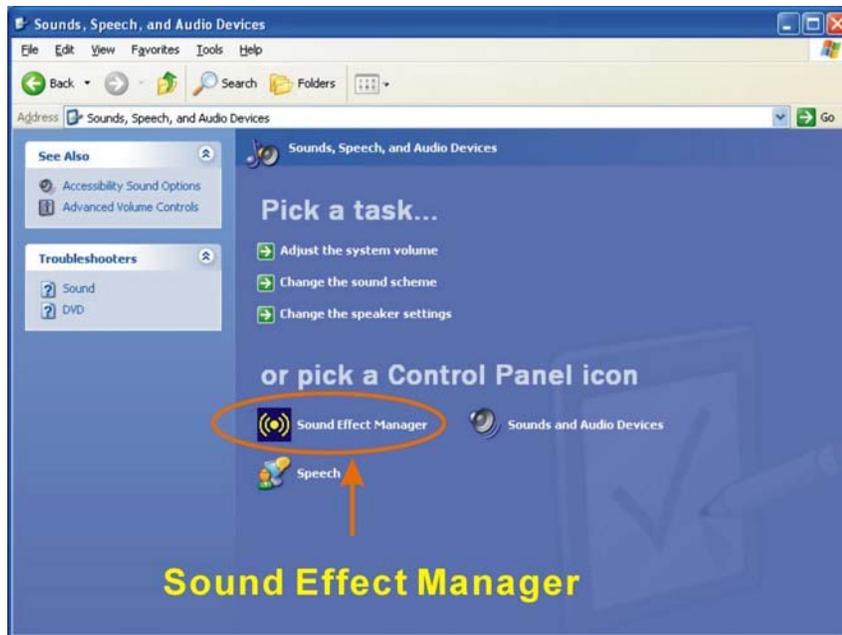
Figure 6-27: Sound Effect Manager Icon [Control Panel]

Step 3: The sound effect manager appears. (See **Figure 6-28**)
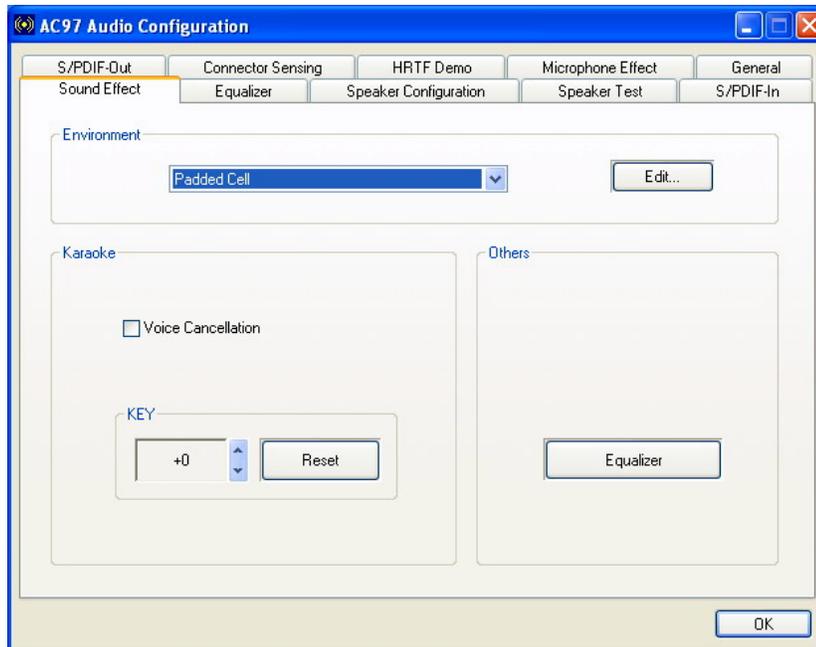
Figure 6-28: Sound Effects Manager (ALC655)

![NOTE icon] **NOTE:**

The Sound Effect Manager shown in **Figure 6-28** is for the RealTek ALC655 audio CODEC. Different CODECs may have different sound manager appearances.

The following section describes the different configuration options in the Sound Effect Manager.

C.2.2 Sound Effect Manager Configuration Options

The **Sound Effects Manager** enables configuration of the items listed below. To configure these items click the corresponding menu tab in the **Sound Effects Manager** in **Figure 6-28**.

The **Karaoke Mode** is configured in the **Sound Effect** menu. To access Karaoke configuration settings, click on the **Sound Effect** menu tab.

- ∫ Sound Effect
- ∫ Karaoke Mode
- ∫ Equalizer
- ∫ Speaker Configuration
- ∫ Speaker Test
- ∫ S/PDIF-In
- ∫ S/PDIF-Out
- ∫ Connector Sensing
- ∫ HRTF Demo
- ∫ Microphone Effect
- ∫ General

Not all RealTek **Sound Effect Managers** have all the above listed options. The Sound Effect Manager loaded onto the system may only have some of the options listed above.

Below is a brief description of the available configuration options in the **Sound Effects Manager**.

- ∫ *Sound Effect*:- Select a sound effect from the 23 listed options in the drop down menu. Selected sound effect properties can be edited. To edit the sound effect click "**EDIT**."
- ∫ *Karaoke Mode*:- The **Karaoke Mode** is accessed in the Sound Effect window. The **Voice Cancellation** disables the vocal part of the music being played. The **Key adjustment** up or down arrow icons enables

users to define a key that fits a certain vocal range.

ƒ   ***Equalizer Selection***:- Preset equalizer settings enable easy audio range settings. Ten frequency bands can be configured.

ƒ   ***Speaker Configuration***:- Multi-channel speaker settings are configured in this menu. Configurable options include:

- O   Headphone
- O   Channel mode for stereo speaker output
- O   Channel mode for 4 speaker output
- O   Channel mode for 5.1 speaker output
- O   Synchronize the phonejack switch with speakers settings

ƒ   ***Speaker Test***:- Each speaker connected to the system is tested individually to see if the 4-channel or 6-channel audio operates properly.

ƒ   ***S/PDIF-In & S/PDIF-Out***:- These functions are currently not supported.

ƒ   ***Connector Sensing***:- Realtek ALC655 detects if an audio device is plugged into the wrong connector. If an incorrect device is plugged in a warning message appears.

ƒ   ***HRTF Demo***:- Adjust HRTF (Head Related Transfer Functions) 3D positional audio here before running 3D applications.

ƒ   ***Microphone Effect***:- Microphone noise suppression is enabled in this menu.

ƒ   ***General***:- General information about the installed AC'97 audio configuration utility is listed here.

RAID Setup

D.1 Introduction

D.1.1 RAID Support

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

- ʃ JBOD
- ʃ RAID0
- ʃ RAID1

D.1.2 What is RAID

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

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

D.2 RAID Setup

D.2.1 Introduction

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

Step 4: Two SATA drives must be installed onto the system.

Step 5: The RAID BIOS must be configured.

RAID drivers must be copied onto a floppy disk.

D.2.2 Copy the RAID Driver

Before configuring the RAID on the system, copy the RAID driver from the driver CD that came with the system onto a floppy disk. To do this, follow the steps below.

Step 1: Insert the CD into a computer.

Step 2: Open the "**ROCKY Driver**" CD directory.

Step 3: Open the **RAID 304c** directory (see **Figure D-1**)**.**

Figure D-1: RAID 304C Subdirectory

Step 4: Select the **964_180** subdirectory (see **Figure D-2**).

Figure D-2: RAID 304C Subdirectory

Step 5: The following subdirectories appear (see **Figure D-3**)

   ƒ Srv2003
   ƒ Win2000
   ƒ Winxp
   ƒ WS03XP64

Figure D-3: Select OS Directory Corresponding to the OS

Step 6: These directories all contain drivers compatible with different OSes. Select the directory for the OS used on the system and copy all the files onto a separate floppy disk drive.

D.2.3   Install SATA Drives

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

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 the 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 the **Exit** menu appears, select the "**Save Changes and Exit**" menu option.

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 the system. Wait for the POST to be complete.

Step 2:   The system prompts the user to press <**CTRL**> and <**S**> to enter the BIOS RAID
Setup Utility (see **Figure D-4**).
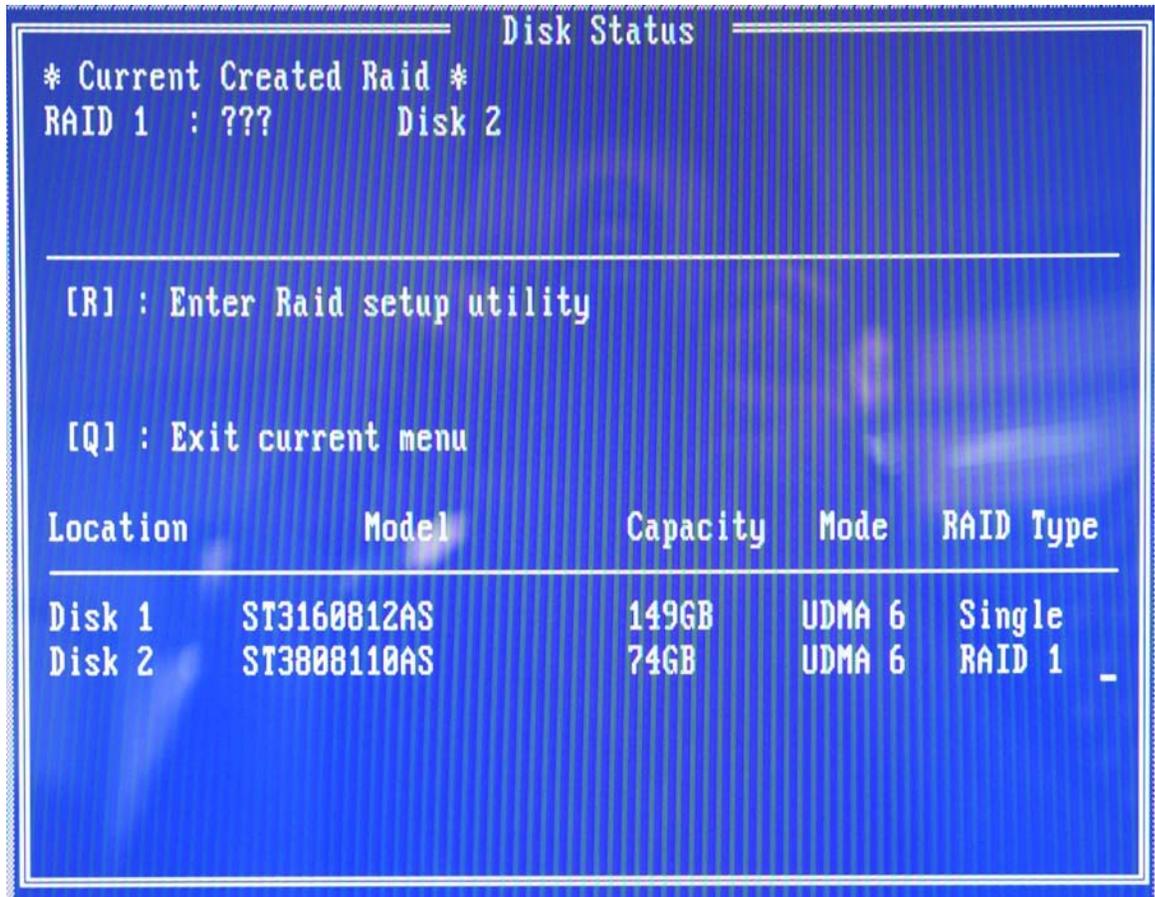
Figure D-4: BIOS RAID Utility

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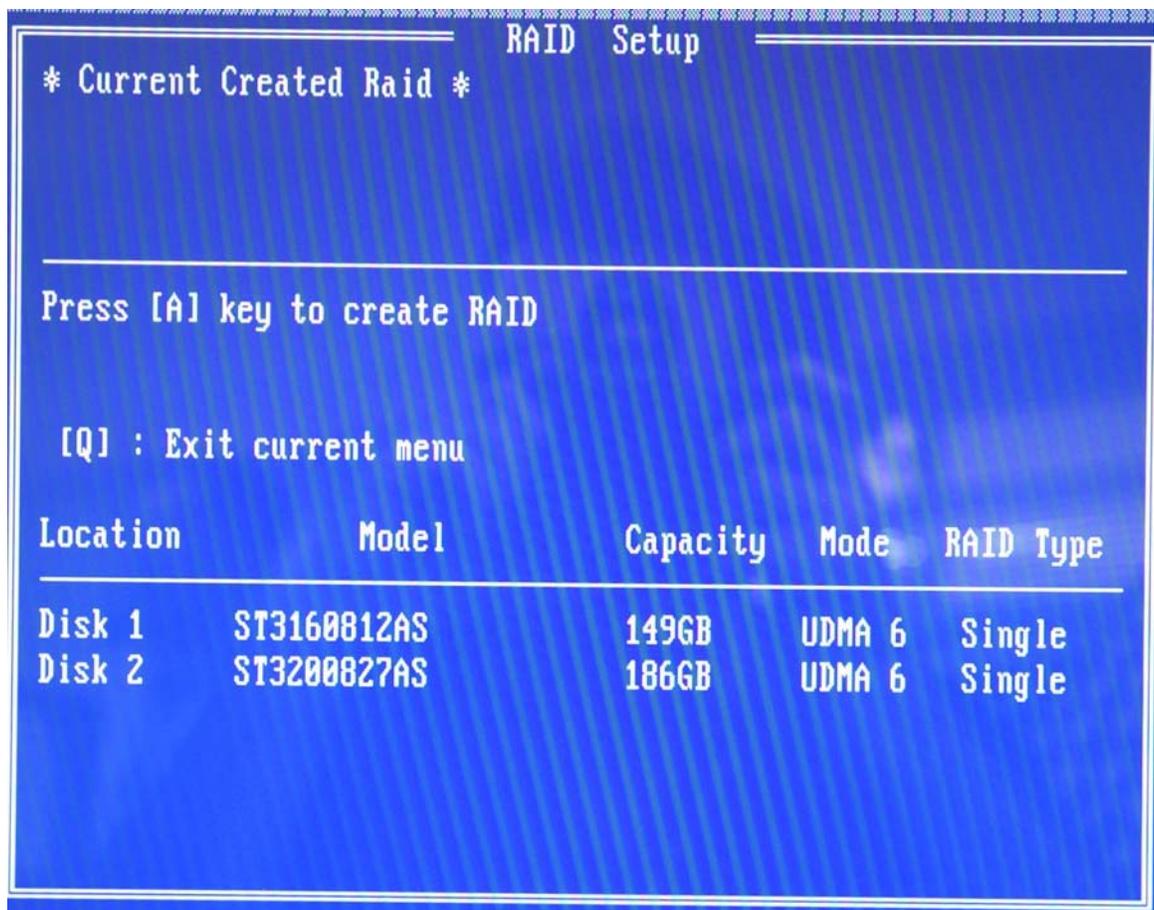
 Figure E-5: Create RAID

Step 4: Click "**A**" to setup the RAID(see **Figure D-5**).

Step 5: The system then prompts the user to select the RAID configuration type. JBOD,

RAID0 or RAID1. Select the desired RAID configuration (see **Figure D-6**).

```
                        ══════ RAID  Setup ══════
* Current Created Raid *



 ────────────────────────────────────────────────────────────────
RAID Type :<1> JBOD <2> RAID 0 <3> RAID 1 : _


  [Q] : Exit current menu

 Location           Model           Capacity    Mode    RAID Type
 ───────────────────────────────────────────────────────
 Disk 1      ST3160812AS            149GB       UDMA 6   Single
 Disk 2      ST3200827AS            186GB       UDMA 6   Single
```
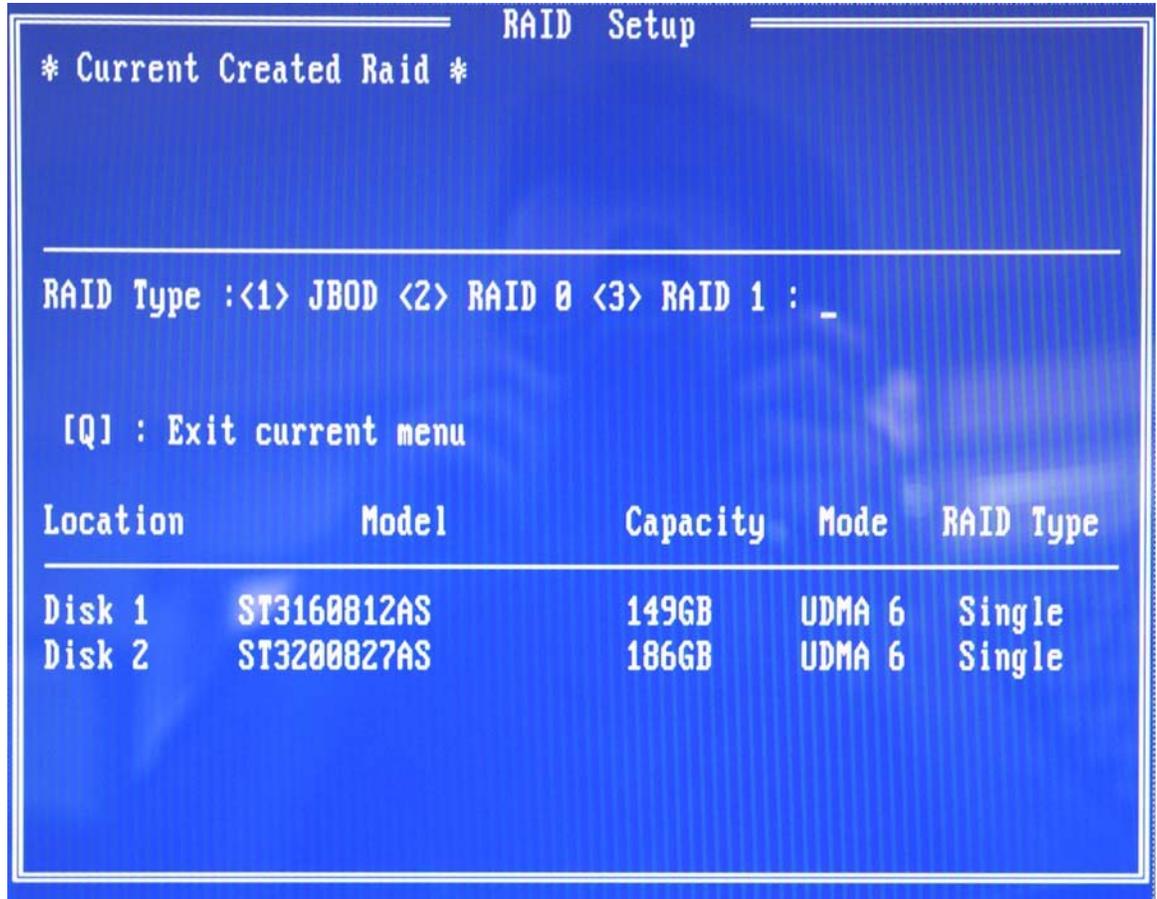
Figure D-6: Create RAID

Step 6: The system then prompts the user to "**Auto Create**" or "**Manual Create**" (see

    Figure D-7).
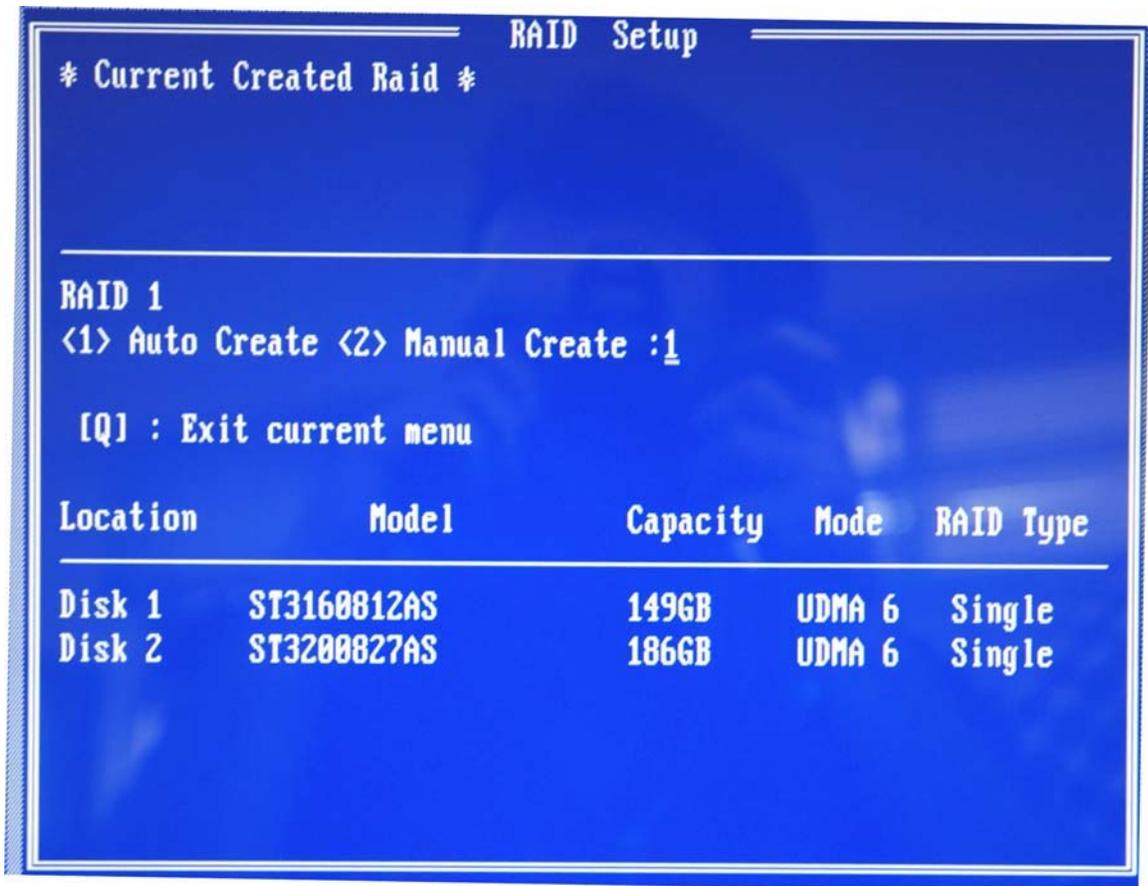
Figure D-7: Select "Auto"

Step 7: The user is prompted to **Auto Create** or **Manual Create**. Select **Auto Create** (see **Figure D-8**).

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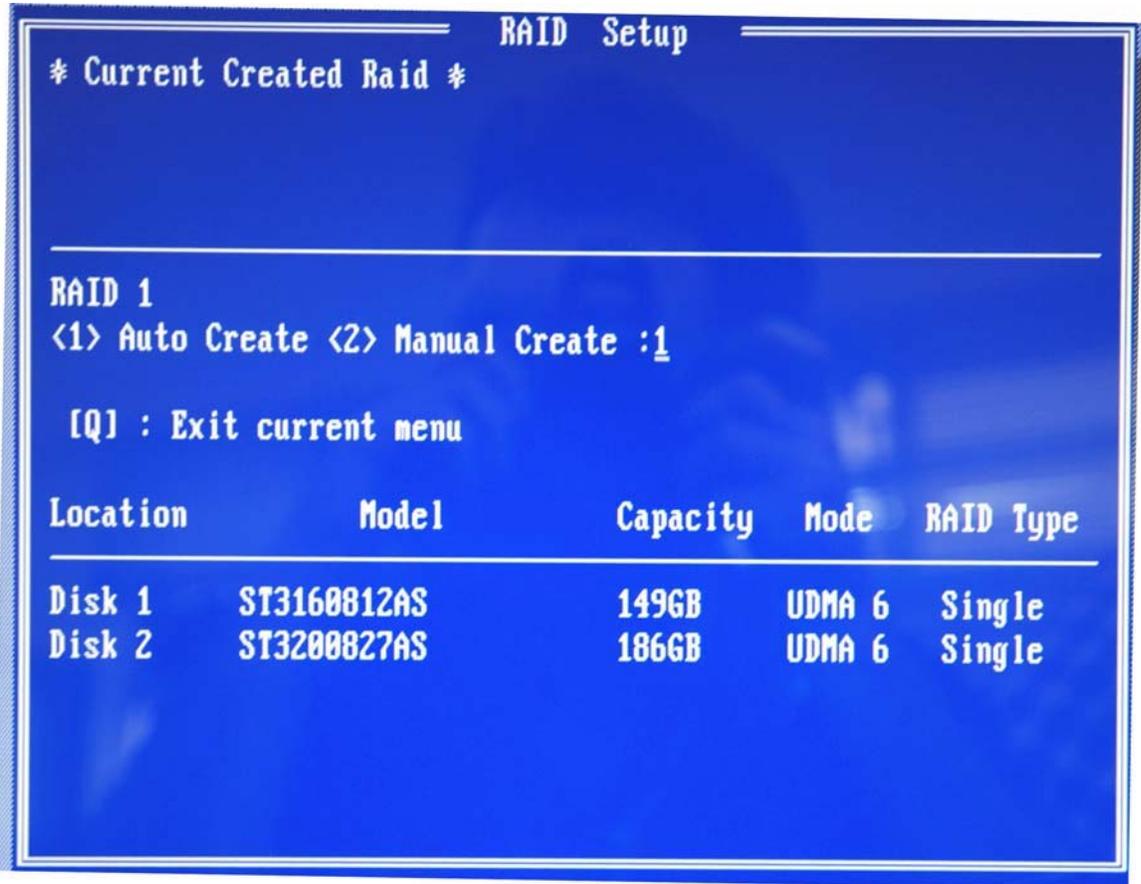
Figure D-8: Select "Auto"

Step 8: After the RAID configuration is complete, save the changes and exit the RAID configuration utility.

D.2.6 Install the OS

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

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

Step 2: Restart the system.

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

Step 4: A message informs the user the OS is unable to determine the mass storage device installed on the system. At this point, insert the FDD with the copied RAID

driver files into the FDD drive. The OS accesses the SATA drives through this disk.

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

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

Step 7: The OS continues to be installed and the RAID on the SATA drives configured.

Any advice or comments about our products and service, or anything we can help you with please don't hesitate to contact with us. We will do our best to support you for your products, projects and business.

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