IEI Technology Corp.

MODEL:
NANO-GX2

EPIC SBC with AMD Geode™ GX 466 CPU with onboard RAM, CompactFlash, Mini PCI, IDE, VGA, LAN, USB 2.0, and Audio

User Manual

Rev. 1.0 May, 2008

RoHS Lead Free

Revision

Date	Version	Changes
May, 2008	1.00	Initial release

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Manual Conventions

WARNING!

Warnings appear where overlooked details may cause damage to the equipment or result in personal injury. Warnings should be taken seriously. Warnings are easy to recognize. The word "warning" is written as "**WARNING**," both capitalized and bold and is followed by text. The text is the warning message. A warning message is shown below:

WARNING:

This is an example of a warning message. Failure to adhere to warning messages may result in permanent damage to the NANO-GX2 or personal injury to the user. Please take warning messages seriously.

CAUTION!

Cautionary messages should also be heeded to help reduce the chance of losing data or damaging the NANO-GX2. Cautions are easy to recognize. The word "caution" is written as "**CAUTION**," both capitalized and bold and is followed. The text is the cautionary message. A caution message is shown below:

CAUTION:

This is an example of a caution message. Failure to adhere to cautions messages may result in permanent damage to the NANO-GX2. Please take caution messages seriously.

NOTE:

These messages inform the reader of essential but non-critical information. These messages should be read carefully as any directions or instructions contained therein can help avoid making mistakes. Notes are easy to recognize. The word "note" is written as "**NOTE**," both capitalized and bold and is followed by text. The text is the cautionary message. A note message is shown below:

NOTE:

This is an example of a note message. Notes should always be read. Notes contain critical information about the NANO-GX2. Please take note messages seriously.

Packing List

NOTE:

If any of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the NANO-GX2 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

The items listed below should all be included in the NANO-GX2 package.

- 1 x NANO-GX2 single board computer
- 1 x 44-pin IDE cable
- 1 x Audio cable
- 1 x Dual port USB cable
- 1 x Mini jumper pack
- 1 x Utility CD
- 1 x QIG (quick installation guide)

Images of the above items are shown in **Chapter 3**.

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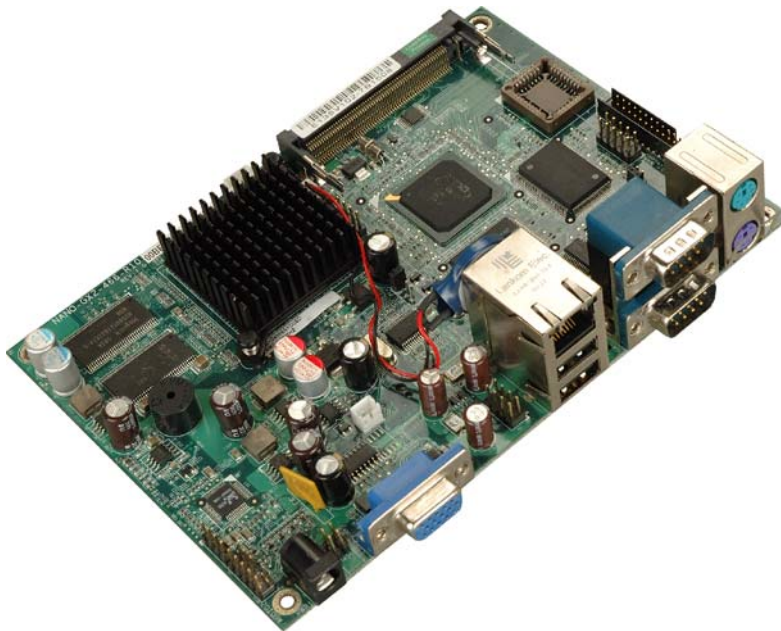
Figure 1-1: NANO-GX2

The EPIC form factor NANO-GX2 is a highly integrated CPU card for embedded computers, specifically optimized for multi-media applications requiring minimum installation space. The NANO-GX2 is particularly suitable for low power and fan-less applications. The NANO-GX2 supports a full range of functionality for an AT/ATX-compatible industrial computer in a space-saving 3.5" profile. The NANO-GX2 is equipped with an on board low-power consumption and high performance AMD Geode™ GX 466 processor. The NANO-GX2 also includes 128 MB of DDR memory onboard.

1.1.1 Applications

The NANO-GX2 motherboard has been designed for thin client applications. The low power consumption and embedded processor provide adequate computing power for these applications. The fanless design ensures a quiet and more reliable computer setup.

1.1.2 Benefits

Some of the NANO-GX2 motherboard benefits include,

- 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
- small form factor ideally suited for thin client applications

1.1.3 Features

Some of the NANO-GX2 motherboard features are listed below:

- EPIC form factor
- RoHS compliant
- Embedded AMD Geode™ GX 466 CPU
- Mini PCI expansion slot
- 128 MB DDR memory
- One high performance Ethernet (10/100M) controller
- Supports up to four USB 2.0 devices
- Integrated audio

1.2 General Overview
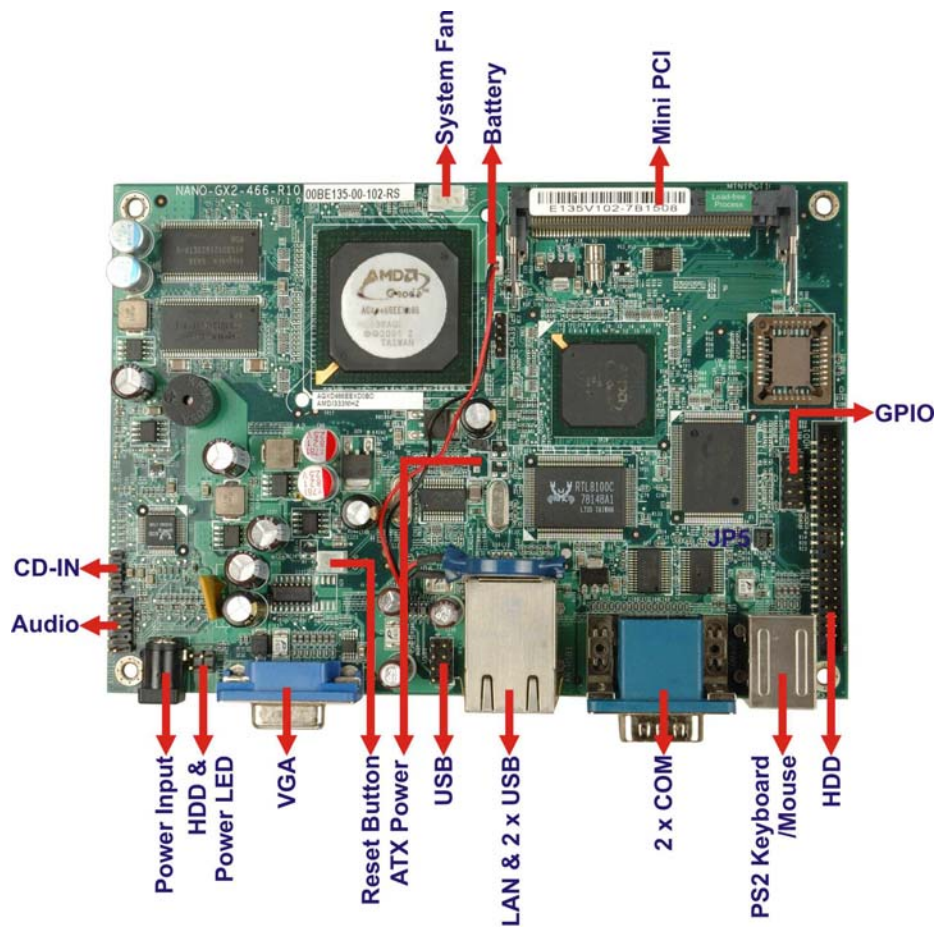
Figure 1-2: Overview (Front Side)
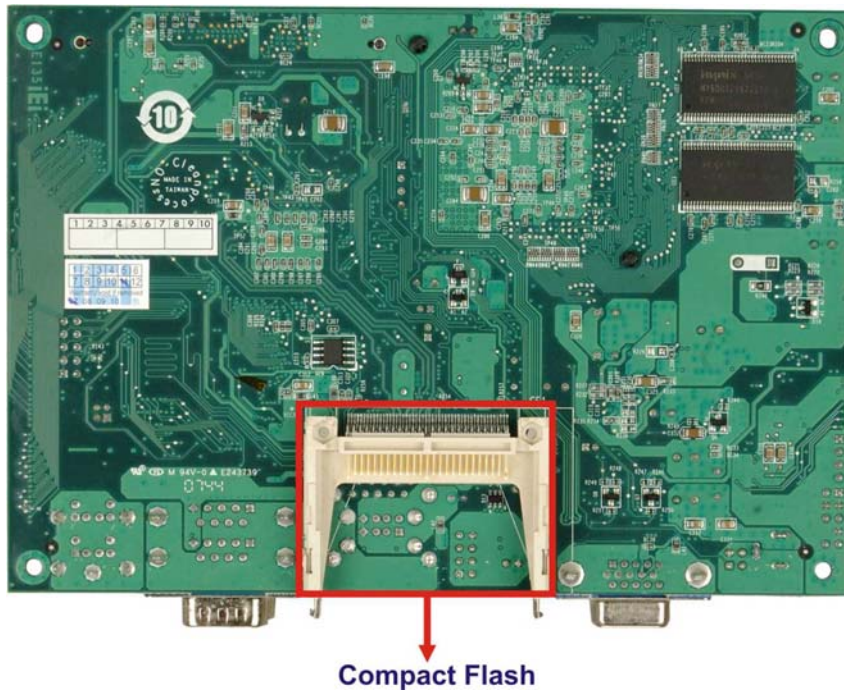
Figure 1-3: Overview (Solder Side)

1.2.1 CPU Board Connectors

The NANO-GX2 has the following connectors onboard:

The NANO-GX2 has the following external peripheral interface connectors:

The NANO-GX2 has the following onboard jumpers:

The location of these connectors on the motherboard can be seen in **Figure 4-1**. These connectors are fully described in **Chapter 4**.

1.2.2 Technical Specifications

NANO-GX2 motherboard technical specifications are listed in **Table 1-1**. Detailed descriptions of each specification can be found in **Chapter 2**.

SPECIFICATION	NANO-GX2
Form Factor	EPIC
CPUs Supported	AMD Geode™ 466
CPU Speed	333 MHz
System Chipset	AMD Geode™ CS5536
Display	CRT integrated in the AMD Geode™ GX 466
Memory	128 MB DDR RAM onboard (256 MB option available)
BIOS	Award BIOS Label
SSD	CompactFlash® (CF)
Super I/O	Winbond W83627EHG
Audio	Realtek ALC203 AC'97 Codec
LAN	Realtek RTL8100C
COM	Two RS-232 ports

SPECIFICATION	NANO-GX2
USB2.0	Two external USB 2.0 ports One internal USB 2.0 pin header (for two USB 2.0 ports)
IDE	One 44-pin IDE connects to two Ultra ATA33/66/100 devices
KB/MS	One PS/2 connector for keyboard One PS/2 connector for mouse
WDT	Software programmable 1-255 sec. by super I/O
Digital I/O	8-bit digital I /O (4-bit input and 4-bit output) by super I/O
Fan connector	One 3-pin for CPU Fan
Expansion	One Mini PCI expansion slot
Power	+5 V only, AT/ATX support
Temperature	0ºC ~ 60ºC
Humidity	5% ~ 95% non-condensing
Dimensions	115mm x 165mm
Weight	GW: 950g; NW: 350g

Table 1-1: Technical Specifications

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Chapter

2

Detailed Specifications

2.1 Overview

This chapter describes the specifications and on-board features of the NANO-GX2 in detail.

2.2 Dimensions

2.2.1 Board Dimensions

The dimensions of the board are listed below:

- **Length**:   165mm
- **Width**:   115mm
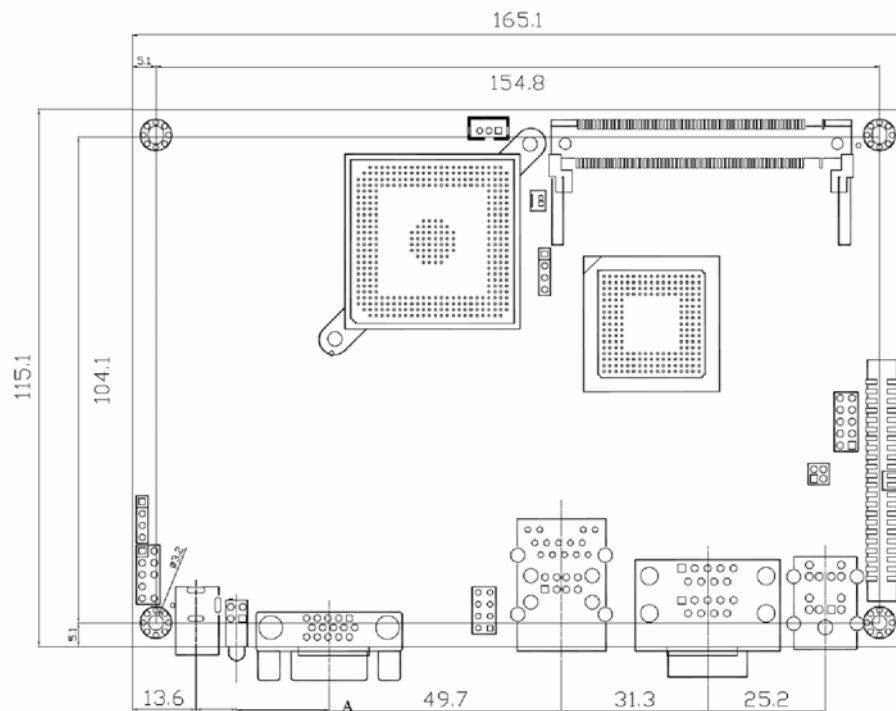
Figure 2-1: NANO-GX2 Dimensions (mm)

2.2.2 External Interface Panel Dimensions

External peripheral interface connector panel dimensions are shown in **Figure 2-2**.
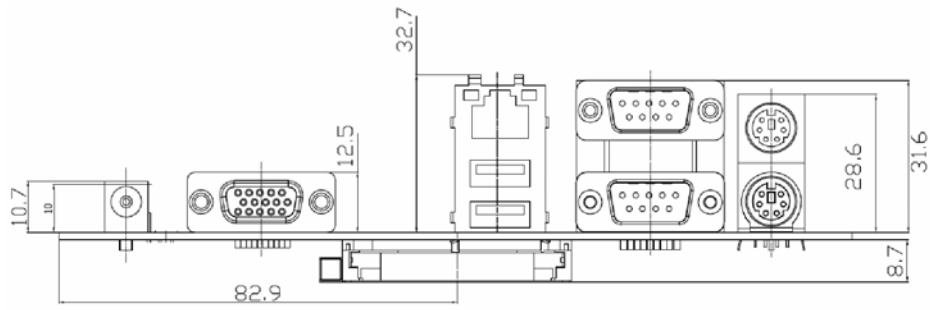
Figure 2-2: External Interface Panel Dimensions (mm)

2.3 Data Flow

The NANO-GX2 motherboard comes with an AMD Geode™ GX 466 and an AMD Geode™ CS5536 linked together by the GeodeLink™ Interface Unit. **Figure 2-3** shows the data flow between the system chipset, the CPU and other components installed on the motherboard.
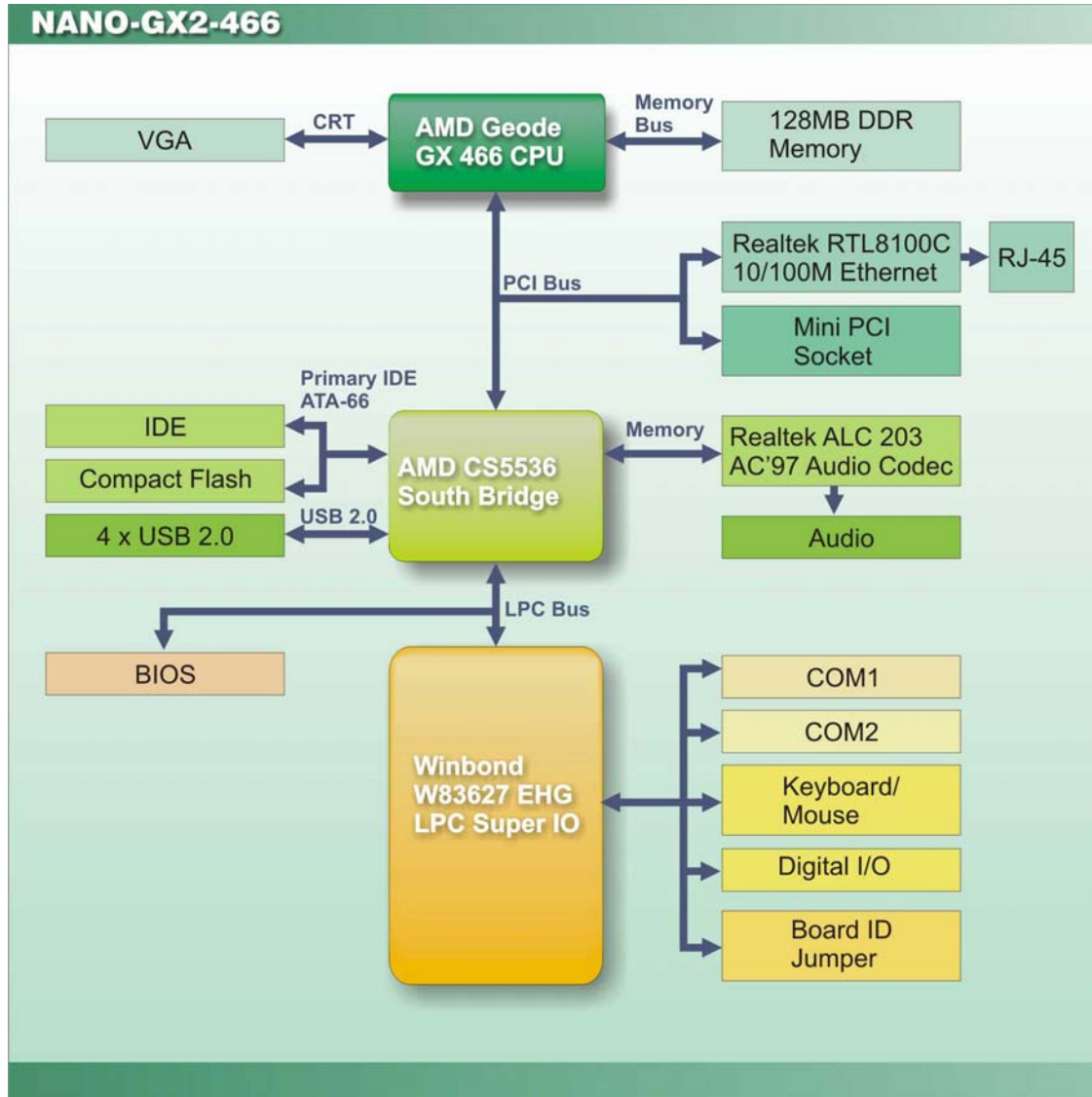
Figure 2-3: Data Flow Block Diagram

2.4 Embedded AMD Geode™ GX 466 CPU

The NANO-GX2 series motherboards all come with a preinstalled AMD Geode™ GX 466 333 MHz CPU.
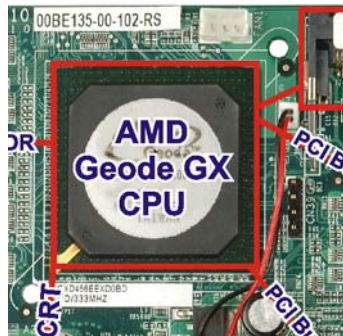
Figure 2-4: AMD Geode GX

The specifications for the 333 MHz AMD Geode™ GX 466 are listed below.

- 32-bit low-power x86 processor with support for MMX and 3DNow! technology extensions
- 32KB of level 1 cache, 16KB instruction and 16KB data
- High-performance patented GeodeLink™ architecture
- Integrated display controller
  - Integrated video DACs and integrated TFT interface for flexible output options: CRT or TFT (bond-out option or strap selectable depending on package)
- PCI 66MHz bus
  - Industry standard PCI 2.2 specification compliant
  - Write gathering and write posting of inbound write requests
  - Supports fast back-to-back transactions
- 64-bit DDR memory controller
- Integrated thermal diode
- Optimized Unified Memory Architecture (UMA) with patented compression technology

Power management features for the AMD GX 466 processor are listed below:

- 3.4W max. @ 333 MHz (CRT)

- Block level gating

- Active hardware power management

- Software power management

- Low power I/O

2.5 Graphics Support
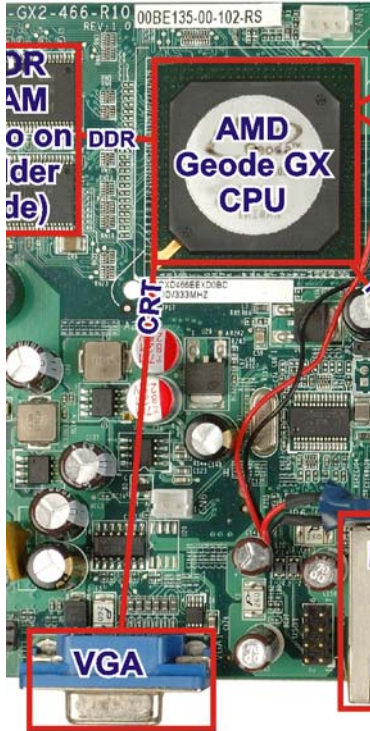
Figure 2-5: Graphics Support

Table 2-1 lists the NANO-GX2 graphics processor features.

Feature	AMD Geode™ GX 466 Processor
Color Depth	32 (24 plus 8 alpha blending)
ROPs	256
BLT Buffers	FIFOs in GP
BLT Splitting	Managed by hardware
Video Synchronized BLT/Vector	Throttle by VBLANK

Feature	AMD Geode™ GX 466 Processor
Bresenham Lines	Yes
Screen to Screen BLT	Yes
Screen to Screen BLT with mono expansion	Yes
Memory to Screen BLT	Yes (through CPU writes)
Accelerated Text	No
Pattern Size (Mono)	8x8 pixels
Pattern Size (Color)	8x1 (32 bpp), 8x2 (16 bpp), 8x4 (8 bpp)
Monochrome Pattern	Yes
Dithered Pattern (4 color)	No
Color Pattern	8, 16, 32 bpp
Transparent Pattern	Monochrome
Solid Fill	Yes
Pattern Fill	Yes
Transparent Source	Monochrome
Color Key Source Transparency	Yes with mask
Variable Source Stride	Yes
Variable Destination Stride	Yes
Destination Write Bursting	Yes
Selectable BLT Direction	Vertical and Horizontal
Alpha BLT	Yes
VGA Support	Decodes VGA Register

Table 2-1: Geode™ GX Graphics Processor Features

2.6 Memory Support

128 MB DDR RAM is embedded on the NANO-GX2. An option of 256 MB of DDR RAM embedded in the board is available.
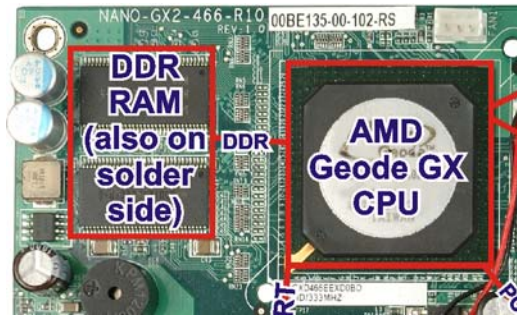
Figure 2-6: Onboard DDR RAM

2.7 GeodeLink™ PCI Bridge

2.7.1 GeodeLink™
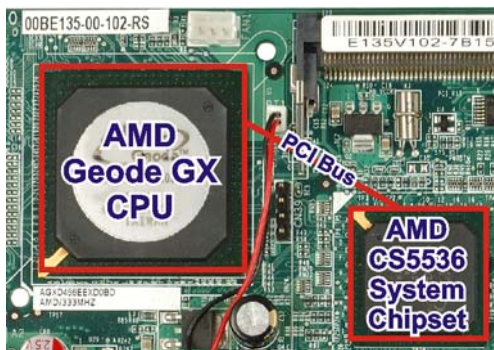
Figure 2-7: GeodeLink™

The GeodeLink™ PCI Bridge (GLPCI) module provides a PCI interface for GeodeLink Interface Unit-based designs. The GLPCI module is composed of six major blocks:

- GeodeLink Interface
- FIFO/Synchronization
- Transaction Forwarding
- PCI Bus Interface
- PCI Arbiter

The GeodeLink™ and PCI Bus Interface blocks provide adaptation to the respective buses. The Transaction Forwarding block provides bridging logic. Some of the features of the GeodeLink™ PCI Bridge are listed below:

- PCI Version 2.2 compliance

- 32-bit, 66 MHz PCI bus operation

- Target support for fast back-to-back transactions

- Arbiter support for three external PCI bus masters

- Write gathering and write posting for in-bound write requests

- Virtual PCI header support

- Delayed transactions for in-bound read requests

- Zero wait state operation within a PCI burst

- Dynamic clock stop/start support for GLIU and PCI clock domains (this is not CLKRUN support)

- Capable of handling out of bound transactions immediately after reset

2.7.2 10/100 Mb/s Ethernet
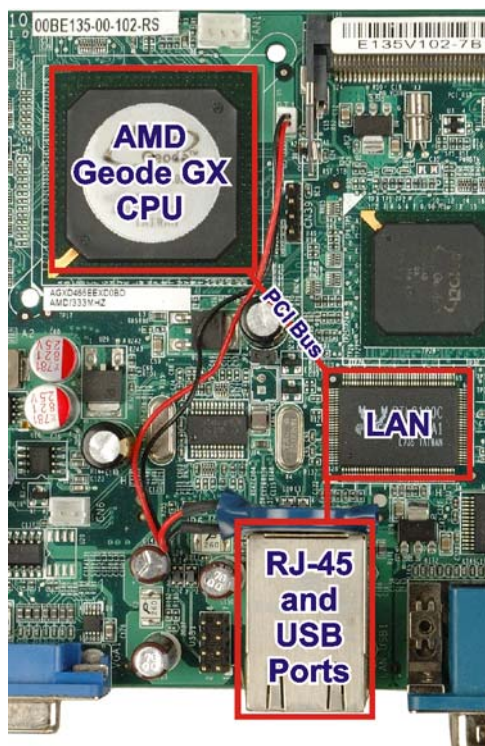
Figure 2-8: 10/100 Mb/s Ethernet

A highly integrated and cost-effective single-chip, fast Realtek RTL8100C 10/100 Mb/s Ethernet controller is interfaced through first the PCI bus and then through the GeodeLink™ PCI Bridge to the CPU and system chipset. The Realtek RTL8100C

controller provides 10 Mb/s or 100 Mb/s Ethernet connectivity to the NANO-GX2. Some of the features of the RealTek RTL8100C are listed below.

- 10 Mb/s and 100 Mb/s operation
- Supports 10 Mb/s and 100 Mb/s N-way auto-negotiation
- Supports 25 MHz Crystal or 25 MHz OSC as the internal clock source
- Complies with PC99/PC2001 standards
- Supports ACPI power management
- Provides PCI bus master data transfer
- Provides PCI memory space or I/O space mapped data transfer
- Supports PCI clock speed of 16.75 MHz – 40 MHz
- Advanced power saving mode
- Supports Wake-on-LAN and remote wake-up (AMD Magic Packet™, Link Change, and Microsoft® Wake-up frame)
- Half/Full duplex capability
- Supports Full Duplex Flow Control (IEEE 802.3x)
- Provides interface to 93C46 EEPROM to store resource configuration and ID parameters
- Provides PCI clock run pin
- Provides LED pins for network operation status indication
- 2.5/3.3 V power supply with 5V tolerant I/Os

2.7.3 Mini PCI Expansion Slot

The Mini PCI expansion slot allows a Mini PCI card to be attached to the NANO-GX2. The Mini PCI slot is connected to the GeodeLink™ PCI interface.

Figure 2-9: Mini PCI Slot

2.8 AMD Geode™ CS5536 System Chipset

The NANO-GX2 motherboard has an AMD Geode™ CS5536 chipset installed. The AMD Geode™ CS5536 is a companion device for the AMD Geode™ GX 466 to create a high-performance, low-power x86 solution for embedded applications.
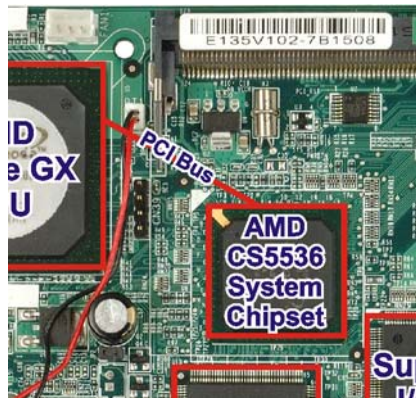
Figure 2-10: System Chipset

Technical specifications of the AMD Geode™ CS5536 chipset are listed below. For more information on these two chipsets, visit the AMD website.

- **GeodeLink™ Interface Unit**
  - 64-bit, 66 MHz operation
  - PCI VSM (Virtual System Module) that makes the interface transparent to applications software and BIOS
  - Programmable routing descriptors, use and activity monitors, and SSMI (Synchronous System Management Interrupt)
- **ATA-6 Controller**
  - 100 MB/second IDE Controller in UDMA mode per the ATA-6 specification
  - 5V interface
- **Flash Interface**
  - Multiplexed with IDE interface Connects to an array of industry standard NAND Flash and/or NOR Flash
- **USB Controller**
  - 4 USB ports

o   Supports both USB 1.1 and USB 2.0

o   4 host ports

▪ **Audio Codec 97 (AC97) Controller**

o   AC97 specification v2.3 compliant interface to multiple audio codecs: Serial In, Serial Out, Sync Out, Bit Clock In

o   Legacy "PC Beep" support

▪ **Diverse Device**

o   82xx Legacy Devices

o   IR Communication Port

o   System Management Bus (SMB) Controller

o   LPC (Low Pin Count) Port

o   General Purpose I/Os (GPIOs)

o   8 Multi-Function General Purpose Timers (MFGPTs)

o   Real-Time Clock (RTC) with CMOS RAM

▪ **Power Management Controller**

o   ACPI v2.0 compliant

2.8.1 GeodeLink™ Interface Unit

o   64-bit, 66MHz operation

o   PCI VSM (Virtual System Module) that makes the interface transparent to applications software and BIOS

o   Programmable routing descriptors, use and activity monitors, and SSMI (Synchronous System Management Interrupt)

2.8.2 ATA-6 Controller
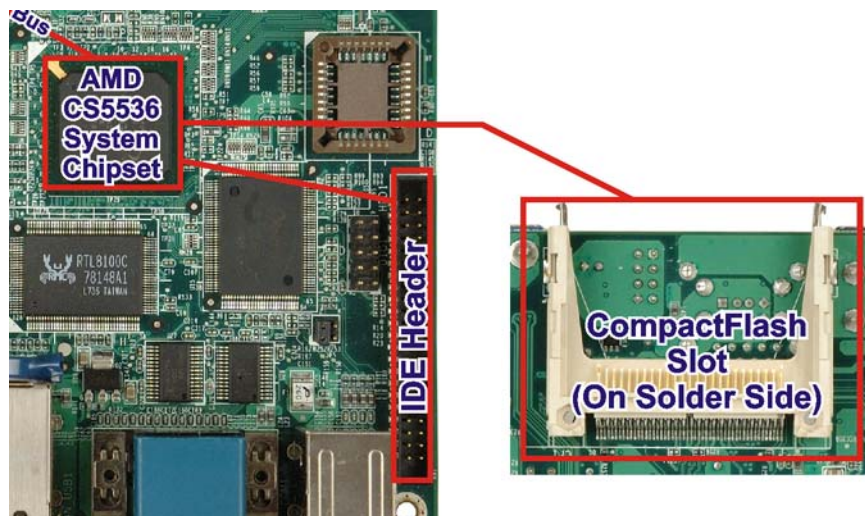
Figure 2-11: IDE Interface

The single NANO-GX2 IDE connector supports two ATA-6 HDDs and a CompactFlash® disk connected to the IDE interface.

The CompactFlash® slot support both Type I and Type II CompactFlash® cards.

An ATA-6 (Ultra ATA/100) compliant IDE controller on the AMD Geode™ CS5536 has a maximum transfer rate of 100 MB/s. ATA-6 includes advancements in error checking and ATA-6 drives are compatible with future interface additions.

The onboard ATA-6 controller is able to support the following IDE HDDs:

- **Ultra ATA/100**, with data transfer rates up to 100MB/s
- **Ultra ATA/66**, with data transfer rates up to 66MB/s
- **Ultra ATA/33**, with data transfer rates up to 33MB/s

Specification	Ultra ATA/100	Ultra ATA/66	Ultra ATA/33
IDE devices	2	2	2
PIO Mode	0 – 4	0 – 4	0 – 4
PIO Max Transfer Rate	16.6 MB/s	16.6 MB/s	16.6 MB/s
DMA/UDMA designation	UDMA 5	UDMA 4	UDMA 2

Specification	Ultra ATA/100	Ultra ATA/66	Ultra ATA/33
DMA/UDMA Max Transfer	100MB/s	66MB/s	33MB/s
Controller Interface	5V	5V	5V

Table 2-2: Supported HDD Specifications

2.8.3 AC'97 Controller

The AC'97 specification v2.3 compliant controller on the chipset is interfaced to a 20-bit DAC and 18-bit ADC full-duplex AC'97 2.3 stereo Realtek ALC203 codec. The ALC203 is then connected to a 10-pin audio connector to which an audio kit can easily be connected.
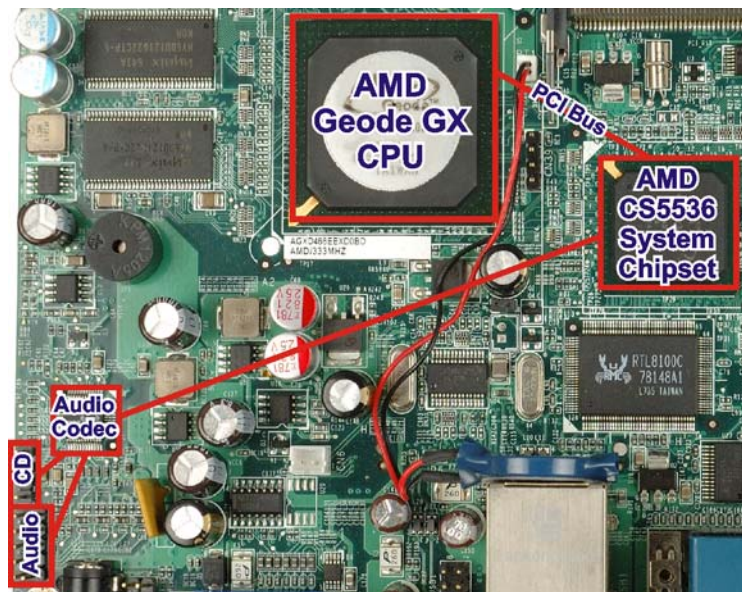
Figure 2-12: Onboard Audio

The codec meets performance requirements for audio on PC99/2001 systems. Some of the codec features are listed below.

- Meets Microsoft® WHQL/WLP 2.0 audio requirements
- 20-bit DAC and 18-bit ADC resolution
- 18-bit Stereo full-duplex CODEC with independent and variable sampling rate
- Complies with AC'97 2.3 specifications
  - LINE/HP-OUT, MIC-IN and LINE-IN sensing

o 14.318MHz -> 24.576MHz PLL saves crystal

o 12.288MHz BITCLK input can be consumed

o Integrated PCBEEP generator to save buzzer

o Interrupt capability

o Page registers and Analog Plug & Play

▪ Support of S/PDIF out is fully compliant with AC'97 rev2.3 specifications

▪ 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 input: PCBEEP, PHONE-IN

▪ Supports double sampling rate (96 KHz) of DVD audio playback

▪ Two software selectable MIC inputs

▪ +6/12/20/30 dB boost preamplifier for MIC input

▪ Stereo output with 6-bit volume control

▪ Mono output with 5-bit volume control

▪ Headphone output with 50mW/20Ohm amplifier

▪ 3D Stereo Enhancement

▪ Multiple CODEC extension capability

▪ External Amplifier Power Down (EAPD) capability

▪ Power management and enhanced power saving features

▪ Stereo MIC record for AEC/BF application

▪ DC Voltage volume control

▪ Auxiliary power to support Power Off CD

▪ Adjustable VREFOUT control

▪ 2 GPIO pins with smart GPIO volume control

▪ 2 Universal Audio Jacks (UAJ) for front panel

▪ Supports 32/44.1/48/96 KHz S/PDIF output

▪ Supports 32/44.1/48 KHz 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

- Sensaura™ 3D Enhancement (optional)
- 10 Bands of Software Equalizer
- Voice Cancellation and Key Shifting in Karaoke mode
- AVRack® Media Player

2.8.4 Flash Interface
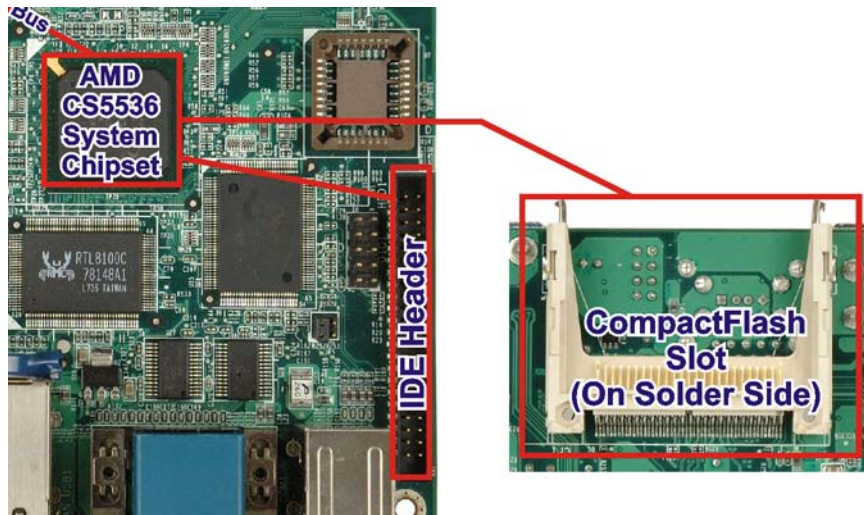
Figure 2-13: CompactFlash® Slot

The NANO-GX2 CompactFlash® socket supports standard CF Type I and CF Type II cards. The chipset flash interface is multiplexed with an IDE interface and can be connected to an array of industry standard NAND Flash or NOR Flash devices.
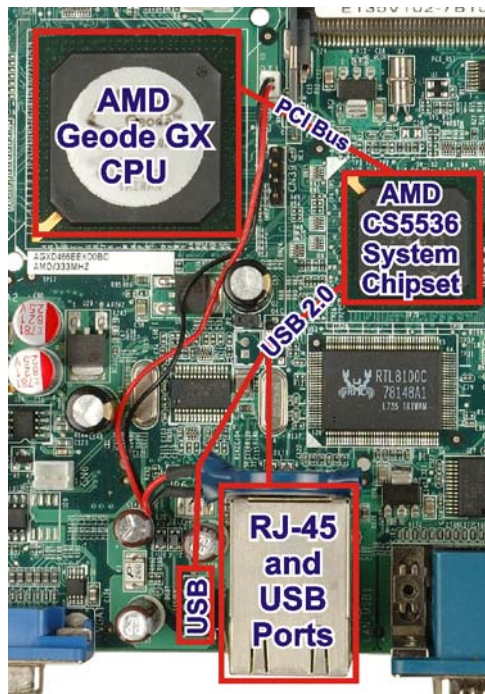
2.8.5 USB Controller

Figure 2-14: USB Ports

Four external USB ports on the NANO-GX2 board are interfaced to the chipset USB controller. Four USB 1.1 or USB 2.0 devices can be connected simultaneously to the NANO-GX2. The chipset USB controller has the following specifications:

- ○ 4 USB ports
- ○ USB 1.1 and USB 2.0 compliant
- ○ 4 host ports

2.8.6 Serial Communications
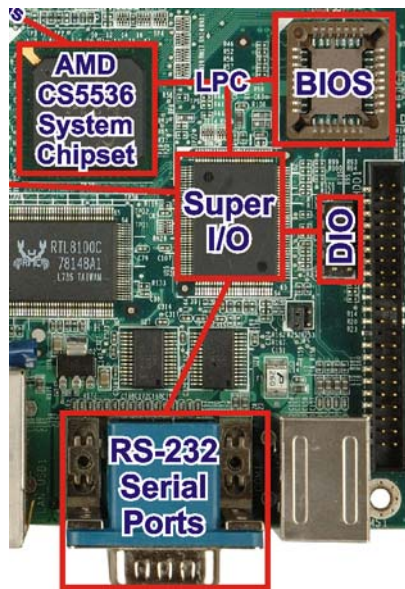
Figure 2-15: Serial Communications

Two high-speed UART serial port connectors (RS-232) are connected to the system chipset low pin count (LPC) port via the LPC bus. The specifications for the serial ports are listed below.

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

2.8.7 Real Time Clock

The system chipset has a battery backed up 256-byte real-time clock (RTC) with CMOS RAM.

2.8.8 BIOS

Figure 2-16: BIOS

The BIOS flash memory chip on the NANO-GX2 has a licensed copy of AWARD BIOS loaded onto it. The BIOS flash memory chip is connected to the chipset via the LPC bus. The flash BIOS features are listed below:

- SMIBIOS (DMI) compliant
- Console redirection function support
- PXE (**P**re-Boot E**xe**cution **E**nvironment) support
- USB booting support

2.9 Environmental and Power Specifications

2.9.1 System Monitoring

The NANO-GX2 is capable of self-monitoring various aspects of its operating status including:

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

2.9.2 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the NANO-GX2 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.

2.9.3 Power Consumption

Table 2-3 shows the power consumption parameters for the NANO-GX2 running with 256 MB of memory.

Voltage	Current	Consumption
+5 V	1.86 A	9.3 W

Table 2-3: Power Consumption

Chapter

3

Unpacking

3.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the NANO-GX2 may result in permanent damage to the NANO-GX2 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the NANO-GX2. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the NANO-GX2, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- *Wear an anti-static wristband*: - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- *Self-grounding*:- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- *Use an anti-static pad*: When configuring the NANO-GX2, place it on an antic-static pad. This reduces the possibility of ESD damaging the NANO-GX2.
- *Only handle the edges of the PCB*:-: When handling the PCB, hold the PCB by the edges.

3.2 Unpacking

3.2.1 Unpacking Precautions

When the NANO-GX2 is unpacked, please do the following:

- Follow the anti-static precautions outlined in **Section 3.1**.
- Make sure the packing box is facing upwards so the NANO-GX2 does not fall out of the box.
- Make sure all the components shown in **Section 3.3** are present.

3.3 Unpacking Checklist

  NOTE:

If some of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the NANO-GX2 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

3.3.1 Package Contents

The NANO-GX2 is shipped with the following components:

Quantity	Item	Image
1	NANO-GX2	
1	Audio Cable (**P/N**: 32000-072103-RS)	
1	IDE Flat Cable (**P/N**: 32200-000009-RS)	

Quantity	Item	Image
1	Dual USB port cable (**P/N**: 32000-044300-RS)	
1	Mini jumper pack	
1	Quick Installation Guide	
1	Utility CD	

Table 3-1: Package List Contents

Chapter

4

Pinouts

4.1 Peripheral Interface Connectors

Section **4.1.2** shows peripheral interface connector locations. **Section 4.1.2** lists all the peripheral interface connectors seen in **Section 4.1.2**.

4.1.1 NANO-GX2 Layout

Figure 4-1 shows the on-board peripheral connectors, rear panel peripheral connectors and on-board jumpers.
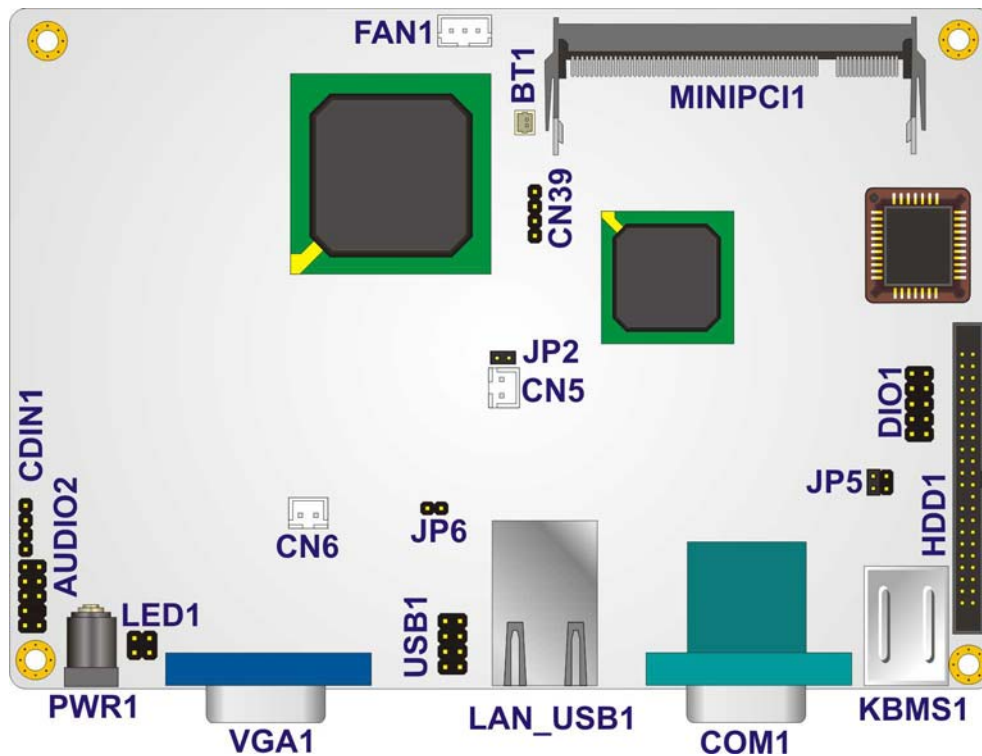
Figure 4-1: Connector and Jumper Locations
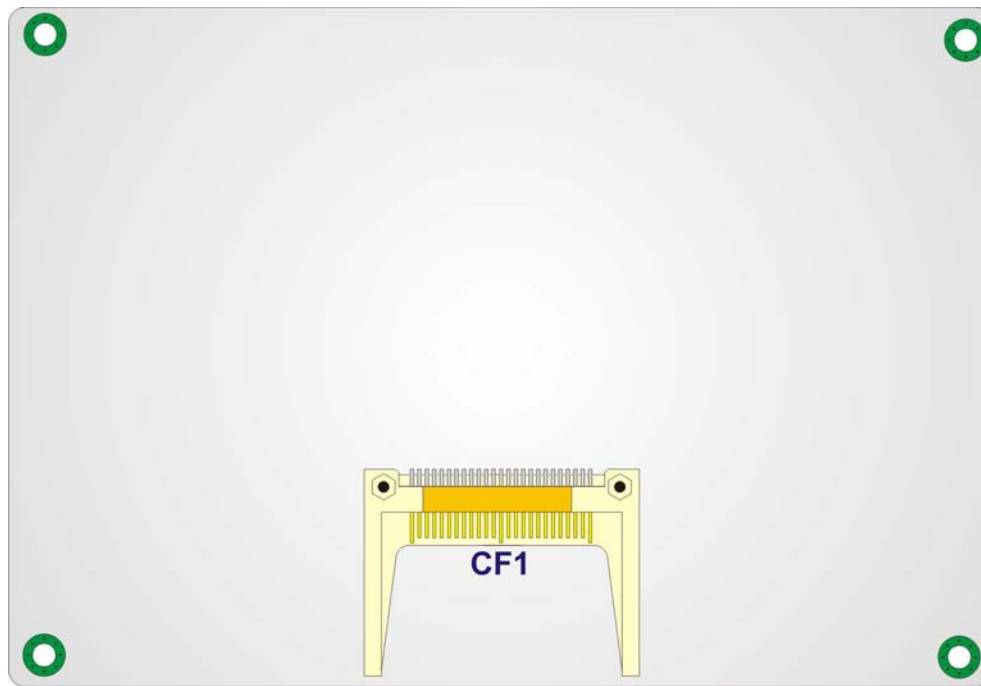
Figure 4-2: Connector and Jumper Locations (Solder Side)

4.1.2 Peripheral Interface Connectors

Table 4-1 shows a list of the peripheral interface connectors on the NANO-GX2. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
Audio connector	10-pin header	AUDIO2
CD in connector	4-pin header	CDIN1
CompactFlash® slot	CF slot	CF1
Digital I/O connector	10-pin header	DIO1
Fan connector	3-pin wafer	FAN1
IDE connector	44-pin ATA connector	HDD1
LED connector	4-pin header	LED1
Mini PCI slot	Mini PCI slot	MINIPCI1
Power button	2-pin wafer	CN5

Connector	Type	Label
Reset button	2-pin wafer	CN6
USB connectors	8-pin header	USB1

Table 4-1: Peripheral Interface Connectors

4.1.3 External Interface Panel Connectors

Table 4-2 lists the rear panel connectors on the NANO-GX2. Detailed descriptions of these connectors can be found in **Section 4.1**.

Connector	Type	Label
Ethernet connector	RJ-45	LAN_USB1
Keyboard and mouse connectors	PS/2	KBMS1
Power input connector	DC power jack (female)	PWR1
Serial port connectors	D-sub 9-pin male	COM1
USB 2.0 ports	USB port	LAN_USB1
VGA port connector	15-pin female	CN24

Table 4-2: Rear Panel Connectors

4.2 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 NANO-GX2.

4.2.1 Audio Connector

CN Label: AUDIO2

CN Type: 10-pin box header

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

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

The 10-pin audio connector is connected to external audio devices including speakers and microphones for the input and output of audio signals to and from the system.
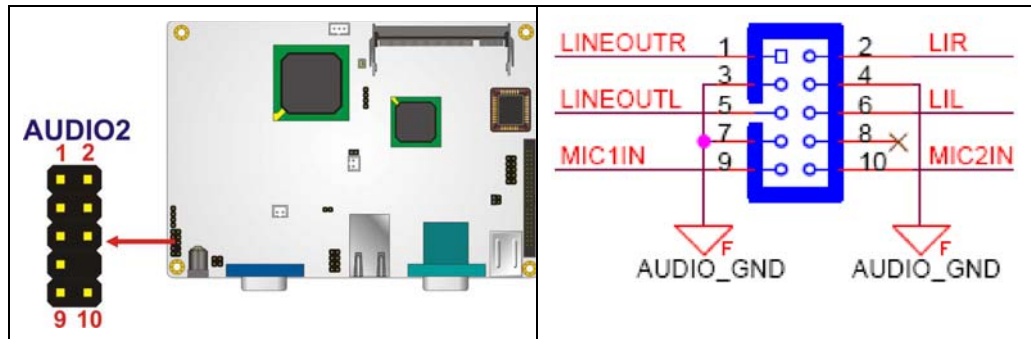
Figure 4-3: Audio Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Line out (right)	2	Line in (right)
3	Ground	4	Ground
5	Line out (left)	6	Line in (left)
7	Ground	8	N/C
9	Microphone 1 in	10	Microphone 2 in

Table 4-3: Audio Connector Pinouts

4.2.2 CD In Connector

CN Label:	**CDIN1**
CN Type:	4-pin header
CN Location:	See **Figure 4-4**
CN Pinouts:	See **Table 4-4**

The 4-pin audio CD in connector is connected to an external audio CD device for the input and output of audio signals from a CD player to the system.
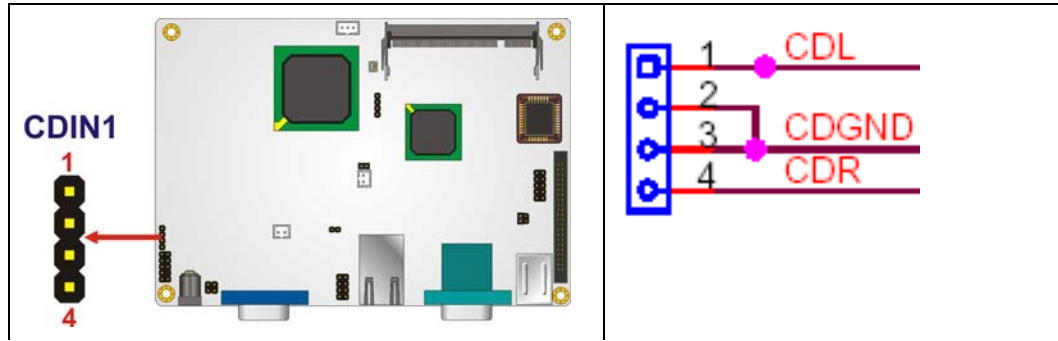
Figure 4-4: Audio CD In Connector Location

PIN NO.	DESCRIPTION
1	CD Signal (Left)
2	Ground
3	Ground
4	CD Signal (Right)

Table 4-4: Audio CD In Connector Pinouts

4.2.3 CompactFlash® Socket

CN Label:	**CF1** (solder side)
CN Type:	50-pin header (2x25)
CN Location:	See **Figure 4-5**
CN Pinouts:	See **Table 4-5**

A CF Type I or Type II memory card is inserted to the CF socket on the solder side of the NANO-GX2.
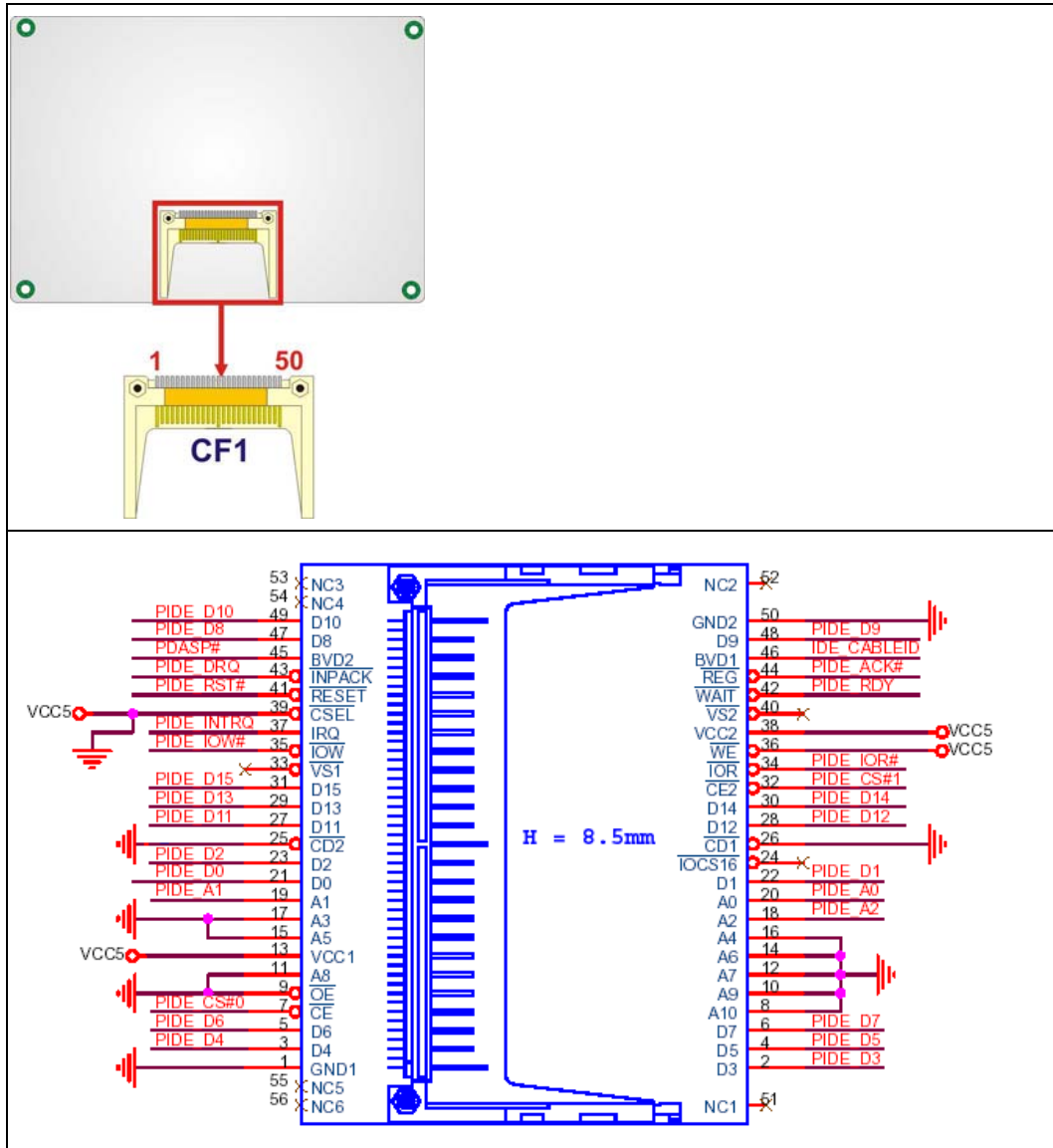
Figure 4-5: CF Card Socket Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	26	GND
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

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
8	GND	33	N/C
9	GROUND	34	IOR#
10	GND	35	IOW#
11	GND	36	VCC5
12	GND	37	IRQ15
13	VCC5	38	VCC5
14	GND	39	CSEL
15	GND	40	N/C
16	GND	41	HDD_RESET
17	GND	42	RDY
18	SA2	43	DRQ
19	SA1	44	DACK#
20	SA0	45	HDD_ACTIVE#
21	DATA 0	46	CABLEID
22	DATA 1	47	DATA 8
23	DATA 2	48	DATA 9
24	N/C	49	DATA 10
25	GND	50	GROUND

Table 4-5: CF Card Socket Pinouts

4.2.4 Digital I/O Connector

CN Label: **DIO1**

CN Type: 10-pin header (2x5)

CN Location: See **Figure 4-6**

CN Pinouts: See **Table 4-6**

The digital input/output connector is managed through a Super I/O chip. The Digital I/O connector pins are user programmable.
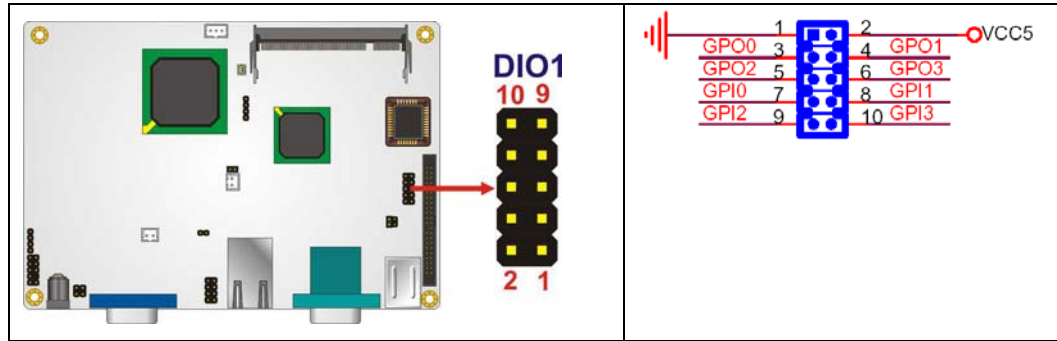
Figure 4-6: Digital I/O Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	VCC5
3	Output 0	4	Output 1
5	Output 2	6	Output 3
7	Input 0	8	Input 1
9	Input 2	10	Input 3

Table 4-6: Digital I/O Connector Pinouts

4.2.5 Fan Connector

CN Label:	**FAN1**
CN Type:	3-pin wafer
CN Location:	See **Figure 4-7**
CN Pinouts:	See **Table 4-7**

The cooling fan connector provides 5 V 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.
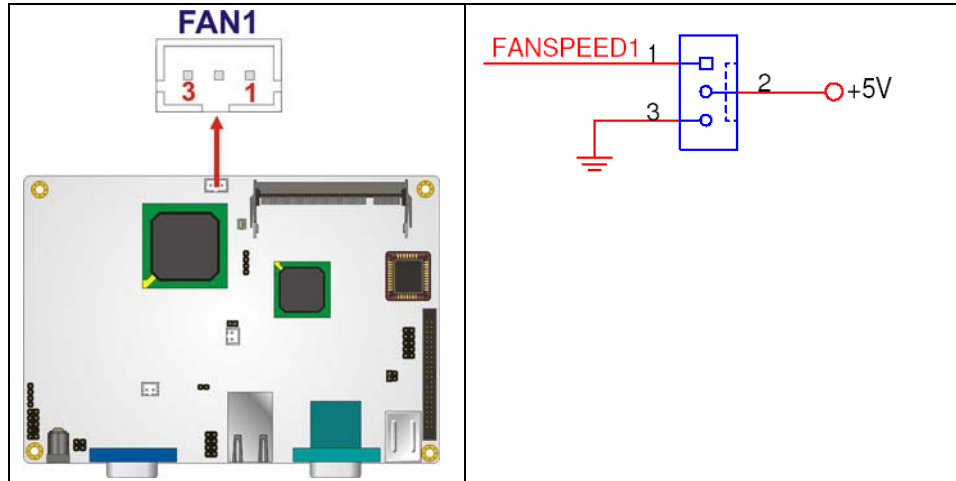
Figure 4-7: Fan Connector Location

PIN NO.	DESCRIPTION
1	Fan Speed Detect
2	+5V
3	GND

Table 4-7: Fan Connector Pinouts

4.2.6 IDE Connector

CN Label:	**HDD1**
CN Type:	44-pin box header (2x22)
CN Location:	See **Figure 4-8**
CN Pinouts:	See **Table 4-8**

One 44-pin IDE device connector on the NANO-GX2 supports connectivity to two hard disk drives.

Figure 4-8: IDE 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

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
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 4-8: IDE Connector Pinouts

4.2.7 Mini PCI Slot

CN Label: **MINIPCI1**

CN Type: 124-pin Mini PCI Slot

CN Location: See Figure 4-9

CN Pinouts: See Table 4-9

The Mini PCI slot enables a Mini PCI expansion module to be connected to the board.
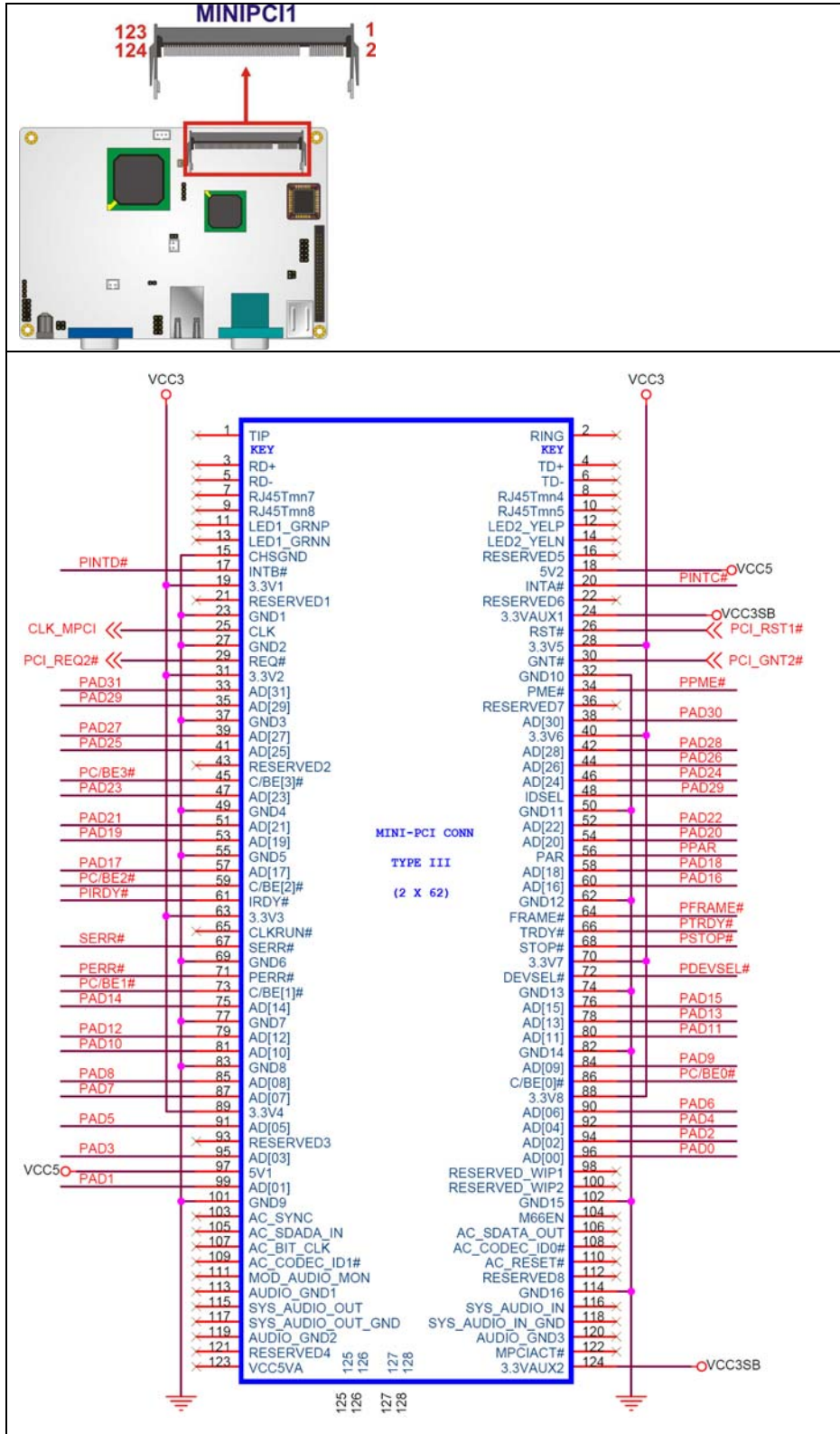
Figure 4-9: Mini PCI Slot Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	NC	2	NC
3	NC	4	NC
5	NC	6	NC
7	NC	8	NC
9	NC	10	NC
11	NC	12	NC
13	NC	14	NC
15	GND	16	NC
17	PINTD#	18	VCC5
19	VCC3	20	PINTC#
21	NC	22	NC
23	GND	24	VCC3SB
25	CLK_MPCI	26	PCI_RST1#
27	GND	28	VCC3
29	PCI_REQ2#	30	PCI_GNT2#
31	VCC3	32	GND
33	PAD31	34	PPME#
35	PAD29	36	NC
37	GND	38	PAD30
39	PAD27	40	VCC3
41	PAD25	42	PAD28
43	NC	44	PAD26
45	PC/BE3#	46	PAD24
47	PAD23	48	PAD29
49	GND	50	GND
51	PAD21	52	PAD22
53	PAD19	54	PAD20
55	GND	56	PPAR

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
57	PAD17	58	PAD18
59	PC/BE2#	60	PAD16
61	PIRDY#	62	GND
63	VCC3	64	PFRAME#
65	NC	66	PTRDY#
67	SERR#	68	PSTOP#
69	GND	70	VCC3
71	PERR#	72	PDEVSEL#
73	PC/BE1#	74	GND
75	PAD14	76	PAD15
77	GND	78	PAD13
79	PAD12	80	PAD11
81	PAD10	82	GND
83	GND	84	PAD9
85	PAD8	86	PC/BE0#
87	PAD7	88	VCC3
89	VCC3	90	PAD6
91	PAD5	92	PAD4
93	NC	94	PAD2
95	PAD3	96	PAD0
97	VCC5	98	NC
99	PAD1	100	NC
101	GND	102	GND
103	NC	104	NC
105	NC	106	NC
107	NC	108	NC
109	NC	110	NC
111	NC	112	NC

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
113	NC	114	GND
115	NC	116	NC
117	NC	118	NC
119	NC	120	NC
121	NC	122	NC
123	NC	124	VCC3SB

Table 4-9: Mini PCI Slot Pinouts

4.2.8 Power and HDD LED Connector

CN Label:	**LED1**
CN Type:	6-pin wafer
CN Location:	See Figure 4-10
CN Pinouts:	See Table 4-10

The **Power and HDD LED Connector** connects to the computer's power and hard drive LED indicators.
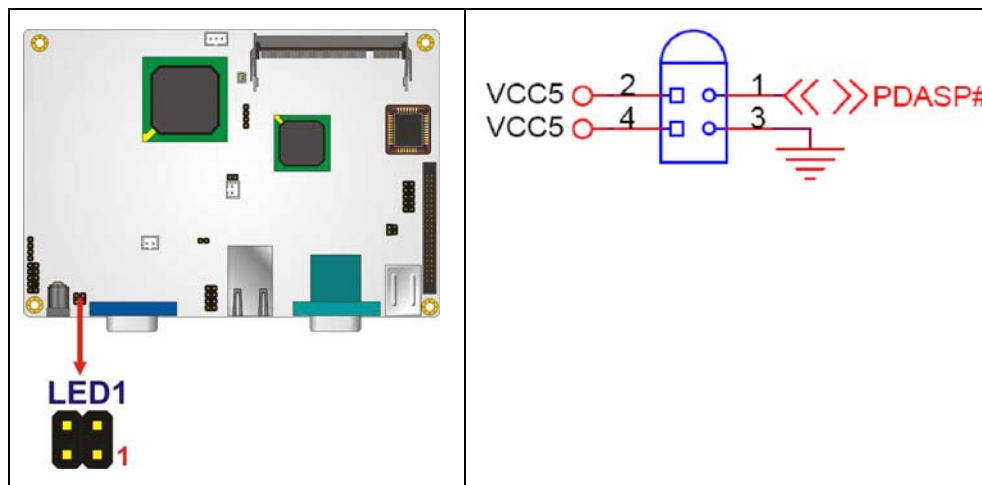
Figure 4-10: Power and HDD LED Connector Location

PIN NO.	DESCRIPTION
1	Hard drive activity

PIN NO.	DESCRIPTION
2	GROUND
3	PWRLED+
4	PWRLED-

Table 4-10: Power and HDD LED Connector Pinouts

4.2.9 Power Button Connector

CN Label:	**CN5**
CN Type:	2-pin wafer
CN Location:	See **Figure 4-11**
CN Pinouts:	See **Table 4-11**

The power button connector is connected to a power switch on the system chassis to enable users to turn the system on and off.
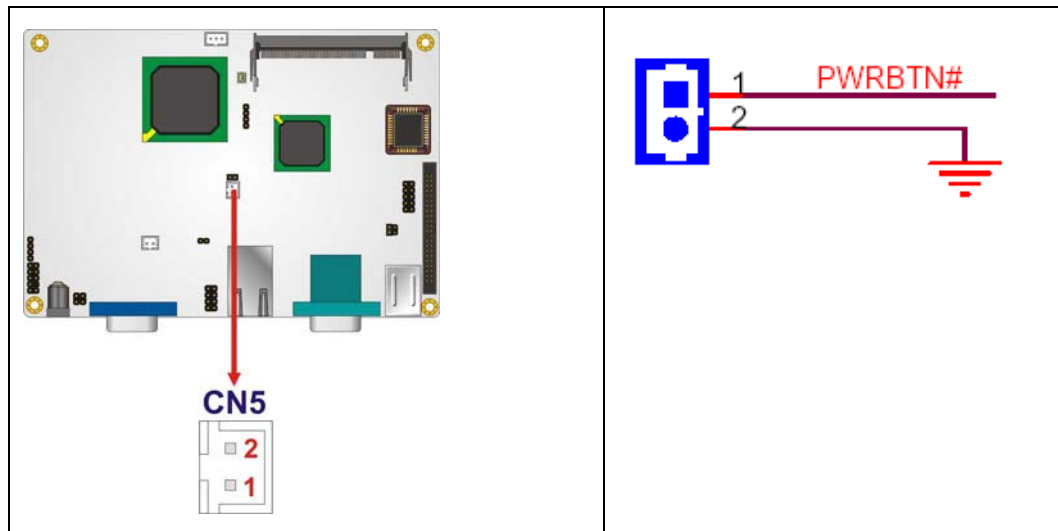
Figure 4-11: Power Button Connector Location

PIN NO.	DESCRIPTION
1	ATX Power button +
2	ATX Power button -

Table 4-11: Power Button Connector Pinouts

4.2.10 Reset Button Connector

CN Label:	**CN6**
CN Type:	2-pin wafer (1x2)
CN Location:	See **Figure 4-12**
CN Pinouts:	See **Table 4-12**

The reset button connector is connected to a reset switch on the system chassis to enable users to reboot the system when the system is turned on.
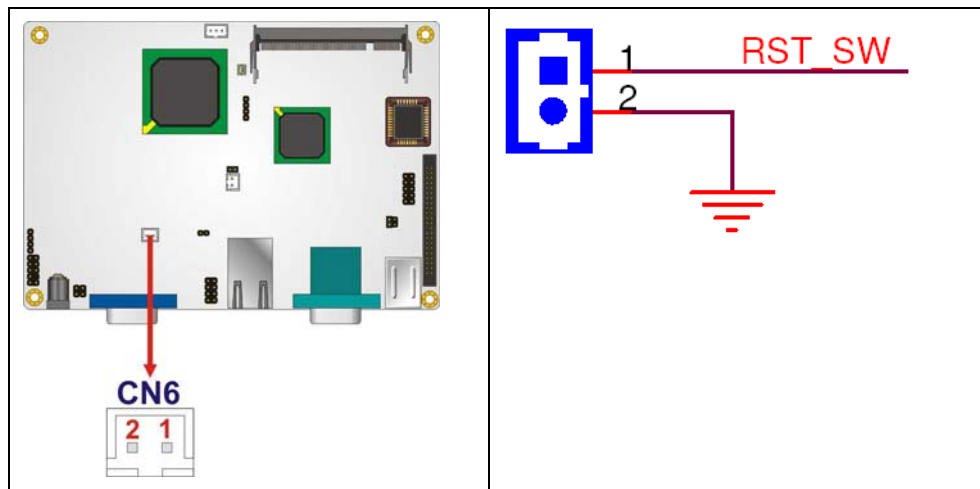
Figure 4-12: Reset Button Connector Locations

PIN NO.	DESCRIPTION
1	Reset button +
2	Reset button -

Table 4-12: Reset Button Connector Pinouts

4.2.11 USB Connectors

CN Label:	**USB1**
CN Type:	8-pin header (2x4)
CN Location:	See **Figure 4-13**
CN Pinouts:	See **Table 4-13**

The 2x4 USB pin connectors each provide connectivity to two USB 1.1 or two USB 2.0 ports. Each USB connector can support two USB devices. Additional external USB ports are found on the rear panel. The USB ports are used for I/O bus expansion.
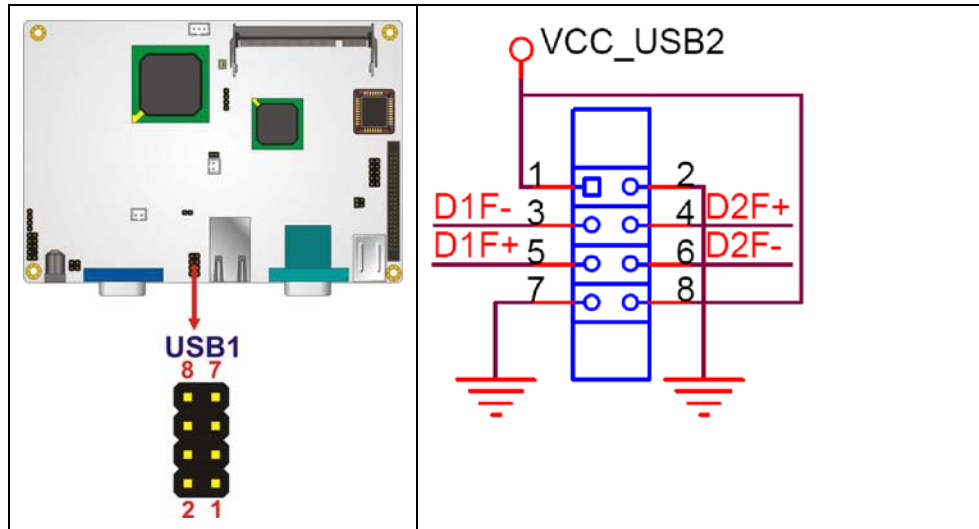
Figure 4-13: USB Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	GND
3	D1F-	4	D2F-
5	D1F+	6	D2F+
7	GND	8	VCC

Table 4-13: USB Port Connector Pinouts

4.3 External Interface Connectors

Figure 4-14 shows the NANO-GX2 motherboard external interface connectors. The NANO-GX2 on-board external interface connectors are listed below and shown in **Figure 4-14**:

- 4.3.1 Ethernet Connector
- 4.3.2 Keyboard and Mouse Connector
- 4.3.3 Power Input Connector
- 4.3.4 RS-232 Serial Port Connectors
- 4.3.5 USB Ports

- 4.3.6 VGA Connector
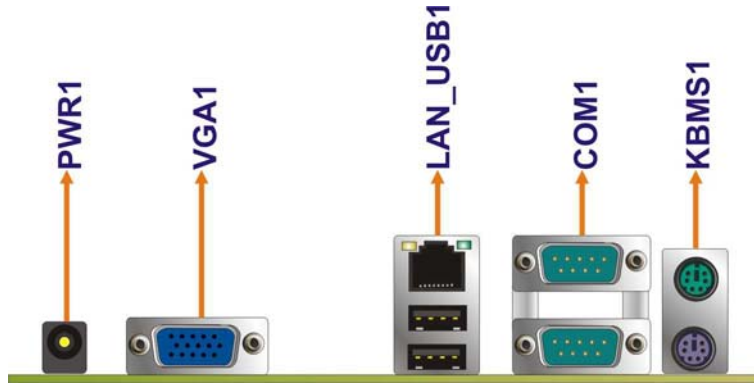
Figure 4-14: NANO-GX2 On-board External Interface Connectors

4.3.1 Ethernet Connector

CN Label:	**LAN_USB1**
CN Type:	**RJ-45**
CN Location:	See **Figure 4-14**
CN Pinouts:	See **Table 4-14**

A 10/100 Mbps connection can be made between the Ethernet connector and a Local Area Network (LAN) through a network hub.

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

Table 4-14: Ethernet Connector Pinouts
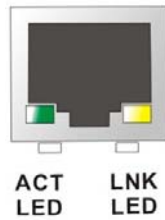
Figure 4-15: Ethernet Connector

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.

SPEED LED		LINK LED	
Status	Description	Status	Description
GREEN	ON: 100MB OFF: 10MB	YELLOW	ON: Linked Flashing: Activity

Table 4-15: Connector LEDs

4.3.2 Keyboard and Mouse Connector

CN Label:	**KBMS1**
CN Type:	PS/2
CN Location:	See **Figure 4-14**
CN Pinouts:	See **Table 4-16** and **Figure 4-16**

The NANO-GX2 has two PS/2 connectors on the mounting bracket for easy connection to a PS/2 keyboard and PS/2 mouse.
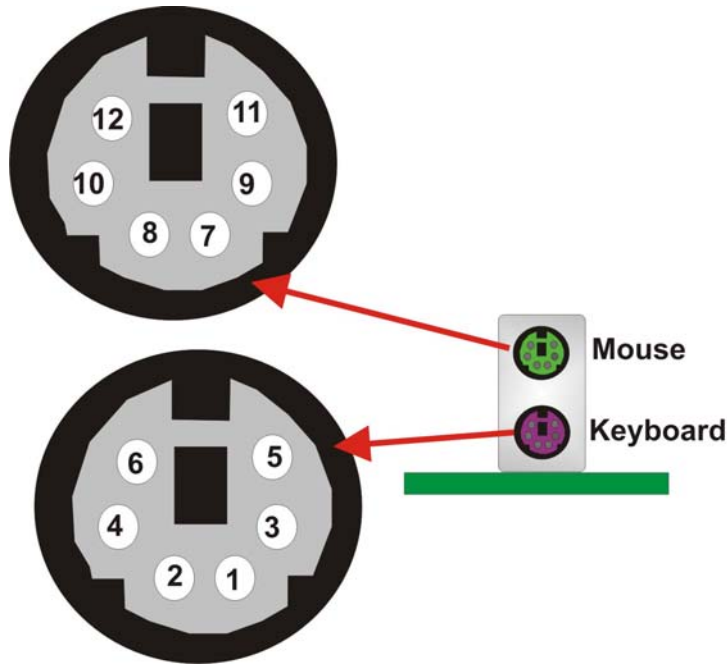
Figure 4-16: PS/2 Connector

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	KEYBOARD DATA	7	MOUSE DATA
2	NC	8	NC
3	GND	9	GND
4	+5 V	10	+5 V
5	KEYBOARD CLOCK	11	MOUSE DATA
6	NC	12	NC

Table 4-16: PS/2 Connectors

4.3.3 Power Input Connector

CN Label: PWR1

CN Type: DC Jack (female)

CN Location: See **Figure 4-14**

CN Pinouts: See **Table 4-17**

The power input connector is for connecting a 5 V power supply to the NANO-GX2. The 5 V DC power jack is connected directly to the power input connector.

PIN NO.	DESCRIPTION
1	GROUND
2	GROUND
3	Power IN(+12V)
4	Power IN(+12V)

Table 4-17: Power Input Connector Pinouts

4.3.4 RS-232 Serial Port Connectors

CN Label: **COM1**

CN Type: Two RS-232 connectors

CN Location: See **Figure 4-14**

CN Pinouts: See **Table 4-18** and **Figure 4-17**

The RS-232 serial connector provides serial connection in the RS-232 mode.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	DCD#	6	DSR#
2	RxD	7	RTS#
3	TxD	8	CTS#
4	DTR#	9	RI#
5	GND		

Table 4-18: Serial Port Pinouts
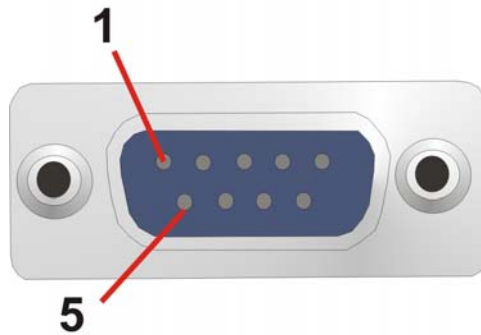
Figure 4-17: Serial Port Pinout Locations

4.3.5 USB Ports

CN Label:	**LAN_USB1**
CN Type:	USB Combo ports
CN Location:	See **Figure 4-14**
CN Pinouts:	See **Table 4-19**

The USB combo port provides connectivity to additional USB devices through an adapter cable. Various adapters may come with USB ports on a slot bracket or ports that can be attached to D-SUB openings on a chassis. USB devices connect directly to the USB connectors on the rear panel.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	+5 V	5	+5 V
2	D3-	6	D4-
3	D3+	7	D4+
4	GND	8	GND

Table 4-19: USB Connector Pinouts

4.3.6 VGA Connector

CN Label:	**VGA1**
CN Type:	D-sub 15-pin female connector

CN Location: See **Figure 4-14**

CN Pinouts: See **Figure 4-18** and **Table 4-20**

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

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

Table 4-20: VGA1 Connector Pinouts
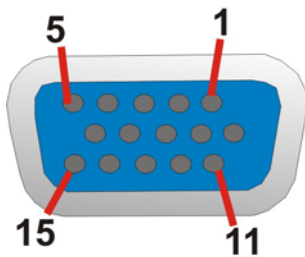
Figure 4-18: VGA1 Connector

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Chapter

5

Installation

5.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the NANO-GX2 may result in permanent damage to NANO-GX2 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the NANO-GX2. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the NANO-GX2, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- *Wear an anti-static wristband*: - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- *Self-grounding*:- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- *Use an anti-static pad*: When configuring the NANO-GX2, place it on an antic-static pad. This reduces the possibility of ESD damaging the NANO-GX2.
- *Only handle the edges of the PCB*:-: When handling the PCB, hold the PCB by the edges.

5.2 Installation Considerations

![NOTE icon] **NOTE:**

The following installation notices and installation considerations should be read and understood before the NANO-GX2 is installed. All installation notices pertaining to the installation of NANO-GX2 should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the NANO-GX2 and injury to the person installing the motherboard.

5.2.1 Installation Notices

![WARNING icon] **WARNING:**

The installation instructions described in this manual should be carefully followed in order to prevent damage to the NANO-GX2, NANO-GX2 components and injury to the user.

Before and during the installation please **DO** the following:

▪ **Read the user manual**:
  ○ The user manual provides a complete description of the NANO-GX2 installation instructions and configuration options.
▪ **Wear an electrostatic discharge cuff (ESD)**:
  ○ Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
▪ **Place the NANO-GX2 on an antistatic pad**:
  ○ When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
▪ **Turn all power to the NANO-GX2 off**:
  ○ When working with the NANO-GX2, 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 NANO-GX2 **DO NOT:**

- Remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- Use the product before verifying all the cables and power connectors are properly connected.
- Allow screws to come in contact with the PCB circuit, connector pins, or its components.

5.2.2 Installation Checklist

The following checklist is provided to ensure the NANO-GX2 is properly installed.

- All the items in the packing list are present
- A compatible memory module is properly inserted into the slot
- The CF Type I or CF Type II card is properly installed into the CF socket
- The jumpers have been properly configured
- The NANO-GX2 is inserted into a chassis with adequate ventilation
- The correct power supply is being used
- The following devices are properly connected
  - ○ Primary and secondary IDE device
  - ○ Audio kit
  - ○ USB cable
- The following external peripheral devices are properly connected to the chassis:
  - ○ VGA screen
  - ○ Keyboard
  - ○ Mouse
  - ○ RS-232 serial communications device
  - ○ Parallel port
  - ○ Power cable

5.2.3 CF Card Installation

NOTE:

The NANO-GX2 can support both CF Type I cards and CF Type II cards. For the complete specifications of the supported CF cards please refer to **Chapter 2**.

To install the a CF card (Type 1 or Type 2) onto the NANO-GX2, please follow the steps below:

Step 1: **Locate the CF card socket**. Place the NANO-GX2 on an anti-static pad with the solder side facing up. Locate the CF card.

Step 2: **Align the CF card**. Make sure the CF card is properly aligned with the CF socket.

Step 3: **Insert the CF card**. Gently insert the CF card into the socket making sure the socket pins are properly inserted into the socket. See **Figure 5-1**.
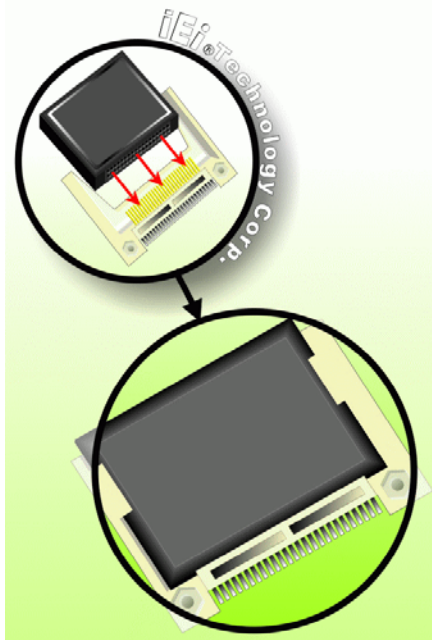
Figure 5-1: CF Card Installation

5.3 Jumper Settings

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.
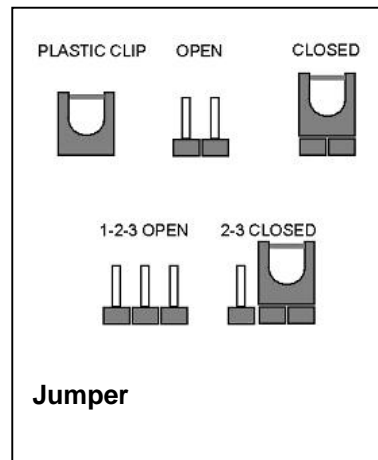
Before the NANO-GX2 is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the NANO-GX2 are listed in **Table 5-1**.

Description	Label	Type
AT/ATX Power Mode Select	JP2	2-pin header
Board ID	JP5	4-pin header
CompactFlash® Master/Slave	JP6	2-pin header

Table 5-1: Jumpers

5.3.1 AT/ATX Power Mode

Jumper Label:	**JP2**
Jumper Type:	2-pin header
Jumper Settings:	See **Table 5-2**
Jumper Location:	See **Figure 5-2**

The **Power Mode** jumper specifies the systems power mode as AT or ATX. AT Power Select jumper settings are shown in **Table 5-2** and the jumper location is shown in **Figure 5-2**.

JP2	Description	
Short	Use AT power	Default
Open	Use ATX power	

Table 5-2: Power Mode Jumper Settings
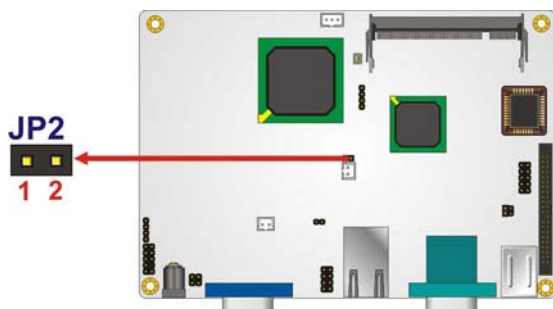
Figure 5-2: Power Mode Jumper Pinout Location

5.3.2 Board ID

Jumper Label:	JP5
Jumper Type:	4-pin header
Jumper Settings:	See **Table 5-3**
Jumper Location:	See **Figure 5-4**

The **Board ID** jumper configures is used to identify how much RAM this model has. The jumper selection options are shown in **Table 5-3**. The jumper location is shown in **Figure 5-3**.

JP5	Description
All Open	128 MB memory
Short 1 – 2	256 MB memory

Table 5-3: Board ID Jumper Settings
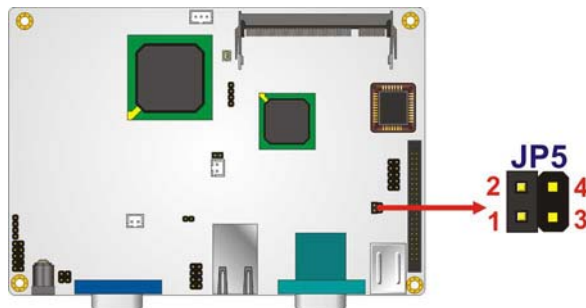
Figure 5-3: Board ID Jumper Pinout Location

5.3.3 CompactFlash® Master/Slave

Jumper Label:	JP6
Jumper Type:	2-pin header
Jumper Settings:	See **Table 5-4**
Jumper Location:	See **Figure 5-4**

The **CompactFlash® Master/Slave** jumper allows the CompactFlash® to be set as IDE Master or IDE Slave. The CompactFlash® Master/Slave jumper settings are shown in **Table 5-4** and the jumper location is shown in **Figure 5-4**.

JP6	Description	
Short	Master	
Open	Slave	Default

Table 5-4: CompactFlash® Master/Slave Jumper Settings
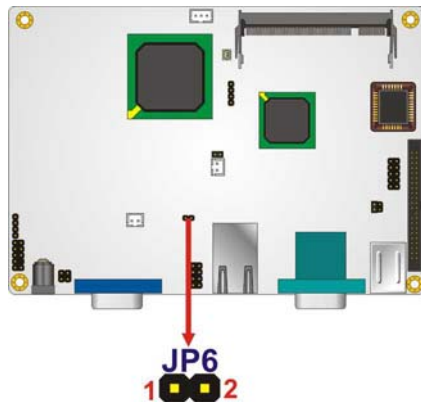
Figure 5-4: CompactFlash® Master/Slave Jumper Pinout Location

5.4 Chassis Installation

5.4.1 Airflow

![WARNING icon] **WARNING:**

Airflow is critical to the cooling of the CPU and other onboard components. The chassis in which the NANO-GX2 must have air vents to allow cool air to move into the system and hot air to move out.

The NANO-GX2 must be installed in a chassis with ventilation holes on the sides allowing airflow to travel through the heat sink surface. In a system with an individual power supply

unit, the cooling fan of a power supply can also help generate airflow through the board surface.

5.4.2 NANO-GX2 Installation

To install the NANO-GX2 motherboard into the chassis please refer to the reference material that came with the chassis.

5.5 Internal Peripheral Device Connections

The cables listed in **Table 5-5** are shipped with the NANO-GX2.

Quantity	Type
1	Audio cables
1	IDE cable
1	USB dual port cable

Table 5-5: IEI Provided Cables

5.5.1 ATA Flat Cable Connection

The ATA 33 flat cable connects the NANO-GX2 to one or two IDE devices. To connect an IDE HDD to the NANO-GX2 please follow the instructions below.

Step 1: **Locate the IDE connector**. The location/s of the IDE device connector is shown in **Chapter 3**.

Step 2: **Insert the connector**. Connect the IDE cable connector to the onboard connector. See **Figure 5-5**. A key on the front of the cable connector ensures it can only be inserted in one direction.
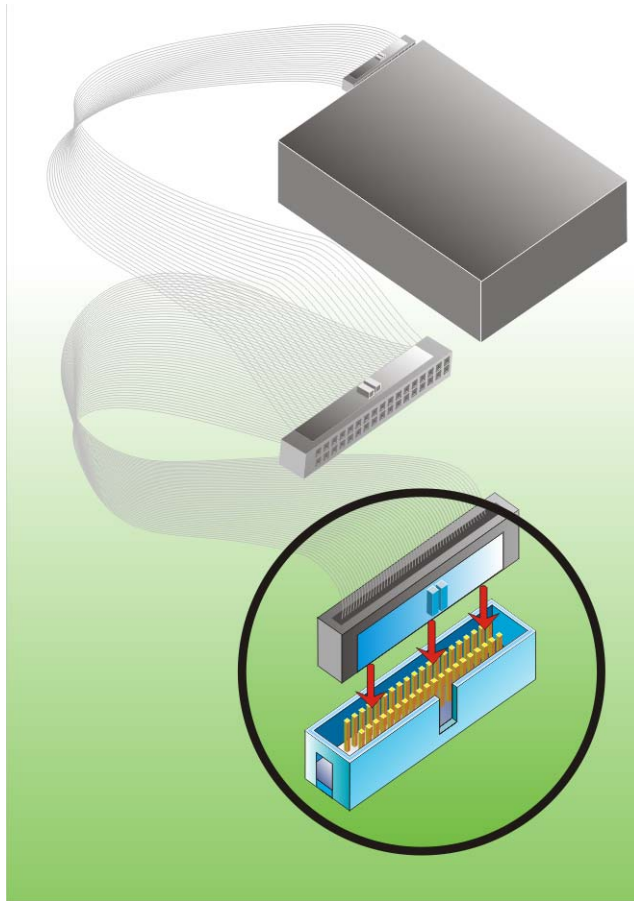
Figure 5-5: IDE Cable Connection

Step 3:   **Connect the cable to an IDE device**. Connect the two connectors on the other

side of the cable to one or two IDE devices. Make sure that pin 1 on the cable

corresponds to pin 1 on the connector

5.5.2 USB Cable

The NANO-GX2 is shipped with a dual port USB 2.0 cable. To connect the USB cable

connector, please follow the steps below.

Step 1:   **Locate the connectors**. The locations of the USB connectors are shown in

Chapter 3.

> **WARNING:**
>
> If the USB pins are not properly aligned, the USB device can burn out.

Step 2: Align the connectors. The cable has two connectors. Correctly align pin 1on each cable connector with pin 1 on the NANO-GX2 USB connector.

Step 3: Insert the cable connectors. Once the cable connectors are properly aligned with the USB connectors on the NANO-GX2, connect the cable connectors to the on-board connectors. See **Figure 5-6**.
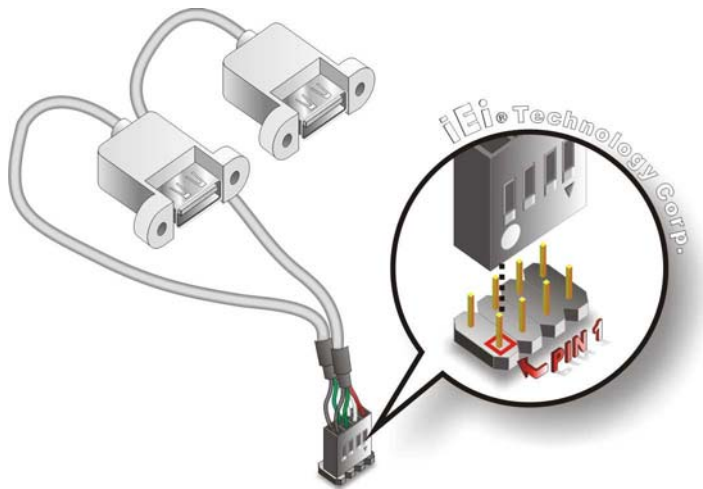
Figure 5-6: Dual USB Cable Connection

Step 4: Attach the USB connectors to the chassis. The USB 2.0 connectors each of two retention screw holes. To secure the connectors to the chassis please refer to the installation instructions that came with the chassis.

5.5.3 Audio Kit Installation

The Audio Kit that came with the NANO-GX2 connects to the 10-pin audio connector on the NANO-GX2. The audio kit consists of three audio jacks. One audio jack, Mic In, connects to a microphone. The remaining two audio jacks, Line-In and Line-Out, connect to two speakers. To install the audio kit, please refer to the steps below:

Step 1: **Locate the audio connector**. The location of the 10-pin audio connector is shown in **Chapter 3**.

Step 2: **Align pin 1**. Align pin 1 on the onboard connector with pin 1 on the audio kit connector. Pin 1 on the audio kit connector is indicated with a white dot. See **Figure 5-7**.
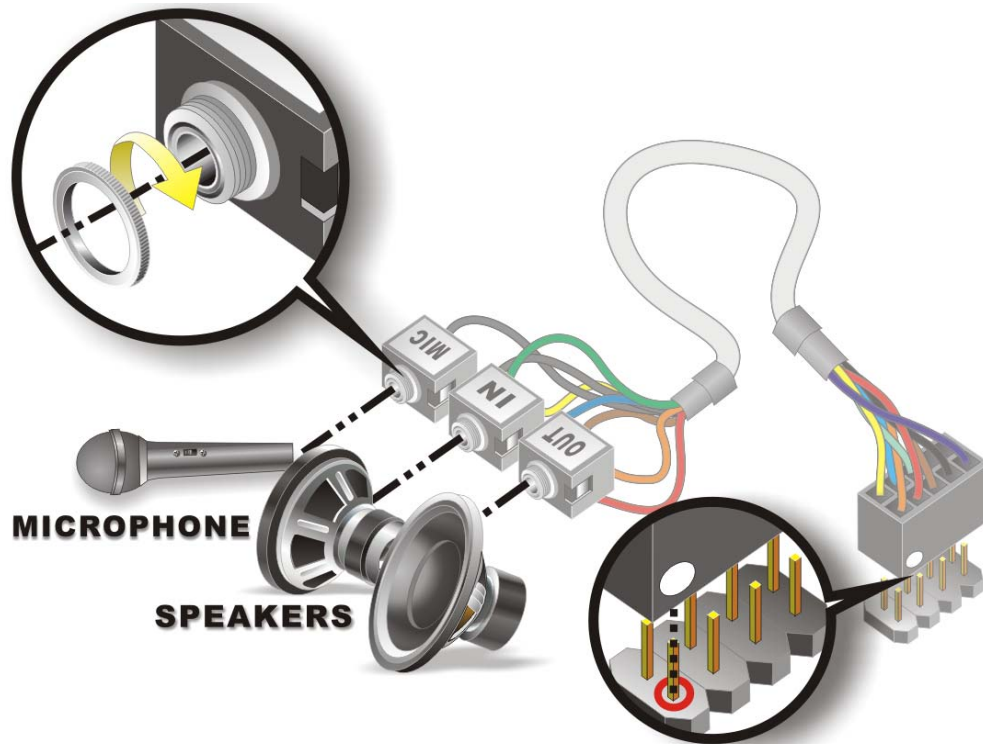
Figure 5-7: Audio Kit Connection

Step 3: **Connect the cable to an IDE device**. Connect the two connectors on the other side of the cable to one or two IDE devices. Make sure that pin 1 on the cable corresponds to pin 1 on the connector

5.6 External Peripheral Interface Connection

The following external peripheral devices can be connected to the external peripheral interface connectors.

- 5.6.1 Keyboard and Mouse

- 5.6.2 LAN
- 5.6.3 Serial Device
- 5.6.4 USB
- 5.6.5 VGA Monitor

To install these devices, connect the corresponding cable connector from the actual device to the corresponding NANO-GX2 external peripheral interface connector making sure the pins are properly aligned.

5.6.1 Keyboard and Mouse

The NANO-GX2 has a dual PS/2 connector on the external peripheral interface panel. The dual PS/2 connector is used to connect to a keyboard and mouse to the system. Follow the steps below to connect a keyboard and mouse to the NANO-GX2.

Step 1: **Locate the dual PS/2 connector**. The location of the dual PS/2 connector is shown in **Chapter 3**.

Step 2: **Insert the keyboard/mouse connector**. Insert a PS/2 keyboard or mouse connector into the appropriate PS/2 connector on the external peripheral interface connector. See Figure 5-8.
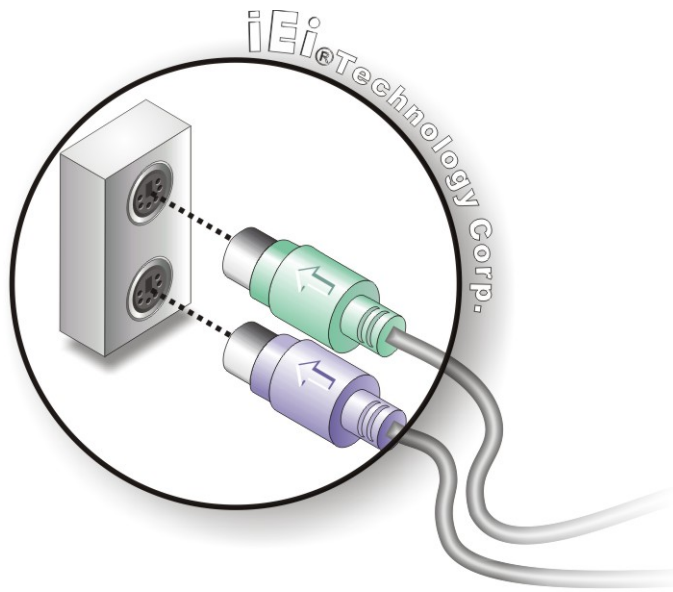
Figure 5-8: PS/2 Keyboard/Mouse Connector

5.6.2 LAN

There are two external RJ-45 LAN connectors. The RJ-45 connectors enable connection to an external network. To connect a LAN cable with an RJ-45 connector, please follow the instructions below.

Step 1: **Locate the RJ-45 connectors**. The locations of the USB connectors are shown in **Chapter 4**.

Step 2: **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the NANO-GX2. See **Figure 5-9**.
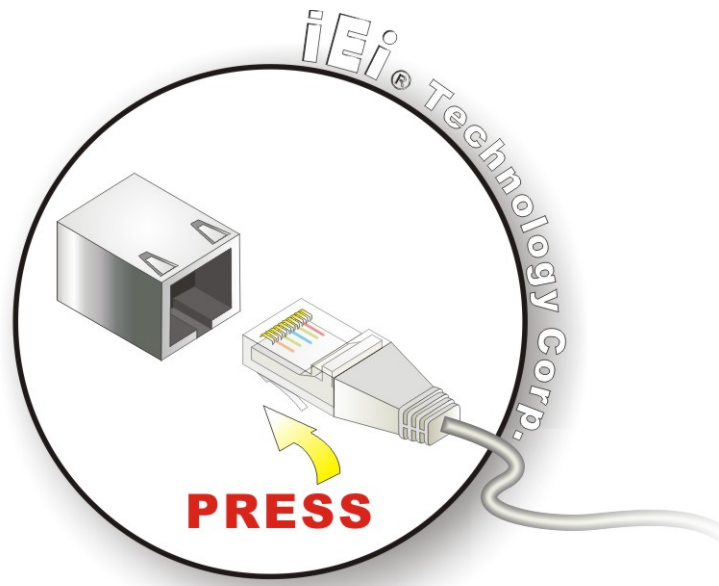
Figure 5-9: LAN Connection

Step 3: **Insert the LAN cable RJ-45 connector.** Once aligned, gently insert the LAN cable RJ-45 connector into the on-board RJ-45 connector.

5.6.3 Serial Device

The NANO-GX2 has a single female DB-9 connector on the external peripheral interface panel for a serial device. Follow the steps below to connect a serial device to the NANO-GX2.

Step 1: **Locate the DB-9 connector**. The location of the DB-9 connector is shown in **Chapter 3**.

Step 2: **Insert the serial connector**. Insert the DB-9 connector of a serial device into the DB-9 connector on the external peripheral interface. See Figure 5-10.
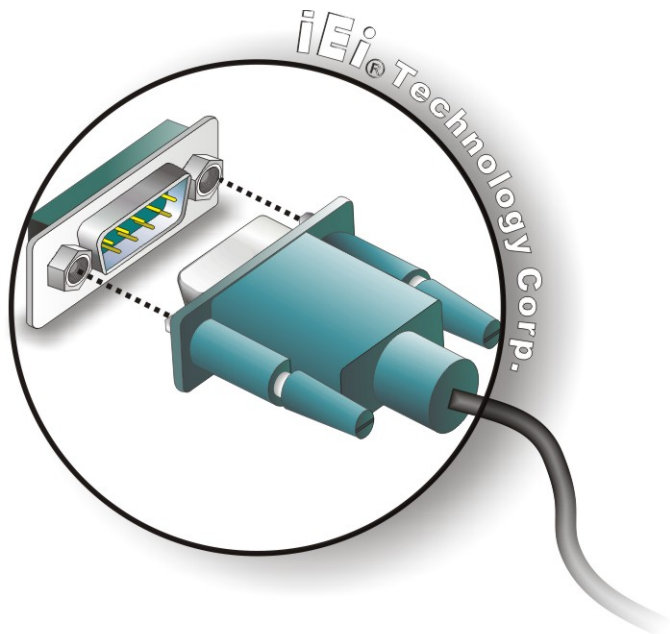
Figure 5-10: Serial Device Connector

Step 3: **Secure the connector**. Secure the serial device connector to the external interface by tightening the two retention screws on either side of the connector.

5.6.4 USB

The external USB Series "A" receptacle connectors provide easier and quicker access to external USB devices. Follow the steps below to connect USB devices to the NANO-GX2.

Step 1: **Locate the USB Series "A" receptacle connectors**. The location of the USB Series "A" receptacle connectors are shown in **Chapter 3**.

Step 2: **Insert a USB Series "A" plug**. Insert the USB Series "A" plug of a device into the USB Series "A" receptacle on the external peripheral interface. See Figure 5-11.
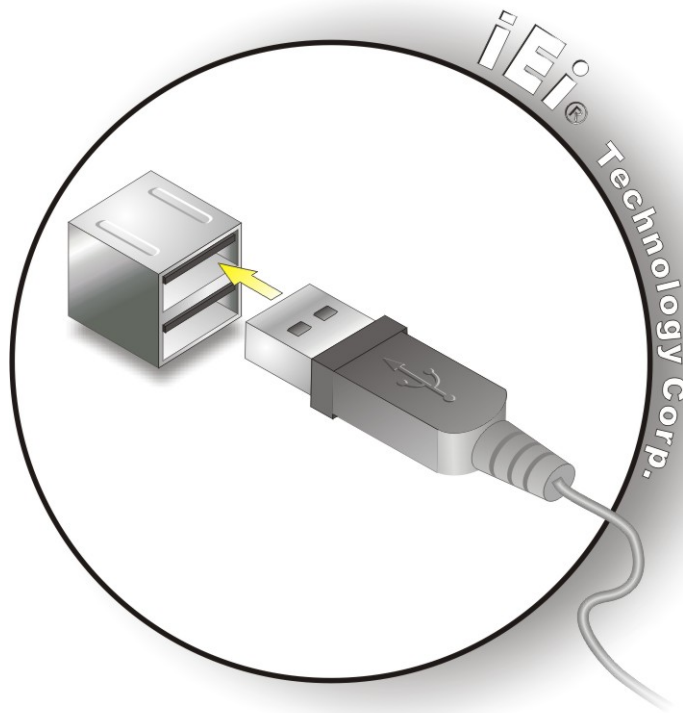
Figure 5-11: USB Connector

5.6.5 VGA Monitor

The NANO-GX2 has a single female DB-15 connector on the external peripheral interface panel. The DB-15 connector is connected to a CRT or VGA monitor. To connect a monitor to the NANO-GX2, please follow the instructions below.

Step 1: **Locate the female DB-15 connector**. The location of the female DB-15 connector is shown in **Chapter 3**.

Step 2: **Align the VGA connector**. Align the male DB-15 connector on the VGA screen cable with the female DB-15 connector on the external peripheral interface.

Step 3: **Insert the VGA connector** Once the connectors are properly aligned with the insert the male connector from the VGA screen into the female connector on the NANO-GX2. See **Figure 5-12**.
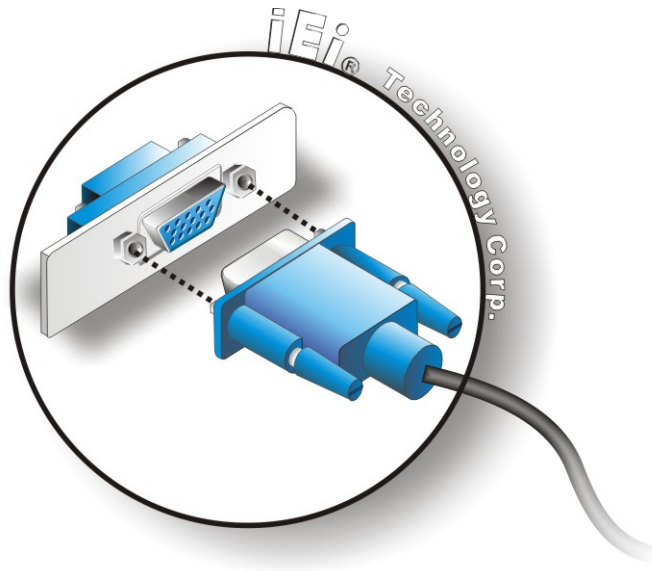
Figure 5-12: VGA Connector

Step 4:   Secure the connector. Secure the DB-15 VGA connector from the VGA

monitor to the external interface by tightening the two retention screws on either

side of the connector.

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Chapter

6

BIOS Setup

6.1 Introduction

A licensed copy of Phoenix Award BIOS is preprogrammed into the ROM BIOS. The BIOS setup program allows users to modify the basic system configuration. This chapter describes how to access the BIOS setup program and the configuration options that may be changed.

6.1.1 Starting Setup

The Phoenix Award BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. Press the DELETE key as soon as the system is turned on or
2. Press the DELETE key when the "**Press Del to enter SETUP**" message appears on the screen.

If the message disappears, restart the computer and try again.

6.1.2 Using Setup

Use the arrow keys to highlight items, press ENTER to select, use the PAGEUP and PAGEDOWN keys to change entries, press F1 for help and press ESC to quit. Navigation keys are shown below.

Key	Function
Up arrow	Move to the item above
Down arrow	Move to the item below
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
+/Page up	Increase the numeric value or make changes
-/Page down	Decrease the numeric value or make changes
Esc	Main Menu – Quit and do not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu

Key	Function
F1	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2	Item help
F5	Previous values for the page menu items
F6	Fail-safe defaults for the current page menu items
F7	Optimized defaults for the current page menu items
F9	Menu in BIOS
F10	Save changes and Exit BIOS

Table 6-1: BIOS Navigation Keys

6.1.3 Getting Help

When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

6.1.4 Unable to Reboot After Configuration Changes

If the system cannot be booted after changes are made, restore the CMOS defaults. To restore CMOS defaults, follow these steps:

Step 1: Unplug the battery connector.

Step 2: Remove the battery.

Step 3: Plug in the battery connector.

6.1.5 Main BIOS Menu

Once the BIOS opens, the **Main Menu** (BIOS Menu 1) appears.

```
          Phoenix - AwardBIOS CMOS Setup Utility

 ▶ Standard CMOS Features          Load Fail-Safe Defaults

 ▶ Advanced BIOS Features          Load Optimized Defaults

 ▶ Advanced Chipset Features       Set Supervisor Password

 ▶ Integrated Peripherals          Set User Password

 ▶ Power Management Setup          Save & Exit Setup

 ▶ PnP/PCI Configurations          Exit Without Saving

 ▶ PC Health Status


 Esc : Quit      F9 : Menu in BIOS      ↑ ↓ → ←   : Select Item
 F10 : Save & Exit Setup

                  Time, Date, Hard Disk Type...
```

BIOS Menu 1: Award BIOS CMOS Setup Utility

   NOTE:

The following sections will completely describe the menus listed below
and the configuration options available to users.

The following menu options are seen in **BIOS** Menu 1.

- Standard CMOS Features: Changes the basic system configuration.
- Advanced BIOS Features: Changes the advanced system settings.
- Advanced Chipset Features: Changes the chipset configuration features.
- Integrated Peripherals: Changes the settings for integrated peripherals.
- Power Management Setup: Configures power saving options.
- PnP/PCI Configurations: Changes the advanced PCI/PnP settings.
- PC Health Status: Monitors essential system parameters.

The following user configurable options are also available in **BIOS Menu 1**:

➔ **Load Fail-Safe Defaults**

Use the **Load Fail-Safe Defaults** option to load failsafe default values for each BIOS parameter in the setup menus. Press **F6** for this operation on any page.

➔ **Load Optimized Defaults**

Use the **Load Optimized Defaults** option to load optimal default values for each BIOS parameter in the setup menus. Press **F7** for this operation on any page.

➔ **Set Supervisor Password**

Use the **Set Supervisor Password** option to set the supervisor password. By default, no supervisor password is set. To install a supervisor password, select this field and enter the password. After this option is selected, a red dialogue box appears with "**Enter Password:** ". Type the password and press **ENTER**. Retype the original password into the "**Confirm Password:** " dialogue box and press **ENTER**. To disable the password, simply press **ENTER** in the "**Enter Password:** " dialogue box, then press any key in the "**Password Disabled !!!**" dialogue box.

➔ **Set User Password**

Use the **Set User Password** option to set the supervisor password. By default no user password is set. To install a user password, select this field and enter the password. After this option is selected, a red dialogue box appears with "**Enter Password:** ". Type the password and press **ENTER**. Retype the original password into the "**Confirm Password:** " dialogue box and press **ENTER**. To disable the password, simply press **ENTER** in the "**Enter Password:** " dialogue box, then press any key in the "**Password Disabled !!!**" dialogue box.

➔ **Save & Exit Setup**

Use the **Save & Exit Setup** option to save any configuration changes made and exit the BIOS menus.

➔ **Exit Without Saving**

Use the **Exit Without Saving** option to exit the BIOS menus without saving any configuration changes.

6.2 Standard CMOS Features

Use the **Standard CMOS Features** BIOS menu (BIOS Menu 2) to set basic BIOS configuration options.

```
               Phoenix - AwardBIOS CMOS Setup Utility
                       Standard CMOS Features

   Date (mm:dd:yy)            Thu, Oct 18 2007         Item Help
   Time (hh:mm:ss)            12 : 12 : 12
                                                    Menu Level  ▶
 ▶ IDE Channel 0 Master      [ None]
 ▶ IDE Channel 0 Slave       [ None]              Change the day, month,
   Halt On                   [No Errors]          year and century

   Base Memory                     640K
   Extended Memory               506880K
   Total Memory                  507904K




 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
    F5: Previous Values     F6: Fail-Safe Defaults    F7: Optimized Defaults
```

BIOS Menu 2: Standard CMOS Features

➔ **Date [Day mm:dd:yyyy]**

Use the **Date** option to set the system date

➔ **Time [hh/mm/ss]**

Use the **Time** option to set the system time.

➔ **IDE Master and IDE Slave**

When entering setup, BIOS auto detects the presence of IDE devices. The **Standard CMOS Features** menu shows the status of the auto detected IDE devices. The following IDE devices are detected and shown in the **Standard CMOS Features** menu:

- IDE Primary Master
- IDE Primary Slave

IDE device configurations are changed or set in the IDE Configuration menu (**BIOS Menu 3**). If an IDE device is detected, and one of the above listed two BIOS configuration options is selected, the IDE configuration options shown in **Section 6.2.1** appear.

➔ **Halt On [All, But Keyboard]**

Use the **Halt On** option to specify what errors detected during the power up process stop the system.

➔	**All Errors**		Whenever BIOS detects a non-fatal error the system is stopped and the user prompted.
➔	**No Errors**	(DEFAULT)	The system boot is not stopped for any errors that may be detected.
➔	**All, But Keyboard**		The system boot does not stop for a keyboard error; it stops for all other errors.
➔	**All, But Diskette**		The system boot does not stop for a disk error; it stops for all other errors.
➔	**All, But Disk/Key**		The system boot does not stop for a keyboard or a disk error; it stops for all other errors.

➔ **Base Memory:**

The **Base Memory** is NOT user configurable. The POST determines the amount of base (or conventional) memory installed in the system. The value of the base memory is typically 512K for systems with 512K memory installed, or 640K for systems with 640K or more memory installed.

➔ **Extended Memory**

The **Extended Memory** is NOT user configurable. The BIOS determines how much extended memory is present during the POST. This is the amount of memory above 1MB located in the memory address map of the CPU.

➔ **Total Memory**

The **Total Memory** is NOT user configurable.

6.2.1 IDE Primary Master/Slave

Use the **IDE Primary Master/Slave** menu (BIOS Menu 3) to set or change the master/slave IDE configurations.

```
                 Phoenix - AwardBIOS CMOS Setup Utility
                          IDE Channel 0 Master

    IDE HDD Auto-Detection    [Press Enter]              Item Help

    IDE Channel 0 Master      [Auto]            Menu Level  ▶
    Access Mode               [Auto]
                                                To auto-detect the
    Base Memory                  0 MB           HDD's size, head... on
                                                this channel
    Cylinder                     0
    Head                         0
    Precomp                      0
    Landing Zone                 0
    Sector                       0







  ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
     F5: Previous Values       F6: Fail-Safe Defaults    F7: Optimized Defaults
```

BIOS Menu 3: IDE Channel Master

➔ **IDE HDD Auto-Detection [Press Enter]**

Use the **IDE HDD Auto-Detection** option to enable BIOS to automatically detect the IDE settings. Select **IDE HDD Auto-Detection** and press ENTER. BIOS automatically detects the HDD type. Do not set this option manually.

➔ **IDE Primary Master [Auto]**

Use the **IDE Primary Master** option to activate or deactivate the following drive channels:

- Channel 0 Master
- Channel 0 Slave
- Channel 1 Master
- Channel 0 Slave

➔ **None** If no drives are connected to the IDE channel select this option. Once set, this IDE channel becomes inaccessible and any drives attached to it are undetected.

➔ **Auto** (DEFAULT) Setting this option allows the device to be automatically detected by the BIOS.

➔ **Manual** Selecting this option allows manual configuration of the device on the IDE channel in BIOS.

➔ **Access Mode [Auto]**

The **Access Mode** option can only be configured if the BIOS configuration option is set to either **Manual** or **Auto**. Use the **Access Mode** option to determine the hard disk BIOS translation modes. Most systems now use hard drives with large capacities and therefore either the LBA translation mode or auto mode should be selected.

➔ **CHS** Select this mode if the HDD capacity is less than 504MB.

➔ **LBA** Select this mode if the HDD capacity is more than 8.4GB.

➔ **Large** This mode is an extended ECHS mode and while it supports HDDs larger than 504MB, it is not recommended.

➔ **Auto** (DEFAULT) If you are unsure of what access mode to set, select this option.

➔ **Capacity**

The **Capacity** specification indicates the storage capacity of the HDD installed in the system.

➔ **Cylinder**

The **Cylinder** specification indicates how many cylinders (tracks) are on the HDD installed in the system.

➔ **Head**

The **Head** specification indicates how many logical heads are on the HDD installed in the system.

➔ **Precomp**

The **Precomp** specification indicates on what track the write precompensation begins.

➔ **Landing Zone**

The **Landing Zone** specification indicates where the disk head will park itself after the system powers off.

➔ **Sector**

The **Sector** specification indicates how many logical sectors the HDD has been divided into.

6.3 Advanced BIOS Features

Use the **Advanced BIOS Features** menu (BIOS Menu 4) to configure the CPU and peripheral device configuration options.

```
                  Phoenix - AwardBIOS CMOS Setup Utility
                         Advanced BIOS Features

    Quick Power On Self Test    [Enabled]           Item Help
    Boot From Lan Control        [Disabled]
    First Boot Device            [CDROM]          Menu Level  ▶
    Second Boot Device           [HDD-0]
    Third Boot Device            [LS120]
    Boot Other Device            [Enabled]
    Boot Up Numlock Status       [On]
    Security Option              [Setup]
    Console Redirection          [Disabled]
    Baud Rate                    [19200]
    Agent after boot             [Disabled]




↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
    F5: Previous Values     F6: Fail-Safe Defaults     F7: Optimized Defaults
```

BIOS Menu 4: Advanced BIOS Features

➔ **Quick Power On Self Test [Enabled]**

Use the **Quick Power On Self Test** option to speed up the POST after the computer is turned on. If enabled, BIOS shortens or skips some POST check items.

➔ Disabled   Normal POST occurs after the computer is turned on.

➔ Enabled   (DEFAULT)   Quick POST occurs after the computer is turned on.

➔ **Boot From Lan Control [Disabled]**

The **Boot From Lan Control** option enables the system to be booted from a remote system.

➔ **Disabled**   (DEFAULT)   The system cannot be booted from a remote system through the LAN.

➔ **Enabled**   The system can be booted from a remote system through the LAN.

➔ **Boot Device**

Use the **Boot Device** options to select the order of the devices the system boots from. There are three boot device configuration options:

- **First Boot Device** [Default: CDROM]
- **Second Boot Device** [Default: HDD-0]
- **Third Boot Device** [Default: LS120]

Using the default values, the system first looks for a CDROM to boot from. If it cannot find a CDROM, it boots from a HDD-0. If both The CDROM and the HDD-0 are unavailable, the system boots from a LS120 drive.

Boot Device configuration options are:

- LS120
- HDD-0
- SCSI
- CDROM
- HDD-1
- ZIP100
- USB-FDD
- USB-ZIP
- USB-CDROM
- USB-HDD
- LAN
- Disabled

➔ **Boot Other Device [Enabled]**

Use the **Boot Other Device** option to determine whether the system uses a second or third boot device if the first boot device is not found.

➔ **Disabled** The system does not look for second and third boot devices if the first one is not found.

➔ **Enabled** (DEFAULT) The system looks for second and third boot devices if the first one is not found.

➔ **Boot Up Numlock Status [On]**

Use the **Boot Up Numlock Status** option to specify the default state of the numeric keypad.

➔ **Off** The keys on the keypad are not activated.

➔ **On** (DEFAULT) Activates the keys on the keypad.

➔ **Security Option [Setup]**

Use the **Security Option** to limit access to both the system and Setup, or just Setup.

➔ **Setup** (DEFAULT) The system does not boot and access to Setup is denied if the correct password is not entered at the prompt.

➔ **System** The system boots, but access to Setup is denied if the correct password is not entered at the prompt.

NOTE:

To disable security, select the password setting in the Main Menu. When asked to enter a password, do not type anything, press **ENTER** and the security is disabled. Once the security is disabled, the system boots and Setup can be accessed.

➔ **Console Redirection [Disabled]**

Use the **Console Redirection [Disabled]** enables and disabled console redirection. Console redirection allows the system to be controlled by a host system by redirecting keyboard input through the serial port. This feature is used to changed BIOS or RAID settings remotely.

➔ **Enabled**   Console redirection enabled

➔ **Disabled** (DEFAULT)   Console redirection is disabled

➔ **Baud Rate [19200]**

Sets the baud rate for console redirection. The following options are available.

- 9600
- 19200   Default
- 38400
- 57600
- 115200

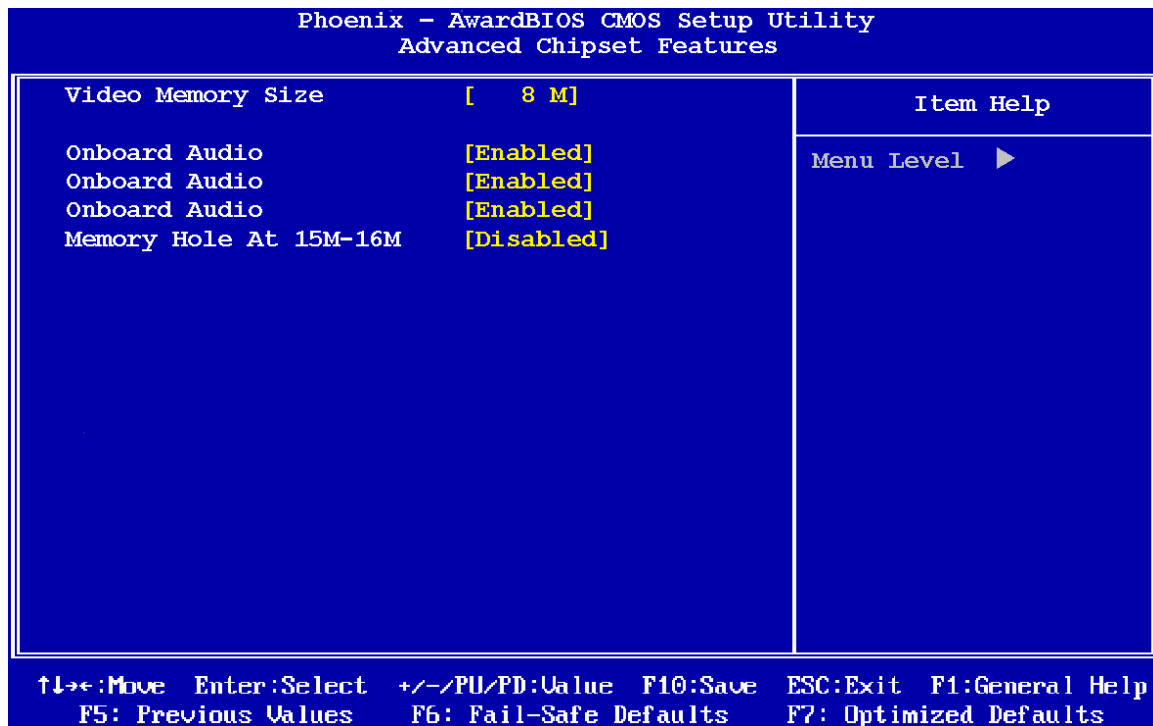➔ **Agent after boot [Disabled]**

Use the **Agent after boot [Disabled]** to keep console redirection active after the operating system loads.

➔ **Disabled** (DEFAULT)   Console redirection is disabled after the operating system starts

➔ **Enabled**   Console redirection is kept on after the operating system boots up

6.4 Advanced Chipset Features

Use the **Advanced Chipset Features** menu (BIOS Menu 5) to change chipset configuration options.

```
                 Phoenix - AwardBIOS CMOS Setup Utility
                        Advanced Chipset Features

  Video Memory Size           [   8 M]                      Item Help

  Onboard Audio               [Enabled]            Menu Level  ▶
  Onboard Audio               [Enabled]
  Onboard Audio               [Enabled]
  Memory Hole At 15M-16M      [Disabled]











  ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
      F5: Previous Values     F6: Fail-Safe Defaults    F7: Optimized Defaults
```

BIOS Menu 5: Advanced Chipset Features

➔ **Video Memory Size [8M]**

Use the **Video Memory Size** option to determine how much memory is allocated to the video graphics device. The **Video Memory Size** options are:

- None
- 4M
- 6M
- 8M   (DEFAULT)
- 12M
- 16M

➔ **OnBoard Audio [Enabled]**

Use the **OnBoard Audio** option to enable or disable the onboard codec.

➔ **Disabled**   The onboard codec is disabled.

➔ **Enabled**   (DEFAULT)   The onboard codec is detected and enabled.

➔ **Onboard USB 2.0 [Enabled]**

The **USB 2.0 Controller** BIOS option enables or disables the USB 2.0 controller

➔ **Disabled**   USB function disabled

➔ **Enabled**   DEFAULT   USB function enabled

➔ **Onboard USB 1.1 [Enabled]**

The **USB 1.1 Controller** BIOS option enables or disables the USB 1.1 controller

➔ **Disabled**   USB function disabled

➔ **Enabled**   DEFAULT   USB function enabled

➔ **Memory Hole At 15M – 16M [Disabled]**

The **Memory Hole At 15M – 16M** reserves the memory space between 15MB and 16MB for ISA expansion cards that require a specified area of memory to work properly. If an older ISA expansion card is used, please refer to the documentation that came with the card to see if it is necessary to reserve the space.

➔ **Disabled**   DEFAULT   Memory is not reserved for ISA expansion cards

➔ **Enabled**   Memory is reserved for ISA expansion cards

6.5 Integrated Peripherals

Use the **Integrated Peripherals** menu (BIOS Menu 6) to change the configuration options for the attached peripheral devices.

```
                Phoenix - AwardBIOS CMOS Setup Utility
                        Integrated Peripherals

    On-Chip IDE Channel 1      [Enabled]              Item Help
    Master Drive PIO Mode       [Auto]
    Slave Drive PIO Mode        [Auto]              Menu Level    ▶
    IDE Primary Master UDMA     [Auto]
    IDE Primary Slave  UDMA     [Auto]
    IDE DMA transfer access     [Auto]
    IDE HDD Block Mode          [Auto]
    Onboard Serial Port 1       [3E8]
    Onboard Serial Port 2       [2E8]
    Onboard Serial Port 2 Mode [Normal]
    RxD , TxD Active            [Hi,Lo]
    UR2 Duplex Mode             [Half]
    Use IR Pins                 [IR-Rx2Tx2]




↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
   F5: Previous Values      F6: Fail-Safe Defaults    F7: Optimized Defaults
```

BIOS Menu 6: Integrated Peripherals

➔ **On-Chip IDE Channel 1 [Enabled]**

Use the **On-Chip IDE Channel 1** option to specify if the system uses the integrated primary IDE channel or not.

➔ **Disabled**   The primary IDE channel is not used.

➔ **Enabled**   (DEFAULT)   The primary IDE channel is used.

➔ **Drive PIO Mode [Auto]**

Use the **Drive PIO Mode** options below to select the Programmed Input/Output (PIO) mode for the following HDDs:

- ▪ Master Drive PIO Mode
- ▪ Slave Drive PIO Mode

➔ **Auto** (DEFAULT) The computer selects the correct mode.

➔ **Mode 0** PIO mode 0 selected with a maximum transfer rate of 3.3MBps.

➔ **Mode 1** PIO mode 1 selected with a maximum transfer rate of 5.2MBps.

➔ **Mode 2** PIO mode 2 selected with a maximum transfer rate of 8.3MBps.

➔ **Mode 3** PIO mode 3 selected with a maximum transfer rate of 11.1MBps.

➔ **Mode 4** PIO mode 4 selected with a maximum transfer rate of 16.6MBps.

➔ **IDE UDMA [Auto]**

Use the **IDE UDMA** option below to select the Ultra DMA (UDMA) mode for the following HDDs:

- ▪ IDE Primary Master UDMA
- ▪ IDE Primary Slave UDMA

➔ **Auto** (DEFAULT) The computer selects the correct UDMA.

➔ **Disabled** The UDMA for the HDD device is disabled.

➔ **IDE DMA transfer access [Enabled]**

Use the **IDE DMA transfer access** option to enable or disable DMA support for IDE devices connected to the system.

➔ **Disabled** All IDE drive DMA transfers are disabled. The IDE drives use PIO mode transfers.

➔ **Enabled** (DEFAULT) All IDE drive DMA transfers are enabled.

➔ **IDE HDD Block Mode [Enabled]**

If the drive connected to the system supports block mode, use the **IDE HDD Block Mode** option to enable the system to detect the optimal number of block read/writes per sector the system IDE drive can support. Block mode is also called block transfer, multiple commands, or multiple sector read/write.

➔ **Disabled**   Block mode is not supported.

➔ **Enabled**   (DEFAULT)   Block mode is supported.

➔ **Onboard Serial Port 1 [3F8/IRQ4]**

Use the **Onboard Serial Port 1** option to select the I/O address and IRQ for the onboard serial port 1. The serial port can be disabled or the I/O address and the IRQ can be automatically selected by the BIOS. The **Onboard Serial Port 1** options are:

- Disabled
- 3F8/IRQ4 (DEFAULT)
- 2F8/IRQ3
- 3E8/IRQ4
- 2E8/IRQ3
- Auto

➔ **Onboard Serial Port 2 [2F8/IRQ3]**

Use the **Onboard Serial Port 2** option to select the I/O address and IRQ for the onboard serial port 2. The serial port can be disabled or the I/O address and the IRQ can be automatically selected by the BIOS. The **Onboard Serial Port 2** options are:

- Disabled
- 3F8/IRQ4
- 2F8/IRQ3 (DEFAULT)
- 3E8/IRQ4
- 2E8/IRQ3
- Auto

➔ **Onboard Serial Port 2 Mode [Normal]**

Use the **Onboard Serial Port 2 Mode** to select the UART mode for the system.

➔ **IrDA**   Infrared port compliant with IrDA specification

➔ **ASK IR**   Amplitude shift keyed infrared port

➔ **Normal** (DEFAULT)   RS-232C serial port

➔ **RxD, TxD Active [Hi,Lo]**

The **RxD, TxD Active** option can only be selected if the **UART Mode Select** option is set to IrDA mode or ASKIR mode. Use the **RxD, TxD Active** option to set the infrared reception (RxD) and transmission (TxD) polarity. The **RxD, TxD Active** options are:

- Hi, Hi
- Hi, Lo (DEFAULT)
- Lo, Hi
- Lo, Lo

➔ **UR2 Duplex Mode [Half]**

Use the **UR2 Duplex Mode** option to specify the transmission mode for the IR port device.

➔ **Full**   Simultaneous bi-directional transmission occurs.

➔ **Half**   (DEFAULT)   Transmission only occurs in one direction at a time.
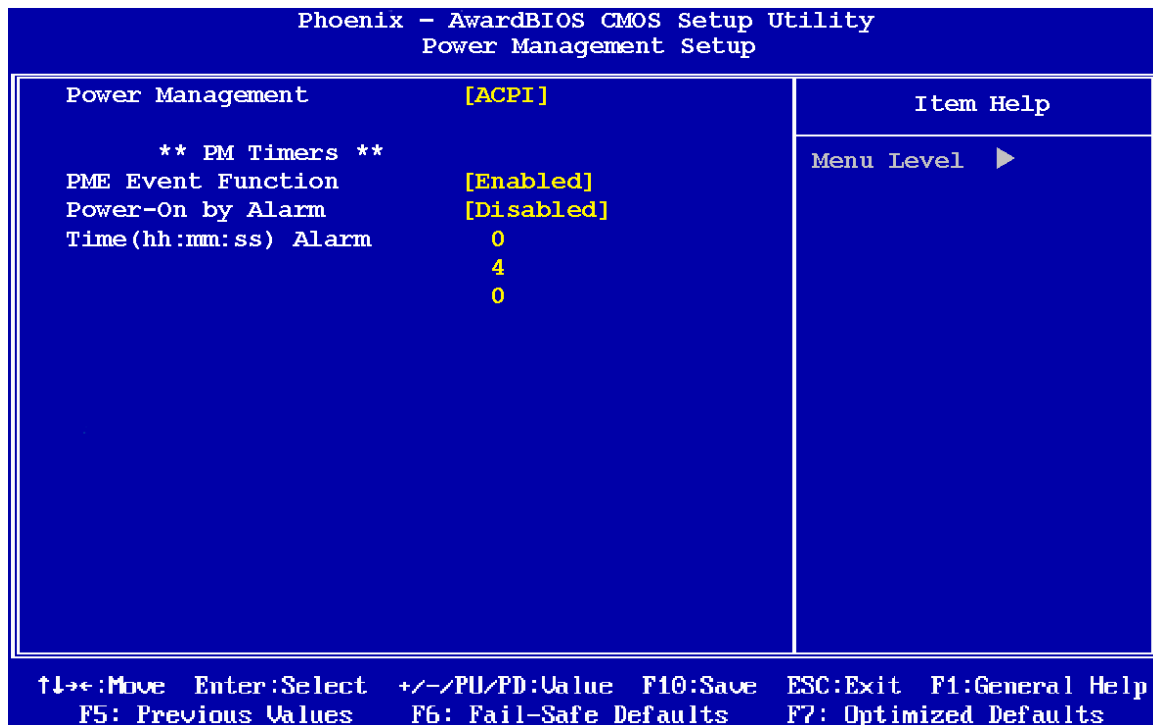
➔ **Use IR Pins [IR-Rx2Tx2]**

Use the **Use IR Pins** options to specify how the IR pins respond. The **Use IR Pins** options are:

- RxD2, TxD2
- IR-Rx2Tx2 (DEFAULT)

6.6 Power Management Setup

Use the **Power Management Setup** menu (BIOS Menu 7) to set the BIOS power management and saving features.

BIOS Menu 7: Power Management Setup

➔ **Power Management [ACPI]**

Use the **Power Management** option to set the power management type used by the system.

➔ **APM**   Advanced power management (APM) is activated

➔ **ACPI**   (DEFAULT)   Advanced Configuration and Power Interface (ACPI) is activated.

➔ **PME Event Function [Enabled]**

The **PME Event Function** BIOS option specifies if the system will be roused from a suspended or standby state when there is activity on the PME (power management event) controller.

➔ **Disabled**   Wake event not generated by PCI PME controller activity

➔ **Enabled** DEFAULT Wake event generated by PCI PME controller activity

➔ **Power-On by Alarm [Disabled]**

Use the **Power-On by Alarm** option to specify when the computer is roused from a suspended state.

➔ **Disabled** DEFAULT The real time clock (RTC) cannot generate a wake event

➔ **Enabled** If selected, the following appears with values that can be selected:
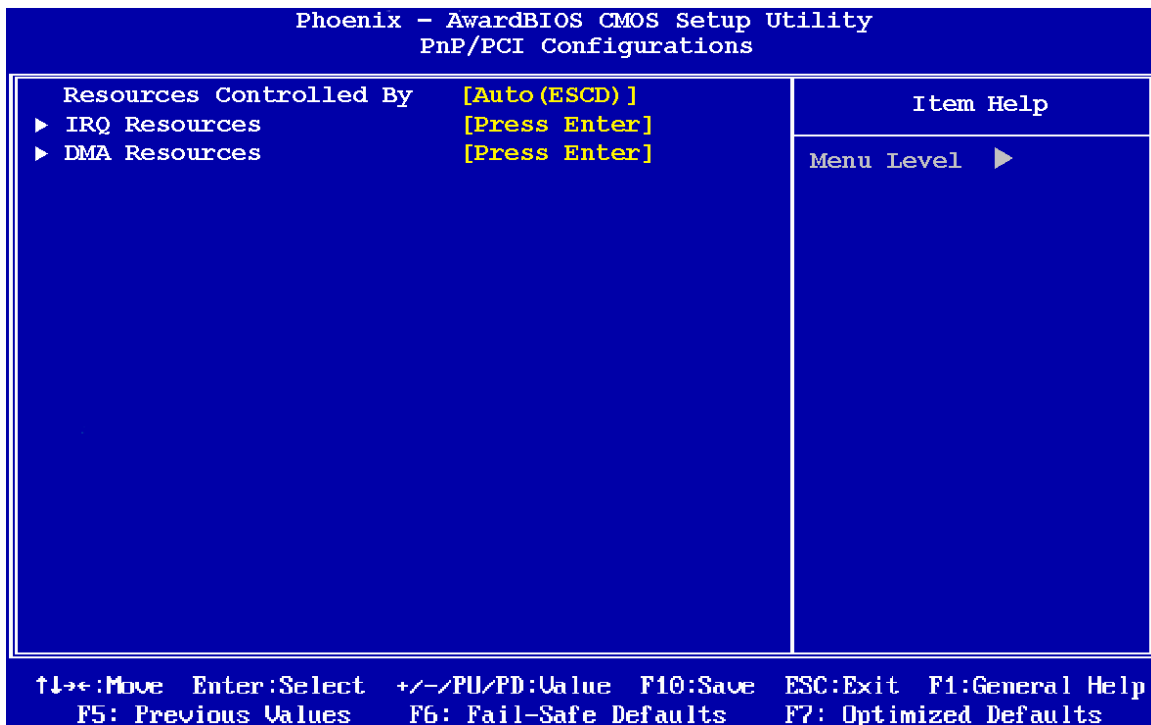
➔ **Hour**

➔ **Minute**

➔ **Second**

After setting the alarm, the computer will turn itself on from a suspend state when the alarm goes off.

6.7 PnP/PCI Configurations

Use the **PnP/PCI Configurations** menu (BIOS Menu 8) to set the plug and play, and PCI options.

```
            Phoenix - AwardBIOS CMOS Setup Utility
                     PnP/PCI Configurations
   Resources Controlled By    [Auto(ESCD)]          Item Help
 ▶ IRQ Resources              [Press Enter]
 ▶ DMA Resources              [Press Enter]       Menu Level  ▶




↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
    F5: Previous Values      F6: Fail-Safe Defaults  F7: Optimized Defaults
```

BIOS Menu 8: PnP/PCI Configurations

➔ **Resources Controlled By [Auto (ESCD)]**

Use the **Resources Controlled By** option to either manually configure all the boot and plug and play devices, or allow BIOS to configure these devices automatically. If BIOS is allowed to configure the devices automatically IRQs, DMA and memory base address fields cannot be set manually.

➔ **Auto(ESCD)**   (DEFAULT)   BIOS automatically configures plug and play devices as well as boot devices.

➔ **Manual**   Manually configure the plug and play devices and any other boot devices.

➔ **IRQ Resources [Press Enter]**

The **IRQ Resources** option (BIOS Menu 9) can only be selected if the **Resources Controlled By** option is set to **Manual**.

```
          Phoenix - AwardBIOS CMOS Setup Utility
                     IRQ Resources

    IRQ-3   assigned to          [Legacy ISA]          Item Help
    IRQ-4   assigned to          [Legacy ISA]
    IRQ-5   assigned to          [PCI/ISA PnP]      Menu Level   ▶
    IRQ-7   assigned to          [Legacy ISA]
    IRQ-10  assigned to          [PCI/ISA PnP]     Legacy ISA for devices
    IRQ-11  assigned to          [PCI/ISA PnP]     compliant with the
                                                   original PC AT bus
                                                   specification, PCI/ISA
                                                   PnP for devices
                                                   compliant with the
                                                   Plug and Play standard
                                                   whether designed for
                                                   PCI or ISA bus
                                                   architecture



↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
  F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```

BIOS Menu 9: IRQ Resources

The **IRQ Resources** menu has the following options:

- IRQ-3 assigned to
- IRQ-4 assigned to
- IRQ-5 assigned to
- IRQ-7 assigned to
- IRQ-10 assigned to
- IRQ-11 assigned to

The above options all have the following default options.

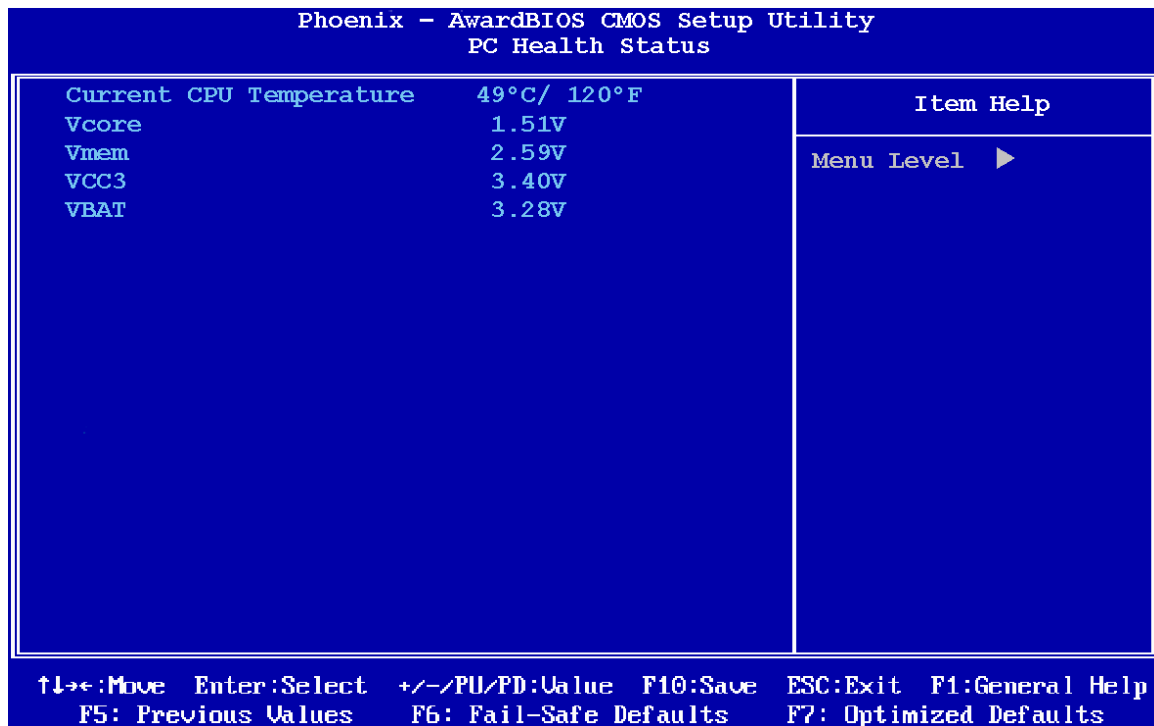➔ **PCI/ISA PnP**   DEFAULT   PCI/ISA PNP for devices compliant with the Plug and Play standard whether designed for the PCI or ISA bus architecture.

➔ **Legacy ISA**   The IRQ is assigned to legacy ISA for devices compliant with the original PC AT bus specification

➔ **DMA Resources [Press Enter]**

The **DMA Resources** menu (BIOS Menu 10) can only be accessed if the **Resources Controlled By** option is set to **Manual**. Use **DMA Resources** to select a base address and the length for the memory area used by a peripheral that requires high memory.

```
              Phoenix - AwardBIOS CMOS Setup Utility
                          DMA Resources
   ┌──────────────────────────────────────────┬──────────────────────────┐
   │ DMA-0  assigned to      [PCI/ISA PnP]     │        Item Help         │
   │ DMA-1  assigned to      [PCI/ISA PnP]     ├──────────────────────────┤
   │ DMA-3  assigned to      [PCI/ISA PnP]     │  Menu Level  ▶           │
   │ DMA-5  assigned to      [PCI/ISA PnP]     │                          │
   │ DMA-6  assigned to      [PCI/ISA PnP]     │ Legacy ISA for devices   │
   │ DMA-7  assigned to      [PCI/ISA PnP]     │ compliant with the       │
   │                                           │ original PC AT bus        │
   │                                           │ specification, PCI/ISA   │
   │                                           │ PnP for devices          │
   │                                           │ compliant with the       │
   │                                           │ Plug and Play standard   │
   │                                           │ whether designed for     │
   │                                           │ PCI or ISA bus           │
   │                                           │ architecture             │
   │                                           │                          │
   │                                           │                          │
   │                                           │                          │
   │                                           │                          │
   └──────────────────────────────────────────┴──────────────────────────┘
   ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
     F5: Previous Values     F6: Fail-Safe Defaults   F7: Optimized Defaults
```

BIOS Menu 10: DMA Resources

The **DMA Resources** menu has the following options:

- DMA-0 assigned to
- DMA-1 assigned to
- DMA-3 assigned to
- DMA-5 assigned to
- DMA-6 assigned to
- DMA-7 assigned to

The above options all have the following default options.

➔ **PCI/ISA**   DEFAULT   PCI/ISA PNP for devices compliant with the Plug and

PnP	Play standard whether designed for the PCI or ISA bus architecture.
➔ **Legacy ISA**	The IRQ is assigned to legacy ISA for devices compliant with the original PC AT bus specification

6.8 PC Health Status

The **PC Health Status** menu (BIOS Menu 11) has no user configurable options, but shows system operating parameters that are essential to the stable operation of the system.

```
              Phoenix - AwardBIOS CMOS Setup Utility
                         PC Health Status
   Current CPU Temperature      49°C/ 120°F          Item Help
   Vcore                          1.51V
   Vmem                           2.59V         Menu Level  ▶
   VCC3                           3.40V
   VBAT                           3.28V










  ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
    F5: Previous Values      F6: Fail-Safe Defaults   F7: Optimized Defaults
```

BIOS Menu 11: PC Health Status

The following system parameters are monitored by the **PC Health Status** menu.

➔ **System Temperature**

The following temperatures are monitored:

- Current CPU Temperature

➔ **Voltages**

The following voltages are monitored:

- Vcore
- Vmem
- VCC3
- VBAT

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Chapter

7

Software Drivers

7.1 Available Software Drivers

NOTE:

The content of the CD may vary throughout the life cycle of the product and is subject to change without prior notice. You may visit the IEI website or contact technical support for the latest updates.

The software drivers for the NANO-GX2 motherboard installed in the subsystem:

- 7.2 VGA Driver
- 7.3 Audio Driver
- 7.4 LAN Driver

All five drivers can be found on the CD that came with the motherboard. To install the drivers please follow the instructions in the sections below.

NOTE:

The installation instructions below are for systems running Windows XP. The Windows XP kernel may already contain some of these drivers and install them automatically when it detects the new hardware.

7.2 VGA Driver

NOTE:

The VGA driver installation instructions are for a system running Windows XP.

To install the VGA driver, please follow the steps below.

Step 1: Turn the system on.

Step 2:   After the system with Windows XP is turned on for the first time, the message in

Figure 7-1 appears.

Figure 7-1: VGA Driver Start Up Screen

Step 3:   If the system should access the Windows Update site, select either the first

option or second option in **Figure 7-1**. If the system should not access the

Windows Update site, select the third option in **Figure 7-1**.

Step 4:   Insert the disk that came with the system.
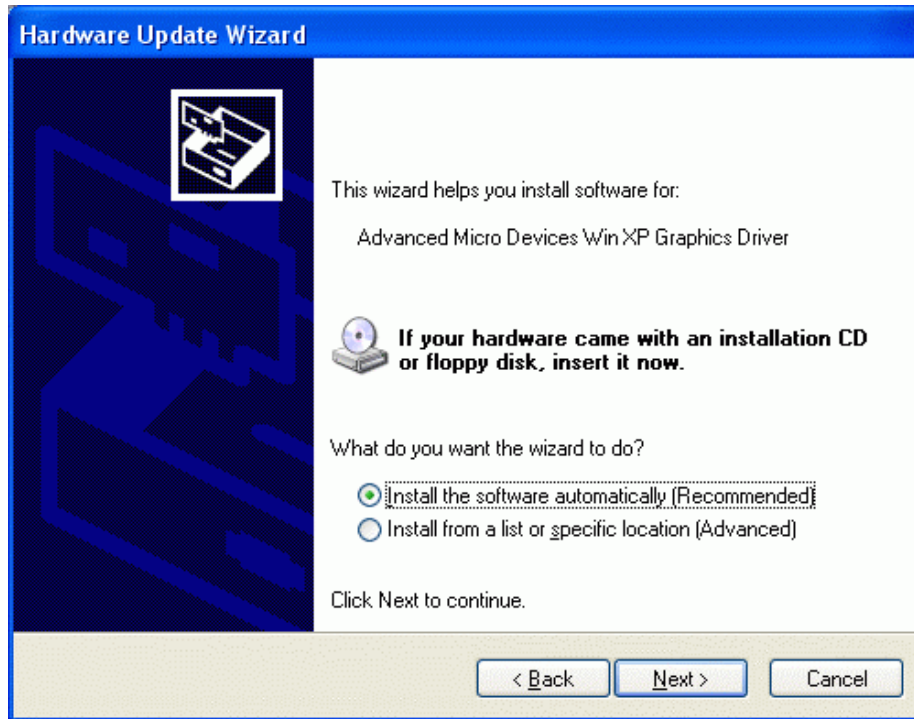
Step 5:   Click NEXT to continue.

Figure 7-2: Select the Installation Method

Step 6: Select if the system should automatically install the software or if the software should be installed form a list or specific location as shown in **Figure 7-2**.

Step 7: Click **NEXT** to continue.

Step 8: The system starts to install the driver. See **Figure 7-3**.
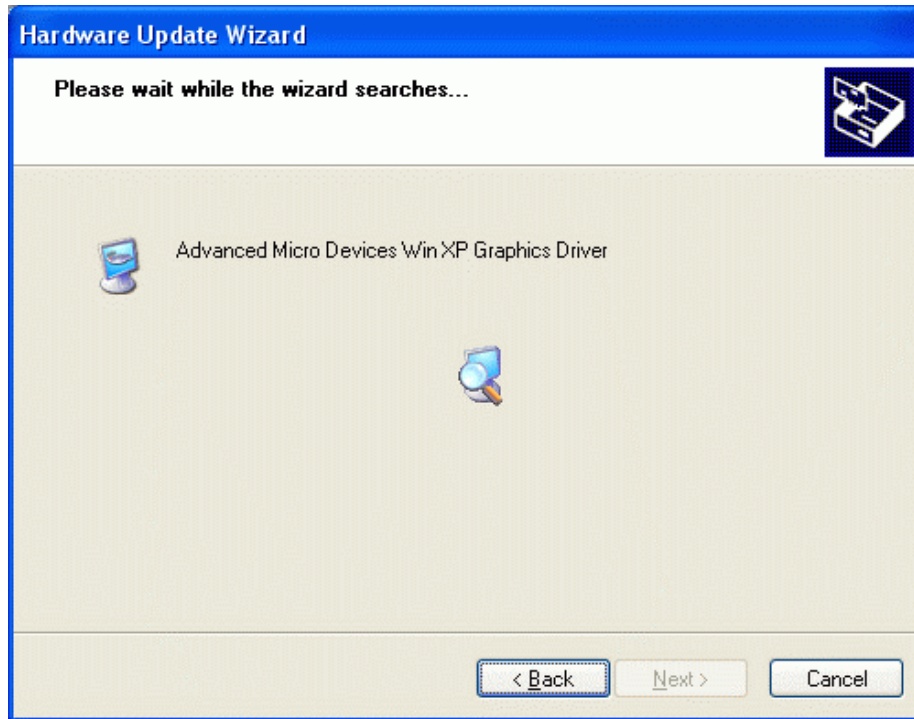
Figure 7-3: VGA Driver Installation

Step 9: If the driver cannot be located by the system, the user is prompted to specify the location of the driver. See **Figure 7-4**.
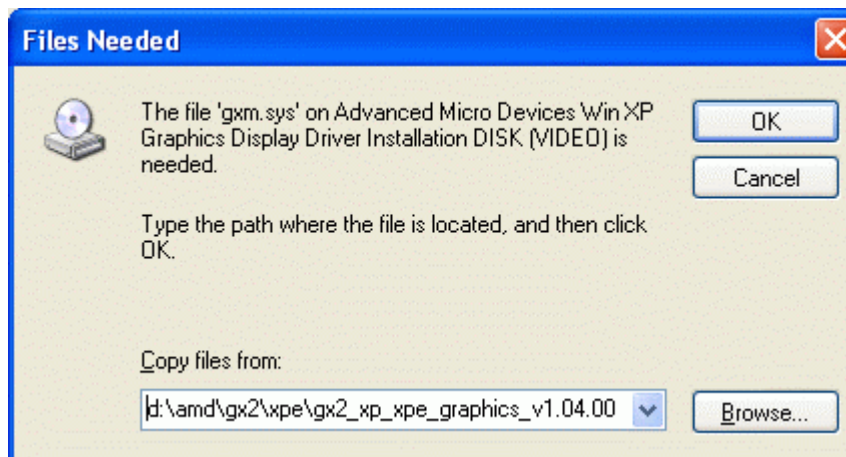
Figure 7-4: VGA Driver Installation

Step 10: Select Browse. The driver is located on the CD in the following directory:

E:\VGA\GX2\XPe\GX2_XP_XPe_Graphics_v1.04.00

Step 11: Once located the driver is installed.

Step 12: When the driver installation is complete, click FINISH to close the installation

wizard. See **Figure 7-5**.
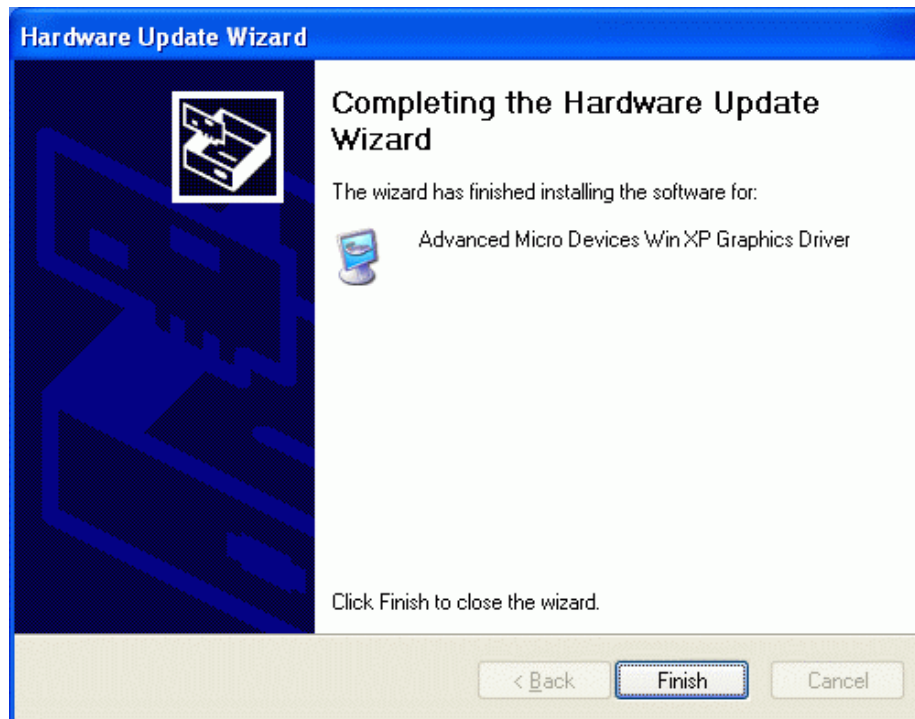
Figure 7-5: Close the VGA Driver Installation Wizard

7.3 Audio Driver

![NOTE icon] **NOTE:**

The Audio driver installation instructions are for a system running
Windows XP.

To install the Audio driver, please follow the steps below.

Step 1: Turn the system on.

Step 2: After the system with Windows XP is turned on for the first time, the message in

Figure 7-6 appears.

Figure 7-6: Audio Driver Start Up Screen

Step 3: If the system should access the Windows Update site, select either the first option or second option in **Figure 7-6**. If the system should not access the Windows Update site, select the third option in **Figure 7-6**.

Step 4: Insert the disk that came with the system.
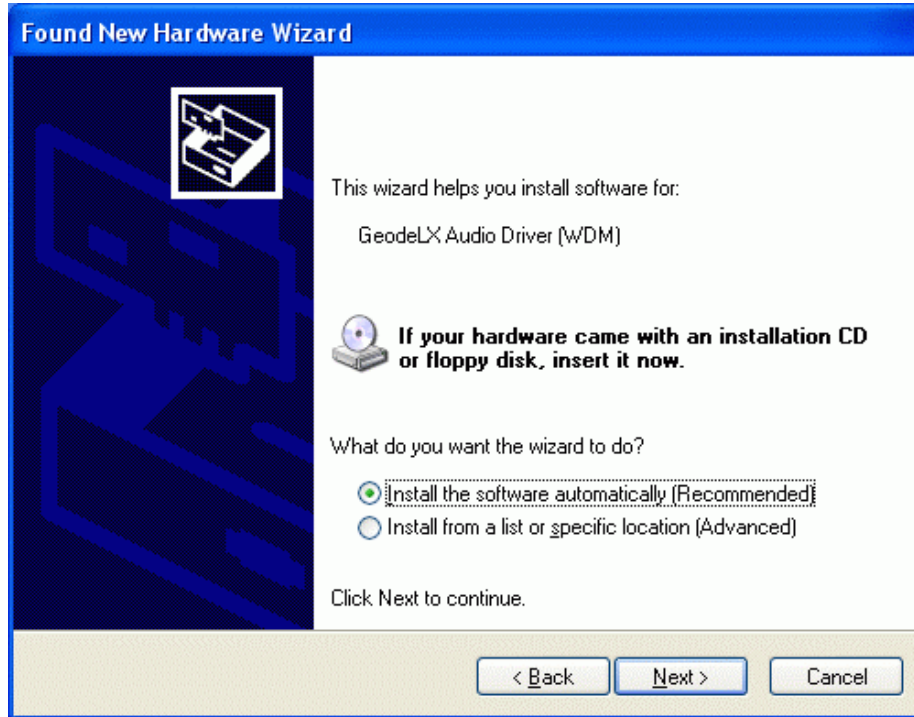
Step 5: Click NEXT to continue.

Figure 7-7: Select the Installation Method

Step 6: Select if the system should automatically install the software or if the software should be installed form a list or specific location as shown in **Figure 7-7**.

Step 7: Click **NEXT** to continue.

Step 8: The system starts to install the driver. See **Figure 7-3**.

![NOTE icon] **NOTE:**

In some cases the Audio driver may already be present in the OS. The OS then automatically detects and installs the driver (as in this case). If the OS does not have the driver, the disk needs to be inserted and the driver located in the following directory:

E:\Audio\GeodeLX_XP_XPe_WDM_Audio_v2.03.00
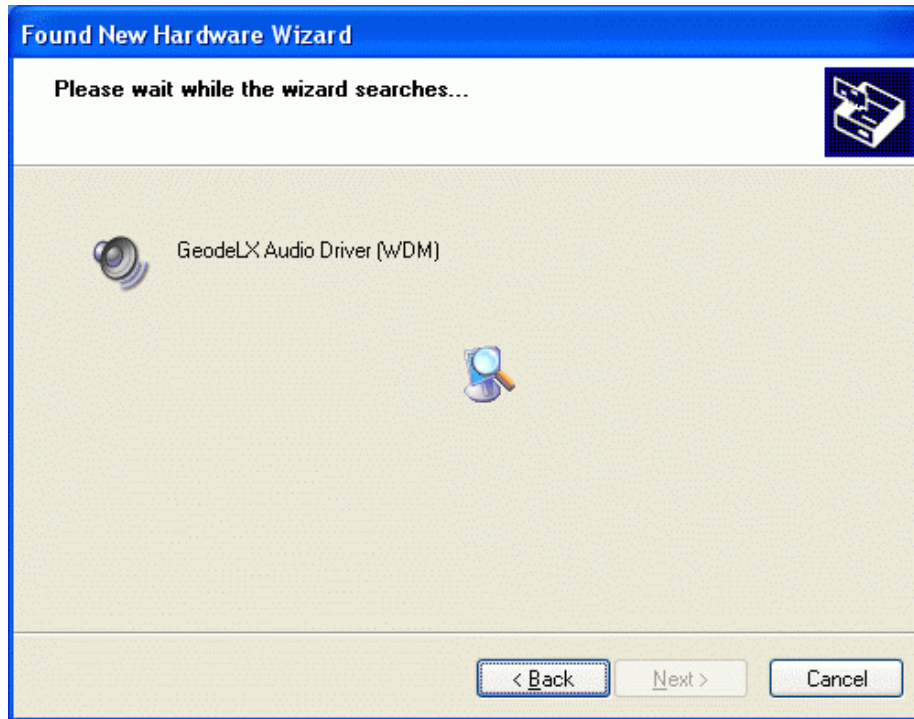
Figure 7-8: Audio Driver Installation

Step 9: When the driver installation is complete, click FINISH to close the installation

wizard. See **Figure 7-9**.
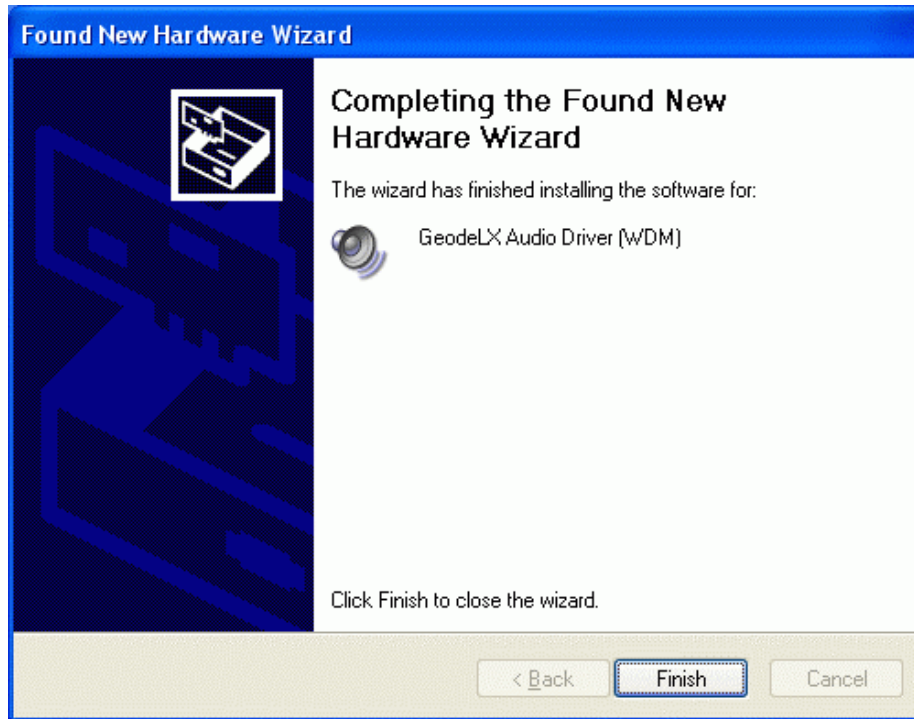
Figure 7-9: Close the Audio Driver Installation Wizard

7.4 LAN Driver

To install the LAN driver, please follow the steps below.

Step 1: Insert the CD that came with the system.

Step 2: The screen shown in **Figure 7-10** appears.

Step 3: Select NANO-GX2 in **Figure 7-10**.

Figure 7-10: CD Main Menu

Step 4: The window **Figure 7-11** appears listing all the available drives.

Step 5: Select LAN in the screen shown in **Figure 7-11**. Click **LAN** from the **AMD LX/GX CD Driver Menu** (**Figure 7-11**) to open a window to the **X:\LAN\Realtek** (where **X:** is the system CD drive folder on the driver CD.
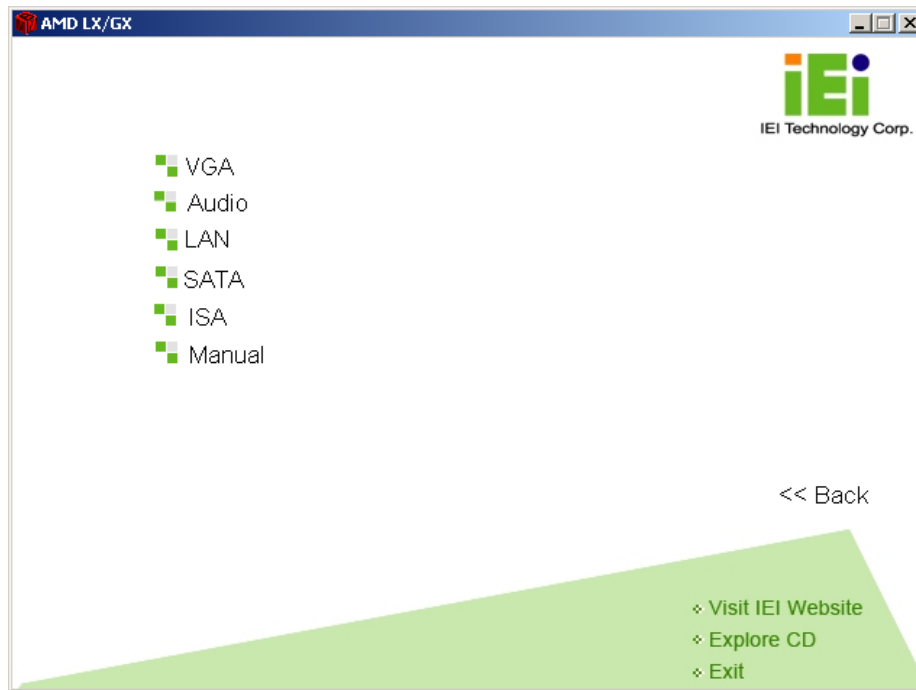
Figure 7-11: AMD LX/GX CD Driver Menu

Step 6: Open the **RTL8100C** folder.

Step 7: Locate the **Setup** program icon (**Figure 7-12**).
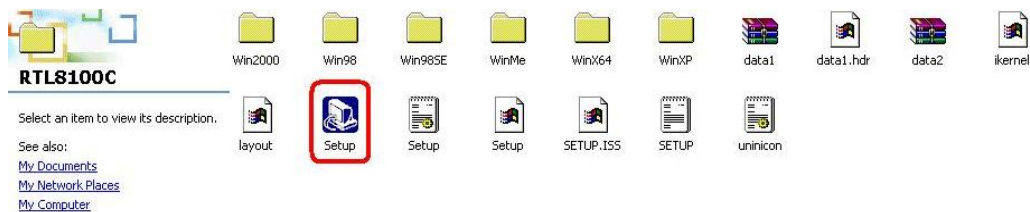
Figure 7-12: Locate the Setup Program Icon

Step 8: Double click the **Setup** program icon in **Figure 7-12**.

Step 9: The **Install Shield Wizard** is prepared to guide the user through the rest of the process (**Figure 7-13**).
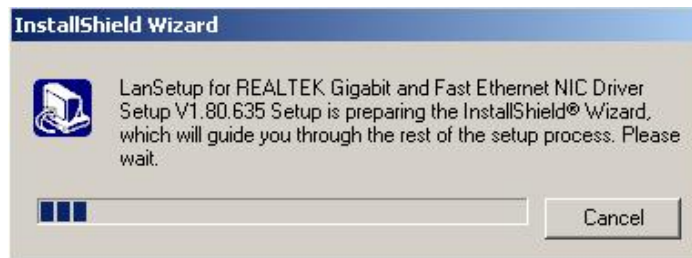
Figure 7-13: Preparing Setup Screen

Step 10: Once initialized, the **Install Wizard** welcome screen appears (**Figure 7-14**).
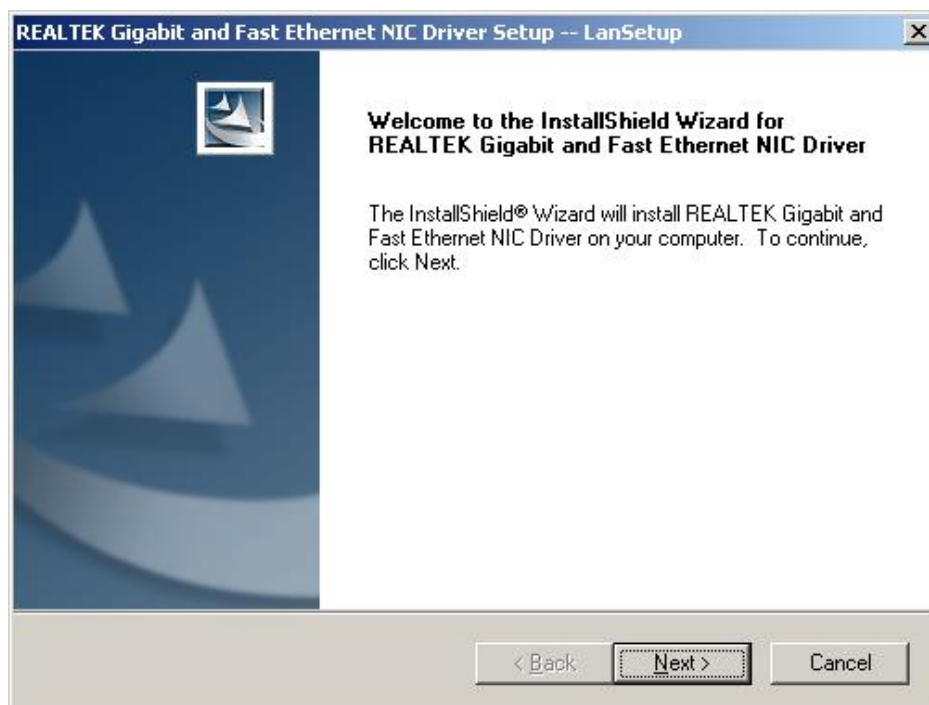
Figure 7-14: Install Wizard Welcome Screen

Step 11: Click NEXT to continue the installation or CANCEL to stop the installation.

Step 12: The **Install Wizard** starts to install the LAN driver.

Step 13: Once the installation is complete, the **InstallShield Wizard Complete** screen

appears (**Figure 7-15**).
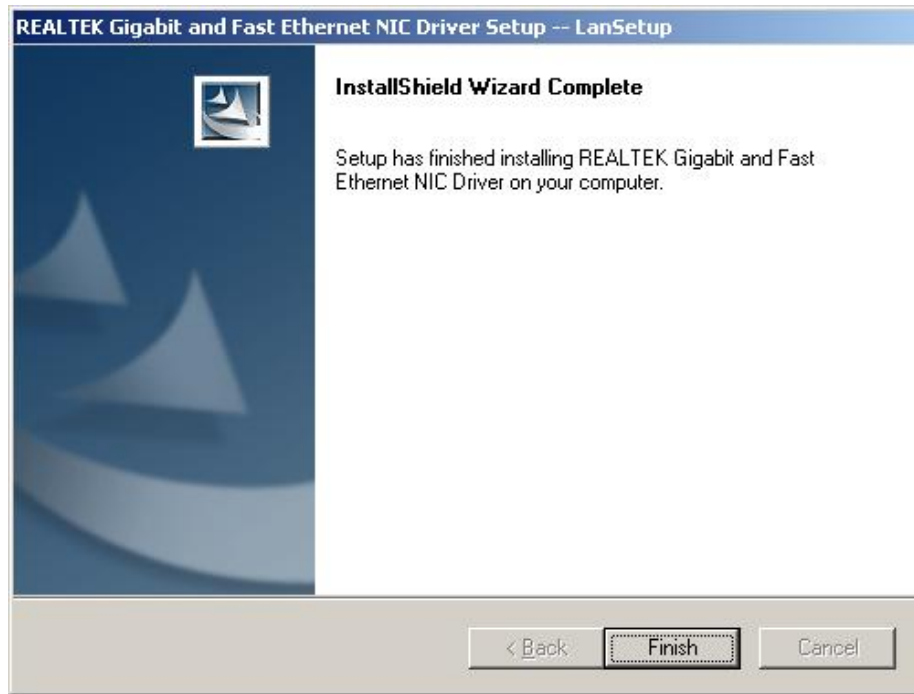
Figure 7-15: Installing Screen

Step 14: Click FINISH to complete the installation and exit the **Install Shield Wizard**.

Step 15: Once the installation process is complete, the computer may be restarted

immediately or later. Select the preferred option and click FINISH to complete

the installation process and exit.

Appendix

A

BIOS Options

Below is a list of BIOS configuration options in the BIOS chapter.

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Appendix

B

Terminology

AC '97	Audio Codec 97 (AC'97) refers to a codec standard developed by Intel® in 1997.
ACPI	Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.
AHCI	Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.
ATA	The Advanced Technology Attachment (ATA) interface connects storage devices including hard disks and CD-ROM drives to a computer.
ARMD	An ATAPI Removable Media Device (ARMD) is any ATAPI device that supports removable media, besides CD and DVD drives.
ASKIR	Amplitude Shift Keyed Infrared (ASKIR) is a form of modulation that represents a digital signal by varying the amplitude ("volume") of the signal. A low amplitude signal represents a binary 0, while a high amplitude signal represents a binary 1.
BIOS	The Basic Input/Output System (BIOS) is firmware that is first run when the computer is turned on and can be configured by the end user
CODEC	The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.
CompactFlash®	CompactFlash® is a solid-state storage device. CompactFlash® devices use flash memory in a standard size enclosure. Type II is thicker than Type I, but a Type II slot can support both types.
CMOS	Complimentary metal-oxide-conductor is an integrated circuit used in chips like static RAM and microprocessors.
COM	COM refers to serial ports. Serial ports offer serial communication to expansion devices. The serial port on a personal computer is usually a male DB-9 connector.
DAC	The Digital-to-Analog Converter (DAC) converts digital signals to analog signals.
DDR	Double Data Rate refers to a data bus transferring data on both the rising and falling edges of the clock signal.

DMA	Direct Memory Access (DMA) enables some peripheral devices to bypass the system processor and communicate directly with the system memory.
DIMM	Dual Inline Memory Modules are a type of RAM that offer a 64-bit data bus and have separate electrical contacts on each side of the module.
DIO	The digital inputs and digital outputs are general control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.
EHCI	The Enhanced Host Controller Interface (EHCI) specification is a register-level interface description for USB 2.0 Host Controllers.
EIDE	Enhanced IDE (EIDE) is a newer IDE interface standard that has data transfer rates between 4.0 MBps and 16.6 MBps.
EIST	Enhanced Intel® SpeedStep Technology (EIST) allows users to modify the power consumption levels and processor performance through application software. The application software changes the bus-to-core frequency ratio and the processor core voltage.
FSB	The Front Side Bus (FSB) is the bi-directional communication channel between the processor and the Northbridge chipset.
GbE	Gigabit Ethernet (GbE) is an Ethernet version that transfers data at 1.0 Gbps and complies with the IEEE 802.3-2005 standard.
GPIO	General purpose input
HDD	Hard disk drive (HDD) is a type of magnetic, non-volatile computer storage device that stores digitally encoded data.
ICH	The Input/Ouput Controll Hub (ICH) is an Intel® Southbridge chipset.
IrDA	Infrared Data Association (IrDA) specify infrared data transmission protocols used to enable electronic devices to wirelessly communicate with each other.
L1 Cache	The Level 1 Cache (L1 Cache) is a small memory cache built into the system processor.
L2 Cache	The Level 2 Cache (L2 Cache) is an external processor memory cache.

LCD	Liquid crystal display (LCD) is a flat, low-power display device that consists of two polarizing plates with a liquid crystal panel in between.
LVDS	Low-voltage differential signaling (LVDS) is a dual-wire, high-speed differential electrical signaling system commonly used to connect LCD displays to a computer.
POST	The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.
RAM	Random Access Memory (RAM) is volatile memory that loses data when power is lost. RAM has very fast data transfer rates compared to other storage like hard drives.
SATA	Serial ATA (SATA) is a serial communications bus designed for data transfers between storage devices and the computer chipsets. The SATA bus has transfer speeds up to 1.5 Gbps and the SATA II bus has data transfer speeds of up to 3.0 Gbps.
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology (S.M.A.R.T) refers to automatic status checking technology implemented on hard disk drives.
UART	Universal Asynchronous Receiver-transmitter (UART) is responsible for asynchronous communications on the system and manages the system's serial communication (COM) ports.
UHCI	The Universal Host Controller Interface (UHCI) specification is a register-level interface description for USB 1.1 Host Controllers.
USB	The Universal Serial Bus (USB) is an external bus standard for interfacing devices. USB 1.1 supports 12Mbps data transfer rates and USB 2.0 supports 480Mbps data transfer rates.
VGA	The Video Graphics Array (VGA) is a graphics display system developed by IBM.

Appendix

C

Digital I/O Interface

C.1 Introduction

The DIO connector on the NANO-GX2 is interfaced to GPIO ports on the IT8712F Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.

NOTE:

For further information, please refer to the datasheet for the IT8712F Super I/O chipset.

C.2 DIO Connector Pinouts

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

Pin	Description	Super I/O Pin	Super I/O Pin Description
1	Ground	N/A	N/A
2	VCC	N/A	N/A
3	Output 0	GP14	General purpose I/O port 1 bit 4.
4	Output 1	GP15	General purpose I/O port 1 bit 5.
5	Output 2	GP16	General purpose I/O port 1 bit 6.
6	Output 3	GP17	General purpose I/O port 1 bit 7.
7	Input 0	GP10	General purpose I/O port 1 bit 0.
8	Input 1	GP11	General purpose I/O port 1 bit 1
9	Input 2	GP12	General purpose I/O port 1 bit 2
10	Input 3	GP13	General purpose I/O port 1 bit 3

C.3 Assembly Language Samples

C.3.1 Enable the DIO Input Function

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

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

C.3.2 Enable the DIO Output Function

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

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

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Appendix

D

Watchdog Timer

  NOTE:

The following discussion applies to DOS environment. IEI support is contacted or the IEI website visited 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 EMIs 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 D-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. When 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.

NOTE:

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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Appendix

E

Address Mapping

E.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	SiS661CX Graphics Controller
3C0-3DF	SiS661CX Graphics Controller
3F6-3F6	Primary IDE Channel
3F7-3F7	Standard floppy disk controller
3F8-3FF	Serial Port 1 (COM1)

Table E-1: IO Address Map

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

E.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 E-3: IRQ Mapping Table

E.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 E-4: IRQ Mapping Table

Appendix

F

Compatibility

NOTE:

The compatible items described here have been tested by the IEI R&D team and found to be compatible with the NANO-GX2

F.1 Compatible Operating Systems

The following operating systems have been successfully run on the NANO-GX2.

- MS-DOS 6.22
- Microsoft Windows XP
- Microsoft® WinPOS (Windows XPE)
- Fedora Core 8
- Red Hat 9.0
- Mandriva Linux 2008

F.2 Compatible Processors

The processor cannot be replaced on the NANO-GX2.

F.3 Compatible Memory Modules

The memory modules cannot be replaced on the NANO-GX2.

Appendix

G

Hazardous Materials Disclosure

G.1 Hazardous Materials Disclosure Table for IPB Products Certified as RoHS Compliant Under 2002/95/EC Without Mercury

The details provided in this appendix are to ensure that the product is compliant with the Peoples Republic of China (China) RoHS standards. The table below acknowledges the presences of small quantities of certain materials in the product, and is applicable to China RoHS only.

A label will be placed on each product to indicate the estimated "Environmentally Friendly Use Period" (EFUP). This is an estimate of the number of years that these substances would "not leak out or undergo abrupt change." This product may contain replaceable sub-assemblies/components which have a shorter EFUP such as batteries and lamps. These components will be separately marked.

Please refer to the table on the next page.

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	X	O	O	O	O	X
Display	X	O	O	O	O	X
Printed Circuit Board	X	O	O	O	O	X
Metal Fasteners	X	O	O	O	O	O
Cable Assembly	X	O	O	O	O	X
Fan Assembly	X	O	O	O	O	X
Power Supply Assemblies	X	O	O	O	O	X
Battery	O	O	O	O	O	O

O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in SJ/T11363-2006

X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有"环境友好使用期限"的标签，此期限是估算这些物质"不会有泄漏或突变"的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	X	O	O	O	O	X
显示	X	O	O	O	O	X
印刷电路板	X	O	O	O	O	X
金属螺帽	X	O	O	O	O	O
电缆组装	X	O	O	O	O	X
风扇组装	X	O	O	O	O	X
电力供应组装	X	O	O	O	O	X
电池	O	O	O	O	O	O
O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。 X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。						

Appendix

H

AC'97 Audio Codec

H.1 Introduction

The motherboard comes with an onboard Realtek ALC655 CODEC. The ALC655 is a 16-bit, full-duplex AC'97 Rev. 2.3 compatible six-channel audio CODEC that provides three pairs of stereo outputs with 5-bit volume control, a mono output, and multiple stereo and mono inputs, along with flexible mixing, gain, and mute functions.

H.1.1 Accessing the AC'97 CODEC

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

- LINE IN
- LINE OUT
- MIC IN

H.1.2 Driver Installation

The driver installation has been described in **Section 7**.

After rebooting, the sound effect configuration utility appears in the **Windows Control Panel** (**Figure H-1**). If the peripheral speakers are properly connected, sound effects should be heard.
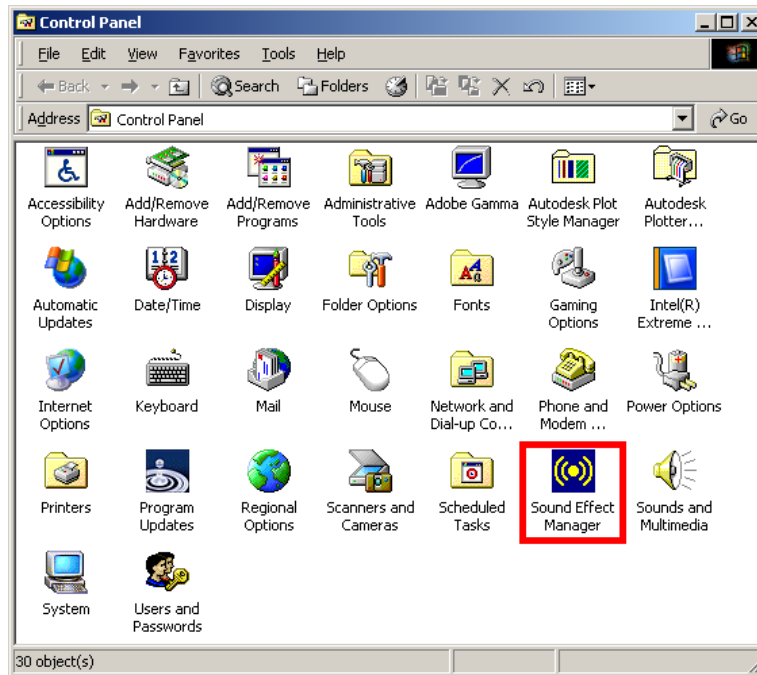
Figure H-1: Control Panel Sound Effect Manager

H.2 Sound Effect Configuration

H.2.1 Accessing the Sound Effects Manager

Follow the steps below to access the **Sound Effect Manager**.

Step 1: Install the ALC655 audio CODEC driver.

Step 2: Click the Sound Effect Manager icon in the system task bar (**Figure H-2**).

Figure H-2: Sound Effect Manager Icon [Task Bar]

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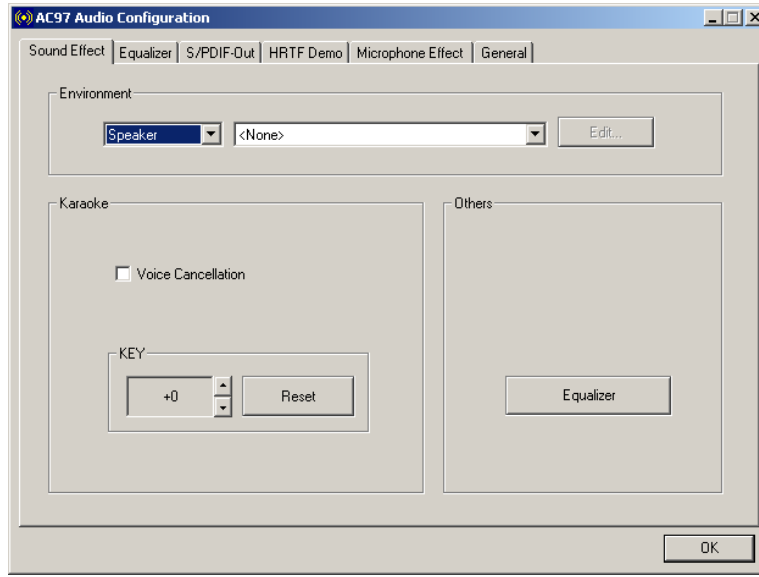
Figure H-3: Sound Effects Manager (ALC655)

![NOTE] **NOTE:**

The Sound Effect Manager shown in **Figure H-3** 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.

H.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** (**Figure H-3**).

![NOTE] **NOTE:**

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

NOTE:

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. Click **EDIT** to edit the sound effect.
- *Karaoke Mode* - **Karaoke Mode** is accessed in the Sound Effect tab. The **Voice Cancellation** disables the vocal part of the music being played. The **Key adjustment** up or down arrow icons enable users to define a key that fits a certain vocal range.
- *Equalizer Selection* - Preset equalizer settings enable easy audio range settings. Ten frequency bands can be configured.
- *Speaker Configuration* - Multi-channel speaker settings are configured in this menu. Configurable options include:
  - Headphone
  - Channel mode for stereo speaker output
  - Channel mode for 4 speaker output

o   Channel mode for 5.1 speaker output

o   Synchronize the phone jack switch with speakers settings

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

▪   ***S/PDIF-In & S/PDIF-Out*** - S/PDIF is used to transmit digital and analog audio signals with either a 48 or 44.1kHz sample rate.

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

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

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

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