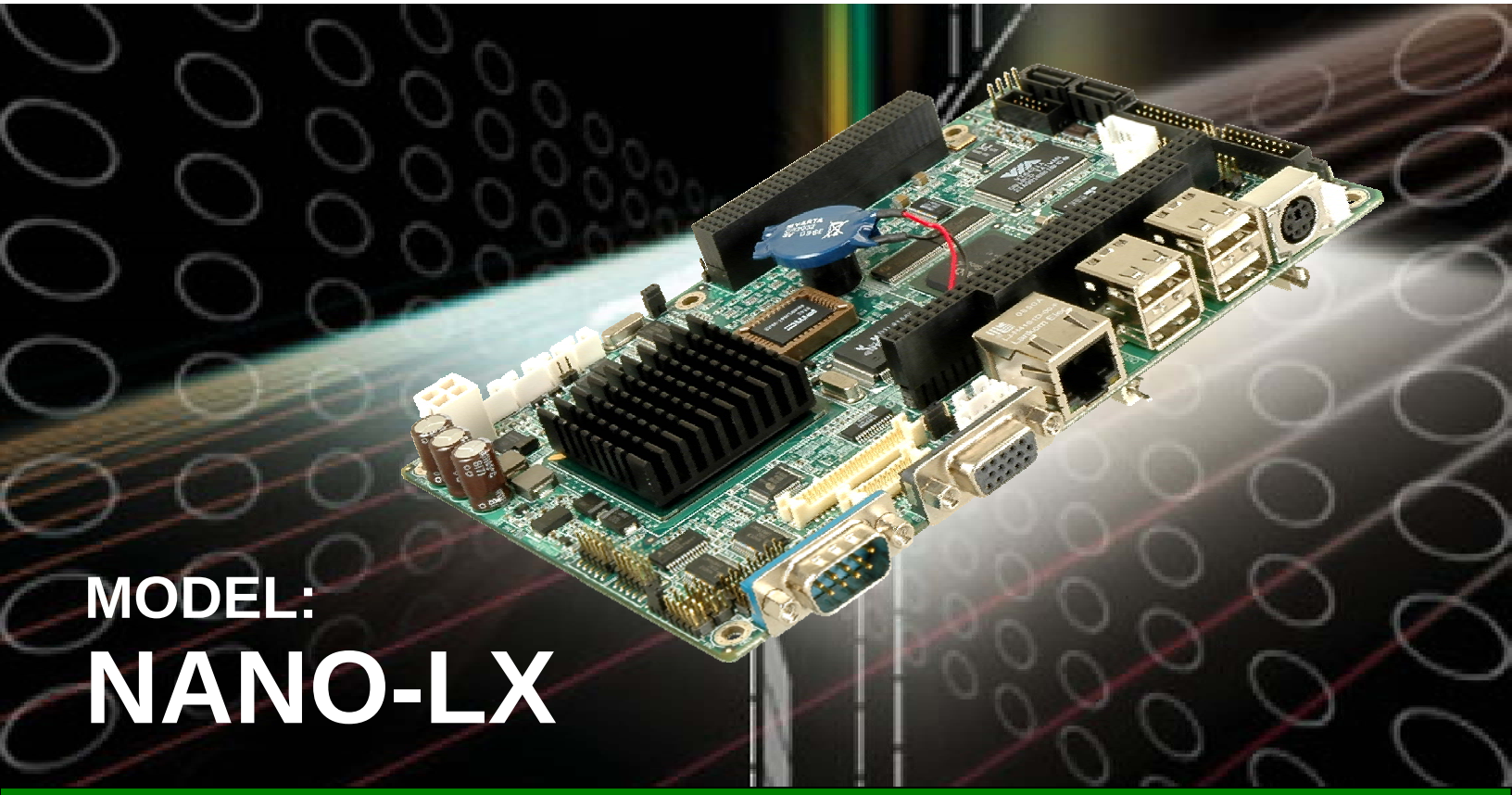
IEI Technology Corp.



MODEL:

NANO-LX

EPIC AMD® Geode LX 800 SBC with VGA/LVDS/TFT

Single GbE, SATA RAID, USB 2.0 and Audio

User Manual

Rev. 1.21 – 6 July, 2010

RoHS Lead Free

Revision

Date	Version	Changes
6 July, 2010	1.21	Modified CN13 connector diagram
9 April, 2009	1.20	Changed SATA controller to VIA VT6421A Added SATA power connector (CN38) Updated BIOS section.
May 2007	1.10	- Added notice for LCD panel voltage select jumper (JP7). - Added dimension drawings. - Changed the document format.
April 2007	1.01	- Updated AMD VGA driver installation (Section 6.2)
August 2006	1.00	Initial release

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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-LX motherboard 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-LX motherboard package.

- NANO-LX single board computer
- IDE flat cable 44p/44p
- RS-232 cables
- Audio cable
- Power cable
- Keyboard/Mouse Y cable
- SATA cables
- SATA power cables
- Mini jumper Pack
- Quick Installation Guide
- Utility CD

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

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Chapter

1

Introduction

1.1 NANO-LX CPU Board Overview

Figure 1-1: NANO-LX EPIC SBC

The EPIC form factor NANO-LX AMD® Geode™ LX800 is a highly-integrated embedded computer specifically optimized for multi-media applications requiring minimum installation space. The NANO-LX is particularly suitable for low power and fan-less applications. The NANO-LX supports a full range of functionality for an AT/ATX-compatible industrial computer in a space-saving 3.5" profile. The NANO-LX is equipped with an on board low-power consumption and high performance AMD® Geode™ LX800 processor. It also contains a DDR SO-DIMM socket that supports up to 1GB memory in size.

1.1.1 NANO-LX CPU Board Applications

The NANO-LX SBC has been designed for use in industrial applications where board expansion is critical and operational reliability is essential.

1.1.2 NANO-LX CPU Board Benefits

Some of the NANO-LX SBC 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

1.1.3 NANO-LX CPU Board Features

Some of the NANO-LX SBC features are listed below:

- Complies with RoHS
- Supports AMD® Geode™ LX800 500 MHz CPU
- Supports up to 1GB of 400/333 MHz single channel DDR memory
- Comes with one high performance gigabit Ethernet (GbE) controller
- Supports two SATA channels with transfer rates up to 150 MB/s and RAID 0, 1 support
- Supports four USB 2.0 connectors

1.2 NANO-LX SBC Overview

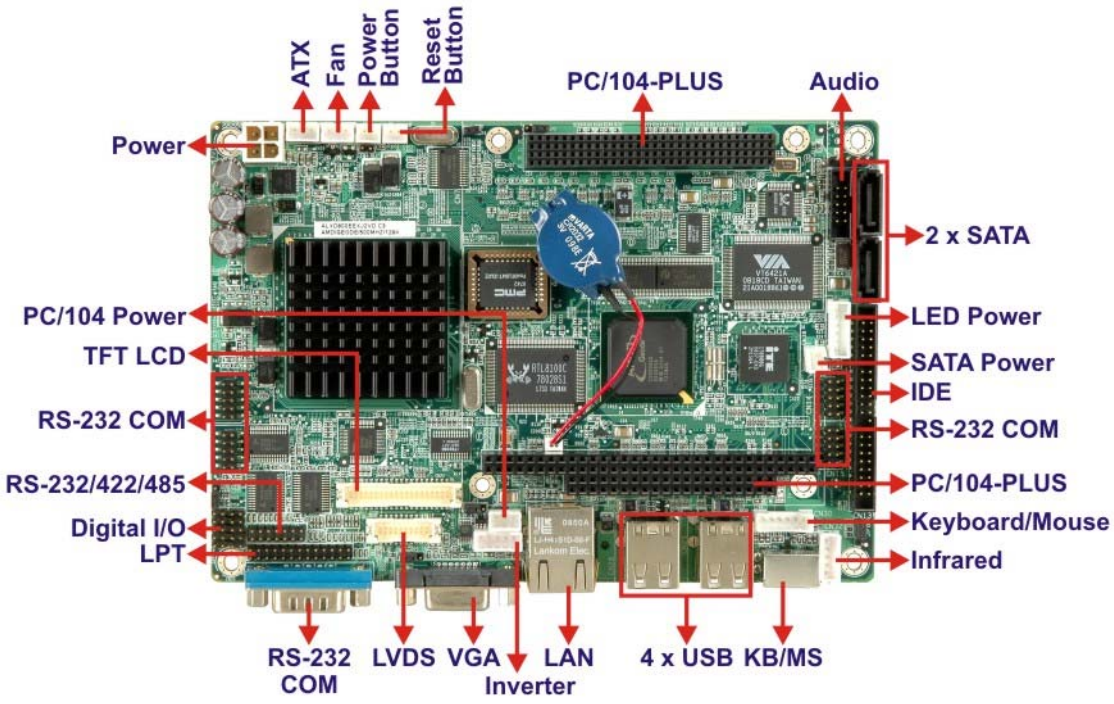


Figure 1-2: NANO-LX CPU Board Overview (Front Side)

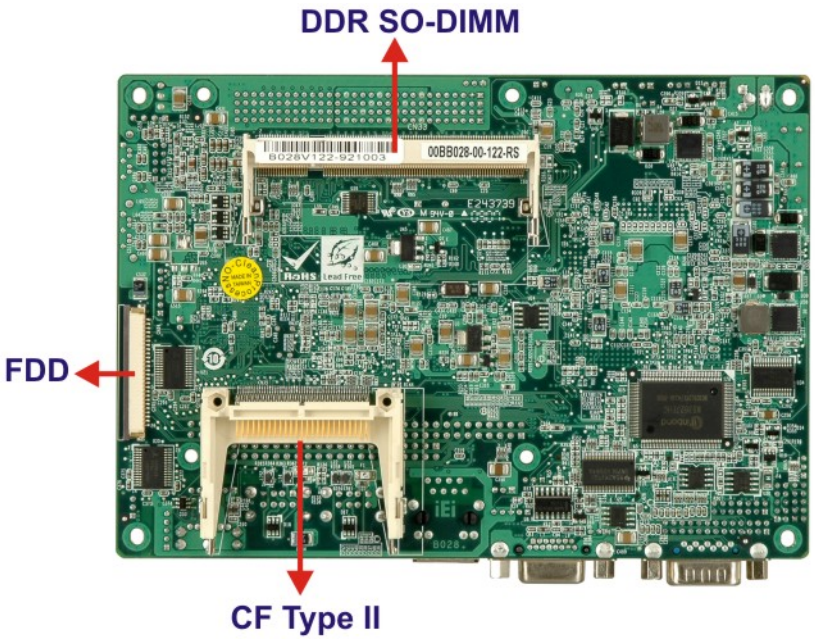


Figure 1-3: NANO-LX CPU Board Overview (Solder Side)

1.2.1 NANO-LX CPU Board Connectors

The NANO-LX SBC has the following connectors onboard:

- 1 x ATX 12V connector
- 1 x CPU cooling fan connector
- 1 x CF type II connector (solder side)
- 1 x TTL/LCD connector
- 1 x Infrared connector
- 1 x IDE device connector
- 1 x FDD connector
- 6 x RS-232 connectors
- 1 x RS-422/485 connector
- 1 x LVDS connector
- 1 x Inverter connector
- 1 x Parallel port connector
- 2 x SATA connectors
- 1 x SATA power connector
- 1 x DIO connector
- 1 x CD_IN connector
- 1 x Keyboard/Mouse connector

The NANO-LX SBC has the following connectors on the board rear panel:

- 1 x RS-232 connector
- 1 x VGA connector
- 1 x RJ-45 Ethernet connector
- 4 x USB ports
- 1 x PS/2 connector

The location of these connectors on the SBC can be seen in **Figure 4-27**. These connectors are fully described in **Chapter 2**.

1.2.2 Technical Specifications

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

SPECIFICATION	
CPUs Supported	AMD® Geode™ LX800
Cache Memory	64K I/ 64k D L1 cache, 128K L2 cache
System Chipset	AMD® CS5536
I/O Controller	AMD® CS5536
Memory	One 200-pin DDR 333/400MHz SO-DIMM SDRAM with a maximum size of 1GB.
PCI Bus Interface	Revision 2.2
Super IO	W83627EHG
Display	CRT integrated in AMD® Geode™ LX 800
TTL/ LVDS	24-bit TTL integrated in AMD® LX 800 18-bit single-channel LVDS integrated in AMD® LX 800 (For dual display, only CRT+LVDS or CRT+TTL)
HDD Interface	One IDE channel supports two Ultra ATA 100/66/33 devices
Power Support	+12V only, AT/ATX power support
Power Consumption	+12V @ 0.92A (DDR400 256MB)
Power Management	Supports Advanced Configuration and Power Interface (ACPI) Specifications Revision 2.0
Watchdog Timer	Software programmable supports 1~255 sec. system reset
I/O Interfaces	1 x FDD 1 x LPT

SPECIFICATION	
	1 x CFII 1 x IDE 6 x RS-232 1 x RS-422/485 2 x SATA channels with RAID 0, 1 support
PC/104-Plus Interface	Direct ISA DMA mode operation.
Infrared Support	One Infrared Data Association (IrDA) interface
Digital I/O	8-bit digital I/O, 4 input/ 4 output by Super I/O
Real Time Clock	256-byte battery backed CMOS RAM
Hardware Monitoring	CPU temperature and system voltages
Ethernet	10/100BASE-T Realtek RTL8100C Ethernet controller
BIOS	AWARD
Physical Dimensions	115mm x 165mm
Weight (GW/NW)	950g/350g
Operating Temperature	Minimum: 0ºC (32°F) Maximum: 60°C (140°F)
Audio Interfaces	AC'97 Codec Realtek ALC203

Table 1-1: Technical Specifications

1.3 Compatible Operating Systems and Memory Modules

The following sections list the operating systems (OS) and memory modules that have passed the test held by IEI. Please consider using these compatible OS and memory modules with the NANO-LX for the best performance.

1.3.1 Operating System

The compatible operating systems include:

- DOS 6.22
- Windows XP
- Windows 2000
- QNX Neutrino 6.2.1
- Fedora Core 3
- RedHat 9.0
- Mandrake Linux 2006
- FreeBSD 5.2.1

1.3.2 Memory Module

The following memory modules have been used while testing:

Mfg.	Model	Capacity/Speed	Description
Transcend	PSC A2S56D30ATP324ALA12	256MB DDR266 SDRAM	200-pin DDR SO-DIMM
Transcend	NANYA NT5DS64M8AF-6K	1GB DDR333 SODIMM	200-pin DDR SO-DIMM
Apacer	Mosel V58C2256804SAS5	512MB DDR PC-3200	200-pin DDR SO-DIMM
Apacer	Infineon HyB25D512800CC-5	512MB DDR PC-3200	200-pin DDR SO-DIMM
Kingston	KV333X64SC25/512	512MB DDR333 SDRAM	200-pin DDR SO-DIMM
Kingston	KV333X64SC25/1G	1GB DDR333 SDRAM	200-pin DDR SO-DIMM
Kingston	KV400X64SC3A/512	512MB DDR400 SDRAM	200-pin DDR SO-DIMM

Table 1-2: Compatible Memory Modules

Chapter

2

Detailed Specifications

2.1 Overview

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

2.2 Dimensions

2.2.1 Board Dimensions

The dimensions of the board are listed below:

- **Length**: 165.10mm
- **Width**: 115.00mm

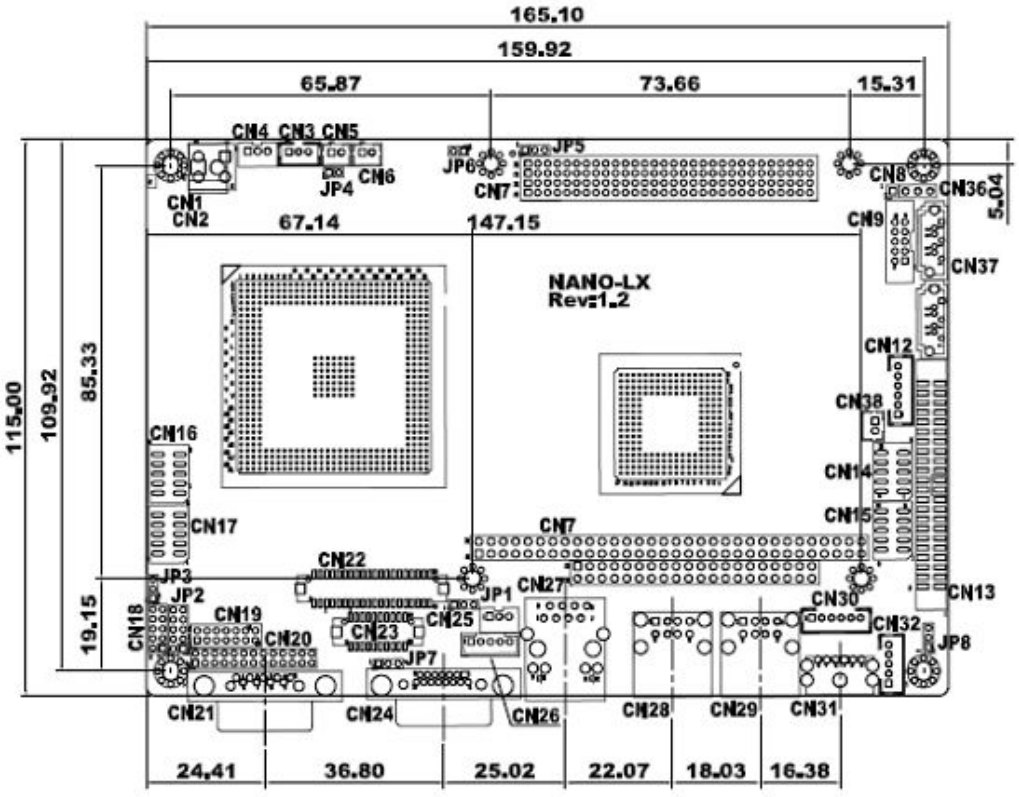


Figure 2-1: NANO-LX Dimensions (mm)

2.2.2 External Interface Panel Dimensions

External peripheral interface connector panel dimensions are shown in **Figure 2-2**.

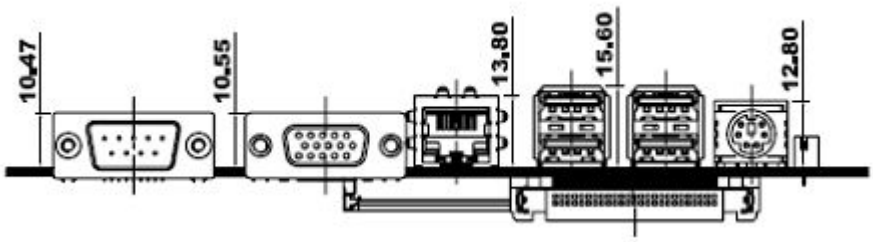


Figure 2-2: External Interface Panel Dimensions (mm)

2.3 Data Flow

The NANO-LX motherboard comes with an AMD® Geode™ LX800 CPU 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.

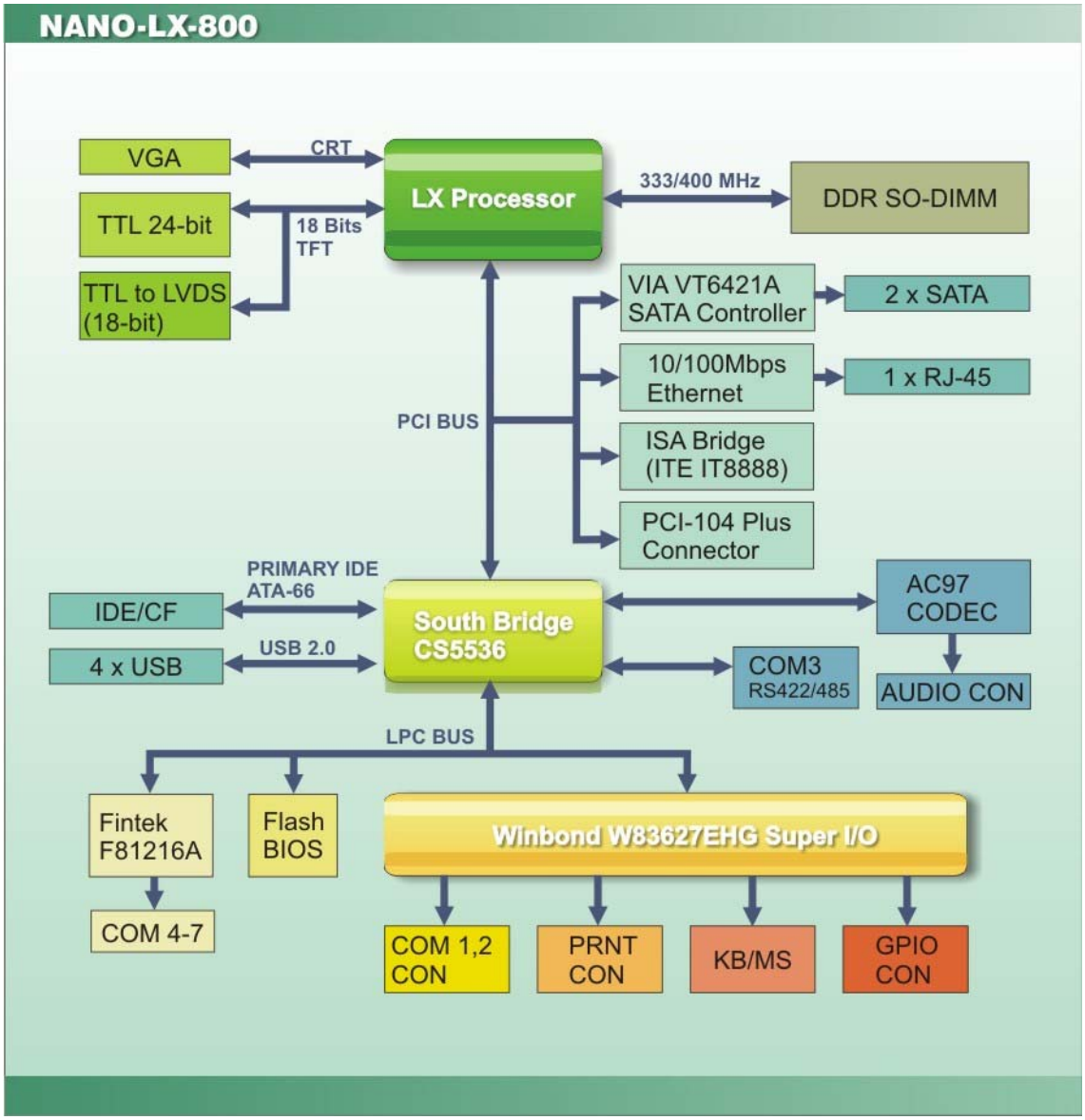


Figure 2-3: Data Flow Block Diagram

2.4 CPU Support

The NANO-LX series motherboards all come with a preinstalled AMD® Geode™ LX800 500MHz CPU.

2.4.1 AMD® Geode™ LX800 500MHz Overview

The specifications for the 500MHz AMD® Geode™ LX800 are listed below

- x86/x87-compatible core
- Processor frequency up to 500 MHz
- 64K I/64K D L1 cache and 128K L2 cache
- Split I/D cache/TLB (Translation Look-Aside Buffer)
- Integrated FPU that supports the Intel MMX® and AMD 3DNow!™ Technology instruction sets
- 9 GB/s internal GeodeLink™ Interface Unit (GLIU)
- Security Block
  - 128-bit AES (CBC/ECB)
- True Random Number Generator

2.4.2 AMD® Geode™ LX800 Memory Support

The AMD® Geode™ LX800 supports 64-bit DDR memory modules with frequencies up to 400MHz. The NANO-LX has one 200-pin DDR SO-DIMM SDRAM socket that supports one 64-bit 333 MHz or 400MHz DDR SO-DIMM memory module with a maximum capacity of 1GB.

2.4.3 AMD® Geode™ LX800 500MHz Display Support

The AMD® Geode™ LX800 supports both CRT and TFT in a dual display mode. The following display specifications.

- Supported Standards
  - High Definition (HD)
  - Standard Definition (SD)
- Supported Resolution
  - 1920x1440 in CRT mode
  - 1600x1200 in TFT mode
- VESA 1.1 and 2.0 VIP/VDA support

2.4.4 AMD® Geode™ LX800 500MHz Graphics Processor

The AMD® Geode™ LX800 BitBLT/vector engine graphics processor supports pattern generation, source expansion, pattern/source transparency, 256 ternary raster operations, alpha blenders to support alpha- BLTs, incorporated BLT FIFOs, a GeodeLink interface and the ability to throttle BLTs according to video timing. New features added to the Graphics Processor include:

- Command buffer interface
- Hardware accelerated rotation BLTs
- Color depth conversion
- Paletized color
- Full 8x8 color pattern buffer
- Separate base addresses for all channels
- Monochrome inversion

Table 2-1: Geode LX Graphics Features lists a complete list of Geode LX graphics features. For more details, please refer to the AMD website or the Geode LX series data book available from AMD.

Feature	AMD® Geode™ LX Processor
Color Depth	8, 16, 32 bpp (A) RGB 4 and 8-bit indexed
ROPs	256 (2-src, dest and pattern)
BLT Buffers	FIFOs in Graphics Processor
BLT Splitting	Managed by hardware
Video Synchronized BLT/Vector	Throttle by VBLANK
Bresenham Lines	Yes
Patterned (stippled) Lines	Yes
Screen to Screen BLT	Yes
Screen to Screen BLT with mono expansion	Yes
Memory to Screen BLT	Yes (throttled rep movs writes)
Accelerated Text	No
Pattern Size (Mono)	8x8 pixels
Pattern Size (Color)	8x8 pixels
Monochrome Pattern	Yes (with inversion)
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	Y with mask
Variable Source Stride	Yes

Variable Destination Stride	Yes
Destination Write Bursting	Yes
Selectable BLT Direction	Vertical and Horizontal
Alpha BLT	Yes (constant α, α/pix, or sep. α channel)
VGA Support	Decodes VGA Register
Pipeline Depth	Unlimited
Accelerated Rotation BLT	8, 16, 32 bpp
Color Depth Conversion	5:6:5, 1:5:5:5, 4:4:4:4, 8:8:8:8

Table 2-1: Geode LX Graphics Features

2.4.5 AMD® Geode™ LX800 500MHz Power Management

The power management for the 500MHz AMD® Geode™ LX800 is listed below:

- 1.8W Typical (3.9W TDP) @ 500MHz
- GeodeLink active hardware power management
- Hardware support for standard ACPI software power management
- I/O companion SUSP#/SUSPA# power controls
- Lower power I/O
- Wakeup on SMI/INTR

2.5 System Chipset

The NANO-LX series motherboards all have a preinstalled AMD® Geode™ CS5536 system chipset. The system chipset features are listed below.

- 82xx Legacy Devices
- System Management Bus (SMB) Controller
- 8 Multi-Function General Purpose Timers (MFGPTs)
- Power Management Controller
- ACPI v2.0 compliant

2.5.1 GeodeLink™ Interface Unit

- 64-bit, 66MHz 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)

2.5.2 AMD® Geode™ CS5536 ATA-6 Controller

The single NANO-LX IDE connector supports two ATA-6 HDDs. An ATA-6 (Ultra ATA/100) compliant IDE controller on the AMD® Geode™ CS5536 has a maximum transfer rate of 100MB/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 3 - 4	UDMA 3 – 4	UDMA 2
DMA/UDMA Max Transfer	100MB/s	66MB/s	33MB/s
Controller Interface	5V	5V	5V

Table 2-2: Supported HDD Specifications

2.5.3 AMD® Geode™ CS5536 Audio Codec 97 (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. 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
  - 14.318MHz -> 24.576MHz PLL saves crystal
  - 12.288MHz BITCLK input can be consumed
  - Integrated PCBEEP generator to save buzzer
  - Interrupt capability
  - 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 (96KHz) of DVD audio playback
- Two software selectable MIC inputs
- +6/12/20/30dB 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 32K/44.1K/48K/96KHz S/PDIF output
- Supports 32K/44.1K/48KHz S/PDIF input
- Power support: Digital: 3.3V; Analog: 3.3V/5V
- Standard 48-Pin LQFP Package
- EAX™ 1.0 & 2.0 compatible
- Direct Sound 3D™ compatible

- A3D™ compatible
- I3DL2 compatible
- HRTF 3D Positional Audio
- Sensaura™ 3D Enhancement (optional)
- 10 Bands of Software Equalizer
- Voice Cancellation and Key Shifting in Kareoke mode
- AVRack® Media Player

2.5.4 AMD® Geode™ CS5536 Flash Interface

The NANO-LX CompactFlash® socket supports standard CF Type II card. 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.

2.5.5 AMD® Geode™ CS5536 USB Controller

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

- 4 USB ports
- USB 1.1 and USB 2.0 compliant
- 3 host ports
- 1 host/device

2.5.6 AMD® Geode™ CS5536 Serial Communications

Seven high-speed UART serial port connectors, six RS-232 and one that can be configured as RS-232, RS-422 or RS-485, 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

2.5.7 AMD® Geode™ CS5536 Real Time Clock

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

2.5.8 BIOS

The BIOS flash memory chip on the NANO-LX 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**x**ecution **E**nvironment) support
- USB booting support

2.6 GeodeLink™ PCI Bridge

2.6.1 Overview

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

2.6.2 10/100M Ethernet

A highly integrated and cost-effective single-chip, fast Realtek RTL8100C 10/100M 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 10Mbps or 100Mbps Ethernet connectivity to the NANO-LX. Some of the features of the Realtek RTL8100C are listed below.

- 10Mbps and 100Mbps operation
- Supports 10Mbps and 100Mbps N-way auto-negotiation
- Supports 25MHz Crystal or 25MHz 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 16.75MHz-40MHz
- 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
- 2.5/3.3V power supply with 5V tolerant I/Os

2.6.3 PCI to ISA Bridge

An ITE IT8888G PCI to ISA bridge single function device connects the onboard NANO-LX ISA bus PC/104 connector to the GeodeLink™ PCI bridge. The IT8888G has a PCI specification v2.1 compliant 32-bit PCI bus interface and supports both PCI Bus master and slave. The PCI interface supports both programmable positive and full subtractive decoding schemes. Some of the features of the IT8888G PCI to ISA bridge are listed below.

- PCI Interface
- Programmable PCI Address Decoders
- PC/PCI DMA Controller
- Distributed DMA Controller
- ISA Interface
- SM Bus
- 1 analog line-level mono output: MONO_OUT
- Power-on Serial Bus Configuration
- Serial IRQ
- Versatile power-on strapping options
- Supports NOGO function
- Single 33 MHz Clock Input
- +3.3V PCI I/F with +5V tolerant I/O buffers
- +5V ISA I/F and core Power Supply

2.7 Environmental and Power Specifications

2.7.1 System Monitoring

The NANO-LX 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)

2.7.2 Operating Temperature and Temperature Control

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

2.7.3 Power Consumption

Table 2-3 shows the power consumption parameters for the NANO-LX when an AMD® Geode™ LX800 processor is running with one 256MB DDR 400MHz memory module.

Voltage	Current
+12V	0.92A

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-LX may result in permanent damage to the NANO-LX and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the NANO-LX. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the NANO-LX, 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-LX, place it on an antic-static pad. This reduces the possibility of ESD damaging the NANO-LX.
- ***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-LX 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-LX 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-LX 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-LX is shipped with the following components:

Quantity	Item and Part Number	Image
1	NANO-LX SBC	
1	IDE flat cable 44p/44p (**P/N**: 32200-000009-RS)	
2	RS-232 cables (**P/N**: 32200-000049-RS)	
1	Audio cable (**P/N**: 32000-072100-RS)	
1	Power cable (**P/N**: 32100-087100-RS)	
1	Keyboard/Mouse Y cable (**P/N**: 32000-000138-RS)	

2	SATA cables (**P/N**: 32000-062800-RS)	
1	SATA power cable (**P/N**: 32100-088600-RS)	
1	Mini jumper Pack	
1	Quick Installation Guide	
1	Utility CD	

Table 3-1: Package List Contents

3.4 Optional Items

ATX power cable (**P/N**: 32100-052100-RS)	
LPT cable (**P/N**: 32200-015100-RS)	
RS-232 and RS-422/485 cable (**P/N**: 32200-026500-RS)	
NANO-LX-CE050	Windows CE 5.0 & BSP, Software CD, Licensed sticker
NANO-LX-XPE	Windows XP Embedded & SLD, software CD, Licensed sticker

Table 3-2: Package List Contents

Chapter

4

Connectors and Jumpers

4.1 Peripheral Interface Connectors

The locations of the peripheral interface connectors are shown in **Section 4.1.1**. A complete list of all the peripheral interface connectors can be seen in **Section 4.1.2**.

4.1.1 NANO-LX SBC Layout

Figure 4-1 shows the onboard peripheral connectors, backplane peripheral connectors and onboard jumpers on the front side of the card.

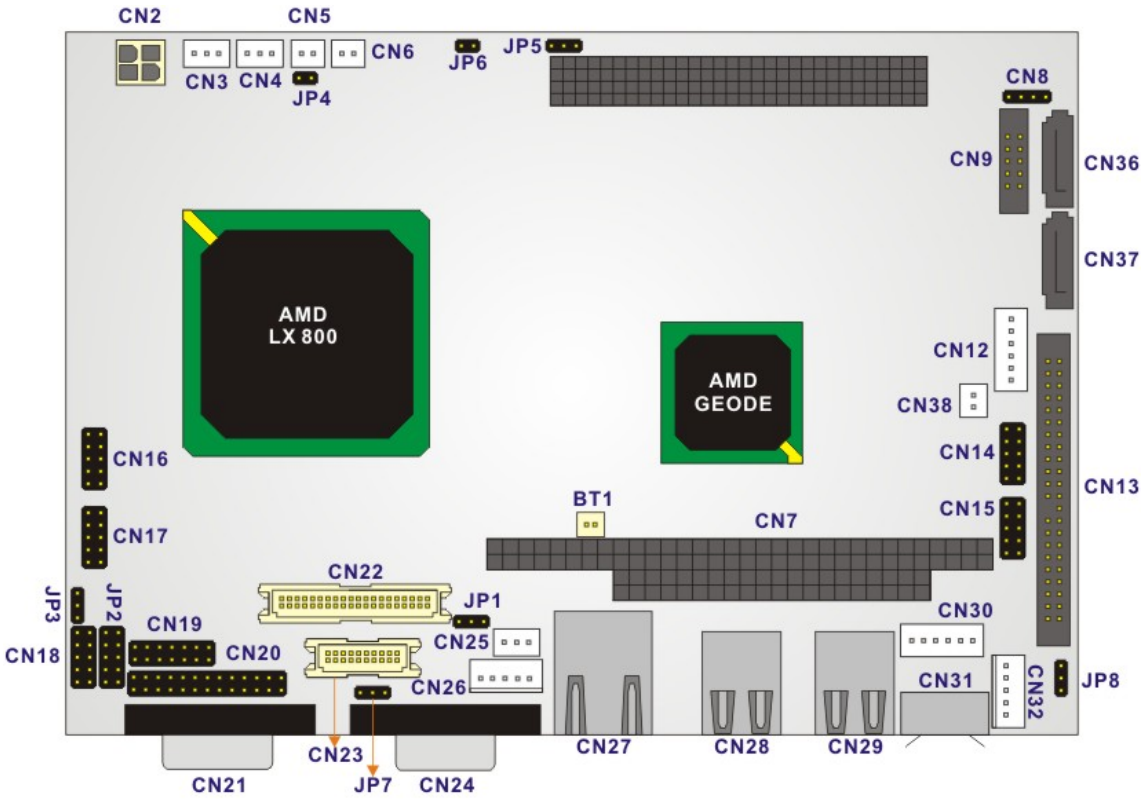


Figure 4-1: Connector and Jumper Locations (Front Side)

Figure 4-2 shows the onboard peripheral connectors on the solder side of the board.

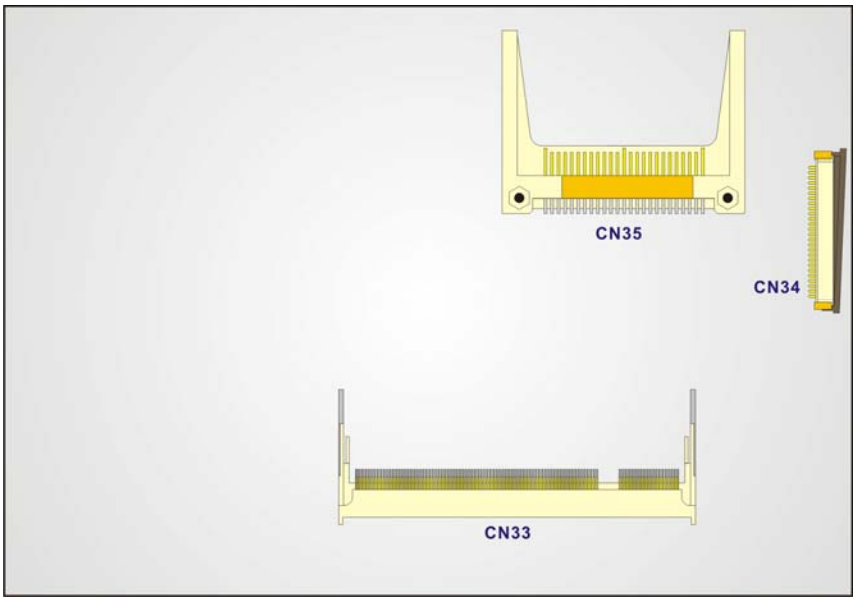


Figure 4-2: Connector and Jumper Locations (Solder Side)

4.1.2 Peripheral Interface Connectors

Table 4-1 shows a list of the peripheral interface connectors on the NANO-LX SBC. Detailed descriptions of these connectors can be found in **Section 4.2**.

Connector	Type	Label
200-pin DDR SO-DIMM socket	200-pin socket	CN33
ATX connector	3-pin wafer	CN3
ATX Power Button connector	2-pin wafer	CN5
Audio CD-In connector	4-pin header	CN8
Audio connector	10-pin box header	CN9
Battery Connector	2-pin wafer	BT1
Compact Flash Type II connector	50-pin CF Type II slot	CN35
Digital Input Output connector	10-pin header	CN18
Fan connector	3-pin wafer	CN4

Connector	Type	Label
FDD connector	26-pin header	CN34
IDE Interface connector	44-pin box header	CN13
Inverter connector	5-pin wafer	CN26
Infrared connector	5-pin wafer	CN32
Keyboard/Mouse connector	6-pin wafer	CN30
LED Power connector	6-pin wafer	CN12
LVDS LCD Panel connector	20-pin crimp	CN23
Parallel Port connector	26-pin header	CN20
PC/104-Plus connector	PC/104-Plus connector	CN7
Power connector (Default)	4-pin Molex	CN2
Power connector (Optional)	2-pin wafer	CN1
Power Input connector	3-pin wafer	CN25
Reset Button connector	2-pin wafer	CN6
SATA Drive port (150MB/s)	SATA disk drive port	CN36
SATA Drive port (150MB/s)	SATA disk drive port	CN37
SATA power connector	2-pin wafer	CN38
Serial Communications connector	10-pin header	CN14
Serial Communications connector	10-pin header	CN15
Serial Communications connector	10-pin header	CN16
Serial Communications connector	10-pin header	CN17
Serial Communications connector	14-pin header	CN19
TFT TTL LCD	40-pin crimp	CN22

Table 4-1: Peripheral Interface Connectors

4.1.3 Rear Panel Connectors

Table 4-2 lists the rear panel connectors on the NANO-LX SBC. Detailed descriptions of these connectors can be found in **Section 4.3**.

Connector	Type	Label
Serial connector	RS232 connector	CN21
VGA Connector	15-pin VGA connector	CN24
Ethernet connector	RJ-45	CN27
USB Combo connector	USB Port	CN28
USB Combo connector	USB Port	CN29
Keyboard/Mouse connector	PS/2	CN31

Table 4-2: Rear Panel Connectors

4.1.4 Onboard Jumpers

Table 4-3 lists the onboard jumpers. Detailed descriptions of these jumpers can be found in **Section 5.6**.

Connector	Type	Label
AT/ATX power mode select	2-pin header	JP4
CF master/slave select	3-pin header	JP8
COM1, COM2 RI Pin and voltage selection (Optional)	10-pin header	JP2
COM3 RS422/RS485 select	3-pin header	JP3
LCD Panel (LVDS/TTL) voltage select	2-pin header	JP7
LCD clock select	3-pin header	JP1
PC104 Plus VIO voltage select	3-pin header	JP5
PC104 Plus SERIRQ select	2-pin header	JP6

Table 4-3: Onboard Jumpers

4.2 Internal Peripheral Connectors

Internal peripheral connectors on the SBC are only accessible when the SBC is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the NANO-LX SBC.

4.2.1 ATX Connector

CN Label: **CN3**

CN Type: 3-pin wafer

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

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

The ATX connector is a 5V standby connection for the ATX power supply.

PIN	DESCRIPTION
1	5VSB
2	NC
3	PS-ON

Table 4-4: CN3 Connector Pinouts

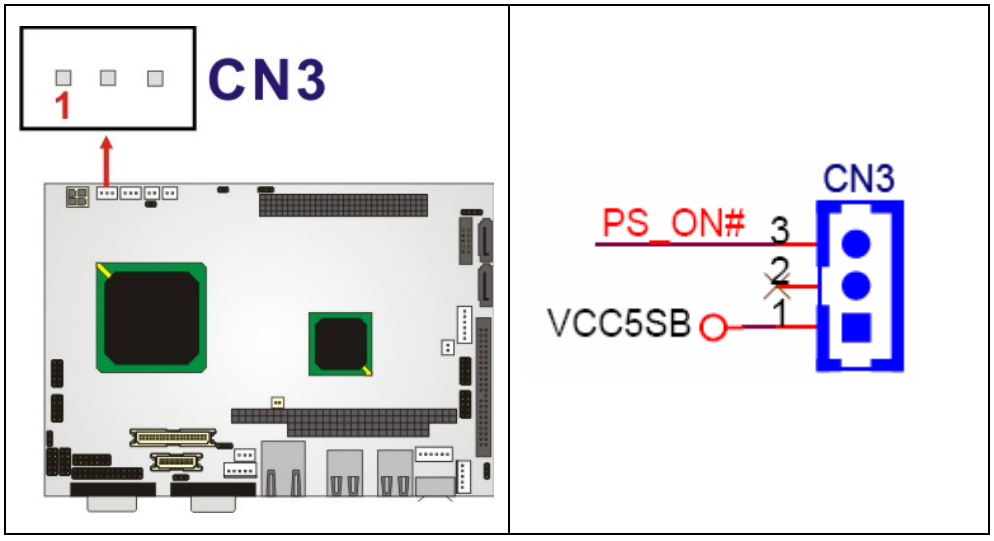


Figure 4-3: CN3 Connector Location

4.2.2 ATX Power Button

CN Label: **CN5**

CN Type: 2-pin wafer

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

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

The ATX Power Button connector connects to the system power On/Off switch.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	ATX Power button +	2	ATX Power button -

Table 4-5: CN5 Connector Pinouts

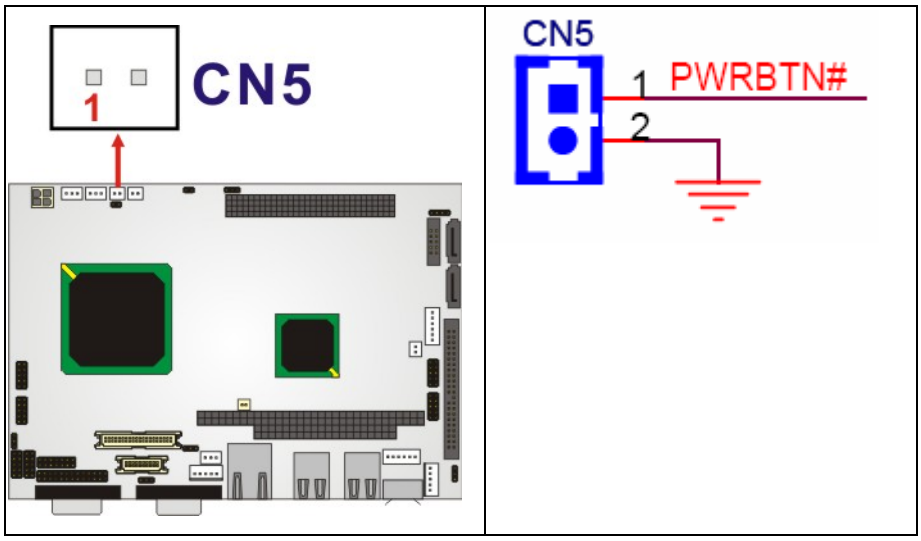


Figure 4-4: CN5 Connector Location

4.2.3 Audio CD-In Connector

CN Label: **CN8**

CN Type: 4-pin header

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

CN Location: See **Figure 4-5**

The Audio CD-In connector connects to audio sources such as CD/DVD-ROM optical drives.

PIN	DESCRIPTION
1	CD Left
2	GND
3	GND
4	CD Right

Table 4-6: CN8 Connector Pinouts

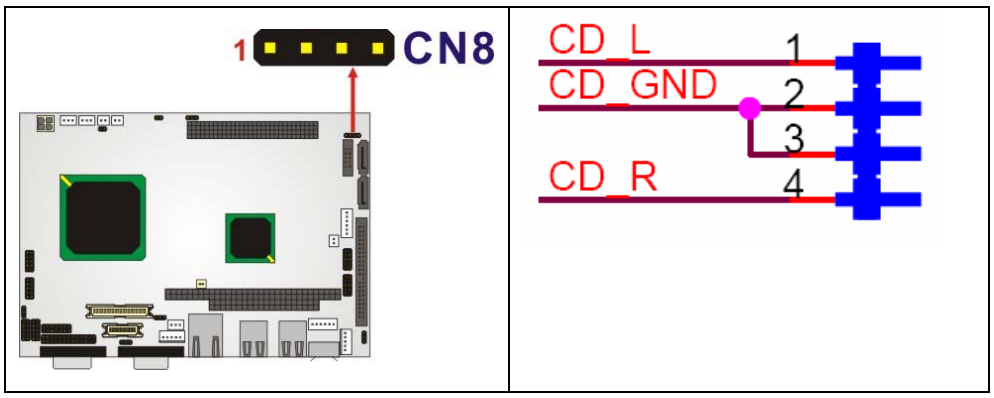


Figure 4-5: CN8 Connector Location

4.2.4 Audio Connector

CN Label: **CN9**

CN Type: 10-pin box header (2x5 pins)

CN Pinouts: See **Table 4-7**

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

AC'97 Audio signals are interfaced through a 10-pin flat-cable connector. These signals include Microphone line-in, line-in stereo, and line-out stereo. An audio 10-pin-to-phone-jack adapter kit is required.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	LINE_OUT_R	2	LINE_IN_R
3	GND	4	GND

5	LINE_OUT_L	6	LINE_IN_L
7	GND	8	GND
9	MIC1-IN	10	MIC2-IN

Table 4-7: CN9 Connector Pinouts

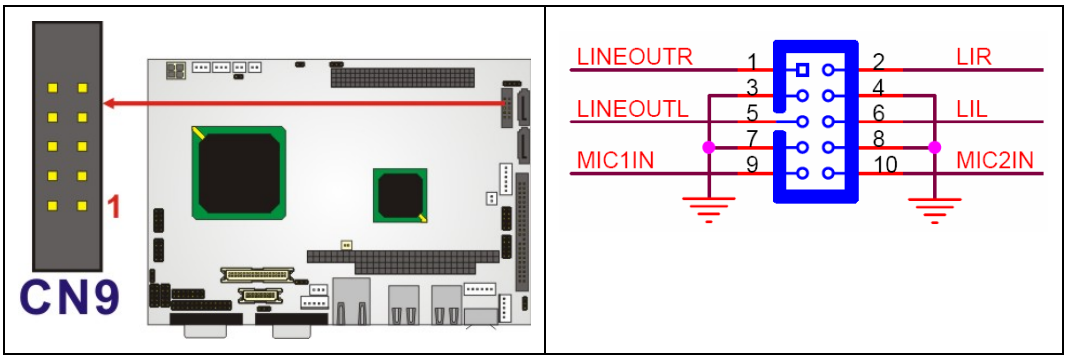


Figure 4-6: CN9 Connector Location

4.2.5 Battery Connector

CN Label: **BT1**

CN Type: 2-pin wafer

CN Pinouts: See **Table 4-8**

CN Location: See **Figure 4-7**

This battery connector connects to an externally mounted 3V, Lithium, cell coin battery (VARTA CR2032). The life expectancy of the battery is approximately 7 years. Depending on the working condition, the life expectancy may be shorter.

Replacing the battery is not a user operation.

If the battery starts to weaken and lose voltage, contact a vendor or IEI for a replacement module. Dispose of the used battery properly. Contact the local waste disposal agency for disposal instructions. Do not dispose of a used battery with normal household waste.

WARNING!

1. **Keep batteries away from children.**
2. **There is a danger of explosion if the battery is incorrectly replaced.**
3. **Only a certified module from IEI can be used as a replacement.**
4. **Do not expose the battery to excessive heat or fire.**
5. **If the battery shows signs of leakage, contact a local vendor or IEI immediately.**

PIN	DESCRIPTION	PIN	DESCRIPTION
1	BAT+ (3.3V)	2	GND

Table 4-8: BT1 Connector Pinouts

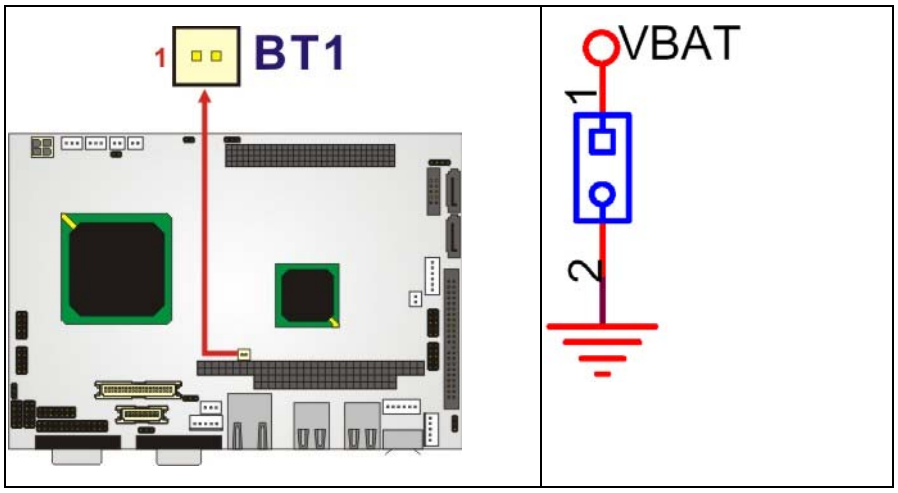


Figure 4-7: BT1 Connector Location

4.2.6 CompactFlash® Connector

CN Label: **CN35**

CN Type: 50-pin CF Type II slot (2x25 pins)

CN Pinouts: See **Table 4-9**

CN Location: See **Figure 4-8**

The Compact Flash connector is used to adapt Type II Compact Flash and CF+ cards for use in Type II (5 mm thick) PCMCIA card slots.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	26	-CD1
2	D03	27	D11
3	D04	28	D12
4	D05	29	D13
5	D06	30	D14
6	D07	31	D15
7	-CE1	32	-CE2
8	A10	33	-VS1
9	-OE	34	-IORD
10	A09	35	-IOWR
11	A08	36	-WE
12	A07	37	READY
13	VCC	38	VCC
14	A06	39	A25
15	A05	40	-VS2
16	A04	41	RESET
17	A03	42	-WAIT
18	A02	43	-INPACK
19	A01	44	-REG
20	A00	45	BVD2
21	D00	46	BVD1
22	D01	47	D08
23	D02	48	D09
24	WP	49	D10
25	-2CD	50	GND

Table 4-9: CN35 Connector Pinouts

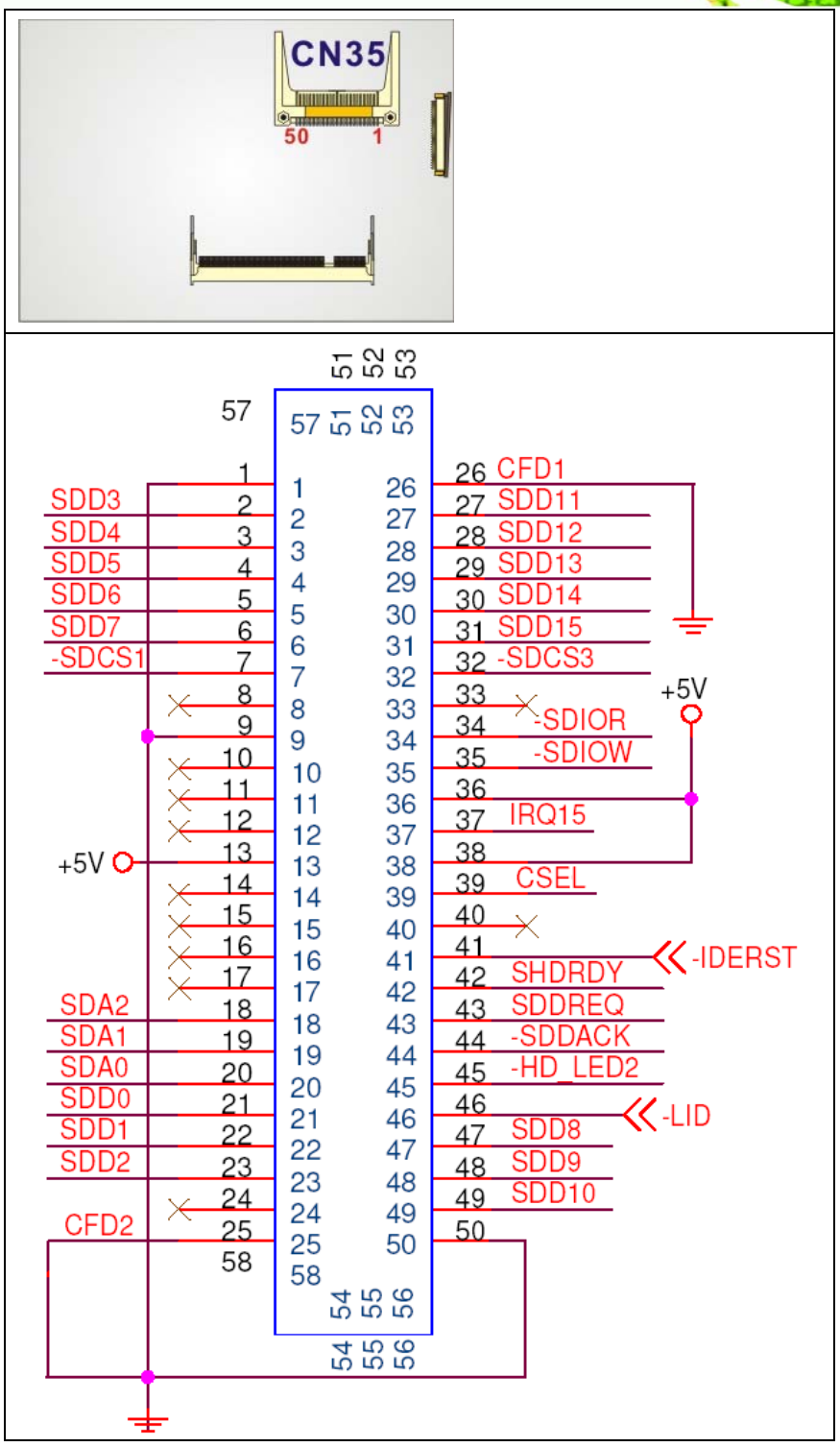


Figure 4-8: CN35 Connector Location

4.2.7 Digital Input Output Connector

CN Label: **CN18**

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

CN Pinouts: See **Table 4-10**

CN Location: See **Figure 4-9**

The Digital Input Output connector is a user-programmable general-purpose I/O controller managed through a Winbond W83697HF LPC SI/O chip.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	2	+5V
3	GPO0	4	GPO1
5	GPO2	6	GPO3
7	GPI0	8	GPI1
9	GPI2	10	GPI3

Table 4-10: CN18 Connector Pinouts

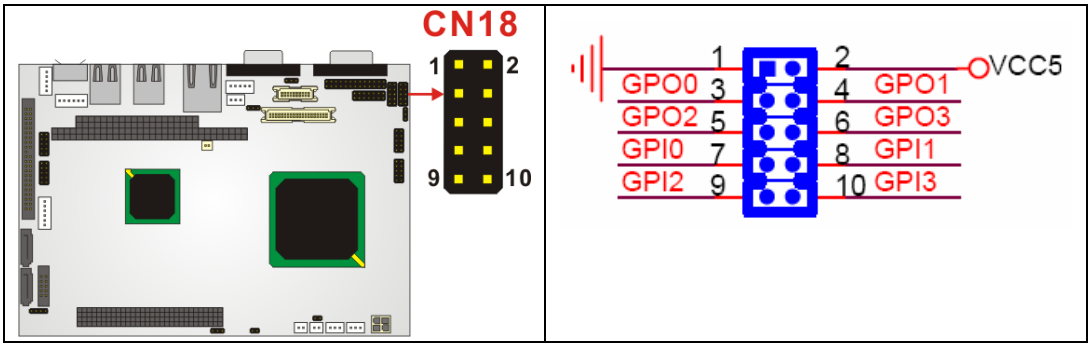


Figure 4-9: CN18 Connector Location

4.2.8 Fan Connector

CN Label: **CN4**

CN Type: 3-pin wafer

CN Pinouts: See **Table 4-11**

CN Location: See **Figure 4-10**

The Fan connector provides a 5Vcurrent to the cooling fan. The connector has a "rotation" pin to get rotation signals from the fan and notify the system so the system BIOS can recognize the fan speed. Please note that only certain fans can issue the rotation signals.

PIN	DESCRIPTION
1	Rotation Signal
2	+5V
3	GND

Table 4-11 CN4 Connector Pinouts

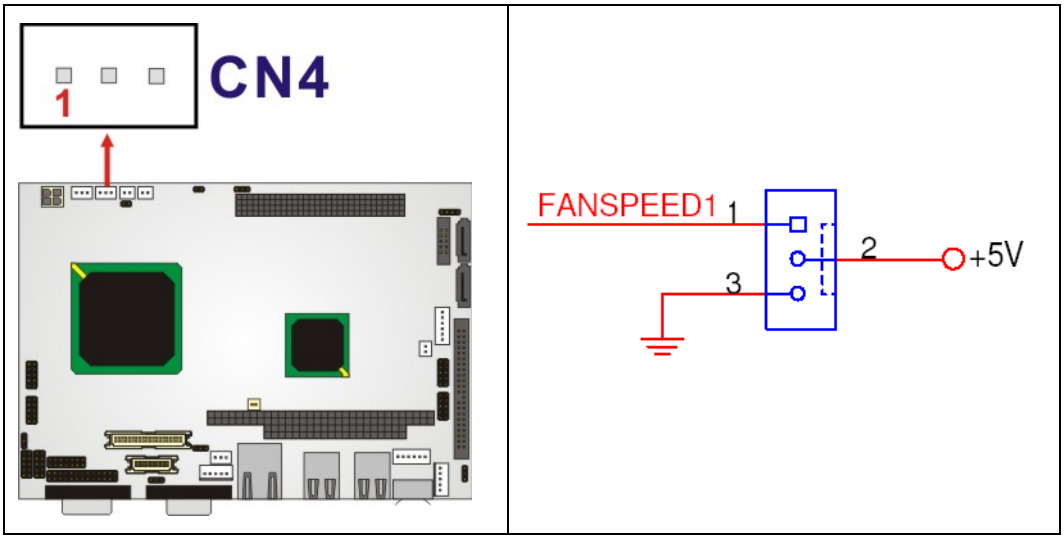


Figure 4-10 CN4 Connector Location

4.2.9 FDD Connector

CN Label: **CN34**

CN Type: 26-pin header

CN Pinouts: See **Table 4-12**

CN Location: See **Figure 4-11**

The FDD connector connects to a floppy disk drive.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	+5V	14	STEP#
2	INDEX#	15	GND
3	+5V	16	WDATA#
4	DSA#	17	GND
5	+5V	18	WGATE#
6	DSKCHG#	19	GND
7	NC	20	TRACK0#
8	NC	21	GND
9	NC	22	WP#
10	MOTO0#	23	GND
11	NC	24	RDATA#
12	DIR#	25	GND
13	NC	26	HEAD#

Table 4-12 CN4 Connector Pinouts

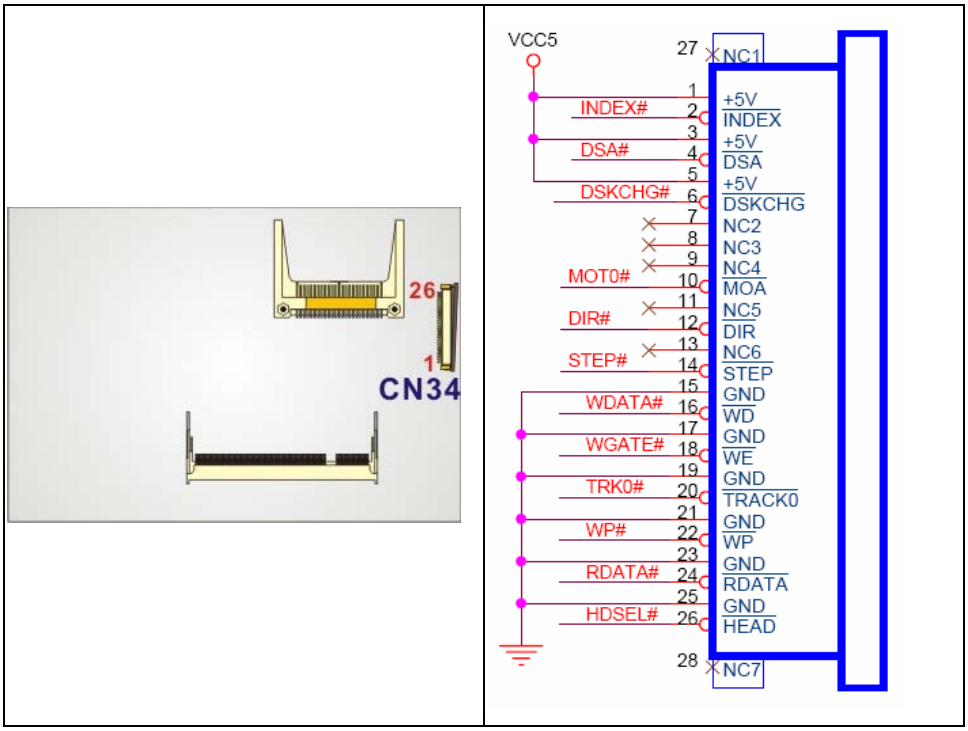


Figure 4-11: CN34 Connector Location

4.2.10 IDE Interface Connector

CN Label: **CN13**

CN Type: 44-pin box header (2x22 pins)

CN Pinouts: See **Table 4-13**

CN Location: See **Figure 4-12**

The IDE Interface connector provides connectivity for two IDE devices.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	RESET#	2	GND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GND	20	NC
21	DRQ	22	GND
23	IOW#	24	GND
25	IOR#	26	GND
27	HD READY	28	N/C
29	HDACK 0	30	GND
31	INT	32	N/C
33	ADDR 1	34	CABLEID
35	ADDR 0	36	ADDR 2
37	CS0#	38	CS1#
39	ASP#	40	GND
41	+5V	42	+5V
43	GND	44	N/C

Table 4-13: CN13 Connector Pinouts

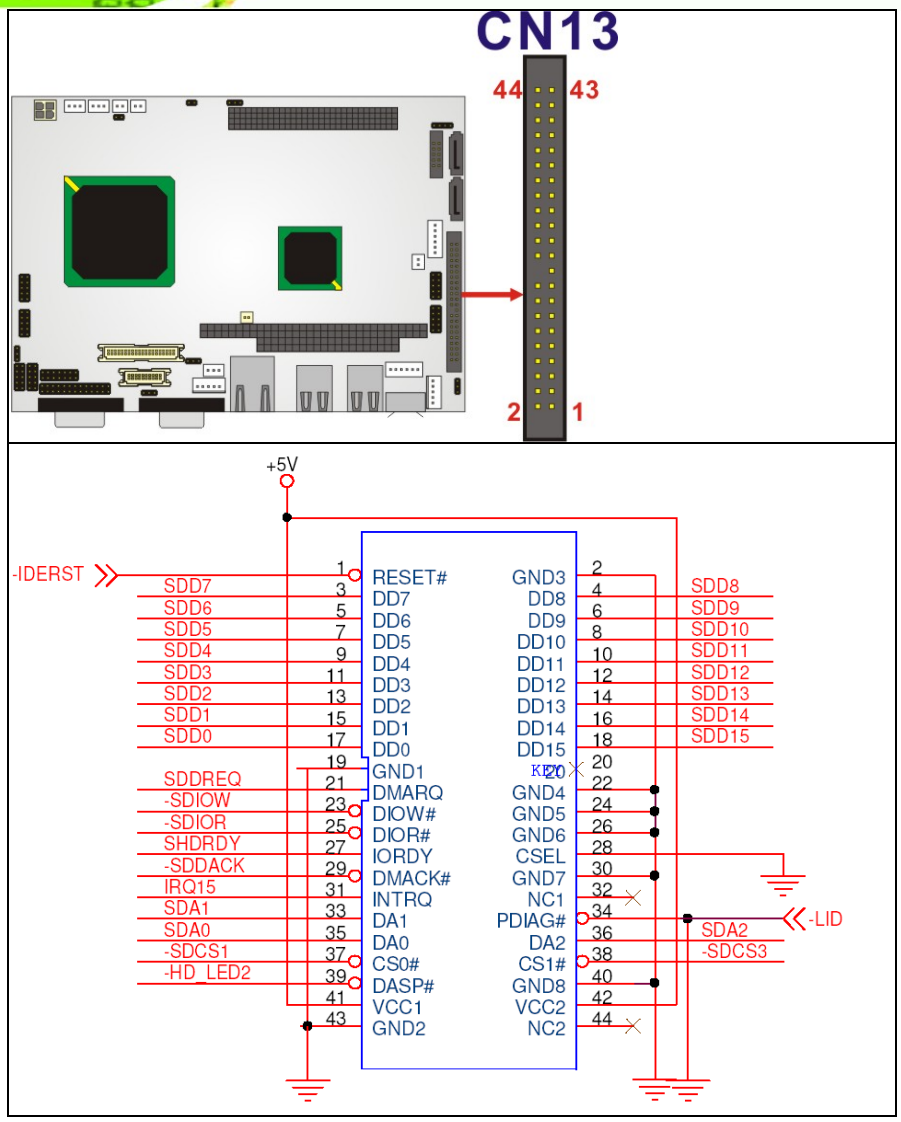


Figure 4-12: CN13 Connector Location

4.2.11 Inverter Connector

CN Label:	**CN26**
CN Type:	5-pin wafer
CN Pinouts:	See **Table 4-14**
CN Location:	See **Figure 4-13**

The Inverter connector connects to the LCD backlight.

PIN	DESCRIPTION
1	BL_ADJ (default:GND)
2	GND
3	+12V
4	GND
5	BL_EN

Table 4-14: CN26 Connector Pinouts

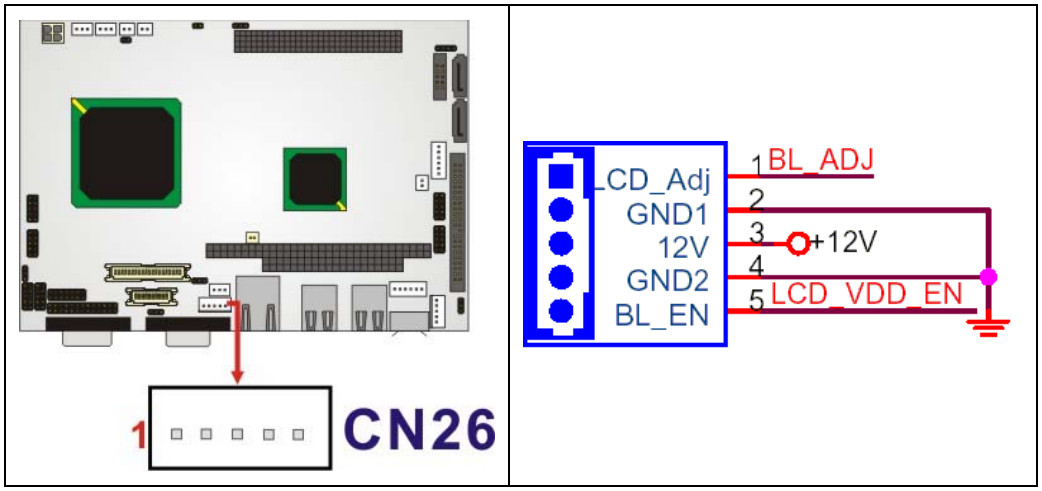


Figure 4-13: CN26 Connector Location

4.2.12 Infrared Connector

CN Label: **CN32**

CN Type: 5-pin wafer

CN Pinouts: See **Table 4-15**

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

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

PIN	DESCRIPTION
1	VCC (+5V)
2	NC
3	IR-RX

PIN	DESCRIPTION
4	GND
5	IR-TX

Table 4-15: CN32 Connector Pinouts

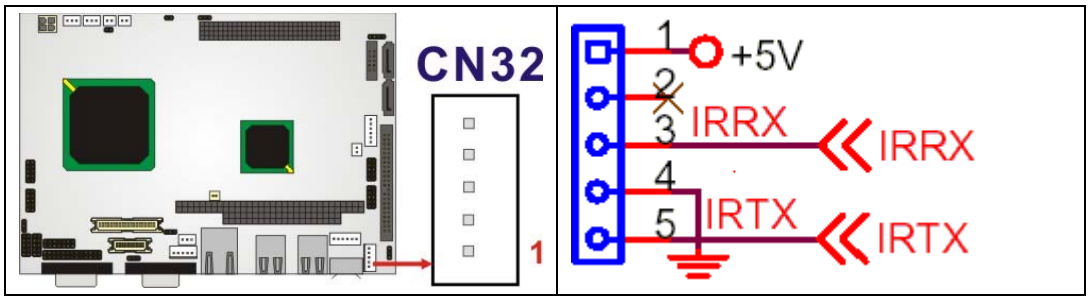


Figure 4-14: CN32 Connector Location

4.2.13 Keyboard/Mouse Connector

CN Label: **CN30**

CN Type: 6-pin wafer

CN Pinouts: See **Table 4-16**

CN Location: See **Figure 4-15**

For alternative applications, an on board keyboard/mouse pin header connector is also available.

PIN	DESCRIPTION
1	VCC (+5V)
2	MS_DATA
3	MS_CLK
4	KB_DATA
5	KB_CLK
6	GND

Table 4-16: CN30 Connector Pinouts

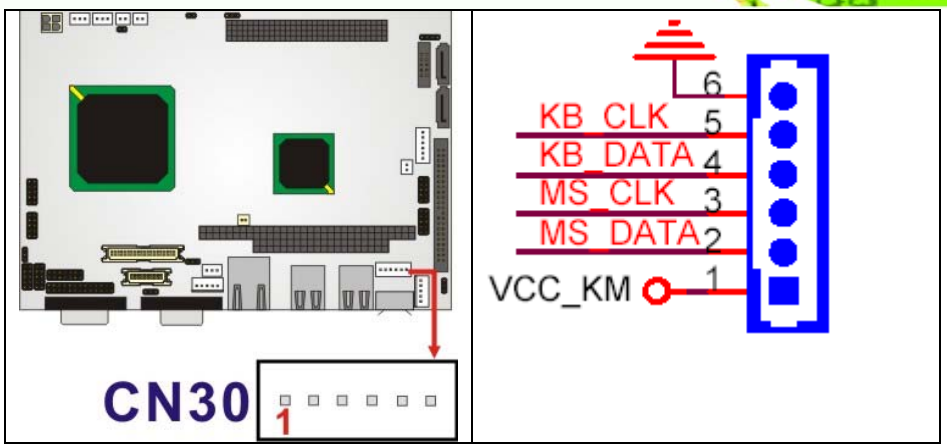


Figure 4-15: CN30 Connector Location

4.2.14 LED Power Connector

CN Label: **CN12**

CN Type: 6-pin wafer

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

CN Location: See **Figure 4-16**

The LED power connector provides the connectivity to the power and hard drive activity LEDs on the chassis front panel. An adapter cable is required.

PIN	DESCRIPTION	
1	+5V Power	+5V
2	Output	GND
3	Power LED	POWER LED+
4		POWER LED-
5	HDD LED	HDD LED+
6		HDD LED-

Table 4-17: CN12 Connector Pinouts

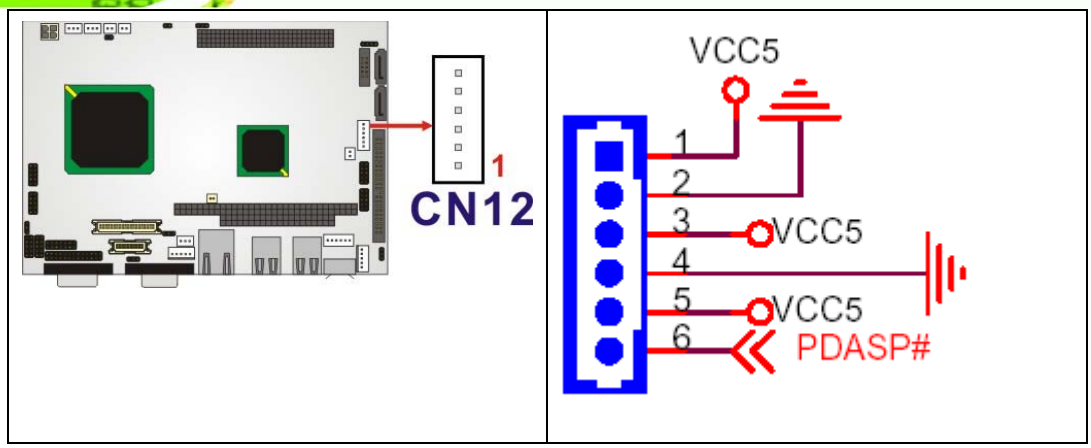


Figure 4-16: CN12 Connector Location

4.2.15 LVDS LCD Panel Connector

CN Label: **CN23**

CN Type: 20-pin crimp (2x10)

CN Pinouts: See **Table 4-18**

CN Location: See **Figure 4-17**

The LVDS LCD connector connects to one channel (18-bit) LVDS panel.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	2	GND
3	D0+	4	D0-
5	D1+	6	D1-
7	D2+	8	D2-
9	CLK+	10	CLK-
11	NC	12	NC
13	GND	14	GND
15	SDA	16	SCL
17	LCD_VCC	18	LCD_VCC
19	LCD_VCC	20	LCD_VCC

Table 4-18: CN23 Connector Pinouts

NOTE:

The supplied voltage can be selected via JP7.

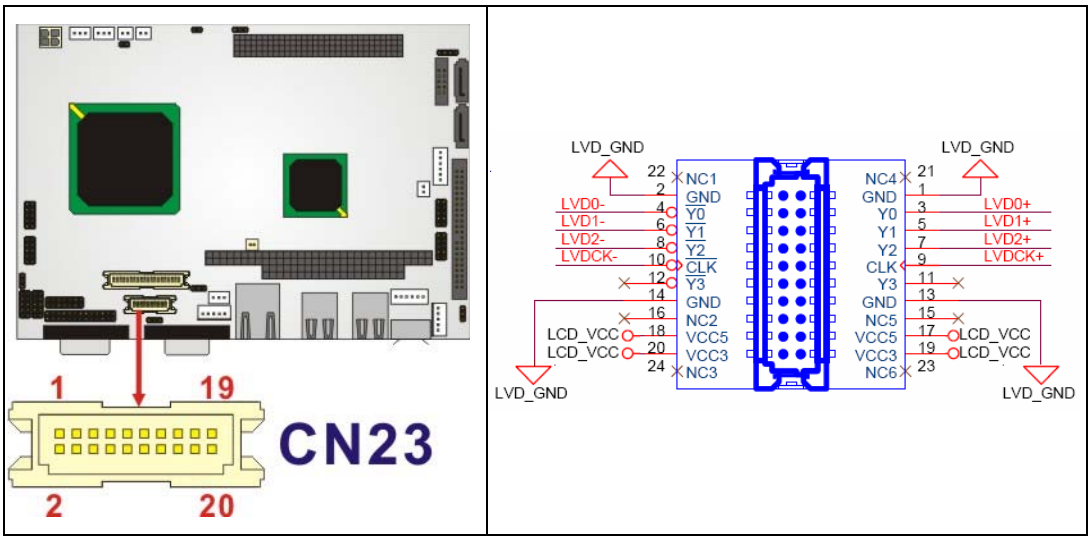


Figure 4-17: CN23 Connector Location

4.2.16 Parallel Port Connector

CN Label:	**CN20**
CN Type:	26-pin header (2x13 pins)
CN Pinouts:	See **Table 4-19**
CN Location:	See **Figure 4-18**

The parallel port connector connects to a printer. The NANO-LX comes with a multi-mode (ECP/EPP/SPP) parallel port. The CN20 parallel port interface features a 26-pin flat-cable connector that requires an adapter cable if a traditional DB-25 connector is preferred. The parallel interface can be re-assigned to LPT2 or LPT3 through the BIOS configuration utility. The default interrupt channel is IRQ7. Select ECP or EPP DMA mode using the BIOS configuration utility.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	STROBE#	2	AUTO FORM FEED#
3	DATA0	4	ERROR#
5	DATA1	6	INITIALIZE
7	DATA2	8	PRINTER SELECT LN#
9	DATA3	10	GROUND
11	DATA4	12	GROUND
13	DATA5	14	GROUND
15	DATA6	16	GROUND
17	DATA7	18	GROUND
19	ACK-	20	GROUND
21	BUSY	22	GROUND
23	PAPER EMPTY	24	GROUND
25	PRINTER SELECT	26	N/C

Table 4-19: CN20 Connector Pinouts

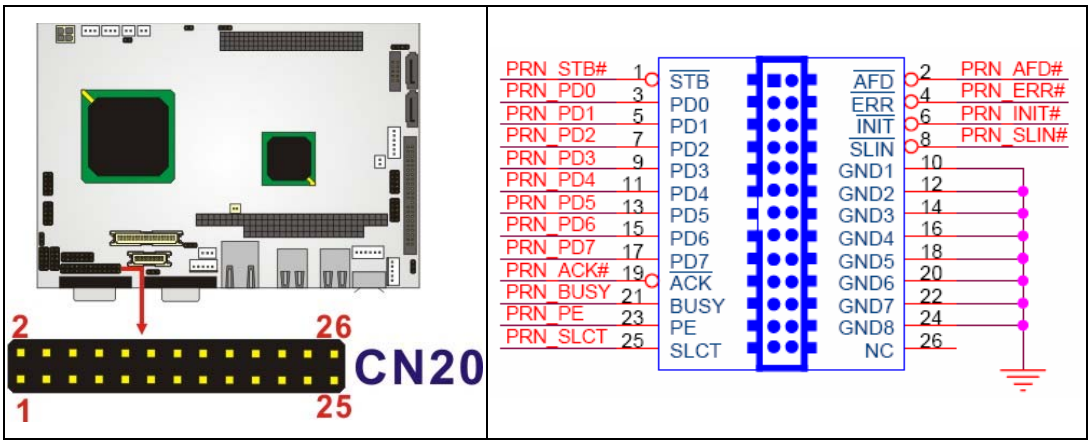


Figure 4-18: CN20 Connector Location

4.2.17 PC/104-Plus Connector

CN Label: **CN7**

CN Type: PC/104-Plus connector

CN Pinouts: See **Table 4-20** and **Table 4-21**

CN Location: See **Figure 4-19**

Use the PC/104-Plus connector to add auxiliary boards using stack-through connectors.

Pin	Row A	Row B	Row C	Row D
0	--	--	GND	GND
1	IOCHCHK*	GND	SBHE*	MEMCS16*
2	SD7	RESETDRV	LA23	IOCS16*
3	SD6	+5V	LA22	IRQ10
4	SD5	IRQ9	LA21	IRQ11
5	SD4	-5V	LA20	IRQ12
6	SD3	DRQ2	LA19	IRQ15
7	SD2	-12V	LA18	IRQ14
8	SD1	ENDXFR*	LA17	DACK0*
9	SD0	+12V	MEMR*	DRQ0
10	IOCHRDY	(KEY)	MEMW*	DACK5*
11	AEN	SMEMW*	SD8	DRQ5
12	SA19	SMEMR*	SD9	DACK6*
13	SA18	IOW*	SD10	DRQ6
14	SA17	IOR*	SD11	DACK7*
15	SA16	DACK3*	SD12	DRQ7
16	SA15	DRQ3	SD13	+5V
17	SA14	DACK1*	SD14	MASTER*
18	SA13	DRQ1	SD15	GND
19	SA12	REFRESH*	(KEY)	GND
20	SA11	SYSCLK	--	--
21	SA10	IRQ7	--	--
22	SA9	IRQ6	--	--
23	SA8	IRQ5	--	--
24	SA7	IRQ4	--	--
25	SA6	IRQ3	--	--
26	SA5	DACK2*	--	--
27	SA4	TC	--	--
28	SA3	BALE	--	--
29	SA2	+5V	--	--

Pin	Row A	Row B	Row C	Row D
30	SA1	OSC	--	--
31	SA0	GND	--	--

Table 4-20: CN7 (PC/104) Connector Pinouts

Pin	A	B	C	D
1	GROUND	TBD1	+5V	AD0
2	VIO	AD2	AD1	+5V
3	AD5	GND	AD4	AD3
4	CBE0-	AD7	GND	AD6
5	GND	AD9	AD8	GND
6	AD11	VIO	AD10	N66EV
7	AD14	AD13	GND	AD12
8	+3.3V	CBE1-	AD15	+3.3V
9	SERR-	GND	SBO-	PAR
10	GND	PERR-	+3.3V	SDONE
11	STOP-	+3.3V	LOCK-	GND
12	+3.3V	TRDY-	GND	DEVSEL-
13	FRAME-	GND	IRDY-	+3.3V
14	GND	AD16	+3.3V	CBE2-
15	AD18	+3.3V	AD17	GND
16	AD21	AD20	GND	AD19
17	+3.3V	AD23	AD22	+3.3V
18	IDSEL0	GND	IDSEL1-	IDSEL2
19	AD24	CBE3-	VIO	IDSEL3
20	GND	AD26	AD25	GND
21	AD29	+5V	AD28	AD27
22	+5V	AD30	GND	AD31
23	REQ0-	GND	REQ1-	VIO
24	GND	REQ2-	+5V	GNT0-
25	GNT1-	VIO	GNT2-	GND
26	+5V	PCICLK0	GND	PCICLK1
27	PCICLK2	+5V	PCICLK3	GND
28	GND	INTD-	+5V	PCIRST-

29	+12V	INTA-	INTB-	INTC-
30	-12v	TBD2	TBD	GND/3.3V

Table 4-21: CN7 (PCI-104) Connector Pinouts

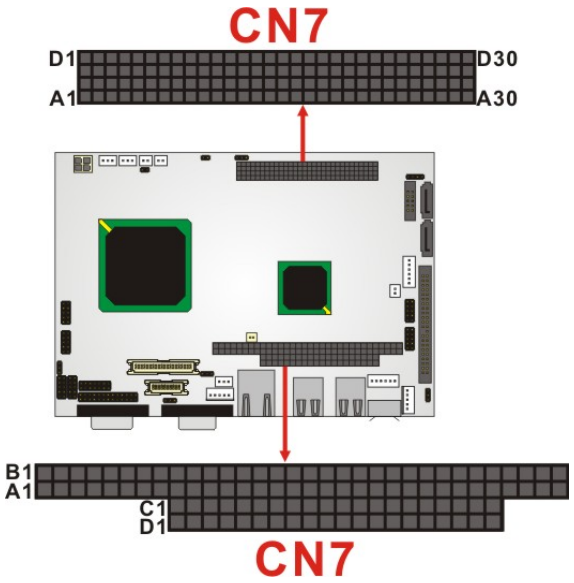


Figure 4-19: CN7 Connector Location

4.2.18 Power Connector

CN Label: **CN2**

CN Type: 4-pin Molex power connector (2x2 pins)

CN Pinouts: See **Table 4-22**

CN Location: See **Figure 4-20**

This connector supports the ATX-12V power supply.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	2	GND
3	+12V	4	+12V

Table 4-22: CN2 Connector Pinouts

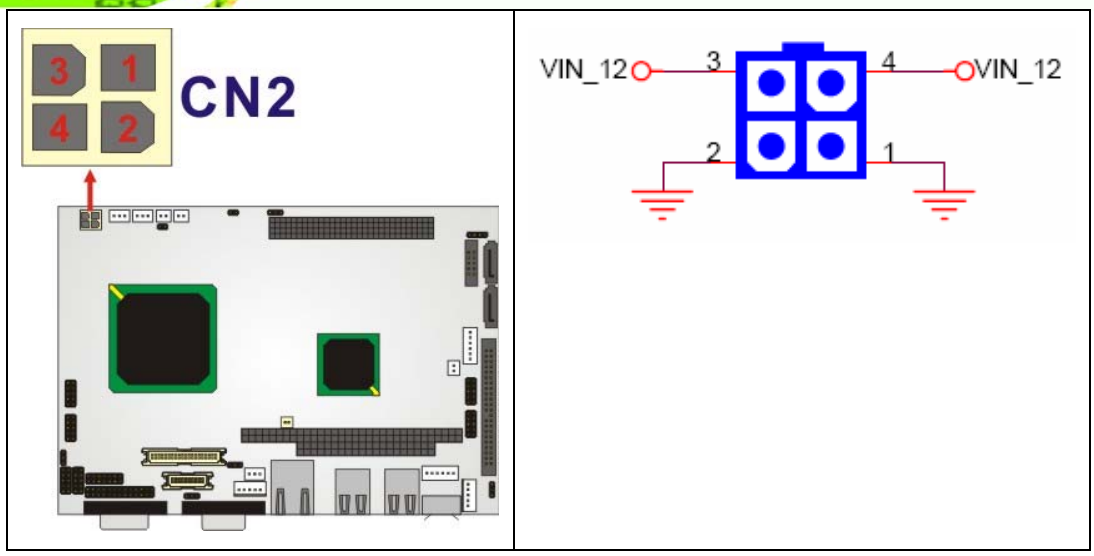


Figure 4-20: CN2 Connector Location

4.2.19 Power Input Connector

CN Label: **CN25**

CN Type: 3-pin wafer

CN Pinouts: See **Table 4-23**

CN Location: See **Figure 4-21**

The Power Input connector is a –5V/-12V power connector for ISA devices.

PIN	DESCRIPTION
1	-VCC5
2	GND
3	-VCC12

Table 4-23: CN25 Connector Pinouts

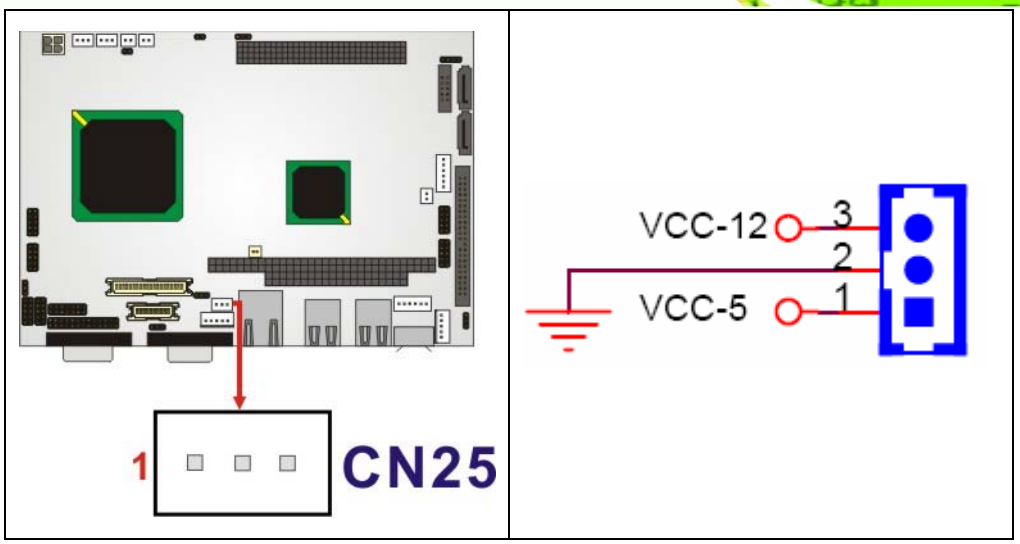


Figure 4-21: CN25 Connector Location

4.2.20 Reset Button Connector

CN Label: **CN6**

CN Type: 2-pin wafer

CN Pinouts: See **Table 4-24**

CN Location: See **Figure 4-22**

The Reset Button connector connects to an external reset button through an adapter cable.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	RESET BUTTON +	2	RESET BUTTON -

Table 4-24: CN6 Connector Pinouts

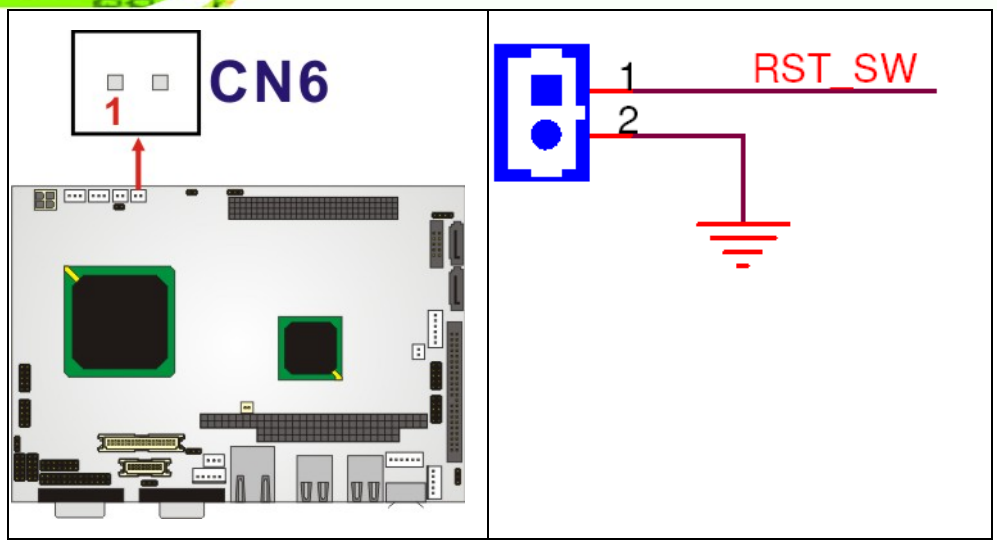


Figure 4-22: CN6 Connector Location

4.2.21 SATA Drive Ports

CN Label:	**CN36**, **CN37**
CN Type:	7-pin port
CN Pinouts:	See **Table 4-25**
CN Location:	See **Figure 4-23**

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

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

Table 4-25: CN10, CN11 Connector Pinouts

CAUTION!

SATA hard drives may come with both a 4P power connector and a SATA power interface. Attach either the 4P connector or the SATA power cable to the SATA hard drives. ***DO NOT*** attach both the power connectors to your SATA hard drives at the same time! Doing so will cause damage.

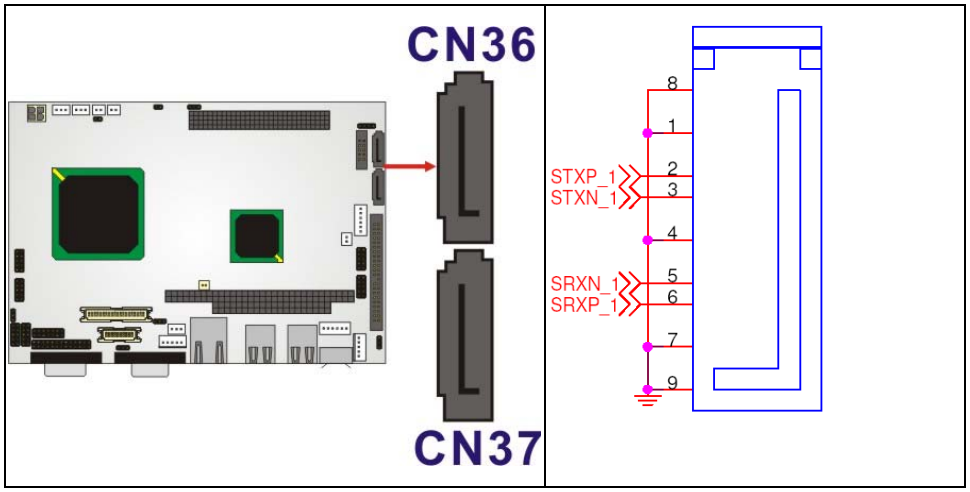


Figure 4-23: CN10, CN11 Connector Locations

NOTE:

1. SATA is supported by:
   - Windows 2000 SP4
   - Windows XP SP1
   - Windows 2003, or later versions.
2. Older OSes, such as Windows 98SE or ME, do not support the SATA interface.

4.2.22 SATA Power Connector

CN Label:	**CN38**
CN Type:	2-pin wafer
CN Pinouts:	See **Table 4-26**

CN Location: See **Figure 4-24**

The SATA power connector is a +5V power connector for SATA devices.

PIN	DESCRIPTION
1	+5V
2	GND

Table 4-26: CN38 Connector Pinouts

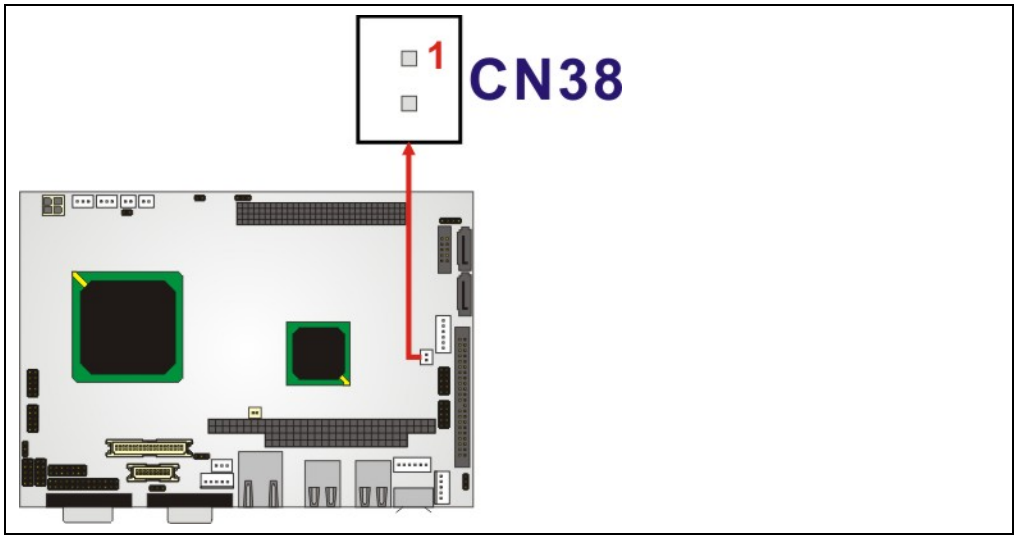


Figure 4-24: CN38 Connector Location

4.2.23 Serial Communications Connector

CN Label: **CN14**, **CN15**, **CN16**, **CN17**, **CN19**

CN Type: 14-pin headers (2x5 pins)

CN Pinouts: See **Table 3-27** and **Table 4-28**

CN Location: See **Figure 4-25**

The NANO-LX offers four ten-pin headers and one 14-pin header for serial connections.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	DCD	6	DSR
2	RXD	7	RTS

3	TXD	8	CTS
4	DTR	9	RI
5	GND	10	GND

Table 4-27: CN14, CN15, CN16, CN17 Connector Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	GND
11	TXD485+	12	TXD485#
13	RXD485+	14	RXD485#

Table 4-28: CN19 Connector Pinouts

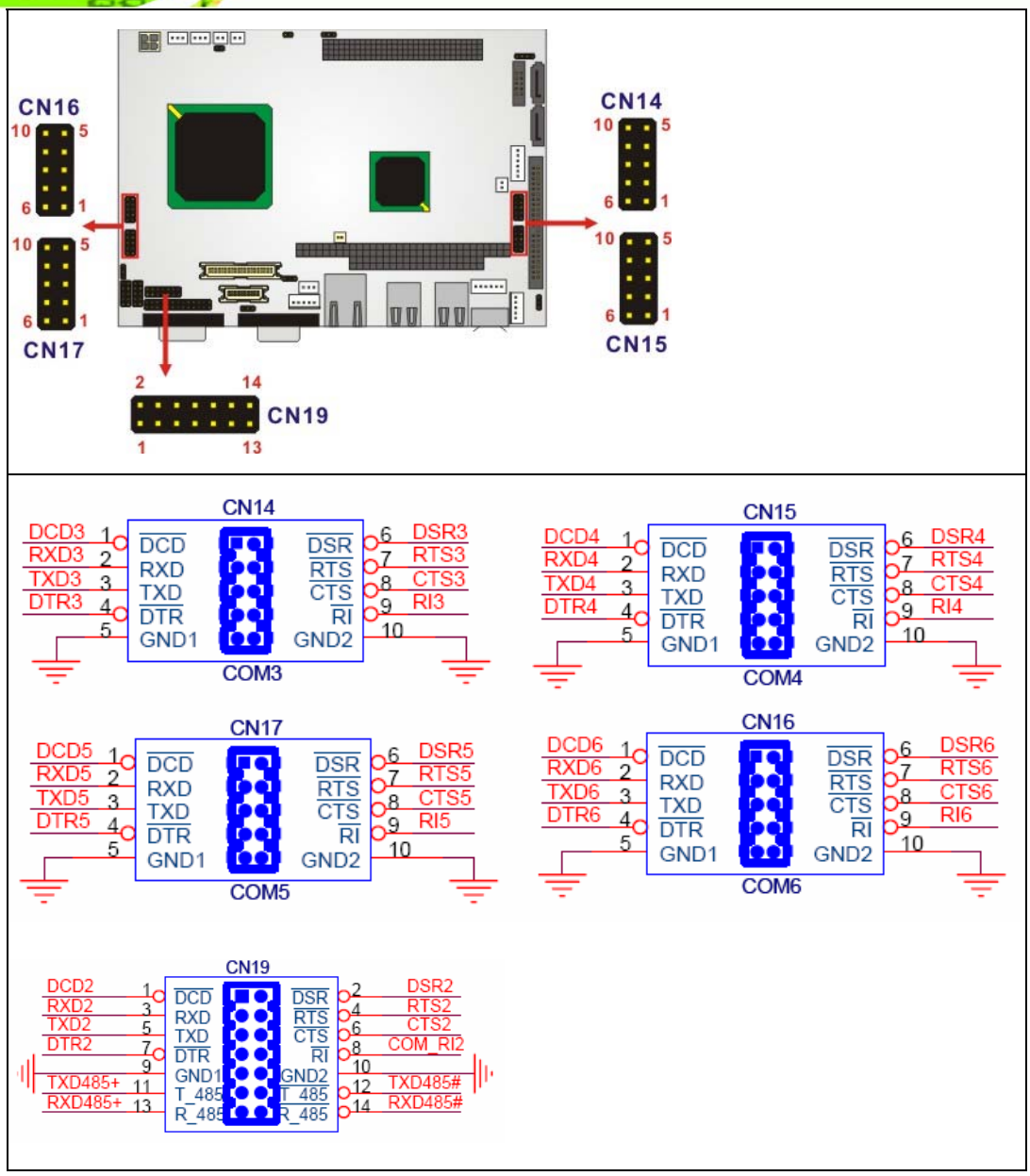


Figure 4-25 CN14, CN15, CN16, CN17, CN19 Connector Locations

4.2.24 TFT TTL LCD Connector

CN Label:	**CN22**
CN Type:	40-pin headers (2x20 pins)
CN Pinouts:	See **Table 4-29**
CN Location:	See **Figure 4-26**

TFT LCD (24-bit one channel; DF13-40DP-1.25V)

PIN	DESCRIPTION	PIN	DESCRIPTION
2	LCD_VCC	1	LCD_VCC
4	GROUND	3	GROUND
6	LCD_VCC	5	LCD_VCC
8	GROUND	7	I_SDA
10	B1	9	B0
12	B3	11	B2
14	B5	13	B4
16	B7	15	B6
18	G1	17	G0
20	G3	19	G2
22	G5	21	G4
24	G7	23	G6
26	R1	25	R0
28	R3	27	R2
30	R5	29	R4
32	R7	31	R6
34	GROUND	33	GROUND
36	VSYNC	35	CLK
38	HSYNC	37	LCD_EN
40	DISP_EN	39	SCL

Table 4-29: CN22 Connector Pinouts

NOTE:

The supplied voltage (3.3V and 5V) can be selected via JP7.

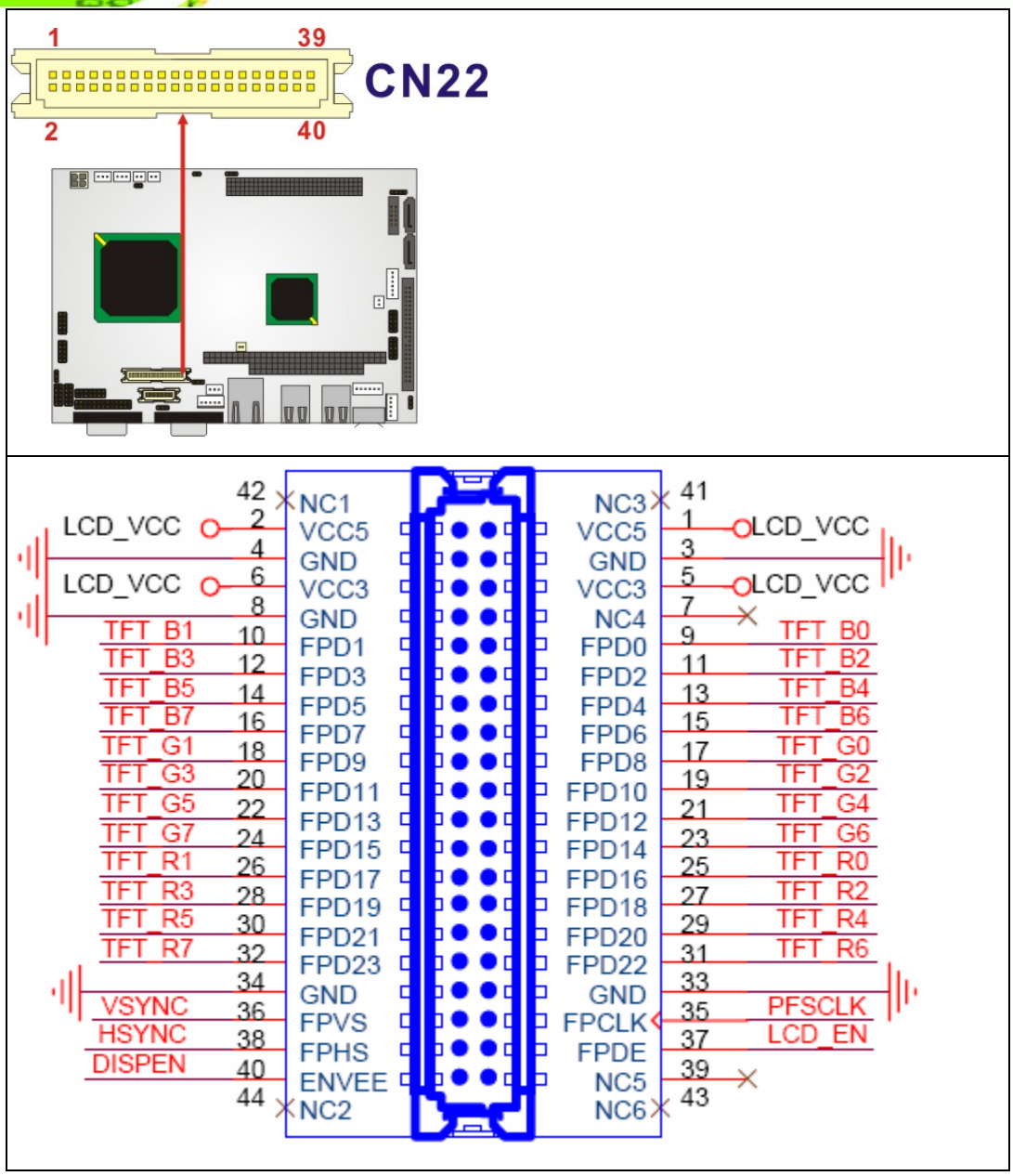


Figure 4-26 CN22 Connector Locations

4.3 External (Rear Panel) Connectors

Figure 4-27 shows the NANO-LX CPU board rear panel. The peripheral connectors on the back panel can connect to external devices when the SBC is installed in a chassis. The peripheral connectors on the rear panel are:

- 1 x RS232 serial connector

- 1 x VGA connector
- 1 x RJ-45 Ethernet connector
- 2 x USB combo connectors
- 1 x PS/2 connector

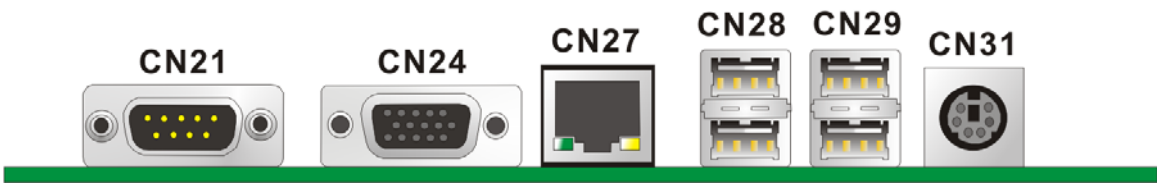


Figure 4-27: NANO-LX CPU Board Rear Panel

4.3.1 RS232 Serial Connector

CN Label: **CN21**

CN Type: RS-232

CN Pinouts: See **Table 4-30** and **Figure 4-28**

CN Location: See **Figure 4-27**

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/Vout
5	GND		

Table 4-30: CN21 Pinouts

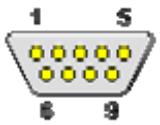


Figure 4-28: CN21 Pinout Locations

4.3.2 VGA Connector

CN Label: **CN24**

CN Type: HD-D-sub 15 Connector

CN Pinouts: See **Table 4-31** and **Figure 4-29**

CN Location: See **Figure 4-27**

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

PIN	DESCRIPTION	PIN	DESCRIPTION
1	Red	9	No Connect
2	Green	10	Ground
3	Blue	11	No Connect
4	No Connect	12	DDC DAT
5	Ground	13	Horizontal Synchronization
6	Ground	14	Vertical Synchronization
7	Ground	15	DDC Clock
8	Ground		

Table 4-31: CN24 Connector Pinouts

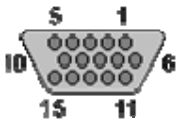


Figure 4-29: CN24 Connector

4.3.3 Ethernet Connector

CN Label: **CN27**

CN Type: RJ-45

CN Pinouts: See **Table 4-32** and **Figure 4-30**

CN Location: See **Figure 4-27**

The Ethernet connector provides a 10/100BaseT Ethernet connection to a local or internet network. Refer to the table below for the Ethernet port LED indication.

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

Table 4-32: CN27 Connector Pinouts

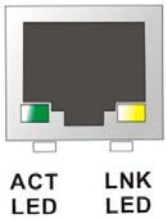


Figure 4-30: CN27 Connector

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 (**Table 4-33**).

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

Table 4-33: CN27 Connector LEDs

4.3.4 USB Combo Connectors

CN Label: **CN28**, **CN29**

CN Type: USB port

CN Pinouts: See **Table 4-34**

CN Location: See **Figure 4-27**

The USB comb connector provides the 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	VCC (+5V)	5	VCC (+5V)
2	DATA-	6	DATA-
3	DATA+	7	DATA+
4	GND	8	GND

Table 4-34: CN28, CN29 Connector Pinouts

4.3.5 Keyboard/Mouse Connector

CN Label: **CN31**

CN Type: PS/2

CN Pinouts: See **Table 4-35** and **Figure 4-31**

CN Location: See **Figure 4-27**

The Keyboard/Mouse connector connects to a mouse and keyboard.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	+5V	2	Mouse Data
3	Mouse Clock	4	Keyboard Data
5	Keyboard Clock	6	GND

Table 4-35: CN31 Pinouts

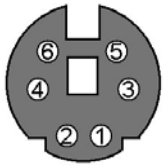


Figure 4-31: CN31 Pinout locations

Chapter

5

Installation and Configuration

5.1 Anti-static Precautions

WARNING:

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

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the NANO-LX. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the NANO-LX, 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-LX, place it on an antic-static pad. This reduces the possibility of ESD damaging the NANO-LX.
- ***Only handle the edges of the PCB***:-: When handling the PCB, hold the PCB by the edges.

5.2 Installation Considerations

NOTE:

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

5.2.1 Installation Notices

WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the NANO-LX, NANO-LX 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-LX 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-LX 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-LX off**:
  - When working with the NANO-LX, 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-LX **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-LX is properly installed.

- All the items in the packing list are present
- The CPU is installed
- The CPU cooling kit is properly installed
- 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-LX 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
  - SATA drives
  - Keyboard and mouse cable
  - Audio kit
  - Power supply
  - USB cable
  - Serial port cable
  - Parallel port cable
- The following external peripheral devices are properly connected to the chassis:
  - VGA screen
  - Keyboard
  - Mouse
  - RS-232 serial communications device

5.3 Unpacking

5.3.1 Unpacking Precautions

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

- Follow the anti-static precautions outlined in **Section 5.1**.
- Make sure the packing box is facing upwards so the NANO-LX does not fall out of the box.
- Make sure all the components in the checklist shown in **Section 5.3.2** are present.

5.3.2 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-LX from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

When the NANO-LX is received, make sure all the components listed below are present.

- NANO-LX single board computer
- IDE flat cable 44p/44p
- RS-232 cables
- Audio cable
- Power cable
- Keyboard/Mouse Y cable
- SATA cables
- SATA power cables
- Mini jumper Pack
- Quick Installation Guide
- Utility CD

5.4 SO-DIMM Installation

WARNING:

Using incorrectly specified SO-DIMM may cause permanently damage the NANO-LX. Please make sure the purchased SO-DIMM complies with the memory specifications of the NANO-LX. SO-DIMM specifications compliant with the NANO-LX are listed in **Chapter 2**.

To install a SO-DIMM into a SO-DIMM socket, please follow the steps below and refer to **Figure 5-1**.

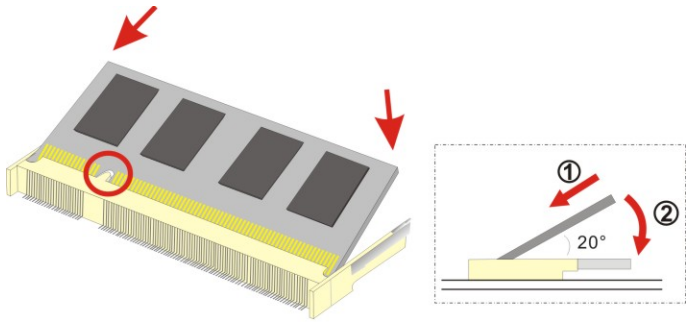


Figure 5-1: SO-DIMM Installation

Step 1: **Locate the SO-DIMM socket**. Place the NANO-LX on an anti-static pad with the solder side facing up.

Step 2: **Align the SO-DIMM with the socket**. The SO-DIMM must be oriented in such a way that the notch in the middle of the SO-DIMM must be aligned with the plastic bridge in the socket.

Step 3: **Insert the SO-DIMM**. Push the SO-DIMM chip into the socket at an angle. (See **Figure 5-1**)

Step 4: **Open the SO-DIMM socket arms**. Gently pull the arms of the SO-DIMM socket out and push the rear of the SO-DIMM down. (See **Figure 5-1**)

Step 5: **Secure the SO-DIMM**. Release the arms on the SO-DIMM socket. They clip into place and secure the SO-DIMM in the socket.

5.5 CF Card Installation

NOTE:

The NANO-LX supports CF Type II card. For the complete specifications of the supported CF cards please refer to **Chapter 2**.

To install the a CF Type II card onto the NANO-LX, please follow the steps below:

Step 1: **Locate the CF card socket**. Place the NANO-LX 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 5-2**.

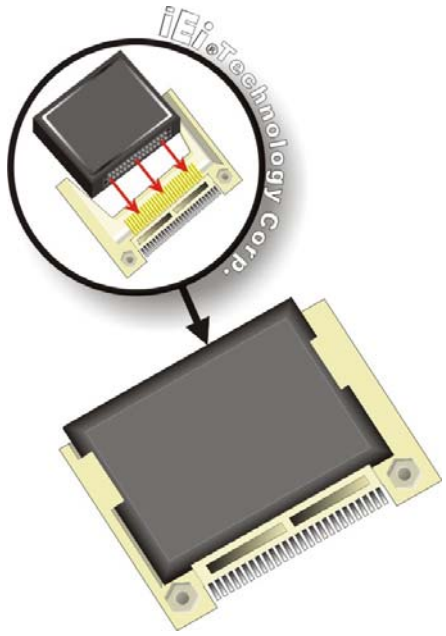


Figure 5-2: CF Card Installation

5.6 Jumper Settings

NOTE:

A jumper is a metal bridge used to close an electrical circuit. It consists of two or three metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.

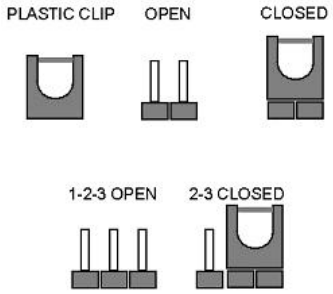


Figure 5-3: Jumper Locations

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

Description	Label	Type
AT/ATX Power Mode Select	2-pin header	JP4
CF mode select	3-pin header	JP8
COM1, COM2 RI Pin and Voltage Selection (Optional)	10-pin header	JP2
COM3 RS422/RS485 Select	3-pin header	JP3
LCD Panel (LVDS/TTL) Voltage select	2-pin header	JP7
LCD PANEL SHIFT CLOCK	3-pin header	JP1
PC104 Plus VIO Voltage Select	3-pin header	JP5
SERIRQ Select	2-pin header	JP6

Table 5-1: Jumpers

NOTE:

The NANO-LX does not provide a “Clear CMOS” configuration jumper. If the

system fails to boot due to improper BIOS settings, reset the CMOS contents by disconnecting and reconnecting the BT1 battery connector. Use small-sized needle nose pliers to carefully disconnect and reconnect the BT1 battery connector.

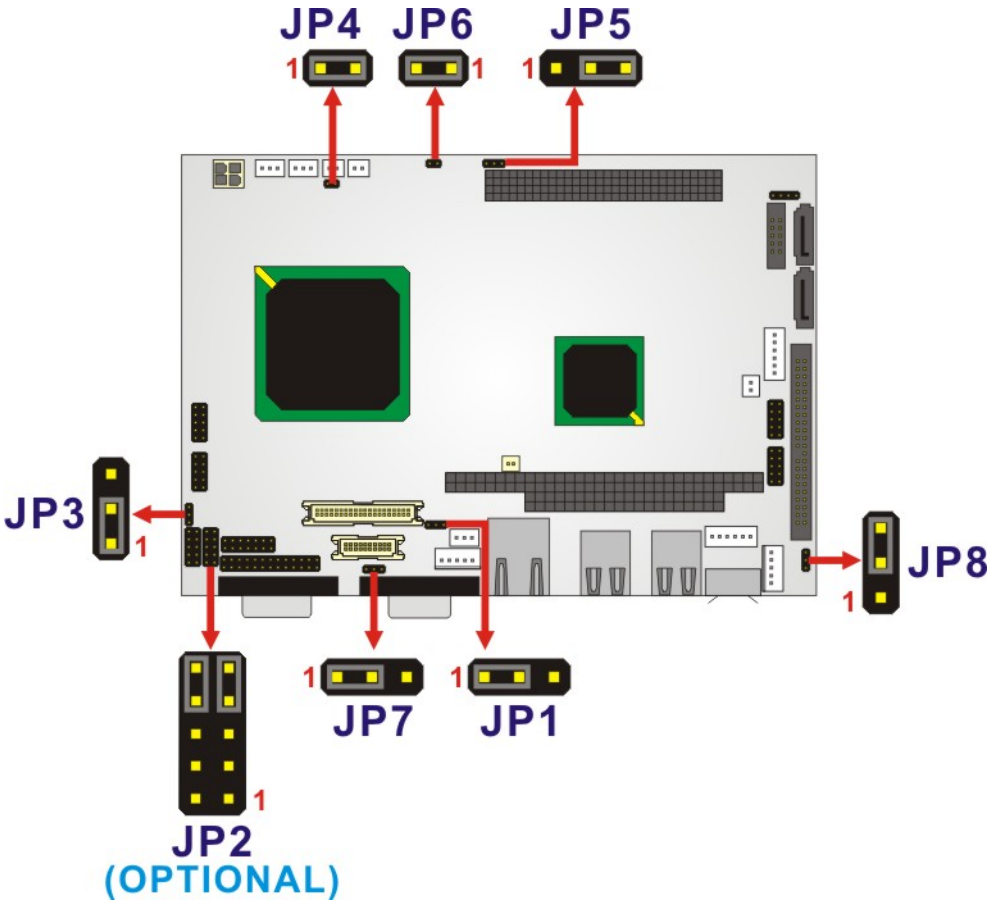


Figure 5-4: Jumper Locations

5.6.1 LCD Panel Shift Clock Jumper

Jumper Label:	**JP1**
Jumper Type:	3-pin header
Jumper Settings:	See **Table 5-2**
Jumper Location:	See **Figure 5-4**

The JP1 jumper sets the LCD panel shift clock.

JP1	Description
1-2	LVDS Clock Normal Output (Default)
2-3	LVDS Clock Invert Output

Table 5-2: JP1 Jumper Settings

5.6.2 COM1/2 Port RI and Voltage Selection Jumper (Optional)

Jumper Label: **JP2**

Jumper Type: 10-pin header (2x5 pins)

Jumper Settings: See **Table 5-3**

Jumper Location: See **Figure 5-4**

The optional JP2 jumper sets the COM1/2 port RI and voltage.

JP2	Description	
1-3	COM1 RI Pin Use +12V	
3-5	COM1 RI Pin Use +5V	
7-9	COM1 RI Pin Use RI	Default
2-4	COM2 RI Pin Use +12V	
4-6	COM2 RI Pin Use +5V	
8-10	COM2 RI Pin Use RI	Default

Table 5-3: JP2 Jumper Settings

5.6.3 COM3 RS422/RS485 Select Jumper

Jumper Label: **JP3**

Jumper Type: 3-pin header

Jumper Settings: See **Table 5-4**

Jumper Location: See **Figure 5-4**

The JP3 jumper sets the COM3 connector type to RS-422 or RS-485.

JP3	Description
1-2	UART-2 RxD Signal connect to RS-422 (Default)
2-3	UART-2 RxD Signal connect to RS-485

Table 5-4: JP3 Jumper Settings

5.6.4 AT/ATX Power Mode Select Jumper

Jumper Label: **JP4**

Jumper Type: 2-pin header

Jumper Settings: See **Table 5-5**

Jumper Location: See **Figure 5-4**

The JP4 jumper block controls the connection to a power supply.

The CN5 connector is used to connect a chassis power On/Off button using an adapter cable and is configured through the JP4 jumper. The CN5 connector has two operational modes:

- Using **ATX** power: CN5 connects to an externally implemented power switch, and the JP4 jumper should be left open.
- Using **AT** power: The pins on JP4 are shorted by a jumper cap. JP4 should be shorted by default as the AMD® Southbridge is designed without the consideration for a power button signal. The shorted JP4 provides a hardware feedback to initiate the system. The power on/off function is then managed by the AT power switch button.

JP4	Description
Short	AT Mode (Default)
Open	ATX Mode

Table 5-5: JP4 Jumper Settings

5.6.5 PC/104-Plus VIO Voltage Select Jumper

Jumper Label: **JP5**

Jumper Type: 3-pin header

Jumper Settings: See **Table 5-6**

Jumper Location: See **Figure 5-4**

The JP5 jumper sets the voltage to the PC/104-Plus connector.

JP5	Description
1-2	PC104 Plus VIO output voltage select 5V
2-3	PC104 Plus VIO output voltage select 3.3V (Default)

Table 5-6: JP5 Jumper Settings

5.6.6 PC/104-Plus SERIRQ Select Jumper

NOTE:

Serial IRQ can only work properly if PCMCIA supports Serial IRQ signal.

Jumper Label: **JP6**

Jumper Type: 2-pin header

Jumper Settings: See **Table 5-7**

Jumper Location: See **Figure 5-4**

Use the JP6 jumper to reserve IRQ addresses for PCMCIA devices.

JP6	Description
Short	SERIRQ Enable (Default)
Open	SERIRQ Disable

Table 5-7: JP6 Jumper Settings

5.6.7 LCD Panel (LVDS/TTL) Voltage select Jumper

Jumper Label:	**JP7**
Jumper Type:	3-pin header
Jumper Settings:	See **Table 5-8**
Jumper Location:	See **Figure 5-4**

The JP7 jumper sets the voltage to the LCD panel.

WARNING!

The LCD panel voltage select jumper setting of NANO-LX-800-**R12** is different from the previous version (NANO-LX-800-**R10**). Please confirm the version number of the motherboard prior to setup the LCD panel voltage select jumper (JP7).

Model No.	Pin	Description
NANO-LX-800-R10	Short 1-2	Panel Voltage select 5V
	Short 2-3	Panel Voltage select 3.3V
NANO-LX-800-R11	Short 1-2	Panel Voltage select 3.3V
NANO-LX-800-R12	Short 2-3	Panel Voltage select 5V

Table 5-8: JP7 Jumper Settings

5.7 Chassis Installation

5.7.1 Airflow

WARNING:

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

The NANO-LX 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.

NOTE:

IEI has a wide range of backplanes available. Please contact your NANO-LX vendor, reseller or an IEI sales representative at sales@iei.com.tw or visit the IEI website (http://www.ieiworld.com.tw) to find out more about the available chassis.

5.7.2 Motherboard Installation

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

5.8 Internal Peripheral Device Connections

5.8.1 Peripheral Device Cables

The cables listed in **Table 5-9** are shipped with the NANO-LX.

Quantity	Type
1	ATA 66/100 flat cable
1	AT power cable
1	Audio cable
2	Single RS-232 cable
1	KB/MS Y cable
2	SATA drive cable
1	SATA drive power cable

Table 5-9: IEI Provided Cables

5.8.2 ATA Flat Cable Connection

The ATA 66/100 flat cable connects to the NANO-LX to one or two IDE devices. To connect an IDE HDD to the NANO-LX please follow the instructions below.

Step 1: **Locate the IDE connector**. The location/s of the IDE device connector/s is/are 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.

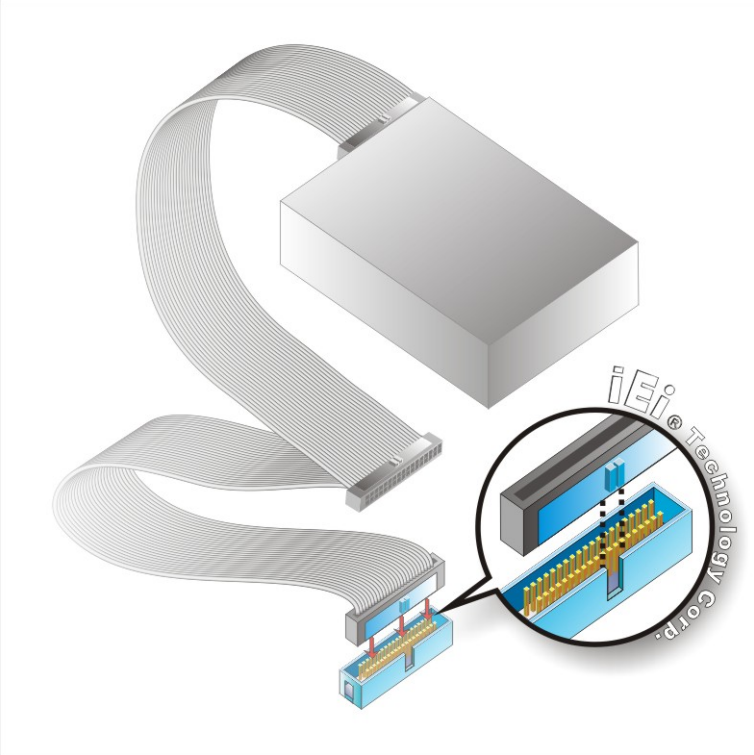


Figure 5-5: IDE Cable Connection

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.

5.8.3 AT Power Connection

Follow the instructions below to connect the NANO-LX to an AT power supply.

WARNING:

Disconnect the power supply power cord from its AC power source to prevent a sudden power surge to the NANO-LX.

Step 1: **Locate the power cable**. The power cable is shown in the packing list in **Chapter 3**.

Step 2: **Connect the Power Cable to the Motherboard**. Connect the 4-pin (2x2) Molex type power cable connector to the AT power connector on the motherboard. See Figure 5-6.

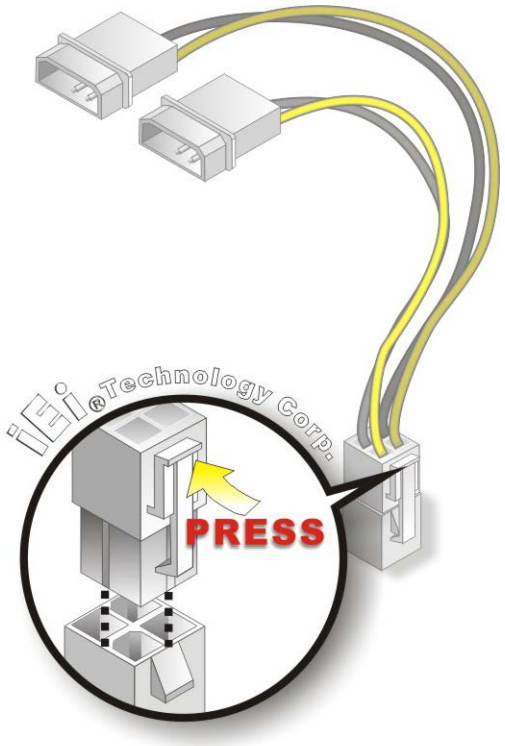


Figure 5-6: Power Cable to Motherboard Connection

Step 3: **Connect Power Cable to Power Supply**. Connect one of the 4-pin (1x4) Molex type power cable connectors to an AT power supply. See Figure 5-7.

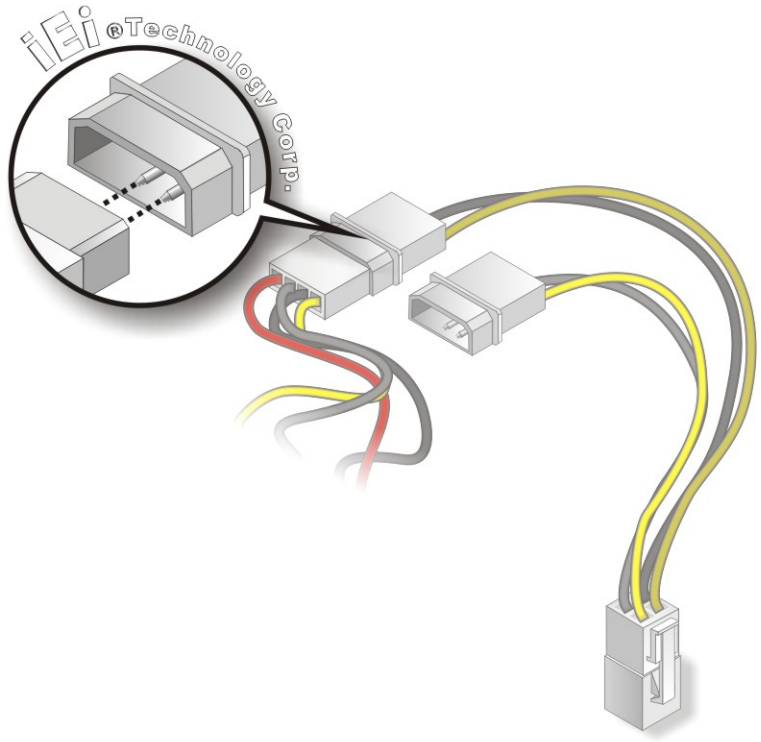


Figure 5-7: Connect Power Cable to Power Supply

5.8.4 Audio Kit Installation

The Audio Kit that came with the NANO-LX connects to the audio connector on the NANO-LX. The audio kit consists of three audio jacks. Mic-in connects to a microphone. Line-in provides a stereo line-level input to connect to the output of an audio device. Line-out, a stereo line-level output, connects to two amplified 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 on-board connector with pin 1 on the audio kit connector. Pin 1 on the audio kit connector is indicated with a white dot. See **Figure 5-8**.

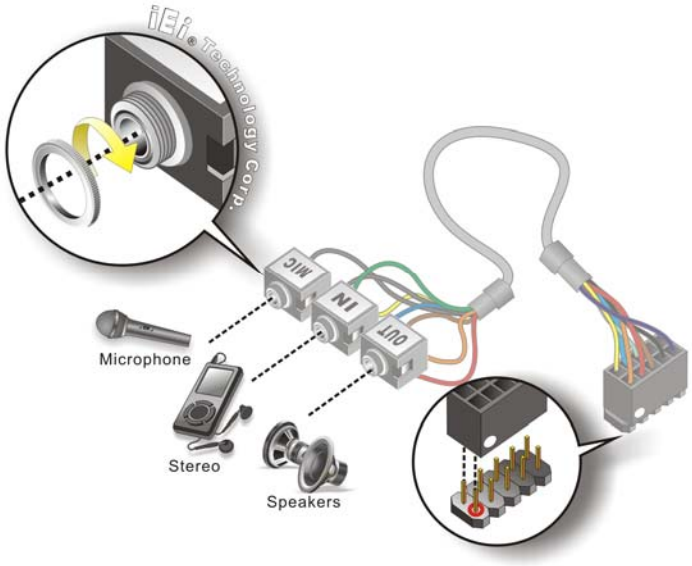


Figure 5-8: Audio Kit Cable Connection

Step 3: **Connect the audio devices**. Connect speakers to the line-out audio jack. Connect the output of an audio device to the line-in audio jack. Connect a microphone to the mic-in audio jack.

5.8.5 Parallel Port Cable

The optional parallel port (LPT) cable respectively connects the onboard LPT 26-pin box header to an external LPT device (like a printer). The cable comprises a 26-pin female header, to be connected to the onboard LPT box-header, on one side and on the other side a standard external LPT connector. To connect the LPT cable, please follow the steps below.

Step 1: **Locate the connector**. The LPT connector location is shown in **Chapter 4**.

Step 2: **Align the connectors**. Correctly align pin 1 on the cable connector with pin 1 on the PCIE-9452 LPT box-header connector. See **Figure 5-9**.

Step 3: **Insert the cable connectors** Once the cable connector is properly aligned with the 26-pin box-header connector on the PCIE-9452, connect the cable connector to the onboard connector. See **Figure 5-9.**

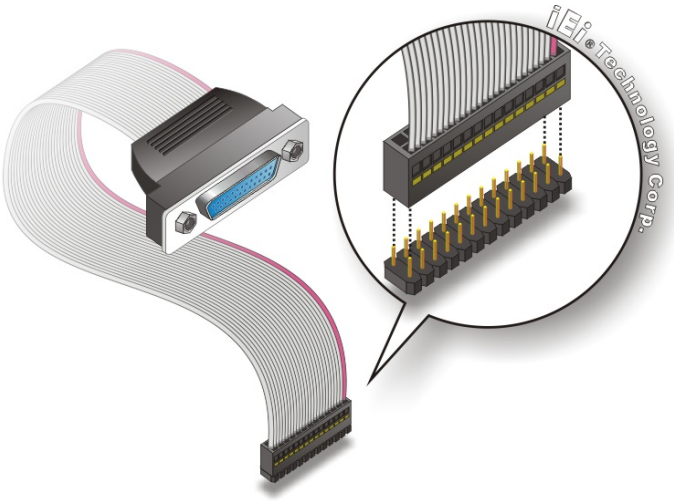


Figure 5-9: LPT Cable Connection

Step 4: **Attach the LPT connector to the chassis**. To secure the LPT interface connector to the chassis please refer to the installation instructions that came with the chassis.

Step 5: **Connect LPT device**. Once the LPT interface connector is connected to the chassis, the LPT device can be connected to the LPT interface connector. See **Figure 5-10.**

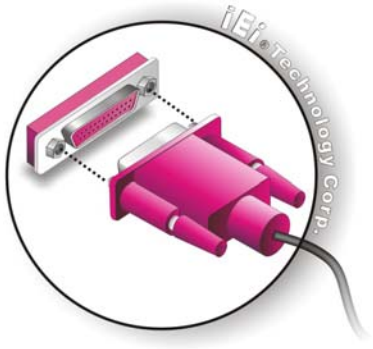


Figure 5-10: Connect the LPT Device

5.8.6 Single RS-232 Cable

The single RS-232 cable consists of one serial port connectors attached to a serial communications cable that is then attached to a D-sub 9 male connector. To install the single RS-232 cable, please follow the steps below.

Step 1: **Locate the connector**. The location of the RS-232 connector is shown in **Chapter 3**.

Step 2: **Insert the cable connector**. Insert the connector into the serial port box header. See **Figure 5-11**. A key on the front of the cable connectors ensures the connector can only be installed in one direction.

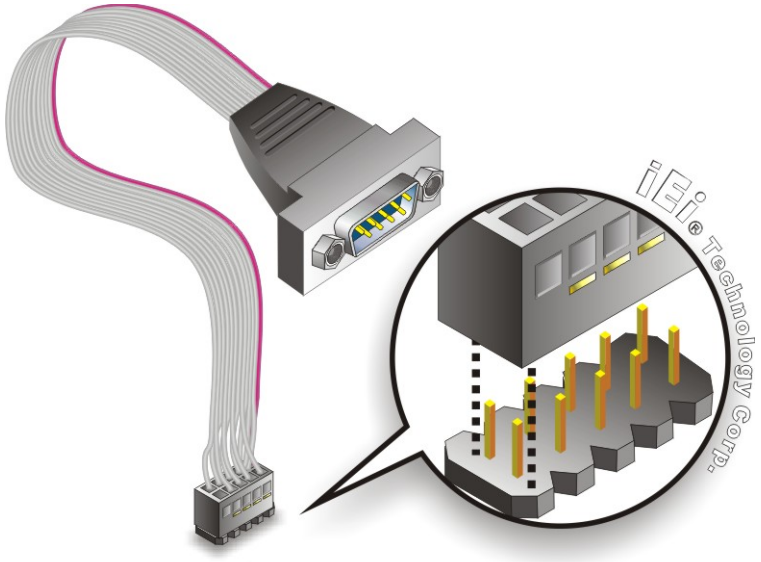


Figure 5-11: Single RS-232 Cable Installation

5.8.7 SATA Drive Connection

The NANO-LX is shipped with two SATA drive cables and one SATA drive power cable. To connect the SATA drives to the connectors, please follow the steps below.

Step 3: **Locate the connectors**. The locations of the SATA drive connectors are shown in **Chapter 3**.

Step 4: **Insert the cable connector**. Press the clip on the connector at the end of the SATA cable and insert the cable connector into the onboard SATA drive connector. See **Figure 5-12**.

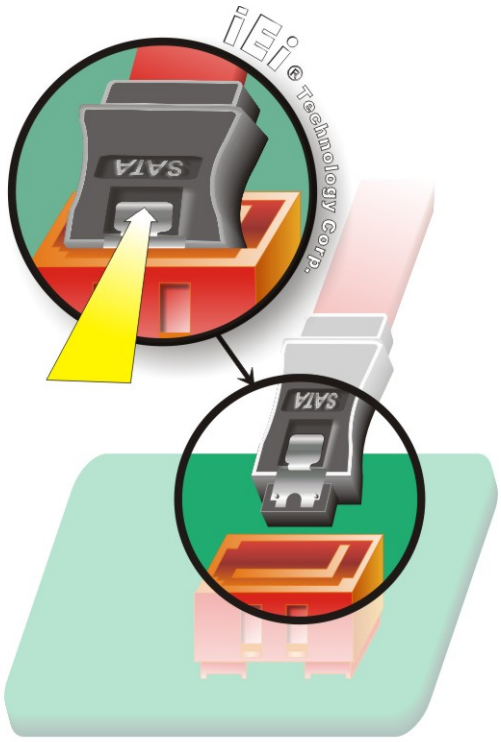


Figure 5-12: SATA Drive Cable Connection

Step 5: **Connect the cable to the SATA disk**. Connect the connector on the other end of the cable to the connector at the back of the SATA drive. See **Figure 5-13**.

Step 6: **Connect the SATA power cable**. Connect the SATA power connector to the back of the SATA drive. See **Figure 5-13**.

Figure 5-13: SATA Power Drive Connection

5.9 External Peripheral Interface Connection

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

- RJ-45 Ethernet cable connectors
- PS/2 devices
- Serial port devices
- USB devices
- VGA monitors

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

5.9.1 LAN Connection (Single Connector)

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-LX. See **Figure 5-14**.

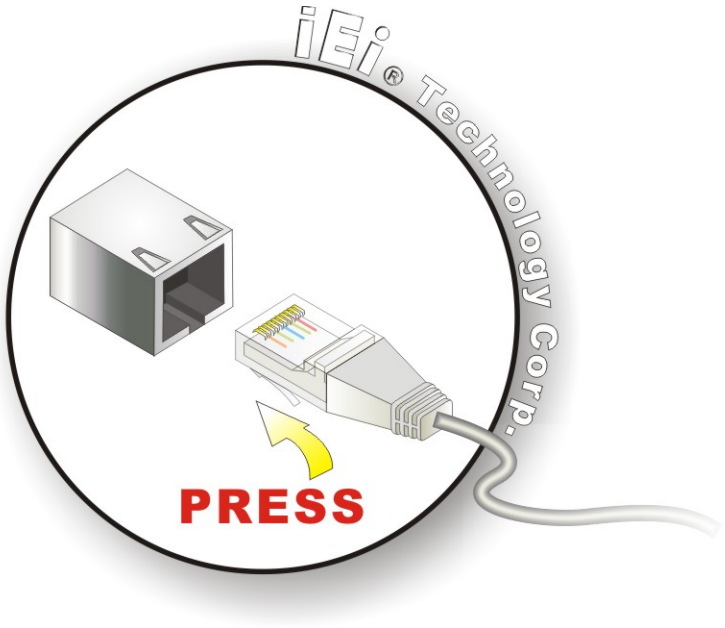


Figure 5-14: LAN Connection

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

5.9.2 PS/2 Keyboard/Mouse Connection

The NANO-LX has a single PS/2 connector on the external peripheral interface panel. The PS/2 connector is connected to a keyboard/mouse through the keyboard/mouse Y cable. To connect a keyboard/mouse to the NANO-LX, please follow the instructions below.

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

Step 2: **Align the PS/2 connector**. Align the PS/2 connector on the keyboard/mouse Y cable with the PS/2 connector on the external peripheral interface.

Step 3: **Insert the PS/2 connector** Once the connector is properly aligned, insert the PS/2 connector from the keyboard/mouse Y cable into the PS/2 connector on the NANO-LX. See **Figure 5-15.**

Step 4: **Connect the keyboard and mouse**. A keyboard and mouse can each be connected to one of the PS/2 connectors. The keyboard PS/2 connector and mouse PS/2 connector are both marked. Please make sure the keyboard and mouse are connected to the correct PS/2 connector.

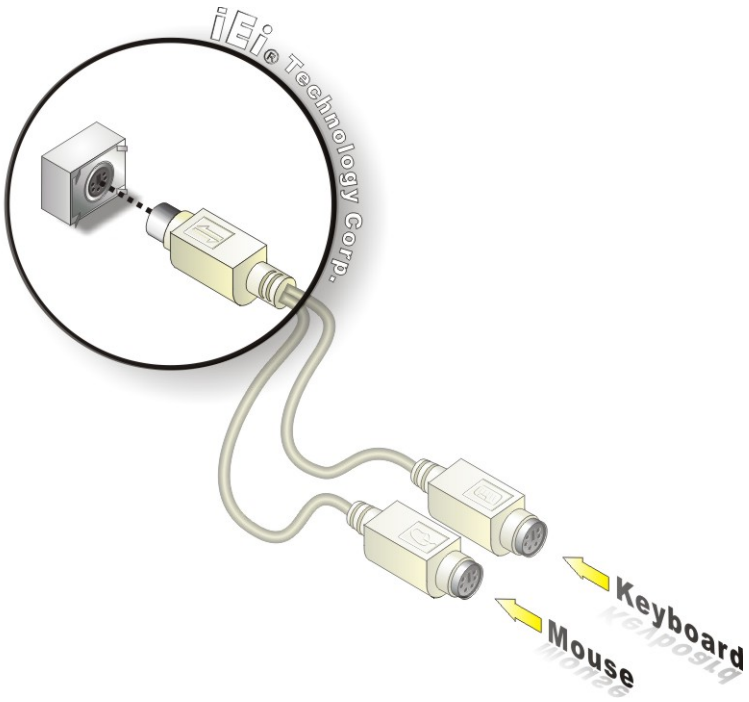


Figure 5-15: PS/2 Connector

5.9.3 Serial Device Connection

The NANO-LX 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-LX.

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 5-16**.

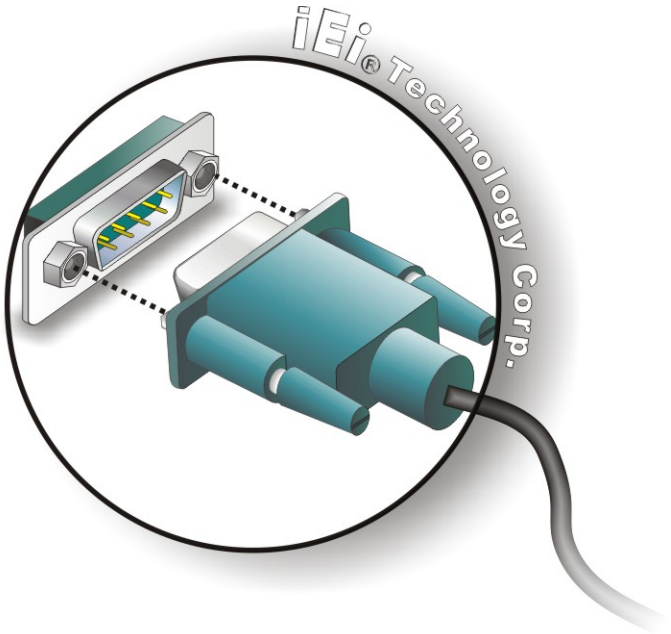


Figure 5-16: Serial Device Connector

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.

5.9.4 USB Connection (Dual Connector)

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-LX.

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 5-17**.

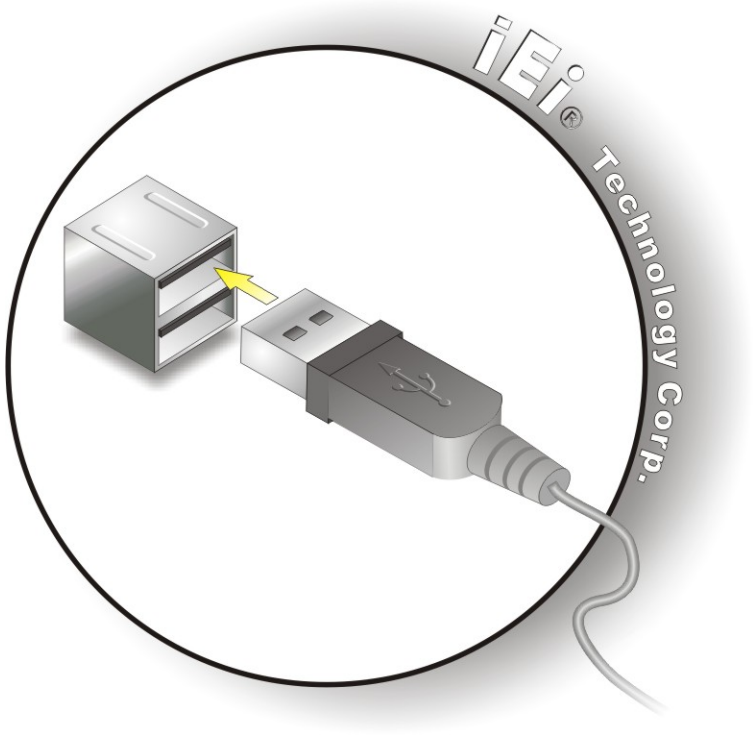


Figure 5-17: USB Connector

5.9.5 VGA Monitor Connection

The NANO-LX 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-LX, 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-LX. See **Figure 5-18**.

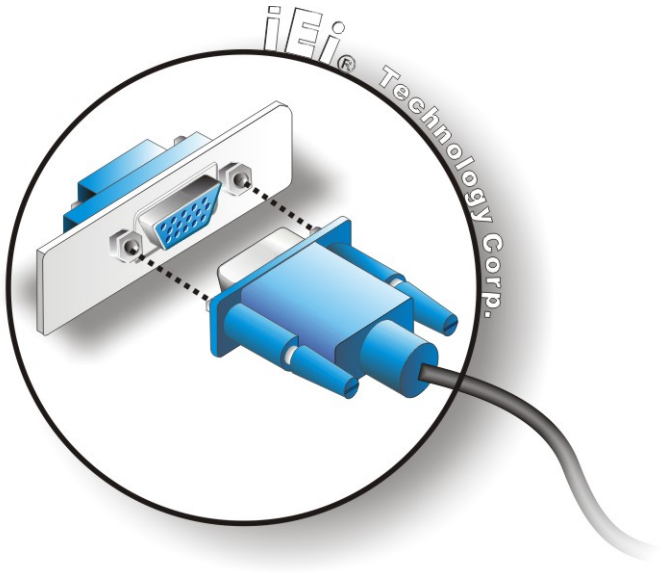


Figure 5-18: VGA Connector

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.

Chapter

6

Award 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
F1	General help, only for Status Page Setup Menu and Option Page Setup Menu

Key	Function
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

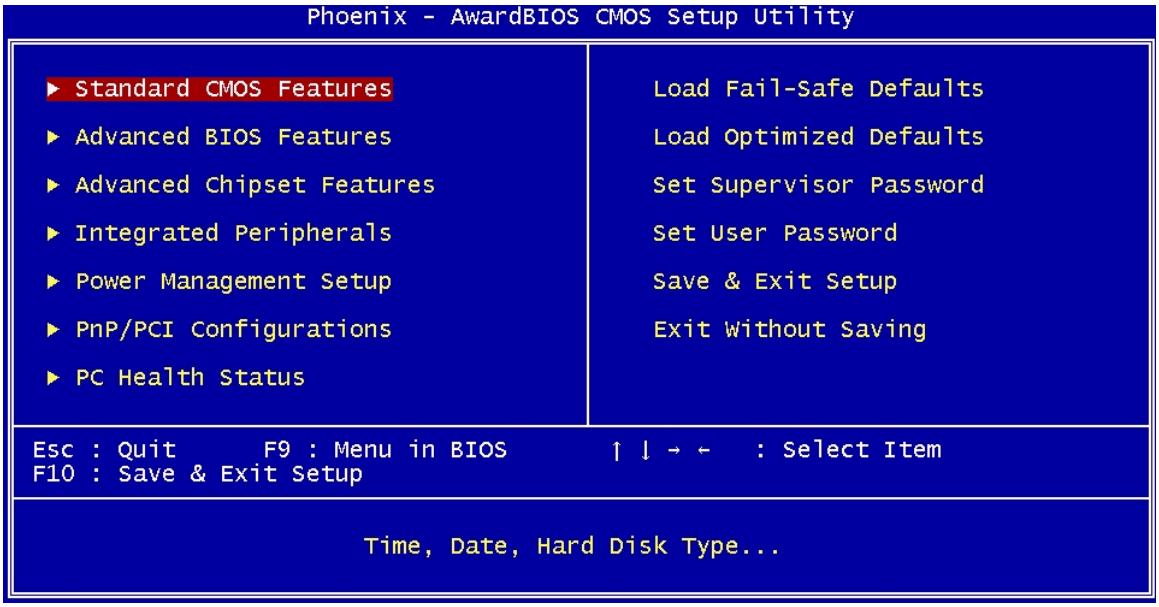
When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

6.1.4 Unable to Reboot After Configuration Changes

If the system cannot be booted after changes are made, restore the CMOS defaults. The SBC should come with a restore CMOS settings jumper. Refer to **Section 5.6** for more information.

6.1.5 Main BIOS Menu

Once the BIOS opens, the main menu (BIOS Menu 1) appears.



BIOS Menu 1: AwardBIOS 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**

Select this 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**

Select this 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**

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**

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**

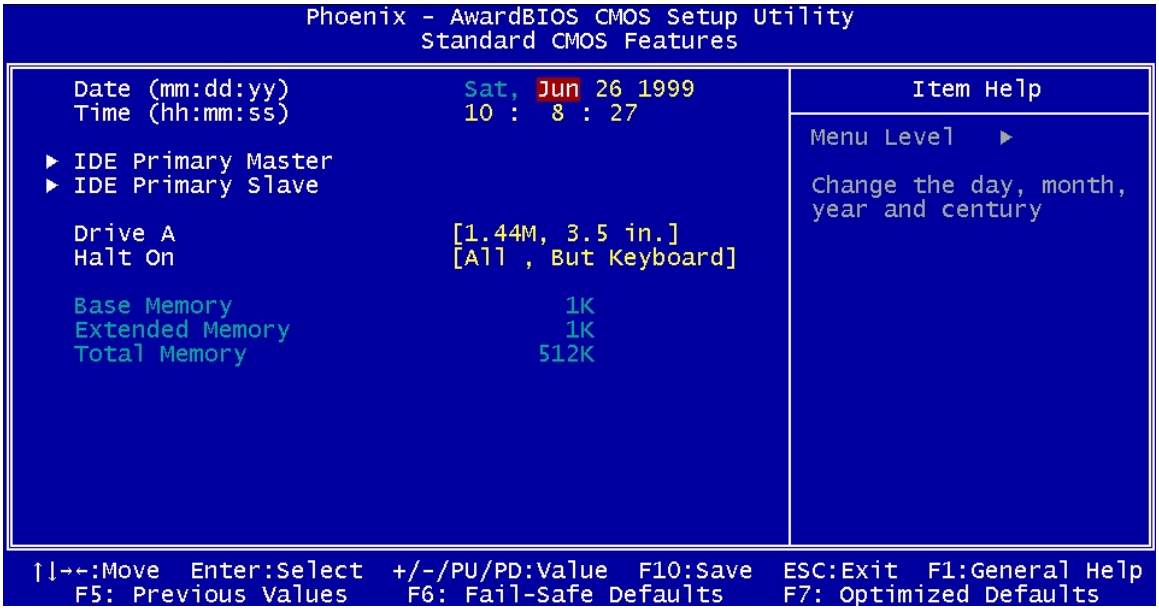
Select this option to save any configuration changes made and exit the BIOS menus.

➔ **Exit Without Saving**

Select this option 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.



BIOS Menu 2: Standard CMOS Features

➔ **Date [Day mm:dd:yyyy]**

The **Date** option sets the system date.

➔ **Time [hh/mm/ss]**

The **Time** option sets 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.

➔ **Drive A [1.44M, 3.5in]**

Use the Drive A configuration to specify the floppy drive type installed in the system. The floppy drive configuration options are:

- None
- 360K, 5.25 in.
- 1.2M, 5.25 in.
- 720K, 3.5 in.
- 1.44M, 3.5in (Default)
- 2.88M, 3.5 in.

➔ **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**		The system boot is not stopped for any errors that may be detected.
➔ **All, But Keyboard**	(Default)	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**

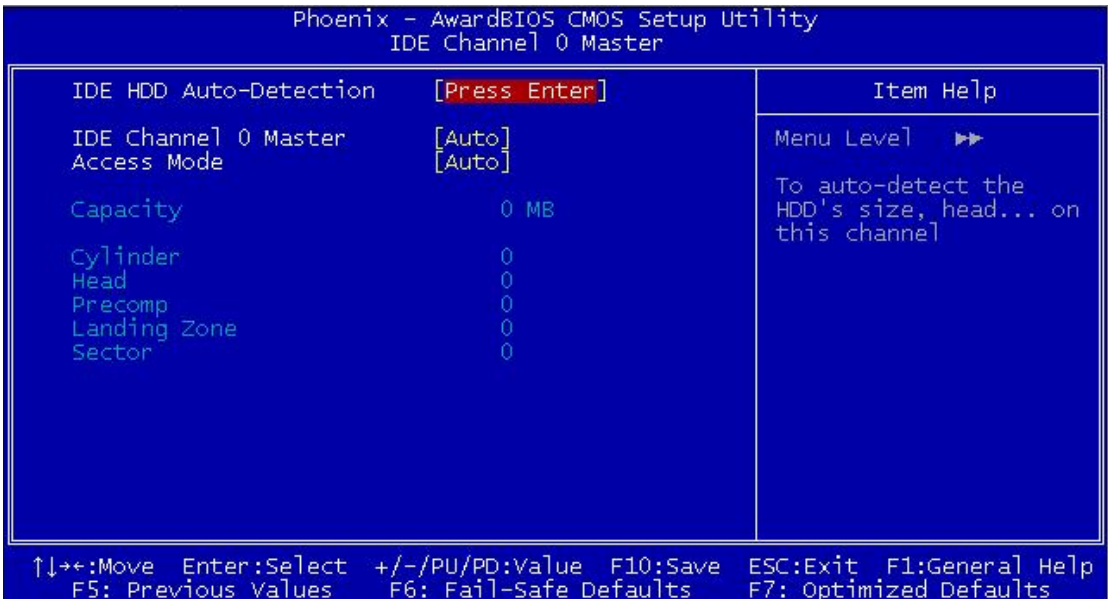
The **Extended Memory** is NOT user configurable. The BIOS determines how much extended memory is present during the POST. This is the amount of memory above 1MB located in the memory address map of the CPU.

➔ **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.



BIOS Menu 3: IDE Primary 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 **IDE Primary Master** 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**

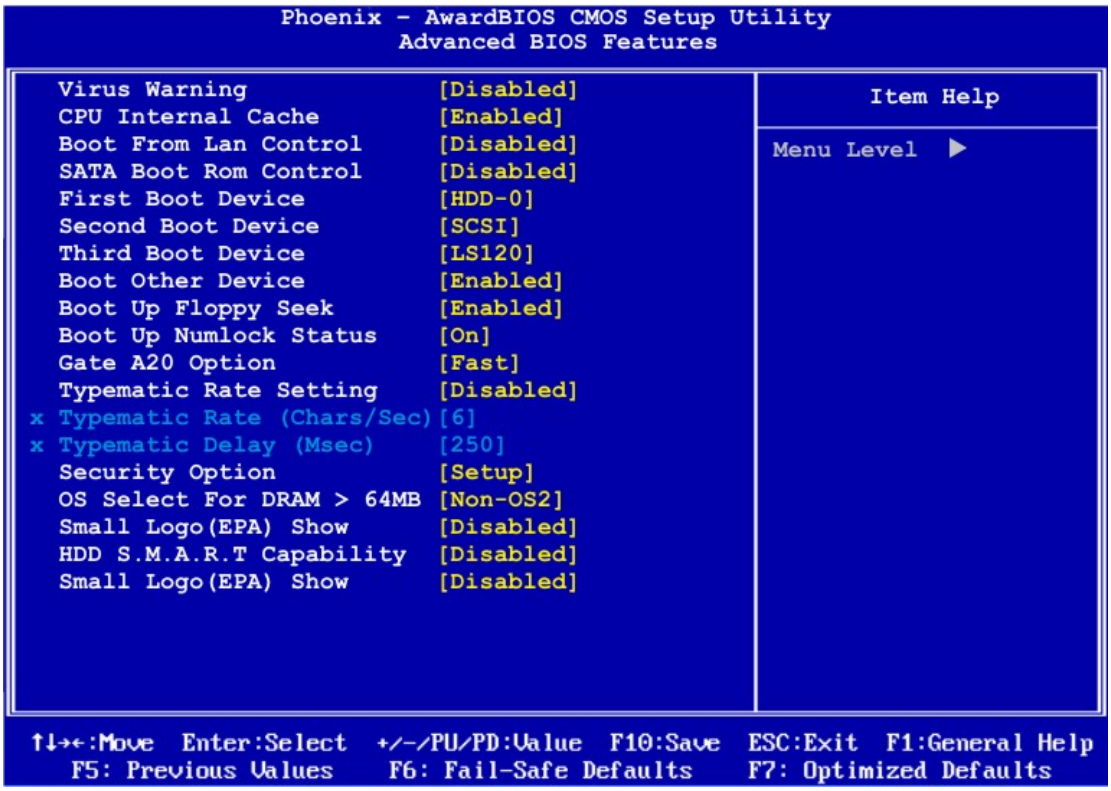
The **Landing Zone** specification indicates where the disk head will park itself after the system powers off.

➔ **Sector**

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

6.3 Advanced BIOS Features

CPU and peripheral device configuration options are accessed in the **Advanced BIOS Features** menu (**BIOS Menu 4**).



BIOS Menu 4: Advanced BIOS Features

➔ **Virus Warning [Disabled]**

NOTE:

Many disk diagnostic programs can cause the above warning message to appear when the program attempts to access the boot sector table. If you

are running such a program, it is recommended that the virus protection function be disabled beforehand.

Use the **Virus Warning** option to enable BIOS to monitor the boot sector and partition table of the HDD for any attempted modification. If a modification attempt is made, the BIOS halts the system and an error message appears. If necessary, an anti-virus program can then be run to locate and remove the virus before any damage is done.

- ➔ **Enabled** Activates automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector or HDD partition table.
- ➔ **Disabled** (Default) No warning message appears when there is an attempt to access the boot sector or HDD partition table.

➔ **CPU Internal Cache [Disabled]**

Use the **CPU Internal Cache** option to enable or disable the internal CPU cache.

- ➔ **Disabled** (Default) The internal CPU cache is disabled.
- ➔ **Enabled** The internal CPU cache is enabled.

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

Use the **BOOT From LAN Control** option to enable 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.

➔ **SATA Boot ROM Control [Disabled]**

Use the **SATA Boot ROM Control** option to configure SATA IDE use in DOS mode.

- ➔ **Disabled** (Default) Disables SATA IDE use in DOS mode.

➔ **Enabled** Enables SATA IDE use in DOS mode.

➔ **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: HDD-0]
- **Second Boot Device** [Default:SCSI]
- **Third Boot Device** [Default: LS120]

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

Boot Device configuration options are:

- Floppy
- 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 Floppy Seek [Enabled]**

Use the **Boot Up Floppy Seek** option to enable the BIOS to determine if the floppy disk drive installed has 40 or 80 tracks during the POST. 360K FDDs have 40 tracks while 760K, 1.2M and 1.44M FDDs all have 80 tracks.

➔ **Disabled** BIOS does not search for the type of FDD drive by track number. Note that there is no warning message if the drive installed is 360K.

➔ **Enabled** (Default) BIOS searches for a FDD to determine if it has 40 or 80 tracks. Note that BIOS cannot tell the difference between 720K, 1.2M or 1.44M drives as they all have 80 tracks.

➔ **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.

➔ **Gate A20 Option [Fast]**

Use the **Gate A20 Option** to set if the keyboard controller or the chipset controls the Gate A20 switching.

➔ **Normal** The keyboard controller does the switching.

➔ **Fast** (Default) The chipset does the switching.

➔ **Typematic Rate Setting [Disabled]**

Use the **Typematic Rate Setting** configuration option to specify if only one character is allowed to appear on the screen if a key is continuously held down. When this option is enabled, the BIOS reports as before, but it then waits a moment, and, if the key is still held

down, it begins to report that the key has been pressed repeatedly. This feature accelerates cursor movement with the arrow keys.

- ➔ **Disabled** (Default) Disables the typematic rate.
- ➔ **Enabled** Enables the typematic rate.

➔ **Typematic Rate (Chars/sec) [6]**

The **Typematic Rate** option can only be configured if the **Typematic Rate Setting** is enabled. Use the **Typematic Rate** option to specify the rate keys are accelerated.

- ➔ **6** (Default) 6 characters per second
- ➔ **8** 8 characters per second
- ➔ **10** 10 characters per second
- ➔ **12** 12 characters per second
- ➔ **15** 15 characters per second
- ➔ **20** 20 characters per second
- ➔ **24** 24 characters per second
- ➔ **30** 30 characters per second

➔ **Typematic Delay (Msec) [250]**

The **Typematic Rate** option can only be configured if the **Typematic Rate Setting** is enabled. Use the **Typematic Delay** option to specify the delay time between when a key is first pressed and when the acceleration begins.

- ➔ **250** (Default) 250 milliseconds
- ➔ **500** 500 milliseconds
- ➔ **750** 750 milliseconds
- ➔ **1000** 1000 milliseconds

➔ **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, don't type anything, press **ENTER** and the security is disabled. Once the security is disabled, the system boots and **Setup** can be accessed.

➔ **OS Select For DRAM > 64MB [Non-OS2]**

Use the **OS Select For DRAM > 64MB** option to specify the operating system.

- **Non-OS2** (Default) Select this option when not using the OS/2 operating system.
- **OS2** Specifies the operating system used as OS/2.

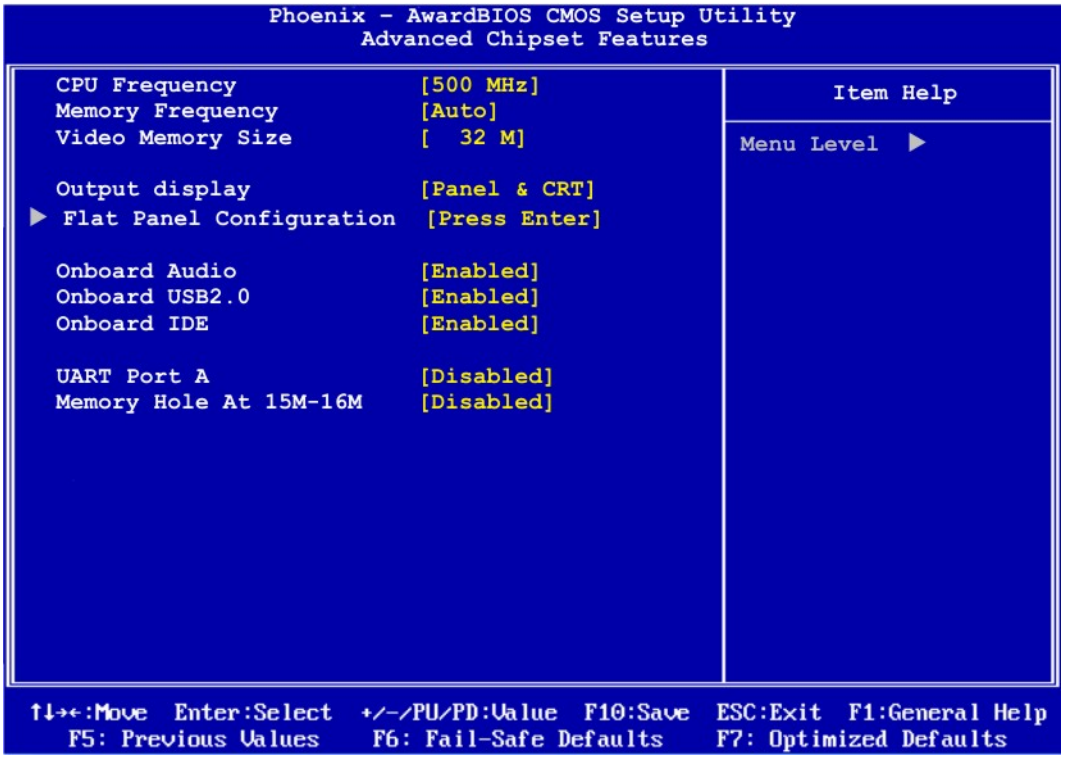
➔ **Small Logo (EPA) Show [Disabled]**

Use the **Small Logo (EPA) Show** option to specify if the Environmental Protection Agency (EPA) logo appears during the system boot-up process. If enabled, the boot up process may be delayed.

- **Disabled** (Default) EPA logo does not appear during boot up.
- **Enabled** EPA logo appears during boot up.

6.4 Advanced Chipset Features

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



BIOS Menu 5: Advanced Chipset Features

➔ **CPU Frequency [500MHz]**

Use the **CPU Frequency** option to set the CPU frequency.

- 500MHz (Default)

➔ **Memory Frequency [Auto]**

Use the **Memory Frequency** option to set the frequency of the installed DRAM modules. The **Memory Frequency** options are:

- Auto (Default)
- 200MHz
- 266MHz
- 333MHz

➔ **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:

- Disabled
- 8M (Default)
- 16M
- 32M
- 64M
- 128M
- 254M

➔ **Output Display [Panel & CRT]**

Use the **Output Display** configuration to specify the display devices the system is connected to. The **Output Display** options are:

- Flat Panel
- CRT
- Panel & CRT (Default)

➔ **Flat Panel Configuration [Press Enter]**

Use the Flat Panel Configuration option to open the Flat Panel Configuration menu. The Flat Panel Configuration options are shown in **Section** .

➔ **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 USB2.0 [Enabled]**

Use the **OnBoard USB2.0** option to enable or disable the onboard USB controller.

➔ **Disabled** The onboard USB controller is disabled.

➔ **Enabled** (Default) The onboard USB controller is detected and enabled.

➔ **OnBoard IDE [Enabled]**

Use the **OnBoard IDE** option to enable or disable the onboard IDE.

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

➔ **Enabled** (Default) The onboard IDE is detected and enabled.

➔ **UART Port A [Disabled]**

Use the **UART Port A** option to select the I/O address and IRQ for the UART port A. The **UART Port A** options are:

- Disabled (Default)
- 3F8/IRQ7
- 2F8/IRQ5
- 3E8/IRQ7
- 2E8/IRQ5

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

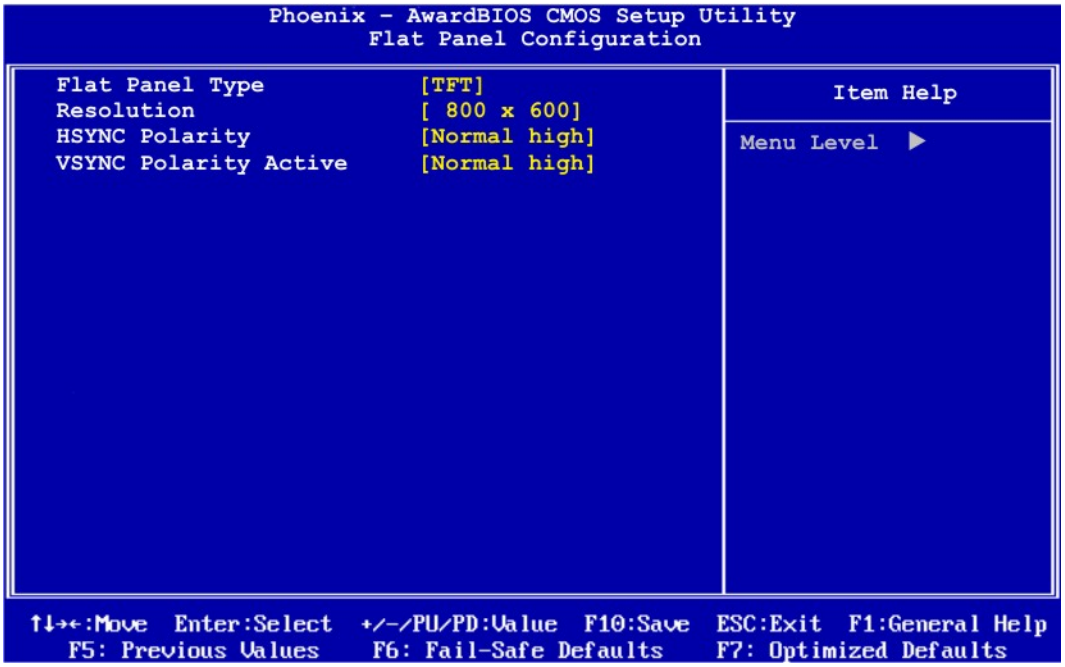
Use the **Memory Hole At 15M – 16M** option to reserve memory space between 15MB and 16MB for ISA expansion cards that require a specified area of memory to work properly. If an older ISA expansion card is used, please refer to the documentation that came with the card to see if it is necessary to reserve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

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

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

6.4.1 Flat Panel Configuration

Use the **Flat Panel Configuration** menu (**BIOS Menu 6**) to set the configuration settings for the flat panel screen connected to the system.



BIOS Menu 6: Flat Panel Configuration

➔ **Flat Panel Type [TFT]**

Use the **Flat Panel Type** option to specify the type of flat panel screen connected to the system.

➔ **TFT**	(Default)	Specifies the system is connected to a TFT display.
➔ **LVDS**		Specifies the system is connected to an LVDS display.
➔ **Auto**		The system detects the display type and the display settings.

➔ **Resolution [800 x 600]**

The **Resolution** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **Resolution** option to set the resolution of the flat panel screen connected to the system. The **Resolution** options are:

- 320 x 240
- 640 x 480
- 800 x 600 (Default)
- 1024 x 768
- 1152 x 864
- 1280 x 1024
- 1600 x 1200
- 320 x 234
- 640 x 240
- 800 x 480
- 1280 x 800

➔ **HSYNC Polarity [Normal high]**

The **HSYNC Polarity** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **HSYNC Polarity** option to set the polarity of the HSYNC signal to the panel. The **HSYNC Polarity** options are:

- Normal High (Default)
- Normal Low

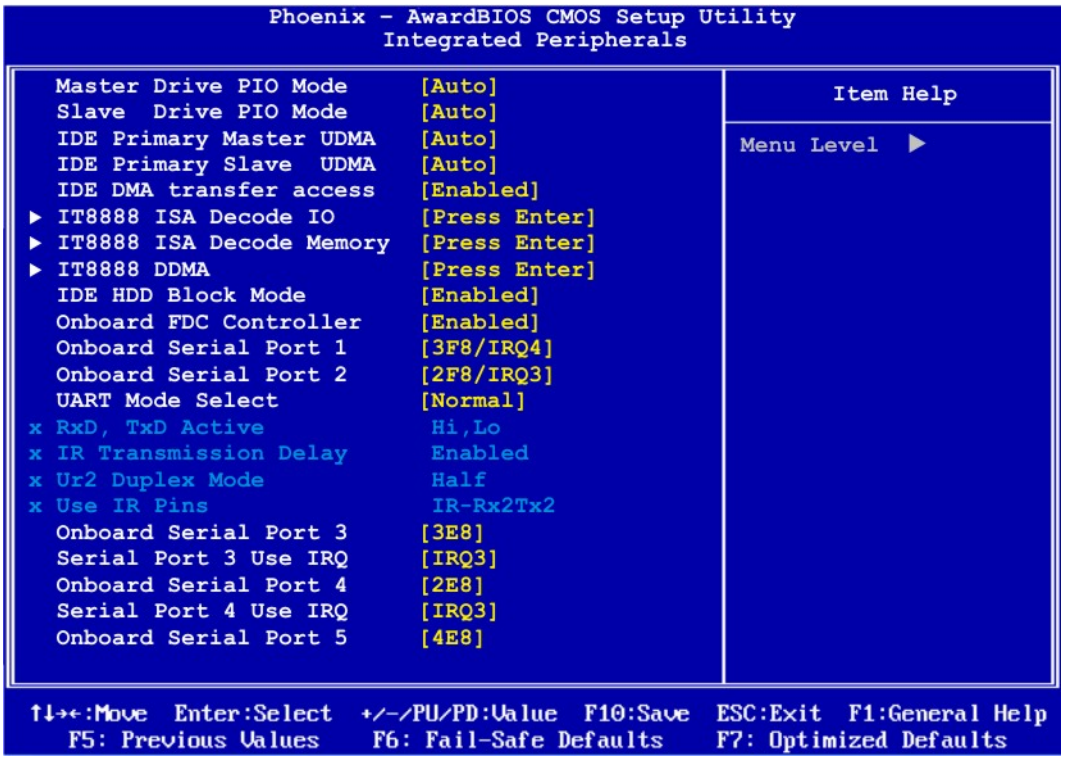
➔ **VSYNC Polarity Active [Normal high]**

The **VGSYNC Polarity Active** option can only be configured if the **Flat Panel Type** option is not set to **Auto**. Use the **VGSYNC Polarity Active** option to set the polarity of the VSYNC signal to the panel. The **VGSYNC Polarity Active** options are:

- Normal High (Default)
- Normal Low

6.5 Integrated Peripherals

Use the Integrated Peripherals menu (**BIOS Menu 7**) to change the configuration options for the attached peripheral devices..



BIOS Menu 7: Integrated Peripherals

➔ **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 FDC Controller [Enabled]**

Use the **Onboard FDC Controller** option to enable or disable the onboard floppy controller. If the system is not connected to a floppy disk or uses an adapter for the FDD, this option can be disabled.

➔ **Disabled**		The FDD controller is disabled.
➔ **Enabled**	(Default)	The FDD controller is enabled.

➔ **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

➔ **UART Mode Select [Normal]**

Use the **UART Mode Select** to select the UART mode for the system.

➔ **IrDA**		IrDA is set as the IR serial mode. If this option is selected, COM2 will be disabled.
➔ **ASKIR**		ASKIR is set as the IR serial mode. If this option is selected, COM2 will be disabled.
➔ **Normal**	(Default)	COM2 is enabled and the IR device disabled.

➔ **x 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

➔ **x IR Transmission Delay [Enabled]**

Use the **IR Transmission Delay** option to enable or disable IR transmission delays.

➔ **Disabled**		IR transmission are not delayed.
➔ **Enabled**	(Default)	IR transmission are delayed.

➔ **x 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.

➔ **x 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)

➔ **Onboard Serial Port # [XXX]**

Use the **Onboard Serial Port #** option to select the I/O address and IRQ for any additional onboard serial ports. The **Onboard Serial Port #** address options are:

- Disabled
- 3F8
- 2F8
- 3E8
- 2E8

➔ **Serial Port # Use IRQ [XXX]**

Use the **Serial Port # Use IRQ** option to select the IRQ for the additional onboard serial ports listed above. The **Serial Port # Use IRQ** IRQ options are:

- IRQ3
- IRQ4
- IRQ5

➔ **Onboard Parallel Port [378/IRQ7]**

Use the **Onboard Parallel Port** option to specify a logical LPT port address and corresponding interrupt for the physical parallel port. The **Onboard Parallel Port** options are:

- Disabled
- 378/IRQ7 (Default)
- 278/IRQ5
- 3BC/IRQ7

➔ **Parallel Port Mode [SPP]**

Use the **Parallel Port Mode** option to select parallel port operation mode.

➔ **SPP** (Default) The parallel port operates in the standard parallel port (SPP) mode. This parallel port mode works with most

parallel port devices but is slow.

- ➔ **EPP** — The parallel port operates in the enhanced parallel port mode (EPP). The EPP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the SPP mode.
- ➔ **ECP** — The parallel port operates in the extended capabilities port (ECP) mode. The ECP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the SPP mode.
- ➔ **ECP+EPP** — The parallel port is compatible with both ECP and EPP devices.
- ➔ **Normal**

➔ **x EPP Mode Select [EPP1.7]**

The **EPP Mode Select** option is only available if the **Parallel Port Mode** option is set to EPP mode. Use the **EPP Mode Select** option to select the parallel port mode standard for the parallel port.

- ➔ **EPP1.9** — EPP 1.9 is selected as the EPP standard.
- ➔ **EPP1.7** (Default) — EPP 1.7 is selected as the EPP standard.

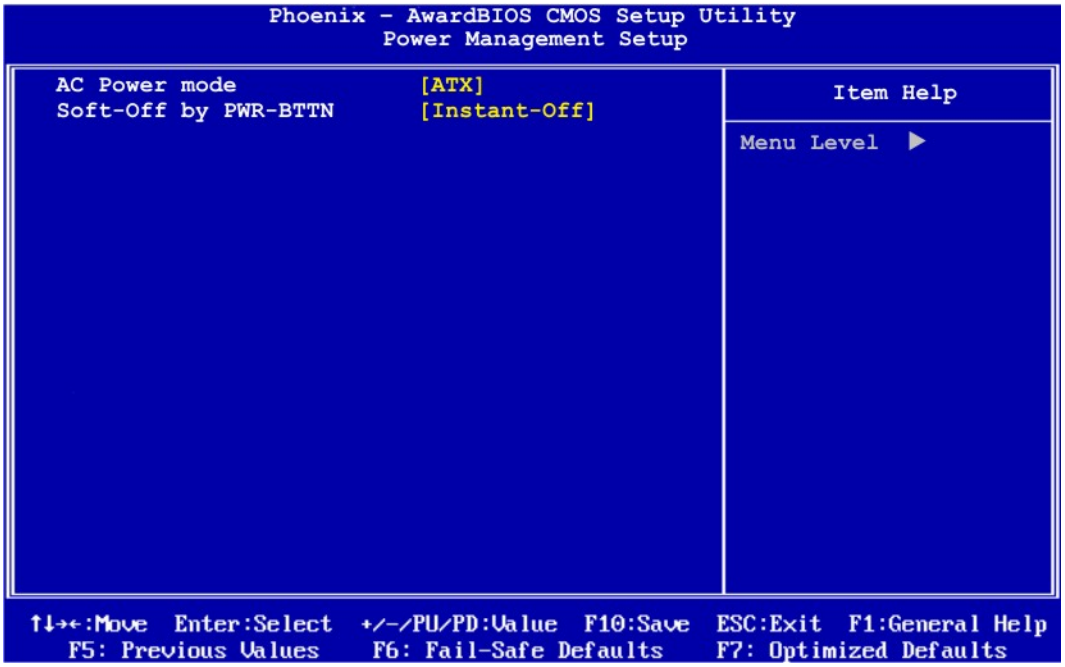
➔ **x ECP Mode Use DMA [3]**

The **ECP Mode Use DMA** option is only available if the **Parallel Port Mode** option is set to ECP mode. Use the **ECP Mode Use DMA** option to specify the DMA channel the parallel port must use in the ECP mode.

- ➔ **1** — The parallel port uses DMA Channel 1 in ECP mode.
- ➔ **3** (Default) — The parallel port uses DMA Channel 3 in ECP mode.

6.6 Power Management Setup

Use the Power Management Setup menu (BIOS Menu 8) to set the BIOS power management and saving features.



BIOS Menu 8: Power Management Setup

➔ **AC Power Mode [ATX]**

Use the **AC Power Mode** option to select the power mode.

➔ **ATX** (Default) The system is in ATX mode.

➔ **AT** The system is in AT power mode.

➔ **Soft-Off by PWR-BTTN [Instant-Off]**

Use the **Soft-Off by PWR-BTTN** option to enabled the system to enter a very low-power-usage state when the power button is pressed.

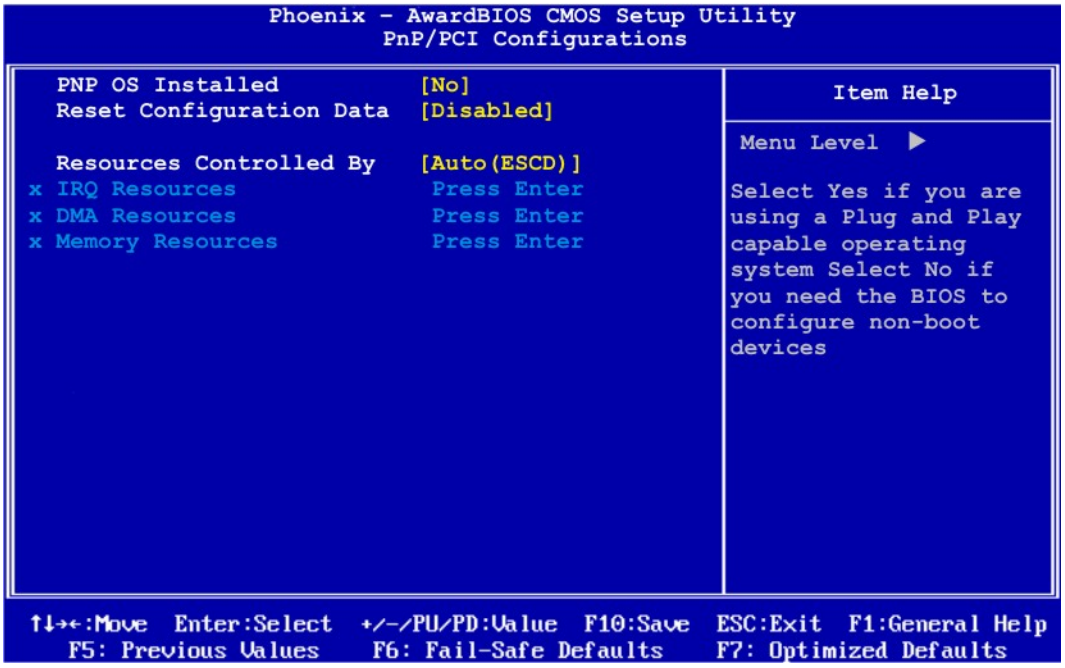
➔ **Instant-Off** (Default) When the power button is pressed, the system is immediately shutdown.

➔ **Delay 4-sec** To shutdown the system the power button must be held

down longer than four seconds otherwise the system enters a low power usage state.

6.7 PnP/PCI Configurations

Use the PnP/PCI Configurations menu (**BIOS Menu 9**) to set the plug and play, and PCI options.



BIOS Menu 9: PnP/PCI Configurations

➔ **PNP OS Installed [No]**

The **PNP OS Installed** option determines whether the Plug and Play devices connected to the system are configured by the operating system or the BIOS.

➔ No (Default) If the operating system does not meet the Plug and Play specifications, BIOS configures all the devices in the system.

➔ Yes Set this option if the system is running Plug and Play aware operating systems. The operating system changes the interrupt, I/O, and DMA settings.

➔ **Reset Configuration Data [Disabled]**

Use the **Reset Configuration Data** option to reset the Extended System Configuration Data (ESCD) when exiting setup if booting problems occur after a new add-on is installed.

➔ **Disabled**	(Default)	ESCD will not be reconfigured
➔ **Enabled**		ESCD will be reconfigured after you exit setup

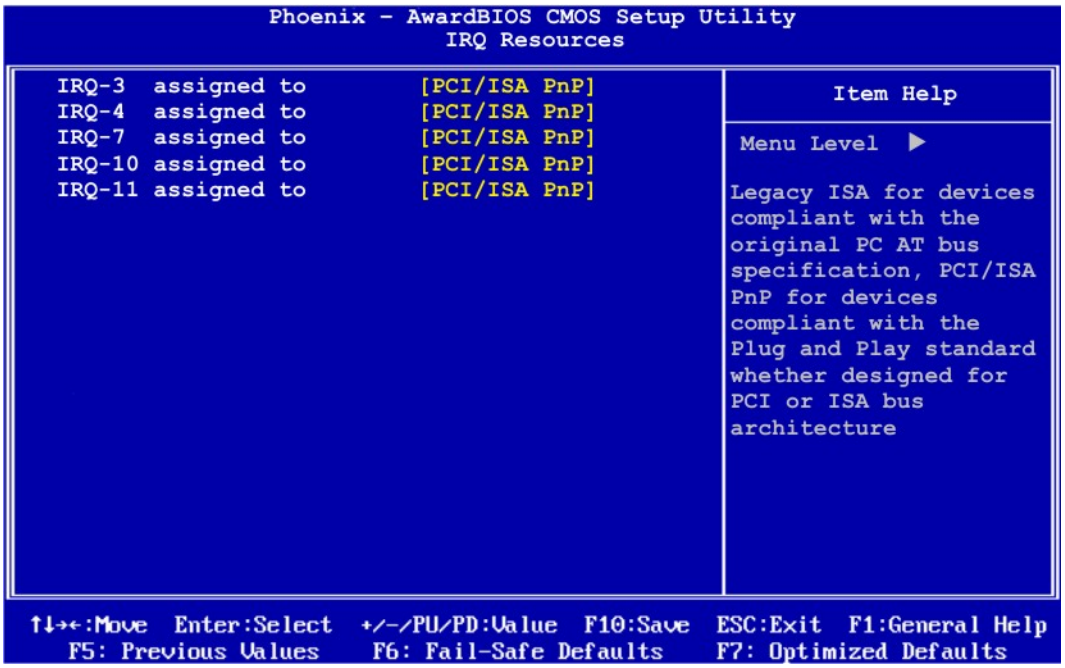
➔ **Resources Controlled By [Auto (ESCD)]**

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.

➔ **x IRQ Resources [Press Enter]**

The IRQ Resources option (**BIOS Menu 10**) can only be selected if the Resources Controlled By option is set to Manual.



BIOS Menu 10: IRQ Resources

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

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

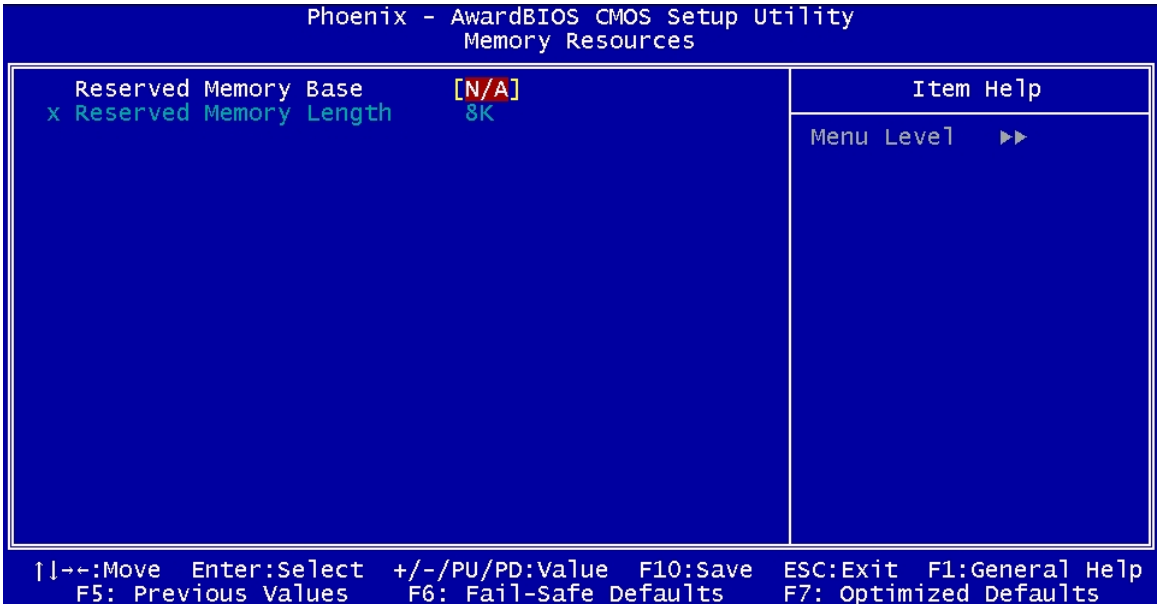
The above options all have the following default options.

➔ **PCI/ISA PnP** (Default) The IRQ is assigned to legacy ISA for devices 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.

➔ **Legacy ISA** The IRQ is assigned to legacy ISA

➔ **x Memory Resources [Press Enter]**

The Memory Resources menu (**BIOS Menu 11**) can only be accessed if the Resources Controlled By option is set to Manual. Use Memory Resources to select a base address and the length for the memory area used by a peripheral that requires high memory.



BIOS Menu 11: Memory Resources

The menu has two configurable options:

- Reserved Memory Base
- Reserved Memory Length

➔ **Reserved Memory Base [N/A]**

The **Reserved Memory Base** option specifies the base address for the peripheral device. The **Reserved Memory Base** options are:

- N/A (Default)
- C800
- CC00
- D000
- D400
- D800
- DC00

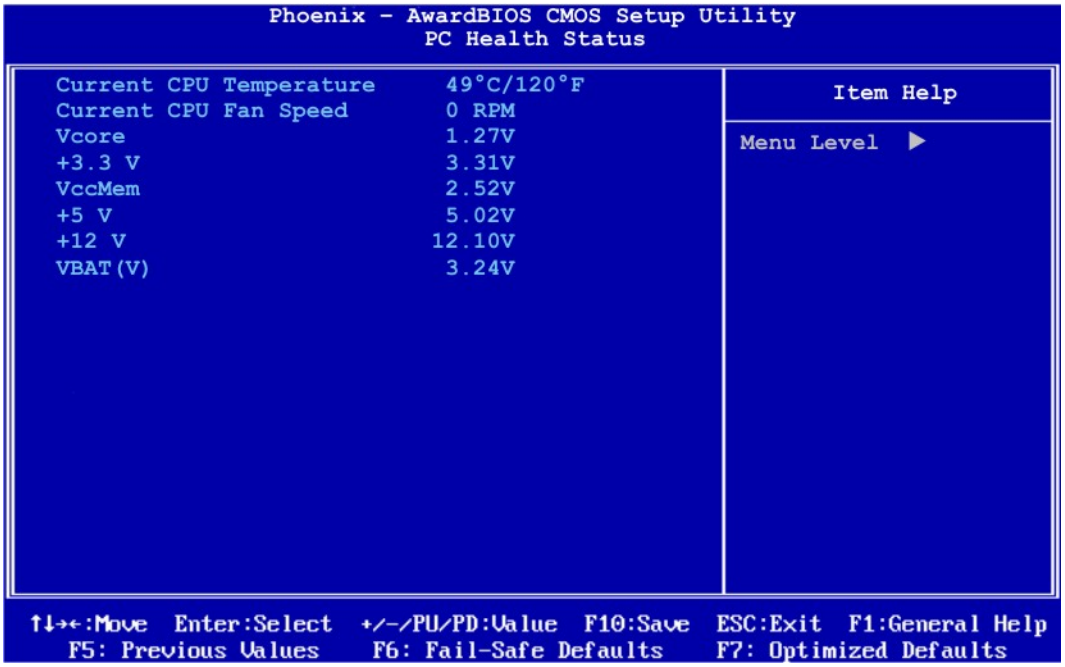
➔ **x Reserved Memory Length [8K]**

The **Reserved Memory Length** option can only be accessed if the **Reserved Memory Base** option is not set to **N/A**. The **Reserved Memory Length** specifies the amount of memory reserved for the peripheral device. The **Reserved Memory Length** options:

- 8K (Default)
- 16K
- 32K
- 64K

6.8 PC Health Status

The **PC Health Status** menu (**BIOS Menu 12**) has no user configurable options, but shows system operating parameters that are essential to the stable operation of the system.



BIOS Menu 12: PC Health Status

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

➔ **Fan Speeds**

The following fan speed is monitored:

- CPU Fan Speed

➔ **Voltages**

The following voltages are monitored:

- Vcore
- VccMem
- +3.3 V
- +5 V
- +12 V
- VBAT(V)

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 NANO-LX SBC has five software drivers:

- VGA Driver
- Audio Driver
- LAN Driver
- SATA/RAID Driver
- ISA Driver

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

Insert the CD into the system that contains the NANO-LX SBC.

NOTE:

If your system does not run the "autorun" program when the CD is inserted, click the **Start** button, select **Run**, then type **X:\autorun.exe** (replace **X** with the actual drive letter for your CD-ROM) to access the **IEI Driver CD** main menu.

Step 1: From the AMD® LX/GX Driver CD main menu (**Figure 7-1**), click **NANO-LX**.

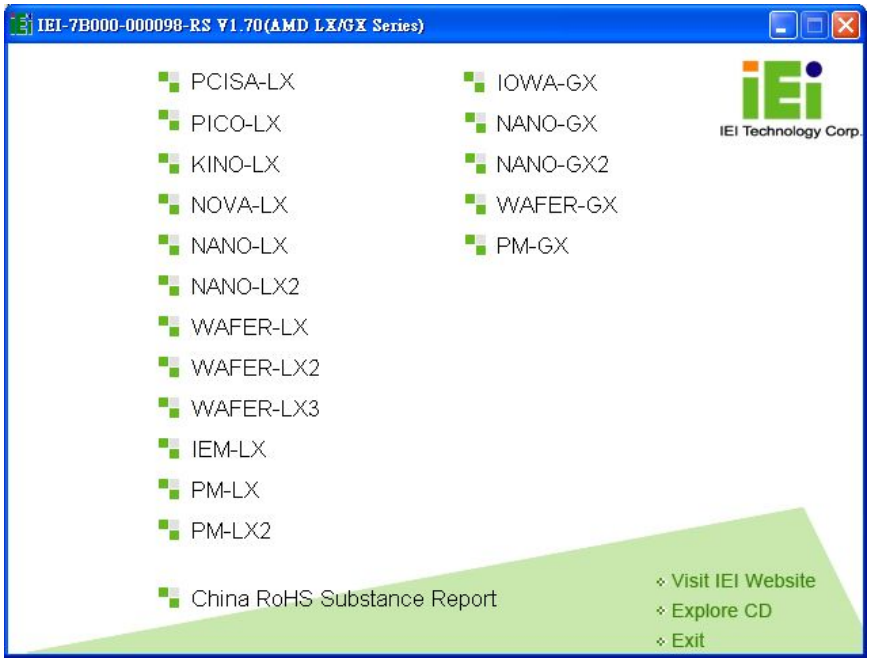


Figure 7-1: AMD® LX/GX CD Main Menu

Step 2: A window appears listing the drivers available for installation (**Figure 7-2**).

Figure 7-2: AMD® LX/GX CD Driver Menu

Step 3: Select any item from the list to view more information on the driver installation, or select Manual to navigate to the NANO-LX user manual.

The following sections fully describe the driver installation procedures for the NANO-LX SBC.

7.2 AMD® VGA Installation

NOTE:

This installation assumes the use of Windows XP as the operating system.

Follow the steps below to install the AMD® VGA display device controller.

Step 1: Open **Windows Control Panel** from the **Start** menu (Figure 7-3).

Figure 7-3: Access Windows Control Panel

Step 2: Double-click the **System** icon (Figure 7-4).

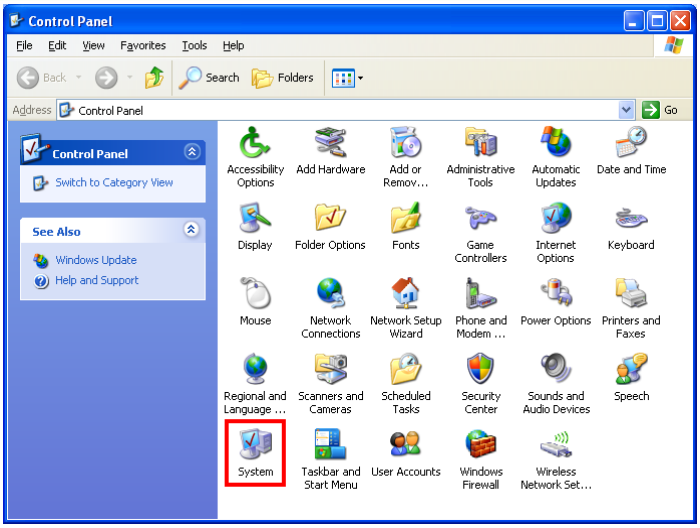


Figure 7-4: Double Click the System Icon

Step 3: Click the **Device Manager** tab (Figure 7-5).

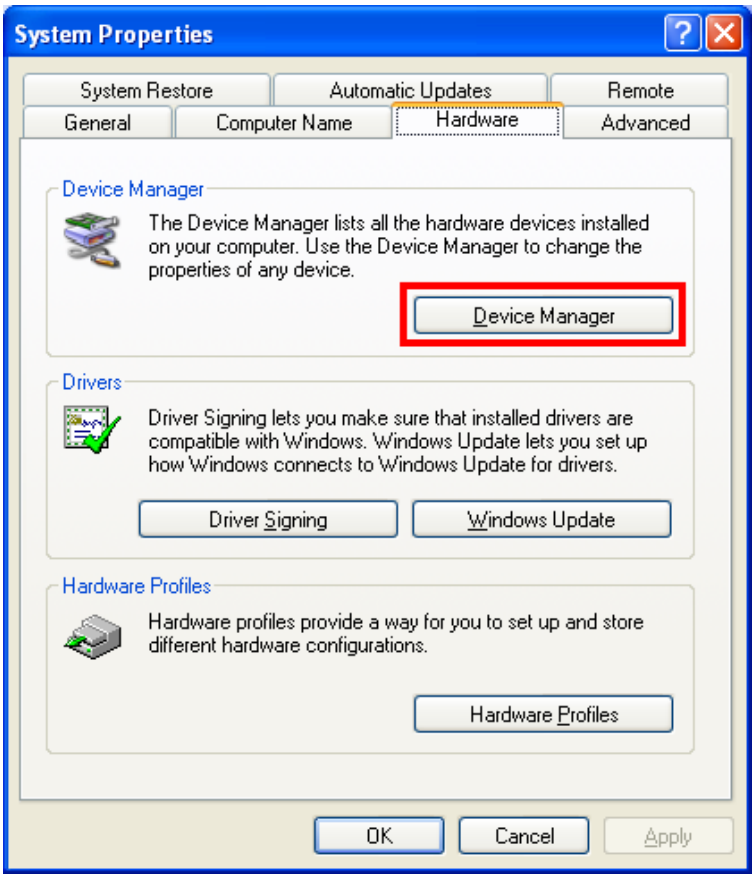


Figure 7-5: Click the Device Manager Tab

Step 4: A list of system hardware devices appears (Figure 7-6).

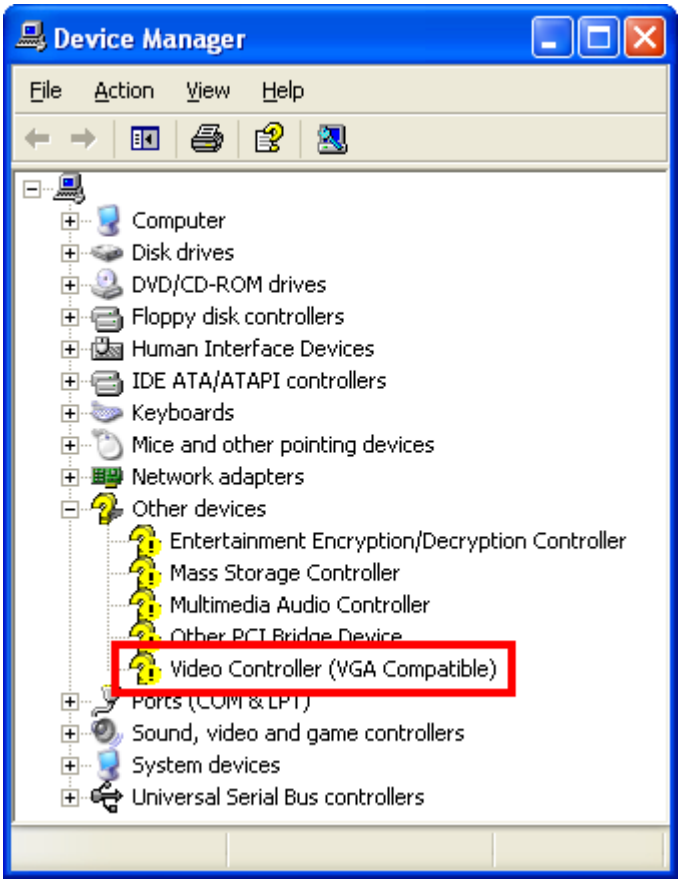


Figure 7-6: Device Manager List

Step 5: Double-click the **Video Controller** device.

Step 6: The **Video Controller Properties** window appears (Figure 7-7).

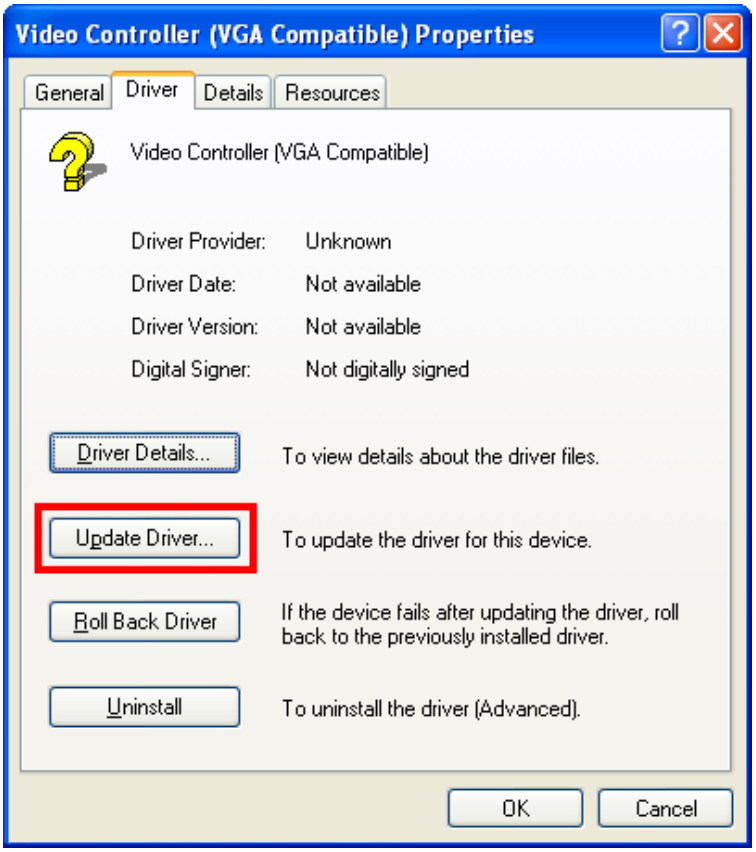


Figure 7-7: Video Controller Properties Window

Step 7: Click the **Update Driver** button in the **Driver** tab.

Step 8: The **Hardware Update Wizard** appears (Figure 7-8).

Figure 7-8: Hardware Update Wizard

Step 9: Select "**No, not this time**," and click **NEXT** to continue.

Step 10: The following window (Figure 7-9) appears.

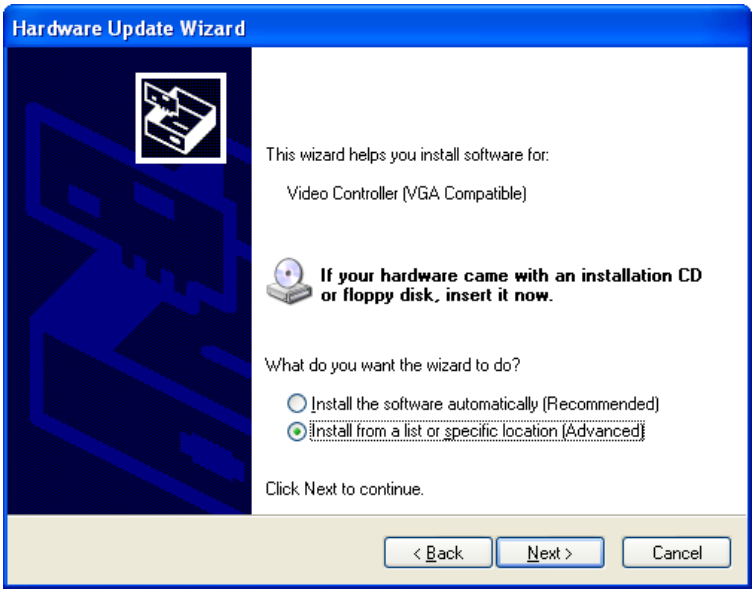


Figure 7-9: Install Options Window

Step 11: Select "**Install from a list or specific location**…" and click **NEXT** to continue.

Step 12: The following window (Figure 7-10) appears.

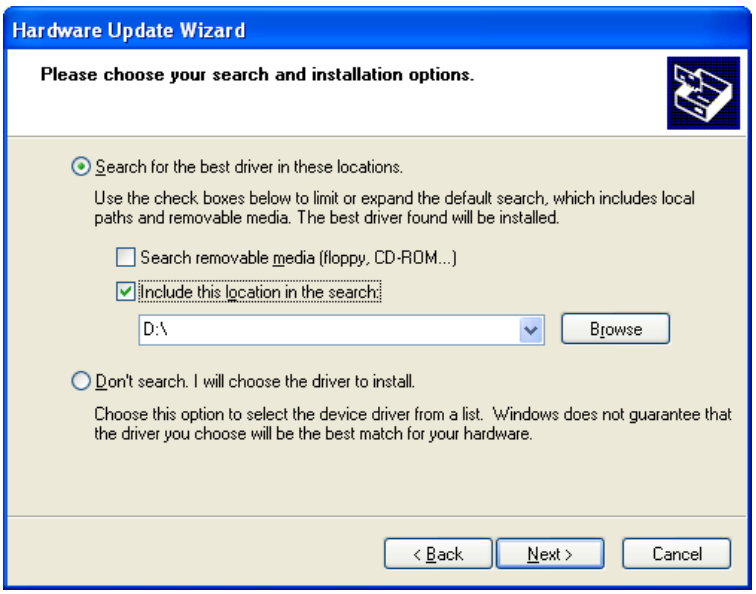


Figure 7-10: Search Options Window

Step 13: Select "**Search for the best driver in these locations**," "**Include this location in the search**," and click **BROWSE** to continue.

Step 14: The following window (Figure 7-11) appears.

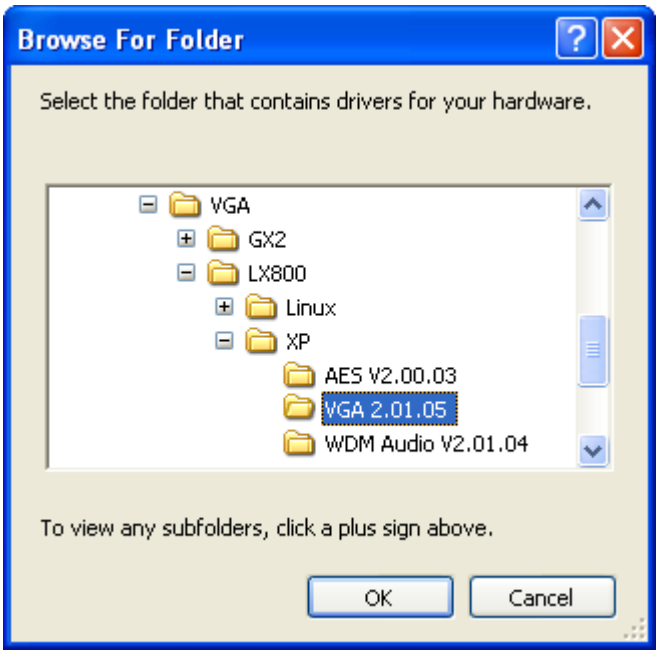


Figure 7-11: Folder Selection Window

Step 15: Select the proper driver folder under the "**X:\VGA\LX 800\XP**" directory in the location browsing window, where "**X:\"** is the system CD drive, and click **OK** to continue.

Step 16: The following window (Figure 7-12) appears.

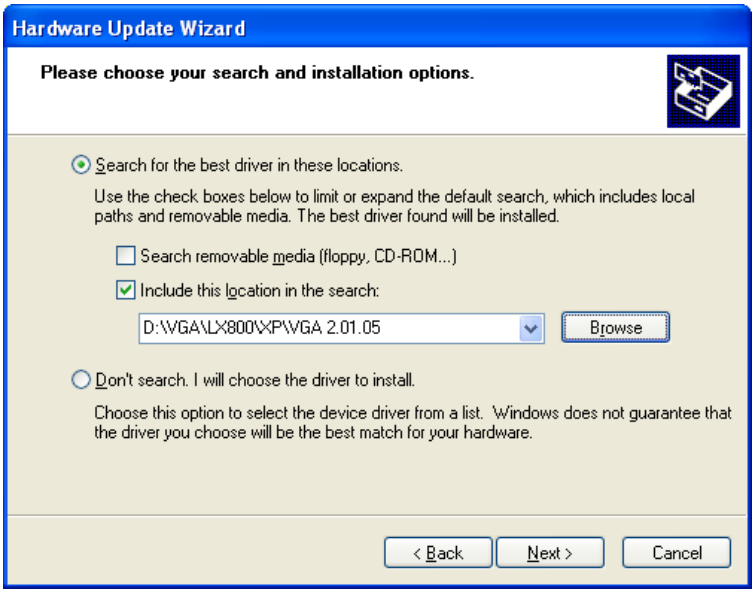


Figure 7-12: Search Options Window

Step 17: Click **NEXT** to continue.

Step 18: The following window (Figure 7-13) appears as the OS searches for the driver.

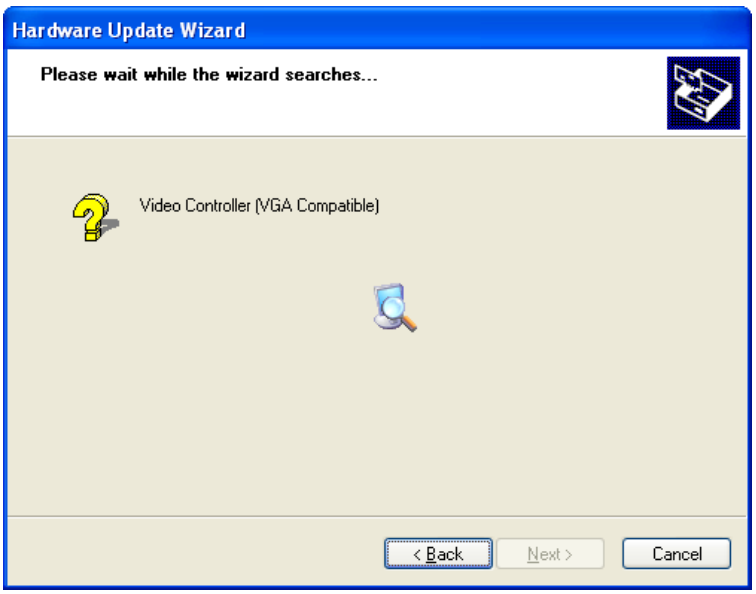


Figure 7-13: Hardware Update Wizard Search Window

Step 19: The following window (Figure 7-14) appears.

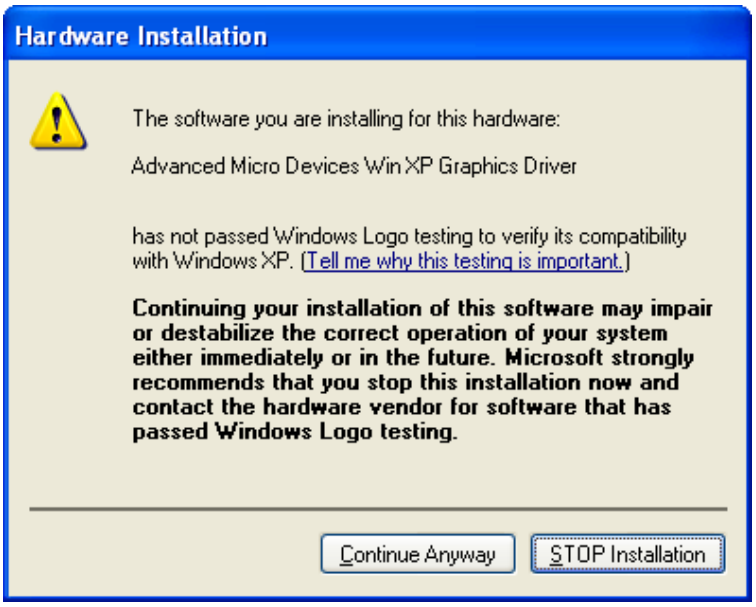


Figure 7-14: Windows Logo Testing Window

Step 20: Click **CONTINUE ANYWAY** to continue.

Step 21: The following window (Figure 7-15) appears as the driver is installed.

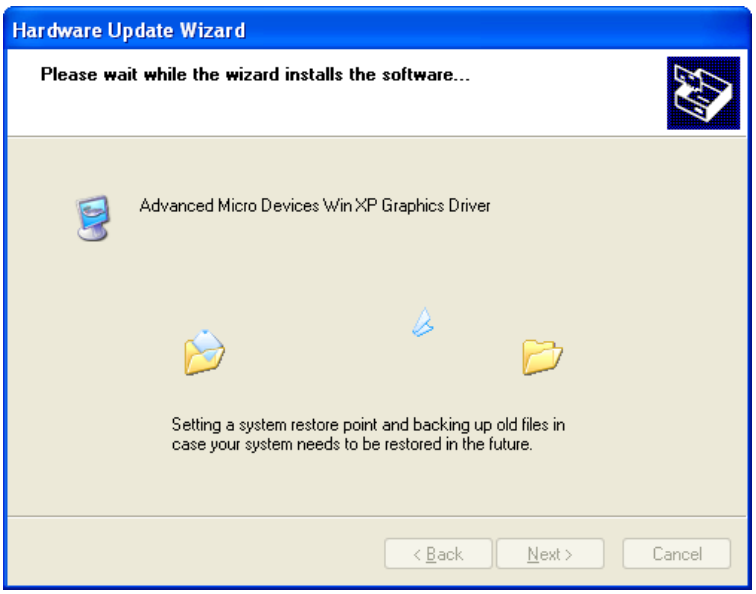


Figure 7-15: Driver Installation Window

Step 22: After the driver installation process is complete, a confirmation screen appears (Figure 7-16).

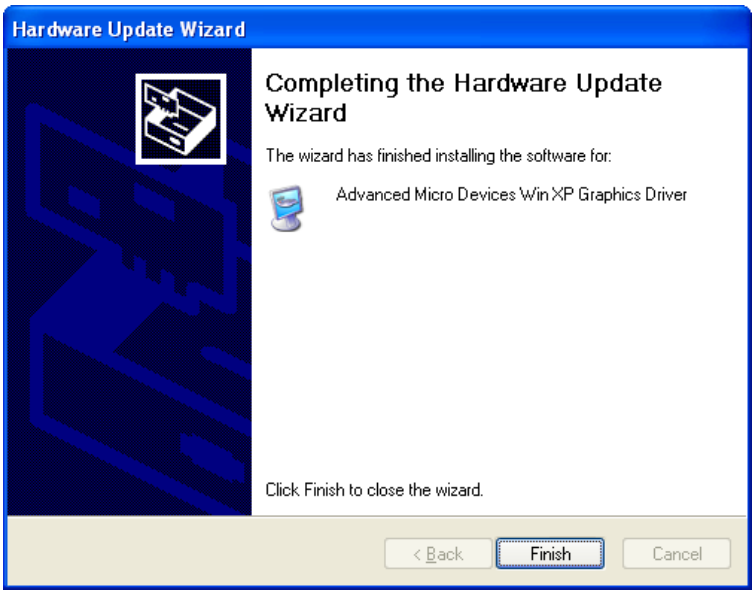


Figure 7-16: Driver Installation Complete Window

Step 23: Click **FINISH** to exit the program.

Step 24: The **Device Manager Window** now shows the installed AMD graphics driver (Figure 7-17).

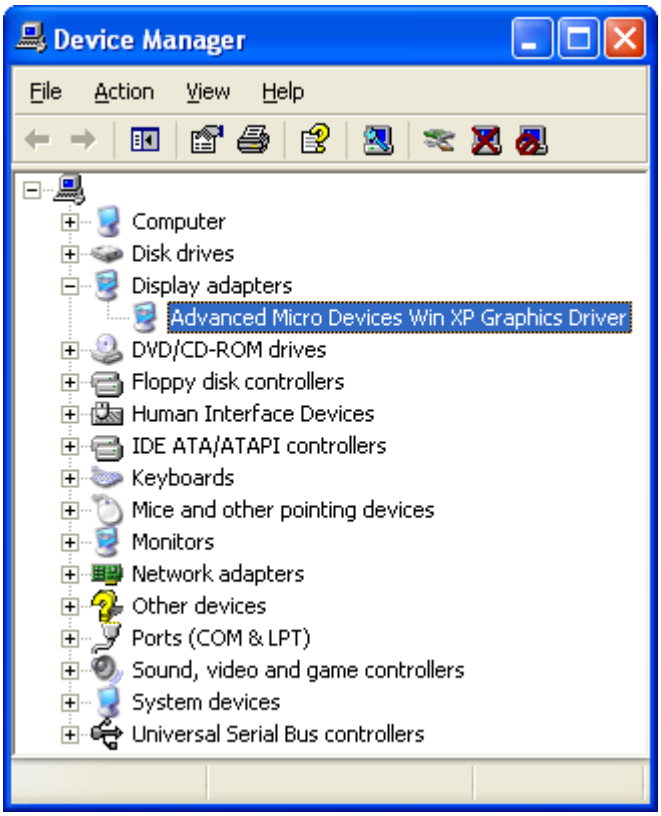


Figure 7-17: Device Manager Window

7.3 Audio Driver Installation

To install the audio driver please follow the steps below.

Step 1: Open **Windows Control Panel (Figure 7-18**).

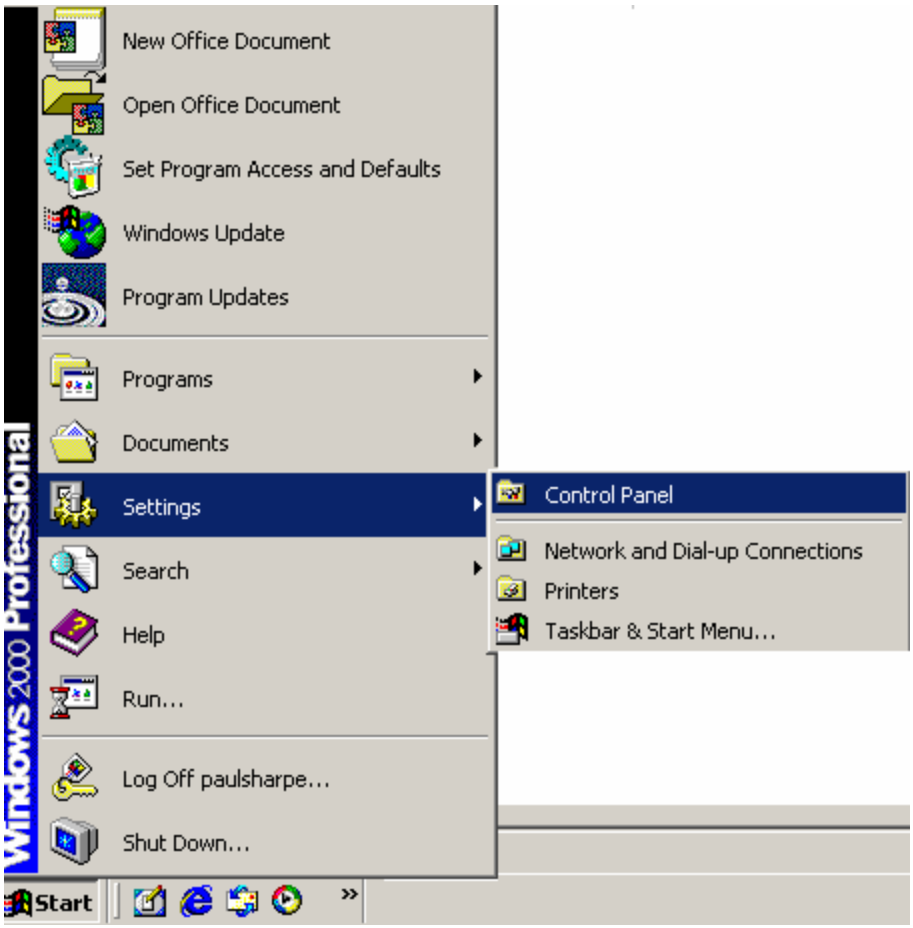


Figure 7-18: Access Windows Control Panel

Step 2: Double click the **System** icon (**Figure 7-19**).

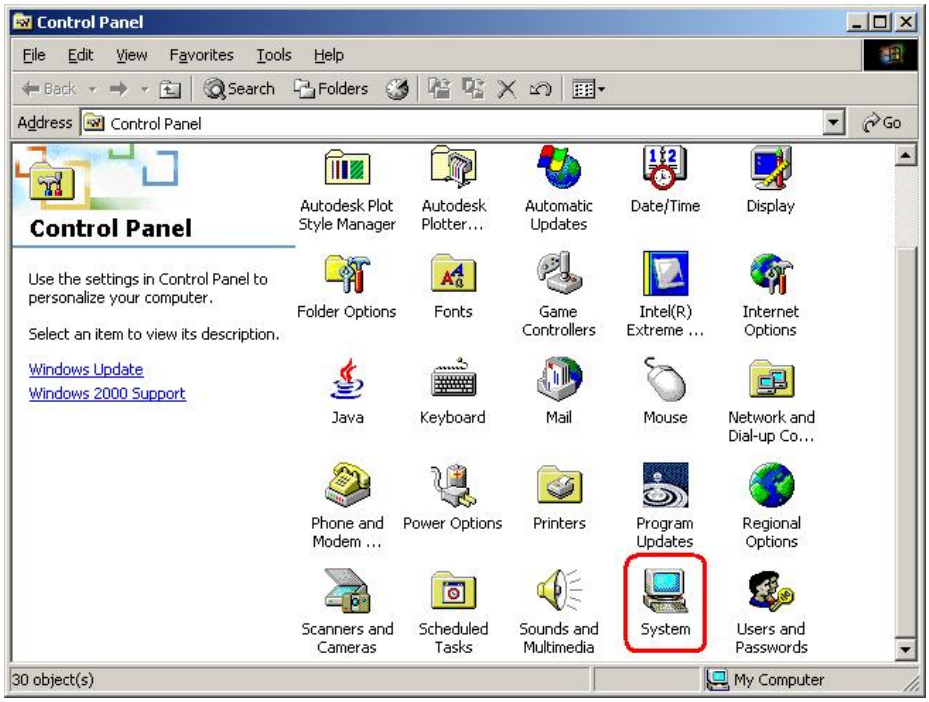


Figure 7-19: Double Click the System Icon

Step 3: Double click the **Device Manager** tab (**Figure 7-20**).

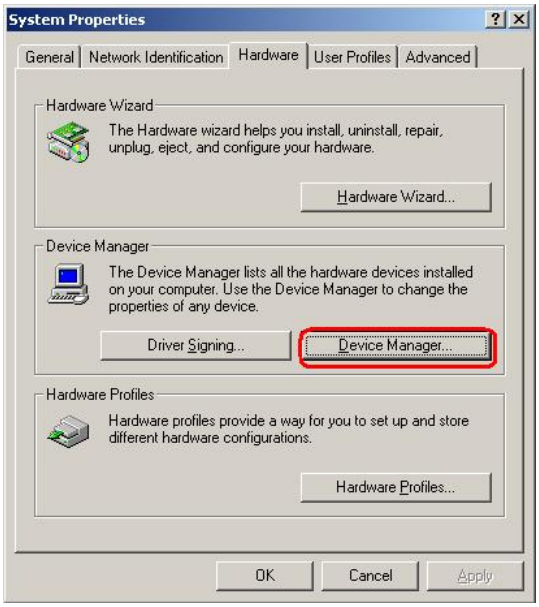


Figure 7-20: Double Click the Device Manager Tab

Step 4: A list of system hardware devices appears (**Figure 7-21**).

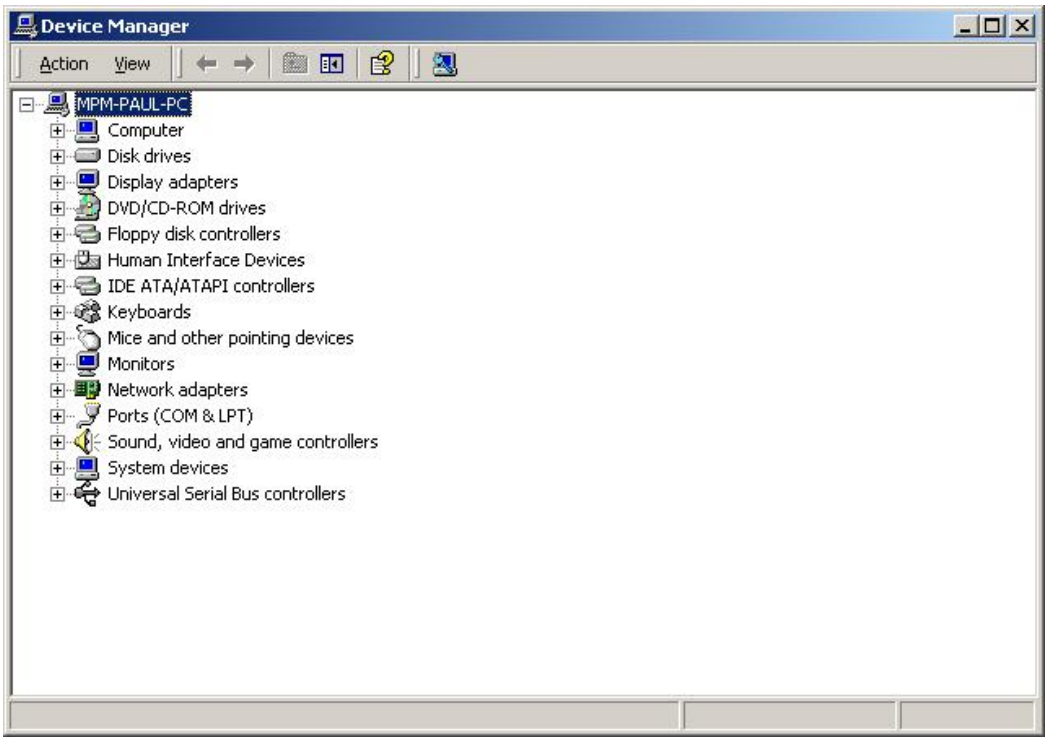


Figure 7-21: Device Manager List

Step 5: Double click the listed device that has question marks next to it. (This means Windows does not recognize the device).

Step 6: The **Device Driver Wizard** appears (**Figure 7-22**). Click **NEXT** to continue.

Figure 7-22: Search for Suitable Driver

Step 7: Select "**Specify a Location**" in the **Locate Driver Files** window (**Figure 7-23**).

Click **NEXT** to continue.

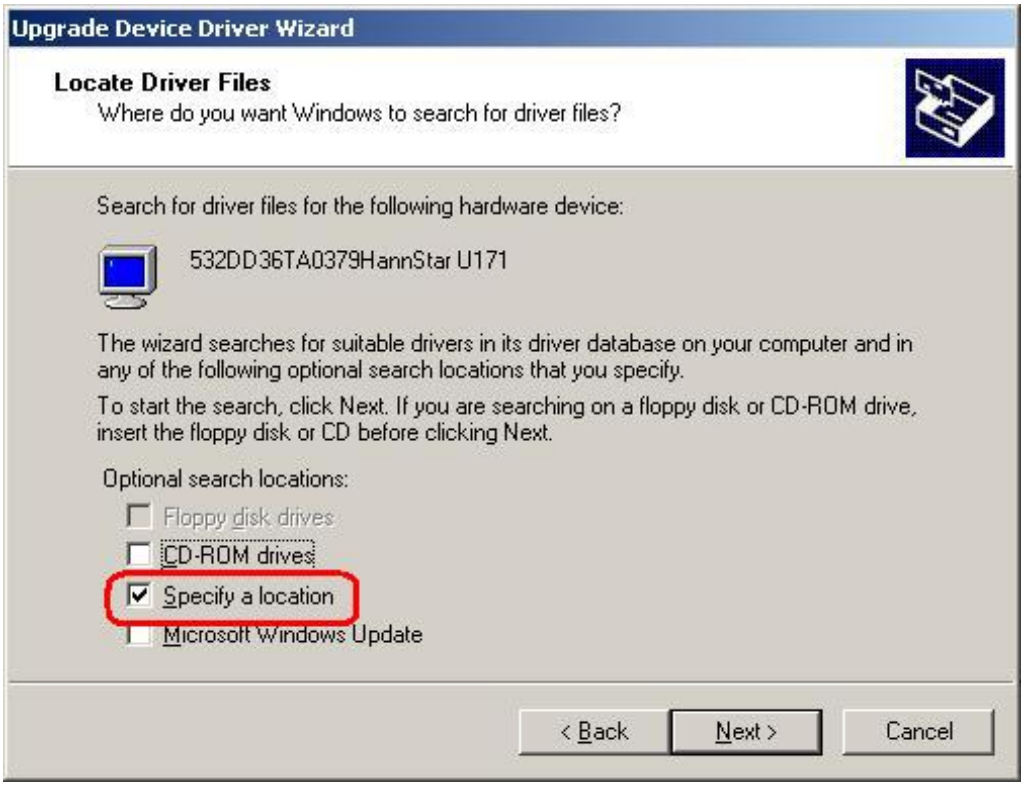


Figure 7-23: Locate Driver Files

Step 8: Select "**X:\ Audio\WDM_Audio_v2.03.00**" directory in the location browsing window, where "**X:\"** is the system CD drive (**Figure 7-24**).

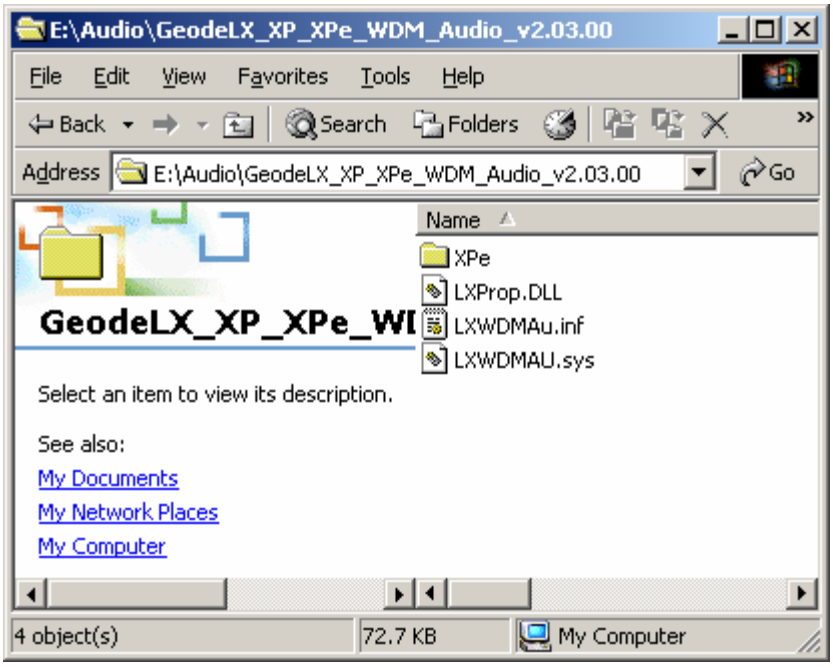


Figure 7-24: Location Browsing Window

Step 9: Click **OK** to continue. A driver files location menu window appears. Select the **LXWDMAu.inf** file and click **OPEN** to continue. The driver is installed.

7.4 LAN Driver

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

Step 1: Click **LAN** from the **AMD LX/GX CD Driver Menu** to open a window to the **X:\LAN\Realtek** (where **X:** is the system CD drive) folder on the driver CD.

Step 2: Open the **RTL8100C** folder.

Step 3: Locate the **Setup** program icon (**Figure 7-25**).

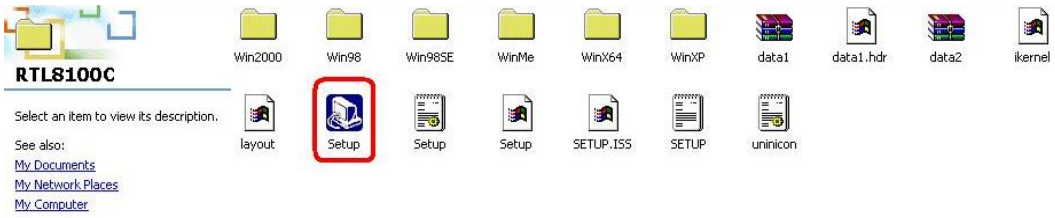


Figure 7-25: Locate the Setup Program Icon

Step 4: Double click the **Setup** program icon in **Figure 7-25**.

Step 5: The **Install Shield Wizard** is prepared to guide the user through the rest of the process (**Figure 7-26**).

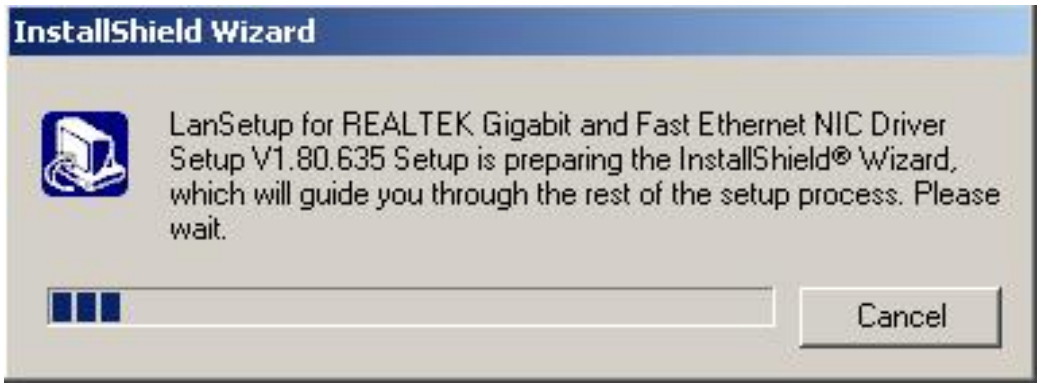


Figure 7-26: Preparing Setup Screen

Step 6: Once initialized, the **Install Wizard** welcome screen appears (**Figure 7-27**).

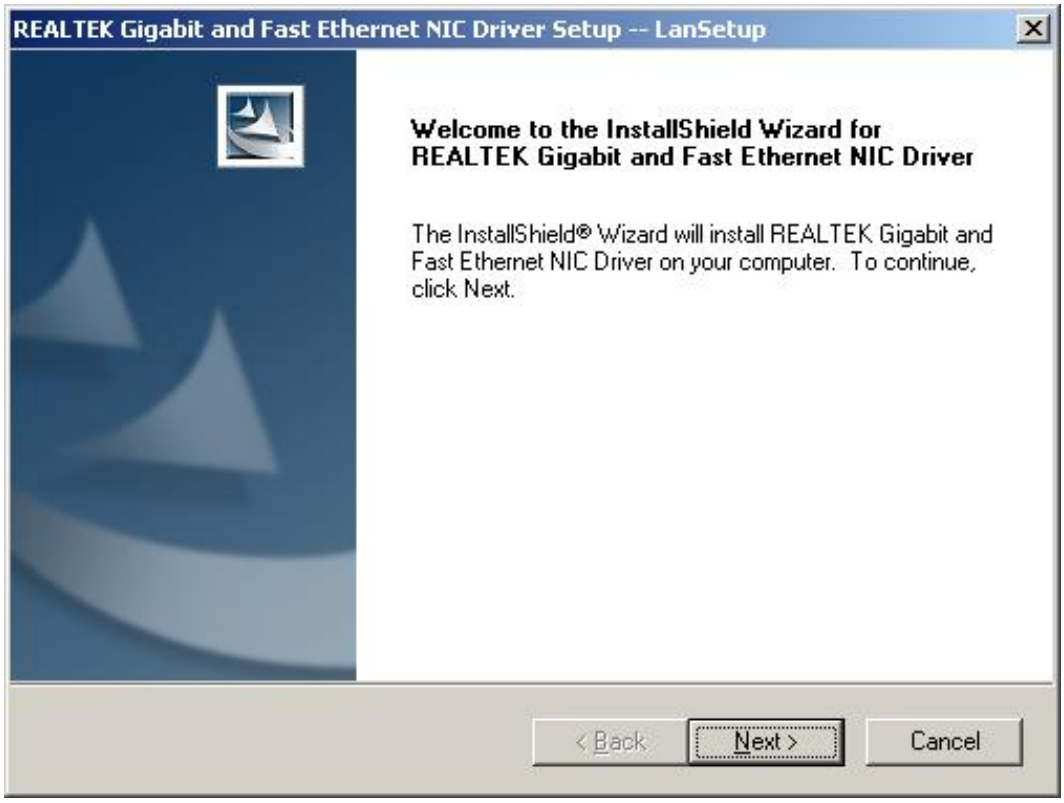


Figure 7-27: Install Wizard Welcome Screen

Step 7: Click **NEXT** to continue the installation or **CANCEL** to stop the installation.

Step 8: The **Install Wizard** starts to install the LAN driver.

Step 9: Once the installation is complete, the **InstallShield Wizard Complete** screen appears (**Figure 7-28**).

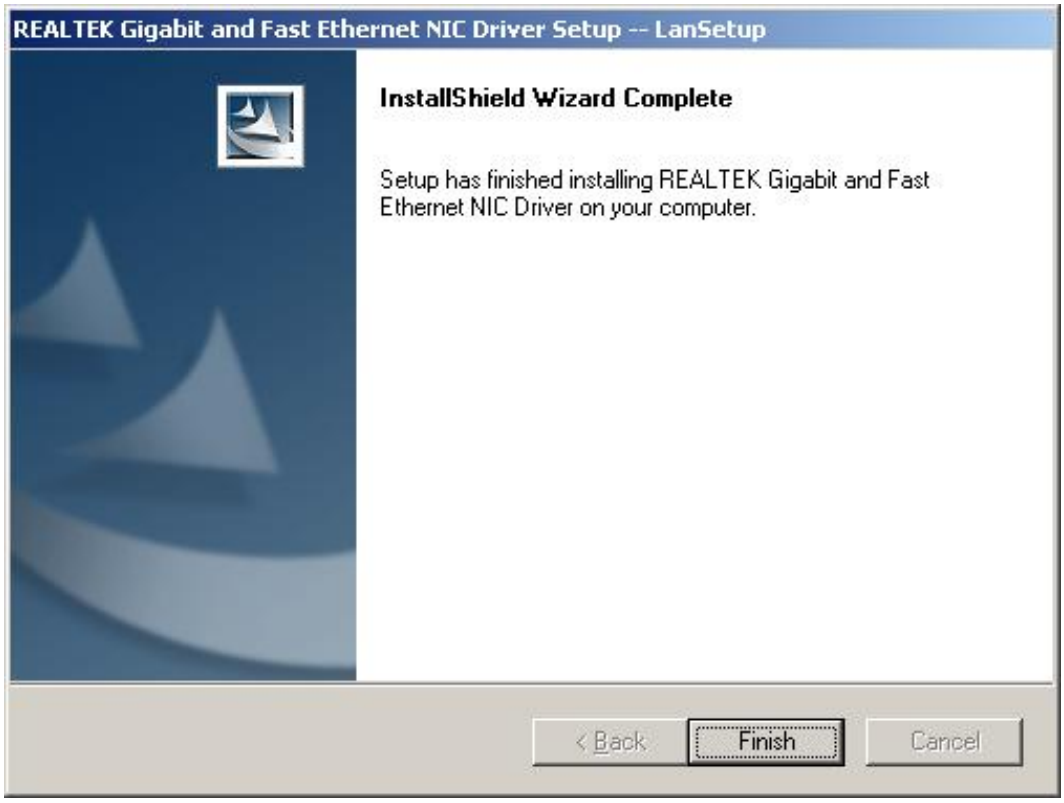


Figure 7-28: Installing Screen

Step 10: Click **FINISH** to complete the installation and exit the **Install Shield Wizard**.

Step 11: 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 the **Install Shield Wizard** (**Figure 7-29**).

Figure 7-29: Restart the Computer

7.5 SATA/RAID Driver

To install the SATA/RAID driver, please follow the steps below.

Step 1: Click **SATA** from the **AMD LX/GX CD Driver Menu** to open a window to the **X:\SATA\VIA VT6421** (where **X:** is the system CD drive) folder on the driver CD.

Step 2: Locate the **Setup** program icon.

Step 3: The **Install Shield Wizard** (**Figure 7-30**) is prepared to guide the user through the rest of the process.

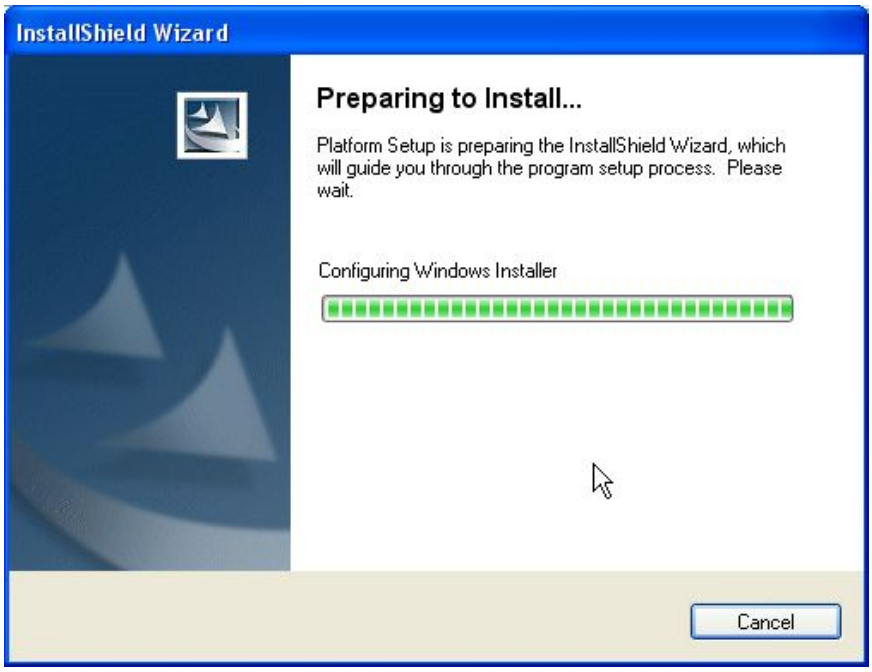


Figure 7-30: Preparing Setup Screen

Step 4: Once initialized, the **Install Wizard** welcome screen appears (**Figure 7-31**).

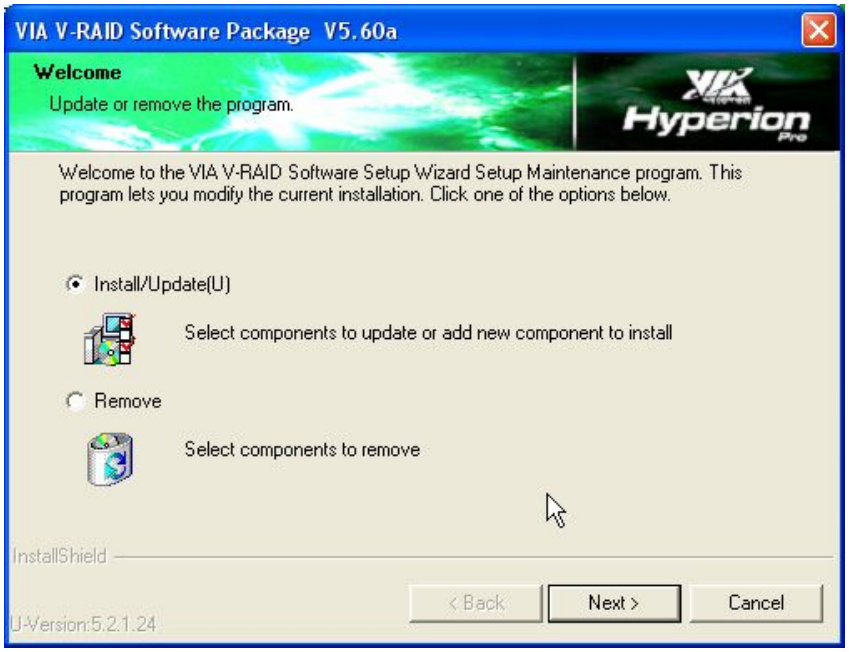


Figure 7-31: Install Wizard Welcome Screen

Step 5: Click **NEXT** to continue the installation or **CANCEL** to stop the installation.

Step 6: Select the components to install. Click **NEXT** to continue the installation (**Figure 7-32**).

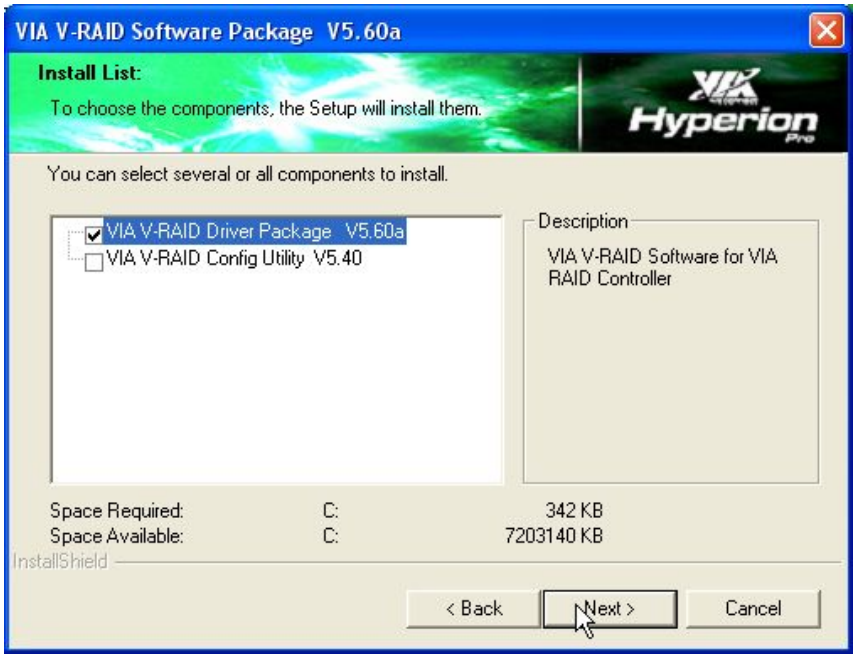


Figure 7-32: Components to Install

Step 7: Confirm the components to install by clicking **NEXT**. (**Figure 7-33**)

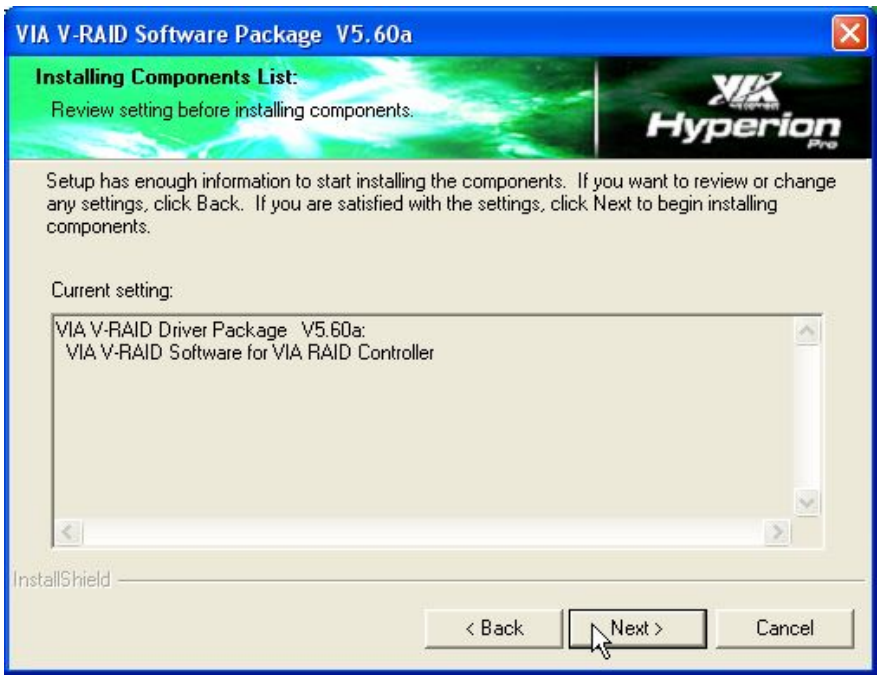


Figure 7-33: Confirm the Installing Component List

Step 8: The **Install Wizard** starts to install the driver (**Figure 7-34**).

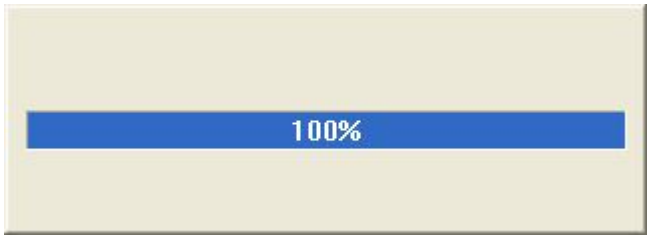


Figure 7-34: Installing Screen

Step 9: Once the installation is complete, the **InstallShield Wizard Complete** screen appears (**Figure 7-35**).

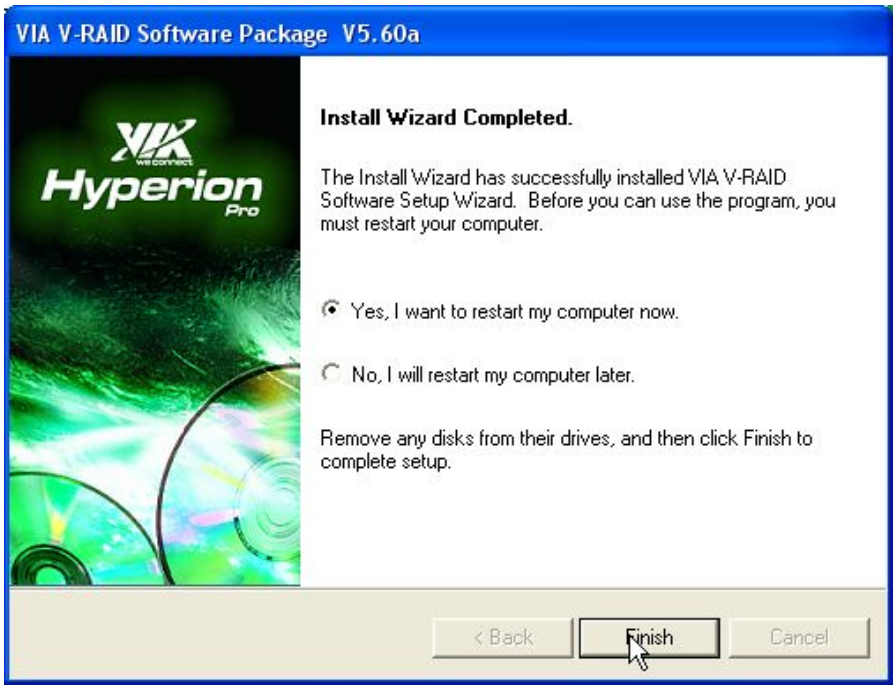


Figure 7-35: InstallShield Wizard Complete Screen

Step 10: 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 the **Install Shield Wizard**.

7.6 ISA Driver

To install the IT8888 ISA Bridge driver please follow the steps below:

Step 1: Open **Windows Control Panel** (**Figure 7-36**).

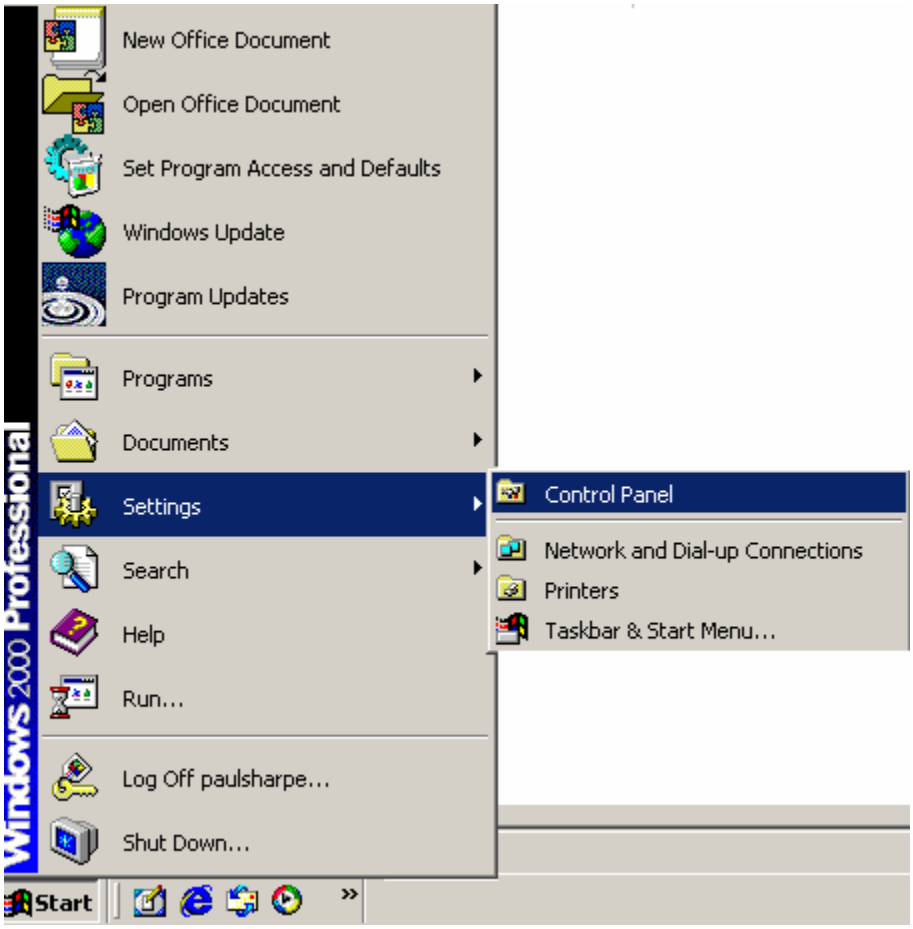


Figure 7-36: Access Windows Control Panel

Step 2: Double click the **System** icon (**Figure 7-37**).

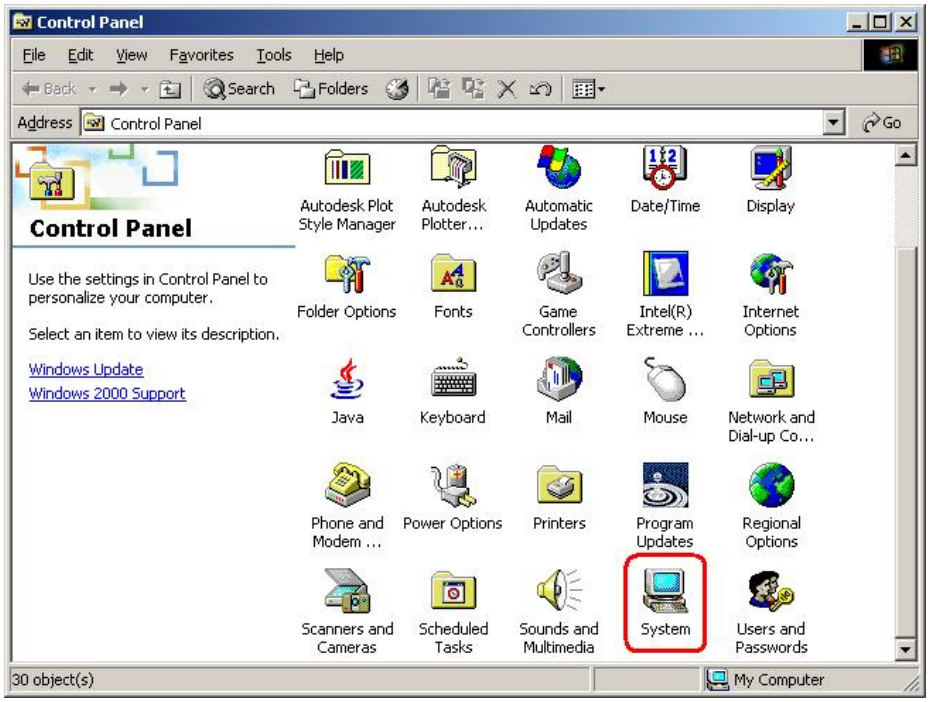


Figure 7-37: Double Click the System Icon

Step 3: Double click the **Device Manager** tab (**Figure 7-38**).

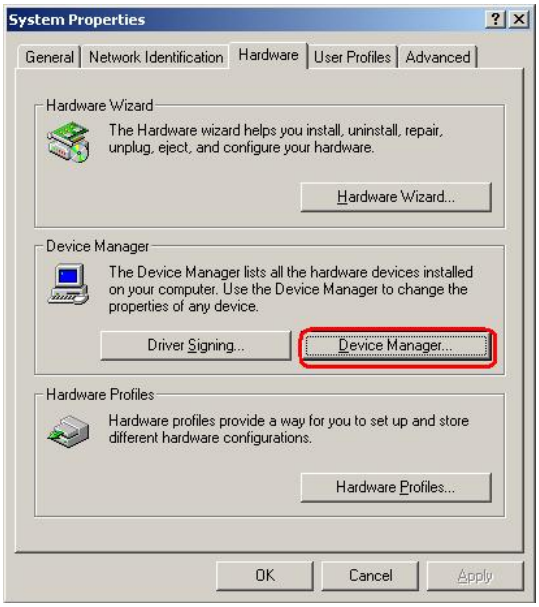


Figure 7-38: Double Click the Device Manager Tab

Step 4: A list of system hardware devices appears (**Figure 7-39**).

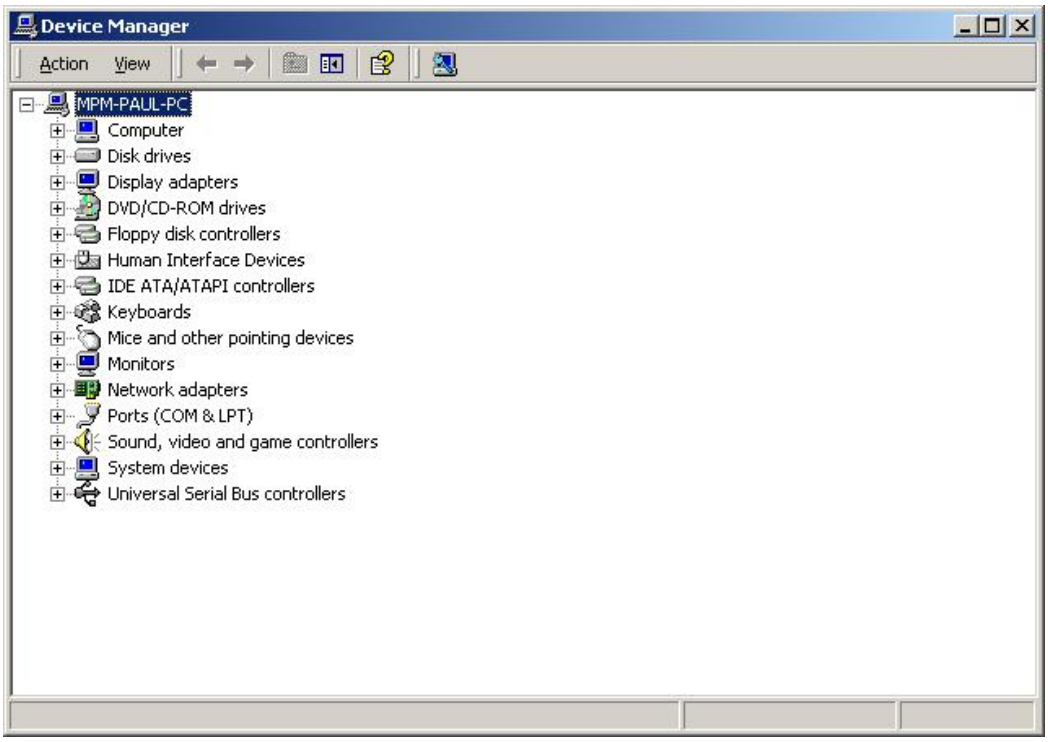


Figure 7-39: Device Manager List

Step 5: Double click the listed device that has question marks next to it. (This means Windows does not recognize the device).

Step 6: The **Device Driver Wizard** appears (**Figure 7-40**). Click **NEXT** to continue.

Figure 7-40: Search for Suitable Driver

Step 7: Select "**Specify a Location**" in the **Locate Driver Files** window (**Figure 7-41**).

Click **NEXT** to continue.

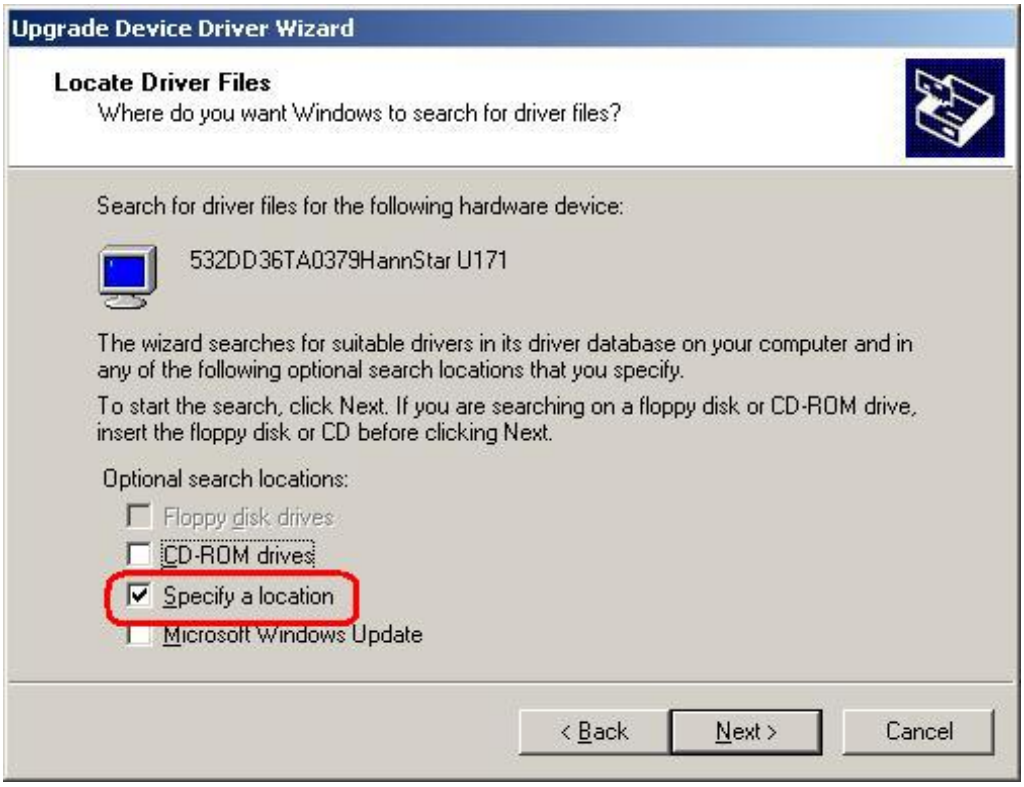


Figure 7-41: Locate Driver Files

Step 8: Select "**X:\IT8888**" directory in the location browsing window, where "**X:\"** is the system CD drive (**Figure 7-42**).

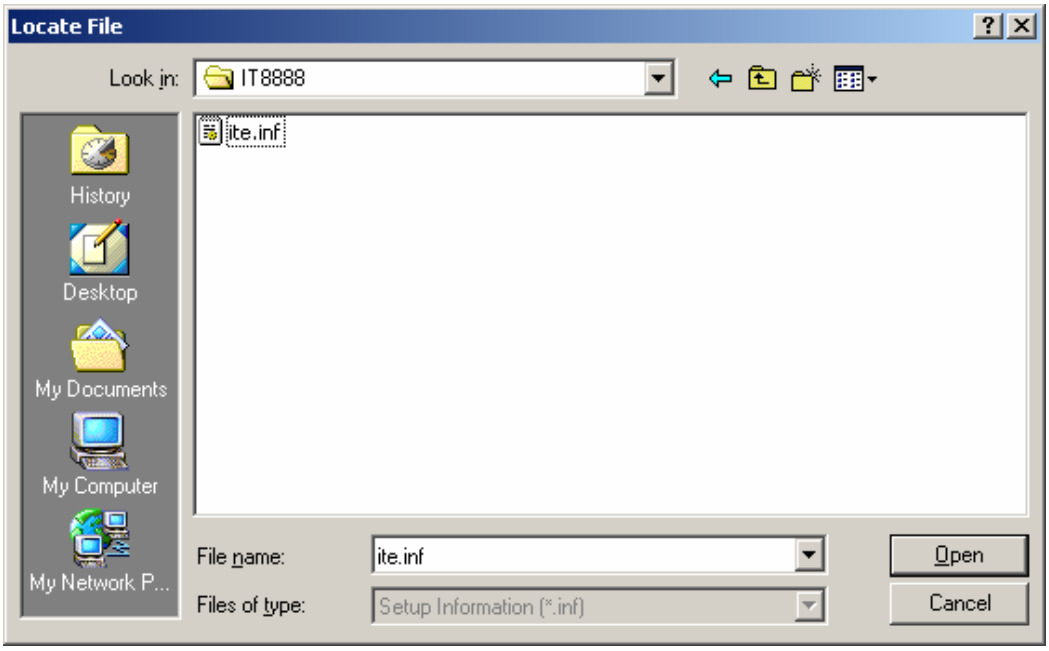


Figure 7-42: Location Browsing Window

Click **OK** to continue. A driver files location menu window appears. Select the **ite.inf** file and click **OPEN** to continue. The driver is installed.

Appendix

A

BIOS Configuration Options

A.1 BIOS Configuration Options

Below is a list of BIOS configuration options described in **Chapter 6**.

Appendix

B

Watchdog Timer

NOTE:

The following discussion applies to DOS environment. It is recommended you contact IEI support or visit our website for specific drivers for more sophisticated operating systems, e.g., Windows and Linux.

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

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

INT 15H:

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

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

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

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

NOTE:

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

Example program:

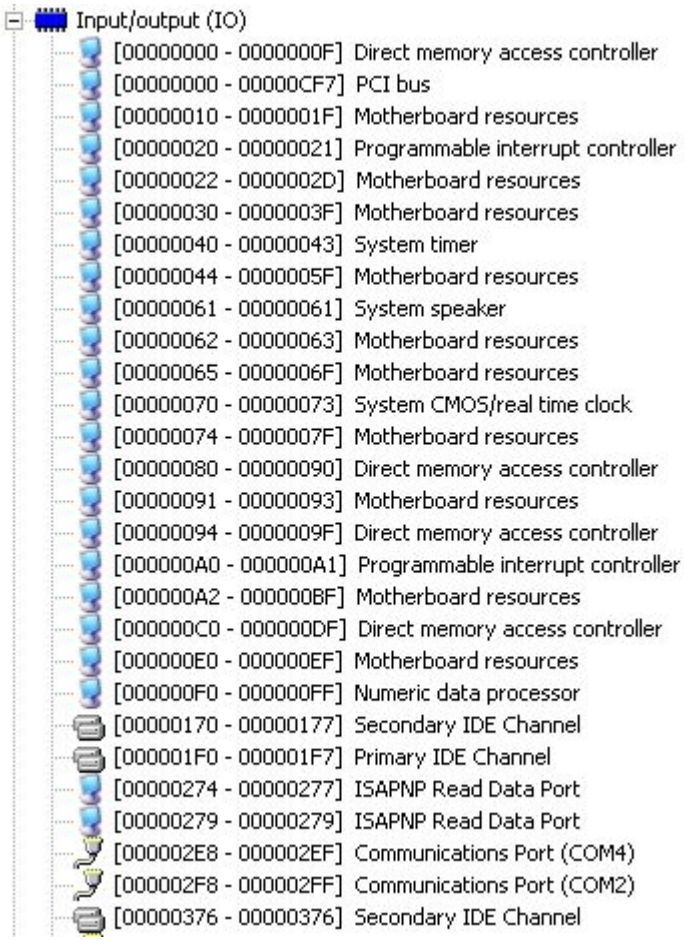
```
; INITIAL TIMER PERIOD COUNTER
;
W_LOOP:
        MOV     AX, 6F02H       ; setting the time-out value
        MOV     BL, 30          ; time-out value is 48 seconds
;
; ADD YOUR APPLICATION PROGRAM HERE
;
        CMP     EXIT_AP, 1      ; is your application over?
        JNE     W_LOOP          ; No, restart your application
        MOV     AX, 6F02H       ; disable Watchdog Timer
        MOV     BL, 0           ;
        INT     15H
;
; EXIT ;
```

Appendix

C

Address Mapping

C.1 I/O Address Map



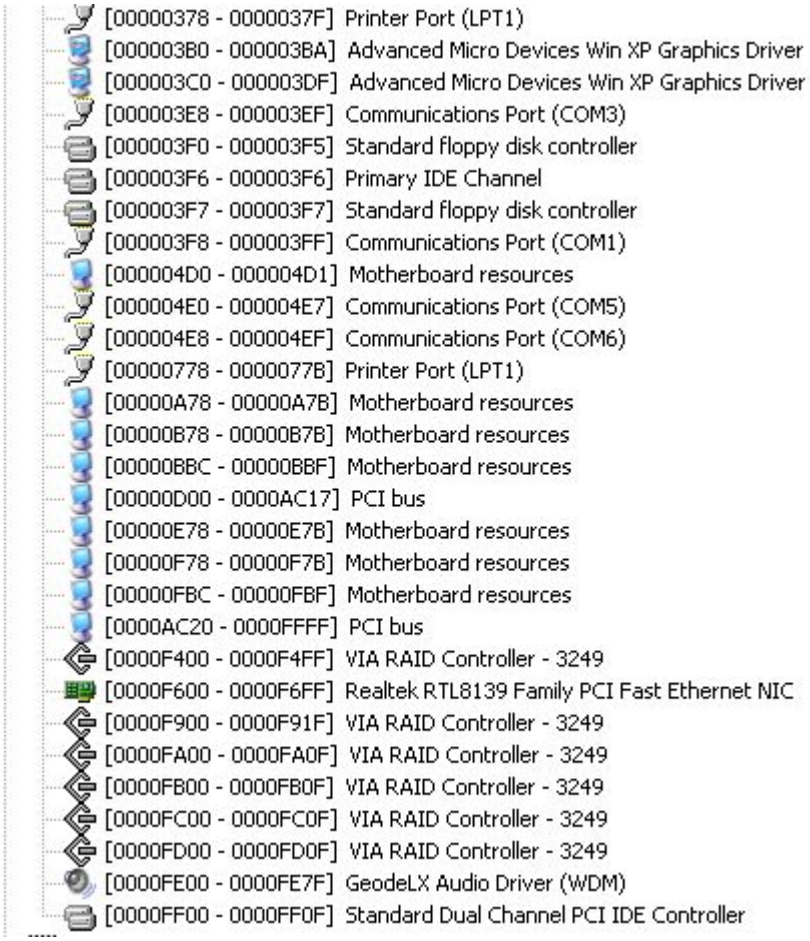
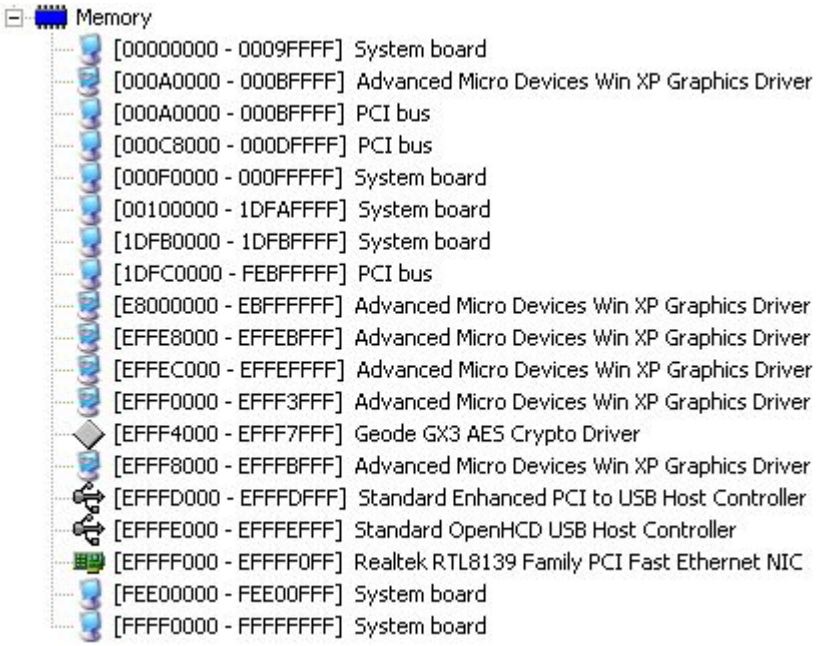


Table C-1: IO Address Map

C.2 IRQ Address Map

Table C-2: IRQ Address Map

C.3 Memory Address Map



Appendix

D

Connecting an ATX Power Supply

The following notes show how to connect ATX Power Supply to the embedded board.

D.1.1 Using ATX Power Switch

Step 1: Disconnect the AC cord of the power supply from the AC source to prevent a sudden electric surge to the board.

Step 2: Remove the jumper caps from the JP4 jumper.

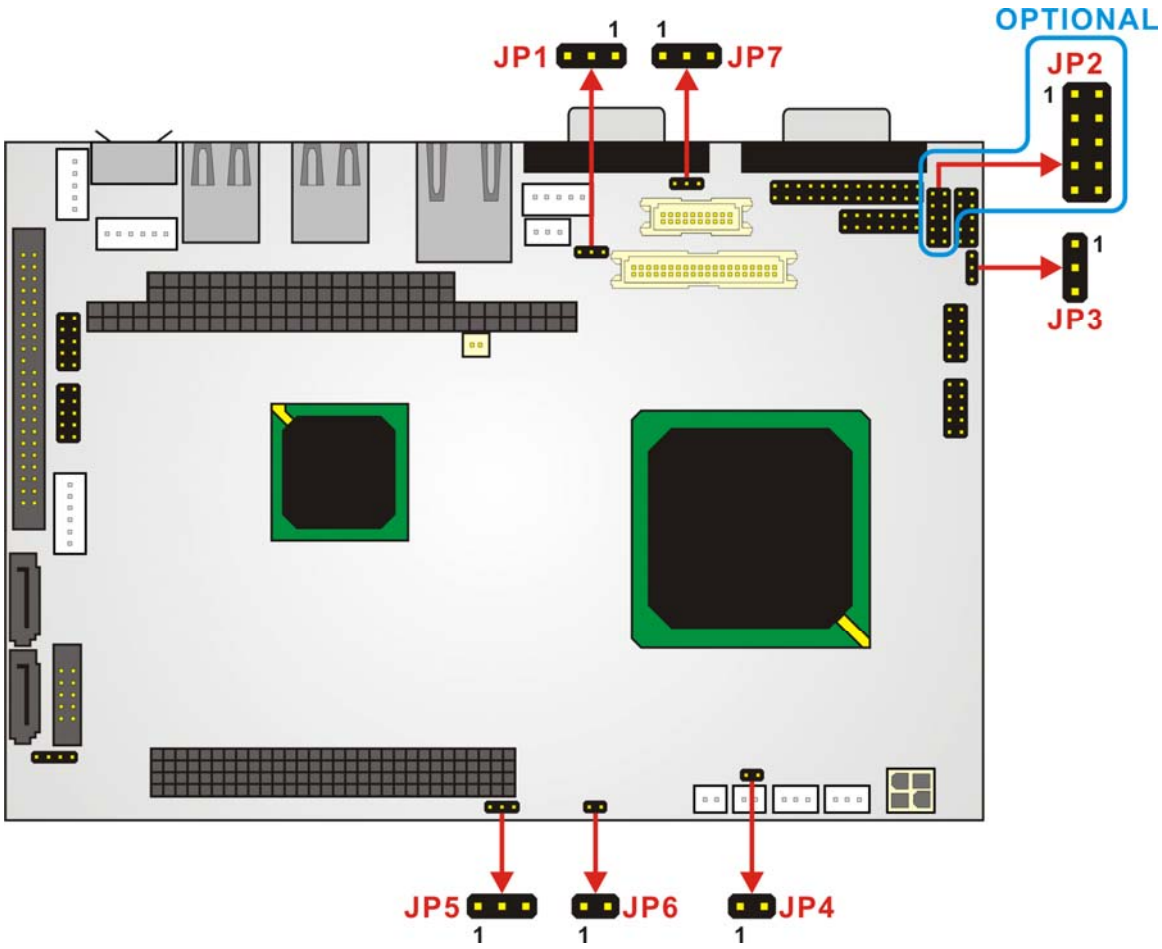


Figure D-1: Jumper Locations

WARNING!

The new power adapter cable for the NANO-LX has its “Ground” pin removed from the 3-pin ATX feature connector. Connecting the power feature connector cable will destroy the CPU board.

Step 3: Be sure that the standard 4-pin Molex power connector is connected to the SBC power connector (CN2).

Step 4: Connect the optional ATX power cable to the AT power cable using their 4P power connectors (**Figure D-2**).

Step 5: Connect the optional ATX power cable to the SBC ATX connector (CN3) using the 3-pin ATX feature connector (**Figure D-2**).

Step 6: Connect an ATX power button switch to CN5.

Step 7: Connect the 20-pin ATX power connector to an ATX power supply (**Figure D-2**).

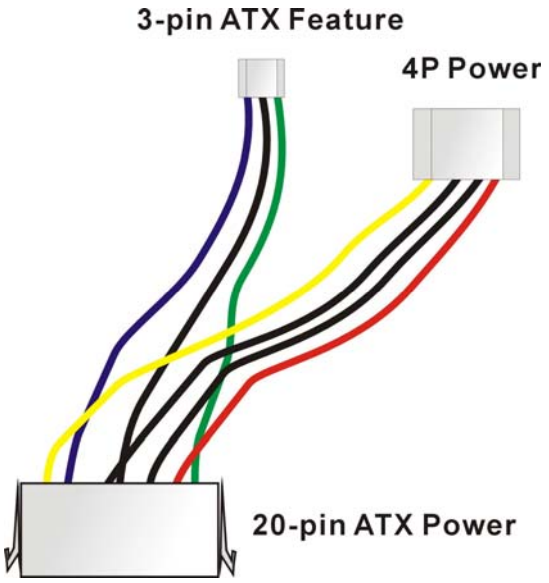


Figure D-2: ATX Power Adapter Cable

Step 8: Press the power button switch once to turn on the system. To turn off the power supply press the ATX power switch button for about 4 seconds.

D.1.2 Using AT Power Supply

Connecting to an AT power supply is as simple as connecting a 4P power connector to CN2. Power on/off is controlled by the power switch on the AT power supply. Let the jumper caps stay on JP4.