NuPRO-720

PICMG 1.0 Full-Size AMD Geode™ LX 800 SBC

User's Manual



Manual Revision: 2.10

Revision Date: October 29, 2008

Part No: 50-13059-1010

Recycled Paper

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Revision History

Revision	Release Date	Description of Change(s)
2.00	2008/04/03	Initial Release
2.01	2008/05/19	Correct address
2.10	2008/10/29	Remove Windows 2000 support; correct operating system and driver installation

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Preface

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Using this Manual

Audience and Scope

The NuPRO-720 User's Manual is intended for hardware technicians and systems operators with knowledge of installing, configuring and operating industrial grade single board computers.

Manual Organization

This manual is organized as follows:

Preface: Presents important copyright notifications, disclaimers, trademarks, and associated information on the proper understanding and usage of this document and its associated product(s).

Chapter 1, Introduction: Introduces the NuPRO-720, its features, applications, and specifications, including functional descriptions and board layout.

Chapter 2, Connectors and Jumpers: Provides technical information on connectors and jumpers as well as pin assignments for configuring NuPRO-720 and any attached external devices.

Chapter 3, Getting Started: Illustrates how to install components to the NuPRO-720, specifically, memory modules, CompactFlash disks, operating systems and drivers.

Chapter 4, Watchdog Timer: Presents information on understanding and configuring the embedded Watchdog timer.

Chapter 5, BIOS Setup: Presents information and illustrations to help understand and configure the system BIOS.

Chapter 6, POST Messages: Presents POST information and detailed descriptions for users.

Important Safety Instructions: Presents safety instructions all users must follow for the proper setup, installation and usage of equipment and/or software.

Getting Service: Contact information for ADLINK's worldwide offices.

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Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.



NOTE: Additional information, aids, and tips that help users perform tasks.



CAUTION: Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.



WARNING: Information to prevent ***serious*** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

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1 Introduction

This chapter will introduce the NuPRO-720, its features, specifications and applications. This chapter also provides detailed information about the mechanics of the product and technical information to assist users.

1.1 Package Contents

Please check that your package contains the items below. If you discover damaged or missing items, please contact your vendor.

- NuPRO-720 SBC
- 2-port USB bracket and cable
- COM and Printer port bracket and cable
- COM bracket and cable
- SATA cable
- SATA power cable
- PS/2 Y cable
- ADLINK All-In-One CD
- User's Manual



DO NOT install or apply power to equipment that is damaged or if there is missing/incomplete equipment. Retain the shipping carton and packing materials for inspection. Please contact your ADLINK dealer/vendor immediately for assistance. Obtain authorization from your dealer before returning any product to ADLINK.

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1.2 Overview

ADLINK's NuPRO-720 is a full-size system host board in PICMG 1.0 form factor. It is based on the AMD Geode LX 800 processor and CS5536 companion device (South bridge) allowing ultra low power consumption and fanless capability. In addition to supporting two DDR 184-pin memory sockets and up to 2 GB of memory, the NuPRO-720 provides two 10/100 base-T LAN ports, four USB 2.0 ports, one Ultra-ATA 133 IDE, two onboard Serial ATA ports, and a CompactFlash Type II socket. This product is designed to run Windows XP and Fedora Core 6 Linux operating systems.

1.3 Features

- PICMG 1.0 Full-size SBC
- AMD Geode LX 800 Processor
- Supports dual 10/100Mbps Ethernet
- Supports dual SATA-150
- AC'97 Audio (via optional DB-AC97S daughter board)
- Onboard CompactFlash socket
- RS-232/422/485/485+
- ISA bus with High Drive capability
- Fan-less capable
- RoHS Compliant

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1.4 Applications

The NuPRO-720 is specifically designed for industrial automation and system integrators looking for fanless SBC solutions in ultra-low power packages and ample I/O connectivity. Several specific usages of NuPRO720 are:

- Industrial automation
- Intelligent transportation systems
- 2D arcade games
- Electronic billboards
- IPC distributors & system integrators

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1.5 Specifications

System	
CPU	• AMD Geode LX 800 Processor 500 MHz, 128 KB L2 Cache
Chipset	• AMD Geode CS5536 Companion Device
Memory	• Two 184-pin DIMM sockets • Supports DDR-400 SDRAM, up to 2 GB
BIOS	• Phoenix-Award BIOS with 2 Mb Flash ROM
Watch Dog Timer	• 1-255 second or 1-255 minute programmable and can generate system reset.
Hardware Monitor	• CPU/System temperature, fan speed and onboard DC voltage
I/O Interfaces	
IDE	• Single-channel ultraATA 100 for CF • Single-channel ultraATA 133 for IDE
CompactFlash	• One CompactFlash type II socket
Serial ATA	• Two serial ATA ports with 150 MB/s data transfer
USB	• Four USB 2.0 ports via onboard pin header
Audio	• Supports two channel audio with line-in, line-out and mic-in via optional DB-AC97S daughter board
Multi I/O	• One RS-232, one RS-232/422/485, one LPT, and one PS/2 keyboard/mouse
Display	
VGA	• Integrated in AMD Geode LX 800, shared VRAM up to 16 MB
CRT	• External D-sub 15 connector, resolution up to 1920 x 1440 x 32 bpp at 85 Hz
Ethernet	
Controller	• Two Intel 82551ER 10/100 Mbps controllers
Port	• Two RJ-45 Ethernet ports
Mechanical and Environment	
Form Factor	• Standard full-size PICMG 1.0 SBC
Dimensions	• 338 x 122 mm (L x W)
Operating Temp.	• 0ºC to 60ºC
Storage Temp.	• -20ºC to 80ºC
Safety	• CE, FCC Class A

Table 1-1: General Specifications

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Power Consumption				
Power Requirements (amps)	+5V	+12V	5VSB	
	(A)	(A)	(A)	
Light-loading	1.761	0.363	0.01	
Average-loading	1.938	0.375	0.011	
Full-loading	2.35	0.439	0.033	
Power Requirements (watts)	+5V	+12V	5VSB	Total
	(W)	(W)	(W)	(W)
Light-loading	8.805	4.356	0.05	13.211
Average-loading	9.69	4.5	0.055	14.245
Full-loading	11.75	5.268	0.165	17.183

Table 1-2: Power Consumption Specifications

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1.6 I/O Connectivity Table

I/O	Bracket	Onboard (pin header)	Golden Finger
VGA / CRT	Y	—	—
LAN (RJ-45)	Y (with LED indication)	—	—
LAN (RJ-45)	Y (with LED indication)	—	—
PS/2 KB/MS	Y	—	—
USB1	—	Y	—
USB2	—	Y	—
COM1	—	Y	—
COM2	—	Y	—
Printer port	—	Y	—
IDE	—	Y	—
SATA-150 1	—	Y	—
SATA-150 2	—	Y	—
PCI 32-bit/33 MHz	—	—	Y
ISA	—	—	Y

Table 1-3: I/O Connectivity Table

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1.7 Functional Diagram

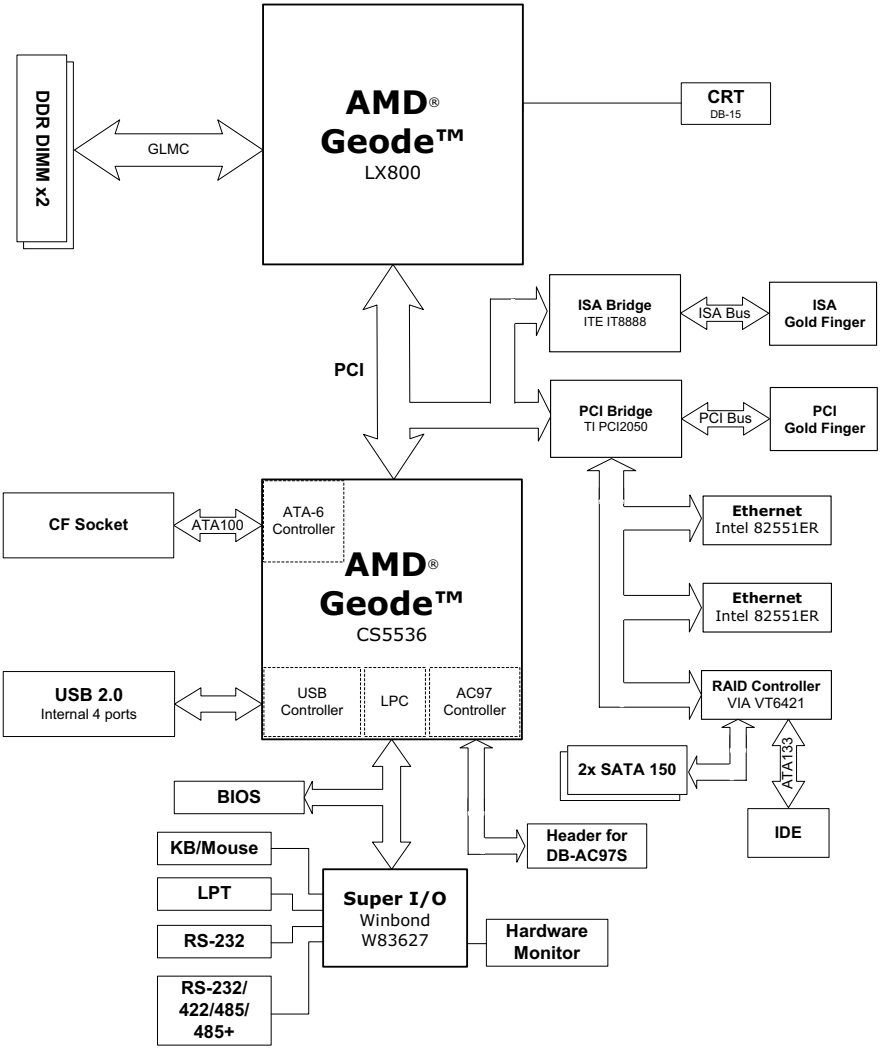


Figure 1-1: NuPRO-720 Functional Diagram

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1.8 Functional Description

Processor

NuPRO-720 supports a single AMD Geode LX 800@1.1W processor in a BGU396 package. Available with a core voltage of 1.25 V, the Geode LX processor offers an extremely low typical power consumption of 2.0 W, leading to longer battery life and enabling small form-factor, fanless designs. The following are general features of the Geode LX processor:

- CPU Core
- GeodeLink Control Processor
- GeodeLink Interface Units
- GeodeLink Memory Controller
- Graphics Processor
- Display Controller
- Video Processor, TFT Controller
- GeodeLink PCI Bridge
- Geode I/O Companion Device Interface
- 0.15 micron process
- Packaged in 396-terminal BGU

Memory

NuPRO-720 supports 184-pin DDR sockets, up to 2 GB. The GeodeLink Memory Controller (GLMC) module supports the Unified Memory Architecture (UMA) of the Geode GX processor and controls a 64-bit DDR SDRAM interface without any external buffering. The SDRAM memory array contains both the main system memory and the graphics frame buffer. Up to four module banks of SDRAM are supported. Each module bank can have two or four component banks depending on memory size and configuration. Memory features include:

- Support for up to 400 MT/S (million transfers per second) DDR SDRAM
- Supports 64-bit data interface
- Can maintain up to 16 open banks at a time
- Can buffer up to two requests at a time

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- Arbiter reorders requests from different sources to optimize data bus utilization
- Single and burst data phase optimization
- Programmable modes of high and low order address interleaving
- Queues up to eight refreshes
- Supports low power mode
- Highly configurable to obtain best performance for installed DRAM

Display

NuPRO-720 supports VGA output. The VGA function is integrated in the Geode LX Processor.

- Supports up to 16.8 million colors (24-bit)
- Supports resolutions up to 1600 x 1200
- Supports vertical refresh rates up to 85 Hz

PCI Bus

NuPRO-720 supports a PCI 33 MHz/32-bit interface compliant to PCI Local Bus Specification, Revision 2.2.

- PCI Version 2.2 compliance
- 32-bit, 33 MHz PCI bus operation
- Target support for fast back-to-back transactions
- Write gathering and write posting for in-bound write requests
- Delayed transactions for in-bound read requests
- Zero wait state operation within PCI burst
- Dynamic clock stop/start support for GLIU and PCI clock domains
- Capable of handling out-bound transactions immediately after reset

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PCI Arbitration

NuPRO-720 supports seven on-board PCI devices. The PCI local bus supports the Geode LX, CS5536, PCI2050BPDV and IT8888G devices. The PCI external bus supports VT6421A and the two 82551ER devices. Because the LX processor supports only three pairs, namely PCI REQ# and GNT# arbiters; NuPRO-720 offers an additional Arbiter (AT123S). The external PCI bus signal is via PCI2050BPDV (VT6421A, 82551ER X2 and Back-plan PCI bus).

Companion Device

The AMD Geode CS5536 companion device is designed to work with an integrated processor component such as an AMD Geode LX processor. Together, the Geode LX processor and Geode CS5536 companion device provide a system-level solution well suited for high-performance, low-power needs of a host of information appliances. The following are features of the Geode CS5536 companion device:

- Designed for AMD Geode LX processor
- 208-Terminal PBGA (plastic ball grid array) package
- 3.3V I/O and 1.5V (nominal) Core operation
- Low power operation: 150 mW type in working state
- Working and Standby power domains
- 32-bit, 33/66 MHz operation, PCI specification v2.2 compliant
- 66 MB per second IDE controller in UDMA mode based on ATA-5 specification
- Two independent host USB controllers; doubles the throughput of a single controller; USB specification v2.0 compliant
- AC'97 specification v2.1 compliant interface to multiple audio codecs
- IR (Infrared) Communication Port
- System Management Bus (SMB) Controller
- LPC (Low Pin Count) Port
- General Purpose I/Os (GPIOs)
- Real-Time Clock (RTC) with CMOS RAM
- Power Management Controller

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Ethernet Controller

NuPRO-720 provides two 10/100Mbps Ethernet interfaces via Intel 82551ER Fast Ethernet PCI controller. It provides excellent performance by off-loading TCP, UDP and IP checksums and supports TCP segmentation off-load. The 82551ER includes both MAC and PHY addresses. Please see the following features:

- Integrated IEEE 802.3 10BASE-T and 100BASE-TX compatible PHY
- 32-bit PCI master interface
- Thin BGA 15mm^2 package
- ACPI and PCI power management standards compliance
- Full Duplex support at 10 and 100 Mbps
- IEEE 802.3x 100BASE-TX flow control support
- Fast back-to-back transmission support with minimum interframe spacing
- Low power 3.3 V device

ISA Bridge

NuPRO-720 uses a IT8888G PCI-to-ISA bridge single function device to support its ISA bus. The IT8888G's 32-bit PCI bus interface is compliant with PCI Specification V2.1 and supports both PCI Bus Master & Slave.

- PCI Interface, PCI specification V. 2.1 compliant
- Programmable PCI address decoders
- PC/PCI DMA controller, complies with Intel Mobile PC/PCI DMA R2.2
- Distributed DMA controller, complies with distributed DMA R6.0
- ISA Interface, supports full ISA compatible functions
- Serial IRQ, complies with serialized IRQ support for PCI system R6.0
- Optional flash ROM Interface, supports up to 1 Mbyte ROM
- Supports NOGO function
- +3.3V PCI I/F with +5V tolerant I/O buffers
- +5V ISA I/F and core power supply

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LPC Bus

The Low Pin Count port is based on Intel's Low Pin Count (LPC) Interface Specification v1.0. In addition to the required pins, the Geode CS5536 companion device also supports two optional pins: LDRQ# and SERIRQ. The LPC interface supports memory, I/O, DMA, and Intel's Firmware Hub Interface. In NuPRO-720, There are three devices (Super I/O, BIOS and LPC Debug Port) routed with the LPC bus. The following are features of LPC bus for NuPRO-720:

- Based on Intel's Low Pin Count (LPC) Specification v1.0
- Serial IRQ support
- Supports memory, I/O, and DMA cycle types
- Bus master cycles not supported
- CLKRUN# and LPCPD# not supported. SMI# and PME# supported via GPIOs
- Supports Firmware Hub (FWH) Interface

Super I/O

NuPRO-720 uses the Winbond W83627HG LPC IO to provide general IOs. W83627HG also includes Hardware Monitoring capabilities, enhanced security features, power control logic, and Motherboard Glue logic. General I/O functions of NuPRO-720 include:

- Watch dog timer
- Resume and main power reset generator with watch dog timer
- Programmable clock output to 16 Hz
- Enhanced digital data separator
- Keyboard/mouse controller
- Two serial ports
- Multi-mode parallel port
- Hardware monitor

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PCI Bridge

- Provides compact PCI hot-swap functionality
- 3.3-V core logic with universal PCI interfaces compatible with 3.3-V signaling environments
- Two 32-bit, 33-MHz PCI buses
- Provides internal two-tier arbitration for up to nine secondary bus masters and supports an external secondary bus arbiter
- Burst data transfers with pipeline architecture to maximize data throughput in both directions
- Independent read and write buffers for each direction
- Up to three delayed transactions in both directions
- Propagates bus locking
- Secondary bus is driven low during reset
- Provides VGA/palette memory, I/O, and subtractive decoding options

PCI to SATA Bridge

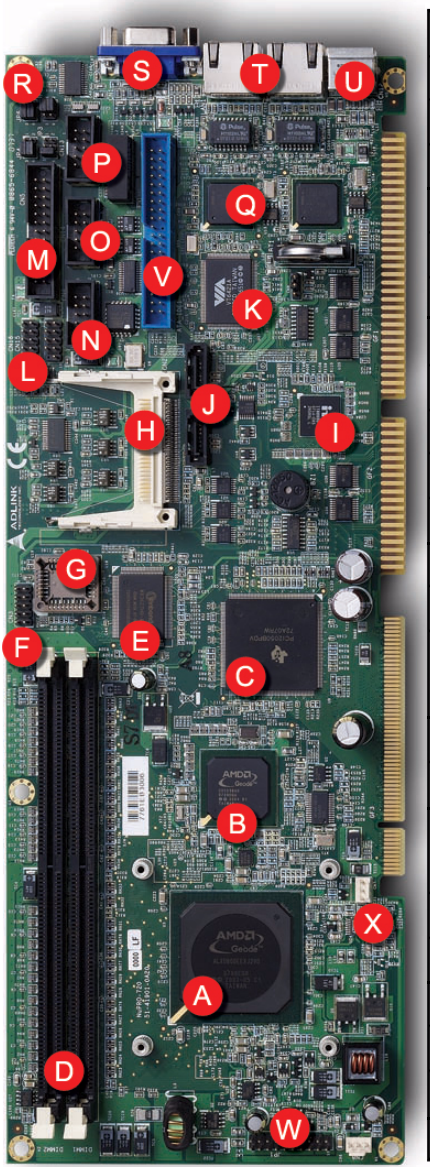
- Supports RAID Level 0, RAID Level 1, RAID 0+1 and JBOD
- Complies with Serial ATA Specification Revision 1.0
- Supports internal PHY, with each PHY supporting up to two S-ATA devices
- Dual channel master mode PCI supporting up to two S-ATA devices. The S-ATA drive transfer rate is capable of up to 150 MB/s per channel
- Single channel master mode hard disk controller supporting two enhanced IDE devices
- Supports ATA PIO mode 4, multi-word DMA-mode 2 drivers and UltraDMA-mode 6

BIOS

- NuPRO-720 supports Phoenix-Award BIOS with 2 Mb Flash ROM

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1.9 Board Layout



A	Geode LX 800
B	CS5536
C	TI2050 PCI Bridge
D	DDR memory socket
E	83627 Super I/O
F	LPC connector (CN3)
G	BIOS
H	CompactFlash socket (CN2)
I	IT8888 ISA bridge
J	SATA connectors
K	VT6421A PCI to storage
L	USB 2.0 connectors (CN15/16)
M	LPT connector (CN5)
N	AC'97 Audio connector (CN4)
O	COM1 connector (CN14) (RS232/422/485/485+)
P	COM2 connector (CN13)
Q	82551ER LAN chipset
R	COM1 multiple function jumper (JP3/JP4/JP5/JP6)
S	CRT/VGA port (CN1)
T	RJ-45 LAN port (CN10/11)
U	KB/MS port (CN12)
V	IDE Connector
W	System Panel Connector (JP1)
X	Fan connectors (CN7/8)

Figure 1-2: NuPRO-720 Board Layout

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1.10 Mechanical Drawings

Dimensions in mm

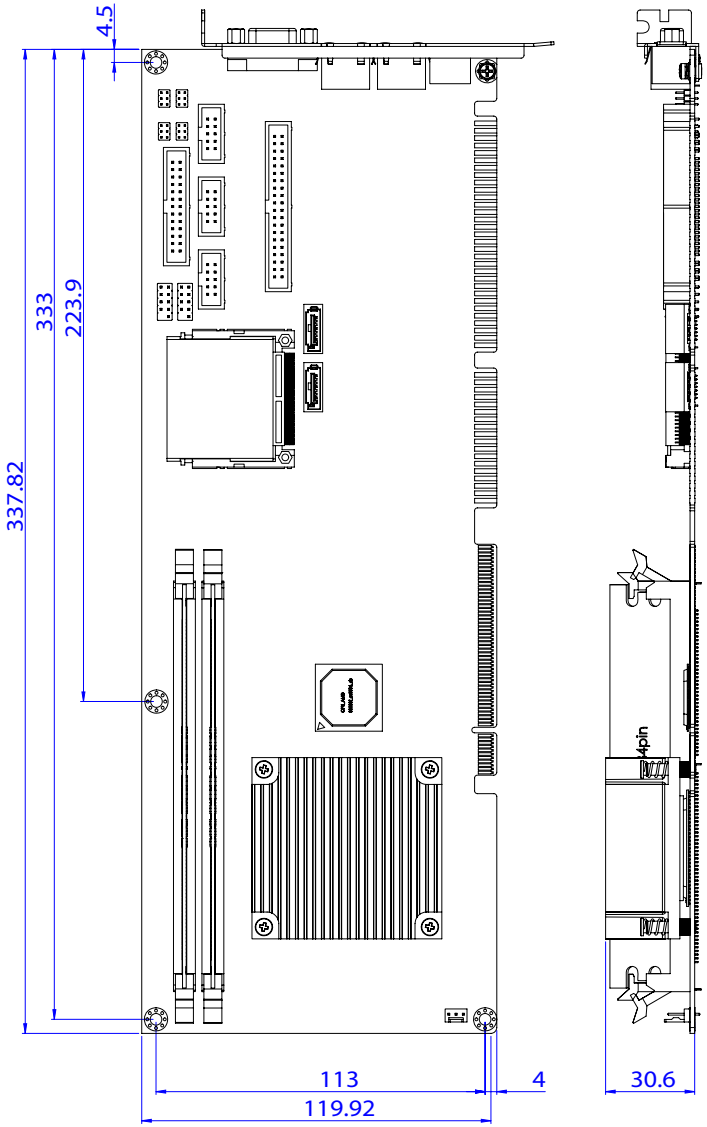


Figure 1-3: Board Dimensions

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2 Connectors & Jumpers

The connectors and jumpers on the NuPRO-720 allow you to connect and configure external devices such as keyboard, floppy disk drives, hard disk drives, printers, etc. The following subsections specify the pin assignments for connectors and jumper blocks on the NuPRO-720.

- CN1 - VGA port
- CN2 - CompactFlash socket
- CN3 - LPC connector
- CN4 - AC'97 Audio connector
- CN5 - LPT connector
- CN6 - CMOS Clear
- CN7 - Fan connector
- CN8 - Fan connector
- CN10 - LAN1 - RJ-45
- CN11 - LAN2 - RJ-45
- CN12 - PS/2 port
- CN13 - COM2 connector
- CN14 - COM1 connector (RS232/422/485/485+)
- CN15 - USB connector
- CN16 - USB connector
- IDE - ATA_IDE1 connector
- JP1 - System Panel connector
- JP3 - COM1 multiple function jumper
- JP4 - COM1 multiple function jumper
- JP5 - COM1 multiple function jumper
- JP6 - COM1 multiple function jumper
- SATA1 - SATA connector 1
- SATA2 - SATA connector 2

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2.1 Motherboard Layout

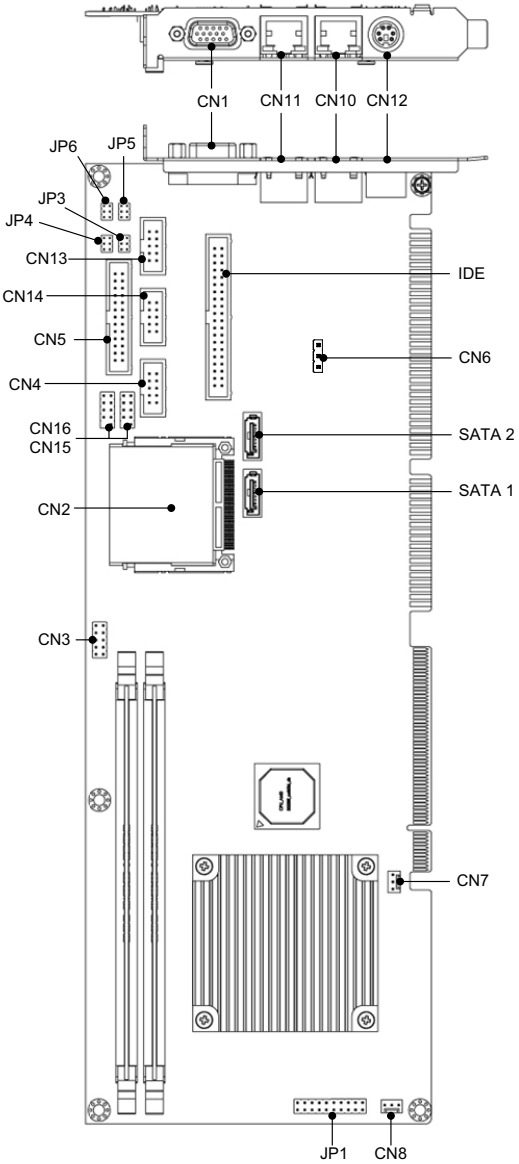


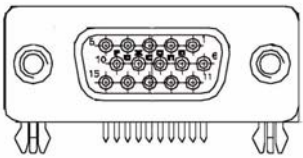
Figure 2-1: Board Connectors & Jumpers Layout

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2.2 Pin Definitions

CN1 - CRT/VGA Port

Figure 2-2: CRT/VGA Port & Pin Assignments



PIN	SIGNAL	FUNCTION
1	RED	Analog RED
2	GREEN	Analog GREEN
3	BLUE	Analog BLUE
4	NC	No Connect
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	+5V	Ground
10	GND	Ground
11	NC	No connect
12	DDCDAT	DDC Data for CRT
13	HSYNC	Horizontal sync for Monitor
14	VSYNC	Vertical sync for Monitor
15	DDCCLK	DDC CLK for CRT

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CN2 - CompactFlash Socket

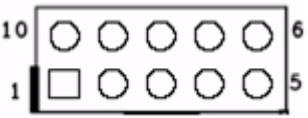
Figure 2-3: CompactFlash Socket & Pin Assignments



Signal Name	Pin	Signal Name	Pin
GND	1	CD1	26
CF_D3	2	CF_D11	27
CF_D4	3	CF_D12	28
CF_D5	4	CF_D13	29
CF_D6	5	CF_D14	30
CF_D7	6	CF_D15	31
CF_CS0	7	CF_CS1	32
GND	8	GND	33
GND	9	CF_DIOR-L	34
GND	10	CF_DIOW-L	35
GND	11	P3V3	36
GND	12	CNCF_IORDY	37
P3V3	13	P3V3	38
GND	14	PCSEL	39
GND	15	NC	40
GND	16	CF_RESET	41
GND	17	N/C	42
CF_A2	18	N/C	43
CF_A1	19	P3V3	44
CF_A0	20	N/C	45
CF_D0	21	N/C	46
CF_D1	22	CF_D8	47
CF_D2	23	CF_D9	48
N/C	24	CF_D10	49
CD2	25	GND	50

CN3 - LPC Connector

Figure 2-4: LPC Connector & Pin Assignments

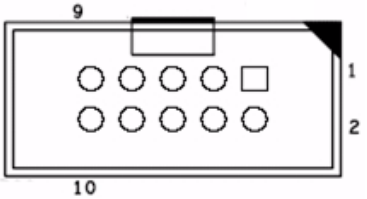


PIN #	SIGNAL NAME	PIN #	SIGNAL NAME
1	3.3V	6	GND
2	ID0	7	AD0
3	PCI RESET	8	AD1
4	FRAME	9	AD2
5	CLK 33	10	AD3

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CN4 - AC'97 Audio Connector

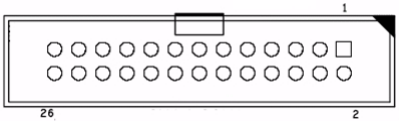
Figure 2-5: Audio Connector & Pin Assignments



PIN #	SIGNAL NAME	PIN #	SIGNAL NAME
1	GND	2	CLK
3	GND	4	SIN
5	5V	6	SOUT
7	5V	8	3.3V
9	SYNC	10	RESET

CN5 - LPT Connector

Figure 2-6: LPT Connector & Pin Assignments



PIN #	SIGNAL NAME	PIN #	SIGNAL NAME
1	STB#	2	AFD#
3	PD0	4	ERR#
5	PD1	6	INIT#
7	PD2	8	SLIN#
9	PD3	10	GND
11	PD4	12	GND
13	PD5	14	GND
15	PD6	16	GND
17	PD7	18	GND
19	ACK#	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	GND

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CN7 & CN8 - Fan Connectors

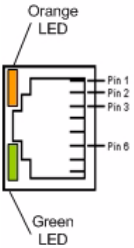
Figure 2-7: Fan Connectors & Pin Assignments



PIN #	SIGNAL NAME
1	GND
2	12V
3	SENSE

CN10 & CN11 - LAN1 & LAN2 Ports

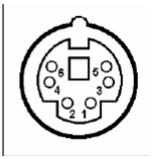
Figure 2-8: LAN Ports (RJ-45) & Pin Assignments



Pin	Signal
1	Transmit Data +
2	Transmit Data -
3	Receive Data +
4	Termination
5	Termination
6	Receive Data -
7	Termination
8	Termination

CN12 - PS/2 Keyboard & Mouse Port

Figure 2-9: PS/2 Port & Pin Assignments

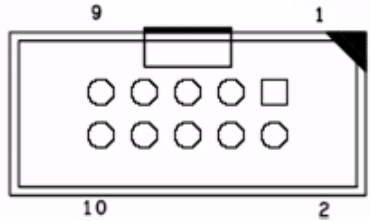


PIN	SIGNAL	FUNCTION
1	KBDAT	Keyboard Data
2	MSDAT	Mouse Data
3	GND	Ground
4	5V	Power
5	KBCLK	Keyboard Clock
6	MSCLK	Mouse Clock

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CN13 - COM2 Connector (RS-232 Only)

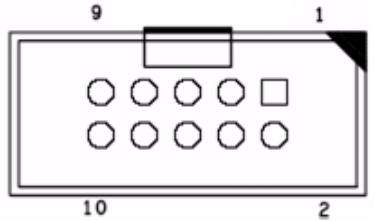
Figure 2-10: COM2 Connector & Pin Assignments



PIN	SIGNAL	FUNCTION
1	DCD	Data Carrier Detect
2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	Ground
6	DSR	Data Set Ready
7	RTS	Request to Send
8	CTS	Clear to Send
9	RI	Ring Indicate
10	NC	No Connect

CN14 - COM 1 Connector (RS-232/422/485/485+)

Figure 2-11: COM1 Connector & Pin Assignments

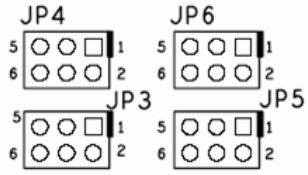


PIN	SIGNAL	FUNCTION
1	DCD	Data Carrier Detect
2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	Ground
6	DSR	Data Set Ready
7	RTS	Request to Send
8	CTS	Clear to Send
9	RI	Ring Indicate
10	NC	No Connect

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COM1 Multiple Function Jumper (JP3/4/5/6)

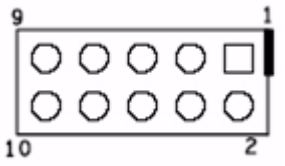
Figure 2-12: JP3, JP4, JP5, & JP6 with Jumper Table



	RS-232	RS-422	RS-485	RS-485+
JP3	1-2	3-4	5-6	5-6
JP4	1-3, 2-4	3-5, 4-6	3-5, 4-6	3-5, 4-6
JP5		1-3, 2-4	1-3, 2-4	3-5, 4-6
JP6	1-3, 2-4	3-5, 4-6	3-5, 4-6	3-5, 4-6

CN15 & CN16 - USB Connectors

Figure 2-13: USB Connectors and Pin Assignments

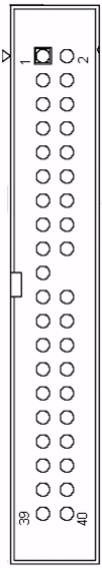


PIN #	SIGNAL NAME	PIN #	SIGNAL NAME
1	5V	2	5V
3	USB A-	4	USB B-
5	USB A+	6	USB B+
7	GND	8	GND
9	N/A	10	N/A

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IDE - UltraATA-133 IDE Connector

Figure 2-14: IDE Connector and Pin Assignments

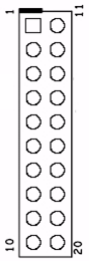


SIGNAL	PIN #	PIN #	SIGNAL
IDERST#	1	2	Ground
PDD 7	3	4	PDD 8
PDD 6	5	6	PDD 9
PDD 5	7	8	PDD 10
PDD 4	9	10	PDD 11
PDD 3	11	12	PDD 12
PDD 2	13	14	PDD 13
PDD 1	15	16	PDD 14
PDD 0	17	18	PDD 15
Ground	19	20	No connect
PDREQ	21	22	Ground
PDIOW#	23	24	Ground
PDIOR#	25	26	Ground
PIORDY	27	28	IDEPU0
PDDACK#	29	30	Ground
IDEIRQ	31	32	No connect
PDA1	33	34	P66DET
PDA0	35	36	PDA2
PCS1#	37	38	PCS3#
IDEACTP#	39	40	Ground

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JP1 - System Panel Connector

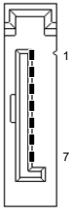
Figure 2-15: JP1 and Pin Assignments



PIN #	SIGNAL NAME	PIN #	SIGNAL NAME
1	5V	11	Buzzer
2	NA	12	N/A
3	POWER LED	13	N/A
4	NA	14	5V
5	GND	15	RESET
6	GND	16	GND
7	NA	17	HDD LED
8	PS ON	18	5V
9	5VSB	19	POWER BTW
10	PME	20	GND

SATA1 & SATA2 - Serial-ATA Ports

Figure 2-16: SATA Connectors and Pin Assignments



PIN	SIGNAL	FUNCTION
1	GND	Ground
2	SATA_TXP	Serial ATA Transmit
3	SATA_TXN	Pair
4	GND	Ground
5	SATA_RXN	Serial ATA Receive
6	SATA_RXP	Pair
7	GND	Ground

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3 Getting Started

This chapter provides information on how to install required components for the NuPRO-720 SBC. The installation of memory modules, CompactFlash cards, operating system and drivers are explained.

3.1 Memory Module Installation

The NuPRO-720 supports up to 2 GB of DDR 400/333 MHz memory modules via two DDR DIMM sockets. Each DDR module has a 184-pin footprint. The DDR modules are notched to facilitate correct installation on the DIMM sockets.

Memory Configuration Options

The NuPRO-720 allows you to install 256 MB, 512 MB and 1GB unbuffered non-ECC DDR DIMMs into the DIMM sockets following these configuration options:

- It is recommended that you install DIMMs with the same CAS latency. For maximum compatibility, install memory modules with the same brand, model, and/or rating.

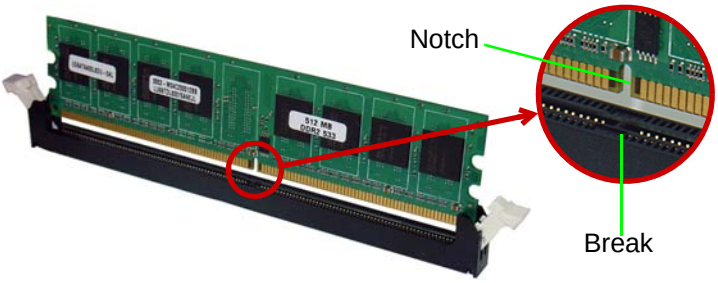
To install a memory module:

1. Locate the DIMM slots on the motherboard (DIMM1 and DIMM2).
2. Press the socket's retaining clips outward to unlock.

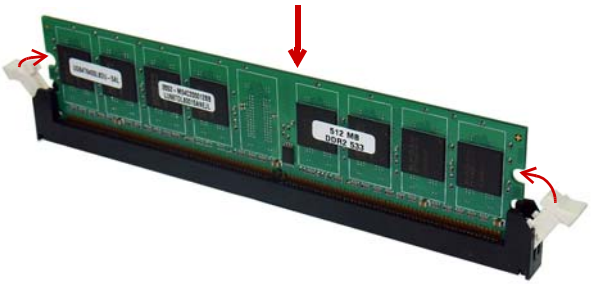


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3. Align the memory module on the socket making sure that the notch matches the break on the socket.



4. Insert the module firmly into the slot until the retaining clips snap back inwards and the module is securely seated.



3.2 CompactFlash Card Installation

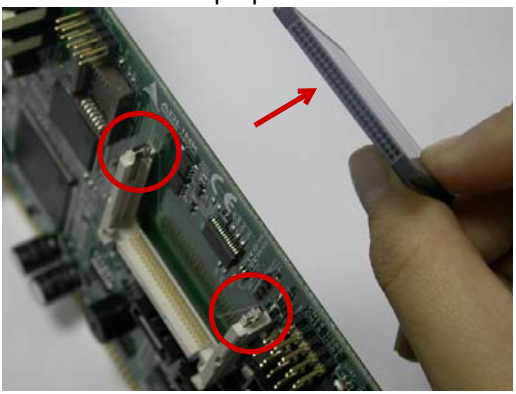
The NuPRO-720 supports standard CompactFlash memory cards via the CN2 CompactFlash type II socket.

To install a CompactFlash card:

1. Locate the CN2 connector - CompactFlash type II socket slot on the NuPRO-720.

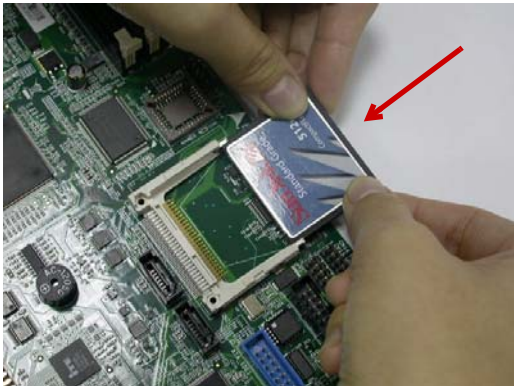


2. Take note of the pin holes on the card and the guide rails of the socket to ensure proper orientation when installing.



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3. Align the card on the socket making sure that the guide rails line up smoothly. Applying too much force may damage the card and/or the socket.



4. Insert the card firmly into the socket until the card and be sure that the socket pins are completely inserted into the card pin holes.



3.3 Operating System Installation

The NuPRO-720 supports Microsoft Windows XP. In order for the system to recognize the IDE and SATA devices supported by the VIA VT6421L Controller, the SATA controller driver must be installed immediately after booting from the Windows Setup CD.

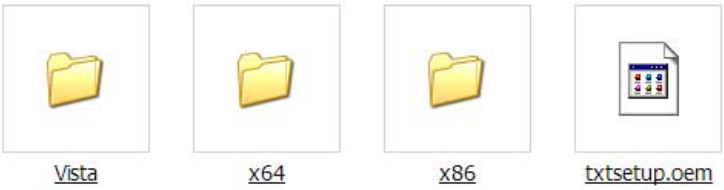
NOTE:

If the SATA controller driver is not installed at the beginning of the Windows XP installation procedure, the system will not recognize any IDE or SATA storage devices.

SATA Controller Driver

Follow these instructions to install SATA controller driver.

1. Copy the SATA controller driver files from the following location on the ADLINK All-in-One CD to a floppy disc: **X:\NuPRO\NuPRO-720\SATA\Driver**.



2. Connect a USB Floppy drive to the NuPRO-720 using the 2-port USB bracket and cable included with SBC.
3. Boot from the Windows XP Setup disk and press '**F6**' as soon as you see the '**Press F6 if you need to install a 3rd party SCSI or RAID driver'** message.
4. Insert the floppy disk containing the SATA controller driver files and press '**S = Specify Additional Device**'.
5. The next screen will give you several options. Choose the **[VIA V-RAID Controller Series (Windows XP/SRV 2003)]** option and Press '**ENTER**'. The SATA controller driver will begin loading from the floppy disk.
6. After the SATA controller driver installation is completed, you should see a screen that indicates that you have installed the SATA controller driver successfully. Press '**ENTER**' to proceed with the Windows XP installation.

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3.4 Driver Installation

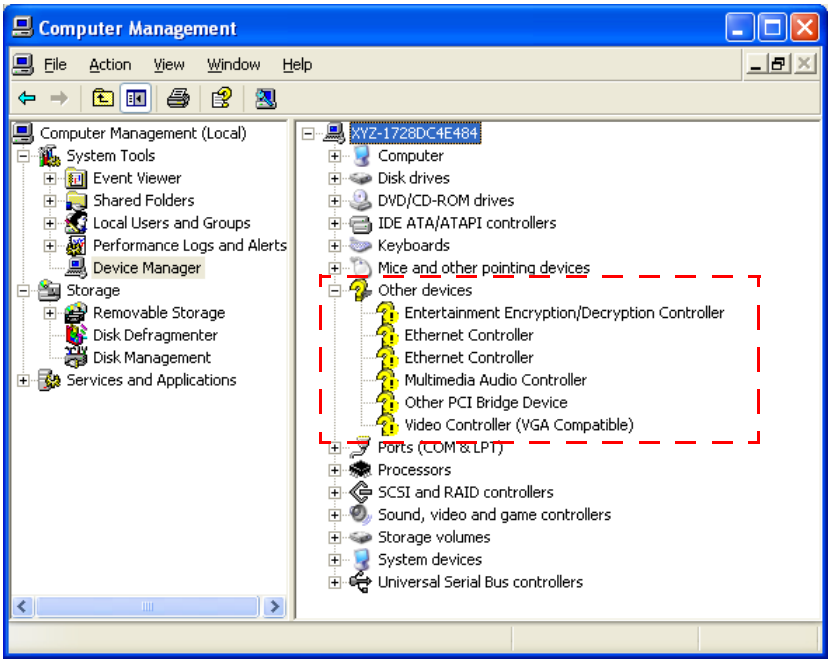
This section provides information on how to install the NuPRO-720 device drivers under Windows XP. The device drivers are located in the following ADLINK All-in-One CD directories:

Chipset driver	\NuPRO\NuPRO-720\Chipset\
Display driver	\NuPRO\NuPRO-720\VGA\
LAN driver	\NuPRO\NuPRO-720\Ethernet\
ISA driver	\NuPRO\NuPRO-720\ISA\
Audio driver	\NuPRO\NuPRO-720\Audio\
DB-AC97S driver	\Audio Daughter Board\DB-AC97S\

General Installation Guidelines

1. Check if your system meets minimum Windows XP configuration requirements. The Windows XP OS must be fully installed and running normally on the system before installing any drivers. Close all running applications.
2. Place the ADLINK All-In-One CD into your optical drive.
3. Find '**My Computer**' on your Windows Desktop and right click on it, select '**Manage**' and left click it to open the '**Computer Management**' window.
4. Click on '**Device Manager**' as shown below and the right hand pane will display a list of devices that have not been properly installed on your system. These will be highlighted in **yellow** with **question marks** next to their status (see screen capture below).

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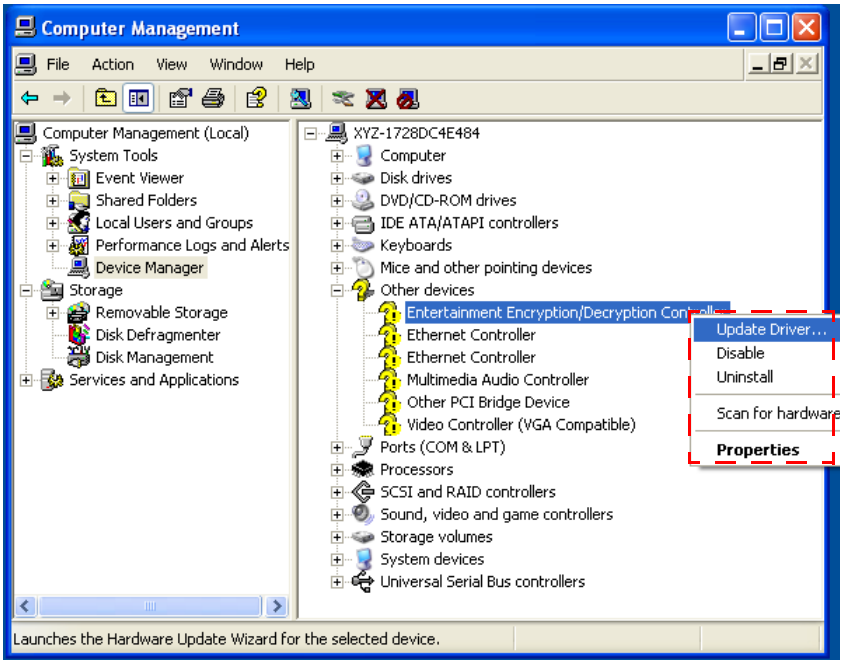


The following instructions will explain specific driver installation procedures.

Chipset Driver

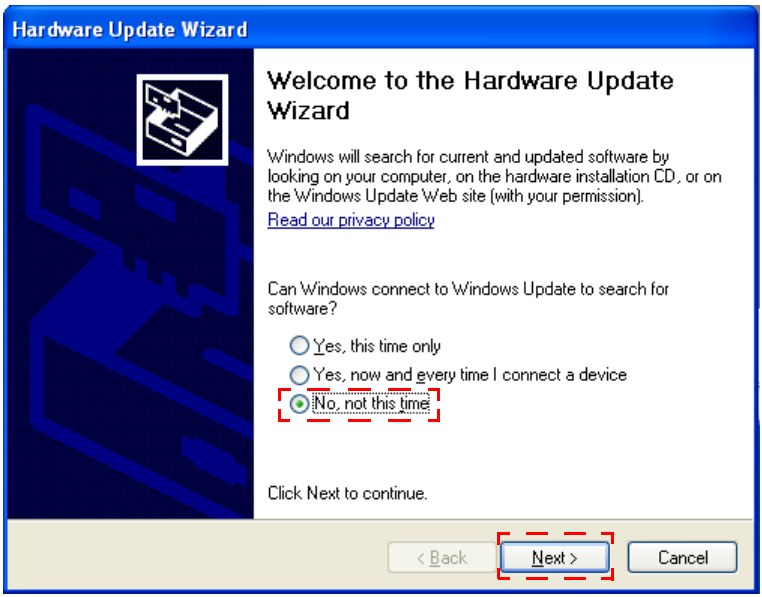
This section describes how to manually install the chipset driver.

1. Follow the basic instructions laid out in the **General Installation Guidelines** section above.
2. In the '**Computer Management**' window on the right side right click the '**Entertainment Encryption/Decryption Controller**'.
3. A dialog box will appear. Select '**Update Driver...**'

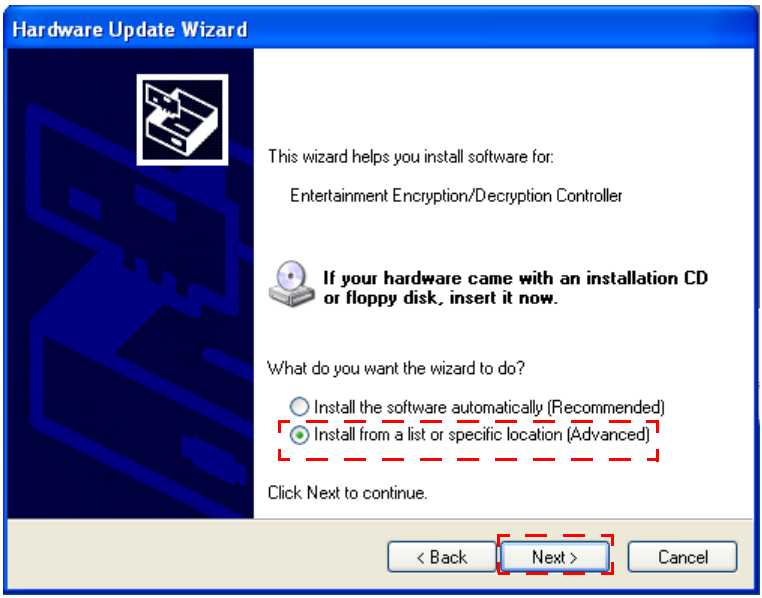


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4. The '**Hardware Update Wizard**' dialog box will open. Read the instructions and then click option 3, '**No, not this time**', then click '**Next**' to continue.

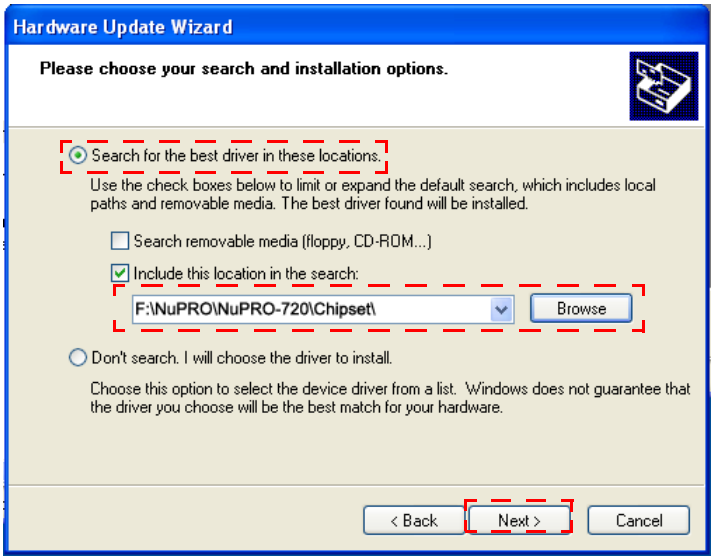


5. The next screen will prompt you to search for where the software/driver for your device is located. Click option 2, '**Install from a list or specific location (Advanced)**' and then click next.

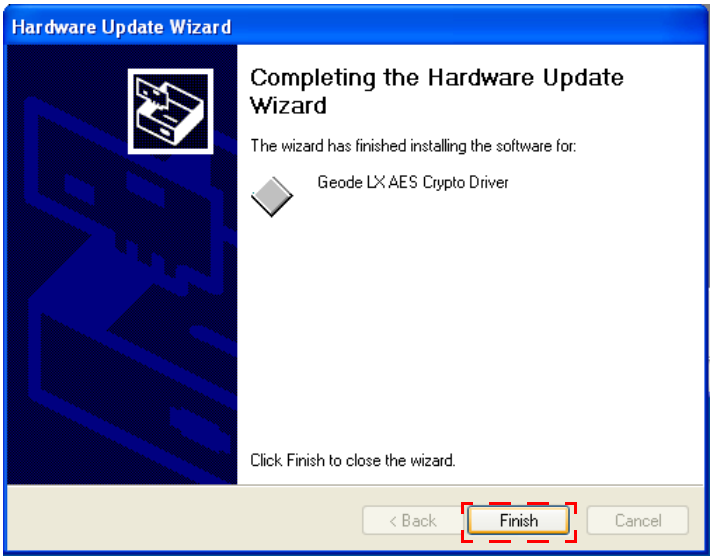


6. At the next screen select '**Search for the best driver in these locations**' and click the tab '**Include this location in the search**'. Click the '**Browse**' button and locate the following folder/file in the ADLINK All-in-One CD:
X:\NuPRO\NuPRO-720\Chipset
Press '**Next**' to install the inf files.

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7. After successfully installing the files, the '**Hardware Update Wizard**' will display the following screen. Click '**Finish**'.

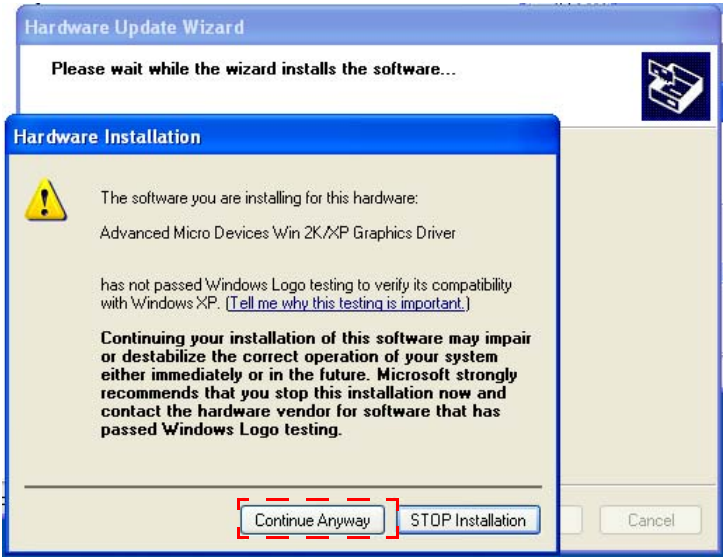


Display Driver

This section describes how to manually install the display driver.

1. Follow the basic instructions laid out in the **General Installation Guidelines** section above.
2. In the '**Computer Management**' window on the right side right click the '**Video Controller (VGA Compatible)**'.
3. A dialog box will appear. Select '**Update Driver...**'
4. The '**Hardware Update Wizard**' dialog box will open. Read the instructions and then click option 3, '**No, not this time**', then click '**Next**' to continue.
5. The next screen will prompt you to search for where the software/driver for your device is located. Click option 2, '**Install from a list or specific location (Advanced)**' and then click '**Next**'.
6. At the next screen select '**Search for the best driver in these locations**' and click the tab '**Include this location in the search**'. Click the '**Browse**' button and locate the following folder/file in the ADLINK All-in-One CD:
   X:\NuPRO\NuPRO-720\Chipset
   Press '**Next**' to install the inf files.
7. You may receive a '**Hardware Installation**' notice that informing you that the video driver has not passed Windows Logo testing to verify compatibility with Windows XP. Click '**Continue Anyway**' and proceed.

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8. After successfully installing the files, the '**Hardware Update Wizard**' will display the '**Completing the Hardware Update Wizard**' screen. Click '**Finish**'.
9. You may now setup the display properties from the Windows Control Panel normally.

LAN Driver

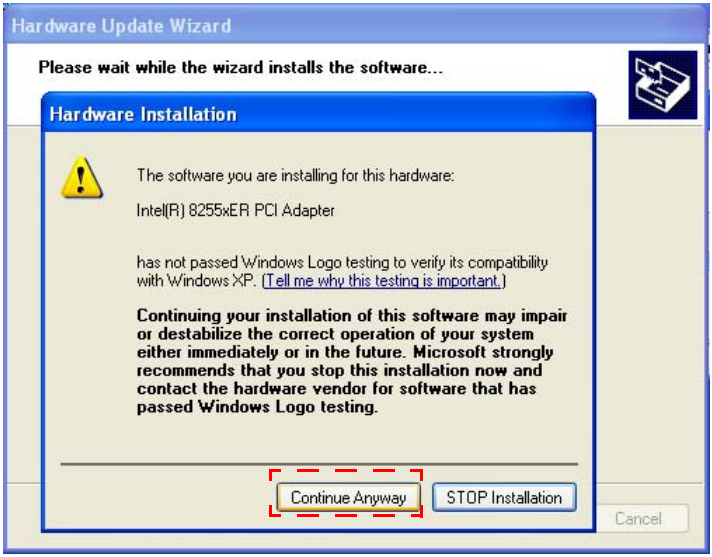
Follow these instructions to manually install the LAN driver.


NOTE:

There are two Ethernet controllers. The following procedure must be performed twice to properly complete LAN driver installation.

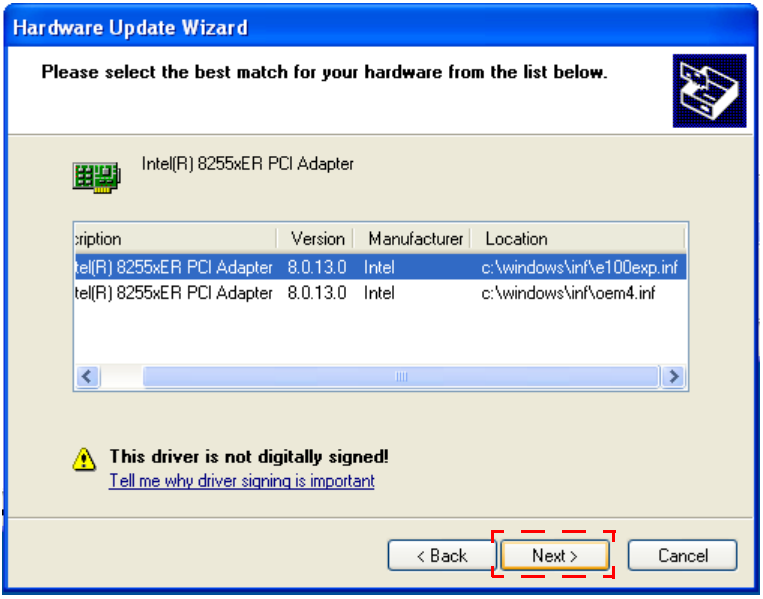
1. Follow the basic instructions laid out in the **General Installation Guidelines** section above.
2. In the '**Computer Management**' window on the right side right click the '**Ethernet Controller**'.
3. A dialog box will appear. Select '**Update Driver...**'
4. The '**Hardware Update Wizard**' dialog box will open. Read the instructions and then click option 3, '**No, not this time**', then click '**Next**' to continue.
5. The next screen will prompt you to search for where the software/driver for your device is located. Click option 2, '**Install from a list or specific location (Advanced)**' and then click '**Next**'.
6. At the next screen select '**Search for the best driver in these locations**' and click the tab '**Include this location in the search**'. Click the '**Browse**' button and locate the following folder/file in the ADLINK All-in-One CD:
   X:\NuPRO\NuPRO-720\Ethernet
   Press '**Next**' to install the inf files.
7. You may receive a '**Hardware Installation**' notice that will prompt you that the LAN driver has not passed Windows Logo testing to verify compatibility with Windows XP. Click '**Continue Anyway**' and proceed.

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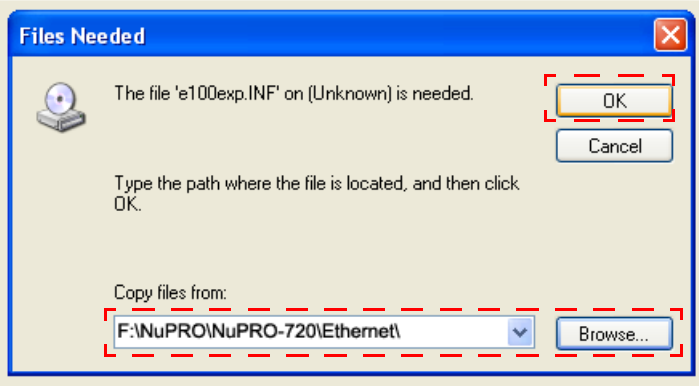


8. After successfully installing the files, the '**Hardware Update Wizard**' will display the '**Completing the Hardware Update Wizard**' screen. Click '**Finish**'.
9. When you install the second Ethernet controller driver you may receive a '**Hardware Update Wizard**' notice informing you that the LAN driver is not digitally signed. Ignore this and click '**Next**' to continue driver installation. The system may ask you for the location of the **e100exp.inf** file (Windows XP). Browse to the appropriate location on the ADLINK All-In-One CD.

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10. The **e100exp.inf** file should be located at:
X:\NuPRO\NuPRO-720\Ethernet



11. After the location and installation of the files, you may setup the network properties from the Windows Control Panel normally.

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ISA Driver

Follow these instructions to install the ISA driver.

1. Follow the basic instructions laid out in the **General Installation Guidelines** section.
2. In the '**Computer Management**' window on the right side right click the '**Other PCI Bridge Devices**'.
3. A dialog box will appear. Select '**Update Driver...**'
4. The '**Hardware Update Wizard**' dialog box will open. Read the instructions and then click option 3, '**No, not this time**', then click '**Next**' to continue.
5. The next screen will prompt you to search for where the software/driver for your device is located. Click option 2, '**Install from a list or specific location (Advanced)**' and then click '**Next**'.
6. At the next screen select '**Search for the best driver in these locations**' and click the tab '**Include this location in the search**'. Click the '**Browse**' button and locate the following folder/file in the ADLINK All-in-One CD:
   X:\NuPRO\NuPRO-720\ISA
   Press '**Next**' to install the inf files.
7. After successfully installing the files, the '**Hardware Update Wizard**' will display the '**Completing the Hardware Update Wizard**' screen. Click '**Finish**'.
8. You may now change the ISA settings from the Windows Control Panel normally.

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Audio Driver

NOTE:

The Onboard Audio in the BIOS must be enabled before installing the audio driver (see “Advanced Chipset Features” on page 60). If you are not using the optional DB-AC97S Audio Daughter Board, please skip the remaining sections and make sure to disable the Onboard Audio in the BIOS.

Follow these instructions to install the chipset audio driver.

1. Follow the basic instructions laid out in the **General Installation Guidelines** section.
2. In the ‘**Computer Management**’ window on the right side right click the ‘**Multimedia Audio Controller**’.
3. A dialog box will appear. Select ‘**Update Driver...**’
4. The ‘**Hardware Update Wizard**’ dialog box will open. Read the instructions and then click option 3, ‘**No, not this time**’, then click ‘**Next**’ to continue.
5. The next screen will prompt you to search for where the software/driver for your device is located. Click option 2, ‘**Install from a list or specific location (Advanced)**’ and then click ‘**Next**’.
6. At the next screen select ‘**Search for the best driver in these locations**’ and click the tab ‘**Include this location in the search**’. Click the ‘**Browse**’ button and locate the following folder/file in the ADLINK All-in-One CD:
   X:\NuPRO\NuPRO-720\Audio
   Press ‘**Next**’ to install the inf files.
7. You may receive a ‘**Hardware Installation**’ notice that will prompt you that the video driver has not passed Windows Logo testing to verify compatibility with Windows XP. Click ‘**Continue Anyway**’ and proceed.
8. After successfully installing the files, the ‘**Hardware Update Wizard**’ will display the ‘**Completing the Hardware Update Wizard**’ screen. Click ‘**Finish**’.

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DB-AC97S Audio Daughter Board

Follow these instructions to install the driver for the optional DB-AC97S daughter board.

1. Place the ADLINK All-in-One CD to the optical drive.
2. Locate the following directory:
   X:\Audio Daughter Board\DB-AC97S\98me2k_driver\wdm_drv2
   then double-click on the **setup.exe** file to start installation.
3. Follow the onscreen instructions to complete installation, then restart the system if prompted.


NOTE:

Make sure to enable the Onboard Audio in the BIOS before installing the DB-AC97S Audio Daughter Board (see “Advanced Chipset Features” on page 60).

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4 Watch Dog Timer

NuPRO-720 implements a watch dog timer (WDT) embedded in the LPC based Winbond 83627HG Super I/O controller.

The Watchdog timer consists of a one-second/minute resolution counter (CRF6 on logical device 8 of 83627HG) and two watch dog control registers (CRF5 and CRF7 on logical device 8). Once a value is set in the WDT, the timer begins to count down.

Any movement in the keyboard, mouse, or software reset of the value will cause a reload of the timer value. The Watchdog output is connected to “reset”. If the system hangs without a software re-trigger, the system will be reset.

The watch dog timer has a one second granularity up to 255 seconds or a one minute granularity up to 255 minutes. The keyboard and mouse will only reset the WDT if Bit 7 and 6 of CRF7 is set; that is values greater than C0h or 192 decimal.

To configure the registers and set up the watch dog timer, the following sequence should be followed:

- Write 87h to location 2Eh twice to enter extended function mode
- Configure the registers to set up the WDT
- Write 0AAh to location 2Eh to exit the extended function mode

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The example shown below resets the system after 15 seconds. Both keyboard and mouse interrupts will reload the WDT from CRF6.

```
begin:
;————————————————————————————————————————————
; Enter extended function mode, interrupt double-write
;————————————————————————————————————————————
     mov dx,2Eh
     mov al,87h
     out dx,al
     out dx,al
     mov dx,2Eh
     mov al,2bh      ;CR2B, bit4 -> 0 = WDTO
                     ;bit4 -> 1 = GP24
     out dx,al
     mov dx,2Fh
     mov al,0C0h
     out dx,al

     mov dx,2Eh
     mov al,07h
     out dx,al
     mov dx,2Fh
     mov al,08h      ;device 8
     out dx,al

     mov dx,2Eh
     mov al,30h
     out dx,al

     mov dx,2Fh
     mov al,01h      ;enable device 8
     out dx,al

     mov dx,2Eh
     mov al,0F7h
     out dx,al       ;device 8, CRF7
     mov dx,2Fh
     mov al,0C0h
     out dx,al

     mov dx,2Eh
     mov al,0F5h     ;device 8, CRF5
```

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```
        out dx,al
        mov dx,2Fh
        mov al,00h      ;bit3 -> 0 = second
                        ;bit3 -> 1 = minute
        out dx,al
        mov dx,2Eh
        mov al,0F6h     ;device 8, CRF6
        out dx,al
        mov dx,2Fh
        mov al,0Fh
        out dx,al
;-------------------------------------------------------
; Exit extended function mode
;-------------------------------------------------------
        mov dx,2Eh
        mov al,0AAh
        out dx,al

.exit

end
```

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5 BIOS Setup

5.1 Description

NuPRO-720 uses Phoenix Award PCI/ISA BIOS ver 6.0 for system configuration. The Award BIOS setup program is designed to provide maximum flexibility in configuring the system by offering various selectable options to meet end-user requirements. This chapter is written to assist you in the proper usage of these features.

To access the Phoenix AWARD PCI/ISA BIOS Setup program, during initial system power up; press the <Del> key. The Main Menu will be displayed.

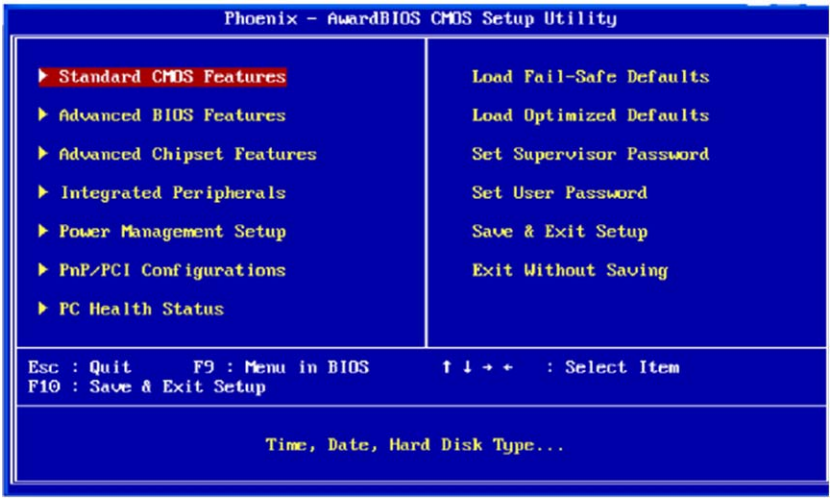


Figure 5-1: Setup Utility Screen Capture

To highlight items press the arrow keys, < `Enter` > to select, the < `PgUp` > and < `PgDn` > keys to change entries, < `F1` > for help and < `Esc` > to quit. The section below the setup items of the main menu displays the control keys for this menu. Another section at the bottom of the main menu just below the control keys section displays information on the currently highlighted item in the list.

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The BIOS also supports storing the CMOS settings into non-volatile ROM by using the F6 or F7 keys.


NOTE:

After making and saving system changes with setup, you may find that your computer does not normally boot, the BIOS supports an override to the CMOS settings that resets your system to its Default values if a critical error occurs.

We strongly recommend that you avoid making any changes to chipset Defaults. These Defaults have been carefully chosen by both the BIOS vendor and your system manufacturer to provide absolute maximum performance and reliability.

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5.2 Standard CMOS Features

The main menu includes the following setup categories. Recall that some systems may not include all entries.

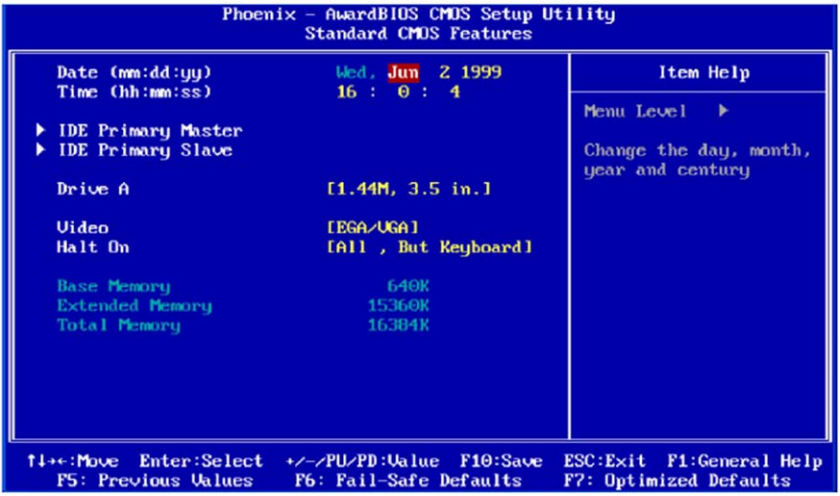


Figure 5-2: CMOS Features Screen Capture

Date

The BIOS determines the day of the week from other date information.

Time

The time format is based on the 24-hour military-time clock. For example, 1 P.M. is 13:00:00. Press the LEFT arrow key 'F' or (appropriate key to move to the desired field). Press the <PgUp> or <PgDn> keys to increment the setting, or type the desired value directly into the field.

IDE Primary Master/Slave Items

This selection brings up a configuration menu of the designated Drive.

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IDE HDD Auto-detection: Press Enter Press Enter to auto-detect the HDD on this channel. If detection is successful, it fills the remaining fields on this menu.

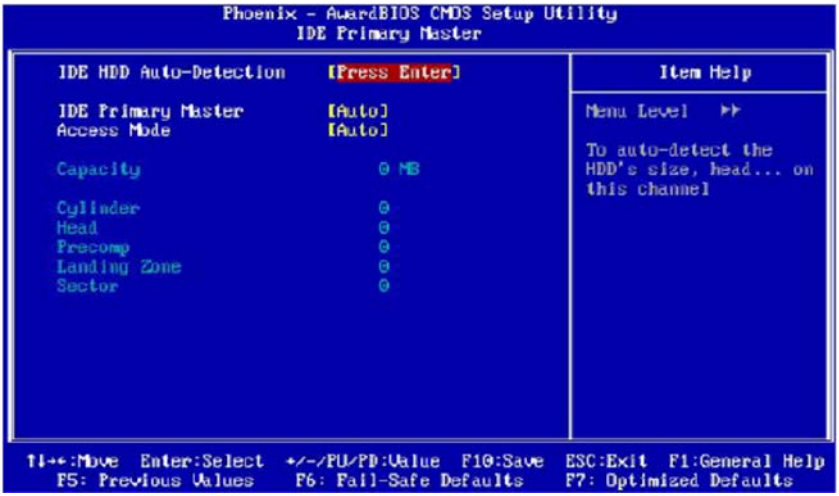


Figure 5-3: IDE Primary Master Screen Capture

IDE Primary Master: None/Auto/Manual Selecting 'manual' allows the user to set the remaining fields on this screen. Selects the type of fixed disk. "User Type" will let you select the number of cylinders, heads, etc.

NOTE:

PRECOMP=65535 means NONE.

Capacity: Auto display disk size Disk drive capacity (approximated).

NOTE:

Disk size is usually slightly greater than the size of a formatted disk given by a disk checking program.

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Access Mode: CHS/LBA/Large/Auto Selects the access mode for a hard disk The following options are selectable only if the 'IDE Primary Master' item is set to 'Manual'

Cylinder: Min = 0 Max = 65535 Sets the number of cylinders for a hard disk.

Head: Min = 0 Max = 255 Sets the number of read/write heads

Precomp: Min = 0 Max = 65535



Setting a value of 65535 means no hard disk

Landing zone: Min = 0 Max = 65535



Setting a value of 65535 means no hard disk

Sector: Min = 0 Max = 255 Number of sectors per track

Video

Selects the type of primary video subsystem in your computer. The BIOS usually detects the correct video type automatically. The BIOS supports a secondary video subsystem, but is not selected in Setup.

Halt On

During the Power On Self Test (POST), the computer stops if the BIOS detects a hardware error. The BIOS can be instructed to ignore certain errors during POST and continue the bootup process. The options are as follows:

- **No errors:** POST does not stop for any errors.
- **All errors:** POST stops for any nonfatal error and will prompt the user to take any corrective measures.
- **All, But Keyboard:** POST does not stop for a keyboard error, but stops for all other errors.
- **All, But Diskette:** POST does not stop for diskette drive errors, but stops for all other errors.
- **All, But Disk/Key:** POST does not stop for a keyboard or disk errors, but stops for all other errors.

Base Memory

Displays the amount of conventional memory detected during boot up.

Extended Memory

Displays the amount of extended memory detected during boot up.

Total Memory

Displays the total memory available on the system.

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5.3 Advanced BIOS Features

This section allows users to configure the system for basic operation. The following features can be selected: system default speed, boot-up sequence, keyboard operation, shadowing, security, CPU internal cache, and CPU external cache.

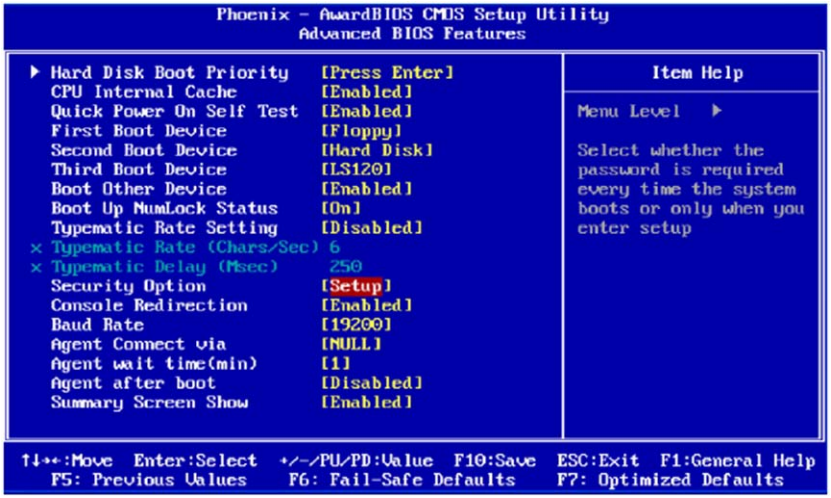


Figure 5-4: Advanced BIOS Features Screen Capture

Hard Disk Boot Priority

Allows Hard Disk Boot Device Priority.

CPU Internal Cache

Enables/disables CPU internal Cache.

Quick Power On Self Test

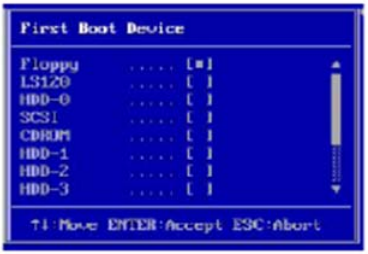
Speeds up the Power On Self Test (POST). If enabled, the BIOS will shorten the test time or skip some check items during POST (default setting: Enabled).

First/Second/Third Boot Device

Pressing <Enter> displays the Boot Device Menu. The BIOS will attempt to load the operating system from the selected device (see menu for options).

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Boot Other Device



Enables the BIOS to boot from a second or third device if booting from the first device fails. When disabled the BIOS will not attempt booting from alternative devices.

Boot Up Floppy Seek

If enabled, the system will search for disk drives during boot up. Disabling will speed up boot up.

Boot-Up NumLock Status

Selects the power on state for system NumLock. Options: On/Off

Typematic Rate Setting

Manually sets the Typematic Rate or the Typematic Delay.

Typematic Rate (Chars/Sec.)

Sets number of characters that can be typed per second on the keyboard.

Typematic Delay (Msec)

The time (in milliseconds) needed before accepting a keystroke on the keyboard.

Security Option

Selects whether a password is required every time the system boots or only when setup is entered. Options include:

- **System:** The system will not boot without password access and access to Setup will be denied if an incorrect password is entered at the prompt.
- **Setup:** The system will boot, but access to Setup will be restricted without password access.

To disable security, select PASSWORD SETTINGS in the Main Menu. The user will then be prompted to enter a password. To disable security, DO NOT type anything, only press <Enter>. Once security is disabled, the system will boot and setup can be accessed.

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Remote Console Function

Enables remote access through POST messages and commands through serial-port access.



Remote Console is a character-based terminal application. It supports either VT100 or ANSI terminals. It does not support graphics or graphical user interfaces.

Console Redirection

Enables/Disables the remote Console Function: The default value is Enabled.

Baud Rate

When Console Redirection is Enabled, the BIOS will allow users to set the serial port's operating baud rate. Options: 9600 bps, 19200 bps, 38400 bps, 57600 bps, and 115200 bps.



The Baud Rate settings between the NuPRO-720 and its monitoring computer must be the same. If they are different, an error message, "Award Preboot Agent Installation Failed" will display and the equipment will not properly communicate.

Agent Connect via

Enables direct connection mode. The NuPRO-720 BIOS only supports NULL mode (connecting two computers to a null modem for direct connection).

Agent Wait Time (min)

Select the amount of time (min) to wait for a successful connection. If the time limit is exceeded, the NuPRO-720 will not communicate with its remote host.

Agent After Boot

Monitors text-based applications (such as DOS) after POST. The default setting is Disabled.

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5.4 Advanced Chipset Features

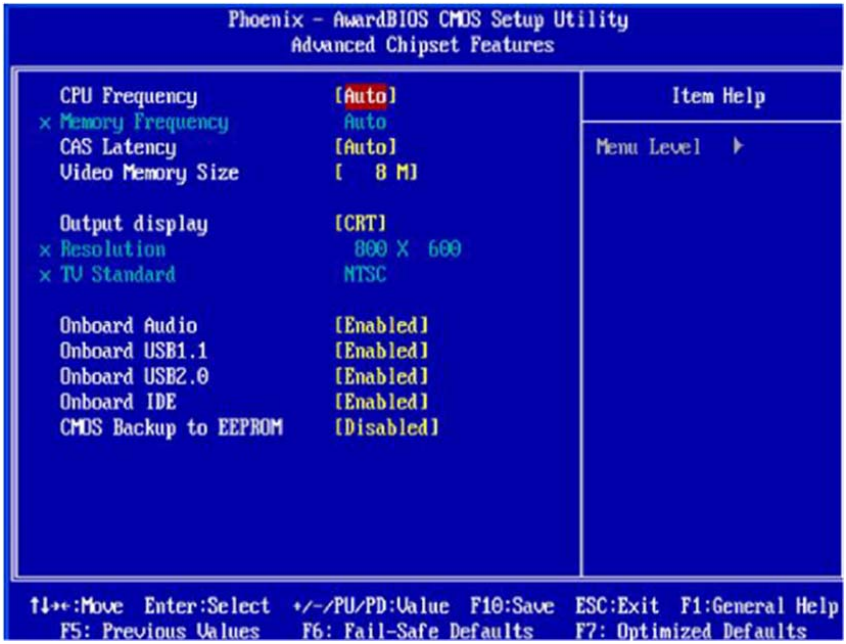


Figure 5-5: Advanced Chipset Features Screen Capture

NOTE:

Please disable onboard audio, if there is no daughter board (DB-AC97S) attached to avoid system errors.

CPU Frequency

Selects the CPU frequency.

Options: Auto, 333 MHz, 400 MHz, 433 MHz, and 500 MHz

Memory Frequency

Selects the memory frequency.

Options: Auto, 200 MHz, 266 MHz, 333 MHz, and 400 MHz

CAS Latency

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When synchronous DRAM is installed, the number of CAS latency clock cycles depend on the DRAM timing.
Options: Auto, 1.5, 2.0, 2.5, 3.0, and 3.5 micro sec.

Video Memory Size

Selects the video memory size.

Options: None/0 MB, 8 MB, 16 MB, 32 MB, 64 MB, and 128 MB

Output Display

Selects the output display device. Allows user to configure the type of external display used.

Options: TV & CRT, CRT, and Panel & CRT

Resolution

Panel & CRT of Output display will Enable the flat panel resolution selection of output

Resolution: 640 x 480, 800 x 600, 1024 x 768, 1280 x 1024, and 1600 x 1200.

TV Standard

TV & CRT of output display will open the settings of TV out format.

Options: NTSC, PAL, and HDTV.

Onboard USB1.1

Turns On/Off the USB 1.1

Options: Disabled/Enabled

Onboard USB2.0

Turns On/Off the USB 2.0

Options: Disabled/Enabled

Onboard IDE

Turns On/Off the onboard primary IDE Port.

Options: Disabled/Enabled

Onboard Audio

Turns On/Off the onboard audio.

Options: Disabled/Enabled

CMOS Backup to EEPROM

The System BIOS uses CMOS to store user BIOS settings. The CMOS Backup to EEPROM saves BIOS settings for use even if system power is shut down. If the BIOS settings are lost due to

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unexpected power failure, etc. the BIOS settings will automatically reset to its default values.

Options: Disabled/Enabled

5.5 Integrated Peripherals

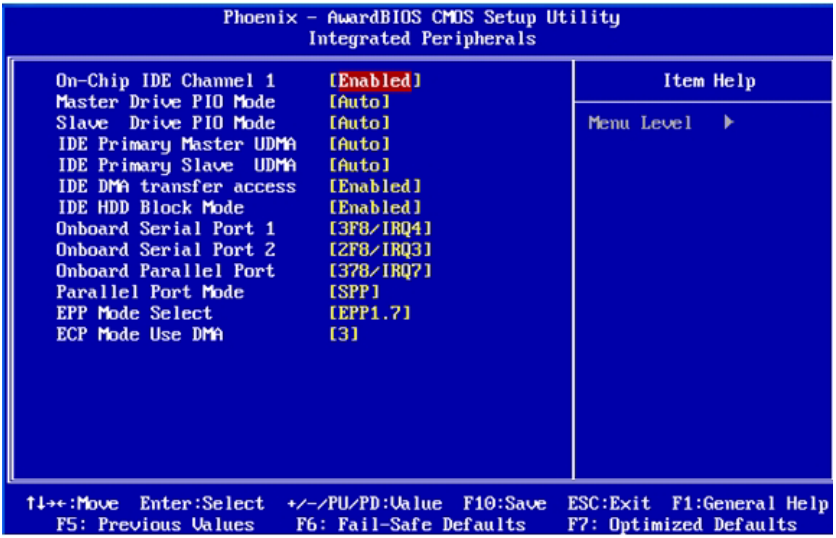


Figure 5-6: Integrated Peripherals Screen Capture

OnChip IDE Channel 1

The integrated peripheral controller contains an IDE interface with support for one IDE channel.

Master/Slave Drive PIO Mode

The four IDE PIO (Programmed Input/Output) fields allow users to set a PIO mode (0 to 4) for each of the four IDE devices that the onboard IDE interface supports. Modes 0 through 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device. Options: Auto, Mode 0, Mode 1, Mode 2, Mode 3, and Mode 4.

IDE Primary & Secondary Master/Slave UDMA

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Ultra DMA implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver. If your hard drive and your system software both support Ultra DMA, select Auto to enable BIOS support.

IDE DMA Transfer Access

Enables/Disables IDE DMA Transfer Access

IDE HDD Block Mode

Enhances disk performance by allowing multi-sector data transfers and eliminates the interrupt handling time for each sector.

Onboard Serial Port 1/2

Selects the address and interrupt for serial ports.

UART Mode Select

Selects the IR (Infra-Red) mode. The onboard serial port 2 offers IrDA and ASKIR modes. Use this menu to select the mode supported by your external IR device.



Choosing the wrong IR mode will prevent your computer from communicating with an external IR device.

Onboard Parallel Port/FDD

Assigns resources to LPT1 or an FDD drive. LPT1 and FDD share the same pins on the X3 connector and only one may be used at a time.

EPP Mode Select

Selects the version of EPP transfer protocol that the parallel port should use. Users may choose the EPP 1.7 or EPP 1.9 version. Generally, EPP 1.9 is the preferred setting because it supports newer EPP 1.9 devices and most EPP 1.7 devices, while offering other advantages such as support for longer cables. However, certain EPP 1.7 devices can not work properly with an EPP 1.9 port. EPP 1.9 is recommended for general use, however, if there are problems connecting to parallel port devices, switch to EPP 1.7

ECP Mode Use DMA

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Determines which DMA channel the parallel port should use when it is in ECP mode. The ECP mode uses the DMA protocol to achieve data transfer rates of up to 2.5 Mbits/s and provides symmetric bidirectional communications.

5.6 Power Management Setup

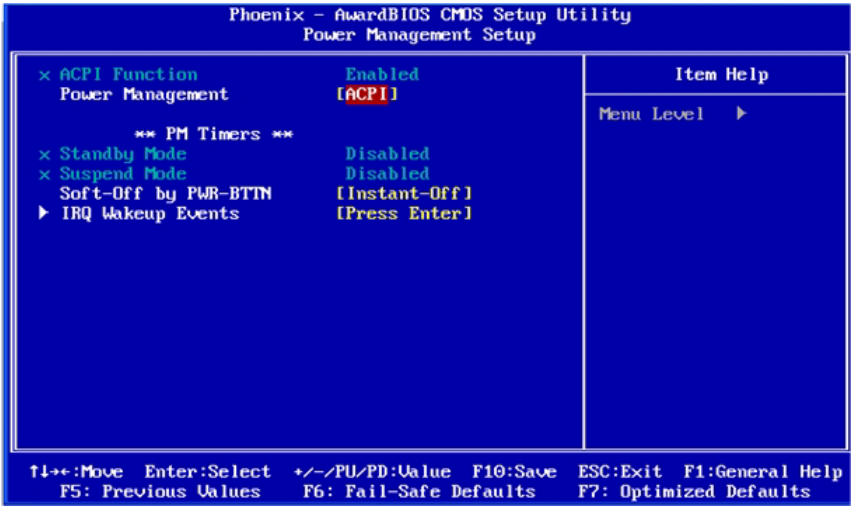


Figure 5-7: Power Management Setup Screen Capture

ACPI Function

Enabled only if the operating system supports ACPI (Advanced Configuration and Power Interface) specifications.

Power Management

This item allows you to select the type of Power Management: Options: Disabled, Legacy, APM, or ACPI.

Standby Mode (PM Timers**):** This Submenu appears only when "Legacy" is enabled in the Power Management menu. Standby mode conserves power by turning off the display and the hard drive after a predetermined period of inactivity (a time-out). When the computer exits standby mode, it returns to the same

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operating state it was in before entering standby mode. Options: 1 sec, 5 sec, 10 sec, 15 sec, 30 sec, 45 sec, 1 min, 5 min, 10 min, 15 min, 30 min, 45 min, 60 min, 90 min, and 120 min

Suspend Mode (PM Timers**):** Sets the period of time after which the suspend mode activates. Options: 1 sec, 5 sec, 10 sec, 15 sec, 30 sec, 45 sec, 1 min, 5 min, 10 min, 15 min, 30 min, 45 min, 60 min, 90 min, and 120 min

Soft-Off by PWR-BTTN: Configures the power button:

- Instant-Off: The power button functions as a normal power-on/-off button.
- Delay 4 Sec: The system is turned off if the power button is pressed for more than four seconds.

IRQ Wake-up Events:

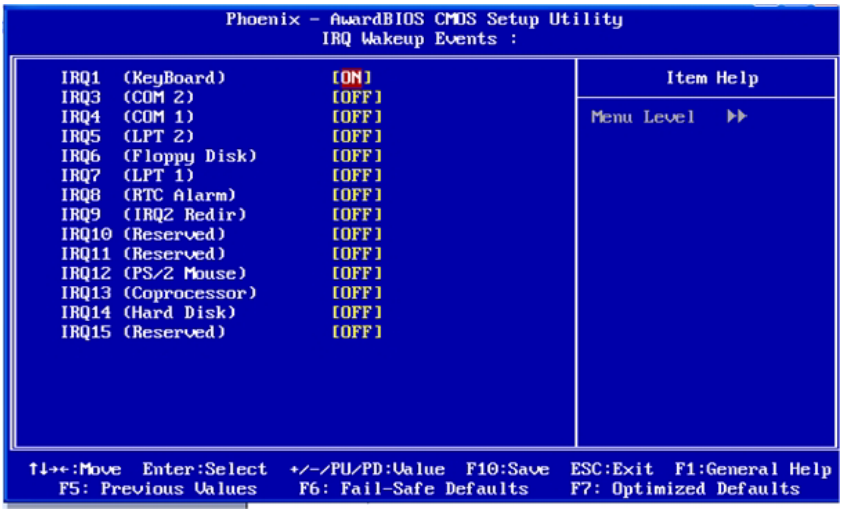


Figure 5-8: IRQ Wake-up Events Screen Capture

IRQ1-15: Enables or disables IRQ Wake-up Events.

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5.7 PnP/PCI Configurations

This section describes configuring the PCI (Personal Computer Interconnect) bus system. PCI is a system which allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its own components.

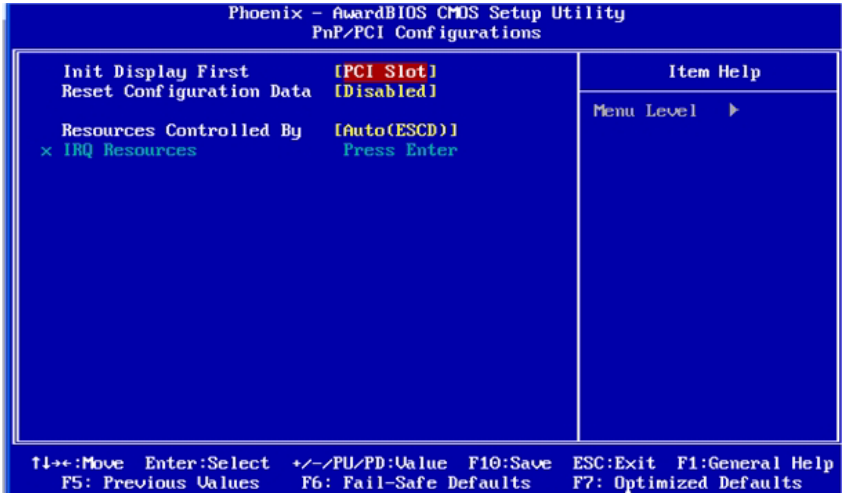


Figure 5-9: PnP/PCI COnfigurations Screen Capture

Init Display First

Selects whether to first activate the PCI slot or on-chip VGA.

Reset Configuration Data

Resets the Extended System Configuration Data (ESCD). The default is set to Disabled. Enable if system does not properly function or communicate with add-ons/peripherals or in the event of a system crash where the operating system cannot boot. Options: Enabled/Disabled.

Resources Controlled By

Automatically configures all boot, and Plug and Play compatible devices. If set to Auto, all interrupt requests (IRQ) and DMA assignment fields are cleared, as the BIOS automatically assigns them.

- ▶ IRQ Resources:
  - ▷ When controlling resources manually, assign each system interrupt specifically, depending on the type of device (PCI or ISA) using the interrupt. Options: (IRQ´s) PCI device, Reserved (for ISA-Devices).

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5.8 PC Health Status

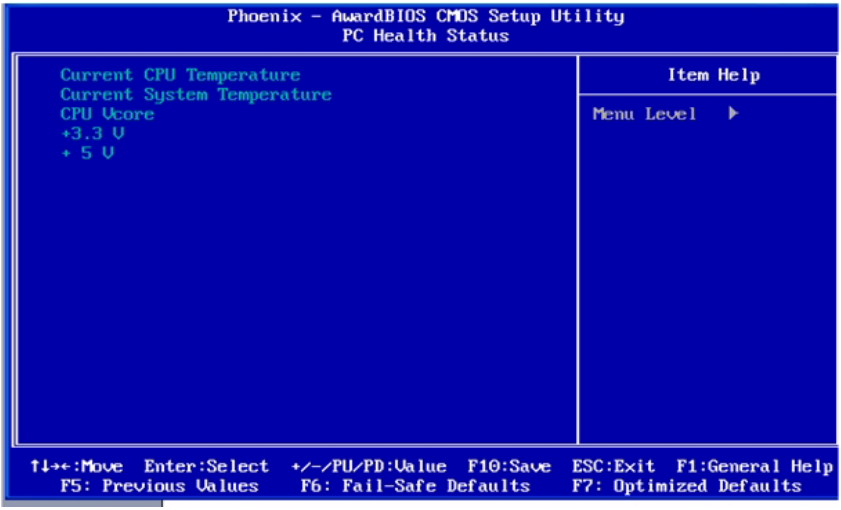


Figure 5-10: PC Health Status Screen Capture

Current CPU Temp.

Displays the current CPU temperature.

Current System Temp.

Displays the current system temperature.

CPU VCORE, +3.3 V, +5 V

Displays the actual voltage levels on the board

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5.9 Load Fail-Safe Defaults

This option allows you to load all BIOS fail-safe Default values permanently stored in the BIOS ROM. These Default settings are non-optimal and Disable all high-performance features. Typing `Y` will load all fail-safe Defaults to CMOS memory. Typing `N` will return to the Setup Utility Main Screen.

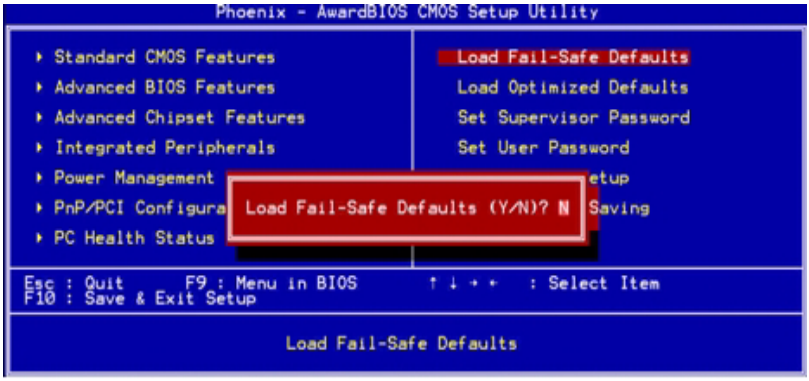


Figure 5-11: Load Fail-Safe Defaults Screen Capture

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5.10 Set Supervisor & User Password

These two options set the system password. Supervisor Password sets a password that will be used to protect the system and Setup utility. User Password sets a password that will be used exclusively on the system. To specify a password, highlight the type you want and press < Enter >. The “Enter Password:” message prompts you on the screen. Type the password, up to eight characters in length, and press < Enter >. The system confirms your password by asking you to type it again. After setting a password, the screen automatically returns to the main screen.

To Disable a password, just press the < Enter > key when you are prompted to enter the password. A message will confirm the password to be Disabled. Once the password is Disabled, the system will boot and you can enter Setup freely.

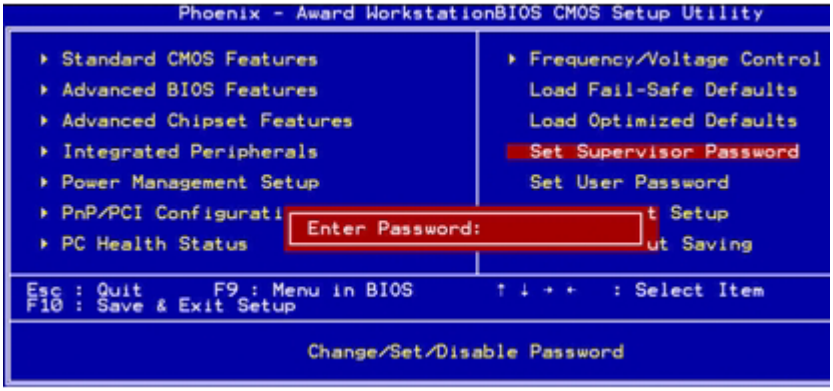


Figure 5-12: Enter Password Screen Capture

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5.11 Save & Exit Setup

This option allows you to determine whether to accept any modifications or not. Typing `Y` will quit the setup utility and save all changes into the CMOS memory. Typing `N` will return to the Setup Utility Main Screen.

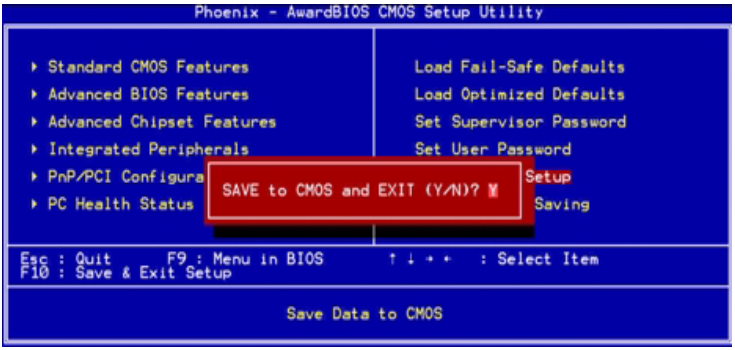


Figure 5-13: Save to CMOS and Exit Screen Capture

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5.12 Exit Without Saving

Select this option to exit the Setup utility without saving the changes you have made in this session. Typing `Y` will quit the Setup utility without saving any modifications. Typing `N` will return to Setup utility.

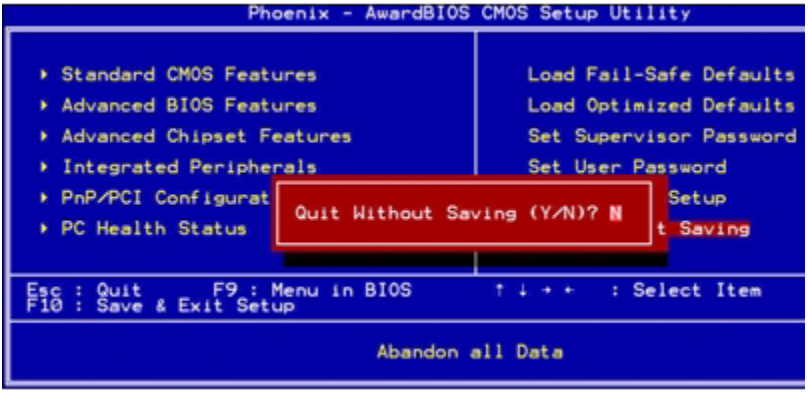


Figure 5-14: Quit Without Saving Screen Capture

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6 POST Messages

If your system BIOS detects an error during the Power On Self-Test (POST), it will prompt the user by either sounding a beep code or displaying a message. If a message is displayed, it will be accompanied by:

```
PRESS F1 TO CONTINUE, OR DEL TO ENTER SETUP
```

6.1 POST Beep

Currently there are two kinds of beep codes in BIOS:

- This first beep code indicates that a video error has occurred and the BIOS cannot initialize the video screen to display any additional information. This beep code consists of a single long beep followed by two short beeps.
- The second beep code indicates that a DRAM error has occurred. This beep code consists of a repeated single long beep.

6.2 Error Messages

One or more of the following messages may be displayed if the BIOS detects an error during POST.

CMOS CHECKSUM ERROR - DEFAULTS LOADED

Checksum of CMOS is incorrect. This may indicate that CMOS has become corrupt. This error may have been caused by a weak battery. Check the battery and replace if necessary.

DISK BOOT FAILURE, INSERT SYSTEM DISK AND PRESS ENTER

No boot device was found. This could mean that either a boot drive was not detected or the drive does not contain proper system boot files. Insert a system disk into Drive A: and press <Enter>. If you assumed the system would boot from the hard drive, make sure the controller is inserted correctly and all cables are properly attached. Also be sure the disk is formatted as a boot device. Reboot the system.

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DISKETTE DRIVES OR TYPES MISMATCH ERROR - RUN SETUP

Type of diskette drive installed in the system is different from the CMOS definition. Run Setup to re-configure the drive type correctly.

DISPLAY SWITCH IS SET INCORRECTLY

Display switch on the motherboard can be set to either monochrome or color. This indicates the switch; is set to a different setting than indicated in Setup. Determine which setting is correct, then either turn off the system and change the jumper, or enter Setup and change the VIDEO selection.

FLOPPY DISK CNTRLR ERROR OR NO CNTRLR PRESENT

Cannot find or initialize the floppy drive controller. Make sure the controller is installed correctly and firmly. If there are no floppy drives installed, be sure the Diskette Drive selection in Setup is set to NONE.

KEYBOARD ERROR OR NO KEYBOARD PRESENT

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot. If you are purposely configuring the system without a keyboard, set the error halt condition in Setup to HALT ON ALL, BUT KEYBOARD. This will cause the BIOS to ignore the missing keyboard and continue the boot.

OFFENDING ADDRESS NOT FOUND

This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem cannot be isolated.

OFFENDING SEGMENT

This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem has been isolated.

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PRESS A KEY TO REBOOT

This will be displayed at the bottom screen when an error occurs that requires you to reboot. Press any key and the system will reboot.

PRESS F1 TO DISABLE NMI, F2 TO REBOOT

When BIOS detects a Non-Maskable Interrupt condition during boot, you can choose to disable the NMI and continue to boot, or you can reboot the system with NMI enabled.

RAM PARITY ERROR - CHECKING FOR SEGMENT

Indicates a parity error in Random Access Memory.

SYSTEM HALTED, (CTRL-ALT-DEL) TO REBOOT

Indicates the present boot attempt has been aborted and the system must be rebooted. Press and hold down the CTRL and ALT keys and press DEL.

MEMORY TEST FAIL

BIOS reports the memory test as failed if the onboard memory test results in an error.

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6.3 POST Codes

The following is a list of Normal POST Codes.

Code (hex)	Name	Description
C0	Turn Off Chipset And CPU test	OEM Specific-Cache control cache Processor Status (1FLAGS) Verification. Tests the following processor status flags: Carry, zero, sign, overflow, The BIOS sets each flag, verifies They are set, then turns each flag off and verifies it is off.
C1	Memory Presence	First block memory detect OEM Specific-Test to size on-board memory. Early chip set initialization Memory presence test OEM chip set routines Clear low 64K of memory Test first 64K memory.
C2	Early Memory Initialization	OEM Specific- Board Initialization
C3	Extend Memory DRAM select	OEM Specific- Turn on extended memory Initialization Cyrix CPU initialization Cache initialization
C4	Special Display Handling	OEM Specific- Display/Video Switch Handling so that Switch Handling display switch errors never occurs
C5	Early Shadow	OEM specific- Early shadow enable for fast boot
C6	Cache presence test	External cache size detection
CF	CMOS Check	CMOS checkup
B0	Spurious	If interrupt occurs in protected mode.
B1	Unclaimed NMI	If unmasked NMI occurs, display Press F1 to disable NMI, F2 reboot.
BF	Program Chip Set	To program chipset from defaults values
E1-EF	Setup Pages	E1- Page 1, E2 - Page 2, etc.
1	Force load Default to chipset	Chipset defaults program
2	Reserved	
3	Early Superio Init	Early Initialized the super IO
4	Reserved	
5	Blank video	Reset Video controller
6	Reserved	
7	Init KBC	Keyboard controller init

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Code (hex)	Name	Description
8	KB test	Test the Keyboard
9	Reserved	
A	Mouse Init	Initialized the mouse
B	Onboard Audio init	Onboard audio controller initialize if exist
C	Reserved	
D	Reserved	
E	CheckSum Check	Check the integrity of the ROM, BIOS and message
F	Reserved	
10	Auto detect EEPROM	Check Flash type and copy flash write/erase routines to 0F000h segments
11	Reserved	
12	Cmos Check	Check Cmos Circuitry and reset CMOS
13	Reserved	
14	Chipset Default load	Program the chipset registers with CMOS values
15	Reserved	
16	Clock Init	Init onboard clock generator
17	Reserved	
18	Identify the CPU	Check the CPU ID and init L1/L2 cache
19	Reserved	
1A	Reserved	
1B	Setup Interrupt Vector Table	Initialize first 120 interrupt vectors with SPURIOUS_INT_HDLR and initialize INT 00h-1Fh according to INT_TBL
1C	Reserved	
1D	Early PM Init	First step initialize if single CPU onboard
1E	Reserved	
1F	Re-initial KB	Re-init KB
20	Reserved	
21	HPM init	If support HPM, HPM get initialized here
22	Reserved	
23	Test CMOS Interface and Battery Status	Verifies CMOS is working correctly, detects bad battery. If failed, load CMOS defaults and load into chipset

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Code (hex)	Name	Description
24	Reserved	
25	Reserved	
26	Reserved	
27	KBC final Init	Final Initial KBC and setup BIOS data area
28	Reserved	
29	Initialize Video Interface	Read CMOS location 14h to find out type of video in use. Detect and Initialize Video Adapter.
2A	Reserved	
2B	Reserved	
2C	Reserved	
2D	Video memory test	Test video memory, write sign-on message to screen. Setup shadow RAM - Enable shadow according to Setup.
2E	Reserved	
2F	Reserved	
30	Reserved	
31	Reserved	
32	Reserved	
33	PS2 Mouse setup	Setup PS2 Mouse and reset KB
34	Reserved	
35	Test DMA Controller 0	Test DMA channel 0
36	Reserved	
37	Test DMA Controller 1	Test DMA channel 1
38	Reserved	
39	Test DMA Page Registers	Test DMA Page Registers.
3A	Reserved	
3B	Reserved	
3C	Test Timer Counter 2	Test 8254 Timer 0 Counter 2.
3D	Reserved	
3E	Test 8259-1 Mask Bits	Verify 8259 Channel 1 masked interrupts by alternately turning off and on the interrupt lines.
3F	Reserved	

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Code (hex)	Name	Description
40	Test 8259-2 Mask Bits	Verify 8259 Channel 2 masked interrupts by alternately turning off and on the interrupt lines.
41	Reserved	
42	Reserved	
43	Test Stuck 8259's Interrupt Bits Test 8259 interrupt Functionality	Turn off interrupts then verify no interrupt mask register is on. Force an interrupt and verify the interrupt occurred.
44	Reserved	
45	Reserved	
46	Reserved	
47	Set EISA Mode	If EISA non-volatile memory checksum is good, execute EISA initialization. If not, execute ISA tests an clear EISA mode flag.
48	Reserved	
49	Size Base and Extended Memory	Size base memory from 256K to 640K and extended memory above 1MB.
4A	Reserved	
4B	Reserved	
4C	Reserved	
4D	Reserved	
4E	Test Base and Extended Memory	Test base memory from 256K to 640K and extended memory above 1MB using various patterns.
NOTE:	This test is skipped in EISA mode and can be skipped with ESC key in ISA mode.	
4F	Reserved	
50	USB init	Initialize USB controller
51	Reserved	
52	Memory Test	Test all memory of memory above 1MB using Virtual 8086 mode, page mode and clear the memory
53	Reserved	
54	Reserved	

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Code (hex)	Name	Description
55	CPU display	Detect CPU speed and display CPU vendor specific version string and turn on all necessary CPU features
56	Reserved	
57	PnP Init	Display PnP logo and PnP early init
58	Reserved	
59	Setup Virus Protect	Setup virus protect according to Setup
5A	Reserved	
5B	Awdflash Load	If required, will auto load Awdflash.exe in POST
5C	Reserved	
5D	Onboard I/O Init	Initializing onboard superIO
5E	Reserved	
5F	Reserved	
60	Setup enable	Display setup message and enable setup functions
61	Reserved	
62	Reserved	
63	Initialize & Install Mouse	Detect if mouse is present, initialize mouse, install interrupt vectors.
64	Reserved	
65	PS2 Mouse special	Special treatment to PS2 Mouse port
66	Reserved	
67	ACPI init	ACPI sub-system initializing
68	Reserved	
69	Setup Cache Controller	Initialize cache controller
6A	Reserved	
6B	Setup Entering	Enter setup check and auto configuration check up
6C	Reserved	
6D	Initialize Floppy Drive & Controller	Initialize floppy disk drive controller and any drives.
6E	Reserved	
6F	FDD install	Install FDD and setup BIOS data area parameters
70	Reserved	

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Code (hex)	Name	Description
71	Reserved	
72	Reserved	
73	Initialize Hard Drive & Controller	Initialize hard drive controller and any drives.
74	Reserved	
75	Install HDD	IDE device detection and install
76	Reserved	
77	Detect & Initialize Serial/Parallel Ports	Initialize any serial and parallel ports (also game port).
78	Reserved	
79	Reserved	
7A	Detect & Initialize Math Coprocessor	Initialize math coprocessor.
7B	Reserved	
7C	HDD Check for Write protection	HDD check out
7D	Reserved	
7E	Reserved	
7F	POST error check	Check POST error and display them and ask for user intervention
80	Reserved	
81	Reserved	
82	Security Check	Ask password security (optional).
83	Write CMOS	Write all CMOS values back to RAM and clear screen.
84	Pre-boot	Enables parity checker Enable NMI, Enable cache before boot.
85	Initialize Option ROMs	Initialize any option ROMs present from C8000h to EFFFFh.
 NOTE:	When FSCAN option is enabled, ROMs initialize from C8000h to F7FFFh.	
86	Reserved	
87	Reserved	

Code (hex)	Name	Description
88	Reserved	
89	Reserved	
8A	Reserved	
8B	Reserved	
8C	Reserved	
8D	Reserved	
8E	Reserved	
8F	Reserved	
90	Reserved	
91	Reserved	
92	Reserved	
93	Boot Medium detection	Read and store boot partition head and cylinders values in RAM
94	Final Init	Final init for last micro details before boot
95	Special KBC patch	Set system speed for boot Setup NumLock status according to Setup
96	Boot Attempt	Set low stack Boot via INT 19h.
FF	Boot	


NOTE:

EISA POST codes are typically output to port address 300h.
ISA POST codes are output to port address 80h.

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Important Safety Instructions

For user safety, please read and follow all **instructions**, **WARNINGS**, **CAUTIONS,** and **NOTES** marked in this manual and on the associated equipment before handling/operating the equipment.

- Read these safety instructions carefully.
- Keep this user's manual for future reference.
- Read the specifications section of this manual for detailed information on the operating environment of this equipment.
- When installing/mounting or uninstalling/removing equipment:
  - Turn off power and unplug any power cords/cables.
- To avoid electrical shock and/or damage to equipment:
  - Keep equipment away from water or liquid sources;
  - Keep equipment away from high heat or high humidity;
  - Keep equipment properly ventilated (do not block or cover ventilation openings);
  - Make sure to use recommended voltage and power source settings;
  - Always install and operate equipment near an easily accessible electrical socket-outlet;
  - Secure the power cord (do not place any object on/over the power cord);
  - Only install/attach and operate equipment on stable surfaces and/or recommended mountings; and,
  - If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.

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- Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.
- A Lithium-type battery may be provided for uninterrupted, backup or emergency power.



Risk of explosion if battery is replaced with one of an incorrect type. Dispose of used batteries appropriately.

- Equipment must be serviced by authorized technicians when:
  - The power cord or plug is damaged;
  - Liquid has penetrated the equipment;
  - It has been exposed to high humidity/moisture;
  - It is not functioning or does not function according to the user's manual;
  - It has been dropped and/or damaged; and/or,
  - It has an obvious sign of breakage.

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Getting Service

Contact us should you require any service or assistance.

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