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NuPRO-900A

Full-Size ePCI-X System Host Board with Dual Xeon CPU

User's Guide



Recycled Paper

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Questions			
Product Model			
Environment	OS: Computer Brand: M/B: CPU: Chipset: BIOS: Video Card: NIC: Other:		
Detail Description			
Suggestions for ADLINK			

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How to Use This Guide

This manual is intended to assist users to configure the NuPRO-900 Full-Size ePCI-X System Host Board with Dual Xeon CPU. It is divided into 5 chapters.

Chapter 1 **Introduction**

Gives an overview of the product features, applications, and specifications.

Chapter 2 **Connectors and Jumpers**

Outlines all the connectors and its pin definitions.

Chapter 3 **Getting Started**

Summarizes of what is required to setup an operational system using the NuPRO-900. Hardware installation and BIOS overview is discuss.

Chapter 4 **Driver Installation**

Provides some instructions of how to install the software drivers successfully.

Chapter 5 **Utilities**

Explains the operation of the WDT, PXE booting, and Hardware Doctor.

1

Introduction

The NuPRO-900A is a full-size ePCI-X dual-processor System Host Board (SHB) based on the Intel® Xeon™ processor and E7501 chipset. It supports two 64-bit PCI/PCI-X busses via the Intel P64H2 chip. It is positioned within the ePCI-X product line as the next generation PCI-X board solution and is fully compliant with PICMG 1.2 R1.0 Embedded PCI-X Specifications.

The NuPRO-900A is a System Host Board with the ultimate computing performance powered by dual Intel® Xeon™ processors. The CPU module supports a front side bus (FSB) of 400/533MHz and a maximum CPU clock of 3.06GHz featuring 64-bit/133MHz PCI/PCI-X bus with up to 8GB high performance DDR host SDRAM support.

It provides all standard I/Os, including RS-232, Printer Port, USB, EIDE, Ethernet, and video interfaces. The NuPRO-900A is designed to meet the needs of applications which require the highest computing performance and highest reliability and is designed to run Windows 2000/XP and Linux operating systems, as well as embedded real-time applications. It is the ideal solution for telecommunications, internet, and industrial networking applications.

This chapter is designed to give you an overview of the NuPRO-900A SHB. The chapter covers the following topics:

- Unpacking and Checklist
- Features
- Specifications

1.1 Unpacking Checklist

Check the shipping carton for any damage. If the shipping carton and contents are damaged, notify the dealer for a replacement. Retain the shipping carton and packing material for inspection by the dealer. Obtain authorization before returning any product to ADLINK.

Check the following items are included in the package, if there are any missing items, contact your dealer:

- The NuPRO-900A module (May be equipped with different speed or capacity CPU, RAM, and HDD).
- This User's Manual
- ADLINK CD
- Y Cable for PS/2 Keyboard & Mouse
- Printer Port + Com Port cables with bracket
- Com Cables with bracket
- USB Cables with bracket
- 2 Sets of Cooler kits
- Floppy cable
- ATA-100 Cables x 2

Note: The package of the NuPRO-90A0 OEM version non-standard configuration, functionality or package may vary according to different configuration requests

CAUTION: This board must be protected from static discharge and physical shock. Never remove any of the socketed parts except at a static-free workstation. Use the anti-static bag shipped with the product to handle the board. Wear a wrist strap grounded through one of the system's ESD Ground jacks when servicing system components.

1.2 Features

- PICMG 1.2 Rev 1.0 Embedded PCI-X Specification compliant.
- PCI Local Bus Specification, Rev 2.2 compliant.
- Single regular or dual low power Intel® Xeon™ processors with 512KB L2 cache, 400/533MHz system bus, auto-selection of CPU frequency and core voltage.
- Four 184-pin DIMM sockets, support 144-bit, 200/266MHz, ECC DDR DRAM, with serial presence detect. Supports a maximum of 8GB of memory by four sockets.
- Two Intel 82546EB 64-bit PCI-X Gigabit Ethernet interfaces (on P64H2#2 bus A).
- ADLINK mPCI-8750 via on-board MiniPCI interface, 32-bit/33MHz ATI Rage XL VGA chip with 8MB Video memory.
- Supports all generic features include VGA, COM ports, USB, keyboard, mouse, and hardware monitoring.
- Built-in monitoring CPU temperatures, FAN speed, system temperature, CPU voltage, and DC voltages.
- Support Intel® Pre-boot Execution Environment (PXE).

1.3 Functional Blocks and Main Board

The following topics provide an overview of the NuPRO-900A main features as shown in the functional block diagram below and also the main board.

Functional Block Diagram

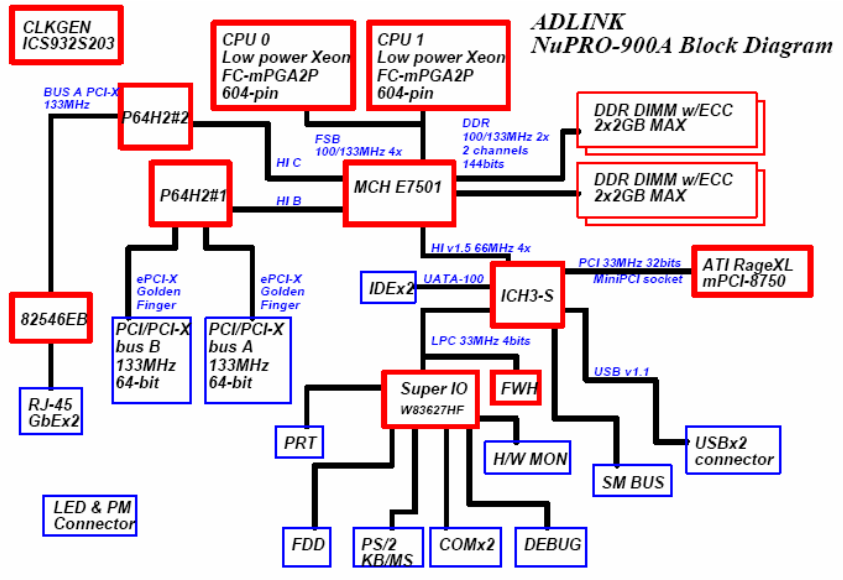


Figure 1: Functional Block Diagram

Main Board Drawing

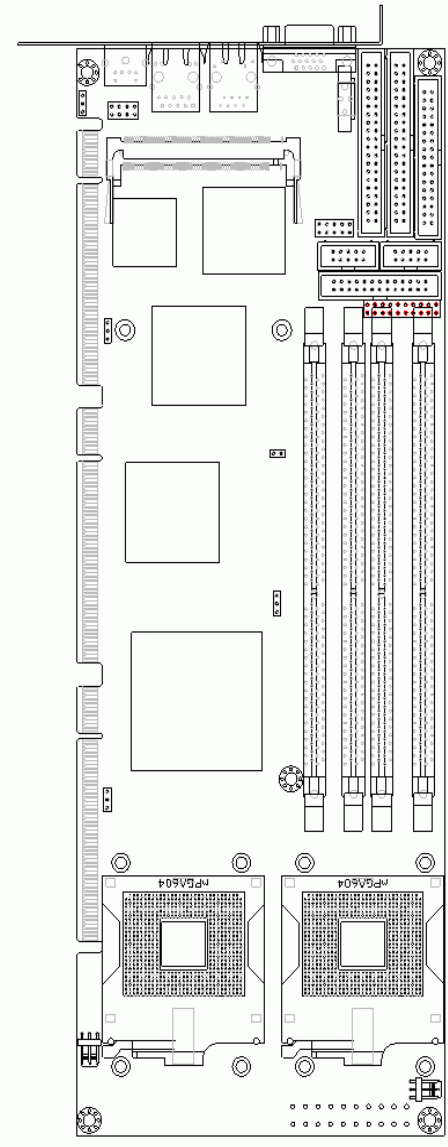


Figure 2: Main Board Drawing

1.3.1 Intel® Low Power Xeon™ Processor

The Intel® Xeon™ processor for dual-processing servers offers users several new system performance boosts, with the Intel Netburst micro-architecture on Intel's 0.13-micron manufacturing process, Hyper-Threading technology, a larger (512 KB) level two-cache size and the E7500 server chipset. The Intel® Xeon™ processor family is the first to feature the new, innovative technologies of Hyper-Threading Technology and Intel® NetBurst™ micro-architecture, providing headroom for current and future server and workstation platforms.

The Intel® NetBurst™ micro-architecture and Hyper-Threading Technology is designed specifically for multi-tasking environments and provides outstanding performance for multi-threaded applications.

1.3.2 The Intel® E7500 Chipset Memory Controller Hub (MCH)

The central hub for all data passing through core system elements such as the dual Intel® Xeon™ processors with 512 KB L2 cache via the system bus interface, the memory via memory interface, and both the 64-bit PCI/PCI-X and I/O controller hubs via Intel® Hub Interfaces. The Intel E7501 chipset delivers compelling performance at 3.2GB/s of bandwidth across the 400/533MHz system bus and up to 3.2GB/s of bandwidth across two high-performance Double Data Rate SDRAM memory channels. To balance the performance offered by the processor and memory interfaces, the MCH allows several high-bandwidth I/O configuration options for a total of 3.2GB/s of I/O bandwidth. Together, these features deliver balanced, high-throughput system performance for dual processor server platforms.

1.3.3 The Intel® 82801CA I/O Controller Hub 3-S (ICH3-S)

Connect to the MCH through a point-to-point Hub Interface 1.5 connection. The ICH3-S provides legacy I/O interfaces through integrated features including a two-channel Ultra ATA/100 bus master IDE controller and a USB controller for two USB ports. The ICH3-S also offers an integrated System Manageability Bus 2.0 (SMBus 2.0) controller, an integrated LAN controller, as well as a PCI 2.2-compliant interface CMG 2.1 Hot Swap Support

1.3.4 Watchdog Timer

The watchdog timer optionally monitors system operation and can be programmed for different timeout periods (from 1 seconds to 255 seconds or 1 minute to 255 minutes). The watchdog is capable generating a Reset. Failure to strobe the watchdog timer within the programmed time period may result in a reset request. A register bit can be enabled to indicate if the watchdog timer caused the reset event. This watchdog timer register is cleared on power-up, enabling system software to take appropriate action if the watchdog generated the reboot.

1.3.5 Video

The NuPRO-900A provides standard SVGA analog output on front bracket I/O panel. The video function is provided via the ATI Rage XL VGA chip with 8MB video memory.

1.3.6 Ethernet Interfaces

The NuPRO-900A provides two Gigabit Ethernet interfaces. The 10/100/1000Mbps Ethernet interfaces is supplied via the Intel 82546EB chip, which is connected to the P64H2#2 bus A and supports 64-bit PCI-X 133MHz. Both LAN ports will be assigned a unique static MAC Address. The Ethernet interfaces are routed to two RJ-45 all-in-one connectors with LEDs on the bracket panel. LED drive signals for Ethernet link status and activity are routed to the same connector.

1.3.7 Serial I/O

Two serial ports are supported by the NuPRO-900A. The EIA232 drivers and receivers reside on board. COM1 and COM2 are available as a 10-pin header on the motherboard. Both ports will be configured as DTE. Firmware will initialize the two serial ports as COM1 and COM2 with ISA I/O base addresses of 3F8h and 2F8h respectively. This default configuration also assigns COM1 to IRQ4 and COM2 to IRQ3. The NuPRO-900A serial controller resides in the W83627HF Super I/O device.

1.3.8 IEEE-1284 Parallel Port/Printer Interface

The parallel I/O interface signals are routed to a 26-pin connector on the board. This port supports the full IEEE-1284 specifications and provides the basic printer interface.

Firmware will initialize the parallel port as LPT1 with ISA I/O base address of 378h. This default configuration also assigns the parallel port to IRQ7. The printer interface mode (Normal, Extended, EPP, or ECP) is selectable through the BIOS SETUP utility with the W83627HF Super I/O device managing the NuPRO-900A parallel port.

1.3.9 Universal Serial Bus (USB)

The Universal Serial Bus (USB) provides a common interface to slower-speed peripherals. Functions such as keyboard, serial ports, printer port, and mouse ports can be consolidated into USB, simplifying the cabling requirements of computers. The NuPRO-900A provides two USB ports pin headers and is controlled by the Intel 82801CA (ICH3-S) device.

1.3.10 IDE Controller and Floppy Interface Controller

The NuPRO-900A includes an IDE Controller (in the ICH3-S) and a Floppy Disk Controller (in the W83627HF). The IDE Controller provides support for

internal or external IDE drives. Signals are available at the IDE connectors CN1 and CN2 and are routed to a 40-pin header. The FDD Controller provides support for an external FDD drives. Signals are available at the FDD connector CN8 and are routed to a 34-pin header.

1.3.11 Keyboard/Mouse Controller

The NuPRO-900A includes an on-board PC/AT keyboard and mouse controller. The keyboard/mouse signals are available through the PS/2 circular DIN on the panel. Both the keyboard and mouse can be connected at the same time using ADLINK's Y cable. An extra pin header connector is available for connection of an external keyboard or mouse. The NuPRO-900A keyboard/mouse controller resides in the Winbond W83627HF Super I/O device

1.3.12 Software

The NuPRO-900A is compatible with all major PC operating systems. ADLINK provides support, which may include additional drivers for ADLINK peripherals. Software device drivers for the NuPRO-900A may be found in the ADLINK CD.

1.4 Specifications

Compliant Specifications

- PICMG 1.2 Rev 1.0 Embedded PCI-X Specification compliant
- PCI Local Bus Specification, Rev 2.2 compliant

Form Factor

- Standard Full-Size ePCI-X System Host Board, 338.6mm x 122mm (13.33"x4.8").

CPU/Cache

- Dual Xeon architecture. The CPU socket supports the FC-mPGA2–604 package.
- Support single Xeon processor, no termination needed
- Support low power Intel® Xeon™ with 512kB L2 cache up to 3.06GHz, 400/533MHz FSB

Chipset

- Intel® E7501 Memory Control Hub (MCH)
- Intel® 82801CA I/O Control Hub 3 (ICH3-S)
- Intel® 82870P2 PCI/PCI-X 64-bit Hub 2 (P64H2)

Host Memory

- Four DDR DIMM sockets
- Supports ECC registered DDR DRAM
- Capacity up to 8GB (note: dependent on DIMM availability)

BIOS: Award / Phoenix BIOS advanced by ADLINK

- BIOS write protection, provide anti-virus capability
- Customized power-on screen (for OEM projects)
- DMI BIOS support
- Support Intel® Pre-boot Execution Environment (PXE)

Gigabit Ethernet

- Two Gigabit Ethernet ports with Intel® 82546EB Ethernet controller, based on 133MHz/64-bit PCI-X bus.
- Support 1000Base-T, 100Base-TX and 10Base-T (IEEE 802.3, 802.3u, and 802.3ab).
- IEEE802.3x compliant flow control, support auto-negotiation and link setup
- Speed and Link LED on the RJ-45 connector

Graphic Display

- PCI based ATI Rage-XL with external 8MB SDRAM
- VGA DB-15 connector on the bracket
- Support up to 1600 x 1200 VGA display resolution with 16-bit true color, non-interlaced.

USB Interface

- Supports two USB version 1.1 ports with integrated USB host controller in ICH3
- USB ports provide 0.5A @ 5V power for peripheral devices with over current protection

IDE Ports

- Bus master IDE controller supports two ultra ATA-100 / 66 / 33 interfaces.

Super I/O and WDT

- Winbond W83627HF
- Two 16C550 UART compatible RS-232 COM ports.
- PS2 keyboard and mouse supported.
- W82782D built-in, monitoring CPU temperatures, FAN speed, system temperature, CPU voltage, and DC voltages.
- Watchdog timer: Programmable I/O port on addresses 02Eh and 02FH. Programmable timer 1 to 255 seconds or 1 to 255 minutes. Easy-to-program libraries for DOS, Windows 95/98/NT are included.

OS Compatibility

- Microsoft® Windows 2000, Windows XP, Red Hat Linux
- Other OS support available upon request.

Environment

- Operating temperature: 5 - 55 °C
- Storage temperature: -40 - 70 °C.
- Humidity: 5% - 95% non-condensed

Safety Certificate and Test

- CE, FCC
- All plastic material used on board are all UL-94V certified

2

Jumpers and Connectors

This chapter will familiarize the user with the NuPRO-900A with the interfaces and connections available before getting started, it will provide information about the board layout, connector definitions and jumper setup, This will includes the following information:

- NuPRO-900A board outline and illustration
- NuPRO-900A connectors pin assignments
- NuPRO-900A jumpers setting

2.1 NuPRO-900 Board Outline and Illustration

2.1.1 NuPRO-900 Top View

Refer to the table below for the description for each location

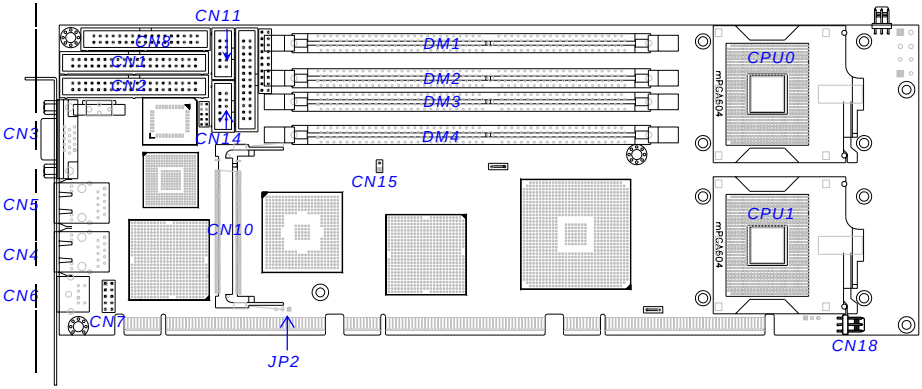


Figure 3: NuPRO-900A Top View

2.1.2 Front View

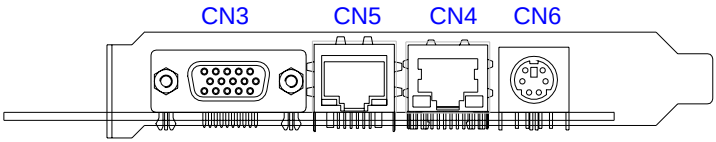


Figure 4: View of Face Plate

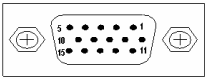
Position	Description
CN1	Secondary IDE connector
CN2	Primary IDE connector
CN3	VGA connector
CN4	LAN1 connector (Gigabit Ethernet)
CN5	LAN2 connector (Gigabit Ethernet)
CN6	Integrated Keyboard/Mouse connector
CN7	USB pin header (2 ports)
CN8	Floppy Disk connector
CN9	Reserved
CN10	Mini PCI socket
CN11	COM1 connector
CN12	Parallel port connector
CN13	Front panel pin header
CN14	COM2 connector
CN15	Case open pin header
CN16	Fan1 (for CPU0)
CN17	ATX power connector
CN18	Fan2 (for CPU1)
DM1	DDR SDRAM A2 socket
DM2	DDR SDRAM B2 socket
DM3	DDR SDRAM A1 socket
DM4	DDR SDRAM B1 socket
CPU0	CPU0 socket for Xeon Processor
CPU1	CPU1 socket for Xeon Processor

Table 1: Description of Connector Locations

2.2 NuPRO-900 Connector Pin Assignments

A detailed description and pin-out for each connector is given in the following section.

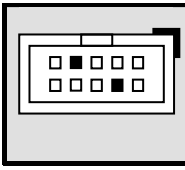
2.2.1 VGA Connector



Signal Name	Pin	Pin	Signal Name
Red	1	2	Green
Blue	3	4	N.C.
GND	5	6	GND
GND	7	8	GND
+5V	9	10	GND
N.C.	11	12	DDCDAT
HSYNC	13	14	VSYNC
DDCCLK	15		

Table 2: VGA Connector Pin Definition

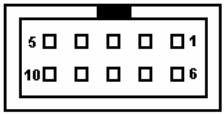
2.2.2 CN7 USB Pin Header (2 Ports)



Pin	Signal	Function	Pin	Signal	Function
1	VCC	Power	2	GND	Ground
3	USB -	Data (-)	4	NC	Empty
5	USB +	Data (+)	6	USB +	Data (+)
7	NC	Empty	8	USB -	Data (-)
9	GND	Ground	10	VCC	Power

Table 3: USB Connectors Pin Definition

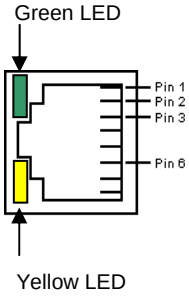
2.2.3 COM1/COM2 Pin Header



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

Table 4: COM1/ COM2 Pin Definition

2.2.4 Gigabit Ethernet (RJ-45) Connector



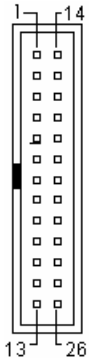
PIN	LAN1 SIGNAL	LAN2 SIGNAL	FUNCTION
1	LAN1_TDP1	LAN2_TDP1	Transmit Data1 +
2	LAN1_TDN1	LAN2_TDN1	Transmit Data1 -
3	LAN1_RDP2	LAN2_RDP2	Receive Data2 +
4	LAN1_RDP3	LAN2_RDP3	Receive Data3 +
5	LAN1_RDN3	LAN2_RDN3	Receive Data3 -
6	LAN1_RDN2	LAN2_RDN2	Receive Data2 +
7	LAN1_TDP4	LAN2_TDP4	Transmit Data4 +
8	LAN1_TDN4	LAN2_TDN4	Transmit Data4 -

Table 5: Ethernet Connector Pin Definition

LED Color	Status	Function
Green (Speed status)	ON	1000Mbps
	OFF	100Mbps
Yellow (Link status)	ON	Link
	OFF	Link off
	Blinking	Data transfer in progress

Table 6: Ethernet Color LED Status

2.2.5 Parallel Port Connector



Signal Name	Pin #	Pin #	Signal Name
Line printer strobe	1	14	AutoFeed
PD0, parallel data 0	2	15	Error
PD1, parallel data 1	3	16	Initialize
PD2, parallel data 2	4	17	Select
PD3, parallel data 3	5	18	Ground
PD4, parallel data 4	6	19	Ground
PD5, parallel data 5	7	20	Ground
PD6, parallel data 6	8	21	Ground
PD7, parallel data 7	9	22	Ground
ACK, acknowledge	10	23	Ground
Busy	11	24	Ground
Paper empty	12	25	Ground
Select	13	N/A	N/A

Table 7: Parallel Connector Pin Definition

2.2.6 Case Open connector

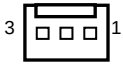
Signal is connected to a limit switch sensor of the chassis to detect case open or closed.



PIN	SIGNAL	FUNCTION
1	CASEOPEN#	Case Open Signal
2	GND	Ground

Table 8: Case Open connector Pin Definition

2.2.7 CPU Fan1/Fan2 connector

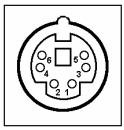


Pin #	Signal Name
1	GND
2	Fan power
3	Fan speed

Table 9: Fan1/Fan2 Connector Pin Definition

2.2.8 Integrated PS/2 KBD/MS connector

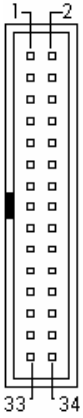
Both the keyboard and mouse can be connected at the same time using ADLINK's Y cable



PIN	SIGNAL	FUNCTION
1	KBDAT	Keyboard Data
2	MSDAT	Mouse Data
3	GND	Ground
4	KBMS5V	Power
5	KBCLK	Keyboard Clock
6	MSCLK	Mouse Clock

Table 10: PS/2 Keyboard & Mouse Connector Pin definition

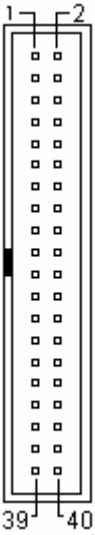
2.2.9 Floppy Disk connector



Pin	Function	Pin	Function
1	Ground	2	Extended Density
3	Ground	4	No Connect
5	-	6	Data Rate
7	Ground	8	Index
9	Ground	10	Motor A Select
11	Ground	12	Drive B Select
13	Ground	14	Drive A Select
15	Ground	16	Motor B Select
17	Ground	18	Step Direction
19	Ground	20	Step Pulse
21	Ground	22	Write Data
23	Ground	24	Write Gate
25	Ground	26	Track 0
27	Ground	28	Write Protect
29	Ground	30	Read Data
31	Ground	32	Side 1
33	Ground	34	Disk Change

Table 11: Floppy Connector Pin Definition

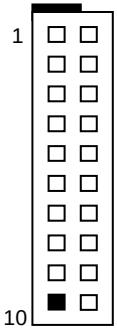
2.2.10 Primary/Secondary IDE Connector



Signal Name	Pin #	Pin #	Signal Name
Reset IDE	1	2	Ground
Host data 7	3	4	Host data 8
Host data 6	5	6	Host data 9
Host data 5	7	8	Host data 10
Host data 4	9	10	Host data 11
Host data 3	11	12	Host data 12
Host data 2	13	14	Host data 13
Host data 1	15	16	Host data 14
Host data 0	17	18	Host data 15
Ground	19	20	N.C
DRQ0 / DRQ1	21	22	Ground
Host IOW	23	24	Ground
Host IOR	25	26	Ground
IOCHRDY	27	28	Host ALE
DACK0 / DACK1	29	30	Ground
IRQ14 / IRQ 15	31	32	No connect
Address 1	33	34	No connect
Address 0	35	36	Address 2
Chip select 0	37	38	Chip select 1
Activity	39	40	Ground

Table 12: IDE Connector Pin Definition

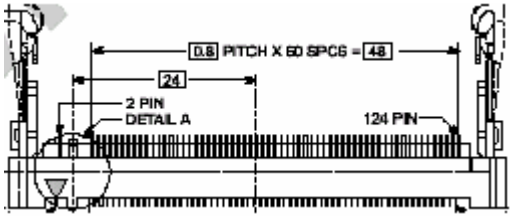
2.2.11 Front Panel Pin Header



PIN	SIGNAL	FUNCTION	PIN GROUP
1	+5V	Power	Power LED
2	WDTLED#	Watch Dog LED Signal	
3	PLED	Power LED Signal	
4	KEYLOCK	Keyboard lock	Key Lock
5	GND	Ground	
6	GND	Ground	ATX Power Connector
7	NC	No connect	
8	PWRON	Power-on signal	
9	+5VSB	Standby Power	
10	PME# (Optional)	Power Management Event	
11	WDSPK	Speaker signal	Chassis Speaker
12	NC	No connect	
13	NC	No connect	
14	+5V	Power	
15	RESETBT	RESET Button signal	RESET button
16	GND	Ground	
17	HDDLED	Hard Disk LED signal	Hard Disk LED
18	+5V	Power	
19	PWRBT	POWER Button signal	Power on button
20	GND	Ground	

Table 13: Front Panel Pin Definition

2.2.12 Mini PCI Socket



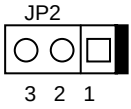
PIN	SIGNAL	PIN	SIGNAL
1	NC	2	NC
3	NC	4	NC
5	NC	6	NC
7	NC	8	NC
9	NC	10	NC
11	NC	12	NC
13	NC	14	NC
15	GND	16	EX_INTC#
17	INTB#	18	+5V
19	+3.3V	20	INTA#
21	EX_CLK	22	EX_INTD#
23	GND	24	+3.3VS
25	CLK	26	RESET#
27	GND	28	+3.3V
29	REQ#	30	GNT#
31	+3.3V	32	GND
33	AD[31]	34	PME#
35	AD[29]	36	EX_REQ#
37	GND	38	AD[30]
39	AD[27]	40	+3.3V
41	AD[25]	42	AD[28]
43	EX_IDSEL#	44	AD[26]
45	C/BE[3]	46	AD[24]
47	AD[23]	48	IDSEL#
49	GND	50	GND
51	AD[21]	52	AD[22]
53	AD[19]	54	AD[20]
55	GND	56	PAR
57	AD[17]	58	AD[18]
59	C/BE[2]	60	AD[16]
61	IRDY#	62	GND

PIN	SIGNAL	PIN	SIGNAL
63	+3.3V	64	FRAME#
65	CLKRUN#	66	TRDY#
67	SERR#	68	STOP#
69	GND	70	+3.3V
71	PERR#	72	DEVSEL#
73	C/BE[1]	74	GND
75	AD[14]	76	AD[15]
77	GND	78	AD[13]
79	AD[12]	80	AD[11]
81	AD[10]	82	GND
83	GND	84	AD[9]
85	AD[8]	86	C/BE[0]
87	AD[7]	88	+3.3V
89	+3.3V	90	AD[6]
91	AD[5]	92	AD[4]
93	EX_GNT#	94	AD[2]
95	AD[3]	96	AD[0]
97	+5V	98	SMBCLK
99	AD[1]	100	SMBDATA
101	GND	102	GND
103	AC_SYNC	104	GND
105	AC_SDIN	106	AC_SDOUT
107	AC_BITCLK	108	AC_ID0#
109	AC_ID1#	110	AC_RST#
111	NC	112	NC
113	NC	114	GND
115	NC	116	NC
117	NC	118	NC
119	NC	120	NC
121	NC	122	MPCIACT#
123	+5Analog	124	+3.3VS

Table 14: Mini PCI Socket Pin Definition

2.3 Clear CMOS

Use one conductor to touch JP2 pin1-2 to clear CMOS



3

Getting Started

This chapter gives a summary of what is required to setup an operational system using the NuPRO-900A. Hardware installation and BIOS overview is discuss.

3.1 CPU Installation

The NuPRO-900A CPU module supports single/dual FC-mPGA2 Intel low power Xeon processor with a front side bus (FSB) of 400MHz or 533MHz. Users need to install highly efficient CPU fan/cooler to guarantee the systems stability.

To install the CPU follow the steps below carefully:

1. Lift the lever on the CPU socket.
2. Insert the CPU in the socket, making sure that pin 1 of the CPU aligns with pin 1 of the socket (both corners are marked with a triangle - see Figure 5.

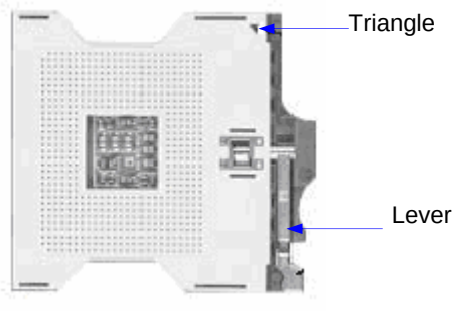


Figure 5: mPGA604 Socket

3. Press the lever down until you hear it “click” into the locked position.
4. Apply the proper amount of thermal compound to the CPU die and place the heatsink and fan on top of the CPU.
5. Connect the three wires of the CPU fan to the respective CPU fan connector.

Note: Ensure that the CPU heat sink and the CPU top surface are in tight contact to avoid CPU overheating problem that would cause your system to hang or crash. The CPU heat sink and fan should be installed tightly together. Please contact ADLINK dealers for suitable heat sink and fan assemblies

3.2 Memory Installation

This section details the procedure for installing system memory on the NuPRO-900A. Correct memory configuration is critical for proper system operation.

3.2.1 Memory Configuration Options

The NuPRO-900 has flexible memory configuration options. These include support for 64MB, 128MB, 256MB, 512MB, 1GB & 2GB Modules. Note that the modules must all be the same type and density and must be installed in pairs and if only one pair of DIMM modules are used, populate DM1 and DM2 first.

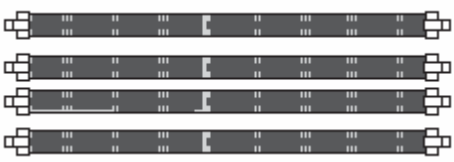


Figure 6: DIMM Sockets

3.2.2 Installing Memory Modules

Installing DIMM modules is simple. The modules insert in the sockets and are held in place by the socket retaining arms. The edge connectors on the modules are of different widths and there are key notches in each module. These ensure that you cannot insert a module incorrectly.

Before you install any modules, you should choose a configuration. You should then prepare the required number and type of DDR modules.

To install either type of module follow these procedure:

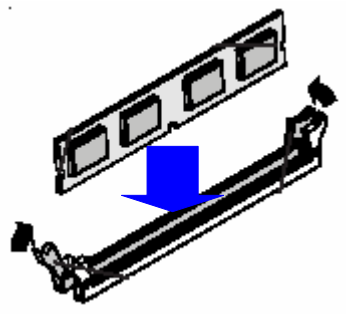


Figure 7: Inserting DIMM into Socket

1. Align the module to the socket so that the edge connectors on the module match the socket sections.
2. Hold the module perpendicular to the motherboard and press the edge connector into the socket.
3. Press the module fully into the socket so that the socket retaining arms swing up and engage the retention notches at each end of the module.
4. Following the configuration you have chosen, repeat this procedure if necessary so that all modules are installed.
5. Once the modules are installed, system memory installation is complete.

3.3 Connecting IDE Devices to the NuPRO-900A

The NuPRO-900A supports two IDE channels, Primary and Secondary. It has two IDE device connectors onboard which support IDE devices running in any data transfer mode up to ATA-100. Each IDE connector supports two drives, a Master and a Slave. The drives connect to the NuPRO-900A with an IDE ribbon cable.

To install an IDE drive, connect the drive to one of the drive connectors to a suitable ribbon cable. Plug the board end of the cable into one of the IDE connectors on the NuPRO-900A. Make sure pin 1 of the ribbon cable connector is probably align with pin 1 of the IDE device connector.

3.4 BIOS Configuration Overview

This topic presents an introduction to the Phoenix/Award PnP BIOS Setup Utility. For more detailed information about the BIOS and other utilities, see the BIOS Manual.

The BIOS has many separately configurable features. These features are selected by running the built-in Setup utility. System configuration settings are saved in a portion of the battery-backed RAM in the real-time clock device and are used by the BIOS to initialize the system at boot up or reset. The configuration is protected by a checksum word for system integrity.

To access the Setup utility, press the "Del" key during the system RAM check at boot time. When Setup runs, an interactive configuration screen displays.

Setup parameters are divided into different categories. The available categories are listed in a menu. The parameters within the highlighted (current) category are listed in the bottom portion of the Setup screen. Context sensitive help is displayed in the right portion of the screen for each parameter.

Use the arrow keys to select a category from the menu. To display a submenu, highlight the category and then press the "Enter" key.

3.5 Operating System Installation

For more detailed information about your operating system, refer to the documentation provided by the operating system vendor.

Install peripheral devices. CompactPCI devices are automatically configured by the BIOS during the boot sequence.

Most operating systems require initial installation on a hard drive from a floppy or CDROM drive. These devices should be configured, installed, and tested with the supplied drivers before attempting to load the new operating system.

Read the release notes and installation documentation provided by the operating system vendor. Be sure to read any *README* files or documents provided on the distribution disks, as these typically note documentation discrepancies or compatibility problems.

Select the appropriate boot device order in the SETUP boot menu depending on the OS installation media used. For example, if the OS includes a bootable installation floppy, select Floppy as the first boot device and reboot the system with the installation floppy installed in the floppy drive. (Note that if the installation requires a non-bootable CD-ROM, it is necessary to boot an OS with the proper CD-ROM drivers in order to access the CD-ROM drive).

Proceed with the OS installation as directed, being sure to select appropriate device types if prompted. Refer to the appropriate hardware manuals for specific device types and compatibility modes of ADLINK NuIPC products.

When installation is complete, reboot the system and set the boot device order in the SETUP boot menu appropriately.

4

Device Driver Installation

To install drivers for the NuPRO-900A, refer to the installation information in this chapter. Basic driver installation information for Windows XP/2000 are outlined in this section. For installation information for non-Windows Operating Systems, refer to the extensive explanation inside the ADLINK CD. The drivers are located in the following directories of the CD-Rom:

Chipset driver	\CHIPDRV\Chipset\E7500
LAN relative driver	\CHIPDRV\LAN\82546EB
Watchdog relative library	\CHIPDRV\WDT\dos\NP900

4.1 Intel® E7501 Chipset

This section describes the installation procedure for the Intel E7501 chipset device driver under Windows 2000/XP.

4.1.1 System Requirements

One of the following operating systems must be fully installed on the system before installing any other driver, utilities or software:

- Windows® 2000
- Windows® XP

4.1.2 Hardware Configuration File Installation

This section describes how to install the hardware configuration files into a system operating Windows 2000/XP.

1. Check the System Requirements. Windows 2000/XP must be fully installed and running on the system prior to running this software.
2. Close any running applications.
3. The files are stored in an integrated application setup program. This program is designed for a Windows 2000/XP and can be executed from the **Run** command prompt.
4. Place the ADLINK CD into the CD-ROM drive. Run the Setup.exe under X:\CHIPDRV\Chipset\E7500. Where X is the CD drive letter
5. You will be prompted with a license agreement. If you do not agree with the terms and conditions of using the software, the Installer will exit before extracting any files.
6. Follow the on-screen instructions and use the default settings to complete the setup, once the operating system has rebooted. This completes the installation of the Intel® Chipset Software Installation Utility.

4.2 Driver Installation

4.2.1 VGA Driver Installation

Windows 2000/XP will attempt to install a standard VGA driver automatically. To guarantee compatibility, manually install the most updated VGA driver, which is stored in the ADLINK CD. After installing Windows 2000/XP, update to the most updated driver using the following procedures

1. Boot Windows 2000/XP, and then run the program ***X:\CHIPDRV\VGA\ATI\SETUP.EXE***
2. The VGA driver will automatically be installed into the system.
3. Restart the system.

4.2.2 LAN Driver Installation

This section describes the LAN driver installation process for the ***Intel 82546EB*** Gigabit Ethernet controller under Windows 2000/XP. The Intel® software utilities package include Diagnostics utility; Makedisk utility; and 10/100/1000Mbps Ethernet device drivers. All drivers and utilities are stored in the ADLINK CD under the directory: ***X:\CHIPDRV\LAN\82546EB***, where X: is the location of the CD-ROM drive. For the driver installation of other OS, please refer the ***readme*** file in the CD.

The installation procedures for Windows 2000/XP are the same. During Windows 2000/XP installation, the operating system will install a LAN driver automatically. We recommend that the most updated LAN driver be installed, which is shipped with the ADLINK CD. This will ensure total compatibility. After installing the OS, update to the newer driver using the following steps.

1. Run the self-extracting ***pro2kxpm.exe*** file. The extracted files are stored to the default location ***C:\IntelPRO.***
2. To install or update the Ethernet drivers for the system, click '***Install Now***'. All Ethernet devices in the computer will be updated.
3. Reboot the system for the new drivers to take effect.

Note: To check if there are newer updates of the drive, it is recommended that the following web site http://www.intel.com/design/software/driver/platform/ be checked out on a regular basis.

5

Watchdog Timer

This chapter explains the operation of the NuPRO-900A's watchdog timer. It provides an overview of watchdog operation and features. Sample programs are located at X:\CHIPDRV\WDT\DOS\NP900

5.1 Watchdog Timer Overview

The primary function of the watchdog timer is to monitor the NuPRO-900A operation and to reset the system if the software fails to function as programmed. The major features of the watchdog timer are:

- Enabled and disabled through software control
- Armed and strobed through software control

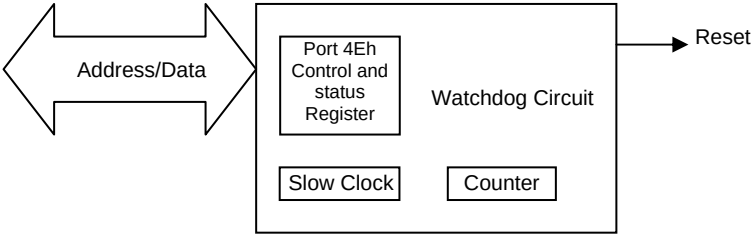


Figure 8: Watchdog Timer Architecture

The NuPRO-900A custom watchdog timer circuit is implemented in a programmable logic device. The watchdog timer contains two "Control and Status Register" (CRF5 and CRF7 of logical device 8).

- The watchdog times out after a selected timeout interval.
- A hard reset occurs.

The timeout period is 1 – 255 seconds or 1 – 255 minutes.

5.1.1 Using the Watchdog in an Application

The following topic is provided to help you learn how to use the watchdog in an application. The watchdog's Reset function is described. The Watchdog Reset is controlled through the watchdog's "Control and Status Register".

Watchdog Reset

An application using the reset feature enables the watchdog reset, sets the terminal count period, and periodically strobes the watchdog to keep it from resetting the system. If a strobe is missed, the watchdog times out and resets the system hardware.

For a detailed programming sample, please refer to the sample code provide with the CD-ROM located at :\CHIPDRV\WDT\DOS\NP900\WDT.CPP

6

ePCI-X Bus Details

6.1 NuPRO-900A ePCI-X Bus

The NuPRO-900A provides two PCI-X buses. Bus-A and Bus-B can run up to 64-bit PCI-X 133.

The ePCI-X Bus pin assignment is compatible with the PICMG 1.2 ePCI-X specifications. In the following sections, we will describe the detail signal definition and the design guide for the backplane designer for compatible with the NuPRO-900A ePCI-X bus.

6.2 Global Signals

6.2.1 Standby Supply (+3.3Vaux)

The NuPRO-900A on-board circuit generate 3.3Vaux power from the +5Vaux or +5V. Therefore, NuPRO-900A does not need the backplane to provide +3.3Vaux.

6.2.2 ATX Support

The ATX support signals include PWRGD, PSON#, PWRBT#, +5Vaux. The NuPRO-900A design provides the ATX power control capability.

If the backplane did not provide the +5Vaux, then the PWRBT# and PSON# won't work as under ATX power mode. Users have to setup the external wiring to switch on/off the power supply.

6.2.3 JTAG

NuPRO-900A does NOT implement the JTAG signals.

6.2.4 I^2C Bus

The on-board SMBus is connected to the SER_SCL and SER_SDA pins.

6.2.5 PME#

The NuPRO-900A implement PME# signal and connect it to ICH3-S.

6.3 PCI-X Bus Signals

6.3.1 Backplane Present

The a_PRSNT# and b_PRSNT# signals are connected to the super I/O chip's GP25 and GP26 pins respectively. These signal are pulled to +3.3V via 4.7k resistors.

6.3.2 VIO Electrical Keying

The NuPRO-900A SHB does not monitor the VIO keying signals. Because both Bus-A and Bus-B support PCI-66 or higher speed, the two PCI buses are all with 3.3V signaling. The devices on the backplane to connect with the ePCI-X buses must be 3.3V or universal PCI interface. If a application need to support 5V only PCI cards, then a PCI-to-PCI bridge must be designed on the backplane to isolated the 5V PCI cards behinds the bridge.

6.3.3 M66EN and PCIXCAP

The Bus-A and Bus-B support up to PCI-X 133, the M66EN and PCIXCAP of Bus-A and Bus-B can be used to program the PCI mode.

6.3.4 REQ/GNT Signals

Both Bus-A and Bus-B provide four REQ/GNT signal pairs for bus mastering operation.

6.4 Extended Features

The NuPRO-900A implement the FAN speed feedback signal on a reserved ePCI-X pin: P1 A15. If user's backplane support this feature, the backplane should covert the FAN speed encoder feedback to 3.3V voltage level.

Note: All the ADLINK ePCI-X backplanes support this feature.

Warranty Policy

Thank you for choosing ADLINK. To understand your rights and enjoy all the after-sales services we offer, please read the following carefully:

1. Before using ADLINK's products please read the user manual and follow the instructions exactly.
2. When sending in damaged products for repair, please attach an RMA application form.
3. All ADLINK products come with a two-year guarantee, repaired free of charge.
   - The warranty period starts from the product's shipment date from ADLINK's factory.
   - Peripherals and third-party products not manufactured by ADLINK will be covered by the original manufacturers' warranty.
   - End users requiring maintenance services should contact their local dealers. Local warranty conditions will depend on local dealers.
4. This warranty will not cover repair costs due to:
   a. Damage caused by not following instructions.
   b. Damage caused by carelessness on the users' part during product transportation.
   c. Damage caused by fire, earthquakes, floods, lightening, pollution, other acts of God, and/or incorrect usage of voltage transformers.
   d. Damage caused by unsuitable storage environments (i.e. high temperatures, high humidity, or volatile chemicals.
   e. Damage caused by leakage of battery fluid.
   f. Damage from improper repair by unauthorized technicians.
   g. Products with altered and/or damaged serial numbers.
   h. Other categories not protected under our guarantees.
5. Customers are responsible for shipping costs to transport damaged products to our company or sales office.
6. To ensure the speed and quality of product repair, please download a RMA application form from our company website: www.adlinktech.com. Damaged products with attached RMA forms receive priority.

For further questions, please contact our FAE staff.

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