NuPRO-842

Full-Size PICMG 1.0 SBC

with Intel® Pentium® 4

User's Manual

Manual Rev. 2.02

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Revision History

Revision	Release Date	Description of Change(s)
2.00	2005/12/03	Initial release
2.01	2006/12/21	Update warranty information
2.02	2010/12/15	Correct Primary/Secondary IDE connector labels

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Preface

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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.



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



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



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

The NuPRO-842 is a full-size PICMG 1.0 Pentium 4-based Single Board Computer (SBC) with Intel 845GV chipset. It supports both PCI and ISA buses.

The CPU module supports a front side bus (FSB) of 533MHz and a maximum CPU clock of 3.06 GHz featuring 32-bit/33MHz PCI/ISA bus with up to 2GB high performance DDR host SDRAM support.

It provides standard I/Os, including RS-232, Printer Port, USB 2.0, EIDE, Ethernet, and video interfaces. The NuPRO-842 is designed to meet the needs of applications that require the highest computing performance and reliability. It is designed to run on Windows 2000/XP, Linux, and other operating systems, as well as embedded real time applications. It is the ideal solution for telecommunications, Internet, and inindustrial networking applications.

This chapter is designed to give you an overview of the NuPRO-842 SBC. 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 materials 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 items missing, please contact your dealer:

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Included Items

- The NuPRO-842 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 cables with bracket
- Com cables with bracket
- USB cables with bracket
- Cooling kit
- Floppy cable
- ATA-100 Cables x 2
- CPU Cooler

Note: The packaging of the NuPRO-842 OEM version with non-standard configuration, functionality, or package may vary according to different configuration requests.

CAUTION: 

The NuPRO-841 single board computer 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 grounded wrist strap when servicing

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1.2 Features

- PICMG 1.0 Rev. 1.0 PCI/ISA Specification compliant.
- PCI Local Bus Specification, Rev 2.2 compliant.
- Intel mPGA478 Socket Pentium 4 FC-PGA2 CPU processor.
- Supports Front Side Bus frequency of 533/400MHz
- Two 184-pin DIMM sockets, support 144-bit, 266MHz, DDR DRAM. Supports a maximum of 2GB of memory.
- Two 10BaseT/100BaseTx/1000Base Ethernet jacks (Intel 82540EM).
- Integrated Intel Extreme Graphics supports Analog Display. Max Dynamic Video Memory 64MB (64MB if system memory is 256MB or greater, 32MB if less than 256MB).
- Supports all standard features, including VGA, serial, USB, keyboard, and mouse ports.
- Built-in system monitoring for CPU temperature, FAN speed, system temperature, CPU voltage, and DC voltages.
- Supports Intel® Pre-boot Execution Environment (PXE).

1.3 Functional Blocks and Main Board

The NuPRO-842 functional block and main board diagrams are provided below:

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Functional Block Diagram

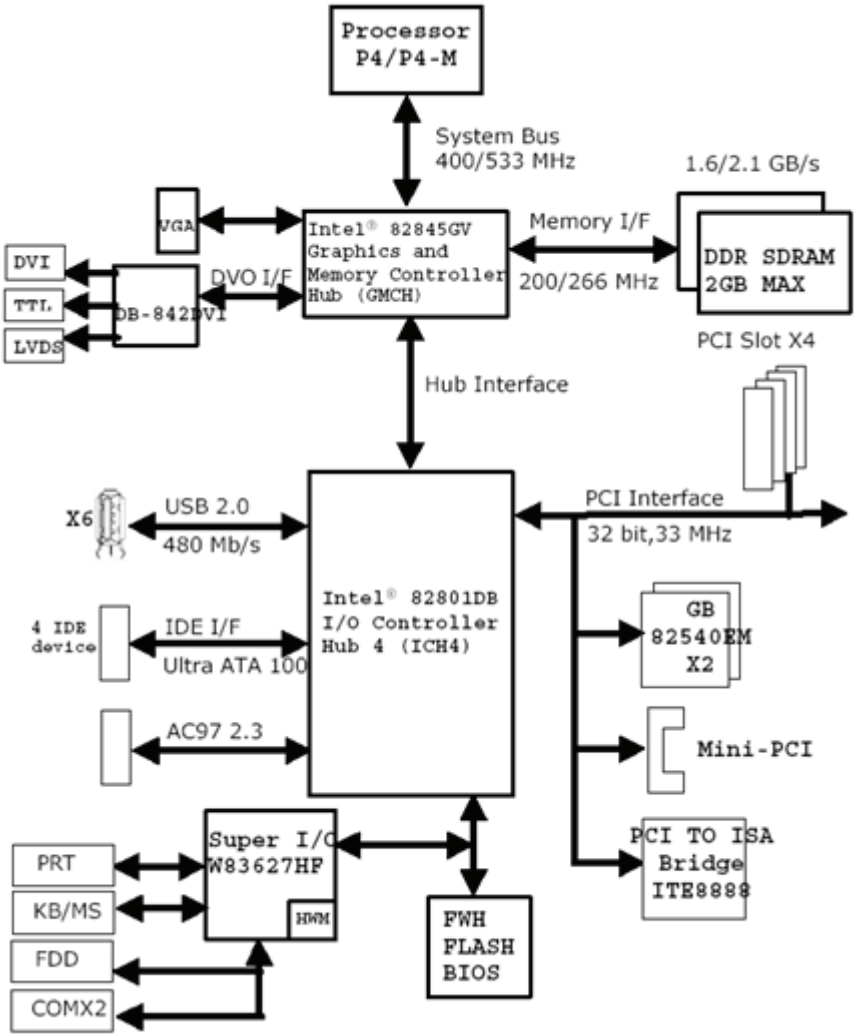


Figure 1-1: Functional Block Diagram

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Main Board Drawing

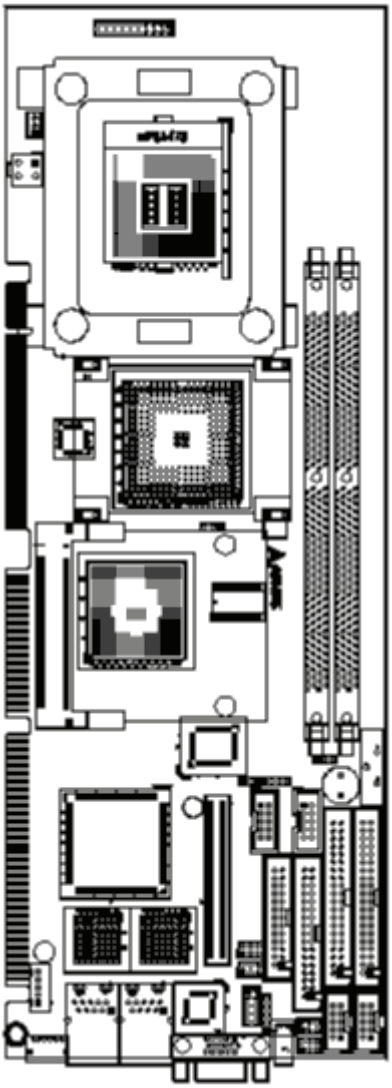


Figure 1-2: Main Board Drawing

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Intel® Pentium® 4 Processor

The NuPRO-842 is a full-sized single board computer (SBC) that supports a single mPGA478 Intel® Pentium® 4 processor or a 478-pin Micro Flip-Chip Pin Grid Array (Micro-FCPGA) Mobile Intel® Pentium® 4 Processor – M.

The Pentium 4 processor runs at a core speed of up to 3.06GHz and the Mobile Intel® Pentium® 4 Processor – M runs at a core speed of up to 2.4Ghz. The 845GV chipset keeps the FSB operation at 400/533 MHz (auto-selected).

Intel Pentium 4 Processor and Mobile Intel Pentium 4 Processor-M have an on-die 512kB L2 Advanced Transfer Cache (ATC). The on-die cache has a 256-bit data bus from the processor core.

The design for using Pentium 4 processor required an upgraded Voltage Regulator Module circuit implementation (VRM 9.0) to handle tighter voltage tolerances.

The Intel® 845GV Graphics Chipset Memory Controller Hub (GMCH)

The central hub for all data passing through core system elements is through the Intel 845GV Graphics Chipset Memory Controller Hub. To balance the performance offered by the processor and memory interfaces, the GMCH allows several high-bandwidth I/O configuration options. This chipset delivers balanced, high-throughput system performance for dual processor server platforms.

The Intel® 82801DB I/O Controller Hub 4 (ICH4)

Connection to the MCH is done through a point-to-point Hub Interface 1.5 connection. The ICH4 provides legacy I/O interfaces through integrated features including a two-channel Ultra ATA/100 bus master IDE controller and an USB controller for two USB ports. The ICH4 also offers an integrated System Manageability Bus 2.0 (SMBus 2.0) controller, as well as a PCI 2.2-compliant interface.

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Watchdog Timer

The watchdog timer optionally monitors system operations. It can be programmed for different timeout periods (from 1 to 255 seconds or 1 to 255 minutes). The watchdog is capable generating a Reset signal. 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.

Video

The NuPRO-842 provides two display ports. One analog port is output on rear IO panel. The analog port uses an integrated 350 MHz RAMDAC of the 845GV GMCH that can directly drive a standard progressive scan monitor up to a resolution of 2048x1536 pixels with 32-bit color at 60 Hz. The NuPRO-842 has a high-speed interface to a digital display use daughter board DB-842DVI. The Intel 845GV chipset implements Dynamic Video Memory Technology (DVMT) to ensure the most efficient use of system memory, allowing up to 64MB of system memory to be shared among OS, applications, and graphics display.

Ethernet Interfaces

The NuPRO-842 provides two 10/100/1000Mbps Ethernet ports supplied via an Intel 82540EM chip, which are connected to the 82801DB. Each Ethernet interface is routed to an RJ45/LED all in one Connector on the rear panel. Each LAN chip will be assigned a unique static MAC Address. LED drive signals for Ethernet link status and activity are routed to the same connector. The onboard Ethernet is Wired For Management 2.0 compliance. This port is available on the real panel.

Serial I/O

Two serial ports are supported by the NuPRO-842. 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

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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-842 serial controller resides in the W83627HF Super I/O device.

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-842's parallel port.

Universal Serial Bus (USB)

NuPRO-842 supports 6 USB2.0 serial ports backward compatible to USB1.x.One USB port is on the faceplate and others with pin header. USB allows for the easy addition of peripherals such as mouse, keyboard, speakers, etc. Transfer rates up to 480Mb/s are supported. Full-speed connections (480Mb/s) require shielded and tested cables. NuPRO-842 will provide the standard 0.5A at 5V to the peripherals.

IDE Controller and Floppy Interface Controller

The NuPRO-842 includes an IDE Controller (in the ICH4) 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 CN14 and CN13 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 CN12 and are routed to a 34-pin header.

Keyboard/Mouse Controller

The NuPRO-842 includes an onboard PC/AT keyboard and mouse controller. The keyboard/mouse signals are available

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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. The NuPRO-842 keyboard/mouse controller resides in the Winbond W83627HF Super I/O device

Software

The NuPRO-842 is compatible with all major PC operating systems. ADLINK provides support for many popular operating systems, including additional drivers for ADLINK peripherals. Software device drivers for the NuPRO-842 may be found on the ADLINK CD.

1.4 Specifications

Compliant Specifications

- PICMG 1.0 Rev. 1.0 PCI-ISA Specification compliant
- PCI Local Bus Specification, Rev 2.2 compliant

Form Factor

- Full-Size Single Board Computer, 388mm x 122mm (15.2"x4.8")

CPU/Cache

- Single mPGA478 Intel Pentium 4 processor or a 478-pin Micro Flip-Chip Pin Grid Array (Micro-FCPGA) Mobile Intel Pentium 4 Processor – M
- Intel Pentium 4 Processor and Mobile Intel Pentium 4 Processor-M have an on-die an on-die 512KB L2 Advanced Transfer Cache (ATC). The on-die cache has a 256-bit data bus from the processor core

Chipset

- Intel 82845GV Graphics Memory Control Hub (GMCH)
- Intel 82801DB I/O Control Hub 4 (ICH4)

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Host Memory

- Two DDR DIMM sockets
- Unbuffered, unregistered 184-pin non-ECC DDR SDRAM
- Supports up to 2GB

BIOS

- Supports 4/8 Mbit Firmware Hub 82802AB(4Mb) or SST49LF004A
- Boot block, PNP, DMI, Write Protection and field upgradeable

Gigabit Ethernet

- Two Gigabit Ethernet ports with an Intel 82540EM Ethernet controller
- Support 1000Base-T, 100Base-TX and 10Base-T (IEEE 802.3, 802.3u, and 802.3ab).
- IEEE802.3x compliant flow control, supports auto-negotiation and link setup
- Speed and Link LEDs on the RJ-45 connector

Graphic Display

- Integrated Intel Extreme Graphics supports Analog Display and DVI Interface with daughter board “DB-842DVI”
- Max dynamic video memory 64MB (If system memory is less than 256MB, then only 32MB can be allocated as video memory)

USB Interface

- Six USB 2.0 ports, one on faceplate, others with pin header
- 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

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Super I/O and WDT

- Winbond W83627HF
- Two 16C550 UART compatible RS-232 COM ports, Com2 support RS-232/RS-422/485/485+.
- PS2 keyboard and mouse supported.
- W82782D built-in, monitoring CPU temperature, fan speed, system temperature, CPU voltage, and DC voltages.
- Watchdog timer: Programmable I/O port on addresses 02Eh and 02FH. Programmable timer for 1-255 seconds or 1-255 minutes. Easy-programming 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: 0 - 60 °C (with proper airflow and active heatsink)
- Storage temperature: -40 - 85 °C
- Humidity: 5% - 95% non-condensed
- Shock: 30G peak-to-peak, 10 ms, non-operation
- Vibration:
  - Non-operation: 6G, 10-1000 Hz, random
  - Operation: 0.5G, 510-1000 Hz, random

Safety Certifications

- CE certified
- FCC Part 15 class
- UL-1950, CSA-950, and VDE EN 60 950/IE950

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2 Jumpers and Connectors

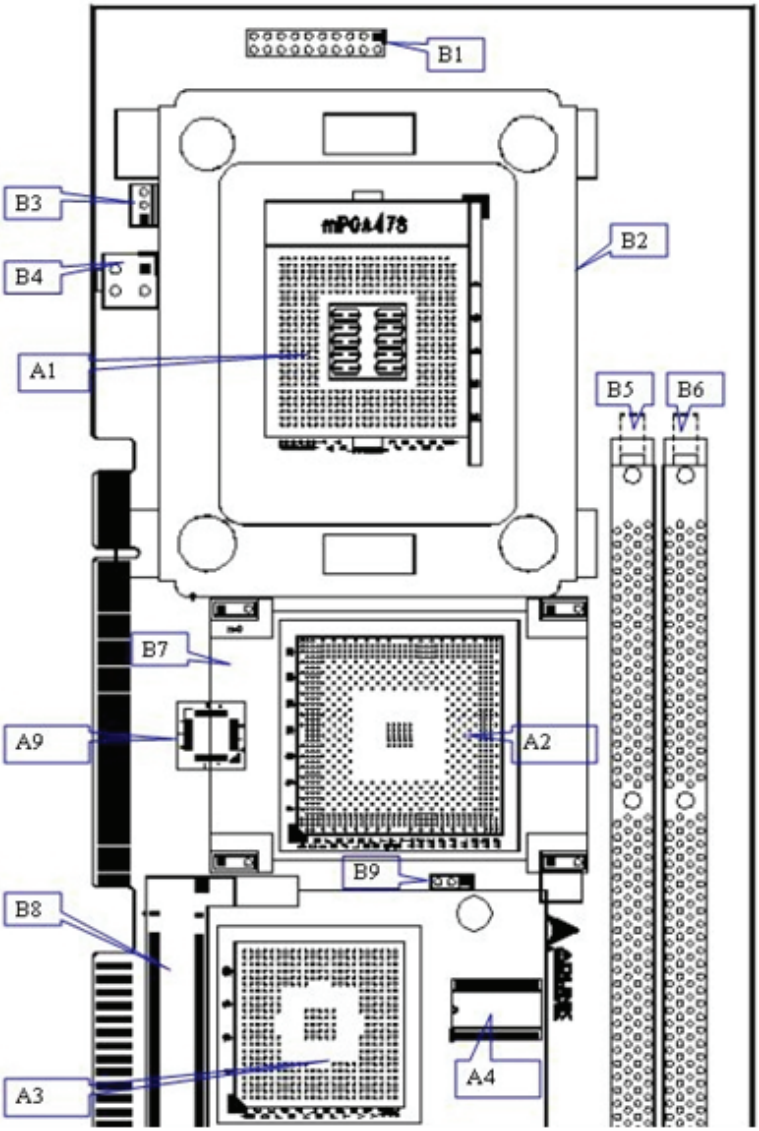
This chapter will familiarize users with the NuPRO-842 interfaces and connections available before getting started. It will provide information about the board layout, connector definitions, and jumper setup, including the following information:

- NuPRO-842 board outline and illustration
- NuPRO-842 connectors pin assignments
- NuPRO-842 jumpers setting

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2.1 NuPRO-842 Board Outline and Illustration

NuPRO-842 Top View



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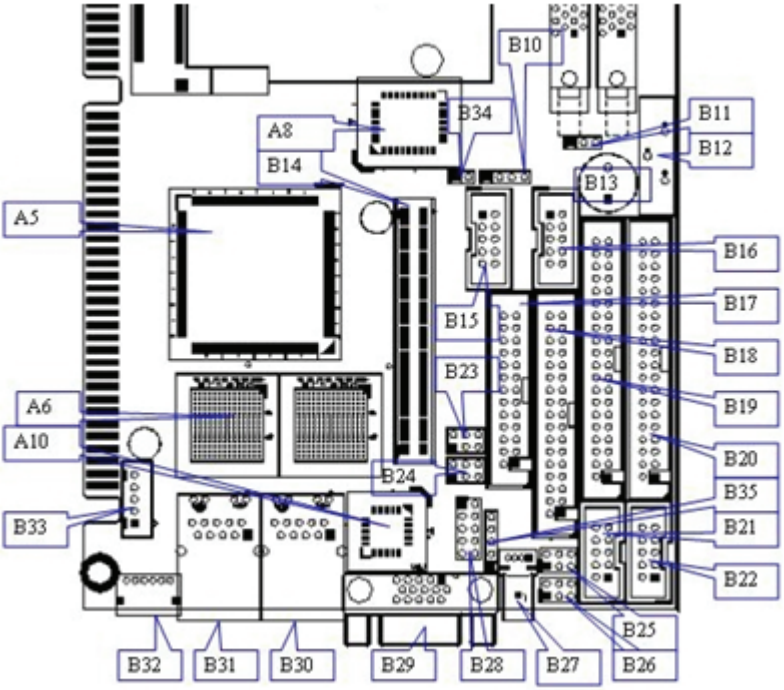


Figure 2-1: NuPRO-842 Top View

A1	U21	CPU P4/P4-M
A2	U19	GMCH 82845GV
A3	U13	ICH4 FW82801DB
A4	U14	Clock Generator
A5	U9	PCI to ISA Bridge IT8888
A6	U2	Intel GB Ethernet 82540EM
A7	U3	Intel GB Ethernet 82540EM
A8	U10	Firmware Hub
A9	U15	842PLD
A10	U1	RS422/RS485 PLD
B1	CN23	ATX Power CONNECTOR
B2	U21	CPU HEATSINK SKT

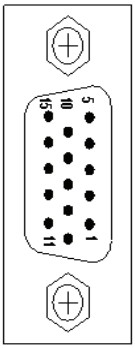
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B3	FN1	CPU FAN
B4	CN21	CPU POWER CONNECTOR
B5	DIMM1	DDR DIMM SOCKET
B6	DIMM2	DDR DIMM SOCKET
B7	U19	GMCH HEATSINK
B8	CN19	MINI PCI CONNECTOR
B9	JP8	FSB FREQUENCY SELECTION JUMPER
B10	JP5	EXTERNAL USB PIN HEADER
B11	JP6	CLEAR CMOS JUMPER
B12	BT1	CR2032 BATTERY HOLDER
B13	BZ1	BUZZER
B14	CN15	DB-842DVI CNN
B15	CN16	USB2.0 PIN HEADER
B16	CN18	USB2.0 PIN HEADER
B17	CN7	PRINTER PORT
B18	CN12	FLOPPY
B19	CN13	SECONDARY IDE
B20	CN14	PRIMARY IDE
B21	CN10	COM2
B22	CN11	COM1
B23	JP4	COM2 SETTING JUMPER
B24	JP3	
B25	JP2	
B26	JP1	
B27	CN9	USB2.0 CNN
B28	CN8	AC'97 CNN
B29	CN3	VGA CNN
B30	CN6	GB CNN
B31	CN5	GB CNN
B32	CN1	KB/MS COMBO
B33	CN2	EXTERNAL KB CNN
B34	CN17	EXTERNAL THERMAL CNN
B35	CN4	IRDA CNN

Table 2-1: NuPRO-842 Connectors

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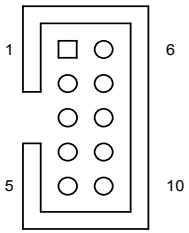
VGA Connector



Pin	Signal	Function
1	Red	Analog RED
2	Green	Analog GREEN
3	Blue	Analog BLUE
4	N/C	No Connect
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	+5V	Ground
10	GND	Ground
11	N/C	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

Table 2-2: VGA Connector

COM1/COM2 Pin Header

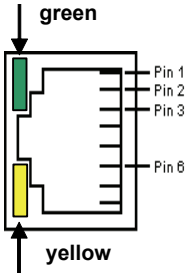


Pin	Signal	Function
1	DCD	Data Carrier Detect
2	RXD	Receive Data
3	TXD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	Ground
6	DSR	Data Set Ready
7	RTS	Request to Send
8	CTS	Clear to Send
9	RI	Ring Indicate
10	NC	No Connect

Table 2-3: COM1/COM2 Pin Header

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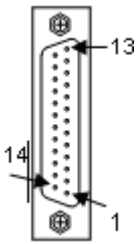
LAN RJ-45 Connector



Pin	Signal	Function
1	LAN2_TDP1	Transmit Data1 +
2	LAN2_TDN1	Transmit Data1 -
3	LAN2_RDP2	Receive Data2 +
4	LAN2_RDP3	Receive Data3 +
5	LAN2_RDN3	Receive Data3 -
6	LAN2_RDN2	Receive Data2 -
7	LAN2_TDP4	Transmit Data4 +
8	LAN2_TDN4	Transmit Data4 -

Table 2-4: LAN RJ-45 Connector

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	GND
PD4, parallel data 4	6	19	GND
PD5, parallel data 5	7	20	GND
PD6, parallel data 6	8	21	GND
PD7, parallel data 7	9	22	GND
ACK, acknowledge	10	23	GND
Busy	11	24	GND
Paper empty	12	25	GND
Select	13	26	N/C

Table 2-5: Parallel Port Connector

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Case Open connector

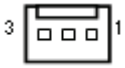
Signal is connected to a limit switch sensor of the chassis to detect if the case is opened or closed.



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

Table 2-6: Case Open Connector Pin Definition

CPU Fan1/Fan2 connector



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

Table 2-7: Fan1/Fan2 Connector Pin Definition

Integrated PS/2 KBD/MS connector

Both the keyboard and mouse can be connected at the same time using an ADLINK Y cable.

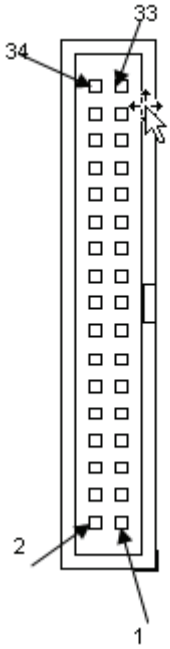


PIN	SIGNAL	FUNCTION
1	KBDAT	Keyboard Data
2	MSDAT	Mouse Data
3	GND	Ground
4	KBMS5V	Power
5	KBCLK	Keyboard Clock
6	MSCLK	Mouse Clock

Table 2-8: PS/2 Keyboard & Mouse Connector Pin Definition

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Floppy Disk Connector

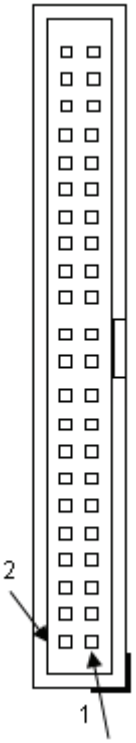


Pin	Function	Pin	Function
1	Ground	2	Extended Density
3	Ground	4	No Connect
5	-	6	Data Rate
7	Ground	8	Index
9	Ground	10	Motor A Select
11	Ground	12	Drive B Select
13	Ground	14	Drive A Select
15	Ground	16	Motor B Select
17	Ground	18	Step Direction
19	Ground	20	Step Pulse
21	Ground	22	Write Data
23	Ground	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 2-9: Floppy Connector Pin Definition

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Primary/Secondary IDE Connector

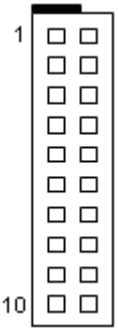


Signal	Pin	Pin	Signal
BRSTDRVJ	1	2	GND
DDP7	3	4	DDP8
DDP6	5	6	DDP9
DDP5	7	8	DDP10
DDP4	9	10	DDP11
DDP3	11	12	DDP12
DDP2	13	14	DDP13
DDP1	15	16	DDP14
DDP0	17	18	DDP15
GND	19	20	NC
PDDREQ	21	22	GND
PDIOWJ	23	24	GND
PDIORJ	25	26	GND
PIORDY	27	28	PCSEL
PDDACKJ	29	30	GND
IRQ14	31	32	NC
DAP1	33	34	DIAG
DAP0	35	36	DAP2
CS1P	37	38	CS3PJ
IDEACTPJ	39	40	GND
+5V	41	42	+5V
GND	43	44	NC

Table 2-10: IDE Connector Pin Definition

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Front Panel Pin Header

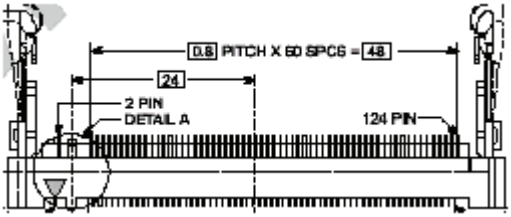


PIN	SIGNAL	FUNCTION	PIN GROUP
1	+5V	Power	Power LED
2	WDTLED#	Watch Dog LED Signal	
3	PLED	Power LED Signal	
4	KEYLOCK	Keyboard lock	Key Lock
5	GND	Ground	
6	GND	Ground	ATX Power Connector
7	NC	No connect	
8	PWRON	Power-on signal	
9	+5VSB	Standby Power	
10	PME#	Power Management Event	
11	WDSPK	Speaker 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 2-11: Front Panel Pin Definition

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Mini PCI Socket



PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL
1	NC	2	NC	63	+3.3V	64	FRAME#
3	NC	4	NC	65	CLKRUN#	66	TRDY#
5	NC	6	NC	67	SERR#	68	STOP#
7	NC	8	NC	69	GND	70	+3.3V
9	NC	10	NC	71	PERR#	72	DEVSEL#
11	NC	12	NC	73	C/BE[1]	74	GND
13	NC	14	NC	75	AD[14]	76	AD[15]
15	GND	16	EX_INTC#	77	GND	78	AD[13]
17	INTB#	18	+5V	79	AD[12]	80	AD[11]
19	+3.3V	20	INTA#	81	AD[10]	82	GND
21	EX_CLK	22	EX_INTD#	83	GND	84	AD[9]
23	GND	24	+3.3VS	85	AD[8]	86	C/BE[0]
25	CLK	26	RESET#	87	AD[7]	88	+3.3V
27	GND	28	+3.3V	89	+3.3V	90	AD[6]
29	REQ#	30	GNT#	91	AD[5]	92	AD[4]
31	+3.3V	32	GND	93	EX_GNT#	94	AD[2]
33	AD[31]	34	PME#	95	AD[3]	96	AD[0]
35	AD[29]	36	EX_REQ#	97	+5V	98	SMBCLK
37	GND	38	AD[30]	99	AD[1]	100	SMBDATA
39	AD[27]	40	+3.3V	101	GND	102	GND
41	AD[25]	42	AD[28]	103	AC_SYNC	104	GND
43	EX_IDSEL#	44	AD[26]	105	AC_SDIN	106	AC_SDOUT
45	C/BE[3]	46	AD[24]	107	AC_BITCLK	108	AC_ID0#

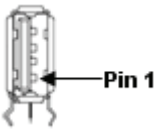
Table 2-12: Mini PCI Socket Pin Definition

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PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL
47	AD[23]	48	IDSEL#	109	AC_ID1#	110	AC_RST#
49	GND	50	GND	111	NC	112	NC
51	AD[21]	52	AD[22]	113	NC	114	GND
53	AD[19]	54	AD[20]	115	NC	116	NC
55	GND	56	PAR	117	NC	118	NC
57	AD[17]	58	AD[18]	119	NC	120	NC
59	C/BE[2]	60	AD[16]	121	NC	122	MPCIACT#
61	IRDY#	62	GND	123	+5Analog	124	+3.3VS

Table 2-12: Mini PCI Socket Pin Definition

USB Connector



Pin	Signal Name
1	Vcc
2	USB-
3	USB+
4	GND

Table 2-13: USB Connectors Pin Definition

AC'97 Connector



PIN	SIGNAL	FUNCTION	PIN	SIGNAL	FUNCTION
1	GND	Ground	2	AC_BITCLK	Bit Clock
3	GND	Ground	4	AC_SDIN0	Data Input 0
5	+5V	Power	6	AC_SDOUT	Data Output
7	AC_SDIN2	Data Input 2	8	AC_SDIN1	Data Input 1
9	AC_SYNC	Synchro-signal	10	AC_RSTJ	Reset

Table 2-14: AC'97 Connector

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USB Pin Header



PIN	SIGNAL	FUNCTION	PIN	SIGNAL	FUNCTION
1	VCC	Power	2	VCC	Power
3	USB -	Data (-)	4	USB -	Data (-)
5	USB +	Data (+)	6	USB +	Data (+)
7	GND	Ground	8	GND	Ground
9	NC	Empty	10	NC	Empty

Table 2-15: USB Pin Header

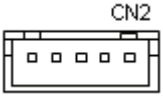
Thermal Connector



PIN	SIGNAL	FUNCTION
1	TGND	Thermal Ground
2	VTIN	Thermal Voltage Input

Table 2-16: Thermal Connector

External KB/MS Connector



PIN	SIGNAL	FUNCTION	COMMENTS
1	KBCLK	Keyboard Clock	External Keyboard Conncetor
2	KBDATA	Keyboard Data	
3	NC	Ground	
4	GND	Power	
5	+5V	Power	

Table 2-17: External KB/MS Connector

2.2 NuPRO-842 Jumper Setting

The NuPRO-842 is designed for maximum flexibility with as few jumpers as possible. Most of the configuration options can be

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selected through the BIOS menu. However, some options still need to be configured by jumpers.

Description	Location
Clear CMOS	JP6
FSB Frequency Selection	JP8
COM2 Function Selection	JP1-3
COM2 RS-485+ Function Selection	JP4

Table 2-18: Jumpers Definitions

Clear CMOS

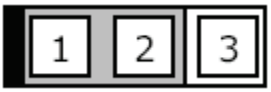
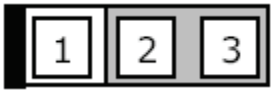
RTC status	JP6	NuPRO-842 JP6
Normal	1-2	
Clear CMOS	2-3	

Table 2-19: Clear CMOS RTC RAM

The CMOS RAM data for real time clock (RTC) contains the date / time and password information. The button cell battery powers the CMOS when the system is powered off.

To erase the CMOS RAM data:

1. Shut down the system.
2. Short pins 1 and 2 of JP6. Then, replace the jumper back to normal operation position.
3. Turn the power on.

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FSB Frequency

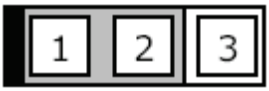
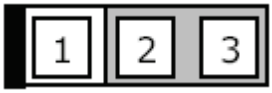
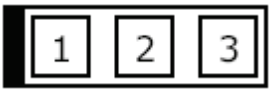
FSB Frequency	JP8	NuPRO-842 JP8
Auto	1-2	
400 MHZ	2-3	
533 MHZ	NC	

Table 2-20: FSB Frequency

The NuPRO-842 will automatically detect Front Side Bus speed, or you can manually force it with jumper JP8.

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COM2 Function Selection

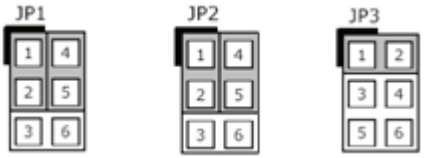
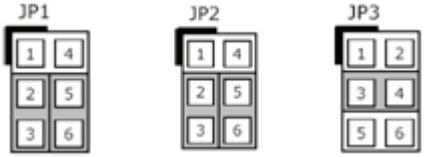
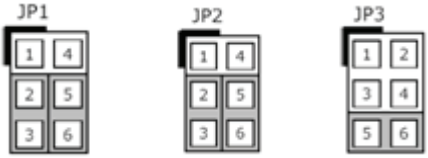
FUNCTION	JP1 JP2	JP3	Jumper Setting
RS-232	1-2 4-5	1-2	
RS-422	2-3 5-6	3-4	
RS-485	2-3 5-6	5-6	

Table 2-21: COM2 Function Selection

COM2 is configurable to act in accordance with the following standards: RS-232, RS-422, and RS-485. Use jumpers J1, J2, and J3 to adjust as needed.

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COM2 Mode Selection

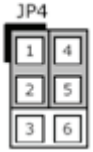
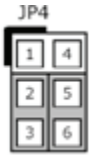
Mode	JP4	Jumper Setting
RS-422 / RS-485	1-2 4-5	
RS-485+	2-3 5-6	

Table 2-22: COM2 Mode Selection

The mode of COM2 can be changed using jumper JP4.

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3 Getting Started

This chapter gives a summary of what is required to setup an operational system using the NuPRO-842. Hardware installation and BIOS overview is discussed.

3.1 CPU Installation

The NuPRO-842 CPU module supports a single Intel mPGA478 Pentium 4 processor or 478-pin Micro Flip-Chip Pin Grid Array (Micro-FCPGA) Pentium 4 Processor-M. Users need to install a highly efficient CPU fan/cooler to guarantee the system stability.

To install the CPU follow the steps 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 (marked with a triangle). Press the lever down until you hear it “click” into the locked position.
3. Apply the proper amount of thermal compound to the CPU die and place the heatsink and fan on top of the CPU.
4. 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 problems that can cause the system to hang or crash. The CPU heat sink and fan should be installed tightly together. Please contact an ADLINK dealer for suitable heat sink and fan assemblies

3.2 Memory Installation

This section details the procedure for installing system memory on the NuPRO-842. Correct memory configuration is critical for proper system operation.

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Memory Configuration Options

The NuPRO-842 has flexible memory configuration options, including support for 64MB, 128MB, 256MB, 512MB, and 1GB modules. Note that the modules must all be the same type and density and must be installed in pairs. If only one pair of DIMM modules is used, populate DM1 and DM2 first.



Figure 3-1: DIMM Sockets

Installing Memory Modules

Installing DIMM modules is simple. The modules are inserted 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. This ensures 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:

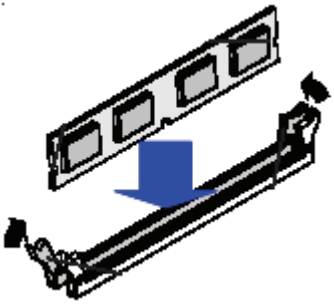


Figure 3-2: Inserting DIMM into Socket

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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-842

The NuPRO-842 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-842 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-842. Make sure pin 1 of the ribbon cable connector is properly aligned with pin 1 of the IDE device connector.

3.4 BIOS Configuration Overview

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.

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Setup parameters are divided into different categories. The available categories are listed in menus. 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 NuPRO products.

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

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4 Device Driver Installation

To install drivers for the NuPRO-842, refer to the installation information in this chapter. Basic driver installation information for Windows 98/ME/NT4.0/2000/XP are outlined in this section. The drivers are located in the following directories of the CD-ROM:

Chipset driver	\CHIPDRV\Chipset\I845GV
LAN relative driver	\CHIPDRV\LAN\82540EM
Watchdog relative library	\CHIPDRV\WDT\dos\NP842
VGA Driver	\CHIPDRV\CHIPDRV\I845GV

4.1 Intel® 845GV Chipset

This section describes the installation procedure for the Intel 845GV chipset device driver under Windows 2000/XP.

System Requirements

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

- Windows 98
- Windows 98 SE
- Windows Me
- Windows 2000
- Windows XP

Hardware Configuration File Installation

This section describes how to install the hardware configuration files into a system operating Windows 98/ME/2000/XP.

Note: Record the location of the Windows 98/ME/2000/XP directory before installing the driver.

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1. Check the System Requirements. Windows 98/ME/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 98/ME/2000/XP program that allows the INF files to be installed.
4. Locate the directory X:\CHIPDRV\Chipset\I845GV in the CD-ROM, and then Run Setup.exe.
5. Click 'Next' on the Welcome screen to read and agree to the license agreement. Click Yes if you agree to continue. NOTE: If you click No, the program will terminate.
6. Click ‘Next’ on Readme Information screen to install INF files.
7. Click 'Finish' and restart the system when prompted.
8. Follow the screen instructions and use the default settings to complete the setup when Windows restarts. Upon restarting, Windows will display that it has found new hardware and is installing drivers. If the New Hardware Found dialog box is displayed requesting the location of the drivers, use the mouse to click on the scrollbar and click on the <Windows directory>.
9. Select Yes, when prompted to restart Windows.

4.2 Driver Installation

VGA Driver Installation

This section provides information on how to install the VGA driver. Please follow the instructions carefully.

Installing Drivers for Windows 98/ME/NT/2000/XP

The following section describes the normal display driver installation procedures for Windows 98/ME/NT/2000/XP.

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Installing the Drivers for Windows 98/ME

1. Boot Windows 98/ME.
2. The driver is included in the ADLINK CD. Run win9x131.exe under the directory: X:\CHIP-DRV\VGA\I845GV.
3. Click Next> on Welcome screen. And select Typical on Setup Type screen and click Next>.
4. Use default program folders on Select Program Folder screen. Click Next> to install driver. Finally, click Finish to re-start.

Installing the Drivers for Windows NT 4.0

1. Boot Windows NT 4.0.
2. The driver is included in the ADLINK CD. Run winnt4131.exe under the directory: X:\CHIP-DRV\VGA\I845GV.
3. Click Next> on Welcome screen. And select Typical on Setup Type screen and click Next>.
4. Use default program folders on Select Program Folder screen. Click Next> to install driver. Finally, click Finish to re-start.

NOTE: Install the Windows NT 4.0 with at least Service Pack 4 (version number: 4.00.1381) first before installing the VGA driver. If Windows NT 4.0 Service Pack 4 is not installed, please contact your software vendor or download it from the Microsoft web site.

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Installing the Drivers for Windows 2000/XP

1. Boot Windows 2000/XP.
2. The driver is included in the ADLINK CD. Run the win2k_xp131.exe under the directory: X:\CHIP-DRV\VGA\I845GV.
3. Click Next> on Welcome screen. And select Typical on Setup Type screen and click Next>.
4. Use default program folders on Select Program Folder screen. Click Next> to install driver. Finally, click Finish to re-start.

LAN Driver Installation

This section describes the LAN driver installation for the onboard Ethernet controllers, the Intel 82540EM . The relative drivers are located in the following directory of the ADLINK CD: X:\CHIP-DRV\LAN.

The Intel LAN drivers supports the following OS or platforms: Windows 98 SE, Windows ME, Windows NT 4.0, Windows 2000, Windows XP, and Linux

All the above drivers are included in the ADLINK CD. Driver Installation information for Windows systems is included below. For LAN driver installation of other OS's, please refer to the readme file in the CD.

Driver Installation on Windows 2000/XP

Windows 2000 may automatically try to install a LAN driver within its directory. We recommend that users manually install the latest LAN driver, which comes with the ADLINK CD to guarantee compatibility. After installing Windows 2000, please update to the new drivers by following these procedures.

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1. Boot Windows 2000.
2. The driver is included in the ADLINK CD. Run Setup.exe under the directory: X:\CHIP-DRV\LAN\82540EM\pro2kxpm.
3. Click the Install now button on the Installation instructions screen to install the drivers.
4. Click Finish button to finish the installation.

Driver Installation on Windows 98/98SE/ME

Windows 98 will install the LAN drivers automatically. We recommend that users manually update the LAN drivers, which come with the ADLINK CD to guarantee compatibility. After installing Windows 98, please update to the new drivers by following these procedures.

1. Boot Windows 98.
2. The driver is included in the ADLINK CD. Run the Setup.exe under the directory: X:\CHIP-DRV\LAN\82540EM\pro98mem.
3. Click the Install now button on the Installation instructions screen to install the drivers.
4. Click Finish button to finish the installation.

Driver Installation on Windows NT

Windows NT may ask to install a LAN driver from its own library of drivers. We recommend that users manually update the LAN drivers, which come with the ADLINK CD to guarantee compatibility. After installing Windows NT, please update to the new driver by following these procedures.

1. Boot Windows NT.
2. The driver is included in the ADLINK CD. Run the Setup.exe under the directory: X:\CHIP-DRV\LAN\82540EM\pront4
3. Click the Install now button on the Installation instructions screen to install the drivers.
4. After installing, click the Restart now button to restart the system.

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5 Watchdog Timer

This chapter explains the operation of the NuPRO-842 watchdog timer. It provides an overview of watchdog operations and features. Sample programs are located at X:\CHIPDRV\WDT\DOS\NP842.

5.1 Watchdog Timer Overview

The primary function of the watchdog timer is to monitor the NuPRO-842 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

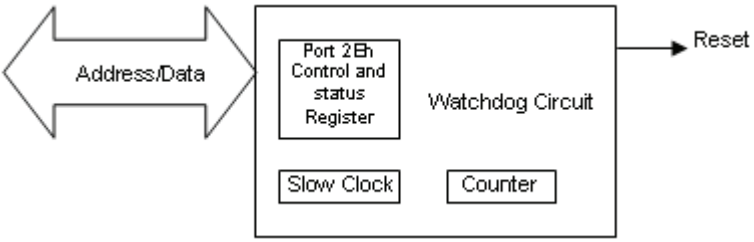


Figure 5-1: Watchdog Timer Architecture

The NuPRO-842 custom watchdog timer circuit is implemented in a programmable logic device. The watchdog timer contains two "Control and Status Registers."

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

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

Using the Watchdog in an Application

The following topic is provided to help users learn how to use the watchdog in an application. The watchdog reset function is also described. The watchdog reset is controlled through the watchdog "Control and Status Registers".

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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 X:\CHIPDRV\WDT

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6 DB-842DVI Display Interface

The DB-842DVI is a multi-display output daughter board add-on for the NuPRO-842. It supports DVI, LVDS, and TTL displays with resolutions of 800x600, and 1024x768 at 60Hz.

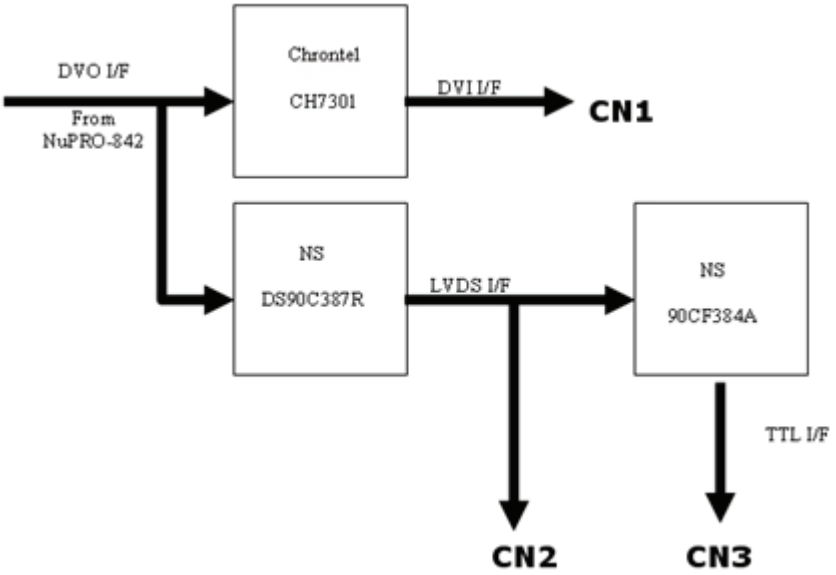


Figure 6-1: DB-842DVI Functional Block Diagram

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6.1 DB-842DVI Jumpers and Pinouts

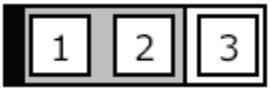
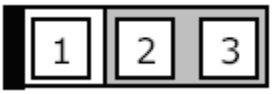
FUNCTION	JP1	
+5V FPVDD	1-2	
+3.3V FPVDD	2-3	

Table 6-1: Flat Panel Voltage Selection (JP1)

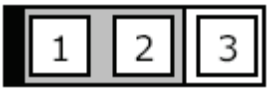
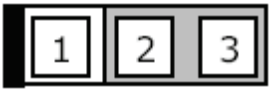
FUNCTION	JP2	
Enable LVDS	1-2	
Disable LVDS	2-3	

Table 6-2: LVDS Panel Enable (JP2)

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PIN	SIGNAL	FUNCTION	PIN	SIGNAL	FUNCTION
1	DVITDC2-	TMDS Data 2-	2	DVITDC2+	TMDS Data 2+
3	GND	Ground	4	NC	No Connect
5	NC	No Connect	6	DDCCLK	I2C Clock
7	DDCDATA	I2C Data	8	NC	No Connect
9	DVITDC1-	TMDS Data 1-	10	DVITDC1+	TMDS Data 1+
11	GND	Ground	12	NC	No Connect
13	NC	No Connect	14	+5V	Power +5V
15	GND	Ground	16	HPDET	Hot Plug Detect
17	DVITDC0-	TMDS Data 0-	18	DVITDC0+	TMDS Data 0+
19	GND	Ground	20	NC	No Connect
21	NC	No Connect	22	GND	Ground
23	DVITLC+	TMDS Clock+	24	DVITLC-	TMDS Clock+

Table 6-3: DVI Panel Connector (CN1)

PIN	SIGNAL	FUNCTION	PIN	SIGNAL	FUNCTION
1	+3.3V	Power +3.3V	2	+3.3V	Power +3.3V
3	GND	Ground	4	GND	Ground
5	A0M_L	LVDS Data 0-	6	A0P_L	LVDS Data 0+
7	GND	Ground	8	A1M_L	LVDS Data 1-
9	A1P_L	LVDS Data 1+	10	GND	Ground
11	A2M_L	LVDS Data 2-	12	A2P_L	LVDS Data 2+
13	GND	Ground	14	CLK1M_L	LVDS Clock -
15	CLK1P_L	LVDS Clock +	16	GND	Ground
17	A3M_L	LVDS Data 3-	18	A3P_L	LVDS Data 3+
19	GND	Ground	20	GND	Ground

Table 6-4: LVDS Panel Connector (CN2)

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PIN	SIGNAL	FUNCTION	PIN	SIGNAL	FUNCTION
1	NC	No Connect	2	NC	No Connect
3	GND	Ground	4	GND	Ground
5	FPVDD	+5V/3.3V	6	FPVDD	+5V/3.3V
7	NC	No Connect	8	GND	Ground
9	B0	Blue Data 0	10	B1	Blue Data 1
11	B2	Blue Data 2	12	B3	Blue Data 3
13	B4	Blue Data 4	14	B5	Blue Data 5
15	B6	Blue Data 6	16	B7	Blue Data 7
17	G0	Green Data 0	18	G1	Green Data 1
19	G2	Green Data 2	20	G3	Green Data 3
21	G4	Green Data 4	22	G5	Green Data 5
23	G6	Green Data 6	24	G7	Green Data 7
25	R0	Red Data 0	26	R1	Red Data 1
27	R2	Red Data 2	28	R3	Red Data 3
29	R4	Red Data 4	30	R5	Red Data 5
31	R6	Red Data 6	32	R7	Red Data 7
33	GND	Ground	34	GND	Ground
35	FPCLK	Clock	36	FPVSYNC	Vertical SYNC
37	FPDEN	Data Enable	38	FPHSYNC	Horizontal SYNC
39	GND	Ground	40	NC	No Connect
41	GND	Ground	42	NC	No Connect
43	NC	No Connect	44	FPVDD	

Table 6-5: TTL Panel Connector

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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

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