

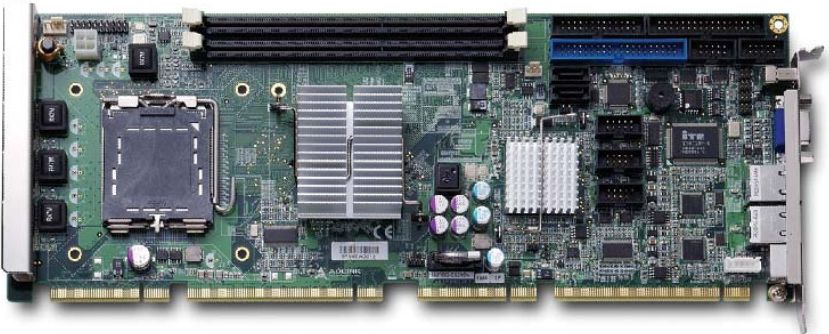


ADLINK
TECHNOLOGY INC.

NuPRO-E320

Full-Sized PICMG 1.3 SHB
Intel® Q45/ICH10 Chipset

User's Manual



Manual Rev.: 2.02
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Revision History

Revision	Release Date	Description of Change(s)
2.00	2009/05/07	Initial Release
2.01	2009/07/09	Correct COM1 Mode jumper settings
2.02	2009/08/28	Correct memory specification (max. 4GB); LPT connector drawing; LAN, Floppy, HDD LED pull-up, IDE, FAN1/2 pin definitions

Preface

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Using this Manual

Audience and Scope

The NuPRO-E320 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-E320, its features, applications, and specifications, including functional descriptions and board layout.

Chapter 2, Hardware Information: Provides technical information on connectors and jumpers for configuring the NuPRO-E320.

Chapter 3, Getting Started: Illustrates how to install components on the NuPRO-E320 such as CPU, heatsink, and memory modules.

Chapter 4, Driver Installation: Provides information on how to install the NuPRO-E320 device drivers.

Chapter 5, BIOS Setup: Describes basic navigation for the AMIBIOS®8 BIOS setup utility.

Appendix A, Watchdog Timer: Presents information on implementing the watchdog timer.

Appendix B, System Resources: Presents information on I/O mapping, IRQ routing, and resource allocation.

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.

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.



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

1.1 Overview

The ADLINK NuPRO-E320 is a PICMG 1.3 System Host Board (SHB) supporting the next-generation Intel® Core™2 Quad/Duo and Intel® Celeron® processors in the LGA775 package to deliver a high performance platform for a wide array of industrial automation applications. The NuPRO-E320 supports 45nm process CPUs at up to 3.00GHz and 1333 MHz Front Side Bus (FSB). Dual channel DDR3 800/1066 MHz memory is supported up to a maximum of 4GB in two DIMM slots.

These advanced features, coupled with PCI Express® x16 expansion capability, dual PCI Express®-based Gigabit Ethernet and diverse I/O and storage make the NuPRO-E320 ideal for instrumentation and automation control applications.

1.2 Features

- ▶ Supports Intel® Core™2 Quad/Duo and Celeron® processors in LGA775 package
- ▶ PCI Express® x16 expansion capability via backplane
- ▶ Dual 10/100/1000Mbps Ethernet (NuPRO-E320LV supports single GbE)
- ▶ 9x USB 2.0 ports (1x on bracket, 4x onboard, 4x on backplane)
- ▶ 4x SATA 3 Gb/s ports (2x onboard, 2x on backplane)
- ▶ Watchdog Timer, Hardware Monitor
- ▶ Optional HD audio kit (DB-Audio2 daughter board)
- ▶ TPM hardware security chip (NuPRO-E320DV only)
- ▶ RoHS compliant



NOTE:

To purchase the optional DB-Audio2 daughter board, please contact your ADLINK sales representative.

1.3 Specifications

System	
CPU/Cache	<ul style="list-style-type: none"> Intel® Core™2 Quad, Core™2 Duo, Celeron® in LGA775 Socket
FSB	<ul style="list-style-type: none"> 800/1066/1333 MHz
Chipset	<ul style="list-style-type: none"> Intel® 82Q45 Graphics Memory Controller Hub Intel® ICH10 I/O Controller Hub
Memory	<ul style="list-style-type: none"> Two 240-pin DIMM sockets support 800/1066MHz DDR3 (up to 4GB)
BIOS	<ul style="list-style-type: none"> AMI BIOS in 16-Mbit SPI Flash
Audio	<ul style="list-style-type: none"> Intel® High Definition Audio support via DB-Audio2 daughter board
Watch Dog Timer	<ul style="list-style-type: none"> 1-255 second or 1-255 minute programmable and can generate system reset.
Hardware Monitor	<ul style="list-style-type: none"> CPU/System temperature, fan speed and onboard DC voltage
TPM	<ul style="list-style-type: none"> Infineon SLB 9635 TT 1.2 (NuPRO-E320DV only)
Operating Systems	<ul style="list-style-type: none"> Windows XP/Vista, Fedora 9
I/O Interfaces	
IDE	<ul style="list-style-type: none"> One-channel UDMA 33, ATA-66/100 support One 40-pin IDE connector (1 device only)
Serial ATA	<ul style="list-style-type: none"> Two SATA ports, data rate up to 3 Gb/s
I/O Ports	<ul style="list-style-type: none"> 1 USB 2.0 port on rear panel, 4x via onboard header, 4x via backplane 2 Serial ports (one RS-232, one RS232/422/485/485+ via onboard pin-header) 2 Gigabit Ethernet RJ45 ports (2nd port optional) 1 VGA port (Dsub-15) PS/2 Keyboard/Mouse (Mini-DIN 6-pin) 1 Parallel port 1 Floppy port
PCIe/PCI	<ul style="list-style-type: none"> PCIe-x16, PCIe-x4 and PCI 32bit/33MHz via golden fingers

Display	
Processor	<ul style="list-style-type: none"> • GMA 4500 integrated in Q45 GMCH
Graphics	<ul style="list-style-type: none"> • VGA by Dsub-15 connector on rear panel, resolution up to 2048 x 1536 @ 75 Hz • Dual SDVO support via PEG x16
Ethernet	
Controller	<ul style="list-style-type: none"> • Dual Intel® 82574L (LV supports 1x LAN only) • supports Preboot Execution Environment (PXE), Wake-On-LAN (LAN1 only)
Ports	<ul style="list-style-type: none"> • Two RJ-45 Ethernet ports (NuPRO-E320LV supports 1x LAN only)
Mechanical and Environment	
Form Factor	<ul style="list-style-type: none"> • Standard full-size PICMG 1.3 SHB
Dimensions	<ul style="list-style-type: none"> • 338 x 122 mm (L x W)
Operating Temp.	<ul style="list-style-type: none"> • 0°C to 60°C
Storage Temp.	<ul style="list-style-type: none"> • -20°C to 80°C
Relative Humidity	<ul style="list-style-type: none"> • 5% to 90% non-condensing both operating and non-operating
Safety	<ul style="list-style-type: none"> • CE, FCC Class A

Table 1-1: NuPRO-E320 General Specifications

1.4 Power Consumption

Intel® Core™2 Quad Processor Q9400

Test Configuration	
CPU	Intel® Core™2 Quad Processor Q9400 2.66 GHz
Memory	Kingston KVR1066D3N7/1G DDR3 1GB 2x
Graphics	Intel ® 82Q45 Graphics Memory controller
SATA Channel 1	Seagate ST3160815AS Barracuda 7200.10 160GB
Power Supply	MSI AL-B450E 450W

DOS (idle)					
Power Req.	+5V	+12V	CPU +12V	+3.3V	Total
Current (A)	1.012	0.546	1.888	1.880	—
Watts (W)	5.060	6.546	22.656	6.204	40.466
Windows XP, Idle					
Power Req.	+5V	+12V	CPU +12V	+3.3V	Total
Current (A)	0.890	0.530	0.9455	1.852	—
Watts (W)	4.45	6.358	11.346	6.112	28.265
Windows XP, KPower					
Power Req.	+5V	+12V	CPU +12V	+3.3V	Total
Current (A)	0.950	0.558	5.934	1.905	—
Watts (W)	4.75	6.697	71.208	6.286	88.944
Windows XP, BurnIn Test 5.3					
Power Req.	+5V	+12V	CPU +12V	+3.3V	Total
Current (A)	1.141	0.775	4.131	1.917	—
Watts (W)	5.705	9.300	49.572	6.326	70.903

Intel® Core™2 Duo Processor E8400

Test Configuration	
CPU	Intel® Core™2 Duo Processor E8400 3.00 GHz
Memory	Kingston KVR1066D3N7/1G DDR3 1GB 2x
Graphics	Intel® 82Q45 Graphics Memory controller
SATA Channel 1	Seagate ST3160815AS Barracuda 7200.10 160GB
Power Supply	MSI AL-B450E 450W

DOS (idle)					
Power Req.	+5V	+12V	CPU +12V	+3.3V	Total
Current (A)	0.999	0.557	2.794	1.894	—
Watts (W)	4.995	6.6804	33.528	6.250	51.453
Windows XP, Idle					
Power Req.	+5V	+12V	CPU +12V	+3.3V	Total
Current (A)	0.881	0.526	1.012	1.867	—
Watts (W)	4.405	6.3072	12.144	6.161	29.017
Windows XP, KPower					
Power Req.	+5V	+12V	CPU +12V	+3.3V	Total
Current (A)	0.906	0.573	4.880	1.870	—
Watts (W)	4.529	6.877	58.560	6.171	76.137
Windows XP, BurnIn Test 5.3					
Power Req.	+5V	+12V	CPU +12V	+3.3V	Total
Current (A)	1.120	0.745	3.820	1.881	—
Watts (W)	5.600	8.939	45.840	6.2073	66.586

Intel® Celeron® Processor 400 Sequence 440

Test Configuration	
CPU	Intel® Celeron® Processor 400 Sequence 440 2GHz
Memory	Kingston KVR1066D3N7/1G DDR3 1GB 2x
Graphics	Intel® 82Q45 Graphics Memory controller
SATA Channel 1	Seagate ST3160815AS Barracuda 7200.10 160GB
Power Supply	MSI AL-B450E 450W

DOS (idle)					
Power Req.	+5V	+12V	CPU +12V	+3.3V	Total
Current (A)	0.914	0.485	1.608	1.893	—
Watts (W)	4.567	5.826	19.296	6.247	35.936
Windows XP, Idle					
Power Req.	+5V	+12V	CPU +12V	+3.3V	Total
Current (A)	0.807	0.472	0.769	1.855	—
Watts (W)	4.036	5.660	9.227	6.121	25.045
Windows XP, KPower					
Power Req.	+5V	+12V	CPU +12V	+3.3V	Total
Current (A)	0.849	0.482	1.960	1.870	—
Watts (W)	4.244	5.783	23.520	6.171	39.718
Windows XP, BurnIn Test 5.3					
Power Req.	+5V	+12V	CPU +12V	+3.3V	Total
Current (A)	0.935	0.603	1.653	1.886	—
Watts (W)	4.675	7.240	19.836	6.224	37.974

1.5 Block Diagram

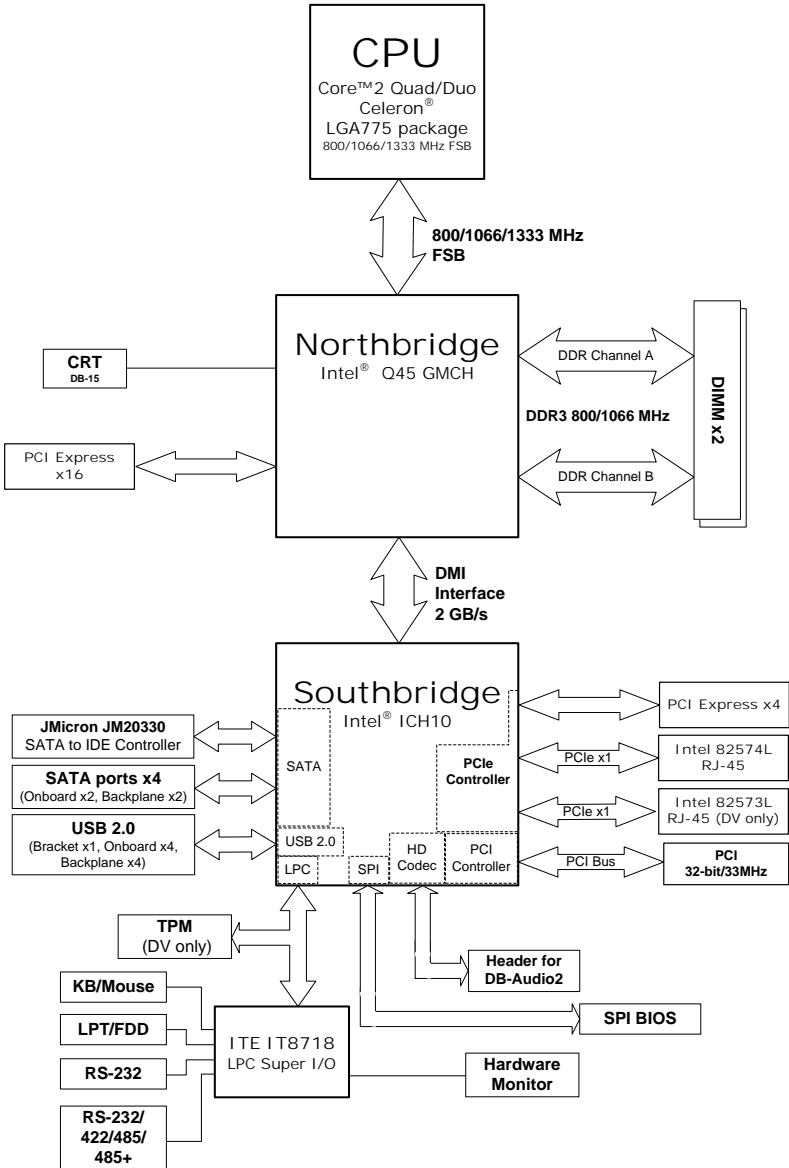


Figure 1-1: NuPRO-E320 Block Diagram

1.6 Functional Description

Processor Support

The NuPRO-E320 is a single processor design for the latest Intel Yorkfield/Wolfdale/Conroe Processor family, starting from 1.8 GHz core frequency up to 3.0 GHz. With one LGA775 socket, the CPU connects with the Intel® Q45 MCH through the 800/1066/1333 MHz Front Side Bus (FSB).

Intel® Q45 + ICH10 Express chipset

The Intel® Q45 Express chipset provides the vital interfaces for the SHB. The Intel® Q45 comes with purpose-built capabilities designed specifically to address the key needs of the industrial computing environment and delivers improved system performance and comes with the integrated Intel® Graphics Media Accelerator 4500 engine for cost-effective system building. The chipset also supports high-bandwidth interfaces including PCI Express, Serial ATA, and USB 2.0, as well as dual-channel DDR3 system memory.

Intel® Graphics Media Accelerator 4500

The Intel® Graphics Media Accelerator (GMA) 4500 revolutionizes integrated graphics with new capabilities that provide significant increase in graphics performance. With support for DirectX 10 hardware acceleration, Shader Model 4.0 and OpenGL 2.0, the Intel GMA 4500 delivers excellent video and 3D graphics for a cost-effective and high-performance graphics solution.

Dual-channel DDR3 memory

To meet the requirements of memory-intensive applications, the NuPRO-E320 has a dual-channel memory architecture supporting DDR3 800/1066 MHz DIMMs. The key advantages of DDR3 are the higher bandwidth and the increase in performance at lower power than DDR2. DDR3 memory technology meets the requirements of the latest 3D graphics, multimedia, and network application, and boosts system performance by eliminating bottlenecks.

Gigabit Ethernet

The NuPRO-E320 uses two Intel® 82574L Gigabit Ethernet controllers (NuPRO-E320LV supports 1x LAN only) connected to the PCI-E x1 bus of the ICH10. Operation at data rates of 10/100/1000 Mbps, wake on LAN and PXE are supported.

Serial ATA II technology

Storage is efficient and secure with the Serial ATA interface. Utilizing the Intel® ICH10, the NUPRO-E320 supports up to four Serial ATA devices capable of reading/writing data at up to 3 Gbps. The SATA specification improves chassis airflow via thinner and more flexible cables with lower pin count.

Universal Serial Bus (USB) 2.0

The NUPRO-E320 incorporates the Universal Serial Bus (USB) 2.0 specification that increases peripheral connection speed from 12 Mbps (USB 1.1) to 480 Mbps. USB 2.0 is backward compatible with USB 1.1.

Hardware monitoring

A built-in, proactive hardware monitoring system in the ASIC monitors the CPU temperature, system fan rotations, and voltage levels to prevent overheating and/or component damage, effect timely failure detection, and ensure stable supply of current for critical components.

Watchdog Timer

The watchdog timer (WDT) monitors system operations based on user-defined configurations. The WDT can be programmed for different time-out periods, such as from 1 to 255 seconds or from 1 to 255 minutes. The WDT generates a reset signal, then a reset request, after failure to strobe it within the programmed time period. A register bit may be enabled to indicate if the watchdog timer caused the reset event. The WDT register is cleared during the power-on sequence to enable the operating system to take appropriate action when the watchdog generates a reboot.

Trusted Platform Module

The NuPRO-E320 optionally supports TPM ver. 1.2 (Trusted Platform Module) for secure storage of keys, passwords and digital certificates. Systems supporting TPM offer improved hardware-based security in numerous applications, such as file and folder encryption, local password management, S-MIME e-mail, VPN and PKI authentication and wireless authentication for 802.1x and LEAP.

1.7 Mechanical Drawing

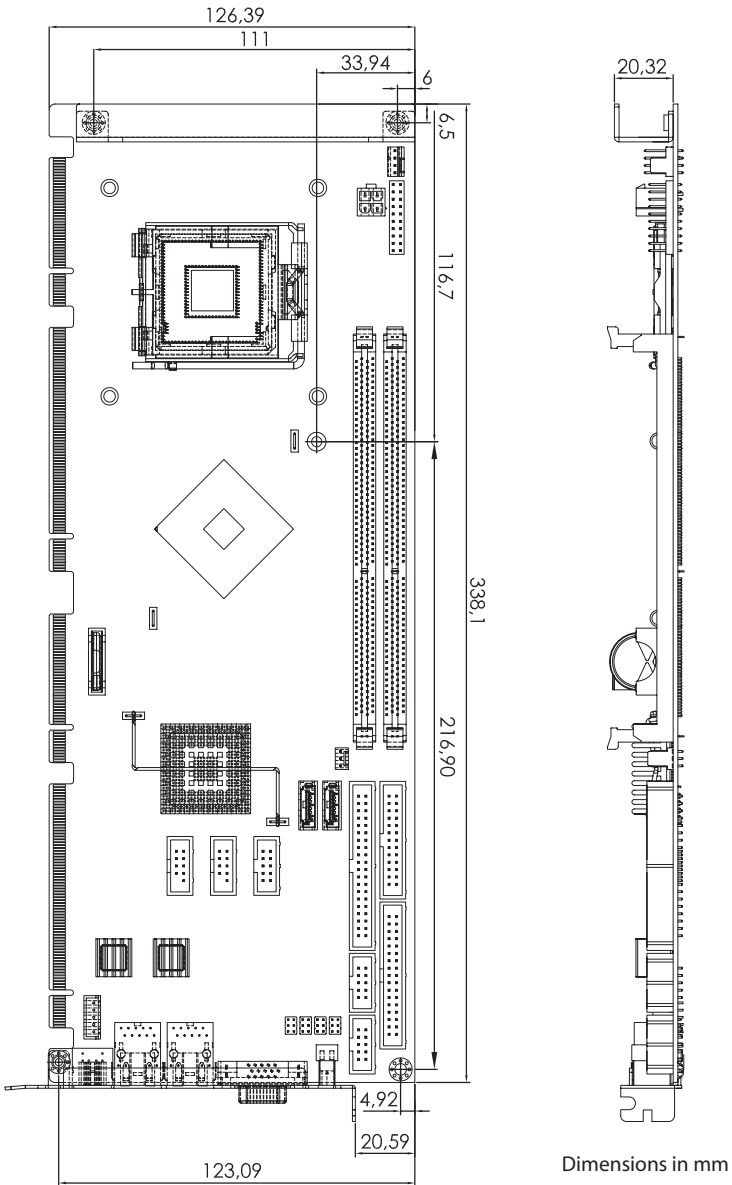


Figure 1-2: NuPRO-E320 Board Dimensions

1.8 I/O Connectivity

I/O	Bracket	Onboard	Golden Finger	Remarks
USB Rear Panel	1	—	—	
VGA	Y	—	—	DB-15
GbE1 (RJ-45)	Y	—	—	Act/Link/Speed LEDs
GbE2 (RJ-45)	Y (DV only)	—	—	Act/Link/Speed LEDs
PS/2 KB/MS	Y	—	—	—
KB header	—	Y	—	—
USB headers	—	4	—	2.54 pitch
USB backplane	—	—	4	—
COM1/2	—	Y	—	2.54 pitch
Parallel port	—	Y	—	—
IDE	—	Y	—	—
Floppy port	—	Y	—	—
SATA	—	2	2	—
PCIe x4	—	—	Y	—
PCIe x16	—	—	Y	—
PCI 32bit/33MHz	—	—	Y	—

1.9 Package Contents

Before unpacking, check the shipping carton for any damage. If the shipping carton and/or contents are damaged, inform your dealer immediately. Retain the shipping carton and packing materials for inspection. Obtain authorization from the dealer before returning any product to ADLINK.

- ▶ NuPRO-E320
- ▶ PS/2 Y cable x1
- ▶ SATA cable x2
- ▶ SATA Power cable x1
- ▶ IDE cable x1
- ▶ Floppy cable x1
- ▶ 2-port USB cable with bracket x1
- ▶ COM+Print cable with bracket x1
- ▶ COM cable with bracket x1
- ▶ ADLINK All-in-One Driver DVD
- ▶ User's manual



The NuPRO-E320 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 installing and/or servicing.

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2 Hardware Information

This chapter provides information on the NuPRO-E320 board layout, connector pin assignments, and jumper settings.

2.1 Rear Panel I/O Ports

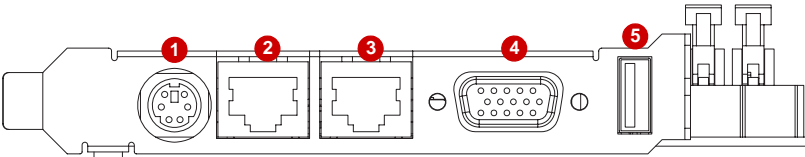
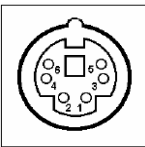


Figure 2-1: Rear Panel I/O Ports

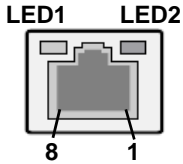
	Connector	Description
1	PS/2 KB/MS port	Connects PS/2 mouse and keyboard via Y cable
2	Gigabit LAN1 port (RJ-45)	Gigabit Ethernet connection
3	Gigabit LAN2 port (RJ-45)	Gigabit Ethernet connection (not supported on NuPRO-E320LV)
4	VGA port	DB-15 connector for CRT or LCD monitor
5	USB 2.0 port	High-speed USB 2.0 port

PS/2 Keyboard/Mouse Port



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

LAN (RJ-45) Ports

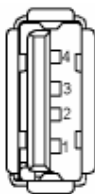


Pin #	10BASE-T/ 100BASE-TX	1000BASE-T
1	TX+	BI_DA+
2	TX-	BI_DA-
3	RX+	BI_DB+
4	--	BI_DC+
5	--	BI_DC-
6	RX-	BI_DB-
7	--	BI_DD+
8	--	BI_DD-

Refer to the table below for the LAN port LED definitions.

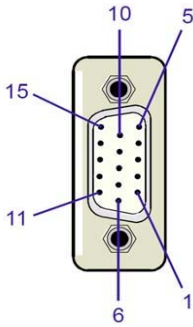
LED1		LED2	
Status	Description	Status	Description
Off	No Link	Off	10 Mb connection
On	Linked	Green	100 Mb connection
Blinking	Data Activity	Amber	1 Gb connection

USB Connector



Pin #	Signal Name
1	Vcc
2	Data-
3	Data+
4	GND

VGA Port



Pin #	Signal
1	Red
2	Green
3	Blue
4	NC
5	Ground
6	Ground
7	Ground
8	Ground
9	+5 V
10	Ground
11	NC
12	DDC DAT
13	HSYNC
14	VSYNC
15	DDC CLK

2.2 Board Layout

The illustrations below show the locations of connectors, slots, and jumpers on the NuPRO-E320.

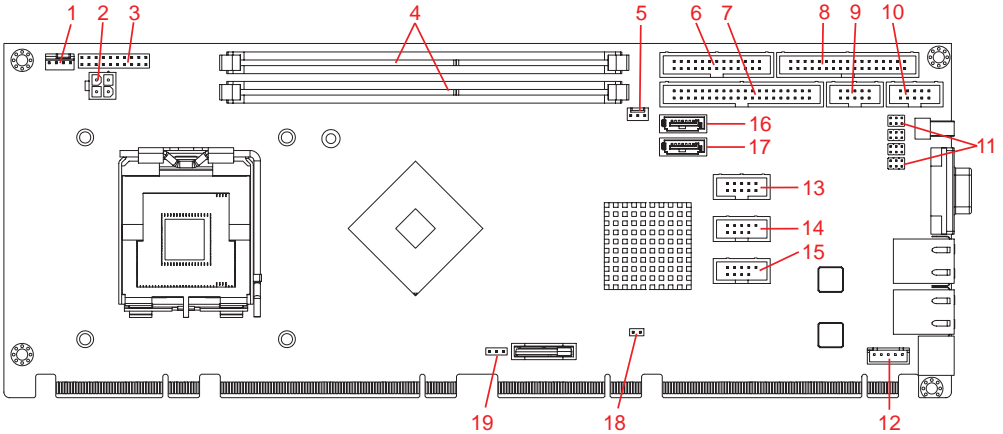


Figure 2-2: Connectors and Jumpers

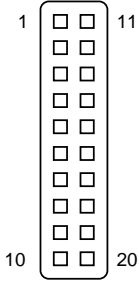
	Connector	Description
1	FAN1	CPU Fan connector
2	CN4	ATX 12V Power connector
3	CN1	System Panel pin header
4	DIMM1/2	DDR3 DIMM slots
5	FAN2	System Fan connector
6	CN2	Parallel Port connector
7	CN5	IDE connector
8	CN3	Floppy connector
9	CN6	COM2 connector
10	CN7	COM1 connector
11	JP1-4	COM1 mode jumpers
12	CN18	Keyboard connector
13	CN11	Audio connector
14	CN14	USB 6, 7
15	CN15	USB 8, 9
16	CN8	SATA1
17	CN10	SATA2
18	JP6	Chassis Intrusion
19	JBAT1	Clear CMOS

2.3 Onboard Connectors

System Panel Connector (CN1)

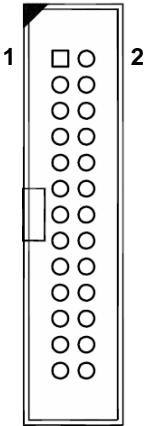
Connects to chassis-mounted buttons, speakers, and LEDs.

Pin #	Signal	Function	Pin Group
1	WDSPK	Speaker signal	Chassis Speaker
2	NC		
3	NC		
4	+5V	Power	
5	NC		
6	GND	Ground	Key Lock
7	KEYLOCK	Keyboard lock	
8	PLED	Power LED signal	Power LED
9	NC		
10	+5V	Power LED pull-up	
11	GND	Ground	Reset Button
12	RESETBT	RESET signal	
13	NC		
14	GND	Ground	Power Button
15	POWERBT	Power-on signal	
16	NC		
17	NC		
18	HDDLED	Hard Disk LED signal	HDD LED
19	+3.3V	Hard Disk LED pull-up	
20	NC		



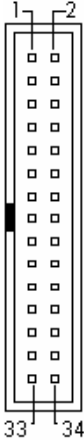
The diagram shows a vertical 20-pin connector. The pins are numbered 1 through 20 from top to bottom. The top pin is labeled '1', the 11th pin is labeled '11', the 10th pin is labeled '10', and the bottom pin is labeled '20'. Each pin position is represented by a small square.

Parallel Port Connector (CN2)



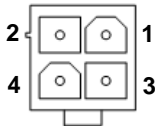
Pin #	Signal	Pin #	Signal
1	Line Printer Strobe	2	Auto-Feed
3	Parallel Data 0	4	Error
5	Parallel Data 1	6	Initialize
7	Parallel Data 2	8	Select
9	Parallel Data 3	10	Ground
11	Parallel Data 4	12	Ground
13	Parallel Data 5	14	Ground
15	Parallel Data 6	16	Ground
17	Parallel Data 7	18	Ground
19	Acknowledge	20	Ground
21	Busy	22	Ground
23	Paper Empty	24	Ground
25	Select	26	NC

Floppy disk drive connector (CN3)



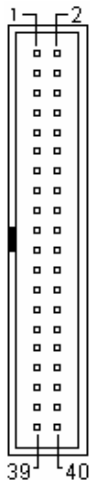
Pin #	Signal	Pin #	Signal
1	GND	2	Extended Density
3	GND	4	No Connect
5	NC	6	NC
7	GND	8	Index
9	GND	10	Motor A Select
11	GND	12	NC
13	GND	14	Drive A Select
15	GND	16	NC
17	GND	18	Step Direction
19	GND	20	Step Pulse
21	GND	22	Write Data
23	GND	24	Write Gate
25	GND	26	Track 0
27	GND	28	Write Protect
29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

ATX 12V Power Connector (CN4)



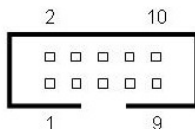
Pin #	Signal
1	GND
2	GND
3	+12V DC
4	+12V DC

IDE Connector (CN5)



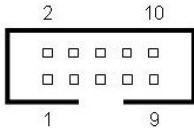
Pin #	Signal	Pin #	Signal
1	Reset IDE	2	Ground
3	Host data 7	4	Host data 8
5	Host data 6	6	Host data 9
7	Host data 5	8	Host data 10
9	Host data 4	10	Host data 11
11	Host data 3	12	Host data 12
13	Host data 2	14	Host data 13
15	Host data 1	16	Host data 14
17	Host data 0	18	Host data 15
19	Ground	20	NC
21	DRQ0 / DRQ1	22	IDE Detect
23	Host IOW	24	Ground
25	Host IOR	26	Ground
27	IOCHRDY	28	Ground
29	DDACK-L	30	Ground
31	IRQ	32	NC
33	Address 1	34	NC
35	Address 0	36	Address 2
37	Chip select 0	38	Chip select 1
39	Activity	40	Ground

COM2/COM1 Connector (RS-232) (CN6/7)



Pin #	RS-232 Signal
1	DCD
2	DSR
3	RXD
4	RTS
5	TXD
6	CTS
7	DTR
8	RI
9	GND
10	NC

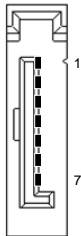
COM1 Connector (RS-422/485/485+) (CN7)



Pin #	RS-422/485+	RS-485
1	TXD-	Data-
2	NC	NC
3	TXD+	Data+
4	NC	NC
5	RXD+	NC
6	NC	NC
7	RXD-	NC
8	NC	NC
9	GND	GND
10	NC	NC

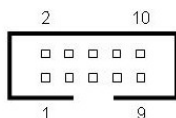
Note: See “COM1 Mode Jumper Settings (JP1-4)” on page 26.

Serial ATA Connectors (CN8/10)



Pin #	Signal
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND

HD Audio Daughter Board Connector (CN11)



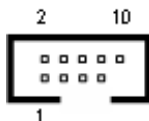
Pin #	Signal	Function
1	GND	Ground
2	AUD_BCLK	Audio Clock
3	GND	Ground
4	ICH_AUD_SDIN1	Audio Data Input
5	P5V	+ 5V
6	ICH_AUD_SDOOUT	Audio Data Output
7	P5V_AUD	+ 5V
8	P3V3_DVDD	3.3V
9	AUD_SYNC	Audio Synchronous
10	AUD_RST-L	Audio Reset



NOTE:

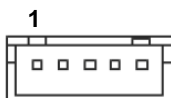
This connector is designed for use with the ADLINK DB-Audio2 daughter board.

USB 2.0 Connectors (CN14/15)



Pin #	Signal	Pin #	Signal
1	+5V	2	+5V
3	USB0-	4	USB1-
5	USB0+	6	USB1+
7	GND	8	GND
9	Key	10	NC

External Keyboard Connector (CN18)



Pin #	Signal	Function
1	KBCLK	Keyboard clock
2	KBDATA	Keyboard data
3	NC	—
4	GND	Power
5	+5 V	Power

CPU Fan Connector (FAN1)



Pin #	Signal
1	GND
2	Fan power (+12V)
3	Fan Tachometer
4	Fan Speed Control

System Fan Connector (FAN2)



Pin #	Signal
1	Fan Sense
2	Fan power (+12V)
3	GND

Chassis Intrusion Connector (JP6)

This header is connected to the chassis intrusion sensor to detect if the case is opened.



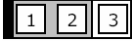

Pin #	Signal
1	CASEOPEN#
2	GND

2.4 Jumpers

Clear CMOS (JBAT1)

The CMOS RAM data contains the date / time and BIOS setting information. CMOS is powered by the onboard button cell battery. To erase the CMOS RAM data:

1. Power down and disconnect power from the system.
2. Short pins 2-3 on JP1.
3. Reconnect power and power up the system.
4. After power up, remove the jumper cap from pins 2-3 and reinstall it to pins 1-2.

RTC status	Connection	JBAT1
Normal	1 – 2	
Clear CMOS	2 – 3	

COM1 Mode Jumper Settings (JP1-4)

Short the jumper pins according to the following settings to set COM1 to RS-232/422/485/485+ mode:



	RS-232	RS-422	RS-485	RS-485+
JP1	-	1-3, 2-4	1-3, 2-4	3-5, 4-6
JP2	1-2	3-4	5-6	5-6
JP3	1-3, 2-4	3-5, 4-6	3-5, 4-6	3-5, 4-6
JP4	1-3, 2-4	3-5, 4-6	3-5, 4-6	3-5, 4-6

3 Getting Started

This chapter provides information on how to install components on the NuPRO-E320 SHB.

3.1 Installing the CPU

The NuPRO-E320 supports a single Intel® Core™2 Quad/Duo, Pentium® D, or Celeron® M processor via the surface mount LGA775 socket (Socket T).



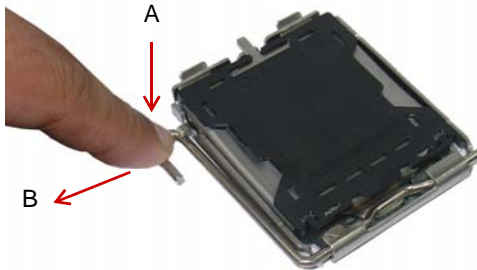
Disconnect all power supply to the board before installing a CPU to prevent damaging the board and CPU.

Do not touch socket contacts. Damaging the contacts voids the product warranty. Follow the installation instructions carefully to avoid damaging to motherboard components.



To install the CPU:

1. Press the load lever (A), then disengage it from the retention tab (B).



2. Lift and rotate the load lever to a 135° angle



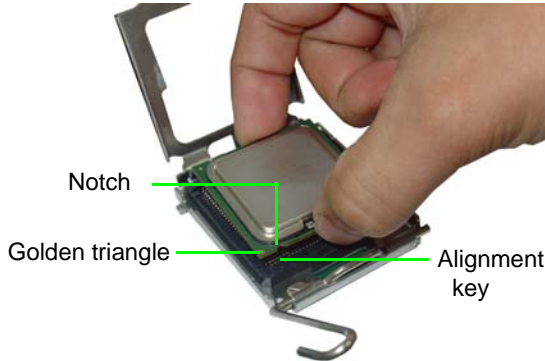
3. Lift the load plate to a 100° angle using your thumb and forefinger



4. Use your thumb to push and remove the protective socket cover (plastic) from the load plate

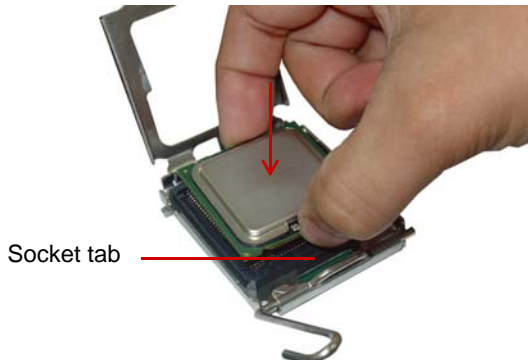


5. Position the CPU over the socket, then match the notches on the CPU side with the alignment keys on the socket. The golden triangle on the CPU must be positioned on the bottom-left corner of the socket .

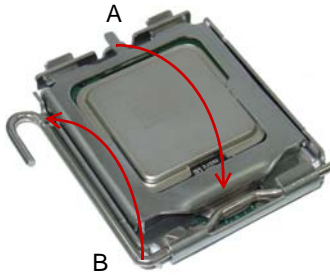


The CPU fits the socket in only one orientation. DO NOT force it into the socket to avoid damaging it.

6. Carefully place the CPU on the socket in a vertical motion. The socket has tabs that accommodate your fingers during installation .



7. Close the load plate (A), then fasten the load lever on the retention tab (B) .



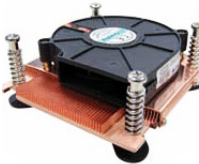
3.2 Installing the CPU Fan and Heatsink



CAUTION:

The CPU requires a chassis with an airflow inlet and maximum internal ambient temperature of 60° C. A especially-designed CPU fan and heatsink must be installed before using the SHB. Failure to install a CPU fan and heatsink may damage the system host board and/or the CPU.

The following CPU fan and heatsink assemblies are recommended for use with the NuPRO-E320:



1U LGA 775 CPU Cooler

Dimensions:

- Heatsink: 92 x 87.6 x 28 mm
- Fan: 75 x 75 x 15 mm

Heatsink: Copper base + copper skived fin

Fan speed: 5500 RPM

Fan airflow: 10.48 CFM

Noise level: 51 dBA

Part number: 32-20065-0000



3U LGA 775 CPU Cooler

Dimensions:

- Heatsink: 100 x 100 x 70 mm
- Fan: 90 x 90 x 25 mm

Heatsink: Aluminum extrusion

Fan speed: 4500 RPM

Fan airflow: 57.7 CFM

Noise level: 47.5 dBA

Part number: 32-20058-0000 + 34-30381-0000



Copper-Core Cooler

Dimensions: 115 x 115 x 61.4 mm

Heatsink: Aluminum extrusion+copper core

Fan speed: 4500 RPM

Fan airflow: 76.9 CFM

Noise level: 49 dBA

Part number: 32-20086-0000

When the CPU fan installation procedures presented here are inconsistent with the installation procedures you obtained from the CPU fan and heatsink package, follow the latter.

To install the CPU fan:

1. Apply thermal grease evenly on top of the installed CPU.
2. Lower the CPU fan to the CPU, then secure it using the provided attachments or screws.
3. Connect the CPU fan cable to the CPU fan connector on the SHB labeled FAN1 (see "Board Layout" on page 18).

3.3 Installing Memory Modules

The NuPRO-E320 supports up to 4 GB of DDR3 800/1066 MHz memory modules via four DDR3 DIMM sockets. A DDR3 module has a 240-pin footprint compared to the legacy 184-pin DDR DIMM. DDR3 modules are notched to facilitate correct installation on the DIMM sockets.



Disconnect all power supply to the board before installing a memory module to prevent damaging the board and memory module .

Memory Configuration Options

The NuPRO-E320 allows you to install 512 MB, 1GB and 2GB unbuffered non-ECC DDR3 DIMMs into the DIMM sockets following these configuration options:

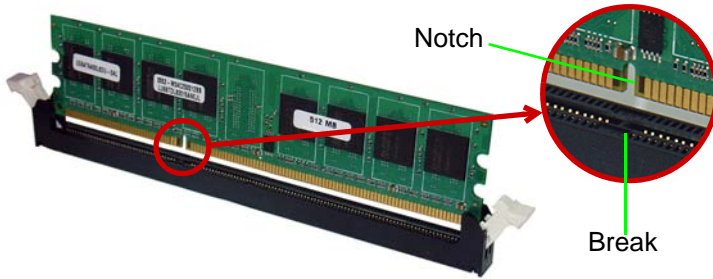
- ▶ Channel A: DIMM1
Channel B: DIMM2
- ▶ For dual-channel configuration, the total size of memory module installed per channel must be the same (DIMM1 = DIMM2).
- ▶ It is recommended that you install DIMMs with the same CAS latency. For maximum compatibility, install memory modules with the same brand, model, and/or rating.

To install a memory module:

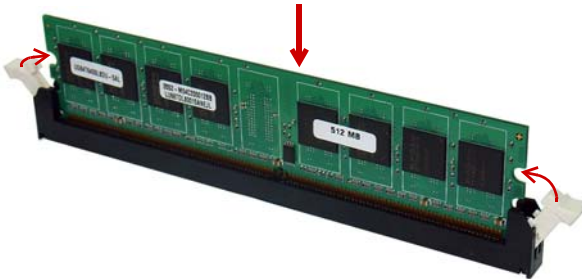
1. Locate the DIMM sockets on the motherboard.
2. Press the socket's retaining clips outward to unlock.



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.



4 Driver Installation

This chapter provides information on how to install the NuPRO-E320 device drivers under Windows XP. The device drivers are located in the following ADLINK All-in-One DVD directories:

Chipset Driver	\\NuPRO\NuPRO-E320\Chipset\
Display Driver	\\NuPRO\NuPRO-E320\VGA\
LAN Driver	\\NuPRO\NuPRO-E320\Ethernet\
TPM Driver	\\NuPRO\NuPRO-E320\TPM\
Audio Driver	\\Audio Daughter Board\DB-Audio2\

4.1 Intel® Q45 Express Chipset Driver

This section describes the installation of the Intel® Q45 Express chipset driver.

1. Locate the directory **X:\NuPRO\NuPRO-E320\Chipset** from the ADLINK All-in-One DVD, select the operating system, then start the installation by double-clicking **infinst_autol.exe**.
2. When the initial installation window appears, click **Next** to display the license agreement. When prompted, click **Yes** to continue.
3. Click **Next** on the Readme information screen to begin installing the driver.
4. When installation is complete, click **Finish**. Restart the system when prompted.
5. After restart, follow screen instructions to complete installation. Windows displays a found new hardware window and automatically installs the required drivers. If the **New Hardware Found** dialog box appears and prompts you to locate the location of the drivers, browse to the relevant directory.
6. Restart the system when prompted.

4.2 Display Driver

This section describes the installation of the Intel® Graphics Media Accelerator (GMA) 3000 driver.

To install the display driver:

1. Locate the display driver from the directory **X:\NuPRO\NuPRO-E320\VGA**, unzip the appropriate file for your operating system, and run **Setup.exe** to start installation.
2. Follow the screen instructions to complete installation, then restart the system if prompted.

4.3 LAN Driver

Follow these instructions to install the LAN driver.

1. Locate the LAN driver from the directory **X:\NuPRO\NuPRO-E320\Ethernet**, unzip the appropriate file for your operating system, and run the *.exe file to start installation.
2. Follow the screen instructions to complete installation, then restart the system if prompted.

4.4 TPM Driver

Follow these instructions to install the TPM driver.

1. Locate the TPM driver from the directory **X:\NuPRO\NuPRO-E320\TPM** and run **Setup.exe** to start installation.
2. Follow the screen instructions to complete installation, then restart the system if prompted.

4.5 Audio Driver

Follow these instructions to install the audio driver for the optional DB-Audio2 daughter board.



NOTE:

Before installing the audio driver, check the BIOS settings to make sure that audio is enabled: **Chipset > South Bridge Configurations > HDA Controller** (see “South Bridge Configuration” on page 67).

1. Place the ADLINK All-in-One DVD to the optical drive.
2. Locate the audio driver from the directory **X:\Audio Daughter Board\DB-Audio2**, then double-click on the **setup.exe** file to start installation.
3. Follow the screen instructions to complete installation, then restart the system if prompted.

This page intentionally left blank.

5 BIOS Setup

The following chapter describes basic navigation for the AMIBIOS®8 BIOS setup utility.

5.1 Starting the BIOS

To enter the setup screen, follow these steps:

1. Power on the motherboard
2. Press the < Delete > key on your keyboard when you see the following text prompt:
< Press DEL to run Setup >
3. After you press the < Delete > key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as Chipset and Power menus.



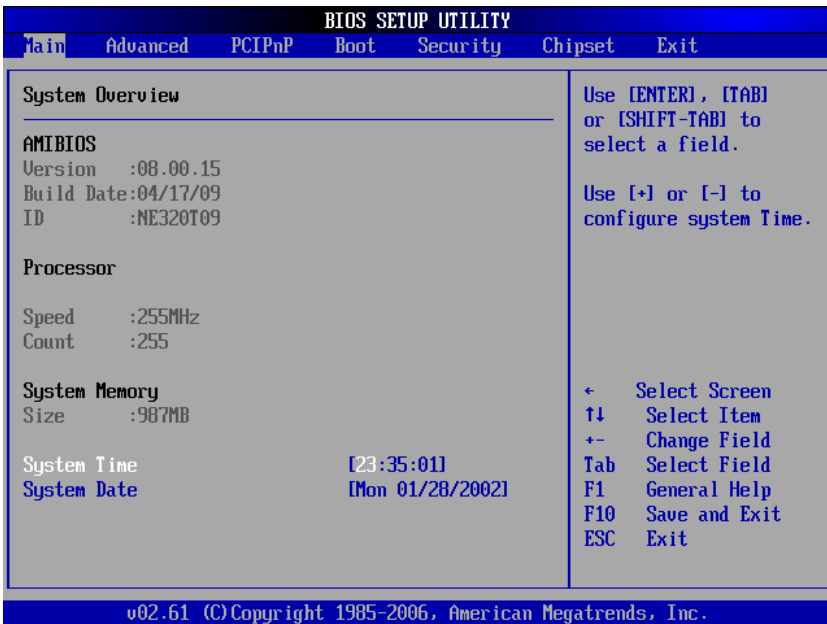
Note: In most cases, the < Delete > key is used to invoke the setup screen. There are several cases that use other keys, such as < F1 >, < F2 >, and so on.

Setup Menu

The main BIOS setup menu is the first screen that you can navigate. Each main BIOS setup menu option is described in this user's guide.

The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. "Grayed" options cannot be configured, "Blue" options can be.

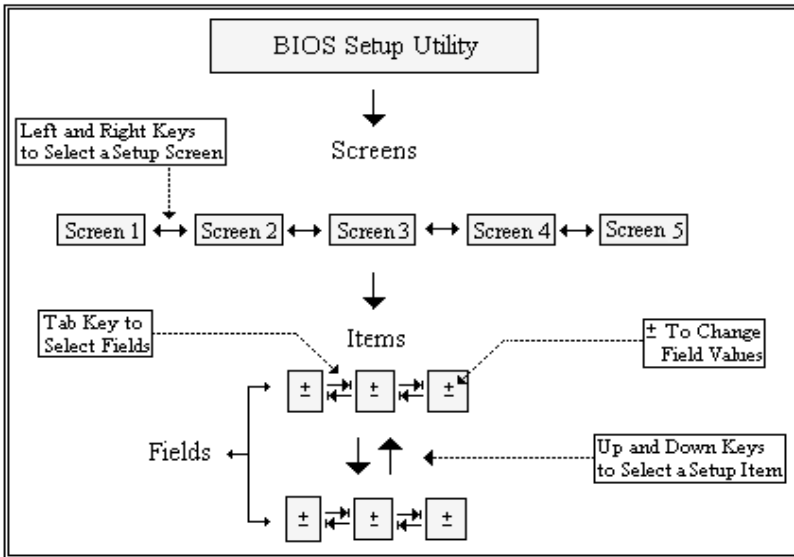
The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.



Navigation

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process.

These keys include < F1 >, < F10 >, < Enter >, < ESC >, < Arrow > keys, and so on. .



Note: There is a hot key legend located in the right frame on most setup screens.

The < F8 > key on your keyboard is the Fail-Safe key. It is not displayed on the key legend by default. To set the Fail-Safe settings of the BIOS, press the < F8 > key on your keyboard. It is located on the upper row of a standard 101 keyboard. The Fail-Safe settings allow the motherboard to boot up with the least amount of options set. This can lessen the probability of conflicting settings.

Hotkey Descriptions

F1 The < F1 > key allows you to display the General Help screen.

Press the < F1 > key to open the General Help screen.

General Help			
↔	Select Screen	↓↑	Select Item
+ -	Change Screen	Enter	Go to Sub Screen
PGDN	Next Page	PGUP	Previous Page
Home	Go to Top of the Screen	End	Go to Bottom of Screen
F2/F3	Change Colors	F7	Discard Changes
F8	Load Failsafe Defaults	F9	Load Optimal Defaults
F10	Save and Exit	ESC	Exit

[Ok]

- F10** The < F10 > key allows you to save any changes you have made and exit Setup. Press the < F10 > key to save your changes. The following screen will appear:

Save configuration changes and exit now?	
[Ok]	[Cancel]

Press the < Enter > key to save the configuration and exit. You can also use the < Arrow > key to select Cancel and then press the < Enter > key to abort this function and return to the previous screen.

- ESC** The < Esc > key allows you to discard any changes you have made and exit the Setup. Press the < Esc > key to exit the setup without saving your changes. The following screen will appear:

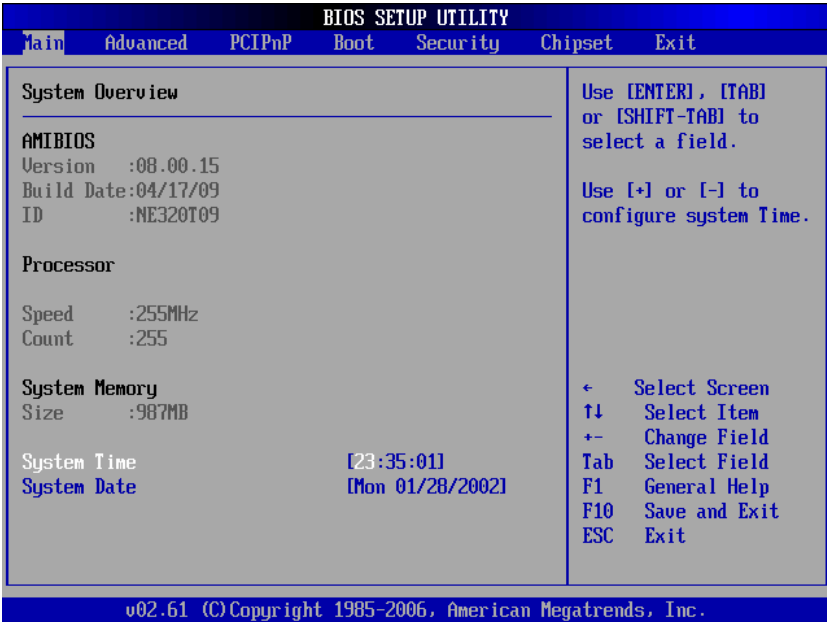
Discard changes and exit setup now?	
[Ok]	[Cancel]

Press the < Enter > key to discard changes and exit. You can also use the < Arrow > key to select Cancel and then press the < Enter > key to abort this function and return to the previous screen.

- Enter** The < Enter > key allows you to display or change the setup option listed for a particular setup item. The < Enter > key can also allow you to display the setup sub-screens.

5.2 Main Setup

When you first enter the Setup Utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.



System Time/System Date

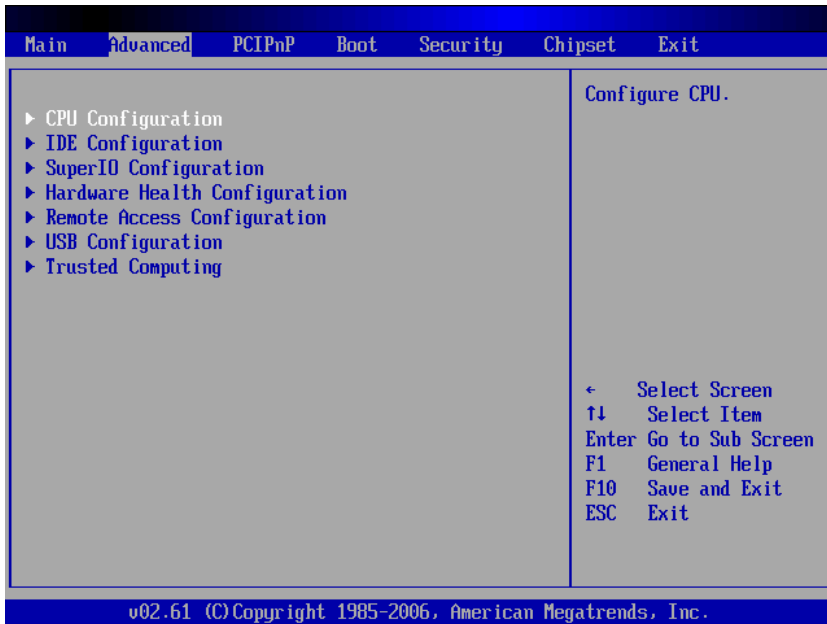
Use this option to change the system time and date. Highlight System Time or System Date using the < Arrow > keys. Enter new values using the keyboard. Press the < Tab > key or the < Arrow > keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

Note: The time is in 24-hour format. For example, 5:30 A.M. appears as 05:30:00, and 5:30 P.M. as 17:30:00.

5.3 Advanced BIOS Setup

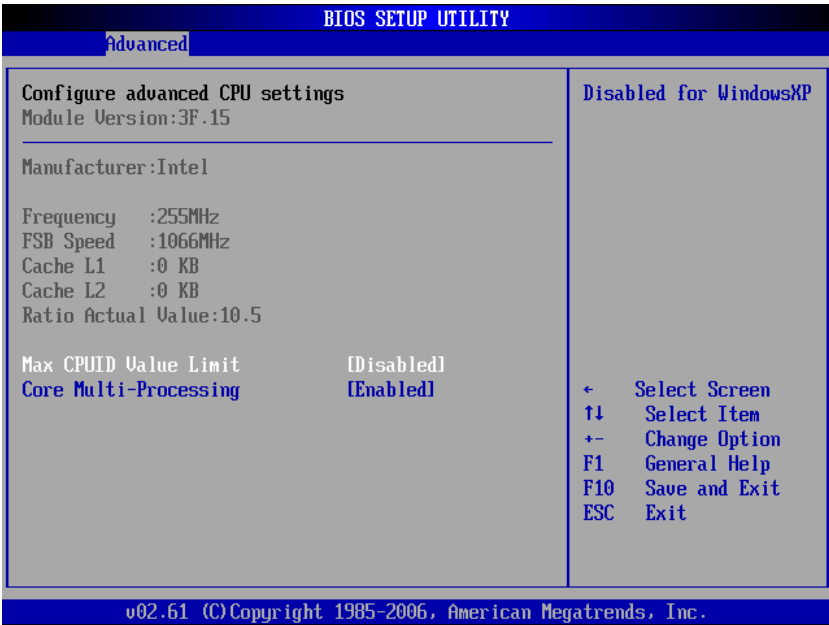
Select the Advanced tab from the setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as SuperIO Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the < Arrow > keys. The Advanced BIOS Setup screen is shown below.

The sub menus are described on the following pages.



5.3.1 CPU Configuration

You can use this screen to select options for the CPU Configuration Settings. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option. A description of the selected item appears on the right side of the screen. The settings are described on the following pages. An example of the CPU Configuration screen is shown below.



Max CPUID Value Limit

When the computer is booted up, the operating system executes the CPUID instruction to identify the processor and its capabilities. Before it can do so, it must first query the processor to find out the highest input value CPUID recognized. This determines the kind of basic information CPUID can provide the operating system. This option allows you to circumvent problems with older operating systems.

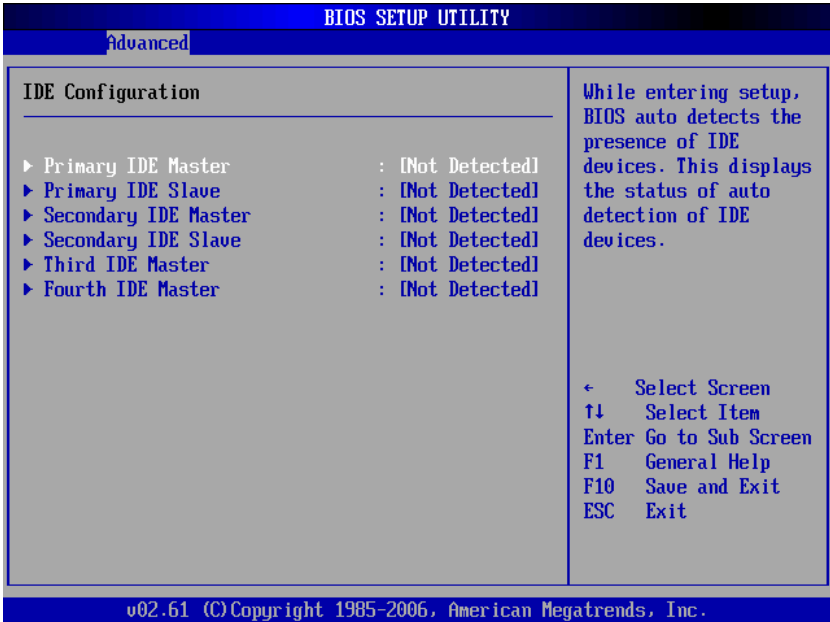
When Enabled, the processor will limit the maximum CPUID input value to 03h when queried, even if the processor supports a higher CPUID input value. When Disabled, the processor will return the actual maximum CPUID input value of the processor when queried.

Core Multi-Processing

This item enables/disables multi-core processing functionality for multi-core processors.

5.3.2 IDE Configuration

You can use this screen to select options for the IDE Configuration Settings. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option. A description of the selected item appears on the right side of the screen. The settings are described on the following pages. An example of the IDE Configuration screen is shown below.

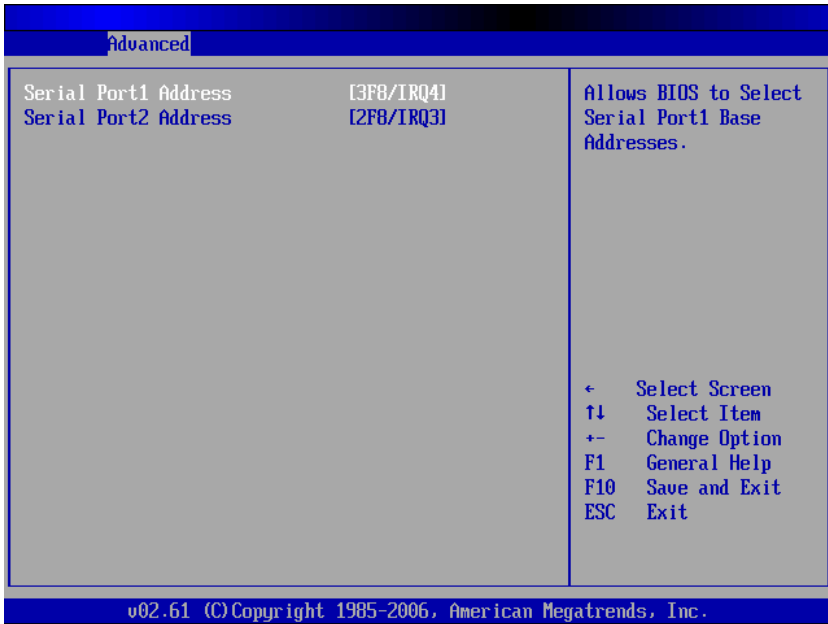


IDE Master/Slave

Select one of the hard disk drives to configure it. Press < Enter > to access its sub menu.

5.3.3 Super IO Configuration

You can use this screen to select options for the Super IO settings. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.



Serial Port1 Address

Select an address and a corresponding interrupt for Serial Port1. Options: 3F8/IRQ4, 3E8/IRQ4, 2F8/IRQ3, 2E8/IRQ3.

Serial Port2 Address

This option specifies the base I/O port address and Interrupt Request address of Serial Port2. The settings of Serial Port2 are the same as Serial Port1. However, the setting used by Serial Port1 will not be available for Serial Port2. For example, if Serial Port1 uses 3F8/IRQ4, the option, the 3F8/IRQ4 will not appear in the options of Serial Port2.

5.3.4 Hardware Health Configuration

This option displays the current status of all of the monitored hardware devices/components such as voltages and temperatures. The options are Enabled and Disabled.

Three modes are provided for the CPU Fan (Fan1): Full On mode, Automatic mode, and PWM Manually mode. Full On mode runs the fan at full speed. Automatic mode is Smart Fan mode. PWM Manually mode runs the fan at the set speed.

Full On mode

BIOS SETUP UTILITY	
Advanced	
Hardware Health Configuration	
H/W Health Function	[Enabled]
FAN 1 Mode Setting	[Full On mode]
System Temperature	:29°C/84°F
CPU Temperature	:25°C/77°F
Fan1 Speed	:1231 RPM
CPU Core	:1.152 V
+3.30V	:3.392 V
+5.00V	:5.107 V
+12.0V	:12.032 V
VBAT	:3.792 V
Fan configuration mode setting	
← Select Screen	
↑↓ Select Item	
+- Change Option	
F1 General Help	
F10 Save and Exit	
ESC Exit	
v02.61 (C) Copyright 1985-2006, American Megatrends, Inc.	

Automatic mode

BIOS SETUP UTILITY	
Advanced	
Hardware Health Configuration	
H/W Health Function	[Enabled]
FAN 1 Mode Setting	[Automatic mode]
Temperature 1 Limit of OFF	[000]
Temperature 1 Limit of Start	[020]
Fan 1 Start PWM	[070]
Slope PWM 1	[0.5 PWM]
<hr/>	
System Temperature	:43°C/109°F
CPU Temperature	:37°C/98°F
<hr/>	
Fan1 Speed	:1300 RPM
<hr/>	
CPU Core	:1.056 V
+3.30V	:3.376 V
+5.00V	:5.107 V
+12.0V	:12.096 V
VBAT	:3.376 V
← Select Screen ↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit	
v02.61 (C) Copyright 1985-2006, American Megatrends, Inc.	

Temperature 1 Limit of OFF

When the temperature (°C) is higher than the set value, Fan1 will run at Start PWM speed. When the temperature is lower than the set value, Fan1 will stop.

Temperature 1 Limit of Start

When the temperature (°C) is higher than the set value, Fan1 will increase its speed by Slope PWM 1 value.

Fan 1 Start PWM

Sets a value to control the fan speed between Limit of OFF and Limit of Start. Minimum is 0 and Maximum is 127.

Slope PWM 1

The Slope PWM Value sets the rate of increase the fan speed when the temperature is above Limit of Start.

PWM Manually mode

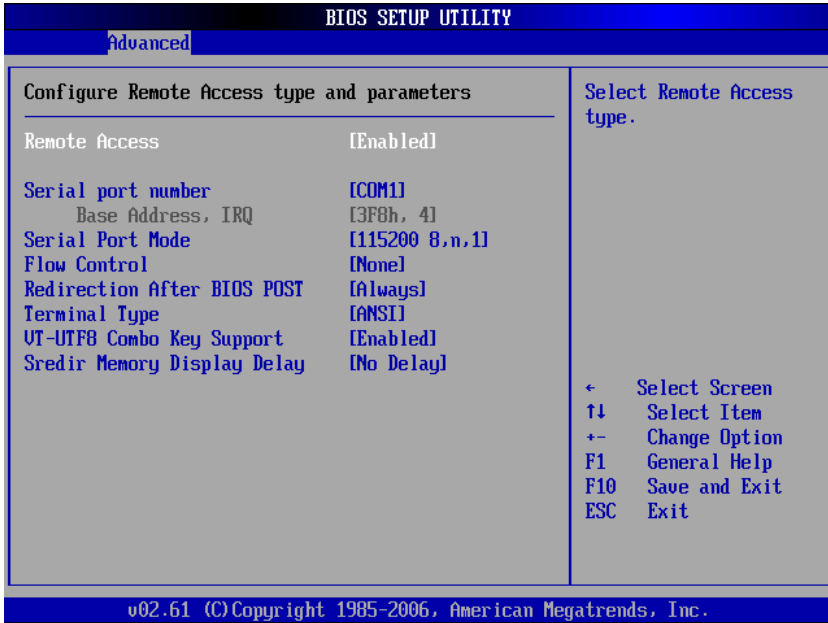
BIOS SETUP UTILITY	
Advanced	
Hardware Health Configuration	
H/W Health Function	[Enabled]
FAN 1 Mode Setting	[PWM Manually mode]
Fan 1 PWM Control	[100]
System Temperature :30°C/86°F	
CPU Temperature :25°C/77°F	
Fan1 Speed :1220 RPM	
CPU Core	:1.152 V
+3.30V	:3.392 V
+5.00V	:5.107 V
+12.0V	:12.032 V
VBAT	:3.792 V
Fan configuration mode setting	
← Select Screen	
↑↓ Select Item	
+- Change Option	
F1 General Help	
F10 Save and Exit	
ESC Exit	
v02.61 (C) Copyright 1985-2006, American Megatrends, Inc.	

Fan 1 PWM Control

Sets a value to control the fan speed. Minimum is 0 and Maximum is 127.

5.3.5 Remote Access Configuration

Remote access configuration provides the settings to allow remote access by another computer to get POST messages and send commands through serial port access.



Remote Access

Select this option to Enable or Disable the BIOS remote access feature.

Note: Enabling Remote Access requires a dedicated serial port connection. Once both serial ports are configured to disabled, you should set this value to Disabled or it may cause abnormal boot.

Serial Port Number

Select the serial port you want to use for the remote access interface. You can set the value for this option to COM1 or COM2.

Note: If you have changed the resource assignment of the serial ports in Advanced> SuperIO Configuration, you must Save Changes and Exit, reboot the system, and enter the setup menu again in order to see those changes reflected in the available Remote Access options.

Serial Port Mode

Select the baud rate you want the serial port to use for console redirection. The options are 115200 8,n,1; 57600 8,n,1; 19200 8,n,1; and 09600 8,n,1.

Flow Control

Set this option to select Flow Control for console redirection. The settings for this value are None, Hardware, or Software.

Redirection After BIOS POST

This option allows you to set Redirection configuration after BIOS POST. The settings for this value are Disabled, Boot Loader, or Always.

- ▶ **Disabled:** Set this value to turn off the redirection after POST
- ▶ **Boot Loader:** Set this value to allow the redirection to be active during POST and Boot Loader.
- ▶ **Always:** Set this value to allow the redirection to be always active.

Terminal Type

This option is used to select either VT100/VT-UTF8 or ANSI terminal type. The settings for this value are ANSI, VT100, or VT-UTF8.

VT-UTF8 Combo Key Support

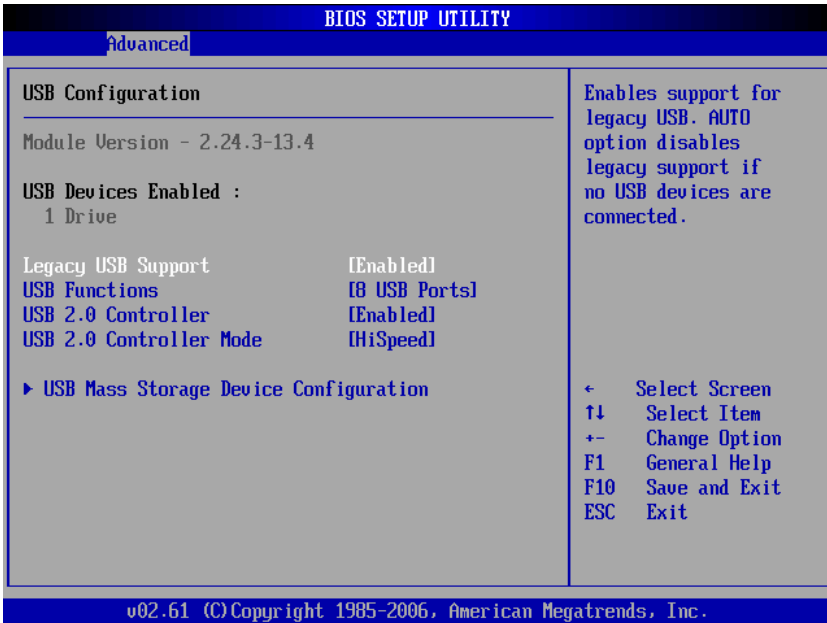
This option enables VT-UTF8 Combination Key Support for ANSI/VT100 terminals. The settings for this value are Enabled or Disabled.

Sredir Memory Display Delay

This option gives the delay in seconds to display memory information. The options for this value are No Delay, Delay 1 Sec, Delay 2 Sec, or Delay 4 Sec.

5.3.6 USB Configuration

You can use this screen to select options for the USB Configuration. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.



Legacy USB Support

Legacy USB Support refers to USB mouse and keyboard support. Normally if this option is not enabled, any attached USB mouse or USB keyboard will not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there are no USB drivers loaded on the system. Set this value to enable or disable the Legacy USB Support.

- ▶ **Disabled:** Set this value to prevent the use of any USB device in DOS or during system boot.

- ▶ **Enabled:** Set this value to allow the use of USB devices during boot and while using DOS.
- ▶ **Auto:** This option auto detects USB Keyboards or Mice and if found, allows them to be utilized during boot and while using DOS.

USB Functions

Set this value to allow the system to Disable or select the number of onboard USB ports.

USB 2.0 Controller

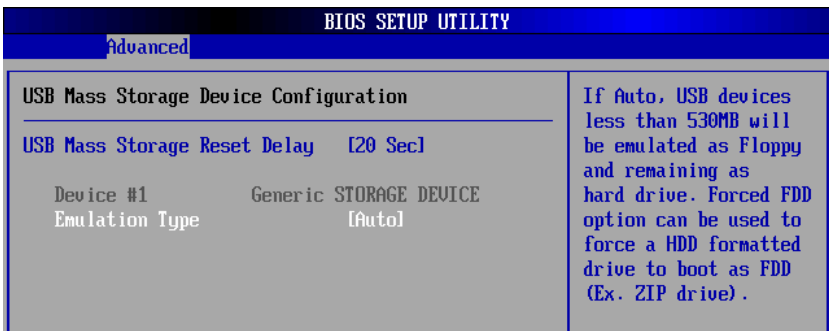
Enables/disables USB 2.0 functionality to all USB ports. If USB Function is set to Disabled, this option has no effect.

USB 2.0 Controller Mode

The USB 2.0 Controller Mode configures the data rate of the USB port. The options are FullSpeed (12 Mbps) and HiSpeed (480 Mbps).

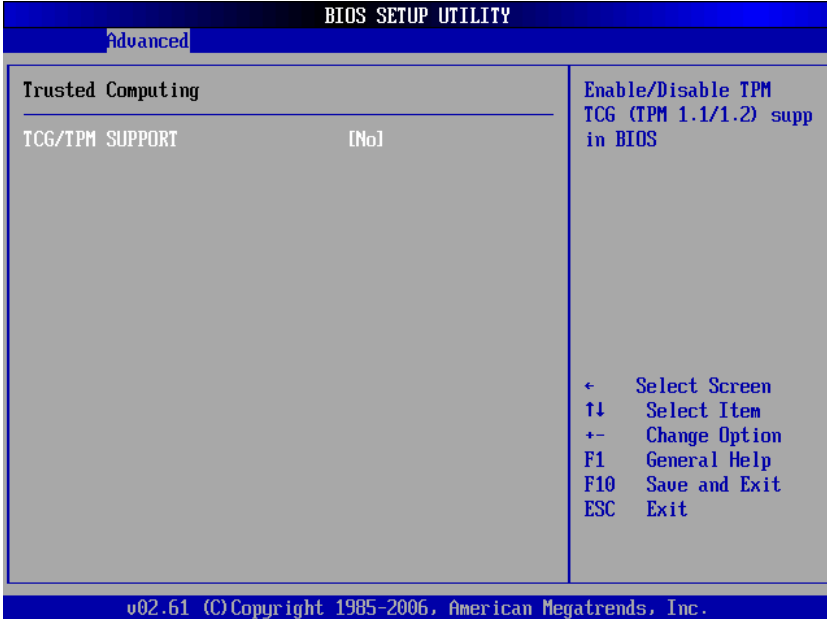
USB Mass Storage Device Configuration

This is a submenu for configuring the USB Mass Storage Class Devices when BIOS finds they are in use on USB ports. Emulation Type can be set according to the type of attached USB mass storage device(s). If set to Auto, USB devices less than 530MB will be emulated as Floppy and those greater than 530MB will remain as hard drive. The Forced FDD option can be used to force a hard disk type drive (such as a Zip drive) to boot as FDD.



5.3.7 Trusted Computing

Trusted computing is an industry standard to make personal computers more secure through a dedicated hardware chip, called a Trusted Platform Module (TPM). This option enables or disables the TPM support.



5.4 PCI/PnP Settings

Select the PCI/PnP tab from the setup screen to enter the Plug and Play BIOS Setup screen. You can display a Plug and Play BIOS Setup option by highlighting it using the < Arrow > keys. The Plug and Play BIOS Setup screen is shown below.

Main	Advanced	PCI/PnP	Boot	Security	Chipset	Exit
IRQ3		[Reserved]				Available: Specified IRQ is available to be used by PCI/PnP devices. Reserved: Specified IRQ is reserved for use by Legacy ISA devices. ← Select Screen ↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit
IRQ4		[Reserved]				
IRQ5		[Available]				
IRQ7		[Available]				
IRQ9		[Available]				
IRQ10		[Available]				
IRQ11		[Available]				
IRQ14		[Available]				
IRQ15		[Available]				
DMA Channel 0		[Available]				
DMA Channel 1		[Available]				
DMA Channel 3		[Available]				
DMA Channel 5		[Available]				
DMA Channel 6		[Available]				
DMA Channel 7		[Available]				

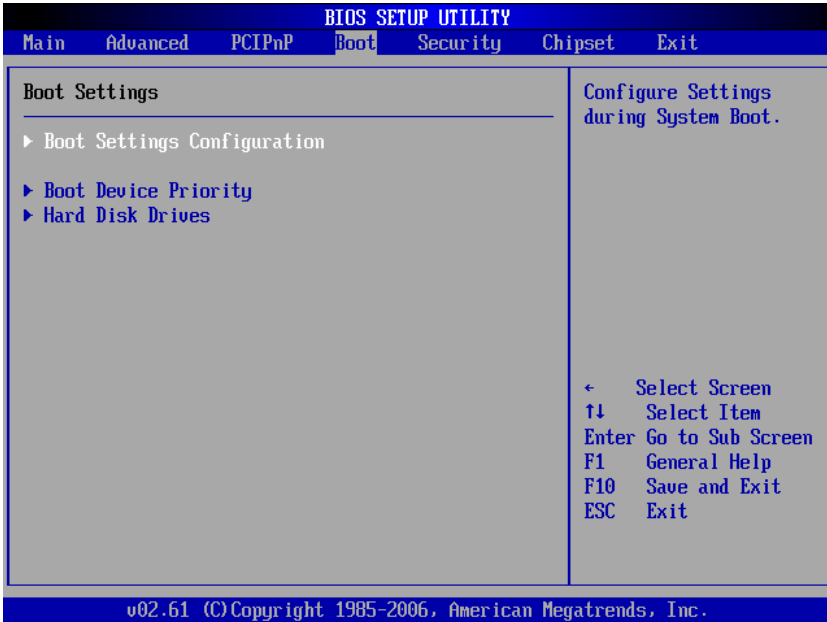
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5.4.1 IRQ/DMA

Set this value to allow the IRQ settings to be modified. Available – This setting allows the specified IRQ/DMA to be used by a PCI/PnP device. Reserved – This setting allows the specified IRQ/DMA to be used by a legacy ISA device.

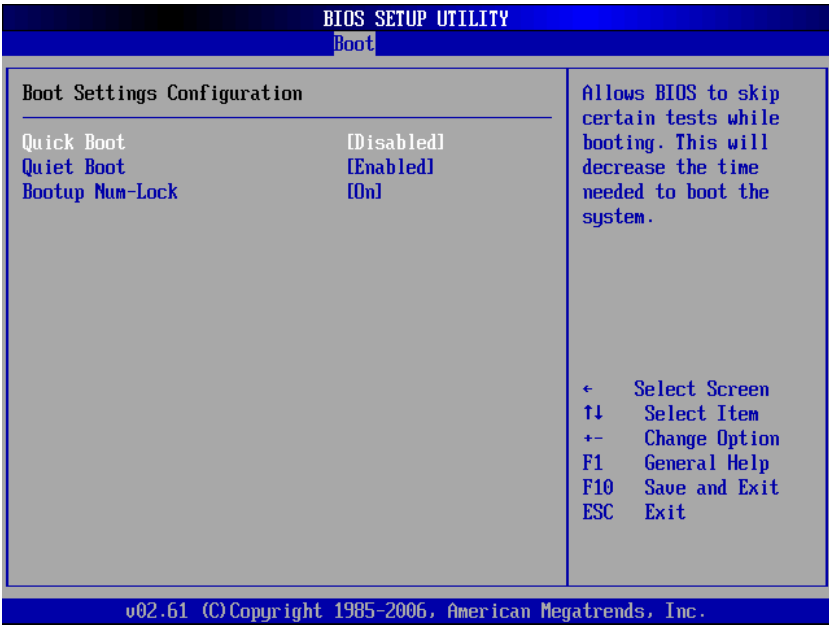
5.5 Boot Settings

Select the Boot tab from the setup screen to enter the Boot BIOS Setup screen. You can select any of the items in the left frame of the screen, such as Boot Device Priority, to go to the sub menu for that item. You can display a Boot BIOS Setup option by highlighting it using the < Arrow > keys. The Boot Settings screen is shown below:



5.5.1 Boot Settings Configuration

Use this screen to select options for the Boot Settings Configuration. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.



Quick Boot

Enabling this setting will cause the BIOS power-on self test routine to skip some of its tests during bootup for faster system boot.

Quiet Boot

When this feature is enabled, the BIOS will display the full-screen logo during the boot-up sequence, hiding normal POST messages.

When it is disabled, the BIOS will display the normal POST messages, instead of the full-screen logo.

Bootup Num-Lock

This setting is to set the Num Lock status when the system is powered on. Setting to [On] will turn on the Num Lock key when the system is powered on. Setting to [Off] will allow users to use the arrow keys on the numeric keypad.

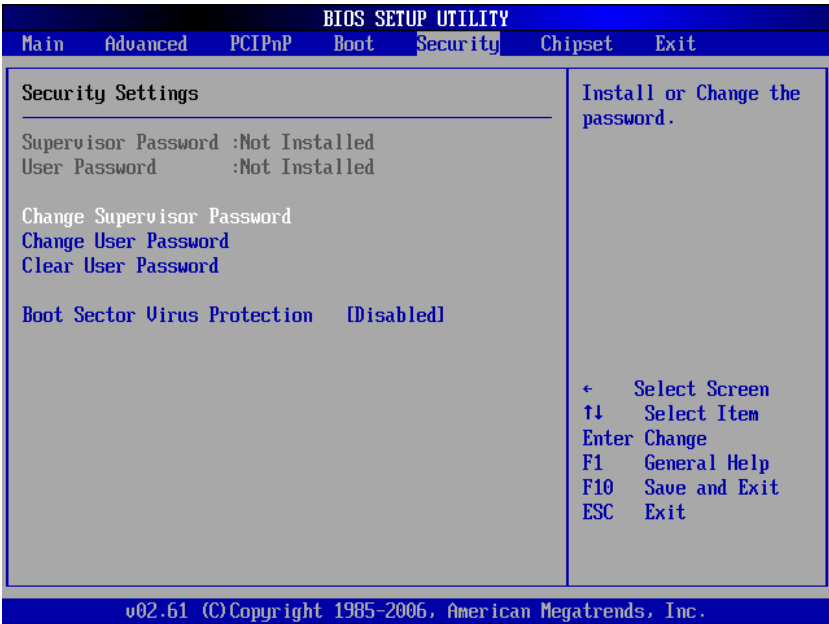
5.5.2 Boot Device Priority

The items allow you to set the sequence of boot devices where BIOS attempts to load the disk operating system. First press <Enter> to enter the sub-menu. Then you may use the arrow keys to select the desired device, then press <+>, <-> or <PageUp>, <PageDown> key to move it up/down in the priority list.

5.5.3 Boot Device Groups

The Boot devices are listed in groups by device type. First press <Enter> to enter the sub-menu. Then you may use the arrow keys to select the desired device, then press <+>, <-> or <PageUp>, <PageDown> key to move it up/down in the priority list. Only the first device in each device group will be available for selection in the Boot Device Priority option.

5.6 Security Setup



Password Support

Two Levels of Password Protection

Provides both a Supervisor and a User password. If you use both passwords, the Supervisor password must be set first.

The system can be configured so that all users must enter a password every time the system boots or when Setup is executed, using either or either the Supervisor password or User password.

The Supervisor and User passwords activate two different levels of password security. If you select password support, you are prompted for a one to six character password. Type the password on the keyboard. The password does not appear on the screen when typed. Make sure you write it down. If you forget it, you must drain NVRAM and re-configure.

Remember the Password

Keep a record of the new password when the password is changed. If you forget the password, you must erase the system configuration information in NVRAM.

To access the sub menu for the following items, select the item and press < Enter >:

- ▶ Change Supervisor Password
- ▶ Change User Password
- ▶ Clear User Password

Supervisor Password

Indicates whether a supervisor password has been set.

User Password

Indicates whether a user password has been set.

Change Supervisor Password

Select this option and press < Enter > to access the sub menu. You can use the sub menu to change the supervisor password.

Change User Password

Select this option and press < Enter > to access the sub menu. You can use the sub menu to change the user password.

Clear User Password

Select this option and press < Enter > to access the sub menu. You can use the sub menu to clear the user password.

Change Supervisor Password

Select Change Supervisor Password from the Security Setup menu and press < Enter >.

Enter New Password:

Type the password and press < Enter >. The screen does not display the characters entered. Retype the password as prompted

and press < Enter >. If the password confirmation is incorrect, an error message appears. The password is stored in NVRAM after completes.

Change User Password

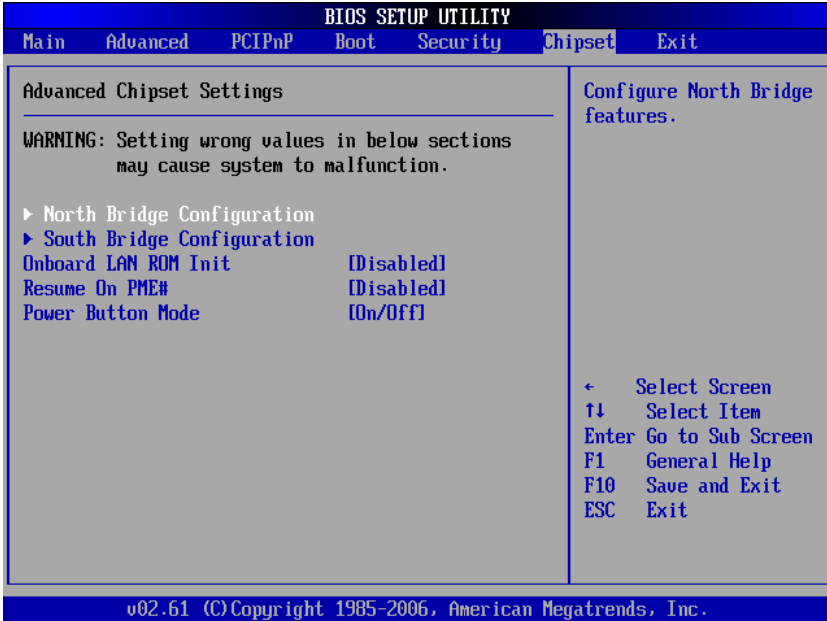
Select Change User Password from the Security Setup menu and press < Enter >.

Enter New Password:

Type the password and press < Enter >. The screen does not display the characters entered. Retype the password as prompted and press < Enter >. If the password confirmation is incorrect, an error message appears. The password is stored in NVRAM after completes.

5.7 Chipset Setup

Select the Chipset tab from the setup screen to enter the Chipset BIOS Setup screen. You can select any of the items in the left frame of the screen to go to the sub menu for that item. The Chipset BIOS Setup screen is shown below.



5.7.1 North Bridge Configuration

You can use this screen to select options for the North Bridge Configuration. Use the up and down < Arrow > keys to select an item. Use the < Plus > and < Minus > keys to change the value of the selected option.



Initiate Graphic Adapter

Select which graphics controller to use as the primary boot device.

IGD: Chipset built-in graphics only.

PCI/IGD: detect PCI graphics first, then chipset built-in graphics. (PCI includes PCI slot and PCI Express x1/x4 slot, PCI will be first)

PCI/PEG: detect PCI graphics first, then PCI Express x16 graphics.

PEG/IGD: detect PCI Express x16 graphics first, then chipset built-in graphics.

PEG/PCI: detect PCI Express x16 graphics first, then PCI graphics, then chipset built-in graphics.

DVMT Mode Select

Dynamic Video Memory Technology (DVMT) allows dynamic allocation of system memory resource for the integrated VGA controller depending on system demand at the time.

Fixed: When set to fixed, the graphics driver will reserve a fixed portion of the system memory as graphics memory.

DVMT: When set to DVMT, the graphics chip will dynamically allocate system as graphics memory as graphics memory.

Both: When set to Both, a minimum amount of memory is allocated and the system is allowed to dynamically allocated more memory resources when necessary.

DVMT/FIXED Memory

Only two choices 128MB or 256MB memory can be assigned as either absolute assignment (FIXED mode) or maximum assignment in DVMT mode.

PEG Port Configuration

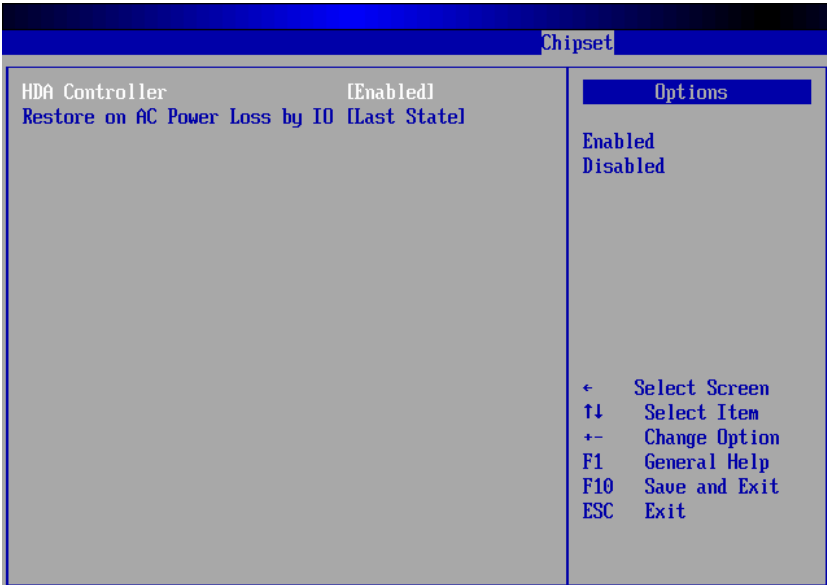
This field is found in motherboards that have a build-in graphics processor as well as a PCI Express port. It allows you to select whether to use the onboard graphics processor or the PCI Express card.

Disabled: The motherboard boots up using the onboard graphics processor.

Auto: The BIOS checks to see if a PCI Express graphics card is installed. If it detects that a PCI Express graphics card is present, the motherboard boots up using that card. Otherwise, it defaults to the onboard graphics processor.

5.7.2 South Bridge Configuration

You can use this screen to select options for the South Bridge Configuration. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.



HDA Controller

Set this value to Enable/Disable the HDA Controller.

Restore on AC Power Loss

Determines which state the computer enters when AC power is restored after a power loss. The options for this value are Last State, Power On and Power Off.

- ▶ **Power Off:** Set this value to always power off the system while AC power is restored.
- ▶ **Power On:** Set this value to always power on the system while AC power is restored.
- ▶ **Last State:** Set this value to power off/on the system depending on the last system power state while AC power is restored.

5.7.3 Advanced Chipset Settings

You can use this screen to select options for Chipset Configuration. Use the up and down < Arrow > keys to select an item. Use the < Plus > and < Minus > keys to change the value of the selected option.

Onboard LAN BIOS Init

Enable the onboard LAN's PXE ROM to enable boot from LAN. The options are Enabled and Disabled.

Resume On PME#

This option specifies if the PME#. event will generate a system wake event. The sub-options are Enabled and Disabled.

Power Button Mode

This option specifies the effect when the power button pressed (On, Off, or Suspend).

- ▶ **On/Off:** System goes into power down mode when power button pressed.
- ▶ **Suspend:** System goes into suspend mode when power button pressed.

5.8 Exit Menu

Select the Exit tab from the setup screen to enter the Exit BIOS Setup screen. You can display an Exit BIOS Setup option by highlighting it using the < Arrow > keys. The Exit BIOS Setup screen is shown below.



Save Changes and Exit

When you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect.

Save Configuration Changes and Exit Now?

[Ok] [Cancel]

appears in the window. Select Ok to save changes and exit.

Discard Changes and Exit

Select this option to quit Setup without making any permanent changes to the system configuration.

Discard Changes and Exit Setup Now?

[Ok] [Cancel]

appears in the window. Select Ok to discard changes and exit.

Discard Changes

Select Discard Changes from the Exit menu and press < Enter >.

Select Ok to discard changes.

Load Optimal Defaults

Automatically sets all Setup options to a complete set of default settings when you select this option. The Optimal settings are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Optimal Setup options if your computer is experiencing system configuration problems.

Select Load Optimal Defaults from the Exit menu and press < Enter >.

Select Ok to load optimal defaults.

Load Failsafe Defaults

Automatically sets all Setup options to a complete set of default settings when you select this option. The Failsafe settings are designed for maximum system stability, but not maximum performance. Select the FailSafe Setup options if your computer is experiencing system configuration problems.

Select Load Fail-Safe Defaults from the Exit menu and press < Enter >.

Load FailSafe Defaults?

[Ok] [Cancel]

appears in the window. Select Ok to load FailSafe defaults.

Appendix A - Watchdog Timer

A sample program for configuring the NuPRO-E320's watchdog timer is included on the ADLINK All-in-One DVD in the following directory: `\NuPRO\NuPRO-E320\WDT`.

A.1 Sample Code

```
#include<stdlib.h>
#include<stdio.h>
#include<string.h>
#include<dos.h>

void WDTRUN(int config_port,int count_value);
void Enter_IT8718_Config(int config_port);
void Exit_IT8718_Config(int config_port);

void main(int argc,char *argv[])
{
    int number,DevID1,DevID2,chipflag=0;
    int ioport = 0x2E;//Default config_port = 0x2E

    if((argc==1) || ((argc == 3) && (*argv[2] != '4') &&
        (*argv[3] != 'E')) || (argc>3))
    {
        printf("ADLINK Watchdog Timer Utility of NuPRO-
935A \n\n");
        printf("    Usage: ITE8718 value [4E]\n");
        printf("                value: 1 to 15300 second.\n");
        printf("                Write 0 will disable watchdog
timer.\n\n");
        printf("                4E - change IO port to 0x4E.
Default is 0x2E.\n");
        exit(1);
    }
    else
    {
        // User selected io port.
        if(argc==3) { ioport=0x4E;
            printf("IOPORT Usage:0x4E \n");
        }

        //Detect ITE8718F.
        Enter_IT8718_Config(ioport);
    }
}
```

```
//Get Chip ID Byte 1 = 0x87, Gip ID Byte 2 =
0x18
    outportb(ioport, 0x20);
    DevID1 = inportb(ioport+1);
    outportb(ioport, 0x21);
    DevID2 = inportb(ioport+1);

    if((DevID1 == 0x87) && (DevID2 == 0x18))
        chipflag = 1;

    if(chipflag == 0)
    {
        printf("ADLINK Watchdog Timer Utility of
NuPRO-935A, FOR ADLINK INTERNAL USE.\n\n");
        printf("Can't find any ITE IT8718F on
system!\n");
        Exit_IT8718_Config(ioport);
        exit(1);
    }
    else
    {
        printf("ADLINK Watchdog Timer Utility of
NuPRO-935A, FOR ADLINK INTERNAL USE.\n\n");
        number=atoi(argv[1]);

        WDTRUN(ioport,number);
        Exit_IT8718_Config(ioport);
    }
}

void Enter_IT8718_Config(int config_port)
{
    switch(config_port)
    {
        case 0x2E:
            //Address port = 0x2E, enter keys = 0x87,
0x01, 0x55, 0x55
            outportb(0x2E, 0x87);
            outportb(0x2E, 0x01);
            outportb(0x2E, 0x55);
            outportb(0x2E, 0x55);
    }
```

```

        break;
    case 0x4E:
        //Address port = 0x4E, enter keys = 0x87,
        0x01, 0x55, 0xAA
        outportb(0x2E, 0x87);
        outportb(0x2E, 0x01);
        outportb(0x2E, 0x55);
        outportb(0x2E, 0xAA);
        break;
    default:
        break;
}
}
void Exit_IT8718_Config(int config_port)
{
    outportb(config_port, 0x02);
    outportb(config_port+1, 0x02);
}
void WDRUN(int config_port,int count_value)
{
    int temp;
    int counter;

    //Select WDT device
    outportb(config_port, 0x07);
    outportb(config_port+1, 0x07);//device 7

    //Set second/minute mode
    outportb(config_port, 0x72);
    temp = inportb(config_port+1);

    if(count_value == 0)
    {
        counter = count_value;
        printf("WDT is Disabled.");
        outportb(config_port+1, temp);//WDT output
        through PWROK2 default is Disabled.
    }// end of (count_value == 0)
    else if(count_value <= 60){
        temp = temp | 0x80;//chip's default is minute.
        counter = count_value;
        printf("WDT timeout in %d seconds.",counter);
    }
}

```

```
//      temp = temp | 0x40;//enable WDT output through
      KBRST
      temp = temp | 0x10;//enable WDT output through
      PWROK2 (pulse)
      outportb(config_port+1, temp);
      } // end of (count_value<=60)
else if(((count_value>60) && (count_value<=15300))
      || (count_value > 15300))
      {
      //Count the timeout value
      if(count_value > 15300)
      count_value = 15300;
      counter = count_value/60;
      if((count_value%60)>30)
      counter=counter+1;
      printf("WDT timeout in %d minutes.",counter);
//      temp = temp | 0x40;//enable WDT output through
      KBRST
      temp = temp | 0x10;//enable WDT output through
      PWROK2 (pulse)
      outportb(config_port+1, temp);
      } // end of (count_value>60)

      //reset WDT by KB, MS interrupt
//      outportb(config_port, 0x71);
//      temp = inportb(config_port + 1);
//      temp = temp | 0x60;//Bit 6 = KB interrupt, Bit 5 =
      MS interrupt
//      outportb(config_port+1, temp);
//Write count value
      outportb(config_port, 0x73);
      outportb(config_port+1, counter);

} // end of WDTRUN
```


Appendix B System Resources

B.1 System Memory Map

Address Range (decimal)	Address Range (hex)	Size	Description
(4GB-2MB)	FFE00000 – FFFFFFFF	2 MB	High BIOS Area
(4GB-18MB) – (4GB-17MB-1)	FEE00000 – FEEFFFFFF	1 MB	FSB Interrupt Memory Space
(4GB-20MB) – (4GB-19MB-1)	FEC00000 – FECFFFFFF	1 MB	APIC Configuration Space
15MB – 16MB	F00000 – FFFFFFF	1 MB	ISA Hole
960 K – 1024 K	F0000 – FFFFF	64 KB	System BIOS Area
896 K – 960 K	E0000 – EFFFF	64 KB	Extended System BIOS Area
768 K – 896 K	C0000 – DFFFF	128 KB	PCI expansion ROM area C0000 – C7FFF: Onboard VGA BIOS CB800 – CC7FFF: Intel 82566DM PXE option ROM when onboard LAN boot ROM is enabled. CC800 – CD7FFF: Marvell 88E805 option ROM when onboard LAN boot ROM is enabled.
640 K – 768 K	A0000 – BFFFF	128 KB	Video Buffer & SMM space
0 K – 640 K	00000 – 9FFFF	640 KB	DOS Area

Table B-1: System Memory Map

Note: The entire D0000H segment except PXE occupied area can be forwarded to ISA bus.

B.2 Direct Memory Access Channels

Channel Number	Data Width	System Resource
0	8-bits	Parallel port ⁽¹⁾
1	8-bits	Parallel port ⁽¹⁾
2	8-bits	Diskette drive ⁽¹⁾
3	8-bits	Parallel port ⁽¹⁾
4		Reserved - cascade channel
5	16-bits	Open
6	16-bits	Open
7	16-bits	Open

Table B-2: Direct Memory Access Channels

Note (1): DMA channel 0/1/3 is selected when using parallel port. Floppy and parallel port cannot be used at the same time.

B.3 IO Map

Hex Range	Device
000-01F	DMA controller 1, 8237A-5 equivalent
020-02D and 030-03F	Interrupt controller 1, 8259 equivalent
02E-02F	LPC SIO (ITE8718) configuration index/data registers
040-05F	Timer, 8254-2 equivalent
060, 062, 064, 066, 068-06F	8742 equivalent (keyboard)
061, 063, 065, 067	NMI control and status
070-07F	Real Time Clock Controller(bit 7 -NMI mask)
080-091	DMA page register
092	Reset (Bit 0)/ Fast Gate A20 (Bit 1)
93-9F	DMA page registers continued
0A0-0B1 and 0B4-0BF	Interrupt controller 2, 8259 equivalent
0B2 and 0B3	APM control and status port respectively
0C0-0DF	DMA controller 2, 8237A-5 equivalent
0E0-0EF	Available
0F0	Co-processor error register
0F1	N/A
0F2-0F3	N/A
0F4	IDE ID port
0F5-0F7	N/A
0F8	IDE Index port
0F9-0FB	N/A
0FC	IDE Data port
0FD-0FF	N/A
100-179	Available
180-181	Default AIM4 SRAM control register (May be remapped)
182-1EF	Available
1F0-1F7	Primary IDE Controller (AT Drive)
1FB-22F	Available
230 -277	Available
278-27F	Parallel Port 2

Hex Range	Device
280-2F7	Available
2F8-2FF	Serial Port 2
300-36F	Available
370-377	Alt. Floppy Disk Controller
378-37F	Parallel Port 1
380-3AF	Available
3B0-3BB and 3BF	Mono/VGA mode video
3BC-3BE	Reserved for parallel port
3C0-3DF	VGA registers
3E0-3EF	Available
3F0-3F7	Primary Floppy disk controller
3F8-3FF	Serial port 1
4D0	Master PIC Edge/Level Trigger register
4D1	Slave PIC Edge/Level Trigger register
CF8-CFB	PCI configuration address register (32 bit I/O only)
CF9	Reset Control register (8 bit I/O)
CFC-CFF	PCI configuration data register
400	Smbus base address for SB.
480	GPIO Base Address for SB
800	PM (ACPI) Base Address for SB
860	Alias for ICH TCO base address.
0A00~0AFF	Reserved for SIO functions base address (eg. PME, GPIO, etc)
200-23Fh	Reserved for ISA.
240-25Fh	Reserved for ISA.
280-28Fh	Reserved for ISA.
2A0-2DFh	Reserved for ISA.
300-33Fh	Reserved for ISA.
380-39Fh	Reserved for ISA.

Table B-3: IO Map

B.4 Interrupt Request (IRQ) Lines

IRQ Lines PIC Mode

IRQ#	Typical Interrupt Resource	Connected to Pin	Available
0	Counter 0	N/A	No
1	Keyboard controller	N/A	No
2	Cascade interrupt from slave PIC	N/A	No
3	Serial Port 2 (COM2) / PCI / ISA	IRQ3 via SERIRQ, IRQ3 at ISA bus	Note (1)
4	Serial Port 1 (COM1) / PCI / ISA	IRQ4 via SERIRQ, IRQ4 at ISA bus	Note (1)
5	Parallel Port 2 (LPT2) / PCI / ISA	IRQ5 via SERIRQ, IRQ5 at ISA bus	Note (1)
6	Floppy Drive Controller	IRQ6 via SERIRQ	No
7	Parallel Port 1 (LPT1) / PCI / ISA	IRQ7 via SERIRQ, IRQ7 at ISA bus	Note (1)
8	Real-time clock	N/A	No
9	Microsoft ACPI-compliant system	N/A	Note (1)
10	PCI / ISA	IRQ10 via SERIRQ, IRQ10 at ISA bus	Note (1)
11	PCI / ISA	IRQ11 via SERIRQ, IRQ11 at ISA bus	Note (1)
12	PS/2 Mouse / PCI / ISA	IRQ12 via SERIRQ, IRQ12 at ISA bus	Note (1)
13	Math Processor	N/A	No
14	Primary IDE controller / PCI / ISA	IRQ14 via SERIRQ, IRQ14 at ISA bus	Note (1)
15	Secondary IDE controller / PCI / ISA	IRQ15 via SERIRQ, IRQ15 at ISA bus	Note (1)

Table B-4: IRQ Lines PIC Mode

Note (1): These IRQs can be used for PCI devices when onboard device is disabled. If IRQ is from ISA, user must reserve IRQ for ISA in BIOS setup menu.

IRQ Lines APIC Mode

IRQ#	Typical Interrupt Resource	Connected to Pin	Available
0	Counter 0	N/A	No
1	Keyboard controller	N/A	No
2	Cascade interrupt from slave PIC	N/A	No
3	Serial Port 2 (COM2) / PCI / ISA	IRQ3 via SERIRQ, IRQ3 at ISA bus	Note (1)
4	Serial Port 1 (COM1) / PCI / ISA	IRQ4 via SERIRQ, IRQ4 at ISA bus	Note (1)
5	Parallel Port 2 (LPT2) / PCI / ISA	IRQ5 via SERIRQ, IRQ5 at ISA bus	Note (1)
6	Floppy Drive Controller	IRQ6 via SERIRQ	No
7	Parallel Port 1 (LPT1) / PCI / ISA	IRQ7 via SERIRQ, IRQ7 at ISA bus	Note (1)
8	Real-time clock	N/A	No
9	SCI / PCI	IRQ9 via SERIRQ, IRQ9 at ISA bus	Note (1), (2)
10	PCI / ISA	IRQ10 via SERIRQ, IRQ10 at ISA bus	Note (1)
11	PCI / ISA	IRQ11 via SERIRQ, IRQ11 at ISA bus	Note (1)
12	PS/2 Mouse / PCI / ISA	IRQ12 via SERIRQ, IRQ12 at ISA bus	Note (1)
13	Math Processor	N/A	No
14	Primary IDE controller / PCI / ISA	IRQ14 via SERIRQ, IRQ14 at ISA bus	Note (1)
15	Secondary IDE controller / PCI / ISA	IRQ15 via SERIRQ, IRQ15 at ISA bus	Note (1)
16	N/A	PCI Slot 1/2/3/4, PCIE Port 0/1/2/3/4/5, UHCI Controller 4/6, P.E.G Root Port, I.G.D	Yes
17	N/A	PCI Slot 1/2/3/4, PCIE Port 0/1/2/3/4/5, P.E.G Root Port	Yes

IRQ#	Typical Interrupt Resource	Connected to Pin	Available
18	N/A	PCI Slot 1/2/3/4, PCIE Port 0/1/2/3/4/5, UHCI Controller 3, P.E.G Root Port, SATA Host controller, SMBus Controller, Thermal Controller, EHCI Controller #2	Yes
19	N/A	PCI Slot 1/2/3/4, PCIE Port 0/1/2/3/4/5, UHCI Controller 2/7, P.E.G Root Port, SATA Host controller, SATA Host controller#1,	Yes
20	N/A	ICH9 internal GBE controller	No
21	N/A	UHCI Controller 5	No
22	N/A	ICH9 HDA	No
23	N/A	UHCI Controller 1, EHCI Controller 1	No

Table B-5: IRQ Lines APIC Mode

Note (1): These IRQs can be used for PCI devices when onboard device is disabled. If IRQ is from ISA, user must reserve IRQ for ISA in BIOS setup menu.

Note (2): BIOS does not open IRQ 9 setting for ISA bus.

PCI Configuration Space Map

Bus #	Device #	Function #	Routing	Description
00h	00h	00h	N/A	Intel Q45 GMCH Host-Hub Interface Bridge
00h	01h	00h	Internal	P.E.G. Root Port
02h	00h	0FFh	N/A	P.E.G. Port
00h	06h	00h	Internal	P.E.G.#1 Root Port
03h	00h	0FFh	N/A	P.E.G.#1 Port
00h	02h	00h	Internal	Intel Integrated Graphics Device
00h	02h	01h	Internal	Intel Integrated Graphics Device (Function 1)
00h	03h	00h	Internal	HECI Host #1
00h	03h	01h	Internal	HECI Host #2
00h	03h	02h	Internal	IDER Controller
00h	03h	03h	Internal	KT Controller
00h	16h	00h	Internal	VE AHCI Controller
00h	19h	00h	Internal	GbE Controller
00h	1Ah	00h	Internal	Intel USB UHCI Controller 4
00h	1Ah	01h	Internal	Intel USB UHCI Controller 5
00h	1Ah	02h	Internal	Intel USB UHCI Controller 7
00h	1Ah	07h	Internal	Intel USB EHCI Controller 2
00h	1Bh	00h	Internal	High Definition Audio controller
00h	1Ch	00h	Internal	Intel ICH Express Root port 0
00h	1Ch	01h	Internal	Intel ICH Express Root port 1
00h	1Ch	02h	Internal	Intel ICH Express Root port 2
00h	1Ch	03h	Internal	Intel ICH Express Root port 3
00h	1Ch	04h	Internal	Intel ICH Express Root port 4
00h	1Ch	05h	Internal	Intel ICH Express Root port 5
00h	1Dh	00h	Internal	Intel USB UHCI Controller 1
00h	1Dh	01h	Internal	Intel USB UHCI Controller 2
00h	1Dh	02h	Internal	Intel USB UHCI Controller 3
00h	1Dh	03h	Internal	Intel USB UHCI Controller 6
00h	1Dh	07h	Internal	Intel USB EHCI Controller 1
00h	1Eh	00h	N/A	Intel Hub Interface to PCI Bridge

Bus #	Device #	Function #	Routing	Description
00h	1Fh	00h	N/A	Intel LPC Interface Bridge
00h	1Fh	02h	Internal	SATA Host Controller
00h	1Fh	03h	Internal	Intel SMBus Controller
00h	1Fh	05h	Internal	Intel Host SATA controller1
00h	1Fh	06h	Internal	Thermal Controller
01h	09h	0FFh	external	PCI slot 7
01h	0Ah	0FFh	external	PCI slot 6
01h	0Bh	0FFh	external	PCI slot 5
01h	0Ch	0FFh	external	PCI slot 4
01h	0Dh	0FFh	external	PCI slot 3
01h	0Eh	0FFh	external	PCI slot 2
01h	0Fh	0FFh	external	PCI slot 1
04h	00h	0FFh	Internal	PCIE Port #0
05h	00h	0FFh	Internal	PCIE Port #1
06h	00h	0FFh	Internal	PCIE Port #2
07h	00h	0FFh	Internal	PCIE Port #3
08h	00h	0FFh	Internal	PCIE Port #4, 82574L
09h	00h	0FFh	Internal	PCIE Port #5, 82574L

Table B-6: PCI Configuration Space Map

PCI Interrupt Routing Map

INT Line	Int0	Int1	Int2	Int3
P.E.G Root Port	INTA:16	INTB:17	INTC:18	INTD:19
P.E.G.#1 Root Port	INTA:16	INTB:17	INTC:18	INTD:19
VGA	INTE:20			
HECI Host #1	INTA:16			
HECI Host #2	INTA:16			
IDER Controller			INTC:18	
KT Controller		INTB:17		
SATA Host Controller	INTC:18	INTD:19		
SMBUS controller			INTC:18	
SATA Host Controller1		INTD:19		
Thermal Controller			INTC:18	
UHCI Controller #1	INTH:23			
UHCI Controller #2		INTD:19		
UHCI Controller #3			INTC:18	
UHCI Controller #6				INTA:16
UHCI Controller #4	INTA:16			
UHCI Controller #5		INTF:21		
UHCI Controller #7				INTD:19
EHCI Controller #1	INTH:23			
EHCI Controller #2			INTC:18	
HDA Controller	INTG:22			
GbE Controller	INTE:20			
PCIE port 0	INTA:16	INTB:17	INTC:18	INTD:19
PCIE port 1	INTB:17	INTC:18	INTD:19	INTA:16
PCIE port 2	INTC:18	INTD:19	INTA:16	INTB:17
PCIE port 3	INTD:19	INTA:16	INTB:17	INTC:18
PCIE port 4	INTA:16	INTB:17	INTC:18	INTD:19
PCIE port 5	INTB:17	INTC:18	INTD:19	INTA:16
VE AHCI Controller	INTC:18	INTD:19		
Slot 1	INTF:21	INTG:22	INTH:23	INTE:20
Slot 2	INTG:22	INTH:23	INTE:20	INTF:21

INT Line	Int0	Int1	Int2	Int3
Slot 3	INTH:23	INTE:20	INTF:21	INTG:22
Slot 4	INTE:20	INTF:21	INTG:22	INTH:23
Slot 5	INTF:21	INTG:22	INTH:23	INTE:20
Slot 6	INTG:22	INTH:23	INTE:20	INTF:21
Slot 7	INTH:23	INTE:20	INTF:21	INTG:22

Table B-7: PCI Interrupt Routing Map

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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.

- ▶ 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.

Getting Service

Contact us should you require any service or assistance.

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