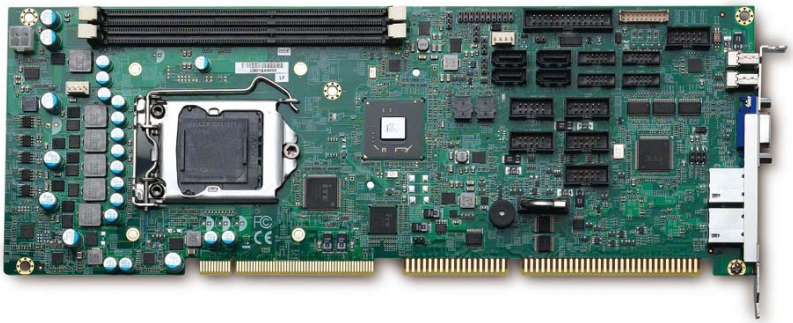
NuPRO-A40H

Full-Size PICMG 1.0 Intel® Core™ i7/i5/i3
LGA1155 SHB

User's Manual



Manual Rev.: 2.00

Revision Date: September 11, 2013

Part No: 50-13072-1010

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Revision History

Revision	Release Date	Description of Change(s)
1.00	2013/07/19	Preliminary release
2.00	2013/09/11	Initial release (add BIOS, WDT, system resources)

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Preface

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Using this Manual

Audience and Scope

The NuPRO-A40H 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-A40H, 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-A40H.

Chapter 3, Getting Started: Illustrates how to install components on the NuPRO-A40H such as CPU, heatsink, and memory modules.

Chapter 4, Driver Installation: Provides information on how to install the NuPRO-A40H 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.

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Conventions

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



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



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



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

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Table of Contents

Revision History ii

Preface iii

List of Figures xi

List of Tables xiii

1 Introduction 1

1.1 Overview 1
1.2 Features 2
1.3 Specifications 3
1.4 Block Diagram 5
1.5 Functional Description 6
1.6 Mechanical Drawing 8
1.7 I/O Connectivity 9
1.8 Power Consumption 10
1.9 Package Contents 11

2 Hardware Information 13

2.1 Rear Panel I/O Ports 13
2.2 Board Layout 15
2.3 Onboard Connectors 16
2.4 Jumpers 24

3 Getting Started 27

3.1 Installing the CPU 27
3.2 Installing the CPU Fan and Heatsink 31
3.3 Installing Memory Modules 32
3.4 Installing the Power Connectors 34

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4 Driver Installation 35
4.1 Chipset Driver 35
4.2 Display Driver 35
4.3 Ethernet Driver 36
4.4 Audio Driver 36

5 BIOS Setup 37
5.1 Starting the BIOS 37
5.2 Main Setup 41
5.3 Advanced BIOS Setup 43
5.3.1 ACPI Settings 44
5.3.2 CPU Configuration 45
5.3.3 SATA Configuration 47
5.3.4 USB Configuration 48
5.3.5 Super IO Configuration 50
5.3.6 Serial Port Console Redirection 51
5.3.7 CPU PPM Configuration 55
5.4 Chipset Setup 56
5.4.1 PCH-IO Configuration 57
5.4.2 System Agent (SA) Configuration 60
5.5 Boot Configuration 63
5.6 Security Setup 66
5.7 System Management 68
5.8 Exit Menu 69

A Appendix: Watchdog Timer 71
A.1 Sample Code 71

B Appendix: System Resources 75
B.1 System Memory Map 75
B.2 Direct Memory Access Channels 75
B.3 IO Map 76
B.4 Interrupt Request (IRQ) Lines 77

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Important Safety Instructions 83

Getting Service 85

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List of Figures

Figure 1-1: NuPRO-A40H Block Diagram 5
Figure 1-2: NuPRO-A40H Board Dimensions 8
Figure 2-1: Rear Panel I/O Ports 13
Figure 2-2: Connectors and Jumpers 15

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List of Tables

Table 1-1: NuPRO-A40H I/O Connectivity 9
Table 1-2: Core™ i7-3770 Processor Power Consumption 10
Table B-1: System Memory Map 75
Table B-2: Direct Memory Access Channels 75
Table B-3: IO Map 77
Table B-4: IRQ Lines PIC Mode 78
Table B-5: IRQ Lines APIC Mode 79
Table B-6: PCI Configuration Space Map 80
Table B-7: PCI Interrupt Routing Map 81

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1 Introduction

1.1 Overview

The ADLINK NuPRO-A40H is a PICMG 1.0 Single Board Computer (SBC) supporting the 3rd generation Intel® Core™ i7/i5/i3 and Pentium® processors in LGA1155 package to deliver a scalable high performance platform for a wide array of industrial applications. The NuPRO-A40H supports 22nm process CPUs at up to 3.4 GHz with integrated graphics and memory controllers, Direct Media Interface (DMI) and Flexible Display Interface (FDI) connectivity to the Intel® H61 Express Chipset. Dual-channel DDR3 1333/1600 MHz memory is supported up to a maximum of 16GB in two DIMM slots.

These advanced features, coupled with dual PCI Express®-based Gigabit Ethernet, SATA 3 Gb/s and USB 2.0 support make the NuPRO-A40H ideal for automation control applications.

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1.2 Features

- Supports 3rd Generation Intel® Core™ i7/i5/i3, and Pentium® processors in LGA1155 package
- Integrated Intel® HD Graphics with VGA and DVI-D output
- Dual Gigabit Ethernet
- 8x USB 2.0 ports (2x faceplate, 6x onboard pin headers)
- 4x SATA 3 Gb/s ports
- 6x COM ports (including 1x RS-232/422/485 with auto flow control)
- Watchdog Timer, Hardware Monitor
- Optional HD audio kit (DB-Audio2 daughter board)
- RoHS compliant



NOTE:

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

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1.3 Specifications

System	
CPU	3rd Gen Intel® Core™ processors in LGA1155 package: • Intel® Core™ i7-3770, 3.4 GHz, 8M Cache, 22nm, 95W • Intel® Core™ i5-3550, 3.0 GHz, 6M Cache, 22nm, 95W • Intel® Core™ i3-3220, 3.3 GHz, 3M Cache, 22nm, 65W • Intel® Pentium® G2120, 3.1 GHz, 3M Cache, 22nm, 55W
Chipset	• Intel® H61 Platform Controller Hub
Memory	• Two 240-pin DIMM sockets support dual-channel 1333/1600 MHz DDR3 (up to 16GB)
BIOS	• AMI BIOS in 64-Mbit SPI Flash
Audio	• Intel® High Definition Audio support via DB-Audio2 daughter board
Watch Dog Timer	• 1-255 second/minute programmable and can generate system reset.
Hardware Monitor	• CPU/System temperature, fan speed and onboard DC voltage by ADLINK Smart Embedded Management Agent (SEMA)
Operating Systems	• Windows® XP, Windows® 7, 32/64-bit; Fedora™ 17, Red Hat Enterprise Linux
I/O Interfaces	
Serial ATA	• 4x SATA 3 Gb/s ports onboard
I/O Ports	• 2x USB 2.0 port on rear panel, 6x via onboard header • 6x serial ports via onboard pin-header (5x RS-232; 1x RS-232/422/485 with auto flow control, BIOS selectable) • 2x GbE RJ-45 ports • VGA port (Dsub-15) • DVI-D (onboard header) • PS/2 Keyboard/Mouse (onboard header) • 1 Parallel port (onboard header)
Expansion	• PCI 32-bit/33MHz, PCIe-to-PCI Bridge: ITE IT8892E • PCI-to-ISA Bridge: ITE IT8888G (DMA not supported)
Display	
Integrated Graphics	• Integrated Intel® HD Graphics on processor • VGA: to 2048x 1536 @ 75 Hz • DVI: 1x internal pin header

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Ethernet	
Controller	• Dual Intel® I211-AT Gigabit Ethernet Controller • Supports Preboot Execution Environment (PXE), Wake-On-LAN, 9KB Jumbo Frames
Ports	• Two RJ-45 Ethernet ports
Mechanical and Environment	
Form Factor	• Standard full-size PICMG 1.0 SBC
Dimensions	• 338 x 122 mm (L x W)
Operating Temp.	• 0ºC to 60ºC
Storage Temp.	• -20ºC to 80ºC
Relative Humidity	• 10% to 90% non-condensing
Safety	• CE, FCC Class A

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1.4 Block Diagram

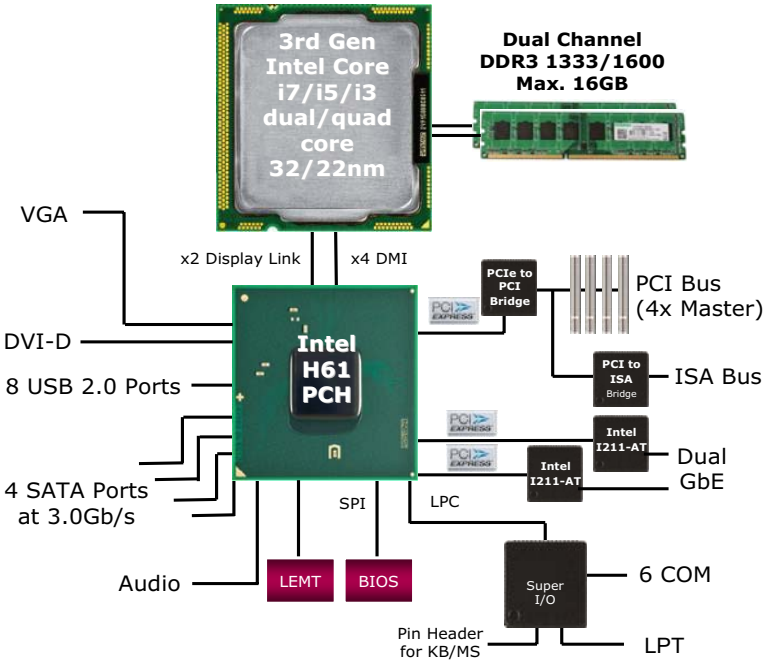


Figure 1-1: NuPRO-A40H Block Diagram

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1.5 Functional Description

Processor Support

The NuPRO-A40H is PICMG 1.0 Single Board Computer supporting the 3rd Generation Intel® Core™ processor family (Intel® Core™ i7/i5/i3, Pentium®) in LGA1155 socket. An integrated memory controller supports dual channel 1333/1600 MHz DDR3 and Intel® HD Graphics is integrated onboard the CPU. Direct Media Interface (DMI) and Flexible Display Interface (FDI) provide connectivity to the Intel® H61 Express Chipset.

Intel® H61 Express Chipset

The Intel® BD82H61 Platform Controller Hub (PCH) combines with the processor to provide a compact yet powerful 2-chip solution. Direct Media Interface (DMI) is the chip-to-chip connection between the processor and PCH. Intel® Flexible Display Interface carries display traffic from the integrated graphics in the processor to the legacy display connectors in the PCH. The PCH supports all other required interfaces including PCI Express, SATA 3 Gb/s, USB 2.0, LPC, and SPI.

Dual-Channel DDR3 Memory

To meet the requirements of memory-intensive applications, the NuPRO-A40H has a dual-channel memory architecture supporting DDR3 1333/1600 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-A40H utilizes dual Intel® I211-AT Gigabit Ethernet Controllers connected to the PCI-E bus of the H61 PCH. Wake-on-LAN, PXE, and 9KB Jumbo Frames are supported.

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Serial ATA

The NuPRO-A40H provides four Serial ATA ports with data transfer rates of up to 3.0 GB/s.

Universal Serial Bus (USB 2.0)

The NuPRO-A40H provides 8 USB 2.0 ports supporting transfer rates up to 480 Mb/s (2x faceplate, 6x onboard pin headers).

Hardware Monitoring - SEMA

Hardware monitoring is provided by ADLINK's Smart Embedded Management Agent (SEMA), which provides functionality through a Board Management Controller and communicates with the CPU/chipset through the SMBus. The following information is provided under System Management:

- System Information
- Runtime Statistics
- Temperatures
- Power Consumption
- SMC Flags

A graphical user interface program called SEMAGui and command line tool called SEMA Tool are available to allow you to communicate with SEMA. Please refer to the SEMA Software and Technical Manuals, available for download on the product page.

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.

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1.6 Mechanical Drawing

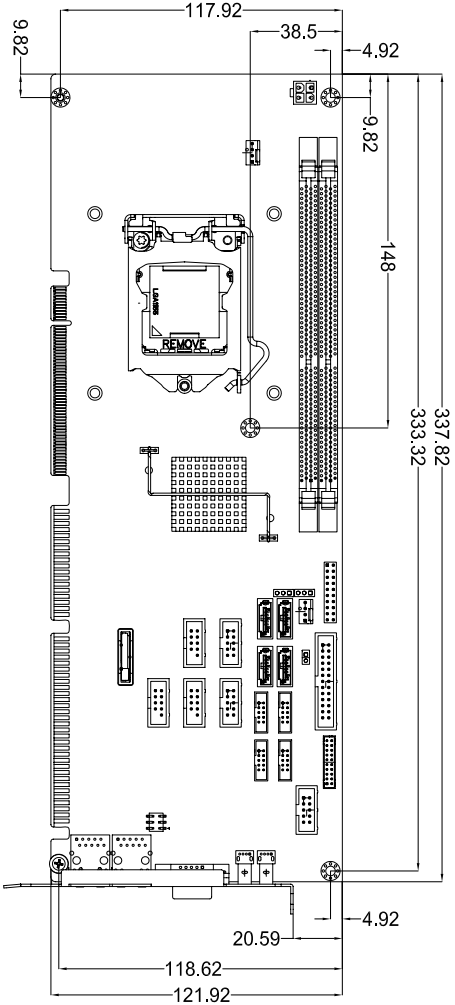


Figure 1-2: NuPRO-A40H Board Dimensions

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1.7 I/O Connectivity

I/O	Bracket	Onboard	Golden Finger	Remarks
VGA	Y	—	—	DB-15
DVI-D	—	Y	—	cable w/ bracket optional (P/N 30-01052-2000)
LAN1/2 (RJ-45)	Y	—	—	Act/Link/ Speed LEDs
PS/2 KB/MS	—	Y	—	cable w/ bracket optional (P/N 30-01019-2000)
USB Rear Panel	2	—	—	—
USB headers	—	6	—	2.54mm pitch
COM1-2	—	Y	—	2.54mm pitch
COM3-6	—	Y	—	2.00mm pitch
Parallel port	—	Y	—	cable w/ bracket optional (P/N 30-25019-1000)
SATA	—	4	—	—
PCI 32bit/33MHz	—	—	Y	Via ITE IT8892E
ISA	—	—	Y	Via ITE IT8888G

Table 1-1: NuPRO-A40H I/O Connectivity

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1.8 Power Consumption

Intel® Core™ i7-3770 8M Cache 3.40GHz)

Test Configuration	
CPU	Intel® Core™ i7-3770 8M Cache 3.40GHz
Memory	Transcend 8GB DDR3 1600 DIMMx2

Windows® 7 (Idle)			
Power Req.	+12V	+5V	Total
Current (A)	1.47A	2.77A	—
Power (W)	17.64W	13.85W	31.49W
Windows® 7, CPU Stress(100% CPU BurnInTest™ Stress)			
Power Req.	+12V	+5V	Total
Current (A)	5.33A	2.89A	—
Power (W)	63.96W	14.45W	78.41W
Windows 7 Total System Stress (100% BurnInTest™ Stress)			
Power Req.	+12V	+5V	Total
Current (A)	6.92A	3.66A	—
Power (W)	83.04W	18.3W	101.34W
Inrush Current			
Power Req.	+12V	+5V	Total
Current (A)	5.7A	2.69A	—
Power (W)	68.4W	13.45W	81.85W

Table 1-2: Core™ i7-3770 Processor Power Consumption

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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-A40H
- SATA data cable with latch x2
- 2-port USB cable with bracket
- 2-port COM cable with bracket for COM1/COM2 (2.54 mm pitch)
- 2-port COM cable with bracket x2 for COM3-6 (2.0 mm pitch)
- Driver DVD
- User's manual



Package contents may vary with ordering options.



The NuPRO-A40H 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-A40H board lay-out, connector pin assignments, and jumper settings.

2.1 Rear Panel I/O Ports

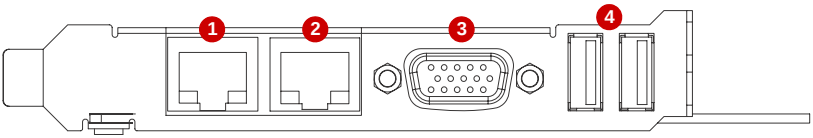
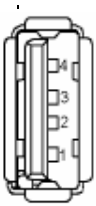


Figure 2-1: Rear Panel I/O Ports

	Connector	Description
1	LAN1 port	Gigabit Ethernet (RJ-45)
2	LAN2 port	Gigabit Ethernet (RJ-45)
3	VGA port	DB-15 connector for CRT or LCD monitor
4	USB 2.0 ports	High-speed USB 2.0 ports

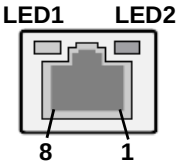
USB Connector



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

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LAN (RJ-45) Ports

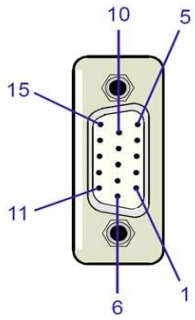


Pin #	10BASE-T/ 100BASE-TX	1000BASE-T
1	TX+	BI_DA+
2	TX-	BI_DA-
3	RX+	BI_DB+
4	--	BI_DC+
5	--	BI_DC-
6	RX-	BI_DB-
7	--	BI_DD+
8	--	BI_DD-

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	Orange	1 Gb connection

VGA Port



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

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2.2 Board Layout

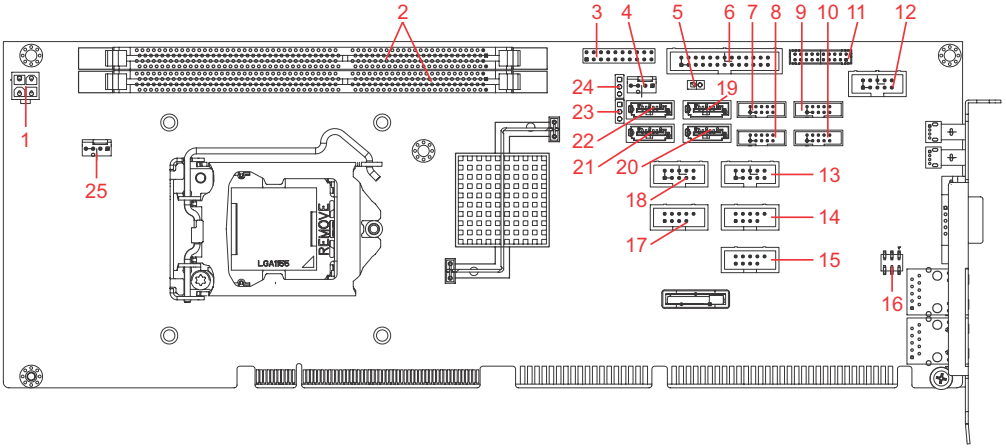


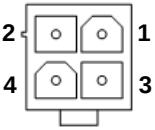
Figure 2-2: Connectors and Jumpers

	Connector	Description
1	CN24	ATX 12V Power connector
2	DIMM1/2	DDR3 DIMM slots
3	CN23	System Panel pin header
4	FAN2	FAN2 connector
5	CN14	Watchdog disable jumper
6	CN30	Parallel Port connector
7	CN25	COM5 connector
8	CN12	COM3 connector
9	CN19	COM4 connector
10	CN26	COM6 connector
11	CN17	DVI-D onboard connector
12	CN10	COM1 connector
13	CN18	COM2 connector
14/15	CN8/6	USB 8/9, 4/5 headers
16	CN16	PS/2 Keyboard/Mouse pin header
17	CN3	USB 2/3 header
18	CN9	Audio connector
19	CN7	SATA5 connector
20	CN9	SATA4 connector
21	CN2	SATA0 connector
22	CN4	SATA1 connector
23	CN28	Clear CMOS jumper
24	CN29	Clear RTC jumper
25	FAN1	FAN1 connector

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2.3 Onboard Connectors

ATX 12V Power Connector (CN24)



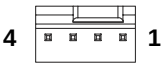
Pin #	Signal
1	GND
2	GND
3	+12V DC
4	+12V DC

NOTE:

The ATX 12V power connector must be connected to provide sufficient power to the SBC in either ATX or AT modes. See “Installing the Power Connectors” on page 36.

Fan Connectors (FAN1/2)

(1x4 Wafer connector, 2.54mm pitch)



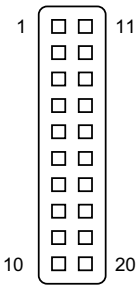
Pin #	Signal
1	GND
2	Fan power (+12V)
3	Fan Tachometer
4	Fan Speed Control

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System Panel Pin Header (CN23)

(2x10 pin header, 2.54mm pitch)

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

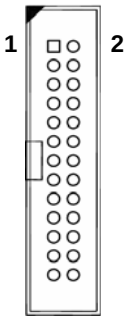


Pin #	Signal	Function	Pin Group
1	P5V	+5V Power	Power LED
2	NC		
3	HC_PLED-L	Power LED signal	
4	NC		
5	GND	Ground	
6	GND	Ground	ATX Power
7	NC		
8	ATX_PSON-L	ATX Power-On signal	
9	P5V_SB_ATX	+5V Standby	
10	PMEJ	Power Control signal	
11	HC_SPKR	Speaker signal	Chassis Speaker
12	NC		
13	NC		
14	P5V	+5V Power	
15	HC_RSTBN-L	Reset signal	Reset Button
16	GND	Ground	
17	HDLED_PWR	HDD LED signal	HDD LED
18	P5V	+5V Power	
19	HC_PBTNJ	Power-On signal	Power Button
20	GND	Ground	

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Parallel Port Onboard Connector (CN30)

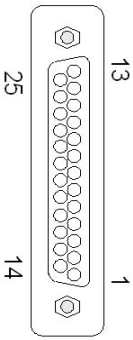
(2x13 box header, 2.54mm pitch)



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

Parallel Port Bracket Connector

(optional cable w/ bracket, P/N: 30-25004-0000)

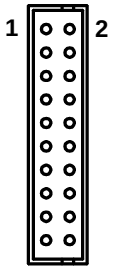


Pin #	Signal	Pin #	Signal
1	Line Printer Strobe	14	Auto-Feed
2	Parallel Data 0	15	Error
3	Parallel Data 1	16	Initialize
4	Parallel Data 2	17	Select
5	Parallel Data 3	18	Ground
6	Parallel Data 4	19	Ground
7	Parallel Data 5	20	Ground
8	Parallel Data 6	21	Ground
9	Parallel Data 7	22	Ground
10	Acknowledge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

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DVI-D Onboard Connector(CN17)

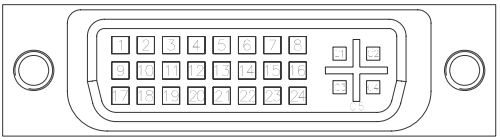
(2x10 Wafer connector, 2.00mm pitch)



Pin #	Signal	Pin #	Signal
1	GND	2	GND
3	DVI-Clock+	4	DVI-Data0-
5	DVI-Clock-	6	DVI-Data0+
7	GND	8	GND
9	DVI-I2C-Clock	10	DVI-Data1-
11	DVI-I2C-Data	12	DVI-Data1+
13	GND	14	GND
15	DVI-HPD	16	DVI-Data2-
17	+5V	18	DVI-Data2+
19	GND	20	GND

DVI-D Bracket Connector

(optional cable w/ bracket, P/N 30-01052-2000)

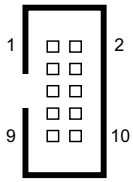


Pin #	Signal	Pin #	Signal
1	TMDS Data2-	13	TMDS Data3+
2	TMDS Data2+	14	+5 V Power
3	TMDS Data2/4 Shield	15	GND
4	TMDS Data4-	16	Hot Plug Detect
5	TMDS Data4+	17	TMDS Data0-
6	DDC Clock [SCL]	18	TMDSData0+
7	DDC Data [SDA]	19	TMDS Data0/5 Shield
8	Analog vertical sync	20	TMDS Data5-
9	TMDS Data1-	21	TMDS Data5+
10	TMDS Data1+	22	TMDS Clock Shield
11	TMDS Data1/3 Shield	23	TMDS Clock +
12	TMDS Data3-	24	TMDS Clock -

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COM1 Connector (RS-232/422/485/485+) (CN10)

(2x5 box header, 2.54mm pitch)

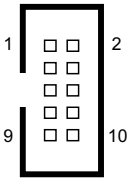


Pin #	RS-232	RS-422/485+	RS-485
1	DCD	TXD-	Data-
2	DSR	NC	NC
3	RXD	TXD+	Data+
4	RTS	NC	NC
5	TXD	RXD+	NC
6	CTS	NC	NC
7	DTR	RXD-	NC
8	RI	NC	NC
9	GND	GND	GND
10	NC	NC	NC

Note: See BIOS: Advanced > Super I/O to set COM1 to RS-232/422/485 mode.

COM2/3/4/5/6 Connectors (RS-232) (CN12/18/19/25/26)

(2x5 box header, 2.00mm pitch)



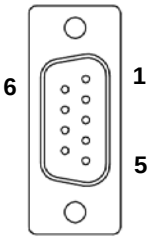
Pin #	RS-232 Signal
1	DCD
2	DSR
3	RXD
4	RTS
5	TXD
6	CTS
7	DTR
8	RI
9	GND
10	NC

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COM Bracket Connectors

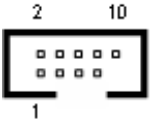
(cables w/ bracket supplied with the NuPRO-A40H - DB9 connector)

Pin #	RS-232	RS422/485+	RS485
1	DCD	TXD-	Data-
2	RXD	TXD+	Data+
3	TXD	RXD+	--
4	DTR	RXD	--
5	GND	GND	GND
6	DSR	--	--
7	RTS	--	--
8	CTS	--	--
9	RI	--	--



USB 2.0 Connectors (CN3/6/8)

(2x5 box header, 2.54mm pitch)

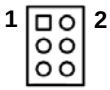


Pin #	Signal	Pin #	Signal
1	+5V	2	+5V
3	USB0-	4	USB1-
5	USB0+	6	USB1+
7	GND	8	GND
9	Key	10	NC

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PS/2 Keyboard/Mouse Pin Header (CN16)

(2x3 pin header, 2.54mm pitch)



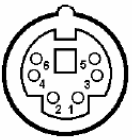
Pin #	Signal	Pin #	Signal
1	KBDATA	2	KBCLK
3	MSDATA	4	MSCLK
5	KM_VCC	6	GND

PS/2 Keyboard/Mouse Bracket Connectors

(optional cable w/ bracket, P/N: 30-01019-2000)

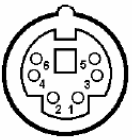
PS/2 Mouse Port (green)

Pin #	Signal	Function
1	MSDATA	Mouse Data
2	NC	not connected
3	GND	Ground
4	+5V	Power
5	CLK	Clock
6	NC	not connected



PS/2 Keyboard Port (purple)

Pin #	Signal	Function
1	KBDATA	Keyboard Data
2	NC	not connected
3	GND	Ground
4	+5V	Power
5	CLK	Clock
6	NC	not connected

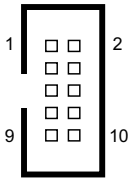


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HD Audio Daughter Board Connector (CN9)

(2x5 box header, 2.54mm pitch)

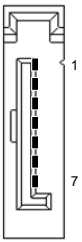
This connector is designed for use with the ADLINK DB-Audio2 daughter board.



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_SDOUT	Audio Data Output
7	P5V_AUD	+ 5V
8	P3V3_DVDD	3.3V
9	AUD_SYNC	Audio Synchronous
10	AUD_RSTJ	Audio Reset

Serial ATA Connectors (CN2/4/7/9)

(7P L-connector, 1.27mm pitch)



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

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2.4 Jumpers

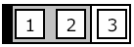
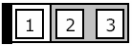
Watchdog Disable Jumper (CN14)

WDT Status	Connection
Normal (default)	1 – 2
Disabled	2 – 3

Clear CMOS Jumper (CN28)

To clear the BIOS settings (RTCRTS# asserts):

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.

CMOS Status	Connection	JBAT1
Normal	1 – 2	
Clear CMOS	2 – 3	

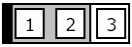
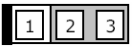
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Clear RTC Jumper (CN29).

To clear the BIOS settings and data/time (SRTCRST# and RTCRST# assert):

1. Power down and disconnect power from the system.
2. Short pins 2-3 on JP1.
3. Reconnect power and power up the system.

After power up, remove the jumper cap from pins 2-3 and reinstall it to pins 1-2.

CMOS Status	Connection	JBAT1
Normal	1 – 2	
Clear CMOS	2 – 3	

COM1 Mode Jumper Settings (CN16, CN31)

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

	RS-232	RS-422	RS-485
CN16	On	On	Off
CN31	Off	On	On

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3 Getting Started

This chapter provides information on how to install components on the NuPRO-A40H SHB.

3.1 Installing the CPU

The NuPRO-A40H supports an Intel® Core™ i7/i5/i3 or Pentium® processor in an LGA1155 socket.

WARNING:

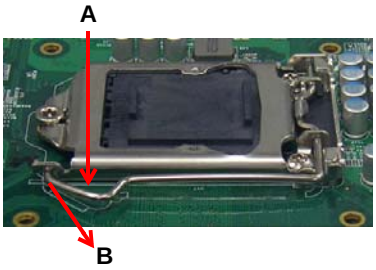
Disconnect all power to the board before installing a CPU to prevent damaging the board and CPU.

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



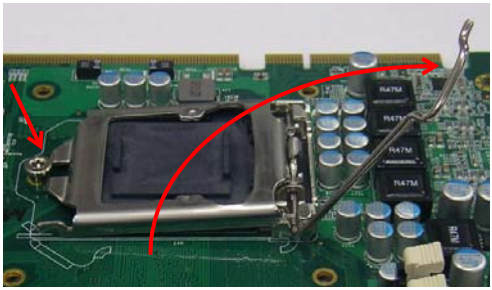
To install the CPU:

1. Press down on the locking arm (A), then push it away from the socket to disengage it from the retention tab (B).

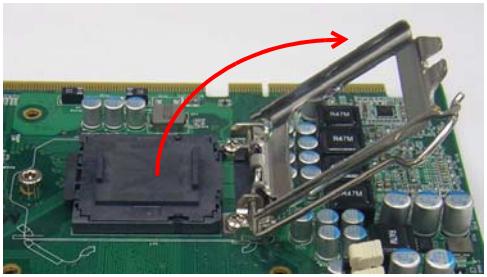


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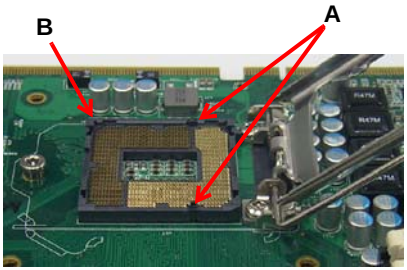
2. Raise the locking arm to unlock the load plate.



3. Lift the load plate to uncover the socket.



4. Remove the plastic protective cover from the socket. Note the locations of the alignment keys (A) and Pin 1 indicator (B).

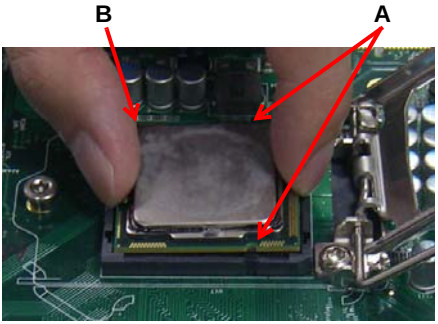


WARNING:

Do NOT touch socket contacts.

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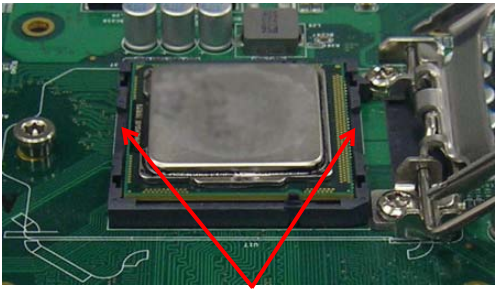
5. Hold the CPU using thumb and forefinger as shown. Position the CPU over the socket, matching the notches on the sides of the CPU with the alignment keys on the socket (A). The golden triangle on the CPU must be positioned at the corner of the socket with the Pin 1 indicator as shown (B).



WARNING:

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

6. Carefully place the CPU into the socket vertically. The socket has cutouts for your fingers to fit into.



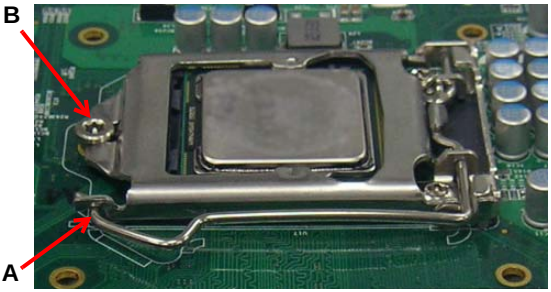
Cutouts

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7. Gently lower the load plate. Make sure the front edge of the plate is under the screw as indicated.



8. Lower the locking arm and fasten it to the retention tab (A). The load plate should be locked underneath the screw as shown (B).



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3.2 Installing the CPU Fan and Heatsink



The CPU requires a chassis with an airflow inlet and maximum internal ambient temperature of 50° 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.

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 15).

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3.3 Installing Memory Modules

The NuPRO-A40H supports up to 16 GB of DDR3 1333/1600 MHz memory modules in two 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 in the DIMM sockets.

WARNING:

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

Memory Configuration Options

The NuPRO-A40H supports 2GB, 4GB and 8GB unbuffered non-ECC DDR3 DIMMs in the following configurations:

- 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.

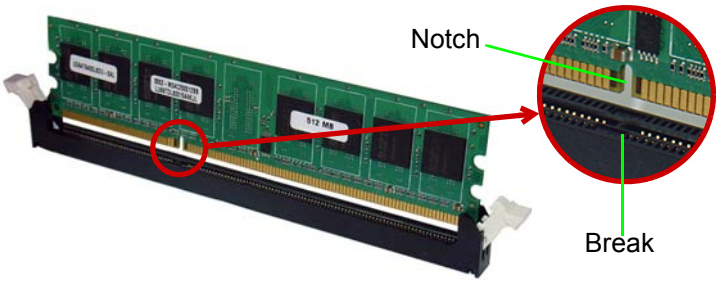
To install a memory module:

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

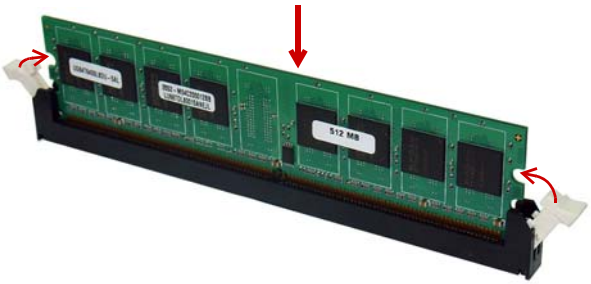


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3. Align the memory module on the socket making sure that the notch matches the break on the socket.



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



3.4 Installing the Power Connectors

Refer to **Section 2.2 Board Layout** on page 15 and **Section 2.3 Onboard Connectors** on page 16 for detailed information on connectors and pin definitions referred to below.

ATX 12V Power Connector

The NuPRO-A40H requires +12V DC power connected to CN24 for proper operation in either ATX or AT modes. If necessary, order an ATX12V Convert Cable from ADLINK for use with Molex 4-pin power connectors (P/N 30-00006-0000).

Front Panel Connector

Before powering up the NuPRO-A40H, connect the necessary signals from the backplane to the System Panel pin header (CN23). The ATX Power Connector pin group (pins 6, 8, 9, 10) and Power Button pin group (pins 19, 20) must be connected for the system to power up in ATX mode.

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4 Driver Installation

This chapter provides information on how to install the NuPRO-A40H device drivers under Windows XP. The device drivers are located in the following ADLINK All-in-One DVD directories:

Chipset	\NuPRO\NuPRO-A40H\Chipset\
Display	\NuPRO\NuPRO-A40H\VGA\
Ethernet	\NuPRO\NuPRO-A40H\Ethernet\
.Net Framework	\NuPRO\NuPRO-A40H\Others\
Audio	\Audio Daughter Board\DB-Audio2\

Install the Windows operating system before installing any driver. Most standard I/O device drivers are installed during Windows installation.**r**

4.1 Chipset Driver

This section describes the installation of the chipset driver.

1. Locate the directory **X:\NuPRO\NuPRO-A40H\Chipset** on the ADLINK All-in-One DVD, and extract the file **setup.exe** from the following archive: **Chipset driver_ Intel_INF_Update_Utility_All_WinOS.zip**.
2. Run the program **setup.exe** and follow the onscreen instructions. Restart the system if prompted.

4.2 Display Driver

Integrated Intel® HD Graphics

This section describes the driver installation for the Integrated Intel® HD Graphics.

Follow these instructions to install the display driver:

1. Locate the directory **X:\NuPRO\NuPRO-A40H\VGA** on the ADLINK All-in-One DVD, and extract the contents of the following archive:
   Microsoft_Net_Framework_v3.5_SP1.zip

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2. Run the program **Microsoft_Net_Framework_v3.5_SP1.exe** and follow the onscreen instructions.Restart the system if prompted.
3. Locate the directory **X:\NuPRO\NuPRO-A40H\VGA** on the ADLINK All-in-One DVD, and extract the file **setup.exe** from the following archive: **VGA_winxp.zip**.
4. Run the program **setup.exe** and follow the onscreen instructions. Restart the system if prompted.

4.3 Ethernet Driver

Follow these instructions to install the Ethernet driver.

1. Locate the directory **X:\NuPRO\NuPRO-A40H\Ethernet** on the ADLINK All-in-One DVD, and extract the file **Autorun.exe** from the following archive: **Network_driver_Intel_Network_Adapter_For_Win32.zip**.
2. Run the program **Autorun.exe** and follow the onscreen instructions. Restart the system if prompted.

4.4 Audio Driver

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



Before installing the audio driver, check the BIOS settings to make sure that audio is enabled: **Chipset > PCH-IO Configuration > PCH Azalia Configuration > Azalia**.

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.

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5 BIOS Setup

The following chapter describes basic navigation for the AMIBIOS® EFI 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.

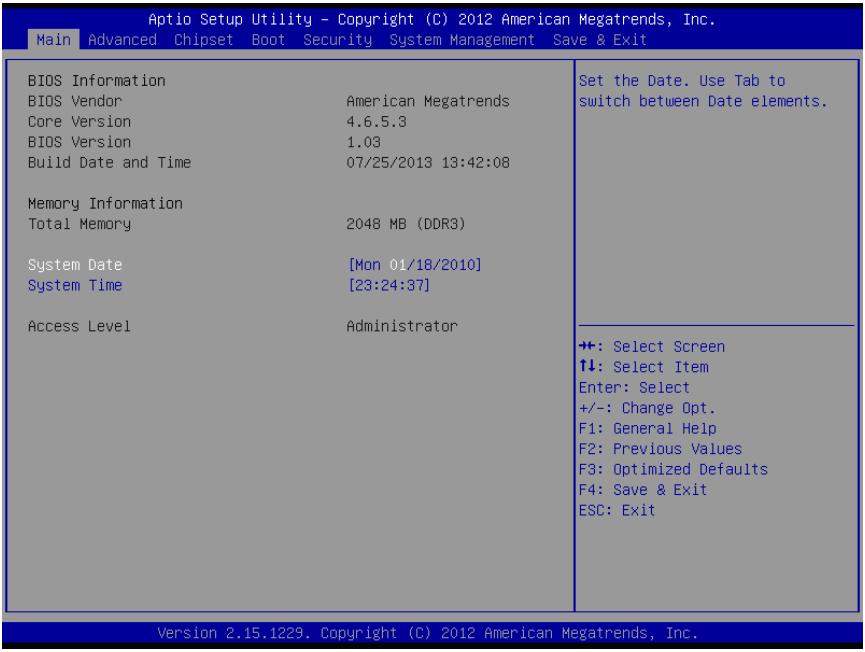
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Setup Menu

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.

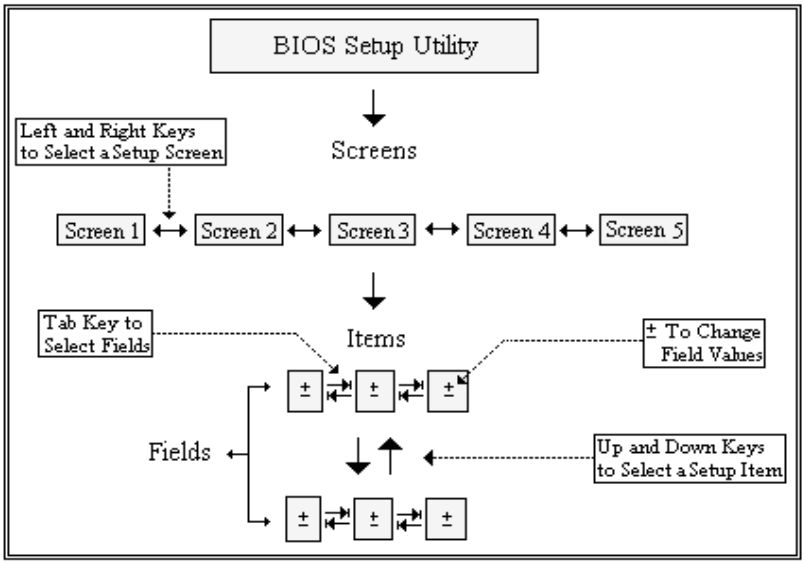


Navigation

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. .

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

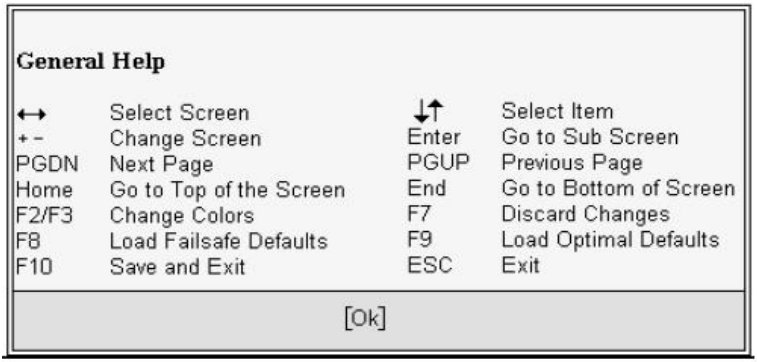
The < F8 > key on your keyboard is the Fail-Safe key. It is not displayed on the key legend by default. To set the Fail-Safe settings of the BIOS, press the < F8 > key on your keyboard. It is located on the upper row of a standard 101 keyboard. The Fail-Safe settings allow the motherboard to boot up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

Hotkey Descriptions

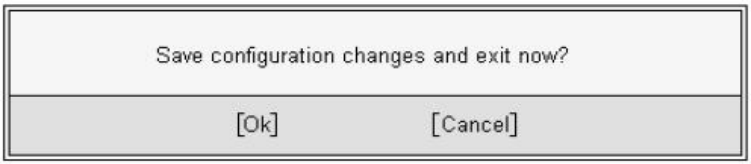
F1 The < F1 > key allows you to display the General Help screen.

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

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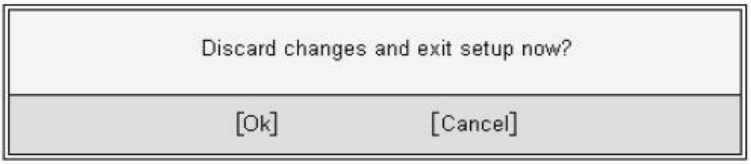


F10 The < F10 > key allows you to save any changes you have made and exit Setup. Press the < F10 > key to save your changes. The following screen will appear:



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:



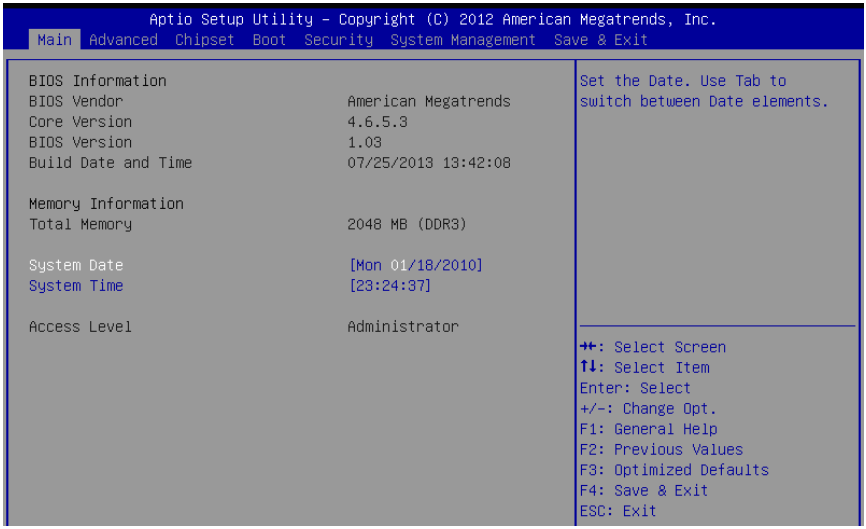
Press the < Enter > key to discard changes and exit. You can also use the < Arrow > key to select Cancel and then press the < Enter > key to abort this function and return to the previous screen.

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.

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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 & Board Info

BIOS Vendor

Displays the BIOS vendor.

Core Version

Displays the BIOS core version.

BIOS Version

Display the current BIOS revision.

Build Data and Time

Displays the BIOS build data.

Total Memory

Display the current system total memory.

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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.

Access Level

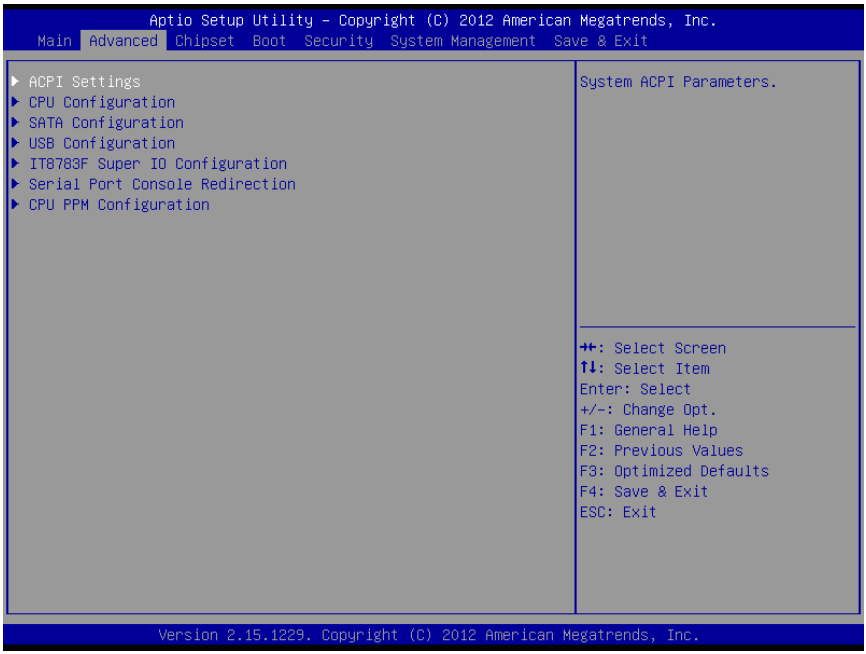
Displays the current system access level.

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5.3 Advanced BIOS Setup

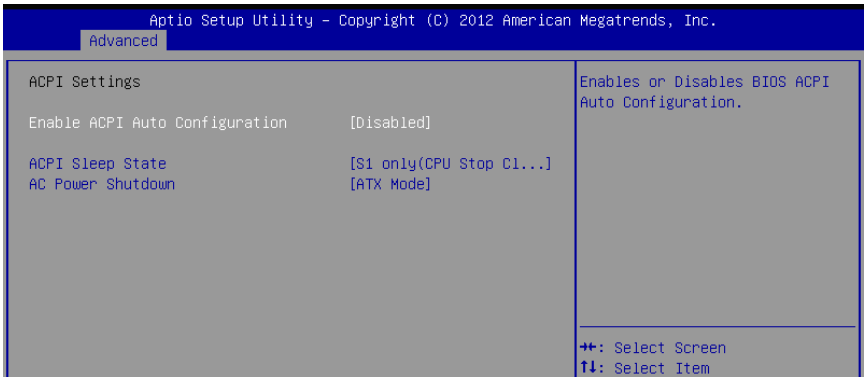
Select the Advanced tab from the setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as SuperIO Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the < Arrow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

The sub menus are described on the following pages.



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5.3.1 ACPI Settings



Enable APIC Auto Configuration

BIOS ACPI Auto Configuration. Options: Enabled/Disabled.

ACPI Sleep State

Select the highest ACPI sleep state the system will enter, when the SUSPEND button is pressed. Options: S1, S3, Suspend Disable.

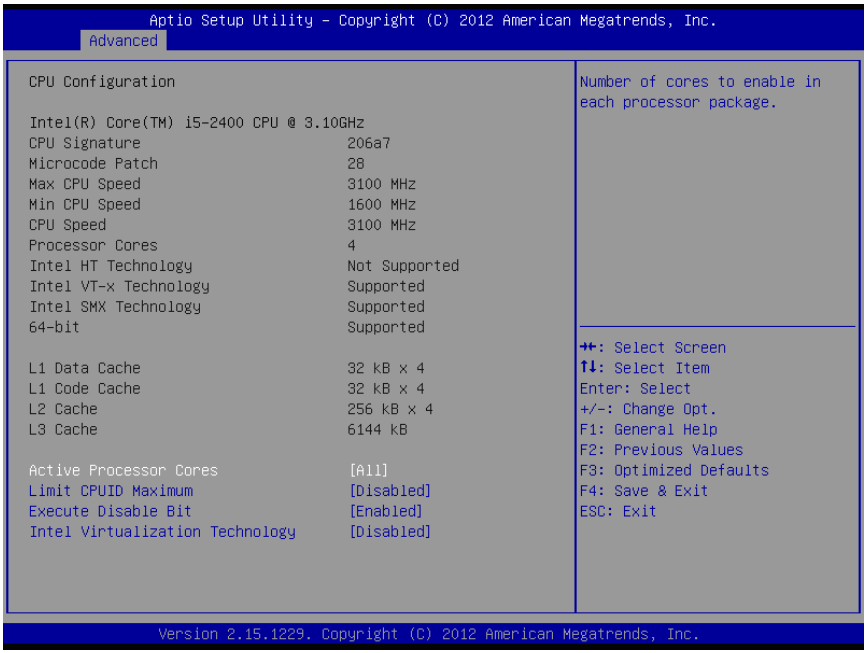
AC Power Shutdown

ATX mode: OS will turn off system power when shutdown.
AT mode: OS show It is now safe to turn off your computer.

NOTE: AT mode will not support S3 & S4.

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5.3.2 CPU Configuration



Active Processor Cores

Number of cores to enable in processor. Options: All, 1, 2.

Limit CPUID Value Maximum

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. Enable this option to allow compatibility with older operating systems.

Execute Disable Bit

Allows you to enable or disable the No-Execution Page Protection Technology. Setting this item to [Disabled] forces the XD feature flag to always return a zero (0). Options: Enabled, Disabled.

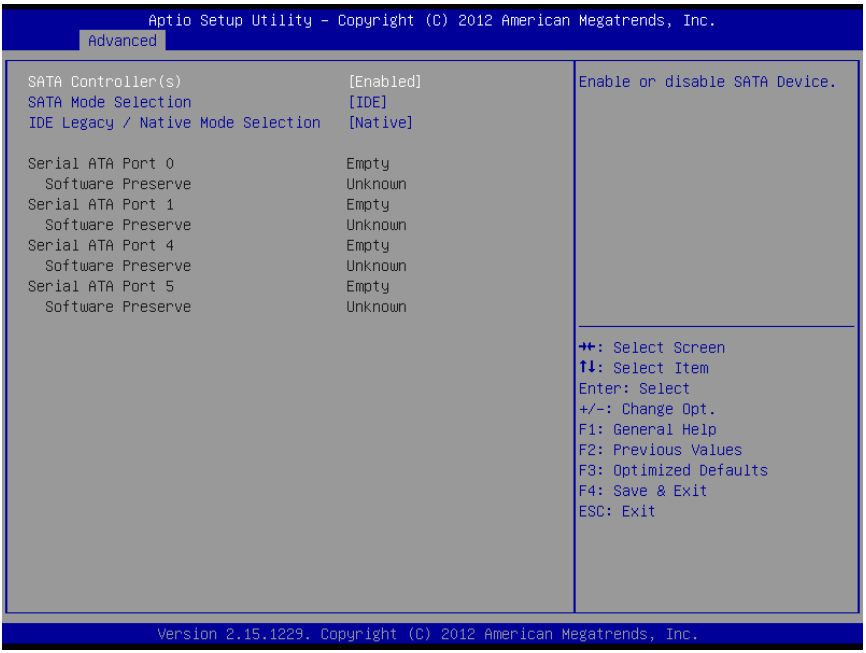
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Intel® Virtualization Tech

When enabled, Intel® Virtualization Technology (Intel® VT) makes a single system appear as multiple independent systems to software. This allows for multiple, independent operating systems to be running simultaneously on a single system.

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5.3.3 SATA Configuration



SATA Mode

Options: IDE, RAID, AHCI.

IDE Legacy/Native Mode Selection

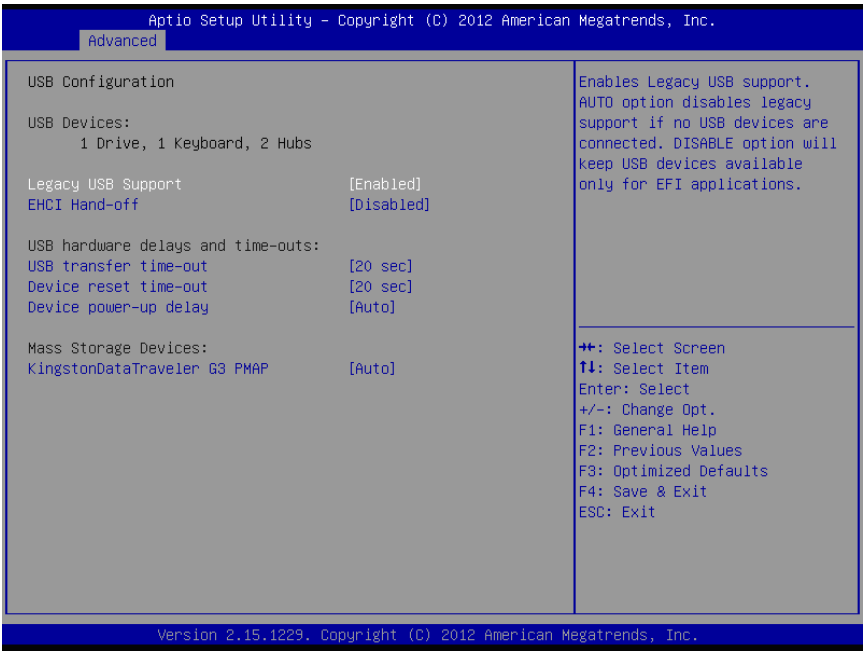
IDE Legacy/Native Mode Selection.

SATA Port 0,1,4,5

Display SATA device name string.

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5.3.4 USB Configuration



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.

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USB transfer time-out

The time-out value for Control, bulk, and Interrupt transfers.

Device reset time-out

USB mass storage device start Unit command time-out.

Device power-up delay

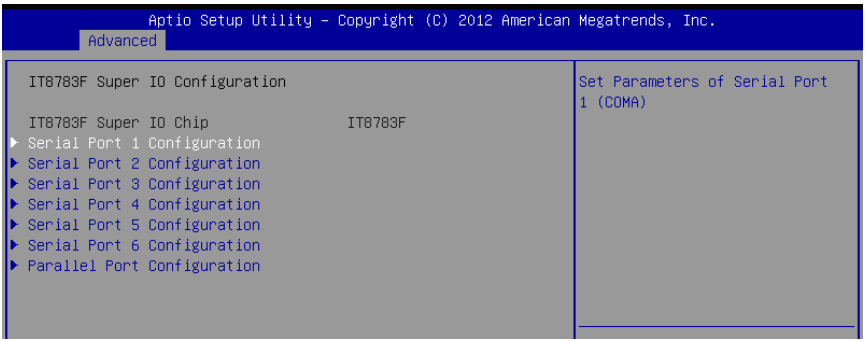
Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken from Hub descriptor.

Mass Storage Devices:

Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type. Options: Auto, Floppy, Forced FDD, Hard Disk, CD-ROM.

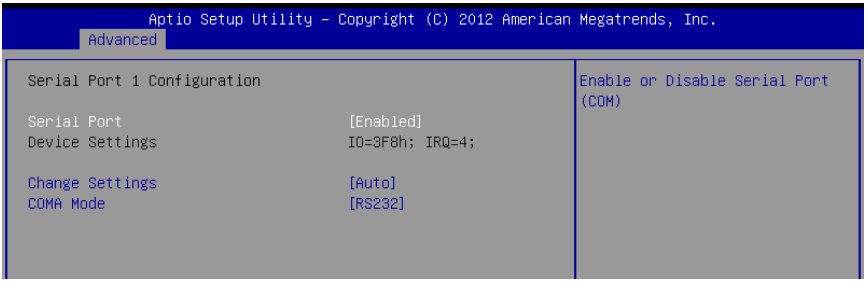
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5.3.5 Super IO Configuration



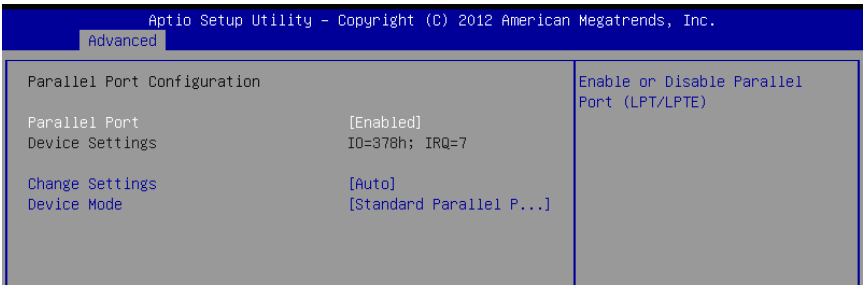
Serial Port 1-6 Configuration

Enter the submenu for each serial port to enable/disable and view the I/O port and IRQ settings.



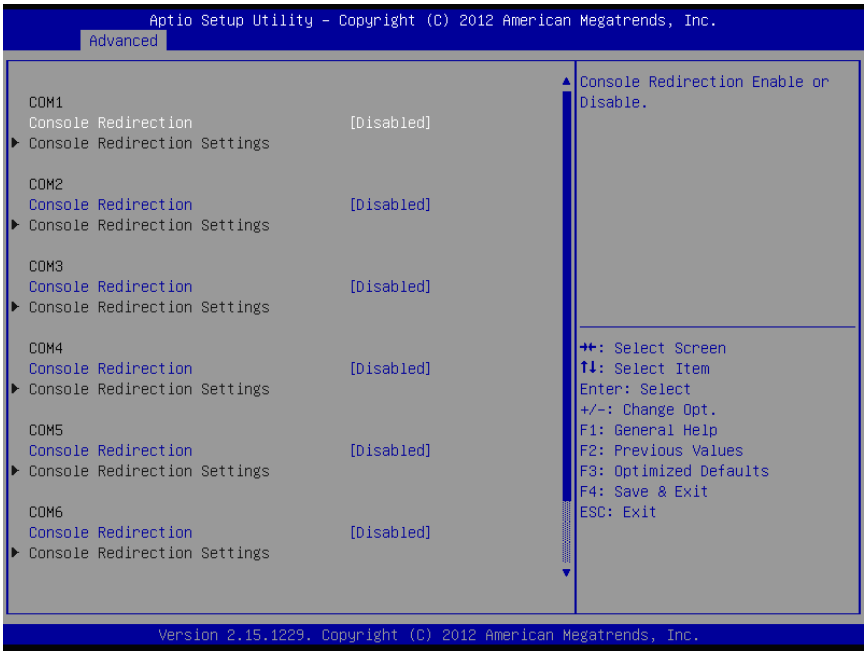
Parallel Port Configuration

Enter the submenu to enable/disable the parallel port and specify the base I/O port address.



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5.3.6 Serial Port Console Redirection



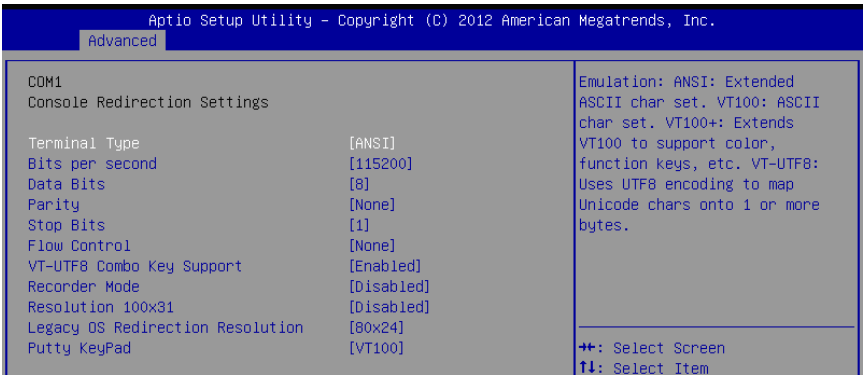
COM1~6 Console Redirection

Options: Enabled/Disabled.

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Console Redirection Settings

The settings specify how the host computer and the remote computer exchange data. Both computers should have the same or compatible settings.



Terminal Type

This option is used to select either VT100/VT-UTF8 or ANSI terminal type. Options: VT100, VT100+, VT-UTF8, ANSI.

Bits per second

Select the bits per second you want the serial port to use for console redirection. The options are 115200, 57600, 38400, 19200, 9600.

Data Bits

Select the data bits you want the serial port to use for console redirection. Set this value to 7 and 8.

Parity

Set this option to select Parity for console redirection. The settings for this value are None, Even, Odd, Mark and Space.

Stop Bits

Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit. Set this value to 1 and 2.

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Flow Control

Set this option to select Flow Control for console redirection. The settings for this value are None, Hardware RTS/CTS.

Record Mode

With this mode enabled only text will be sent., allowing capture of Terminal data. Set this value to Enabled or Disabled.

Resolution 100x31

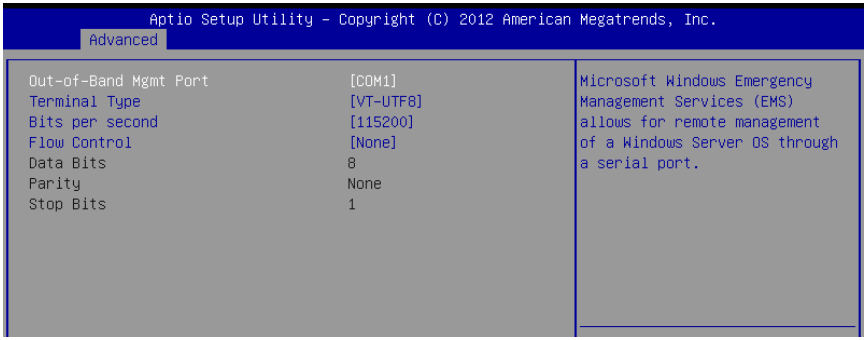
Enable or disable extended terminal resolution. Set this value to Enabled or Disabled.

Legacy OS Redirection Resolution

On a legacy OS, the number of Rows and Columns supported by redirection. Set this value to 80x24 and 80x25.

Serial Port for Out-of-Band Management

These settings control the ACPI serial port redirection table (SPCR) which is used by Windows servers to provide Windows Emergency Management Services (EMS) and is independent from console redirection output. OoB Management or EMS allows the remote management of selected components of Windows servers, even when a server is not connected to the network or the network is not available



Out-of-Band Mgmt Port

Selects the serial port used for Out-of-Band Management.

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Terminal Type

VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100. See above, in Console Redirection Settings page, for more Help with Terminal Type/Emulation. Options: **VT100, VT100+, VT-UTF8, ASNI.**

Bits per second

Select the bits per second you want the serial port to use for console redirection. The options are 115200, 57600, 38400, 19200, 9600.

Flow Control

Set this option to select Flow Control for console redirection. The settings for this value are None, Hardware RTS/CTS.

Data Bits

Displays the frame width for Out-of-Band Management.

Parity

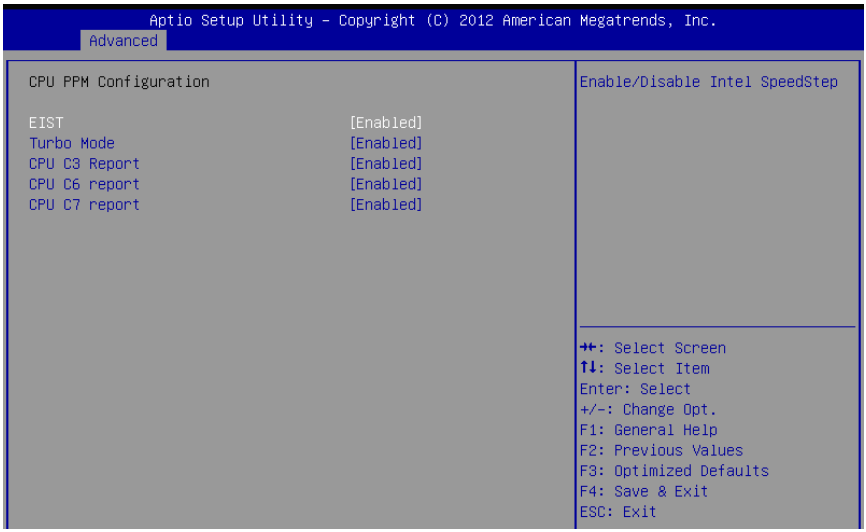
Displays the parity for Out-of-Band Management.

Stop Bits

Displays the number of stop bits for Out-of-Band Management.

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5.3.7 CPU PPM Configuration



EIST

The CPU speed is controlled by the operating system. Set this value to Enabled/Disabled.

Turbo Mode

Enabled/Disabled CPU Turbo Mode in OS.

CPU C3 Report

CPU C3 (ACPI C2) report to OS. Set this value is Enabled/Disabled.

CPU C6 Report

CPU C6(ACPI C3) report to OS. Set this value is Enabled/Disabled.

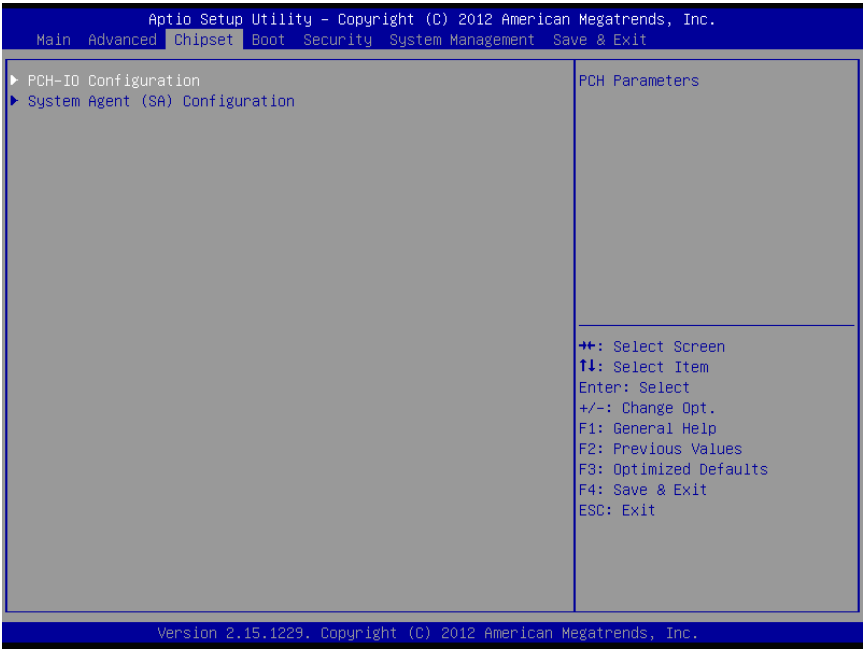
CPU C7 Report

CPU C7(ACPI C3) report to OS. Set this value is Enabled/Disabled.

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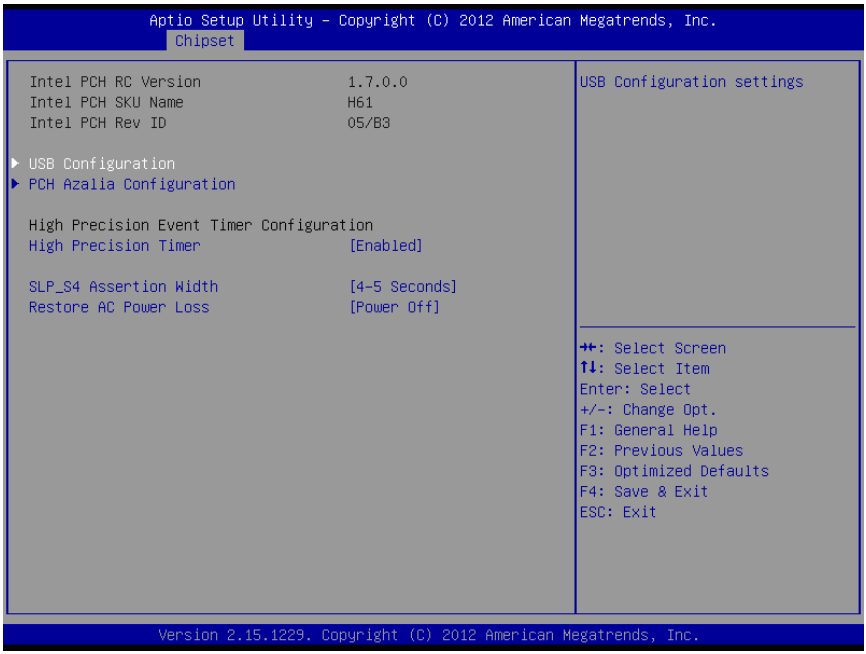
5.4 Chipset Setup

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.



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5.4.1 PCH-IO Configuration



High Precision Timer

Enabled/Disabled the High Precision Event Timer

Slp_S4 Assertion Width.

Select a minimum assertion width of the SLP_S4# signal.

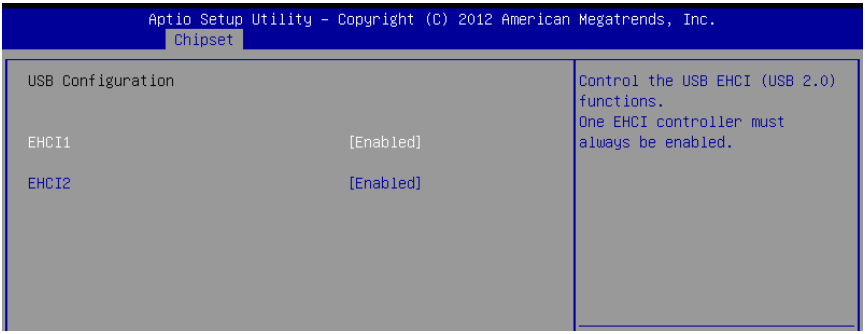
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Restore on AC Power Loss

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.

USB Configuration



EHCI 1

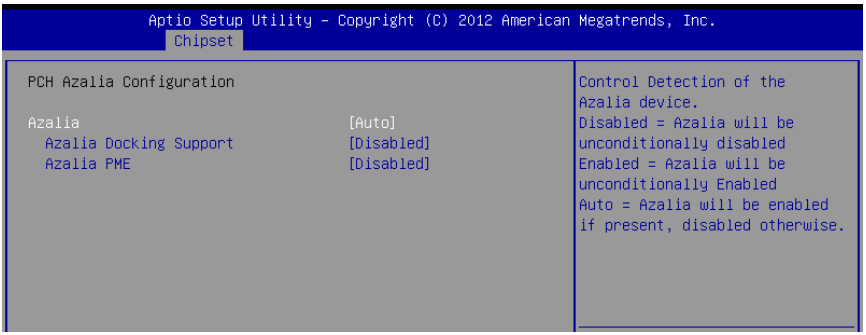
Enabled/Disabled USB 2.0 (EHCI) Support. Options: Enable, Disable.

EHCI 2

Enabled/Disabled USB 2.0 (EHCI) Support. Options: Enable, Disable.

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PCH Azalia Configuration



Azalia

Control Detection of the Azalia device. Disabled=Azaila will be unconditionally disabled.

- Enabled = Azaila will be unconditionally Enabled
- Auto=Azalia will be enabled if present, disabled otherwise.

Azalia Docking Support

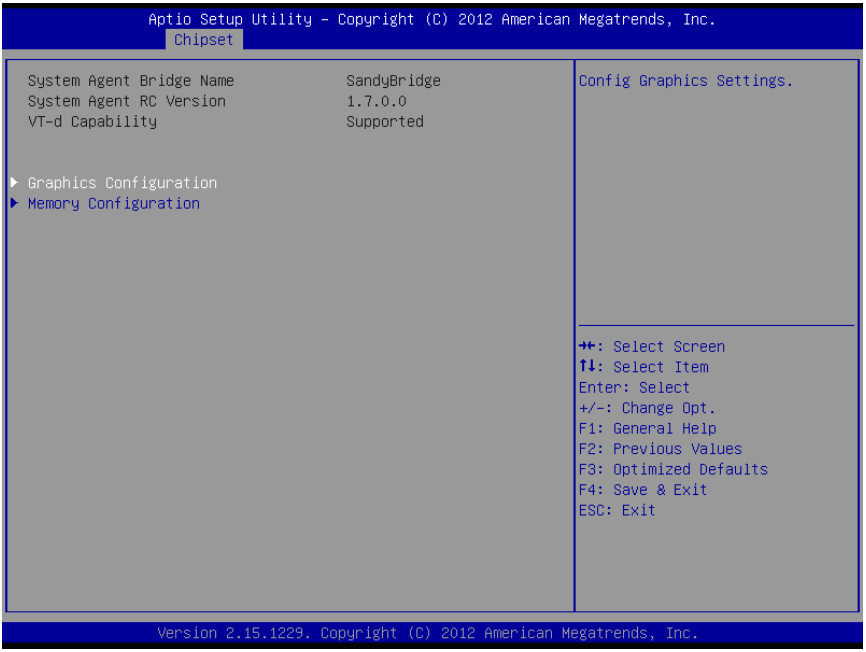
Enabled/Disabled Azalia Docking Support of Audio Controller.

Azalia PME

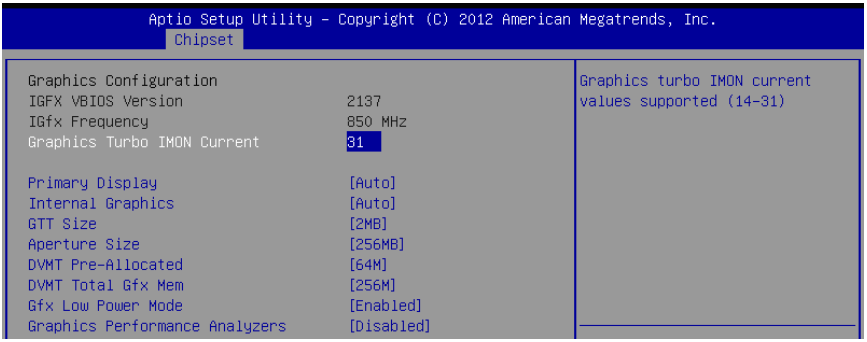
Enabled/Disabled Power Management Capability of Audio Controller.

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5.4.2 System Agent (SA) Configuration



Graphics Configuration



Graphic Turbo IMON Current

Graphic Turbo IMON Current values supported: 14-31 µA.

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Primary Display

Allows you to select which graphics controller to use as the primary boot device. Options: Auto, IGFX, PEG, PCI.

Internal Graphics

Keep IGD enabled based on the setup options. Options:Auto, Disabled, Enabled

GTT Size

Set GTT (Graphics Memory Manager) size. Options:1MB, 2MB

Aperture Size

Options: 128MB, 256MB, 512MB

DVMT Pre-Allocated

Select DVMT 5.0 Pre-allocated(Fixed) Graphics Memory size used by the Internal Graphics Device.

DVMT Total Gfx Mem

Select DVMT/Fixed memory size used by the Integrated Graphics Device. Options: 128MB, 256MB, Maximum.

Gfx Low Power Mode

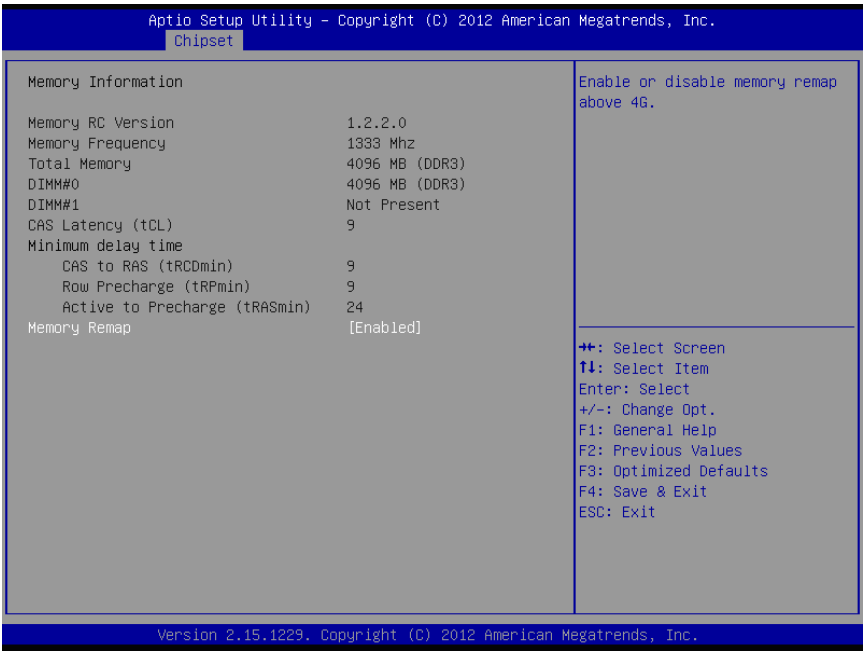
Options: Enabled, Disabled

Graphics Performance Analyzers

Enabled or Disable Intel Graphics Performance Analyzers Counters.

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Memory Configuration



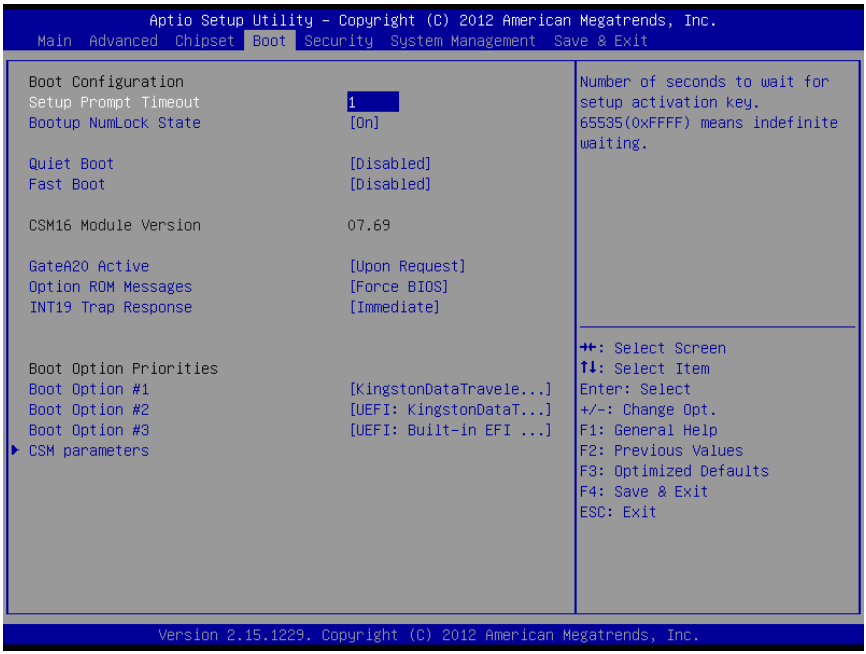
Memory Remap

Enabled or Disable Memory remap above 4G.

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5.5 Boot Configuration

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 Configuration screen is shown below:



Setup Prompt Timeout

Number of seconds to wait for setup activation. 65535 (0xFFFF) means wait indefinitely.

Bootup NumLock State

This setting determines the state of the NumLock function on bootup. Options: On, Off.

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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.

Fast Boot

Enabled/Disabled boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.

Gate A20 Active

Options: Upon Request, Always.

Option ROM Messages

Set display mode for Option ROM.

INT19 Trap Response

BIOS reaction on INT19 trapping by Option ROM: IMMEDIATE- execute the trap right away; POSTPONED-execute the during legacy boot.

Boot Option Priorities

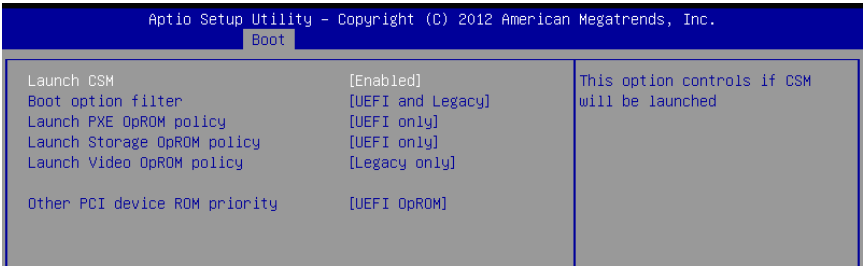
Set the boot device options to determine the sequence in which the computer checks which device to boot from.

Hard Drive BBS Priorities

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

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CSM Parameters



Launch CSM

This Option controls if CSM will be launched.

Boot Option Filter

This Option controls what device system can boot to.

Launch PXE OpRom Policy

Controls the execution of UEFI and Legacy PXE OpRom.

Launch Storage OpRom Policy

Controls the execution of UEFI and Legacy Storage OpRom.

Launch Video OpRom Policy

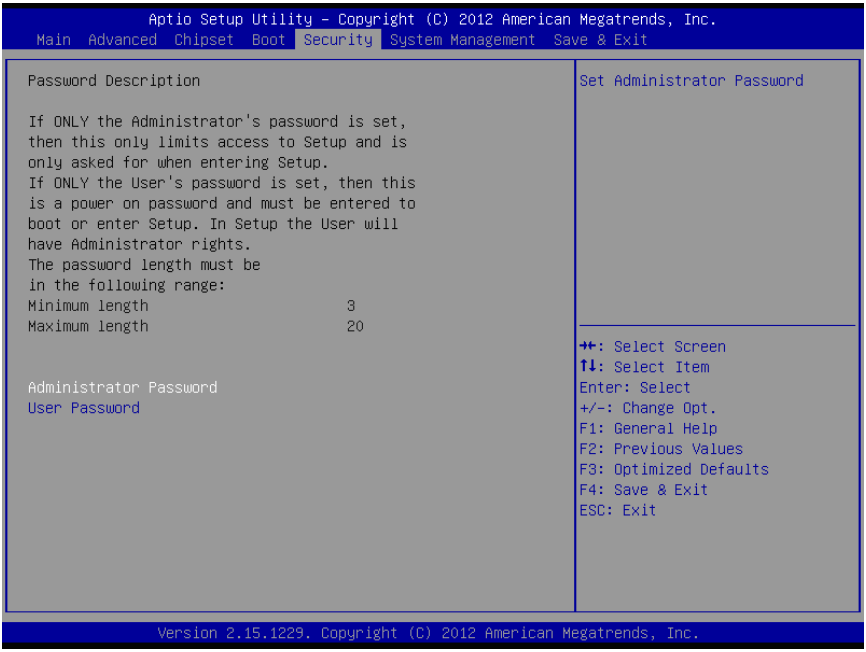
Controls the execution of UEFI and Legacy Video OpRom.

Other PCI device ROM priority

For PCI device other than network, mass storage or Video defines which OpRom to launch.

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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.

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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 Administrator Password
- Change User Password
- Clear User Password

Administrator Password

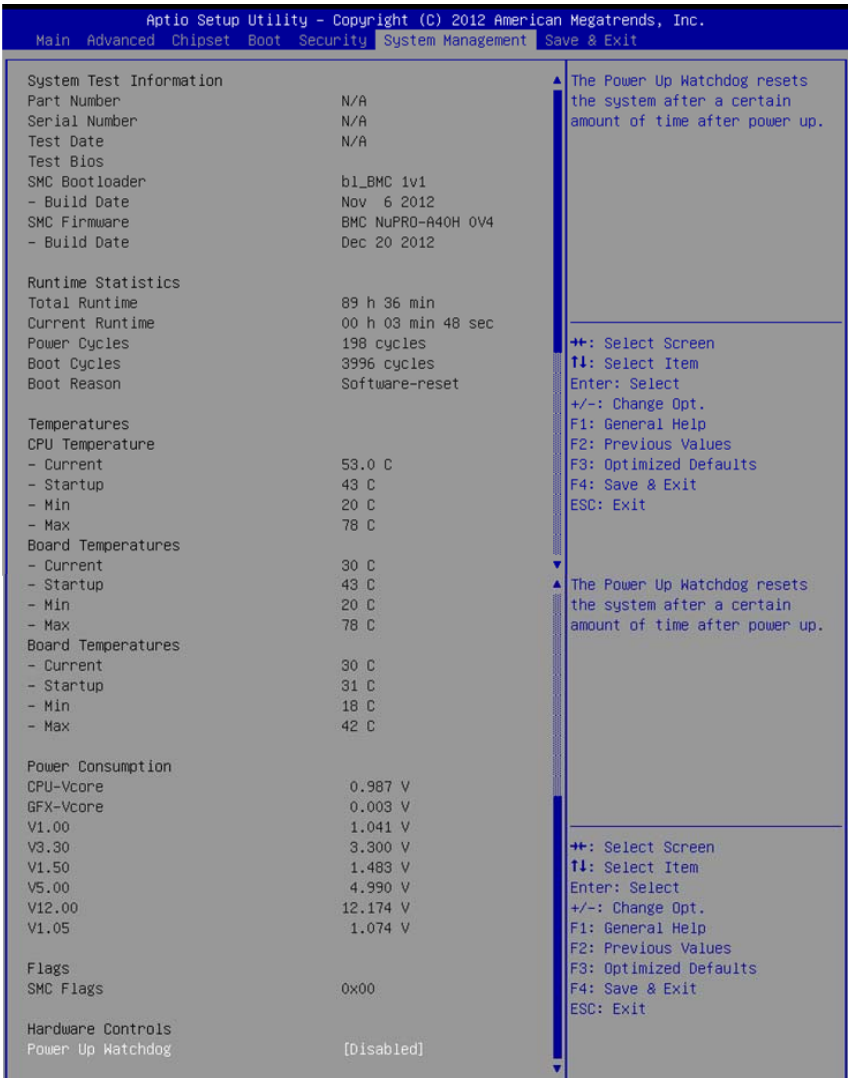
Indicates whether a Administrator password has been set.

User Password

Indicates whether a user password has been set.

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5.7 System Management



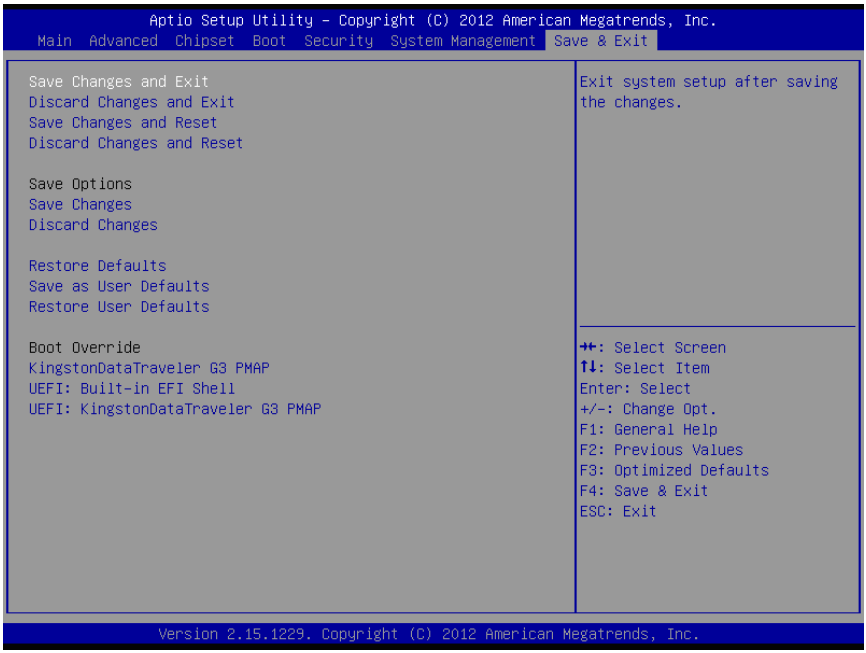
Power Up Watchdog

The Power Up Watchdog resets the system after a certain amount of time after power up.

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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 high-lighting 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.

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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.

Save Changes and Reset

Reset the system after saving the changes.

Discard Changes and Reset

Reset system setup without saving any changes.

Save Changes

Save changes made so far to any of the setup options.

Discard Changes

Select Discard Changes from the Exit menu and press < Enter >. Select OK to discard changes.

Restore Defaults

Restore/Load Default values for all the setup options.

Save as User Defaults

Save the changes made so far as User Defaults.

Restore User Defaults

Restore the User Defaults to all the setup options.

Boot Override

This group of functions includes a list of devices within the boot order. Select a drive to immediately boot that device regardless of the current boot order. If you are booting to the EFI Shell, an exit from the shell returns to Setup.

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Appendix A - Watchdog Timer

To use the Watchdog Timer on the NuPRO-A40H, first download the WDT driver from the product page on the ADLINK website: **www.adlinktech.com/PD/web/PD_detail.php?cKind=&pid=1256**.

Install the driver by extracting the appropriate version for your Windows operating system (32 or 64-bit), and copying it to the following location: **C:\Windows\System32\drivers**.

A sample program for configuring the NuPRO-A40H's watchdog timer is shown below.

A.1 Sample Code

```
#include <stdlib.h>
#include <float.h>
#include "Sema.h"
#include "SemaLog.h"
#include "ErrorCodes.h"
#include "Debug.h"
#include "Conv.h"
#include "dmi_info.h"
#include "Version.h"
#ifdef WIN32
   #include <windows.h>
#else
   #include <string.h>
   #include <unistd.h>
   #include <ctype.h>
#endif

typedef struct
{
   bool SetWatchdog;// Set/Reset/Disable watchdog?
   word Watchdog;// Num of seconds for wdt to trigger
}tCmdLineArgs;

tCmdLineArgs CmdLineArgs;
char*   ExeName;
```

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```
void ErrorMessage(char *Message)
{
   Sema_EventLogError(Message);

   exit(-1);
}


void ParseArgs(int argc, char* argv[], tCmdLineArgs
     *Args)
{
   int i;

   for (i=1; i<argc; i++)
   {
      if (strncmp(argv[i], "wdt", 3)==0)
      {
         if (++i >= argc)
         {
            ErrorMessage("Watchdog: Timeout missing");
         }

         Args->Watchdog = atoi(argv[i]);
         Args->SetWatchdog = true;
      }
   }
}

void PrintData(tCmdLineArgs Args)
{
   if (Args.SetWatchdog)
   {
      Sema_SetWatchdog(Args.Watchdog);
      printf("Watchdog set to %d seconds.\n",
      Args.Watchdog);
   }
}

int main(int argc, char* argv[])
{
   memset(&CmdLineArgs, 0, sizeof(tCmdLineArgs));
   ParseArgs(argc, argv, &CmdLineArgs);
   Sema_Init();
```

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```
    PrintData(CmdLineArgs);// Print requested data to
       console
    Sema_Close();

    return 0;
}
```

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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 – FEEFFFFF	1 MB	FSB Interrupt Memory Space
(4GB-20MB) – (4GB-19MB-1)	FEC00000 – FECFFFFF	1 MB	APIC Configuration Space
15MB – 16MB	F00000 – FFFFFF	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-CE7FF: Onboard VGA BIOS CE800-D07FF: Intel i211 PXE option ROM when onboard LAN boot ROM is enabled.
640 K – 768 K	A0000 – BFFFF	128 KB	Video Buffer & SMM space

Table B-1: System Memory Map

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 the parallel port.

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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 (ITE8783) 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
0F0	Co-processor error register
2E0-2EF	Serial Port 6
2E8-2EF	Serial Port 4
2F0-2F7	Serial Port 5
2F8-2FF	Serial Port 2
378-37F	Parallel port
3B0-3BB and 3BF	Mono/VGA mode video
3BC-3BE	Reserved for parallel port
3C0-3DF	VGA registers
3E8-3FF	Serial port 3
3F8-3FF	Serial port 1
4D0	Master PIC Edge/Level Trigger register
4D1	Slave PIC Edge/Level Trigger register
CF8	PCI configuration address register (32 bit I/O only)
CF9	Reset Control register (8 bit I/O)
CFC-CFF	PCI configuration data register
500-57F	GPIO Base Address for SB
400-45F	PM (ACPI) Base Address for SB

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Hex Range	Device
460-47F	Alias for ICH TCO base address.
0A00~0AFF	Reserved for SIO functions base address (ex: HardWare Monitor /GPIO etc)
F040-F05F	SMBus base address for SB

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)	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	Serial Port 3,4 (COM3 ,COM4) PCI / ISA	IRQ5 via SERIRQ, IRQ5 at ISA bus	Note (1)
6	Serial Port 5 (COM5) PCI / ISA	IRQ6 via SERIRQ	No
7	Parallel port / 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	Serial Port 6 (COM6) 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)

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IRQ#	Typical Interrupt Resource	Connected to Pin	Available
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

Notes:

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

(2) The BIOS does not open the IRQ 9 setting for the ISA bus.

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) / ISA	IRQ3 via SERIRQ, IRQ3 at ISA bus	Note (1)
4	Serial Port 1 (COM1) / ISA	IRQ4 via SERIRQ, IRQ4 at ISA bus	Note (1)
5	Serial Port 3,4 (COM3 ,COM4) /ISA	IRQ5 via SERIRQ, IRQ5 at ISA bus	Note (1)
6	Serial Port 5 (COM5)/ ISA	IRQ6 via SERIRQ	No
7	Parallel port / 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)

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IRQ#	Typical Interrupt Resource	Connected to Pin	Available
10	Serial Port 6 (COM6) / ISA	IRQ10 via SERIRQ, IRQ10 at ISA bus	Note (1)
11	ISA	IRQ11 via SERIRQ, IRQ11 at ISA bus	Note (1)
12	PS/2 Mouse / ISA	IRQ12 via SERIRQ, IRQ12 at ISA bus	Note (1)
13	Math Processor	N/A	No
14	Primary IDE controller / ISA	IRQ14 via SERIRQ, IRQ14 at ISA bus	Note (1)
15	Secondary IDE controller / ISA	IRQ15 via SERIRQ, IRQ15 at ISA bus	Note (1)
16	N/A	PCIE Port 0, EHCI Controller #2, I.G.D, Intel Management Engine Interface,PCIE to PCI Bridge(IT8892),PCI SLOT1	Yes
17	N/A	PCI SLOT4	Yes
18	N/A	PCIE Port 2, Intel I211 LAN. PCI SLOT3	Yes
19	N/A	PCIE Port 3 SATA Host controller #1, SATA Host controller #2, Intel I211 LAN. PCI SLOT2	Yes
20	N/A	N/A	No
21	N/A	N/A	No
22	N/A	N/A	No
23	N/A	EHCI Controller #1	No

Table B-5: IRQ Lines APIC Mode

Notes:

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

(2) The BIOS does not open the IRQ 9 setting for the ISA bus.

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PCI Configuration Space Map

Bus #	Device #	Function #	Routing	Description
00h	00h	00h	N/A	Intel Host-Hub Bridge
00h	02h	00h	Internal	Intel Integrated Graphics Device
00h	16h	00h	Internal	Intel Management Engine Interface
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	02h	Internal	Intel ICH Express Root port 2
00h	1Ch	03h	Internal	Intel ICH Express Root port 3
00h	1Dh	00h	Internal	Intel USB EHCI Controller #1
00h	1Fh	00h	N/A	Intel LPC Interface Bridge
00h	1Fh	02h	Internal	Intel SATA Host controller #1
00h	1Fh	03h	Internal	Intel SMBus Controller
00h	1Fh	05h	Internal	Intel Host SATA controller #2
01h	00h	00h	Internal	IT8892 PCIE to PCI Bridge
02h	07h	00h	Internal	IT8888 PCI to ISA Brdige
02h	0Ch	00h	Internal	PCI Slot 4
02h	0Dh	00h	Internal	PCI Slot 3
02h	0Eh	00h	Internal	PCI Slot 2
02h	0Fh	00h	Internal	PCI Slot 1
03h	0Fh	00h	Internal	Intel I211 Lan
04h	0Fh	00h	Internal	Intel I211 Lan

Table B-6: PCI Configuration Space Map

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PCI Interrupt Routing Map

PIRQ	A	B	C	D	E	F	G	H
INT Line	INTA	INTB	INTC	INTD				
VGA	X							
SATA Controller				X				
SATA Controller 1				X				
EHCI 1								X
EHCI 2	X							
HAD							X	
PCIE port0	INTA	INTB	INTC	INTD				
PCIE port2	INTC	INTD	INTA	INTB				
PCIE port3	INTD	INTA	INTB	INTC				
IT 8892	X							
PCI Slot 1	X							
PCI Slot 2				X				
PCI Slot 3			X					
PCI Slot 4		X						
Intel I211 #1				X				
Intel I211 #2			X					

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.

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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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Contact us should you require any service or assistance.

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