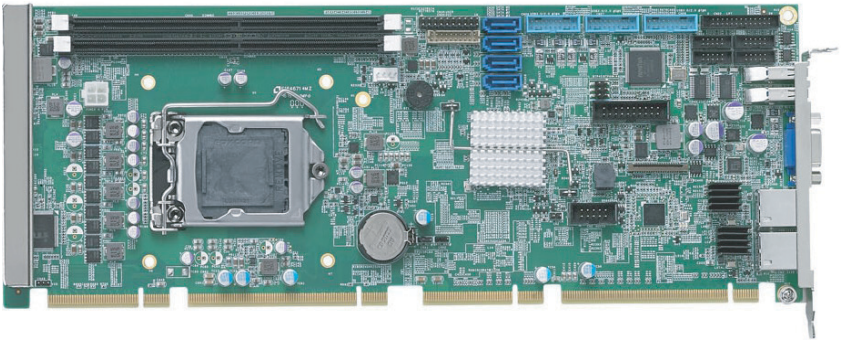
NuPRO-E43

PICMG® 1.3 Full Size LGA1151 Intel® Core™

i7/i5/i3 Processor-Based SHB

User's Manual



Manual Rev.:	2.1
Revision Date:	November 2, 2023
Part No:	50M-41809-2010

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Revision History

Revision	Release Date	Description of Change(s)
2.0	May 13, 2016	Initial release
2.1	November 2, 2023	Updated specs

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Preface

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Conventions

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



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



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



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

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1 Introduction

1.1 Overview

The ADLINK NuPRO-E43 is a PICMG 1.3 System Host Board (SHB) supporting the 6th Generation Intel® Core™ i7/i5/i3 and Pentium® processors in LGA1151 package to deliver a scalable high performance platform for a wide array of industrial applications. The NuPRO-E43 supports 14nm process CPUs at up to 3.7 GHz with integrated graphics and memory controllers, Direct Media Interface (DMI) and Flexible Display Interface (FDI) connectivity to the Intel® Q170 Express chipset. Dual-channel DDR4 memory is supported up to a maximum of 32GB on two DIMM slots.

These advanced features, coupled with PCI Express® x16 expansion capability, dual PCI Express®-based Gigabit Ethernet, SATA 6 Gb/s and USB 3.0 support make the NuPRO-E43 ideal for vision and automation control applications.

1.2 Features

- Supports Intel® Core™ i7/i5/i3 and Pentium® processors in LGA1151 package
- Integrated Intel® HD Graphics
- PCI Express® x16 expansion capability via backplane
- Dual Gigabit Ethernet
- 8x USB 3.0 ports (2 on rear panel, 6 on SHB)
- 4x USB 2.0 ports on backplane
- 4x SATA 6 Gb/s ports on SHB
- 4x COM ports (including 2x RS232/422/485)
- Watchdog timer, hardware monitor
- Optional HD audio kit (DB-Audio2 daughter board)
- Expanded TPM hardware security module
- RoHS compliant

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NOTE:

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

1.3 Specifications

Processor& System

CPU	Intel® Core™ i7-6700, 3.4GHz, 8M cache, 14nm, 65W TDP, LGA1151 (4C/8T) Intel® Core™ i7-6700TE, 2.4GHz 8M cache, 14nm, 35W TDP, LGA1151 (4C/8T) Intel® Core™ i5-6500, 3.6GHz, 6M cache, 14nm, 65W TDP, LGA1151 (4C/4T) Intel® Core™ i5-6500TE, 3.3GHz, 6M cache, 14nm, 35W TDP, LGA1151 (4C/4T) Intel® Core™ i3-6100, 3.7GHz, 3M cache, 14nm, 65W TDP, LGA1151 (2C/4T) Intel® Core™ i3-6100TE, 2.7GHz, 4M cache, 14nm, 35W TDP, LGA1151 (2C/4T) Intel® Pentium® G4400, 3.3GHz, 3M cache, 14nm, 65W TDP, LGA1151 (2C/2T) Intel® Pentium® G4400TE, 2.9GHz, 3M cache, 14nm, 35W TDP, LGA1151 (2C/2T) Intel® Celeron® G3900, 2.8GHz, 2M cache, 14nm, 65W TDP, LGA1151 (2C/2T) Intel® Celeron® G3900TE, 2.6GHz, 2M cache, 14nm, 35W TDP, LGA1151 (2C/2T)
Chipset	Intel® Q170 Express
Memory	Dual channel DDR4-2133 up to 32 GB
BIOS	AMI® UEFI BIOS 128 Mbit SPI flash memory
TPM	1x box header for TPM module Infineon SLB 9665XT2.0
WDT	1-255 sec. or 1-255 min. software programmable, can generate system reset
Hardware Monitor	CPU temperature, system temperature, system voltage, CPU fan speed

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OS	Microsoft® Windows® 7 32/64-bit Microsoft® Windows® 10 64-bit Ubuntu 15.10

I/O

Serial ATA	4x SATA 3.0 onboard with RAID support
Serial Ports	2x RS-232 via onboard 2.0 pitch box header 2x RS-232/422/485 with auto flow control via onboard 2.0 pitch box header
PCIe/PCI bus (Via backplane)	1x PCIe x16 with Intel PCIe slot bifurcation support, can be configured to 1x PCIex 16 or 2x PCIe x8 or 1x PCIe x8 + 2x PCIe x4 to backplane (based on backplane), 1x PCIe x4 to backplane, and 4x PCI to backplane
USB	8x USB 3.0 (2 on rear I/O& 6 onboard box header) 4x USB 2.0 to backplane
LPT Port	1x LPT port via onboard box header
Audio	1x box header for audio module DB-Audio2
KB/MS	1x pin header for PS/2 keyboard& mouse

Audio

Codec	Realtek® ALC262 support by DB-Audio2 daughter board
Interface	Intel® High Definition Audio via onboard box header

Display

Graphics	Integrated Intel® HD series, based on CPU for different GPU
VGA	1x VGA on rear I/O, resolution up to 1920 x 1200@60Hz
DVI-D	1x DVI-D via onboard pin header, resolution up to 1920 x 1200@60Hz

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Ethernet

Controller	LAN1: Intel® I219LM PHY via RJ45 LAN2: Intel® I225-V via RJ45
Interface	PCIe x1 bus
iAMT	Support iAMT 11
Wake On LAN	Support on LAN1

Manageability

SEMA	SEMA support with BMC SEMA Cloud

Mechanical and Environmental

Form Factor	Full-sized PICMG® 1.3 system host board
Dimensions	338 mm x 126 mm (L x W)
Operating Temperature	0 to 60°C
Storage Temperature	-40 to 80°C
Certification	CE & FCC Class A
Relative Humidity	5% to 95%, non-condensing

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1.4 Block Diagram

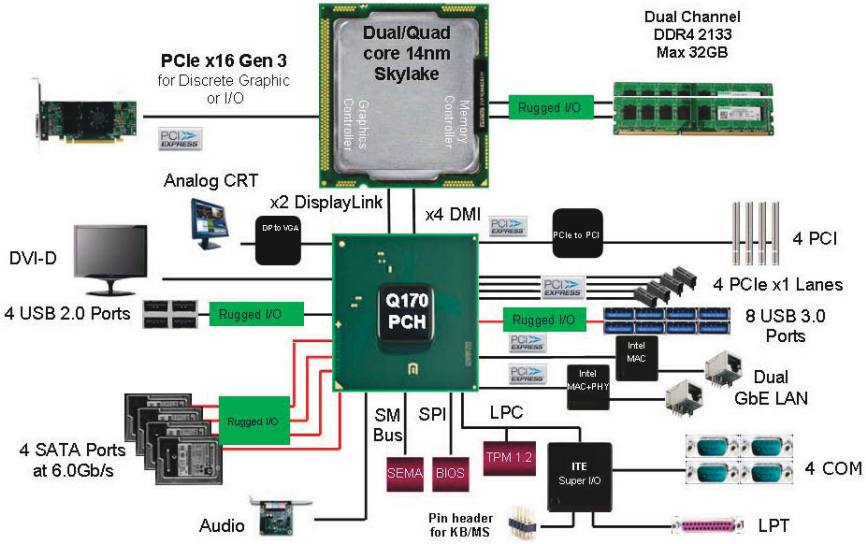


Figure 1-1: NuPRO-E43 Block Diagram

1.5 Functional Description

Processor Support

The NuPRO-E43 is PICMG 1.3 System Host Board supporting the 6th Generation Intel® Core™ processor family (Intel® Core™ i7/ i5/i3) in LGA1151 socket. An integrated memory controller supports dual channel DDR4 and Intel® HD Graphics is integrated onboard the CPU. The CPU provides a PCI Express x16 for external graphics or expansion. Direct Media Interface (DMI) and Flexible Display Interface (FDI) provide connectivity to the Intel® Q170 Express Chipset.

Intel® Q170 Express Chipset

The Intel® Q170 Platform Controller Hub (PCH), with the processor, provides a compact yet powerful 2-chip solution, with Direct Media Interface (DMI) chip-to-chip connection between the pro-

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cessor and PCH and Intel Flexible Display Interface transmitting display traffic from processor-based integrated graphics to the legacy display connectors in the PCH, including PCI Express, SATA 6 Gb/s, USB 3.0, LPC and SPI.

Dual-Channel DDR4 Memory

To meet the requirements of memory-intensive applications, NuPRO-E43 dual-channel memory architecture supports DDR4 2133 MHz DIMMs, which delivers higher bandwidth and increased performance with lower power consumption than DDR3.

Gigabit Ethernet

The NuPRO-E43 utilizes an Intel® I219LM Gigabit Ethernet PHY and Intel® I211-AT Gigabit Controller connected to the PCI-E bus of the Q170 PCH, with Intel® AMT 11 (I219LM on LAN1), Wake-on-LAN, and PXE supported.

Serial ATA

The NuPRO-E43 provides four Serial ATA ports with data transfer rates of up to 6.0 GB/s. Intel® Rapid Storage Technology supports AHCI and RAID 0/1/5/10 functionality.

Universal Serial Bus (USB 2.0/3.0)

The NuPRO-E43 provides 4 USB 2.0 ports (backplane) supporting transfer rates up to 480 Mb/s and 8 USB 3.0 ports (2x on rear panel, 6x on SHB) supporting transfer rates up to 5 Gb/s. All ports are USB 2.0/1.1 compatible.

Hardware Monitoring

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

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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-E43 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.

Intel® Active Management Technology

Intel® Active Management Technology (Intel® AMT) is hardware-based technology for remotely managing and securing PCs out-of-band. Intel® AMT includes hardware-based remote management, security, power-management, and remote-configuration features. Intel® AMT allows remote access to a system when traditional techniques and methods are not available.

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1.6 Schematics and Dimensions

NOTE:

All dimensions shown are in mm (millimeters).

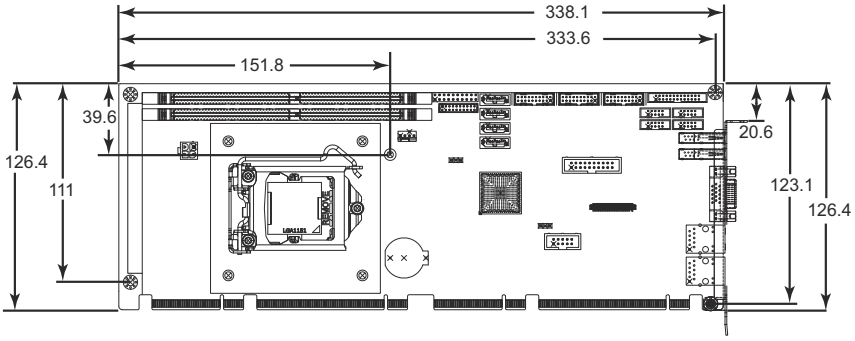


Figure 1-2: Board Dimensions

1.7 I/O Connectivity

I/O	Bracket	Onboard	Edge Connector	Remarks
VGA	Y	—	—	DB-15
DVI-D	—	Y	—	Cable w/ bracket optional
LAN1/2 (RJ-45)	Y	—	—	Act/Link/ Speed LEDs
PS/2 KB/MS	—	Y	—	Cable w/ bracket optional
USB rear panel	2	—	—	USB 3.0
USB 3.0 headers	—	6	—	Cable w/ bracket optional
USB backplane	—	—	4	USB 2.0
COMA-D	—	Y	—	2.00” pitch

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I/O	Bracket	Onboard	Edge Connector	Remarks
SATA	—	4	—	—
PCIe x4	—	—	Y	—
PCIe x16	—	—	Y	—
PCI 32bit/33MHz	—	—	Y	via ITE IT8892

Table 1-1: NuPRO-E43 I/O Connectivity

1.8 Rear Panel I/O Ports

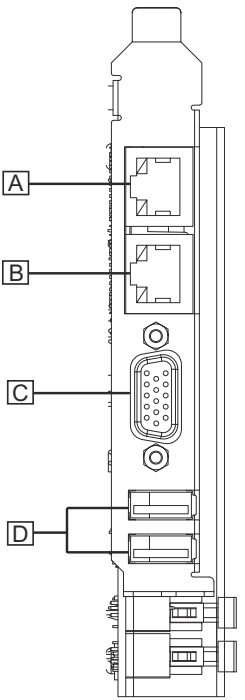


Figure 1-3: Rear Panel I/O Ports

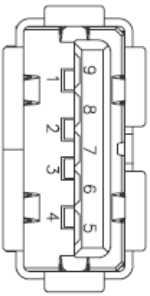
	Connector	Description
A	LAN1 (RJ-45)	Gigabit Ethernet (supports Intel® AMT)
B	LAN2 (RJ-45)	Gigabit Ethernet

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	Connector	Description
C	VGA	DB-15 connector for CRT or LCD monitor
D	USB 3.0 x2	SuperSpeed USB 3.0 ports

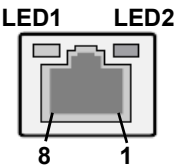
Table 1-2: Rear Panel I/O Legend

USB 3.0 Connectors



Pin #	Signal Name
1	USB3.0_P5VA
2	USB2_CMAN
3	USB2_CMAP
4	GND
5	USB3A_CMRXN
6	USB3A_CMRXP
7	GND
8	USB3A_CMTXN
9	USB3A_CMTXP

LAN (RJ-45) Ports



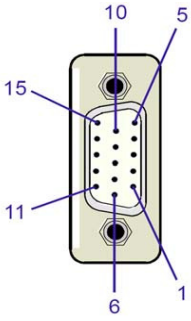
Pin #	10BASE-T/ 100BASE-TX	1000BASE-T
1	TX+	BI_DA+
2	TX-	BI_DA-
3	RX+	BI_DB+
4	--	BI_DC+
5	--	BI_DC-
6	RX-	BI_DB-
7	--	BI_DD+
8	--	BI_DD-

LED1		LED2	
Status	**Description**	**Status**	**Description**
Off	No Link	Off	10 Mb connection

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LED1		LED2	
On	Linked	Green	100 Mb connection
Blinking	Data Activity	Amber	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		

1.9 Board Layout

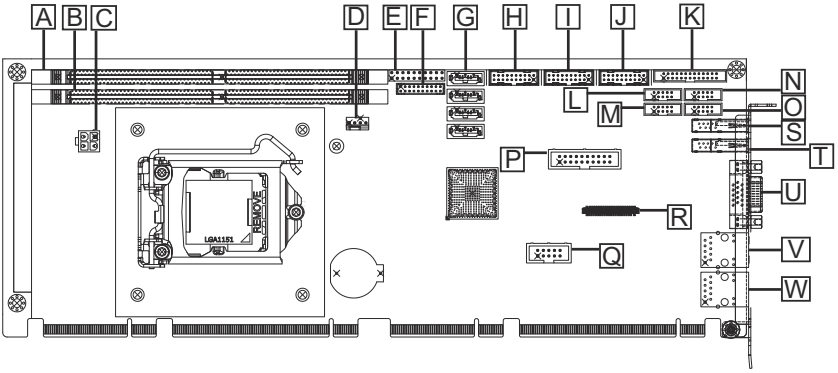


Figure 1-4: Board Layout

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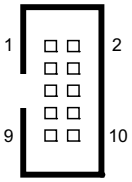
	Connector	Description
A	CN40	DIMM B0
B	CN39	DIMM A0
C	CN36	Power 4-pin (ATX 12V)
D	FAN1	Fan1(CPU fan)
E	CN35	USER (system panel pin header)
F	CN34	DVI (DVI-D)
G (Top down)	CN30 CN31 CN32 CN33	SATA #0 SATA #1 SATA #2 SATA #3
H	CN26	USB3.0 #3/4
I	CN27	USB3.0 #5/6
J	CN28	USB3.0 #7/8
K	CN22	LPT
L	CN9	COM C
M	CN10	COM D
N	CN8	COM A
O	CN7	COM B
P	CN17	TPM
Q	CN5	Audio
R	CN20	DB40
Rear Side Mounted		
S	CN24	USB3.0#1
T	CN25	USB3.0#2
U	CN1	D-SUB
V	CN4	I211 LAN
W	CN3	I219 LAN

Table 1-3: Board Layout Legend

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1.10 Onboard Connectors

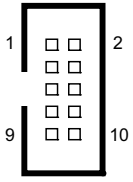
COMA to D Connector (RS-232) (CN7/8/9/10)



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

	COMA (COM2)	COMB (COM1)	COMC (COM3)	COMD (COM4)
Connector	CN8	CN7	CN9	CN10
Pitch	2.00 mm	2.00 mm	2.00 mm	2.00 mm

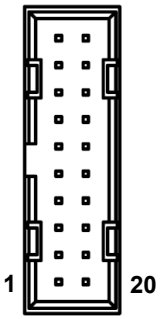
COMA to B Connector (RS-422/485) (CN7/8)



Pin #	RS-422	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

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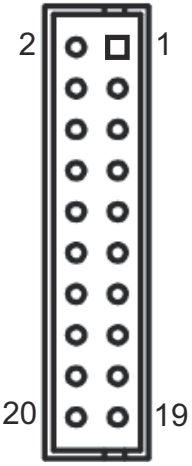
USB 3.0 Connectors (CN26/27/28)



Pin #	Signal	Pin #	Signal
1	P5V_USB3B	20	NC
2	S_USB3_RN3_R	19	P5V_USB3B
3	S_USB3_RP3_R	18	S_USB3_RN4_R
4	GND	17	S_USB3_RP4_R
5	S_USB3_TN3_R	16	GND
6	S_USB3_TP3_R	15	S_USB3_TN4_R
7	GND	14	S_USB3_TP4_R
8	S_USB2_N2_R	13	GND
9	S_USB2_P2_R	12	S_USB2_N3_R
10	S_USB_OC1#	11	S_USB2_P3_R

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DVI-D Onboard Connector(CN34)

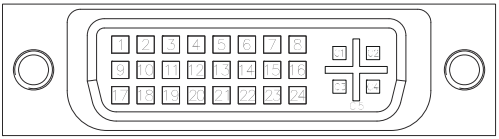


Pin #	Signal
1	GND
2	GND
3	TMD_CKP
4	TMD_N2
5	TMD_CKN
6	TMD_P2
7	GND
8	GND
9	TMD_SCL
10	TMD_N1
11	TMD_SDA
12	TMD_P1
13	GND
14	GND
15	TMD_HPD
16	TMD_N0
17	+5V_PSU_DVI
18	TMD_P0
19	GND
20	GND

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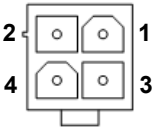
DVI-D Bracket Connector

(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 -

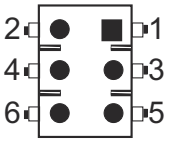
ATX 12V Power Connector (CN36)



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

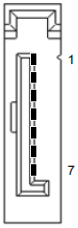
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PS/2 Keyboard/Mouse Pin Header (CN37)



Pin #	Signal
1	KBCLK_R
2	KBDATA_R
3	MSCLK_R
4	MSDATA_R
5	GND
6	KM_VCC

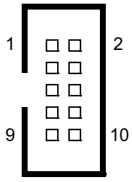
Serial SATA Connectors (CN30~33)HD Audio Daughter



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

Board Connector (CN5)

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

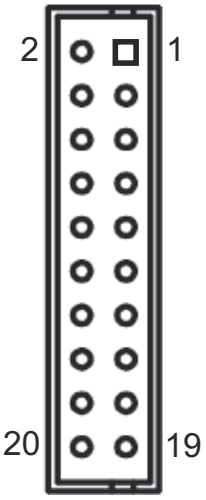


Pin #	Signal	Function
1	GND	Ground
2	AUD_BCLK	Audio Clock
3	GND	Ground
4	ICH_AUD_SDIN1	Audio Data Input
5	P5V	+ 5V
6	ICH_AUD_SDOUT	Audio Data Output
7	P5V_AUD	+ 5V
8	P3V3_DVDD	3.3V
9	AUD_SYNC	Audio Synchronous
10	AUD_RSTJ	Audio Reset

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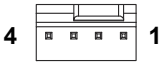
System Panel Connector (CN35)

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



Pin #	Signal
1	GND
2	SPKR
3	RSTBTN
4	NC
5	NC
6	NC
7	GND
8	+5V_PSU
9	PWRBTN
10	NC
11	NC
12	GND
13	NC
14	KEYLOCK
15	HLED
16	PLED
17	HLED_POWER
18	NC
19	NC
20	+5V_PSU

Fan Connector (FAN1)



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

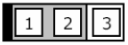
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1.11 Jumpers & Switches

Clear CMOS Jumper (CN41)

To clear the BIOS settings (RTC RST#):

1. Power down and disconnect power from the system.
2. Short pins 2-3 on CN41.
3. Reconnect power and power up the system.
4. Wait 3 seconds or more.
5. Power down and disconnect power from the system.
6. Re-short pins 1-2, and power up the system..

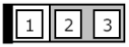
CMOS Status	Connection	CN41
Normal	1 – 2	
Clear CMOS	2 – 3	

Clear RTC Jumper (CN42)

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

1. Power down and disconnect power from the system.
2. Short pins 2-3 on CN42.
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	CN42
Normal	1 – 2	
Clear CMOS	2 – 3	

To clear CMOS, clear both CMOS and RTC jumpers at the same time.

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2 Getting Started

2.1 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-E43
- SATA data cable with latch (x2)
- 2-port USB 3.0 cable with bracket (2.0 mm pitch)
- 2-port COM cable with bracket (2.0 mm pitch)
- Printer port cable with bracket (2.0 mm pitch)



The NuPRO-E43 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.

2.2 Installing the CPU

The NuPRO-E43 supports an Intel® Core™ i7/i5/i3 or Pentium® processor in an LGA1151 socket.

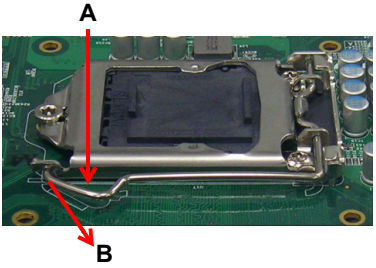


- Disconnect all power to the board before installing a CPU to prevent damaging the board and CPU.
- Do not touch socket contacts. Damaging the contacts voids the product warranty. Follow the installation instructions carefully to avoid damaging the board components.

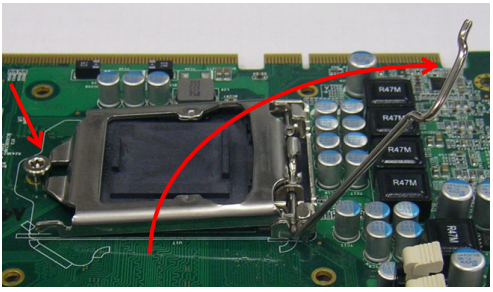
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To install the CPU:

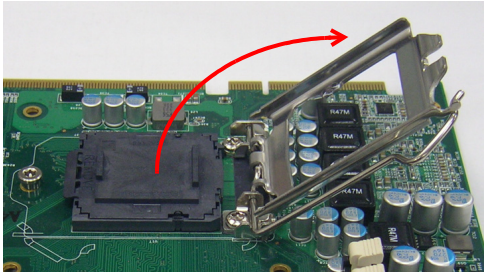
1. Press down on the locking arm (A), then push it away from the socket to disengage it from the retention tab (B).



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

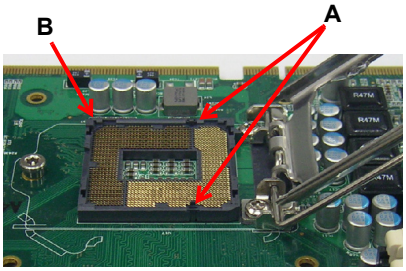


3. Lift the load plate to uncover the socket.



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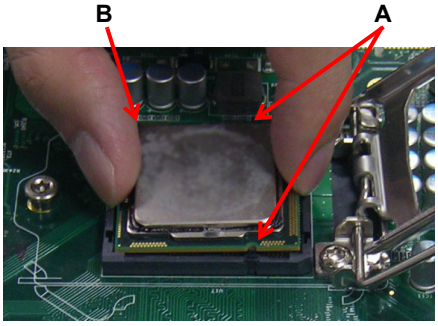
4. Remove the plastic protective cover from the socket. Note the locations of the alignment keys (A) and Pin 1 indicator (B).



WARNING:

Do NOT touch socket contacts.

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).

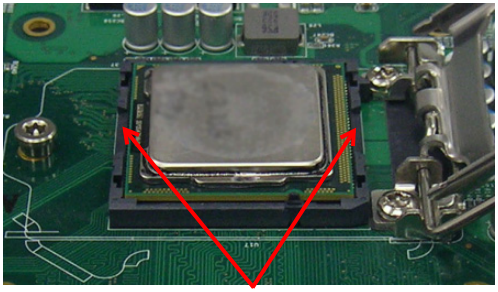


WARNING:

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

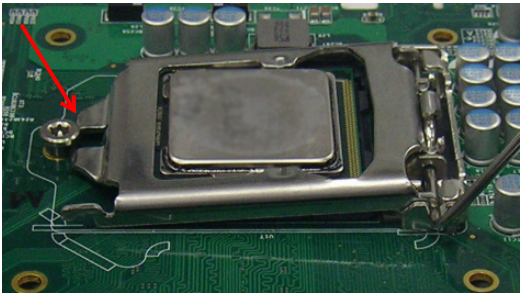
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Carefully place the CPU into the socket vertically. The socket has cutouts for your fingers to fit into.

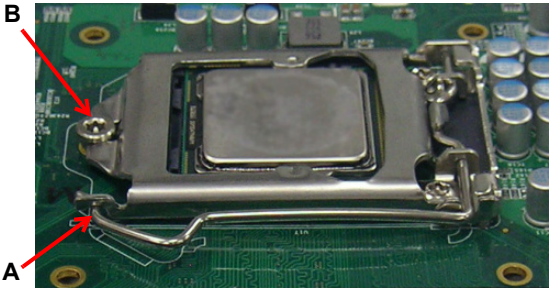


Cutouts

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



7. 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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2.3 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..

If 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.

2.4 Installing Memory Modules

The NuPRO-E43 supports up to 32 GB of DDR4 2133 MHz memory on two DIMM sockets. DDR4 modules have a 288-pin footprint compared to DDR3's 240-pin DIMM.



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

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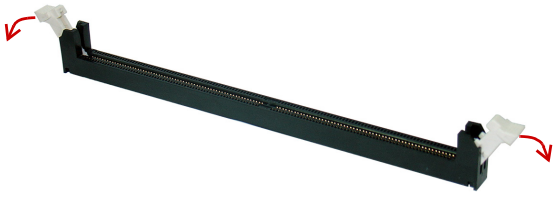
Memory Configuration Options

4GB, 8GB, and 16GB unbuffered non-ECC DDR4 DIMM are supported in the following configurations.

- Channel A: DIMMA0
  Channel B: DIMMB0
- For dual-channel configuration, the total size of memory module installed per channel must be the same (DIMMA0 = DIMMB0).
- 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.

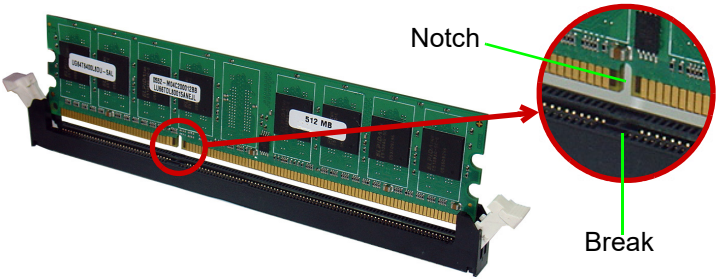
To install a memory module:

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

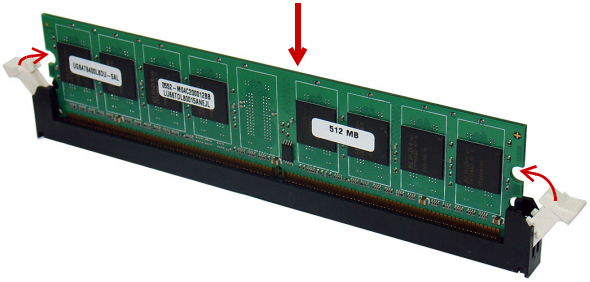


3. Align the memory module on the socket making sure that the notch matches the break on the socket.

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



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2.5 Driver Installation

Download requisite drivers, as follows, for your system from http://www.adlinktech.com and install.

- Chipset
- Display
- Ethernet
- Rapid Storage
- USB 3.0
- Management Engine



In order to enable RAID or AHCI mode, you must pre-install the Intel® Rapid Storage Technology driver during the Windows* installation process. using the F6 installation method.
*Not required for Windows Vista and Windows 7.

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Appendix A BIOS Setup

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

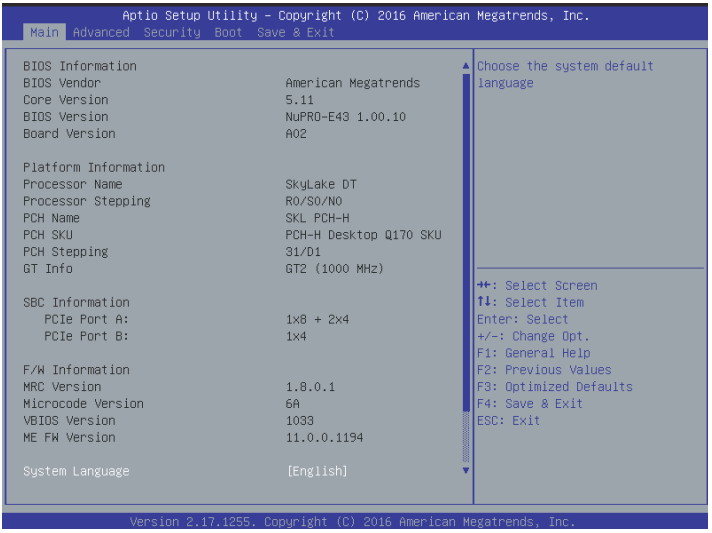
A.1 Entering the BIOS

To enter the setup screen, follow these steps:

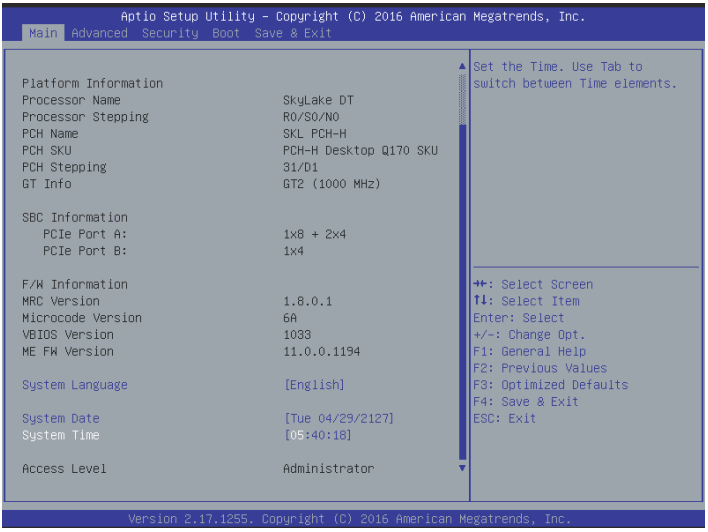
1. Power on the motherboard
2. Press < Delete > when the prompt appears:

A.2 Main Menu

When UEFI Setup is started, the Main menu appears, displaying the system overview.



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System Language

Selects the default system language.

System Date

Sets the date. Use Tab to switch between date elements.

System Time

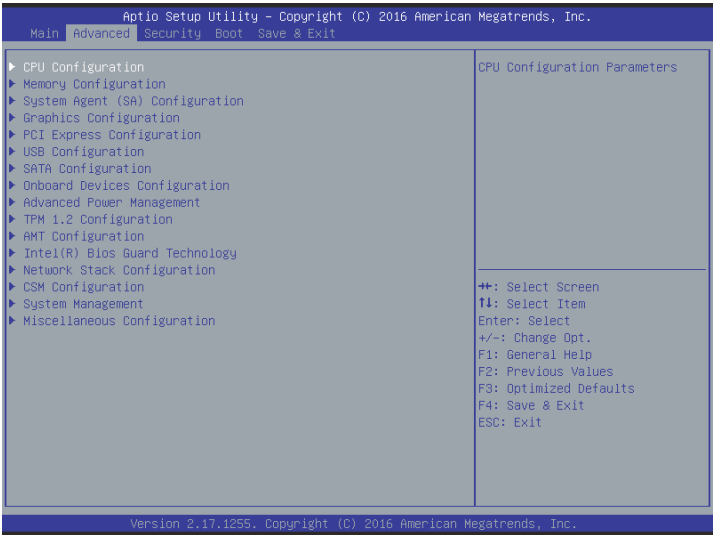
Sets the time. Use Tab to switch between time elements.

A.3 Advanced Menu

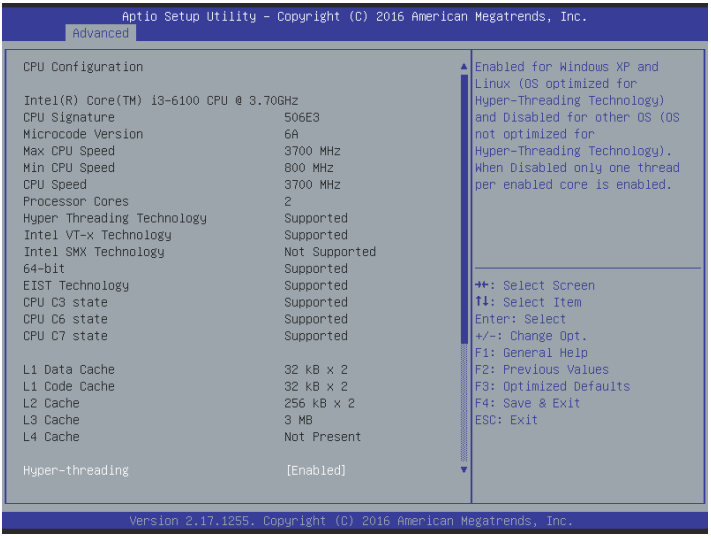
Accesses CPU Configuration, Memory Configuration, System Agent (SA) Configuration, Graphics Configuration, PCI Express Configuration, USB Configuration, SATA Configuration, Onboard Device Configuration, Advance Power Management, TPM 1.2 Configuration, AMT Configuration, Intel® Bios Guard Technology,

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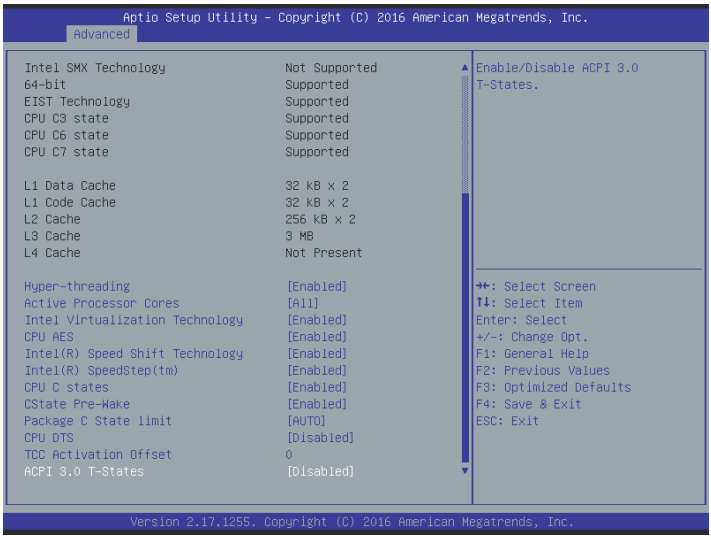
Network Stack Configuration, CSM Configuration, System Management, Miscellaneous Configuration.



A.3.1 CPU Configuration



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Hyper-threading

(Appears if CPU supports Hyper Threading)

Enabled for Windows and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology). When Disabled only one thread per enabled core is enabled.

Active Processor Cores

Number of cores to be enabled in each processor package.

Intel Virtualization Technology

When enabled, VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

CPU AES

Enables/disables CPU Advanced Encryption Standard instructions

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Intel® Speed Shift Technology

Enables/disables Intel® Speed Shift Technology support. Enabling displays the CPPC v2 interface to allow hardware controlled P-states.

Intel® SpeedStep™

Allows more than two frequency ranges to be supported.

Turbo Mode

Enables/disables Turbo Mode.

CPU C states

Enables/disables CPU C states

CState Pre-Wake

Disable sets bit 30 of POWER_CTL MSR(0x1FC) to 1 to disable the Cstate Pre-Wake.

Package C State limit

Package C State limit

CPU DTS

Disabled: ACPI thermal management uses EC reported temperature values.

Enabled: ACPI thermal management uses DTS SMM mechanism to obtain CPU temperature values.

Out of Spec: ACPI Thermal Management uses EC reported temperature values and DTS SMM is used to handle Out of Spec condition.

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TCC Activation Offset

Offset from the factory TCC activation temperature.

ACPI 3.0 T-States

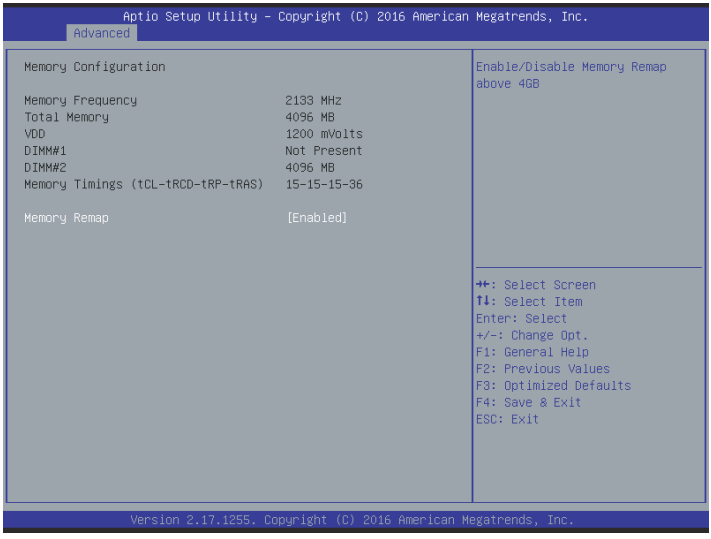
Enables/disables ACPI 3.0 T-States.

Intel TXT(LT) Support

Enables or Disables Intel® TXT(LT) support.

A.3.2 Memory Configuration

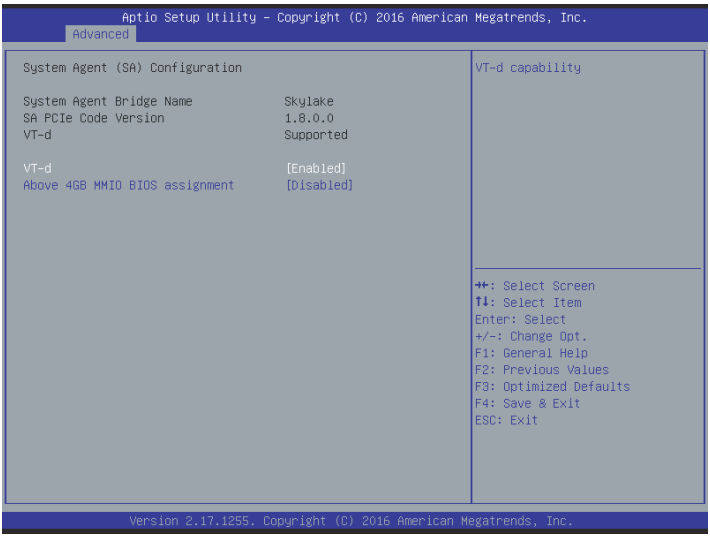
Memory Remap



Enables/disables Memory Remap above 4GB.

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A.3.3 System Agent (SA) Configuration



VT-d

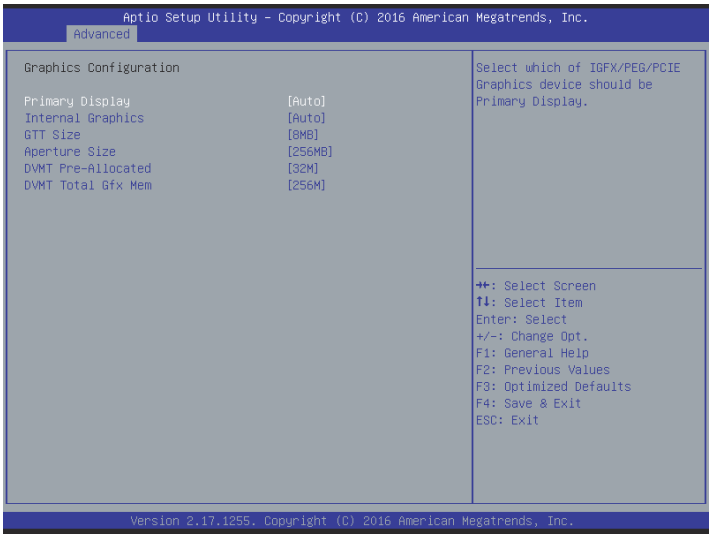
Enables VT-d capability

Above 4GB MMIO BIOS assignment

Enables/disables Memory MappedIO BIOS assignment over 4GB, disabled automatically when Aperture Size is set to 2048MB.

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A.3.4 Graphics Configuration



Primary Display

Sets the Primary Display from among IGFX/PEG/PCIE.

Internal Graphics

Keeps IGFX enabled based on the setup options.

GTT Size

Sets GTT size.

Aperture Size

Sets Aperture size.

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NOTE:

Above 4GB MMIO BIOS assignment is automatically enabled when a 2048MB aperture is set; to use, disable CSM Support.

DVMT Pre-Allocated

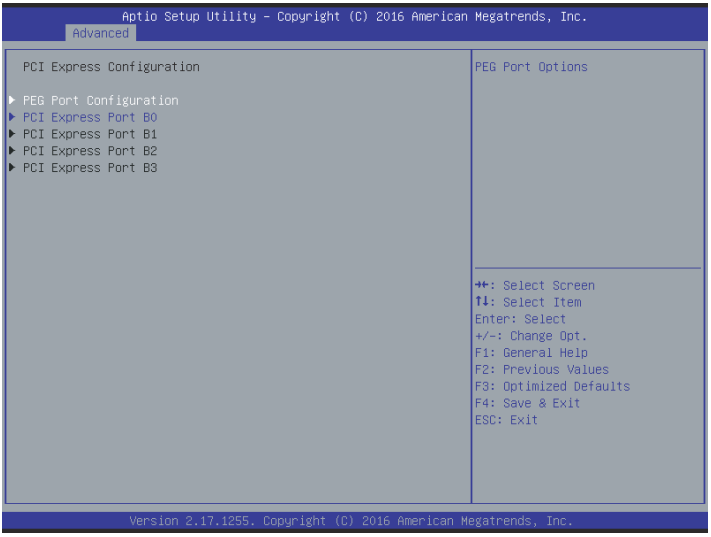
Sets DVMT 5.0 Pre-Allocated (Fixed) graphics memory size used by the internal graphics device.

DVMT Total Gfx Mem

Sets DVMT5.0 total graphic memory size used by the internal graphics device.

A.3.5 PCI Express Configuration

PCI Express port allocation B0 to B3 depends on backplane design, whether 1x4 or 4x1.



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A.3.5.1 PEG Port Configuration



Peg 1

Max Link Speed

Sets PEG 1 maximum speed, from among Auto, Gen1, Gen2, and Gen3.

Max Payload size

(Appears if a PEG 1 device is present)

Sets PEG 1 maximum payload size, from Auto (Default Device Capability) or forced to 128/256 bytes.

Peg 2

Max Link Speed

Sets PEG 2 maximum speed, from among Auto, Gen1, Gen2, and Gen3.

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Max Payload size

(Appears if a PEG 2 device is present)

Sets PEG 2 maximum payload size, from Auto (Default Device Capability) or forced to 128/256 bytes.

Peg 3

Max Link Speed

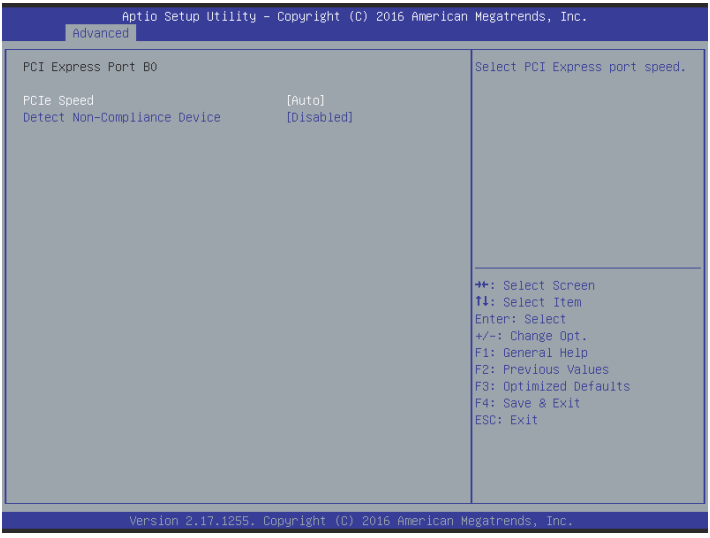
Sets PEG 3 maximum speed, from among Auto, Gen1, Gen2, and Gen3.

Max Payload size

(Appears if a PEG 3 device is present)

Sets PEG 3 maximum payload size, from Auto (Default Device Capability) or forced to 128/256 bytes.

A.3.5.2 PCI Express Ports B0 to B3



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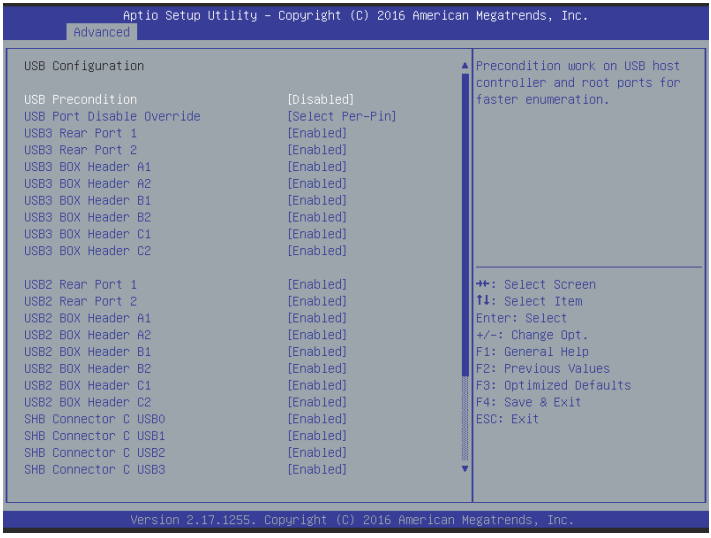
PCIe Speed

Sets PCI Express port speed from among Auto, Gen1, Gen2, and Gen3.

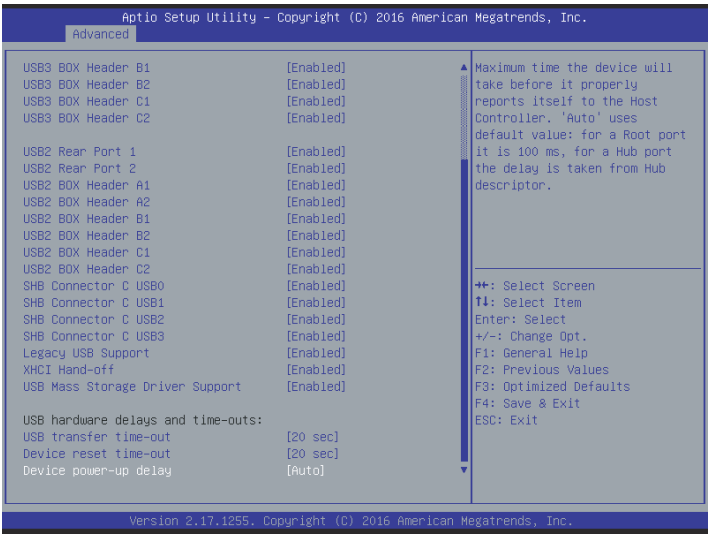
Detect Non-Compliance Device

Detects non-compliant PCI Express device. If enabled, increases POST duration.

A.3.6 USB Configuration



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USB Precondition

Presets USB host controller and root ports for faster enumeration.

USB Port Disable Override

Selectively enables/disables the corresponding USB port from reporting a device connection to the controller.

USB3 Rear Port 1 to USB3 Rear Port 2

Enables/disables port.

USB3 BOX Header A1 to USB3 BOX Header A2

Enables/disables port.

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USB3 BOX Header B1 to USB3 BOX Header B2

Enables/disables port.

USB3 BOX Header C1 to USB3 BOX Header C2

Enables/disables port.

USB2 Rear Port 1 to USB2 Rear Port 2

Enables/disables port.

USB2 BOX Header A1 to USB2 BOX Header A2

Enables/disables port.

USB2 BOX Header B1 to USB2 BOX Header B2

Enables/disables port.

USB2 BOX Header C1 to USB2 BOX Header C2

Enables/disables port.

SHB Connector C USB0 to SHB Connector C USB3

Enables/disables port.

Legacy USB Support

Enables Legacy USB support.

AUTO disables legacy support if no USB devices are connected, DISABLE maintains USB device availability only for EFI applications.

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XHCI Hand-off

For OS without XHCI hand-off support, with XHCI ownership change claimed by XHCI driver.

USB Mass Storage Driver Support

Enables/disables USB Mass Storage Driver Support.

USB transfer timeout

Sets timeout value for Control, Bulk, and Interrupt transfers, from among 1, 5, 10, and 20 sec.

Device reset timeout

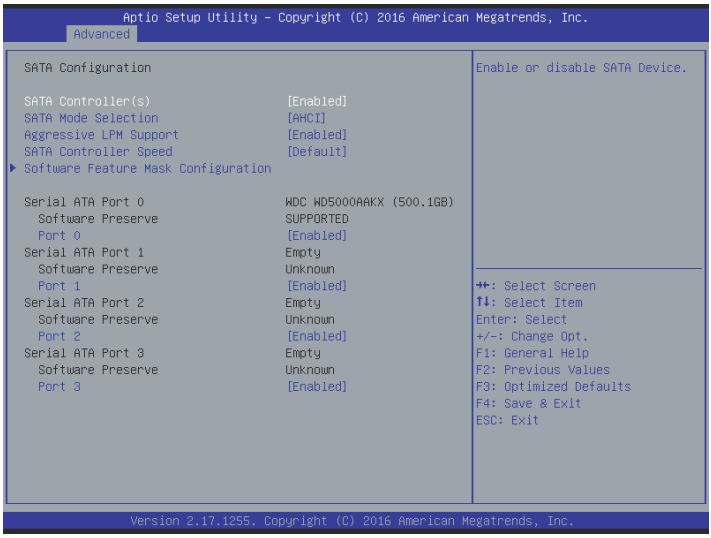
Sets USB mass storage device Start Unit command timeout, from among 10, 20, 30, and 40 sec.

Device power-up delay

Sets the maximum time before the device reports itself to the Host Controller, with Auto using a default Root port value of 100 ms with Hub port delay obtained from the Hub descriptor, and Manual delay range set from 1 to 40 seconds in one second increments.

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A.3.7 SATA Configuration



SATA Controller(s)

Enables/disables SATA Device.

SATA Mode Selection

Determines how SATA controller(s) operate.

Alternate ID

(Appears if SATA is in RAID mode)

Reports alternate device ID.

Aggressive LPM Support

Enables PCH to aggressively enter a link power state.

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SATA Controller Speed

Sets the maximum speed the SATA controller can support, from among Default, Gen1, Gen2, and Gen3.

Port 0 to Port 3

Enables/disables SATA port.

A.3.7.1 Software Feature Mask Configuration



RAID0

Enables/disables RAID0 feature.

RAID1

Enables/disables RAID1 feature.

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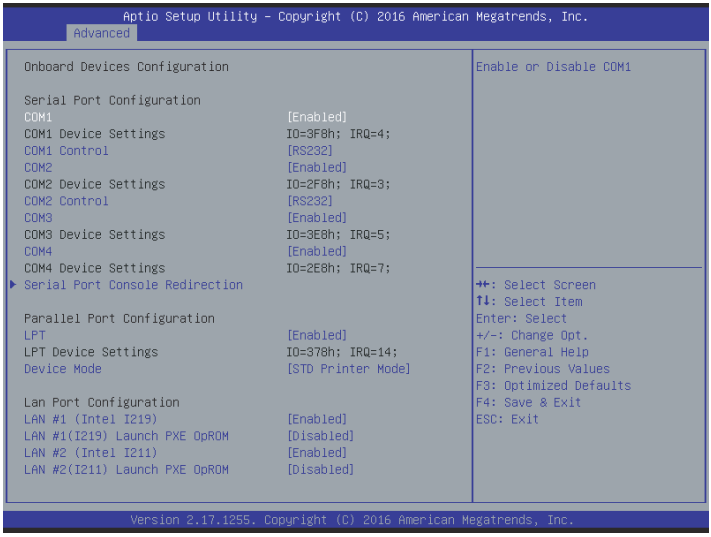
RAID10

Enables/disables RAID10 feature.

RAID5

Enables/disables RAID5 feature.

A.3.8 Onboard Device Configuration



COM1 to COM4

Enables/disables individual COM ports.

COM1 Control

Sets COM1 mode from among RS232, RS422, and RS485.

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COM2 Control

Sets COM2 mode from among RS232, RS422, and RS485.

LPT

Enables/disables LPT.

Device Mode

Sets Printer port mode from among STD Printer Mode, SPP Mode, EPP-1.9 and SPP Mode, EPP-1.7 and SPP Mode.

LAN #1 (Intel I219)

Enables/disables LAN #1.

LAN #1(I219) Launch PXE OpROM

Enables/disables Boot Option for Legacy Network Devices.

LAN #2 (Intel I211)

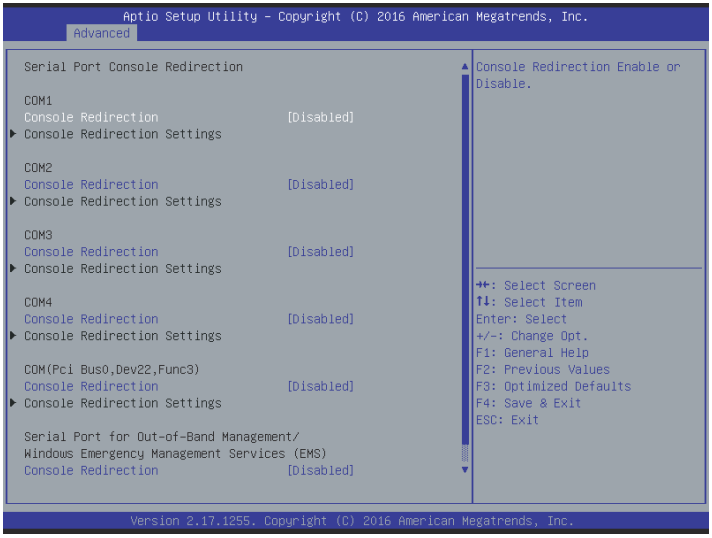
Enables/disables LAN #2.

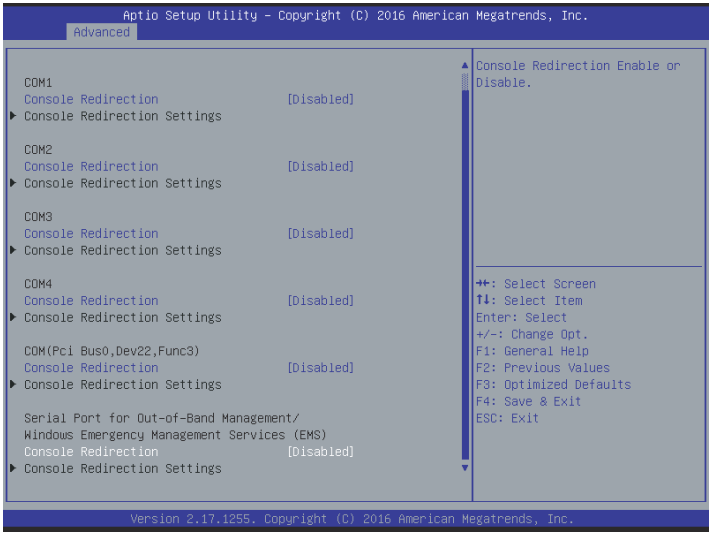
LAN #2(I211) Launch PXE OpROM

Enables/disables Boot Option for Legacy Network Devices.

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A.3.8.1 Serial Port Console Redirection





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Console Redirection

Enables/disables console redirection.

Console Redirection Settings

(Depends on Console Redirection setting))

Specify how the host computer and the remote console computer (in use) exchange data. Both computers should have the same or compatible settings.

COM1 Console Redirection Settings

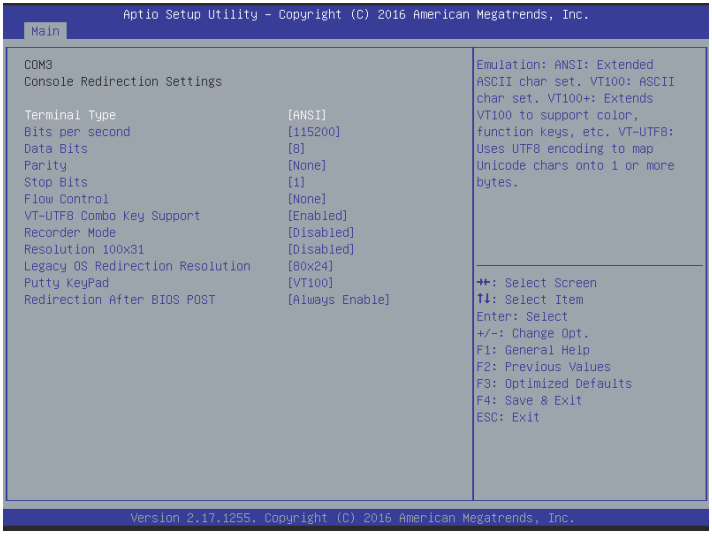


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COM2 Console Redirection Settings



COM3 Console Redirection Settings



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COM4 Console Redirection Settings



COM (PCI) Console Redirection Settings



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Terminal Type

Emulation:.

ANSI	Extended ASCII character set
VT100	ASCII character set
VT100+	Extends VT100 to support color, function keys, etc.
VT-UTF8	UTF8 encoding maps Unicode characters onto 1 or more bytes

Bits per second

Sets serial port transmission speed, which must be matched on the other side, with long or noisy lines possibly requiring lower speeds, from among 9600, 19200, 38400, 57600, and 115200.

Data Bits

Sets data bit count, from 7 or 8.

Parity

Parity bit can be sent with the data bits to detect transmission errors.

Even	Parity bit is 0 if the 1 count in the data bits is even
Odd	Parity bit is 0 if the 1 count in the data bits is odd
Mark	Parity bit is always 1
Space	Parity bit is always 0

Mark and Space Parity do not allow error detection, and can be used as an additional data bit.

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Stop Bits

Indicate the end of a serial data packet (as opposed to a start bit indicating the beginning) with the standard setting 1 stop bit. Communication with slower devices may require more than 1 stop bit.

Flow Control

Can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a Stop signal stops the ANSI Extended ASCII character set.

VT100 ASCII character set

Enables VT-UTF8 combination key support for ANSI/VT100 terminals.

Recorder Mode

When enabled, only text is transmitted, to capture terminal data.

Resolution 100x31

Enables/disables extended terminal resolution.

Legacy OS Redirection Resolution

In legacy OS, sets the number of rows and columns supported for redirection.

Putty KeyPad

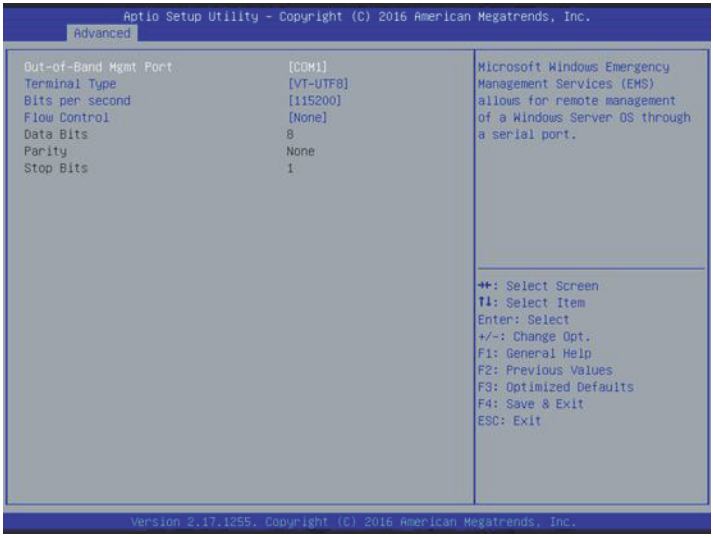
Selects FunctionKey and KeyPad on Putty, from among VT100, LINUX, XTERMR6, SCO, ESCN, and VT400.

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Redirection After BIOS POST

If BootLoader is selected, legacy console redirection is disabled before booting to the legacy OS. Default is Always Enable.

EMS Console Redirection Settings



Out-of-Band Mgmt Port

Microsoft Windows Emergency Management Services (EMS) allows remote management of Windows Server OS through a serial port, from among COM1, COM2, COM3, COM4, and COM (PCI Bus0,Dev22,Func3).

Terminal Type

VT-UTF8 is the preferred terminal type for out-of-band management, followed by VT100+ and then VT100, from among VT100, VT100+, VT-UTF8, and ANSI. See Console Redirection Settings for more about Terminal Type/Emulation.

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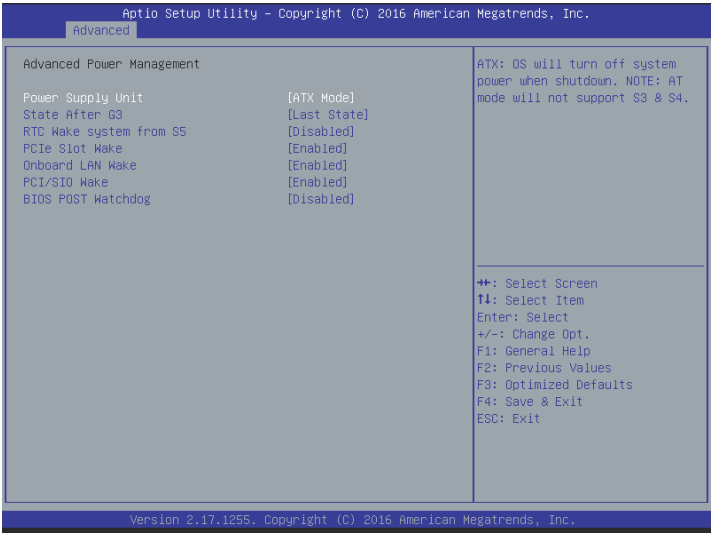
Bits per second

Sets serial port transmission speed, which must be matched on the other side, with long or noisy lines possibly requiring lower speeds, from among 9600, 19200, 57600, and 115200.

Flow Control

Can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a Stop signal stops the data flow. Once the buffers are empty, a Start signal restarts the flow. Hardware flow control uses two lines to send start/stop signals.

A.3.9 Advanced Power Management



Power Supply Unit

In ATX, the OS turns off system power when shut down.

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NOTE:

AT mode will not support S3 & S4.

State After G3

Sets the state entered when power is re-applied after a power failure (G3 state), from among Power On, Power Off, and Last State.

RTC Wake system from S5

Enables/disables system wake on alarm event, with FixedTime waking the system at specified hr::min::sec, and DynamicTime waking the system at the current time + one minute.

PCIe Slot Wake

Enables/disables PCI Express Slot wake function.

Onboard LAN Wake

Enables/disables onboard LAN wake function.

PCI/SIO Wake

Enables/disables PCI/SIO wake function.

BIOS POST Watchdog

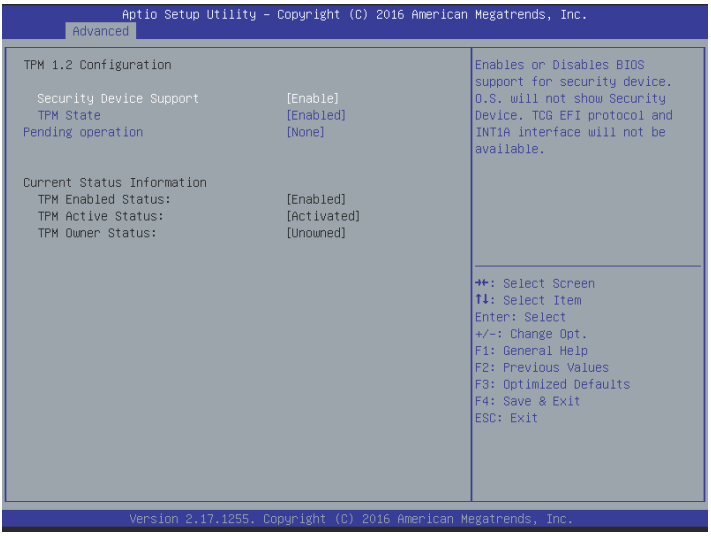
Sets watchdog timer for BIOS POST process, from among Disabled, Second Mode, and Minute Mode.

BIOS Watchdog Timer

Appears if BIOS POST Watchdog is enabled. Sets watchdog timer for BIOS POST process.

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A.3.10 TPM 1.2 Configuration



Appears if a TPM device is present.

Security Device Support

Enables/disables BIOS support for security device. When disabled, OS will not show the Security Device and TCG EFI protocol and INT1A interface will not be available.

TPM State

Enables/disables the security device.

NOTE: The computer reboots during restart to change State of the Device.

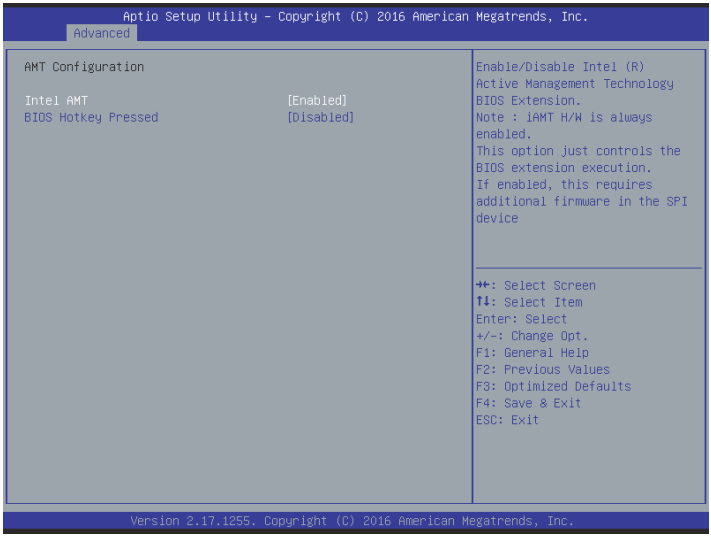
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Pending Operation

Schedules an operation for the security device.

NOTE: The computer reboots during restart to change State of Security Device.

A.3.11 AMT Configuration



Intel AMT

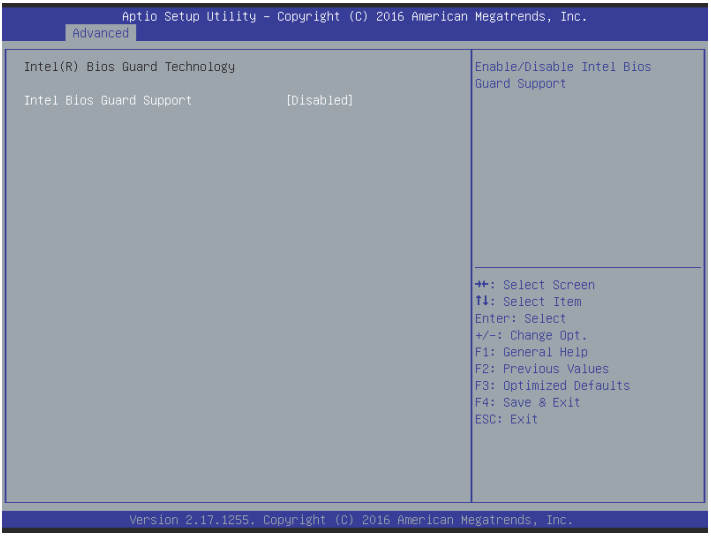
Enables/disables Intel® Active Management Technology BIOS Extension. While iAMT H/W is always enabled, this option controls the BIOS extension execution. If enabled, additional firmware is required in the SPI device.

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BIOS Hotkey Pressed

OEMFLag Bit 1: Enables/disables BIOS hotkey.

A.3.12 Intel® Bios Guard Technology

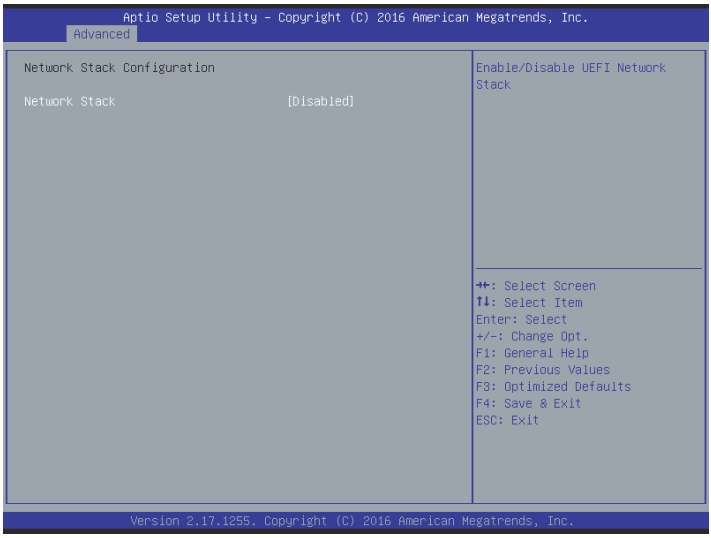


Intel® Bios Guard Support

Enables/disables Intel® BIOS Guard support.

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A.3.13 Network Stack Configuration



Network Stack

Enables/disables UEFI Network Stack.

Ipv4 PXE Support

Appears if Network Stack is enabled.

Enables Ipv4 PXE boot support, if disabled no IPV4 PXE boot option is created

Ipv6 PXE Support

Appears if Network Stack is enabled.

Enables Ipv6 PXE boot support, if disabled no IPV6 PXE boot option is created.

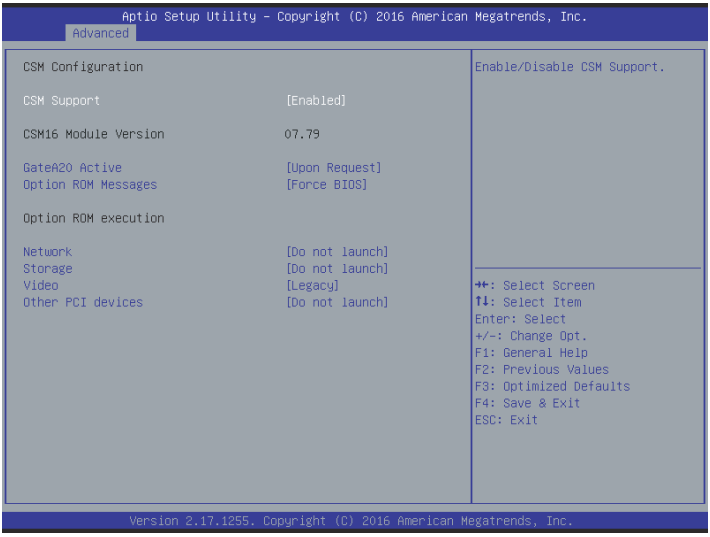
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PXE boot wait time

Appears if Network Stack is enabled.

Sets wait duration to press ESC key to abort PXE boot.

A.3.14 CSM Configuration



CSM Support

Enables/disables CSM Support.

GateA20 Active

UPON REQUEST to GA20 can be disabled using BIOS services.

ALWAYS prevents disabling GA20, useful when any RT code exceeding 1MB is executed.

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Option ROM Messages

Sets display mode for Option ROM, from Force BIOS or Keep Current.

Network

Controls execution of UEFI and legacy PXE OpROM.

Storage

Controls execution of UEFI and legacy storage OpROM.

Video

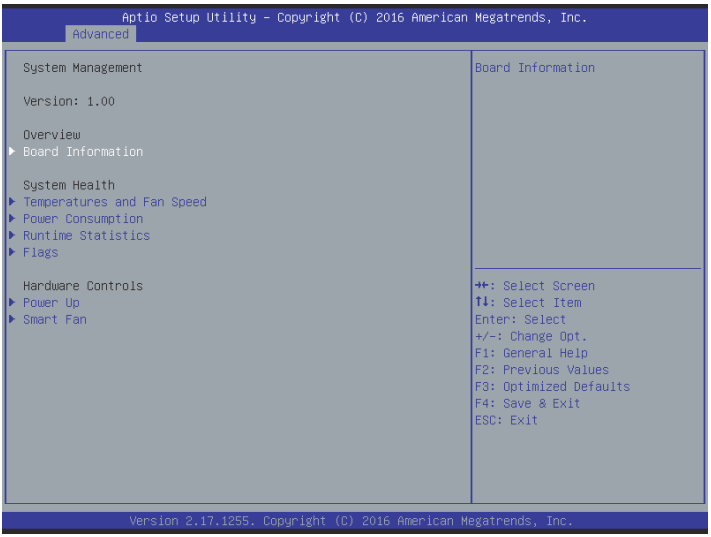
Controls execution of UEFI and legacy video OpROM.

Other PCI devices

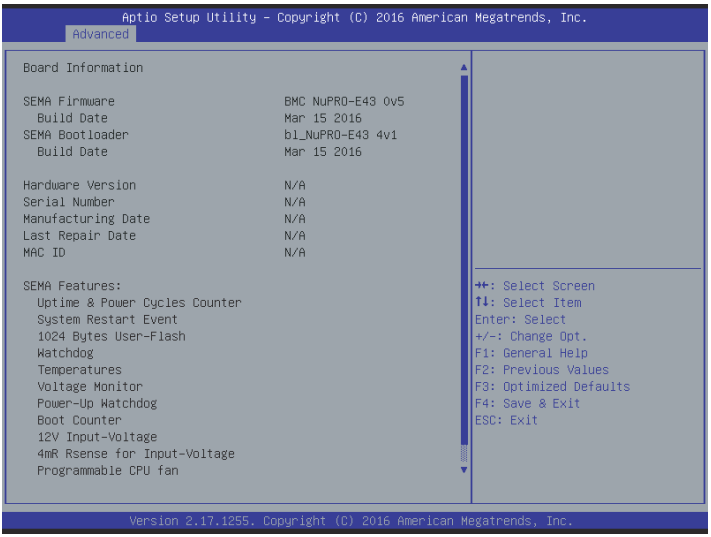
Sets OpROM execution policy for devices other than network, storage, or video.

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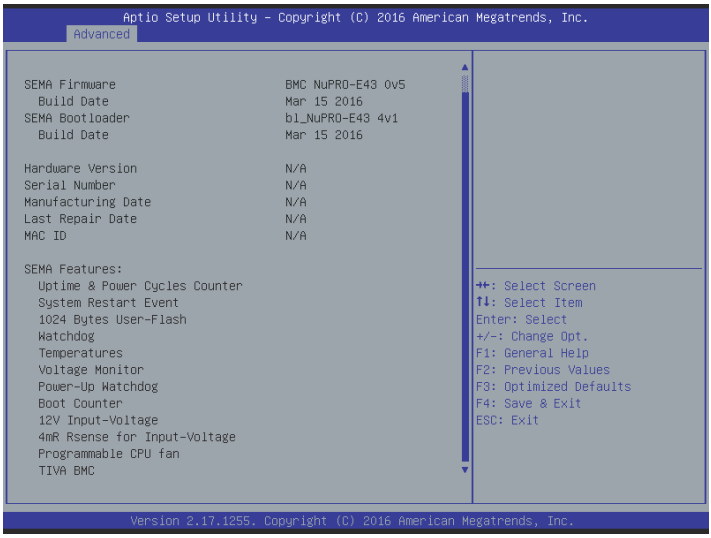
A.3.15 System Management



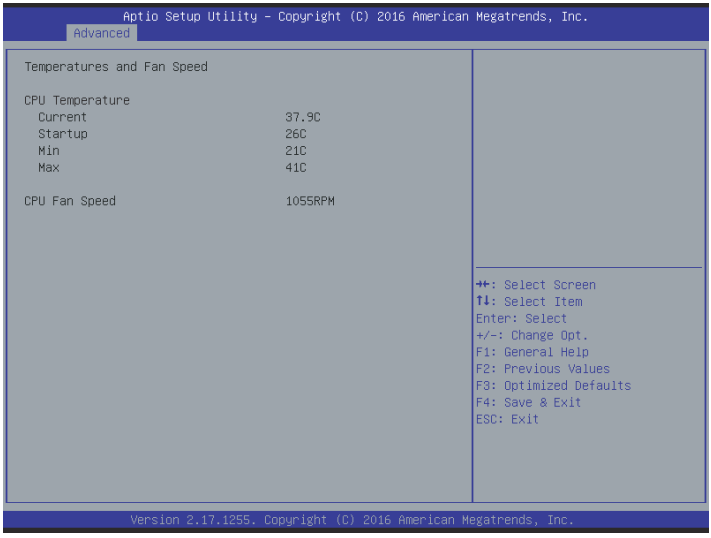
A.3.15.1 Board Information



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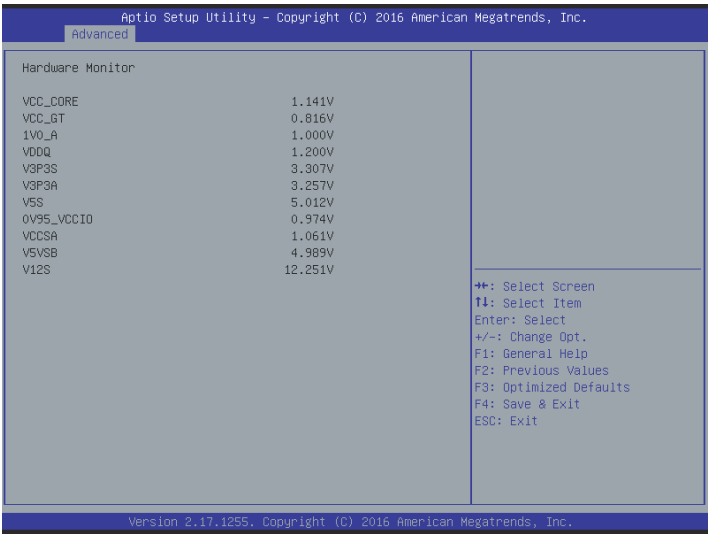


A.3.15.2 Temperatures and Fan Speed

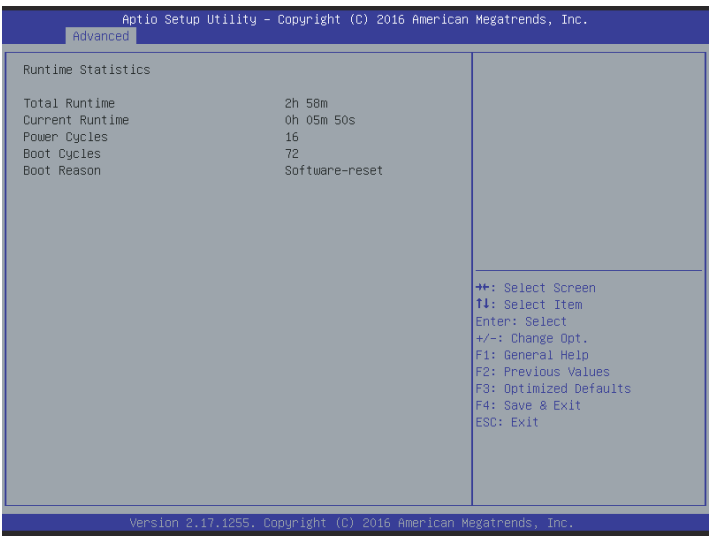


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A.3.15.3 Hardware Monitor

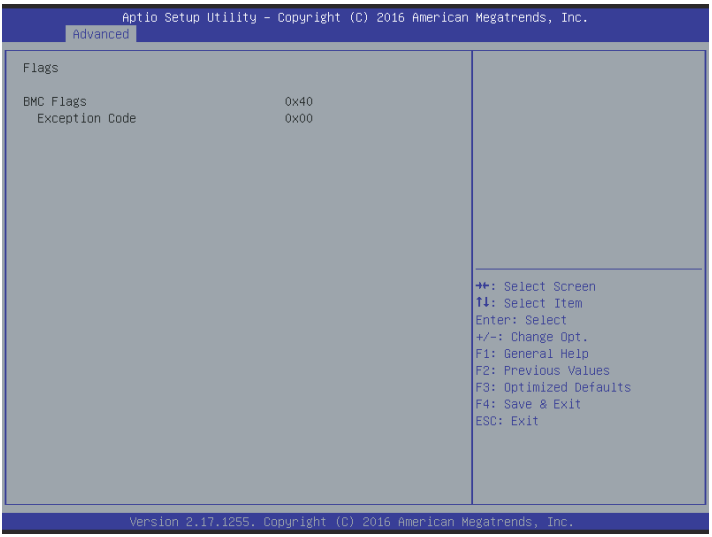


A.3.15.4 Runtime Statistics

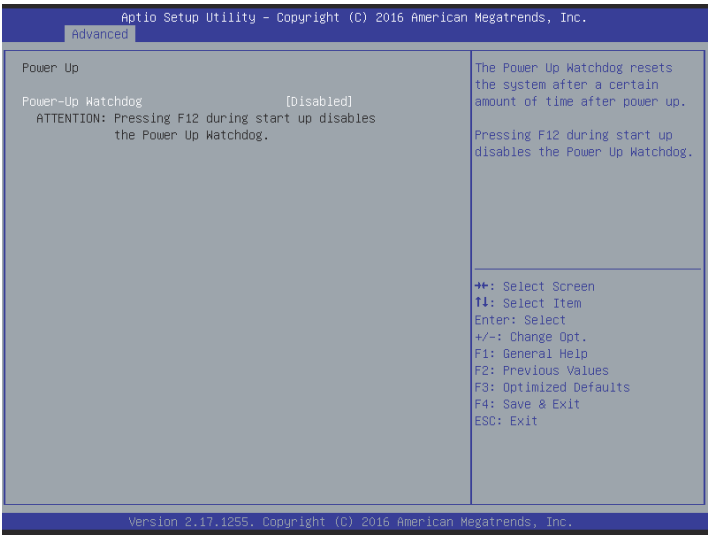


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A.3.15.5 Flags



A.3.15.6 Power Up



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Power-Up Watchdog

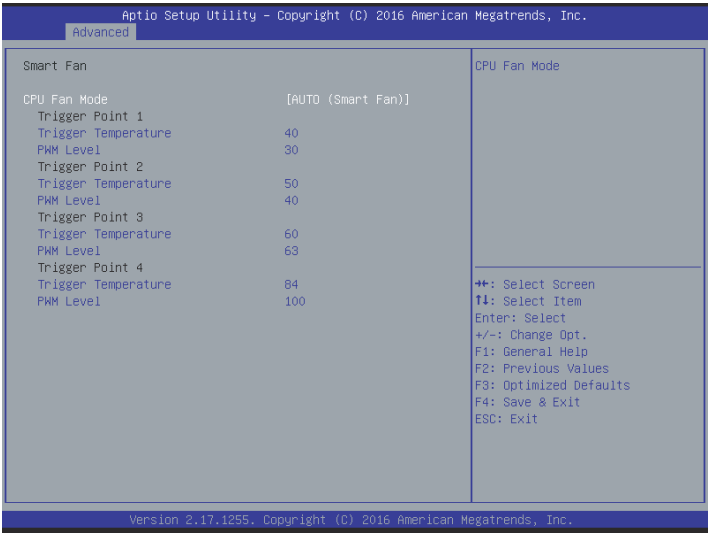
Enables/disables the Power-Up Watchdog, which resets the system a set time after power up.

Timeout

Appears if Power-Up Watchdog is enabled.

Sets the time before the Power Up Watchdog resets the system, from between 24 and 65535.

A.3.15.7 Smart Fan



CPU Fan Mode

Sets CPU fan operation, from among AUTO (Smart Fan), Fan Off, and Fan On.

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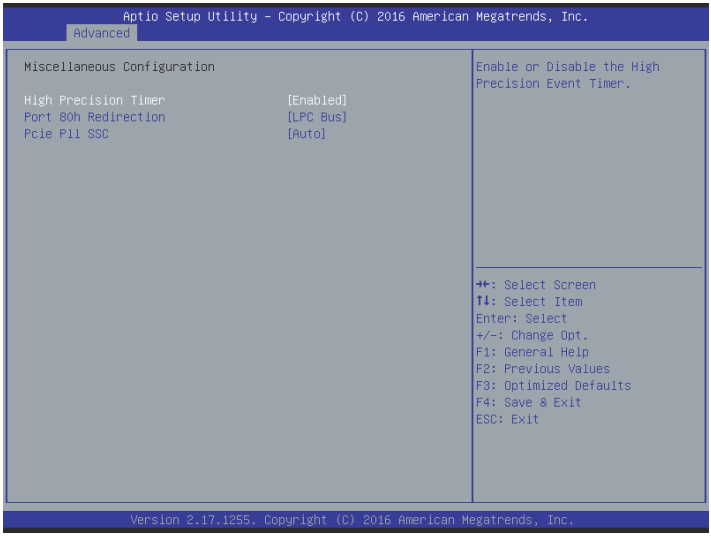
Trigger Temperature

From 0 to 100°C.

PWM Level

From 0 to 100kHz.

A.3.16 Miscellaneous Configuration



High Precision Timer

Enables/disables High Precision Event timer.

Port 80h Redirection

Sets destination for Port 80h cycles, from LPC Bus or PCIE Bus.

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Pcie Pll SSC

Sets percentage for Pcie Pll SSC, with AUTO retaining hw default, with no BIOS override, from 0.0% to 2.0%.

A.4 Security



In addition to allowing supervisor/user passwords to be set, changed, or cleared, the following settings are available.

Administrator Password

Sets administrator password.

User Password

Sets user password.

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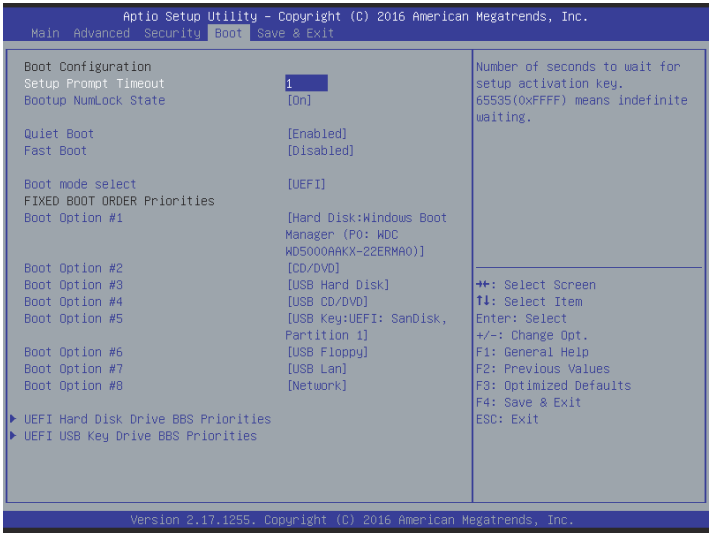
RTC Lock

When enabled, bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM are locked.

BIOS Lock

Enables/disables PCH BIOS Lock Enable (BLE bit).

A.5 Boot



Setup Prompt Timeout

Sets number of seconds to wait for setup activation key, with 65535 (0xFFFF) indicating indefinite wait.

Bootup NumLock State

Enables/disables keypad NumLock.

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Quiet Boot

Enables/disables Quiet Boot.

Fast Boot

Enables/disables boot with initialization of the minimal set of required devices for active boot, with no effect on BBS boot options.

Boot mode select

Selects boot mode from LEGACY or UEFI.

Boot Options #1 to #8

Sets the system boot order.

UEFI XXXXXXXX Drive BBS Priorities

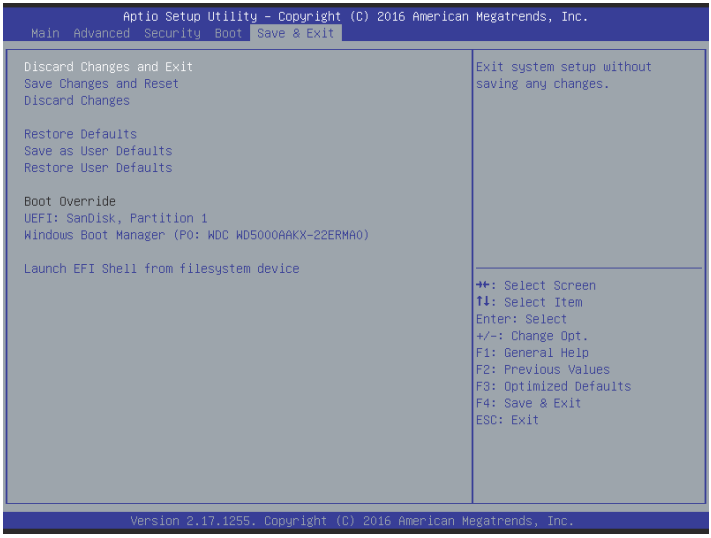
Specifies the Boot Device Priority sequence from available UEFI XXXXXXXX drives, appearing when boot mode is set as UEFI,with XXXXXXXX indicating available devices.

XXXXXXXX Drive BBS Priorities

Specifies the Boot Device Priority sequence from available UEFI XXXXXXXX drives, appearing when boot mode is set as Legacy, with XXXXXXXX indicating available devices.

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A.6 Save & Exit



Discard Changes and Exit

Exits system setup without saving any changes.

Save Changes and Reset

Resets the system after saving changes.

Discard Changes

Discards all changes made to any setup options.

Restore Defaults

Reverts to factory default values for all setup options.

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Save as User Defaults

Saves all changes as User Defaults.

Restore User Defaults

Reverts to user defaults for all setup options.

Launch EFI Shell from filesystem device

Initiates launch of the EFI Shell application (Shell.efi) from an available filesystem device.

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Appendix B - Watchdog Timer

The watchdog timer on the NuPro-E43 can be implemented by:

- Embedded Application Programming Interface (EAPI) library functions
- SEMA library functions

Please refer to the SEMA Software Manual for detailed information:

http://www.adlinktech.com/PD/web/PD_detail.php?cKind=&pid=1274

EAPI Library Sample Code

Ensure the SEMA driver and application have been installed, and that, during installation, the “Install EAPI” option was enabled.

1. Include the relevant header files

```
#ifndef _WIN32
#include "linux/EApiOs.h"
#else /* _WIN32 */
#include "winnt/EApiOs.h"
#endif /* _WIN32 */
#include "EApi.h"
```

2. Initialize the EAPI

```
EApiLibInitialize();
```

3. Call the EAPI function

```
uint32_t
     status=EApiWDogStart(Delay,EventTimeout,Res
     etTimeout);
```

For detailed information regarding the PICMG EAPI library, please refer to the PICMG EAPI - Embedded Application Programming Interface specification:

http://picmg.staging.wedu.com//wp-con¬tent/uploads/COM_EAPI_R1_0.pdf

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Appendix C - System Resources

C.1 System Memory Map

Address Range (hex)	Size	Description
FFA00000 – FFFFFFFF	6 MB	High BIOS Area
FEE00000 – FEEFFFFF	1 MB	MSI Interrupts
FED50000–FED5FFFF	64kB	Intel ME
FED40000 –FED40FFF	4kB	TPM
FED00000 – FED003FF	1kB	HPET
FEC80000 – FECFFFFF	512kB	Local (CPU) APIC
FEC00000 – FEC7FFFF	512kB	I/O APIC
F0000 – FFFFF	64 kB	System BIOS Area (Upper)
E8000 – EFFFF	32 kB	System BIOS Area (Lower)
C0000 – E7FFF	160 kB	PCI expansion ROM area
A0000 – BFFFF	128 kB	Video Buffer & SMM space
00000 – 9FFFF	640 kB	DOS Area

C.2 I/O Map

Hex Range	Device
020 to 021 024 to 025 028 to 029 02C to 02D	Interrupt controller, 8259 equivalent
02E to 02F	LPC SI/O (NCT6106D) configuration index/data registers
030 to 031 034 to 035 038 to 039 03C to 03D	Interrupt controller, 8259 equivalent
040, 042 to 043 050, 052 to 053	Timer, 8254 equivalent
060, 062, 064, 066	Microcontroller
061, 063, 065, 067	NMI controller
070 to 077	Real time clock controller
092	Reset generator

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Hex Range	Device
0A0, 0A1 0A4 to 0A5 0A8 to 0A9 0AC to 0AD 0B0 to 0B1	Interrupt controller, 8259 equivalent
0B2 to 0B3	Power management
0B4 to 0B5 0B8 to 0B9 0BC to 0BD	Interrupt controller, 8259 equivalent
2E8 to 2EF	Serial port 4
2F8 to 2FF	Serial port 2
378 to 37F	Parallel port
3B0 to 3BB	Intel® HD Graphics
3C0 to 3DF	Intel® HD Graphics
3E8 to 3EF	Serial port 3
3F8 to 3FF	Serial port 1
4D0, 4D1	Interrupt controller, 8259 equivalent
A00 to A3F	SIO PME base address
CF9	Reset control register (8 bit I/O)
1800 to 18FE	SB PM base address
F000 to F03F	Intel® HD Graphics
F040 to F05F	Intel® SMBus
F060 to F083 F090 to F097	Intel® SATA Controller
F0A0 to F0A7	Intel® AMT to SOL (COM5)

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C.3 Interrupt Request (IRQ) Lines

C.3.1 IRQ Lines PIC Mode

IRQ#	Pin	SERIRQ	PCI Use	Interrupt Resource / Function
0	No	No	No	Counter 0
1	No	Yes	No	Keyboard controller
2	No	No	No	Cascade from IRQ9
3	PIRQA	Yes	No	Serial Port 2 (COM2)
4	PIRQA	Yes	No	Serial Port 1 (COM1)
5	PIRQA	Yes	No	Serial Port 3 (COM3)
6	PIRQA	Yes	No	Option for configurable sources including PIRQx, GPIO, eSPI and internal PCI/ACPI devices.
7	PIRQA	Yes	No	Serial Port 4 (COM4)
8	No	No	No	Real-time clock
9	PIRQA	Yes	No	Cascade to IRQ2
10	PIRQA	Yes	Yes	Option for configurable sources including PIRQx, GPIO, eSPI, internal PCI/ACPI devices, SCI and TCO.
11	PIRQA	Yes	Yes	Option for configurable sources including PIRQx, GPIO, eSPI, internal ACPI devices, SCI, TCO, HPET #2
12	PIRQA	Yes	No	PS/2 Mouse
13	No	No	No	Math Processor
14	PIRQA	Yes	No	Parallel Port (LPT)
15	PIRQA	Yes	Yes	Option for configurable sources including PIRQx, GPIO, eSPI and internal ACPI devices.

C.3.2 IRQ Lines APIC Mode

IRQ#	Pin	SERIRQ	PCI Use	IRQ Sharable	Interrupt Resource / Function
0	No	No	No	No	Counter 0

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IRQ#	Pin	SERIRQ	PCI Use	IRQ Sharable	Interrupt Resource / Function
1	No	Yes	No	No	Keyboard controller
2	No	No	No	No	Cascade from IRQ9
3	No	Yes	No	No	Serial Port 2 (COM2)
4	No	Yes	No	No	Serial Port 1 (COM1)
5	No	Yes	No	No	Serial Port 3 (COM3)
6	No	Yes	No	Yes	Option for configurable sources including GPIO, eSPI, internal ACPI/ PCI devices.
7	No	Yes	No	No	Serial Port 4 (COM4)
8	No	No	No	No	Real-time clock
9	No	Yes	No	No	Cascade to IRQ2
10	No	Yes	No	Yes	Option for configurable sources including GPIO, eSPI, internal ACPI/ PCI devices, SCI and TCO.
11	No	Yes	No	Yes	Option for configurable sources including GPIO, eSPI, internal ACPI/ PCI devices, SCI, TCO, HPET #2.
12	No	Yes	No	No	PS/2 Mouse
13	No	No	No	No	Math Processor
14	No	Yes	No	No	Parallel Port (LPT)
15	No	Yes	No	Yes	Option for configurable sources including GPIO, eSPI and internal ACPI/PCI devices.
16	PIRQA	PIRQA	Yes	Yes	Option for configurable sources including internal PIRQA, GPIO, eSPI and internal ACPI/PCI devices.
17	No	PIRQ[B-D]	Yes	Yes	Option for configurable sources including internal PIRQ[B-D], GPIO, eSPI and internal ACPI/ PCI devices
18	No	PIRQ[B-D]	Yes	Yes	Option for configurable sources including internal PIRQ[B-D], GPIO, eSPI and internal ACPI/ PCI devices

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IRQ#	Pin	SERIRQ	PCI Use	IRQ Sharable	Interrupt Resource / Function
19	No	PIRQ[B-D]	Yes	Yes	Option for configurable sources including internal PIRQ[B-D], GPIO, eSPI and internal ACPI/ PCI devices
20	No	No	No	Yes	Option for configurable sources including internal PIRQ[E-H], GPIO, eSPI, SCI, TCO, internal ACPI/PCI devices and HPET
21	No	No	No	Yes	Option for configurable sources including internal PIRQ[E-H], GPIO, eSPI, SCI, TCO, internal ACPI/PCI devices and HPET
22	No	No	No	Yes	Option for configurable sources including internal PIRQ[E-H], GPIO, eSPI, SCI, TCO, internal ACPI/PCI devices and HPET
23	No	No	No	Yes	Option for configurable sources including internal PIRQ[E-H], GPIO, eSPI, SCI, TCO, internal ACPI/PCI devices and HPET

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C.3.3 PCI Configuration Space Map

Bus	Device	Function	Routing	Description
00h	00h	00h	N/A	Intel Host Bridge
00h	01h	00h	Internal	PEG X16/X8 Root Port
00h	01h	01h	Internal	PEG X8/X4 Root Port
00h	01h	02h	Internal	PEG X4 Root Port
00h	02h	00h	Internal	Intel Integrated Graphics Device
00h	14h	00h	Internal	Intel USB XHCI Controller
00h	14h	02h	Internal	Intel Thermal Controller
00h	15h	00h	Internal	Intel I2C Controller #0
00h	15h	01h	N/A	Intel I2C Controller #1
00h	16h	00h	Internal	Intel® MEI
00h	16h	03h	N/A	Intel Keyboard and Text (KT) Redirection
00h	17h	00h	Internal	Intel SATA controller
00h	1Ch	00h	Internal	PCI Express Root port 1
00h	1Ch	04h	Internal	PCI Express Root port 5
00h	1Ch	05h	Internal	PCI Express Root port 6
00h	1Ch	06h	Internal	PCI Express Root port 7
00h	1Ch	07h	Internal	PCI Express Root port 8
00h	1Dh	00h	Internal	PCI Express Root port 9
00h	1Dh	01h	Internal	PCI Express Root port 10
00h	1Eh	00h	Internal	Intel UART Controller #0
00h	1Fh	00h	Internal	Intel LPC or eSPI Controller
00h	1Fh	02h	N/A	Intel PMC Controller
00h	1Fh	03h	Internal	Intel® High Definition Audio
00h	1Fh	04h	Internal	Intel SMBus Controller
00h	1Fh	06h	Internal	Intel GbE Controller
01h	00h	00h	Internal	PEG X16/X8 SLOT
02h	00h	00h	Internal	PEG X8/X4 SLOT
03h	00h	00h	Internal	PEG X4 SLOT
04h	00h	00h	Internal	PCIE X4/X1 SLOT 1

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Bus	Device	Function	Routing	Description
05h	00h	00h	Internal	PCIE X1 SLOT 2
06h	00h	00h	Internal	PCIE X1 SLOT 3
07h	00h	00h	Internal	PCIE X1 SLOT 4
08h	00h	00h	Internal	PCIE To PCI Bridge(IT8892E)
09h	0Fh	00h	Internal	PCI SLOT 1
09h	0Eh	00h	Internal	PCI SLOT 2
09h	0Dh	00h	Internal	PCI SLOT 3
09h	0Ch	00h	Internal	PCI SLOT 4
0Ah	00h	00h	Internal	Intel I211 LAN Controller

C.3.4 PCI Interrupt Routing Map

Description	A	B	C	D
PEG X16/X8 Root Port	INTA	INTB	INTC	INTD
PEG X8/X4 Root Port	INTB	INTC	INTD	INTA
PEG X4 Root Port	INTC	INTD	INTA	INTB
Intel Integrated Graphics Device	INTA			
Intel USB XHCI Controller	INTA			INTD
Intel Thermal Controller			INTC	
Intel I2C Controller #0	INTA	INTB	INTC	INTD
Intel® MEI	INTA	INTB	INTC	INTD
Intel SATA controller	INTA			
PCI Express Root port 1	INTA	INTB	INTC	INTD
PCI Express Root port 5	INTA	INTB	INTC	INTD
PCI Express Root port 6	INTB	INTC	INTD	INTA
PCI Express Root port 7	INTC	INTD	INTA	INTB
PCI Express Root port 8	INTD	INTA	INTB	INTC
PCI Express Root port 9	INTA	INTB	INTC	INTD
PCI Express Root port 10	INTB	INTC	INTD	INTA
Intel UART Controller #0	INTA	INTB	INTC	INTD
Intel LPC or eSPI Controller	INTA	INTB	INTC	INTD
Intel® High Definition Audio	INTA			

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Description	A	B	C	D
Intel SMBus Controller	INTA			
Intel GbE Controller	INTA			
PEG X16/X8 SLOT	INTA	INTB	INTC	INTD
PEG X8/X4 SLOT	INTB	INTC	INTD	INTA
PEG X4 SLOT	INTC	INTD	INTA	INTB
PCIE X4/X1 SLOT 1	INTA	INTB	INTC	INTD
PCIE X1 SLOT 2	INTB	INTC	INTD	INTA
PCIE X1 SLOT 3	INTC	INTD	INTA	INTB
PCIE X1 SLOT 4	INTD	INTA	INTB	INTC
PCIE To PCI Bridge(IT8892E)	INTA	INTB	INTC	INTD
PCI SLOT 1	INTB	INTC	INTD	INTA
PCI SLOT 2	INTC	INTD	INTA	INTB
PCI SLOT 3	INTD	INTA	INTB	INTC
PCI SLOT 4	INTA	INTB	INTC	INTD
Intel I211 LAN Controller	INTB	INTC	INTD	INTA

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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.

WARNING:

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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ADLINK Technology, Inc.
No.66 Huaya 1st Road, Guishan District
Taoyuan City 333, Taiwan
Tel: +886-3-216-5088
Fax: +886-3-328-5706
Email: service@adlinktech.com

Ampro ADLINK Technology, Inc.
5215 Hellyer Avenue, #110
San Jose, CA 95138, USA
Tel: +1-408-360-0200
Toll Free: +1-800-966-5200 (USA only)
Fax: +1-408-360-0222
Email: info@adlinktech.com

ADLINK Technology (China) Co., Ltd.
300 Fang Chun Rd., Zhangjiang Hi-Tech Park
Pudong New Area, Shanghai, 201203 China
Tel: +86-21-5132-8988
Fax: +86-21-5132-3588
Email: market@adlinktech.com

ADLINK Technology GmbH
Hans-Thoma-Strasse 11
D-68163 Mannheim, Germany
Tel: +49-621-43214-0
Fax: +49-621 43214-30
Email: emea@adlinktech.com

Please visit the Contact page at www.adlinktech.com for information on how to contact the ADLINK regional office nearest you.

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ADLINK Technology, Inc. (French Liaison Office)
Address: 6 allée de Londres, Immeuble Ceylan
91940 Les Ulis, France
Tel: +33 (0) 1 60 12 35 66
Fax: +33 (0) 1 60 12 35 66
Email: france@adlinktech.com

ADLINK Technology Japan Corporation
Address: 〒101-0045 東京都千代田区神田鍛冶町 3-7-4
神田 374 ビル 4F
KANDA374 Bldg. 4F, 3-7-4 Kanda Kajicho,
Chiyoda-ku, Tokyo 101-0045, Japan
Tel: +81-3-4455-3722
Fax: +81-3-5209-6013
Email: japan@adlinktech.com

ADLINK Technology, Inc. (Korean Liaison Office)
Address: 경기도 성남시 분당구 수내로 46 번길 4 경동빌딩 2 층
(수내동 4-4 번지) (우) 463-825
2F, Kyungdong B/D, 4 Sunae-ro 46 beon-gil
Bundang-gu, Seongnam-si, Gyeonggi-do, Korea, 463-825
Toll Free +82-80-800-0585
Tel +82-31-786-0585
Fax +82-31-786-0583
Email: korea@adlinktech.com

ADLINK Technology Singapore Pte. Ltd.
Address: 84 Genting Lane #07-02A, Cityneon Design Centre
Singapore 349584
Tel: +65-6844-2261
Fax: +65-6844-2263
Email: singapore@adlinktech.com

ADLINK Technology Singapore Pte. Ltd. (Indian Liaison Office)
Address: #50-56, First Floor, Spearhead Towers
Margosa Main Road (between 16th/17th Cross)
Malleswaram, Bangalore - 560 055, India
Tel: +91-80-65605817, +91-80-42246107
Fax: +91-80-23464606
Email: india@adlinktech.com

ADLINK Technology, Inc. (Israeli Liaison Office)
Address: 27 Maskit St., Corex Building
PO Box 12777
Herzliya 4673300, Israel
Tel: +972-54-632-5251
Fax: +972-77-208-0230
Email: israel@adlinktech.com

ADLINK Technology, Inc. (UK Liaison Office)
Tel: +44 774 010 59 65
Email: UK@adlinktech.com

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