USER'S MANUAL

BH-0927

Intel® 4th Gen. Core™ i3/i5i/i7
PICMG 1.3 Half-sized CPU Card
With VGA/Audio/2 LAN/2COM

BH-0927 M1

BH-0927
Half-sized CPU Card

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DISCLAIMER

This operation manual is meant to assist both Embedded Computer manufacturers and end users in installing and setting up the system. The information contained in this document is subject to change without any notice.

CE NOTICE

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC NOTICE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any change or modifications to the equipment not expressly approve by the party responsible for compliance could void your authority to operate such equipment.

CAUTION! Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

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CHAPTER

1

INTRODUCTION

This chapter gives you the information for BH-0927. It also outlines the system specifications.

Sections included:

- About This Manual
- System Specifications
- Safety Precautions

Experienced users can jump to chapter 2 on page 2-1 for a quick start.

1-1. ABOUT THIS MANUAL

Thank you for purchasing our BH-0927 Intel® 4th Gen. Core™ i3/i5/i7 half-sized CPU card enhanced with VGA/Audio/2LAN/2COM, which is fully PC/AT compatible. The BH-0927 provides faster processing speed, greater expandability and can handle more tasks than before. This manual is designed to assist you how to install and set up the system. It contains four chapters. The user can apply this manual for configuration according to the following chapters:

Chapter 1 Introduction

This chapter introduces you to the background of this manual, and the specifications for this system. The final page of this chapter will indicate how to avoid damaging this board.

Chapter 2 Hardware Configuration

This chapter outlines the component locations and their functions. In the end of this chapter, you will learn how to set jumper and how to configure this card to meet your own needs.

Chapter 3 Software Utilities

This chapter contains helpful information for proper installations of the VGA utility, LAN utility, Sound utility, and Flash BIOS Update. It also describes the Watchdog-timer configuration.

Chapter 4 BIOS Setup

This chapter indicates you how to set up the BIOS configurations.

Appendix A Expansion Bus

This appendix introduces you the expansion connector pin assignment for a CFast Card Slot.

Appendix B Technical Summary

This appendix gives you the information about the Technical maps.

1-2. SYSTEM SPECIFICATIONS

System

CPU	Intel® 4th Gen. Core™ i3/i5/i7
Chipset	Intel® HM86/QM87
Memory	2 x DDR3 SO-DIMM (204 pins), 1333/1600 MHz, up to 16GB
OS	Window 8/7
BIOS	AMI
Watchdog	1~255 seconds
Power Supply/Request	ATX Power
Speaker	Buzzer
Dimension	198 x 126mm (7.8" x 4.96")
Certificate	CE/FCC

I/O Ports

Serial Port	2 ports, +5V/+12V/RI selectable ▪ COM1: for RS-232 ▪ COM2: for RS-232/422/485
USB Port	8 ports ▪ 2 x external USB 3.0 ▪ 6 x internal USB 2.0 (4 internal & 2 external)
SATA Interface	2 x SATA III connector
Digital I/O	4 in / 4 out
LAN	Dual ports, RJ45 10/100/1000Mbps: ▪ Intel® I217LM ▪ Intel® I211AT
Audio	High Definition audio daughter board
Expansion Bus	▪ 1 x CFast slot ▪ 1 x PCIe X16 ▪ 4 x PCIe X1

Display

Graphics	Built-in processor, share the system memory. ▪ 1 x VGA ▪ 1 x Display port

Environment

Operation Temp.	0 ~ 60°C (32 ~ 140°F)
Storage Temp.	-40 ~ 80°C (-40 ~ 176°F)
Humidity	Operation: 20~90% Storage: 20~95%

1-3. SAFETY PRECAUTIONS

Follow the messages below to avoid your systems from damage:

1. Keep your system away from static electricity on all occasions.

2. Prevent electric shock. Don‘t touch any components of this card when the card is power-on. Always disconnect power when the system is not in use.

3. Disconnect power when you change any hardware devices.
   For instance, when you connect a jumper or install any cards, a surge of power may damage the electronic components or the whole system.

HARDWARE CONFIGURATION

CHAPTER

2

*** QUICK START ***

Helpful information describes the jumper, port & connector settings, and component locations.

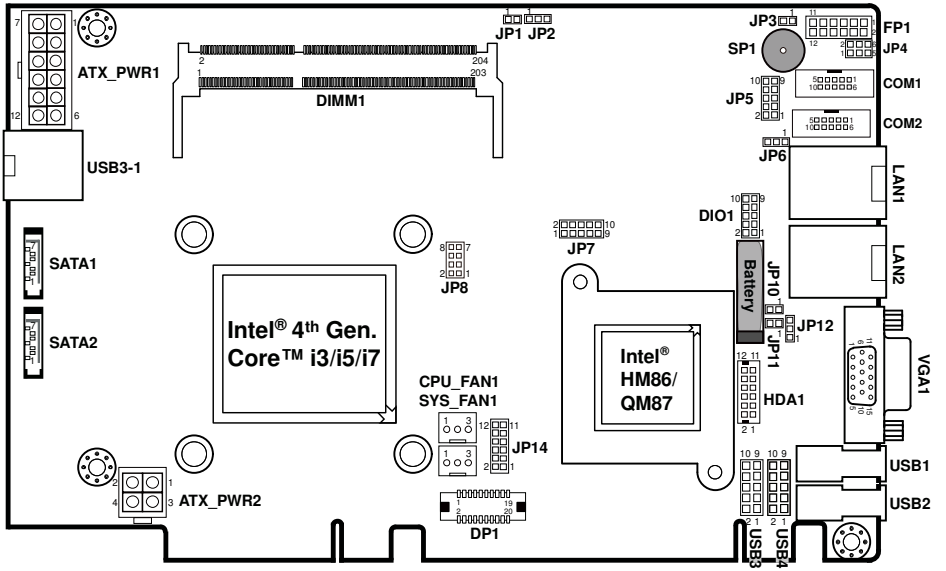
Sections included:

- Jumper, Port & Connector Reference Table
- Component Locations
- Configuration and Jumper settings
- Connector's Pin Assignments

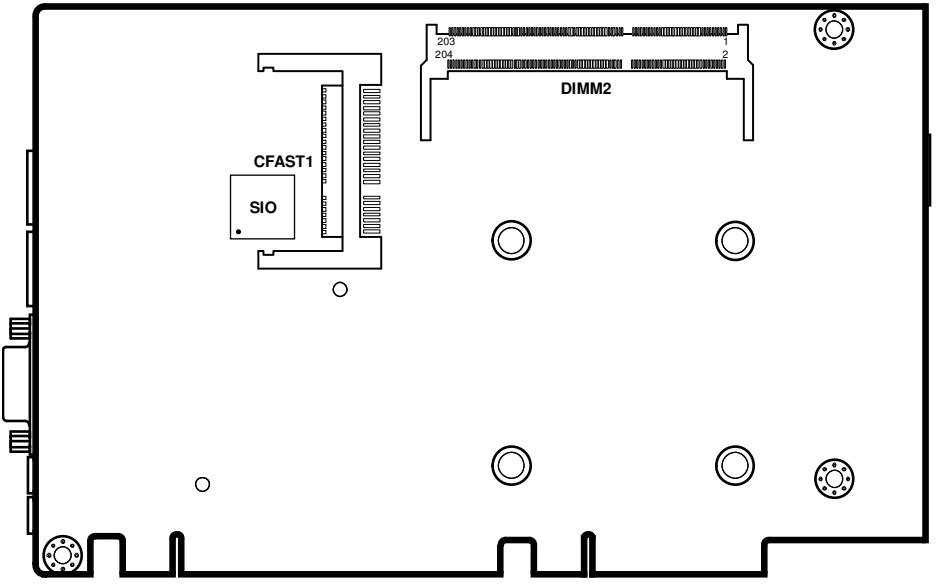
2-1. JUMPER, PORT & CONNECTOR REFERENCE TABLE

JUMPER/PORT/CONNECTOR	NAME
LAN Port	LAN1, LAN2
VGA Port	VGA1
USB Port	▪ USB1, USB2 (Both are USB2.0.) ▪ USB3-1 (USB3.0)
SATA Port	SATA1, SATA2
COM Connector	COM1, COM2
COM1 RI & Voltage Selection	JP4
COM2 Auto Detect Selection	JP6
COM2 RS-232/422/485 Selection	JP5
USB 2.0 Connector	USB3, USB4
Audio Connector	HDA1
Fan Connector	CPU_FAN1, SYS_FAN1
Clear CMOS Data Selection	JP10
CFast Voltage Selection	JP2
DDR3 Voltage Selection	JP1
Digital I/O Connector	DIO1
Display Port Connector	DP1
Front Panel Connector & Selection	FP1
Flash Descriptor Override Selection	JP11
Hardware Power Fail Selection	JP3
Power Input Connector	ATX_PWR1, ATX_PWR2

2-2. COMPONENT LOCATIONS



BH-0927 Front Connector, Jumper and Component Locations



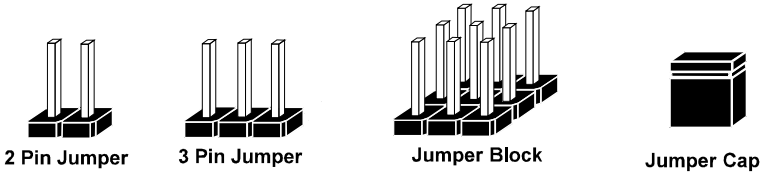
BH-0927 Rear Component Locations

2-3. HOW TO SET JUMPERS

You can configure your board by setting jumpers. Jumper is consists of two or three metal pins with a plastic base mounted on the card, and by using a small plastic "cap", Also known as the jumper cap (with a metal contact inside), you are able to connect the pins. So you can set-up your hardware configuration by "open" or "close" pins.

The jumper can be combined into sets that called jumper blocks. When the jumpers are all in the block, you have to put them together to set up the hardware configuration. The figure below shows how this looks like.

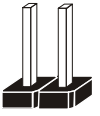
JUMPERS AND CAPS



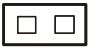
If a jumper has three pins (for examples, labelled PIN1, PIN2, and PIN3), You can connect PIN1 & PIN2 to create one setting by shorting. You can either connect PIN2 & PIN3 to create another setting. The same jumper diagrams are applied all through this manual. The figure below shows what the manual diagrams look and what they represent.

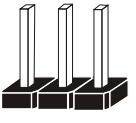
JUMPER DIAGRAMS

Jumper Cap looks like this



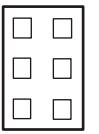
2 pin Jumper looks like this





3 pin Jumper looks like this

Jumper Block looks like this

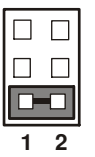


JUMPER SETTINGS

2 pin Jumper close(enabled) Looks like this

3 pin Jumper 2-3 pin close(enabled) Looks like this

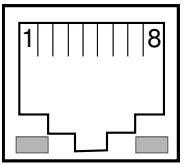
Jumper Block 1-2 pin close(enabled) Looks like this



2-4. LAN PORT

LAN1, LAN2: RJ45 LAN Port

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	MDI_P0	5	MDI_P2
2	MDI_N0	6	MDI_N2
3	MDI_P1	7	MDI_P3
4	MDI_N1	8	MDI_N3



Green Yellow

LAN1/ LAN2

LAN LED Indicator:

Left Side LED

Green Color On	10/100 LAN Speed Indicator
Orange Color On	Giga LAN Speed Indicator
OFF	No LAN Switch/Hub Connected

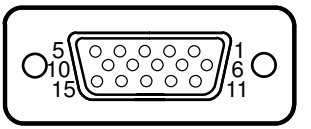
Right Side LED

Yellow Color Blinking	LAN Message Active
OFF	No LAN Message Active

2-5. VGA PORT

VGA1: VGA Port

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	CRT_RED	9	CRT_VCC
2	CRT_GREEN	10	GND
3	CRT_BLUE	11	NC
4	NC	12	CRT_DATA
5	GND	13	CRT_HSYNC
6	NC	14	CRT_VSYNC
7	GND	15	CRT_CLK
8	GND		

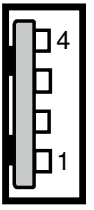


VGA1

2-6. USB PORT

USB1, USB2: USB 2.0 Port

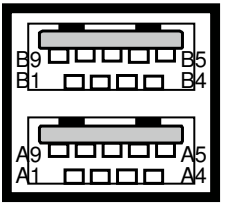
PIN	ASSIGNMENT
1	USB_VCC5
2	USB_N
3	USB_P
4	GND



USB1/ USB2

USB3-1: USB 3.0 Port

PIN	ASSIGNMENT	PIN	ASSIGNMENT
A1	VCC5	B1	USB_VCC5
A2	USB_N	B2	USB_N
A3	USB_P	B3	USB_P
A4	GND	B4	GND
A5	USB_RX_N	B5	USB_RX_N
A6	USB_RX_P	B6	USB_RX_P
A7	GND	B7	GND
A8	USB_TX_N	B8	USB_TX_N
A9	USB_TX_P	B9	USB_TX_P



USB3-1

2-7. SATA PORT

SATA1, SATA2: SATA Ports

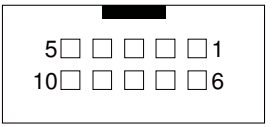
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	5	RXN
2	TXP	6	RXP
3	TXN	7	GND
4	GND		

SATA1/ SATA2

2-8. COM CONNECTOR

COM1: COM Connector, fixed as RS-232

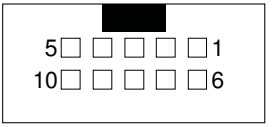
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	DCD#	6	DSR#
2	RX	7	RTS#
3	TX	8	CTS#
4	DTR#	9	RI#
5	GND		



COM1

COM2: COM Connector, selectable as RS-232/422/485

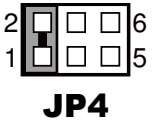
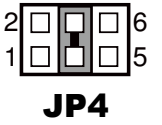
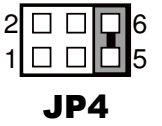
PIN	ASSIGNMENT		
	RS-232	**RS-422**	**RS-485**
1	DCD#	TX-	RS-485-
2	RX	TX+	RS-485+
3	TX	RX+	X
4	DTR#	RX-	X
5	GND	GND	GND
6	DSR#	X	X
7	RTS#	X	X
8	CTS#	X	X
9	RI#	X	X



COM2

2-9. COM1 RI & VOLTAGE SELECTION

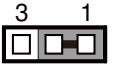
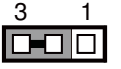
JP4: COM1 RI & Voltage Selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
RI	1-2	 **JP4**
12V	3-4,	 **JP4**
5V	5-6,	 **JP4**

Note: Manufacturing default is RI.

2-10. COM2 AUTO DETECT SELECTION

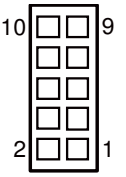
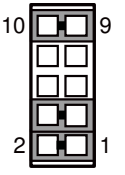
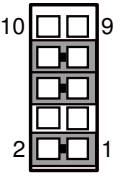
JP6: COM2 Auto Detect Selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
Normal	1-2	 **JP6**
Auto	2-3	 **JP6**

Note: Manufacturing default is Auto.

2-11. COM2 RS-232/422/485 SELECTION

JP5: COM2 RS-232/422/485 Selection

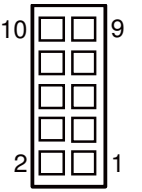
SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
RS-232	All Open	 **JP5**
RS-422	1-2, 3-4, 9-10	 **JP5**
RS-485	1-2, 5-6, 7-8	 **JP5**

Note: Manufacturing default is RS-232.

2-12. USB 2.0 CONNECTOR

USB3, USB4: USB 2.0 Connectors

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	USB_VCC5	6	USB_P_B
2	USB_VCC5	7	GND
3	USB_N_A	8	GND
4	USB_N_B	9	NC
5	USB_P_A	10	GND

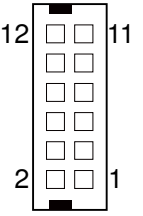


USB3/ USB4

2-13. AUDIO CONNECTOR

HDA1: Audio Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC12	7	GND
2	HDA_SDIN	8	HDA_SYN
3	VCC12	9	VCC3
4	HDA_SDOUT	10	HDA_RST
5	GND	11	NC
6	HDA_BITCLK	12	HDA_SPKR

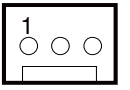


HDA1

2-14. FAN CONNECTOR

CPU_FAN1: CPU Fan Connector
SYS_FAN1: System Fan Connector

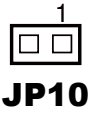
PIN	ASSIGNMENT
1	GND
2	FANIN
3	FANOUT



CPU_FAN1/ SYS_FAN1

2-15. CLEAR CMOS DATA SELECTION

JP10: Clear CMOS Data Selection

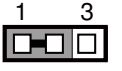
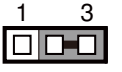
SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
Normal	Open	 **JP10**
Clear CMOS*	Close	 **JP10**

Note: Manufacturing default is Normal.

*To clear CMOS data, user must power-off the computer and set the jumper to "Clear CMOS" as illustrated above. After five to six seconds, set the jumper back to "Normal" and power-on the computer.

2-16. CFAST VOLTAGE SELECTION

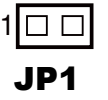
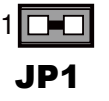
JP2: CFast Voltage Selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
3.3V	1-2	 **JP2**
5V	2-3	 **JP2**

Note: Manufacturing default is 3.3V.

2-17. DDR3 VOLTAGE SELECTION

JP1: DDR3 Voltage Selection

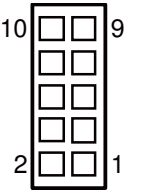
SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
Auto	Open	 JP1
1.35V	Close	 JP1

Note: Manufacturing default is Auto.

2-18. DIGITAL I/O CONNECTOR

DIO1: Digital I/O Connector

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC5	6	DOUT2
2	GND	7	DIN3
3	DIN1	8	DOUT3
4	DOUT1	9	DIN4
5	DIN2	10	DOUT4

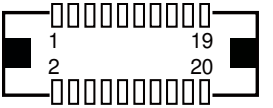


DIO1

2-19. DISPLAY PORT CONNECTOR

DP1: Display Port Connector

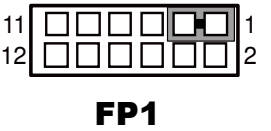
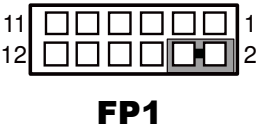
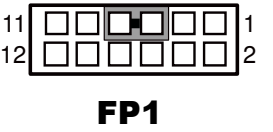
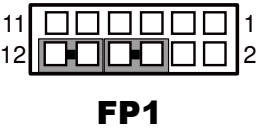
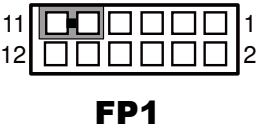
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	DATA0+	11	GND
2	GND	12	DATA3-
3	DATA0-	13	AUX_EN#
4	DATA1+	14	GND
5	GND	15	AUX+
6	DATA1-	16	HPD
7	DATA2+	17	AUX-
8	GND	18	VCC3
9	DATA2-	19	VCC5
10	DATA3+	20	VCC3



DP1

2-20. FRONT PANEL CONNECTOR

FP1: Front Panel Connector

SELECTION	PIN & ASSIGNMENT	JUMPER SETTINGS	JUMPER ILLUSTRATION
HDD LED	1. HDD_LED+	1-3	
	3. HDD_LED-		
Power LED	2. PWR_LED+	2-4	
	4. GND		
Reset Button	5. GND	5-7	
	7. RST_BTN		
External Speaker	6. SPK+	6-8, 10-12	
	8. SPK-		
	10. SPK-		
	12. SPK-		
ATX Power Button	9. PWR_BTN	9-11	
	11. GND		

2-21. FLASH DESCRIPTOR OVERRIDE SELECTION

JP11: Flash Descriptor Override Selection

SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
Disable	Open	 **JP11**
Enable	Close	 **JP11**

Note: Manufacturing default is Disable.

2-22. HARDWARE POWER FAIL SELECTION

JP3: Hardware Power Failure Selection

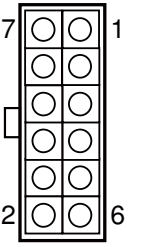
SELECTION	JUMPER SETTING	JUMPER ILLUSTRATION
Disable	Open	 **JP3**
Enable	Close	 **JP3**

Note: Manufacturing default is Disable.

2-23. POWER INPUT CONNECTOR

ATX_PWR1: Power Input Connector

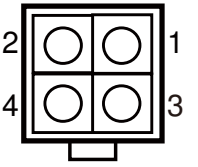
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	PS_ON	7	VCC5_SB
2	GND	8	NC
3	GND	9	NC
4	VCC12	10	NC
5	VCC3	11	GND
6	VCC12	12	GND



ATX_PWR1

ATX_PWR2: Optional Power Input Connector

PIN	ASSIGNMENT
1	GND
2	GND
3	VCC12
4	VCC12



ATX_PWR2

SOFTWARE UTILITIES

CHAPTER

3

This chapter comprises the detailed information of VGA driver, LAN driver, and Sound driver.

Sections included:

- Introduction.
- Intel® Chipset Software Installation Utility
- Intel® USB 3.0 eXtensible Host Controller Utility
- Intel® Management Engine Components Utility
- VGA Driver Utility
- LAN Driver Utility
- Sound Driver Utility

3-1. INTRODUCTION

Enclosed with BH-0927 package are our driver utilities, which come in a format of CD ROM or floppy disk. Refer to the following table for driver locations:

FILENAME (Assume that CD ROM drive is D:)	**PURPOSE**
D:\Driver\Flash BIOS	For Aptio (EFI)BIOS update utility
▪ D:\Driver\Platfrom\Win7(32-bit)\UTILITY ▪ D:\Driver\Platfrom\Win7(64-bit)\UTILITY ▪ D:\Driver\Platfrom\Win8(32-bit)\UTILITY ▪ D:\Driver\Platfrom\Win8(64-bit)\UTILITY	Intel® Chipset Device Software Installation Utility
▪ D:\Driver\Platfrom\Win7(32-bit)\USB3 ▪ D:\Driver\Platfrom\Win7(64-bit)\USB3	Intel® USB3.0 eXtensible host controller
▪ D:\Driver\Platfrom\Win7(32-bit)\ME ▪ D:\Driver\Platfrom\Win7(64-bit)\ME ▪ D:\Driver\Platfrom\Win8(32-bit)\ME ▪ D:\Driver\Platfrom\Win8(64-bit)\ME	Intel® Management Engine Interface
▪ D:\Driver\Platfrom\Win7(32-bit)\VGA ▪ D:\Driver\Platfrom\Win7(64-bit)\VGA ▪ D:\Driver\Platfrom\Win8(32-bit)\VGA ▪ D:\Driver\Platfrom\Win8(64-bit)\VGA	Intel® Graphics Media Accelerator 3600 for VGA driver installation
▪ D:\Driver\Platfrom\Win7(32-bit)\LAN ▪ D:\Driver\Platfrom\Win7(64-bit)\LAN ▪ D:\Driver\Platfrom\Win8(32-bit)\LAN ▪ D:\Driver\Platfrom\Win8(64-bit)\LAN	Intel® 82583V for LAN driver installation
▪ D:\Driver\Platfrom\Win7(32-bit)\Sound ▪ D:\Driver\Platfrom\Win7(64-bit)\Sound ▪ D:\Driver\Platfrom\Win8(32-bit)\Sound ▪ D:\Driver\Platfrom\Win8(64-bit)\Sound	Realtek ALC888S for sound driver installation

Note: Be sure to install the Utility right after the OS fully installed.

3-2. INTEL® CHIPSET SOFTWARE INSTALLATION UTILITY

3-2-1. Introduction

The Intel® Chipset Device Software installs Windows *.INF files to the target system, and this package contains the drivers for all the interfaces such as B, SATA, I2C, SPI of the Intel® Platform Controller Hub EG20T with information about a piece of hardware on the system. These files outline the operating system how to configure the Intel® chipset components in order to ensure that the following features function properly:

- DMA Support
- GPIO Support
- I2C Support
- Packet HUB Support
- Serial Peripheral Interface (SPI) Support
- PCIe Support
- IDE/ATA33/ATA66/ATA100 Storage Support
- SATA Storage Support
- USB Support

3-2-2. Installation of Utility for Windows 7/8

The Utility Pack is to be installed only for Windows 7/8, and it should be installed right after the OS installation. Please follow the steps below:

1. Insert the driver disk into a CD ROM device.
2. Under Windows system, go to the directory where the Utility driver is located.
3. Run the application with administrative privileges.

3-3. INTEL® USB 3.0 EXTENSIBLE HOST CONTROLLER UTILITY

3-3-1. Introduction

Intel® USB 3.0 eXtensible Host Controller Driver supports the following Intel® Chipsets/Processors:

- 4th Generation Intel® Core™ Processor Family
- Intel® 8 Series/C220 Series Chipset Family
- 4th Generation U-Series Platform I/O

3-3-2. Installation Instructions for Windows 7

1. Insert the driver disk into a CD ROM device.
2. Under Windows system, go to the directory where the driver is located.
3. Run the application with administrative privileges.

3-4. INTEL® MANAGEMENT ENGINE COMPONENTS UTILITY

3-4-1. Introduction

The Intel® ME software components that need to be installed depend on the system's specific hardware and firmware features. The installer, compatible with Windows 7/8, detects the system's capabilities and installs the relevant drivers and applications.

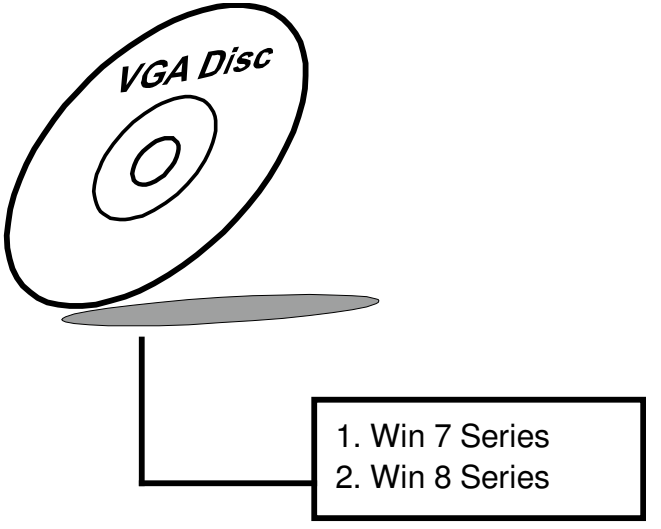
3-4-2. Installation Instructions for Windows 7/8

1. Insert the driver disk into a CD ROM device.
2. Under Windows system, go to the directory where the driver is located.
3. Run the application with administrative privileges.

3-5. VGA DRIVER UTILITY

3-5-1. Introduction

The VGA interface embedded with our BH-0927 can support a wide range of display. You can display CRT & LVDS simultaneously with the same mode.



3-5-2. Installation of VGA Driver

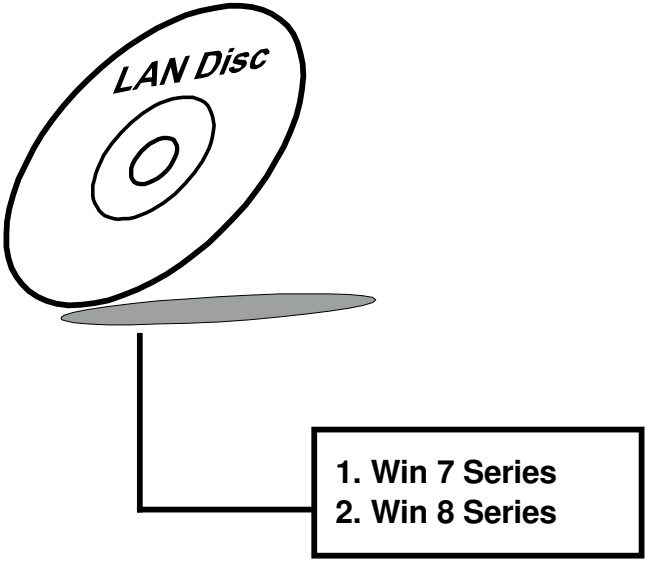
To install the VGA Driver, simply follow the following steps:

1. Insert the driver disk into a CD ROM device.
2. Under Windows system, go to the directory where the VGA driver is located.
3. Run the application with administrative privileges..

3-6. LAN DRIVER UTILITY

3-6-1. Introduction

BH-0927 is enhanced with LAN function that can support various network adapters. Installation programs for LAN drivers are listed as follows:

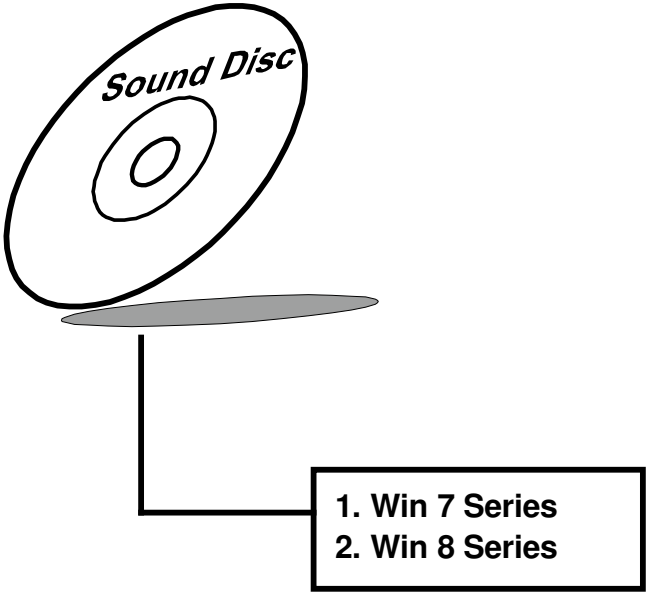


For more details on Installation procedure, please refer to Readme.txt file found on LAN Driver Utility.

3-7. SOUND DRIVER UTILITY

3-7-1. Introduction

The Realtek sound function enhanced in this system is fully compatible with Windows 7/8. Below, you will find the content of the Sound driver:



3-7-2. Installation of Sound Driver

1. Insert the driver disk into a CD ROM device.
2. Under Windows system, go to the directory where the Sound driver is located.
3. Run the application with administrative privileges..
4. Follow the instructions on the screen to complete the installation.
5. Once the installation is completed, shut down the system and restart in order for the changes to take effect.

CHAPTER

4

BIOS SETUP

This chapter shows how to set up the AMI BIOS.

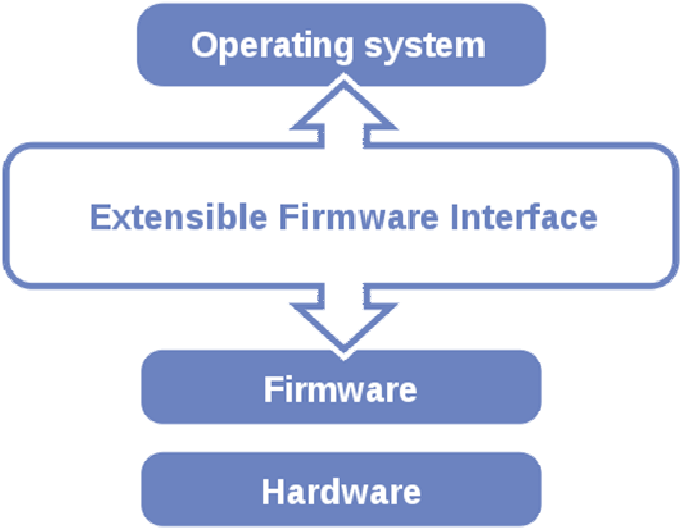
Sections included:

- Introduction
- Entering Setup
- Main
- Advanced
- Chipset
- Boot
- Security
- Save & Exit

4-1. INTRODUCTION

The board BH-0927 uses an AMI Aptio BIOS that is stored in the Serial Peripheral Interface Flash Memory (SPI Flash) and can be updated. The SPI Flash contains the BIOS Setup program, Power-on Self-Test (POST), the PCI auto-configuration utility, LAN EEPROM information, and Plug and Play support.

Aptio is AMI's BIOS firmware based on the UEFI (Unified Extensible Firmware Interface) Specifications and the Intel Platform Innovation Framework for EFI. The UEFI specification defines an interface between an operating system and platform firmware. The interface consists of data tables that contain platform-related information, boot service calls, and runtime service calls that are available to the operating system and its loader. These provide standard environment for booting an operating system and running pre-boot applications. Following illustration shows Extensible Firmware Interface's position in the software stack.



EFI BIOS provides an user interface allow users the ability to modify hardware configuration, e.g. change system date and time, enable or disable a system component, decide bootable device priorities, setup personal password, etc., which is convenient for modifications and customization of the computer system and allows technicians another method for finding solutions if hardware has any problems.

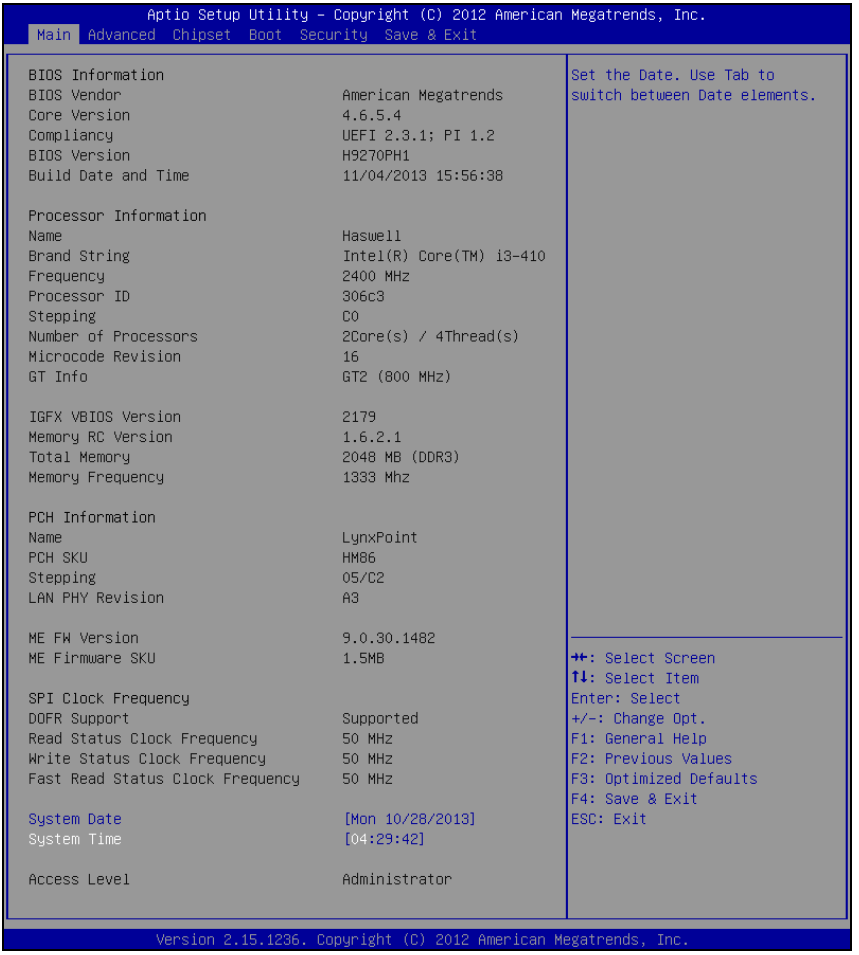
The BIOS Setup program can be used to view and change the BIOS settings for the computer. The BIOS Setup program is accessed by pressing the <Del> or <Esc> key after the POST memory test begins and before the operating system boot begins. The settings are shown below.

4-2. ENTERING SETUP

When the system is powered on, the BIOS will enter the Power-On Self Test (POST) routines and the following message will appear on the lower screen:

First POST screen with AMI logo

For as long as this message is present on the screen before the operating system boot begins, you may press the <F2> or <Del> key (the one that shares the decimal point at the bottom of the number keypad) to access the setup menu. In a moment, the main menu of the Aptio Setup Utility will appear on the screen:



BIOS setup program initial screen

The BIOS setup menu interface and help messages are shown in US English. You may move the cursor by up/down keys to highlight the individual menu items. As you highlight each item, a brief description of the highlighted selection will appear at the bottom of the screen.

4-2-1. BIOS Setup Menu Keys

The following table provides list of keys available for BIOS setup menu.

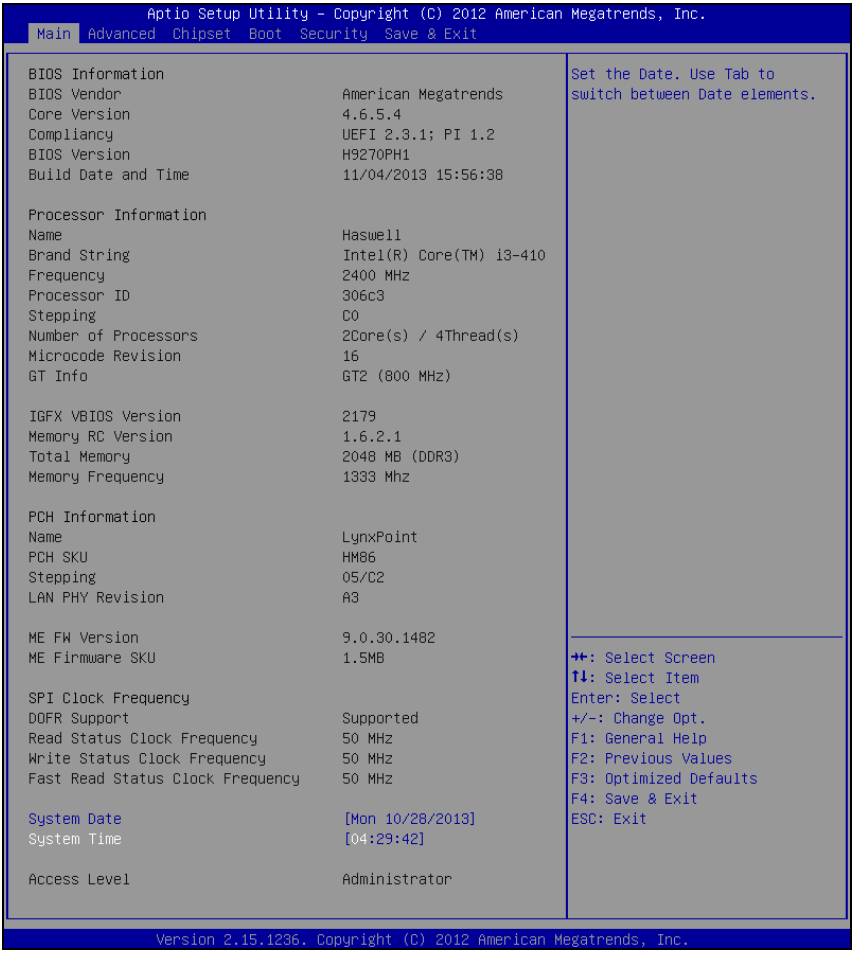
BIOS Setup menu key	Description
<←> and <→>	Selects a different menu screen (moves the selection left or right).
< ↑ > and < ↓ >	Selects an item (moves the selection up or down).
<Enter>	Executes command or selects the sub-menu.
<F2>	Load the previous configuration values.
<F3>	Load the default configuration values.
<F4>	Save the current values and exits the BIOS setup menu.
<Esc>	Leaves the sub-menu. Triggers confirmation to exit BIOS setup menu.

4-2-2. BIOS Messages

This section describes error messages generated by the board's BIOS. These messages would be displayed on the monitor when certain recoverable error/event occurs during POST stage. The table bellow gives an explanation of the BIOS messages.

BIOS Setup menu key	Explanation
A first boot or NVRAM reset condition has been detected.	BIOS has been updated or the battery was replaced.
The CMOS defaults were loaded.	Default values have been loaded after the BIOS was updated or the battery was replaced.
The CMOS battery is bad or was recently replaced.	The battery may be losing power, replace the battery soon. Also, this message is displayed once the new battery was placed.

4-3. MAIN



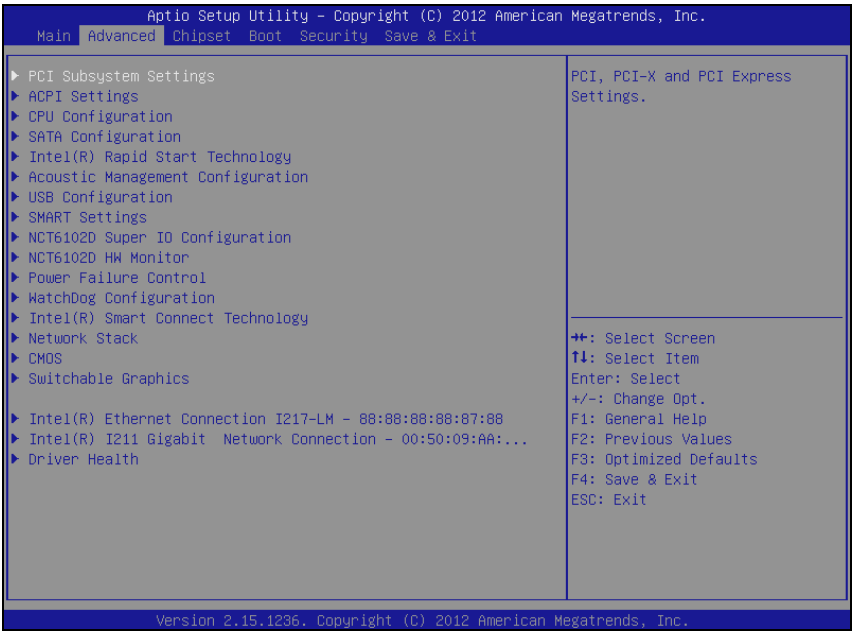
Main screen

BIOS Setting	Options	Description/Purpose
BIOS Vendor	No changeable options	Displays the BIOS vendor.
Core Version	No changeable options	Displays the current BIOS core version.

BIOS Setting	Options	Description/Purpose
Compliancy	No changeable options	Displays the current UEFI version.
BIOS Version	No changeable options	Displays the version of the BIOS.
Build Date and Time	No changeable options	Displays the date of current BIOS version.
Name	No changeable options	Intel processor codename.
Brand String	No changeable options	Intel processor model designation.
Frequency	No changeable options	Processor clock speed.
Processor ID	No changeable options	Processor ID.
Stepping	No changeable options	Processor stepping information.
Number of processors	No changeable options	Total number of physical cores and logical threads available.
Microcode Revision	No changeable options	Information about current microcode version.
GT Info	No changeable options	Integrated graphics processor type (its clock speed).
IGFX VBIOS Version	No changeable options	Intel VBIOS (Video BIOS) version.
Memory RC Version	No changeable options	Intel MRC (Memory Reference Code) version.
Total Memory	No changeable options	Total RAM installed in SO-DIMM slots (and its type).
Memory Frequency	No changeable options	Memory module(s) frequency.
Name	No changeable options	Intel chipset codename
PCH SKU	No changeable options	Intel chipset model designation.
Stepping	No changeable options	Chipset stepping information.
LAN PHY Revision	No changeable options	Chipset integrated LAN card revision information.
ME FW Version	No changeable options	Intel Management Engine firmware version.
ME Firmware SKU	No changeable options	Intel Management Engine edition.
DOFR Support	No changeable options	SPI (Serial Peripheral Interface) chip supports Fast Read Dual Output

BIOS Setting	Options	Description/Purpose
		feature.
Read Status Clock Frequency	No changeable options	Reading speed of SPI chip.
Write Status Clock Frequency	No changeable options	Writing speed SPI chip.
Fast Read Status Clock Frequency	No changeable options	Reading speed of SPI chip in fast mode.
System Date	Month, day, year	Specifies the current date.
System Time	Hour, minute, second	Specifies the current time.
Access Level	No changeable options	Displays security levels currently in use.

4-4. ADVANCED



Advanced screen

BIOS Setting	Options	Description/Purpose
PCI Subsystem Settings	Sub-menu	Accesses settings for PCI subsystem.
ACPI Settings	Sub-menu	Enters menu to set ACPI option.
CPU Configuration	Sub-menu	All processor basic options menu.
SATA Configuration	Sub-menu	SATA device(s) configuration section.
Intel(R) Rapid Start Technology	Sub-menu	Menu which deals with control for Intel Rapid Start Technology.
Acoustic Management Configuration	Sub-menu	Enters menu to set Acoustic Management feature.
USB Configuration	Sub-menu	Enters menu to configure USB options.

BIOS Setting	Options	Description/Purpose
SMART Settings	Sub-menu	Section allows controlling SATA HDD/SSD S.M.A.R.T. capability.
NCT6102D Super IO Configuration	Sub-menu	Serial and parallel ports configuration section.
NCT6102D HW Monitor	Sub-menu	Options for NCT6102D hardware monitor chip.
Power Failure Control	Sub-menu	Enters menu to set behavior configuration in case of power loss event.
WatchDog Configuration	Sub-menu	Section to configure Watchdog timer.
Intel(R) Smart Connect Technology	Sub-menu	Menu which deals with control for Intel Smart Connect Technology.
Network Stack	Sub-menu	Enters menu to enable network during DXE stage and UEFI shell environment.
CMOS	Sub-menu	Options for CMOS battery.
Switchable Graphics	Sub-menu	Switchable graphics options menu.
Intel(R) Ethernet Connection I217-LM	Sub-menu	Additional settings and information regarding Intel I217 GbE device.
Intel(R) I211 Gigabit Network Connection	Sub-menu	Additional settings and information regarding Intel I211 GbE device.
Driver Health	Sub-menu	Menu allows checking both GbE drivers status.

4-4-1. PCI Subsystem Settings

PCI subsystem settings screen

BIOS Setting	Options	Description/Purpose
PCI Bus Driver Version	No changeable options	Displays PCI UEFI driver version.
PCI Latency Timer	-32 PCI Bus Clocks -64 PCI Bus Clocks -96 PCI Bus Clocks -128 PCI Bus Clocks -160 PCI Bus Clocks -192 PCI Bus Clocks -224 PCI Bus Clocks -248 PCI Bus Clocks	Sets PCI latency time.

BIOS Setting	Options	Description/Purpose
VGA Palette Snoop	-Disabled -Enabled	Enabling this feature turns on this palette "snoop". Some special VGA cards need to be able to look at the video card's VGA palette to determine what colors are currently in use.
PERR# Generation	-Disabled -Enabled	Enables or disables generation of PERR# signals (data parity errors) used to signal the detection of a parity error related to a data phase.
SERR# Generation	-Disabled -Enabled	Enables or disables generation of SERR# signals (unrecoverable errors) which are reported to the system and handled by system software.
PCI Express Settings	Sub-menu	Enters menu to configure PCI Express Settings.

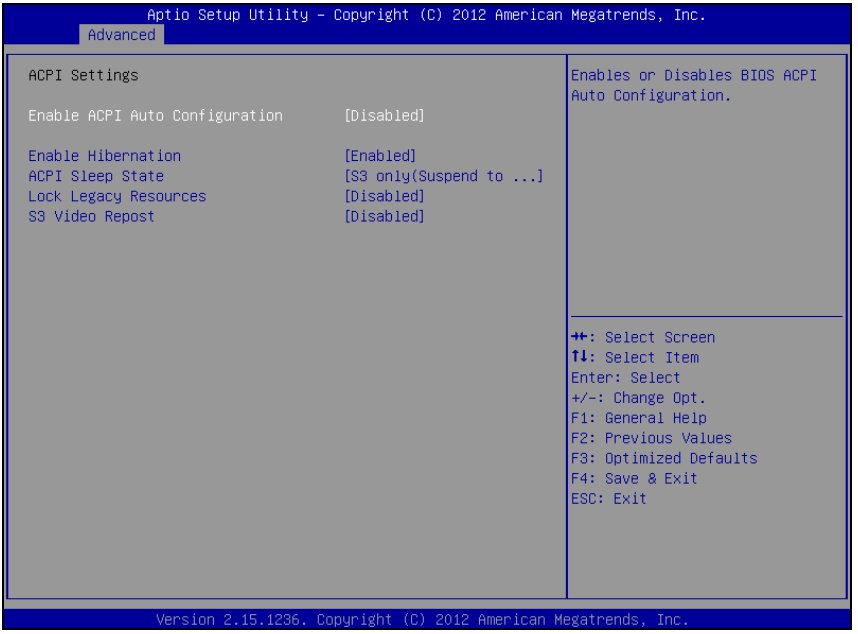
4-4-1-1. PCI Subsustem Settings – PCI Express Settings

PCI Express Settings screen

BIOS Setting	Options	Description/Purpose
Relaxed Ordering	-Disabled -Enabled	Enables or disables relaxed ordering feature which allows transactions that do not have any order of completion requirements to complete more efficiently.
Extended Tag	-Disabled -Enabled	Enables or disables extended tag support for maximum value of outstanding requests possible per components from 32 to 2048.
No Snoop	-Disabled -Enabled	Control No Snoop option on PCIe devices.

BIOS Setting	Options	Description/Purpose
Maximum Read Request	-Auto -128 Bytes -256 Bytes -512 Bytes -1024 Bytes -2048 Bytes -4096 Bytes	Maximum read request size specifies the size for the device when acting as the requestor. The device must not generate read requests with a size larger this value.
Maximum Payload	-Auto -128 Bytes -256 Bytes -512 Bytes -1024 Bytes -2048 Bytes -4096 Bytes	Maximum payload size supported specifies the size that the function supports for TLPs (Transaction Layer Packets).
Automatic ASPM	-Disabled -Auto -Force L0	Specifies mode for Active State Power Management (ASPM), hardware-based link power conservation mechanism. Force L0 standby mode applies to a single direction on the link.
Extended Synch	-Disabled -Enabled	Enabling extended synch feature forces the transmission of additional ordered sets when exiting the L0 state and when in the recovery state. This mode provides external devices monitoring the link time to achieve bit symbol lock before the link enters L0 state and resumes communication.

4-4-2. ACPI Settings

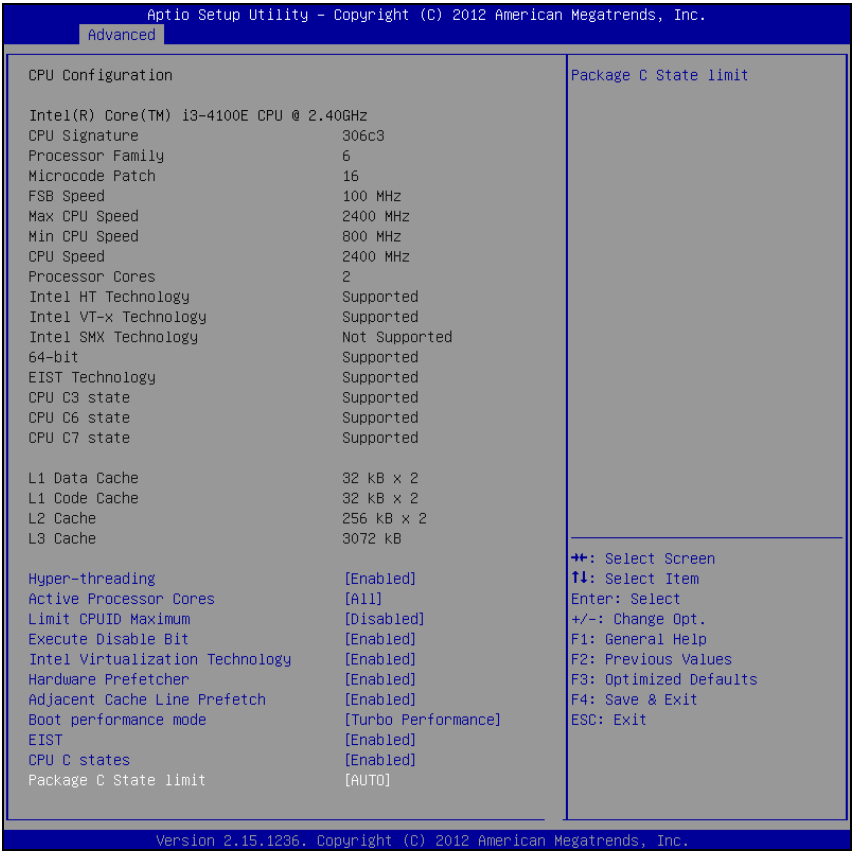


ACPI Settings screen

BIOS Setting	Options	Description/Purpose
Enable ACPI Auto Configuration	-Disabled -Enabled	Allows deciding whether ACPI settings are configured by operating system or manually (option disabled).
Enable Hibernation	-Disabled -Enabled	Enables ability to enter S4 state (to be able to hibernate in Windows operating system).
ACPI Sleep State	-Suspend Disabled -S1 only -S3 only -Both S1 and S3 available for OS	Specifies the ACPI sleep state. Disabled option disables ACPI sleep feature. S3 allows the platform to enter Sleep mode (also known as Standby or Suspend to RAM). S1 is less common state in which the CPU is stopped.

BIOS Setting	Options	Description/Purpose
Lock Legacy Resources	-Disabled -Enabled	Prevents the operating system from changing resources to serial or parallel controller.
S3 Video Repost	-Disabled -Enabled	If enabled re-initialises the VBIOS after waking up from an S3 sleep.

4-4-3. CPU Configuration



CPU Configuration screen

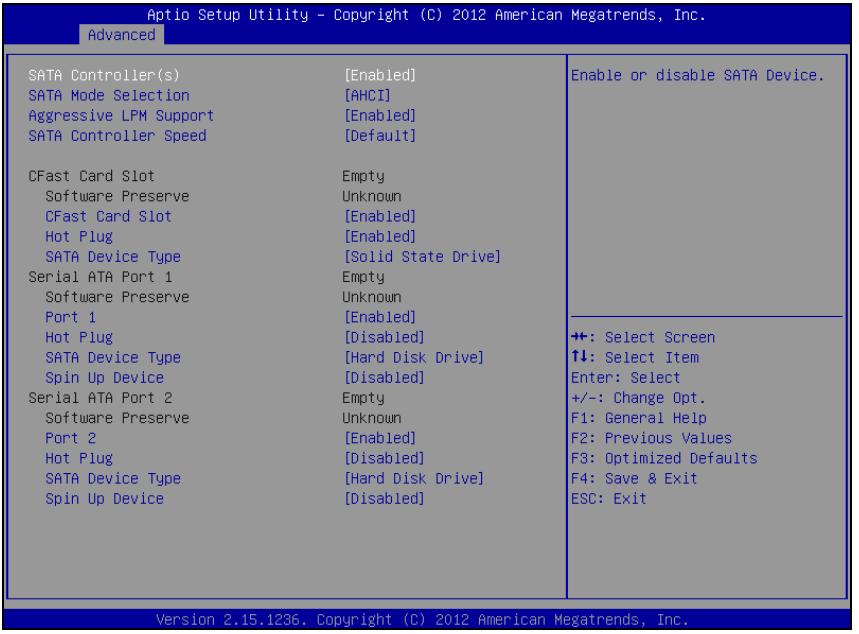
BIOS Setting	Options	Description/Purpose
Processor Type	No changeable options	Displays the current processor model number and its frequency.
CPU Signature	No changeable options	Displays processor's stepping.
Processor Family	No changeable options	Displays processor's family model.

BIOS Setting	Options	Description/Purpose
Microcode Patch	No changeable options	Displays processor's microcode update revision.
FSB Speed	No changeable options	Displays FSB frequency.
Max CPU Speed	No changeable options	Shows maximal supported processor frequency with Turbo mode enabled.
Min CPU Speed	No changeable options	Shows minimal supported processor frequency.
CPU Speed	No changeable options	Displays the current processor frequency.
Processor Cores	No changeable options	Displays information about number of physical cores in processor.
Intel HT Technology	No changeable options	Reports if Intel Hyper-Threading Technology is supported by processor.
Intel VT-x Technology	No changeable options	Displays hardware support for virtualization Intel Virtualization Technology (VT-x) status.
Intel SMX Technology	No changeable options	Shows processor ability for Safer Mode Extensions (SMX), enhanced version of Intel (Trusted Execution Technology) TXT.
64-bit	No changeable options	Reports if processor supports Intel x86-64 (amd64) implementation.
EIST Technology	No changeable options	Checks Intel Enhanced SpeedStep feature status.
CPU C3 State	No changeable options	Reports processor support for C3 state.
CPU C6 State	No changeable options	Reports processor support for C6 state.
CPU C7 State	No changeable options	Reports processor support for C7 state.
L1 Data Cache	No changeable options	Displays amount of Level 1 cache for data.
L1 Code Cache	No changeable options	Displays amount of Level 1 cache for instructions.

BIOS Setting	Options	Description/Purpose
L2 Cache	No changeable options	Displays amount of Level 2 cache.
L3 Cache	No changeable options	Displays amount of Level 3 cache.
Intel HT Technology	No changeable options	Reports if Intel Hyper-Threading Technology is supported by processor.
Hyper-threading	-Disabled -Enabled	When disabled, only one thread per active core will operate.
Active Processor Cores	-All -1	Controls number of active physical cores in processor.
Limit CPUID Maximum	-Disabled -Enabled	Enables for legacy operating systems to boot processors with extended CPUID (CPU Identification) functions.
Execute Disable Bit	-Disabled -Enabled	Enables the NX bit (No eXecute) security feature (if supported by operating system).
Intel Virtualization Technology	-Disabled -Enabled	Enables or disables Intel Virtualization Technology (VT-x). Takes affect only after power cycling.
Hardware Prefetcher	-Disabled -Enabled	Enables capability for bringing data or instructions from memory into the cache before they are needed.
Adjacent Cache Line Prefetch	-Disabled -Enabled	Ability for hardware prefetcher to fetch adjacent 64-byte cache line.
Boot performance mode	-Max Non-Turbo -Turbo Performance	Allows to pick which performance mode is used during boot stage.
EIST	-Disabled -Enabled	Enables Intel Enhanced SpeedStep feature for dynamic scaling processor frequency.
CPU C states	-Disabled -Enabled	Enables or disables idle C states in processor.

BIOS Setting	Options	Description/Purpose
Package C State limit	-C0/C1 -C2 -C3 -C6 -C7 -C7s -AUTO	Controls C state limit on package level.

4-4-4. SATA Configuration [Enabled]



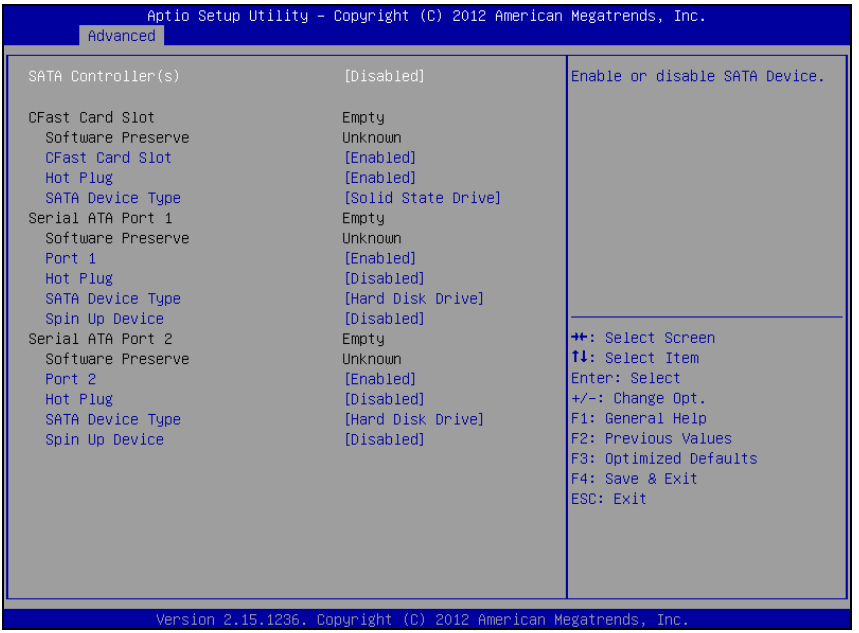
SATA Configuration screen

BIOS Setting	Options	Description/Purpose
SATA Controller(s)	-Disabled -Enabled	Enables SATA controller.
SATA Mode Selection	-AHCI -RAID -IDE	Configures SATA devices as AHCI, RAID or IDE (please note that RAID is available on QM87 chipset only). It is not advised to change this option once the operating system is installed.
Aggressive LPM Support	-Disabled -Enabled	Aggressive Link Power Management (LPM) feature adds ability to enter low-power states during inactivity periods (with a drawback in form of increased latency).

SATA Controller Speed	-Default -Gen1 -Gen2 -Gen3	Configures SATA (only when set as AHCI) interface: Gen1 mode sets the device to 1.5 Gbit/s speed. Gen2 mode sets the device to 3 Gbit/s speed (in case it is compatible). Gen3 mode sets the device to 6 Gbit/s speed (in case it is compatible).
CFast Card Slot	No changeable options	Displays device ID plugged in CFast slot (if any).
Software Preserve	No changeable options	Indicates whether SATA device supports SSP (Software Settings Preservation) or not.
CFast Card Slot	-Disabled -Enabled	Allows controlling specific SATA port.
Hot Plug	-Disabled -Enabled	Enables Hot Plug feature on CFast card slot (if supported by the device).
SATA Device Type	-Hard Disk Drive -Solid State Drive	Option to select appropriate type of SATA device.
Serial ATA Port 1	No changeable options	Displays device ID plugged in SATA port 1 (if any).
Software Preserve	No changeable options	Indicates whether SATA device supports SSP (Software Settings Preservation) or not.
Port 1	-Disabled -Enabled	Allows controlling specific SATA port.
Hot Plug	-Disabled -Enabled	Enables Hot Plug feature on SATA port 1 (if supported by the device).
SATA Device Type	-Hard Disk Drive -Solid State Drive	Option to select appropriate type of SATA device.
Spin Up Device	-Disabled -Enabled	For hard disk SATA devices, it is possible to enable to spin up the drive in advance.
Serial ATA Port 2	No changeable options	Displays device ID plugged in SATA port 2 (if any).

Software Preserve	No changeable options	Indicates whether SATA device supports SSP (Software Settings Preservation) or not.
Port 2	-Disabled -Enabled	Allows controlling specific SATA port.
Hot Plug	-Disabled -Enabled	Enables Hot Plug feature on SATA port 2 (if supported by the device).
SATA Device Type	-Hard Disk Drive -Solid State Drive	Option to select appropriate type of SATA device.
Spin Up Device	-Disabled -Enabled	For hard disk SATA devices, it is possible to enable to spin up the drive in advance.

4-4-5. SATA Configuration [Disabled]



SATA Configuration screen

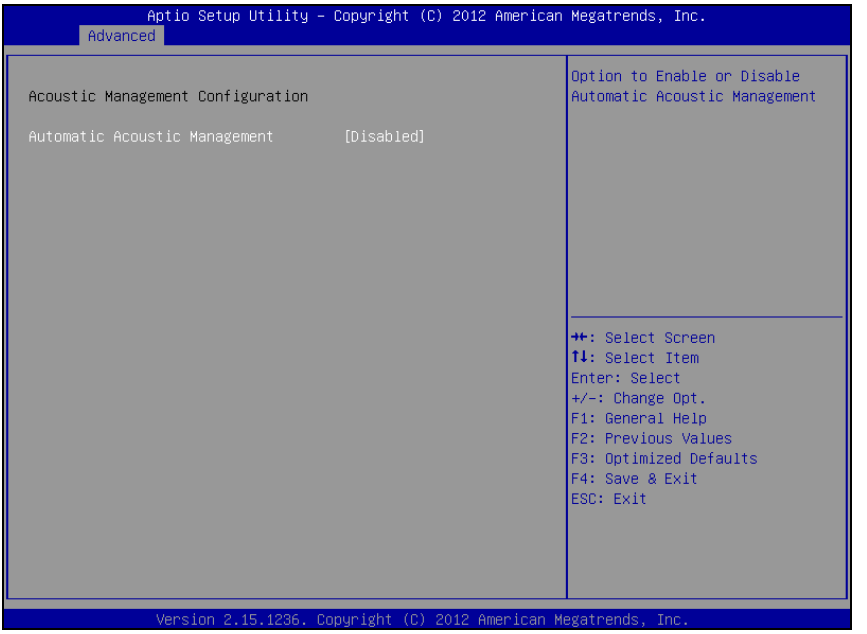
BIOS Setting	Options	Description/Purpose
SATA Controller(s)	-Disabled -Enabled	Enables SATA controller.
CFast Card Slot	No changeable options	Displays device ID plugged in CFast slot (if any).
Serial ATA Port 1	No changeable options	Displays device ID plugged in SATA port 1 (if any).
Serial ATA Port 2	No changeable options	Displays device ID plugged in SATA port 2 (if any).

4-4-6. Intel® Rapid Start Technology

Intel Rapid Start Technology screen

BIOS Setting	Options	Description/Purpose
Intel(R) Rapid Start Technology	-Disabled -Enabled	Enables Intel Rapid Start Technology feature (additional steps involving partitioning the solid state drive are required).

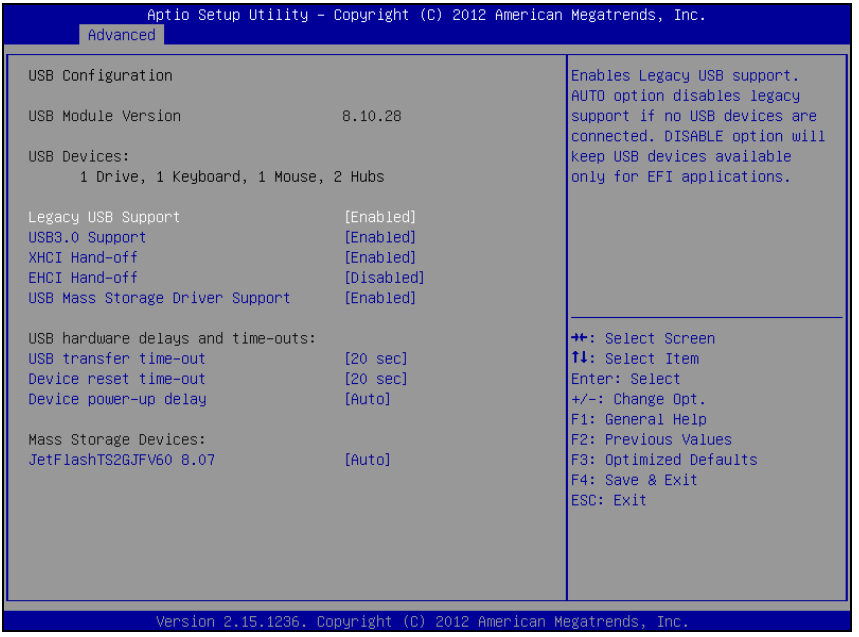
4-4-7. Acoustic Management Configuration



Acoustic Management Configuration screen

BIOS Setting	Options	Description/Purpose
Automatic Acoustic Management	-Disabled -Enabled	Enables Acoustic Management feature which could be found on many modern HDD.

4-4-8. USB Configuration

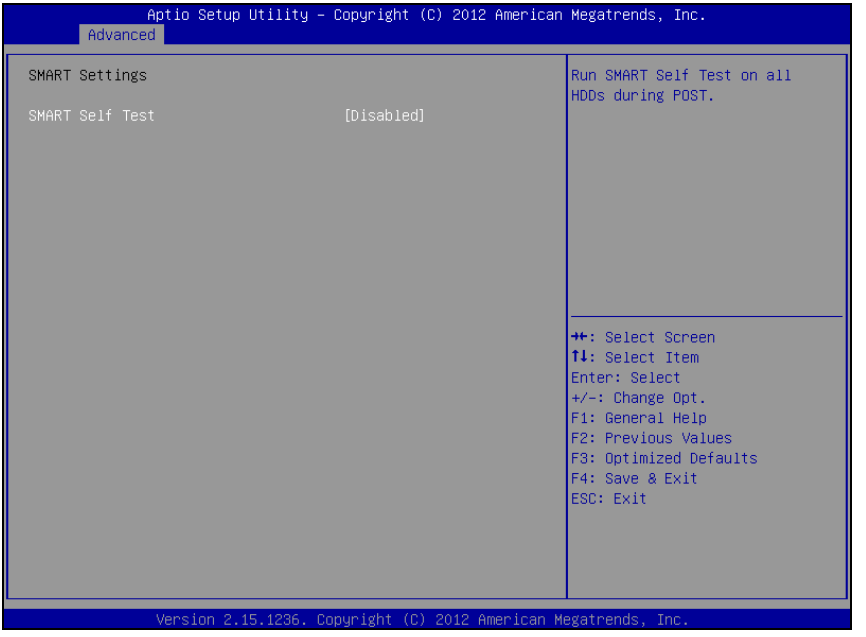


USB Configuration screen

BIOS Setting	Options	Description/Purpose
USB Module Version	No changeable options	Indicates USB module version number.
USB Devices	No changeable options	Reports number and type of connected USB device(s) (if any).
Legacy USB Support	-Disabled -Enabled -Auto	Enables support for USB in legacy operating systems (e.g. MS-DOS, Windows NT).
EHCI Hand-off	-Disabled -Enabled	When enabled it allows BIOS support control of the EHCI controller and the OS hand-off synchronization capability.

BIOS Setting	Options	Description/Purpose
USB transfer time-out	-1 sec -5 sec -10 sec -20 sec	Specifies time-out value for Control, Bulk and Interrupt transfers.
Device reset time-out	-10 sec -20 sec -30 sec -40 sec	Specifies the value for device reset timeout.
Device power-up delay	-Auto -Manual	Specifies maximum time it would take for USB device to report itself to the controller. If set to auto, it would use default values (100 ms for root port) and value read from hub descriptor in case of hub port.
Mass Storage Devices: [drive(s)]	-Auto -Floppy -Forced FDD -Hard Disk -CD-ROM	Appears only when USB flash drive is plugged in. Allows selecting which emulation to use on available drive(s). **Note:** The sector size of your USB drive should be emulated device native sector size.

4-4-9. SMART Settings



SMART Settings screen

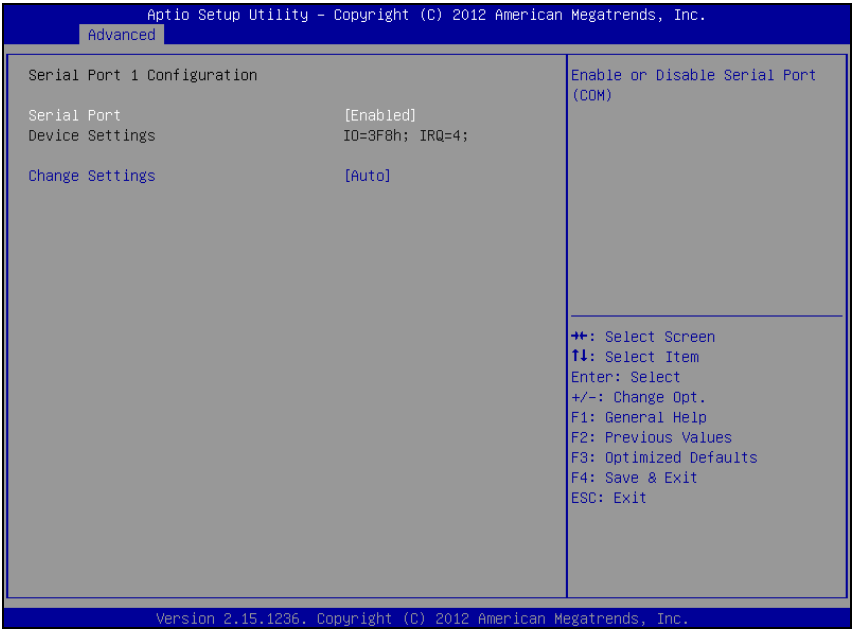
BIOS Setting	Options	Description/Purpose
SMART Self Test	-Disabled -Enabled	Enables S.M.A.R.T. (Self-Monitoring, Analysis and Reporting Technology) feature to be found on most modern HDD/SSD.

4-4-10. NCT6102D Super IO Configuration

NCT6102D Super IO Configuration screen

BIOS Setting	Options	Description/Purpose
NCT6102D Super IO Chip	No changeable options	Shows Super IO manufacturer and model.
Serial Port 1 Configuration	Sub-menu	Enters menu to configure serial port 1.
Serial Port 2 Configuration	Sub-menu	Enters menu to configure serial port 2.

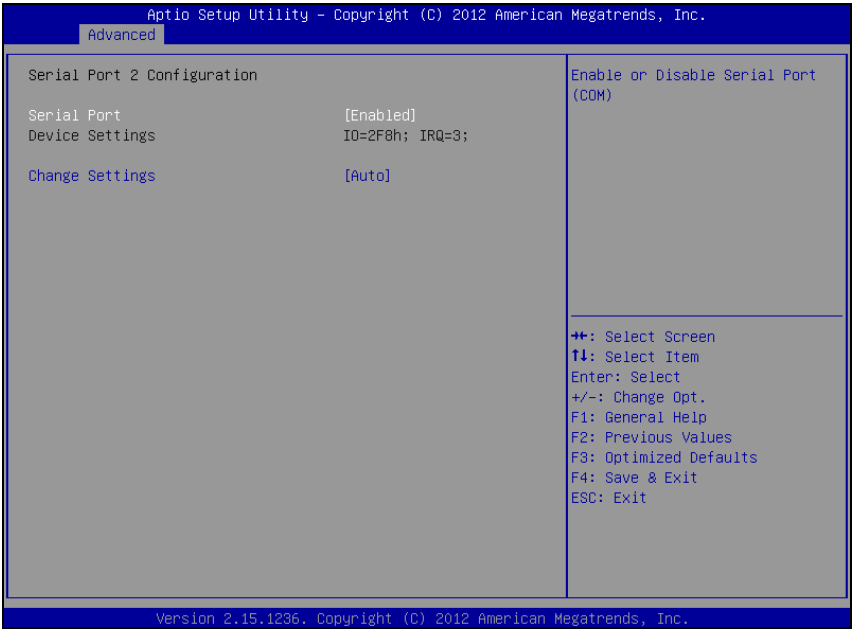
4-4-10-1. NCT6102D Super IO Configuration – Serial Port 1 Configuration



Serial Port 1 Configuration screen

BIOS Setting	Options	Description/Purpose
Serial Port	-Disabled -Enabled	Configures the serial port 1.
Device Settings	No changeable options	Shows current settings applied to the serial port.
Change Settings	-Auto -IO=3F8h; IRQ=4; -IO=3F8h; IRQ=3,4,5,6,7,10,11,12; -IO=2F8h; IRQ=3,4,5,6,7,10,11,12; -IO=3E8h; IRQ=3,4,5,6,7,10,11,12; -IO=2E8h; IRQ=3,4,5,6,7,10,11,12;	Specifies the base I/O address and interrupt request for the serial port 1 if enabled.

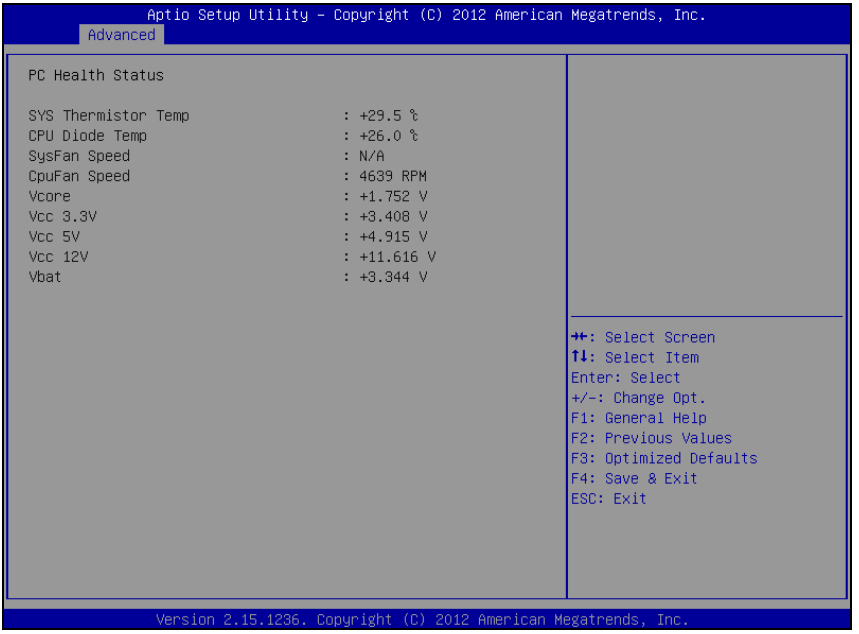
4-4-10-2. NCT6102D Super IO Configuration – Serial Port 2 Configuration



Serial Port 2 Configuration screen

BIOS Setting	Options	Description/Purpose
Serial Port	-Disabled -Enabled	Configures the serial port 2.
Device Settings	No changeable options	Shows current settings applied to the serial port.
Change Settings	-Auto -IO=3F8h; IRQ=4; -IO=3F8h; IRQ=3,4,5,6,7,10,11,12; -IO=2F8h; IRQ=3,4,5,6,7,10,11,12; -IO=3E8h; IRQ=3,4,5,6,7,10,11,12; -IO=2E8h; IRQ=3,4,5,6,7,10,11,12;	Specifies the base I/O address and interrupt request for the serial port 2 if enabled.

4-4-11. NCT6102D Hardware Monitor

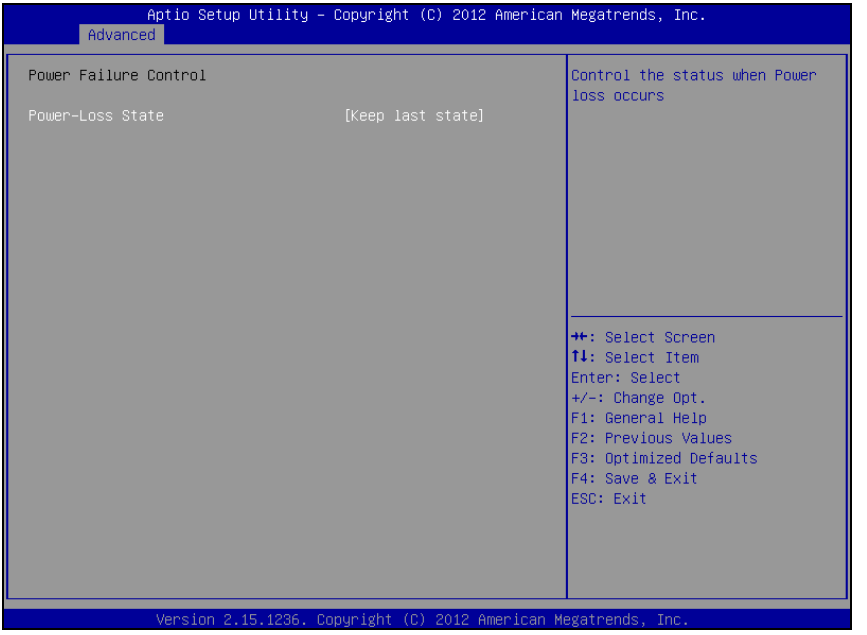


NCT6102D Hardware monitor screen

BIOS Setting	Options	Description/Purpose
System Thermistor Temp	No changeable options	Monitors system temperature in degree Celsius.
CPU Diode Temp	No changeable options	Shows processor temperature in degree Celsius.
SysFan Speed	No changeable options	Monitors system fan's RPM (if connected).
CpuFan Speed	No changeable options	Monitors processor fan's RPM (if connected).
Vcore	No changeable options	Shows actual voltage of processor core in volt.
Vcc 3.3V	No changeable options	Monitors 3.3V voltage rail (in volt).
Vcc 5V	No changeable options	Monitors 5V section (in volt).

BIOS Setting	Options	Description/Purpose
Vcc 12V	No changeable options	Reports on 12V section (in volt).
Vbat	No changeable options	Monitors battery voltage (in volt).

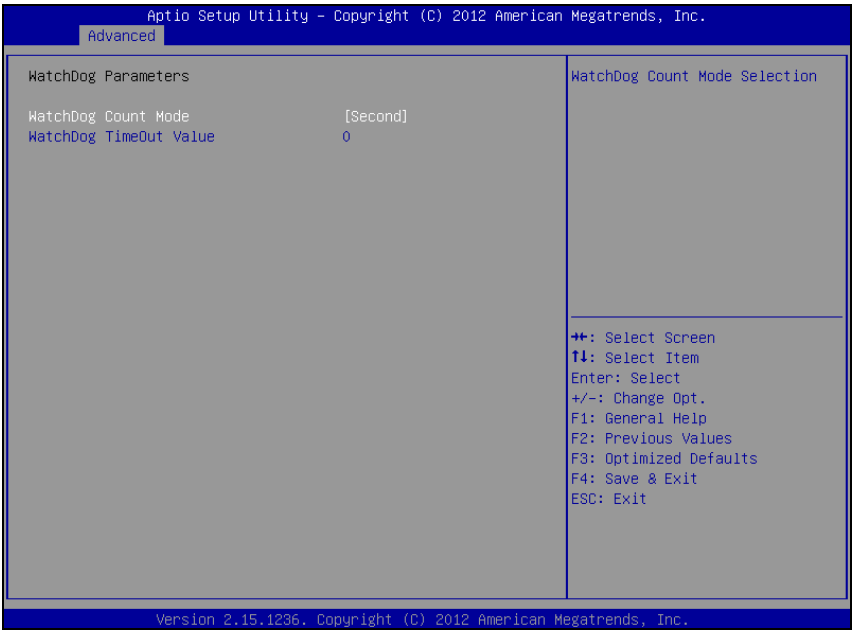
4-4-12. Power Failure Control



Power Failure Control screen

BIOS Setting	Options	Description/Purpose
Power-Loss State	-Power Off -Power On -Keep Last State	Section to configure the board behavior if sudden loss of power should occur.

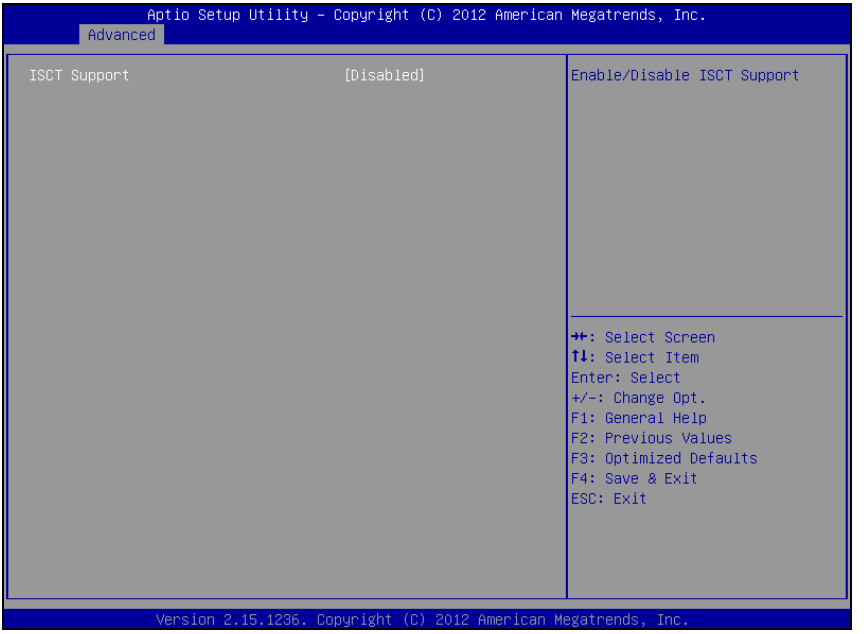
4-4-13. Watchdog Configuration



Watchdog Configuration screen

BIOS Setting	Options	Description/Purpose
Watchdog Timer	-Second -Minute	Selects time unit for watchdog timer feature.
WatchDog TimeOut Value	Multiple options ranging from 0 to 255	Sets the desired value (in seconds) for watchdog timeout. Setting value '0' means the watchdog is disabled.

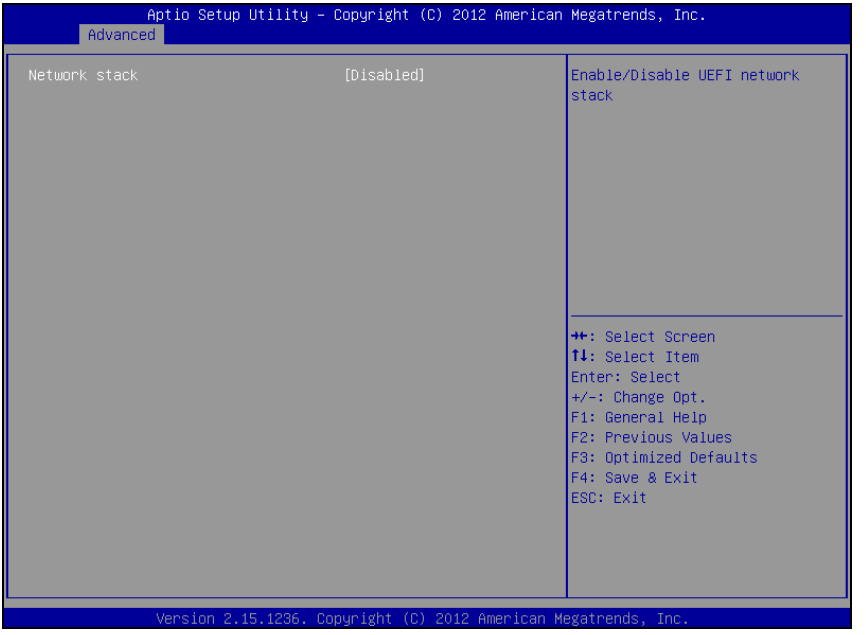
4-414. Intel® Smart Connect Technology



Intel Smart Connect Technology screen

BIOS Setting	Options	Description/Purpose
ISCT Support	-Disable -Enabled	Enables Intel Smart Connect Technology feature (additional steps involving operating system driver installation might be required).

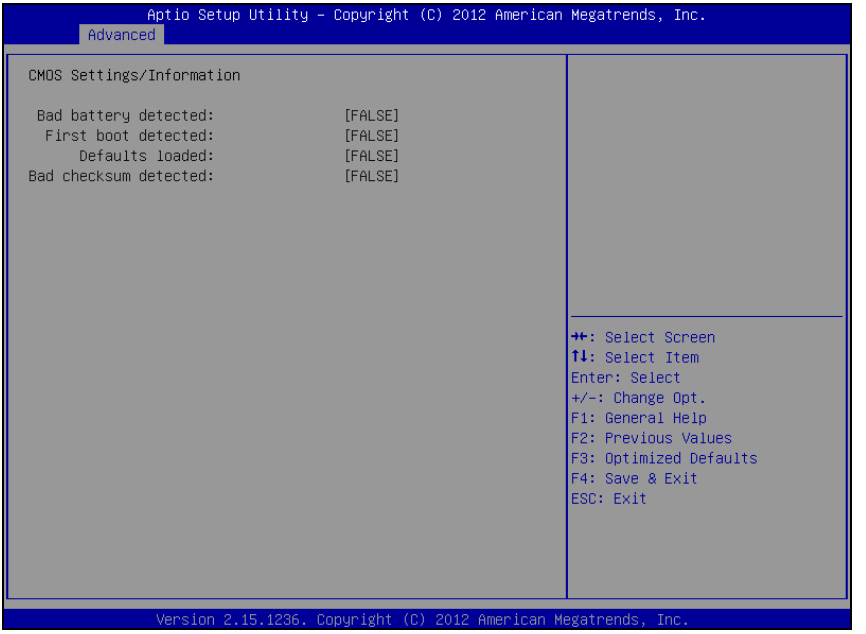
4-4-15. Network Stack



Network Stack screen

BIOS Setting	Options	Description/Purpose
Network stack	-Disable -Enabled	Allows for enabling network capability during DXE stage and in UEFI shell.

4-4-16. CMOS



CMOS screen

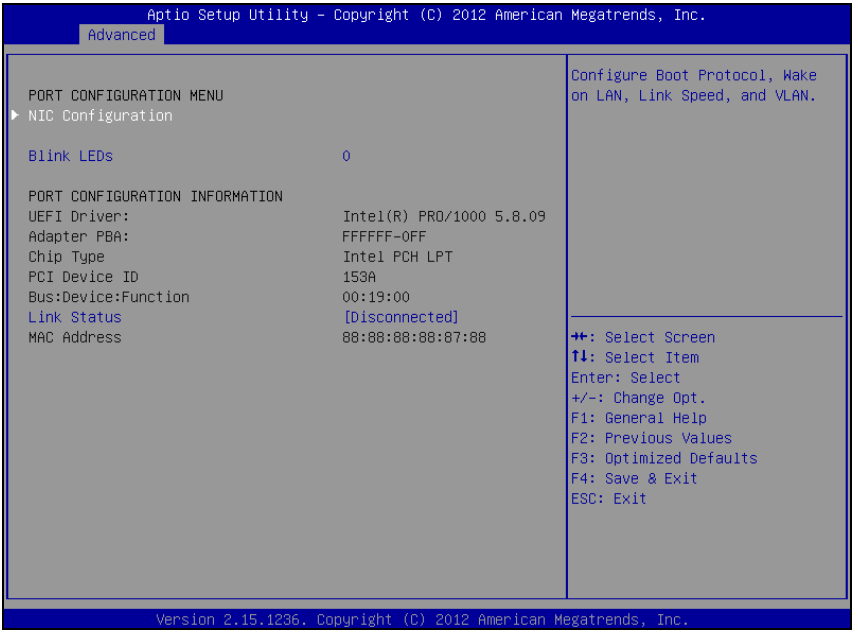
BIOS Setting	Options	Description/Purpose
Bad battery detected	No changeable options	Informs about low voltage on CMOS backup battery. Please replace the battery.
First boot detected	No changeable options	Shows that this is first boot after updating BIOS.
Defaults loaded	No changeable options	Confirms that loaded default values has been selected and loaded.
Bad checksum detected	No changeable options	Informs about CMOS memory bad checksum.

4-4-17. Switchable Graphics

Switchable Graphics screen

BIOS Setting	Options	Description/Purpose
SG Mode Select	No changeable options	Displays current state of graphics system configuration, for instance whether external PCIe graphics card is inserted or not.

4-4-18. Intel® Ethernet Connection I217-LM



Intel Ethernet Connection I217-LM screen

BIOS Setting	Options	Description/Purpose
NIC Configuration	Sub-menu	Enters further adapter configuration.
Blink LEDs	Multiple options ranging from 0 to 15	To identify port easily, entered value (in seconds) corresponds to period of time its LED would be blinking.
UEFI Driver	No changeable options	Displays UEFI driver version for this device.
Adapter PBA	No changeable options	Displays GbE device serial number.
Chip Type	No changeable options	Indentifies whether GbE is part of chipset or standalone chip.

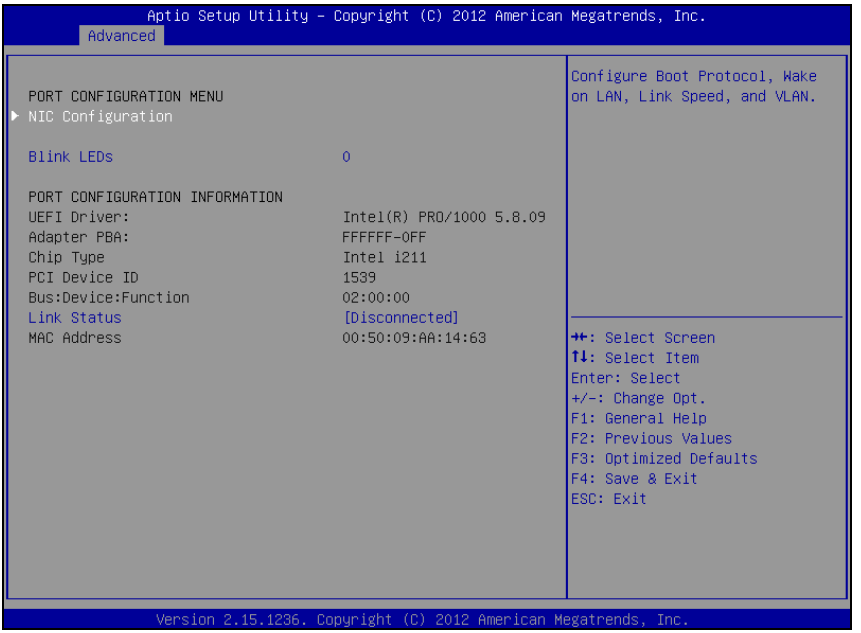
BIOS Setting	Options	Description/Purpose
PCI Device ID	No changeable options	Displays device's unique identification.
Bus:Device:Function	No changeable options	Displays device's PCI address.
Link Status	No changeable options	Indicates whether link has been established or not.
MAC Address	No changeable options	Shows MAC address for this GbE device.

4-4-18-1. Intel® Ethernet Connection I217-LM - NIC Configuration

NIC Configuration screen

BIOS Setting	Options	Description/Purpose
Link Speed	-Auto Negotiated -10 Mbps Half -10 Mbps Full -100 Mbps Half -100 Mbps Full	Allows configuring link speed on GbE device manually or automatically.
Wake On LAN	-Disabled -Enabled	Option to control Wake on LAN feature for this particular GbE device.

4-4-19. Intel® I211 Gigabit Network Connection

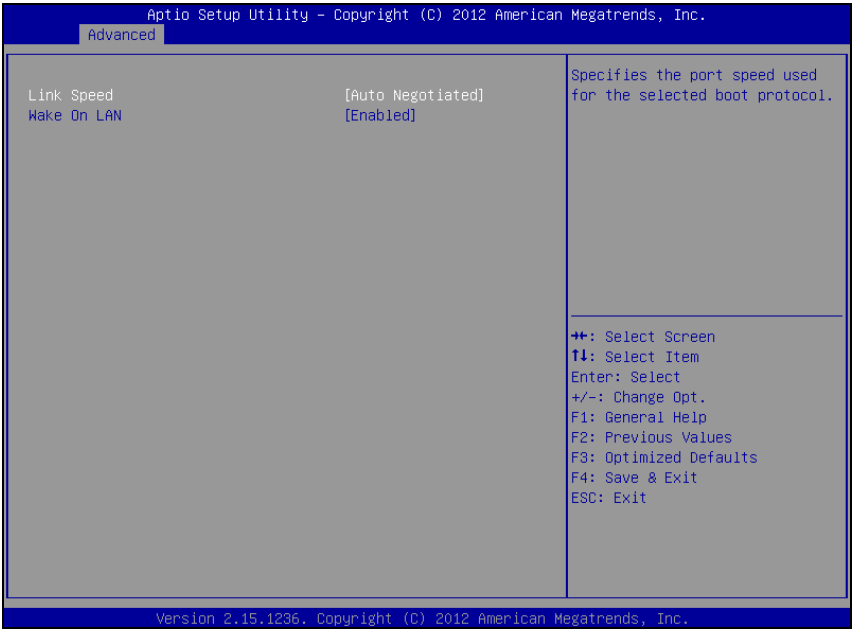


Intel I211 Gigabit Network Connection screen

BIOS Setting	Options	Description/Purpose
NIC Configuration	Sub-menu	Enters further adapter configuration.
Blink LEDs	Multiple options ranging from 0 to 15	To identify port easily, entered value (in seconds) corresponds to period of time its LED would be blinking.
UEFI Driver	No changeable options	Displays UEFI driver version for this device.
Adapter PBA	No changeable options	Display GbE device serial number.
Chip Type	No changeable options	Indentifies whether GbE is part of chipset or standalone chip.
PCI Device ID	No changeable options	Displays device's unique identification.

BIOS Setting	Options	Description/Purpose
Bus:Device:Function	No changeable options	Displays device's PCI address.
Link Status	No changeable options	Indicates whether link has been established or not.
MAC Address	No changeable options	Shows MAC address for this GbE device.
Virtual MAC Address	Multiple options based on MAC address values	Allows for entering virtual MAC address for this GbE device.

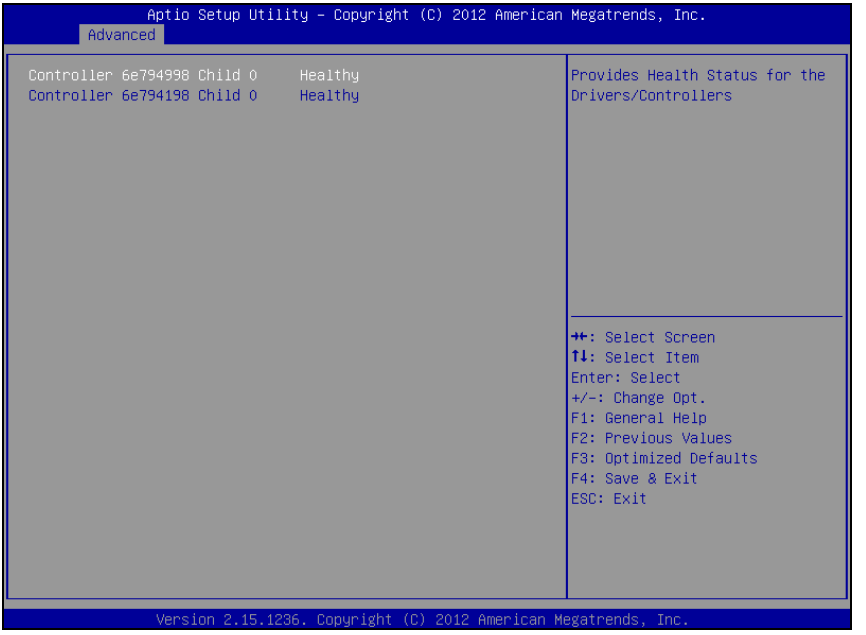
4-4-19-1. Intel® I211 Gigabit Network Connection – NIC Configuration



NIC Configuration screen

BIOS Setting	Options	Description/Purpose
Link Speed	-Auto Negotiated -10 Mbps Half -10 Mbps Full -100 Mbps Half -100 Mbps Full	Allows configuring link speed on GbE device manually or automatically.
Wake On LAN	-Disabled -Enabled	Option to control Wake on LAN feature for this particular GbE device.

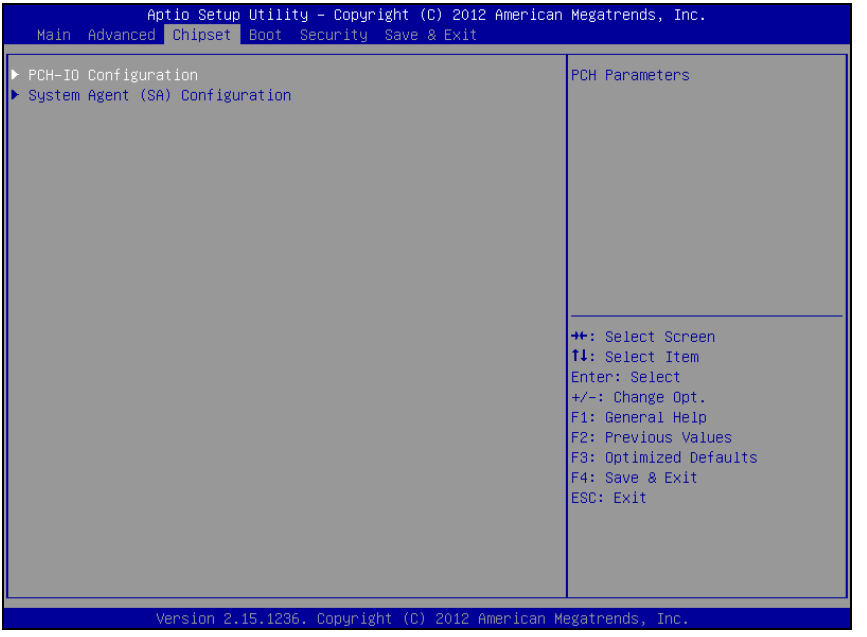
4-4-20. Driver Health



Driver Health screen

BIOS Setting	Options	Description/Purpose
Controller 6e794998 Child 0	No changeable options	Displays GbE driver's health status.
Controller 6e794198 Child 0	No changeable options	Shows GbE driver's health status.

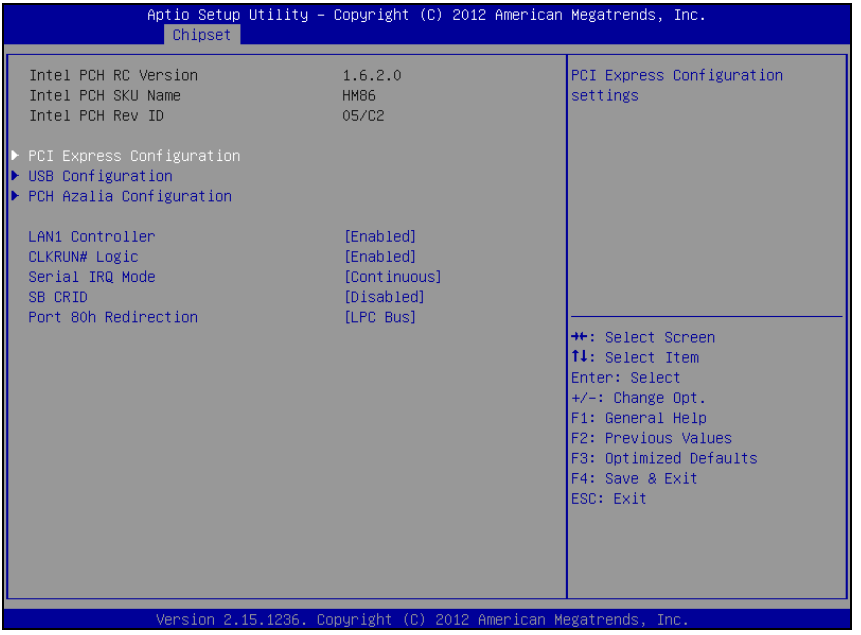
4-5. CHIPSET



Chipset screen

BIOS Setting	Options	Description/Purpose
PCH-IO Configuration	Sub-menu	Enters menu to configure integrated graphics & memory related items.
System Agent (SA) Configuration	Sub-menu	Enters menu to configure audio, USB and other items.

4-5-1. PCH-IO Configuration

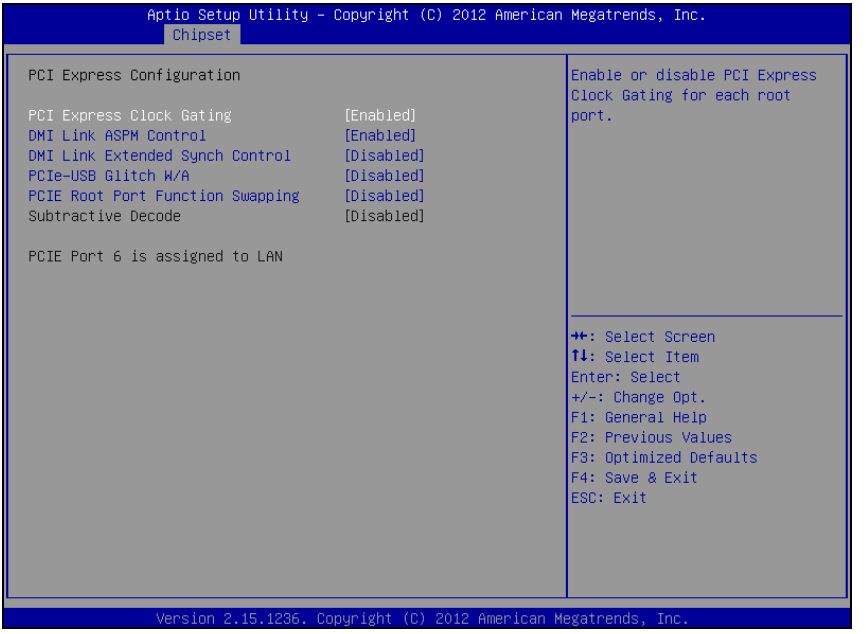


PCH-IO Configuration screen

BIOS Setting	Options	Description/Purpose
Intel PCH RC Version	No changeable options	Displays UEFI module version for chipset.
Intel PCH SKU Name	No changeable options	Shows chipset model name.
Intel PCH Rev ID	No changeable options	Displays chipset's stepping version.
PCI Express Configuration	Sub-menu	--
USB Configuration	Sub-menu	Enters menu to configure audio and USB devices.
PCH Azalia Configuration	Sub-menu	Enters menu to configure audio and USB devices.

BIOS Setting	Options	Description/Purpose
LAN1 Controller	-Disabled -Enabled	Controls chipset internal PHY GbE device.
CLKRUN# Logic	-Disabled -Enabled	Enables CLKRUN# logic to control the system PCI 33 MHz clock (used by LPC peripherals or other legacy devices).
Serial IRQ Mode	-Continuous -Quiet	Selects which mode to use for IRQ Mode, quiet (every device can start communication) or continuous (only host controller can initiate it).
SB CRID	-Disabled -Enabled	Compatible Revision Identification (CRID) for chipset intended for forward compatibility. OS image built on the earlier stepping to be used on any new stepping(s) (if marked by Intel as compatible).
Port 80h Redirection	-LPC Bus -PCIE Bus	Selects to which location debug port information would be send.

4-5-1-1. PCH-IO Configuration – PCI Express Configuration

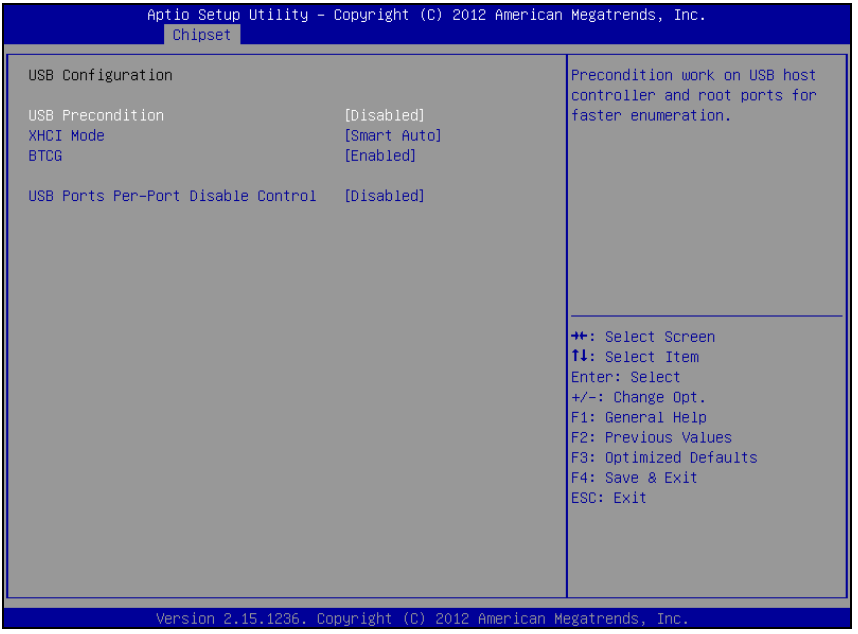


PCI Express Configuration screen

BIOS Setting	Options	Description/Purpose
PCI Express Clock Gating	-Disabled -Enabled	Controls clock gating function on PCIe devices.
DMI Link ASPM Control	-Disabled -Enabled	Option to control ASPM (Active State Power Management) on both sides of the DMI link.
DMI Link Extended Sync Control	-Disabled -Enabled	Enables or disables extended synchronization on DMI link.
PCIe-USB Glitch W/A	-Disabled -Enabled	Allows using PCIe-USB glitch workaround for bad USB devices connected behind the PCIe/PEG ports.

BIOS Setting	Options	Description/Purpose
PCIE Root Port Function Swapping	-Disabled -Enabled	Enables feature for PCIe endpoint to be inserted or removed from a PCIe system gracefully.
Subtractive Decode	-Disabled -Enabled	Controls subtractive decode function (if supported by the device).
PCIE Port 6 is assigned to LAN	No changeable options	Informs about GbE LAN device location (hardwired by hardware design decision).

4-5-1-2. PCH-IO Configuration – USB Configuration



USB Configuration screen

BIOS Setting	Options	Description/Purpose
USB Precondition	-Disabled -Enabled	By default set as disabled, in which USB initialization happens in DXE stage as usually. When selected enabled USB initialization is forced to take place during PEI stage as part of 2 seconds Fast Boot BIOS optimization.
XHCI Mode	-Auto -Smart Auto -Disabled -Enabled	Various methods to control USB 3.0 controller behavior. When set to enabled USB speed is always set to USB 3.0 as opposed to disabled which forces speed to USB 2.0 at all times.

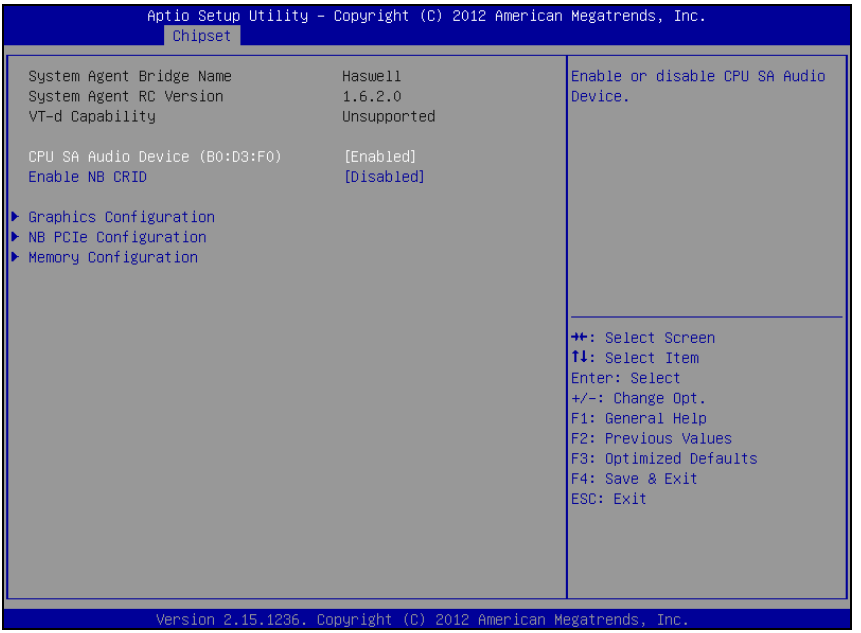
BIOS Setting	Options	Description/Purpose
		Option auto sets USB 2.0 speed during POST & booting to Windows and USB 3.0 speed in Windows itself, while smart auto means speed would be set always USB 3.0 once USB devices is recognized in Windows as USB 3.0 capable.
BTCG	-Disabled -Enabled	Enables or disables trunk clock gating.
USB Ports Per-Port Disable Control	-Disabled -Enabled	Allowing control USB precisely by each port.

4-5-1-3. PCH-IO Configuration – PCH Azalia Configuration

PCH Azalia Configuration screen

BIOS Setting	Options	Description/Purpose
Azalia	-Auto -Disabled -Enabled	Controls Intel HD Audio controller (please note, audio feature supported only if Protech PDB-A3010 card is connected).

4-5-2. System Agent (SA) Configuration

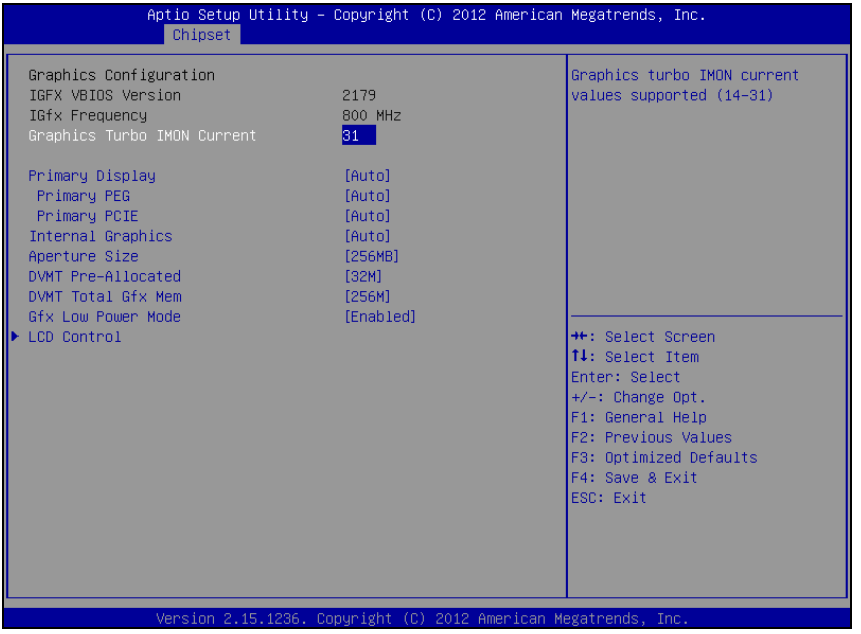


System Agent Configuration screen

BIOS Setting	Options	Description/Purpose
System RC Version	No changeable options	Displays current Intel Reference Code version.
VT-d Capability	No changeable options	Displays chipset's support for Intel VT-d
VT-d	-Disabled -Enabled	Enables Intel Virtualization Technology for Directed I/O (Intel VT-x must be enabled first) if supported by chipset (QM87 only).
CPU SA Audio Device (B0:D3:F0)	-Disabled -Enabled	Controls Intel Display Audio feature.
Enable NB CRID	-Disabled -Enabled	Revision Identification (RID) for processor intended for forward compatibility.

BIOS Setting	Options	Description/Purpose
Graphics Configuration	Sub-menu	Enters menu to deal with graphics configuration settings.
NB PCIe Configuration	Sub-menu	Menu to control additional settings for PCIe add-on cards.
Memory Configuration	Sub-menu	Allows controlling memory controller related options.

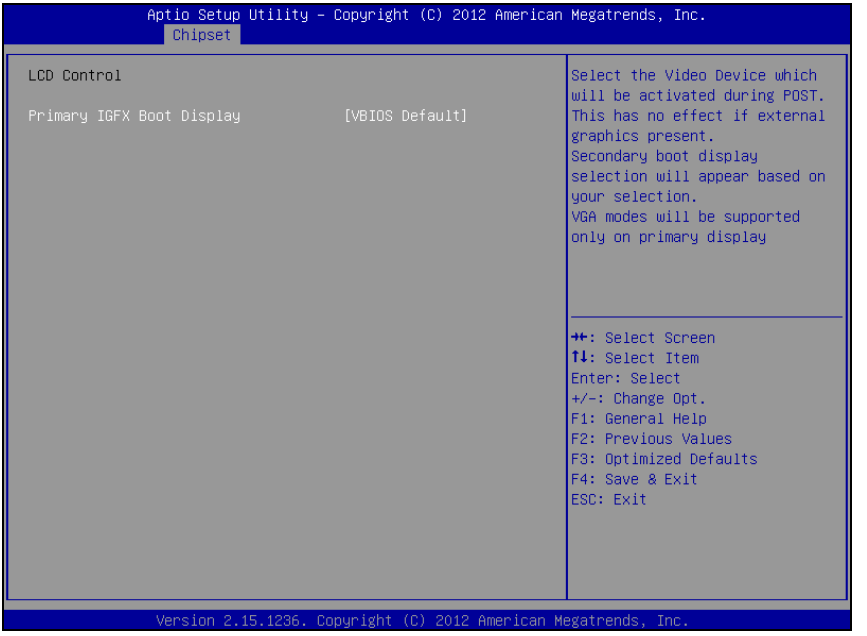
4-5-2-1. System Agent (SA) Configuration – Graphics Configuration



Graphics Configuration screen

BIOS Setting	Options	Description/Purpose
IGFX VBIOS Version	No changeable options	Displays Intel VBIOS version.
IGfx Frequency	No changeable options	Reports about graphics engine current frequency.
Graphics Turbo IMON Current	Multiple options ranging from 14 to 31	Controls value for IMON, which is an analog output signal proportional to the voltage regulator's total output load current.
Primary Display	-Auto -IGFX -PEG -PCIE -SG	Allows controlling which device (if applicable) is going to be used for graphical output initially.

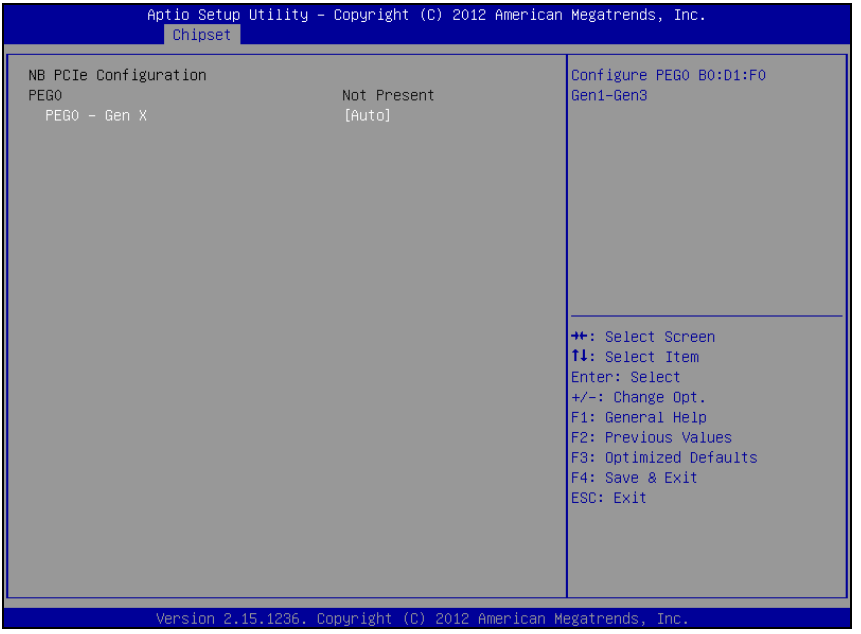
BIOS Setting	Options	Description/Purpose
Internal Graphics	-Auto -Disabled -Enabled	Controls internal graphics engine (which could be disabled if discrete graphical card is being used).
Aperture Size	-128M -256M -512M	Specifies the size of the graphics memory aperture in function
DVMT Pre-Allocated	-32M -64M -… -1024M	Selects how big portion of main memory is going to be allocated for Intel Dynamic Video Memory Technology (DVMT).
DVMT Total Gfx Mem	-128M -256M -MAX	Controls amount of Dynamic Video Memory Technology (DVMT) total memory size for graphics engine.
Gfx Low Power Mode	-Disabled -Enabled	Selects support for graphics engine low power mode.
LCD Control	Sub-menu	Enters menu to configure active graphics output during boot.



LCD Control screen

BIOS Setting	Options	Description/Purpose
IGFX - Boot Type	-VBIOS Default -CRT -EFP	Selects which screen is going to be active on power on. DisplayPort is utilized by EFP (this option also applies to add-on DP to LVDS card).

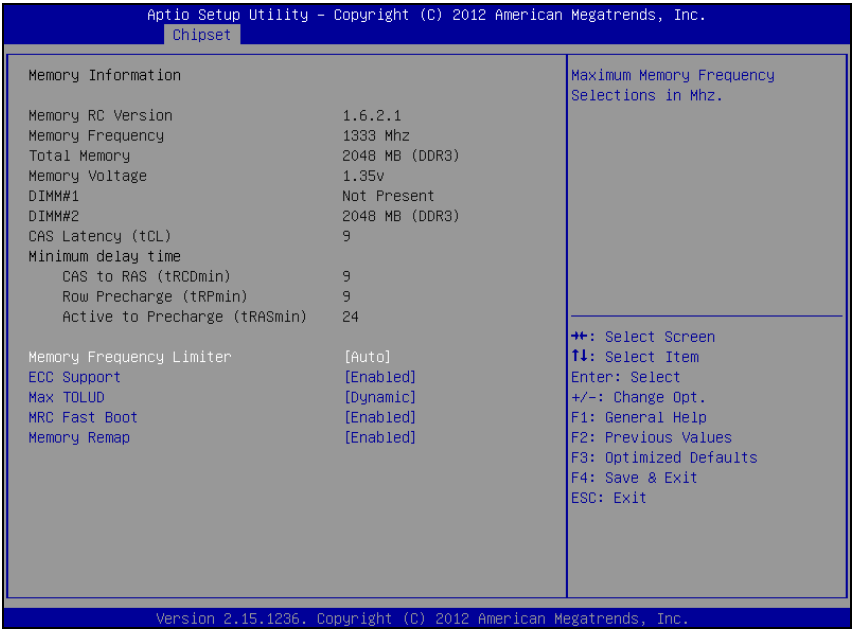
4-5-2-2. System Agent (SA) Configuration – NB PCIe Configuration



MB PCIe Configuration screen

BIOS Setting	Options	Description/Purpose
PEG0	No changeable options	Displays PCIe graphical card device (if inserted).
PEG0 - Gen X	-Auto -Gen1 -Gen2 -Gen3	Allows controlling which mode is used for PCIe device (if inserted). This could resolve potential compatibility issues.

4-5-2-3. System Agent (SA) Configuration – Memory Configuration



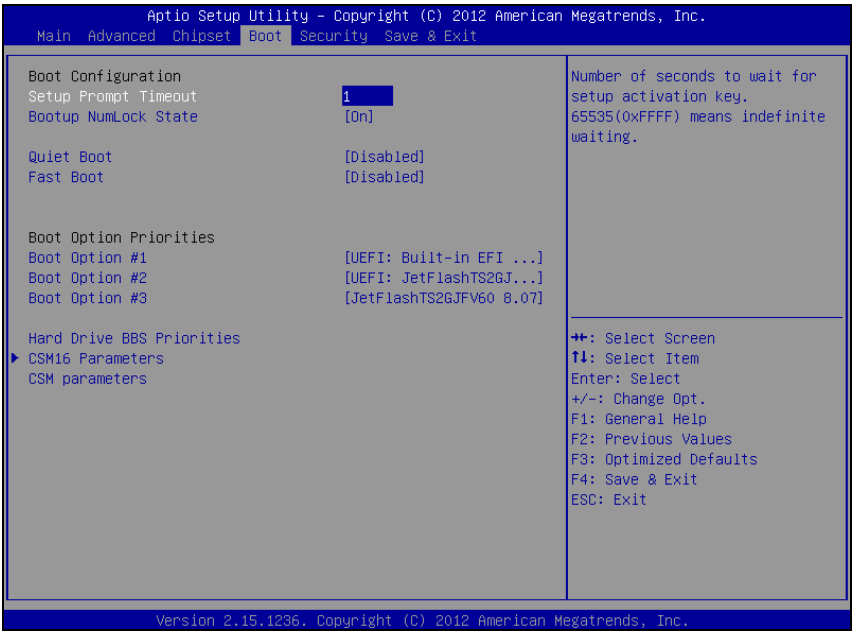
Memory Configuration screen

BIOS Setting	Options	Description/Purpose
Memory RC Version	No changeable options	Reports Intel Memory Reference Code (MRC) version.
Memory Frequency	No changeable options	Displays operating memory current speed in MHz.
Total Memory	No changeable options	Reports current total memory size, e.g. “2048 MB”.
Memory Voltage	No changeable options	Indicates memory modules voltage (in order to distinguish between DDR3 and DDR3L modules).
DIMM#1	No changeable options	Displays current amount of memory in DIMM slot number 1, e.g. “1024 MB”.

BIOS Setting	Options	Description/Purpose
DIMM#2	No changeable options	Displays current amount of memory in DIMM slot number 2, e.g. "1024 MB".
CAS Latency (tCL)	No changeable options	Displays specific value for memory module.
CAS to RAS (tRCDmin)	No changeable options	Displays specific value for memory module.
Row Precharge (tRPmin)	No changeable options	Displays specific value for memory module.
Active to Precharge (tRASmin)	No changeable options	Displays specific value for memory module.
Memory Frequency Limiter	-Auto -1067 -1333 -1600	Option to set memory module frequency (must be within limits of each module) in MHz.
ECC Support	-Disabled -Enabled	Software option to control ECC (error-correcting code) for operating memory.
Max TOLUD	-Dynamic -1 GB -1.25 GB -1.5 GB -1.75 GB -2 GB -2.25 GB -2.5 GB -2.75 GB -3 GB -3.25 GB	Ability to control range which extends from 1 MB to the top of Low Usable physical memory that is permitted to be accessible by the processor (as programmed in the TOLUD register).
MRC Fast Boot	-Disabled -Enabled	Selects MRC (Memory Reference Code) boot setting. Disabled MRC fast boot may help to resolve memory issues if encountered.

BIOS Setting	Options	Description/Purpose
Memory Remap	-Disabled -Enabled	Enables memory remapping above 4 GB border (capability to recover addressable memory space).

4-6. BOOT



Boot screen

BIOS Setting	Options	Description/Purpose
Setup Prompt Timeout	Multiple options ranging from 1 to 65535	Specifies number of seconds to wait for setup activation key (value 65535 results in indefinite waiting).
Bootup NumLock Status	-On -Off	Specifies the power-on state of the numlock feature on the numeric keypad of keyboard.
Quiet Boot	-Disabled -Enabled	When quiet boot is enabled, it displays AMI or OEM logo (if implemented) instead of POST messages during the boot.
Fast Boot	-Disabled -Enabled	When enabled, system would omit several non-critical devices initialization in order to speed up boot up time.

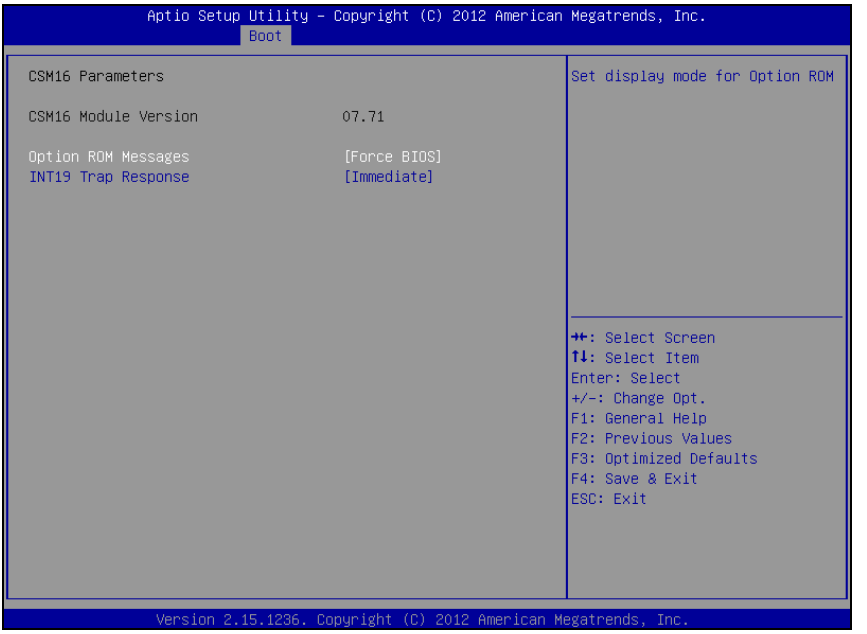
BIOS Setting	Options	Description/Purpose
Boot Option #1	-[USB/DVD/ hard drive(s)] -Built-in EFI shell -Disabled	Allows setting up boot option(s) from menu listed.

4-6-1. Hard Driver BBS Priorities

Hard Drive BBS Priorities screen

BIOS Setting	Options	Description/Purpose
Boot Option #1	-[drive(s)] -Disabled	Allows setting the boot order of available drive(s).

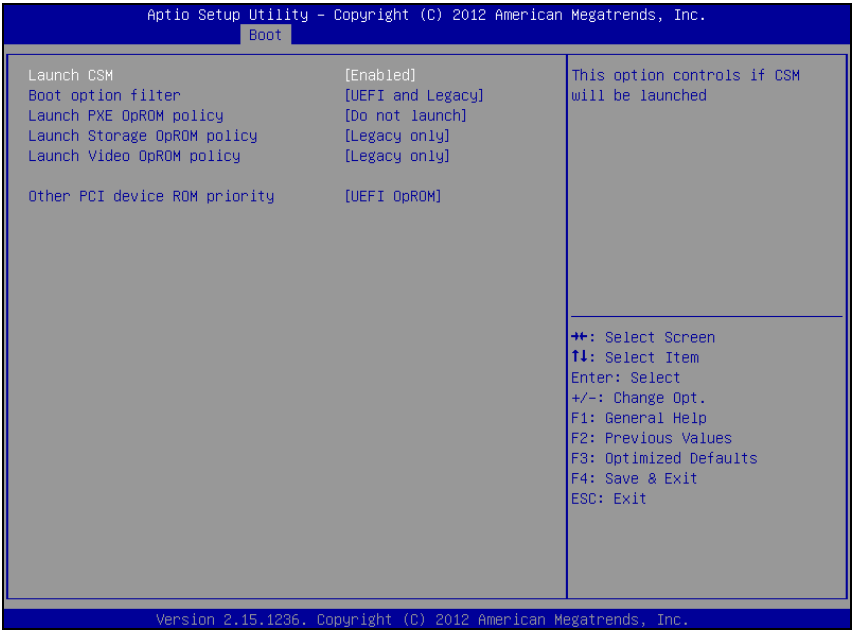
4-6-2. CSM16 Parameters



CSM16 Parameters screen

BIOS Setting	Options	Description/Purpose
Option ROM Messages	-Force BIOS -Keep Current	When set to Force BIOS it allows the POST screen to display Option ROM messages.
INT19 Trap Response	-Immediate -Postponed	When set to immediate the trap is executed right away in contrast to postponed which delays execution to legacy boot.

4-6-3. CSM Parameters

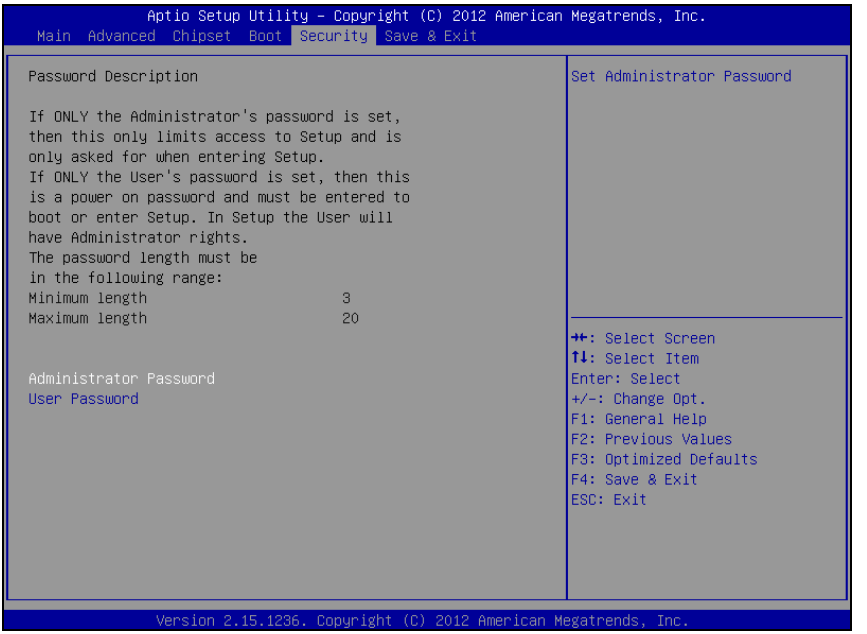


CSM Parameters screen

BIOS Setting	Options	Description/Purpose
Launch CSM	-Disabled -Enabled	Enables or disables Compatibility System Module (depends on operating system in use).
Boot option filter	-UEFI and Legacy -Legacy only -UEFI only	Set this option according to your operating systems installed.
Launch PXE OpROM policy	-Do not launch -UEFI only -Legacy only	Selection to control which Option ROM to use for PXE boot method.
Launch Storage OpROM policy	-Do not launch -UEFI only -Legacy only	Selection to control which Option ROM to use for storage system.

BIOS Setting	Options	Description/Purpose
Launch Video OpROM policy	-Do not launch -UEFI only -Legacy only	Allows to select between GOP (UEFI) and VBIOS (legacy) to handle graphics output.
Other PCI device ROM priority	-UEFI OpROM -Legacy OpROM	Selection to control which Option ROM to use on PCI device(s) (if inserted).

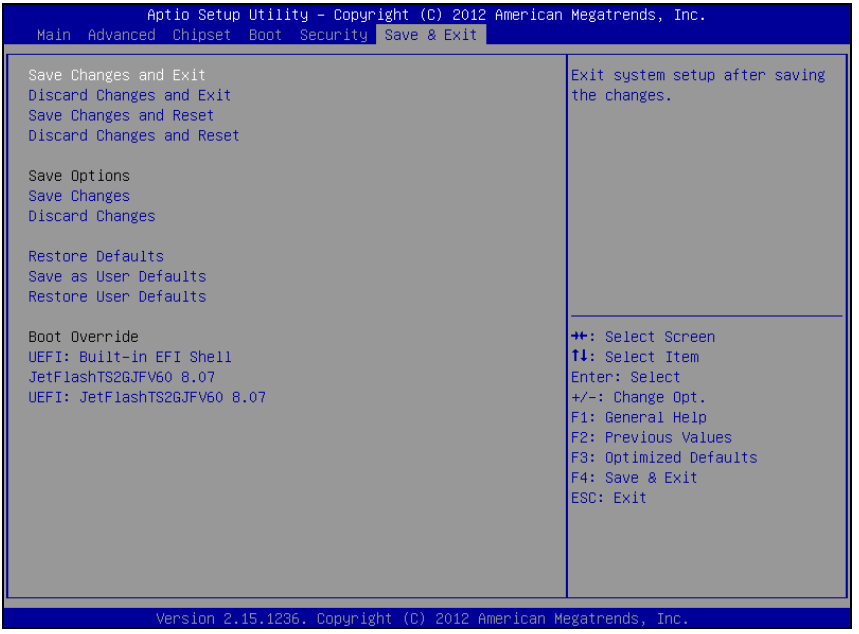
4-7. SECURITY



Security screen

BIOS Setting	Options	Description/Purpose
Administrator Password	Password can be up to 20 alphanumeric characters	Specifies the administrator password.
User Password	Password can be up to 20 alphanumeric characters	Specifies the user password.
HDD Security Configuration	Sub-menu	Enters sub-menu with option to enabled password protected HDD/SSD (if supported by SATA device).

4-8. SAVE & EXIT



Save & Exit screen

BIOS Setting	Options	Description/Purpose
Save Changes and Exit	No changeable options	Exits and saves the changes in CMOS memory.
Discard Changes and Exit	No changeable options	Exits without saving any changes made in BIOS settings.
Save Changes and Reset	No changeable options	Saves the changes in CMOS memory and resets.
Discard Changes and Reset	No changeable options	Resets without saving any changes made in BIOS settings.
Save Changes	No changeable options	Saves the changes done in BIOS settings so far.
Discard Changes	No changeable options	Discards the changes done in BIOS settings so far.

BIOS Setting	Options	Description/Purpose
Restore Defaults	No changeable options	Loads the optimized defaults for BIOS settings.
Save as User Defaults	No changeable options	Saves the current values as user defaults.
Restore User Defaults	No changeable options	Loads the user defaults for BIOS settings.
Boot Override	-[drive(s)]	Forces to boot from selected [drive(s)] or UEFI shell

EXPANSION BUS

APPENDIX

A

This appendix indicates pin assignments of expansion slot.

Sections included:

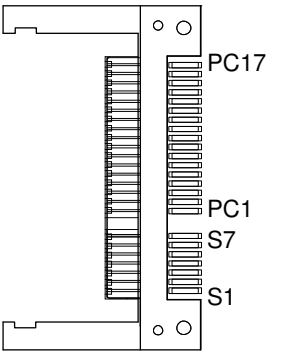
- CFAST Card Slot Pin Assignment

CFAST SLOT PIN ASSIGNMENT

You will find a **CFAST1** card slot on BH-0927.
The pin assignments are as follows:

CFAST1: CFAST Card Slot

PIN	ASSIGNMENT	PIN	ASSIGNMENT
S1	GND	PC6	NC
S2	SATA_TXP0	PC7	GND
S3	SATA_TXN0	PC8	NC
S4	GND	PC9	NC
S5	SATA_RXN0	PC10	NC
S6	SATA_RXP0	PC11	NC
S7	GND	PC12	NC
PC1	NC	PC13	3.3V/5V
PC2	GND	PC14	3.3V/5V
PC3	NC	PC15	GND
PC4	NC	PC16	GND
PC5	NC	PC17	NC



CFAST1

TECHNICAL SUMMARY

APPENDIX

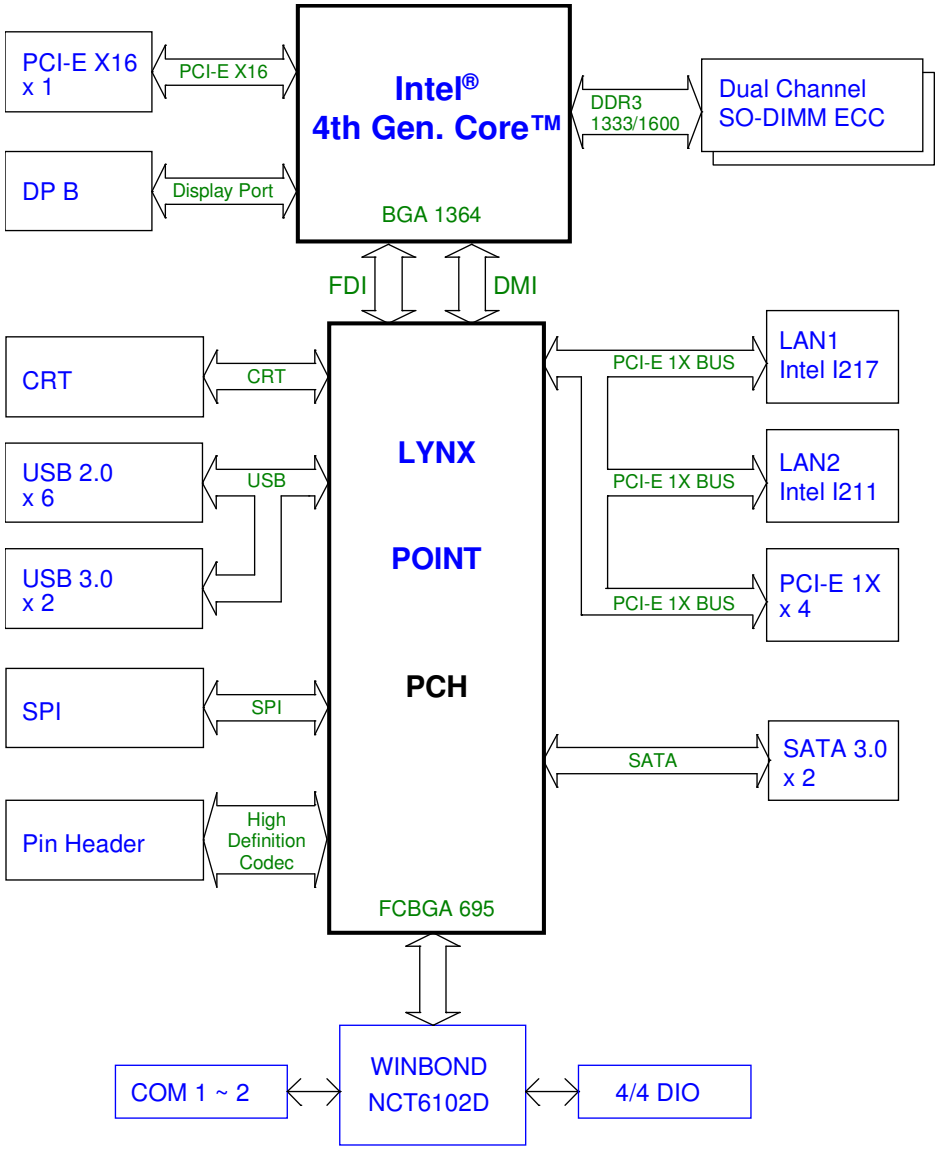
B

This section introduce you the maps concisely.

Sections included:

- Block Diagram
- Interrupt Map
- DMA Channel Map
- I/O Map
- Memory Map
- Watchdog Timer Configuration
- Flash BIOS Update

BLOCK DIAGRAM



INTERRUPT MAP

IRQ	ASSIGNMENT
0	System timer
1	Standard PS/2 Keyboard
3	Communications Port (COM2)
4	Communications Port (COM1)
8	System CMOS/real time clock
10	Intel® 8 Series/C220 Series SMBus Controller
10	PCI Serial Port
11	Ethernet Controller
11	PCI Simple Communications Controller
12	Microsoft PS/2 Mouse
13	Numeric data processor
16	Intel® 8 Series/C220 Series USB Enhanced Host Controller #2
16	High Definition Audio Controller
19	Intel® 8 Series SATA AHCI Controller
23	Intel® 8 Series/C220 Series USB Enhanced Host Controller #1
81 - 190	Microsoft ACPI-Compliant System
-	Intel® Ethernet Connection I217-LM
-	Intel® HD Graphics 4600
-	Intel® 8 Series/C220 Series PCI Express Root Port
-	Intel® USB 3.0 eXtensible Host Controller
-	Intel® 8 Series/C220 Series PCI Express Root Port

DMA CHANNELS MAP

TIMER CHANNEL	ASSIGNMENT
Channel 4	Direct memory access controller

I/O MAP

I/O MAP	ASSIGNMENT
0x000002F8-0x000002FF	Communications Port (COM2)
0x00001854-0x00001857	Motherboard resources
0x0000E000-0x0000E01F	Ethernet Controller
0x0000E000-0x0000E01F	Intel® 8 Series/C220 Series PCI Express Root Port
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000064-0x00000064	Standard PS/2 Keyboard
0x00000000-0x00000CF7	PCI bus
0x00000000-0x00000CF7	Direct memory access controller
0x00000D00-0x0000FFFF	PCI bus
0x00000070-0x00000077	System CMOS/real time clock
0x00000070-0x00000077	Motherboard resources
0x0000F040-0x0000F05F	Intel® 8 Series/C220 Series SMBus Controller
0x00000010-0x0000001F	Motherboard resources
0x00000022-0x0000003F	Motherboard resources
0x00000044-0x0000005F	Motherboard resources
0x00000072-0x0000007F	Motherboard resources
0x00000080-0x00000080	Motherboard resources
0x00000080-0x00000080	Motherboard resources
0x00000084-0x00000086	Motherboard resources
0x00000088-0x00000088	Motherboard resources
0x0000008C-0x0000008E	Motherboard resources
0x00000090-0x0000009F	Motherboard resources
0x000000A2-0x000000BF	Motherboard resources
0x000000E0-0x000000EF	Motherboard resources
0x000004D0-0x000004D1	Motherboard resources
0x000004D0-0x000004D1	Programmable interrupt controller
0x0000F0E0-0x0000F0E7	PCI Serial Port
0x00000020-0x00000021	Programmable interrupt controller
0x00000024-0x00000025	Programmable interrupt controller
0x00000028-0x00000029	Programmable interrupt controller

I/O MAP	ASSIGNMENT
0x0000002C-0x0000002D	Programmable interrupt controller
0x00000030-0x00000031	Programmable interrupt controller
0x00000034-0x00000035	Programmable interrupt controller
0x00000038-0x00000039	Programmable interrupt controller
0x0000003C-0x0000003D	Programmable interrupt controller
0x000000A0-0x000000A1	Programmable interrupt controller
0x000000A4-0x000000A5	Programmable interrupt controller
0x000000A8-0x000000A9	Programmable interrupt controller
0x000000AC-0x000000AD	Programmable interrupt controller
0x000000B0-0x000000B1	Programmable interrupt controller
0x000000B4-0x000000B5	Programmable interrupt controller
0x000000B8-0x000000B9	Programmable interrupt controller
0x000000BC-0x000000BD	Programmable interrupt controller
0x00000290-0x0000029F	Motherboard resources
0x000002A0-0x000002AF	Motherboard resources
0x0000F000-0x0000F03F	Intel® HD Graphics 4600
0x000003B0-0x000003BB	Intel® HD Graphics 4600
0x000003C0-0x000003DF	Intel® HD Graphics 4600
0x0000002E-0x0000002F	Motherboard resources
0x0000004E-0x0000004F	Motherboard resources
0x00000061-0x00000061	Motherboard resources
0x00000063-0x00000063	Motherboard resources
0x00000065-0x00000065	Motherboard resources
0x00000067-0x00000067	Motherboard resources
0x00000092-0x00000092	Motherboard resources
0x000000B2-0x000000B3	Motherboard resources
0x00000680-0x0000069F	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x00001C00-0x00001CFE	Motherboard resources
0x00001D00-0x00001DFE	Motherboard resources

I/O MAP	ASSIGNMENT
0x00001E00-0x00001EFE	Motherboard resources
0x00001F00-0x00001FFE	Motherboard resources
0x00001800-0x000018FE	Motherboard resources
0x0000164E-0x0000164F	Motherboard resources
0x00000040-0x00000043	System timer
0x00000050-0x00000053	System timer
0x000000F0-0x000000F0	Numeric data processor
0x0000F0D0-0x0000F0D7	Intel® 8 Series SATA AHCI Controller - 8C03
0x0000F0C0-0x0000F0C3	Intel® 8 Series SATA AHCI Controller - 8C03
0x0000F0B0-0x0000F0B7	Intel® 8 Series SATA AHCI Controller - 8C03
0x0000F0A0-0x0000F0A3	Intel® 8 Series SATA AHCI Controller - 8C03
0x0000F060-0x0000F07F	Intel® 8 Series SATA AHCI Controller - 8C03
0x00000081-0x00000091	Direct memory access controller
0x00000093-0x0000009F	Direct memory access controller
0x000000C0-0x000000DF	Direct memory access controller
0x000003F8-0x000003FF	Communications Port (COM1)

WATCHDOG TIMER CONFIGURATION

The I/O port address of the watchdog timer is 2Eh (in hex) and 2Fh (in hex). 2E is the address port. 2F is the data port. User must first assign the address of register by writing address value into address port 2Eh, then write/read data to/from the assigned register through data port 2Fh.

Configuration Sequence

To program NCT6102D configuration registers, the following configuration sequence must be followed:

1. Enter the extended function mode
2. Configure the configuration registers
3. Exit the extended function mode

1. Enter the extended function mode

To place the chip into the Extended Function Mode, two successive writes of 0x87 must be applied to *Extended Function Enable Registers* (EFERs, i.e. 2Eh or 4Eh).

2. Configure the configuration registers

The chip selects the Logical Device and activates the desired Logical Devices through *Extended Function Index Register* (EFIR) and *Extended Function Data Register* (EFDR). The EFIR is located at the same address as the EFER, and the EFDR is located at address (EFIR+1). First, write the Logical Device Number (i.e. 0x07) to the EFIR and then write the number of the desired Logical Device to the EFDR. If accessing the Chip (Global) Control Registers, this step is not required. Secondly, write the address of the desired configuration register within the Logical Device to the EFIR and then write (or read) the desired configuration register through the EFDR.

3. Exit the extended function mode

To exit the Extended Function Mode, writing 0xAA to the EFER is required. Once the chip exits the Extended Function Mode, it is in the normal running mode and is ready to enter the configuration mode.

Code example for watch dog timer

Enable and start watchdog timer, while set 30 seconds as timeout interval:

Step 1 Enter to extended function mode

In assembly			In C language
Mov	dx,	2eh	IoWrite8(NCT6102D_CFG_INDEX,0x87);
Mov	al,	87h	IoWrite8(NCT6102D_CFG_INDEX,0x87);
Out	dx,	al	
Out	dx,	al	

Step 2 Select Logical Device 8 of watchdog timer

In assembly			In C language
Mov	al,	07h	IoWrite8(NCT6102D_CFG_INDEX,0x07);
Out	dx,	al	IoWrite8(NCT6102D_CFG_DATA,0x08);
Inc	dx		
Mov	al,	08h	
Out	dx,	al	

Step 3 Set second as counting unit

In assembly			In C language
Dec	dx		IoWrite8(NCT6102D_CFG_INDEX,0xF0); TempData = (IoRead8(NCT6102D_CFG_DATA) & 0xF7)\ | (SetupData.WdtCountMode << 3); IoWrite8(NCT6102D_CFG_DATA,TempData);
Mov	al,	0f0h	
Out	dx,	al	
Inc	dx		
In	al,	dx	
And	al,	not 08h	
Out	dx,	al	

Step 4 Set timeout interval as 30seconds and start counting

In assembly			In C language
Dec	dx		IoWrite8(NCT6102D_CFG_INDEX,0xF1); IoWrite8(NCT6102D_CFG_DATA,SetupData.WdtTime Out);
Mov	al,	0f1h	
Out	dx,	al	
Inc	dx		
Mov	al,	30	
Out	dx,	al	

Step 5 Exit the extended function mode

In assembly			In C language
Dec	dx		IoWrite8(NCT6102D_CFG_INDEX,0xAA)
Mov	al,	0aah	
Out	dx,	al	

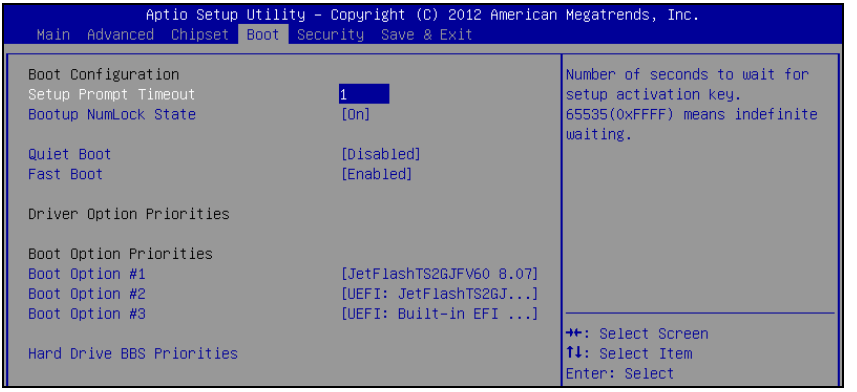
Flash BIOS Update

I. Before System BIOS update

1. Prepare a bootable media (ex. USB storage device) which can boot system to DOS prompt.
2. Download and save the BIOS file (ex. H9270PH1.ROM) to the bootable device.
3. Copy AMI flash utility – AFUDOS.exe into bootable device.

```
C:\AFUDOS>dir


 Volume in drive C is EFI_DUET
 Volume Serial Number is 32E4-9D1F
 Directory of C:\AFUDOS

              <DIR>              02-23-12   9.51a
              <DIR>              02-23-12   9.51a
AFUDOS    EXE       167,152        11-12-12   3.12p
63100P01  BIN    16,777,217        11-01-13   2.14p
          2 file(s)         4,361,456 bytes
          2 dir(s)        864,940,088 bytes free



C:\AFUDOS>
```

4. Make sure the target system can first boot to the bootable device.
   a. Connect the bootable USB device.
   b. Turn on the computer and press <Del> or <Esc> key during boot to enter BIOS Setup.
   c. System will go into the BIOS setup menu.
   d. Select [Boot] menu.
   e. Select [Hard Drive BBS Priorities], set the USB bootable device to be the 1st boot device.
   f. Press <F4> key to save configuration and exit the BIOS setup menu.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Boot Configuration
Setup Prompt Timeout
1
Bootup NumLock State
[On]
Quiet Boot
[Disabled]
Fast Boot
[Enabled]
Driver Option Priorities
Boot Option Priorities
Boot Option #1
[JetFlashTS2GJFV60 8.07]
Boot Option #2
[UEFI: JetFlashTS2GJ...]
Boot Option #3
[UEFI: Built-in EFI ...]
Hard Drive BBS Priorities
Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
→←: Select Screen
↑↓: Select Item
Enter: Select

II. AFUDOS Command for System BIOS Update

AFUDOS.exe is the AMI firmware update utility; the command line is shown as below:

AFUDOS <ROM File Name> [option1] [option2]…

You can type AFUDOS /? to see all the definition of each control options. The recommended options for BIOS ROM update consist of following parameters:

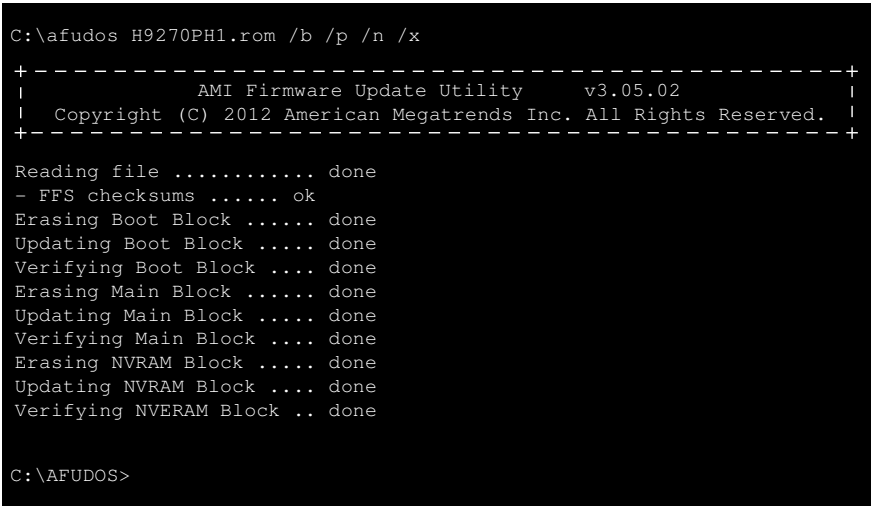
/P: program main BIOS image
/B: program Boot Block
/N: program NVRAM
/X: don't check ROM ID

III. BIOS update procedure

1. Use the bootable USB device to boot up system into the MS-DOS command prompt.
2. Type in AFUDOS H9270PHx.ROM /p /b /n /x and press enter to start the flash procedure.

   Note: xxxx means the BIOS revision part, ex. 0P01…

3. During the update procedure, you will see the BIOS update process status and its percentage. Beware! Do not turn off system power or reset your computer if the whole procedure are not complete yet, or it may crash the BIOS ROM and make system unable to boot up next time.
4. After BIOS update procedures is complete, the messages should be like the figure shown below:



5. You can restart the system and boot up with new BIOS now.
6. Update is complete after restart.

7. Verify during following boot that the BIOS version displayed at initialization screen has changed.