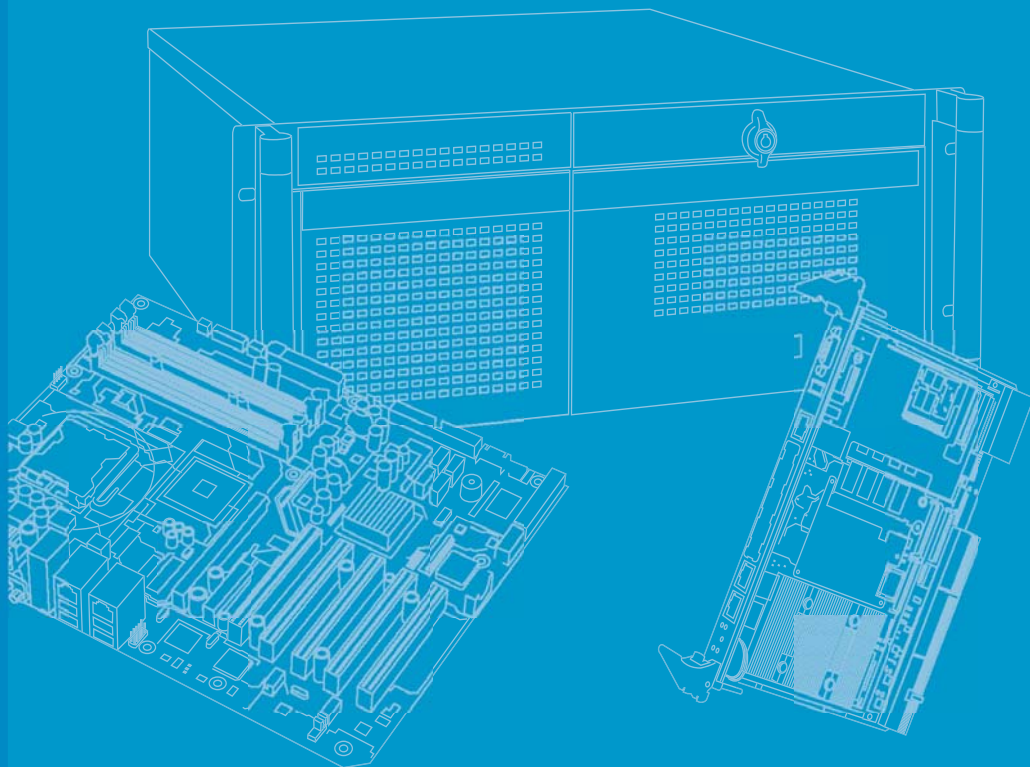# User Manual

AIIS-1240

Power over Ethernet Control System

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Product Warranty (%years)

The manufacturer warrants to you, the original purchaser, that each of its products will befree from defects in materials and workmanship for two years f rom the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have be en subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For o ut-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.

2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.

3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.

4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.

5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Declaration of Conformity

FCC Class A

Note: 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 interfere nce when the eq uipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accord ance with the instruction manual, may cause harmful interference to radio communications. Opera-tion 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.

Technical Support and Assistance

1. Visit the Advantech web site at www.advantech.com/support where you can find the latest information about the product.

2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

Warnings, Cautions and Notes

Warning! *Warnings indicate conditions, which if not observed, can cause personal injury!*

Caution! *Cautions are included to help you avoid damaging hardware or losing data. e.g.*

There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Note! *Notes provide optional additional information.*

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
    If one of the following situations arises, get the equipment checked by service personnel:
    ■ The power cord or plug is damaged.
    ■ Liquid has penetrated into the equipment.
    ■ The equipment has been exposed to moisture.
    ■ The equipment does not work well, or you cannot get it to work according to the user's manual.
    ■ The equipment has been dropped and damaged.
    ■ The equipment has obvious signs of breakage.
14. Do not leave this equipment in an environment where the storage temperature may go below -40° C (-40° F) or above 85° C (185° F). This could damage the equipment. The equipment should be in a controlled environment.
15. CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer, discard used batteries according to the manufacturer's instructions.
16. The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).
17. RESTRICTED ACCESS AREA: The equipment should only be installed in a Restricted Access Area.
18. DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Packing List

Before installation, please ensure the following items have been shipped:

- 1 x AIIS-1240 Unit
- 4 x Rubber foot
- 2 x Wall mount bracket
- 1 x CPU Cooler
- 1 x English & Simplified Chinese Startup Manual
- 1 x China RoHS
- 1 x Utility CD

Ordering information

Part Number	PoE Port	Display	USB 3.0/2.0	DIO	COM 232/ 422/485	COM 232
AIIS-1240-00A1E	4-CH	VGA+DVI-D	4 / 4	8-bit	2	4

Optional accessories

Part Number	Description
98R2124000E	DIN-Rail Kit
1757004518-01	220Watt 24Vdc Adapter
AIIS-DIO32-00A1E	32-bit DIO module

Contents

Chapter 3   AMI BIOS Setup............................... 23

Chapter 1

General Introduction

This chapter gives background information on the AIIS-1240 series.

1.1 Introduction

AIIS-1240 Box IPC is an ideal, application-ready, system platform solution. All electronics are protected in a compact sealed case for easy embedding in the customer's own housing, or as a stand-alone unit where space is limited.

AIIS-1240's self-contained PoE con troller features performance computing with Power over Ethernet, rich I/O interface, and extended product longevity, all in a compact form factor. These PoE boxes use the latest, 3rd generation Intel® Core™ processors to deliver improved computing power and graphics performance. Already fully verified and certified, they offer system integrators a no-nonsense solution.

AIIS-1240 utilizes a single RJ45 cable that carries both data and electrical power. Compliant with IEEE 802.3af, it can provide a maximum of 15.4 watts of power to each powered device up to a distance of 100 meters, whereas USB 2.0 can only provide up to 2.5 watts, with a maximum cable length of 5 meters.

AIIS-1240 offers rich I/O interfaces such as four PoE port channels, max. 40-bit digital I/O, four USB 3.0, four USB 2.0, and six serial ports. Four USB 3.0 ports provide a high performance data transfer rate up to 5 Gbps. The two serial ports on the front panel can be configured as RS-232, RS-422 or RS-485 via BIOS setting. These interfaces can support a number of various peripheral devices.

1.2 Product Features

- Intel® 3rd/2nd Core™ i7/i5/i3 CPU (LGA1155)
- 4-CH GbE PoE (Power over Ethernet), IEEE 802.3af compliant
  - Powered Device auto detection and classification
  - Supports IEEE 1588 & GigE Vision devices
- Compact & thoughtful design
  - Volume less than 3 Liter
  - Easier Fan filter maintenance
  - Internal USB Type-A with lock design (Max. 49mm length)
  - Wall or DIN Rail mounting kit (optional)
  - Build in G-sensor for vibration detection

1.3 Product Specifications

1.3.1 Processor System

- LGA1155 Intel® Core™ i7/i5/i3/Pentium®/Celeron

CPU	Core i7-3770	Core i7-2600	Core i5-3550S	Core i5-2400	Core i3-3220	Core i3-2120	Core G2120	Core G850	Core G540
Core	4	4	4	4	2	2	2	2	2
Base Frequency	3.4 GHz	3.4 GHz	3.0 GHz	3.1 GHz	3.3 GHz	3.3 GHz	3.1 GHz	2.9 GHz	2.5 GHz
L3 Cache	8 MB	8 MB	6 MB	6 MB	3 MB	3 MB	3 MB	3 MB	2 MB
Chipset	H61								
BIOS	AMI 64Mb SPI Flash								

1.3.2 Memory

■ Supports dual channel DDR3 1066/1333 8 GB per DIMM without ECC function; Max. capacity is up to 16 GB

1.3.3 Graphics

■ **Chipset:** Intel® HD Graphics

1.3.4 PoE (Power Over Ethernet)

■ **Controller:** Intel® i210 x 4
■ **Compliant:** IEEE 802.3af
■ **Power Output:** 15.4W per Channel

1.3.5 Ethernet

■ **Interface:** 10/100/1000 Mbps
■ **Controller:** LAN1: Intel® 82579V, LAN2: Intel® 82583V

1.3.6 Storage

■ **Internal 2.5" HDD Bay:** 1
■ **CFast:** 1

1.3.7 Front I/O

■ **Display:** VGA+DVI-D
■ **USB:** 4 USB3.0
■ **Serial:** 2 (RS-232, RS-422 or RS-485 via BIOS setting)
■ **DIO:** 8-bit (default), 32-bit (optional by AIIS-DIO32)

1.3.8 Rear I/O

■ **USB:** 4 USB2.0
■ **Serial:** 4 RS-232

1.3.9 Watchdog Timer

■ **Output:** System reset
■ **Interval:** Programmable 1~255 sec/min

1.3.10 Power Requirement

■ **Power Type:** ATX
■ **Power Input Voltage:** 19 VDC ~ 24 VDC
■ **Minimum Power Input:** DC19-24V @ 8-6.3A
■ **Normal Power Input:** DC19-24V @ 11.57-9.16A
■ **Power Adapter:** AC to DC, DC24 V/9.16 A, 220 W (Optional)

1.3.11 Cooling

■ **System Fan:** 1 (6cm / 27.7 CFM)

1.3.12 Miscellaneous

■ **LED Indicators:** Power, HDD, temperature
■ **Control:** Power on/off switch

1.3.13 Environment

- **Operating Temperature:** 0 ~ 45ºC (32 ~ 113ºF)*
- **Non-operating Temperature:** -40 ~ 70ºC (-40 ~ 158ºF)
- **Operating Humidity:** 10 ~ 95% @ 40ºC, non-condensing
- **Non-operating Humidity:** 10 ~ 95% @ 60ºC, non-condensing

* Depends on CPU, i7 CPU supports 0 ~ 40ºC.

1.3.14 Physical Characteristics

- **Dimension (WxHxD):** 232 x 70 x 175 mm
- **Weight:** 2.5Kg

1.3.15 EMC

CE, FCC, CCC, BSMI

1.3.16 Safety

UL, CB, CCC, BSMI

1.4 Jumper Settings
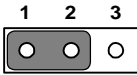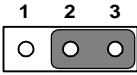
1.4.1 How to Set Jumpers

You can configure your motherboard to match the needs of your application by setting the jumpers. A jumper is a metal bridge that closes an electrical circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To "close" (or turn ON) a jumper, you connect the pins with the clip. To "open" (or turn OFF) a jumper, you remove the clip. Sometimes a jumper consists of a set of three pins, labeled 1, 2 and 3. In this case you connect either pins 1 and 2, or 2 and 3. A pair of needle-nose pliers may be useful when setting jumpers.

1.4.2 BIOS CMOS (JCMOS1)

AIIS-1240 CPU card contains a jumper that can erase BIOS CMOS data and reset the system BIOS information. Norma lly this jumper should be set with pins 1-2 closed. If you want to reset those data, set JCMOS1 to 2-3 closed for just a few seconds, and then move the jumper ba ck to 1-2 closed. This procedure will reset the CMOS to its last status or default setting.

Table 1.1: Clear BIOS CMOS (JCMOS1)	
Function	**Jumper Setting**
*Keep BIOS CMOS data	1-2 closed
Clear BIOS CMOS data	2-3 closed
*default setting	

1.4.3 Hardware Monitor Alarm (JOBS1) and Watchdog Timer Output (JWDT1)

AIIS-1240 contains a watchdog timer that will reset the CPU in the event the CPU stops processing. This feature means AIIS-1240 will recover from a software failure or an EMI prob lem. The JWDT1 jumpe r settings control the outcome of what the computer will do in the event the watchdog timer is tripped.

AIIS-1240 also provides jumper: JOBS1 to enable or disable hardware monitor function.

Table 1.2: H/W Monitor Alarm and Watchdog Timer (JOBS1+JWDT1)	
Function	**Jumper Setting**
*Enable watchdog timer	
*Enable H/W monitor alarm	
*default setting	

Chapter 2

Hardware installation

This chapter introduces external IO and the installation of AIIS-1240 Hardware.

2.1 Front Panel Controls, Indicators & Connectors
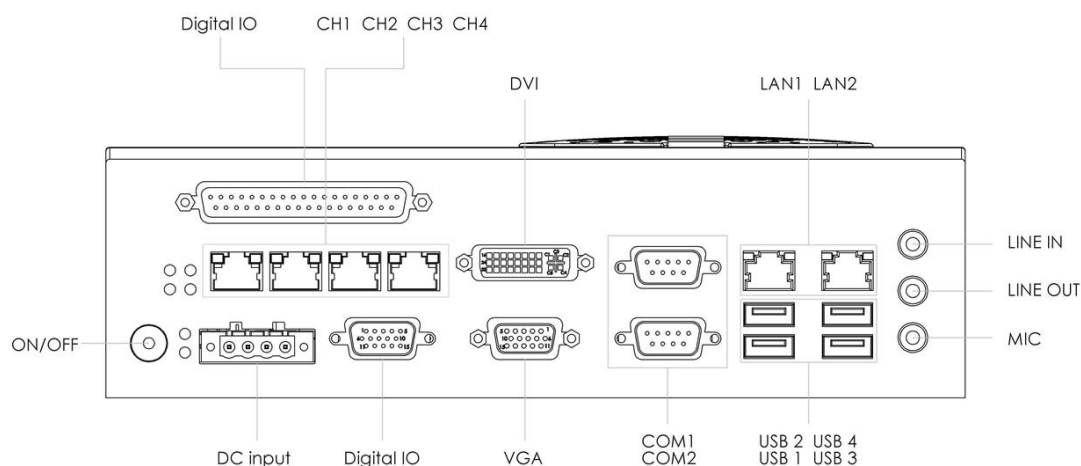
Figure 2.1 AIIS-1240 Front View

2.1.1 Power On/Off Button

AIIS-1240 has a Power On/Off button with LED indicators on the front side that show On status (Green LED) and Off/Suspend status (Orange LED). The Power button supports dual functions: Soft Power -On/Off (Instant off or Delay 4 Seconds then off), and Suspend.
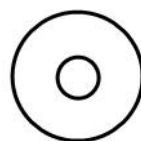
Figure 2.2 Power On/Off Button

Table 2.1: Power Button Connector Pin Assignment	
LED color	**Status**
Green	Power ON
Amber	S1/S4/S5

2.1.2 LED Indicators

There are two LEDs on the front panel that indicate system status: The thermal LED is for system thermal alarm status; and HDD LED is for HDD and Cfast disk status. In addition, there are four LEDs to indicate the connection of powered device via PoE port.
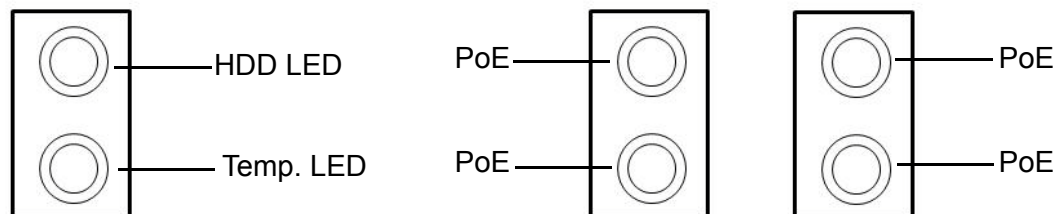
Figure 2.3 LED Indicators

Table 2.2: LED Indicators (Thermal & HDD)	
LED color	Function
Red	Over Temperature LED
Amber	SATA LED

Table 2.3: LED Indicator (PoE)	
LED color	Function
Red	Connected Powered Device

2.1.3 Power Input Connector

AIIS-1240 comes with a four pins header that carries 19 ~ 24 VDC external power input.
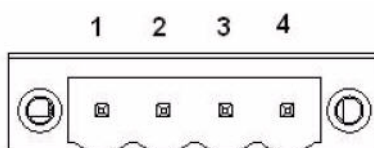
Figure 2.4 Power Input Connector

Table 2.4: Power Input Connector Pin Assignment	
Pin	Signal
1	GND
2	+19~24 VDC
3	+19~24 VDC
4	GND

2.1.4 Digital I/O

AIIS-1240 provides one DSUB-15 male connector which offers 4-ch digital input and 4-ch digital output with 2.5KV isola tion. AIIS-1240F provides additional DSUB-male connector which offers 4-ch digital input and 4-ch digital output with 2.5KV isolation.

DSUB-15 Male Connector
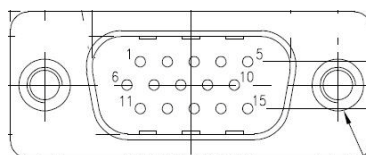
Figure 2.5 8-bit DIO Connector

Table 2.5: 8-bit DIO Connector Pin Assignment			
Pin	Signal	Pin	Signal
1	GND	2	DI0
3	DI1	4	DI2
5	DI3	6	COM
7	DO0	8	DO1

Table 2.5: 8-bit DIO Connector Pin Assignment			
9	DO2	10	DO3
11	GND	12	N/C
13	N/C	14	N/C
15	+5V		

DSUB-37 female connector
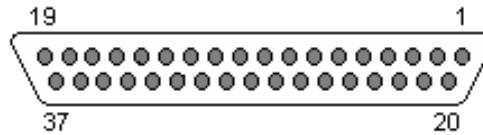
Figure 2.6 32-bit DIO Connector

Table 2.6: 32-bit DIO Connector Pin Assignment			
Pin	Signal	Pin	Signal
1	DI0	2	DI2
3	DI4	4	DI6
5	DI8	6	DI10
7	DI12	8	DI14
9	GND	10	COM1
11	DO0	12	DO2
13	DO4	14	DO6
15	DO8	16	DO10
17	DO12	18	DO14
19	COM2	20	DI1
21	DI3	22	DI5
23	DI7	24	DI9
25	DI11	26	DI13
27	DI15	28	GND
29	GND	30	DO1
31	DO3	32	DO5
33	DO7	34	DO9
35	DO11	36	DO13
37	DO15		

2.1.5 VGA+DVI Connector

AIIS-1240 offers an integrated D-sub 24-pin female DVI-D Digital Visual Interface connector and a D-sub 15-pin VGA; DVI-D carries digital video signal. This supports high-speed, high-resolution digital displays and traditional analog displays.
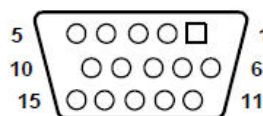
Figure 2.7 Figure 2.7 VGA Connector

Table 2.7: VGA Connector Pin Assignment			
Pin	**Signal**	**Pin**	**Signal**
1	RED	2	GREEN
3	BLUE	4	N/C
5	GND	6	GND
7	GND	8	GND
9	VCC	10	GND
11	N/C	12	SDT
13	H-SYNC	14	V-SYNC
15	SCK		
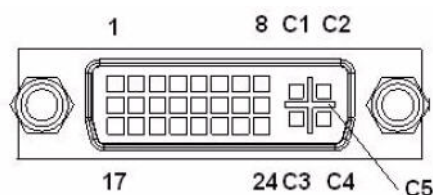
Figure 2.8 DVI Connector

Table 2.8: DVI Connector Pin Assignment			
Pin	**Signal**	**Pin**	**Signal**
1	TMDS Data 2-	2	TMDS Data 2+
3	GND	4	N/C
5	N/C	6	DDC clock
7	DDC data	8	N/C
9	TMDS Data 1-	10	TMDS Data 1+
11	GND	12	N/C
13	N/C	14	+5 V
15	GND	16	Hot plug detect
17	TMDS Data 0-	18	TMDS Data 0+
19	GND	20	N/C
21	N/C	22	GND
23	TMDS clock +	24	TMDS clock -
C1	N/C	C2	N/C
C3	N/C	C4	N/C
C5	N/C		

2.1.6 COM Connectors

AIIS-1240 provides 2 D-sub 9-pin connectors that are serial communication interface ports. COM-1 & COM-2 support RS-232/422/485 mode by BIOS selection.
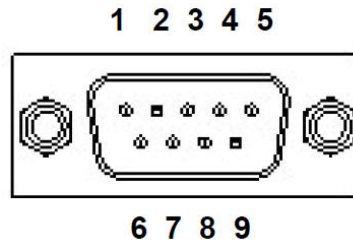
Figure 2.9 COM Connectors

Table 2.9: Front 2-COM Pin Assignment			
Pin	RS-232	RS-422	RS-485
1	DCD	TXD -	DATA -
2	SIN#	TXD +	DATA +
3	SOUT#	RXD +	NC
4	DTR	RXD -	NC
5	GND	GND	GND
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC

2.1.7 Ethernet Connectors (LANs)

AIIS-1240 provides six RJ45 connectors for Gigabit LAN interfaces; two of them are equipped with Intel® 82579V and 82583V Ethernet controllers that are fully compliant with IEEE 802.3u 10/100/1000 Mbps CSMA/CD st andards, four o f them are equipped with Intel® i210 Ethernet controllers that are fully compliant with IEEE 802.3af Power over Ethern et standard. The Ethe rnet ports provide standard RJ-45 jack connectors with LED in dicators that show Active/Link status (Green LED) and Speed status (Yellow LED).
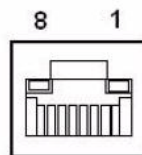
Figure 2.10 Figure 2.10 Ethernet Connectors

Table 2.10: Ethernet Connector Pin Assignment			
Pin	Signal	Pin	Signal
1	MDI0 +	2	MDI0 -
3	MDI1 +	4	MDI1 -
5	MDI2 +	6	MDI2 -
7	MDI3 +	8	MDI3 -

2.1.8 USB 3.0 Connectors

The USB port 1~4 support USB 3.0 interface, which give comple te Plug & Pla y and hot swapping for up to 127 external devices. The USB interface complies with USB

UHCI, Rev. 3.0 compliant. Please refer to below table for its pin assignments. USB 3.0 connectors contain legacy pins to interface to USB 2.0 devices, and a new set of pins for USB 3.0 connectivity (both sets reside in the same connector).
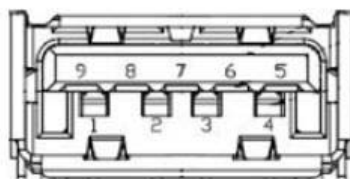
Figure 2.11 USB 3.0 Connectors

Table 2.11: USB3.0 Connector Pin Assignment			
Pin	**Signal**	**Pin**	**Signal**
1	+5V	2	USB Data -
3	USB Data +	4	GND
5	SSRX-	6	SSRX+
7	GND	8	SSTX-
9	SSTX+		

2.1.9 Audio Connector

AIIS-1240 offers stereo audio ports by three phone jack connectors of Line_Out, Line_In, Mic_In. The audio chip is controlled by ALC892, and it's compliant with Azalea standard.
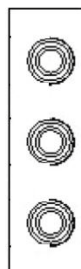
Figure 2.12 Audio Connector

Table 2.12: Audio Pin Assignment	
Color	**Function**
Blue	Line In
Green	Line Out
Pink	Mic In

2.2   Rear Panel Connectors
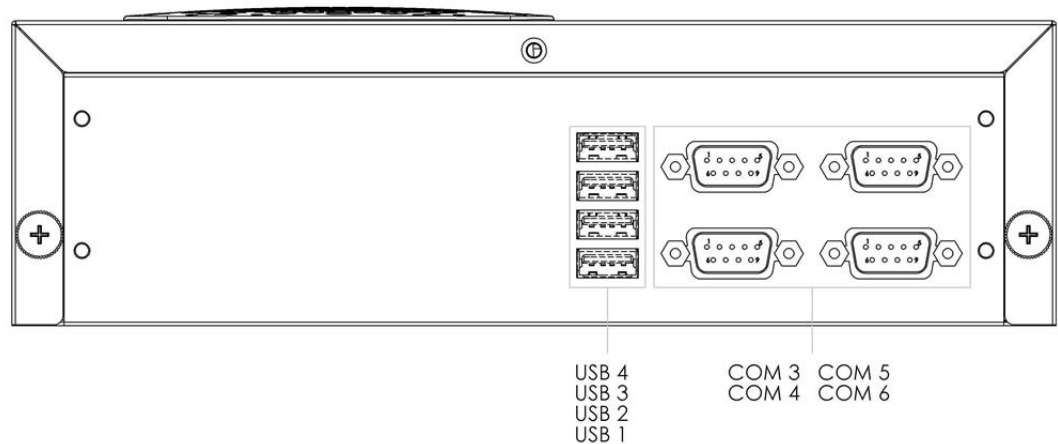
Figure 2.13 AIIS-1240 Rear View

2.2.1   COM Connectors

AIIS-1240 provides four D-sub 9-pin connectors in rear panel which offer RS-232 serial communication interface ports.
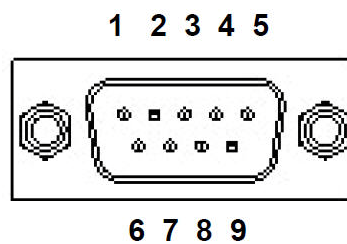
Figure 2.14 COM Connectors

Table 2.13: USB3.0 Connector Pin Assignment			
Pin	Signal	Pin	Signal
1	DCD	2	SIN#
3	SOUT#	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI		

2.2.2   USB 2.0 Connectors

AIIS-1240 provides four USB2.0 interface connectors, which give complete Plug & Play and hot swapping for up to 127 external devices. The USB interface complies with USB UHCI, Rev. 2.0 compliant. The USB interface can be disabled in the system BIOS setup. Please refer to below table for its pin assignments. The USB connectors are used to conne ct any device that conforms to the USB int erface. Most digital devices conform to this standard. The USB interface supports Plug and Play.
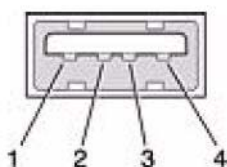
Figure 2.15 USB 2.0 Connectors

Table 2.14: USB2.0 Connector Pin Assignment			
Pin	Signal	Pin	Signal
1	+5V	2	USB Data -
3	USB Data +	4	GND

2.3 CPU Installation

1. Remove top cover.
2. Pull the handle beside the processor socket outward and lift it.
3. Remove the socket protection cap.
4. Align the cuts on the processor with the edges of the socket.
5. Replace the socket cap; lower the retainer handle and clip it shut.
6. Processor installation is complete.
7. Reinstall top cover.

2.4 CPU Cooler Installation

1. Remove top cover.
2. Attach the CPU cooler on the Motherboard.
3. Fastening four screws on the cooler into the steel back-plate on the PCB.
4. Reinstall top cover.
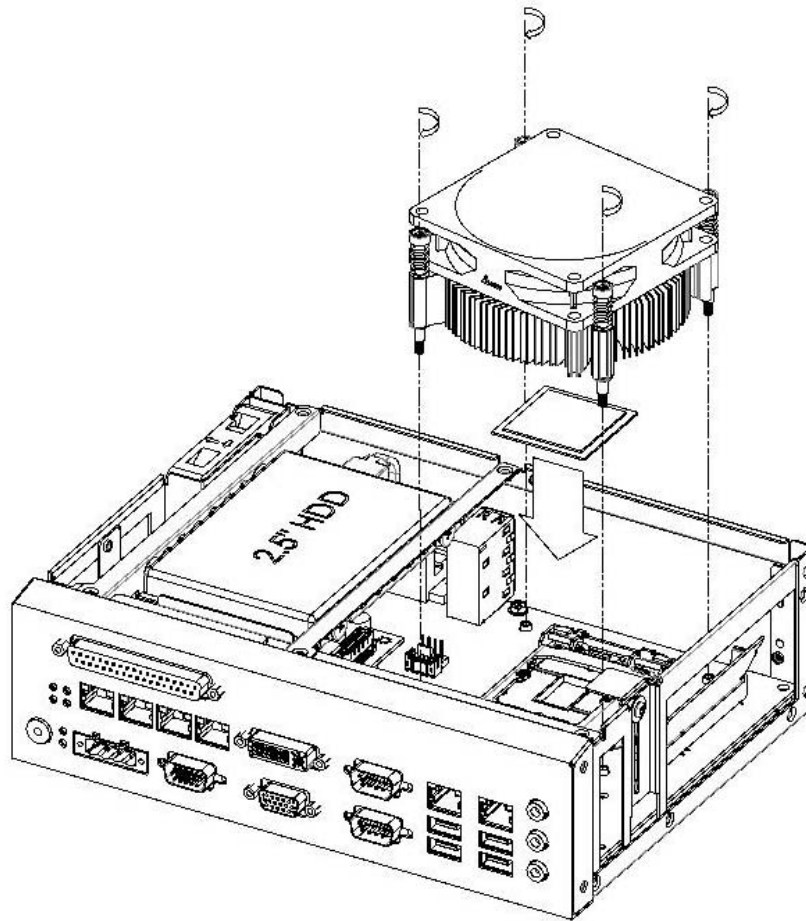
Figure 2.16 CPU & CPU Cooler Installation

2.5   Memory Installation

1.   Remove top cover.
2.   Insert the memory module into the SODIMM socket.
3.   Reinstall top cover.
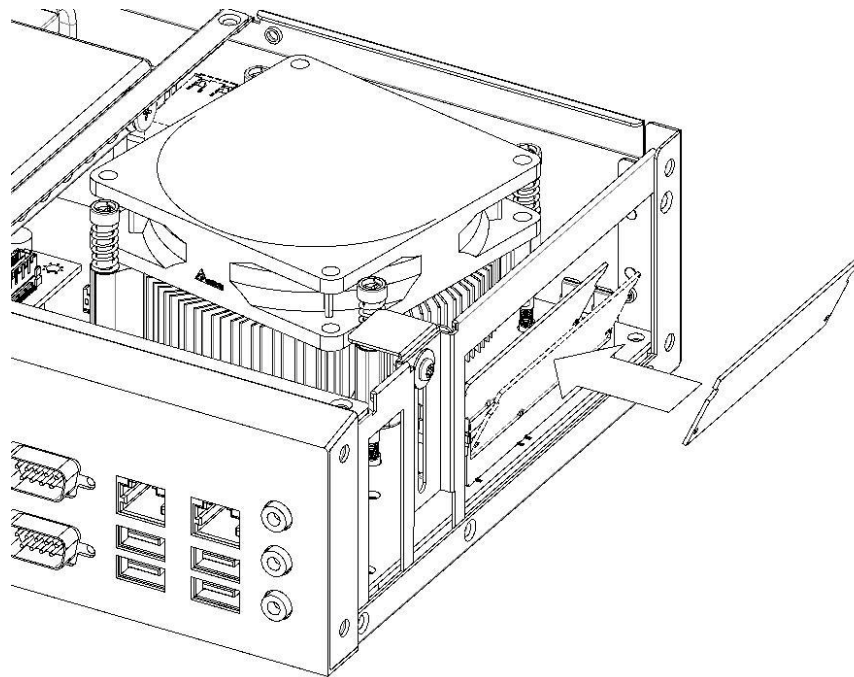
Figure 2.17 Memory Installation

2.6 HDD Installation

1. Remove top cover and HDD bracket by unscrewing the 4 screws.
2. Install the 2.5" SATA HDD with the 4 HDD mounting screws. Make sure the PCB side of the HDD will be facing the bottom cover.
3. Connect the SATA signal cable and power cable to the HDD.
4. Reinstall the HDD bracket and top cover.
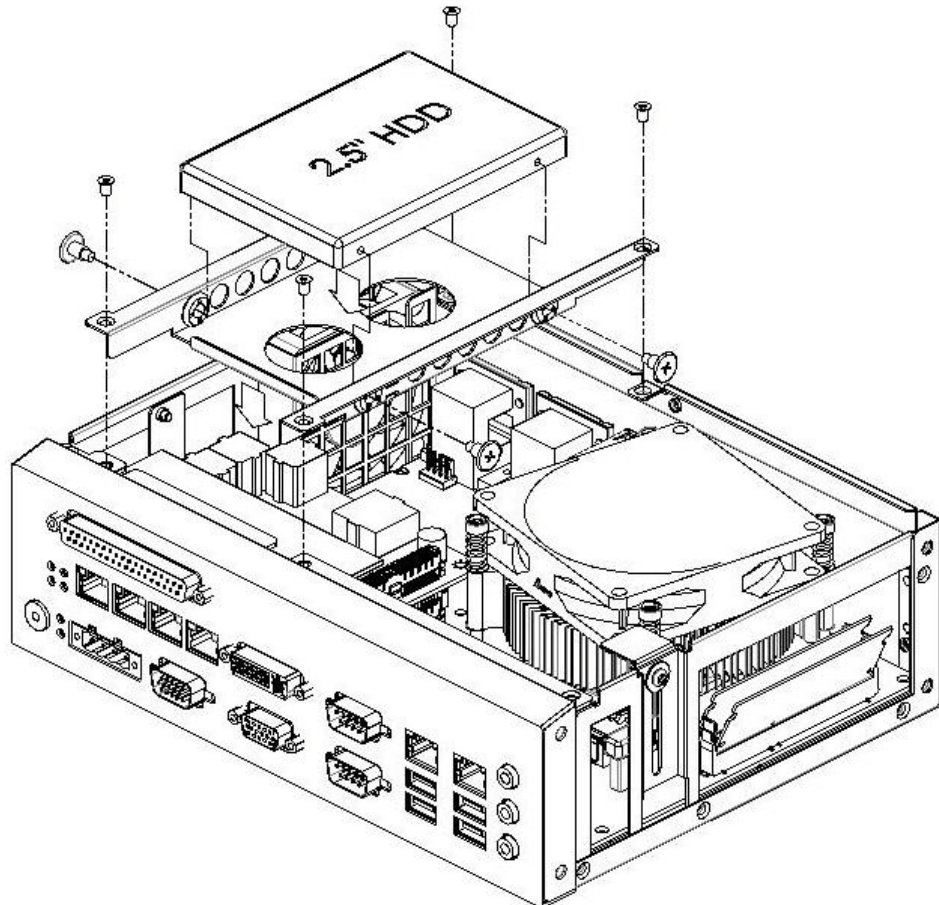
Figure 2.18 HDD Installation

2.7 Internal USB lock Installation

1. Remove top cover and USB lock-kit by unscrewing the single screw.
2. Install the USB dongle and adjust the position of the lock-kit properly.
3. Reinstall the USB lock-kit and top cover.
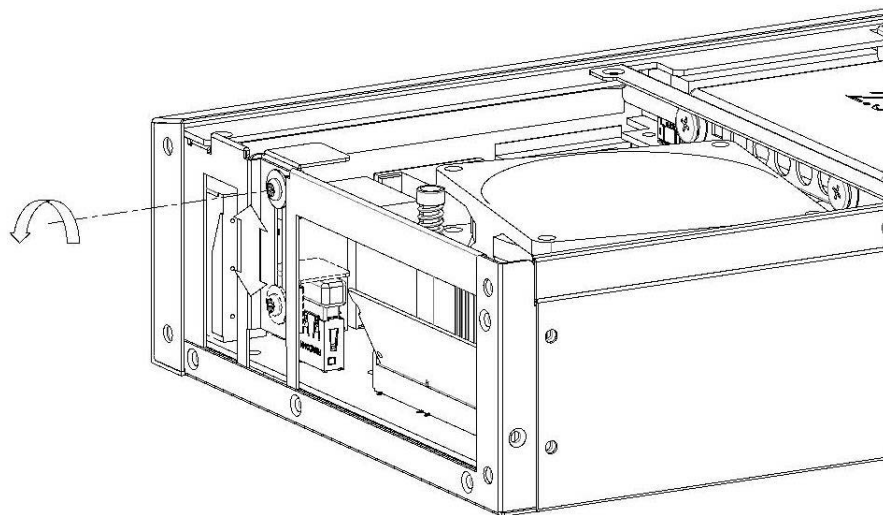
Figure 2.19 Internal USB lock Installation

2.8 Cfast Installation

1. Remove top cover.
2. Insert the Cfast card into socket.
3. Assemble the Cfast clamping to avoid the loosing.
4. Reinstall top cover.
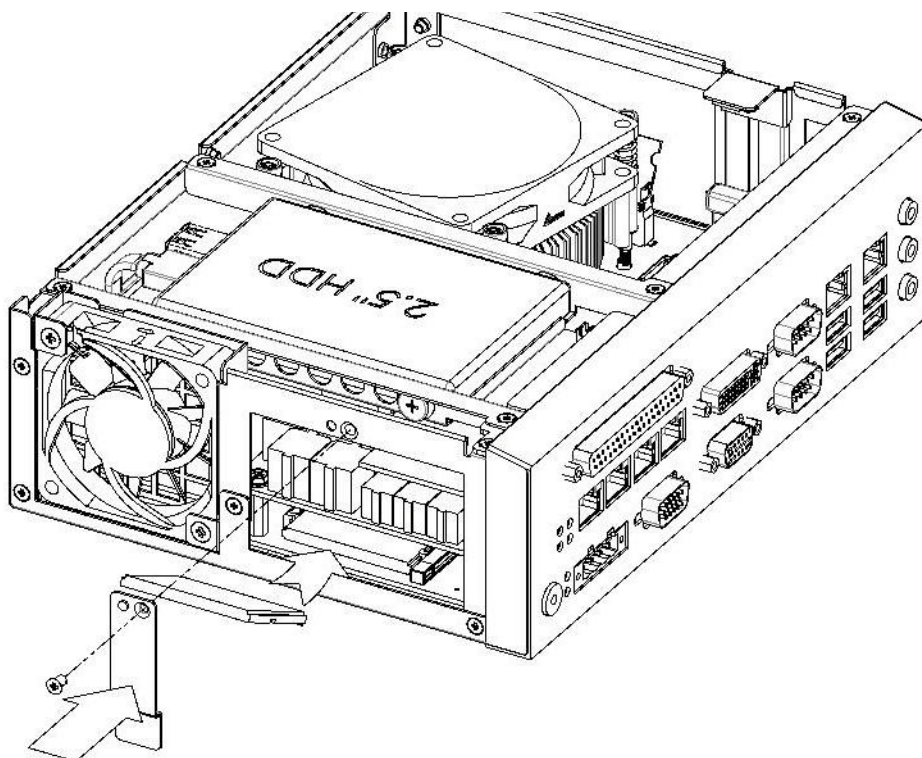
Figure 2.20 Cfast Installation

2.9 AIIS-DIO32 Installation

1. Remove top cover.
2. Install the AIIS-DIO32 with 2 stand-off and 2 screws.
3. Connecting main board USB12 connector with AIIS-DIO32 USB1 connector via DIO cable.
4. Reinstall top cover.
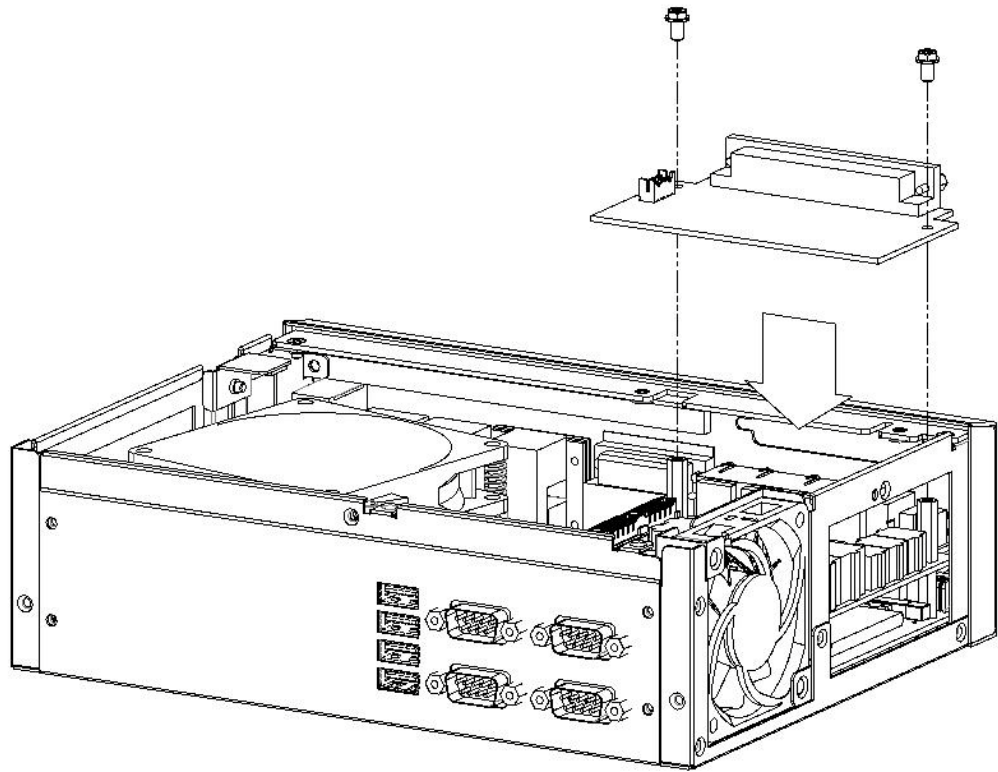
Figure 2.21 AIIS-DIO32 Installation

2.10 Wallmount Installation
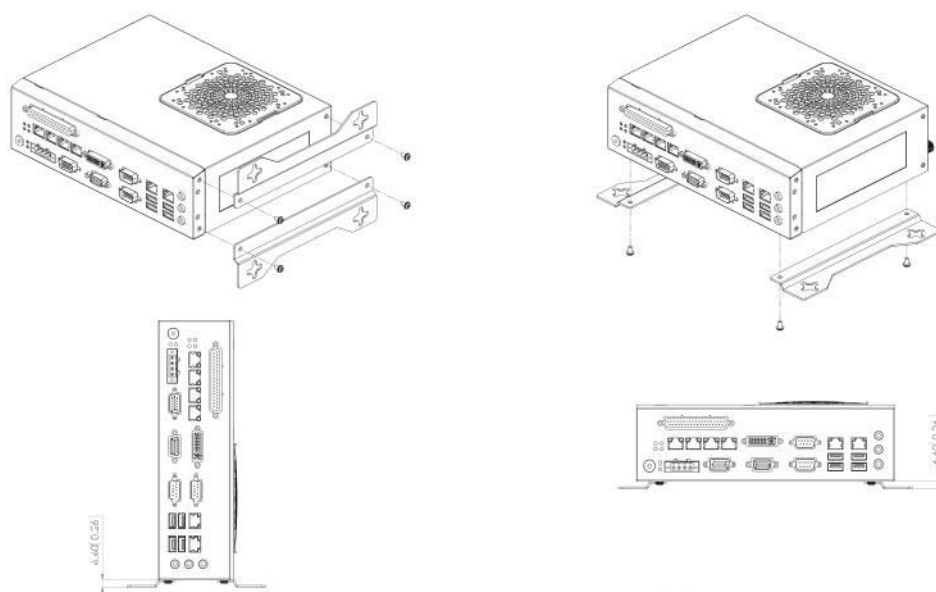
Figure 2.22 Wallmount Installation

Note! *This pair of wallmount brackets is designed for the side of the chassis and the bottom. Reverse installation is not permitted.*

2.11 DIN-Rail Installation
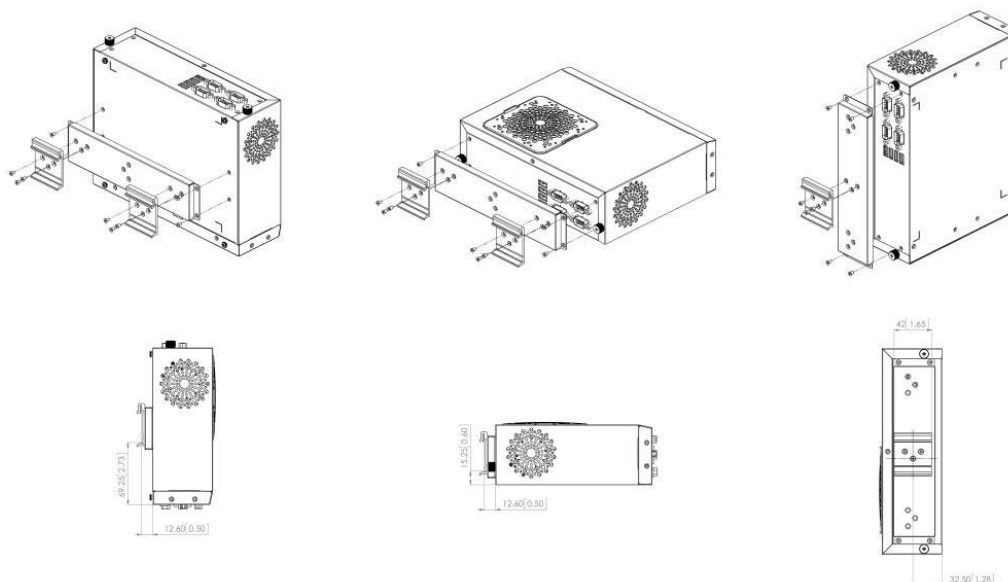
Figure 2.23 DIN-Rail Installation

Note! *This DIN-Rail bracket is designed for the rear side and the bottom. Reverse installation is not permitted.*

Chapter 3

AMI BIOS Setup

3.1 Introduction

With the AMI BIOS Setup program, you can modify BIOS settings and control the special features of your computer. The Setup program uses a number of menus for making changes and turning the special features on or off. This chapter describes the basic navigation of AIIS-1240 setup screens.

3.2 Entering Setup

Turn on the computer and during POST startup the BIOS setup program can be triggered by pressing "DEL" or "F2" key.

> **Note!**   If the message disappears before you press the "DEL" or "F2" key, please restart the computer and try again.

3.2.1 Main Setup

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

```
Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
 Main  Advanced  Chipset  Boot  Security  Save & Exit

 BIOS Information                                          Set the Date. Use Tab to
 BIOS Vendor                 American Megatrends           switch between Date elements.
 Core Version                4.6.5.3   0.18 x64
 Compliancy                  UEFI 2.3; PI 1.2
 Project Version             AIIS 1240X007
 Build Date and Time         06/26/2013 17:12:30

 Total Memory                4096 MB (DDR3)


 System Date                 [Mon 07/15/2013]
 System Time                 [11:05:10]

 Access Level                Administrator          →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit



           Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Figure 3.1 Main setup screen

The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can. The right frame displays the key legend.

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

■   **System Time / System Date**

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

3.2.2 Advanced BIOS Features Setup

Select the Advanced tab from AIIS-1240setup screen to enter the Advanced BIOS
Setup screen. You can select any of the items in the left frame of the screen, such as
CPU Configuration, to go to the sub menu for that item. You can display an Advanced
BIOS Setup option by highl ighting it using th e <Arrow> keys. All Advan ced BIOS
Setup options are described in th is section. The Advanced BIOS Setup screen is
shown below, and the sub menus are described on the following pages.
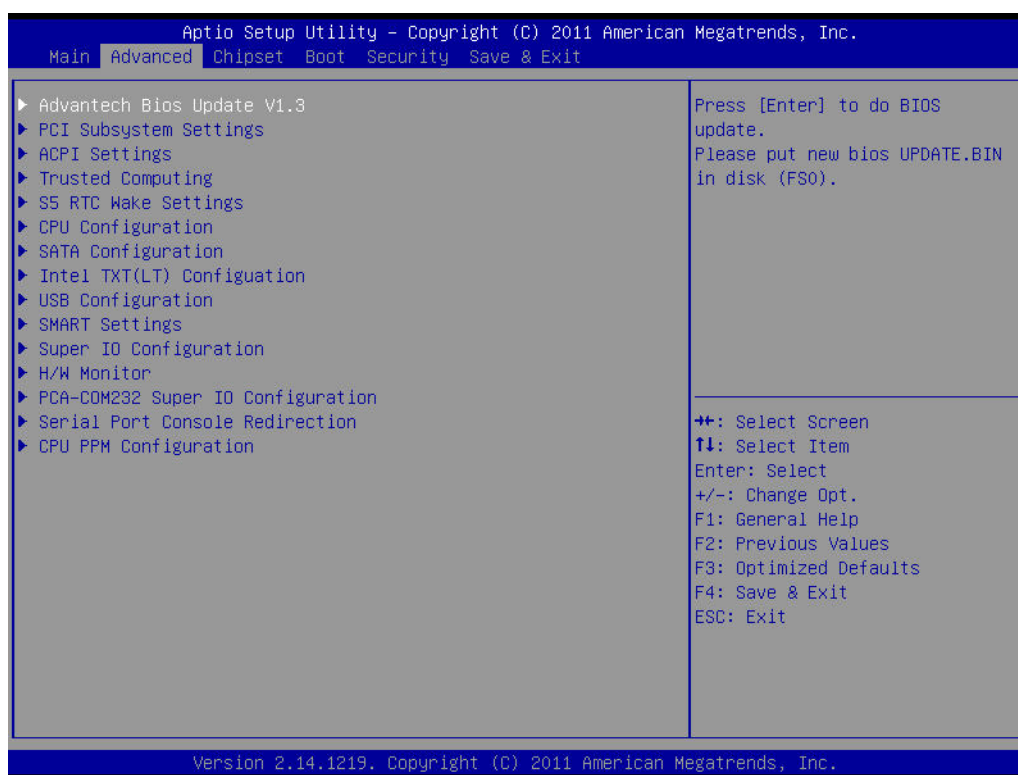
Figure 3.2 Advanced BIOS features setup screen

3.2.2.1 Advantech BIOS Update V1.3
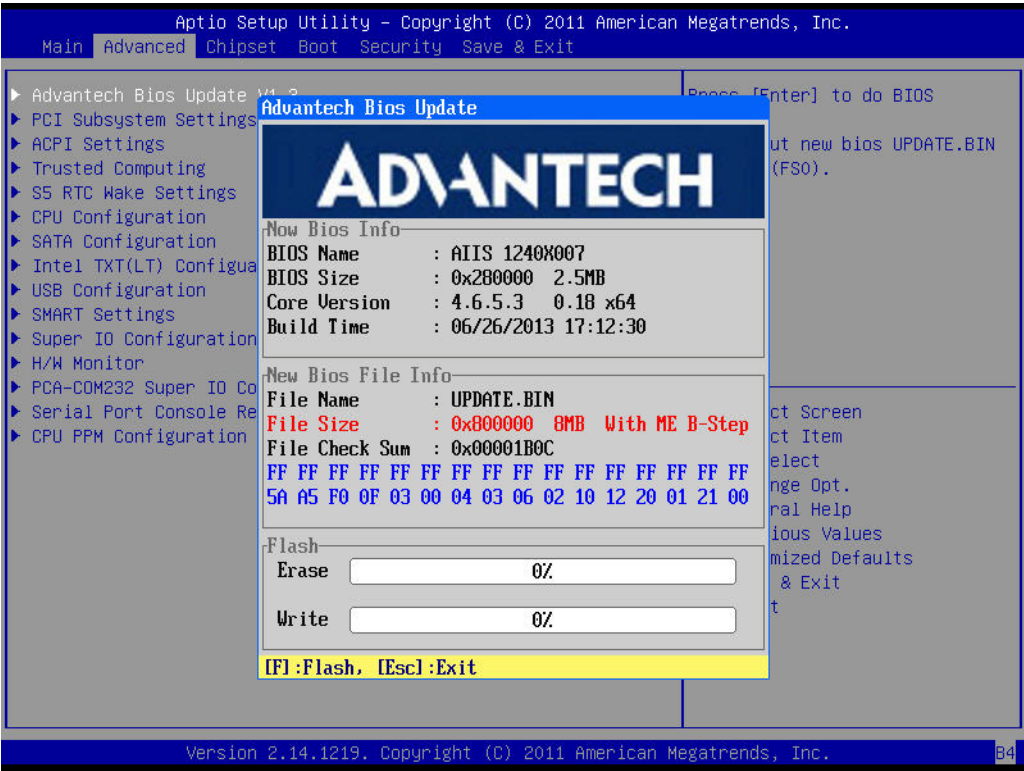
Figure 3.3 Advantech BIOS Update V1.3

You can update the BIOS via a USB storage device in FAT32 format.

3.2.2.2 PCI Subsystem Settings
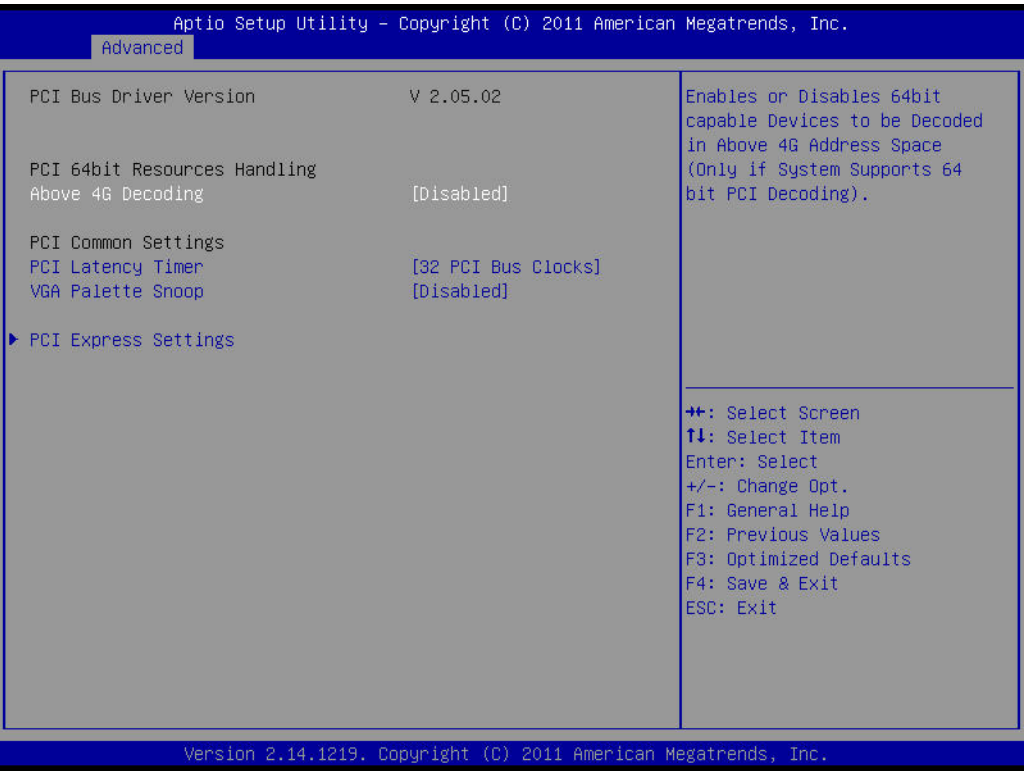
Figure 3.4 PCI Subsystem Settings

■ **PCI 64-bit Resources Handing**
Above 4G Decoding
Enable/Disable 64-bit capable devices to be decoded in ab ove 4G ad dress space (only if system supports 64-bit PCI decoding).

■ **PCI Common Settings**
PCI Latency Timer
Value to be programed into PCI Latency Timer Register.
VGA Palette Snoop
Enables/Disables VGA palette registers snooping.
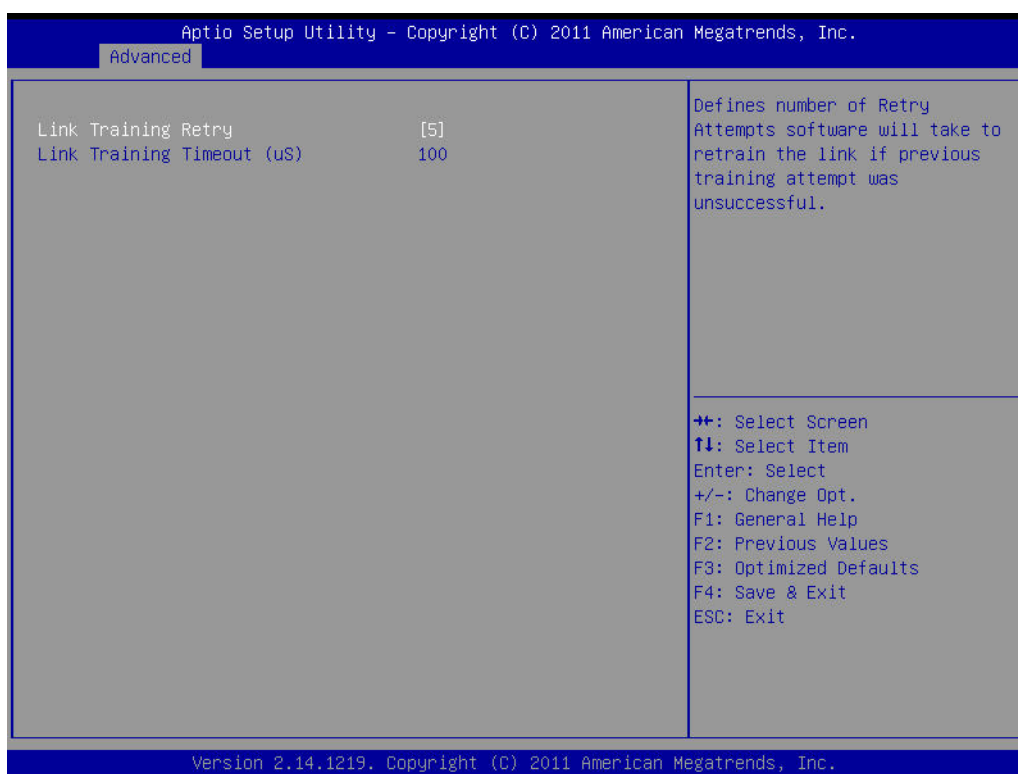
Figure 3.5 PCI Express Settings

■ **Link Training Retry**
Defines number of retry attempts the software will take to retrain the link if previous training attempts were unsuccessful.

■ **Link Training Timeout**
Defines number of micro-seconds the sof tware will wait before polling "Link Training" bit in the link status register. Values range from 10 to 1000 uS.

3.2.2.3 ACPI Settings

```
               Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
       Advanced

 ACPI Settings                                                Choose this item correspond
                                                              with your power supply type.
 Power Type                          [ATX]
 Enable ACPI Auto Configuration      [Disabled]

 Enable Hibernation                  [Enabled]
 Lock Legacy Resources               [Disabled]
 PowerOn by Modem                    [Disabled]




                                                             →←: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F3: Optimized Defaults
                                                             F4: Save & Exit
                                                             ESC: Exit




               Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Figure 3.6 ACPI Settings

■ **Power Type**

Choose the item that corresponds with your power supply type: ATX or AT.

■ **Enable ACPI AUTO configuration**

Enable or disable ACPI auto configuration

■ **Enable Hibernation**

"Enable or disable" Hiber nate (OS/S4 Slee p State). This opt ion may not be effective with some OS.

■ **Lock Legacy Resources**

"Enable" or "Disable" Lock Legacy Resources.

■ **PowerOn by Modem**

"Enable" or "Disable" PowerOn by Modem

3.2.2.4 Trust Computing

```
           Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
  Advanced

Configuration                                          Enables or Disables BIOS
  Security Device Support          [Disable]           support for security device.
                                                       O.S. will not show Security
                                                       Device. TCG EFI protocol and
Current Status Information                             INT1A interface will not be
  NO Security Device Found                             available.


                                                       ─────────────────────────────
                                                       ↔: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit




           Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Figure 3.7 Trust Computing

■ **Security Device Support**

Enable or disable BIOS security device support. You can purchase Advantech TPM (Trust Platform Module) PCA-TPM-00A1E for your security device.

3.2.2.5 S5 RTC Wake Setting
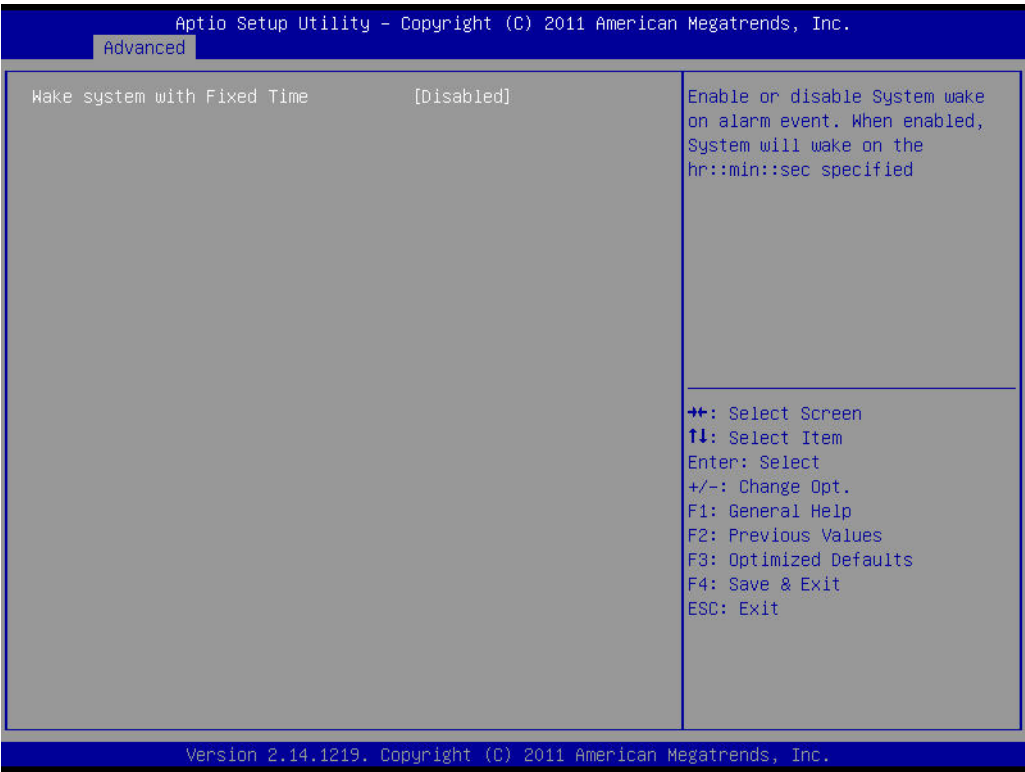
Figure 3.8 S5 RTC configuration

■ **Wake System with Fixed Time**

Enable or disable system wake on alarm event, When enabled, the system will wake on the hr:min:sec as specified.

3.2.2.6 CPU Configuration
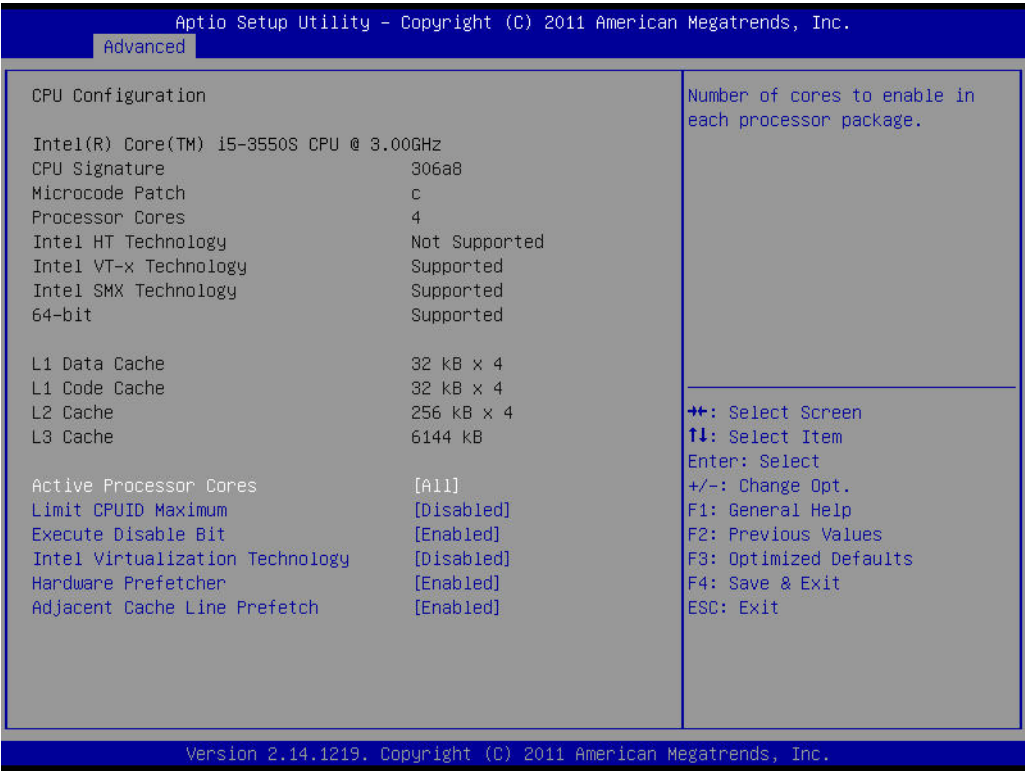
Figure 3.9 CPU Configuration

■ **Hyper-threading**

This item allows you to enable or disable Intel hyper-threading technology.

■ **Active Processor Core**

Use this to select how many processor cores you want to activate when you are using a dual or quad core processor.

■ **Limit CPUID Maximum**

Setting this item to [Enable] allows legacy operating systems to boot even without support for CPUs with extended CPUID functions.

■ **Execute Disable Bit**

This item specifies the Execute Disable Bit Feature. The settings are Enabled and Disabled. The Optimal and Fail-Safe default setting is Enabled. If Disabled is selected, the BIOS forces the XD feature flag to always return to 0.

■ **Intel Virtualization Technology**

This feature is used to enable or disable the Intel Virtualization Technology (IVT) extension. It allows multiple operating systems to run simultaneously on the same system. It does this by creating virtual machines, each running its own x86 operating system.

■ **Hardware Prefetcher**

Hardware Prefetcher is a technique that fetches instructions and/or data from memory into the CPU cache memory well before the CPU needs it, so that it can improve the load-to-use latency. You may choose to enable or disable it.

■ **Adjacent Cache Line Prefetch**

The Adjacent Cache-Line Prefetch mechanism, like automatic hardware prefetch, operates without programmer intervention. When enabled through the BIOS, two 64-byte cache lines are fetched into a 128-byte sector, regardless of whether the additional cache line has been requested or not. You may choose to enable or disable it.

3.2.2.7 SATA Configuration


```
                  Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
            Advanced

  SATA Controller(s)                  [Enabled]              Enable or disable SATA Device.
  SATA Mode Selection                 [IDE]

  Serial ATA Port 1                   Empty
    Software Preserve                 Unknown
  Serial ATA Port 2                   Empty
    Software Preserve                 Unknown
  CFast                               Empty
    Software Preserve                 Unknown

                                                            →←: Select Screen
                                                            ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit

                  Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Figure 3.10 SATA Configuration

AIIS-1240 User Manual

■ **SATA Controller(s)**
Enable or disable SATA Device
■ **SATA Mode**
This can be configured as IDE and AHCI.

Note! *Some OS request to install under AHCI mode so please consult your local OS vendor for more detailed information.*

3.2.2.8 Intel Trusted Execution Technology Configuration

```
          Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
  Advanced

 Intel Trusted Execution Technology Configuration

 Intel TXT support only can be enabled/disabled if SMX
 is enabled. VT and VT-d support must also be enabled
 prior to TXT.

 Secure Mode Extensons (SMX)          Enabled

 Intel TXT(LT) Support                [Disabled]


                                               →←: Select Screen
                                               ↑↓: Select Item
                                               Enter: Select
                                               +/-: Change Opt.
                                               F1: General Help
                                               F2: Previous Values
                                               F3: Optimized Defaults
                                               F4: Save & Exit
                                               ESC: Exit


          Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Figure 3.11 Intel Trusted Execution Technology Configuration

■ **Intel Trusted Execution Technology Configuration**
This enables or disables Intel® Trusted Execution Technology.

Note! *Your hardware platform should support Trust Platform Module (TPM 1.2) to enable Intel Trusted Execution Technology. Please also ensure that Intel VT and Intel VT-d are enabled prior to TXT.*

3.2.2.9 USB Configuration

```
            Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
      Advanced

  USB Configuration                                        Enables Legacy USB support.
                                                           AUTO option disables legacy
  USB Devices:                                             support if no USB devices are
        1 Drive, 2 Hubs                                    connected. DISABLE option will
                                                           keep USB devices available
  Legacy USB Support               [Enabled]               only for EFI applications.
  EHCI Hand-off                    [Disabled]

  USB hardware delays and time-outs:
  USB transfer time-out            [20 sec]
  Device reset time-out            [20 sec]
  Device power-up delay            [Auto]

  Mass Storage Devices:                                    ↔: Select Screen
  USB2.0 Flash Disk 8.07           [Auto]                  ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit



            Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Figure 3.12 USB Configuration

■ **Legacy USB Support**

This is f or supporting USB devices under legacy OS such as DOS. When choosing "AUTO", the system will automatically dete ct if any USB device is plugged into the computer. It will automatically enable USB legacy mode when a USB device is plugged in, and disable USB legacy mode when no USB device is plugged in.

■ **EHCI Hand-off**

This is a wo rkaround for OS without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.

■ **USB transfer time-out**

Allows you to select the USB transfer time-out value. [1,5,10,20 sec]

■ **Device reset time-out**

Allows you to select the USB device reset time-out value. [10, 20, 30, 40 sec]

■ **Device power-up delay**

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

3.2.2.10 Smart Setting

```
                    Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
                    Advanced

SMART Settings                                             Run SMART Self Test on all
                                                           HDDs during POST.
SMART Self Test                        [Disabled]




                                                           ←→: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit



                    Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
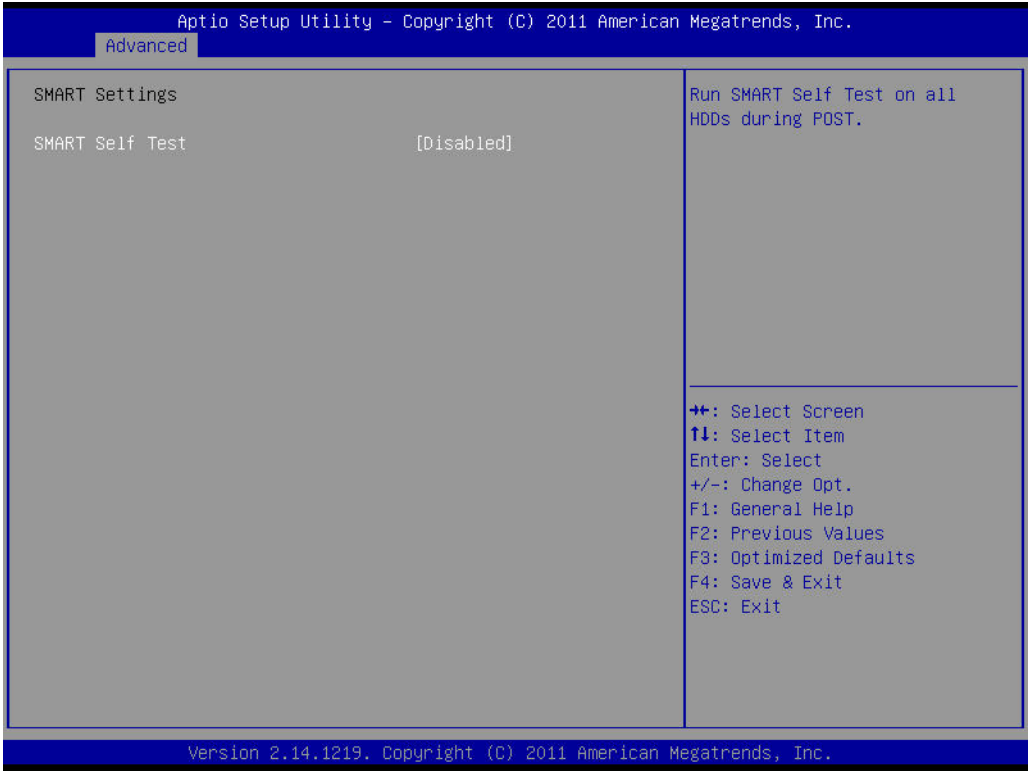
Figure 3.13 Smart Setting

■ **Smart self test**

Run SMART Self Test on all HDDs during POST.

3.2.2.11 Super IO Configuration

```
                    Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
                    Advanced

Super IO Configuration                                     Set Parameters of Serial Port
                                                           1 (COMA)
Super IO Chip                          NCT6776D
▶ Serial Port 1 Configuration
▶ Serial Port 2 Configuration




                                                           ←→: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit



                    Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Figure 3.14 Super IO Configuration

Figure 3.15 Serial Port 1 Configuration
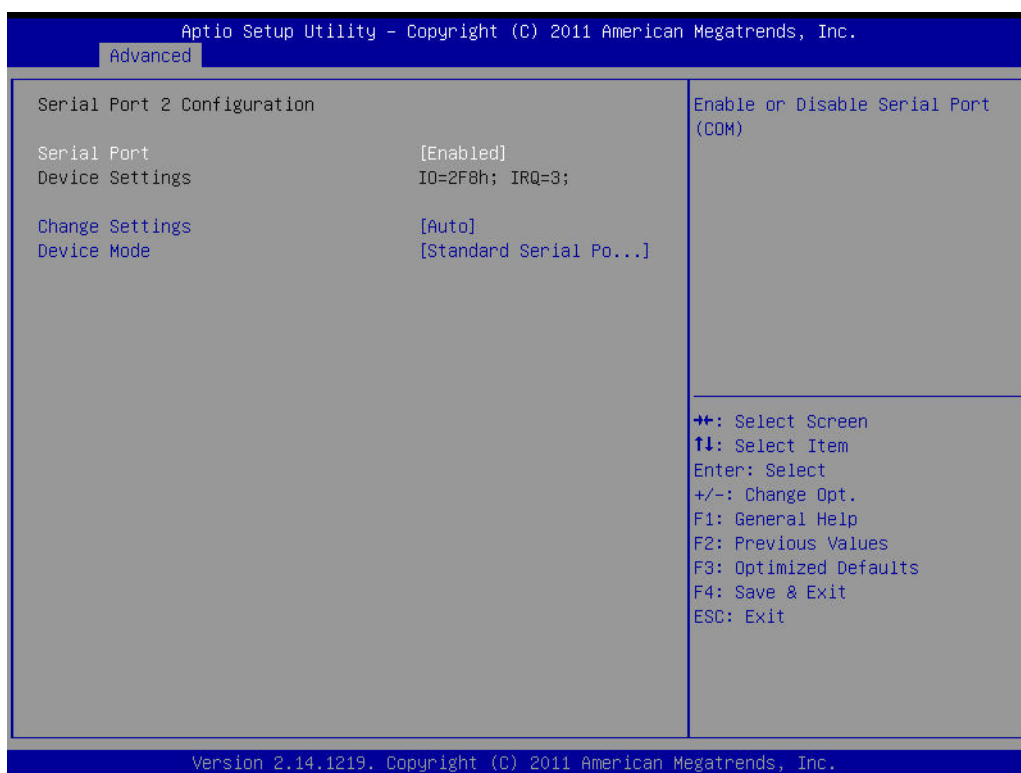
Figure 3.16 Serial Port 2 Configuration

■ **Serial Port 1 -2 configuration**
"Enable or Disable" Serial Port.

■ **Change settings**
Select optimal settings for serial port 1 &2

- **Device mode**

  Serial port 1: could be selected as [Standard Serial Port Mode], RS-485 Half Duplex, or RS-422 Full Duplex.

  Serial port 2: could be selected as [Standard Serial Port Mode], [IrDA 1.0 (HP SIR) Mode], [ASKIR Mode], RS-485 Half Duplex, or RS-422 Full Duplex.

3.2.2.12 H/W Monitor

```
               Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
        Advanced

 ▶ Smart Fan Mode Configuration                            Smart Fan Mode Select
   Pc Health Status

   System temperature              : +44°C
   CPU Temperature                 : +52°C
   SYSFAN1 Speed                   : N/A
   CPUFAN1 Speed                   : 5172 RPM
   VCORE                           : +0.928 V
   +12V                            : +12.038 V
    +5V                            : +5.054 V
   DC IN VOLTAGE                   : +23.520 V
   DC IN CURRENT                   : +1.037 A
   3VCC                            : +3.296 V
   VBAT                            : +2.976 V               →←: Select Screen
   Case Open Warning               [Disabled]               ↑↓: Select Item
   CPU Warning Temperature         [Disabled]               Enter: Select
   ACPI Shutdown Temperature       [Disabled]               +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit



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```

Figure 3.17 PC Health Status

- **Smart Fan Mode Configuration**

  Enable or disable Smart fan

- **Case Open Warning**

  Enable/Disable the Chassis Intrusion monitoring function. When enabled and the case is opened, the speaker beeps.

- **CPU Warning Temperature**

  Use this to set the CPU warning temperature threshold. When the system reaches the warning temperature, the speaker will beep.

- **ACPI Shutdown Temperature**

  Use this to set the ACPI shutdown temperature threshold. When the system reaches the shutdown temperature, it will be automatically shut down by ACPI OS to protect the system from overheating damage.

3.2.2.13 PCA-COM232 Super IO Configuration

```
              Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
   Advanced

   PCA-COM232 Super IO Configuration                          Set Parameters of Serial Port
                                                              3 (COM3)
   Super IO Chip                    Fintek F81216
 ▶ Serial Port 3 Configuration
 ▶ Serial Port 4 Configuration
 ▶ Serial Port 5 Configuration
 ▶ Serial Port 6 Configuration



                                                              →←: Select Screen
                                                              ↑↓: Select Item
                                                              Enter: Select
                                                              +/-: Change Opt.
                                                              F1: General Help
                                                              F2: Previous Values
                                                              F3: Optimized Defaults
                                                              F4: Save & Exit
                                                              ESC: Exit


              Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Figure 3.18 PCA-COM232 Super IO Configuration

```
              Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
   Advanced

   Serial Port 3 Configuration                                Enable or Disable Serial Port
                                                              (COM)
   Serial Port                      [Enabled]
   Device Settings                  IO=C80h; IRQ=11;

   Change Settings                  [Auto]



                                                              →←: Select Screen
                                                              ↑↓: Select Item
                                                              Enter: Select
                                                              +/-: Change Opt.
                                                              F1: General Help
                                                              F2: Previous Values
                                                              F3: Optimized Defaults
                                                              F4: Save & Exit
                                                              ESC: Exit


              Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Figure 3.19 Serial Port 3 Configuration

Figure 3.20 Serial Port 4 Configuration
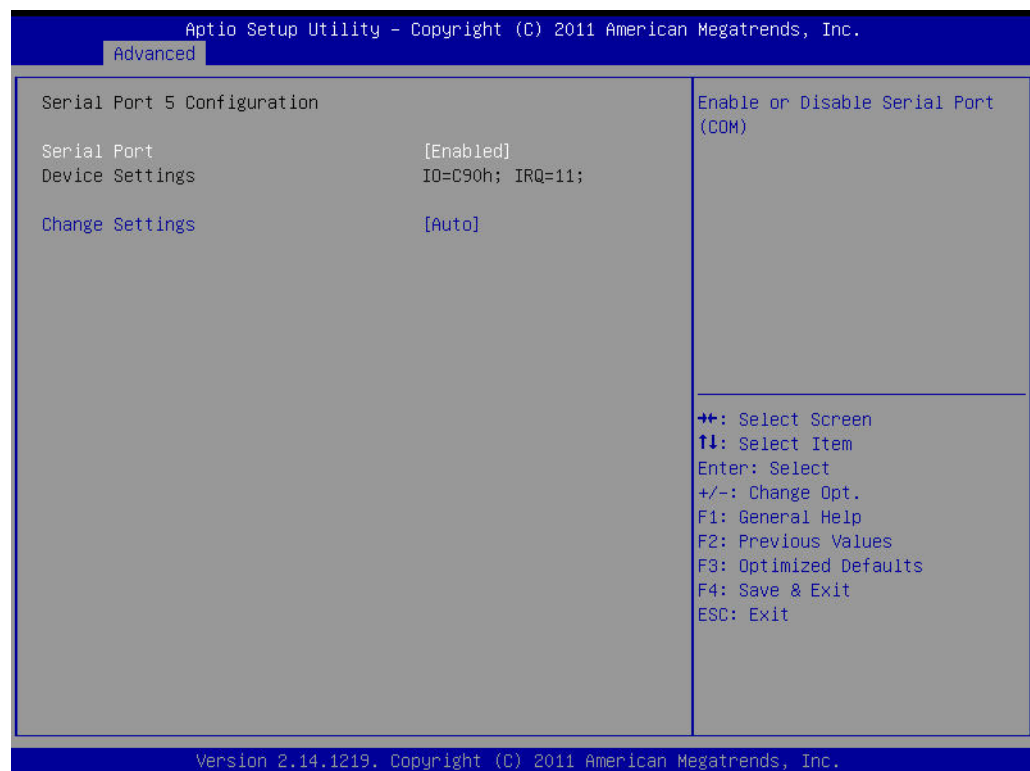
Figure 3.21 Serial Port 5 Configuration
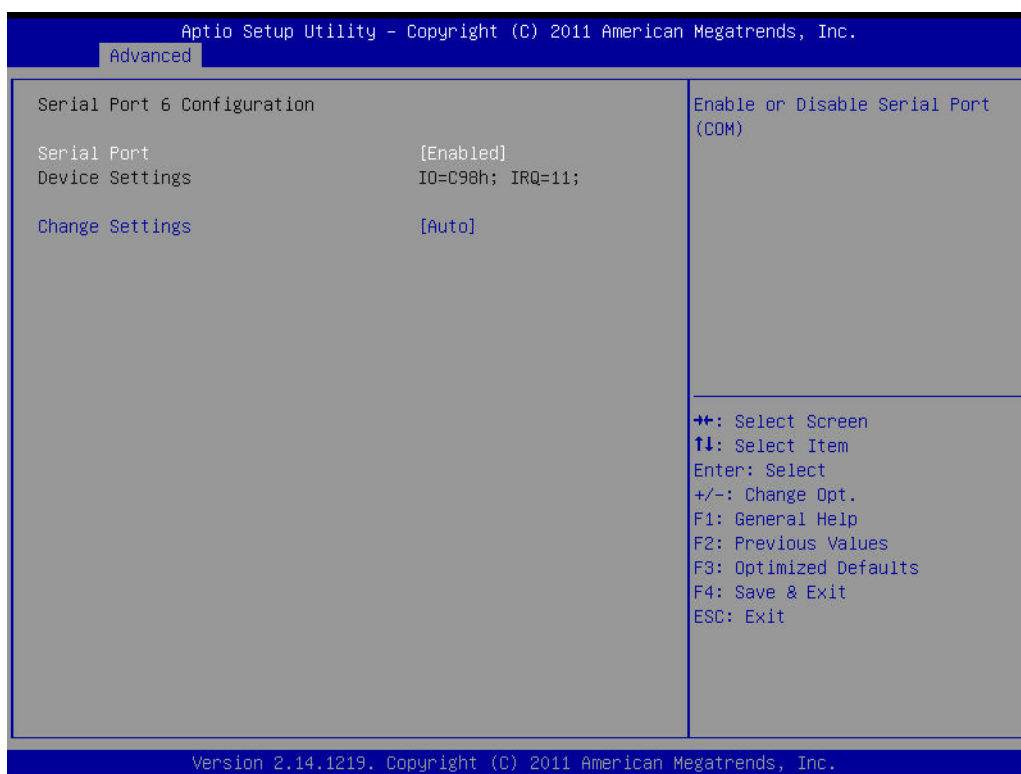
Figure 3.22 Serial Port 6 Configuration

■ **Serial Port 3 - 6 configuration**
"Enable or Disable" Serial Port.

■ **Change settings**
Select optimal settings for serial port 3, 4, 5 &6

3.2.2.14 Serial Port Console Redirection

```
        Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
        Advanced

      COM0 (Disabled)                                        Console Redirection Enable or
      Console Redirection            Port Is Disabled        Disable.

      COM1(Pci Bus0,Dev0,Func0) (Disabled)
      Console Redirection            Port Is Disabled

      Serial Port for Out-of-Band Management/
      Windows Emergency Management Services (EMS)
      Console Redirection            [Enabled]
    ▶ Console Redirection Settings

                                                             ↔: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F3: Optimized Defaults
                                                             F4: Save & Exit
                                                             ESC: Exit

        Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Figure 3.23 Serial Port Console Redirection

3.2.2.15 CPU PPM Configuration

```
        Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
        Advanced

      CPU PPM Configuration                                  Enable/Disable Intel SpeedStep

      EIST                           [Enabled]
      Turbo Mode                     [Enabled]
      CPU C3 Report                  [Enabled]
      CPU C6 report                  [Enabled]
      CPU C7 report                  [Enabled]
      ACPI T State                   [Disabled]

                                                             ↔: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F3: Optimized Defaults
                                                             F4: Save & Exit
                                                             ESC: Exit

        Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Figure 3.24 CPU PPM Configuration

■ **EIST**
Enable/Disable Intel Speedstep.

■ **Turbo mode**
Enable or disable turbo mode.

■ **CPU C3 report**
Enable/Disable CPU C3 (ACPI C2) report to OS.

■ **CPU C6 report**
Enable/Disable CPU C6 (ACPI C2) report to OS.

■ **CPU C7 report**
Enable/Disable CPU C7 (ACPI C2) report to OS.

■ **ACPI T state**
Enable/Disable ACPI T state support.

3.2.3 Chipset

```
          Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
    Main  Advanced  Chipset  Boot  Security  Save & Exit

 ▶ PCH-IO Configuration                                    PCH Parameters
 ▶ System Agent (SA) Configuration




                                                           ↔: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit



          Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Figure 3.25 Chipset

3.2.3.1 PCH-IO Configuration

```
         Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
            Chipset

   Intel PCH RC Version              1.1.0.0            PCI Express Configuration
   Intel PCH SKU Name                H61               settings
   Intel PCH Rev ID                  05/B3

 ▶ PCI Express Configuration
 ▶ USB Configuration
 ▶ PCH Azalia Configuration

   LAN1 Controller                   [Enabled]
     LAN1 Option-ROM                 [Disabled]
     Wake on LAN1 from S5            [Disabled]
   LAN2 Controller                   [Enabled]
     LAN2 Option-ROM                 [Disabled]         →←: Select Screen
   PCIE Wake                         [Disabled]         ↑↓: Select Item
                                                        Enter: Select
   High Precision Event Timer Configuration             +/-: Change Opt.
                                                        F1: General Help
   High Precision Timer              [Enabled]          F2: Previous Values
                                                        F3: Optimized Defaults
   SLP_S4 Assertion Width            [4-5 Seconds]      F4: Save & Exit
   Restore AC Power Loss             [Power Off]        ESC: Exit

         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Figure 3.26 PCH IO Configuration

3.2.3.1.1 PCI Express Configuration

```
         Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
            Chipset

   PCI Express Configuration                            Enable or disable PCI Express
                                                        Subtractive Decode.
   Subtractive Decode                [Disabled]
 ▶ PCI Express Root Port 1
 ▶ PCI Express Root Port 2
 ▶ PCI Express Root Port 3
 ▶ PCI Express Root Port 4
   PCIE Port 5 is assigned to LAN
 ▶ PCI Express Root Port 6
 ▶ PCI Express Root Port 7
 ▶ PCI Express Root Port 8

                                                        →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit

         Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Figure 3.27 PCI Express Configuration

■ **Subtractive decode**
Enable or disable PCI Express subtractive decode.
■ **PCI Express Configuration**
PCI Express Root Port 1 to 8 Setting.

3.2.3.1.2 USB Configuration

```
                Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
                  Chipset

 USB Configuration                                      Control the USB EHCI (USB 2.0)
                                                        functions.
 EHCI1                            [Enabled]             One EHCI controller must
                                                        always be enabled.
 EHCI2                            [Enabled]

 USB Ports Per-Port Disable Control   [Disabled]




                                                        →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit



                Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Figure 3.28 USB Configuration

■ **EHCI1**
Control the USB EHCI (USB2.0) functions. One EHCI controller must always be enabled.
■ **EHCI2**
Control the USB EHCI(USB2.0) functions. One EHCI controller must always be enabled.
■ **USB Ports Pre-port Disable Control**
Control each of the USB ports (0-13) disabling.

3.2.3.1.3 PCH Azalia Configuration

```
                  Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
                   Chipset

 PCH Azalia Configuration                                         Control Detection of the
                                                                  Azalia device.
 Azalia                                      [Auto]               Disabled = Azalia will be
                                                                  unconditionally disabled
                                                                  Enabled = Azalia will be
                                                                  unconditionally Enabled
                                                                  Auto = Azalia will be enabled
                                                                  if present, disabled otherwise.




                                                                  →←: Select Screen
                                                                  ↑↓: Select Item
                                                                  Enter: Select
                                                                  +/-: Change Opt.
                                                                  F1: General Help
                                                                  F2: Previous Values
                                                                  F3: Optimized Defaults
                                                                  F4: Save & Exit
                                                                  ESC: Exit




                  Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Figure 3.29 PCH Azalia Configuration

■ **Azalia**

Control detection of the Azalia device.

Disable=Azalia will be unconditionally disabled

Enable=Azalia will be unconditionally enabled

Auto=Azalia will be enabled if present, disabled otherwise.

■ **LAN1 Controller**

Enable or Disable LAN1 Controller.

■ **LAN 1 Option-ROM**

Enable or Disable LAN 1 boot option for legacy network devices.

■ **Wake on LAN1 from S5**

Enable or Disable LAN1 to wake the system. (The wake on LAN cannot be disabled if ME is on at Sx state).

■ **LAN2 Controller**

Enable or Disable LAN2 Controller.

■ **LAN 2 Option-ROM**

Enable or Disable LAN 2 boot option for legacy network devices.

■ **PCIE Wake**

Enable or Disable PCIE to wake the system from S5.

■ **High precision Timer**

Enable or Disable high precision event timer.

■ **SLP_S4 Assertion Width**

Select a minimum assertion width of the SLP_S4# signal.

■ **Restore AC Power Loss**

Power Off, power On or Last State to restore AC power loss

3.2.3.2 System Agent (SA) Configuration

```
                Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
                  Chipset

    System Agent Bridge Name        IvyBridge              Check to enable VT-d function
    System Agent RC Version         1.1.0.0                on MCH.
    VT-d Capability                 Supported

    VT-d                            [Enabled]
    BDAT ACPI Table Support         [Disabled]
    C-State Pre-Wake                [Enabled]

  ▶ Graphics Configuration
  ▶ NB PCIe Configuration
  ▶ Memory Configuration

                                                           →←: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save & Exit
                                                           ESC: Exit

                Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Figure 3.30 System Agent (SA) Configuration

- **VT-d**
  Check to enable VT-d function on MCH.
- **BDAT ACPI Table support**
  Enable support for the BDAT ACPI table.
- **C-State Pre-Wake**
  Enable support for C-Sate Pre-Wake.
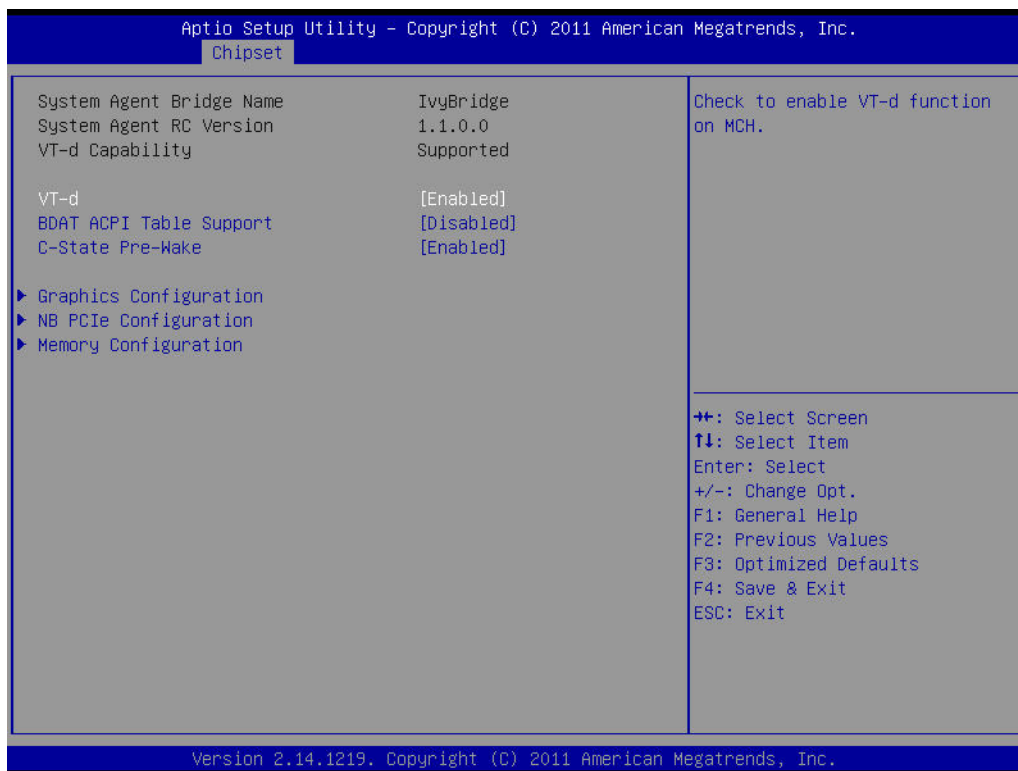
3.2.3.3 Graphics Configuration


```
          Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
               Chipset

Graphics Configuration                                        Select which of IGFX/PEG/PCI
IGFX VBIOS Version              2126                          Graphics device should be
IGfx Frequency                 350 MHz                        Primary Display Or select SG
                                                              for Switchable Gfx.
Primary Display                [Auto]
Internal Graphics              [Auto]
GTT Size                       [2MB]
Aperture Size                  [256MB]
DVMT Pre-Allocated             [64M]
DVMT Total Gfx Mem             [256M]
Gfx Low Power Mode             [Enabled]
Primary IGFX Boot Display      [VBIOS Default]
                                                              →←: Select Screen
                                                              ↑↓: Select Item
                                                              Enter: Select
                                                              +/-: Change Opt.
                                                              F1: General Help
                                                              F2: Previous Values
                                                              F3: Optimized Defaults
                                                              F4: Save & Exit
                                                              ESC: Exit

          Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Figure 3.31 Graphics Configuration

■ **Primary Display**

Select which IGFX/PEG/PCI graphics device should be primary display or select SG for switchable GFX.

■ **Internal Graphics**

Keep IGD enabled based on the setup options.

■ **GTT Size**

Select the GTT size.

■ **Aperture Size**

Select the aperture size.

■ **DVMT Pre-Allocated**

Select DVMT5.0 pre-allocated (fixed) graphics memory size, up to 1024 M, used by the internal graphics device.

■ **DVMT Total Gfx Mem**

Select 128 M, 256 M or MAX DVMT5.0 total graphics memory size used by the internal graphics device.

■ **Gfx Low Power Mode**

This option is applicable for SFF only.

■ **Primary IGFX Display**

Select the video device which will be activated during POST. This has no effect if external graphics are present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on primary display. Note: In DOS mode, only either VGA or DVI single output are supported.

3.2.3.4 NB PCIe Configuration

```
              Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
                Chipset

 NB PCIe Configuration                                        Configure PEG0 B0:D1:F0
 PEG0                             Not Present                 Gen1-Gen3
   PEG0 - Gen X                   [Auto]
   PEG0 ASPM                      [Auto]

 Enable PEG                       [Auto]
 De-emphasis Control              [-3.5 dB]




                                                             →←: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F3: Optimized Defaults
                                                             F4: Save & Exit
                                                             ESC: Exit




              Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
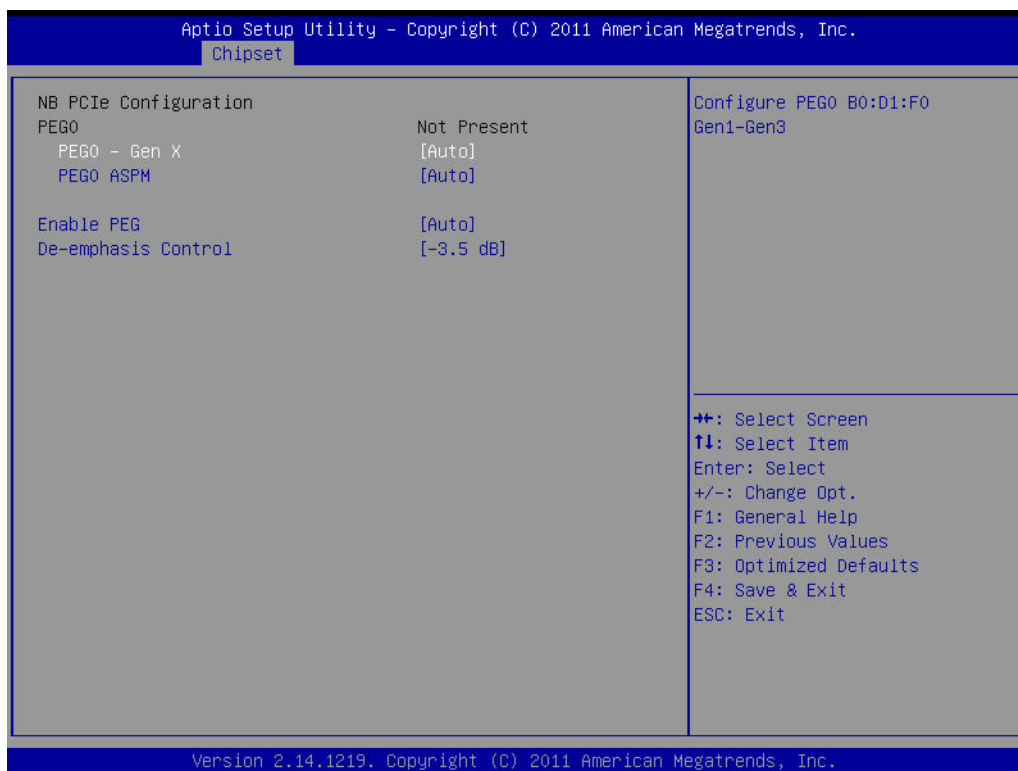
Figure 3.32 NB PCIe Configuration

- **PEG0-Gen X**

  Configure auto, Gne1, Gen2, or Gen 3.

- **PEG0 ASPM**

  Control ASPM support for the PEG: Device 1 Function 0. This has no effect if PEG is not the currently active device.

- **Enable PEG**

  Enable/Disable/Auto the PEG.

- **De-emphasis Control**

  Configure the De-emphasis control on PEG.

3.2.3.5 Memory Configuration
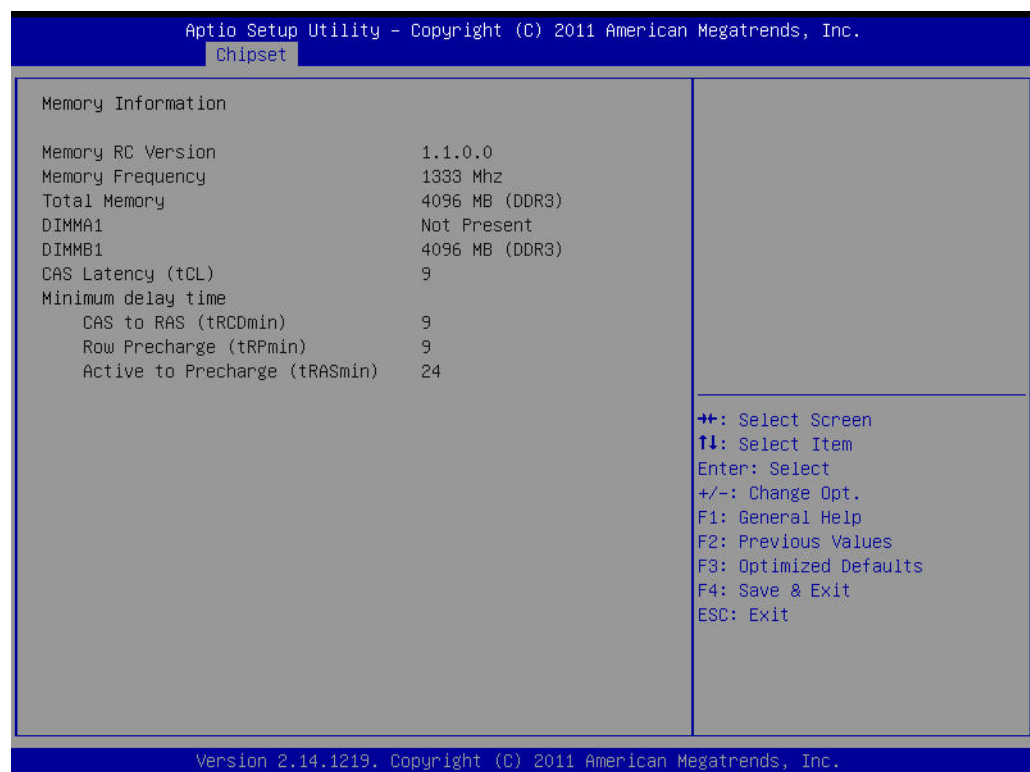
Overview memory detail information.

```
            Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
            Chipset

  Memory Information

  Memory RC Version            1.1.0.0
  Memory Frequency             1333 Mhz
  Total Memory                 4096 MB (DDR3)
  DIMMA1                       Not Present
  DIMMB1                       4096 MB (DDR3)
  CAS Latency (tCL)            9
  Minimum delay time
      CAS to RAS (tRCDmin)     9
      Row Precharge (tRPmin)   9
      Active to Precharge (tRASmin)   24

                                                   →←: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F3: Optimized Defaults
                                                   F4: Save & Exit
                                                   ESC: Exit

            Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Figure 3.33 Memory Information

3.2.4 Boot

```
            Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
     Main  Advanced  Chipset  Boot  Security  Save & Exit

  Boot Configuration                                 Number of seconds to wait for
  Setup Prompt Timeout          1                    setup activation key.
  Bootup NumLock State          [On]                 65535(0xFFFF) means indefinite
                                                     waiting.
  Quiet Boot                    [Disabled]

  CSM16 Module Version          07.69

  GateA20 Active                [Upon Request]
  Option ROM Messages           [Force BIOS]
  INT19 Trap Response           [Immediate]

  Boot Option Priorities
  Boot Option #1                [USB2.0 Flash Disk ...]   →←: Select Screen
  Boot Option #2                [UEFI: USB2.0 Flash...]   ↑↓: Select Item
                                                     Enter: Select
  Hard Drive BBS Priorities                          +/-: Change Opt.
                                                     F1: General Help
                                                     F2: Previous Values
                                                     F3: Optimized Defaults
                                                     F4: Save & Exit
                                                     ESC: Exit

            Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```
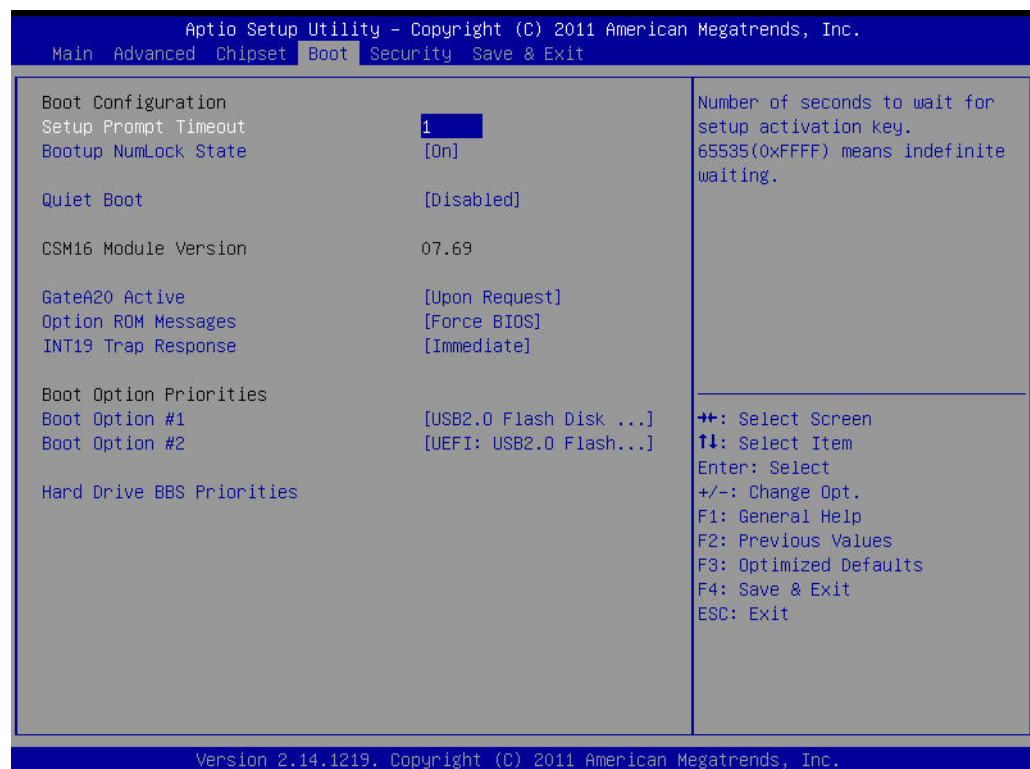
Figure 3.34 Boot

- **Setup Prompt timeout**

  Number of seconds to wait for setup activation key.

- **Bootup NumLock State**

  Select the keyboard Numlock state.

- **Quiet Boot**

  Enable/Disable Quiet Boot option.

- **GateA20 Active**

  Upon request-GA20 can be disabled using BIOS services.

  Always-do not allow disabling GA20; this option is useful when any RT code is executed above 1 MB.

- **Option Rom Messages**

  Set display mode for option ROM.

- **INT19 Trap Response**

  BIOS reaction on INT19 trapping by option ROM:

  IMMEDATE-execute the trap right away.

  POSTPONED-execute the trap during legacy boot.

- **Boot Option Priorities**

  you can see the information of boot priority option of devices.

3.2.5 Security
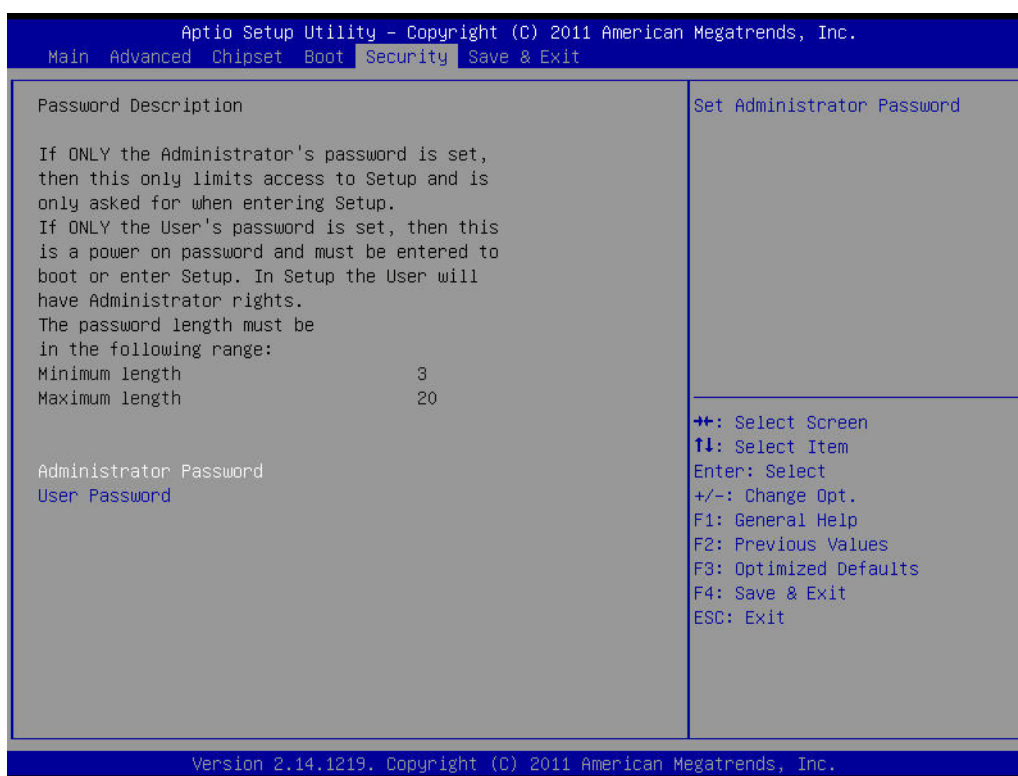
Figure 3.35 Security

Select Security Setup from AIIS-1240 Setup main BIOS setup menu. All Securit y Setup options, such as password protection and virus protection are described in this section. To access the sub menu for the following items, select the item and press <Enter>
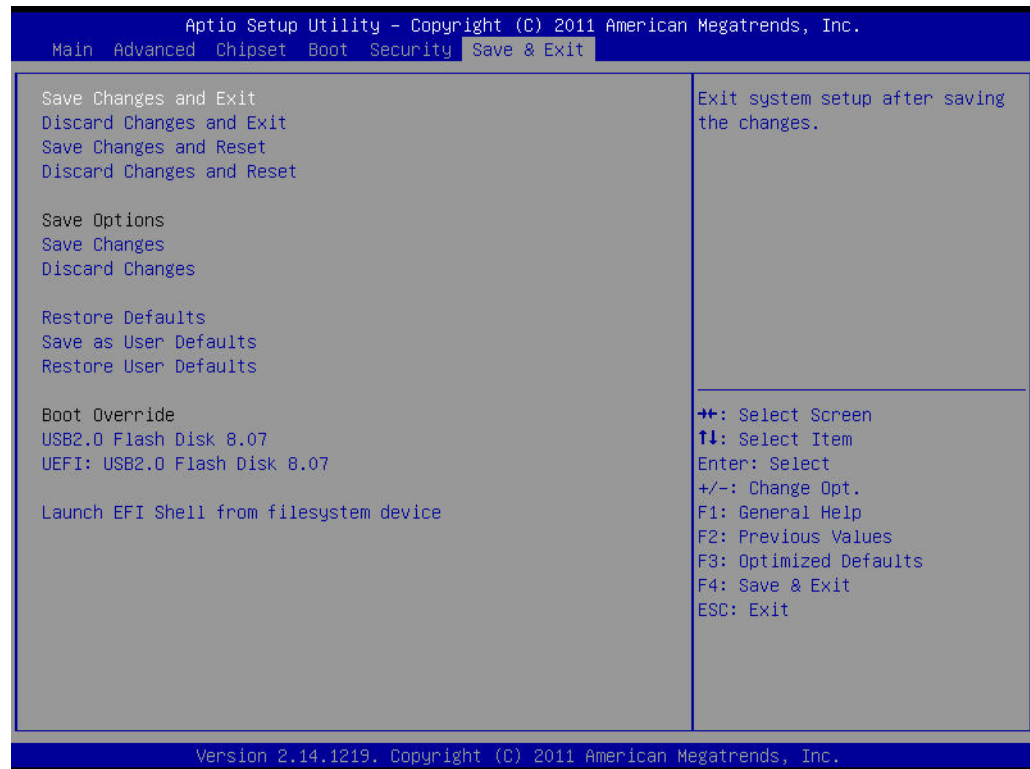
3.2.6 Save & Exit

```
              Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
       Main  Advanced  Chipset  Boot  Security  Save & Exit

       Save Changes and Exit                              Exit system setup after saving
       Discard Changes and Exit                           the changes.
       Save Changes and Reset
       Discard Changes and Reset

       Save Options
       Save Changes
       Discard Changes

       Restore Defaults
       Save as User Defaults
       Restore User Defaults
                                                          →←: Select Screen
       Boot Override                                      ↑↓: Select Item
       USB2.0 Flash Disk 8.07                             Enter: Select
       UEFI: USB2.0 Flash Disk 8.07                       +/-: Change Opt.
                                                          F1: General Help
       Launch EFI Shell from filesystem device            F2: Previous Values
                                                          F3: Optimized Defaults
                                                          F4: Save & Exit
                                                          ESC: Exit



              Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Figure 3.36 Save & Exit

- **Save changes and exit***
  When you have completed system configuration, select this option to save your changes, exit BIOS setup and boot into the OS so the new system configuration parameters can take effect.
- **Discard changes and exit**
  Select this option to quit Setup without making any permanent changes to the system configuration.
- **Save changes and Reset**
  When you have completed system configuration, select this option to save your changes, exit BIOS setup and reboot into the computer so the new system configuration parameters can take effect.
- **Discard changes and Reset**
  Select this option to quit Setup and reset computer without making any permanent changes to the system configuration.
- **Save Changes**
  Select this option to save your changes.
- **Discard Changes**
  Select this option to discard your changes.
- **Restore Defaults**
  Select this option to restore BIOS configuration as origin.
- **Save as User Defaults**
  Select this option to save user's configuration.
- **Restore User Defaults**
  Select this option to restore BIOS to user's configuration.
- **Launch EFI Shell from file system device**
  This option allows you to attempt to launch the EFI Shell application (shellx64.efi) from one of the available file system devices.

*When you make some critical changes, the system will still reboot even if you choose "Save changes and exit".

Appendix A

Programming the Watchdog Timer

A.1 Introduction

The AIIS-1240's watchdog timer can be used to monitor system software operation and take corrective action if the software fails to function within the programmed period. This section describes the operation of the watchdog timer and how to program it.

A.1.1 Watchdog Timer Overview

The watchdog timer is built in to the NCT6776D super I/O controller. It provides the following user programmable functions:

- Can be enabled and disabled via user's program
- Timer can be set from 1 to 255 seconds or 1 to 255 minutes
- Generates a reset signal if the software fails to reset the timer before time-out

A.1.2 Programming the Watchdog Timer

The I/O port address of the watchdog timer is 2E (hex) and 2F (hex). 2E (hex) is the address port. 2F (hex) is the data port. You must first write an address value into address port 2E (hex), then write/read data to/from the assigned register through data port 2F (hex).

```
        ┌─────────────┐
        │   Unlock    │
        │   NCT6776D  │
        └──────┬──────┘
               │
               ▼
        ┌─────────────┐
        │ Select register of │
        │ watchdog timer │
        └──────┬──────┘
               │
               ▼
        ┌─────────────┐
        │ Enable the function of │
        │ the watchdog timer │
        └──────┬──────┘
               │
               ▼
        ┌─────────────┐
        │ Use the function of │
        │ the watchdog timer │
        └──────┬──────┘
               │
               ▼
        ┌─────────────┐
        │    Lock     │
        │   NCT6776D  │
        └─────────────┘
```
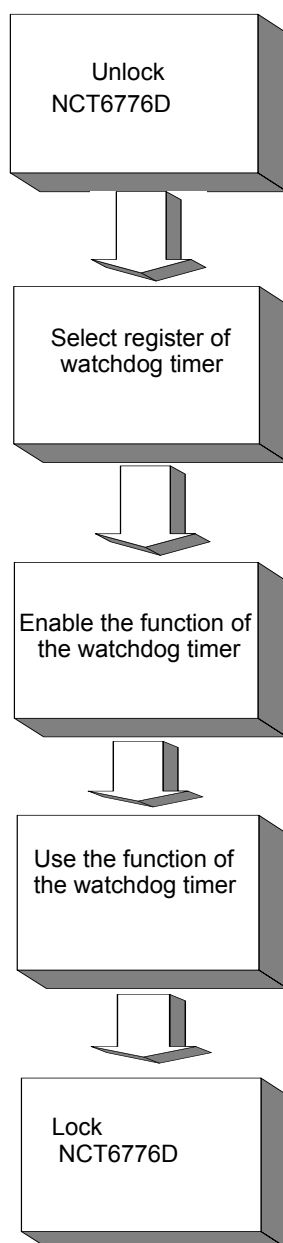
Table A.1: Watchdog Timer Registers		
Address of register (2E)	**Attribute Read/Write**	**Value (2F)& description**
87 (hex)	-----	Write this address to I/O address port 2E (hex) twice to unlock the NCT6776D.
07 (hex)	write	Write 08 (hex) to select register of watchdog timer.
30 (hex)	write	Write 01 (hex) to enable the function of the watchdog timer. Disabled is set as default.
F5 (hex)	write	Set seconds or minutes as units for the timer. Write 0 to bit 3: set second as counting unit. [default]. Write 1 to bit 3: set minutes as counting unit. Write 1 to bit 4: Watchdog timer count mode is 1000 times faster. If bit 3 is 0, the count mode is 1/1000 seconds mode. If bit 3 is 1, the count mode is 1/1000 minutes mode.

F6 (hex)	write	0: stop timer [default] 01~FF (hex): The amount of the count, in seconds or minutes, depends on the value set in register F5 (hex). This number decides how long the watchdog timer waits for strobe before generating an interrupt or reset signal. Writing a new value to this register can reset the timer to count with the new value.
F7 (hex)	read/write	Bit 6: Write 1 to enable keyboard to reset the timer, 0 to disable.[default] Bit 5: Write 1 to generate a timeout signal immediately and automatically return to 0. [default=0] Bit 4: Read status of watchdog timer, 1 means timer is "timeout".
AA (hex)	-----	Write this address to I/O port 2E (hex) to lock the NCT6776D.

A.1.3 Example Program

1. Enable watchdog timer and set 10 sec. as timeout interval

```
;----------------------------------------------------------
Mov dx,2eh          ; Unlock NCT6776D
Mov al,87h
Out dx,al
Out dx,al

;----------------------------------------------------------
Mov al,07h          ; Select registers of watchdog timer
Out     dx,al
Inc     dx
Mov     al,08h
Out     dx,al

;----------------------------------------------------------
Dec dx              ; Enable the function of watchdog timer
Mov     al,30h
Out     dx,al
Inc     dx
In      al,dx
Or      al,01h
Out     dx,al

;----------------------------------------------------------
Dec dx              ; Set second as counting unit
Mov     al,0f5h
Out     dx,al
Inc     dx
In      al,dx
And al,not 08h
Out     dx,al

;----------------------------------------------------------
Dec dx              ; Set timeout interval as 10 seconds and start counting
Mov     al,0f6h
```

```
Out      dx,al
Inc      dx
Mov      al,10        ; 10 seconds
Out      dx,al
;-------------------------------------------------------
Dec dx                ; Lock NCT6776D
Mov      al,0aah
Out      dx,al
```

2.   Enable watchdog timer and set 5 minutes as timeout interval

```
;-------------------------------------------------------
Mov dx,2eh            ; Unlock NCT6776D
Mov al,87h
Out dx,al
Out dx,al
;-------------------------------------------------------
Mov al,07h            ; Select registers of watchdog timer
Out      dx,al
Inc      dx
In       al,dx
Or       al,08h
Out      dx,al
;-------------------------------------------------------
Dec dx                ; Enable the function of watchdog timer
Mov      al,30h
Out      dx,al
Inc      dx
Mov      al,01h
Out      dx,al
;-------------------------------------------------------
Dec dx                ; Set minute as counting unit
Mov      al,0f5h
Out      dx,al
Inc      dx
In       al,dx
Or       al,08h
Out      dx,al
;-------------------------------------------------------
Dec dx                ; Set timeout interval as 5 minutes and start counting
Mov      al,0f6h
Out      dx,al
Inc      dx
Mov      al,5         ; 5 minutes
Out      dx,al
;-------------------------------------------------------
```

```
Dec dx            ; Lock NCT6776D
Mov    al,0aah
Out    dx,al


3.    Enable watchdog timer to be reset by mouse
;----------------------------------------------------------
Mov dx,2eh        ; Unlock NCT6776D
Mov al,87h
Out dx,al
Out dx,al
;----------------------------------------------------------
Mov al,07h        ; Select registers of watchdog timer
Out    dx,al
Inc    dx
Mov    al,08h
Out    dx,al
;----------------------------------------------------------
Dec dx            ; Enable the function of watchdog timer
Mov    al,30h
Out    dx,al
Inc    dx
In     al,dx
Or     al,01h
Out    dx,al
;----------------------------------------------------------
Dec dx            ; Enable watchdog timer to be reset by mouse
Mov    al,0f7h
Out    dx,al
Inc    dx
In     al,dx
Or   al,80h
Out    dx,al
;----------------------------------------------------------
Dec dx            ; Lock NCT6776D
Mov    al,0aah
Out    dx,al


4.    Enable watchdog timer to be reset by keyboard
;----------------------------------------------------------
Mov dx,2eh        ; Unlock NCT6776D
Mov al,87h
Out dx,al
Out dx,al
;----------------------------------------------------------
Mov al,07h        ; Select registers of watchdog timer
```

```
Out     dx,al
Inc     dx
Mov     al,08h
Out     dx,al
;----------------------------------------------------------
Dec dx                  ; Enable the function of watchdog timer
Mov     al,30h
Out     dx,al
Inc     dx
Mov     al,01h
Out     dx,al
;----------------------------------------------------------
Dec dx                  ; Enables watchdog timer to be strobe reset by keyboard
Mov     al,0f7h
Out     dx,al
Inc     dx
In      al,dx
Or   al,40h
Out     dx,al
;----------------------------------------------------------
Dec dx                  ; Lock NCT6776D
Mov     al,0aah
Out     dx,al
```

5.   Generate a time-out signal without timer counting

```
;----------------------------------------------------------
Mov dx,2eh          ; Unlock NCT6776D
Mov al,87h
Out dx,al
Out dx,al
;----------------------------------------------------------
Mov al,07h          ; Select registers of watchdog timer
Out     dx,al
Inc     dx
Mov     al,08h
Out     dx,al
;----------------------------------------------------------
Dec dx              ; Enable the function of watchdog timer
Mov     al,30h
Out     dx,al
Inc     dx
Mov     al,01h
Out     dx,al
;----------------------------------------------------------
Dec dx                  ; Generate a time-out signal
```

```
Mov      al,0f7h
Out      dx,al        ;Write 1 to bit 5 of F7 register
Inc      dx
In       al,dx
Or   al,20h
Out      dx,al
;----------------------------------------------------------
Dec dx                ; Lock NCT6776D
Mov      al,0aah
Out      dx,al
```

Appendix B

Programming 8-bit DIO (GPIO)

B.1 Supported GPIO Register

Below are the detailed descriptions of the GPIO addresses and a programming sample.

B.2 GPIO Registers

Bank	Offset	Description
09h	30h	Write 1 to bit 7 to enable GPIO
07h	E0h	GPIO I/O Register When set to a '1', respective GPIO port is programmed as an input port. When set to a '0', respective GPIO port is programmed as an output port.
07h	E1h	GPIO Data Register If a port is programmed to be an output port, then its respective bit can be read/written. If a port is programmed to be an input port, then its respective bit can only be read.
07h	E2h	GPIO Inversion Register When set to a '1', the incoming/outgoing port value is inverted. When set to a '0', the incoming/outgoing port value is the same as in data register.

B.3 GPIO Example Program-1

```
-----------------------------------------------
 Enter the extended function mode, interruptible double-write
-----------------------------------------------
MOV DX,2EH
MOV AL,87H
OUT DX,AL
OUT DX,AL

------------------------------------------------------------
Configure logical device, configuration register CRE0,CRE1,CRE2
------------------------------------------------------------
MOV DX,2EH
MOV AL,09H
OUT DX,AC
DEC DX
MOV AL,30H
OUT DX,AL
INC DX
IN AL,DX
OR AL,10000000B
DEC DX
MOV AL,07H
OUT DX,AL
```

```
INC DX
MOV AL,07H ; Select logical device 7
OUT DX,AL ;
DEC DX
MOV AL,E0H
OUT DX,AL
INC DX
MOV AL,00H  ; 1:Input  0:output  for  GPIO respective
OUT DX,AL
DEC DX
MOV AL,E2H ;
OUT DX,AL
INC DX
MOV AL,00H    ;Set GPIO is normal not inverter
OUT DX,AL;
DEC DX
MOV AL,E1H
OUT DX,AL
INC DX
MOV AL,??H ;  Put the output value into AL
OUT DX,AL
-----------------------------------------
 Exit extended function mode |
-----------------------------------------
MOV DX,2EH
MOV AL,AAH
OUT DX,AL
```

Appendix C

32-bit DIO Signal Connections

C.1 Overview

Maintaining good signal connections is one of the most important factors in ensuring that your application system is sending and receiving data correctly. A good signal connection can avoid unnecessary and costly damage to your PC and other hardware devices.

C.2 Isolated Digital I/O Connections

C.2.1 Dry/Wet Contact Support for Digital Input

Each digital input channel accepts either dry contact or 0 ~ 5 VDC wet contact inputs. Dry contact capability allows the channel to respond to changes in external circuitry (e.g., the closing of a switch in the external circuitry) when no voltage is present in the external circuit. Figure 3-1 shows external circuitry with both wet and dry contact components, connected as an input source to one of the card's digital input channels.
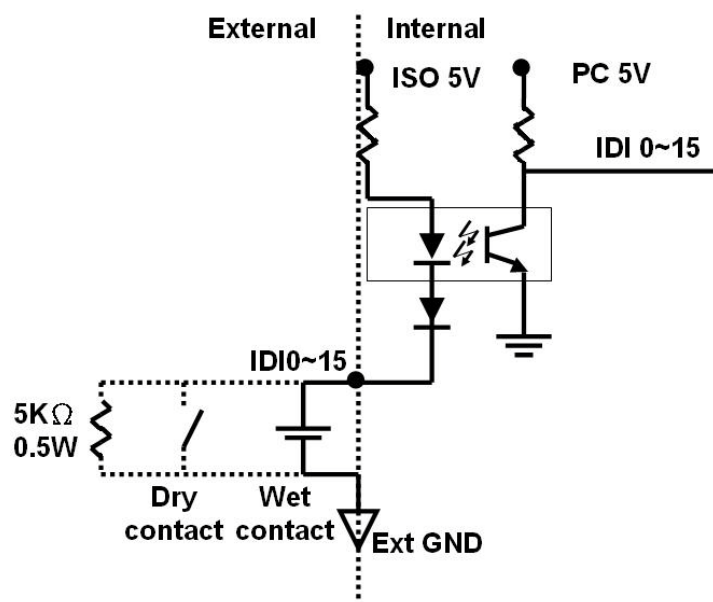
Figure C.1 Isolated Digital Input Connections

C.2.2 Isolated Digital Output Connections

Each of 8 isolated digital output channels comes equipped with a Darlington transistor. Every 8 output channels share common collectors and integral suppression diodes for inductive loads. Channels 0 ~ 7 use COM0, and channels 8 ~ 15 use COM1 as a common pin. If an external voltage (5 ~ 40 V) is applied to an isolated output channel (IDO 0 ~ IDO 15) while it is being used as an output channel, the current will flow from the external voltage source to the card. Please take care that the current through each GND pin not exceed 100 mA.
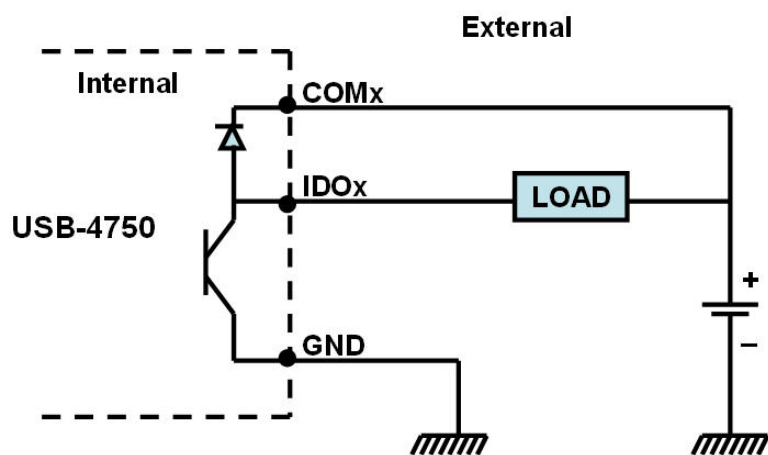
Figure C.2 Isolated Digital Output Connections

Appendix D

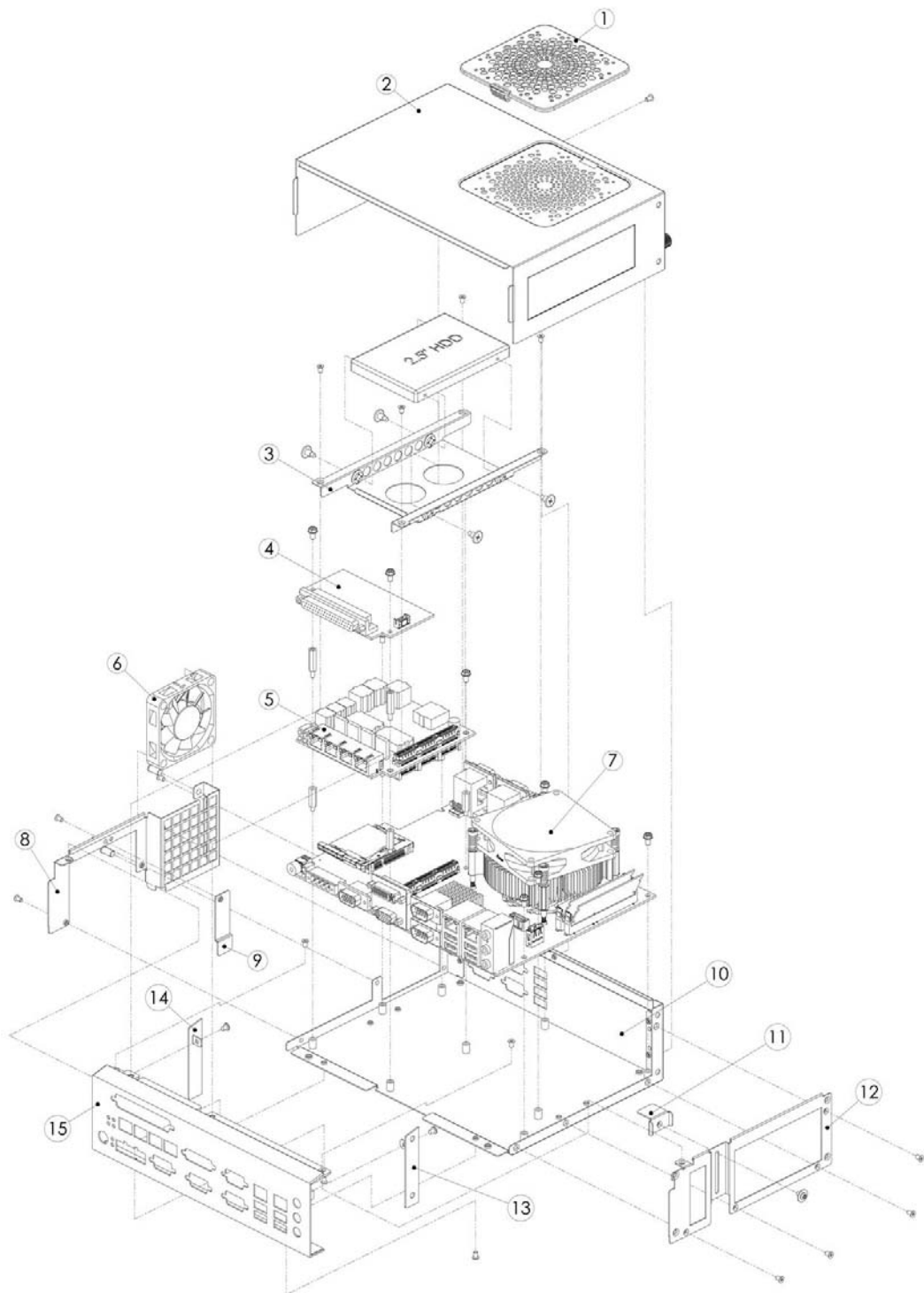## Explored Diagram & Parts List

D.1 Explored Diagram

Figure D.1 Explored Diagram

Table D.1: Parts List			
1	Fan filter	9	CFast card clamps bracket
2	Top cover	10	Chassis assy
3	HDD tray	11	USB clamps bracket
4	DIO board	12	Side bracket
5	PoE board	13	Side cover R
6	SYS fan	14	Side cover L
7	Main board	15	Front IO panel
8	Fan bracket		

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