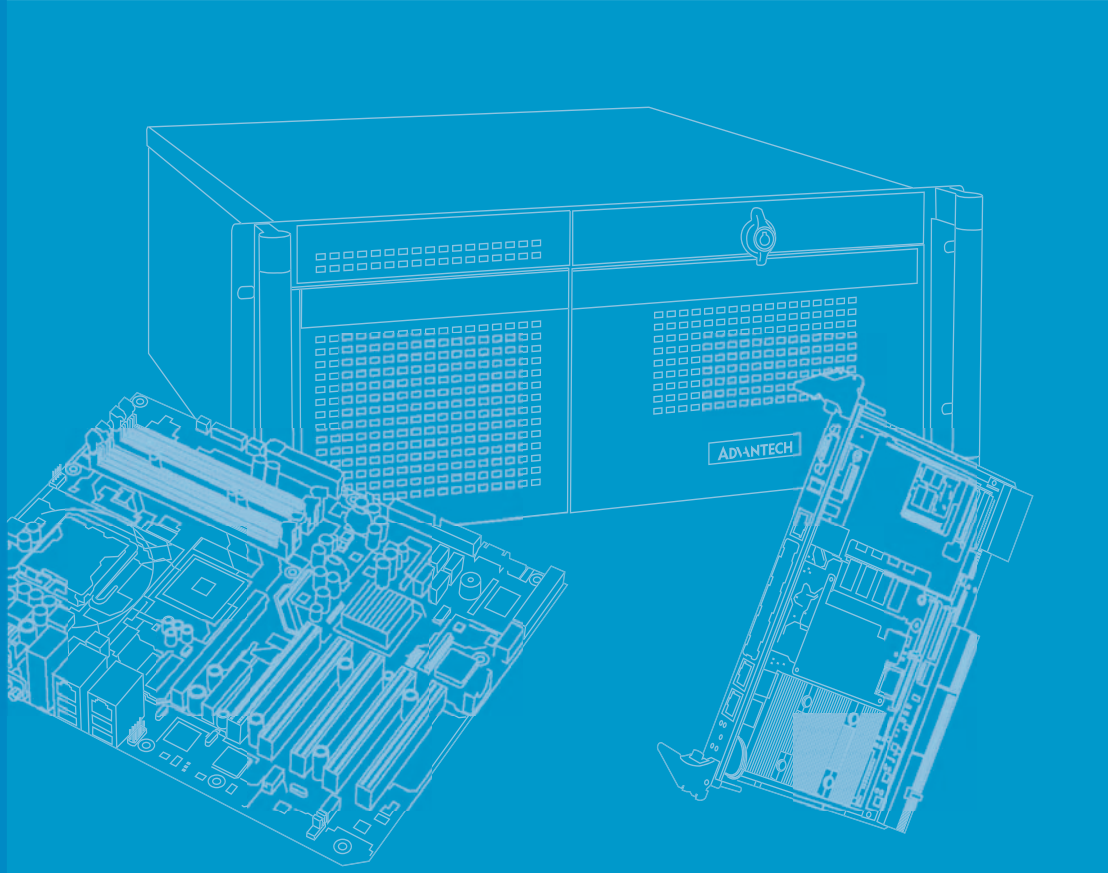

User Manual

AIIS-3400/3410

Machine Vision System (Computer)

ADVANTECH

Enabling an Intelligent Planet

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Acknowledgements

For more information about this and other Advantech products, please visit our website at:

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http://www.advantech.com/ePlatform/

For technical support and service, please visit our support website at:

http://support.advantech.com.tw/support/

Part No. 2001340020 Edition 1

Printed in China October 2016

Product Warranty (2 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from 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 been 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 out-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 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.

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 on the unit. 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:

For AIIS-3400

■ Bare system x 1	PN: AIIS-3400
■ Startup manual (EN/CN) x 1	PN: 2001340000
■ Startup manual(TC) x 1	PN: 2001340010
■ Driver CD x 1	PN: 2061340000
■ Wallmount Bracket x 2	PN: 1960014487T006
■ Rubber Foot x 4	PN: 1990006571S000
■ CPU cooler x 1	PN: 1960060620N001
■ 2-pin Phoenix DC power connector x 1	PN: 1652002205

For AIIS-3410

■ Bare system x 1	PN: AIIS-3410
■ Startup manual (EN/CN) x 1	PN: 2001341000
■ Startup manual (TC) x 1	PN: 2001341010
■ Driver CD x 1	PN: 2061340000
■ Wallmount Bracket x 2	PN: 1960014487T006
■ Hole Protector x 4	PN: 1990022908S000
■ CPU cooler x 1	PN: 1960060620N001
■ 2-pin Phoenix DC power connector x 1	PN: 1652002205
■ PCI Riser card x 1	PN: 9691341010E

Ordering information

For AIIS-3400

Part Number	Camera Interface	Display	USB 3.0	Isolated DIO	COM 232/ 422/485
AIIS-3400P-00A1E	4-CH GigE PoE	VGA+DVI-D	4	8-CH	2
AIIS-3400U-00A1E	4-CH USB 3.0	VGA+DVI-D	4	8-CH	2

For AIIS-3410

Part Number	Camera Interface	Display	USB 3.0	Isolated DIO	COM 232/ 422/485
AIIS-3410P-00A1E	4-CH GigE PoE	VGA+DVI-D	4	8-CH	2
AIIS-3410U-00A1E	4-CH USB 3.0	VGA+DVI-D	4	8-CH	2

Optional accessories

For AIIS-3400

Part number	Description
98R2124000E	DIN-rail Bracket (AIIS-3400P/U only)
96PSA-A220W24P4-1	220Watt 24Vdc Adapter, FSP220-AAAN2
1702002600	Power cord 3-pin UL/CSA(USA)
1700022940-01	Power cord PSE
1702002605	Power cord 2P (France)
1700023217-01	8-CH DIO Cable for Wiring Board
ADAM-3925-AE	8-CH DIO DB-25 Wiring Terminal, DIN-rail Mount
AIIS-DIO32-00A1E	Isolated DIO module, 32-CH, 9-pin USB interface
AIIS-E730-AE	Isolated DIO module, 32-CH, AIIS interface
PCL-10137-1E	32-CH DIO Cable 1M for Wiring Terminal
ADAM-3937-BE	32-CH DIO DB-37 Wiring Terminal, DIN-rail Mount

For AIIS-3410

Part number	Description
96PSA-A220W24P4	220Watt 24Vdc Adapter, FSP220-AAAN2
1702002600	Power cord 3-pin UL/CSA (USA)
1700022940-01	Power cord PSE
1702002605	Power cord 2P (France)
1700023217-01	8-CH DIO Cable for Wiring Board
1700023217-01	8-CH DIO Cable for Wiring Board
ADAM-3925-AE	8-CH DIO DB-25 Wiring Terminal, DIN-rail Mount
AIIS-DIO32-00A1E	Isolated DIO module, 32-CH, 9-pin USB interface
AIIS-E730-AE	Isolated DIO module, 32-CH, MIO with PCIex1 interface
PCL-10137-1E	32-CH DIO Cable 1M for Wiring Terminal
ADAM-3937-BE	32-CH DIO DB-37 Wiring Terminal, DIN-rail Mount
TBD	PCI riser card

Contents

Chapter 1

General Introduction

This chapter gives background information on the AIIS-3400/3410 series.

1.1 Introduction

AIIS-3400/3410 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-3400P/3410P's self-contained PoE controller 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, 6th 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-3400U/3410U is designed with dedicated USB3 controller to make sure of significant bandwidth and a single USB cable can carry both data and electrical power. Compliant with USB 3.0 SuperSpeed, it is capable of transferring data up to 5 Gbps, whereas USB 2.0 can only provide up to 480 Mbps.

AIIS-3400/3410 utilizes a single RJ45 cable that carries both data and electrical power. Compliant with IEEE 802.3af, it can provide a maximum of 15 watts of power to each powered device up to a distance of 100 meters, whereas USB 2.0 can only provide up to 4.5 watts, with a maximum cable length of 5 meters.

AIIS-3400P/3410P offers rich I/O interfaces such as four PoE port channels and AIIS-3400U/3410U offers eight USB 3.0 ports (four of them are designed with dedicated controller), max. 40-bit digital I/O, and two 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

- 6th gen. Intel® Core™ i7/i5/i3 CPU (LGA1151)
- PoE, AIIS-3400P/3410P
  - Controller: CH1~CH4: Intel® i210 x 4
  - Compliant: IEEE 802.3af
  - Power Output: 15W per channel/ 30W for 1&2 channel
- USB, AIIS-3400U/3410U
  - Controller: CH1~CH4: uPD720202 x4
  - Compliant: USB 3.0
  - Power output: 4.5W per channel
- Compact & Thoughtful Design
  - Volume: less than 3 liters
  - Easier fan filter maintenance
  - Internal USB Type-A with locking design (Max. 49mm length)
  - Wall or DIN-rail mounting kit (optional)
    (DIN-rail mounting for AIIS-3400P/U only)

1.3 Product Specifications

1.3.1 Processor System

- LGA1151 Intel® Core™ i7/i5/i3/Pentium®/Celeron®

CPU	i7-6700	i7-6700TE	i5-6500	i5-6500TE	i3-6100	i3-6100TE	G4400	G4400TE	G3900	G3900TE
Core	4	4	4	4	2	2	2	2	2	2
Base Frequency	3.4 GHz	2.4 GHz	3.2 GHz	2.3 GHz	3.7 GHz	2.7 GHz	3.3 GHz	2.9 GHz	2.8 GHz	2.6 GHz
L3 Cache	8 MB	8 MB	6 MB	6 MB	4 MB	4 MB	3 MB	3 MB	2 MB	2 MB
Chipset	H110									
BIOS	AMI 128Mb SPI Flash									

1.3.2 Memory

- Supports dual channel DDR4 SODIMM-2133 MHz, 16GB per slot without ECC function; Max capacity: 32GB

1.3.3 Graphics

- **Chipset:** Intel® HD Graphics

1.3.4 PoE (Power Over Ethernet)

- **PoE, AIIS-3400P/3410P**
  - Controller: CH1~CH4: Intel i210 x 4
  - Compliant: IEEE 802.3af
  - Power Output: 15W per channel/ 30W for 1&2 channel
- **USB, AIIS-3400U/3410U**
  - Controller: CH1~CH4: uPD720202 x4
  - Compliant: USB 3.0
  - Power output: 4.5W per channel

1.3.5 Ethernet

- **Interface:** 10/100/1000 Mbps
- **Controller:**
  - LAN1: Intel i219LM, support Wake on LAN
  - LAN2: Intel i210AT, support Wake on LAN

1.3.6 Storage

- Internal 2.5” HDD Bay: 1
- CFast: 1

1.3.7 Front I/O

- Display: 1 x VGA; 1 x DVI-D
- USB: 4 x USB3.0
- Serial: 2 x RS-232/422/485
- Isolated DIO: 4 DI and 4 DO channels
- Audio: Line-in/Line-out/Mic-in

1.3.8 Watchdog Timer

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

1.3.9 Power Requirement

- **Power type:** ATX/AT
- **Power input voltage:** 19Vdc - 24Vdc (+-10%)
- **Minimum Power Input:** 19Vdc - 24Vdc @ 8-6.3A
- **Power adapter:** AC to DC, 24Vdc/9.16A, 220W, FSP220-AAAN2 (optional)

1.3.10 Cooling

- **System Fan:**
  - 1 (8 cm / 57 CFM) for AIIS-3410
  - 1 (6 cm / 27.7 CFM) for AIIS-3400

1.3.11 Miscellaneous

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

1.3.12 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

1.3.13 Physical Characteristics

For AIIS-3410P/U

- **Dimension:** 240 x 97 x 190 mm (9.45" x 3.82" x 7.48")
- **Weight:** 2.4 kg (5.29 lb,w/o CPU cooler)

For AIIS-3400P/U

- **Dimension:** 230x 70 x 175 mm(9.06" x 2.76" x 6.89")
- **Weight:** 1.8 kg (3.97 lb, w/o CPU cooler)

1.3.14 EMC

CE, FCC, CCC, BSMI

1.3.15 Safety

UL, CB, CCC

1.4 Jumper Settings

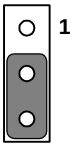
1.4.1 How to Set Jumpers

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-3400/3410 CPU card contains a jumper that can erase BIOS CMOS data and reset the system BIOS information. Normally 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 back 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
Clear BIOS CMOS data	 2-3 closed

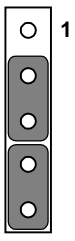
*default setting

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

AIIS-3400/3410 contains a watchdog timer that will reset the CPU in the event the CPU stops processing. This feature means AIIS-3400/3410 will recover from a software failure or an EMI problem. The JWDT1 jumper settings control the outcome of what the computer will do in the event the watchdog timer is tripped.

AIIS-3400/3410 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
*Watch dog timer reset	
*Enable H/W monitor alarm	

*default setting

Chapter 2

Hardware Installation

This chapter introduces external IO and the installation of AIIS-3400/3410 Hardware.

2.1 Front Panel Controls, Indicators & Connectors

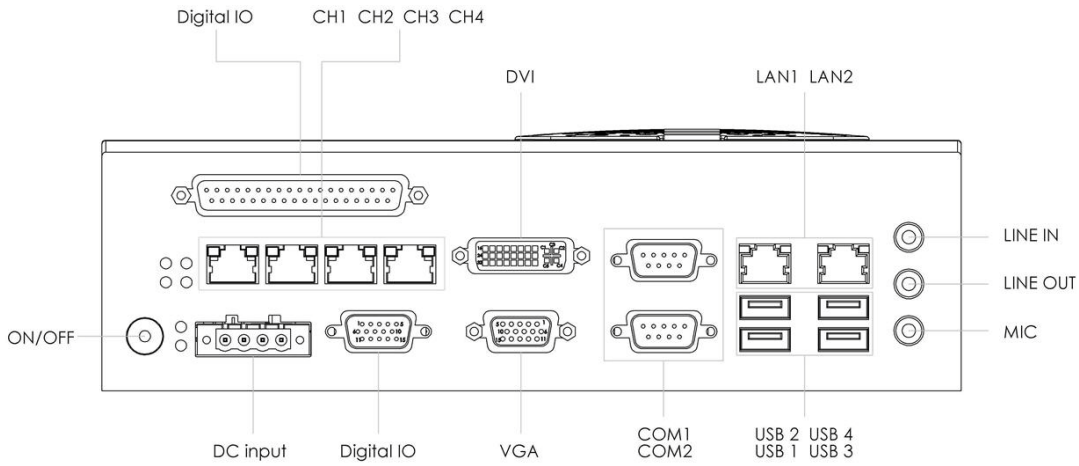


Figure 2.1 AIIS-3400 Front View

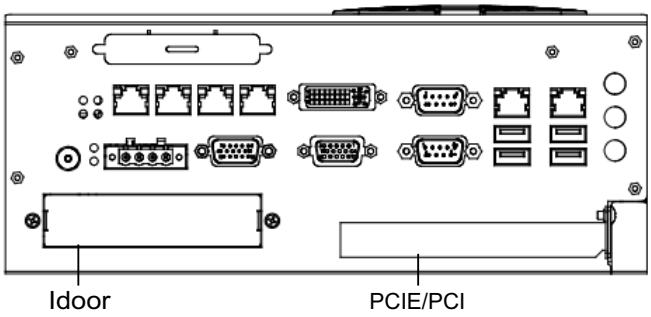


Figure 2.2 AIIS-3410 Front View

2.1.1 Power On/Off Button

AIIS-3400/3410 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.

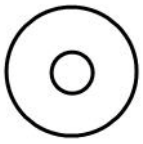


Figure 2.3 Power On/Off Button

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.

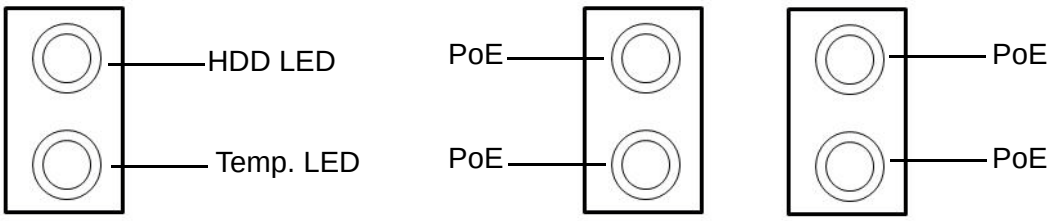


Figure 2.4 LED Indicators

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

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

2.1.3 Power Input Connector

AIIS-3400/3410 comes with a four-pin header that carries 19Vdc - 24Vdc external power input.

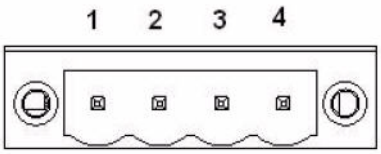


Figure 2.5 Power Input Connector

Table 2.4: Power Input Connector Pin Assignments	
Pin	**Signal**
1	GND
2	19Vdc - 24 Vdc
3	19Vdc - 24 Vdc
4	GND

2.1.4 Digital I/O

AIIS-3400/3410 provides one DSUB-15 male connector which offers 4-ch digital input and a 4-ch digital output with 2.5KV isolation. AIIS-3400/3410 provides additional DSUB-male connector which offers 4-ch digital input and 4-ch digital output with 2.5KV isolation.

DSUB-15 Male Connector

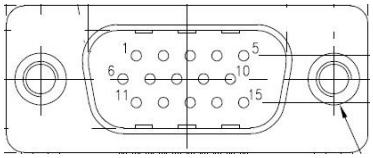


Figure 2.6 8-bit DIO Connector

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
9	DO2	10	DO3
11	GND	12	N/C
13	N/C	14	N/C
15	+5V		

DSUB-37 female connector

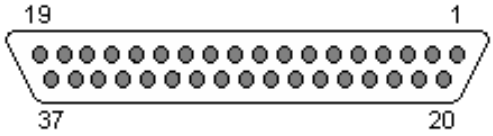


Figure 2.7 32-bit DIO Connector

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

Table 2.6: 32-bit DIO Connector Pin Assignment			
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-3400/3410 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.

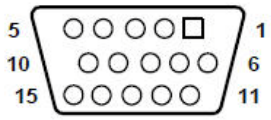


Figure 2.8 Figure 2.7 VGA Connector

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		

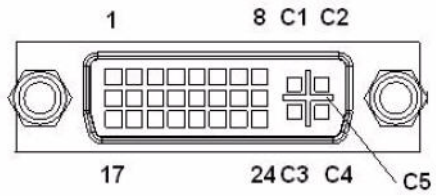


Figure 2.9 DVI Connector

AIIS-3400/3410

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

Table 2.8: DVI Connector Pin Assignment			
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-3400/3410 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.

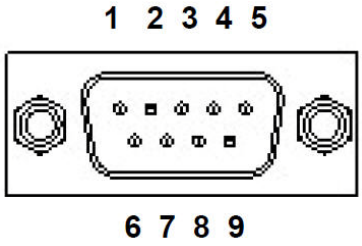


Figure 2.10 COM Connectors

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-3400/3410 provides six RJ45 connectors for Gigabit LAN interfaces; two of them are equipped with Intel® i219LM, i210AT Ethernet controllers, four of them are equipped with Intel® i210 Ethernet controllers that are fully compliant with IEEE 802.3af Power over Ethernet standard. The Ethernet ports provide standard RJ-45 jack connectors with LED indicators that show Active/Link status (Green LED) and Speed status (Yellow LED).

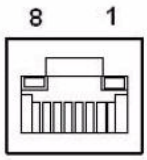


Figure 2.11 Ethernet Connector

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

USB ports 1~4 support USB 3.0 interface, which give complete Plug & Play and hot swapping for up to 127 external devices. The USB interface complies with USB UHCI, Rev. 3.0 compliant. Please refer to table below for pin assignments. USB 3.0 connectors contain legacy pins to interface with USB 2.0 devices, and a new set of pins for USB 3.0 connectivity (both sets reside in the same connector).

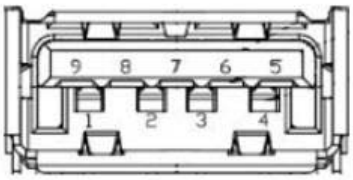


Figure 2.12 USB 3.0 Connectors

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-3400/3410 offers stereo audio ports via 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.

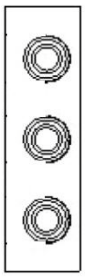


Figure 2.13 Audio Connector

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

2.1.10 Remote Power Switch Connector

AIIS-3400/3410 includes a 2-pin Phoenix DC power connector that provides for remote power control.

2.2 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 notch or marked corner on the processor with the corresponding corner on the socket.
5. Replace the socket cap; lower the retainer handle and clip it shut.
6. Processor installation is complete.
7. Reinstall top cover.

2.3 CPU Cooler Installation

1. Remove top cover.
2. Attach the CPU cooler on the motherboard.
3. Fasten four screws on the cooler into the steel back-plate on the PCB.
4. Reinstall top cover.

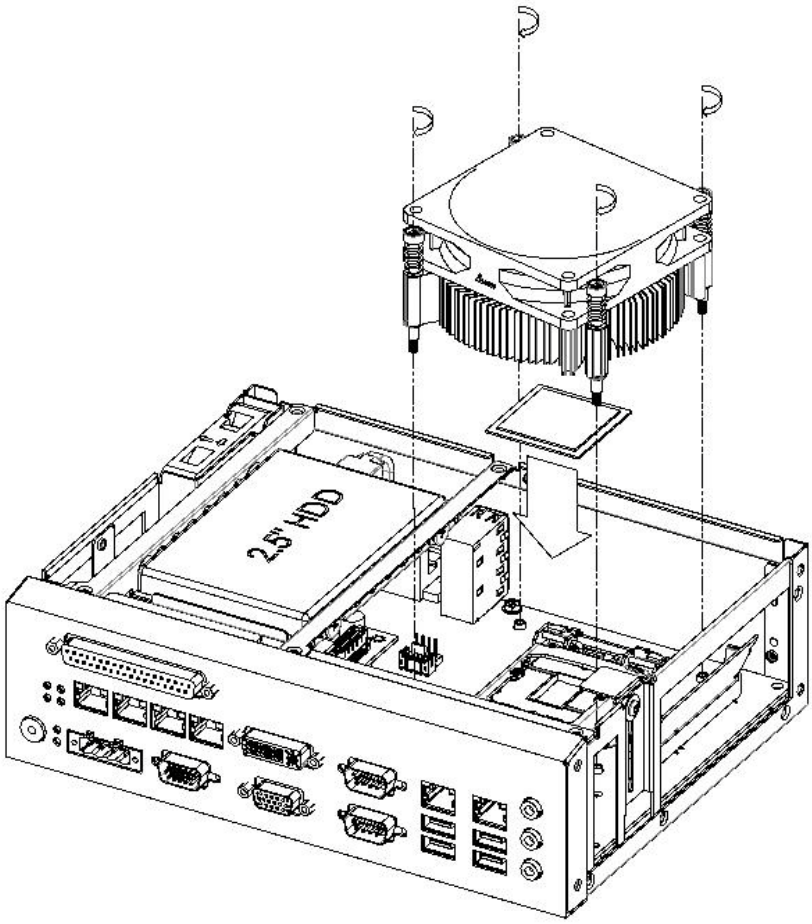


Figure 2.14 CPU & CPU Cooler Installation

2.4 Memory Installation

1. Remove top cover.
2. Insert the memory module into the SODIMM socket.
3. Reinstall top cover.

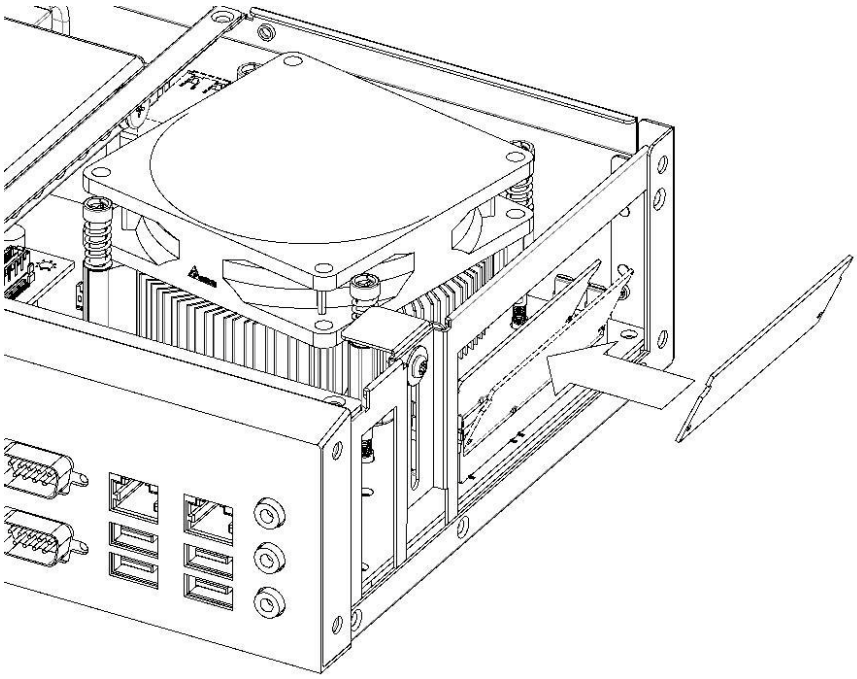


Figure 2.15 Memory Installation

2.5 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.

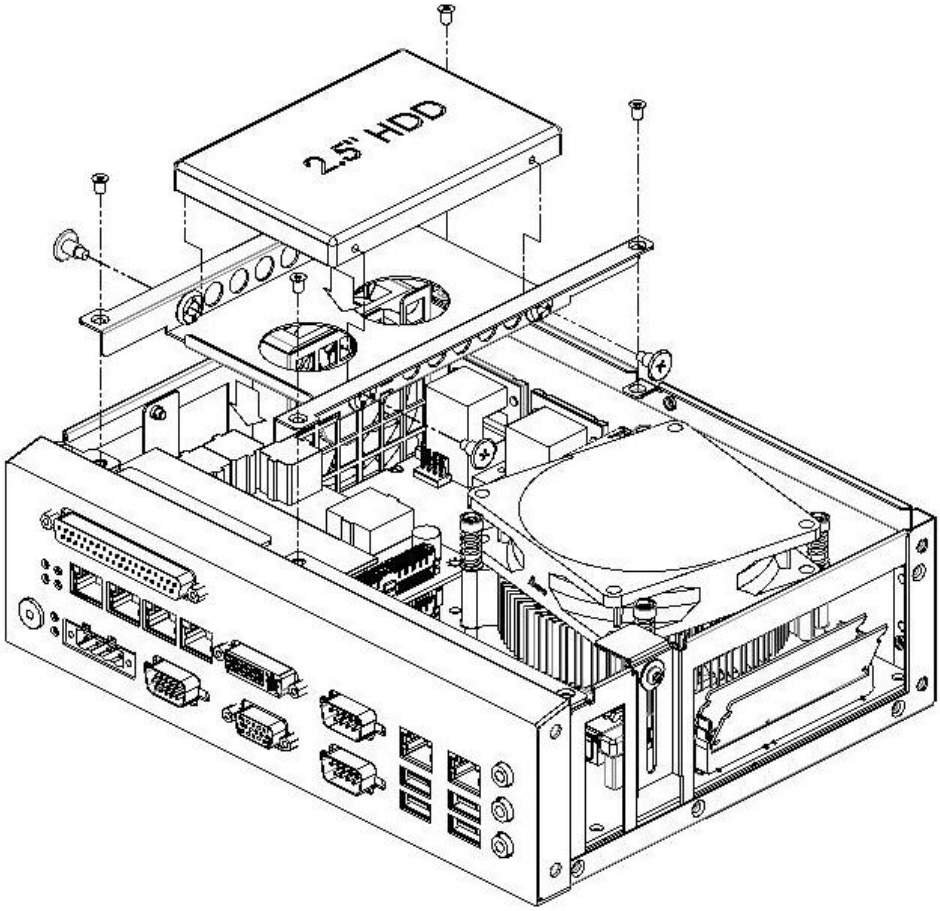


Figure 2.16 HDD Installation

2.6 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.

2.7 CFast Installation

1. Remove top cover.
2. Insert the CFast card into socket.
3. Assemble the CFast clamp to assure firm installation.
4. Reinstall top cover.

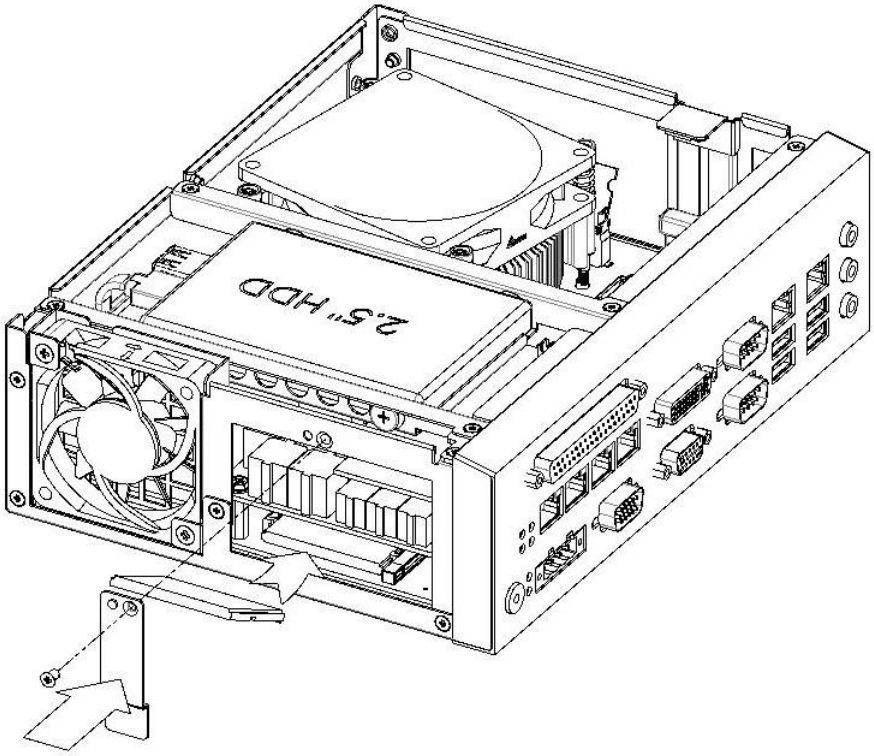


Figure 2.17 CFast Installation (AIIS-3400 only)

2.8 AIIS-DIO32 Installation

1. Remove top cover.
2. Install the AIIS-DIO32 with 2 stand-offs and 2 screws.
3. Connect main board USB12 connector with AIIS-DIO32 USB1 connector via DIO cable.
4. Reinstall top cover.

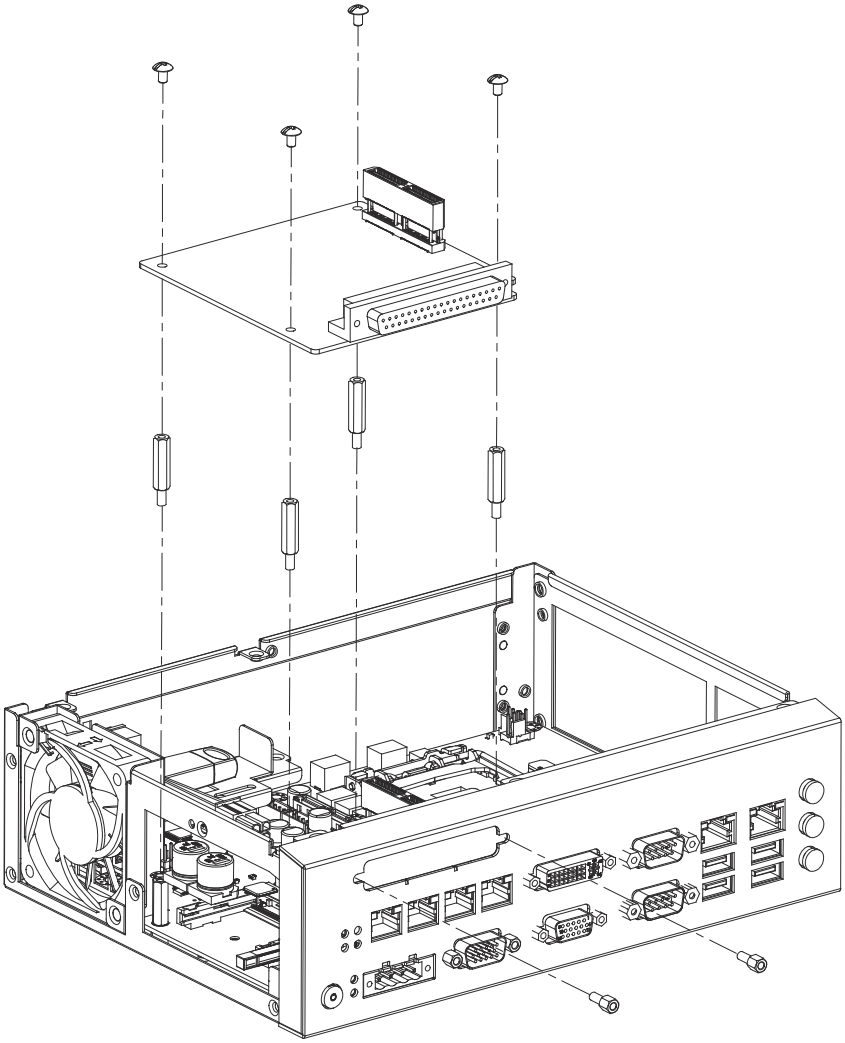


Figure 2.18 AIIS-DIO32 Installation

2.9 Wallmount Installation

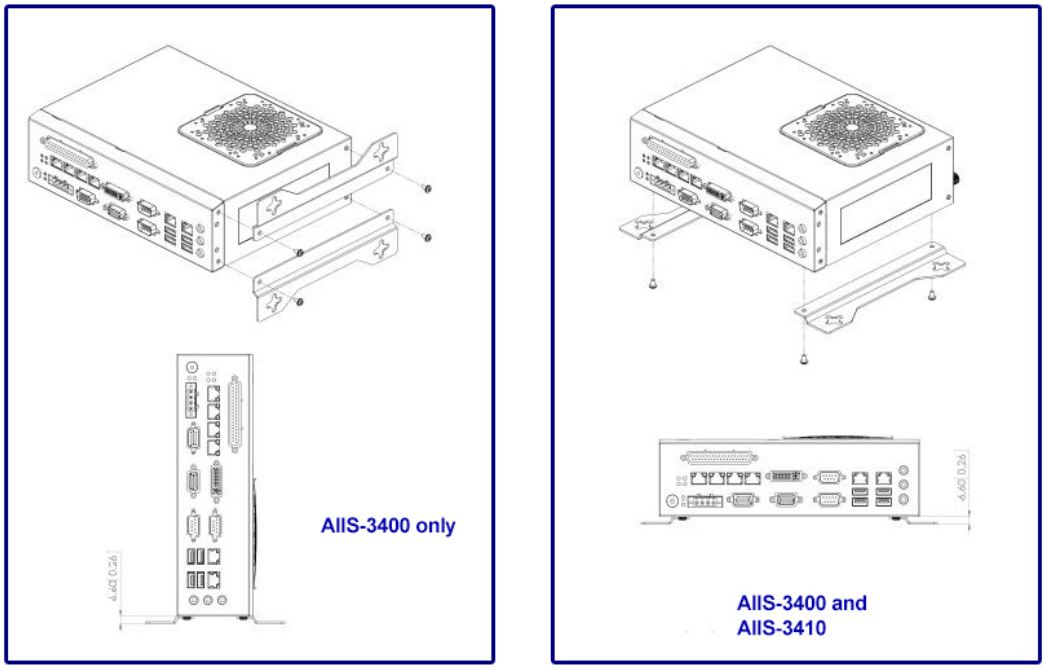


Figure 2.19 Wallmount Installation

Note!

1. This pair of wallmount brackets is designed for use on the side of the chassis or the bottom. Reverse installation is not permitted.

2. Screw holes that are not used for wallmount brackets should be kept filled with screws.

2.10 DIN-rail Installation (AIIS-3400 only)

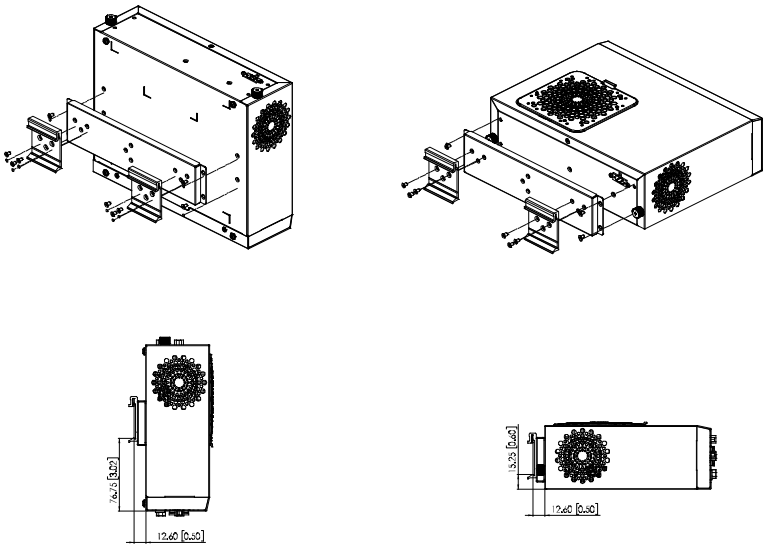


Figure 2.20 DIN-rail Installation

Note!

1. This DIN-rail bracket is designed for use on the rear side or the bottom. Reverse installation is not permitted.

2. Screw holes that are not used for DIN-rail brackets should be kept filled with screws.

2.11 DIO Installation

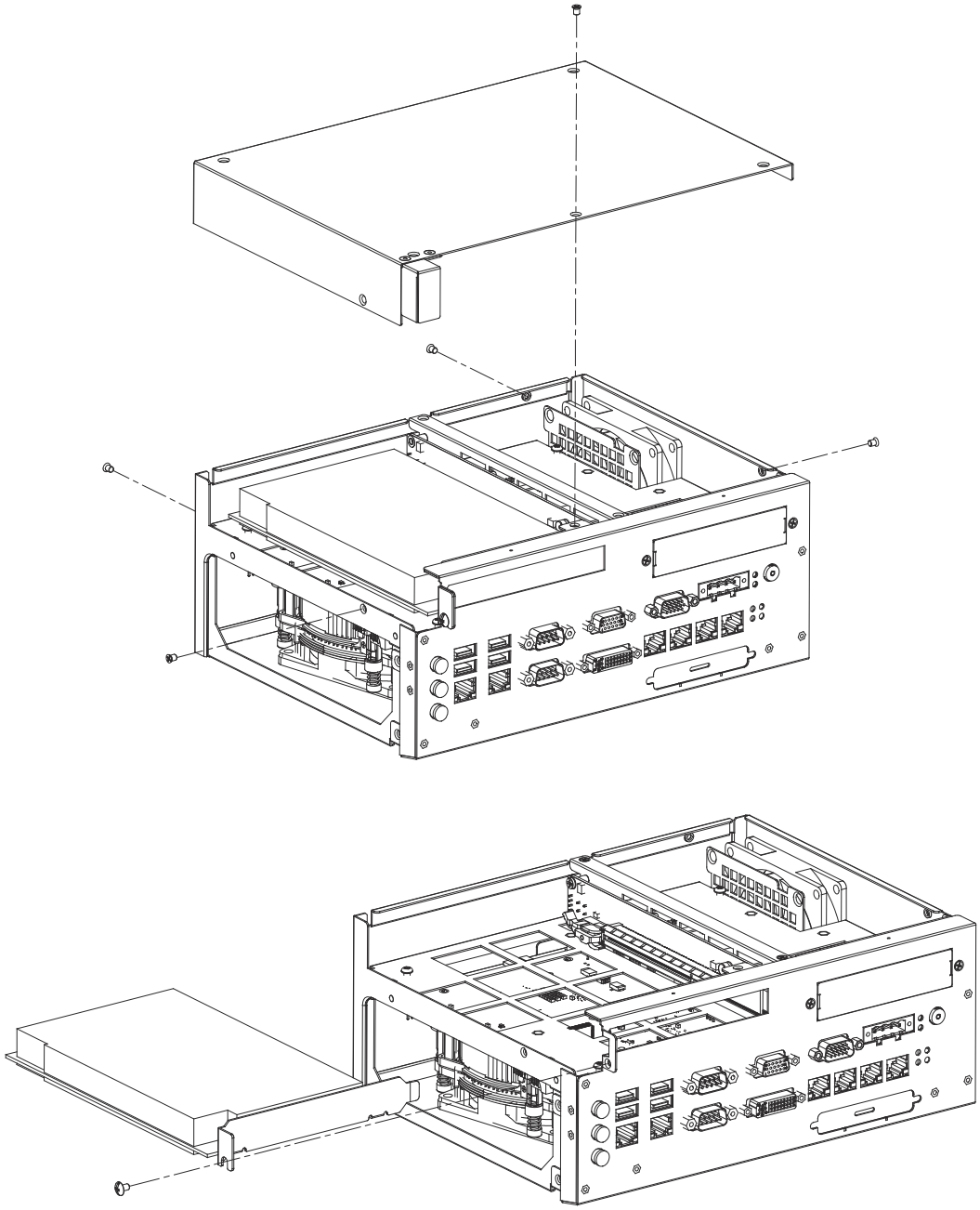


Figure 2.21 DIO Installation

Chapter 3

AMI BIOS Setup

3.1 Introduction

With the AMI BIOS Setup Utility, you can modify BIOS settings and control the specific features of your computer. The Setup Utility uses a number of menus for making changes and turning specific features on or off. This chapter describes the basic navigation of the AIIS-3400/3410 setup screens.

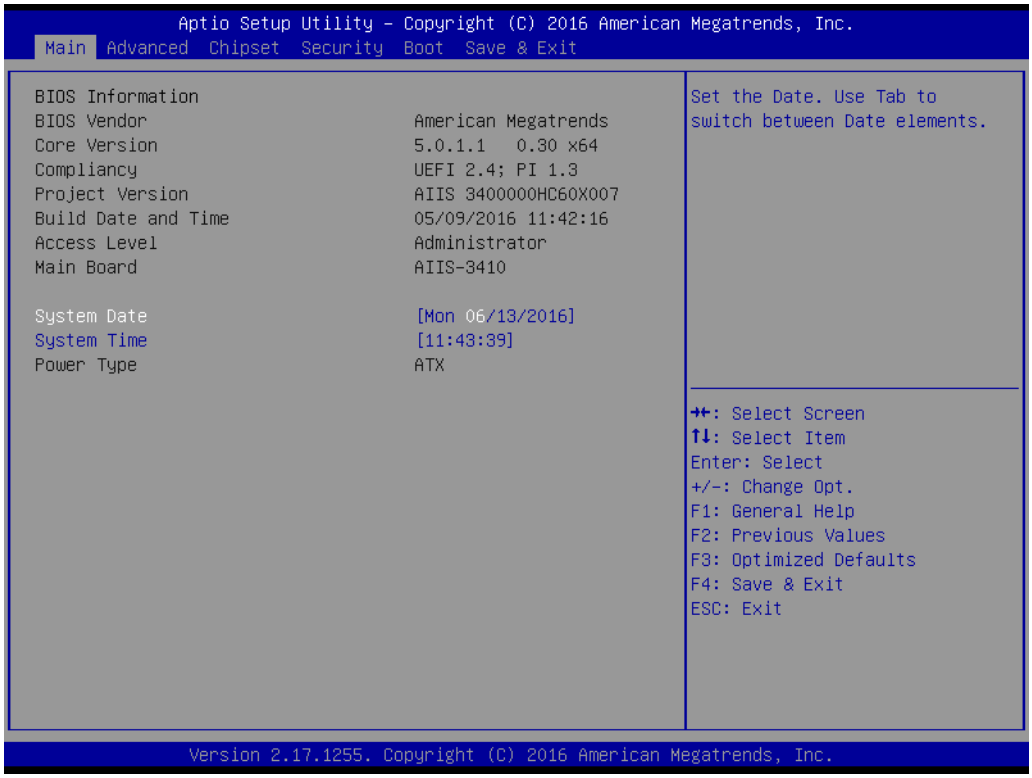


Figure 3.1 Main setup screen

AMI's BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This information is stored in NVRAM so Setup information is retained even when the power is turned off.

3.2 Entering BIOS Setup

During bootup, press <Del> to enter AMI BIOS Setup Utility. When users first enter the BIOS Setup Utility, they enter the Main setup screen. Users can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options described in this section. The Main BIOS Setup screen is shown below.

3.2.1 Main Menu

Press <Del> at bootup to enter AMI BIOS Setup Utility, the Main Menu will appear on the screen. Use arrow keys to select among the items and press <Enter> to accept or enter a sub-menu.

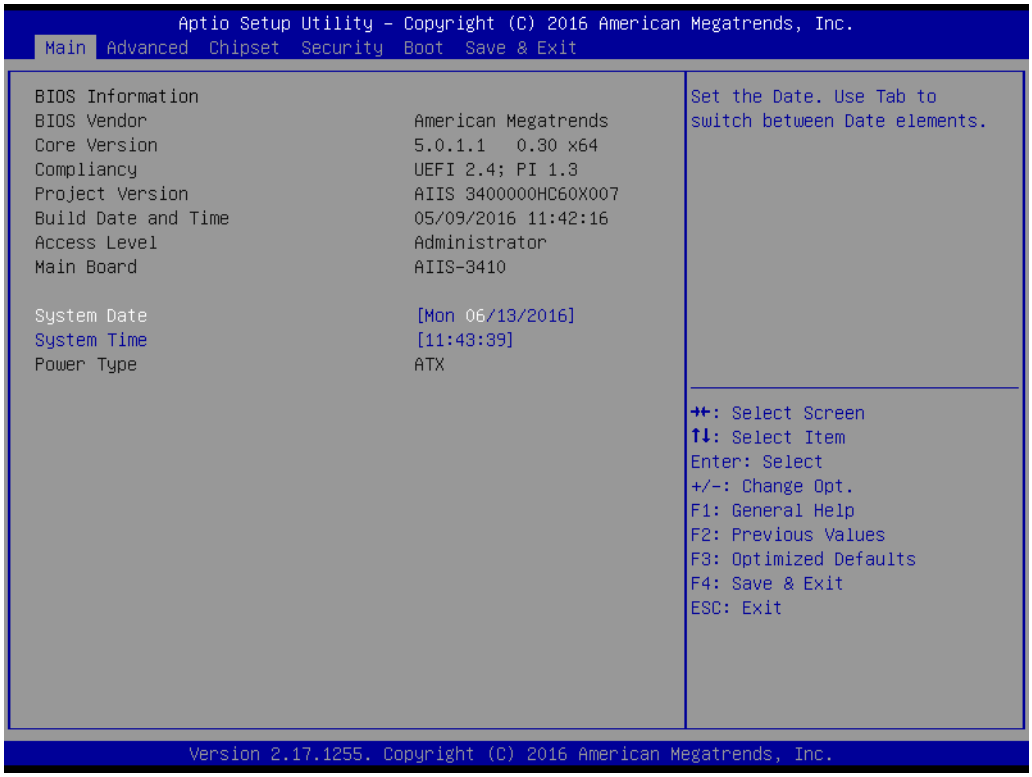


Figure 3.2 Main Setup Screen

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 be. The right frame displays the key legend.

The key legend above 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 change the system time and date. Highlight System Time or System 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 the AIIS-3400/3410 setup screen to enter the Advanced BIOS setup screen. You can select any of the items in the left frame of the screen, such as CPU configuration, to go to the sub menu for that item.

You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screens are shown below. The sub menus are described on the following pages.

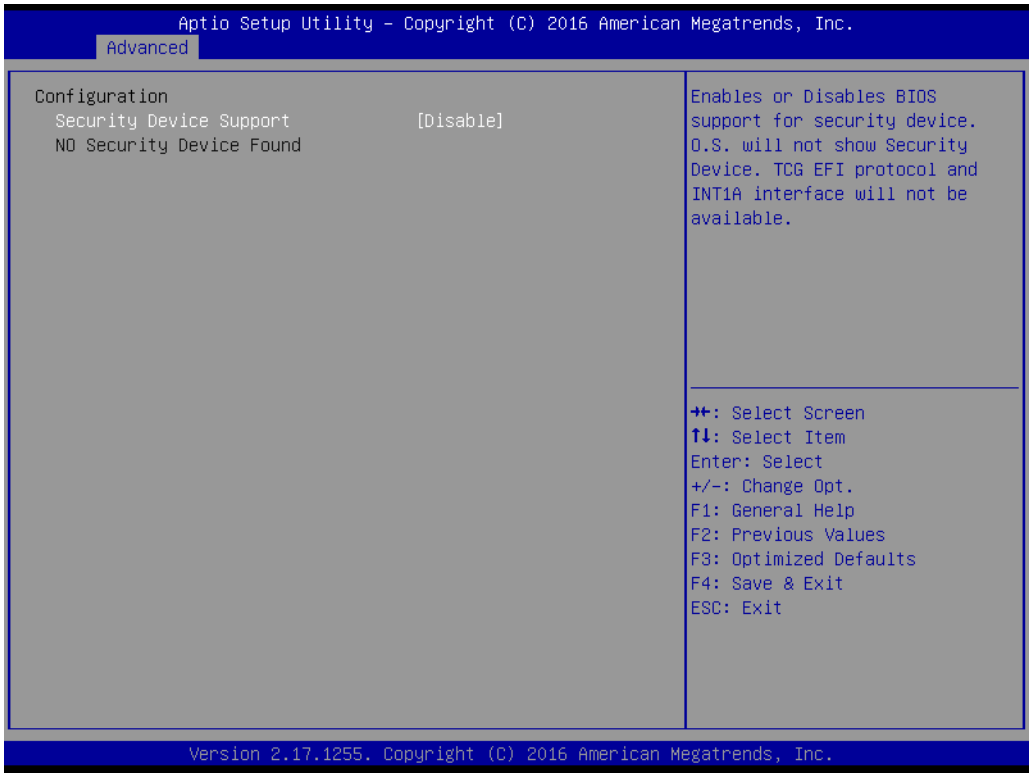


Figure 3.3 Advanced BIOS features setup screen

3.2.2.1 Trusted Computing

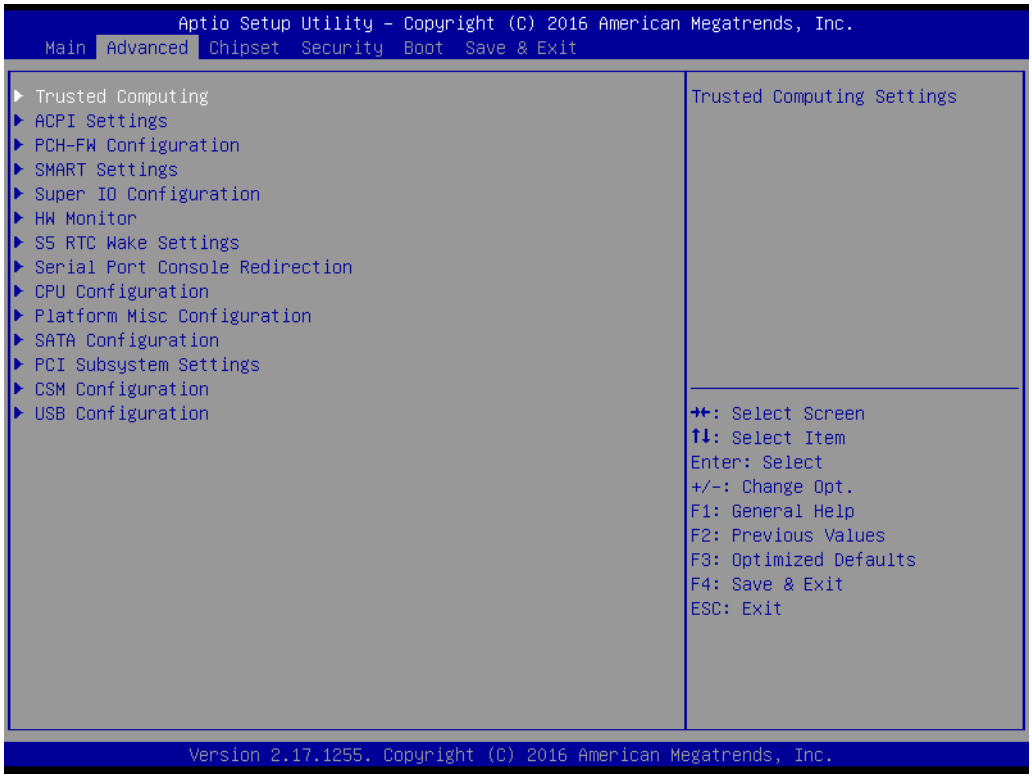


Figure 3.4 TPM Settings

- **TPM Support**
  Enable or Disable TPM Support. You can purchase Advantech LPC TPM module to enable TPM function. P/N: PCA-TPM-00A1E.

3.2.2.2 ACPI Settings

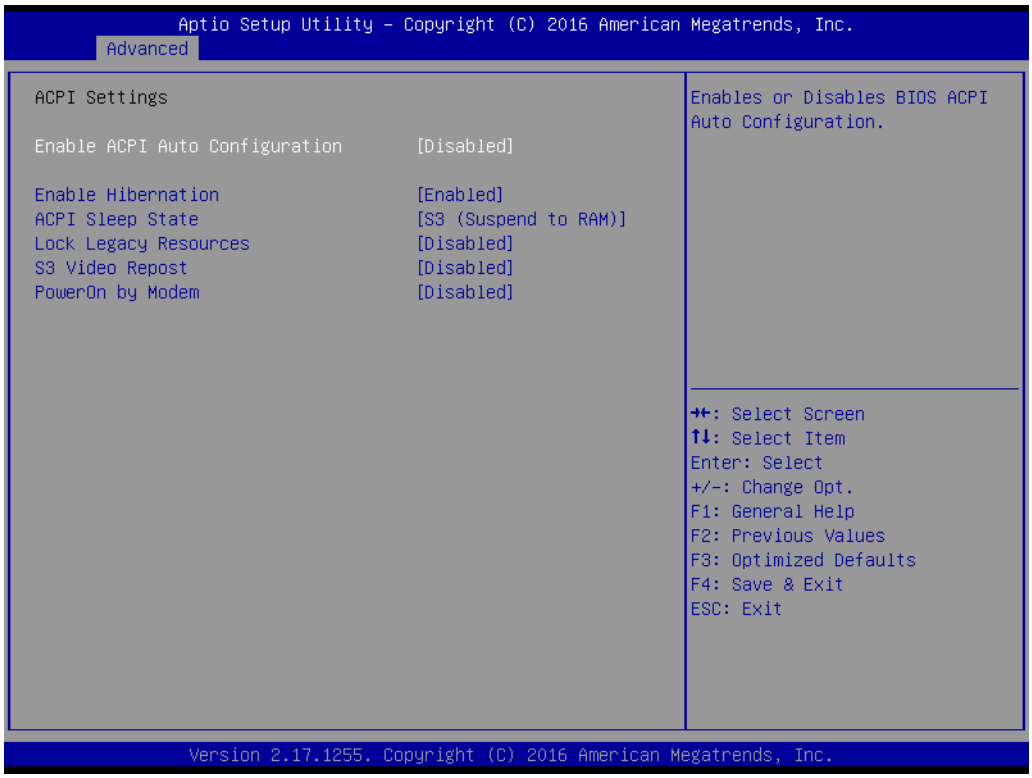


Figure 3.5 ACPI Settings

- **Enable Hibernation**
  Enable or Disable Hibernation (OS/S4 Sleep State). This option may not be applied in some OSs.
- **ACPI Sleep State**
  Select S3 or disable suspend.
- **Lock Legacy Resources**
  Enable or Disable Lock Legacy Resources.
- **S3 Video Repost**
  Enable or Disable S3 Video Repost.
- **PowerOn by Modem**
  Enable or Disable PowerOn by Modem.

3.2.2.3 PCH-FW Configuration

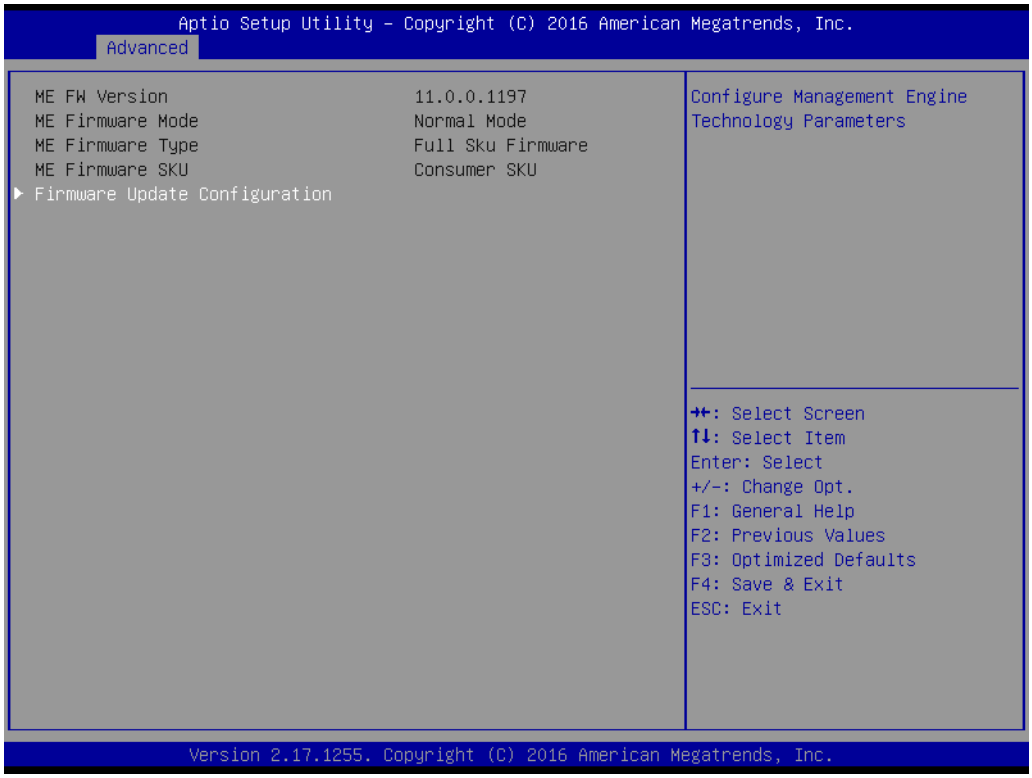


Figure 3.6 PCH-FW Configuration

- **PCH-FW Version**

  PCH-FW page shows Intel® ME FW information.

3.2.2.4 SMART Settings

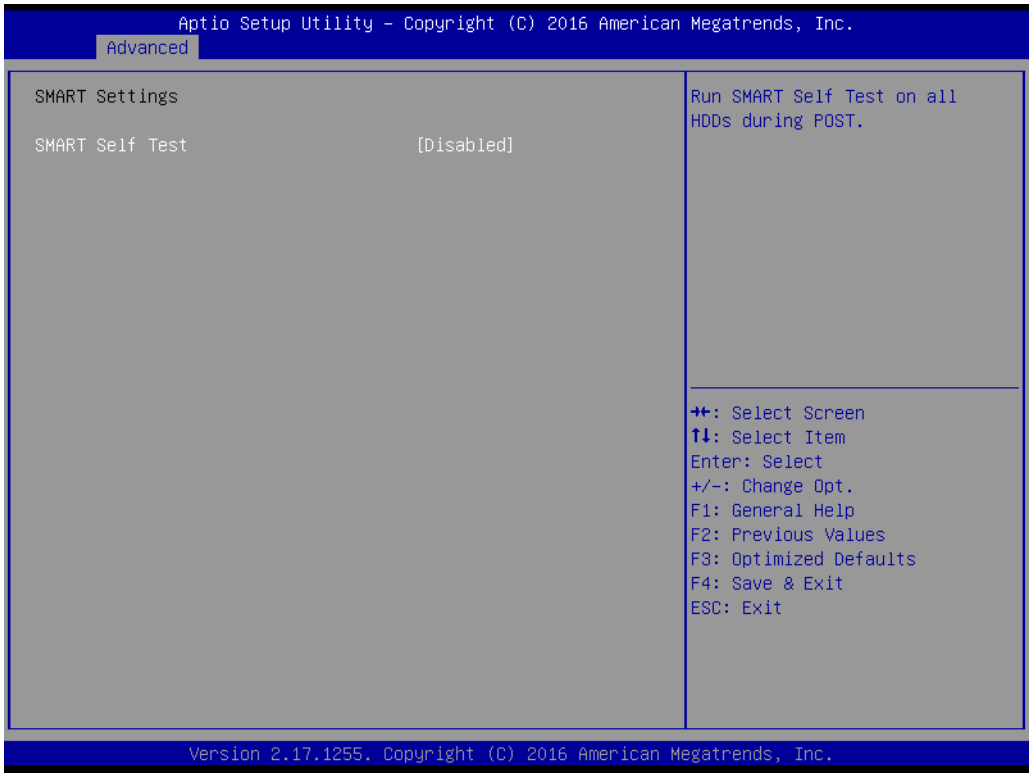


Figure 3.7 SMART Settings

- **SMART Self Test**
  Enable or Disable SMART Self Test on all HDDs during POST.

3.2.2.5 Super IO Configuration

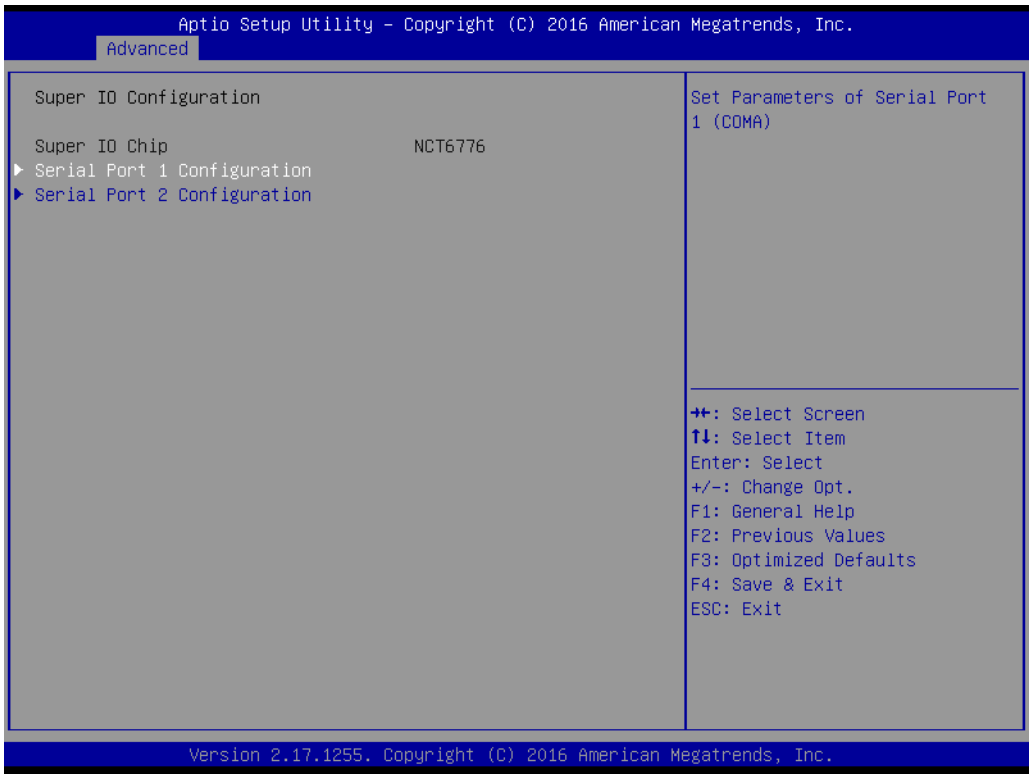


Figure 3.8 Super IO Configuration

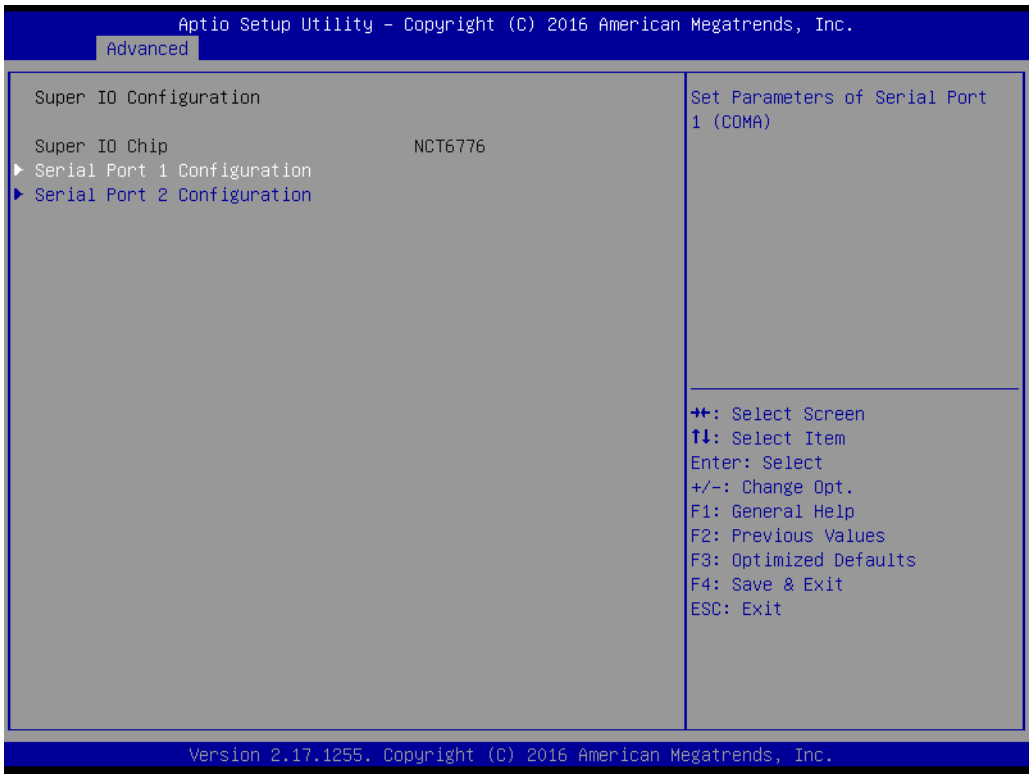


Figure 3.9 Serial Port 1 Configuration

- **Serial Port 1 Configuration**
  - **Serial Port**
    Enable or Disable Serial Port 1.
  - **Change Settings**
    To select an optimal setting for serial port 1.
- **Serial Port 2 Configuration**
  - **Serial Port**
    Enable or Disable Serial Port 2.
  - **Change Settings**
    To select an optimal setting for serial port 2.
  - **Device Mode**
    Serial port 2 could be selected as Standard serial port".
- **Parallel Port**
  Enable or Disable Parallel Port.
  - **Change Settings**
    To select an optimal setting for parallel port.
  - **Device Mode**
    Parallel port could be selected as "ECP and EPP 1.9 Mode" and other settings.

3.2.2.6 H/W Monitor

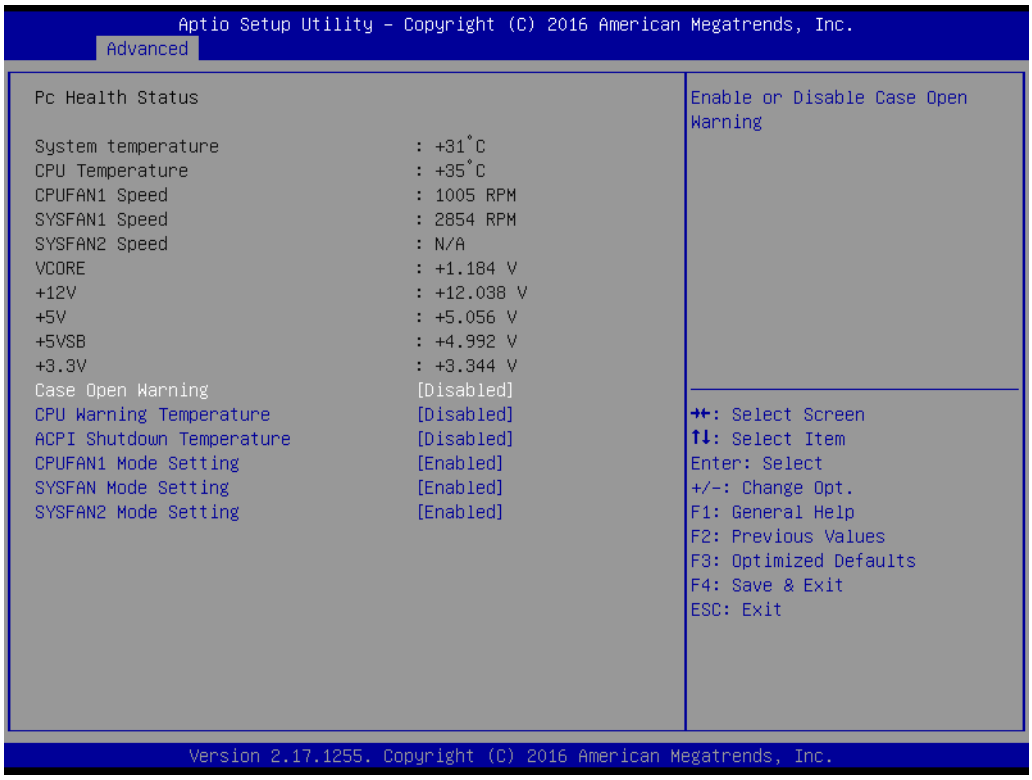


Figure 3.10 PC Health Status

- **Case Open Warning**
  Enable or Disable the Chassis Intrusion monitoring function. When it is enabled and the case is opened, the speaker beeps.
- **CPU Warning Temperature**
  Use this item to set the CPU warning temperature. When the system reaches the warning temperature, the speaker will beep.
- **ACPI Shutdown Temperature**
  Use this item to set the ACPI shutdown temperature. When the system reaches the shutdown temperature, it will be automatically shut down by ACPI OS to protect the system from overheat damage.
- **CPUFAN Smartfan Setting**
  Enable or Disable CPUFAN Mode to SMART FAN setting.
- **SYSFAN1 Smartfan Setting**
  Enable or Disable SYSFAN Mode to SMART FAN setting.
- **SYSFAN2 Smartfan Setting**
  Enable or Disable SYSFAN Mode to SMART FAN setting.

3.2.2.7 S5 RTC Wake Settings

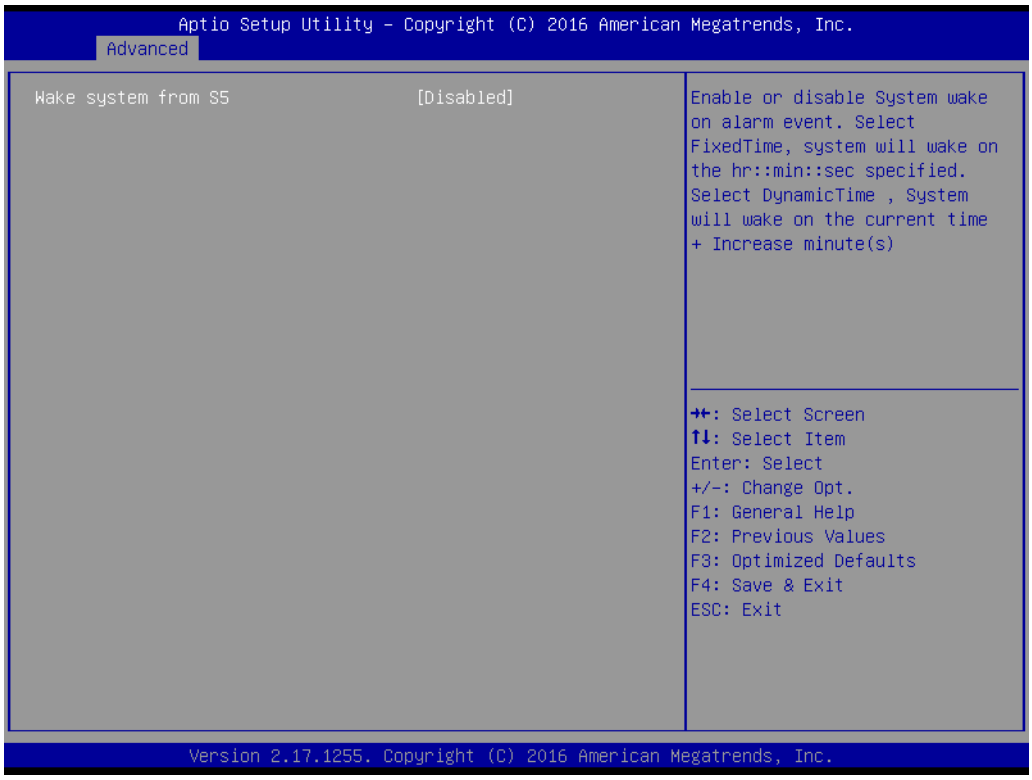


Figure 3.11 S5 RTC Wake Settings

- **Wake System at Fixed Time**
  To Enable or Disable System wake at set time event. The system will wake at the hr:min:sec as specified.

3.2.2.8 Serial Port Console Redirection

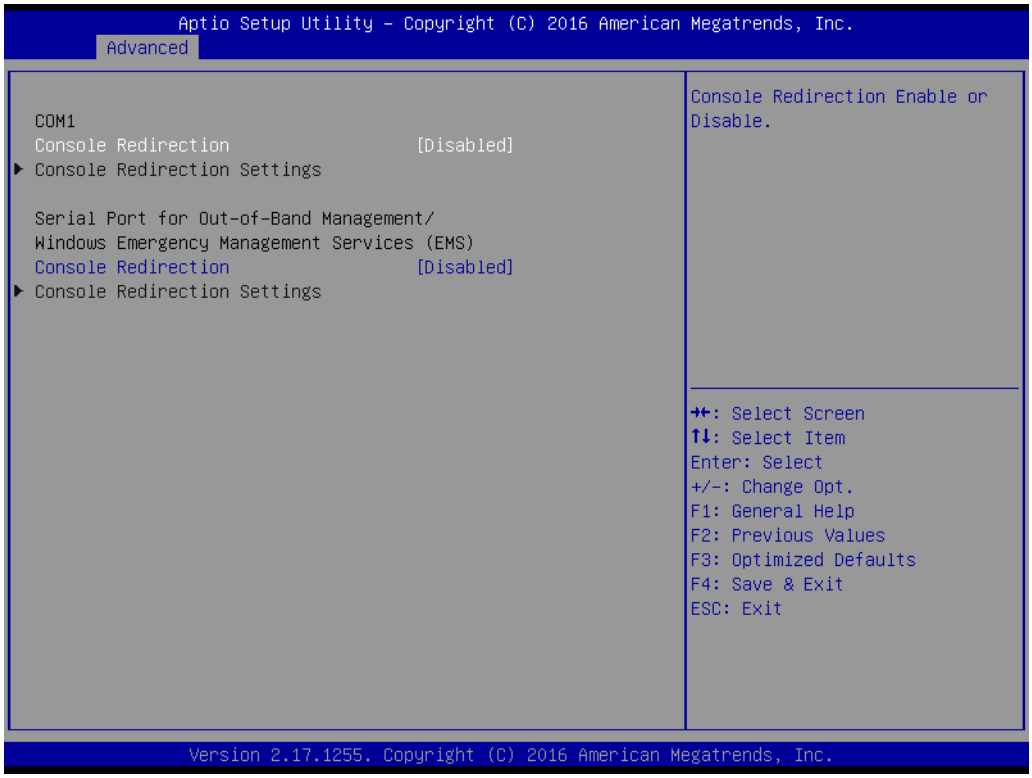


Figure 3.12 Serial Port Console Redirection

- **COM1**
  - **Console Redirection Settings**
    Console Redirection Enable or Disable.
- **Serial Port for Out-of-Band Management/ Windows Emergency Management services (EMS)**
  - **Console Redirection**
    Console Redirection Enable or Disable.

3.2.2.9 CPU Configuration

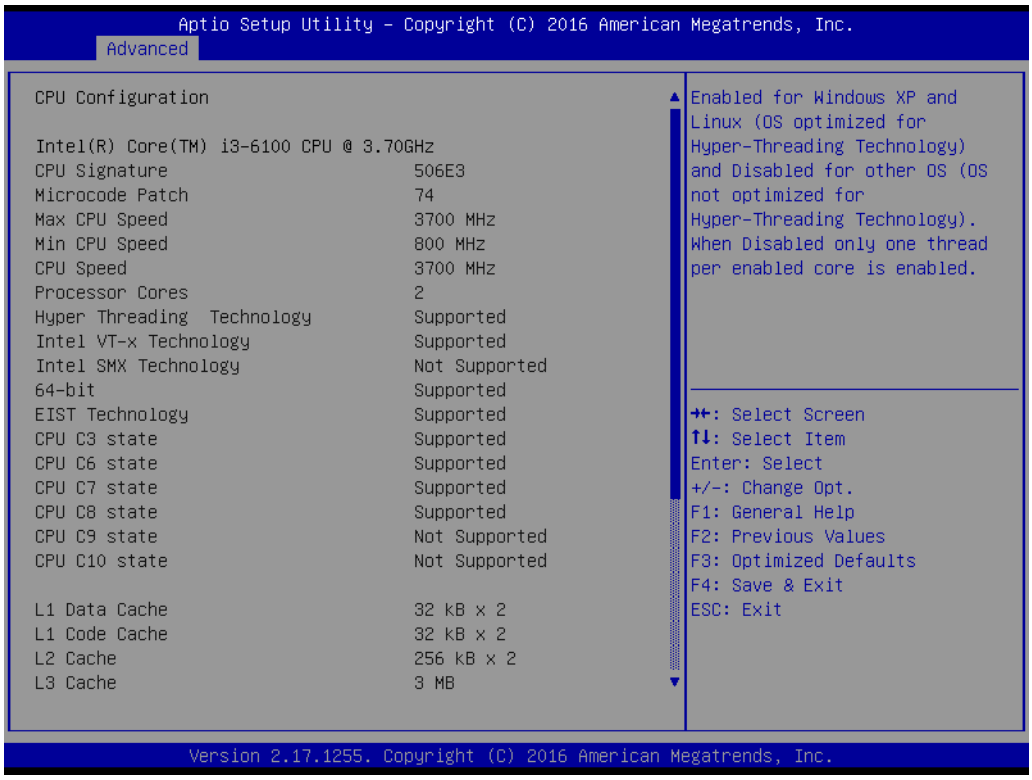


Figure 3.13 CPU Configuration

- **Active Processor Core**

  Use this item to select the number of processor cores you want to activate when you are using a dual or quad core processor.

- **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 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 to 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 it is 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.

- **CPU AES**

  Enable or Disable CPA advanced encryption standard instruction.

- **Boot Performance**

  Select the performance state that the BIOS will set before OS handoff.

- **Intel® Speedstep™**

  Allows more than two frequency ranges to be supported.

- **Turbo Mode**
  Turbo mode.
- **CPU C states**
  Intel® C states setting for power saving.
- **Intel TXT(LT) Support**
  Enable or Disable Intel® TXT support.

3.2.2.10 Platform Misc Configuration

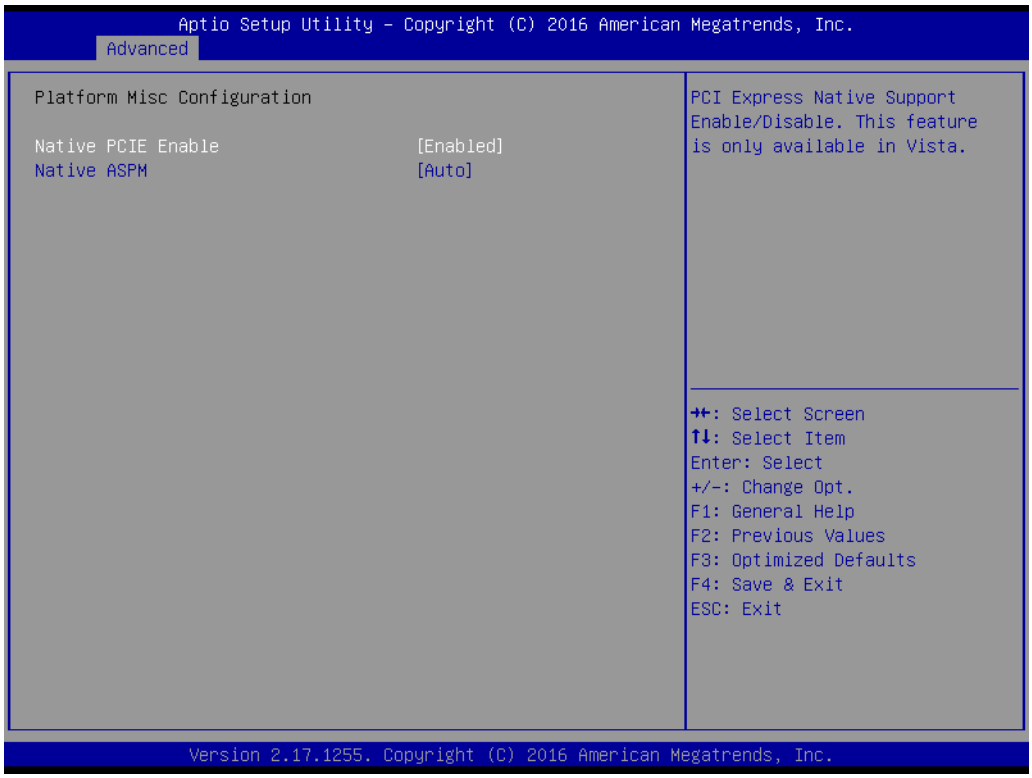


Figure 3.14 Platform Misc Configuration

- **Platform Misc Configuration**
  - **Native PCIE Enable**
    PCI Express Native Support Enable/Disable. This is only available in Vista.
  - **Native ASPM**
    On enable, Vista will control the ASPM support for the device.

3.2.2.11 SATA Configuration

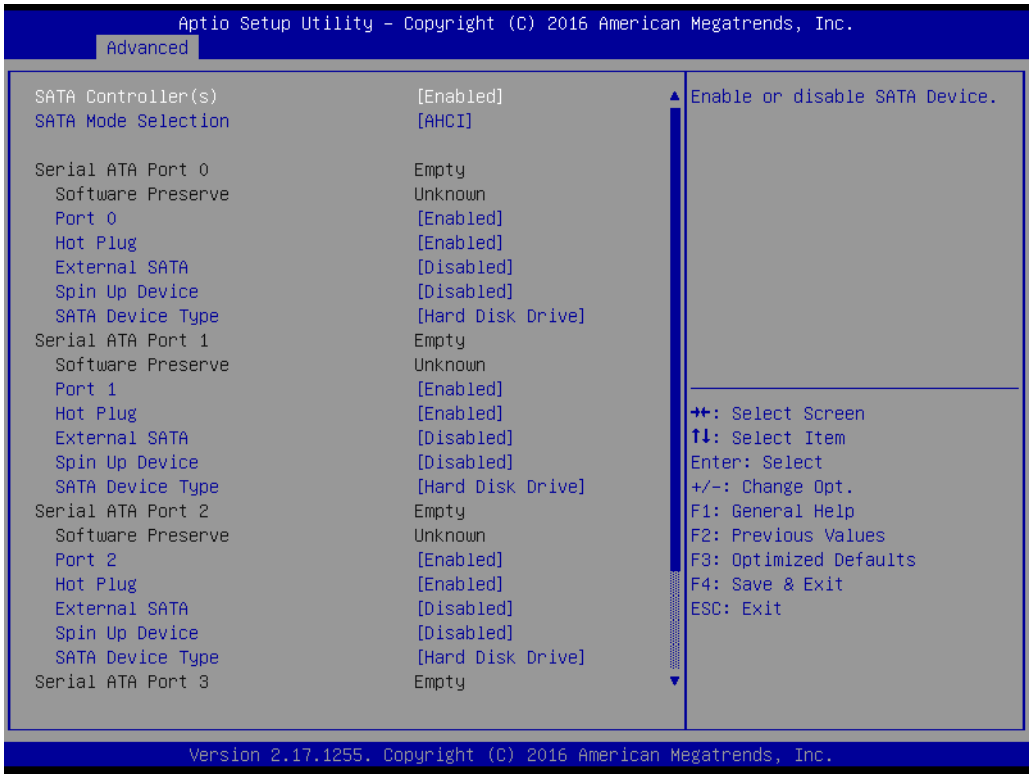


Figure 3.15 SATA Configuration

- **SATA Controller(s)**
  Enable or Disable SATA Controller.
- **SATA Mode Selection**
  Select AHCI mode.

3.2.2.12 PCI Subsystem Settings

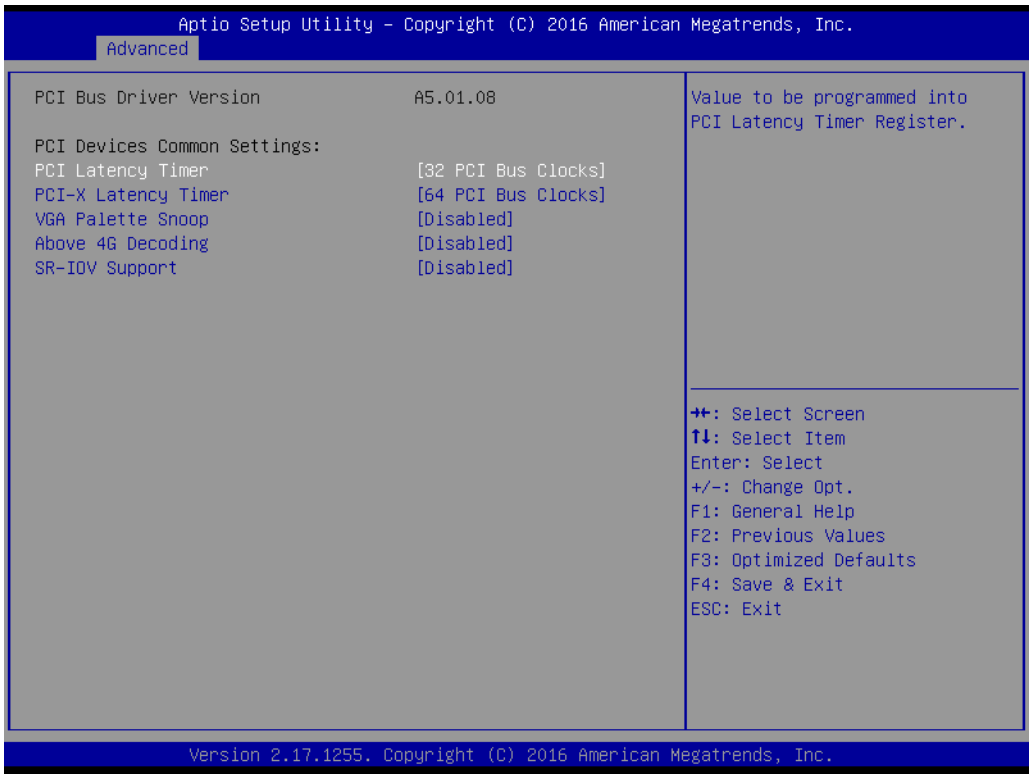


Figure 3.16 PCI Subsystem Settings

- **PCI Common Settings**
  PCI Latency Timer
  Value to be programed into PCI Latency Timer Register.
  VGA Palette Snoop
  Enable or Disable VGA palette registers snooping.

3.2.2.13 CSM Configuration

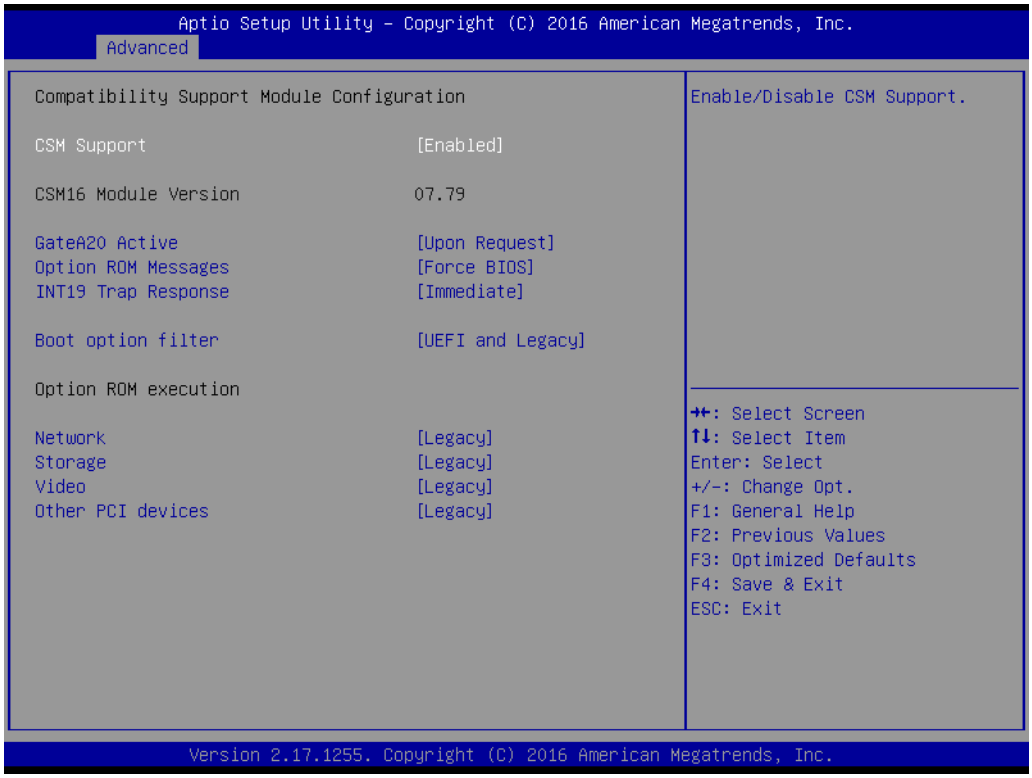


Figure 3.17 CSM Configuration

- **Compatibility Support Module Configuration**
  - **CSM Support**

    Enable/Disable CSM Support.
- **CSM16 Module Version**
  - **GateA20 Active**

    Upon Request - GA20 can be disabled using BIOS services. Never allow disabling of GA20; this option is useful when any RT code is executed above 1MB.
  - **Option ROM Message**

    Set display mode for Option ROM.
  - **INT19 Trap Response**

    BIOS reaction on INT19 trapping by Option ROM: Immediate - execute the trap right away; Postponed - execute the trap during legacy boot.
  - **Boot option filter**

    This option controls Legacy/UEFI ROMs Priority.
- **Option ROM execution**
  - **Network**

    Controls the execution of UEFI and Legacy PXE OpROM.
  - **Storage**

    Controls the execution of UEFI and Legacy Storage OpROM.
  - **Video**

    Controls the execution of UEFI and Legacy Video OpROM.
  - **Other PCI devices**

    Determines OpROM execution policy for devices other than Network, Storage or Video.

3.2.2.14 USB Configuration

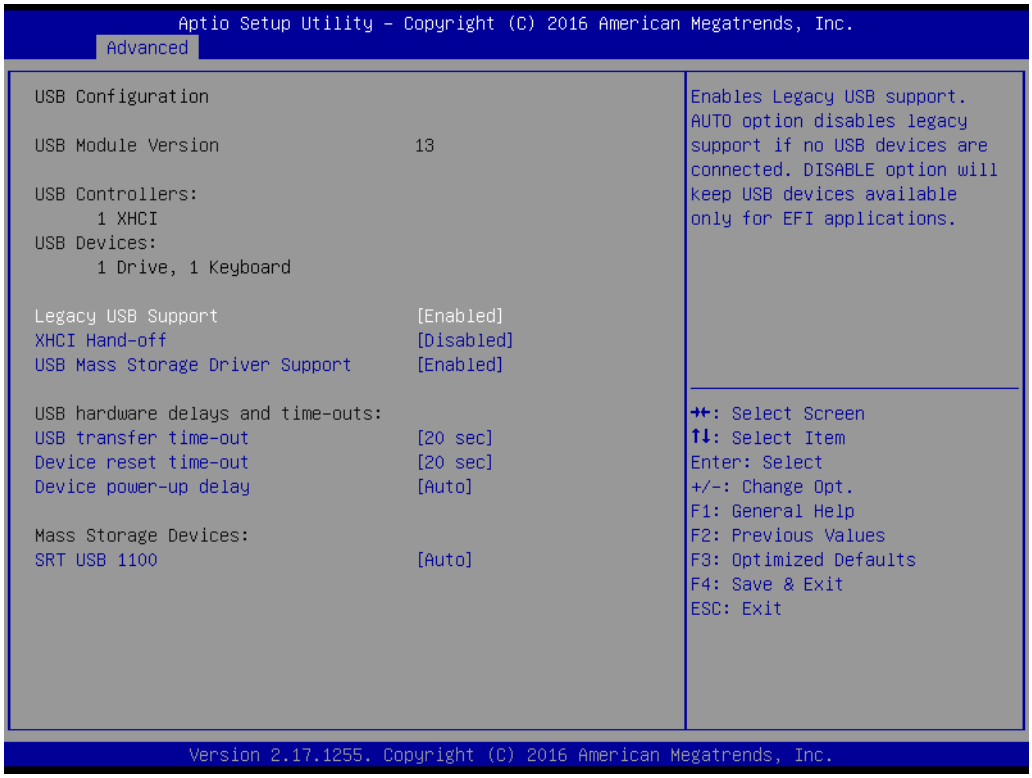


Figure 3.18 USB Configuration

- **Legacy USB Support**
  This is for supporting USB device under legacy OS such as DOS. When choosing "AUTO", the system will automatically detect if any USB device is plugged into the computer and enable USB legacy mode when a USB device is plugged and disable USB legacy mode when no USB device is plugged.
- **XHCI Hand-off**
  This is a workaround for OSs without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
- **USB Mass Storage Driver Support**
  Enable or Disable USB Mass Storage driver support.
- **USB transfer time-out**
  Allows you to select the USB transfer time-out value. [1,5,10,20sec]
- **Device reset time-out**
  Allows you to select the USB device reset time-out value. [10,20,30,40sec]
- **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 take from Hub descriptor.
- **Mass Storage Devices**
  Mass storage device emulation type. "Auto" enumerates device according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.

3.2.3 Chipset

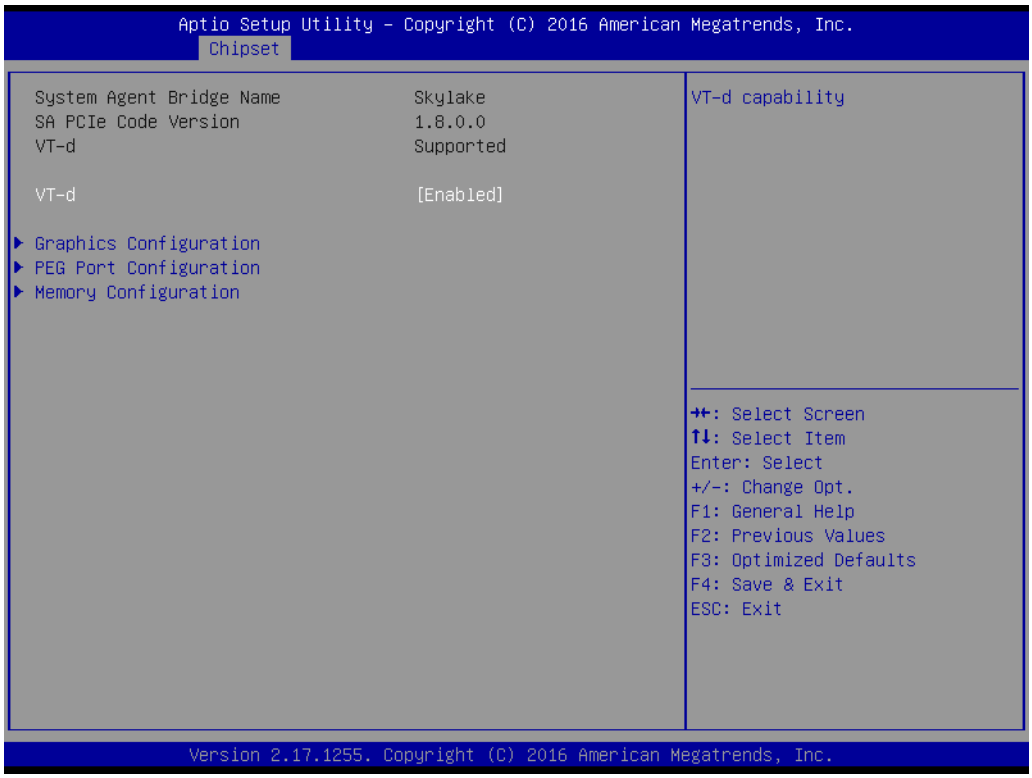


Figure 3.19 Chipset

This page provides information on the AIIS-3400/3410 chipset.

3.2.3.1 PCH-IO Configuration

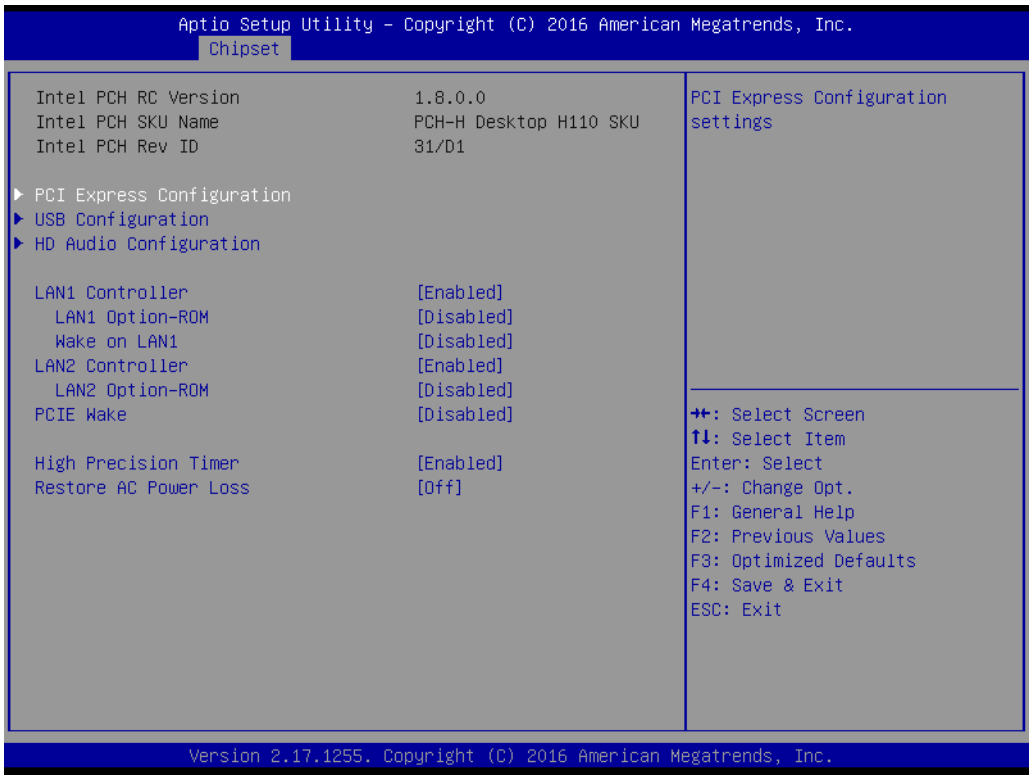


Figure 3.20 PCH-IO Configuration

- **LAN1 Controller**
  - **LAN1 Option-ROM**
    Enable or Disable LAN 1 boot option for legacy network devices.
  - **Wake on LAN**
    Enable or Disable Wake on LAN1.
- **LAN2 Controller**
  - **LAN2 Option-ROM**
    Enable or Disable LAN 2 boot option for legacy network devices.
  - **PCIE Wake**
    Enable or Disable PCIE Wake function.
- **Deep Sleep**
  Enable or Disable Deep Sleep.
- **Serial IRQ Mode**
  Configure Serial IRQ Mode.
- **High Precision timer**
  Enable or Disable the high precision event timer.
- **Restore AC Power Loss**
  Power off or Power on or Last State to restore AC Power Loss.

3.2.3.2 PCI Express Configuration

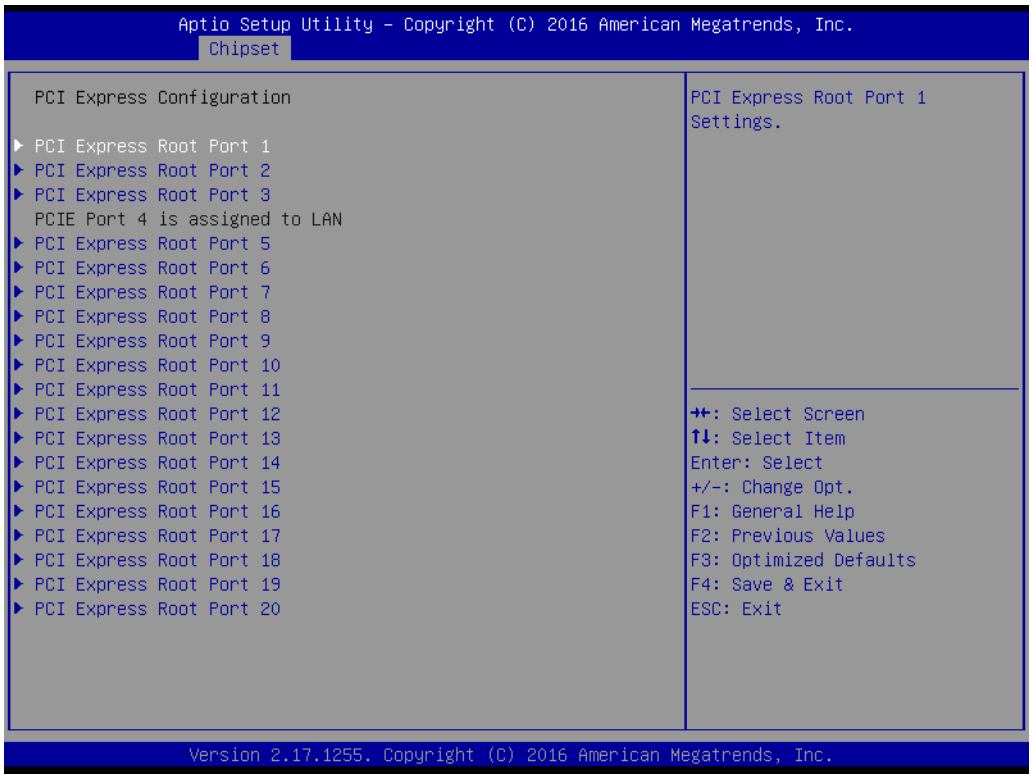


Figure 3.21 PCI Express Configuration

- **PCI Express Root Port 1~20 status**
  Enable or Disable PCI Express Root Ports.

3.2.3.3 USB Configuration

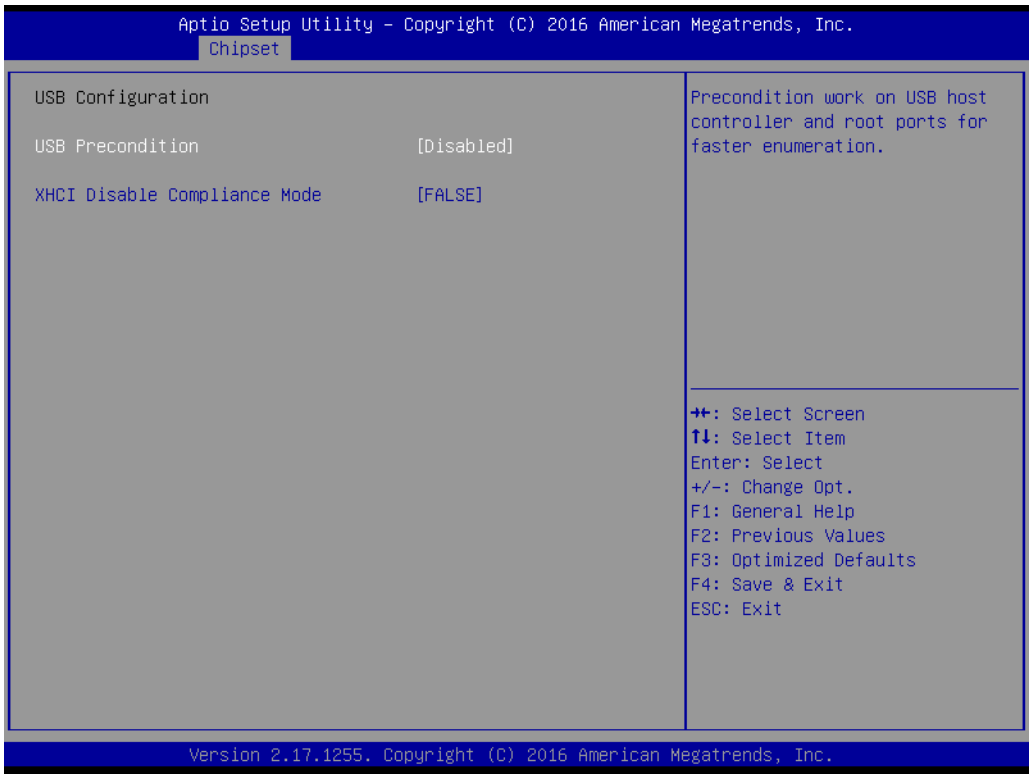


Figure 3.22 USB Configuration

- **USB Precondition**
  Pre-condition work on USB host controller and root ports for faster enumeration.
- **XHCI Disable Compliance mode**
  Options to disable compliance mode. Default is FALSE, enable compliance mode. Set TRUE to disable compliance mode.

3.2.3.4 HD Audio Configuration

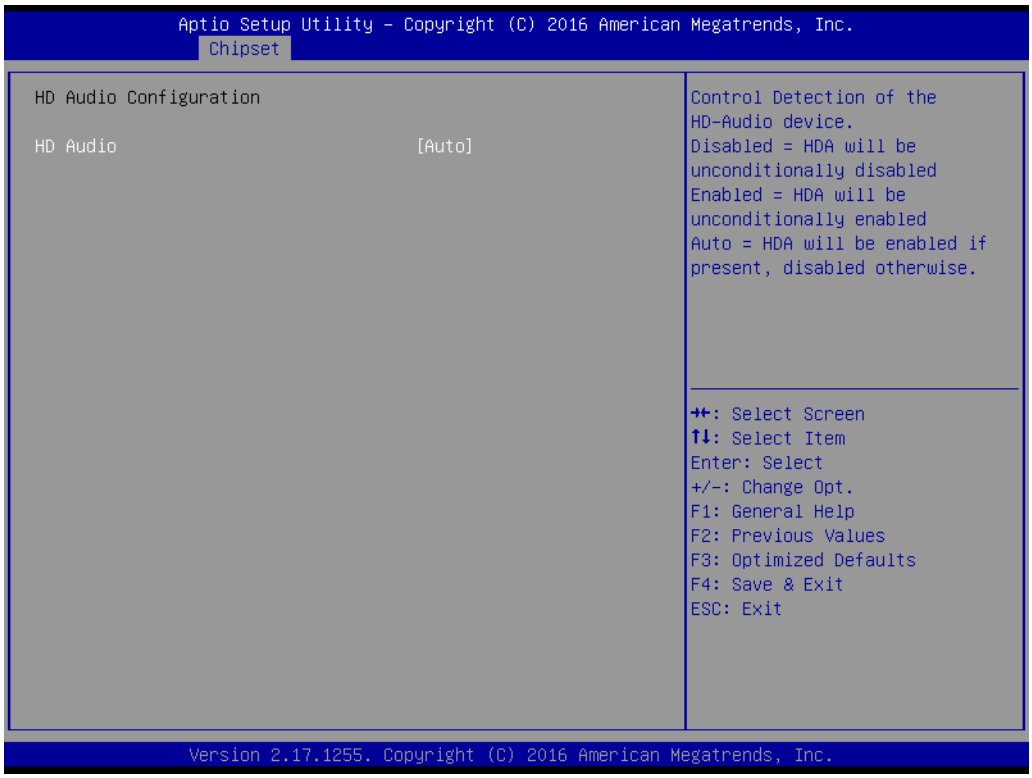


Figure 3.23 HD Audio Configuration

- **HD Audio**

  Control detection of the HD-Audio device.

  Disable = Azalia will be unconditionally disabled.

  Enable = Azalia will be unconditionally enabled.

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

3.2.3.5 System Agent (SA) Configuration

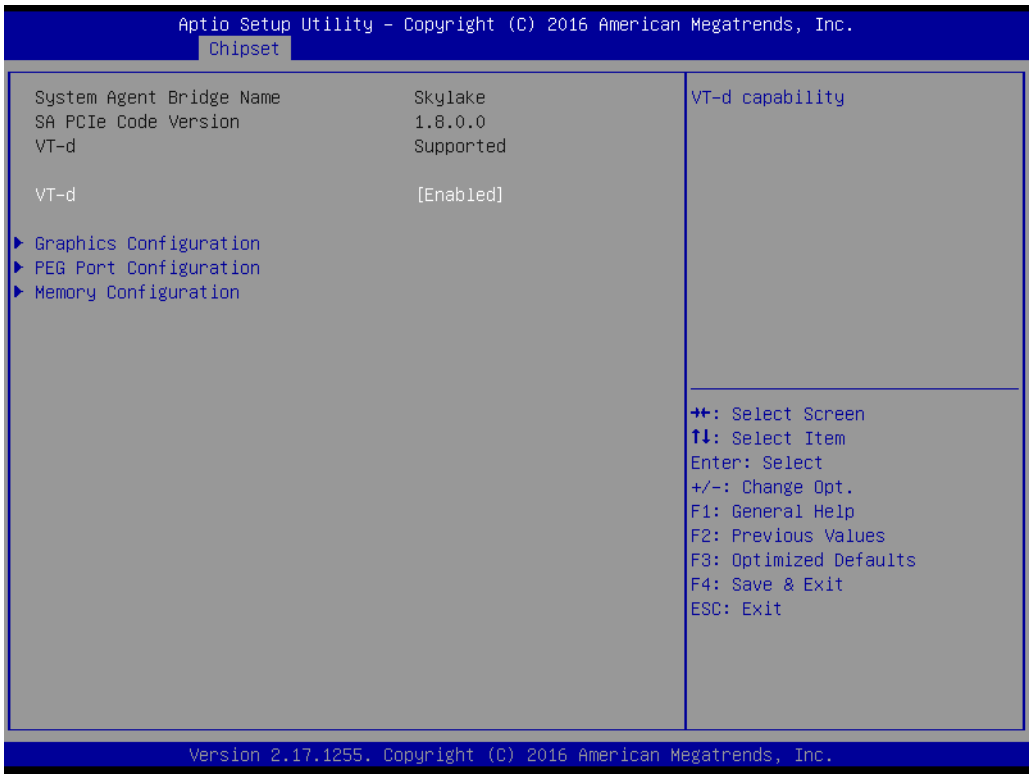


Figure 3.24 System Agent (SA) Configuration

- **VT-d**
  Enable or Disable VT-d function.
- **Graphics Configuration**

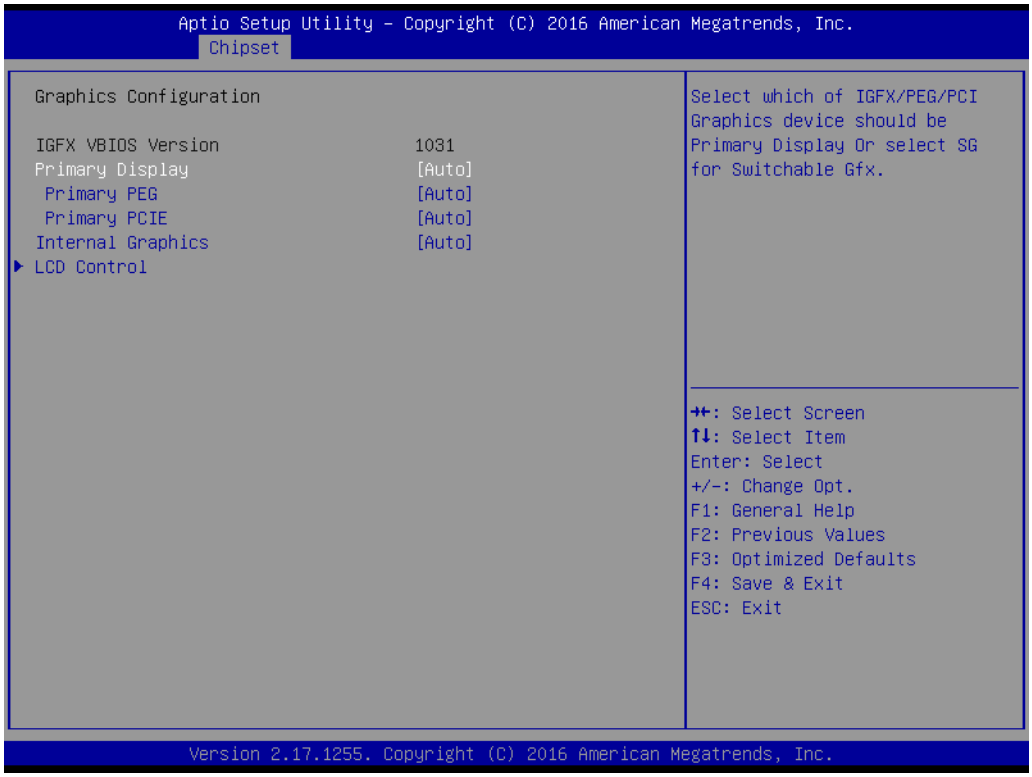
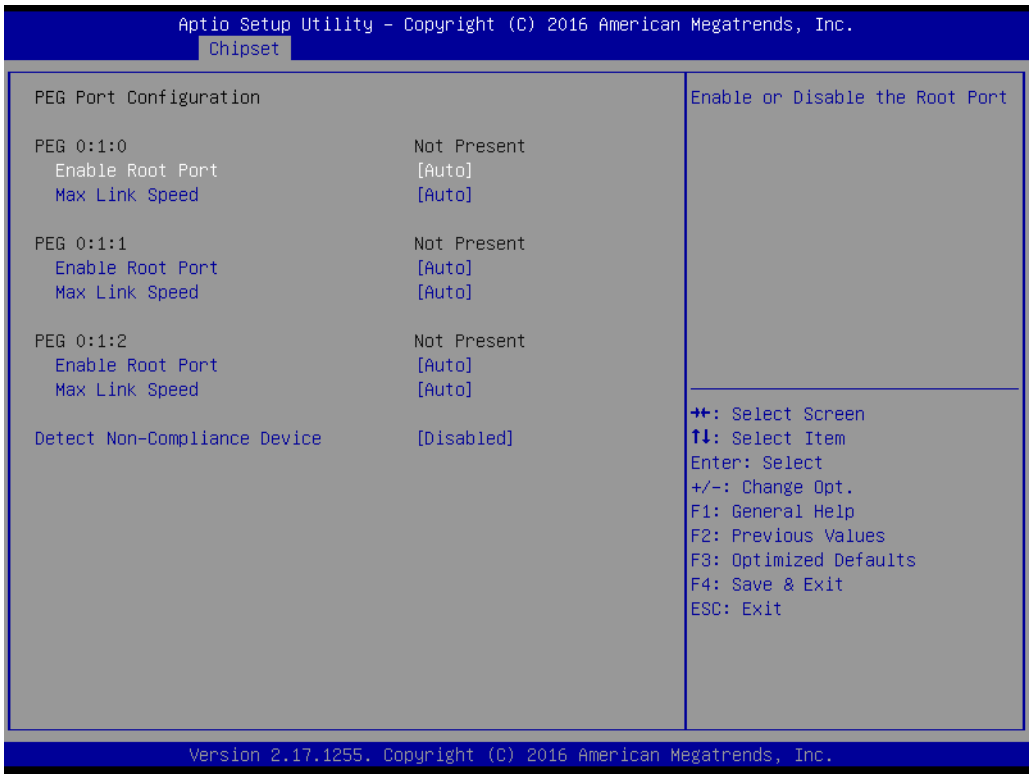
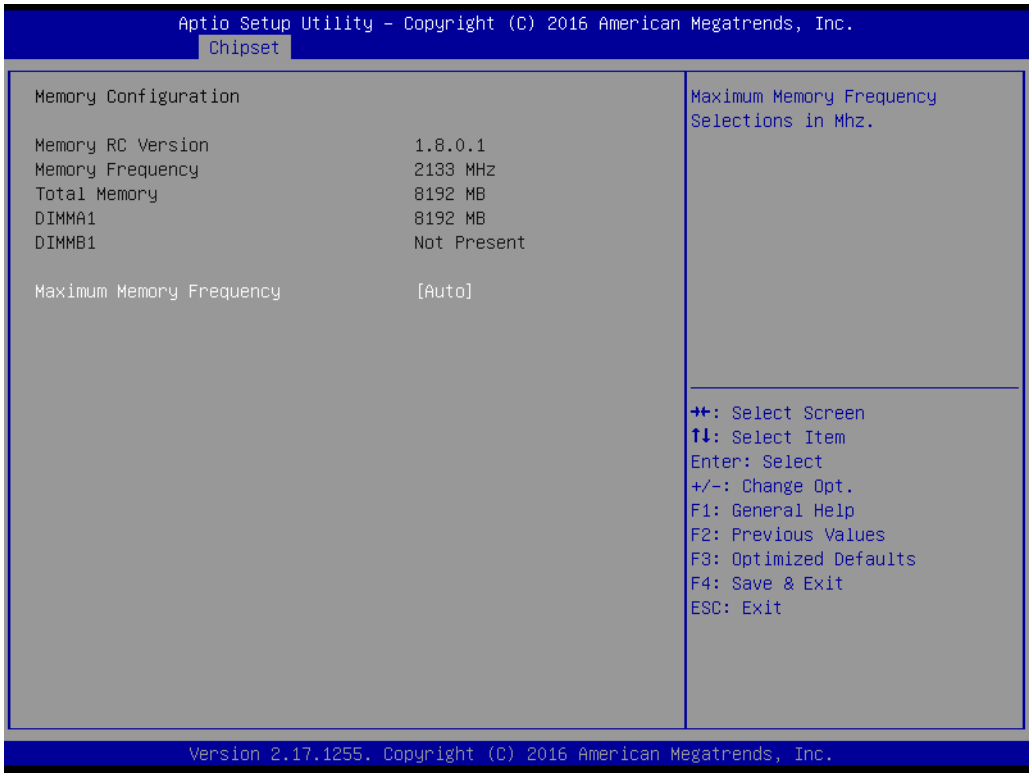


Figure 3.25 Graphics Configuration

- **Primary Display**
  Auto or IGFX or PEG or PCI or SG optimal to Primary Display.
- **Primary PEG**
  Select PEG0/PEG1/PEG2/PEG3 graphics device should be Primary PEG.
- **Primary PCIE**
  Select Auto/ PCIE1/ PCIE2/ PCIE3/ PCIE4/ PCIE5/ PCIE6/ PCIE7 of D28: F0/ F1/ F2/ F3/ F4/ F5/ F6/ F7, PCIE8/PCIE9/PCIE10/PCIE11/PCIE12/PCIE13/ PCIE14/PCIE15 of D29: F0/ F1/ F2/ F3/ F4/ F5/ F6/ F7/, PCIE16/ PCIE17/ PCIE18/ PCIE19 of D27: F0/ F1/ F2/ F3, Graphics device should be primary PCIE.
- **Internal Graphics**
  Auto or Disable or Enable Internal Graphics.



- **Enable Root Port**
  Enable or disable the root port.
- **Max Link speed**
  Configure PEG 0:1:0 max speed.
- **Detect Non-compliance device**
  Detect Non-Compliance PCI express Device in PEG.
- **Maximum Memory Frequency**
  Maximum memory frequency selections in Mhz.



3.2.4 Security

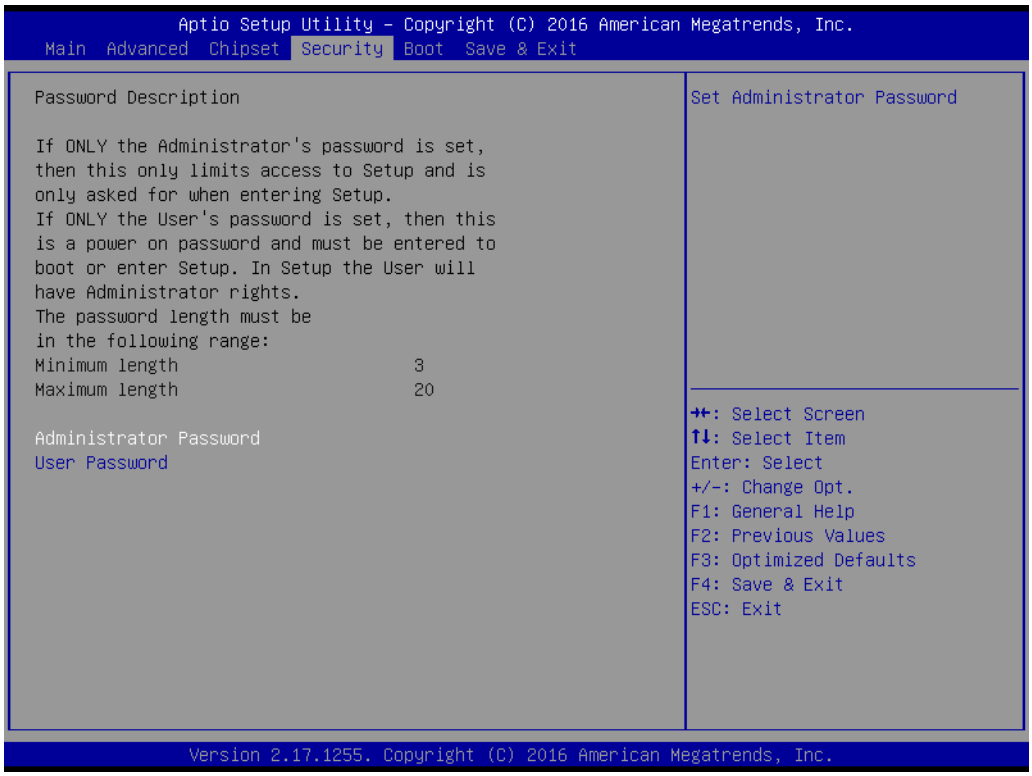


Figure 3.26 Security

Select Security Setup from the AIIS-3400/3410 Setup main BIOS setup menu. All Security Setup options, such as password protection is described in this section. To access the sub menu for the following items, select the item and press <Enter>.

3.2.5 Boot

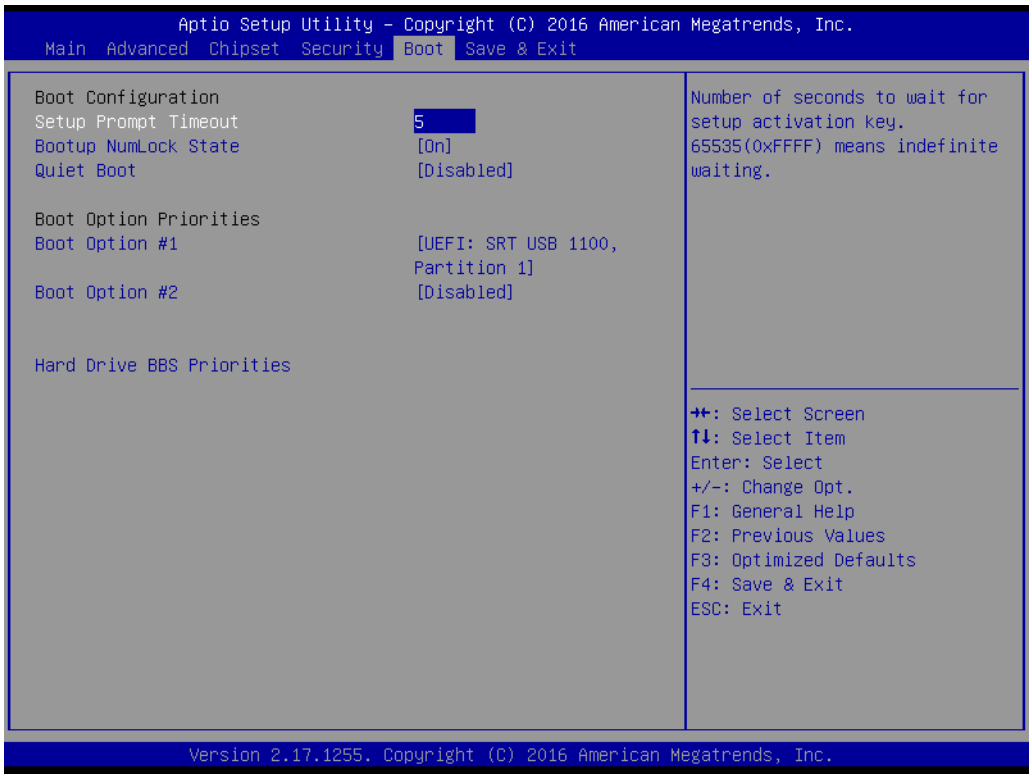


Figure 3.27 Boot

- **Setup Prompt Timeout**
  Use the <+> and <-> keys to adjust the number of seconds to wait for setup activation key.
- **Bootup NumLock State**
  On or Off power-on state for the NumLock.
- **Quiet Boot**
  Enable or Disable Quiet Boot option.
- **Boot Option #1/2**
  Sets the boot order.
- **New Boot Option Policy**
  Controls the placement of newly detected UEFI boot options.
- **Floppy Drive BBS Priorities**
  Set the order of the legacy devices on this group.

3.2.6 Save & Exit

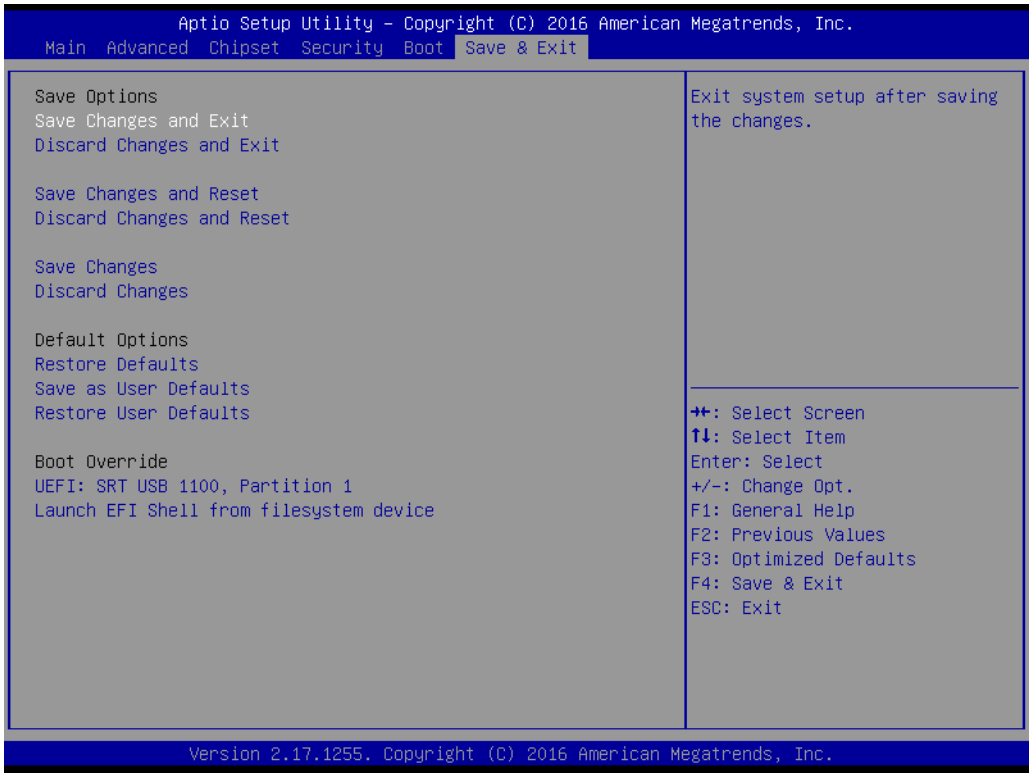


Figure 3.28 Save & Exit

- **Save Changes and Exit**

  When you complete system configuration, select this option to save your changes, exit BIOS setup and reboot the computer so the new system configuration parameters can take effect.

  1. Select Exit Saving Changes from the Exit menu and press <Enter>. The following message appears:

     Save Configuration Changes and Exit Now?

     [Yes] [No]

  2. Select Yes or No.

- **Discard changes and exit**

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

  1. Select Exit Discarding Changes from the Exit menu and press <Enter>. The following message appears:

     Quit without saving?

     [Yes] [No]

  2. Select Yes to discard changes and exit.

- **Discard Changes**

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

Chapter 4

Software Installation

This chapter introduces driver installation.

4.1 Chipset Software Installation Utility

4.1.1 Before you begin

To facilitate the installation of the enhanced display drivers and utility software, read the instructions in this chapter carefully. The drivers for the AIIS-3400/3410 are located on the software installation CD.

Note! *The files on the software installation CD are compressed. Do not attempt to install the drivers by copying the files manually. You must use the supplied SETUP program to install the drivers.*

Before you begin, it is important to note that most display drivers need to have the relevant software application already installed in the system prior to installing the enhanced display drivers. In addition, many of the installation procedures assume that you are familiar with both the relevant software applications and operating system commands. Review the relevant operating system commands and the pertinent sections of your application software's user manual before performing the installation.

4.1.2 Introduction

The Intel® Chipset Software Installation (CSI) utility installs the Windows INF files that outline to the operating system how the chipset components will be configured. This is needed for the proper functioning of the following features:

- Core PCI PnP services
- Serial ATA interface support
- USB 1.1/2.0 support
- Identification of Intel chipset components in the Device Manager.

Note! *The chipset driver is used for the following versions of Windows, and it has to be installed before installing all the other drivers:*

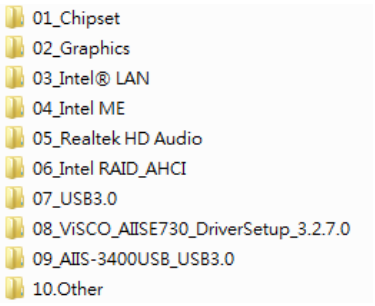
- *Windows 10 (64bit)*
- *Windows 8.1 (64-bit)*
- *Windows 7 (32-bit)*
- *Windows 7 (64-bit)*

Caution! *Intel® Skylake Platform does not include a USB3.0 driver. The user can use a SATA interface driver (SATA CD-RAM or CFast or m-SATA) to install Windows 7 OS.*

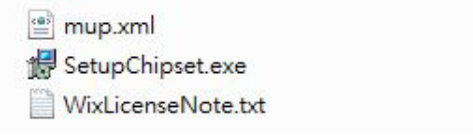
Advantech supports a powerful Windows 7 OS that includes USB3.0 (EFI OS not supported). It can help you install Win7 OS easily. If you need this option, please contact your distributor or sales representative.

4.1.3 Windows 10 / Windows 8.1/ Windows 7

1. Put the driver CD into the system's CD-ROM drive. You will see driver folder items. Select "01 Chipset" folder. In the **Chipset_10.1.1.13_Public** folder, click the executable file to complete driver installation.



2. Click setup to execute program.



4.2 Integrated Graphic Device Setup

4.2.1 Introduction

The 4th Gen Intel® Core™ i processors are embedded with integrated graphics controller. You need to install the VGA driver to enable this function, which includes the following features:

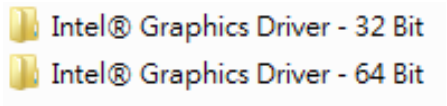
- Optimized integrated graphic solution: Intel® Graphics Flexible Display Interface supports versatile display options and 32-bit 3D graphics engine for dual independent displays, enhanced display modes for widescreen flat panels for extended, twin, and cloned dual display modes, and optimized 3D support delivers an intensive and realistic visual experience.

Caution! *Intel® Graphic Device does not support Windows 10 (32bit) and Windows 8.1 (32.bit)*

4.2.2 Windows 10 /Windows 8.1 /Windows 7 Driver Setup

Note! *Before installing these drivers, make sure the INF driver has been installed in your system. See Chapter 4 for information on installing the INF driver.*

Insert the driver CD into your system's CD-ROM drive. You can see the driver folders. Navigate to the "02 Graphic" folder and click the executable file to complete the installation of the drivers for Windows 7, Windows 8 and Windows 10.



4.3 Intel® ME

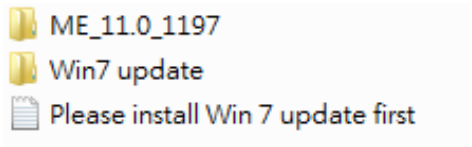
4.3.1 Introduction

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

4.3.2 Installation

Insert the driver CD into your system's CD-ROM drive. Navigate to the "04_Intel ME" folder and find folder "Intel ME" to install the driver.

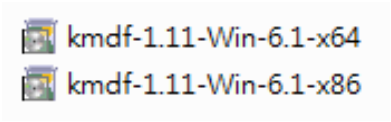
Note! *If the Intel® Management Engine (Intel® ME) driver has not been successfully installed in Win7, please refer to the Win7 ME install process below.*



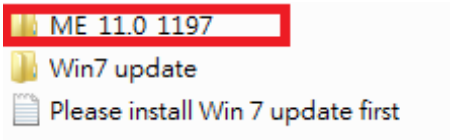
4.3.3 Install Intel® ME for Windows 7

Please follow this processer to install Intel® ME for Windows 7.

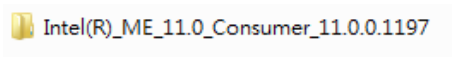
1. Install hot fix first.



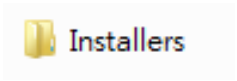
2. Install ME.
   a. ME_11.0_1197



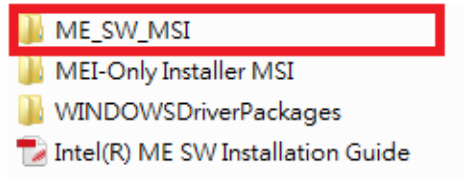
   b. Intel(R)_ME_11.0_Consumer_11.0.0.1197



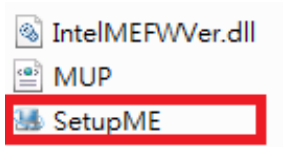
   c. Installers



   d. ME_SW_MAI



3. Install SetupME.



4.4 LAN Configuration

4.4.1 Introduction

The AIIS-3400/3410 has dual Gigabit Ethernet LANs via dedicated PCI Express x1 lanes (Intel® I219LM (LAN1) and I210IT (LAN2)) that offer bandwidth of up to 500 MB/sec, eliminating the bottleneck of network data flow and incorporating Gigabit Ethernet at 1000 Mbps.

4.4.2 Features

- 10/100/1000Base-T Ethernet controller
- 10/100/1000Base-T triple-speed MAC
- Full duplex at 10, 100, or 1000 Mbps and half duplex at 10 or 100 Mbps
- Wake-on-LAN (WOL) support
- PCIe x1 host interface

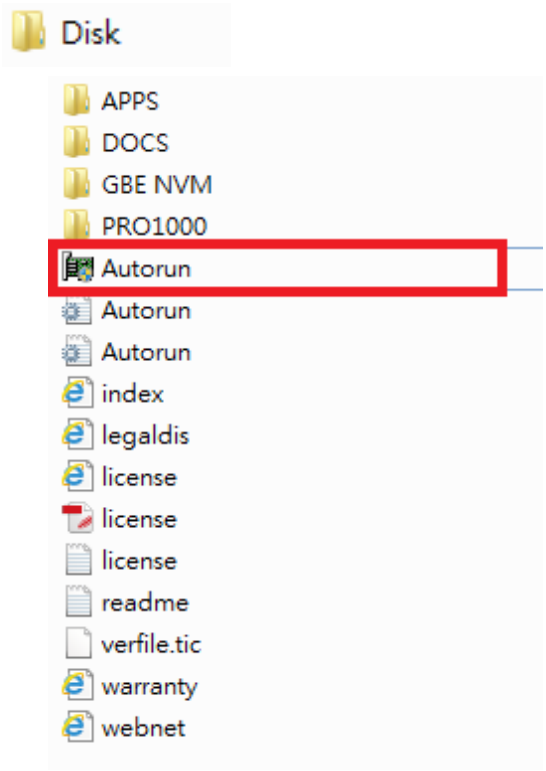
4.4.3 Installation

Note! *Before installing the LAN drivers, make sure the CSI utility has been installed on your system. See Chapter 4 for information on installing the CSI utility.*

The integrated Intel® gigabit Ethernet controller supports all major network operating systems. However, the installation procedure varies with different operating systems. In the following sections, refer to the one that provides the driver setup procedure for the operating system you are using.

4.4.4 Windows 10 /Windows 8.1 /Windows 7

Insert the driver CD into your system's CD-ROM drive. Select folder "03_LAN" then click the "Disk" folder, and then click "Autorun".



4.5 SATA RAID Setup

4.5.1 Introduction

To support demanding disk I/O, Intel® H110 chipset integrates six Serial ATA controllers with software RAID 0, 1, 5, 10 capabilities.

RAID 0 striping increases the storage performance and is designed to speed up data transfer rates for disk-intensive applications.

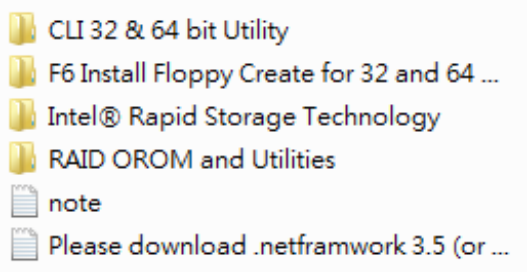
RAID 1 mirroring protects valuable data that might be lost in the event of a hard drive failure.

RAID 5 array contains three or more hard drives where the data is divided into manageable blocks called strips. Parity is a mathematical method for recreating data that was lost from a single drive, which increases fault-tolerance. The data and parity are striped across all the hard drives in the array. The parity is striped in a rotating sequence to reduce bottlenecks associated with the parity calculations.

RAID 10 array uses four hard drives to create a combination of RAID levels 0 and 1. The data is striped across a two-drive array forming the RAID 0 component. Each of the drives in the RAID 0 array is then mirrored by a RAID 1 component.

4.5.2 SATA RAID Driver and Utility Setup

The installation utility is in the CD's "06_Intel RAID_AHCI" folder. Go to the directory of the CD and follow these steps to install.



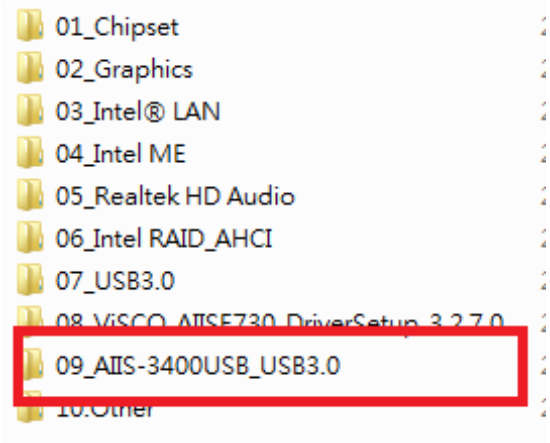
Note! *Please install ".NET 4.5" before installing "Intel Rapid Storage Technology".*

4.6 Install USB3.0

4.6.1 Introduction

AIIS-3400/3410 provides 8x USB 3.0 and the data transfer rate of USB3.0 (5Gb/s) is 10 times to USB2.0 (480 Mbps).

Insert the driver CD into your system's CD-ROM drive. Navigate to "09_AIIS-3400USB_USB3.0" to install the drier.



Appendix A

Programming the Watchdog Timer

The AIIS-3400/3410'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 Watchdog Timer Overview

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

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

A.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), and then write/read data to/from the assigned register through data port 2F (hex).

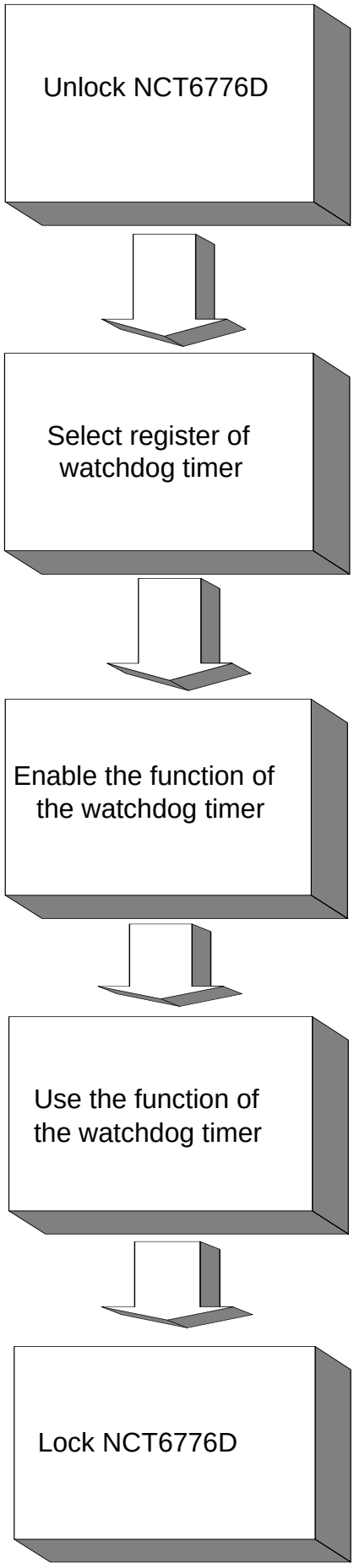

Unlock NCT6776D
Select register of watchdog timer
Enable the function of the watchdog timer
Use the function of the watchdog timer
Lock NCT6776D

Table A.1: Watchdog timer registers		
Address of register (2E)	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 seconds 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 NCT6776D.

A.2.1 Example Programs

Enable watchdog timer and set 10 seconds as the 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
Mov 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
```

Enable watchdog timer and set 5 minutes as the 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
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
```

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
```

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 ; Enable watchdog timer to be strobed 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
```

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
```

```
In al,dx
Or 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

```
-----------------------------------------------
 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 0Vdc - 5Vdc 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 C-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.

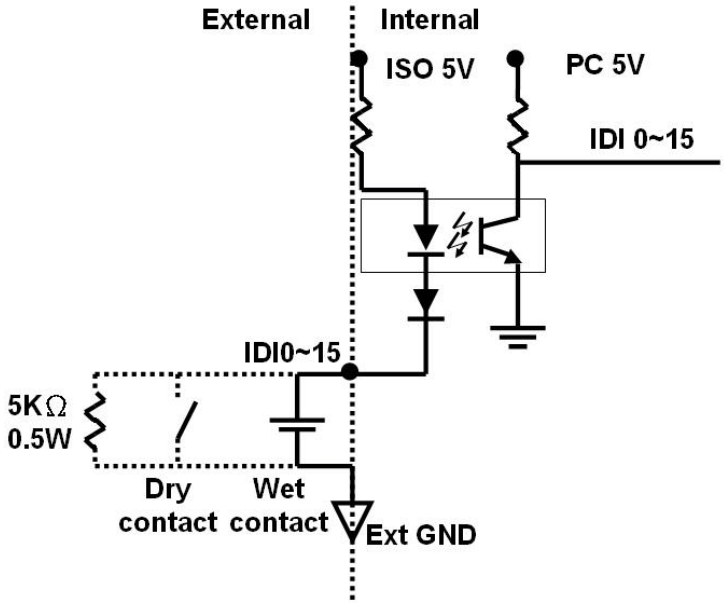


Figure C.1 Isolated Digital Input Connections

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 (5Vdc - 40Vdc) 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.

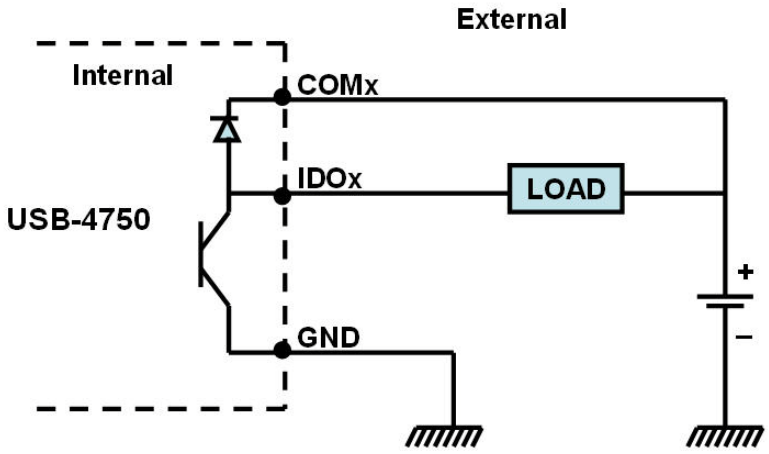


Figure C.2 Isolated Digital Output Connections

Appendix D

Exploded Diagram & Parts List

D.1 Exploded Diagram

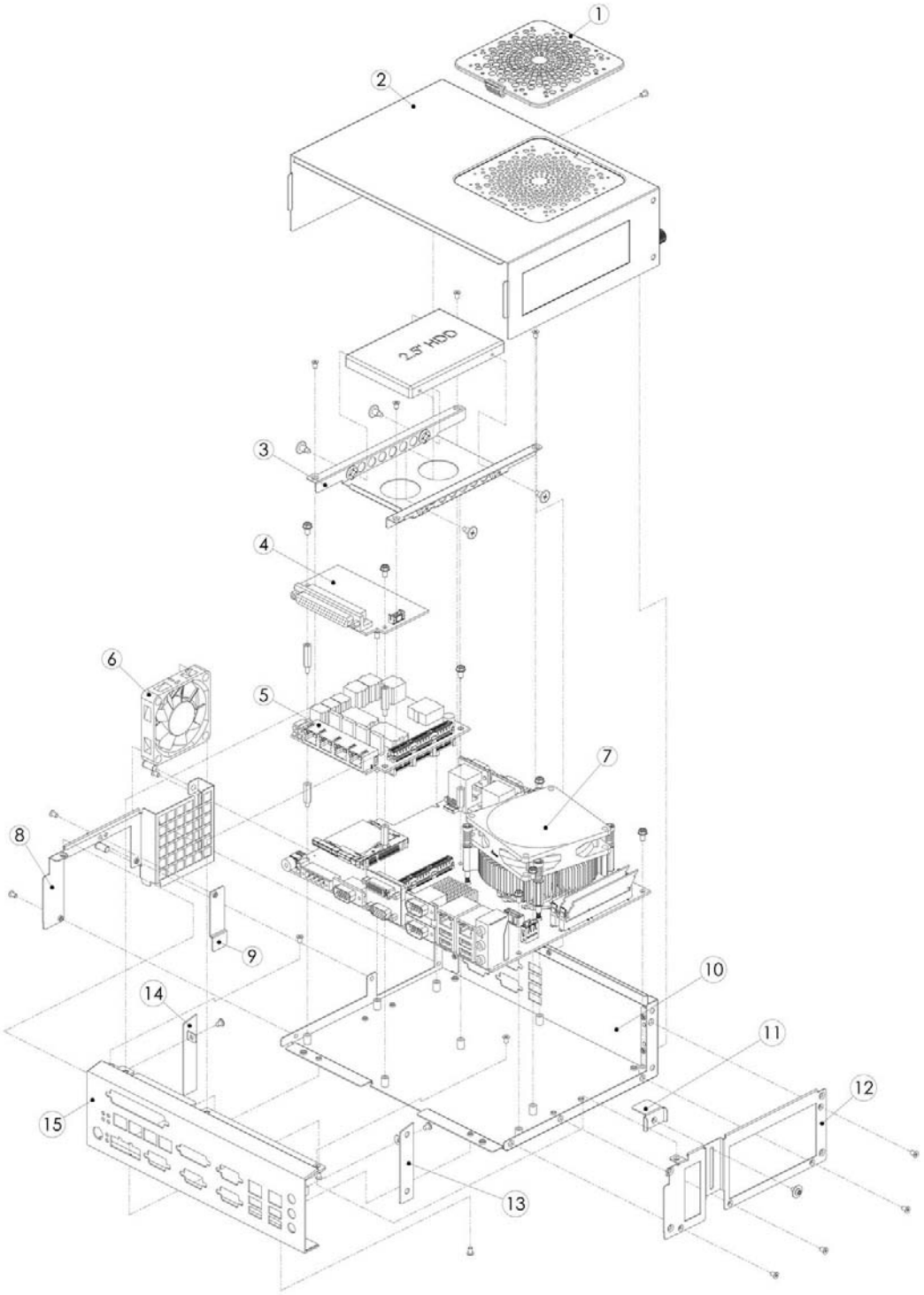


Figure D.1 Exploded Diagram

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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