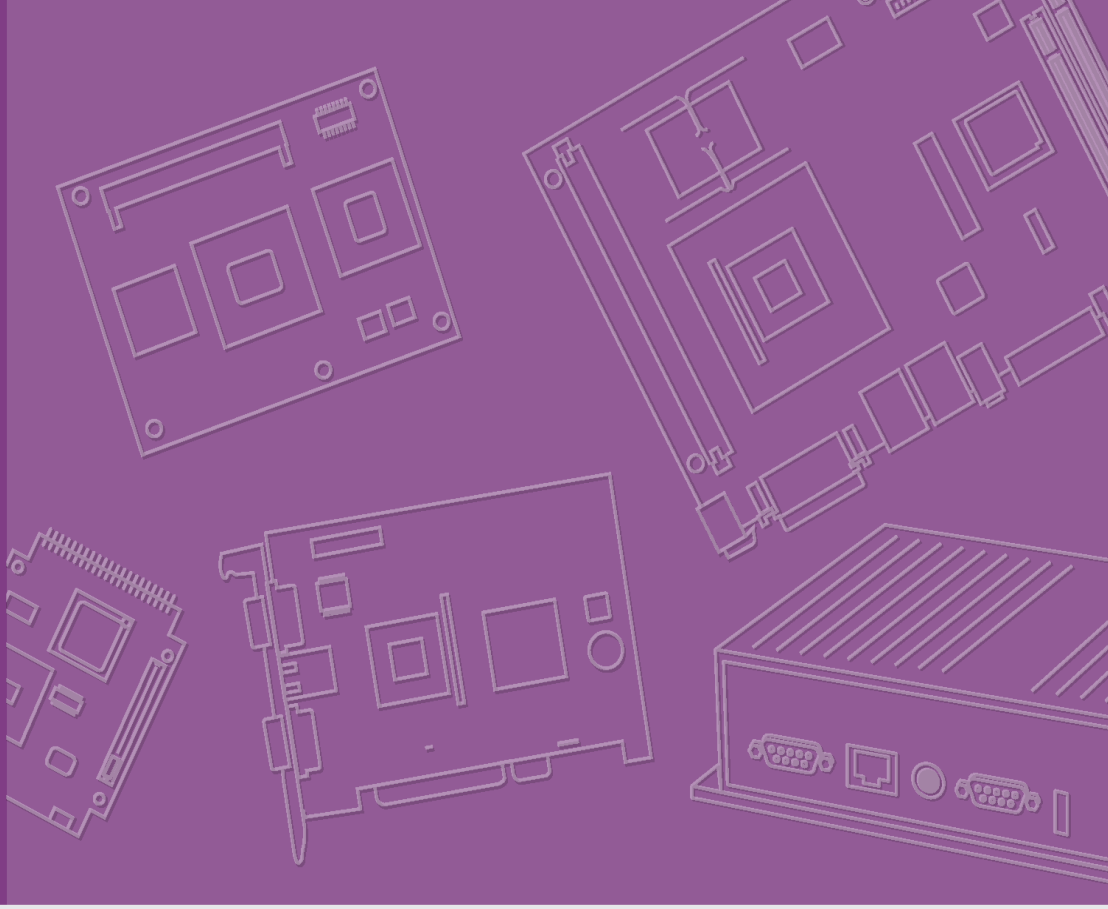

User Manual

ASMB-820I

ADVANTECH

Enabling an Intelligent Planet

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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.

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

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A Message to the Customer

Advantech Customer Services

Each and every Advantech product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Advantech equipment is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Advantech has come to be known.

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We want you to get the maximum performance from your products. So if you run intotechnical difficulties, we are here to help. For the most frequently asked questions, you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone.

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This device complies with the requirements in part 15 of the FCC rules:

Operation is subject to the following two conditions:

- This device may not cause harmful interference
- This device must accept any interference received, including interference that-may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B 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 device in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense. The user is advised that any equipment changes or modifications not expressly approved by the party responsible for compliance would void the compliance to FCC regulations and therefore, the user's authority to operate the equipment.

Caution! *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.*

Peripheral Compatibility

Category	Advantech PN	Vendor	Part Description	Remarks
MB	ASMB-820I-00A1E	Advantech	Support BMC module	
	ASMB-820-00A1E	**Advantech**	**Basic sku**	
CPU	TBD	Intel	Xeon E5-2430/2.2GHz/6cores	95W
	TBD	**Intel**	**Xeon E5-2448L/1.8GHz/8cores**	**70W**
	TBD	**Intel**	**Xeon E5-2428L/1.8GHz/6cores**	**60W**
	TBD	**Intel**	**Xeon E5-2418L/2.0GHz/4cores**	**50W**
SATA3 HDD	**96HD500G-ST-SG7K12**	**SEAGATE**	**500G 3.5" SATA 7KRPM 16M**	**ST500DM002**
	96HD1000G-ST-SG7K6	**SEAGATE**	**1T 3.5" SATA 7KRPM 64M**	**ST1000DM003**
	96HD2000G-ST-SG7K2	**SEAGATE**	**2T 3.5" SATA 7KRPM 64M**	**ST2000DM001**
Memory / REG	96D3-1G1333ER-AP	Apacer	1G DDR3-1333 240PIN REG 128X8 ELP(G)	78.01GCC.AF0
	96D3-2G1333ER-AP	Apacer	2G DDR3-1333 240PIN REG 128X8 ELP(G)	78.A1GDR.4200C
	96D3-4G1333ER-AP1	Apacer	4G DDR3-1333 240PIN REG 256X8 HYX(G)	78.B1GDR.4201C
	TBD	Transcend	1G DDR3-1333 240PIN ECC REG	TS128MKR72V3U
	TBD	Transcend	2G DDR3-1333 240PIN ECC REG	TS256MKR72V3U
	TBD	Transcend	4G DDR3-1333 240PIN ECC REG	TS512MKR72V3N
	TBD	ADATA	4G DDR3-1333 240PIN ECC REG	EL93I1C18
	TBD	ADATA	8G DDR3-1333 240PIN ECC REG	EL93I1D18
	TBD	InnoDisk	4G DDR3-1333 240PIN ECC REG	ACT4GHR72P8H 1333H
	TBD	InnoDisk	8G DDR3-1333 240PIN ECC REG	ACT8GHR72Q4H 1333S
	TBD	InnoDisk	16G DDR3-1066 240PIN ECC REG	ACT16GHR72Q4J 1333S
Memory / ECC	TBD	Transcend	1G DDR3-1333 240PIN ECC	TS128MLK72V3U
	TBD	Transcend	2G DDR3-1333 240PIN ECC	TS256MLK72V3U
	TBD	Transcend	4G DDR3-1333 240PIN ECC	TS512MLK72V3N
	TBD	InnoDisk	4G DDR3-1333 240PIN ECC	M3CN-4GHJ3C09
	TBD	ADATA	4G DDR3-1333 240PIN ECC	EL03I1C18
Memory / UNB	TBD	ADATA	4G DDR3-1600 240PIN	EL64C1C16
	96D3-4G1333NN-TR	Transcend	4G DDR3-1333 240PIN	TS512MLK64V3N
Cooler	**1960055362N011**	**AVC**	**Cooler I-LGA1356/1366 S-95W 90x90x65.65-SS(M3)**	**Z6UR41J002**
Option Card	**PCA-AUDIO-HDA1E**	**Advantech**	**Audio card**	

Initial Inspection

Before installing motherboard, please make sure that the following materials have been shipped:

- 1 x ASMB-820I ATX motherboard
- 1 x ASMB-820I Startup Manual
- 1 x Driver CD (user manual is included)
- 2 x Serial ATA HDD data cables
- 1 x I/O port bracket
- 2 x SATA power cable
- 1 x Warranty card

If any of these items are missing or damaged, contact distributor or sales representative immediately. We have carefully inspected the ASMB-820I mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt. When unpacking the ASMB-820I, check it for signs of shipping damage. (For example, damaged box, scratches, dents, etc.) If it is damaged or it fails to meet the specifications, notify our service department or local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection, we will make arrangements to repair or replace the unit.

Order Information

Part Number	HDD	Expansion Slot	IPMI
ASMB-820I-00A1E	6 SATA	1 x PCIe x16 + 1x PCIe x8	Yes
ASMB-820-00A1E	6 SATA	1 x PCIe x16 + 1x PCIe x8	-

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Chapter 1

Overview

1.1 Introduction

The ASMB-820I serverboard is the most cost-effective Intel Xeon E5-2400 series board for server-grade IPC applications that require high-performance computing. The serverboard supports an Intel Xeon E5-2400 series processor and DDR3 1066/ 1333/1600 MHz memory up to 96 GB.

ASMB-820I provides dual PCIe x16 slots (1 x8 link; 1 x16 link) which can support two high performance graphic cards.

For multi-interface expansion card applications, ASMB-820I can also support 1* PCIe x1 & 1* PCIe x4 & 2* PCI slots.

In addition, the ASMB-820I has dual Gigabit Ethernet LAN ports via a dedicated PCIe x1 bus, which offer bandwidth up to 500 MB/s, eliminating network bottlenecks.

The ASMB-820I has a third RJ-45 LAN connector which is dedicated for IPMI function allowing remote control

High reliability and outstanding performance makes ASMB-820I the ideal platform for industrial server/networking applications.

By using the Intel C602J chipset, the ASMB-820I offers a variety of features such as 4 onboard SATA II, and 2 onboard SATA III interfaces; it provides software RAID 0, 1, 10 and 5 (Windows only); and it has 12 USB 2.0 connectors.

These powerful I/O capabilities ensure even more reliable data storage capabilities and high-speed I/O peripheral connectivity.

Note!

1. *IPMI module sold separately.*
2. *4 rear USB connectors; 3 USB pin headers onboard (2 ports from one header); 2 type-A USB connector onboard.*

1.2 Features

General

- **Intel next generation dual processor platform:** ASMB-820I supports one Intel E5-2400 series Quad/Six/Eight core processor.
- **High performance I/O capability:** Dual Gigabit LAN via PCIe x1 bus, two PCIe X16 slots, 6 SATA connectors and 12 USB 2.0 ports.
- **Standard ATX form factor with industrial features:** ASMB-820I provides industrial features like long product lifecycle, reliable operation under wide temperature range, watchdog timer, etc.
- **IPMI 2.0 support:** ASMB-820I equipped with Aspeed 2300 BMC chip supports IPMI 2.0 (Intelligent Platform Management Interface 2.0) via dedicated LAN port.
- **KVM over IP:** ASMB-820I KVM over IP function allows remote control of system through your own computer.

1.3 Specifications

Table 1.1: Specifications

Processor	
CPU	■ Supports Intel XEON E5-2400 series processor with Quad/ Six/Eight cores ■ Supports TDP 50W/60W/70W/95W Intel XEON E5-2400 series processor
System Memory	
Memory Capacity	■ Xeon processor supports DDR3 memory bus ■ Total 6 memory slots provided ■ 3 channels per processor, 2 memory slot per channel ■ Supports up to 96 GB memory
Memory Type	Supports DDR3 1066/1333/1600 MHz ECC Registered / ECC Unbuffered / Non-ECC Unbuffered Modules.
DIMM Sizes	Each memory slot supports 1GB, 2GB, 4GB, 8GB, 16GB memory size modules.
Memory Voltage	1.35V & 1.5 V
Error Detection	■ Corrects single-bit errors ■ Detects double-bit errors (using ECC memory)
On-Board Devices	
Chipsets	Intel C602J PCH provide 8xPCIe Gen2 lanes for VGA, Network.
Network Controllers	■ 1 x Intel 82574L Gigabit Ethernet Controller connected to C602J through PCIe Gen2 Lane. ■ 1x Intel 82579LM Gigabit PHY connected to C602J MAC. ■ Above network Supports 10BASE-T, 100BASE-TX, and 1000BASE-T, RJ-45 output. ■ 1 x 10/100BASE RealTek 8201EL-VB PHY connected to AST2300 for dedicated IPMI/IKVM.
VGA	ASPEED AST2300 controller with 64 MB VGA memory provides basic 2D VGA function.
Super I/O	Nuvoton NCT6776F chip provides motherboard keyboard mouse, RS-232, and hardware monitor functions.
BMC (820I SKU Only)	ASPEED AST2300 provides IPMI & IKVM function.
Input / Output	
Serial ATA	■ Total 6 x SATA ports, 2 ports provide 6 Gb/s bandwidth, 4 ports provide 3 Gb/s bandwidth. ■ RAID 0, 1, 5, 10 support (Windows only).
LAN	■ 2 x RJ-45 LAN ports (10/100/1000 Base-T LAN). ■ 1 x RJ-45 Dedicated IPMI LAN port(10/100 Base-T) for IPMI only, there is no regular LAN function (ASMB-820I Only).
USB	■ 4 x USB ports at rear window. ■ 3 x USB internal headers (6 ports). ■ 2 x internal Type-A USB port.
VGA	■ 1 x VGA port
Keyboard / Mouse	■ PS/2 keyboard and mouse connector at rear window.
Serial Port / Header	■ 1 x internal header (2 x 5 2.5 mm pitch) for UART port ■ 1 x external DB9 UART
Power Connector	
System Power	1 x 24-pin SSI EPS 12 V power connector (Input 12 V, 5 V, 3.3 V, 5 V standby)

Table 1.1: Specifications	
CPU Power	1 x 8 pin SSI EPS 12 V power connector for CPU & Memory power (12V)
Expansion Slots	
PCI-Express	■ 1 x PCI-E x16 slot (x16 link) ■ 1 x PCI-E x1 slot ■ 1 x PCI-E x16 slot (x8 link) ■ 1 x PCI-E x4 slot ■ 2 x PCI slot
System BIOS	
BIOS Type	64 Mb SPI Flash EEPROM with AMI BIOS
PC Health Monitoring	
Voltage	Monitors for CPU Cores, +3.3 V, +5 V, +12 V, +5 V Standby, VBAT
FAN	■ One 4-pin heads for CPU cooler and four 4-pin headers for system fan. ■ All fans with tachometer status monitoring ■ Thermal control for all fan connectors
Temperature	■ Monitoring for CPU (PECI) ■ Monitoring for System (SIO)
Other Features (Case Open)	■ Chassis intrusion detection ■ Chassis Intrusion header
Operating Environment / Compliance	
RoHS	RoHS Compliant 6/6 Pb Free
Environmental Spec.	■ Operating Temperature: 0 to 60°C ■ Non-operating Temperature: -40 to 85°C ■ Operating Relative Humidity: 0% to 90% (non-condensing) ■ Non-operating Relative Humidity: 5% to 95% (non-condensing)

Note! *Specifications are subject to change without notice.*

1.4 Board Layout, Jumpers and Connectors

Connectors on the ASMB-820I are linked to external devices such as hard disk drives. In addition, ASMB-820I has a number of jumpers that are used to configure system for specific applications.

The tables below list the functions of each jumper and connector. Later sections in this chapter give instructions for setting jumpers. Chapter 2 gives instructions for connecting external devices to ASMB-820I.

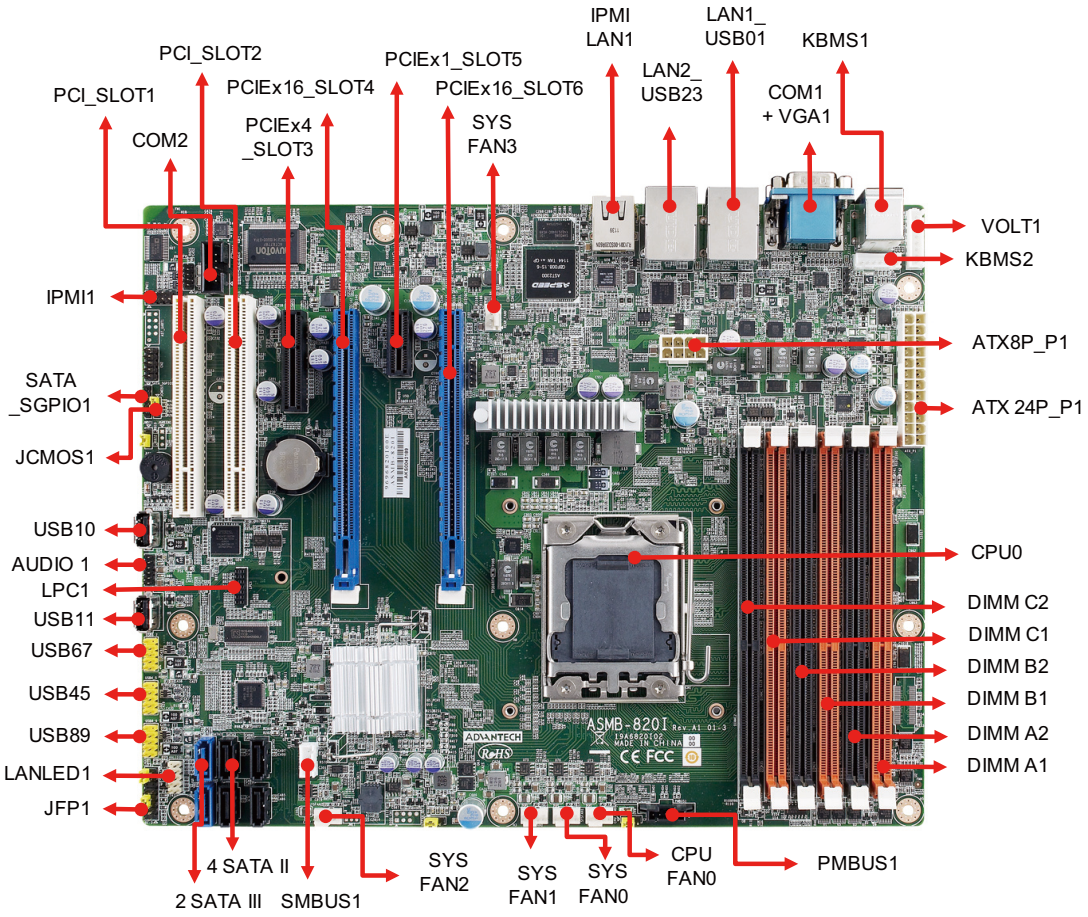


Figure 1.1 Board Layout

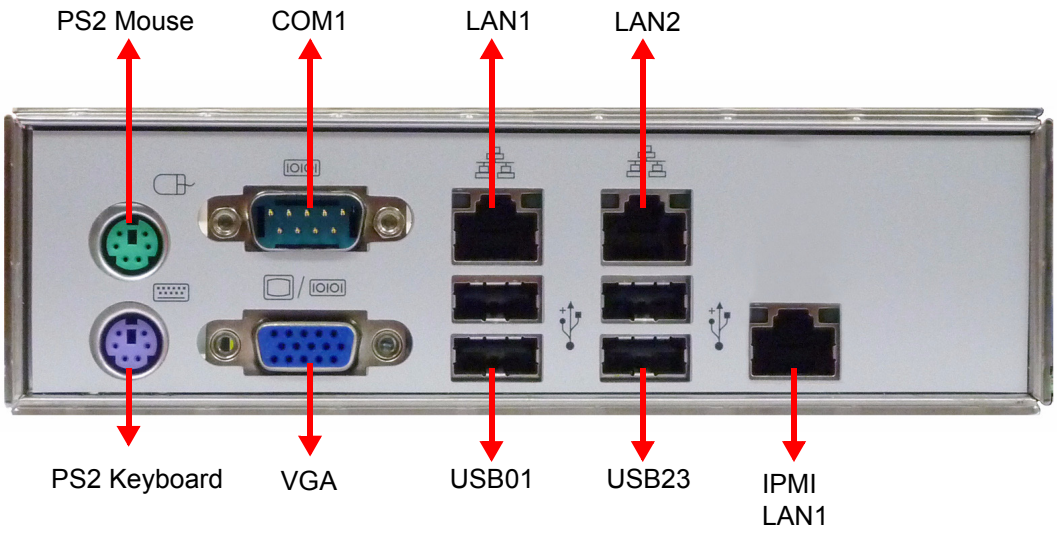
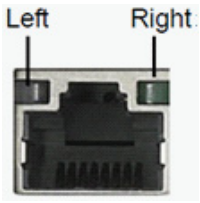


Figure 1.2 Rear I/O

Table 1.2: Onboard LAN LED Color Definition

10/100/1000 Mbps LAN Link/Activity LED Scheme



		LAN1 & LAN2		IPMI LAN1	
		Left LED	Right LED	Left LED	Right LED
10 Mbps	Link Active	Off Off	Green Blinking green	Amber	- Blinking green
100 Mbps	Link Active	Amber Amber	Green Blinking green	Amber	- Blinking green
1000 Mbps	Link Active	Green Green	Green Blinking green	-	-
No Link		Off	Off	Off	Off

Table 1.3: Jumpers

Label	Function
JCMOS1	CMOS Clear
JME1	ME update

Table 1.4: Connectors

Label	Function
ATX_8P_P0	SSI EPS 12 V auxiliary power connector (for CPU0) and memory
ATX_24P_P1	SSI EPS 24-pin main power connector (for system)
COM2	Serial port: RS-232
CPU0	Intel LGA1356 CPU0 socket
CPUFAN0	CPU0 fan connector (4-pin)
DIMMA1	Channel A DIMM1 of CPU0
DIMMA2	Channel A DIMM2 of CPU0
DIMMB1	Channel B DIMM1 of CPU0
DIMMB2	Channel B DIMM2 of CPU0
DIMMC1	Channel C DIMM1 of CPU0
DIMMC2	Channel C DIMM2 of CPU0
JFP1	Front panel pin header connector
AUDIO1	HD audio Interface connector
IPMI1	IPMI connector
LANLED1	LAN1/2 LED extension connector
LPC1	LPC port for debug & TPM module
SATA0	Serial ATA0 hard drive connector(SATA III)
SATA1	Serial ATA1 hard drive connector(SATA III)
SATA2	Serial ATA2 hard drive connector(SATA II)
SATA3	Serial ATA3 hard drive connector(SATA II)
SATA4	Serial ATA4 hard drive connector(SATA II)
SATA5	Serial ATA5 hard drive connector(SATA II)
SATA_SGPIO_1	SGPIO connector for SATA0 ~ SATA5

Table 1.4: Connectors	
SYS FAN0	System fan connector (4-pin)
SYS FAN1	System fan connector (4-pin)
SYS FAN2	System fan connector (4-pin)
SYS FAN3	System fan connector (4-pin)
USB45	USB port 4, 5
USB67	USB port 6, 7
USB89	USB port 8, 9
USB10	USB port 10 (Type-A)
USB11	USB port 11 (Type-A)

Table 1.5: Onboard LED			
LED	**Description**	**LED Definition**	
5V_LED1	Power on LED	Off: Power off	On (Green): System is On
5VSB_LED1	Standby LED	Off: No input AC Power	On (Green): System is ON, in sleep mode, or in soft-off mode
LED1	BMC heartbeat LED (820I SKU Only)	Blinking (Green) : Controller is working normally	

1.5 Block Diagram

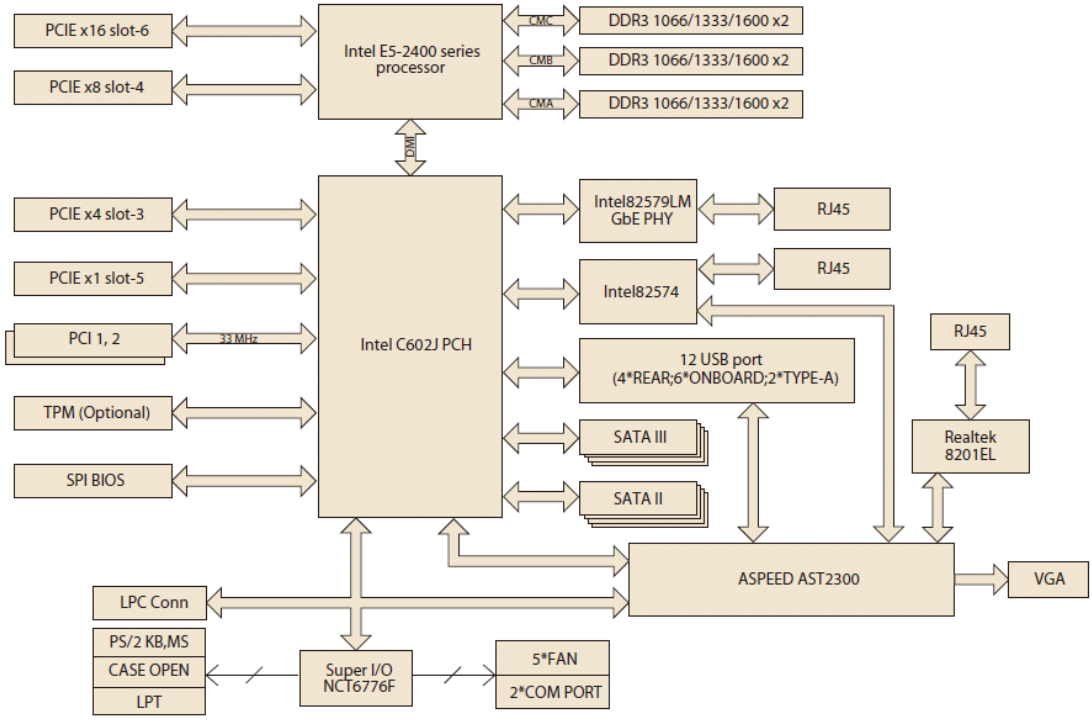


Figure 1.3 Block Diagram

1.6 System Memory

ASMB-820I has six 240-pin memory slots for DDR3 1066/1333/1600 MHz memory modules with maximum capacity of 96 GB (Maximum 16 GB for each DIMM).

ASMB-820I supports registered DIMMs or unbuffered DIMM with ECC / Non-ECC memory module.

1.7 Memory Installation Procedures

To install DIMMs, make sure that two handles of the DIMM socket are in the "open" position. The handles lean outward. Slowly slide the DIMM module along the plastic guides on both ends of the socket, and then press the DIMM module right down into the socket, until you hear a click. This is when the two handles have automatically locked the memory module into the correct position of the DIMM socket. To remove the memory module, just push both handles outward, and the memory module will be ejected by the mechanism in the socket.

	Quantity of memory installed					
Socket / Color	1	2	3	4	5	6
DIMMA1 (Orange)	V	V	V	V	V	V
DIMMA2 (Black)		V	V	V	V	V
DIMMB1 (Orange)			V	V	V	V
DIMMB2 (Black)				V	V	V
DIMMC1 (Orange)					V	V
DIMMC2 (Black)						V

1.8 Processor Installation

The ASMB-820I is designed for single LGA1356, Intel E5-2400 series Xeon processor.

Chapter 2

Connections

2.1 Introduction

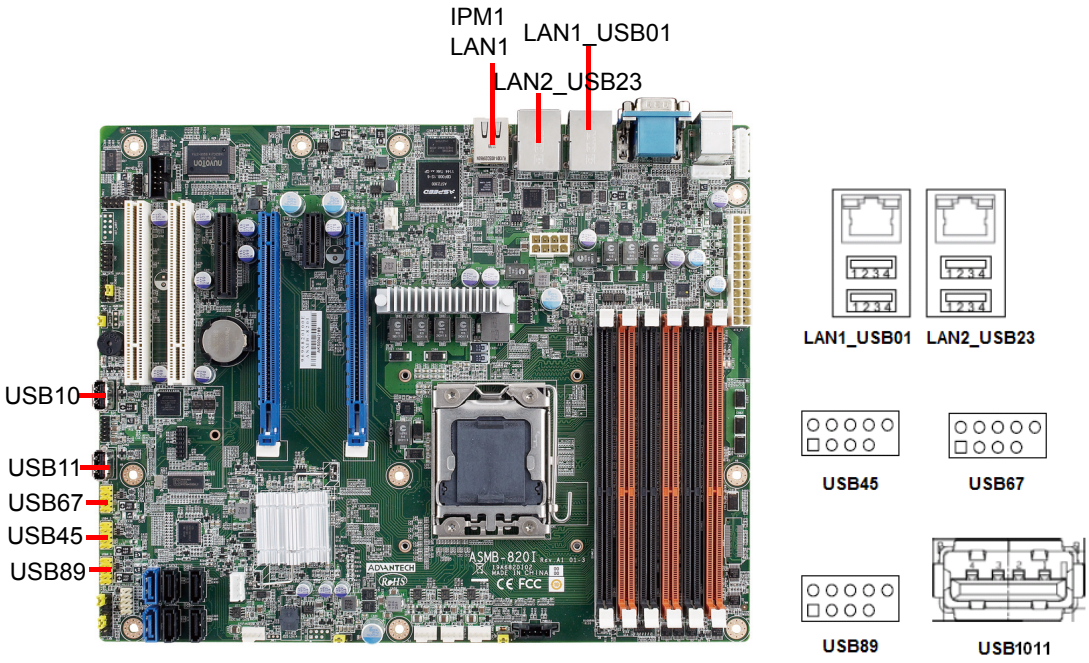
You can access most of the connectors from the top of the board as it is being installed in the chassis. If you have a number of cards installed, you may need to partially remove a card to make all the connections.

2.2 USB Ports and LAN Ports (USB0~USB11/LAN1/LAN2/IPMI_LAN1)

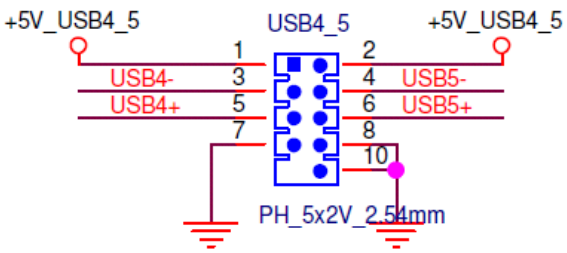
The USB ports comply with USB specification rev. 2.0. Transmission rates of up to 480 Mbps and fuse protection are supported. The USB interface can be disabled in the system BIOS setup.

The ASMB-820I is equipped with two high-performance 1000 Mbps Ethernet LANs. They are supported by all major network operating systems. The RJ-45 jacks on the rear plate provide convenient 1000Base-T operation.

ASMB-820I is also equipped with the additional 100 Mbps Ethernet LAN (IPMI_LAN1 Port) which is shared with IPMI for system management.

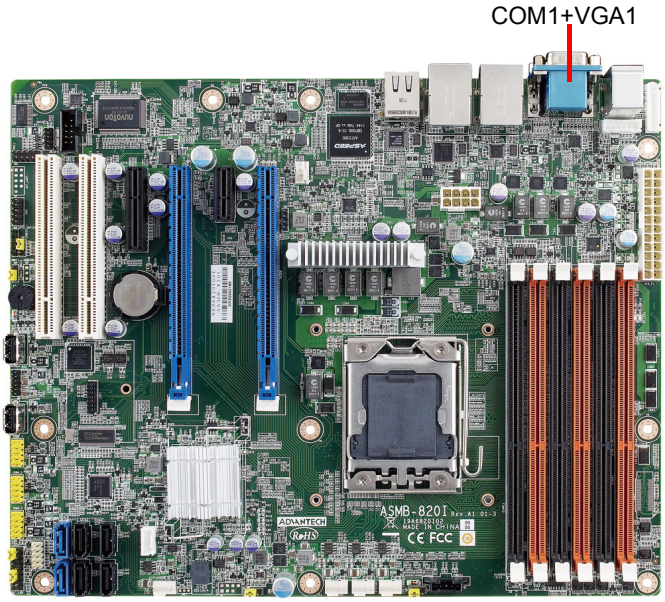


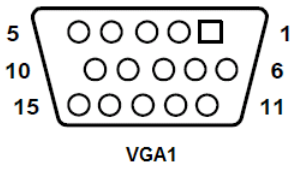
Example: Set USB45 (pin definitions are the same as USB67 & USB89)



2.3 VGA Connector

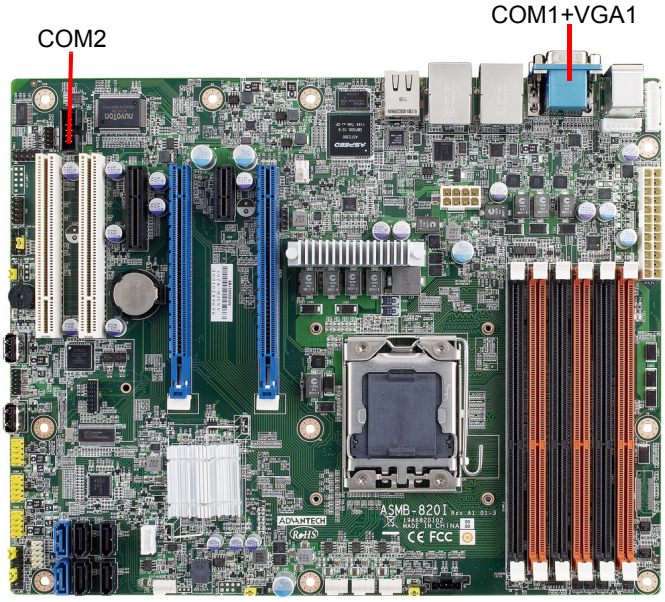
The ASMB-820I includes a VGA interface that can drive conventional CRT and LCD displays.

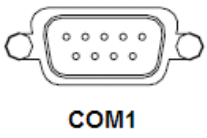




2.4 Serial Ports (COM1/COM2)

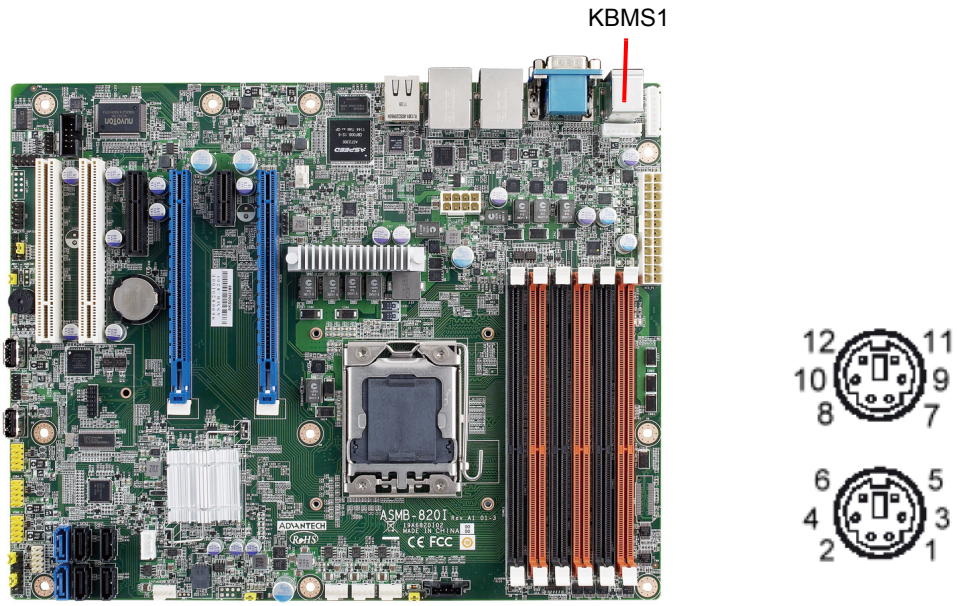
The ASMB-820I offers 2 serial ports (One on the rear panel and one onboard).





2.5 PS2 Keyboard and Mouse Connectors (KBMS1)

Two 6-pin mini-DIN connectors (KBMS1) on the rear panel of the motherboard provide PS/2 keyboard and mouse connections.



2.6 CPU Fan Connector (CPU FAN0)

If a fan is used, this connector supports cooling fans that draw up to 500 mA (6 W).

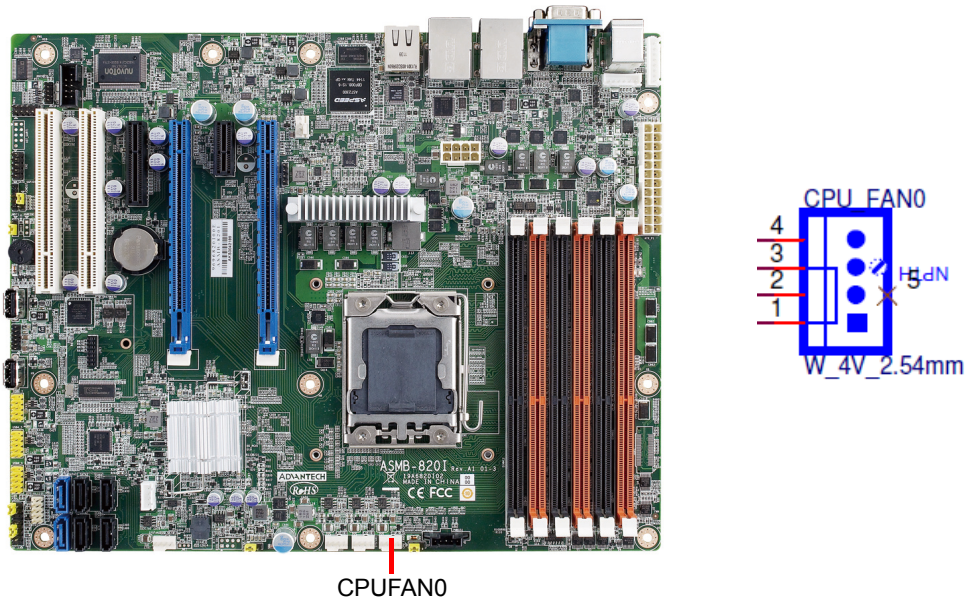
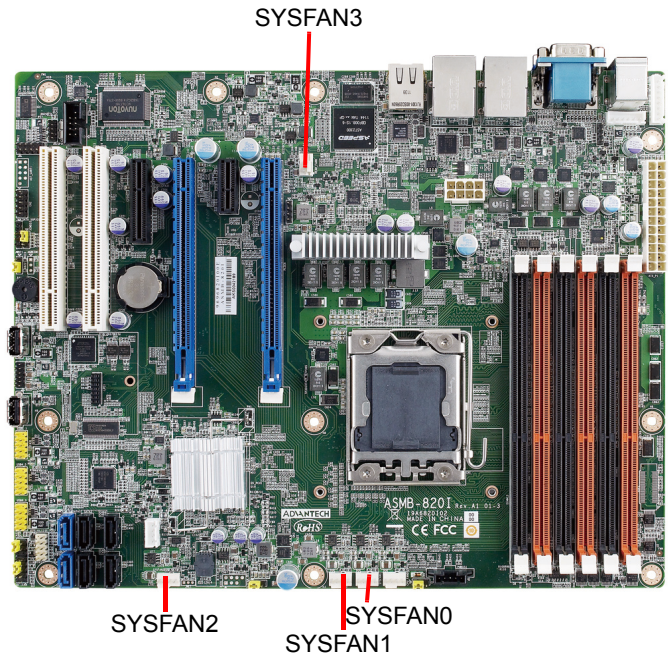


Table 2.1: CPU FAN0 Pin Definition	
	CPU FAN0
1	GND
2	+12V
3	CPU0_TACH
4	CPU0_PWM

2.7 System Fan Connector (SYS FAN0/FAN1/FAN2/FAN3)



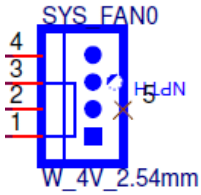
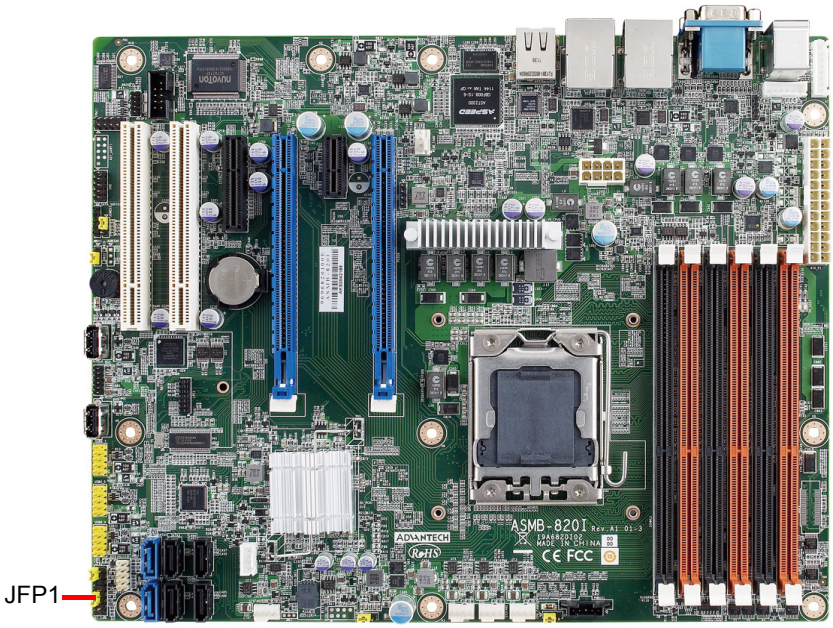


Table 2.2: SYS FAN0 Pin Definition				Table 2.3:
	SYS FAN0	SYS FAN1	SYS FAN2	SYS FAN3
1	GND	GND	GND	GND
2	+12V	+12V	+12V	+12V
3	FAN0_TACH	FAN1_TACH	FAN2_TACH	FAN3_TACH
4	FAN0_PWM	FAN1_PWM	FAN2_PWM	FAN3_PWM

2.8 Front Panel Connector (JFP1)

There are several external switches and LEDs to monitor and control the ASMB-820I.



JFP1

2	4	6	8	10	12	14	16
1	3	5	7	9	11	13	15

RSTBTN	Case Open	SPEAKER	
PWRBTN	HDDLED	PWRLED	NC

2.8.1 Power LED (JFP1)

JFP1 pin 9 and pin 13 are for the power LED. Refer to Appendix B for detailed information on the pin assignments. If an ATX power supply is used, the system's power LED status will be as indicated as follows.

Table 2.4: ATX Power Supply LED Status

Power mode	LED (ATX power)
System On	On
System Suspend	Fast flashes
System Off	Off

2.8.2 External Speaker (JFP1 pins 10, 12, 14, 16)

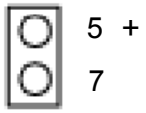
JFP1 pins 10, 12, 14, 16 connect to an external speaker. The ASMB-820I provides an onboard buzzer as an alternative. To enable the buzzer, set pins 14-16 closed.

10 12 14 16

\+ -

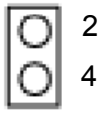
2.8.3 HDD LED Connector (JFP1 Pins 5 & 7)

You can connect an LED to connector JFP1 to indicate when the HDD is active.



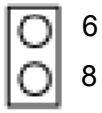
2.8.4 Reset Connector (JFP1 Pins 2 & 4)

Many computer cases offer the convenience of a reset button.

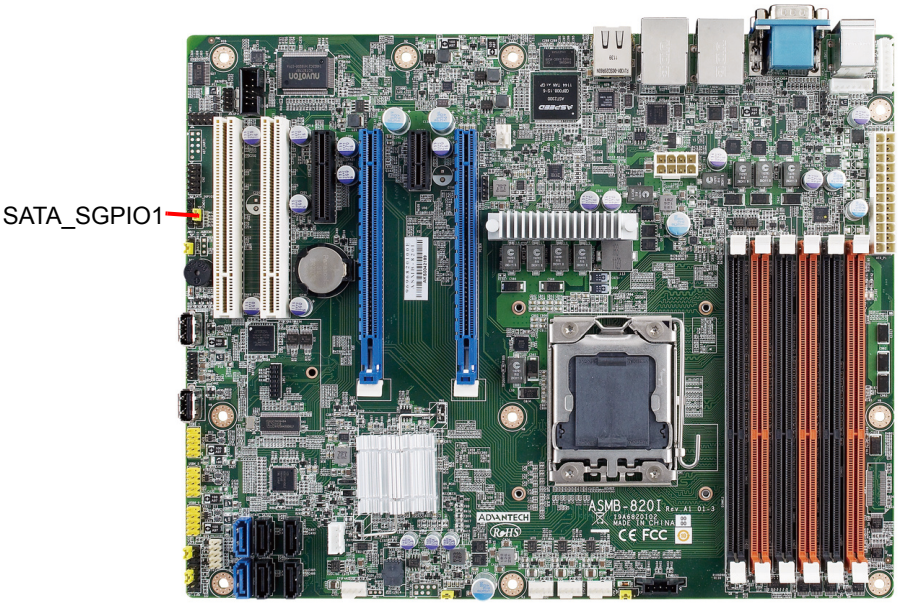


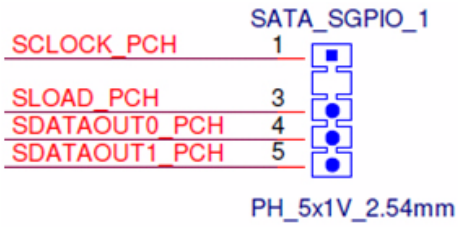
2.8.5 Case Open (JFP1 Pins 6 & 8)

A Chassis Intrusion header is located at JFP1 on the motherboard. Attach the appropriate cable from the chassis to be informed of a chassis intrusion when the chassis is opened.

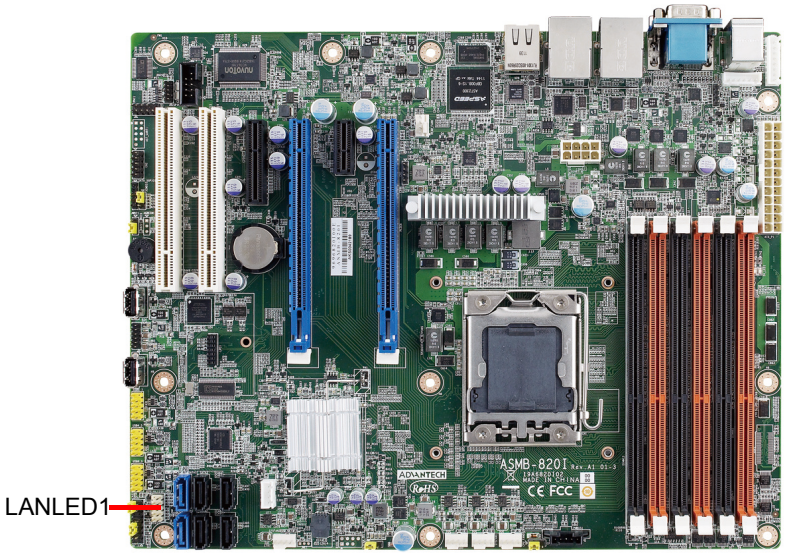


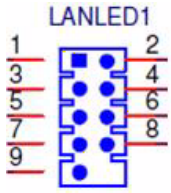
2.9 SATA SGPIO (SATA_SGPIO1)





2.10 Front Panel LAN Indicator Connector (LANLED1)

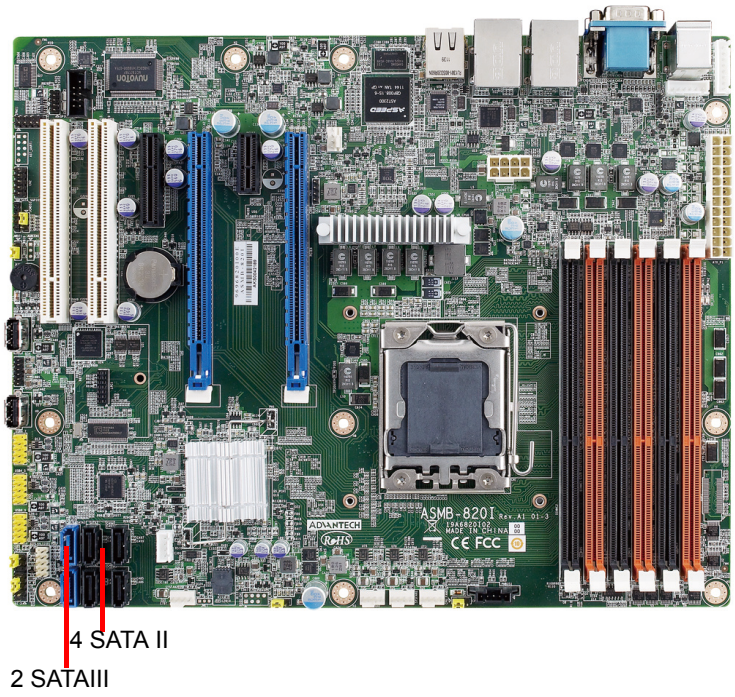




1	LAN1_LED0_ACT	2	LAN2_LED1_ACT
3	VCC3_LAN1LED	4	VCC3_LAN2LED
5	LAN1_LED1_1000M	6	LAN2_LED2_1000
7	LAN1_LED2_100M	8	LAN2_LED0_100
9	VCC3	10	NC

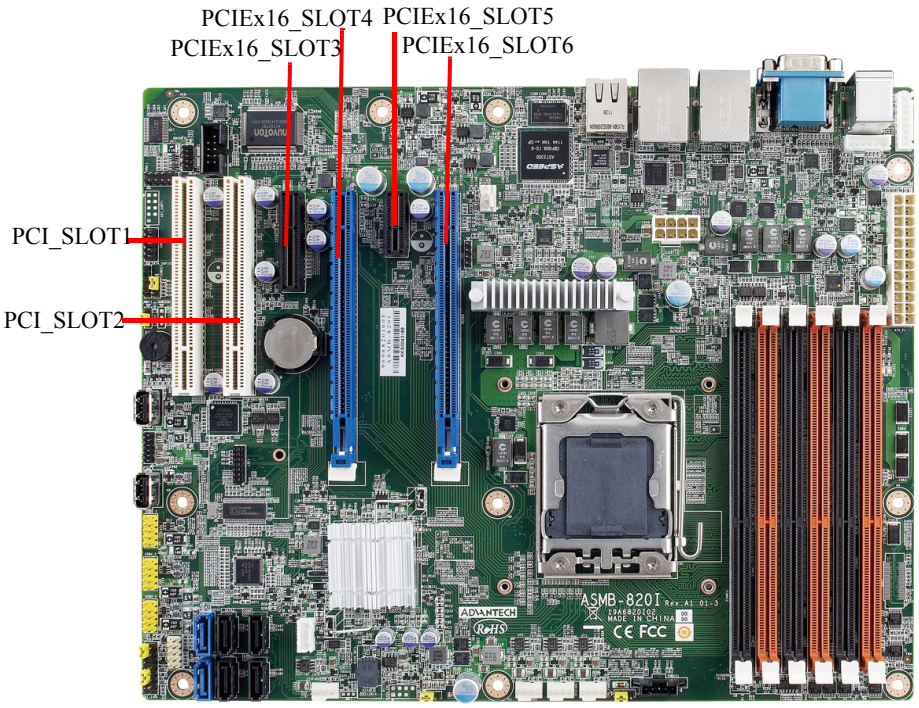
2.11 Serial ATA Interface (SATA0 ~ 5)

ASMB-820I features two serial ATA III (SATA 0 & SATA 1) interfaces (up to 600 MB/s) and four serial ATA II (SATA 2 ~ SATA 5) interfaces (up to 300 MB/s) which ease cabling to hard drives with thin and long cables.

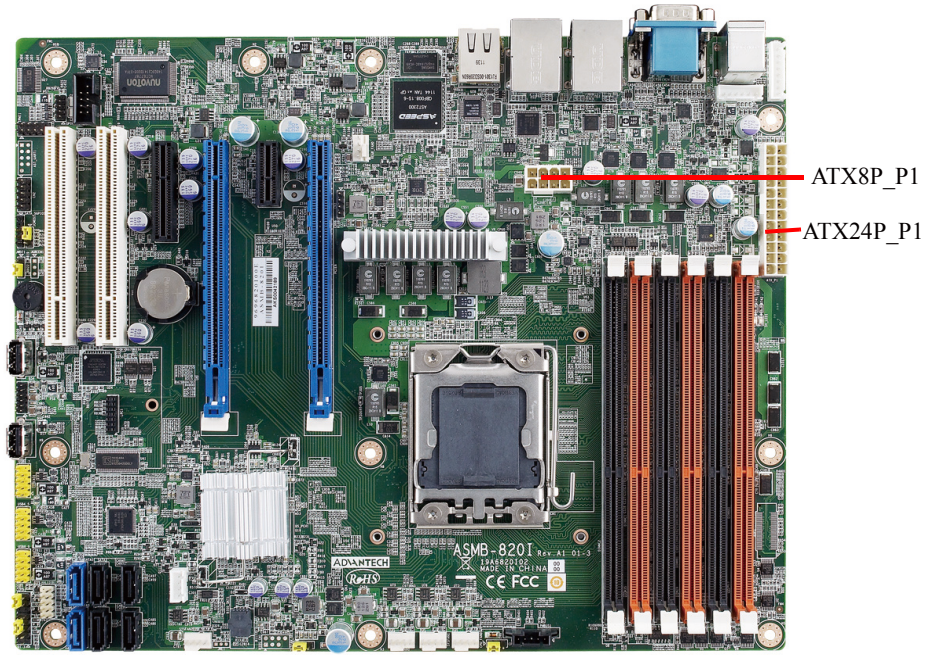


2.12 Expansion Slots

The ASMB-820I provides multi-interface expansion slots.



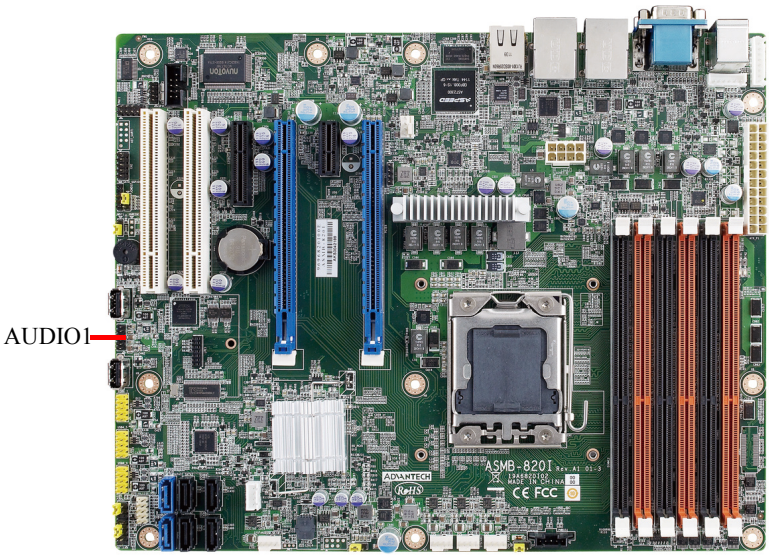
2.13 Auxiliary Power Connector (ATX_8P_P1/ ATX_24P_P1)

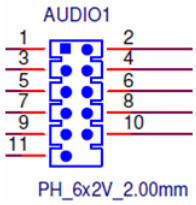


Note!

1. *Please use a power supply which is of SSI type; minimum output should be at least 596W.*
2. *ATX 8P_P1 & ATX 24P_P1 sockets should be connected with power supply, otherwise ASMB-820I will not boot up normally.*

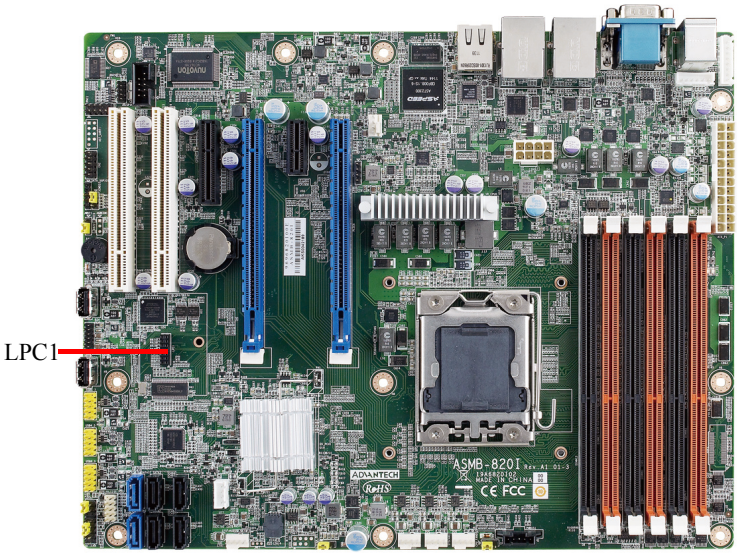
2.14 HD Audio Interface Connector (AUDIO1)

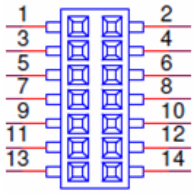




1	+5 V_AUD	2	GND
3	ACZ_SYNC	4	ACZ_BITCLK
5	ACZ_SDOUT	6	ACZ_SDIN0
7	ACZ_SDIN1	8	ACZ_RST#
9	+AC_12V	10	GND
11	GND	12	NC

2.15 LPC Connector (LPC1) for Optional TPM Module

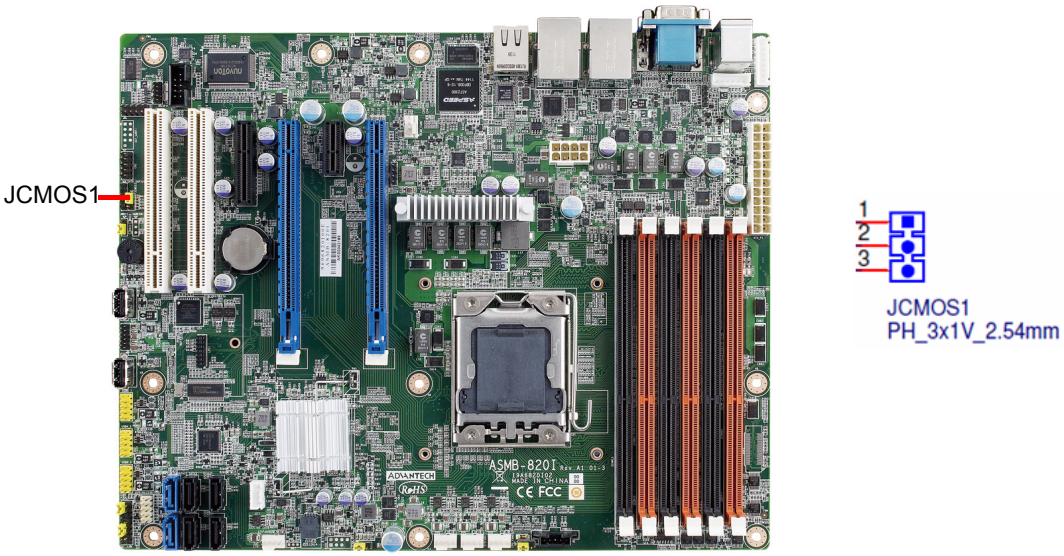




1	CLK_33M_TPM	2	LPC_AD1
3	PLTRST_LPC	4	LPC_AD0
5	LPC_FRAME	6	+3.3 V
7	LPC_AD3	8	GND
9	LPC_AD2	10	SMB_SCL_LPC
11	SERIRQ_PCH	12	SMB_SDA_LPC
13	+5V_AUX	14	+5V

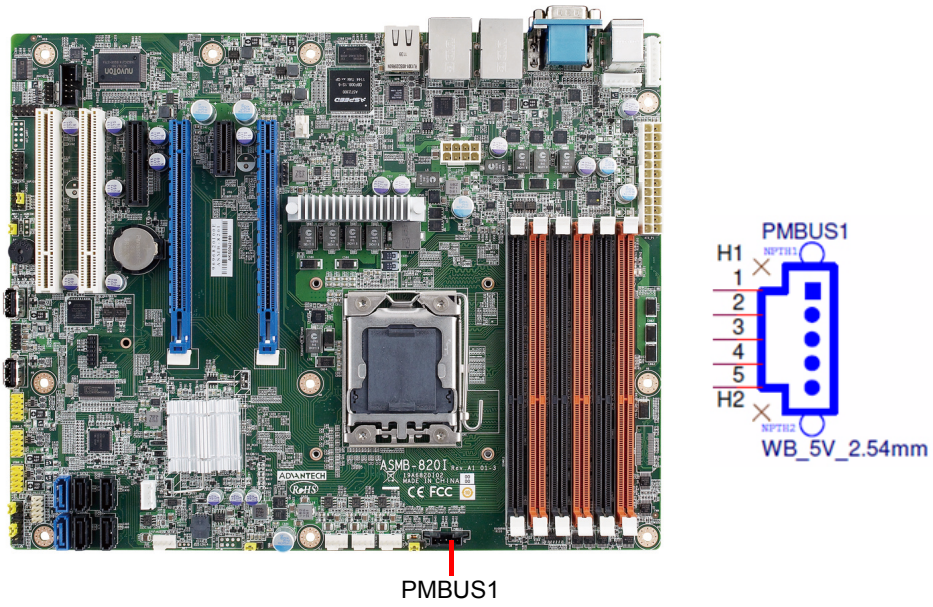
2.16 Clear CMOS Connector (JCMOS1)

Setting jumper from pin 1_2 to pin 2_3,then back to pin 1_2 to reset CMOS data.



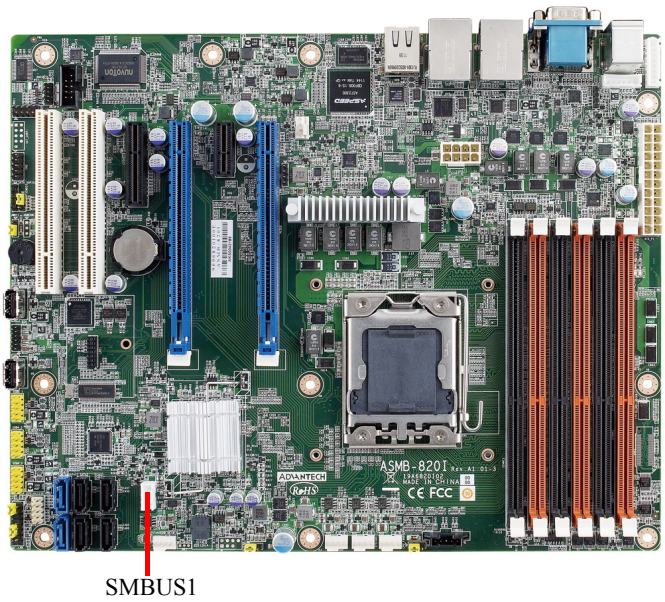
1	SRTC_RST_PCH
2	RTC_RST_PCH
3	GND

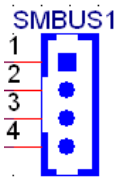
2.17 PMBUS Connector (PMBUS1)



1	SMB_SCL_PM
2	SMB_SDA_PM
3	SMB_ALT_PM
4	GND
5	+3.3V

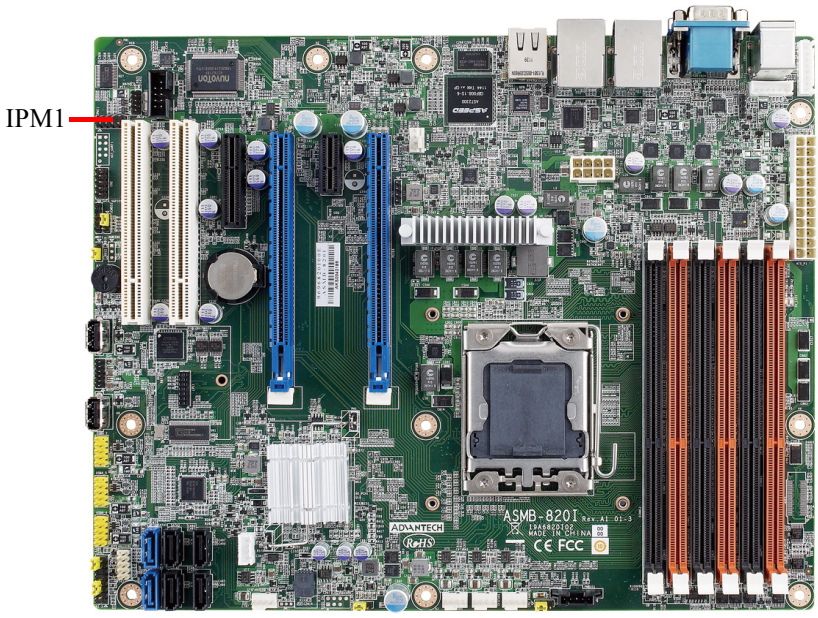
2.18 Front Panel SMBUS Connector (SMBUS1)





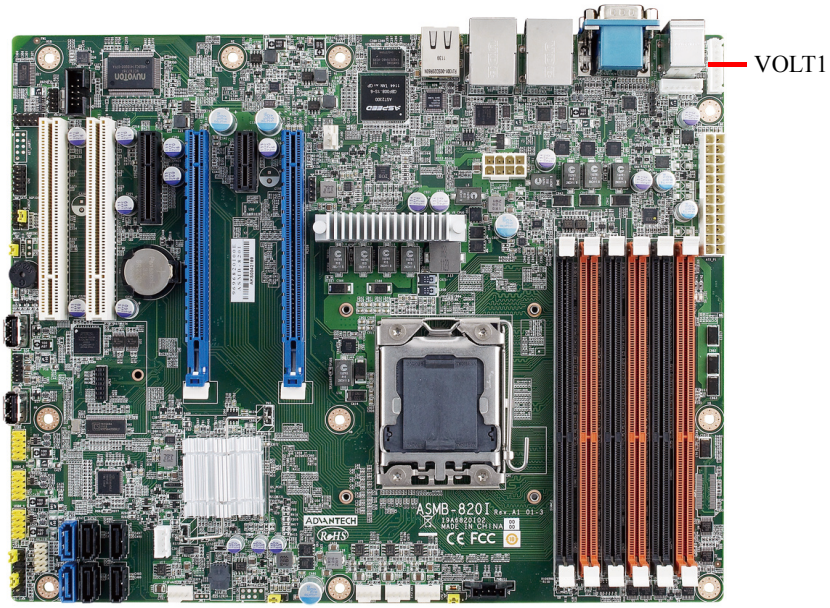
1	+3.3V_AUX
2	SMB_SCL_FRU
3	SMB_SDA_FRU
4	GND

2.19 IPMI Module Connector (IPMI1)*

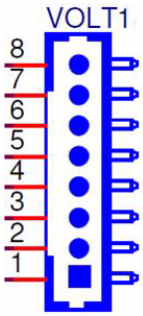


Note! *To enable IPMI, you must buy an IPMI module made by Advantech.*

2.20 VOLT1 Connector



VOLT1 connects to the alarm board of Advantech chassis. These alarm boards give warnings if a power supply or fan fails, if the chassis overheats, or if the backplane malfunctions.



1	5VSB	5	+5V
2	GND	6	+3.3V
3	GND	7	-12V
4	-5V	8	+12V

Chapter 3

AMI BIOS

3.1 Introduction

AMI BIOS has been integrated into many motherboards for over a decade. In the past, people often referred to the AMI BIOS setup menu as BIOS, BIOS setup or CMOS setup. 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 the ASMB-820I setup screens.

AMI's BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This type of information is stored in battery-backed up CMOS so it retains the Setup information when the power is turned off.

Note! *The BIOS setup screens shown in this chapter are just for reference only, it may not exactly match what you see on your display devices.*

3.2 BIOS Setup

3.2.1 Main Menu

Press <Del> to enter AMI BIOS CMOS 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 the sub-menu.

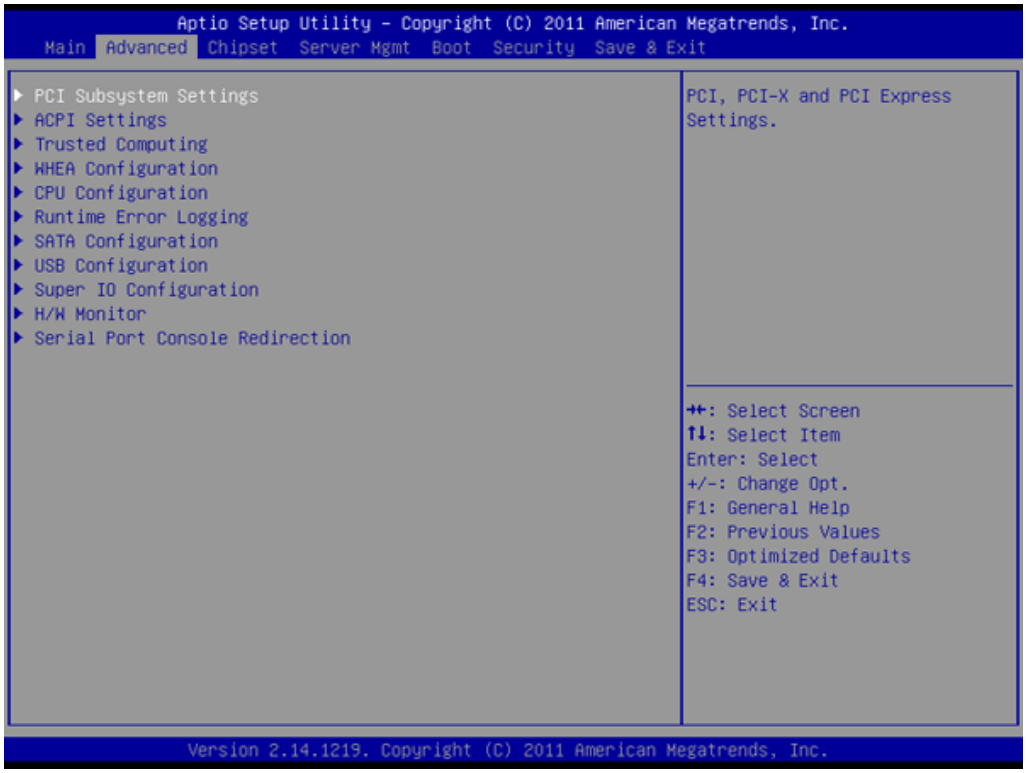
The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can be. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

3.2.1.1 System Time / System Date

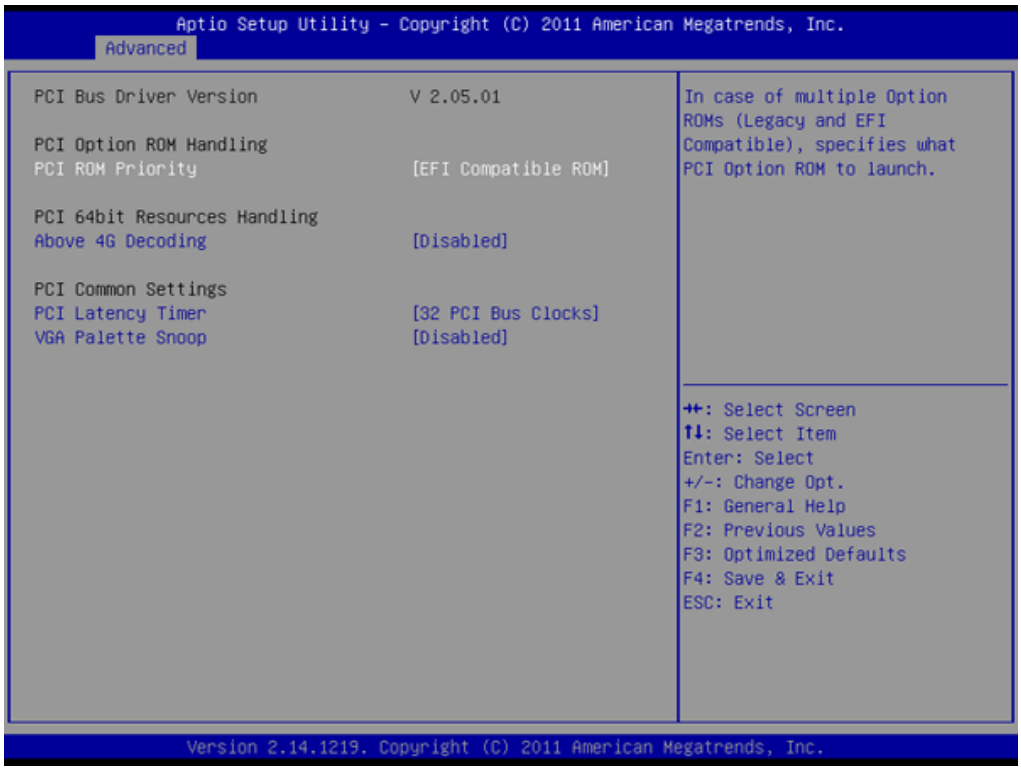
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

3.2.2 Advanced BIOS Features Setup

Select the Advanced tab from the ASMB-820I 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.



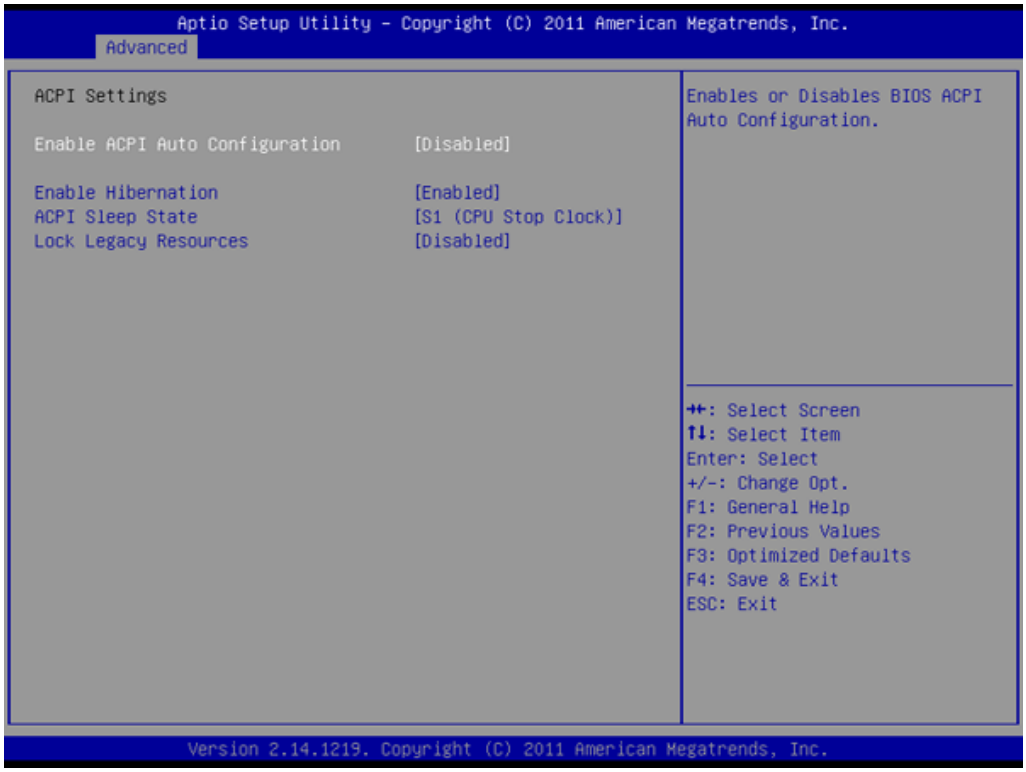
3.2.2.1 PCI Subsystem Settings



- **PCI ROM Priority**
  Default setting is EFI Compatible mode. In case PCI legacy Option ROM required, you can change the mode from EFI to Legacy.

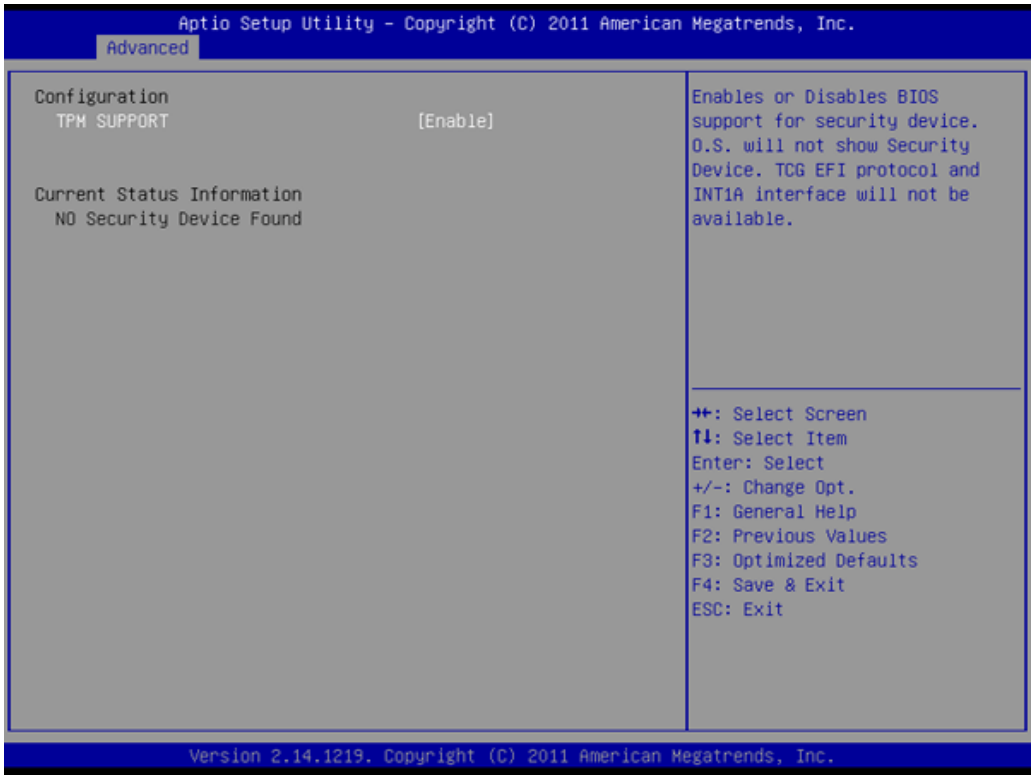
- **Above 4G Decoding**
  Enables or disables 64-bit capability. Devices to be decoded above 4G Address Space (Only if the system supports 64-bit PCI decoding).
- **PCI Latency Timer**
  Value in units of PCI clocks for PCI device latency timer register.
- **VGA Palette Snoop**

3.2.2.2 ACPI Settings



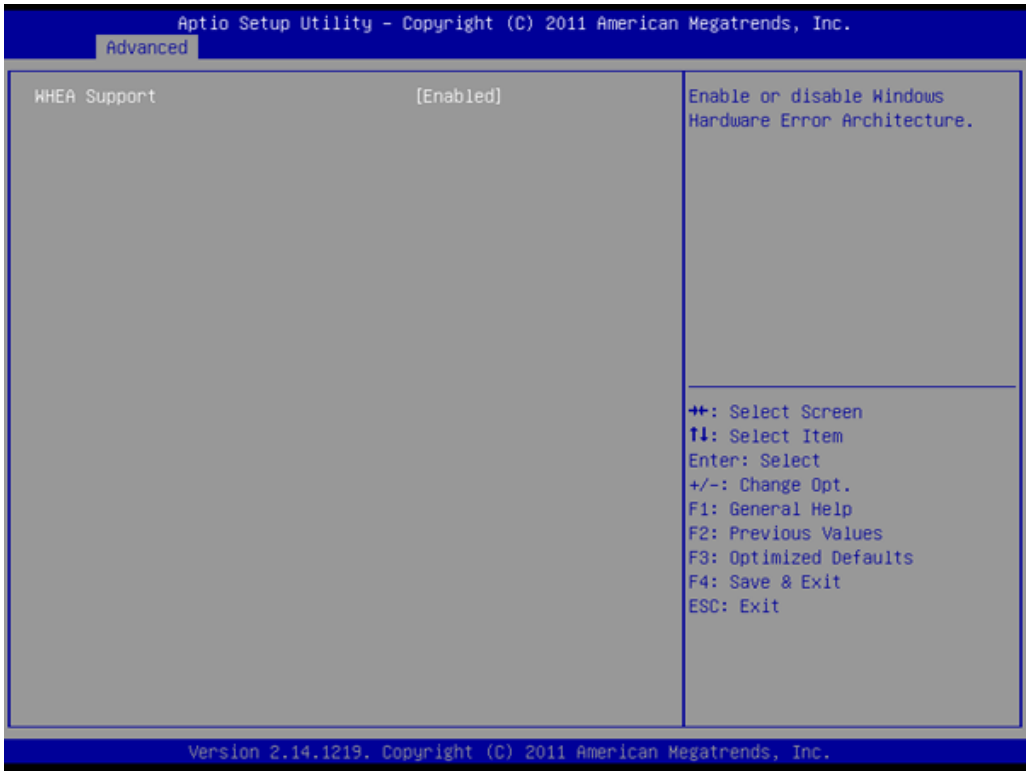
- **Enable ACPI Auto Configuration**
  "Enable or disable" ACPI auto configuration.
- **Enable Hibernation**
  "Enable or disable" hibernation.
- **ACPI Sleep State**
  Specifies the ACPI sleep state when the system enters suspend.
- **Lock Legacy Resources**
  "Enabled" or "Disabled" lock legacy resources.

3.2.2.3 Trusted Computing



- **TPM Support**
  "Enable or disable" TPM support. Purchase Advantech LPC TPM module to enable TPM function. P/N: PCA-TPM-00A1E.

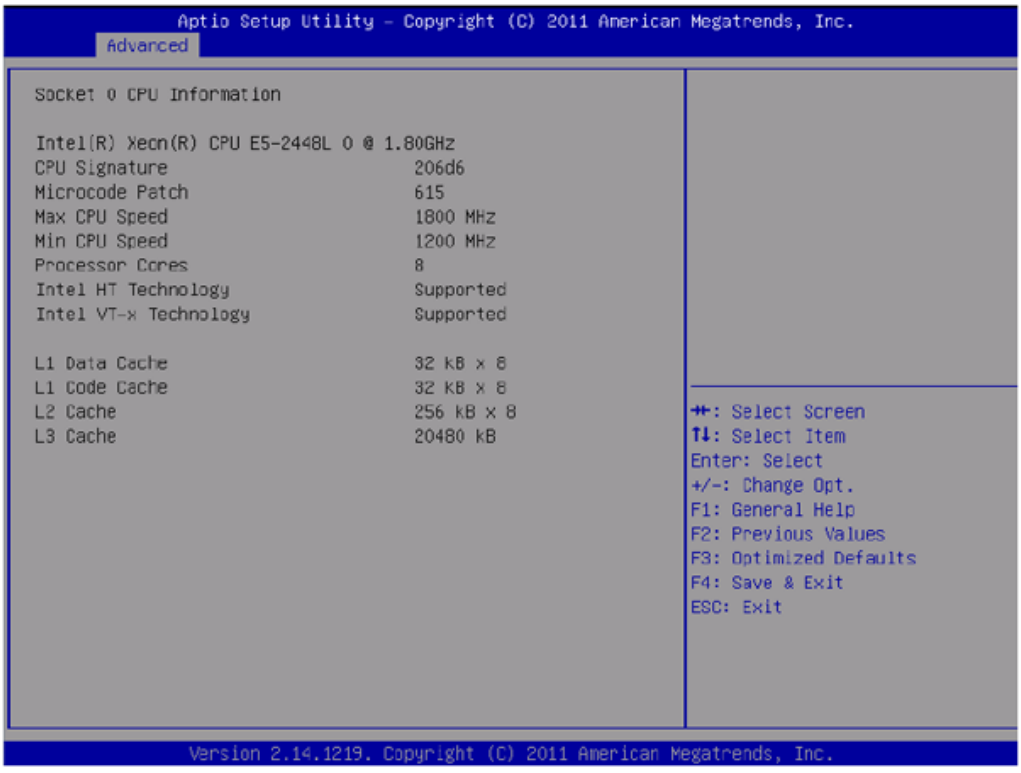
3.2.2.4 WHEA Support



- **WHEA Support**
  "Enable or disable" Windows Hardware Error Architecture.

3.2.2.5 CPU Configuration

- **Socket 0 CPU Information**



- **Hyper-threading**
  Enable or disable Intel Hyper Threading technology.
- **Active Processor Core**
  Select how many processor cores to activate when 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.

- **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. Set to enable or disable.

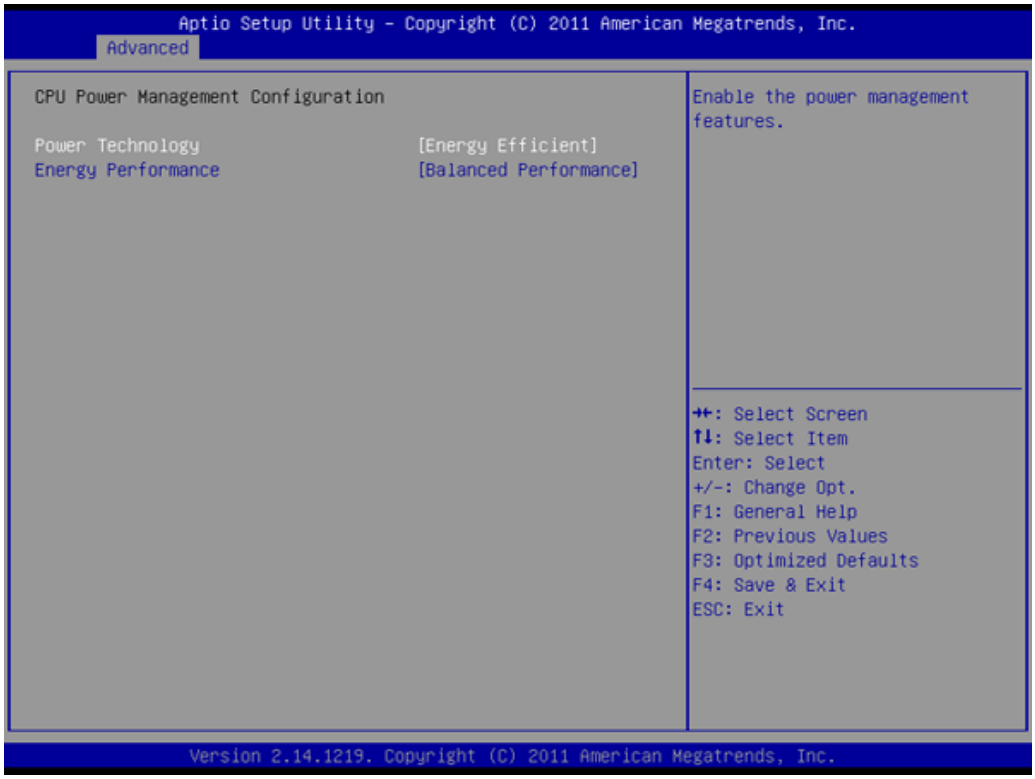
- **Adjacent Cache Line Prefetch**

  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. Set to enable or disable.

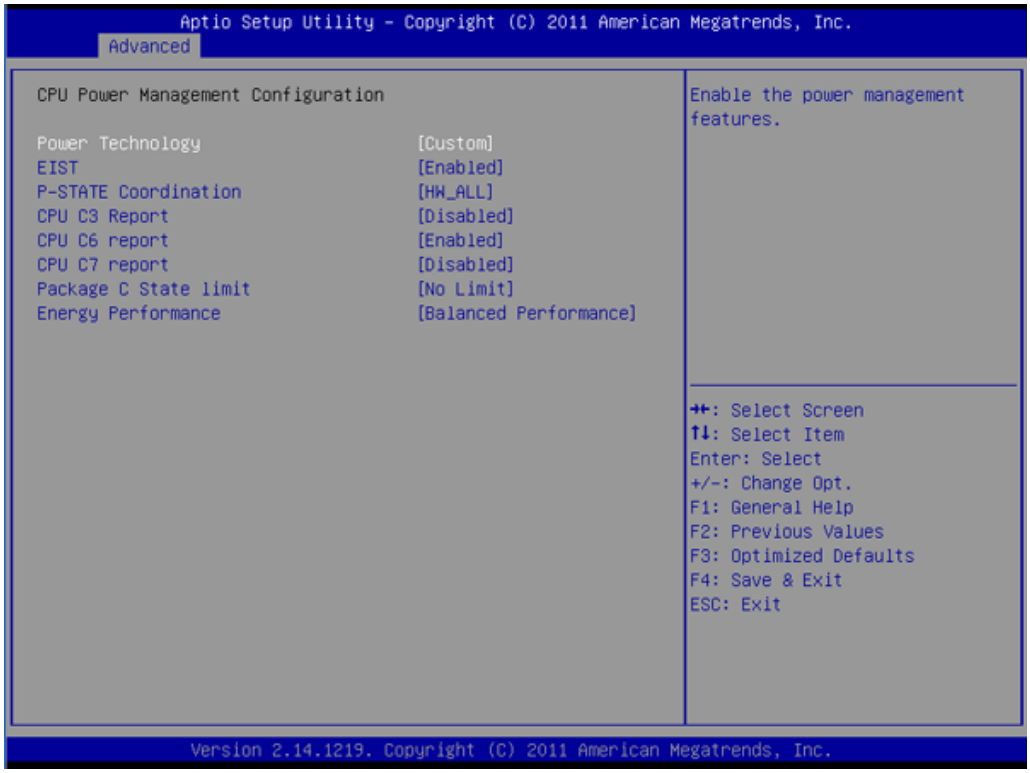
- **DCU Streamer Prefetch**
- **DCU IP Prefetcher**
- **Intel Virtualization Technology**

  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.

- **CPU Power Management Configuration**



Power technology default is “Energy Efficient”.

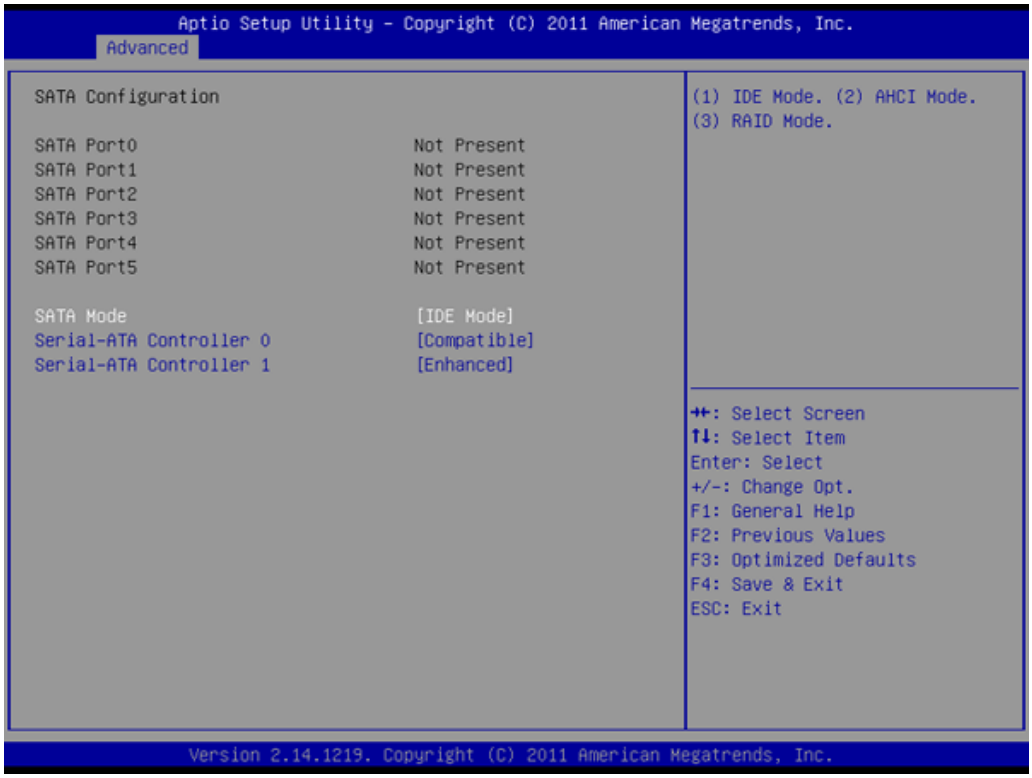


User can set “EIST”, “P-STATE”, “C3”, “C6”, “C7”, “Package C State limit” under “Custom” Mode.

3.2.2.6 Runtime Error Logging

User can enable or disable Runtime Error Logging Support.

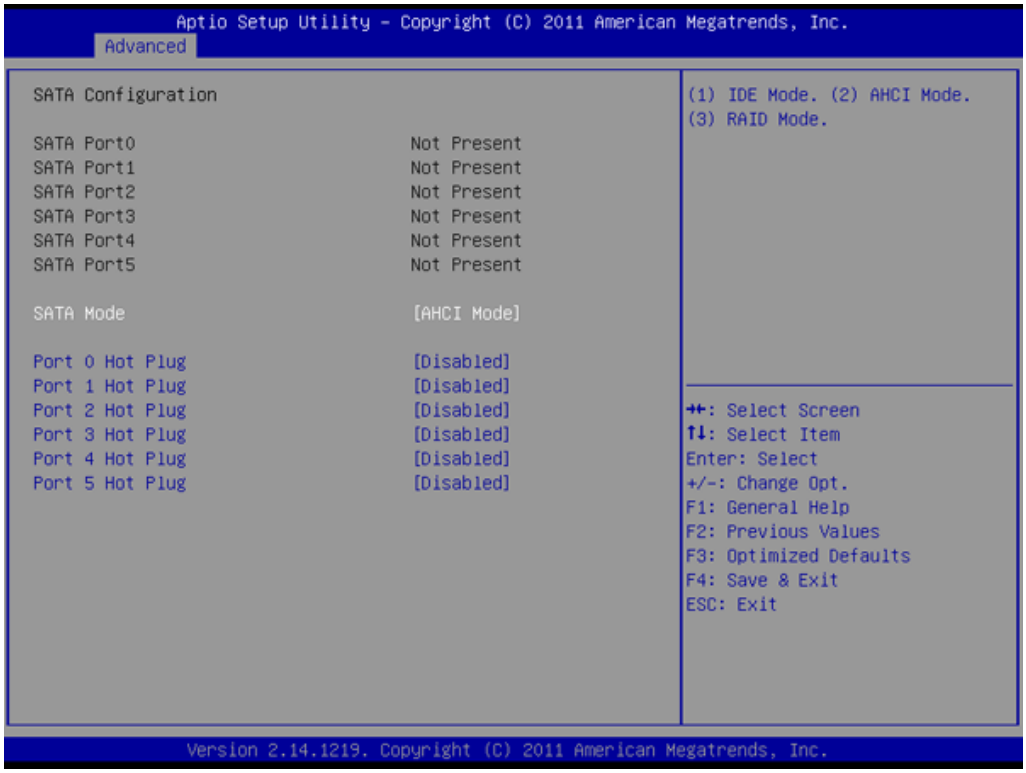
3.2.2.7 SATA Configuration



- **SATA Mode**
  Configured as IDE/RAID/AHCI or disabled.

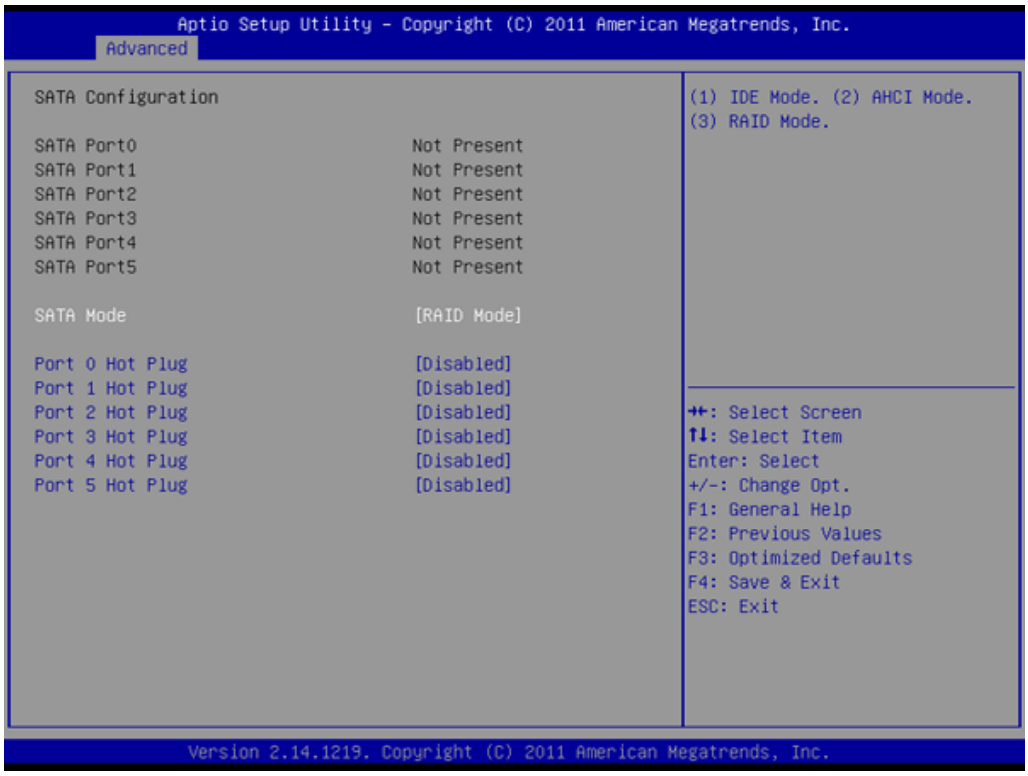
- **IDE Mode**
  Serial-ATA Controller 0
  This item appears only when SATA Mode item set to [IDE Mode]. Set to [Enhanced] to support two SATA 6.0 Gb/s and four SATA 3.0 Gb/s devices. Set to [Compatible] when using Windows 98/NT/2000/MS-DOS. Up to four SATA devices are supported by controller 0 and two SATA devices are supported by controller 1 when under these operating systems.
  Serial-ATA Controller 1
  This item appears only when SATA Mode item to [IDE Mode] is set. Set to [Enhanced] to support two SATA 3.0 Gb/s devices.

Serial-ATA Controller 1



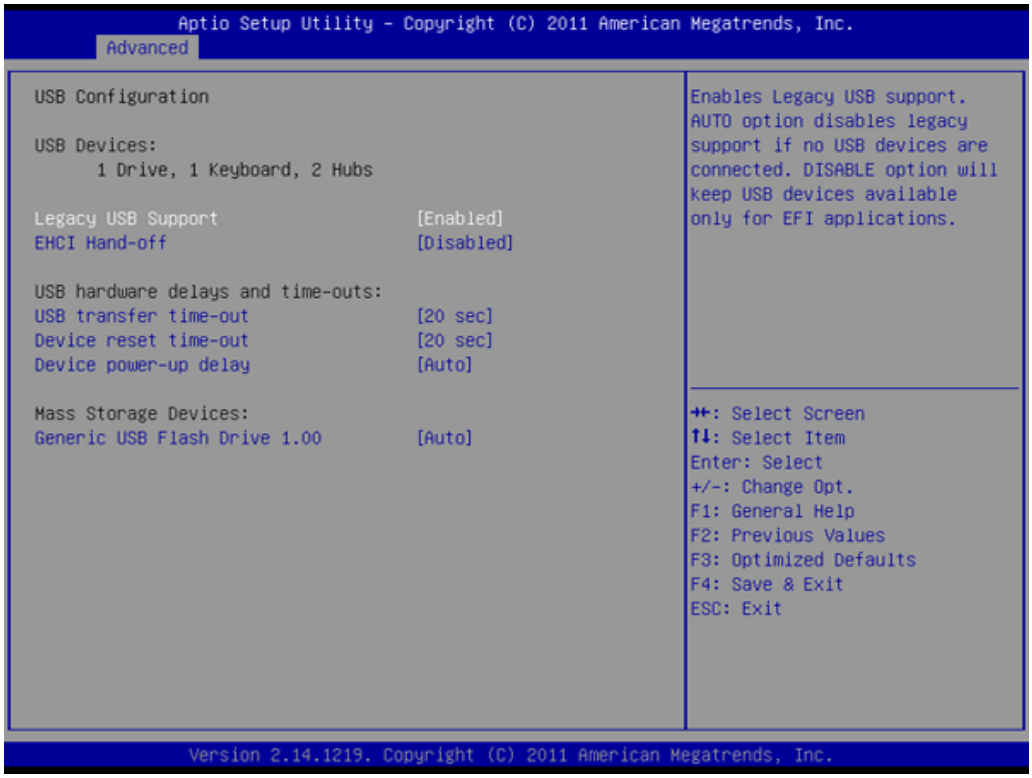
Set to [AHCI Mode] to have the SATA hard disk drives use the AHCI (Advanced Host Controller Interface). The AHCI allows the onboard storage driver to enable advanced Serial ATA features that increases storage performance on random workloads by allowing the drive to internally optimize the order of commands.

RAID Mode



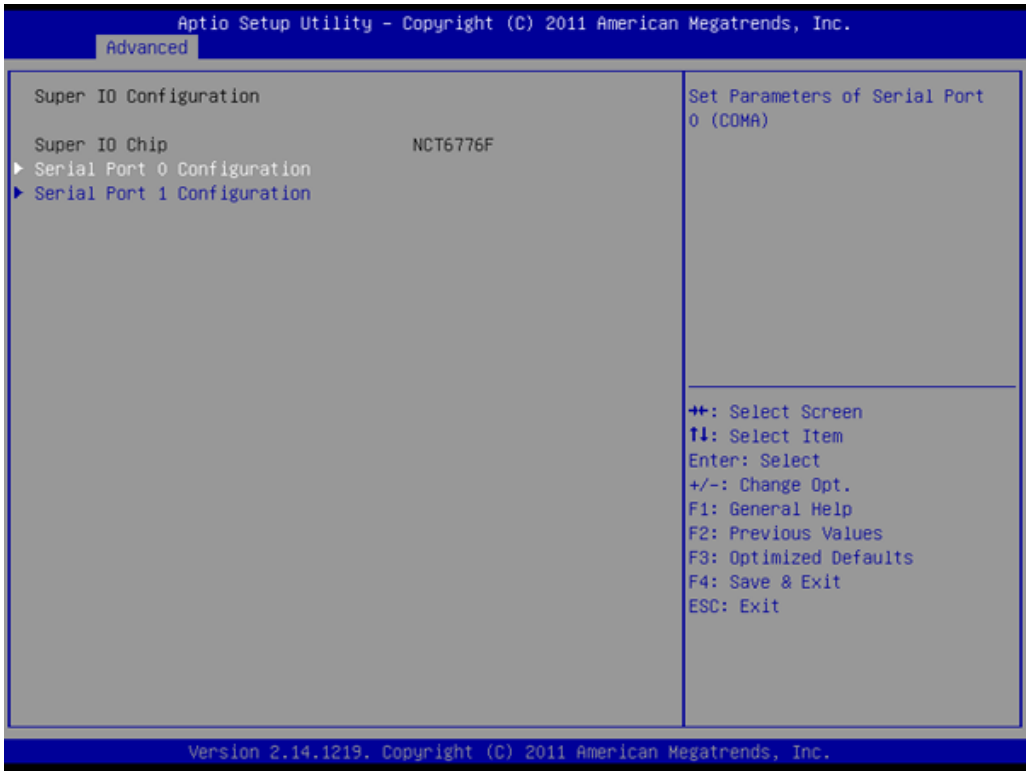
Set to [RAID Mode] to create a RAID configuration from the SATA hard disk drives.

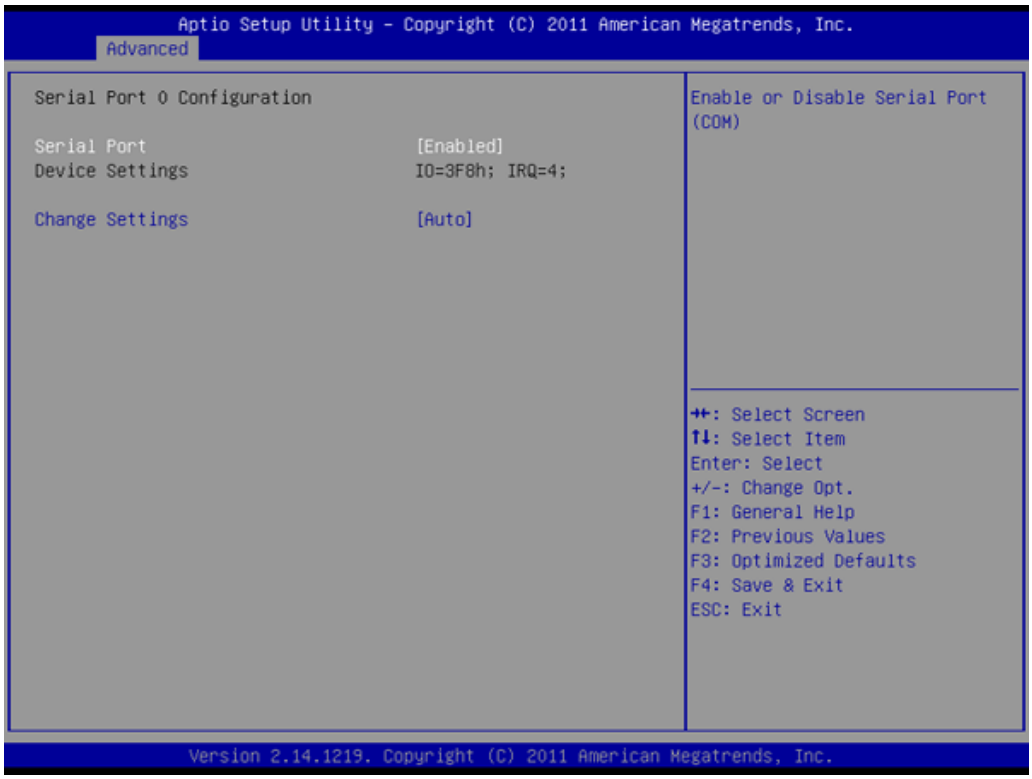
3.2.2.8 USB Configuration



- **Legacy USB Support**
  This is for supporting USB devices under a 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 in and disable USB legacy mode when no USB devices are plugged in.
- **EHCI Hand-off**
  Enables or disables supporting an OS without EHCI hand-off feature.
- **USB Transfer Time-out**
  Selects the USB transfer time-out value. [1,5,10,20sec]
- **Device Reset Time-out**
  Selects the USB device reset time-out value. [10,20,30,40 sec]
- **Device Power-up Delay**
  This item appears only when Device power-up delay item is set to [manual].
- **Mass Storage Devices**
  This item appears only when plugging in a USB flash device. Users can choose “Auto”, “Floppy”, “Forced FDD”, “Hard Disk” and “CD-ROM” to simulate USB flash devices.

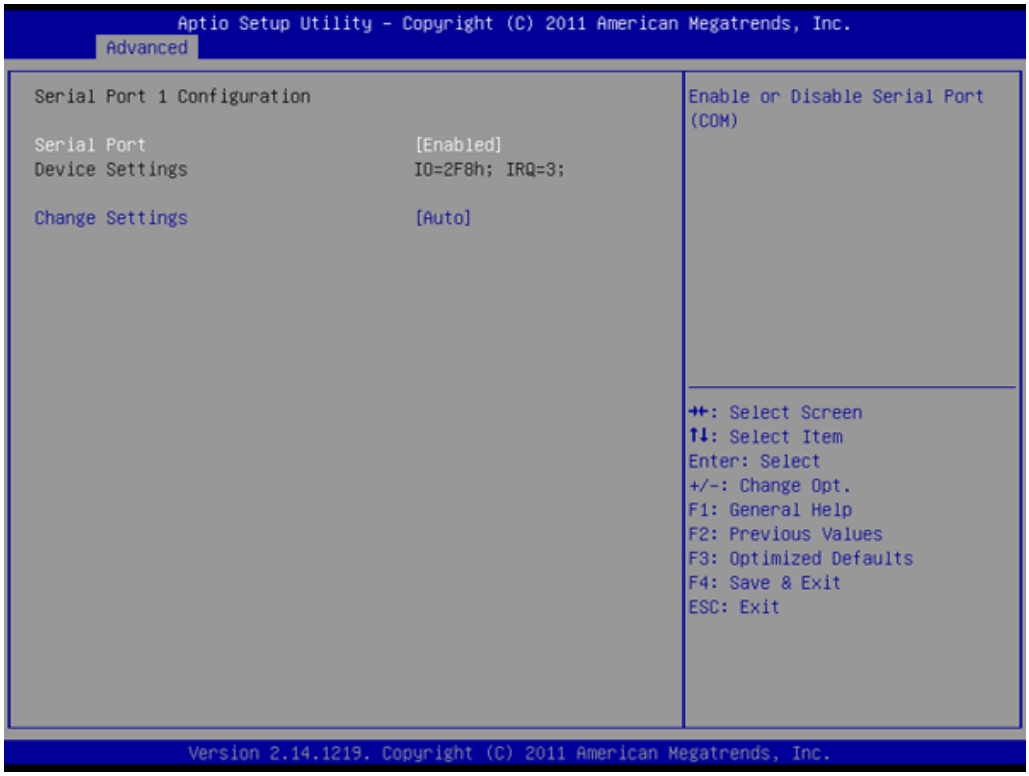
3.2.2.9 Super I/O Configuration





Serial Port 0 Configuration

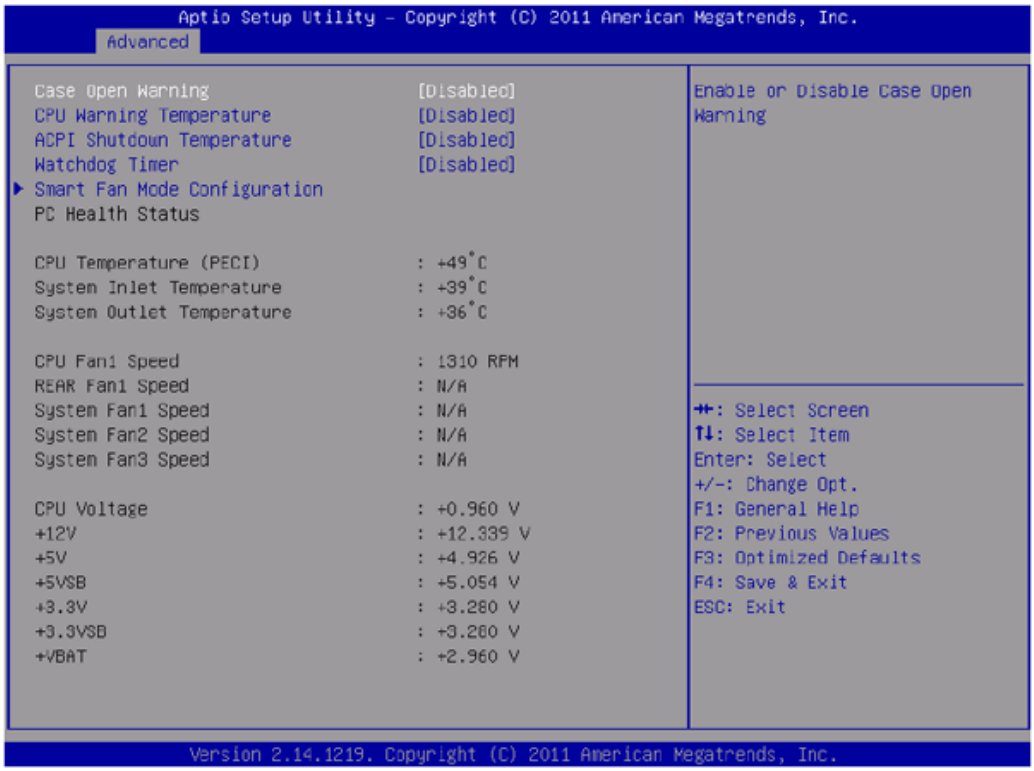
- **Serial Port**
  To “enable” or “disable” Serial Port 0.
- **Change Settings**
  To select an optimal setting for serial port 0.



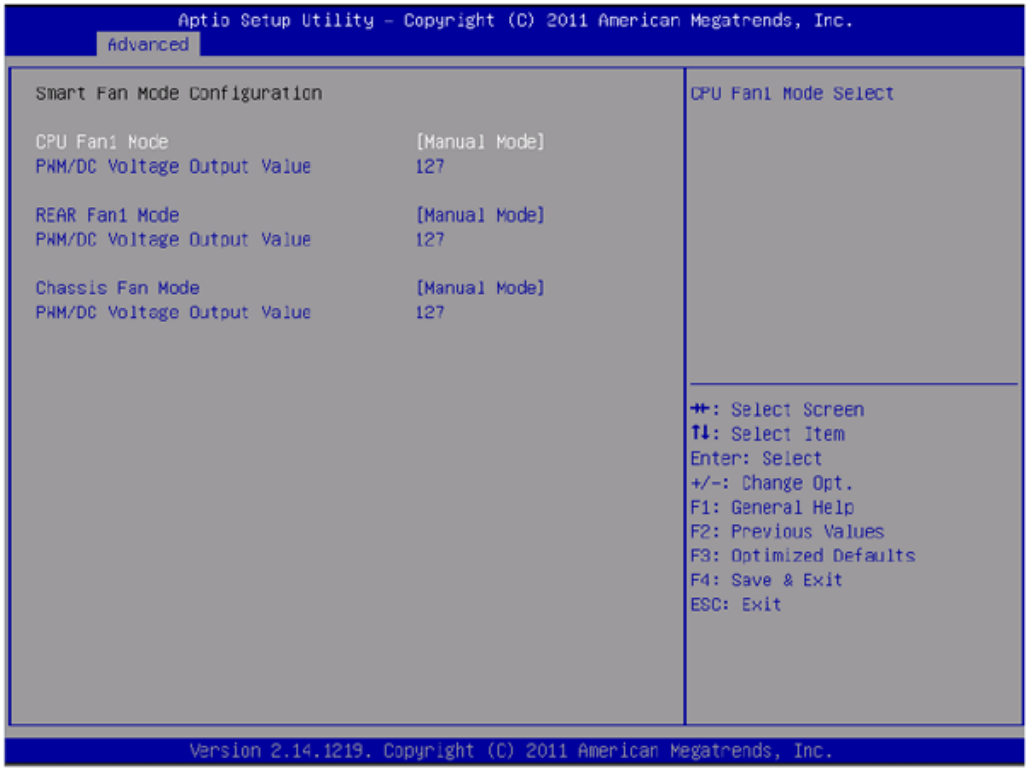
Serial Port 1 Configuration

- **Serial Port**
  To “enable” or “disable” Serial Port 1.
- **Change Settings**
  To select an optimal setting for serial port 1.

3.2.2.10 H/W Monitor



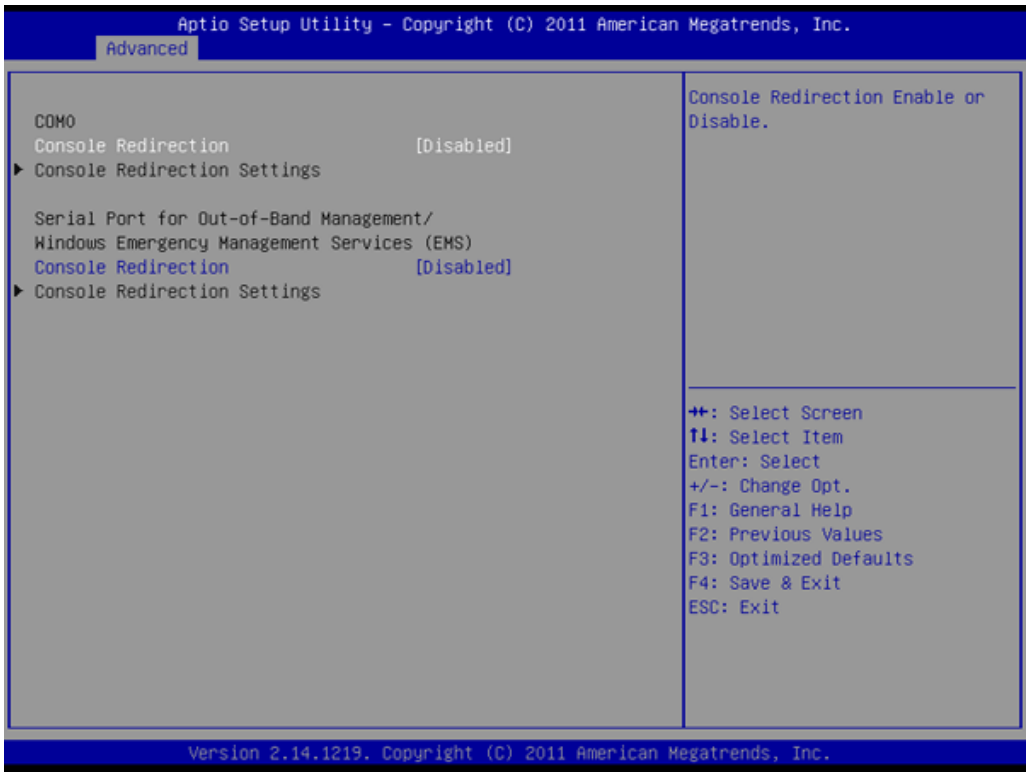
- **Case Open Warning**
  Enable/Disable the Chassis Intrusion monitoring function. When enabled and the case is opened, the warning message will show in post screen.
- **CPU Warning Temperature**
  Set the CPU warning temperature threshold. When the system reaches the warning temperature, the speaker will beep.
- **ACPI Shutdown Temperature**
  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 overheat damage.
- **Watchdog Timer**
  Enable and Disable the watchdog timer function.
- **Smart Fan Mode Configuration**
  When set to manual mode, fan duty setting can be set; the range is from 0~255, default setting is 127.



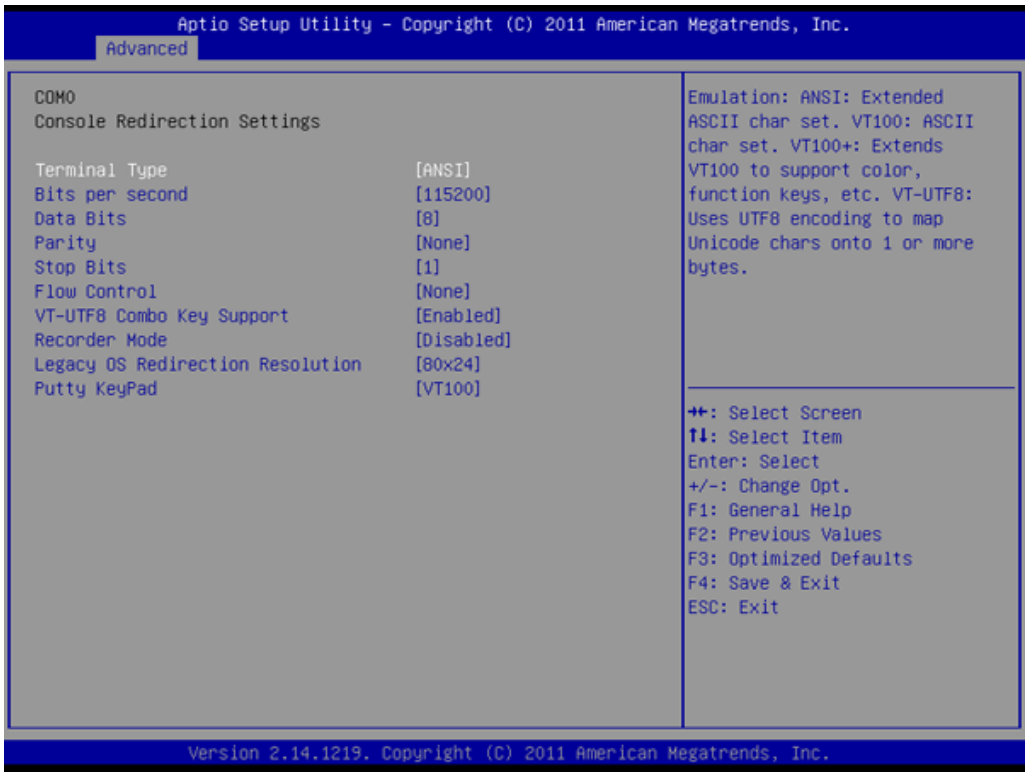
3.2.2.11 Serial Port Console Redirection

- **Console Redirection**

  To “Enable or disable" console redirection feature,



- **Console Redirection Settings**



- **Terminal Type**

  Select a terminal type to be used for console redirection.
  Options available: VT100/VT100+/ANSI /VT-UTF8.

- **Bits Per Second**
  Select the baud rate for console redirection.
  Options available: 9600/19200/57600/115200.
- **Parity**
  A parity bit can be sent with the data bits to detect some transmission errors.
  Even: parity bit is 0 if the num of 1's in the data bits is even.
  Odd: parity bit is 0 if num of 1's the data bits is odd.
  Mark: parity bit is always 1. Space: Parity bit is always 0.
  Mark and Space Parity do not allow for error detection.
  Options available: None/Even/Odd/Mark/Space.
- **Stop Bits**
  Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning).
  The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.
  Options available: 1/2.
- **Flow Control**
  Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.
  Options available: None/Hardware RTS/CTS.
- **Recorder Mode**
  With this mode enabled, only text will be sent. This is to capture Terminal data.
  Options available: Enabled/Disabled.
- **Legacy OS Redirection Resolution**
  On Legacy OS, the number of Rows and Columns supported redirection.
  Options available: 80x24/80X25.
- **Putty Keypad**

- **Console Redirection Setting**

  Out-of-Band Mgmt Port

  Used to select the COM port a user would like to set for having console redirection.

  Terminal Type

  Set as "VT100", "VT100+", "VT-UTF8", or "ANSI". "VT-UTF8" is the default setting.

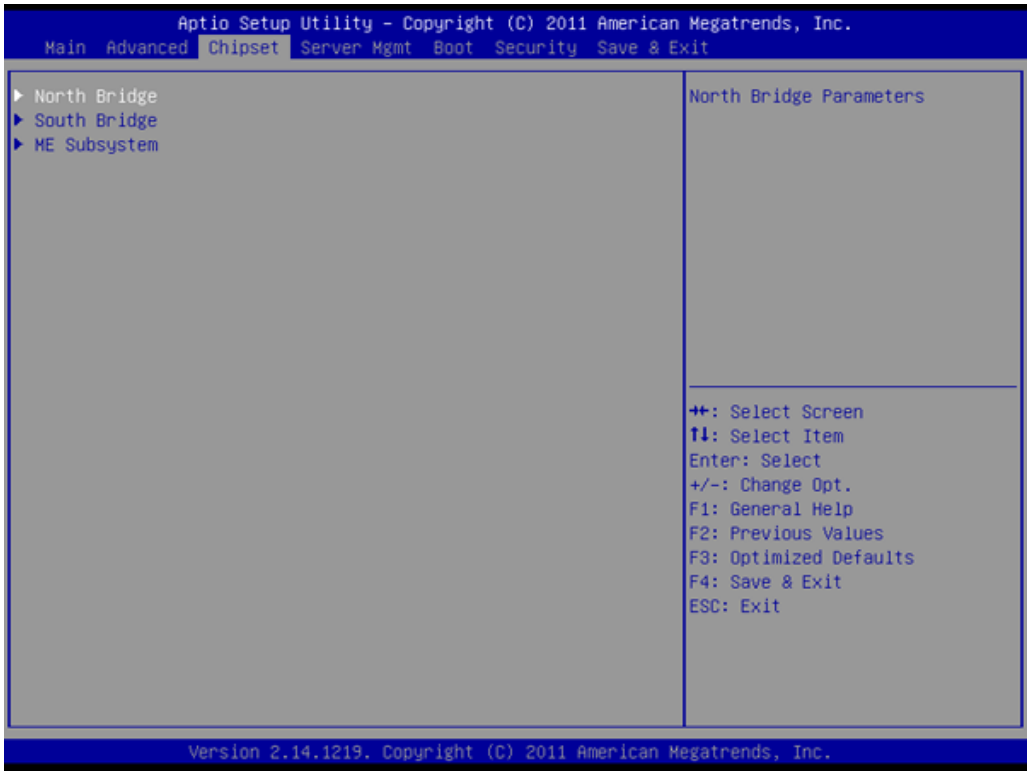
  Bits Per Second

  To select serial port transmission. Speed must be matched on the other side. It can be set as "9600", "19200", "57600", or "115200". "115200" is the default setting.

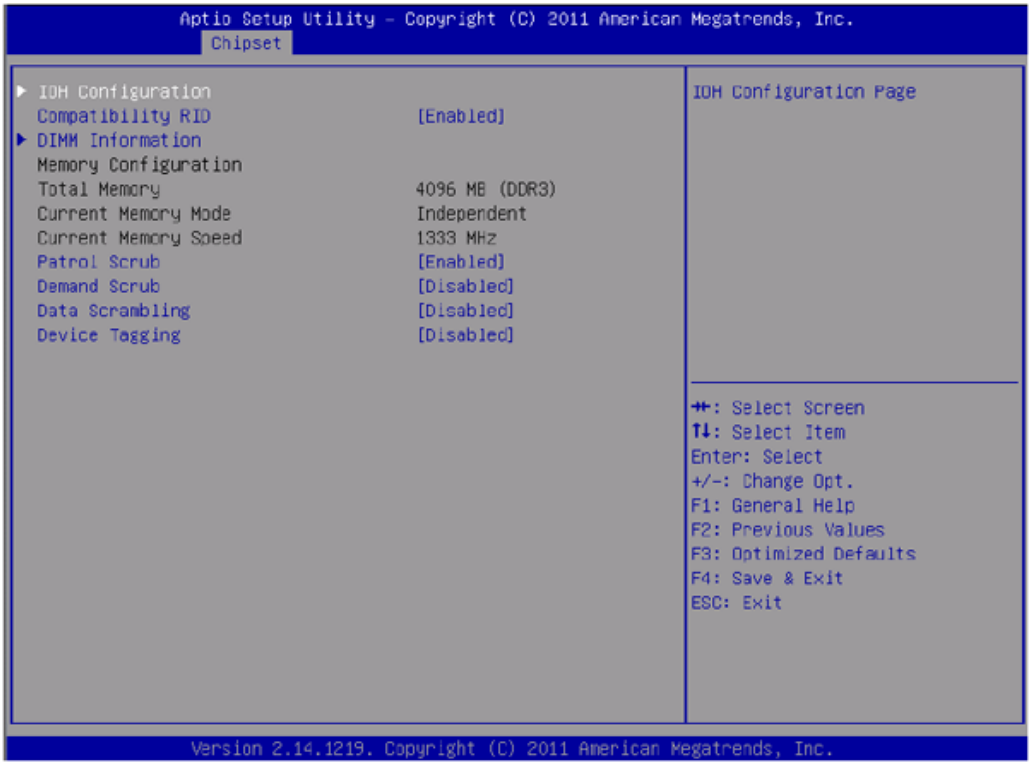
  Flow Control

  Flow control can prevent data loss from buffer overflow. It can be set as "None", "Hardware RTS/CTS", or "Software Xon/Xoff". "None" is the default setting.

3.2.3 Chipset



3.2.3.1 North Bridge



Patrol Scrub

Enable/Disable patrol scrub feature

Demand Scrub

Enable/Disable demand scrub feature

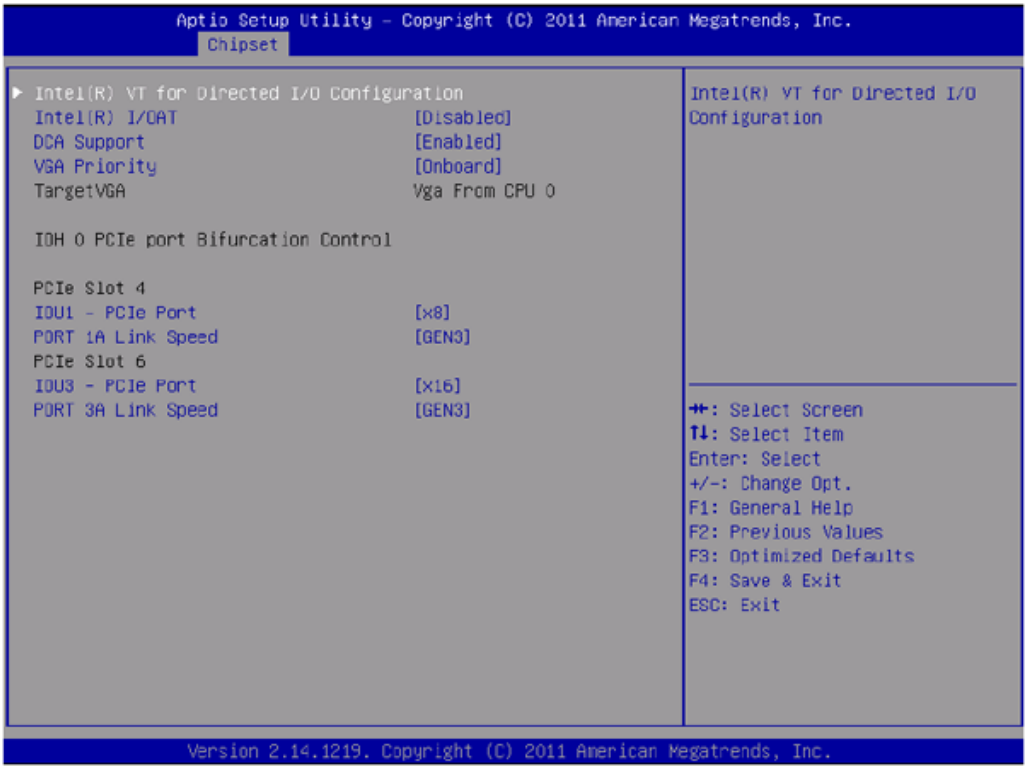
Data Scrambling

Enable/Disable data scrambling

Device Tagging

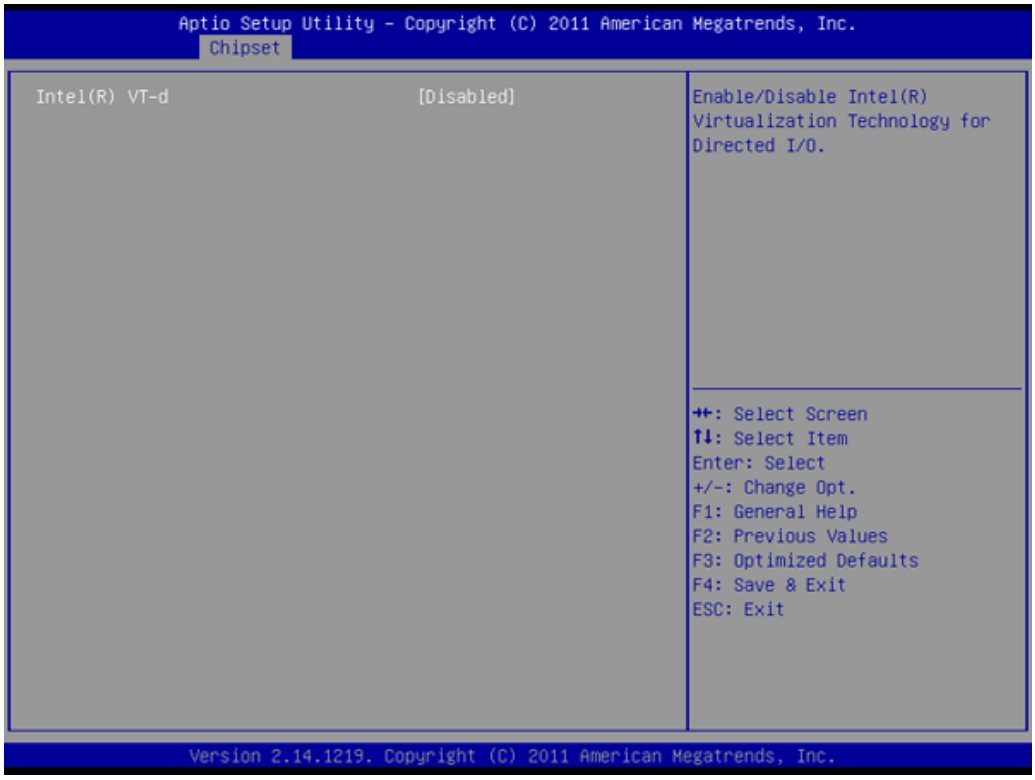
Enable/Disable device tagging

IOH Configuration



- **Intel I/OAT**
  Enable/Disable Intel I/O Acceleration Technology function.
- **DCA Support**
  Enable/Disable Direct Cache Access Support
- **VGA Priority**
  Determines priority between onboard and 1st offboard video device found.
- **IOU 0 PCIe port Bifurcation control**
  IOU1 - PCIe Port(PCIEX16_SLOT4)
  Functions visible based on this setting : x4x4, x8,
  PORT 2A Link Speed
  Select Target Link Speed Gen1, Gen2, Gen3
  IOU3 - PCIe Port(PCIEX16_SLOT6)
  Functions visible based on this setting : x4x4x4x4, x4x4x8, x8x4x4, x8x8,
  x16PORT 3A Link Speed
  Select Target Link Speed Gen1, Gen2, Gen3

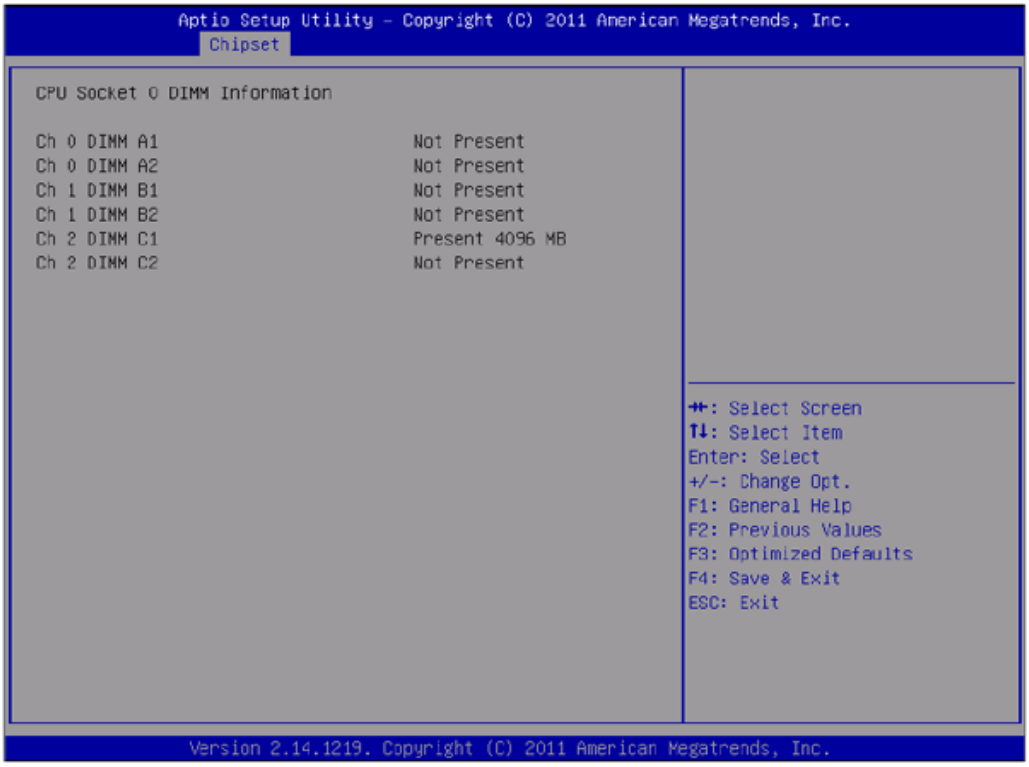
Intel(R) VT for Directed I/O Configuration



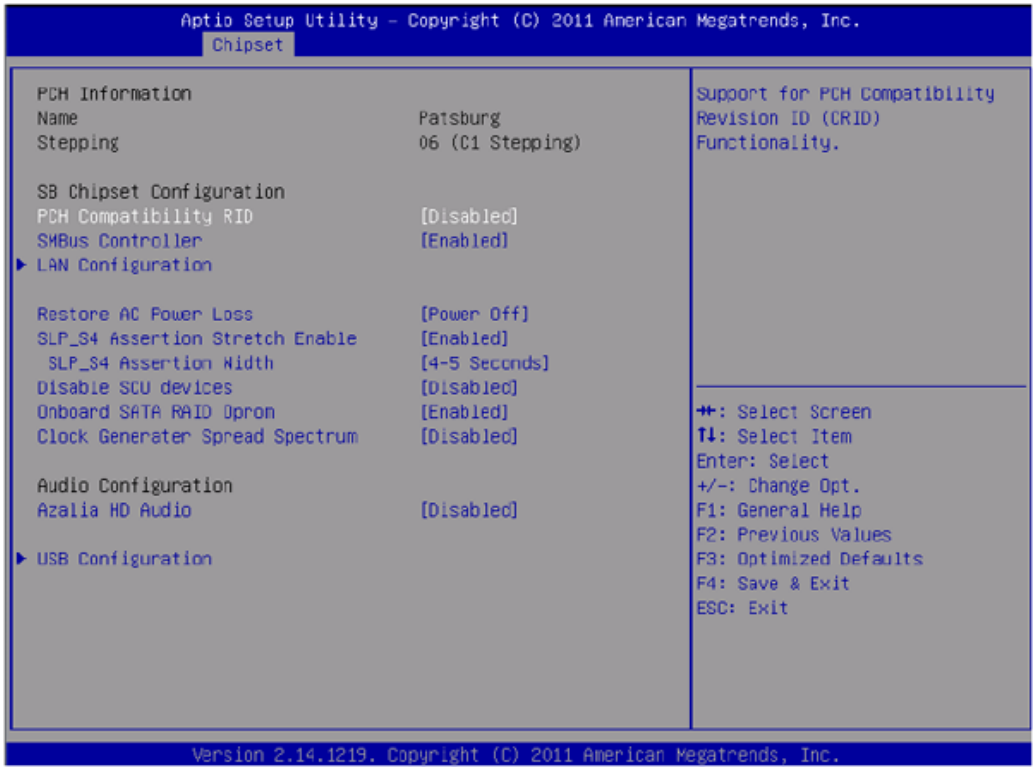
Intel VT-d

Enable/Disable Intel Virtualization Technology for Directed I/O

DIMM Information

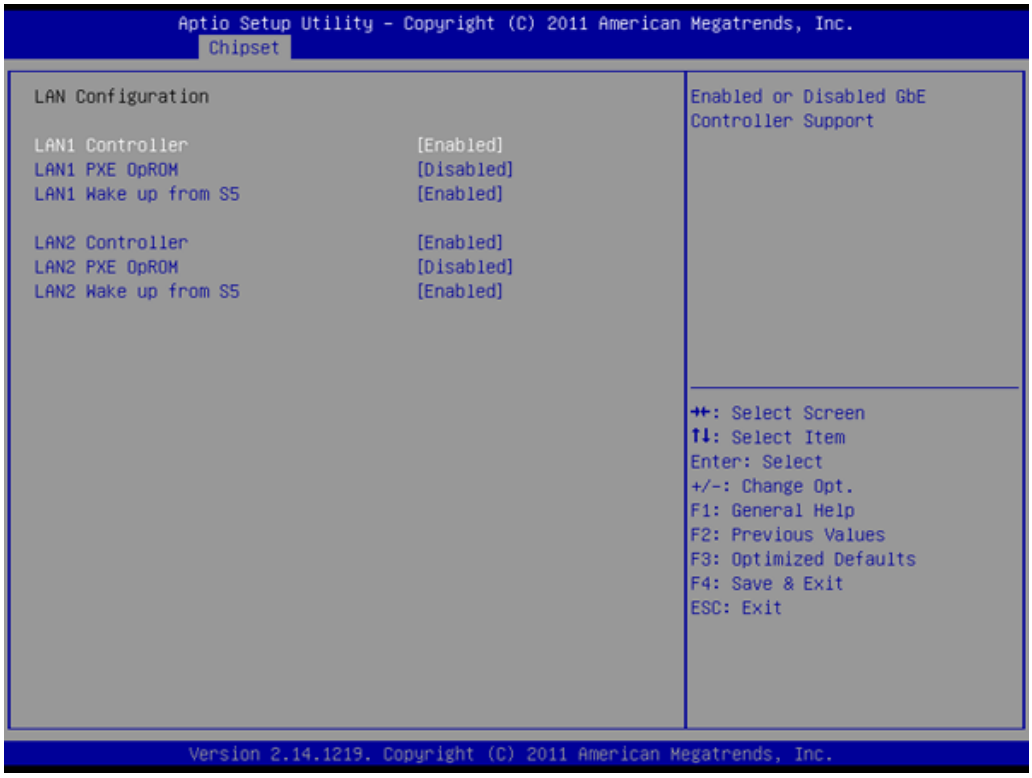


3.2.3.2 South Bridge



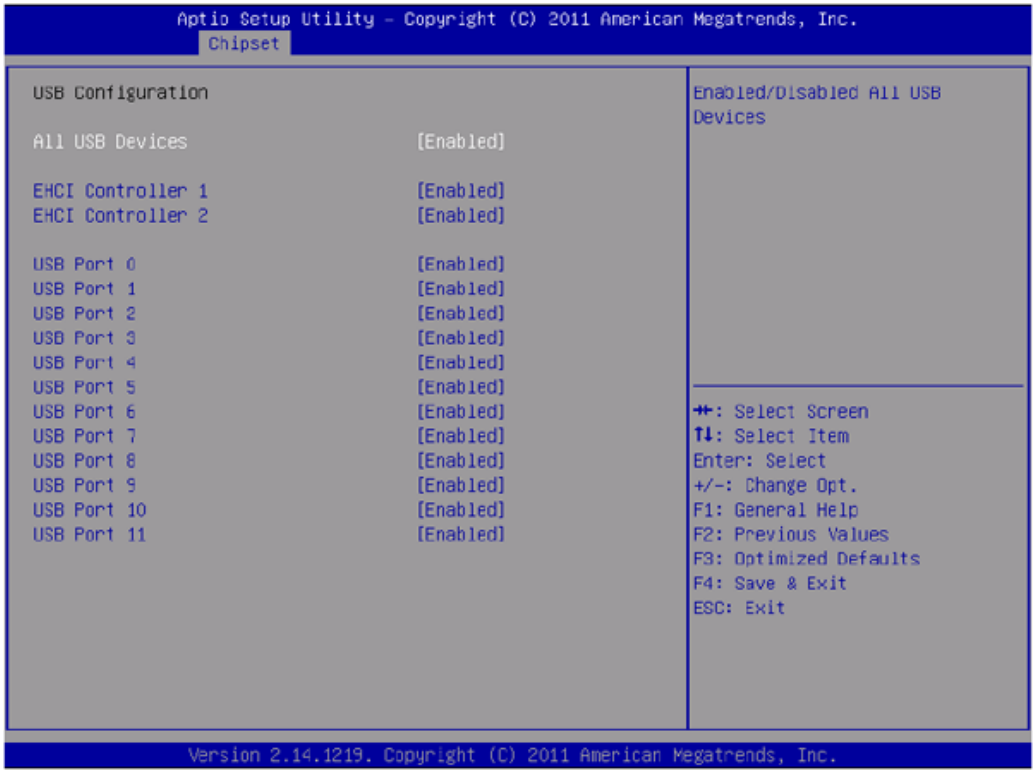
- **PCH Compatibility RID**
  Enable/Disable PCH Compatibility Revision ID (CRID) Functionality.
- **SMBus Controller**
  Enable/Disable SMBus controller
- **Restore AC Power Loss**
  Specify what state to go to when power is re-applied after a power failure (G3 state).
- **SLP_S4 Assertion Stretch Enable**
  Enable/Disable SLP_S4 Assertion Stretch function
- **Onboard SATA RAID Oprom**
  Enable/Disable onboard SATA RAID option rom if Launch Storage Oprom is enabled.
- **Azalia HD Audio**
  Enable/Disable Azalia HD audio function
- **High Precision Timer**
  Enable/Disable high precision timer function

LAN Configuration



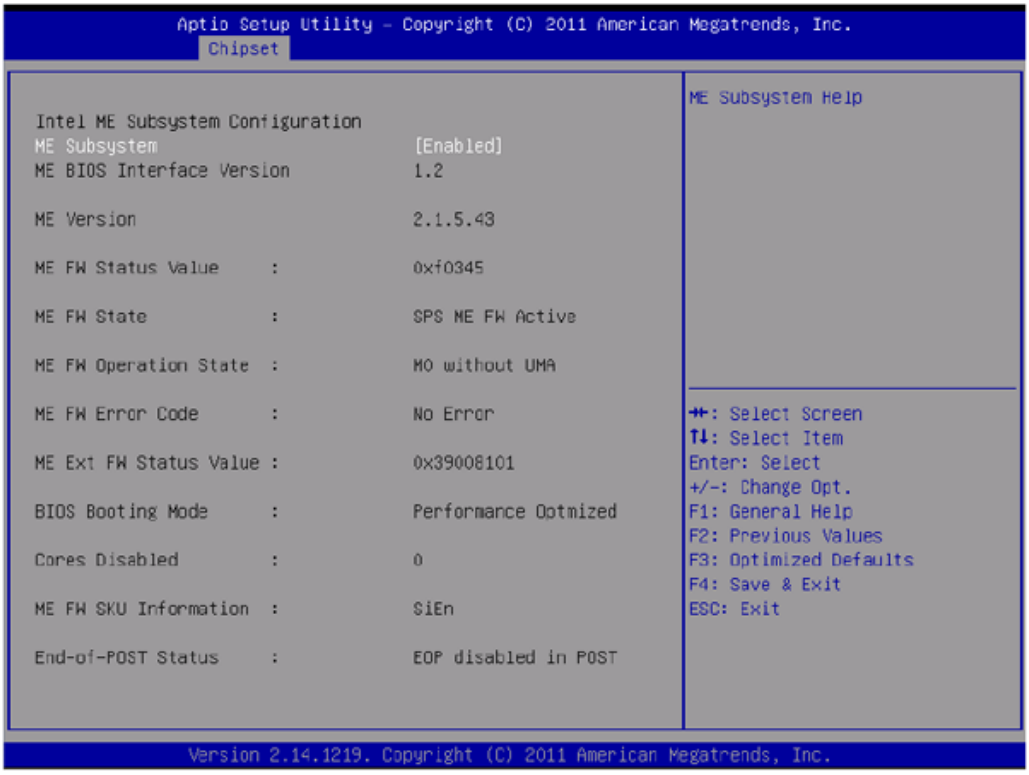
- **LAN1 Controller**
  Enable/Disable Intel 82579LM Controller support.
- **LAN1 PXE Oprom**
  Enable/Disable Boot option for Intel 82579LM controller.
- **LAN1 Wake up from S5**
  Enable/Disable Intel 82579LM controller wake up from S5 support.
- **LAN2 Controller**
  Enable/Disable Intel 82574L Controller support
- **LAN2 PXE Oprom**
  Enable/Disable Boot option for Intel 82574L controller.
- **LAN2 Wake up From S5**
  Enable/Disable Intel 82574L controller wake up from S5 support.

USB Configuration

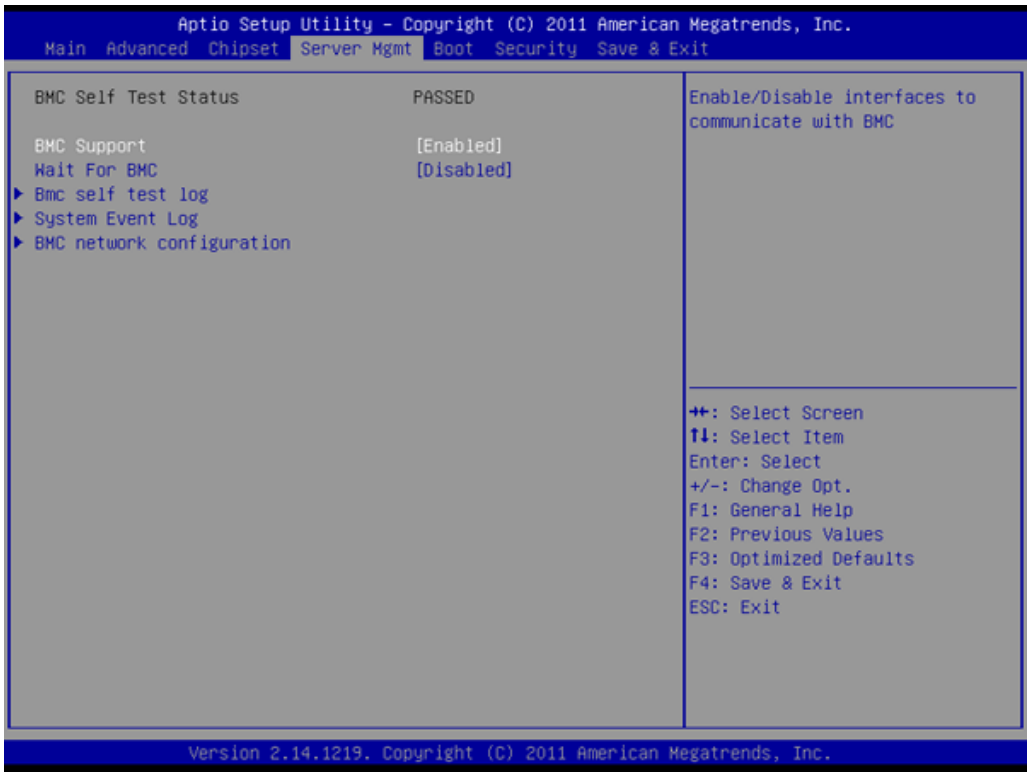


- **All USB Devices**
  Enable/Disable all USB devices
- **EHCI Controller 1**
  Enable/Disable USB 2.0 (EHCI) support
- **EHCI Controller 2**
  Enable/Disable USB 2.0 (EHCI) support
- **USB Port 0 ~ 11**
  Enable/Disable USB 0 ~ 11 port

3.2.3.3 ME Subsystem



3.2.4 Server Management



- **BMC Support**
  Enable/Disable interfaces to communicate with BMC

- **Wait for BMC**
  If enabled, the motherboard will wait 60 seconds until BMC module boots up completely, after which a normal BIOS post screen will be displayed.
  If disabled, the motherboard will not wait for the BMC module's response.

3.2.4.1 BMC Self Test Log

- **Erase Log**
  Erase log options
- **When Log is Full**
  Select the action to be taken when log is full

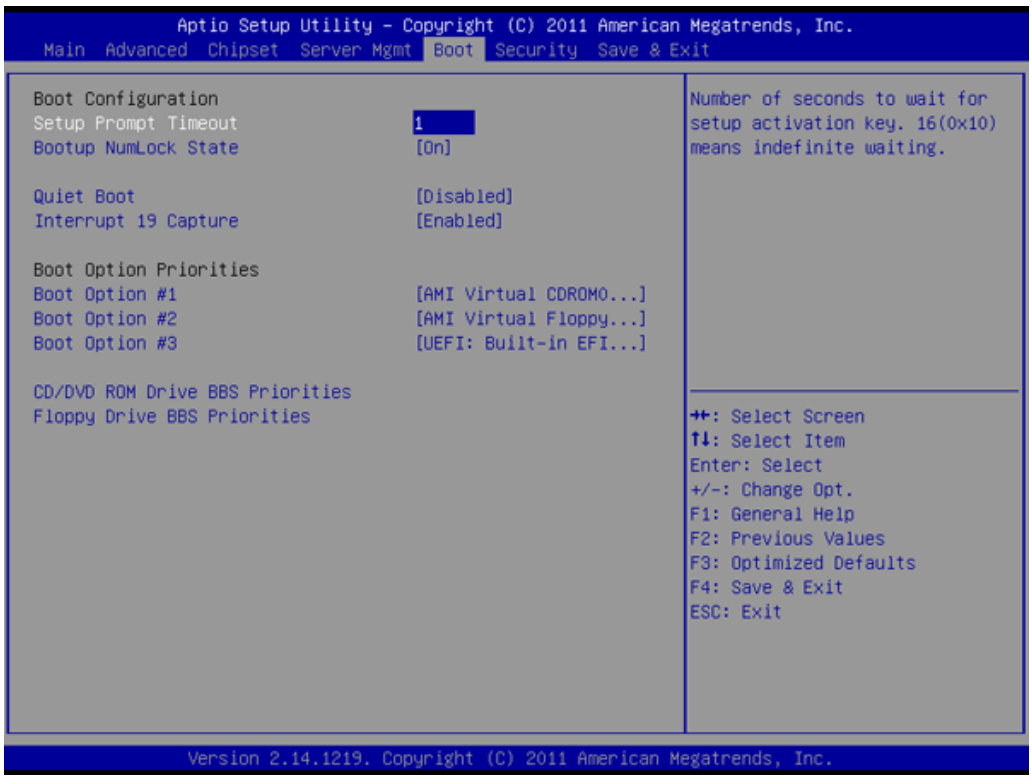
3.2.4.2 System Event Log

- **SEL Components**
  Enable/Disable all features of system event logging during boot
- **Erase SEL**
  Choose options for erasing SEL
- **When SEL is Full**
  Choose options for reactions to a full SEL
- **Log EFI Status Codes**
  Disable the logging of EFI status codes or log only error code or only progress code or both

3.2.4.3 BMC Network Configuration

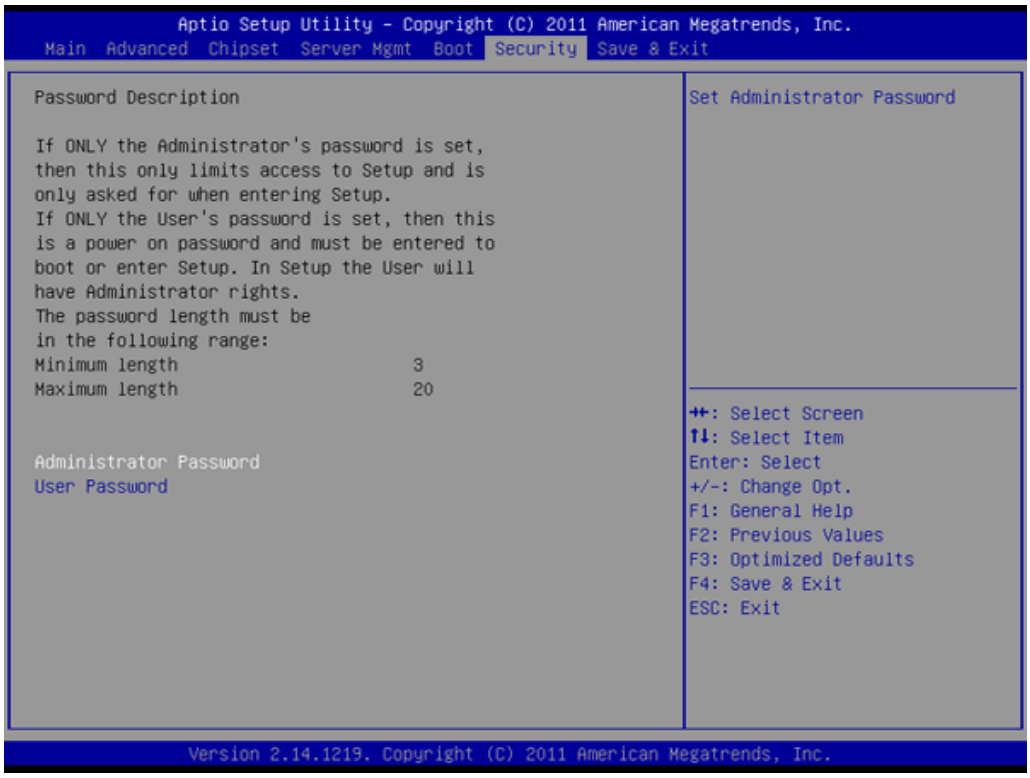
- **Configuration Address Source**
  Select to configure LAN channel parameters statically or dynamically (by BMC). Unspecified option will not modify any BMC network parameters during BIOS phase.

3.2.5 Boot

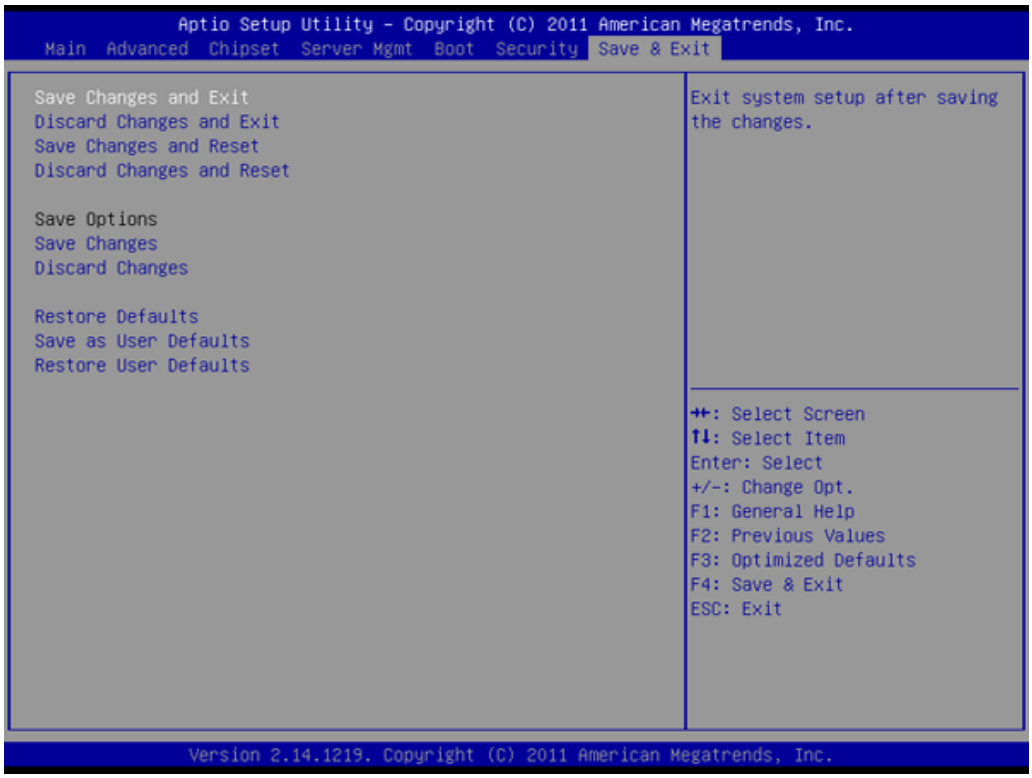


- **Setup Prompt Timeout**
  Number of seconds to wait for setup activation key. 16 (0x10) means indefinite waiting.
- **Bootup NumLock State**
  Select the keyboard NumLock state
- **Quit Boot**
  Enable/Disable quiet boot option
- **Interrupt 19 Capture**
  Enable: Allows option ROMs to trap Int 19
- **Boot Option**
  Sets the system boot priorities

3.2.6 Security



3.2.7 Save & Exit



- **Save Changes and Exit**
  Exit system setup after saving the changes
- **Discard Changes and Exit**
  Exit system setup without saving any changes
- **Save Changes and Reset**
  Reset the system after saving changes
- **Discard Changes and Reset**
  Reset system setup without saving any changes
- **Save Changes**
  Save changes done so far to any of the setup options
- **Discard Changes**
  Discard changes done so far to any of the setup options
- **Restore Defaults**
  Restore/Load default values for all the setup options
- **Save as User Defaults**
  Save the changes done so far as user defaults
- **Restore User Defaults**
  Restore the user default to all the setup options

Chapter 4

Chipset Software Installation Utility

4.1 Before Beginning

To facilitate the installation of the enhanced display drivers and utility software, read the instructions in this chapter carefully. The drivers for the ASMB-820I are located on the software installation CD.

Before beginning, it is important to note that most display drivers need to have the relevant software application already installed on 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.

4.2 Introduction

4.2.1 Main Menu

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 (USB 2.0 driver needs to be installed separately for Windows 98)
- Identification of Intel chipset components in the Device Manager

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.*

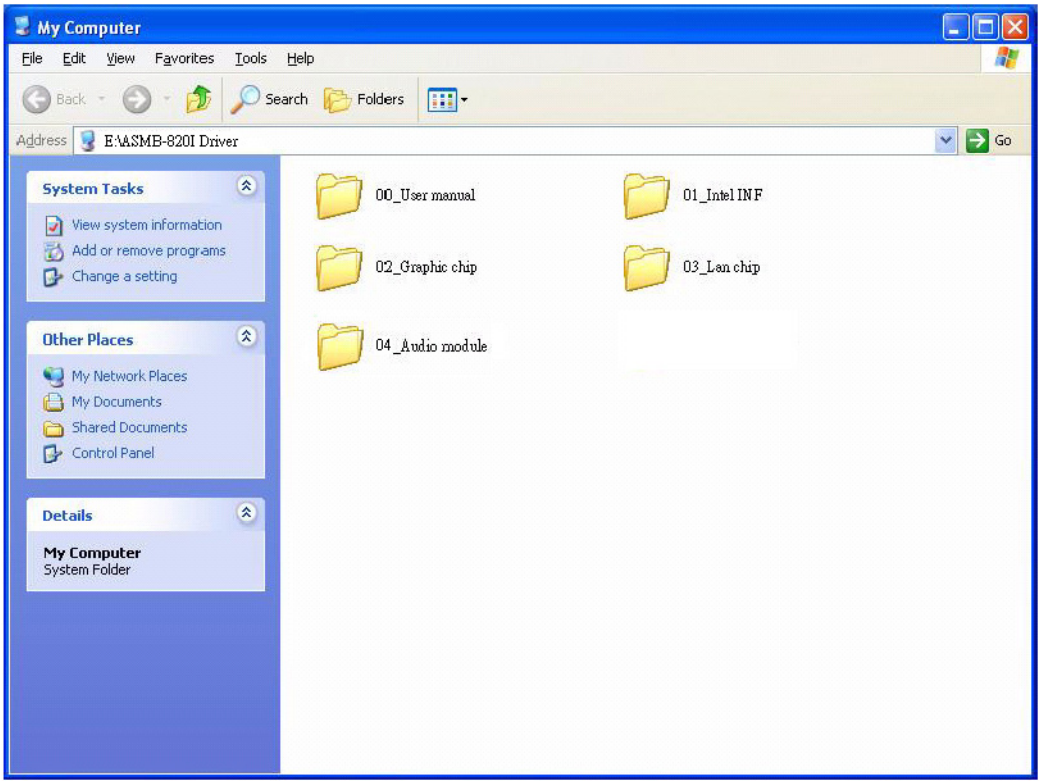
Note! *The chipset driver is used for the following versions of Windows, and it has to be installed before installing all the other drivers:*

Windows Server 2008 Enterprise Edition R2	*x64*
Windows Server 2008 Enterprise Edition	*x86 & x64*
Windows Server 2003 Enterprise Edition SP2	*x86 & x64*
Windows 7(Ultimate SP1)	*x86 & x64*
Windows Vista SP2	*x86 & x64*
*Windows XP SP3 Professional**	*x86 & x64*
Windows XP Embedded SP3 (WES2009)	*x86(TBD)*

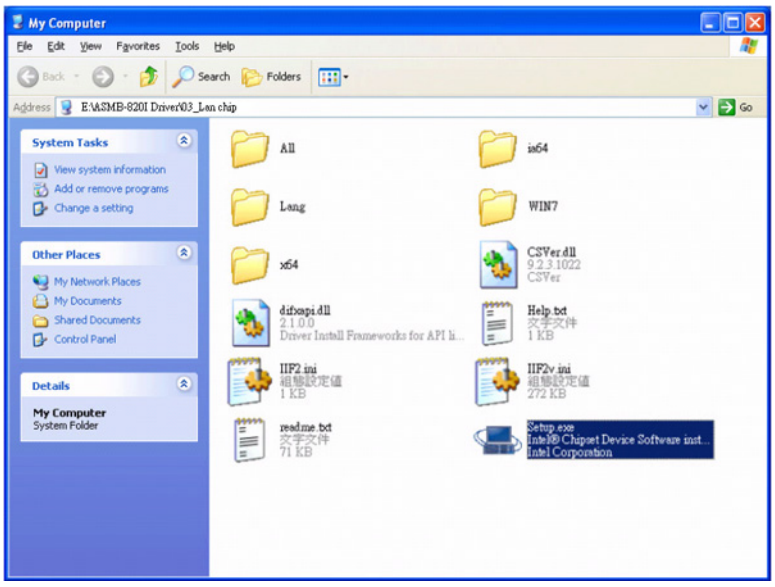
Note! *It is necessary to update all the latest Microsoft hotfix files when using this OS.*

4.3 Windows XP / Windows 2003 / Windows 2008 / Windows 7 Driver Setup

1. Insert the driver CD into your system's CD-ROM drive. When the folder is displayed, move the mouse cursor over the folder "01_Intel INF". Find the executable in the CSI folder, click to install the driver.



2. Click the **Setup** icon to execute the program.



Chapter 5

VGA Setup

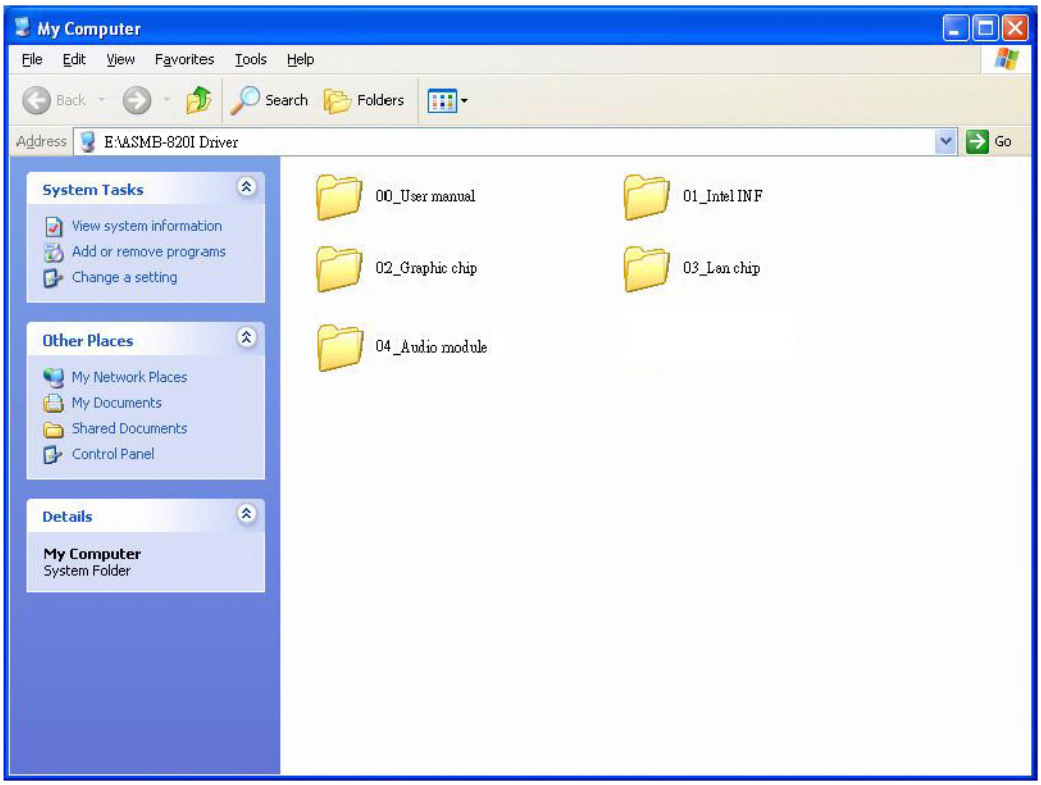
5.1 Introduction

Install the ASPEED VGA driver to enable this function, which includes the following features:

- 32bit 2D graphics engine on board for normal use.
- 64MB Ram for this chip, the highest resolution is 1920x1200.

5.2 Windows Series Driver Setup

Insert the driver CD into your system's CD-ROM drive. When the folder is displayed, navigate to the "02_Graphic chip" folder and click the executable file to complete the installation of the drivers for OS that you need.



Note! *Please use Windows 2008 server R2(WinS08R2) VGA driver version for Windows 7 VGA driver*

Chapter 6

LAN Configuration

6.1 Introduction

The ASMB-820I has two Gigabit Ethernet LAN connections via dedicated PCI Express x1 lanes: GbE LAN1 - Intel 82579LM; GbE LAN2 - Intel 82574L. They offer bandwidth of up to 500 MB/sec, eliminating the bottleneck of network data flow and incorporating Gigabit Ethernet at 1000 Mbps.

6.2 Features

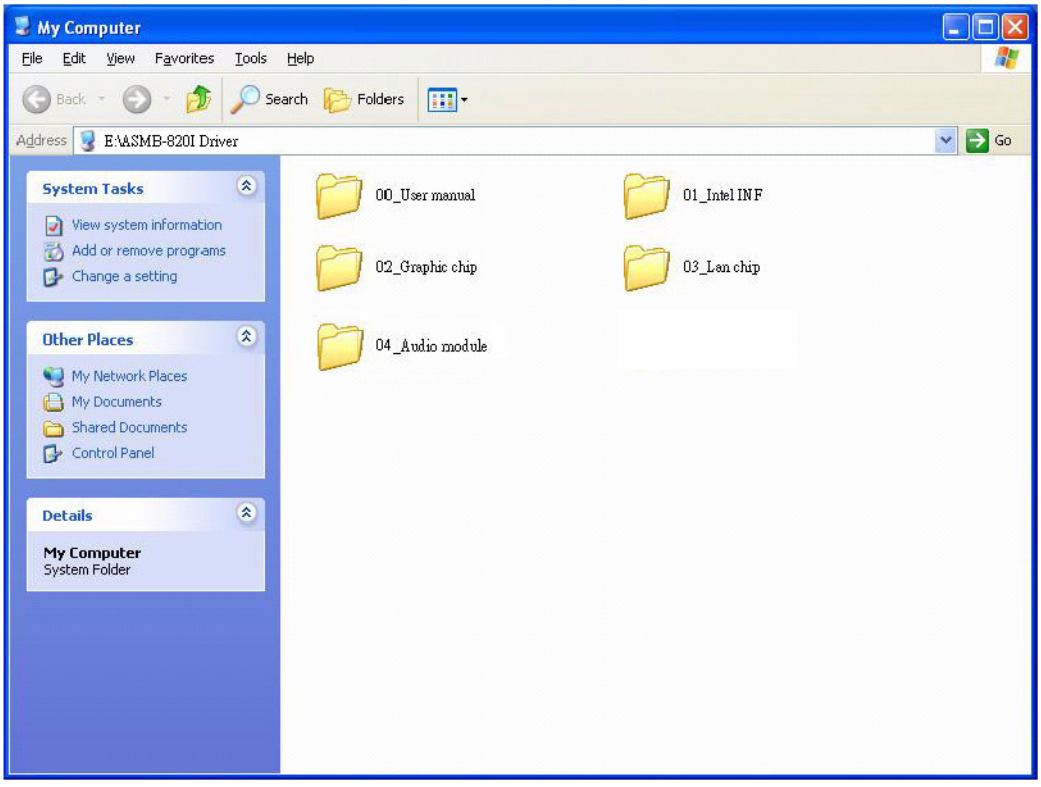
- 10/100/1000Base-T Ethernet controller
- 10/100/1000Base-T triple-speed MAC
- Full duplex at 10, 100, or 1000 Mbps and half duplex at 10 or 100 Mbps
- Wake-on-LAN (WOL) support
- PCIe x1 host interface

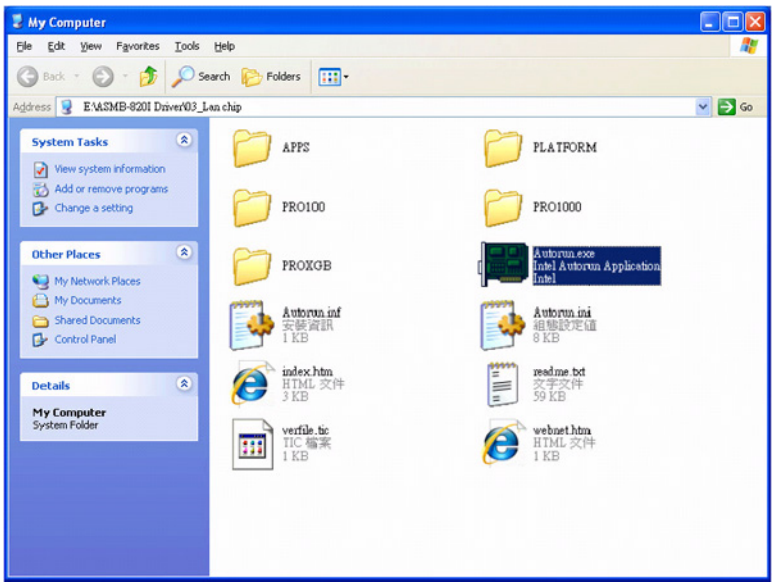
6.3 Installation

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.

6.4 Windows Series Driver Setup (LAN)

1. Insert the driver CD into your system's CD-ROM drive. Select folder "03_Lan chip" then click the proper LAN driver for the OS.




My Computer
File Edit View Favorites Tools Help
Back Search Folders
Address E:\ASMB-820I Driver\03_Lan chip
Go
System Tasks
View system information
Add or remove programs
Change a setting
Other Places
My Network Places
My Documents
Shared Documents
Control Panel
Details
My Computer
System Folder
APPS
PLATFORM
PRO100
PRO1000
PROXGB
Autorun.exe
Intel Autorun Application
Intel
Autorun.inf
安裝資訊
1 KB
Autorun.ini
組態設定值
8 KB
index.htm
HTML 文件
3 KB
readme.txt
文字文件
59 KB
verfile.tic
TIC 檔案
1 KB
webnet.htm
HTML 文件
1 KB

Appendix A

Programming the Watchdog Timer

The ASMB-820I'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 NCT6776F. It provides the following functions for user programming:

- Can be enabled and disabled by user program
- Timer can be set from 1 to 255 seconds or 1 to 255 minutes
- 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).

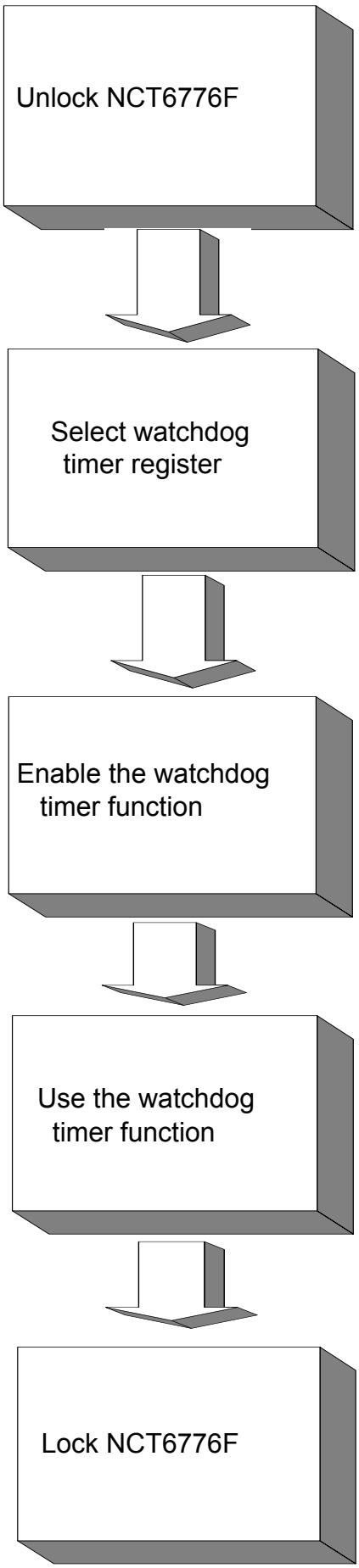

Unlock NCT6776F
Select watchdog timer register
Enable the watchdog timer function
Use the watchdog timer function
Lock NCT6776F

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 NCT6776F
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 NCT6776F.

A.2.1 Example Programs

Enable watchdog timer and set 10 seconds as the timeout interval

```
;--------------------------------------------------------
Mov dx,2eh ; Unlock NCT6776F
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 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 minutes
Out dx,al
;-------------------------------------------------------
Dec dx ; lock NCT6776F
Mov al,0aah
Out dx,al
```

Enable watchdog timer and set 5 minutes as the timeout interval

```
;-------------------------------------------------------
Mov dx,2eh ; unlock NCT6776F
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 NCT6776F
Mov al,0aah
Out dx,al
```

Enable watchdog timer to be reset by mouse

```
;--------------------------------------------------------
Mov dx,2eh ; unlock NCT6776F
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 NCT6776F
Mov al,0aah
Out dx,al
```

Enable watchdog timer to be reset by keyboard

```
;--------------------------------------------------------
Mov dx,2eh ; unlock NCT6776F
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 NCT6776F
Mov al,0aah
Out dx,al
```

Generate a time-out signal without timer counting

```
;--------------------------------------------------------
Mov dx,2eh ; unlock NCT6776F
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 NCT6776F
Mov al,0aah
Out dx,al
```

Appendix B

I/O Pin Assignments

B.1 USB Header (USB45, USB67, USB89)

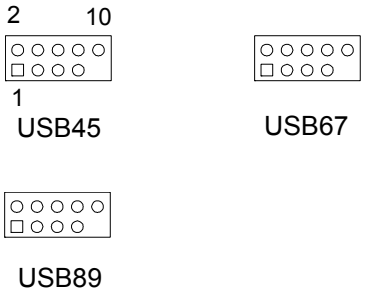


Table B.1: USB Header (USB45,USB67,USB89)

Pin	Signal	Pin	Signal
1	USB_VCC5	2	USB_VCC5
3	USB_D-	4	USB_D-
5	USB_D+	6	USB_D+
7	GND	8	GND
9	Key	10	N/C

B.2 VGA Connector (VGA1)

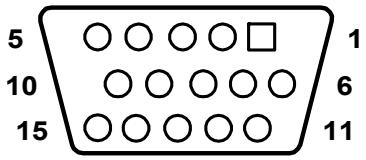


Table B.2: VGA Connector (VGA1)

Pin	Signal	Pin	Signal
1	RED	9	VCC
2	GREEN	10	GND
3	BLUE	11	N/C
4	N/C	12	SDT
5	GND	13	H-SYNC
6	GND	14	V-SYNC
7	GND	15	SCK
8	GND		

B.3 RS-232 Interface (COM2)

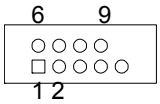


Table B.3: RS-232 Interface (COM2)	
Pin	**Signal**
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

B.4 PS/2 Keyboard and Mouse Connector (KBMS1)

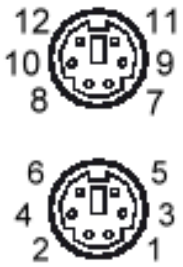


Table B.4: Keyboard and Mouse Connector (KBMS1)	
Pin	**Signal**
1	KB DATA
2	N/C
3	GND
4	KB VCC
5	KB CLK
6	N/C
7	M_DATA
8	N/C
9	GND
10	M_VCC
11	M_CLK
12	N/C

B.5 External Keyboard Connector (KBMS2)

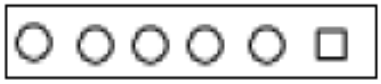


Table B.5: External Keyboard Connector (KBMS2)	
Pin	**Signal**
1	KB CLK
2	KB DATA
3	MS DATA
4	GND
5	VCC
6	MS CLK

B.6 System Fan Power Connector (SYSFAN0~3)

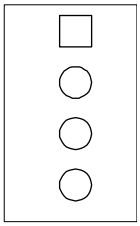


Table B.6: Fan Power Connector (SYSFAN0~3)	
Pin	**Signal**
1	GND
2	+12 V
3	DETECT
4	PWM

B.7 Power LED (JFP1)

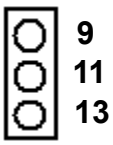


Table B.7: Power LED (JFP1)	
Pin	**Function**
9	LED power (3.3 V)
11	NC
13	Ground

B.8 External Speaker Connector (JFP1)

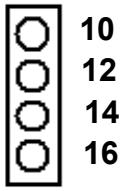


Table B.8: External Speaker Connector (JFP1)	
Pin	**Function**
10	SPK_VCC
12	SPK_OBS
14	SPK_BUZ
16	SPK_OUT

B.9 Reset Connector (JFP1)

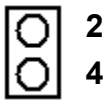


Table B.9: Reset Connector (JFP1)	
Pin	**Signal**
2	RESET
4	GND

B.10 HDD LED Connector (JFP1)

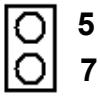


Table B.10: HDD LED Connector (JFP1)	
Pin	**Signal**
5	HDD_LED+
7	HDD_LED-

B.11 ATX Soft Power Switch (JFP1)

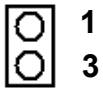
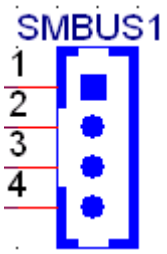


Table B.11: ATX Soft Power Switch (JFP1)

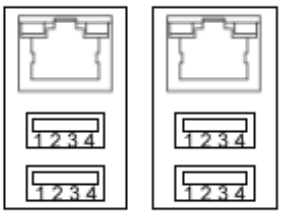
Pin	Signal
1	PWR-BTN
3	GND

B.12 Front panel SMBus Connector (SMBUS1)



1	+3.3V_AUX
2	SMB_SCL_FRU
3	SMB_SDA_FRU
4	GND

B.13 USB/LAN Ports (LAN1_USB01 and LAN2_USB23)



LAN1_USB01 **LAN2_USB23**

Table B.12: USB Port

Pin	Signal	Pin	Signal
1	VCC_DUAL	3	Data0+
2	Data0-	4	GND

Table B.13: Giga LAN 10/100/1000 Base-T RJ-45 Port			
Pin	**Signal**	**Pin**	**Signal**
1	MID0+	5	MID2+
2	MID0-	6	MID2+
3	MID1+	7	MID3+
4	MID1-	8	MID3+

B.14 Audio Connector (AUDIO1)

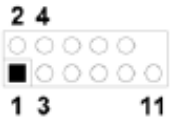


Table B.14: Front Panel Audio Connector (FPAUD1)			
Pin	**Signal**	**Pin**	**Signal**
1	ACZ_VCC	2	GND
3	ACZ_SYNC	4	ACZ_BITCLK
5	ACZ_SDOUT	6	ACZ_SDIN0
7	ACZ_SDIN1	8	ACZ_RST
9	ACZ_12V	10	GND
11	GND	12	N/C

B.15 8-pin Alarm Board Connector (VOLT1)

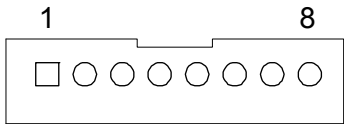


Table B.15: 8-pin Alarm Board Connector (VOLT1)			
Pin	**Signal**	**Pin**	**Signal**
1	5VSB	5	+5V
2	GND	6	+3.3V
3	GND	7	-12V
4	-5V	8	+12V

B.16 Case Open Connector (JFP1)

Table B.16: Case Open Connector (JFP1)

Pin	Signal
6	CASEOP
8	GND

B.17 Front Panel LAN LED Connector (LANLED1)

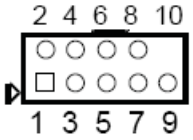


Table B.17: LAN LED Connector (LANLED1)

Pin	Signal	Pin	Signal
1	LAN1/3_LED0_ACT	2	LAN2/4_LED1_ACT
3	VCC3_LAN1LED	4	VCC3_LAN2LED
5	LAN1/3_LED1_1000M	6	LAN2/4_LED2_1000
7	LAN1/3_LED2_100M	8	LAN2/4_LED0_100
9	VCC3	10	N/C

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