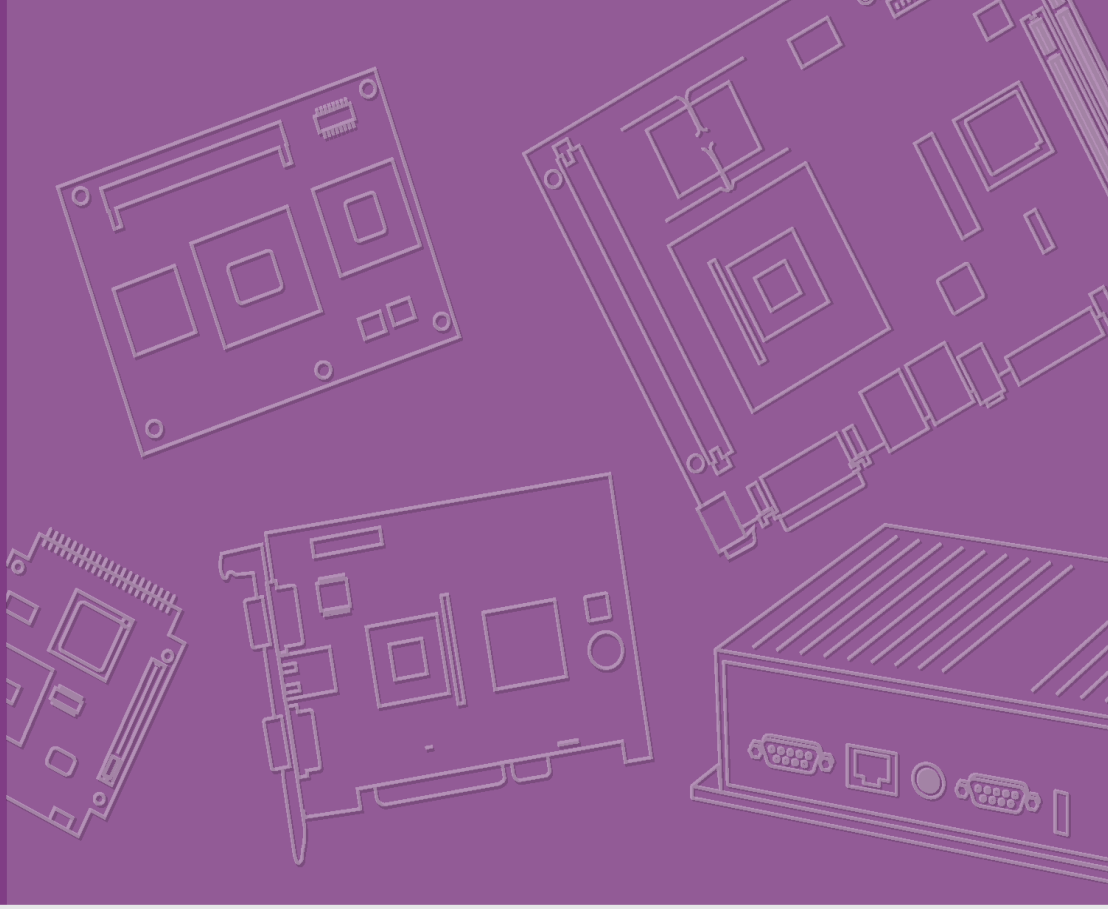

User Manual

ASMB-310IR/310

Dual 1366 Socket CEB Server Board with 2 PCIe x16 Expansion Slots

Trusted ePlatform Services

ADVANTECH

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Part No. 2006310R00 Edition 1

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Peripheral Compatibility

Order Information		
Processor P/N	**Description**	**Manufacturer PN**
96MPXE-2.53-8M13T	XEON 2.53G 8M 1366P 4CORE E5540(G)	AT80602000789AA (E5540/ SLBF6) - Quad Core - **Embedded**
96MPXE-2.0-4M13T	XEON 2.0G 4M 1366P 4CORE E5504(G)	AT80602000801AA (E5504/ SLBF9) - Quad Core - **Embedded**
96MPXE-2.4-12M13T	XEON 2.4G 12M 1366P 4CORE E5620(G)	AT80614005073AB (E5620/ SLBV4)
96MPXE-2.13-8M13T	XEON 2.13G 8M 1366P 4CORE L5518(G)	AT80602002265AB (L5518/ SLBFW)
96MPXE-2-8M13T	XEON 2.0G 8M 1366P 2CORE L5508(G)	AT80602002697AC (L5508)
96MPXE-2.4-12M13T1	XEON 2.4G 12M 1366P 6CORE E5645(G)	AT80614003597AC (E5645/ SLBWZ)

Memory P/N	**Description**	**Manufacturer PN**
96D3-1G1333E-AP	1G DDR3-1333 240PIN ECC 128X8 ELP(G)	78.01GC8.422
96D3-2G1333E-AP	2G DDR3-1333 240PIN ECC 128X8 ELP(G)	78.A1GC8.423
96D3-4G1333E-AP	4G DDR3-1333 240PIN ECC 256X8 HYX(G)	78.B1GDF.AF3
96D3-1G1333ER-AP	1G DDR3-1333 240PIN REG 128X8 ELP(G)	78.01GCC.420
96D3-2G1333ER-AP	2G DDR3-1333 240PIN REG 128X8 ELP(G)	78.A1GCC.421
96D3-4G1333ER-AP1	4G DDR3-1333 240PIN REG 256X8 HYX(G)	78.B1GDM.AF1

SATA HDD P/N	**Description**	**Manufacturer PN**
96HD500G-ST-SG7K6	SEAGATE 500G 3.5" SATA 7KRPM 16M(G)	ST3500418AS
96HD1000G-ST-SG7K	SEAGATE 1000G 3.5" SATA 7KRPM 32M(G)	ST31000528AS

SAS HDD P/N	**Description**	**Manufacturer PN**
96HD146G-SS-SG15K1	Seagate 3.5" SAS 15K 146G, dual ports	ST3146356SS

ASMB-310IR and ASMB-310 Feature Comparison

	ASMB-310IR	ASMB-310
Chipset	E5520	E5520
SAS	8	n/a
SATA	6	6
PCIe	4 x PCIe x8 (or 2 x PCIe x16), 1 x PCIe x4	4 x PCIe x8 (or 2 x PCIe x16), 2 x PCIe x4
IPMI	IPMI 2.0 + iKVM	n/a
LAN(RJ-45)	3	2
S/W RAID	yes	yes

Initial Inspection

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

- 1 x ASMB-310IR/310 CEB motherboard
- 1 x ASMB-310IR Startup Manual
- 1 x Driver CD (user's manual is included)
- 2 x Serial ATA HDD data cables
- 2 x LGA 1366 2U/4U CPU Cooler
- 2 x mini-SAS to 4 Serial ATA HDD data cable (For ASMB-310IR only)
- 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 your distributor or sales representative immediately. We have carefully inspected the ASMB-310IR mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt. As you unpack the ASMB-310IR, 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 your 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-310-00A1E	6 SATA	4 x PCIe x8 (or 2 x PCIe x16), 2 x PCIe x4	-
ASMB-310IR-00A1E	6 SATA + 8 SAS/SATA	4 x PCIe x8 (or 2 x PCIe x16), 1 x PCIe x4	Yes

Contents

Chapter 1

Overview

1.1 Introduction

ASMB-310IR serverboard is the most advanced Intel E5520 board for industrial server applications that require high-performance computing. The serverboard supports Intel Xeon 5500/5600 processors and DDR3 800/1066/1333 MHz memory up to 48GB. ASMB-310IR provides dual PCIe x16 slots which support two high performance graphic cards.

In addition, the ASMB-310IR has dual Gigabit Ethernet LAN ports via a dedicated PCIe x1 bus, which offers bandwidth of up to 500 MB/s, eliminating network bottlenecks. High reliability and outstanding performance make the ASMB-310IR the ideal platform for industrial server/networking applications.

By using the Intel E5520 chipset, the ASMB-310IR offers five PCIe slots; two PCIe x16 slots, two PCIe x8 slots, one PCIe x4 slot and a variety of features such as 6 onboard SATA II interfaces (bandwidth = 300 MB/s) with software for RAID 0, 1, 10 and 5 (Windows only); 11 USB 2.0 connectors. Furthermore, ASMB-310IR is embedded with an LSI SAS controller 1068E, and can support 8 SAS/SATA HDD with software RAID 0, 1, 1E. These powerful I/O capabilities ensure even more reliable data storage capabilities and high-speed I/O peripheral connectivity.

With all these excellent features and outstanding performance, the ASMB-310IR is the ideal platform for today's industrial server applications.

Note! *ASMB-310 SKU contains 6 PCIe slots; two PCIe x16 slots, two PCIe x8 slots, and two PCIe x4 slots. ASMB-310 does not have an SAS controller onboard.*

1.2 Features

1.2.1 General

- **PCIe architecture:** The Intel E5520 PCH chipset supports 36 PCIe lanes.
- **Intel latest Daul processor platform:** ASMB-310IR support two Intel Latest 5500/5600 Quad/Dual core Processor.
- **High performance I/O capability:** Dual Gigabit LAN via PCIe x1 bus, one PCIe x4 slot, 6 SATAII connectors and 11 USB 2.0 ports and 8 SAS/SATA connectors (ASMB-310IR only)
- **Standard CEB form factor with industrial features:** ASMB-310IR provides industrial features like long product life, reliable operation under wide temperature range, watchdog timer, etc.
- **SAS hard drive support:** Embedded LSI 1068E SAS controller which can support eight SAS/SATA HDD with software RAID 0,1,1E.
- **IPMI 2.0 support:** ASMB-310IR equip Aspeed 2050 BMC chip supports IPMI 2.0 (Intelligent Platform Management Interface 2.0) via dedicated LAN port.
- **KVM over IP:** ASMB-310IR KVM over IP function.

1.3 Specifications

Table 1.1: Specification	
Processor	
CPU	■ Dual 1366-pin LGA Sockets Intel® 64-bit Xeon® processor(s) ■ Quad-Core Intel® Xeon® Processor 5500 / 5600 sequence (Nehalem-EP/ Westmere processor) ■ Support TDP 60W/80W/95W CPU
Processor Bus	QPI bus speed as 6.4 GT/s
System Memory	
Memory Capacity	■ Xeon processor support DDR3 memory bus ■ Each processor have 3 channels memory bus, each channel have one DIMM socket. 3 x 240-pin DIMM sockets for each processor, total 6 x DIMM sockets ■ Support up to 48 GB memory
Memory Type	Support 1333 / 1066 MHz ECC Registered / Unbuffered ECC DDR3 modules
DIMM Sizes	Each memory socket support 1 GB, 2 GB, 4 GB, 8 GB memory size module.
Memory Voltage	1.5 V
Error Detection	■ Corrects single-bit errors ■ Detects double-bit errors (using ECC memory) ■ Supports Intel® x4 and x8 Single Device Data Correction (SDDC)

On-Board Devices	
Chipsets	■ Intel 5520 (Tylersburg 36D) chipset IOH ■ ICH10R chipset ■ Intel 5520 IOH provide 36 lanes PCIe Gen-2 bus, used for PCIe slots. ■ ICH10R provide SATA, USB, Network, motherboard basic I/Os ■ SAS LSI1068E (ASMB-310IR SKU Only) conntected to ICH10R PCI-e Gen1 x4 lanes
Network Controllers	■ 1x Intel 82574L Gigabit Ethernet Controller connected to ICH10R PCIe-Gen-1 Lane ■ 1x Intel 82567LM Gigabit PHY connected to ICH10R MAC ■ Above network Supports 10BASE-T, 100BASE-TX, and 1000BASE-T, RJ45 output ■ 1x 10/100BASET RTL8201N PHY(Realtek) connected to AST2050 dedicated IPMI/IKVM, if this option is on
VGA	ASPEED AST2050 controller with 64 MB VGA memory provides basic 2D VGA function
Super I/O	Winbond W83627DHG chip provide motherboard keyboard mouse, RS232, and Hardware monitor functions.
SAS (ASMB-310IR)	LSI SAS1068E is 8 ports SAS 3 Gb/s controller RAID 0, 1, 1E supported
IKVM/BMC (ASMB-310IR)	ASPEED AST2050 is also as IKVM/BMC controller

Input / Output	
Serial ATA	6x Serial ATA ports with standard 7-pins SATA connectors. SATA ports come from Intel ICH10R . The SATAs support 3Gb/s / RAID 0, 1, 5, 10 (Windows only)
SAS (Optional)	8x SAS ports come from LSI1068E SAS controller with standard 7-pins connector like SATA connector.
LAN	■ 2x RJ45 LAN ports (10/100/1000BASET LAN) ■ 1x RJ45 Dedicated IPMI LAN port(10/100BASET) (For ASMB-310IR Only), fro IPMI only, there is no regular LAN function
USB	■ 6x USB port to rear connected with RJ45 ■ 3x USB internal headers (5 ports)
VGA	1x VGA Port
Keyboard / Mouse	PS/2 keyboard and mouse connector in rear site
Serial Port / Header	■ 1x internal header(2x5 2.5 mm pitch) for UART port ■ 1x 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 stand by)
CPU Power	2 x 8 pin SSI EPS 12 V power connector for CPU & Memory power (12 V)

Expansion Slots	
PCI-Express	■ 2x PCI-E x16 slot (Gen 2) (Slot 1 and 3) ■ 2x PCI-E x8 slot (Gen 2) (Slot 2 and 4) – Slot Location 1: 1 x PCI-E x16 (Gen2 x16 Link) (Auto switch to x8 Link if slot 2 is occupied) – Slot Location 2: 1 x PCI-E x8 (Gen2 x8 Link) – Slot Location 3: 1 x PCI-E x16 (Gen2 x16 Link) (Auto switch to x8 Link if slot 4 is occupied) – Slot Location 4: 1 x PCI-E x8 (Gen2 x8 Link) ■ 1x PCI-E in x4 slots (Gen 2) (Slot 5) ■ 1x PCI-E in x4 slots (Gen 1 x4 lanes) **(Removed when SAS onboard)** (Slot 6)

System BIOS	
BIOS Type	32 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	■ Total of five fan headers supporting up to 5 fans ■ Five 4-pin fan headers ■ 4 x fans with tachometer status monitoring ■ Thermal Control for 4 x fan connectors
Temperature	■ Monitoring for CPU *2 (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: 10 to 40° C ■ Non-operating Temperature: -10 to 70° C ■ Operating Relative Humidity: 0% to 90% (non-condensing) ■ Non-operating Relative Humidity: 5 to 95% (non-condensing)

1.4 Board Layout, Jumpers and Connectors

Connectors on the ASMB-310IR motherboard link it to external devices such as hard disk drives and a keyboard. In addition, the board has a number of jumpers that are used to configure your system for your application.

The tables below list the function of each of the jumpers and connectors. Later sections in this chapter give instructions on setting jumpers. Chapter 2 gives instructions for connecting external devices to your motherboard.

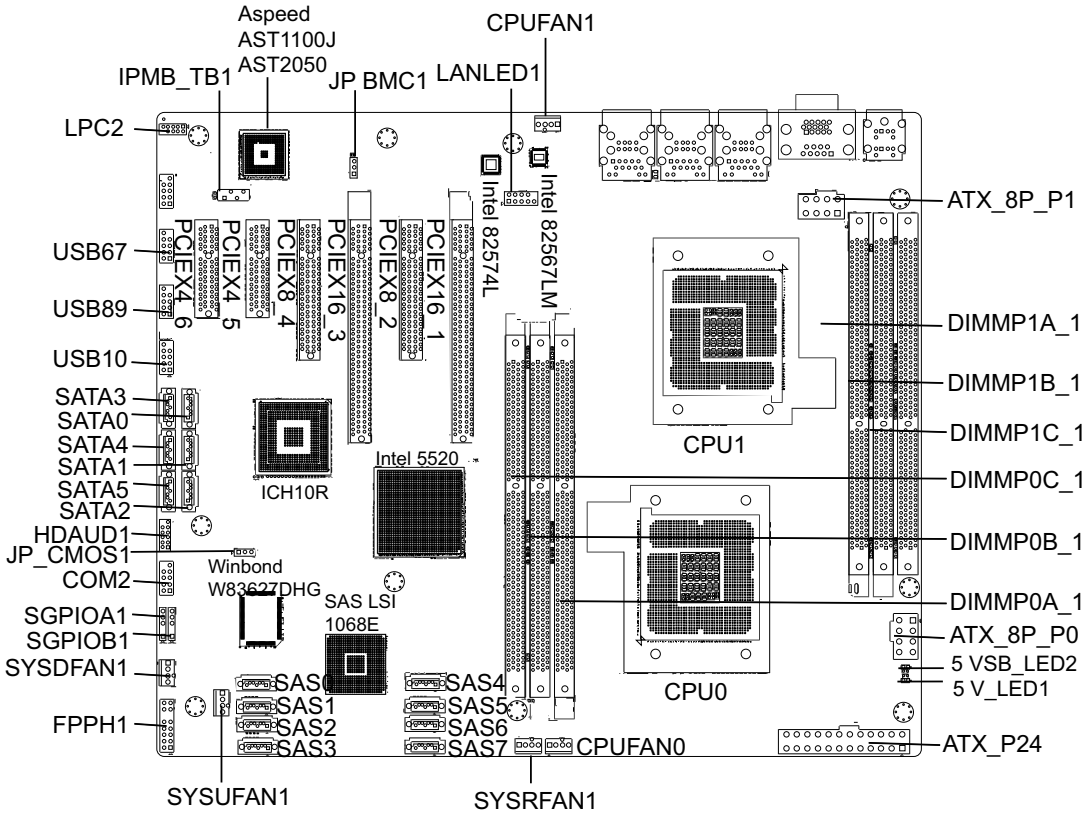


Figure 1.1 Board layout

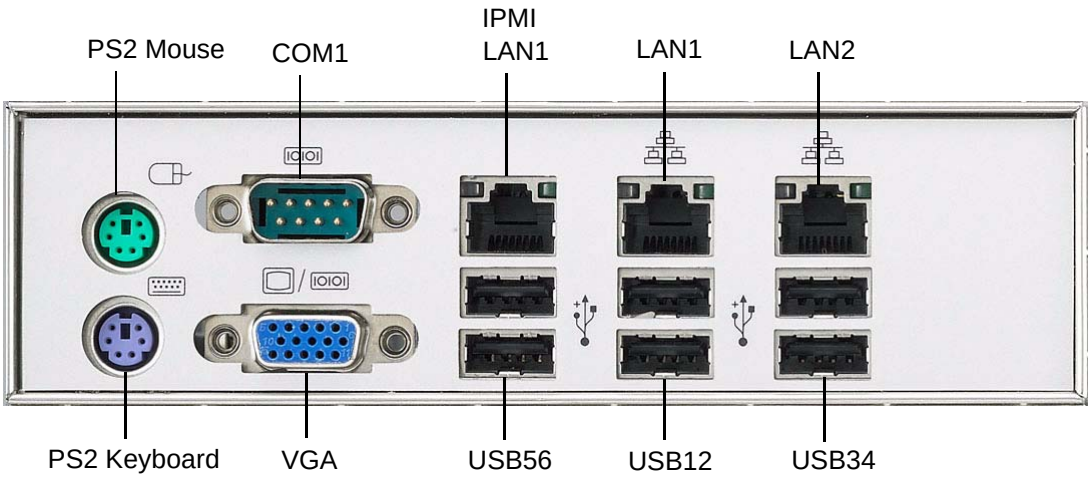
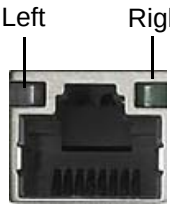


Figure 1.2 Rear I/O

Table 1.2: Onboard LAN LED Color Definition

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



		Left LED	Right LED
10 Mbps	Link	Off	Green
	Active	Off	Blinking green
100 Mbps	Link	Amber	Green
	Active	Amber	Blinking green
1000 Mbps	Link	Green	Green
	Active	Green	Blinking green
No Link		Off	Off

Table 1.3: Jumpers

Label	Function
JP_CMOS1	CMOS Clear
JP_BMC1	BMC Enable (2-3) or Disable (1-2)

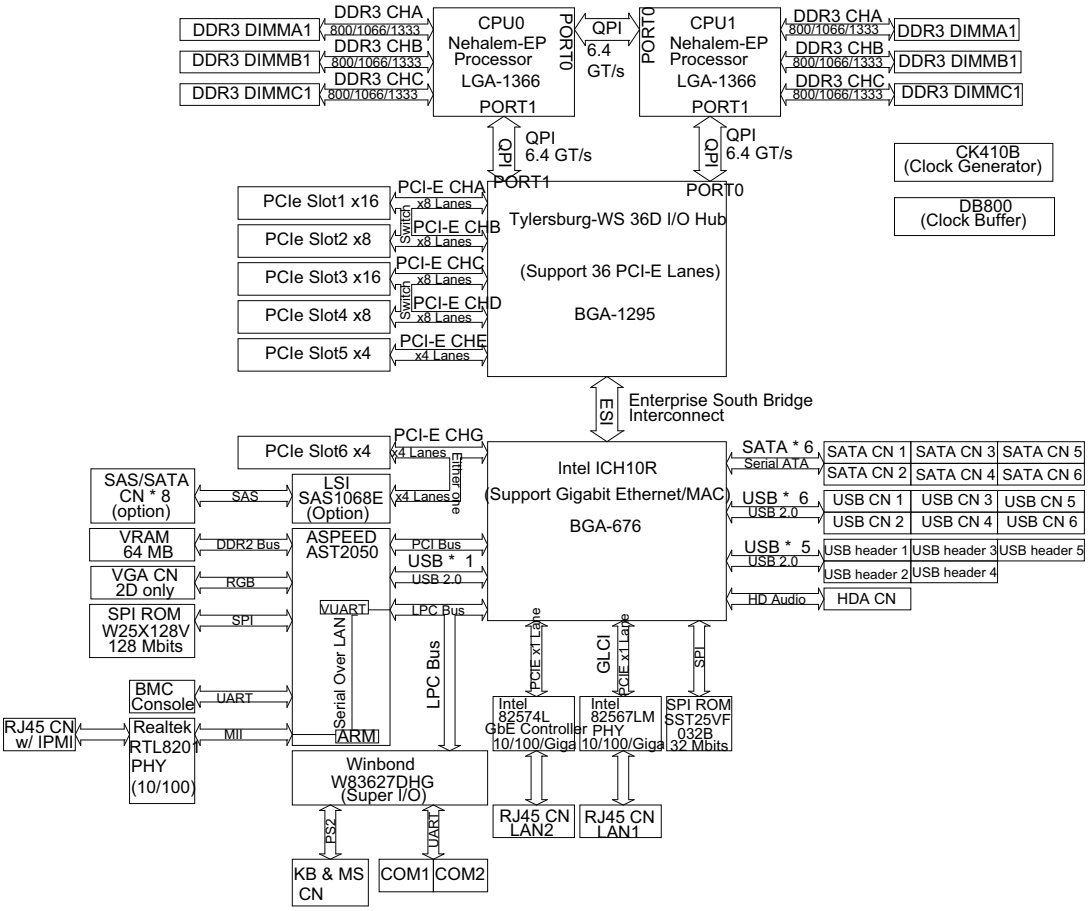
Table 1.4: Connectors

Label	Function
ATX_8P_P0	SSI EPS 12 V auxiliary power connector (for CPU0) and memory
ATX_8P_P1	SSI EPS 12 V auxiliary power connector (for CPU1) and memory
ATX_P24	SSI EPS 24-pin main power connector (for system)
COM2	Serial port: RS-232
CPU0	Intel LGA1366 CPU0 socket
CPU1	Intel LGA1366 CPU1 socket

Table 1.4: Connectors	
CPUFAN0	CPU0 fan connector (4-pin)
CPUFAN1	CPU1 fan connector (4-pin)
DIMMP0A_1	Channel A DIMM1 of CPU0
DIMMP0B_1	Channel B DIMM1 of CPU0
DIMMP0C_1	Channel C DIMM1 of CPU0
DIMMP1A_1	Channel A DIMM1 of CPU1
DIMMP1B_1	Channel B DIMM1 of CPU1
DIMMP1C_1	Channel C DIMM1 of CPU1
FPPH1	Front panel pin header connector
HDAUD1	HD audio Interface connector
IPMB_TB1	IPMB connector (For ASMB-310IR only)
LANLED1	LAN1/2 LED extension connector
LPC2	LPC port for debug
PCIEX16_1	PCIe x16 slot
PCIEX16_3	PCIe x16 slot
PCIEX4_5	PCIe x4 slot
PCIEX4_6	PCIe x4 slot (For ASMB-310IR only)
PCIEX8_2	PCIe x8 slot
PCIEX8_4	PCIe x8 slot
SAS0	SAS0 hard drive connector (For ASMB-310IR only)
SAS1	SAS1 hard drive connector (For ASMB-310IR only)
SAS2	SAS2 hard drive connector (For ASMB-310IR only)
SAS3	SAS3 hard drive connector (For ASMB-310IR only)
SAS4	SAS4 hard drive connector (For ASMB-310IR only)
SAS5	SAS5 hard drive connector (For ASMB-310IR only)
SAS6	SAS6 hard drive connector (For ASMB-310IR only)
SAS7	SAS7 hard drive connector (For ASMB-310IR only)
SATA0	Serial ATA0 hard drive connector
SATA1	Serial ATA1 hard drive connector
SATA2	Serial ATA2 hard drive connector
SATA3	Serial ATA3 hard drive connector
SATA4	Serial ATA4 hard drive connector
SATA5	Serial ATA5 hard drive connector
SGPIOA1	GPIO connector for SAS0 ~ SAS3 (For ASMB-310IR only)
SGPIOB1	GPIO connector for SAS4 ~ SAS7 (For ASMB-310IR only)
SYSDFAN1	system fan connector (4-pin)
SYSRFAN1	system fan connector (4-pin)
SYSUFAN1	system fan connector (4-pin)
USB10	USB port 10
USB67	USB port 6, 7
USB89	USB port 8, 9

Table 1.5: Onboard LED	
5 V_LED1	Power on LED
5 V_{SB}_LED2	Standby LED

1.5 Block Diagram



1.6 System Memory

ASMB-310IR has six 240-pin memory sockets for DDR3 1066/1333 MHz memory modules with maximum capacity of 48 GB (Maximum 8 GB for each DIMM).

ASMB-310IR supports registered DIMMs or unbuffered DIMM with ECC / Non-ECC memory module.

1.7 Memory Installation Procedures

To install DIMMs, first make sure the two handles of the DIMM socket are in the "open" position. i.e. 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.

	Single CPU Installed (CPU0)			**Dual CPU Installed (CPU0 & CPU1)**				
Quantity of memory installed	1	2	3	2	3	4	5	6
DIMMP0A-1	V	V	V	V	V	V	V	V
DIMMP0B-1		V	V		V	V	V	V
DIMMP0C-1			V				V	V
DIMMP1A-1				V	V	V	V	V
DIMMP1B-1						V	V	V
DIMMP1C-1								V

1.8 Processor Installation

The ASMB-310IR is designed for dual LGA1366, Intel E5500/E5600 series Xeon processor.

Chapter 2

Connections

2.1 Introduction

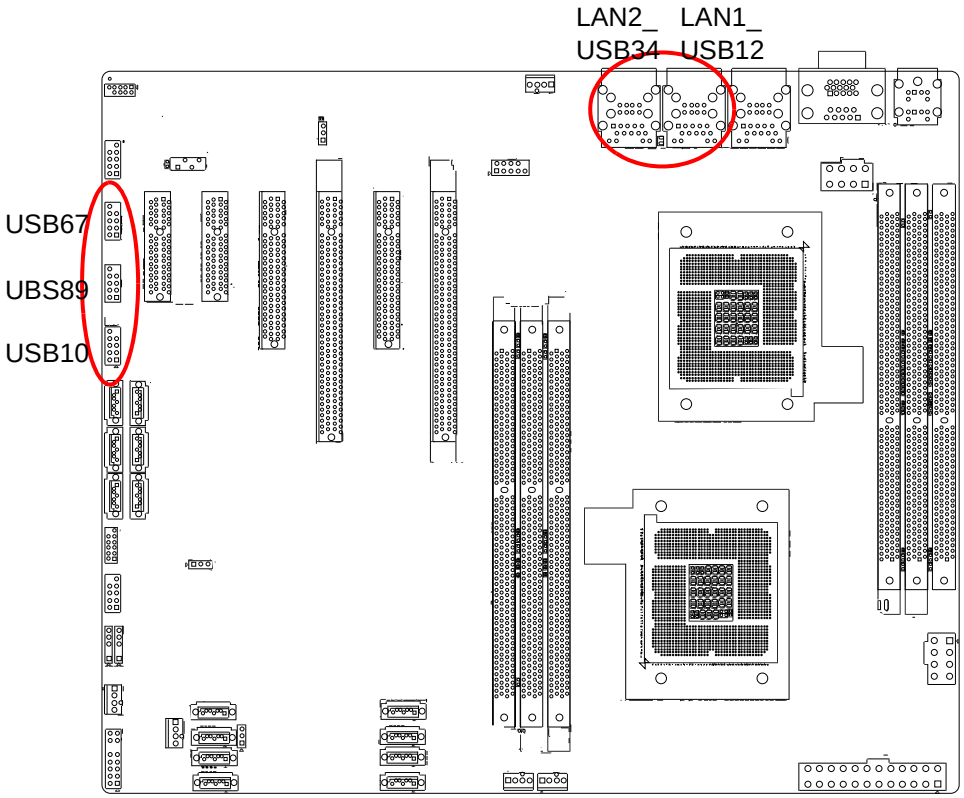
You can access most of the connectors from the top of the board as it is being installed in the chassis. If you have a number of cards installed, you may need to partially remove a card to make all the connections.

2.2 USB Ports and LAN Ports (USB01/USB23/ USB45/LAN1/LAN2/IPMI_LAN1)

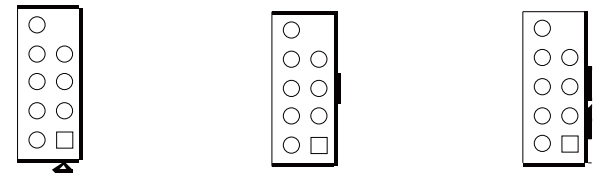
The USB ports comply with USB specification rev. 2.0. Transmission rates of up to 480 Mbps and fuse protection are supported. The USB interface can be disabled in the system BIOS setup.

The ASMB-310IR & ASMB-310 are 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-310IR is also equipped with the additional 100 Mbps Ethernet LAN (IPMI_LAN1 Port) which is shared with IPMI for system management.



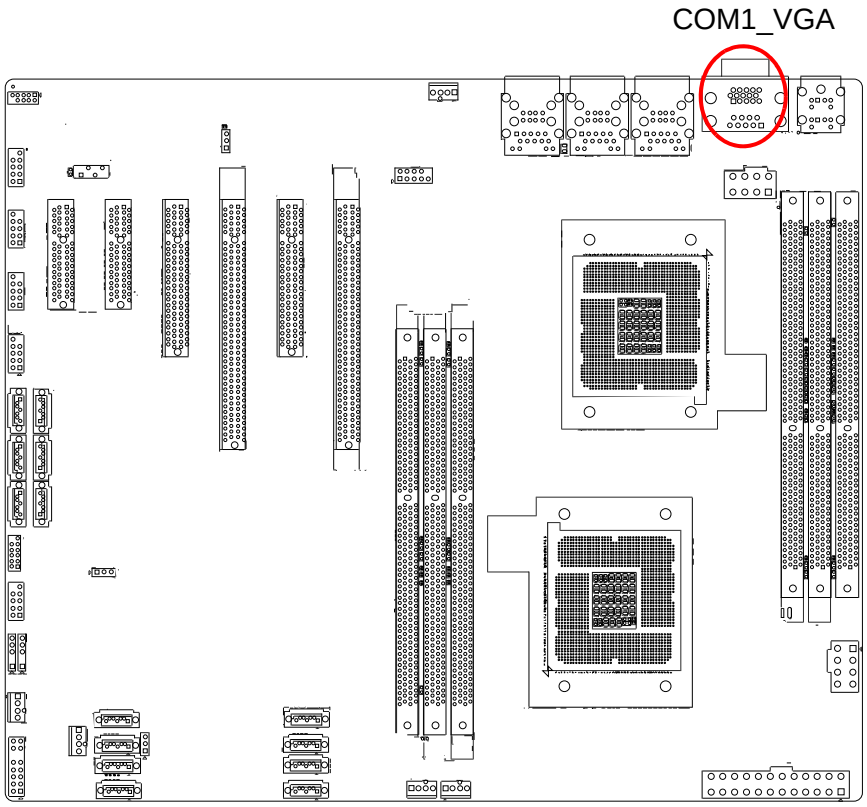
IPMI_LAN1	LAN1	LAN2
USB4	USB0	USB2
USB5	USB1	USB3



USB67 USB89 USB10

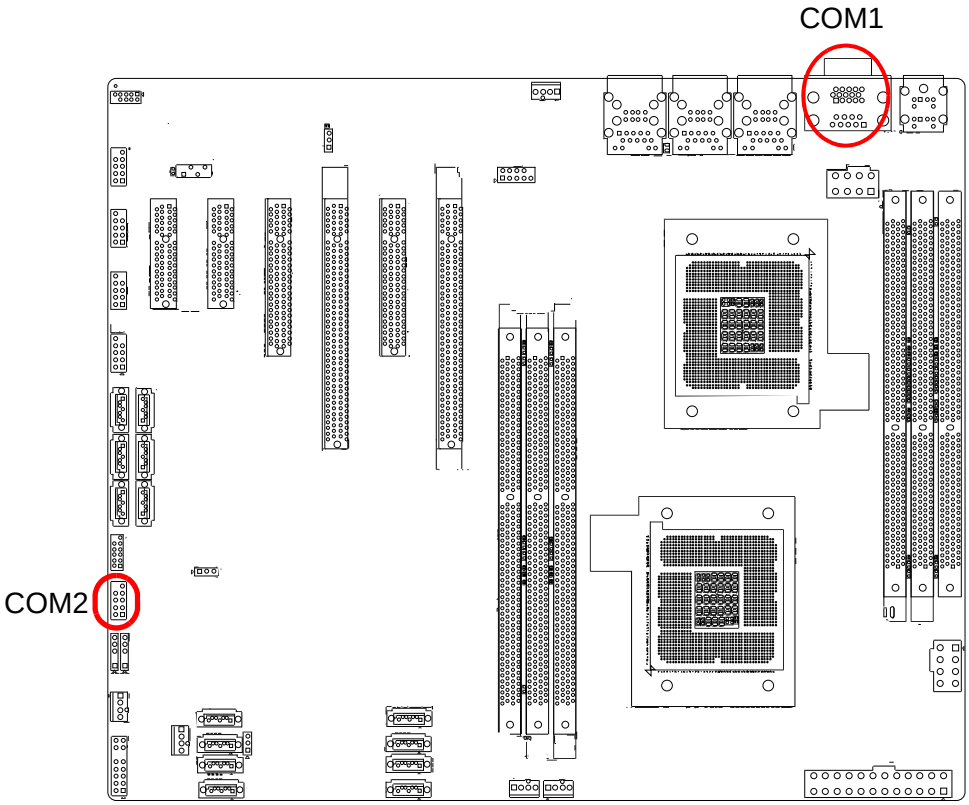
2.3 VGA Connector

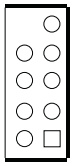
The ASMB-310IR includes VGA interface that can drive conventional CRT and LCD displays.



2.4 Serial Ports (COM1/COM2)

The ASMB-310IR offers 2 serial ports (One on the rear panel and one onboard).

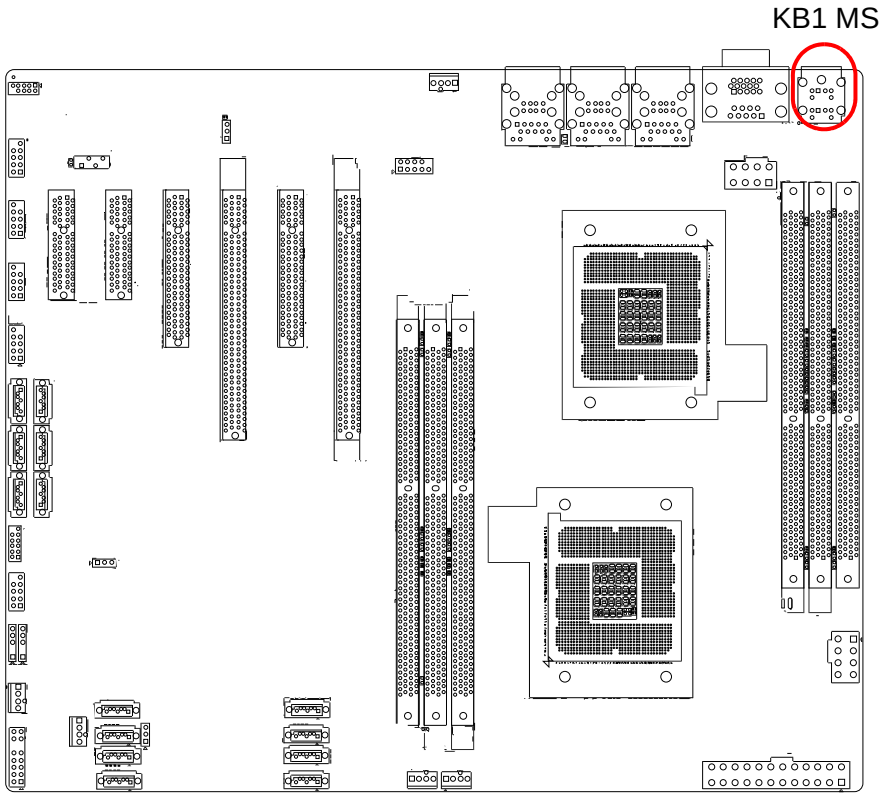




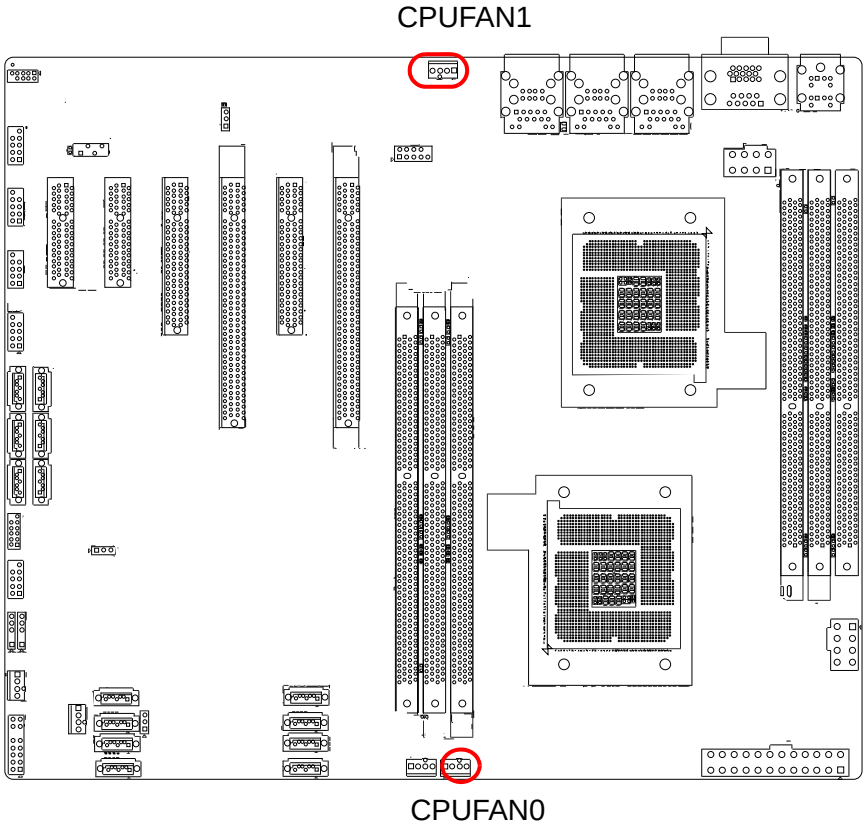
COM2

2.5 PS2 Keyboard and Mouse Connectors (KB1MS)

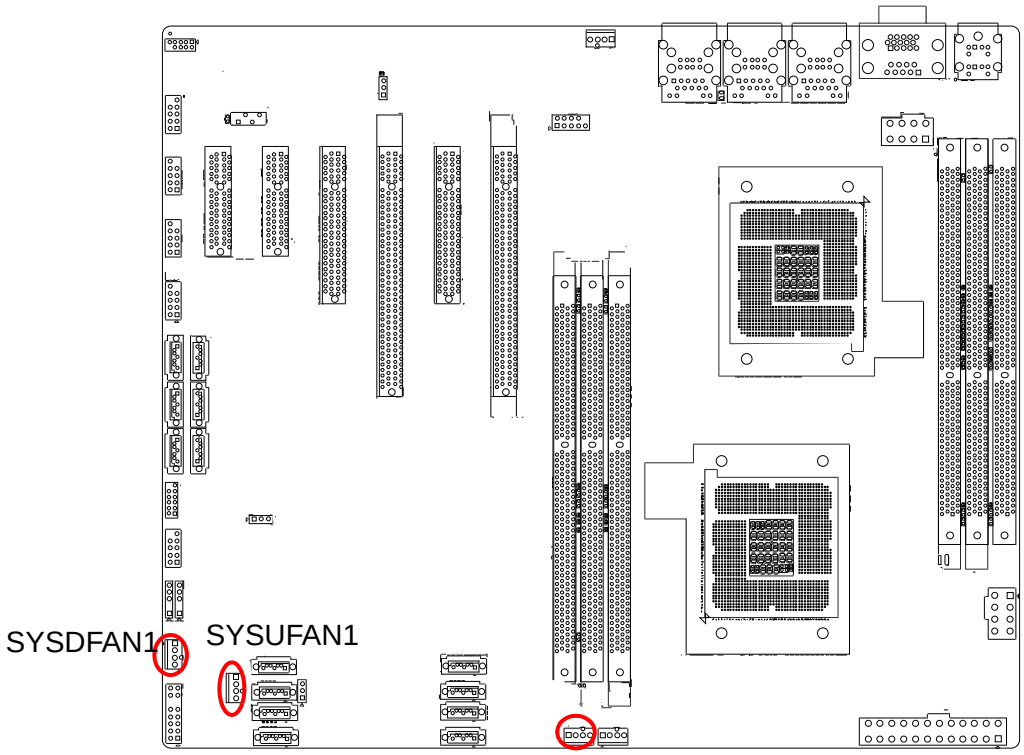
Two 6-pin mini-DIN connectors (KBMS1) on the rear panel of the motherboard provide PS/2 keyboard and mouse connections.



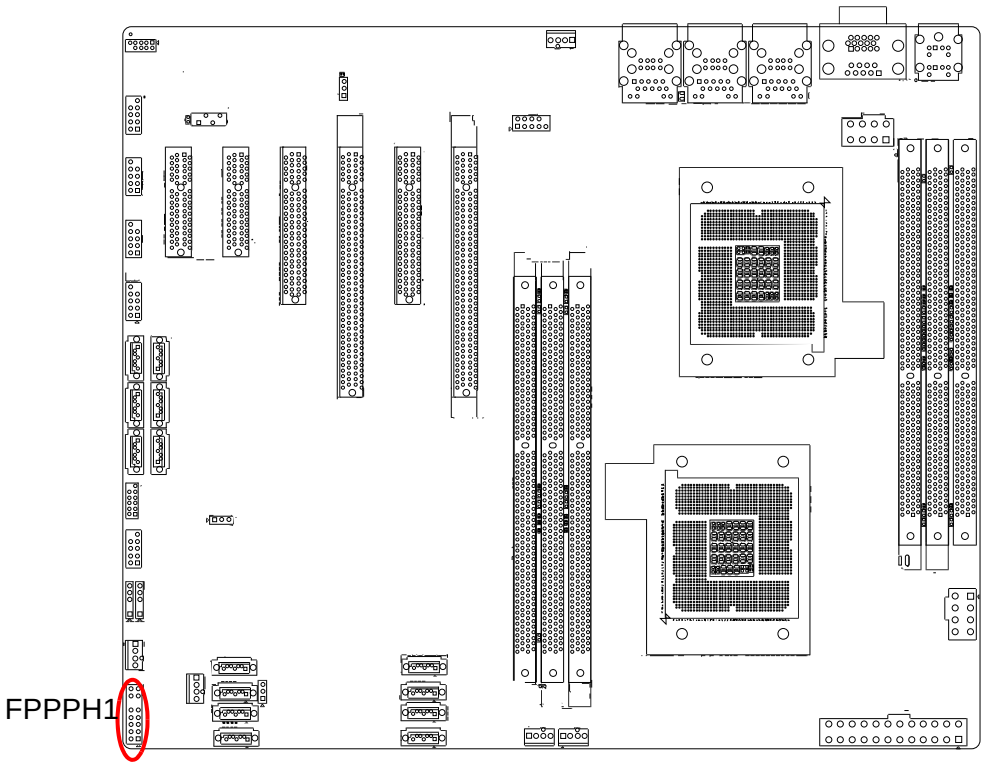
2.6 CPU Fan Connector (CPU FAN0/CPU FAN1)

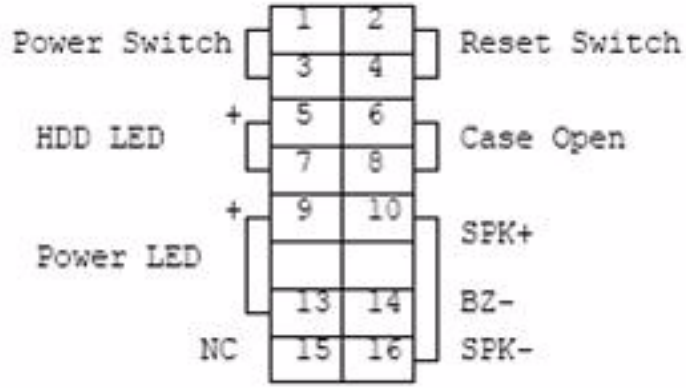


2.7 System FAN Connector (SYS DFAN1/UFAN1/ RFAN1)

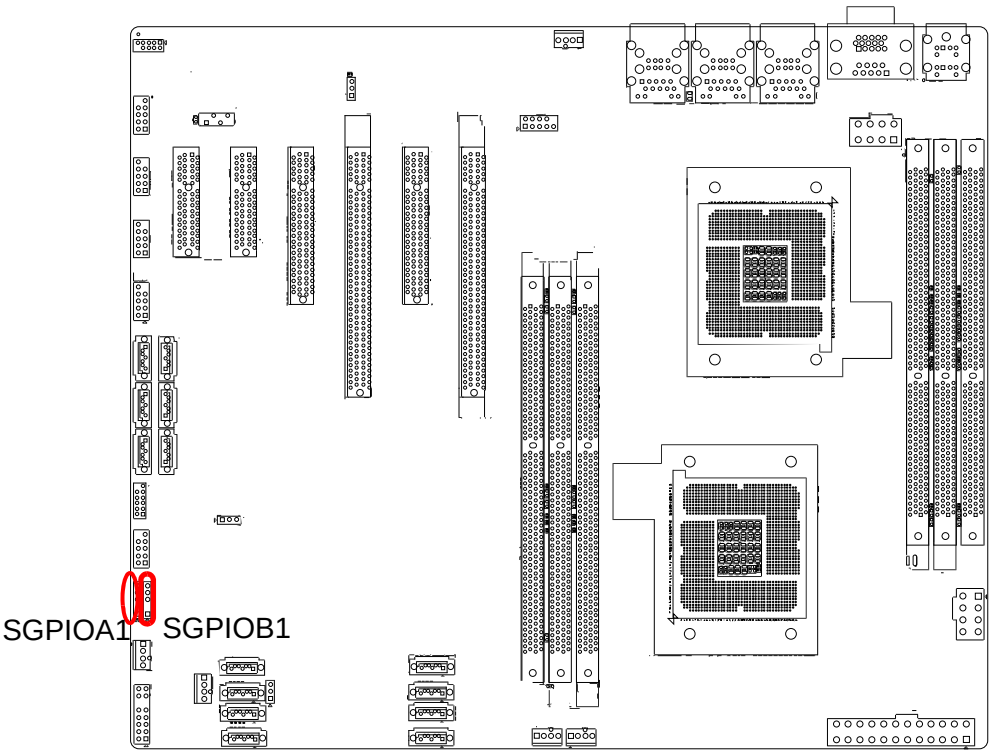


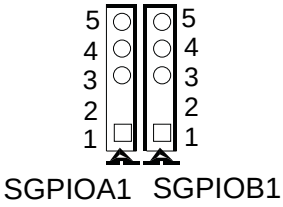
2.8 Front Panel Connector (FPPH1)





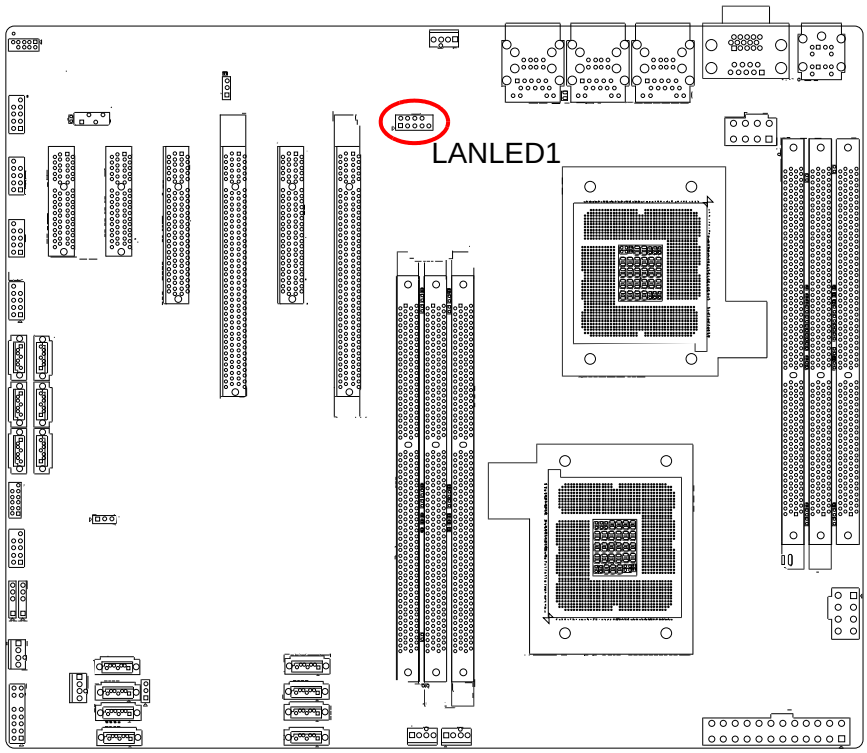
2.9 SGPIO (SGPIOA1/SGPIOB1)

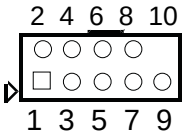




SGPIOA1		SGPIOB1	
1	SIOCLKA	1	SIOCLKB
2	NC	2	NC
3	SIOENDA	3	SIOENDB
4	SIOENDA	4	SIOENDB
5	SIODINA	5	SIODINB

2.10 Front Panel LAN Indicator Connector (LANLED1)



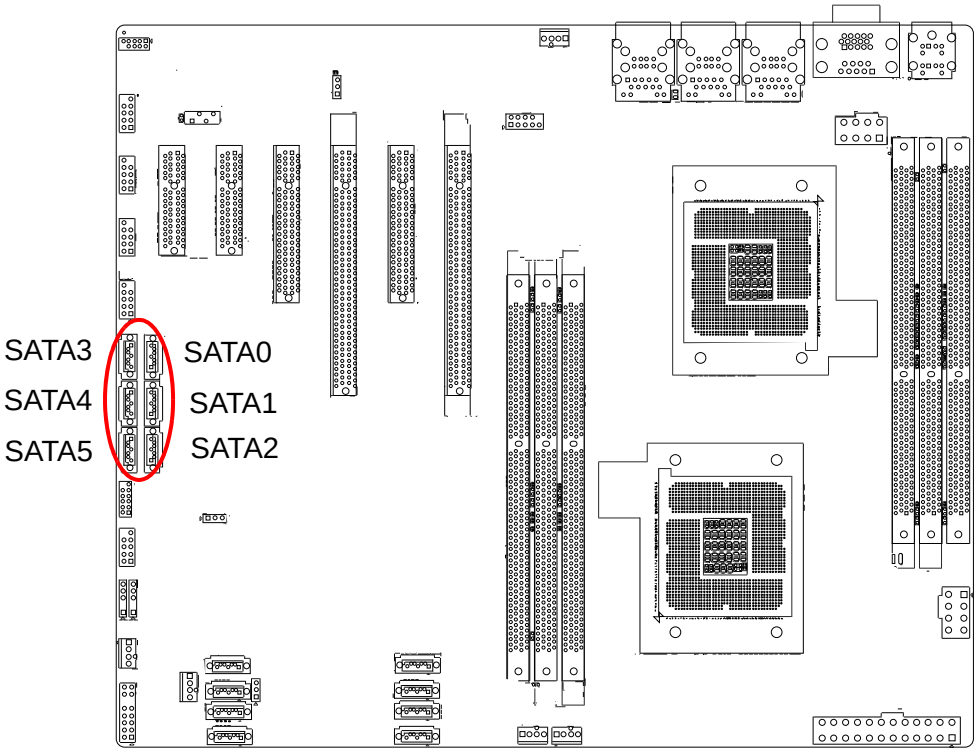


LANLED1

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

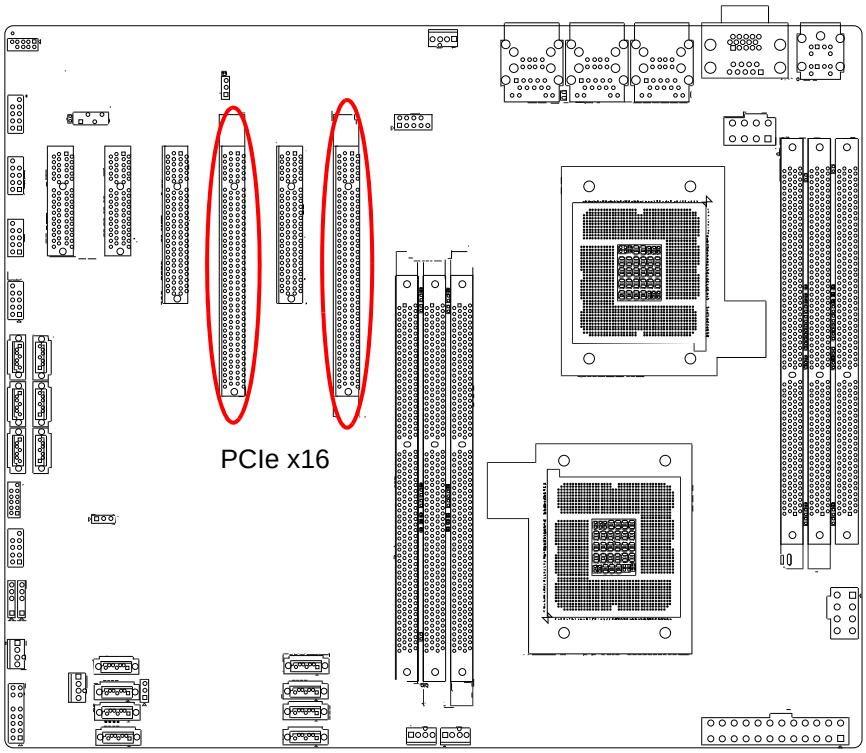
2.11 Serial ATA Interface (SATA0 ~ 5)

ASMB-310IR features six high performance serial ATA interface (up to 300 MB/s) which eases cabling to hard drives with thin and long cables.



2.12 PCIe x16 Expansion Slot (PCIEX16_1/ PCIEX16_3)

The ASMB-310IR provides two PCIe x16 slots.

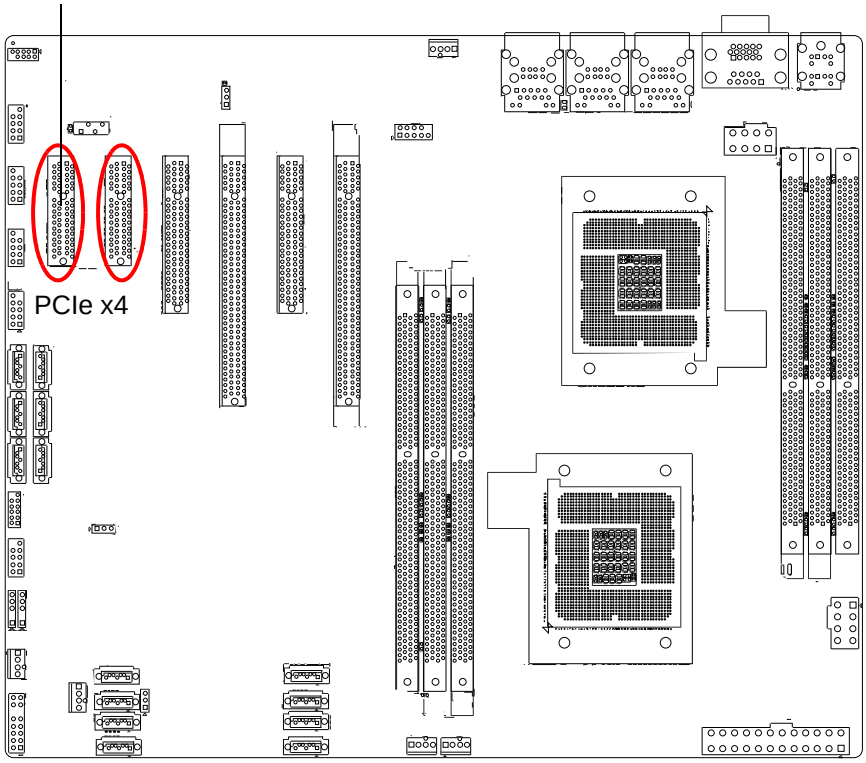


Note! *PCIe x16 can only run x8 link while next PCIe x8 is occupied.*

2.13 PCIe x4 Expansion Slot (PCIEX4_5/PCIEX4_6)

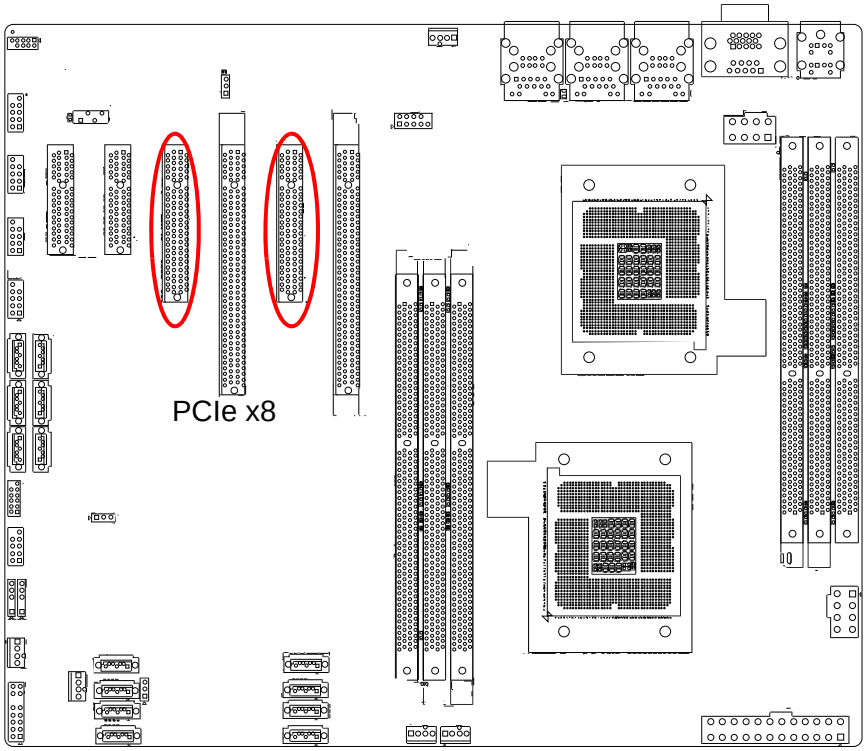
The ASMB-310IR provides One PCIe x4 slot. (ASMB-310 provides two PCIe x4 slots)

This slot only available in ASMB-310 SKU.

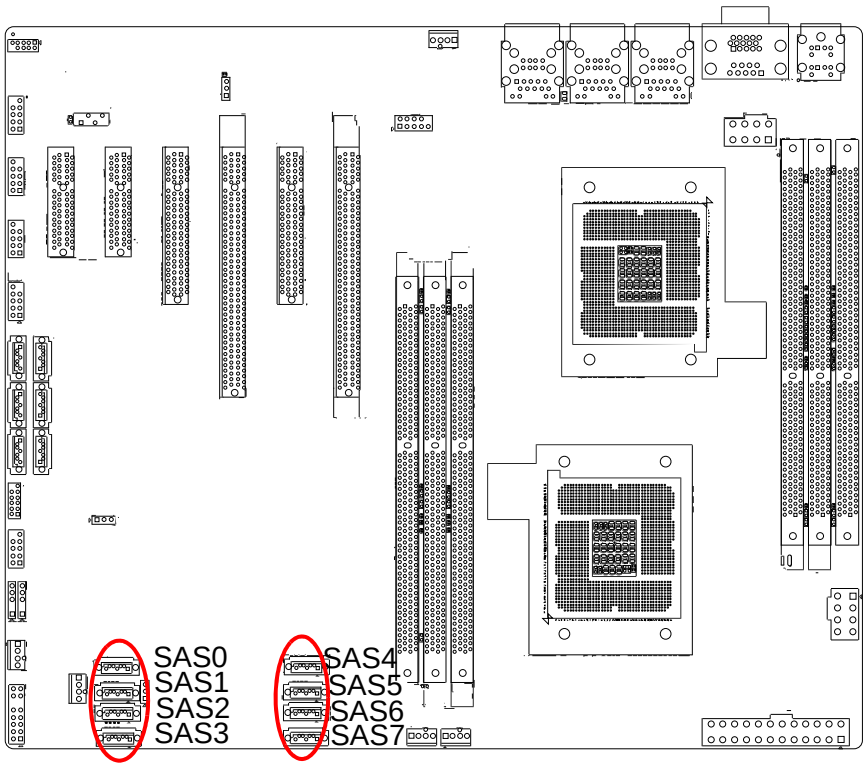


2.14 PCIe x8 Expansion Slot (PCIEX8_2/PCIEX8_4)

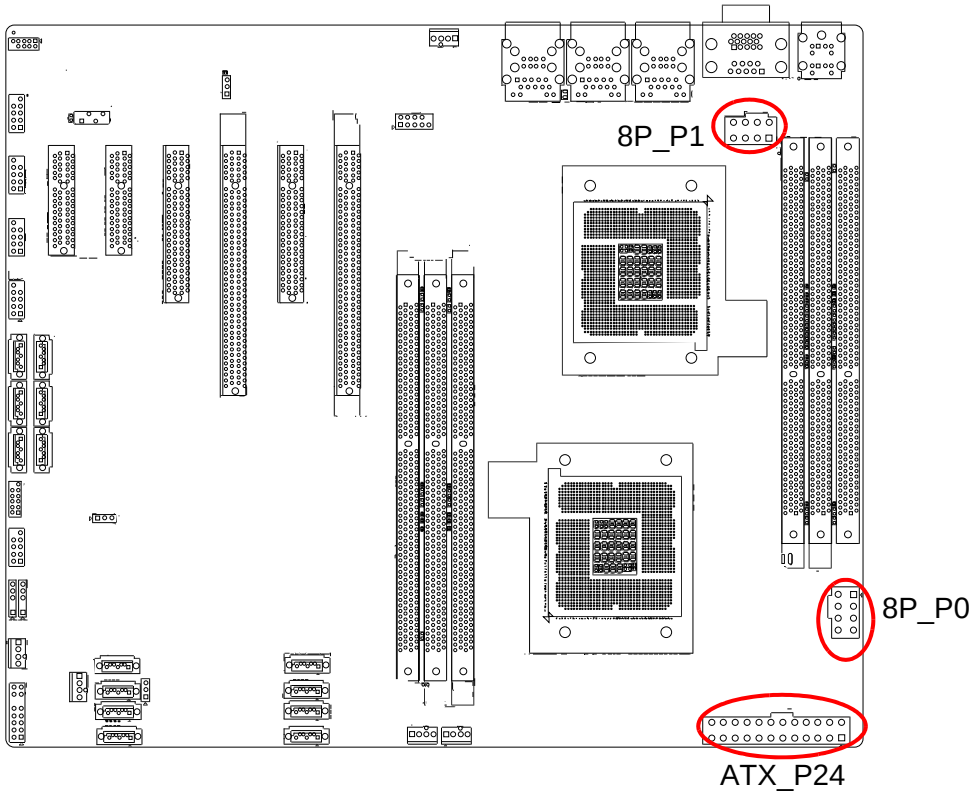
The ASMB-310IR provides two PCIe x8 slots.



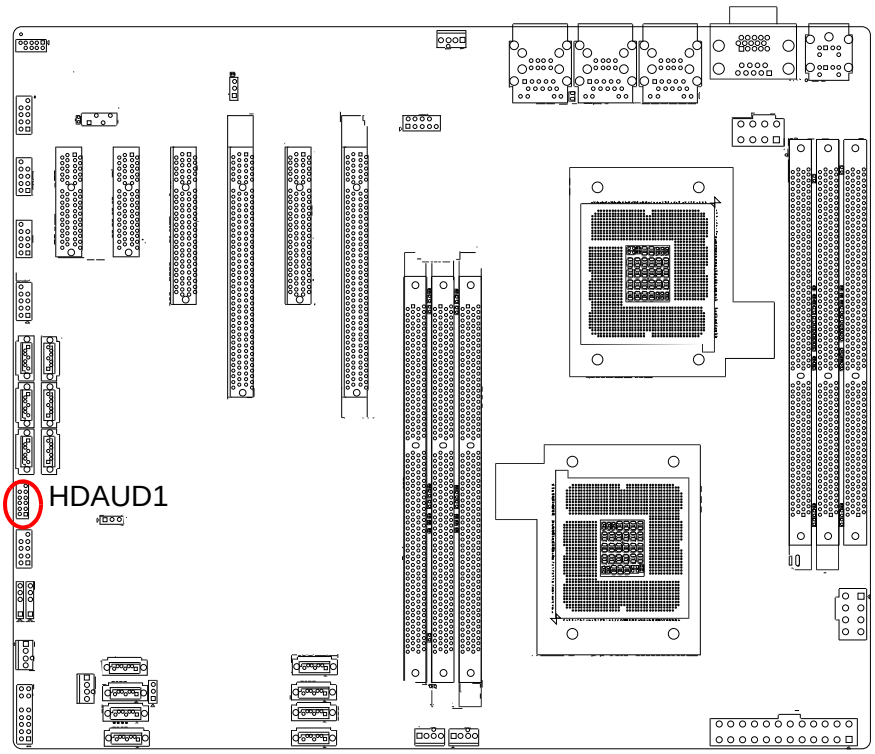
2.15 Series Attached SCSI Interface (SAS0 ~ 7)

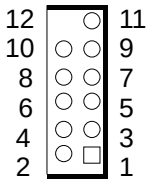


2.16 Auxiliary Power Connector (ATX_8P_PQ/ ATX_8P_P1/ATX_P24)



2.17 HD Audio Interface Connector (HDAUD1)

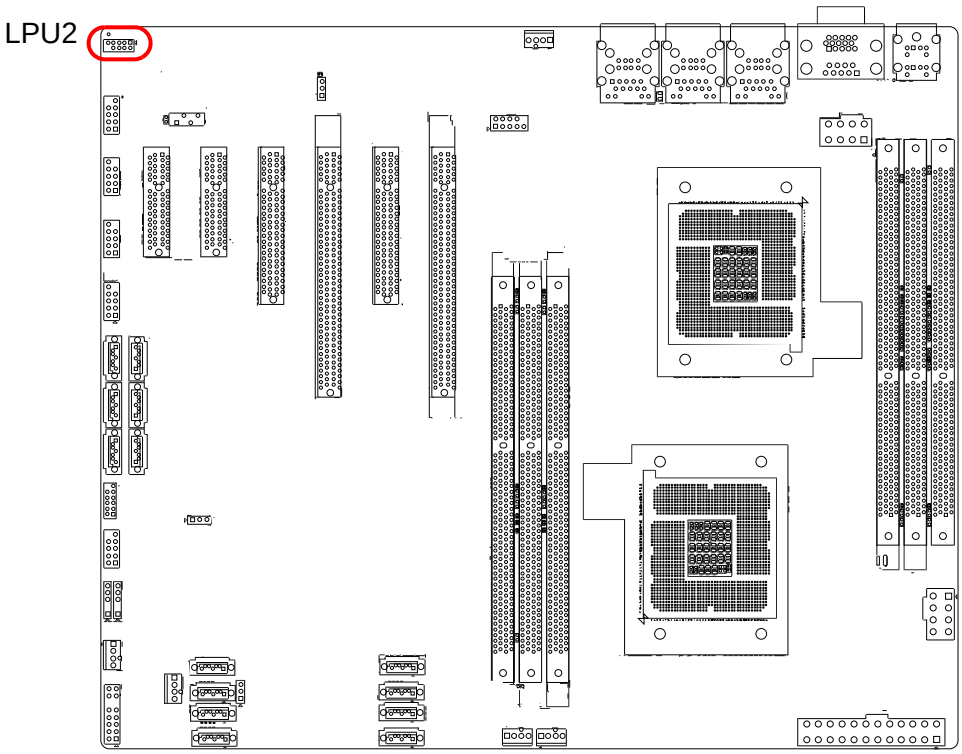


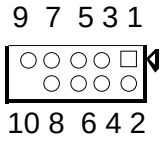


HDAUD1

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

2.18 LPU connector (LPU2)





LPC2

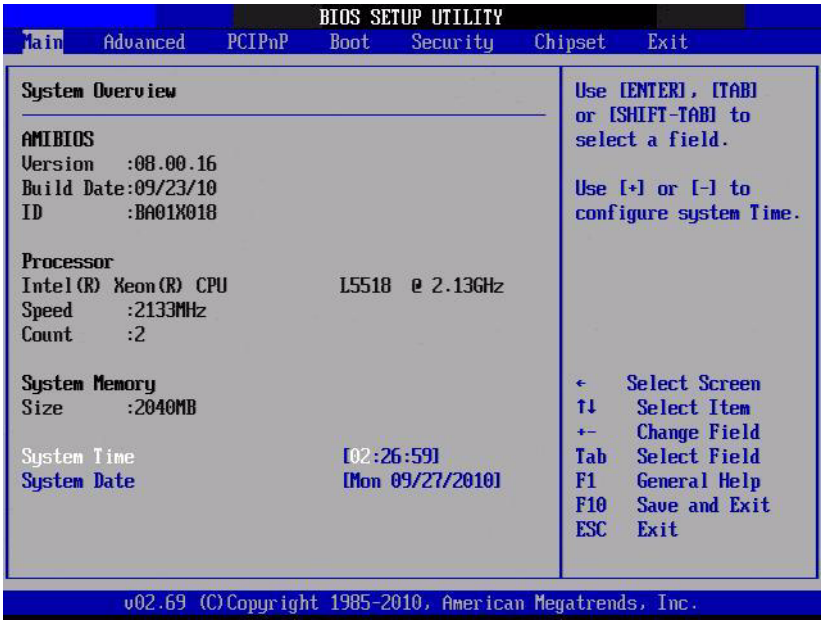
1	CLK_33M_PORT80_CN	2	LPC_LAD1
3	PLTRST_LPCP80	4	LPC_LAD0
5	LPC_LFRAME	6	+3.3 V
7	LPC_LAD3	8	GND
9	LPC_LAD2	10	NC

Chapter 3

AMI BIOS

3.1 Introduction

AMIBIOS has been integrated into many motherboards for over a decade. In the past, people often referred to the AMIBIOS setup menu as BIOS, BIOS setup or CMOS setup. With the AMIBIOS 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-310IR setup screens.

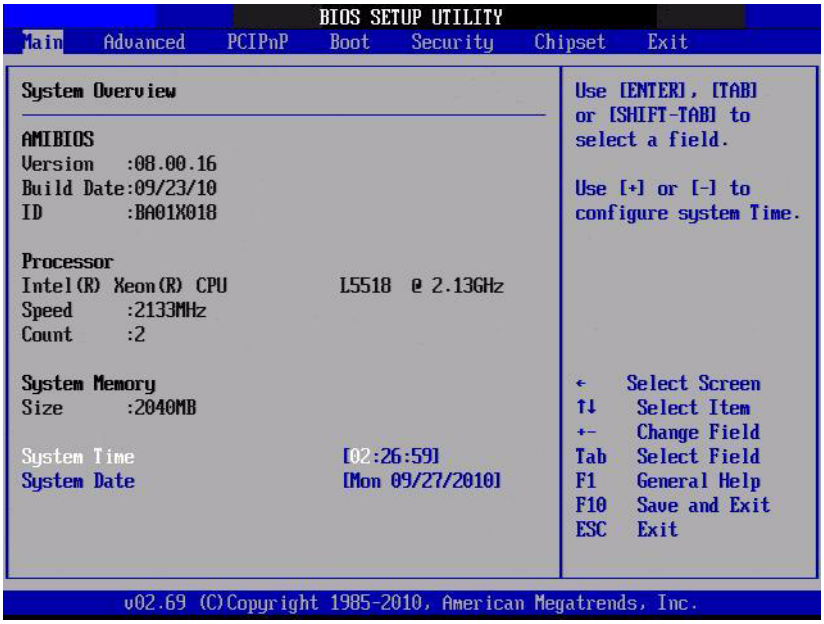


AMI's BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This type of information is stored in battery-backed up CMOS so it retains the Setup information when the power is turned off.

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.



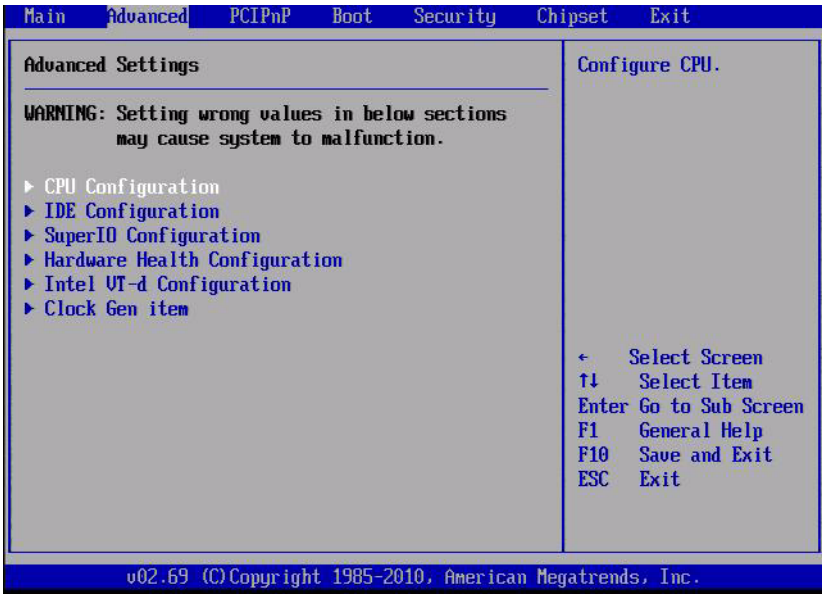
The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can be. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected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

3.2.1.1 System Time / System Date

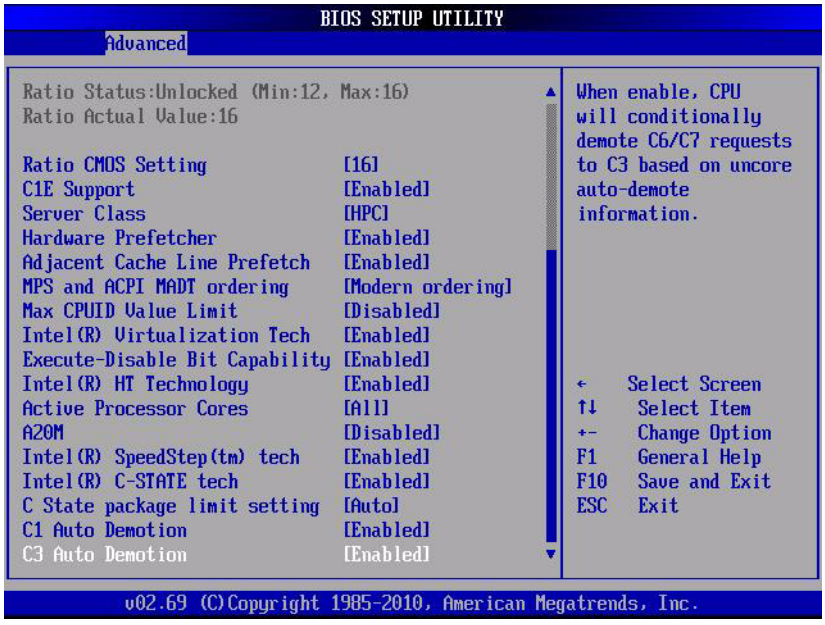
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

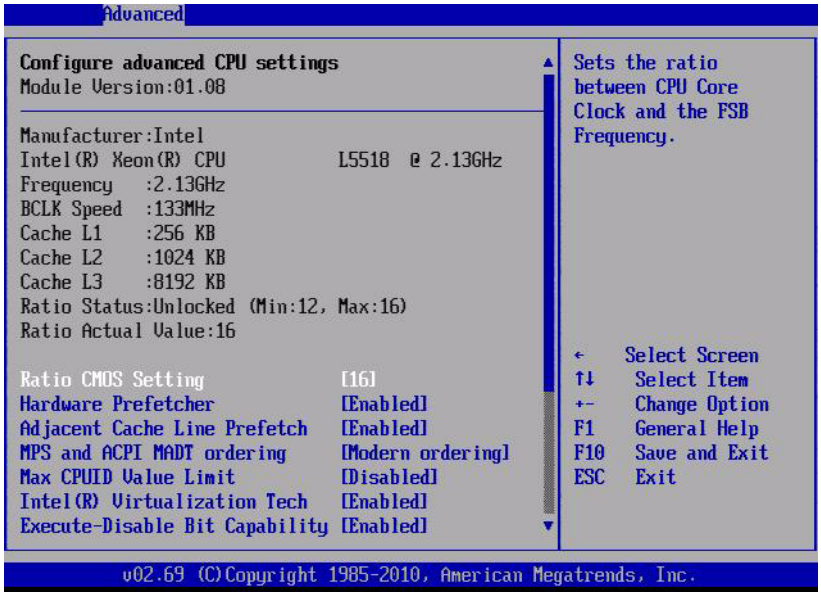
3.2.2 Advanced BIOS Features Setup

Select the Advanced tab from the ASMB-310IR 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 CPU Configuration





- **Ration CMOS Setting**

  Allows you to set the ratio between the CPU Core Clock and the BCLK Frequency.

  The valid value ranges vary according to your CPU model.

- **Hardware Prefetcher**

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

- **Adjacent Cache Line Prefetch**

  The processor fetches the currently requested cache line, as well as the subsequent cache line. This reduces the cache latency by making the next cache line immediately available if the processor requires it as well.

- **MPS and ACPI MADT ordering**

  MADT refers to Multiple APIC Description Table.

- **Max CPUID Value Limit**

  This item allows you to limit CPUID maximum value.

- **Intel® Virtualization Tech**

  Intel Virtualization Technology (Intel VT) is a set of hardware enhancements to Intel server and client platforms that provide software-based virtualization solutions. Intel VT allows a platform to run multiple operating systems and applications in independent partitions, allowing one computer system to function as multiple virtual systems.

- **Execute-Disable Bit Capability**

  This item allows you to enable or disable the No-Execution page protection technology.

- **Intel® HT Technology**

  This item allows you to enable or disable Intel Hyper Threading technology.

- **A20M**

  This makes legacy OS compatible with some APs.

- **Intel® SpeedStep® tech**

  When set to disabled, the CPU runs at its default speed, when set to enabled, the CPU speed is controlled by the operating system.

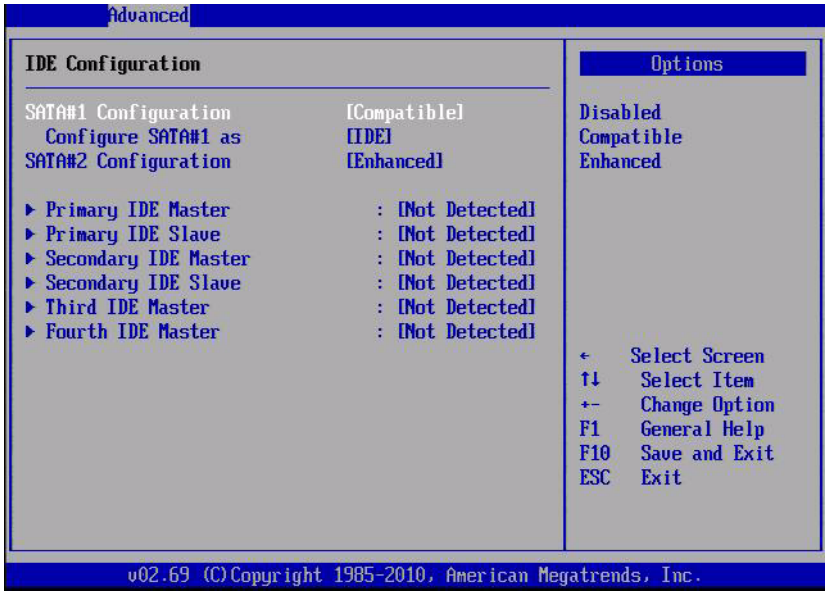
- **Intel® TurboMode tech**

  Turbo mode allows processor cores to run faster than marked frequency for specific conditions.

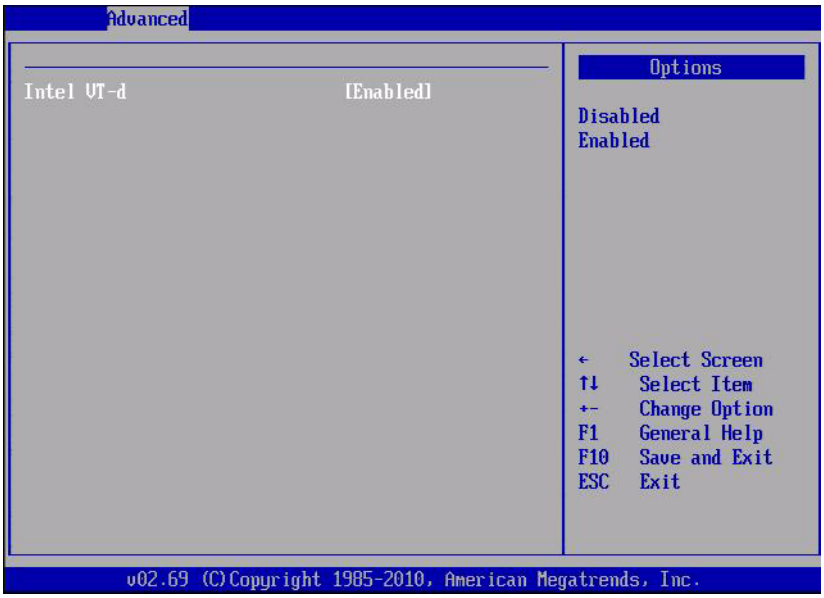
- **Intel® C-STATE tech**

  This function saves CPU power consumption when in system halt state. When enabled, the CPU speed and voltage will be reduced during system halt state to save power consumption. You may choose to enable or disable it.

3.2.2.2 IDE Configuration



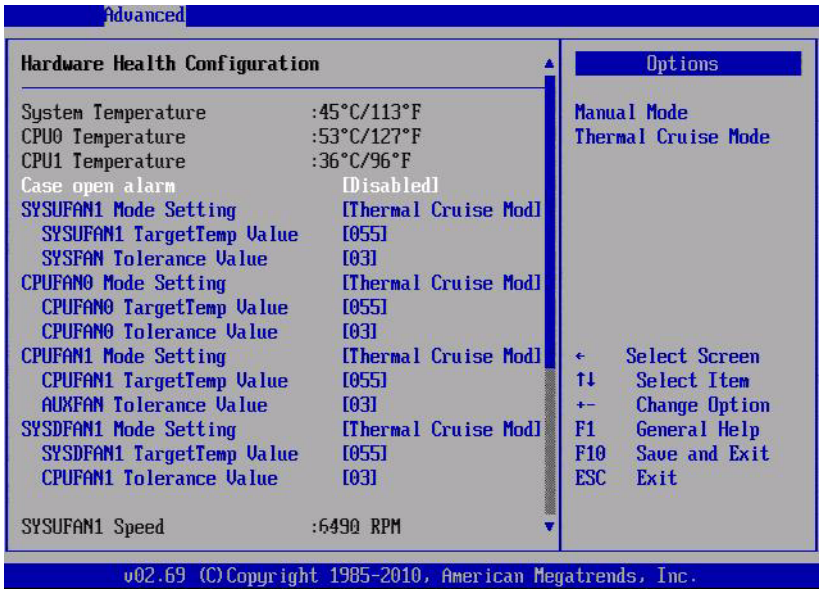
3.2.2.3 Intel VT-d Setting



- **Intel VT-d Configuration**

  To support Intel chipset virtualization technology for directed I/O.

3.2.2.4 Hardware Health Configuration

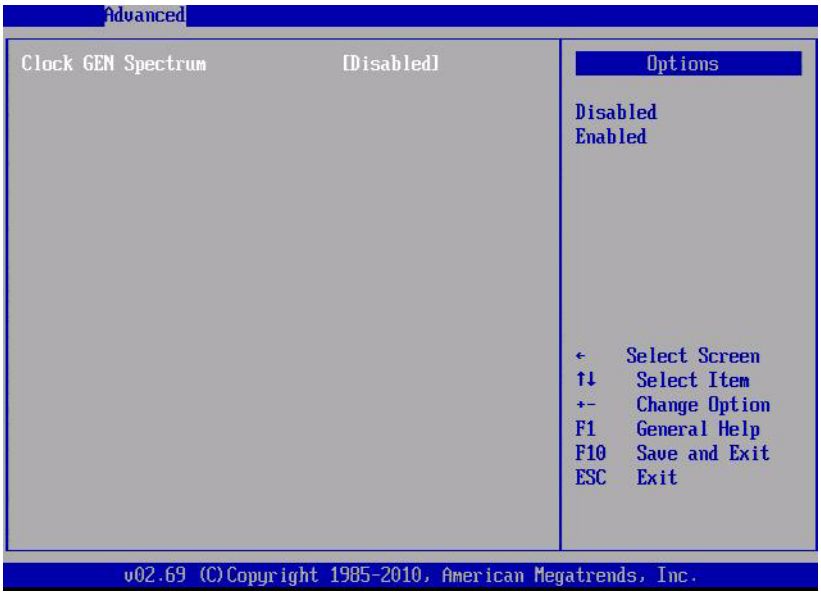


- **Chassis Intrusion**
  Enable/Disable the Chassis Intrusion monitoring function. When the case is opened, the buzzer beeps.

3.2.2.5 Super I/O Configuration

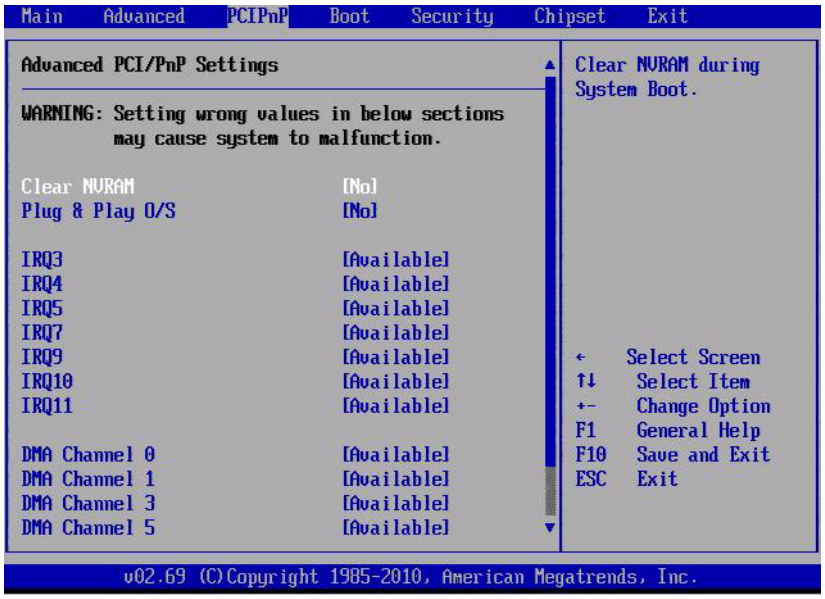
- **Serial Port1 Address**
  This option configures serial port 1 base addresses.
- **Serial Port2 Address**
  This option configures serial port 2 base addresses.

3.2.2.6 Clock Gen Spectrum Setting



3.2.3 Advanced PCI/PnP Settings

Select the PCI/PnP tab from the ASMB-310IR setup screen to enter the Plug and Play BIOS Setup screen. You can display a Plug and Play BIOS Setup option by highlighting it using the <Arrow> keys. All Plug and Play BIOS Setup options are described in this section. The Plug and Play BIOS Setup screen is shown below.



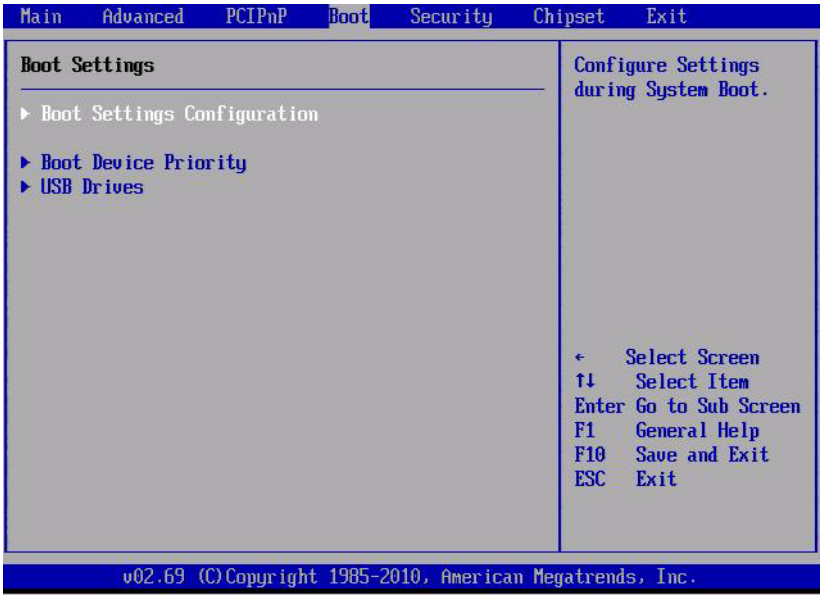
3.2.3.1 Clear NVRAM

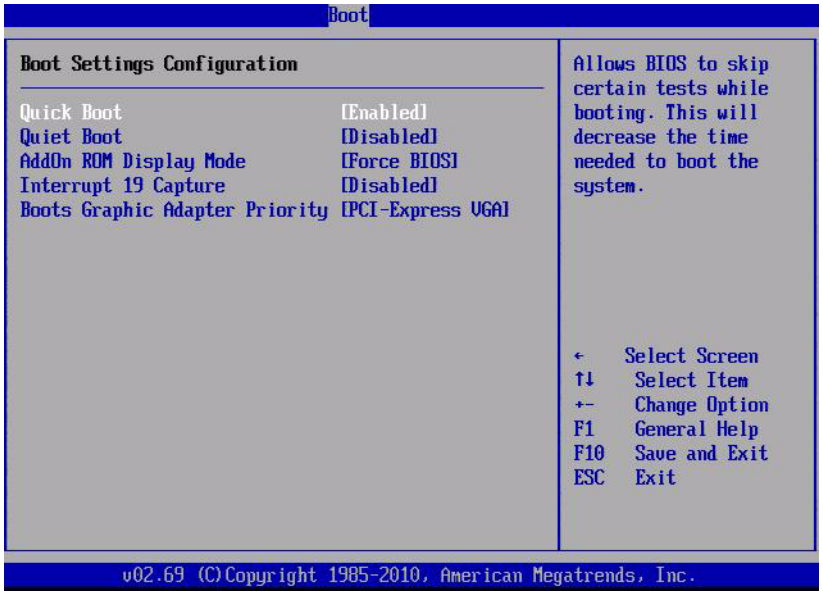
Set this value to force the BIOS to clear the Non-Volatile Random Access Memory (NVRAM).The Optimal and Fail-Safe default setting is No.

3.2.3.2 Plug & Play O/S

When set to No, BIOS configures all the devices in the system. When set to Yes and if you install a Plug and Play operating system, the operating system configures the Plug and Play devices not required for bootup.

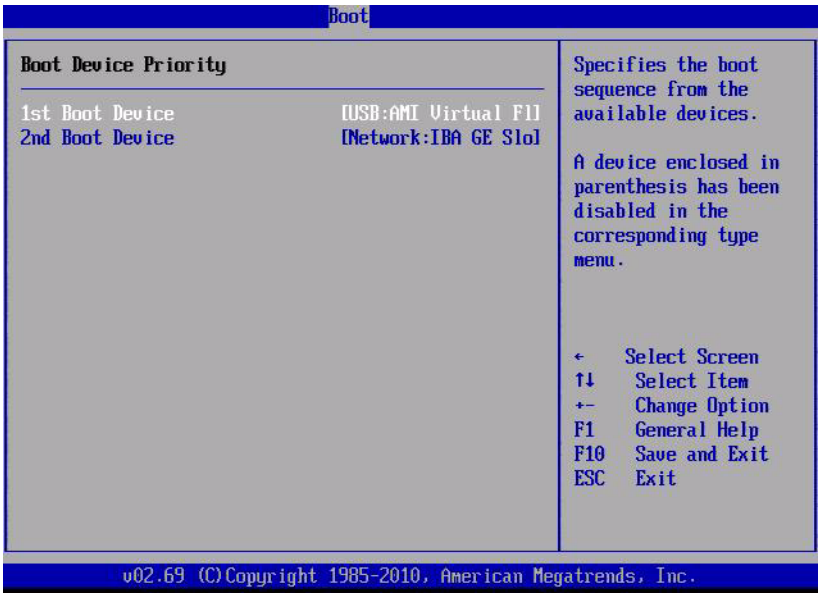
3.2.4 Boot Settings

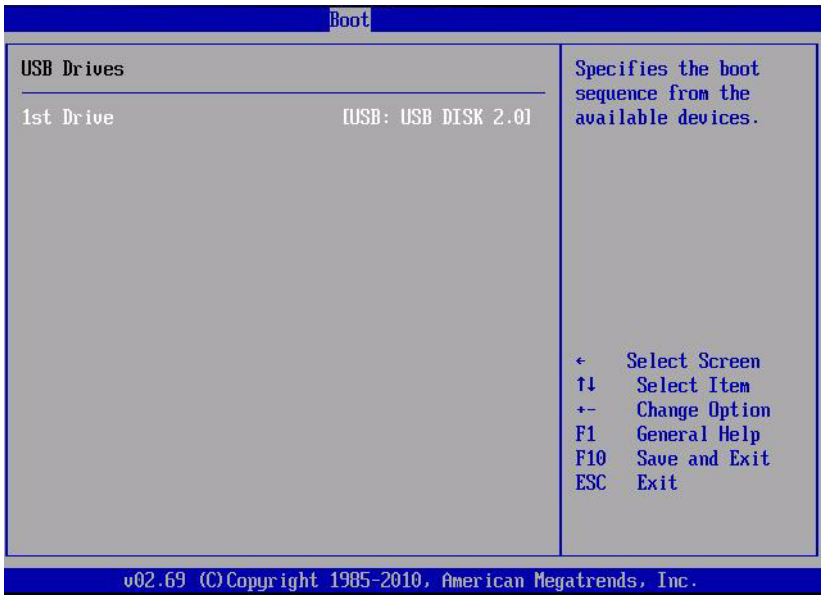




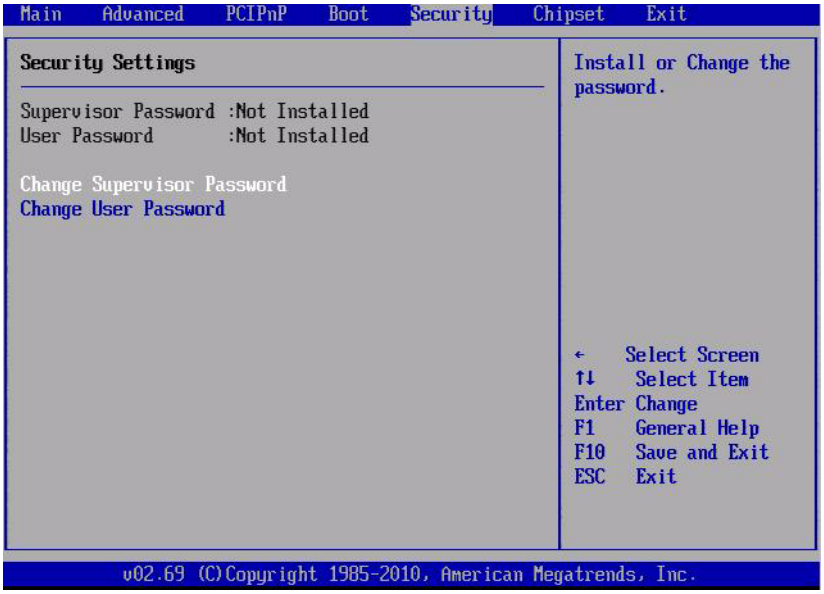
- **Quick Boot**
  This item allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.
- **Quiet Boot**
  If this option is set to Disabled, the BIOS displays normal POST messages. If Enabled, an OEM Logo is shown instead of POST messages.
- **AddOn ROM Display Mode**
  Set display mode for option ROM.
- **Interrupt 19 Capture**
  Some add-on cards' option ROMs need Interrupt 19, this is to enable or disable supporting this kind of add-on cards.

Boots Graphic Adapter Priority





3.2.5 Security Setting

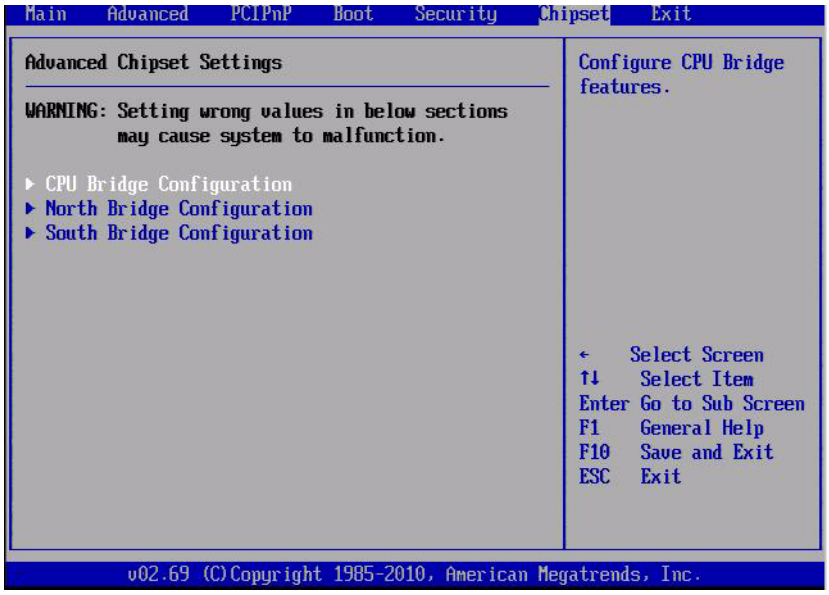


Select Security Setup from the ASMB-310IR Setup main BIOS setup menu. All Security Setup options, such as password protection and virus protection are described in this section. To access the sub menu for the following items, select the item and press <Enter>:

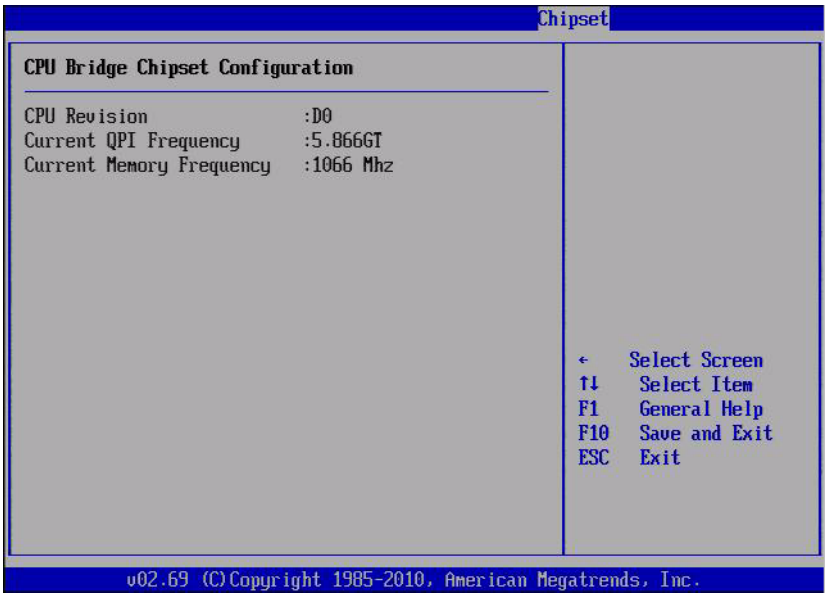
3.2.5.1 Change Supervisor / User Password

Provides for either installing or changing the password.

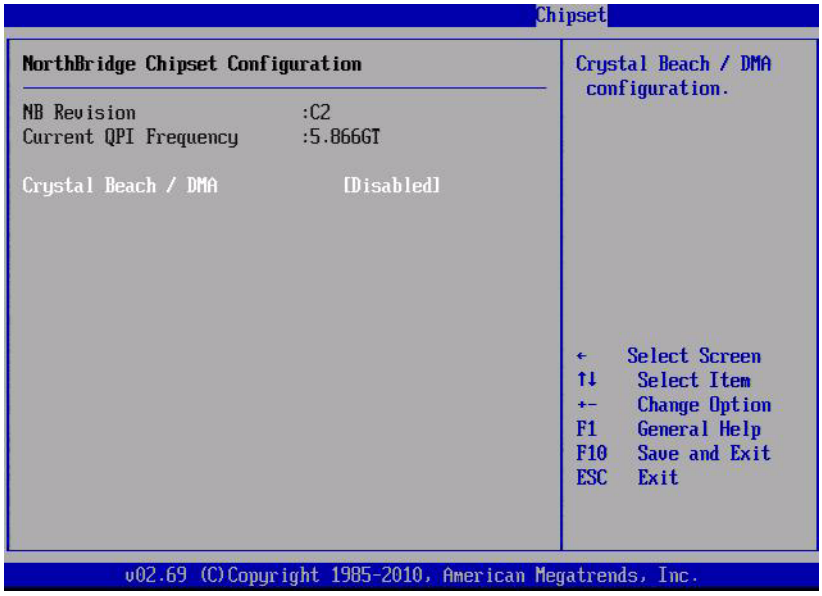
3.2.6 Advanced Chipset Settings



3.2.6.1 CPU Bridge Chipset Configuration



3.2.6.2 North Bridge Chipset Configuration



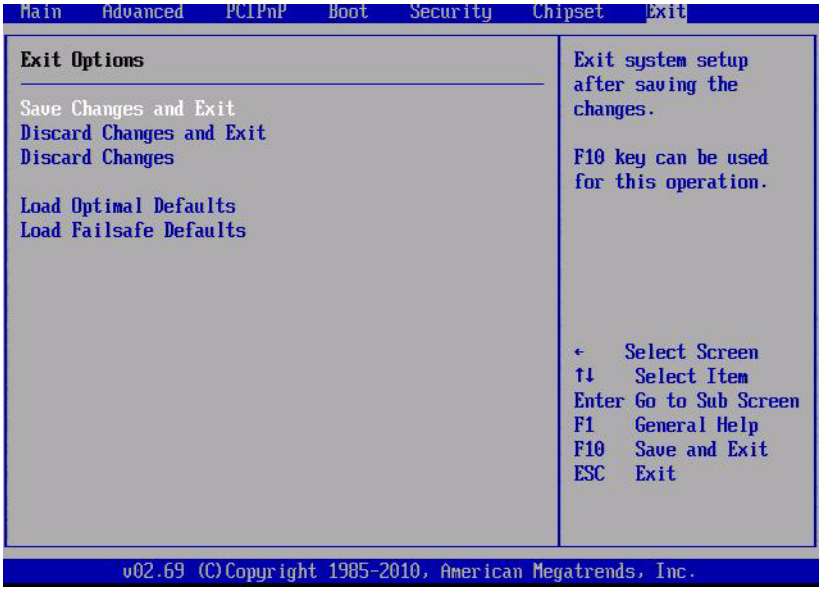
- **PCI-E port assign method [Auto][x8x8x8x8]**

Note! *PCI-E port assign method defaults as "Auto". When inserting a riser card into PCI-E x16 Slot 1, and it fails to recognize the add-on card of the riser card, plase change the default setting to x8x8x8x8 manually.*

3.2.6.3 South Bridge Chipset Configuration

- **HDA Controller**
  Enables or disables the High Definition audio controller.

3.2.7 Exit Option



3.2.7.1 Save Changes and Exit

When you have completed 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 Save Changes and Exit from the Exit menu and press <Enter>. The following message appears:
   Save Configuration Changes and Exit Now?
   [Ok] [Cancel]
2. Select Ok or Cancel.

3.2.7.2 Discard Changes and Exit

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

   Discard Changes and Exit Setup Now?

   [Ok] [Cancel]

2. Select Ok to discard changes and exit.

3.2.7.3 Discard Changes

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

3.2.7.4 Load Optimal Defaults

The ASMB-310IR automatically configures all setup items to optimal settings when you select this option. Optimal Defaults are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Optimal Defaults if your computer is experiencing system configuration problems. Select Load Optimal Defaults from the Exit menu and press <Enter>.

3.2.7.5 Load Failsafe Defaults

The ASMB-310IR automatically configures all setup options to failsafe settings when you select this option. Failsafe Defaults are designed for maximum system stability, but not maximum performance. Select Failsafe Defaults if your computer is experiencing system configuration problems.

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

   Save Configuration Changes and Exit Now?

   [Ok] [Cancel]

2. Select OK to load Failsafe defaults.

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