GS-R22PDP
GS-R22PDT

Four hot-pluggable systems (nodes)
Dual LGA2011 sockets motherboard for Intel® E5-2600 series processors

Service Guide

Rev. 1.0

Copyright

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Documentation Classifications

In order to assist in the use of this product, GIGABYTE provides the following types of documentations:

- For detailed product information, carefully read the Serice Guide.

For product-related information, check on our website at:
http://www.gigabyte.com

Preface

Before using this information and the product it supports, please read the following general information.

1. This Service Guide provides you with all technical information relating to the BASIC CONFIGURATION decided for GIGABYTE's "global" product offering. To better fit local market-requirements and enhance product competitiveness, your regional office MAY have decided toextend the functionality of a machine (e.g. add-on card, modem, or extra memory capability).These LOCALIZED FEATURES will NOT be covered in this generic service guide. In suchcases, please contact your regional offices or the responsible personnel/channel to provide youwith further technical details.
2. Please note WHEN ORDERING SPARE PARTS, you should check the most up-to-date informationavailable on your regional web or channel. For whatever reason, if a part number change is made,it will not be noted in the printed Service Guide. For GIGABYTE-AUTHORIZED SERVICEPROVIDERS, your GIGABYTE office may have a DIFFERENT part number code to thosegiven in the FRU list of this printed Service Guide. You MUST use the list provided by yourregional GIGABYTE office to order FRU parts for repair and service of customer machines.

Table of Contents

Box Contents

- ☑ Server System
- ☑ 8 x Heat sinks

- The box contents above are for reference only and the actual items shall depend on the product package you obtain. The box contents are subject to change without notice.
- The motherboard image is for reference only.

Safety, Care and Regulatory Information

Important safety information

Read and follow all instructions marked on the product and in the documentation before you operateyour system. Retain all safety and operating instructions for future use.

- The product should be operated only from the type of power source indicated on the rating label.* If your computer has a voltage selector switch, make sure that the switch is in the proper position foryour area. The voltage selector switch is set at the factory to the correct voltage.
- The plug-socket combination must be accessible at all times because it serves as the main disconnecting device.
- All product shipped with a three-wire electrical grounding-type plug only fits into a grounding-type poweroutlet. This is a safety feature. The equipment grounding should be in accordance with local and nationalelectrical codes. The equipment operates safely when it is used in accordance with its marked electricalratings and product usage instructions
- Do not use this product near water or a heat source.* Set up the product on a stable work surface or so as to ensure stability of the system.
- Openings in the case are provided for ventilation. Do not block or cover these openings. Make sure youprovide adequate space around the system for ventilation when you set up your work area. Never insertobjects of any kind into the ventilation openings.
- To avoid electrical shock, always unplug all power cables and modem cables from the wall outletsbefore removing covers.
- Allow the product to cool before removing covers or touching internal components.

Precaution for Product with Laser Devices

Observe the following precautions for laser devices:

- Do not open the CD-ROM drive, make adjustments, or perform procedures on a laser device other than those specified in the product's documentation.
- Only authorized service technicians should repair laser devices.

Precaution for Product with Modems, Telecommunications, ot Local AreaNetwork Options

Observe the following precautions for laser devices:

- Do not connect or use a modem or telephone during a lightning storm. There may be a risk of electricalshock from lightning.
- To reduce the risk of fire, use only No. 26 AWG or larger telecommunications line cord.
- Do not plug a modem or telephone cable into the network interface controller (NIC) receptacle.
- Disconnect the modem cable before opening a product enclosure, touching or installing internalcomponents, or touching an uninsulated modem cable or jack.
- Do not use a telephone line to report a gas leak while you are in the vicinity of the leak.

Federal Communications Commission (FCC) Statement

Warning

This is a class A product. In a domestic environment this product may cause radiointerfer-

enceIn which case the user may be required to take adequate measures.

This equipment has been tested and found to comply with the limits for a Class A digital device,pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection againstharmful interference when the equipment is operated in a commercial environment. This equipmentgenerates, uses, and can radiate radio frequency energy and, if not installed and used in accordance withthe instruction manual, may cause harmful interference to radio communications. Operation of thisequipment in a residential area is likely to cause harmful interference in which case the user will berequired to correct the interference at his own expense.Properly shielded and grounded cables and connectors must be used in order to meet FCC emissionlimits. Neither the provider nor the manufacturer are responsible for any radio or television interferencecaused by using other than recommended cables and connectors or by unauthorized changes ormodifications to this equipment. Unauthorized changes or modifications could void the user's authority tooperate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

FCC part 68 (applicable to products fitted with USA modems)

The modem complies with Part 68 of the FCC Rules. On this equipment is a label that contains, amongother information, the FCC registration number and Ringer Equivalence Number (REN) for this equipment.You must, upon request, provide this information to your telephone company.If your telephone equipment causes harm to the telephone network, the Telephone Company maydiscontinue your service temporarily. If possible, they will notify in advance. But, if advance notice is notpractical, you will be notified as soon as possible. You will be informed of your right to file a complaint with the FCC.Your telephone company may make changes in its facilities, equipment, operations, or procedures thatcould affect proper operation of your equipment. If they do, you will be notified in advance to give you anopportunity to maintain uninterrupted telephone service.The FCC prohibits this equipment to be connected to party lines or coin-telephone service.The FCC also requires the transmitter of a FAX transmission be properly identified (per FCC Rules Part68, Sec. 68.381 (c) (3)./ for Canadian users only

Canadian Department of Communications Compliance Statement

This digital apparatus does not exceed the Class A limits for radio noise emissions from digitalapparatus as set out in the radio interference regulations of Industry Canada.Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables auxappareils numeriques de Classe A prescrites dans le reglement sur le brouillage radioelectrique edicte parIndustrie Canada.

DOC notice (for products fitted with an Industry Canada-compliant modem)

The Canadian Department of Communications label identifies certified equipment. This certificationmeans that the equipment meets certain telecommunications network protective, operational and safetyrequirements. The Department does not guarantee the equipment will operate to the user satisfaction.Before installing this equipment, users ensure that it is permissible to be connected to the facilities of thelocal Telecommunications Company. The equipment must also be installed using an acceptable methodof connection. The customer should be aware that compliance with the above conditions might not preventdegradation of service in some situations.Repairs to certified equipment should be made by an authorized Canadian maintenance

facility designatedby the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions,may give the telecommunications company cause to request the user to disconnect the equipment.Users should ensure for their own protection that the electrical ground connections of the power utility,telephone lines and internal metallic water pipe system, if resent are connected together. This precautionmay be particularly important in rural areas.Caution: Users should not attempt to make such connections themselves, but should contact theappropriate electric inspection authority, or electrician, as appropriate.

NOTICE: The Load Number (LN) assigned to each terminal device denotes the percentage of the totalload to be connected to a telephone loop which is used by the device, to prevent overloading. Thetermination on a loop may consist of any combination of devices subject only to the requirement that thesum of the Load Numbers of all the devices does not exceed 100./ for European users only /

Class A equipment

This device has been tested and found to comply with the limits for a class A digital device pursuantPart 15 of the FCC Rules. These limits are designed to provide reasonable protection againstharmful interference when the equipment is operated in a commercial environment. This equipmentgenerate, uses, and can radiate radio frequency energy, and if not installed and used in accordancewith the instructions, may cause harmful interference to radio communication. Operation of thisequipment in a residential area is likely to cause harmful interference, in which case the user will berequired to correct the interference at personal expence.

However, there is no guarantee that interference will not occur in a particular installation. If thisdevice does cause harmful interference to radio or television reception, which can be determined bytuning the device off and on, the user is encouraged to try to correct the interference by on or more ofthe following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the device and receiver
- Connect the device into an outlet on a circuit different from that to which the receiver isconnected□Consult the dealer or an experienced radio/television technician for help.

WEEE Symbol Statement

The symbol shown below is on the product or on its packaging, which indicates that this product must not be disposed of with other waste. Instead, the device should be taken to the waste collection centers for activation of the treatment, collection, recycling and disposal procedure. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local government office, your household waste disposal service or where you purchased the product for details of environmentally safe recycling.

- When your electrical or electronic equipment is no longer useful to you, "take it back" to your local or regional waste collection administration for recycling.
- If you need further assistance in recycling, reusing in your "end of life" product, you may contact us at the Customer Care number listed in your product's user's manual and we will be glad to help you with your effort.

Battery Warning: Incorrectly installing a battery or using incompatible battery may increase the risk of ifre explosion. Replace the battery only with the same or equivalent type.

- Do not disassemble, crush, punchture batteries.
- Do not store or place your battery pack next to or in a heat source such as a fire, heatgenerating appliance, can or exhaust vent. Heating battery cells to temperatures above 65°C (149°F) can cause explosion or fire.
- Do not attempt to open or service batteries. Do not dispose of batteries in a fire or with household waste.

Chapter 1 Hardware Installation

1-1 Installation Precautions

The motherboard/system contain numerous delicate electronic circuits and components which can become damaged as a result of electrostatic discharge (ESD). Prior to installation, carefully read the service guide and follow these procedures:

- Prior to installation, do not remove or break motherboard S/N (Serial Number) sticker or warranty sticker provided by your dealer. These stickers are required for warranty validation.
- Always remove the AC power by unplugging the power cord from the power outlet before installing or removing the motherboard or other hardware components.
- When connecting hardware components to the internal connectors on the motherboard, make sure they are connected tightly and securely.
- When handling the motherboard, avoid touching any metal leads or connectors.
- It is best to wear an electrostatic discharge (ESD) wrist strap when handling electronic components such as a motherboard, CPU or memory. If you do not have an ESD wrist strap, keep your hands dry and first touch a metal object to eliminate static electricity.
- Prior to installing the motherboard, please have it on top of an antistatic pad or within an electrostatic shielding container.
- Before unplugging the power supply cable from the motherboard, make sure the power supply has been turned off.
- Before turning on the power, make sure the power supply voltage has been set according to the local voltage standard.
- Before using the product, please verify that all cables and power connectors of your hardware components are connected.
- To prevent damage to the motherboard, do not allow screws to come in contact with the motherboard circuit or its components.
- Make sure there are no leftover screws or metal components placed on the motherboard or within the computer casing.
- Do not place the computer system on an uneven surface.
- Do not place the computer system in a high-temperature environment.
- Turning on the computer power during the installation process can lead to damage to system components as well as physical harm to the user.
- If you are uncertain about any installation steps or have a problem related to the use of the product, please consult a certified computer technician.

1-2 Product Specifications (Per Node)

CPU	◆ Support for Intel® Xeon® E5-2600 series processors in the LGA2011 package ◆ L3 cache varies with CPU ◆ Supports QuickPath Interconnect up to 8GT/s ◆ Enhanced Intel SpeedStep Technology (EIST) ◆ Support Intel Virtualization Technology (VT)
Chipset	◆ Intel® C602 (Patsburg-A) Chipset
Memory	◆ 16 x 1.35V/1.5V DDR3 DIMM sockets supporting up to 128GB (UDIMM) and 256GB (RDIMM) of system memory ◆ 16 x 1.35V/1.5V DDR3 LRDIMM sockets supporting up to 512GB of system memory ◆ Four channel memory architecture ◆ Support for 800/1066/1333/1600 memory modules ◆ Support for ECC RDIMM/ UDIMM/ LRDIMM memory modules
LAN	◆ Intel® I350 supports dual Gigabit ethernet LAN ports ◆ 1 x Management LAN port
Expansion Slot	◆ 1 x Half-length low-profile slot with PCIe x16 (Gen3 x16 bus) connector ◆ 1 x Mezzanine I/F PCIe x8 (Gen3 x8 bus) connector
Onboard Graphics	◆ ASPEED® AST2300 supports 16MB VRAM
Mass Storage (SATA)	◆ Intel® C602 controller ◆ 2 x SATA 6Gb/s connectors (SATA0/SATA1) ◆ 4 x SATA 3Gb/s connectors (SATA2/SATA3/SATA4/SATA5) ◆ Support for Intel RSTe SATA RAID 0, RAID 1, RAID 10, RAID 5
System Fans (Per node)	◆ 16 x 40x40x56mm 23000rpm
USB	◆ 2 x USB 2.0 ports (front panel) ◆ 2 x USB 2.0 ports (back panel)
Internal Connectors (Motherboard)	◆ 2 x 9 pin 12V power connector ◆ 2 x SATA 6Gb/s connectors ◆ 4 x SATA 3Gb/s connectors ◆ 1 x Front panel headers ◆ 1 x SATA SGPIO header ◆ 1 x Front panel VGA header ◆ 1 x Serial port header ◆ 1 x USB 2.0 header ◆ 1 x RAID KEY header ◆ 1 x IPMB connector

	Rear Panel I/O	◆ 2 x USB 2.0 ports ◆ 2 x 100/1000 RJ-45 LAN ports ◆ 1 x 10/100 dedicated management LAN port ◆ 1 x Serial port ◆ 1 x VGA port ◆ 1 x Power switch button ◆ 1 x ID switch button ◆ 1 x Reset button ◆ 1 x BMC Reset button ◆ 1 x NMI button ◆ 1 x System status LED
	Front Panel LED/Buttons	◆ 1 x Power button/LED ◆ 1 x ID button/LED
	BMC Controller	◆ ASPEED® AST2300 BMC chip
	Hardware Monitor	◆ System voltage detection ◆ CPU/System temperature detection ◆ CPU/System fan speed detection ◆ CPU/System fan speed control * Whether the CPU/system fan speed control function is supported will depend on the CPU/system cooler you install.
	BIOS	◆ 64 Mb flash ◆ AMI BIOS
	Environment Ambient Temperature Relative Humidity	◆ Operating Temperature: 5°C to 35°C ◆ Non-operating Temperature: 0°C to 40°C ◆ 10-80% operating Humidity at 30°C
	System Dimension	◆ 447Wx87.2Hx780D (mm)
	Electrical Power Supply (R22PDP)	◆ 2 x Hot-swap 1200W 80 Plus Platinum with redundancy function (When system total power consumption over of 1200W, the system will not support PSU redundancy function.)
	Electrical Power Supply (R22PDT)	◆ 2 x Hot-swap 1600W 80 Plus Platinum with redundancy function (When system total power consumption over of 1600W, the system will not support PSU redundancy function.)

* GIGABYTE reserves the right to make any changes to the product specifications and product-related information without prior notice.

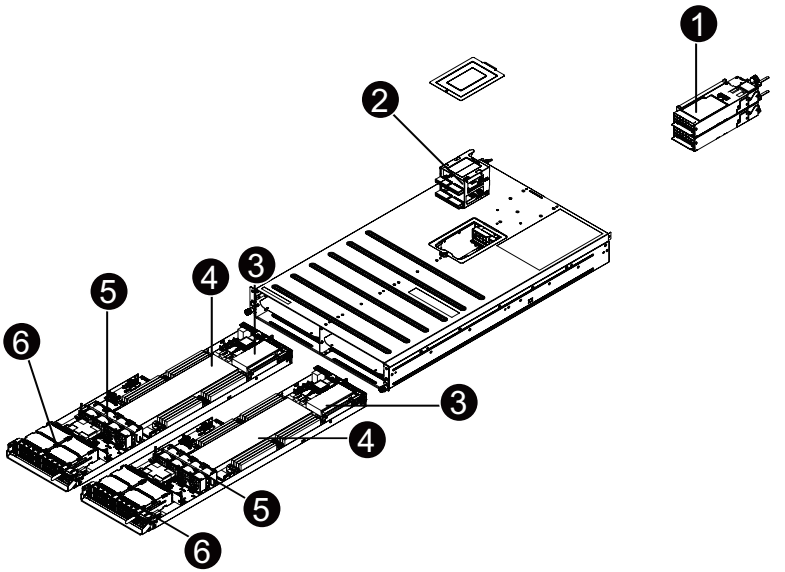
Chapter 2 System Hardware Installation

Pre-installation Instructions

Perform the steps below before you open the server or before you remove or replaceany component.

- Back up all important system and data files before performing any hardwareconfiguration.
- Turn off the system and all the peripherals connected to it.
- Locate the pin one of the CPU. The CPU cannot be inserted if oriented incorrectly. (Or you may locate the notches on both sides of the CPU and alignment keys on the CPU socket.)
- Apply an even and thin layer of thermal grease on the surface of the CPU.
- Do not turn on the computer if the CPU cooler is not installed, otherwise overheating and damage of the CPU may occur.
- Set the CPU host frequency in accordance with the CPU specifications. It is not recommended that the system bus frequency be set beyond hardware specifications since it does not meet the standard requirements for the peripherals. If you wish to set the frequency beyond the standard specifications, please do so according to your hardware specifications including the CPU, graphics card, memory, hard drive, etc.

2-1 System Components



Item	Decription
1.	Power module
2.	Power supply board cage
3.	PCI Express card
4.	Fan duct
5.	System fans
6.	Hard drive

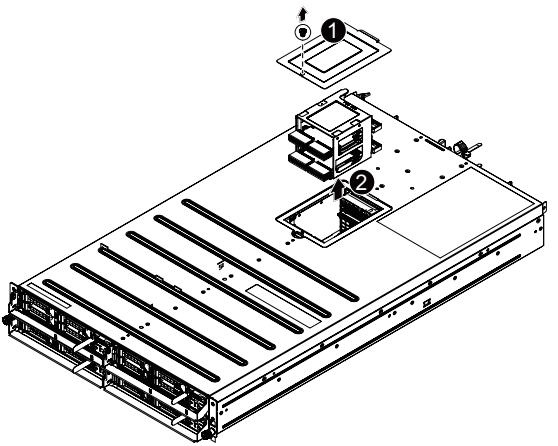
2-2 Replacing Power Supply Board Cage Cover

Before you remove or install the power supply board cage cover

- Make sure the system is not turned on or connected to AC power.

Follow these instructions to remove the power supply board cage cover:

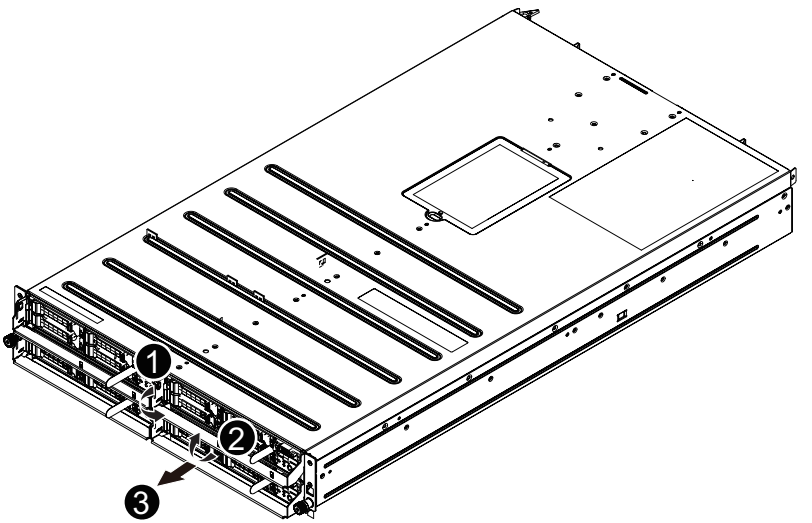
1. Loosen and remove the screw securing the cover.
2. Holding the cage and vertically lift it from the system.



2-3 Replacing the Motherboard Tray

Follow these instructions to replace the motherboard tray:

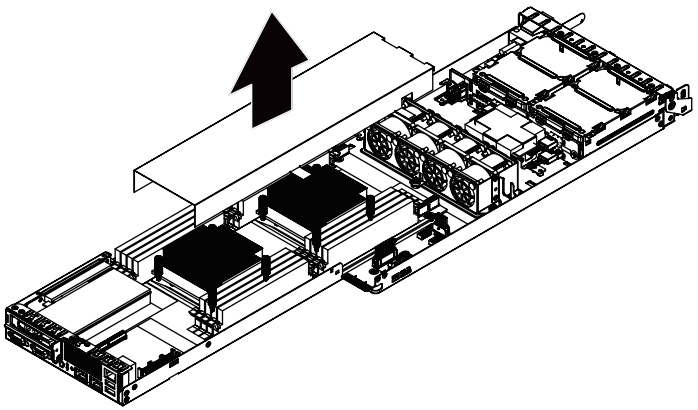
1. Disconnect the power, SATA, front panel, and mainboard cable connectors.
2. Press the retaining clip on the left side of the tray along the direction of the arrow.
3. At the same time, pull out the tray by using its handle.Pull up the tray handle and slide of the motherboard tray along the direction of the arrow.



2-4 Removing and Installing the Fan Duct

Follow these instructions to remove/install the fan duct:

1. Lift up to remove the fan duct
2. To install the fan duct, align the fan duct with the guiding groove. Push down the fan duct into chassis until its firmly seats.
3. Reverse the steps above to install the sfan duct.



2-5 Installing the CPU

Read the following guidelines before you begin to install the CPU:

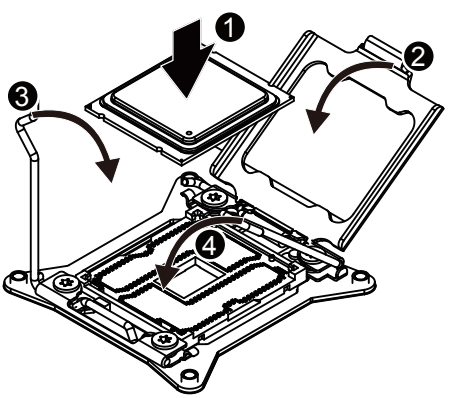
- Make sure that the motherboard supports the CPU.
- Always turn off the computer and unplug the power cord from the power outlet before installing the CPU to prevent hardware damage.
- Unplug all cables from the power outlets.
- Disconnect all telecommunication cables from their ports.
- Place the system unit on a flat and stable surface.
- Open the system according to the instructions.

WARNING!

Failure to properly turn off the server before you start installing componentsmay causeserious damage. Do not attempt the procedures described in the following sections unless youare a qualified servicetechnician.

Follow these instructions to install the CPU:

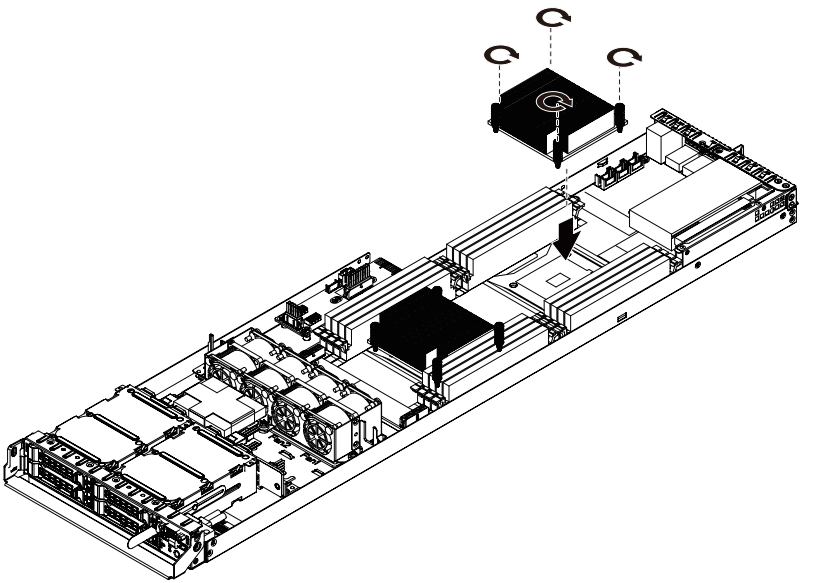
1. Raise the metal locking lever on the socket.
2. Remove the plastic covering on the CPU socket.Insert the CPU with the correct orientation. The CPU only fits in one orientation.
3. Replace the metal cover.
4. Push the metal lever back into locked position.



2-6 Installing the Heat Sink

Follow these instructions to install the heat sinks:

1. Apply thermal compound evenly on the top of the CPU.
2. Remove the protective cover from the underside of the heat sink.
3. Place the heat sink on top of the CPU and tighten the four positioning screws.



2-7 Installing the Memory

Read the following guidelines before you begin to install the memory:

- Make sure that the motherboard supports the memory. It is recommended that memory of the same capacity, brand, speed, and chips be used.
- Always turn off the computer and unplug the power cord from the power outlet before installing the memory to prevent hardware damage.
- Memory modules have a foolproof design. A memory module can be installed in only one direction. If you are unable to insert the memory, switch the direction.

2-7-1 Four Channel Memory Configuration

This motherboard provides sixteen DDR3 memory sockets and supports Four Channel Technology. After the memory is installed, the BIOS will automatically detect the specifications and capacity of the memory. Enabling Four Channel memory mode will be four times of the original memory bandwidth.

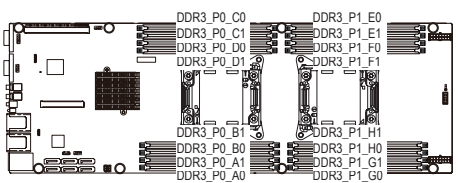
The four DDR3 memory sockets are divided into four channels each channel has two memory sockets as following:

Channel 1: DDR3_P0_A0/DDR3_P0_A1 (For pimary CPU);
DDR3_P1_E0/DDR3_P1_E1 (For secondary CPU)

Channel 2: DDR3_P0_B0/DDR3_P0_B1 (For pimary CPU);
DDR3_P1_F0/DDR3_P1_F1 (For secondary CPU)

Channel 3: DDR3_P0_C0/DDR3_P0_C1 (For pimary CPU);
DDR3_P1_G0/ DDR3_P1_G1 (For secondary CPU)

Channel 4: DDR3_P0_D0/DDR3_P0_D1 (For pimary CPU);
DDR3_P1_H0/DDR3_P1_H1 (For secondary CPU)



Due to CPU limitations, read the following guidelines before installing the memory in Dual Channel mode.

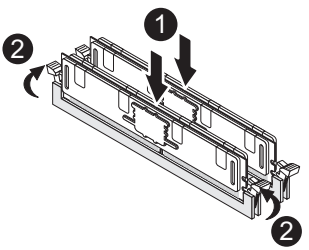
1. Dual Channel mode cannot be enabled if only one DDR3 memory module is installed.
2. When enabling Dual Channel mode with two or four memory modules, it is recommended that memory of the same capacity, brand, speed, and chips be used for optimum performance.

2-7-2 Installing a Memory

Before installing a memory module, make sure to turn off the computer and unplug the power cord from the power outlet to prevent damage to the memory module.
Be sure to install DDR3 DIMMs on this motherboard.

Follow these instructions to install the Memory:

1. Insert the DIMM memory module vertically into the DIMM slot, and push it down.
2. Close the plastic clip at both edges of the DIMM slots to lock the DIMM module.
3. Reverse the installation steps when you wish to remove the DIMM module.



2-8 Installing the PCI Expansion Card

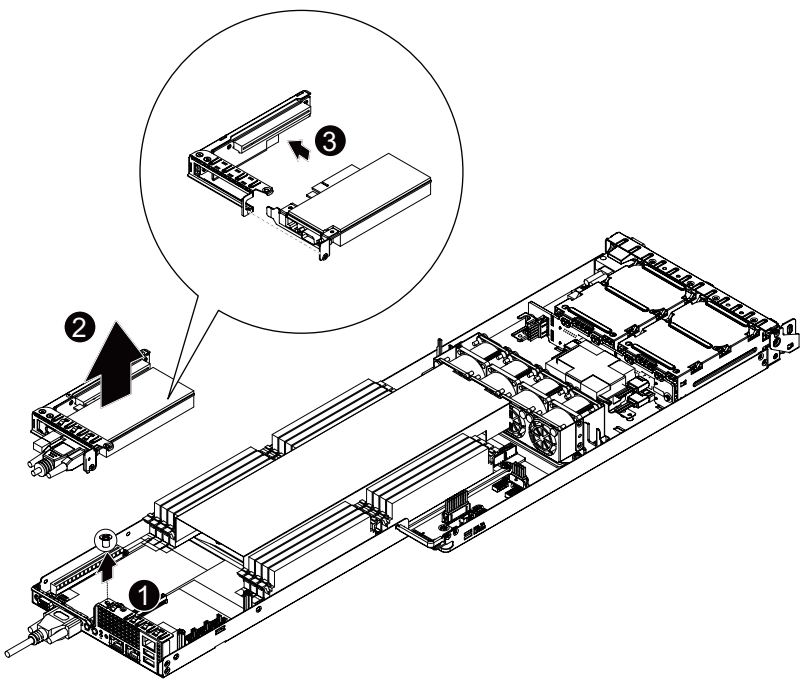
- Voltages can be present within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position. Ensure that the system is powered-down and all power sources have been disconnected from the server prior to installing a PCI card.

Failure to observe these warnings could result in personal injury or damage to equipment.

- The PCI riser assembly does not include a riser card or any cabling as standard. To install a PCI card, a riser card must be installed.

Follow these instructions to PCI Expansion card:

1. Loosen the riser bracket screwsand lift the riser bracket slightly.
2. Pull the riser bracket out from the server chassis.
3. Insert the PCI card into the selected slot (PCIE_1)and secure the card with screws. Make sure that the card is properly seated.
4. Secure the add-on card in place with screws.



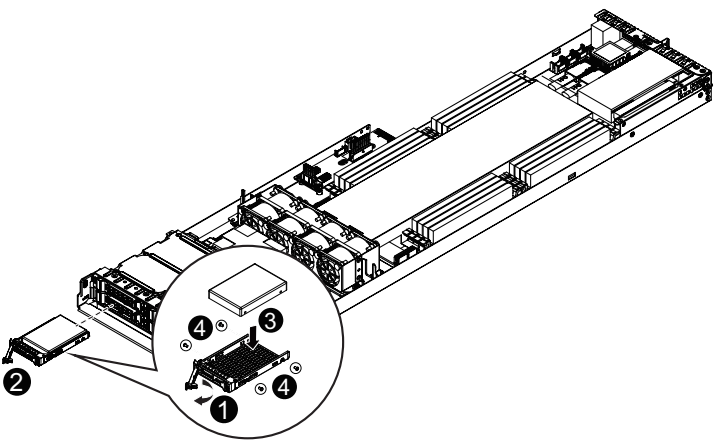
2-9 Installing the Hard Disk Drive

Read the following guidelines before you begin to install the Hard disk drive:

- Take note of the drive tray orientation before sliding it out.
- The tray will not fit back into the bay if inserted incorrectly.
- Make sure that the HDD is connected to the HDD connector on the backplane.

Follow these instructions to Hard disk drive:

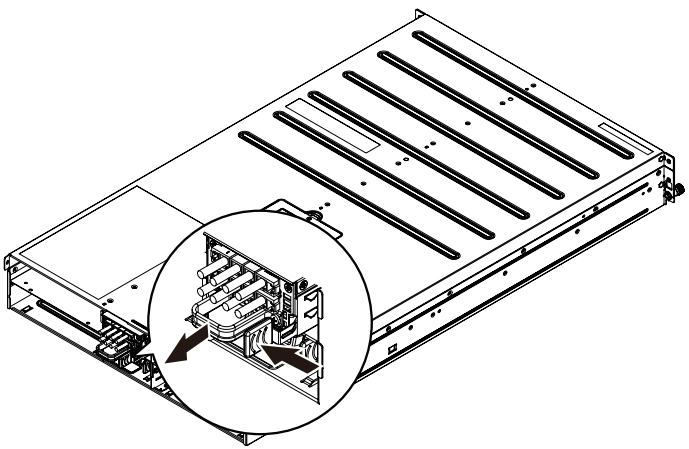
1. Press the release button.
2. Pull the locking lever to remove the HDD tray.
3. Slide hard disk into blank.
4. Secure the hard drive to the tray with four (4) screws as shown. Do not over tighten thescrews. Slide the blank into the bay until it locks into place.
5. Engage the HDD Security Lock. For detail instruction, please see the following section.



2-10 Replacing the Power Supply

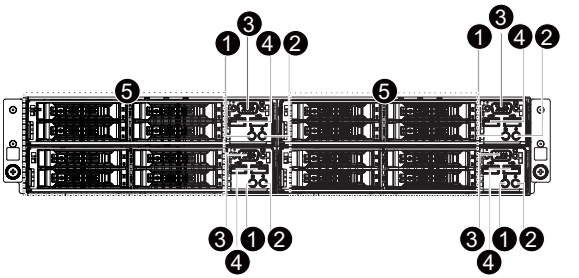
Follow these instructions to replace the power supply:

1. Disconnect the three power cables.
2. Pull up the power supply handle.
3. Press the retaining clip on the right side of the power supply along the direction of the arrow.
4. At the same time, pull out the power supply by using its handle.
5. Insert the replacement power supply firmly into the chassis. Connect the AC power cord to the replacement power supply.



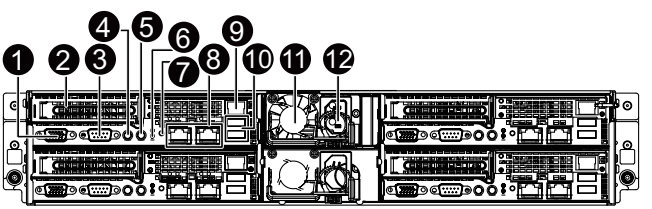
Chapter 3 System Appearance

3-1 Front View



No.	Decription
1	ID button and LED
2.	Power button and LED
3.	VGA port
4.	USB 3.0 ports
5.	HDD bays

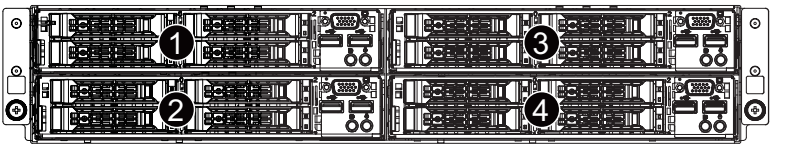
3-2 Rear View



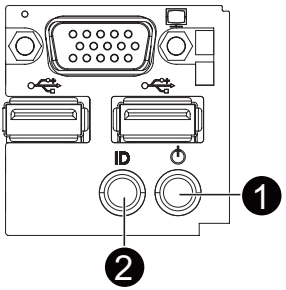
No.	Decription
1	VGA port
2.	PCIe slot cover
3.	Serial port
4.	Power button and LED
5.	ID Button and LED
6.	BMC Reset button (top)/NMI button (bottom)
7.	System Status LED
8.	LAN ports
9.	10/100 Server management LAN port
10.	USB 2.0 ports
11.	Power supply fan
12.	Power supply module cord socket

NOTE! For detail LED description, please see the following section: **Front Panel LED and Buttons** and **Rear System LEDs and Button**.

3-3 HDD and Nodes Connection

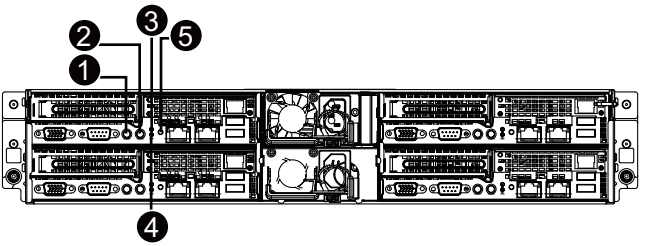


3-4 Front Panel LED and Buttons



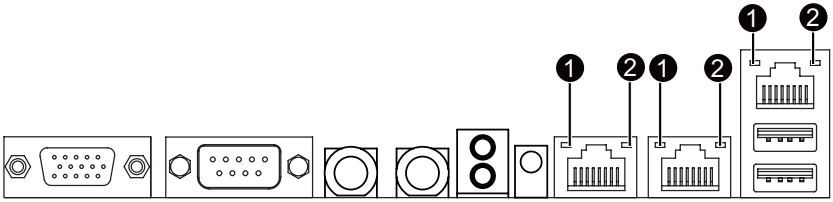
No.	Name	Color	Status	Critical Event	Description
1.	Power button and LED	Amber	On	No	System has power applied to it or ACPI S0 state
			Blink	Yes	System is in ACPI S5 state (Power off)
		Green	On	No	System has power applied to it or ACPI S0 State
				No	System is in ACPI S1 state (Entry S1)
2.	ID button and LED	Blue	On	N/A	Unit selected for identification.
		N/A	Off	N/A	No identification.

3-5 Rear System LEDs and Button



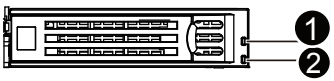
No.	Name	Color	Status	Critical Event	Description
1.	Power button and LED	Green	Solid On	N/A	System is powered on
		N/A	Off	N/A	• System is not powered on or in ACPI S5 state (power off) • System is in ACPI S4 state (hibernate mode)
2.	ID Button and LED	Blue	Solid On	N/A	System identification is active.
		N/A	Off	N/A	System identification is disabled.
3.	BMC Reset Button				Press the button to reset the system.
4.	NMI button				Press the button server generates a NMI to the processor if the multiple-bit ECC errors occur, which effectively halt the server.
5.	System Status LED	Green	Solid On	N/A	System is operating normally.
			Blink	N/A	Degrade condition, may indicates the following: • CPU failure • DIMM killed
		Amber	Solid On	Yes	Critical condition, may indicates the following: • Power module failure • System fan failure • Power supply voltage issue • System temperature/voltage issue
			Blink	N/A	Non-critical condition, may indicates the following: • Redundant power module failure • Temperature and voltage issue • Chassis intrusion
		N/A	Off	N/A	System is not ready. May indicate the following: • POST error • NMI error • Processor or terminator missing

3-6 Rear System LAN LEDs



No.	Name	Color	Status	Description
1	Speed LED	Yellow	On	1 Gbps data rate
			Blink	Identify 1 Gbps data rate
		Green	On	100 Mbps data rate
			Blink	Identify 100 Mbps data rate
		N/A	Off	10 Mbps data rate
2.	Link/ Activity LED	Green	On	Link between system and network or no access
			Blink	Data transmission or receiving is occurring
		N/A	Off	No data transmission or receiving is occurring

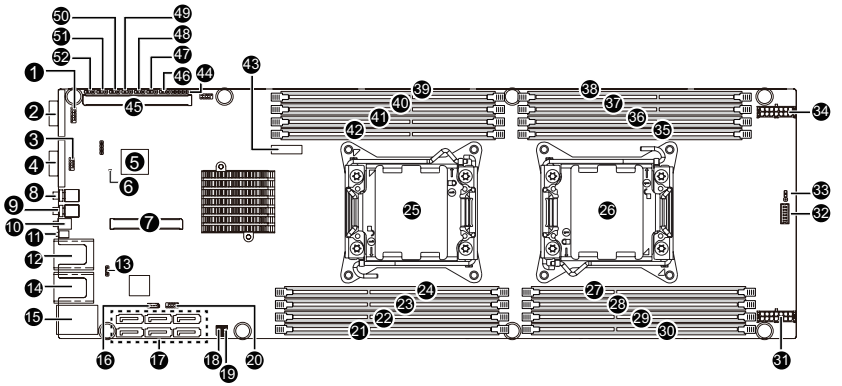
3-7 Hard Disk Drive LEDs



LED No.	Mode	Description	Multi-Color LED	
			LED Active Green	LED Active Amber
1	Non-RAID	Hard disk drive is not present	Off	Off
		Hard disk drive is present but not active	On	Off
		Hard disk drive is present and active	Blink	Off
	Onboard RAID	Hard disk drive is not present	Off	Off
		Hard disk drive is present but not active	On	Off
		Hard disk drive is present and active	Blink	Off
		Location	On	Blink @ 4 Hz (Alternative)
		RAID failed	On	On
		Hard disk drive is rebuilding	Blink	Blink @ 1 Hz
	SAS RAID Card	Hard disk drive is not present	Off	Off
		Hard disk drive is present but not active	On	Off
		Hard disk drive is present and active	Blink	Off
		Location	On	Blink @ 4 Hz (Alternative)
		RAID failed	On	On
		Hard disk drive is rebuilding	Blink	Blink @ 1 Hz
2	Reserve	Reserve	Reserve	Reserve

Chapter 4 Motherboard Components

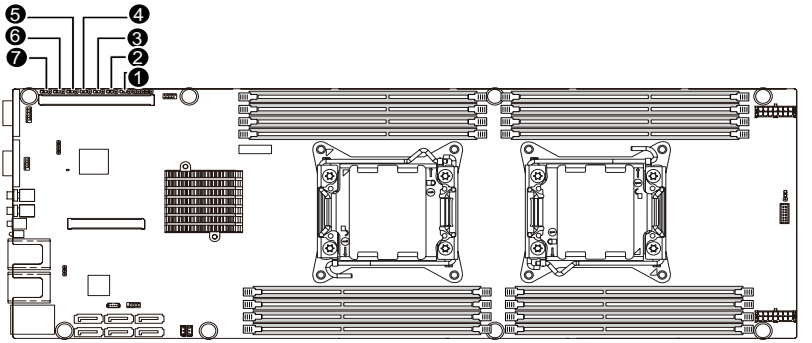
4-1 GA-7PTSH Motherboard Components



Item	Code	Description
1	FP_VGA1	Front VGA header
2	VGA1	Rear VGA port
3	COM2	Serial port cable header
4	COM1	Serial port
5	U47	ASPEED 2300 BMC chipset
6	BMC_LED1	BMC readiness LED
7	PCIE_2	PCI-E slot 2 (x8 slot/Proprietary/Running at x8)
8	PWR_SW	Power swith button
9	ID_SW1	ID switch button
10	NMI_BMCRST	BMC Reset button (top)/NMI button (bottom)
11	SATAUS_LED	System status LED
12	LAN1	LAN1 port
13	LAN_LED	LAN1 port and LAN2 port active LED header
14	LAN2	LAN2 port
15	MLAN1	BMC Management LAN port (top) / USB ports (bottom)
16	SATA_SGPIO	SATA SGPIO header
17	SATA0/1/2/3/4/5	SATA 6Gb/s connectors
18	IPMB1	IPMB connector
19	RAID_KEY1	Intel RAID Selection connector(Optional)
20	USB1	USB 2.0 header
21	DDR3_P0_A0	Channel 1 slot 0 (for primary CPU)
22	DDR3_P0_A1	Channel 1 slot 1 (for primary CPU)
23	DDR3_P0_B0	Channel 2 slot 0 (for primary CPU)
24	DDR3_P0_B1	Channel 2 slot 1 (for primary CPU)
25	CPU0	Intel LGA2011 socket (Primary CPU)
26	CPU1	Intel LGA2011 socket (Secondary CPU)
27	DDR3_P1_H1	Channel 4 slot 1 (for secondary CPU)

28	DDR3_P1_H0	Channel 4 slot 0 (for secondary CPU)
29	DDR3_P1_G1	Channel 3 slot 1 (for secondary CPU)
30	DDR3_P1_G0	Channel 3 slot 0 (for secondary CPU)
31	SSI_2X9P2	18 pin power connector (for secondary CPU)
32	F_PANEL	Front panel header
33	ACK_SEL	4 Nodes System and Rack System switch jumper
34	SSI_2X9P1	18 pin power connector (for primary CPU)
35	DDR3_P1_F1	Channel 2 slot 1 (for secondary CPU)
36	DDR3_P1_F0	Channel 2 slot 0 (for secondary CPU)
37	DDR3_P1_E1	Channel 1 slot 1 (for secondary CPU)
38	DDR3_P1_E0	Channel 1 slot 0 (for secondary CPU)
39	DDR3_P0_C0	Channel 3 slot 0 (for primary CPU)
40	DDR3_P0_C1	Channel 3 slot 1 (for primary CPU)
41	DDR3_P0_D0	Channel 4 slot 0 (for primary CPU)
42	DDR3_P0_D1	Channel 4 slot 1 (for primary CPU)
43	BAT1	Battery socket
44	PWR_DET	PMBus header
45	PCIE_1	PCI-E slot 1 (x16 slot/Proprietary/Running at x16)
46	BIOS_RVCR1	BIOS recovery jumper
47	SSB_ME1	ME Recovery jumper
48	PASSWORD1	Clearing supervisor password jumper
49	CLR_CMOS1	Clear CMOS jumper
50	BIOS_WP1	BIOS Write Protect jumper
51	FLASH_DP1	Flash descriptor security jumper
52	BMC_FRB1	Force to Stop FRB Timer jumper

4-2 Jumper Setting



No.	Jumper Code	Jumper Setting
1.	BIOS_RVCR1 (BIOS Recovery Jumper)	1-2 Close: Normal operation (Default setting)
		2-3 Close: BIOS recovery mode.
2.	SSB_ME1 (ME enable/ disable Jumper)	1-2 Close: Normal operation. (Default setting)
		2-3 Close: ME recovery mode.
3.	PASSWORD1 (Skip Supervisor Password Jumper)	1-2 Close: Normal operation (Default setting)
		2-3 Close: Skip supervisor password.
4.	CLR_CMOS1 (Clearing CMOS Jumper)	1-2 Close: Normal operation (Default setting)
		2-3 Close: Clear CMOS data
5.	BIOS WP1 (BIOS Write Protect Jumper)	1-2 Close: Normal operation. (Default setting)
		2-3 Close: Enable BIOS write protect function.
6.	FLASH_DP1 (Flash Descriptor Security Jumper)	1-2 Close: Flash Descriptor Security Overridden
		2-3 Close: Flash Descriptor Security in effect. (Default setting)
7.	BMC_FRB1 (Force to Stop FRB Timer Jumper)	1-2 Close: Normal operation (Default setting)
		2-3 Close: Force to Stop FRB Timer

Chapter 5 BIOS Setup

BIOS (Basic Input and Output System) records hardware parameters of the system in the EFI on the motherboard. Its major functions include conducting the Power-On Self-Test (POST) during system startup, saving system parameters and loading operating system, etc. BIOS includes a BIOS Setup program that allows the user to modify basic system configuration settings or to activate certain system features. When the power is turned off, the battery on the motherboard supplies the necessary power to the CMOS to keep the configuration values in the CMOS.

To access the BIOS Setup program, press the <F2> key during the POST when the power is turned on.

- BIOS flashing is potentially risky, if you do not encounter problems of using the current BIOS version, it is recommended that you don't flash the BIOS. To flash the BIOS, do it with caution. Inadequate BIOS flashing may result in system malfunction.
- It is recommended that you not alter the default settings (unless you need to) to prevent system instability or other unexpected results. Inadequately altering the settings may result in system's failure to boot. If this occurs, try to clear the CMOS values and reset the board to default values. (Refer to the "Restore Defaults" section in this chapter or introductions of the battery/clearing CMOS jumper in Chapter 1 for how to clear the CMOS values.)

BIOS Setup Program Function Keys

<←><→>	Move the selection bar to select the screen
<↑><↓>	Move the selection bar to select an item
<Enter>	Execute command or enter the submenu
<+>	Increase the numeric value or make changes
<->	Decrease the numeric value or make changes
<Esc>	Main Menu: Exit the BIOS Setup program Submenus: Exit current submenu
<F1>	Show descriptions of general help
<F3>	Restore the previous BIOS settings for the current submenus
<F9>	Load the Optimized BIOS default settings for the current submenus
<F10>	Save all the changes and exit the BIOS Setup program

- **Main**
  This setup page includes all the items in standard compatible BIOS.
- **Advanced**
  This setup page includes all the items of AMI BIOS special enhanced features.
  (ex: Auto detect fan and temperature status, automatically configure hard disk parameters.)
- **Chipset**
  This setup page includes all the submenu options for configuring the function of North Bridge and South Bridge.
  (ex: Auto detect fan and temperature status, automatically configure hard disk parameters.)
- **Security**
  Change, set, or disable supervisor and user password. Configuration supervisor password allows you to restrict access to the system and BIOS Setup.
  A supervisor password allows you to make changes in BIOS Setup.
  A user password only allows you to view the BIOS settings but not to make changes.
- **Server Management**
  Server additional features enabled/disabled setup menus.
- **Boot**
  This setup page provides items for configuration of boot sequence.
- **Exit**
  Save all the changes made in the BIOS Setup program to the CMOS and exit BIOS Setup. (Pressing <F10> can also carry out this task.)
  Abandon all changes and the previous settings remain in effect. Pressing <Y> to the confirmation message will exit BIOS Setup. (Pressing <Esc> can also carry out this task.)

5-1 The Main Menu

Once you enter the BIOS Setup program, the Main Menu (as shown below) appears on the screen. Use arrow keys to move among the items and press <Enter> to accept or enter other sub-menu.

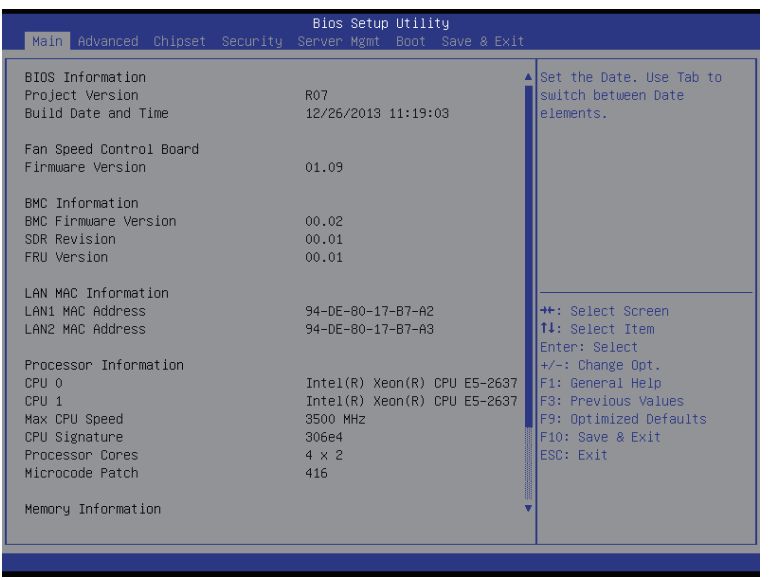
Main Menu Help

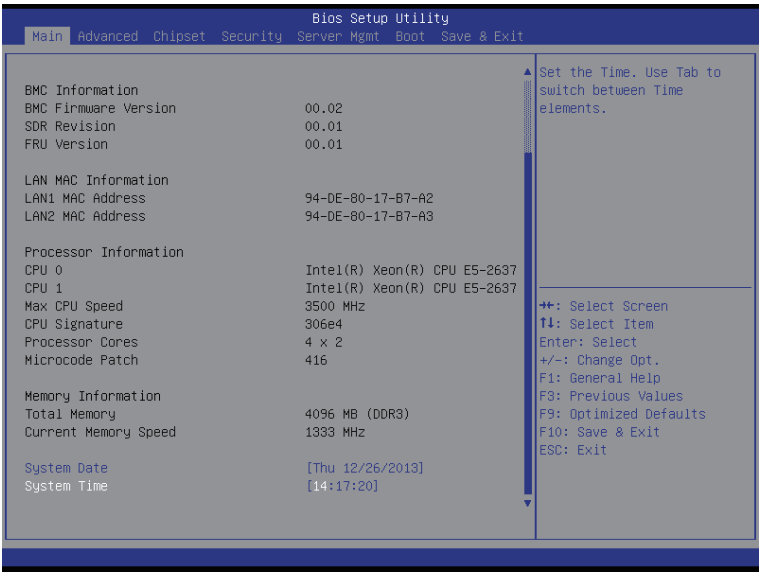
The on-screen description of a highlighted setup option is displayed on the bottom line of the Main Menu.

Submenu Help

While in a submenu, press <F1> to display a help screen (General Help) of function keys available for the menu. Press <Esc> to exit the help screen. Help for each item is in the Item Help block on the right side of the submenu.

- When the system is not stable as usual, select the **Restore Defaults** item to set your system to its defaults.
- The BIOS Setup menus described in this chapter are for reference only and may differ by BIOS version.





- **BIOS Information**
- **Project Version**

  Display version number of the project.
- **BIOS Build Date and Time**

  Displays the date and time when the BIOS setup utility was created.
- **BMC Information**
- **BMC Firmware Version**

  Display version number of the Firmware setup utility.
- **SDR Reversion**

  Display the SDR reversion information.
- **FRU Version**

  Display the FRU reversion information.
- **LAN MAC Information**
- **LAN1 MAC Address**

  Display LAN1 MAC address information.
- **LAN2 MAC Address**

  Display LAN2 MAC address information.
- **Processor Information**
- **CPU Type/ Max CPU Speed/ CPU Signature / Processor Cores / Microcode Patch**

  Displays the technical specifications for the installed processor.

☞ **Memory Information**

☞ **Total Memory / Current Memory Speed**

Displays the technical specifications for the installed memory.

☞ **System Date**

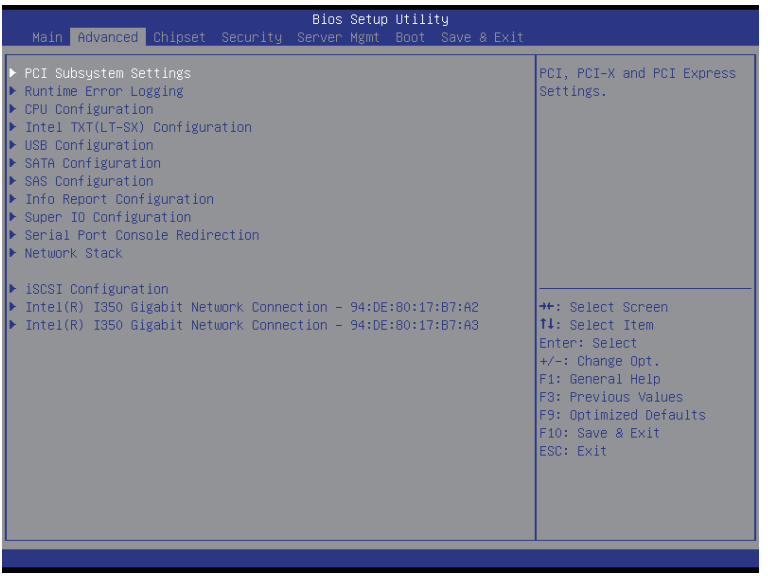
Set the date following the weekday-month-day- year format.

☞ **System Time**

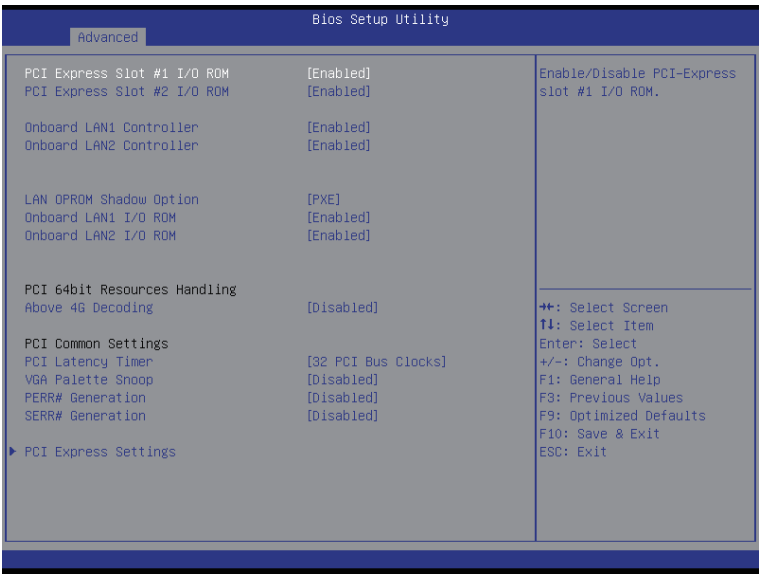
Set the system time following the hour-minute- second format.

5-2 Advanced Menu

The Advanced menu display submenu options for configuring the function of various hardware components. Select a submenu item, then press Enter to access the related submenu screen.



5-2-1 PCI Subsystem Settings



☞ PCI Express Slot 1/2 I/O ROM

When enabled, This setting will initialize the device expansion ROM for the related PCI-E slot.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ Onboard LAN1/2 Controller

Enable/Disable Onboard LAN controllers.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ LAN OPROM Shadow Option

Configure onboard LAN devices and initialize device expansion ROM.

Options available: PXE/iSCSI. Default setting is **PXE**.

☞ Onboard LAN1/2 I/O ROM

Enable/Disable onboard LAN devices and initialize device expansion ROM.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ PCI 64bit Resources Handling

☞ Above 4G Decoding

Enable/Disable Above 4G Decoding.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ PCI Common Settings

☞ PCI Latency Timer

Configure PCI Latency Timer.

Options available: 32 PCI Bus Clocks/64 PCI Bus Clocks/96 PCI Bus Clocks/128 PCI Bus Clocks/160 PCI Bus Clocks/192 PCI Bus Clocks/224 PCI Bus Clocks/248 PCI Bus Clocks.

Default setting is **32 PCI Bus Clocks**.

☞ **VGA Platte Snoop**

Enable/Disable VGA Palette Tegisters Snooping.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **PERR Generation**

When this item is set to enabled, PCI bus parity error (PERR) is generated and is routed to NMI.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **SERR Generation**

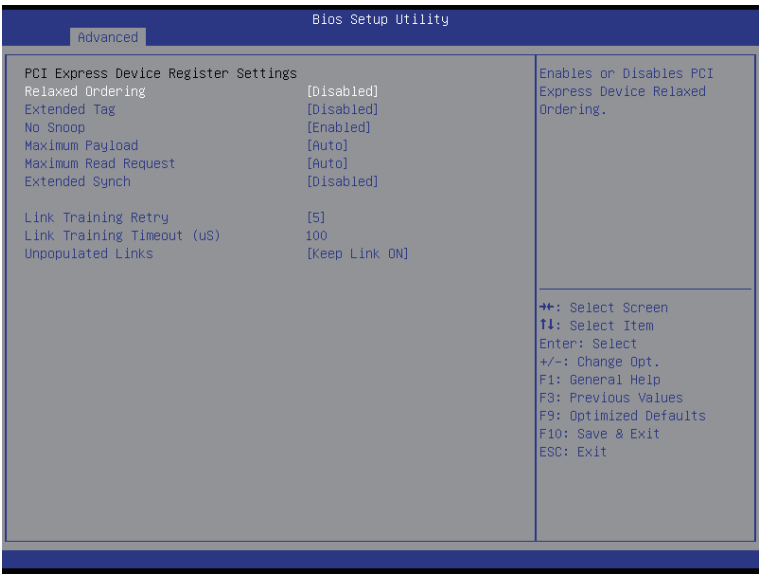
When this item is set to enabled, PCI bus system error (SERR) is generated and is routed to NMI.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **PCI Express Settings**

Press [Enter] for configuration of advanced items.

5-2-1-1 PCI Express Settings



☞ PCI Express Device Register Settings

☞ Relaxed Ordering

Enable/DIsable PCI Express Device Relaxed Ordering feature.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ Extended Tag

Wnen this feature is enabled, the system will allow device to use 8-bit Tag field as a requester.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ No Snoop

Enable/Disable PCI Express Device No Snoop option.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ Maximum Playload

Set maximum playlooad for PCI Express Device or allow system BIOS to select the value.

Options available: Auto/128 Bytes/256 Bytes/512 Bytes/1024 Bytes/2048 Bytes/4096 Bytes.

Default setting is **Auto**.

☞ Maximum Read Request

Set maximum Read Reuest size for PCI Express Device or allow system BIOS to select the value.

Options available: Auto/128 Bytes/256 Bytes/512 Bytes/1024 Bytes/2048 Bytes/4096 Bytes.

Default setting is **Auto**.

☞ Extended Synch

Wnen this feature is enabled, the system will allow generation of Extended Synchronization patterns.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ Link Training Retry

Define the number of Retry Attempts software wil take to retrain the link if previous training attempt was unsuccessful. Press <+> / <-> keys to increase or decrease the desired values.

☞ Link Training Timeout (us)

Define the number of Microseconds software will wait before polling 'Link Training' bit in Link Status register. Press <+> / <-> keys to increase or decrease the desired values. Value rang is from 10 to 10000 us.

☞ Unpopulated Links

When this item is set to 'Disable Link, the system will operate power save feature for those unpopulated PCI Express links.

Options available: Keep Link ON/ Disable. Default setting is **Keep Link ON**.

5-2-2 Runtime Error Logging

☞ **Runtime Error Logging**

Enable/Disable Runtime error logging support.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **Memory Corr. Error Threshold**(Note)

Press <+> / <-> keys to increase or decrease the desired values.

☞ **PCI Error Logging Support**(Note)

Enable/Disable PCI Error Logging Support.

Options available: Enabled/Disabled. Default setting is **Disabled**.

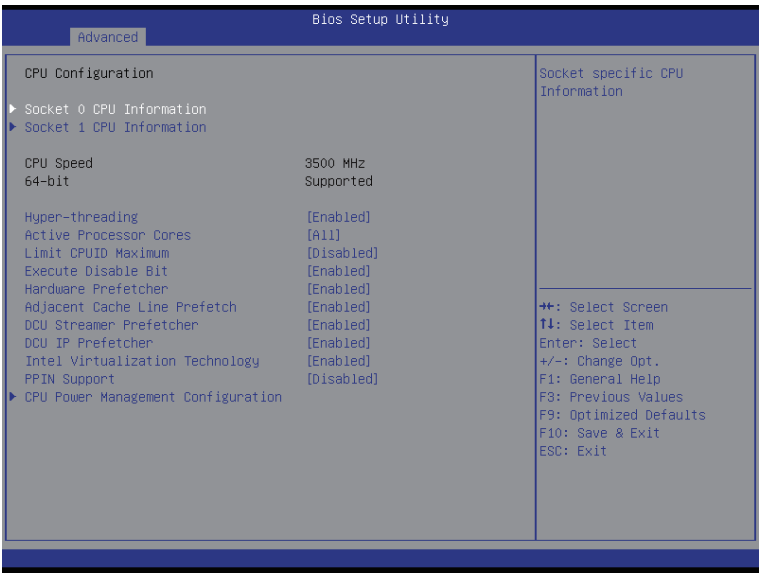
☞ **Poison Support**(Note)

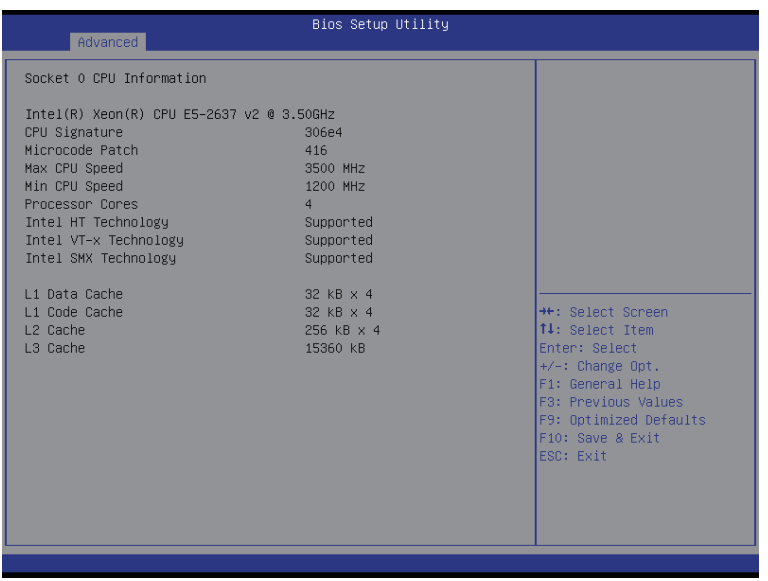
Enable/Disable Poison Support.

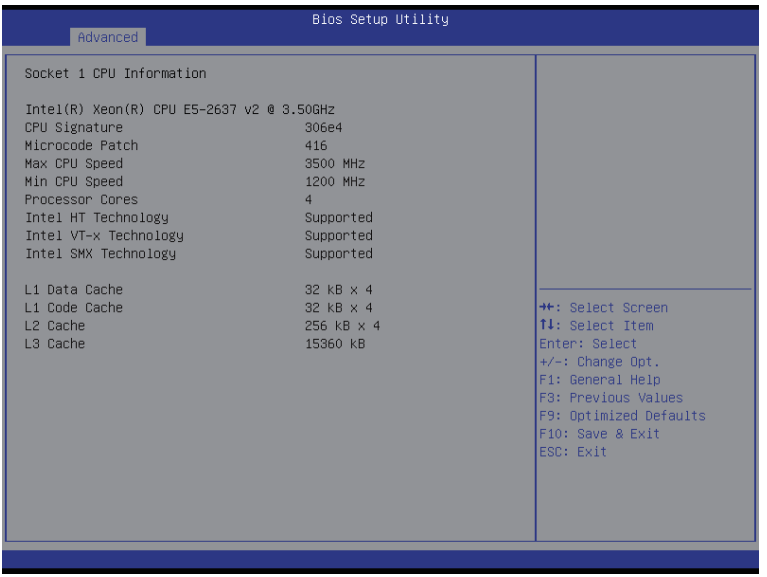
Options available: Enabled/Disabled. Default setting is **Disabled**.

(Note) This item appears when **Runtime Error Logging** is set to **Enabled**.

5-2-3 CPU Configuration







- **CPU Information**
- **Socket 0/1 CPU Information**
- **CPU Type/ Signature / Microcode Patch / Max CPU Speed / Min CPU Speed / Processor Cores**

  Displays the technical specifications for the installed processor.
- **Intel HT Technology / Intel VT-x Technology / Intel SMX Technology**

  Displays the support information for the installed processor.
- **Cache Information**
- **L1 Data Cache / L1 Code Cache / L2 Cache / L3 Cache**

  Displays the technical specifications for the installed processor.
- **CPU Speed / 64-bit**

  Displays the technical specifications for the installed processor.
- **Hyper-threading** (Note)

  The Intel Hyper Threading Technology allows a single processor to execute two or more separate threads concurrently. When hyper-threading is enabled, multi-threaded software applications can execute their threads, thereby improving performance.
  Options available: Enabled/Disabled. Default setting is **Enabled**.
- **Active Processor Cores** (Note)

  Allows you to determine whether to enable all CPU cores.
  Options available: All/1/2/3. Default setting is **All**.

(Note) This item is present only if you install a CPU that supports this feature. For more information about Intel CPUs' unique features, please visit Intel's website.

☞ Limit CPUID Maximum

When enabled, the processor will limit the maximum COUID input values to 03h when queried, even if the processor suppports a higher CPUID input value.

When disabled, the processor will return the actual maximum CPUID input value of the processor when queried.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ Execute Disable Bit

When enabled, the processor prevents the execution of code in data-only memory pages. This provides some protection against buffer overflow attacks.

When disabled, the processor will not restrict code execution in any memory area. This makes the processor more vulnerable to buffer overflow attacks.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ Hardware Prefetcher

Select whether to enable the speculative prefetch unit of the processor.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ Adjacent Cache Line Prefetch

When enabled, cache lines are fetched in pairs. When disabled, only the required cache line is fetched.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ DCU Streamer Prefetch

Enable prefetch of next L1 Data line based upon multiple loads in same cache line.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ DCU IP Prefetch

Enable prefetch of next L1 Data line based upon sequential load history.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ Intel Virtualization Technology

Select whether to enable the Intel Virtualization Technology function. VT allows a single platform to run multiple operating systems in independent partitions.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ PPIN Support

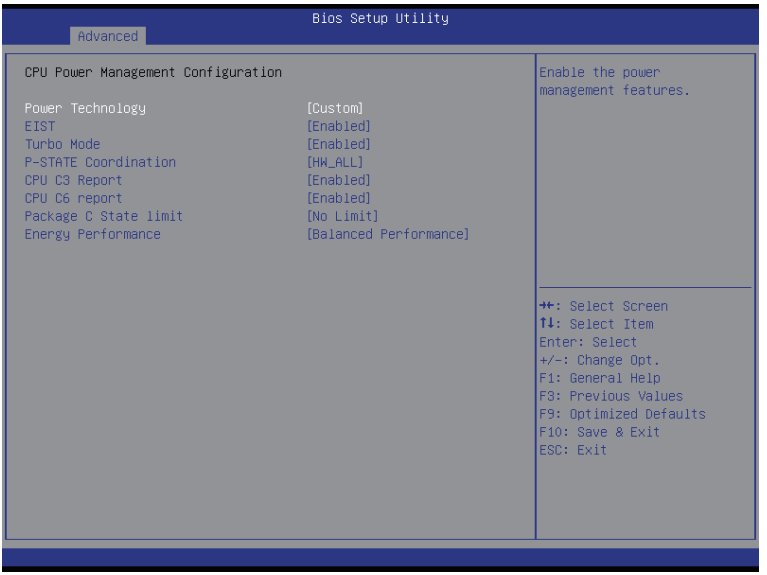
Enable/Disable PPIN Support function.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ CPU Power Management Configuration

Press [Enter] for configuration of advanced items.

5-2-3-1 CPU Power Management Configuration



☞ CPU Power Management Configuration

☞ Power Technology

Configure the power management features.

Options available: Disable/Energy Efficient/Custom. Default setting is **Custom**.

☞ EIST (Enhanced Intel SpeedStep Technology)

Conventional Intel SpeedStep Technology switches both voltage and frequency in tandem between high and low levels in response to processor load.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ Turbo Mode

When this item is enabled, tje processor will automatically ramp up the clock speed of 1-2 of its processing cores to improve its performance.

When this item is disabled, the processor will not overclock any of its core.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ P-STATE Coordination

In HW_ALL mode, the processor hardware is responsible for coordinating the P-state among logical processors dependencies. The OS is responsible for keeping the P-state request up to date on all logical processors.

In SW_ALL mode, the OS Power Manager is responsible for coordinating the P-state among logical processors with dependencies and must initiate the transition on all of those Logical Processors.

In SW_ANY mode, the OS Power Manager is responsible for coordinating the P-state among logical processors with dependencies and may initiate the transition on any of those Logical Processors.

Options available: HW_ALL/SW_ALL/SW_ANY. Default setting is **HW_ALL**.

☞ CPU C3/C6 Report (Note)

Allows you to determine whether to let the CPU enter C3/C6 mode in system halt state. When enabled, the CPU core frequency and voltage will be reduced during system halt state to decrease power consumption. The C3/C6 state is a more enhanced power-saving state than C1.
Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ Package C State Limit

Configure state for the C-State package limit.
Options available: C0/C1/C6/C7/No Limit. Default setting is **No Limit**.

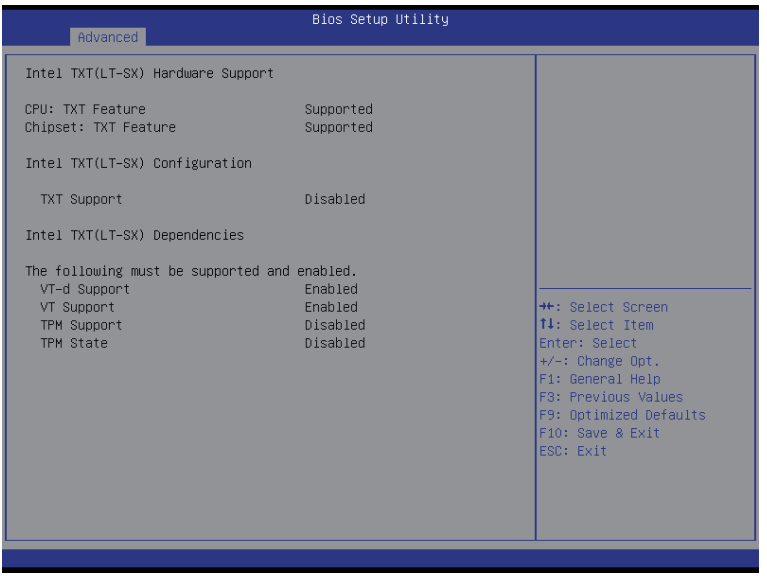
☞ Energy Performance

Energy Performance Bias is Intel CPU function.
The larger value in MSR_ENERGY_PERFORMANCE_BIAS register,
CPU will save more power but lose more performance.
Note: This register will be changed by OS too if OS support it like Windows 2008 or newer Linux.
Options available:
Performance : Write value 0 into MSR_ENERGY_PERFORMANCE_BIAS
Balanced Performance: Write value 7 into MSR_ENERGY_PERFORMANCE_BIAS
Balanced Energy: Write value 11 into MSR_ENERGY_PERFORMANCE_BIAS
Energy Efficient: Write value 15 into MSR_ENERGY_PERFORMANCE_BIAS
Default setting is **Performance**.

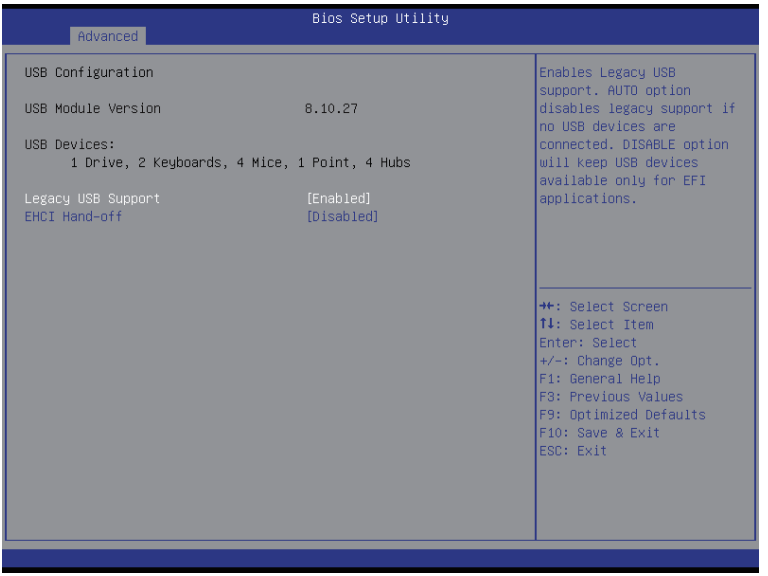
(Note) This item is present only if you install a CPU that supports this feature. For more information about Intel CPUs' unique features, please visit Intel's website.

5-2-4 Intel TXT (LT-SX) Configuration

Press Enter to view the Intel TXT (LT-SX) Configuration screen which displays Intel TXT Configuration support information, Items on this window are non-configurable.



5-2-5 USB Configuration



☞ **USB Configuration**

☞ **Legacy USB Support**

Enables or disables support for legacy USB devices.

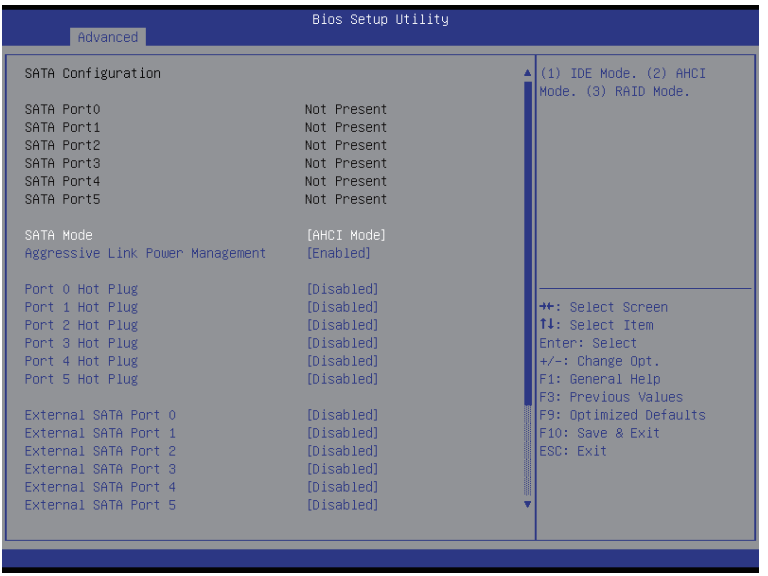
Options available: Auto/Enabled/Disabled. Default setting is **Enabled**.

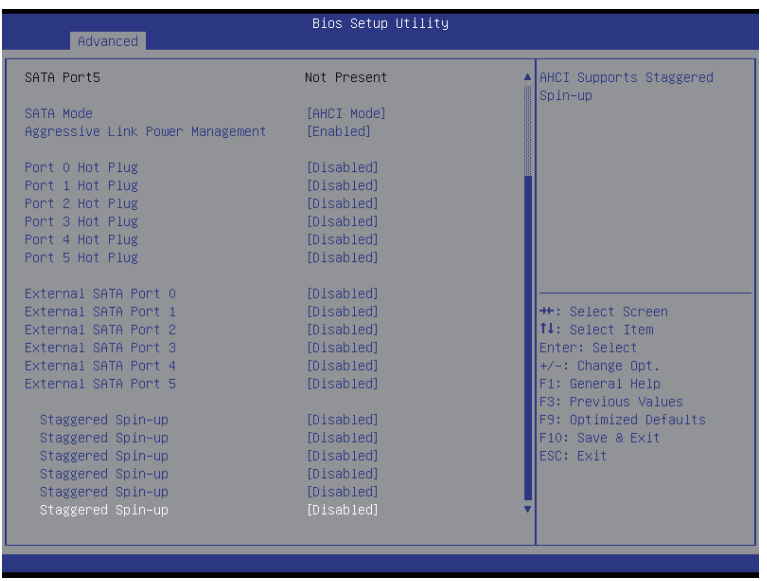
☞ **EHCI Hand-off**

Enable/Disable EHCI (USB 2.0) Hand-off function.

Options available: Enabled/Disabled. Default setting is **Disabled**.

5-2-6 SATA Configuration





☞ **SATA Configuration**

☞ **SATA Port 0/1/2/3/4/5** (Note)

Displays the installed HDD devices information. System will automatically detect HDD type.

☞ **SATA Mode**

Select the on chip SATA type.

IDE Mode: When set to IDE, the SATA controller disables its RAID and AHCI functions and runs in the IDE emulation mode. This is not allowed to access RAID setup utility.

RAID Mode: When set to RAID, the SATA controllerenables both its RAID and AHCI functions. You will be allows access the RAID setup utility at boot time.

ACHI Mode: When set to AHCI,the SATA controller enables its AHCI functionality. Then the RAID function is disabled and cannot be access the RAID setup utility at boot time.

Options available: IDE/RAID/ACHI/Disabled. Default setting is **ACHI Mode**.

☞ **Aggressive Link Power Management**

Enable PCH to aggressively enter link power state.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ **Hot Plug (for Serial SATA Port 0/1/2/3/4/5)**

Enable/Disable Hot Plug support for Serial ATA Port 0/1/2/3/4/5.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **External SATA (for Serial SATA Port 0/1/2/3/4/5)**

Enable/Disable External SATA support for Serial ATA Port 0/1/2/3/4/5.

Options available: Enabled/Disabled. Default setting is **Disabled**.

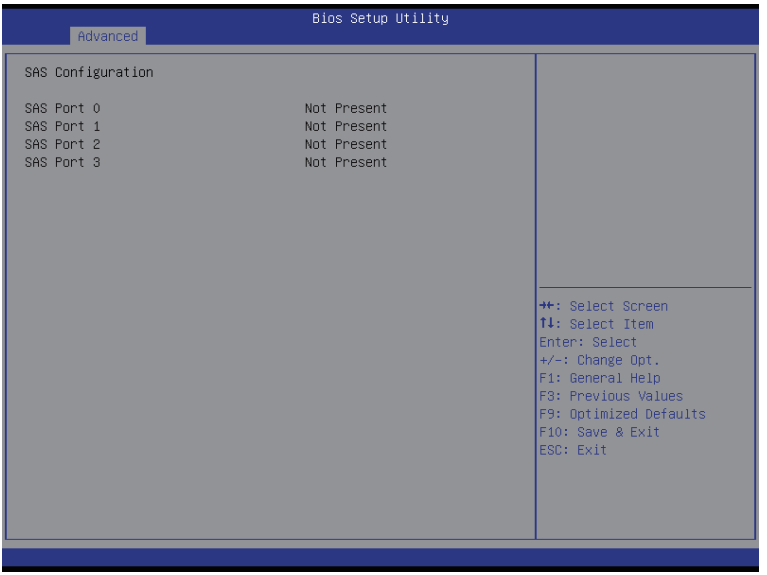
☞ **Straggered Spin Up (for Serial SATA Port 0/1/2/3/4/5)**

On an edge detect from 0 to 1, the PCH starts a COMreset initialization to the device.

Options available: Enabled/Disabled. Default setting is **Disabled**.

(Note) This item is will not appear when the SATA mode is set ot RAID mode.

5-2-7 SAS Configuration



☞ **SAS Configuration**

☞ **SAS Port 0/1/2/3** (Note)

Press [Enter] to view the installed HDD devices.

(Note) The number of SATA and SAS devices depends on the PCH SKU.

5-2-8 Info Report Configuration

☞ **Info Report Configuration**

☞ **Post Report**

☞ **Post Report**

Enable/Disable Post Report support.

Options available: Enabled/Disabled. Default setting is **Enabled**.

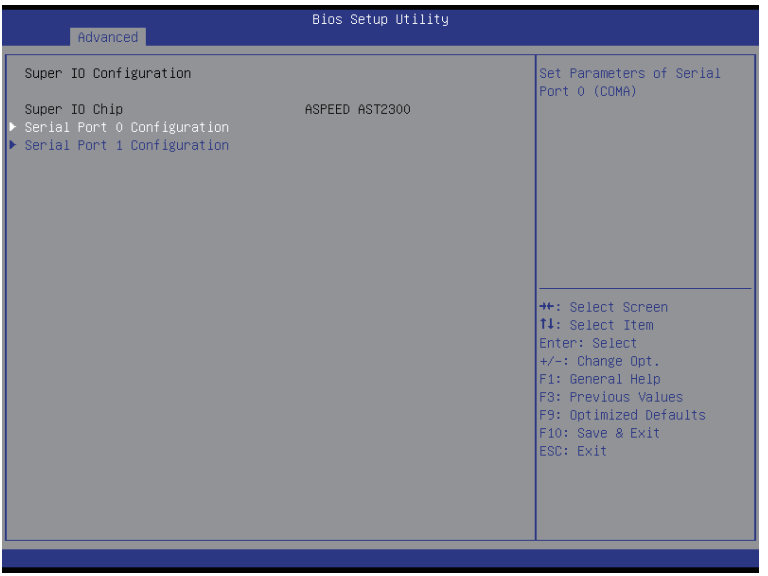
☞ **Error Message Report**

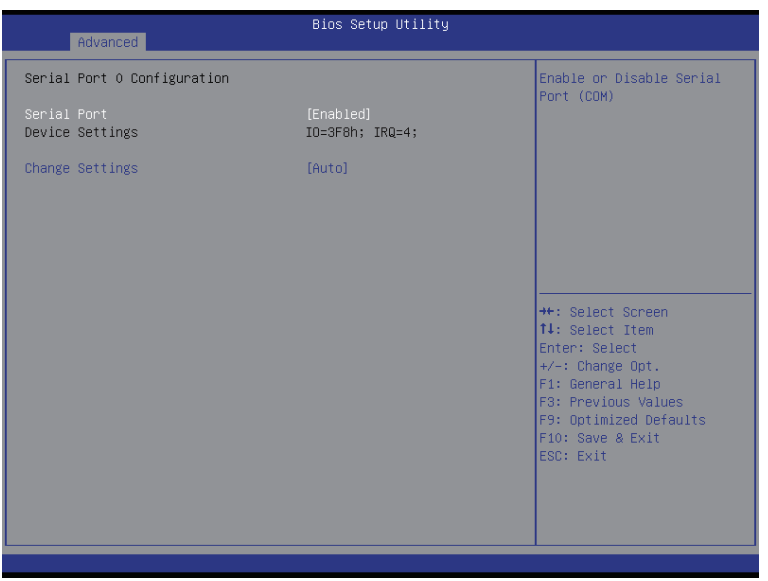
☞ **Info Error Message**

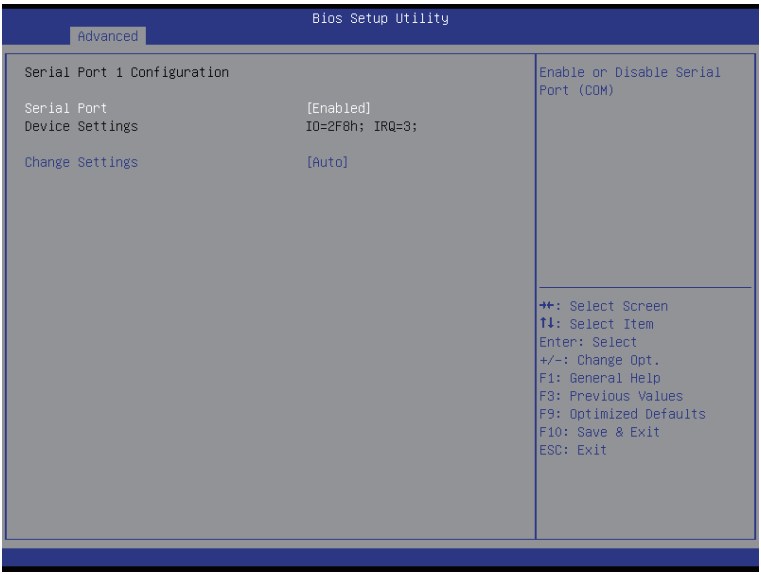
Enable/Disable Info Error Message support.

Options available: Enabled/Disabled. Default setting is **Enabled**.

5-2-9 Super IO Configuration







☞ **Super IO Configuration**

☞ **Super IO Chip**

Display the model name of Super IO chipset.

☞ **Serial Port 0/1 Configuration**

☞ **Serial Port**

When enabled allows you to configure the serial port settings. When set to Disabled, displays no configuration for the serial port.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ **Device Settings**

Displays the Serial Port base I/O address and IRQ.

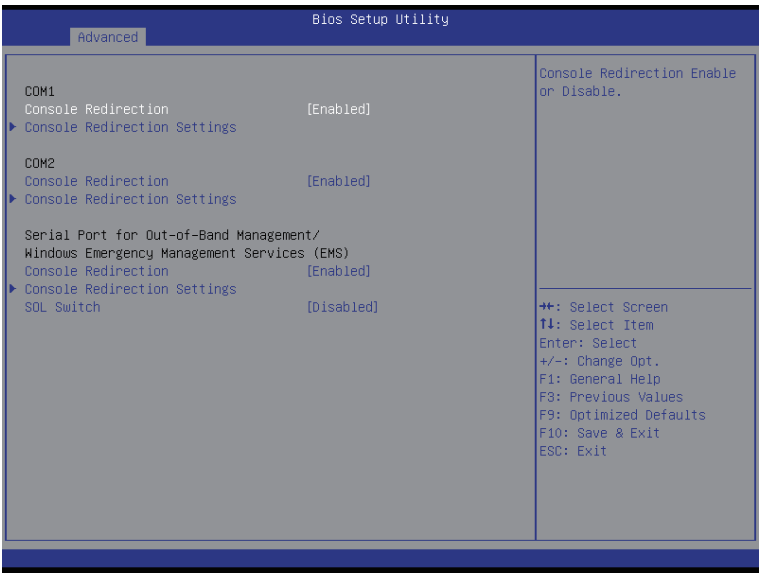
☞ **Change Settings**

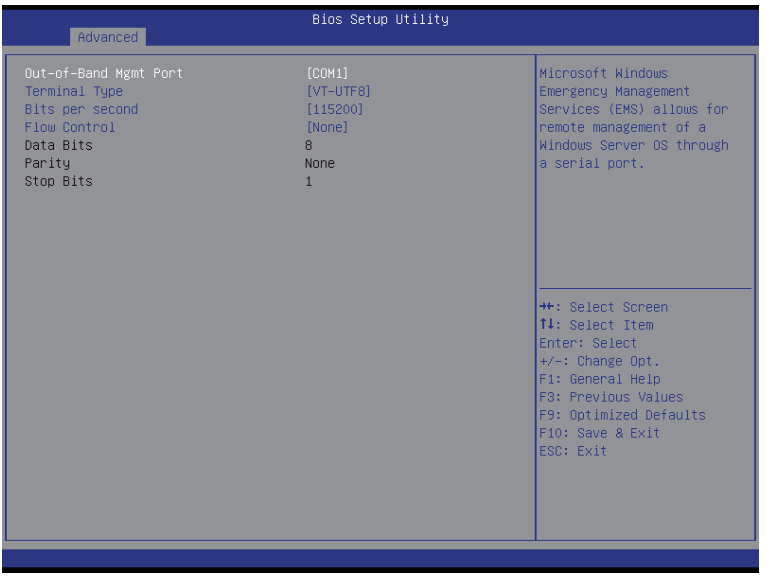
Change Serial Port 0/1 device settings. When set to Auto allows the server's BIOS or OS to select a configuration.

Options available for Serial Port 0: Auto/IO=3F8; IRQ=4/IO=3F8h; IRQ=3,4,5,6,7,10,11,12/ IO=2F8h; IRQ=3,4,5,6,7,10,11,12 /IO=3E8h; IRQ=3,4,5,6,7,10,11,12/IO=2E8h; IRQ=3,4,5,6,7,10,11,12.

Options available for Serial Port 1: Auto/IO=3F8h; IRQ=3/IO=3F8h; IRQ=3,4,5,6,7,10,11,12/ IO=2F8h; IRQ=3,4,5,6,7,10,11,12 /IO=3E8h; IRQ=3,4,5,6,7,10,11,12/IO=2E8h; IRQ=3,4,5,6,7,10,11,12.

5-2-10 Serial Port Console Redirection





☞ **COM1/COM2/Serial Port for Out-of Band Management / Windows Emergency Management Service (EMS)**

☞ **Console Redirection** (Note)

Select whether to enable console redirection for specified device. Console redirection enables users to manage the system from a remote location.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **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.

☞ **Data Bits**

Select the data bits for console redirection.

Options available: 7/8.

☞ **Parity**

A parity bit can be sent with the data bits to detect some transmission errors.

Even: parity bi is 0 if the num of 1's in the data bits is even.

Odd: parity bit is0if 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.

(Note) Advanced items prompt when this item is defined.

☞ **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**(Note)

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.

☞ **VT-UTF8 Combo Key Support** (Note)

Enable/Disable VT-UTF8 Combo Key Support.
Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ **Recorder Mode** (Note)

When this mode enabled, only text will be send. This is to capture Terminal data.
Options available: Enabled/Disabled.

☞ **Resolution 100x31** (Note)

Enables or disables extended terminal resolution.
Options available: Enabled/Disabled.

☞ **Legacy OS Redirection Resolution** (Note)

On Legacy OS, the number of Rows and Columns supported redirection.
Options available: 80x24/80X25.

☞ **Putty KeyPad** (Note)

Select function FunctionKey and KeyPad on Putty.
Options available: VT100/LINUX/XTERMR6/SCO/ESCN/VT400.

☞ **Redirection After BIOS POST** (Note)

This option allows user to enable console redirection after O.S has loaded.
Options available: Always Enable/Boot Loader. Default setting is **Always Enable**.

☞ **Out-of-Bnad Mgmt Port**

Microsoft Windows Emerency Management Service (EMS) allows for remote management of a Windows Server OS through a serial port.
Options available: COM1/COM2.

☞ **SOL Switch**

When enabled, COM1 Switch to AST2300 SOL UART.
When disabled, COM1 Switch to IT8728 SOL UART.
Options available: Enabled/Disabled. Default setting is **Disabled**.

(Note) The item is only available for COM1/COM2.

5-2-11 Network Stack

☞ **Network stack**

Enable/Disable UEFI network stack.

Options available: Enabled/DIsabled. Default setting is **Disabled**.

☞ **Ipv4 PXE Support**(Note)

Enable/Disable Ipv4 PXE feature.

Options available: Enabled/DIsabled. Default setting is **Enabled**.

☞ **Ipv6 PXE Support**(Note)

Enable/Disable Ipv6 PXE feature.

Options available: Enabled/DIsabled. Default setting is **Enabled**.

☞ **PXE boot wait time**

Press the <+> or <-> keys to configure the desired value.

(Note) This item appears when **Network Stack** is set to **Enabled**.

5-2-12 iSCSI Configuration

☞ **iSCSI Initiator Name**

☞ **Add an Attempts**

Press [Enter] for configuration of advanced items.

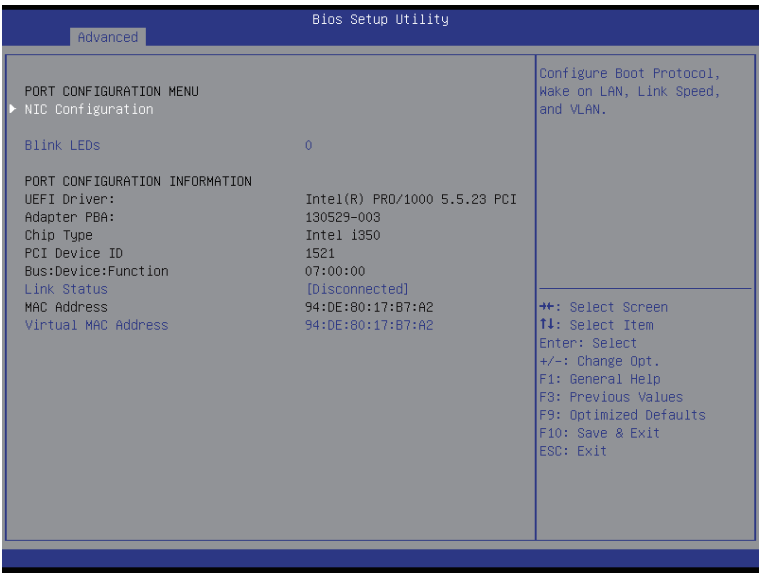
☞ **Delete Attempts**

Press [Enter] for configuration of advanced items.

☞ **Change Attempt Order**

Press [Enter] for configuration of advanced items.

5-2-13 Intel (R) I350 Gigabit Network Connection



☞ **PORT CONFIGURATION MENU**

☞ **NIC Configuration**

Press [Enter] for configuration of advanced items.

☞ **Blink LEDs (range 0-15 seconds)**

Blink LEDs for the specified duration (up to 15 seconds).
Press the numberic keys to input the desired value.

☞ **PORT CONFIGURATION INFORMATION**

☞ **UEFI Driver**

Display the UEFI driver information.

☞ **Adapter PBA**

Display the Adapter PBA information.

☞ **Chip Type**

Display the Chip type.

☞ **PCI Device ID**

Display the PCI device ID.

☞ **Bus:Device:Function**

Display the number of Bus/Device/Function

☞ **Link Status**

Display the link status.

☞ **MAC Address**

Display the Factory MAC address information.

☞ **Virtual MAC Address**

Display the virtual MAC address information.

☞ **Link Speed**

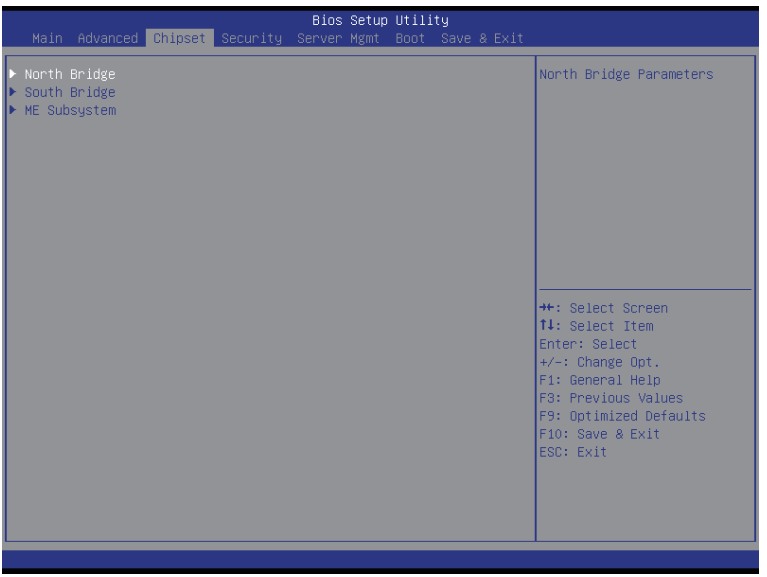
Change link speed duplex for current port.
Options available: AutoNeg/10Mbps Half/10Mbps Half/10Mbps Half/100Mbps Full.
Default setting is **AutoNegotiated**.

☞ **Wake On LAN**

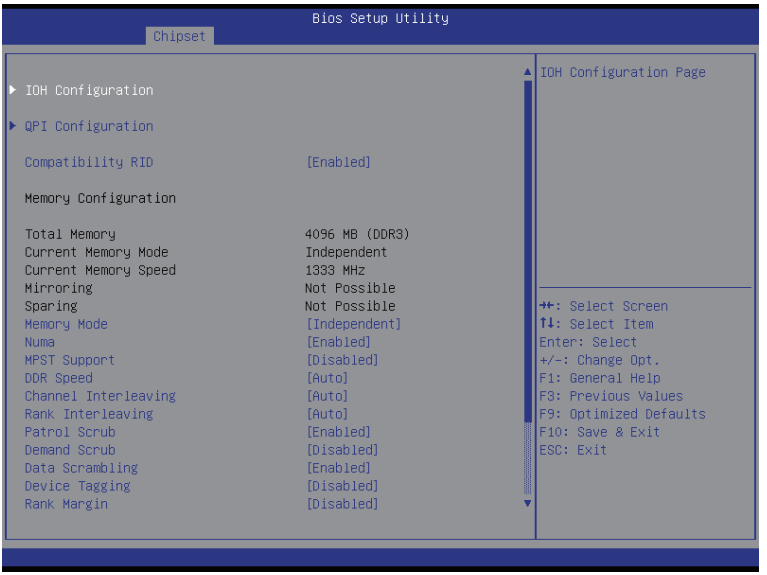
Enable/Disable Wake On LAN feature.
Options available: Enabled/DIsabled. Default setting is **Enabled**.

5-3 Chipset Menu

The Chipset menu display submenu options for configuring the function of North Bridge and South Bridge. Select a submenu item, then press Enter to access the related submenu screen.



5-3-1 North Bridge



☞ **IOH Configuration**

Press [Enter] for configuration of advanced items.

☞ **QPI Configuration**

Press [Enter] for configuration of advanced items.

☞ **Compatibility RID**

Enable/Disable Compatibility RID function.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ **Memory Configuration**

☞ **Total Memory**

Displays the total capacity of the installed memory.

☞ **Current Memory Mode**

Displays the current memory mode. Memory mode can be determined in **Memory Mode** item.

☞ **Current Memory Speed**

Displays the current memory speed.

☞ **Mirroring/Sparing**

Displays the current support memory mode.

☞ **Memory Mode**

Determine the memory mode.

When set to Indendent mode, all DIMMs are available to the operation system.

When set to Mirroring mode, the motherboard maintains two identical (redundant) copies of all data in memory.

When set to Lockstep mode, the motherboard uses two areas of memory to run the same set of operations in parallel.

When set to Sparing mode, a preset threshold of coorectable errors is used to trigger fail-over. The spare memory is put online and used as active memory in place of the failed memory.

Options available: Indpendent /Mirroring/ Lockstep/Sparing.

☞ **Numa**

Enable/Disable Numa function.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ **MPST**

Enable/Disable MPST function.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **DDR Speed**

Configure the DDR Speed.

Options available: Auto/Force DDR3 800/Force DDR3 1066/Force DDR3 1333/Force DDR3 1600/Force DDR3 1866. Default setting is **Auto**.

☞ **Channel interleaving**

Configure DDR Channel Interleaving.

Options available: Auto/1 Way/2 Way/3 Way/4 Way. Default setting is **Auto**.

☞ **Rank interleaving**

Configure DDR Rank Interleaving. This improves memory performance by masking the refresh cycles of each memory bank. The Rank Interleaving works between different physical banks.

Options available: Auto/1 Way/2 Way/3 Way/4 Way. Default setting is **Auto**.

☞ **Patrol Scrub**

Enable/Disable Patrol Scrub function.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ **Demand Scrub**

Enable/Disable Demand Scrub function.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **Data Scrambling**

Enable/Disable Data Scrambling function.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ **Device Tagging**

Enable/Disable Device Tagging function.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **Rank Margin**

Enable/Disable Rank Margin function.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **Thermal Thortting**

Configure theThermal Thortting.

Options available: Disabled/OLTT/CLTT. Default setting is **CLTT**.

☞ **OLTT Peak BW %**

Press the numberic keys to increase or decrease the desired values.

☞ **Altitude**

Configure the Altitude value.

Options available: Auto/300 M/900 M/1500 M/3000 M. Default setting is **3000 M**.

☞ **Enforce DIMM**

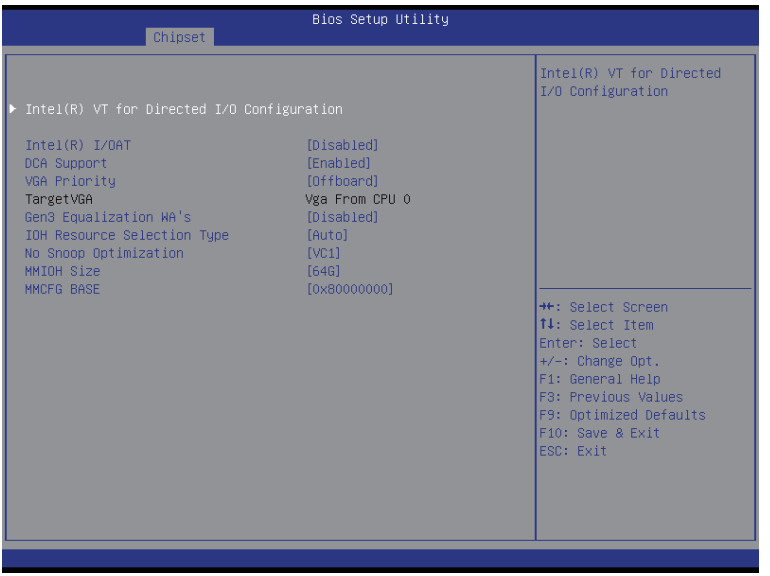
To enforce POR function. When disabled, the system will enforce 1600MHz LRDIMM.

Options available: Enforce EN/Stretch EN/Enforce DIS. Default setting is **Enforce DIS**.

☞ **DIMM Information**

Press [Enter] for configuration to view installed DIMM information.

5-3-1-1 IOH Configuration



☞ **IOH Configuration**

☞ **Intel(R) VT for Directed I/O Configuration**

Press [Enter] for configuration of advanced items.

☞ **Intel(R) I/OAT (Intel I/O Acceleration Technology)**

Enable/Disable Intel I/OAT function.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **DCA Support (Direct Cache Access)**

Enable/Disable Intel DCA Support function.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **VGA Priority**

Define the display device priority.

Options available: Onboard/Offboard. Default setting is **Offboard**.

☞ **TargetVGA**

Display the Target VGA support informaiton.

☞ **Gen3 Equalization WA's**

Enable/DIsable the support for Gen3 Equalization Workaround.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **IOH Resource Seletion Type**

Configure IOH Resource Seletion Type.

Options available: Auto/Manual. Default setting is **Auto**.

☞ **No Snoop Optimization**

Options VC0/VCP/VC1. Default setting is **VC1**.

☞ **MMCFG Size (Size of the Memory Mapped Configuration Space)**

Options available: 1G/2G/4G/8G/16G/32G/64G. Default setting is **64G**.

☞ **MMCFGBASE (Base address of the Memory Mapped Configuration Space)**

Options available: 0x80000000/0xA0000000/0xC0000000/0x40000000. Default setting is **0x80000000**.

☞ **Intel(R) VT-d**

Enable/Disable Intel VT-d Technology function.

Options available: Enabled/Disabled. Default setting is **Enabled**.

5-3-1-2 QPI Configuration

☞ **Current QPI Link Speed/ Current QPI Link Freq**

Displays the current QPI Link Speed and Frequency information.

☞ **Isoc**

Enable/Disable Isoc.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **QPI Link Speed Mode**

Configure QPI Link Speed mode.

Options available: Fast/Slow. Default setting is **Fast**.

☞ **QPI Link Frequency Select**

Configure QPI Link Frequency.

Options available: Auto/6.4 GT/s7.2 GT/s/8.6 GT/s. Default setting is **Auto**.

☞ **QPI Link0s**

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **QPI Link0p**

Options available: Enabled/Disabled. Default setting is **Disabled**.

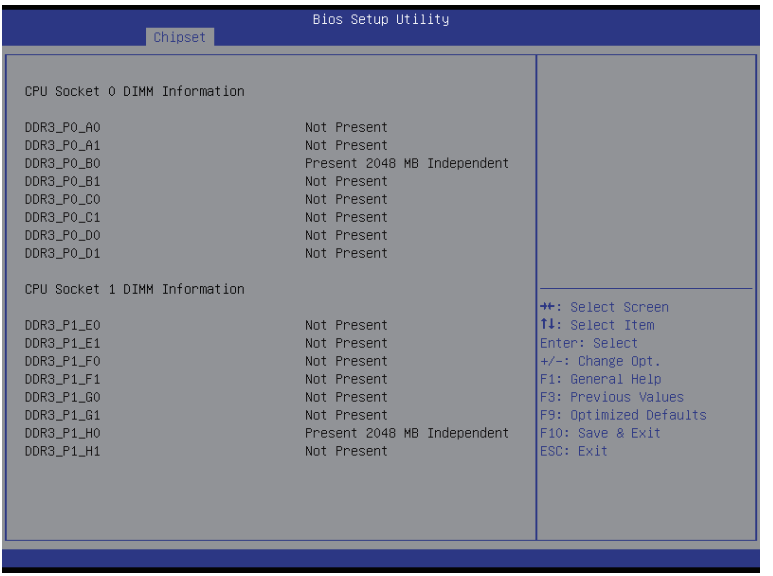
☞ **QPI Link1**

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ **Snoop Mode**

Options available: Auto/Disabled. Default setting is **Auto**.

2-3-1-3 DIMM Information

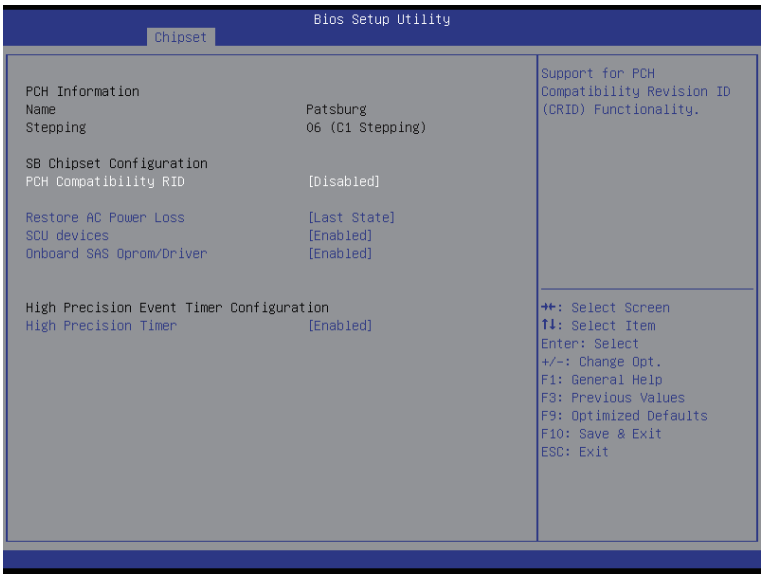


- **CPU Socket 0/1 DIMM Information**
- **CPU Socket 0:**
- **DDR3_P0_A0/DDR3_P0_A1/DDR3_P0_B0/DDR3_P0_B1/ DDR3_P0_C0/DDR3_P0_C1/DDR3_P0_D0/DDR3_P0_D1 Status**

  The size of memory installed on each of the DDR3 slots.
- **CPU Socket 1:**
- **DDR3_P1_E0/DDR3_P1_E1/ DDR3_P1_F0/DDR3_P1_F1/ DDR3_P1_G0/DDR3_P1_G1/DDR3_P1_H0/ DDR3_P1_H1 Status**

  The size of memory installed on each of the DDR3 slots.

5-3-2 South Bridge Configuration



☞ **PCH Information**

☞ **Name/Stepping Information**

Displays the name and stepping information of the south bridge.

☞ **SB Chipset Configuration**

☞ **PCH Compatibility RID**

Enable/Disable PCH Compatibility RID support.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **USB WakeOnDev insertion**

Enable/Disable USB Device WakeOn support.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **Restore on AC Power Loss** (Note)

Defines the power state to resume to after a system shutdown that is due to an interruption in AC power. When set to Last State, the system will return to the active power state prior to shutdown. When set to Stay Off, the system remains off after power shutdown.

Options available: Last State/Stay Off/Power On. The default setting depends on the BMC setting.

☞ **SCU Devices**

Enable/Disable Patsburg SCU device.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **Onboard SAS Oprom/Driver**

Enable/Disable onboard SAS option ROM.

Options available: Enabled/Disabled. Default setting is **Enabled**.

(Note) When the power policy is controlled by BMC, please wait for 15-20 seconds for BMC to save the last power state.

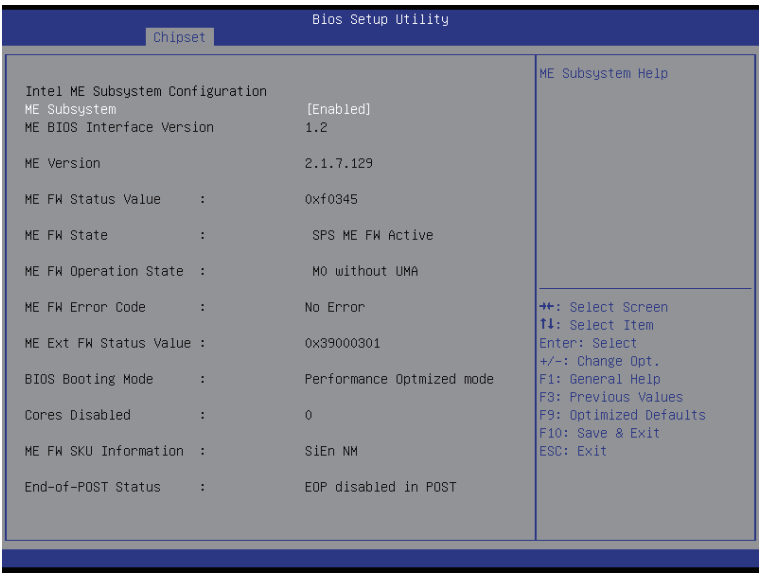
☞ **High Precision Event Timer Configuration**

☞ **High Precision Event Timer**

Enable/Disable High Precision Event Timer.

Options available: Enabled/Disabled. Default setting is **Enabled**.

5-3-3 Intel ME Subsystem



ME Subsystem Configuration

Enable/Disable ME subsystem configuration.

Options available: Enabled/Disabled. Default setting is **Enabled**.

5-4 Security Menu

The Security menu allows you to safeguard and protect the system from unauthorized use by setting up access passwords.

There are two types of passwords that you can set:

- Administrator Password

  Entering this password will allow the user to access and change all settings in the Setup Utility.

- User Password

  Entering this password will restrict a user's access to the Setup menus. To enable or disable this field, a Administrator Password must first be set. A user can only access and modify the System Time, System Date, and Set User Password fields.

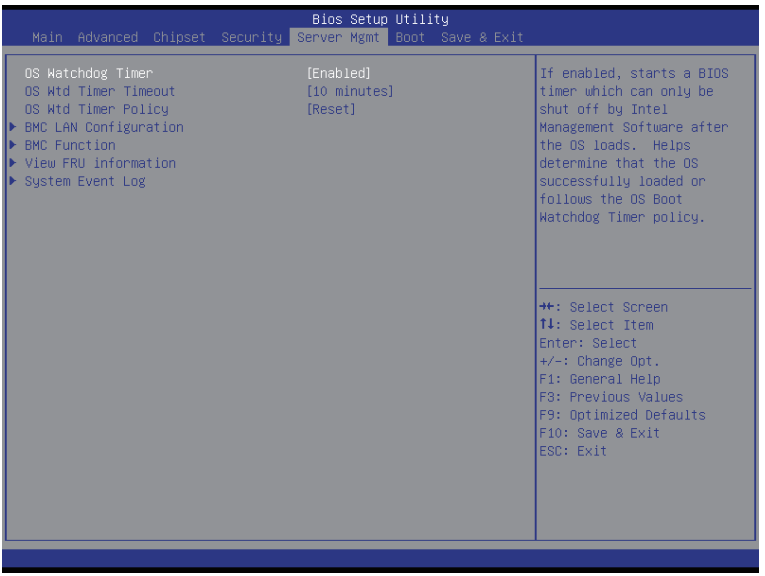
☞ **Administrator Password**

Press Enter to configure the Administrator password.

☞ **User Password**

Press Enter to configure the user password.

5-5 Server Management Menu



☞ **OS Watchdog Timer**

Enable/Disable OS Watchdog Timer function.

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **OS Wtd Timer Timeout**

Configure OS Watchdog Timer.

Options available: 5 minutes/10 minutes/15 minutes/20 minutes. Default setting is **10 minutes**.

☞ **OS Wtd Timer Policy**

Configure OS Watchdog Timer Policy.

Options available: Reset/Do Nothing/Power Down. Default setting is **Reset**.

☞ **BMC LAN Configuration**

BMC LAN Configuration. Press Enter to access the related submenu.

☞ **BMC Function**

BMC related function configuration.Press Enter to access the related submenu.

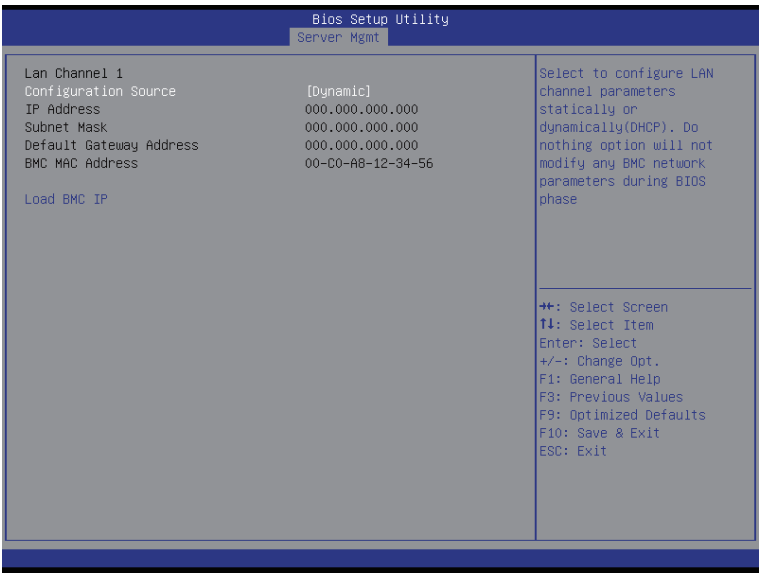
☞ **View FRU information**

The FRU information submenu is a simple display page for basic system ID information, as well as system product information. Items on this window are non-configurable.

☞ **System Event Log**

Displays Event Log advanced settings. Press Enter to access the related submenu.

5-5-1 BMC LAN Configuration



☞ **Lan Channel 1**

☞ **Configuration Source**

Select to configure LAN channel parameters statically or dynamically (DHCP). Do nothing option willnot modify any BMC network parameters during BIOS phase.

Options available: Static/Dynamic/Do Nothing.

☞ **IP Address**

Display IP Address information.

☞ **Subnet Mask**

Display Subnet Mask information.

Please note that the IP address must be in three digitals, for example, 192.168.000.001.

☞ **Default Gateway Address**

Display Default Gateway Address information.

☞ **Load BMC IP**

Press [Enter] to load BMC IP.

5-5-2 BMC Function

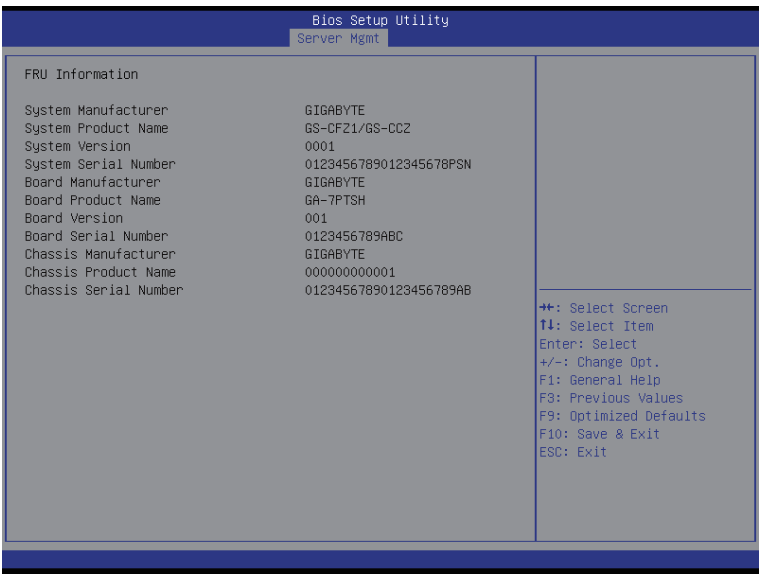
☞ Select NCSI and Dedicated LAN

Switch NCSI and dedicated LAN and send KCS command.

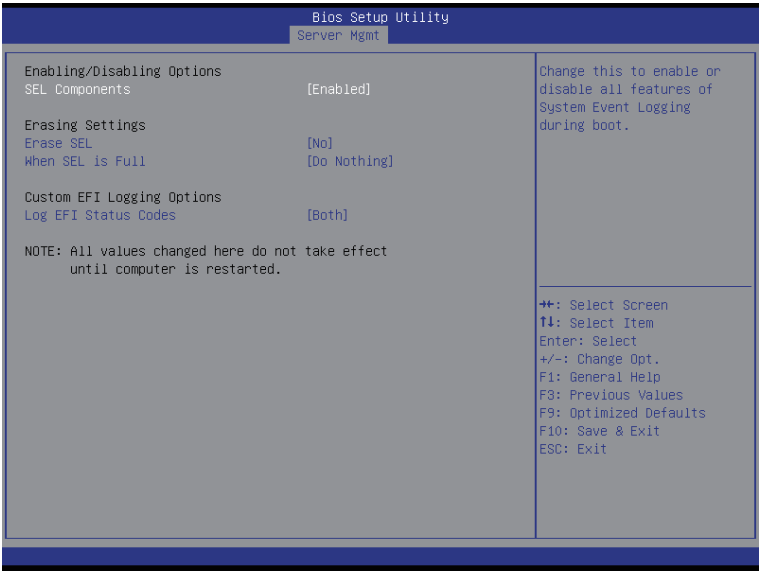
Options available: Mode2(NSCI)/ Mode1 (Dedicated). Default setting is **Mode1 (Dedicated)**.

5-5-3 View FRU Information

The View FRU Information menu is a simple display page for basic system ID information, as well as System product information. Items on this window are non-configurable.



5-5-4 System Event Log



☞ **Enabling/Disabling Options**

☞ **SEL Components**

Change this to enable or disable all features of System Event Logging during boot.

Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ **Erasing Settings**

☞ **Erasing SEL**

Choose options for erasing SEL.

Options available: No/Yes, On next reset/Yes, On every reset. Default setting is **No**.

☞ **When SEL is Full**

Choose options for reactions to a full SEL.

Options available: Do Nothing/Erase Immediately. Default setting is **Do Nothing**.

☞ **Custom EFI Logging Options**

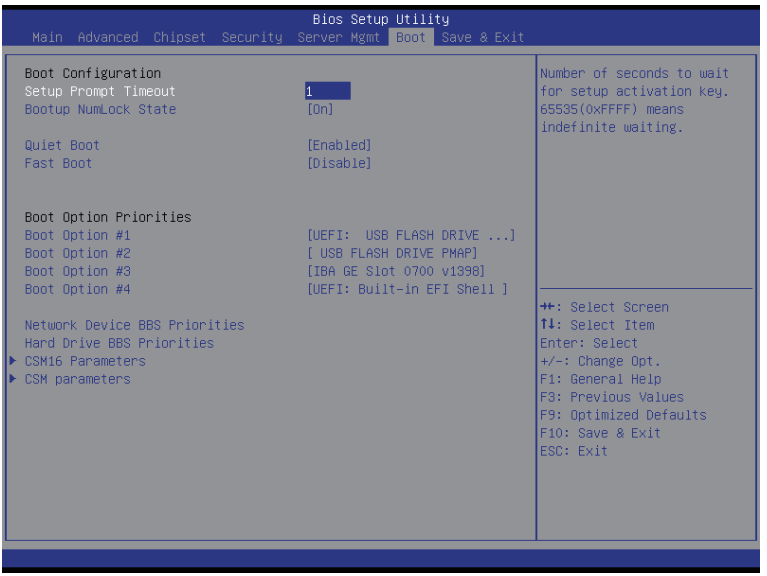
☞ **Log EFI Status Codes**

Enable/Disable the logging of EFI Status Codes (if not already converted to legacy).

Options available: Disabled/Both/Error code/Progress code. Default setting is **Both**.

5-6 Boot Menu

The Boot menu allows you to set the drive priority during system boot-up. BIOS setup will display an error message if the legacy drive(s) specified is not bootable.



☞ **Boot Configuration**

☞ **Setup Prompt Timeout**

Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting."
Press the numberic keys to input the desired value.

☞ **Bootup NumLock State**

Enable or Disable Bootup NumLock function.
Options available: On/Off. Default setting is **On**.

☞ **Quiet Boot**

Enable/Disbable showing the manufacturer's logo during POST.
Options available: Enabled/Disabled. Default setting is **Enabled**.

☞ **Fast Boot**

This BIOS feature alows you to decrease the time it takes to boot up the system by skipping certain booting procedures.
Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **Boot Priority Order**

☞ **Boot Option #1/#2/#3/#4**

Press Enter to configure the boot priority.

By default, the server searches for boot devices in the following secquence:

1. UEFI device.
2. Hard drive.
3. Network device.
4. Removable device

☞ **Network Device BBS Priorities**

Press Enter to configure the boot priority.

☞ **Hard Drive BBS Priorities**

Press Enter to configure the boot priority.

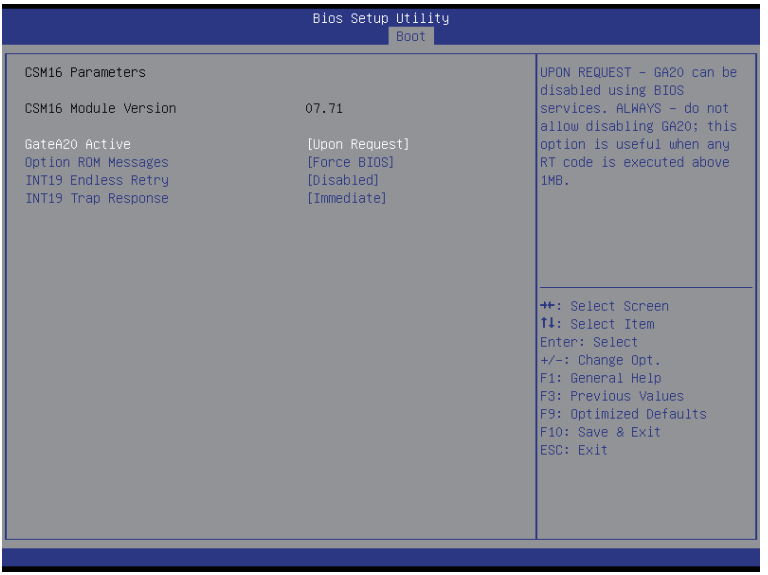
☞ **CSM16 Parameters**

Press Enter to configure the CSM16 parameters.

☞ **CSM Parameters**

Press Enter to configure the CSM parameters.

5-6-1 CSM16 Parameters



☞ **CSM16 Parameters**

☞ **CSM16 Module Version**

Display CSM Module version information.

☞ **Gate20 Active**

Upon Request: GA20 can be disabled using BIOS services.

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

Options available: Upon Request/Always. Default setting is **Upon Request**.

☞ **Option ROM Messages**

Option ROM Messages.

Options available: Force BIOS/Keep Current. Default setting is **Force BIOS**.

☞ **INT19 Endless Retry**

Enabled: Allowed headless retry boot

Options available: Enabled/Disabled. Default setting is **Disabled**.

☞ **INT19 Trap Response**

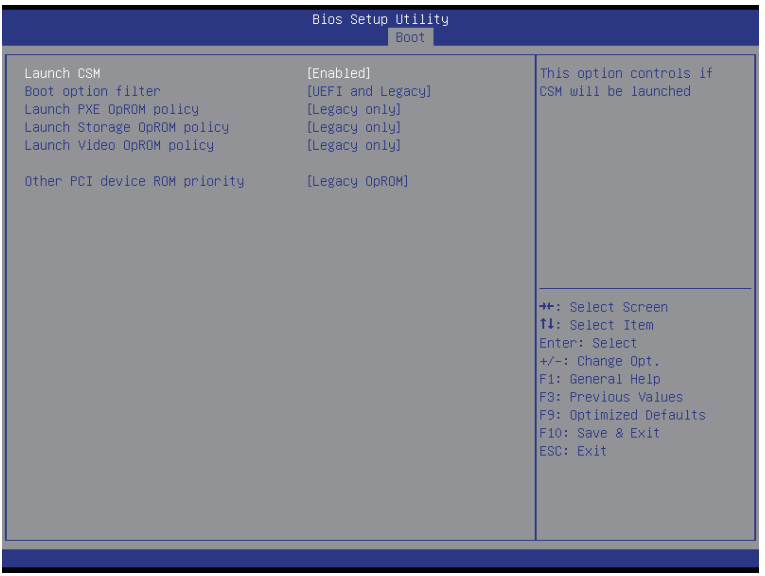
BIOS reaction on INT19 trapping by Option ROM

Immediate: execute the trap right away.

Postpone: execute the trap during legacy boot.

Options available: Immediate/Postpone. Default setting is **Immediate**.

5-6-2 CSM Parameters



☞ CSM parameters

Press Enter to configure the advanced items.

☞ Launch CSM (Compatibility Support Module)

Enable/Disable Compatibility Support Module (CSM) launch.

Options available: Enabled/Disabled. Default setting is **Enabled**.

- The following five items appears and configurable when the **Launch CSM** is set to **Enabled**.
- If the **Launch CSM** is set to **Disabled,** the following five items will not be able to support Legacy mode.

☞ Boot option filter

Determines which devices system will boot to.

Options available: UEFI and Legacy/Legacy only/UEFI only. Default setting is **UEFI and Legacy**.

☞ Launch PXE OpROM policy

Determines which devices system will boot to.

Options available: UEFI only/Legacy only. Default setting is **Legacy only**.

☞ Launch Storage OpROM policy

Determines which devices system will boot to.

Options available: Do not launch/UEFI only/Legacy only. Default setting is **Legacy only.**

☞ Launch Video OpROM policy

Determines which devices system will boot to.

Options available: Do not launch/UEFI only/Legacy only/Legacy first. Default setting is **Legacy only.**

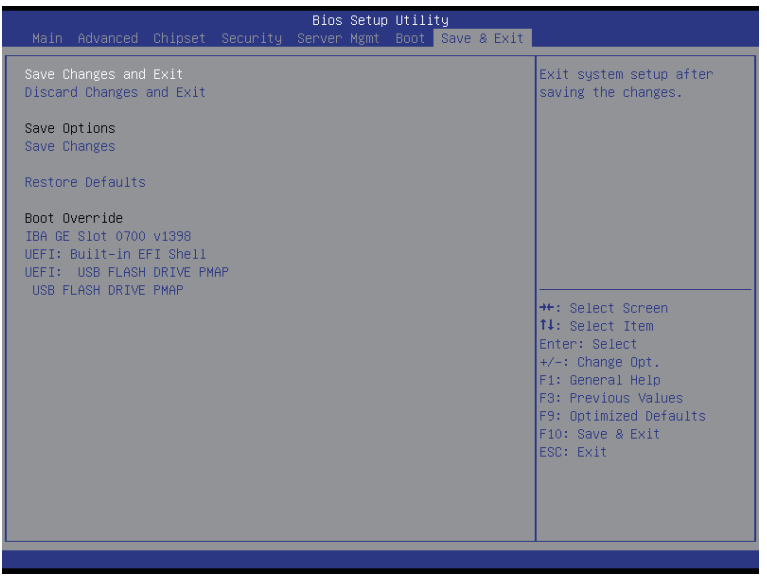
☞ Other PCI device ROM priority

For PCI devices other than Network, Mass storage or Video device, defines which OpROM to launch.

Options available: UEFI OpROM/Legacy OpROM. Default setting is **Legacy OpROM.**

5-7 Exit Menu

The Exit menu displays the various options to quit from the BIOS setup. Highlight any of the exit options then press **Enter**.



☞ **Save Changes and Exit**

Saves changes made and close the BIOS setup.
Options available: Yes/No.

☞ **Discard Changes and Exit**

Discards changes made and close the BIOS setup.
Options available: Yes/No.

☞ **Save Options**

☞ **Save Changes**

Saves changes made in the BIOS setup.
Options available: Yes/No.

☞ **Restore Defaults**

Loads the default settings for all BIOS setup parameters. Setup Defaults are quite demanding in terms of resources consumption. If you are using low-speed memory chips or other kinds of low-performance components and you choose to load these settings, the system might not function properly.
Options available: Yes/No.

☞ **Boot Override**

Press Enter to configure the device as the boot-up drive.

☞ **UEFI: Built-in in EFI Shell**

Press <Enter> on this item to Launch EFI Shell from filesystem device.

5-8 BIOS Beep Codes

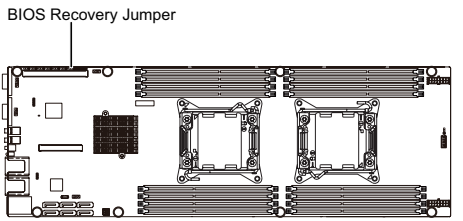
# of Beeps	Description
1	Invalid password
2	Recovery started
4	S3 Resume failed
4	DXEIPL was not found
5	No Console Input/Output Devices are found
6	Flash update is failed

5-9 BIOS Recovery Instruction

The system has an embedded recovery technique. In the event that the BIOS becomes corrupt the boot block can be used to restore the BIOS to a working state. To restore your BIOS, please follow the instructions listed below:

Recovery Instruction:

1. Change xxx.ROM to amiboot.rom.
2. Copy amiboot.rom and AFUDOS.exe to USB diskette.
3. Setting BIOS Recovery jump to enabled status.



4. Boot into BIOS recovery.
5. Run Proceed with flash update.
6. BIOS update.