

MD70-HB0

MD70-HB1

Dual LGA2011 sockets R3 motherboard for Intel® E5-2600 V3 series processors

User's Manual

Rev. 1201

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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 User's Manual.

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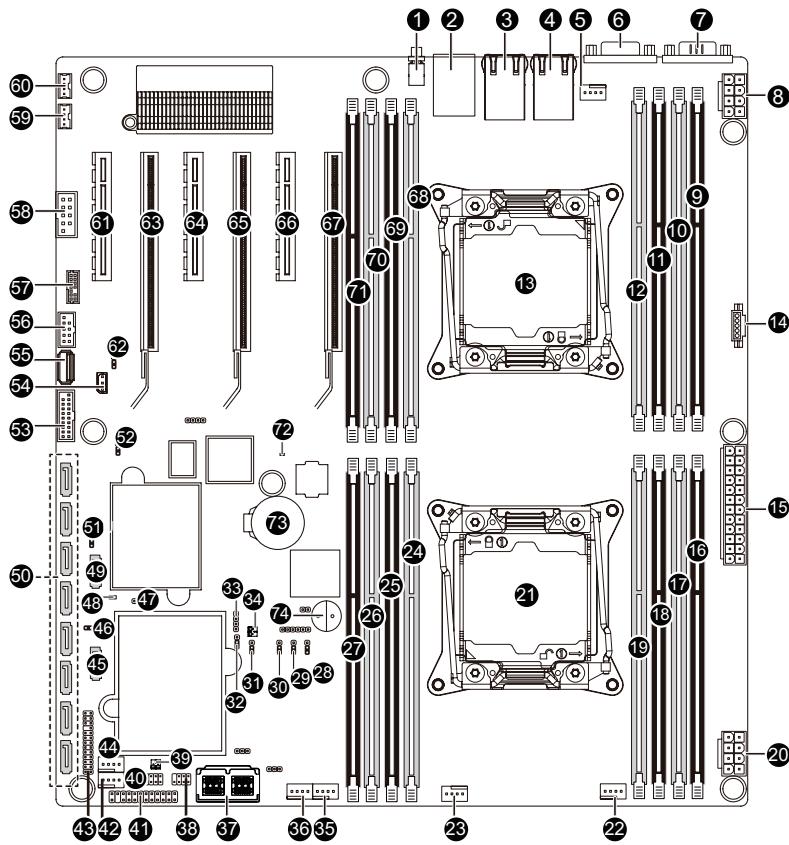
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Box Contents

- Motherboard
- Driver CD
- User's Manual
- Two SATA cables
- I/O Shield

- 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.

MD70-HB0/MD70-HB1 Motherboard Layout



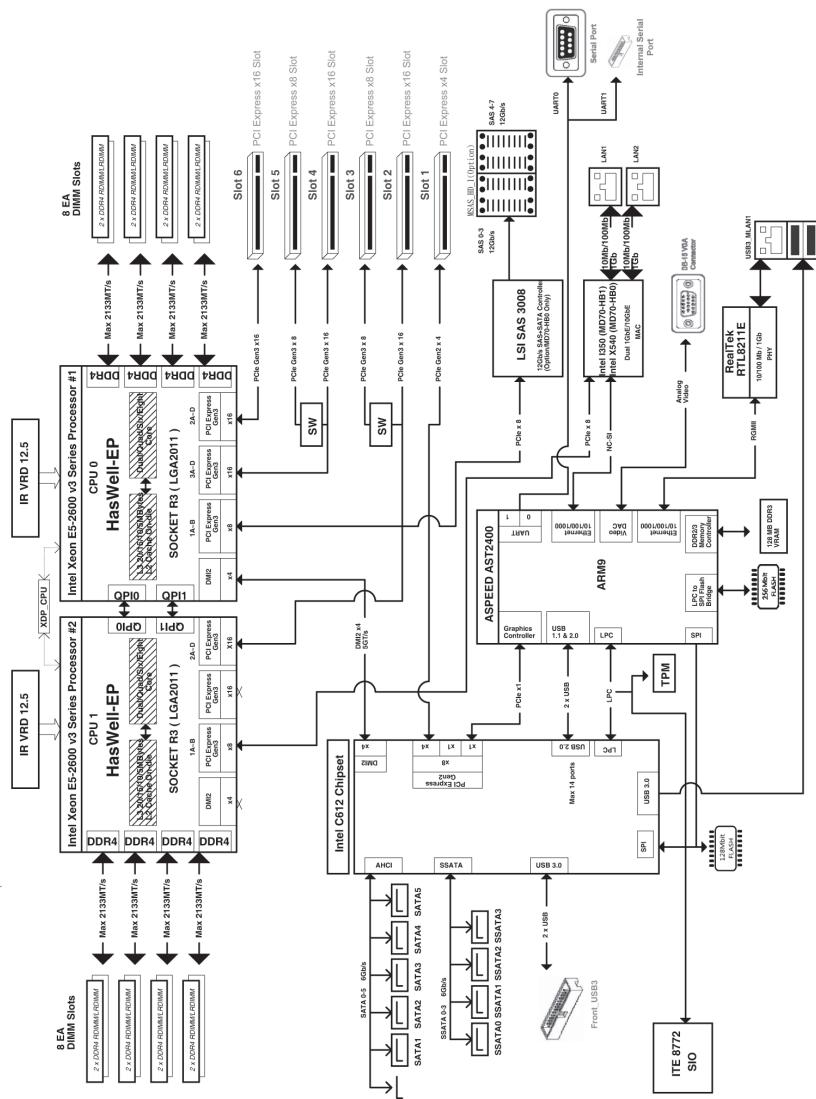
Item	Code	Description
1	SW_ID	ID switch button
2	USB3_MLAN1	BMC Management LAN port (top) / USB 3.0 ports (bottom)
3	LAN1	LAN1 port
4	LAN2	LAN2 port
5	CPU1_FAN	CPU1 fan connector (for Secondary CPU)
6	VGA	VGA port
7	COM1	Serial port
8	P12V_AUX2	8 pin power connector (for secondary CPU)
9	DIMM_P1_G0	Channel 3 slot 0 (for secondary CPU)
10	DIMM_P1_G1	Channel 3 slot 1 (for secondary CPU)
11	DIMM_P1_H0	Channel 4 slot 0 (for secondary CPU)
12	DIMM_P1_H1	Channel 4 slot 1 (for secondary CPU)
13	CPU1	Intel LGA2011 Socket R (Secondary CPU)
14	PMBUS	PMBus connector
15	ATX1	24 pin main power connector
16	DIMM_P0_A0	Channel 1 slot 0 (for primary CPU)
17	DIMM_P0_A1	Channel 1 slot 1 (for primary CPU)
18	DIMM_P0_B0	Channel 2 slot 0 (for primary CPU)
19	DIMM_P0_B1	Channel 2 slot 1 (for primary CPU)
20	P12V_AUX1	8 pin power connector (for primary CPU)
21	CPU0	Intel LGA2011 Socket R (Primary CPU)
22	SYS_FAN5	System fan connector#5
23	CPU0_FAN	CPU0 fan connector (for Primary CPU)
24	DIMM_P0_D1	Channel 4 slot 1 (for primary CPU)
25	DIMM_P0_D0	Channel 4 slot 0 (for primary CPU)
26	DIMM_P0_C1	Channel 3 slot 1 (for primary CPU)
27	DIMM_P0_C0	Channel 3 slot 0 (for primary CPU)
28	ME_UPDATE	ME update jumper
29	BMC_FRB	Force to Stop FRB Timer jumper
30	ME_RCVR	ME recovery jumper
31	BIOS_PWD	Clearing Supervisor Password jumper
32	BIOS_RCVR	BIOS recovery jumper
33	LSI_UART1	LSI UART header
34	SW_RAID	Intel Software RAID Key jumper
35	SYS_FAN4	System fan connector#4
36	SYS_FAN3	System fan connector#3
37	MSAS_HD_1	Mini-SAS HD connector (MD70-HB0 Only)
38	SATA_SGP	SATA SGPIO header

39	IMR_KEY	LSI RAID key header (MD70-HB0 Only)
40	SSATA_SGP	sSATA GPIO header
41	FP_1	Front panel header
42	SYS_FAN1	System fan connector#1
43	BP_1	HDD back plane board header
44	SYS_FAN2	System fan connector#2
45	SATA0	SATA 3 6Gb/s connector
46	SATA_DOM0	SATA port 0 DOM support jumper
47	CASE_OPEN	Case open intrusion alert header
48	LED5	LSI firmware readiness LED (MD70-HB0 Only)
49	SATA1	SATA 3 6Gb/s connector
50	SATA2/3/4/5/SSATA0/1/2/3	SATA 3 6Gb/s connectors
51	SATA_DOM1	SATA port 1 DOM support jumper
52	CLR_CMOS	Clear CMOS jumper
53	F_USB3	USB 3.0 header
54	IPMB	IPMB connector
55	USB3_A	Type A USB 3.0 connector
56	F_USB2	USB 2.0 header
57	TPM	TPM module connector
58	COM2	Serial port cable header
59	LAN1_LED	LAN #1 Active/Link connector
60	LAN2_LED	LAN #2 Active/Link connector
61	PCIE_1	PCI Express x8 slot
62	S3_MASK	S3 Power On Select jumper
63	PCIE_2	PCI Express x16 slot
64	PCIE_3	PCI Express x8 slot
65	PCIE_4	PCI Express x16 slot
66	PCIE_5	PCI Express x8 slot
67	PCIE_6	PCI Express x16 slot
68	DIMM_P1_F1	Channel 3 slot 1 (for secondary CPU)
69	DIMM_P1_F0	Channel 3 slot 0 (for secondary CPU)
70	DIMM_P1_E1	Channel 4 slot 1 (for secondary CPU)
71	DIMM_P1_E0	Channel 4 slot 0 (for secondary CPU)
72	LED_BMC	BMC firmware readiness LED
73	BAT	Battery socket
74	BUZZER1	Buzzer



CAUTION! If a SATA type hard drive is connected to the motherboard, please ensure the jumper is closed and set to **2-3 pins** (Default setting), in order to reduce any risk of hard disk damage. Please refer to Page 38 for SATA_DOM0 and SATA_DOM1 jumper setting instruction.

Block Diagram



Chapter 1 Hardware Installation

1-1 Installation Precautions

The motherboard contains numerous delicate electronic circuits and components which can become damaged as a result of electrostatic discharge (ESD). Prior to installation, carefully read the user's manual 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

 CPU	<ul style="list-style-type: none">Support for Intel® Xeon® E5-2600 V3 series processors in the LGA2011 packageL3 cache varies with CPUSupports Dual QuickPath Interconnect up to 9.6GT/sEnhanced Intel SpeedStep Technology (EIST)Support Intel Virtualization Technology (VT)
 Chipset	<ul style="list-style-type: none">Intel® C612 Express (Wellsburg) Chipset
 Memory	<ul style="list-style-type: none">16 x 1.2V DDR4 DIMM sockets supporting up to 512GB RDIMM of system memory16 x 1.2V DDR4 DIMM sockets supporting up to 1TB LRDIMM of system memoryFour channel memory architectureDDR4 2133MHz RDIMM memory modulesDDR4 2133MHz LR-DIMM memory modulesSupport for ECC RDIMM/LRDIMM memory modules
 LAN	<ul style="list-style-type: none">Intel® X540 supports dual 10GbE LAN ports (MD70-HB0)Intel® I350 supports dual GbE LAN ports (MD70-HB1)
 Expansion Slots	<ul style="list-style-type: none">1 x PCI Express x16 slot, running at x16 (Gen3/PCIE_6)1 x PCI Express x16 slot, running at x16 (Gen3/PCIE_4/The slot shares bandwidth with the PCIE_5 slot. When PCIE_5 slot is populated, the PCIE_4 will operate at x8 mode.)1 x PCI Express x16 slot, running at x16 (Gen3/PCIE_2/The slot shares bandwidth with the PCIE_3 slot. When PCIE_3 slot is populated, the PCIE_4 will operate at x8 mode.)3 x PCI Express x8 slots
 Onboard Graphics	<ul style="list-style-type: none">ASPEED® AST2400 supports 16MB DDR3 VRAM
 Storage Interface	<ul style="list-style-type: none">Intel® C612 Express controller10 x SATA3 6Gb/s connectors2 x Mini-SAS HD connectors (MD70-HB0 Only)Support for Intel RSTe 4.0 with RAID 0, 1, 10, 5LSI® 3008 controller supports LSI RAID 0, 1, 1E (MD70-HB0 Only)
 USB	<ul style="list-style-type: none">Up to 5 USB 3.0 ports (1 Type A connector, 2 on the back panel, 2 additional ports via the USB brackets connected to the internal USB headers)

 Internal Connectors	<ul style="list-style-type: none"> ◆ 1 x 24-pin ATX main power connector ◆ 2 x 8-pin ATX 12V power connector ◆ 2 x Mini-SAS HD connectors ◆ 10 x SATA3 6Gb/s connectors ◆ 1 x PMBus header ◆ 2 x CPU fan headers ◆ 5 x System fan headers ◆ 1 x Front panel header ◆ 1 x HDD Back plane board header ◆ 1 x USB 3.0 header ◆ 1 x TPM module connector ◆ 1 x Serial port connector ◆ 2 x SATA SPGIO headers ◆ 1 x IPMB connector ◆ 1 x Software RAID key connector ◆ 1 x LSI RAID key connector ◆ 2 x LAN LED connectors
 Rear Panel I/O	<ul style="list-style-type: none"> ◆ 2 x USB 3.0 ports ◆ 3 x RJ-45 ports (1 x 10/100/1000 dedicated management LAN port) ◆ 1 x COM port ◆ 1 x VGA port ◆ 1 x ID Button/LED
 I/O Controller	<ul style="list-style-type: none"> ◆ ASPEED® AST2400 BMC chip
 Hardware Monitor	<ul style="list-style-type: none"> ◆ System voltage detection ◆ CPU/System temperature detection ◆ CPU/System fan speed detection ◆ CPU/System fan speed control <ul style="list-style-type: none"> * Whether the CPU/system fan speed control function is supported will depend on the CPU/system cooler you install.
 BIOS	<ul style="list-style-type: none"> ◆ 1 x 128 Mbit flash ◆ AMI BIOS
 Form Factor	<ul style="list-style-type: none"> ◆ EATX Form Factor; 13 inch x 12 inch

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

1-3 Installing the CPU and CPU Cooler

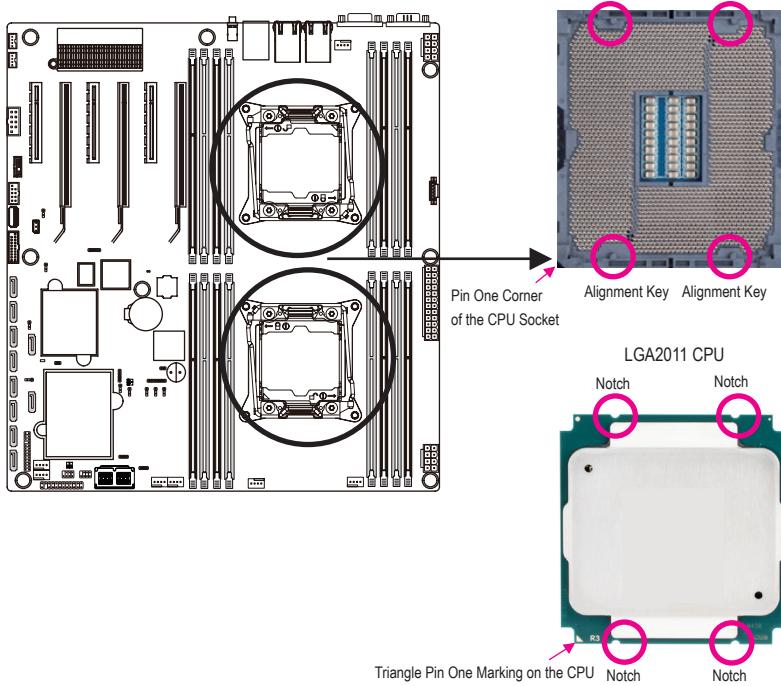
Read the following guidelines before you begin to install the CPU:



- 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.
- 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.

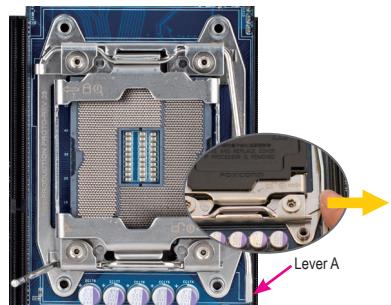
1-3-1 Installing the CPU

A. Locate the alignment keys on the motherboard CPU socket and the notches on the CPU.



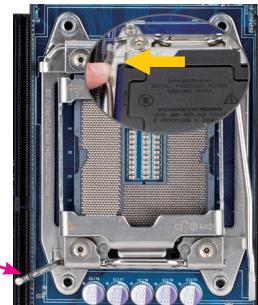
B. Follow the steps below to correctly install the CPU into the motherboard CPU socket.

- Before installing the CPU, make sure to turn off the computer and unplug the power cord from the power outlet to prevent damage to the CPU.
- To protect the socket contacts, do not remove the protective plastic cover unless the CPU is inserted into the CPU socket. Save the cover properly and replace it if the CPU is removed.



Step 1:

Push the lever closest to the "unlock" marking "□~" (below referred as lever A) down and away from the socket to release it.



Step 2:

Push the lever closest to the "lock" marking "□" (below referred as lever B) down and away from the socket. Then lift the lever.



Step 3:

Gently press lever A to allow the load plate to rise. Open the load plate. (Note: DO NOT touch the socket contacts after the load plate is opened.)



Step 4:

Hold the CPU with your thumb and index fingers. Align the CPU pin one marking (triangle) with the pin one corner of the CPU socket (or align the CPU notches with the socket alignment keys) and carefully insert the CPU into the socket vertically.



Step 5:

Once the CPU is properly inserted, carefully replace the load plate. Then secure lever B under its retention tab.

The protective plastic cover may pop off from the load plate during the process of engaging the lever. Remove the cover. Save the cover properly and always replace it when the CPU is not installed.



Step 6:

Finally, secure lever A under its retention tab to complete the installation of the CPU.

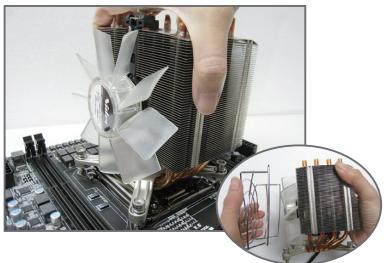
1-3-2 Installing the CPU Cooler

Refer to the steps below to correctly install the CPU cooler on the motherboard. (Actual installation process may differ depending the CPU cooler to be used. Refer to the user's manual for your CPU cooler.)



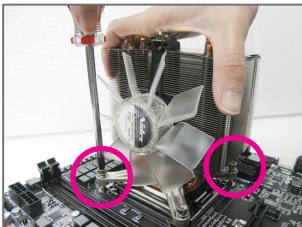
Step 1:

Apply an even and thin layer of thermal grease on the surface of the installed CPU.



Step 2:

Place the cooler atop the CPU, aligning the four mounting screws with the mounting holes on the ILM. (If your cooler has a fan grill which may cause interference when you tighten the screws, remove it first and replace it after tightening the screws.)



Step 3:

Use one hand to hold the cooler and the other to tighten the screws in a diagonal sequence with a screw driver. Begin tightening a screw with a few turns and repeat with the screw diagonally opposite the one you just tightened. Then do the same to the other pair. Next, fully tighten the four screws.



Step 4:

Finally, attach the power connector of the CPU cooler to the CPU fan header (CPU_FAN) on the motherboard.



Please pay more attention when removing the CPU cooler because the thermal grease/tape between the CPU cooler and CPU may adhere to the CPU. Inadequately removing the CPU cooler may damage the CPU.

1-4 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.

1-4-1 Four Channel Memory Configuration

This motherboard provides sixteen DDR4 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 DDR4 memory sockets are divided into four channels each channel has two memory sockets as following:

Channel 1: DIMM_P0_A0/DIMM_P0_A1 (For primary CPU)
DIMM_P1_E0/DIMM_P1_E1 (For secondary CPU)

Channel 2: DIMM_P0_B0/DIMM_P0_B1 (For primary CPU)
DIMM_P1_F0/DIMM_P1_F1 (For secondary CPU)

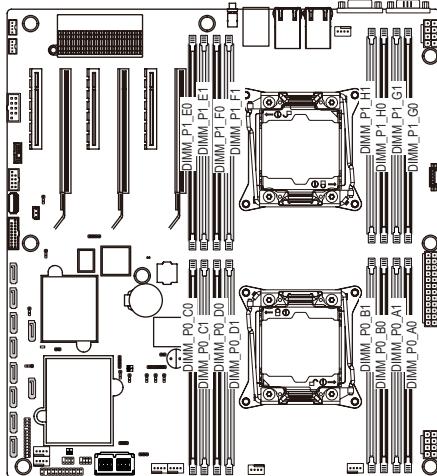
Channel 3: DIMM_P0_C0/DIMM_P0_C1 (For primary CPU)
DIMM_P1_G0/DIMM_P1_G1 (For secondary CPU)

Channel 4: DIMM_P0_D0/DIMM_P0_D1 (For primary CPU)
DIMM_P1_H0/DIMM_P1_H1 (For secondary CPU)

When only one DIMM is used, it must be populated in memory slot0 first.

Memory populated sequence must be followed with slot0/slot1

System will not boot normally with incorrect populated sequence.



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

1. Four Channel mode cannot be enabled if only one DDR3 memory module is installed.
2. When enabling Four 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.

1-4-2 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.

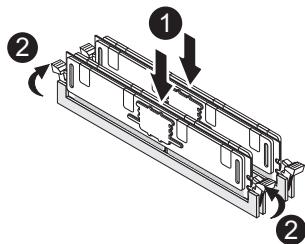
Be sure to install DDR3 DIMMs on this motherboard.

Installation Step:

- Step 1. Insert the DIMM memory module vertically into the DIMM slot, and push it down.
- Step 2. Close the plastic clip at both edges of the DIMM slots to lock the DIMM module.

Note: For dual-channel operation, DIMMs must be installed in matched pairs.

- Step 3. Reverse the installation steps when you wish to remove the DIMM module.

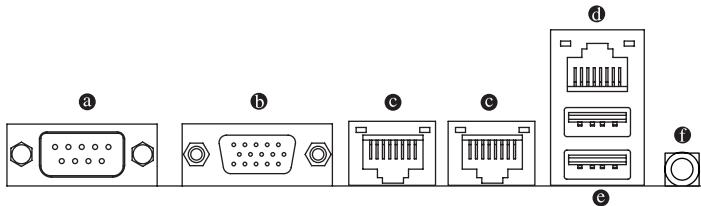


1-4-3 DIMM Population Table

Two Slots Channel RDIMM Population Configuration Within a Channel

Type	Ranks Per DIMM and Data Width	Speed (MT/s); Slot Per Channel (SPC) and DIMM Per Channel (DPC)		
		1 Slot Per Channel	2 Slot Per Channel	
		1DPC	1DPC	2DPC
RDIMM	SRx4	2133	2133	1866
RDIMM	SRx8	2133	2133	1866
RDIMM	DRx8	2133	2133	1866
RDIMM	DRx4	2133	2133	1866
LRDIMM	QRx4	2133	2133	2133

1-5 Back Panel Connectors



① Serial Port

Connects to serial-based mouse or data processing devices.

② Video Port

The video in port allows connect to video in, which can also apply to video loop thru function.

③ RJ-45 LAN Ports (10 Gigabit Ethernet LAN Ports)

The Gigabit Ethernet LAN port provides Internet connection at up to 10 Gbps data rate. The following describes the states of the LAN port LEDs.

④ KVM Server Management 10/100/1000 LAN Port (Dedicated LAN Port)

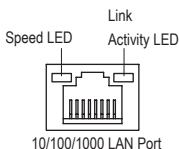
The LAN port provides Internet connection with data transfer speeds of 10/100/1000Mbps. This port is the decated LAN port for server management.

⑤ USB 3.0 Port

The USB port supports the USB 3.0 specification. Use this port for USB devices such as a USB keyboard/mouse, USB printer, USB flash drive and etc.

⑥ ID Switch Button

This button provide the selected unit idenfication function.

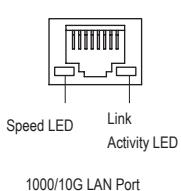


Speed LED:

State	Description
Yellow On	1 Gbps data rate
Yellow Blink	Identify 1 Gbps data rate
Green On	100 Mbps data rate
Green Blink	Identify 100 Mbps data rate
Off	10 Mbps data rate

Link/Activity LED:

State	Description
On	Link between system and network or no access
Blinking	Data transmission or receiving is occurring
Off	No data transmission or receiving is occurring



Speed LED:

State	Description
Green On	10 Gbps data rate
Green Blink	Identify 10 Gbps data rate
Yellow On	1 Gbps data rate
Yellow Blink	Identify 1 Gbps data rate
Off	100 Mbps data rate

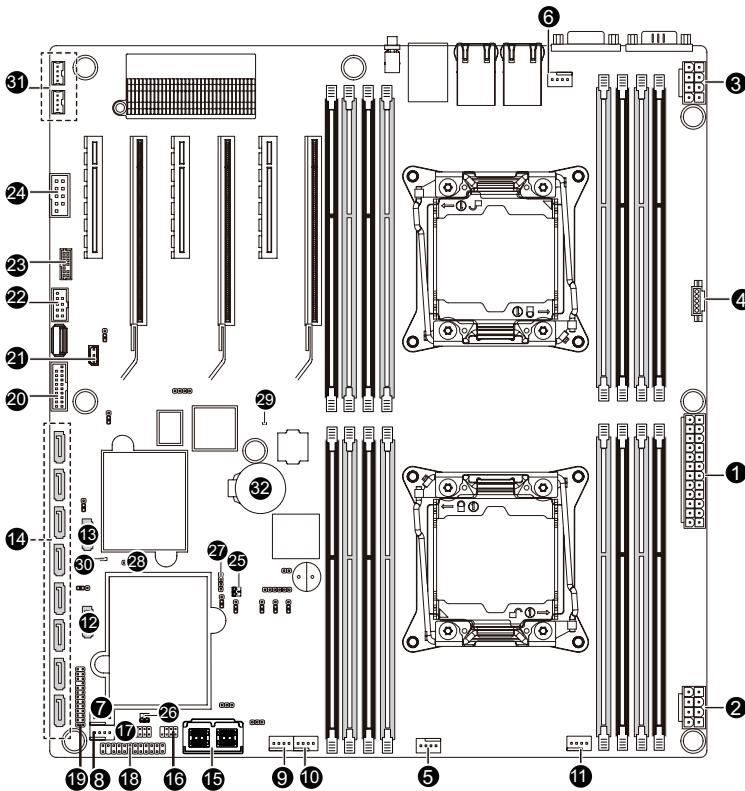
Link/Activity LED:

State	Description
On	Link between system and network or no access
Blinking	Data transmission or receiving is occurring
Off	No data transmission or receiving is occurring



- When removing the cable connected to a back panel connector, first remove the cable from your device and then remove it from the motherboard.
- When removing the cable, pull it straight out from the connector. Do not rock it side to side to prevent an electrical short inside the cable connector.

1-6 Internal Connectors



1) ATX1	17) SSATA_SGP
2) P12V_AUX1	18) FP_1
3) P12V_AUX2	19) BP_1
4) PMBUS	20) F_USB3
5) CPU0_FAN (for primary CPU)	21) IPMB
6) CPU1_FAN (for secondary CPU)	22) F_USB2
7) SYS_FAN1 (System Fan)	23) TPM
8) SYS_FAN2 (System Fan)	24) COM2
9) SYS_FAN3 (System Fan)	25) SW_RAID
10) SYS_FAN4 (System Fan)	26) IMR_KEY (MD70-HB0)
11) SYS_FAN5 (System Fan)	27) LSI_UART1 (MD70-HB0)
12) SATA0	28) CASE_OPEN
13) SATA1	29) LED_BMC
14) SATA/2/3/4/5/SSATA0/1/2/3	30) LED5 (MD70-HB0)
15) MSAS_HD_1 (MD70-HB0 Only)	31) LAN1_LED (bottom)/LAN2_LED (top)
16) SATA_SGP	32) BAT



Read the following guidelines before connecting external devices:

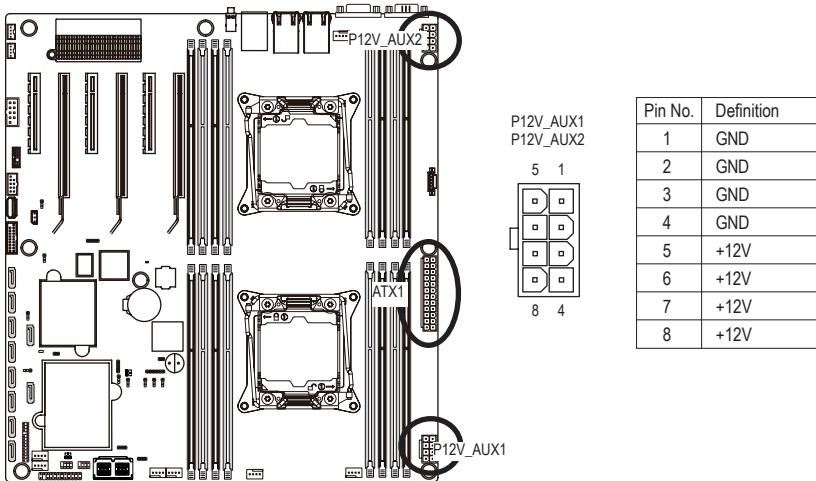
- First make sure your devices are compliant with the connectors you wish to connect.
- Before installing the devices, be sure to turn off the devices and your computer. Unplug the power cord from the power outlet to prevent damage to the devices.
- After installing the device and before turning on the computer, make sure the device cable has been securely attached to the connector on the motherboard.

1/2/3) ATX1/P12V_AUX1/P12V_AUX2

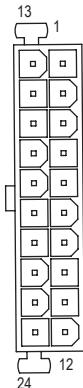
(2x4 12V Power Connector and 2x12 Main Power Connector)

With the use of the power connector, the power supply can supply enough stable power to all the components on the motherboard. Before connecting the power connector, first make sure the power supply is turned off and all devices are properly installed. The power connector possesses a foolproof design. Connect the power supply cable to the power connector in the correct orientation. The 12V power connector mainly supplies power to the CPU. If the 12V power connector is not connected, the computer will not start.

- **To meet expansion requirements, it is recommended that a power supply that can withstand high power consumption be used (500W or greater). If a power supply is used that does not provide the required power, the result can lead to an unstable or unbootable system.**



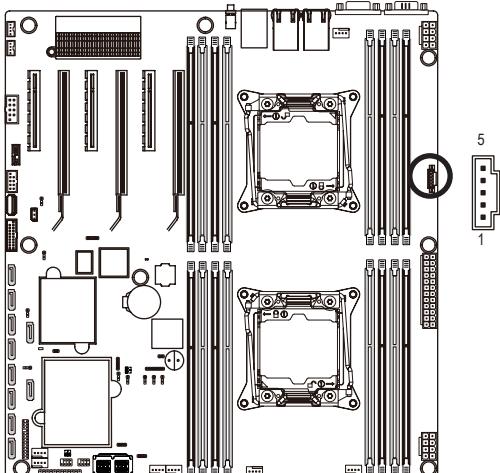
ATX1



ATX1

Pin No.	Definition	Pin No.	Definition
1	3.3V	13	3.3V
2	3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	Power Good	20	-5V
9	5VSB (stand by +5V)	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	3.3V	24	GND

4) PMBUS (PMBus connector)

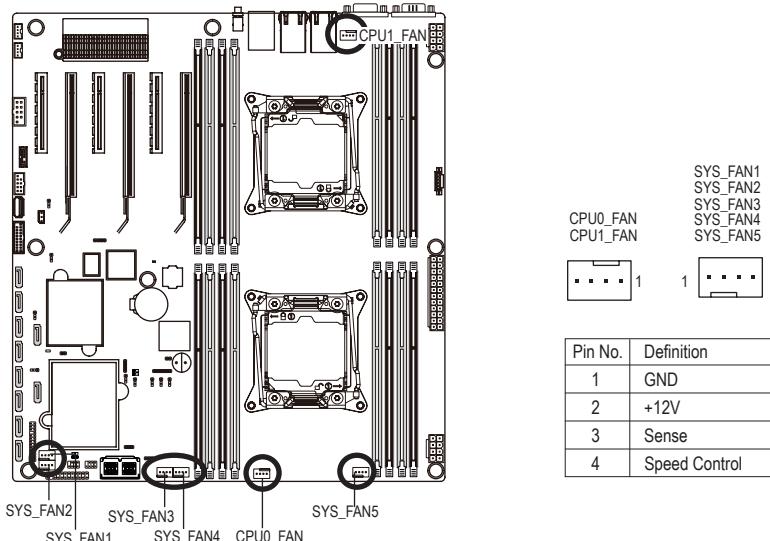


Pin No.	Definition
1	PMBus CLK
2	PMBus DATA
3	PMBus Alert
4	GND
5	3.3V Sense

5/6/7/8/9/10/11) CPU_FAN0/CPU_FAN1/SYS_FAN1/SYS_FAN2/SYS_FAN3/SYS_FAN4/

SYS_FAN5 (CPU Fan/System Fan Headers)

The motherboard has two 4-pin CPU fan headers, and four 4-pin system fan headers. Most fan headers possess a foolproof insertion design. When connecting a fan cable, be sure to connect it in the correct orientation (the black connector wire is the ground wire). The motherboard supports CPU fan speed control, which requires the use of a CPU fan with fan speed control design. For optimum heat dissipation, it is recommended that a system fan be installed inside the chassis.

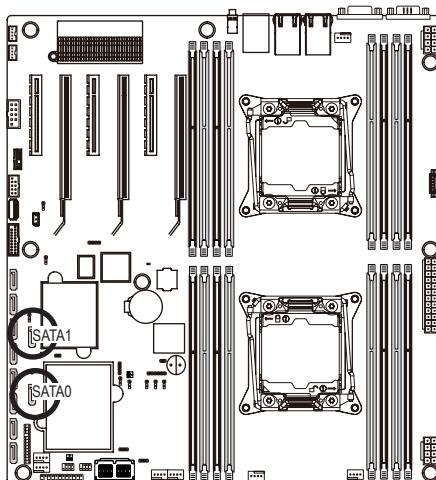


Pin No.	Definition
1	GND
2	+12V
3	Sense
4	Speed Control

- Be sure to connect fan cables to the fan headers to prevent your CPU and system from overheating. Overheating may result in damage to the CPU or the system may hang.
- These fan headers are not configuration jumper blocks. Do not place a jumper cap on the headers.

12/13) SATA0/SATA1 (SATA 6Gb/s Connectors/SATA4/5 Support SATA DOM Function)

The SATA connectors conform to SATA 6Gb/s standard and are compatible with SATA 3Gb/s and 1.5Gb/s standard. Each SATA connector supports a single SATA device.
Please see page 35 for SATA DOM jumper setting.



Normal Mode:

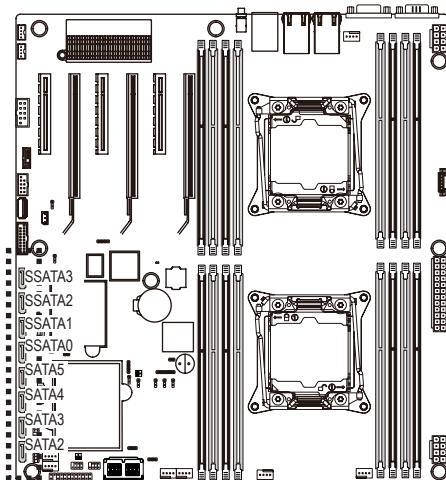
Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND

SATA DOM Mode:

Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	P5V

14) SATA2/3/4/5/SSATA0/1/2/3 (SATA 6Gb/s Connectors)

The SATA connectors conform to SATA 6Gb/s standard and are compatible with SATA 3Gb/s and 1.5Gb/s standard. Each SATA connector supports a single SATA device.



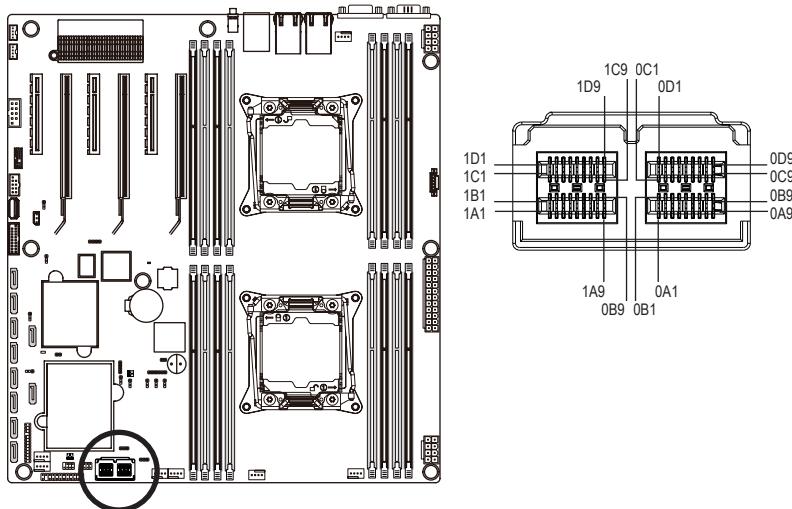
Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND

 • A RAID 0 or RAID 1 configuration requires at least two hard drives. If more than two hard drives are configured, the total number of hard drives must be an even number.
• A RAID 10 configuration requires four hard drives.

(Note) When a RAID configuration is built across the SATA 6Gb/s channels, the system performance of the RAID configuration may vary depends on the devices are connected.

15) MSAS_HD_1 (Mini-SAS HD connectors/MD70-HB0 Only)

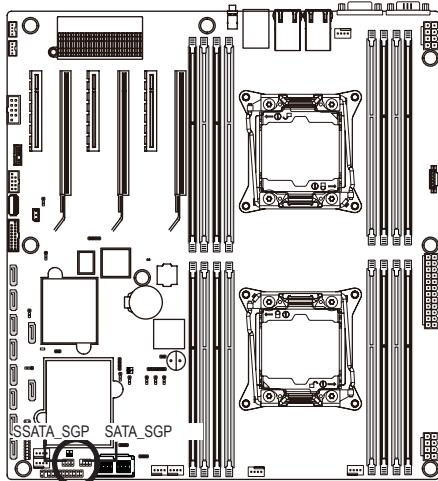
Mini-SAS HD(High Density SFF-8644) is the next-generation SAS high-density and high-speed IO interface. Mini-SAS HD is in the SAS 3.0 standard, meets the 12Gb/s SAS specification.



Pin No.	Definition	Pin No.	Definition	Pin No.	Definition	Pin No.	Definition
0A1	NC	0C1	GND	1A1	GND	1C1	GND
0A2	GPIO_CLOCK0	0C2	GND	1A2	GPIO_CLOCK1	1C2	GND
0A3	GND	0C3	GND	1A3	GND	1C3	GND
0A4	RXP1	0C4	TXP1	1A4	RXP5	1C4	TXP5
0A5	RXN1	0C5	TXN1	1A5	RXN5	1C5	TXN5
0A6	GND	0C6	GND	1A6	GND	1C6	GND
0A7	RXP3	0C7	TXP3	1A7	RXP7	1C7	TXP7
0A8	RXN3	0C8	TXN3	1A8	RXN7	1C8	TXN7
0A9	GND	0C9	GND	1A9	GND	1C9	GND
0B1	GND	0D1	GPIO_DATAIN0	1B1	GND	1D1	GPIO_DATAIN1
0B2	GPIO_LOAD0	0D2	NC	1B2	GPIO_LOAD1	1D2	GND
0B3	GND	0D3	GND	1B3	GND	1D3	GND
0B4	RXP0	0D4	TXP0	1B4	RXP4	1D4	TXP4
0B5	RXN0	0D5	TXN0	1B5	RXN4	1D5	TXN4
0B6	GND	0D6	GND	1B6	GND	1D6	GND
0B7	RXP2	0D7	TXP2	1B7	RXP6	1D7	TXP6
0B8	RXN2	0D8	TXN2	1B8	RXN6	1D8	TXN6
0B9	GND	0D9	GND	1B9	GND	1D9	GND

16/17) SATA_SGP/SSATA_SGP (SAS SGPIO Headers)

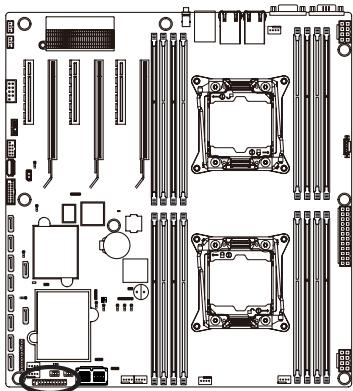
SGPIO stands for Serial General Purpose Input/Output which is a 4-signal (or 4-wire) bus used between a Host Bus Adapter (HBA) and a backplane. Out of the 4 signals, 3 are driven by the HBA and 1 is driven by the backplane. Typically, the HBA is a storage controller located inside a server, desktop, rack or workstation computer that interfaces with Hard disk drives (HDDs) to store and retrieve data.



Pin No.	Definition
1	DATAIN
2	No Pin
3	DATAOUT
4	GND
5	GND
6	LOAD
7	NC
8	CLOCK

18) FP_1 (Front Panel Header)

Connect the power switch, reset switch, chassis intrusion switch/sensor and system status indicator on the chassis to this header according to the pin assignments below. Note the positive and negative pins before connecting the cables.

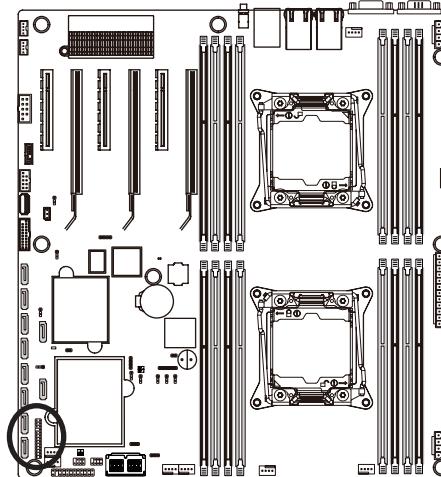


Pin No.	Signal Name	Definition
1	PWLED+	Power LED Signal anode (+)
2	5VSB	5V Standby Power
3	NC	No Pin
4	ID_LED+	ID LED Signal anode (+)
5	PWLED-	Power LED Signal cathode(-)
6	ID_LED-	ID LED Signal cathode(-)
7	HD+	Hard Disk LED Signal anode (+)
8	SYS_LED+	System Front board LED Signal anode (+)
9	HD-	Hard Disk LED Signal cathode(-)
10	SYS_LED-	System Status LED Signal cathode(-)
11	PWR_BTN	Power Button Signal
12	L1_ACT	LAN1 active LED Signal
13	PWR_BTN_GND	Ground
14	L1_LINK-	LAN1 Link LED Signal cathode(-)
15	RST_BTN+	Reset button Signal anode (+)
16	SENSOR_SDA	SMBus Data Signal
17	RST_BTN_GND	Ground
18	SENSOR_SCL	SMBus Clock Signal
19	ID_SW+	ID Switch Signal anode (+)
20	CASE_OPEN-	Chassis intrusion Signal cathode(-)
21	ID_SW-	ID Switch Signal cathode(-)
22	L2_ACT	LAN2 active LED Signal
23	NMI_SW-	NMI switch Signal cathode(-)
24	L2_LINK-	LAN2 Link LED Signal cathode(-)



The front panel design may differ by chassis. A front panel module mainly consists of power switch, reset switch, power LED, hard drive activity LED, speaker and etc. When connecting your chassis front panel module to this header, make sure the wire assignments and the pin assignments are matched correctly.

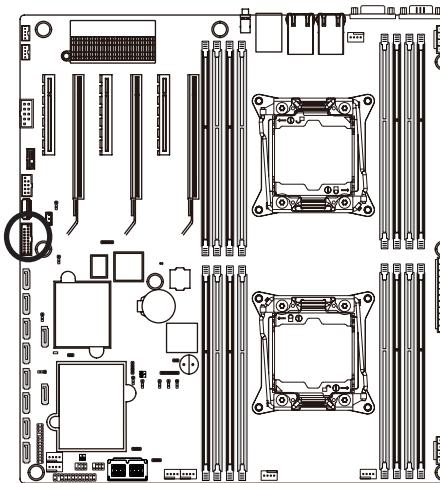
19) BP_1 (HDD Back Plane Board Headers)



Pin No.	Definition
1	BP_SGP_CLK
2	NC
3	BP_SGP_GLD
4	FAN_GATE_N
5	BP_SGP_DOUT
6	GND
7	KEY
8	Reset
9	GND
10	BP_LED_A_N
11	BP_LED_G_N
12	GND
13	BP_SGP_DIN
14	NC
15	GND
16	SMB_BP_DATA
17	GND
18	SMB_BP_CLK
19	P_3V3_AUX
20	BMC_ACK
21	P_3V3_AUX
22	BMC_REQ
23	GND
24	KEY
25	BP_PRESENSE
26	GND

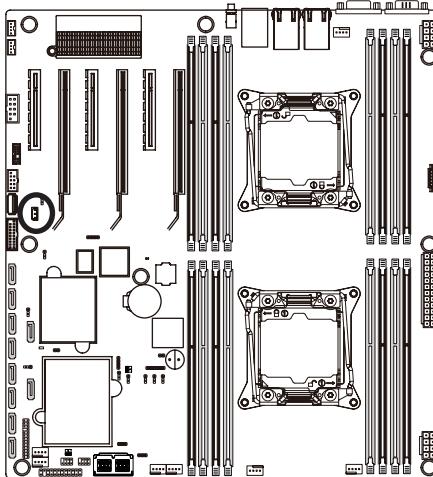
20) F_USB3 (USB 3.0 Header)

The headers conform to USB 3.0 specification. Each USB header can provide two USB ports via an optional USB bracket. For purchasing the optional USB bracket, please contact the local dealer.



Pin No.	Definition
1	Power
2	IntA_P1_SSRX-
3	IntA_P1_SSRX+
4	GND
5	IntA_P1_SSTX-
6	IntA_P1_SSTX+
7	GND
8	IntA_P1_D-
9	IntA_P1_D+
10	NC
11	IntA_P2_D+
12	IntA_P2_D-
13	GND
14	IntA_P2_SSTX+
15	IntA_P2_SSTX-
16	GND
17	IntA_P2_SSRX+
18	IntA_P2_SSRX-
19	Power
20	No Pin

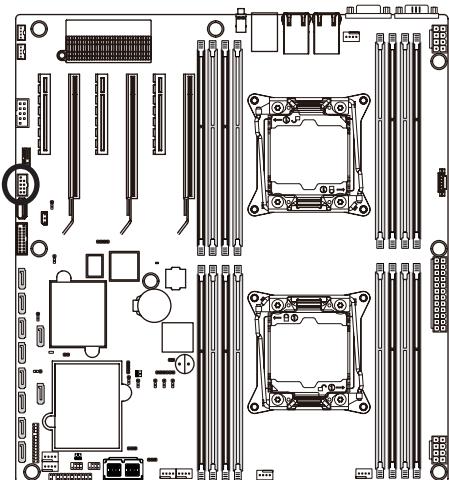
21) IPMB (IPMB Connector)



Pin No.	Definition
1	Clock
2	GND
3	Data

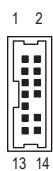
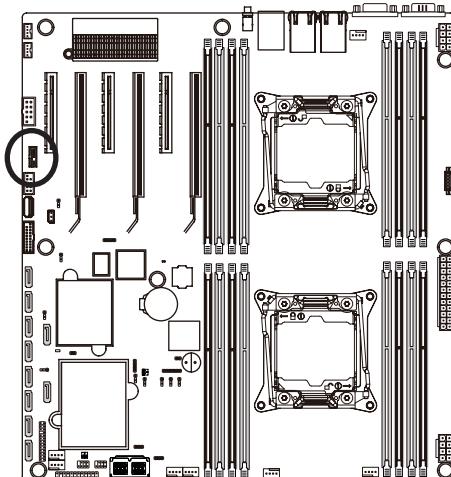
22) F_USB2 (Front USB Header)

The header conform to USB 2.0 specification. Each USB header can provide two USB ports via an optional USB bracket. For purchasing the optional USB bracket, please contact the local dealer.



Pin No.	Definition
1	Power (5V)
2	Power (5V)
3	USB DX-
4	USB DY-
5	USB DX+
6	USB DY+
7	GND
8	GND
9	No Pin
10	NC

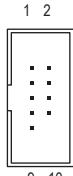
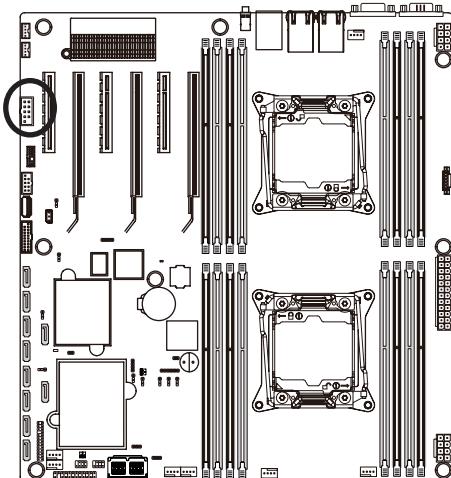
23) TPM (TPM Module Connector)



Pin No.	Definition
1	CLK_33M_TPM
2	P_3V3_AUX
3	LPC_RST
4	P3V3
5	LPC_LAD0
6	IRQ_SERIAL
7	LPC_LAD1
8	TPM_DET_N
9	LPC_LAD2
10	NC
11	LPC_LAD3
12	GND
13	LPC_FRAME_N
14	GND

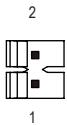
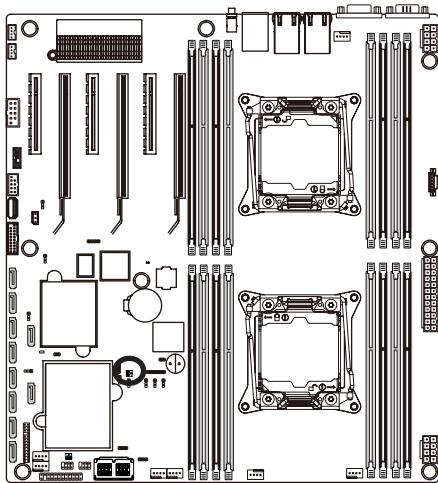
24) COM2 (Serial Port Header)

The COM header provides one serial port via an optional COM port cable. For purchasing the optional COM port cable, please contact the local dealer.



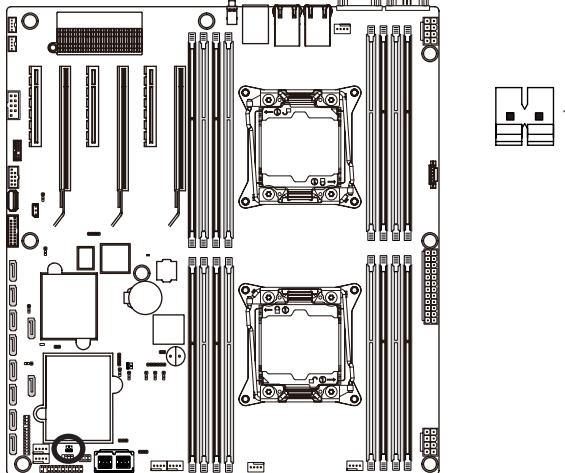
Pin No.	Definition
1	NDCD-
2	NSIN
3	NSOUT
4	NDTR-
5	GND
6	NDSR-
7	NRTS-
8	NCTS-
9	NRI-
10	No Pin

25) SW_RAID (Intel RAID Key Header)



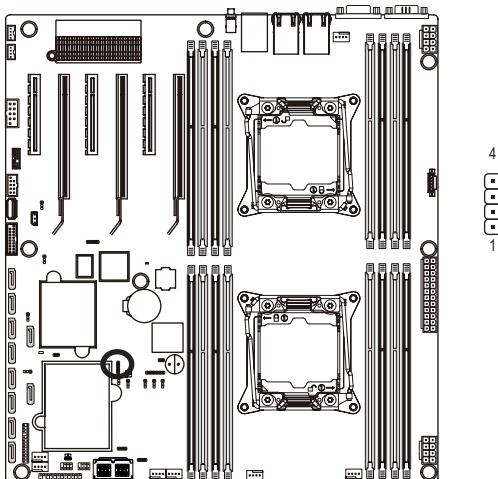
Pin No.	Definition
1	KEY
2	GND

26) IMR_KEY (LSI RAID Key Header/MD70-HB0 Only)



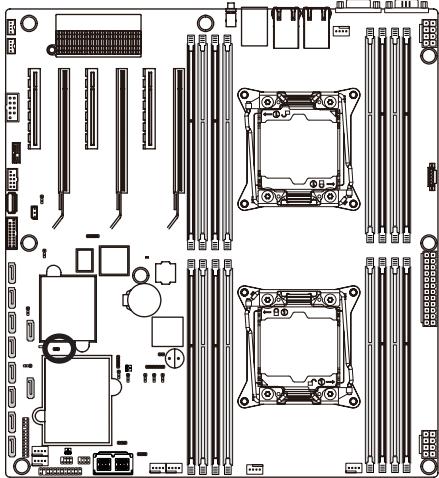
Pin No.	Definition
1	KEY
2	GND

27) LSI_UART1 (LSI UART Header)



Pin No.	Definition
1	UART0_TX
2	GND
3	UART0_RX
4	P1V8

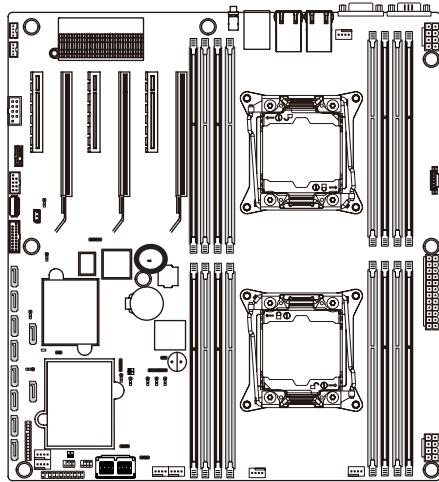
28) CASE_OPEN (Case open intrusion alert header)



□ Open: Normal operation.

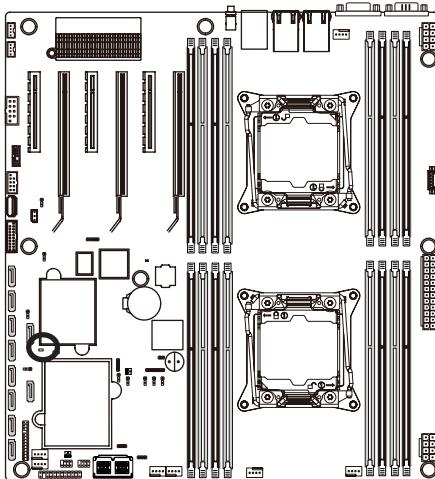
□ Closed: Active chassis intrusion alert.

29) LED_BMC (BMC Firmware Readiness LED)



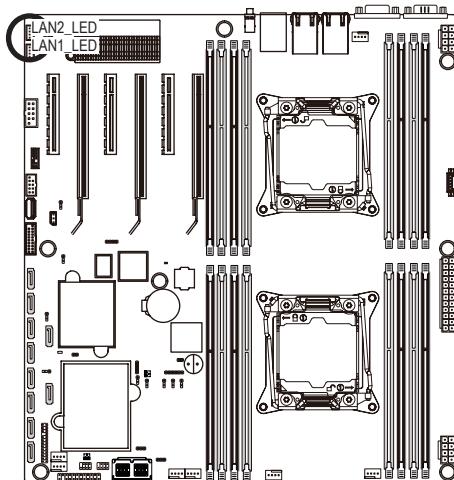
State	Description
On	BMC firmware is initial
Blinking	BMC firmware is ready
Off	AC loss

30) LED5 (LSI Firmware Readiness LED)



State	Description
On	LSI firmware is initial
Blinking	LSI firmware is ready
Off	AC loss

31) LAN1_LED/LAN2_LED (LAN1/LAN2 link/active LED Headers)



LAN1_LED:

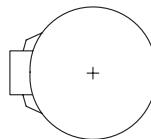
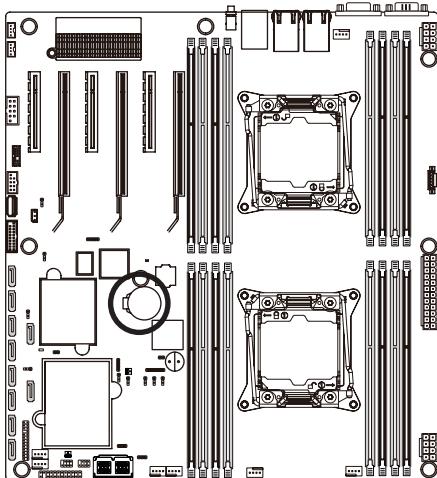
Pin No.	Definition
1	P_3.3V_AUX
2	LED_LINK1_ACT_BUFF2
3	LED_LINK1_1G_BUFF2
4	LED_LINK1_10G_100M_BUFF2

LAN2_LED:

Pin No.	Definition
1	P_3.3V_AUX
2	LED_LINK2_ACT_BUFF2
3	LED_LINK2_1G_BUFF2
4	LED_LINK2_10G_100M_BUFF2

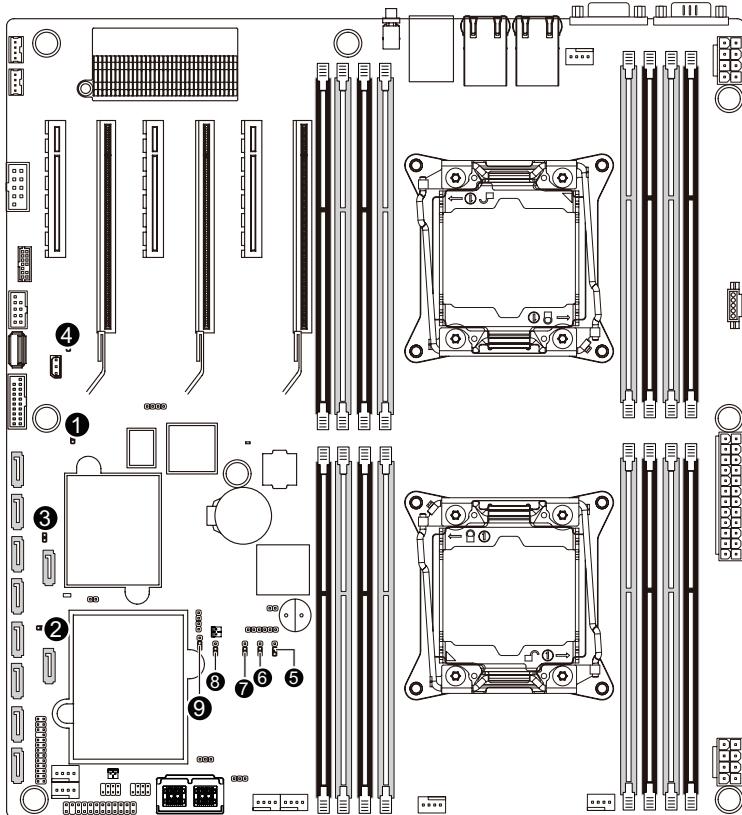
32) BAT (Battery)

The battery provides power to keep the values (such as BIOS configurations, date, and time information) in the CMOS when the computer is turned off. Replace the battery when the battery voltage drops to a low level, or the CMOS values may not be accurate or may be lost.



- Always turn off your computer and unplug the power cord before replacing the battery.
- Replace the battery with an equivalent one. Danger of explosion if the battery is replaced with an incorrect model.
- Contact the place of purchase or local dealer if you are not able to replace the battery by yourself or uncertain about the battery model.
- When installing the battery, note the orientation of the positive side (+) and the negative side (-) of the battery (the positive side should face up).
- Used batteries must be handled in accordance with local environmental regulations.

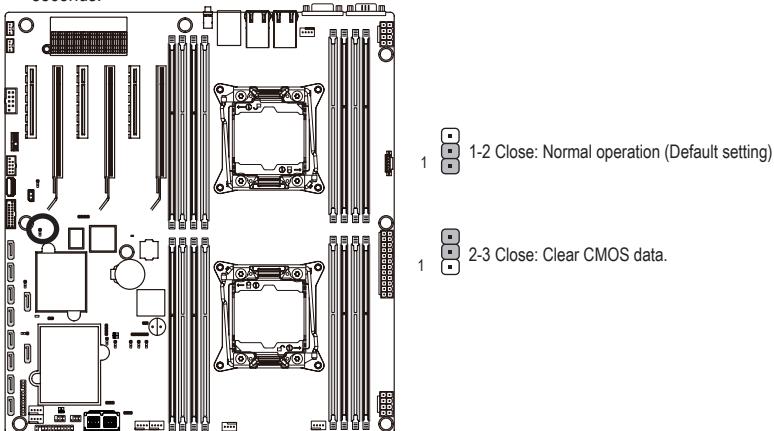
1-7 Jumper Settings



1) CLR_CMOS	6) BMC_FRB
2) SATA_DOM0	7) ME_RCVR
3) SATA_DOM1	8) BIOS_PWD
4) S3_MASK	9) BIOS_RVCR
5) ME_UPDATE	

1) CLR_CMOS (Clearing CMOS Jumper)

Use this jumper to clear the CMOS values (e.g. date information and BIOS configurations) and reset the CMOS values to factory defaults. To clear the CMOS values, place a jumper cap on the two pins to temporarily short the two pins or use a metal object like a screwdriver to touch the two pins for a few seconds.



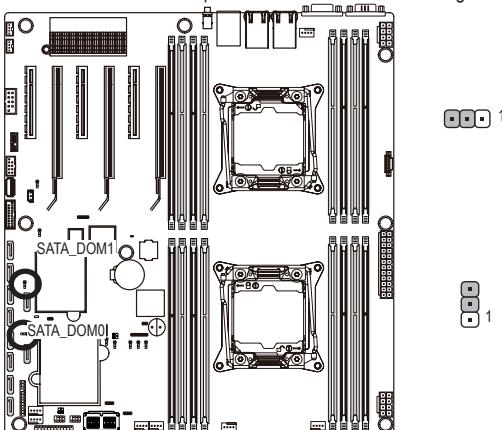
- Always turn off your computer and unplug the power cord from the power outlet before clearing the CMOS values.
- After clearing the CMOS values and before turning on your computer, be sure to remove the jumper cap from the jumper. Failure to do so may cause damage to the motherboard.

2/3) SATA_DOM0/SATA_DOM0 (SATA port 0 and port 1 DOM Jumpers)

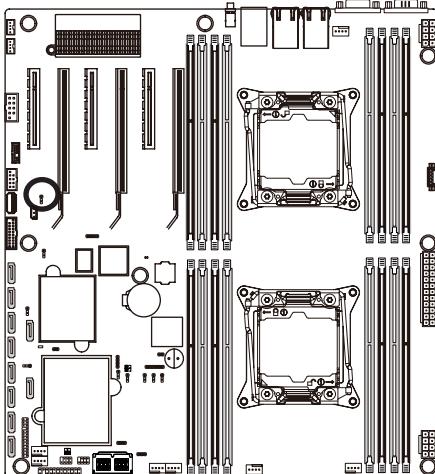
CAUTION!

- If the SATA DOM power is supplied by the motherboard, set the jumper to pin 1-2.
- If the SATA DOM power is supplied by external power, set the jumper to pin 2-3.
- If a SATA type hard drive is connected to the motherboard, please ensure the jumper is closed and set to **2-3 pins** (Default setting), in order to reduce any risk of hard disk damage.

Please refer to the pin definition table in the following.



4) S3_MASK (S3 Power On Select Jumper)

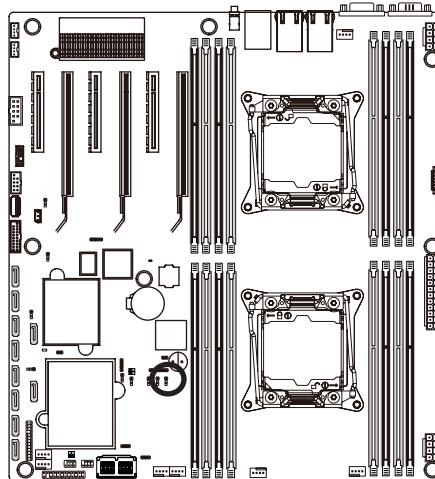


1-2 Close: Stop an initial power on when BMC is not ready.



2-3 Close: Keep initial power on. (Default setting)

5) ME_UPDATE (ME Update Jumper)

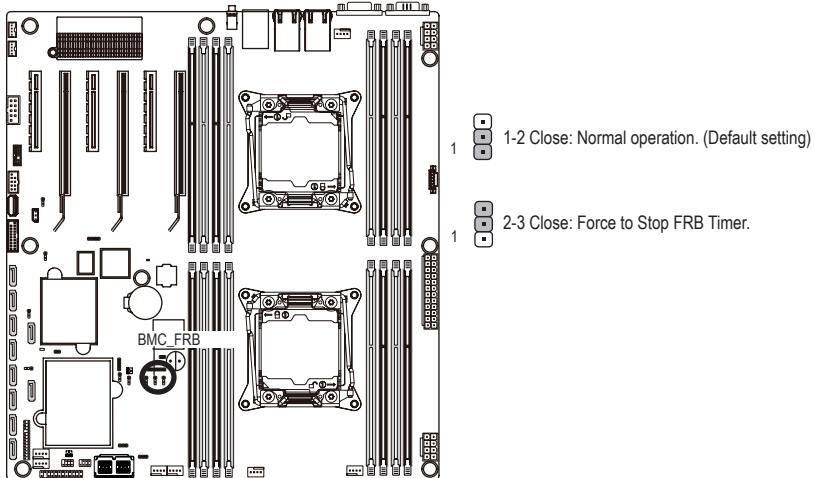


1-2 Close: Normal operation (Default setting)

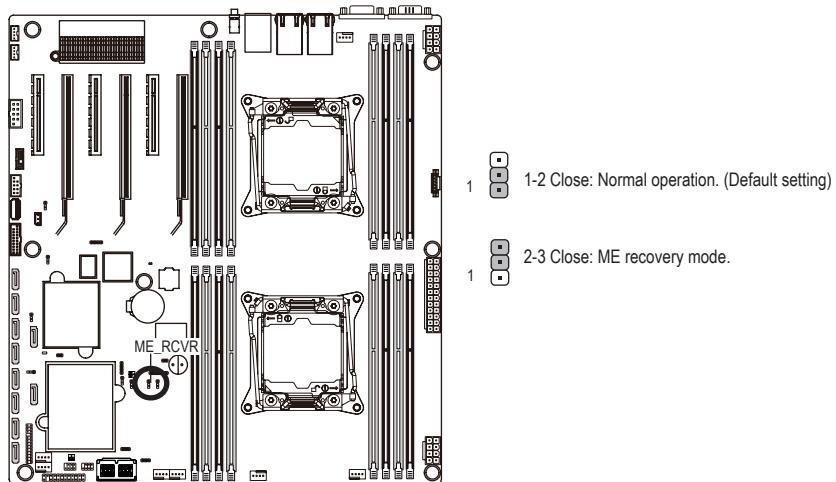


2-3 Close: ME updated.

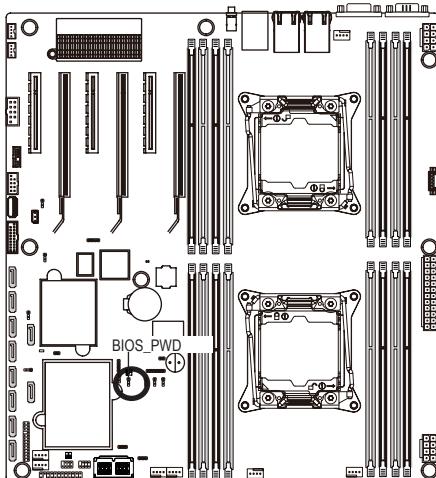
6) BMC_FRB (Force to Stop FRB Timer Jumper)



7) ME_RCVR (ME Recovery Jumper)



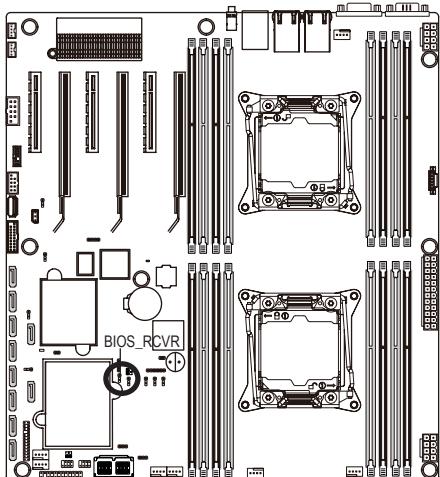
8) BIOS_PWD (Clearing Supervisor Password Jumper)



1 1-2 Close: Normal operation. (Default setting)

1 2-3 Close: Skip supervisor password.

9) BIOS_RVCR (BIOS Recovery Jumper)



1 1-2 Close: Normal operation. (Default setting)

1 2-3 Close: BIOS recovery mode.

Chapter 2 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 **Exit** 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
<+>	Increase the numeric value or make changes
<->	Decrease the numeric value or make changes
<Enter>	Execute command or enter the submenu
<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.)

■ Intel RC Setup

This setup page includes all the submenu options for configuring the function of processor, network, North Bridge, South Bridge, and System event logs.

■ Server Management

Server additional features enabled/disabled setup menus.

■ 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.

■ 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.)

2-1 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.

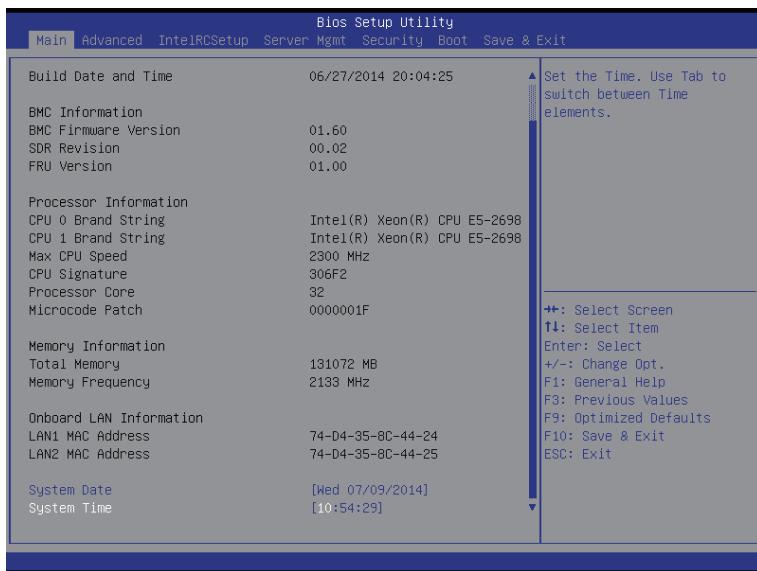
Submenu Help

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 Name

Display the project name information.

☞ Project Version

Display version number of the BIOS setup utility.

☞ 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 Version

Display the SDR version information.

☞ FRU Version

Display the FRU version information.

☞ Processor Information

☞ CPU Brand String/Max CPU Speed/CPU Signature/Processors Core/Microcode Patch

Displays the technical specifications for the installed processor.

☞ Memory Information

☞ Total Memory

Display the total memory size of the installed memory.

☞ Memory Frequency

Display the frequency information of the installed memory.

☞ **Onboard LAN Information**

☞ **LAN1/LAN2 MAC Address**

Display LAN1/LAN2 MAC address information.

☞ **System Date**

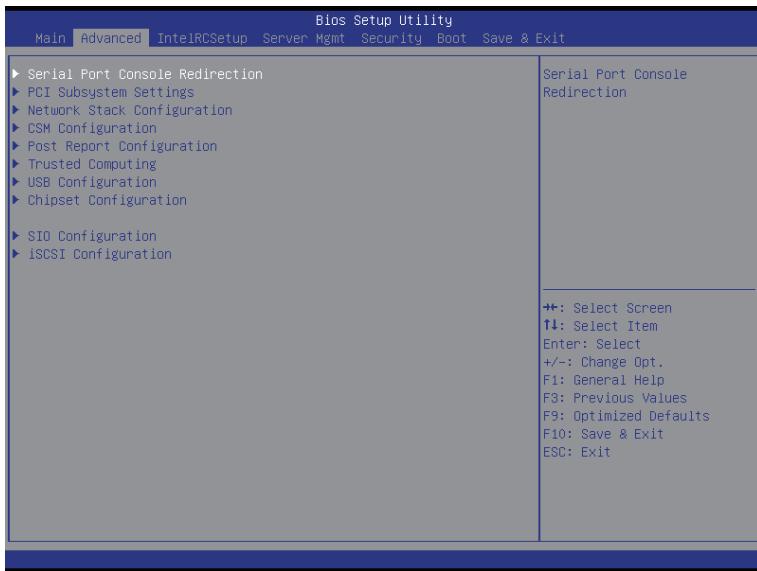
Set the date following the weekday-month-day- year format.

☞ **System Time**

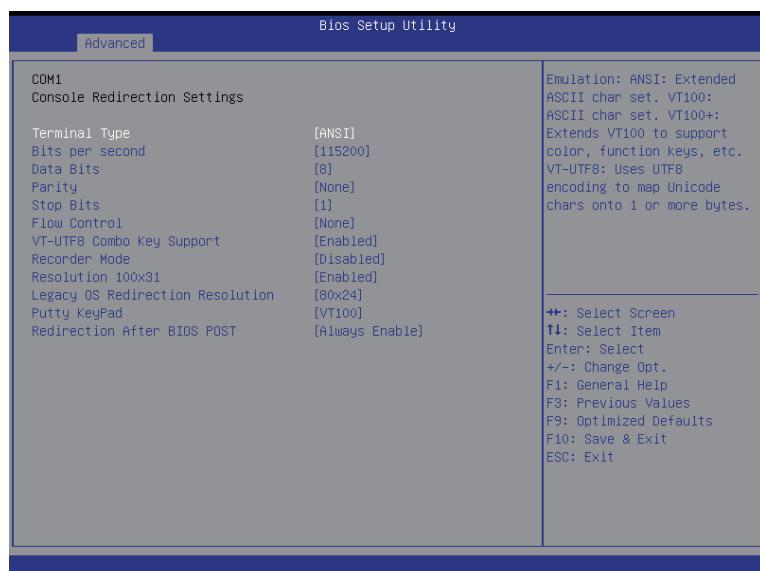
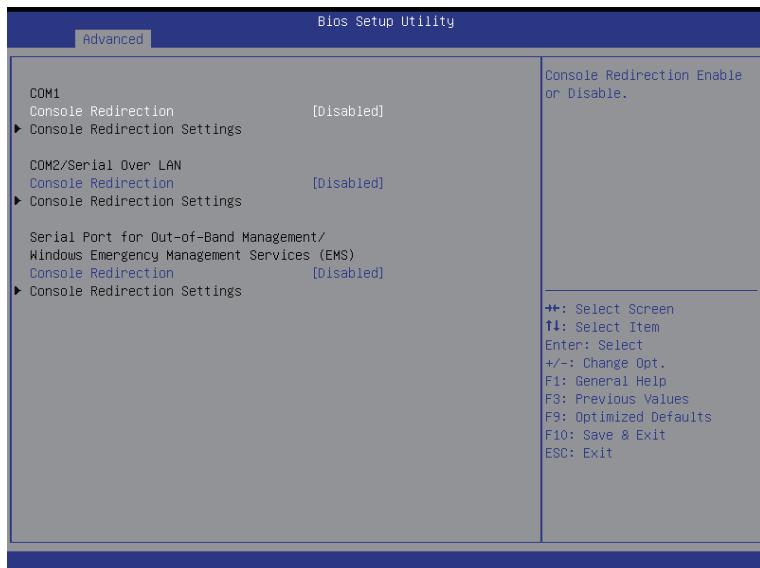
Set the system time following the hour-minute- second format.

2-2 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.



2-2-1 Serial Port Console Redirection



Bios Setup Utility		
Advanced		
COM2/Serial Over LAN	[ANSI]	Emulation: ANSI: Extended ASCII char set. VT100+: ASCII char set. VT100: Extends VT100 to support color, function keys, etc.
Console Redirection Settings		VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
Terminal Type	[ANSI]	
Bits per second	[115200]	
Data Bits	[8]	
Parity	[None]	
Stop Bits	[1]	
Flow Control	[None]	
VT-UTF8 Combo Key Support	[Enabled]	
Recorder Mode	[Disabled]	
Resolution 100x31	[Enabled]	
Legacy OS Redirection Resolution	[80x24]	
Putty KeyPad	[VT100]	
Redirection After BIOS POST	[Always Enable]	
		++: Select Screen !!: Select Item Enter: Select +/-: Change Opt. F1: General Help F3: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit

Bios Setup Utility		
Advanced		
Out-of-Band Mgmt Port	[COM1]	Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.
Terminal Type	[VT-UTF8]	
Bits per second	[115200]	
Flow Control	[None]	
Data Bits	8	
Parity	None	
Stop Bits	1	
		++: Select Screen !!: Select Item Enter: Select +/-: Change Opt. F1: General Help F3: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit

☞ COM1/COM2/Serial Over AN Console Redirection Settings

☞ 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. Default setting is **ANSI**.

☞ Bits per second

Select the baud rate for console redirection.

Options available: 9600/19200/38400/57600/115200. Default setting is **115200**.

☞ Data Bits

Select the data bits for console redirection.

Options available: 7/8. Default setting is **8**.

☞ Parity

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

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

Odd: parity bit is 0 if num of 1's in 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. Default setting is **None**.

☞ 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. Default setting is **1**.

☞ Flow Control

Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.

Options available: None/Hardware RTS/CTS. Default setting is **None**.

☞ 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. Default setting is **Disabled**.

☞ Resolution 100x31 (Note)

Enables or disables extended terminal resolution. Default setting is **Enabled**.

Options available: Enabled/Disabled.

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

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

On Legacy OS, the number of Rows and Columns supported redirection.

Options available: 80x24/80X25. Default setting is **80x24**.

☞ **Putty KeyPad** (Note)

Select function FunctionKey and KeyPad on Putty.

Options available: VT100/LINUX/XTERMR6/SCO/ESCN/VT400. Default setting is **VT100**.

☞ **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**.

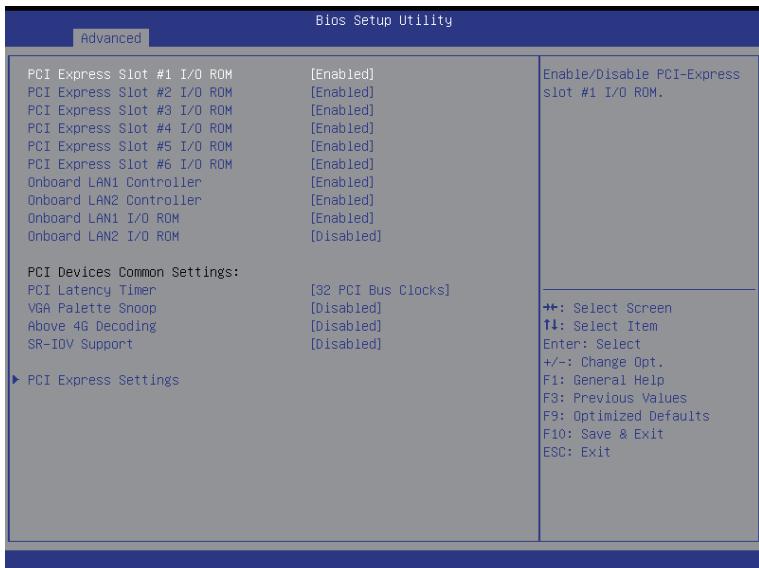
☞ **Out-of-Bnad Mgmt Port**

Microsoft Windows Emergency Management Service (EMS) allows for remote management of a Windows Server OS through a serial port.

Options available: COM1/COM2. Default setting is **COM1**.

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

2-2-2 PCI Subsystem Settings



☛ PCI Express Slot #1/#2/#3/#4/#5/#6 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 LAN#1/#2 Controller

Enable/Disable onboard LAN devices.

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

☛ Onboard LAN #1/#2 I/O ROM

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

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

☛ PCI Devices Common Settings

☛ PCI Latency Timer

Value to be programmed into PCI Latency Timer Register.

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 Palette Snoop

Enable/Disable VGA Palette Registers Snooping.

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

☛ Above 4G Decoding

Enable/Disable Above 4G Decoding.

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

☞ **SR-IOV Support**

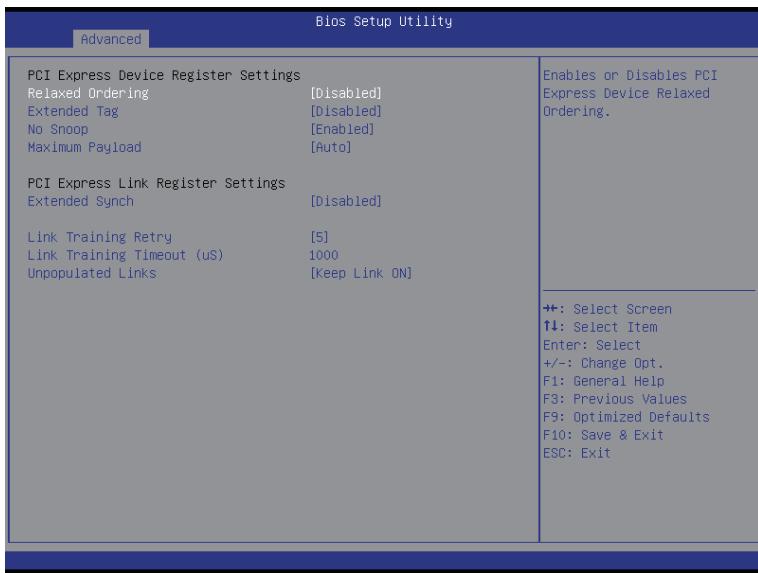
If system has SR-IOV capable PCIe Devices, this option enables or disables Single Root IO Virtualization Support.

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

☞ **PCI Express Settings**

Press [Enter] for configuration of advanced items.

2-2-2-1 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

When 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 Payload

Set maximum payload 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**.

☛ PCI Express Link Register Settings

☛ Extended Synch

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

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

☛ Link Training Retry

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

Options available: Disabled/2/3/5. Default setting is **5**.

☞ **Link Training Timeout (us)**

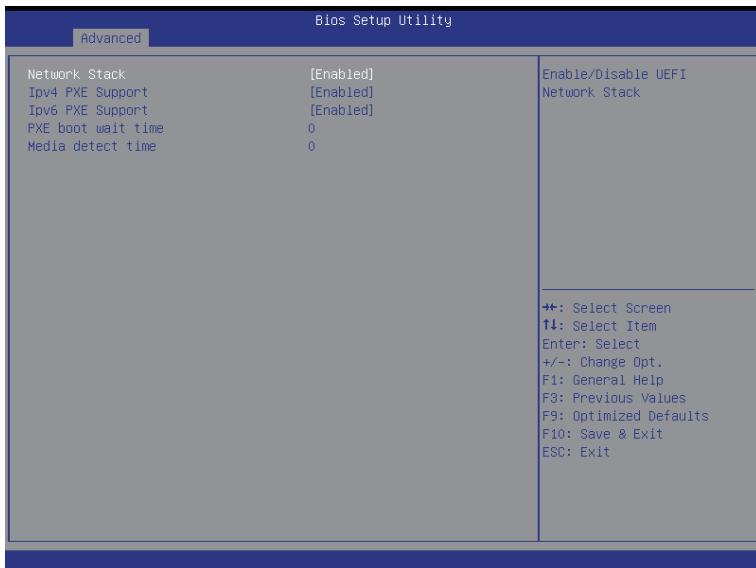
Define the number of Microseconds software will wait before polling 'Link Training' bit in Link Status register. Press <+> / <-> keys to increase or decrease the desired values. Value range is from 10 to 10000 us.

☞ **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 Link. Default setting is **Keep Link ON**.

2-2-3 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^(Note)

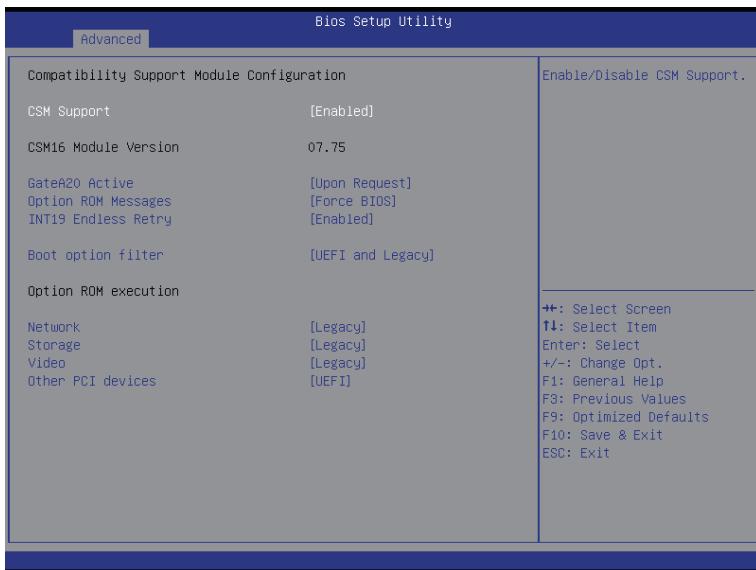
Press <+> / <-> keys to increase or decrease the desired values.

☞ Media detect time^(Note)

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

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

2-2-4 CSM Configuration



Compatibility Support Module Configuration

CSM Support

Enable/Disable Compatibility Support Module (CSM) support.

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

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 **Enabled**.

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**.

☞ **Option ROM execution**

☞ **Network**

Controls the execution UEFI and Legacy PXE OpROM.

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

☞ **Storage**

Controls the execution UEFI and Legacy Storage OpROM.

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

☞ **Video**

Controls the execution UEFI and Legacy Video OpROM.

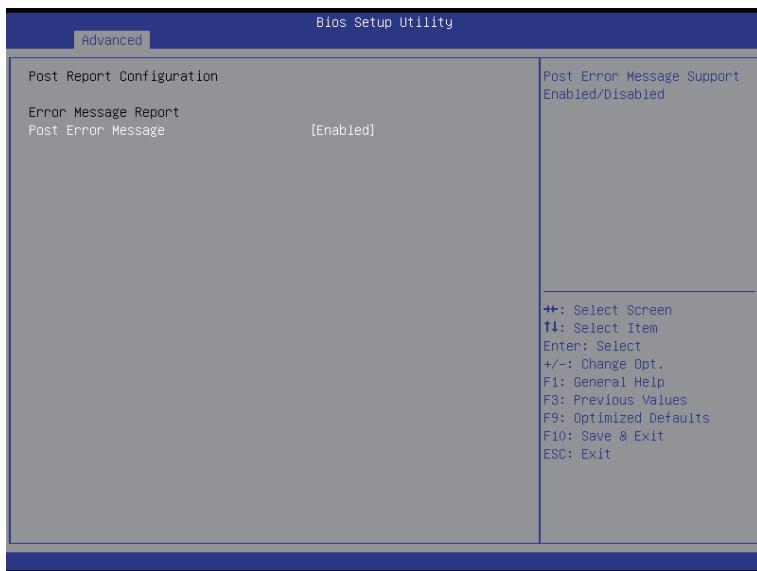
Options available: Do not launch/UEFI only/Legacy. Default setting is **Legacy**.

☞ **Other PCI devices**

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

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

2-2-5 Post Report Configuration



☞ Post Report Configuration

☞ Error Message Report

☞ Post Error Message

Enable/Disable Info Error Message support.

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

2-2-6 Trusted Computing



Configuration

Security Device Support

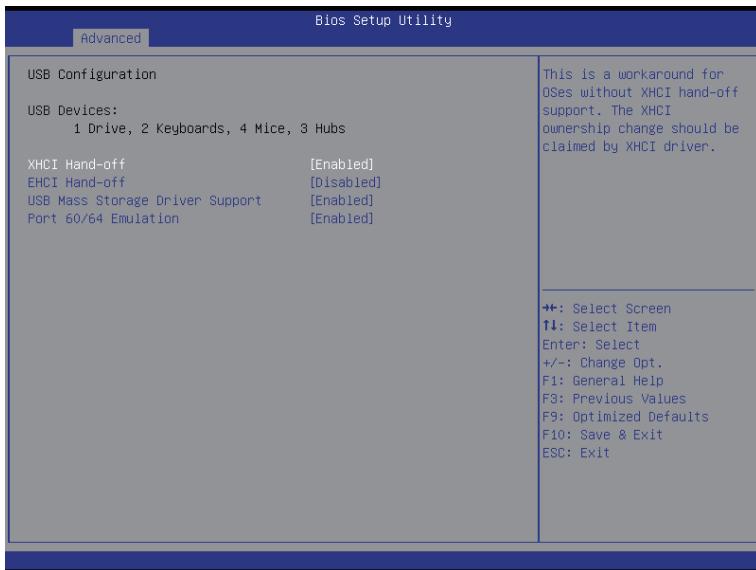
Select Enabled to activate TPM support feature.

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

Current Status Information

Display current TPM status information.

2-2-7 USB Configuration



USB Configuration

USB Devices:

Display the USB devices connected to the system.

Legacy USB Support

Enables or disables support for legacy USB devices.

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

XHCI Hand-off

Enable/Disable XHCI (USB 3.0) Hand-off support.

Options available: 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**.

USB Mass Storage Driver Support^(Note)

Enable/Disable USB Mass Storage Driver Support.

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

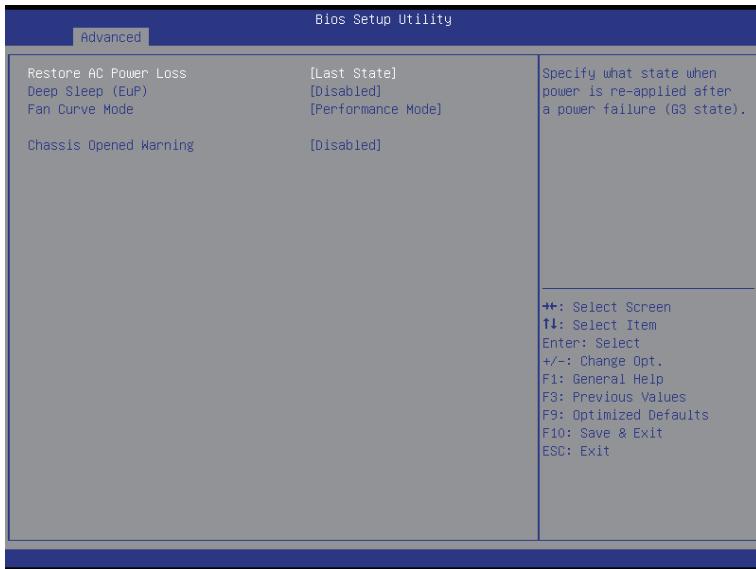
Port 60/64 Emulation

Enable I/O port 60h/64h emulation support. This should be enabled for the complete USB Keyboard Legacy support for non-USB aware OS.

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

(Note) This item is present only if you attach USB types of device.

2-2-8 Chipset Configuration



☞ **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.

☞ **Deep Sleep (EuP)**

Enable/Disable Deep Sleep mode.

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

☞ **Fan Curve Mode**

Configure system fan curve mode

Options available: Performance Mode. Default setting is **Performance Mode**.

☞ **Chassis Opened Warning**

Enable/Disable Chassis intrusion alert function.

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

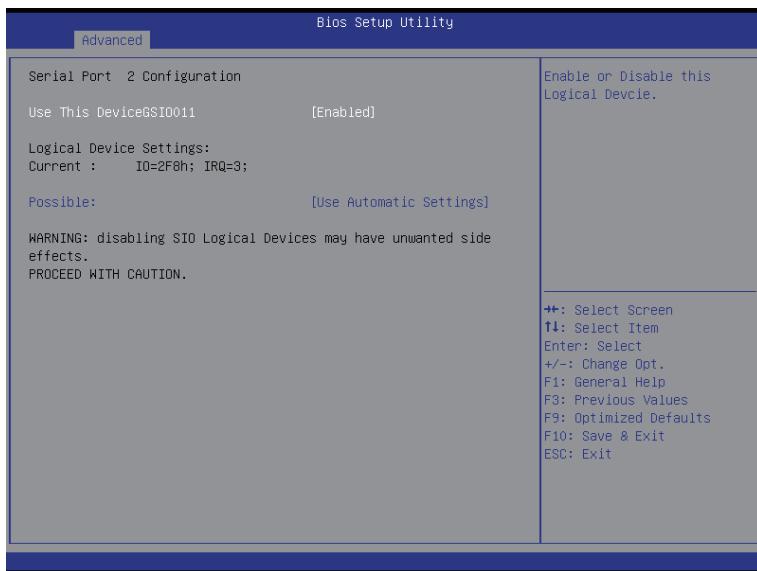
☞ **Chassis Opened Status**

Display the chassis opened status.

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

2-9 SIO Configuration





AMI SIO Driver Version

Display the AMI SIO driver version information.

Super IO Chip Logical Device(s) Configuration

[*Active*] Serial Port 1/2

Press [Enter] for configuration of advanced items.

[*Active*] PS2 Keyboard

Press [Enter] for configuration of advanced items.

[*Active*] PS2 Mouse

Press [Enter] for configuration of advanced items.

Serial Port 1 Configuration

Use This Device

When enabled allows you to configure the serial port 1 settings. When set to Disabled, displays no configuration for the serial port.

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

Logical Device Settings:

Current:

Display the Serial Port 1 base I/O address and IRQ.

☞ **Possible:**

Configure Serial Port 1 base I/O address and IRQ.

Option available:

Use Automatic Settings

IO=2F8h; IRQ=3; DMA:/

IO=3F8h; IRQ=3,4,5,7,9,10,11,12; DMA:/

IO=2F8h; IRQ=3,4,5,7,9,10,11,12; DMA:/

IO=3E8h; IRQ=3,4,5,7,9,10,11,12; DMA:/

IO=2E8h; IRQ=3,4,5,7,9,10,11,12; DMA;. Default setting is **Use Automatic Settings**.

☞ **Serial Port 2 Configuration**

☞ **Use This Device**

When enabled allows you to configure the serial port 2 settings. When set to Disabled, displays no configuration for the serial port.

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

☞ **Logical Device Settings:**

☞ **Current:**

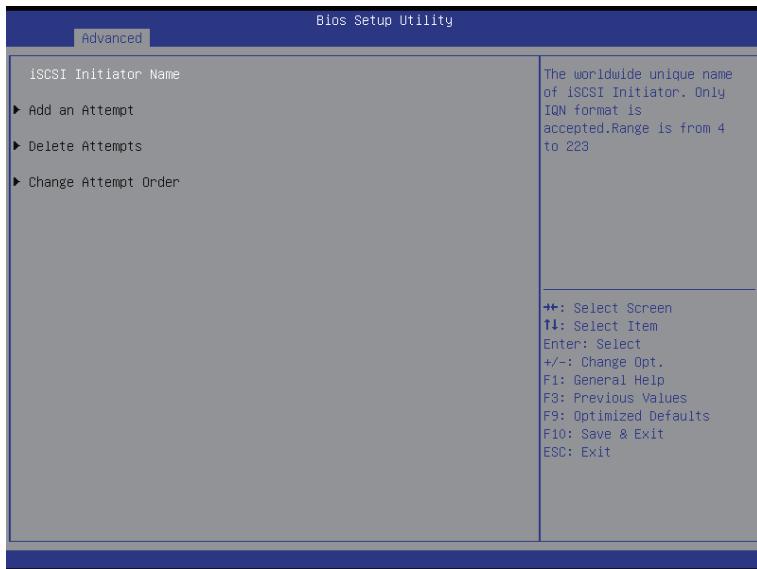
Display the Serial Port 2 base I/O address and IRQ.

☞ **Possible:**

Configure Serial Port 2 base I/O address and IRQ.

Option available: Use Automatic Settings. Default setting is **Use Automatic Settings**.

2-2-10 iSCSI Configuration



☞ **iSCSI Initiator Name**

☞ **Add an Attempts**

Press [Enter] for configuration of advanced items.

☞ **Delete Attempts**

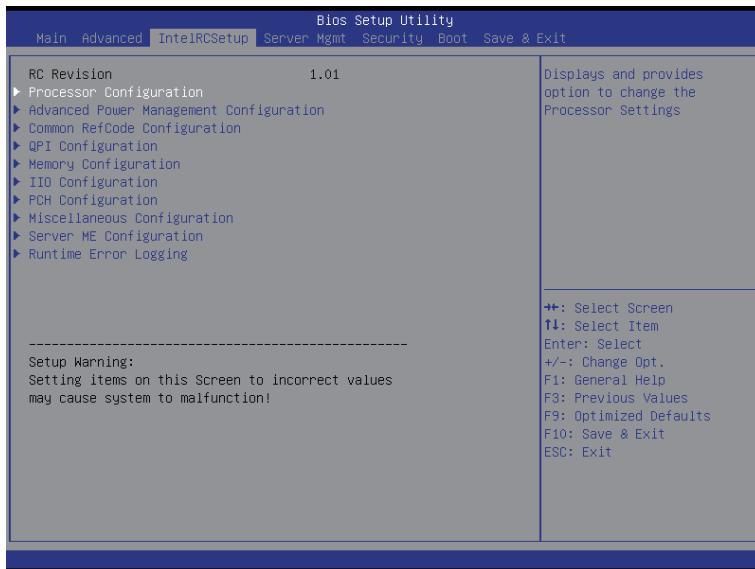
Press [Enter] for configuration of advanced items.

☞ **Change Attempt Order**

Press [Enter] for configuration of advanced items.

2-3 Intel RC Setup Menu

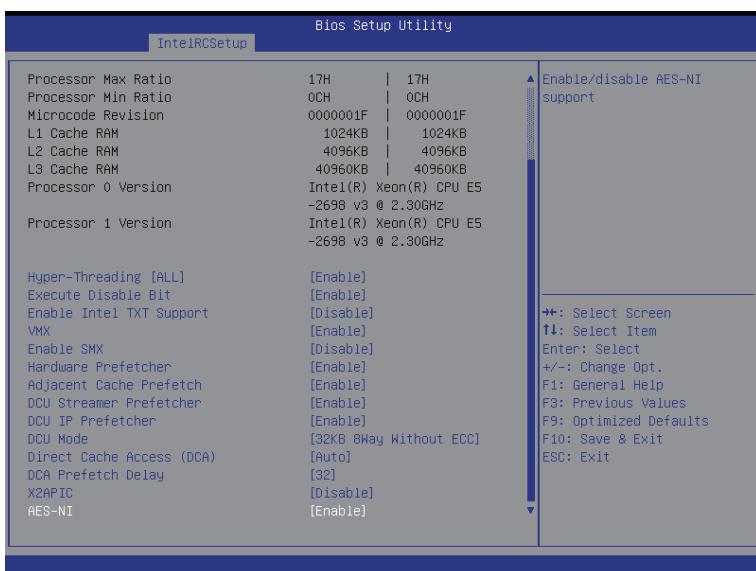
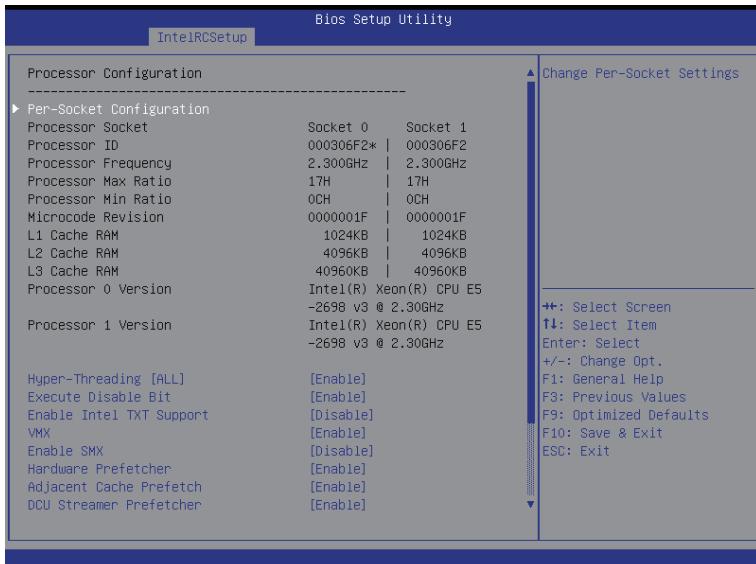
Intel RC Setup menu displays submenu options for configuring the function of North Bridge and South Bridge. Select a submenu item, then press Enter to access the related submenu screen.



RC Revision

Display Intel RC version information.

2-3-1 Processor Configuration



☛ **Processor Configuration**

☛ **Pre-Socket Configuration**

Press [Enter] for configuration of advanced items.

☛ **Processor Socket/Processor ID/Processor Frequency/Processor Max Raito/
Processor Min Raio/Microcode Revision/L1 Cache RAM/L2 Cache RAM/L3 Cache RAM/
Processor 0/1Version**

Displays the technical specifications for the installed processor.

☛ **Hyper-Threading [All]**

The 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**.

☛ **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**.

☛ **Enable Intel TXT Support**

Enable/Disable Intel Trusted Execution Technology support function.

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

☛ **VMX (Vanderpool Technology)**

Enable/Disable Vanderpool Technology. This will take effect after rebooting the system.

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

☛ **Enable SMX (Intel Safer Mode Extensions Technology)**

Enable/Disblae Intel Safer Mode Extensions (SMX) support function.

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

☛ **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**.

☛ **DCU Mode**

Configure DCU mode.

Options available: 32KB 8Way Without ECC/16KB 4Way With ECC. Default setting is **32KB 8Way Without ECC**.

☞ **Direct Cache Access (DCA)**

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

☞ **DCA Prefetch Delay**

Options available: Disabled/8/16/24/32/40/48/56/64/72/80/88/96/104/112. Default setting is **32**.

☞ **X2APIC**

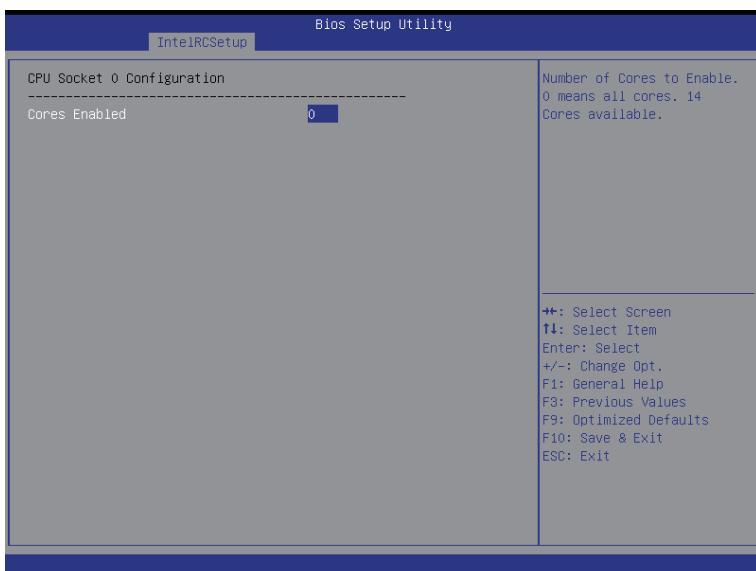
Options available: Enabled/Disabled. Default setting is **Disabled**.

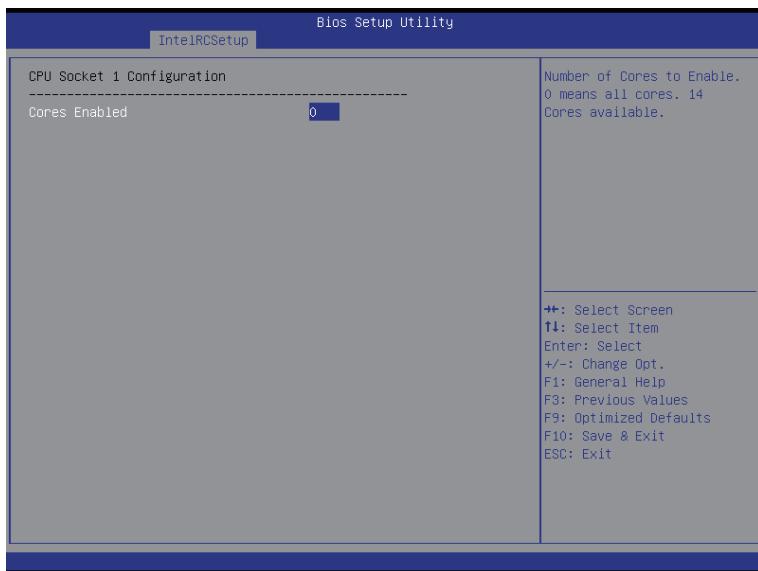
☞ **AES-NI**

Enable/Disable AES-NI (Intel Advanced Encryption Standard New Instructions) support function.

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

2-3-1-1 Pre-Socket Configuration





☞ CPU Socket 0/1 Configuration

Press [Enter] for configuration of advanced items.

☞ Cores Enabled (for CPU socket 0/1)

Number of Cores to enable. 0 means all cores. 14 Cores is available. Press <+> and <-> keys to adjust desired values.

2-3-2 Advanced Power Management Configuration



☞ Advanced Power Management Configuration

☞ Power Technology

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

☞ Config TDP

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

☞ Config TDP Level

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

☞ CPU P State Control

Press [Enter] for configuration of advanced items.

☞ CPU C State Control

Press [Enter] for configuration of advanced items.

☞ CPU T State Control

Press [Enter] for configuration of advanced items.

2-3-2-1 CPU P State Control



☞ EIST (P-State)

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, the 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

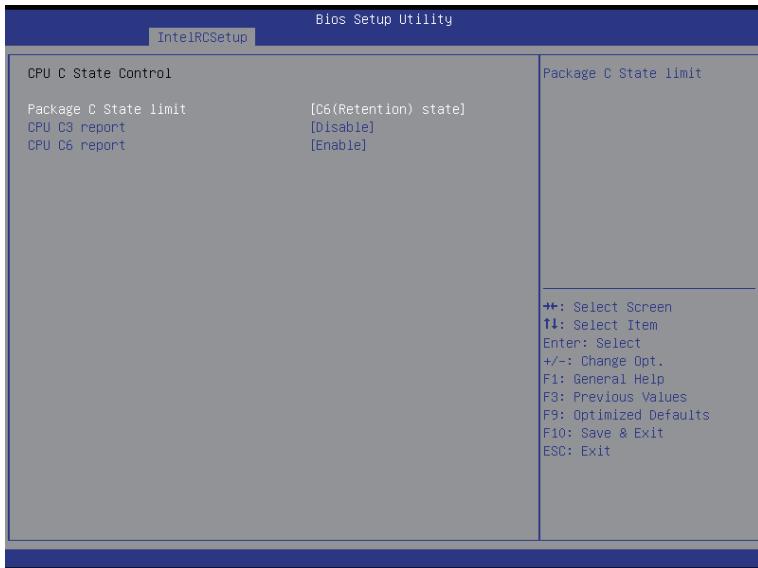
In HW_ALL mode, the processor hardware is responsible for coordinating the P-state among logical processors dependencies. The OS is responsible for keeping the P-state request up to date on all logical processors.

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**.

2-3-2-2 CPU C State Control



☞ Package C State Limit

Configure state for the C-State package limit.

Options available: C0/C1 state/C2 state/C6(non Retention) state/C6(Retention) state.

Default setting is **C6(non Retention) state**.

☞ CPU C3/C6 Report

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.

Default setting for C3 is **Disabled**; default setting for C6 is **Enabled**.

2-3-2-3 CPU T State Control



☞ ACPI T-States

Enable/Disable CPU throttling by OS. Throttling reduces power consumption.

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

2-3-3 Common RefCode Configuration



Common RefCode Configuration

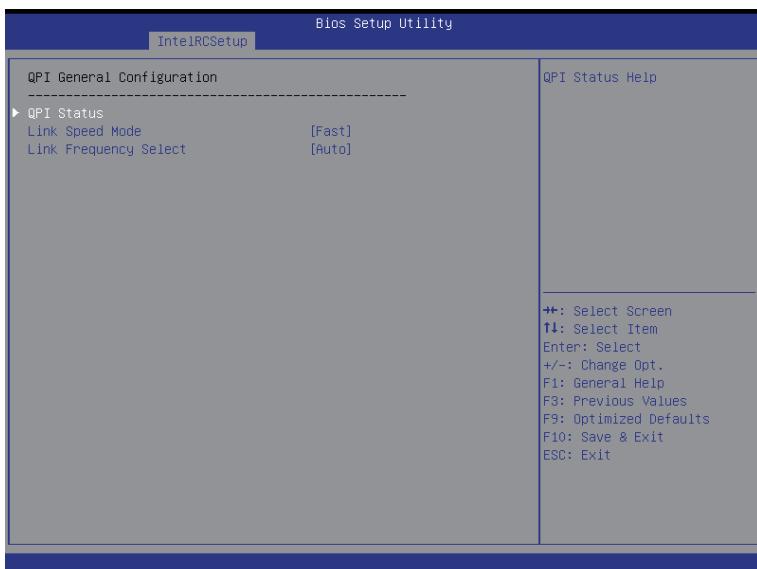
Isoc Mode

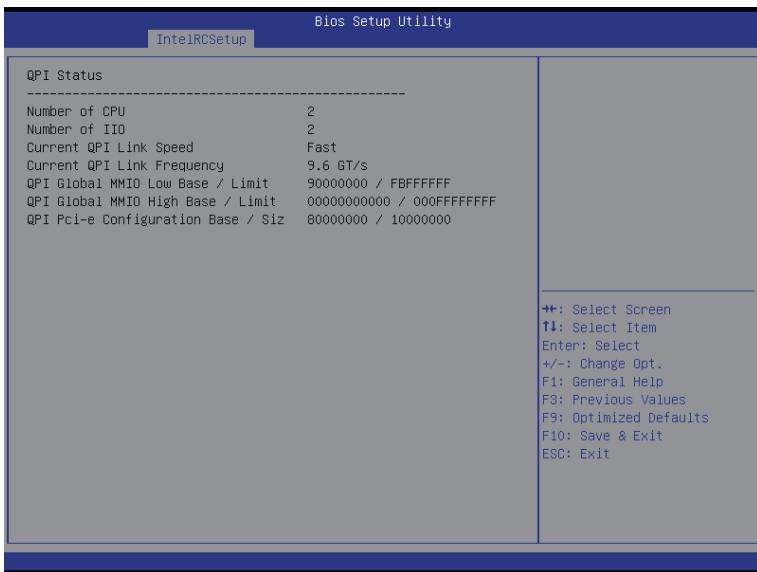
Options available: Auto/Enabled/Disabled. Default setting is **Auto**.

Numa (Non-Uniform Memory Access)

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

2-3-4 QPI Configuration





☞ QPI General Configuration

Press [Enter] for configuration of advanced items.

☞ QPI Status

Press [Enter] to view QPI status.

☞ Link Speed Mode

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

☞ Link Frequency Select

Options available: 6.4GB/s/8.0GB/s/9.6GB/s/Auto/Auto Limited. Default setting is **Auto**.

2-3-5 Memory Configuration



☞ **Integrated Memory Controller (iMC)**

☞ **Enforce POR**

Enable to enforce POR restrictions for DDR4 frequency and voltage programming.

Options available: Enforce POR/Disabled/Enforce Stretch Goals. Default setting is **Enforce POR**.

☞ **Memory Frequency**

Configure memory frequency.

Options available: Auto/1333/1400/1600/1800/1867/2000/2133.

Default setting is **Auto**.

☞ **ECC Support**

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

☞ **Rank Margin Tool**

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

☞ **RMT Pattern Length**

Display RMT Pattern Length.

☞ **SPD Write Lock**

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

☞ **Memory Topology**

Press [Enter] for configuration of advanced items.

☞ **Memory Thermal**

Press [Enter] for configuration of advanced items.

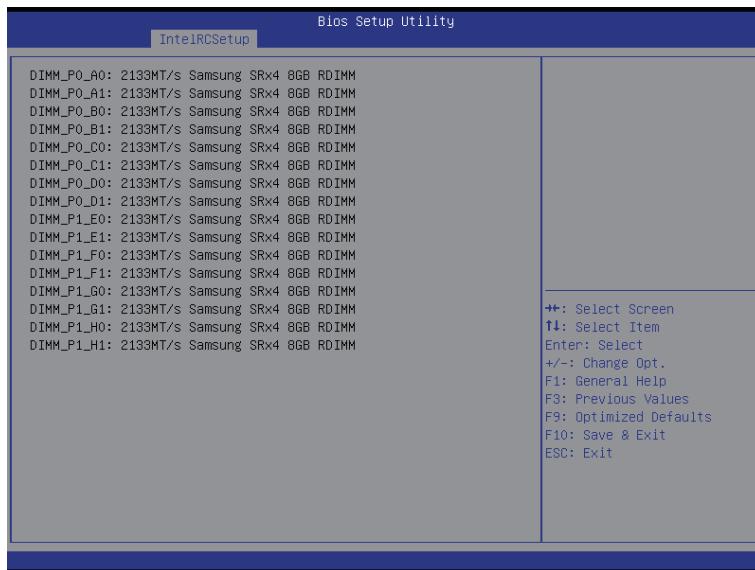
☞ **Memory Map**

Press [Enter] for configuration of advanced items.

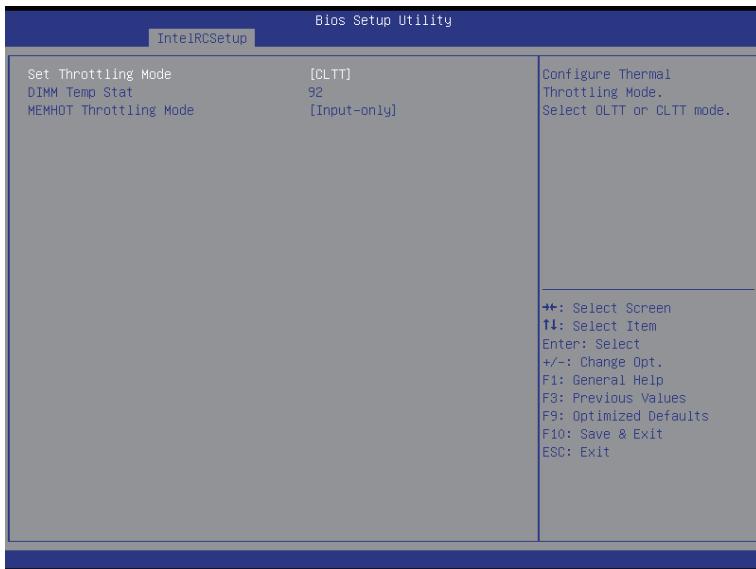
☞ **Memory RAS Configuration**

Press [Enter] for configuration of advanced items.

2-3-5-1 Memory Topology



2-3-5-2 Memory Thermal



☛ Set Throttling

Configure Thermal Throttling Mode. Select OLTT or CLTT mode.

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

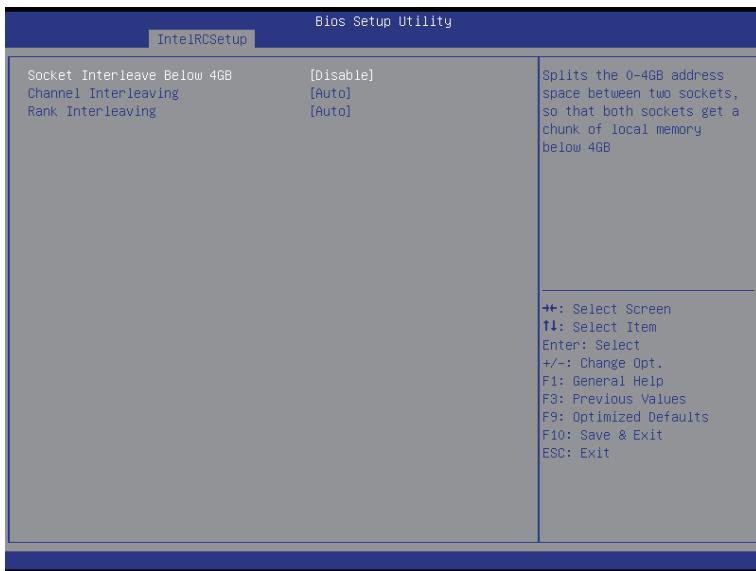
☛ DIMM Temp Stat

Display DIMM Temp Stat.

☛ MEMHOT Throttling Mode

Options available: Disabled/Output-only/Input-only. Default setting is **Input-only**.

2-3-5-3 Memory Map



☞ **Socket Interleave Below 4GB**

Splits the 0-4GB address space between two sockets, so that both sockets get a chunk of local memory below 4GB.

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

☞ **Channel Interleaving**

Options available: Auto/1-way Interleave/2-way Interleave/3-way Interleave/4-way Interleave.

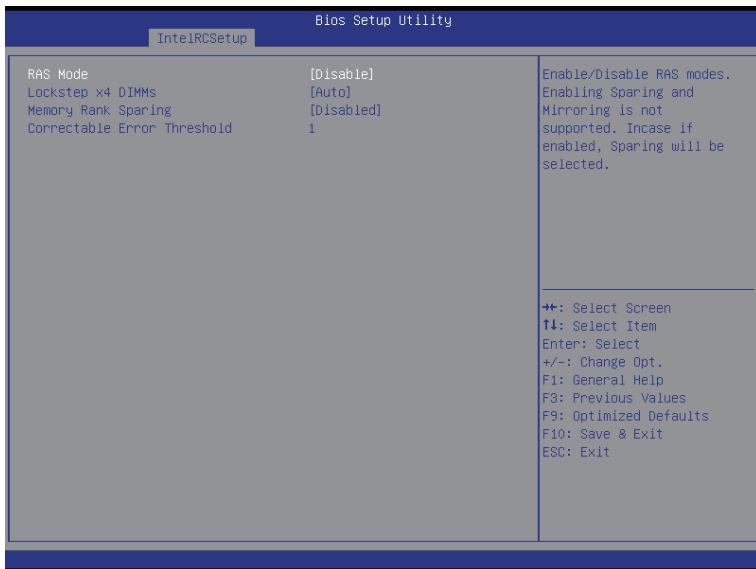
Default setting is **Auto**.

☞ **Rank Interleaving**

Options available: Auto/1-way Interleave/2-way Interleave/4-way Interleave/8-way Interleave.

Default setting is **Auto**.

2-3-5-4 Memory RAS Configuration



☞ RAS Mode

Enable/Disable RAS modes. Enabling Sparing and Mirroring is not supported. When this item is set to enabled, Sparing will be selected.

Options available: Disable/Mirror/Lockstep Mode. Default setting is **Disabled**.

☞ Lockstep x4 DIMMs

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

☞ Memory Rank Sparing

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

☞ Correctable Error Threshold

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

2-3-6 IIO Configuration



☞ **IIO Configuration**

☞ **EV DFX Features**

Set this option to allow DFX Lock Bits to remain clear.

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

☞ **IOAT Configuration**

Press [Enter] for configuration of advanced items.

☞ **Intel VT for Directed I/O (VT-d)**

Press [Enter] for configuration of advanced items.

2-3-6-1 IOAT Configuration



☞ IOAT Configuration

☞ Enable IOAT

Control to enable/disable IOAT (Intel I/O Acceleration Technology) device.

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 **Disabled**.

2-3-6-2 Intel VT for Directed I/O (VT-d)



☞ Intel VT for Directed I/O (VT-d)

☞ VT-d Azalea VCp Optimizations

Enable/Disable Azalea VCp optimizations.

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

☞ Intel VT for Directed I/O (VT-d)

Enable/Disable Intel VT for Directed I/O (VT-d) support function.

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

☞ Interrupt Remapping

Enable/Disable interrupt remapping support function.

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

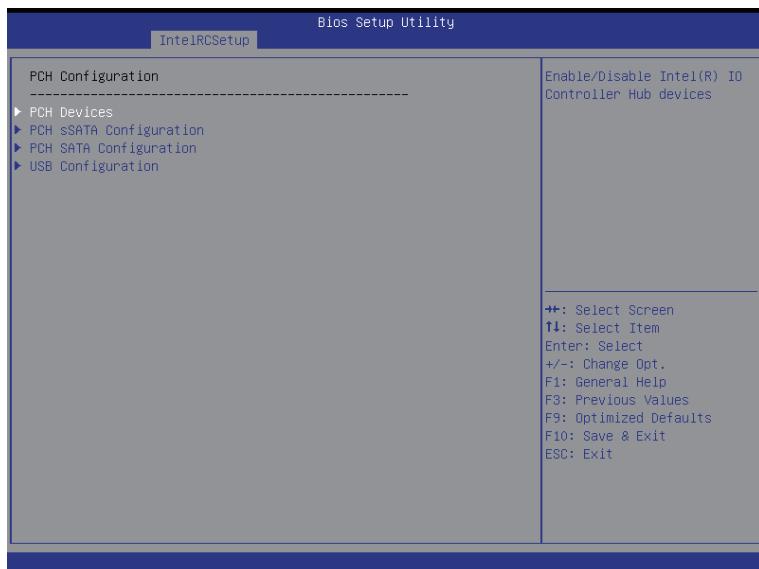
☞ Coherency Support (Non-Isoch)

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

☞ Coherency Support (Isoch)

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

2-3-7 PCH Configuration



☞ PCH Configuration

☞ PCH Devices

Press [Enter] for configuration of advanced items.

☞ PCH ssATA Configuration

Press [Enter] for configuration of advanced items.

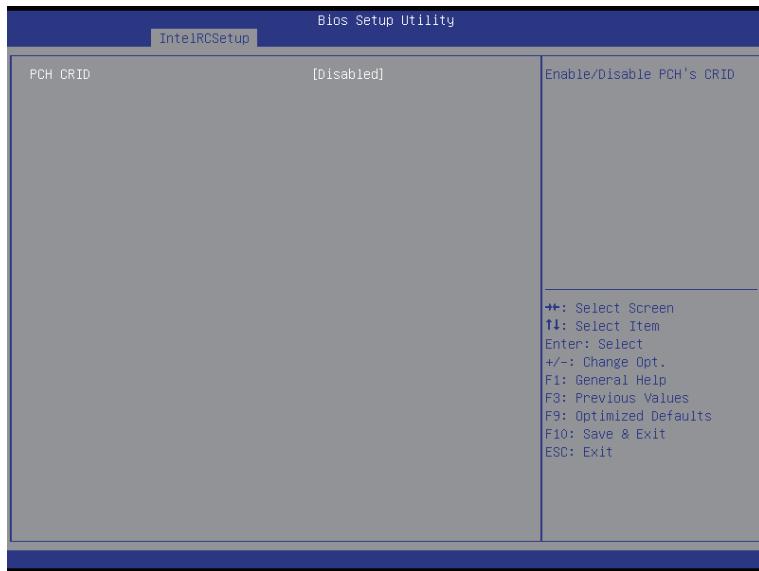
☞ PCH SATA Configuration

Press [Enter] for configuration of advanced items.

☞ USB Configuration

Press [Enter] for configuration of advanced items.

2-3-7-1 PCH Devices

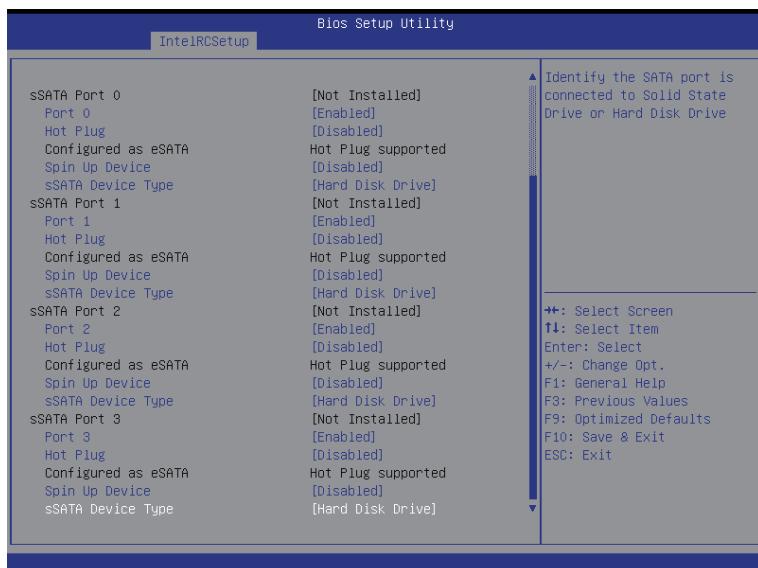


☞ PCH CRID

Enable/Disable Intel Compatible Revision ID.

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

2-3-7-2 PCH sSATA Configuration



When SATA Type is set to IDE



☞ PCH sSATA Configuration

☞ sSATA Controller(s)

Enable/Disable sSATA controller.

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

☞ Configure sSATA as

Configure 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 controller enables both its RAID and AHCI functions. You will be allowed to access the RAID setup utility at boot time.

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

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

☞ SATA Test Mode

Enable/Disable SATA Test Mode.

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

☞ SATA Mode options^(Note)

Press [Enter] for configuration of advanced items.

☞ Support Aggressive Link Power Mana^(Note)

Enable PCH to aggressively enter link power state.

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

(Note) Only Supported When HDD is in **AHCI** or **RAID** Mode.

Alternate Device ID on RAID

Enable /Disable Alternate Device ID on RAID mode.

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

Please note that this option appears when HDD is in RAID Mode.

sSATA Port 0/1/2/3

The category identifies sSATA type of hard disk that are installed in the computer.

System will automatically detect HDD type.

Port 0/1/2/3

Enable/Disable Port 0/1/2/3 device.

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

Hot Plug (for Port 0/1/2/3)^(Note)

Enable/Disable HDD Hot-Plug function.

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

Configured as eSATA^(Note)

Display Hot-Plug supported information.

Spin Up Device (for Port 0/1/2/3)^(Note)

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

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

sSATA Device Type

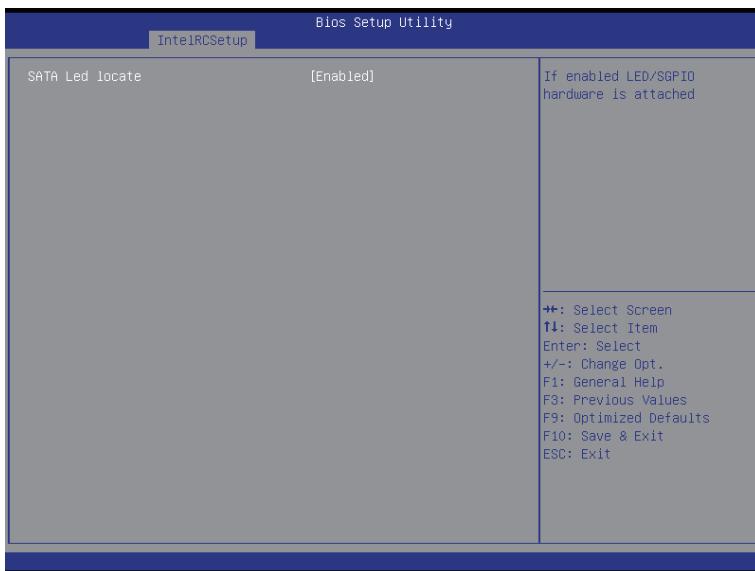
Select sSATA device type.

Options available: Hard Disk Drive/Solid State Drive. Default setting is **Hard Disk Drive**.

(Note) Only Supported When HDD is in **AHCI** or **RAID** Mode.

2-3-7-2-1 SATA Mode Options

When SATA Type is set to IDE/AHCI Mode



☞ SATA LED locate

When this option is enabled, LED/SGPIO hardware is attached.

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

When SATA Type is set to RAID Mode



☞ **SATA LED locate**

When this option is enabled, LED/SGPIO hardware is attached.

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

☞ **Intel Rapid Recovery Technology**

Enable/Disable Intel Rapid Recovery Technology support function.

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

☞ **RAID Option ROM UI banner**

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

☞ **IRRT Only on ESATA**

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

☞ **Smart Response Technology**

Enable/Disable Intel Smart Response Technology support function.

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

☞ **RAID OROM prompt delay**

Options available: 2 Seconds/4 Seconds/6 Seconds/8 Seconds. Default setting is **2 Seconds**.

2-3-7-3 PCH SATA Configuration



When SATA Type is set to IDE



☞ PCH SATA Configuration

☞ SATA Controller(s)

Enable/Disable sSATA controller.

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

☞ Configure sSATA as

Configure 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 controller enables both its RAID and AHCI functions. You will be allowed to access the RAID setup utility at boot time.

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

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

☞ SATA Test Mode

Enable/Disable SATA Test Mode.

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

☞ SATA RSTe Boot Info^(Note 1)

Enable/Disable SATA RSTe Boot Information.

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

☞ SATA Mode options^(Note 2)

Press [Enter] for configuration of advanced items.

(Note 1) Only Supported When HDD is in **RAID** Mode.

(Note 2) Only Supported When HDD is in **AHCI** or **RAID** Mode.

☞ **Support Aggressive Link Power Mana^(Note)**

Enable PCH to aggressively enter link power state.

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

☞ **Alternate Device ID on RAID**

Enable /Disable Alternate Device ID on RAID mode.

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

Please note that this option appears when HDD is in RAID Mode.

☞ **ssATA Port 0/1/2/3/4/5**

The category identifies ssATA type of hard disk that are installed in the computer.

System will automatically detect HDD type.

☞ **Port 0/1/2/3/4/5**

Enable/Disable Port 0/1/2/3 device.

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

☞ **Hot Plug (for Port 0/1/2/3/4/5)^(Note)**

Enable/Disable HDD Hot-Plug function.

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

☞ **Configured as eSATA^(Note)**

Display Hot-Plug supported information.

☞ **Spin Up Device (for Port 0/1/2/3/4/5)^(Note)**

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

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

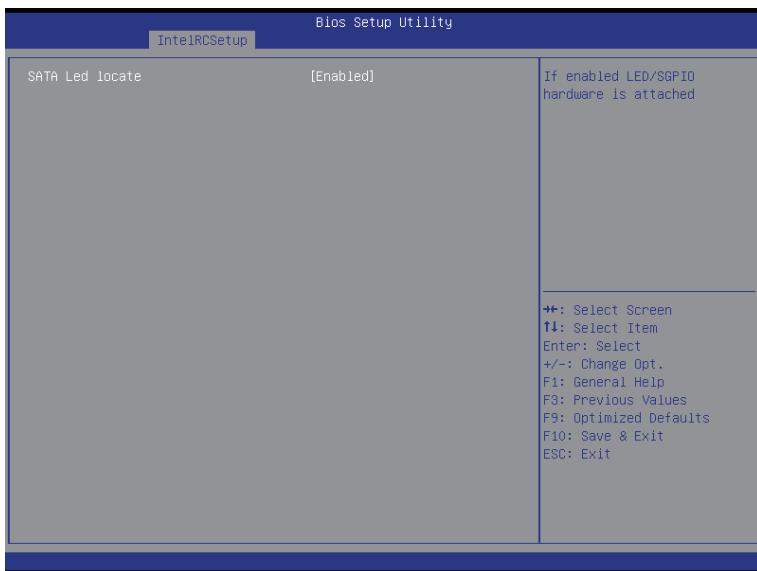
☞ **ssATA Device Type**

Select ssATA device type.

Options available: Hard Disk Drive/Solid State Drive. Default setting is **Hard Disk Drive**.

2-3-7-3-1 SATA Mode Options

When SATA Type is set to IDE/AHCI Mode



☞ SATA LED locate

When this option is enabled, LED/SGPIO hardware is attached.

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

When SATA Type is set to RAID Mode



☞ **SATA LED locate**

When this option is enabled, LED/SGPIO hardware is attached.

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

☞ **Intel Rapid Recovery Technology**

Enable/Disable Intel Rapid Recovery Technology support function.

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

☞ **RAID Option ROM UI banner**

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

☞ **Smart Response Technology**

Enable/Disable Intel Smart Response Technology support function.

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

☞ **RAID OROM prompt delay**

Options available: 2 Seconds/4 Seconds/6 Seconds/8 Seconds. Default setting is **2 Seconds**.

2-3-7-4 USB Configuration



USB Precondition

Precondition work on USB host controller and root ports for faster enumeration.

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

xHCI Mode

Enable/Disable xHCI (USB 3.0) support function.

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

2-3-8 Miscellaneous Configuration



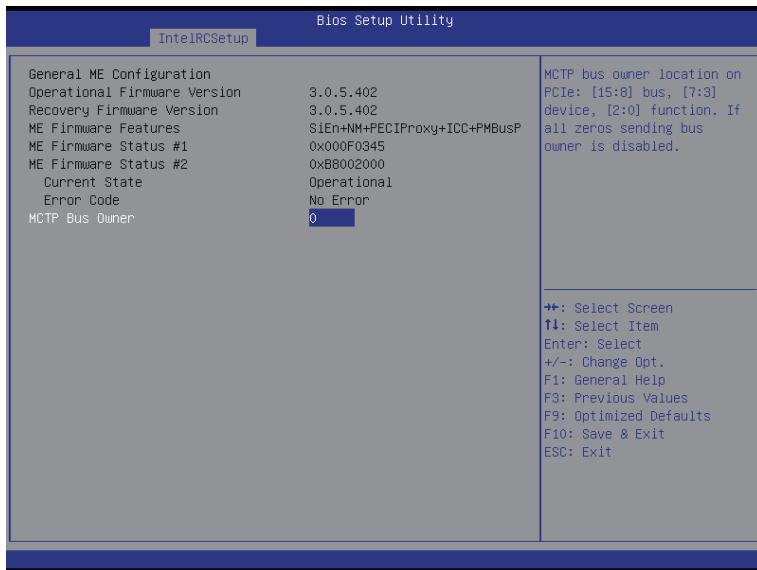
☞ Miscellaneous Configuration

☞ Active Video

Select active Video type.

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

2-3-9 Server ME Configuration



☞ General ME Configuration

☞ Operational Firmware Version

Display Operational Firmware Version information.

☞ Recovery Firmware Version

Display Recovery Firmware Version information.

☞ ME Firmware Features

Display ME Firmware features information.

☞ ME Firmware Status #1/#2

Display ME Firmware status information.

☞ Current State (for ME Firmware)

Display ME Firmware current status information.

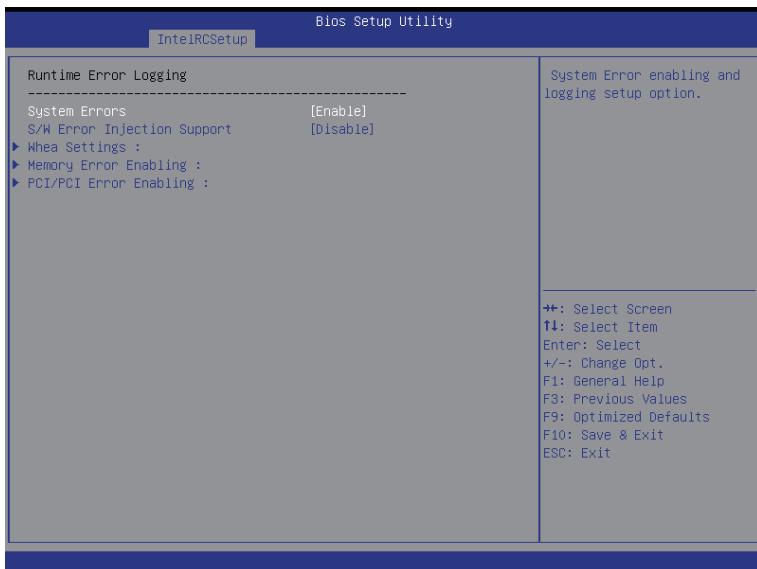
☞ Error Code (for ME Firmware)

Display ME Firmware status error code.

☞ MCTP Bus Owner

Configure MCTP Bus Owner.

2-3-10 Runtime Error Logging



☞ Runtime Error Logging

☞ System Errors

Enable/Disable system error logging function.

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

☞ S/W Error Injection Support

Enable/Disable software injection error logging function.

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

☞ Whea Settings

Press [Enter] for configuration of advanced items.

☞ Memory Error Enabling

Press [Enter] for configuration of advanced items.

☞ PCI/PCI Error Enabling

Press [Enter] for configuration of advanced items.

2-3-10-1 Whea Setting

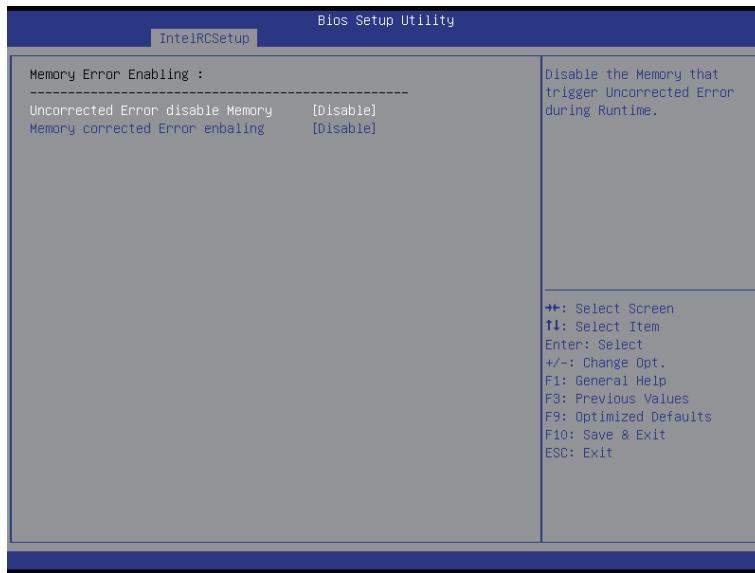


☞ WHEA Support (Windows Hardware Error Architecture)

Enable/Disable WHEA Support.

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

2-3-10-2 Memory Error Enabling



☞ **Memory Error Enabling**

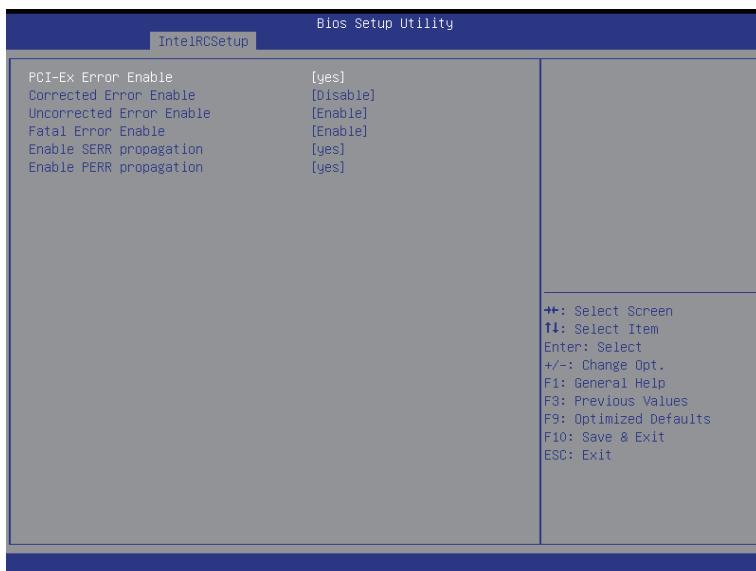
☞ **Un-Correctable Errors disable Memory**

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

☞ **Memory corrected Errors enabling**

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

2-3-10-3 PCI/PCI Error Enabling



PCI-Ex Error Enable

Options available: Yes/No. Default setting is **No**.

Corrected Error Enable

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

Uncorrected Error Enable

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

Fatal Error Enable

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

Enable SERR propagation

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

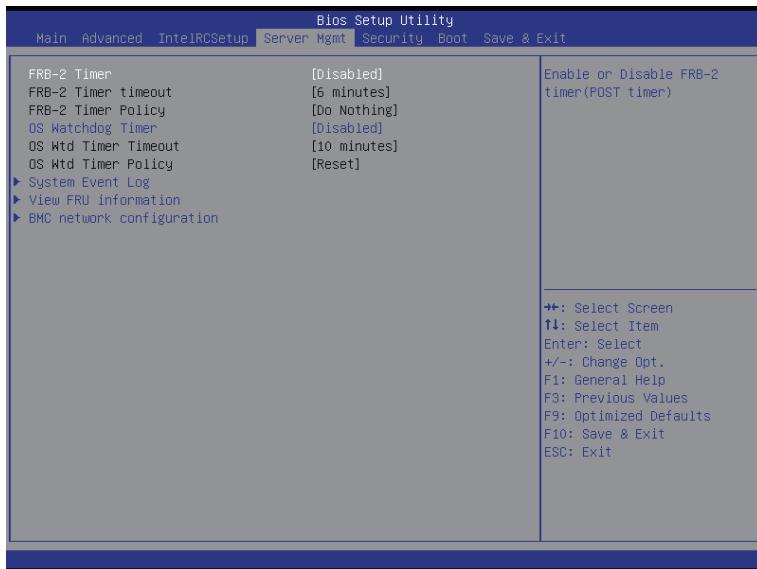
Options available: Yes/No. Default setting is **Yes**.

Enable PERR propagation

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

Options available: Yes/No. Default setting is **Yes**.

2-4 Server Management Menu



☛ FRB-2 Timer

Enable/Disable FRB-2 timer (POST timer).

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

☛ FRB2 Timer timeout

Configure the FRB2 Timer timeout.

Options available: 3 minutes/4 minutes/5 minutes/6 minutes. Default setting is **6 minutes**.

Please note that this item is configurable when FRB-2 Timer is set to Enabled.

☛ FRB2 Timer Policy

Configure the FRB2 Timer policy.

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

Please note that this item is configurable when FRB-2 Timer is set to Enabled.

☛ 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**.

Please note that this item is configurable when OS Watchdog Timer is set to Enabled.

☛ OS Wtd Timer Policy

Configure OS Watchdog Timer Policy.

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

Please note that this item is configurable when OS Watchdog Timer is set to Enabled.

☞ **System Event Log**

Press [Enter] for configuration of advanced items.

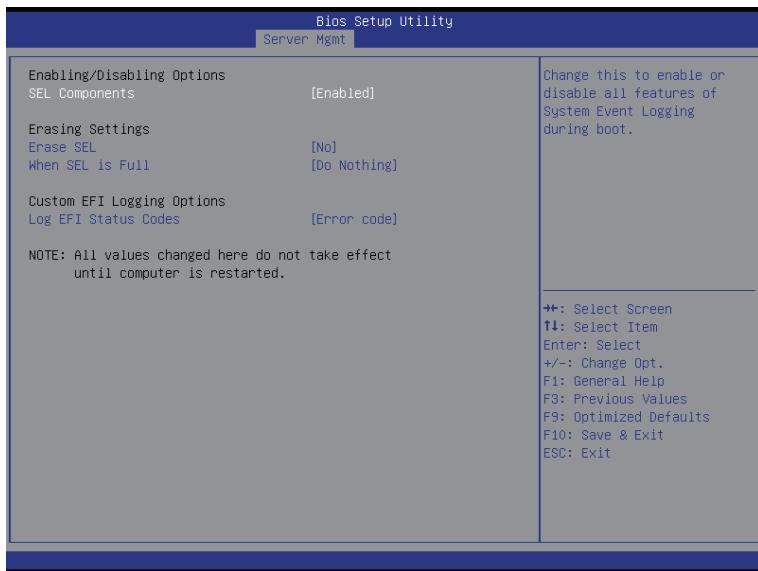
☞ **View FRU Information**

Press [Enter] to view the advanced items.

☞ **BMC network configuration**

Press [Enter] for configuration of advanced items.

2-4-1 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

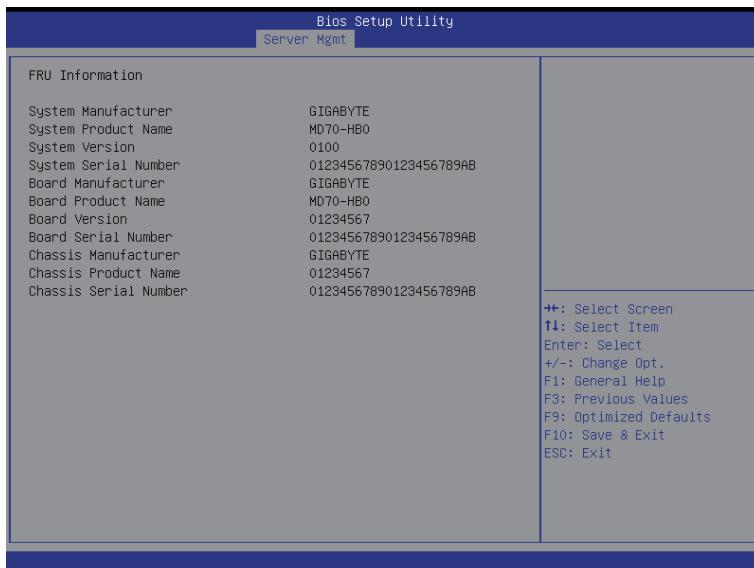
☞ Log EFI Status Codes

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

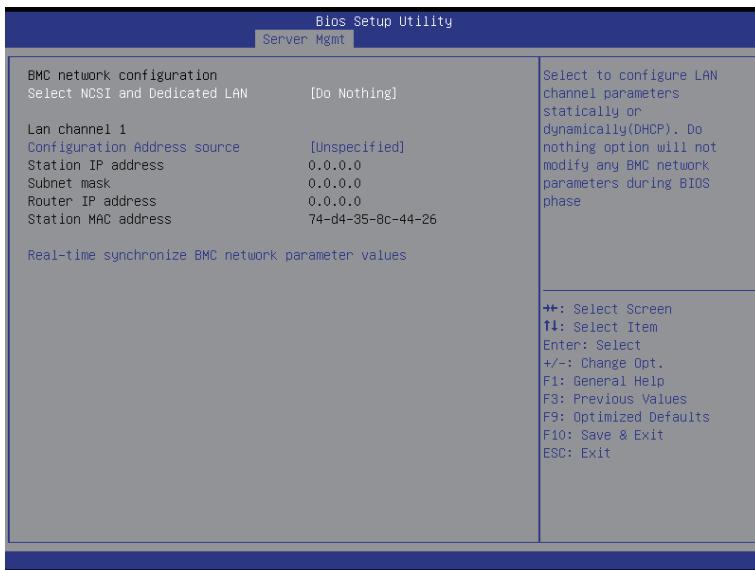
Options available: Disabled/Both/Error code/Progress code. Default setting is **Error code**.

2-4-2 View FRU Information

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



2-4-3 BMC network configuration



☞ BMC network configuration

☞ Select NCSI and Dedicated LAN

Switch NCSI and dedicated LAN and send KCS command.

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

☞ Lan Channel 1

☞ Configuration Address source

Select to configure LAN channel parameters statically or dynamically (DHCP). Do nothing option will not modify any BMC network parameters during BIOS phase.

Options available: Unspecified/Static/DynamicBmcDhcp. Default setting is **DynamicBmcDhcp**.

☞ Station IP Address

Display IP Address information.

☞ Subnet mask

Display Subnet Mask information.

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

☞ Router IP address

Display the Router IP Address information.

☞ Station MAC Address

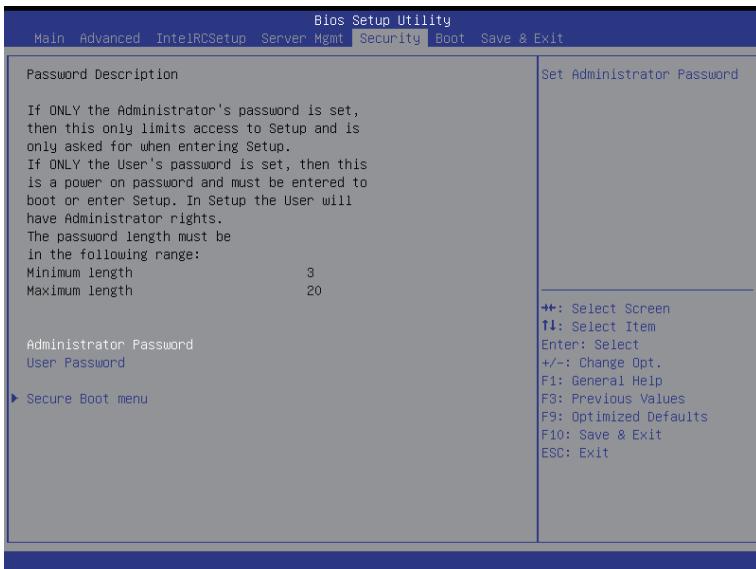
Display the MAC Address information.

☞ Real-time synchronize BMC network parameter values

Press [Enter] to synchronize BMC network parameter values.

2-5 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, an 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

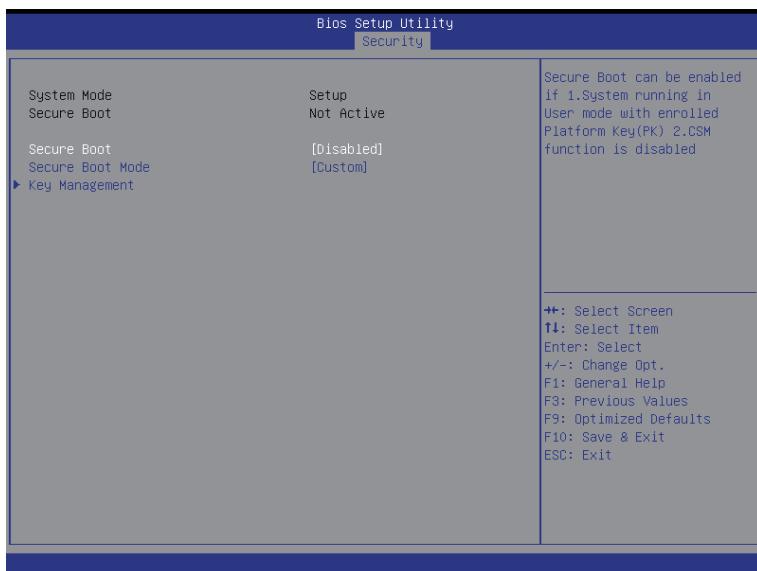
Press Enter to configure the user password.

☞ Secure Boot menu

Press [Enter] for configuration of advanced items.

2-5-1 Secure Boot menu

The Secure Boot Menu is applicable when your device is installed the Windows® 8 operatin system.



☞ Secure Mode

Display the System secure mode state.

☞ Secure Boot

Display the status of Secure Boot.

☞ Secure Boot

Enable/Disable Secure Boot function.

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

☞ Secure Boot Mode

Secure Boot requires all the applications that are running during the booting process to be pre-signed with valid digital certificates. This way, the system knows all the files being loaded before Windows 8 loads and gets to the login screen have not been tampered with.

When set to Standard, it will automatically load the Secure Boot keys from the BIOS databases.

When set to Custom, you can customize the Secure Boot settings and manually load its keys from the BIOS database.

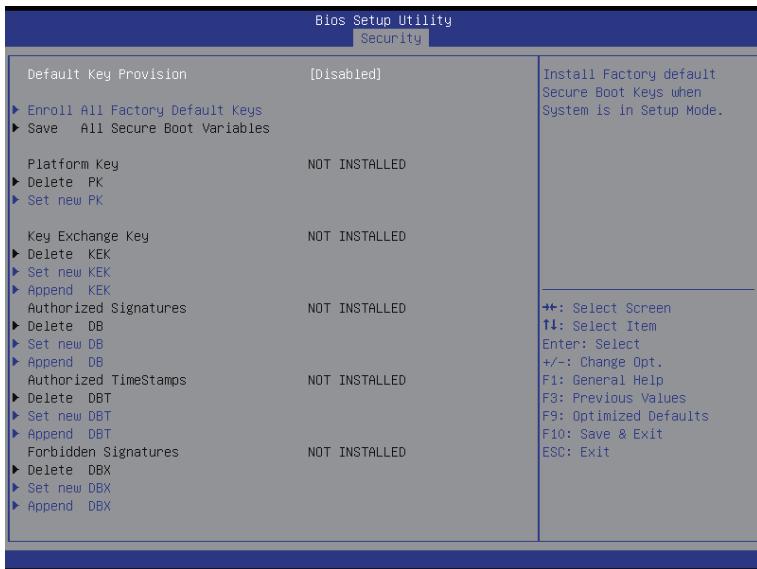
Options available: Standard/Custom. Default setting is **Custom**.

☞ Key Management^(Note)

Press [Enter] for configuration of advanced items.

(Note) Advanced items prompt when this item is set to **Cutom**.

2-5-1-1 Key Management



Default Key Provisioning

Force the system to Setup Mode. This will clear all Secure Boot Variables such as Platform Key (PK), Key-exchange Key (KEK), Authorized Signature Database (db), and Forbidden Signaures Database (dbx).

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

Enroll All Factory Default Keys

Press [Enter] to install all factory default keys.

Save All Secure Boot Variables

Press [Enter] to save all Secure Boot Variables.

Platform Key (PK)

Display the status of Platform Key.

Delete the PK

Press [Enter] to delete the existed PK. Once the PK is deleted, all the system's Secure Boot keys will not be activated.

Set new PK File

Press [Enter] to configure a new PK.

Key Exchange Key Database (KEK)

Display the status of Platform Key.

Delete KEK

Press [Enter] to delete the KEK from your system.

Set new KEK

Press [Enter] to configure a new KEK.

☞ **Append Var to KEK**

Press [Enter] to load additional KEK from a storage devices for an additional db and dbx management.

☞ **Authorized Signature Database (DB)**

Display the status of Authorized Signature Database.

☞ **Delete DB**

Press [Enter] to delete the db from your system.

☞ **Set new DB**

Press [Enter] to configure a new db.

☞ **Append aVar to DB**

Press [Enter] to load additional db from a storage devices.

☞ **Forbidden Signature Database (DBX)**

Display the status of Forbidden Signature Database.

☞ **Delete the DBX**

Press [Enter] to delete the dbx from your system.

☞ **Set DBX from File**

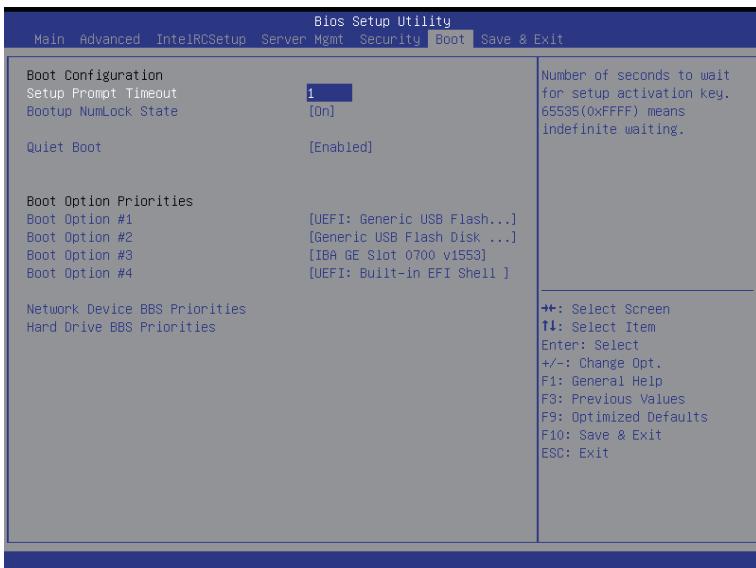
Press [Enter] to configure a new dbx.

☞ **Append Var to DBX**

Press [Enter] to load additional db from a storage devices.

2-6 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 numeric 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

Enables or disables showing the logo during POST.

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

Boot Option Priorities

Boot Option #1/#2/#3#4

Press Enter to configure the boot priority.

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

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

☞ **Network Device BBS Priorities**

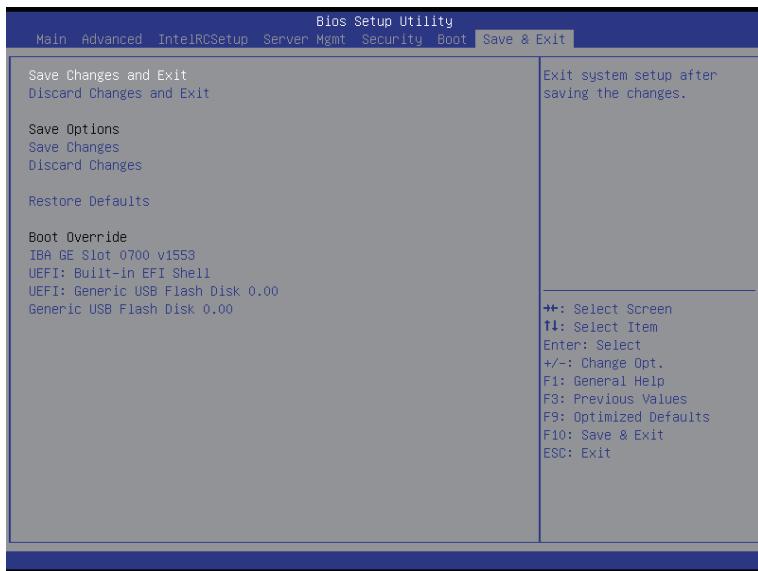
Press Enter to configure the boot priority.

☞ **Hard Drive BBS Priorities**

Press Enter to configure the boot priority.

2-7 Save & 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 exit the BIOS setup.

Options available: Yes/No.

☞ Save Options

☞ Save Changes

Saves changes made in the BIOS setup.

Options available: Yes/No.

☞ Discard Changes

Discards changes made and close 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.

2-8 BIOS POST Codes

PEI_CORE_STARTED	0x10
PEI_CAR_CPU_INIT	0x11
// reserved for CPU 0x12 - 0x14	
PEI_CAR_NB_INIT	0x15
// reserved for NB 0x16 - 0x18	
PEI_CAR_SB_INIT	0x19
// reserved for SB 0x1A - 0x1C	
PEI_MEMORY_SPD_READ	0x1D
PEI_MEMORY_PRESENCE_DETECT	0x1E
PEI_MEMORY_TIMING	0x1F
PEI_MEMORY_CONFIGURING	0x20
PEI_MEMORY_INIT	0x21
// reserved for OEM use: 0x22 - 0x2F	
// reserved for AML use: 0x30	
PEI_MEMORY_INSTALLED	0x31
PEI_CPU_INIT	0x32
PEI_CPU_CACHE_INIT	0x33
PEI_CPU_BSP_SELECT	0x34
PEI_CPU_AP_INIT	0x35
PEI_CPU_SMM_INIT	0x36
PEI_MEM_NB_INIT	0x37
// reserved for NB 0x38 - 0x3A	
PEI_MEM_SB_INIT	0x3B
// reserved for SB 0x3C - 0x3E	
// reserved for OEM use: 0x3F - 0x4E	
PEI_DXE_IPL_STARTED	0x4F
//Recovery	
PEI_RECOVERY_AUTO	0xF0
PEI_RECOVERY_USER	0xF1
PEI_RECOVERY_STARTED	0xF2
PEI_RECOVERY_CAPSULE_FOUND	0xF3
PEI_RECOVERY_CAPSULE_LOADED	0xF4
//S3	
PEI_S3_STARTED	0xE0
PEI_S3_BOOT_SCRIPT	0xE1
PEI_S3_VIDEO_REPOST	0xE2
PEI_S3_OS_WAKE	0xE3
//DXE_STATUS_CODE	
DXE_CORE_STARTED	0x60
DXE_NVRAM_INIT	0x61
DXE_SBRUN_INIT	0x62

DXE_CPU_INIT	0x63
//reserved for CPU 0x64 - 0x67	
DXE_NB_HB_INIT	0x68
DXE_NB_INIT	0x69
DXE_NB_SMM_INIT	0x6A
//reserved for NB 0x6B - 0x6F	
DXE_SB_INIT	0x70
DXE_SB_SMM_INIT	0x71
DXE_SB_DEVICES_INIT	0x72
//reserved for SB 0x73 - 0x77	
DXE_ACPI_INIT	0x78
DXE_CSM_INIT	0x79
//reserved for AMI use: 0x7A - 0x7F	
//reserved for OEM use: 0x80 - 0x8F	
DXE_BDS_STARTED	0x90
DXE_BDS_CONNECT_DRIVERS	0x91
DXE_PCI_BUS_BEGIN	0x92
DXE_PCI_BUS_HPC_INIT	0x93
DXE_PCI_BUS_ENUM	0x94
DXE_PCI_BUS_REQUEST_RESOURCES	0x95
DXE_PCI_BUS_ASSIGN_RESOURCES	0x96
DXE_CON_OUT_CONNECT	0x97
DXE_CON_IN_CONNECT	0x98
DXE_SIO_INIT	0x99
DXE_USB_BEGIN	0x9A
DXE_USB_RESET	0x9B
DXE_USB_DETECT	0x9C
DXE_USB_ENABLE	0x9D
//reserved for AMI use: 0x9E - 0x9F	
//reserved for AML use: 0xA0	
DXE_IDE_BEGIN	0xA1
DXE_IDE_RESET	0xA2
DXE_IDE_DETECT	0xA3
DXE_IDE_ENABLE	0xA4
DXE_SCSI_BEGIN	0xA5
DXE_SCSI_RESET	0xA6
DXE_SCSI_DETECT	0xA7
DXE_SCSI_ENABLE	0xA8
DXE_SETUP VERIFYING_PASSWORD	0xA9
//reserved for AML use: 0xAA	
DXE_SETUP_START	0xAB
DXE_SETUP_INPUT_WAIT	0xAC

DXE_READY_TO_BOOT	0xAD
DXE_LEGACY_BOOT	0xAE
DXE_EXIT_BOOT_SERVICES	0xAF
RT_SET_VIRTUAL_ADDRESS_MAP_BEGIN	0xB0
RT_SET_VIRTUAL_ADDRESS_MAP_END	0xB1
DXE_LEGACY_OPROM_INIT	0xB2
DXE_RESET_SYSTEM	0xB3
DXE_USB_HOTPLUG	0xB4
DXE_PCI_BUS_HOTPLUG	0xB5
DXE_NVRAM_CLEANUP	0xB6
DXE_CONFIGURATION_RESET	0xB7
//reserved for AMI use: 0xB8 - 0xBF	
//reserved for OEM use: 0xC0 - 0xCF	
//PEI_STATUS_CODE	
//Errors	
//Regular boot	
PEI_MEMORY_INVALID_TYPE	0x50
PEI_MEMORY_INVALID_SPEED	0x50
PEI_MEMORY_SPD_FAIL	0x51
PEI_MEMORY_INVALID_SIZE	0x52
PEI_MEMORY_MISMATCH	0x52
PEI_MEMORY_NOT_DETECTED	0x53
PEI_MEMORY_NONE_USEFUL	0x53
PEI_MEMORY_ERROR	0x54
PEI_MEMORY_NOT_INSTALLED	0x55
PEI_CPU_INVALID_TYPE	0x56
PEI_CPU_INVALID_SPEED	0x56
PEI_CPU_MISMATCH	0x57
PEI_CPU_SELF_TEST_FAILED	0x58
PEI_CPU_CACHE_ERROR	0x58
PEI_CPU_MICROCODE_UPDATE_FAILED	0x59
PEI_CPU_NO_MICROCODE	0x59
PEI_CPU_INTERNAL_ERROR	0x5A
PEI_CPU_ERROR	0x5A
PEI_RESET_NOT_AVAILABLE	x5B
//reserved for AMI use: 0x5C - 0x5F	
//Recovery	
PEI_RECOVERY_PPI_NOT_FOUND	0xF8
PEI_RECOVERY_NO_CAPSULE	0xF9
PEI_RECOVERY_INVALID_CAPSULE	0xFA
//reserved for AMI use: 0xFB - 0xFF	
//S3 Resume	

PEI_MEMORY_S3_RESUME_FAILED	0xE8
PEI_S3_RESUME_PPI_NOT_FOUND	0xE9
PEI_S3_BOOT_SCRIPT_ERROR	0xEA
PEI_S3_OS_WAKE_ERROR	0xEB
//reserved for AMI use: 0xEC - 0xEF	
// DXE_STATUS_CODE	
DXE_CPU_ERROR	0xD0
DXE_NB_ERROR	0xD1
DXE_SB_ERROR	0xD2
DXE_ARCH_PROTOCOL_NOT_AVAILABLE	0xD3
DXE_PCI_BUS_OUT_OF_RESOURCES	0xD4
DXE_LEGACY_OPROM_NO_SPACE	0xD5
DXE_NO_CON_OUT	0xD6
DXE_NO_CON_IN	0xD7
DXE_INVALID_PASSWORD	0xD8
DXE_BOOT_OPTION_LOAD_ERROR	0xD9
DXE_BOOT_OPTION_FAILED	0xDA
DXE_FLASH_UPDATE_FAILED	0xDB
DXE_RESET_NOT_AVAILABLE	0xDC
//reserved for AMI use: 0xDE - 0xDF	

2-9 BIOS POST Beep code

2-9-1 PEI Beep Codes

# of Beeps	Description
1	Memory not Installed.
1	Memory was installed twice (InstallPeiMemory routine in PEI Core called twice)
2	Recovery started
3	DXEIPL was not found
3	DXE Core Firmware Volume was not found
4	Recovery failed
4	S3 Resume failed
7	Reset PPI is not available

2-9-2 DEX Beep Codes

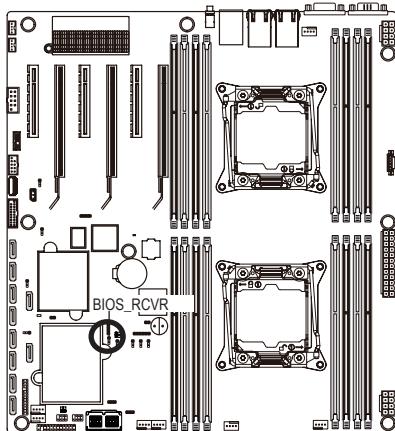
# of Beeps	Description
1	Invalid password
4	Some of the Architectural Protocols are not available
5	No Console Output Devices are found
5	No Console Input Devices are found
6	Flash update is failed
7	Reset protocol is not available

2-10 BIOS Recovery Instruction

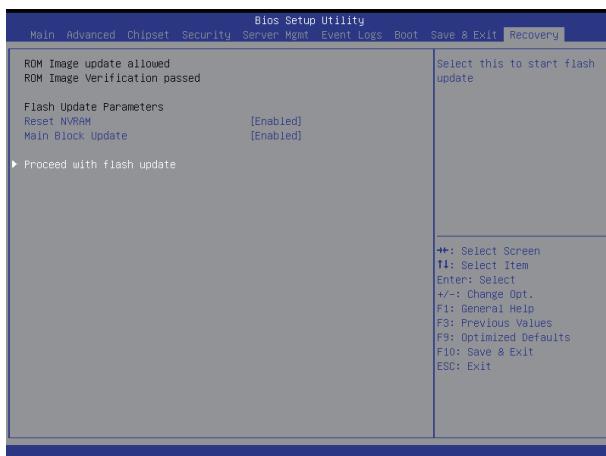
The system has an embedded recovery technique. In the event that the BIOS becomes corrupt the boot block can be used to restore the BIOS to a working state. To restore your BIOS, please follow the instructions listed below:

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.



Chapter 3 Appendix

3-1 Regulatory Statements

Regulatory Notices

This document must not be copied without our written permission, and the contents there of must not be imparted to a third party nor be used for any unauthorized purpose. Contravention will be prosecuted. We believe that the information contained herein was accurate in all respects at the time of printing. GIGABYTE cannot, however, assume any responsibility for errors or omissions in this text. Also note that the information in this document is subject to change without notice and should not be construed as a commitment by GIGABYTE.

Our Commitment to Preserving the Environment

In addition to high-efficiency performance, all GIGABYTE motherboards fulfill European Union regulations for RoHS (Restriction of Certain Hazardous Substances in Electrical and Electronic Equipment) and WEEE (Waste Electrical and Electronic Equipment) environmental directives, as well as most major worldwide safety requirements. To prevent releases of harmful substances into the environment and to maximize the use of our natural resources, GIGABYTE provides the following information on how you can responsibly recycle or reuse most of the materials in your "end of life" product.

Restriction of Hazardous Substances (RoHS) Directive Statement

GIGABYTE products have not intended to add and safe from hazardous substances (Cd, Pb, Hg, Cr+6, PBDE and PBB). The parts and components have been carefully selected to meet RoHS requirement. Moreover, we at GIGABYTE are continuing our efforts to develop products that do not use internationally banned toxic chemicals.

Waste Electrical & Electronic Equipment (WEEE) Directive Statement

GIGABYTE will fulfill the national laws as interpreted from the 2002/96/EC WEEE (Waste Electrical and Electronic Equipment) directive. The WEEE Directive specifies the treatment, collection, recycling and disposal of electric and electronic devices and their components. Under the Directive, used equipment must be marked, collected separately, and disposed of properly.

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.

Finally, we suggest that you practice other environmentally friendly actions by understanding and using the energy-saving features of this product (where applicable), recycling the inner and outer packaging (including shipping containers) this product was delivered in, and by disposing of or recycling used batteries properly. With your help, we can reduce the amount of natural resources needed to produce electrical and electronic equipment, minimize the use of landfills for the disposal of "end of life" products, and generally improve our quality of life by ensuring that potentially hazardous substances are not released into the environment and are disposed of properly.