# **MD30-RS0**

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

## User's Manual

Rev. 1001

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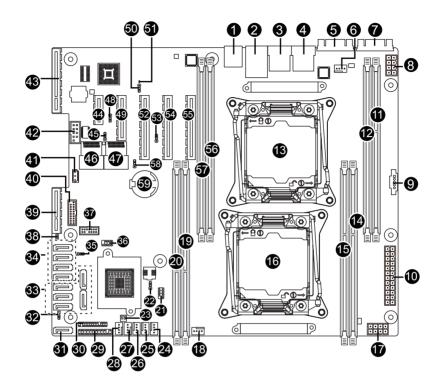
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- ✓ Motherboard
- ✓ Driver CD
- ✓ Two SATA 6Gb/s cables
- ✓ User's Manual
- √ I/O Shield

- 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.

## MD30-RS0 Motherboard Layout

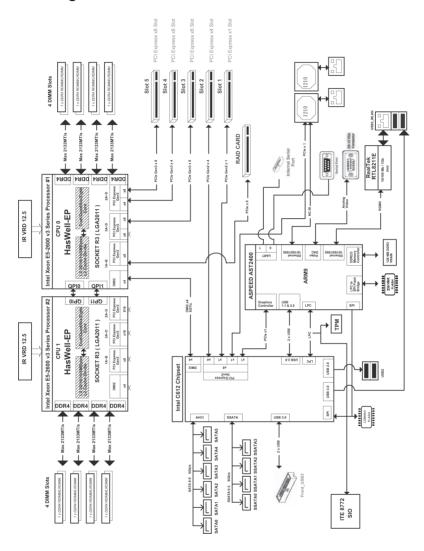


| Item | Code           | Description                                 |
|------|----------------|---|
| 1    | USB2_1         | USB 2.0 ports                               |
|      | 11000 111 1114 | BMC Management LAN port (top)/USB 3.0 ports |
| 2    | USB3_MLAN1     | (bottom)                                    |
| 3    | LAN1           | LAN port #1                                 |
| 4    | LAN2           | LAN port #2                                 |
| 5    | VGA1           | VGA port                                    |
| 6    | CPU1_FAN       | CPU1 fan connector (for Secondary CPU)      |
| 7    | COM1           | Serial port                                 |
| 8    | P12V_AUX2      | 8 pin power connector (for secondary CPU)   |
| 9    | PMBUS          | PMBus connector                             |
| 10   | ATX1           | 24 pin main power connector                 |
| 11   | DIMM_P1_G0     | Channel 3 slot (for secondary CPU)          |
| 12   | DIMM_P1_H0     | Channel 4 slot (for secondary CPU)          |
| 13   | CPU1           | Intel LGA2011 Socket R3 (Secondary CPU)     |
| 14   | DIMM_P0_A0     | Channel 1 slot (for primary CPU)            |
| 15   | DIMM_P0_B0     | Channel 2 slot (for primary CPU)            |
| 16   | CPU0           | Intel LGA2011 Socket R (Primary CPU)        |
| 17   | P12V_AUX1      | 8 pin power connector (for primary CPU)     |
| 18   | CPU0_FAN       | CPU0 fan connector (for Primary CPU)        |
| 19   | DIMM_P0_D0     | Channel 4 slot (for primary CPU)            |
| 20   | DIMM_P0_C0     | Channel 3 slot (for primary CPU)            |
| 21   | SATA_SGP       | SATA SGPIO header                           |
| 22   | ME_UPDATE      | ME update jumper                            |
| 23   | SW_RAID        | Software RAID Key jumper                    |
| 24   | SYS_FAN5       | System fan connector#5                      |
| 25   | SYS_FAN4       | System fan connector#4                      |
| 26   | SYS_FAN3       | System fan connector#3                      |
| 27   | SYS_FAN2       | System fan connector#2                      |
| 28   | SYS_FAN1       | System fan connector#1                      |
| 29   | FP_1           | Front panel header                          |
| 30   | BP_1           | HDD back plane board header                 |
| 31   | SATA2          | SATA3 6Gb/s connector                       |
| 32   | SATA_DOM0      | SATA port 0 DOM support jumper              |
| 33   | SATA0/1/3/4/5  | SATA3 6Gb/s connectors                      |
| 34   | SSATA0/1/2/3   | sSATA3 6Gb/s connectors                     |
| 35   | PCH_ME         | ME recovery jumper                          |
| 36   | SSATA_SGP      | sSATA SGPIO header                          |
| 37   | TPM            | TPM module connector                        |
| 38   | CASE_OPEN      | Case open intrusion alert header            |
| 39   | RAID_SLOT2     | PCI Express x4 slot (Proprietary slot)      |
| 40   | F_USB3         | USB 3.0 header                              |

| 41 | IPMB       | IPMB connectot                                  |
|----|------------|---|
| 42 | COM2       | Serial port cable connector                     |
| 43 | RAID_SLOT1 | PCI Express x8 slot                             |
| 44 | PCIE_1     | PCI Express x1 slot                             |
| 45 | BIOS_PWD   | Clearing Supervisor Password jumper             |
| 46 | MINI_CN1   | Mini-SAS cable connector#1 supports SATA3 6Gb/s |
| 47 | MINI_CN2   | Mini-SAS cable connector#2 supports SATA3 6Gb/s |
| 48 | BMC_FRB    | Force to Stop FRB Timer jumper                  |
| 49 | PCIE_2     | PCI Express x4 slot                             |
| 50 | BIOS_RVCR  | BIOS recovery jumper                            |
| 51 | LED_BMC    | BMC firmware readiness LED                      |
| 52 | PCIE_3     | PCI Express x8 slot                             |
| 53 | S3_MASK    | S3 Power On Select jumper                       |
| 54 | PCIE_4     | PCI Express x8 slot                             |
| 55 | PCIE_5     | PCI Express x8 slot                             |
| 56 | DIMM_P1_F0 | Channel 2 slot (for secondary CPU)              |
| 57 | DIMM_P1_E0 | Channel 1 slot (for secondary CPU)              |
| 58 | CLR_CMOS   | Clear CMOS jumper                               |
| 59 | BAT        | Battery socket                                  |

**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 32 for SATA\_DOM0 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

| <b>€</b> CPU        | <ul> <li>Support for Intel® Xeon® E5-2600 V3 series processors in the LGA2011 package</li> <li>L3 cache varies with CPU</li> <li>Supports Dual QuickPath Interconnect up to 9.6GT/s</li> <li>Enhanced Intel SpeedStep Technology (EIST)</li> <li>Support Intel Virtualization Technology (VT)</li> </ul>                                   |
|---------------------|--|
| Chipset             | ◆ Intel® C612 Express (Wellsburg) Chipset  |
| Memory              | 8 x 1.2V DDR4 DIMM sockets supporting up to 256GB RDIMM of system memory     8 x 1.2V DDR4 DIMM sockets supporting up to 512GB LRDIMM of system memory   |
|                     | Four channel memory architecture     DDD4.2122MU = DDDMM memory modules  |
|                     | <ul> <li>DDR4 2133MHz RDIMM memory modules</li> <li>DDR4 2133MHz LR-DIMM memory modules</li> </ul>   |
|                     | Support for ECC RDIMM/LRDIMM memory modules  |
| LAN LAN             | 2 x Intel® I210 supports GbE LAN ports     1 x Management LAN 10/100/1000Mpbs LAN port   |
| Expansion Slots     | <ul> <li>2 x PCI Express x8 slot, running at x8 (Gen3/PCIE_3/PCIE_5)</li> <li>1 x PCI Express x8 slot, running at x4 (Gen3/PCIE_4)</li> <li>1 x PCI Express x4 slot, running at x4 (Gen2/PCIE_2)</li> </ul>  |
|                     | 1 x PCI Express x1 slot, running at x1 (Gen2/PCIE_1)   |
|                     | 1 x PCI Express mezzanine type T, running at x8 (Gen3/RAID_SLOT1&2)  |
| Onboard<br>Graphics | ◆ ASPEED® AST2400 supports 16MB DDR3 VRAM  |
| Storage Interface   | <ul> <li>Intel® C612 Express controller</li> <li>10 x SATA3 6Gb/s connectors (SATA0/SATA1/SATA2/SATA3/SATA4/SATA5/SSATA0/SSATA1/SSATA2/SSATA3)</li> <li>8 x SAS 6Gb/s connectors (SAS0/SAS1/SAS2/SAS3/SAS4/SAS5/SAS6/SAS7; Activating SAS ports with Gigabyte extension card</li> <li>Support for Intel RSTe SATA RAID 0/1/5/10</li> </ul> |
| USB                 | Up to 4 USB 3.0 ports (2 on the back panel, 2 additional ports via the USB brackets connected to the internal USB headers)     2 x USB 2.0 ports (back panel)  |

| Internal       | 1 x 24-pin ATX main power connector  |
|----------------|--|
| Connectors     | 2 x 8-pin ATX 12V power connector  |
|                | 2 x Mini-SAS 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 borad header  |
|                | • 1 x USB 3.0 header   |
|                | 1 x TPM module connector   |
|                | 1 x Serial port connector  |
|                | 2 x SATA SPGIO headers   |
|                | 1 x Software RAID key connector  |
|                | 1 x IPMB connector   |
| Rear Panel I/O | • 2 x USB 3.0 ports  |
|                | • 2 x USB 2.0 ports  |
|                | 3 x RJ-45 ports (1 x 10/100/1000 Mbps dedicated management LAN port)   |
|                | • 1 x COM port   |
|                | • 1 x VGA port   |
| I/O Controller | ASPEED® AST2400 BMC chip   |
| Hardware       | System voltage detection   |
| Monitor        | CPU/System temperature detection   |
|                | CPU/System fan speed detection   |
|                | CPU/System fan speed control   |
|                | <ul> <li>Whether the CPU/system fan speed control function is supported will depend on<br/>the CPU/system cooler you install.</li> </ul> |
| BIOS           | 1 x 128 Mbit flash   |
|                | AMI BIOS   |
| Form Factor    | ATX Form Factor; 12 inch x 10 inch   |

<sup>\*</sup> 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

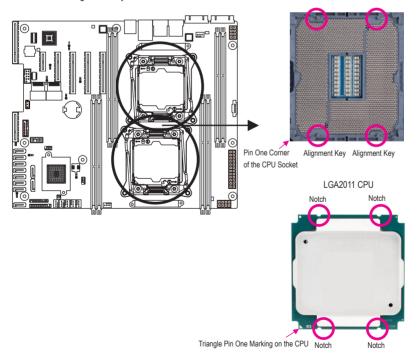


Read the following guidelines before you begin to install the CPU:

- 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

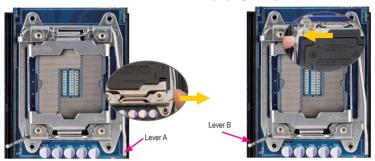
A. Locate the alignment keys on the motherboard CPU socket and the notches on the CPU.



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 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 2:

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



#### 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 Finally, secure lever A under its retention tab to load plate. Then secure lever B under its retention tab. complete the installation of the CPU. 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:

## 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 Eight 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.

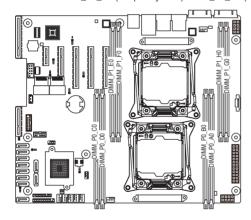
The four DDR4 memory sockets are divided into four channels each channel has two memory sockets as following:

Channel 1: DIMM\_P0\_A0 (For pimary CPU)/DIMM\_P1\_E0 (For secondary CPU)

Channel 2: DIMM\_P0\_B0 (For pimary CPU)/DIMM\_P1\_F0 (For secondary CPU)

Channel 3: DIMM\_P0\_C0 (For pimary CPU)/DIMM\_P1\_G0 (For secondary CPU)

Channel 4: DIMM P0 D0 (For pimary CPU)/DIMM P1 H0 (For secondary CPU)



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 DDR4 memory module is installed.
- 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 DDR4 DIMMs on this motherboard.

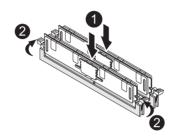
#### Installation Step:

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.

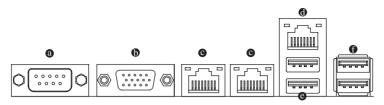


## 1-4-3 DIMM Population Table

Two Slots Channel RDIMM Population Configuration Within a Channel

| Type   | Ranks Per<br>Type DIMM and<br>Data Width | Speed (MT/s);<br>Slot Per Channel (SPC) and DIMM Per Channel (DPC) |                                   |      |
|--------|--|--|-----------------------------------|------|
|        |  | 1 Slot Per Channel   | Slot Per Channel 2 Slot Per Chann |      |
|        |  | 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



#### Serial Port

Connects to serial-based mouse or data processing devices.

#### Video Port

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

### RJ-45 LAN Ports (Gigabit Ethernet LAN Ports)

The Gigabit Ethernet LAN port provides Internet connection at up to 1 Gbps data rate. The following describes the states of the LAN port LEDs.

#### KVM Server Management 10/100/1000 MbpsLAN 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.

#### 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.

#### USB 2.0 Port

The USB port supports the USB 2.0 specification. Use this port for USB devices such as a USB keyboard/mouse, USB printer, USB flash drive and etc.



| Speed LED: |                    |  |  |
|------------|--------------------|--|--|
| State      | Description        |  |  |
| Yellow On  | 1 Gbps data rate   |  |  |
| Green On   | 100 Mbps data rate |  |  |
| Off        | 10 Mbps data rate  |  |  |

| LITIN/ACTIVITY LLD. |   |  |  |  |
|---------------------|---|--|--|--|
| State               | Description                                 |  |  |  |
| On                  | Link between system and network or no       |  |  |  |
|                     | access                                      |  |  |  |
| Blinking            | Data transmission or receiving is occurring |  |  |  |

No data transmission or receiving is occurring

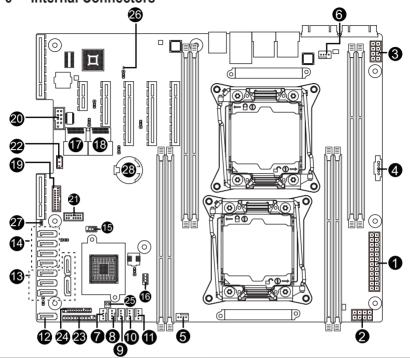


When removing the cable connected to a back panel connector, first remove the cable from your
device and then remove it from the motherboard.

Off

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                        | 15) | SSATA_SGP |
|-----|-----------------------------|-----|-----------|
| 2)  | P12V_AUX1                   | 16) | SATA_SGP  |
| 3)  | P12V_AUX2                   | 17) | MINI_CN1  |
| 4)  | PMBUS                       | 18) | MINI_CN2  |
| 5)  | CPU0_FAN (for primary CPU)  | 19) | F_USB3    |
| 6)  | CPU1_FAN (for seconary CPU) | 20) | COM2      |
| 7)  | SYS_FAN1 (System Fan)       | 21) | TPM       |
| 8)  | SYS_FAN2 (System Fan)       | 22) | IPMB      |
| 9)  | SYS_FAN3 (System Fan)       | 23) | FP_1      |
| 10) | SYS_FAN4 (System Fan)       | 24) | BP_1      |
| 11) | SYS_FAN5 (System Fan)       | 25) | SW_RAID   |
| 12) | SATA2                       | 26) | LED_BMC   |
| 13) | SATA0/1/3/4/5               | 27) | CASE_OPEN |
| 14) | SSATA0/SSATA1/SSATA2/SSATA3 | 28) | 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.

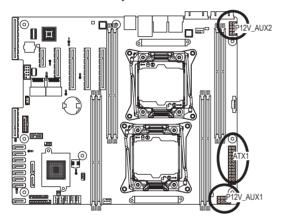
#### 1/2/3) ATX1/P12V AUX1/P12V AUX2

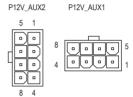
#### (2x4 12V Power Connector and 2x12 Main Power Connector)

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.



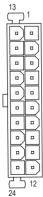
To meet expansion requirements, it is recommended that a power supply that can withstand high power consumption be used (500W or greater). If a power supply is used that does not provide the required power, the result can lead to an unstable or unbootable system.





| Pin No.   | Definition |
|-----------|------------|
| PIII INO. | Delinition |
| 1         | GND        |
| 2         | GND        |
| 3         | GND        |
| 4         | GND        |
| 5         | +12V       |
| 6         | +12V       |
| 7         | +12V       |
| 8         | +12V       |

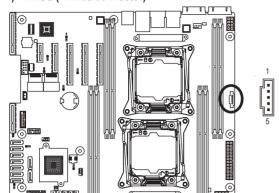
| 1 | ٦  | ٠, | 4   |
|---|----|----|-----|
| , | ٦ı | ^  | . 1 |



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        |

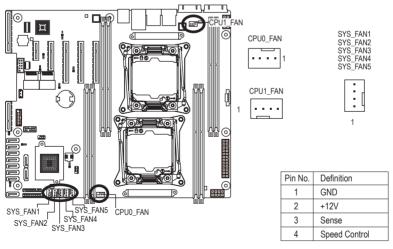
#### 4) PMBUS (PMBus connector)



| 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 five 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.





- 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.

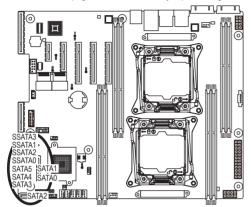
#### 12/13) SATA0/SATA1/SATA2/SATA3/SATA4/SATA5

(SATA 6Gb/s Connectors/SATA0 Support SATA DOM Function)

#### 14) SSATA0/SSATA1/SSATA2/SSATA3 (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.

Please see page 34 for SATA DOM jumper setting.





| Normal Mode: |            |   | SATA DON | I Mode:    |
|--------------|------------|---|----------|------------|
| Pin No.      | Definition |   | Pin No.  | Definition |
| 1            | GND        |   | 1        | GND        |
| 2            | TXP        |   | 2        | TXP        |
| 3            | TXN        |   | 3        | TXN        |
| 4            | GND        |   | 4        | GND        |
| 5            | RXN        |   | 5        | RXN        |
| 6            | RXP        |   | 6        | RXP        |
| 7            | OND        | 1 | -        | DC) /      |

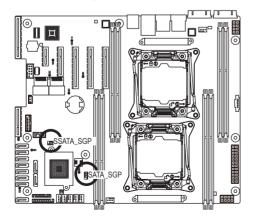


- A RAID 0 or RAID 1 configuration requires at least two hard drives. If more than two hard drives are configured, the total number of hard drives must be an even number.
- A RAID 10 configuration requires four hard drives.

(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.

#### 15/16) SSATA SGP/SATA SGP (SATA 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.

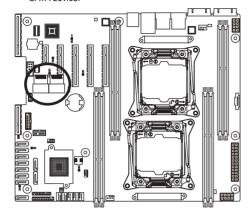




| Pin No. | Definition |
|---------|------------|
| 1       | DATAIN     |
| 2       | No Pin     |
| 3       | DATAOUT    |
| 4       | GND        |
| 5       | GND        |
| 6       | LOAD       |
| 7       | NC         |
| 8       | CLOCK      |

## 17/18) MINI\_CN1/MINI\_CN2 (Mini SAS cable connectors)

The Mini SAS connectors conform to SATA 6Gb/s standard. Each Mini SAS connector supports four SATA device.



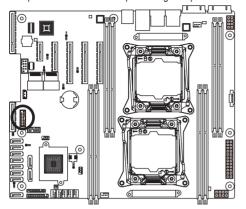


| Pin No. | Definition | Pin No. | Definition |
|---------|------------|---------|------------|
|         |            |         |            |
| A1      | GND        | B1      | GND        |
| A2      | RX0+       | B2      | TX0+       |
| A3      | RX0-       | B3      | TX0-       |
| A4      | GND        | B4      | GND        |
| A5      | RX1+       | B5      | TX1+       |
| A6      | RX1-       | В6      | TX1-       |
| A7      | GND        | В7      | GND        |
| A8      | SIB7       | B8      | SIB0       |
| A9      | SIB3       | В9      | SIB1       |
| A10     | SIB4       | B10     | SIB2       |
| A11     | SIB5       | B11     | SIB6       |
| A12     | GND        | B12     | GND        |
| A13     | RX2+       | B13     | TX2+       |
| A14     | RX2-       | B14     | TX2-       |
| A15     | GND        | B15     | GND        |
| A16     | RX3+       | B16     | TX3+       |
| A17     | RX3-       | B17     | TX3-       |
| A18     | GND        | A18     | GND        |

### 19) 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.

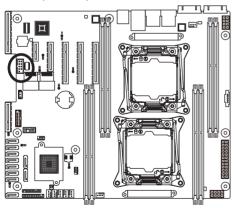
201

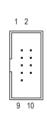


| Pin No. | Definition    |
|---------|---------------|
| 1       | Power         |
| 2       | IntA_P1_SSRX- |
| 3       | IntA_P1_SSRX+ |
| 4       | GND           |
| 5       | IntA_P1_SSTX- |
| 6       | IntA_P1_SSTX+ |
| 7       | GND           |
| 8       | IntA_P1_D-    |
| 9       | IntA_P1_D+    |
| 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        |

## 20) COM2 (Serial Port Header)

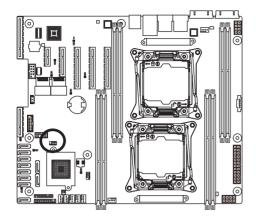
The COM header provides one serial port via an optional COM port cable. For purchasing the optional COM port cable, please contact the local dealer.





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

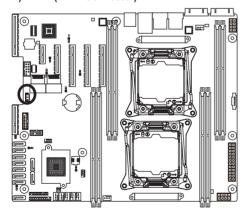
## 21) TPM (TPM Module Connector)





| 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         |

## 22) IPMB (IPMB Connector)

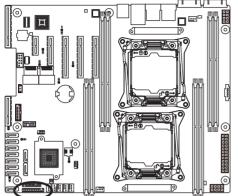




| Pin No. | Definition |
|---------|------------|
| 1       | Clock      |
| 2       | GND        |
| 3       | Data       |

#### 23) 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.

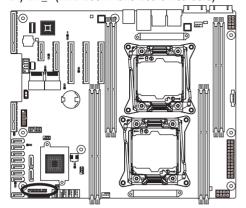




|         | iii           |                            |
|---------|---------------|----------------------------|
| Pin No. | Signal Name   | Definition                 |
| 1       | PWR_LED+      | Power LED Anode            |
| 2       | 5VSB          | Front Panel Power          |
| 3       | KEY           | Key                        |
| 4       | ID_LED+       | System ID LED Anode        |
| 5       | PWR_LED-      | Power LED Cathode          |
| 6       | ID_LED-       | System ID LED Cathode      |
| 7       | HDD_LED+      | HDD Activity LED Anode     |
| 8       | SYS_STATUS+   | System Fault LED Anode     |
| 9       | HDD_LED-      | HDD Activity LED Cathode   |
| 10      | SYS_STATUS-   | System Fault LED Cathode   |
| 11      | PWR_BTN       | Power Switch               |
| 12      | LAN1_LED+     | NIC#1 Activity LED Anode   |
| 13      | PWR_BTN (GND) | Power Switch (GND)         |
| 14      | LAN1_LED-     | NIC#1 Activity LED Cathode |
| 15      | RST_BTN       | Reset Switch               |
| 16      | SDA           | SMBus SDA                  |
| 17      | RST_BTN (GND) | Reset Switch (GND)         |
| 18      | SCL           | SMBus SCL                  |
| 19      | ID_BTN        | System ID Switch           |
| 20      | CASE_OPEN     | Chassis Intrusion          |
| 21      | ID_BTN (GND)  | System ID Switch (GND)     |
| 22      | LAN2_LED+     | NIC#2 Activity LED Anode   |
| 23      | NMI_BTN       | NMI to CPU Switch          |
| 24      | LAN2_LED-     | NIC#2 Activity LED 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.

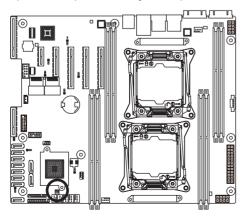
## 24) BP\_1 (HDD Back Plane Board Hearders)



## 

| 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       | Rreset      |
| 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         |

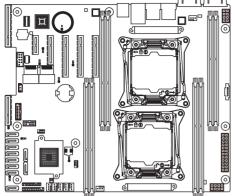
## 25) SW\_RAID (Intel RAID Key Header)





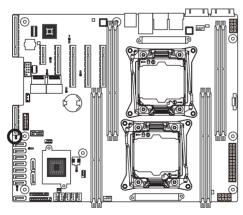
| Pin No. | Definition |
|---------|------------|
| 1       | KEY        |
| 2       | GND        |

## 26) LED\_BMC (BMC Firmware Readiness LED)



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

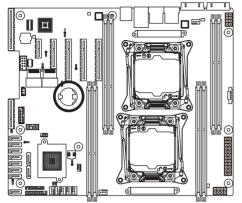
## 27) CASE\_OPEN (Case open intrusion alert header)



- Open: Normal operation.
- Closed: Active chassis intrustion alert.

#### 28) 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.

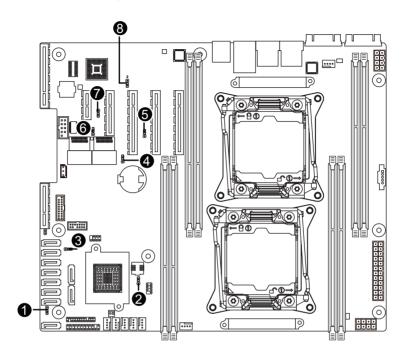






- Always turn off your computer and unplug the power cord before replacing the battery.
- · Replace the battery with an equivalent one. Danger of explosion if the battery is replaced with an incorrect model.
- Contact the place of purchase or local dealer if you are not able to replace the battery by 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) | SATA_DOM0 | 5) | S3_MASK   |
|----|-----------|----|-----------|
| 2) | ME_UPDATE | 6) | BIOS_PWD  |
| 3) | PCH_ME    | 7) | BMC_FRB   |
| 4) | CLR_CMOS  | 8) | BIOS_RVCR |

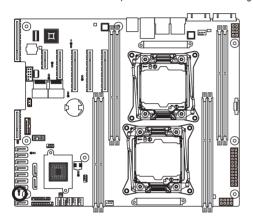
### 1) SATA\_DOM0 (SATA port 0 Jumper)



#### 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.

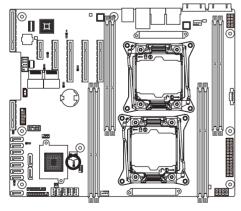
Please refer to the pin definition table in the following.





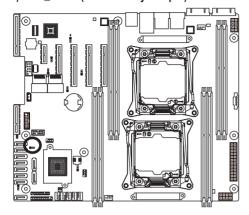
| Pin No. | Definition |
|---------|------------|
| 1       | P5V        |
| 2       | SATA0 Pin7 |
| 3       | GND        |

## 2) ME\_UPDATE (ME Update Jumper)



- 1-2 Close: Normal operation (Default setting)
- 2-3 Close: ME recovery mode.

#### 3) ME\_RCVR (ME Recovery Jumper)

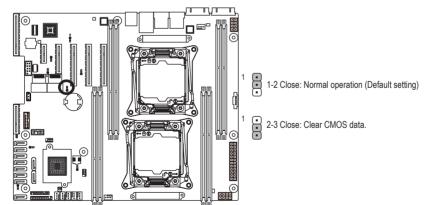


1-2 Close: Normal operation.(Default setting)

2-3 Close: ME recovery mode.

#### 4) CLR\_CMOS (Clearing CMOS Jumper)

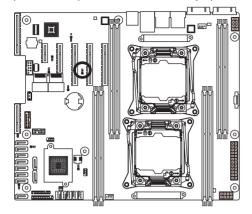
Use this jumper to clear the CMOS values (e.g. date information and BIOS configurations) and reset the CMOS values to factory defaults. To clear the CMOS values, place a jumper cap on the two pins to temporarily short the two pins or use a metal object like a screwdriver to touch the two pins for a few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





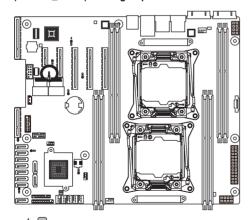
- Always turn off your computer and unplug the power cord from the power outlet before clearing the CMOS values.
- After clearing the CMOS values and before turning on your computer, be sure to remove the jumper cap from the jumper. Failure to do so may cause damage to the motherboard.

## 5) S3\_MASK (S3 Power On Select Jumper)



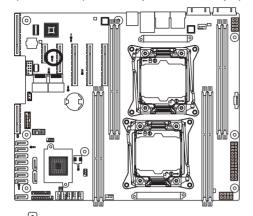
- 1-2 Close: Stop an initial power on when BMC is not ready.
- 2-3 Close: Keep initial power on. (Default setting)

## 6) BIOS\_PWD (Clearing Supervisor Password Jumper)



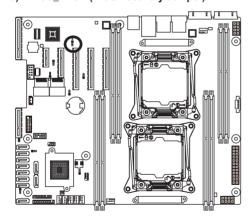
- 1 1-2 Close: Normal operation. (Default setting)
- 1 2-3 Close: Skip supervisor password.

## 7) BMC\_FRB (Force to Stop FRB Timer Jumper)



- 1-2 Close: Normal operation. (Default setting)
- 2-3 Close: Force to Stop FRB Timer.

## 8) BIOS\_RVCR (BIOS Recovery Jumper)



- 1-2 Close: Normal operation. (Default setting)
- 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></enter> | Execute command or enter the submenu                              |
| <esc></esc>     | Main Menu: Exit the BIOS Setup program                            |
|                 | Submenus: Exit current submenu                                    |
| <f1></f1>       | Show descriptions of general help                                 |
| <f3></f3>       | Restore the previous BIOS settings for the current submenus       |
| <f9></f9>       | Load the Optimized BIOS default settings for the current submenus |
| <f10></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

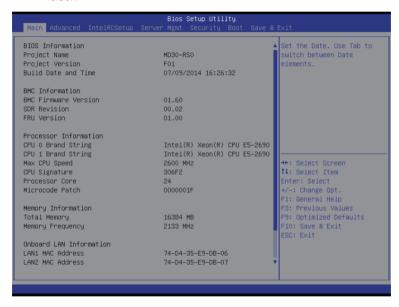
The on-screen description of a highlighted setup option is displayed on the bottom line of the Main Menu.

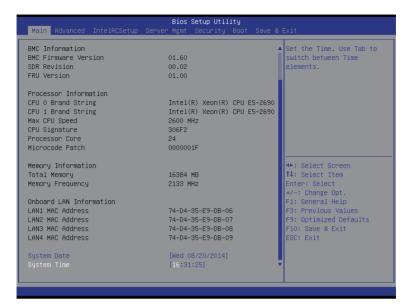
#### Submenu Help

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.

#### Porject 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 Reversion

Display the SDR revision information.

#### → FRU Version

Display the FRU version information.

#### Processor Information

# 

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/LAN3/LAN4 MAC Address

Display LAN1/LAN2/LAN/LAN4 MAC address information.

# 

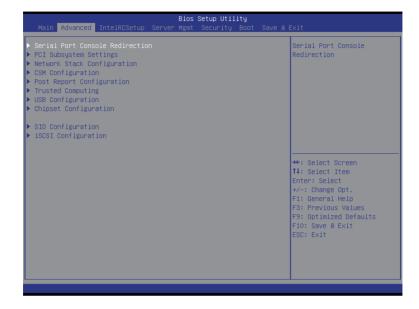
Set the date following the weekday-month-day- year format.

# → System Time

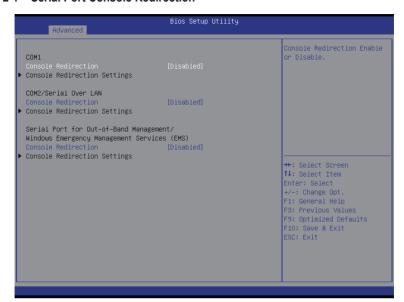
Set the system time following the hour-minute- second format.

# 2-2 Advanced Menu

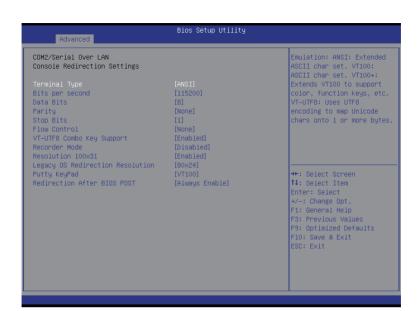
The Advanced menu display submenu options for configuring the function of various hardware components. Select a submenu item, then press Enter to access the related submenu screen.



# 2-2-1 Serial Port Console Redirection









# COM1/COM2/Serial Over AN Console Redirection Settings

#### 

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: 9600/19200/57600/115200. 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 bi 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.

# □ 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.

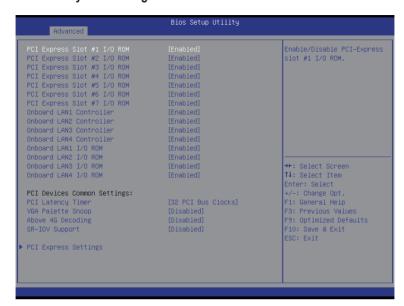
Options available: Always Enable/Boot Loader. Default setting is **Always Enable**.

# Out-of-Bnad Mgmt Port

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

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

# 2-2-2 PCI Subsystem Settings



#### → PCI Express Slot #1/#2/#3/#4/#5/#6#7 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/#3/#4 Controller

Enable/Disable onboard LAN devices

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

## Onboard LAN #1/#2/#3/#4 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 Tegisters 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

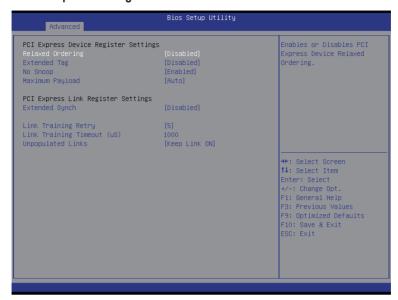
If system has SR-IOV capable PCIe Devices, this option enables or disables Single Root IO Virtualization Support.

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 Playload

Set maximum playload 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 wil take to retrain the link if previous training attempt was unsuccessful. Press <+> / <-> keys to increase or decrease the desired values.

# ☐ Link Training Timeout (us)

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

# Unpopulated Links

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

Options available: Keep Link ON/ Disable 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<sup>(Note)</sup>

Enable/Disable Ipv4 PXE feature.

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

# → Ipv6 PXE Support<sup>(Note)</sup>

Enable/Disable Ipv6 PXE feature.

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

# → PXE boot wait time<sup>(Note)</sup>

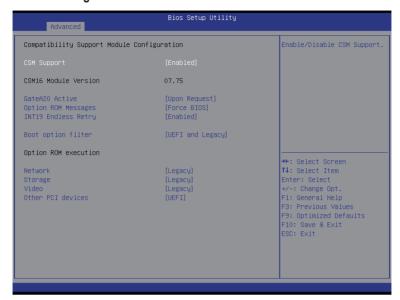
Press <+> / <-> keys to increase or decrease the desired values.

# → Media detect time<sup>(Note)</sup>

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

**BIOS Setup** 

# 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.

#### 

Display CSM Module version information.

# → Gate20 Active

Upon Reguest: 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/Legacy. Default setting is Legacy.

# → Storage

Controls the execution UEFI and Legacy Storage OpROM.

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

#### → Video

Controls the execution UEFI and Legacy Video OpROM.

Options available: Do not launch/UEFI/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
- → Post Error Message

Enable/Disable Info Error Message support.

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

# 2-2-6 Trusted Computing



- ☐ Configuration

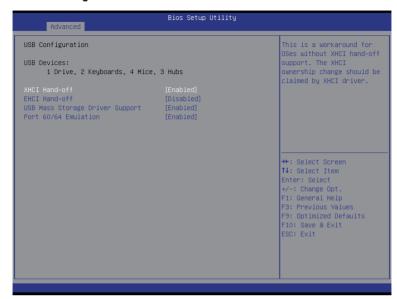
Select Enabled to activate TPM support feature.

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.

#### 

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

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

#### → EHCl Hand-off

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

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

# USB Mass Storage Driver Support<sup>(Note)</sup>

Enable/Disable USB Mass Storage Driver Support.

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

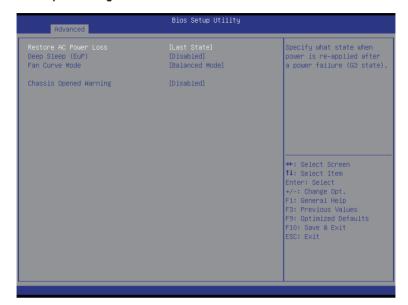
#### → Port 60/64 Emulation

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 ystem fan curve mode

Options available: Full Dpeed Mode/Performance ModeBalanced mode/Energy Saving Mode.

Default setting is **Performance Mode**.

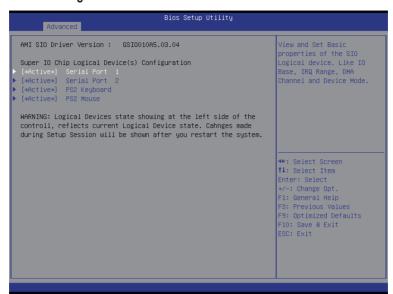
#### Chassis Opened Warning

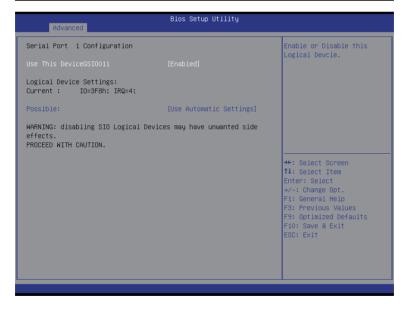
Enable/Disable Chassis intrusion alter funtion.

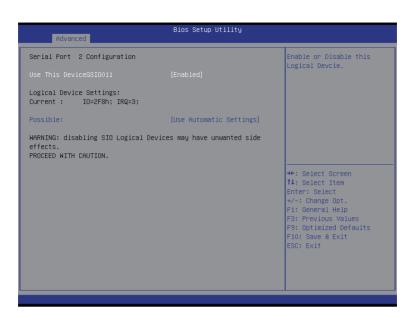
Options available: Enabled/Disabled. Default setting is Disabled.

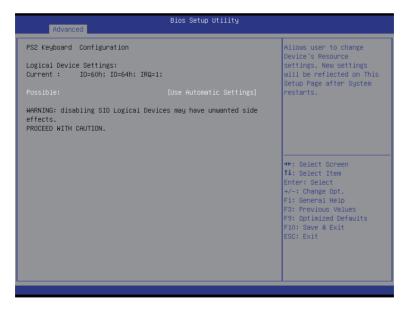
(Note) When the power policy is controlled by BMC, please wait for 15-20 seconds for BMC to save the last power state.

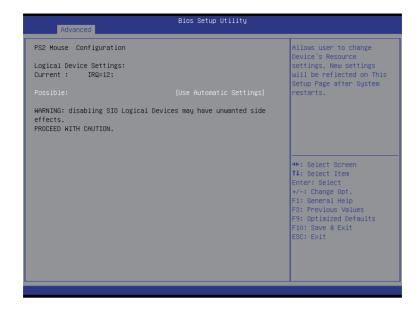
# 2-9 SIO Configuration











#### → 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 confuguration of advanced items.

□ [\*Active\*] PS2 Keyboard

Press [Enter] for confuguration of advanced items.

□ [\*Active\*] PS2 Mouse

Press [Enter] for confuguration 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 addressand IRQ.

#### → Possible:

Configure Serial Port 1 base I/O addressand IRQ.

Option available:

Use Automatic Settings

IO=3F8h; IRQ=4; 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 addressand IRQ.

#### → Possible:

Configure Serial Port 2 base I/O addressand 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.

#### → PS2 Keyboard Configuration

#### □ Logical Device Settings:

#### ☐ Current:

Display the PS2 keyboard base I/O addressand IRQ.

#### → Possible:

Configure PS2 keyboard base I/O addressand IRQ.

Option available: Use Automatic Settings/IO=60h; IO=64h; IRQ=1.

Default setting is Use Automatic Settings.

#### PS2 Mouse Configuration

# Logical Device Settings:

#### → Current:

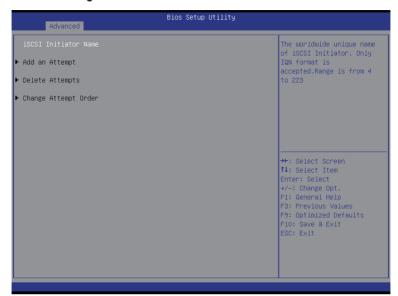
Display the PS2 mouse base I/O addressand IRQ.

#### → Possible:

Configure PS2 nouse base I/O addressand IRQ.

Option available: Use Automatic Settings/IRQ=12;. Default setting is **Use Automatic Settings**.

# 2-2-10 iSCSI Configuration



- Add an Attempts

Press [Enter] for configuration of advanced items.

Delete Attempts

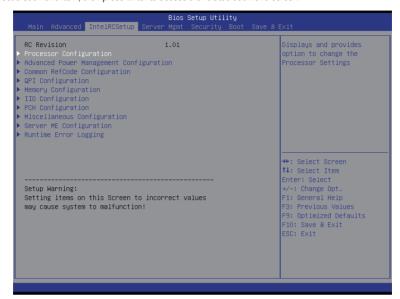
Press [Enter] for configuration of advanced items.

○ Change Attempt Order

Press [Enter] for configuration of advanced items.

# 2-3 Intel RC Setup Menu

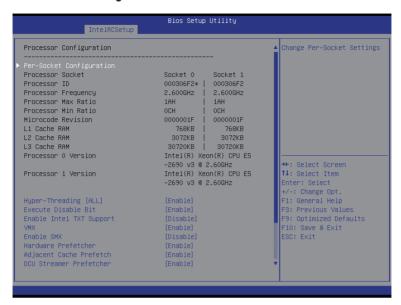
Intel RC Setup menu displays submenu options for configuring the function of North Bridge and South Bridge. Select a submenu item, then press Enter to access the related submenu screen.



#### → RC Revision

Display Intel RC version information.

# 2-3-1 Processor Configuration



| Processor Max Ratio       | 1AH   1AH               | ▲ Enable/disable AES-NI |
|---------------------------|-------------------------|-------------------------|
| Processor Min Ratio       | och   och               | support                 |
| Microcode Revision        | 0000001F   0000001F     |                         |
| _1 Cache RAM              | 768KB   768KB           |                         |
| _2 Cache RAM              | 3072KB   3072KB         |                         |
| _3 Cache RAM              | 30720KB   30720KB       |                         |
| Processor O Version       | Intel(R) Xeon(R) CPU E5 |                         |
|                           | -2690 v3 @ 2.60GHz      |                         |
| Processor 1 Version       | Intel(R) Xeon(R) CPU E5 |                         |
|                           | -2690 v3 @ 2.60GHz      |                         |
| Hyper–Threading [ALL]     | [Enable]                |                         |
| Execute Disable Bit       | [Enable]                |                         |
| Enable Intel TXT Support  | [Disable]               | →+: Select Screen       |
| VMX                       | [Enable]                | ↑↓: Select Item         |
| Enable SMX                | [Disable]               | Enter: Select           |
| Hardware Prefetcher       | [Enable]                | +/-: Change Opt.        |
| Adjacent Cache Prefetch   | [Enable]                | F1: General Help        |
| DCU Streamer Prefetcher   | [Enable]                | F3: Previous Values     |
| CU IP Prefetcher          | [Enable]                | F9: Optimized Defaults  |
| CU Mode                   | [32KB 8Way Without ECC] | F10: Save & Exit        |
| Direct Cache Access (DCA) | [Auto]                  | ESC: Exit               |
| OCA Prefetch Delay        | [32]                    |                         |
| K2APIC                    | [Disable]               |                         |
|                           |                         | ▼                       |

### 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.

#### 

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/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

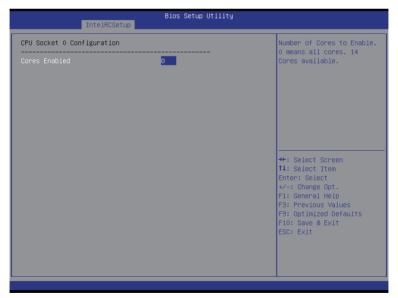
Options available: Enabled/Disabled. Default setting is **Disabled**.

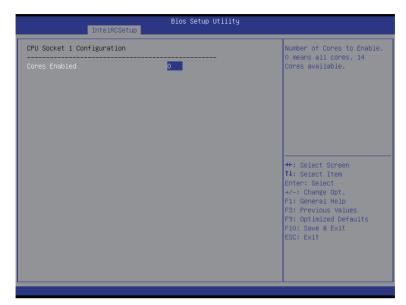
# → AES-NI

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







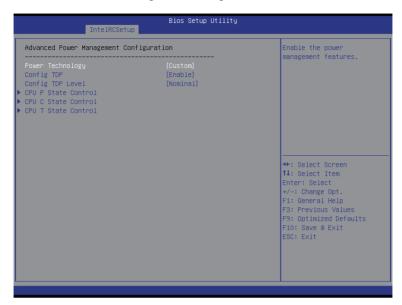
# □ CPU Socket 0/1 Configuration

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 **Disabled**.

□ Config TDP Level<sup>(Note)</sup>

Options available: Nominal. Default setting is Nominal.

→ CPU P State Control<sup>(Note)</sup>

Press [Enter] for configuration of advanced items.

→ CPU C State Control<sup>(Note)</sup>

Press [Enter] for configuration of advanced items.

→ CPU T State Control<sup>(Note)</sup>

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

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

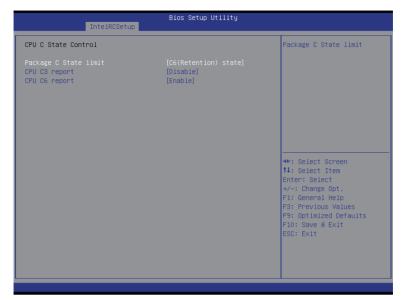
Options available: Enabled/Disabled. Default setting is **Enabled**.

#### → P-state coordination

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

In SW\_ALL mode, the OS Power Manager is responsible for coordinating the P-state among logical processors with dependencies and must initiate the transition on all of those Logical Processors. In SW\_ANY mode, the OS Power Manager is responsible for coordinating the P-state among logical processors with dependencies and may initiate the transition on any of those Logical Processors. Options available: HW\_ALL/SW\_ALL/SW\_ANY. Default setting is HW\_ALL.

# 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**.

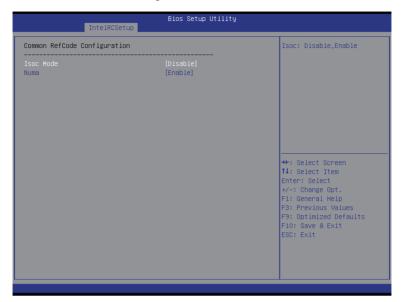
# 2-3-2-3 CPU T State Control



#### → ACPI T-States

Enable/Disable CPU throttling by OS. Thorttling reduces power comsumption. Options available: Enabled/Disabled. Default setting is **Enabled**.

# 2-3-3 Common RefCode Configuration

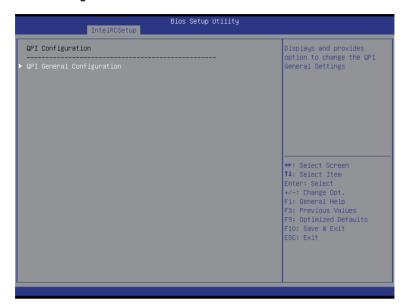


- → Isoc Mode

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

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.

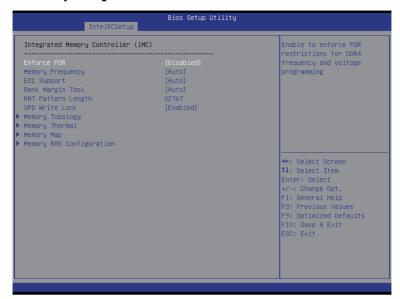
### □ Link Speed Mode

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.

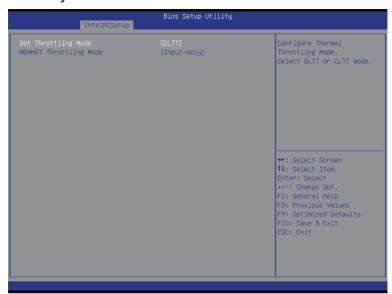
Press [Enter] for configuration of advanced items.

Press [Enter] for configuration of advanced items.

# 2-3-5-1 Memory Topology

| Bios Setup Utility IntelRCSetup   |  |
|---|--|
| DIMM_PO_AO: 2133MT/S Samsung DRx4 16GB RDIMM DIMM_PO_BO: 2133MT/S Samsung DRx4 16GB RDIMM DIMM_PO_DO: 2133MT/S Samsung DRx4 16GB RDIMM DIMM_PO_DO: 2133MT/S Samsung DRx4 16GB RDIMM DIMM_P1_EO: 2133MT/S Samsung DRx4 16GB RDIMM DIMM_P1_FO: 2133MT/S Samsung DRx4 16GB RDIMM DIMM_P1_GO: 2133MT/S Samsung DRx4 16GB RDIMM DIMM_P1_HO: 2133MT/S Samsung DRx4 16GB RDIMM DIMM_P1_HO: 2133MT/S Samsung DRx4 16GB RDIMM  ##: Select Screen T1: Select Item Enter: Select +/-: Change Opt. F1: General Help F3: Previous Values F9: Optimized Defaults F10: Sawe & Exit ESC: Exit |  |

# 2-3-5-2 Memory Thermal



# ○ Set Throttling

Configure Thermal Throttling Mode. Select OLTT or CLTT mode. Options available: Disabled/OLTT/CLTT. Default setting is **CLTT**.

# 

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

# 2-3-5-3 Memory Map



### 

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.

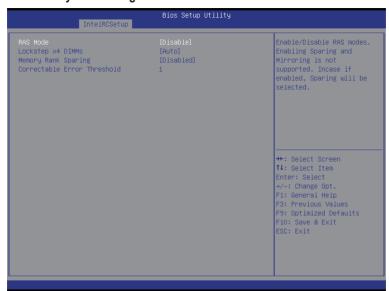
### Channel Interleaving

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.

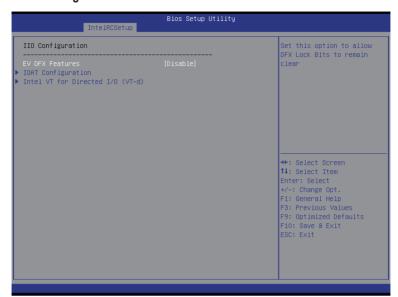
### Memory Rank Sparing

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

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

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

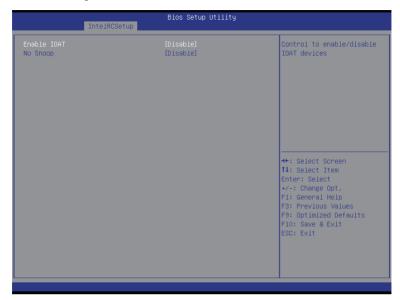
→ IOAT Configuration

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

### 

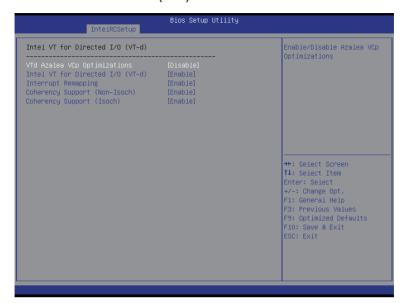
Control to enable/disable IOAT (Intel I/O Acceleration Technology) device. Options available: Enabled/Disabled. Default setting is **Disabled**.

### → 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.

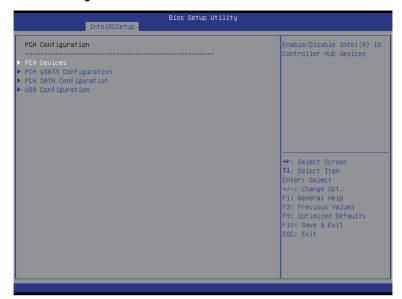
Options available: Enabled/Disabled. Default setting is Enabled.

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.

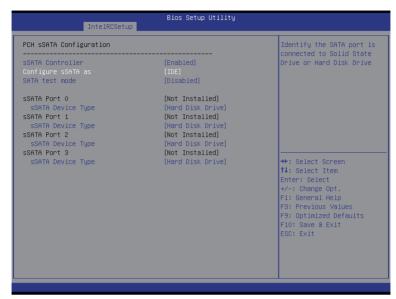
Options available: Enabled/Disabled. Default setting is Disabled.

# 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

Coonfigure on chip SATA type.

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

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

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

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

#### 

Enable/Disable SATA Test Mode.

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

## → SATA Mode options(Note1)

Press [Enter] for configuration of advanced items.

### ⇒ sSATA RSTe Boot Info<sup>(Note2)</sup>

Enable/Disable SATA RSTe Boot Information.

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

(Note1) Only Supported When HDD is in AHCI or RAID Mode.

(Note2) Only Supported When HDD is in RAID Mode.

### → Support Aggressive Link Power Mana<sup>(Note)</sup>

Enable PCH to aggressively enter link power state.

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

#### 

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.

#### 

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.

### 

Display Hot-Plug supported information.

### → Spin Up Device (for Port 0/1/2/3)<sup>(Note)</sup>

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**.

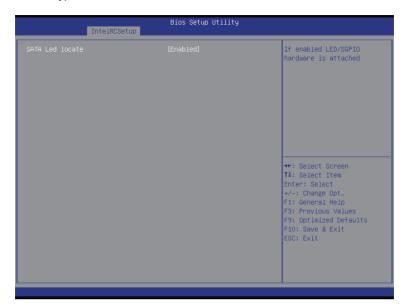
### 

Select sSATA device type.

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

# 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.

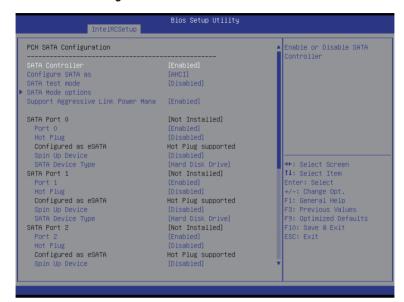
### Smart Response Technology

Enable/Disable Intel Smart Response Technology support function. Options available: Enabled/Disabled. Default setting is **Enabled**.

### → RAID OROM prompt delay

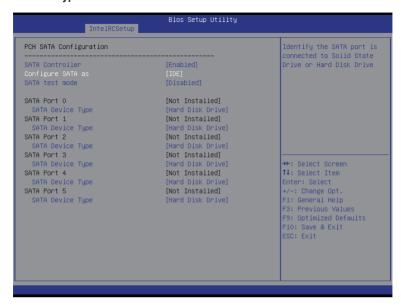
Options available: 2 Seconds/4 Seconds/6 Seconds/8 Seconds. Default setting is 2 Seconds.

# 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

Coonfigure on chip SATA type.

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

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

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

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

#### SATA Test Mode

Enable/Disable SATA Test Mode.

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

### → SATA RSTe Boot Info<sup>(Note 1)</sup>

Enable/Disable SATA RSTe Boot Information.

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

### → SATA Mode options<sup>(Note 2)</sup>

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<sup>(Note)</sup>

Enable PCH to aggressively enter link power state.

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

#### 

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)<sup>(Note)</sup>

Enable/Disable HDD Hot-Plug function.

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

### ☐ Configured as eSATA<sup>(Note)</sup>

Display Hot-Plug supported information.

### → Spin Up Device (for Port 0/1/2/3/4/5)<sup>(Note)</sup>

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.

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

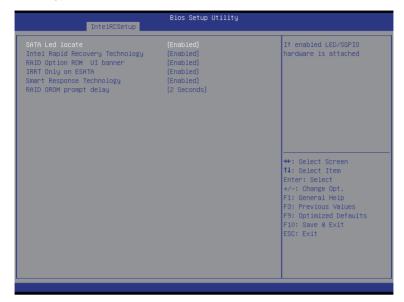
# When SATA Type is set to IDE/AHCI Mode



### 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 conteoller and root ports for faster enumeration.

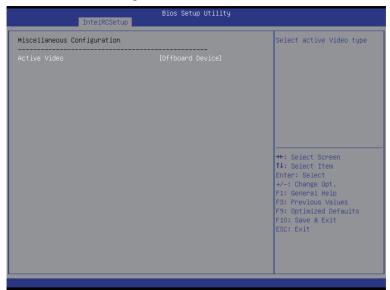
Options available: Enabled/Disabled. Default setting is Disabled.

### 

Enable/Disable xHCI (USB 3.0) support function.

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

# 2-3-8 Miscellaneous Configuration



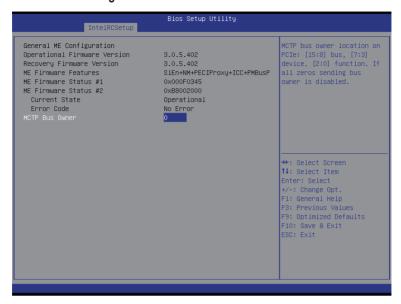
# 

### Active Video

Select active Video type.

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

# 2-3-9 Server ME Configuration



- □ Greneral 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.

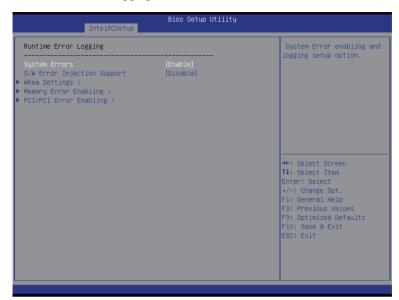
**☞** Error Code (for ME Firmware)

Display ME Firmware status error code.

→ MCTP Bus Owner

Configure MCTP Bus Owner.

# 2-3-10 Runtime Error Logging



### 

### System Errors

Enable/Disable system error logging function.

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

## 

Enable/Disable software injection error logging function.

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

### → Whea Settings

Press [Enter] for configuration of advanced items.

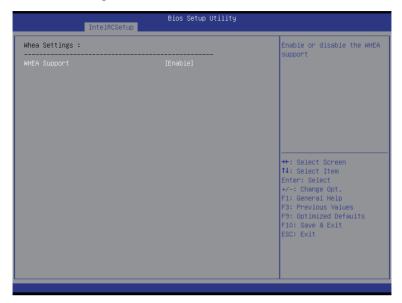
### Memory Error Enabling

Press [Enter] for configuration of advanced items.

### → PCI/PCI Error Enabling

Press [Enter] for configuration of advanced items.

# 2-3-10-1 Whea Setting

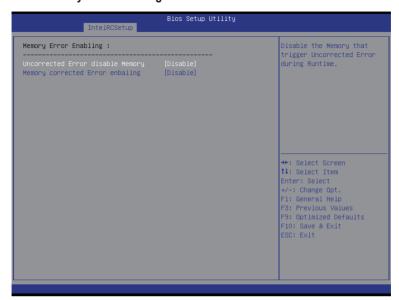


# **☞ WHEA Support (Windows Hardware Error Architecture)**

Enable/Disable WHEA Support.

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

# 2-3-10-2 Memory Error Enabling



- 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 (Note)

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.

### 

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

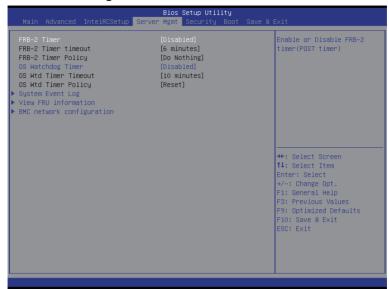
### Enable SERR propagation

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**.

### 

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.

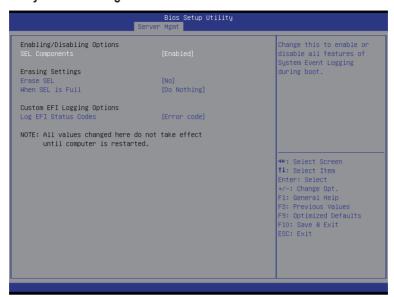
# ▽ View FRU Information

Press [Enter] to view the advanced items.

# → BMC network configuration

Press [Enter] for configuration of advanced items.

# 2-4-1 System Event Log



### 

### 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

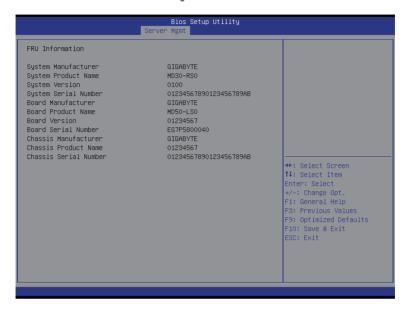
### Log EFI Status Codes

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

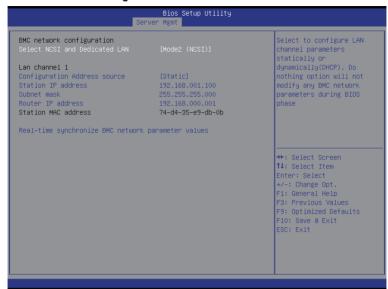
Options available: Disabled/Both/Error code/Progress code. Default setting is Error code.

### 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(NSCI)/ Mode1 (Dedicated)/Do Nothing. Default setting is Do Nothing.

### □ Lan Channel 1

### Configuration Address source

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

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

### Station IP Address

Display IP Address information.

#### → Subnet mask

Display Subnet Mask information.

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

### Router IP address

Display the Router IP Address information.

#### Station MAC Address

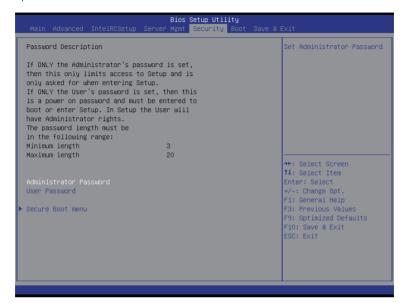
Display the MAC Address information.

#### 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, a Administrator Password must first be set. A user can only access and modify the System Time, System Date, and Set User Password fields.

#### Administrator Password

Press Enter to configure the Administrator password.

#### User Password

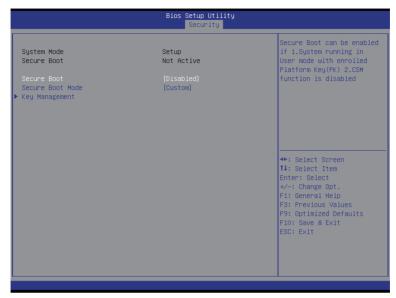
Press Enter to configure the user password.

#### 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.

#### 

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 form 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 Standard.

# 

Press [Enter] for configuration of advanced items.

# 2-5-1-1 Key Management

| Default Key Provision  - Enroll All Factory Default Keys - Save All Secure Boot Variables |               | Install Factory default<br>Secure Boot Keys when<br>System is in Setup Mode. |
|---|---------------|--|
| Platform Key<br>Delete PK<br>Set new PK   | NOT INSTALLED |  |
| Key Exchange Key<br>▶ Delete KEK<br>▶ Set new KEK<br>► Append KEK                         | NOT INSTALLED |  |
|   | NOT INSTALLED | ++: Select Screen  11: Select Item Enter: Select +/-: Change Opt.            |
| Authorized TimeStamps  Delete DBT  Set new DBT  Append DBT                                | NOT INSTALLED | F1: General Help F3: Previous Values F9: Optimized Defaults F10: Save & Exit |
| Forbidden Signatures  Delete DBX Set new DBX Append DBX                                   | NOT INSTALLED | ESC: Exit  |

# □ 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 Signatures Database (dbx). Options available: Enabled/Disabled. Default setting is **Disabled**.

### □ Enroll All Factory Default Keys

Press [Enter] to install all factory default keys.

### 

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.

#### 

Press [Enter] to configure a new PK.

# 

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.

## 

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.

# 

Display the status of Forbidden Signature Database.

### → Delete the DBX

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

### → Set DBX from File

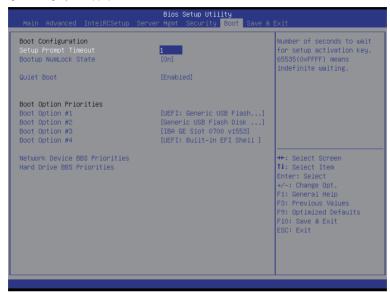
Press [Enter] to configure a new dbx.

# → 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 numberic keys to input the desired value.

## → Bootup NumLock State

Enable or Disable Bootup NumLock function.

Options available: On/Off. Default setting is On.

## Quiet Boot

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.

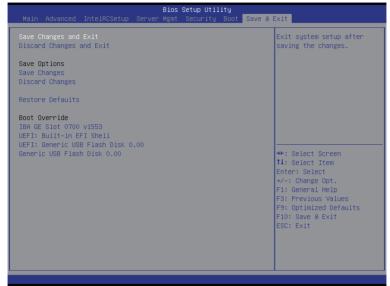
By default, the server searches for boot devices in the following secquence:

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

- Network Device BBS Priorities
   Press Enter to configure the boot priority.
- Hard Drive BBS PrioritiesPress 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       |      |
| PEL 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 |

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| 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                         |      |
|                                     |      |

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| 0xE8 |
|------|
| 0xE9 |
|      |
| 0xEA |
| 0xEB |
|      |
|      |
| 0xD0 |
| 0xD1 |
| 0xD2 |
| 0xD3 |
| 0xD4 |
| 0xD5 |
| 0xD6 |
| 0xD7 |
| 0xD8 |
| 0xD9 |
| 0xDA |
| 0xDB |
| 0xDC |
|      |
|      |

# 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                       |

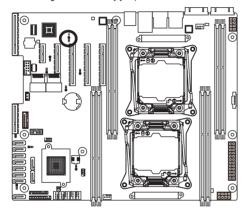
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# 2-10 BIOS Recovery Instruction

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.

