GIGABYTE™

# MX33-BS0

Intel® Socket LGA1200 processor motherboard

User Manual

Rev. 1.0

## Copyright



## Disclaimer



## Documentation Classifications

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

- User Manual: detailed information & steps about the installation, configuration and use this product (e.g. motherboard, server barebones), covering hardware and BIOS.
- User Guide: detailed information about the installation & use of an add-on hardware or software component (e.g. BMC firmware, rail-kit) compatible with this product.
- Quick Installation Guide: a short guide with visual diagrams that you can reference easily for installation purposes of this product (e.g. motherboard, server barebones).

Please see the support section of the online product page to check the current availability of these documents

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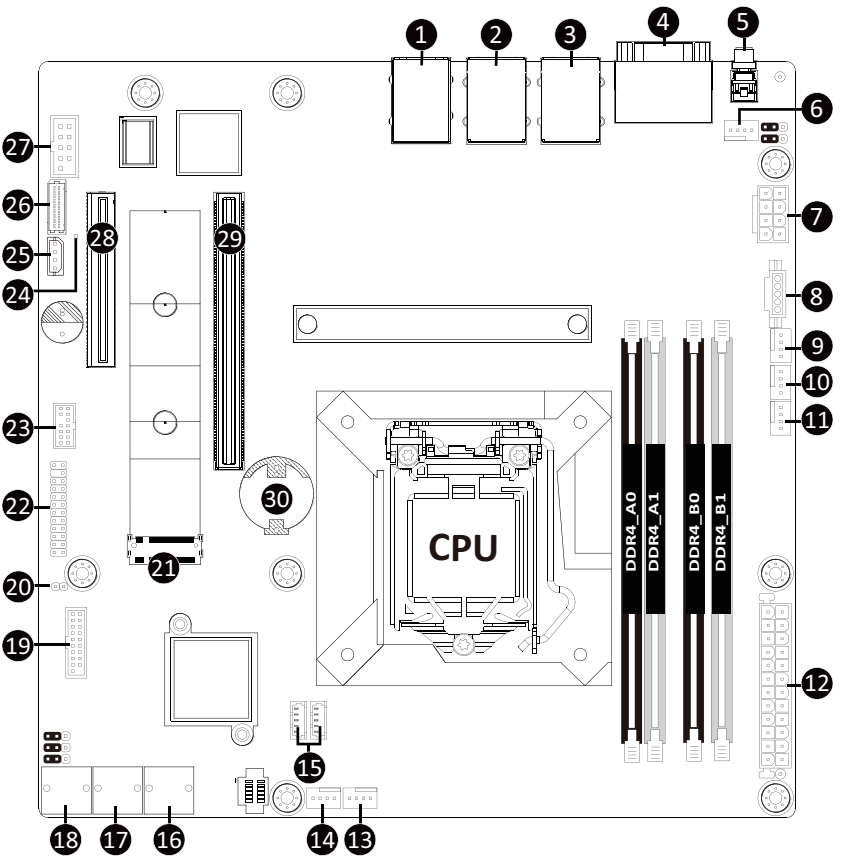

| Item | Code | Description |
|---|---|---|
| 1 | USB3_MLAN | Server Management LAN Port (Top)/USB 3.2 Ports (Bottom) |
| 2 | USB2_LAN1 | GbE LAN Port #1 (Top)/USB 2.0 Ports (Bottom) |
| 3 | USB2_LAN2 | GbE LAN Port #2 (Top)/USB 2.0 Ports (Bottom) |
| 4 | COM1_VGA_1 | Serial Port (Top)/VGA Port (Bottom) |
| 5 | SW_ID | ID Button with LED |
| 6 | SYS_FAN1 | System Fan Connector #1 |
| 7 | ATX_12V | 2x4 Pin 12V Power Connector |
| 8 | PMBUS | PMBus Connector |
| 9 | CPU_FAN | CPU Fan Connector |
| 10 | SYS_FAN2 | System Fan Connector #2 |
| 11 | SYS_FAN3 | System Fan Connector #3 |
| 12 | ATX | 2x12 Pin Main Power Connector |
| 13 | SYS_FAN5 | System Fan Connector #5 |
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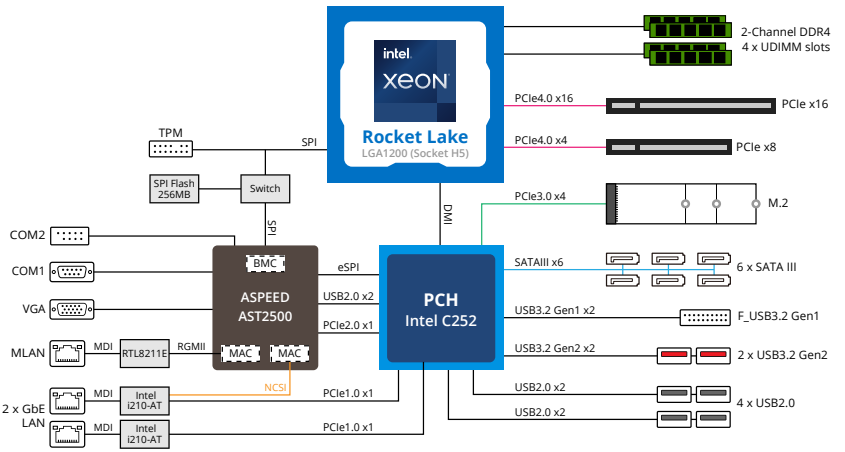
| 19 | F_U32 | Front Panel USB 3.2 Connector |
| 20 | CASE_OPEN | Case Open Intrusion Alert Header |
| 21 | M2P_SB | M.2 Slot (PCIe Gen3 x4, Support NGFF-2280) |
| 22 | TPM | TPM Connector |
| 23 | FP_1 | Front Panel Header |
| 24 | LED_BMC1 | BMC Firmware Readiness LED |
| 25 | IPMB | IPMB Connector |
| 26 | BP_1 | HDD Back Plane Board Connector |
| 27 | COM2 | Serial Port Cable Connector |
| 28 | PCIEx8_1 | PCIe x8 Slot (Gen3 x4) |
| 29 | PCIEx16 | PCIe x16 Slot (Gen3 x16) |
| 30 | BAT1 | Battery Socket |

# 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.
- To avoid any potential short circuit of the DIMM slots, please remove any stand-offs from the chassis that will be located underneath the DIMM slots, before installing the motherboard into the chassis.

## 1-2 Product Specifications

**NOTE:**
**We reserve the right to make any changes to the product specifications and product-related information without prior notice.**

| | |
|---|---|
| Form Factor | ◆ microATX<br>◆ 244W x 244D (mm) |
| CPU | ◆ Intel® Xeon® E-2300 series processors<br>◆ 11th Gen. Intel Pentium® processors<br>◆ CPU TDP up to 95W<br>◆ 1 x LGA 1200; Socket H5 |
| Chipset | ◆ Intel® C252 Express Chipset |
| Memory | ◆ 4 x DIMM slots<br>◆ Dual channel memory architecture<br>◆ Supports 1.2V DDR4 memory<br>◆ ECC UDIMM modules supported<br>◆ Total capacity up to 128GB<br>◆ Supported speeds: 3200/2666 MHz |
| LAN | ◆ 2 x GbE LAN ports (Intel® I210-AT)<br>◆ 1 x 10/100/1000 management LAN |
| Onboard Graphics | ◆ Integrated in Aspeed® AST2500<br>◆ 2D Video Graphic Adapter with PCIe bus interface<br>◆ 1920x1200@60Hz 32bpp, DDR4 SDRAM |
| Audio | ◆ In option |
| Storage Interface | ◆ 6 x SATA 6Gb/s ports |
| RAID | ◆ Intel® SATA RAID 0/1/10/5 |
| Expansion Slots | ◆ 1 x PCIe x16 (Gen4 x16 bus) slot from CPU*<br>◆ 1 x PCIe x8 (Gen4 x4 bus) slot from CPU**<br><br>* NOTE: Gen3 x16 supported if installed Intel Pentium® Processor<br>** NOTE: Function not available if installed Intel Pentium® Processor<br><br>◆ 1 x M.2 slot:<br>- M-key<br>- PCIe Gen3 x4 per slot<br>- Supports NGFF-2280/2242 cards |

| | |
|---|---|
| Internal I/O Connectors | ◆ 1 x 24-pin ATX main power connector<br>◆ 1 x 8-pin ATX 12V power connector<br>◆ 6 x SATA III 6Gb/s ports<br>◆ 1 x M.2 slot<br>◆ 1 x CPU fan header<br>◆ 5 x System fan headers<br>◆ 1 x USB 3.2 Gen1 header<br>◆ 1 x COM2 header<br>◆ 1 x back panel connector<br>◆ 1 x TPM header<br>◆ 1 x Front panel header<br>◆ 1 x JTAG BMC header<br>◆ 1 x Case Open header<br>◆ 1 x BIOS recovery jumper<br>◆ 1 x ME recovery jumper<br>◆ 1 x ME update jumper<br>◆ 1 x Clear CMOS jumper<br>◆ 1 x S3 mask jumper<br>◆ 1 x IPMB connector<br>◆ 1 x PMBus connector<br>◆ 1 x Buzzer |
| Rear I/O Connectors | ◆ 1 x COM<br>◆ 1 x VGA<br>◆ 2 x RJ45<br>◆ 1 x MLAN<br>◆ 2 x USB 3.2 Gen2<br>◆ 4 x USB 2.0<br>◆ 1 x ID switch |
| TPM | ◆ 1 x TPM Header with SPI Interface<br>◆ Optional TPM2.0 kit: CTM010 |
| Board Management | ◆ Aspeed® AST2500 Management Controller<br>◆ GIGABYTE Management Console (AMI MegaRAC SP-X) Web Interface |
| Operating Properties | ◆ Operating temperature: 10°C to 40°C<br>◆ Operating humidity: 8-80% (non-condensing)<br>◆ Non-operating temperature: -40°C to 60°C<br>◆ Non-operating humidity: 20%-95% (non-condensing) |

## 1-3 Installing and Removing the CPU

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

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

**WARNING!**

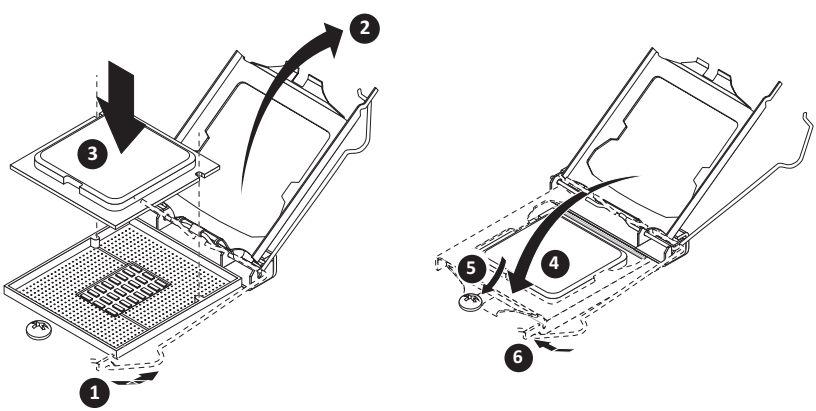
Failure to properly turn off the server before you start installing components may cause serious damage. Do not attempt the procedures described in the following sections unless you are a qualified service technician.

### Follow these instructions to Install the CPU:

1. Gently press the CPU socket lever handle down to unclip it.
2. Completely lift the CPU socket lever and the metal load plate will be lifted as well.
3. Hold the CPU with your thumb and index fingers. Align the CPU pin one (triangle marking) with the pin one corner of the CPU socket (or you may align the CPU notches with the socket alignment keys). Gently insert the CPU into position.
4. Once the CPU is properly inserted, carefully replace the load plate.
5. When replacing the load plate, make sure the front end of the load plate is under the shoulder screw. Then, remove the CPU cover.

   **Note:** Save and replace the CPU cover if the processor is removed from its socket.

6 Secure the CPU socket lever.



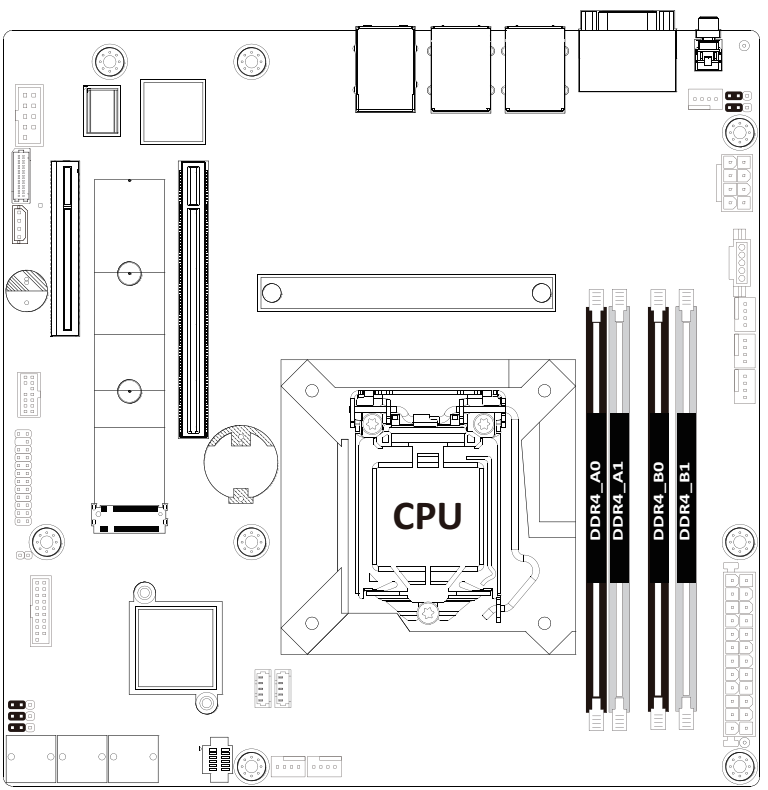
# 1-4 Installing and Removing Memory

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

- Make sure that the motherboard supports the memory. It is recommended to use memory of the same capacity, brand, speed, and chips.
- 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 2-Channel Memory Configuration

This motherboard provides 4 DDR4 memory slots and supports 2-Channel Technology. After the memory is installed, the BIOS will automatically detect the specifications and capacity of the memory.

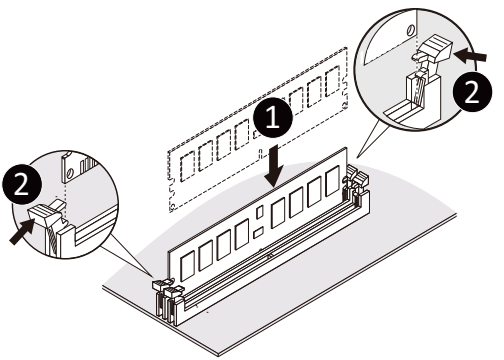


## 1-4-2 Installing and Removing a Memory Module

**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 ECC UDIMMs on this motherboard.**

**Follow these instructions to install a UDIMM module:**

1. Insert the UDIMM memory module vertically into the UDIMM slot and push it down.
2. Close the plastic clip at both edges of the UDIMM slots to lock the UDIMM module.
   Note: For dual-channel operation, UDIMMs must be installed in matched pairs.
3. Reverse the installation steps when you want to remove the UDIMM module.



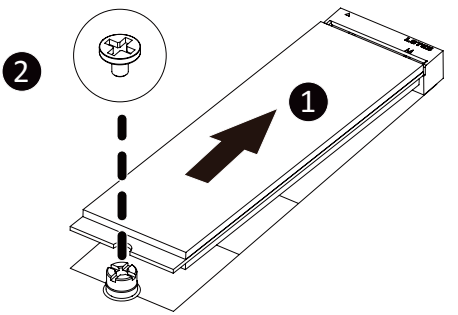

**Note:** DIMM must be populated in sequential alphabetic order, starting with bank A0.

| Type | DIMM Slots per Channel | DIMMs populated per channel | Supported Voltage | POR Speed (MT/s) | Ranks per DIMM (1R=one rank) | Mem DIMM Device | Maximum Memory Capacity |
|---|---|---|---|---|---|---|---|
| DDR4 ECC UDIMM | 2 | 2 | 1.2V | 2666/ 2933/ 3200 | 1R1R | 1Rx8 | 64GB |
| | 2 | 2 | | 2666/ 2933 | 2R2R | 2Rx8 | 128GB |
| | 2 | 1 | | 2666/ 2933/ 3200 | 1R0R | 1Rx8 | 32GB |
| | 2 | 1 | | 2666/ 2933/ 3200 | 2R0R | 2Rx8 | 64GB |

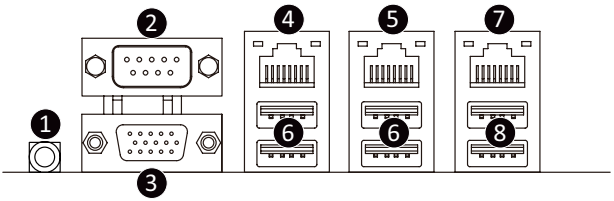
## 1-5 Installing the M.2 SSD Module

Follow the steps below to install a M.2 SSD module on your motherboard.

Step1. Insert the M.2 SSD module into the slot.
Step2. Secure it with the screw, tightening as necessary to fasten the M.2 SSD module in place.



## 1-6 Back Panel Connectors




### ❶ ID button with LED

When the system identification is active, the ID LED on the front/ back panel glows blue.

### ❷ Serial Port

Connects to serial-based mouse or data processing devices.

### ❸ VGA Port

Connect to a monitor device.

### ❹ GbE LAN Port #2

The Gigabit Ethernet LAN port provides Internet connection at up to 1 Gbps data rate. See the section below for a description of the states of the LAN port LEDs.

### ❺ GbE LAN Port #1

The Gigabit Ethernet LAN port provides Internet connection at up to 1 Gbps data rate. See the section below for a description of the states of the LAN port LEDs.

### ❻ USB 2.0 Ports

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 etc.

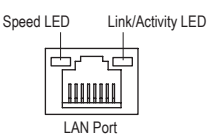
### ❼ Server Management LAN Port

The LAN port provides Internet connection with data transfer speeds of 10/100/1000Mbps. This port is the dedicated LAN port for Server Management.

### ❽ USB 3.2 Ports

The USB port supports the USB 3.2 specification. Use this port for USB devices such as a USB keyboard/mouse, USB printer, USB flash drive etc.

**LAN and ID Button LEDs**




**10/100/1000 LAN LED:**

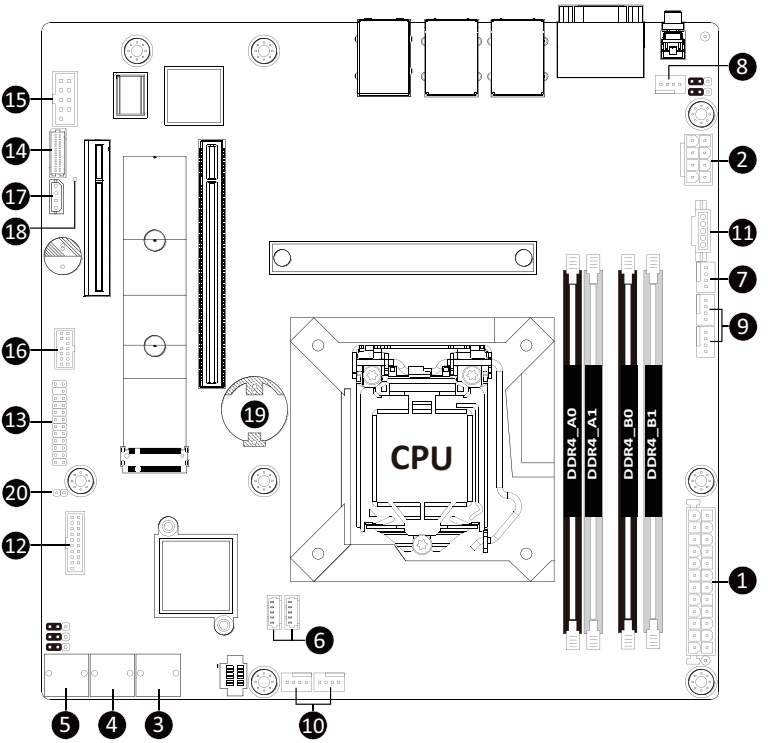
| State | Description |
|---|---|
| Yellow On | 1Gbps data rate |
| Green On | 100Mbps data rate |
| Off | 10Mbps data rate |

**ID button/LED:**

| State | Description |
|---|---|
| Blue On | System identification is active |
| Off | System identification is disabled |

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

## 1-7 Internal Connectors




| | | | |
|---|---|---|---|
| 1) | ATX | 11) | PMBUS |
| 2) | ATX_12V | 12) | F_U32 |
| 3) | SATA3_0_1 | 13) | FP_1 |
| 4) | SATA3_2_3 | 14) | BP_1 |
| 5) | SATA3_4_5 | 15) | COM2 |
| 6) | SATA_SGP2/SATA_SGP1 | 16) | TPM |
| 7) | CPU_FAN | 17) | IPMB |
| 8) | SYS_FAN1 | 18) | LED_BMC1 |
| 9) | SYS_FAN2/3 | 19) | BAT1 |
| 10) | SYS_FAN4/5 | 20) | CASE_OPEN |

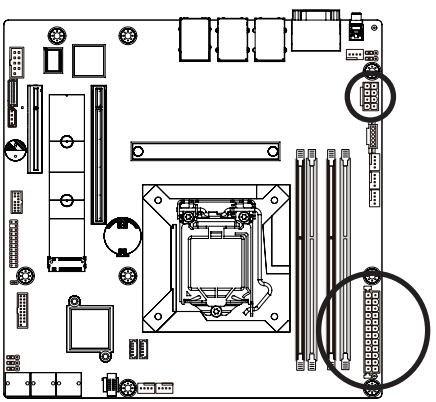
Read the following guidelines before connecting external devices:

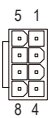
- First make sure your devices are compliant with the connectors you wish to connect.
- Before installing the devices, be sure to turn off the devices and your computer. Unplug the power cord from the power outlet to prevent damage to the devices.
- After installing the device and before turning on the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

## 1/2) ATX/ATX_12V (2x12 Main Power Connector and 2x4 12V 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.

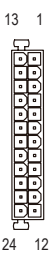
To meet expansion requirements, it is recommended that a power supply that can withstand high power consumption be used (500W or greater). If a power supply is used that does not provide the required power, the result can lead to an unstable or unbootable system.






**ATX_12V**

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

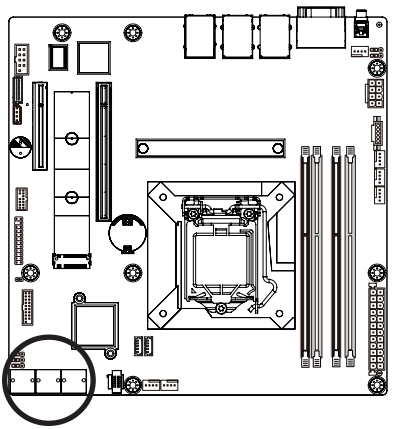



**ATX**

| 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 | 21 | +5V |
| 10 | +12V | 22 | +5V |
| 11 | +12V | 23 | +5V |
| 12 | 3.3V | 24 | GND |

### 3/4/5) SATA3_0_1/SATA3_2_3/SATA3_4_5 (SATA III 6Gb/s Connectors)

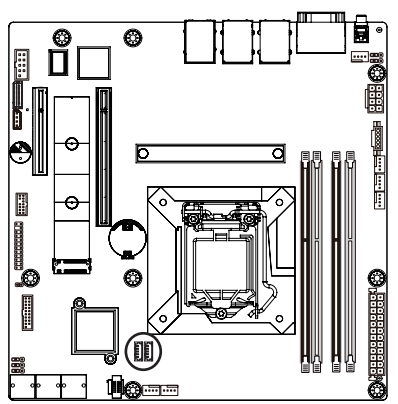
The SATA connectors conform to SATA III 6Gb/s standard and are compatible with SATA 3Gb/s standard. Each SATA connector supports a single SATA device.




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

### 6) SATA_SGP1/SATA_SGP2 (SATA SGPIO Connector)

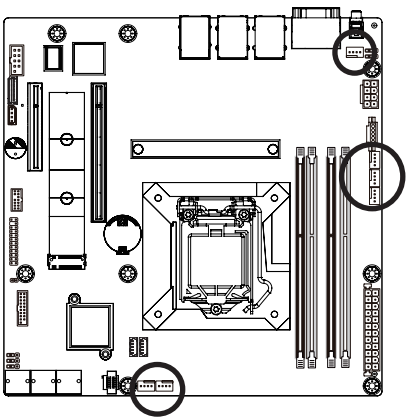
Serial General Purpose Input/Output (SGPIO) is a communication method used between a host bus adapter (HBA) and a main board.

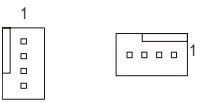



| Pin No. | Definition |
|---|---|
| 1 | Data |
| 2 | GND |
| 3 | NC |
| 4 | Load |
| 5 | Clock |

### 7/8/9/10) CPU_FAN/SYS_FAN1/SYS_FAN2/SYS_FAN3/SYS_FAN4/SYS_FAN5 (Fan Headers)

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



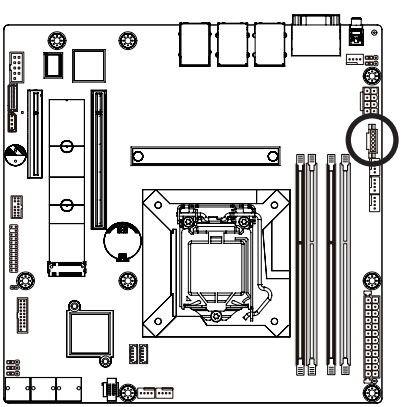



| Pin No. | Definition |
|---|---|
| 1 | GND |
| 2 | +12V |
| 3 | Sense |
| 4 | Speed Control |

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

### 11) PMBus Connector

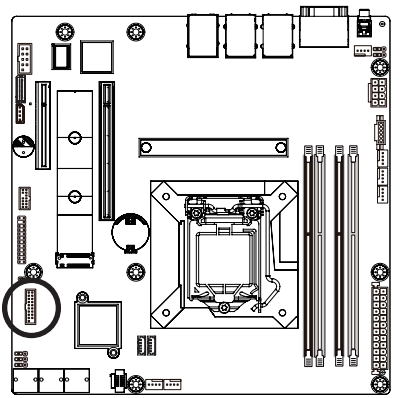
The Power Management Bus (PMBus) is a variant of the System Management Bus (SMBus) which is targeted at digital management of power supplies.




| Pin No. | Definition |
|---|---|
| 1 | PMBus Clock |
| 2 | PMBus Data |
| 3 | PMBus Alert |
| 4 | GND |
| 5 | 3.3V Sense |

### 12) F_U32 (Front Panel USB 3.2 Connector)

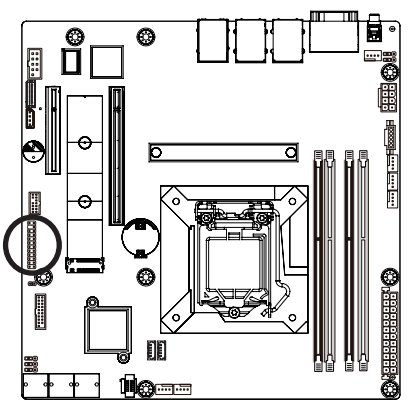
The header conform to USB 3.2 specification. Each USB header can provide two USB ports via an optional USB bracket. For purchasing the optional USB bracket, please contact the local dealer.




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

### 13) FP_1 (Front Panel Header)

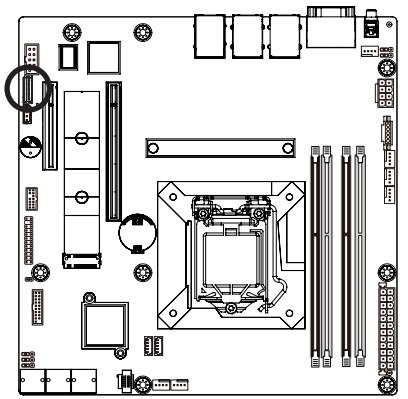
Connect the power switch, reset switch, speaker, chassis intrusion switch/sensor and system status indicator on the chassis to this header according to the pin assignments below. Note the positive and negative pins before connecting the cables.

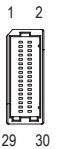



| Pin No. | Definition | Pin No. | Definition |
|---|---|---|---|
| 1 | Power LED+ | 2 | 5V Standby |
| 3 | No Pin | 4 | ID LED+ |
| 5 | Power LED- | 6 | ID LED- |
| 7 | HDD LED+ | 8 | System Status LED (Green) |
| 9 | HDD LED- | 10 | System Status LED (Yellow) |
| 11 | Power Button | 12 | LAN1 Active LED+ |
| 13 | GND | 14 | LAN1 Link LED- |
| 15 | Reset Button | 16 | SMBus Data |
| 17 | GND | 18 | SMBus Clock |
| 19 | ID Button | 20 | Case Open |
| 21 | GND | 22 | LAN2 Actve LED+ |
| 23 | NMI Switch | 24 | LAN2 Link LED- |

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 etc. When connecting your chassis front panel module to this header, make sure the wire assignments and the pin assignments are matched correctly.

## 14) BP_1 (HDD Backplane Board Connector)

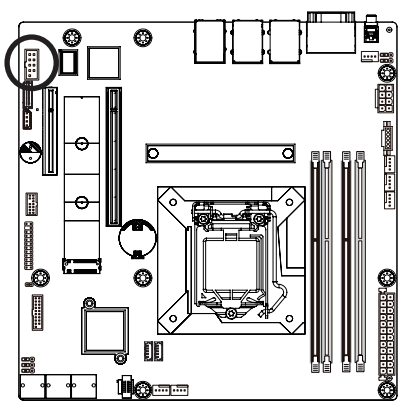


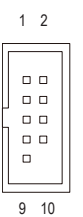



| Pin No. | Definition | Pin No. | Definition |
|---|---|---|---|
| 1 | Reserved | 2 | BP_SGDIN |
| 3 | GND | 4 | BP_SGDOUT |
| 5 | BP_SGLD | 6 | GND |
| 7 | BP_SGCLK | 8 | PLD_Program_EN |
| 9 | GLED_AMB_N | 10 | GLED_GRN_N |
| 11 | FAN_IRQ_N | 12 | Reserved |
| 13 | BP_SCL | 14 | GND |
| 15 | BP_SDA | 16 | BP_RST_N |
| 17 | SMB_U2_TMP_SCL | 18 | GND |
| 19 | SMB_U2_TMP_SDA | 20 | 12C_DEV_RST |
| 21 | Reserved | 22 | GND |
| 23 | Reserved | 24 | GND |
| 25 | Reserved | 26 | GND |
| 27 | Reserved | 28 | GND |
| 29 | P3V3_AUX | 30 | P3V3_AUX |

## 15) COM2 (Serial Port Cable Connector)

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

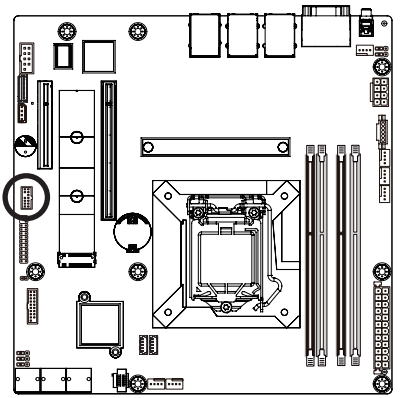


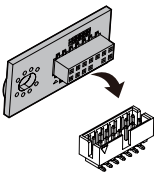



| Pin No. | Definition |
|---|---|
| 1 | NDCDB_N |
| 2 | NSINB |
| 3 | NSOUTB |
| 4 | NDTRN |
| 5 | GND |
| 6 | NDSRB_N |
| 7 | NRTSB_N |
| 8 | NCTSB_N |
| 9 | NRIB_N |
| 10 | Key |

## 16) TPM (Trusted Platform Module Connector)

Trusted Platform Module (TPM) is an international standard for a secure cryptoprocessor, a dedicated microcontroller designed to secure hardware through integrated cryptographic keys.

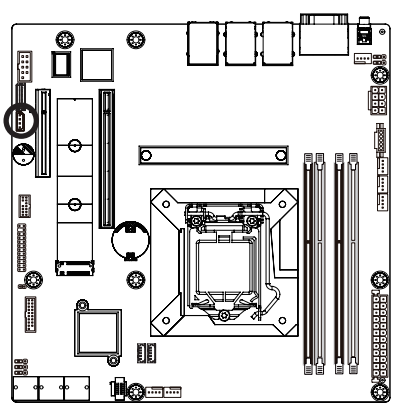


| Pin No. | Definition | Pin No. | Definition |
|---|---|---|---|
| 1 | SPI_TPM_CLK | 8 | NC |
| 2 | P_3V3_AUX | 9 | NC |
| 3 | RST_PLTRST | 10 | Key |
| 4 | VCC3 | 11 | NC |
| 5 | SPI_TPM_MISO | 12 | GND |
| 6 | IRQ_TPM_SPI | 13 | SPI_CS_TPM |
| 7 | SPI_TPM_MOSI | 14 | GND |

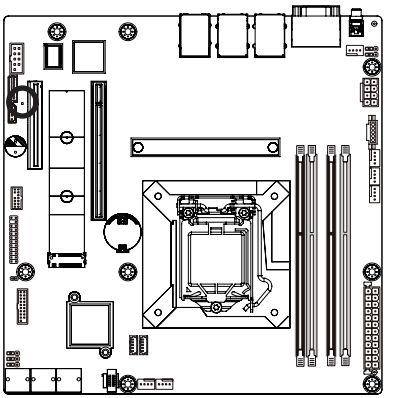
## 17) IPMB (Intelligent Platform Management Bus) Connector

The Intelligent Platform Management Bus Communications Protocol defines a byte-level transport for transferring Intelligent Platform Management Interface Specification (IPMI) messages between intelligent I2C devices.




| Pin No. | Definition |
|---|---|
| 1 | Clock |
| 2 | Data |
| 3 | GND |
| 4 | VCC |

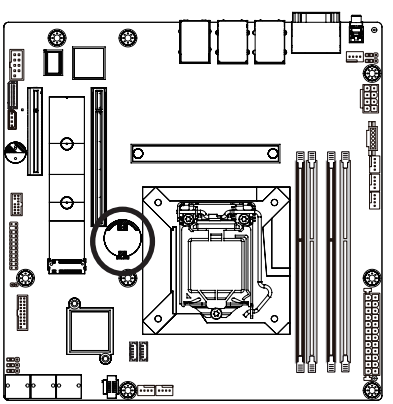
## 18) LED_BMC1 (BMC Firmware Readiness LED)

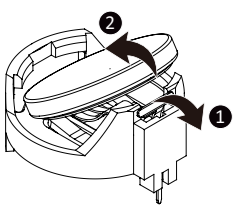


| State | Description |
|---|---|
| On | BMC firmware is initial |
| Blink | BMC firmware is ready |
| Off | AC loss |

## 19) BAT1 (Battery Socket)

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.

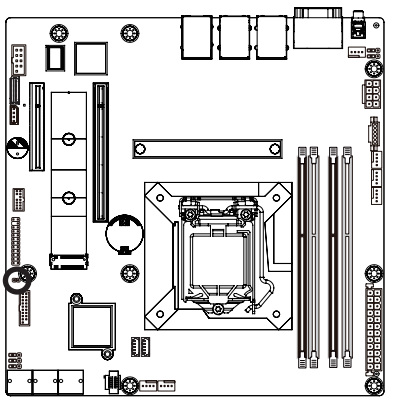





- Always turn off your computer and unplug the power cord before replacing the battery.
- Replace the battery with an equivalent one. Danger of explosion if the battery is replaced with an incorrect model.
- Contact the place of purchase or local dealer if you are not able to replace the battery by yourself or uncertain about the battery model.
- Used batteries must be handled in accordance with local environmental regulations.

### 20) CASE_OPEN (Case Open Intrusion Alert Header)

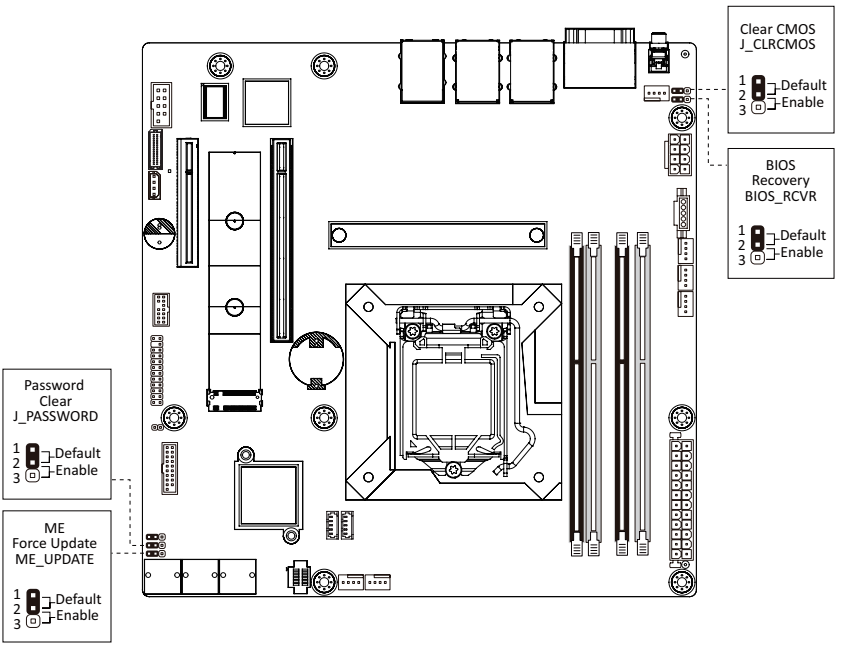
This motherboard provides a chassis detection feature that detects if the chassis cover has been removed. This function requires a chassis with chassis intrusion detection design.



Open: Normal Operation (Default)

Closed: Active Chassis Intrusion Alert

## 1-8 Jumper Settings




| Jumper Name | Jumper Setting |
|---|---|
| ME Force Update | 1-2: Normal operation (Default)<br>2-3: Enable ME Force Update |
| Password Clear | 1-2: Normal operation (Default)<br>2-3: Clear administrator and user passwords |
| Clear CMOS | 1-2: Normal operation (Default)<br>2-3: Clear CMOS data |
| BIOS Recovery | 1-2: Normal operation (Default)<br>2-3: Enable BIOS Recovery |

# 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, loading the operating system etc. The 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 <DEL> key during the POST when the power is turned on.

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

### BIOS Setup Program Function Keys

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

- **Main**
  This setup page includes all the items of the standard compatible BIOS.
- **Advanced**
  This setup page includes all the items of AMI BIOS special enhanced features.
  (ex: Auto detect fan and temperature status, automatically configure hard disk parameters.)
- **Chipset**
  This setup page includes all the submenu options for configuring the functions of the Platform Controller Hub.
- **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 the boot sequence.
- **Save & 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.

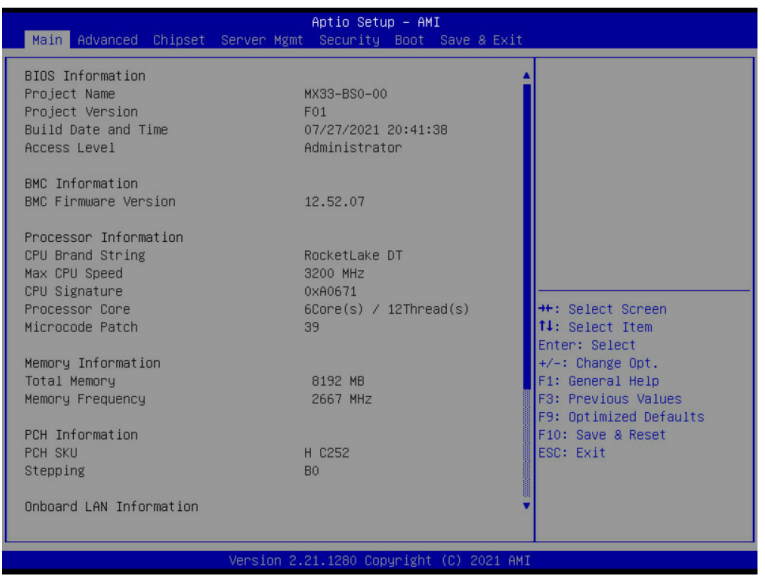
**Main Menu Help**

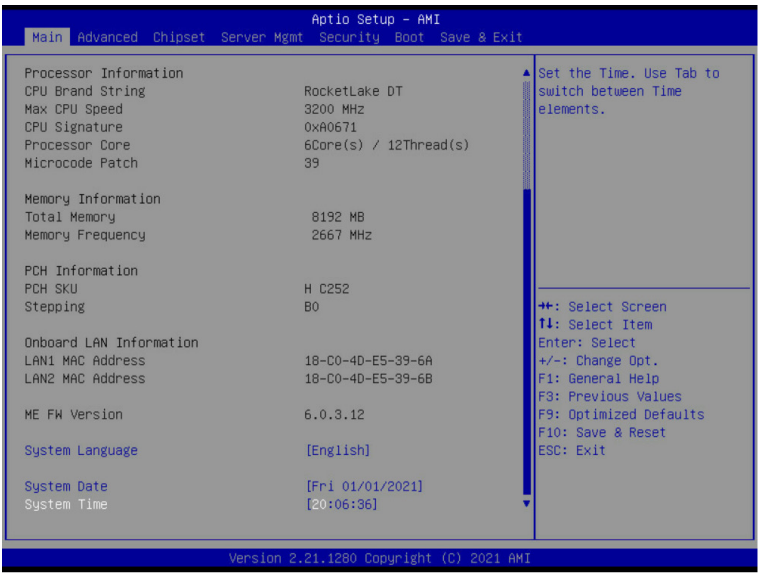
The on-screen description of a highlighted setup option is displayed on the bottom line of the Main Menu.

**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.






| Parameter | Description |
|---|---|
| Access Level | Display the privileges level information. |
| Project Name | Displays the project name information. |
| Project Version | Displays version number of the BIOS setup utility. |
| Build Date and Time | Displays the date and time when the BIOS setup utility was created. |
| BMC Information(Note1) | |
| BMC Firmware Version(Note1) | Displays BMC firmware version information. |
| Processor Information | |
| CPU Brand String/ Max CPU Speed / CPU Signature / Processor Core / Microcode Patch | Displays the technical information for the installed processor(s). |
| Memory Information | |
| Total Memory(Note2) | Displays the total memory size of the installed memory. |
| Memory Frequency(Note2) | Displays the frequency information of the installed memory. |
| PCH Information | |
| PCH SKU | Displays the technical information for the installed Platform Controller Hub (PCH). |

(Note1) Functions available on selected models..

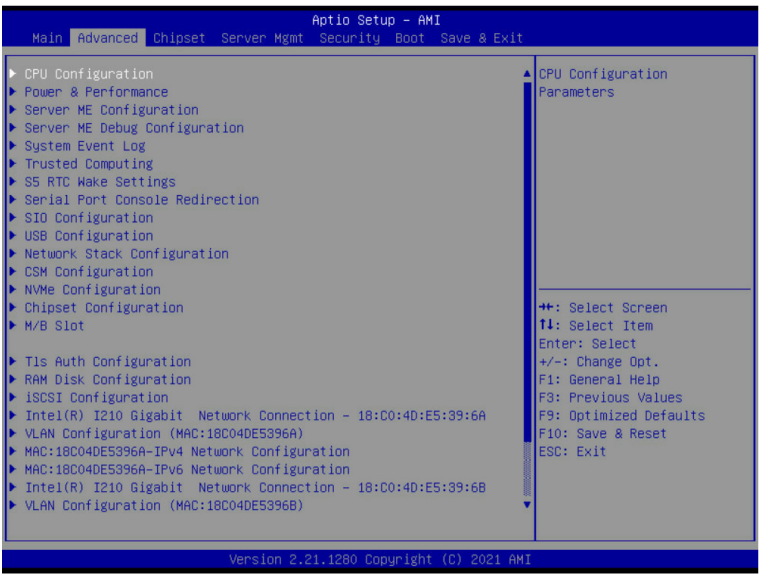
(Note2) This section will display capacity and frequency information of the memory that the customer has installed.

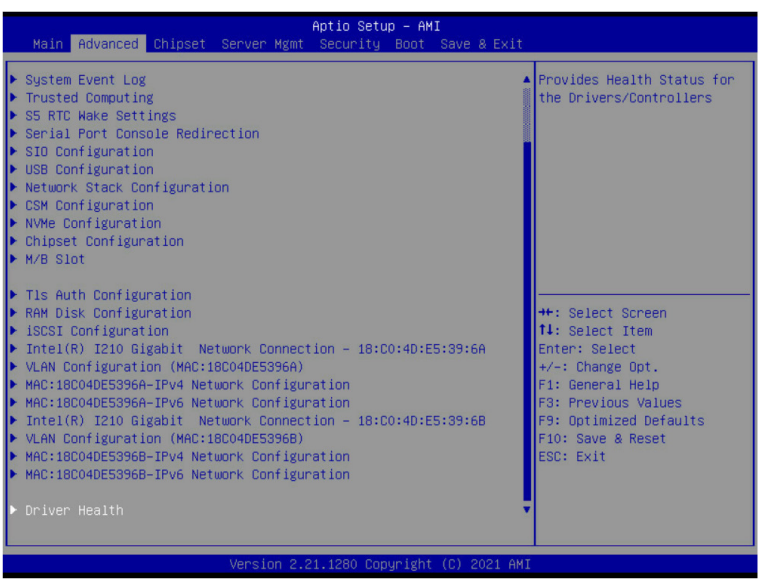
| Parameter | Description |
|---|---|
| ME Firmware Information | |
| ME FW Version | Displays the ME firmware version information. |
| Onboard LAN Information | |
| LAN1 MAC Address(Note) | Displays LAN MAC address information. |
| LAN2 MAC Address (Note) | Displays LAN MAC address information. |
| System Date | Sets the date following the weekday-month-day-year format. |
| System Time | Sets the system time following the hour-minute-second format. |

(Note) The number of LAN ports listed will depend on the motherboard / system model.

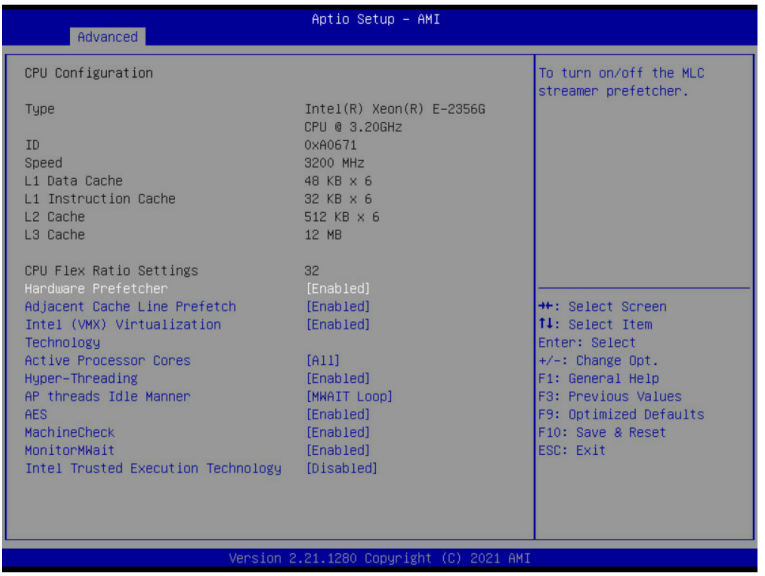
## 2-2 Advanced Menu

The Advanced Menu displays 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 CPU Configuration



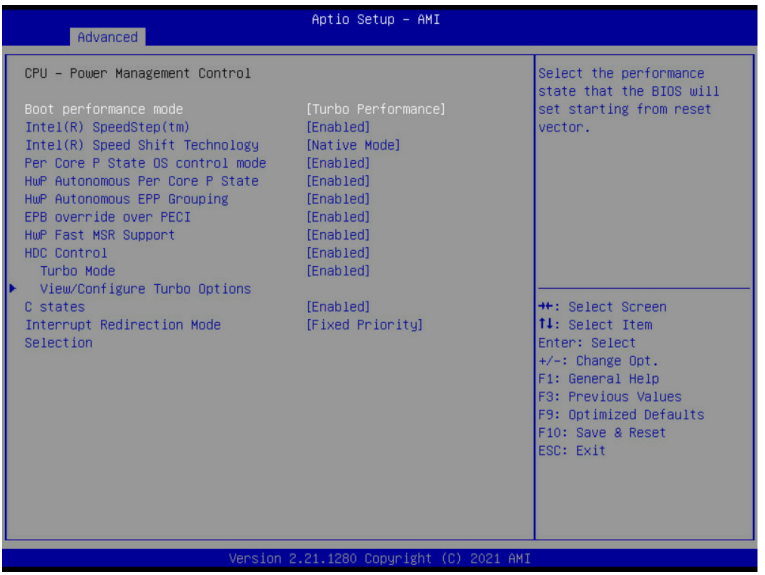

| Parameter | Description |
|---|---|
| CPU Configuration | |
| Type/ID/Speed/L1 Data Cache/ L1 Instruction Cache/L2 Cache/ L3 Cache/CPU Flex Ratio Settings | Displays the technical information for the installed processor(s). |
| Hardware Prefetcher | Enable/Disable this item to turn on/off the MLC streamer prefetcher.<br>Options available: Disabled, Enabled. 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.<br>Options available: Disabled, Enabled. Default setting is **Enabled**. |
| Intel (VMX) Virtualization Technology | When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.<br>Options available: Disabled, Enabled. Default setting is **Enabled**. |
| Active Processor Cores | The Number of Cores to enable in each processor package.<br>Options available: All, 1, 2, 3, 4, 5. Default setting is **All**. |
| Hyper-Threading | Enable/Disable the Hyper-Threading Technology.<br>Options available: Disabled, Enabled. Default setting is **Enabled**. |
| AP threads Idle Manner | Options available: HALT Loop, MWAIT Loop, RUN Loop. Default setting is **MWAIT Loop**. |

| Parameter | Description |
|---|---|
| AES | Options available: Disabled, Enabled. Default setting is **Enabled**. |
| MachineCheck | Options available: Disabled, Enabled. Default setting is **Enabled**. |
| MonitorMWait | Options available: Disabled, Enabled. Default setting is **Enabled**. |
| Intel Trusted Execution Technology | Enables utilization of additional hardware capabilities provided by Intel(R) Trusted Execution Technology. Changes requires a full power cycle to take effect.<br>Options available: Disabled, Enabled. Default setting is **Disabled**. |

## 2-2-2 Power & Performance


| Parameter | Description |
|---|---|
| Power & Performance | |
| CPU-Power Management Control | Press [Enter] to configure advanced items. |

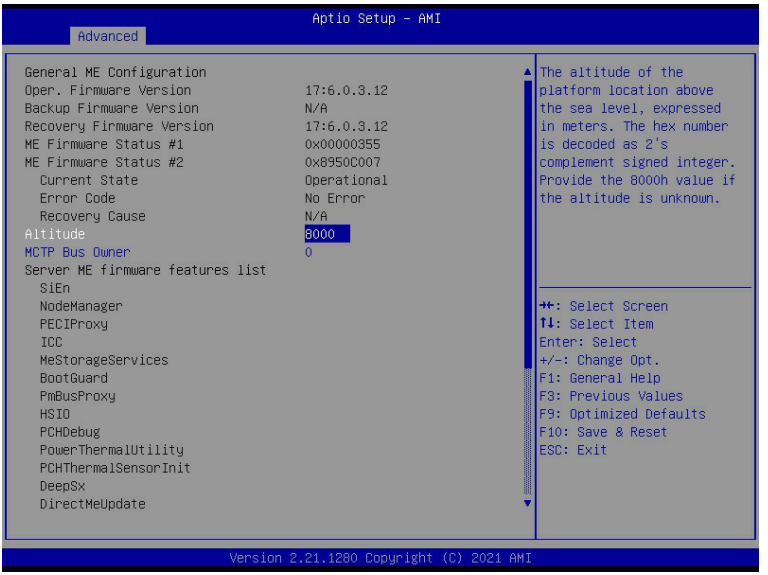
## 2-2-2-1 CPU-Power Management Control

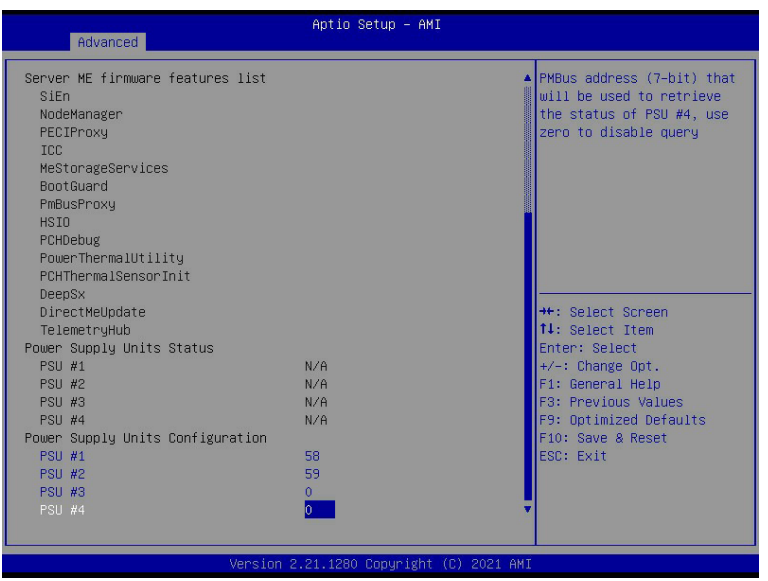



| Parameter | Description |
|---|---|
| CPU-Power Management Control | |
| Boot performance mode | Selects the performance state that the BIOS will set starting from reset vector.<br>Options available: Max Battery, Max Non-Turbo performance, Turbo Performance. Default setting is **Turbo Performance**. |
| Intel(R) SpeedStep(tm) | Allows more than two frequency ranges to be supported.<br>Options available: Disabled, Enabled. Default setting is **Enabled**. |
| Intel(R) Speed Shift Technology | Enable/Disable Intel(R) Speed Shift Technology support.<br>Options available: Disabled, Native Mode, Out of Band Mode. Default setting is **Native Mode**. |
| Per Core P State OS control mode | Enable/Disable Per Core P state OS control mode.<br>Options available: Disabled, Enabled. Default setting is **Enabled**. |
| HwP Autonomous Per Core P State | Enable/Disable Autonomous Per Core P State control.<br>Options available: Disabled, Enabled. Default setting is **Enabled**. |
| HwP Autonomous EPP Grouping | Enable/Disable EPP Grouping.<br>Options available: Disabled, Enabled. Default setting is **Enabled**. |
| EPB override over PECI | Enable/Disable EPB override over PECI.<br>Options available: Disabled, Enabled. Default setting is **Enabled**. |

| Parameter | Description |
|---|---|
| HwP Fast MSR Support | Enable/Disable HwP Fast MSR Support for IA32_HWP_REQUEST MSR.<br>Options available: Disabled, Enabled. Default setting is **Enabled**. |
| HDC Control | When Enabled, it can be enabled by OS if OS native support is available.<br>Options available: Disabled, Enabled. Default setting is **Enabled**. |
| Turbo Mode | Enable/Disable processor Turbo mode (requires EMTTM enabled).<br>Options available: Disabled, Enabled. Default setting is **Enabled**. |
| View/Configure Turbo Options | Press [Enter] to view/configure Turbo Options.<br>◆ Turbo Ratio Limit Options<br>– Press [Enter] to view/configure Turbo Ratio Limit Options.<br>◆ Power Limit 1 Override<br>– Enable/Disable Power Limit 1 override. If this option is disabled, BIOS will program the default values for Power Limit 1 and Power Limit 1 Time Window.<br>– Options available: Disabled, Enabled. Default setting is **Disabled**.<br>◆ Power Limit 2 Override<br>– Enable/Disable Power Limit 2 override. If this option is disabled, BIOS will program the default values for Power Limit 2.<br>– Options available: Disabled, Enabled. Default setting is **Enabled**.<br>◆ Power Limit 2<br>– Configures PL2 power limit in Watts.<br>◆ Energy Efficient Turbo<br>– Enable/Disable Energy Efficient Turbo feature. This feature will opportunistically lower the turbo frequency to increase efficiency. Recommended only to disable in overclocking situations where turbo frequency must remain constant. Otherwise, leave enabled.<br>– Options available: Disabled, Enabled. Default setting is **Enabled**.<br>◆ Turbo Configuration<br>– To change the PL2 and Tau to mitigate the thermal throttling event storm.<br>– Options available: Max Transient Turbo, 1.2x TDP. Default setting is **Max Transient Turbo**. |
| C States | Enable/Disable CPU Power Management.<br>Options available: Disabled, Enabled. Default setting is **Enabled**. |
| Interrupt Redirection Mode Selection | Selects the Interrupt Redirection Mode for Logical Interrupts.<br>Options available: Fixed Priority, Round robin, Hash Vector, No Change. Default setting is **Fixed Priority**. |

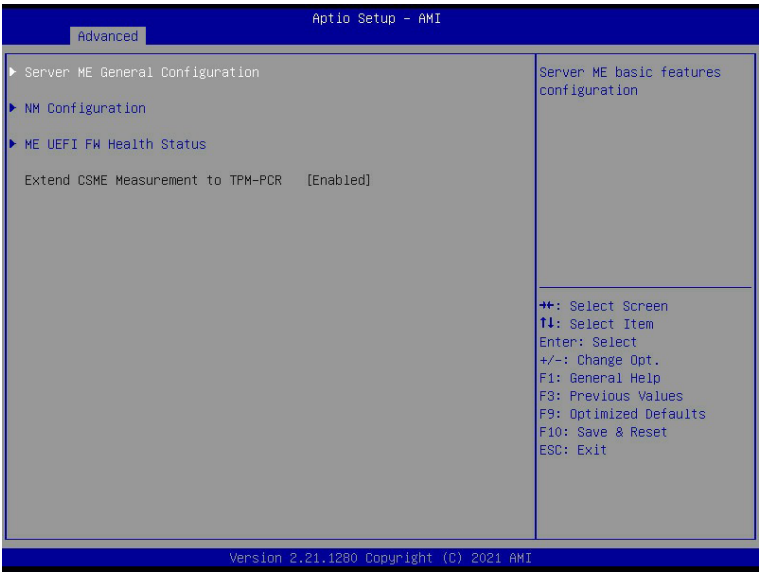
## 2-2-3 Server ME Configuration



| Parameter | Description |
|---|---|
| General ME Configuration | |
| Oper./Backup/Recovery Firmware Version | Displays the ME firmware version information. |
| ME Firmware Status 1/2 | Displays the ME firmware status 1/2 information. |
| Current State/Error Code/ Recovery Cause | Displays the ME firmware information of Current State/Error Code/ Recovery Cause. |
| Altitude | The altitude of the platform location above the sea level, expressed in meters. The hex number is decoded as 2's complement signed integer. Provide the 8000h value if the altitude is unknown. |
| MCTP Bus Owner | MCTP bus owner location on PCIe: [15:8] bus, [7:3] device, [2:0] function. If all zeros sending bus owner is disabled. |
| Server ME firmware features list | Displays the ME firmware features list. |
| Power Supply units Status | Displays the power supply units status information. |
| Power Supply Units Configuration | PMBus address (7-bit) that will be used to retrieve the status of PSU#, use zero to disable query. |

## 2-2-4 Server ME Debug Configuration




| Parameter | Description |
|---|---|
| Server ME General Configuration | Press [Enter] to configure advanced items.<br>◆ ME Initialization Complete Timeout<br>– This option defines how long BIOS waits for ME to initialize.<br>◆ Enable HSIO Messaging<br>– Options available: Disabled, Enabled. Default setting is **Disabled**.<br>◆ DRAM Init Done Enable<br>– Options available: Disabled, Enabled. Default setting is **Enabled**.<br>◆ DRAM Initialization Status<br>– Options available: Auto-true status, 0-Success, 1-No memory in Channels, 2-Memory Init Error. Default setting is **Auto-true status**.<br>◆ DRAM Init Done Enable<br>– Options available: Disabled, Enabled. Default setting is **Enabled**.<br>◆ Host Reset Warning<br>– Options available: Disabled, Enabled. Default setting is **Disabled**.<br>◆ Pre-DramInitDone ME Reset<br>– Options available: Disabled, Enabled. Default setting is **Disabled**. |

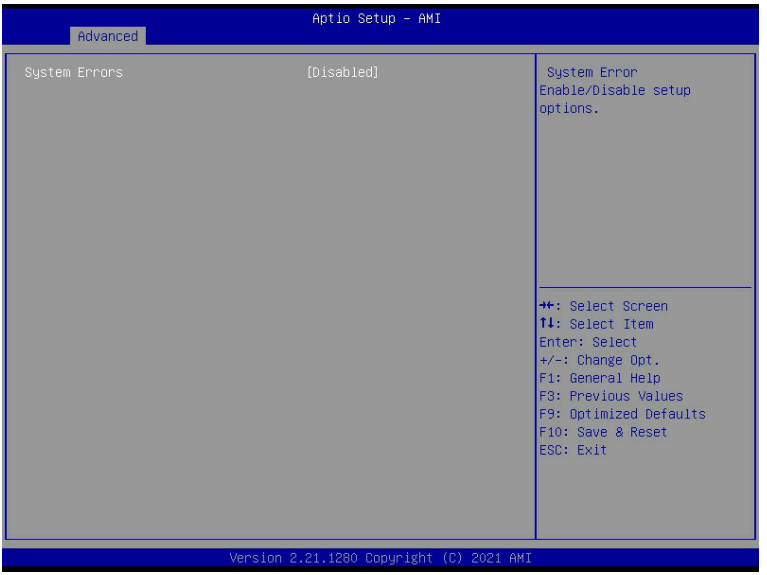
| Parameter | Description |
|---|---|
| Server ME General Configuration (Continued) | ◆ Override ICC Clock Settings<br>– ICC Clock Spread Spectrum.<br>» Options available: Disabled, Enabled. Default setting is **Enabled.**<br>◆ HMRFPO via HECI-3<br>– Options available: Disabled, Enabled. Default setting is **Disabled**.<br>◆ HMRFPO_LOCK Message<br>– Options available: Disabled, Enabled. Default setting is **Enabled**.<br>◆ HMRFPO_ENABLE Message(Note)<br>– Options available: Disabled, Enabled. Default setting is **Disabled**.<br>◆ Region selector<br>– Options available: Intel ME region, Region 13. Default setting is **Intel ME region**.<br>◆ END_OF_POST Message<br>– Options available: Disabled, Enabled. Default setting is **Enabled**.<br>◆ REGION_SELECT Message(Note)<br>– Options available: Disabled, Enabled. Default setting is **Disabled**.<br>◆ WATCHDOG_CONTROL Message<br>– Options available: Disabled, Enabled. Default setting is **Enabled**.<br>◆ Disable WATCHDOG in SPS<br>– Options available: Disabled, Enabled. Default setting is **Disabled**.<br>◆ ARB SVN Commit Message<br>– Options available: Disabled, Enabled. Default setting is **Disabled**.<br>◆ CF9 global reset promotion<br>– Options available: Disabled, Enabled. Default setting is **Disabled**.<br>◆ Global Reset Lock<br>– Options available: Disabled, Enabled. Default setting is **Enabled**.<br>◆ HECI-1/2/3/4 Enable<br>– Options available: Disabled, Enabled, Auto. Default setting is **Auto**.<br>◆ IDEr Enable<br>– Options available: Disabled, Enabled, Auto. Default setting is **Auto**. |

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

| Parameter | Description |
|---|---|
| Server ME General Configuration (Continued) | ◆ HECI-1/2/3/4 Hide in ME<br>– Options available: Off, Hide, Disabled. Default setting is **Off**.<br>◆ DOI3 Setting for HECI Disable<br>– Options available: Disabled, Enabled. Default setting is **Disabled**.<br>◆ Break RTC Configuration<br>– Options available: Disabled, Enabled. Default setting is **Disabled**.<br>◆ Core Bios Done Message<br>– Options available: Disabled, Enabled. Default setting is **Enabled**.<br>◆ Delayed Authentication Mode (DAM) Override(Note)<br>– Options available: Disabled, Enabled. Default setting is **Disabled**.<br>◆ Delayed Authentication Mode (DAM)<br>– Options available: Disabled, Enabled. Default setting is **Disabled**.<br>◆ MCTP Broadcast Cycle<br>– Options available: Disabled, Enabled. Default setting is **Enabled**. |
| NM Configuration | Press [Enter] to configure advanced items.<br>◆ Power Measurement Override<br>– Options available: Disabled, Enabled. Default setting is **Disabled**.<br>◆ Power Measurement(Note)<br>– Options available: Disabled, Enabled. Default setting is **Disabled**.<br>◆ Hardware Change Override<br>– Options available: Disabled, Enabled. Default setting is **Disabled**.<br>◆ Hardware Change(Note)<br>– Options available: No, Yes. Default setting is **No**.<br>◆ PTU Load Override<br>– Options available: Disabled, Enabled. Default setting is **Disabled**. |
| ME UEFI FW Health Status | Press [Enter] to view the information of ME firmware status. |

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

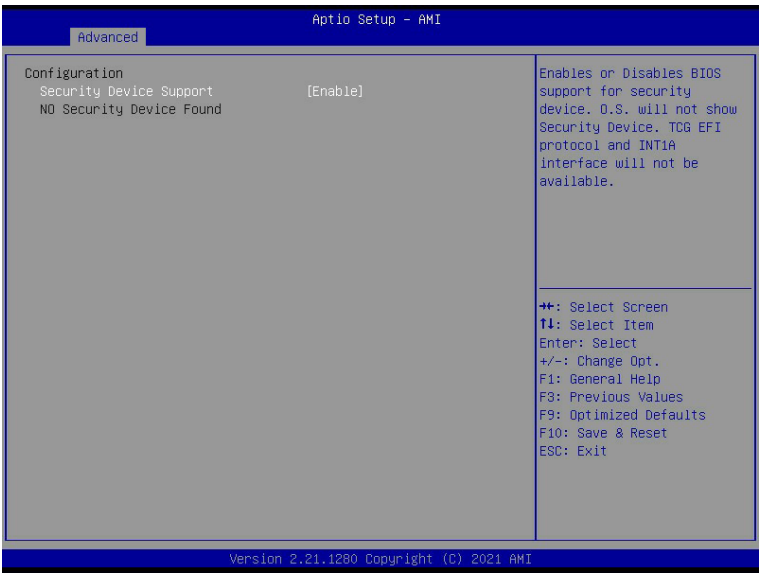
## 2-2-5 System Event Log




| Parameter | Description |
|---|---|
| System Errors(Note) | Options available: Disabled, Enabled. Default setting is **Disabled**. |
| Whea Driver Support | Enable/Disable Whea Driver Support.<br>Options available: Disabled, Enabled. Default setting is **Disabled**. |
| Memory Error Enabling | Press [Enter] to configure advanced items.<br>◆ Memory corrected Error enabling<br>– Options available: Disabled, Enabled. Default setting is **Disabled**.<br>◆ Memory uncorrected Error enabling<br>– Options available: Disabled, Enabled. Default setting is **Disabled**. |
| PCH Error Enable | Options available: No, Yes. Default setting is **No**. |

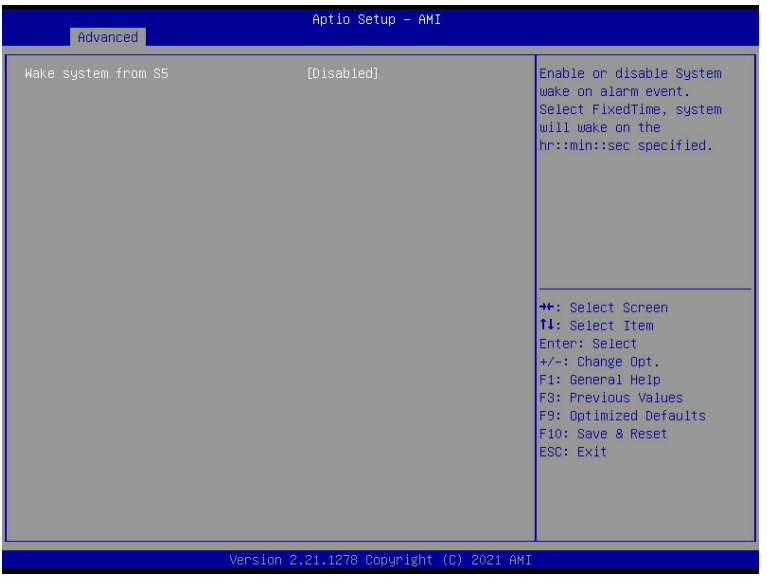
(Note) Advanced items prompt when this item is defined.

## 2-2-6 Trusted Computing



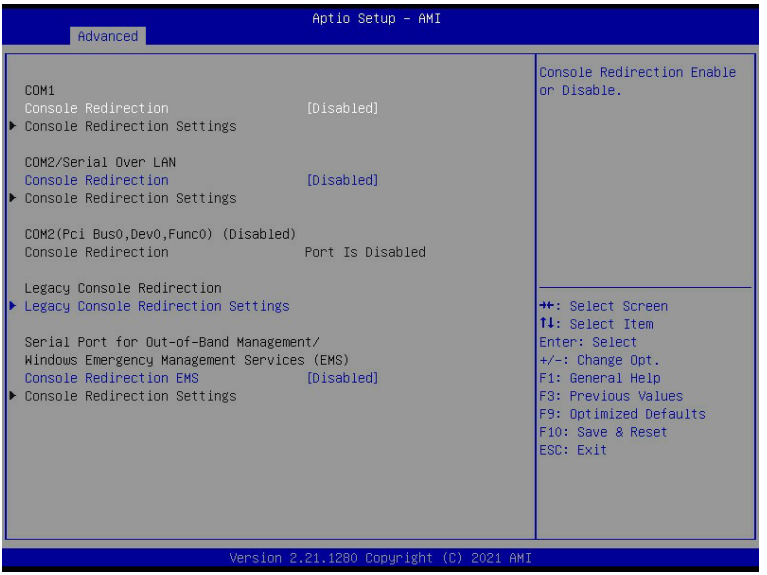

| Parameter | Description |
|---|---|
| Configuration | |
| Security Device Support | Enable/Disable BIOS support for security device. OS will not show security device. TCG EFI protocol and INT1A interface will not be available.<br>Options available: Enable, Disable. Default setting is **Enable**. |

## 2-2-7 S5 RTC Wake Settings




| Parameter | Description |
|---|---|
| Wake System from S5 | Enable/Disable system wake on alarm event.<br>Options available: Disabled, Fixed Time. When Fixed Time is selected, system will wake on the hr::min::sec specified.<br>Default setting is **Disabled**. |

## 2-2-8 Serial Port Console Redirection




| Parameter | Description |
|---|---|
| COM Console Redirection(Note) | Console redirection enables the users to manage the system from a remote location.<br>Options available: Enabled, Disabled. Default setting is **Disabled**. |
| COM Console Redirection Settings | Press [Enter] to configure advanced items.<br>**Please note that this item is configurable when COM Console Redirection is set to Enabled.**<br>◆ Terminal Type<br>– Selects a terminal type to be used for console redirection.<br>– Options available: VT100, VT100+, ANSI, VT-UTF8. Default setting is **VT100+**.<br>◆ Bits per second<br>– Selects the transfer rate for console redirection.<br>– Options available: 9600, 19200, 38400, 57600, 115200. Default setting is **115200**.<br>◆ Data Bits<br>– Selects the number of data bits used for console redirection.<br>– Options available: 7, 8. Default setting is **8**. |

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

| Parameter | Description |
|---|---|
| COM Console Redirection Settings (continued) | ◆ Parity<br>– A parity bit can be sent with the data bits to detect some transmission errors.<br>– Even: parity bit is 0 if the num of 1's in the data bits is even.<br>– Odd: parity bit is 0 if num of 1's in the data bits is odd.<br>– Mark: parity bit is always 1. Space: Parity bit is always 0.<br>– Mark and Space Parity do not allow for error detection.<br>– Options available: None, Even, Odd, Mark, Space. Default setting is **None**.<br>◆ Stop Bits<br>– 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.<br>– Options available: 1, 2. Default setting is **1**.<br>◆ Flow Control<br>– 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.<br>– Options available: None, Hardware RTS/CTS. Default setting is **None**.<br>◆ VT-UTF8 Combo Key Support<br>– Enable/Disable the VT-UTF8 Combo Key Support.<br>– Options available: Enabled, Disabled. Default setting is **Enabled**.<br>◆ Recorder Mode<br>– When this mode enabled, only texts will be send. This is to capture Terminal data.<br>– Options available: Enabled, Disabled. Default setting is **Disabled**.<br>◆ Resolution 100x31<br>– Enable/Disable extended terminal resolution.<br>– Options available: Enabled, Disabled. Default setting is **Enabled**.<br>◆ Putty KeyPad<br>– Selects FunctionKey and KeyPad on Putty.<br>– Options available: VT100, LINUX, XTERMR6, SC0, ESCN, VT400. Default setting is **VT100**. |

| Parameter | Description |
|---|---|
| Legacy Console Redirection | |
| Legacy Console Redirection Settings | Press [Enter] to configure advanced items.<br>◆ Redirection COM Port<br>– Selects a COM port for Legacy serial redirection.<br>– Default setting is **COM1**.<br>◆ Resolution<br>– Selects the number of rows and columns used in Console Redirection for legacy OS support.<br>– Options available: 80x24, 80x25. Default setting is **80x24**.<br>◆ Redirect After POST<br>– When Bootloader is selected, then Legacy Console Redirection is disabled before booting to legacy OS. When Always Enable is selected, then Legacy Console Redirection is enabled for legacy OS.<br>– Options available: Always Enable, BootLoader. Default setting is **Always Enable**. |
| Serial Port for Out-of-Band Management / Windows Emergency Management Services (EMS) Console Redirection(Note) | EMS console redirection allows the user to configure Console Redirection Settings to support Out-of-Band Serial Port management.<br>Options available: Enabled, Disabled. Default setting is **Disabled**. |
| Serial Port for Out-of-Band EMS Console Redirection Settings | Press [Enter] to configure advanced items.<br>**Please note that this item is configurable when Serial Port for Out-of-Band Management EMS Console Redirection is set to Enabled.**<br>◆ Out-of-Band Mgmt Port<br>– Microsoft Windows Emergency Management Service (EMS) allows for remote management of a Windows Server OS through a serial port.<br>– Default setting is **COM1**.<br>◆ Terminal Type EMS<br>– Selects a terminal type to be used for console redirection.<br>– Options available: VT100, VT100+, ANSI, VT-UTF8. Default setting is **VT100+**.<br>◆ Bits per second EMS<br>– Selects the transfer rate for console redirection.<br>– Options available: 9600, 19200, 57600, 115200. Default setting is **115200**. |

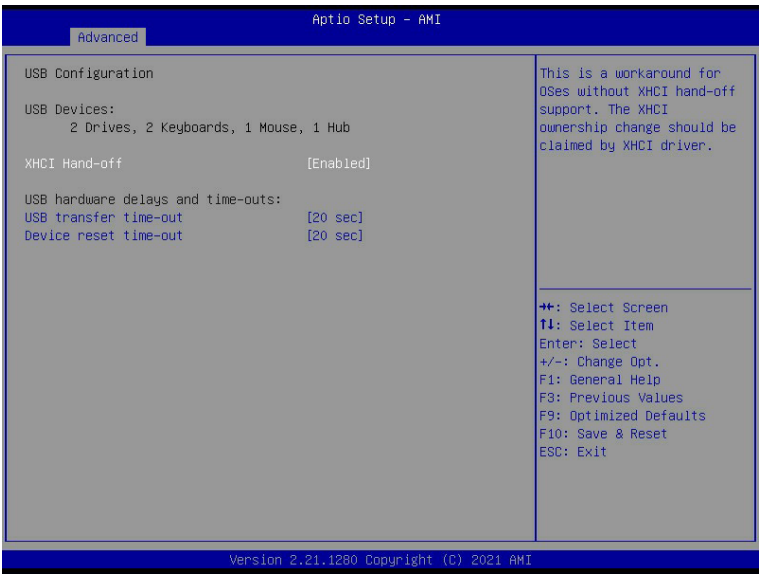
(Note) Advanced items prompt when this item is defined.

| Parameter | Description |
| --- | --- |
| Serial Port for Out-of-Band EMS Console Redirection Settings(continued) | ◆ Flow Control EMS<br>– 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.<br>– Options available: None, Hardware RTS/CTS, Software Xon/Xoff. Default setting is **None**. |

## 2-2-9 SIO Configuration

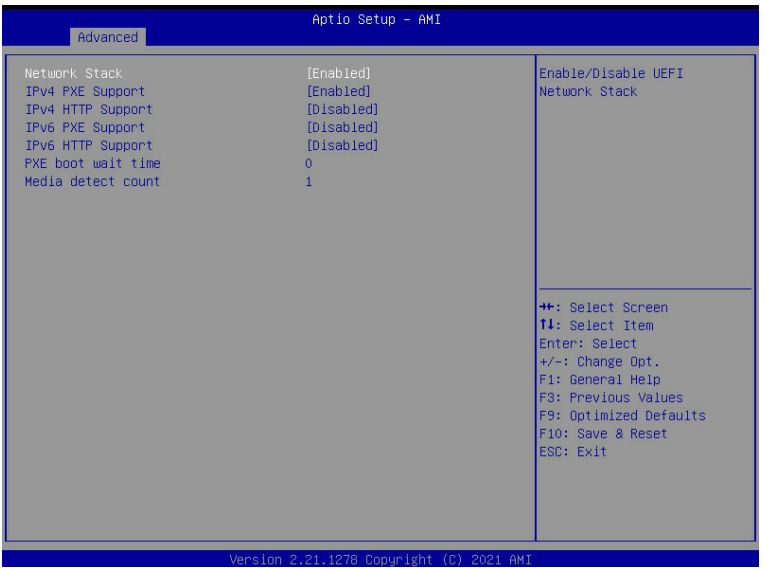

| Parameter | Description |
|---|---|
| AMI SIO Driver Version | Displays the AMI SIO driver version information. |
| Super IO Chip Logical Device(s) Configuration | |
| [*Active*] Serial Port 1/2 | Press [Enter] to configure advanced items.<br>◆ Use This Device<br>– When set to Enabled allows you to configure the serial port settings. When set to Disabled, displays no configuration for the serial port.<br>– Options available: Enabled, Disabled. Default setting is **Enabled**.<br>◆ Current:<br>– Displays the serial port base I/O address and IRQ.<br>◆ Possible:<br>– Configures the serial port base I/O address and IRQ.<br>Use Automatic Settings<br>IO=3F8h; IRQ=4; DMA;<br>IO=3F8h; IRQ=4; DMA;<br>IO=2F8h; IRQ=4; DMA;<br>IO=3E8h; IRQ=4; DMA;<br>IO=2E8h; IRQ=4; DMA;<br>Default setting is **Use Automatic Settings**. |

## 2-2-10 USB Configuration



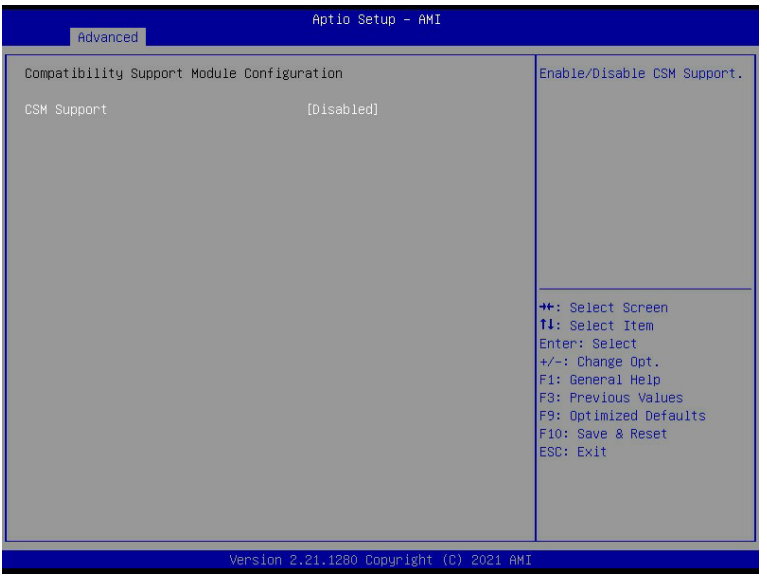

| Parameter | Description |
|---|---|
| USB Configuration | |
| USB Devices: | Displays the USB devices connected to the system. |
| XHCI Hand-off | Enable/Disable the XHCI (USB 3.0) Hand-off support.<br>Options available: Disabled, Enabled. Default setting is **Enabled**. |
| USB hardware delays and time-outs | |
| USB transfer time-out | Select the time-out value for USB Control/Bulk/Interrupt transfers.<br>Options available: 1 sec, 5 sec, 10 sec, 20 sec.<br>Default setting is **20 sec**. |
| Device reset time-out | Select the time-out value during a USB mass storage device reset.<br>Options available: 10 sec, 20 sec, 30 sec, 40 sec.<br>Default setting is **20 sec**. |

## 2-2-11 Network Stack Configuration




| Parameter | Description |
|---|---|
| Network Stack | Enable/Disable the UEFI network stack.<br>Options available: Enabled, Disabled. Default setting is **Enabled**. |
| Ipv4 PXE Support | Enable/Disable the Ipv4 PXE feature.<br>Options available: Enabled, Disabled. Default setting is **Enabled**. |
| Ipv4 HTTP Support | Enable/Disable the Ipv4 HTTP feature.<br>Options available: Enabled, Disabled. Default setting is **Disabled**. |
| Ipv6 PXE Support | Enable/Disable the Ipv6 PXE feature.<br>Options available: Enabled, Disabled. Default setting is **Enabled**. |
| Ipv6 HTTP Support | Enable/Disable the Ipv6 HTTP feature.<br>Options available: Enabled, Disabled. Default setting is **Disabled**. |
| PXE boot wait time | Wait time in seconds to press ESC key to abort the PXE boot.<br>Press the <+> / <-> keys to increase or decrease the desired values. |
| Media detect count | Number of times the presence of media will be checked.<br>Press the <+> / <-> keys to increase or decrease the desired values. |

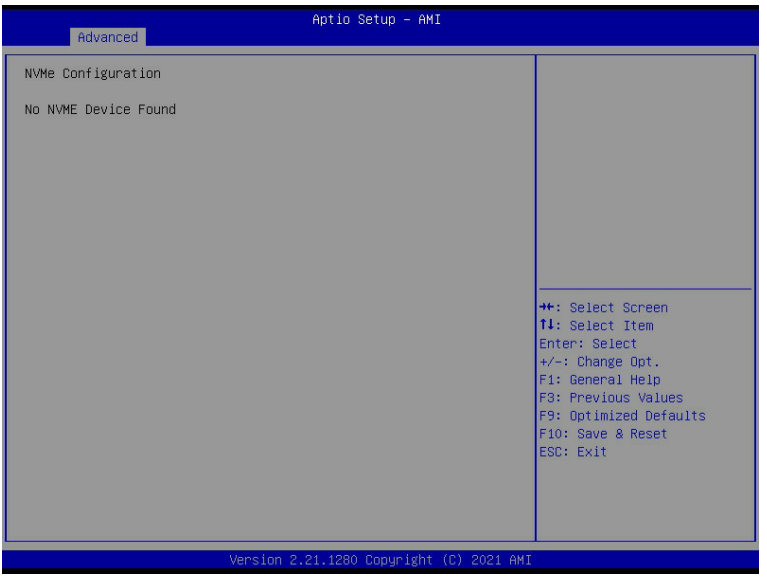
## 2-2-12 CSM Configuration




| Parameter | Description |
|---|---|
| Compatibility Support Module Configuration | |
| CSM Support(Note) | Options available: Enabled, Disabled. Default setting is **Disabled**. |
| Boot option filter | Options available: UEFI and Legacy, Legacy only, UEFI only. Default setting is **UEFI only**. |
| Option ROM execution - Network/Storage/Video/ Other PCI devices | Options available: Do not launch, UEFI, Legacy. Default setting is **UEFI**. |

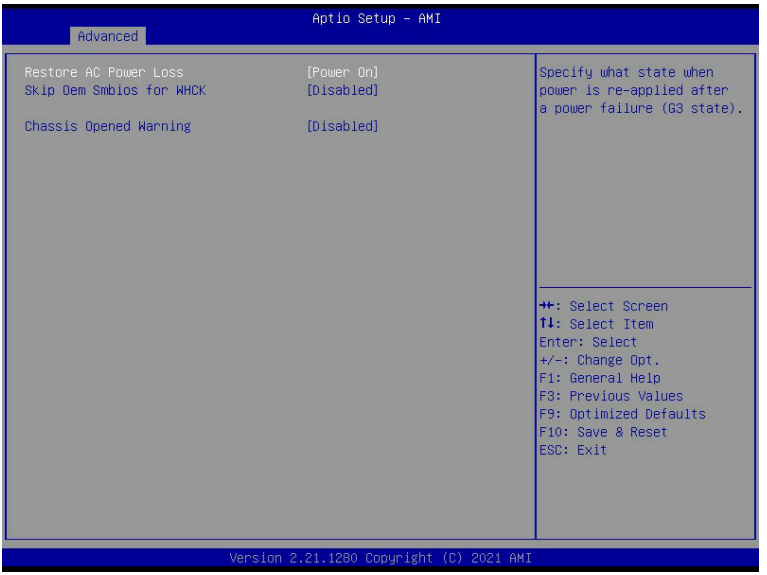
(Note) Advanced items prompt when this item is defined.

## 2-2-13 NVMe Configuration




| Parameter | Description |
|---|---|
| NVMe Configuration | Displays the NVMe devices connected to the system. |

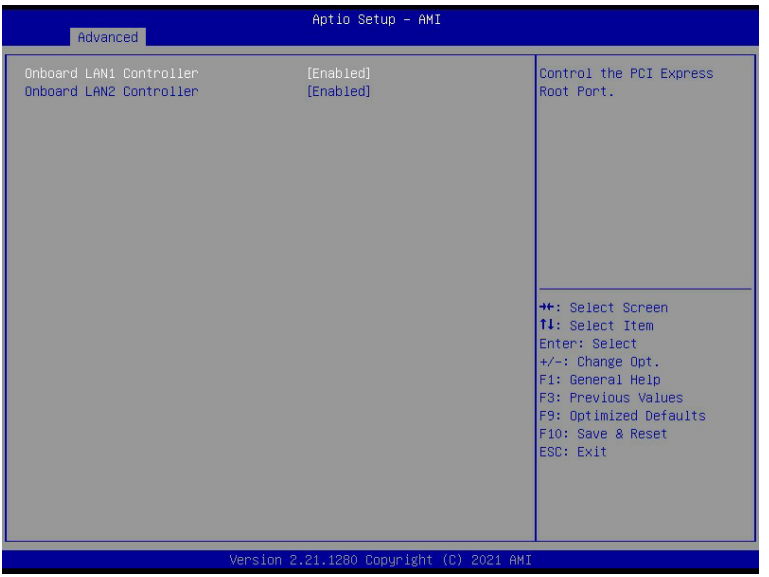
## 2-2-14 Chipset Configuration




| Parameter | Description |
|---|---|
| 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 Power Off, the system remains off after power shutdown.<br>Options available: Last State, Power Off, Power On, Unspecified. The default setting depends on the BMC setting. |
| Skip Oem smbios for WHK | Options available: Enabled, Disabled. Default setting is **Disabled**. |
| Chassis Opened Warning | Enable/Disable the chassis intrusion alert function.<br>Options available: Enabled, Disabled, Clear. Default setting is **Disabled**. |

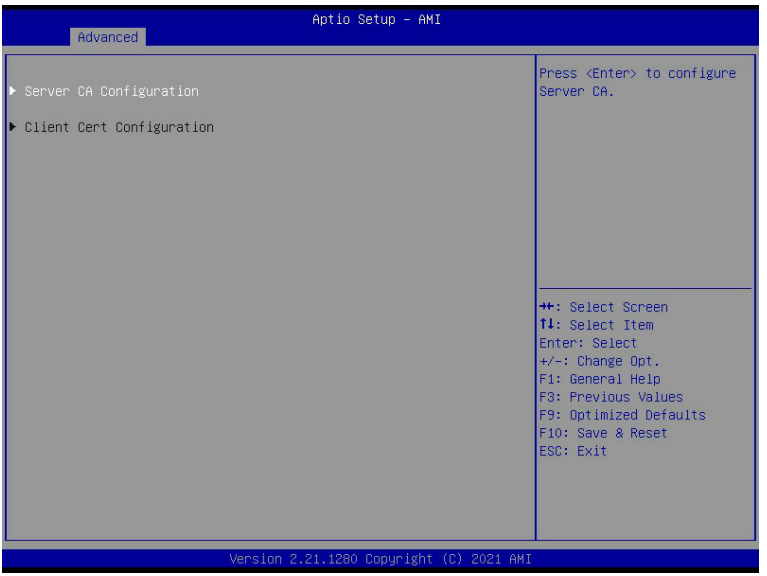
(Note) When the power policy is controlled by BMC, please wait for 15-20 seconds for BMC to save the last power state.

## 2-2-15 M/B Slot



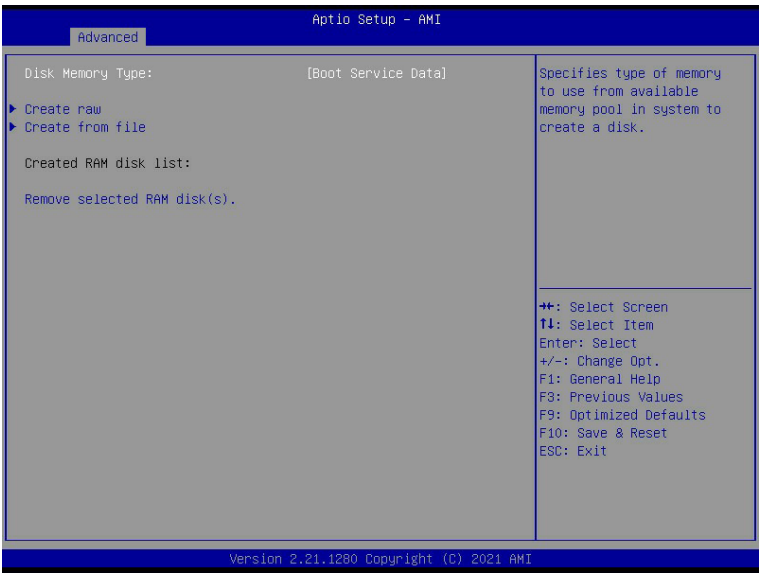

| Parameter | Description |
|---|---|
| Onboard LAN 1/2 Controller | Options available: Enabled, Disabled. Default setting is **Disabled**. |

## 2-2-16 Tls Auth Configuration



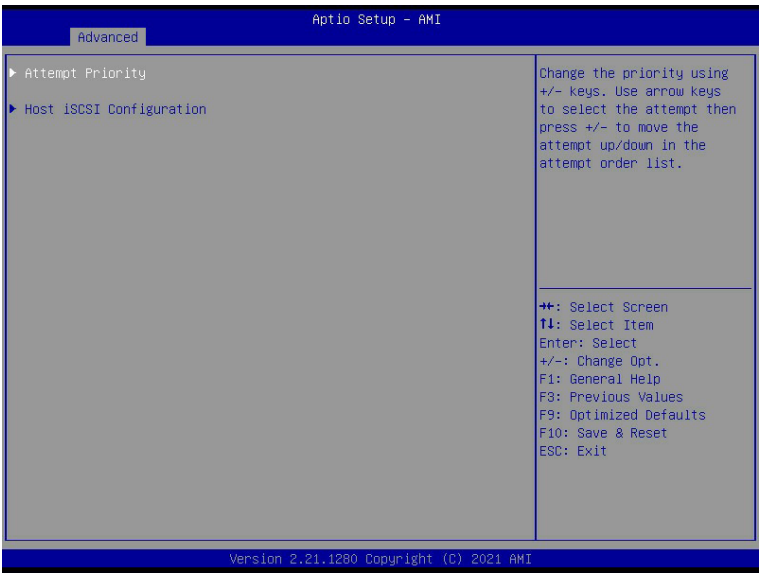

| Parameter | Description |
|---|---|
| Server CA Configuration | Press [Enter] for configuration of advanced items.<br>◆ Enroll Cert<br>– Press [Enter] to enroll a certificate<br>• Enroll Cert Using File<br>• Cert GUID<br>Input digit character in 1111111-2222-3333-4444-1234567890ab format.<br>– Commit Changes and Exit<br>– Discard Changes and Exit<br>◆ Delete Cert |
| Client Cert Configuration | Press [Enter] for configuration of advanced items. |

## 2-2-17 RAM Disk Configuration



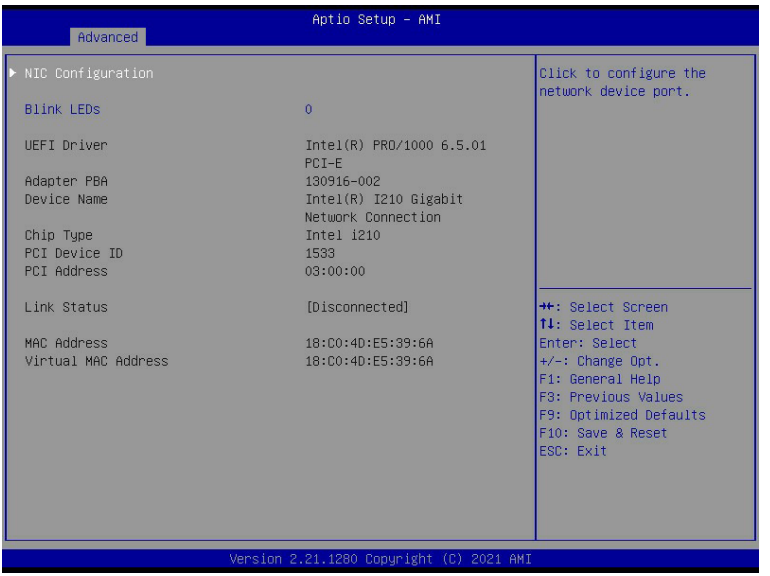

| Parameter | Description |
|---|---|
| Disk Memory Type | Specifies the type of memory to use from available memory pool in system to create a disk.<br>Options available: Boot Service Data, Reserved. Default setting is **Boot Service Data**. |
| Create raw | ◆ Size (Hex)<br>– The valid RAM disk size should be multiples of the RAM disk block size. Default setting is **1**.<br>◆ Create & Exit<br>◆ Discard & Exit |
| Create from file | To create a RAM disk from a file. |
| Create RAM Disk List | |
| Remove selected RAM disk(s) | To delete the RAM disk(s). |

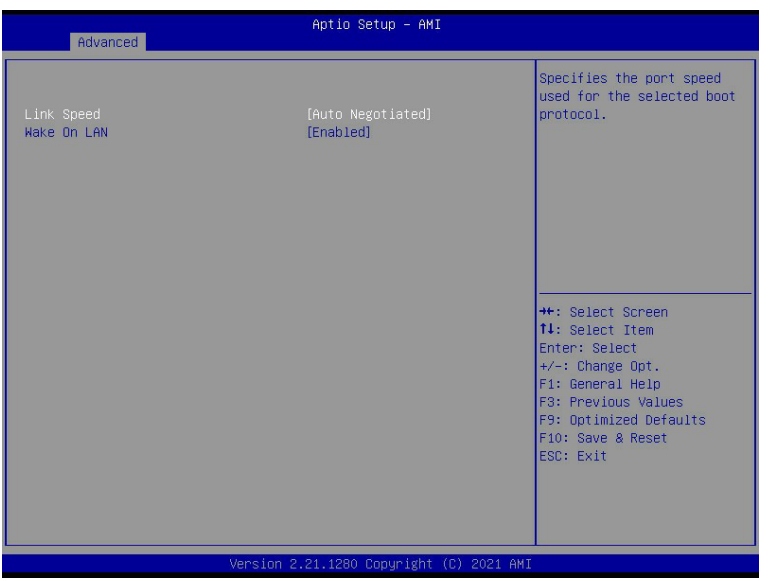
## 2-2-18 iSCSI Configuration




| Parameter | Description |
|---|---|
| Attempt Priority | Press [Enter] configure advanced items.<br>◆ Attempt Priority<br>– Options available: Host Attempt, Redfish Attempt. Default setting is **Host Attempt**.<br>◆ Commit Changes and Exit |
| Host iSCSI Configuration | Press [Enter] to configure advanced items.<br>◆ iSCSI Initiator Name<br>– Only IQN format is accepted. Range: from 4 to 223<br>◆ Add an Attempt<br>◆ Delete Attempts<br>◆ Change Attempt Order |

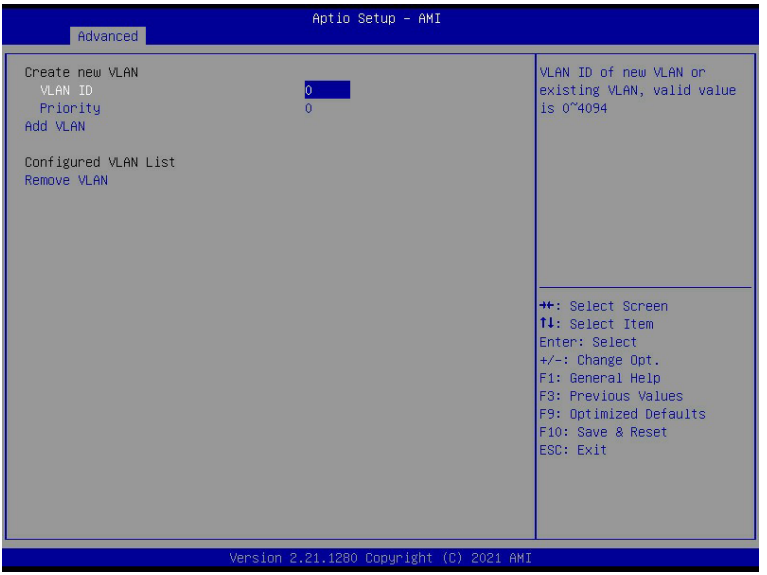
## 2-2-19 Intel(R) I210 Gigabit Network Connection



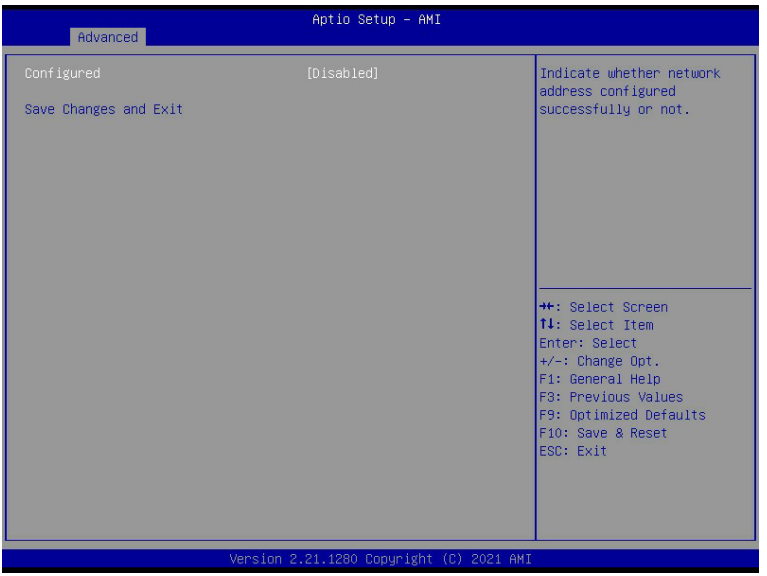
| Parameter | Description |
|---|---|
| NIC Configuration | Press [Enter] to configure advanced items.<br>◆ Link Speed<br>– Allows for automatic link speed adjustment.<br>– Options available: Auto Negotiated, 10 Mbps Half, 10 Mbps Full, 100 Mbps Half, 100 Mbps Full. Default setting is **Auto Negotiated**.<br>◆ Wake On LAN<br>– Enables power on of the system via LAN. Note that configuring Wake on LAN in the operating system does not change the value of this setting, but does override the behavior of Wake on LAN in OS controlled power states.<br>– Options available: Disabled, Enabled. Default setting is **Disabled**. |
| Blink LEDs | Identifies the physical network port by blinking the associated LED.<br>Press the numeric keys to adjust desired values (up to 15 seconds). |
| UEFI Driver | Displays the technical specifications for the Network Interface Controller. |
| Adapter PBA | Displays the technical specifications for the Network Interface Controller. |
| Device Name | Displays the technical specifications for the Network Interface Controller. |
| Chip Type | Displays the technical specifications for the Network Interface Controller. |
| PCI Device ID | Displays the technical specifications for the Network Interface Controller. |
| PCI Address | Displays the technical specifications for the Network Interface Controller. |
| Link Status | Displays the technical specifications for the Network Interface Controller. |
| MAC Address | Displays the technical specifications for the Network Interface Controller. |
| Virtual MAC Address | Displays the technical specifications for the Network Interface Controller. |

## 2-2-20 VLAN Configuration




| Parameter | Description |
|---|---|
| Enter Configuration Menu | Press [Enter] to configure advanced items.<br>◆ Create new VLAN<br>◆ VLAN ID<br>– Sets VLAN ID for a new VLAN or an existing VLAN.<br>– Press the <+> / <-> keys to increase or decrease the desired values.<br>– The valid range is from 0 to 4094.<br>◆ Priority<br>– Sets 802.1Q Priority for a new VLAN or an existing VLAN.<br>– Press the <+> / <-> keys to increase or decrease the desired values.<br>– The valid range is from 0 to 7.<br>◆ Add VLAN<br>– Press [Enter] to create a new VLAN or update an existing VLAN.<br>◆ Configured VLAN List<br>◆ Remove VLAN<br>– Press [Enter] to remove an existing VLAN. |

## 2-2-21 IPv4 Network Configuration




| Parameter | Description |
|---|---|
| Configured | Indicates whether network address is configured successfully or not.<br>Options available: Enabled, Disabled. Default setting is **Disabled.** |
| Enable DHCP(Note) | Options available: Enabled, Disabled. Default setting is **Disabled.** |
| Local IP Address(Note) | Press [Enter] to configure local IP address. |
| Local NetMask(Note) | Press [Enter] to configure local NetMask. |
| Local Gateway(Note) | Press [Enter] to configure local Gateway |
| Local DNS Servers(Note) | Press [Enter] to configure local DNS servers |
| Save Changes and Exit | Press [Enter] to save all configurations. |

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

## 2-2-22 MAC IPv6 Network Configuration

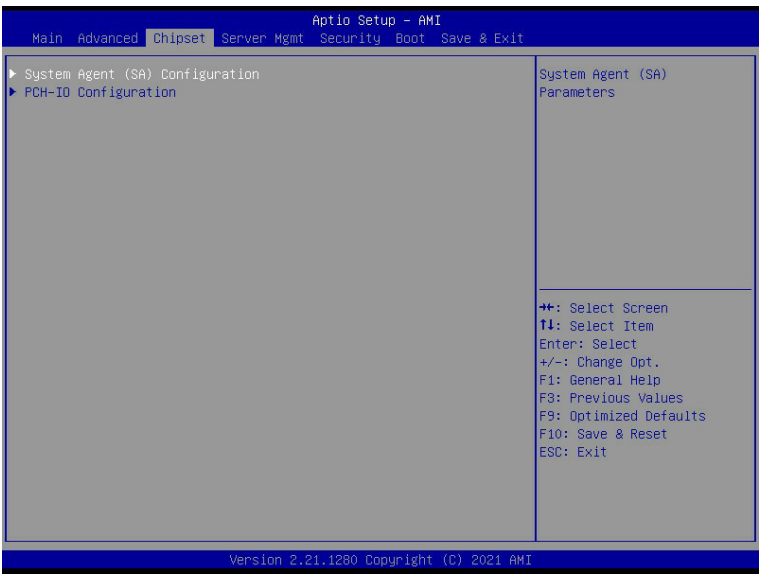

| Parameter | Description |
|---|---|
| Enter Configuration Menu | Press [Enter] to configure advanced items.<br>◆ Displays the MAC Address information.<br>◆ Interface ID<br>– The 64 bit alternative interface ID for the device. The string is colon separated. e.g. ff:dd:88:66:cc:1:2:3.<br>◆ DAD Transmit Count<br>– The number of consecutive Neighbor solicitation messages sent while performing Duplicate Address Detection on a tentative address. A value of zero indicates that Duplicate Address Detection is not performed.<br>◆ Policy<br>– Options available: automatic, manual. Default setting is **automatic**.<br>◆ Save Changes and Exit<br>– Press [Enter] to save all configurations. |

## 2-2-23 Driver Health


| Parameter | Description |
|---|---|
| Driver Health | Displays driver health status of the devices/controllers if installed. |

## 2-3 Chipset Menu

Chipset Setup menu displays submenu options for configuring the function of Platform Controller Hub(PCH). Select a submenu item, then press <Enter> to access the related submenu screen.



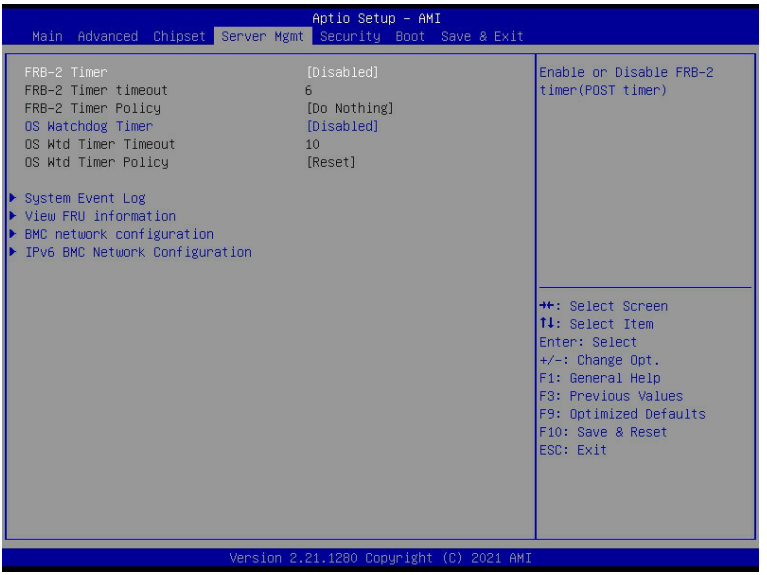
## 2-3-1 System Agent (SA) Configuration


| Parameter | Description |
|---|---|
| Memory Configuration | Press [Enter] to configure advanced items.<br>◆ Memory<br>– Press [Enter] to view/configure memory overclocking menu.<br>◆ Memory Configuration<br>◆ Memory Frequency<br>– Displays the frequency information of installed memory.<br>◆ Channel and slot information of memory DIMMs.<br>◆ Max TOLUD<br>– Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller<br>– Default setting is **Dynamic**. |
| CRID Support | Enable/Disable SA CRID and TCSS CRID control for Intel SIPP.<br>Options available: Enabled, Disabled. Default setting is **Disabled**. |
| Above 4GB MMIO BIOS assignment | Enable/Disable the Above 4G Memory Mapped IO BIOS Assignment.<br>Options available: Enabled, Disabled. Default setting is **Enabled** |

## 2-3-2 PCH-IO Configuration


| Parameter | Description |
|---|---|
| PCH-IO Configuration | |
| SATA And RST Configuration | Press [Enter] to configure advanced items.<br>◆ SATA Controller<br>– Enable/Disable SATA controller.<br>– Options available: Enabled, Disabled. Default setting is **Enabled**.<br>◆ SATA Mode Selection<br>– Configures on chip SATA type.<br>– Options available: AHCI, Intel RST Premium with Intel Optane System Acceleration. Default setting is **AHCI**.<br>◆ SATA Port #<br>– The category identifies SATA hard drives that are installed in the computer. System will automatically detect HDD type. |
| Security Configuration | Press [Enter] to configure advanced items.<br>◆ BIOS Lock<br>– Enable/Disable the PCH BIOS Lock Enable feature.<br>– Options available: Disabled, Enabled. Default setting is **Enabled**. |

## 2-4 Server Management Menu

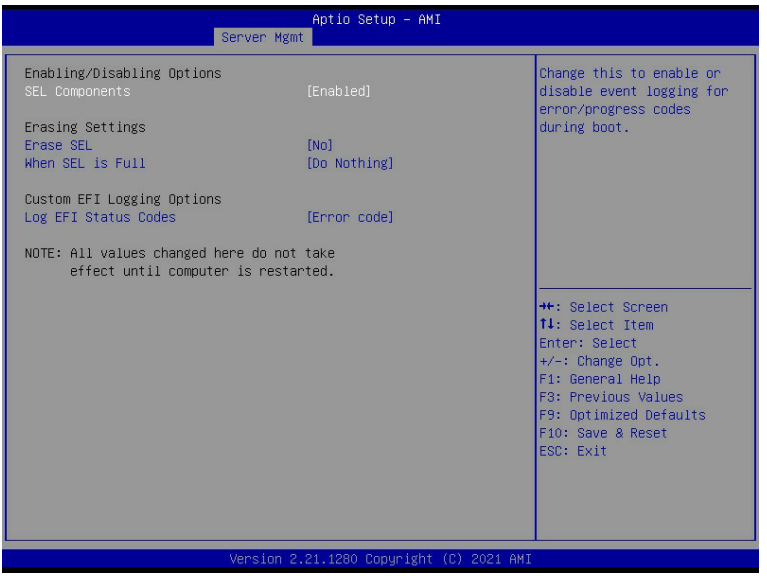



| Parameter | Description |
|---|---|
| FRB-2 Timer | Enable/Disable FRB-2 timer (POST timer).<br>Options available: Enabled, Disabled. Default setting is **Disabled**. |
| FRB-2 Timer timeout(Note1) | Configures the FRB2 Timer timeout.<br>Options available: 3 minutes, 4 minutes, 5 minutes, 6 minutes. Default setting is **6 minutes**. |
| FRB-2 Timer Policy(Note1) | Configures the FRB2 Timer policy.<br>Options available: Do Nothing, Reset, Power Down, Power Cycle.<br>Default setting is **Do Nothing**. |
| OS Watchdog Timer | Enable/Disable OS Watchdog Timer function.<br>Options available: Enabled, Disabled. Default setting is **Disabled**. |
| OS Wtd Timer Timeout(Note2) | Configures OS Watchdog Timer.<br>Options available: 5 minutes, 10 minutes, 15 minutes, 20 minutes. Default setting is **10 minutes**. |
| OS Wtd Timer Policy(Note2) | Configure OS Watchdog Timer Policy.<br>Options available: Reset, Do Nothing, Power Down, Power Cycle. Default setting is **Reset**. |

(Note1) This item is configurable when **FRB-2 Timer** is set to **Enabled**.
(Note2) This item is configurable when **OS Watchdog Timer** is set to **Enabled**.

| Parameter | Description |
|---|---|
| System Event Log | Press [Enter] to configure advanced items. |
| View FRU Information | Press [Enter] to view the FRU information. |
| BMC network Configuration | Press [Enter] to configure advanced items. |
| IPv6 BMC Network Configuration | Press [Enter] to configure advanced items. |

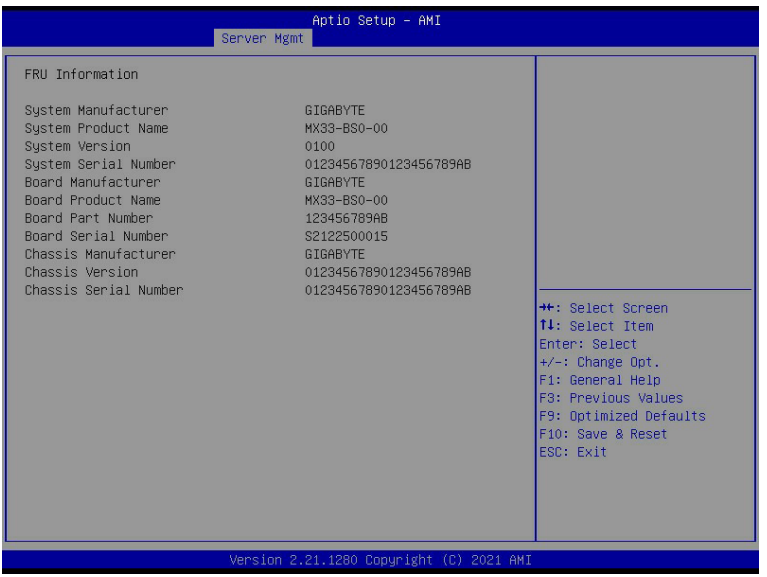
## 2-4-1 System Event Log




| Parameter | Description |
|---|---|
| Enabling / Disabling Options | |
| SEL Components | Change this item to enable or disable all features of System Event Logging during boot.<br>Options available: Enabled, Disabled. Default setting is **Enabled**. |
| Erasing Settings | |
| Erase SEL | Choose options for erasing SEL.<br>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.<br>Options available: Do Nothing, Erase Immediately, Delete Oldest Record. 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).<br>Options available: Disabled, Both, Error code, Progress code. Default setting is **Error code**. |

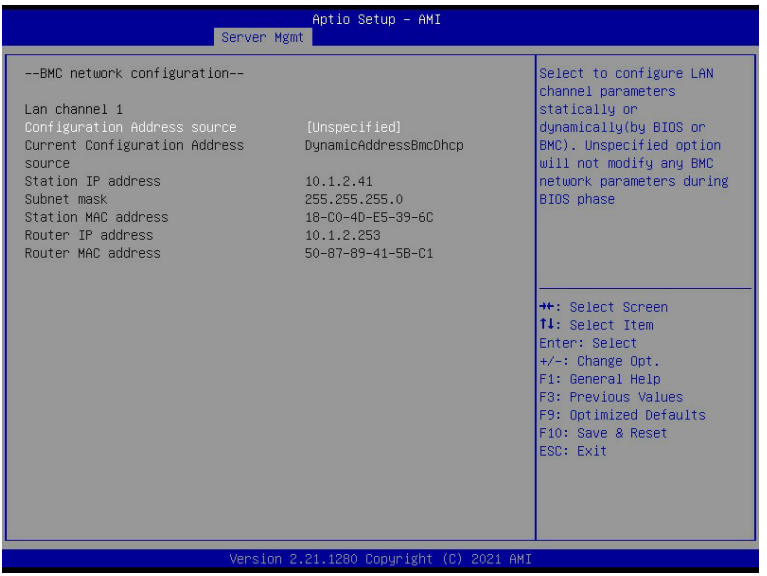
## 2-4-2 View FRU Information

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.




(Note) The model name will vary depends on the product you purchased

## 2-4-3 BMC Network Configuration



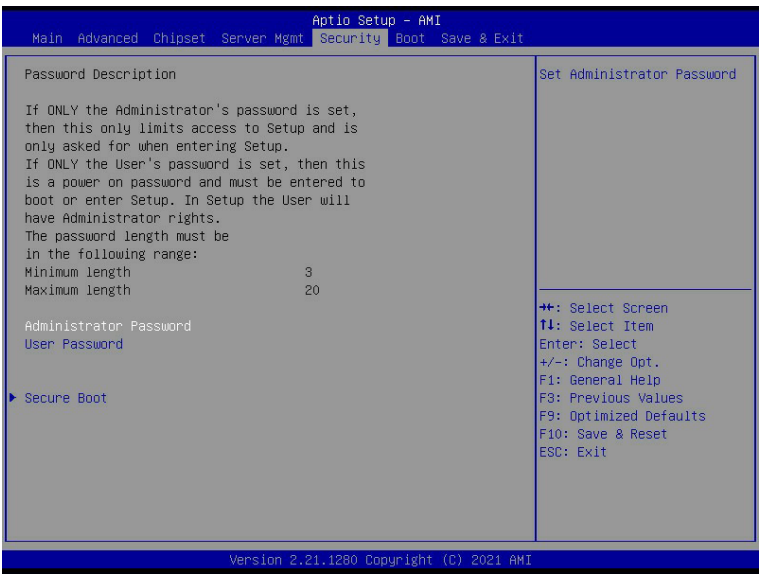

| Parameter | Description |
|---|---|
| BMC network configuration | |
| Lan Channel 1 | |
| Configuration Address source | Selects to configure LAN channel parameters statically or dynamically (by BIOS or BMC).<br>Options available: Unspecified, Static, DynamicBmcDhcp, DynamicBmcNonDhcp. Default setting is **Unspecified**. |
| Current Configuration Address Source | Display the current configuration information. |
| Station IP address | Displays IP Address information. |
| Subnet mask | Displays Subnet Mask information. |
| Station MAC address | Displays the MAC Address information. |
| Router IP address | Displays the Router IP Address information. |
| Router MAC address | Displays the Router MAC Address information. |

## 2-4-4 IPv6 BMC Network Configuration


| Parameter | Description |
|---|---|
| IPv6 BMC network configuration | |
| IPv6 BMC Lan Channel 1 | |
| IPv6 BMC Lan Option | Enable/Disable IPv6 BMC LAN channel function. When this item is disabled, the system will not modify any BMC network during BIOS phase.<br>Options available: Unspecified, Disable, Enable. Default setting is **Enable**. |
| IPv6 BMC Lan IP Address Source | Selects to configure LAN channel parameters statically or dynamically (by BIOS or BMC).<br>Options available: Unspecified, Static, Dynamic-Obtained by BMC running DHCP. Default setting is **Dynamic-Obtained by BMC running DHCP**. |
| IPv6 BMC Lan IP Address/ Prefix Length | Check if the IPv6 BMC LAN IP address matches those displayed on the screen. |

## 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.

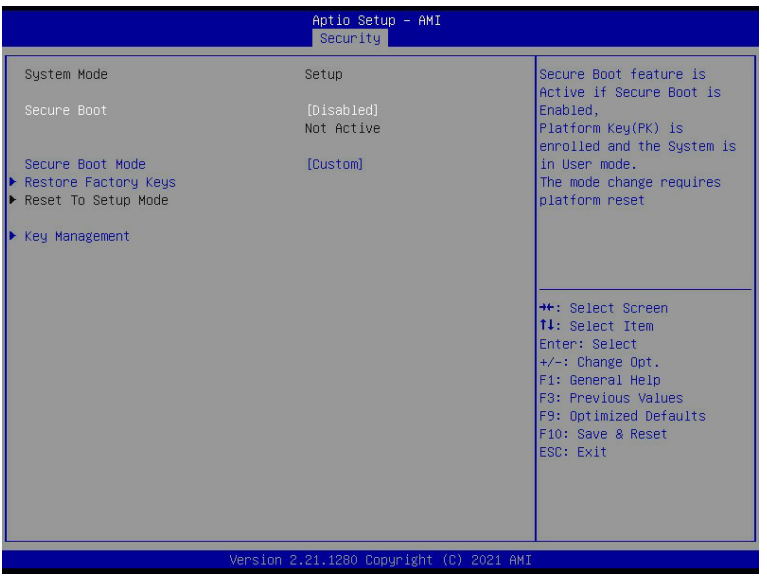
- User Password

  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.

| Parameter | Description |
|---|---|
| Administrator Password | Press [Enter] to configure the administrator password. |
| User Password | Press [Enter] to configure the user password. |
| Secure Boot | Press [Enter] to configure advanced items. |

## 2-5-1 Secure Boot

The Secure Boot submenu is applicable when your device is installed the Windows® 8 (or above) operating system.




| Parameter | Description |
|---|---|
| System Mode | Displays if the system is in User mode or Setup mode. |
| Secure Boot | Enable/ Disable the Secure Boot function.<br>Options available: Enabled, Disabled. Default setting is **Disabled**. |
| Secure Boot Mode(Note) | 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 files being loaded before Windows loads to the login screen have not been tampered with.<br>When set to Standard, it will automatically load the Secure Boot keys form the BIOS databases.<br>When set to Custom, you can customize the Secure Boot settings and manually load its keys from the BIOS database.<br>Options available: Standard, Custom. Default setting is **Standard**. |
| Restore Factory Keys | Forces the system to user mode and installs factory default Secure Boot key database. |
| Reset To Setup Mode | Reset the system to Setup Mode. |

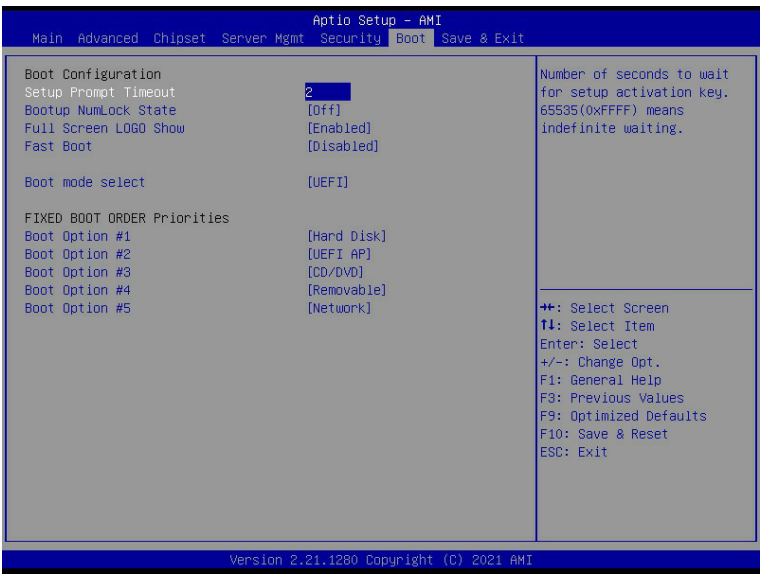
(Note) Advanced items prompt when this item is set to **Custom**.

| Parameter | Description |
|---|---|
| Key Management | Press [Enter] to configure advanced items.<br>**Please note that this item is configurable when Secure Boot Mode is set to Custom.**<br>◆ Factory Key Provision<br>– Allows to provision factory default Secure Boot keys when system is in Setup Mode.<br>– Options available: Enabled, Disabled. Default setting is **Disabled**.<br>◆ Restore Factory Keys<br>– Installs all factory default keys. It will force the system in User Mode.<br>– Options available: Yes, No.<br>◆ Reset To Setup Mode<br>– Reset the system to Setup Mode.<br>– Options available: Yes, No.<br>◆ Export Secure Boot variables<br>– Copy NVRAM content of Secure Boot variables to files in a root folder on a file system device.<br>◆ Enroll Efi Image<br>– Press [Enter] to enroll SHA256 hash of the binary into Authorized Signature Database (db).<br>◆ Device Guard Ready<br>◆ Remove 'UEFI CA' from DB<br>– Press [Enter] to remove Microsoft UEFI CA from Secure Boot DB.<br>◆ Restore DB defaults<br>– Restore DB variable to factory defaults.<br>◆ Secure Boot variable<br>– Displays the current status of the variables used for secure boot.<br>◆ Platform Key (PK)<br>– Displays the current status of the Platform Key (PK).<br>– Press [Enter] to configure a new PK.<br>– Options available: Update.<br>◆ Key Exchange Keys (KEK)<br>– Displays the current status of the Key Exchange Key Database (KEK).<br>– Press [Enter] to configure a new KEK or load additional KEK from storage devices.<br>– Options available: Update, Append.<br>◆ Authorized Signatures (DB)<br>– Displays the current status of the Authorized Signature Database.<br>– Press [Enter] to configure a new DB or load additional DB from storage devices.<br>– Options available: Update, Append.<br>◆ Forbidden Signatures (DBX)<br>– Displays the current status of the Forbidden Signature Database.<br>– Press [Enter] to configure a new dbx or load additional dbx from storage devices.<br>– Options available: Update, Append. |

| Parameter | Description |
| --- | --- |
| Key Management (continued) | ◆ Authorized TimeStamps (DBT)<br>– Displays the current status of the Authorized TimeStamps Database.<br>– Press [Enter] to configure a new DBT or load additional DBT from storage devices.<br>– Options available: Update, Append.<br>◆ OsRecovery Signatures<br>– Displays the current status of the OsRecovery Signature Database.<br>– Press [Enter] to configure a new OsRecovery Signature or load additional OsRecovery Signature from storage devices.<br>– Options available: Update, Append. |

## 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.




| Parameter | Description |
|---|---|
| Boot Configuration | |
| Setup Prompt Timeout | Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.<br>Press the numeric keys to input the desired values. |
| Bootup NumLock State | Enable/Disable the Bootup NumLock function.<br>Options available: On, Off. Default setting is **Off**. |
| Full Screen LOGO Show | Enable/Disable showing the logo during POST.<br>Options available: Enabled, Disabled. Default setting is **Enabled**. |
| Fast Boot | Enable/Disable Fast Boot to shorten the OS boot process.<br>Options available: Enabled, Disabled. Default setting is **Disabled**. |
| Boot mode select | Selects the boot mode.<br>Options available: LEGACY, UEFI. Default setting is **UEFI**. |

| Parameter | Description |
| --- | --- |
| FIXED BOOT ORDER Priorities | |
| Boot Option #1 / #2 / #3 / #4 / #5 | Press [Enter] to configure the boot priority.<br>By default, the server searches for boot devices in the following sequence:<br>1. Hard drive.<br>2. CD-COM/DVD drive.<br>3. USB device.<br>4. Network.<br>5. UEFI. |

## 2-7 Save & Exit Menu

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


| Parameter | Description |
|---|---|
| Save Options | |
| Save Changes and Reset | Restarts the system after saving the changes made.<br>Options available: Yes, No. |
| Discard Changes and Reset | Restarts the system without saving any changes.<br>Options available: Yes, No. |
| Default Options | |
| Boot Override | Press [Enter] to configure the device as the boot-up drive. |
| Launch EFI Shell from filesystem device | Attempts to Launch EFI Shell application (Shell.efi) from one of the available file system devices. |

## 2-8 BIOS POST Beep code (AMI standard)

### 2-8-1 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 |

### 2-8-2 DXE 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 |
| 8 | Platform PCI resource requirements cannot be met |