GIGABYTE™

R281-Z91
R281-Z92

AMD EPYC™ 7003 DP Server System - 2U 24-Bay

User Manual

Rev. 100

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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 of 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.

For More Information

For related product specifications, the latest firmware and software, and other information please visit our website at http://www.gigabyte.com

For GIGABYTE distributors and resellers, additional sales & marketing materials are available from our reseller portal: http://reseller.b2b.gigabyte.com

For further technical assistance, please contact your GIGABYTE representative or visit https://esupport.gigabyte.com/ to create a new support ticket

For any general sales or marketing enquiries, you may also message GIGABYTE server directly by email: server.grp@gigabyte.com

Conventions

The following conventions are used in this user's guide:

	**NOTE!** Gives bits and pieces of additional information related to the current topic.
	**CAUTION!** Gives precautionary measures to avoid possible hardware or software problems.
	**WARNING!** Alerts you to any damage that might result from doing or not doing specific actions.

Server Warnings and Cautions

Before installing a server, be sure that you understand the following warnings and cautions.

WARNING!

To reduce the risk of electric shock or damage to the equipment:

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
- Unplug the power cord from the power supply to disconnect power to the equipment.
- Do not route the power cord where it can be walked on or pinched by items placed against it. Pay particular attention to the plug, electrical outlet, and the point where the cord extends from the server.

WARNING!

To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

WARNING!

This server is equipped with high speed fans. Keep away from hazardous moving fan blades during servicing.

CAUTION!

- Do not operate the server for long periods with the access panel open or removed. Operating the server in this manner results in improper airflow and improper cooling that can lead to thermal damage.
- Danger of explosion if battery is incorrectly replaced.
- Replace only with the same or equivalent type recommended by the manufacturer.
- Dispose of used batteries according to the manufacturer's instructions.

Electrostatic Discharge (ESD)

CAUTION!

ESD CAN DAMAGE DRIVES, BOARDS, AND OTHER PARTS. WE RECOMMEND THAT YOU PERFORM ALL PROCEDURES AT AN ESD WORKSTATION. IF ONE IS NOT AVAILABLE, PROVIDE SOME ESD PROTECTION BY WEARING AN ANTI-STATIC WRIST STRAP ATTACHED TO CHASSIS GROUND -- ANY UNPAINTED METAL SURFACE -- ON YOUR SERVER WHEN HANDLING PARTS.

Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges without any component and pin touching. After removing a board from its protective wrapper or from the system, place the board component side up on a grounded, static free surface. Use a conductive foam pad if available but not the board wrapper. Do not slide board over any surface.

System power on/off: To remove power from system, you must remove the system from rack. Make sure the system is removed from the rack before opening the chassis, adding, or removing any non hot-plug components.

Hazardous conditions, devices and cables: Hazardous electrical conditions may be present on power, telephone, and communication cables. Turn off the system and disconnect the cables attached to the system before servicing it. Otherwise, personal injury or equipment damage can result.

Electrostatic discharge (ESD) and ESD protection: ESD can damage drives, boards, and other parts. We recommend that you perform all procedures in this chapter only at an ESD workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground (any unpainted metal surface on the server) when handling parts.

ESD and handling boards: Always handle boards carefully. They can be extremely sensitive to electrostatic discharge (ESD). Hold boards only by their edges. After removing a board from its protective wrapper or from the system, place the board component side up on a grounded, static free surface. Use a conductive foam pad if available but not the board wrapper. Do not slide board over any surface.

Installing or removing jumpers: A jumper is a small plastic encased conductor that slips over two jumper pins. Some jumpers have a small tab on top that can be gripped with fingertips or with a pair of fine needle nosed pliers. If the jumpers do not have such a tab, take care when using needle nosed pliers to remove or install a jumper; grip the narrow sides of the jumper with the pliers, never the wide sides. Gripping the wide sides can dam-age the contacts inside the jumper, causing intermittent problems with the function con-trolled by that jumper. Take care to grip with, but not squeeze, the pliers or other tool used to remove a jumper, or the pins on the board may bend or break.

CAUTION!

Risk of explosion if battery is replaced incorrectly or with an incorrect type. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Table of Contents

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Chapter 1 Hardware Installation

1-1 Installation Precautions

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

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

1-2 Product Specifications

System Dimension	◆ 2U ◆ 438 (W) x 87 (H) x 730 (D) mm
CPU	◆ AMD EPYC™ 7003 processors with AMD 3D V-Cache™ Technology ◆ AMD EPYC™ 7003 series processor family ◆ Dual processors, 7nm ◆ Up to 64-core, 128 threads per processor ◆ cTDP up to 280W Compatible with AMD EPYC™ 7002 series processor family NOTE: If only 1 CPU is installed, some PCIe or memory functions might be unavailable
Socket	◆ Socket SP3
Chipset	◆ System on Chip
Memory	◆ 32 x DIMM slots ◆ DDR4 memory supported only ◆ 8-Channel memory architecture ◆ RDIMM modules up to 128GB supported ◆ LRDIMM modules up to 128GB supported ◆ 3DS RDIMM/LRDIMM modules up to 256GB supported ◆ Memory speed: Up to 3200*/ 2933 MHz NOTE: * Follow BIOS setting and memory QVL list if running 3200 Mhz with 2DPC
LAN	◆ 2 x 1GbE LAN ports (1 x Intel® I350-AT2) ◆ 1 x 10/100/1000 management LAN
Video	◆ Integrated in Aspeed® AST2500 ◆ 2D Video Graphic Adapter with PCIe bus interface ◆ 1920x1200@60Hz 32bpp
Storage (R281-Z91)	◆ Front side: 6 x 2.5" U.2, 18 x 2.5" SATA/SAS hot-swappable HDD/SSD bays ◆ Rear side: 2 x 2.5" SATA/SAS hot-swappable HDD/SSD bays ◆ LSI SAS35x36 expander ◆ Bandwidth: SATAIII 6Gb/s or SAS 12Gb/s per port ◆ Default configuration supports: ◆ 6 x U.2, 0 x SAS/SATA drives ◆ SAS card is required to enable the drive bays
(R281-Z92)	◆ Front side: 24 x 2.5" U.2 hot-swappable HDD/SSD bays ◆ Rear side: 2 x 2.5" SATA/SAS hot-swappable HDD/SSD bays ◆ SAS card is required for SAS devices support

	Expansion Slot (R281-Z91)	◆ Riser Card CRS2133: ◆ - 1 x PCIe x16 slot (Gen3 x16 or x8), Full height half-length ◆ - 1 x PCIe x8 slots (Gen3 x0 or x8), Full height half-length ◆ - 1 x PCIe x8 slots (Gen3 x8), Full height half-length ◆ Riser Card CRS2134: ◆ - 1 x PCIe x16 slot (Gen3 x16 or x8), Full height half-length ◆ - 1 x PCIe x8 slots (Gen3 x0 or x8), Full height half-length ◆ - 1 x PCIe x8 slots (Gen3 x8), Full height half-length, Occupied by CNV3122, 2 x U.2 ports ◆ Riser Card CRS2124: ◆ - 1 x PCIe x8 slots (Gen3 x0 or x8), Low profile half-length ◆ - 1 x PCIe x16 slot (Gen3 x16 or x8), Low profile half-length ◆ 2 x OCP mezzanine slots ◆ - PCIe Gen3 x16 ◆ - Type1, P1, P2, P3, P4, K2, K3 ◆ 1 x M.2 slot: ◆ - M-key ◆ - PCIe Gen3 x4 ◆ - Supports NGFF-2242/2260/2280 cards

	Expansion Slot (R281-Z92)	◆ Riser Card CRS2133: ◆ - 1 x PCIe x16 slot (Gen3 x16 or x8), Full height half-length ◆ - 1 x PCIe x8 slots (Gen3 x0 or x8), Full height half-length ◆ - 1 x PCIe x8 slots (Gen3 x8), Full height half-length, Occupied by CNV3122, 2 x U.2 ports ◆ Riser Card CRS2134: ◆ - 1 x PCIe x16 slot (Gen3 x16 or x8), Full height half-length ◆ - 1 x PCIe x8 slots (Gen3 x0 or x8), Full height half-length ◆ - 1 x PCIe x8 slots (Gen3 x8), Full height half-length ◆ Riser Card CRS2124: ◆ - 1 x PCIe x8 slots (Gen3 x0), Low profile half-length ◆ - 1 x PCIe x16 slot (Gen3 x16), Low profile half-length, Occupied by CNV3124, 4 x U.2 ports ◆ 2 x OCP mezzanine slots ◆ - PCIe Gen3 x16 ◆ - Type1, P1, P2, P3, P4, K2, K3 ◆ - 2 x OCP mezzanine slots are occupied by CNVO124, total 8 x U.2 ports ◆ 1 x M.2 slot: ◆ 1 x M.2 slot: ◆ - M-key ◆ - PCIe Gen3 x4 ◆ - Supports NGFF-2242/2260/2280 cards
	Backplane I/O (R281-Z91)	◆ Front side_CBP20O5: 18 x SATA/SAS and 6 x NVMe ports ◆ Rear side_CBP2020: 2 x SATA/SAS ports (connected to SAS expander) ◆ Front side_CEP26O0: 18 x SATA/SAS expander
	(R281-Z92)	◆ Front side_CBP20O6: 24 x NVMe ports ◆ Rear side_CBP2020: 2 x SATA/SAS ports
	Internal I/O	◆ 6 x SlimSAS connectors ◆ 1 x M.2 slot ◆ 2 x CPU fan headers ◆ 1 x USB 3.0 header ◆ 1 x TPM header ◆ 5 x PCIe expansion slots ◆ 2 x OCP mezzanine slots ◆ 2 x Power supply connectors ◆ 1 x Front panel header ◆ 1 x Back plane board header ◆ 1 x IPMB connector ◆ 1 x Clear CMOS jumper ◆ 1 x BIOS recovery jumper

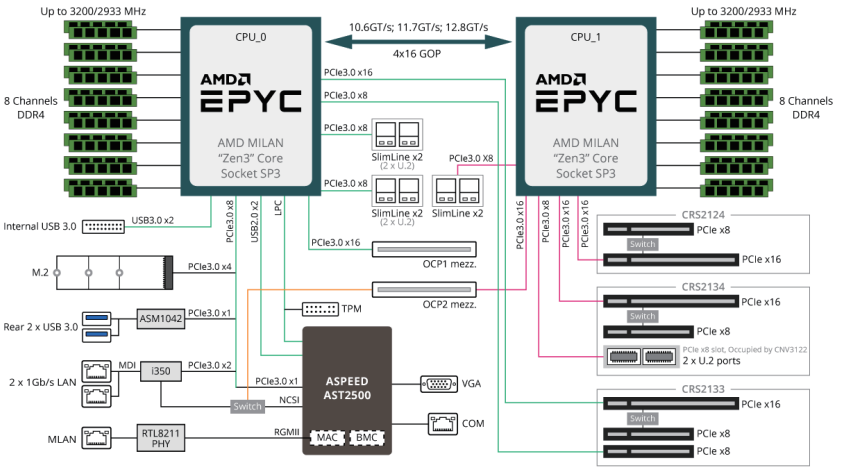
Front Panel I/O	◆ 2 x USB 3.0 ◆ 1 x Power button with LED ◆ 1 x ID button with LED ◆ 1 x Reset button ◆ 1 x NMI button ◆ 1 x System status LED ◆ 1 x HDD activity LED ◆ 2 x LAN activity LEDs
Rear I/O	◆ 2 x USB 3.0 ◆ 1 x VGA ◆ 1 x COM (RJ45 type) ◆ 2 x RJ45 ◆ 1 x MLAN ◆ 1 x ID button with LED
TPM	◆ 1 x TPM header ◆ Optional TPM2.0 kit: CTM000
System Management	◆ Aspeed® AST2500 management controller ◆ GIGABYTE Management Console (AMI MegaRAC SP-X) web interface ◆ Dashboard ◆ HTML5 KVM ◆ Sensor Monitor (Voltage, RPM, Temperature, CPU Status …etc.) ◆ Sensor Reading History Data ◆ FRU Information ◆ SEL Log in Linear Storage / Circular Storage Policy ◆ Hardware Inventory ◆ Fan Profile ◆ System Firewall ◆ Power Consumption ◆ Power Control ◆ LDAP / AD / RADIUS Support ◆ Backup & Restore Configuration ◆ Remote BIOS/BMC/CPLD Update ◆ Event Log Filter ◆ User Management ◆ Media Redirection Settings ◆ PAM Order Settings ◆ SSL Settings ◆ SMTP Settings

Power Supply	(R281-Z91)	◆ 2 x 1200W redundant PSUs ◆ 80 PLUS Platinum ◆ AC Input: ◆ - 100-240V~/ 12-7A, 50-60Hz ◆ DC Input: ◆ - 240Vdc/ 6A ◆ DC Output: ◆ - Max 1000W/ 100-240V~ ◆ +12V/ 80.5A ◆ +12Vsb/ 3A ◆ - Max 1200W/ 200-240V~ or 240Vdc input ◆ +12V/ 97A ◆ +12Vsb/ 3A
	(R281-Z92)	◆ 2 x 1600W redundant PSUs ◆ 80 PLUS Platinum AC Input: ◆ 100-120V~/ 12A, 50-60Hz ◆ - 200-240V~/ 10A, 50-60Hz DC Output: ◆ Max 1000W/ 100-120V~ ◆ +12V/ 81.5A ◆ +12Vsb/ 2.5A ◆ - Max 1600W/ 200-240V or 240Vdc Input ◆ +12V/ 133A ◆ +12Vsb/ 2.5A
Operating Properties		◆ Operating temperature: 10°C to 35°C ◆ Operating humidity: 8%-80% (non-condensing) ◆ Non-operating temperature: -40°C to 60°C ◆ Non-operating humidity: 20%-95% (non-condensing)

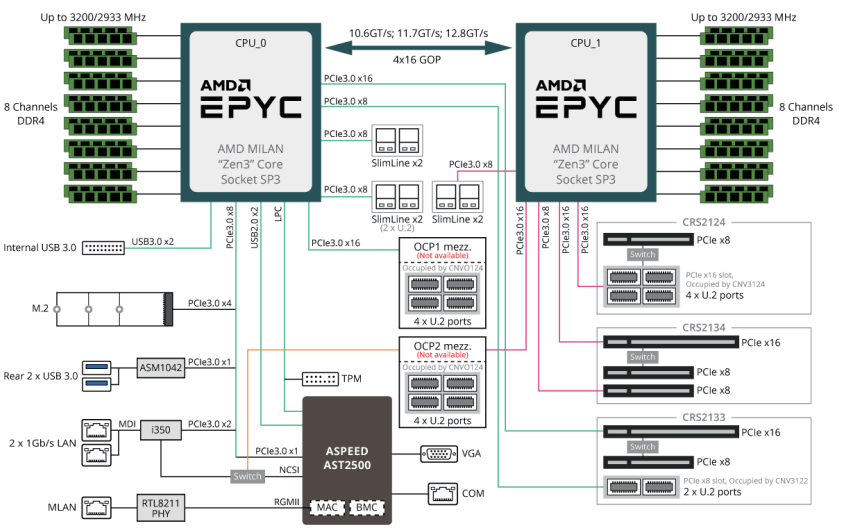
* We reserves the right to make any changes to the product specifications and product-related information without prior notice.

1-3 System Block Diagram

R281-Z91



R281-Z92



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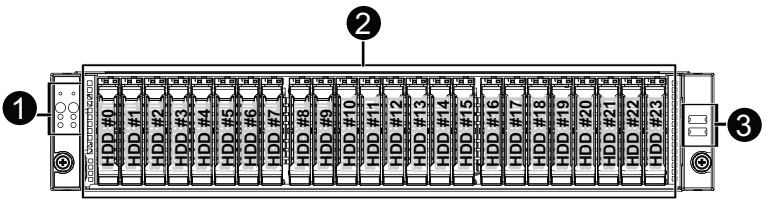
Chapter 2 System Appearance

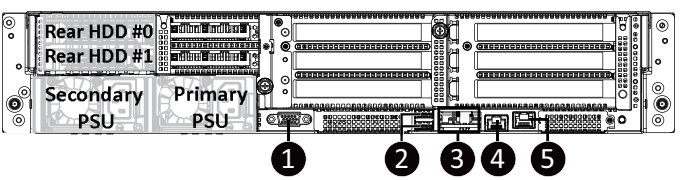
2-1 Front View



No.	Description
1.	Front Panel LEDs and buttons
2.	HDD Bays
3.	Front USB 3.0 ports

- Refer to Chapter **2-3 Front Panel LED** and Buttons for a detailed description of the function of the LEDs.

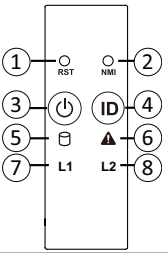
2-2 Rear View



No.	Description
1.	VGA port
2.	USB 3.0 ports
3.	LAN ports
4.	COM port (RJ45 type)
5.	10/100/1000 Server management LAN port

- Refer to Chapter **2-4 Rear System LAN LEDs** for a detailed description of the function of the LEDs.

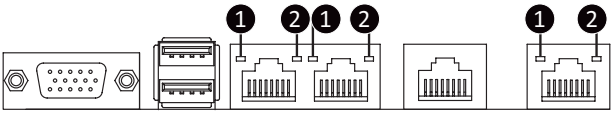
2-3 Front Panel LED and Buttons



No.	Name	Color	Status	Description
1.	Reset Button	--	--	Press this button to reset the system.
2.	NMI button	--	--	Press this button for the server to generate a NMI to the processor. If multiple-bit ECC errors occur, the server will effectively be halted.
3.	Power button with LED	Green	On	Indicates the system is powered on.
		Green	Blink	System is in ACPI S1 state (sleep mode).
		N/A	Off	• System is not powered on or in ACPI S5 state (power off) • System is in ACPI S4 state (hibernate mode)
4.	ID Button with LED	Blue	On	Indicates the system identification is active.
		N/A	Off	Indicates the system identification is disabled.
5.	HDD Status LED	Green	On	Indicates locating the HDD.
			Blink	Indicates accessing the HDD.
		Amber	On	Indicates HDD error.
		Green/ Amber	Blink	Indicates HDD rebuilding.
		N/A	Off	Indicates no HDD access or no HDD error.
6.	System Status LED	Green	On	Indicates system is operating normally.
		Amber	On	Indicates a critical condition, may include: -System fan failure -System temperature
			Blink	Indicates non-critical condition, may include: -Redundant power module failure -Temperature and voltage issue
		N/A	Off	Indicates system is not ready, may include: -POST error -NMI error -Processor or terminator is missing

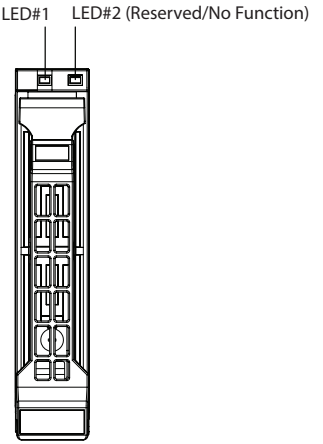
7.	LAN1 Active/ Link LED	Green	On	Indicates a link between the system and the network or no access.
		Green	Blink	Indicates data trasmission or receiving is occuring.
		N/A	Off	Indicates no data transmission or receiving is occuring.
8.	LAN2 Active/ Link LED	Green	On	Indicates a link between the system and the network or no access.
		Green	Blink	Indicates data trasmission or receiving is occuring.
		N/A	Off	Indicates no data transmission or receiving is occuring.

2-4 Rear System LAN LEDs



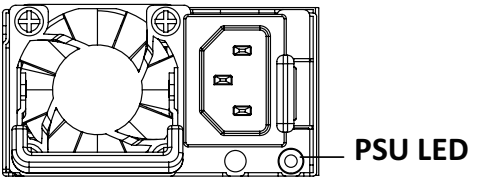
No.	Name	Color	Status	Description
1.	1GbE Speed LED	Yellow	On	1 Gbps data rate
		Green	On	100 Mbps data rate
		N/A	Off	10 Mbps data rate
2.	1GbE Link/ Activity LED	Green	On	Link between system and network or no access
			Blink	Data transmission or receiving is occurring
		N/A	Off	No data transmission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

2-5 Hard Disk Drive LEDs



RAID SKU	LED #1	Locate	HDD Fault	Rebuilding	HDD Access	HDD Present (No Access)
No RAID configuration (via HBA, ICH)	Disk LED (LED on Back Panel)	Green	ON(*1)	OFF	Green	OFF
		Amber	OFF	OFF	Amber	OFF
	Removed HDD Slot (LED on Back Panel)	Green	ON(*1)	OFF	Green	--
		Amber	OFF	OFF	Amber	--
RAID configuration (via HW RAID Card, or SW RAID Card)	Disk LED	Green	ON	OFF	Alternately	OFF
		Amber	OFF	ON	(Low Speed: 2 Hz)	OFF
	Removed HDD Slot	Green	ON(*1)	OFF	(*3)	--
		Amber	OFF	ON	(*3)	--

2-6 Power Supply Unit LED



State	Description
Green ON	Output ON and OK
Off	No AC power to all power supplies
Green BLINKING 1 Sec./On 1 Sec./Off 0.5Hz	Standby Mode (normal)
Green BLINKING 0.25 Sec./On 0.25 Sec./Off 2Hz	PSU Sleep Mode (cold Redundant/Offline mode)
Amber	Standby Mode (with OTP range)
	12V Fault (OVP, UVP, OCP, SCP, and OTP)
	Power Supply fan lock (15 seconds including Standby mode)
Amber	(*3)

Chapter 3 System Hardware Installation

Pre-installation Instructions

Computer components and electronic circuit boards can be damaged by discharges of static electricity. Working on computers that are still connected to a power supply can be extremely dangerous. Follow the simple guidelines below to avoid damage to your computer or injury to yourself.

- Always disconnect the computer from the power outlet whenever you are working inside the computer case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal system of the computer case, or the bare metal body of any other grounded appliance.
- Hold electronic circuit boards by the edges only. Do not touch the components on the board unless it is necessary to do so. Do not flex or stress the circuit board.
- Leave all components inside the static-proof packaging until you are ready to use the component for the installation.

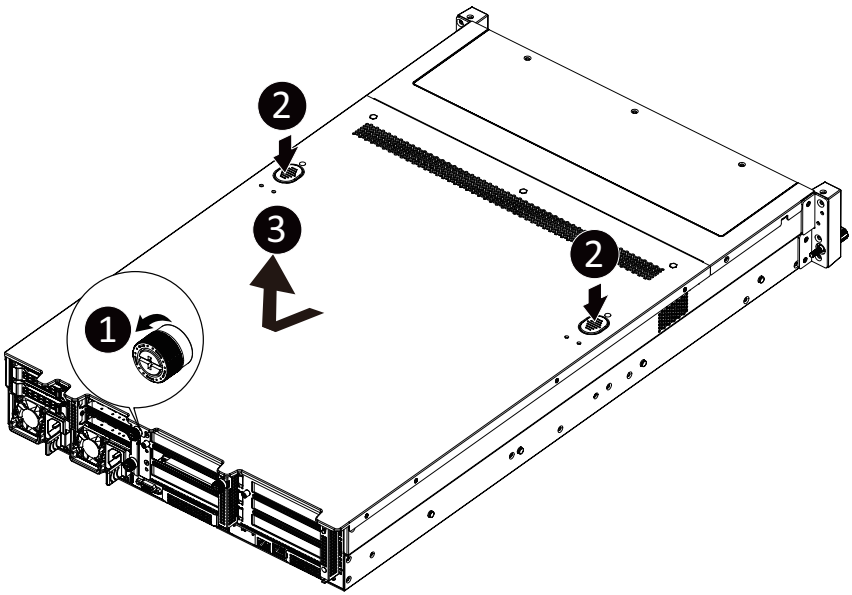
3-1 Removing and Installing the Chassis Cover

Before you remove or install the system cover

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

Follow these instructions to remove the chassis covers:

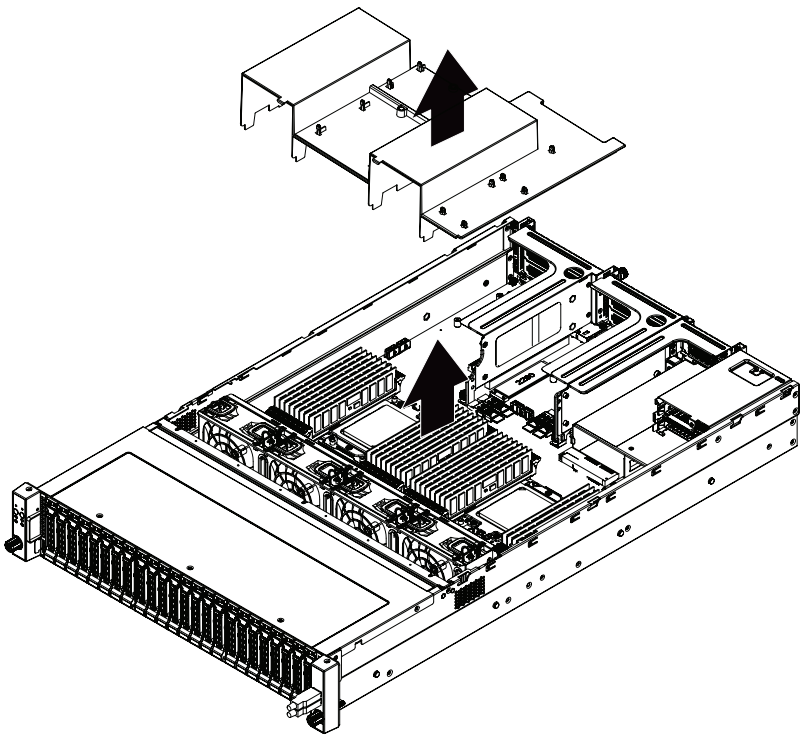
1. Loosen and remove the thumbscrew securing the chassis cover.
2. Push down on the indentations located on the side of the chassis cover.
3. Slide the chassis cover to the rear of the system and then remove the cover in the direction of the arrow.
4. To reinstall the chassis cover follow steps 1-3 in reverse order.



3-2 Removing and Installing the Fan Duct

Follow these instructions to remove the fan duct:

1. Lift up to remove the fan duct.
2. To reinstall the fan duct, align the fan duct with the guiding groove. Push down the fan duct until it is firmly seated on the system.



3-3 Removing and Installing the CPU and Heat Sink

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

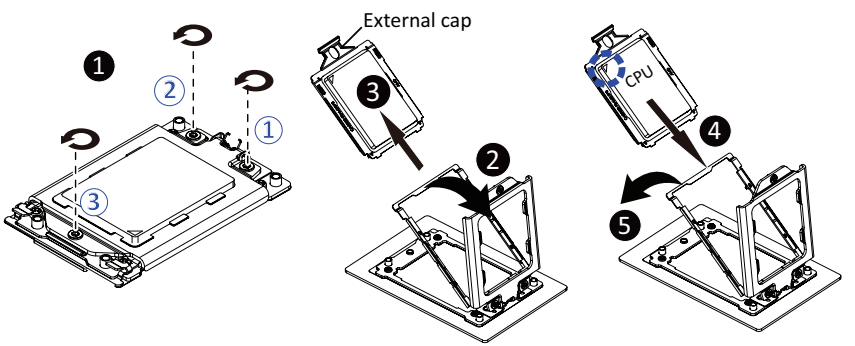
- •Make sure that the motherboard supports the CPU.
- •Always turn off the computer and unplug the power cord from the power outlet before installing the CPU to prevent hardware damage.
- •Unplug all cables from the power outlets.
- •Disconnect all telecommunication cables from their ports.
- •Place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

WARNING!

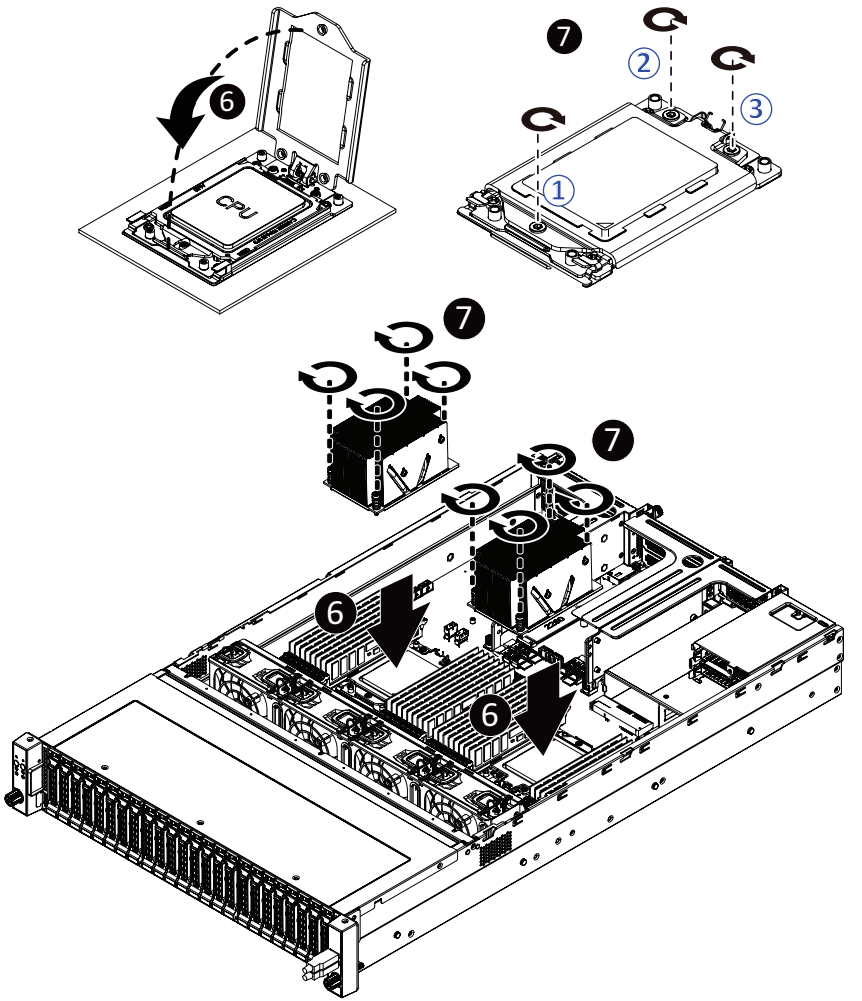
Failure to properly turn off the server before you start installing components may cause serious damage. Do not attempt the procedures described in the following sections unless you are a qualified service technician.

Follow these instructions to install the CPU:

1. Loosen the three captive screws in sequential order (1→2→3) securing the CPU cover.
2. Flip open the CPU cover.
3. Remove the CPU cap with CPU from the CPU frame using the handle on the CPU cap.
4. Using the handle on the CPU cap insert the new CPU cap with CPU installed into the CPU frame.
   NOTE: Ensure that the CPU is installed in the CPU cap in the correct orientation, with the gold triangle on the CPU aligned to the top left corner of the CPU cap.
5. Flip the CPU frame with CPU installed into place in the CPU socket.



1. Flip the CPU cover into place over the CPU socket.
2. Tighten the CPU cover screws in sequential order (1→2→3) to secure the CPU cover in place.



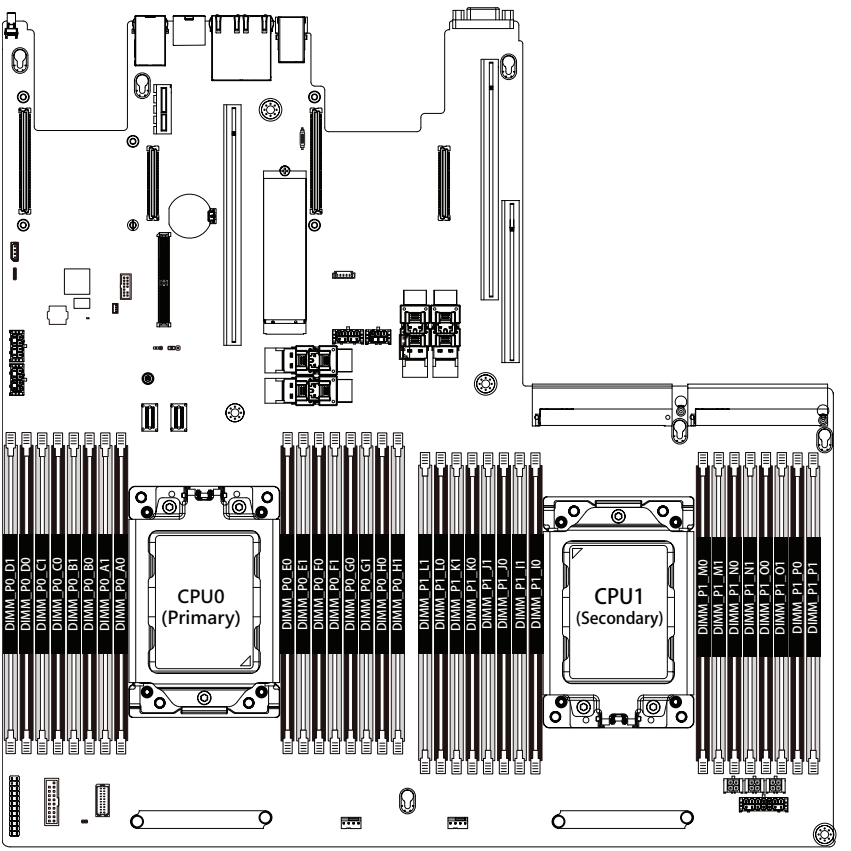
3-4 Removing and Installing Memory

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.

3-4-1 Eight-Channel Memory Configuration

This motherboard provides 32 DDR4 memory sockets and supports Eight Channel Technology. After the memory is installed, the BIOS will automatically detect the specifications and capacity of the memory.

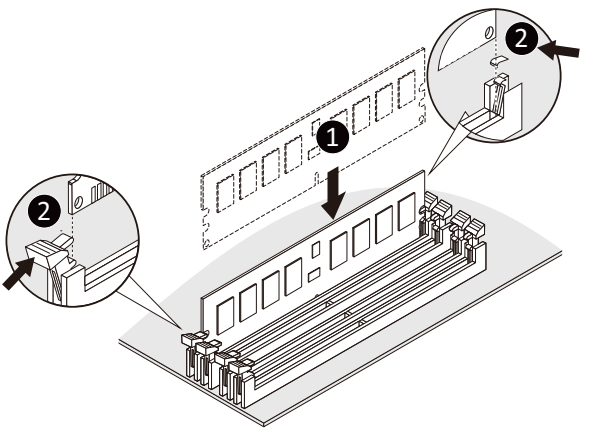


3-4-2 Removing and Installing a Memory Module

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 DIMMs on to this motherboard.

Follow these instructions to install a DIMM module:

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



3-4-3 Processor and Memory Module Matrix Table

Processor and Memory Module Matrix Table																
CPU#	Channel A/I		Channel B/J		Channel C/K		Channel D/L		Channel E/M		Channel F/N		Channel G/O		Channel H/P	
8 DIMMs																
CPU0		A1		B1		C1		D1		E1		F1		G1		H1
16 DIMMs																
CPU0	A0	A1	B0	B1	C0	C1	D0	D1	E0	E1	F0	F1	G0	G1	H0	H1
16 DIMMs																
CPU0		A1		B1		C1		D1		E1		F1		G1		H1
CPU1		I1		J1		K1		L1		M1		N1		O1		P1
32 DIMMs																
CPU0	A0	A1	B0	B1	C0	C1	D0	D1	E0	E1	F0	F1	G0	G1	H0	H1
CPU1	I0	I1	J0	J1	K0	K1	L0	L1	M0	M1	N0	N1	O0	O1	P0	P1

3-4-4 Memory Population Table

- When only one DIMM is used, it must be populated in memory slot DIMM1.

EPYC Memory Speed based on DIMM Population (One DIMM per Channel)

DIMM Type	DIMM Population	Max EPYC 7003 DDR Frequency (MHz)
	DIMM 0	
RDIMM	1R (1 Rank)	3200
	2R or 2DR (2 Ranks)	3200
LRDIMM	4DR (4 Ranks)	3200
	2S2R (4 Ranks)	3200
	2S4R (8 Ranks)	3200

EPYC Memory Speed based on DIMM Population (Two DIMM per Channel)

DIMM Type	DIMM Population		Max EPYC 7003 DDR Frequency (MHz)
	DIMM 0	DIMM 1	
RDIMM	--	1R	3200
	1R	1R	2933
	--	2R or 2DR	3200
	1R	2R or 2DR	2933
	2R or 2DR	2R or 2DR	2933
LRDIMM	--	4DR	3200
	4DR	4DR	2933
	--	2S2R (4 Ranks)	3200
	--	2S4R (8 Ranks)	3200
	2S2R (4 Ranks)	2S2R (4 Ranks)	2933

3-5 Removing and Installing the PCI Expansion Card

- Voltages can be present within the server whenever an AC power source is connected. This voltage is present even when the main power switch is in the off position. Ensure that the system is powered off and all power sources have been disconnected from the server prior to installing a PCIe card.
- Failure to observe these warnings could result in personal injury or damage to equipment.

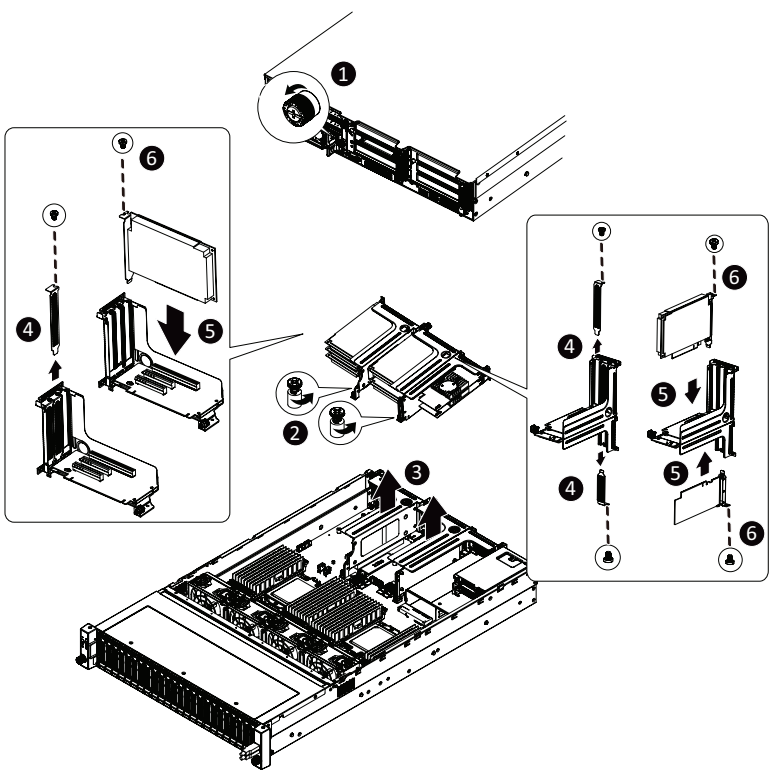
- The PCI riser assembly does not include a riser card or any cabling as standard. To install a PCIe card, a riser card must be installed.

Follow these instructions to PCI Expansion card:

1. Loosen and remove the thumbscrew on the riser bracket.
2. Remove the screw securing the riser bracket.
3. Lift up the riser bracket out of system.
4. Loosen and remove the screw securing the slot cover from riser bracket.
5. Orient the PCIe card with the riser guide slot and push in the direction of the arrow until the PCIe card sits in the PCIe card connector.

NOTE: Some riser brackets allow for single or multiple PCIe cards. Repeat steps 4-5 as necessary.

6. Secure the PCIe card with the screw.
7. Reverse steps 1-3 to install the riser bracket.



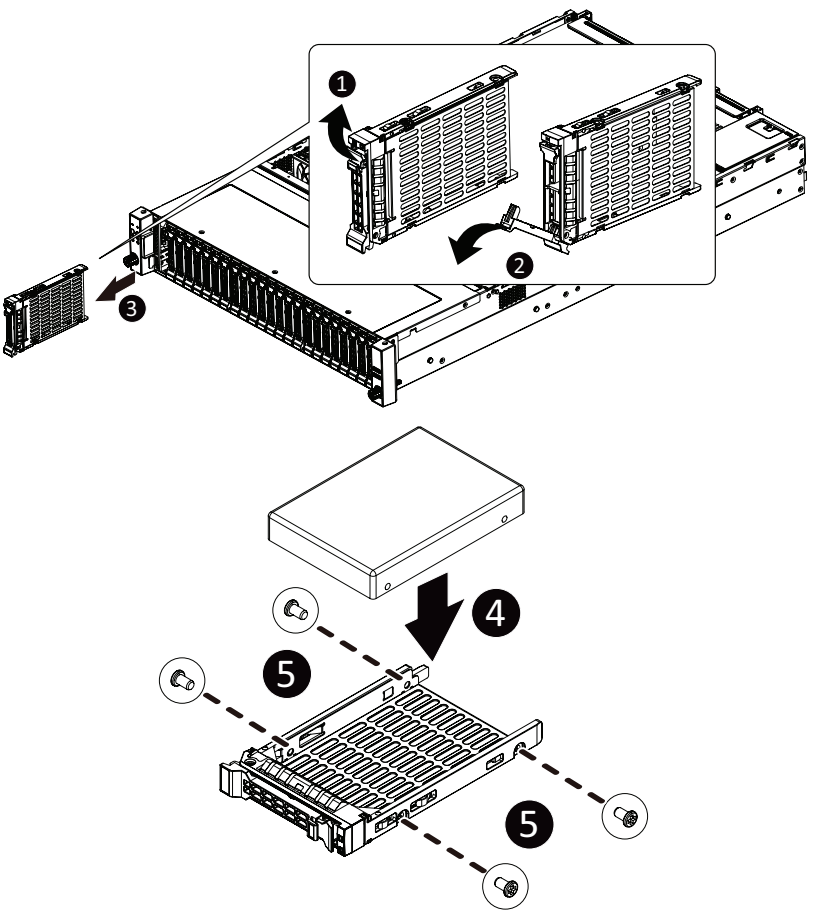
3-6 Removing and Installing the Hard Disk Drive

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

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

Follow these instructions to install a hard disk drive:

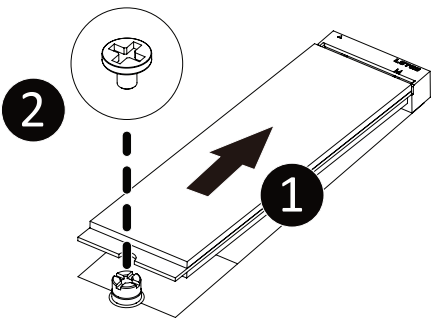
1. Press the release button.
2. Extend the locking lever.
3. Pull the locking lever in the direction of the arrow to remove the HDD tray.
4. Slide the hard disk into the HDD tray.
5. Install 4 screws to secure the hard drive to the HDD tray.
6. Reinsert the HDD tray into the slot and close the locking lever.

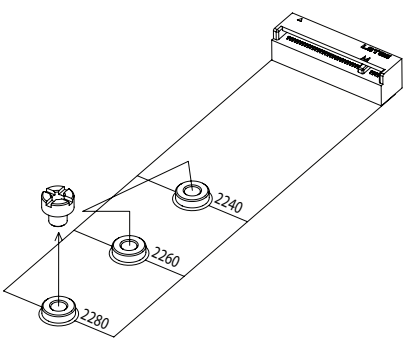


3-7 Installing and Removing an M.2 Solid State Drive

Follow these instructions to install an optional M.2 solid state drive (SSD):

1. Place the solid state drive into the M.2 connector.
2. Secure the solid state drive to the motherboard with a single screw.
   NOTE: The position of the screw will depend on the size of the SSD. Refer to the second image below for proper placement.
3. Reverse steps 1-2 to remove the solid state drive.

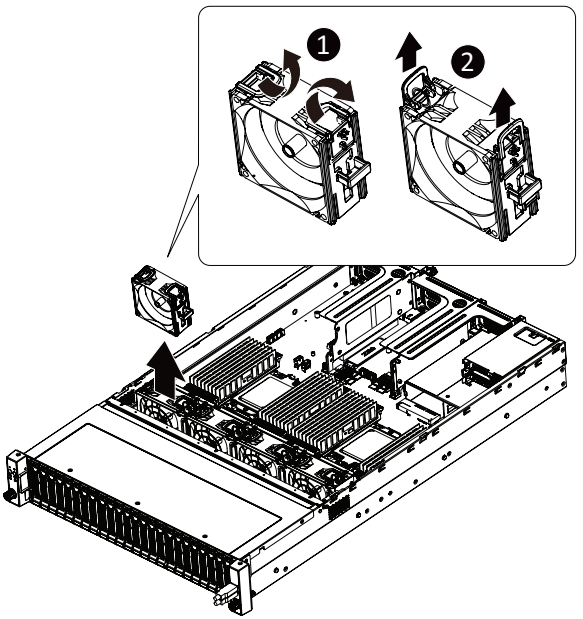




3-8 Replacing the Fan Assembly

Follow these instructions to replace a fan assembly:

1. Flip the latches on the top of the fan outwards.
2. Using the latches, lift up the fan assembly from the chassis.
3. Reverse the previous steps to install the replacement fan assembly.



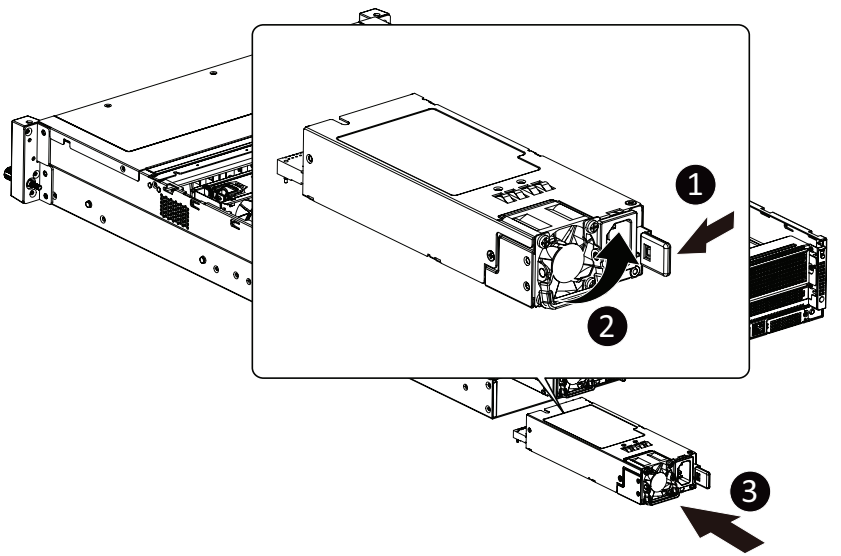
3-9 Removing and Installing the Power Supply

Before you remove or install the power supply unit:

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

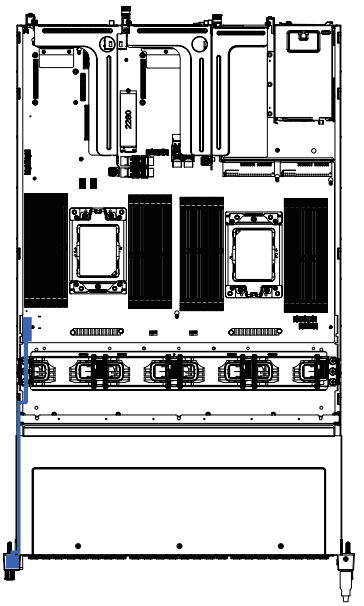
Follow these instructions to replace the power supply:

1. Press the retaining clip on the left side of the power supply unit along the direction of the arrow.
2. Pull the power supply handle at the same time and pull out the power supply unit.
3. Insert the replacement power supply unit firmly into the chassis. Connect the AC power cord to the replacement power supply.
4. Repeat steps 1-3 for replacement of the second power supply.

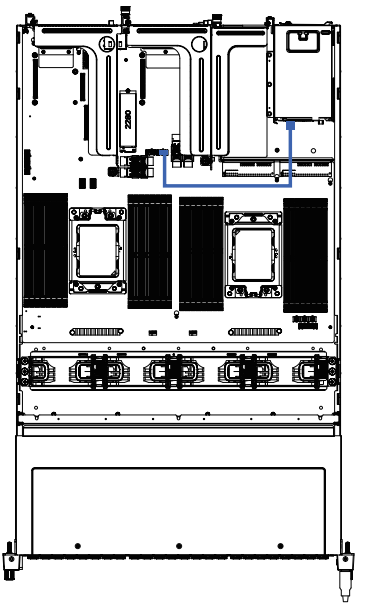


3-10 Cable Routing

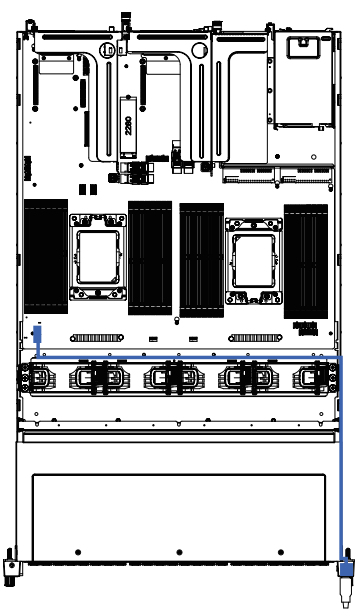
Front Panel Board Cable



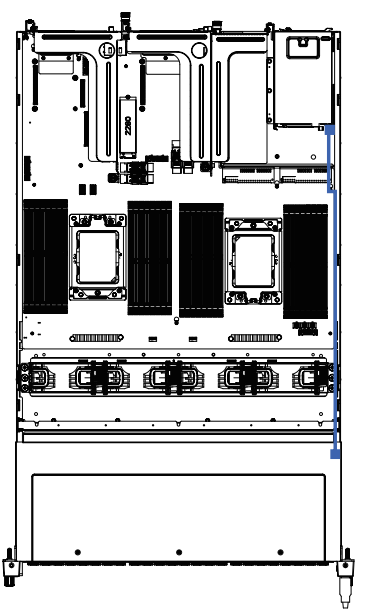
Rear HDD Back Panel Board Power Cable



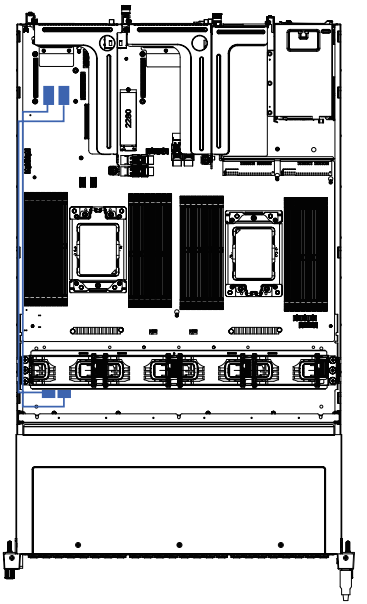
Front Panel USB 3.0 Cable



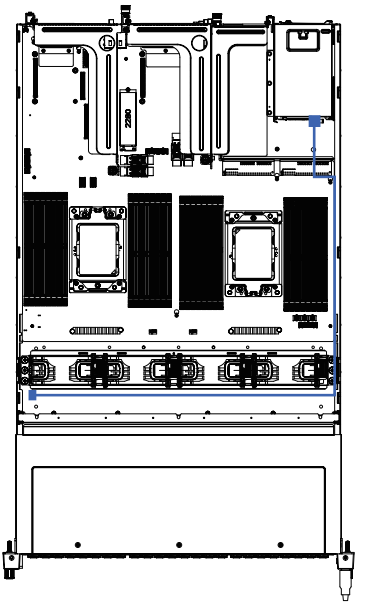
Rear HDD Back Panel Board Signal Cable



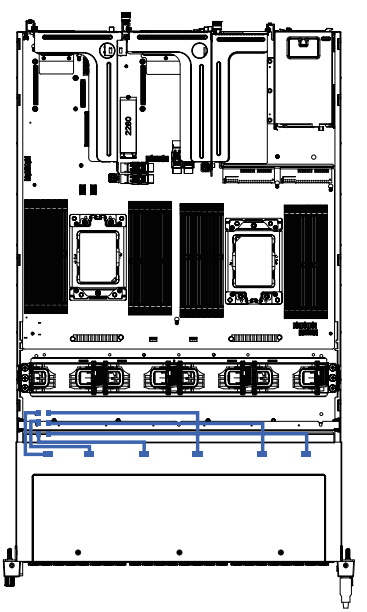
OCP RAID Card to SAS Expension Card Cable



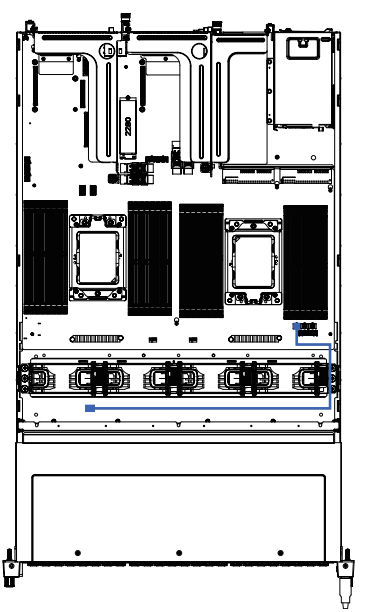
SAS Expansion to Rear Back Plane Board Cable



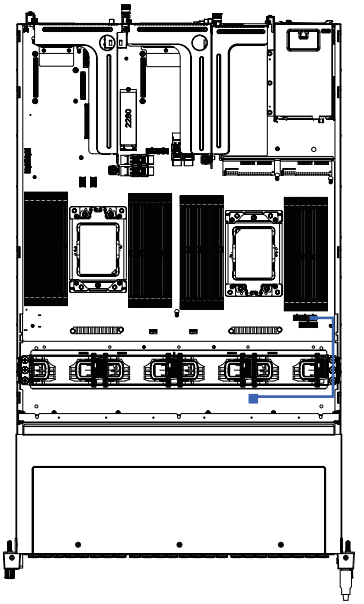
SAS Expansion to Back Plane Board Cable



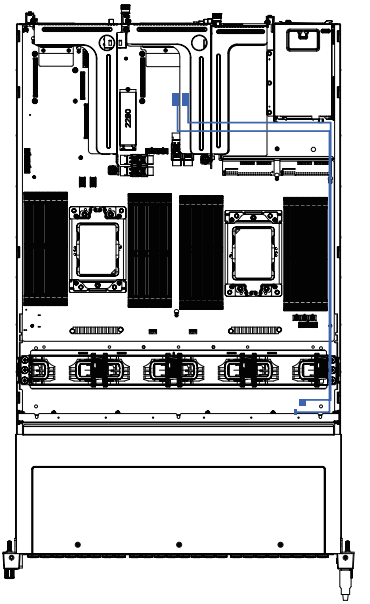
SAS Expansion Power Cable



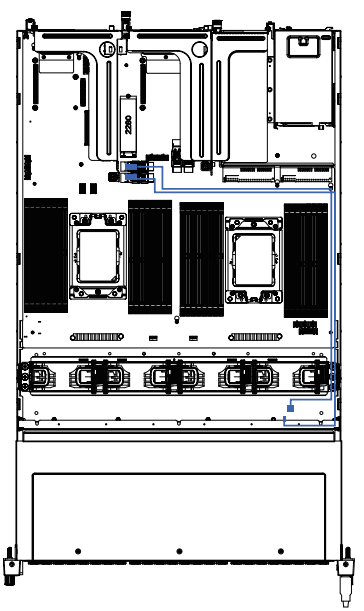
NMVe Card Power Cable



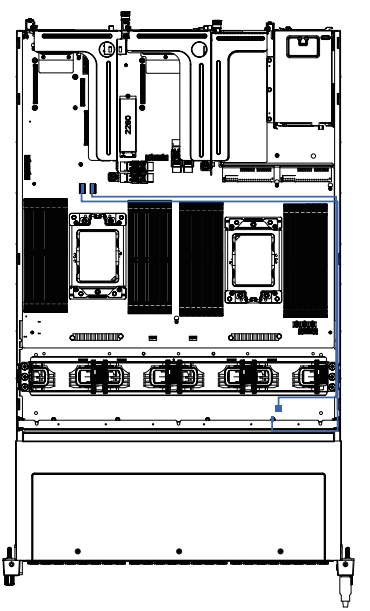
NMVe Card Cable #1



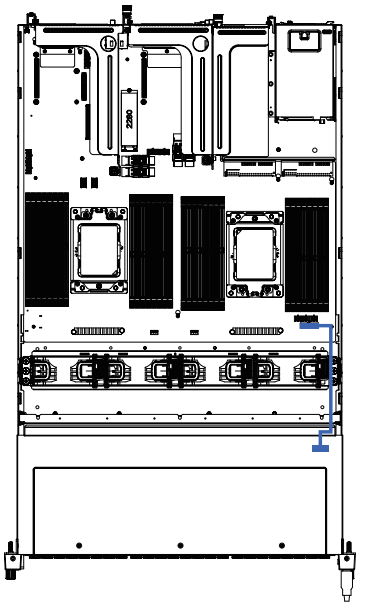
NMVe Card Cable #2



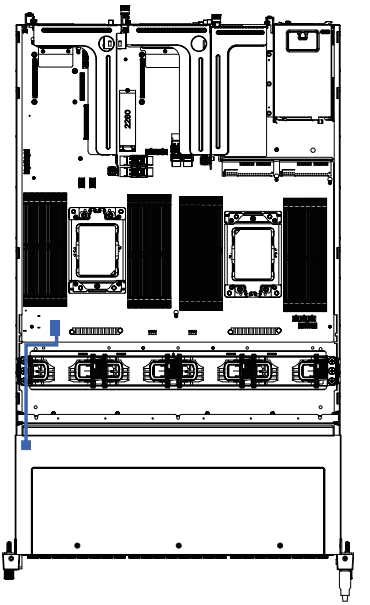
NMVe Card Cable #3



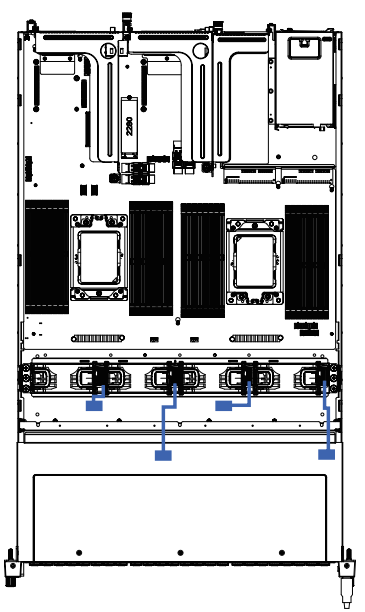
HDD Back Panel Board Power Cable



HDD Back Panel Board Signal Cable



System Fan Cable



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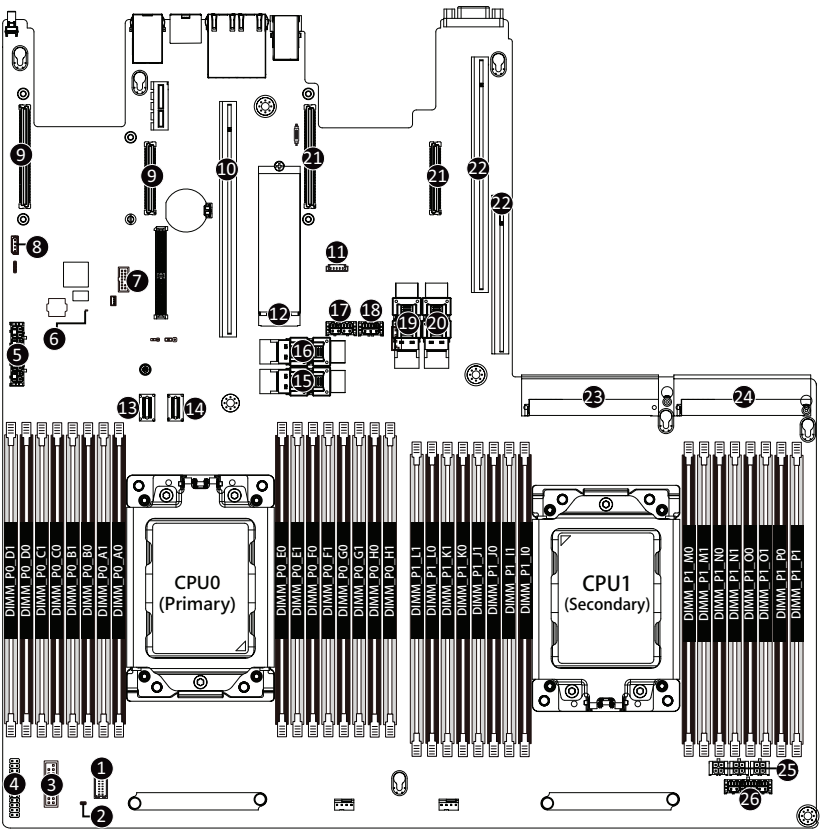
Chapter 4 Motherboard Components

4-1 Motherboard Components



Item	Description
1	HDD back plane board connector
2	Case open intrusion header
3	Front panel USB 3.0 connector)
4	Front panel connector
5	2 x 4 Pin GPGPU power connectors
6	BMC firmware readiness LED
7	TPM modue connector
8	IPMB connector
9	OCP mezzanine connector#1

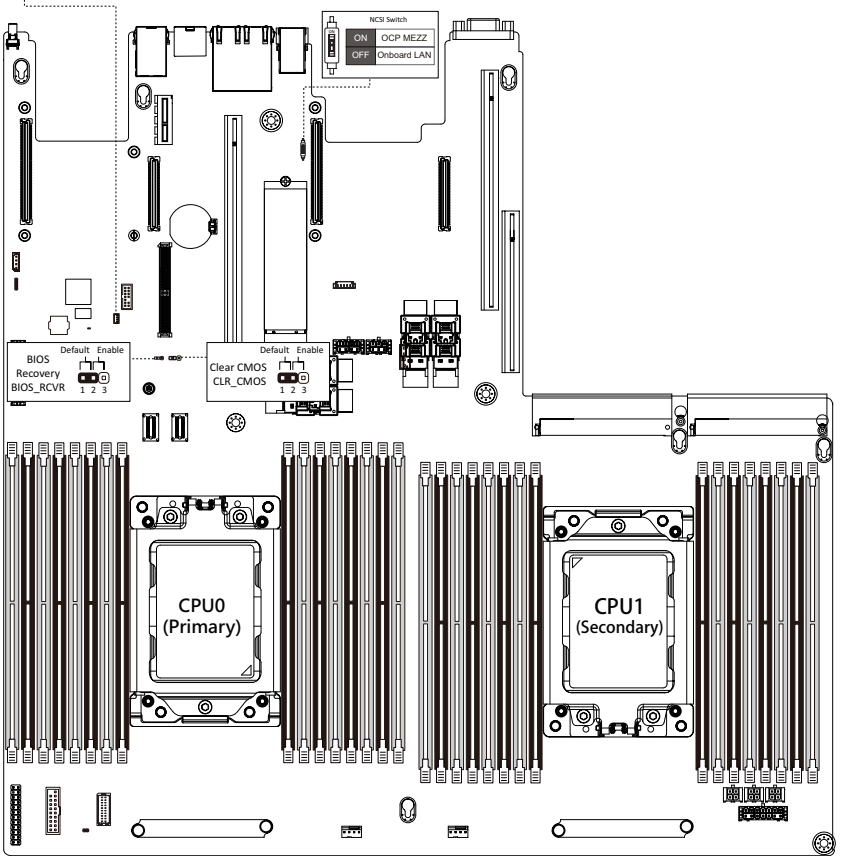
10	Riser slot connector #1
11	SGPIO connector
12	M.2 slot (PCIe Gen3 x4, Support NGFF-2280, M-Key)
13	Slimline SAS connector #0 (PCIe/SATA/Configurable and define SKUs)
14	Slimline SAS connector #1 (PCIe/SATA/Configurable and define SKUs)
15	Slimline SAS connector #3 (PCIe/SATA/Configurable and define SKUs)
16	Slimline SAS connector #2 (PCIe/SATA/Configurable and define SKUs)
17	2 x 4 Pin GPGPU power connector
18	2 x 3 Pin Rear back plane board power connector
19	Slimline SAS connector #4 (PCIe/SATA/Configurable and define SKUs)
20	Slimline SAS connector #5 (PCIe/SATA/Configurable and define SKUs)
21*	OCP mezzanine connector#2 (Support NCSI)
22	Riser slot connector #2
23	Power supply connector#1 (primary)
24	Power supply connector#2 (secondary)
25	2 x 2 Pin extention card power connectors
26	2 x 7 Pin system main power connector

NOTE! Set the NCSI switch to **On** to enable NCSI fucnction.

4-2 Jumper Settings

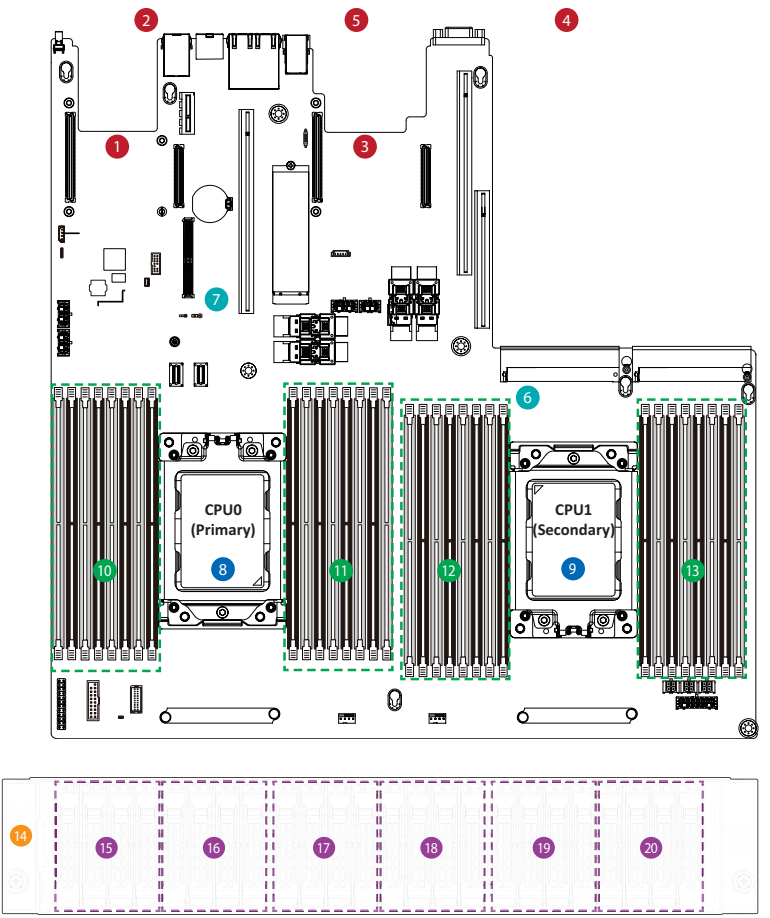
J1

J1		ON	OFF
1	HOST_SMBUS_SEL	BIOS defined	
2	PMBUS_SEL	BIOS defined	
3	BIOS_PWD	Clear supervisor password	Normal [Default]
4	DB_PLD	CPLD debug mode	Normal [Default]



4-3 Thermal Mapping Table

1 M2_TEMP1 (OCP)	8 CPU0_TEMP	15 NVMeG0_TEMP
2 M2_TEMP2 (Riser #2)	9 CPU1_TEMP	16 NVMeG1_TEMP
3 M2_TEMP3 (OCP)	10 DIMMG0_TEMP	17 NVMeG2_TEMP
4 M2_TEMP4 (Riser #4)	11 DIMMG1_TEMP	18 NVMeG3_TEMP
5 M2_TEMP5 (Riser #3)	12 DIMMG2_TEMP	19 NVMeG4_TEMP
6 MB_TEMP1	13 DIMMG3_TEMP	20 NVMeG5_TEMP
7 MB_TEMP2	14 INLET_AIR_TEMP	



Chapter 5 BIOS Setup

BIOS (Basic Input and Output System) records hardware parameters of the system in the EFI on the motherboard. Its major functions include conducting the Power-On Self-Test (POST) during system startup, saving system parameters, 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 4 for how to clear the CMOS values.)

BIOS Setup Program Function Keys

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

- **Main**
  This setup page includes all the items 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.)
- **AMD CBS**
  This setup page includes the common items for configuration of AMD motherboard-related information.
- **AMD PBS Option**
  This setup page includes the common items for configuration of AMD CPM RAS related settings.
- **Chipset**
  This setup page includes all the submenu options for configuring the functions of the North Bridge.
- **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.)

5-1 The Main Menu

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

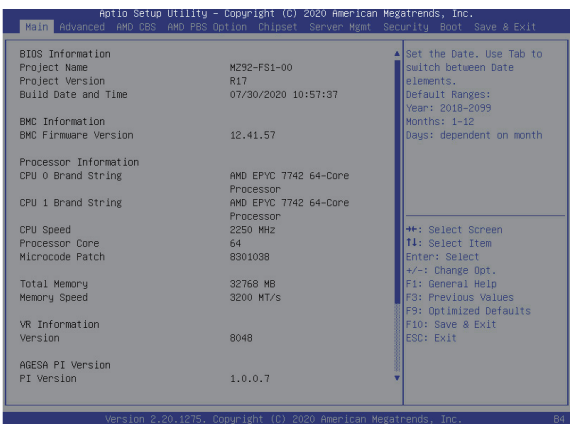
Main Menu Help

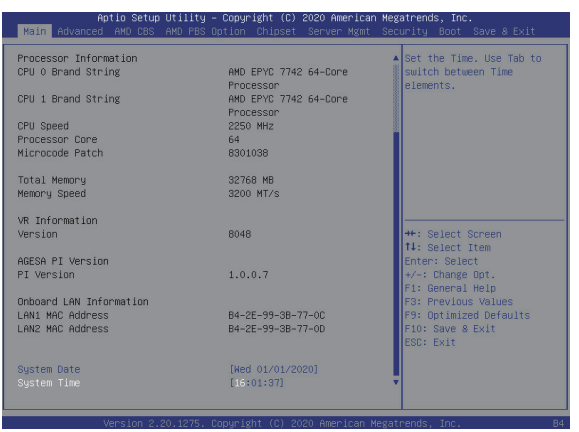
The on-screen description of a highlighted setup option is displayed on the bottom line of the Main Menu.

Submenu Help

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

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





Parameter	Description
BIOS 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	
BMC Firmware Version	Displays BMC firmware version information.
CPU Brand String / CPU Speed / Processor Core / Microcode Patch	Displays the technical information for the installed processor(s).
Total Memory(Note3)	Displays the total memory size of the installed memory.
Memory Frequency(Note3)	Displays the frequency information of the installed memory.
VR Information Version	Displays VR version information.
AGESA PI Version PI Version	Displays AGESA PI version information.
Onboard LAN Information	
LAN1 MAC Address(Note1)	Displays LAN MAC address information.
LAN2 MAC Address (Note2)	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.

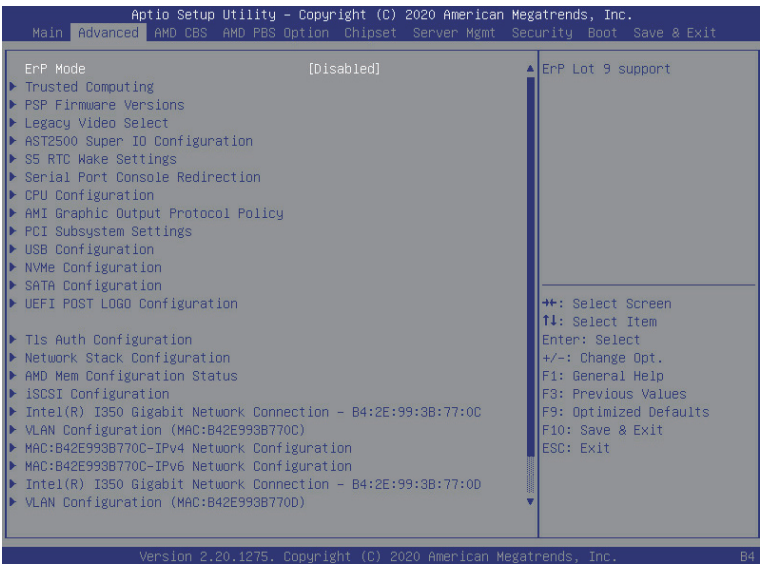
(Note1) The number of LAN ports listed will depend on the motherboard / system model.

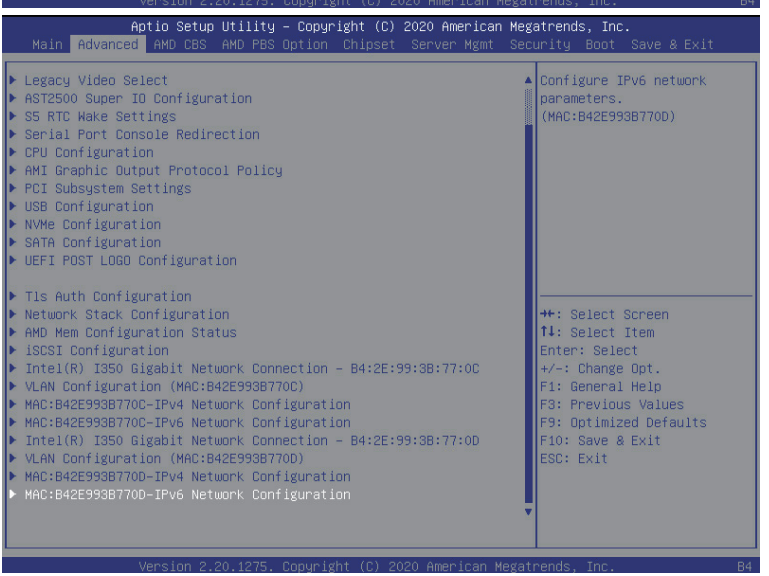
(Note2) This section will display capacity and frequency information of the memory that the customer has installed.

5-2 Advanced Menu

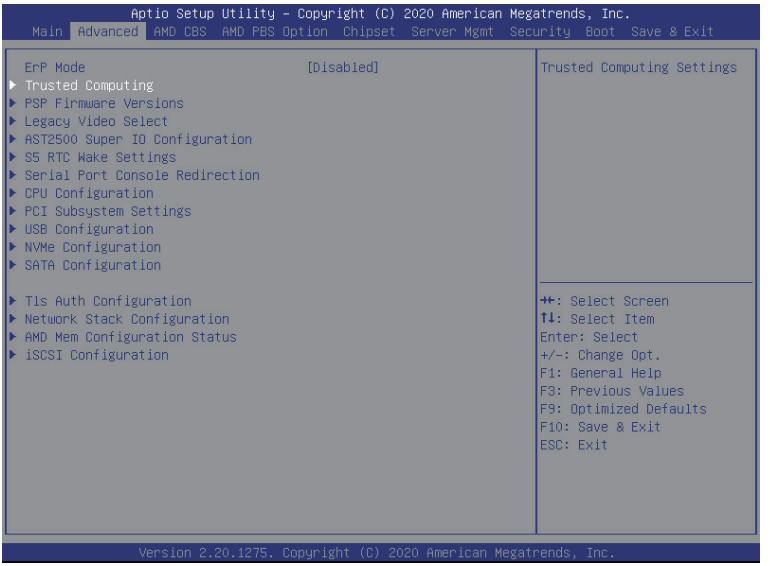
The Advanced Menu displays submenu options for configuring the function of various hardware components. Select a submenu item, then press <Enter> to access the related submenu screen.

When Boot Mode Select is set to UEFI (Default)



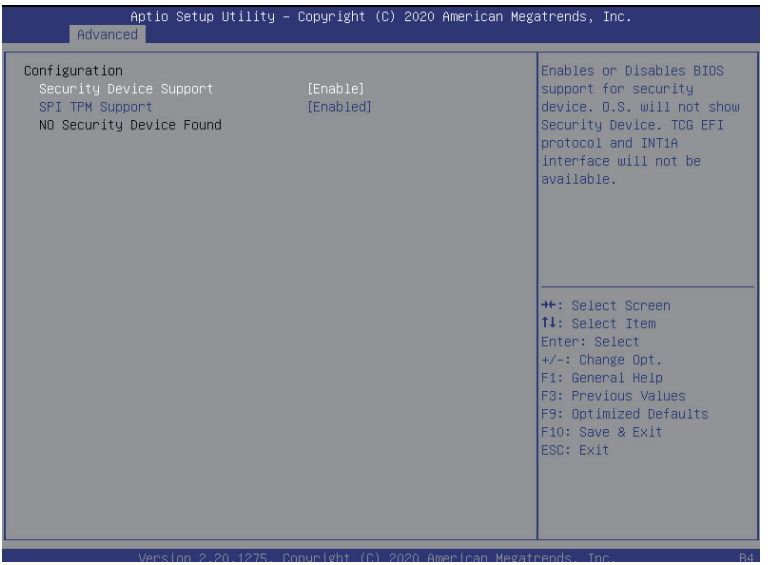


When "Boot Mode Select" is set to Legacy in the Boot > Boot Mode Select section



Parameter	Description
ErP Mode	Enable/Disable ErP Lot 9 suuport. Options available: Enable/Disable. Default setting is **Disable**.

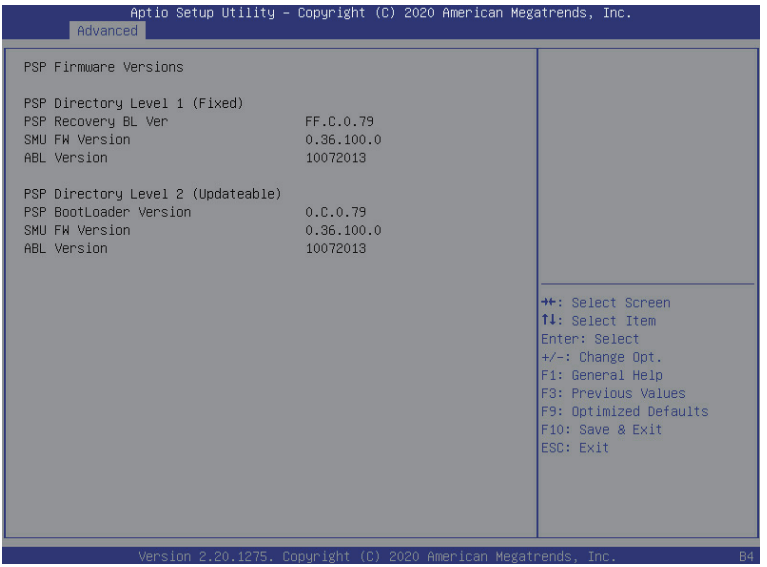
5-2-1 Trusted Computing



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. Options available: Enable/Disable. Default setting is **Enable**.
SPI TPM Support	Select Enable to activate TPM support feature. Options available: Enabled/Disabled. Default setting is **Enabled**

5-2-2 PSP Firmware Versions

The PSP Firmware Versions page displays the basic PSP firmware version information. Items on this window are non-configurable.

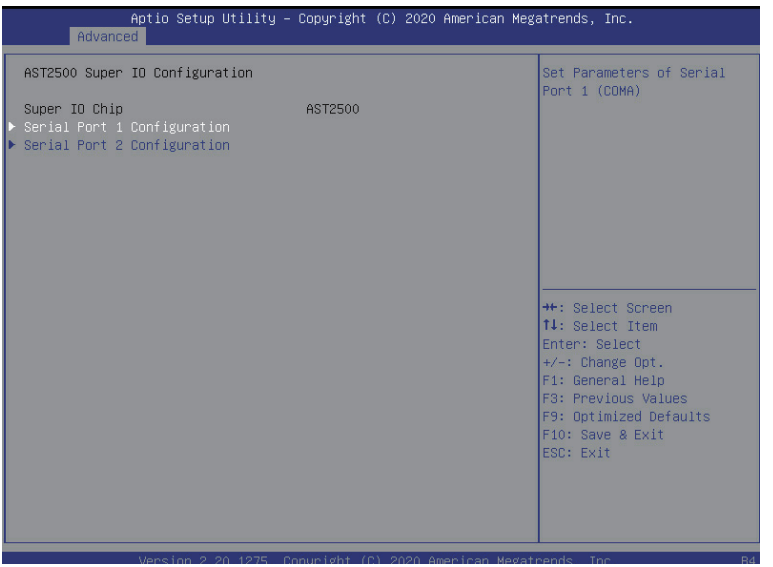


5-2-3 Legacy Video Select

Parameter	Description
OnBrd/Ext VGA Select(Note)	Selects between onboard or external VGA support. Options available: Auto, Onboard, External. Default setting is **Onboard**.

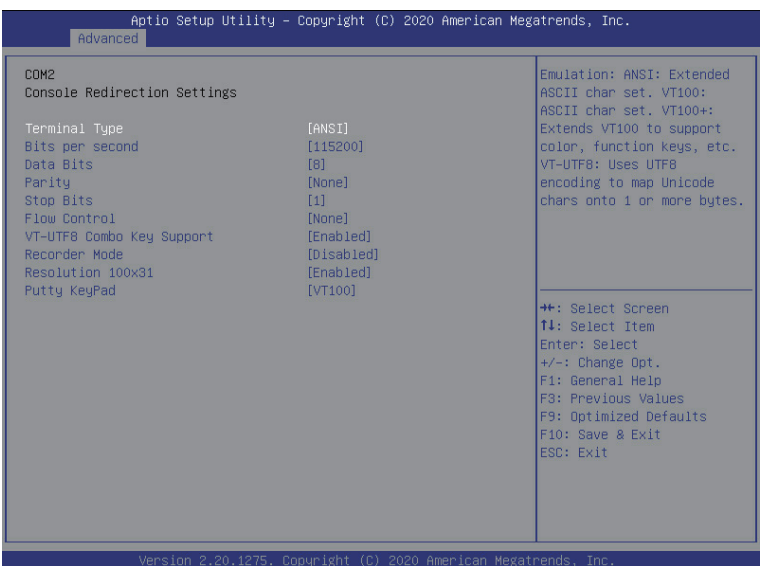
(Note) This configurable option will be displayed when "Boot Mode Select" is set to **Legacy** in the Boot > Boot Mode Select section.

5-2-4 AST2500 Super IO Configuration



Parameter	Description
AST2500 Super IO Configuration	
Super IO Chip	Displays the super IO chip information
Serial Port 1/2 Configuration	Press [Enter] for configuration of advanced items.

5-2-4-1 Serial Port 1/2 Configuration

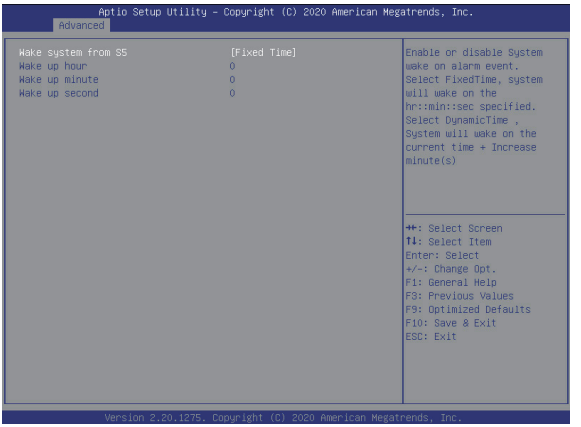


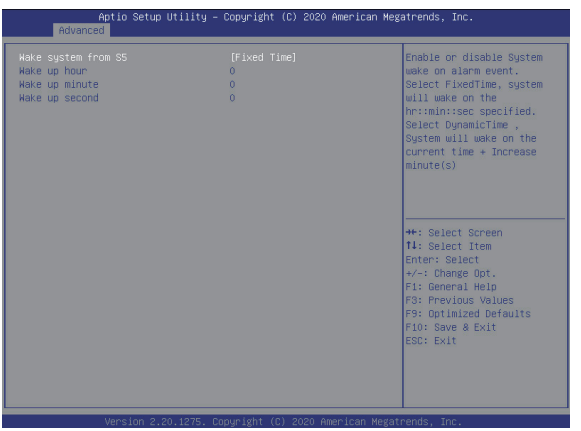
(Note1) Advanced items prompt when this item is defined.

Parameter	Description
Serial Port 1/2 Configuration	
Serial Port(Note1)	Enable/Disable the Serial Port (COM). When set to Enabled allows you to configure the Serial port 1/2 settings. When set to Disabled, displays no configuration for the serial port. Options available: Enabled/Disabled. Default setting is **Enabled**.
Devices Settings(Note2)	Displays the Serial Port 1/2 device settings.
Change Settings(Note2)	Select an optimal settings for Super IO Device. Options available for Serial Port 1: Auto IO=3F8h; IRQ=4; IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12; IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12; IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12; IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12; Default setting is **Auto**. Options available for Serial Port 2: Auto IO=2F8h; IRQ=3; IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12; IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12; IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12; IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12; Default setting is **Auto**. **Please note that this item is configurable when Serial Port is set to Enabled.**

(Note2) This item appears when **Serial Port** is set to **Enabled**.

5-2-5 S5 RTC Wake Settings

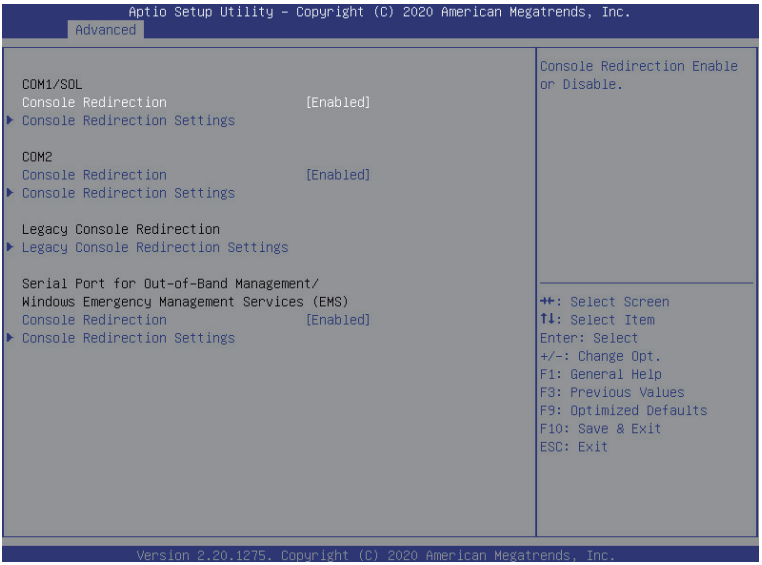




Parameter	Description
Wake System from S5(Note1)	Enable/Disable system wake on alarm event. Options available: Disabled/Fixed Time/Dynamic Time. When Fixed Time enabled, system will wake on the hr::min::sec specified. Default setting is **Disabled**.

(Note1) Advanced items prompt when this item is defined.

5-2-6 Serial Port Console Redirection



Parameter	Description
COM1/COM2/Serial Over LAN (Note)	Select whether to enable console redirection for specified device. Console redirection enables the users to manage the system from a remote location. Options available: Enabled/Disabled. Default setting is **Disabled**.
COM1/COM2/Serial Over LAN Console Redirection Settings	Press [Enter] to configure advanced items. **Please note that this item is configurable when COM1/Serial Over LAN & COM2 Console Redirection is set to Enabled.** ◆ Terminal Type – Selects a terminal type to be used for console redirection. – Options available: VT100, VT100+, ANSI, VT-UTF8. Default setting is **ANSI**. ◆ Bits per second – Selects the transfer rate for console redirection. – Options available: 9600, 19200, 38400, 57600, 115200. Default setting is **115200**. ◆ Data Bits – Selects the number of data bits used for console redirection. – Options available: 7/8. Default setting is **8**.

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

Parameter	Description
COM1/COM2/Serial Over LAN Console Redirection Settings (continued)	◆ Parity – A parity bit can be sent with the data bits to detect some transmission errors. – Even: parity bit is 0 if the num of 1's in the data bits is even. – Odd: parity bit is 0 if num of 1's in the data bits is odd. – Mark: parity bit is always 1. Space: Parity bit is always 0. – Mark and Space Parity do not allow for error detection. – Options available: None, Even, Odd, Mark, Space. Default setting is **None**. ◆ Stop Bits – Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit. – Options available: 1/2. Default setting is **1**. ◆ Flow Control – Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals. – Options available: None, Hardware RTS/CTS. Default setting is **None**. ◆ VT-UTF8 Combo Key Support – Enable/Disable the VT-UTF8 Combo Key Support. – Options available: Enabled/Disabled. Default setting is **Enabled**. ◆ Recorder Mode(Note) – When this mode enabled, only texts will be send. This is to capture Terminal data. – Options available: Enabled/Disabled. Default setting is **Disabled**. ◆ Resolution 100x31(Note) – Enable/Disable extended terminal resolution. – Options available: Enabled/Disabled. Default setting is **Enabled**. ◆ Putty KeyPad(Note) – Selects FunctionKey and LeyPad on Putty. – Options available: VT100, LINUX, XTERMR6, SC0, ESCN, VT400. Default setting is **VT100**.

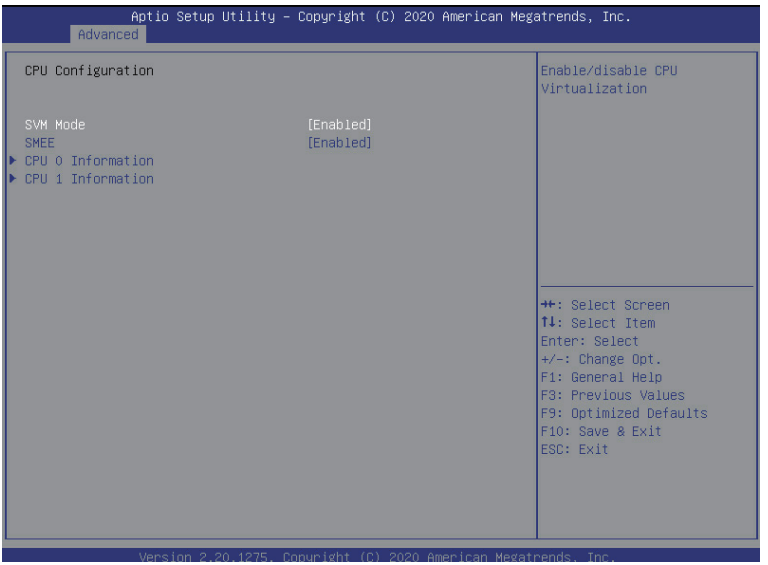
(Note) Advanced items prompt when this item is defined.

Parameter	Description
Legacy Console Redirection	
Legacy Console Redirection Settings	Press [Enter] to configure advanced items. ◆ Redirection COM Port – Selects a COM port for Legacy serial redirection. – Options available: COM1/Serial Over LAN, COM2. Default setting is **COM1/Serial Over LAN**. ◆ Resolution – Selects the number of rows and columns used in Console Redirection for legacy OS support. – Options available: 80x24, 80x25. Default setting is **80x24**. ◆ Redirect After POST – 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. – 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. Options available: Enabled/Disabled. Default setting is **Disabled**.
Serial Port for Out-of-Band EMS Console Redirection Settings	Press [Enter] to configure advanced items. **Please note that this item is configurable when Serial Port for Out-of-Band Management EMS Console Redirection is set to Enabled.** ◆ Out-of-Band Mgmt Port – Microsoft Windows Emerency Management Service (EMS) allows for remote management of a Windows Server OS through a serial port. – Options available: COM1/Serial Over LAN, COM2. Default setting is **COM1/Serial Over LAN**. ◆ Terminal Type – Selects a terminal type to be used for console redirection. – Options available: VT100, VT100+, ANSI, VT-UTF8. Default setting is **ANSI**. ◆ Bits per second – Selects the transfer rate for console redirection. – Options available: 9600, 19200, 38400, 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 – 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, Software Xon/Xoff. Default setting is **None**.

5-2-7 CPU Configuration

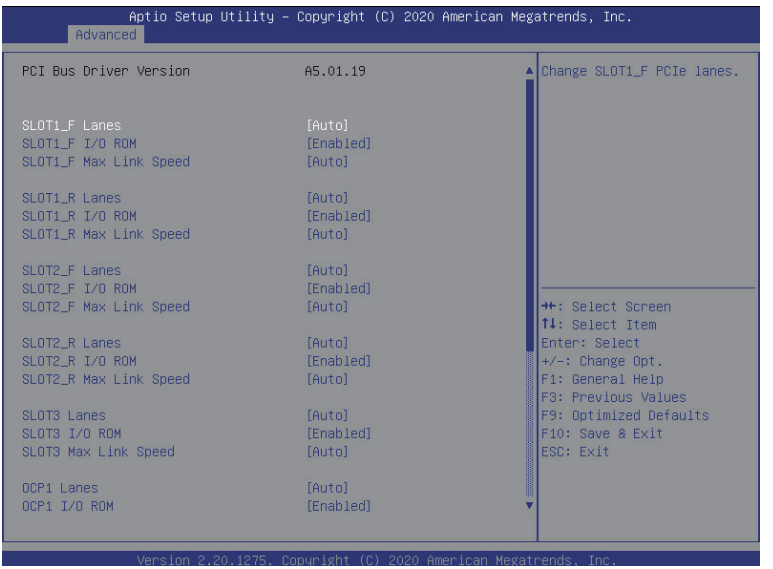


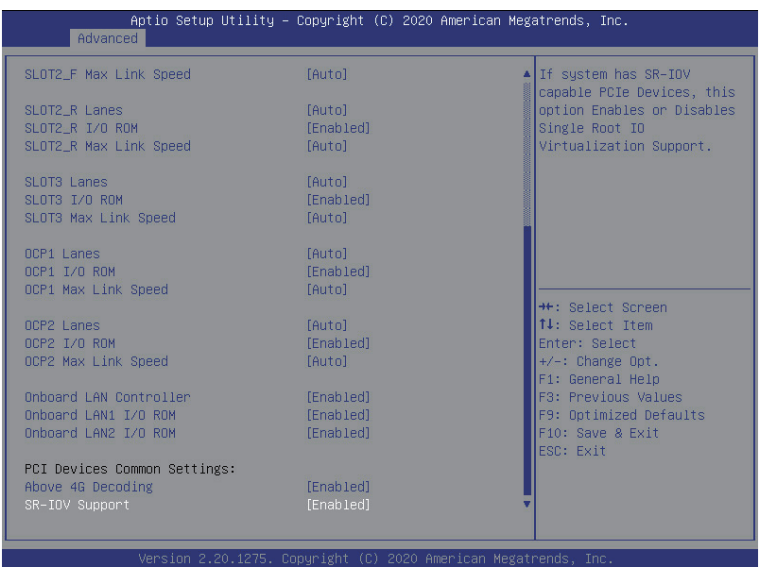
Parameter	Description
SVM Mode	Enable/Disable the CPU Virtualization. Options available: Enabled/Disabled. Default setting is **Enabled**.
SMEE	Controls the Secure Memory Encryption Enable (SMEE) function. Options available: Enabled/Disabled. Default setting is **Enabled**.
CPU 0/CPU 1 Information	Press [Enter] to view more information related to CPU.

5-2-8 AMI Graphic Output Protocol Policy

Parameter	Description
ASPEED Graphics PCI Adapter	
ASPEED Graphics Driver	
Output Select	Press [Enter] to select output interface.

5-2-9 PCI Subsystem Settings

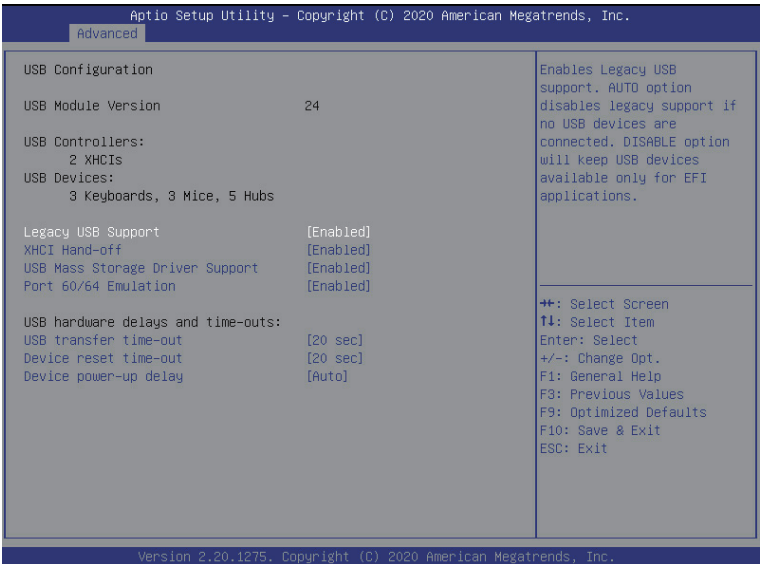




Parameter	Description
PCI Bus Driver Version	Displays the PCI Bus Driver version information.
SLOT_#(Note1) Lanes Configuration	Change the PCIe lanes. Options available: Disabled, Auto, x16, x8x8, x8x4x4, x4x4x8, x4x4x4x4. Default setting is **Auto**.
SLOT Slot # I/O ROM (Note1)	When enabled, this setting will initialize the device expansion ROM for the related PCI-E slot. Options available: Enabled/Disabled. Default setting is **Enabled**.
SLOT Slot # Max Link (Note1)	Configure mezzanine PCIe max link speed. Options available: Auto/Maximum/Gen1/Gen2/Gen3/Gen4. Default setting is **Auto**.
OCP#(Note2) Lanes	Change mezzanine PCIe lanes. Options available: Auto, x16, x8x8, x8x4x4, x4x4x8, x4x4x4x4, Disabled. Default setting is **Auto**.
OCP#(Note2) I/O ROM	When enabled, this setting will initialize the device expansion ROM for the related U.2 device. Options available: Enabled/Disabled. Default setting is **Enabled**.
OCP#(Note2) Max Link Speed	Configure mezzanine OCP max link speed. Options available: Auto/Maximum/Gen1/Gen2/Gen3/Gen4. Default setting is **Auto**.
Onboard LAN Controller(Note3)	Enable/Disable the onboard LAN devices. Options available: Enabled/Disabled. Default setting is **Enabled**.
Onboard LAN I/O ROM(Note3)	Enable/Disable the onboard LAN devices, and initializes device expansion ROM. Options available: Enabled/Disabled. Default setting is **Enabled**.
PCI Devices Common Settings	
Above 4G Decoding	Enable/Disable memory mapped I/O to 4GB or greater address space (Above 4G Decoding). Options available: Enabled/Disabled. Default setting is **Enabled**.
SR-IOV Support	If the system has SR-IOV capable PCIe devices, this item Enable/Disable Single Root IO Virtualization Support. Options available: Enabled/Disabled. Default setting is **Enabled**.

(Note1) This section is dependent on the available PCIe Slot.
(Note2) This section is dependent on the available OCP connector.
(Note3) This section is dependent on the available LAN controller.

5-2-10 USB Configuration

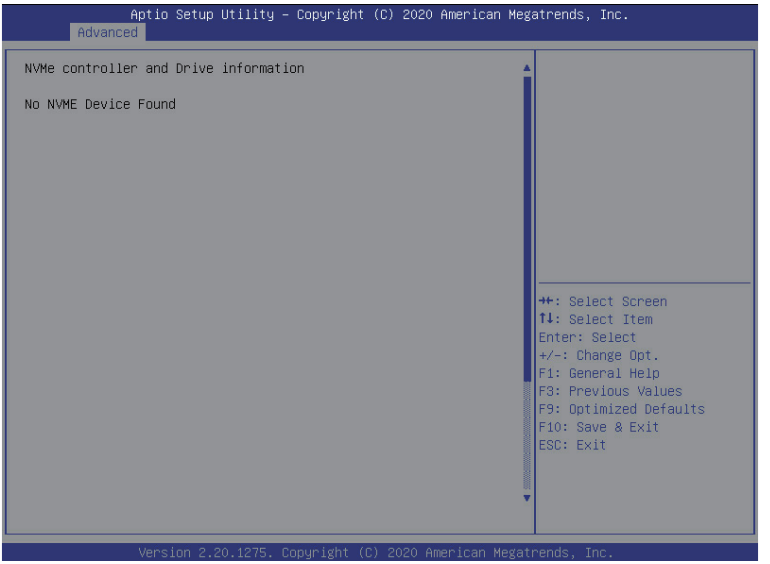


Parameter	Description
USB Configuration	
USB Module Version	Displays the USB version.
USB Controllers	Displays the supported USB controllers.
USB Devices	Displays the USB devices connected to the system.
Legacy USB Support	Enable/disable the Legacy USB support fuction. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications. Options available: Auto/Enabled/Disabled. Default setting is **Enabled**.
XHCI Hand-off	Enable/Disable the XHCI (USB 3.0) Hand-off support. Options available: Enabled/Disabled. Default setting is **Enabled**.
USB Mass Storage Driver Support(Note)	Enable/Disable the USB Mass Storage Driver Support. Options available: Enabled/Disabled. Default setting is **Enabled**.
Port 60/64 Emulation	Enables the 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**.
USB hardware delays and time-outs	
USB transfer time-out	The time-out value for Control, Bulk, and Interrupt transfers. Options available: 1 sec/5 sec/10 sec/20 sec. Default setting is **20 sec**.

(Note) This item is present only if you attach USB devices.

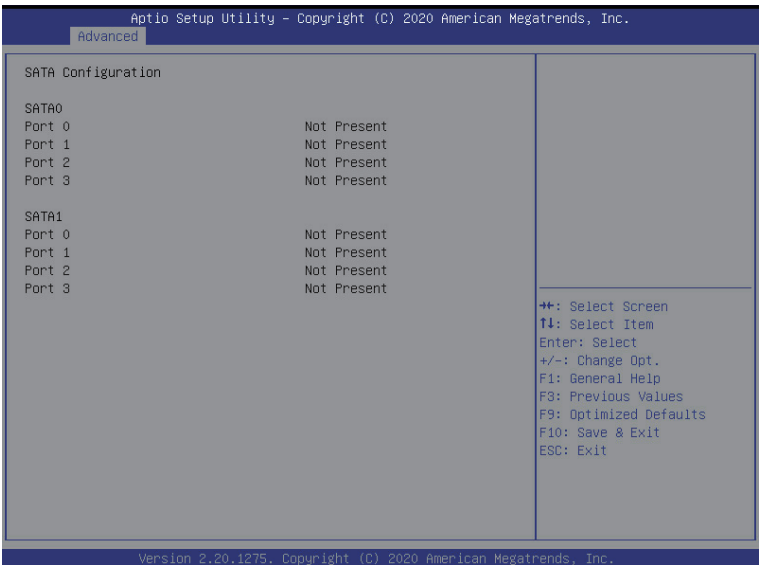
Parameter	Description
Device reset time-out	USB mass storage device Start Unit command time-out. Options available: 10 sec/20 sec/30 sec/40 sec. Default setting is **20 sec**.
Device power-up delay	Maximum time the device will take before it properly reports itself to the Host Controller. "Auto" uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor. Options available: Auto/Manual. Default setting is **Auto**.
Mass Storage Devices	
AMI Virtual CDROM0 1.00 / AMI HDisk0 1.00 / Generic Flash Disk 8.07 / ADATA USB Flash Drive 1100	Mass storage device emulation type. AUTO enumerates devices according to their media format. Optical drives are emulated as CDROM, drives with no media will be emulated according to a drive type. Options available: Auto/Floppy/Forced FDD/Hard Disk/CD-ROM. Default setting is **Auto**.

5-2-11 NVMe Configuration



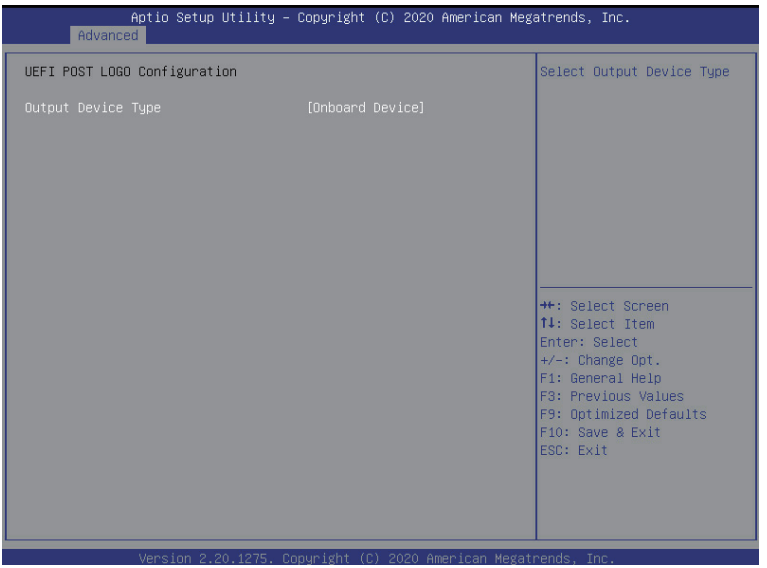
Parameter	Description
NVMe Configuration	Displays the NVMe devices connected to the system

5-2-12 SATA Configuration



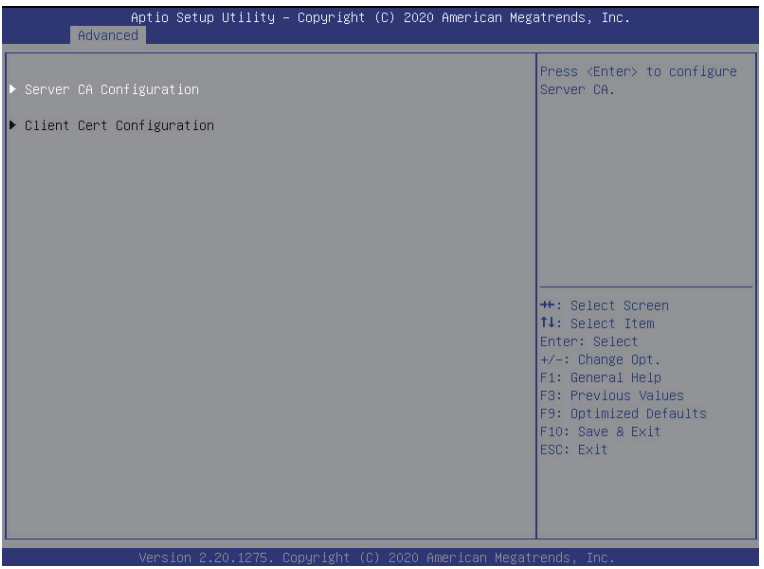
Parameter	Description
SATA Configuration	Displays the installed HDD devices information. System will automatically detect HDD type.

5-2-13 UEFI Configuration



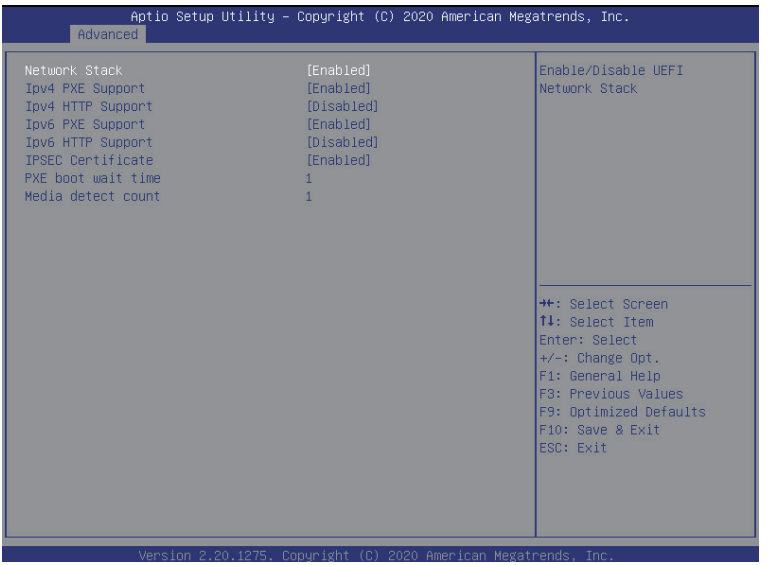
Parameter	Description
UEFI Configuration	Select output device type.

5-2-14 Tls Auth Configuration



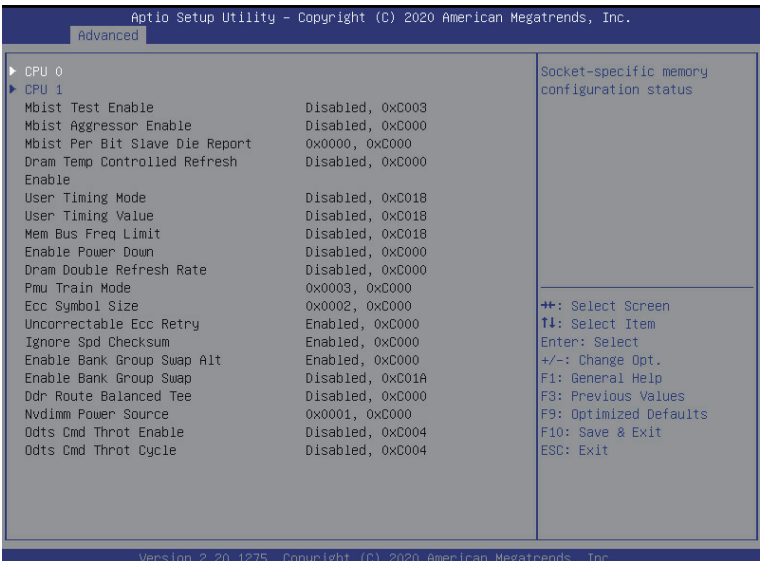
Parameter	Description
Server CA Configuration	Press [Enter] for configuration of advanced items. ◆ Enroll Cert – Press [Enter] to enroll a certificate • Enroll Cert Using File • Cert GUID Input digit character in 1111111-2222-3333-4444-1234567890ab format. – Commit Changes and Exit – Discard Changes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

5-2-15 Network Stack Configuration



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

5-2-16 AMD Mem Configuration Status

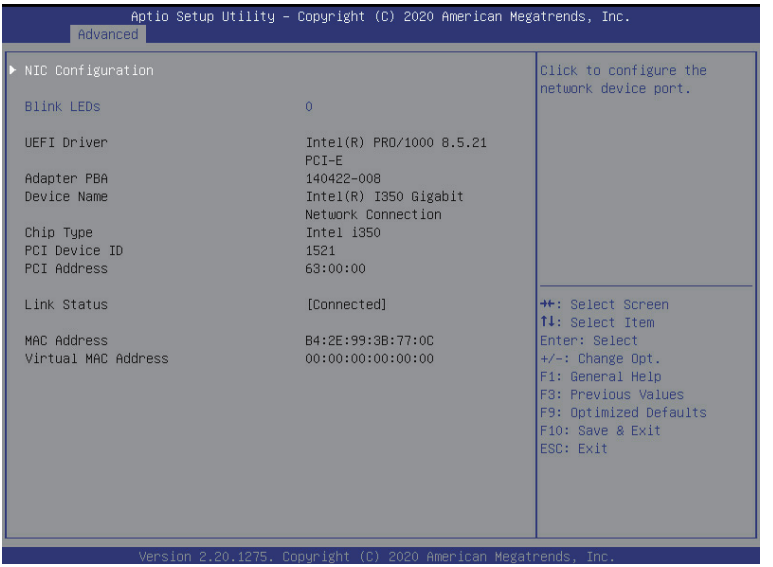


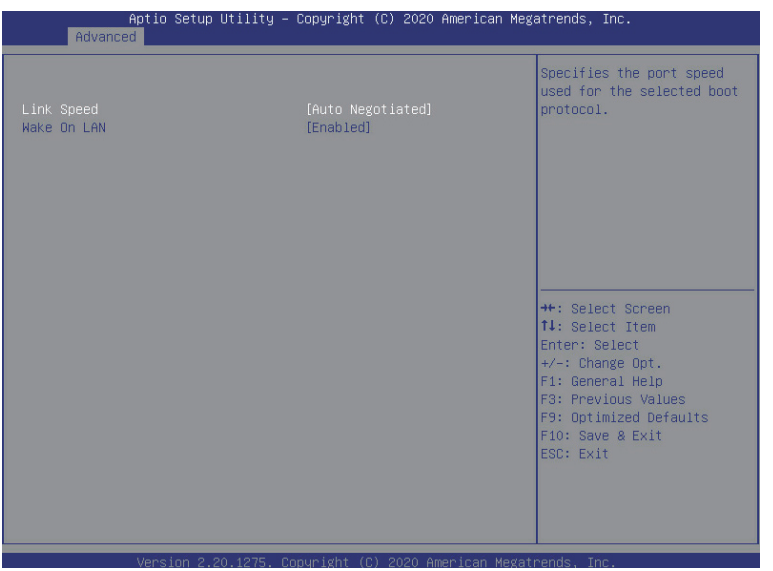
Parameter	Description
CPU0/1	Press [Enter] to view the memory configuration status related to CPU 0/1.

5-2-17 iSCSI Configuration

Parameter	Description
iSCSI Initiator Name	Press [Enter] and name iSCSI Initiator. Only IQN format is accecpted. Range: from 4 to 223
Add an Attempt	Press [Enter] to configure advanced items.
Delete Attempts	Press [Enter] to configure advanced items.
Change Attempt Order	Press [Enter] to configure advanced items.

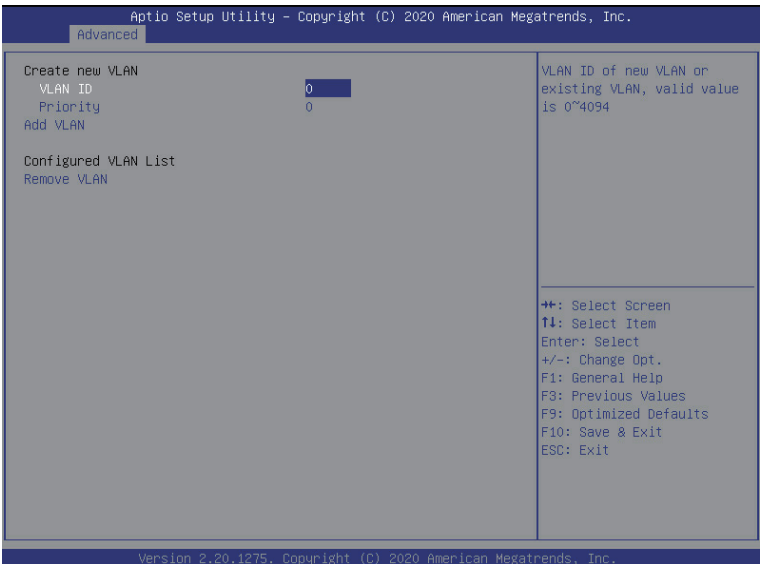
5-2-18 Intel(R) I350 Gigabit Network Connection

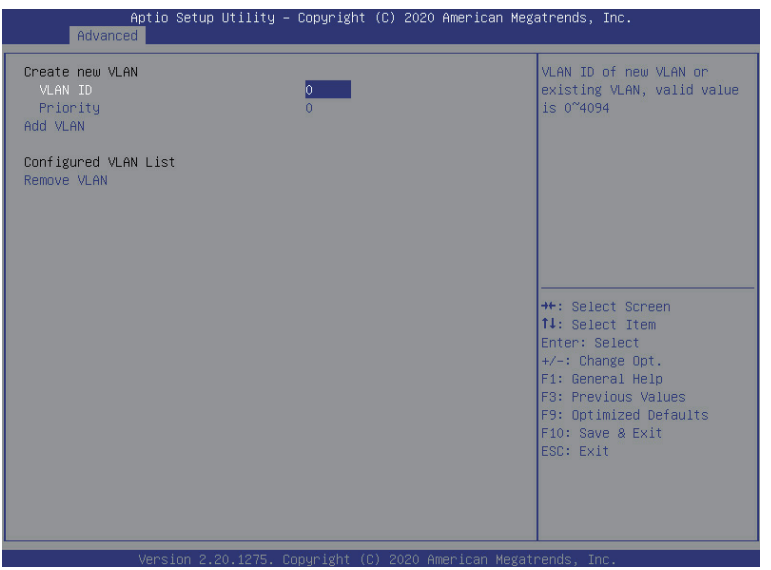




Parameter	Description
NIC Configuration	Press [Enter] to configure advanced items. ◆ Link Speed – Allows for automatic link speed adjustment. – Options available: Auto Negotiated, 10 Mbps Half, 10 Mbps Full, 100 Mbps Half, 100 Mbps Full. Default setting is **Auto Negotiated**. ◆ Wake On LAN – Enables 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. – Options available: Enabled/Disabled. Default setting is **Enabled**.
Blink LEDs	Identifies the physical network port by blinking the associated LED. Press the numeric keys to adjust desired values.
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.

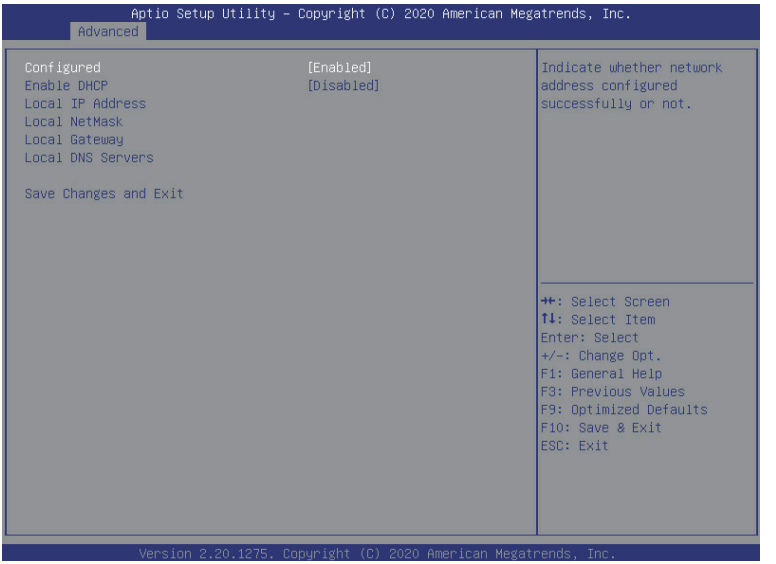
5-2-19 VLAN Configuration





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

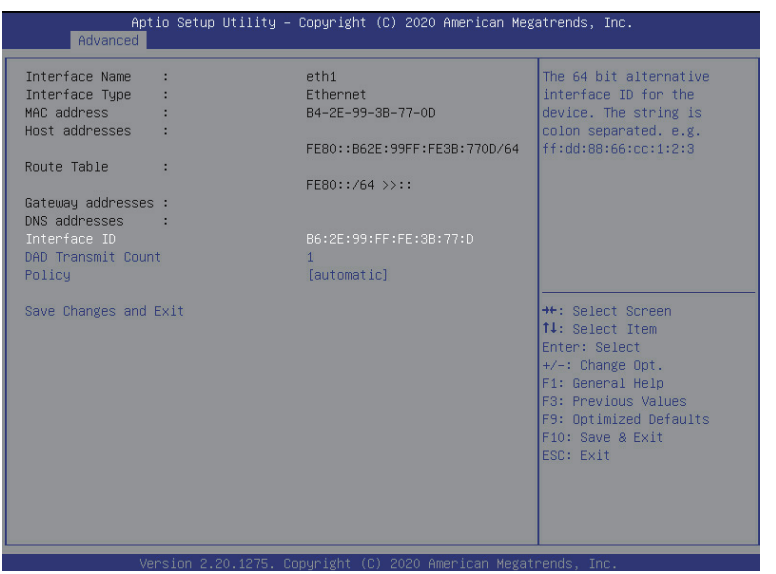
5-2-20 MAC IPv4 Network Configuration



Parameter	Description
Configured	Indicates whether network address is configured successfully or not. Options available: Enabled/Disabled. Default setting is **Disabled.**
Enable DHCP(Note)	Options available: Enabled/Disabled. Default setting is **Enabled.**
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**.

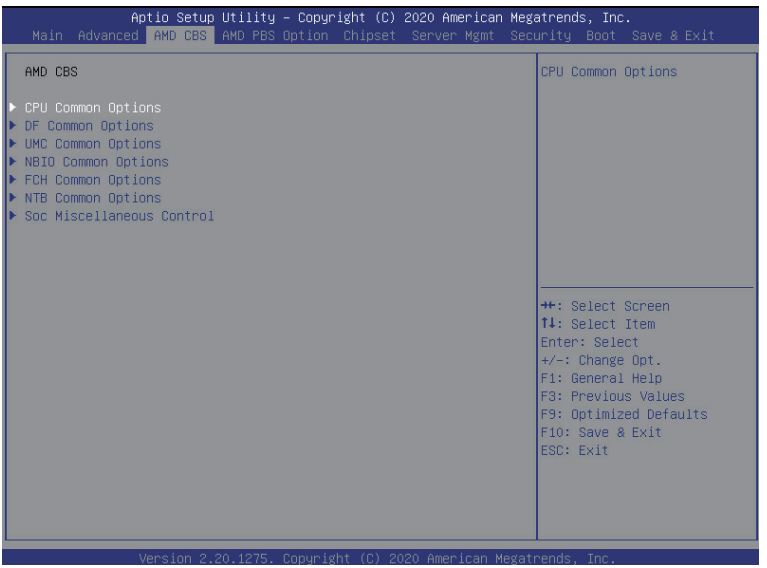
5-2-21 MAC IPv6 Network Configuration



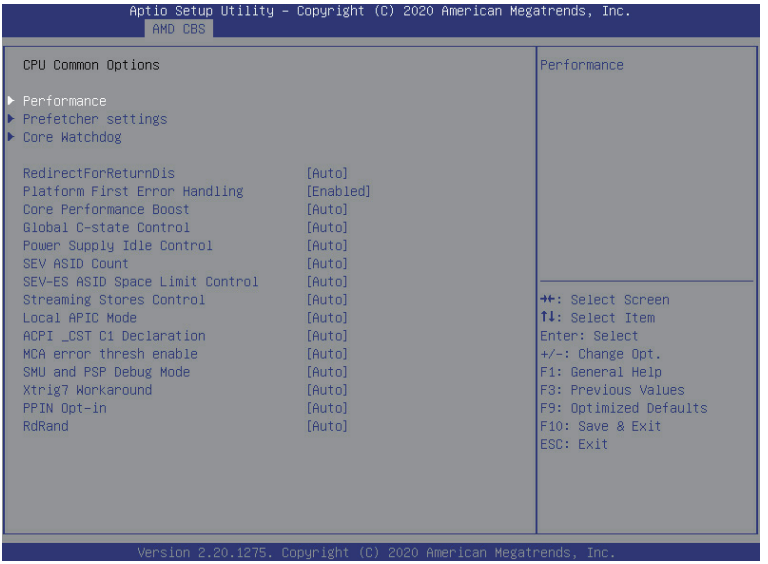
Parameter	Description
Enter Configuration Menu	Press [Enter] to configure advanced items. ◆ Displays the MAC Address information. ◆ Interface ID – The 64 bit alternative interface ID for the device. The string is colon separated. e.g. ff:dd:88:66:cc:1:2:3. ◆ DAD Transmit Count – The number of consective 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. ◆ Policy – Options available: automatic/manual. Default setting is **automatic**. ◆ Save Changes and Exit – Press [Enter] to save all configurations.

5-3 AMD CBS Menu

AMD CBS menu displays submenu options for configuring the CPU-related information that the BIOS automatically sets. Select a submenu item, then press [Enter] to access the related submenu screen.



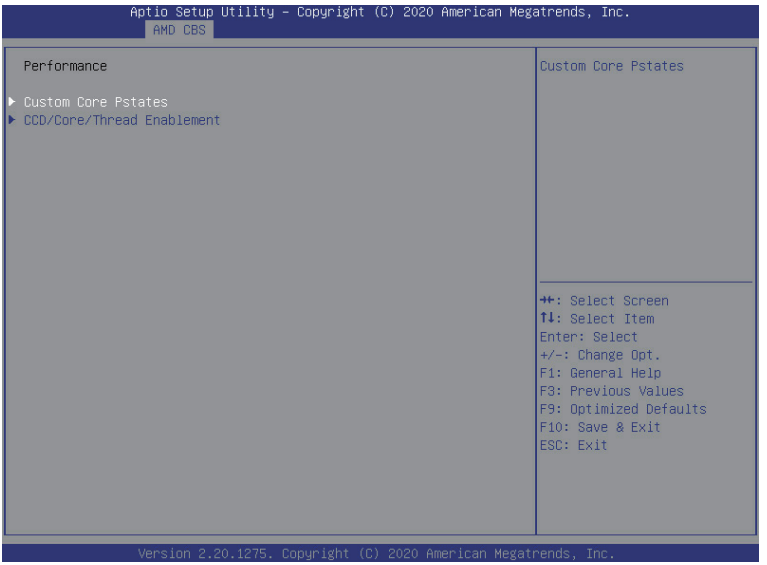
5-3-1 CPU Common Options



Parameter	Description
CPU Common Options	
Performance	Press [Enter] for configuration of advanced items.
Prefetcher settings	Press [Enter] for configuration of advanced items.
Core Watchdog	Press [Enter] for configuration of advanced items.
RedirectForReturnDis	From a workaround for GCC/C000005 issue for XV Core on CZ A0, setting MSRC001_1029 Decode Configuration (DE_CFG) bit 14 [DecfgNoRdrctForReturns] to 1. Options available: Auto, 1, 0. Default setting is **Auto**.
Platform First Error Handling	Enable/Disable PFEH, cloak individual banks, and mask deferred error interrupts from each bank. Options available: Auto, Enabled, Disabled. Default setting is **Enabled**.
Core Performance Boost	Enable/Disable the Core Performance Boost function. Options available: Auto/Disabled. Default setting is **Auto**.
Global C-State Control	Controls the IO based C-state generation and DF C-states. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
Power Supply Idle Control	Configures the Power Supply Idle Control. Options available: Auto, Low Current Idle, Typical Current Idle. Default setting is **Auto**.
SEV ASID Count	Specifies the maximum valid ASID, which affects the maximum system physical address space. Options available: Auto, 253 ASIDs, 509 ASIDs. Default setting is **Auto**.

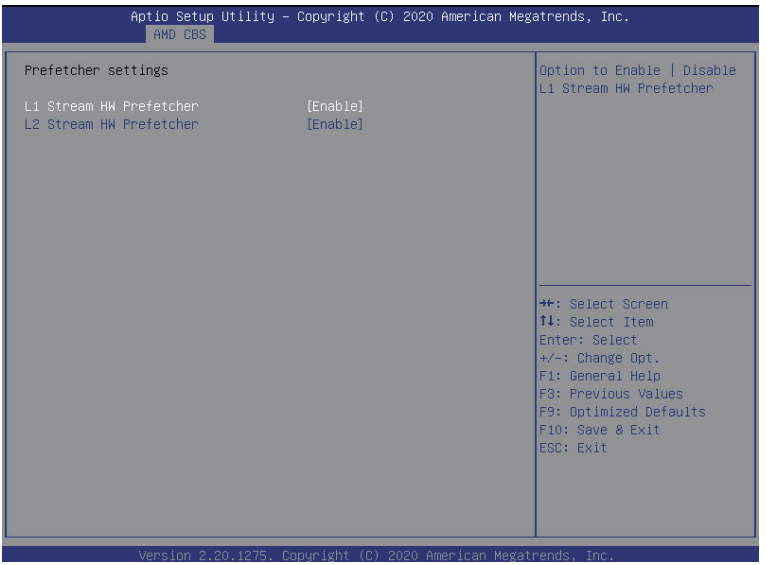
Parameter	Description
SEV-ES ASID Space Limit Control	Space limit control for SEV-ES ASIDs. Options available: Auto/Manual. Default setting is **Auto**.
Streaming Stores Control	Enable/Disable the Streaming Stores functionality. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
Local APIC Mode	Sets the Local APIC Mode. Options available: Auto, xAPIC, x2APIC. Default setting is **Auto**.
ACPI_CST C1 Decaration	Determines whether or not to declare the C1 state to the OS.. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
MCA error thresh enable	Enable MCA error thresholding. Options available: Auto, False, True. Default setting is **Auto**.
SMU and PSP Debug Mode	When this option is enabled, specific uncorrected errors detected by the PSP FW or SMU FW will hand and not reset the system. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
Xtrig7 Workaround	Options available: Auto, No Workaround, Bronze Workaround, Sliver Workaround. Default setting is **Auto**.
PPIN Opt-in	Enable/Disable the PPIN feature. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
RdRand	Enable/Disable RdRand instruction. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.

5-3-1-1 Performance



Parameter	Description
Performance	
Custom Core Pstates	Allows you to accept or decline enabling Custom Core Pstates. When accepted, you can disable or customize core pstates.
CCD/Core/Thread Enablement	Allows you to accept or decline enabling CCDs, processor cores and threads. When accepted, you can control the number of CCDs to be used, the number of cores to be used, and whether to enable or disable Simultaneous Multithreading Technology (SMT) support.

5-3-1-2 Prefetcher Settings



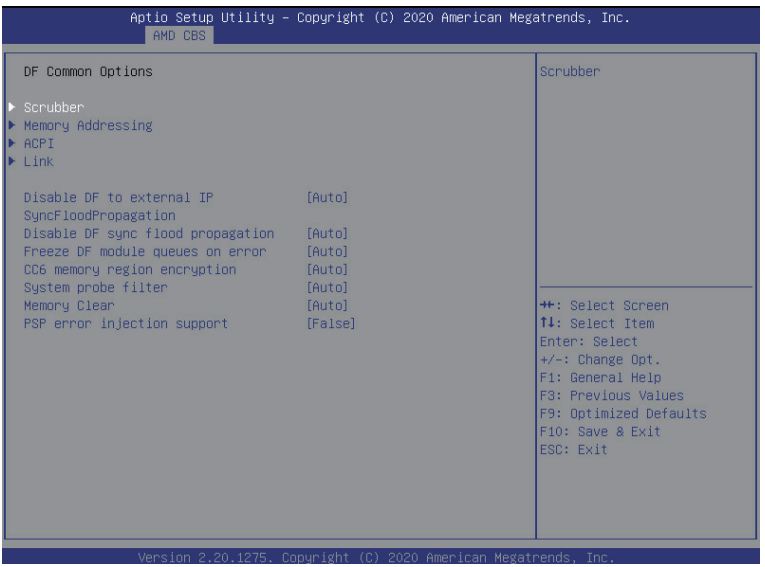
Parameter	Description
Prefetcher settings	
L1 Stream HW Prefetcher	Enable/Disable L1 Stream HW Prefetcher. Options available: Auto, Enabled, Disabled. Default setting is **Enabled**.
L2 Stream HW Prefetcher	Enable/Disable L2 Stream HW Prefetcher. Options available: Auto, Enabled, Disabled. Default setting is **Enabled**.

5-3-1-3 Core Watchdog

Parameter	Description
Core Watchdog	
Core Watchdog Timer Enable	Enable/Disable CPU Watchdog Timer. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
Core Watchdog Timer Interval(Note)	Enable/Disable CPU Watchdog Timer Interval. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
Core Watchdog Timer Enable Serverity(Note)	Enable/Disable CPU Watchdog Timer Serverity. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.

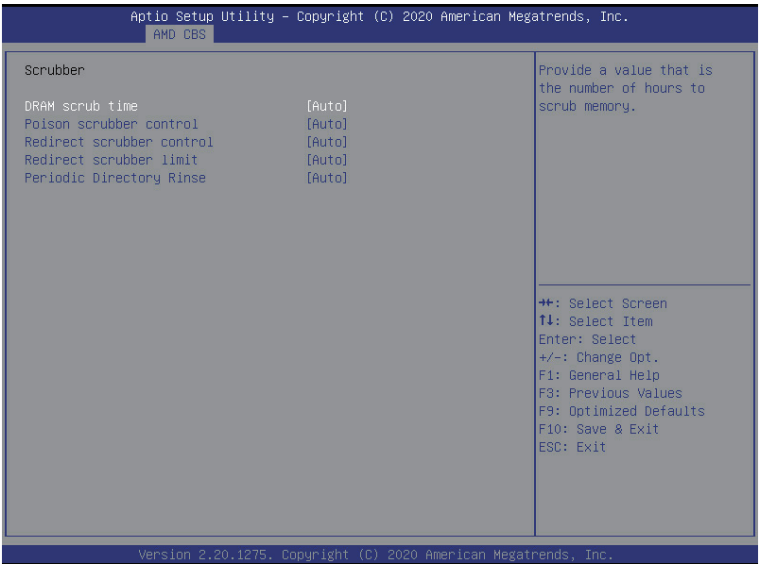
(Note) This item appears when **Core Watchdog Timer Enable** is set to **Enabled**.

5-3-2 DF Common Options



Parameter	Description
DF Common Options	
Scrubber	Press [Enter] for configuration of advanced items.
Memory Addrssing	Press [Enter] for configuration of advanced items.
ACPI	Press [Enter] for configuration of advanced items.
Link	Press [Enter] for configuration of advanced items.
Disable DF to external IP sync flood propagation	Enable/Disable SyncFlood to UMC & downstream slaves. Options available: Auto, Sync flood disabled, Sync flood enabled. Default setting is **Auto**.
Disable DF sync flood propagation	Enable/Disable DF Sync Flood propagation. Options available: Auto, Sync flood disabled, Sync flood enabled. Default setting is **Auto**.
Frezze DF module queues on error	Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
CC6 memory region encryption	Controls whether or not the CC6 save/restor memory is encrypted. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
System probe filter	Enable/Disable Systme probe filter. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
Memory Clear	Enable/Disable the Memory Clear feature. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
PSP error injection support	Enable/Disable PSP error injection support. Options available: False/True. Default setting is **False**.

5-3-2-1 Scrubber



Parameter	Description
Scrubber	
DRAM scrub time	Provide a value that is the number of hours to scrub memory. Options available: Auto, Disabled, 1 hour, 4 hours, 8 hours, 16 hours, 24 hours, 48 hours. Default setting is **Auto**.
Poison scrubber control	Enable/Disable the Poison scrubber control feature. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
Redirect scrubber control	Enable/Disable the Redirect scrubber control feature. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
Redirect scrubber limit	Sets the redirect scrubber limit. Options available: Auto, 2, 4, 8, Infinite. Default setting is **Auto**.
Periodic Directory Rinse	Control Periodic Dirctory Rinse Mode Options available: Auto, Enabled, Disabled. Default setting is **Auto**.

5-3-2-2 Memory Addressing

Parameter	Description
Memory Addressing	
NUMA nodes per socket	Specifies the number of desired NUMA nodes per socket. Options available: Auto, NPS0, NPS1, NPS2, NPS4. Default setting is **NPS1**.
Memory inerleaving	Enable/Disable the Memory interleaving feature. Options available: Auto/Disabled. Default setting is **Auto**.
Memory interleaving size	Controls the memory interleaving size. This determines the starting address of the interleave (bit 8, 9, 10 or 11). Options available: Auto, 256Bytes, 512Bytes, 1KB, 2KB. Default setting is **Auto**.
1TB remap	Enable/Disable to remap DRAM out of the space just below the 1TB boundary. The ability to remap depends on DRAM configuration, NPS, and interleaving selection, and may not always be possible. Options available: Auto, Do not remap, Attempt to remap. Default setting is **Auto**.
DRAM map inversion	Enable/Disable the DRAM map inversion function. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
Location of private memory regions	Control whether or not the rpivate memory regions (PSP, SMU, and CC6) are at the top of DRAM or distributed. Note that distributed requires memory on all dies. Note that it will always be at the top of DRAM if some dies don't have memory regardless of this. Options available: Auto, Distributed, Consolidated. Default setting is **Auto**.

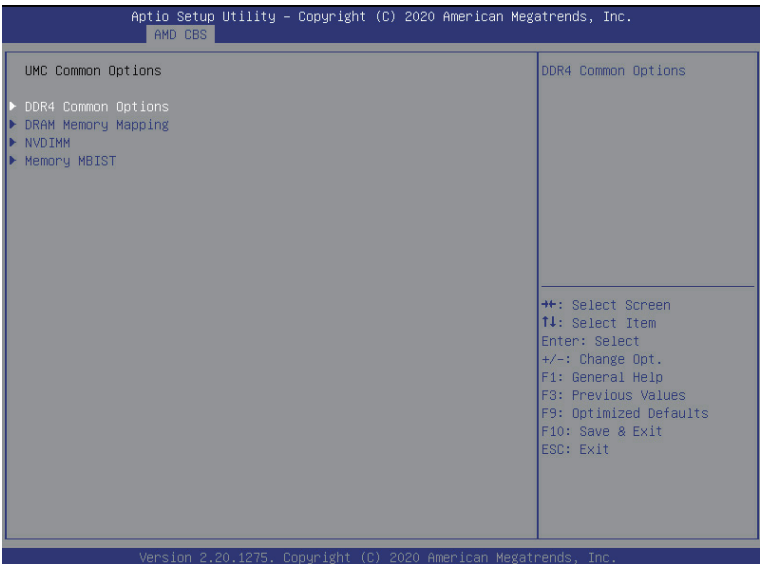
5-3-2-3 ACPI

Parameter	Description
ACPI	
ACPI SRAT L3 Cache As NUMA Domain	Enable/Disable the ACPI SRAT L3 Cache As NUMA Domain function. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
ACPI SLIT Distance Control	Determines how the SLIT distances are declared. Options available: Auto/Manual. Default setting is **Auto**.
ACPI SLIT remote relative distance	Sets the remote socket distance for 2P systems as near (2.8) or far (3.2). Options available: Auto, Near, Far. Default setting is **Auto**.

5-3-2-4 Link

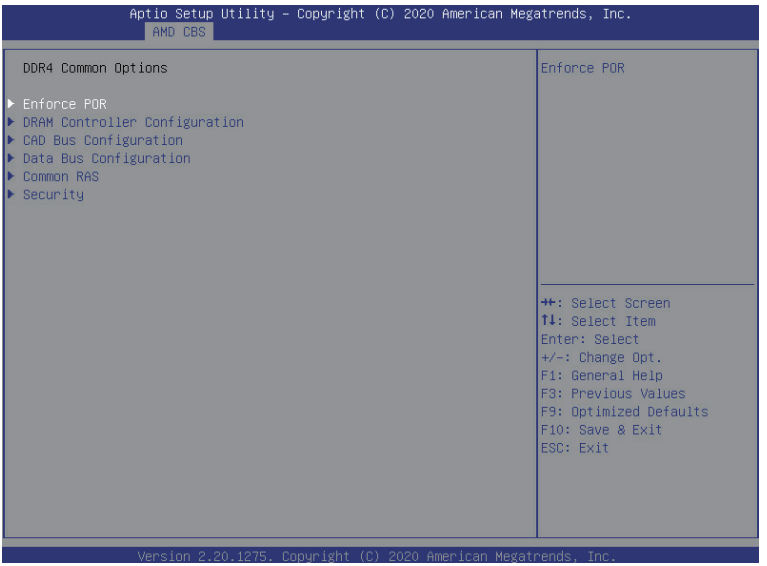
Parameter	Description
Link	
GMI encryption control	Enable/Disable GMI link encryption. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
xGMI encryption control	Enable/Disable xGMI link encryption. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
CAKE CRC perf bounds Control	Options available: Auto/Manual. Default setting is **Auto**.
4-link xGMI max speed	Specifies the max speed of 4-link xGMI. Options available: Auto, 10.667Gbps, 13Gbps, 16Gbps, 18Gbps. Default setting is **Auto**.
3-link xGMI max speed	Specifies the max speed of 3-link xGMI. Options available: Auto, 10.667Gbps, 13Gbps, 16Gbps, 18Gbps. Default setting is **Auto**.
xGMI TXEQ Mode	Configures xGMI TXEQ/RX vetting Mode. Options available: Auto, TXEQ_Disabled, TXEQ_Lane, TXEQ_Link, TXEQ_RX_Vet. Default setting is **Auto**.

5-3-3 UMC Common Options



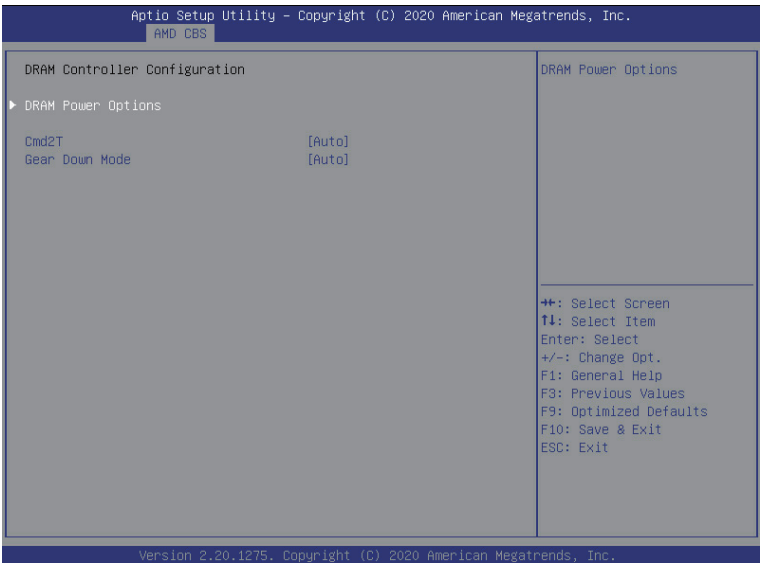
Parameter	Description
UMC Common Options	
DDR4 Common Options	Press [Enter] for configuration of advanced items.
DRAM Memory Mapping	Press [Enter] for configuration of advanced items.
NVDIMM	Press [Enter] for configuration of advanced items.
Memory MBIST	Press [Enter] for configuration of advanced items.

5-3-3-1 DDR4 Common Options



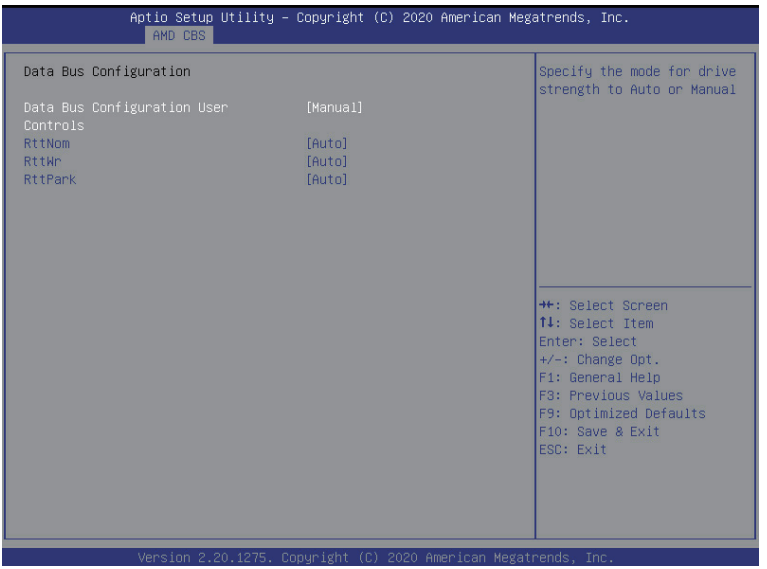
Parameter	Description
DDR4 Common Options	
Enforce POR	Press [Enter] to configure the Plan of Record (POR) to enable / disable restrictions for DDR4 frequency and voltage programming. Memory speeds will be capped at AMD guidelines. **Note: To enable 2 DIMMs per Channel at 3200MHz function, select [Accept] at warning message, change Overclock from [Auto] to [Enabled], and then set memory speed to 3200MHz.**
DRAM Controller Configuration	Press [Enter] to configure DRAM Controller Configuration.
CAD Bus Configuration	Press [Enter] to configure CAD Bus Configuration.
Data Bus Configuration	Press [Enter] to configure Data Bus Configuration.
Common RAS	Press [Enter] to configure Common RAS.
Security	Press [Enter] to configure Security.

5-3-3-1-1 DRAM Controller Configuration



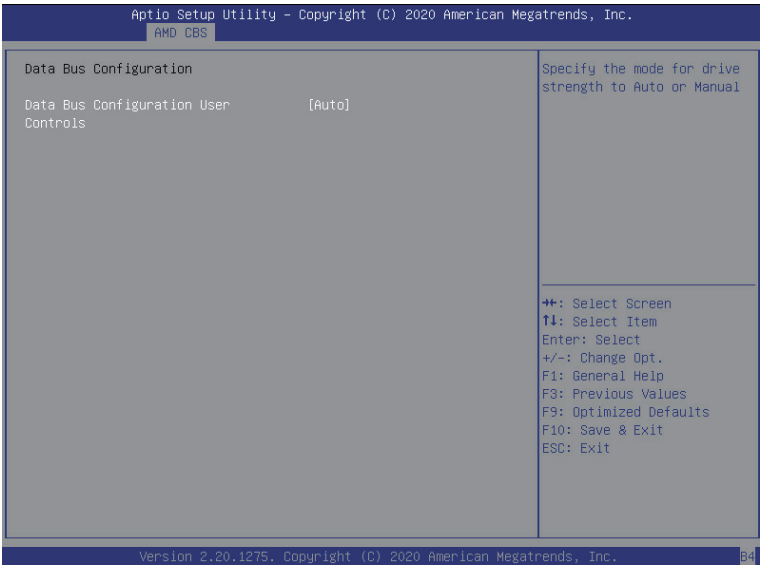
Parameter	Description
DRAM Controller Configuration	
DRAM Power Options	Press [Enter] to configure DRAM Power OptionsMa. ◆ Power Down Enable – Enable/Disable DDR power down mode. – Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
Cmd2T	Selects the Cmd2T mode on ADDR/CMD. Options available: Auto, 1T, 2T. Default setting is **Auto**.
Gear Down Mode	Enable/Disable the Gear Down Mode function. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.

5-3-3-1-2 CAD Bus Configuration



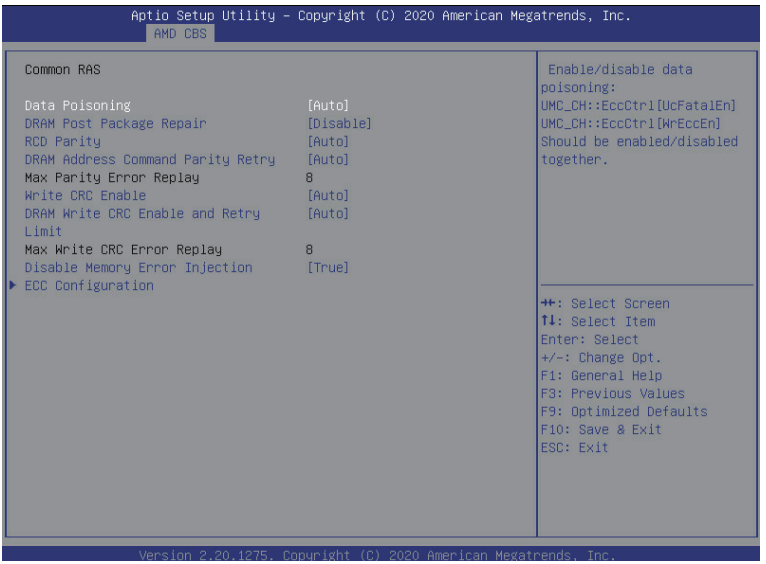
Parameter	Description
CAD Bus Configuration	
CAD Bus Timing User Controls	Setup time on CAD bus signals to Auto or Manual. Options available: Auto/Manual. Default setting is **Auto**.
CAD Bus Drive Strength User Controls	Drive Strength on CAD bus signals to Auto or Manual. Options available: Auto/Manual. Default setting is **Auto**.

5-3-3-1-3 Data Bus Configuration



Parameter	Description
Data Bus Configuration	
Data Bus Configuration User Controls	Specifies the mode for drive strength to Auto or Manual. Options available: Auto/Manual. Default setting is **Auto**.

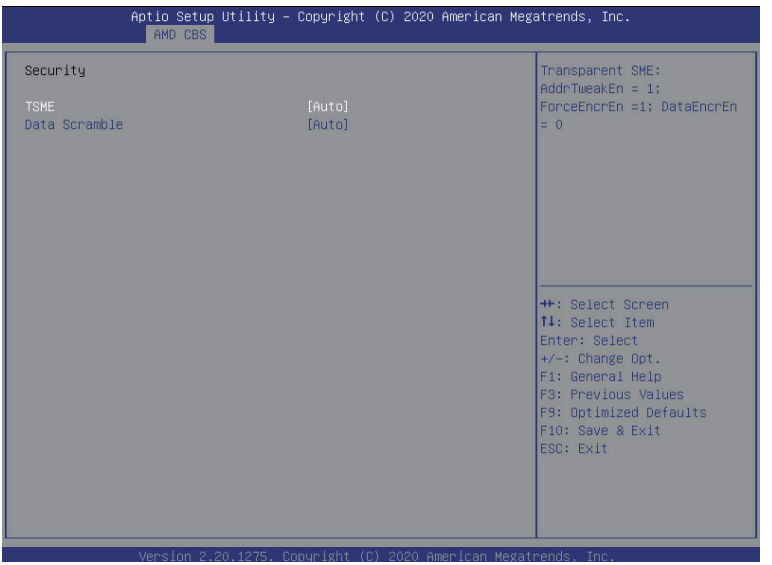
5-3-3-1-4 Common RAS



Parameter	Description
Common RAS	
Data Poisoning	Enable/Disable the Data Poisoning function. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
DRAM Post Package Repair	Enable/Disable the DRAM Post Package Repair function. Options available: Enabled/Disable. Default setting is **Disable**.
RCD Parity	Enable/Disable the RCD Parity function. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
DRAM Address Command Parity Retry	Enable/Disable the DRAM Address Command Parity Retry function. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
Max Parity Error Replay	Configures the Max Parity Error Replay. (0~0x3f) Default setting is **8**. **Please note that this item is configurable when DRAM Address Command Parity Retry is set to Enabled.**
Write CRC Enable	Enable/Disable the Write CRC function. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
DRAM Write CRC Enable and Retry Limit	Enable/Disable DRAM Write CRC Enable and Retry Limit. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
Max Write CRC Error Replay	Configures the Max Write CRC Error Replay. (0~0x3f) Default setting is **8**. **Please note that this item is configurable when DRAM Write CRC Enable and Retry Limit is set to Enabled.**

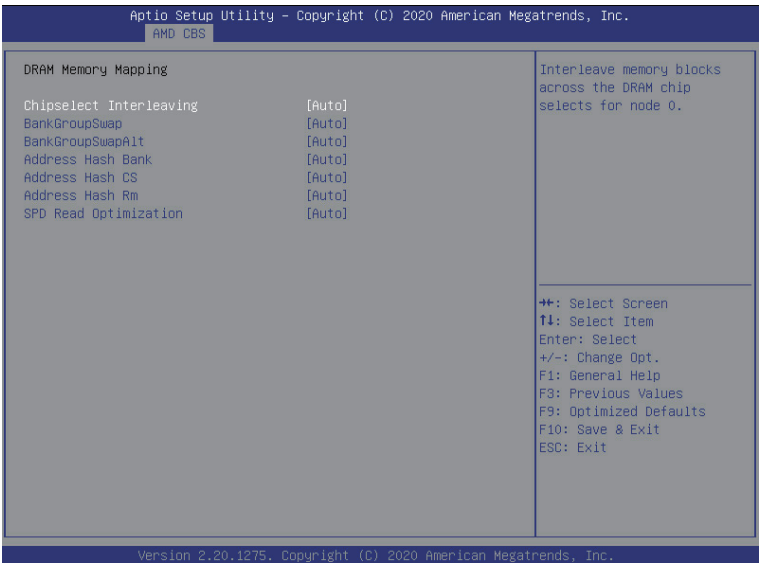
Parameter	Description
Disable Memory Error Injection	Options available: False/True. Default setting is **True**.
ECC Configuration	Press [Enter] to configure advanced items. ◆ DRAM ECC Symbol Size – Configures the DRAM ECC Symbol Size. – Options available: Auto, x4, x8, x16. Default setting is **Auto**. ◆ DRAM ECC Enable – Enable/Disable DRAM ECC. When set to Auto, it will set ECC to enable. – Options available: Auto, Enabled, Disabled. Default setting is **Auto**. ◆ DRAM UECC Retry – Enable/Disable DRAM UECC Retry. – Options available: Auto, Enabled, Disabled. Default setting is **Auto**.

5-3-3-1-5 Security



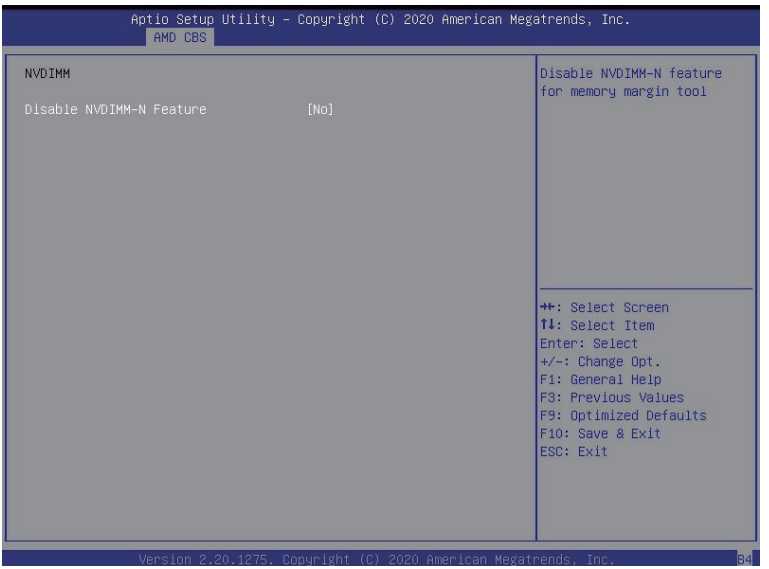
Parameter	Description
Security	
TSME	Enable/Disable Transparent SME. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
Data Scramble	Enable/Disable Data Scrambling. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.

5-3-3-2 DRAM Memory Mapping



Parameter	Description
DRAM Memory Mapping	
Chipselect Interleaving	Interleave memory blocks across the DRAM chip selects for CPU 0. Options available: Auto/Disabled. Default setting is **Auto**.
BankGroupSwap	Configures the BankGroupSwap. BankGroupSwap (BGS) is a new memory mapping option in AGESA that alters how applications get assigned to physical locations within the memory modules. When this option sets to Auto, it is null: No help string. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
BankGroupSwapAlt	Configures the BankGroupSwapAlt. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
Address Hash Bank	Enable/Disable bank address hashing. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
Address Hash CS	Enable/Disable CS address hashing. Options available: Auto, Enabled, Disabled. Default setting is **Auto**
Address Hash Rm	Enable/Disable RM address hashing. Options available: Auto, Enabled, Disabled. Default setting is **Auto**
SPD Read Optimization	Enable/Disable SPD Read Optimization. Options available: Auto, Enabled, Disabled. Default setting is **Auto**

5-3-3-3 NVDIMM



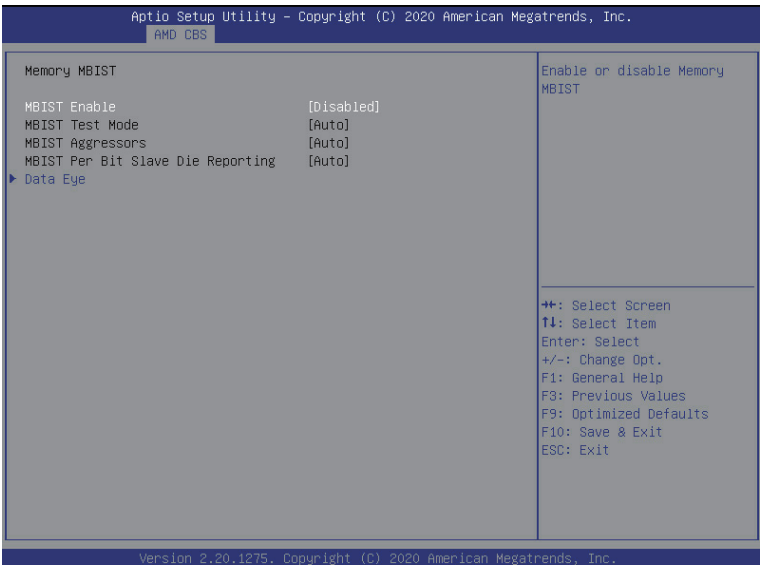
Parameter	Description
NVDIMM	Disable NVDIMM-N feature for memory margin tool. Options available: Yes/No, Yes. Default setting is **No**.

5-3-3-4 Memory MBIST

Parameter	Description
Memory MBIST	
MBIST Enable	Enable/Disable the Memory MBIST function. Options available: Enabled/Disabled. Default setting is **Disabled**.
MBIST Test Mode(Note)	Selects MBIST Test Mode. **Interface Mode**: Tests Single and Multiple CS transactions and Basic Connectivity. **Data Eye Mode**: Measures Voltage vs. Timing. Options available: Auto, Both, Interface Mode, Data Eye Mode. Default setting is **Auto**.
MBIST Aggressors(Note)	Enable/Disable MBIST Aggressor test. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
MBIST Per Bit Slave Die Reporting(Note)	Enable/Disable to report 2D data eye results in ABL log for each DQ, Chipselect, and Channel. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
Data Eye	Press [Enter] to configure advanced items.

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

5-3-3-4-1 Data Eye



Parameter	Description
Data Eye	
Pattern Select	Options available: PRBS, SSO, Both. Default setting is **PRBS**.
Pattern Length	Determines the pattern length. The possible options are N=3....12.
Aggressor Channel	This item helps read the aggressors channels. Options available: Disabled, 1 Aggressor Channel, 3 Aggressor Channels, 7 Aggressor Channels. Default setting is **1 Aggressor Channel**.
Aggressor Static Lane Control	Enable/Disable the Aggressor Static Lane Control function. Options available: Enabled/Disabled. Default setting is **Disabled**.
Aggressor Static Lane Select Upper 32 bits	This item is configurable when **Aggressor Static Lane Control** is set to **Enabled**.
Aggressor Static Lane Select Lower 32 bits	This item is configurable when **Aggressor Static Lane Control** is set to **Enabled**.
Aggressor Static Lane Select ECC	This item is configurable when **Aggressor Static Lane Control** is set to **Enabled**.
Aggressor Static Lane Value	This item is configurable when **Aggressor Static Lane Control** is set to **Enabled**.
Target Static Lane Control	Enable/Disable the Target Static Lane Control function. Options available: Enabled/Disabled. Default setting is **Disabled**.

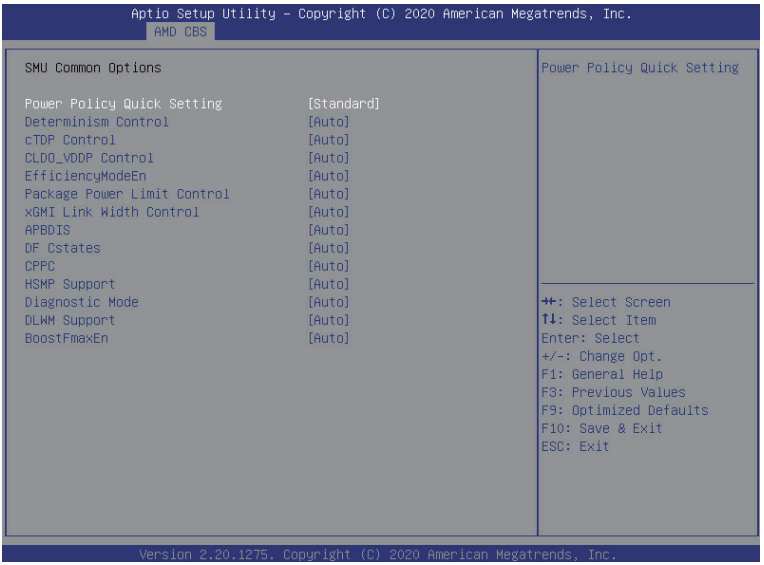
Parameter	Description
Target Static Lane Select Upper 32 bits	This item is configurable when **Target Static Lane Control** is set to **Enabled**.
Target Static Lane Select Lower 32 bits	This item is configurable when **Target Static Lane Control** is set to **Enabled**.
Target Static Lane Select ECC	This item is configurable when **Target Static Lane Control** is set to **Enabled**.
Target Static Lane Value	This item is configurable when **Target Static Lane Control** is set to **Enabled**.
Data Eye Type	This item determines which results are expected to be captured for Data Eye. Options available: 1D Voltage Sweep, 1D Timing Sweep, 2D Full Data Eye, Worst Case Margin Only. Default setting is **Worst Case Margin Only**.
Worst Case Margin Granularity	Configures Worst Case Margin Granularity. Options available: Per Chip Select, Per Nibble. Default setting is **Worst Case Margin Only**.
Read Voltage Sweep Step Size	Configures the step size for read Data Eye voltage sweep. Options available: 1, 2, 4. Default setting is **2**.
Read Timing Sweep Step Size	Configures the step size for read Data Eye timing sweep. Options available: 1, 2, 4. Default setting is **1**.
Write Voltage Sweep Step	Configures the step size for write Data Eye voltage sweep. Options available: 1, 2, 4. Default setting is **2**.
Write Timing Sweep Step Size	Configures the step size for write Data Eye timing sweep. Options available: 1, 2, 4. Default setting is **1**.

5-3-4 NBIO Common Options

Parameter	Description
NBIO Common Options	
IOMMU	Enable/Disable the IOMMU function. Options available: Enabled/Disabled. Default setting is **Enabled**.
PCIe ARI Support	Enable/Disable Alternative Routng-ID Interpretation. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
PCIe Ten Bit Tag Support	Enable/Disable PCIe ten bit tags for supported devices. (Auto=Disabled) Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
SMU Common Options	Press [Enter] for configuration of advanced items.
NBIO RAS Common Options	Press [Enter] for configuration of advanced items.
Enable AER Cap	Enable/Disable Advanced Error Reporting Capability. Options available: Auto, Enabled, Disabled. Default setting is **Disabled**.
Early Link Speed	Configures Early Link Speed. Options available: Auto, Gen1, Gen2. Default setting is **Auto**.

Parameter	Description
Hot Plug Handling mode	Controls the Hot Plug Handling mode. Options available: Auto, A0 Mode, OS First (No Error Handling), OS First (Error Handling-Not Implemented), Firmware First (Not Implemented). Default setting is **Auto**.
Presence Detect Select mode	Controls the Presence Detect Select mode. Options available: Auto, OR, AND. Default setting is **Auto**.
Preferred IO Device	Configures Preferred IO Device. Options available: Auto, Manual. Default setting is **Auto**.
Loopback Mode	Enabled/Disabled PCIe Loopback mode. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
CV test	Set this to Enabled to support running PCIECV tool. Auto: preserve hardware defaults. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.

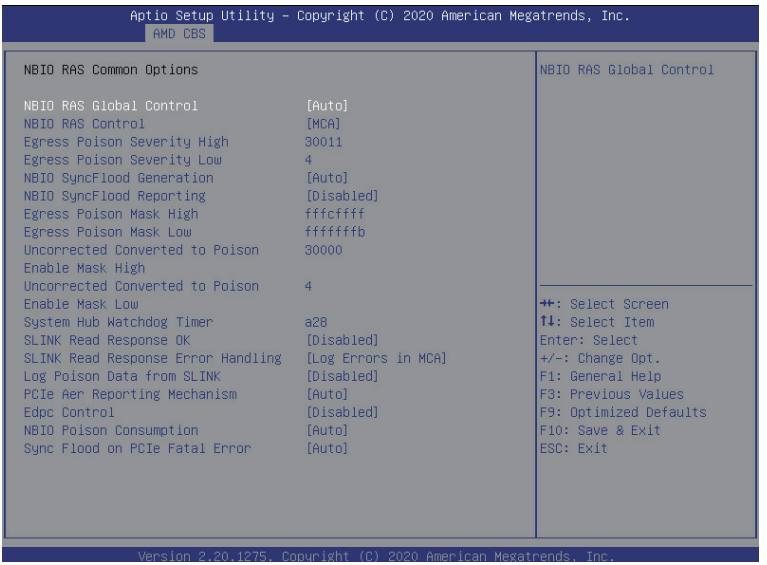
5-3-4-1 SMU Common Options



Parameter	Description
SMU Common Options	
Power Policy Quick Setting	Options available: Standard, Best Performance, Energy Efficient. Default setting is **Standard**.
Determinism Control	Selects use the fused Determinism or set customized Determinism. Options available: Auto/Manual. Default setting is **Auto**.
cTDP Control	Selects use the fused TDP or set customized TDP. **TDP is used to define the RC thermal model only** Options available: Auto/Manual. Default setting is **Auto**.
CLD0_VDDP Control	Options available: Auto/Manual. Default setting is **Auto**.
EfficiencyModeEn	Options available: Auto/Enabled. Default setting is **Auto**.
Package Power Limit Control	Selects use the fused PPT or set customized PPT. **PPT will be used as the ASIC power limit** Options available: Auto/Manual. Default setting is **Auto**.
xGMI Link Width Control	Options available: Auto/Enabled. Default setting is **Auto**.
APBDIS	Options available: Auto, 0, 1. Default setting is **Auto**.

Parameter	Description
DF Cstates	Enable/Disable DF C-states. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
CPPC	Enable/Disable the CPPC feature. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
HSMP Support	Select HSMP support enable or disable. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
Diagnostic Mode	Select Diagnostic Mode enable or disable. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
BoostFmaxEn	Options available: Auto/Enabled. Default setting is **Auto**.

5-3-4-2 NBIO RAS Common Options



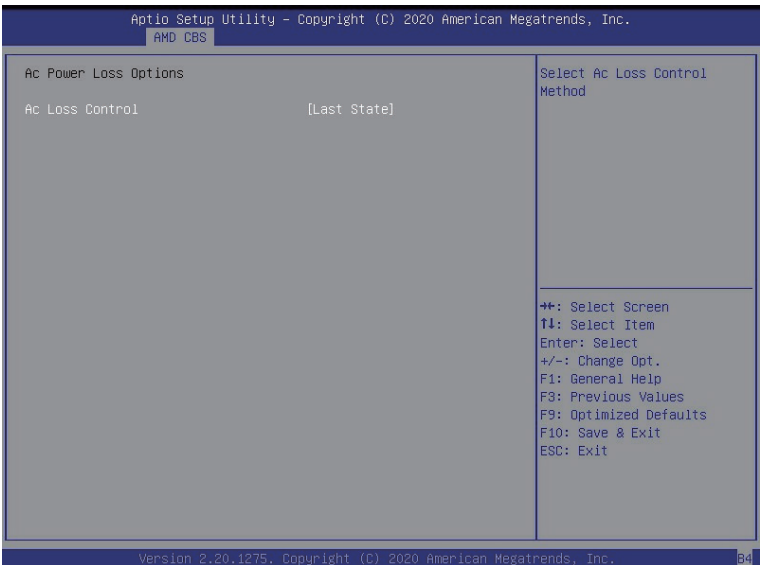
Parameter	Description
NBIO RAS Common Options	
NBIO RAS Global Control	Options available: Auto/Manual. Default setting is **Auto**.
NBIO RAS Control	Options available: Disabled, MCA, Legacy. Default setting is **MCA**.
Egress Poison Serverity High	Configures the Egress Poison High Serverity. Each bit set to 1 enables High serverity on the associated IOHC egress port. A bit of 0 indicates LOW serverity.
Egress Poison Serverity Low	Configures the Egress Poison Low Serverity. Each bit set to 1 enables High serverity on the associated IOHC egress port. A bit of 0 indicates LOW serverity.
NBIO SyncFlood Generation	The value may be used to mask SyncFlood caused by NBIO RAS options. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
NBIO SyncFlood Reporting	The value may be used to enanle SyncFlood reporting to APML. Options available: Enabled/Disabled. Default setting is **Disabled**.
Egress Poison Mask High	Enables mask for masking of errors logged in EGRESS_POISON_ STATUS. For each bit set to 1, errors are masked. For each bit set to 0, errors trigger response actions.
Egress Poison Mask Low	Enables mask for masking of errors logged in EGRESS_POISON_ STATUS. For each bit set to 1, errors are masked. For each bit set to 0, errors trigger response actions.

Parameter	Description
Uncorrected Converted to Poison Enabke Mask High	Enables mask for masking of uncorrectable parity errors on internal arrays.
Uncorrected Converted to Poison Enabke Mask Low	Enables mask for masking of uncorrectable parity errors on internal arrays.
System Hub Watchdog Timer	Specifies the timer interval of the SYSHUB Watchdog timer in miliseconds.
SLINK Read Response OK	This item specifies whether SLINK read response errors are converted to an Okay response. Options available: Enabled/Disabled. Default setting is **Disabled**.
SLINK Read Response Error Handling	Options available: Enabled, Trigger MCOMMIT Error, Log Errors in MCA. Default setting is **Log Errors in MCA**.
Log Poison Data from SLINK	Enable/Disable the Log Poison Data from SLINK feature. Options available: Enabled/Disabled. Default setting is **Disabled**.
PCIe Aer Reporting Mechanism	Selects the method of reporting AER errors from PCI Express. Options available: Auto, Firmware First, OS First, MCA. Default setting is **Auto**.
Edpc Control	Options available: Auto, Enabled, Disabled. Default setting is **Disabled**.
NBIO Poison Consumption	Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
Sync Flood on PCIe Fatal Error	Options available: Auto, True, False. Default setting is **Auto**.

5-3-5 FCH Common Options

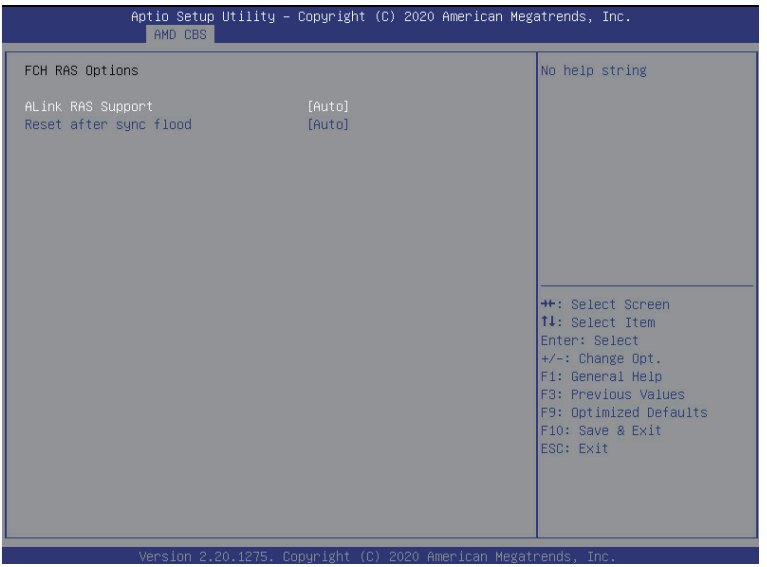
Parameter	Description
FCH Common Options	
AC Power Loss Options	Press [Enter] for configuration of advanced items.
FCH RAS Options	Press [Enter] for configuration of advanced items.

5-3-5-1 AC Power Loss Options



Parameter	Description
AC Power Loss Options	
AC Loss Control	Selects the AC Loss Control Method. Options available: Power Off, Power On, Last State. Default setting is **Last State**.

5-3-5-2 FCH RAS Options



Parameter	Description
FCH RAS Options	
ALink RAS Support	Enable/Disable the ALink RAS Support. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
Reset after sync flood	Enables AB to forward downstream sync-flood message to system controller. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.

5-3-6 NTB Common Options

Parameter	Description
NTB Common Options	
NTB Enable	Options available: Auto/Enabled. Default setting is **Auto**.

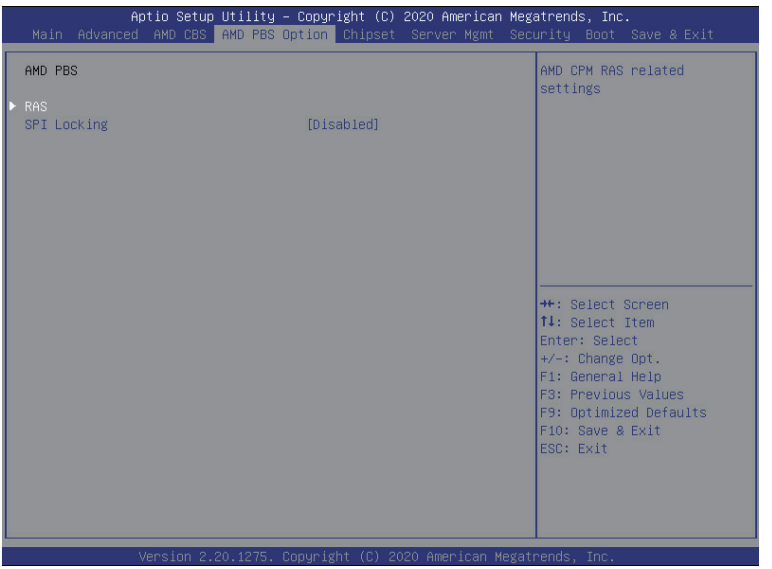
5-3-7 SOC Miscellaneous Control

Parameter	Description
SOC Miscellaneous Control	
ABL Console Out Control	Enable/Disable the ConsoleOut function for ABL. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.
ABL PMU message Control(Note)	To Control the total number of PMU debug messages. Options available: Auto, Enabled, Disabled. Default setting is **Auto**.

(Note) This item appears when **ABL Console Out Control** is set to **Enabled**.

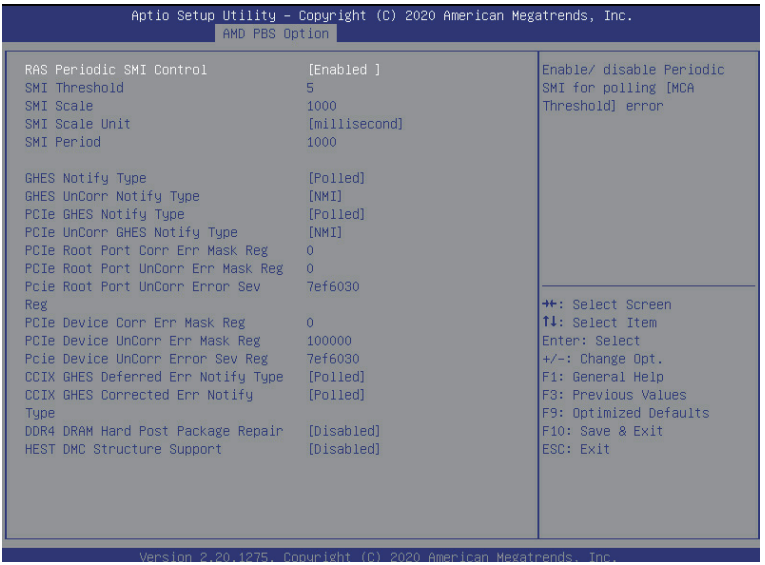
5-4 AMD PBS Menu

AMD PBS Option menu displays submenu options for configuring the function of AMD PBS. Select a submenu item, then press [Enter] to access the related submenu screen.



Parameter	Description
RAS	Press [Enter] for configuration of advanced items.
SPI Locking	Enable/Disable SPI Locking for protect ROM part. Options available: Enabled/Disabled. Default setting is **Disabled**.

5-4-1 RAS

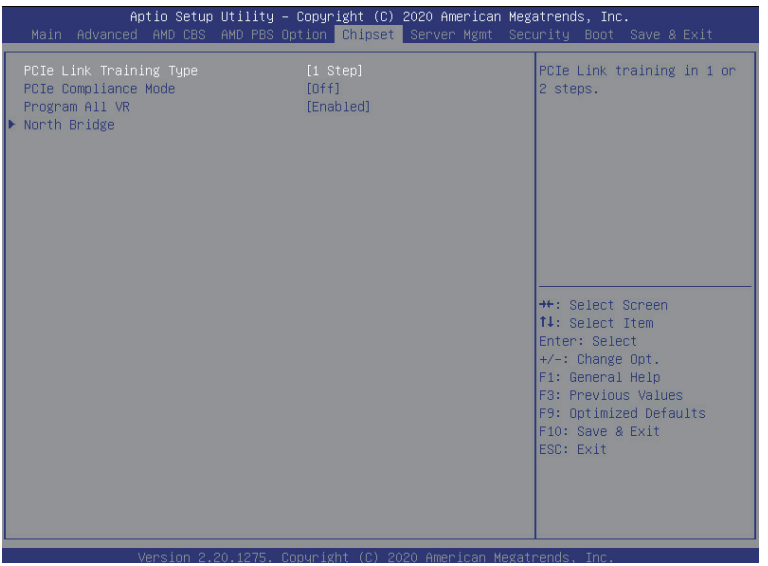


Parameter	Description
RAS Periodic SMI Control	Enable/Disable the Periodic SMI for polling [MCA Threshold] error. Options available: Enabled/Disabled. Default setting is **Enabled**.
SMI Threshold	Configures the SMI Threshold value.
SMI Scale	Configures the SMI Scale value.
SMI Scale Unit	Defines the unit of time scale. Options available: millisecond, second, minute. Default setting is **millsecond**.
SMI Period	Configures the SMI Period.
GHES Notify Type	Selects the Notification type for deferred/ corrected errors. Options available: Polled/SCI. Default setting is **Polled**.
GHES UnCorr Notify Type	Selects the Notification type for uncorrected errors. Options available: Polled/NMI. Default setting is **NMI**.
PCIe GHES Notify Type	Selects the Notification type for PCIe corrected errors. Options available: Polled/SCI. Default setting is **Polled**.
PCIe UnCorr GHES Notify Type	Selects the Notification type for PCIe uncorrected errors. Options available: Polled/NMI. Default setting is **NMI**.
PCIe Root Port Corr Err Mask Reg	Initialize the PCIe AER Corrected Error Mask register of Root Port.

Parameter	Description
PCIe Root Port UnCorr Err Mask Reg	Initialize the PCIe AER Uncorrected Error Mask register of Root Port.
PCIe Root Port UnCorr Err Sev Reg	Initialize the PCIe AER Uncorrected Error Serverity register of Root Port.
PCIe Device Corr Err Mask Reg	Initialize the PCIe AER Corrected Error Mask register of PCIe device.
PCIe Device UnCorr Err Mask Reg	Initialize the PCIe AER Uncorrected Error Mask register of PCIe device.
PCIe Device UnCorr Err Sev Reg	Initialize the PCIe AER Uncorrected Error Serverity register of PCIe device.
CCIX GHES Deferred ERR Notify Type	Selects the Notification type for CCIX deffered error. Options available: Polled/SCI. Default setting is **Polled**.
CCIX GHES Corrected Err Notify Type	Selects the Notification type for CCIX corrected error. Options available: Polled/SCI. Default setting is **Polled**.
DDR4 DRAM Hard Post Package Repair	This feature allows spare DRAM rows to replace malfunctioning rows via an in-field repair mechanism. Options available: Enabled/Disabled. Default setting is **Disabled**.
HEST DMC Structure Support	HEST DMC (Deferred Machine Check) Structure Support. Options available: Enabled/Disabled. Default setting is **Disabled**.

5-5 Chipset Setup Menu

Chipset Setup menu displays submenu options for configuring the function of the North Bridge. Select a submenu item, then press <Enter> to access the related submenu screen.

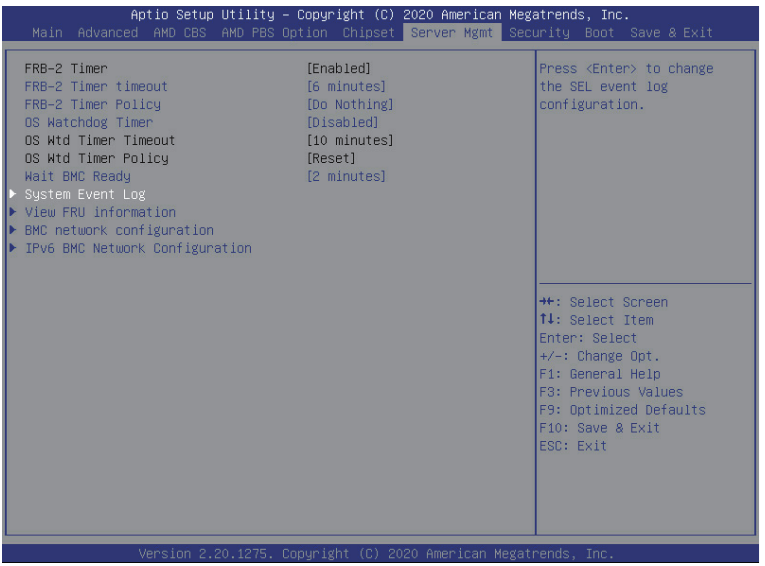


Parameter	Description
PCIe Link Training Type	Configures the PCIe Link training in 1 or 2 steps. Options available: 1 Step/2Step. Default setting is **1 Step.**
PCIe Compliance Mode	Options available: On/Off. Default setting is **Off.**
Program All VR	Enable/Disable program all VR on MB. Options available: Enabled/Disabled. Default setting is **Enabled**.
North Bridge	Press [Enter] for configuration of advanced items.

5-5-1 North Bridge

Parameter	Description
North Bridge Configuration Memory Information	
Total Memory	Displays the total memory information.
CPU0 Information	Press [Enter] to view information related to CPU 0.

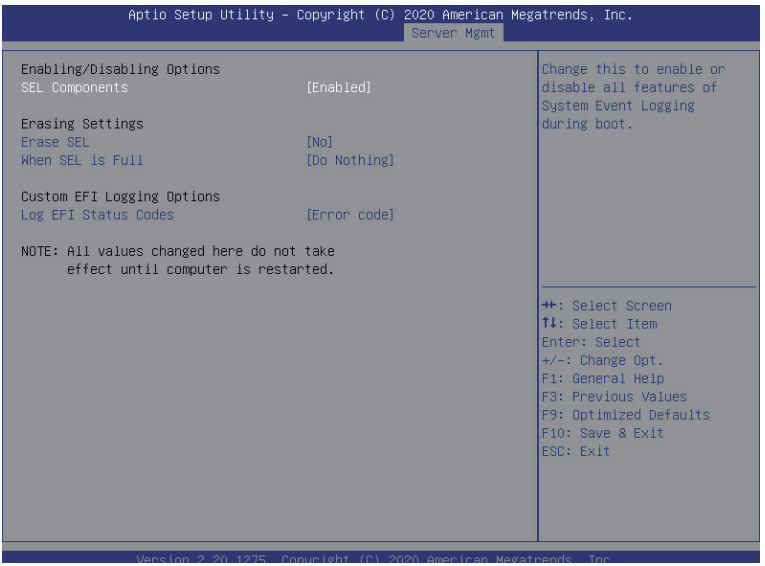
5-6 Server Management Menu



Parameter	Description
FRB-2 Timer	Enable/Disable FRB-2 timer (POST timer). Options available: Enabled/Disabled. Default setting is **Enabled**.
FRB-2 Timer timeout	Configures 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.**
FRB-2 Timer Policy	Configures 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	Configures 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.**

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.

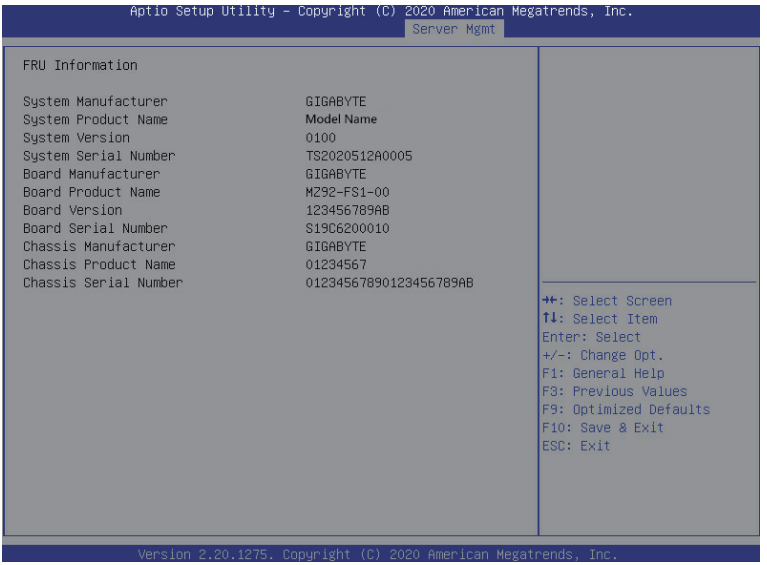
5-6-1 System Event Log



Parameter	Description
Enabling / Disabling Options	
SEL Components	Change this item to enable or disable all features of System Event Logging during boot. Options available: Enabled/Disabled. Default setting is **Enabled**.
Erasing Settings	
Erase 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 and Progress code. Default setting is **Error code**.

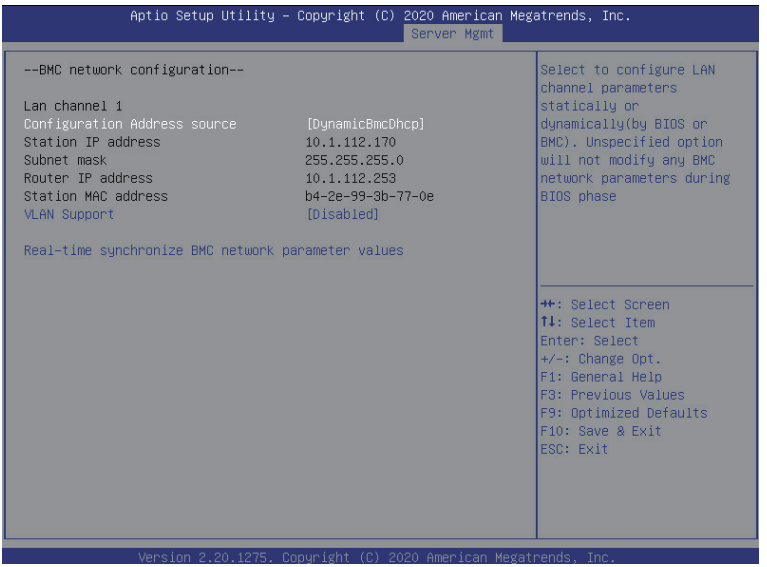
5-6-2 View FRU Information

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.



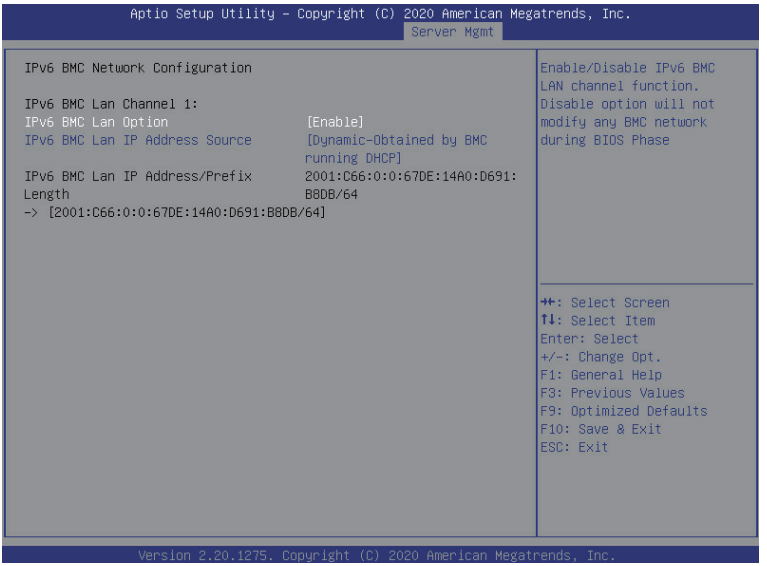
(Note) The model name will vary depends on the product you purchased

5-6-3 BMC Network Configuration



Parameter	Description
BMC network configuration	
Lan Channel 1	
Configuration Address source	Selects to configure LAN channel parameters statically or dynamically (DHCP). Do nothing option will not modify any BMC network parameters during BIOS phase. Options available: Unspecified, Static, DynamicBmcDhcp. Default setting is **DynamicBmcDhcp**.
Station IP address	Displays IP Address information.
Subnet mask	Displays Subnet Mask information. Please note that the IP address must be in three digitals, for example, 192.168.000.001.
Router IP address	Displays the Router IP Address information.
Station MAC address	Displays the MAC Address information.
Real-time get BMC network address	Press [Enter] will set LAN mode and Address source and then get IP, Subnet, Gateway and MAC address.

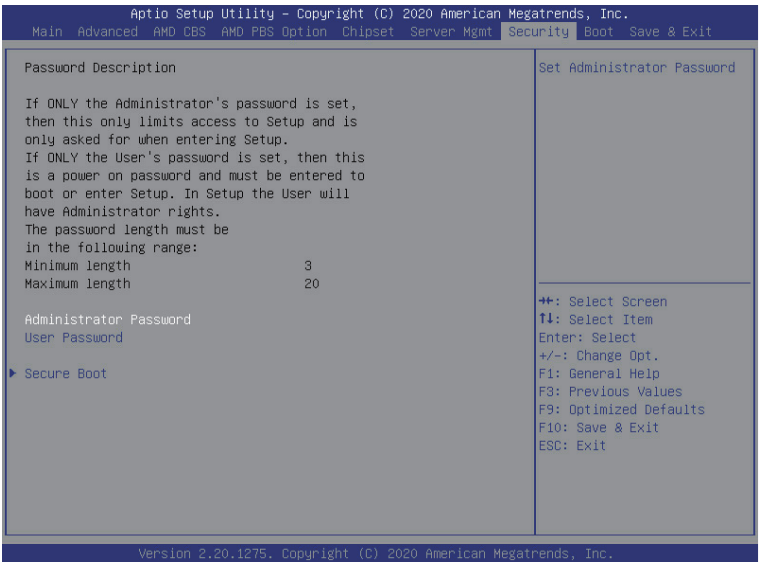
5-6-4 IPv6 BMC Network Configuration



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. 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). Options available: Unspecified, Static, Dynamic-Obtained by BMC running DHCP. Default setting is **Enable 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.

5-7 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.

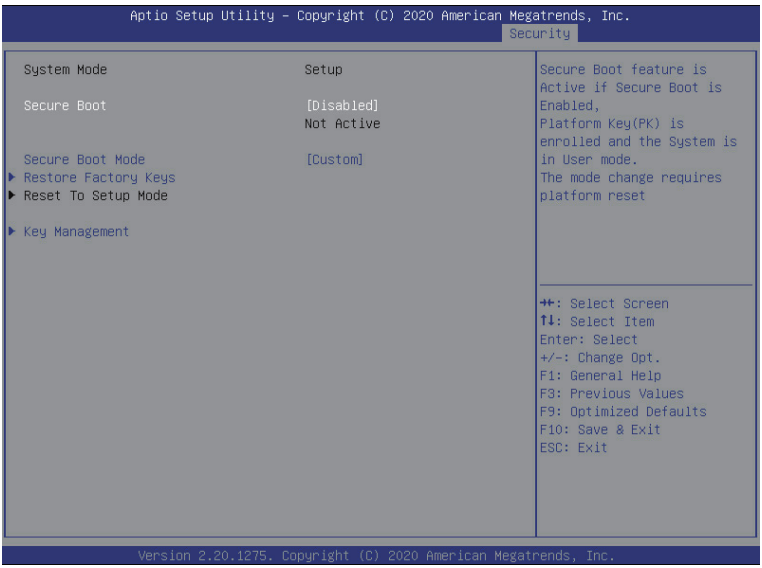
- User Password

  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.

5-7-1 Secure Boot

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



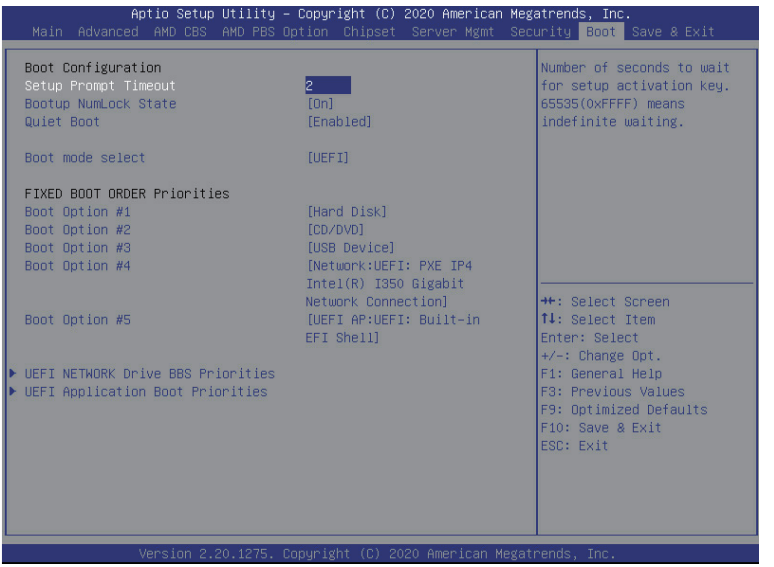
Parameter	Description
System Mode	Displays if the system is in User mode or Setup mode.
Secure Boot	Enable/ Disable the Secure Boot function. Options avaiable:Enabled/Disabled. Default setting is **Disabled**.
Secure Boot Mode(Note)	Secure Boot requires all the applications that are running during the 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. 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 **Custom**.
Restore Factory Keys	Forces the system to user mode and installs factury default Secure Boot key database.

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

Parameter	Description
Key Management	Press [Enter] to configure advanced items. **Please note that this item is configurable when Secure Boot Mode is set to Custom.** ◆ Factory Key Provision – Allows to provision factory default Secure Boot keys when system is in Setup Mode. – Options available: Enabled/Disabled. Default setting is **Disabled**. ◆ Restore Factory Keys – Installs all factory default keys. It will force the system in User Mode. – Options available: Yes/No. ◆ Enroll Efi Image – Press [Enter] to enroll SHA256 hash of the binary into Authorized Signature Database (db). ◆ Restore DB defaults – Restore DB variable to factory defaults. ◆ Secure Boot variable – Displays the current status of the variables used for secure boot. ◆ Platform Key (PK) – Displays the current status of the Platform Key (PK). – Press [Enter] to configure a new PK. – Options available: Set New. ◆ Key Exchange Keys (KEK) – Displays the current status of the Key Exchange Key Database (KEK). – Press [Enter] to configure a new KEK or load additional KEK from storage devices. – Options available: Set New/Append. ◆ Authorized Signatures (DB) – Displays the current status of the Authorized Signature Database. – Press [Enter] to configure a new DB or load additional DB from storage devices. – Options available: Set New/Append. ◆ Forbidden Signatures (DBX) – Displays the current status of the Forbidden Signature Database. – Press [Enter] to configure a new dbx or load additional dbx from storage devices. – Options available: Set New/Append. ◆ Authorized TimeStamps (DBT) – Displays the current status of the Authorized TimeStamps Database. – Press [Enter] to configure a new DBT or load additional DBT from storage devices. – Options available: Set New/Append. ◆ OsRecovery Signatures – Displays the current status of the OsRecovery Signature Database. – Press [Enter] to configure a new OsRecovery Signature or load additional OsRecovery Signature from storage devices. – Options available: Set New/Append.

5-8 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. Press the numeric keys to input the desired values.
Bootup NumLock State	Enable/Disable the Bootup NumLock function. Options available: On/Off. Default setting is **On**.
Quiet Boot	Enable/Disable showing the logo during POST. Options available: Enabled/Disabled. Default setting is **Enabled**.
Boot mode select	Selects the boot mode. 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. By default, the server searches for boot devices in the following sequence: 1. Hard drive. 2. CD-COM/DVD drive. 3. USB device. 4. Network. 5. UEFI.
UEFI Network Drive BBS Priorities	Press [Enter] to configure the boot priority.
UEFI Application Boot Priorities	Press [Enter] to configure the boot priority.

5-8-1 UEFI NETWORK Drive BBS Priorities

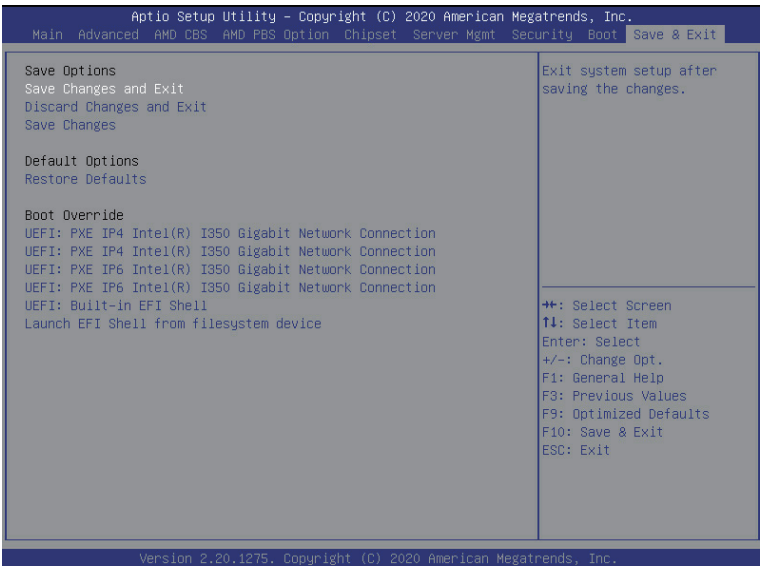
The UEFI network drive BBS priorities submenu allows you to specify the boot device priority from the available UEFI network drives during system boot-up. BIOS setup will display an error message if the legacy drive(s) specified is not bootable.

5-8-2 UEFI Application Boot Priorities

The UEFI application boot priorities submenu allows you to specify the boot device priority from the available UEFI applications during system boot-up. BIOS setup will display an error message if the legacy drive(s) specified is not bootable.

5-9 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 Exit	Saves changes made and closes the BIOS setup. Options available: Yes/No.
Discard Changes and Exit	Discards changes made and exits the BIOS setup. Options available: Yes/No.
Save Changes	Saves changes done so far to any of the setup options. Options available: Yes/No.
Default Options	
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.
Launch EFI Shell from filesystem device	Attempts to Launch EFI Shell application (Shell.efi) from one of the available filesystem devices.

5-10 BIOS POST Beep code (AMI standard)

5-10-1 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

5-10-2 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