VSS2249RQ Storage Server (BSP-28)

User Guide

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About the User Guide & Helpful Resources

This user guide includes detailed product information and guidance designed to assist system administrators and technicians responsible for installation, configuration, maintenance, and observation of the VSS2249RQ Storage Server that is equipped with the VSSEP1EC Server Module.

WARNING: Only skilled persons having the relevant education or experience in the various energies and energy magnitudes used in this equipment, or persons who are instructed or supervised by such skilled persons, should operate, install, or handle the VSS2249RQ Storage Server, the VSSEP1EC Server Module, or any of the system components.

About the Guide

The VSS2249RQ Storage Server User Guide provides information necessary to implement and maintain the system.

GUIDE ORGANIZATION

Presented in a sequential flow, the guide begins with an overview of the VSS2249RQ Storage Server and VSSEP1EC Server Module layout and design, and explores the features and benefits available to the VSS2249RQ user. Comprehensive instructions guide users through connection and configuration options, system installation, power functionality, and system monitoring tools. Should any of the field replaceable units (FRUs) require servicing or replacement, the chapter on system maintenance offers solutions.

ASSUMPTIONS

This guide assumes the user is familiar with NVM Express™ (NVMe™) technology, computer hardware, data storage, and network administration terminology and tasks.

HELPFUL INFORMATION

Colored “call-outs” provide the user with important safety alerts and usage tips in the form of critical warnings (red), safety cautions (yellow), pencil notes (green), and reference icons (open book). Hot links provide instant access to related topics of discussion. These supportive tools ensure each user has the information necessary to successfully implement and maintain the VSS2249RQ Storage Server and VSSEP1EC Server Modules.

Warnings, Cautions, & Notes

The following icons display throughout the guide to alert the user to take precautions against the possible loss of data, warn of potential risk of electrical or other hazards, and offer additional helpful information. Observe all safety alerts provided throughout this documentation.

	**WARNING:** “ELECTRICAL HAZARD” symbols warn the user of the potential for property damage, personal injury, or death due to electric shock or other hazards.
	**HEAVY OBJECT:** “HEAVY OBJECT” warnings advise the user to take special precautions and obtain assistance during receiving and installation as the system can weigh hundreds of pounds fully loaded.
	**ESD-SENSITIVE DEVICE:** Electrostatic discharge (ESD) sensitive device warnings remind the user to take protective measures to avoid damage to system components due to electrostatic discharge.

	**CAUTION**: The “CAUTION” symbol instructs the user to take precautions to prevent damage to the product, loss of data, or personal injury.
	**SHARP**: Use care when handling the product to avoid injury due to sharp pins or edges that can puncture or cut the skin. Always exercise caution when handling boards and components.
	**HOT SURFACE:** The “HOT SURFACE” symbol reminds the user that integrated circuits and heat sinks might become hot if the system has been running for any length of time. Always use care when handling the board and components.

	**NOTE**: Pencil notes provide additional information to assist the user in making the best use of the product.

 The reference icon refers the user to additional information related to the current topic of discussion. Click the link provided to access the referred page.

REVISION HISTORY

CTC-DOC-002293

Rev.	Date	Source	Revision Description
A.1	09/08/2021	GK	New release.
A.2	6/20/2022	GK	Minor updates.

Helpful Resources

The following section lists additional resources available for the VSS2249RQ Storage Server user and provides instructions for obtaining the latest firmware updates.

PRODUCT DOCUMENTATION

Whether using the documentation offered in the VES Online Document Library or visiting other product-specific industry resources, the information provided will assist the user in gaining a better understanding of the product design and application.

VES Online Document Library

Viking Enterprise Solutions™ product documentation is available via the VES Online Document Library, which is maintained on a secure site. To access the library, email customersupport@vikingenterprise.com and request the secure login information and password for the VSS2249RQ Storage Server document library. The following additional documentation is available for download:

- VES Product Documentation
  - VSS2249RQ Product Safety Guide
    - CTC-DOC-002373

FIRMWARE UPDATES

Viking Enterprise periodically releases firmware updates for the VSS2249RQ Storage Server. Contact a Viking Enterprise Solutions support representative to obtain access to the appropriate files and release notes.

For firmware installation instructions, refer to the release notes PDF included with the firmware files.

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Product Safety & Handling

This product safety document includes important safety and handling information for users to consider prior to system installation. Be sure to read all safety warnings, cautions, and notes thoroughly and contact a sales representative with any questions.

	**WARNING:** Only skilled persons having the relevant education or experience in the various energies and energy magnitudes used in this equipment, or persons who are instructed or supervised by such skilled persons, should operate, install, or handle the VSS2249RQ Storage Server, the VSSEP1EC Server Module, or any of the system components.
	**WARNING:** This product is designed to be installed in a Restricted Access area accessible only to skilled persons and instructed persons with the proper authorization.
	**WARNING:** This equipment is not suitable for use in locations where children are likely to be present.
	**WARNING:** Each storage subsystem must have a good electrical ground connection through each power cord, power distribution unit (PDU), and the building power grid to the point of origin, at the building's power source.
	**WARNING:** There is no power switch on this unit. Once a power cord is connected to an active PDU, the system starts. Two power cords must be unplugged from the PDU receptacle to properly shut down the chassis.
	**WARNING:** While some factory-approved maintenance on FRUs (e.g. hot-swapping a power supply, drive, or server module) does not require the user to disconnect power to the system, performing other types of maintenance on systems connected to an electrical power supply may result in serious injury or death. Only individuals with knowledge and training in working with devices containing live circuits should operate the system. Take precautions when performing all other types of maintenance. **Disconnect 2 power supply cords before servicing.**
	**WARNING:** The server module contains a lithium battery. There is a risk of explosion if the battery is replaced with an incorrect battery type. Dispose of used batteries according to the vendor's instructions and in accordance with local environmental regulations.
	**WARNING:** Do not connect or disconnect any device cables during an electrical storm.
	**ESD-SENSITIVE DEVICE:** Only install the device on a properly grounded electrostatic discharge (ESD) protection surface to avoid damage to the components. Always use a properly grounded ESD wrist strap or mat during operation or installation of the device, or when connecting the cables.
	**HEAVY OBJECT:** This system weighs approximately **25.5 kilograms (56.2 pounds)** when all 24 drives, two PSUs, and two server modules are installed. To prevent injury and property damage, always obtain assistance when installing the system, and when inserting the system into or removing it from the rack.
	**WARNING:** Install the server module in the correct orientation. Ensure the connector pins in the storage enclosure are straight and ready to align into the connector holes in the server module. Never force the module into the enclosure. If a pin or data connector is damaged, return the system for service. Do NOT attempt to straighten pins as this can cause further damage to the storage enclosure.

	WARNING: Hot-swapping FRUs must be completed within five (5) minutes to ensure proper system cooling and prevent damage to the drives. Individual drive temperature monitoring is not currently supported.

	CAUTION: Take precautions before connecting the enclosure to a power supply to ensure that the equipment does not overload circuits, or negatively impact over-current protection and supply wiring. Check the equipment nameplate ratings when addressing power concerns.
	TIPPING HAZARD—Prevent instability and hazardous conditions due to uneven loading by installing heavier items into the bottom of the equipment rack and lighter items into the top.
	CAUTION: Place the equipment rack in a dust-free, well-ventilated area close to an appropriate power source that is protected by a uninterruptible power supply (UPS). Leave enough room behind the rack for servicing and to allow sufficient airflow from front to back.
	CAUTION: Two server modules must be installed to ensure proper system cooling. Running the system without both modules can cause the drives to overheat.
	**HEARING PROTECTION:** This enclosure produces 78 dB levels of sound power at 60% of power during normal operation. The acoustic sound power increases to 85.5dB at 100% power under fault conditions. Prolonged periods of high sound levels may be potentially harmful. Use of hearing protection is recommended.

	NOTE: For equipment racks with single or multiple storage subsystems installed, the typical TMRA (manufacturer's maximum recommended ambient) is 35°C (95°F). (Refer to the product user guide to obtain the actual TMRA for the product.) When installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than the room ambient; therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum recommended ambient temperature.
	NOTE: To obtain a copy of the product user guide, email customersupport@vikingenterprise.com.
	NOTE: This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference; and (2) This device must accept any interference received, including interference that may cause undesired operation.

Chapter 1

About the VSS2249RQ Storage Server

The VSS2249RQ Storage Server is a versatile, 2U high, enterprise-class storage solution that supports up to 24 2.5-inch U.2 (SFF-8639) solid-state drives (SSDs) using the PCI Express® (PCIe®) Interface (up to PCIe Gen 4) and NVM Express™ (NVMe™) Protocol. By adding two VSSEP1EC Server Modules and third-party software, the storage enclosure is transformed into a storage server platform that is highly available and ultra-high density. Chapter 1 provides a review of the following:

- Product Highlights & Features
- System Layout & Design
- Cooling & Environmental Requirements
- Certifications

Product Highlights & Features

Designed for outstanding performance and reliability, the server system includes two N+1 redundant power modules (PMs) that are available in various capacities to support higher wattage PCIe cards and NVMe SSDs. The enclosure also provides for redundant cooling and fits inside a standard 19-inch (48.3-centimeter) rack. Each of these storage server features are presented in this section, along with additional features of the rack, server system enclosure, drives, server modules, fans, PMs, and LEDs. The VSS2249RQ Storage Server is depicted in Figure 1.1.

Figure 1.1 VSS2249RQ Storage Server

NOTE: Contact a Viking Enterprise Solutions sales representative with questions on any of these features.

RACK

- Standard 19-inch 2U rack
- Designed to fit in 1.0-meter racks
- 67.6-centimeter (27-inch) chassis length
  - 98.7-centimeter (38.9-inch) enclosure length with CMA installed
- Rail kit supports 68.6-centimeter (27.0-inch) to 94.0-centimeter (37.0-inch) rail depth
- Conforms to EIA-310-D Specifications

ENCLOSURE

- 2U high
- 24 drive bays
- Six fan slots
- Two PM slots
- Two VSSEP1EC Server Module slots
- Cable management assembly (CMA)

DRIVE CARRIER ASSEMBLIES

- Up to 24 2.5-inch U.2 (SFF-8639) SSDs
  - NVMe™ Protocol plus Gen 3 or Gen 4 PCIe® Interface
    - Gen 3 or Gen 4 PCIe® based on power configuration
  - Up to 25W average power per drive
  - Support for single-ported or dual-ported drives
    - Single-ported drives report to server module 1, links remain X2
- 24 drive carriers
  - Support 2.5-inch U.2 NVMe SSDs or drive blanks
    - Drive blanks are required in unoccupied drive bays
  - Allow for controlled insertion and removal of drives

- Hot plug and surprise removal supported
- LEDs display drive operational status

VSSEP1EC SERVER MODULES

- Two redundant VSSEP1EC Server Modules
  - Single AMD EPYC™ Rome or Milan CPUs per server module
- Up to 225W of power per server module
- Eight DDR4 3200 MHz memory channels
  - One DIMM per channel (DPC)
- Hot-swappable, serviceable from enclosure rear
- Support for optional NVDIMMs
  - Requires use of factory-installed supercaps
- Connected via Gen 3 PCIe® NTB bus (four lanes)
- 1 GbE internal network for CPUs/management controllers
- Four slots for half height, half length (HHHL) Gen 4 PCIe® add-in cards
- ASPEED® AST2500 Server Management Processor
- Secure out-of-band management through the MegaRAC® BMC WebUI
- Supports system management via IPMI protocol

Refer to Chapter 2 titled “About the VSSEP1EC Server Module” that begins on page 13 for information on these and more server module components.

COOLING

- Six fan modules
- 5+1 redundant
- Hot-swappable, top loadable

POWER MODULES

- Two field-replaceable PMs, each containing
  - One factory-installed power supply
    - Default capacity is 1600W

        - Additional capacities available based on PCIe add-in cards or NVMe SSD power requirements
        - Both factory-installed PSUs must be of the same form factor, manufacturer, and capacity
    - One factory-installed power adapter board
        - Length varies based on selected PSU
- Hot-swappable, N+1 redundant
- Serviceable from the enclosure rear
- Support for AC and DC options

LEDS

- Enclosure status
- Fans
- PSUs
- Server modules
- SSDs

System Layout & Design

This section provides an overview of the enclosure layout and design and discusses field-replaceable unit (FRU) vital product data (VPD) identification. The CMA—integral to the enclosure and varying rack configurations—is discussed as well.

SYSTEM OVERVIEW

The VSS2249RQ Storage Server provides a multitude of features designed to provide customizable, high-performance data storage using PCIe® and NVMe™ technology. This section includes the enclosure dimensions and weight, and discusses each of the enclosure components as viewed from the enclosure front, top, and rear. Figure 1.2 on page 5 includes a close-up of the enclosure from each angle.

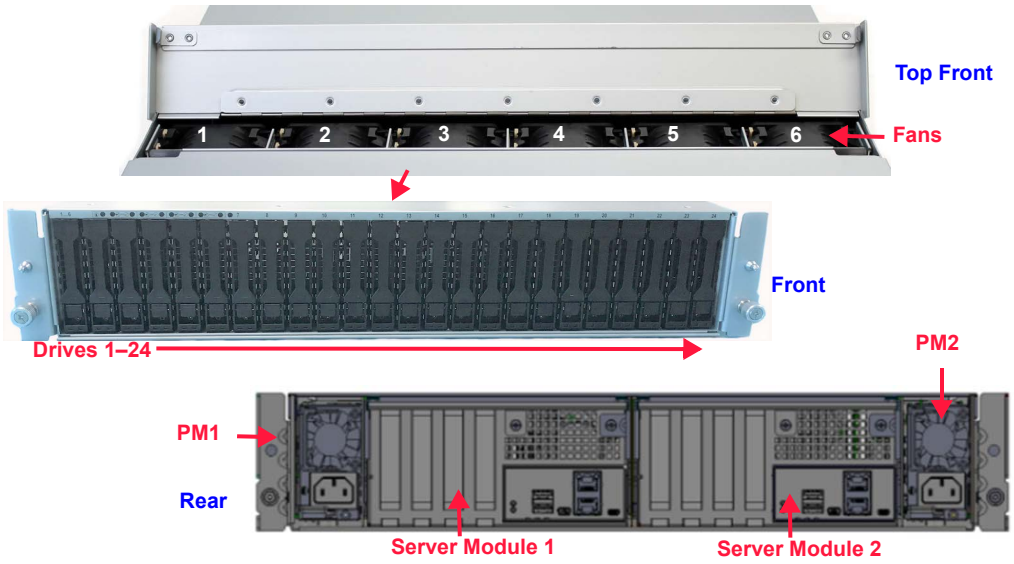

Figure 1.2 Enclosure layout

Refer to Chapter 2 titled “About the VSSEP1EC Server Module” that begins on page 13 for information on each of the server module components.

Dimensions

The VSS2249RQ Storage Server is designed for installation into a standard 2U 19-inch rack that is compliant with the EIA-310-D specification. Table 1.1 lists the enclosure dimensions.

Parameter	Measurement
Chassis length—Front surface to rear surface	67.6 cm (26.7 in.)
Overall length—Front bezel to edge of CMA baskets	98.7 cm (38.9 in.)
Depth—Vertical rail to rear surface	69.7 cm (27.5 in.)
Serviceable position pull length	34.1 cm (13.4 in.)
Rail depth	76.2 cm (30.0 in.) to 94.0 cm (37.0 in.)
Rack envelope	1.0 m (39.4 in.)
Enclosure width w/ rack ears	48.2 cm (19.0 in.)
Front width w/o rack ears	43.8 cm (17.3 in.)
Height	8.7 cm (3.5 in.)

Table 1.1 Enclosure dimensions

Weight

Each system component weight is provided in Table 1.2. The total weight does not include the weight of the shipping carton.

Component	System Total	Component Weight	Extended Weight
Chassis—including midplane	1	9.5 kg (21.0 lbs)	9.5 kg (21.0 lbs)
Power modules	2	1.5 kg (3.2 lbs)	2.9 kg (6.4 lbs)
Server modules	2	3.4 kg (7.4 lbs)	6.7 kg (14.8 lbs)
Fan modules	6	0.1 kg (0.1 lbs)	0.4 kg (0.8 lbs)
Drive carrier assemblies	24	0.1 kg (0.3 lbs)	3.3 kg (7.2 lbs)
System Weight	—	—	**22.8 kg (50.2 lbs)**
CMA & rail kit	1	2.7 kg (6.0 lbs)	2.7 kg (6.0 lbs)
Total Weight	**—**	**—**	**25.5 kg (56.2 lbs)**

Table 1.2 Enclosure weights

Front

The 24 drives are accessible from the front of the enclosure. The drives are installed in a drive carrier and are numbered starting from left to right. Figure 1.2 on page 5 provides a close-up look at the drive installation.

Refer to Chapter 7 titled “Monitoring the VSS2249RQ Storage Server” that begins on page 77 for more information on the system status and drive LEDs.

Top

Six fan modules are accessed through the top of the enclosure. Figure 1.2 on page 5 provides a close-up look at the fan compartment on top of the enclosure. Fan numbering runs left to right.

Refer to Chapter 7 titled “Monitoring the VSS2249RQ Storage Server” that begins on page 77 for more information on the fan LEDs.

See the section titled “Fan Modules” on page 105 of Chapter 8 for assistance with replacing a fan.

Rear

The VSS2249RQ Storage Server includes two VSSEP1EC Server Modules and dual redundant PMs installed at the rear of the enclosure. Figure 1.2 on page 5

identifies the location of the server modules and PMs. The CMA is also located at the rear of the enclosure.

Refer to Chapter 2 titled “About the VSSEP1EC Server Module” that begins on page 13 for information on the server module and server components.

Refer to Chapter 3 titled “Connection and Configuration Options” that begins on page 21 for information on the CMA.

Refer to Chapter 5 titled “Powering the VSS2249RQ Storage Server” that begins on page 51 for information on the system power configuration.

Refer to Chapter 7 titled “Monitoring the VSS2249RQ Storage Server” that begins on page 77 for information on the server module and PM LEDs.

Refer to Chapter 8 titled “System Maintenance” that begins on page 93 for information on replacing a server module or a PM.

FRUS

The VSS2249RQ Storage Server includes the following FRUs:

- Drive Carrier Assemblies
- Fan Modules
- PMs
- VSSEP1EC Server Modules

The VPD EEPROM (located on the enclosure's baseboard) stores vital information regarding each FRU, such as the FRU version and serial number. Additional fields may be included in a customer-definable section of the VPD. Each FRU includes a visible label that displays the part and serial numbers in barcode-readable format. It may be necessary to remove the FRU from the chassis to read the label.

Drive Carrier Assemblies

The VSS2249RQ Storage Server supports up to 24 hot-swappable drive carrier assemblies, each comprised of one 2.5-inch U.2 (SFF-8639) NVMe SSD and one drive carrier. The use of drive carriers provides for controlled insertion and removal of the drive from the drive bay and helps to ensure complete seating of the drive through typical operational shock and vibration.

When fully populated with all 24 drives, the storage enclosure provides up to 25 watts of power per drive. All drive bays must be completely filled with drive carriers containing either drives or drive blanks to ensure proper system airflow and cooling. Both single-ported and dual-ported drives are supported. Single-ported drives report to server module 1 (see Figure 1.2 on page 5), which

is on the left side of the enclosure rear. Dual-ported drives can be mapped to server module 1 or 2 (on the right side of the enclosure rear), or they can be mapped to both server modules.

NOTE: For assistance in ordering drive blanks, contact a Viking Enterprise Solutions sales representative.

Refer to Chapter 7 titled “Monitoring the VSS2249RQ Storage Server” that begins on page 77 for information on the system status and drive LEDs.

Refer to the section titled “Replacing a Drive or Drive Carrier” that begins on page 103 for more information on replacing a drive.

Fan Modules

Six fan modules provide system cooling and are cold aisle serviceable. The fans are single impeller and 5+1 redundant. Fan speed is controlled by server module 1, which is the master server. Fans operate at the lowest possible speed to minimize power consumption and noise. If the sensors exceed the critical high thresholds, the host must take action by either shutting down the appropriate component or the entire server system, as necessary, to reduce the thermal load.

Refer to Chapter 7 titled “Monitoring the VSS2249RQ Storage Server” that begins on page 77 for information on the system status and fan LEDs.

Refer to the section titled “Fan Modules” that begins on page 105 for more information on replacing a fan.

PMs

The VSS2249RQ Storage Server is powered by two high-efficiency, hot-swappable PMs that are installed in the right and left power cavities at the rear of the enclosure. By default, each PM includes one factory-installed 1600W, CRPS form factor PSU and one factory-installed power adapter board. Additional PSU capacities and form factors are available to support higher wattage Gen 3 or Gen 4 PCIe cards or NVMe SSDs. Upgrading or replacing a PSU requires replacement of the entire power module. Changing a PSU might require a change to the power adapter board; therefore, the PSU and power adapter board are not field-serviceable.

Each PM has active current sharing and supports N+1 redundancy. A single PM can power the storage enclosure indefinitely; however, both PMs are required to ensure redundancy. The PM provides 12V power and 3.3V standby power to the system and includes an internal cooling fan. Refer to Figure 1.2 on page 5 for the location of each PM.

NOTE: The maximum current draw is listed on each PSU label and is visible from the PM. For example, if the maximum input for one 1600W PSU is 200–240V ~15A max, this rating is for one PM and there are two PMs per enclosure sharing the load.

Refer to Chapter 5 titled “Powering the VSS2249RQ Storage Server” that begins on page 51 for more information on the system power configuration.

Refer to Chapter 7 titled “Monitoring the VSS2249RQ Storage Server” that begins on page 77 for information on system status and PSU LEDs.

Refer to the section titled “Replacing a PM” that begins on page 107 of Chapter 8 for guidance in replacing a power module.

VSSEP1EC Server Modules

Two redundant, hot-swappable VSSEP1EC Server Modules are installed in the rear of the enclosure. Each server module contains a single AMD EPYC™ Rome or Milan CPU and provides up to 225W of power. Additionally, each server module supports up to eight memory channels that provide speeds up to 3200 MT/s.

Refer to Chapter 2 titled “About the VSSEP1EC Server Module” that begins on page 13 for more information on the server modules.

Refer to Chapter 7 titled “Monitoring the VSS2249RQ Storage Server” that begins on page 77 for information on system status and server module LEDs.

Refer to the section titled “Server Modules” that begins on page 110 for more information on replacing a server module.

Cooling & Environmental Requirements

This section provides information on the system’s cooling and environmental requirements, including maximum ambient air temperature, relative humidity (RH), and altitude.

COOLING—TEMPERATURE & HUMIDITY

- Maximum Ambient Air Temperature
  - 35°C (95°F) to inlet of storage enclosure

The environmental specifications for system temperature, RH, and altitude during operation, non-operation, transit, and storage are presented in Table 1.3 on page 10.

Parameter	Operating	Non-Operating	Transit	Storage
Temperature	5°C to 35°C4 (1°F to 95°F*)	5°C to 35°C4 (1°F to 95°F)	-40°C to 60°C (-40°F to 140°F)	1°C to 60°C (34°F to 140°F)
Relative Humidity	20% to 80% non-condensing	10% to 90% non-condensing	10% to 90% non-condensing	10% to 80% non-condensing
Altitude	-61 to 3,048 m (-200 to 10,000 ft)	-61 to 3,048 m (-200 to 10,000 ft)	-61 to 12,192 m (),-200 to 40,000 ft	-61 to 3,048 m (-200 to 10,000 ft)

Table 1.3 Environmental specifications

*. Maximum operating temperature is specified at sea level and is derated 2 percent per 305 m (1,000 ft) of increased altitude.

SHOCK & VIBRATION

Shock and vibration levels are tested in a simulated rack condition. The results are presented in Table 1.4.

Test Parameter	Level	Frequency Range	Duration (Sweep Rate / # of Shocks)
Operating Vibration	0.10 G, 0-peak swept sine	5–500 Hz	1 complete sweep 1/2 octave/min
Operating Random Vibration	0.15 Grms	5–500 Hz	10 minutes
Operating Shock	5 G, 0-peak 11 mS half sine		3 positive shocks 3 negative shocks
Non-operational Vibration	0.5 G, 0-peak swept sine	5–500 Hz	1 complete sweep 1/2 octave/min
Non-operational Random Vibration	0.5 Grms	5–500 Hz	10 minutes
Non-operational Shock	10 G, 0-peak 11 mS half sine		3 positive shocks 3 negative shocks

Table 1.4 Shock and vibration levels

Certifications

The VSS2249RQ Storage Server is designed to meet the following requirements:

- RoHS and WEEE compliant
- Safety
- Federal Communications Commission (FCC) Federal Code of Regulation, Title 47, Part 15 for Class A devices
- Electromagnetic Interference (EMI)/Electromagnetic Compatibility (EMC) for FCC Part 15A

- CISPR 22:1997 emissions

NOTE: The enclosure may meet other countries' regulatory requirements as defined by the country marks on the regulatory label at the rear of the product. Additional certifications may be added without notice.

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Chapter 2

About the VSSEP1EC Server Module

The VSSEP1EC Server Module is the compatible server module designed for the VSS2249RQ Storage Server. The server module utilizes a single AMD EPYC™ Rome or Milan CPU that offers eight memory channels with speeds of up to 3200 MT/s based on the CPU SKU selected. This chapter includes detailed product information for the VSSEP1EC Server Module, including:

- Product Highlights and Features
- System Layout and Design
- Additional Safety Considerations
- Certification Information

Product Highlights and Features

This section provides an overview of the VSSEP1EC Server Module features and benefits.

OVERVIEW OF THE VSSEP1EC SERVER MODULE

The VSSEP1EC Server Module (shown in Figure 2.1 on page 14) is a fully integrated, enterprise class compute node designed for use in the VSS2249RQ Storage Server. The server module provides advanced capabilities to send and retrieve data from the U.2 SSDs.

Figure 2.1 VSSEP1EC Server Module

Each hot-swappable server module provides up to 225W of power when both server modules and all 24 drives are installed. Up to eight DIMMs are supported per server module (one DIMM per channel), which can yield up to 2 TB of memory and range from 8 GB DDR4 RDIMMs to 256 GB RDIMMs or LRDIMMs.

PRODUCT FEATURES AND BENEFITS

This section lists the server module features and benefits, including CPU information, possible DIMM configurations, and features of the BMC.

Server Modules

- Two VSSEP1EC Server Modules
  - One VSSEP1EC Server Module installed in the left slot (Server 1) and one server module installed in the right slot (Server 2)
- Hot-swappable
- 128 lanes of Gen 4 PCIe
- PCI Express® (PCIe) Gen 4 Expansion Slots
  - Four x16 PCIe slots for half height, half length (HHHL) add-in cards

Basic Input/output System (BIOS)

- Two 32 MB SPI2 Flash (primary and alternate)

BMC

- Choice of server class ASPEED® iBMC
  - AST2500 (full-featured with video over IP support, PCIe Gen 2)
- 800 MHz ARM11 processor
- Complies with Intelligent Platform Management Interface (IPMI) v2.1
- Support for Redfish®
- Virtual UART for serial-over-LAN
- MegaRAC-SPX BMC WebUI
  - Firmware updates

⚠	**CAUTION:** Always follow the firmware update instructions provided in the release notes that accompany the update.

  - Remote monitoring
  - System health

CPUs

- Single AMD EPYC™ Rome or Milan CPU per server module
  - Multiple single socket SKUs supported
- Four lanes PCIe Gen 3 non-transparent bus (NTB)
- Up to 225W of power per SKU CPU

System I/O

- Serial console via USB Mini-B
- Two 10GbE host/management ports
- Two USB 3.1 Gen 1 (5 Gb/s), type A
- Video

Memory

- Eight memory channels per CPU

- One DIMM per channel (DPC)
- Up to eight DIMMs per server module
- Supports Registered DDR4 (RDIMM), Load-reduced DDR4 (LRDIMM) and LRDIMM 3DS DDR4 SDRAM
  - UDIMMs are not supported

- Total memory:
  - Up to 2 TB of memory per server module, 4 TB per server system
- Memory data rates are CPU SKU dependent:
  - Up to 3200 MT/s

DIMM Population Rules

The following population rules apply to the VSSEP1EC Server Module:

- Support for RDIMMs, LRDIMMs, and LRDIMM 3DS DDR4 memory
  - UDIMMs are not supported
- DIMM sizes can range from 8 GB to 256 GB
  - X4 widths and X8 widths are supported
- Best performance is achieved populating eight DIMMs from the same manufacturer that are of equal capacity, speed, and configuration and duplicating this configuration across both server modules
- DIMM minimums
  - A minimum of one DIMM must be installed in any socket
    - DIMM slots may be populated in any order and are identified as A through H in Figure 2.2 on page 17
  - For improved performance, utilize an even number of DIMMs with a minimum of four DIMMs populated in the appropriate channels

Refer to the “AMD EPYC Memory Population Guidelines” available in the VES Online Document Library.

  - When DIMM speeds, sizes, and/or configurations are mixed, the server system (across both server modules) will use the slowest common speed for all DIMMs

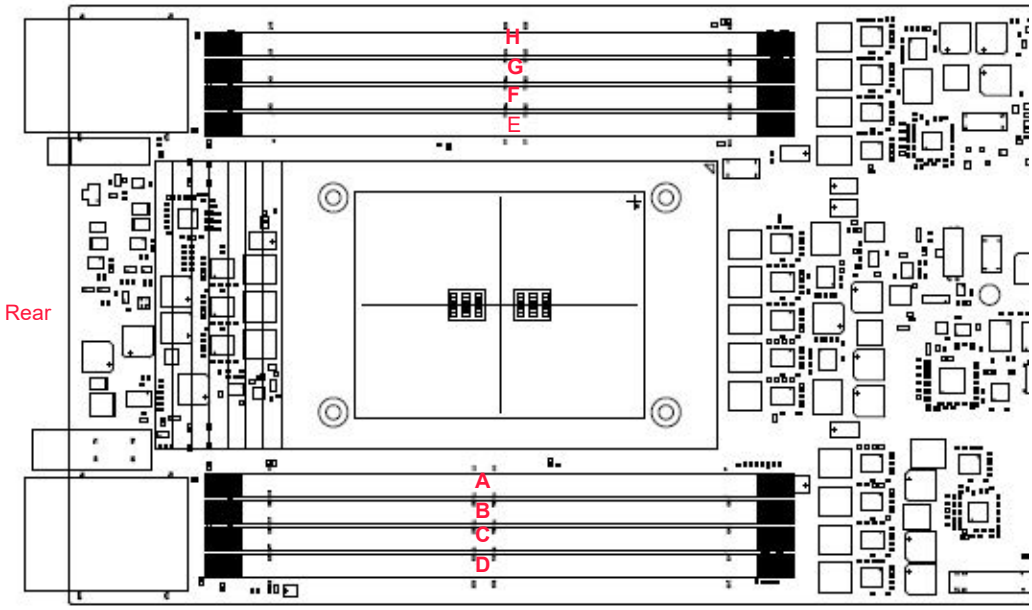

Figure 2.2 DIMM slots

M.2s

- Two internal type M (only) M.2 sockets for NVMe SSDs
- Boot drive and cache backup

Ports

- Two USB 3.1A Gen 1 host port
  - iKVM
  - External drive
- One USB Mini-B serial console port
- Micro HDMI port
- Two RJ-45 Ethernet ports

System Layout and Design

The following section discusses the VSSEP1EC Server Module's physical layout and design.

For more information on the storage enclosure, including the drives, system fans, and PMs, refer to Chapter 1, "About the VSS2249RQ Storage Server," that begins on page 1.

SERVER MODULE COVERS

The VSSEP1EC Server Module has two canister covers, neither of which should be removed without the prior direction of a Viking Enterprise Solutions support representative. Removal of either cover will void the warranty.

CAUTION: Removal of the CPU cover might void the warranty. Contact a Viking Enterprise Solutions™ support representative for assistance with any components located under the CPU cover.

SERVER MODULE FRONT

From the front of the server module, the user can access the operator panel that includes the server LEDs, power and CPU reset controls, and connectivity options, such as the USB port, Mini-B USB port, RJ45 port, or micro HDMI port.

The server module also provides four HHHL x16 expansion slots also identified in Figure 2.3 .

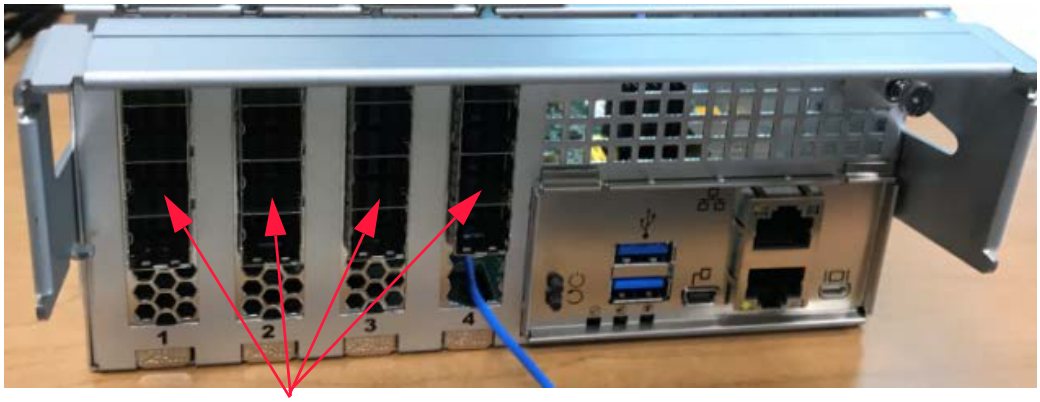

Figure 2.3 PCIe expansion slots

The server module operator panel features are described in detail in the section titled “Server Module Operator Panel” on page 24 of Chapter 3.

Refer to Chapter 5 titled “Powering the VSS2249RQ Storage Server” that begins on page 51 for more information on the server module power configuration.

Chapter 7 titled “Monitoring the VSS2249RQ Storage Server” that begins on page 77 discusses the server module LEDs.

SERVER MODULE REAR

The server module’s personality connectors (shown in Figure 2.4) plug into the personality board and are not visible after installation.

⚠	**CAUTION:** Use extreme caution when handling, installing, or connecting the server module. Install the server module in the correct orientation. If any connectors become damaged or bent, return the server module for servicing. **Do not** attempt to straighten the connectors as this can cause further damage to the system. For assistance with servicing the server module, see the section titled “Customer Support” on page 208.

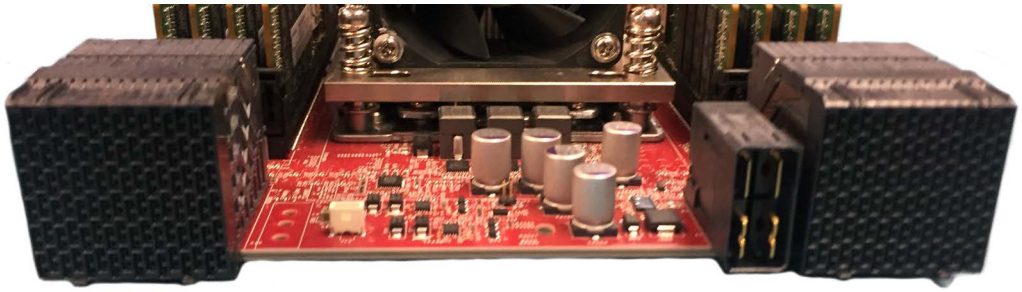

Figure 2.4 VSSEP1EC Server Module connectors

Additional Safety Considerations

The following safety precautions, as well as those presented in the section titled “Product Safety & Handling” on page xxiii, help to ensure safe and proper operation and installation of the VSSEP1EC Server Module into the VSS2249RQ Storage Server.

⚡	**WARNING:** Do not attempt to power or operate the server module outside of the storage enclosure. The enclosure provides essential power and cooling features.
ESD	**ESD-SENSITIVE DEVICE:** Users should take anti-static precautions before touching any of the interior components of the enclosure. Use an anti-static wrist strap and grounding wire as a minimum precaution.

Certification Information

The VSSEP1EC Server Module will not be certified as a standalone unit. The server module will be certified as part of the VSS2249RQ Storage Server. Refer to the appropriate storage enclosure certifications and product labels for more information.

Chapter 3 Connection and Configuration Options

Chapter 3 provides an overview of the connection and configuration options available to the VSS2249RQ Storage Server user. The following subjects are discussed:

- Connecting the System
- System Configuration Options
- Zoned Configurations

Connecting the System

This section includes a description of each of the recommended system cables and an overview of the available ports on the fabric module operator panel.

SYSTEM CABLING & MANAGEMENT

Ensure the appropriate cabling and cable management assemblies are available prior to system installation.

Ethernet Cables

Use only high quality, RJ45 CAT5e rated cables that support 10/100/1000 Mb/s.

Figure 3.1 RJ45 CAT5e cable

Ethernet Add-in Card Cables

Use high quality Ethernet cables as recommended by the chosen add-in card(s). Figure 3.2 provides a close-up of a 100 GbE QSFP28 cable.

Figure 3.2 100 GbE QSFP28 cable

Power Cords

Viking Enterprise Solutions recommends the use of two high quality C13 to C14 PDU-style, 6-foot (1.83-meter) power cords for use with the VSS2249RQ Storage Server. Do not use extension cords with this enclosure. Viking Enterprise Solutions also recommends the use of a power distribution unit (PDU) to manage power and an uninterruptible power supply (UPS) to assist in protecting the system.

Figure 3.3 C13 to C14 PDU-style power cords

USB Cables

- One USB 3.1 Gen 1 (5 Gb/s), type A to Mini-B cable as shown in Figure 3.4 on page 23.

Figure 3.4 USB 3.1 Gen 1 type A to USB Mini-B

Video Cable

One micro HDMI cable similar to that shown in Figure 3.5.

Figure 3.5 Micro HDMI cable

Cable Management

Cable management aids in better routing and securing of the system's cabling. The CMA hardware simplifies cable organization in a rack configuration and enables the enclosure to slide easily into and out of the rack without cable interference. Each server module has its own CMA, which allows removal of cables from one server without disrupting the other server. Figure 3.6 on page 24 provides a close-up example of the CMA assembly. The top CMA services

the cables for the server and PM on the right side of the enclosure, and the bottom CMA services the cables for the server and PM on the left.

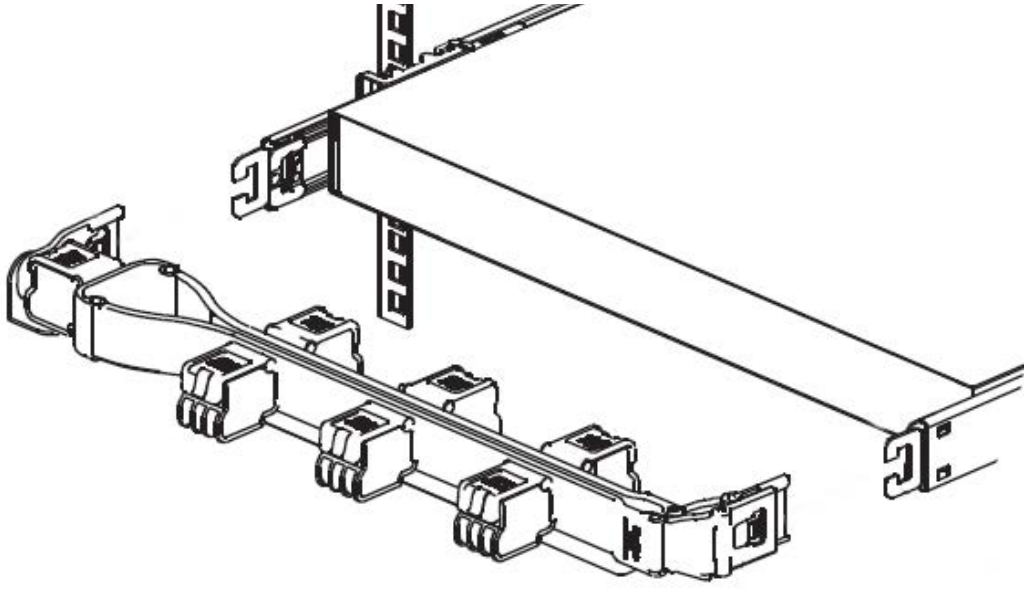

Figure 3.6 CMA assembly

Refer to the section titled “Cable Management Hardware” that begins on page 45 of Chapter 4 for CMA installation instructions.

SERVER MODULE OPERATOR PANEL

The VSSEP1EC Server Module operator panel enables the following tasks to be completed.

- Connect to the following ports:
  - USB Mini-B console port for serial console connection only (not a charging port)
  - USB 3.1 Gen 1 (5 Gb/s) type A port
  - 1 gigabit Ethernet (GbE) RJ45 port
  - Micro HDMI port
- Installation of up to two HHHL x16 PCIe® Ethernet add-in cards per server module provide network ports

⚠	**CAUTION:** The add-in card and prospective slot must be the same form factor.

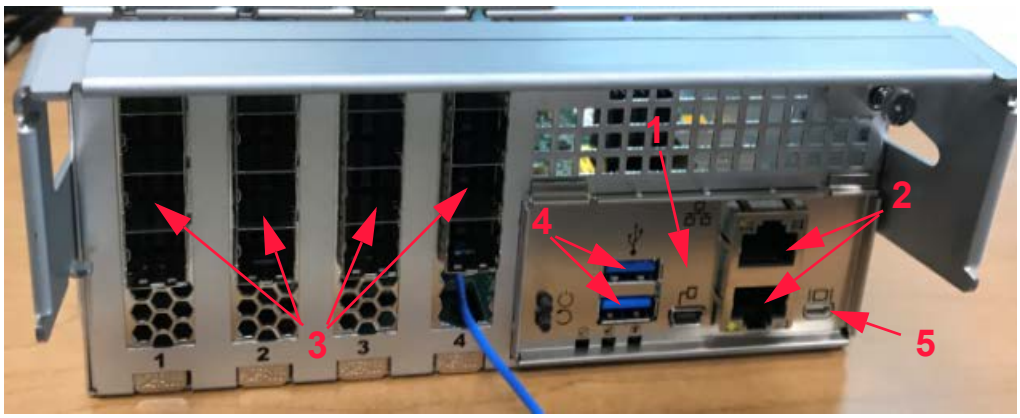

Figure 3.7 Server module operator panel

Each of the operator panel connectors shown in Figure 3.7 is identified in Table 3.1.

Item #	Feature	Description
1	USB Mini-B Console Port	Provides a serial console connection only to a USB serial port to access the BMC. This port is not a charging connection.
2	10GbE RJ45 Port	Provides 2 10GbE RJ45 ports for network access to the BMC WebUI.
3	PCIe Gen 4 Add-in Card Slot	Provides an option slot for one x16 PCIe Gen 4 card(s) per server module.
4	USB 3.1 Gen 1 type A Port	Provides 2 USB 3.1 Gen 1 (5 Gb/s) type A ports for high-speed data transfer rates.
5	BMC Micro HDMI Display Port	Provides for a micro HDMI video connection to the BMC.

Table 3.1 Operator panel connectors and indicators

Refer to the section titled “Server Module Operator Panel” that begins on page 84 of Chapter 7 for more information on the server module operator panel LEDs.

System Configuration Options

The section that follows discusses the available server module configurations.

SUPPORTED CONFIGURATIONS

The VSS2249RQ Storage Server is currently available in a dual server module configuration.

NOTE: Contact a Viking Enterprise Solutions support representative for more information on custom server module configurations.

Dual Configuration

With a dual configuration, the VSS2249RQ Storage Server includes two VSSEP1EC Server Modules installed in the rear of the enclosure. By default, Module 1 is installed in the left I/O slot and Module 2 is installed in the right slot. Single-ported drives report only to Module 1. The dual server module configuration is pictured in Figure 3.8.

⚠	**CAUTION**: Hot-swapping a server module must be completed within five minutes to prevent the drives from overheating. If a replacement will take longer than five minutes, a canister blank must be installed in the empty I/O slot to ensure proper air circulation. Contact a Viking Enterprise Solutions sales representative for information on obtaining a canister blank.

Figure 3.8 Dual server module configuration

Zoned Configurations

Drives are mapped according to their location within the enclosure and zoning of the drives enables the user to control data access based on user, location, or other criteria.

Drive Numbering & Zoning

Each of the 24 drives bays is numbered from 1 through 24. While facing the front of the enclosure, drive numbering begins on the left and increases incrementally from left to right. Each numbered drive is identified in Figure 3.9.

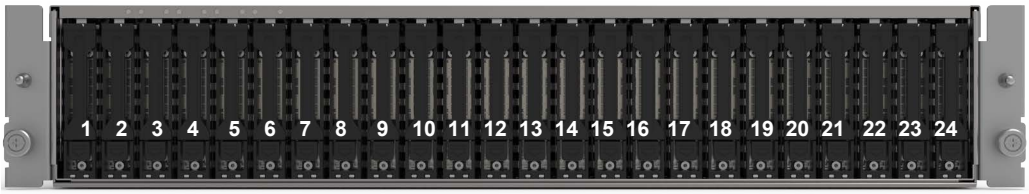

Figure 3.9 Drive numbering

Drive bays are then assigned to a drive group and each group is zoned to a server module. All drives are visible to each server module by default. Contact a Viking Enterprise Solutions support representative for more information on other zoning configurations that might be available.

Chapter 4

Installing the Enclosure Into a Rack

The following chapter describes the procedures for installing the VSS2249RQ Storage Server into a standard 19-inch (48.3-cm) rack. Instructions are provided for the following:

- Installation Safety & Handling
- Planning & Preparation
- Enclosure Rack Installation
- Cable Management Hardware
- Attaching the Optional Bezel

Installation Safety & Handling

Prior to installing the VSS2249RQ Storage Server into the rack, read the following safety warnings, cautions, and notes, those detailed in “Product Safety & Handling” on page xxiii, and those presented elsewhere throughout this documentation. Observing all recommendations will help to ensure user safety, system longevity, and proper component functionality.

	**WARNING:** Only skilled persons having the relevant education or experience in the various energies and energy magnitudes used in this equipment, or persons who are instructed or supervised by such skilled persons, should operate, install, or handle the VSS2249RQ Storage Server, the VSSEP1EC Server Module, or any of the system components.
	**ESD-SENSITIVE DEVICE**. Only install the device on a properly grounded electrostatic discharge (ESD) protection surface to avoid damage to the components. Always utilize a properly grounded ESD wrist strap or mat during operation or installation of the device, or when connecting the cables.

	**HEARING PROTECTION:** This enclosure produces 78 dB levels of sound power at 60% of power during normal operation. The acoustic sound power increases to 85.5dB at 100% power under fault conditions. Prolonged periods of high sound levels may be potentially harmful. Use of hearing protection is recommended.

NOTE: The maximum current draw is listed on each PM label. For example, if the maximum input for one 1600W PSU is 200–240V ~15A max, this rating is for one PM and there are two PMs per enclosure sharing the load.

Planning & Preparation

Planning ensures the installation process goes smoothly. The recommendations provided help the user properly plan for installation, and includes the steps necessary to install the VSS2249RQ Storage Server.

INSTALLATION CHECKLIST

HEAVY OBJECT: This system weighs approximately **56.2 pounds (25.5 kilograms)** when all drives, two PMs, and two server modules are installed. (This weight does not include the container weight.) Prevent personal injury and equipment damage. Obtain assistance during rack installation and when sliding the system in or out of the rack.

1. Consider the power requirements when planning installation. The supplied power cords extend 6 feet (1.8 meters) beyond the enclosure when inserted into a rack. The maximum length of each PDU extension plus PM power cord must not exceed 8 feet (2.4 meters) long.

NOTE: The rack envelope is 39.4 inches (1.0 meter).

2. The rail kit supports a 27.0-inch (68.6-centimeter) to 37.0-inch (94.0-centimeter) rail depth.
3. Plan the system environment beforehand to ensure that the following conditions are met:
    a. There is access to 200–240V AC.
    b. There is enough room around the rack to allow for future servicing. (See Appendix D.)
    c. There is sufficient air flow around the system.
    d. The space is dust-free and well-ventilated.
    e. The space is close to an uninterruptible power supply (UPS) and that appropriate power is available. The maximum wall current is ~15A for each 1600W PM.
4. Lifting the system into and out of the rack requires two people (A forklift or lift table is recommended). Always obtain help when lifting the system, or when negotiating the system into and out of the rack.

REQUIRED HARDWARE

Verify that all necessary installation hardware is available.

- All necessary cables (e.g. CAT5e, USB, 100 GbE QSFP28, etc.)
- Phillips® #2 screwdriver
- Level

RECEIVING & INSPECTION

Once the checklist items are completed, the required hardware is available, and the shipment is received, the next steps are to unpack the system from the shipping container, inspect the packaging and contents for any damage, and verify all necessary components are included in the shipment.

Unpacking & Inspecting the Shipping Container

The following image illustrates the typical container used to ship the VSS2249RQ Storage Server. The container style may vary depending on availability and customer needs.

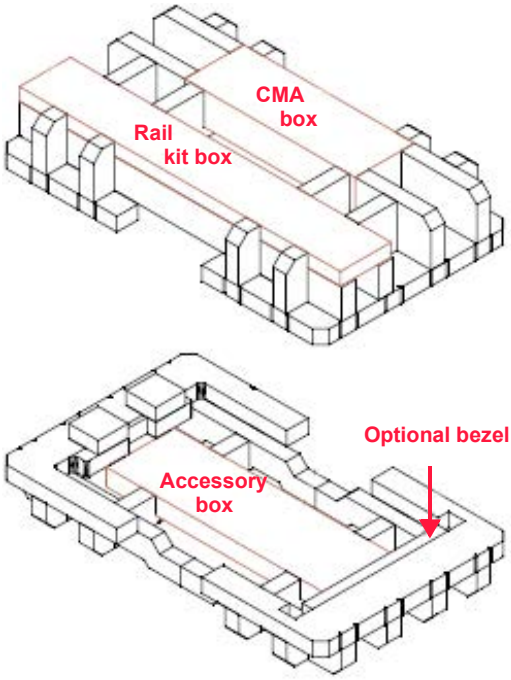

Figure 4.1 Packaging

1. Visually inspect the shipping box and lid for any signs of damage before opening the container.

a. If the container is damaged, contact a Viking Enterprise Solutions support representative for RMA instructions.

See the section titled “Contact Information” that begins on page 207 for instructions on contacting a Viking Enterprise Solutions support representative.

b. If the container is undamaged, continue to step 2.

HEAVY OBJECT: This system weighs approximately **56.2 pounds (25.5 kilograms)** when all drives, two PMs, and two server modules are installed. (This weight does not include the container weight.) Prevent personal injury and equipment damage. Obtain assistance during rack installation and when sliding the system in or out of the rack.

2. Unpack the shipping container.
   a. Remove the rail kit and CMA boxes from the shipping container.
   b. Lift the top packing from the shipping container.
   c. Lift the enclosure out of the shipping container.
   d. Lift the bezel box from the bottom packing, if included.
   e. Lift the accessory box from the bottom packing.
3. Inspect each box for shipping damage.
   a. If any of the boxes have sustained damage, contact a Viking Enterprise Solutions support representative for RMA instructions.

See the section titled “Contact Information” that begins on page 207 for instructions on contacting a VES support representative.

   b. If the contents are not damaged, continue to step 3.
4. Place all contents on an anti-static surface and proceed to verify container contents.

Shipping Container Contents

The shipping container contents may vary in both system components and quantity based on individual customer needs. The system typically arrives with each component preinstalled, but might require installation. The container contents will likely include the following:

- VSS2249RQ Storage Server:
  - Two VSSEP1EC Server Modules
  - Two PMs, each containing one 1600W PSU
  - Six 60mm single impeller fans

- 24 drive carrier assemblies with drives or drive blanks preinstalled in the drive carriers

NOTE: Viking Enterprise Solutions recommends that disk drives acclimate to room temperature for two hours prior to installation.

- Accessories:
- Interface cables (if ordered)

- Rail kit:
  - One left adjustable rack mounting rail (marked LEFT)
  - One right adjustable rack mounting rail (marked RIGHT)
  - Rail installation hardware
    - Four M4 X 4 Phillips® screws (two for rack installation and two spares)
    - Eight #10 32 X 14.5 (7.1mm) round hole rack screws
    - Two M5 X 9 Phillips shipping screws

See the section titled “Contact Information” that begins on page 207 for instructions on contacting a Viking Enterprise Solutions sales representative to inquire about any missing components.

REDUCING SYSTEM WEIGHT

If all FRU components arrive preinstalled, removing them from the enclosure may be necessary to reduce system weight before installing the enclosure into the rack. Removing these FRUs can reduce the total weight by as much as 29.2 pounds (13.3 kilograms). This section provides instructions on removing the FRU components to minimize system weight for rack installation.

To skip the weight reduction instructions, proceed to “Enclosure Rack Installation” on page 35.

To view the system weight table, refer to the section titled "Weights" that begins on page 127 of Appendix A.

CAUTION: These instructions assume the enclosure and drives are being installed for the first time, and the enclosure has not yet been connected to a power source. If replacing or hot-swapping a FRU, proceed to Chapter 8 titled “System Maintenance” that begins on page 93 for instructions.

Removing the Drives

The following instructions guide the user in removing the drive carrier assemblies to minimize weight during rack installation.

See the section titled “Removing Server Modules” that begins on page 33 to skip drive carrier assembly removal instructions.

Drive Carrier Assemblies

A drive carrier assembly consists of the drive carrier and a 2.5-inch U.2 NVMe SSD or drive blank. Drive carriers provide for controlled installation and removal of the drives into and out of the VSS2249RQ Storage Server. The drive carrier handle ensures complete seating of the connectors through typical operational shock and vibration by camming the drive carrier assembly into the drive bay.

The following instructions guide the user in removing the drive carrier assembly from the enclosure to minimize enclosure weight. Removal of a drive or drive blank from the drive carrier is not necessary. Figure 4.2 shows the front of the enclosure with an extended drive carrier assembly.

Figure 4.2 Drive carrier assembly access

ESD-SENSITIVE DEVICE. Only install the device on a properly grounded electrostatic discharge (ESD) protection surface to avoid damage to the components. Always utilize a properly grounded ESD wrist strap or mat during operation or installation of the device, or when connecting the cables.

1. Press the release catch in the direction of the arrow on the drive carrier to open the release handle as shown in Figure 4.3. The cam releases from the locked position.

Figure 4.3 Drive carrier assembly

2. Lift the release handle fully open as shown in Figure 4.2 and gently begin to remove the drive carrier from the drive bay by gently pulling the middle of the handle. Use care to avoid damaging the release latch identified in Figure 4.3.
3. Grab the carrier frame above and below the release handle as shown in Figure 4.3 and pull the drive carrier assembly completely out of the bay.
4. Place the drive carrier assembly on an anti-static surface until reinstallation.
5. Repeat steps 1 through 4 to remove the remaining drive carrier assemblies from the enclosure.
6. Drive carrier removal is complete.

Removing Server Modules

Removing the VSSEP1EC Server Modules may be necessary during rack installation to minimize weight. The following instructions describe how to remove the server modules from the enclosure.

ESD-SENSITIVE DEVICE. Only install the device on a properly grounded electrostatic discharge (ESD) protection surface to avoid damage to the components. Always utilize a properly grounded ESD wrist strap or mat during operation or installation of the device, or when connecting the cables.

1. Loosen the thumbscrew securing the first server module to the enclosure. The thumbscrew is identified in Figure 4.4.

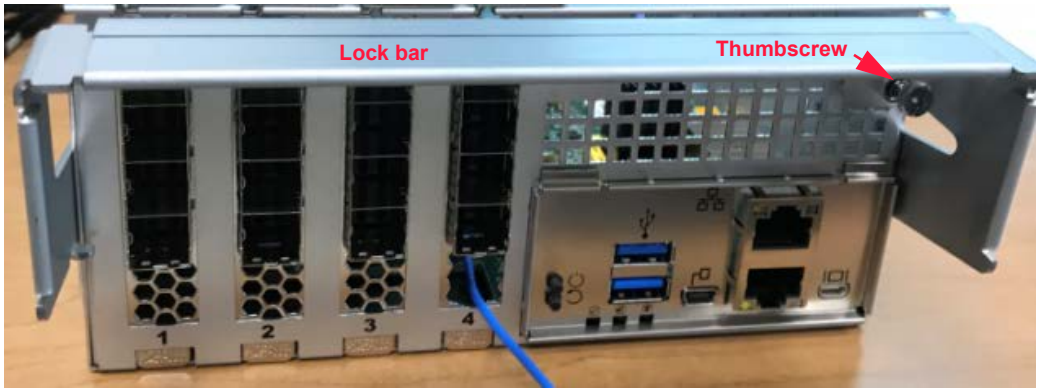

Figure 4.4 Server module thumbscrew and lock bar

2. Pull the lock bar downward to release the cam from the locked position. The lock bar motion is demonstrated in Figure 4.5 on page 34.

Figure 4.5 Server module removal

3. With one hand supporting the bottom of the module, grab the lock bar and pull the server module out of the enclosure.
4. Place the server module on an anti-static surface until reinstallation.
5. Repeat steps 1 through 4 to remove the second server module.
6. VSSEP1EC Server Module removal is complete.

Removing the PMs

	WARNING: At this point in installation, the system should not be connected to a power source. There is no power switch on this unit. Once the first power cord is connected to an active PDU, the system starts. If this system has been powered up, two power cords must be unplugged from the PDU receptacle to properly shut down the chassis.
	ESD-SENSITIVE DEVICE. Only install the device on a properly grounded electrostatic discharge (ESD) protection surface to avoid damage to the components. Always utilize a properly grounded ESD wrist strap or mat during operation or installation of the device, or when connecting the cables.
	WARNING: While some factory-approved maintenance on FRUs (e.g. hot-swapping a PM, NVMe drive, or server module) does not require the user to disconnect power to the system, performing other types of maintenance on systems connected to an electrical power source may result in serious injury or death. Only individuals with knowledge and training in working with devices containing live circuits should operate the system. Take precautions when performing all other types of maintenance. **Disconnect 2 power supply cords before servicing.**

1. Verify that both power cords are unplugged from the PM jacks on the rear of the enclosure. Refer to Figure 4.6 for the location of the jacks.

Figure 4.6 PM jacks

2. Push the PM release tab downwards in the direction of the finger handle while simultaneously pulling the finger handle outward to disengage the PM cam. Figure 4.7 identifies the release tab and finger handle. Do NOT press the PSU tab below the finger handle.

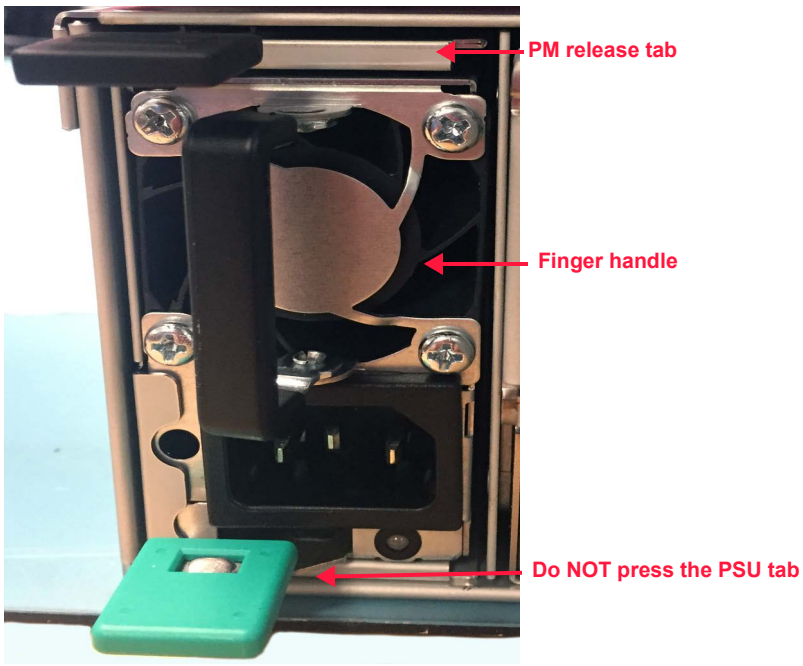

Figure 4.7 PM removal

3. Using one hand to support the bottom of the PM, let go of the release tab and pull the PM completely out of the enclosure by the finger handle.
4. Place the PM on an anti-static surface until reinstallation.
5. Repeat steps 1 through 4 for the remaining PM.
6. PM removal is complete.

Enclosure Rack Installation

The instructions that follow discuss the procedures for installing the VSS2249RQ Storage Server into a standard EIA 19-inch (48.3-centimeter) rack. When properly installed, the rail kit's chassis member (bolted to the sides of the enclosure) slides inside the rail kit's cabinet member (bolted to the rack).

⚠	**TIPPING HAZARD:** Only extend one enclosure from the rack at a time. Ensure that each of the remaining enclosures in the rack are secured to the front rack posts. Enclosures should be installed into the rack according to their weight, with the heaviest system on the bottom and lightest system on top.

✎	**NOTE:** The rail kit supports a 27.0-inch (68.6-centimeter) to 37.0-inch (94.0-centimeter) rail depth. The rack envelope is 39.4 inches (1 meter).

PREPARING THE RAILS FOR INSTALLATION

The rail kit accommodates racks with square or round rack post holes. Preparation for each type are nearly identical with the exception that round post holes will require the use of a different set of screws. No changes are necessary for racks with square rack post holes.

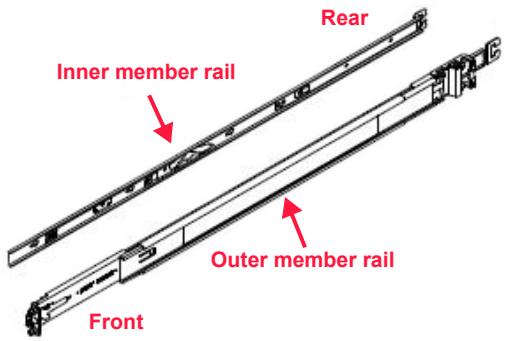

Figure 4.8 Inner and outer rails

For Racks with Round Post Holes

Complete the following steps only if the rack has round post holes. If the rack has square post holes, skip this section and move on to “Separating the Inner and Outer Rails.”

1. Remove the eight preinstalled 9.5mm screws (used for racks with square post holes): two on each of the brackets on the front and rear outer cabinet member rail as demonstrated in Figure 4.9.

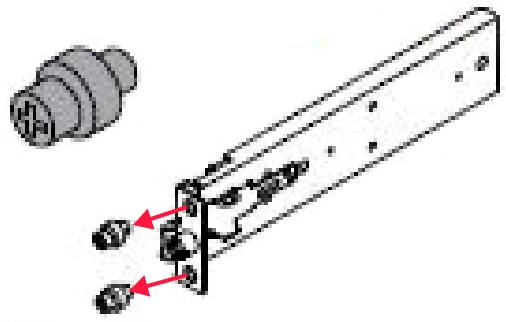

Figure 4.9 Removing the 9.5-inch screws

2. Install the eight 7.1mm screws (used for racks with round post holes): two on each of the brackets on the front and rear outer cabinet member rail as demonstrated in Figure 4.10 on page 37.

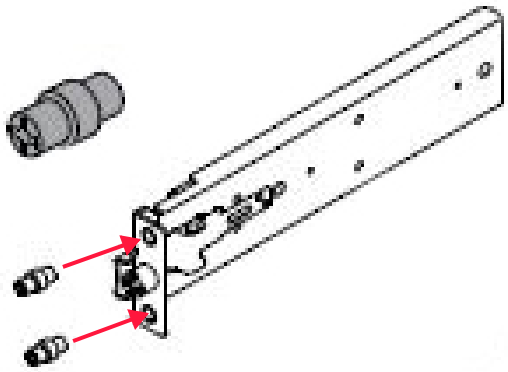

Figure 4.10 Installing 7.1-inch screws

3. Proceed to the next section to separate the rails for installation.

Separating the Inner and Outer Rails

Before the rail kit is installed, the inner chassis member rails must be separated from the outer cabinet member rail.

1. Slide the inner chassis member rail out from the outer cabinet member rail until there is an audible click. The rail locks in the serviceable position as shown in Figure 4.11.

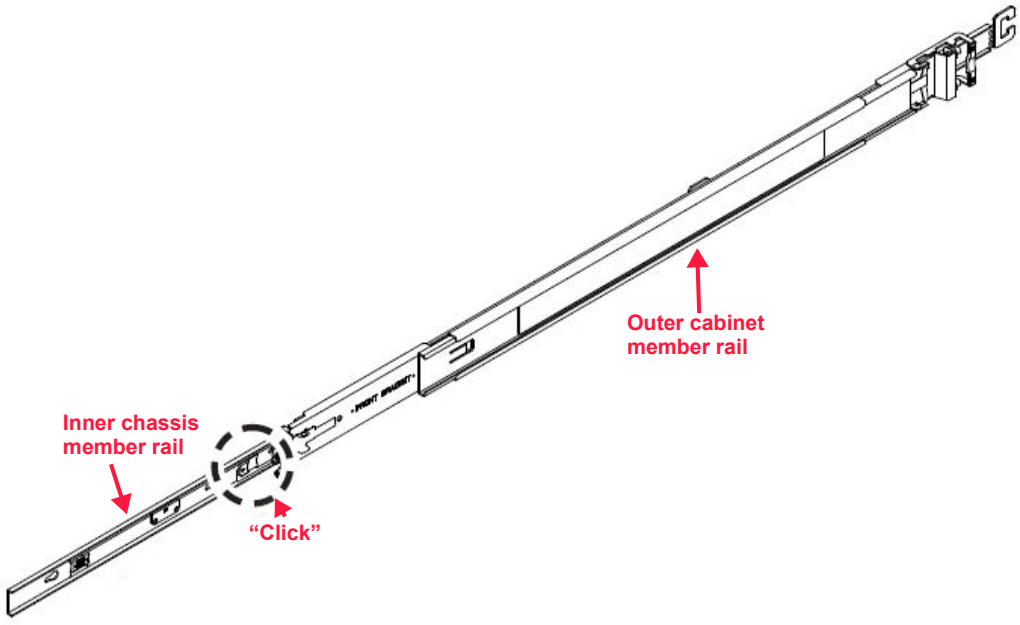

Figure 4.11 Removing the inner rail

2. Pull the release tab on the inner chassis member rail forward as demonstrated in Figure 4.12 on page 38.

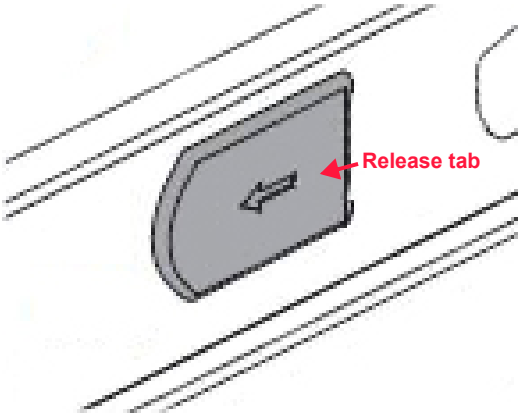

Figure 4.12 Rail release tab

3. Fully pull the inner chassis member rail from the outer cabinet member rail and set aside.
4. Repeat steps 1 through 3 to separate the second inner chassis member rail from the outer cabinet member rail.

INSTALLING THE INNER RAILS ONTO THE CHASSIS

Each inner chassis member rail must be installed onto the left and ride sides of the enclosure.

1. Align the large section of the keyholes on the right chassis member rail with the standoffs on the right side of the chassis as shown in Figure 4.13 on page 39.

NOTE: RIGHT and LEFT are marked on the front end of the adjustable rack mounting rails to indicate the proper placement. The shelves on the bottom of the left and right rail should be positioned towards the inside of the rack.

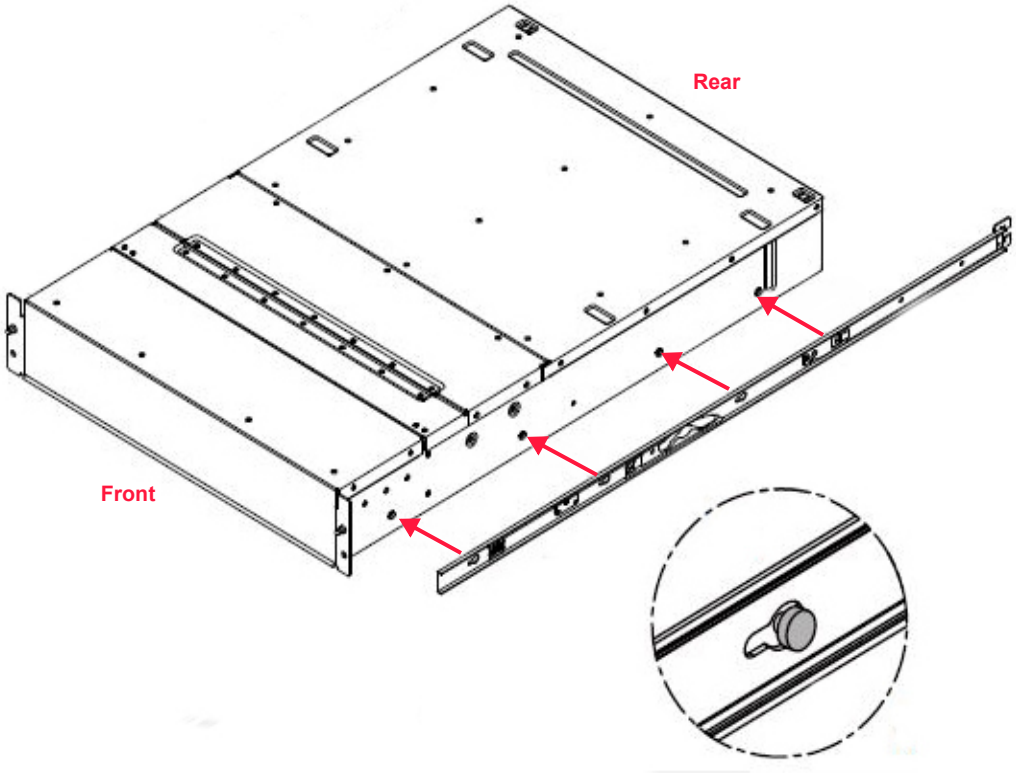

Figure 4.13 Align the standoffs with the keyholes

2. Slide the rail towards the back of the enclosure to secure the standoff on the smaller section of the keyhole to lock the rail in place, which is accompanied by an audible click. Refer to Figure 4.14.

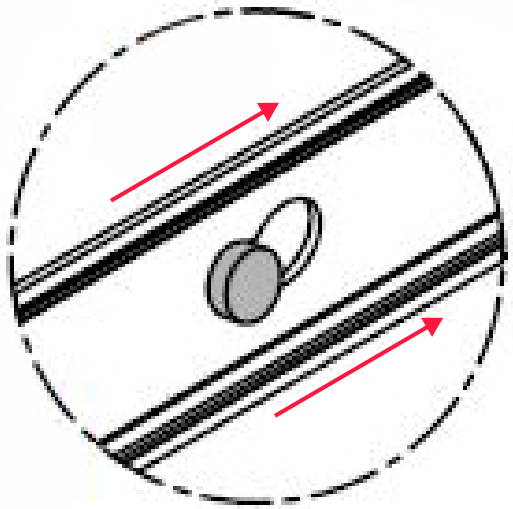

Figure 4.14 Securing the standoff over the keyhole

3. Secure the rail in place using one of the M4 X 4 screws in the hole just behind the release tab as identified in Figure 4.15 on page 40.

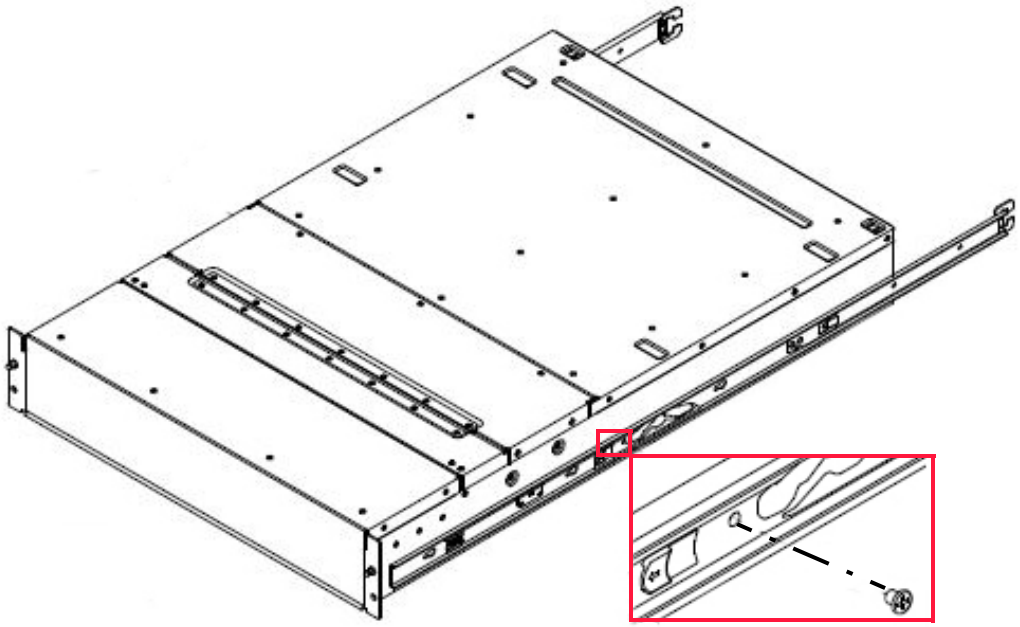

Figure 4.15 Securing the rail

4. Repeat steps 1 through 3 to secure the left rail onto the chassis.

INSTALLING THE RAILS ONTO THE RACK POSTS

These instructions provide the process for installing the front and rear mounting brackets into each of the four rack posts.

1. Align the left rear bracket mounting screws with the appropriate left rear rack post holes as shown in the “Before” image of Figure 4.16.

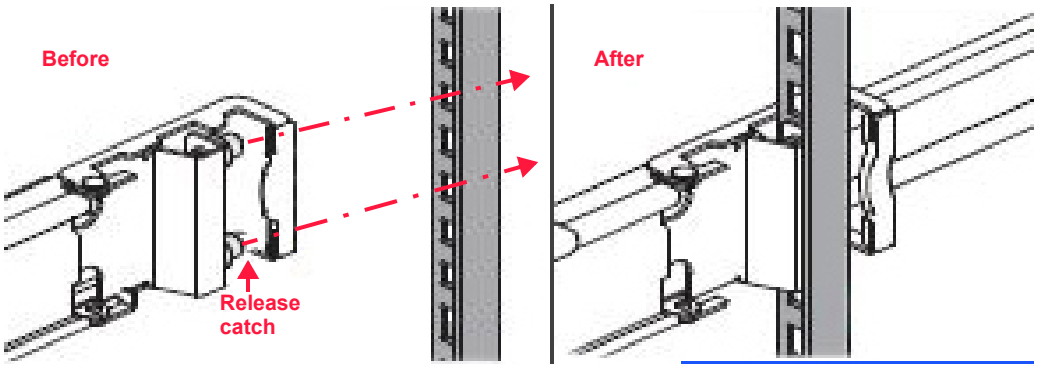

Figure 4.16 Installing the left rear bracket

2. Press and hold the release catch identified in the “Before” image of Figure 4.16 and push the bracket into place so that the mounting screws install securely into the rack post holes.

3. Once the screws are fully inserted, release the catch to secure the rail to the post. Refer to the “After” image in Figure 4.16 on page 40 for an illustration of a properly installed left rear cabinet member bracket.
4. Align the left front bracket mounting screws with the appropriate rack post holes in the front left rack post. Ensure the rail is level before continuing.
5. Push and hold the release catch outward (see Figure 4.17) and insert the left front bracket mounting screws into the left front rack post holes. Verify the rail is level.

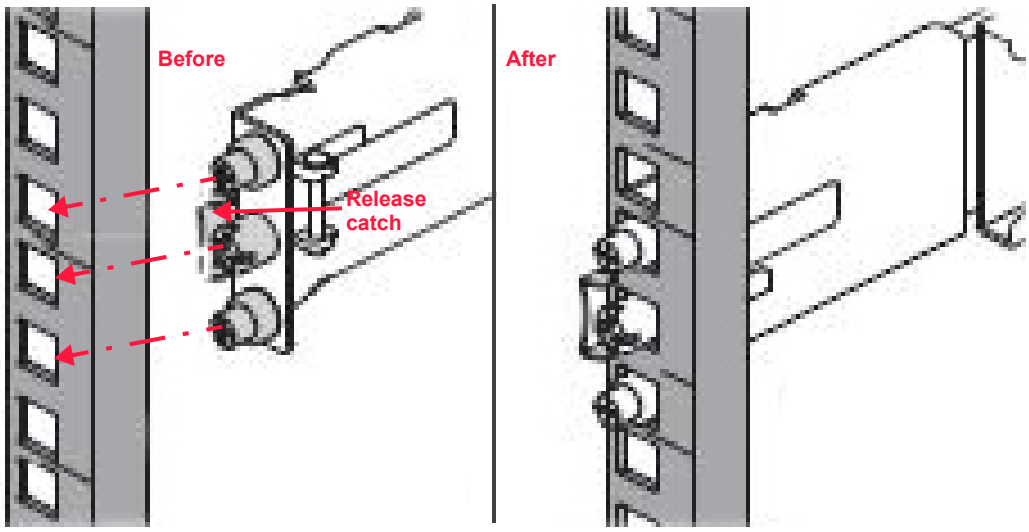

Figure 4.17 Install the front bracket

6. Once the mounting screws are fully inserted into the rack post holes, release the catch to secure the rail to the post. Refer to the “After” image in Figure 4.17 for an illustration of a properly installed left front cabinet member bracket.
7. Repeat steps 1 through 6 to install the right rear and front cabinet member rail into the right rear and front rack post.

INSTALLING THE ENCLOSURE INTO THE RACK

Once the rail kit is installed, install the enclosure into the rack as outlined in the following steps.

⚠	**CAUTION:** Avoid personal injury and obtain assistance or use a lift table or forklift when installing the system into the rack.
⚠	**CAUTION:** Extreme care must be taken when inserting the enclosure to hold it both horizontally and square to the rails. This will require two people.

1. Ensure the ball bearing retainers are located at the front of the left and right cabinet member rails. This is followed by an audible click.
2. While facing the front of the VSS2249RQ Storage Server, align the enclosure both horizontally and square to the rails.
3. Insert each chassis member rail into the cabinet member rail.
4. Push the enclosure into the rack while pulling the cabinet member rail until the cabinet and chassis member rails lock into the serviceable position. This is accompanied by an audible click.
5. Press the release tab shown in Figure 4.12 on page 38 and push the enclosure fully into the rack.
6. Secure the dog ears on the left and right front of the enclosure to the left and right front rack posts using the two M5 X 9 shipping screws.

	**NOTE:** The rail kit supports rail depths between 27 inches (68.6 centimeters) and 37 inches (94.0 centimeters). The rack envelope is 39.4 inches (1 meter).

7. Installation of the storage enclosure into the rack is complete.

Reinstalling the FRUs

Once enclosure rack installation is complete, return the FRUs that were removed earlier to minimize weight back to the enclosure.

DRIVE CARRIER ASSEMBLIES

The following instructions guide the user in reinstalling the drive carrier assemblies.

	**ESD-SENSITIVE DEVICE**. Only install the device on a properly grounded electrostatic discharge (ESD) protection surface to avoid damage to the components. Always utilize a properly grounded ESD wrist strap or mat during operation or installation of the device, or when connecting the cables.

	**CAUTON:** Ensure that the SSDs have had a minimum of two hours to acclimate to room temperature prior to their installation in the enclosure.
	**CAUTION:** Due to thermal considerations, all 24 drive bays must be populated with drive carrier assemblies containing SSDs or drive blanks to maintain proper cooling.

1. Ensure the release handle is in the open position as shown in Figure 4.3 on page 32.

2. With the drive upright and the release handle at the top, grab the frame just below the release handle and carefully push the drive carrier assembly into the drive bay until the carrier handle engages the cam.
3. Ensure the drive is pushed fully into the drive bay and press the release handle downward until the release catch engages and the drive carrier assembly cams into place.
4. Repeat steps 1 through 3 for the remaining 23 drives carrier assemblies.
5. Drive reinstallation is complete.

SERVER MODULES

This section discusses reinstalling the VSSEP1EC Server Modules into the enclosure.

	**ESD-SENSITIVE DEVICE**. Only install the device on a properly grounded electrostatic discharge (ESD) protection surface to avoid damage to the components. Always utilize a properly grounded ESD wrist strap or mat during operation or installation of the device, or when connecting the cables.
	**WARNING:** Install the server module in the correct orientation. Ensure the connector pins in the storage enclosure are straight and ready to align into the connector holes in the server module. Never force the module into the enclosure. If a pin or data connector is damaged, return the system for service. Do NOT attempt to straighten pins as this can cause further damage to the storage enclosure.

1. Become familiar with the server module connectors. The connectors must align properly so that the module smoothly inserts into the I/O option slot on the rear of the enclosure. Refer to Figure 4.18 for a close-up view of the server module connectors.

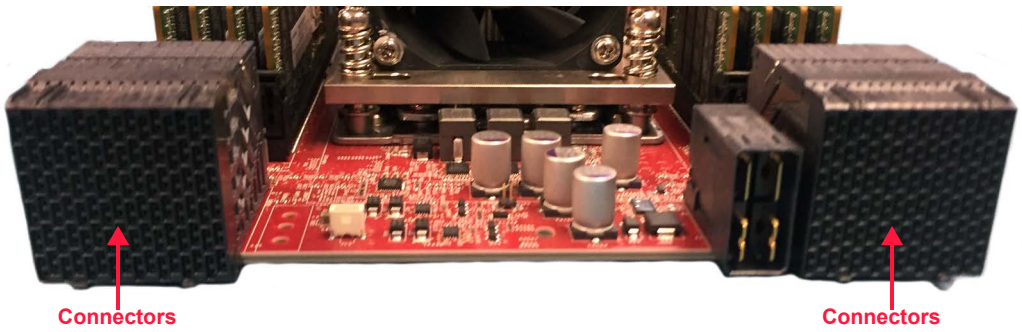

Figure 4.18 Server module connectors

2. Ensure the server module lock bar is in the down, unlocked position. Refer to Figure 4.4 on page 33 to view the lock bar operation.
3. With one hand supporting the bottom of the server module, fully slide the server module into the appropriate empty slot on the rear of the storage enclosure.

4. Push the module into the enclosure until the lock bar engages and the module is flush with the face of the enclosure. Never force the module into place.
5. Push the lock bar upward to cam the server module into the enclosure.
6. Tighten the thumbscrew to secure the module in place. The thumbscrew locations are also pictured in Figure 4.4 on page 33.
7. Install the appropriate cables into their corresponding ports on the server module operator panel.

See the section titled “Server Module Operator Panel” that begins on page 24 for guidance in cable connection.

8. Repeat steps 1 through 7 to install the remaining server module.
9. Server module reinstallation is complete.

REINSTALLING THE PMS

	**WARNING:** At this point in installation, the system should not be connected to a power source. There is no power switch on this unit. Once the first power cord is connected to an active PDU, the system starts. If this system has been powered up, two power cords must be unplugged from the PDU receptacle to properly shut down the chassis.
	**ESD-SENSITIVE DEVICE**. Only install the device on a properly grounded electrostatic discharge (ESD) protection surface to avoid damage to the components. Always utilize a properly grounded ESD wrist strap or mat during operation or installation of the device, or when connecting the cables.
	**WARNING:** While some factory-approved maintenance on FRUs (e.g. hot-swapping a PM, SSD, or server module) does not require the user to disconnect power to the system, performing other types of maintenance on systems connected to an electrical power source may result in serious injury or death. Only individuals with knowledge and training in working with devices containing live circuits should operate the system. Take precautions when performing all other types of maintenance. **Disconnect 2 power supply cords before servicing.**

1. Ensure the PM is in the proper orientation with the PM release tab at the top. Figure 4.7 on page 35 identifies the release tab and finger handle.
2. With one hand supporting the bottom of the first PM, insert the first PM into the power cavity on the rear of the enclosure.
3. Fully push the PM into the enclosure until the PM release tab engages and the PM cams into place.
4. Test to ensure the PM is properly installed. Pull the finger handle slightly outward to verify the PM is locked in place. If the PM can be easily removed from the enclosure without pushing the PM release tab, remove the PM and repeat steps 2 and 3, and then retest installation.
5. Repeat steps 1 through 4 for the remaining PM to complete installation.

Cable Management Hardware

The CMA aids in better routing and securing of the system's cabling and enables the storage enclosure to be easily slid into and out of the rack for drive installation or replacement without having to disconnect cables from the PMs or server modules. A properly installed CMA prevents cable tangling and interference with other components in the rack, allowing for smooth operation of the rails.

CMA INSTALLATION

Each server module enclosure is supported by a CMA, which permits removal of the cables from one server module without disrupting any other server modules. Each of the CMA connectors listed in Table 4.1 is identified in Figure 4.19.

Connector	Description
A	Inner CMA arm connector
B	Inner rail connector
C	Outer CMA arm connector
D	Outer rail connector
E	CMA body connector
F	CMA body rail connector

Table 4.1 CMA components

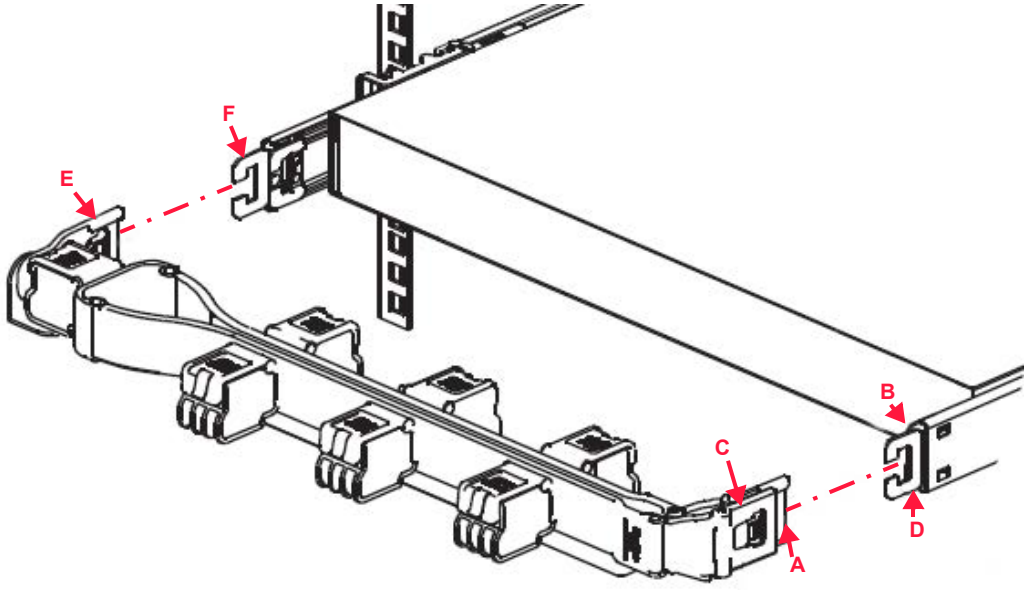

Figure 4.19 CMA components

The following instructions guide the user in the installation of the CMAs.

1. Become familiar with each of the CMA components that are identified in Figure 4.19 and listed in Table 4.1 on page 45.

> **CAUTION:** If the CMA ships preinstalled, a zip tie strap will secure the CMA to the cross bar during transportation to prevent damaging the CMA. This strap must be removed prior to initial use. See Figure 4.21 on page 47.

2. Verify the CMA direction. To change the direction of the CMA so that the body connector is on the opposite side of the enclosure, press the pivot release button on the outside of the CMA elbow (identified in Figure 4.20), pivot the arm 180 degrees, and pivot the arm connectors 180 degrees.

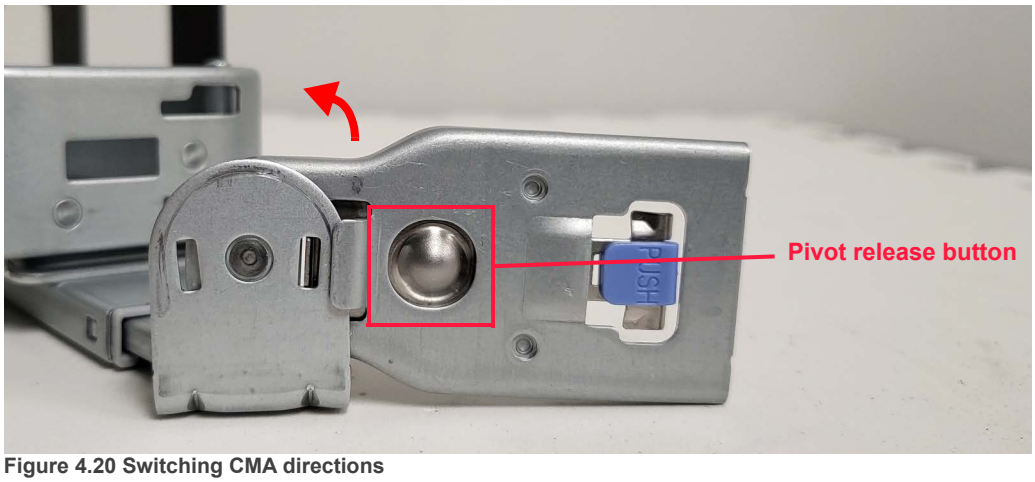

Figure 4.20 Switching CMA directions

3. Slide the CMA body connector (E) onto the body rail connector (F) until the connector release button clicks.
4. Slide the inner CMA arm connector (A) onto the inner rail connector (B) until the connector release button clicks.
5. Slide the outer CMA arm connector (C) onto the outer rail connector (D) until the connector release button clicks.
6. Connect the cables to the appropriate ports server module operator panels and jacks. **Do not** connect the power cords to a PDU at this time.
7. Starting with the thickest gauge cable first, run each cable through the loops on the CMA as demonstrated in Figure 4.21.

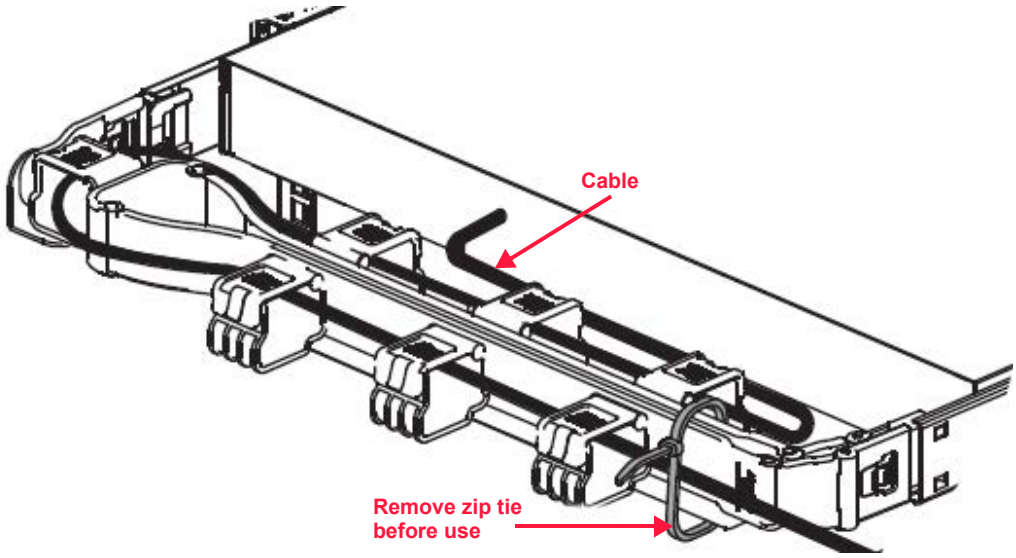

Figure 4.21 Assembled CMA

8. Test the CMA to ensure smooth CMA operation. No pinching or binding of the cables should occur. When pulling the enclosure from the rack, the rails lock in the serviceable position. To release the rails from the serviceable position, press the release tab on each inner chassis member rail simultaneously (see Figure 4.22) and push the enclosure into the rack.

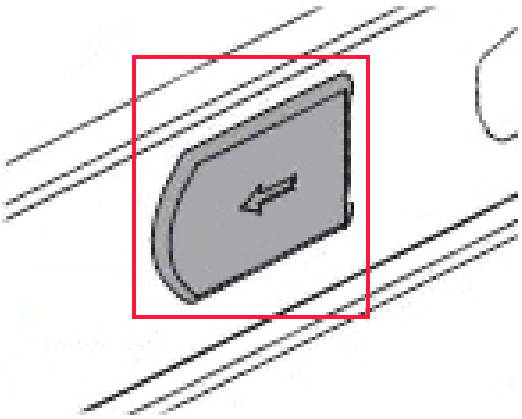

Figure 4.22 Release tab

Refer to the section titled “System Cabling & Management” that begins on page 21 of Chapter 3 for guidance with the server module operator panel and cable recommendations.

9. Do not power the system at this time. Proceed to Chapter 5 to review the system power configuration.

Attaching the Optional Bezel

Figure 4.23 presents a rendering of the optional bezel design.

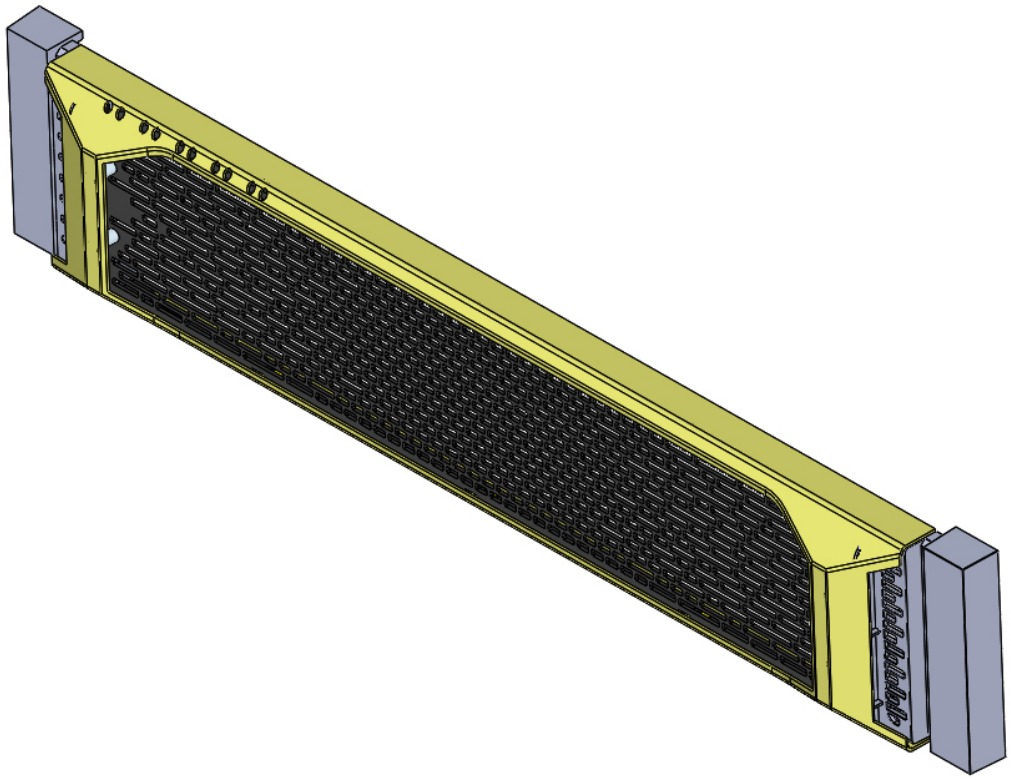

Figure 4.23 Optional bezel

BEZEL INSTALLATION

1. Align the ends of the bezel with the right and left rack ears.
2. Push the bezel into the right side of the right rack ear. The stud should join the retention clip inside the right side of the bezel cover (see Figure 4.24.

	NOTE: Only the left side rack ear and bezel underside are shown in Figure 4.24. The right side is a mirror image of the left.

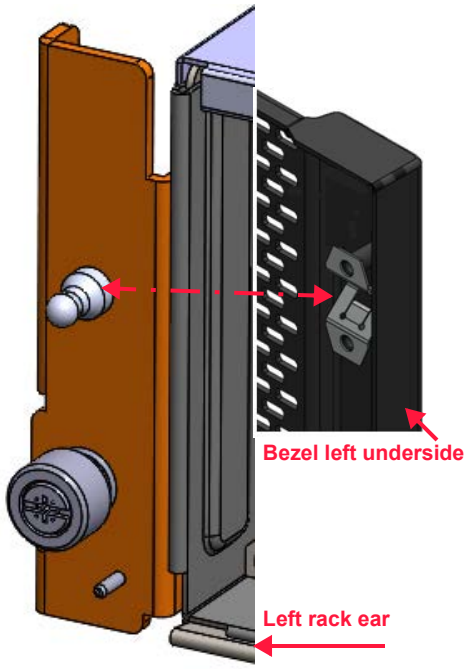

Figure 4.24 Bezel installation

3. Push the bezel into the left side of the left rack ear. The stud should join the retention clip inside the left side of the bezel cover.
4. Bezel installation is complete.
5. Rack installation is complete.

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Chapter 5

Powering the VSS2249RQ Storage Server

This chapter discusses the available system power configurations and includes procedures—and important considerations—for controlling power to the VSS2249RQ Storage Server.

> **CAUTION:** Use only VES-approved power cords. Do not use any other type of cords or extension cords. To obtain additional power cords, please contact a Viking Enterprise Solutions™ sales representative.

System Power Overview

This section provides an overview of the system-compatible PMs. Input specifications are also included.

ABOUT THE SYSTEM POWER CONFIGURATION

The VSS2249RQ Storage Server power configuration includes two power sleds, each containing one factory-installed 12V DC 1600W PSU and one factory-installed 3.3V power adapter board that provides standby power to the drives. Regardless of the desired power configuration, both PSUs must be of the same capacity and form factor.

> **CAUTION:** A change in power module capacity and/or length will likely require a change in the power adapter board. Contact a Viking Enterprise Solutions™ support representative for assistance in upgrading the system power configuration.

PMs have active load-sharing and support 1+1 redundancy. This configuration enables the PMs to operate in an active/passive mode, so during normal system operation, each PM is functioning at the most efficient level.

If there is a PM failure, the system defaults to the second PM without fault. During a PM hot-swap, the remaining PM powers the VSS2249RQ Storage Server until the hot-swap is completed. (PM hot-swaps should be performed within five minutes to ensure redundancy.) Though a single PM can power the VSS2249RQ Storage Server indefinitely, both are required to ensure redundancy.

For more information on power supply replacement, refer to the section titled “Power Modules” that begins on page 107 of Chapter 8.

Each PM contains a built-in cooling fan and a bi-color LED to assist the user in identifying the PM operational status. (The PM cooling fan is not field-serviceable and failure requires PM replacement.) Figure 5.1 provides a close-up of an installed 1600W PM.

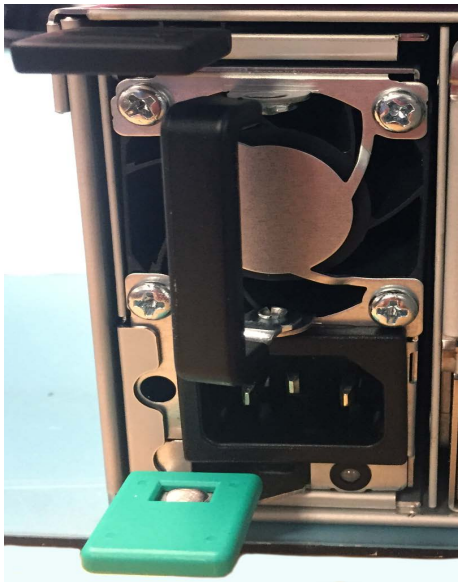

Figure 5.1 1600W PM close-up

To learn more about the PM LEDs, refer to the section titled “PMs” that begins on page 82 of Chapter 7.

AC Input Specifications

Based on the system requirements, each PM will contain one of three possible factory-installed PSUs, using the same PSU model number for both PMs. The three PSUs meet the AC input specifications as outlined in Appendix 5.1.

PSU Model#	Power Maximum	Input Voltage	Input Frequency	Inrush Current	Efficiency	Efficiency Standard
DPS-1600EB	1600W	200–240V AC	50–60 Hz	40A peak	91% at 100% Load	80PLUS™ Platinum
YSEF-1600EM	1600W	200–240V AC	50–60 Hz	35A peak	91% at 100% Load	80PLUS™ Platinum
G1136-1600WNA	1600W	200–240V AC	50–60 Hz	50A peak	91% at 100% Load	80PLUS™ Platinum

Table 5.1 AC input characteristics

SERVER POWER CONFIGURATION

The VSSEP1EC Server Module includes a power button and a CPU reset button that enable the user to control server power independently of the system power or remaining server module.

Power & CPU Reset Actions

Power and CPU reset buttons are identified in Figure 5.2.

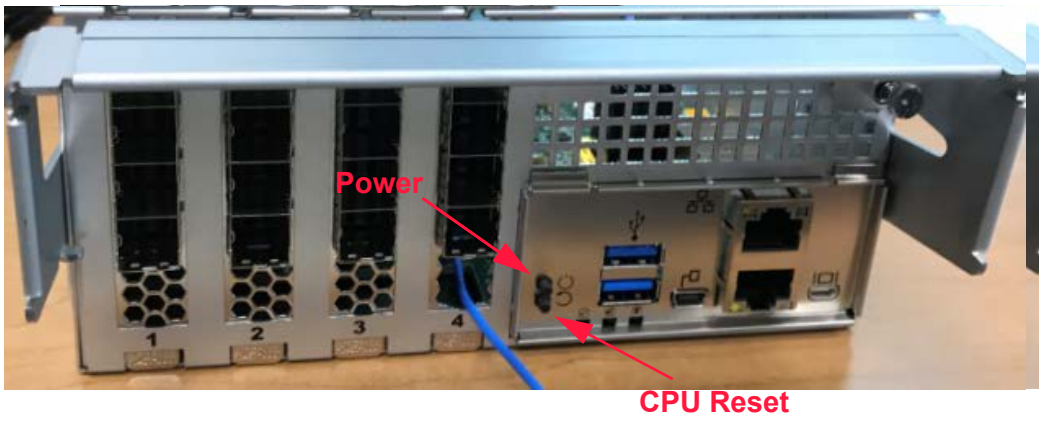

Figure 5.2 Server power and reset buttons

Press each the button for the amount of time specified in Table 5.2, depending on the desired functionality.

Server State	Function	User Action
Powered on	To power **OFF**	Press and hold the power button for 4 seconds or longer, and then release it to immediately power **OFF** the server module without software intervention.
Powered on	To power **OFF**	Press and hold the power button momentarily, and then release it to initiate normal shutdown actions.
Powered off	To power **ON**	Press and hold the power button momentarily, and then release it to turn power **ON** to the server module.
Powered on	To **RESET**	Press and hold the CPU reset button momentarily, and then release it to reset the server module.

Table 5.2 Power and CPU reset button actions

Controlling System Power

This section includes generic step-by-step instructions for using the power cords to control system power, using the server module's power and CPU reset buttons to control server power, and for performing a graceful or immediate shutdown from the command line or BMC WebUI. Individual system configurations may differ based on customer needs and customization. Contact an IT manager for additional information on controlling power for the system configuration in use.

	NOTE: The VSS2249RQ Storage Server sequences the power supplied to the disk drives on start-up to prevent an overcurrent condition. Different disk drive manufacturers, types, and capacities used will result in varying weights and differences in the amount of time that the drives take to become ready. In most cases, waiting approximately one to two minutes from power-on will ensure that all drives are available.
	NOTE: The VSS2249RQ Storage Server does not support single PM configurations due to thermal and redundancy considerations.

USING THE POWER CORDS

The storage server does not contain a power button. Power is controlled by the two power cords that plug into the two PM jacks on the rear of the enclosure and into an active power distribution unit (PDU). The system initiates a power up when the first PM is plugged into an active power source. While connected to active PDUs, drives will remain at an idle speed, even if both servers are powered down. PMs are hot-swappable and do not require the system power to be shut down during replacement. The PM jacks are located at the rear of the enclosure, as pictured in Figure 5.3 on page 54.

Figure 5.3 PM jack locations

	WARNING: While some factory-approved maintenance on FRUs (e.g. hot-swapping a PM, server module, fan, or drive) does not require the user to disconnect power to the system, performing other types of maintenance on systems connected to an electrical power supply may result in serious injury or death. Only individuals with knowledge and training in working with devices containing live circuits should operate the system. Take precautions when performing all other types of maintenance. **Disconnect 2 power supply cords before servicing.**

Powering on the System

These step-by-step instructions guide the user in turning system power **ON**.

1. Plug the female end of each power cord into a jack on the enclosure rear as identified in Figure 5.3.
2. Plug the male end of each power cord into an active PDU.
3. System power initiates the moment that the first PM is plugged into the PDU. The NVMe SSDs power on simultaneously.
4. Wait approximately one to two minutes for the drives to become ready.

Power-Up Sequence and Online Readiness Time

Timeline	Component Readiness
~ 1 second	Enclosure powers on Server modules power on
~1 minute	Server modules are booted Enclosure is configured
~1.5 minutes	SSDs are powered on

Table 5.3 Power-up sequence and readiness time

Shutting System Power Down

⚠	**CAUTION**: Viking Enterprise Solutions recommends using proper shutdown procedures when shutting down the storage server to prevent possible data loss or damage to the equipment. Only perform an immediate shutdown when absolutely necessary.
⚠	**CAUTION:** Ensure no data transactions are taking place on either server module before initiating an immediate system shutdown.

These step-by-step instructions guide the user in performing an immediate shutdown. Though not recommended, it might be necessary at times to shut the system down immediately without waiting for the operating system to do so.

1. Verify all data transactions have completed prior to shutting down the system.
2. Disconnect power to the VSS2249RQ Storage Server. Unplug each power cord from each of the PM jacks or from the PDU.
3. System power shuts down immediately.
4. Wait a minimum of 15 seconds before restoring power to the system.

USING THE SERVER

Both power and CPU reset buttons are located on the bottom center of each server's operator panel as shown in Figure 5.2 on page 53. Viking Enterprise Solutions recommends using these buttons when either rebooting or shutting down the server.

Booting the Server

When the server module is shut down, use the power button to start it.

NOTE: Wait for a minimum of 15 seconds after powering off the server before powering it on again.

1. Refer to Figure 5.2 on page 53 to identify the location of the power button.
2. Press the power button momentarily and then release it to initiate boot-up procedures.
3. The server powers on.

Resetting the Server

When the server must be reset, use the CPU reset button to allow the software to initiate normal reset actions.

1. Ensure no data transactions are taking place on the server being reset.
2. Refer to Figure 5.2 on page 53 to identify the location of the CPU reset button.
3. Press and hold the CPU reset button momentarily and then release it to initiate a CPU reset action.
4. The server resets.

Server Shutdown

When it is necessary to shut down a server, one of two options are available. The user may initiate an immediate shutdown without software intervention, or shutdown the server module gracefully, which allows the software to perform normal shutdown actions. If the user has shut down each server module (and providing the two PMs remain connected to a power source), the drives will remain powered at an idle speed.

1. Ensure no data transactions are taking place on the server module that will be shut down.
2. Refer to Figure 5.2 on page 53 to identify the location of the power button.

3. Perform one of the following two actions:

> **CAUTION:** Viking Enterprise Solutions recommends shutting the server down gracefully, allowing the operating system to perform normal shutdown actions. Shutting down the server without proper software intervention may cause damage to the operating system.

   a. Press and hold the power button momentarily and then release it to initiate normal shutdown actions. This is the desired method.

   b. Press and hold the power button for four seconds to immediately power off the server without software intervention.

4. The server module powers off.

USING THE BMC WEBUI

A user may control power using the BMC WebUI. Accessing the BMC WebUI requires a virtual video connection, the BMC IP address, and a web browser.

The information contained in each screen capture in this section is for illustrative purposes only and may vary depending on the BMC version, web browser, system, and chosen configuration in use.

> **NOTE:** To access the BMC WebUI, a virtual video connection, knowledge of the BMC IP address, and a web browser are required.
>
> For detailed instructions on setting up a video connection and obtaining the server's BMC IP address, refer to the section titled "Establishing a Serial Console Connection" on page 62 of Chapter 6.

Replace the "***BMC-IP-Address***" using the actual address for the BMC IP.

1. Point a web browser (e.g. Internet Explorer®, Firefox®, etc.) to:

   https://<*BMC-IP-Address*>

2. The BMC WebUI login screen displays as shown in Figure 5.4.

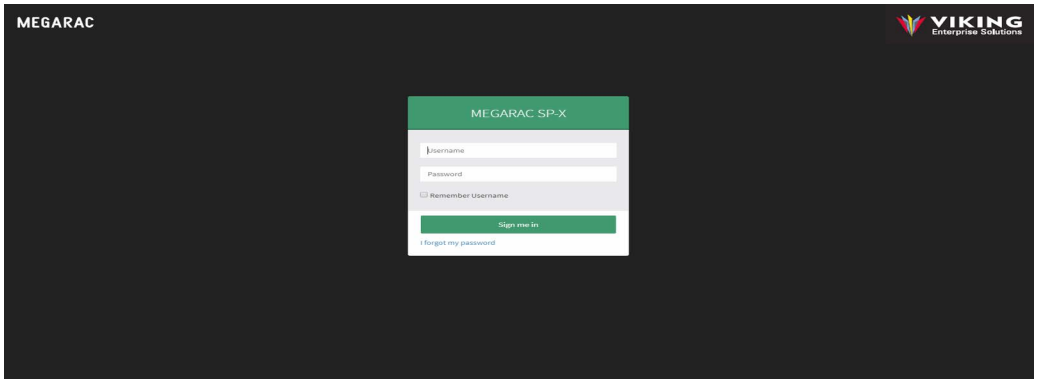

Figure 5.4 BMC WebUI login

3. Log on to the software. Type the standard credentials, **admin**, for both the **Username** and **Password** fields, and click **Login**.
4. The BMC WebUI automatically displays the Dashboard as shown in Figure 5.5 on page 58.

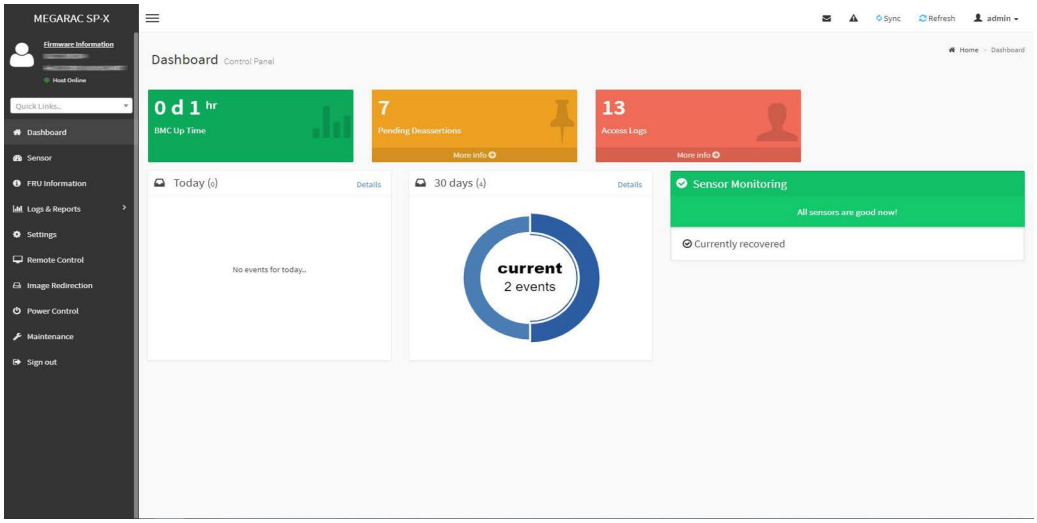

Figure 5.5 Dashboard menu

5. Click **Power Control** on the WebUI menu (shown in Figure 5.6) to control server power by selecting the appropriate option.

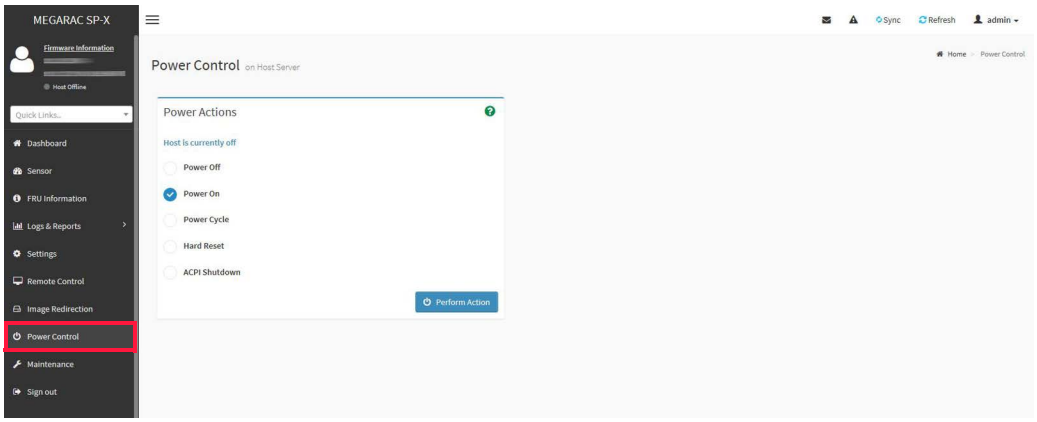

Figure 5.6 Power Control menu

6. The server's power status is shown, followed by options to power off, power on, power cycle, hard reset, and ACPI shutdown. Make the appropriate selection and click **Perform Action**.
7. The server is reset.

IPMITOOL

The VSS2249RQ Storage Server supports IPMItool, which is a standardized open-source command-line interface (CLI) utility that is available online for both Linux and Windows operating systems. Numerous IPMItool commands are available to control system power, such as “ipmitool chassis power on” or “ipmitool chassis reset,” etc. Refer to the online IPMItool documentation for assistance with this product.

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Chapter 6 Operating System & Firmware Setup

The VSSEP1EC Server Module is a compact, full-function compute node for the VSS2249RQ Storage Server and is designed to run an operating system from the two type M.M2 SSDs, an optional Pre-boot Execution Environment (PXE) server, or a USB device. This chapter explores the recommended methods for the operating system and firmware set up for each server module.

CAUTION: The M.2 SSDs are **NOT** hot-swappable or field-serviceable. Opening any of the canister covers might void the warranty. Contact a Viking Enterprise Solutions™ support representative for assistance.

Supported Operating Systems

The server module utilizes a single AMD EPYC™ Rome or Milan CPU and supports the following Linux and Windows® operating systems. Contact a Viking Enterprise Solutions support representative for information on other operating systems.

- Linux, e.g. CentOS®, Ubuntu®, or Fedora®
- Windows Server® 2012

Establishing Server Console Access

The VSSEP1EC Server Module uses the ASPEED® AST2500 (video over IP) iBMC. Connecting a PC (either a desktop or laptop) to the server's serial or video functionality is necessary to obtain and define various settings in the BIOS, and to install an operating system.

This section provides the procedures necessary to establish a serial connection in order to obtain the BMC IP address from the BIOS, and then to establish a virtual video connection over the BMC controller to prepare for operating system installation. Also included are instructions for using an optional, alternative method for establishing a serial connection using IPMI SOL.

REQUIRED HARDWARE/SOFTWARE

- A PC (either a laptop or desktop)
- One USB to Mini-B USB cable
- One CAT5e RJ45 Ethernet cable
- Internet access and a web browser
- Operating system preloaded on a USB drive or other device

ESTABLISHING A SERIAL CONSOLE CONNECTION

A serial console connection allows the user to connect to the BIOS to obtain the BMC IP address, which is necessary when using the JAVA™ console session to install an operating system. Though a few operating systems may be installed using a serial console, the majority of operating systems require the use of a video console.

Setting up the Serial Console

The serial console connection is established by connecting a USB to Mini-B USB cable between the Mini-B USB port (shown in Figure 6.1) on the server's operator panel and a USB port on the PC, and then installing a terminal emulator application to establish communication between the server and PC.

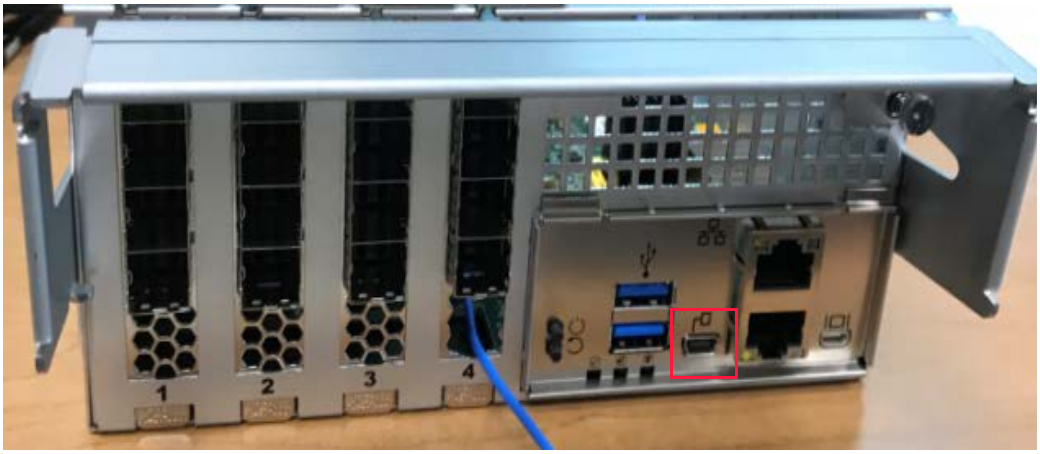


Figure 6.1 Mini-B USB port on server's operator panel

The first step in establishing communication is to install a virtual communications port (VCP) driver on the PC.

Install the VCP Driver on the PC

The appropriate VCP driver for the VSSEP1EC Server Module's Cypress® CY7C65213 USB to Universal Asynchronous Receiver-Transmitter (UART) Bridge Controller is available directly from the Cypress website. At the time of publication, the Cypress web address was http://www.cypress.com. Once the appropriate VCP driver for the PC's operating system has been selected and downloaded onto the PC, proceed with installation.

1. Power on the PC.
2. Power on the storage enclosure.

Refer to Chapter 5 titled "Powering the VSS2249RQ Storage Server" that begins on page 51 for guidance.

3. The PC's operating system detects the connected device and automatically installs the VCP driver.

NOTE: Contact the Cypress support department for detailed guidance in the download and installation of the Cypress VCP driver onto the PC.

Install a Terminal Emulator Application

Once the VCP driver is installed onto the PC, install the terminal emulator application. Many open-source terminal emulator applications are available for free download on the Internet. Select from any of the available products; however, it is important to note that some products have some limitations. For example, Tera Term and HyperTerminal may not properly display some of the lines, colors, or highlighting.

Downloading and Installing the Terminal Emulator Application

Contact the individual organization's support department for detailed instructions with downloading, installing, and executing the chosen terminal emulator application onto the PC. Typical installation includes these steps:

1. On the local PC, open a web browser and search for any specific terminal emulator application, or search "free" or "open source" and "terminal emulator application."
2. Choose from the list of available applications.
3. Follow the instructions provided to download the desired application appropriate for the local PC's operating system.
4. Follow the instructions provided to install the terminal emulator application onto the local PC.

	NOTE: PuTTY is available for Microsoft® Windows download as an executable, or for Linux as an installation.

5. For future use, make note of the directory in which the tool saves the transfer files.

Setting up the VCP

After installing the VCP driver and terminal emulator application, configure the PC's VCP. Verify the PC's COM port terminal emulation settings are properly defined as follows:

- Function keys and keypad = **VT100**
- Speed (baud) = **115200**
- Data bits: **8**
- Stop bits: **1**
- Parity: **None**
- Flow control: **None**
- Click the **Control-H** option button in **The Backspace key** dialog.

	NOTE: The BIOS setup utility is best viewed with the terminal display set to 100x31.

Obtaining the Server's BMC IP Address

To obtain the server's BMC IP address, the user must access the BIOS. The user may change the BIOS settings to perform certain task, such as to:

- Select a different boot order (e.g. to boot an operating system from a USB device)
- Turn processor chip hyperthreading on or off
- Enable Virtualization settings
- Set up the BMC network configuration
- Reset the system date and time

Accessing the BIOS

These instructions guide the user in accessing the server's BIOS to obtain the BMC IP address.

1. Insert the USB drive or other device—preloaded with the chosen operating system—into one of the USB ports on the server's operator panel. The USB ports are identified in Figure 6.2.

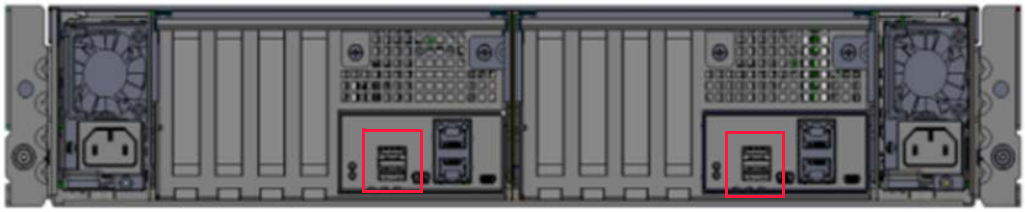


Figure 6.2 USB port on server's operator panel

2. Start a serial console session using the terminal emulator application installed on the PC.
3. Reset the server.

Refer to Chapter 5 titled "Powering the VSS2249RQ Storage Server" that begins on page 51 for instructions to reset the server.

4. As the server reboots, BIOS messages begin to appear in the terminal emulator's window.
5. Press the <**Esc**> or <**F7**> key repeatedly once the logo displays during boot to interrupt the boot process and enter the BIOS setup utility.

	NOTE: If the terminal emulation program does not respond, connect a USB keyboard to one of the server's USB ports, and repeat steps 1 and 2 to interrupt the boot process and enter the BIOS setup.

6. A line of text displays at the bottom of the screen to advise the user that they are entering the BIOS setup mode. If the BIOS has an administrator or limited user password set, the **Password** dialog box will appear. Type the password to proceed into the BIOS setup utility. Note the following:
   a. If both the administrator and limited user passwords are set, one of the passwords must be entered correctly to enter BIOS setup.
   b. If only the administrator password is set, any user may enter BIOS setup by leaving the password field blank and pressing <**Enter**>. This user is then logged into the BIOS as a limited user instead of as an administrator. Only administrators have access to configurable options.
7. The BIOS **Main** tab opens automatically. Refer to Figure 6.3 on page 66 for a screen capture of the BIOS Main tab.

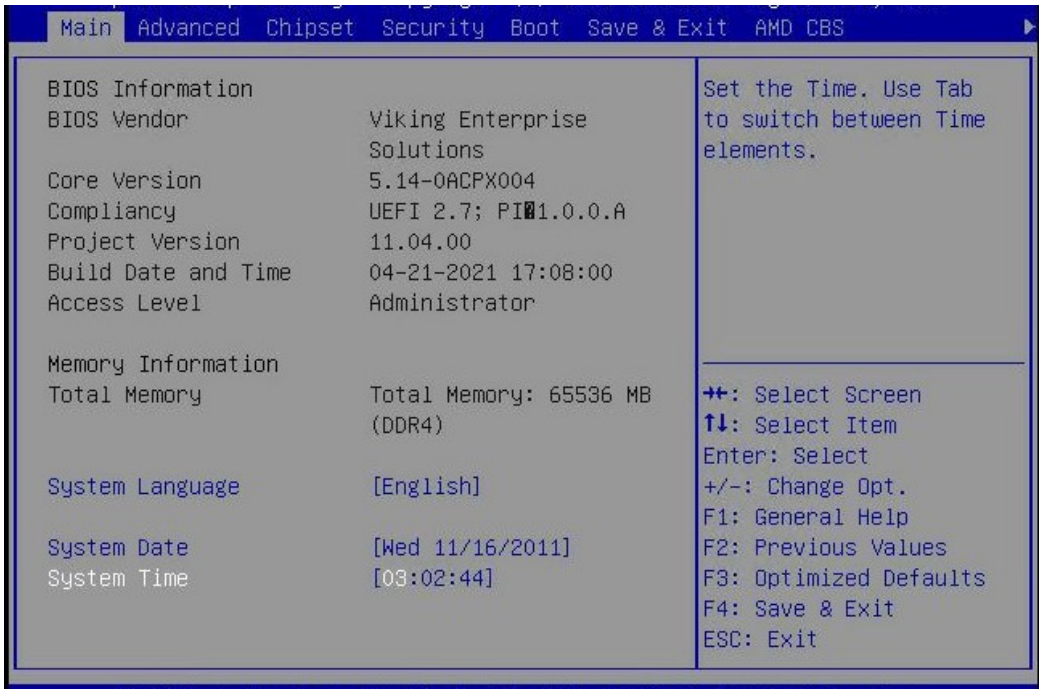
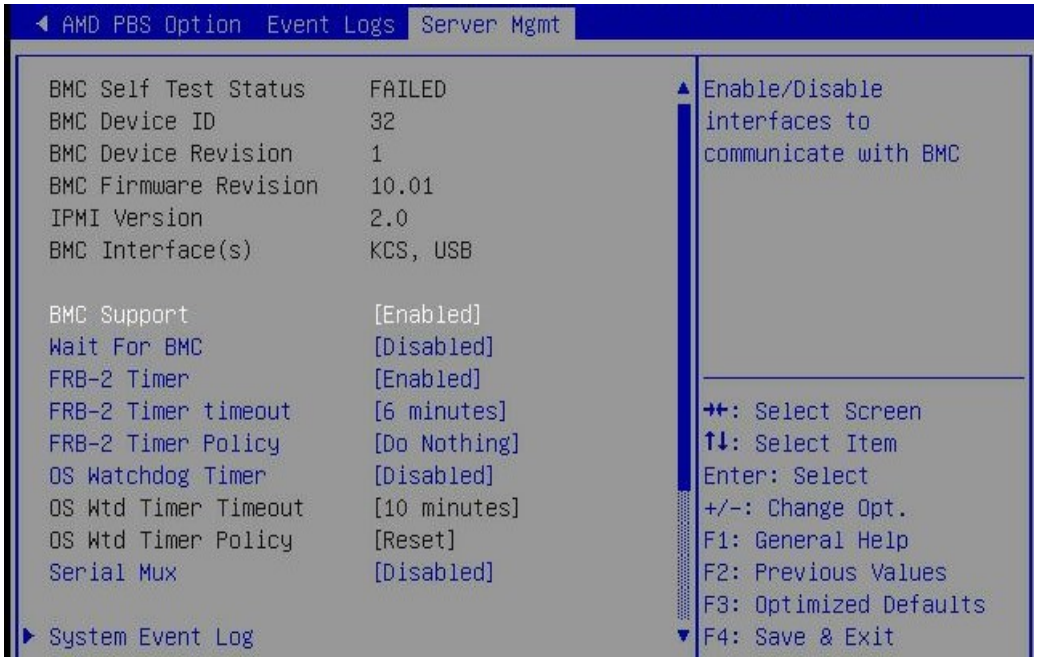


Figure 6.3 BIOS setup utility—BIOS Main tab

8. Press the right arrow key to navigate to the **Server Mgmt** tab, which displays as shown in Figure 6.4 that follows.



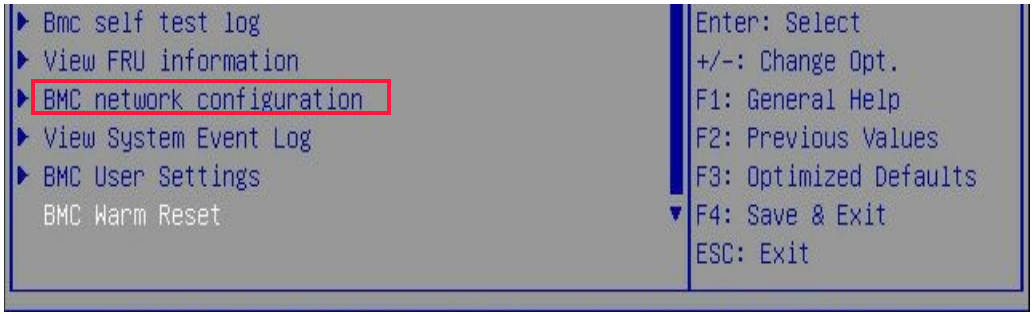


Figure 6.4 Server Mgmt tab

9. Press the arrow down key to position the cursor at **BMC network configuration** on the Server Mgmt menu, and then press **<Enter>**. The **BMC Network Configuration** screen displays as shown in Figure 6.5, and the **Configuration Address source** field displays **Unspecified**.

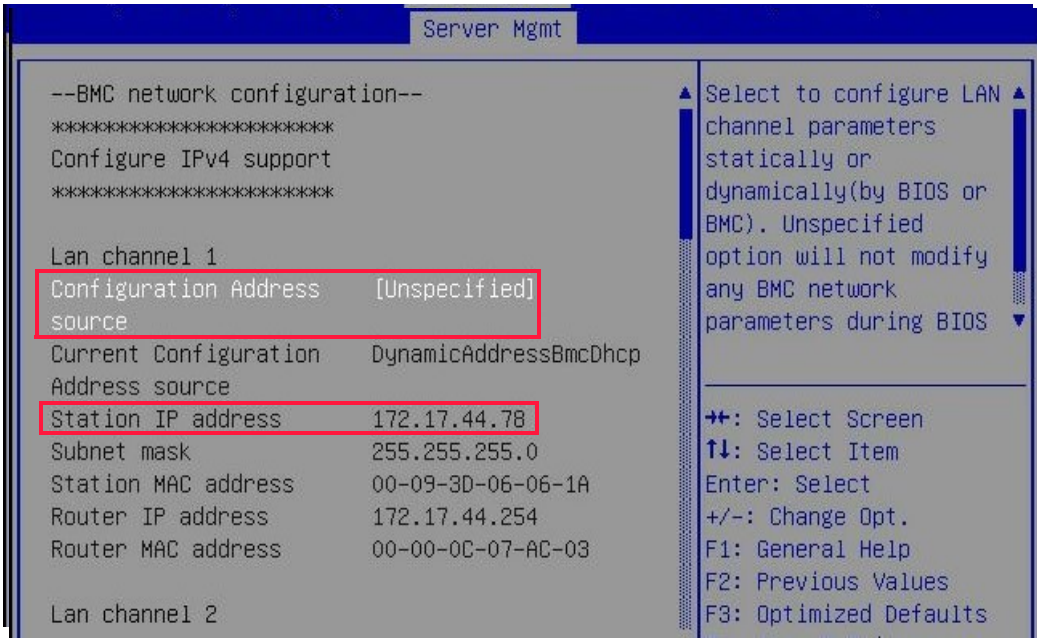


Figure 6.5 BMC network config

10. The **Station IP address** field typically displays the BMC IP address that is assigned automatically during system boot. Choose from 10a or 10b, as appropriate.

    a. Make note of the address and proceed to “Establishing The BMC Remote Video Connection” on page 68.

    b. If the Station IP address does not display an address, then proceed to the next section to define a static IP address.

Defining a Static IP Address (DHCP Server is Unavailable)

The network's Dynamic Host Configuration Protocol (DHCP) server is the primary method used to assign an IP address automatically during the boot process; however, if the network's DHCP server is not available, a static IP address must be assigned.

These instructions guide the user in defining a static IP address for the VSS2249RQ Storage Server when the DHCP server is not available.

	**NOTE:** The user must have access to the appropriate static IP address for the network to define a static IP address for the server system.

1. Return to the terminal emulator application established on the PC. The BMC Network Configuration screen should still be displayed and the cursor positioned in the **Configuration Address** field.
2. Press <**Enter**> to edit the configuration address source.
3. Press the down arrow key to select **Static** from the list of available choices, and then press <**Enter**>.
4. Press the down arrow key to navigate to the **Station IP address** field, and then press <**Enter**>.
5. Backspace over the zeros and type the appropriate network static IP address. (Click <**123** > to access the numeric keypad.)
6. Press <**Esc**> to return to the Sever Mgmt tab.
7. Press the right arrow key to navigate to the **Save & Exit** tab.
8. **Save Changes & Exit** is highlighted. Press the down arrow key to select **Save Changes**, and then press <Enter>.
9. Leave the terminal emulator application window open and perform one of the following tasks, as appropriate:
    a. Proceed to the next section to establish the BMC remote video connection to prepare for a graphical installation of the operating system.
    b. Proceed to the section titled "Installing Linux (Console Installation)" on page 72 to install a Linux operating system over the serial console.

ESTABLISHING THE BMC REMOTE VIDEO CONNECTION

Establishing a virtual video connection over the BMC controller is necessary to perform a graphical installation of the chosen operating system either directly, or over a network.

1. Connect a CAT5e RJ45 cable to either RJ45 port on the VSSEP1EC Server Module operator panel. The RJ45 ports provide network access to the BMC WebUI and are identified in Figure 6.6.

Figure 6.6 RJ45 port on server's operator panel

2. Connect the opposite end of the cable to the appropriate port on the local PC.
3. Proceed to access the BMC WebUI to graphically install the operating system.

Accessing the BMC WebUI

The BMC WebUI is used to launch the JAVA™ console, which provides a graphical interface necessary to install most operating systems.

Replace the "***BMC-IP-Address***" using the actual address for the BMC IP.

1. From the PC, open a web browser and navigate to the following URL. (Use https for a secure login.)

   https://<*BMC-IP-Address*>

2. The BMC WebUI login dialog box displays as shown in Figure 6.7 on page 70.

	NOTE: The screen captures presented here are indicative of what displays upon logging on to the BMC WebUI. The information may differ slightly depending on the operating system, chosen browser, and server configuration.

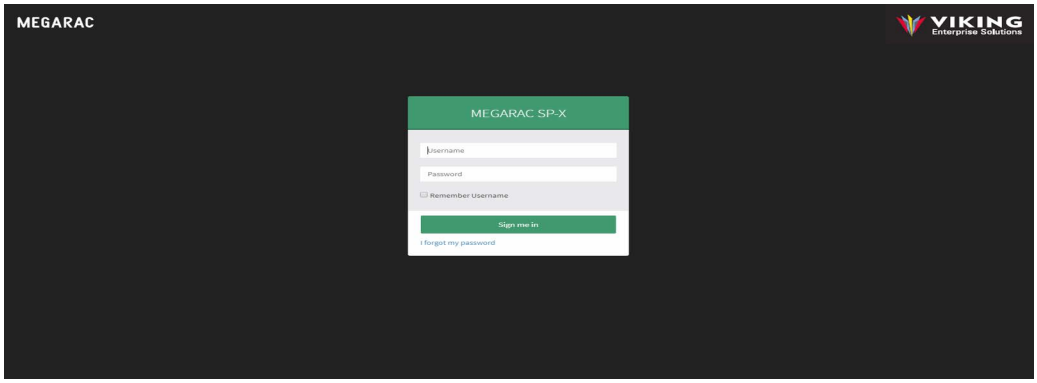


Figure 6.7 BMC WebUI login screen

3. Log on to the software. Type the standard login, **admin**, for both the Username and Password fields.
4. The BMC WebUI **Dashboard** is automatically displayed as shown in Figure 6.8. Click **Remote Control** from the main menu.

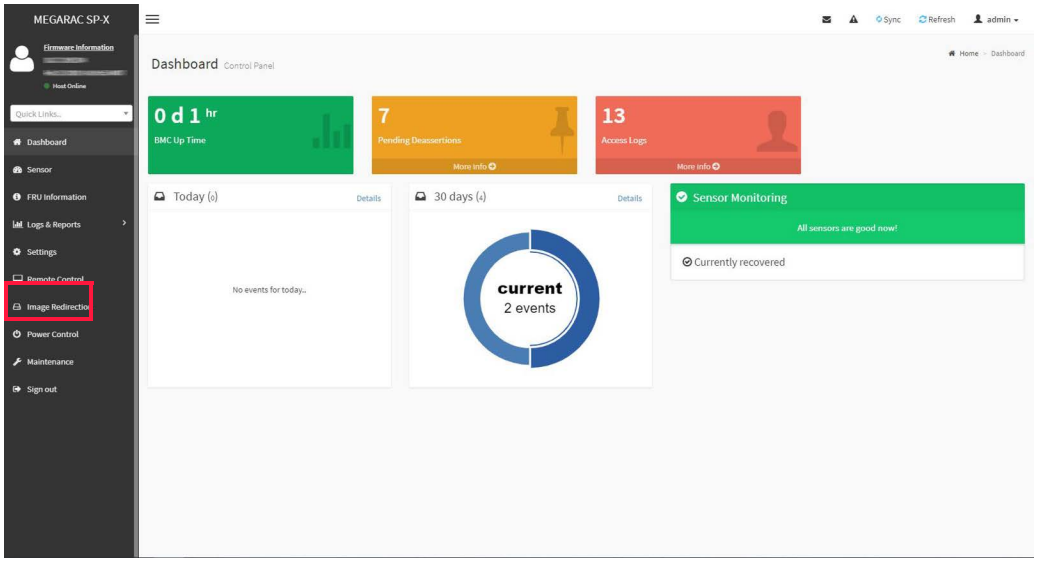


Figure 6.8 BMC WebUI Dashboard

5. Select **Launch JViewer**. **Open with: Java™ Web Start Launcher** (default) is automatically selected as shown Figure 6.9 on page 71. Click **OK** to proceed.

	NOTE: These screen shots provide examples of possible dialog boxes and may differ depending on the JAVA version installed and/or the web browser in use.

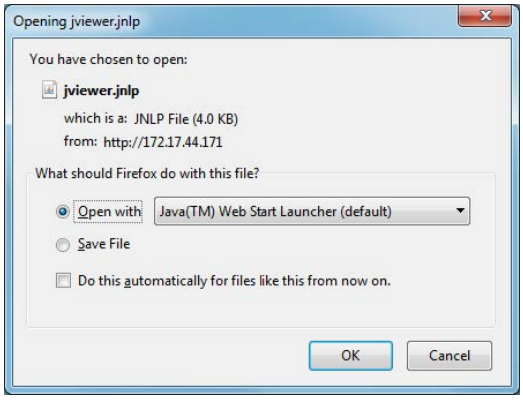


Figure 6.9 Opening JAVA

6. Depending on the chosen browser, a security warning may appear as displayed in Figure 6.10, which asks if the user wants to run the JViewer application

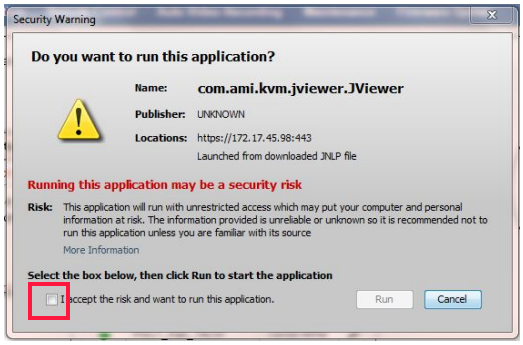


Figure 6.10 Security warning

7. Select **I accept the risk and want to run this application**, and then click **Run**. JViewer displays the command prompt.
8. BMC video console connection is established. Proceed to the appropriate graphical operating system installation instructions that follow.

Operating System Installation

The VSSEP1EC Server Module provides industry-standard CPU resources and runs standard operating systems, such as Windows Server 2012 and a variety of Linux platforms.

INSTALLING THE OPERATING SYSTEM

The upcoming section includes basic installation instructions for a Linux operating system or Windows Server 2012, which are representative of many installation procedures.

To obtain additional information or assistance with the operating system installation, refer to “Customer Support” on page 208 for instructions on contacting a Viking Enterprise Solutions support representative.

Linux Operating Systems

Linux operating system installation instructions are provided for both graphical and console installation methods.

Installing Linux (Graphical Installation)

The Linux operating system installation is straightforward. Consult the operating system’s documentation for graphical installation procedures.

CAUTION: Contact a Viking Enterprise Solutions support representative to verify the chosen Linux operating system prior to installation.

Installing Linux (Console Installation)

This section describes how to install a typical Linux operating system over a serial console using the terminal emulator application. Though the instructions pertain to a specific Linux version, they are representative of many Linux platforms.

CAUTION: Contact a Viking Enterprise Solutions support representative to verify the chosen Linux operating system prior to installation.

1. The terminal emulator application window should still be active in the BIOS and positioned at the **Save & Exit** tab. If the terminal emulator application is not currently running, reestablish a connection and follow the instructions provided for “Accessing the BIOS” on page 64.

Refer to “Establishing Server Console Access” on page 61 for instructions on installation and setup of the terminal emulation program.

NOTE: Connect a USB keyboard directly to the server’s USB port to simplify setup. Some of the keystrokes, such as **Ctrl**+**Alt**+**Delete**, are easier to enter using an external keyboard rather than the terminal emulation program.

2. From the **Save & Exit** tab, arrow down to the **Boot Override** section, and then select the appropriate USB drive or CD-ROM containing the preloaded Linux operating system image.

NOTE: The characters typed do not display in the terminal emulation window; however, the operating system’s installer program still recognizes and responds to them. If the installer program does not respond, press the <**space bar**> before the console line when typing the command.

3. Press the up arrow key to select **Save Changes and Reset**, and press <**Enter**> to reset the server system.
4. In the terminal emulator window, the first screen of the Linux installer appears as shown in Figure 6.11 on page 73. Continue through the screens, following the online instructions to complete the operating system installation.

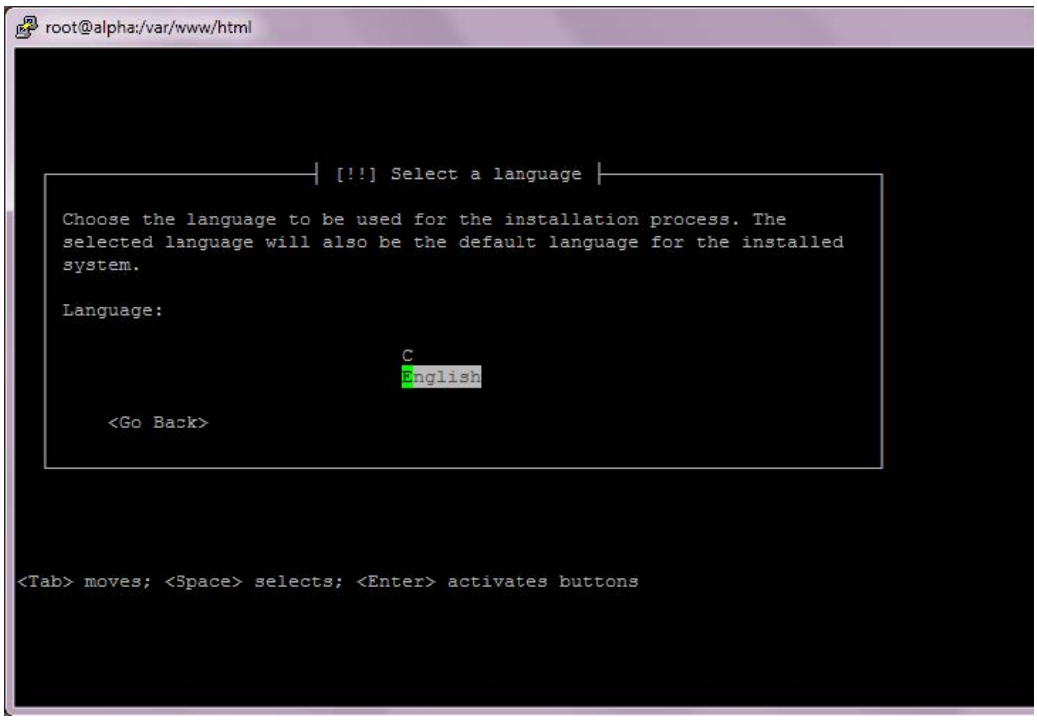


Figure 6.11 Linux installation screen

Windows Server 2012 Operating System

These instructions guide the user in installing the Windows Server 2012 operating system.

> **CAUTION:** Contact a Viking Enterprise Solutions support representative to verify any other Windows operating systems prior to installation.

Windows Server 2012 (Graphical Installation)

Use these steps to install Windows Server 2012 from a bootable USB drive or CD ROM.

1. Return to the JAVA console window in the BMC WebUI, and then follow steps 1a through 1e to access BIOS.

NOTE: Connect a USB keyboard directly to the server's USB port to simplify setup. Some of the keystrokes, such as **Ctrl**+**Alt**+**Delete**, are easier to enter using an external keyboard rather than the terminal emulation program.

a. Follow the instructions provided for "Accessing the BMC WebUI" on page 69. If the JAVA console window is still active, skip this step.

b. From within the BMC WebUI, select the **Remote Control** tab and follow the prompts to reset the server.

c. As the server reboots, BIOS messages begin to appear in the JAVA console window.

d. Press the <**Esc**> or <**F7**> key repeatedly when the logo displays during boot to interrupt the boot process and enter the BIOS setup utility.

e. A line of text displays at the bottom of the screen to advise the user that they are entering the BIOS setup mode. If the BIOS has an administrator or limited user password set, the **Password** dialog box will appear. Type the password to proceed into the BIOS setup utility.

- If both the administrator and limited user passwords are set, one of the passwords must be entered correctly to enter BIOS setup.
- If only the administrator password is set, any user may enter BIOS setup by leaving the password field blank and pressing <**Enter**>. This user is then logged into the BIOS as a limited user instead of as an administrator. Only administrators have access to configurable options.

f. The BIOS **Main** tab opens automatically. (Refer to Figure 6.3 on page 66 for a screen capture of the BIOS Main tab.)

g. Press the right arrow to navigate to the **Save & Exit** tab.

NOTE: If the terminal emulation program does not respond, connect a USB keyboard to one of the server's USB ports and repeat steps 1b through 1f to interrupt the boot process and enter the BIOS setup.

2. From the **Save & Exit** tab, arrow down to the **Boot Override** section, and then select the appropriate bootable USB drive or CD-ROM containing the preloaded Windows Server 2012 operating system image.

NOTE: The characters typed do not display in the terminal emulation window; however, the operating system's installer program still recognizes and responds to them. If the installer program does not respond, press the <**space bar**> before the console line when typing the command.

3. Press the up arrow key to select **Save Changes and Reset**, and then press <**Enter**> to reset the server system.

4. Windows® Installer launches. Follow the on-screen instructions in the JAVA console window to install the Windows Server 2012 operating system.

IPMI SOL (OPTIONAL)

IPMI SOL is an optional method of establishing a serial console connection to enable the console installation of a Linux operating system onto the server and is used instead of a terminal emulator program. IPMItool is open source and information on its use is available online. IPMI SOL allows the user to install the operating system through the use of IPMItool commands.

NOTE: The user must have IPMItool installed on the local PC for the appropriate operating system to use IPMI SOL.

Beginning a IPMI SOL session on the PC:

1. Access the IPMItool directory.
2. Type the following command to obtain the BMC IP address.

   ipmitool lan print

3. Type the following command from the command prompt at the IPMItool directory.

   ipmitool -I lanplus -H bmc_ip_addr -U admin -P admin sol activate

Replace the "***bmc_IP_addr***" using the actual address for the BMC IP.

4. The IPMI SOL session initiates on the local PC.
5. Follow the instructions provided to install the Linux operating system via a serial console.

Refer to the section titled "Installing Linux (Console Installation)" on page 72 for instructions on installing Linux through an IPMI SOL session.

Completing an IPMI SOL session:

Once the Linux operating system is installed, end the IPMI SOL session.

1. Type the following command to disconnect the IPMI SOL session (including the period):

   ~.

2. The IPMI SOL session ends. Close the IPMItool window.

Server Firmware Updates

Occasionally, it may be necessary to update the BIOS, BMC, and FPGA firmware when new releases become available. These procedures guide the user in updating the storage enclosure firmware, both remotely and locally.

> **CAUTION:** Only update firmware on one server at a time. Confirm that the updated server is functioning properly before updating any remaining server.

UPDATING THE BIOS

Viking Enterprise provides the tools necessary for updating the system BIOS in the field. Contact a Viking Enterprise Solutions support representative to obtain the necessary updates and the release notes, which include detailed installation instructions.

Refer to the section titled “Customer Support” on page 208 for instructions on contacting a Viking Enterprise Solutions customer support representative.

UPDATING THE BMC

The BMC is the center of the IPMI architecture, which functions independently of the operating system and manages the monitoring and recovery interface between the system’s firmware and hardware. Stored on a 128 MB SPI flash on the server module baseboard, the BMC boot drive image is updated using one of the methods described as follows.

- BMC WebUI
- YAFUFlash

Detailed instructions to update the BMC remotely using either of these methods are available in the release notes that accompany the update. Contact a Viking Enterprise Solutions support representative to obtain the necessary updates and the release notes, which include detailed installation instructions.

Refer to the section titled “Customer Support” on page 208 for instructions on contacting the customer support department.

UPDATING THE FPGA

FPGA firmware are typically performed in one of two ways: automatically during the BIOS firmware update process or via an independent update. Refer to the release notes accompanying the firmware files for more information or contact a customer support representative for assistance.

Chapter 7

Monitoring the VSS2249RQ Storage Server

The VSS2249RQ Storage Server provides the flexibility to enable users to customize the behavior of many of the system LEDs using IPMI commands. This chapter discusses the programmable and self-driven LEDs and provides suggestions for programming LED behavior. Additionally, the BMC WebUI provides access to system monitoring tools.

NOTE: VES offers assistance with using IPMI commands to program LED behavior in the document titled, “VSS2249RQ Management Over IPMI,” which is available for download. Contact a VES support representative (see page 208) to obtain the secure login and password to access the VES Online Document Library.

LEDs

LEDs are available for the following components:

- System Status
- FRUs
  - Drive Carrier Assemblies
  - Fans
  - PMs
  - Server Module Operator Panel

SYSTEM STATUS

Ten programmable status LEDs are located along the top left edge on the front of the enclosure, just above the drive bays. These LEDs do not illuminate on startup until programmed. From the left of the enclosure, the first three LEDs can provide system status. For those FRUs that are not visible from the cold aisle—the fans, server modules, and power modules—the next six LEDs can provide FRU group status and direct the user to the appropriate FRU for further investigation in the event of a fault. The final LED is not currently in use. Figure 7.1 on page 78 provides a close-up view of these LEDs.

Figure 7.1 Enclosure status LEDs

Figure 7.2 demonstrates the location of each LED available for system status running from the left to the right.

Figure 7.2 Illuminated system status LEDs

One example of system status LED behavior is outlined in Table 7.1.

Description	LED Color	Behavior
#1: Chassis Identify	Blue	**ON**: The enclosure is receiving an identify command. **OFF**: The enclosure is not receiving an identify command.
#2: Chassis Fault	Amber	**ON**: One or more components within the enclosure have experienced a fault requiring a service action. **OFF**: No detectable faults are present in the enclosure.
#3: Chassis Power OK	Green	**ON**: The enclosure is powered on and operating correctly. **OFF**: The enclosure is not powered on.

Table 7.1 System status LED behavior

Description	LED Color	Behavior
#4 Server Fault	Amber	**ON**: One or more server modules have experienced a fault requiring a service action.
#5 Servers OK	Green	**ON**: Both server modules are powered on and operating correctly.
#6 Fan Fault	Amber	**ON**: One or more fan modules have experienced a fault requiring a service action.
#7 Fans OK	Green	**ON**: All fan modules are powered on and operating correctly.
#8 PM Fault	Amber	**ON**: One or more power modules have experienced a fault requiring a service action.
#9 PMs OK	Green	**ON**: Both power modules are powered on and operating correctly.
#10 Not in Use	N/A	N/A

Table 7.1 System status LED behavior (cont.)

DRIVE CARRIER ASSEMBLIES

Each drive carrier assembly includes one set of LEDs that are visible from the bottom of the drive carrier. On system startup, the green LED illuminates automatically. Behavior for the left blue identify LED is programmable. The right bi-color green/amber LED is self-driven and behavior may not be changed. The location of the drive status LEDs is shown in Figure 7.3 that follows.

Figure 7.3 Drive carrier LEDs

An example of drive identify LED behavior is outlined in Table 7.2.

Description	LED Color	Behavior
Identify (Left)	Blue	**ON**: The SSD has been identified. **OFF**: The SSD has not been sent an identify command.

Table 7.2 Drive identify LED

The behavior of the self-driven drive carrier LEDs is described in Table 7.3.

Green LED	Amber LED	Behavior
ON*	**OFF**	SSD activity has been detected. There are no detectable faults.
OFF	**OFF**	There is no SSD activity.
OFF	**ON**	The SSD has experienced a fault. A service action is required.
OFF	**Blinking ~1 Hz**	The SSD is attempting to link
OFF	**Blinking ~2 Hz**	The SSD has failed to link as Gen 3 x4

Table 7.3 Self-driven drive carrier LED behavior

*. This LED may be reversed or absent depending on the manufacturer and SSD in use. Consult the drive manufacturer documentation for the self-driven LED behavior.

FANS

The VSS2249RQ Storage Server includes three programmable LEDs with each of the six fan modules. The available LEDs are blue, amber, and green. On system startup, the green LED is illuminated automatically until reprogrammed. Figure 7.4 on page 81 provides an illustration of the illuminated LEDs.

Figure 7.4 Fan LEDs

One example of LED behavior is provided in Table 7.4.

Blue	Amber	Green	Behavior
OFF	**OFF**	**ON**	The fan module is functioning properly.
OFF	**ON**	**OFF**	A fan module fault has been detected.
ON	**OFF**	**ON**	The fan is being sent an identify command.

Table 7.4 Fan LED behavior

PMS

The PM LEDs are self-driven and the LED functionality and location may vary based on the PSU manufacturer and model; therefore, refer to the manufacturer's data sheet for LED location and behavior. The power status LEDs are visible from the rear of the enclosure. Figure 7.15 provides a close-up of the typical PSU LED location.

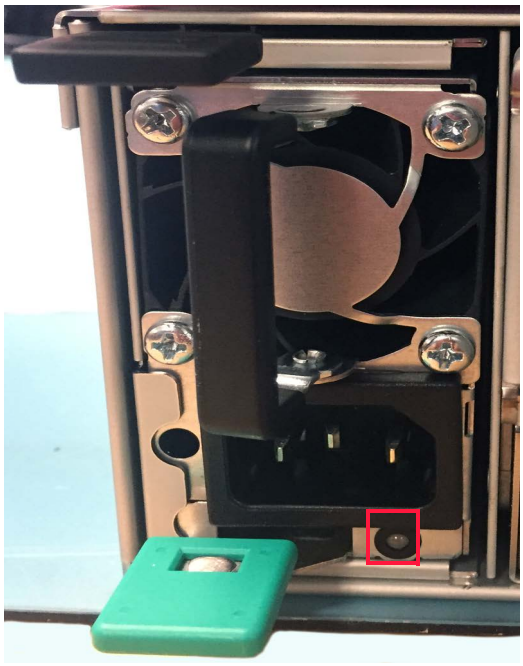


Figure 7.5 PM LED

Delta DPS-1600EB

A bi-color LED is provided to indicate the PM status as outlined in Table 7.5.

Green LED	Amber LED	Behavior
OFF	**OFF**	No AC power to all PMs.
OFF	**ON**	PM critical event causing a shutdown. Also indicates the power cord is unplugged.
OFF	**Blinking 0.5 Hz**	PM hi-temp, hot spot temp, slow fan, high current, or high power warning. PM continues to operate.
Blinking 0.5 Hz	**OFF**	AC present, 12V standby **ON**/PSU **OFF**, or PSU in smart redundant state.
ON	**OFF**	PM **ON** and **OK**.
OFF	**ON**	AC power cord unplugged.

Table 7.5 DPS-1600EB PM LEDs

Green LED	Amber LED	Behavior
Blinking 2.0 Hz	**OFF**	Firmware update mode.

Table 7.5 DPS-1600EB PM LEDs (cont.)

3Y YSEF-1600AM

A bi-color LED is provided to indicate the PM status as outlined in Table 7.6.

Green LED	Amber LED	Behavior
ON	**OFF**	PM **ON** and **OK**.
OFF	**OFF**	No AC power to all PMs.
OFF	**ON**	PM critical event causing a shutdown. Also indicates the power cord is unplugged.
OFF	**Blinking 1.0 Hz**	PM hi-temp, hot spot temp, slow fan, high current, or high power warning. PM continues to operate.
Blinking 1.0 Hz	**OFF**	PM standby state. AC present, 12V standby **ON**. PM is in cold standby state or always standby state.
Blinking 2.0 Hz	**OFF**	Firmware update mode.

Table 7.6 YSEF-1600AM LEDs

Gospower G1136-1600WNA

A bi-color LED is provided to indicate the PM status as outlined in Table 7.7 that follows.

Green LED	Amber LED	Behavior
ON	**OFF**	Output **ON** and **OK**.
OFF	**OFF**	No AC power to all PMs.
Blinking 1.0 Hz	**OFF**	AC is present, only 12V SB **ON**. PM is **OFF** or in **Smart On** state.
OFF	**ON**	AC cord is unplugged or AC power is lost. Second PM still has AC power input. Also indicates a PM critical event causing a shutdown due to fail, OVP, fan fail.
OFF	**Blinking 1.0 Hz**	PM hi-temp, hot spot temp, slow fan, high current, or high power warning. PM continues to operate.
Blinking 2.0 Hz	**OFF**	Firmware update mode.

Table 7.7 G1136-1600WNA LEDs

SERVER MODULE OPERATOR PANEL

The VSSEP1EC Server Module includes three programmable status LEDs located on the bottom of the server module operator panel and two self-driven NIC LEDs to the right of the server status LEDs. Until programmed, the green “Server OK” LED illuminates on system startup.

The add-in card LEDs vary from manufacturer and may or may not be available, depending on the card and system configuration chosen. LED locations are identified in Figure 7.6.

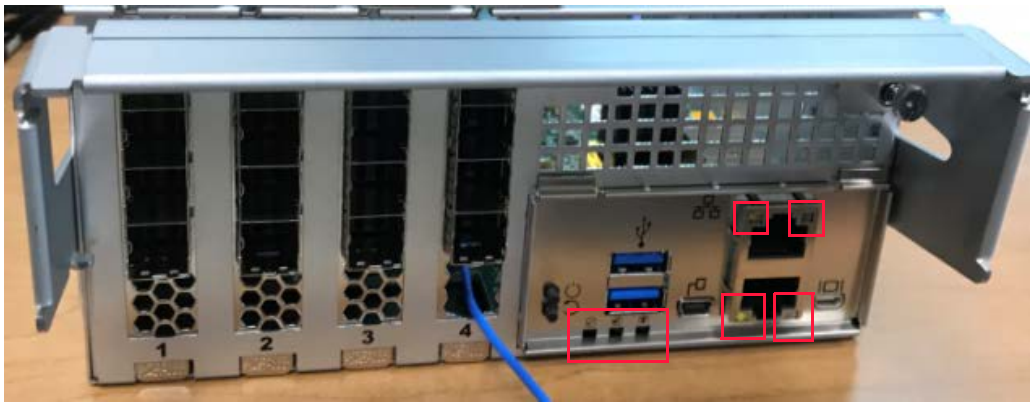


Figure 7.6 Server module LED locations

Figure 7.7 provides a close-up of the server module LED locations.

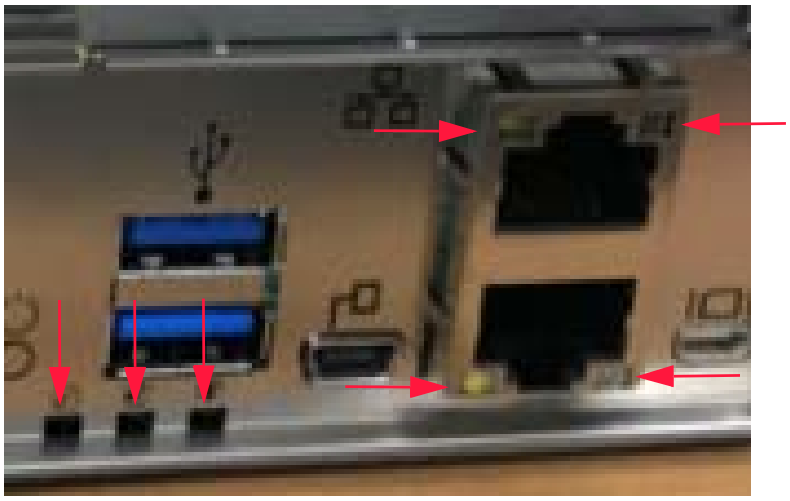


Figure 7.7 Server module LEDs

Server Module Status

Possible server module status LED behavior is exampled in Table 7.8.

Green	Blue	Amber	Behavior
ON	**OFF**	**OFF**	The server module has booted and is operating normally. A service action is not allowed.
OFF	**OFF**	**ON**	A server module fault has been detected.
OFF	**ON**	**OFF**	The server module is being sent an identify command.
OFF	**Blinking ~1 Hz**	**OFF**	A service action is allowed

Table 7.8 Potential server module status LEDs

NIC Status

The 10GbE ports on the rear of each server module are standard RJ45-style connector. The self-driven green LEDs indicate link and speed. The amber LEDs indicate link activity. A close-up of the LEDs is shown in Figure 7.7 on page 84 and Figure 7.8 below.

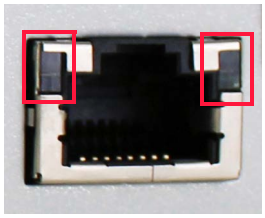


Figure 7.8 Ethernet LEDs

The NIC LED functionality is outlined in Table 7.9.

Left LED	Right LED	Description
OFF	**OFF**	No link.
Amber	Green	Link at 100 Mb
Green	Green	Link at 1000 Mb
Blinking	Blinking	Indicates Ethernet link activity.

Table 7.9 NIC LEDs

BMC WebUI

The VSSEP1EC Server Module provides a variety of system tools to monitor system health. These tools are available using the BMC WebUI utility, which provides the user with remote BMC access and BIOS management.

SYSTEM MONITORING VIA THE BMC WEBUI

The BMC WebUI is a built-in web server that provides access to a variety of information and controls, such as:

- At-a-glance sensor health
- BMC Ethernet network configuration
- FRU data contents (also available using **ipmi fru print** command)
  - Drive-specific information is not available using IPMI
- Detailed sensor information, including error thresholds
  - All customer-defined sensor thresholds are set through IPMI commands
- BMC system event logs
- Remote power control (even if the host is shut down)
- Remote graphical console redirection using keyboard, video, and mouse (iKVM)
- Remote BMC firmware updating

NOTE: To access the BMC WebUI, a video connection is required.

For instructions on setting up a video connection, refer to the section titled "Establishing The BMC Remote Video Connection" on page 68 of Chapter 6.

Accessing the BMC WebUI

These instructions offer a brief overview of functionality available in the BMC WebUI, along with sample screen captures. The information on these screens may vary depending on the enclosure, server configuration, operating system, and selected web browser.

Replace the "***BMC-IP-Address***" using the actual address for the BMC IP.

1. Point a web browser (e.g. Microsoft Edge®, Chrome®, etc.) to:

   https://<*BMC-IP-Address*>

2. The BMC WebUI login screen displays as shown in Figure 7.9 on page 87.

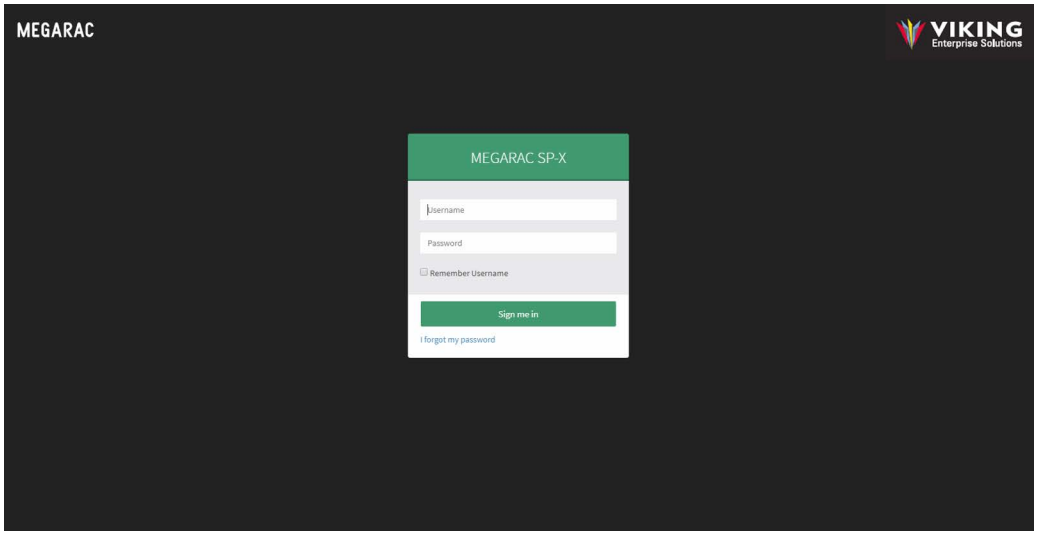


Figure 7.9 MegaRAC® BMC WebUI login

3. Log on to the software. Type the standard credentials, **admin**, for both the **Username** and **Password** fields, and click **Login**.
4. The BMC WebUI automatically displays the **Dashboard** tab as shown in Figure 7.10. Device, network, sensor monitoring, and event log information is presented.

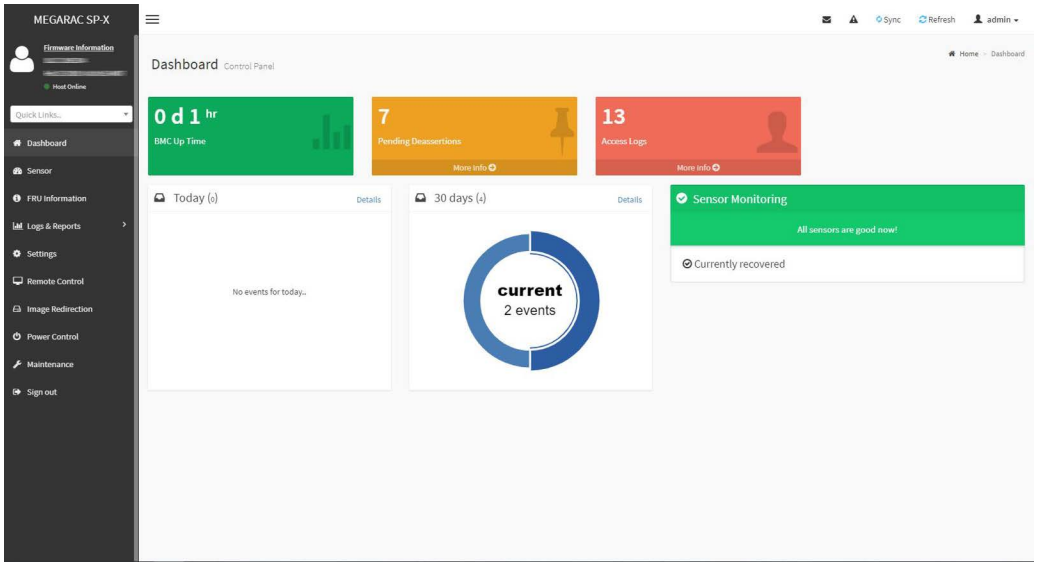


Figure 7.10 Dashboard menu

5. Select the **Sensor** menu to view the current and discreet system sensors. The **Sensor** menu is shown in Figure 7.11 on page 88.

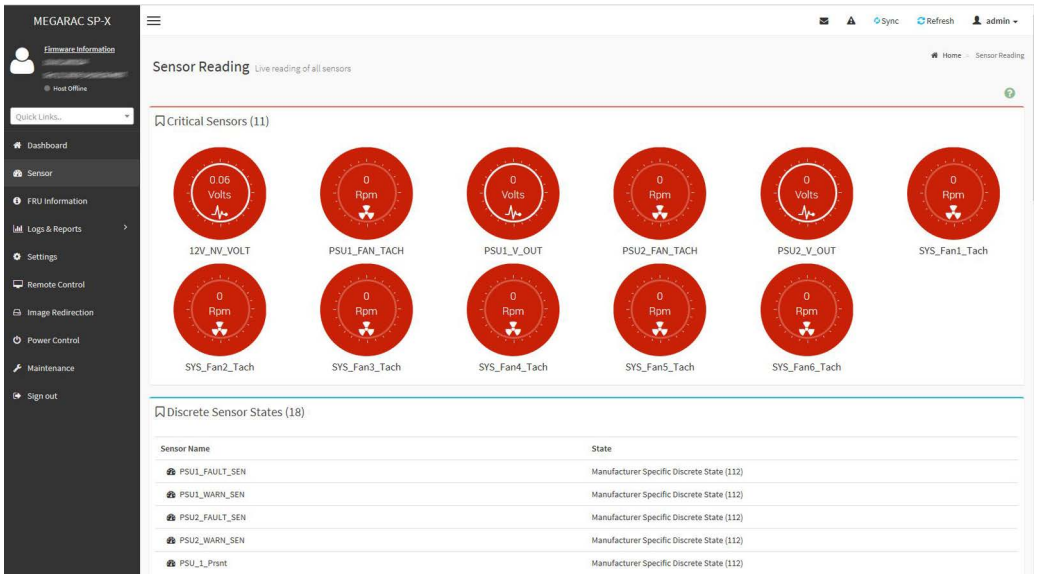


Figure 7.11 Sensor menu

6. Click **FRU Information** to view the chassis, board, and product information related to the selected FRU device as shown in Figure 7.12.

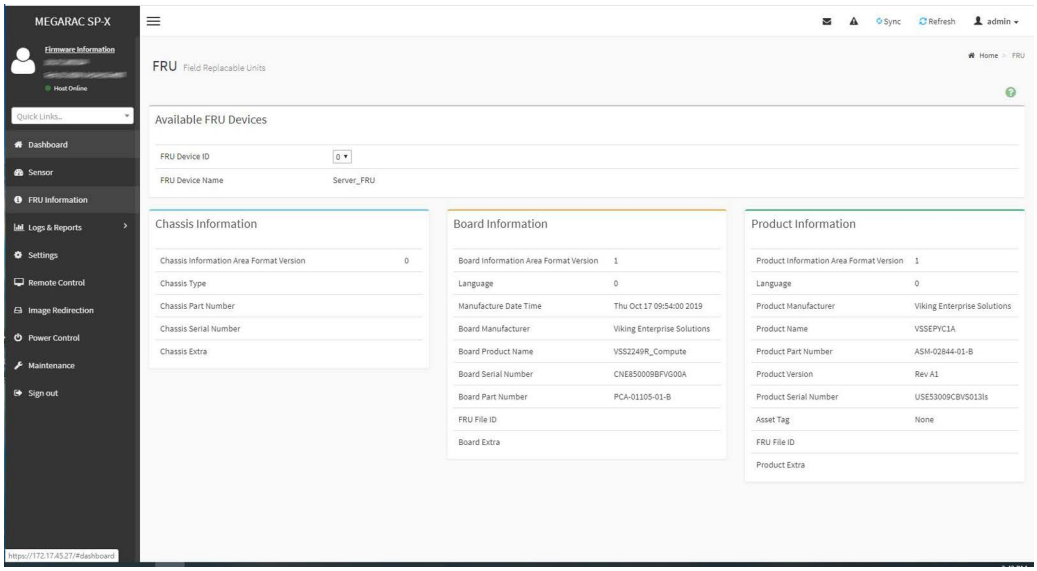


Figure 7.12 FRU Information menu

7. The Logs & Reports menu enables the user to view logs for IPMI events, system events, audits, and video as shown in Figure 7.13 on page 89.

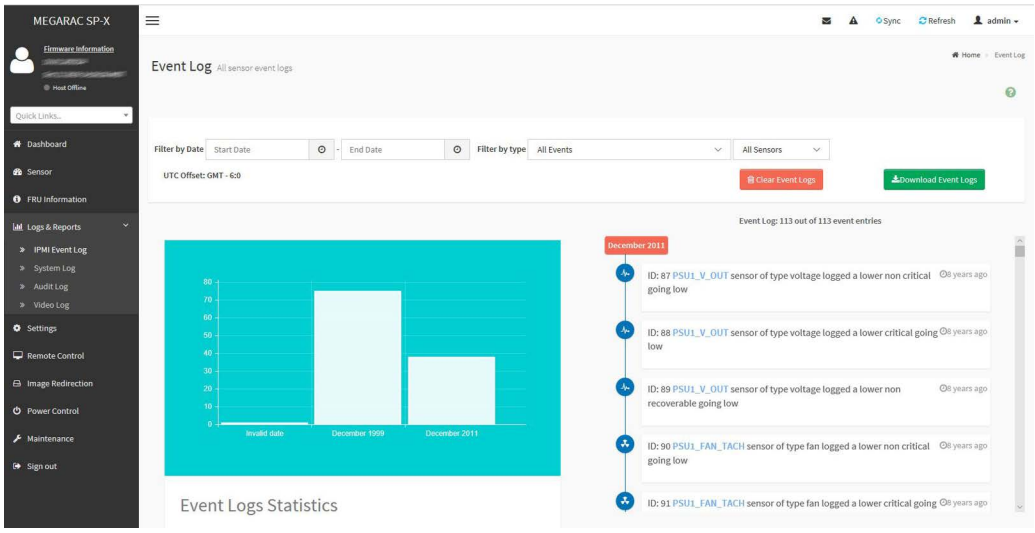


Figure 7.13 Logs & reports

8. The **Settings** menu enables the user to define network settings, virtual media, etc. Figure 7.14 displays the list of available configuration options.

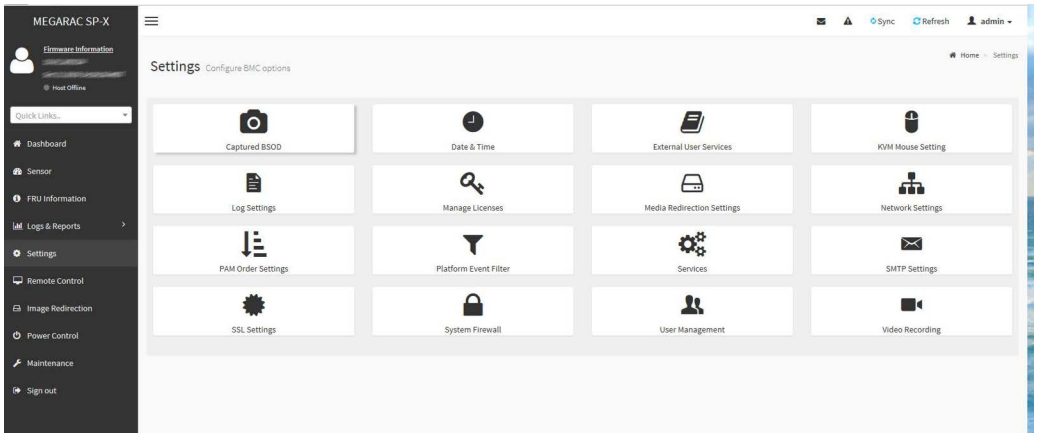


Figure 7.14 Settings menu

9. Click **Remote Control** to access the JAVA console or H5Viewer. Figure 7.15 on page 90 provides a close-up of the Remote Control menu.

Figure 7.15 Remote control menu

10. **Image Redirection** provides users and administrators with the ability to mount a remote disk image to the server and install software, operating systems, files, BIOS images etc. Refer to Figure 7.16 to view the image redirection menu.

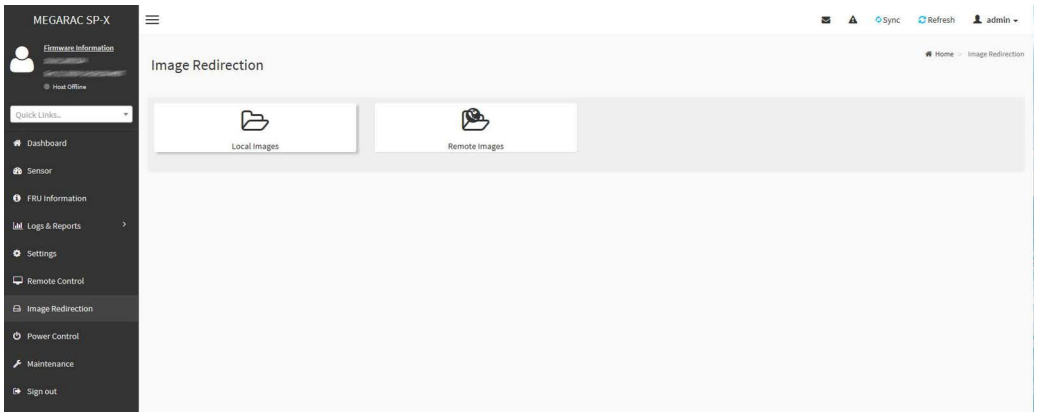


Figure 7.16 Image redirection menu

11. **Power Control** enables users to control server power, but providing options to power off, power on, power cycle, hard reset, and ACPI shutdown as shown in Figure 7.17 on page 91.

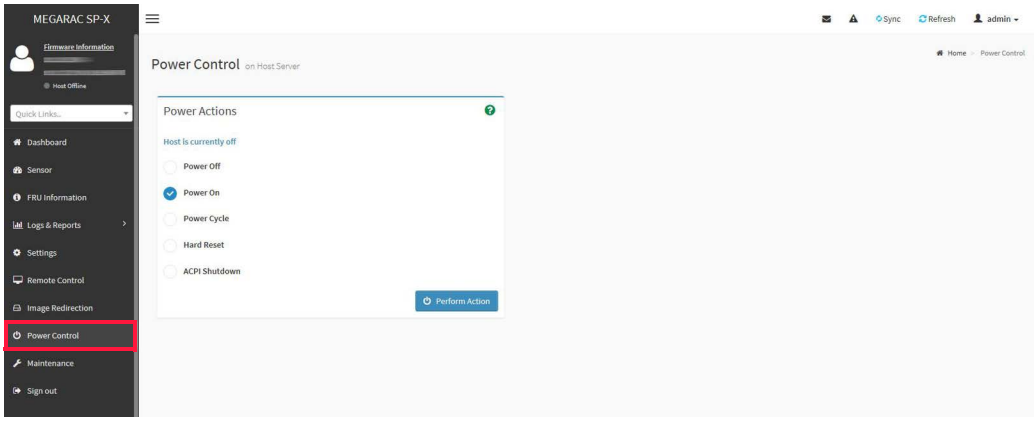


Figure 7.17 Power Control menu

12. Select **Maintenance** to access options to back up the current configuration, identify the firmware image location, view firmware information, and update the current firmware version. The user may also restore configuration settings and obtain access to the password change functionality. Maintenance options are displayed in Figure 7.18.

⚠	**CAUTION:** Contact a VES customer support representative for instructions on accessing the latest firmware updates and the corresponding release notes containing firmware installation instructions prior to selecting **Firmware Update** in the BMC WebUI

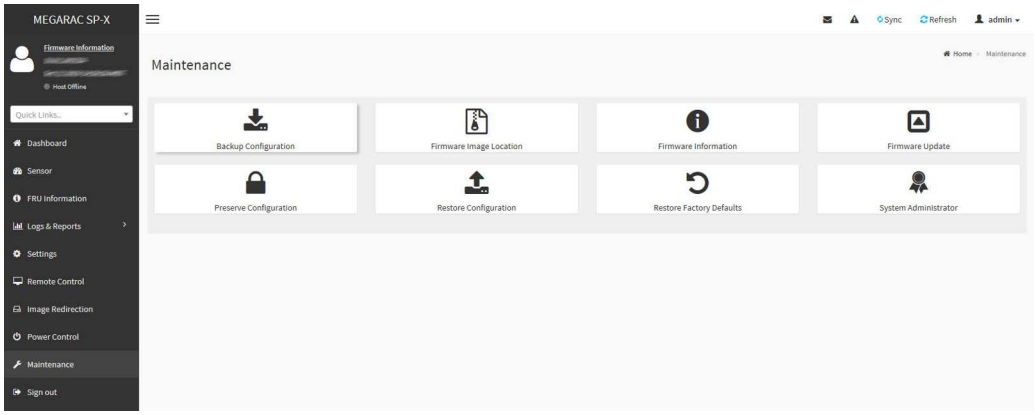


Figure 7.18 Maintenance menu options

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Chapter 8

System Maintenance

System maintenance typically includes the upgrade or replacement of hot-swappable FRU components installed in the VSS2249RQ Storage Server. This chapter provides the necessary steps to prepare for a service action and includes instructions for the replacement of the following components:

- Drives
- Fan Modules
- Power Modules
- Server Modules

WARNING: Only skilled persons having the relevant education or experience in the various energies and energy magnitudes used in this equipment, or persons who are instructed or supervised by such a skilled person, should operate, install, or handle the VSS2249RQ Storage Server, the VSSEP1EC Server Modules, or any of the system components.

Preparing for a Service Action

Read all of the instructions provided in this chapter prior to commencing with any service action on the VSS2249RQ Storage Server. Contact support with questions on replacing or upgrading a component—including verification that a replacement component is compatible with the system—and for assistance in purchasing the necessary replacement components and accessories.

ESD-SENSITIVE DEVICE. Only install the device on a properly grounded electrostatic discharge (ESD) protection surface to avoid damage to the components. Always utilize a properly grounded ESD wrist strap or mat during operation or installation of the device, or when connecting the cables.

Refer to Chapter 7 titled “Monitoring the VSS2249RQ Storage Server” that begins on page 77 for information on the system and FRU LEDs.

SERVICE ACTION PREPARATION

These instructions guide the user through the steps necessary to prepare for a service action, which consists of reviewing product safety requirements, locating the service label, and ensuring the appropriate tools are on hand.

System Safety & Handling

Review the product safety supplement provided on page xxiii prior to commencing with any service action. Each section in this chapter provides additional safety precautions. Make note of these warnings, cautions, and notes to ensure user safety and system longevity.

Locating the Service Labels

This section identifies the purpose and location of each of the following labels:

Dual Cord Warning Label

The two dual cord warnings ensure user safety by reminding the user to remove both power cords—one from each PM—prior to commencing with service actions that require system power to be shut down. This label is located on the rear of the enclosure.

Figure 8.1 Dual cord warnings

Regulatory Label

The regulatory label identifies system compliance with different regulatory agencies (such as ROHS, WEEE, and UL), and may also contain various country marks as well. Additional certifications may be added without notice. The regulatory label is located on top of the right side of the chassis (as viewed from the front), closest to the drives.

Serial Number & Product Number Label

Serial and product numbers are required to obtain an RMA from the Viking Enterprise Solutions support department. The serial number and product number label is on the front right chassis rack ear. A second label is located on the side of each server module. The serial and product numbers are also located on the regulatory label.

Required Tools

- Phillips screwdriver (drive replacement only)

Removing the Optional Bezel

Drive access or enclosure extension on the rails requires the removal of the optional front bezel. Figure 8.2 shows a rendering of the optional bezel design.

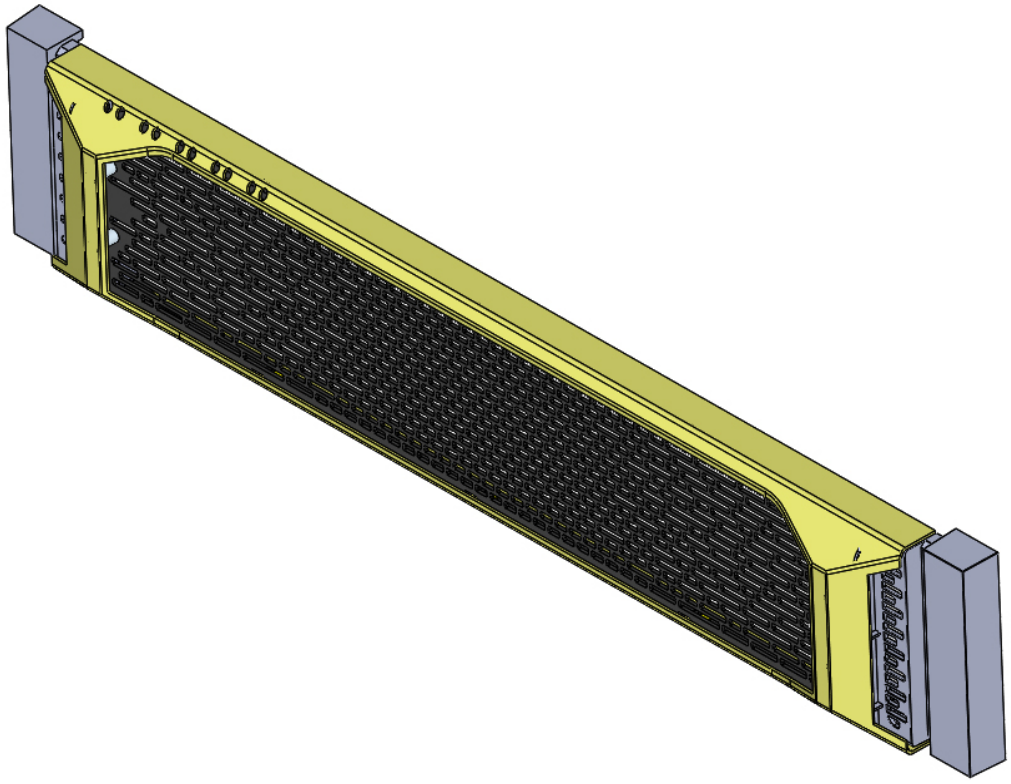

Figure 8.2 Optional bezel

Bezel Removal

1. Slowly pull the bezel partially out of the left side of the left rack ear. The stud will release from the retention clip inside the left side of the bezel cover. Refer to Figure 8.3 on page 96.

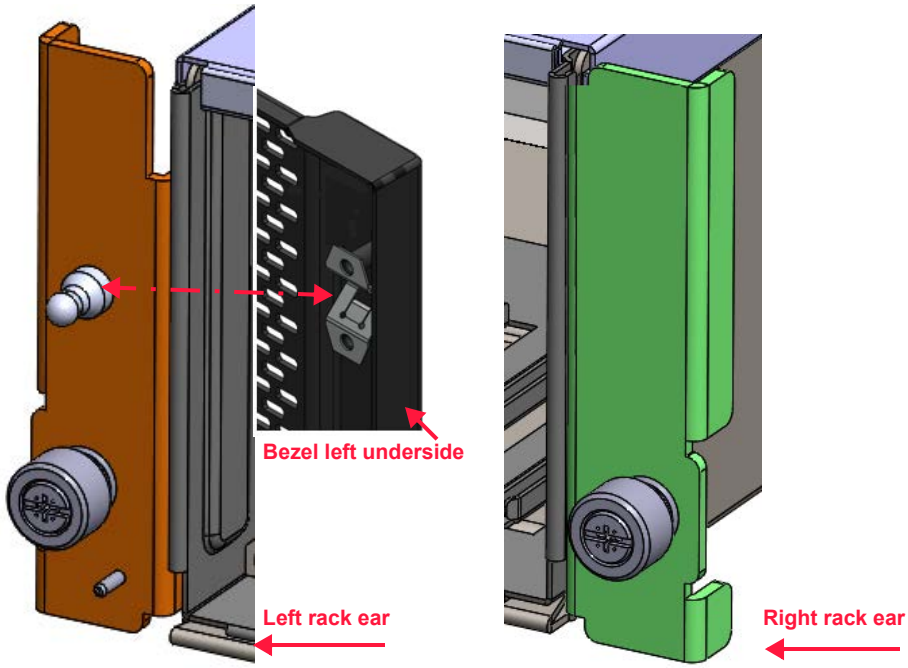

Figure 8.3 Bezel removal

2. Slide the two retention tabs out of the slots in the top of the right rack ear identified in Figure 8.3.
3. Lift the bezel away from the enclosure.

Enclosure Extension

Replacing system fan modules requires that the enclosure is extended from the rack in the serviceable position. The hot-swappable PMs and server modules are hot aisle service items and do not require the enclosure to be extended from the rack for service.

If replacing a PM or server module, skip this section and proceed to page 98 for instructions on releasing the CMA.

HEAVY OBJECT: This system weighs approximately **56.2 pounds (25.5 kilograms)** when all 24 drives, two PMs, and two server modules are preinstalled. To prevent personal injury and equipment damage, always obtain assistance during rack installation and when sliding the system in or out of the rack.

TIPPING HAZARD—Prevent instability and hazardous conditions due to uneven loading by installing heavier items into the bottom of the equipment rack and lighter items into the top.

Perform the following steps to extend the enclosure from the rack into the serviceable position.

1. Follow the procedure to prepare for the service action by removing the optional bezel as outlined on page 95. If a bezel is not installed, skip this step.
2. Loosen the left and right shipping screws that secure the enclosure to the rack posts. Refer to Figure 8.4 for guidance.

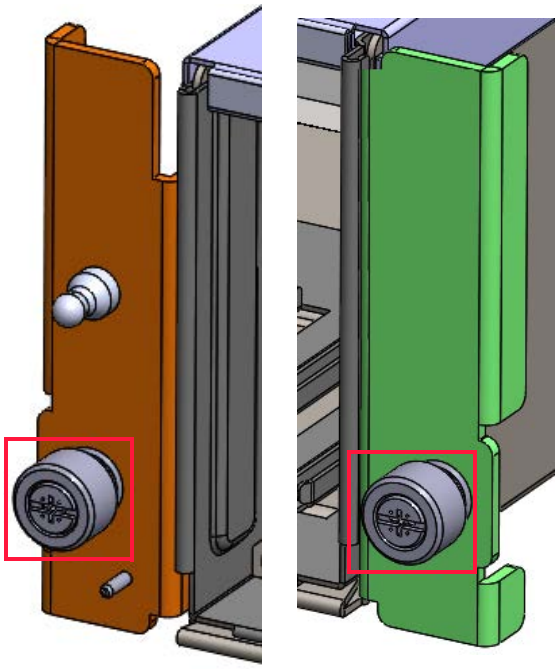

Figure 8.4 Shipping screws

3. Grab the rack ears (shown in Figure 8.5) on the front left and right sides of the enclosure front.

Figure 8.5 Rack ears

4. Slowly pull the enclosure completely forward until it locks into the serviceable position, which is accompanied by an audible click.
5. The enclosure is extended into the serviceable position. Proceed to the appropriate section to replace the fan modules.

If replacing a system fan, proceed to page 105 for fan module replacement instructions.

Releasing the CMA

Releasing the appropriate side of the CMA is necessary when performing a hot aisle service action in order to access the PMs and server modules.

	NOTE: The photographs showing overall views of the CMA in this chapter show the CMA mounted in a test rack and are for purposes of illustration only. They are not intended to represent the CMA in an actual VSS2249RQ configuration.

	NOTE: The photographs illustrating the following procedures show the CMA body connector on the left side of the enclosure and the CMA arm connectors on the right side of the enclosure as seen from the hot aisle. As noted in Chapter 4, “Installing the Enclosure Into a Rack,” that begins on page 27 of this User Guide, the CMA may also be installed with the body connector on the right and the arm connectors on the left. The procedures for releasing the CMA are the same in either case.

Releasing the CMA - Body Side

Figure 8.6 provides a close-up of the outside of the CMA body release button, and identifies the CMA body connector and the CMA body rail connector referenced in this procedure.

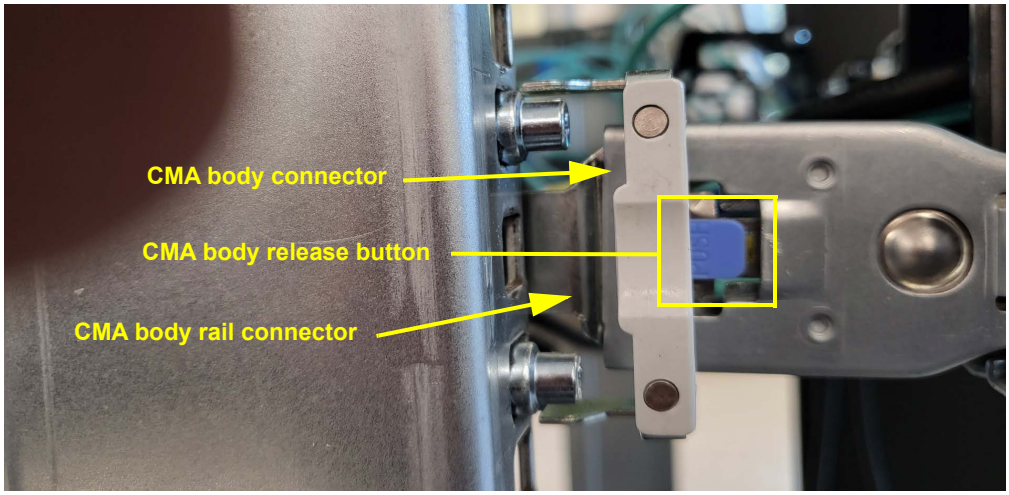

Figure 8.6 CMA body side components

To review the CMA components, refer to the section titled “Cable Management Hardware” that begins on page 45 of Chapter 4.

1. Open the cable retaining clips on the section of the CMA arm closest to the server and lift the cables out of the clips (see Figure 8.7).

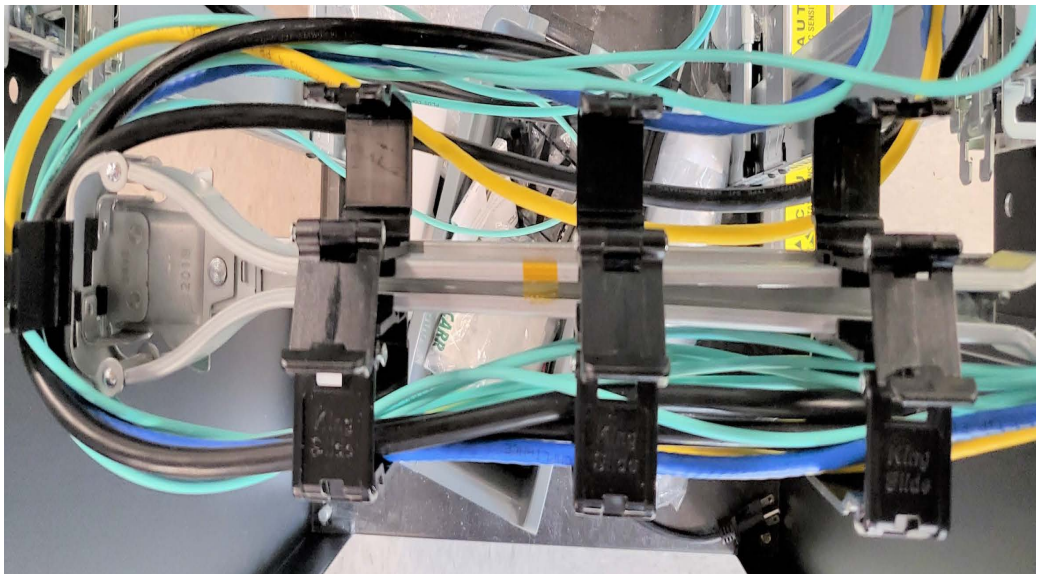

Figure 8.7 Cables removed from retaining clips

2. Pull the CMA body connector off of the CMA body rail connector.
3. Swing the CMA arm outward, as shown in Figure 8.8.

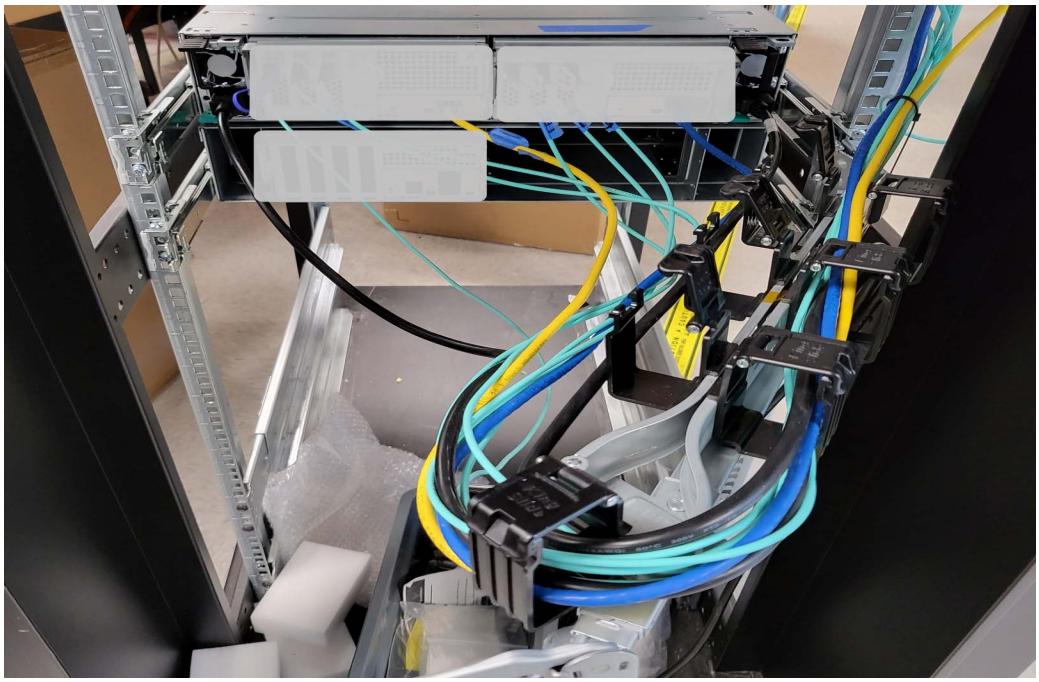

Figure 8.8 CMA body side cleared

The body side of the CMA is cleared. Proceed to the appropriate FRU section that follows to replace the server module or PM.

If replacing a PM, proceed to page 107 for PM replacement instructions.

If replacing a server module, proceed to page 110 for server module replacement instructions.

Releasing the CMA - Arm Side

Figure 8.9 provides a close-up of the outer CMA arm release button, and identifies the outer CMA arm connector and the outer CMA rail connector referenced in this procedure.

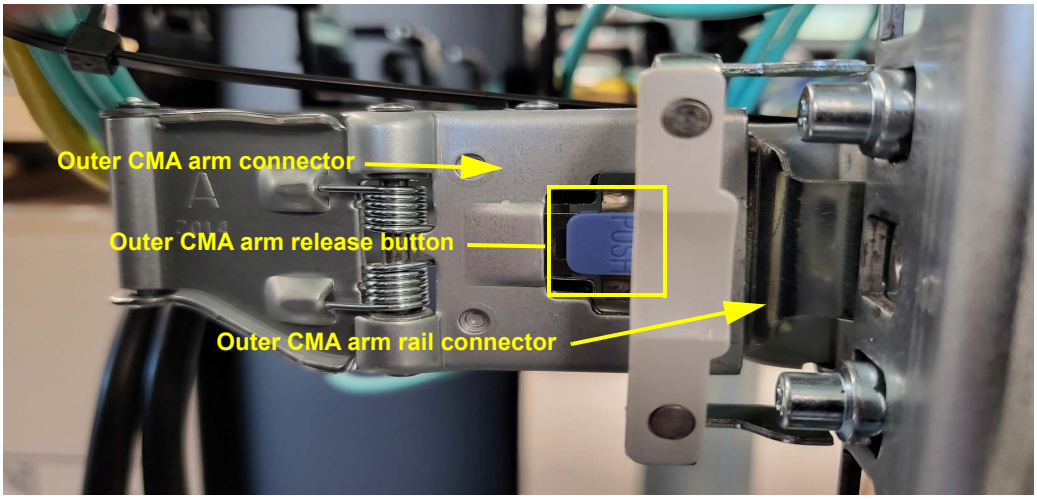

Figure 8.9 CMA outer arm components

Figure 8.10 provides a close-up of the inner CMA arm release button, and identifies the inner CMA body connector and the inner CMA rail connector referenced in this procedure.

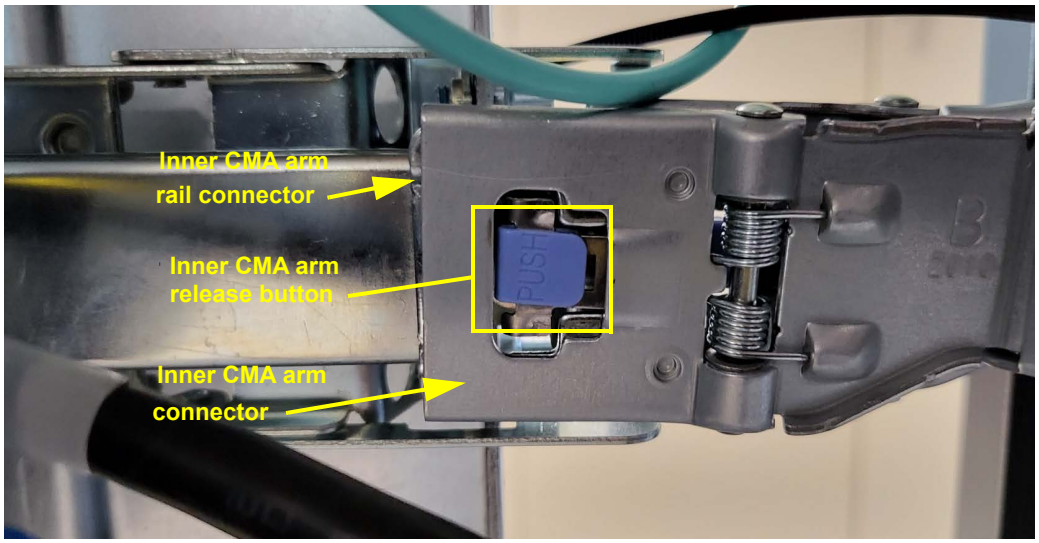

Figure 8.10 CMA inner arm components

To review the CMA components, refer to the section titled “Cable Management Hardware” that begins on page 45 of Chapter 4.

1. Open all of the cable retaining clips on the CMA arm and lift the cables out of the clips.
2. Press and hold the outer CMA arm release button.
3. Pull the outer CMA arm connector off of the outer CMA arm rail connector.
4. Press and hold the inner CMA arm release button.
5. Pull the inner CMA arm connector off of the inner CMA arm rail connector.
6. Swing the CMA arm outward, as shown in Figure 8.11.

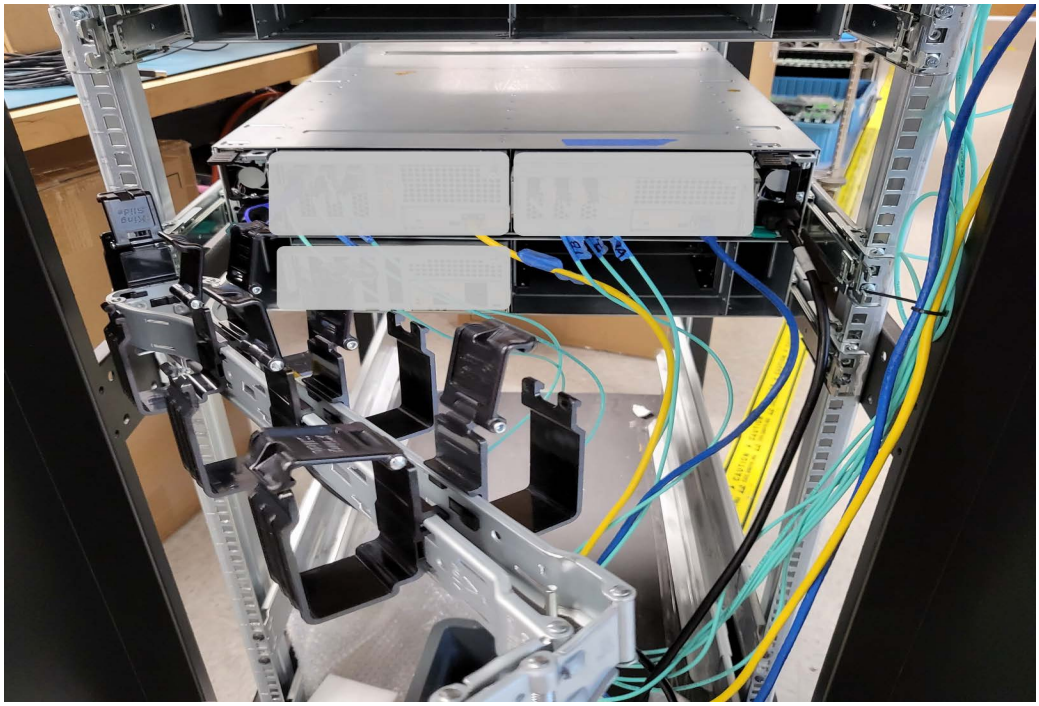

Figure 8.11 CMA arm side cleared

The CMA arm is cleared. Proceed to the appropriate FRU section that follows to replace the server module or PM.

Replacing FRUS

Replacing the FRUs in the VSS2249RQ Storage Server is a nearly tool-less process; only a screwdriver is necessary when replacing a drive. Contact a Viking Enterprise Solutions support representative to obtain the replacement components or to verify a specific replacement component is compatible with the system.

DRIVES

The VSS2249RQ Storage Server supports 24 U.2 (SFF8639) NVMe SSDs. Drives may be dual or single ported; however, single ported drives report only to Server Module 1 (on the left as viewed from the enclosure rear). Drives are hot-swappable. Drive replacement is a cold aisle service action. Shutting down the system to replace a drive is not necessary; however, verify no data transactions are taking place before hot-swapping any of the NVMe drives.

Drive Mapping and Zoning Review

Drives are mapped according to their location within the enclosure. Each drive is numbered from 1 through 24. While facing the front of the enclosure, numbering begins with Drive 1 in the first slot on the left, and then increases incrementally from left to right.

For more information on drive numbering, refer to the section titled “Drive Numbering & Zoning” on page 26 of Chapter 3.

Drive Carrier Assemblies

A drive carrier assembly is comprised of the drive or drive blank and a drive carrier, and are utilized to provide for controlled insertion into, and extraction from, the storage enclosure. Drive carrier assemblies are installed via the front of the enclosure, which simplifies service access. Closing the drive carrier handle ensures complete seating of the connectors through typical operational shock and vibration.

All 24 drive bays must be filled with drive carrier assemblies—each containing either a drive or drive blank—to ensure proper airflow and system cooling. Figure 8.12 provides a close-up view of a drive carrier assembly with a preinstalled NVMe SSD.

Figure 8.12 Drive carrier assembly

Replacing a Drive or Drive Carrier

The following instructions guide the user in replacing a drive or drive carrier. Figure 8.13 demonstrates drive carrier assembly removal from (or insertion into) the storage enclosure.

Figure 8.13 Drive carrier assembly access

⚠	**CAUTON:** Viking Enterprise Solutions recommends that drives have a minimum of two hours to acclimate to room temperature prior to installation in the enclosure.
⚠	**CAUTION:** Completely filling all 24 drive bays with drive carrier assemblies is required to ensure proper system cooling. Contact a Viking Enterprise Solutions sales representative for assistance in obtaining the appropriate drive blank(s) for the system.

1. Identify the drive or drive carrier requiring replacement.

Refer to Chapter 7 titled “Monitoring the VSS2249RQ Storage Server” that begins on page 77 for information on identifying the drive that requires replacement.

2. Ensure no data transactions are occurring on the drive or drive carrier being replaced.
3. Verify the necessary service action preparation was performed to remove the bezel as outlined on page 95. If no bezel is installed, skip this step.

⚠	**CAUTION:** When hot-swapping any device, the replacement must be completed within **five (5)** minutes to maintain proper system airflow and cooling. If a replacement will take longer than five minutes, install a drive carrier containing a drive blank to prevent thermal damage to the system.
⚠	**ESD-SENSITIVE DEVICE**. Only install the device on a properly grounded electrostatic discharge (ESD) protection surface to avoid damage to the components. Always utilize a properly grounded ESD wrist strap or mat during operation or installation of the device, or when connecting the cables.

✎	**NOTE:** In a remove/replace action, make note of the location of each carrier containing a drive prior to removal. This is especially important if the drives contain data and the system has a zoned configuration.

4. Press the release catch on the drive carrier in the direction of the arrow to open the handle as identified in Figure 8.13 on page 103. The cam releases from the locked position.

Figure 8.14 Open carrier handle

5. Lift the carrier handle fully open as shown in Figure 8.14 and gently begin to partially remove the drive carrier from the drive bay by pulling the middle of the handle. Use care to avoid damaging the release latch, also identified in Figure 8.14.
6. Grab the carrier frame below the release handle and pull the drive carrier assembly completely out of the drive bay.
7. Place the drive carrier assembly on an anti-static surface.
8. Remove the two screws that secure the drive to the drive carrier assembly. Review Figure 8.15 for the location of the screws.

Figure 8.15 Drive carrier assembly screw location

9. Slide the drive toward the drive carrier handle to disengage the drive from the carrier.

⚠	**CAUTION:** Use care when removing and installing the drive to avoid damage to the LED light pipe, which is exposed along the side of the drive carrier. (see Figure 8.14 on page 104)

10. Lift the drive up and away from the drive carrier.
11. Either place the existing drive in a new drive carrier, or a new drive in the existing drive carrier, and align the carrier connectors with those on the bottom of the SSD.
12. Slide the drive into the carrier until the connectors engage.
13. Secure the drive to the carrier using the two screws previously removed in step 8.

CAUTION: Only torque screws to 4–6 in-lbs (.045-.068 Nm). Over-torqued screws can damage the drive carrier.

14. Ensure the carrier handle is in the fully open position as shown in Figure 8.14 on page 104.
15. Grab the frame just below the carrier handle and gently push the drive carrier assembly into the drive bay until the carrier handle engages.
16. Press the release handle downward until the release latch (identified in Figure 8.14 on page 104) connects with the release catch and the drive carrier assembly cams into place.
17. Ensure that the drive carrier assembly is properly installed fully inside the drive bay so that it is flush with the face of the enclosure.
18. Repeat steps 4 through 17 for any remaining drives.
19. Follow the instructions provided on page 117 to complete the service action and return the bezel to the front of the enclosure. If no bezel is installed, skip this step.
20. Drive and/or drive carrier replacement is complete.

FAN MODULES

The storage enclosure includes six fan modules. Should a fan fail, replace the fan module as per the following instructions.

1. Complete all steps outlined in the section titled “Removing the Optional Bezel” that begins on page 95. If a bezel is not installed, skip this step.
2. Complete all steps outlined in the section titled “Enclosure Extension” that begins on page 96.
3. Lift the fan module cover on the top of the enclosure to expose the fan module cavity as shown in Figure 8.16.

Figure 8.16 Fan module cavity

4. Squeeze the locking tab on each side of the defective fan module. The locking tabs are shown in Figure 8.17.

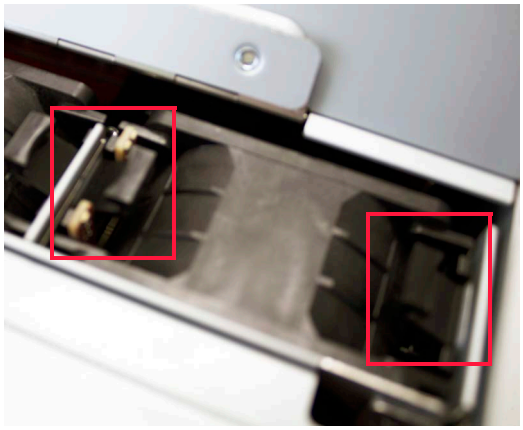

Figure 8.17 Fan module locking tabs

5. Lift the defective fan module up and out of the slot as shown in Figure 8.18 on page 107.

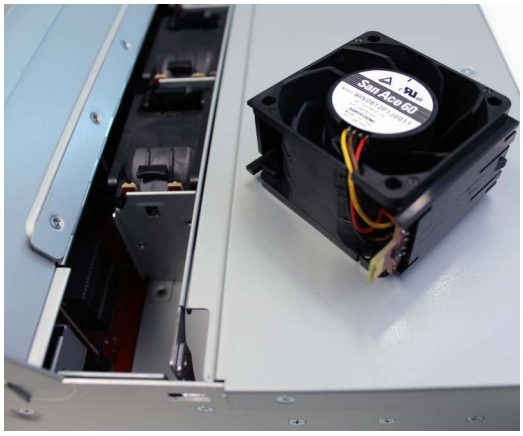

Figure 8.18 Fan removal

6. Insert the replacement fan module in the same orientation as the removed fan module, with the fan connector on the left while facing the front of the enclosure.
7. Follow the procedures outlined in the section titled “Returning the Enclosure to the Rack” on page 116.
8. Follow the instructions provided in the section titled “Returning the Optional Bezel” that begins on page 117 to complete the service action. If a bezel is not installed, skip this step.
9. Fan module replacement is complete.

POWER MODULES

The N+1 redundant PMs are hot-swappable. A hot aisle replacement, PMs may be replaced while the system is running; completing one PM replacement before replacing the second PM. The PSU is factory-installed inside the power module and is not field-serviceable. The entire power module must be replaced. Extending the enclosure from the rack to replace a PM is not necessary.

Refer to the section titled “Power Modules” that begins on page 3 of Chapter 1 for information on the 1600W PSUs.

Refer to Chapter 5 titled “Powering the VSS2249RQ Storage Server” that begins on page 51 for more information on the system power configuration.

Replacing a PM

⚠	**WARNING:** There is no power switch on this unit. Once the first power cord is connected to an active PDU, the system starts.

	ESD-SENSITIVE DEVICE. Only install the device on a properly grounded electrostatic discharge (ESD) protection surface to avoid damage to the components. Always utilize a properly grounded ESD wrist strap or mat during operation or installation of the device, or when connecting the cables.
	WARNING: While some factory-approved maintenance on FRUs (e.g. hot-swapping a power supply, fan, NVMe drive, or server module) does not require the user to disconnect power to the system, performing other types of maintenance on systems connected to an electrical power supply may result in serious injury or death. Only individuals with knowledge and training in working with devices containing live circuits should operate the system. Take precautions when performing all other types of maintenance. **Disconnect 2 power supply cords before servicing.**

	NOTE: The maximum current draw is listed on each PSU label. For example, if the maximum input for one 1600W PSU is 200–240V ~15A max, this rating is for one PM and there are two PMs per enclosure sharing the load.

1. Follow the appropriate steps to prepare for a service action included in the section “Releasing the CMA” on page 98.
2. Identify the PM requiring replacement. Make note of the following:
   a. If both PMs require replacement and the second PM is operational, follow steps 3 through 10 to replace the first PM, and then repeat these steps to replace the second PM. Shutdown is not required.
   b. If both PMs have faulted, follow proper shutdown procedures (if possible) prior to commencing with PM replacement.

Refer to Chapter 7 titled “Monitoring the VSS2249RQ Storage Server” that begins on page 77 for information on identifying the PM requiring replacement.

3. Unplug the power cord from the PSU jack on the rear of the enclosure—two power cords if replacing both PSUs simultaneously. Refer to Figure 8.19 for the location of the jacks.

Figure 8.19 PSU jacks

4. Press the PM release tab toward the finger handle while simultaneously pulling the finger handle outward to disengage the PM cam. Figure 8.20 on page 109 identifies the release tab and finger handle. Do NOT push the PSU tab.

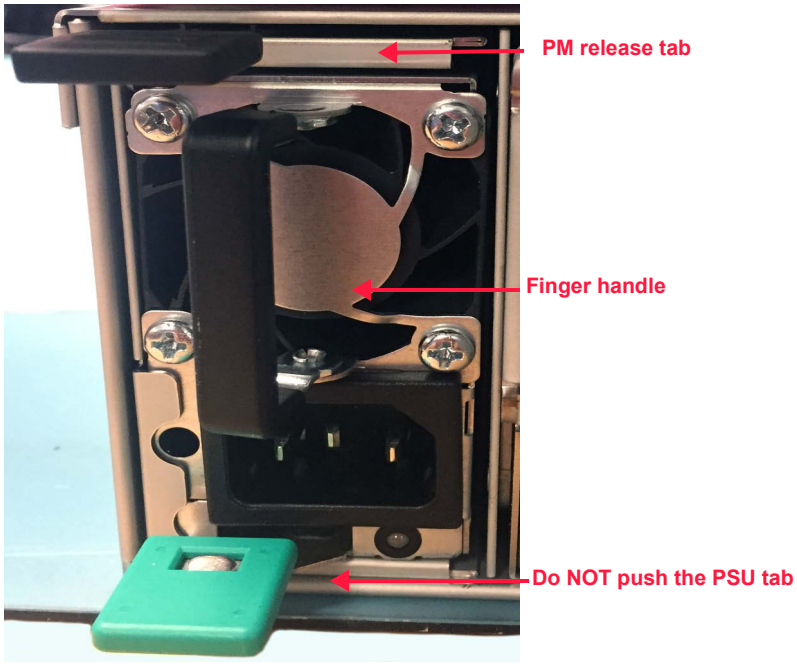

Figure 8.20 PSU removal

5. Using one hand to support the bottom of the PM, let go of the PM release tab and pull the PM completely out of the enclosure by the finger handle.

> **CAUTION:** If both PMs require replacement and the second PM is operational, complete all steps to remove and install the first PM, and then repeat all steps to replace the second PM.

6. Ensure the replacement PM is in the proper orientation with the PM release tab at the top.
7. With one hand supporting the bottom of the replacement PM, insert the PM into the power cavity on the rear of the enclosure.
8. Fully push the PM into the enclosure until the PM release tab engages and the PM cams into place.
9. Test to ensure the PM is properly installed. Pull the finger handle slightly outward to verify the PM is locked in place. If the PM is easily removed from the enclosure without pushing the PM release tab, remove the PM and repeat steps 6 through 8, and then retest the installation.

> **NOTE:** The proper orientation allows the PSU to cam into place once it is fully inserted into the enclosure. If the PSU slides out of the enclosure easily without pressing the release tab, check the orientation and reinsert the PSU into the slot.

10. Choose from one of the following steps, as appropriate:

a. If replacing both PMs at the same time, repeat steps 4 through 9 to replace the second PM.

b. If only replacing one PM, skip this step and continue with step 11.

11. Insert the power cord(s) into the PSU jack(s).
12. Follow the procedures to complete the service action as outlined in the section titled “Returning the CMA” on page 118.
13. PM replacement is complete.

SERVER MODULES

The VSS2249RQ Storage Server supports two VSSEP1EC Server Modules. To replace or upgrade any of the remaining internal server module components, such as an Ethernet add-in card, contact a Viking Enterprise Solutions support representative to request an RMA.

Refer to the section titled “Customer Support” on page 208 for guidance in obtaining an RMA.

ESD-SENSITIVE DEVICE. Only install the device on a properly grounded electrostatic discharge (ESD) protection surface to avoid damage to the components. Always utilize a properly grounded ESD wrist strap or mat during operation or installation of the device, or when connecting the cables.

CAUTION: Hot-swapping any VSSEP1EC Server Module should be completed within five (5) minutes to maintain proper system cooling. If replacement will not completed within five minutes, install a module blank in the empty I/O option slot. Contact a Viking Enterprise Solutions support representative for information on obtaining a server module blank.

Replacing a Server Module

Server modules are located in the hot aisle. Extending the enclosure from the rack to replace a server module is not necessary.

1. Follow the appropriate steps to prepare for a service action included in the section “Releasing the CMA” on page 98.
2. Identify the VSSEP1EC Server Module requiring service.

Refer to Chapter 7 titled “Monitoring the VSS2249RQ Storage Server” that begins on page 77 for information on identifying the server module requiring service.

3. Ensure all transactions have completed on the server module requiring the service action.

4. Remove the cables from their corresponding connectors on the server module operator panel. Label all cables to ensure that each cable is reinstalled in the correct port when service is completed.
5. Loosen the thumbscrew on the top right corner of the server module. The thumbscrew location is pictured in Figure 8.21.

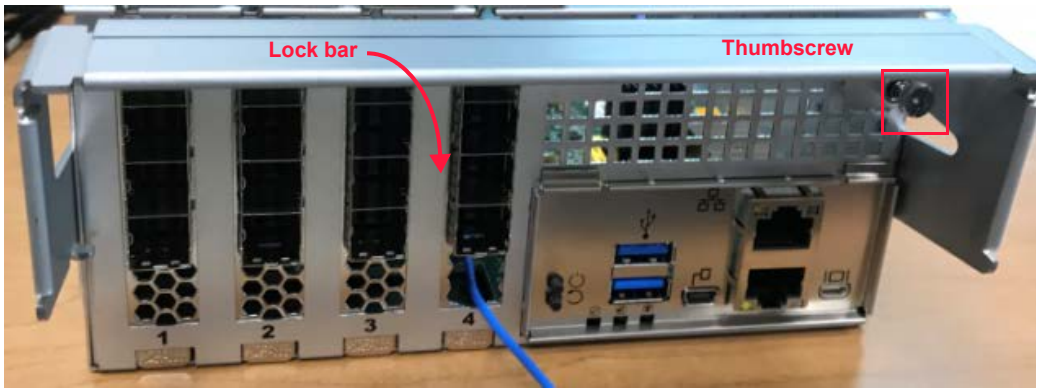

Figure 8.21 Server module thumbscrew and lock bar

6. Pull the lock bar downward to release the cam from the locked position. The lock bar motion is demonstrated in Figure 8.21.
7. With one hand supporting the bottom of the module, grab the lock bar and pull the server module out of the enclosure.

	**ESD-SENSITIVE DEVICE**. Only install the device on a properly grounded electrostatic discharge (ESD) protection surface to avoid damage to the components. Always utilize a properly grounded ESD wrist strap or mat during operation or installation of the device, or when connecting the cables.
	**WARNING:** Install the server module in the correct orientation. Ensure the connector pins in the storage enclosure are straight and ready to align into the connector holes in the server module. Never force the module into the enclosure. If a pin or data connector is damaged, return the system for service. Do NOT attempt to straighten pins as this can cause further damage to the enclosure.

8. Become familiar with the server module connectors. The connectors must align properly so that the module smoothly inserts into the I/O option slot on the rear of the enclosure. Refer to Figure 8.22 on page 112 for a close-up view of the server module connectors.

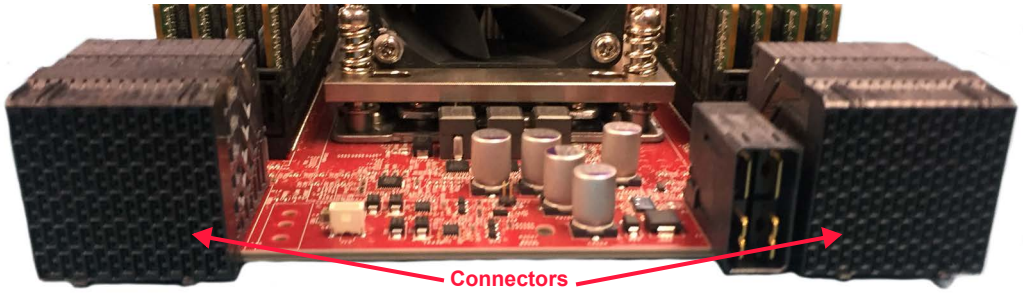

Figure 8.22 Server module connectors

9. Ensure the server module lock bar is in the downward, unlocked position. Refer to Figure 8.21 on page 111 to view the lock bar operation.
10. With one hand supporting the bottom of the server module, fully slide the server module into the appropriate empty I/O option slot on the rear of the enclosure.
11. Push the module into the enclosure until the lock bar engages and the module is flush with the face of the enclosure. Never force the module into place.
12. Push the lock bar upward to cam the server module in place. Lock bar operation is pictured in Figure 8.21 on page 111.
13. Tighten the thumbscrew to secure the module to the enclosure. The thumbscrew locations are pictured in Figure 8.21 on page 111.
14. Connect all cables that were removed earlier into the appropriate ports on the server module operator panel.
15. Perform the required steps to complete the service action as outlined in the section titled “Returning the CMA” on page 118.
16. Server module service is complete.

SERVER MODULE COIN CELL BATTERY

The VSS2249RQ Storage Server features a replaceable coin cell battery mounted in a bracket on the server board. The following procedure assumes that the canister lid has been removed so that the battery slot is accessible.

ESD-SENSITIVE DEVICE. Always use a properly grounded ESD wrist strap or mat and non-conductive tools during removal and replacement of the battery.

CAUTION: Hot-swapping any VSSEP1EC Server Module should be completed within five (5) minutes to maintain proper system cooling. If replacement will not completed within five minutes, install a module blank in the empty I/O option slot. Contact a Viking Enterprise Solutions support representative for information on obtaining a server module blank.

⚠	**CAUTION:** The battery holder is made of plastic and can be loosened or broken if not properly supported. Be sure to use the tools and methods specified in the procedure to avoid damage.

Tools Required

The following tools are required to replace the coin cell battery:

- Non-conductive needle-nose tweezers.
- A non-conductive prober soldering tool

See Figure 8.23 for examples.

Figure 8.23 Tools required for battery replacement

Replacing a Coin Cell Battery

The coin cell battery holder is located near the edge of the server board next to the wall of the canister. To replace the battery follow these steps:

1. Place the prober soldering tool on the server board between the battery holder and the wall of the canister to provide support for the base of the battery holder, as shown in Figure 8.24.

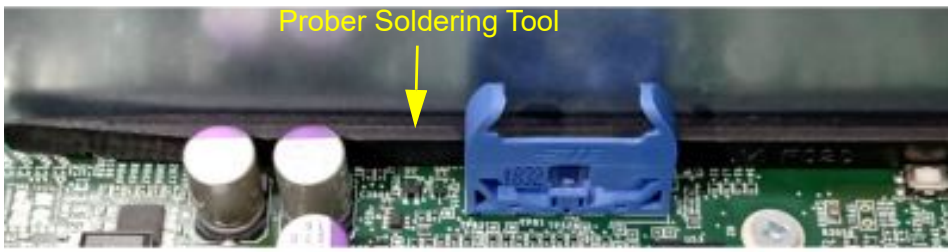

Figure 8.24 Prober soldering tool in place

2. While supporting the top of the battery holder with one hand, use the tips of the tweezers to press the coin cell battery toward the wall of the canister until it is free of the battery holder, as shown in Figure 8.25.

Figure 8.25 Pressing the battery out of the holder

3. Use the tweezers to remove the battery. Dispose of the battery in accordance with local regulations.

4. Use the tweezers to position the bottom of the replacement battery in the bottom of the battery holder, as shown in Figure 8.26.

Figure 8.26 Positioning the replacement battery in the battery holder

5. Using the tweezers, squeeze the battery into the battery holder until the battery clicks into place, as shown in Figure 8.27.

Figure 8.27 Snapping the replacement battery into place

6. Lift out the prober soldering tool.
7. Battery replacement is complete.

Completing the Service Action

These instructions guide the user in completing a service action, to include returning and securing the enclosure to the rack.

CAUTION: This data storage product contains some plastic parts. Recycle all parts in accordance with local regulations.

RETURNING THE ENCLOSURE TO THE RACK

1. With the enclosure in the serviceable position, press the release tab on each inner chassis member rail (shown in Figure 8.28 on page 117) to release the rail from the serviceable position, and simultaneously push the enclosure into the rack.

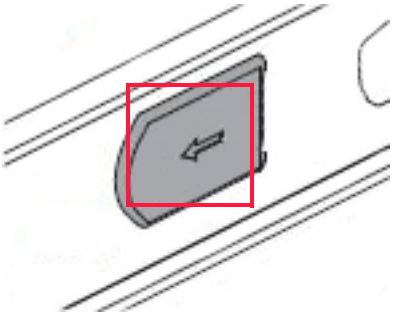

Figure 8.28 Release tab

2. Secure the enclosure to the rack. Tighten the left and right shipping screws on each side of the enclosure as demonstrated in Figure 8.29.

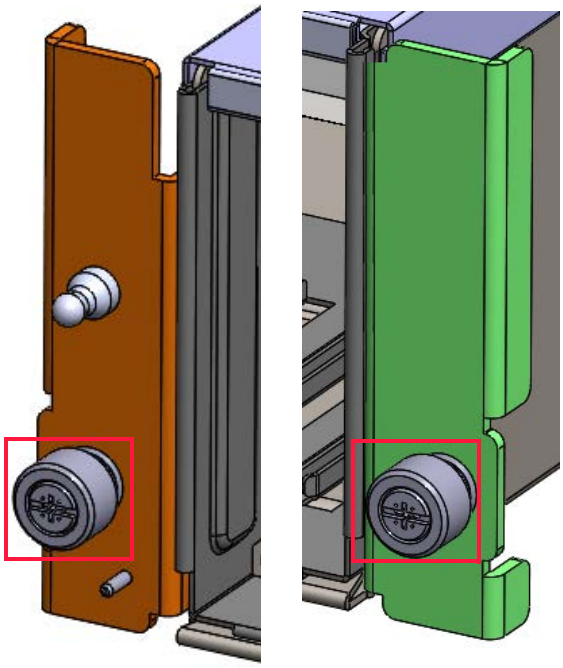

Figure 8.29 Shipping screws

3. Complete the appropriate service action as outlined in the section titled “Returning the Optional Bezel” on page 117. If no bezel is required, skip this step.

RETURNING THE OPTIONAL BEZEL

1. Align the ends of the bezel with the right and left rack ears.
2. Slide the two retention tabs on the underside of the right bezel into the slots in the top of the right rack ear identified in Figure 8.30 on page 118.

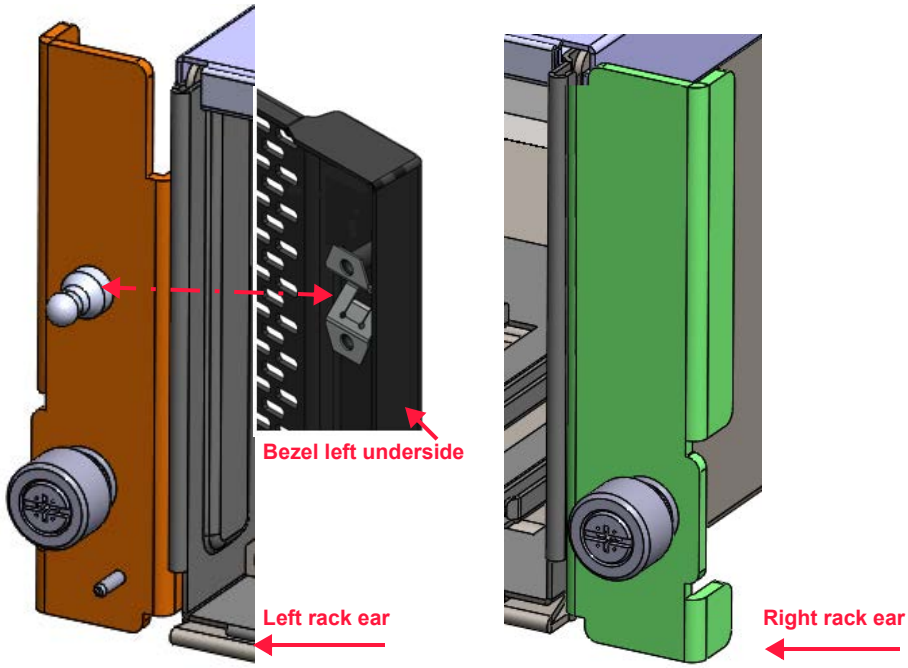

Figure 8.30 Bezel installation

3. Push the bezel into the left side of the left rack ear. The stud should join the retention clip inside the left side of the bezel cover.
4. Bezel installation is complete.

Returning the CMA

Once service actions to the PMs or server modules are completed, return the CMA to its operational position.

Returning the CMA - Body Side

To review the CMA components, refer to the section titled “Cable Management Hardware” that begins on page 47 of Chapter 4.

1. Swing the CMA arm forward to the CMA body side rail.
2. Align the CMA body connector with the CMA body rail connector, as shown in Figure 8.31 on page 119.

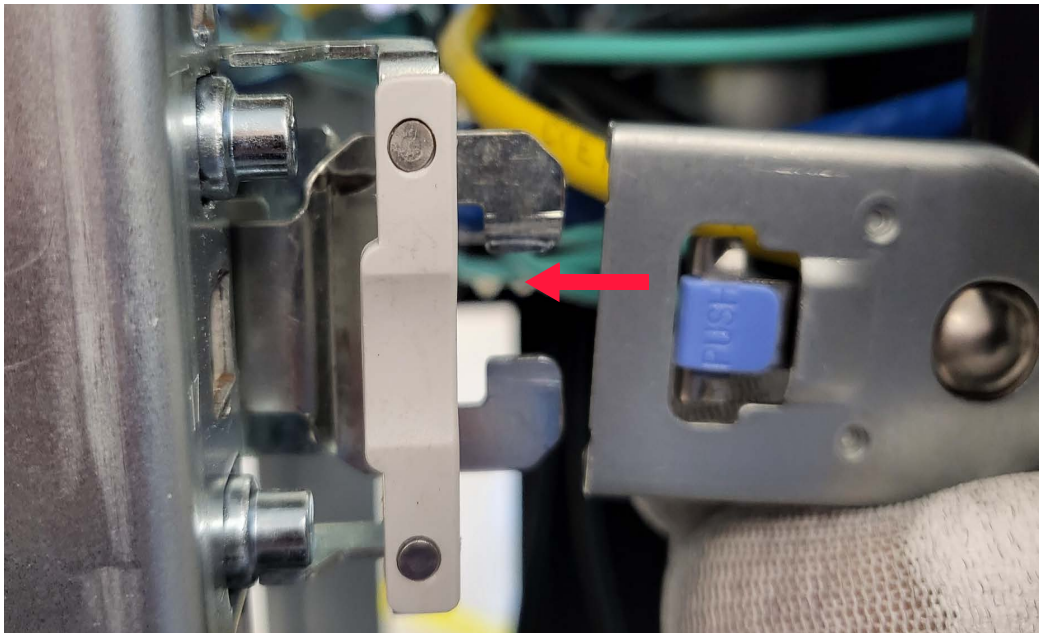

Figure 8.31 Aligning CMA body connector and body rail connector

3. Slide the CMA body connector onto the CMA body rail connector until the release button clicks. When connected correctly, the body side of the CMA appears as shown in Figure 8.32.

Figure 8.32 CMA body side correctly installed

The CMA body is secured to the CMA body rail connector. PM and/or server module servicing is completed.

Returning the CMA - Arm Side

To review the CMA components, refer to the section titled “Cable Management Hardware” that begins on page 47 of Chapter 4.

1. Swing the inner and outer CMA arms forward to the CMA arm side rail.
2. Align the inner CMA arm connector with the inner CMA arm rail connector, as shown in Figure 8.33.

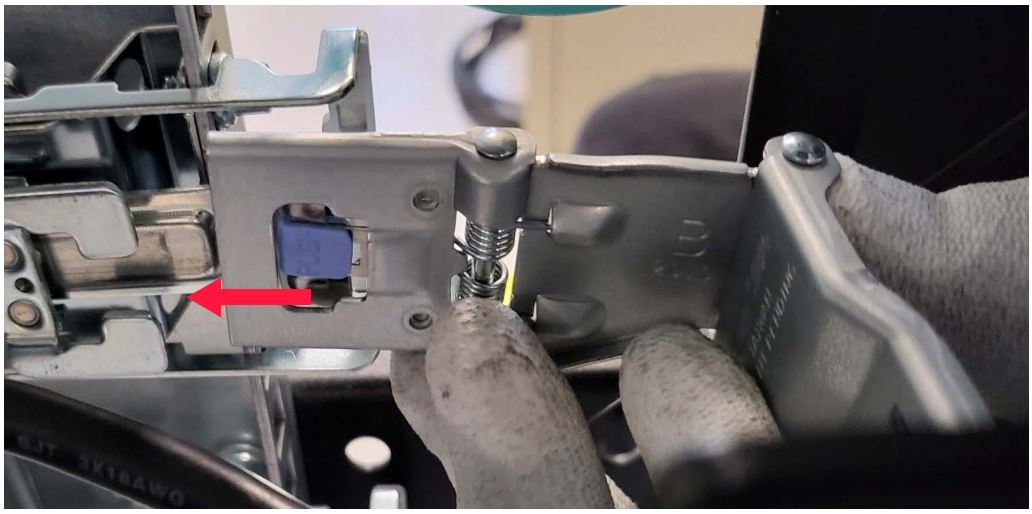

Figure 8.33 Aligning inner CMA arm connector and inner arm rail connector

3. Slide the inner arm connector onto the inner arm rail connector until the release button clicks. When connected correctly, the inner arm of the CMA appears as shown in Figure 8.34.

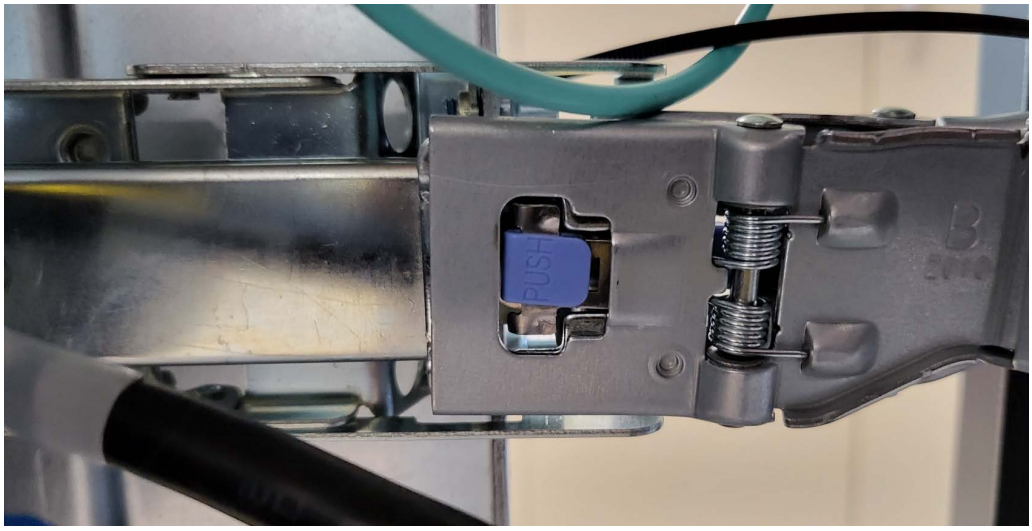

Figure 8.34 CMA inner arm correctly installed

4. Align the outer CMA arm connector with the outer CMA arm rail connector, as shown in Figure 8.35.

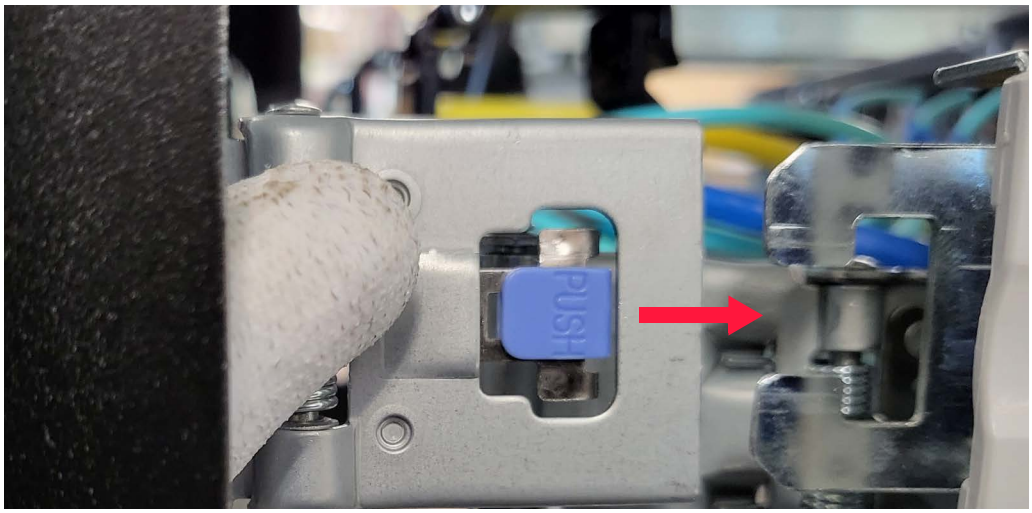

Figure 8.35 Aligning outer CMA arm connector and outer arm rail connector

5. Slide the outer arm connector onto the outer arm rail connector until the release button clicks. When connected correctly, the outer arm of the CMA appears as shown in Figure 8.36.

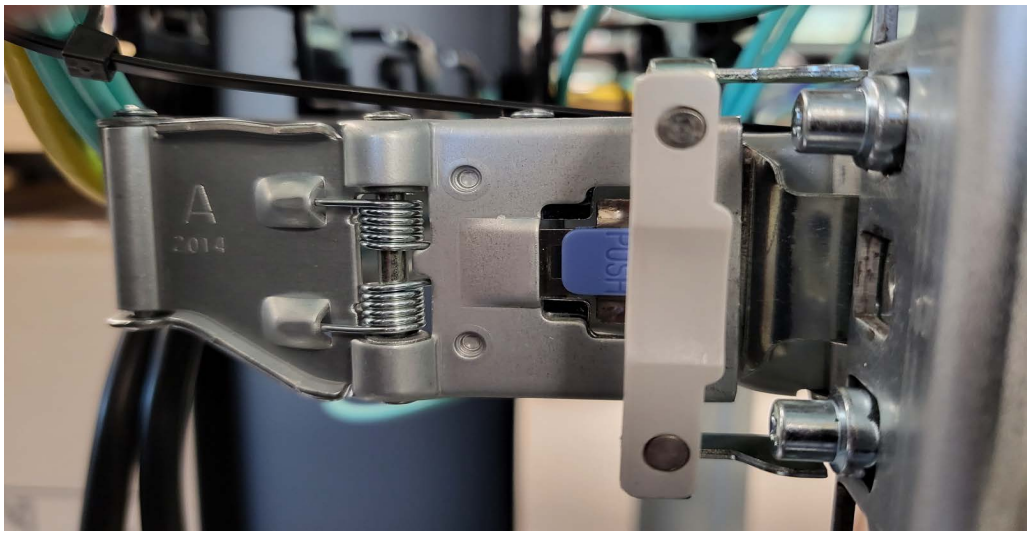

Figure 8.36 CMA outer arm correctly installed

The CMA arms are secured to the CMA arm rail connectors. PM and/or server module servicing is completed.

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Appendix A

Product Specifications

VSS2249RQ Storage Server

SYSTEM FEATURES

Features & Benefits		
Rack Mount		2U 19-in rack-mountable
		Rail kit supports 76.2 cm (30.0-in.) to 94.0 cm (37.0-in.) rail depth
		1.0 m (39.4-in.) rack envelope
		Conforms to EIA-310-D Specifications
		CMA
LEDs		Programmable status LEDs for drive ident, server modules, fans, and enclosure
		Self-driven LEDs for PMs and bi-color drive
FRUs		Hot-swappable
	Drives	Up to 24x 2.5-in NVMe™ U.2 (SSF-8639) SSDs
		Drive blanks required in unoccupied drive bays
		Drive carriers provide direct drive mounting to midplane
		25W SSDs supported
		Dual-ported, provide Gen 4 x2 PCIe to each server module
		Support for single-ported drives report to server module 1 only
		Individual power and clock control to each drive slot
	Fans	6x single impeller 60mm fan modules
		5+1 redundant
	VSSEP1EC Server Module	Dual server module configuration supported
		Single AMD EPYC™ Rome or Milan CPU up to 225W
		8x DDR4, 3200 MT/s, 1 DPC
		RDIMM, LRDIMM, and LRDIMM 3DS DDR4 SRAM

	Up to 2 TB memory supported
	4 GB to 128 GB DIMMs
	2x internal type M M.2 SSDs
	4x PCIe® Gen 4 x16 slots for HHHL add-in card
	ASPEED® AST2500 (video) iBMC
	1 GbE (BMC) and NTB (host)
	4x lanes PCIe Gen 3 NTB
	Out-of-band mgmt via MegaRAC® BMC WebUI
	2x USB 3.1 Gen 1 (5 Gb/s) type A
	1x USB Mini-B serial console only
	128x lanes PCIe
	2x 32MB SPI2 Flash
	IPMI v2.1, support for Redfish®
	Virtual UART for serial-over-LAN
PMs	2x 1600W PMs
	N+1 redundant
	Support for AC and DC option, CRPS form factor
	Additional capacities available based on SSD or add-in card requirements
	Different PSU CRPS form factors may require a change in the power adapter board.

Monitoring

Temperature	
Fans	
PSUs	
Event reporting through IPMI	
Secure management access	Logging into the data center
Reporting	Serial and part numbers, enclosure and server module revisions

Physical Design

Rack Specification	EIA-310-D 19-in. (48.3cm) 2U high
Chassis length—Front surface to rear surface (excluding CMA)	67.6 cm (26.7 in.)
Overall length - Front bezel to edge of CMA baskets	98.7 cm (38.9 in.)
Depth - Vertical rail to rear surface	69.7 cm (27.5 in.)
Serviceable position pull length	34.1 cm (13.4 in.)
Rail depth	From: 76.2 cm (30.0 in.) To: 94.0 cm (37.0 in.)
Rack envelope	1.0 m (39.4 in.)
Enclosure width	48.3 cm (19.0 in.)
Front width w/o rack ears	43.8 cm (17.3 in.)
Height	8.7 cm (3.5 in.)

PMS

NOTE: PSU wattage is dependent on the add-in card power requirements. Both PSUs must be of the same wattage.

1600W PM Input Power—DPS-1600EB

Input	**1600W**
Voltage	200–240V AC
Input range	50–60 Hz nominal
Power maximum	1600W
Inrush current	40A peak
Efficiency	91% at 100% load
Efficiency standard	80 PLUS™ Platinum (95% peak)

1600W PM Input Power—YSEF-1600EM

Input	**1600W**
Voltage	200–240V AC
Input range	50–60 Hz nominal
Power maximum	1600W
Inrush current	35A peak
Efficiency	91% at 100% load
Efficiency standard	80 PLUS™ Platinum (95% peak)

1600W PM Input Power—G1136-1600WNA

Input	**1600W**
Voltage	200–240V AC
Input range	50–60 Hz nominal
Power maximum	1600W
Inrush current	50A peak
Efficiency	91% at 100% load
Efficiency standard	80 PLUS™ Platinum (95% peak)

TEMPERATURE, HUMIDITY, & ALTITUDE

At the time of publication, thermal testing was still in progress. The anticipated environmental specifications for system temperature, RH, and altitude are presented in the following tables.

Operating Environment

Temperature range	5°C (41°F) to 35°C* (95°F)
Relative humidity	20% to 80% non-condensing
Altitude	-61 m ft (-200) to 3,048 m (10,000 ft)

*. Maximum operating temperature is specified at sea level and is derated 2 percent per 305 m (1,000 ft) of increased altitude

Non-operating Environment

Temperature range	5°C (41°F) to 45°C (113°F)
Relative humidity	10% to 90% non-condensing
Altitude	-61 m (-200 ft) to 3,048 m (10,000 ft)

Transit Conditions Storage Environment

Temperature range	-40°C (-40°F) to 60°C (140°F)
Relative humidity	10% to 90% non-condensing
Altitude	-61 m (-200 ft) to 12,192 m (40,000 ft)
Temperature range	1°C (34°F) to 60°C (140°F)
Relative humidity	10% to 80% non-condensing
Altitude	-61 m (-200 ft) to 3,048 m (10,000 ft)

SOUND POWER

Acoustics

Acoustic levels are not anticipated to exceed an A-weighted sound power of 7.4 Bels at idle/active operation and have been tested to ISO 7779. The acoustic sound level is expected to increase to 8.4 Bels under fault conditions.

HEARING PROTECTION: This enclosure produces 78 dB levels of sound power at 60% of power during normal operation. The acoustic sound power increases to 85.5dB at 100% power under fault conditions. Prolonged periods of high sound levels may be potentially harmful. Use of hearing protection is recommended.

PACKAGING & TRANSPORTATION

The VSS2249RQ Storage Server's packaging is designed to meet ISTA Procedure 1A 01-06 for single packaging and ISTA Procedure 1E 05-07 for pallet shipping.

WEIGHTS

A breakdown of the chassis and individual component weights is included in the following table. Where more than one product component is available, the heaviest component is listed to provide the maximum weight.

Enclosure & Component Weights

Component	# Units	Weight	Extended Weight
Chassis, including midplane	1	9.5 kg (21.0 lbs)	9.5 kg (21.0 lbs)
Power modules	2	1.5 kg (3.2 lbs)	2.9 kg (6.4 lbs)
Server modules	2	3.4 kg (7.4 lbs)	6.8 kg (14.8 lbs)
Fan modules	6	0.06 kg (0.14 lbs)	0.4 kg (0.8 lbs)
SSD and carrier	24	0.1 kg (0.3 lbs)	3.2 kg (7.2 lbs)
CMA	1		
System Weight	**—**	**—**	**22.8 kg (50.2 lbs)**
Rail kit without CMA	1	6.0 lbs (2.7 kg)	2.7 kg (6.0 lbs)
Total Weight	**—**	**—**	**25.5 kg (56.2 lbs)**

NOTE: Drives will not exceed the manufacturers' rotational vibration guidelines during typical enclosure operation.

FRU WEIGHTS AND DIMENSIONS

The part numbers, dimensions, and weights of the FRUs are listed in the following table.

FRU Weights and Dimensions

FRU	Part #	Dimensions	Weight
2.5" SSD Carrier Only (24 Pack)	VDS2249-FRU-001	99x58x33 cm (39x23x13 in.)	8.2 kg (18 lbs.)
2.5" Drive Blank (24 Pack)	VDS2249-FRU-002	41x15x10 cm (16x6x4 in.)	3.2 kg (7 lbs.)
LaJolla/Soquel Cable Management Assembly	VDS2249-FRU-003	41x15x10 cm (16x6x4 in.)	4.1 kg (9 lbs.)
LaJolla/Soquel PSU Canister Assembly	NSS2249-FRU-006	41x15x10 cm (16x6x4 in.)	1.4 kg (3 lbs.)
LaJolla Server Canister Configuration 1	VDS2249-FRU-010	56x18x8 cm (22x7x3 in.)	1.4 kg (3 lbs.)
LaJolla/Soquel Fan Module	NSS2249-FRU-005	10x10x10 cm (4x4x4 in.)	0.45 kg (1 lb.)
LaJolla/Soquel Dual Port Shelf Assembly	VDS2249-FRU-007	99x58x33 cm (39x23x13 in.)	18.1 kg (40 lbs.)
LaJolla/Soquel Rail Kit	VDS2249-FRU-004	97x15x5 cm (38x6x2 in.)	3.2 kg (7 lbs.)

SHOCK & VIBRATION

Shock & Vibration Values

Test Parameter	Level	Frequency Range	Duration/Sweep Rate/# of Shocks
Operating vibration	0.10 G, 0-peak swept sine	5–500 Hz	1 complete sweep 1/2 octave/min
Operating random vibration	0.15 Grms	5–500 Hz	10 minutes
Operating shock	5 G, 0-peak 11 mS half sine		3 positive shocks 3 negative shocks
Non-operational vibration	0.75 G, 0-peak swept sine	5–500 Hz	1 complete sweep 1/2 octave/min
Non-operational random vibration	0.5 Grms	5–500 Hz	10 minutes
Non-operational shock	10 G, 0-peak 11 mS half sine		3 positive shocks 3 negative shocks

AGENCY APPROVALS

Environmental Protection

RoHS and WEEE compliant	

Certifications

FCC Federal Code of Regulation	Title 47, Part 15 for Class A devices
EMI/EMC	For Part 15 for Class A devices
CE	Europe
Safety	USA and Canada

NOTE: The enclosure may also meets other countries' regulatory requirements as defined by the country marks on the regulatory label. Additional certifications may be added without notice.

Appendix B VSS2249RQ Block Diagram

The VSS2249RQ Storage Server offers up to 24 U.2 NVMe SSDs, two server modules, two PMs, and six system fan modules. Refer to Figure B.1 to view storage enclosure's block diagram.

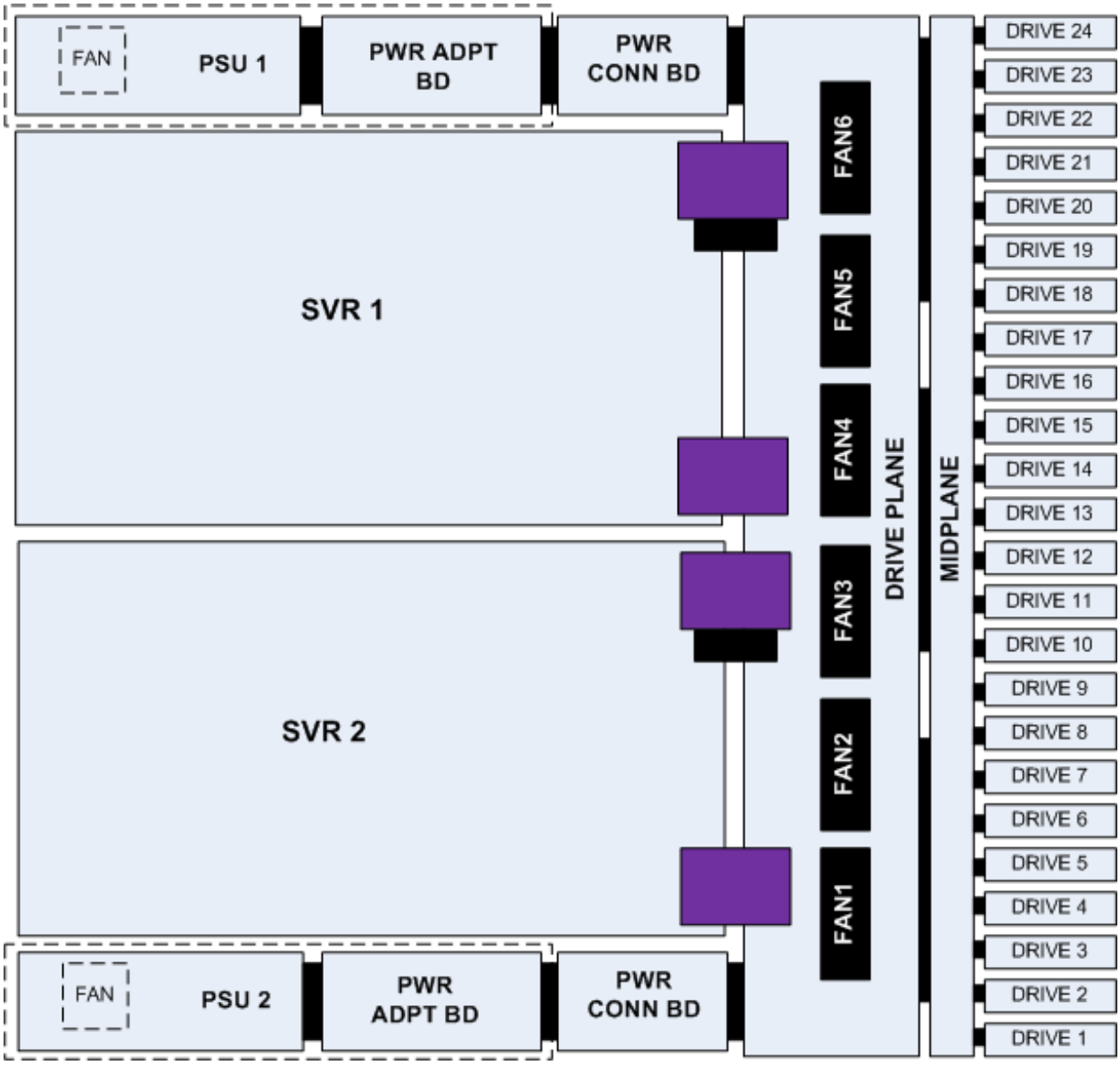

Figure B.1 VSS2249RQ block diagram

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Appendix C VSSEP1EC Block Diagram

The VSSEP1EC Server Module offers an AMD EPYC™ Rome or Milan CPU with eight memory channels and 128 lanes of PCIe. Refer to Figure C.1 to view the server module's block diagram.

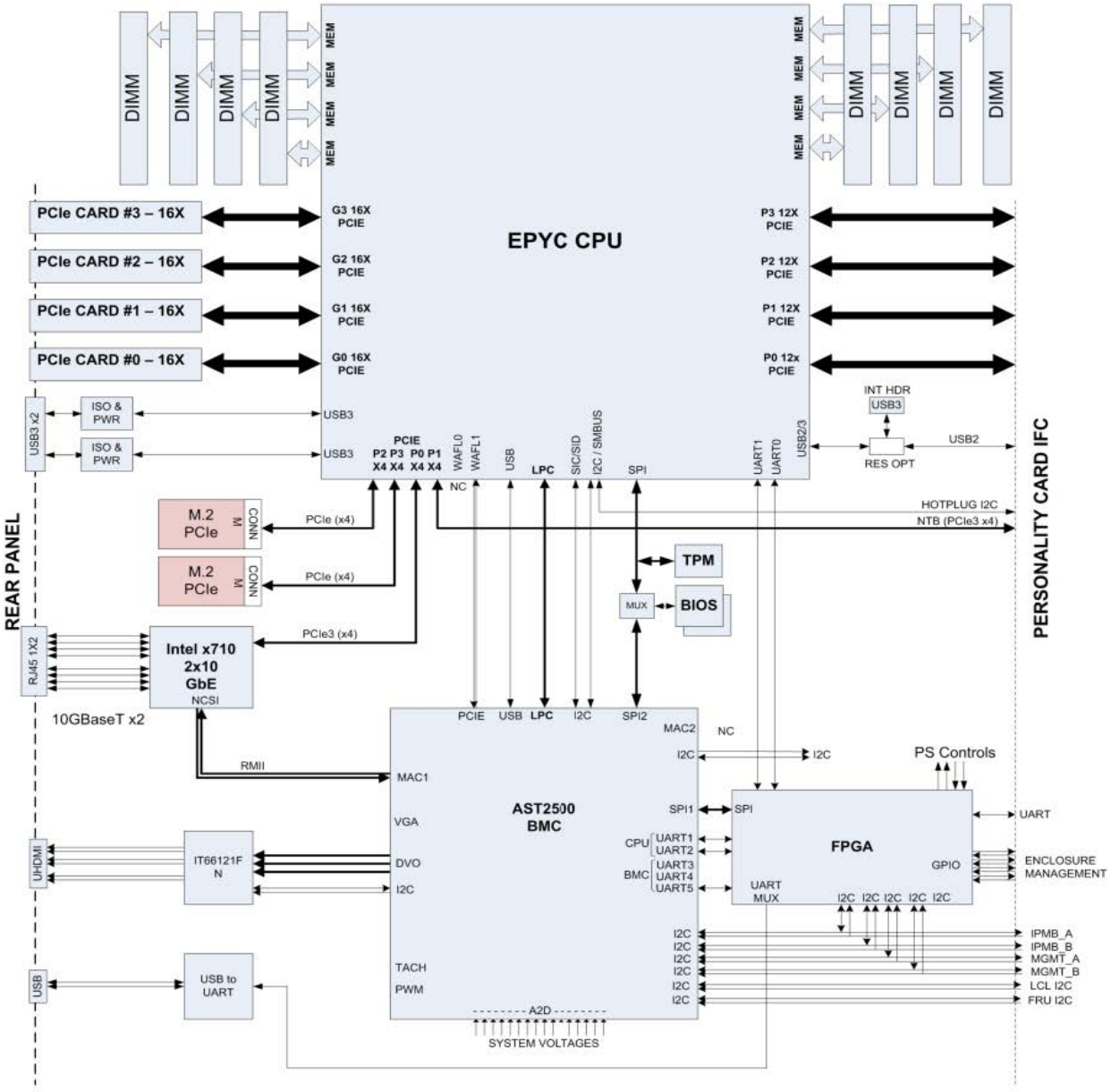

Figure C.1 VSSEP1EC block diagram

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Appendix D Mounting Envelope Diagrams

This appendix provides a close-up view of the VSS2249R Storage Server mounting envelope.

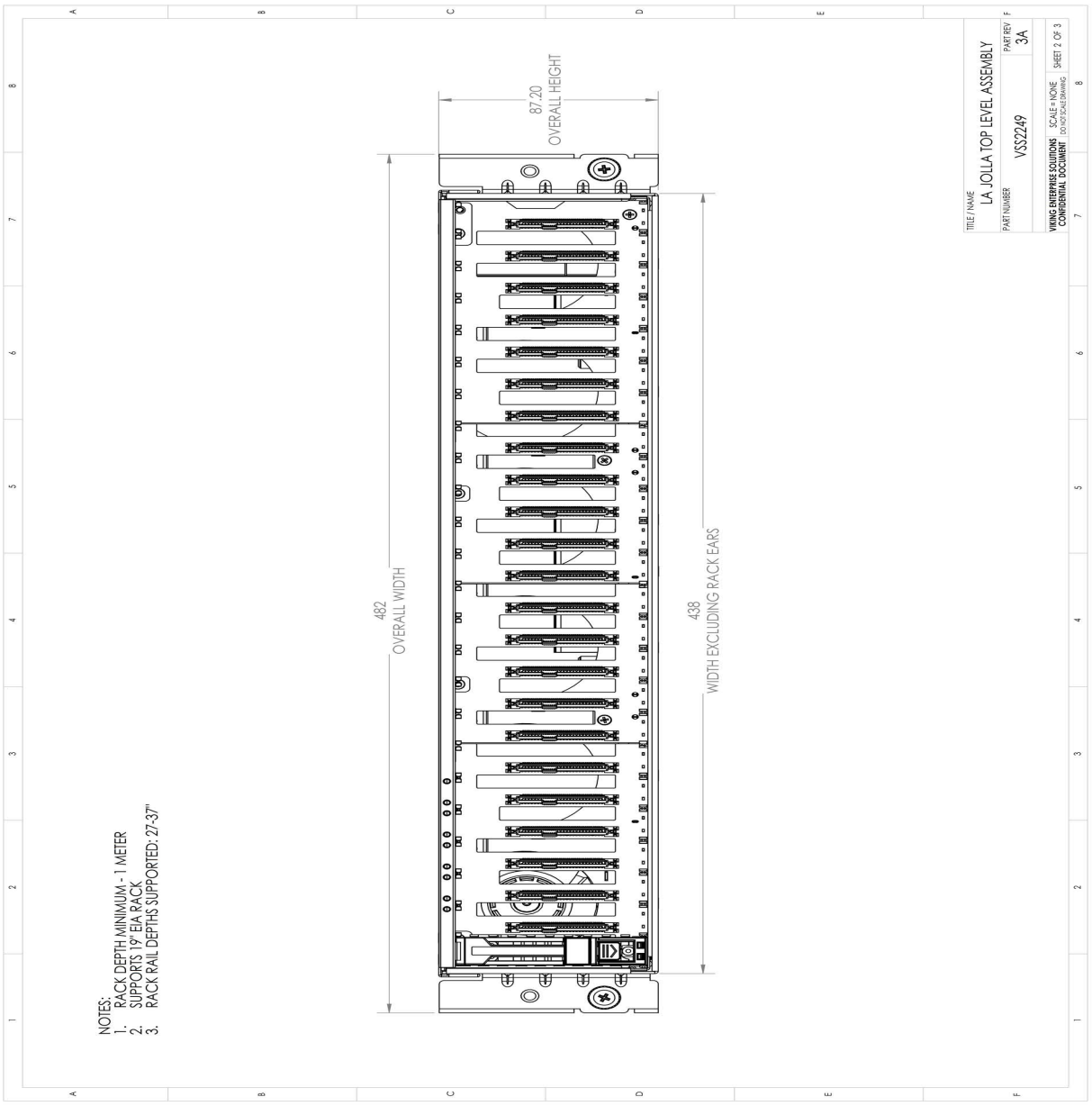


Figure D.1 Enclosure mounting envelope 1 of 2

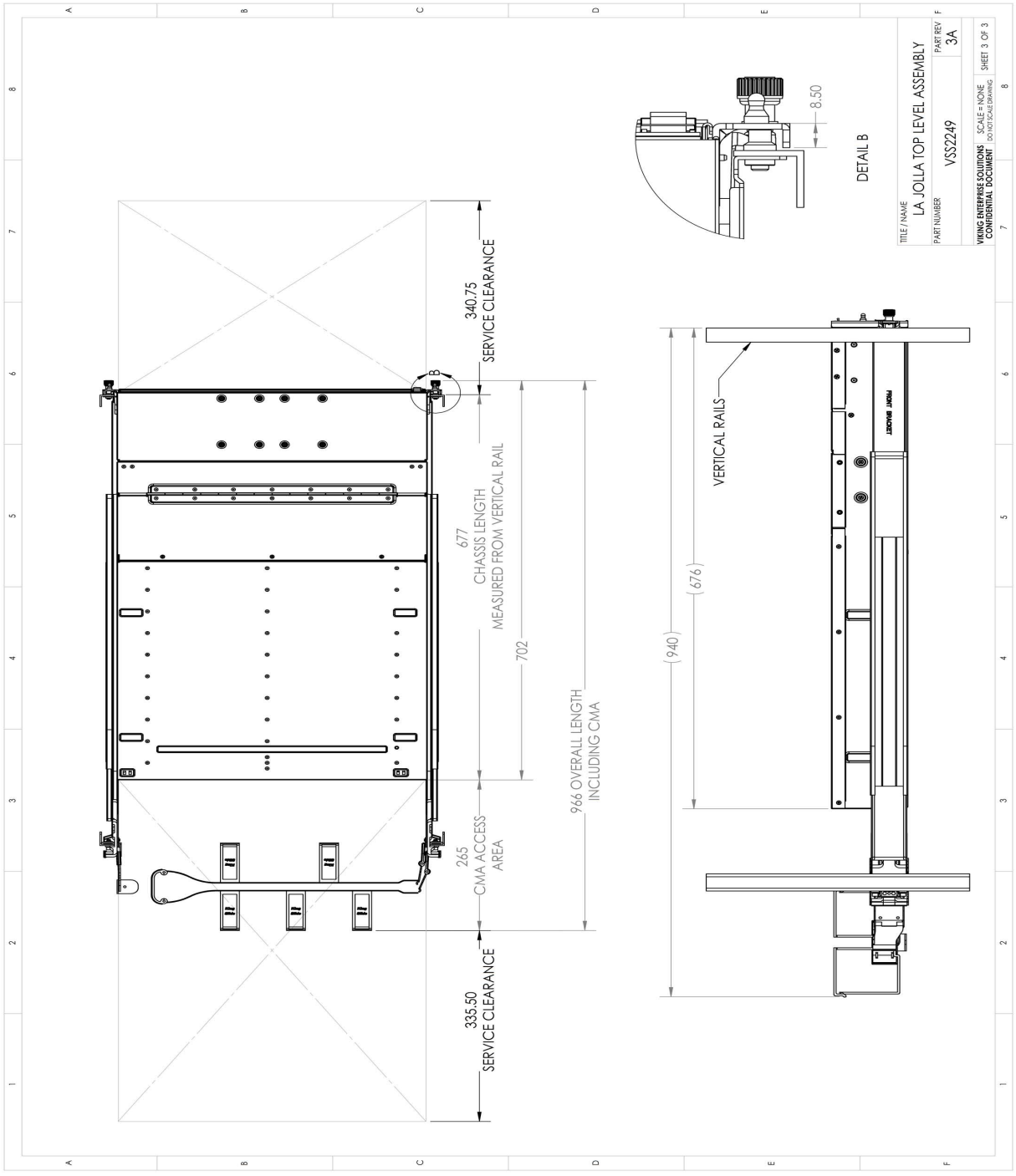


Figure D.2 Enclosure mounting envelope 2 of 2

Appendix E Lot 9: Annex II, 3.2 and 3.3

3. Information to be Provided by Manufacturers

3.2 DATA STORAGE PRODUCT INFORMATION

3.2.a. **Product type:** Data storage product

3.2.b. **Manufacturer:** Sanmina Corp., Viking Enterprise Solutions™, 30 East Plumeria Dr., San Jose, CA 95134

3.2.c. **Product model number:** VSS2249RQ (BSP-28)

3.2.d. **Year of manufacture:** See product regs label

3.2.e. **PSU efficiency:** PSUs have an 80PLUS Platinum or Gold rating. See Table E.1

% of Rated Load	10%	20%	50%	100%	Minimum Power Factor
80PLUS™ Platinum Requirement	--	90%	94%	91%	0.95
BSP-21 VSS2249RQVSS2249 RQ DPS-1600EB		90%	94%	91%	0.95
BSP-21 VSS2249RQ YSEF-1600EM	90%	94%	96%	91%	0.98
BSP-21 VSS2249RQ G1136-1600WNA	85%	90%	94%	91%	0.99

Table E.1 PSU Efficiency and power factor

3.2.f. **Power factor:** See Table E.1

3.2.g. **Operating condition class:** A2

3.2.h. **Data deletion tool:** System is delivered without an operating system. Refer to software provider for data deletion tool.

CAUTION: This data storage product contains some plastic parts. Recycle all parts in accordance with local regulations.

3.3 PRODUCT INFORMATION

3.3.a. Indicative weight

3.3.a.a. Cobalt in batteries: None

3.3.a.b. Neodymium in HDDs: HDDs not supported.

3.3.b. Disassembly

Instructions that follow assume the enclosure has been powered down, all cables have been removed, and the enclosure is removed from the rack.

3.3.b.a. **Type:** Data storage devices-Drives

3.3.b.b. **Fastening techniques:** Release catch

3.3.b.c. **Tools required:** Phillips® #1 screwdriver

If installed, pull the bezel off of the front of the enclosure. Press the drive release catch to open the release handle. Pull the drive out of the drive bay. Remove the screws from the drive carrier and extract the drive. Repeat for all remaining drives. Recycle according to local regulations.

3.3.b.a. **Type:** Data Storage Devices-M.2s

3.3.b.b. **Fastening technique:** Thumbscrew, lock bar, screws

3.3.b.c. **Tools required:** Phillips® #1 screwdriver

Unscrew the VSSEP1EC thumbscrew and pull the lock bar outward and down to release the cam. Slide the VSSEP1EC out of the enclosure. Remove the screws securing the cover on the module and remove the cover. If installed, remove the screw securing the PCIe face plate in the upper left PCIe slot, and then remove the card from the riser. Unscrew the M.2 and remove. Repeat if a second M.2 is installed. Recycle according to local regulations.

3.3.b.a. **Type:** Memory

3.3.b.b. **Fastening technique:** Thumbscrew, lock bar, screws

3.3.b.c. **Tools required:** Phillips® #1 screwdriver

Unscrew the VSSEP1EC thumbscrew and pull the lock bar outward and down to release the cam. Slide the VSSEP1EC out of the enclosure. Remove the screws securing the cover on the module and remove the cover. Press the release tabs to the left and right of the first DIMM, and then lift the DIMM out of the canister. Repeat for each DIMM. Recycle according to local regulations.

3.3.b.a. **Type:** Processor

3.3.b.b. **Fastening technique:** Thumbscrew, lock bar, screws

3.3.b.c. **Tools required:** Phillips® #1 and Phillips #2 screwdrivers

Unscrew the VSSEP1EC thumbscrew and pull the lock bar outward and down to release the cam. Slide the VSSEP1EC out of the enclosure. Remove the screws securing the cover to the module and lift the cover off. Use the Phillips #2 screwdriver to remove the screws securing the heat sink to the processor. Unscrew the ILM and lift up on the load plate to expose the CPU. Lift the CPU out of the socket. Recycle according to local regulations.

3.3.b.a. .**Type:** Motherboard

3.3.b.b. **Fastening technique:** N/A

3.3.b.c. **Tools required:** N/A

Data storage product does not have a motherboard.

3.3.b.a. **Type:** Expansion card/graphic card

3.3.b.b. **Fastening technique:** Thumbscrew, lock bar, screws

3.3.b.c. **Tools required:** Phillips® #1 screwdriver

Unscrew the VSSEP1EC thumbscrew and pull the lock bar outward and down to release the cam. Slide the VSSEP1EC out of the enclosure. Remove the screws securing the cover on the module and remove the cover. If installed, remove the screws securing the PCIe face plates in the four PCIe card slots, and then remove the cards from the risers/connectors. Recycle according to local regulations.

3.3.b.a. **Type:** PSU

3.3.b.b. **Fastening technique:** Release tab

3.3.b.c. **Tools required:** None

Press up on the release lever on the bottom of each power module and pull the module out of the slot by the finger pull. Recycle according to local regulations.

3.3.b.a. **Type:** Chassis

3.3.b.b. **Fastening technique:** N/A

3.3.b.c. **Tools required:** N/A

N/A.

3.3.b.a. **Type:** Battery

3.3.b.b. **Fastening technique:** Thumbscrew, lock bar, screws

3.3.b.c. **Tools required:** Phillips® #1 screwdriver

Unscrew the VSSEP1EC thumbscrew and pull the lock bar outward and down to release the cam. Slide the VSSEP1EC out of the enclosure. Remove the screws securing the cover on the module and remove the cover. If installed, remove the screw securing the PCIe face plate in the top right PCIe card slot, and then remove the card from the riser/connector. Remove the battery. Recycle according to local regulations.

Firmware

The VES Online Document Library is maintained on a secure site. Email customersupport@vikingenterprise.com to obtain the login and password necessary to access the latest firmware for the VSS2249RQ product

Website Information

The VES Online Document Library is maintained on a secure site. Email customersupport@vikingenterprise.com to obtain the login and password necessary to access the documentation for the VSS2249RQ product.

Appendix F

VSSEP1EC Server Module BIOS Default Settings

This appendix identifies each of the VSSEP1EC Server Module BIOS default values for BIOS Core Version 5.14 as shown in the following BIOS screen captures.

NOTE: The following images identify the factory-defined default values for many of the options available in the stated core version of the VSSEP1EC Server Module BIOS. **BIOS options may vary from version to version and from customer to customer based on product configuration.** Contact a Viking Enterprise Solutions™ support representative to verify the server is running the latest BIOS updates for the purchased product configuration.

For instructions on accessing BIOS, refer to “Accessing the BIOS” on page 64 of Chapter 6.

NOTE: Navigation options might vary based on the terminal emulation program used to access the BIOS. In general, the left or right arrow key navigates the user from tab to tab, the up or down arrow key moves the cursor up or down, selecting **PgUp** or **PgDn** displays additional options within a menu, and pressing <**Enter**> or double-clicking an option selects it. Press <**Esc**> at any time to exit the current menu, or to exit the BIOS.

Main Tab

NOTE: The default system date and time are updated using the hyphen <**-**> key. Pressing the <**Enter**> or <**Tab**> key moves the cursor from month to day and year, and from hour to minutes and seconds.

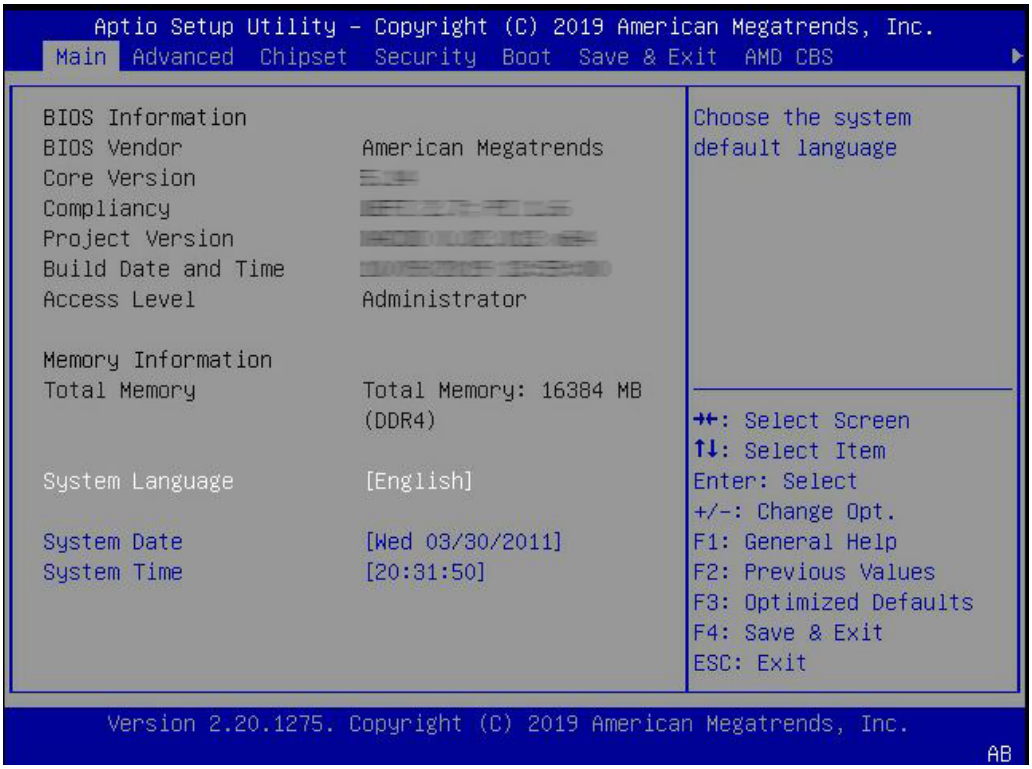


Figure F.1 BIOS Main tab

Advanced Tab

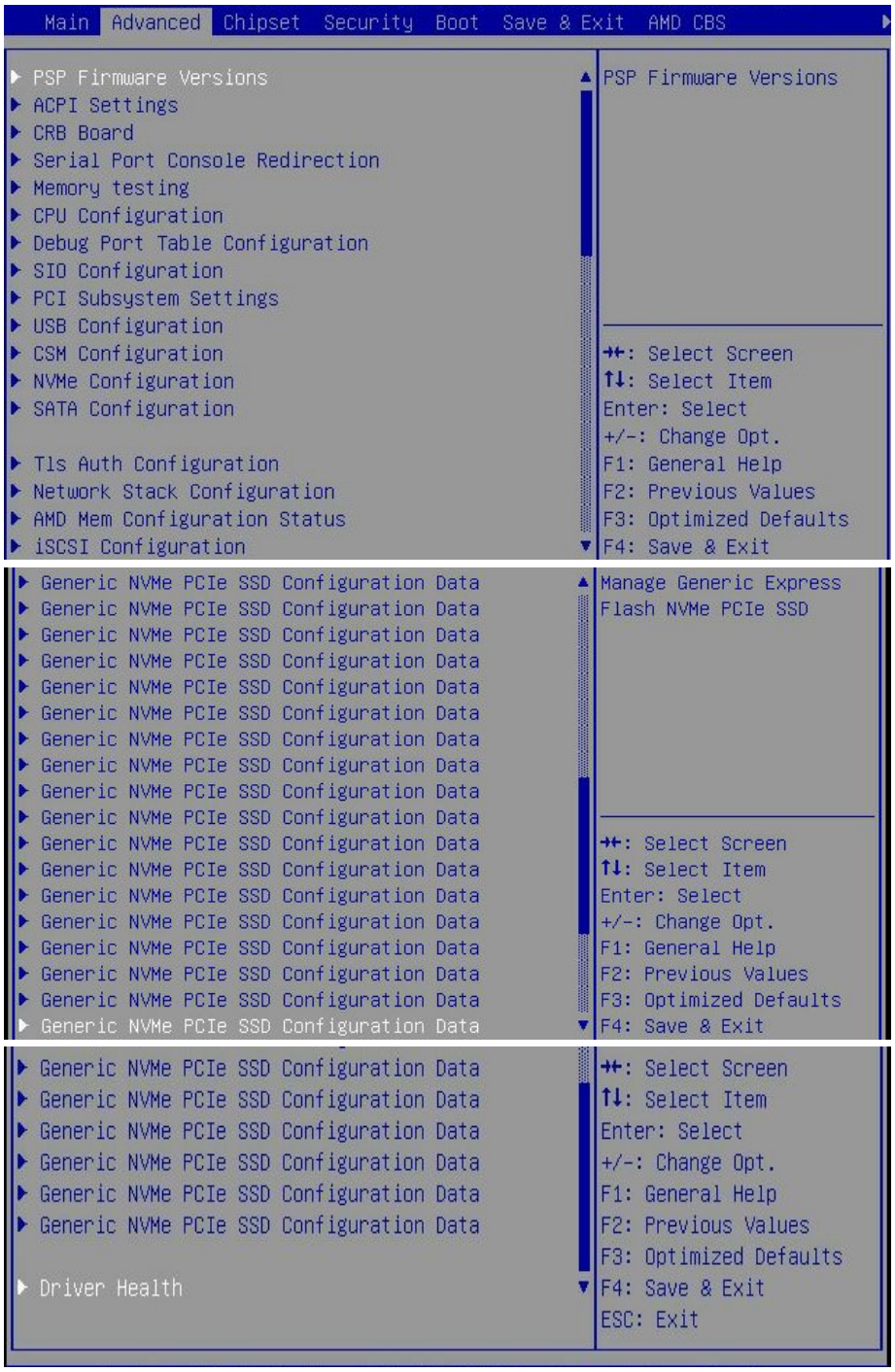


Figure F.2 Advanced tab

PSP FIRMWARE VERSIONS

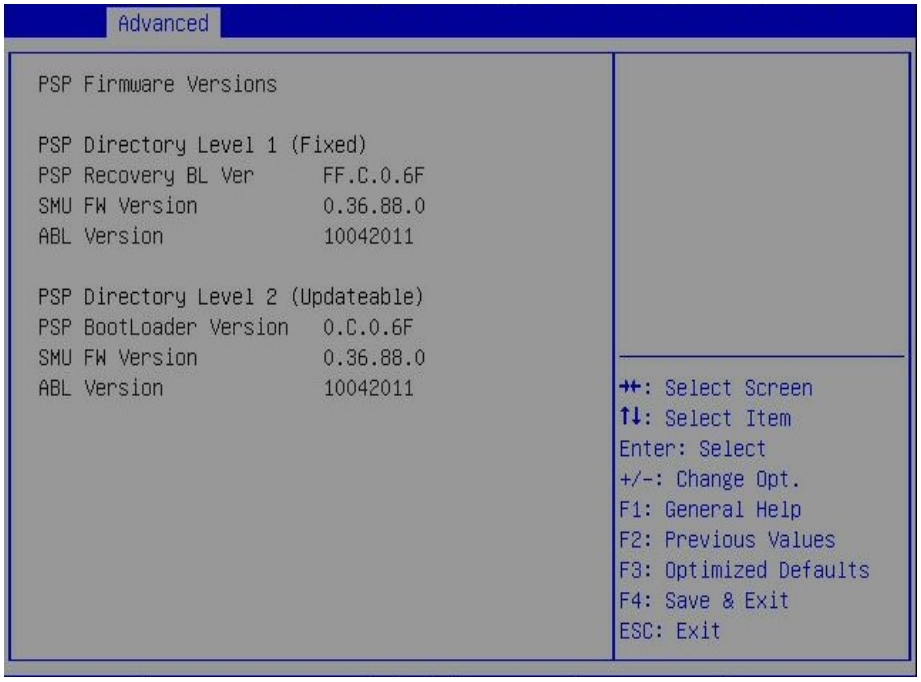


Figure F.3 Advanced>>PSP firmware versions

ACPI SETTINGS

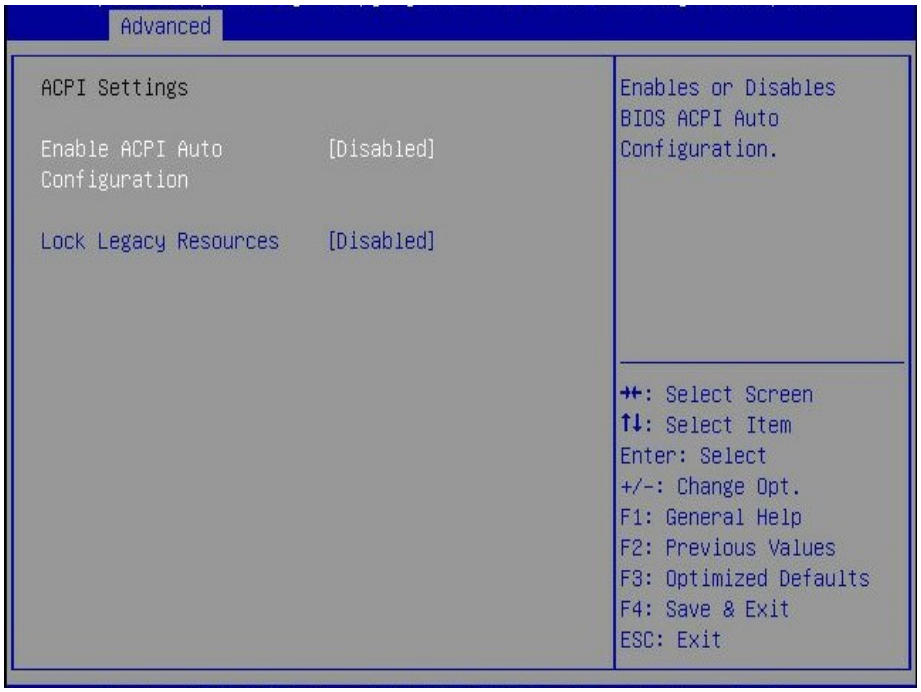


Figure F.4 Advanced>>ACPI settings

CRB BOARD

Option not currently available.

SERIAL PORT CONSOLE REDIRECTION

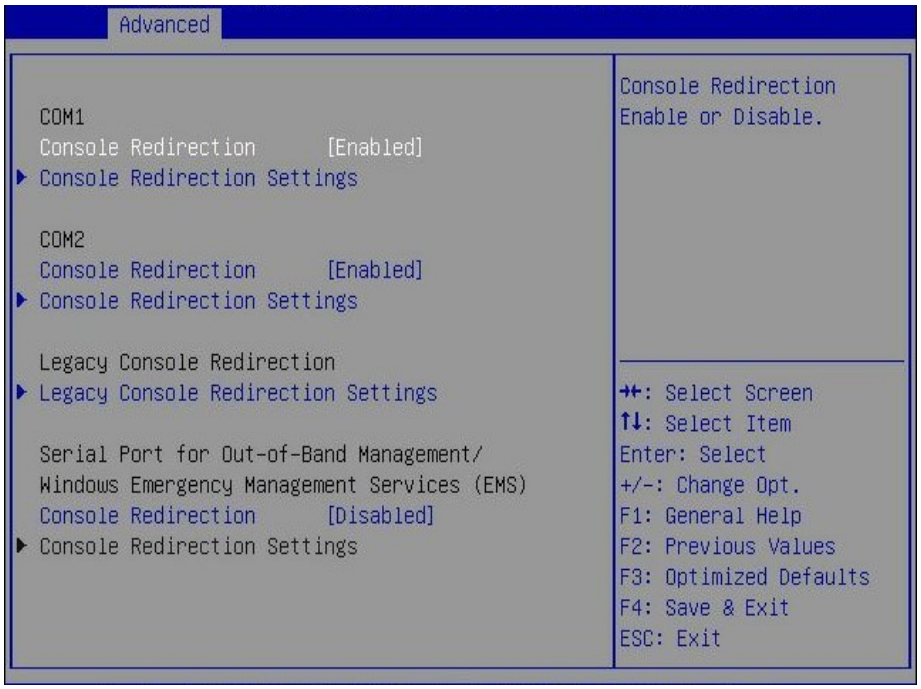


Figure F.5 Advanced>>Serial port console redirection

COM1 Console Redirection Settings

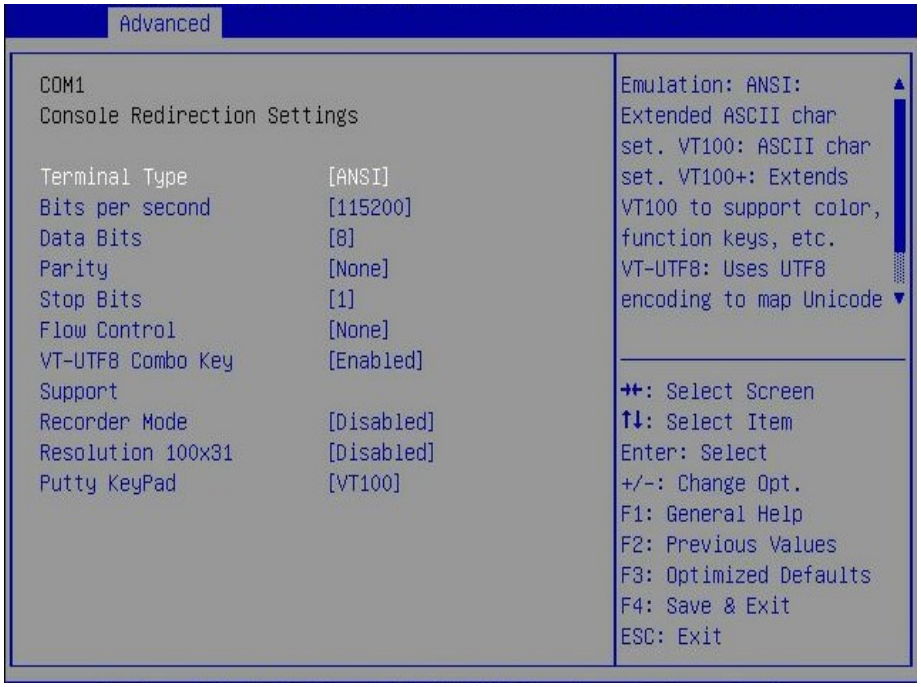


Figure F.6 Advanced>>Serial port console redirection>>COM1 console redirection settings

COM2 Console Redirection Settings

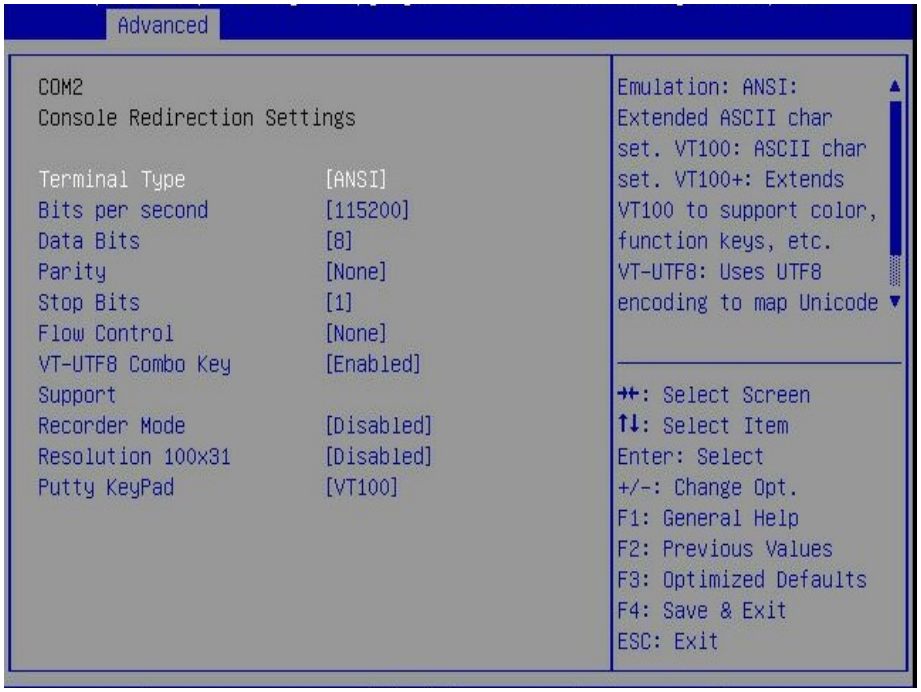


Figure F.7 Advanced>>Serial port console redirection>>COM2 console redirection settings

Legacy Console Redirection Settings

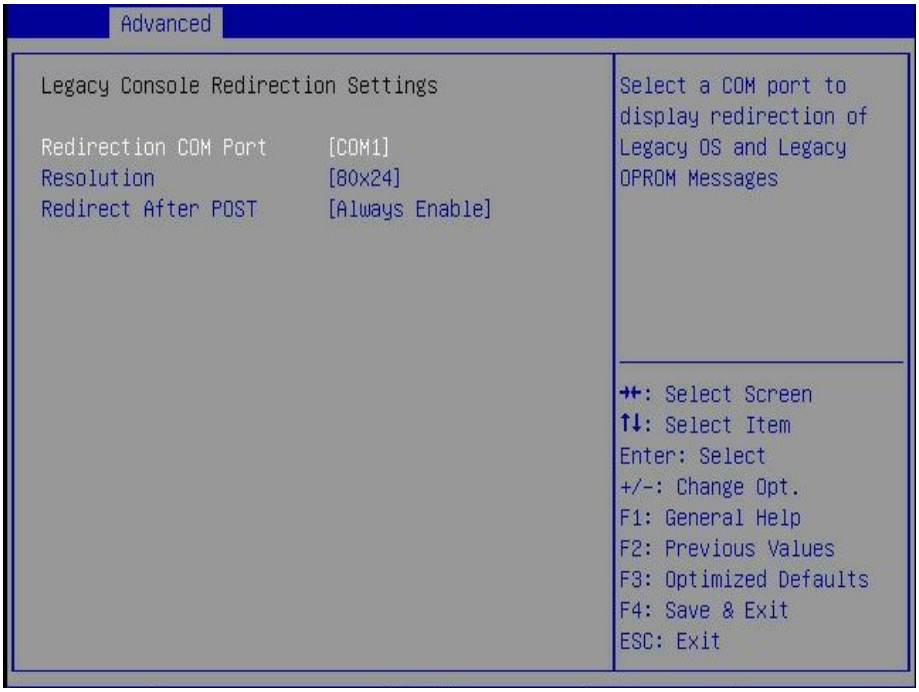


Figure F.8 Advanced>>Serial port console redirection>>Legacy console redirection settings

Serial Port for Out-of-Band Management
Windows Emergency Management Services (EMS) Console Redirection Settings

Option not currently available.

MEMORY TESTING

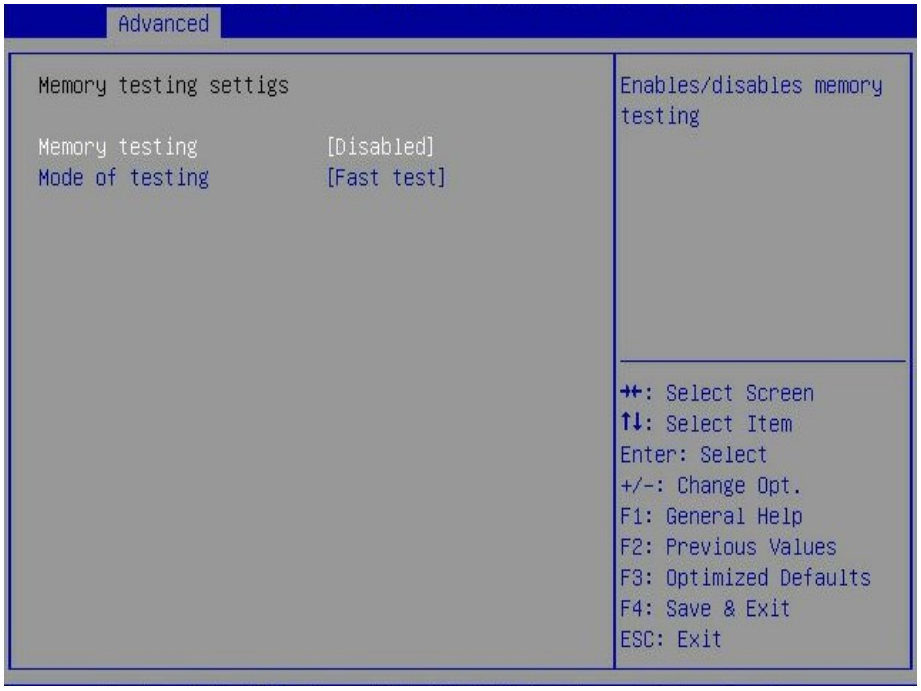


Figure F.9 Advanced>>Memory testing

CPU CONFIGURATION

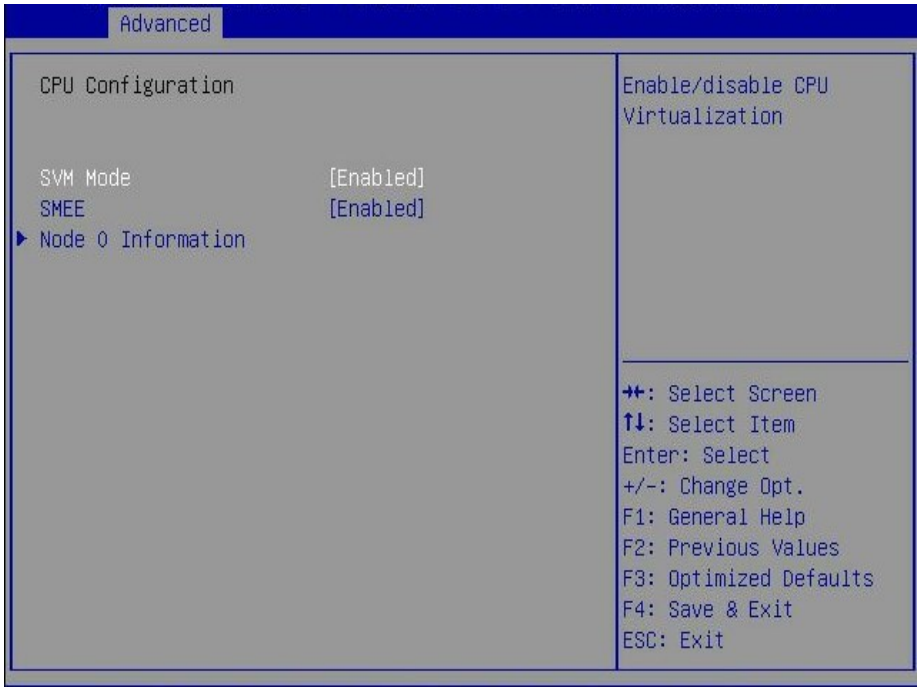


Figure F.10 Advanced>>CPU config

Node 0 Information

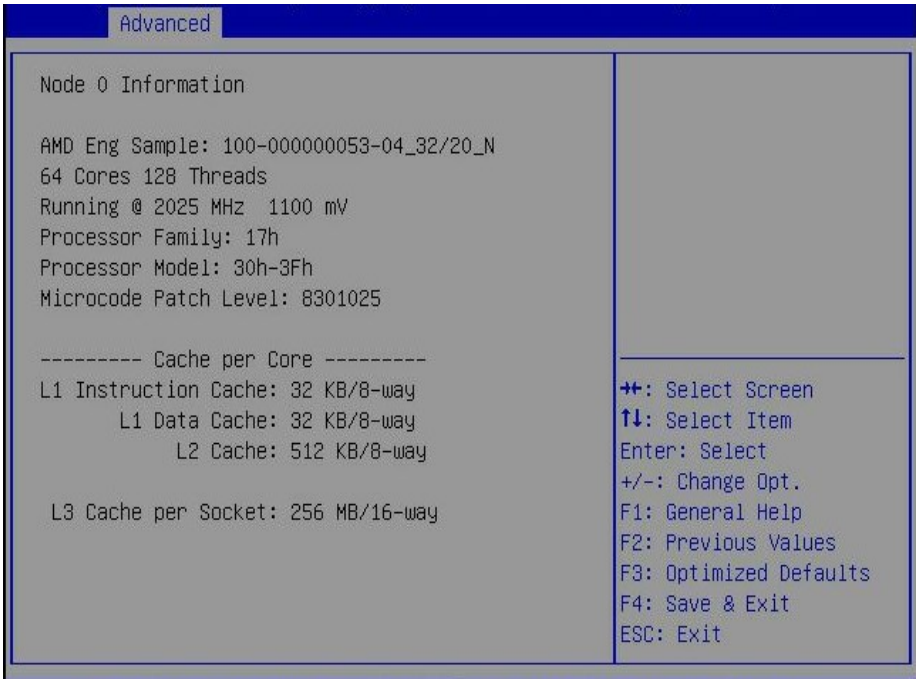


Figure F.11 Advanced>>CPU config>>Node 0 information

DEBUG PORT TABLE CONFIGURATION

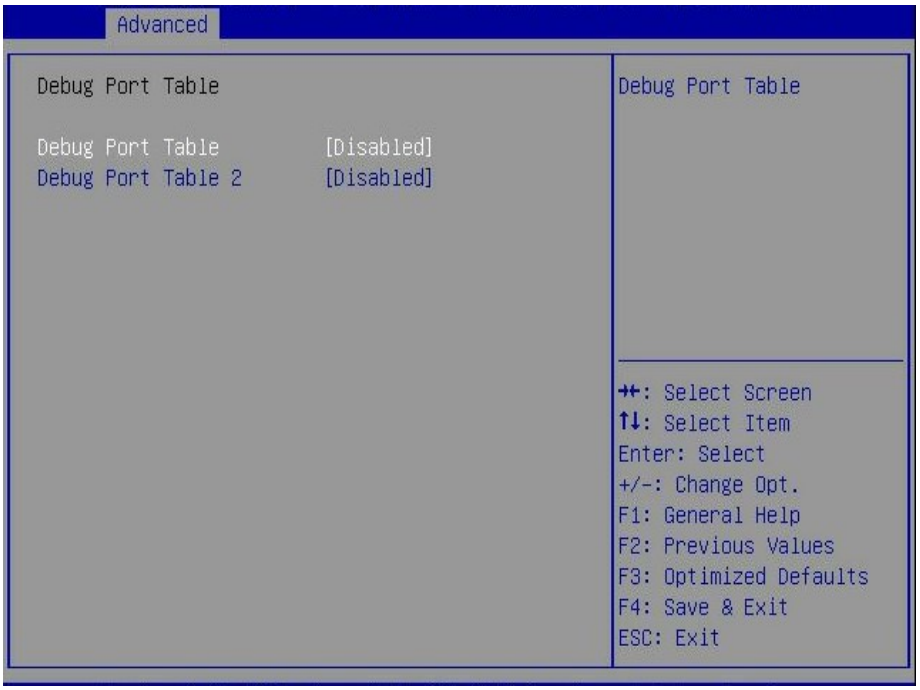


Figure F.12 Advanced>>Debug port table config

SIO CONFIGURATION

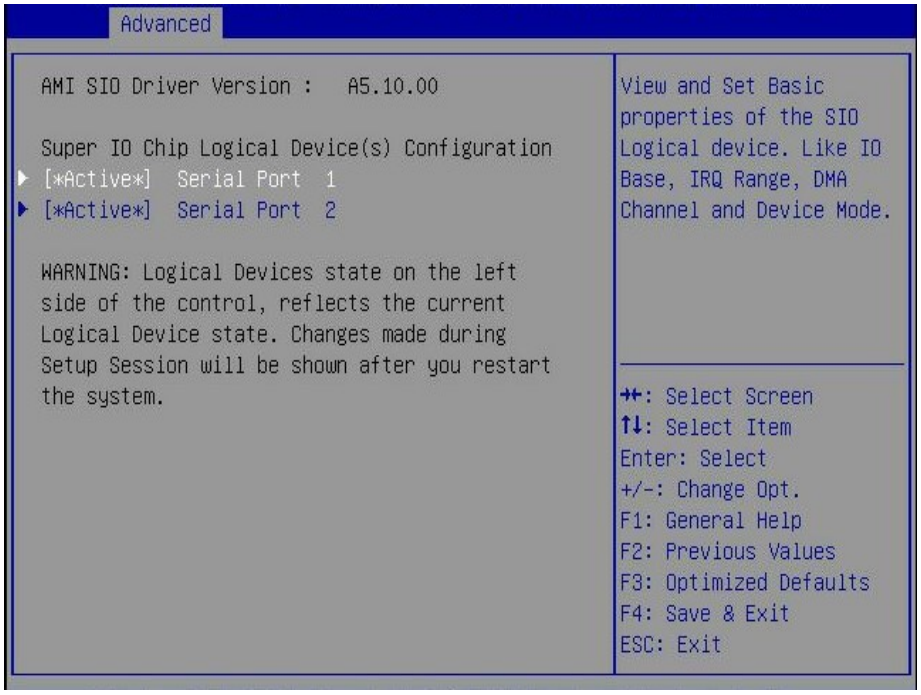


Figure F.13 Advanced>>SIO config

Serial Port 1

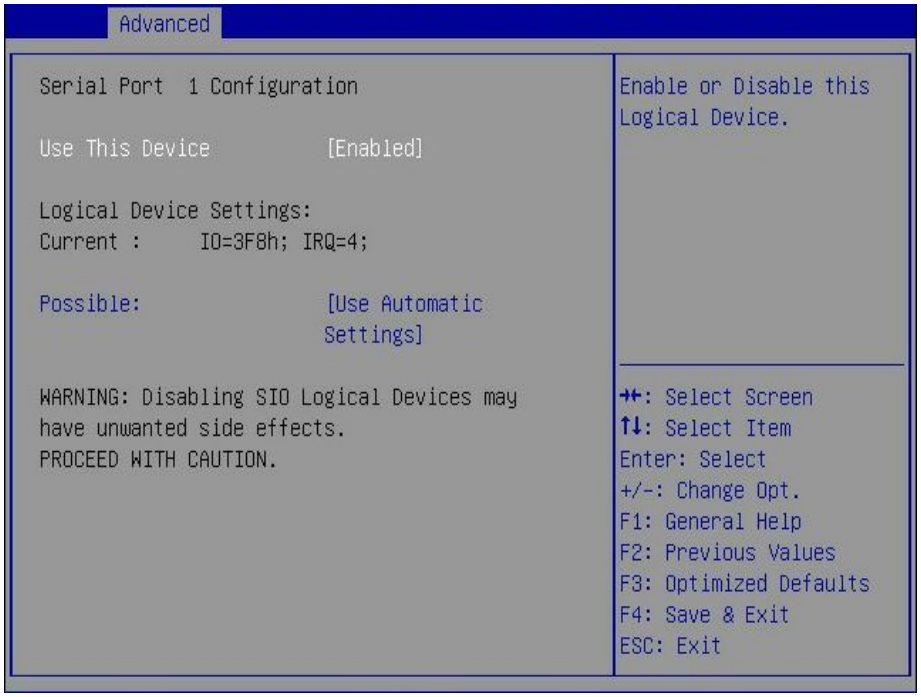


Figure F.14 Advanced>>SIO config>>Serial port 1

Serial Port 2

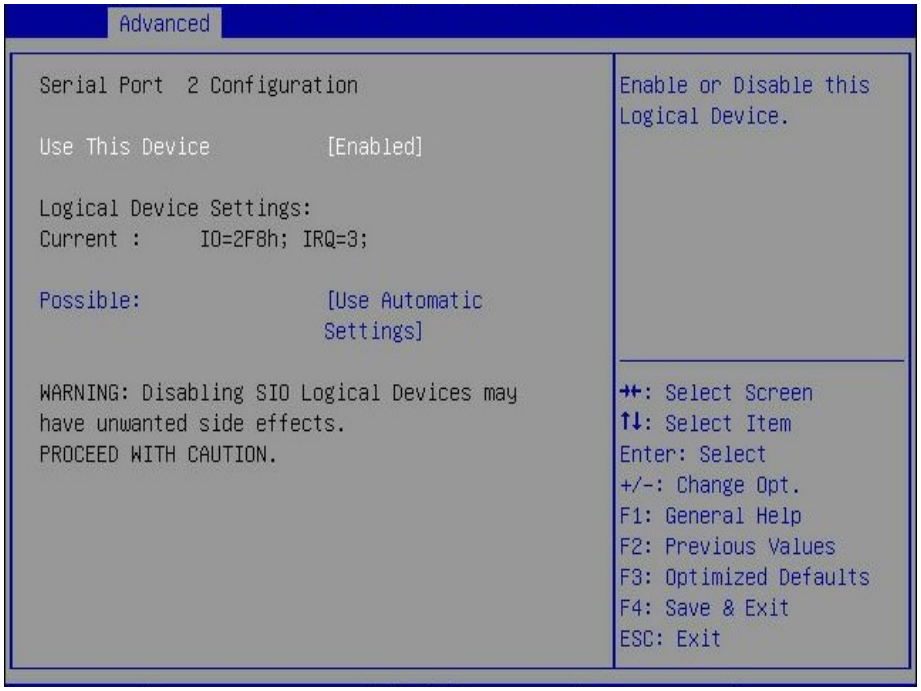


Figure F.15 Advanced>>SIO config>>Serial port 2

PCI SUBSYSTEM SETTINGS

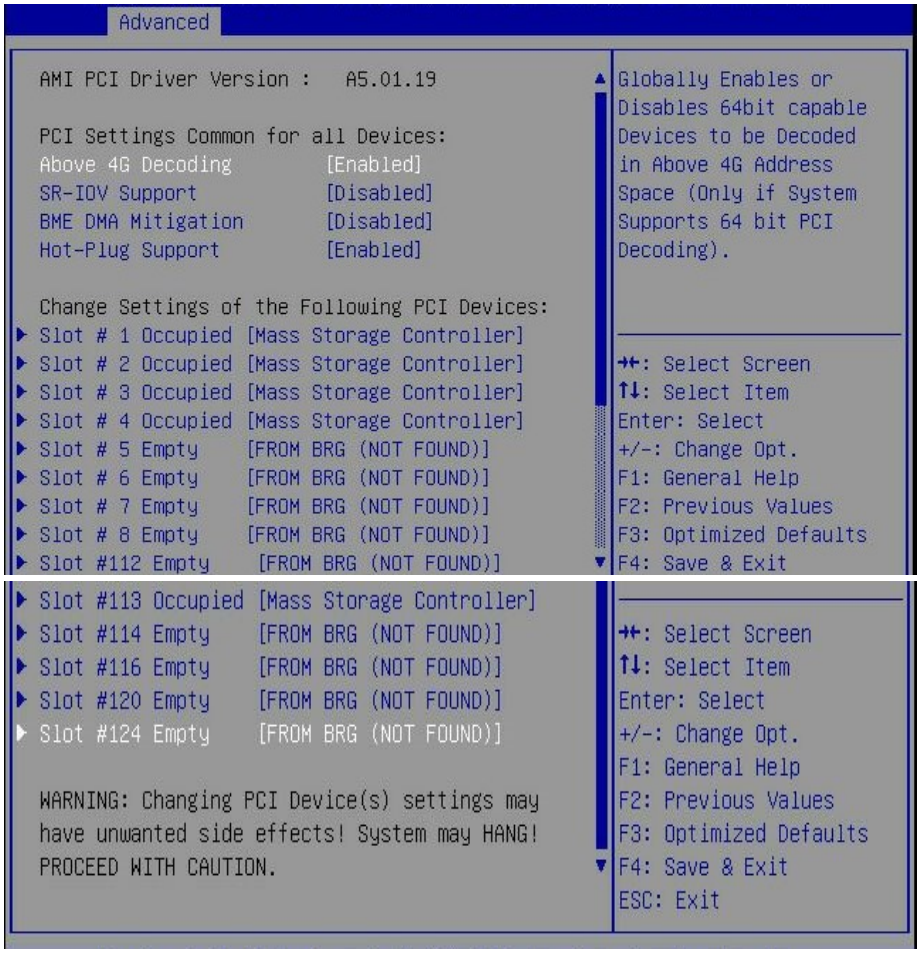


Figure F.16 Advanced>>PCI subsystem settings

All Slots (When Populated)

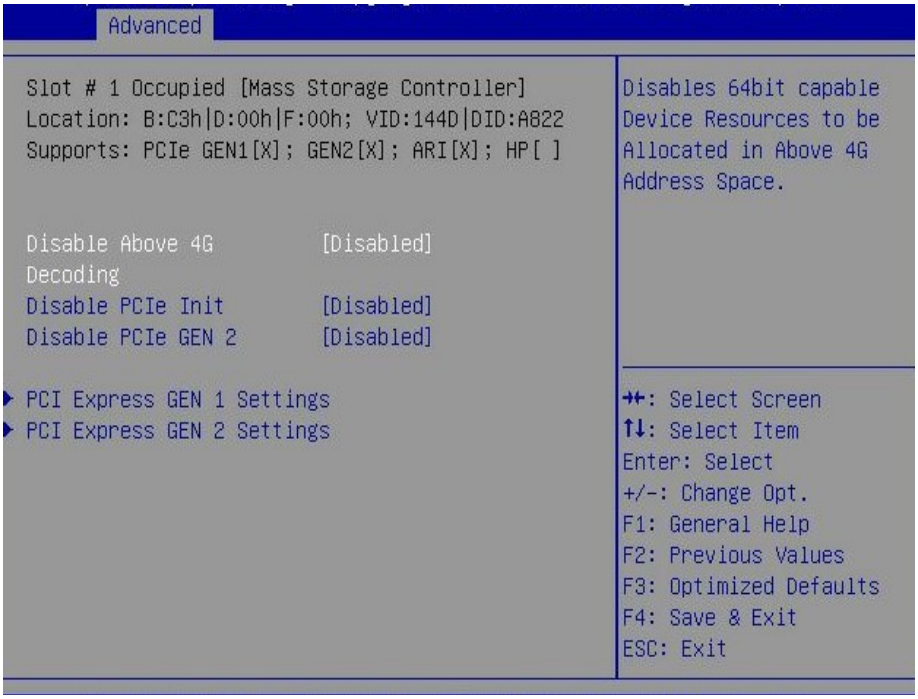


Figure F.17 Advanced>>PCI subsystem settings>>Slot #X

PCI Express GEN 1 Settings

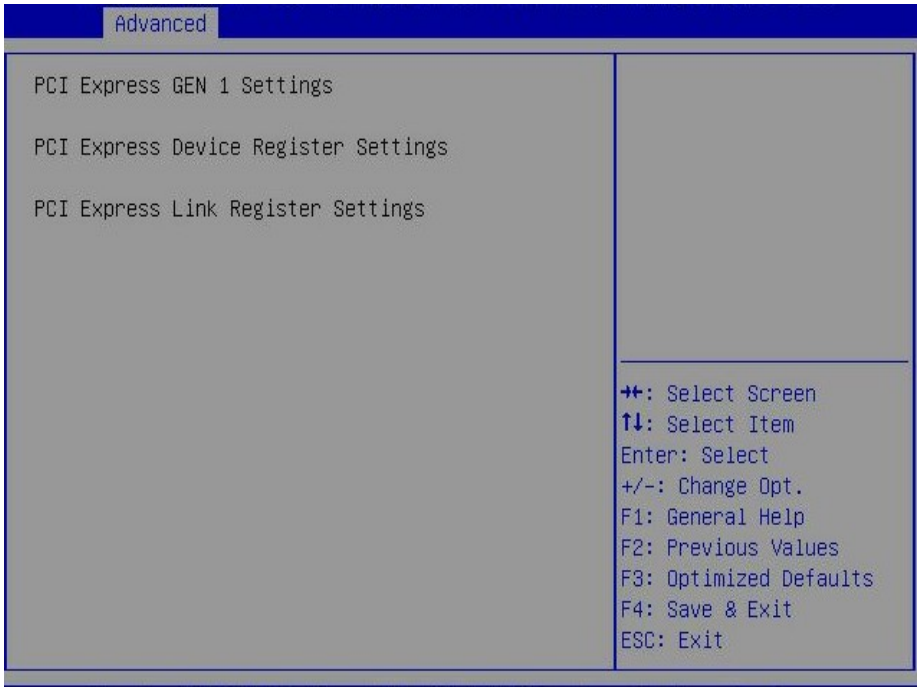


Figure F.18 Advanced>>PCI subsystem settings>>Slot #X>>PCI Express GEN 1 settings

PCI Express GEN 2 Settings

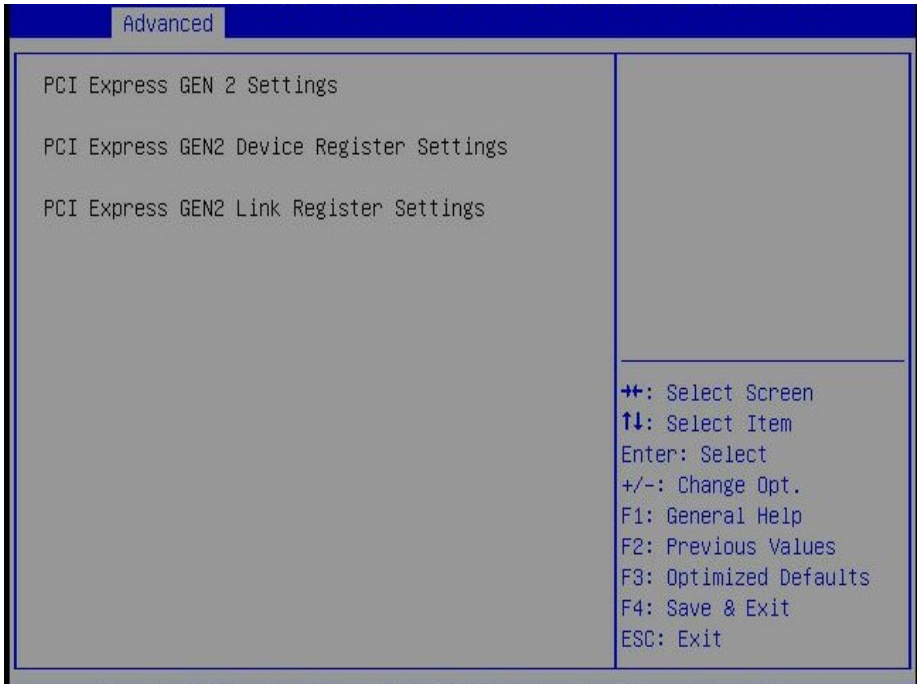


Figure F.19 Advanced>>PCI subsystem settings>>Slot #X>>PCI Express GEN 2 settings

USB CONFIGURATION

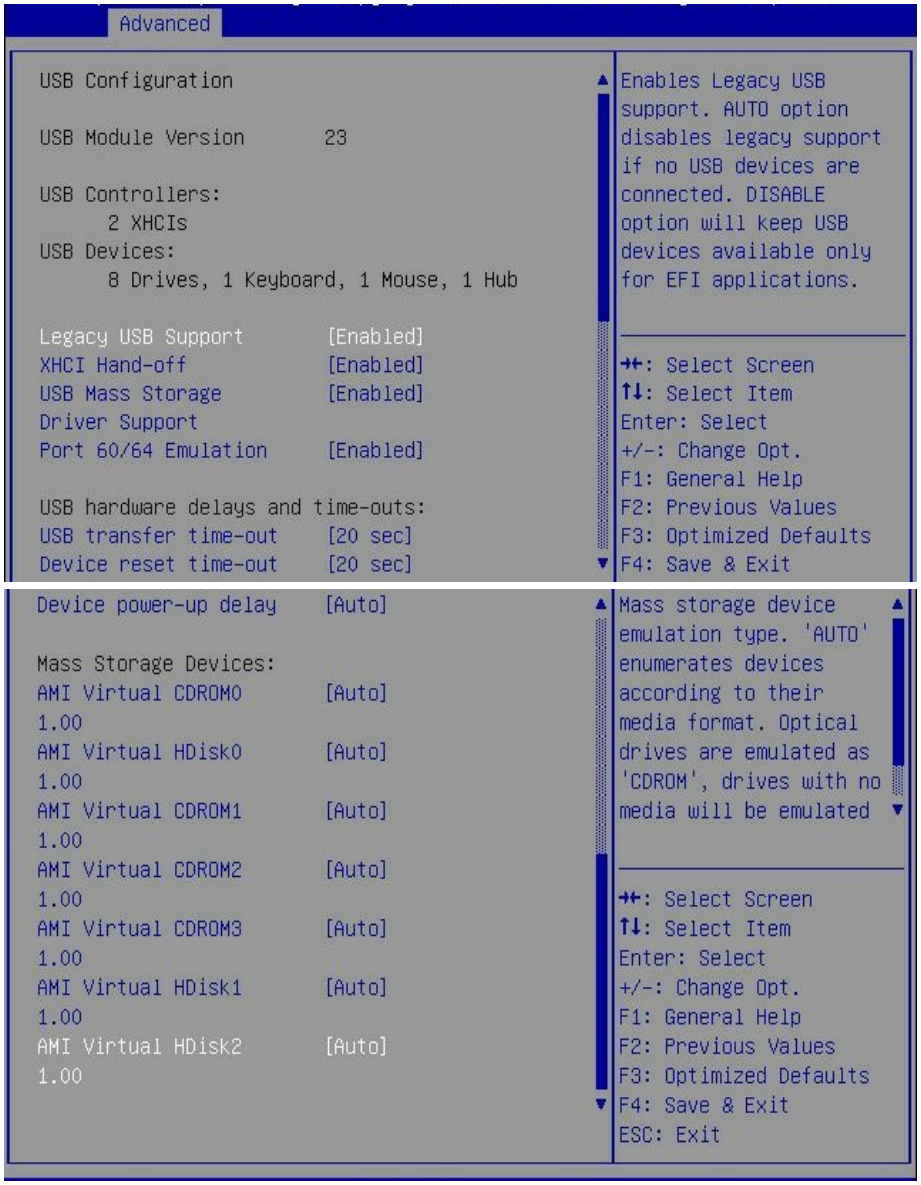


Figure F.20 Advanced>>USB config

CSM CONFIGURATION

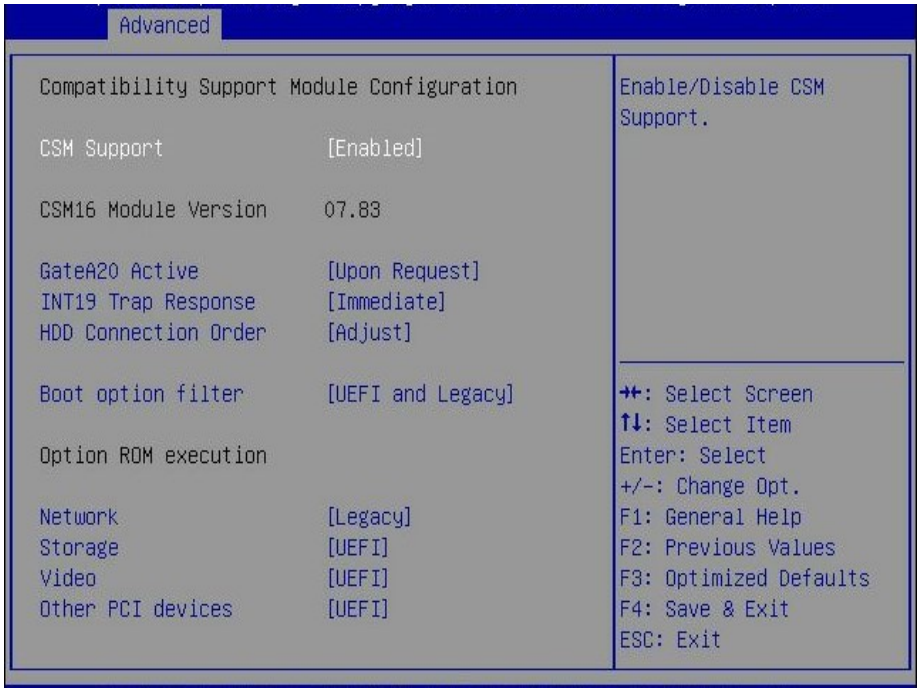


Figure F.21 Advanced>>CSM config

NVME CONFIGURATION

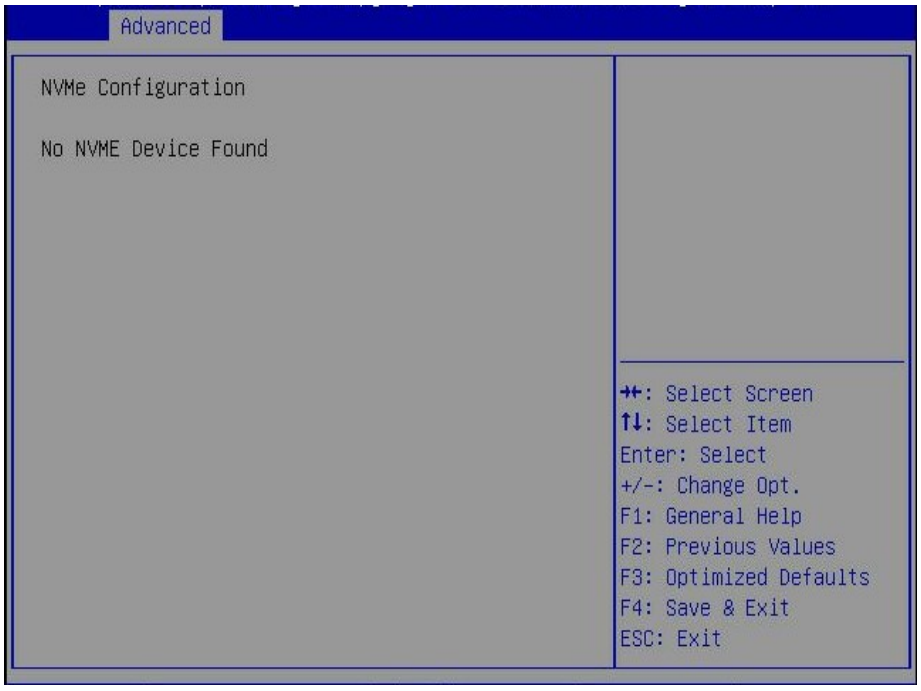


Figure F.22 Advanced>>NVMe config

SATA CONFIGURATION

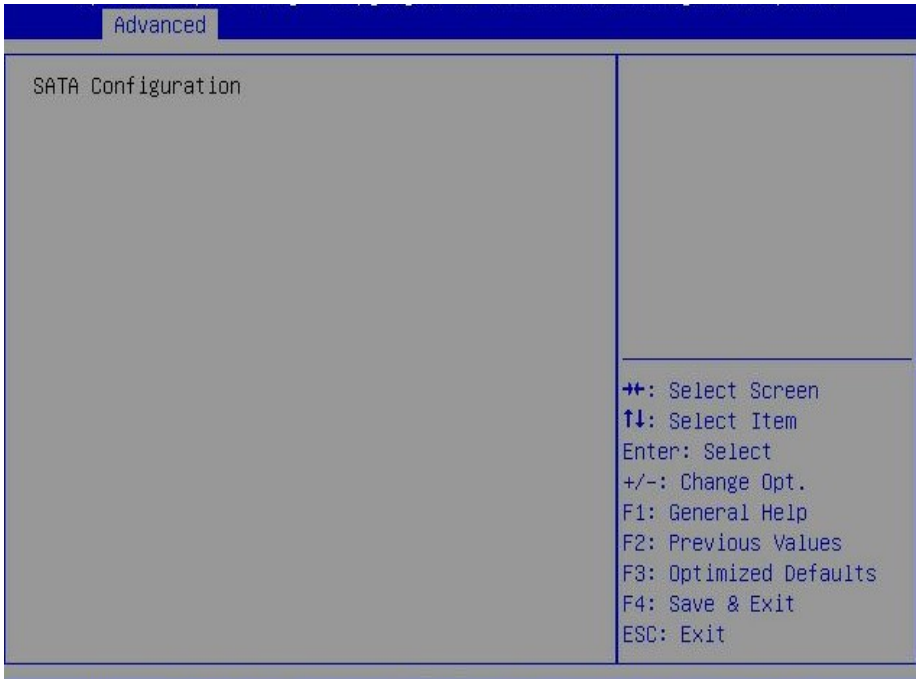


Figure F.23 Advanced>>SATA config

T1S AUTH CONFIGURATION

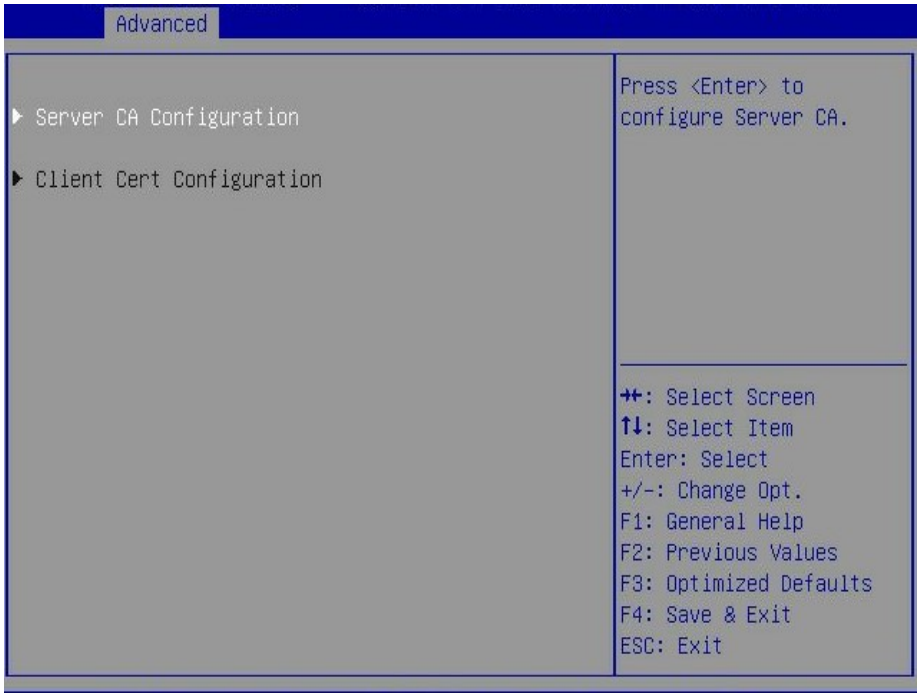


Figure F.24 Advanced>>T1s auth config

Server CA Configuration

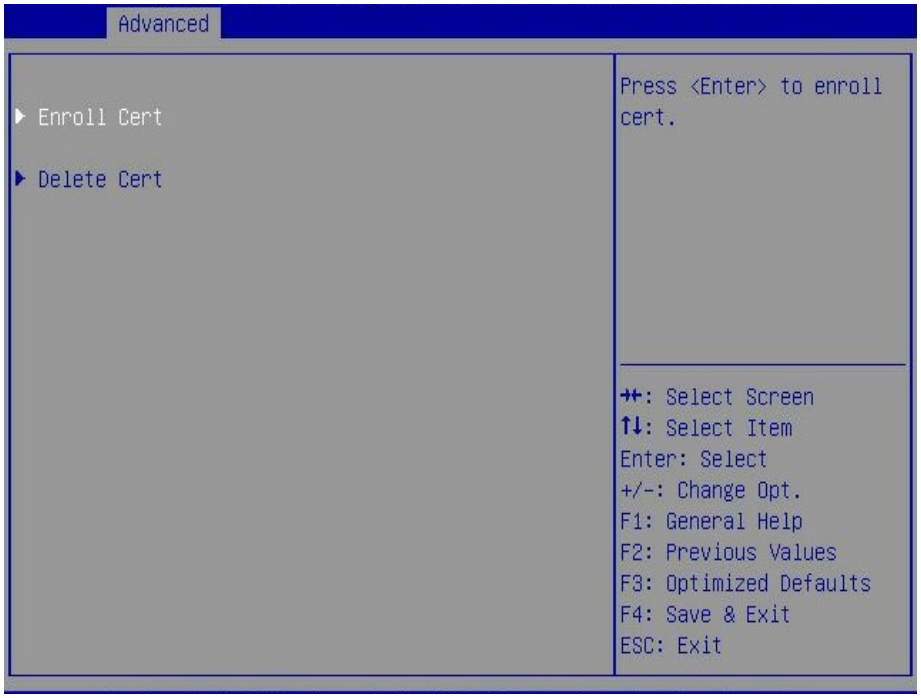


Figure F.25 Advanced>>T1s auth config>>Server CA config

Enroll Cert

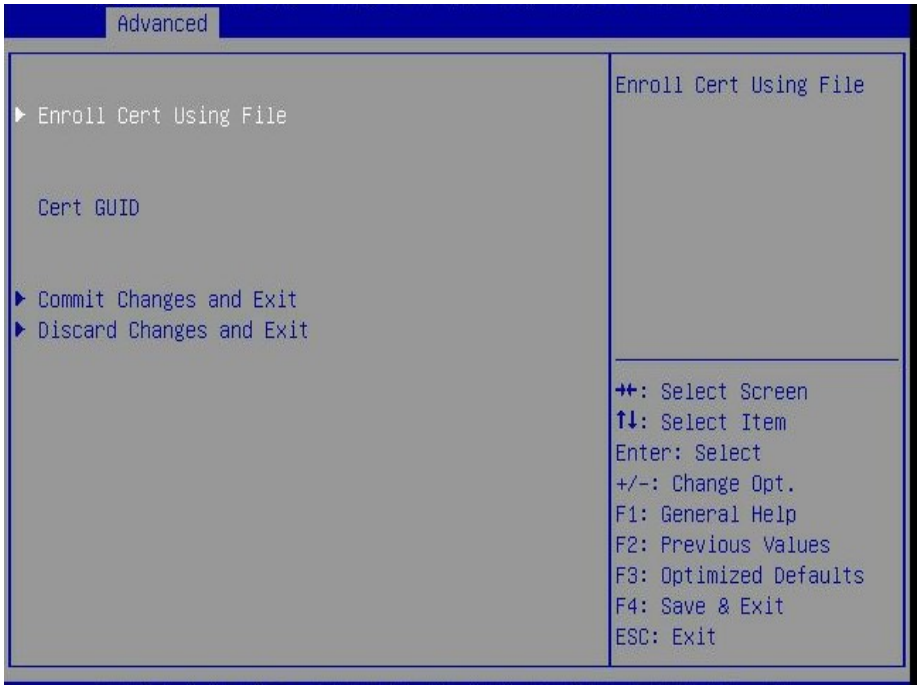


Figure F.26 Advanced>>T1s auth config>>Server CA config>>Enroll cert

Delete Cert

No certs are enrolled by default.

Client Cert Configuration

No certs are enrolled by default.

NETWORK STACK CONFIGURATION

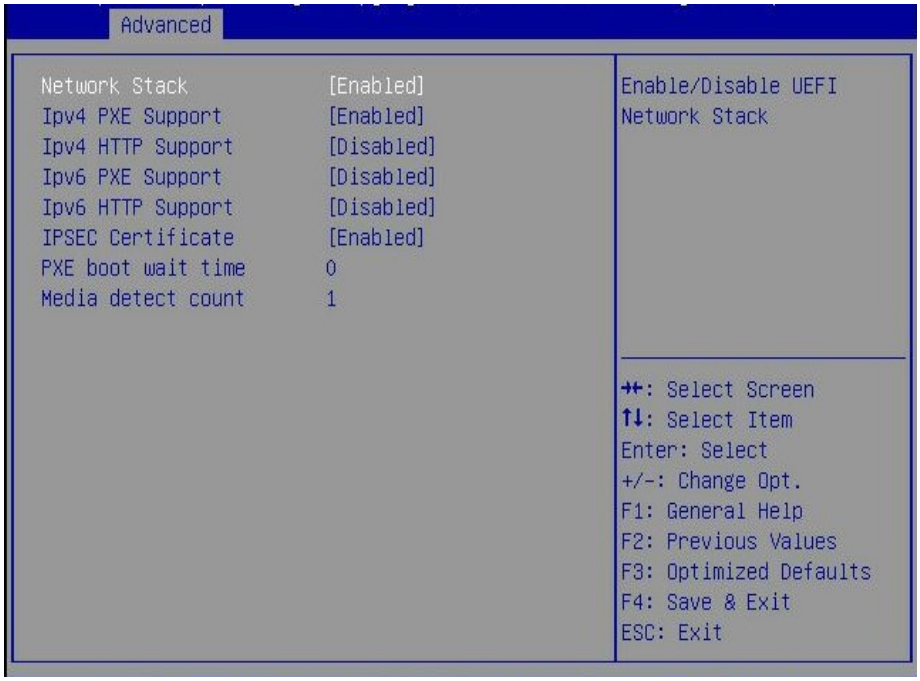


Figure F.27 Advanced>>Network stack config

AMD MEM CONFIGURATION STATUS

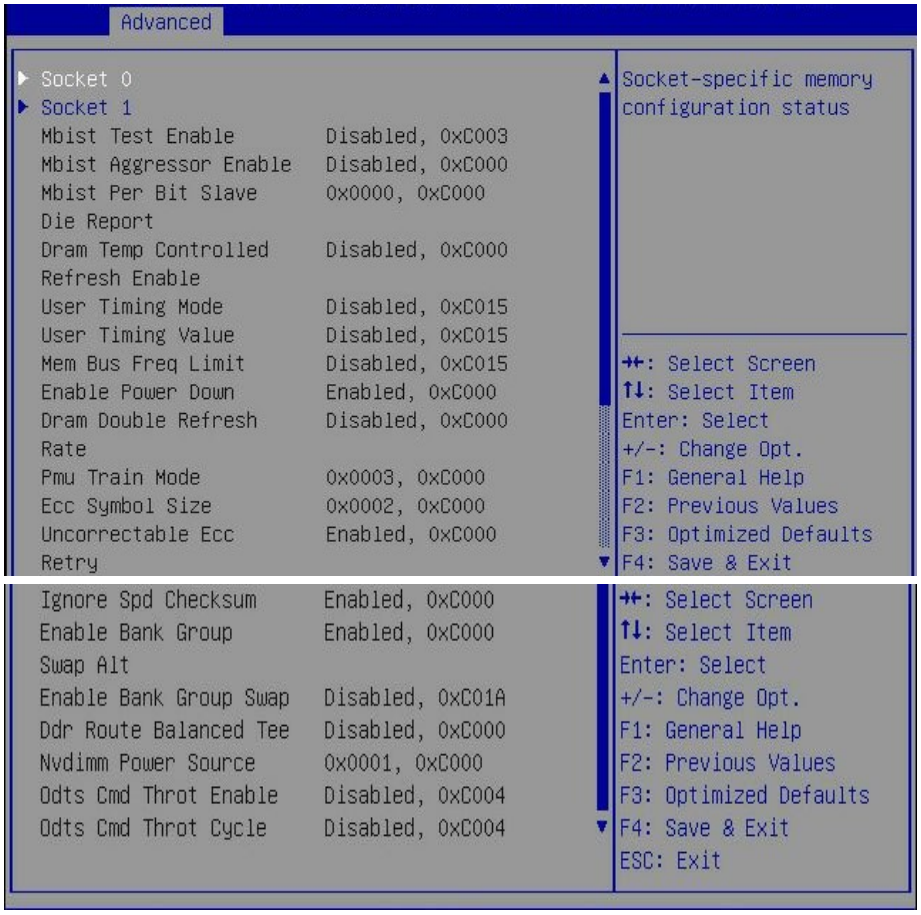


Figure F.28 Advanced>>AMD Mem config status

Socket 0 & Socket 1

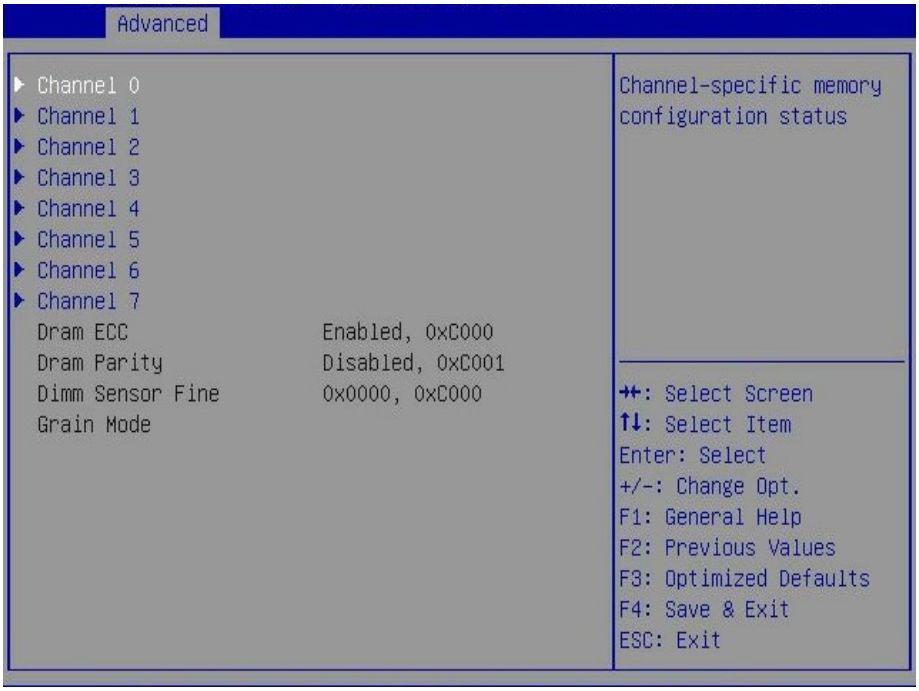


Figure F.29 Advanced>>AMD mem config status>>Socket 0 & socket 1

Channels 0–7

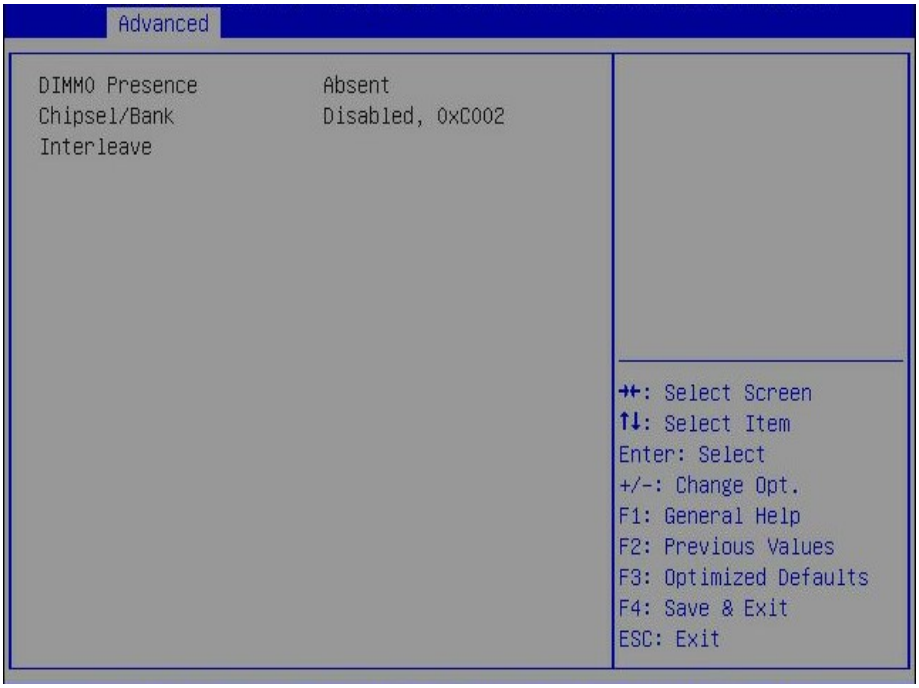


Figure F.30 Advanced>>AMD mem config status>>Socket 0 & socket 1>>Channel 0–7

ISCSI CONFIGURATION

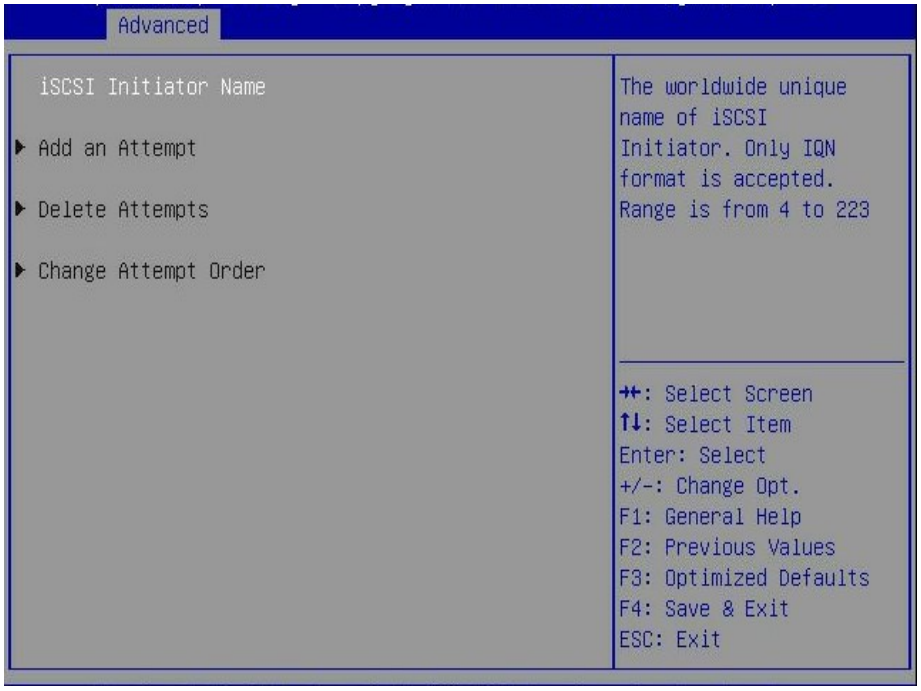


Figure F.31 Advanced>>iSCSI config

Add an Attempt

Option not currently available.

Delete Attempts

Option not currently available.

Change Attempt Order

Option not currently available.

GENERIC NVME PCIE SSD CONFIGURATION DATA (ALL)

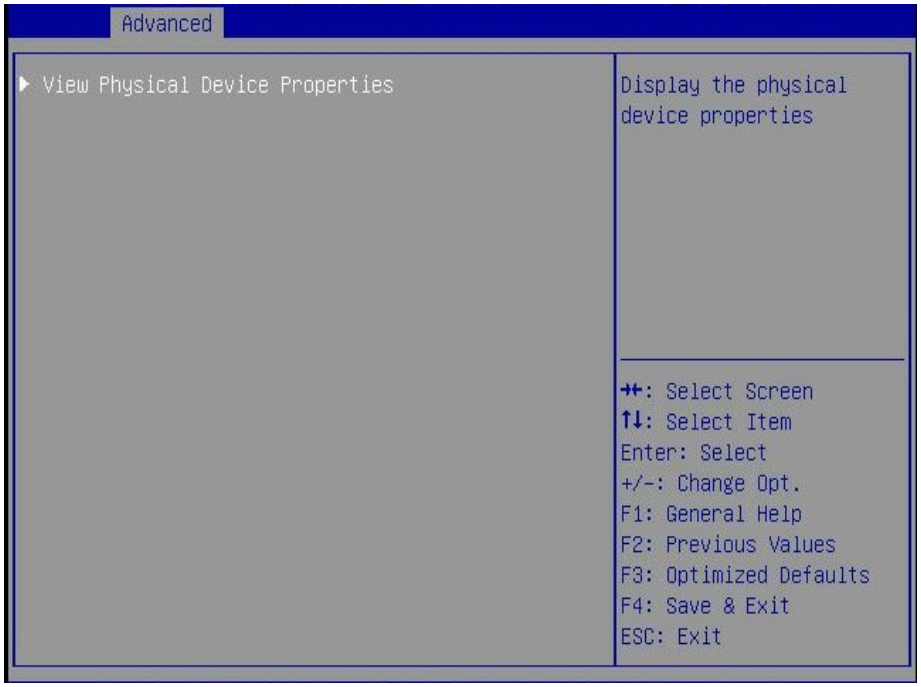


Figure F.32 Advanced>>Generic NVMe PCIe SSD config data

View Physical Device Properties

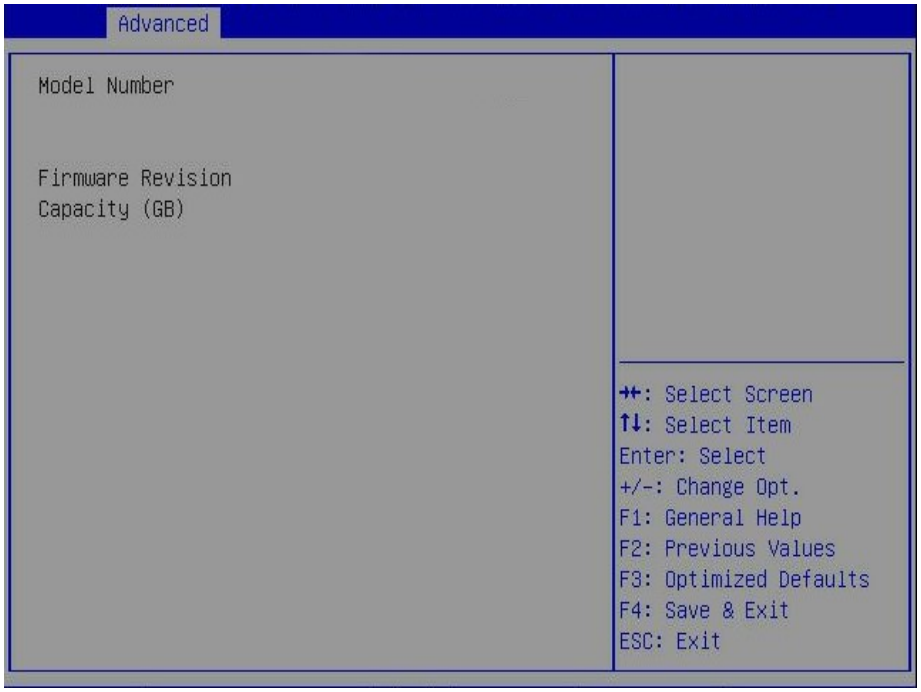


Figure F.33 Advanced>>Generic NVMe PCIe SSD config data>>View physical device properties

DRIVER HEALTH

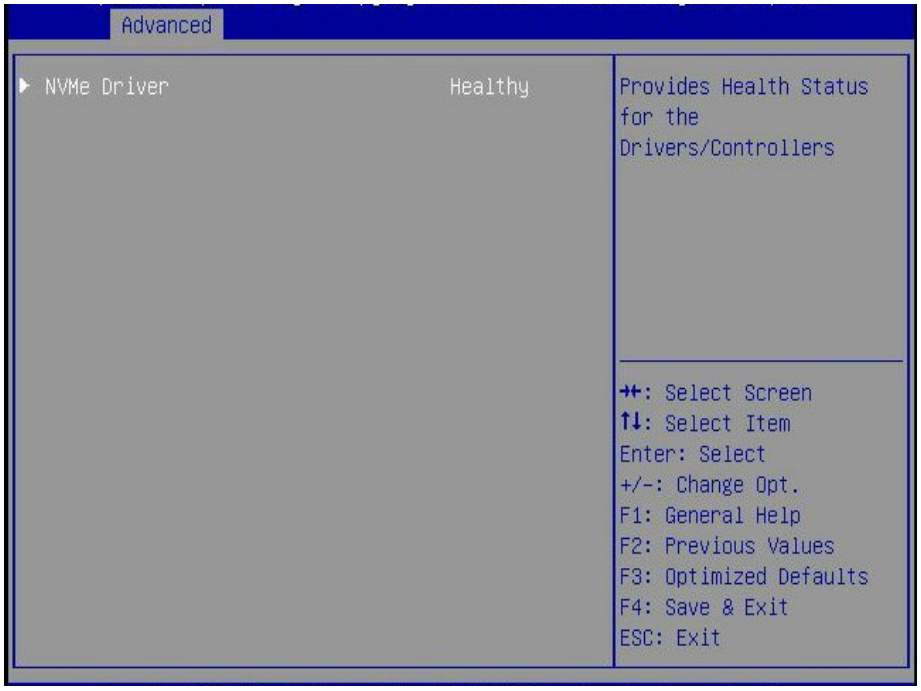


Figure F.34 Advanced>>Driver health

Driver

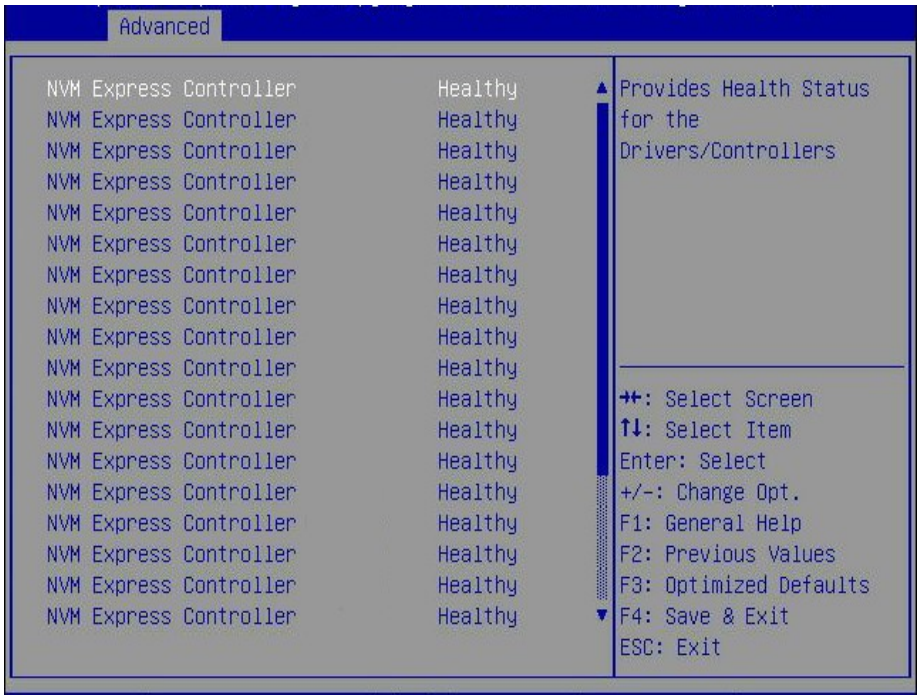


Figure F.35 Advanced>>Driver health>>Driver

Chipset Tab

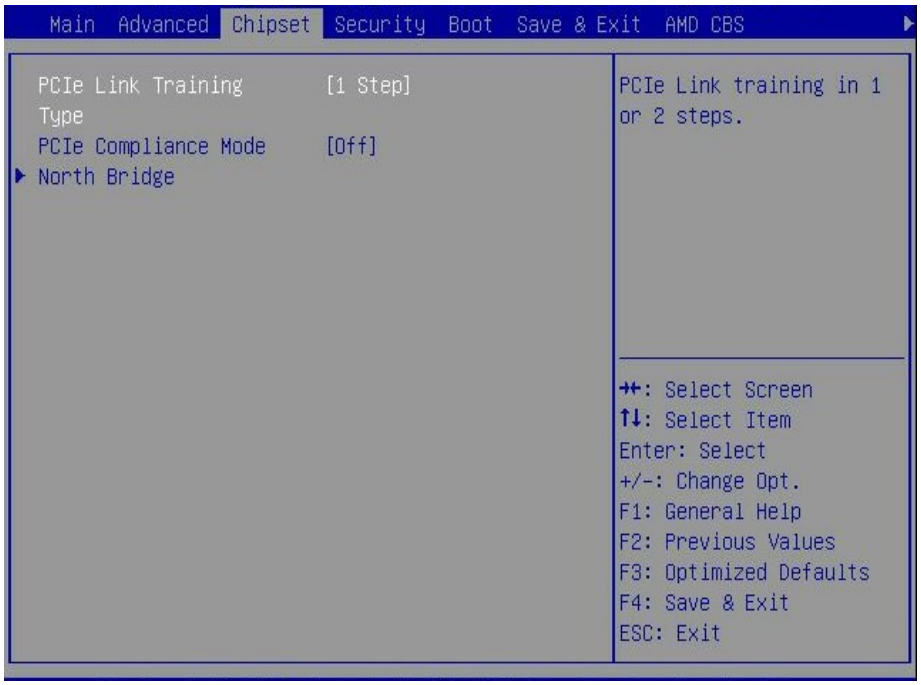


Figure F.36 Chipset

NORTH BRIDGE

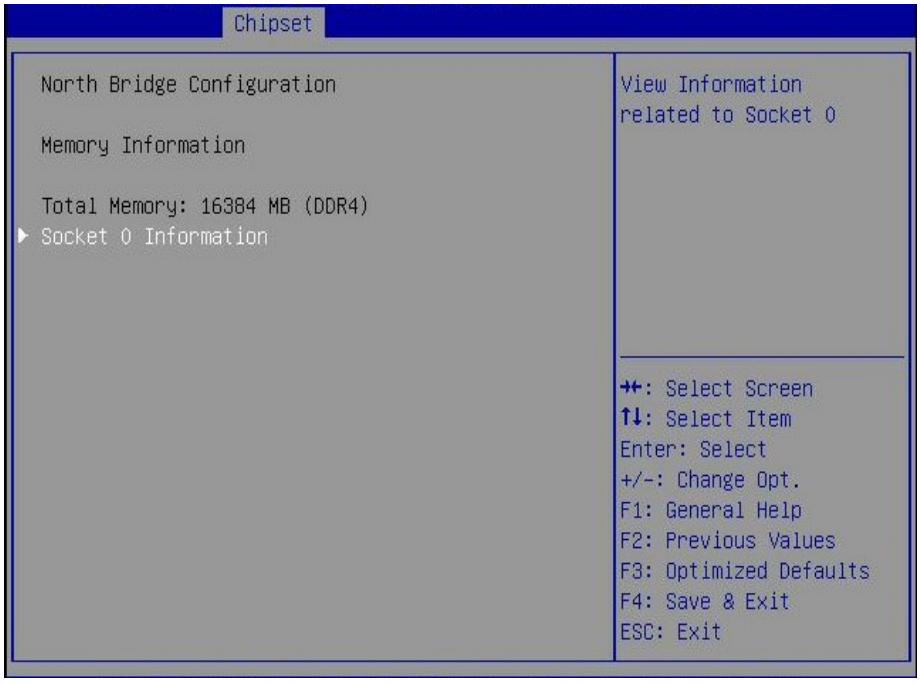


Figure F.37 Chipset>>North bridge

Socket 0 Information

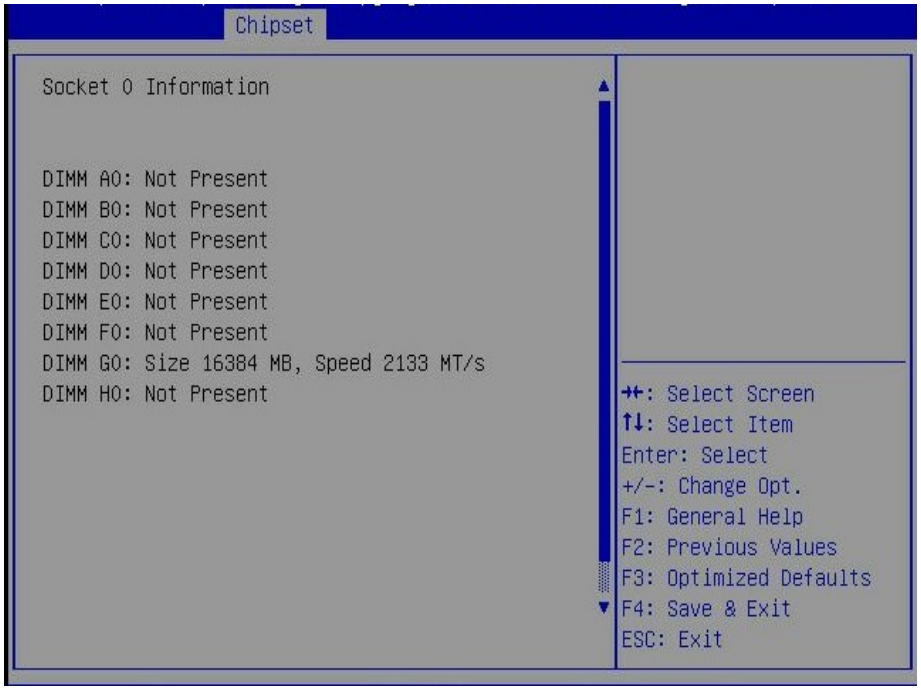


Figure F.38 Chipset>>North bridge>>Socket 0 information

Security Tab

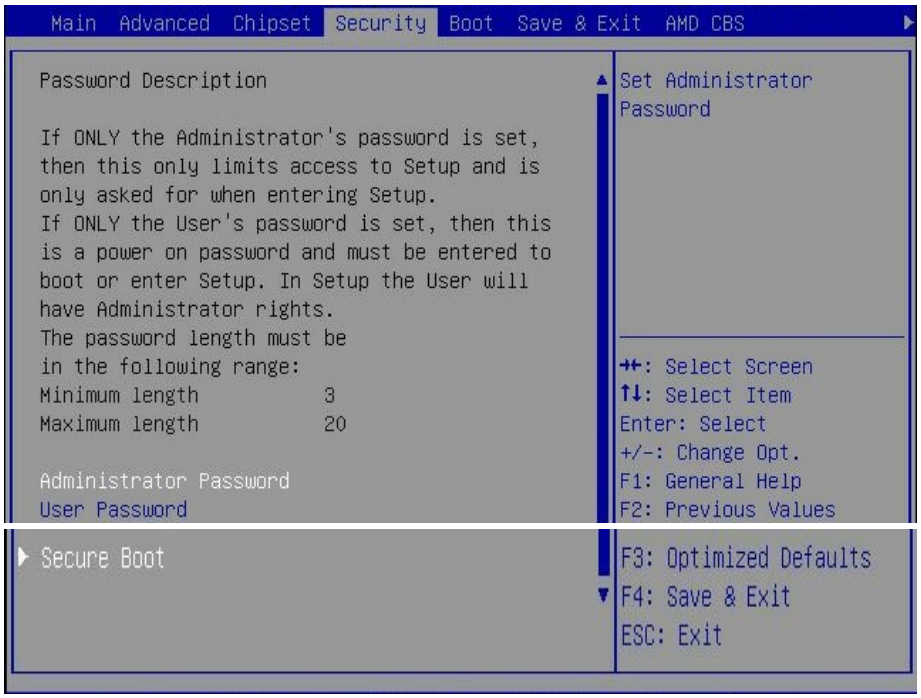


Figure F.39 Security

SECURE BOOT

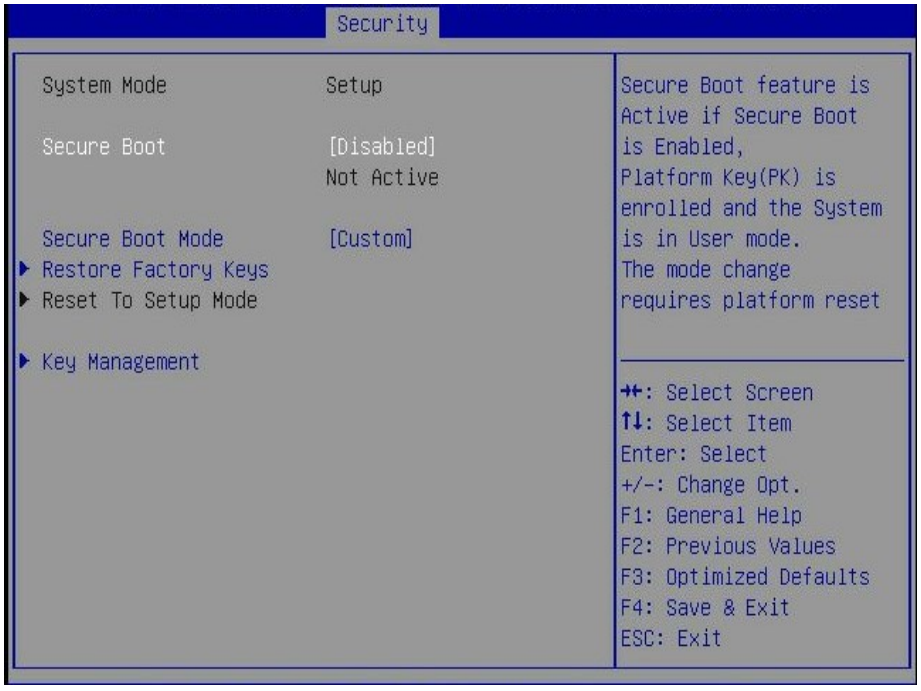


Figure F.40 Security>>Secure boot

Key Management

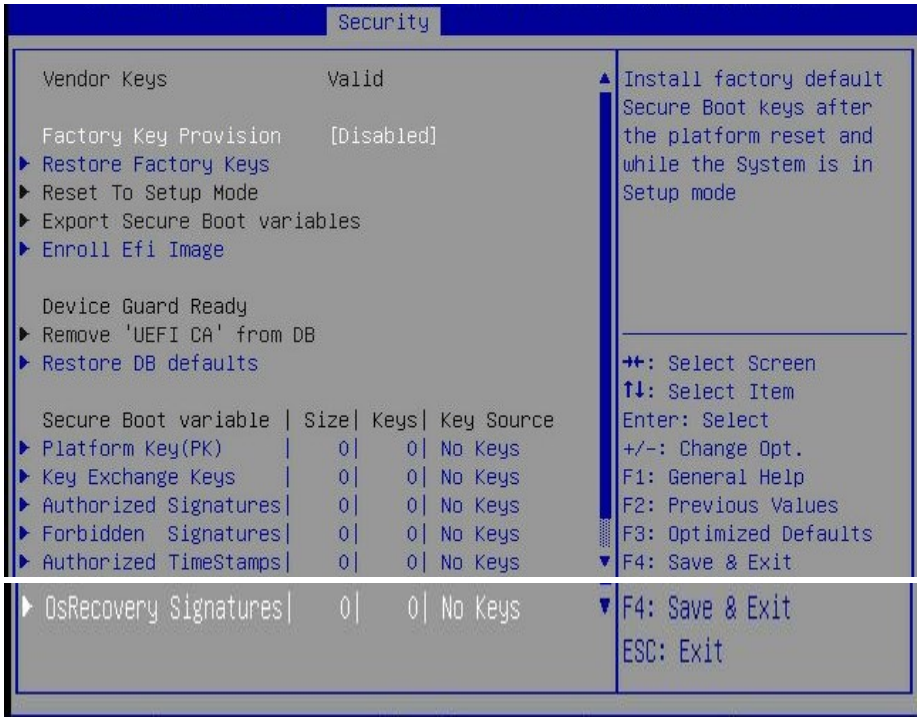


Figure F.41 Security>>Secure boot>>Key management

Boot Tab

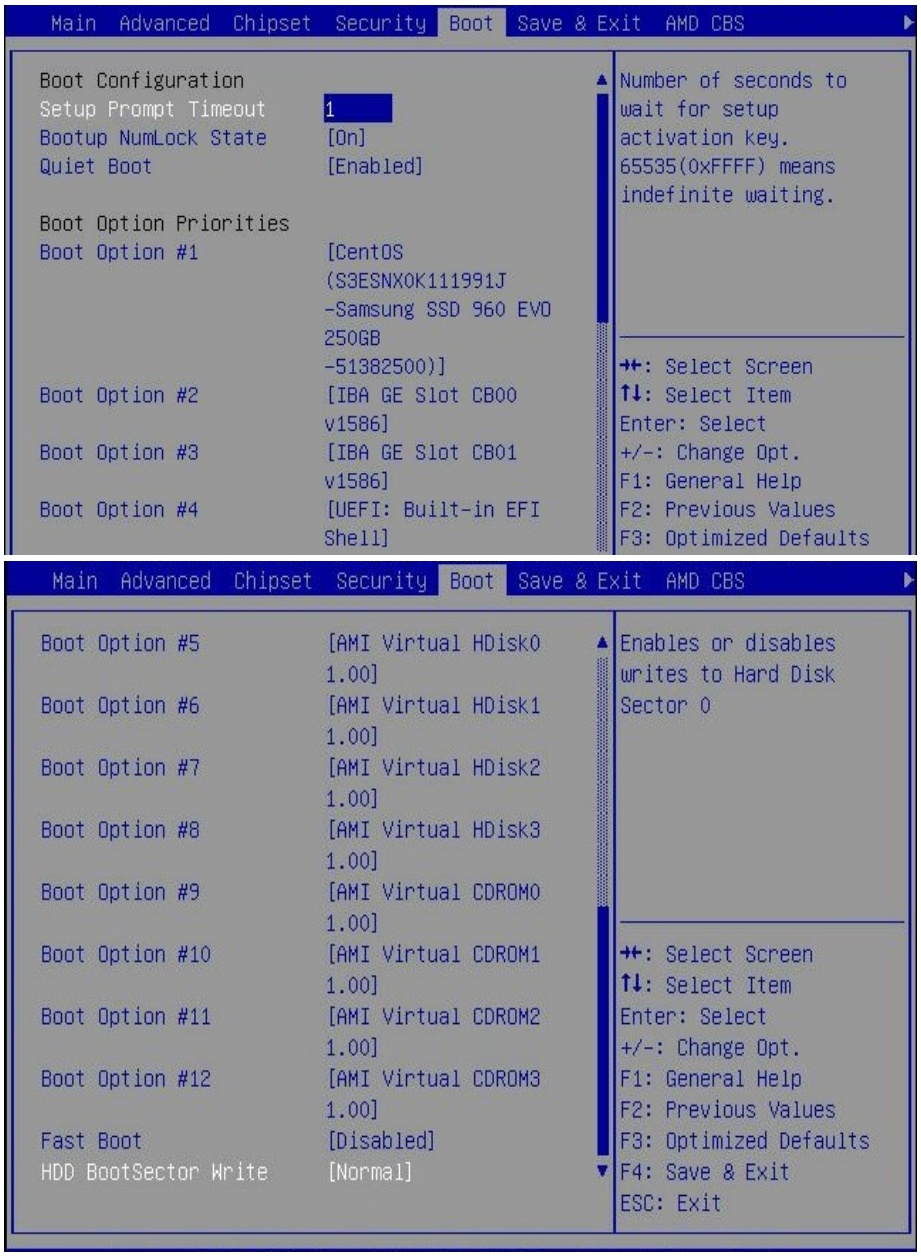


Figure F.42 Boot tab

Save & Exit Tab

Figure F.43 Save & Exit tab

AMD CBS Tab

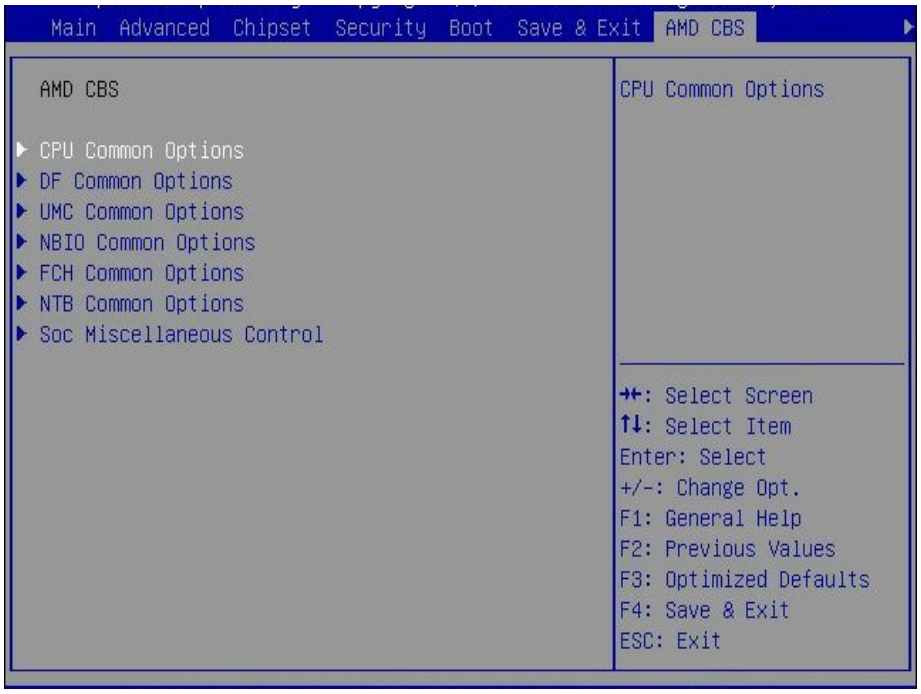


Figure F.44 AMD CBS tab

CPU COMMON OPTIONS

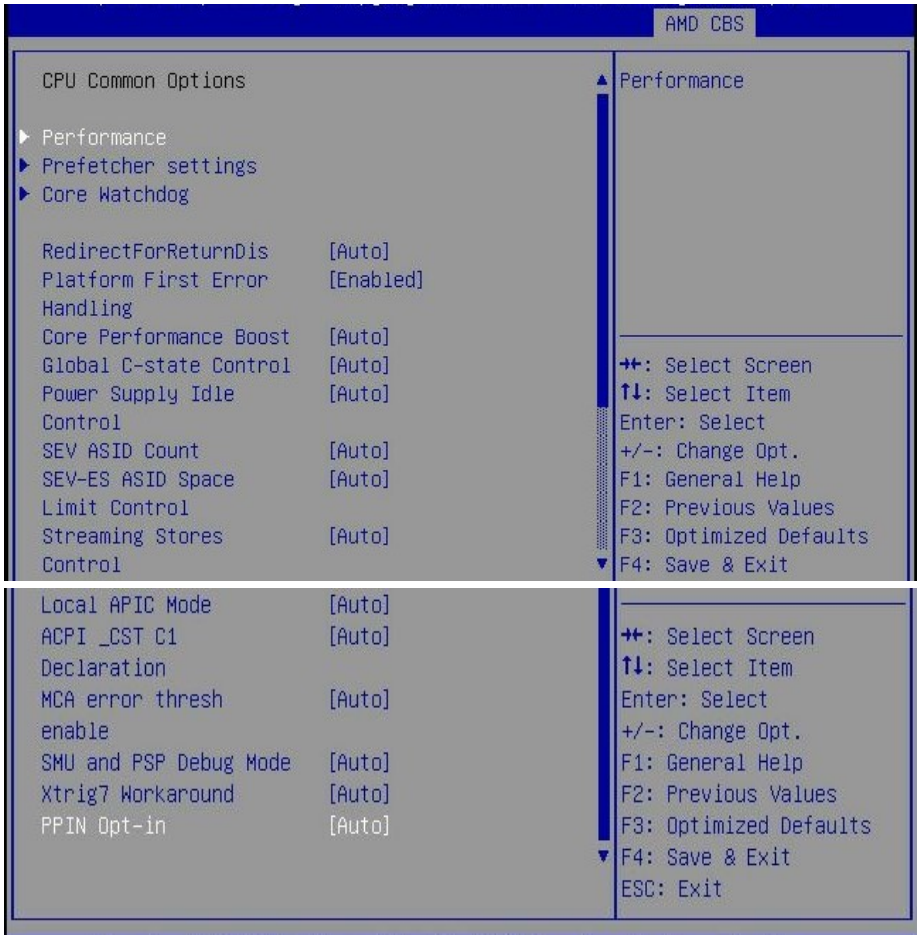


Figure F.45 AMD CBS>>CPU common options

Performance

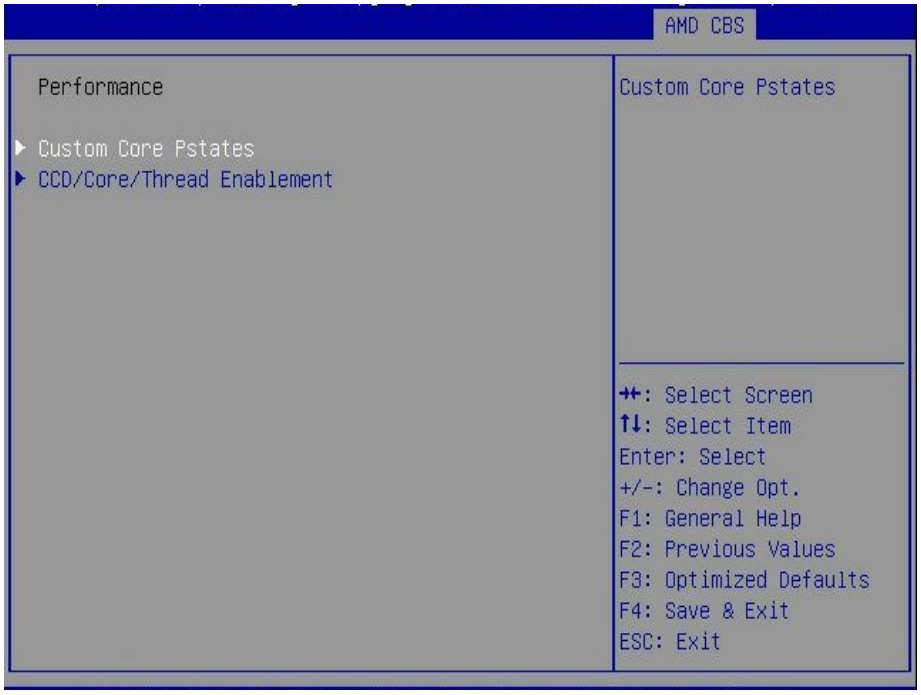


Figure F.46 AMD CBS>>CPU common options>>Performance

Custom Core Pstates

Option not currently available

CCD/Core/Thread Enablement

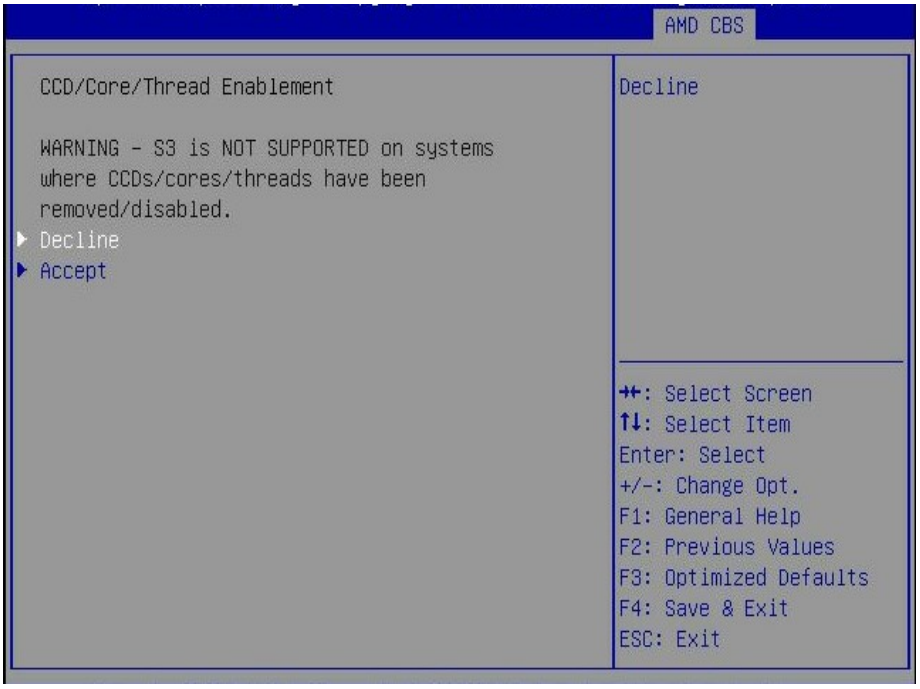


Figure F.47 AMD CBS>>CPU common options>>Performance>>CCD/core/thread enablement

Prefetcher Settings

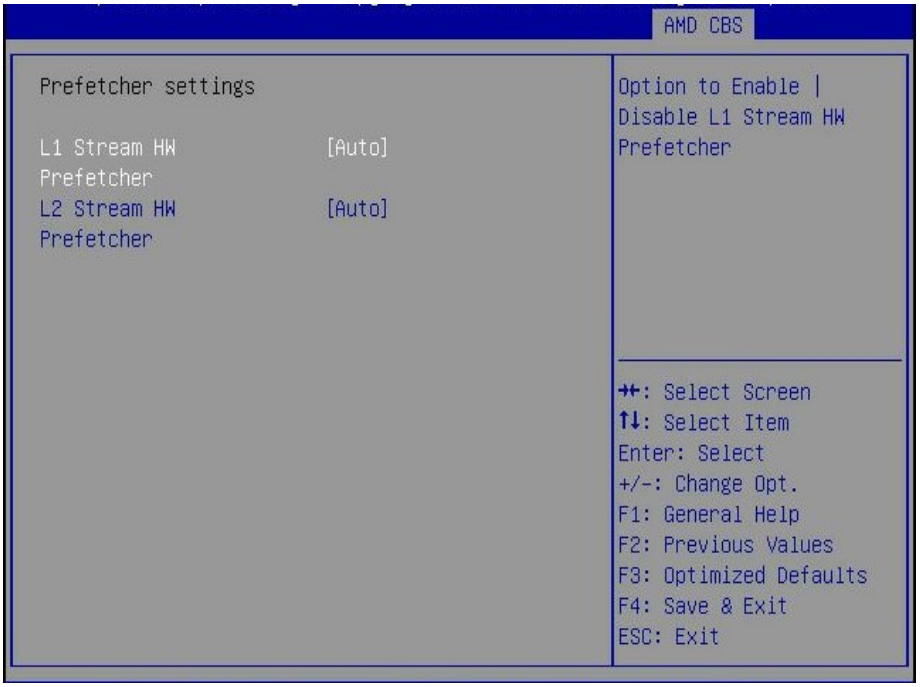


Figure F.48 AMD CBS>>CPU common options>>Prefetcher settings

Core Watchdog

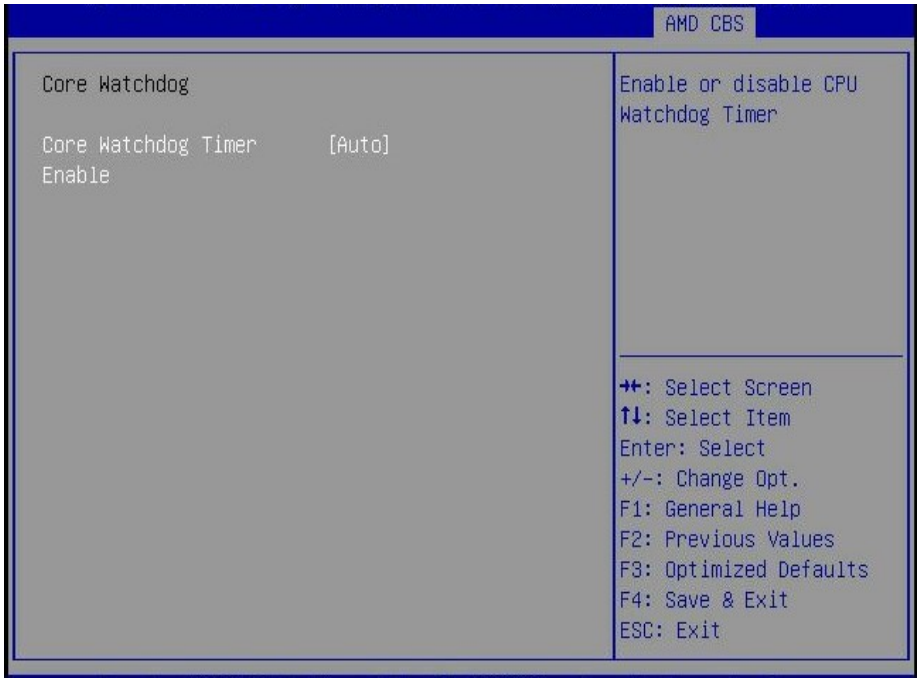


Figure F.49 AMD CBS>>CPU common options>>Core watchdog

DF COMMON OPTIONS

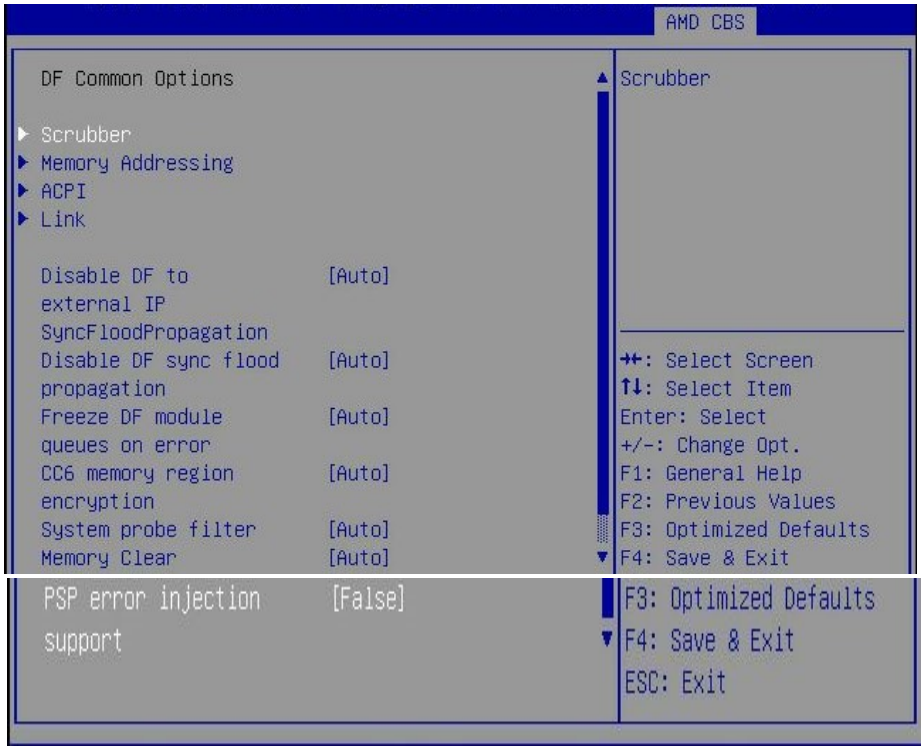


Figure F.50 AMD CBS>>DF common options

Scrubber

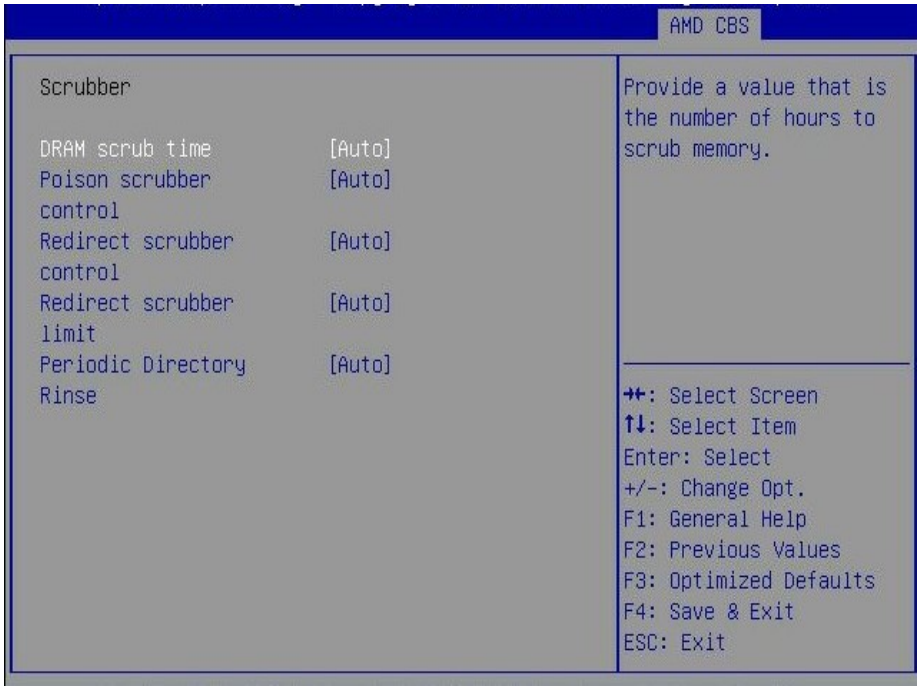


Figure F.51 AMD CBS>>DF common options>>Scrubber

Memory Addressing

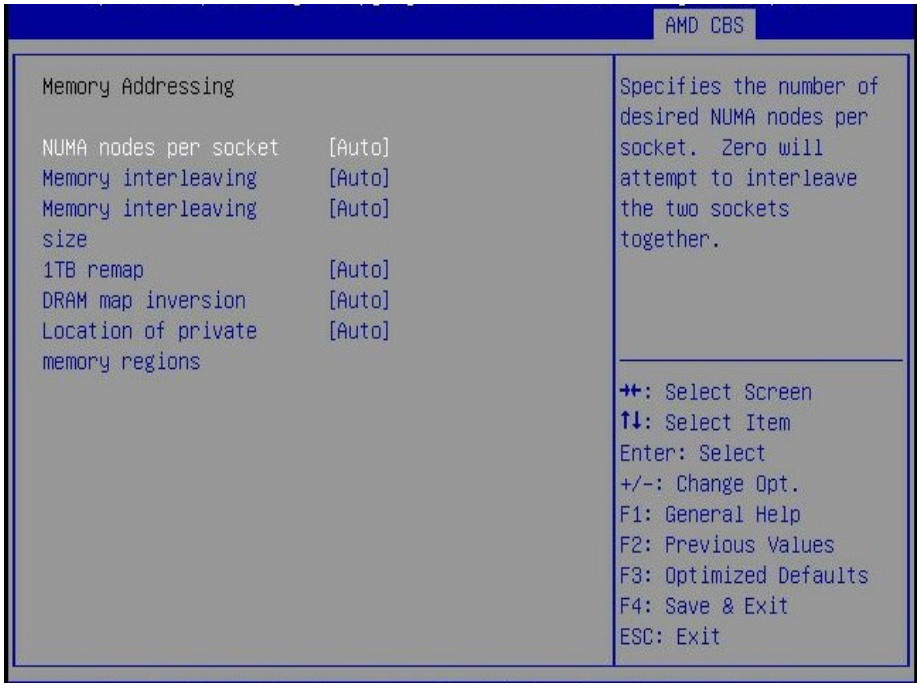


Figure F.52 AMD CBS>>DF common options>>Memory addressing

ACPI

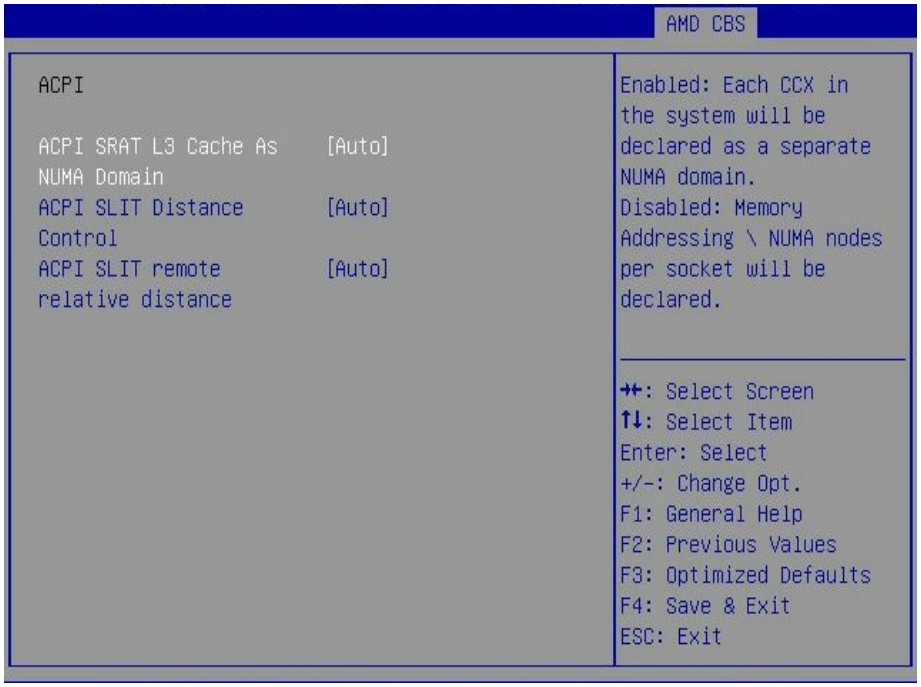


Figure F.53 AMD CBS>>DF common options>>ACPI

Link

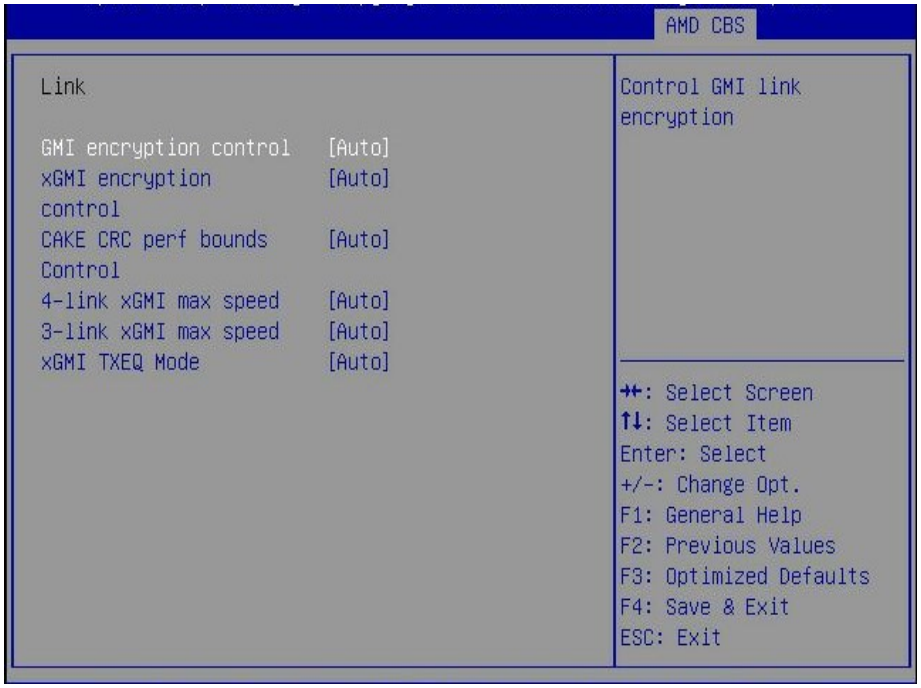


Figure F.54 AMD CBS>>DF common options>>Link

UMC COMMON OPTIONS

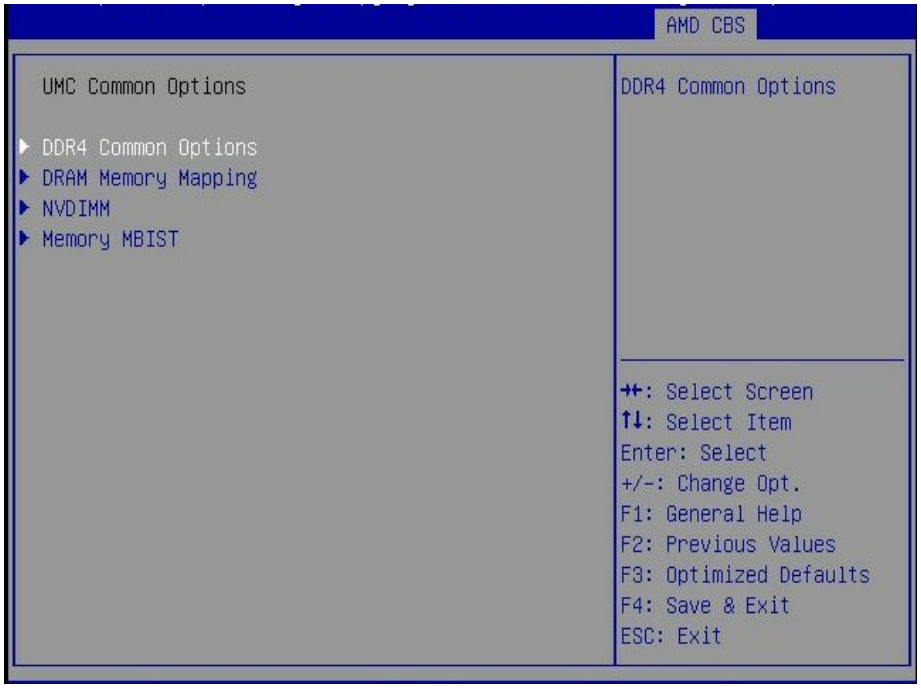


Figure F.55 AMD CBS>>UMC common options

DDR4 Common Options

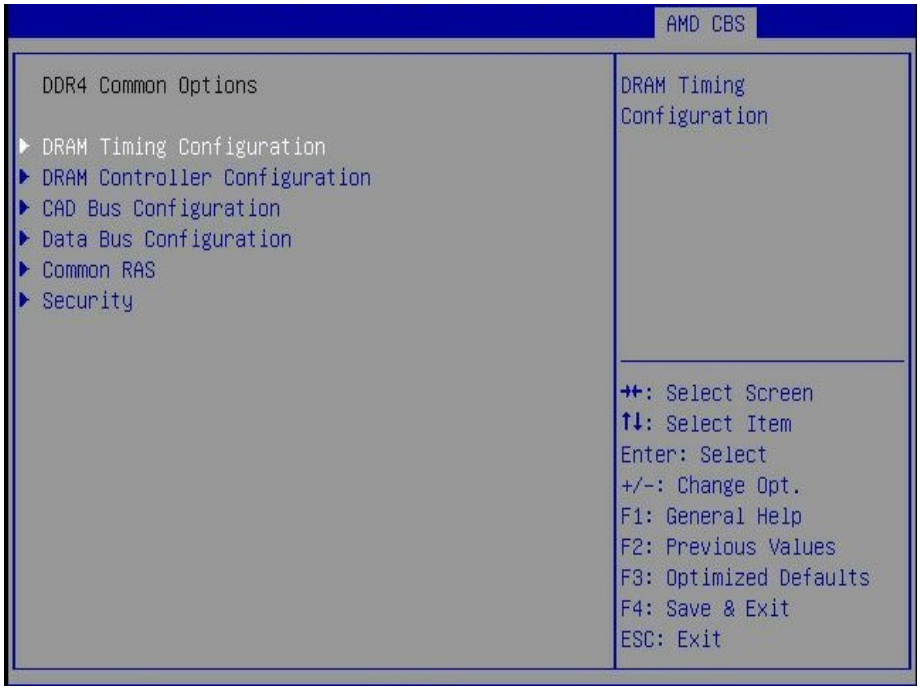


Figure F.56 AMD CBS>>UMC common options>>DDR4 common options

DRAM Timing Configuration

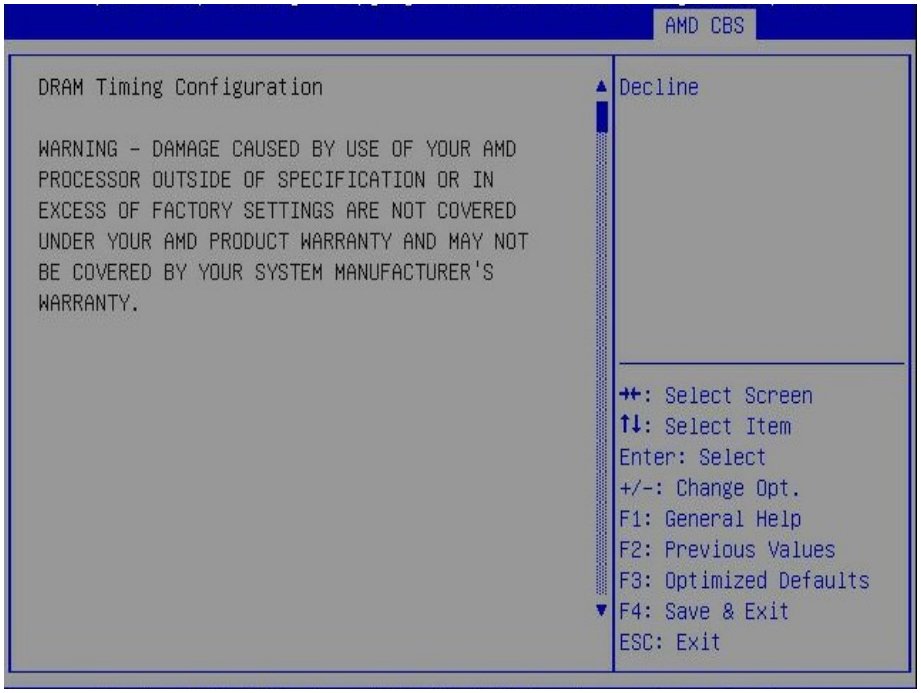


Figure F.57 AMD CBS>>UMC common options>>DDR4 common options>>DRAM timing config

DRAM Controller Configuration

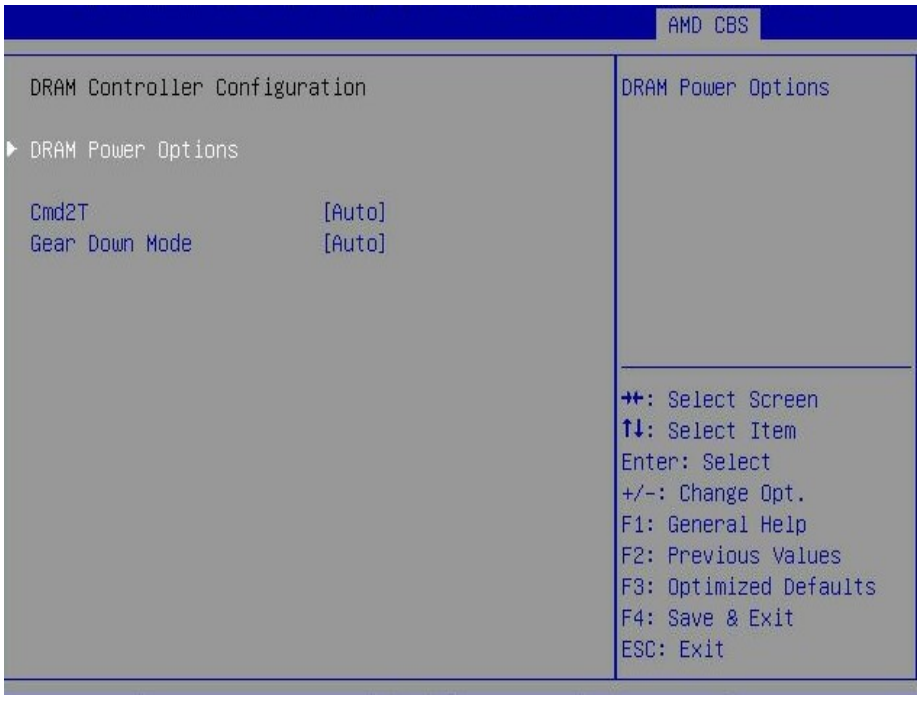


Figure F.58 AMD CBS>>UMC common options>>DDR4 common options>>DRAM controller config

DRAM Power Options

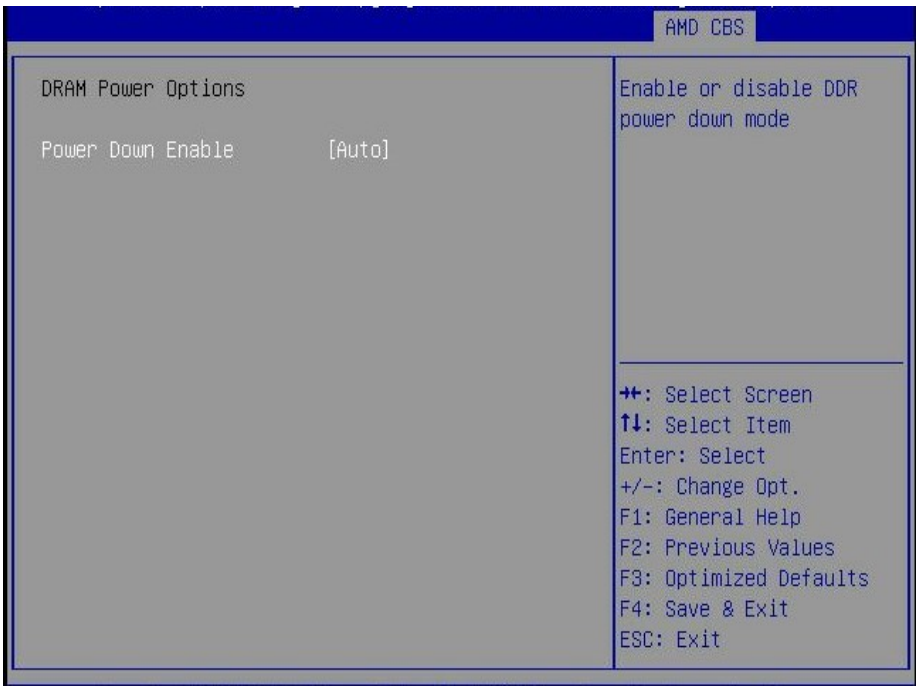


Figure F.59 AMD CBS>>UMC common options>>DDR4 common options>>DRAM controller config>>DRAM power options

CAD Bus Configuration

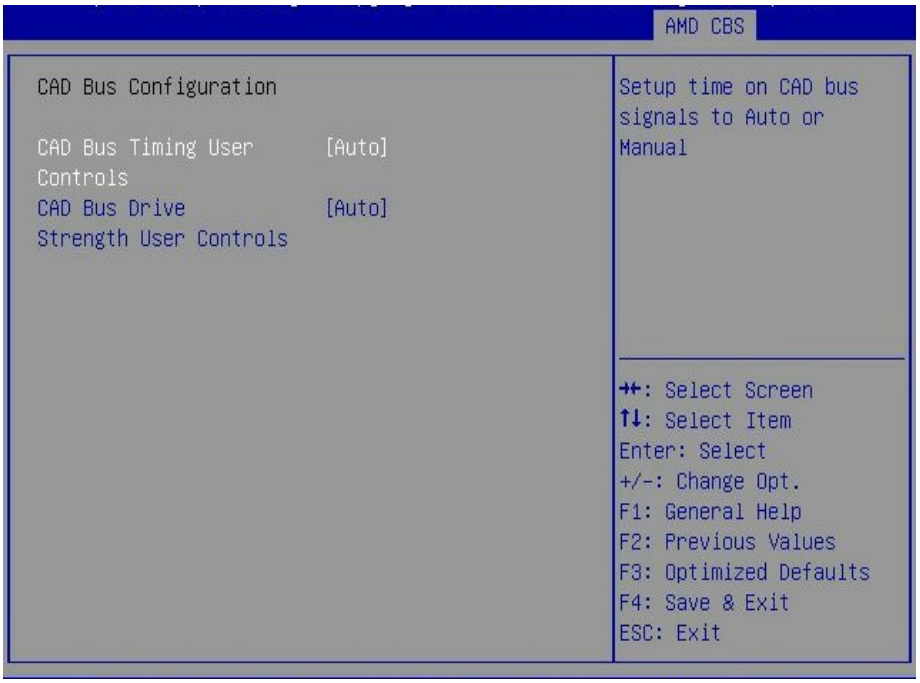


Figure F.60 AMD CBS>>UMC common options>>DDR4 common options>>CAD bus config

Data Bus Configuration

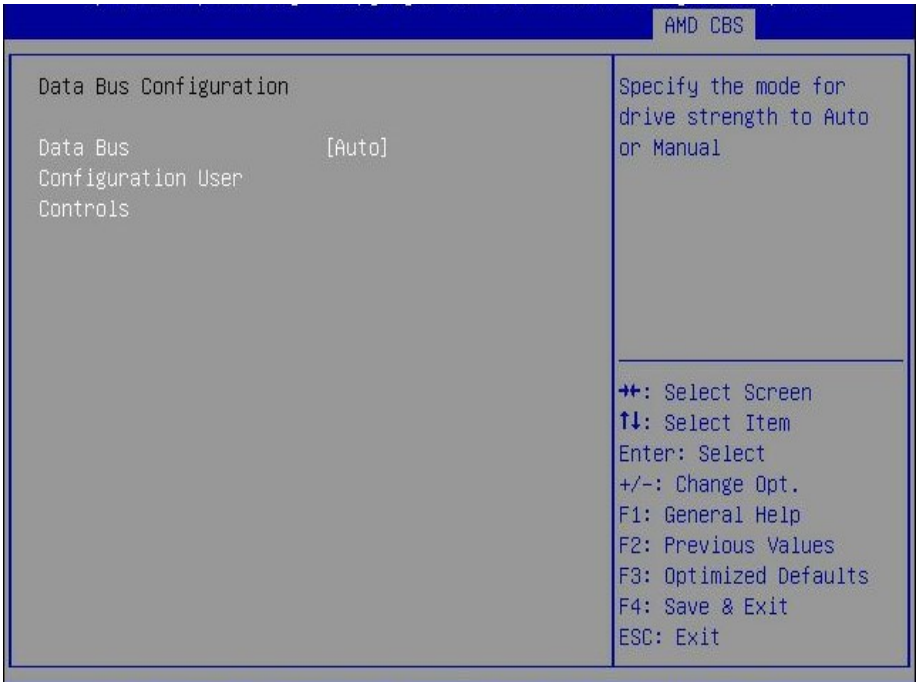


Figure F.61 AMD CBS>>UMC common options>>DDR4 common options>>Data bus config

Common RAS

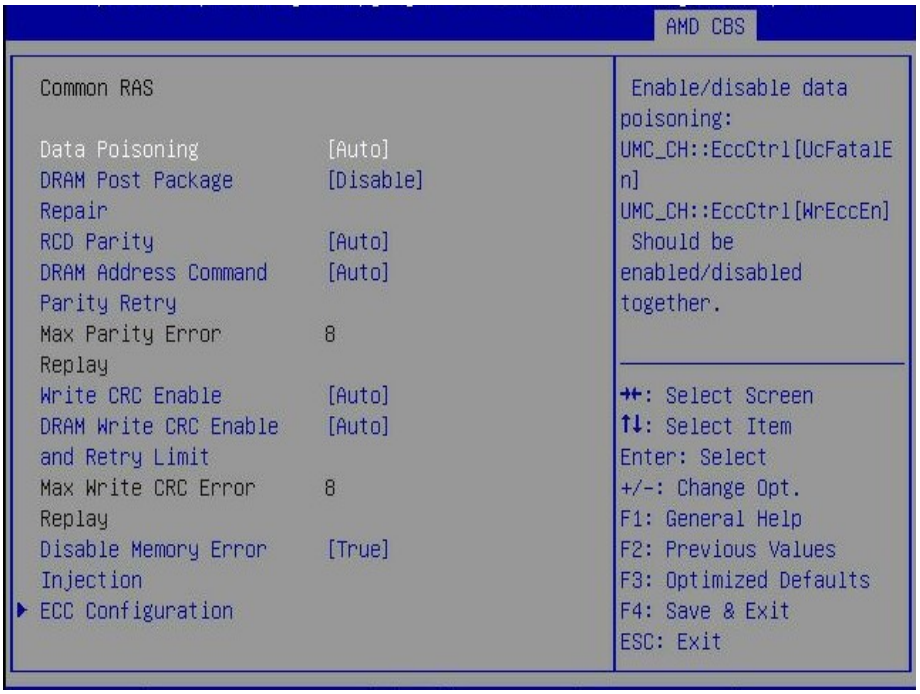


Figure F.62 AMD CBS>>UMC common options>>DDR4 common options>>Common RAS

ECC Configuration

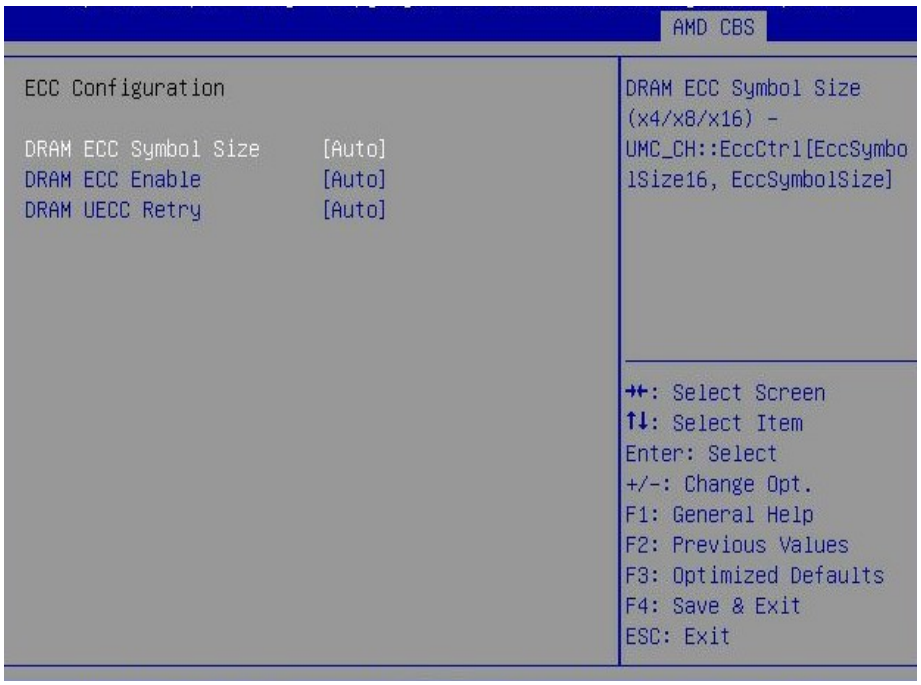


Figure F.63 AMD CBS>>UMC common options>>DDR4 common options>>Common RAS>>ECC config

Security

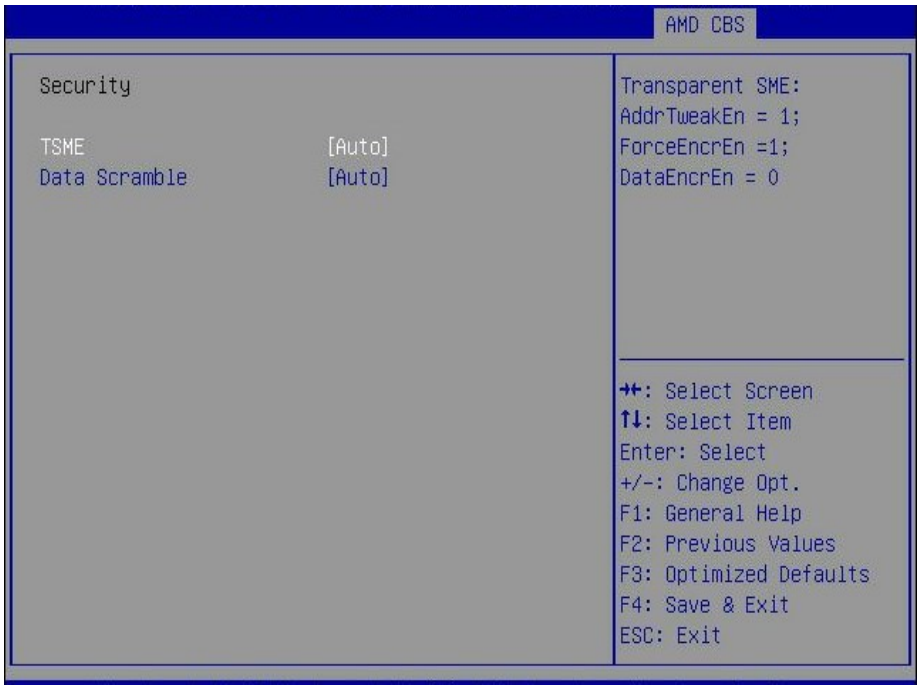


Figure F.64 AMD CBS>>UMC common options>>DDR4 common options>>Security

DRAM Memory Mapping

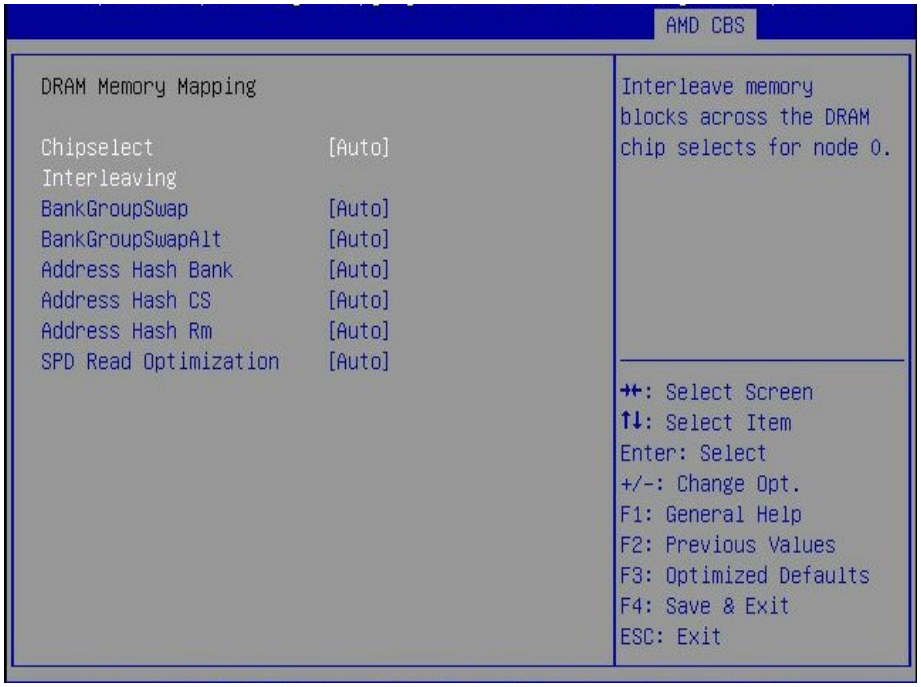


Figure F.65 AMD CBS>>UMC common options>>DRAM memory mapping

NVDIMM

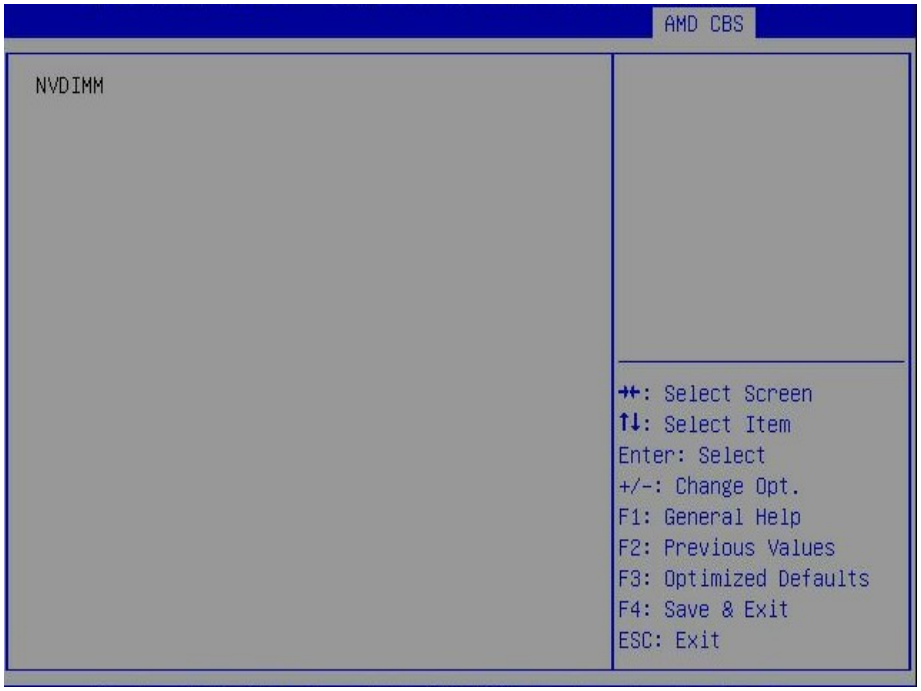


Figure F.66 AMD CBS>>UMC common options>>NVDIMM

Memory MBIST

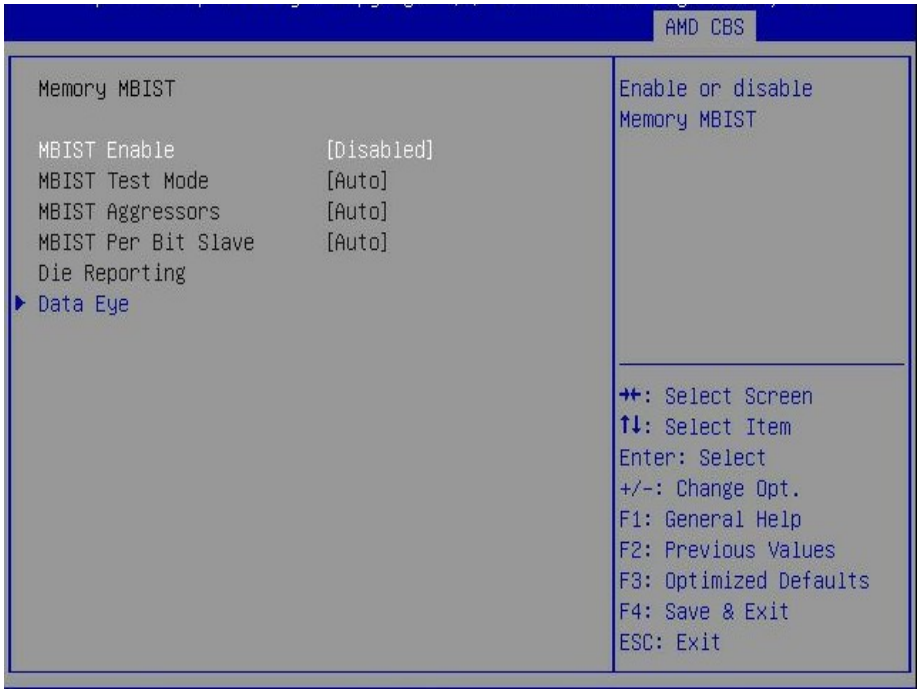


Figure F.67 AMD CBS>>UMC common options>>Memory MBIST

Data Eye

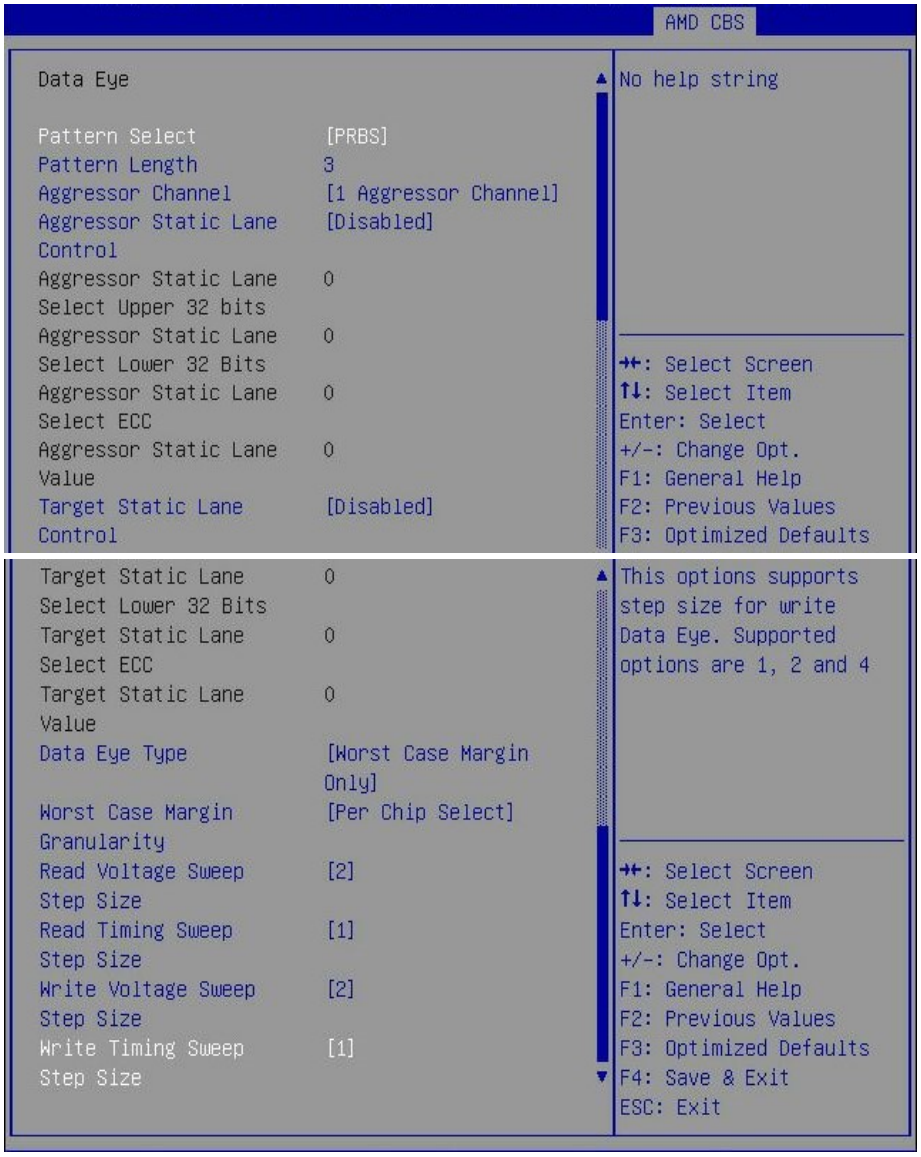


Figure F.68 AMD CBS>>UMC common options>>Memory MBIST>>Data eye

NBIO COMMON OPTIONS

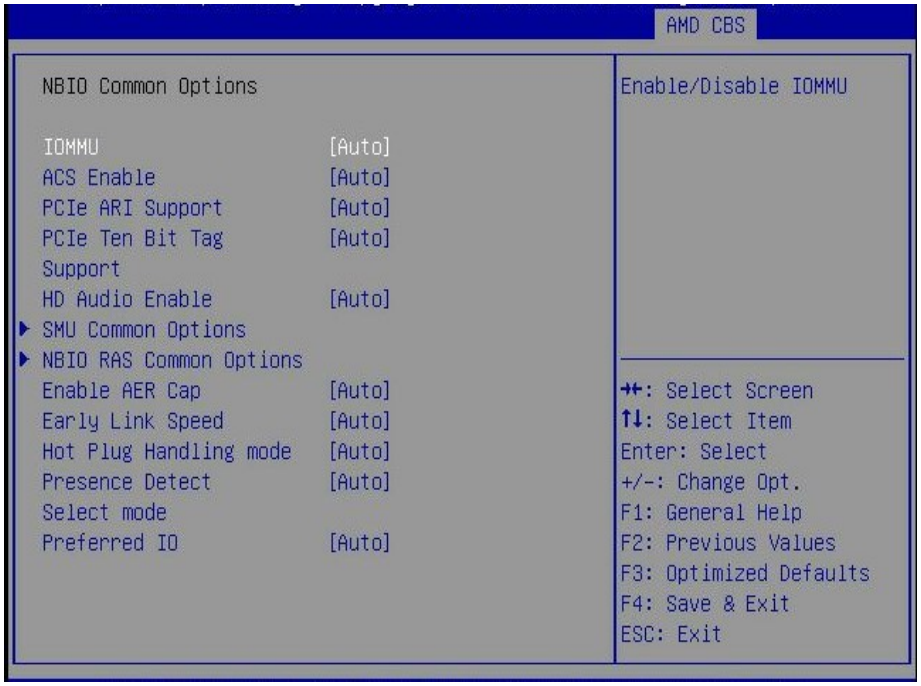


Figure F.69 AMD CBS>>NBIO common options

SMU Common Options

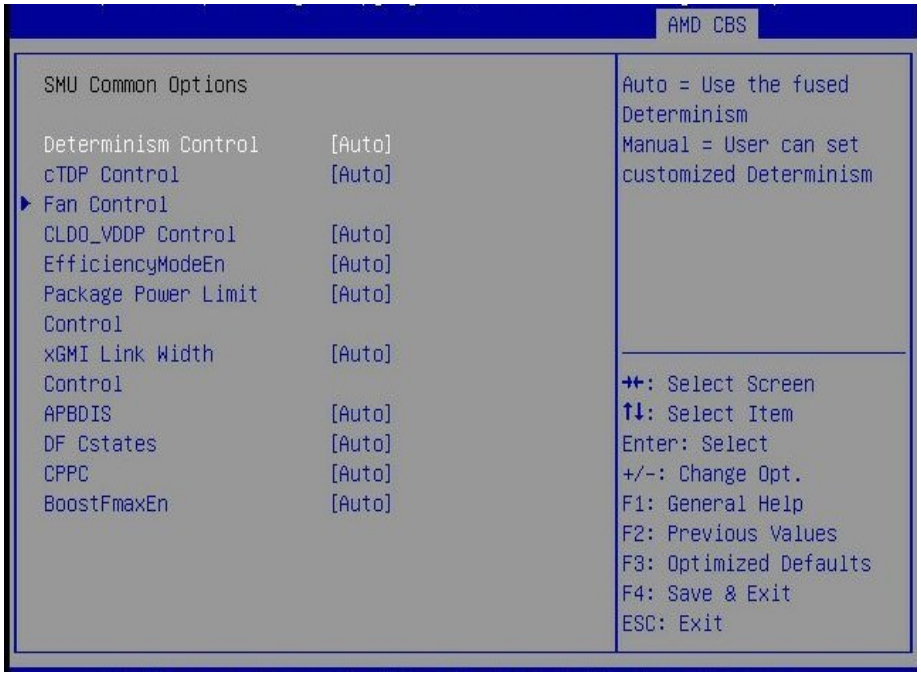


Figure F.70 AMD CBS>>NBIO common options>>SMU common options

Fan Control

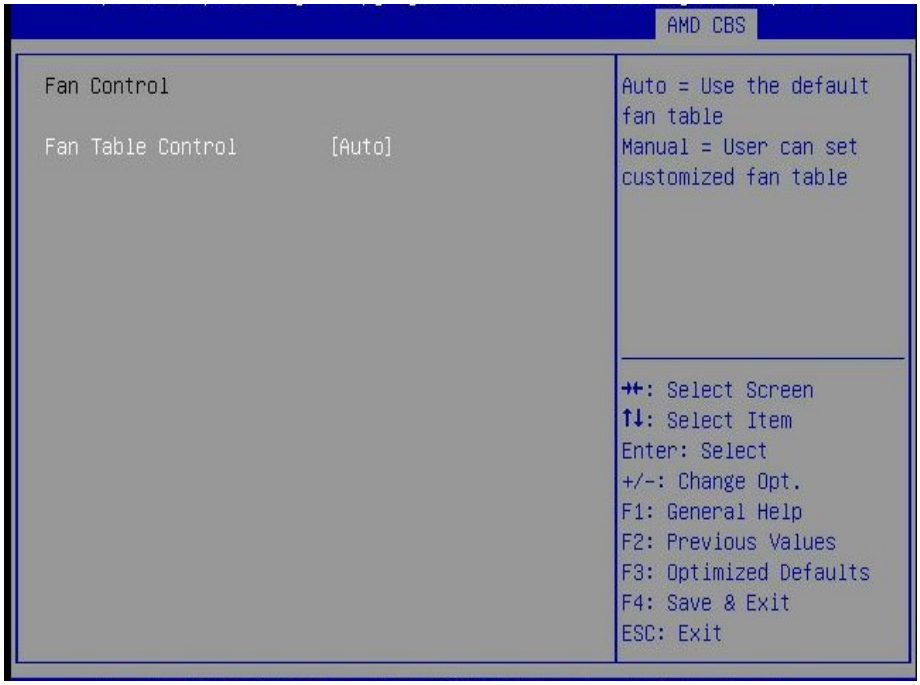


Figure F.71 AMD CBS>>NBIO common options>>SMU common options>>Fan control

NBIO RAS Common Options

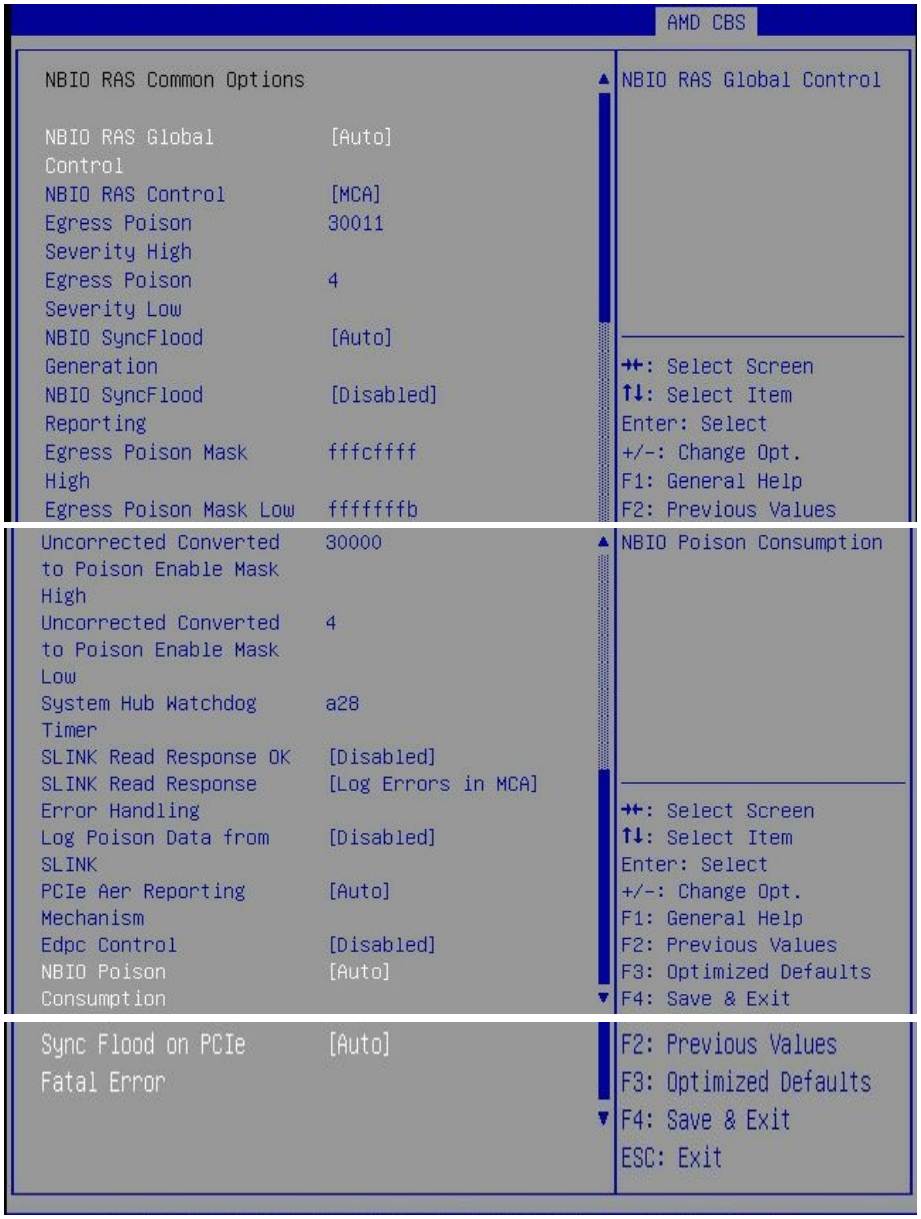


Figure F.72 AMD CBS>>NBIO common options>>NBIO RAS common options

FCH COMMON OPTIONS

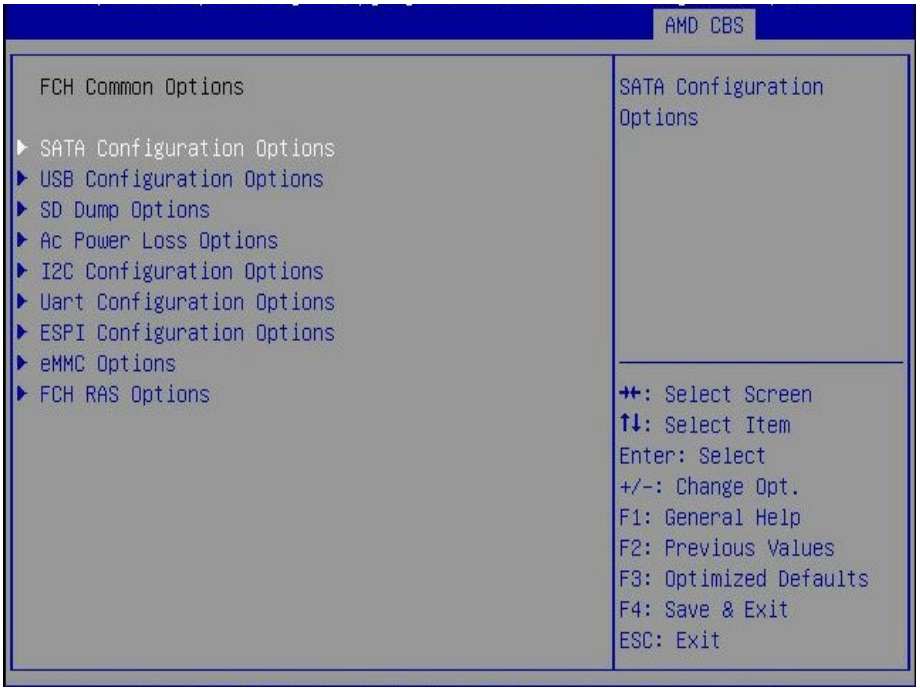


Figure F.73 AMD CBS>>FCH common options

SATA Configuration Options

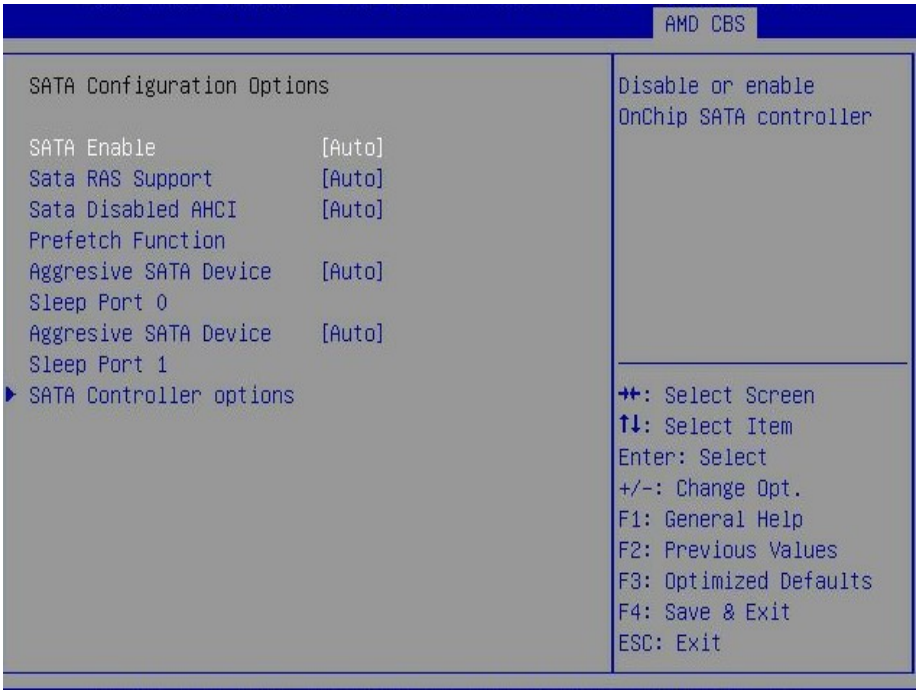


Figure F.74 AMD CBS>>FCH common options>>SATA config options

SATA Controller Options

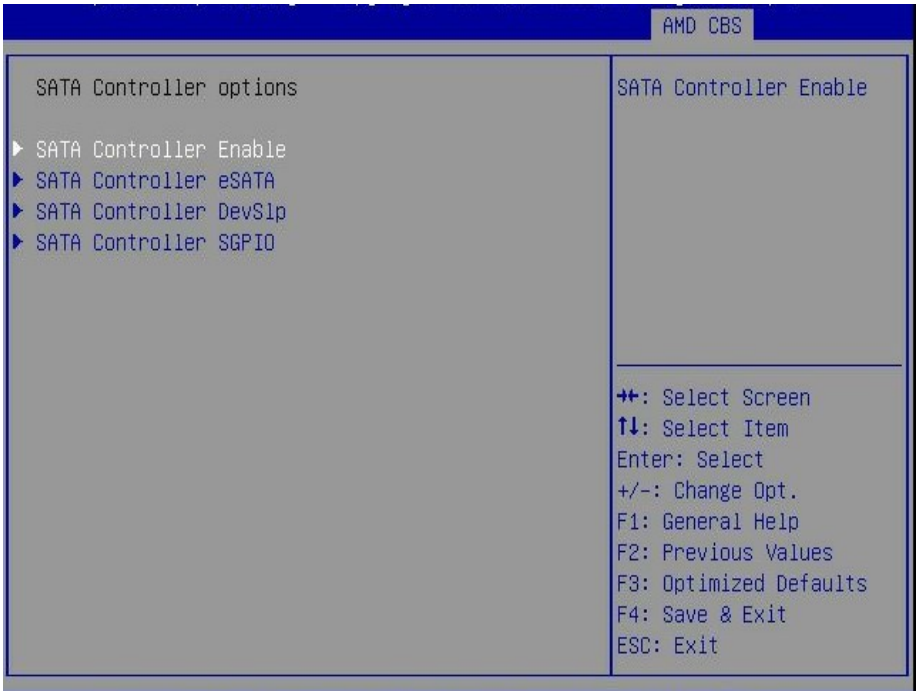


Figure F.75 AMD CBS>>FCH common options>>SATA config options>>SATA controller options

SATA Controller Enable

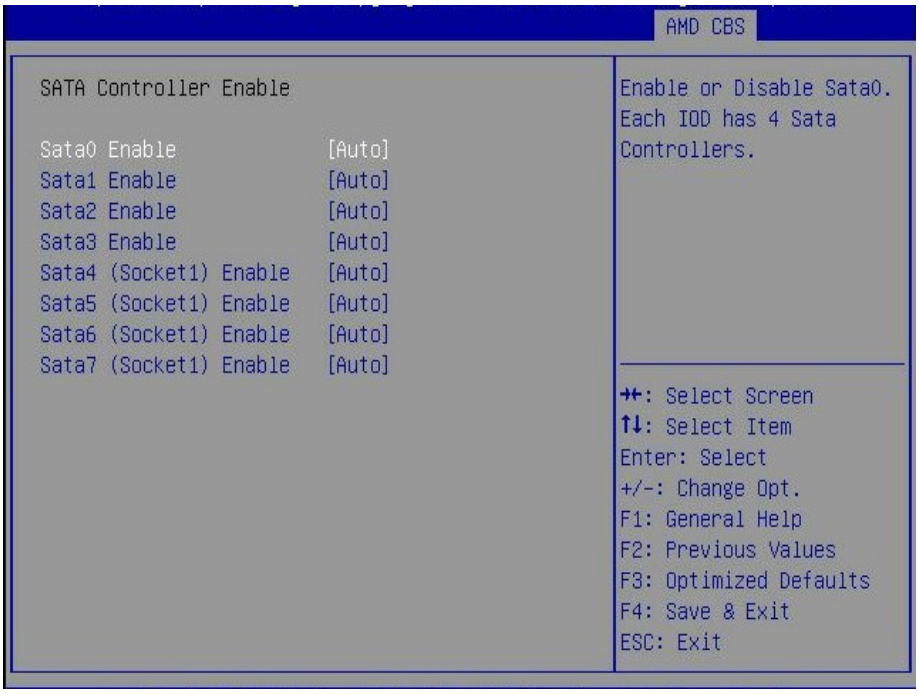


Figure F.76 AMD CBS>>FCH common options>>SATA config options>>SATA controller options>>SATA controller enable

SATA Controller eSATA

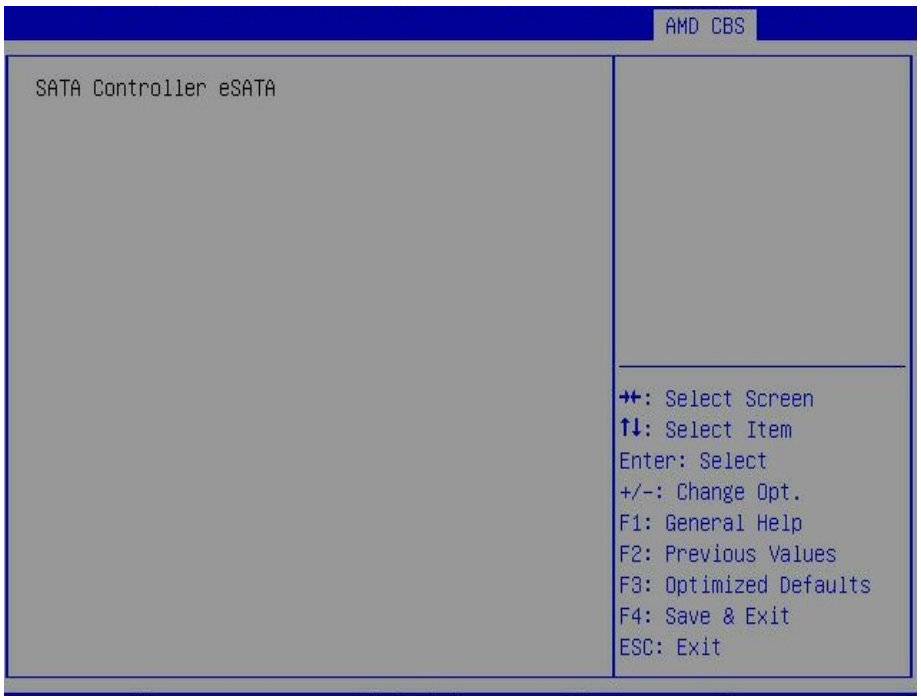


Figure F.77 AMD CBS>>FCH common options>>SATA config options>>SATA controller options>>SATA controller eSATA

SATA Controller DevSlp

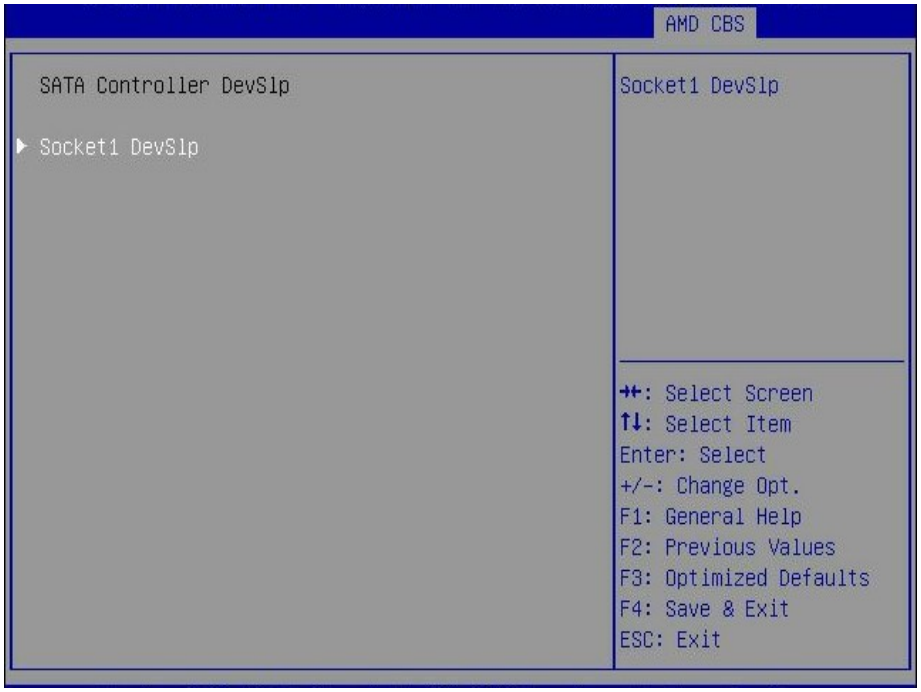


Figure F.78 AMD CBS>>FCH common options>>SATA config options>>SATA controller options>>SATA controller DevSlp

Socket 1 DevSlp

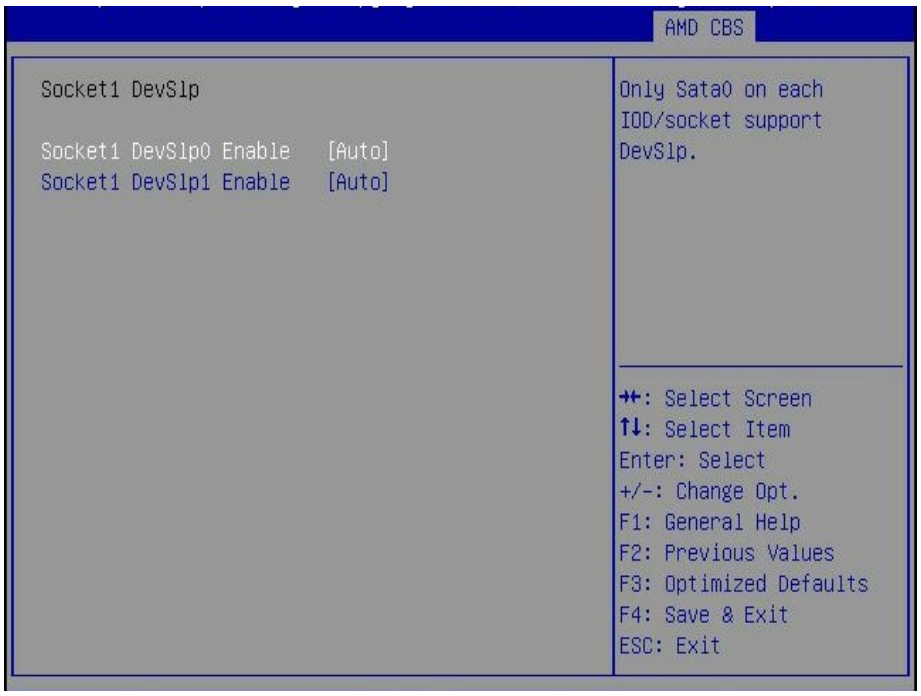


Figure F.79 AMD CBS>>FCH common options>>SATA config options>>SATA controller options>>SATA controller Dev Slp>>Socket 1 Dev Slp

SATA Controller SGPIO

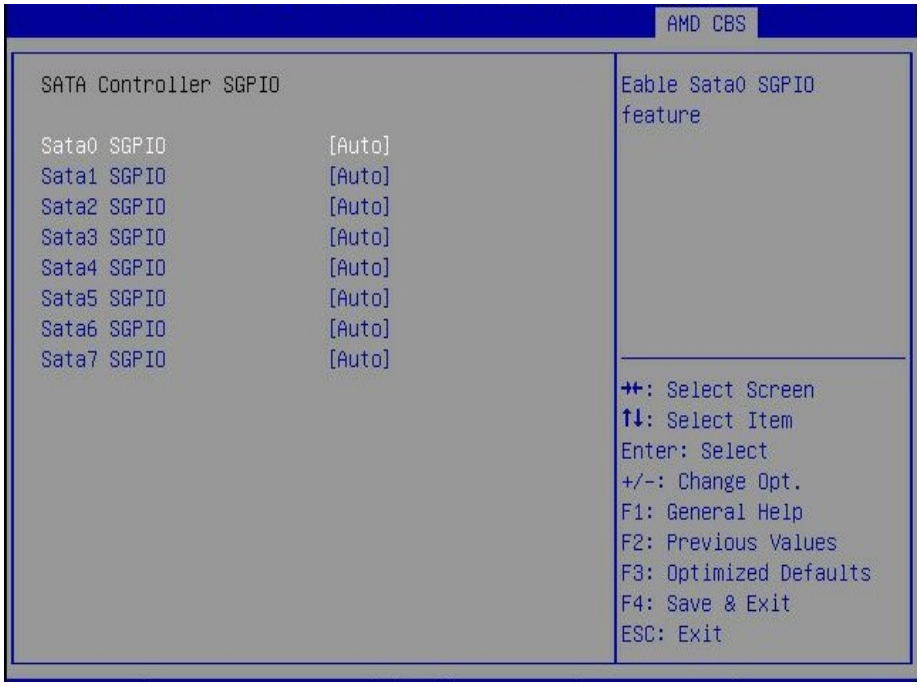


Figure F.80 AMD CBS>>FCH common options>>SATA config options>>SATA controller options>>SATA controller SGPIO

USB Configuration Options

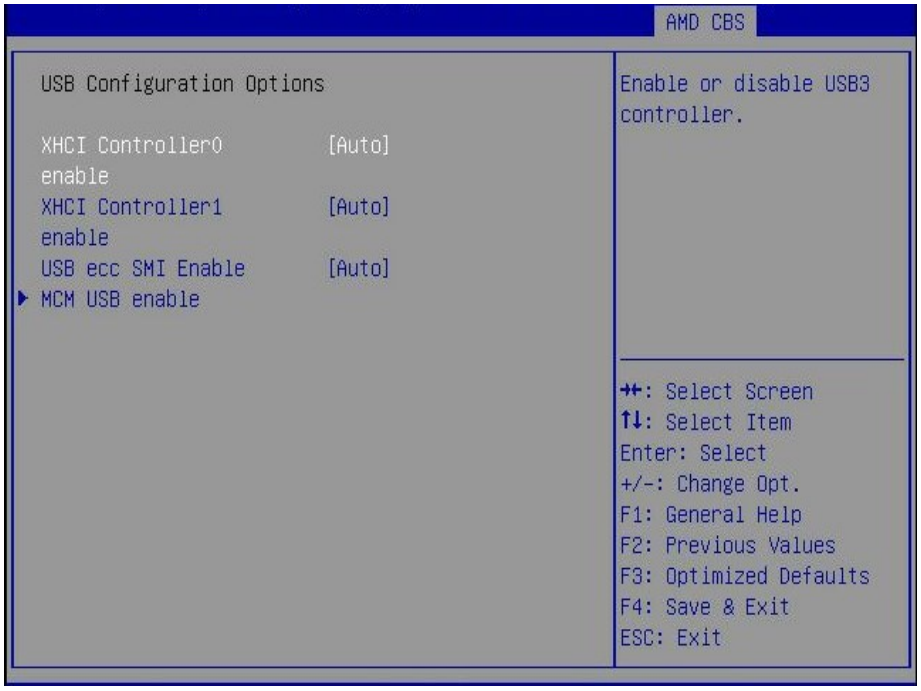


Figure F.81 AMD CBS>>FCH common options>>USB config options

MCM USB Enable

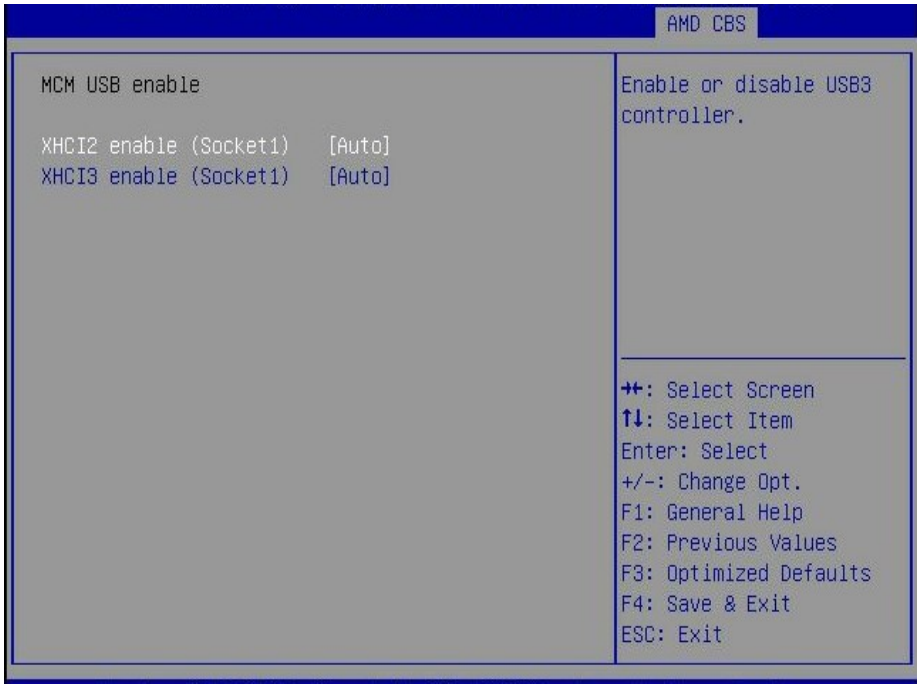


Figure F.82 AMD CBS>>FCH common options>>USB config options>>MCM USB enable

SD Dump Options

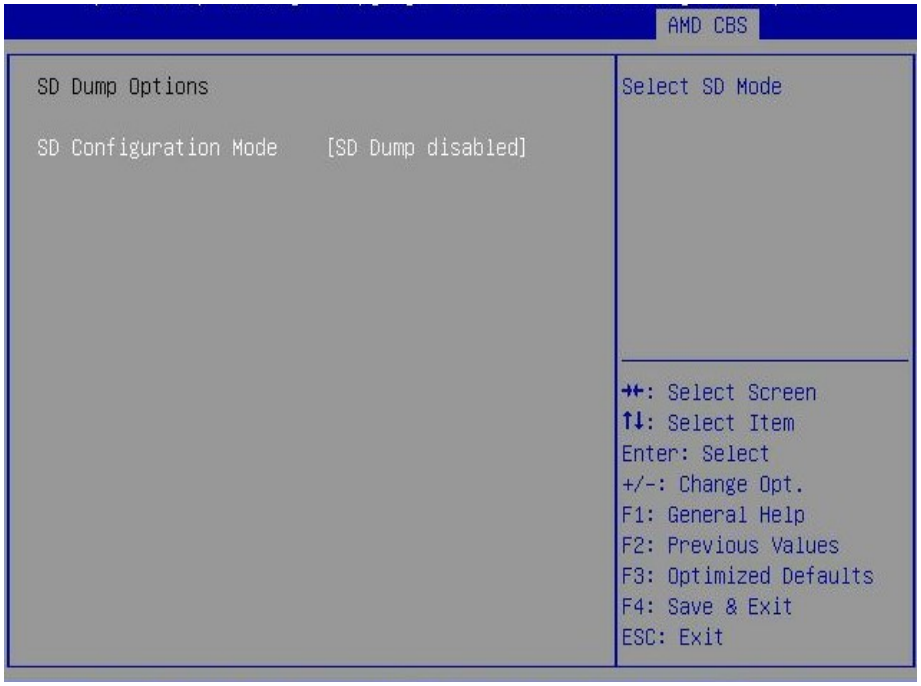


Figure F.83 AMD CBS>>FCH common options>>SD dump options

AC Power Loss Options

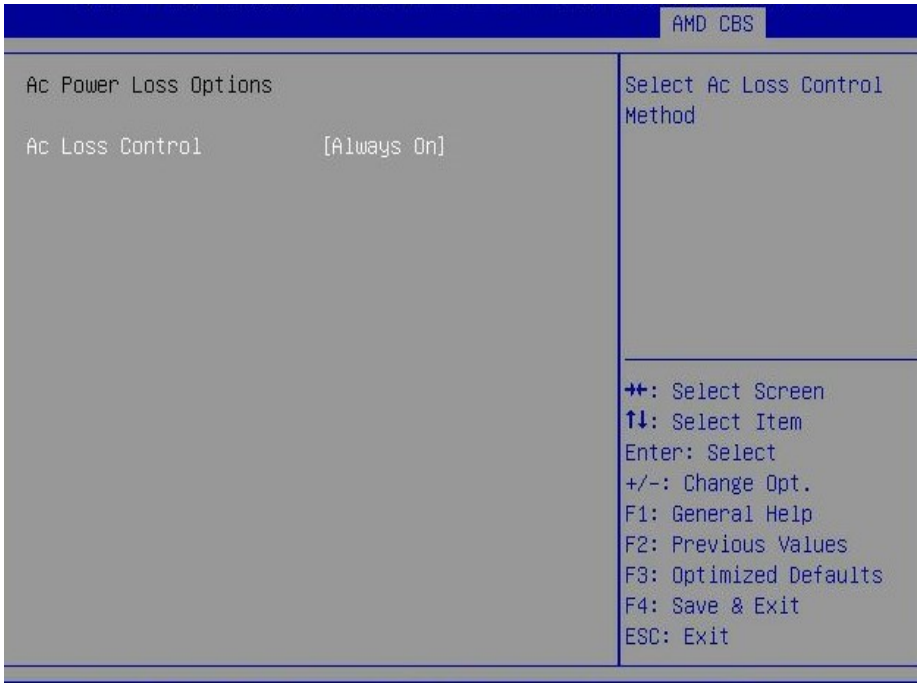


Figure F.84 AMD CBS>>FCH common options>>AC power loss options

I2C Configuration Options

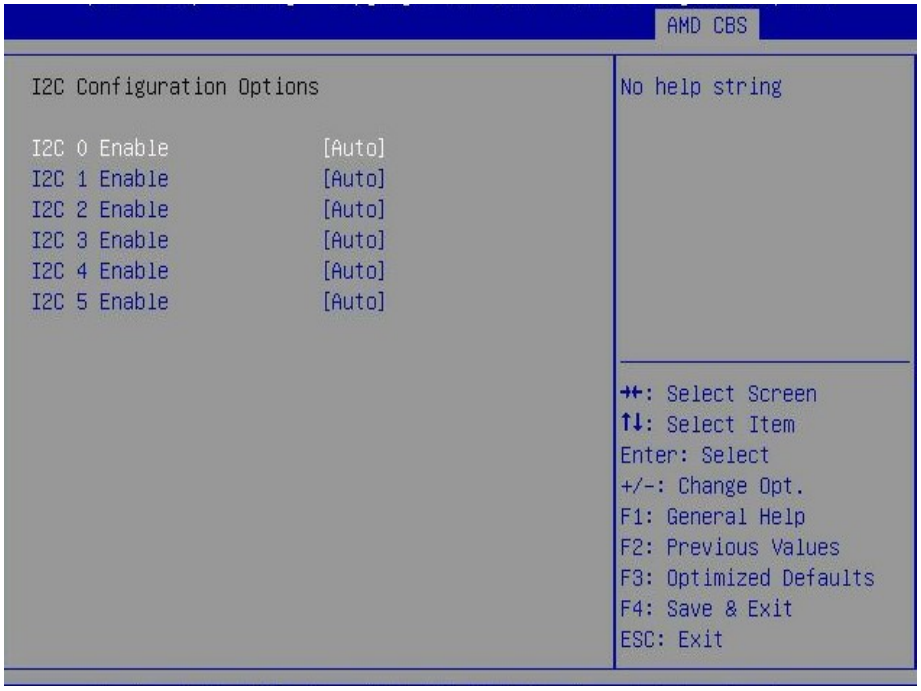


Figure F.85 AMD CBS>>FCH common options>>I2C config options

Uart Configuration Options

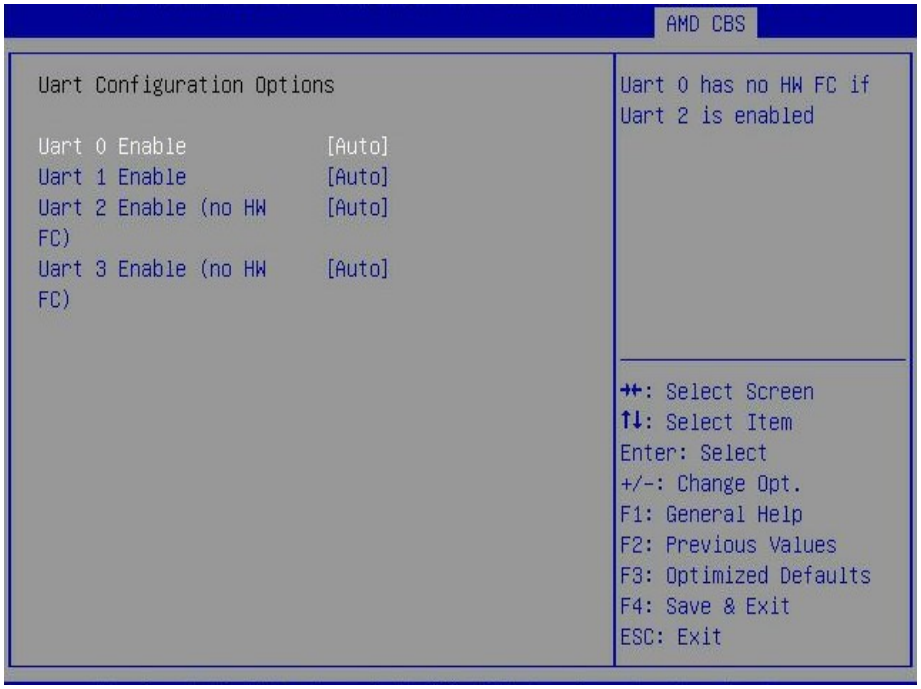


Figure F.86 AMD CBS>>FCH common options>>UART config options

ESPI Configuration Options

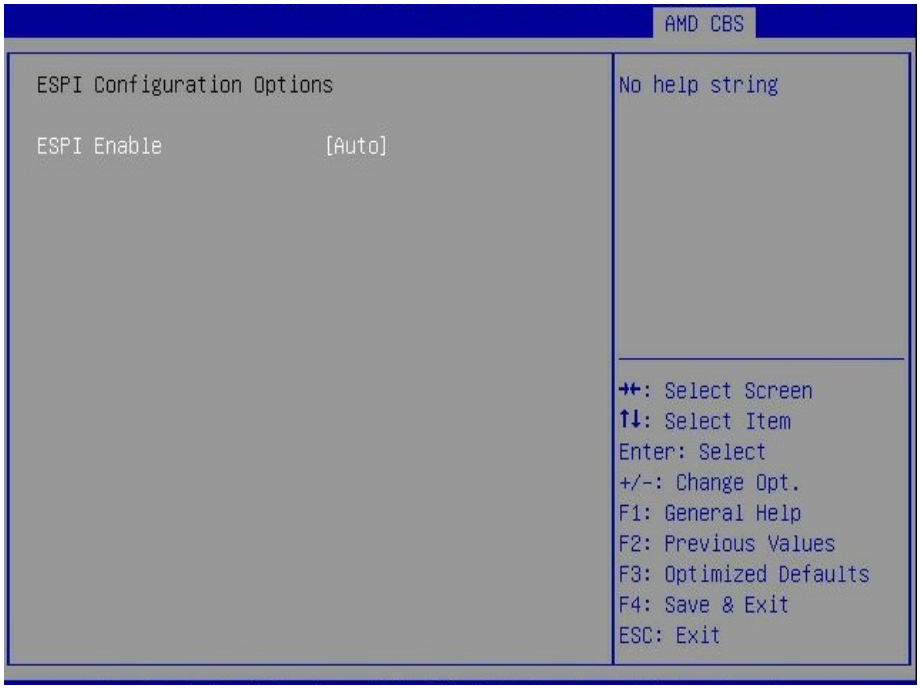


Figure F.87 AMD CBS>>FCH common options>>ESPI config options

eMMC Options

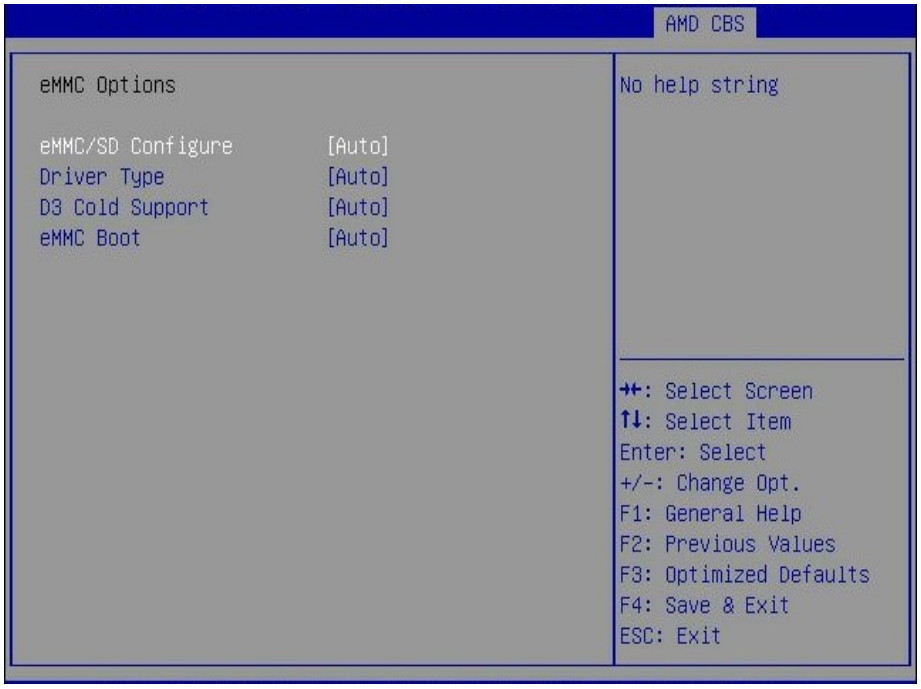


Figure F.88 AMD CBS>>FCH common options>>eMMC options

FCH RAS Options

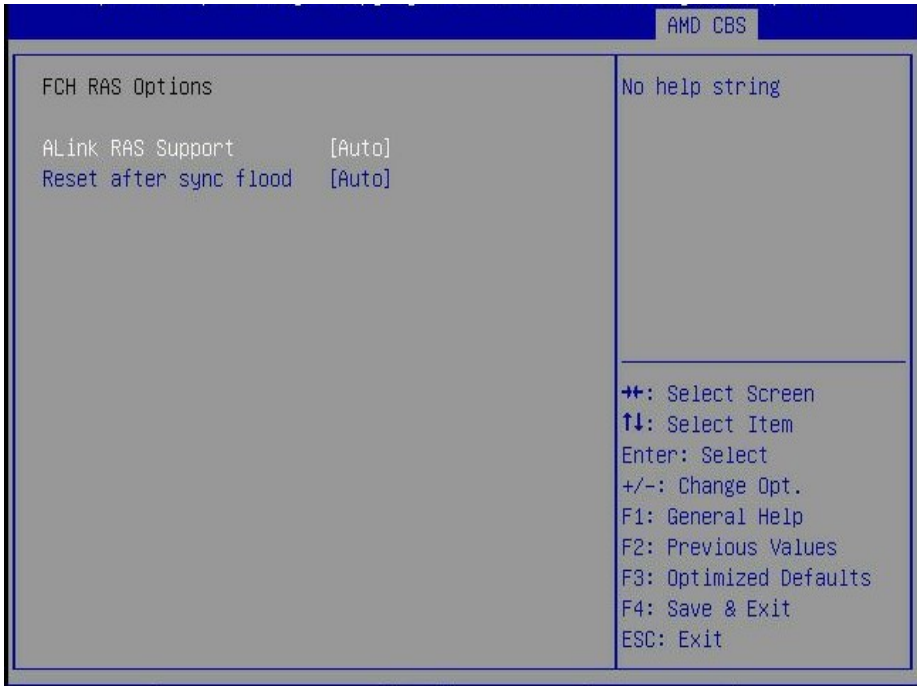


Figure F.89 AMD CBS>>FCH common options>>FCH RAS options

NTB COMMON OPTIONS

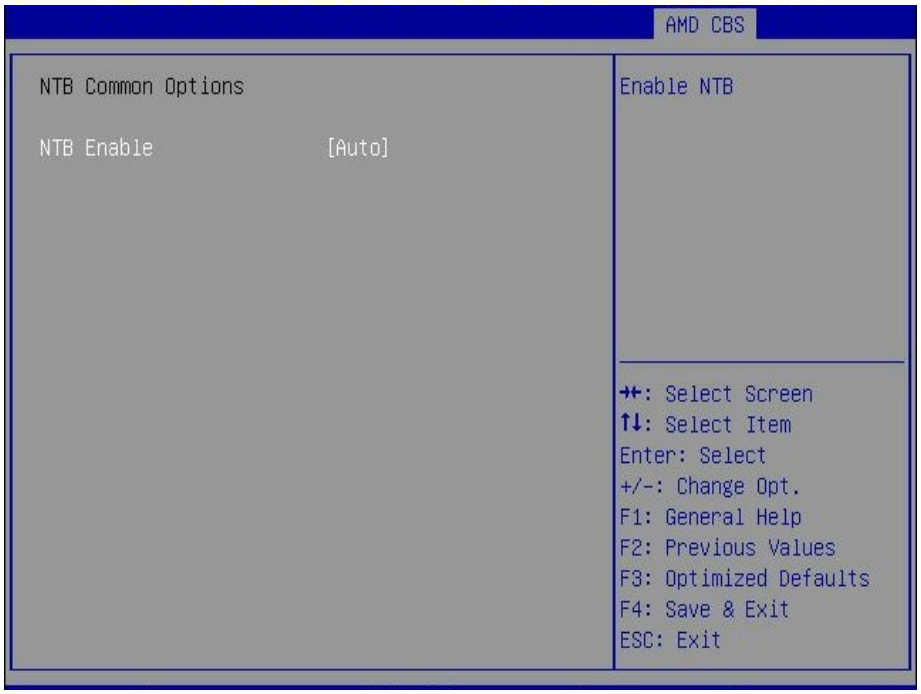


Figure F.90 AMD CBS>>NTB common options

SOC MISCELLANEOUS CONTROL

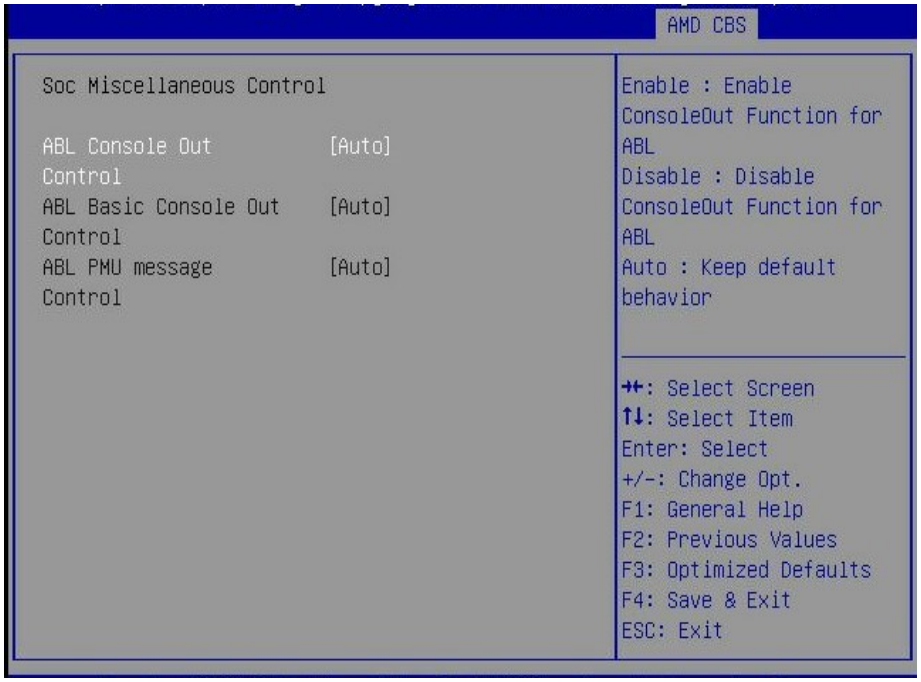


Figure F.91 AMD CBS>>Soc miscellaneous control

AMD PBS Option Tab

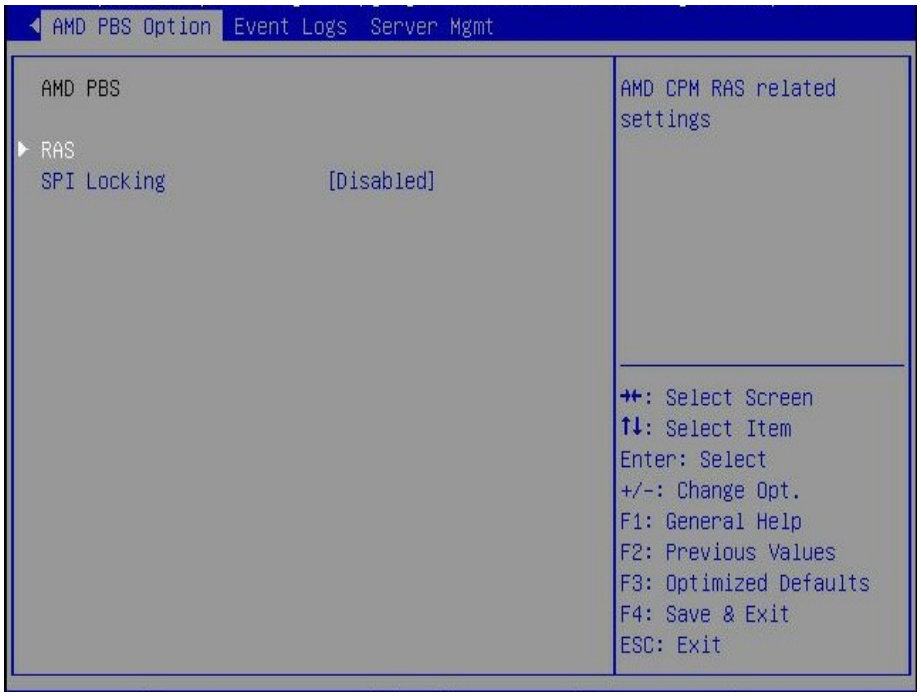


Figure F.92 AMD PBS option tab

RAS

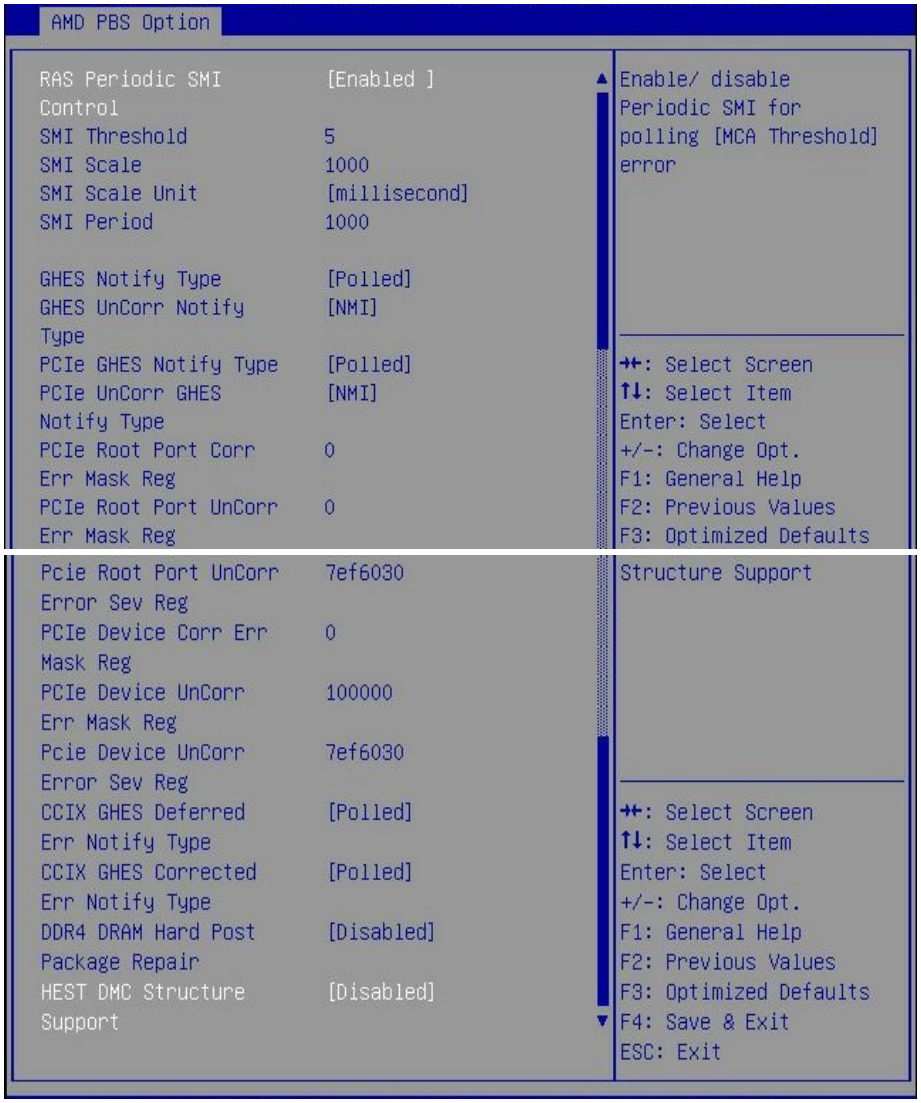


Figure F.93 AMD PBS option>>RAS

Event Logs Tab

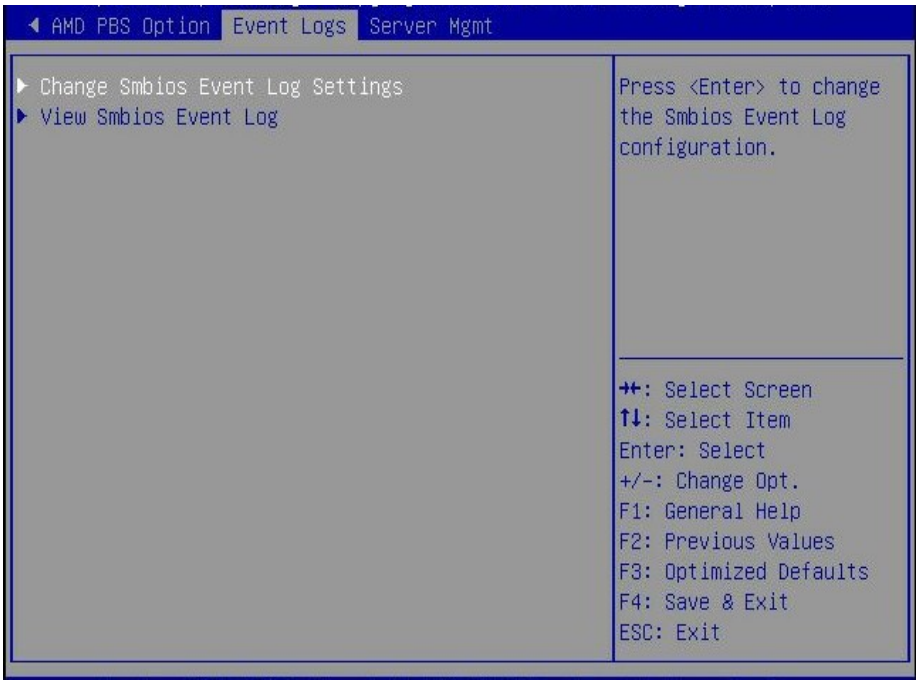


Figure F.94 Event Logs tab

CHANGE SMBIOS EVENT LOG SETTINGS

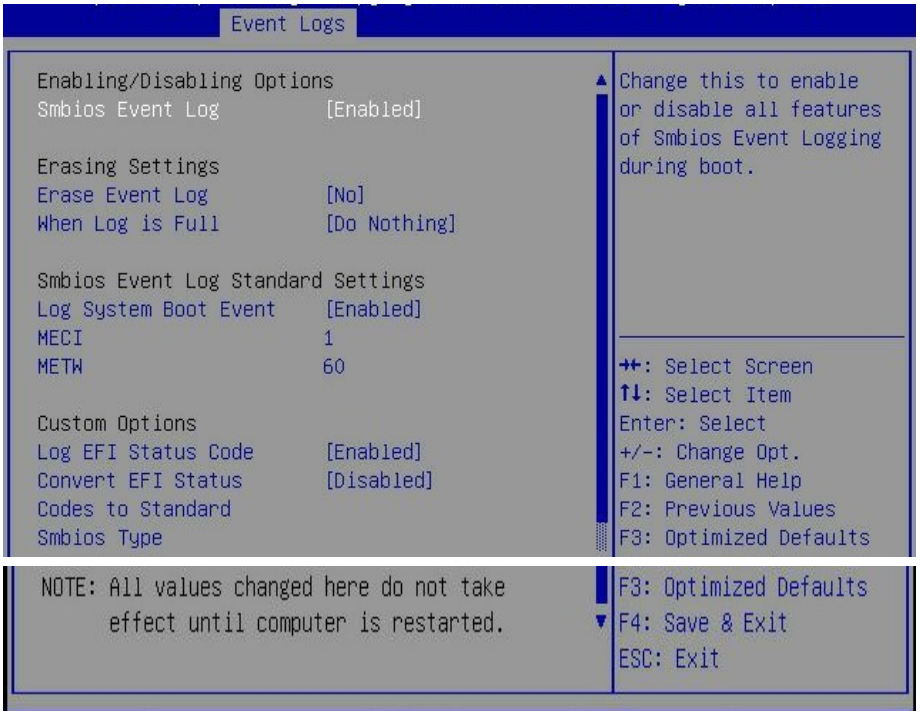


Figure F.95 Event logs>>Change SMBIOS event log settings

VIEW SMBIOS EVENT LOG

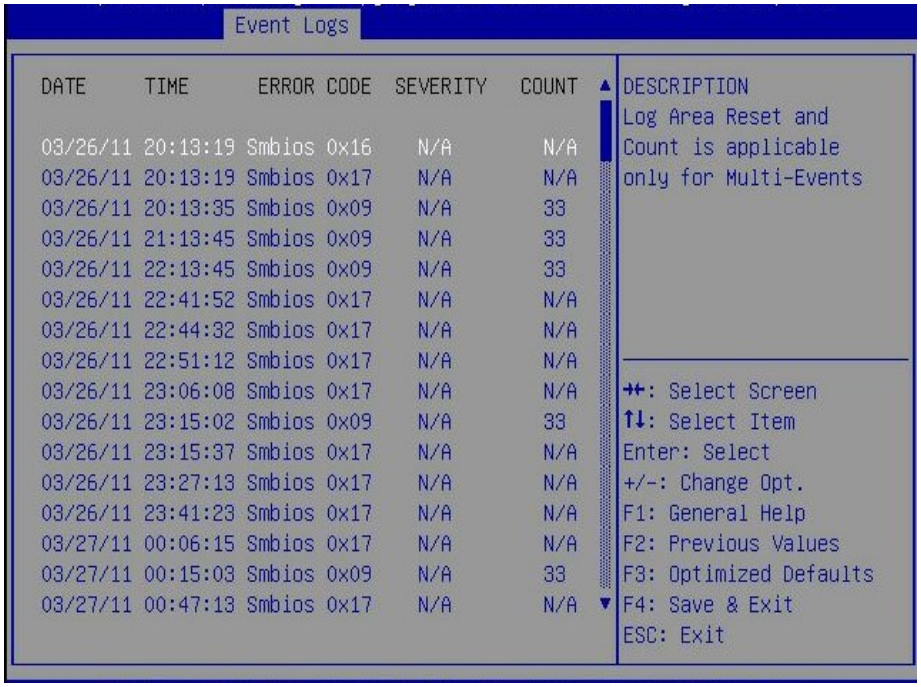


Figure F.96 Event logs>>View SMBIOS event log

Server Mgmt Tab

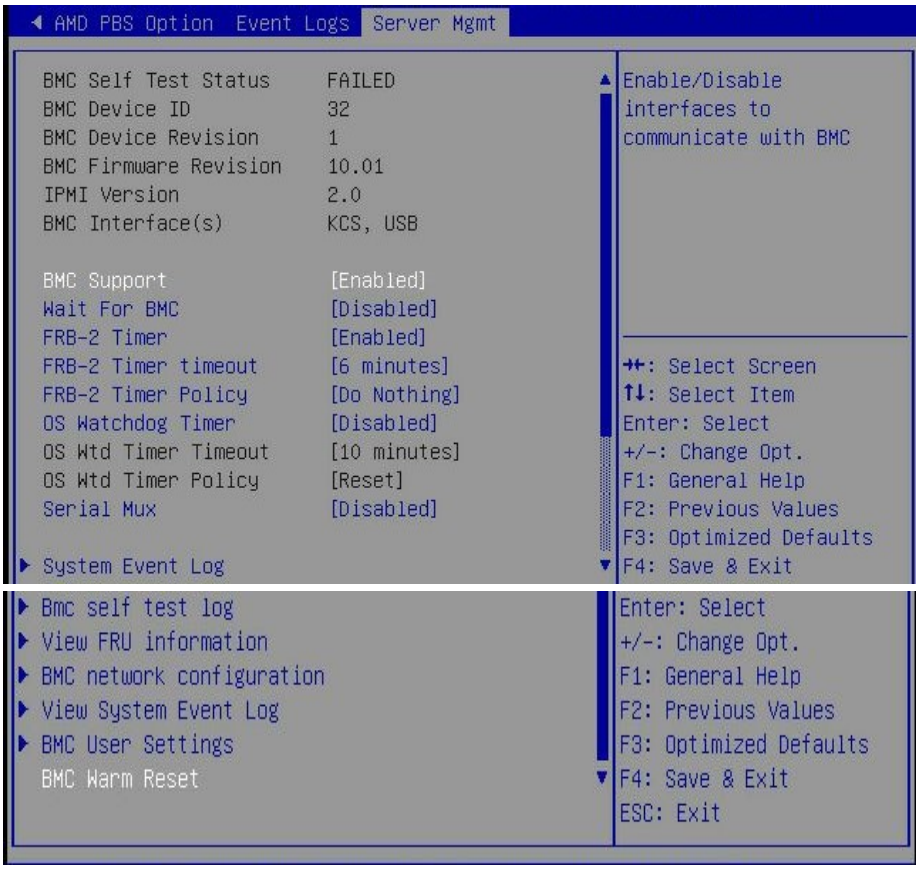


Figure F.97 Server Mgmt tab

SYSTEM EVENT LOG

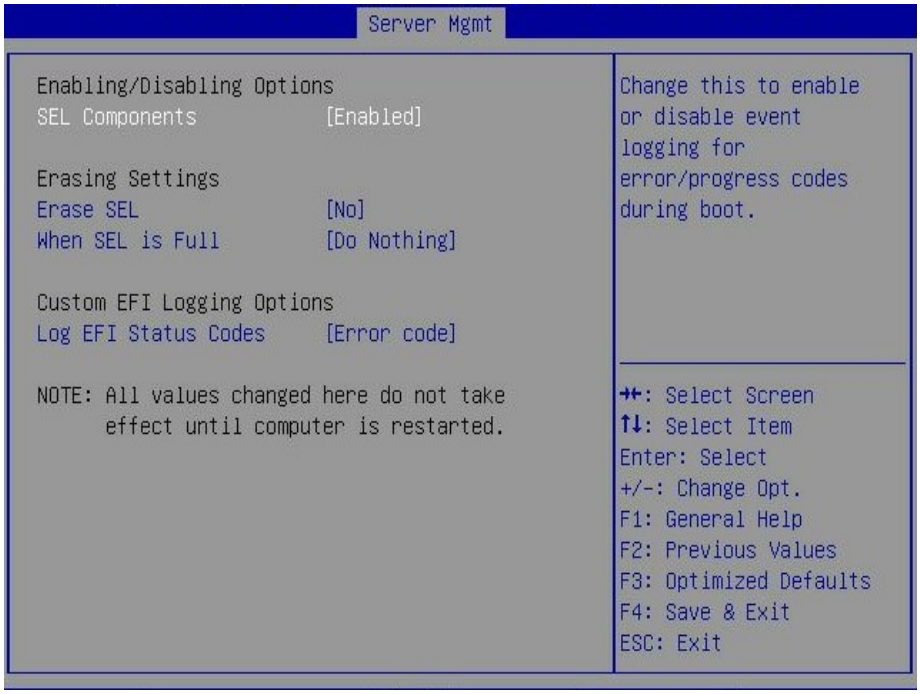


Figure F.98 Server Mgmt>>System event log

BMC SELF TEST LOG

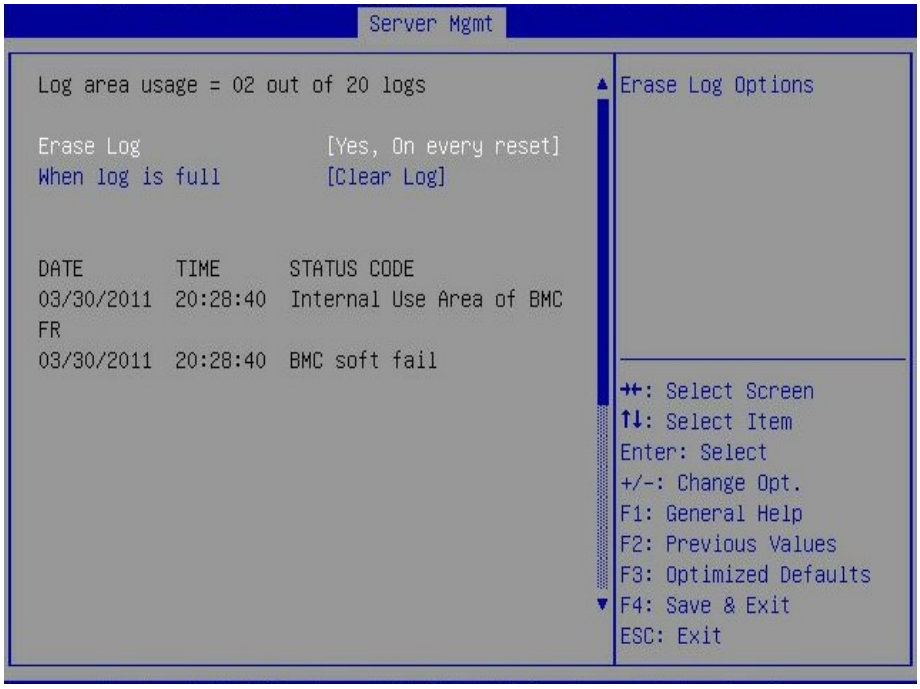


Figure F.99 Server Mgmt>>BMC self test log

VIEW FRU INFORMATION

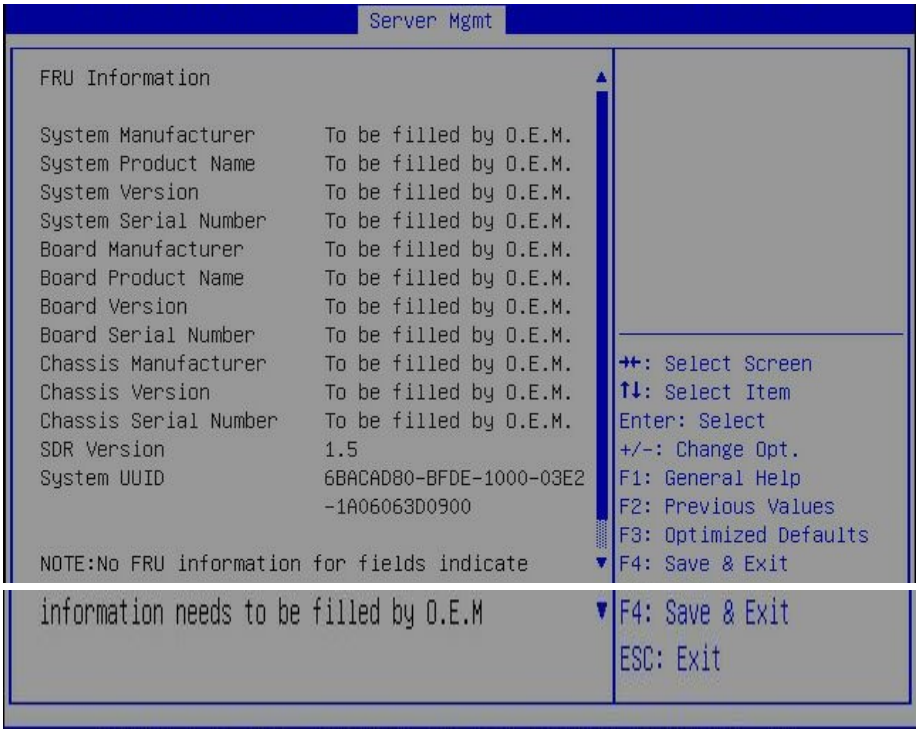
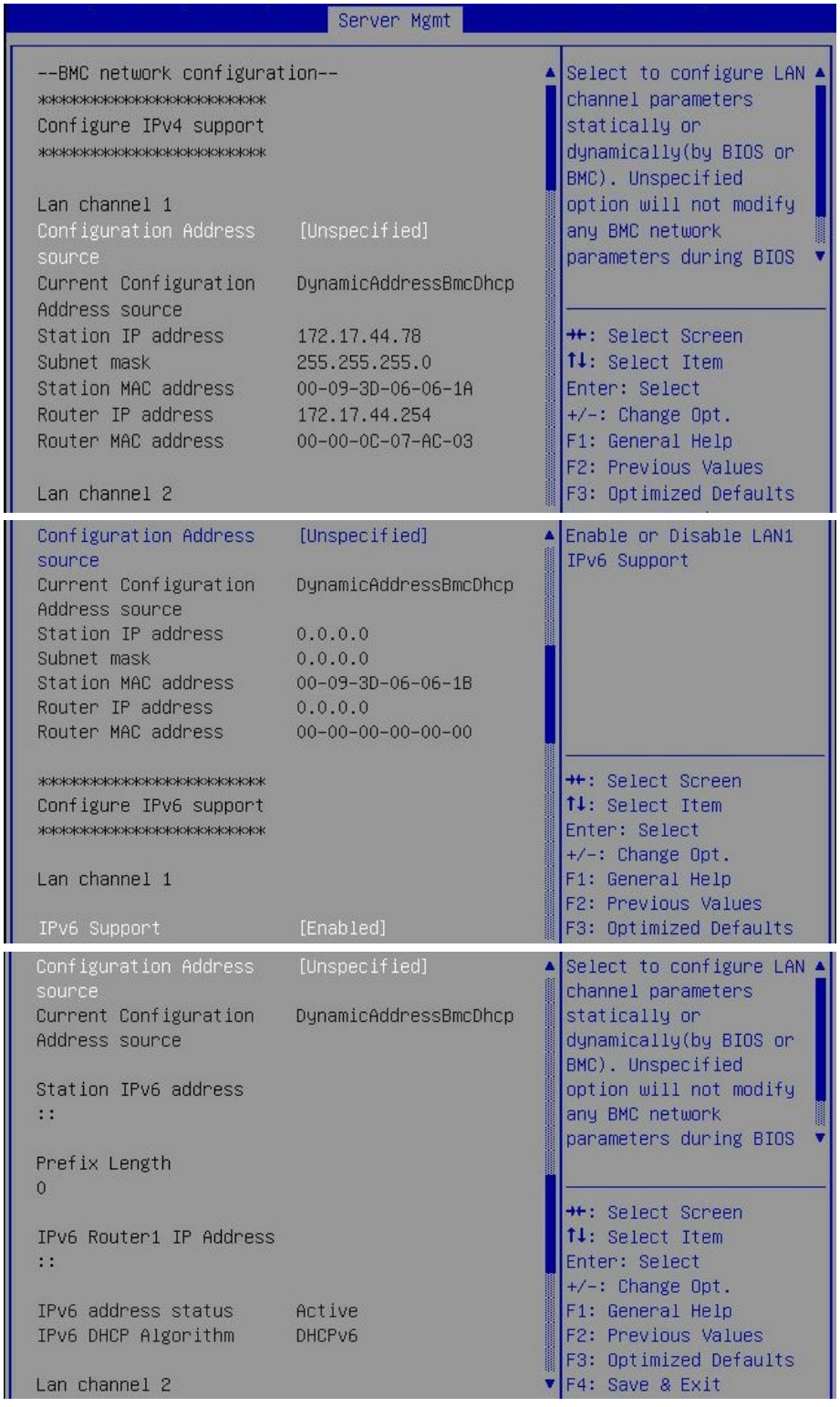


Figure F.100 Server Mgmt>>View FRU information

BMC NETWORK CONFIGURATION



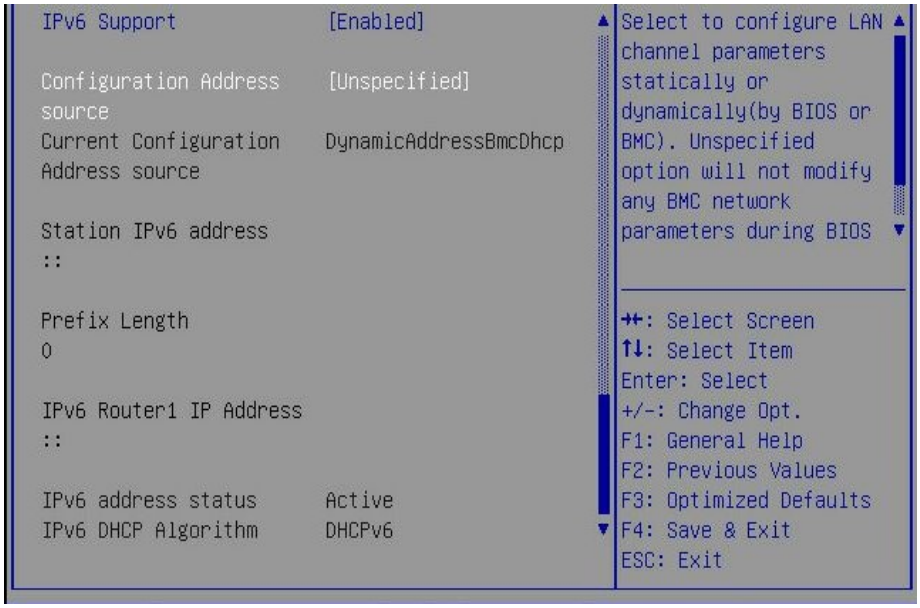


Figure F.101 Server Mgmt>>BMC network config

VIEW SYSTEM EVENT LOG

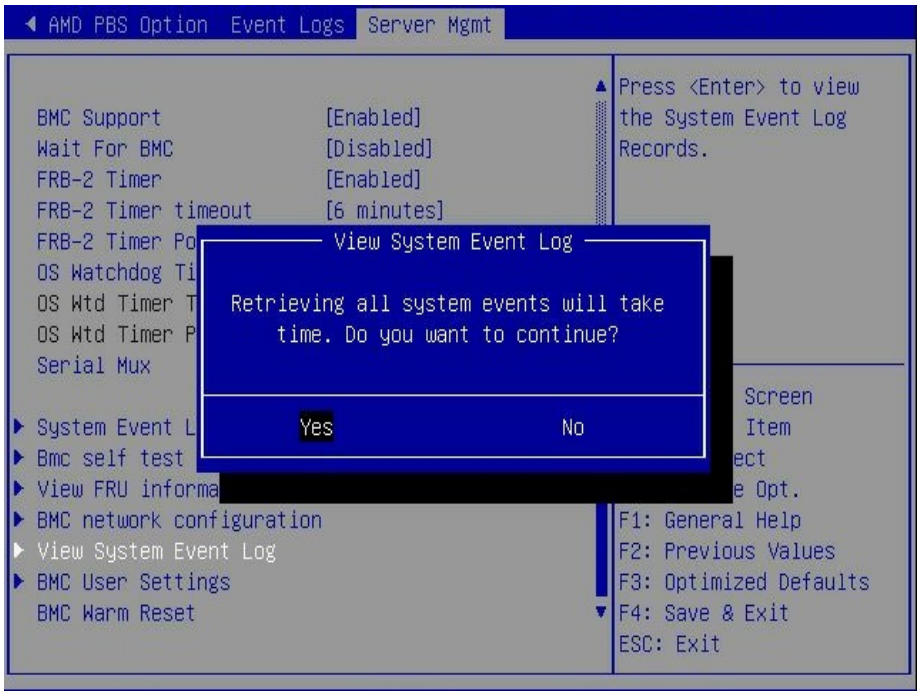


Figure F.102 Server Mgmt>>View system event log

BMC USER SETTINGS

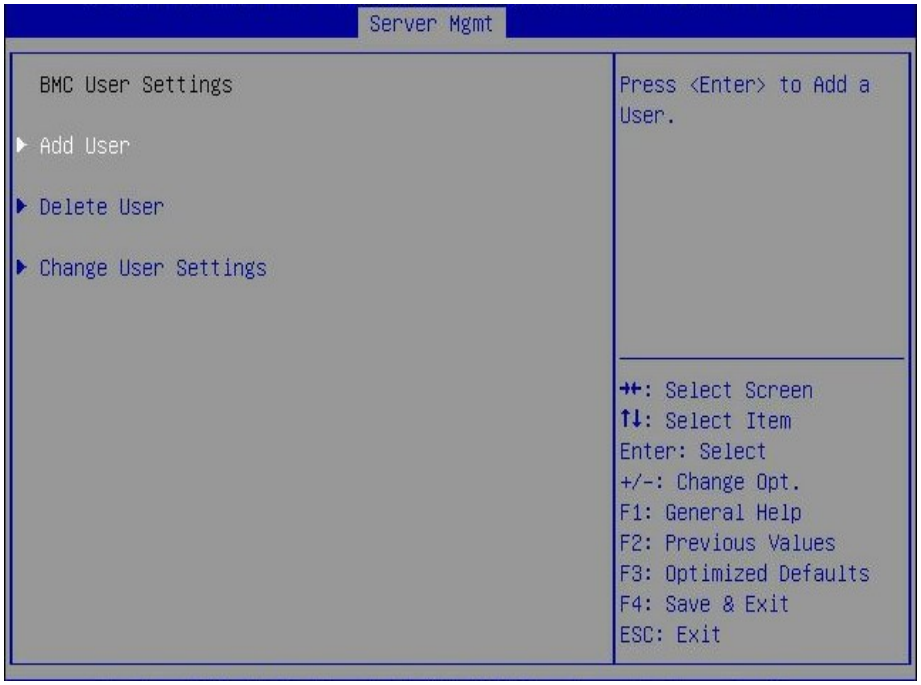


Figure F.103 Server Mgmt>>BMC user settings

Add User

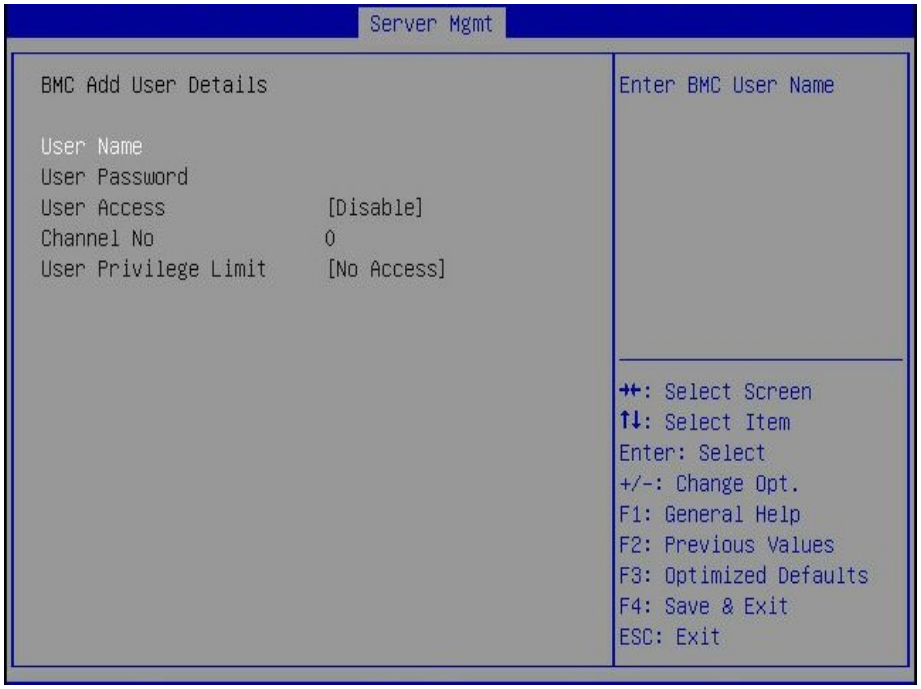


Figure F.104 Server Mgmt>>BMC user settings>>Add user

Delete User

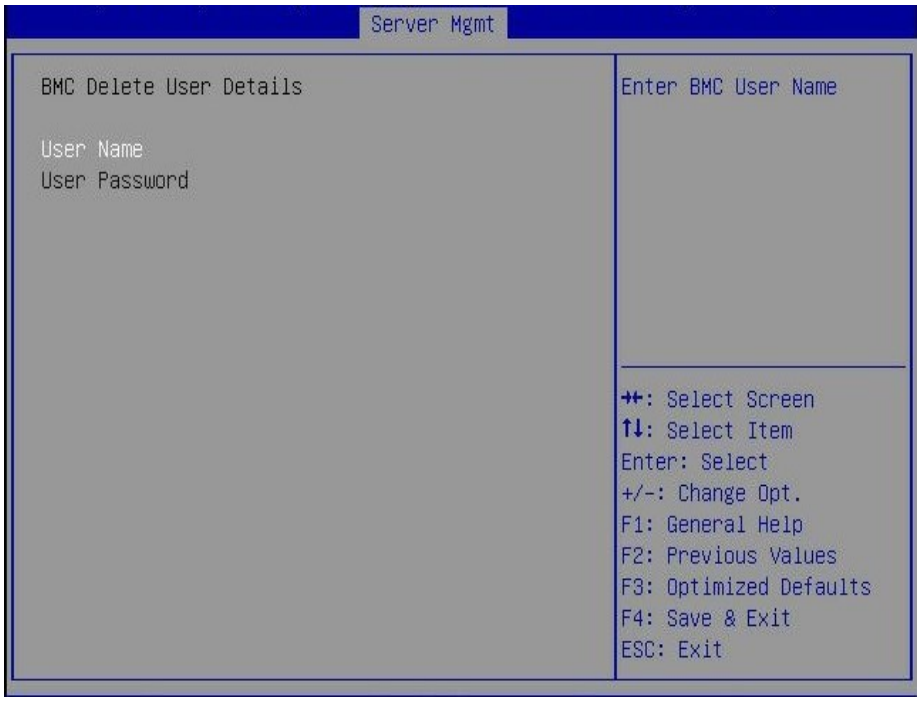


Figure F.105 Server Mgmt>>BMC user settings>>Delete user

Change User Settings

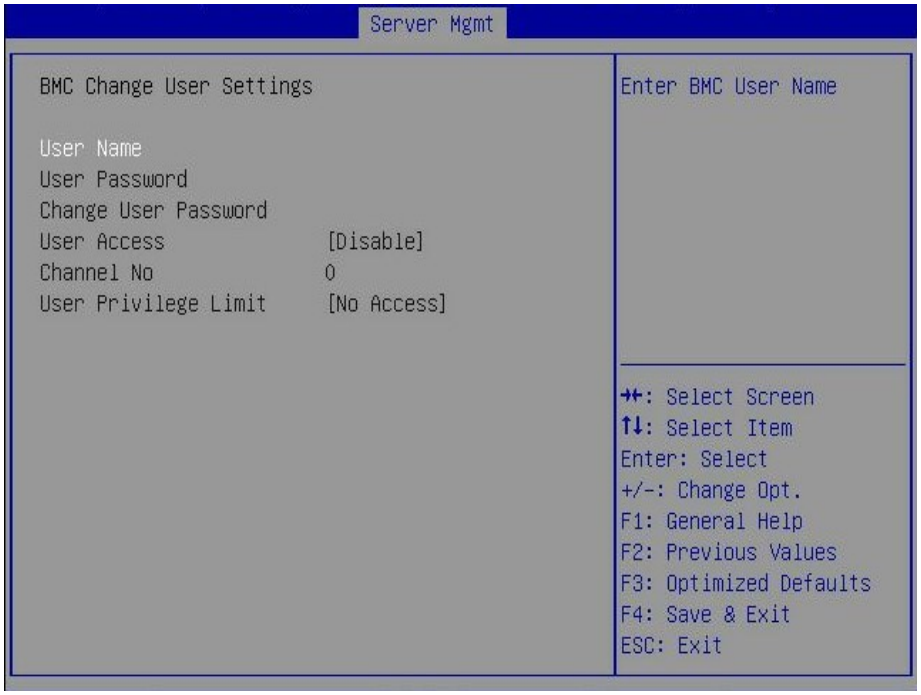


Figure F.106 Server Mgmt>>BMC user settings>>Change user settings

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Web: http://www.vikingenterprise.com
E-mail: customersupport@vikingenterprise.com

Servicing Instructions

If the storage enclosure needs repair or servicing, request a Return Merchandise Authorization (RMA) from VES by sending an email to:

rma@vikingenterprise.com

Locating the Service Label

The serial number and product number are required for servicing. While facing the enclosure's front bezel, the storage enclosure's serial and product number label is located on right side of the enclosure. A second label is located on top of the server module.

Warranty Information

Check the sales agreement for details. Contact a Viking Enterprise Solutions sales representative for assistance.

⚠	**CAUTION:** Opening the server module canister without approval from a Viking Enterprise Solutions support representative may void the warranty.