Cisco UCS C890 M5 Rack Server Service Guide

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Contents

1 Preface

This manual is written for professional system integrators, partner engineers and field consultants. It provides information for the installation and use of the Cisco UCS C890 M5 Rack Server. Installation and maintenance should be performed by experienced technicians only.

Refer to the Cisco UCS C890 M5 Rack Server specifications page on our website for updates on supported memory, processors and operating systems (Cisco UCS C890 M5 Rack Server Data Sheet).

2 Overview

The Cisco UCS C890 M5 Rack Server, with eight sockets, is designed for workloads that demand high-reliability, intensive compute operations with best-in-industry management costs. This server delivers an impressive 605,730 SAPS by incorporating eight Intel® Xeon® Platinum 8268, 8276, or 8280L processors. This server meets the critical workload demands for SAPS/4 HANA, BW/4 HANA, Epic Caché databases, and other massive virtualization workload consolidation efforts packed into a Seven-Unit (7U) form factor.

2.1 Unpacking the System

Inspect the box the Cisco UCS C890 M5 Rack Server was shipped in and note if it was damaged in any way. If any equipment appears damaged, file a damage claim with the carrier who delivered it.

Decide on a suitable location for the rack unit that will hold the server. It should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. It will also require a grounded AC power outlet nearby. For additional facility power considerations, see: **Facility Power Consideration**.

2.2 System Specifications

The following table provides you with an overview of the main features and specifications of the Cisco UCS C890 M5 Rack Server.

System Specifications
Motherboard
C890-M5-CPU-BOARD=
Chassis
C890-M5-CHASSIS=
CPU
The Cisco UCS C890 M5 Server includes eight C890-M5-CPU boards, and supports up to eight second-generation Intel® Xeon series processors, which offers three full-width Intel UltraPath Interconnect (UPI) links with the data transfer rates of up to 10.4 GT/s in each direction among eight CPUs.
Socket Type
Socket P Type
Memory

Each CPU board supports up to 3TB DCPMM or up to 3TB 3DS Load Reduced (3DS LRDIMM)/Load Reduced (LRDIMM)/3DS Registered (RDIMM)/Registered (RDIMM) DDR4 memory of 2933*/MHz in 12 DIMM slots. It also supports up to 4.5TB DCPMM & DDR4 combined memory of up to 2933MHz in 12 slots per CPU board. With eight C890-M5 boards built-in, the C890-M5 Platform provides up to 24TB of DDR4 memory or up to 36TB of Intel Optane DC PMem& DDR4 combined memory in 96 DIMM slots.. **Note: 1.** For your system memory to work properly, use memory modules of the same type and the same speed on the motherboard. For more information on CPU, memory support, refer to the X11OPi board section in this chapter. **2.** Memory speed support depends on the processors used on the motherboard. **3.** 2933 MHz memory and DCPMM memory are supported by Second Generation Intel® Xeon® Platinum processors only. **4.** Populating DDR4 memory modules in a two-DIMMs per-channel (2DPC) configuration on this motherboard will affect memory bandwidth and performance. **Note 2:** Supported DIMM memory sizes are: • DDR4: 32GB, 64GB, 128 GB, and 256 GB • Intel Optane DC PMem: 128 GB, 256 GB and 512 GB
Chipset
Intel C621 chipset
Expansion Slots
CPU modules: 16 FHFL PCI-e 3.0 x16 slots, two PCI-E 3.0x16 slots (CPU Slot1/Slot2) on each C890-M5-CPU-BOARD= board. PCIE modules: five FHHL PCI-e 3.0 x16 slots, one PCI-E 3.0 x16 slot on each C890-M5-PCIEBOARD= board. Storage module: two (2) PCI-E 3.0x8 in x16 slots (Slot1/Slot2) on the C890-M5-HDD-BOARD= board. PCH module: two M.2 PCI-e 3.0 x4 slots (Slot1/Slot2) on the C890-M5-AOC-1025 board. **Note:** FHHL = full-height, half-length; FHFL = full-height, full-length; LP = low-profile
I/O Module Slot
One SIOM PCI-E 3.0x16 slot on the C890-M5-AOC-1025 board
Hard Drives
Storage module: Default setup is 2 hot-swap 2.5” HDDs to on-board SATA 3.0 ports with RAID card options. Total capacity is sixteen hot-swap 2.5” HDDs and six 3.5” or eight 2.5” internal fixed HDDs PCH module: two SATA 3.0 ports for SATA DOMs

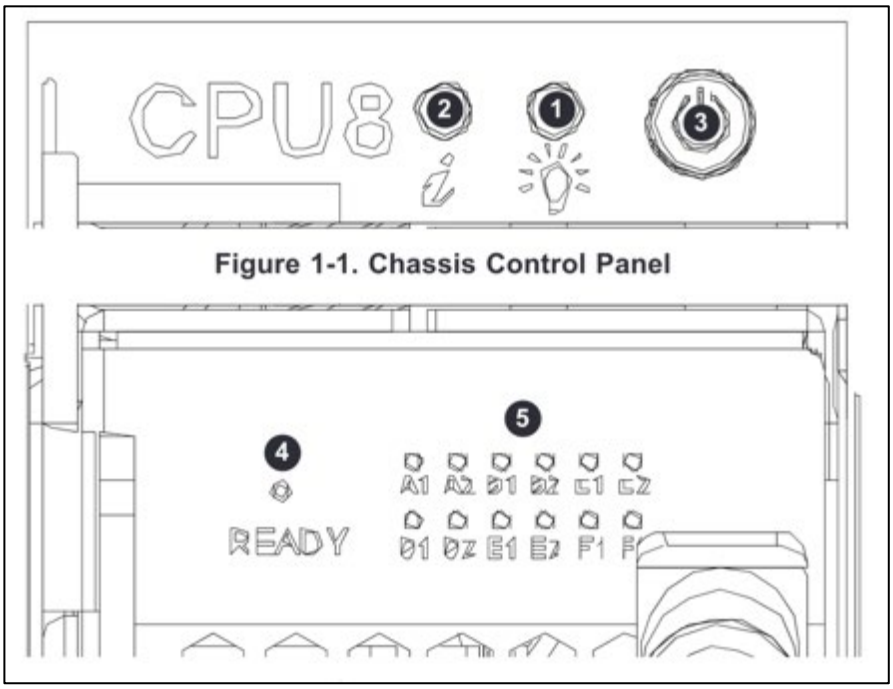
System Specifications
Graphics
ASPEED AST2500 BMC video controller via the BMC on the C890-M5-BMC card
Power
Five 1600 Watts Titanium Level power supplies. Also see: Facility Power Consideration.
Form Factor
7U rackmount
Dimensions
(WxHxD) 17.63 x 12.2 x 28.87-in. / 310 x 448 x 733-cm

Note: For IPMI configuration instructions, refer to the "Cisco UCS C-Series Integrated Management Controller GUI Configuration Guide".

2.3 Server Chassis Features

2.3.1 Control Panel/CPU Module Indicators

The switches and LEDs located on the control panel are described below.

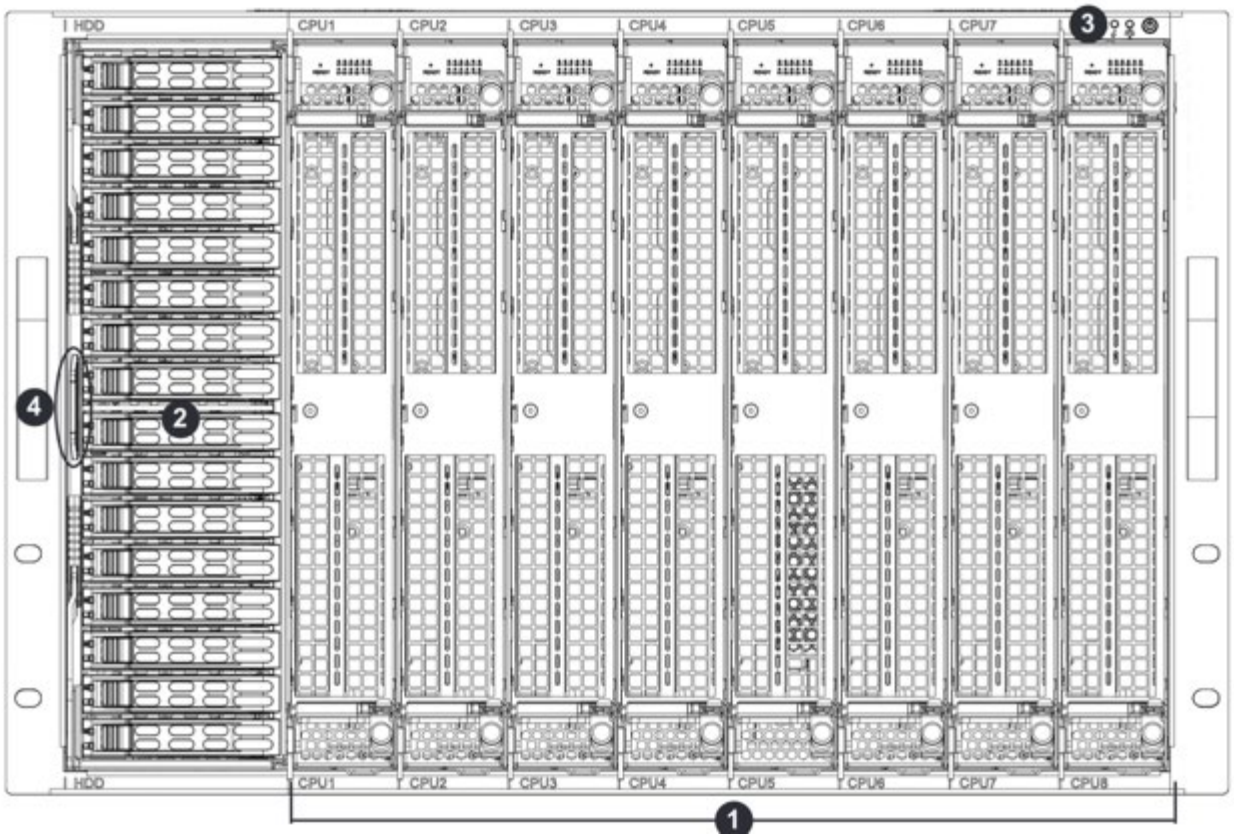


Control Panel/CPU Module LED Indicators		
Item	**Feature**	**Description**
1	Power LED	Indicates power is being supplied to the system power supply. This LED is green when the system is operating and amber when in standby mode.
2	Information LED	See table below.
3	Power Button	Used to apply or remove power to the system. Turning off system power with this button removes the main power but maintains standby power. To perform most maintenance tasks, you should also unplug the AC power cords before servicing.
4	CPU Module Connection LED	When illuminated, this green LED indicates a CPU module is properly installed and functioning.
5	Memory Error LEDs	This array of LEDs is provided to indicate a memory slot on the CPU board that has failed. If illuminated red, the designations (A1, A2, etc.) correspond to the failed slot on the CPU board.
Information LED		

Status	Description
Continuously on and red	An overheat condition has occurred (this may be caused by cable congestion).
Blinking red (1Hz or 1/sec.)	Fan failure, check for an inoperative fan.
Blinking red (.25Hz or 4/sec.)	Indicates a power supply module has failed.

2.3.2 Front Features

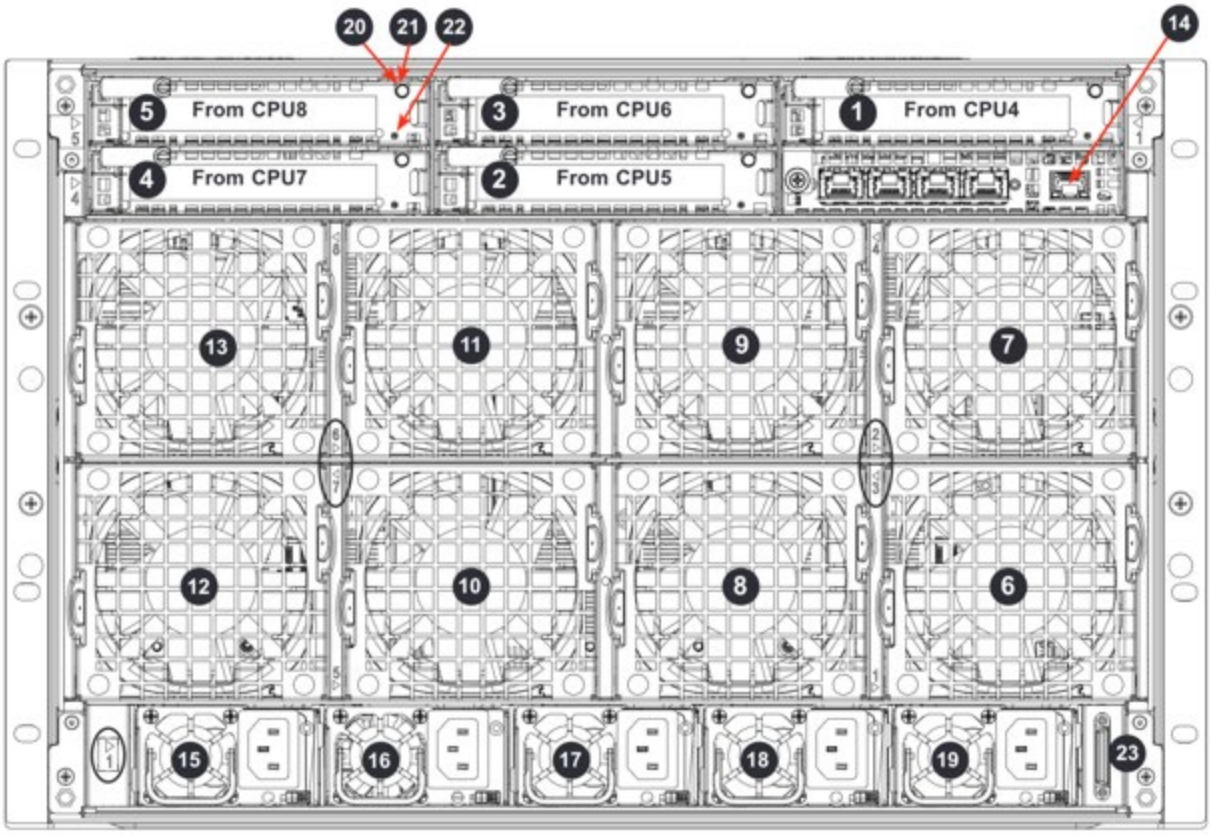
The Cisco UCS C890 M5 Rack Server is a 7U chassis.



Front Chassis Features		
Item	**Feature**	**Description**
1	CPU Modules	Eight CPU modules (designated CPU1-CPU8) for CPU, memory, NVMe, PCI-E card and GPU.
2	Storage Module	Storage module for sixteen 2.5" hot-swap HDDs, optional RAID cards, and optional fixed HDDs
3	Control Panel	Control panel with LEDs and buttons
4	Service Tag	Hidden tag for the information label

2.3.3 Rear Features

The illustration below shows the features included on the **rear** of the chassis.



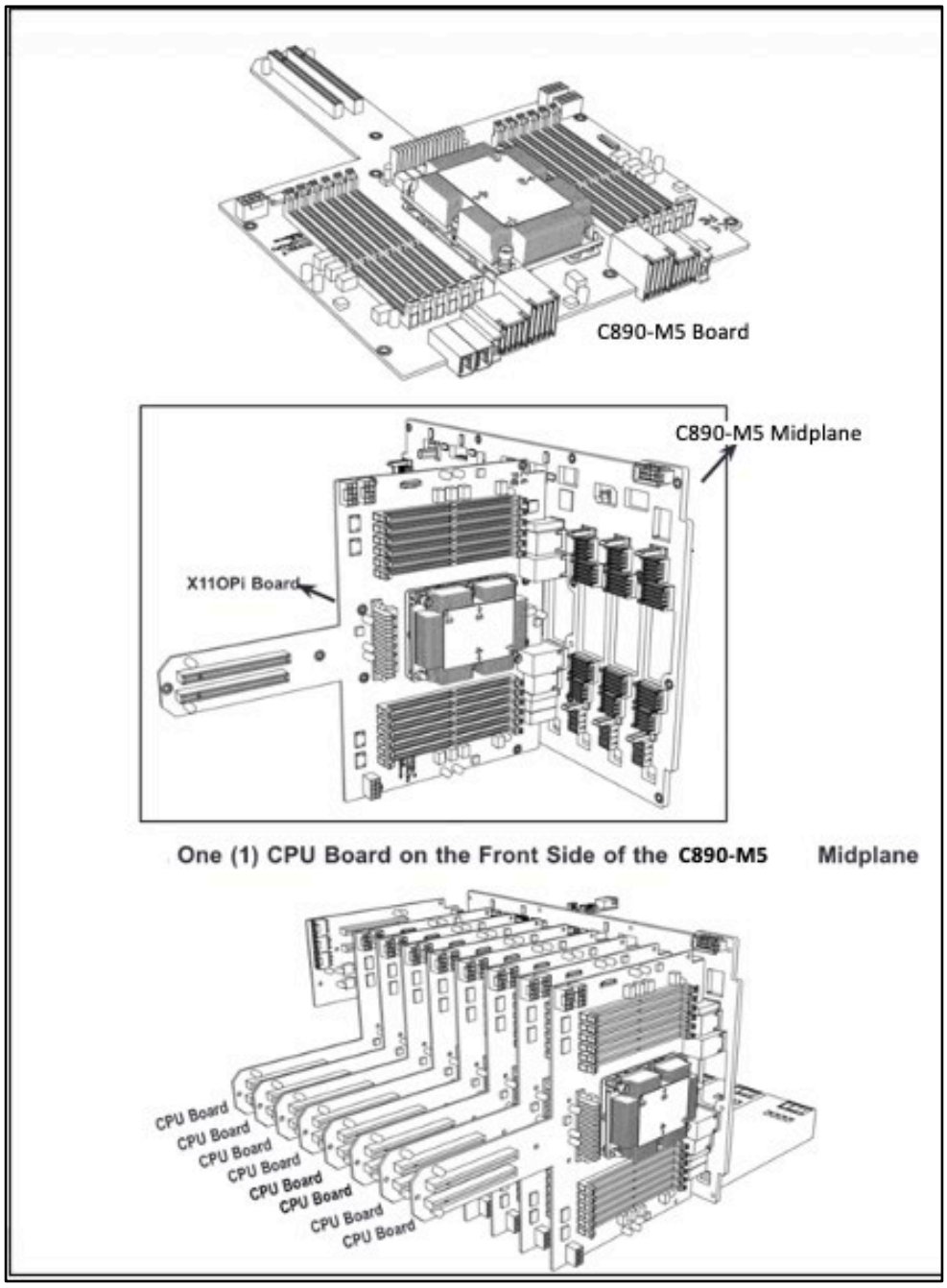
Item	Feature	Description
1-5	PCI-E Modules	Hot-plug* PCI-E modules 1 through 5 (#1 = PCIE module 1, etc.)
6-13	Hot-swap Fans	9-cm counter-rotating fans (#6 = FAN1, etc.)
14	PCH Module	PCH module for system PCH chip, IPMI port, SATA-DOM, M.2, TPM, RAID key. Also includes a SIOM from CPU3 (default 4x 10G RJ45 with SFP LAN ports)
15-19	Power Supplies	5x Titanium Level 1600W power supplies (#15 = PS1, etc.)
20	Attention Button	Used to remove or apply power to the PCIE module
21	PCI-E Power LED	Green LED indicating power is present on the PCI-E module.
22	Attention LED	Amber LED indicating an operational problem on the PCI-E module.
23	I/O Ports	VGA, COM and two USB ports in KVM port

*Must be supported by the OS.

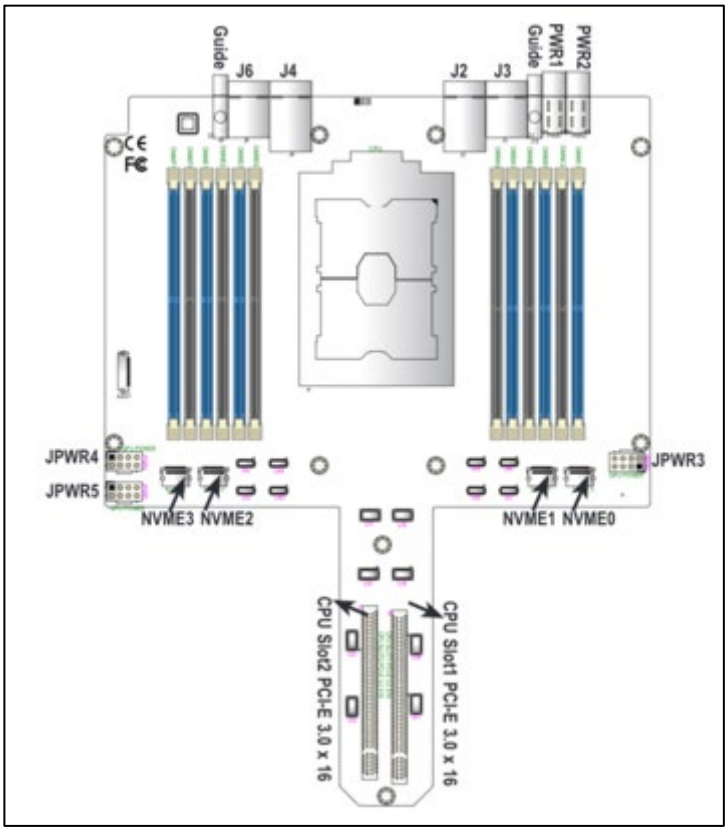
2.3.4 CPU Board

This section covers details about the CPU board.

Location of the C890-M5 Board



Major Components on the C890-M5 CPU Board



Connectors on the C890-M5-CPU-BOARD

Connector	Description
J3/J6	High speed interconnect
J2/J4	High speed interconnect
J7	PCI-E 3.0 x16 slot supported by the CPU (Slot1)
J8	PCI-E 3.0 x16 slot supported by the CPU (Slot2)
J9/J10	CPU card guides (to be used to attach the CPU cards to the midplane board)
JLED1	Memory error LED connector
JPWR3/JPWR4/JPWR5	GPU power connectors 3/4/5
PWR1/PWR2	12-pin CPU power connectors 1/2
NVME0-NVME3	Non-Volatile Memory Express (NVME) connectors 1/2/3/4
DIMMA1-F2	DIMM memory modules (DIMMA1/A2/B1/B2/C1/C2/D1/D2/E1/E2/F1/F2)

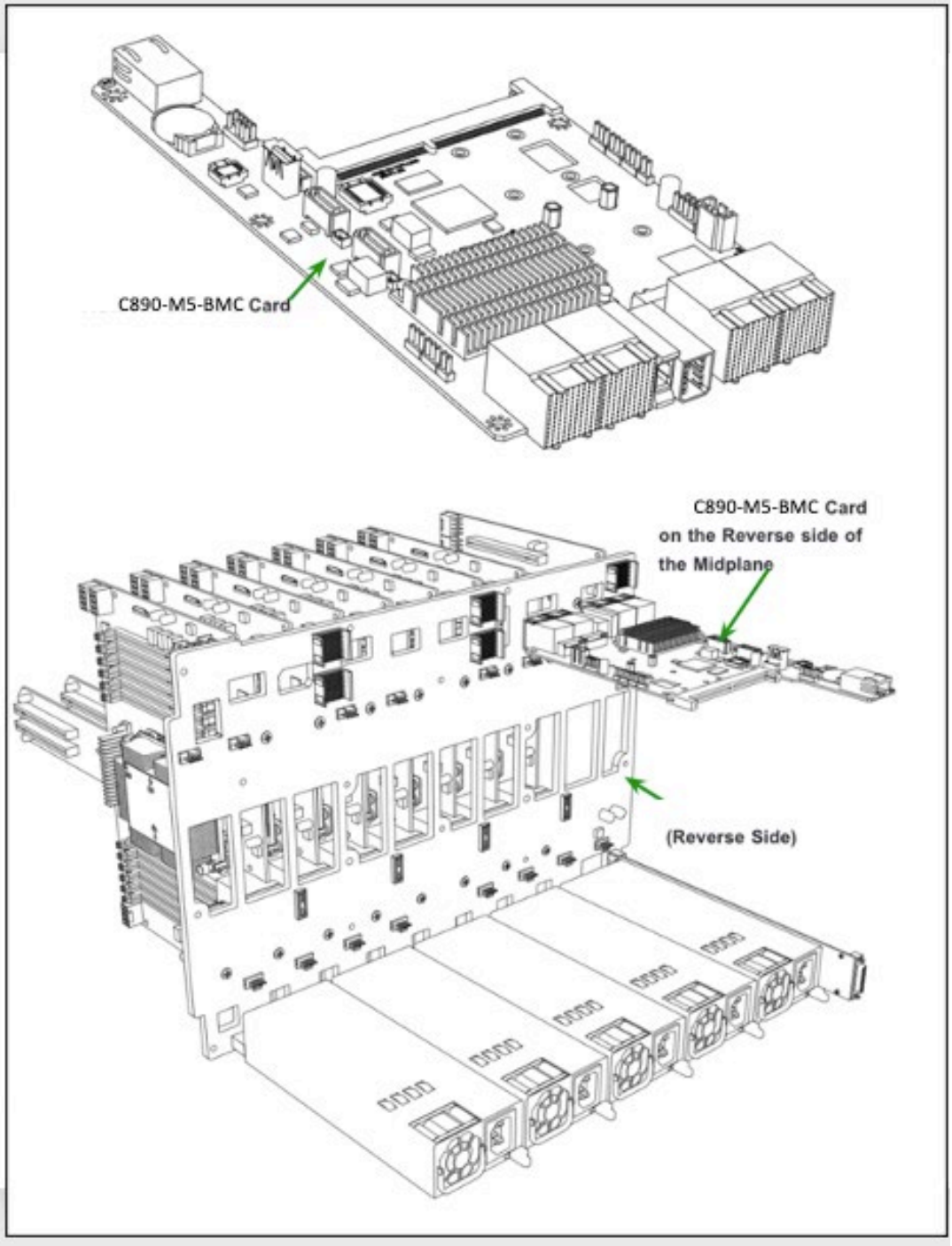
2.3.4.2 Processor and Memory Support on the C890-M5 CPU Board

CPU & Memory Support	
Component	**Description**
CPU	Second-generation Intel® Xeon® Platinum 8XXX processor with UPI up to 10.4GT/s
DIMM Slots: DIMMA1/A2, DIMMB1/B2, DIMMC1/C2, DIMMD1/D2, DIMME1/E2, DIMMF1/F2	1. Each C890-M5-CPU-BOARD= board supports up to 3 TB Intel Optane PMem memory of up 2933 MHz in 12 slots. 2. Each C890-M5-CPU-BOARD= board supports up to 2933 MHz Intel Optane DC PMem and DDR4 combined memory in 12 slots. 3. With eight (8) C890-M5-CPU-BOARD= boards built-in, this platform supports up to 24 TB of DDR4 memory or up to 36 TB of DCPMM & DDR4 combined memory in 96 DIMM slots. **Notes:** 1. Memory speed support depends on the CPUs used in the motherboard. 2. Refer to the memory configuration & population tables to maximize memory performance.

2.3.5 C890-M5-BMC Layout

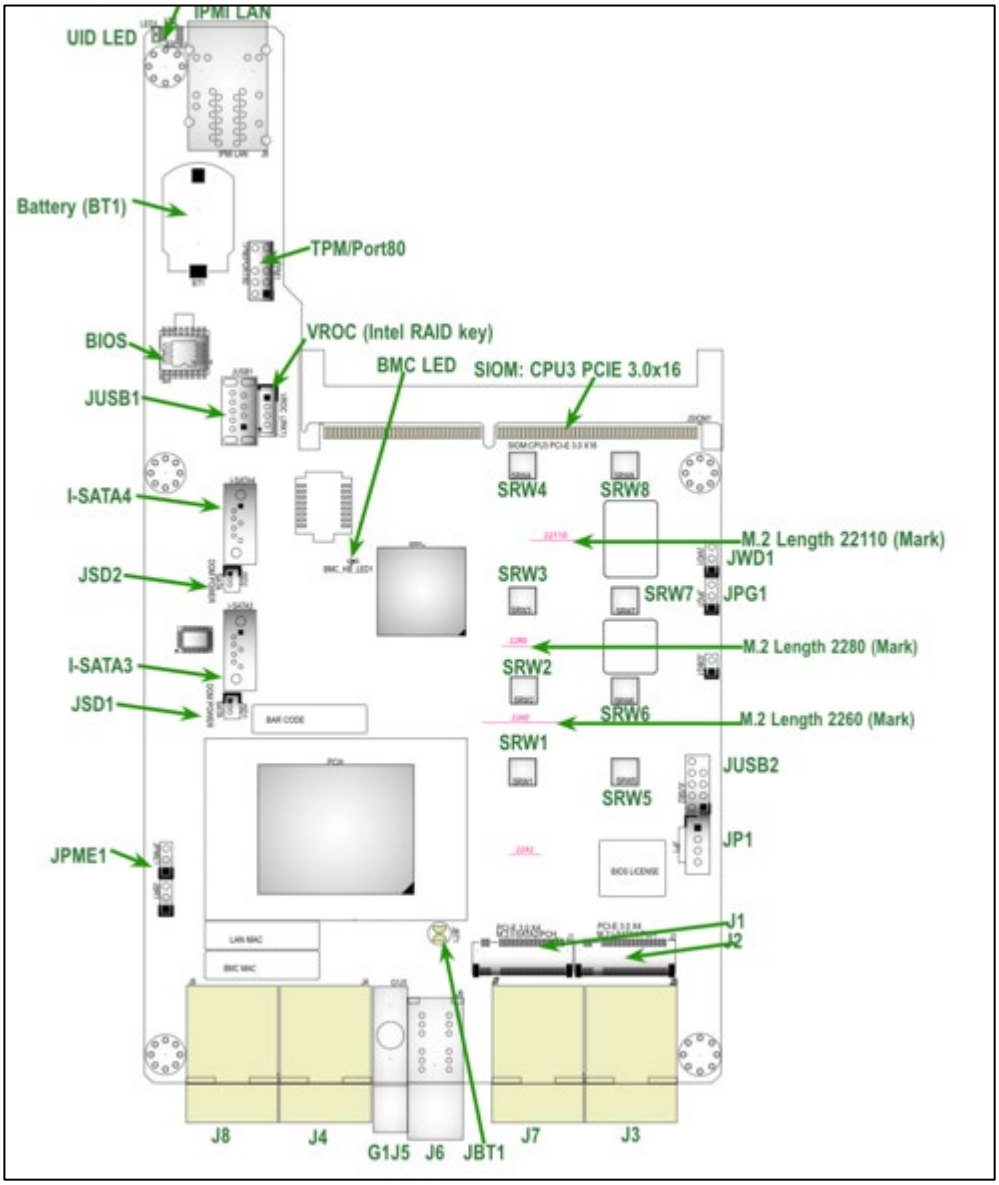
Your system comes with the C890-M5-BMC= card, which is to be installed on the C890-M5-BPLANE= midplane. This section provides the information on the Intel C621 chipset add- on module.

Location of the C890-M5-BMC= Card



2.3.6 Major Components on the C890-M5-BMC Card

This section provides detailed information of the major components on the C890-M5-BMC card.



C890-M5-BMC I/O Controllers

Note: M.2 modules come with 3 sizes in length. Horizontal lines marked "2260", "2280", "22110" on the layout above indicate the locations where M.2 modules should be installed depending on the sizes in length.

2.3.6.1 Quick Reference to the Components on the C890-M5-BMC

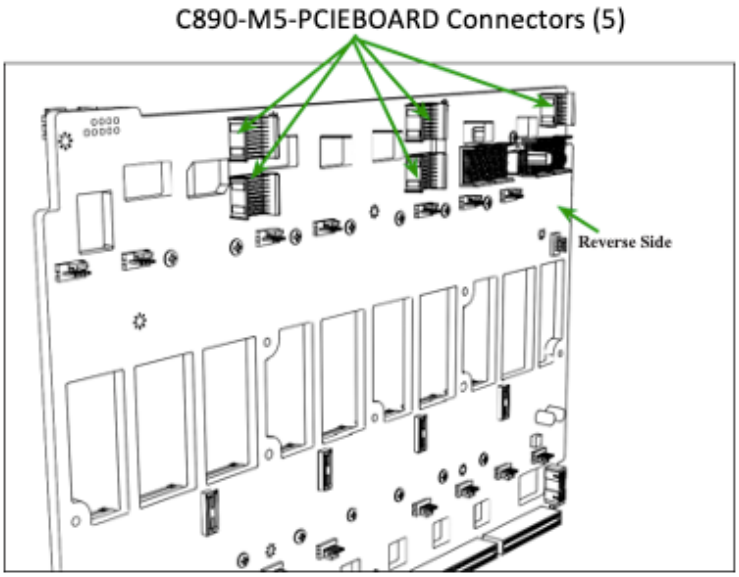
Jumper	Description	Default Setting
JBT1	Clear CMOS	
JPME1	ME Manufacturing Mode Select	Pins 1-2 (Normal)
JWD1	Watch Dog Timer Enable	Pins 1-2 (Reset)

Connector	Description
Battery (BT1)	Onboard CMOS Battery (See Chapter 3 for used battery disposal)
I-SATA3	Powered SATA 3.0 connector with a power pin built in. (SuperDOM) supported by Intel PCH.
I-SATA4	Powered SATA 3.0 connector with a power pin built in. (SuperDOM) supported by Intel PCH.
IPMI LAN	IPMI-dedicated LAN (J9) supported by the Baseboard Management Controller (BMC).
J1	M.2 connector used for SATA 3.0 or PCI-E 3.0 x4 support (Mounting hole locations: SWR1/SWR2/ SWR3/SWR4).
J2	M.2 connector used for SATA 3.0 or PCI-E 3.0 x4 support (Mounting hole locations: SWR5/SWR6/ SWR7/SWR8).
J5	Guide pin
J6	Power connector
JP1	DVD ROM power header (optional)
JSD1/JSD2	Power Connectors 1/2 for I-SATA DOM (Disk_on_Module).
JSIOM1	SIOM (Super I/O Module) PCI-E 3.0 x16 slot supported by CPU3 for use of a proprietary add-on card
JTPM1	TPM (Trusted Platform Module)/Port 80 header.
JUSB1	Type A USB 3.0 header with support of USB 3.0 Port1, USB 2.0 Port2
JUSB2	USB 2.0 header with support of USB 5/USB 6
JUIDB1	UID (Unit Identification) button.
VROC (JRK1)	Intel VROC RAID key header for NVMe SSD

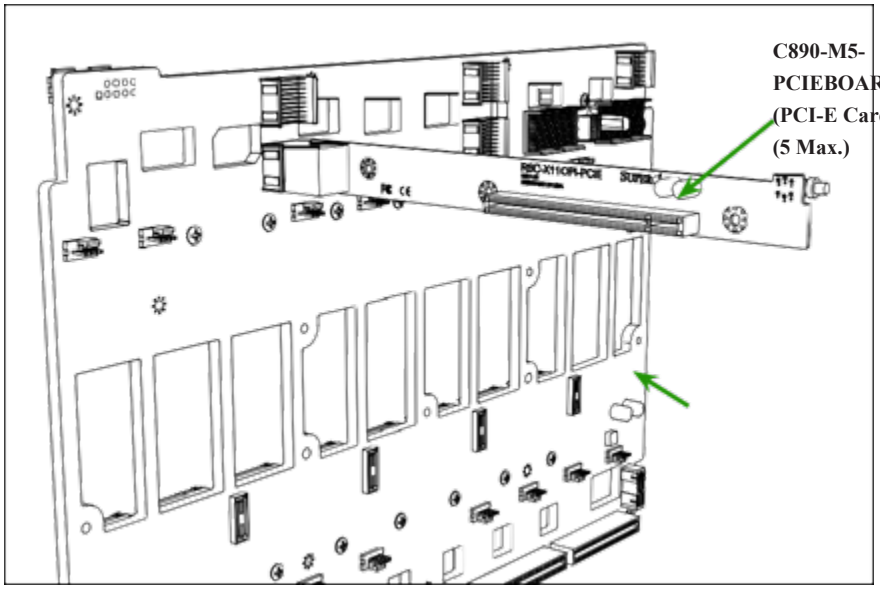
LED	Description
BMC_HB_LED1	BMC Heartbeat LED indicator (Green Blinking: BMC Normal)
LED1	Unit Identifier LED indicator (Blue: Unit Identified)

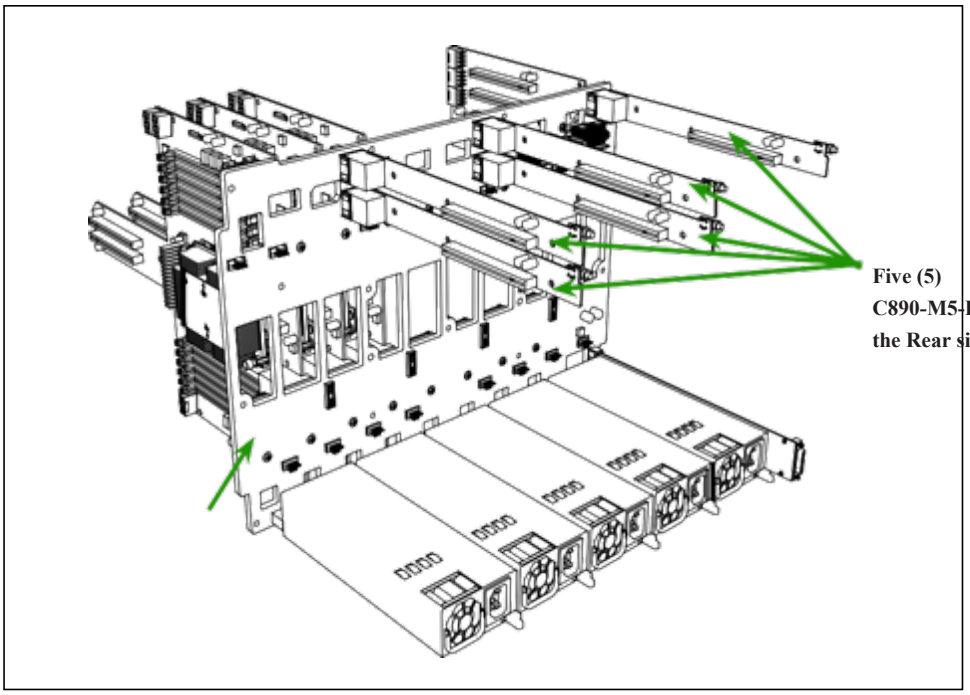
2.3.7 C890-M5 PCIE Card

This section provides the information on the C890-M5-PCIEBOARD= add-on card.



2.3.8 Location of the C890-M5-PCIEBOARD= Cards

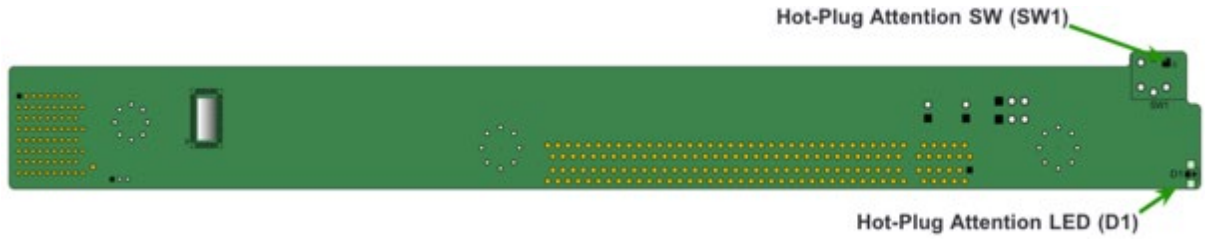




Five (5) C890-M5-PCIEBOARD on the Rear side of Midplane

2.3.9 Major Components on the C890-M5-PCIEBOARD Card

C890-M5-PCIEBOARD Card Layout (Front)

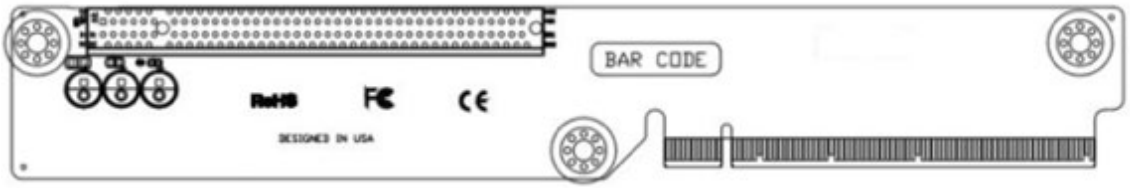


C890-M5-PCIEBOARD Card Layout (Reverse Side)

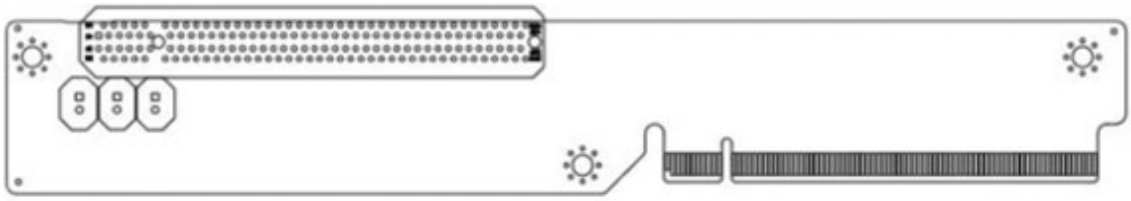
Major Components on the C890-M5-PCIEBOARD		
Location	**Description**	**Detailed Description**
Front Side	J2	PCI-E Slot1: PCI-E 3.0 x16 slot
Reverse Side	SW1	Hot-plug attention button
Reverse Side	D1	Hot-plug attention LED (Orange: Hot-plug support needs attention)

2.3.10 C890-M5-RISER-A Card

This section provides the information on the C890-M5-RISER-A= add-on card.



C890-M5-RISER-A Card Layout (Front)

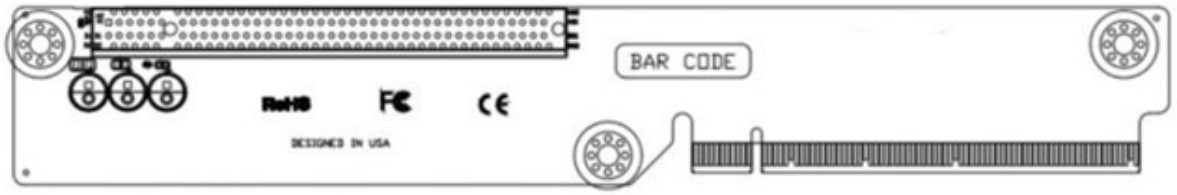


C890-M5-RISER-A Card Layout (Rear)

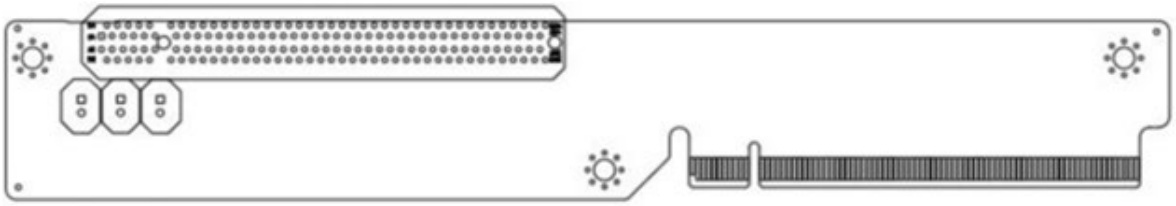
Major Components on the C890-M5-RISER-A=		
Location	**Description**	**Detailed Description**
Front Side	JPCIE1	PCI-E JPCIE1: PCI-E 3.0 x16 slot

2.3.11 C890-M5-RISER-B Card

This section provides the information on the C890-M5-RISER-B= add-on card.



C890-M5-RISER-B Card Layout (Front)

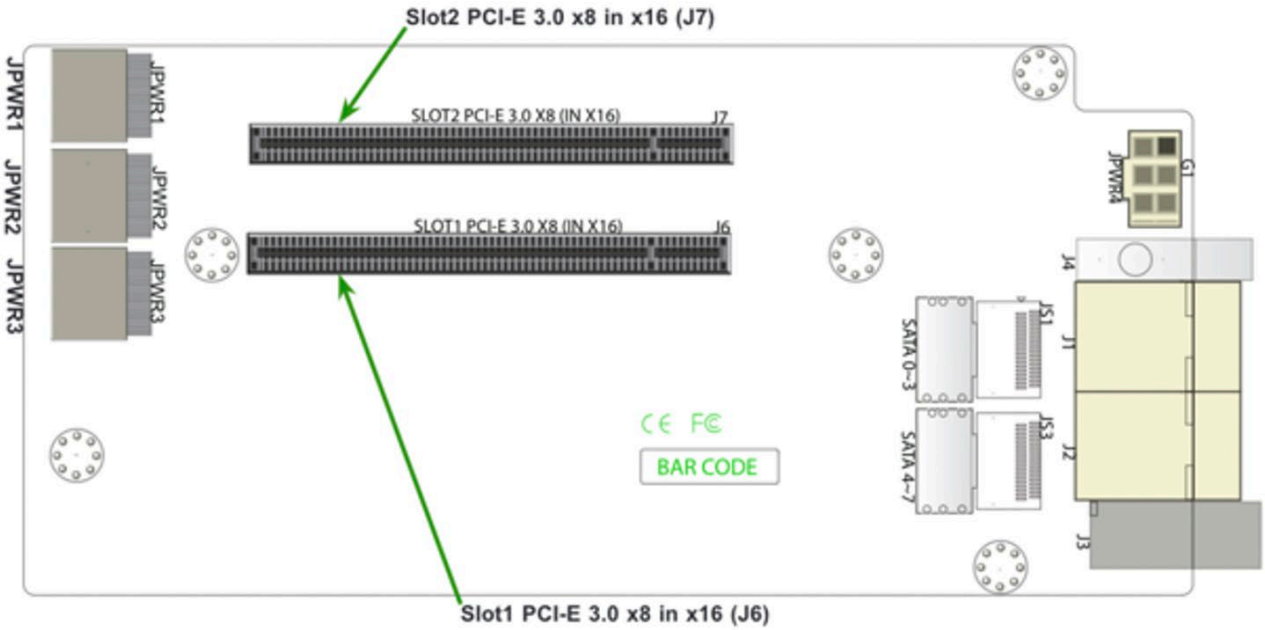


C890-M5-RISER-B Card Layout (Rear)

Major Components on the C890-M5-PCIEBOARD=		
Location	**Description**	**Detailed Description**
Front Side	SLOT1	PCI-E Slot1: PCI-E 3.0 x16 slot

2.3.12 C890-M5-HDD-BOARD Card

This section provides the information on the C890-M5-HDD-BOARD add-on card.

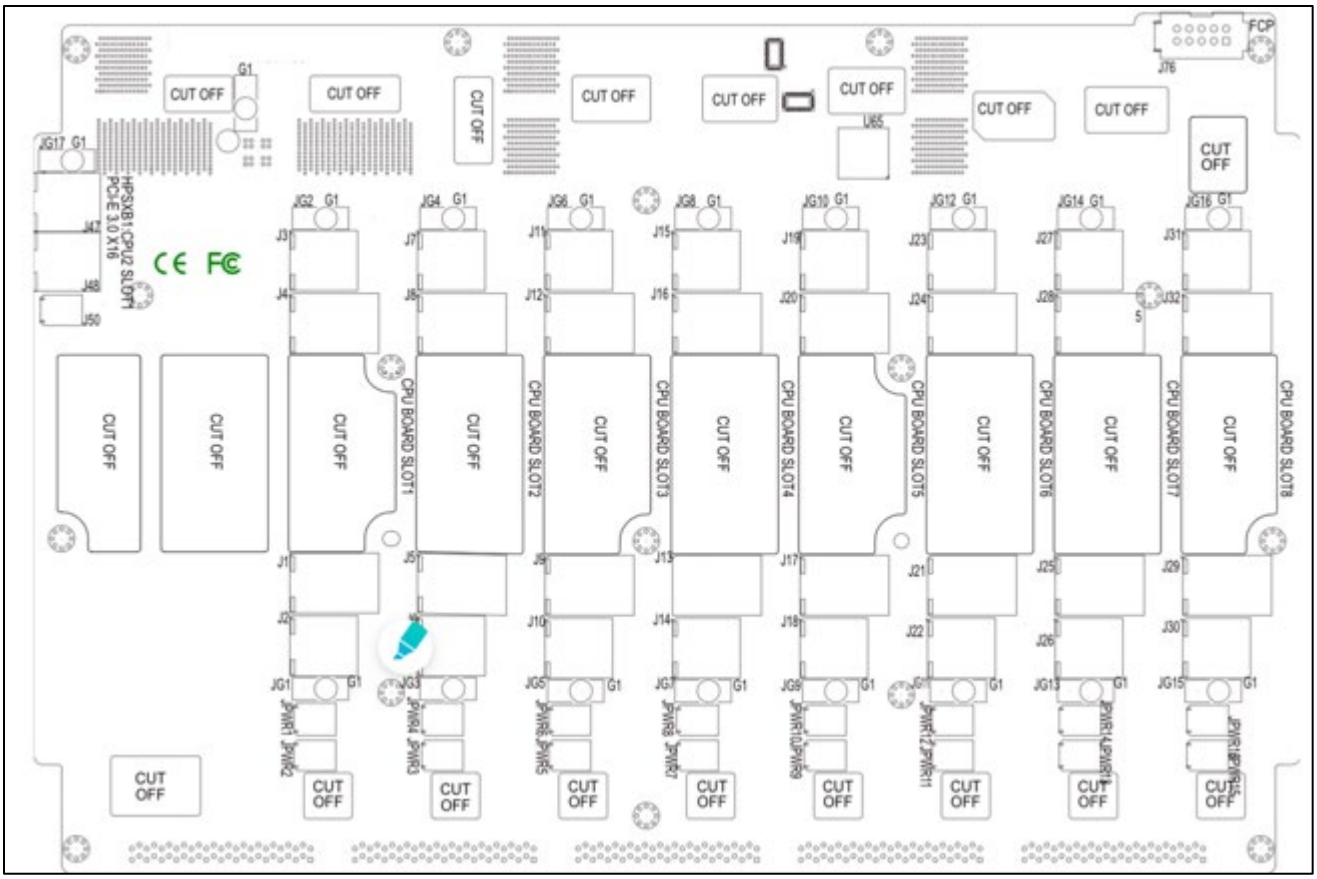


Major Components of the C890-M5-HDD-BOARD Card

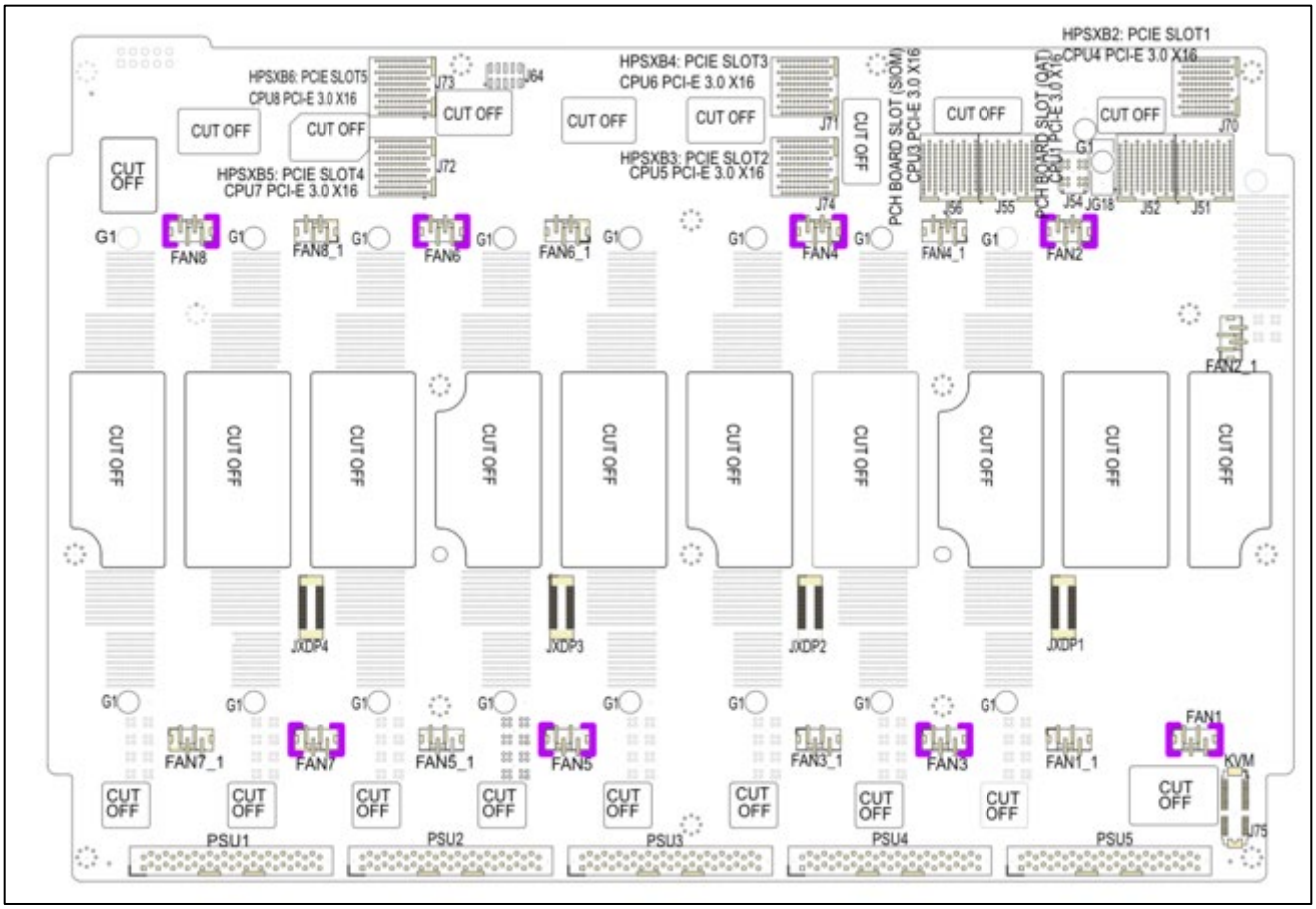
Major Components on the C890-M5-HDD-BOARD Card	
Description	**Default Setting**
J1	High speed interconnect
J2	High Speed interconnect
J3	Guide pin
J4	Power connector
JPWR1/JPWR2/JPWR3/JPWR4	8-pin power connectors 1/2/3/4 for HDD use
Slot1/Slot2	PCI-E 3.0x8 in x16 slots (Slot1/Slot2)
SATA0-3, SATA4-7 (JS1/JS3)	SATA connections 0-3, 4-7

2.3.13 C890-M5-BPLANE Midplane

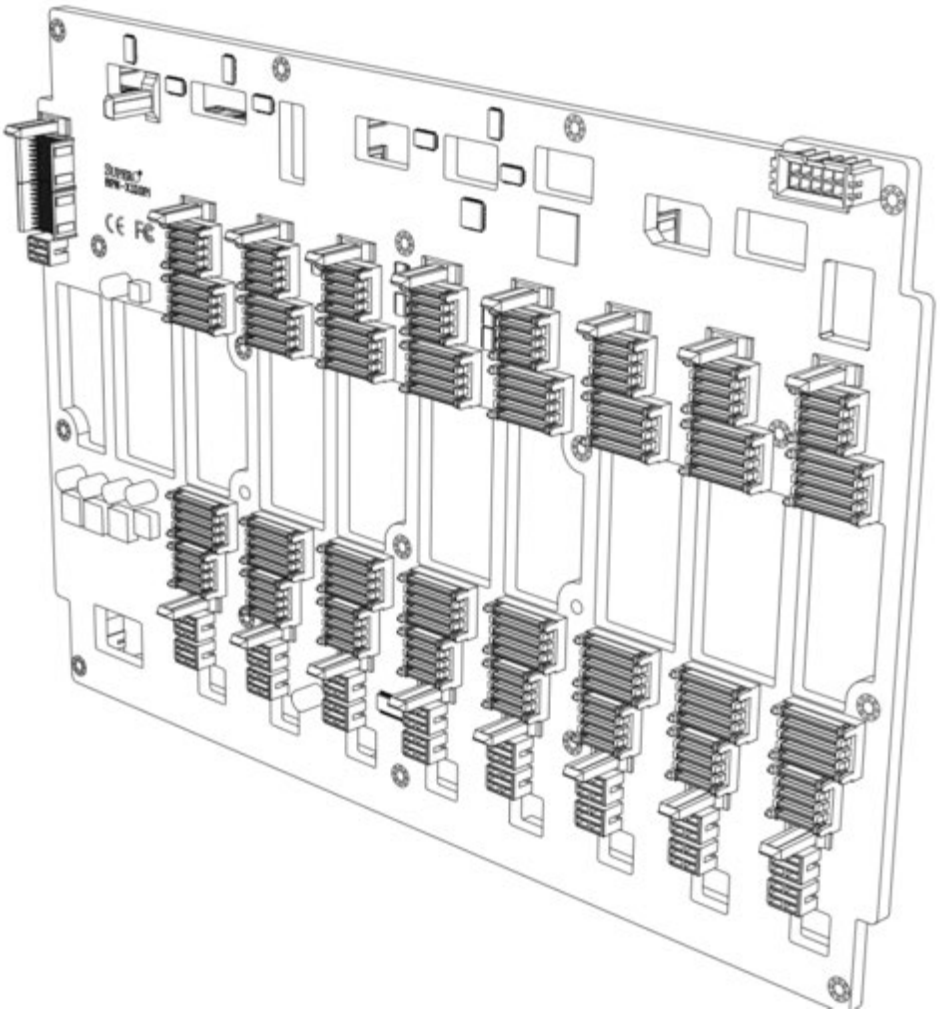
This section provides detailed information on the C890-M5-BPLANE= midplane.



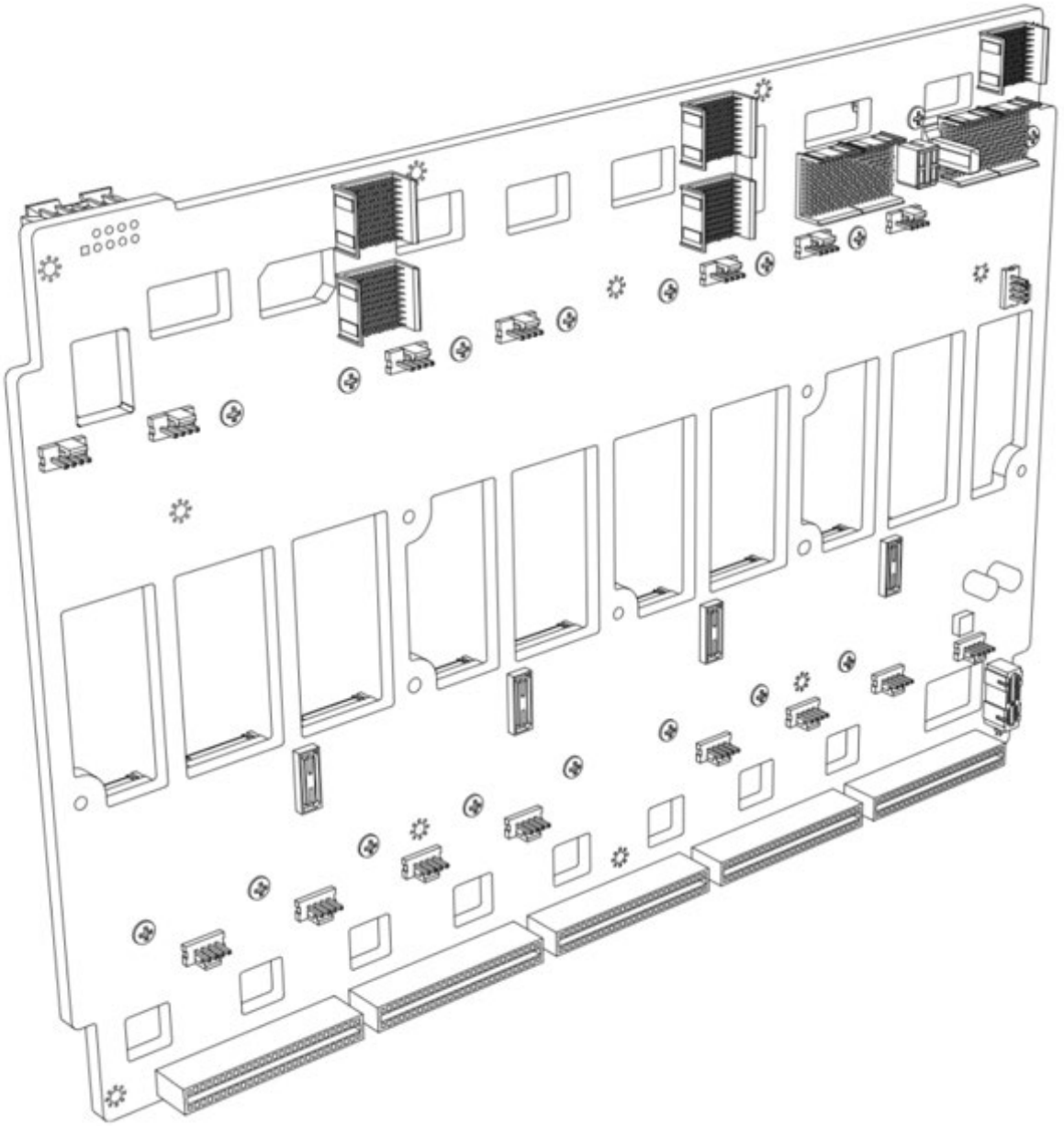
C890-M5-BPLANE Midplane Layout (Front Side)



C890-M5-BPLANE Midplane Layout (Rear Side)

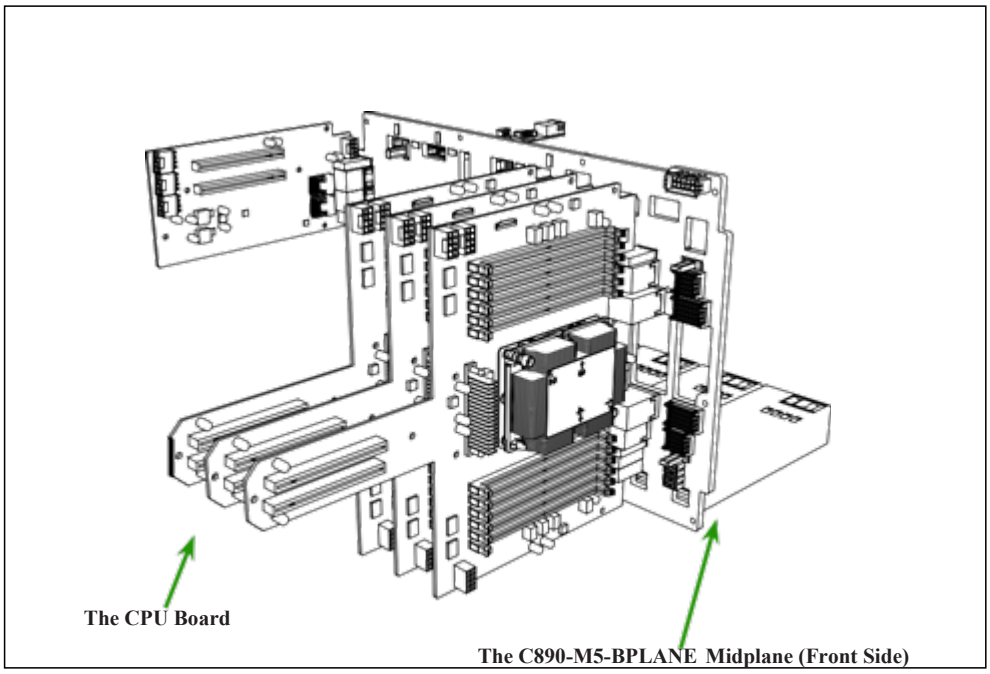


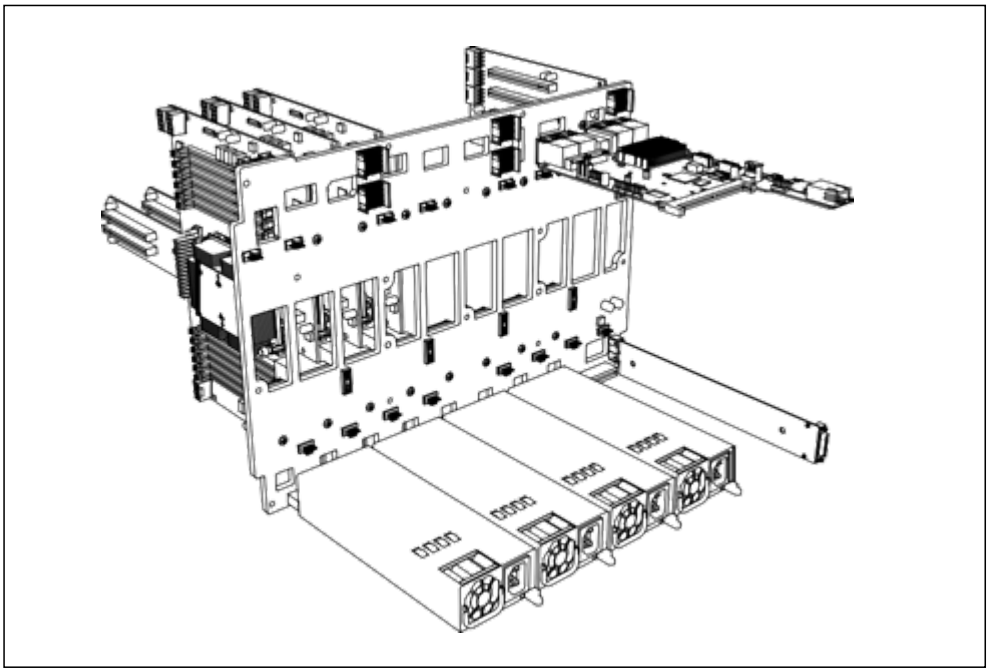
Front View of the C890-M5-BPLANE Midplane



Rear View of the C890-M5-BPLANE Midplane

2.3.14 Location of the C890-M5-BPLANE= Midplane

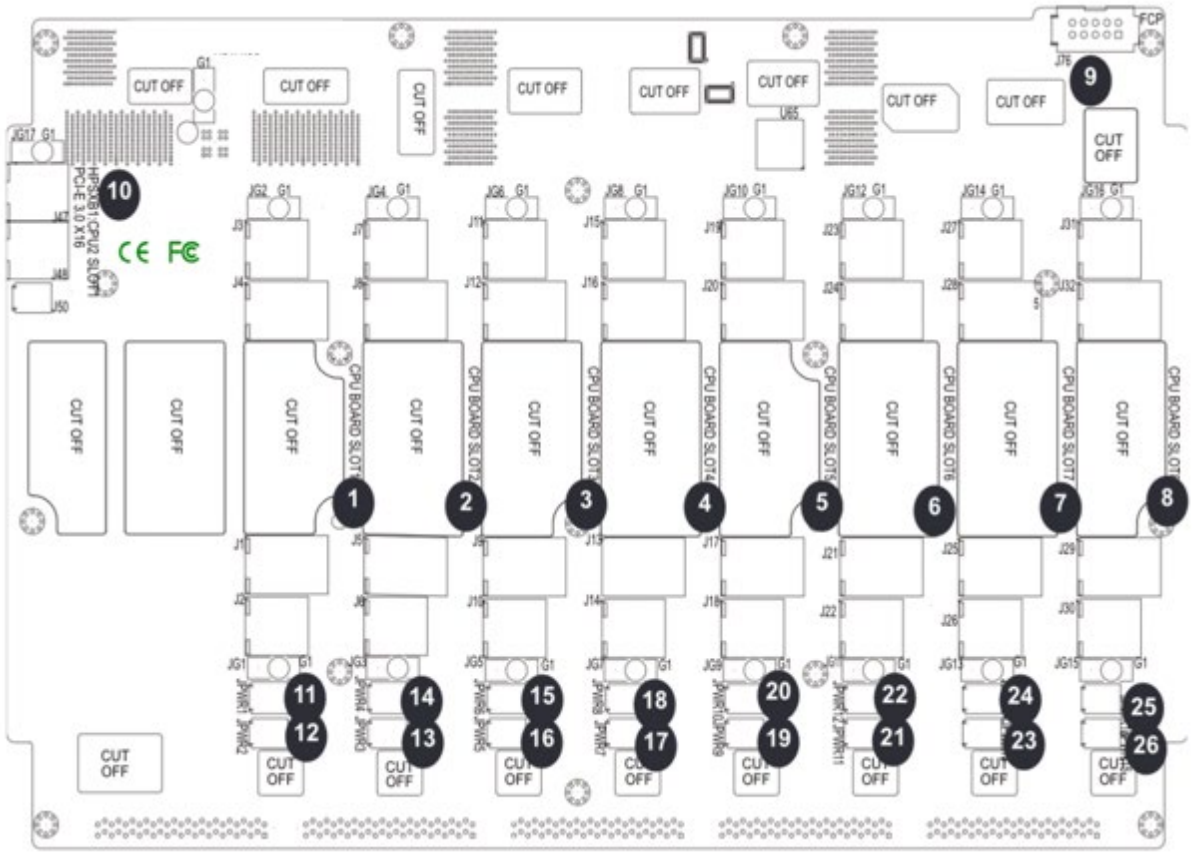




2.3.15 Major Components on the C890-M5-BPLANE= Midplane

2.3.15.1 Components on the Front Side of the Midplane

The following section provides detailed information of the major components on the front side of the C890-M5-BPLANE= midplane. All CPU boards and HDD card are installed on the front side of the midplane and can be accessed from the front side of your system.



C890-M5-BPLANE **Layout (Front)**

2.3.15.2 Major Front Side Components of the C890-M5-BPLANE= Midplane

Item#	Description	Detailed Description
1	CPU BOARD SLOT1	CPU Board slot used for C890-M5 Board 1
2	CPU BOARD SLOT2	CPU Board slot used for C890-M5 Board 2
3	CPU BOARD SLOT3	CPU Board slot used for C890-M5 Board 3
4	CPU BOARD SLOT4	CPU Board slot used for C890-M5 Board 4
5	CPU BOARD SLOT5	CPU Board slot used for C890-M5 Board 5
6	CPU BOARD SLOT6	CPU Board slot used for C890-M5 Board 6
7	CPU BOARD SLOT7	CPU Board slot used for C890-M5 Board 7
8	CPU BOARD SLOT8	CPU Board slot used for C890-M5 i Board 8
9	FCP (Front Control Panel)	Front Control Panel header
10	HPSXB1 (CPU2Slot1)	2 x PCI-E 3.0 x8 slot supported by CPU2 (for the C890-M5-HDD-BOARD= card)
11, 12	JPWR1/JPWR2	Power connectors 1/2 for C890-M5 Board 1
13, 14	JPWR3/JPWR4	Power connectors 3/4 for C890-M5 Board 2
15, 16	JPWR5/JPWR6	Power connectors 5/6 for C890-M5 Board 3
17, 18	JPWR7/JPWR8	Power connectors 7/8 for C890-M5 Board 4
19, 20	JPWR9/JPWR10	Power connectors 9/10 for C890-M5 Board 5
21, 22	JPWR11/JPWR12	Power connectors 11/12 for C890-M5 Board 6
23, 24	JPWR13/JPWR14	Power connectors 13/14 for C890-M5 Board 7
25, 26	JPWR15/JPWR16	Power connectors 15/16 for C890-M5 Board 8

2.4 Major Components on the Rear Side of the C890-M5-BPLANE= Midplane

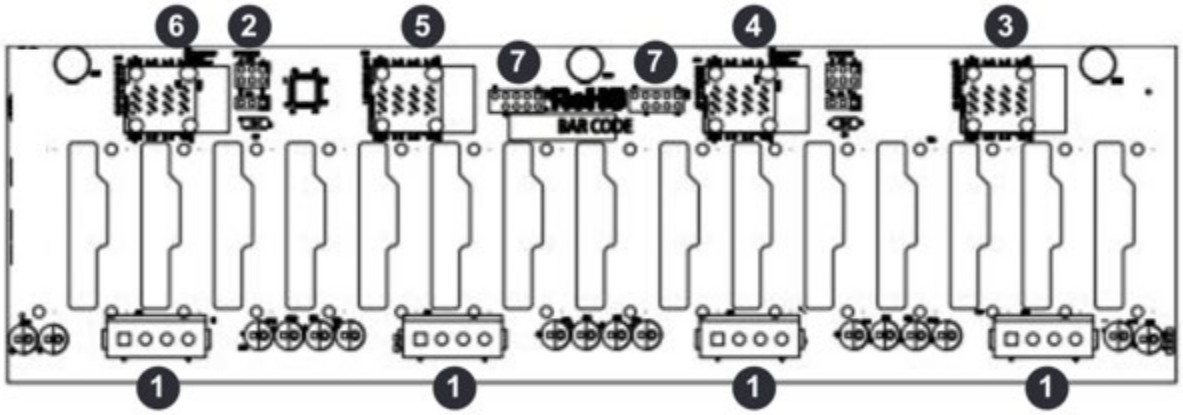
The following section provides the information of the major components on the reverse side of the C890-M5-BPLANE= midplane. The PCH card, PCI-E card, power supply modules, and cooling fans are installed on the reverse side of the midplane and can be accessed from the rear side of your system.

2.5 Major Reverse Side Components of the C890-M5-BPLANE= Midplane

Item#	Location	Detailed Description
1	J51/J52/J54/J55/J56	PCH Board Slot (SIOM) CPU1/CPU3 PCI-E 3.0 x16 Slot (for the AOM-X11OPi-LBG)
2	J70	HPSXB2: Slot1 CPU4 PCI-E 3.0 x 16
3	J74	HPSXB3: Slot2 CPU5 PCI-E 3.0 x 16
4	J71	HPSXB4: Slot3 CPU6 PCI-E 3.0 x 16
5	J72	HPSXB5: Slot4 CPU7 PCI-E 3.0 x 16
6	J73	HPSXB6: Slot5 CPU8 PCI-E 3.0 x 16
7	J75	KVM header for KVM (Keyboard/Video/Mouse) support
8	FAN1	Rear Fan Connector 1
8a	FAN1_1	Rear Fan Connector 1_1
9	FAN2	Rear Fan Connector 2
9a	FAN2_1	Rear Fan Connector 2_1
10	FAN3	Rear Fan Connector 3
10a	FAN3_1	Rear Fan Connector 3_1
11	FAN4	Rear Fan Connector 4
11a	FAN4_1	Rear Fan Connector 4_1
12	FAN5	Rear Fan Connector 5
12a	FAN5_1	Rear Fan Connector 5_1
13	FAN6	Rear Fan Connector 6
13a	FAN6_1	Rear Fan Connector 6_1
14	FAN7	Rear Fan Connector 7
14a	FAN7_1	Rear Fan Connector 7_1
15	FAN8	Rear Fan Connector 8
15a	FAN8_1	Rear Fan Connector 8_1
16	PSU1	Power Supply Unit 1
17	PSU2	Power Supply Unit 2
18	PSU3	Power Supply Unit 3
19	PSU4	Power Supply Unit 4
20	PSU5	Power Supply Unit 5

2.5.1 C890-M5-BPLANE-D= Midplane

This section provides detailed information on the C890-M5-BPLANE-D= midplane.



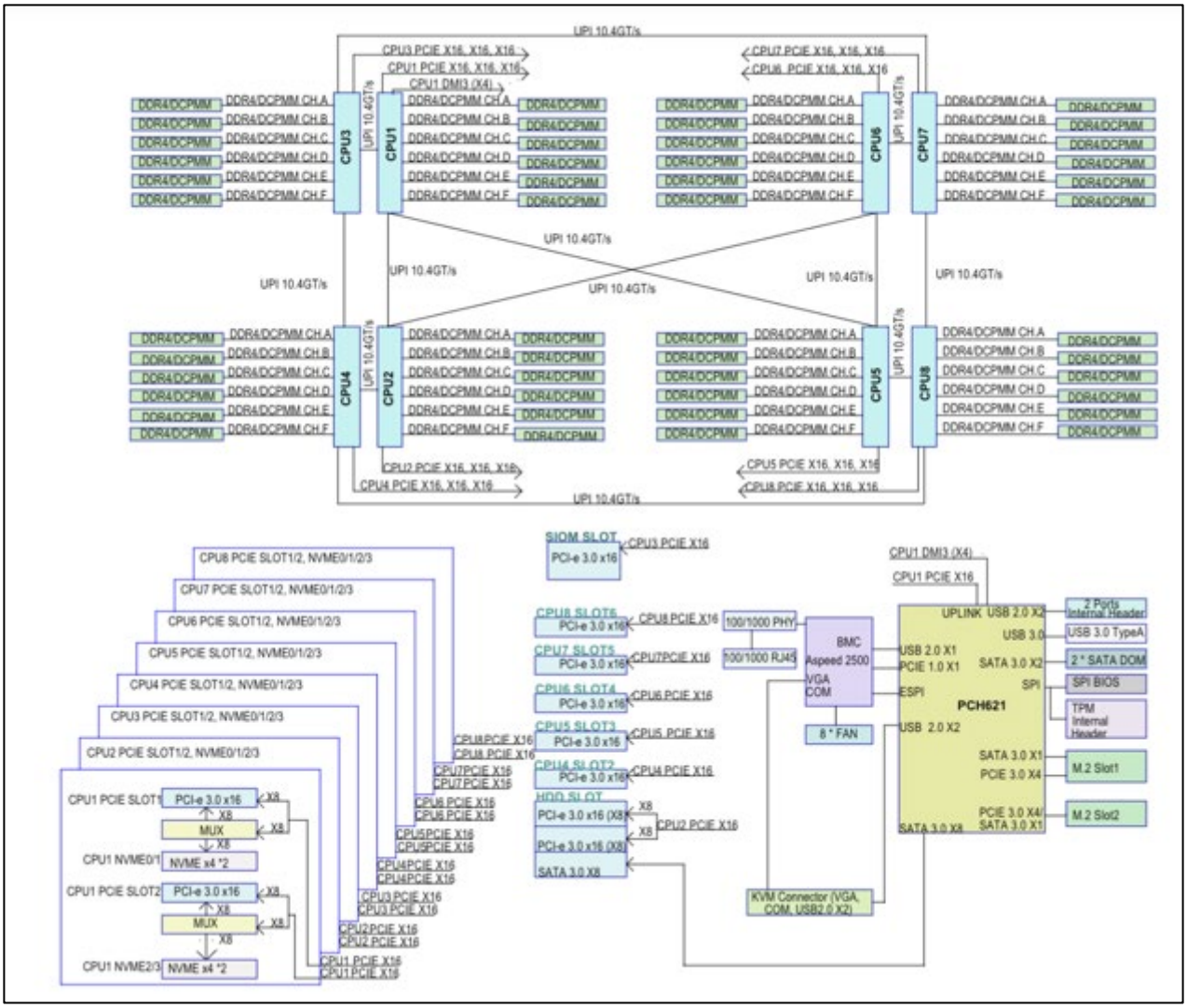
C890-M5-BPLANE-D **Midplane Image (Front Side)**

2.6 Major Front Side Components of the C890-M5-BPLANE-D= Midplane

Item#	Description	Detailed Description
1	JP3, JP4, JP5 and JP6	Power Connectors (4-pin)
2	JP1 and JP2	Upgrade Connectors
3	J17	SAS IN #0-#3
4	J18	SAS IN #4-#7
5	J19	SAS IN #8-#11
6	J20	SAS IN #12-#15
7	JP26 and JP27	For Manufacturers Use Only

2.6.1 System Block Diagram

This section provides a detailed block diagram of the system.



3 Server Installation

3.1 Overview

This chapter provides advice and instructions for mounting your system in a server rack. If your system is not already fully integrated with processors, and system memory.

Caution: Electrostatic Discharge (ESD) can damage electronic components. To prevent such damage to PCBs (printed circuit boards), it is important to use a grounded wrist strap, handle all PCBs by their edges and keep them in anti-static bags when not in use.

3.2 Preparing for Setup

The box in which the system was shipped should include the rackmount hardware needed to install it into the rack.

3.3 Choosing a Setup Location

- The system should be situated in a clean, dust-free area that is well ventilated. Avoid area where heat, electrical noise and electromagnetic fields are generated.
- Leave enough clearance in front of the rack so that you can open the front door completely (~25 inches) and approximately 30 inches of clearance in the back of the rack to allow sufficient space for airflow and access when servicing.
- This product should be installed only in a Restricted Access Location (dedicated equipment rooms, service closets, etc.).
- This product is not suitable for use with visual display workplace devices according to §2 of the German Ordinance for Work with Visual Display Units.

3.4 Rack Precautions

- Ensure that the leveling jacks on the bottom of the rack are extended to the floor so that the full weight of the rack rests on them.
- In single rack installations, stabilizers should be attached to the rack. In multiple rack installations, the racks should be coupled together.

- Always make sure the rack is stable before extending a server or other component from the rack.
- You should extend only one server or component at a time - extending two or more simultaneously may cause the rack to become unstable.

3.5 Server Precautions

- Determine the placement of each component in the rack *before* you install the rails.
- Install the heaviest server components at the bottom of the rack first and then work your way up.
- Use a regulating uninterruptible power supply (UPS) to protect the server from power surges and voltage spikes and to keep your system operating in case of a power failure.
- Allow any drives and power supply modules to cool before touching them.
- When not servicing, always keep the front door of the rack and all covers/panels on the servers closed to maintain proper cooling.

3.6 Rack Mounting Considerations

3.6.1 Ambient Operating Temperature

If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than the room's ambient temperature. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer’s maximum recommended ambient temperature (TMRA).

3.6.1.1 Airflow

Equipment should be mounted into a rack so that the amount of airflow required for safe operation is not compromised.

3.6.1.2 Mechanical Loading

Equipment should be mounted into a rack so that a hazardous condition does not arise due to uneven mechanical loading.

3.6.1.3 Circuit Overloading

Consideration should be given to the connection of the equipment to the power supply circuitry and the effect that any possible overloading of circuits might have on overcurrent protection and power supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

3.6.1.4 Facility Power Considerations

Cisco recommends connecting the Cisco UCS C890 M5 server to 220V dual-phase facility power circuits. Connecting the server to 220V facility power offers the server the most power efficiency and redundancy against power module failures. In addition, the Cisco UCS C890 M5 server supports 110V single-phase facility power circuits without power supply redundancy.

3.6.1.5 Maximum Power Consumption Considerations

Refer to the following table for maximum power consumption for a fully configured 8-socket configuration. The following table lists the maximum power consumption for a fully configured system. Depending on the number and type of components in your server, your power consumption might be less.

PID	Description	Power (Watts)
UCSC-C890-M5-18O2	C890 M5 with 18T (8x8280L, 48x256G, 48x128G DCPMM)	4605
UCSC-C890-M5-12F	C890 M5 with 12T (8x8280L,96x128G)	3885
UCSC-C890-M5-3F	C890 M5 with 3T (8x8268, 96x32G)	3453

3.6.1.6 Reliable Ground

A reliable ground must always be maintained. To ensure this, the rack itself should be grounded. Particular attention should be given to power supply connections other than the direct connections to the branch circuit (for example, the use of power strips, etc.).

To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.

- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

Slide rail mounted equipment is not to be used as a shelf or a workspace.

Warning: do not pick up the server with the front handles. They are designed to pull the system from a rack only.

3.7 Installing the System into a Rack

This section provides information on installing the system into a rack. There are a variety of rack units on the market, meaning the procedure may differ slightly. Refer to the Enclosure Template that was included with the system for help.

3.7.1 Rack Mounting Hardware

The following is a list of rack mounting hardware you will need for rack setup and installation:

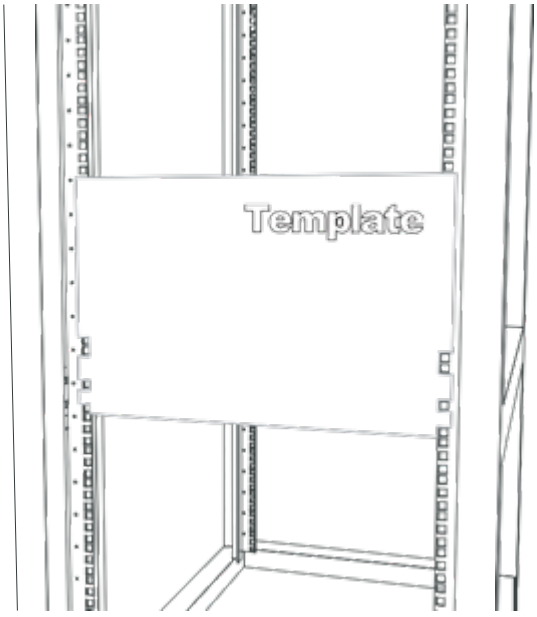
- Two rail assemblies (one for each side of the enclosure).
- Two handles.
- Four roundhead screws for fastening the enclosure ears to the rack.
- Eight flathead screws and washers for mounting the rails to the rack.

3.7.1.1 Installation

Use the procedure below for installing the system into a rack.

Installing to a Rack

1. Decide where you want to place the system into the rack see the previous section.
2. Position the Enclosure Template at the front of the enclosure to determine the locations of the screws for the chassis rails.



3. The two rail sections are screwed together to keep them immobile during shipping. Release these screws just enough to allow the rails to slide apart. Note the arrow on the rail, which indicates the end that attaches to the front of the rack.

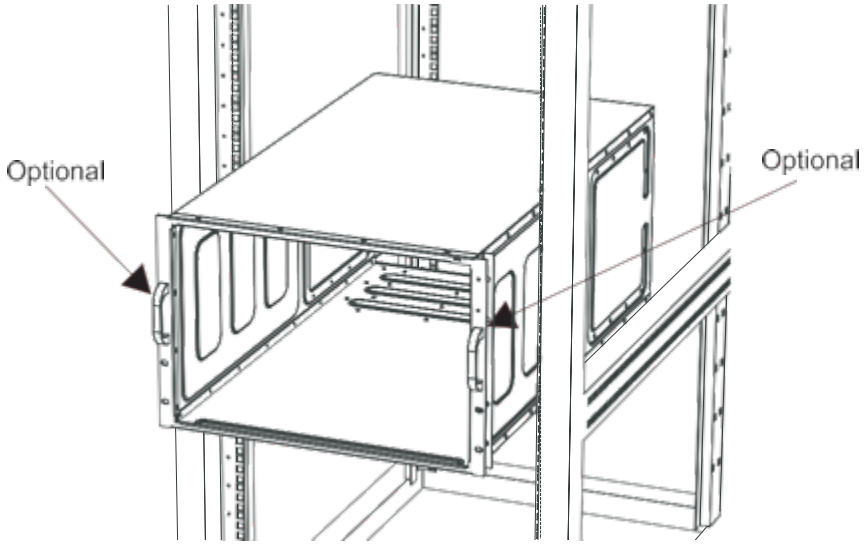
4. Slide the rails apart far enough to match the depth of the rack. Position the rails with the template and secure the front of each to the front of the rack with two flathead screws, then secure the back of each rail to the rear of the rack with two flathead screws. Note that the rails are left/right specific and very heavy.

5. (Optional step) Add the front left and right handles to the chassis using five screws to secure each handle. Install a thumbscrew through the bottom hole of each handle.

   Note: These handles are optional and need only be installed when mounting the system into a short rack. When mounting into a deep rack, they are unnecessary and regular screws should be used instead of thumbscrews.

   Be aware that these handles are not to be used for lifting the system, they are only to be used to slide the system within the rack.

6. With one person on either side (see the descriptive label on the side of the chassis), lift the system and slide it into the installed rails.



Attaching the Optional Handles

WARNING: Be sure that the system is empty of all CPU modules, storage modules, power supplies, PCI-E modules and the PCH module BEFORE lifting (as shown in the figure above with the chassis empty). These should be installed AFTER the system is mounted in the rack. Injury and damage may occur if components are not removed from the rack prior to installation.

7. After pushing the system all the way into the rack, use two roundhead screws on each side of the server to lock it into place.

8. With the system now secure in the rack, the CPU modules, storage modules, power supplies, PCI-E modules and the PCH module may all be installed in the chassis.

Note: Figures are for illustrative purposes only. Always install servers to the bottom of a rack first.

Warning: Stability hazard. The rack stabilizing mechanism must be in place, or the rack must be bolted to the floor before you slide the unit out for servicing. Failure to stabilize the rack can cause the rack to tip over.

3.8 Logging into the Server

Each server has a unique password. This password is required for initial access to the BMC to set the IP management address.

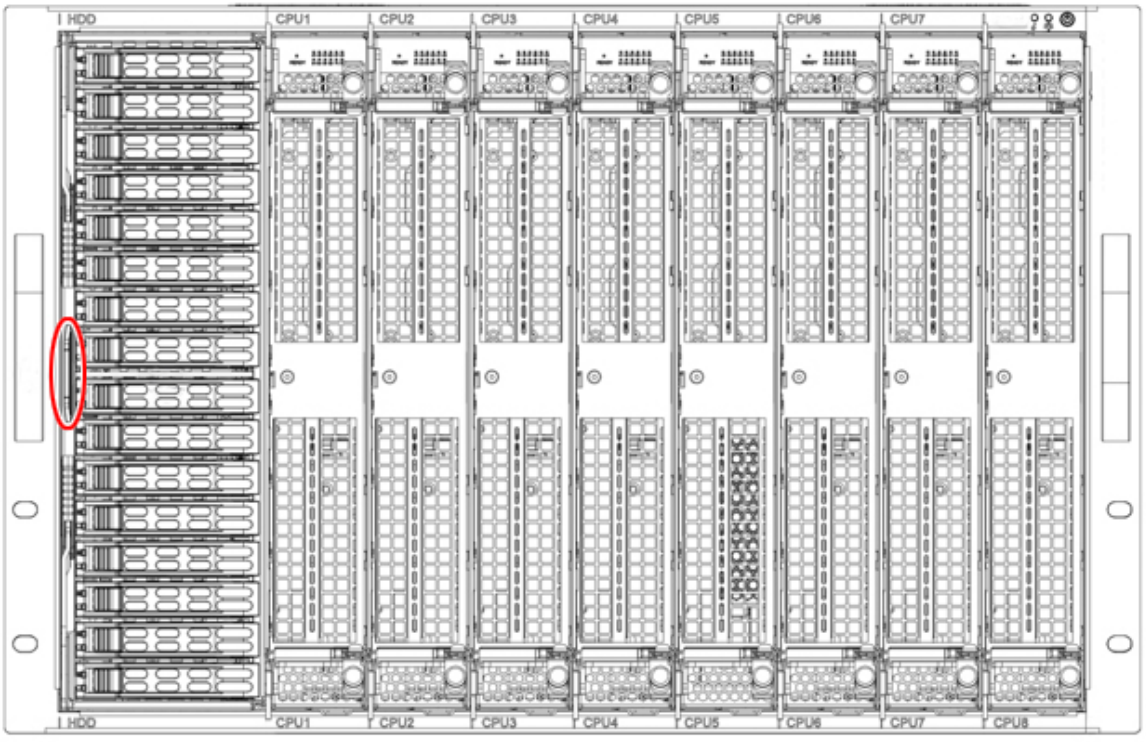
3.8.1 Password Specification

The unique, pre-programmed password will consist of a string of exactly 10 uppercase alphabetic letters. The 10-character alphabetic password string is on a sticker placed on the server asset tag.

3.8.2 Password Location

You can find the initial, unique password in the following locations:

- The baseboard management controller (BMC) module (C890-M5-AOC-102) close to the platform controller hub (PCH) module (C890-M5-AOC-102). For the location of the PCH, see Rear Features.
- A sticker placed on the server asset tag as highlighted in the illustration below.



You can view the sticker by using your fingers to pull the asset tag out. When you have noted the default password make sure to slide the asset tag back in.

4 Maintenance and Component Installation

This chapter provides instructions on installing and replacing main system components. To prevent compatibility issues, only use components that match the specifications and/or part numbers given.

Installation or replacement of most components require that power first be removed from the system.

4.1 Removing Power

Removing power from the system is necessary when removing or installing non-hot-swap components or when replacing a non-redundant power supply.

1. Use the operating system to power down the system.
2. After the system has completely shut down, **disconnect the AC power cords from all power supply modules**.

4.2 Accessing the System

The Cisco UCS C890 M5 Rack Server is a modular system with the motherboards, hard drives, fans, and power supplies all accessible for servicing without the need to open the chassis.

Refer to the relevant sections in this chapter for the correct procedures to use when servicing any of these subsystems.

4.3 CPU Modules

4.3.1 Removing/Installing a CPU Module

1. Begin by removing power from the system as described in Section 3-1. Note: If CPU Module is not inserted, a Blank Module is needed to maintain airflow and other system dynamics.
2. Pull the top thumb lock outward while slightly lifting the top lever. Repeat this procedure for the bottom thumb lock and lever.
3. Lift the top lever up while simultaneously pushing the bottom lever down all the way until the CPU module pops out.
4. With both levers fully released, grasp them both and pull the module outward to remove it from the enclosure.
5. Put the module on a flat, non-conductive surface before removing or installing any components.

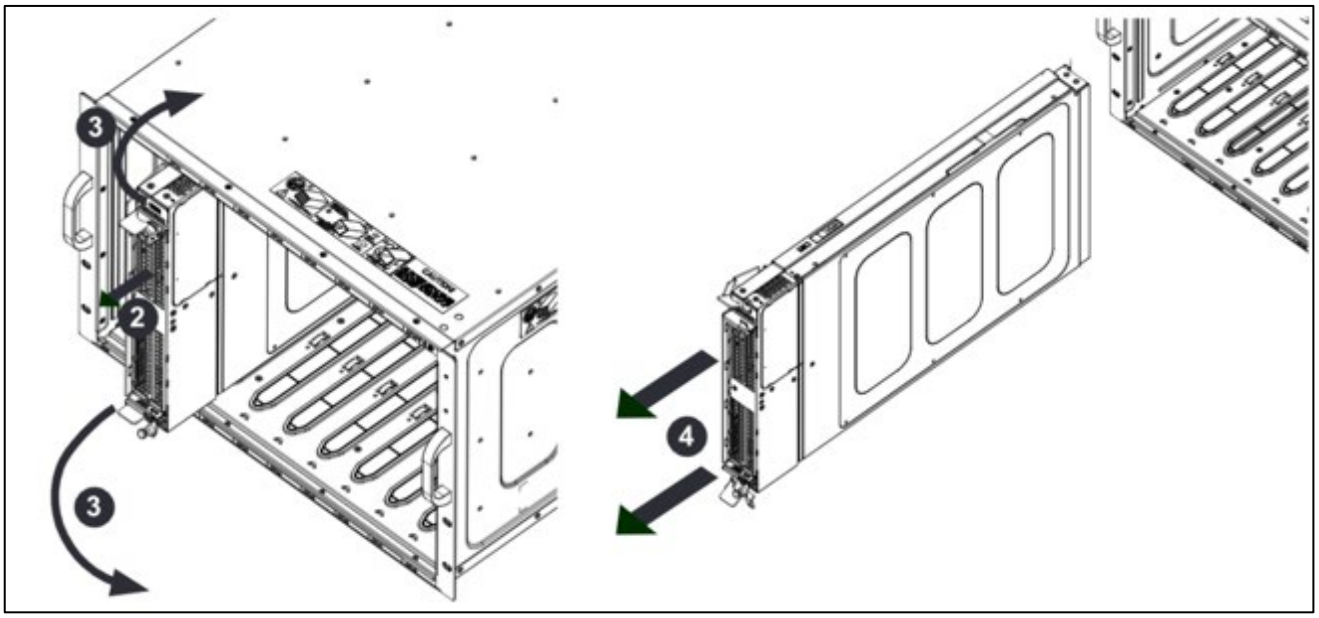


Figure 3-1. Removing a CPU Module

Memory Support and Installation

4.3.2 ESD Precautions

Electrostatic Discharge (ESD) can damage electronic components including memory modules. To avoid damaging your DIMM modules, it is important to handle it very carefully. The following measures are generally sufficient to protect your equipment from ESD.

4.3.3 Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Handle the memory module by its edges only.
- Put the memory modules into the antistatic bags when not in use.

4.3.4 Introduction to Intel® Optane DC Persistent Memory

Intel® 82xx processor support the Intel Optane™ DC Persistent Memory technology. Intel Optane DC PMem offers data persistence with higher capacity at lower latencies than the existing memory modules and provides hyper-speed storage capability for high performance computing platforms with flexible configuration options.

4.3.5 Memory Support

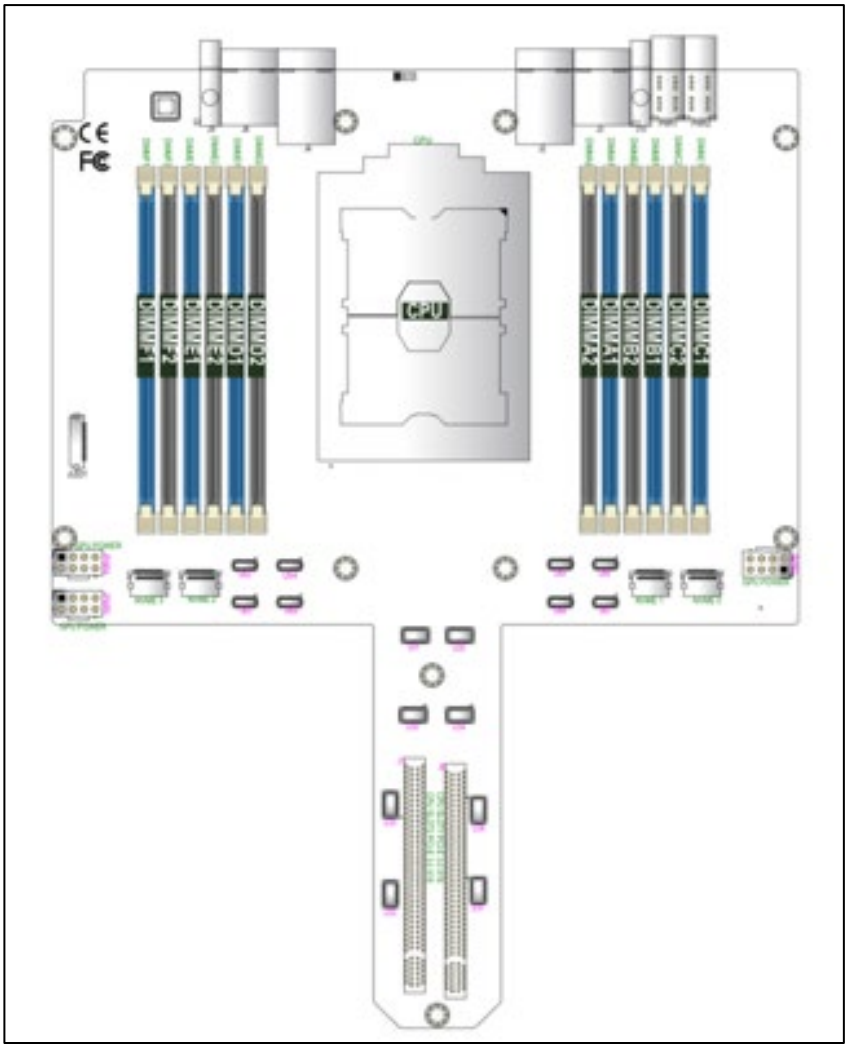
Each CPU board supports up to 3 TB DCPMM* or 3DS LRDIMM (Load Reduced)/ LRDIMM/3DS RDIMM (Registered)/RDIMM DDR4 memory of 2933 MHz in 12 DIMM slots. It also supports up to 4.5 TB Intel Optane DC PMem and DDR4 combined memory in12 DIMM slots. With eight CPU boards installed, your system will support up to 24 TB of DDR4 memory or up to 36 TB Intel Optane DC PMem & DDR4 combined memory in 96 memory slots.

Notes:

1. Populating DDR4 memory modules in a two- DIMMs per-channel (2DPC) configuration on this motherboard will affect memory bandwidth and performance.
2. Mixing of DDR4 memory modules of different types and speeds is not allowed.

3. Memory speed support is dependent on the processors used in the system.

Note: Unbalanced memory configuration decreases memory performance and is not recommended for Cisco UCS C890 M5 Rack Server.



4.3.5.1 DDR4 Memory Support for 2nd Gen Intel® Xeon® Platinum 82XX Processors

DDR4 Memory Support						
Type	Ranks Per DIMM & Data Width	DIMM Capacity (GB)			Speed (MT/s); Voltage (V); Slots Per Channel (SPC) and DIMMs Per Channel (DPC)	
					2 Slots Per Channel	
		DRAM Density			1DPC (1-DIMM Per Channel)	2DPC (2-DIMM Per Channel)
		4Gb*	8Gb	16Gb	1.2 V	1.2 V
RDIMM	DRx4	16GB	32GB	64GB	2933	2933
RDIMM 3Ds	QRX4	N/A	2H-64GB	2H-128GB	2933	2933
RDIMM 3Ds	8RX4	N/A	4H-128GB	4H-256GB	2933	2933
LRDIMM	QRx4	32GB	64GB	128GB	2933	2933
LRDIMM 3Ds	QRX4	N/A	2H-64GB	2H-128GB	2933	2933
LRDIMM 3Ds	8Rx4	N/A	4H-128GB	4H-256GB	2933	2933

Note: 2933 MHz memory support in two-DIMMs per-channel (2DPC) configuration can be achieved by using memory purchased from Cisco.

4.3.6 DIMM Population Guidelines for Optimal Performance

For optimal memory performance, follow the instructions listed in the tables below when populating memory modules.

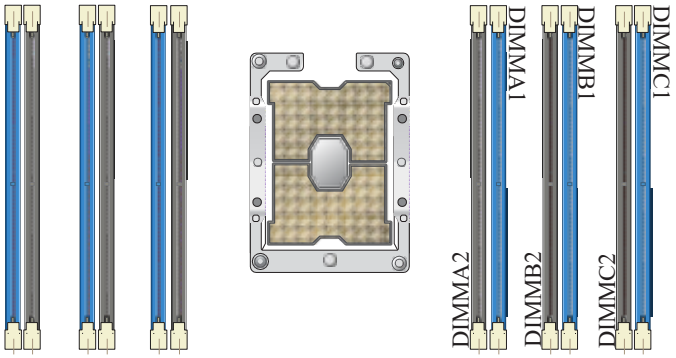
4.3.6.1 Key Parameters for DIMM Configuration

Key Parameters for DIMM Configurations	
Parameters	**Possible Values**
Number of Channels	1, 2, 3, 4, 5, or 6
Number of DIMMs per Channel	1DPC (1 DIMM Per Channel) or 2DPC (2 DIMMs Per Channel)
DIMM Type	RDIMM (w/ECC), 3DS RDIMM, LRDIMM, 3DS LRDIMM
DIMM Construction	non-3DS RDIMM Raw Cards: A/B (2Rx4), C (1Rx4), D (1Rx8), E (2Rx8) 3DS RDIMM Raw Cards: A/B (4Rx4) non-3DS LRDIMM Raw Cards: D/E (4Rx4) 3DS LRDIMM Raw Cards: A/B (8Rx4)

4.3.6.2 DIMM Mixing Guidelines

General DIMM Mixing Guidelines
DIMM Mixing Rules
• Mixing DIMMs with DC PMem and DDR4. • x4 and x8 DIMMs can be mixed in the same channel. • Mixing of LRDIMMs and RDIMMs is not allowed in the same channel, across different channels, and across different sockets. • Mixing of non-3DS and 3DS LRDIMM is not allowed in the same channel, across different channels, and across different sockets.

Mixing of DIMM Types not allowed within a Channel			
DIMM Types	**RDIMM**	**LRDIMM**	**3DS LRDIMM**
RDIMM	Allowed	Not Allowed	Not Allowed
LRDIMM	Not Allowed	Allowed	Not Allowed
3DS LRDIMM	Not Allowed	Not Allowed	Allowed



Note: The drawing above shows DIMM module population for each CPU board installed in your system. Install your processors starting with CPU board #1.

Mixed DIMM/DC PMem Population Table

Symmetric Population													
2-2-2	(For Channel Configuration: 2-2-2)												
Modes													
CPU1	P1-DIMMF1	P1-DIMMF2	P1-DIMME1	P1-DIMME2	P1-DIMMD1	P1-DIMMD2	P1-DIMMA2	P1-DIMMA1	P1-DIMMB2	P1-DIMMB1	P1-DIMMC2	P1-DIMMC1
AD	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
MM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
AD + MM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3
CPU2	P2-DIMMF1	P2-DIMMF2	P2-DIMME1	P2-DIMME2	P2-DIMMD1	P2-DIMMD2	P2-DIMMA2	P2-DIMMA1	P2-DIMMB2	P2-DIMMB1	P2-DIMMC2	P2-DIMMC1
AD	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
MM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
AD + MM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3
CPU3	P3-DIMMF1	P3-DIMMF2	P3-DIMME1	P3-DIMME2	P3-DIMMD1	P3-DIMMD2	P3-DIMMA2	P3-DIMMA1	P3-DIMMB2	P3-DIMMB1	P3-DIMMC2	P3-DIMMC1
AD	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
MM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
AD + MM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3
CPU4	P4-DIMMF1	P4-DIMMF2	P4-DIMME1	P4-DIMME2	P4-DIMMD1	P4-DIMMD2	P4-DIMMA2	P4-DIMMA1	P4-DIMMB2	P4-DIMMB1	P4-DIMMC2	P4-DIMMC1
AD	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
MM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
AD + MM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3
CPU5	P5-DIMMF1	P5-DIMMF2	P5-DIMME1	P5-DIMME2	P5-DIMMD1	P5-DIMMD2	P5-DIMMA2	P5-DIMMA1	P5-DIMMB2	P5-DIMMB1	P5-DIMMC2	P5-DIMMC1
AD	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
MM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
AD + MM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3
CPU6	P6-DIMMF1	P6-DIMMF2	P6-DIMME1	P6-DIMME2	P6-DIMMD1	P6-DIMMD2	P6-DIMMA2	P6-DIMMA1	P6-DIMMB2	P6-DIMMB1	P6-DIMMC2	P6-DIMMC1
AD	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
MM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
AD + MM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3
CPU7	P7-DIMMF1	P7-DIMMF2	P7-DIMME1	P7-DIMME2	P7-DIMMD1	P7-DIMMD2	P7-DIMMA2	P7-DIMMA1	P7-DIMMB2	P7-DIMMB1	P7-DIMMC2	P7-DIMMC1
AD	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
MM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
AD + MM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3
CPU8	P8-DIMMF1	P8-DIMMF2	P8-DIMME1	P8-DIMME2	P8-DIMMD1	P8-DIMMD2	P8-DIMMA2	P8-DIMMA1	P8-DIMMB2	P8-DIMMB1	P8-DIMMC2	P8-DIMMC1
AD	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
MM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DCPMM	DRAM1	DCPMM	DRAM1	DCPMM	DRAM1
AD + MM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DCPMM	DRAM3	DCPMM	DRAM3	DCPMM	DRAM3

Legend					
	DDR4 Type				Capacity
DRAM1	RDIMM	3DS RDIMM	LRDIMM	3DS LRDIMM	Refer to Validation Matrix (DDR4 DIMMs validated with DCPMM) on the next page.
DRAM2	RDIMM	-		-	
DRAM3	RDIMM	3DS RDIMM	LRDIMM	-	

Note: DDR4 single rank DIMMs based on x8 devices are not compatible with any DCPMM operating mode.

Legend	
	Capacity
DCPMM	Any Capacity (Uniformly for all channels for a given configuration)

1. For MM, general NM/FM ratio is between 1:4 and 1:16. Excessive capacity for FM can be used for AD. (NM = Near Memory; FM = Far Memory)
2. For each individual population, rearrangements between channels are allowed as long as the resulting population is compliant with the X11 memory population rules for the 2nd Gen Intel® Xeon® Platinum 82XX processors.
3. For each individual population, use the same DDR4 DIMM in all slots.
4. For each individual population, sockets are normally symmetric with exceptions for 1 DCPMM per socket and 1 DCPMM per node case.
5. No mixing of DCPMM and NVMDIMMs within the same platform is allowed.
6. This DCPMM population guide targets a balanced DCPMM-to-DRAM-cache ratio in MM and MM + AD modes.

Validation Matrix (DDR4 DIMMs Validated w/DCPMM)			
DIMM Type	Ranks Per DIMM & Data Width (Stack)	DIMM Capacity (GB)	
		DRAM Density	
		4Gb	8Gb
RDIMM	1Rx4	8GB	16GB
	2Rx8	8GB	16GB
	2Rx4	16GB	32GB
LRDIMM	4Rx4	N/A	64GB
LRDIMM 3DS	8Rx4 (4H)	N/A	128GB

Memory Rank Sparing Tables

Quad Rank Memory Rank Sparing (64GB DIMM)		
Memory Population	Total RAM Detected	
	One Rank Configuration	Two Rank Configuration
A1	48GB	32GB
A1+B1	96GB	64GB
A1+B1+C1	144GB	96GB
A1+B1+C1+D1	192GB	128GB
A1+B1+C1+D1+E1	240GB	160GB
A1+B1+C1+D1+E1+F1	288GB	192GB

4.3.6.3 Installing DIMM Modules on the C890-M5-CPU Board

CAUTION: Exercise extreme care when installing or removing DIMM modules to prevent any possible damage.

Installing DIMM Modules on the C890-M5-CPU Board

CAUTION: Exercise extreme care when installing or removing DIMM modules to prevent any possible damage.

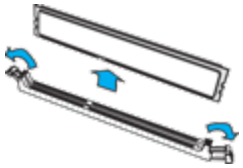
1. Install the desired number of DIMM modules on the CPU board; each board supports up to 12 DIMMs. When installing memory, be sure to always populate the blue slots first, starting with DIMMA1, DIMMB1, DIMMC1, DIMMD1, DIMME1, and DIMMF1. For best performance, use the memory modules of the same type and same speed in the same bank.

C890-M5-CPU Memory Support
DIMMA1/A2, DIMMB1/B2
DIMMC1/C2, DIMMD1/D2
DIMME1/E2, DIMMF1/F2

2. Push the release tabs outwards on both ends of the DIMM slot to unlock it.
3. Align the key of the DIMM module with the receptive point on the memory slot.
4. Align the notches on both ends of the module with the receptive points on the ends of the slot. Use two thumbs together to press module straight down into the slot until the module snaps into place.
5. Press the release tabs to the lock positions.

4.3.6.4 DIMM Module Removal

Press the release tabs on both ends of the DIMM socket to release the DIMM module from the socket as shown in the drawing on the right.



Warning:

1. Try to avoid damage to the DIMM module or the DIMM socket, do not use excessive force when pressing the release tabs on the ends of the DIMM socket.

2. Handle DIMM modules with care. Carefully follow all the instructions given in Section 1 of this user guide to avoid ESD-related damage to your components or system.

3. All graphics, including the layout drawing above, are for reference only. Your system components may or may not look the same as shown in this guide.

4.3.6.5 PCI-E Expansion Card Installation

The Cisco UCS C890 M5 Rack Server supports up to 23 PCI-E 3.0 slots: five are in the rear five PCI-E modules, sixteen are in the eight front CPU modules, two are inside the storage module.

4.3.6.6 The Rear Five PCI-E Modules

Each module can support one FHHL PCI-E 3.0 x16 card, which features a hot-plug* capability for adding and removing PCI-E cards.

4.3.6.7 The Front Eight CPU Modules

Each CPU module has two PCI-E bays, and together to support the one of the following configurations:

- Up to sixteen full-height (FH) PCI-E 3.0 x16 cards
- Up to eight GPUs plus 16 U.2 NVMe drives or eight full-height (FH) PCI-E 3.0 x16 cards
- Up to thirty-two U.2 NVMe drives

4.3.6.8 Inside the Storage Module

The storage module supports two low-profile (LP) PCI-E 3.0 x8 (in x16 slot) internal cards, or one full-height (FH) PCI-E 3.0 x8 (in x16 slot) internal cards via riser for OEM.

4.3.6.9 PCIE Module

Perform the following steps to replace a PCI-E card in one of five hot-plug PCI-E modules at the rear of the system while the system is on.

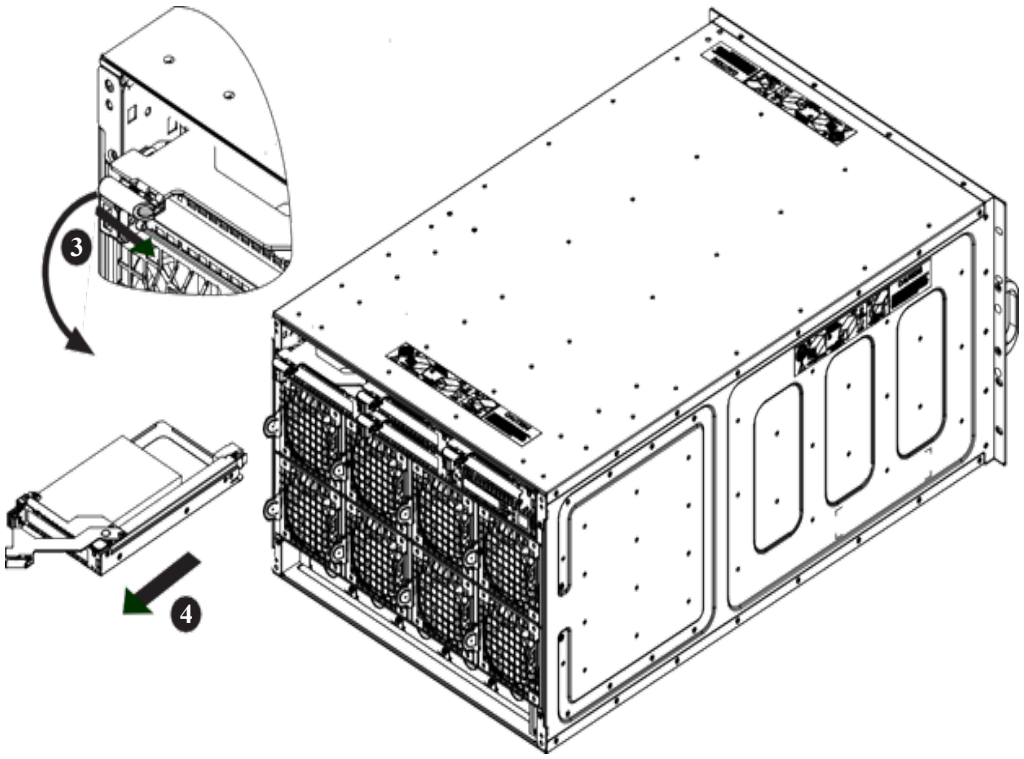
Note: Both the OS and PCI-E card must support the hot-plug feature.

4.3.6.10 Removing a Hot-Plug PCI-E Card

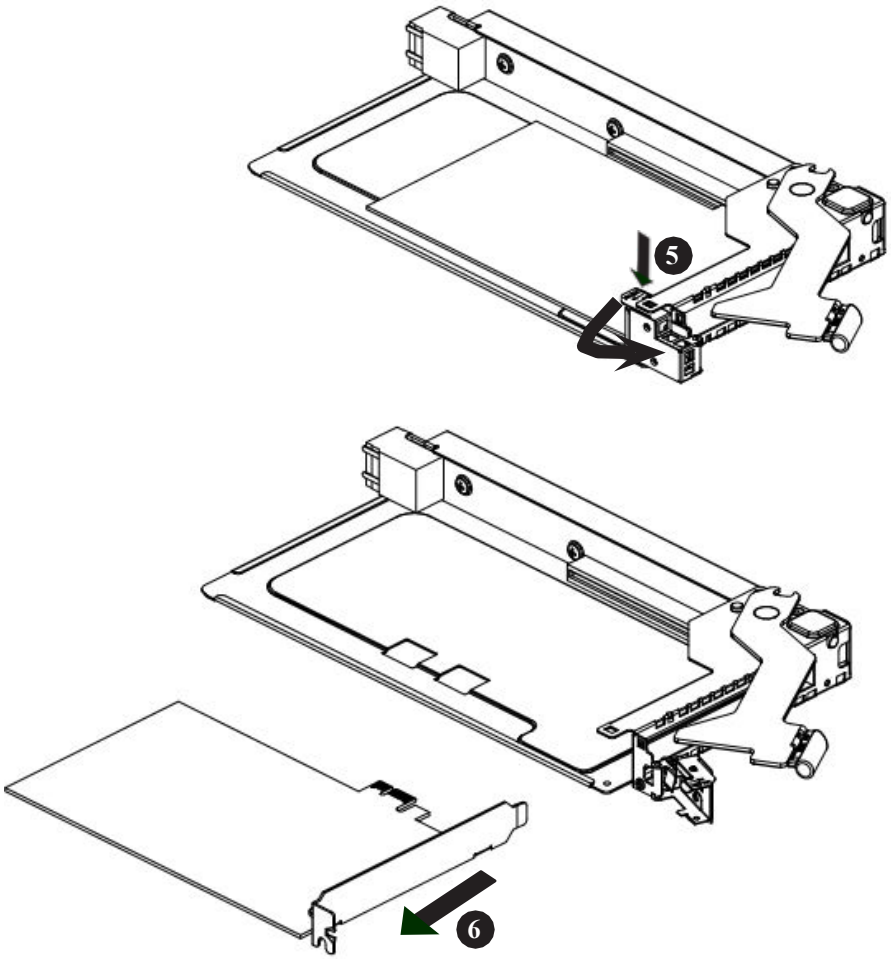
1. Initiate a hot-removal request by pushing the Attention Button on the corresponding slot. The green power LED will blink to indicate the module is in a transition state. (To cancel the hot-plug removal operation, press the Attention Button again within five seconds.)
2. The power LED will turn off, showing that it is safe to remove the module. If not, it indicates the request has failed (possibly due to client's software unwilling to relinquish the device).

3. Push the red release tab located at the top left of the module to the right in order to pull out the lever.
4. Use the lever to pull the PCI-E module out of the chassis.
5. Press and rotate the silver locking tab to fully release the PCI-E card

6. Pull the card out of the PCI-E board.



Removing a PCI-E Module

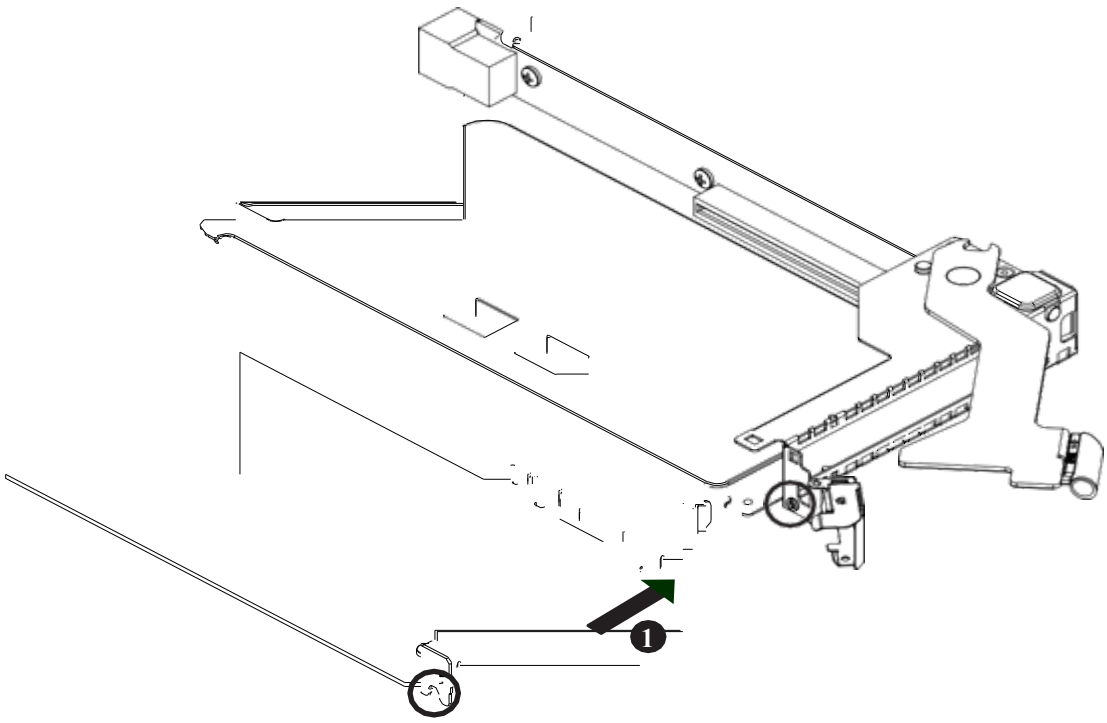


Removing a PCI-E Card from a PCIE Module

4.3.7 Adding a Hot-Plug PCI-E Card

1. Insert the PCI-E card into the PCIE board, making sure the card bracket aligns with the optional screw hole.
2. Secure the PCI-E card by locking the silver locking tab. Insert the PCI-E module back to the chassis and fully close the lever before locking it by pushing the red release tab to left.
3. A hot-plug addition request is made by pushing the Attention Button on the corresponding slot. The green power LED will blink to indicate the module is in a transition state. (To cancel the hot-plug removal operation, press the Attention Button again within five seconds.)
4. The power LED will change from blinking to solid on to indicate that the device to be added has been found, configured, and has the driver loaded.
5. If the request fails, the power LED will stop blinking and the slot will remain disabled. The hot-plug software should activate the Attention LED to indicate an operational problem.

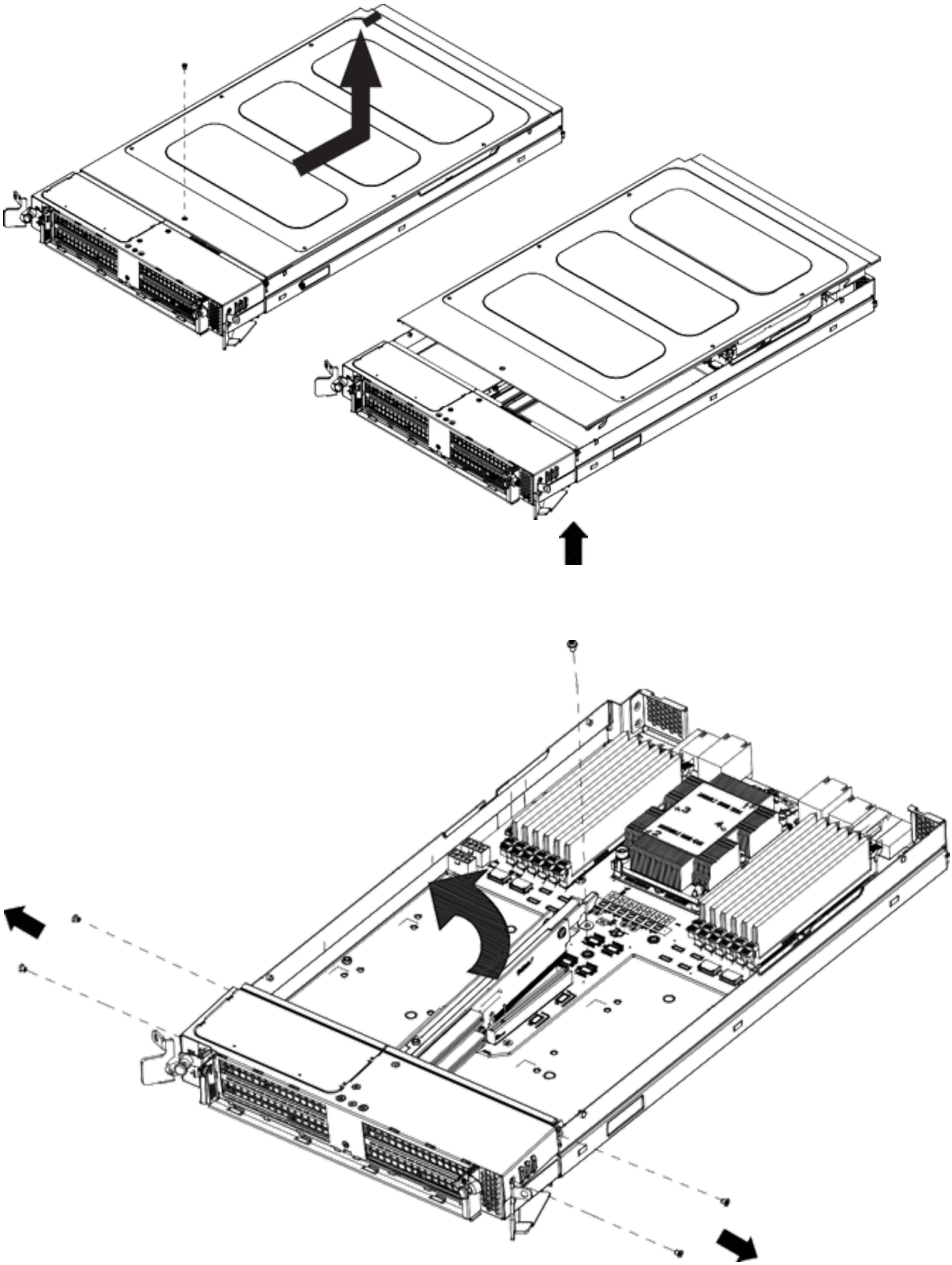
Adding a PCI-E Card to a PCI-E Module



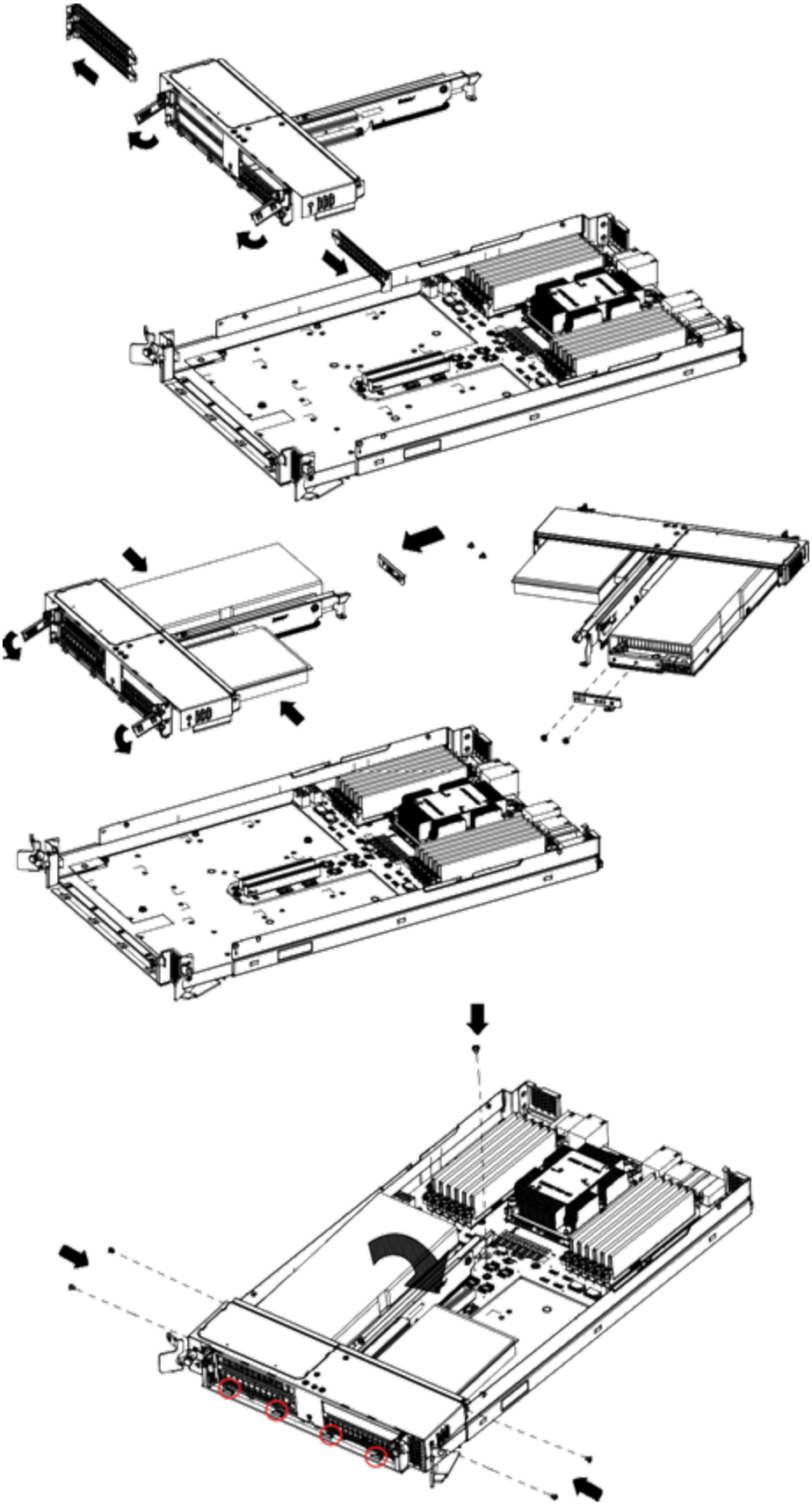
4.3.8 CPU Module

Perform the following steps to install a PCI-E card in any of the eight CPU modules at the front of the system. Power must be removed from the when performing this procedure.

1. Begin by removing the corresponding CPU module.
2. Open the top cover after removing the screw that secures it to the chassis.
3. Remove the five screws on the front riser cover and lift it up. If a GPU card is installed in the CPU module you must also remove two additional screws and the GPU power cable.
4. Release the latch and pull the dummy cover or existing PCI-E card out of the front slot.
5. Insert the PCI-E card to the riser card.
6. Reverse the steps above to secure the PCI-E card and replace the CPU module back into the chassis. Make sure the four front hooks have been completely inserted.
7. Power up the system.



Installing a PCI-E Card in a CPU Module

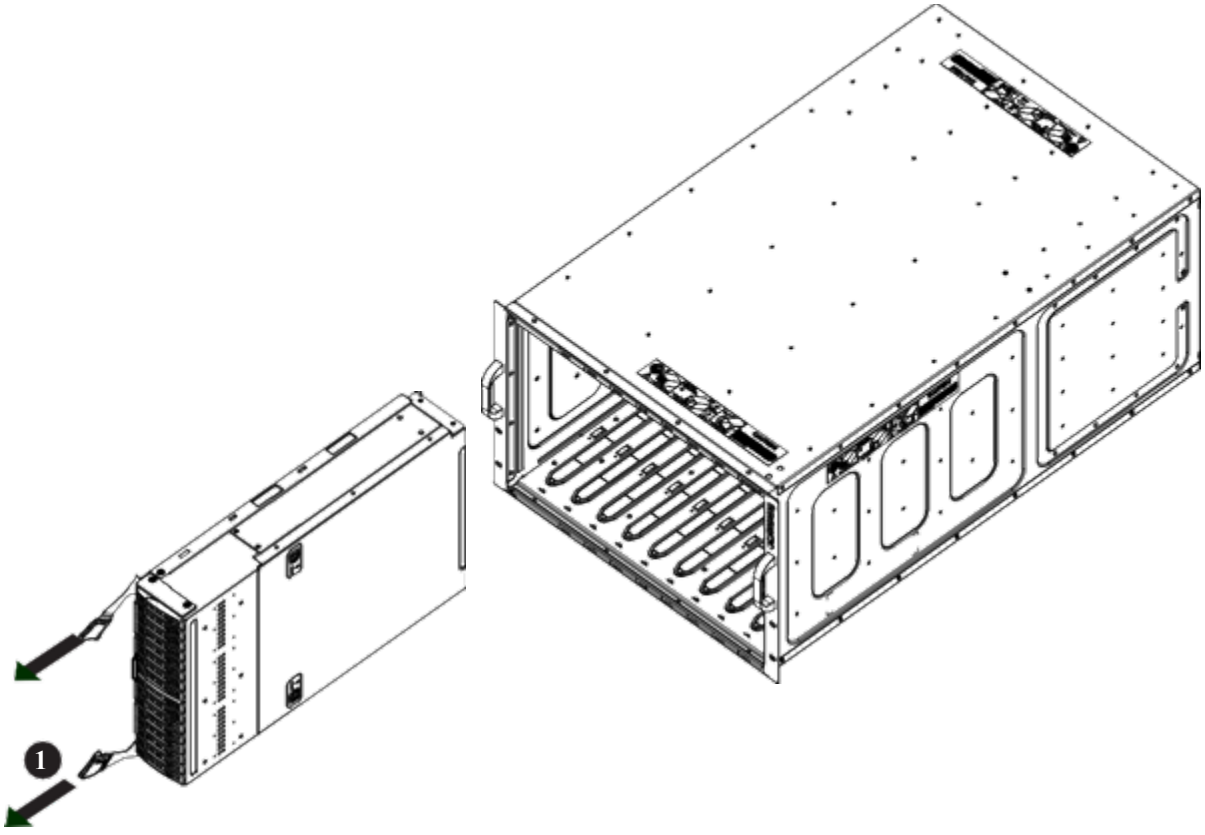


Installing a PCI-E Card in a CPU Module (cont.)

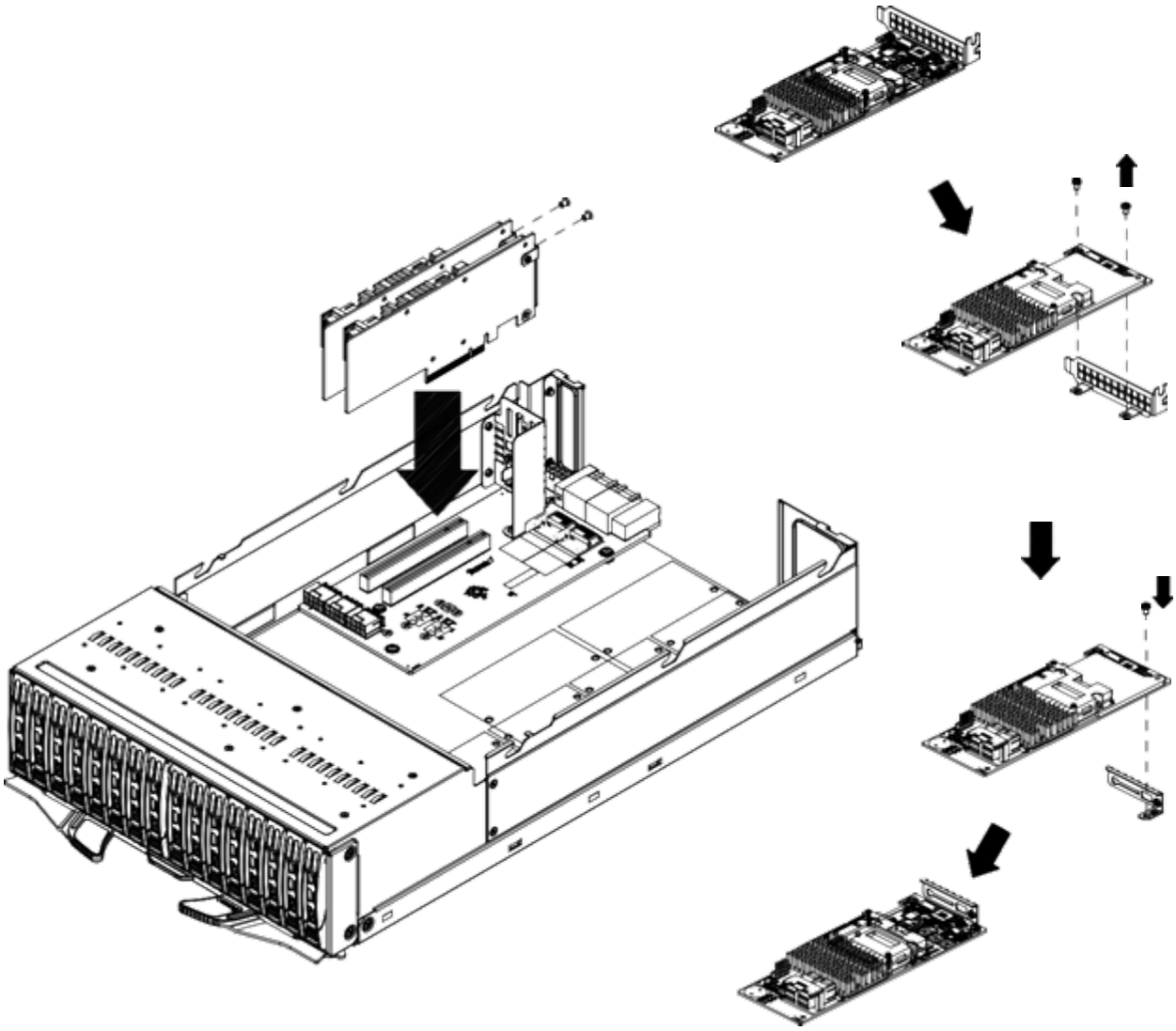
4.3.8.1 Storage Module

Perform the following steps to install a PCI-E card in the HDD storage module at the front of the system. Power must be removed from the system.

1. Begin by removing the storage module.
2. Open the top cover of the storage module.
3. Remove the screw that secures the card adapter on the card cage. Lift and then forward the card adapter (with existed PCI-E card if any) to disengage from card cage.
4. Remove the card adapter from the existed PCI-E card (if any is present).
5. Replace the original PCI-E bracket of the card with card adapter and secure with a screw.
6. Reverse the steps above to secure the card and replace the storage module back into the chassis.
7. Power up the system.



Removing a Storage Module



Installing a PCI-E Card in a Storage Module

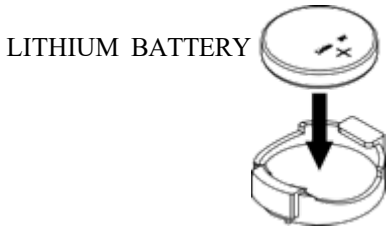
4.3.9 Onboard Battery

The system uses non-volatile memory to retain system information when system power is removed. This memory is powered by a lithium battery on the PCH board. In addition, the system also uses a super charged capacitor.

4.3.9.1 Replacing the Battery

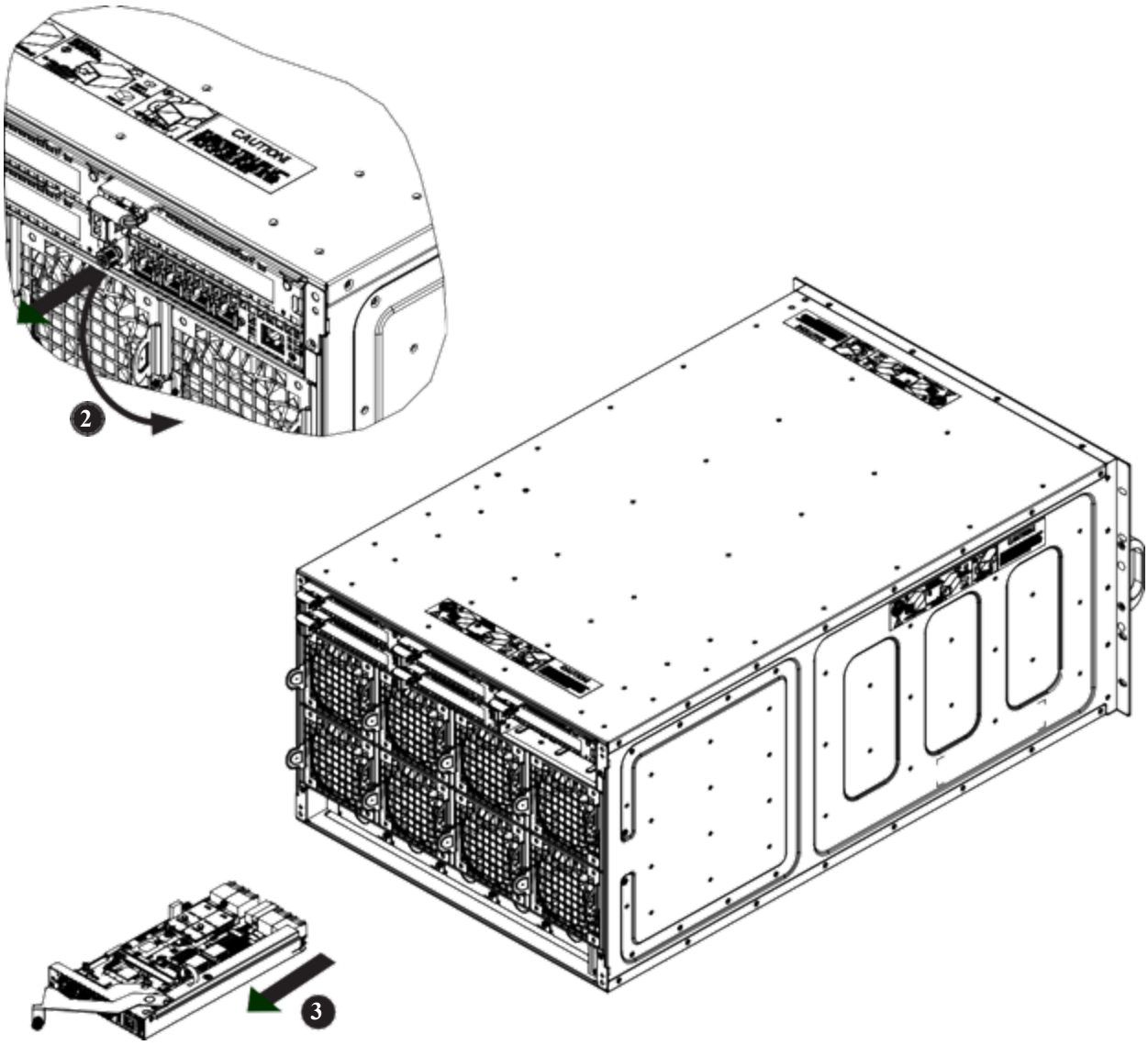
1. Begin by removing power from the system.
2. Rotate the black thumb screw counterclockwise in order to pull out the lever.
3. Use the lever to pull the PCH module out of the chassis.
4. Push aside the small clamp that covers the edge of the battery. When the battery is released, lift it out of the holder.
5. To insert a new battery, slide one edge under the lip of the holder with the positive (+) side facing up. Then push the other side down until the clamp snaps over it.
6. Insert the PCH module back to the chassis and fully close the lever before locking it by rotating the red, black thumb screw clockwise.

Note: Handle used batteries carefully. Do not damage the battery in any way; a damaged battery may release hazardous materials into the environment. Do not discard a used battery in the garbage or a public landfill. Comply with the regulations set up by your local hazardous waste management agency to dispose of your used battery properly.



Installing the Onboard Battery

Warning: There is a danger of explosion if the onboard battery is installed upside down (which reverses its polarities). The battery must be replaced only with the same or an equivalent type recommended by the manufacturer (CR2032).



Installing the Battery

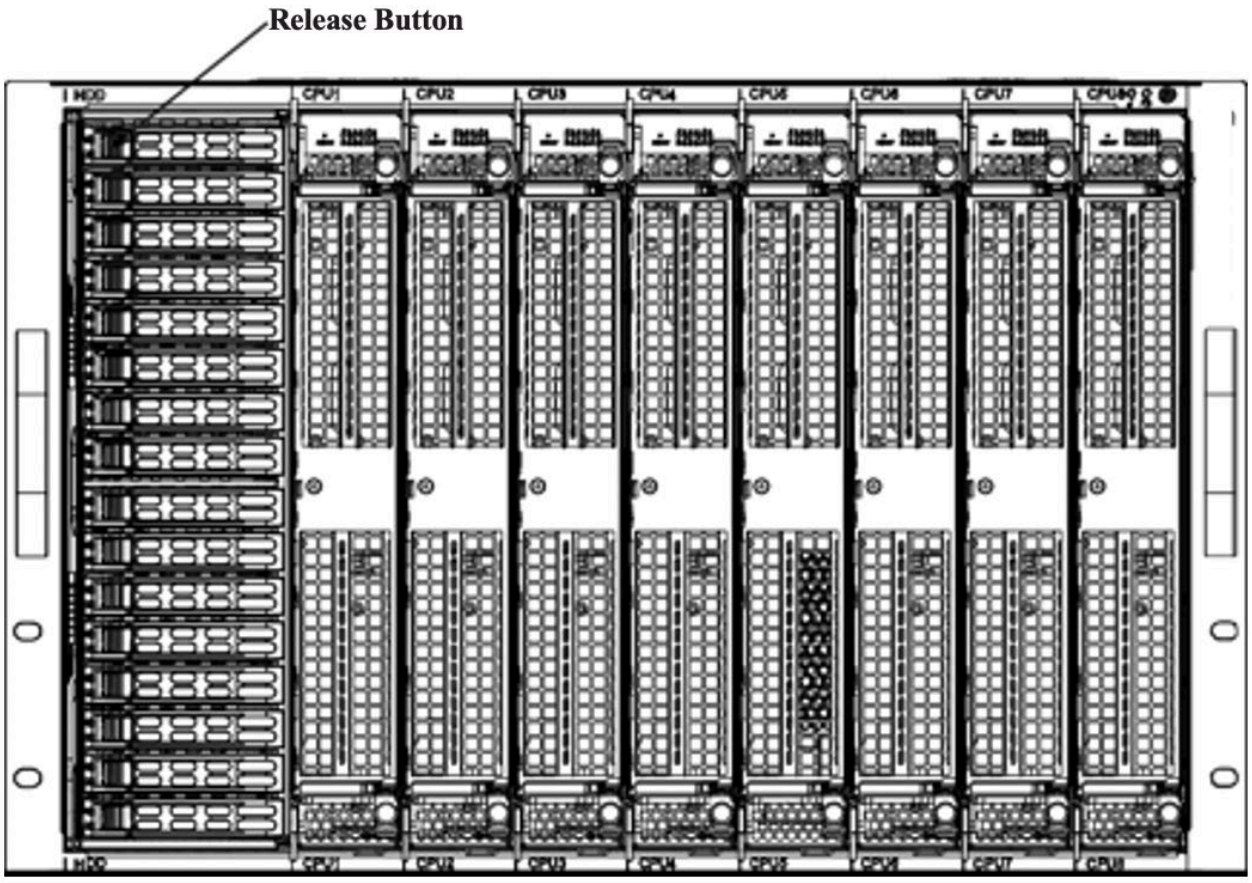
4.3.10 Chassis Components

4.3.10.1 Hot-Swap Hard Drives

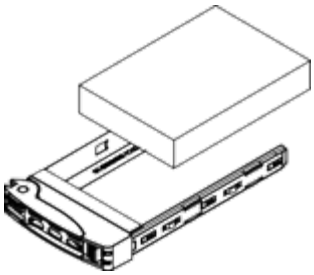
The Cisco C890 M5 Server includes one storage module that supports 16 2.5" drives, which can be removed without powering down the system. Only enterprise level SAS or SATA HDDs are recommended.

4.3.10.2 Removing Hard Drive Carriers from the Chassis

1. Press the release button on the drive tray. This extends the drive bay handle.
2. Use the handle to pull the tray out of the chassis.



Removing a Drive Carrier



Mounting a Drive in a Carrier

4.3.10.3 Installing a Hard Drive into a Drive Carrier

1. Insert a drive into the carrier with the PCB side facing down and the connector end toward the rear of the carrier.
2. Align the drive in the carrier so that the mounting holes of both are aligned. Note that there are holes in the carrier marked "SAS" or “SATA” to aid in correct installation.
3. Secure the drive to the carrier with four screws as illustrated above. Use the four M3 flat-head screws included in the HDD bag of the accessory box. Note that the screws used to secure the dummy drive to the carrier cannot be used to secure the hard drive.
4. Insert the hard drive and drive carrier into its bay, the release handle will retract.
5. Using the thumb, push against the upper part of the hard drive handle. Push the hard drive into the hard drive bay as illustrated below, until the hard drive clicks into the locked position.

4.3.10.4 Hard Drive Carrier Indicators

Each hard drive carrier has two LED indicators: an activity indicator and a status indicator. In RAID configurations, the status indicator lights to indicate the status of the drive. In non-RAID configurations, the status indicator remains off. See the table below for details.

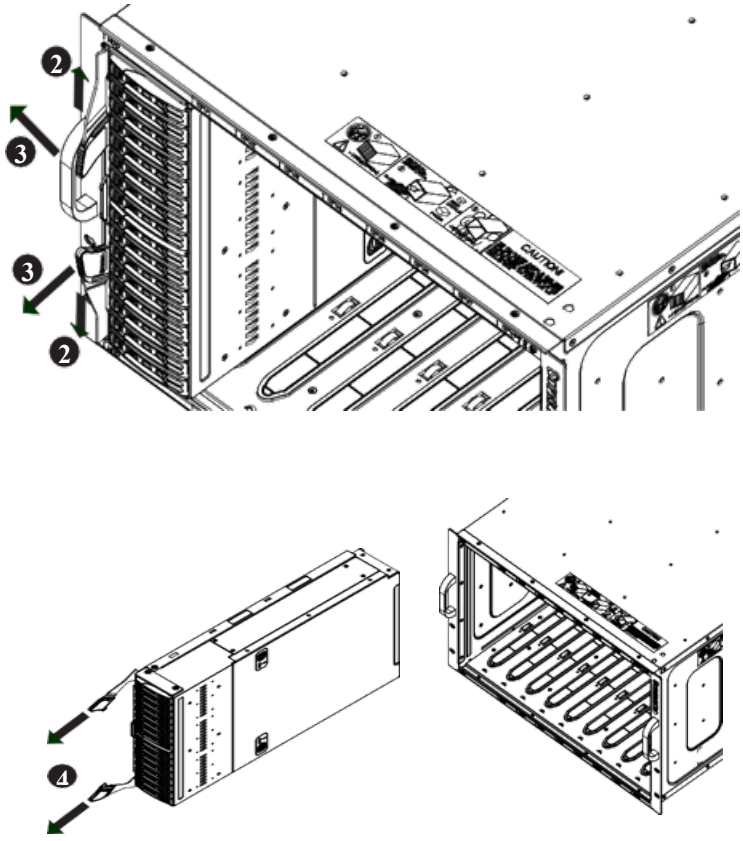
Hard Drive Carrier LED Indicators		
LED	**State/Condition**	**Indication**
Blue	Blinking	Drive activity
Red	Solid on	Drive failure

4.3.10.5 Internal Hard Drives

The storage module in the C890 M5 Rack Server supports up to six 3.5" or eight 2.5" fixed HDDs. Installing or removing these drives requires the module to be removed from the chassis.

Removing a Storage Module

1. Begin by removing power from the system.
2. Each release lever on the module has a locking latch. Push both latches to unlock the levers.
3. Grasp the release levers on both ends of the module and pull outward as shown below.
4. The module should disengage, allowing you to pull it completely out of the chassis.
5. Put the module on a flat, non-conductive surface before removing or installing the internal hard drives.



Removing a Storage Module

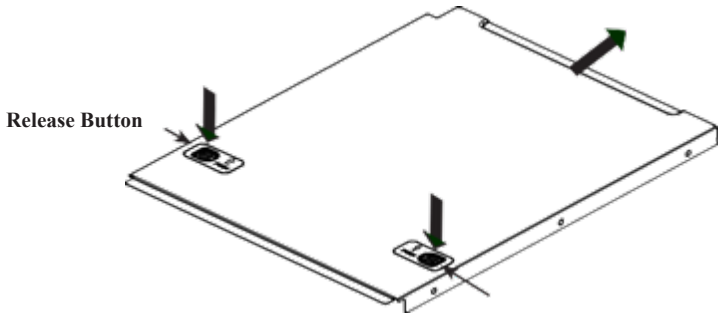
4.3.10.6 Installing Internal Hard Drives

To remove the cover of the storage module, depress the two release buttons and push the cover toward the rear of the module as shown below.

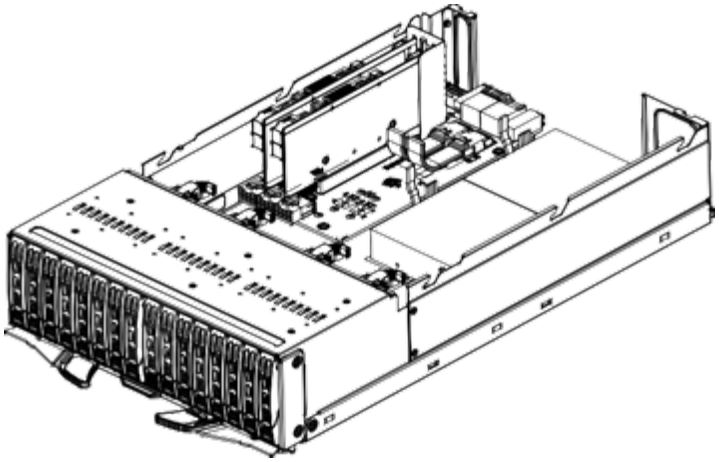
2.5" HDDs.

The 2.5" hard drives are mounted in brackets or directly secured to the bottom of the storage module tray. See Figure 3-16 below for the case with brackets.

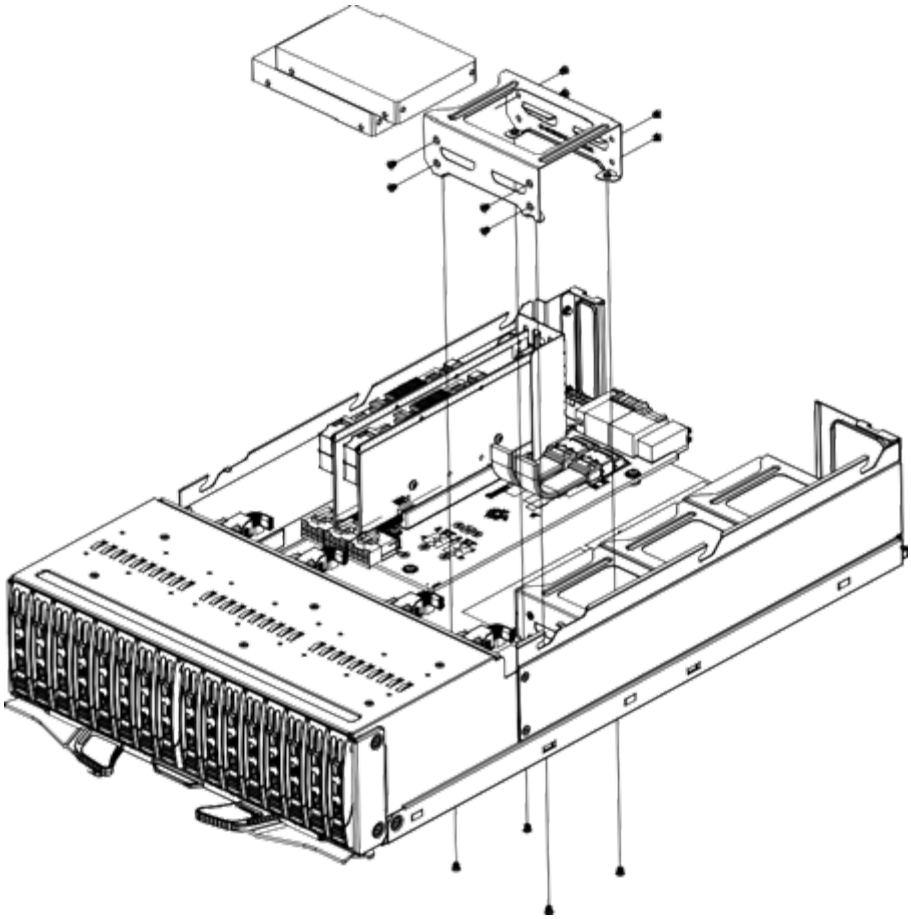
1. Remove the bracket (if any) holding the drive you wish to replace by unscrewing from the bottom of the storage module.
2. Each drive is held in place in the bracket (if any) with four screws. Remove these as well as the SATA power and data cables then take out the hard drive.
3. Install a new hard drive into the bracket (if needed), reconnect the power and data cables and secure the drive with the four screws.
4. Repeat the steps above as necessary.
5. With all brackets and their drives installed in the module, replace the cover and slide the storage module back into its bay in the chassis.
6. Depress the power button to boot up the system.



Release Button



Removing the Storage Module Cover



Installing/Removing 2.5" HDDs with bracket

4.3.10.7 Drive Carrier Indicators

Each drive carrier has two LED indicators: an activity indicator and a status indicator. For RAID configurations using a controller, the meaning of the status indicator is described in the table below. For OS RAID or non-RAID configurations, some LED indications are not supported, such as hot spare.

Drive Carrier LED Indicators			
	Color	**Blinking Pattern**	**Behavior for Device**
Activity LED	Blue	Solid On	SAS/NVMe drive installed
	Blue	Blinking	I/O activity
Status LED	Red	Solid On	Failure of drive with RSTe support
	Red	Blinking at 1 Hz	Rebuilding drive with RSTe support
	Red	Blinking with two blinks and one stop at 1 Hz	Hot spare for drive with RSTe support *(not supported in VMD mode)*
	Red	On for five seconds, then off	Power on for drive with RSTe support
	Red	Blinking at 4 Hz	Identify drive with RSTe support
	Green	Solid On	Safe to remove NVMe device *(not supported in VMD mode)*
	Amber	Blinking at 1 Hz	Attention state—do not remove NVMe device *(not supported in VMD mode)*

4.3.10.8 Hot-Swap for NVMe Drives

An NVMe drive can be inserted and replaced using IPMI. Note: If you are using VROC, see the VROC appendix in this manual instead.

Ejecting a Drive

1. IPMI > Server Health > NVMe SSD.
2. Select Device, Group and Slot, and click Eject. After ejecting, the drive Status LED indicator turns green.
3. Remove the drive.

Note: The Device and Group are categorized by the CPLD design architecture. The C890 M5 Rack Server has one Device and one Group, except the 2029U-TN24 server which has one Device and two Groups. Slot is the slot number on which the NVMe drives are mounted.

4.3.10.9 Replacing the Drive

1. Insert the replacement drive.
2. IPMI > Server Health > NVMe SSD.
3. Select Device, Group and slot and click **Insert**. The drive Status LED indicator flashes red, then turns off. The Activity LED turns blue.

4.3.10.10 Checking the Temperature of an NVMe Drive

There are two ways to check using IPMI.

1. IPMI > Server Health > NVMe SSD – Shows the temperatures of all NVMe drives.
2. IPMI > Server Health > Sensor Reading > NVME_SSD – Shows the single highest temperature among all the NVMe drives.

4.3.10.11 System Cooling

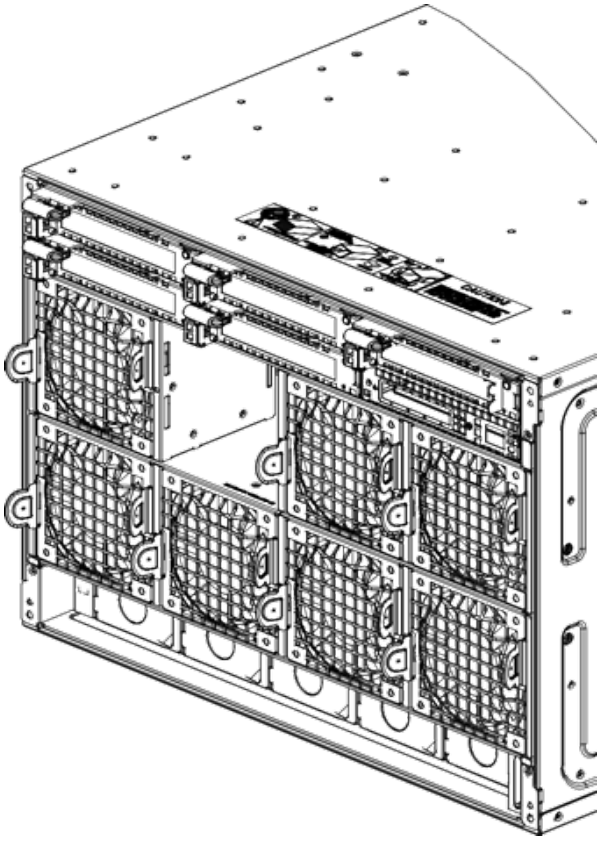
Eight hot-swappable 9-cm counter-rotating fans at the rear of the chassis provide the cooling for the system. Each fan unit is made up of two fans joined back-to-back, which rotate in opposite directions. This counter-rotating action generates exceptional airflow and is effective in dampening vibration levels.

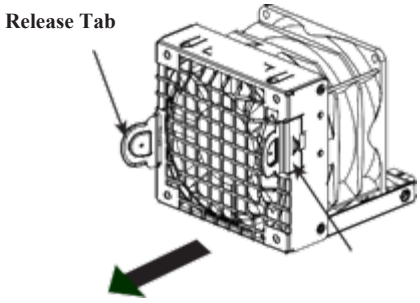
4.3.10.12 Replacing Fans

Fan speed is controlled by system temperature via IPMI. If a fan fails, the remaining fans will ramp up to full speed. Replace any failed fan at your earliest convenience with the same type and model (the system can continue to run with a failed fan).

4.3.10.13 Replacing a System Fan

1. Inspect the rear of the chassis to determine which fan requires changing.
2. Squeeze both release tabs on the fan simultaneously and gently pull the fan from the housing (see figure below). The fan's wiring will automatically detach.
3. Place the new fan into the vacant fan space and push in until it clicks into place.





Power Supply

The Cisco UCS C890 M5 Rack Server has a redundant power system composed of five Titanium level 1600W power supplies.

Power Supply Failure

If a power supply unit fails, the others will take on the load to allow the system to continue operation without interruption. The amber Power Fail LED will illuminate and remain on until the failed unit has been replaced.

Removing the Power Supply

Begin by removing power from the system.

1. Unplug the AC power cord from the power supply to be replaced.
2. Push the release tab on the back of the power supply.
3. Grip the unit's handle to pull the power supply out from its bay.

Installing a New Power Supply

1. Replace the failed power module with the same model (C890-M5-POWER-SU=).
2. Push the new power supply module into the power bay until you hear a click.
3. Plug the AC power cord back into the module.

5 Board Connections

This section describes the connections on the various boards in the system and provides pinout definitions. The LEDs on the motherboard are also described here. Review the Safety Precautions in Chapter 3 before installing or removing components.

5.1 UCS C890 M5 Rack Server Connectors and LEDs

Power Connections

Two power connections on the Cisco UCS C890 M5 Rack Server must be connected to the power supply with the power supply.

- 12-pin Primary CPU Power (PWR1/PWR2)
- 8-pin GPU Power Connections (JPWR3/JPWR4/JPWR5)

12-pin CPU Power Connectors

PWR1/PWR2 are the 12-pin power inputs for 12V power from the power supply to the CPU Board.

+12V 12-pin Power Pin Definitions	
Pin#	**Definition**
1 - 4	Ground
5 - 8	+12V
9-12	

GPU Power Connectors

Three 8-pin 12V GPU power connectors (JPWR3/JPWR4/JPWR5) may also be connected to the power supply for GPU cards.

+12V 8-pin Power Pin Definitions	
Pin#	**Definition**
1 - 4	Ground
5 - 8	+12V

NVMe Connections

Two NVMe ports are located on the server board. JNVME ports 1/2 provide high-speed, low-latency PCI-Exp. 3.0 x4 connections directly from the CPU to NVMe Solid State (SSD) drives. This greatly increases SSD data-throughput performance and significantly reduces PCI-E latency by simplifying driver/software requirements resulted from direct PCI-E interface from the CPU to the NVMe SSD drives.

5.2 C890-M5-BMC= Connections, Jumpers and LEDs

How Jumpers Work

To modify the operation of the motherboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the diagram below for an example of jumping pins 1 and 2.

Note: On two-pin jumpers, "Closed" means the jumper is on and "Open" means the jumper is off the pins.

CMOS Clear

JBT1 is used to clear the CMOS. Instead of pins, this "jumper" consists of contact pads to prevent the accidental clearing of the CMOS. To clear the CMOS, use a metal object such as a small screwdriver to touch both pads at the same time to short the connection. Always remove the AC power cord from the system before clearing the CMOS.

Note 1: For an ATX power supply, you must completely shut down the system, remove the AC power cord, and then short JBT1 to clear the CMOS.

Note 2: Be sure to remove the onboard CMOS Battery before you short JBT1 to clear the CMOS. Clearing the CMOS will also clear any passwords.

Do not use the PW_ON connector to clear CMOS.

Manufacturer Mode Select

Close pin 2 and pin 3 of Jumper JPME1 to bypass SPI flash security and force the system to operate in the Manufacturer mode, allowing the user to flash the system firmware from a host server for system-setting modifications. Refer to the table below for jumper settings.

ME Mode Select Jumper Settings	
Jumper Setting	**Definition**
1-2	Normal (Default)
2-3	Manufacturer Mode

Watch Dog Enable/Disable

Watch Dog (JWD1) is a system monitor that can reset the system when a software application hangs. Close pins 1-2 to reset the system if an application hangs. Close pins 2-3 to generate a non-maskable interrupt signal for the application that hangs. Refer to the table on the below for jumper settings. Watch Dog must also be enabled in the BIOS.

Watch Dog Jumper Settings	
Jumper Setting	**Definition**
Pins 1-2	Reset (Default)
Pins 2-3	NMI
Open	Disabled

Headers and Connectors

I-SATA 3/I-SATA 4 & Disk-on-Module Connectors

Two yellow SATA 3.0 compatible connectors (I-SATA 3 & I-SATA 4), driven by Intel C621 chipset, support two DOM storage devices. These modified SATA connectors have two power pins that allow Cisco supplied DOM devices to operate without any extra power cables. For DOM devices that require external power, two extra two pin headers placed right next to I-SATA ports, are available. They are labeled JSD1 and JSD2.

SATA 3.0 Pin Definitions	
Pin#	**Definition**
1	Ground
2	TX_P
3	TX_N
4	Ground
5	RX_N
6	RX_P
7	Ground
8	Power
9	Ground

Unit Identifier Switch/LED

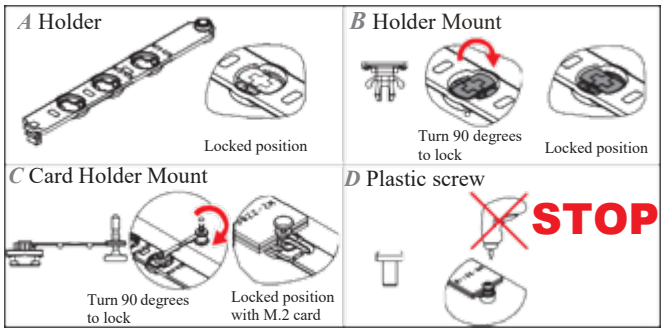
A Unit Identifier (UID) switch (JUIDB1) and an UID LED (indicator are located on the AOM-X11OPi-LBG. The UID LED (LED1) is located next to the UID switch. When you press the UID switch, the UID LED will be turned on. Press the UID switch again to turn it off. These UID indicator provide easy identification of a system unit that may be in need of service.

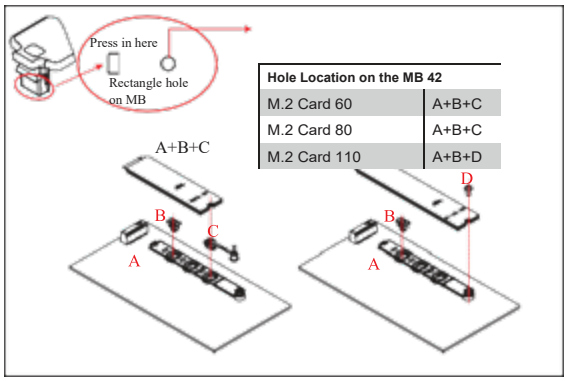
Note: UID can also be triggered via the IPMI on the system motherboard.

UID Switch Pin Definitions	
Pin#	**Definition**
1	Ground
2	Ground
3	Button In
4	Button In

J1/J2 & M.2 Storage Module Connectors

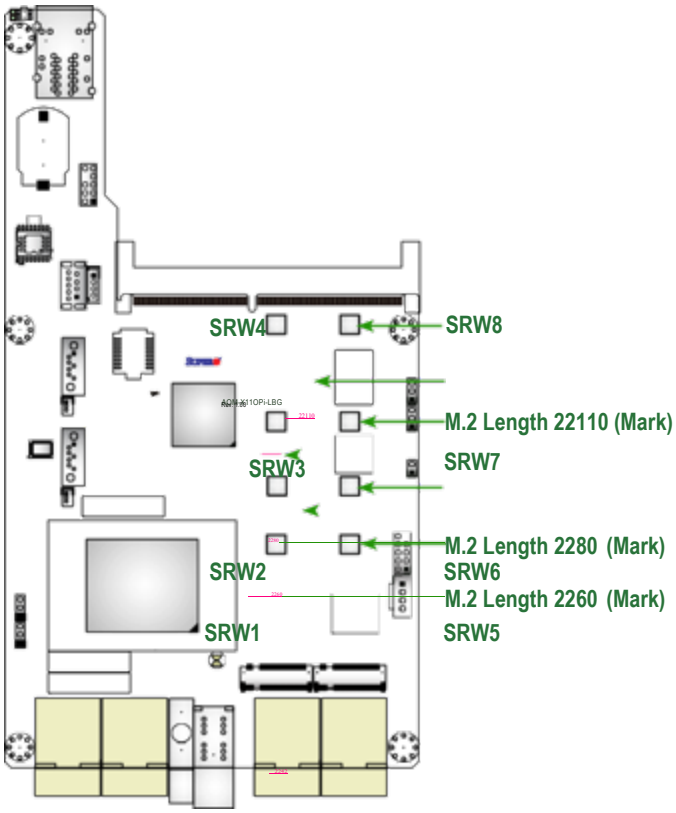
Two M.2 connectors (J1/J2) provide support for two M.2 SSD storage modules. These connectors are keyed for PCIe 3.0 x4 and SATA 3.0 connectivity. The C890-M5-BMC= board provides mounting holes for three lengths of M2 modules: 2260, 2280 and 22110 standards. Typically, these connectors are populated with the M.2 SSD in a RAID 1 configuration, containing a bootable Operating System. These connectors comply with PCI Express M.2 Specification rev 1.1, maintained by the PCI-SIG. Refer to the drawings below of installation information.





Hole Location on the MB 42	
M.2 Card 60	A+B+C
M.2 Card 80	A+B+C
M.2 Card 110	A+B+D

C890-M5-BMC= Layout



Note 1: Molding holes: SWR1 to SWR4 are used for the M.2 module located at J1.

Note 2: Molding holes: SWR5 to SWR8 are used for the M.2 module located at J2.

Note 3: M.2 modules come with 3 sizes in length. Horizontal lines marked "2260", "2280", "22110" on the LBG layout indicate the locations where M.2 modules should be installed depending on the sizes of the modules.

Universal Serial Bus (USB)

An internal USB header, located at JUSB1, provides two USB 2.0 connections (USB 5/USB6) for your system. In addition, a Type A 3.0 header (JUSB2) also provides USB 3.0 Port 1 and USB 2.0 Port 2 connections for internal access. (Cables are not included). See the tables below for pin definitions.

Type A USB 3.0 (USB1)/USB 2.0 (USB2) Pin Definitions	
Pin#	**Definition**
1	VBUS
2	USB_PN1
3	USB_PP1
4	Ground
5	SSRX_N
6	SSRX_P
7	Ground
8	SSTX_N
9	SSTX_P

Front Panel USB (2.0) (USB 5/6) Pin Definitions			
Pin#	**Definition**	**Pin#**	**Definition**
1	+5V	6	USB_PP6
2	+5V	7	Ground
3	USB_PN5	8	Ground
4	USB_PN6	9	Key
5	USB_PP5	10	OC

VROC RAID Key Header

A VROC RAID Key header is located at JRK1 on the motherboard. Install a VROC RAID Key on JRK1 for NVMe RAID support as shown in the illustration below. Refer to the layout below for the location of JRK1.

Note: The graphics contained in this user's manual are for illustration only. The components installed in your system may or may not look exactly the same as the graphics shown in the manual.

TPM/Port 80 Header

A Trusted Platform Module (TPM)/Port 80 header is located at JTPM1 to provide TPM support and a Port 80 connection. Use this header to enhance system performance and data security. See the table below for pin definitions.

TPM/Port 80 Header Pin Definitions

Pin#	Definition	Pin#	Definition
1	+3.3V	6	Ground
2	SPI_CS_N	7	SPI_MOSI
3	TPM_REST		
4	SPI_MISO	9	+3V STBY
5	SPI_CLK	10	TPM_IRQ3.3

IPMI LAN

An IPMI_dedicated LAN, located on the AOM-X11OPi-LBG, provides KVM support for IPMI 2.0. This port accepts an RJ45_type cable.

IPMI LAN Activity LED (Right) LED State

LED Color	Status	Definition
Yellow	Blinking	Active

IPMI LAN LED Indicators

The IPMI LAN has two LED indicators. The yellow LED on the right indicates activity, while the green LED on the left indicates the speed of the connection. Refer to the table below for LED settings.

DOM Power Connectors

Two power connectors for SATA DOM (Disk_On_Module) devices are located at JSD1/JSD2. Connect appropriate cables here to provide power support for your Serial Link DOM devices.

DOM PWR Pin Definitions

Pin#	Definition
1	+5V
2	Ground
3	Ground

LED Indicators

BMC Heartbeat LED

A BMC Heartbeat LED is located at BMC_HB_LED1 on the motherboard. When this LED is blinking, BMC functions normally. See the table below for more information.

BMC Heartbeat LED Status	
LED Color/State	**Definition**
Green: Blinking	BMC: Normal

UID LED

For UID LED (LED1), refer to the UID Switch/LED section.

IPMI LAN LED Indicators

For IPMI LAN LED indicators, refer to the IPMI LAN section.

5.3 C890-M5-HDD-BOARD= Connections and Jumpers

HDD Power Connectors

Three 8-pin 12V power connectors (JPWR1/JPWR2/JPWR3/JPWR4) are located on the AOM-X11OPi-HDD to provide power supply for HDDs.

+12V 8-pin Power Pin Definitions	
Pin#	**Definition**
1 - 4	Ground
5, 6	+12V
7, 8	+5V

SATA Ports

Two Serial ATA (SATA) 3.0 headers (JS1/JS3) support eight (8) SATA 3.0 connections (SATA0 ~3, 4~7) on the AOM-X11OPI-HDD card.

Note: For more information on SATA HostRAID configuration.

5.4 C890-M5-BPLANE= Connections

Fan Headers

There are 16 system/CPU fan headers (Fans 1-8_1) on the reverse side of the C890-M5-BPLANE= midplane. All these 4-pin fans headers are backward-compatible with the traditional 3-pin fans. However, fan speed control is available for 4-pin fans only by Thermal Management via the IPMI 2.0 interface. See the table below for pin definitions.

Fan Header Pin Definitions	
Pin#	**Definition**
1	Ground
2	+12V
3	Tachometer
4	PWM (Power Width Modulation)

6 Software

After the hardware has been installed, you can install the Operating System (OS), configure RAID settings and install the drivers.

6.1 Driver Installation

The Cisco UCS C890 M5 Rack server has been validated with the standard Linux ISO installation image included drivers and the Cisco website will only list additional drivers once they become available.

After accessing the website, go into the CDR_Images (in the parent directory of the above link) and locate the ISO file for your motherboard. Download this file to a USB flash drive or a DVD. (You may also use a utility to extract the ISO file if preferred.)

Find the product page for your motherboard, and "Download the Latest Drivers and Utilities".

Insert the flash drive or disk and the screenshot shown below should appear.

Note: Click the icons showing a hand writing on paper to view the readme files for each item. Click the computer icons to the right of these items to install each item (from top to the bottom) one at a time. **After installing each item, you must re-boot the system before moving on to the next item on the list.** The bottom icon with a CD on it allows you to view the entire contents.

6.2 IPMI

The Cisco UCS C890 M5 Rack Server supports the Intelligent Platform Management Interface (IPMI). IPMI is used to provide remote access, monitoring and management. There are several BIOS settings that are related to IPMI.

Cisco UCS C890 M5 Rack Server ships with a unique password for the BMC ADMIN user. For information on finding the password, see Logging into the Server. For general documentation and information on IPMI, visit our website at: Cisco UCS C-Series Servers Integrated Management Controller CLI Configuration Guide.

7 UEFI BIOS

7.1 Introduction

This chapter describes the AMIBIOS™ setup utility for the Cisco UCS C890 M5 Rack Server motherboard. The BIOS is stored on a chip and can be easily upgraded using a flash program.

Note: Due to periodic changes to the BIOS, some settings may have been added or deleted and might not yet be recorded in this manual.

Starting the Setup Utility

To enter the BIOS setup utility, press the <Delete> key while the system is booting up. Each main BIOS menu option is described in this manual.

The Main BIOS screen has two main frames. The left frame displays all the options that can be configured. “Grayed-out” options cannot be configured. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it. (Note that BIOS has default text messages built in. We retain the option to include, omit, or change any of these text messages.) Settings printed in **Bold** are the default values.

A "▶" indicates a submenu. Highlighting such an item and pressing the <Enter> key will open the list of settings within that submenu.

The BIOS setup utility uses a key-based navigation system called hot keys. Most of these hot keys (<F1>, <F2>, <F3>, <F4>, <Enter>, <ESC>, <Arrow> keys, etc.) can be used at any time during the setup navigation process.

7.2 Main Setup

When you first enter the AMI BIOS setup utility, you will see the Main setup screen. You can always return to the Main setup screen by selecting the Main tab on the top of the screen.

System Date/System Time

Use this item to change the system date and time. Highlight *System Date* or *System Time* using the arrow keys. Enter new values using the keyboard. Press the <Tab> key or the arrow keys to move between fields. The date must be entered in Day MM/DD/YYYY format. The time is entered in HH:MM:SS format.

> **Note:** The time is in the 24-hour format. For example, 5:30 P.M. appears as 17:30:00. The date's default value is the BIOS build date after the RTC (Real Time Clock) reset.

Cisco UCS C890 M5 Rack Server

BIOS Version

This feature displays the version of the BIOS ROM used in the system.

Build Date

This feature displays the date when the version of the BIOS ROM used in the system was built.

CPLD Version

This feature displays the version of the CPLD (Complex-Programmable Logical Device) used in the system.

Memory Information

Total Memory

This feature displays the total size of memory available in the system.

Memory Speed

This feature displays the default speed of the memory modules installed in the system.

7.3 Advanced Setup Configurations

Use the arrow keys to select the Advanced submenu and press <Enter> to access the submenu items.

Warning: Take Caution when changing the Advanced settings. An incorrect value, an improper DRAM frequency, or a wrong BIOS timing setting may cause the system to malfunction. When this occurs, restore the setting to the manufacturer default setting.

▶Boot Configuration

Quiet Boot

Use this feature to select the screen between displaying POST messages or the Cisco logo at bootup. Select Disabled to display the POST messages. Select Enabled to display the Cisco logo instead of the normal POST messages. The options are **Enabled** and Disabled.

Note: POST message will always display regardless of the setting of this feature.

Option ROM Messages

Use this feature to set the display mode for the Option ROM. Select Keep Current to use the current AddOn ROM display settings. Select Force BIOS to use the Option ROM display mode set by the system BIOS. The options are **Force BIOS** and Keep Current.

Bootup NumLock State

Use this feature to set the Power-on state for the Numlock key. The options are Off and **On**.

Wait For 'F1' If Error

Select Enabled to force the system to wait until the <F1> key is pressed if an error occurs. The options are Disabled and **Enabled**.

Interrupt 19 Capture

Interrupt 19 is the software interrupt that handles the boot disk function. When this feature is set to Immediate, the ROM BIOS of the host adaptors will "capture" Interrupt 19 at bootup immediately and allow the drives that are attached to these host adaptors to function as bootable disks. If this item is set to Postponed, the ROM BIOS of the host adaptors will not capture Interrupt 19 immediately to allow the drives attached to these adaptors to function as bootable devices at bootup. The options are **Immediate** and Postponed.

Re-try Boot

When EFI (Extensible Firmware Interface) Boot is selected, the system BIOS will automatically reboot the system from an EFI boot device after an initial boot failure. Select Legacy Boot to allow the BIOS to automatically reboot the system from a Legacy boot device after an initial boot failure. The options are **Disabled**, Legacy Boot, and EFI Boot.

Power Configuration

Watch Dog Function

Select Enabled to allow the Watch Dog timer to reboot the system when it is inactive for more than 5 minutes. The options are Enabled and **Disabled.**

Power Button Function

This feature controls how the system shuts down when the power button is pressed. Select 4 Seconds Override for the user to power off the system after pressing and holding the power button for 4 seconds or longer. Select Instant Off to instantly power off the system as soon as the user presses the power button. The options are 4 Seconds Override and **Instant Off.**

Restore on AC Power Loss

Use this feature to set the power state after a power outage. Select Power Off for the system power to remain off after a power loss. Select Power On for the system power to be turned on after a power loss. Select Last State to allow the system to resume its last power state before a power loss. The options are Stay Off, Power On, and **Last State**.

▶CPU Configuration

Warning: Setting the wrong values in the following sections may cause the system to malfunction.

▶Processor Configuration

The following CPU information will display:

- Processor BSP Revision
- Processor Socket
- Processor ID
- Processor Frequency
- Processor Max Ratio
- Processor Min Ratio
- Microcode Revision
- L1 Cache RAM
- L2 Cache RAM
- L3 Cache RAM
- Processor 1 Version through Processor 8 Version

Hyper-Threading (ALL)

Select Enable to use Intel Hyper-Threading Technology to enhance CPU performance. The options are **Enable** and Disable.

Core Enabled

Use this feature to enable or disable CPU cores in the processor specified by the user. Use the <+> key and the <-> key on the keyboard to set the desired number of CPU cores you want to enable in a processor. The maximum of 28 CPU cores are currently available in each CPU package. The default setting is **0**.

Monitor/Mwait

Select Enable to enable the Monitor/Mwait instructions in the processor. The options are **Enable** and Disable.

Execute Disable Bit (Available if supported by the OS & the CPU)

Select Enable for Execute Disable Bit support which will allow the processor to designate areas in the system memory where an application code can execute and where it cannot to prevent a worm or a virus from flooding illegal codes to overwhelm the processor, causing damages to the system during a virus attack. The options are **Enable** and Disable. (Refer to Intel and Microsoft websites for more information.)

Intel Virtualization Technology (Available when two or more processors are installed on the motherboard)

Select Enable to use Intel Virtualization Technology which will allow multiple workloads to share the same set of common resources. On shared virtualized hardware, various workloads (or tasks) can co-exist, sharing the same resources, while functioning in full independence from each other, and migrating freely across multi-level infrastructures and scale as needed. The settings are **Enable** and Disable.

PPIN Control

Select Unlock/Enable to use the Protected-Processor Inventory Number (PPIN) in the system. The options are **Unlock/Enable** and Lock/Disable.

Hardware Prefetcher (Available when supported by the CPU)

If this feature is set to Enable, the hardware prefetcher will prefetch streams of data and instructions from the main memory to the Level 2 (L2) cache to improve CPU performance. The options are Disable and **Enable**.

Adjacent Cache Prefetch (Available when supported by the CPU)

Select Enable for the CPU to prefetch both cache lines for 128 bytes as comprised. Select Disable for the CPU to prefetch both cache lines for 64 bytes. The options are Disable and **Enable**.

DCU Streamer Prefetcher (Available when supported by the CPU)

If this feature is set to Enable, the DCU (Data Cache Unit) streamer prefetcher will prefetch data streams from the cache memory to the DCU (Data Cache Unit) to speed up data accessing and processing to enhance CPU performance. The options are Disable and **Enable**.

DCU IP Prefetcher

This feature allows the system to use the sequential load history, which is based on the instruction pointer of previous loads, to determine whether the system will prefetch additional lines. The options are **Enable** and Disable.

LLC Prefetch

If this feature is set to Enable, LLC (hardware cache) prefetching on all threads will be supported. The options are **Disable** and Enable.

Extended APIC (Extended Advanced Programmable Interrupt Controller)

Based on the Intel Hyper-Threading technology, each logical processor (thread) is assigned 256 APIC IDs (APIDs) in 8-bit bandwidth. When this feature is set to Enable, the APIC ID will be expanded from 8 bits to 16 bits to provide 512 APIDs to each thread to enhance CPU performance. The options are **Enable** and Disable.

Force x2APIC (Extended Advanced Programmable Interrupt Controller)

Select Enable to force the BIOS to use the x2 APIC mode which will allow the operating system to perform more efficiently on high-core CPU configurations and optimize interrupt distribution in virtualization. The options are **Disable** and Enable.

AES-NI

Select Enable to use the Intel Advanced Encryption Standard (AES) New Instructions (NI) to ensure data security. The options are **Enable** and Disable.

▶ Advanced Power Management Configuration

Power Technology

Select Energy Efficient to support power-saving mode. Select Custom to customize system power settings. Select Disabled to disable power-saving settings. The options are Disable, **Energy Efficient**, and Custom.

Power Performance Tuning (Available when "Power Technology" is set to Custom)

Select BIOS to allow the system BIOS to configure the Power-Performance Tuning Bias setting. The options are BIOS Controls EPB and **OS Controls EPB**.

Energy Performance BIOS Setting (Available when "Power Performance Tuning" is set to BIOS Controls EPB)

Use this feature to set the processor power use policy to achieve the desired operation settings for your machine by prioritizing system performance or energy savings. Select Maximum Performance to maximize system performance (to its highest potential); however, this may result in maximum power consumption as energy is needed to fuel the processor frequency. The higher the performance is, the higher the power consumption will be. Select Max Power Efficient to maximize power saving; however, system performance may be substantially impacted because limited power use decreases the processor frequency. The options are Max (Maximum) Performance, Performance, **Balanced Performance**, Balanced Power, and Power.

Super Performance Mode (Available when "Power Technology" is set to Custom)

Select Enable to support Super Performance to enhance system performance. The options are Enable and **Disable**.

▶CPU P State Control (Available when "Power Technology" is set to Custom)

SpeedStep (PStates)

EIST (Enhanced Intel SpeedStep Technology) allows the system to automatically adjust processor voltage and core frequency in an effort to reduce power consumption and heat dissipation. Refer to Intel's website for detailed information. The options are Disable and **Enable**.

Config (Configure) TDP (Available when SpeedStep is set to Enable)

Use this feature to set the appropriate TDP (Thermal Design Power) level for the system. The TDP refers to the maximum amount of power allowed for running "real applications" without triggering an overheating event. The options are **Normal**, Level 1, and Level 2.

EIST PSD Function (Available when SpeedStep is set to Enable)

Use this feature to configure the processor's P-State coordination settings. During a P-State, the voltage and frequency of the processor will be reduced when it is in operation. This makes the processor more energy efficient, resulting in further energy gains. The options are **HW_ALL**, SW_ALL and SW_ANY.

Turbo Mode (Available when SpeedStep is set to Enable)

Select Enable for processor cores to run faster than the frequency specified by the manufacturer. The options are Disable and **Enable**.

▶Hardware PM (Power Management) State Control Available when "Power Technology" is set to Custom)

Hardware P-States

If this feature is set to Disable, hardware will choose a P-States setting for the system based on an OS request. If this feature is set to Native Mode, hardware will choose a P-States setting based on OS guidance. If this feature is set to Native Mode with No Legacy Support, hardware will choose a P-States setting independently without OS guidance. The options are **Disable**, Native Mode, Out of Band Mode, and Native Mode with No Legacy Support.

▶CPU C State Control

Autonomous Core C-State

Select Enable to support Autonomous Core C-State control which will allow the processor core to control its C-State setting automatically and independently. The options are **Disable** and Enable.

CPU C6 Report (Available when Autonomous Core C-State is set to Disable)

Select Enable to allow the BIOS to report the CPU C6 state (ACPI C3) to the operating system. During the CPU C6 state, power to all caches is turned off. The options are **Auto**, Enable, and Disable.

Enhanced Halt State (C1E) (Available when Autonomous Core C-State is set to Disable)

Select Enable to enable "Enhanced Halt State" support, which will significantly reduce the CPU's power consumption by minimizing CPU's clock cycles and reduce voltage during a "Halt State." The options are Disable and **Enable**.

▶ Package C State Control (Available when "Power Technology" is set to Custom)

Package C State

Use this feature to set the limit on the C-State package register. The options are C0/C1 state, C2 state, C6 (non-Retention) state, C6 (Retention) state, No Limit, and **Auto**.

▶ CPU T State Control Available when "Power Technology" is set to Custom)

Software Controlled T-States

If this feature is set to Enable, CPU throttling settings will be supported by the software of the system. The options are **Enable** and Disable.

▶ Chipset Configuration

Warning: Setting the wrong values in the following items may cause the system to malfunction.

▶ North Bridge

This feature allows the user to configure the settings for the Intel North Bridge.

▶UPI (Ultra Path Interconnect) Configuration

This section displays the following UPI General Configuration information:

- Number of CPU
- Number of Active UPI Link
- Current UPI Link Speed
- Current UPI Link Frequency
- UPI Global MMIO Low Base/Limit
- UPI Global MMIO High Base/Limit
- UPI PCI-E Configuration Base/Size

Degrade Precedence

Use this feature to select the degrading precedence option for Ultra Path Interconnect (UPI) connections. Select Topology Precedent to degrade UPI features if system options are in conflict. Select Feature Precedent to degrade UPI topology if system options are in conflict. The options are **Topology Precedence** and Feature Precedence.

Link L0p Enable

Select Enable to enable Link L0p. The options are Disable, Enable, and **Auto**.

Link L1 Enable

Select Enable to enable Link L1 (Level 1 link). The options are Disable, Enable, and **Auto**.

IO Directory Cache (IODC)

Select Enable for the IODC (I/O Directory Cache) to generate snoops instead of generating memory lockups for remote IIO (InvIToM) and/or WCiLF (Cores). Select Auto for the IODC to generate snoops (instead of memory lockups) for WCiLF (Cores). The options are Disable, **Auto**, Enable for Remote InvItoM Hybrid Push, InvItoM AllocFlow, Enable for Remote InvItoM Hybrid AllocNonAlloc, and Enable for Remote InvItoM and Remote WViLF.

SNC

Select Enable to use "Sub NUMA Clustering" (SNC), which supports full SNC (2-cluster) interleave, and 1-way IMC interleave. Select Auto for 1-cluster or 2-cluster support depending on the status of IMC (Integrated Memory Controller) Interleaving. The options are **Disable**, Enable, and Auto.

XPT Prefetch

Select Enable to support XPT Prefetching to enhance system performance. The options are Enable, **Disable**, and Auto.

KTI Prefetch

Select Enable to support KTI Prefetching to enhance system performance. The options are **Enable** and Disable.

Local/Remote Threshold

This feature allows the user to set the threshold for the Interrupt Request (IRQ) signal, which handles hardware interruptions. The options are Disable, **Auto**, Low, Medium, and High.

Stale AtoS (A to S)

The in-memory directory has three states: I, A, and S states. The I (-invalid) state indicates that the data is clean and does not exist in the cache of any other sockets. The A (-snoop All) state indicates that the data may exist in another socket in an exclusive or modified state. The S state (-Shared) indicates that the data is clean and may be shared in the caches across one or more sockets. When the system is performing "read" on the memory and if the directory line is in A state, we must snoop all other sockets because another socket may have the line in a modified state. If this is the case, a "snoop" will return the modified data. However, it may be the case that a line "reads" in an A state, and all the snoops come back with a "miss". This can happen if another socket reads the line earlier and then has silently dropped it from its cache without modifying it. If the "Stale AtoS" feature is enabled, a line will transition to the S state when the line in the A state returns only snoop misses. That way, subsequent reads to the line will encounter it in the S state and will not have to snoop, saving the latency and snoop bandwidth. Stale "AtoS" may be beneficial in a workload where there are many cross-socket reads. The options are Disable, Enable, and **Auto**.

LLC Dead Line Alloc

Select Enable to opportunistically fill the deadlines in the LLC. The options are **Enable**, Disable, and Auto.

Isoc Mode

Select Enable to enable Isochronous support to meet QoS (Quality of Service) requirements. This feature is especially important for Virtualization Technology. The options are Disable, Enable, and **Auto**.

▶ Memory Configuration

Enforce POR (Plan of Record)

Select POR to enforce POR restrictions for DDR4 memory frequency and voltage programming. The options are **POR** and Disable.

PPR Type

Post Package Repair (PPR) is a new feature available for the DDR4 Technology. PPR provides additional spare capacity within a DDR4 DRAM module that is used to replace faulty cell areas detected during system boot. PPR offers two types of memory repairs. Soft Post Package Repair (sPPR) provides a quick, temporary fix on a raw element in a bank group of a DDR4 DRAM device, while hard Post Package Repair (hPPR) will take a longer time to provide a permanent repair on a raw element. The options are **Auto**, Enable, Soft PPR, and Disable.

Memory Frequency

Use this feature to set the maximum memory frequency for onboard memory modules. The options are **Auto**, 1866, 2000, 2133, 2400, 2666, and 2933. (**Note**: 2933 MHz memory is supported by the Intel® 82xx series only.)

Data Scrambling for DDR4

Select Enable to enable data scrambling for DDR4 memory to enhance system performance and security. Select Auto for the default setting of the Memory Reference Code (MRC) to set configure data scrambling for DDR4 setting. The options are **Auto**, Disable, and Enable.

tCCD_L Relaxation

If this feature is set to Enable, SPD (Serial Presence Detect) will override tCCD_L ("Column to Column Delay-Long", or “Command to Command Delay-Long” on the column side.) If this feature is set to Disable, tCCD_L will be enforced based on the memory frequency. The options are **Auto**, Enable, and Disable.

tRWSR (Read to Write turnaround time for Same Rank) Relaxation

Select Enable to use the same tRWSR DDR timing setting among all memory channels, and in which case, the worst-case value among all channels will be used. Select Disable to use different values for the tRWSR DDR timing settings for different channels as trained. The options are Auto, **Disable**, and Enable.

Enable ADR

Select Enable for ADR (Async DIMM Self-Refresh) support to enhance memory performance. The options are Disable and **Enable**.

Data Scrambling for NVDIMM

Select Enable to enable data scrambling support for onboard NVDIMM memory to improve system performance and security. The options are **Auto**, Disable, and Enable.

Erase-Arm NVDIMMs

If this feature is set to Enable, the function that arms the NVDIMMs for safe operations in the event of a power loss will be removed. The options are **Enable** and Disable.

Restore NVDIMMs

Select Enable to restore the functionality and the features of NVDIMMs. The options are **Enable** and Disable.

Interleave NVDIMMs

If this feature is set to Enable, all onboard NVDIMM modules will be configured together as a group for the interleave mode. If this item is set to Disable, individual NVDIMM modules will be configured separately for the interleave mode. The options are Enable and **Disable**.

Reset Trigger ADR (Async DIMM Self-Refresh)

Upon system power loss, an ADR sequence will be triggered to allow ADR to flush the write-protected data buffers in the memory controller and place the DRAM memory in self-refresh mode. When this process is complete, the NVDIMM will then take control of the DRAM memory and transfer the contents to the onboard Flash memory. After the transfer is complete, the NVDIMM goes into a zero-power state. The data transferred will be retained for the duration specified by the flash memory. The options are Enable and **Disable**.

S5 Trigger ADR

Select Enabled to support S5-Triggered ADR to enhance system performance and data integrity. The options are **Disabled** and Enabled.

2X Refresh

Select Enable for memory 2X refresh support to enhance memory performance. The options are Disable, Enable, and **Auto**.

Page Policy

Use this feature to set the page policy for onboard memory support. The options are Closed, Adaptive, and **Auto**.

IMC Interleaving

Use this feature to configure interleaving settings for the IMC (Integrated Memory Controller), which will improve memory performance. The options are 1-way Interleave, 2-way Interleave, and **Auto**.

▶Memory Topology

This item displays the information of onboard memory modules as detected by the BIOS.

- P1
  DIMMA1/DIMMA2/DIMMB1/DIMMB2/DIMMC1/DIMMC2/DIMMD1/DIMMD2/
  DIMME1/DIMME2/DIMMF1/DIMMF2
- P2
  DIMMA1/DIMMA2/DIMMB1/DIMMB2/DIMMC1/DIMMC2/DIMMD1/DIMMD2/
  DIMME1/DIMME2/DIMMF1/DIMMF2
- P3
  DIMMA1/DIMMA2/DIMMB1/DIMMB2/DIMMC1/DIMMC2/DIMMD1/DIMMD2/
  DIMME1/DIMME2/DIMMF1/DIMMF2
- P4
  DIMMA1/DIMMA2/DIMMB1/DIMMB2/DIMMC1/DIMMC2/DIMMD1/DIMMD2/

DIMME1/DIMME2/DIMMF1/DIMMF2

- P5
  DIMMA1/DIMMA2/DIMMB1/DIMMB2/DIMMC1/DIMMC2/DIMMD1/DIMMD2/
  DIMME1/DIMME2/DIMMF1/DIMMF2
- P6
  DIMMA1/DIMMA2/DIMMB1/DIMMB2/DIMMC1/DIMMC2/DIMMD1/DIMMD2/
  DIMME1/DIMME2/DIMMF1/DIMMF2

- P7
  DIMMA1/DIMMA2/DIMMB1/DIMMB2/DIMMC1/DIMMC2/DIMMD1/DIMMD2/
  DIMME1/DIMME2/DIMMF1/DIMMF2
- P8
  DIMMA1/DIMMA2/DIMMB1/DIMMB2/DIMMC1/DIMMC2/DIMMD1/DIMMD2/
  DIMME1/DIMME2/DIMMF1/DIMMF2

▶Memory Map

Use this submenu to configure the following Memory Map settings.

Volatile Memory Mode

Select 1LM and 2LM to use 1LM memory mode for volatile memory modules installed in the system. Select 2LM to use 2LM memory mode for volatile memory modules installed in the system. The options are **Auto**, 1LM, and 2LM.

AppDirect Cache

Select Enable to support memory caching for the memory region. The options are **Disable**, Enable, and Auto.

eADR Support

Select Enable to utilize eADR capability in the platform. The options are **Disable**, Enable, and Auto.

1LM Memory Interleave Granularity

Use this feature to select 1LM memory interleave granularity setting to improve memory performance. The options are **Auto**, 256B Target, 256B Channel, and 64B Target, 64B Channel.

Channel Interleaving

Use this feature to configure interleave settings for memory channels to enhance memory performance. The options are **Auto**, 1-way Interleave, 2-way Interleave, and 3-way Interleave.

Rank Interleaving

Use this feature to configure interleave settings for memory ranks to enhance memory performance. The options are **Auto**, 1-way Interleave, 2-way Interleave, 4-way Interleave, and 8-way Interleave.

Socket Interleave Below 4GB

If this feature is set to Enable, memory located at 0-4GB address will be split between two sockets for memory interleaving. The options are **Disable** and Enable.

▶ Memory RAS (Reliability_Availability_Serviceability) Configuration

Use this submenu to configure the following Memory RAS settings.

Static Virtual Lockstep Mode

Select Enable to support Static Virtual Lockstep mode to enhance memory performance. The options are Enable and **Disable**.

Mirror Mode

Use this feature to configure the mirror mode settings for all 1LM/2LM memory modules installed in the system which will create a duplicate copy of data stored in the memory to increase memory security, but it will reduce the memory capacity into half. The options are **Disable**, Mirror Mode 1LM, and Mirror Mode 2LM.

UEFI ARM Mirror

If this feature is set to Enable, mirror mode configuration settings for UEFI-based Address Range memory will be enabled upon system boot. This will create a duplicate copy of data stored in the memory to increase memory security, but it will reduce the memory capacity into half. The options are **Disable** and Enable.

Memory Rank Sparing

Select Enable to support memory-rank sparing to optimize memory performance. The options are Enable and **Disable**.

> **Note:** This item will not be available when memory mirror mode is set to Mirror Mode 1LM or an AEP device is plugged in.

Correctable Error Threshold

Use this feature to enter the threshold value for correctable memory errors. The default setting is **512**.

Intel Run Sure

Select Enable to use Intel Run Sure Technology which will enhance critical data protection and increase system uptime and resiliency. The options are **Enable** and Disable.

SDDC Plus One (Available when supported by the CPUs installed)

Select Enable for SDDC (Single Device Data Correction) Plus One support, which will activate memory ECC mode for memory error checking and correction. It will also protect against memory failures caused by 'single-bit' errors in the same memory rank. The options are **Disable** and Enable.

ADDDC (Adaptive Double Device Data Correction) Sparing (Available when Intel Run Sure is set to Enable and when supported by the CPUs installed)

Select Enable for Adaptive Double Device Data Correction (ADDDC) support, which will not only provide memory error checking and correction but will also prevent the system from issuing a performance penalty before a device fails. Note that virtual lockstep mode will only start to work for ADDDC after a faulty DRAM module is spared. The options are Disable and **Enable**.

Patrol Scrub

Patrol Scrubbing is a process that allows the CPU to correct correctable memory errors detected in a memory module and send the corrections to the requestor (the original source). When this feature is set to Enable, the IO hub will read and write back one cache line every 16K cycles if there is no delay caused by internal processing. By using this method, roughly 64 GB of memory behind the IO hub will be scrubbed every day. The options are **Enable** and Disable.

Patrol Scrub Interval (Available when Patrol Scrub is set to Enable)

Use this feature to specify the number of hours (between 0 to 24) required for the system to complete a full patrol scrubbing. Enter 0 for patrol scrubbing to be performed automatically. The default setting is **24**.

▶ IIO Configuration

EV DFX (Device Function On-Hide) Features

When this feature is set to Enable, the EV_DFX Lock Bits that are located in a processor will always remain clear during electric tuning. The options are **Disable** and Enable.

▶ Socket1 Configuration - Socket8 Configuration

IOU0 (IIO PCIe Br1)

Use this feature to configure the PCI-E Bifurcation setting for a PCI-E port specified by the user. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

IOU1 (IIO PCIe Br2)

Use this feature to configure the PCI-E Bifurcation setting for a PCI-E port specified by the user. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

IOU2 (IIO PCIe Br3)

Use this feature to configure the PCI-E Bifurcation setting for a PCI-E port specified by the user. The options are x4x4x4x4, x4x4x8, x8x4x4, x8x8, x16, and **Auto**.

MCP0 (IIO PCIe Br4)

Use this feature to configure the PCI-E Bifurcation setting for a PCI-E port specified by the user. The options are x16 and **Auto**.

MCP1 (IIO PCIe Br5)

Use this feature to configure the PCI-E Bifurcation setting for a PCI-E port specified by the user. The options are x16 and **Auto**.

▶ Socket 1 PCI-E Br0D00F0 - Port 0/DMI (Available for Socket 1 Configuration)

Link Speed

Use this feature to configure the link speed of a PCI-E port specified by the user. The options are **Auto**, Gen 1 (Generation 1) (2.5 GT/s), Gen 2 (Generation 2) (5 GT/s), and Gen 3 (Generation 3) (8 GT/s)

The following information will display:

- PCI-E Port Link Status
- PCI-E Port Link Max
- PCI-E Port Link Speed

PCI-E Port Max (Maximum) Payload Size (Available for CPU 1 Configuration only)

Select Auto for the system BIOS to automatically set the maximum payload value for a PCI-E device specified by to user for system performance enhancement. The options are **Auto**, 128B, and 256B.

▶ IOAT Configuration

▶ Socket1 IOAT Configuration - Socket8 IOAT Configuration

IOAT Function 0 Items - IOAT Function 7 Items

DMA

Select Enable to enable DMA (Direct Memory Access) support for the CB device specified by the user. The options are **Enable** and Disable.

No Snoop

Select Enable for No Snoop support for the CB device specified by the user. The options are **Disable** and Enable.

Disable TPH (TLP Processing Hint)

TPH is used for data-tagging with a destination ID and a few important attributes. It can send critical data to a particular cache without writing through to memory. Select No in this item for TLP Processing Hint support, which will allow a "TPL request" to provide "hints" to help optimize the processing of each transaction occurred in the target memory space. The options are Yes and **No**.

Prioritize TPH (TLP Processing Hint)

Select Yes to prioritize the TPL requests that will allow the "hints" to be sent to help facilitate and optimize the processing of certain transactions in the system memory. The options are Enable and **Disable**.

Relaxed Ordering

Select Enable to allow certain transactions to be processed and completed before other transactions that have already been enqueued. The options are **Disable** and Enable.

▶ Intel VT for Directed I/O (VT-d)

Intel® VT for Directed I/O (VT-d)

Select Enable to use Intel Virtualization Technology support for Direct I/O VT-d by reporting the I/O device assignments to the VMM (Virtual Machine Monitor) through the DMAR ACPI tables. This feature offers fully protected I/O resource sharing across Intel platforms, providing greater reliability, security and availability in networking and data-sharing. The options are **Enable** and Disable.

ACS (Access Control Services) Control

Select Enable to program Access Control Services to Chipset PCI-E Root Port Bridges. Select Disable to program Access Control Services to all PCI-E Root Port Bridges. The options are **Enable** and Disable.

Interrupt Remapping

Select Enable for Interrupt Remapping support to enhance system performance. The options are **Enable** and Disable.

PassThrough DMA

Select Enable for the Non-Isoch VT-d engine to pass through DMA (Direct Memory Access) to enhance system performance. The options are **Enable** and Disable.

ATS

Select Enable to enable ATS (Address Translation Services) support for the Non-Isoch VT-d engine to enhance system performance. The options are **Enable** and Disable.

Posted Interrupt

Select Enable to support VT_D Posted Interrupt which will allow external interrupts to be sent directly from a direct-assigned device to a client machine in non-root mode to improve virtualization efficiency by simplifying interrupt migration and lessening the need of physical interrupts. The options are **Enable** and Disable.

Coherency Support (Non-Isoch)

Select Enable for the Non-Isoch VT-d engine to pass through DMA (Direct Memory Access) to enhance system performance. The options are **Enable** and Disable.

▶Intel® VMD Technology

Use this feature to configure Intel Volume Management Device (VMD) Technologysettings.

Note: After you've enabled VMD in the BIOS on a backplane (BPN) of your choice, this backplane will be dedicated for VMD use only, and it will no longer support any PCI-E device. To re-activate this backplane for PCI-E use, disable VMD in the BIOS.

▶Intel® VMD for Volume Management Device on CPU1 BPN1 through Intel® VMD for Volume Management Device on CPU8 BPN2

Select Enable to enable Intel Volume Management Device Technology support for the for the device specified by the user. The options are **Disable** and Enable.

▶IIO-PCIE Express Global Options

IIO-PCIE Express Global Options

The section allows the user to configure the following PCI-E global options:

PCI-E Hot Plug

Select Enable to support Hot-plugging for the selected PCI-E slots which will allow the user to replace the devices installed in the slots without shutting down the system. The options are Disable, **Enable**, Auto, and Manual.

PCI-E Completion Timeout (Global) Disable

Use this feature to select the PCI-E Completion Time-out settings. The options are Yes, **No**, and Per-Port.

▶South Bridge

The following South Bridge information will display:

- USB Module Version
- USB Devices

Legacy USB Support

Select Enabled to support onboard legacy USB devices. Select Auto to disable legacy support if there are no legacy USB devices present. Select Disable to have all USB devices available for EFI applications only. The options are **Enabled,** Disabled, and Auto.

XHCI Hand-Off

This is a work-around solution for operating systems that do not support XHCI (Extensible Host Controller Interface) hand-off. The XHCI ownership change should be claimed by the XHCI driver. The options are Disabled and **Enabled**.

Port 60/64 Emulation

Select Enabled for I/O port 60h/64h emulation support, which in turn, will provide complete legacy USB keyboard support for the operating systems that do not support legacy USB devices. The options are Enabled and **Disabled**.

PCIe PLL SSC

Select Enabled for PCH PCI-E Spread Spectrum Clocking support, which will allow the BIOS to monitor and attempt to reduce the level of Electromagnetic Interference caused by the components whenever needed. The options are Enabled and **Disabled**.

Port 61h Bit-4 Emulation

Select Enabled for I/O Port 61h-Bit 4 emulation support to enhance system performance. The options are Enabled and **Disabled**.

Install Windows 7 USB Support

Select Enabled to install the Windows 7 USB utility to support legacy USB devices for Windows 7 systems. The options are Enabled and **Disabled**.

▶Server ME (Management Engine) Configuration

This feature displays the following system ME configuration settings.

General ME Configuration

- Oper. (Operational) Firmware Version
- Backup Firmware Version
- Recovery Firmware Version
- ME Firmware Status #1/ME Firmware Status #2
  - Current State
  - Error Code

▶SATA Configuration

When this submenu is selected, the AMI BIOS automatically detects the presence of the SATA devices that are supported by Intel PCH and displays the following items:

SATA Controller

This feature enables or disables the onboard SATA controller supported by Intel PCH. The options are **Enable** and Disable.

Configure SATA as (Available when SATA Controller is set to Enable)

Select AHCI to configure a SATA drive specified by the user as an AHCI drive. Select RAID to configure a SATA drive specified by the user as a RAID drive. The options are **AHCI** and RAID.

SATA HDD Unlock (Available when SATA Controller is set to Enable)

Select Enable to unlock SATA HDD password in the OS. The options are **Enable** and Disable.

SATA/sSATA RAID Boot Select (Available when Configure SATA as is set to RAID)

This feature allows the user to decide which controller should be used to boot the system. The options are None, SATA Controller, **sSATA Controller**, and Both.

Aggressive Link Power Management

When this feature is set to Enable, the SATA AHCI controller manages the power use of the SATA link. The controller will put the link in a low power mode during an extended period of I/O inactivity and will return the link to an active state when I/O activity resumes. The options are Enable and **Disable**.

SATA RAID Option ROM/UEFI Driver (Available when Configure SATA as is set to RAID)

Select EFI to load the EFI driver for system boot. Select Legacy to load a legacy driver for system boot. The options are Disable, EFI, and **Legacy**.

SATA Port 0 - SATA Port 7

Hot Plug

Select Enable to support Hot plugging for the device installed on a selected SATA port which will allow the user to replace the device installed in the slot without shutting down the system. The options are **Enable** and Disable.

Spin Up Device

When this feature is set to Enable, the SATA device installed on the SATA port specified by the user will start a COMRESET initialization when an edge is detected from 0 to 1. The options are Enable and **Disable**.

SATA Device Type

Use this feature to specify if the device installed on the SATA port specified by the user should be connected to a Solid-State drive or a Hard Disk Drive. The options are **Hard Disk Drive** and Solid-State Drive.

▶sSATA Configuration

When this submenu is selected, the AMI BIOS automatically detects the presence of the sSATA devices that are supported by the sSATA controller and displays the following items:

sSATA Controller

This feature enables or disables the onboard sSATA controller supported by Intel PCH. The options are **Enable** and Disable.

Configure sSATA as (Available when sSATA Controller is set to Enable)

Select AHCI to configure an sSATA drive specified by the user as anAHCI drive. Select RAID to configure an sSATA drive specified by the user as a RAID drive. The options are **AHCI** and RAID.

SATA HDD Unlock (Available when sSATA Controller is set to Enable)

Select Enable to unlock sSATA HDD password in the OS. The options are **Enable** and Disable.

SATA/sSATA RAID Boot Select (Available when Configure sSATA as is set to RAID)

This feature allows the user to decide which controller should be used to boot the system. The options are None, SATA Controller, **sSATA Controller**, and Both.

Aggressive Link Power Management

When this feature is set to Enable, the sSATA AHCI controller manages the power use of the sSATA link. The controller will put the link in a low power mode during an extended period of I/O inactivity and will return the link to an active state when I/O activity resumes. The options are **Disable** and Enable.

sSATA RAID Option ROM/UEFI Driver (Available when Configure sSATA as is set to RAID)

Select EFI to load the EFI driver for system boot. Select Legacy to load a legacy driver for system boot. The options are Disable, EFI, and **Legacy**.

sSATA Port 0 - sSATA Port 5

Hot Plug

Select Enable to support Hot plugging for the device installed on an sSATA port specified by the user, which will allow the user to replace the device installed in the slot without shutting down the system. The options are **Enable** and Disable.

Spin Up Device

This setting allows the SATA device installed on the SATA port specified by the user to start a COMRESET initialization when an edge is detected from 0 to 1. The options are Enable and **Disable**.

sSATA Device Type

Use this feature to specify if the device installed on the sSATA port specified by the user should be connected to a Solid-State drive or a Hard Disk Drive. The options are **Hard Disk Drive** and Solid-State Drive.

▶ PCIe/PCI/PnP Configuration

Note: PCIe/PCI/PnP Configuration settings may differ depending on the PCI-E devices installed on the motherboard.

The following PCI information will be displayed:

- PCI Bus Driver Version
- PCI Devices Common Settings

Above 4G Decoding (Available if the system supports 64-bit PCI decoding)

Select Enabled to decode a PCI device that supports 64-bit in the space above 4G Address. The options are **Enabled** and Disabled.

SR-IOV Support (Available if the system supports Single-Root Virtualization)

Select Enabled for Single-Root IO Virtualization support. The options are Enabled and **Disabled.**

MMIOHBase

Use this feature to select the base memory size according to memory-address mapping for the IO hub. The base memory size must be between 4032G to 4078G. The options are **56T**, 40T, 24T, 16T, 4T, and 1T.

MMIO High Granularity Size

Use this feature to select the high memory size according to memory-address mapping for the IO hub. The options are 1G, 4G, 16G, 64G, **256G**, and 1024G.

Maximum Read Request

Select Auto for the system BIOS to automatically set the maximum size for a read request for a PCI-E device to enhance system performance. The options are **Auto**, 128 Bytes, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, and 4096 Bytes.

MMCFG Base

This feature determines how the lowest MMCFG (Memory-Mapped Configuration) base is assigned to onboard PCI devices. The options are 1G, 1.5G, 1.75G. **2G**, 2.25G, and 3G.

VGA Priority

Use this feature to select the graphics device to be used as the primary video display for system boot. The options are Auto, **Onboard** and Offboard.

Onboard Devices Option ROM Setting

Use this feature to configure the Option ROM setting for an onboard device specified by the user to be used for system boot.

Onboard Video OPROM (Option ROM)

Use this feature to set the type of the onboard video device specified by the user for system boot. The options are Do Not Launch, **Legacy**, and UEFI.

SIOM Module OPROM (Option ROM)

Use this feature to set the type of the SIOM (Super I/O Module) specified by the user for system boot. The options are Disabled, **Legacy**, and UEFI.

NVMe Module OPROM (Option ROM)

Use this feature to set the type of the NVMe module specified by the user for system boot. The options are Disabled, **Legacy**, and UEFI.

GPU Module OPROM (Option ROM)

Use this feature to set the type of the GPU module specified by the user for system boot. The options are Disabled, **Legacy**, and UEFI.

HDD Module OPROM (Option ROM)

Use this feature to set the type of the GPU module specified by the user for system boot. The options are Disabled, **Legacy**, and UEFI.

PCIE Module SLOT1 x16 OPROM/PCIE Module SLOT2 x16 OPROM/PCIE Module SLOT3 x16 OPROM/ PCIE Module SLOT4 x16 OPROM/PCIE Module SLOT5 x16 OPROM

Select EFI to allow the user to boot the computer using an EFI (Extensible Firmware Interface) device installed on the PCI-E slot specified by the user. Select Legacy to allow the user to boot the computer using a legacy device installed on the PCI-E slot specified by the user. The options are Disabled, **Legacy**, and EFI. (**Note:** Riser card names may differ in each system.)

▶ Network Stack Configuration

Network Stack

Select Enabled to enable PXE (Preboot Execution Environment) or disable for UEFI (Unified Extensible
Firmware Interface) network stack support. The options are **Enabled** and Disabled.

If "Network Stack" is set to Enabled, the following items will display:

Ipv4 PXE Support

Select Enabled to enable Ipv4 PXE boot support. If this feature is disabled, it will not create the Ipv4 PXE boot option. The options are Disabled and **Enabled**.

Ipv4 HTTP Support

Select Enabled to enable Ipv4 HTTP boot support. If this feature is disabled, it will not create the Ipv4 HTTP boot option. The options are Enabled and **Disabled**.

Ipv6 PXE Support

Select Enabled to enable Ipv6 PXE boot support. If this feature is disabled, it will not create the Ipv6 PXE boot option. The options are Disabled and **Enabled**.

Ipv6 HTTP Support

Select Enabled to enable Ipv6 HTTP boot support. If this feature is disabled, it will not create the Ipv6 HTTP boot option. The options are Enabled and **Disabled**.

IPSEC Certificate

Select Enable to enable the IPSEC certificate for Ikev support. The options are Disabled and **Enabled**.

PXE Boot Wait Time

Use this feature to select the wait time to press the <ESC> key to abort the PXE boot. The default is **0**.

Media Detect Time

Use this feature to select the wait time in seconds for the BIOS ROM to detect the LAN media (Internet connection or LAN port). The default is **1**.

▶ Super IO Configuration

Super IO Chip AST2500

▶ Serial Port 1 Configuration

Serial Port

Select Enabled to enable Serial Port 1. The options are **Enabled** and Disabled.

Device Settings (Available when the item above "Serial Port (1)" is set to Enabled)

This feature displays the base I/O port address and the Interrupt Request address of a serial port specified by the user.

Change Settings

This feature specifies the base I/O port address and the Interrupt Request address of Serial Port 1. Select **Auto** for the BIOS to automatically assign the base I/O and IRQ address to a serial port specified.

The options for Serial Port 1 are **Auto**, (IO=3F8h; IRQ=4), (IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12), (IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12); (IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12), and (IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12).

▶Serial Port 2 Configuration

Serial Port

Select Enabled to enable Serial Port 2. The options are **Enabled** and Disabled.

Device Settings (Available when the item above "Serial Port (2)" is set to Enabled)

This feature displays the base I/O port address and the Interrupt Request address of a serial port specified by the user.

Change Settings

This feature specifies the base I/O port address and the Interrupt Request address of Serial Port 2. Select Auto for the BIOS to automatically assign the base I/O and IRQ address to a serial port specified.

The options for Serial Port 2 are **Auto**, (IO=2F8h; IRQ=3), (IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12), (IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12); (IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12), and (IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12).

Serial Port 2 Attribute

Select SOL to use COM Port 2 as a Serial_Over_LAN (SOL) port for console redirection. The options are COM and **SOL**.

▶Serial Port Console Redirection

COM 1

Console Redirection

Select Enabled to enable COM Port 1 for Console Redirection, which will allow a client machine to be connected to a host machine at a remote site for networking. The options are Enabled and **Disabled**.

**If the item above set to Enabled, the following items will become available for configuration:*

▶Console Redirection Settings (for COM 1)

Terminal Type

Use this feature to select the target terminal emulation type for Console Redirection. Select VT100 to use the ASCII Character set. Select VT100+ to add color and function key support. Select ANSI to use the Extended ASCII Character Set. Select VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes. The options are ANSI, VT100, **VT100+**, and VT-UTF8.

Bits Per second

Use this feature to set the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 38400, 57600, and **115200** (bits per second).

Data Bits

Use this feature to set the data transmission size for Console Redirection. The options are 7 (Bits) and **8 (Bits)**.

Parity

A parity bit can be sent along with regular data bits to detect data transmission errors. Select Even if the parity bit is set to 0, and the number of 1's in data bits is even. Select Odd if the parity bit is set to 0, and the number of 1's in data bits is odd. Select None if you do not want to send a parity bit with your data bits in transmission. Select Mark to add a mark as a parity bit to be sent along with the data bits. Select Space to add a Space as a parity bit to be sent with your data bits. The options are **None**, Even, Odd, Mark, and Space.

Stop Bits

A stop bit indicates the end of a serial data packet. Select 1 Stop Bit for standard serial data communication. Select 2 Stop Bits if slower devices are used. The options are **1** and 2.

Flow Control

Use this feature to set the flow control for Console Redirection to prevent data loss caused by buffer overflow. Send a "Stop" signal to stop sending data when the receiving buffer is full. Send a "Start" signal to start sending data when the receiving buffer is empty. The options are **None** and Hardware RTS/CTS.

VT-UTF8 Combo Key Support

Select Enabled to enable VT-UTF8 Combination Key support for ANSI/VT100 terminals. The options are **Enabled** and Disabled**.**

Recorder Mode

Select Enabled to capture the data displayed on a terminal and send it as text messages to a remote server. The options are **Disabled** and Enabled.

Resolution 100x31

Select Enabled for extended-terminal resolution support. The options are Disabled and **Enabled**.

Putty KeyPad

This feature selects Function Keys and KeyPad settings for Putty, which is a terminal emulator designed for the Windows OS. The options are **VT100**, LINUX, XTERMR6, SCO, ESCN, and VT400.

COM2/SOL (Serial-Over-LAN)

Console Redirection (for SOL/COM2)

Select Enabled to use the SOL port for Console Redirection. The options are **Enabled** and Disabled.

**If the item above is set to Enabled, the following items will become available for user's configuration:*

▶Console Redirection Settings (for SOL/COM2)

Use this feature to specify how the host computer will exchange data with the client computer, which is the remote computer used by the user.

Terminal Type

Use this feature to select the target terminal emulation type for Console Redirection. Select VT100 to use the ASCII Character set. Select VT100+ to add color and function key support. Select ANSI to use the Extended ASCII Character Set. Select VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes. The options are ANSI, VT100, **VT100+**, and VT-UTF8.

Bits Per second

Use this feature to set the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in the host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 38400, 57600 and **115200** (bits per second).

Data Bits

Use this feature to set the data transmission size for Console Redirection. The options are 7 (Bits) and **8 (Bits)**.

Parity

A parity bit can be sent along with regular data bits to detect data transmission errors. Select Even if the parity bit is set to 0, and the number of 1's in data bits is even. Select Odd if the parity bit is set to 0, and the number of 1's in data bits is odd. Select None if you do not want to send a parity bit with your data bits in transmission. Select Mark to add a mark as a parity bit to be sent along with the data bits. Select Space to add a Space as a parity bit to be sent with your data bits. The options are **None**, Even, Odd, Mark, and Space.

Stop Bits

A stop bit indicates the end of a serial data packet. Select 1 Stop Bit for standard serial data communication. Select 2 Stop Bits if slower devices are used. The options are **1** and 2.

Flow Control

Use this feature to set the flow control for Console Redirection to prevent data loss caused by buffer overflow. Send a "Stop" signal to stop sending data when the receiving buffer is full. Send a "Start" signal to start data-sending when the receiving buffer is empty. The options are **None** and Hardware RTS/CTS.

VT-UTF8 Combo Key Support

Select Enabled to enable VT-UTF8 Combination Key support for ANSI/VT100 terminals. The options are **Enabled** and Disabled**.**

Recorder Mode

Select Enabled to capture the data displayed on a terminal and send it as text messages to a remote server. The options are **Disabled** and Enabled.

Resolution 100x31

Select Enabled for extended-terminal resolution support. The options are Disabled and **Enabled**.

Putty KeyPad

This feature selects Function Keys and KeyPad settings for Putty, which is a terminal emulator designed for the Windows OS. The options are **VT100**, LINUX, XTERMR6, SCO, ESCN, and VT400.

▶Legacy Console Redirection Settings

Legacy Console Redirection Settings

Use this feature to select the COM port to display redirection of Legacy OS and Legacy OPROM messages. The options are COM1 and **COM2/SOL**.

Legacy OS Redirection Resolution

Use this feature to select the number of rows and columns used in Console Redirection for Legacy OS support. The options are **80x24** and 80x25.

Redirection After BIOS Post

Use this feature to enable or disable Legacy Console Redirection after BIOS POST. When the option-Bootloader is selected, Legacy Console Redirection is disabled before booting the OS. When the option-Always Enable is selected, Legacy Console Redirection remains enabled upon OS bootup. The options are **Always Enable** and Bootloader.

Serial Port for Out-of-Band Management/Windows Emergency Management Services (EMS)

The feature allows the user to configure Console Redirection settings to support Out-of-Band Serial Port management.

Console Redirection (for EMS)

Select Enabled to use a COM port specified by the user for EMS Console Redirection. The options are **Disabled** and Enabled.

**If the item above is set to Enabled, the following items will become available for user's configuration:*

▶ **Console Redirection Settings (for EMS)**

Out-of-Band Management Port

This feature selects a serial port in a client server to be used by the Windows Emergency Management Services (EMS) to communicate with a remote host server. The options are **COM1 (Console Redirection)** and COM2/SOL (Console Redirection).

Terminal Type

Use this feature to select the target terminal emulation type for Console Redirection. Select VT100 to use the ASCII character set. Select VT100+ to add color and function key support. Select ANSI to use the extended ASCII character set. Select VT-UTF8 to use UTF8 encoding to map Unicode characters into one or more bytes. The options are ANSI, VT100, VT100+, and **VT-UTF8**.

Bits Per Second

This feature sets the transmission speed for a serial port used in Console Redirection. Make sure that the same speed is used in both host computer and the client computer. A lower transmission speed may be required for long and busy lines. The options are 9600, 19200, 57600, and **115200** (bits per second).

Flow Control

Use this feature to set the flow control for Console Redirection to prevent data loss caused by buffer overflow. Send a "Stop" signal to stop data-sending when the receiving buffer is full. Send a "Start" signal to start data-sending when the receiving buffer is empty. The options are **None,** Hardware RTS/CTS, and Software Xon/Xoff.

The setting for each these features is displayed:

Data Bits, Parity, Stop Bits

▶ACPI Settings

Use this feature to configure Advanced Configuration and Power Interface (ACPI) power management settings for your system.

NUMA Support (Available when the OS supports this feature)

Select Enabled to enable Non-Uniform Memory Access support to enhance system performance. The options are **Enabled** and Disabled.

WHEA Support

Select Enabled to support the Windows Hardware Error Architecture (WHEA) platform and provide a common infrastructure for the system to handle hardware errors within the Windows OS environment to reduce system crashes and to enhance system recovery and health monitoring. The options are **Enabled** and Disabled.

▶Trusted Computing (Available when a TPM device is installed and detected by the BIOS)

When a TPM (Trusted-Platform Module) device is detected in your machine, the following information will be displayed.

- TPM2.0 Device Found
- Firmware Version
- Vendor

Security Device Support

If this feature and the TPM jumper (JPT1) on the motherboard are both enabled, the onboard security (TPM) device will be enabled in the BIOS to enhance data integrity and system security. Note that the OS will not show the security device. Neither TCG EFI protocol nor INT1A interaction will be made available for use. If you have made changes on the setting on this item, be sure to reboot the system for the changes to take effect. The options are Disable and **Enable**. If this option is set to Enable, the following screen and items will display:

- Active PCR Banks
- Available PCR Banks

SHA-1 PCR Bank

Select Enabled to enable SHA-1 PCR Bank support to enhance system security and data integrity. The options are **Enabled** and Disabled.

SHA256 PCR Bank

Select Enabled to enable SHA256 PCR Bank support to enhance system security and data integrity. The options are **Enabled** and Disabled.

Pending Operation

Use this feature to schedule a TPM-related operation to be performed by a security (TPM) device at the next system boot to enhance system data integrity. The options are **None** and TPM Clear.

Note: Your system will reboot to carry out a pending TPM operation.

Platform Hierarchy (for TPM Version 2.0 and above)

Select Enabled for TPM Platform Hierarchy support which will allow the manufacturer to utilize the cryptographic algorithm to define a constant key or a fixed set of keys to be used for initial system boot. These early boot codes are shipped with the platform and are included in the list of "public keys". During system boot, the platform firmware uses the trusted public keys to verify a digital signature in an attempt to manage and control the security of the platform firmware used in a host system via a TPM device. The options are **Enabled** and Disabled.

Storage Hierarchy

Select Enabled for TPM Storage Hierarchy support that is intended to be used for non-privacy-sensitive operations by the platform owner such as an IT professional or the end user. Storage Hierarchy has an owner policy and an authorization value, both of which can be set and are held constant (-rarely changed) through reboots. This hierarchy can be cleared or changed independently of the other hierarchies. The options are **Enabled** and Disabled.

Endorsement Hierarchy

Select Enabled for Endorsement Hierarchy support, which contains separate controls to address the user's privacy concerns because the primary keys in this hierarchy are certified by the TPM or the manufacturer to be used as an authentic TPM device attached to an authentic platform. A primary key can be encrypted, and a certificate can be created using TPM2_ ActivateCredential. It allows the user to independently enable "flag, policy, and authorization value" without involving other hierarchies. A user with privacy concerns can disable the endorsement hierarchy while still using the storage hierarchy for TPM applications and permitting the platform software to use the TPM. The options are **Enabled** and Disabled.

PH (Platform Hierarchy) Randomization (for TPM Version 2.0 and above)

Select Enabled for Platform Hierarchy Randomization support, which is used only during the platform developmental stage. This feature cannot be enabled in the production platforms. The options are **Disabled** and Enabled.

TXT Support

Select Enabled to enable Intel Trusted Execution Technology (TXT) support to enhance system security and data integrity. The options are **Disabled** and Enabled.

> **Note 1**: If the option for this item (TXT Support) is set to Enabled, be sure to disable EV DFX (Device Function On-Hide) support for the system to work properly. (EV DFX is under "IIO Configuration" in the "Chipset/North Bridge" submenu).

▶ TLS Authenticate Configuration

When this submenu is selected, the following items will be displayed:

▶ Server CA Configuration

This feature allows the user to configure the client certificate that is to be used by the server.

▶ Enroll Certification

This feature allows the user to enroll the certificate in the system.

▶ Enroll Cert (Certification) Using File

This feature allows the user to enroll the security certificate in the system by using a file.

Cert (Certification) GUID (Global Unique Identifier)

This feature displays the GUID for this system.

▶ **Commit Changes and Exit**

Select this feature to keep the changes you have made and exit from the system.

▶ **Discard Changes and Exit**

Select this feature to discard the changes you have made and exit from the system.

▶ **Delete Certification**

If this feature is set to Enable, the certificate enrolled in the system will be deleted. The options are Enable and **Disable**.

▶ **Client Certification Configuration**

This feature allows the user to configure the client certificate to be used by the server.

▶ **Enroll Certification**

This feature allows the user to enroll the certificate in the system.

▶ **Enroll Cert (Certification) Using File**

This feature allows the user to enroll the security certificate in the system by using a file.

Cert (Certification) GUID (Global Unique Identifier)

This feature displays the GUID for this system.

▶ **Commit Changes and Exit**

Select this feature to keep the changes you have made and exit from the system.

▶ **Discard Changes and Exit**

Select this feature to discard the changes you have made and exit from the system.

▶ **Delete Certification**

If this feature is set to Enable, the certificate enrolled in the system will be deleted. The options are Enable and **Disable**.

▶ RAM Disk Configuration

This feature allows the user to configure the settings for the RAM disks installed in the system. When you select this submenu and press <Enter>, the following items will display:

Disk Memory

- Disk Memory Type: This feature specifies the type of memory that is available for you to create a RAM disk. The options are **Boot Service Data** and Reserved.

▶ Create Raw

This feature allows the user to create a raw RAM disk from all available memory modules in the system. When you select this submenu and press <Enter>, the following items will display:

- **Size (Hex)**: Use this feature to set the size of the raw RAM disk. The default setting is **1**.
- **Create & Exit**: Select this feature when you want to exit from this submenu after you've created a raw RAM disk.
- **Discard & Exit**: Select this feature when you want to abandon the changes you've made and to exit from the submenu.

▶ Create from File

This feature allows the user to create a RAM disk from a file specified by the user. Select this submenu and press <Enter>, the following items will display:

- **Create RAM Disk List**: Use this feature to create a RAM disk list.
- **Remove Selected RAM Disk(s)**: Use this feature to delete the RAM disk(s) specified by the user.

Intel® Optane® DC Persistent Memory Configuration

This option is available only if DC PMem is installed.

When you select this submenu and press <Enter>, the following screen displays.

- **Version**: This feature displays the version of DC PMem used in the system.
- **Select an action below**
- **Detected DIMMs**: This feature displays the number of DC PMem memory modules detected by the BOS.
- **All DIMMs are healthy** (The health status of the DC PMem is displayed.)

▶ DIMMs

This submenu allows the user to view and configure the settings of the DC PMem memory modules installed in the system. Select this submenu and press <Enter>, the following items will display:

Select a specific DIMM that you want to view.

DIMMs on Socket 0x0000:/DIMMs on Socket 0x0001:/DIMMs on Socket 0x0002:/ DIMMs on Socket 0x0004:/DIMMs on Socket 0x0005:/DIMMs on Socket 0x0006:/ DIMMs on Socket 0x0007:

▶ DIMM ID 0x0011 - DIMM ID 0x7101

This submenu allows the user to view and to perform an action on a DC PMem module specified by the user. When this submenu is selected, the following items will display:

- **DIMM UID**: This feature displays the unique ID of the DC PMem module.
- **DIMM Handle:** This feature displays the unique handle that the CPU assigns to the DC PMem module.

- **DIMM Physical ID:** This feature displays the physical ID of the DCPMM module.
- **Manageability State:** This feature indicates the manageability state of the DCPMM module.
- **Health State:** This feature indicates the health state of the DCPMM module.
- **Health State Reason:** This feature indicates the reason that effectuates the health state of the DCPMM module.
- **Capacity:** This feature indicates the capacity of the DCPMM module.
- **Firmware Version:** This feature indicates the firmware version of the DCPMM module.
- **Firmware API Version:** This feature indicates the firmware API version of the DCPMM module.
- **Lock State:** This feature indicates the lock state of the DCPMM module.
- **Staged Firmware Version:** This feature indicates the staged firmware version of the DCPMM module.
- **Firmware Update Status:** This feature indicates the firmware update status of the DCPMM module.
- **Manufacturer:** This feature indicates the manufacturer of the DCPMM module.

Show More Details

Select Enabled to view more detailed information on the DCPMM module. The options are **Disabled** and Enabled.

**If this option is set to Enabled, the following items will display:*

- Serial Number
- Part Number
- Socket
- Memory Controller ID
- Vendor ID
- Device ID
- System Vendor ID
- Subsystem Vendor ID
- Subsystem Device ID
- Device Locator

- Subsystem Revision ID
- Interface Format Code
- Manufacturing Information Valid
- Manufacturing Date
- Manufacturing Location
- Memory Type
- Memory Bank Label
- Data Width Label [b]
- Total Width [b]
- Speed [MHz]
- Channel ID
- Channel Position
- Revision ID
- Form Factor
- Manufacturer ID
- Controller Revision ID
- IS New
- Memory Capacity
- APP Direct Capacity
- Unconfigured Capacity
- Inaccessible Capacity
- Reserved Capacity
- Peak Power Budget [mW]
- Avg (Average) Power Budget [mW]
- Max Average Power Budget [mW]
- Package Sparing Capable

- Package Sparing Enabled
- Package Spares Available
- Configuration Status
- SKU Violation
- ARS Status
- Overwrite DIMM Status
- Last Shutdown Time
- First Fast Refresh
- Viral Policy Enable
- Viral State
- Latched Last Shutdown Status
- Unlatched Last Shutdown Status
- Security Capabilities
- Modes Supported
- Boot Status
- AIT DRAM Enabled
- Error Injection Enabled
- Media Temperature Injection Enabled
- Software Triggers Enabled
- Software Triggers Enabled Details
- Poison Error Injections Counter
- Poison Error Clear Counter
- Media Temperature Injections Counter
- Software Triggers Counter
- Master Passphrase Enabled

7.4 Event Logs

Use this feature to configure Event Log settings.

Note: After you've made a change on a setting below, be sure to reboot the system for the change to take effect.

▶ **Change SMBIOS Event Log Settings**

Enabling/Disabling Options

SMBIOS Event Log

Select Enabled to enable SMBIOS (System Management BIOS) Event Logging during system boot. The options are **Enabled** and Disabled.

Erasing Settings

Erase Event Log

Select "No" to keep the event log without erasing it upon next system bootup. Select "Yes, Next Reset" to erase the event log upon next system reboot. The options are "**No"**, "Yes, Next Reset", and "Yes, Every Reset".

When Log is Full

Select Erase Immediately to immediately erase all errors in the SMBIOS event log when the event log is full. Select Do Nothing for the system to do nothing when the SMBIOS event log is full. The options are **Do Nothing** and Erase Immediately.

SMBIOS Event Log Standard Settings

Log System Boot Event

Select Enabled to log system boot events. The options are Enabled and **Disabled**.

MECI (Multiple Event Count Increment)

Enter the increment value for the multiple event counter. Enter a number between 1 to 255. The default setting is **1**.

METW (Multiple Event Count Time Window)

This feature is used to determine how long (in minutes) should the multiple event counter wait before generating a new event log. Enter a number between 0 to 99. The default setting is **60**.

▶ View System Event Log

This feature allows the user to view the event in the system event log. Select this item and press <Enter> to view the status of an event in the log. The following categories are displayed: **Date/Time/Error Code/Severity**

7.5 IPMI

Use this feature to configure Intelligent Platform Management Interface (IPMI) settings.

When you select this submenu and press the <Enter> key, the following information will display:

- **IPMI Firmware Revision**: This feature indicates the IPMI firmware revision used in your system.
- **Status of BMC**: This feature indicates the status of the BMC (Baseboard Management Controller) installed in your system.

▶ **System Event Log**

Enabling/Disabling Options

SEL Components

Select Enabled to enable all system event logging upon system boot. The options are **Enabled** and Disabled.

Erasing Settings

Erase SEL

Select "Yes, On next reset" to erase all system event logs upon next system boot. Select "Yes, On every reset" to erase all system event logs upon each system reboot. Select "No" to keep all system event logs after each system reboot. The options are "**No",** "Yes, On next reset", and "Yes, On every reset".

When SEL is Full

This feature allows the user to determine what the BIOS should do when the system event log is full. Select Erase Immediately to erase all events in the log when the system event log is full. The options are **Do Nothing** and Erase Immediately.

▶ BMC Network Configuration

The following items will be displayed:

- IPMI LAN Selection: This feature displays the IPMI LAN setting. The default setting is **Dedicated**.
- IPMI Network Link Status: This feature displays the IPMI Network Link status. The default setting is **Dedicated LAN**.
- Station MAC Address: This feature displays the Station MAC address for this computer. Mac addresses are 6 two-digit hexadecimal numbers.
- VLAN: This feature displays the status of VLAN support. The default setting is **Disabled**.
- IPv4 Address Source: This feature displays the source of IPv4 addresses. The default setting is **DHCP**.
- Station IP Address: This feature displays the Station IP address for this computer. This should be in decimal and in dotted quad form (i.e., 192.168.10.253).
- Subnet Mask: This feature displays the sub-network that this computer belongs to. The value of each three-digit number separated by dots should not exceed 255.
- Gateway IP Address: This feature displays the Gateway IP address for this computer. This should be in decimal and in dotted quad form (i.e., 192.168.10.253).
- IPv6 Address Status: This feature displays the IPv6 address status. The default setting is **Disabled**.
- Station IPv6 Address: This feature displays the station IPv6 address.
- Prefix Length: This item displays the prefix length.
- IPv6 Router IP Address: This feature displays the IPv6 router IP address.

Update IPMI LAN Configuration

Select Yes for the BIOS to implement all IP/MAC address changes upon next system boot. The options are **No** and Yes. If this option is set to Yes, the following items will display:

IPMI LAN Selection (Available when Update IPMI LAN Configuration is set to Yes)

Use this feature to select the type of the IPMI LAN. The options are Dedicated, Shared, and **Failover**.

VLAN

Select Enabled to enable IPMI VLAN function support. The options are **Disabled** and Enabled.

Configuration Address Source

Use this feature to select the IP address source for this computer. If Static is selected, you will need to know the IP address of this computer and enter it to the system manually in the field. If DHCP is selected, AMI BIOS will search for a DHCP (Dynamic Host Configuration Protocol) server attached to the network and request the next available IP address for this computer. The options are **DHCP** and Static.

IPv6 Support: Select Enabled for IPv6 support. The options are Enabled and **Disabled**. If this option is set to Enabled, the following item will display:

Configuration Address Source: Use this feature to select the IP address source for this computer. If Static is selected, you will need to know the IP address of this computer and enter it to the system manually in the field. If DHCP is selected, AMI BIOS will search for a DHCP (Dynamic Host Configuration Protocol) server attached to the network and request the next available IP address for this computer. The options are **DHCP** and Static

7.6 Security Settings

This menu allows the user to configure the following security settings for the system.

Administrator Password

Use this feature to set the administrator password which is required to enter the BIOS setup utility. The length of the password should be from 3 characters to 20 characters long.

User Password

Use this feature to set the user password which is required to enter the BIOS setup utility. The length of the password should be from 3 characters to 20 characters long.

Password Check

Select Setup for the system to check for a password at Setup. Select Always for the system to check for a password at system boot and upon entering the BIOS Setup utility. The options are **Setup** and Always.

▸Secure Boot

When you select this submenu and press the <Enter> key, the following items will display:

- System Mode

Secure Boot

Select Enabled to use Secure Boot settings. The options are Enabled and **Disabled**.

Secure Boot Mode

Use this feature to select the desired secure boot mode for the system. The options are Standard and **Custom**.

CMS Support

If this feature is set to Enabled, legacy devices will be supported by the system. The options are **Enabled** and Disabled.

▶ Restore Factory Keys

Select Yes to restore manufacturer default keys used to ensure system security. The options are **Yes** and No.

▶ Reset to Setup Mode

Select Yes to reset the system to the Setup Mode. The options are **Yes** and No.

▶ Key Management

Vendor Keys

Factory Key Provision

Select Yes to install manufacturer default keys for system security use. The options are Enabled and **Disabled**.

▶ Restore Factory Keys

Select Yes to restore all manufacturer default keys for system security use. The options are **Yes** and No.

▶ Reset to Setup Mode

This feature resets the system to Setup Mode.

▶ Export Secure Boot Variables

This feature is used to copy the NVRAM content of Secure Boot variables to a storage device.

▶ Enroll EFI Image

Select this feature and press <Enter> to specify an EFI (Extensible Firmware Interface) image for the system to use when it operates in the Secure Boot mode.

Device Guard Ready

▶ Remove 'UEFI CA' from DB

Select Yes to remove UEFI CA from the database. The options are **Yes** and No.

▶ **Restore DB defaults**

Select Yes to restore database variables to the manufacturer default settings. The options are **Yes** and No.

Secure Boot Variable/Size/Keys/Key Source

▶ **Platform Key (PK)**

This feature allows the user to enter and configure a set of values to be used as platform firmware keys for the system. The sizes, keys numbers, and key sources of the platform keys will be indicated as well. Select Update to update the platform key.

▶ **Key Exchange Keys**

This feature allows the user to enter and configure a set of values to be used as Key-Exchange-Keys for the system. The sizes, keys numbers, and key sources of the Key-Exchange-Keys will be indicated as well. Select Update to update your "Key Exchange Keys". Select Append to append your "Key Exchange Keys".

▶ **Authorized Signatures**

This feature allows the user to enter and configure a set of values to be used as Authorized Signatures for the system. These values also indicate the sizes, keys numbers, and the sources of the authorized signatures. Select Update to update your "Authorized Signatures". Select Append to append your "Authorized Signatures". The settings are Update and Append.

▶ **Forbidden Signatures**

This feature allows the user to enter and configure a set of values to be used as Forbidden Signatures for the system. These values also indicate sizes, keys numbers, and key sources of the forbidden signatures. Select Update to update your "Forbidden Signatures". Select Append to append your "Forbidden Signatures". The settings are Update and Append.

▶ **Authorized TimeStamps**

This feature allows the user to set and save the timestamps for the authorized signatures which will indicate the time when these signatures are entered into the system. Select Update to update your "Authorized TimeStamps". Select Append to append your "Authorized TimeStamps". The settings are Update and Append.

▶ OS Recovery Signatures

This feature allows the user to set and save the authorized signatures used for OS recovery. Select Update to update your "OS Recovery Signatures". Select Append to append your "OS Recovery Signatures". The settings are Update and Append.

7.7 Boot Settings

Use this feature to configure Boot Settings:

Fast Boot

Select Enabled to support fast boot by initializing a minimal set of devices that are required to boot up the system. The options are Enabled and **Disabled.**

Boot Mode Select

Use this feature to select the type of devices from which the system will boot. The options are Legacy, UEFI (Unified Extensible Firmware Interface), and **Dual.**

Legacy to EFI Support

Select Enabled for the system to boot from an EFI OS when the Legacy OS fails. The options are Enabled and **Disabled**.

Fixed Boot Order Priorities

This feature prioritizes the order of a bootable device from which the system will boot. Press <Enter> on each item sequentially to select devices.

When the item above -"Boot Mode Select" is set to **Dual** (default), the following items will be displayed for user's configuration:

- Boot Option #1 - Boot Option #17

When the item above -"Boot Mode Select" is set to Legacy, the following items will be displayed for configuration:

- Boot Option #1 - Boot Option #8

When the item above -"Boot Mode Select" is set to UEFI, the following items will be displayed for configuration:

- Boot Option #1 - Boot Option #9

Add New Boot Option

This feature allows the user to add a new boot option to the boot priority features for system boot.

Add Boot Option

Use this feature to specify the name for the new boot option.

Path for Boot Option

Use this feature to enter the path for the new boot option in the format fsx:\path\filename.efi.

Boot Option File Path

Use this feature to specify the file path for the new boot option.

Create

After the name and the file path for the boot option are set, press <Enter> to create the new boot option in the boot priority list.

▶ Delete Boot Option

Use this feature to select a boot device to delete from the boot priority list.

Delete Boot Option

Use this feature to remove an EFI boot option from the boot priority list.

▶ Add New Driver Option

Use this feature to select a new driver to add to the boot priority list.

Add Driver Option

Use this feature to specify the name of the driver to be added to the boot priority list.

Path for Drover Option

Use this feature to specify the path to the driver that will be added to the boot priority list.

Driver Option File Path

Use this feature to specify the file path of the driver that will be added to the boot priority list.

Create

After the driver option name and the file path are set, press <Enter> to enter to submenu and click OK to create the new boot option drive.

▶ Delete Driver Option

Use this item to select a boot driver to delete from the boot priority list.

Delete Drive Option
Select the target boot driver to delete from the boot priority list.

□ Hard Disk Drive BBS Priorities

- Boot Option #1 - #5

□ USB Key Drive BBS Priorities

- Boot Option #1

□ UEFI Application Boot Priorities

- Boot Option #1

□ Network Drive BBS Priorities

- Boot Option #1

▶ UEFI Application Boot Priorities

- UEFI Boot Order #1 - This feature sets the system boot order of detected devices. The options are **UEFI: Built-in EFI Shell** and Disabled.

7.8 Save & Exit

Select the Save & Exit menu from the BIOS setup screen to configure the settings.

Save Options

Discard Changes and Exit

Select this option to exit from the BIOS setup utility without making any permanent changes to the system configuration and reboot the computer.

Save Changes and Reset

When you have completed the system configuration changes, select this option to leave the BIOS setup utility and reboot the computer for the new system configuration parameters to become effective.

Save Changes

When you have completed the system configuration changes, select this option to save all changes made. This will not reset (reboot) the system.

Discard Changes

Select this option and press <Enter> to discard all the changes you've made and return to the AMI BIOS setup utility.

Default Options

Restore Optimized Defaults

To set this feature, select Restore Defaults from the Exit menu and press <Enter> to load manufacturer default settings which are intended for maximum system performance but not for maximum stability.

Save As User Defaults

To set this feature, select Save as User Defaults from the Exit menu and press <Enter>. This enables the user to save all changes to the BIOS setup for future use.

Restore User Defaults

To set this feature, select Restore User Defaults from the Exit menu and press <Enter>. Use this feature to retrieve user-defined default settings that were saved previously.

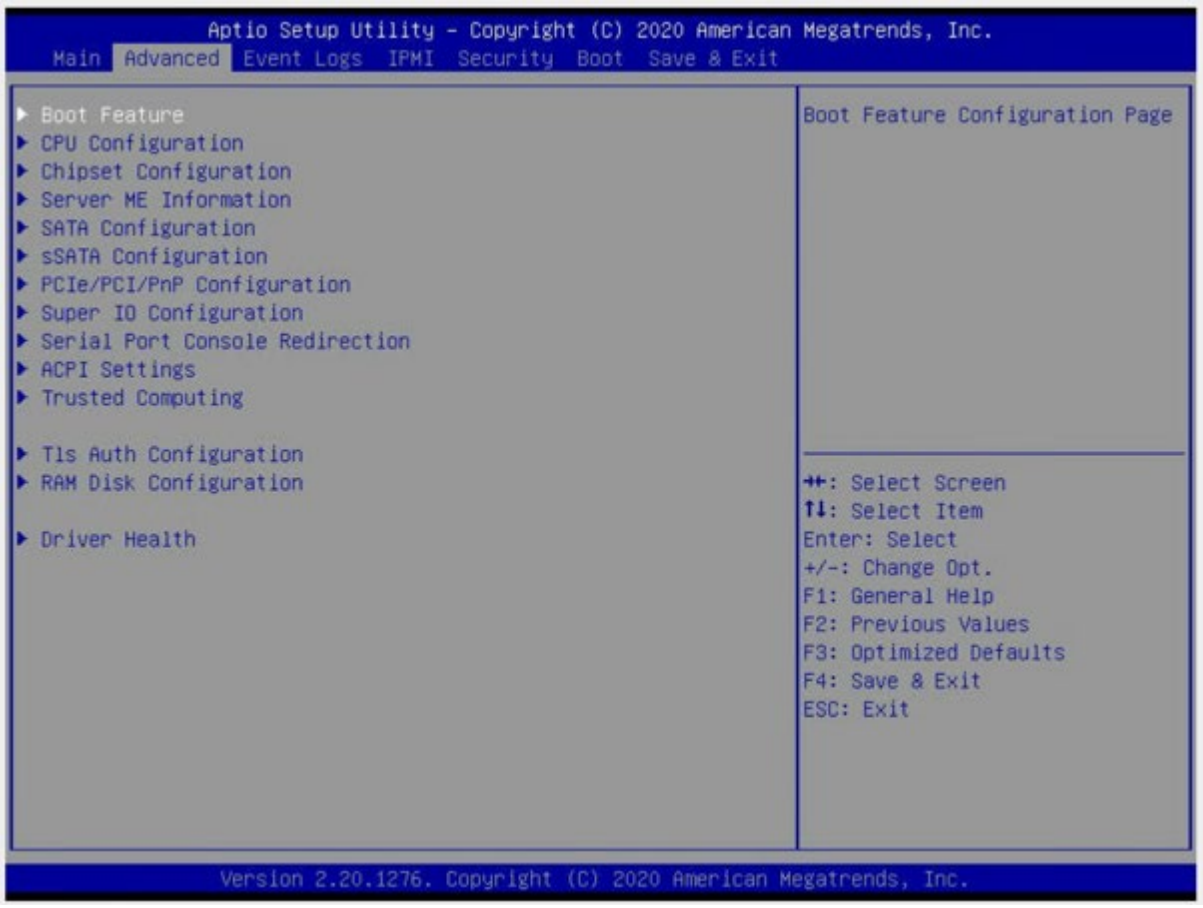
Boot Override

This feature allows the user to override the Boot priorities sequence in the Boot menu, and immediately boot the system with a device specified by the user instead of the one specified in the boot list. This is a one-time override.

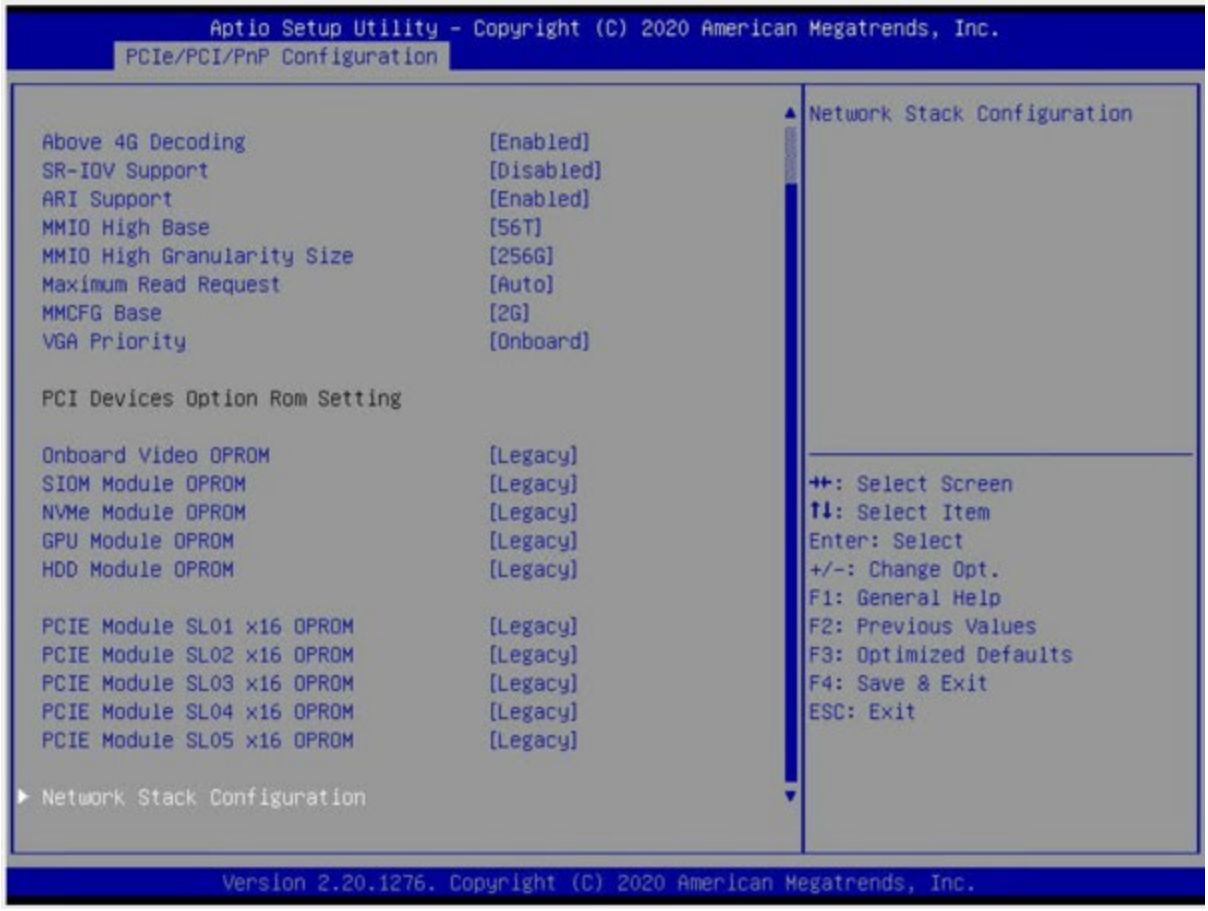
8 BIOS PCIe Configuration

Factory Default – Option ROM set to Legacy

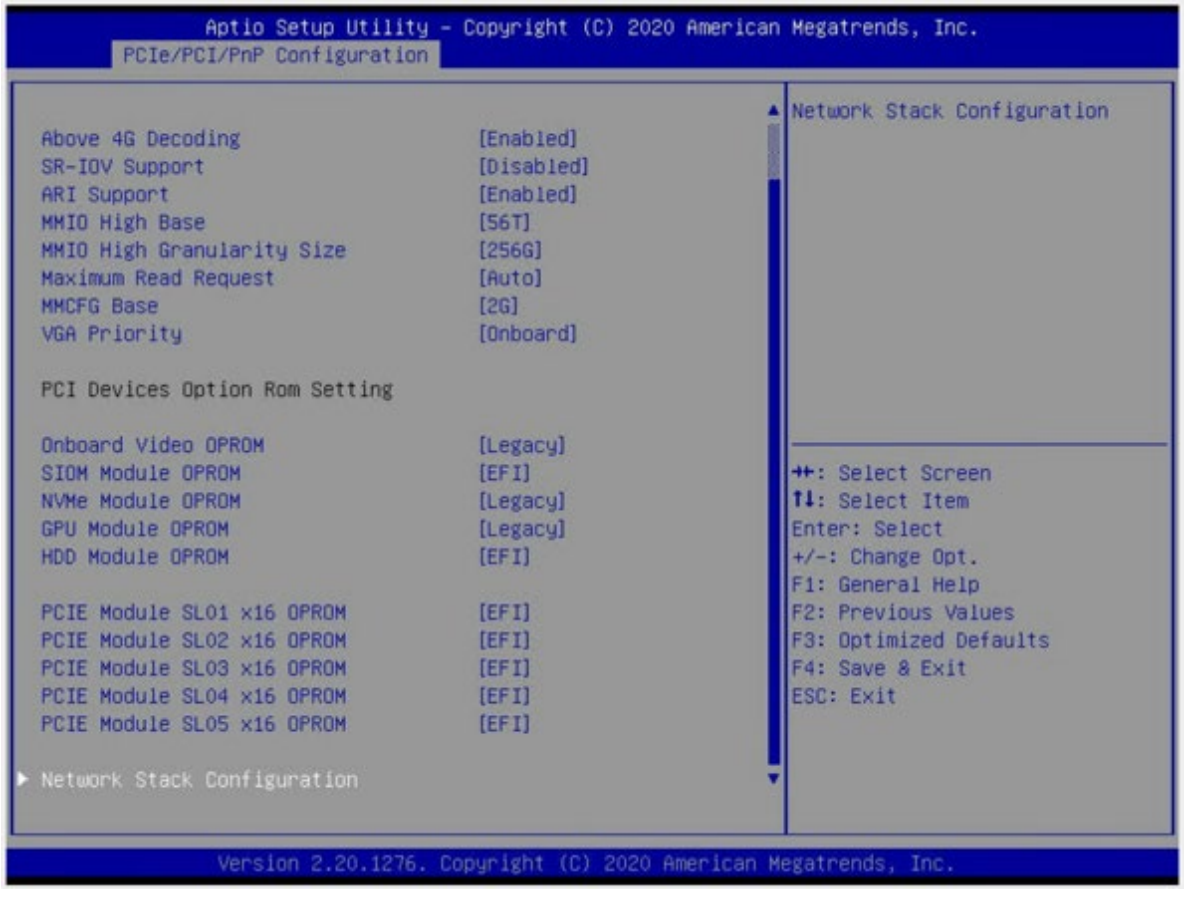
When pressing ESC during the Cisco Logo presentation to enter the Setup, the startup will initialize all PCIe components prior of entering the BIOS.



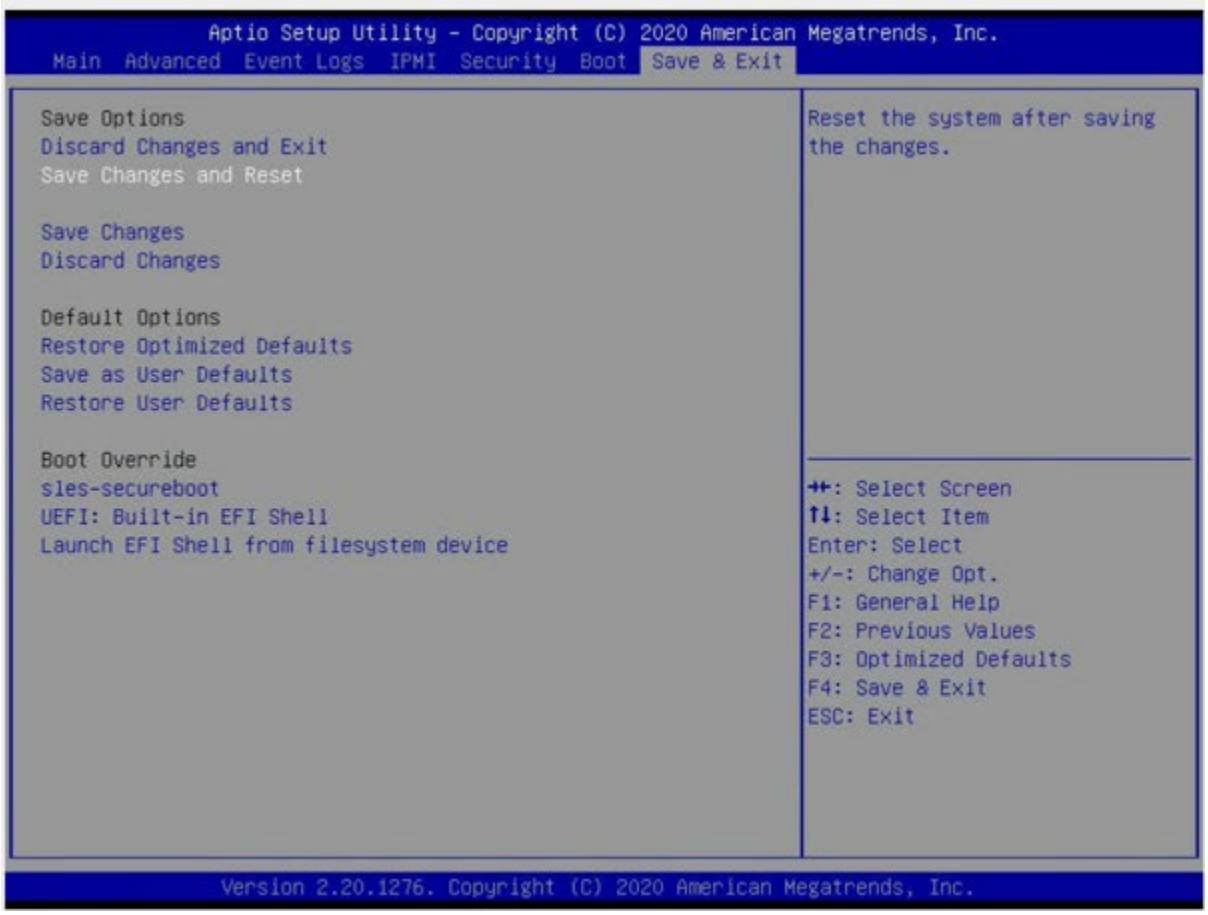
With the legacy setting, device configuration is not accessible from the Boot Setup.



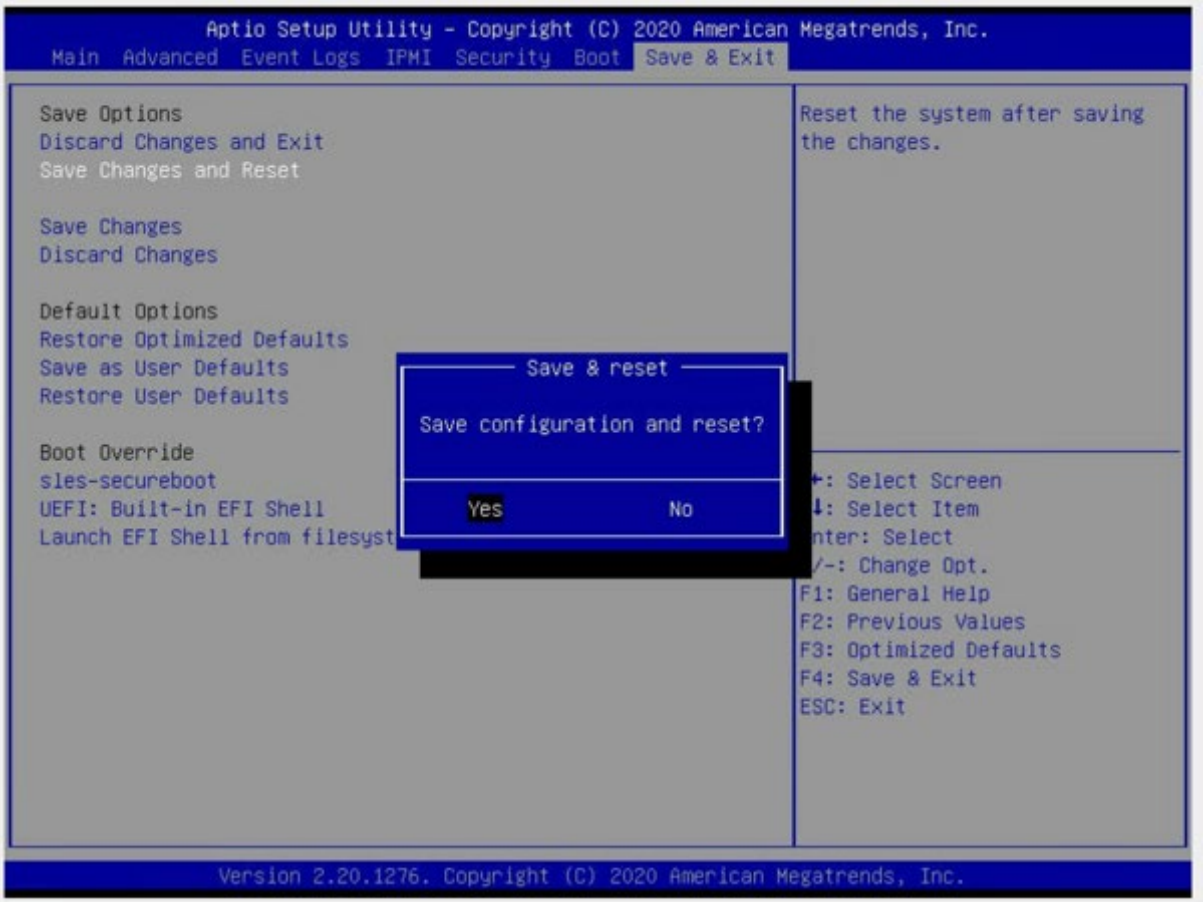
Change the Option ROM setting to EFI. Press ESC to return to return to the main screen.



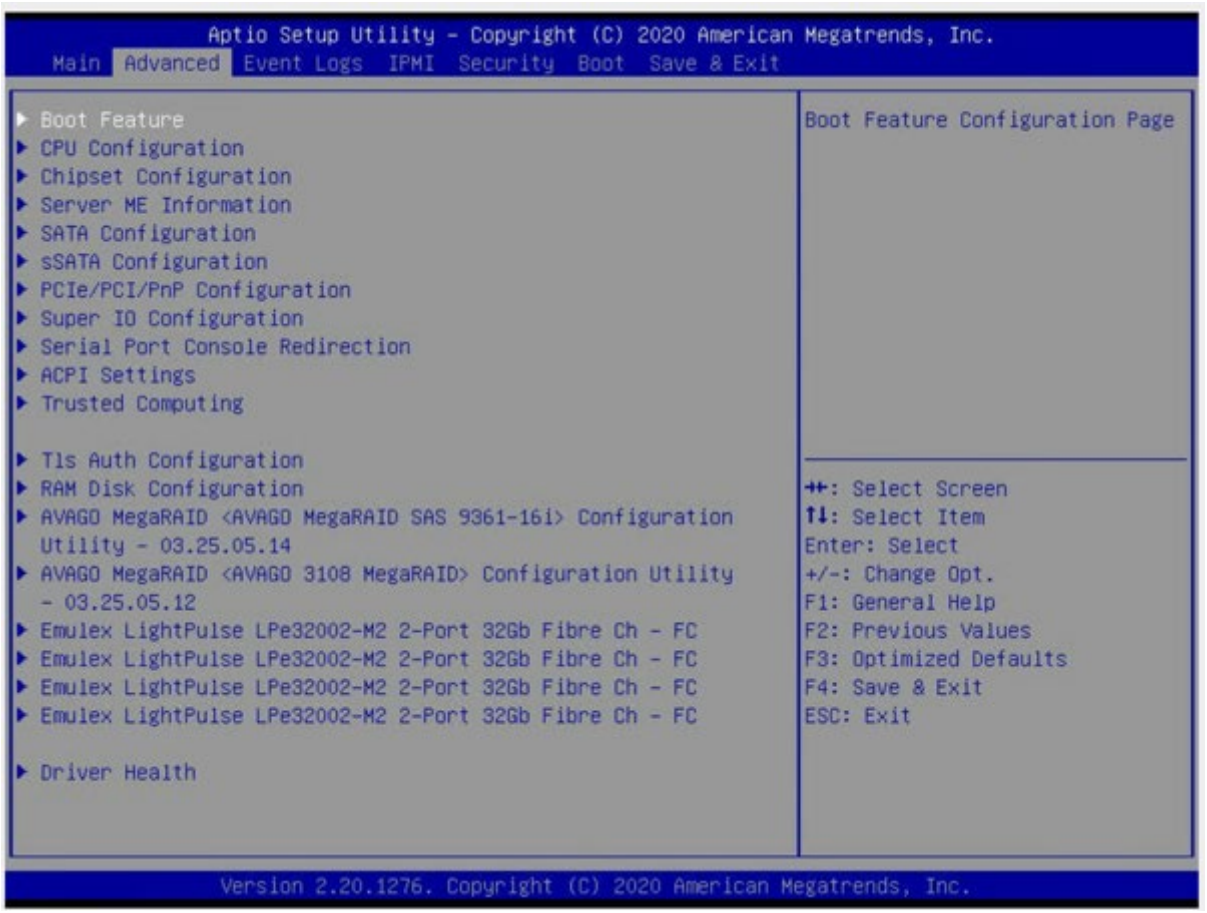
Save changes and Reset.



In the Save & reset confirmation pop-up, click Yes.



Enter the BIOS again. The BIOS Setup Advanced screen changes (compare with the screenshot above) and lists the PCIe devices.


Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
Main Advanced Event Logs IPMI Security Boot Save & Exit
Boot Feature
CPU Configuration
Chipset Configuration
Server ME Information
SATA Configuration
sSATA Configuration
PCIe/PCI/PnP Configuration
Super IO Configuration
Serial Port Console Redirection
ACPI Settings
Trusted Computing
Tls Auth Configuration
RAM Disk Configuration
AVAGO MegaRAID <AVAGO MegaRAID SAS 9361-16i> Configuration Utility - 03.25.05.14
AVAGO MegaRAID <AVAGO 3108 MegaRAID> Configuration Utility - 03.25.05.12
Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch - FC
Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch - FC
Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch - FC
Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch - FC
Driver Health
Boot Feature Configuration Page
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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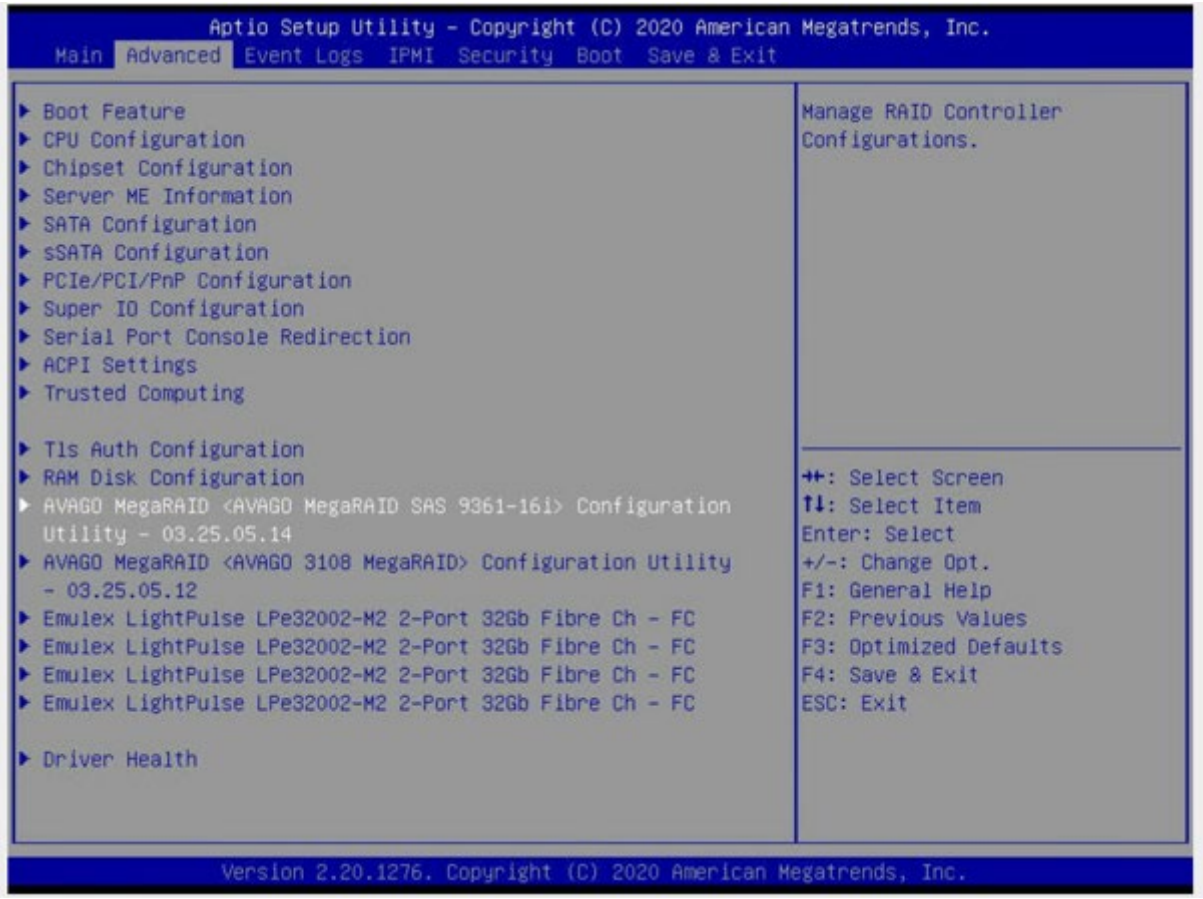
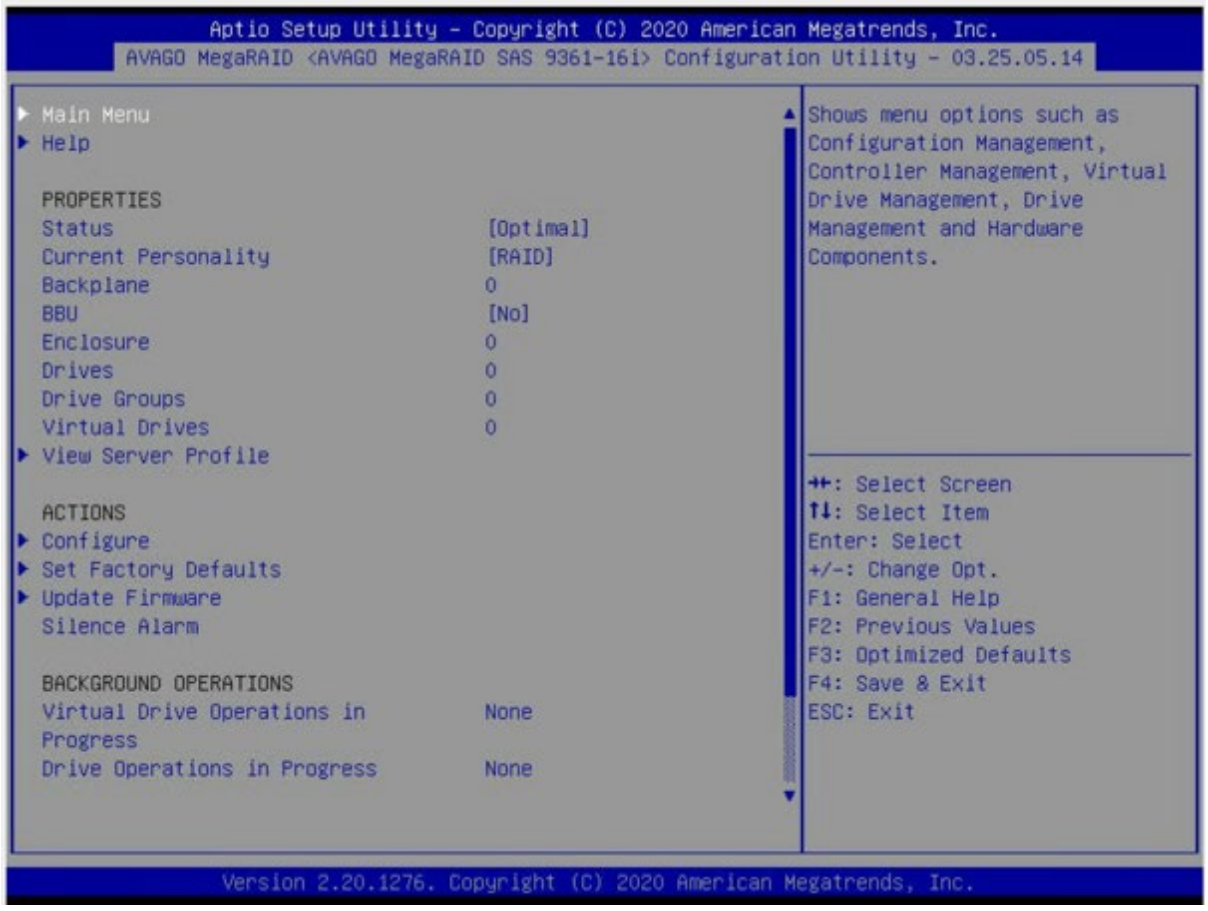
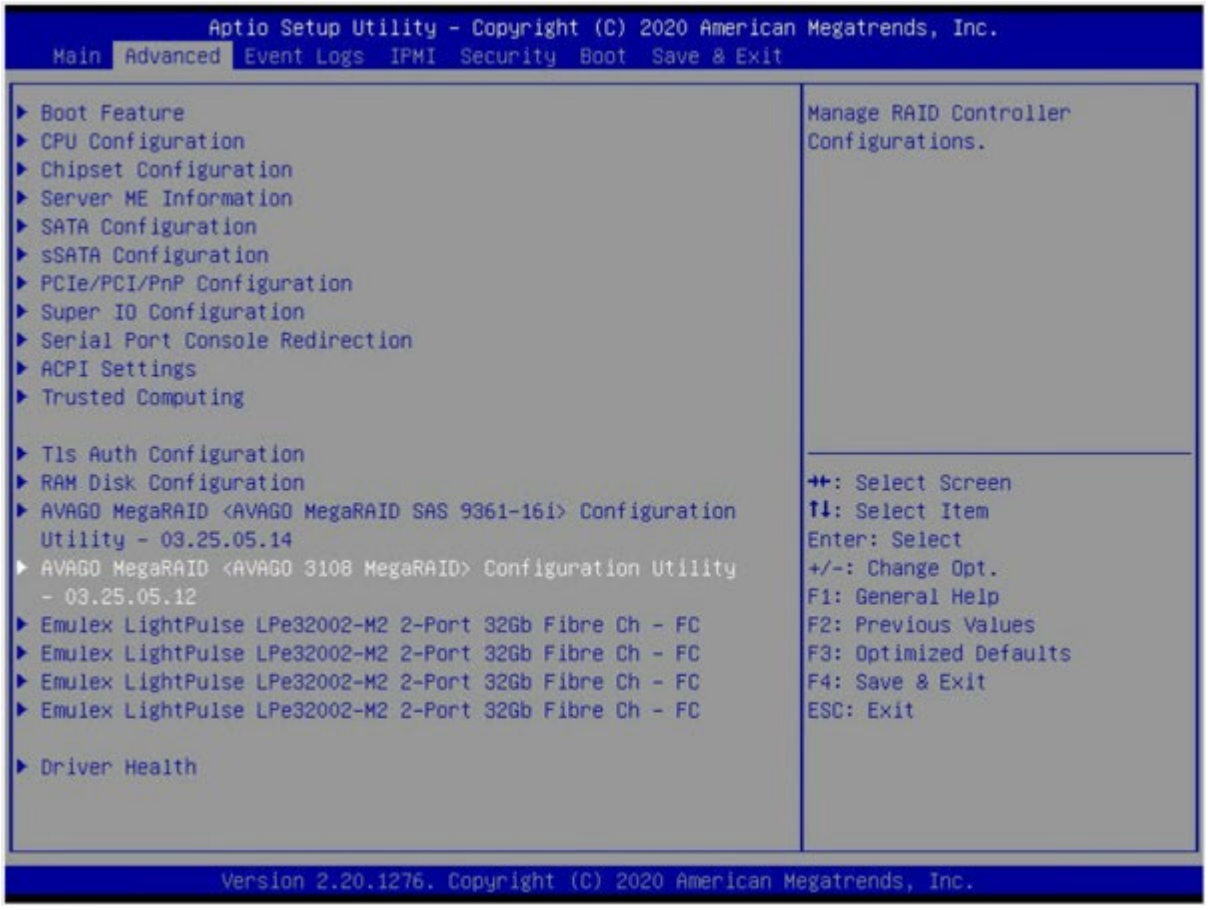
AVAGO MegaRAID 9361 Config Utility

Description is the same as with the Config Utility, enter in legacy mode.




Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
AVAGO MegaRAID <AVAGO MegaRAID SAS 9361-16i> Configuration Utility - 03.25.05.14
Main Menu
Help
PROPERTIES
Status [Optimal]
Current Personality [RAID]
Backplane 0
BBU [No]
Enclosure 0
Drives 0
Drive Groups 0
Virtual Drives 0
View Server Profile
ACTIONS
Configure
Set Factory Defaults
Update Firmware
Silence Alarm
BACKGROUND OPERATIONS
Virtual Drive Operations in Progress None
Drive Operations in Progress None
Shows menu options such as Configuration Management, Controller Management, Virtual Drive Management, Drive Management and Hardware Components.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.20.1276. Copyright (C) 2020 American Megatrends, Inc.


Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
Main Advanced Event Logs IPMI Security Boot Save & Exit
Boot Feature
CPU Configuration
Chipset Configuration
Server ME Information
SATA Configuration
sSATA Configuration
PCIe/PCI/PnP Configuration
Super IO Configuration
Serial Port Console Redirection
ACPI Settings
Trusted Computing
Tls Auth Configuration
RAM Disk Configuration
AVAGO MegaRAID <AVAGO MegaRAID SAS 9361-16i> Configuration Utility - 03.25.05.14
AVAGO MegaRAID <AVAGO 3108 MegaRAID> Configuration Utility - 03.25.05.12
Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch - FC
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Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch - FC
Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch - FC
Driver Health
Manage RAID Controller Configurations.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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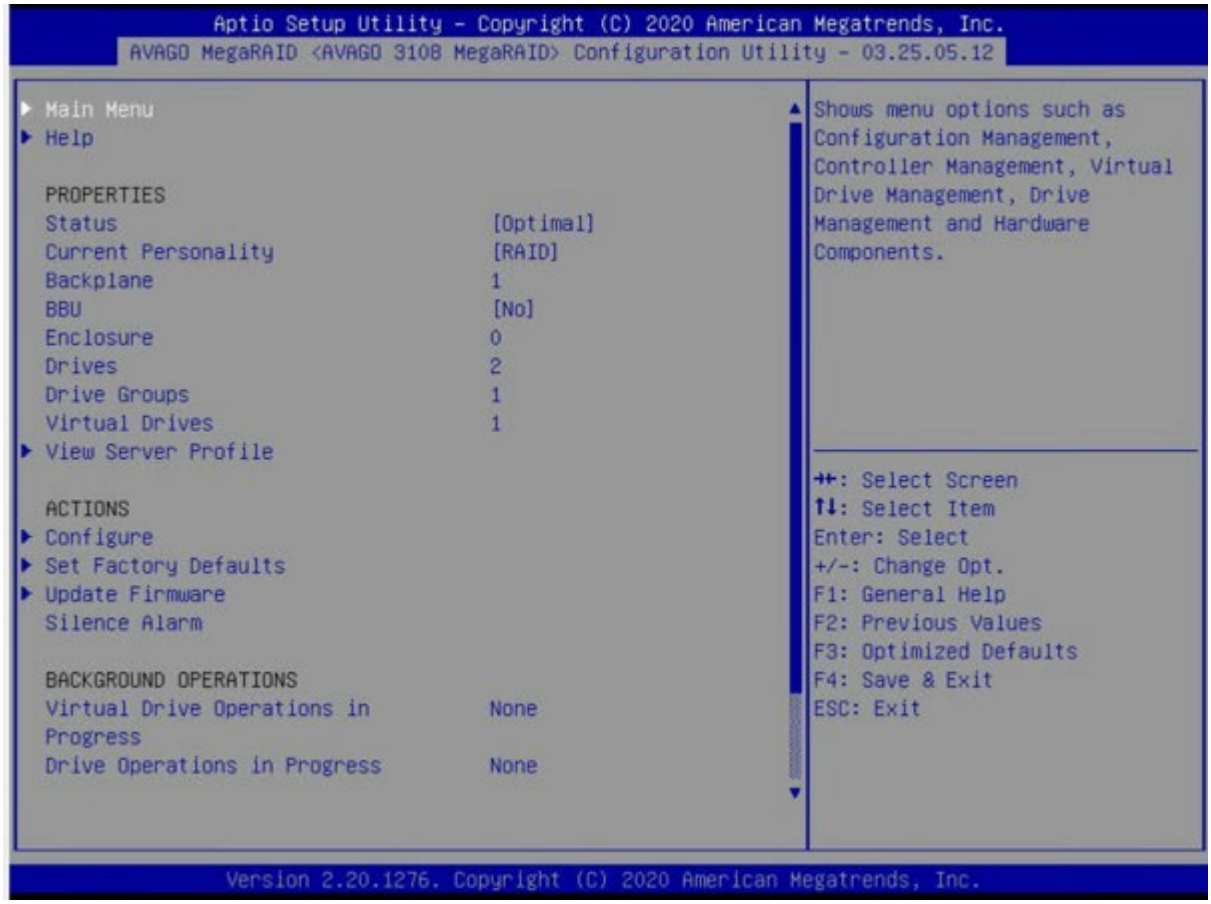
Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
AVAGO MegaRAID <AVAGO 3108 MegaRAID> Configuration Utility – 03.25.05.12
Main Menu
Help
PROPERTIES
Status [Optimal]
Current Personality [RAID]
Backplane 1
BBU [No]
Enclosure 0
Drives 2
Drive Groups 1
Virtual Drives 1
View Server Profile
ACTIONS
Configure
Set Factory Defaults
Update Firmware
Silence Alarm
BACKGROUND OPERATIONS
Virtual Drive Operations in Progress None
Drive Operations in Progress None
Shows menu options such as Configuration Management, Controller Management, Virtual Drive Management, Drive Management and Hardware Components.
→←: Select Screen
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Enter: Select
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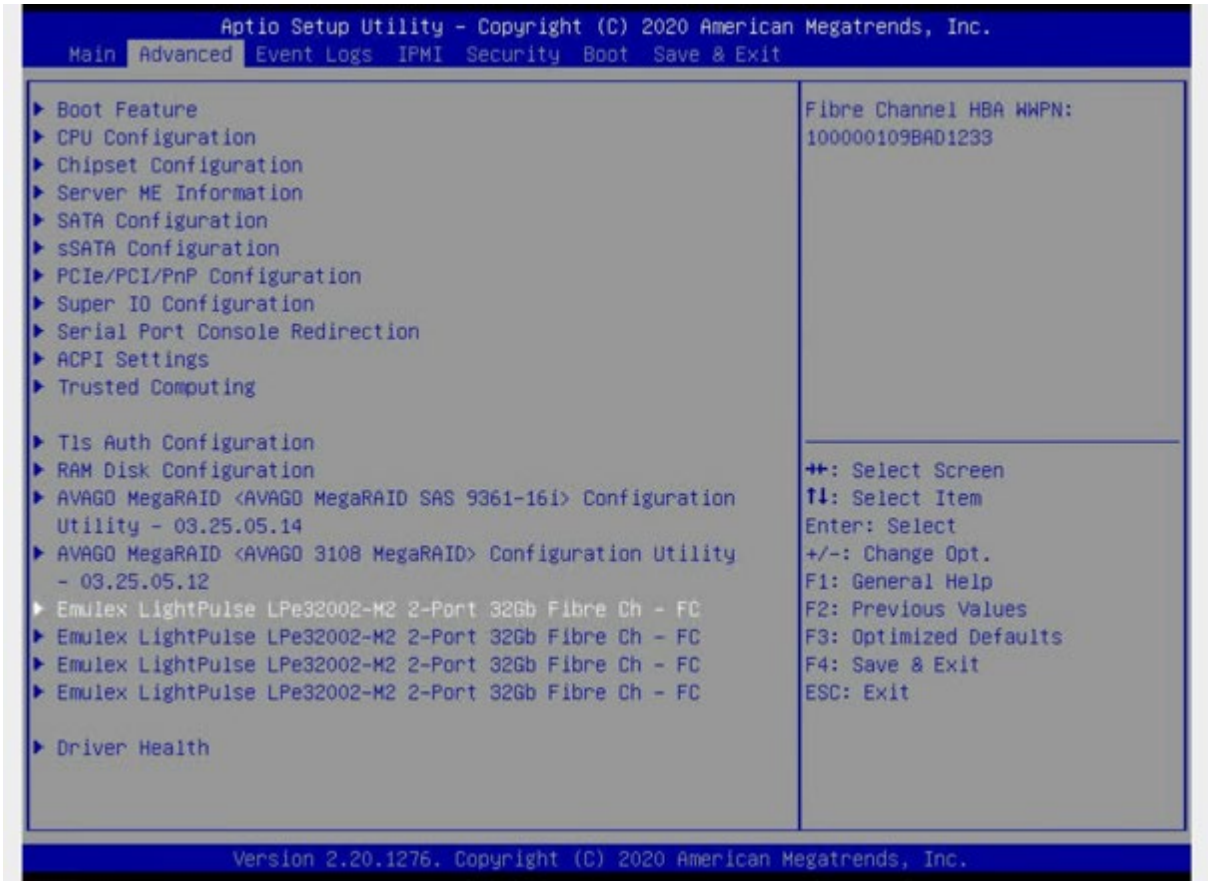
Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
Main Advanced Event Logs IPMI Security Boot Save & Exit
Boot Feature
CPU Configuration
Chipset Configuration
Server ME Information
SATA Configuration
sSATA Configuration
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Super IO Configuration
Serial Port Console Redirection
ACPI Settings
Trusted Computing
Tls Auth Configuration
RAM Disk Configuration
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Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch – FC
Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch – FC
Driver Health
Fibre Channel HBA WWPN: 100000109BAD1233
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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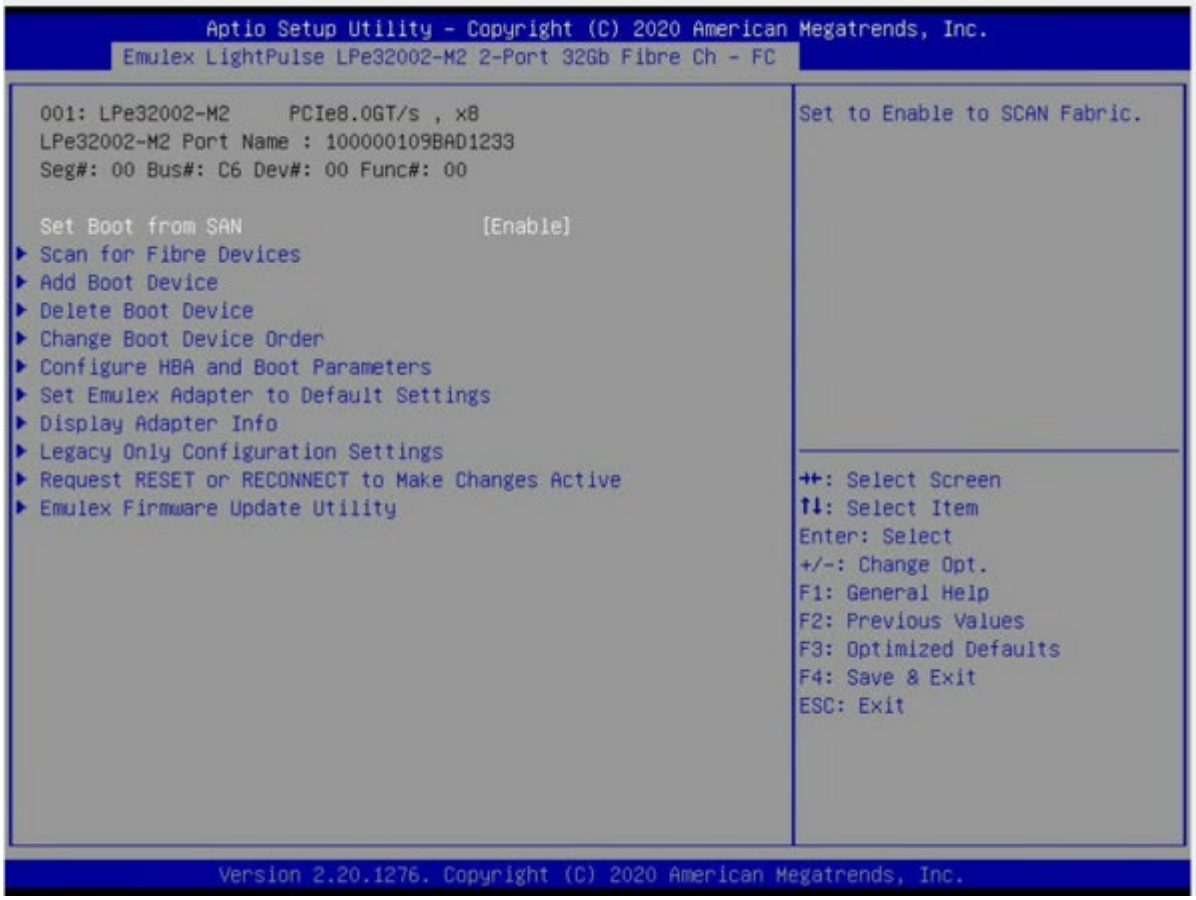
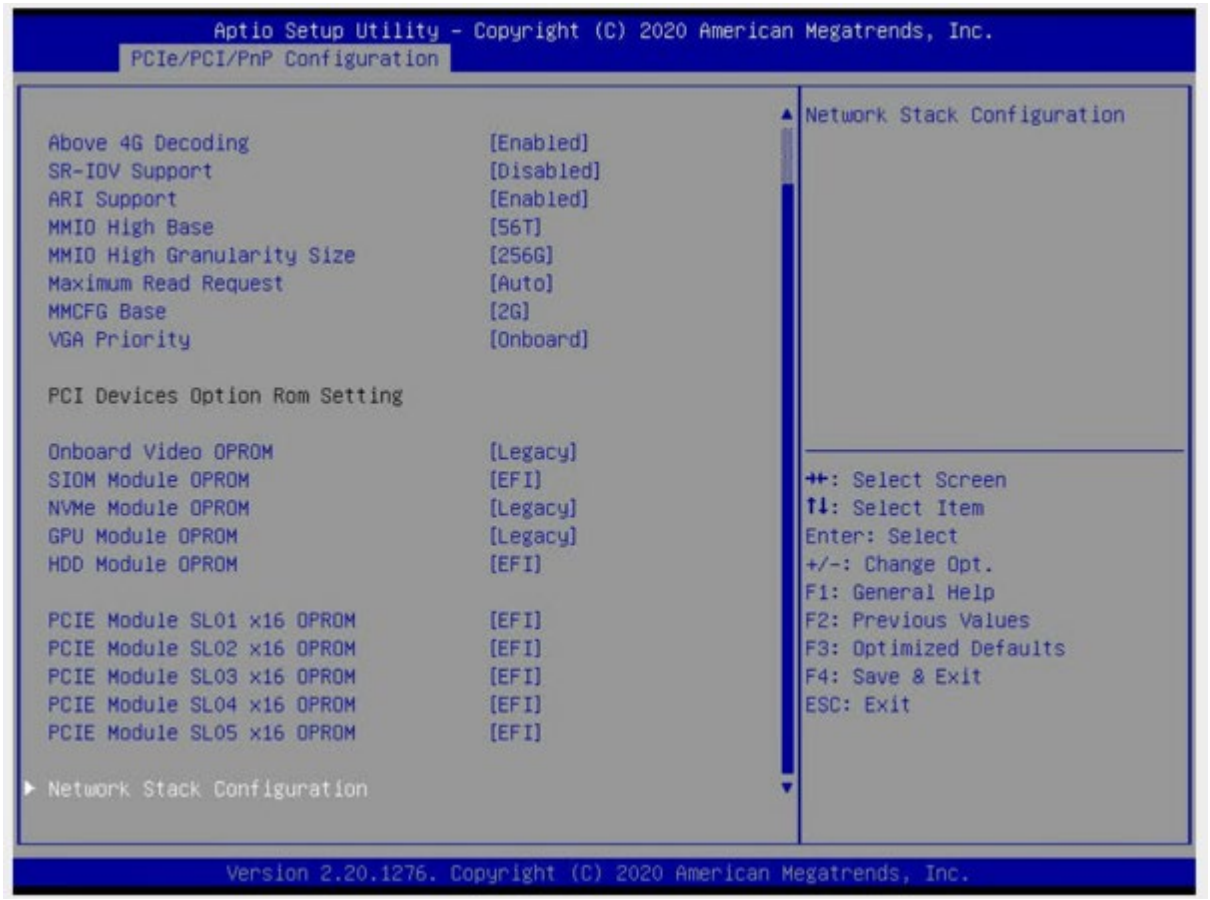
Emulex FC


Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch – FC
001: LPe32002-M2 PCIe8.0GT/s , x8
LPe32002-M2 Port Name : 100000109BAD1233
Seg#: 00 Bus#: C6 Dev#: 00 Func#: 00
Set Boot from SAN [Enable]
Scan for Fibre Devices
Add Boot Device
Delete Boot Device
Change Boot Device Order
Configure HBA and Boot Parameters
Set Emulex Adapter to Default Settings
Display Adapter Info
Legacy Only Configuration Settings
Request RESET or RECONNECT to Make Changes Active
Emulex Firmware Update Utility
Set to Enable to SCAN Fabric.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.20.1276. Copyright (C) 2020 American Megatrends, Inc.


Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
PCIe/PCI/PnP Configuration
Above 4G Decoding [Enabled]
SR-IOV Support [Disabled]
ARI Support [Enabled]
MMIO High Base [56T]
MMIO High Granularity Size [256G]
Maximum Read Request [Auto]
MMCFG Base [2G]
VGA Priority [Onboard]
PCI Devices Option Rom Setting
Onboard Video OPROM [Legacy]
SIOM Module OPROM [EFI]
NVMe Module OPROM [Legacy]
GPU Module OPROM [Legacy]
HDD Module OPROM [EFI]
PCIE Module SL01 x16 OPROM [EFI]
PCIE Module SL02 x16 OPROM [EFI]
PCIE Module SL03 x16 OPROM [EFI]
PCIE Module SL04 x16 OPROM [EFI]
PCIE Module SL05 x16 OPROM [EFI]
Network Stack Configuration
Network Stack Configuration
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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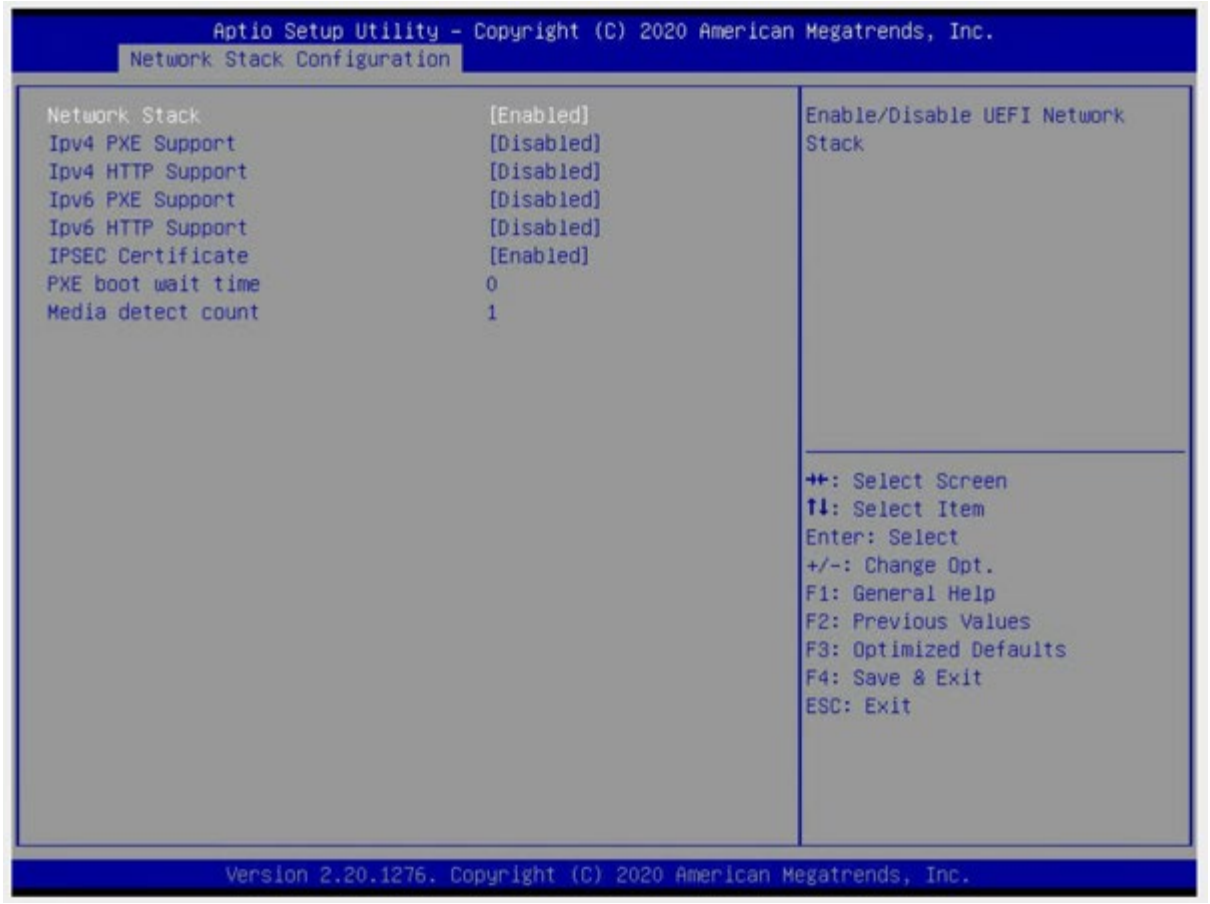
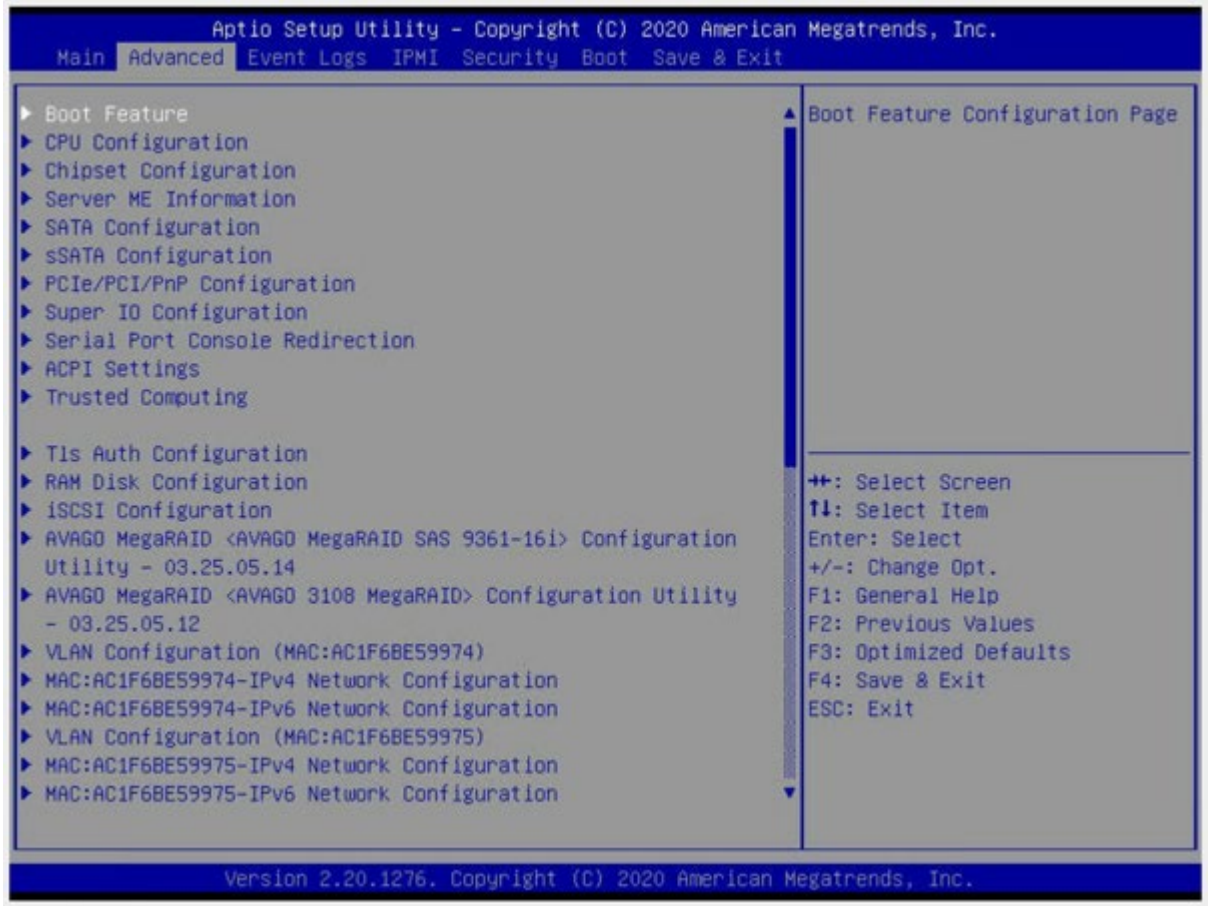
Default is enabled.



The Advanced BIOS Setup Menu screen above displays the network stack disabled. If enabled, additional PCIe devices show up here for configuration.


Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
Main Advanced Event Logs IPMI Security Boot Save & Exit
Boot Feature
CPU Configuration
Chipset Configuration
Server ME Information
SATA Configuration
sSATA Configuration
PCIe/PCI/PnP Configuration
Super IO Configuration
Serial Port Console Redirection
ACPI Settings
Trusted Computing
Tls Auth Configuration
RAM Disk Configuration
iSCSI Configuration
AVAGO MegaRAID <AVAGO MegaRAID SAS 9361-16i> Configuration Utility - 03.25.05.14
AVAGO MegaRAID <AVAGO 3108 MegaRAID> Configuration Utility - 03.25.05.12
VLAN Configuration (MAC:AC1F6BE59974)
MAC:AC1F6BE59974-IPv4 Network Configuration
MAC:AC1F6BE59974-IPv6 Network Configuration
VLAN Configuration (MAC:AC1F6BE59975)
MAC:AC1F6BE59975-IPv4 Network Configuration
MAC:AC1F6BE59975-IPv6 Network Configuration
Boot Feature Configuration Page
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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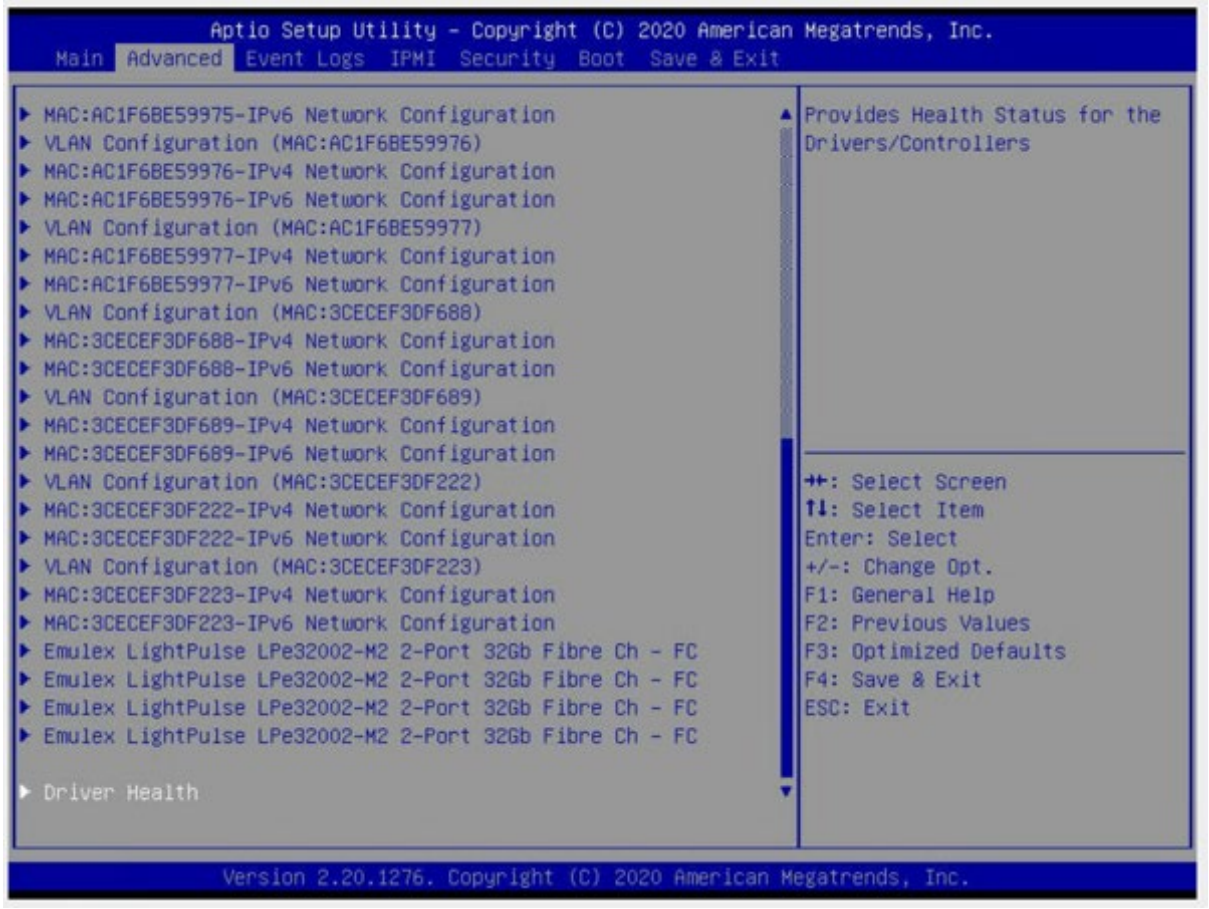
Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.
Main Advanced Event Logs IPMI Security Boot Save & Exit
MAC:AC1F6BE59975-IPv6 Network Configuration
VLAN Configuration (MAC:AC1F6BE59976)
MAC:AC1F6BE59976-IPv4 Network Configuration
MAC:AC1F6BE59976-IPv6 Network Configuration
VLAN Configuration (MAC:AC1F6BE59977)
MAC:AC1F6BE59977-IPv4 Network Configuration
MAC:AC1F6BE59977-IPv6 Network Configuration
VLAN Configuration (MAC:3CECEF3DF688)
MAC:3CECEF3DF688-IPv4 Network Configuration
MAC:3CECEF3DF688-IPv6 Network Configuration
VLAN Configuration (MAC:3CECEF3DF689)
MAC:3CECEF3DF689-IPv4 Network Configuration
MAC:3CECEF3DF689-IPv6 Network Configuration
VLAN Configuration (MAC:3CECEF3DF222)
MAC:3CECEF3DF222-IPv4 Network Configuration
MAC:3CECEF3DF222-IPv6 Network Configuration
VLAN Configuration (MAC:3CECEF3DF223)
MAC:3CECEF3DF223-IPv4 Network Configuration
MAC:3CECEF3DF223-IPv6 Network Configuration
Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch - FC
Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch - FC
Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch - FC
Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch - FC
Driver Health
Provides Health Status for the Drivers/Controllers
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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Appendix A BIOS Error Codes

A.1 BIOS Error Beep (POST) Codes

During the POST (Power-On Self-Test) routines, which are performed each time the system is powered on, errors may occur.

Non-fatal errors are those which, in most cases, allow the system to continue the boot-up process. The error messages normally appear on the screen.

Fatal errors are those which will not allow the system to continue the boot-up procedure. If a fatal error occurs, you should consult with your system manufacturer for possible repairs.

These fatal errors are usually communicated through a series of audible beeps. The numbers on the fatal error list (on the following page) correspond to the number of beeps for the corresponding error.

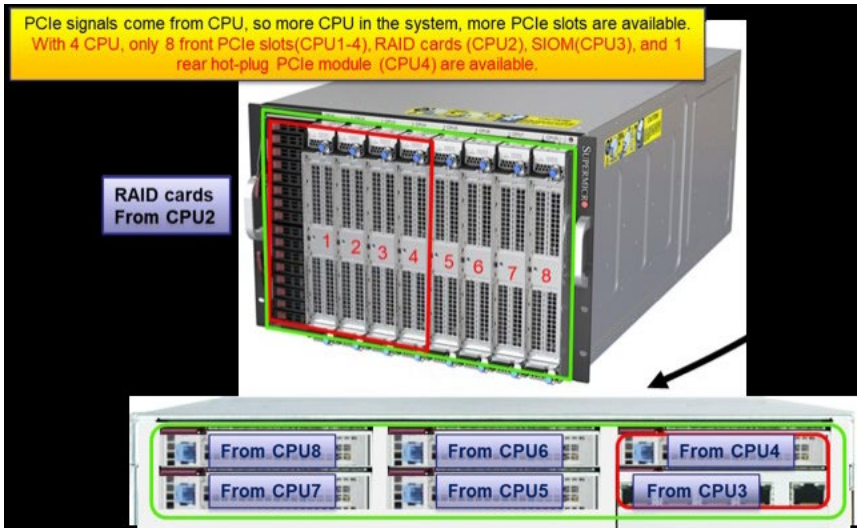
BIOS Beep (POST) Codes		
Beep Code	**Error Message**	**Description**
1 beep	Refresh	Circuits have been reset (Ready to power up)
5 short, 1 long	Memory error	No memory detected in system
5 long, 2 short	Display memory read/write error	Video adapter missing or with faulty memory
1 long continuous	System OH	System overheat condition

A.1 Additional BIOS POST Codes

When BIOS performs the Power On Self-Test, it writes checkpoint codes to I/O port 0080h. If the computer cannot complete the boot process, a diagnostic card can be attached to the computer to read I/O port 0080h.

Appendix B Networking Options with Four CPUs

CPU modules need to be populated from left to right with no gaps. CPU2 can support both RAID cards.

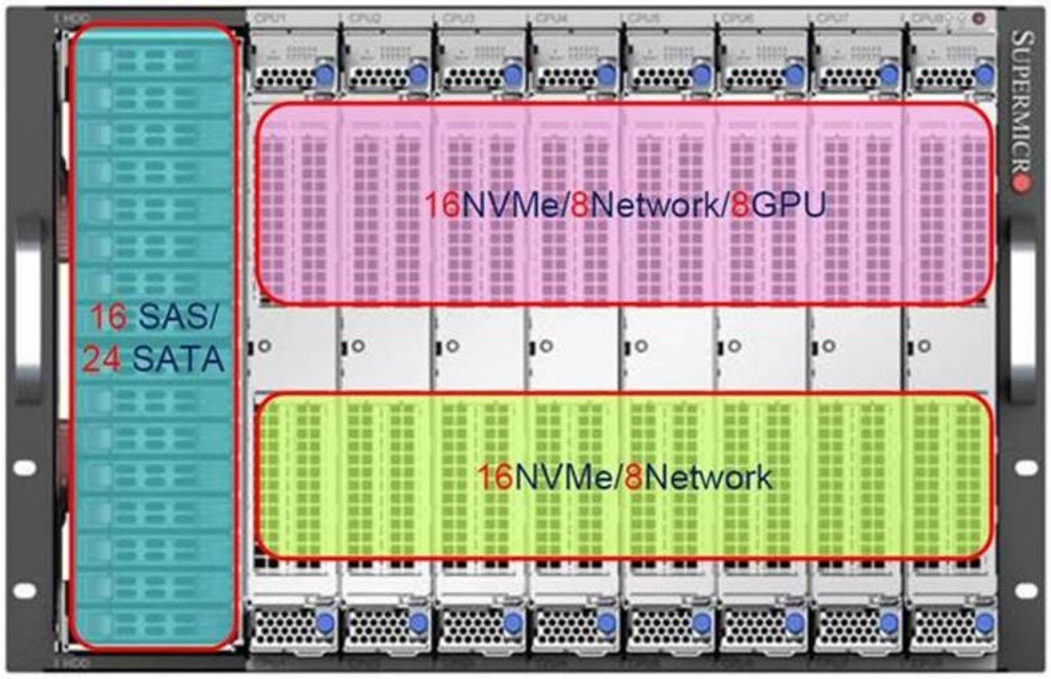


The default installation with eight CPU modules is to have five PCIe slots populated on the server rear side. In a four CPU module configuration there are only two PCIe slots available on the rear side for the quad-port 25G network card and an empty slot on the top right corner.

This means PCIe cards need to move from the rear to the front with only four CPUs installed.

From the front side of the Cisco UCS C890 M5 Rack Server, four PCIe cards are supported per CPU module: Two on the top (purple area) and two on the bottom (yellow area).

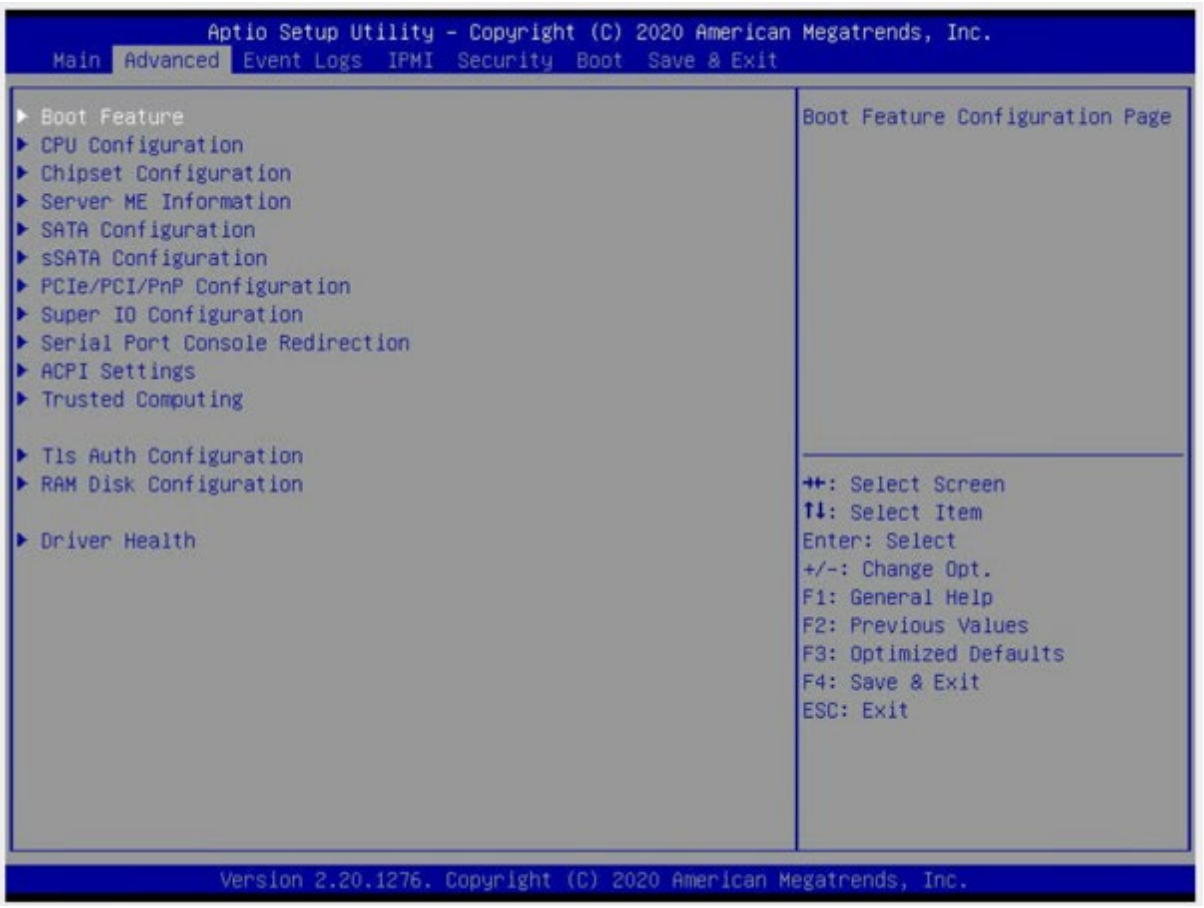
Cisco recommends installing networking PCIe cards in the bottom yellow area.



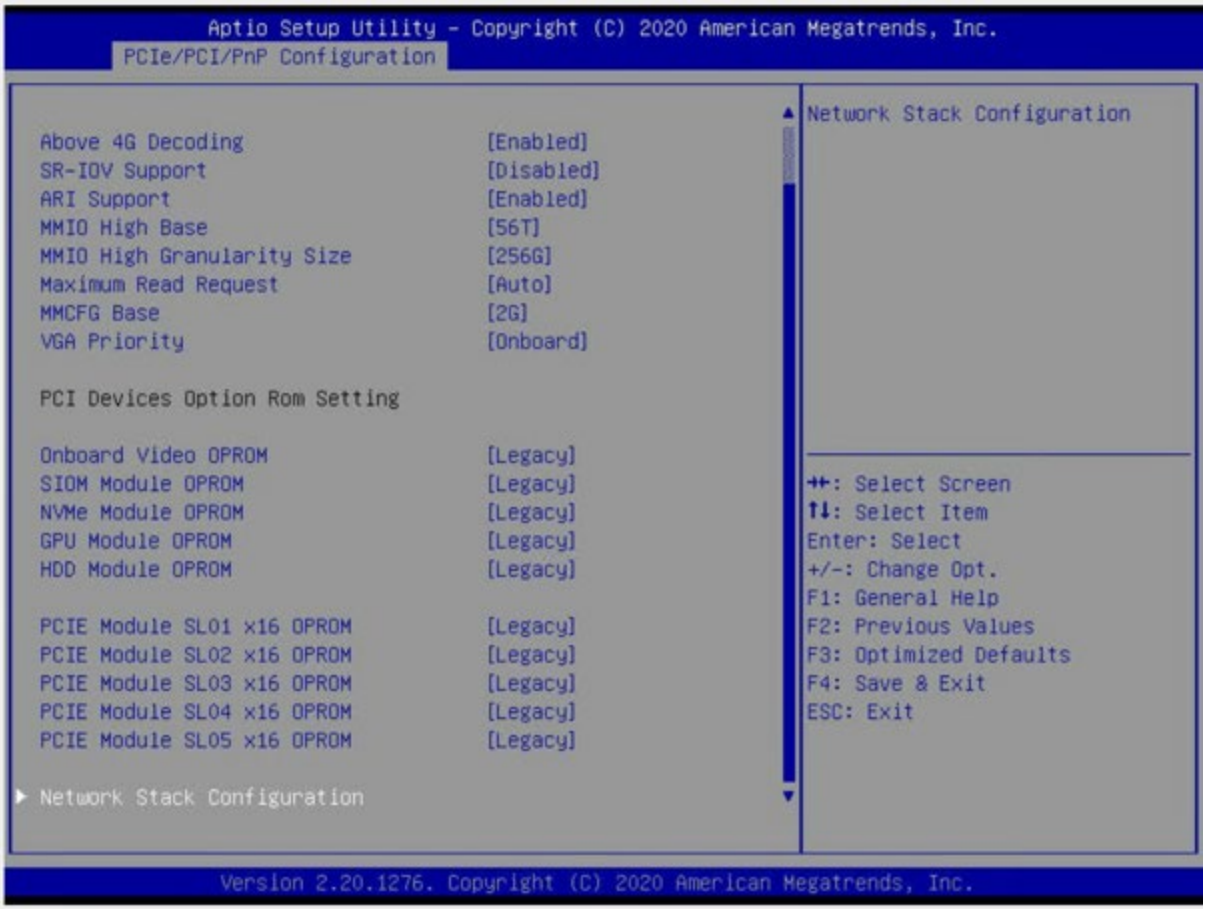
Appendix C BIOS PCIe Configuration

Factory Default – Option ROM set to Legacy

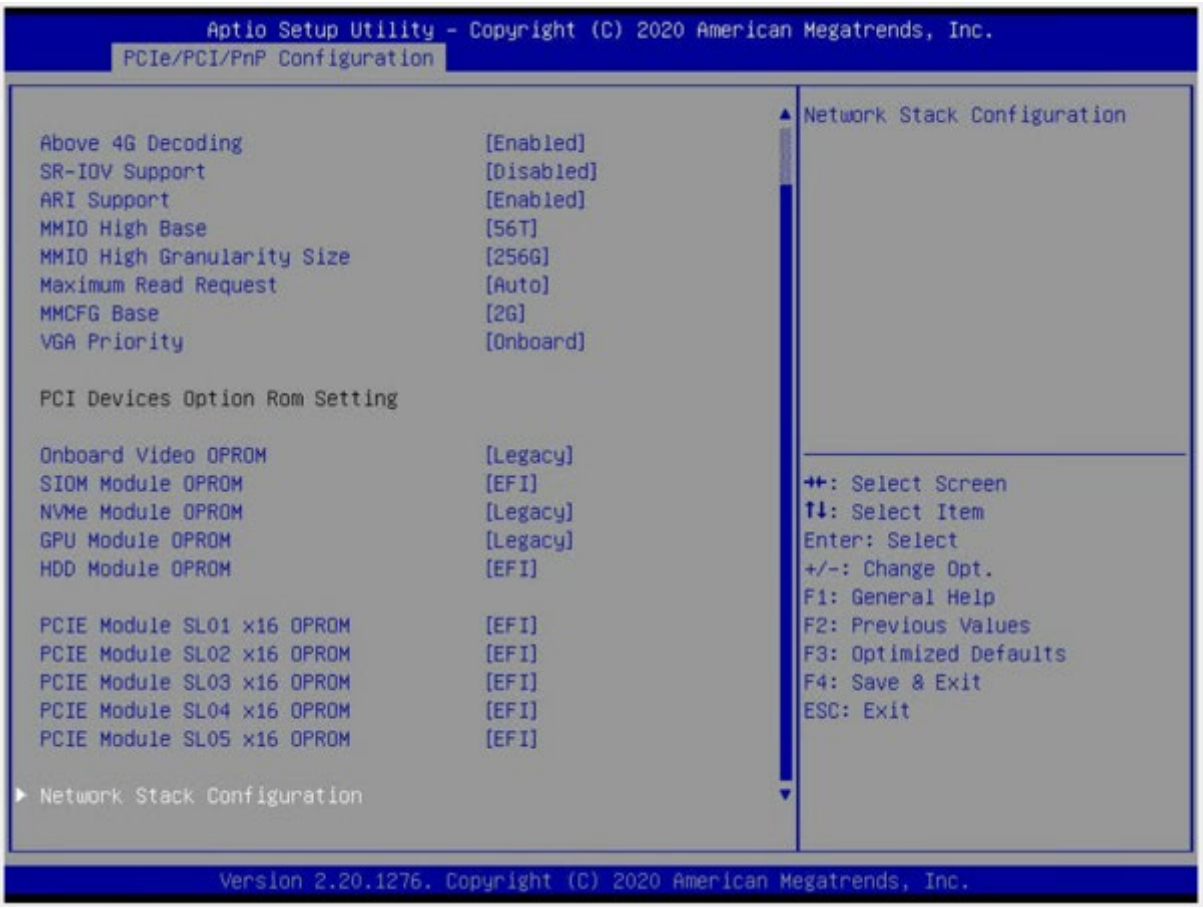
When pressing ESC during the Cisco Logo presentation to enter the Setup, the startup initializes all PCIe components prior of entering the BIOS.



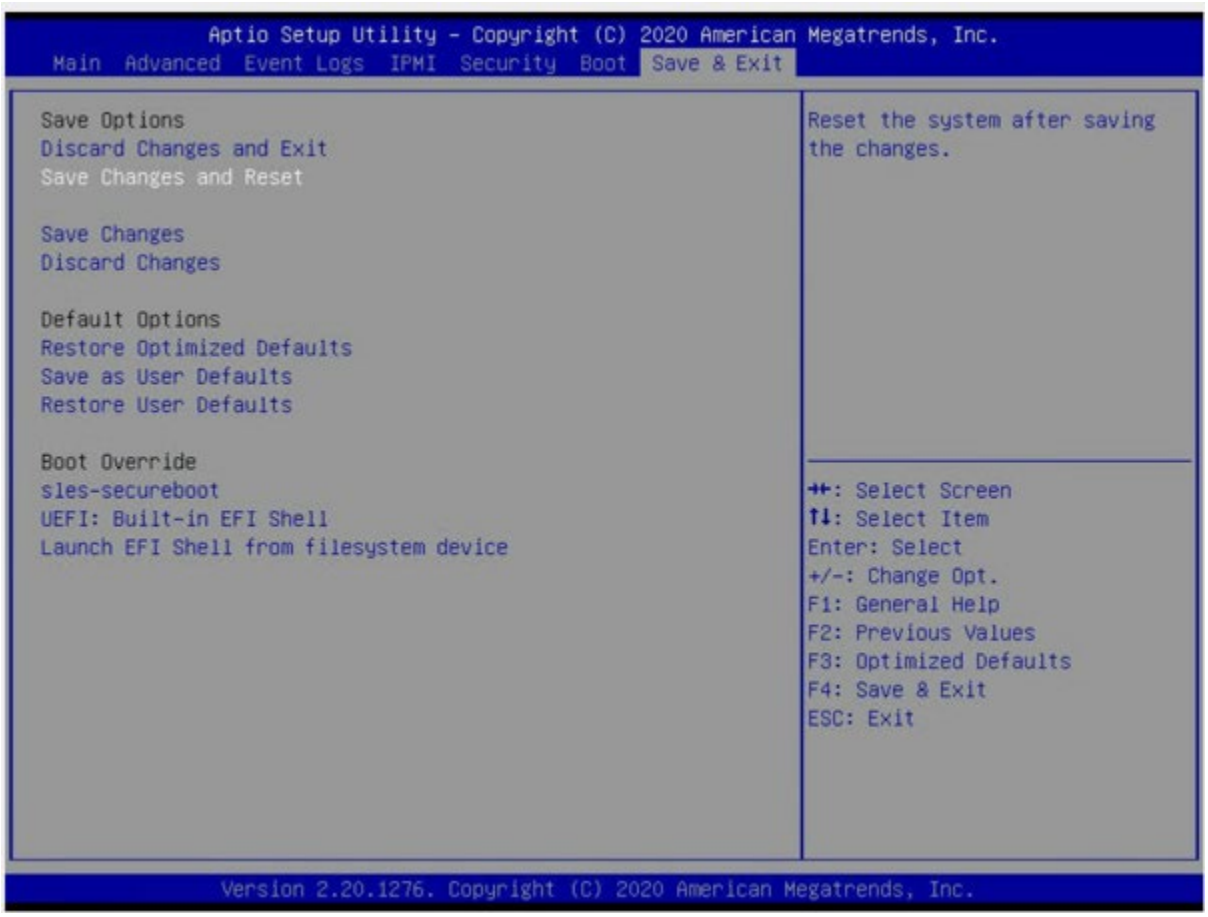
With the legacy setting, device configuration is not accessible from the Boot Setup.



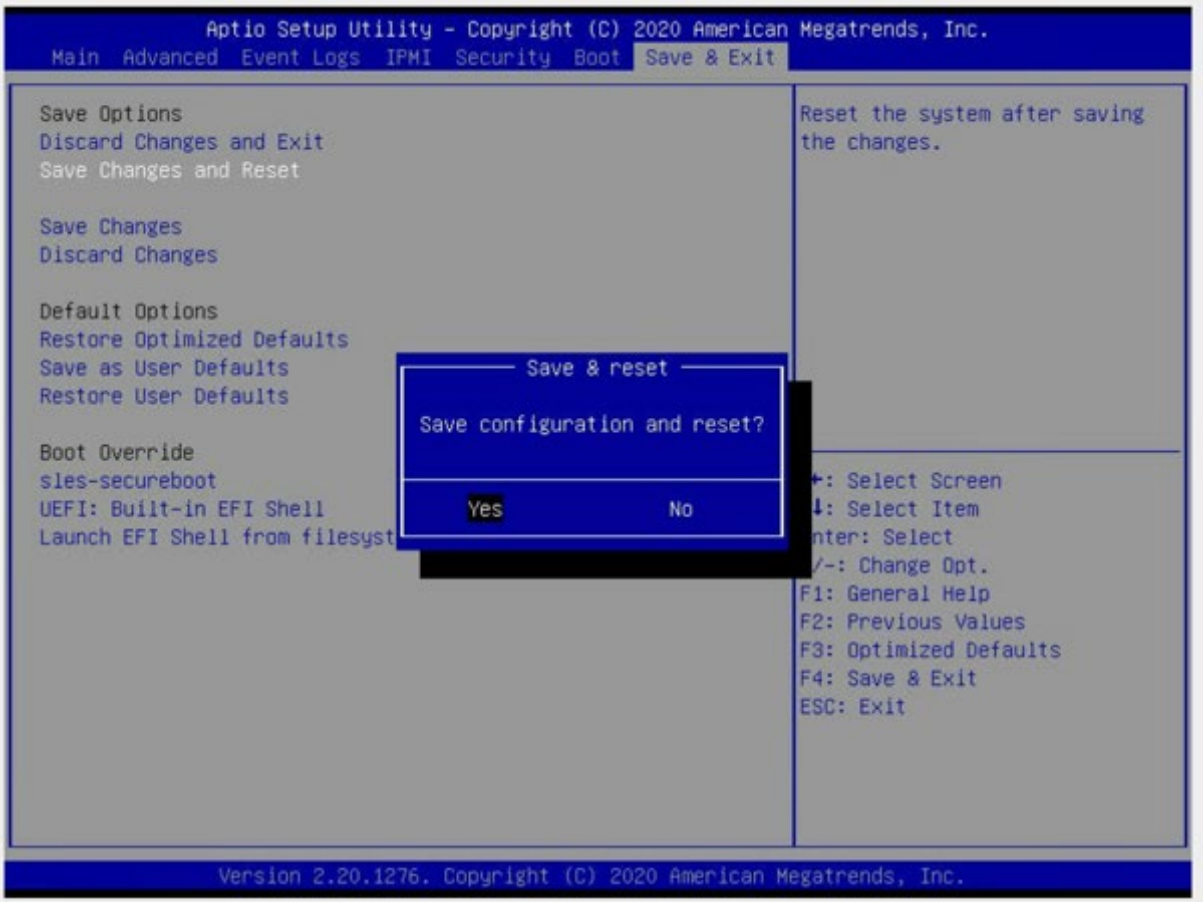
Change the Option ROM setting to EFI. Press **ESC** to return to the main screen.



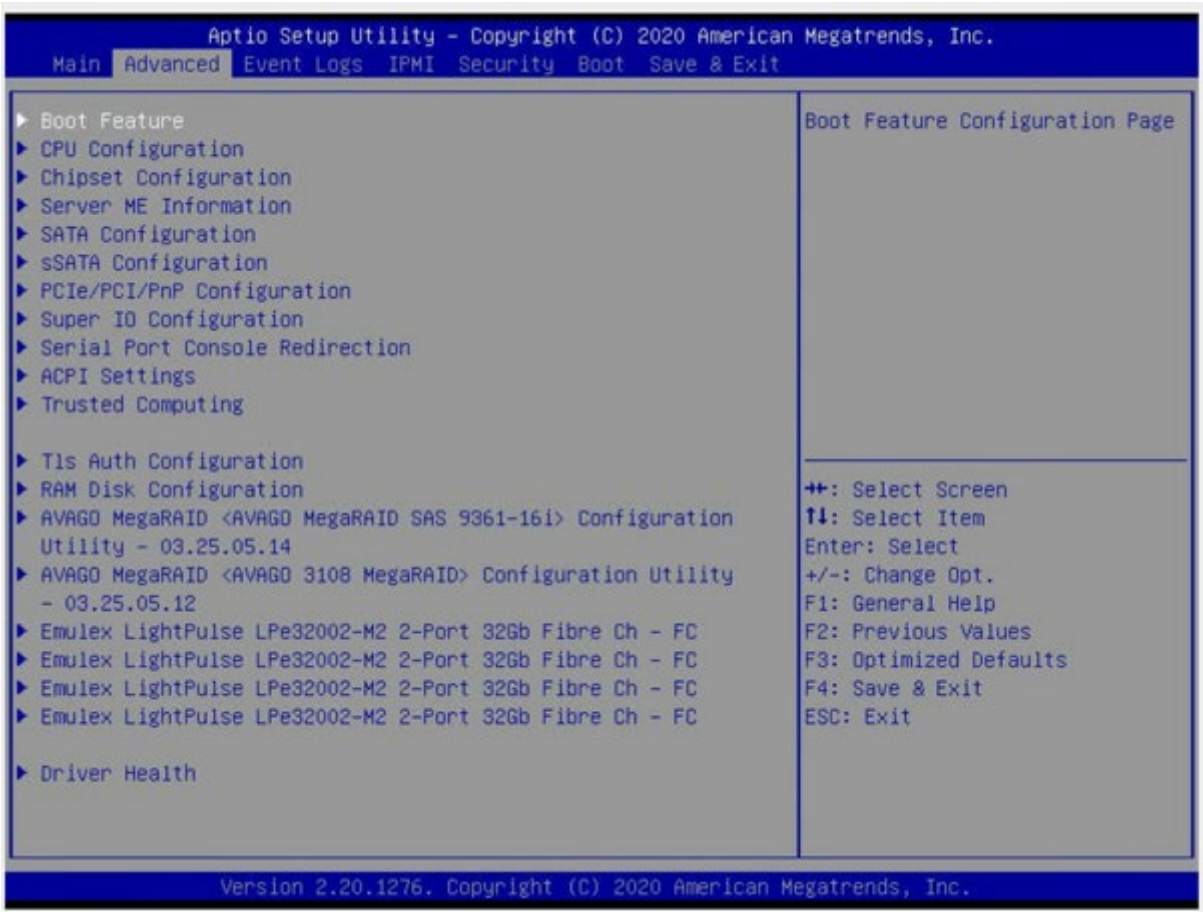
Save changes and Reset.



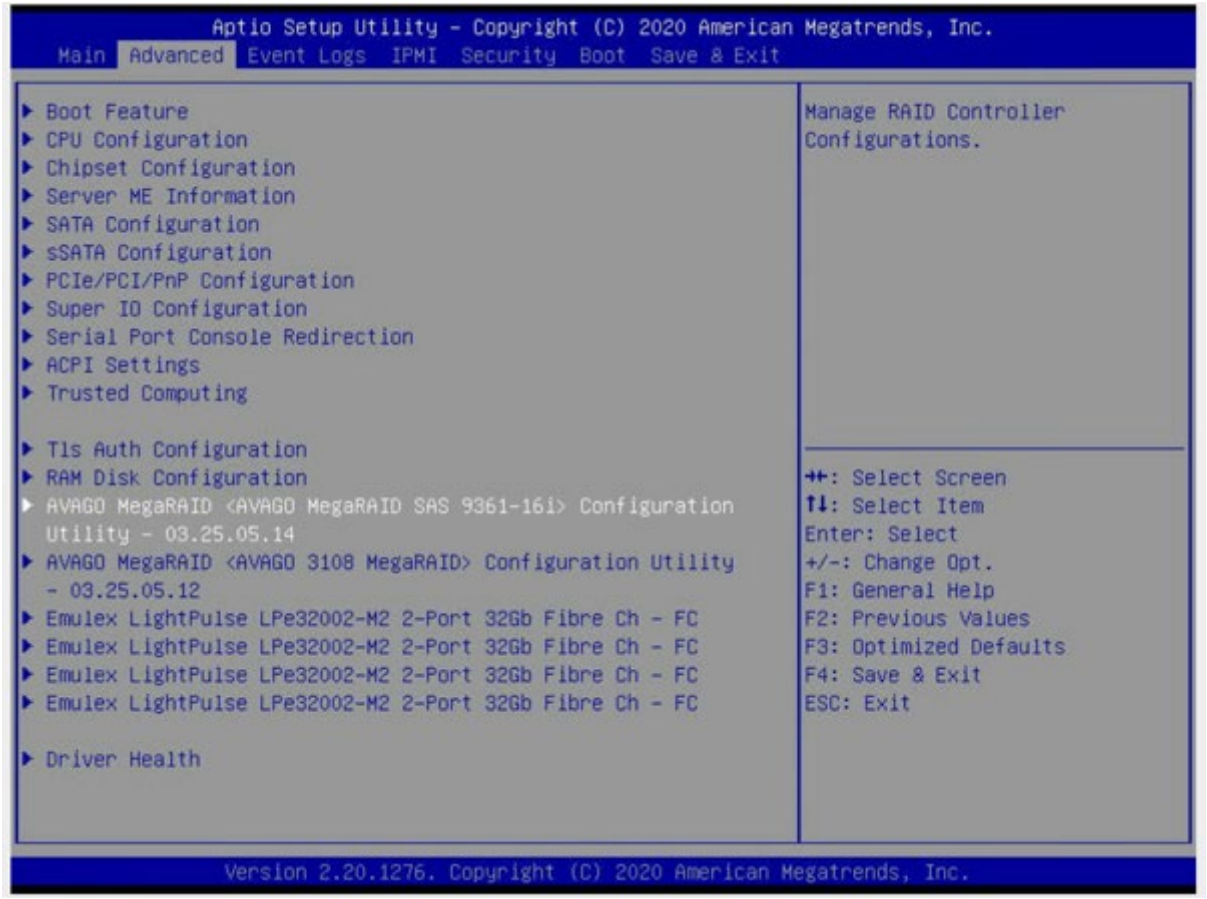
Confirm by selecting yes.



Enter the BIOS again. The Logo stays on the screen until cards are initialized and the BIOS setup opens. The BIOS Setup Advanced screen changes (compare with the screenshot above) and lists the PCIe devices.



AVAGO MegaRAID 9361 Config Utility Description is the same as with the Config Utility you can enter in legacy mode.


Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
Main Advanced Event Logs IPMI Security Boot Save & Exit
Boot Feature
CPU Configuration
Chipset Configuration
Server ME Information
SATA Configuration
sSATA Configuration
PCIe/PCI/PnP Configuration
Super IO Configuration
Serial Port Console Redirection
ACPI Settings
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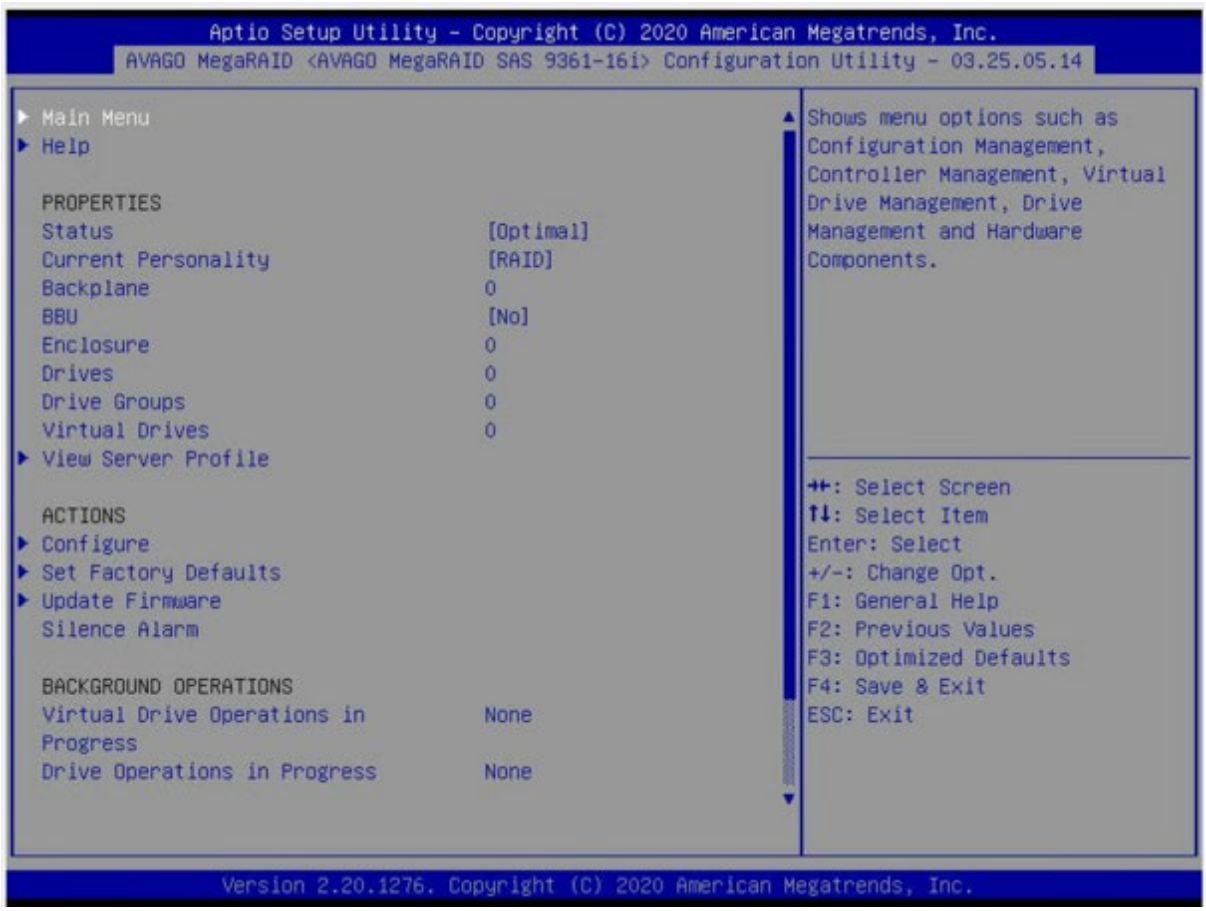
Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch - FC
Driver Health
Manage RAID Controller Configurations.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.20.1276. Copyright (C) 2020 American Megatrends, Inc.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AVAGO MegaRAID <AVAGO MegaRAID SAS 9361-16i> Configuration Utility - 03.25.05.14
Main Menu
Help
PROPERTIES
Status [Optimal]
Current Personality [RAID]
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BBU [No]
Enclosure 0
Drives 0
Drive Groups 0
Virtual Drives 0
View Server Profile
ACTIONS
Configure
Set Factory Defaults
Update Firmware
Silence Alarm
BACKGROUND OPERATIONS
Virtual Drive Operations in Progress None
Drive Operations in Progress None
Shows menu options such as Configuration Management, Controller Management, Virtual Drive Management, Drive Management and Hardware Components.
→←: Select Screen
↑↓: Select Item
Enter: Select
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F1: General Help
F2: Previous Values
F3: Optimized Defaults
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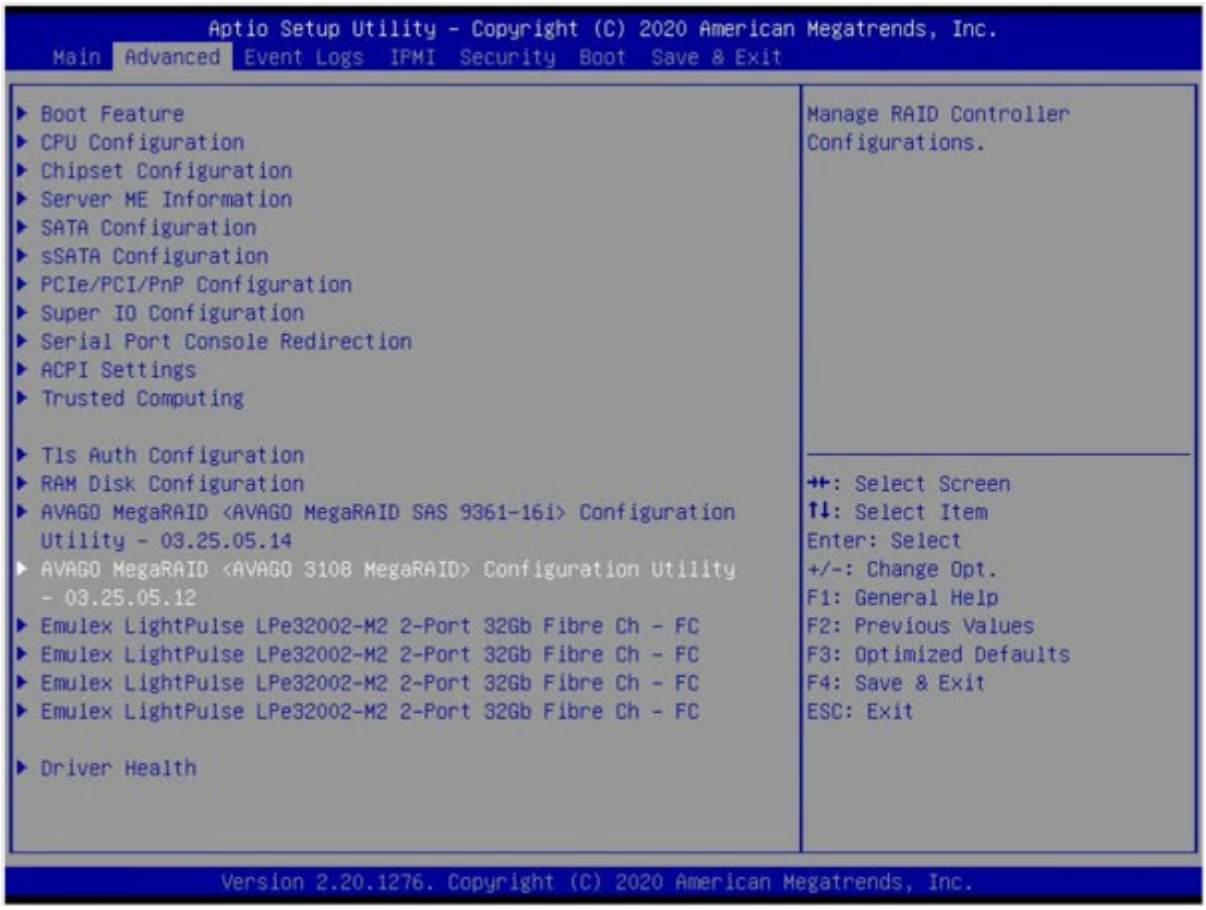
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Main Advanced Event Logs IPMI Security Boot Save & Exit
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Super IO Configuration
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ACPI Settings
Trusted Computing
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Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch - FC
Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch - FC
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↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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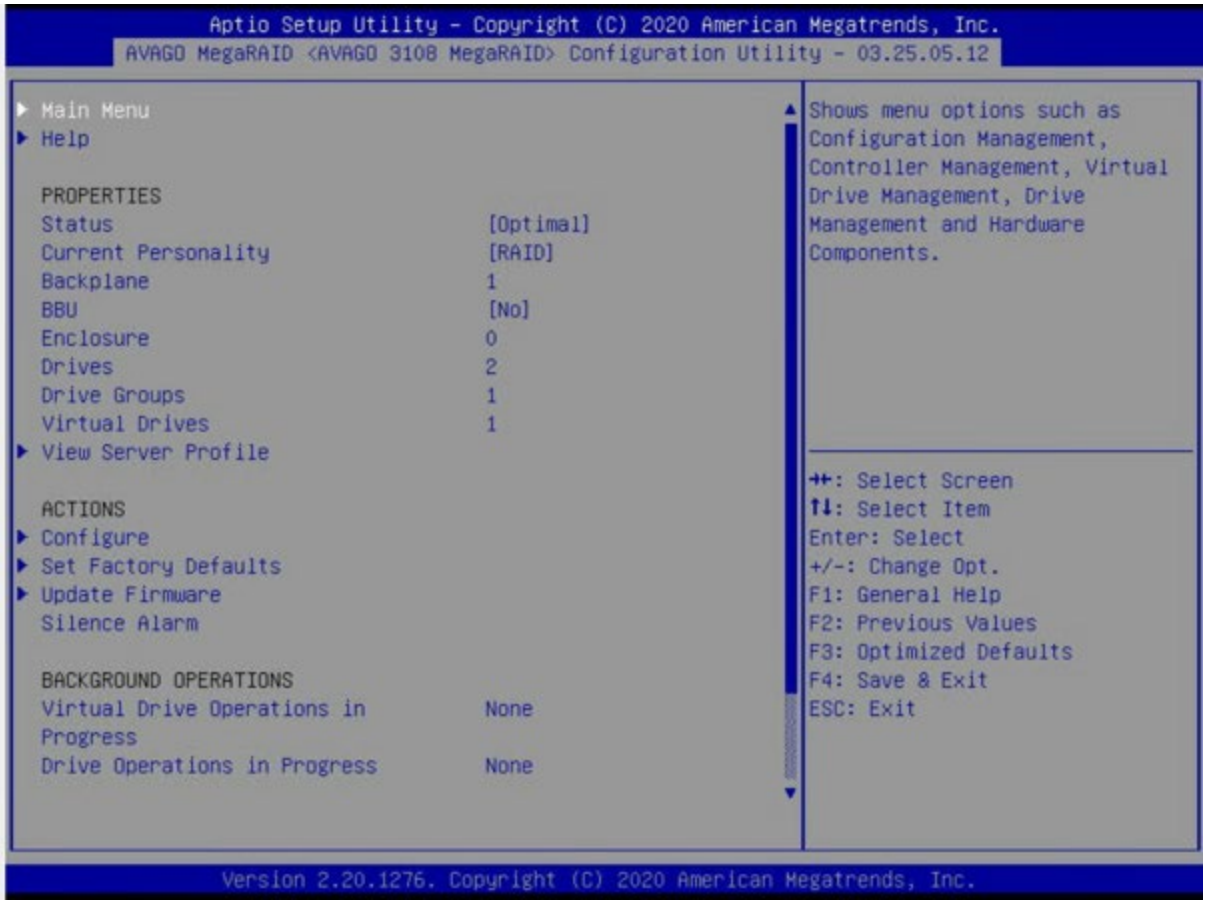
Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
AVAGO MegaRAID <AVAGO 3108 MegaRAID> Configuration Utility – 03.25.05.12
Main Menu
Help
PROPERTIES
Status [Optimal]
Current Personality [RAID]
Backplane 1
BBU [No]
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Set Factory Defaults
Update Firmware
Silence Alarm
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Virtual Drive Operations in Progress None
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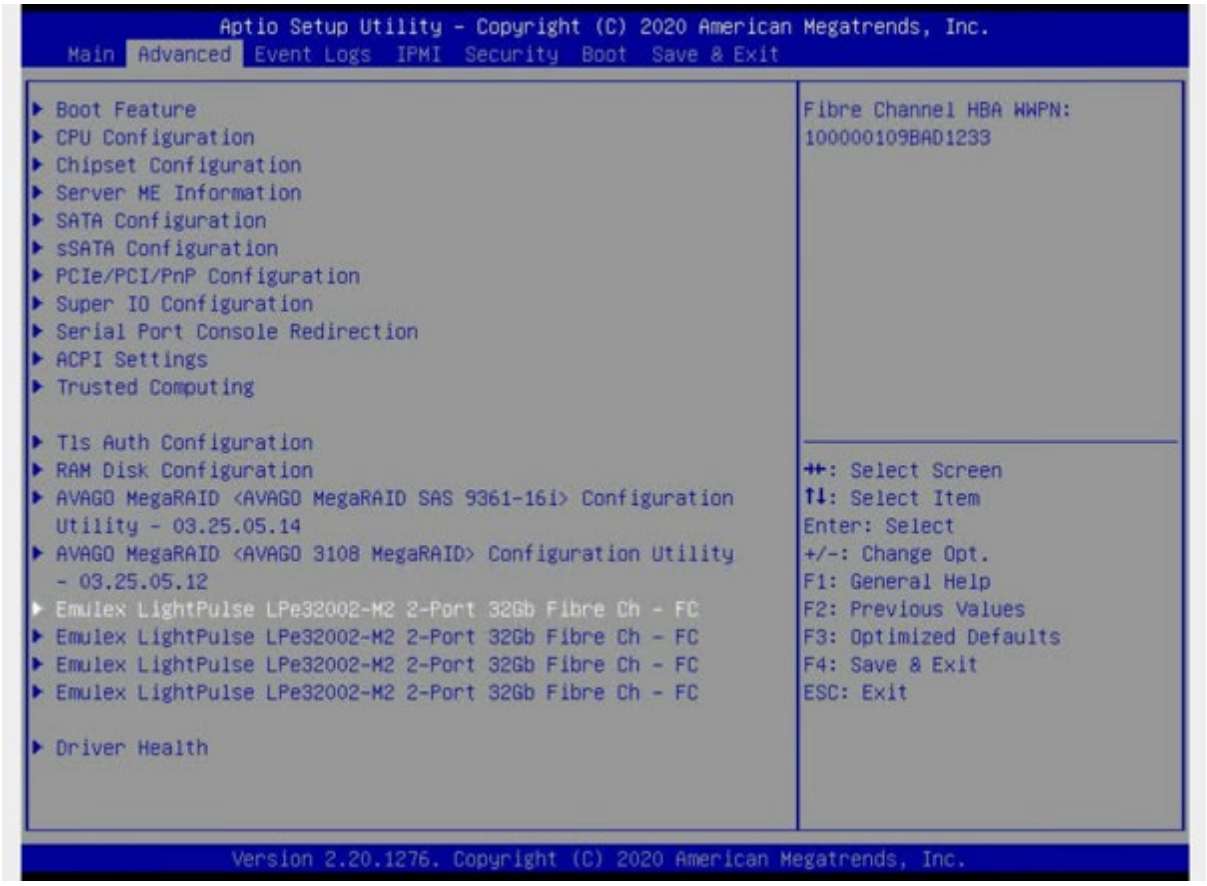
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Chipset Configuration
Server ME Information
SATA Configuration
sSATA Configuration
PCIe/PCI/PnP Configuration
Super IO Configuration
Serial Port Console Redirection
ACPI Settings
Trusted Computing
Tls Auth Configuration
RAM Disk Configuration
AVAGO MegaRAID <AVAGO MegaRAID SAS 9361-16i> Configuration Utility - 03.25.05.14
AVAGO MegaRAID <AVAGO 3108 MegaRAID> Configuration Utility - 03.25.05.12
Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch - FC
Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch - FC
Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch - FC
Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch - FC
Driver Health
Fibre Channel HBA WWPN:
100000109BAD1233
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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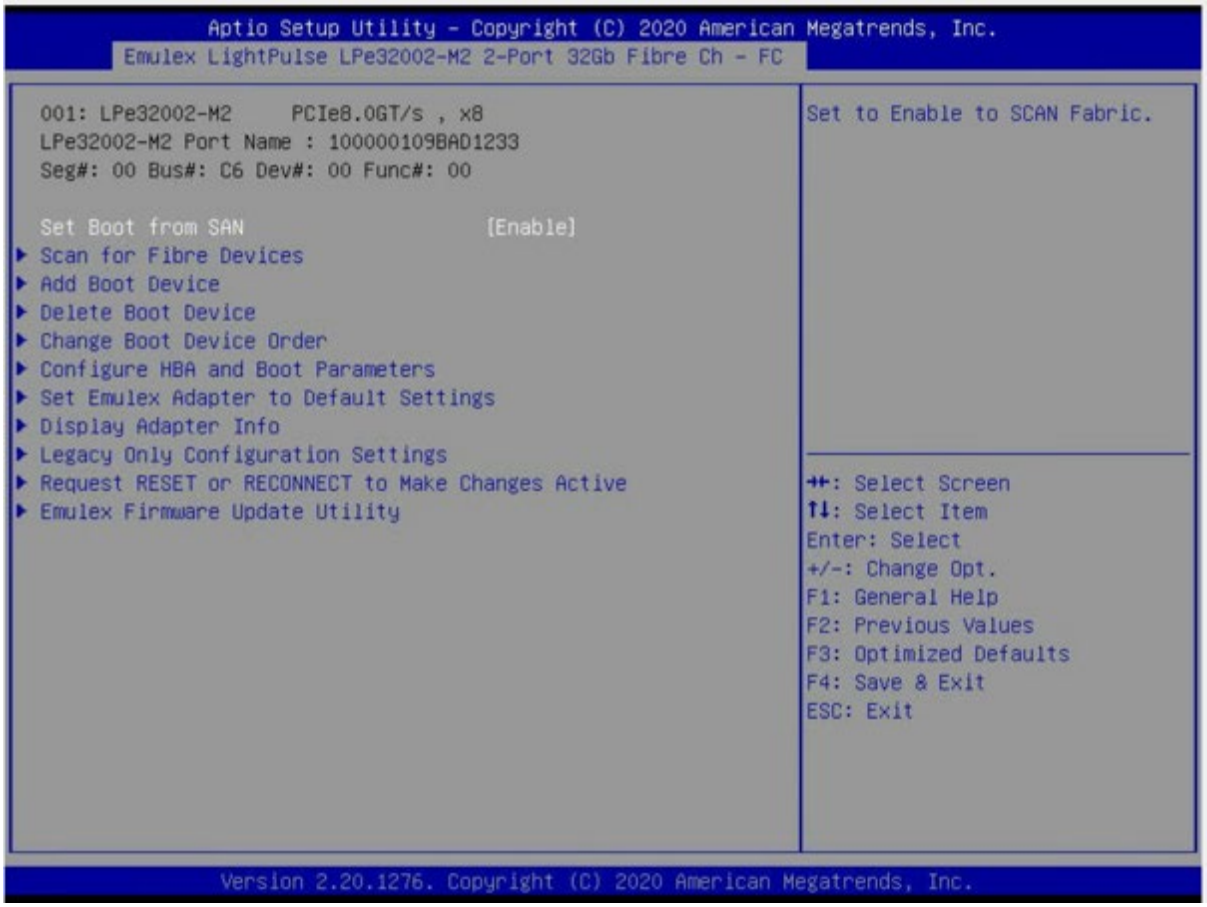
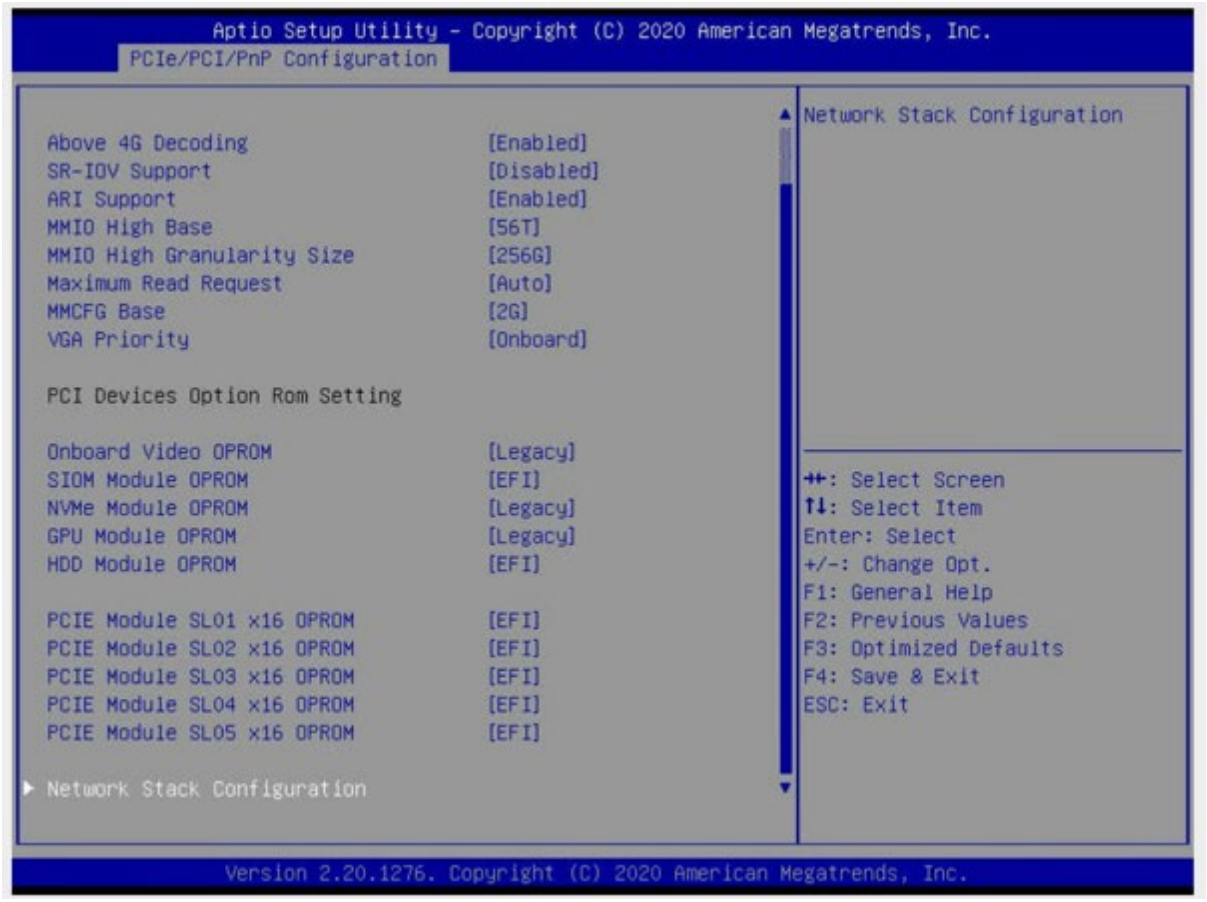
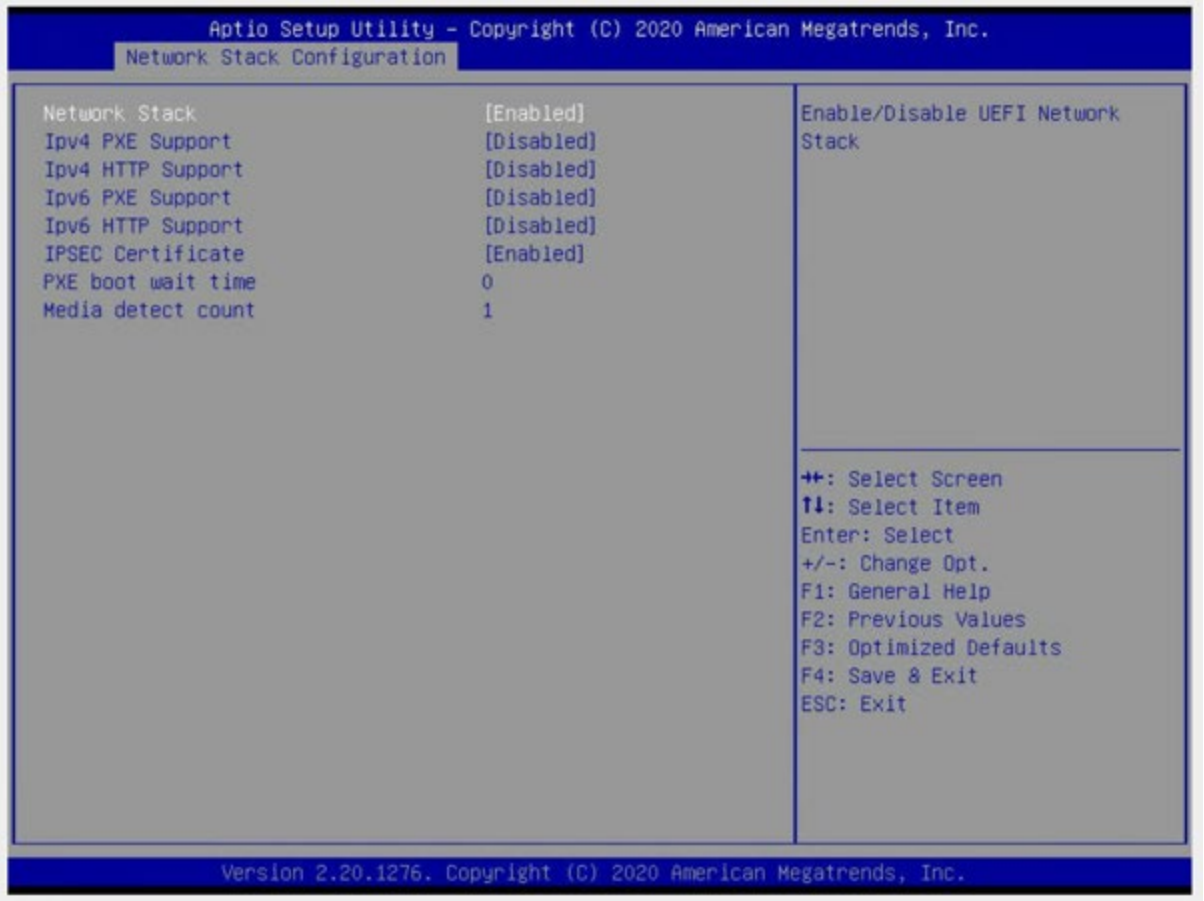


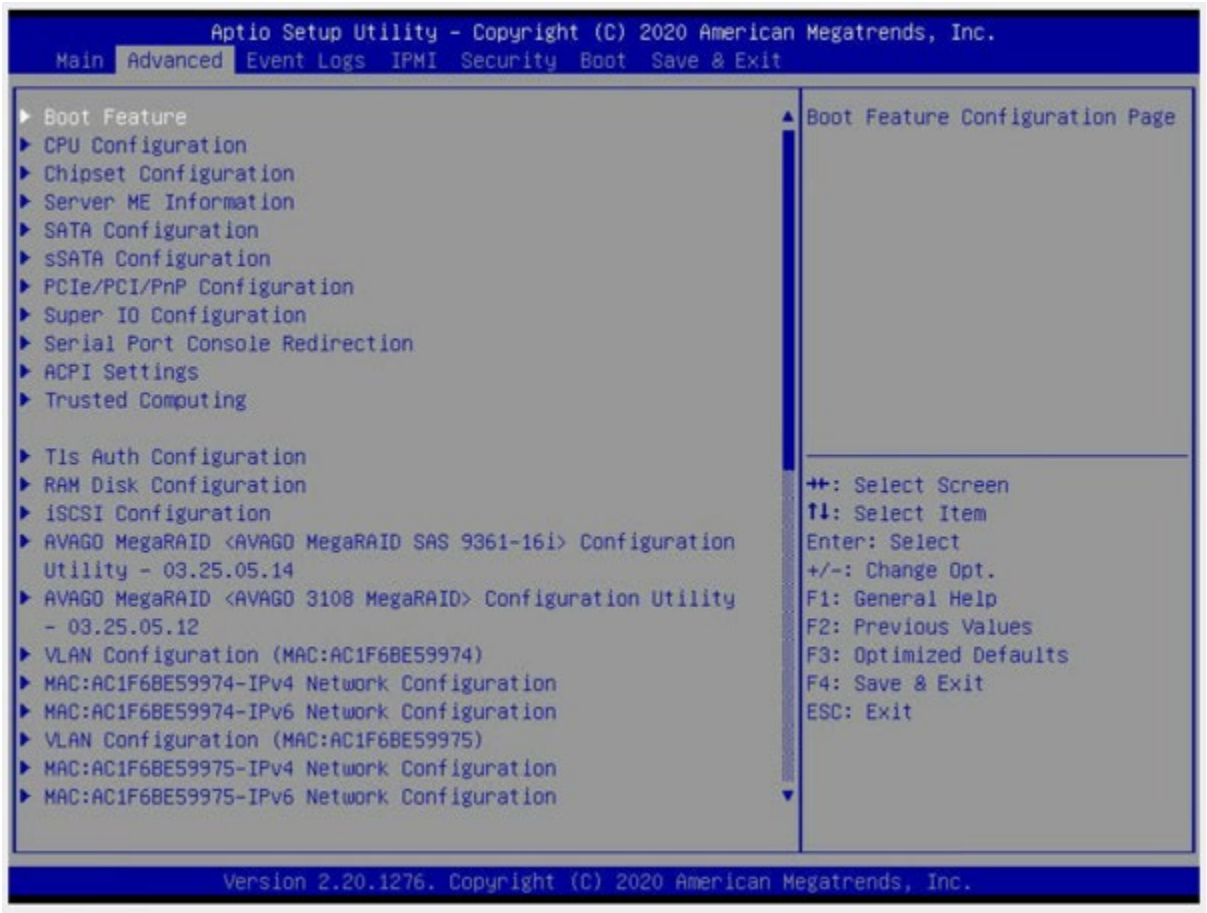
Another default setting is in regards the network stack in the PCIE section.



Default is enabled.



The Advanced BIOS Setup Menu screen shots above show the network stack disabled. If enabled like the default, additional PCIe devices show up here for configuration.


Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
Main Advanced Event Logs IPMI Security Boot Save & Exit
Boot Feature
CPU Configuration
Chipset Configuration
Server ME Information
SATA Configuration
sSATA Configuration
PCIe/PCI/PnP Configuration
Super IO Configuration
Serial Port Console Redirection
ACPI Settings
Trusted Computing
Tls Auth Configuration
RAM Disk Configuration
iSCSI Configuration
AVAGO MegaRAID <AVAGO MegaRAID SAS 9361-16i> Configuration Utility - 03.25.05.14
AVAGO MegaRAID <AVAGO 3108 MegaRAID> Configuration Utility - 03.25.05.12
VLAN Configuration (MAC:AC1F6BE59974)
MAC:AC1F6BE59974-IPv4 Network Configuration
MAC:AC1F6BE59974-IPv6 Network Configuration
VLAN Configuration (MAC:AC1F6BE59975)
MAC:AC1F6BE59975-IPv4 Network Configuration
MAC:AC1F6BE59975-IPv6 Network Configuration
Boot Feature Configuration Page
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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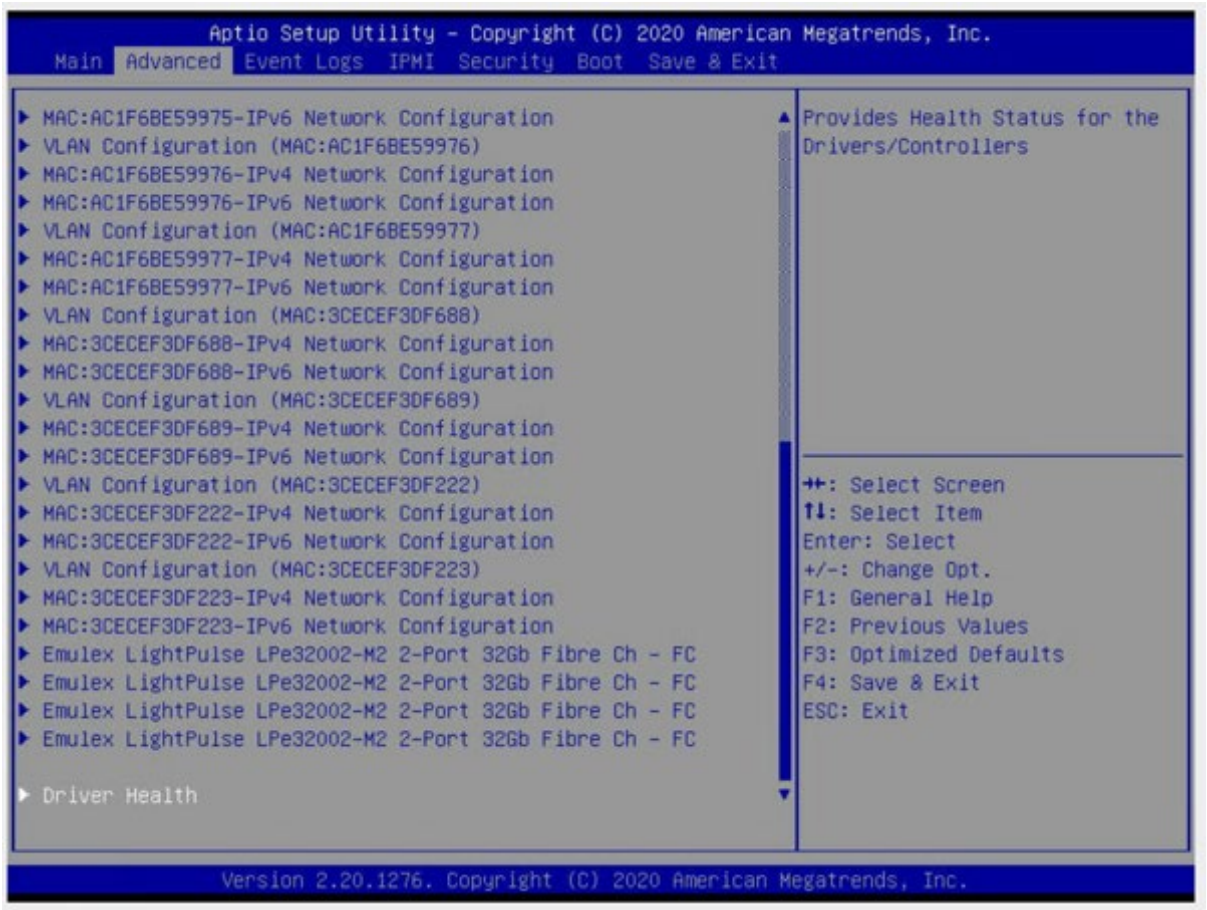
Aptio Setup Utility – Copyright (C) 2020 American Megatrends, Inc.
Main Advanced Event Logs IPMI Security Boot Save & Exit
MAC:AC1F6BE59975-IPv6 Network Configuration
VLAN Configuration (MAC:AC1F6BE59976)
MAC:AC1F6BE59976-IPv4 Network Configuration
MAC:AC1F6BE59976-IPv6 Network Configuration
VLAN Configuration (MAC:AC1F6BE59977)
MAC:AC1F6BE59977-IPv4 Network Configuration
MAC:AC1F6BE59977-IPv6 Network Configuration
VLAN Configuration (MAC:3CECEF3DF688)
MAC:3CECEF3DF688-IPv4 Network Configuration
MAC:3CECEF3DF688-IPv6 Network Configuration
VLAN Configuration (MAC:3CECEF3DF689)
MAC:3CECEF3DF689-IPv4 Network Configuration
MAC:3CECEF3DF689-IPv6 Network Configuration
VLAN Configuration (MAC:3CECEF3DF222)
MAC:3CECEF3DF222-IPv4 Network Configuration
MAC:3CECEF3DF222-IPv6 Network Configuration
VLAN Configuration (MAC:3CECEF3DF223)
MAC:3CECEF3DF223-IPv4 Network Configuration
MAC:3CECEF3DF223-IPv6 Network Configuration
Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch - FC
Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch - FC
Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch - FC
Emulex LightPulse LPe32002-M2 2-Port 32Gb Fibre Ch - FC
Driver Health
Provides Health Status for the Drivers/Controllers
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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