Netberg Demos R420
M2 server. User manual.

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Table of Contents

List of Figures

List of Tables

Chapter 1. Safety Information

1.1. Conventions

Several different typographic conventions are used throughout this manual. Refer to the following examples for common usage.

Bold type face denotes menu items, buttons and application names.

Italic type face denotes references to other sections, and the names of the folders, menus, programs, and files.

`<Enter>` type face denotes keyboard keys.

Warning information appears before the text it references and should not be ignored as the content may prevent damage to the device.

CAUTIONS APPEAR BEFORE THE TEXT IT REFERENCES, SIMILAR TO NOTES AND WARNINGS. CAUTIONS, HOWEVER, APPEAR IN CAPITAL LETTERS AND CONTAIN VITAL HEALTH AND SAFETY INFORMATION.

Indicates information that is important to know for the proper completion of a procedure, choice of an option, or completing a task.

Highlights general or useful information and tips.

1.2. Acronyms

Word	Definition
A/D	Analog to Digital
ACPI	Advanced Configuration and Power Interface
ASF	Alerting Standard Forum
Asserted	Active-high (positive true) signals are asserted when in the high electrical state (near power potential). Active-low (negative true) signals are asserted when in the low electrical state (near ground potential).
BIOS	Basic Input/Output System
BIST	Built-In Self Test
BMC	At the heart of the IPMI architecture is a microcontroller called the Baseboard management controller (BMC)
Bridge	Circuitry connecting one computer bus to another, allowing an agent on one to access the other
BSP	Bootstrap processor
Byte	8-bit quantity
CLI	Command Line Interface
CMOS	In terms of this specification, this describes the PC-AT compatible region of battery-backed 128 bytes of memory, which normally resides on the base-board
CPU	Central Processing Unit
Deasserted	A signal is deasserted when in the inactive state. Active-low signal names have "_L" appended to the end of the signal mnemonic. Active-high signal names have no "_L" suffix. To reduce confusion when referring to active-high and active-low signals, the terms one/zero, high/low, and true/false are not used when describing signal states.
DTC	Data Transfer Controller
EEPROM	Electrically Erasable Programmable Read-Only Memory
EMP	Emergency Management Port
FRU	Field Replaceable Unit
GB	1024 MB.
GPIO	General Purpose Input/Out
HSC	Hot-Swap Controller
Hz	Hertz (1 cycle/second)
I2C	Inter-Integrated Circuit bus
IANA	Internet Assigned Numbers Authority
IBF	Input buffer
ICH	I/O Controller Hub

Word	Definition
ICMB	Intelligent Chassis Management Bus
IERR	Internal Error
IP	Internet Protocol
IPMB	Intelligent Platform Management Bus
IPMI	Intelligent Platform Management Interface
ITP	In-Target Probe
KB	1024 bytes.
KCS	Keyboard Controller Style
KVM	Keyboard, Video, Mouse
LAN	Local Area Network
LCD	Liquid Crystal Display
LCT	Lower Critical Threshold
LED	Light Emitting Diode
LNCT	Lower Non-Critical Threshold
LNRT	Lower Non-Recoverable Threshold
LPC	Low Pin Count
LSI	Large Scale Integration
LUN	Logical Unit Number
MAC	Media Access Control
MB	1024 KB
MD2	Message Digest 2 - Hashing Algorithm
MD5	Message Digest 5 - Hashing Algorithm - Higher Security
Ms	Milliseconds
Mux	Multiplexer
NIC	Network Interface Card
NMI	Nonmaskable Interrupt
NM	Node Management
OBF	Output buffer
OEM	Original Equipment Manufacturer
Ohm	Unit of electrical resistance
PDB	Power Distribution Board
PEF	Platform Event Filtering
PEP	Platform Event Paging
PERR	Parity Error
POH	Power-On Hours

Word	Definition
POST	Power-On Self Test
PWM	Pulse Width Modulation
RAC	Remote Access Card
RAM	Random Access Memory
RMCP	Remote Management Control Protocol
ROM	Read Only Memory
RTC	Real-Time Clock. Component of the chipset on the baseboard.
RTOS	Real Time Operation System
SCI	Serial Communication Interface
SDC	SCSI Daughter Card
SDR	Sensor Data Record
SEEPROM	Serial Electrically Erasable Programmable Read-Only Memory
SEL	System Event Log
SERR	System Error
SMBus	A two-wire interface based on the I2C protocol. The SMBus is a low-speed bus that provides positive addressing for devices, as well as bus arbitration
SMI	Server Management Interrupt. SMI is the highest priority nonmaskable interrupt
SMM	Server Management Mode
SMS	Server Management Software
SNMP	Simple Network Management Protocol
SOL	Serial Over LAN
UART	Universal Asynchronous Receiver/Transmitter
UCT	Upper Critical Threshold
UDP	User Datagram Protocol
UNCT	Upper Non-Critical Threshold
UNRT	Upper Non-Recoverable Threshold
WDT	Watchdog Timer
Word	16-bit quantity

1.3. Safety Information

1.3.1. Important Safety Instructions

Read all caution and safety statements in this document before performing any of the instructions.

Warnings

Heed safety instructions: Before working with the server, whether using this manual or any other resource as a reference, pay close attention to the safety instructions. Adhere to the assembly instructions in this manual to ensure and maintain compliance with existing product certifications and approvals. Use only the described, regulated components specified in this manual. Use of other products / components will void the UL listing and other regulatory approvals of the product and will most likely result in non-compliance with product regulations in the region(s) in which the product is sold.

System power on/off: The power button DOES NOT turn off the system AC power. To remove power from system, you must unplug the AC power cord from the wall outlet. Make sure the AC power cord is unplugged before opening the chassis, adding, or removing any components.

Hazardous conditions, devices and cables: Hazardous electrical conditions may be present on power, telephone, and communication cables. Turn off the server and disconnect the power cord, telecommunications systems, networks, and modems attached to the server before opening it. Otherwise, personal injury or equipment damage can result.

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

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

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

1.4. Disclaimer

The information in this document is subject to change without notice. The manufacturer makes no representations or warranties with respect to the contents hereof and specifically disclaims any implied warranties of merchantability or fitness for any particular purpose. Furthermore, the manufacturer reserves the right to revise this publication and to make changes from time to time in the content hereof without obligation of the manufacturer to notify any person of such revision or changes.

For the latest information and updates please refer to www.netbergtw.com

All the illustrations in this technical guide are for reference only and are subject to change without prior notice.

Chapter 2. About the Server

2.1. Introduction

This document is for the person who installs, administers, and troubleshoots servers and storage systems. Netberg assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

2.2. System Features

This chapter describes the external features of this server. It includes specific sections that identify these features and specifications.

Figure 2.1. 3.5" HDD System Front View

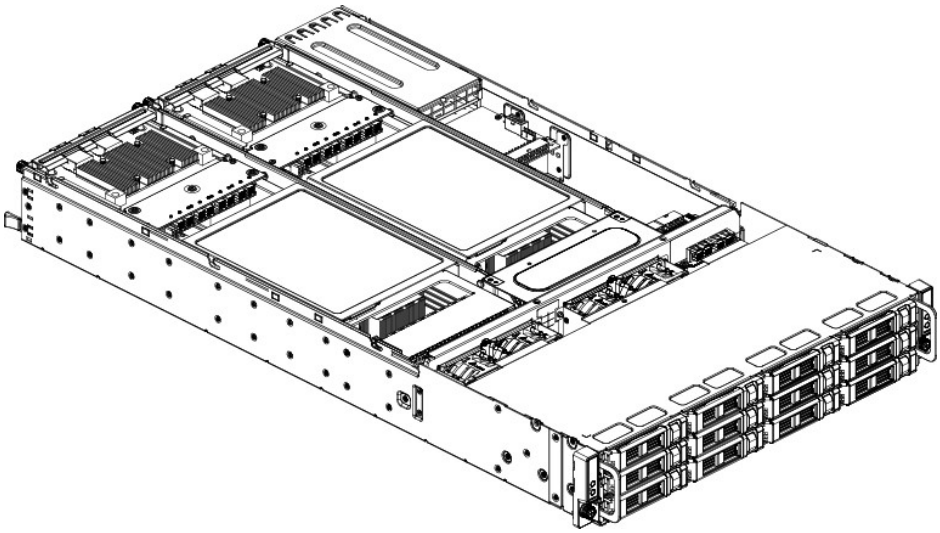


Figure 2.2. 2.5" HDD System Front View

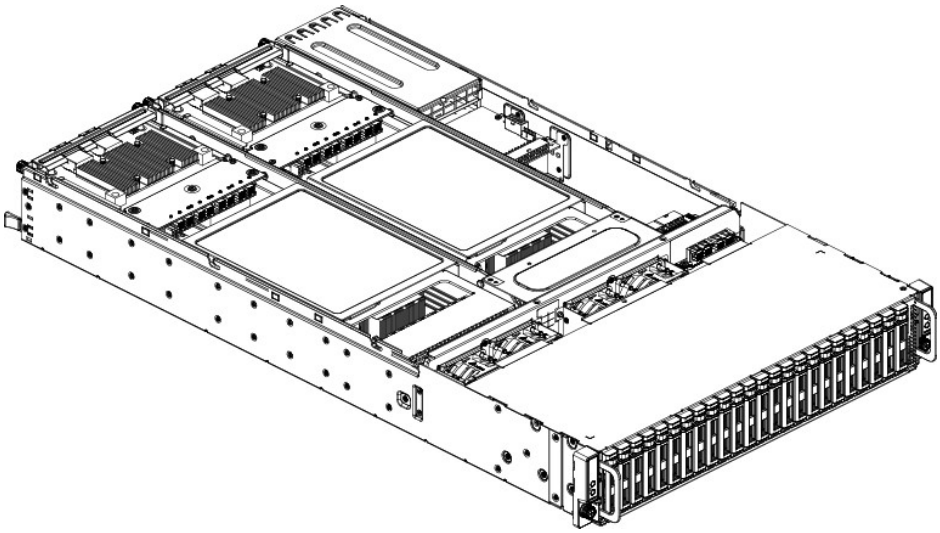


Table 2.1. Major Features

Chassis	**2U rack-mounted chassis**
Power	2 x 1400W redundant AC power supplies
Node	Supports 2 nodes
Storage	Front: 12 x 3.5” LFF or 24 x 2.5” SFF SAS 12Gb/s hot-pluggable HDDs (Front)

Chassis	**2U rack-mounted chassis**
	Rear: 4 x 2.5” SATA 6Gb/s SSDs (2 pieces per node)
Backplane	One 3.5” or 2.5” HDD Front Backplane Two rear HDD Backplanes (one per node)
System Fan	Number of fan cage: 4 Single Fan Size: 60mm x 60mm x 38mm

Table 2.2. Specifications

Form Factor	**2 independent nodes in a 2U chassis**
Chassis Size (L x W x H)	800 mm x 448 mm x 87.3 mm
Processor	(2) Intel® Xeon® processor E5-2600 v3/v4 family per node
Chipset	Intel® C612 (Wellsburg)
SAS Controller	LSI SAS HBA/RAID controller
Memory	(16) DDR4 1333/1600/1866/2100 MHz per node
PCI-E	2 PCIe x8 slots
SW RAID Options	Microsoft Storage Spaces
HW RAID Options	LSI Syncro CS Cluster-in-a-box Solution (optional)
Network	(2) Intel® 10G SFP+ ports (option) (2) Intel® 10G Base-T ports (option)
Management Port	(1) Dedicated management 10/100BASE-T port (BMC AST2400)
Integrated Graphics	Aspeed AST2400 8 MB DDR3 video memory
Rear I/O	• (1) Power button w/LED • (2) USB 3.0 ports per node • (1) VGA D-sub per node • (1) RJ45 (dedicated for BMC) per node • (2) RJ45 10G BASE-T ports • (1) COM port • (1) ID LED (blue)
Power Support Unit	(2) 1400W high efficiency redundant PSU, 110-240 VAC 50/60 Hz
Current	12A~9.6A
Restriction of Hazardous Substances (RoHS)	Yes
Intel Node Management Support	No
System Management	IPMI v2.0 Compliant, on board "KVM over IP" support
Weight	Maxi-weight: 33.3KG
Temperature	Operating System: +5°C ~ +35°C Non-operating System (with package): -40°C ~ +70°C

Form Factor	**2 independent nodes in a 2U chassis**
Humidity	Operating System: +20% ~ +80% Non-operating System (with package): +10% ~ +90%

2.3. Package Contents

The following list includes the package components:

1 x 2U chassis system

1 x Power cord

1 x Rail kit

2.4. A Tour of the System

The following illustrations show the major component parts of these two variants.

2.4.1. System

Figure 2.3. 3.5" HDD System Overview

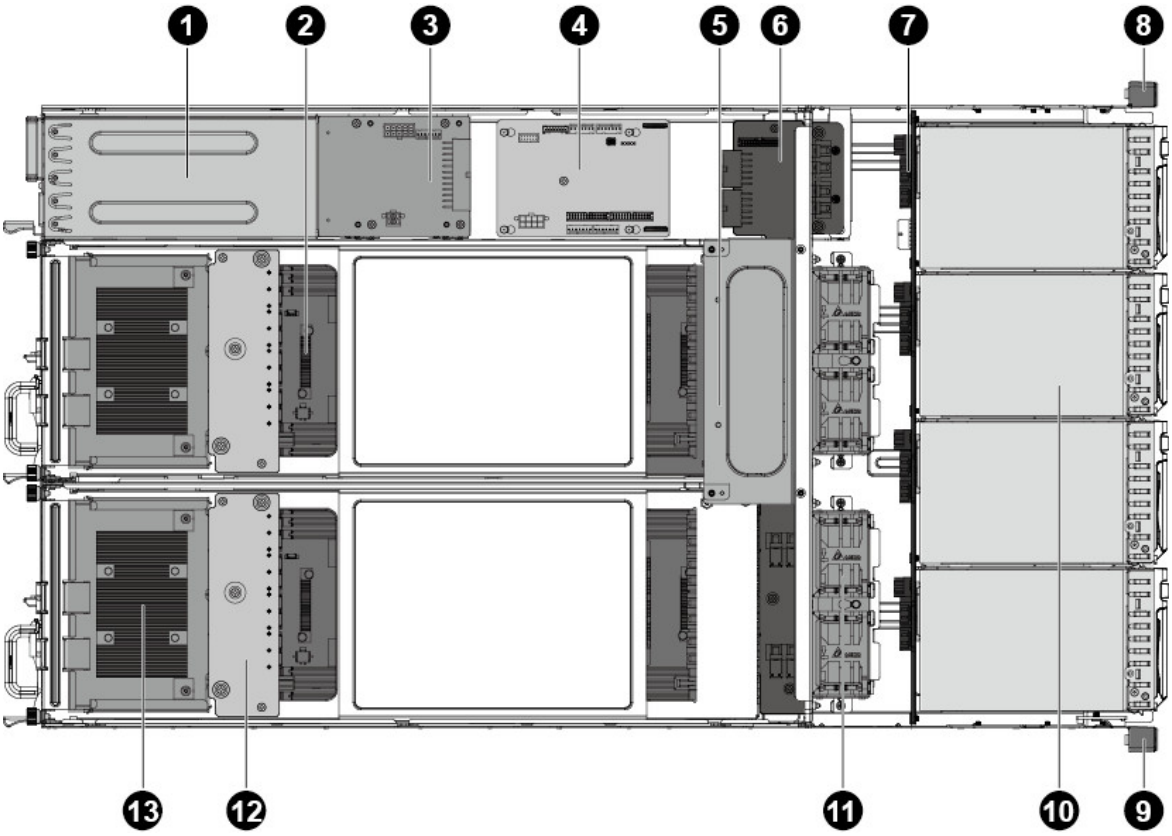


Table 2.3. Component Overview

No.	Description
1	Power Suply
2	Nodes
3	Power Distribution Boards
4	FCB (Fan Control Board)
5	Strong Plate
6	Middle Plane
7	12x3.5” HDD Backplane
8	Front Panel 2

No.	Description
9	Front Panel 1
10	3.5” HDD Bays
11	System Fans
12	Interposers
13	Expansion boards

Figure 2.4. 2.5" HDD System Overview

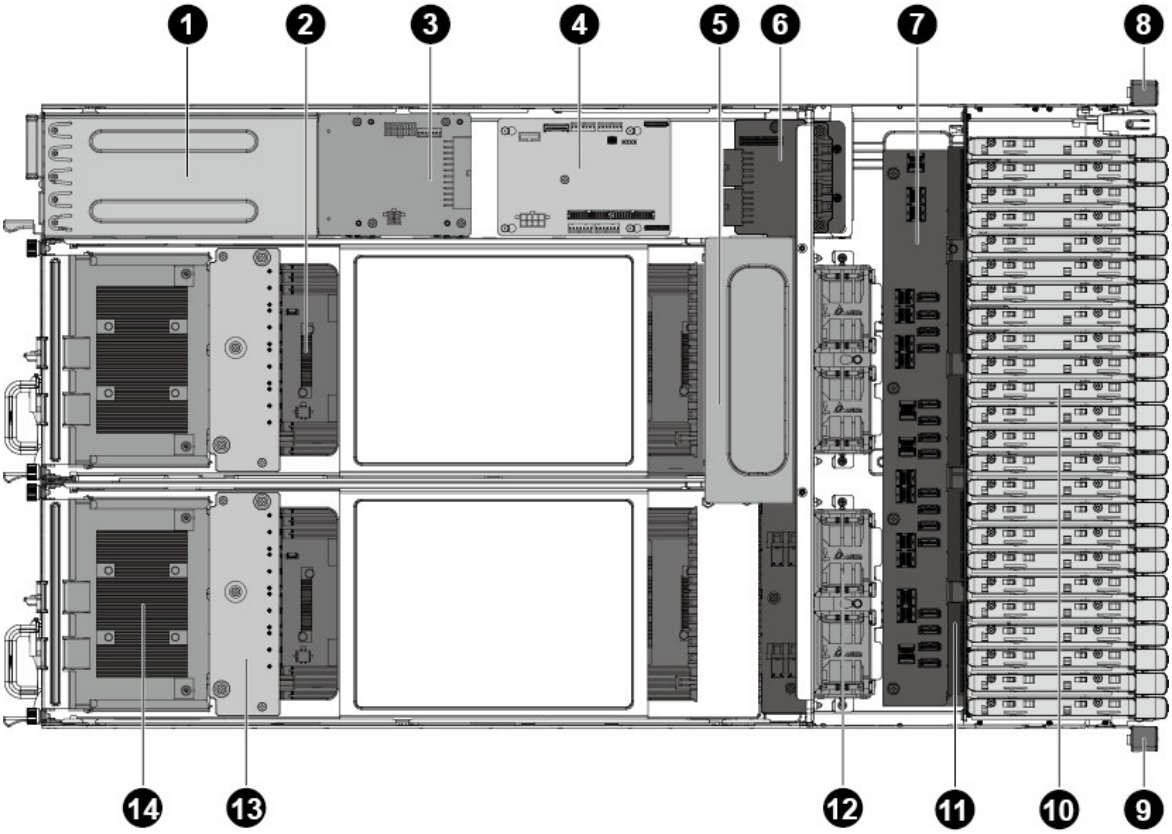


Table 2.4. Component Overview

No.	Description
1	Power Suply
2	Nodes
3	Power Distribution Boards
4	FCB (Fan Control Board)
5	Strong Plate
6	Middle Planes (Upper and Lower)
7	Bridge Board

No.	Description
8	Front Panel 2
9	Front Panel 1
10	2.5” HDD Bays
11	24x2.5” HDD Backplane
12	System Fans
13	Interposers
14	Expansion boards

2.4.2. System Front View

The system supports up to 12 x 3.5” or 24 x 2.5” HDD configurations. The front view of this 2U server allows easy access to HDDs. Also, the front panel with buttons and system LEDs is located on the front.

Figure 2.5. 3.5" HDD System Front View

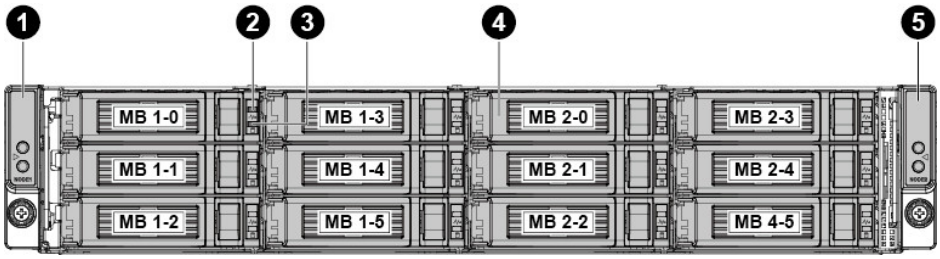


Table 2.5. 3.5" HDD System Front View

No.	Description
1	Front Panel 1
2	HDD Activity LED
3	HDD Status LED
4	HDDs
5	Front Panel 2

Figure 2.6. 3.5" HDD System Front View

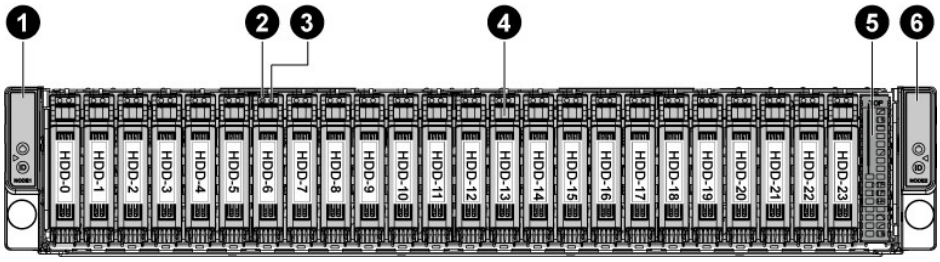


Table 2.6. 2.5" HDD System Front View

No.	Description
1	Front Panel 1
2	HDD Activity LED
3	HDD Status LED
4	HDDs
5	Dummy HDD/SSD
6	Front Panel 2

2.4.3. System Rear View

The server back view includes the connectors of the external system devices.

Figure 2.7. Back View with Two Nodes (with OCP 1G/10G Base-T NIC)

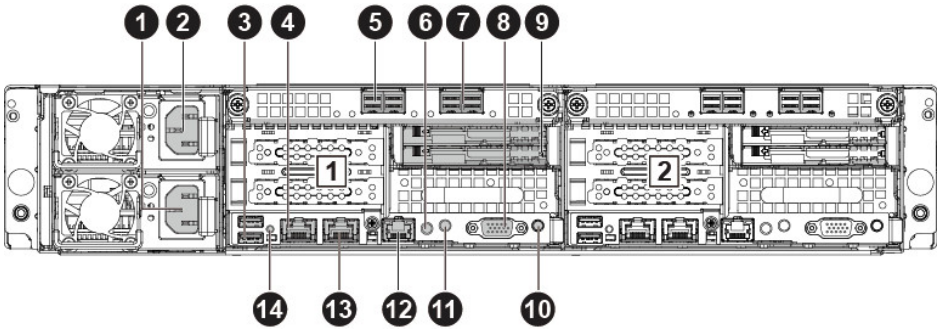


Table 2.7. System Rear View

No.	Description
1	Power Supply 2
2	Power Supply 1
3	Rear Dual USB Port
4	10G NIC 1 port
5	SAS External Port 1
6	BMC Reset Button
7	SAS External Port 0
8	VGA Connector
9	Dual SSD OS Disks
10	Power Button
11	ID LED/Button
12	Management Port
13	NIC Port 0

No.	Description
14	System Health LED

Figure 2.8. Back View with Two Nodes (with OCP SFP+ NIC)

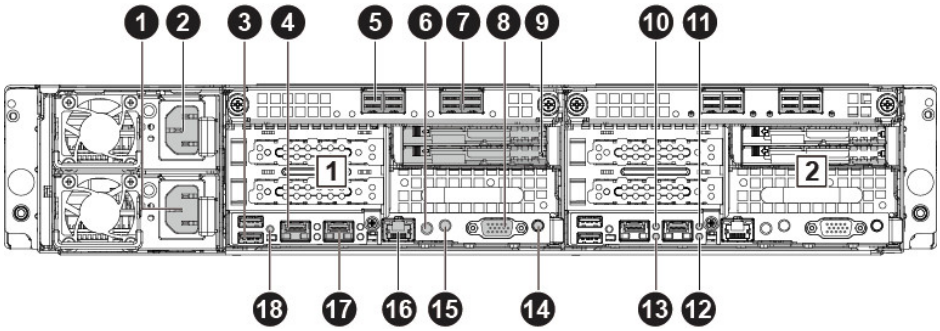


Table 2.8. System Rear View

No.	Description
1	Power Supply 2
2	Power Supply 1
3	Rear Dual USB Port
4	10G NIC 1 port
5	SAS External Port 1
6	BMC Reset Button
7	SAS External Port 0
8	VGA Connector
9	Dual SSD OS Disks
10	10Gbe NIC 1 Link/Activity LED
11	10Gbe NIC 0 Link/Activity LED
12	10Gbe NIC 0 Speed LED
13	10Gbe NIC 1 Speed LED
14	Power Button
15	ID LED/Button
16	Management Port
17	NIC Port 0
18	System Health LED

2.4.4. Buttons and System LED description

This server is equipped with system LED indicators, and buttons located on the front panels. The front panel status LEDs allow constant monitoring of basic system functions while the server is operating. These LEDs provide visual cues to the status of power and ID of each node.

Figure 2.9. 3.5" Front Panel Buttons and LEDs

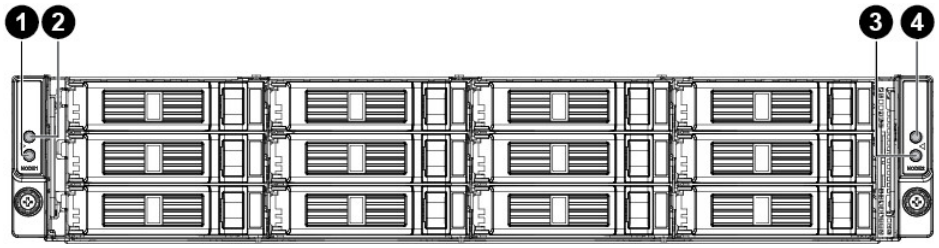


Figure 2.10. 2.5" Front Panel Buttons and LEDs

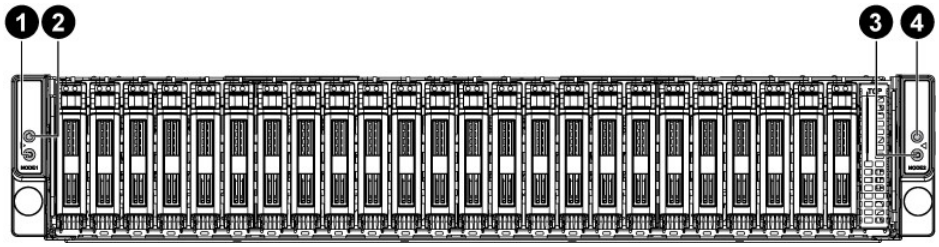


Table 2.9. Front Panel Buttons and LEDs

No.	Description
1	ID Button for Node 1
2	Power Button for Node 1
3	ID Button for Node 2
4	Power Button for Node 2

The back view LED information displays details regarding the AC power LED.

Figure 2.11. Rear Panel Power LEDs

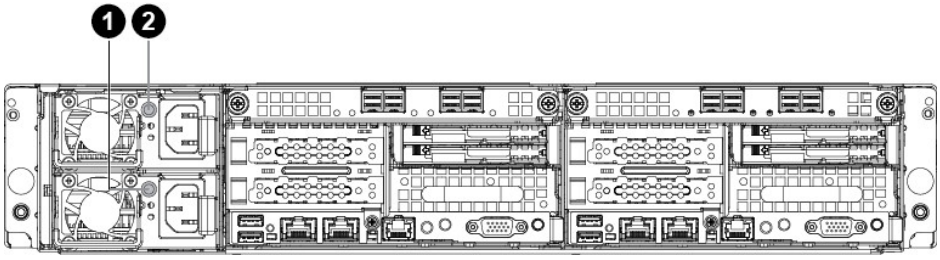


Table 2.10. Rear Panel Power LEDs

No.	Description
1	AC Power LED 2
2	AC Power LED 1

2.4.5. LED Status Definition

The detailed LED information is shown below:

Table 2.11. HDD LED Definition

Name	Color	Condtion	Description
Activity LED	Green	On	HDD ready for access
		Blink	During spin up or accessing HDDs
		Off	HDD not ready
Status LED	Blue	On	Ready for remove (SES)
		Blink	HDD Identifier (SES)
		Off	Normal
	Red	On	Hard drive fail or port disable (SES)
		Off	Mormal
	Purple	Blink	Rebulid/Remap (SES)
	Blue→Purple→ →Blue→Purple→	Blink	Consistency Check (SES)

Table 2.12. Front Panel LED Definition

Name	Color	Condtion	Description
Power LED	Green	On	Power On (S0/S1)
	Amber	Off	
	Green	Off	Power Off (S4/S5)
	Amber	Off	
	Green	Off	BMC critical condition event in Power Off mode (S4 / S5)
	Amber	Blink	
	Green	Blink	BMC critical condition event in Power On mode (S0 / S1)
	Amber		
ID LED	Blue	On	(IPMI) Via chassis identify command on or ID button press ID on
		Off	(IPMI) Via chassis identify command off or ID button press ID off
		Blink	Only (IPMI) Via chassis identify command blink on

Chapter 3. Installing Hardware

3.1. Safety Measures

Always ask for assistance to move or lift the system.

Only perform troubleshooting as authorized by the product documentation, or as directed by a service and support team. Repairs not authorized by warranty may void the warranty and damage the system.

Always make sure to disconnect the system from the AC electrical source. Powering down the system DOES NOT ensure there is no electrical activity in the system.

Server components and circuit boards are easily damaged by discharges of static electricity. Working on servers that are connected to a power supply can be extremely dangerous. Follow the guidelines below to avoid personal injury or damage to the server.

Always disconnect the server from the power outlet whenever you are working inside the server case.

Wear a grounded wrist strap. If none are available, discharge any personal static electricity by touching the bare metal chassis of the server case, or the bare metal body of any other grounded device.

Humid environments tend to have less static electricity than dry environments. A grounding strap is warranted whenever danger of static electricity exists.

Do not touch the components on the unless it is necessary to do so. Do not flex or stress circuit boards.

Leave all replacement components inside their static-proof packaging until you are ready to use them.

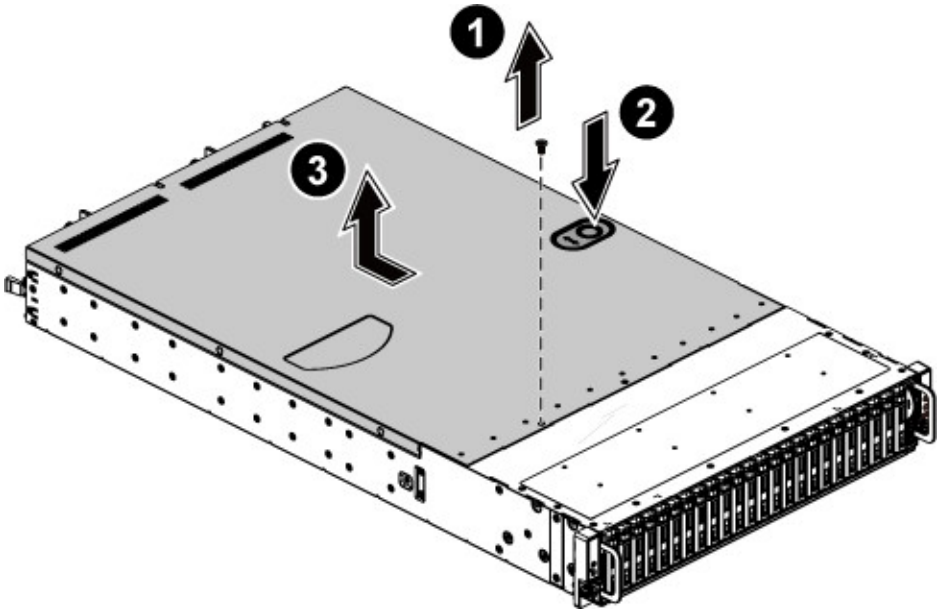
3.2. Top Cover

3.2.1. Removing a Top Cover

ENSURE ALL POWER IS DISCONNECTED FROM THE SYSTEM BEFORE PROCEEDING.

1. Release the screw on the chassis cover.
2. Press the button along the direction of the arrow.
3. Simultaneously slide the cover horizontally to the back and remove it.

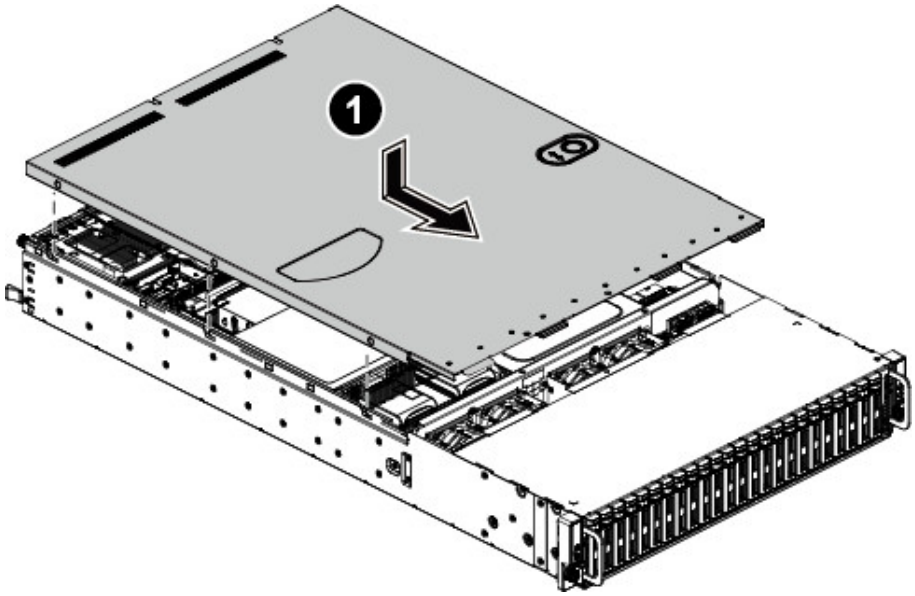
Figure 3.1. Removing Top Cover



3.2.2. Installing a Top Cover

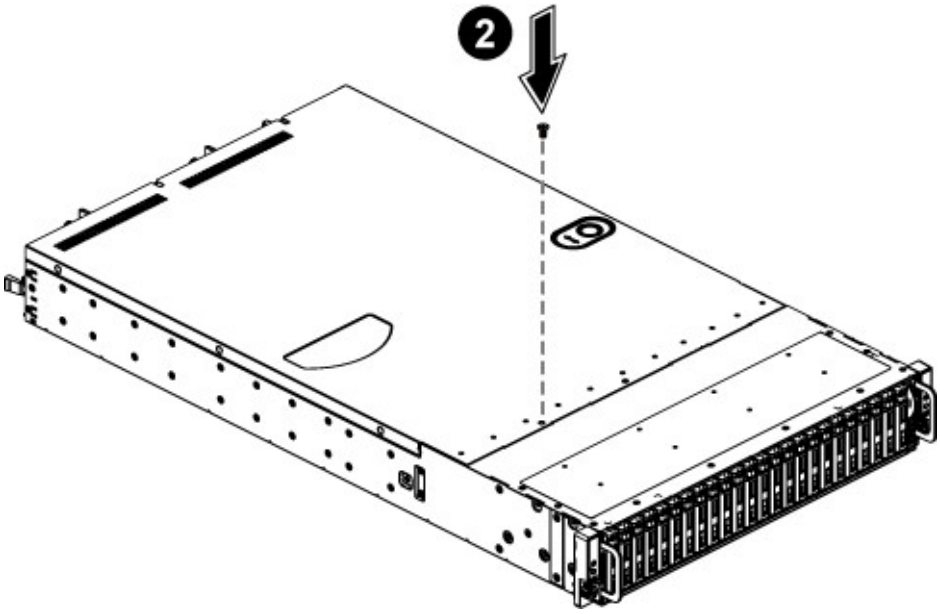
1. Locate the chassis cover to the right position on the chassis as shown below and then slide it to the front until it is closed.

Figure 3.2. Sliding the Chassis Cover to the Front



2. Secure the chassis cover with one screw.

Figure 3.3. Installing Screws



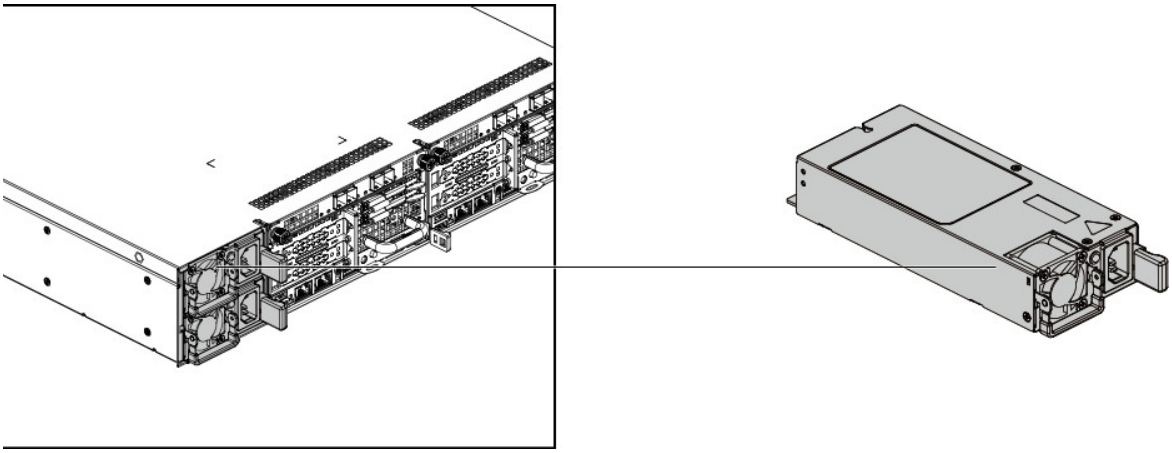
This system must be operated with the chassis cover installed to ensure proper cooling.

3.3. Power Supply Unit

This server is designed with two 1400W power supplies. When the server is equipped with dual power supply, the hot-swappable redundant function is provided. If one power supply does not work, you can replace the failed power supply without powering off the server, because the other one can take the place of the failed one.

The location of power supplies on the server is shown below:

Figure 3.4. Power Supply Locations



Partial redundancy is supported on design with a throttling feature to downgrade power consumption when a PSU is faulty or has been removed. A single faulty PSU can be replaced without system shut down.

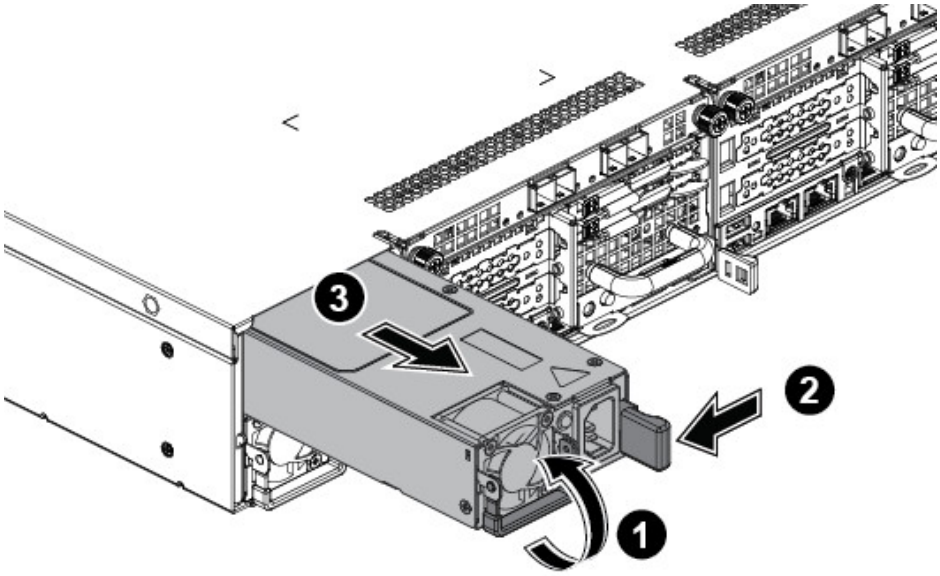
DISCONNECT THE POWER SUPPLY UNIT FROM THE POWER SOURCE BEFORE REMOVING PSU. FAILURE TO DO SO COULD RESULT IN DAMAGE TO THE EQUIPMENT OR PERSONAL INJURY.

The redundant power supply unit can be replaced without shutting down the system.

3.3.1. Removing a Power Supply Unit

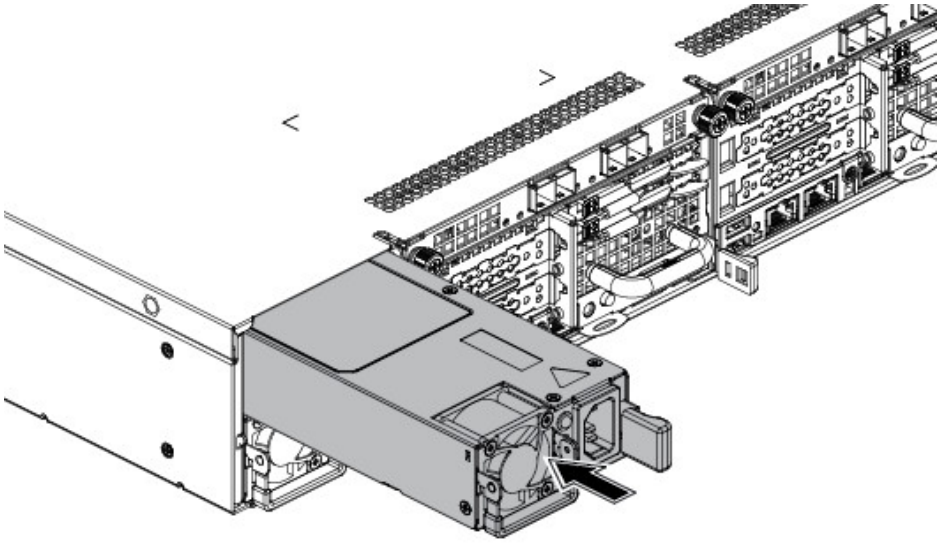
1. Pull up the handle.
2. Press the retaining clip on the right side of the power supply along the direction of the arrow.
3. At the same time, pull out the power supply. (The power supply takes considerable force to remove.)

Figure 3.5. Removing the Power Supply



3.3.2. Installing a Power Supply Unit

Figure 3.6. Installing a Power Supply Unit



Insert the replacement power supply firmly into the bay. The retaining clip should snap. Connect the AC power cord to the replacement power supply.

3.4. Hard Disk Drives

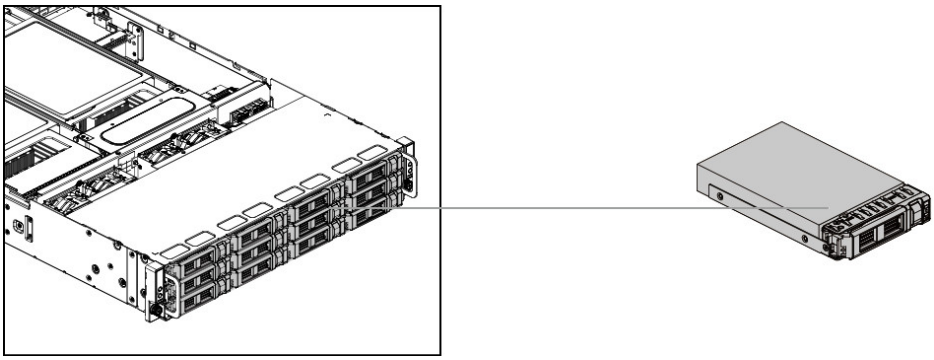
Do not operate the system without all hard drive trays inserted into the chassis. All hard drive bays must be occupied by either a hard drive or an empty hard drive tray. Hard drives may be removed while the system is operational but should be immediately replaced by another hard drive or an empty hard drive tray.

3.4.1. 3.5” SATA / SAS HDDs

The server can support up to 12 x 3.5” hot-pluggable SATA / SAS HDDs. You don’t need to power-off the system when removing or installing a HDD.

The location of 3.5” SATA / SAS HDD assemblies on the server is shown below:

Figure 3.7. 3.5” SATA / SAS HDD Locations

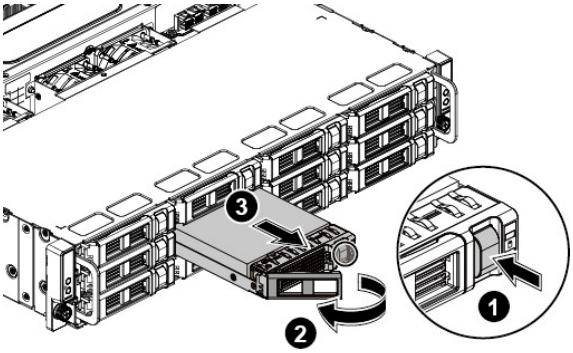


Take note of the drive tray orientation before sliding it out. The tray will not fit back into the bay if inserted incorrectly.

3.4.2. Removing a 3.5” Hard Drive tray

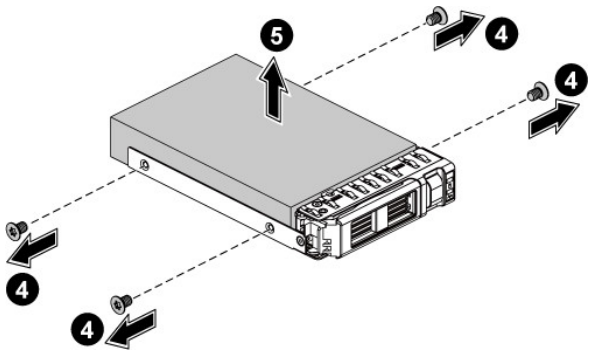
1. Push the release button.
2. Pull the lever open.
3. Slide the HDD assembly out of the HDD bay.

Figure 3.8. Sliding out the HDD Assembly



4. Loosen the four screws that secure the HDD.
5. Lift the HDD out of the HDD tray.

Figure 3.9. Removing the HDD

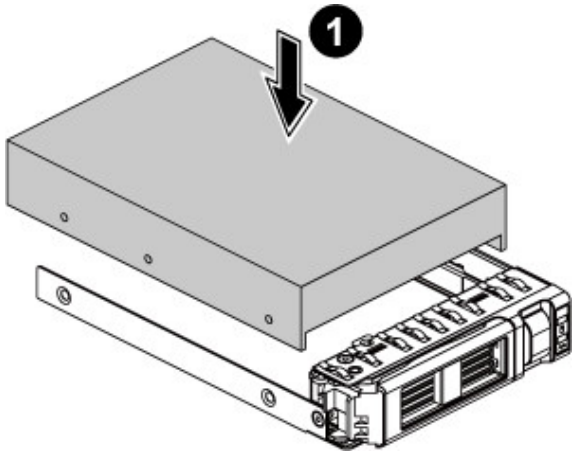


3.4.3. Installing a 3.5” Hard Drive tray

Do not force the tray handle closed. If resistance is encountered, check the hard drive is properly inserted and the hard drives on either side are properly inserted.

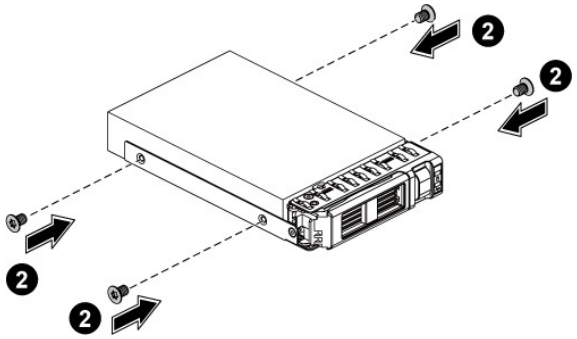
1. Place the HDD to the HDD tray.

Figure 3.10. Placing the HDD to the HDD Tray



2. Secure the HDD to the HDD tray with four screws.

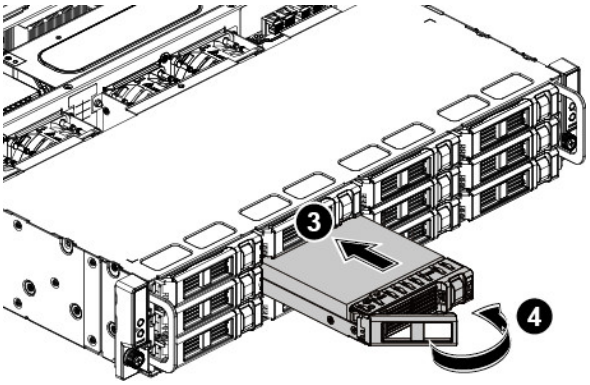
Figure 3.11. Fastening the Screws



3. Carefully insert the HDD assembly into the HDD bay with the lever lifted until it completely enters the HDD bay.

4. Push the lever back in place.

Figure 3.12. Installing the HDD Assembly



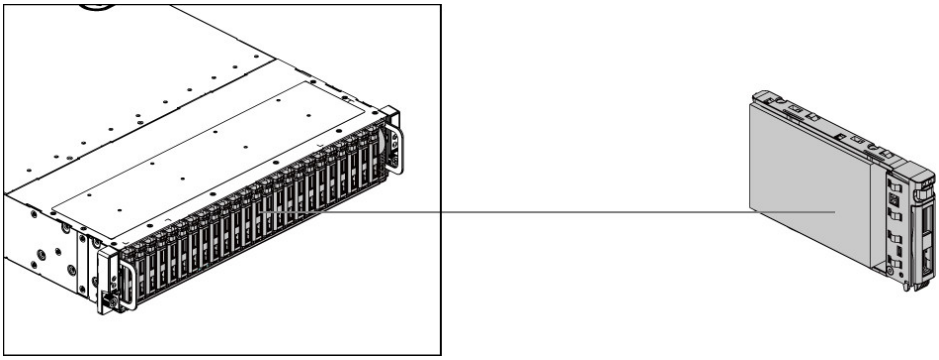
Make sure that the HDD is connected to the HDD connector on the backplane.

3.4.4. 2.5” SATA / SAS HDDs

The server can support up to 24 x 2.5” hot-pluggable SATA / SAS HDDs. You don’t need to power-off the system when removing or installing a HDD.

The location of 2.5” SATA / SAS HDD assemblies on the server is shown below:

Figure 3.13. 2.5” SATA / SAS HDD Locations

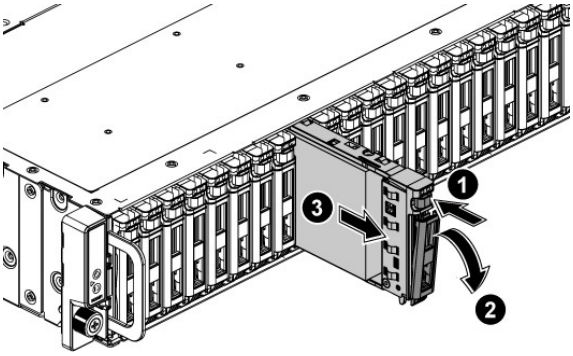


Take note of the drive tray orientation before sliding it out. The tray will not fit back into the bay if inserted incorrectly.

3.4.5. Removing a 2.5” Hard Drive tray

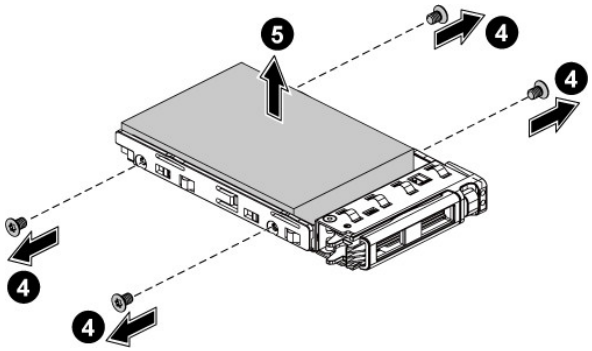
1. Push the release button.
2. Pull the lever open.
3. Slide the HDD assembly out of the HDD bay.

Figure 3.14. Sliding out the HDD Assembly



4. Loosen the four screws that secure the HDD.
5. Lift the HDD out of the HDD tray.

Figure 3.15. Removing the HDD

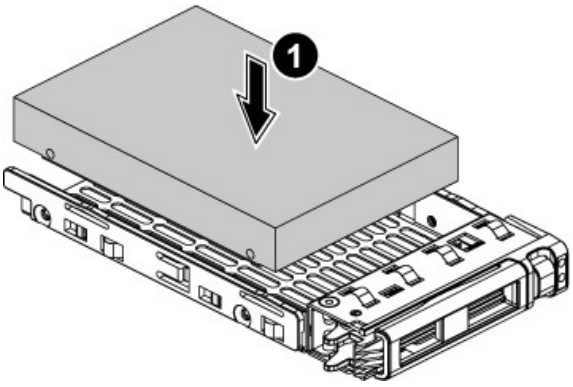


3.4.6. Installing a 2.5” Hard Drive tray

Do not force the tray handle closed. If resistance is encountered, check the hard drive is properly inserted and the hard drives on either side are properly inserted.

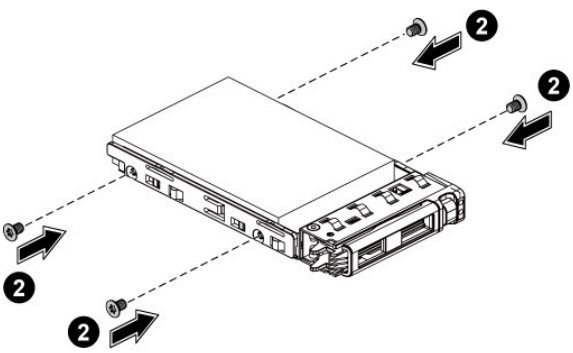
1. Place the HDD to the HDD tray.

Figure 3.16. Placing the HDD to the HDD Tray



2. Secure the HDD to the HDD tray with four screws.

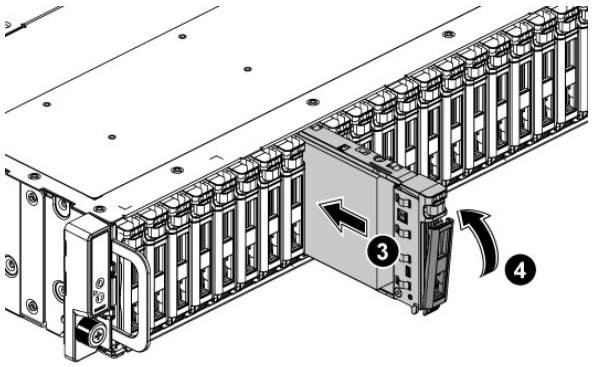
Figure 3.17. Fastening the Screws



3. Carefully insert the HDD assembly into the HDD bay with the lever lifted until it completely enters the HDD bay.

4. Push the lever back in place.

Figure 3.18. Installing the HDD Assembly



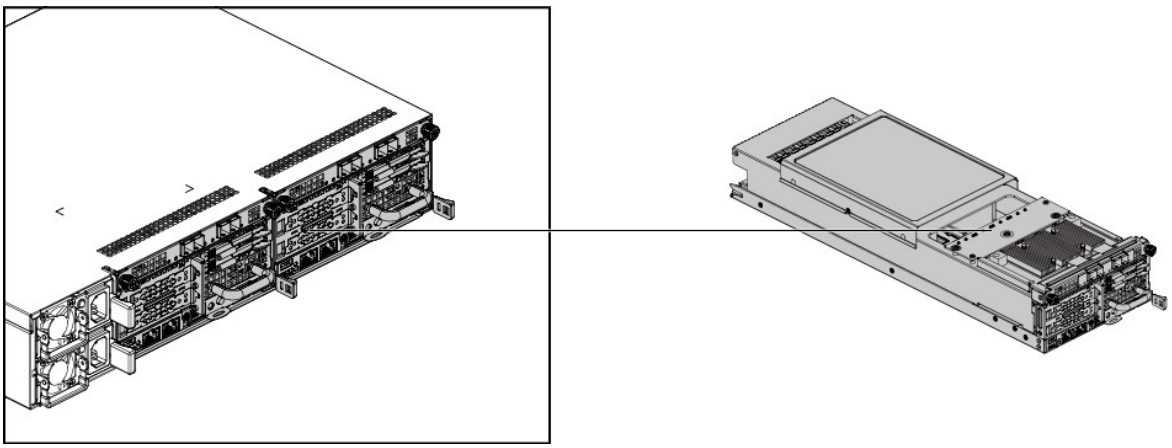
Make sure that the HDD is connected to the HDD connector on the backplane.

3.5. Mainboard Modules

The multi-node server system can be populated with up to two nodes. Each motherboard module supports up to two Intel® E5-2600 v3/v4 series processors.

The location of node on the server is shown below:

Figure 3.19. Node Locations

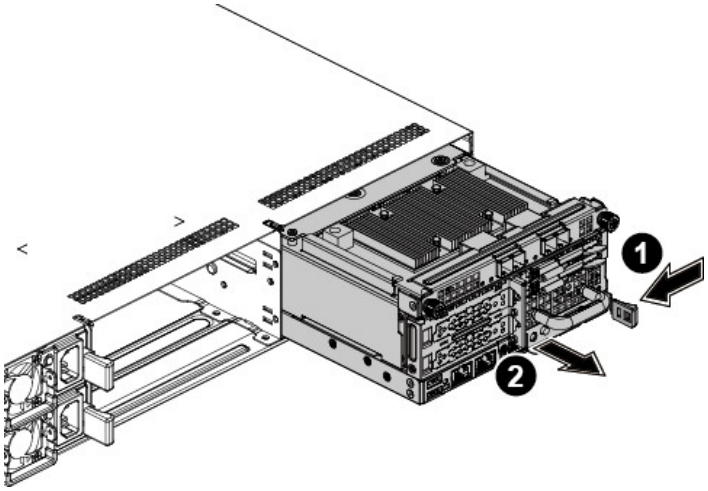


3.5.1. Removing a Mainboard Module

There are no restraining latches on the modules. When removing a module make sure to support the module from underneath as it is removed. Serious hazard warning.

1. Press the retaining latch.
2. Slide the node out of the chassis by using the handle.

Figure 3.20. Removing a Mainboard Module

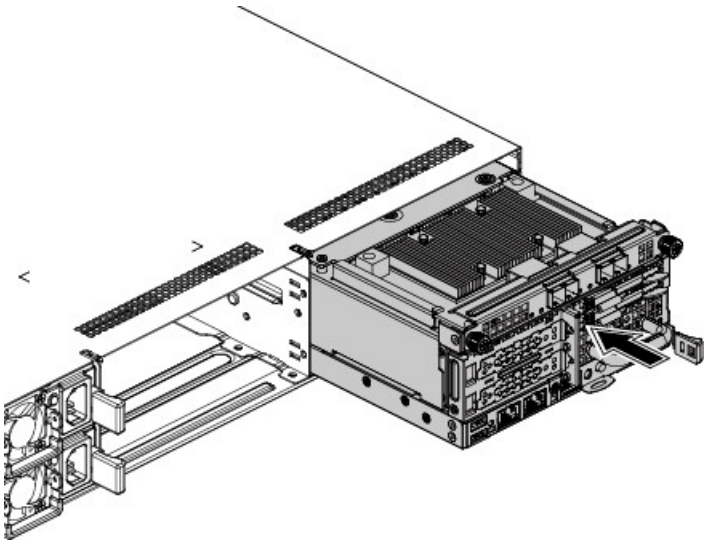


3.5.2. Installing a Mainboard Module

IF MAINBOARD MODULE IS NOT PROVIDED, A DUMMY MODULE MUST BE INSTALLED, TO ALLOW PROPER COOLING OF THE SYSTEM.

Push the node into the chassis until it’s completely seated in place.

Figure 3.21. Installing a Mainboard Module



3.6. Heat Sink

3.6.1. To remove the heat sink

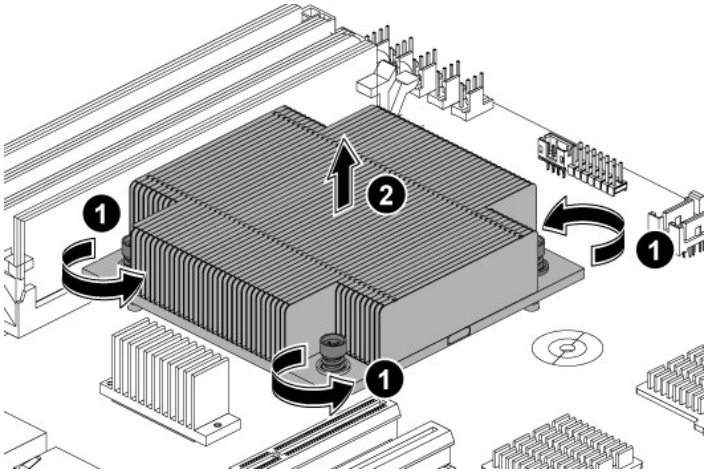
Before you remove or install the heat sink, please follow the steps below:

1. Make sure the server is not turned on or connected to AC power.
2. Remove the node. To remove the node, please see Section 3.5.1, “Removing a Mainboard Module”.
3. Remove the fan duct. To remove the fan duct, please see Section 3.14, “Fan Duct”.
4. Disconnect all necessary cables.

Steps:

1. Loosen the four securing screws.
2. Lift the heat sink up from the installed processor

Figure 3.22. Removing the Heat Sink



3.6.2. To install the heat sink

Reverse the steps above to install the heat sink.

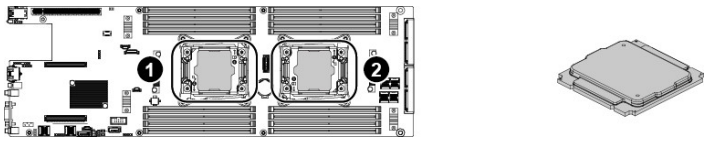
Before you put the heat sink on top of the installed processor, please do not forget to check if the grease is complete on bottom of the heat sink.

3.7. Processor

This motherboard supports Intel® Xeon E5-26xx v3/v4 series processors.

The location of the processors on the motherboard is shown as below:

Figure 3.23. Processor Location



3.7.1. To remove a processor

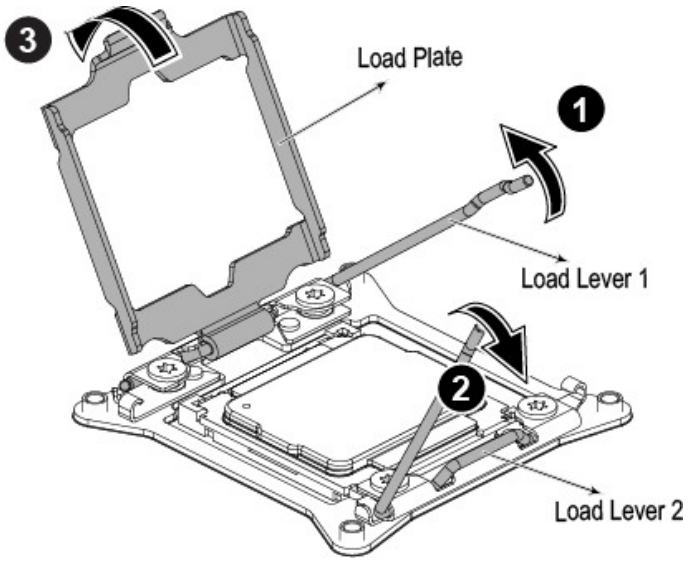
Before you remove or install the processor, please follow the steps below:

1. Make sure the server is not turned on or connected to AC power.
2. Remove the node. To remove the node, please see Section 3.5.1, “Removing a Mainboard Module”.
3. Remove the heat sink. To remove the heat sink, please see Section 3.6, “Heat Sink”.

Steps:

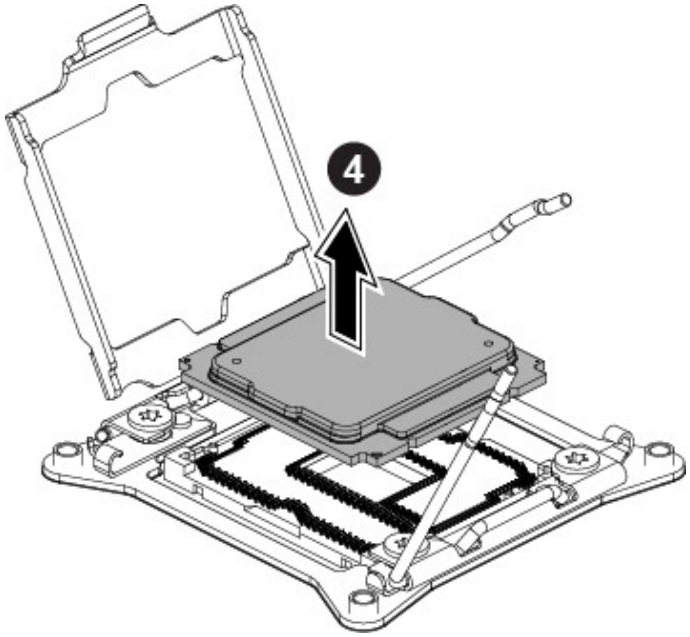
1. Unlock the load lever 1 and lift it up.
2. Unlock the load lever 2 and lift it up.
3. Open the load plate.

Figure 3.24. Opening the Load Plate



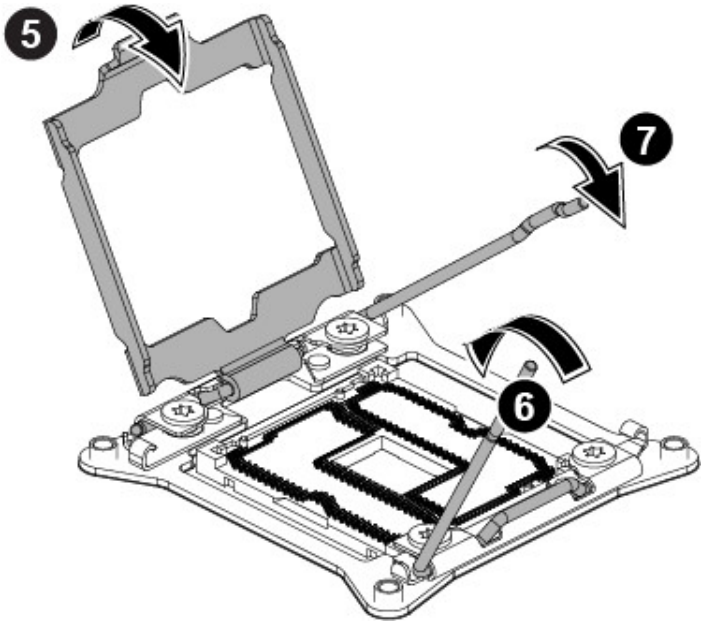
4. Lift the processor out of the socket.

Figure 3.25. Lifting the Processor out of the Socket



5. Close the load plate.
6. Lock the load lever 2.
7. Lock the load lever 1.

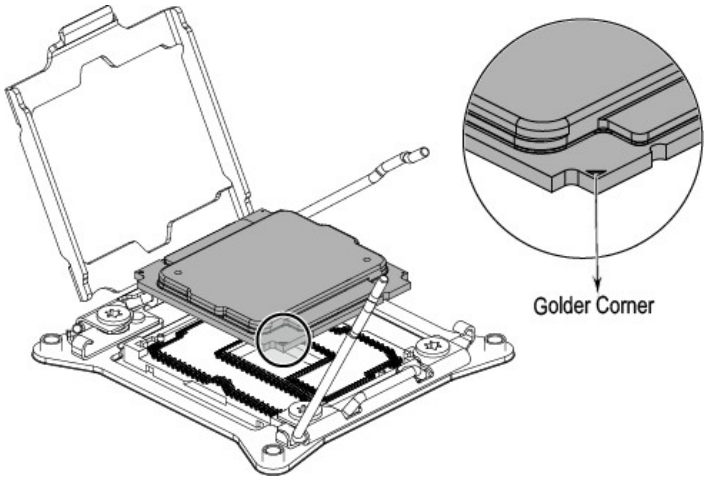
Figure 3.26. Closing the Load Plate



3.7.2. To install a processor

Reverse the steps above to install the processor. However, when inserting the processor into the socket, make sure that the processor is installed following the fool-proof design as the picture shows:

Figure 3.27. Placing the Processor



When the processor is in place, press it firmly on the socket while you push down the socket lever to secure the processor. The lever clicks on the socket indicating that it is locked.

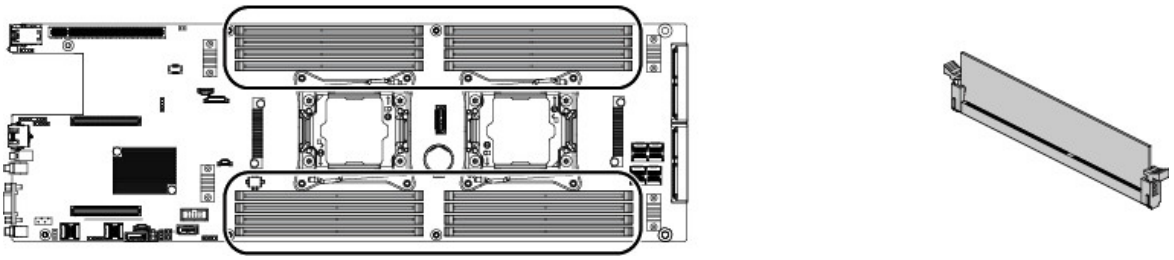
The processor fits only in one orientation. Do not force the processor into the socket to avoid bending the pins and damaging the processor. If the processor does not fit completely, check its orientation or check for bent pins.

3.8. Memory

This motherboard supports 16 DDR4 1333/1600/1866/2133 MT/s DIMMs, RDIMMs, and LRDIMMs. Each processor supports four DDR4 channels.

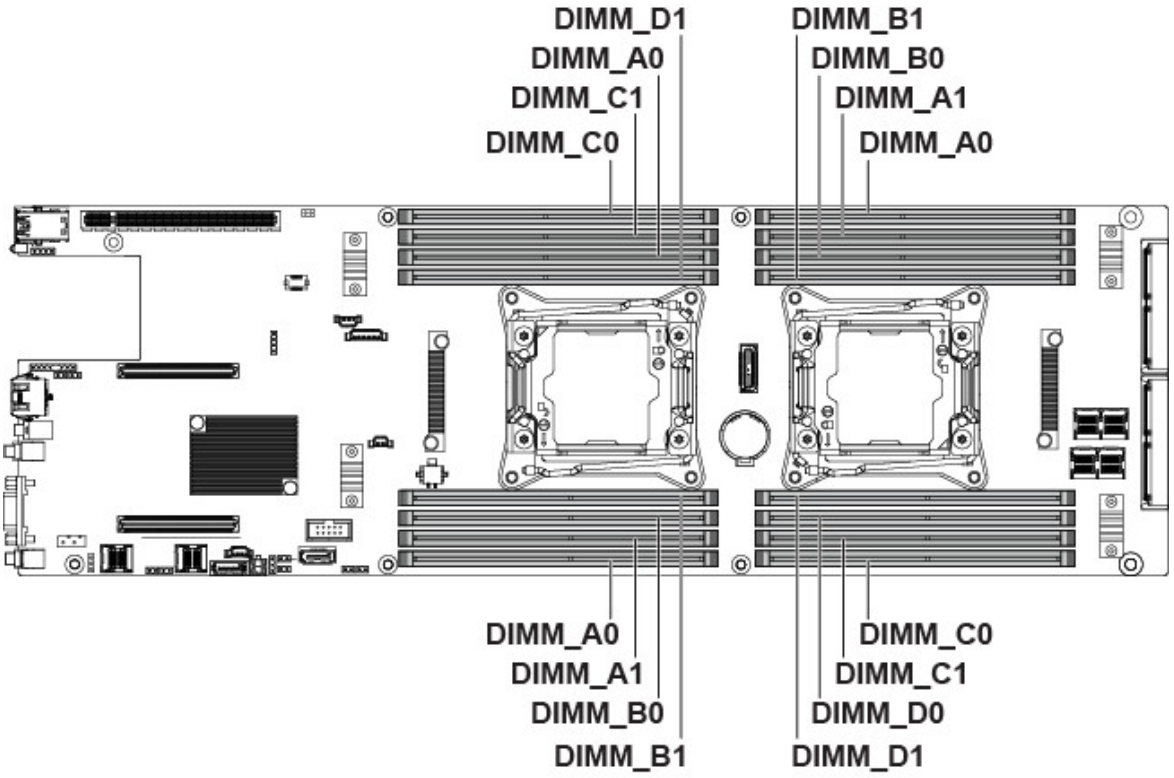
The location of DIMM sockets on the motherboard is shown below:

Figure 3.28. Location of System Memory



There are 16 DIMMs on the motherboard to support the processor. The DIMM sequence of the DIMM sockets is respectively shown below.

Figure 3.29. DIMM Socket Location



3.8.1. DDR4 3 slots per channel (SPC) DIMM population configuration

All allowed DIMM population configration for three slots per channel designs are shown in the table below:

1. Three slots per channel RDIMM population configuration within a channel

Configuration number	POR speed	DIMM2	DIMM1	DIMM0
1	DDR4-1866, 1600	Empty	Empty	Single-rank
2	DDR4-1866, 1600	Empty	Empty	Dual-rank
3	DDR4-1866, 1600	Empty	Single-rank	Single-rank
4	DDR4-1866, 1600	Empty	Single-rank	Dual-rank
5	DDR4-1866, 1600	Empty	Dual-rank	Dual-rank
6	DDR4-1333	Single-rank	Single-rank	Single-rank
7	DDR4-1333	Single-rank	Single-rank	Dual-rank
8	DDR4-1333	Single-rank	Dual-rank	Dual-rank
9	DDR4-1333	Dual-rank	Dual-rank	Dual-rank

1. Three slots per channel LR-DIMM population configuration within a channel

Configuration number	POR speed	DIMM2	DIMM1	DIMM0
1	DDR4-1866, 1600	Empty	Empty	Quad-rank+
2	DDR4-1866, 1600	Empty	Quad-rank+	Quad-rank+
3	DDR4-1600, 1333	Quad-rank+	Quad-rank+	Quad-rank+

3.8.2. DDR4 2 slots per channel (SPC) DIMM population configuration

All allowed DIMM population configration for two slots per channel designs are shown in the table below:

1. Two slots per channel RDIMM population configuration within a channel

Configuration number	POR speed	DIMM1	DIMM0
1	DDR4-2133, 1866, 1600	Empty	Single-rank
2	DDR4-2133, 1866, 1600	Empty	Dual-rank
3	DDR4-1866, 1600	Single-rank	Single-rank
4	DDR4-1866, 1600	Single-rank	Dual-rank
5	DDR4-1866, 1600	Dual-rank	Dual-rank

1. Two slots per channel LR-DIMM population configuration within a channel

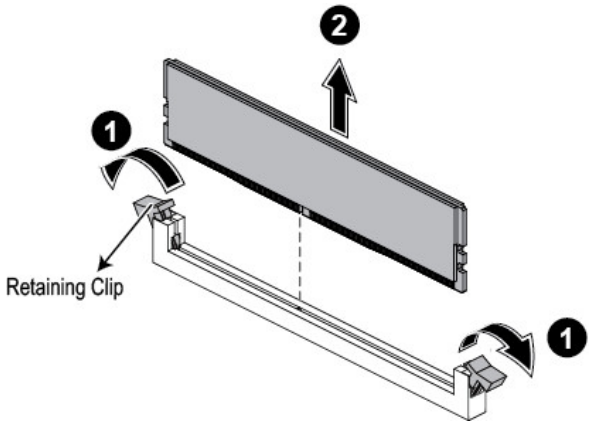
Configuration number	POR speed	DIMM1	DIMM0
1	DDR4-2133, 1866, 1600	Empty	Quad-rank+

Configuration number	POR speed	DIMM1	DIMM0
2	DDR4-1866, 1600	Quad-rank+	Quad-rank+

3.8.3. To remove a DIMM

1. Unlock a DIMM socket by pressing the retaining clips outward. This action releases the module and partially lifts it out of the socket.
2. Lift out the DIMM.

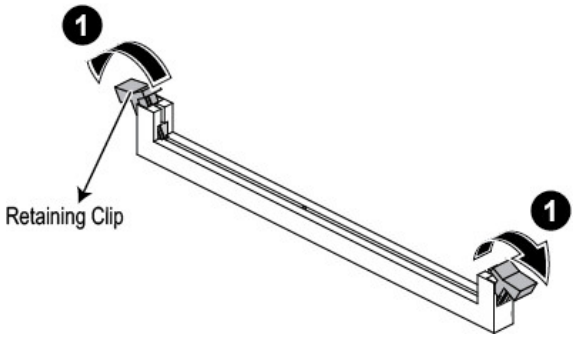
Figure 3.30. Lifting the DIMM out of the Socket



3.8.4. To install a DIMM

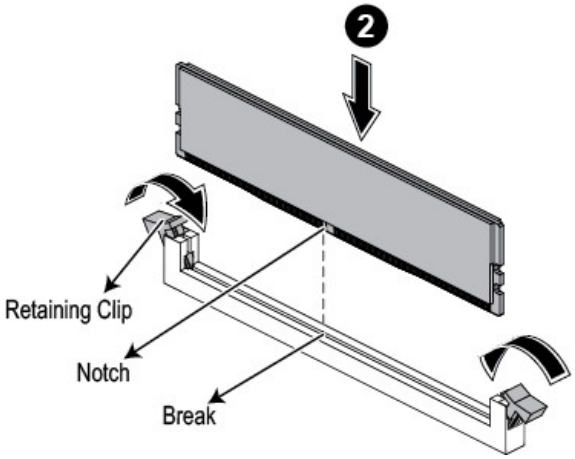
1. Unlock a DIMM socket by pressing the retaining clips outward.

Figure 3.31. Pressing the Retaining Clips Outward



2. Align the notch on the DIMM to the break on the socket. Carefully insert the DIMM into the socket until the retaining clips snap back in place.

Figure 3.32. Inserting the DIMM into the Socket



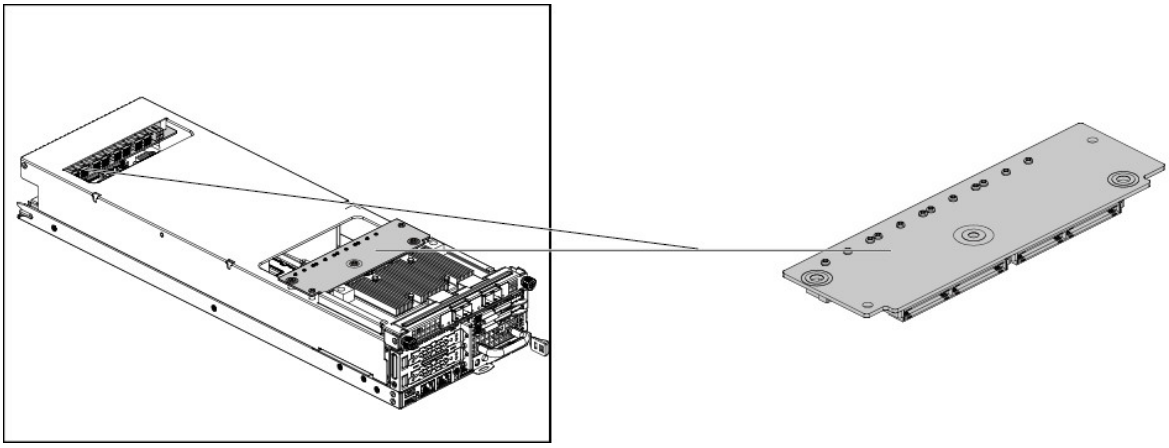
DIMMs fit in only one direction. DO NOT force a DIMM into the socket to avoid damaging the DIMM.

3.9. Interposer Board

The server supports two interposer boards for each node.

The location of interposer boards on the node is shown below:

Figure 3.33. Interposer Board Location



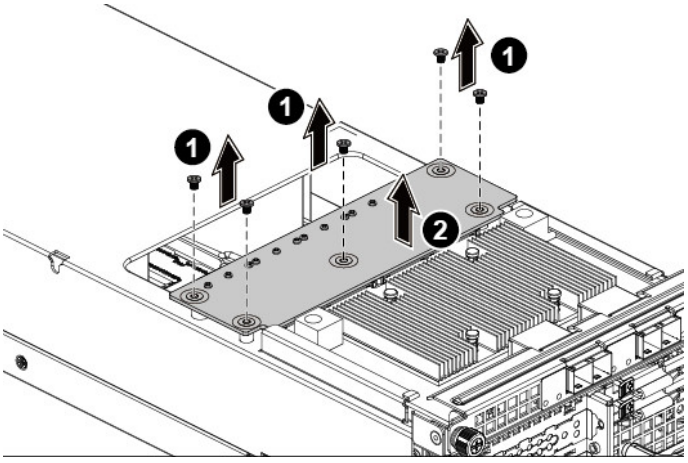
Before you remove or install the interposer board, please follow the steps below:

1. Make sure the server is not turned on or connected to AC power.
2. Remove the nodes. To remove the nodes, see Section 3.5.1, “Removing a Mainboard Module”.
3. Remove the expander board. To remove the expander board, see Section 3.11.1, “To remove the expander board”.
4. Disconnect all necessary cables.

3.10. To remove the interposer board

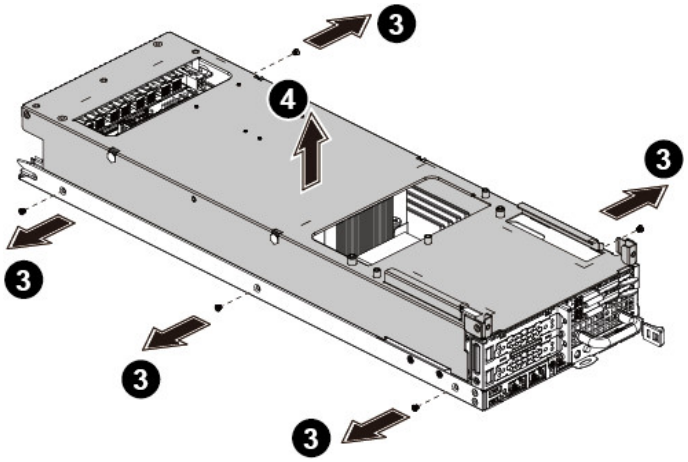
1. Loosen the screws that secure the interposer board 1 to the bracket.
2. Lift the interposer board 1 from the bracket.

Figure 3.34. Removing the interposer Board 1



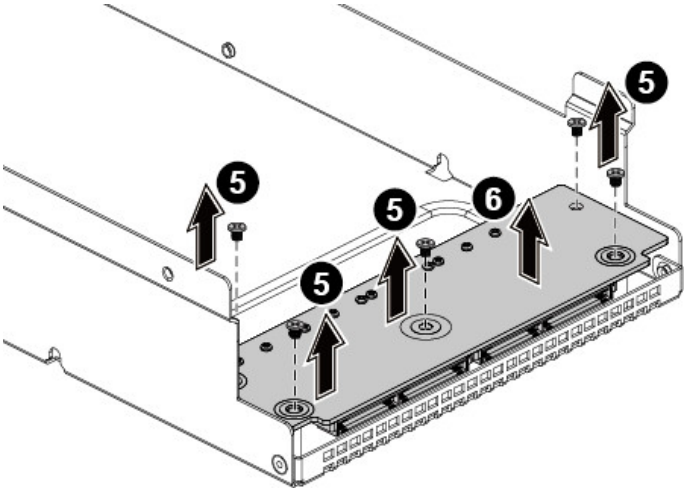
3. Loosen the screws that secure the bracket.
4. Lift the bracket from the node assembly.

Figure 3.35. Removing the Bracket



5. Loosen the screws that secure the interposer board 2.
6. Lift the interposer board 2 out of the bracket.

Figure 3.36. Removing the interposer Board 2



3.10.1. To install the interposer board

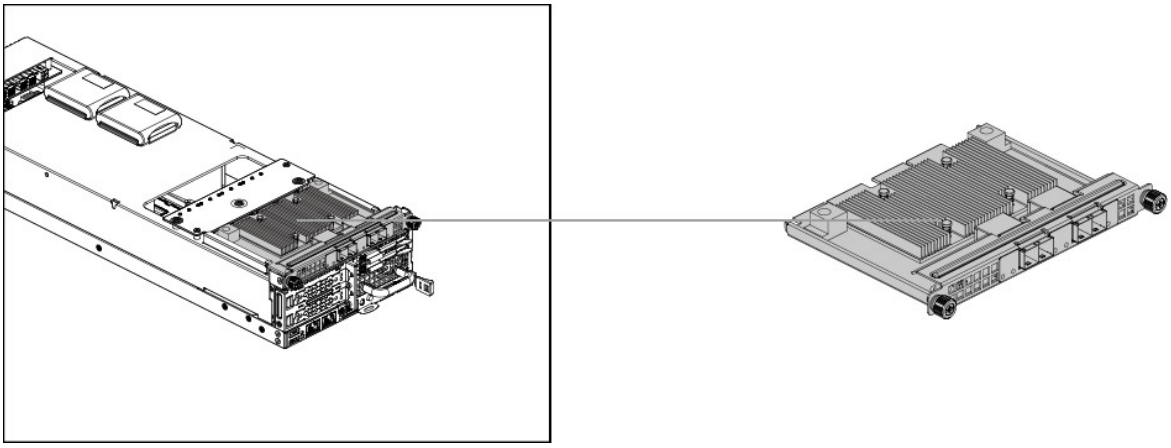
Reverse the steps above to install the interposer board.

3.11. Expander Board

The server supports two expander boards.

The location of expander board on the server is shown below:

Figure 3.37. Expander Board Location



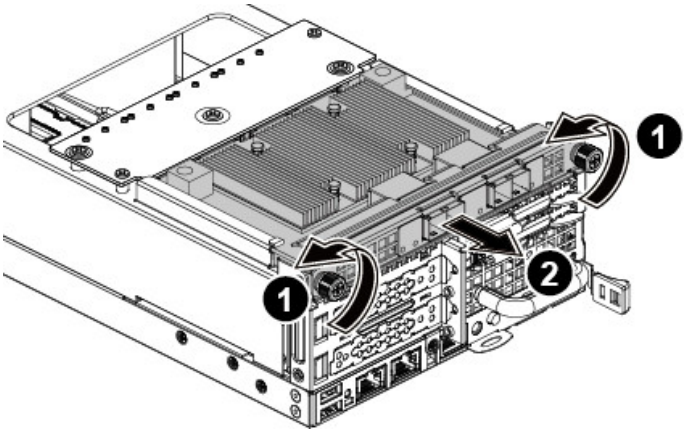
Before you remove or install the expander board, please follow the steps below:

1. Make sure the server is not turned on or connected to AC power.
2. Remove the nodes. To remove the nodes, see Section 3.5.1, “Removing a Mainboard Module”.
3. Disconnect all necessary cables.

3.11.1. To remove the expander board

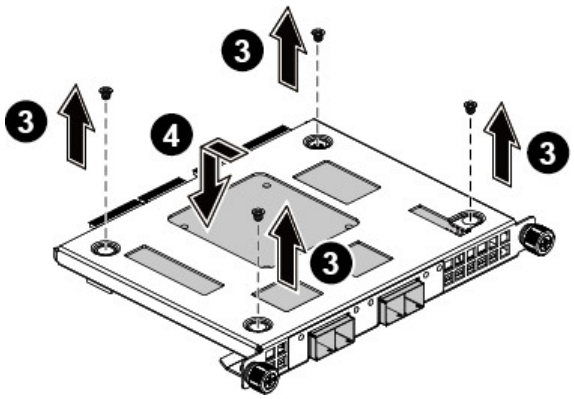
1. Loosen the screws that secure the expander board assembly.
2. Pull the expander board assembly out of the node.

Figure 3.38. Removing the Expander Board Assembly



3. Loosen the screws that secure the expander board.
4. Press and remove the expander board in the direction as shown below.

Figure 3.39. Removing the Expander Board



3.11.2. To install the expander board

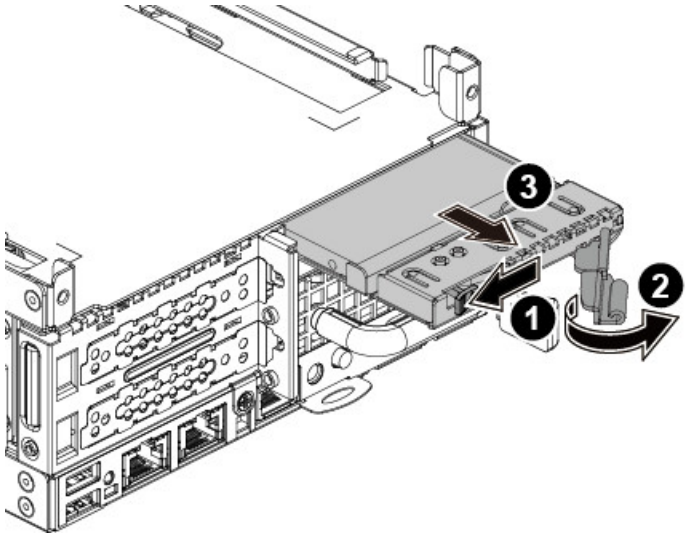
Reverse the steps above to install the expander board.

3.12. Rear HDD Assembly

3.12.1. To remove the rear HDD

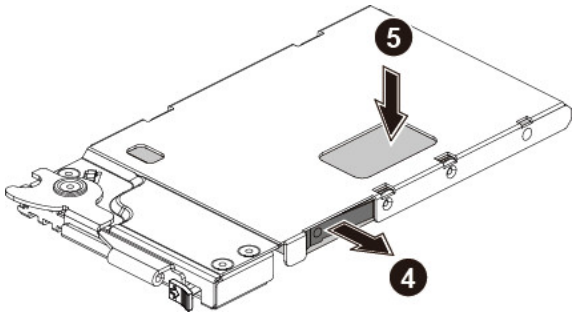
1. Push the release button.
2. Pull the lever open.
3. Pull the HDD assembly out of the HDD cage.

Figure 3.40. Removing the Rear HDD Assembly



4. Open the locking tab on the HDD carrier.
5. Press on the HDD to detach it from the HDD carrier.

Figure 3.41. Removing the Rear HDD

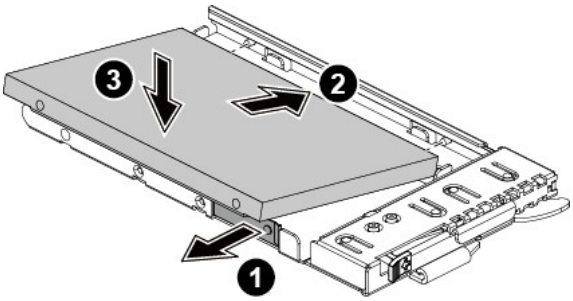


3.12.2. To install the rear HDD

1. Open the locking tab on the rear HDD carrier.
2. Put the HDD into the HDD carrier in the direction as shown below.

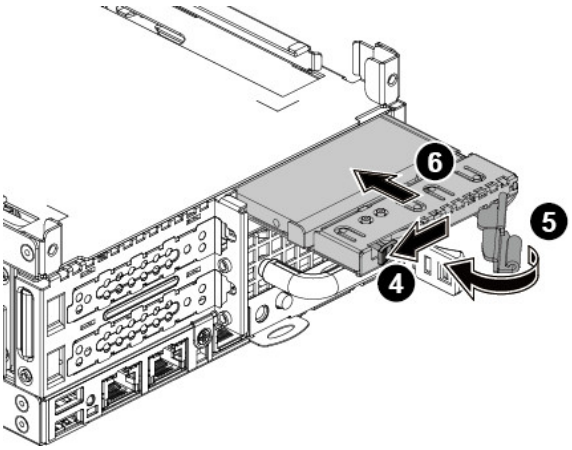
3. Press down the HDD to locate it properly in the HDD carrier.

Figure 3.42. Installing the Rear HDD



4. Push the release button.
5. Close the lever.
6. Push the HDD assembly into the HDD cage.

Figure 3.43. Installing the Rear HDD Assembly



3.12.3. To remove the rear HDD backplane

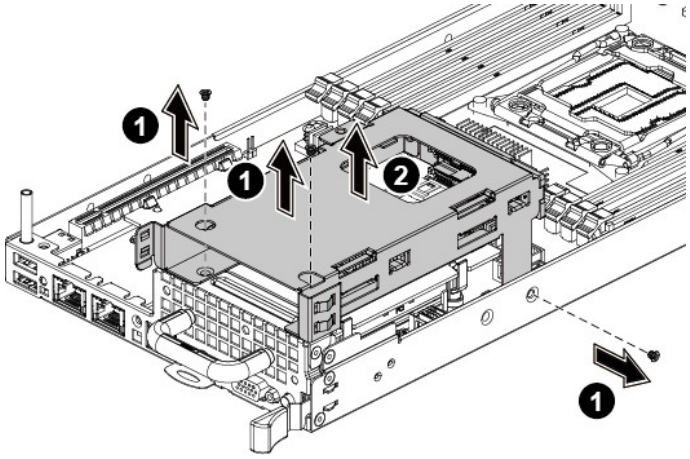
Before you remove or install the rear HDD backplane, please follow the steps below:

1. Make sure the server is not turned on or connected to AC power.
2. Remove the node. To remove the node, see Section 3.5.1, “Removing a Mainboard Module”
3. Remove the rear HDD. To remove the rear HDD, see Section 3.12.1, “To remove the rear HDD”
4. Disconnect all necessary cables.

Steps:

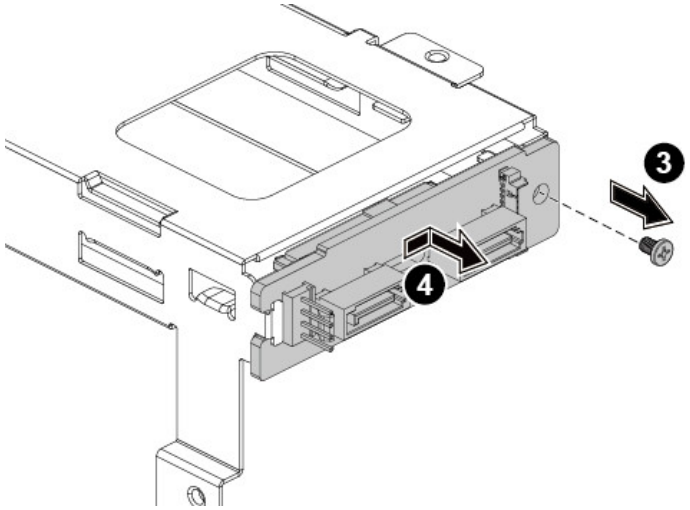
1. Loosen the screws that secure the rear HDD backplane bracket.
2. Remove the rear HDD backplane bracket.

Figure 3.44. Removing the Rear HDD Backplane Bracket



3. Loosen the screw that secures the rear HDD backplane.
4. Remove the rear HDD backplane.

Figure 3.45. Removing the Rear HDD Backplane



3.12.4. To install the rear HDD backplane

Reverse the steps above to install the rear HDD backplane.

3.13. X16 Riser Card

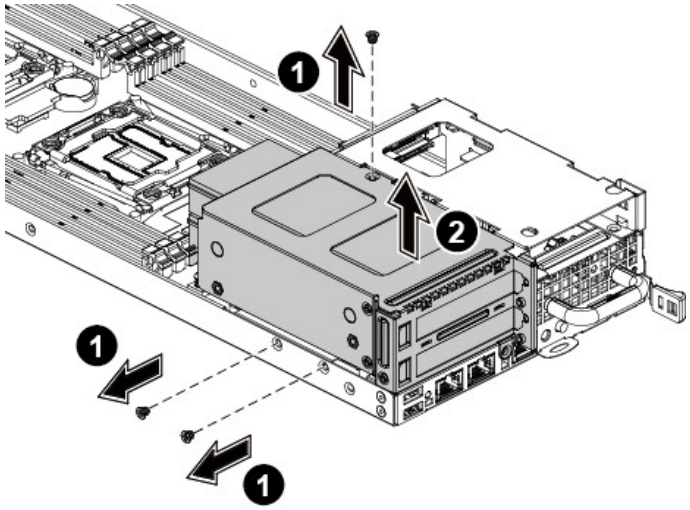
Before you remove or install the rear HDD, please follow the steps below:

1. Make sure the server is not turned on or connected to AC power.
2. Remove the node. To remove the node, see Section 3.5.1, “Removing a Mainboard Module”
3. Remove the expansion-card assembly and rear HDD assembly. To remove the rear HDD assembly, see Section 3.12.1, “To remove the rear HDD”
4. Disconnect all necessary cables.

3.13.1. To remove the expansion card

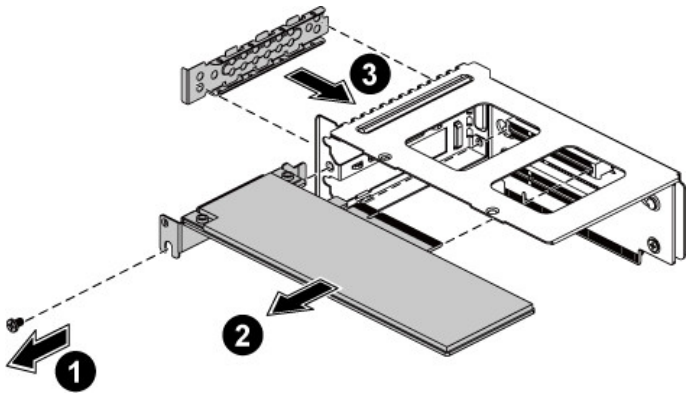
1. Loosen the screws that secure the expansion card assembly.
2. Remove the expansion card assembly.

Figure 3.46. Removing the Expansion Card Assembly



3. Loosen the screws that secure the expansion card.
4. Remove the expansion card.
5. Install the expansion-card slot cover.

Figure 3.47. Removing the Expansion Card



3.13.2. To install the expansion card

Reverse the steps above to install the expansion card.

3.13.3. To remove the X16 riser card

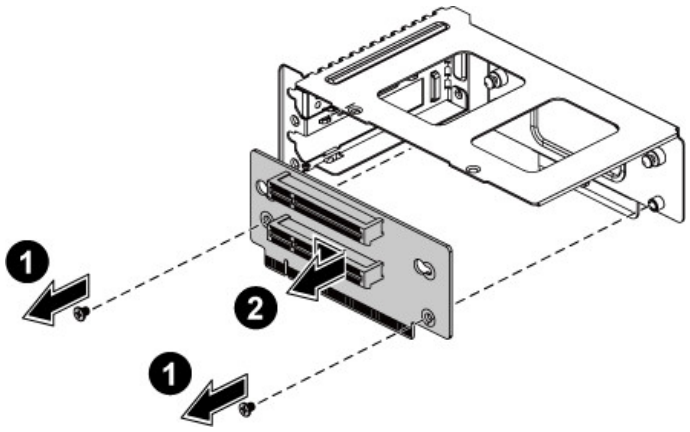
Before you remove or install the rear HDD, please follow the steps below:

1. Make sure the server is not turned on or connected to AC power.
2. Remove the node. To remove the node, see Section 3.5.1, “Removing a Mainboard Module”
3. Remove the expansion-card assembly and rear HDD assembly. To remove the rear HDD assembly, see Section 3.12.1, “To remove the rear HDD”
4. Remove the expansion card. To remove the expansion card, see Section 3.13.1, “To remove the expansion card”
5. Disconnect all necessary cables.

Steps:

1. Loosen the screws that secure the riser card.
2. Remove the riser card.

Figure 3.48. Removing the Riser Card



3.13.4. To install the X16 Riser Card

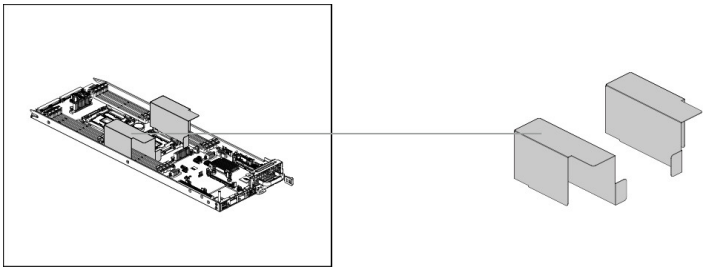
Reverse the steps above to install the riser card.

3.14. Fan Duct

This server is equipped with two fan ducts on each motherboard.

The location of fan ducts on the server is shown below:

Figure 3.49. Fan Duct Location



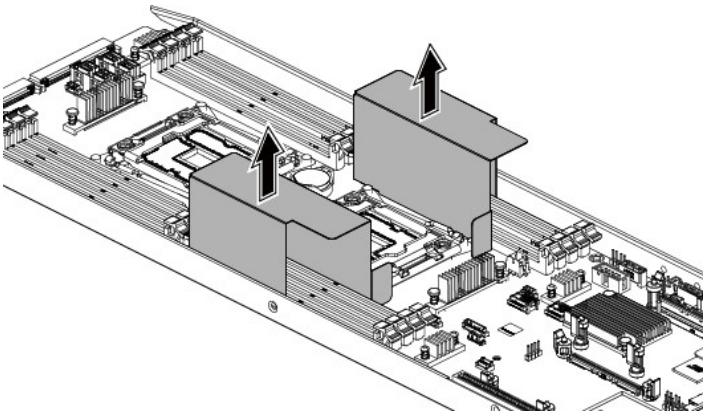
Before you remove or install the fan duct, please follow the steps below:

1. Make sure the server is not turned on or connected to AC power.
2. Remove the chassis cover. To remove the chassis cover, see Section 3.2, “Top Cover”
3. Remove the node. To remove the node, see Section 3.5.1, “Removing a Mainboard Module”
4. Disconnect all necessary cables.

3.14.1. To remove the fan duct

Lift up the fan ducts to remove them from the motherboard.

Figure 3.50. Removing the Fan Ducts



3.14.2. To install the fan duct

Reverse the steps above to install the fan duct.

3.15. Motherboard

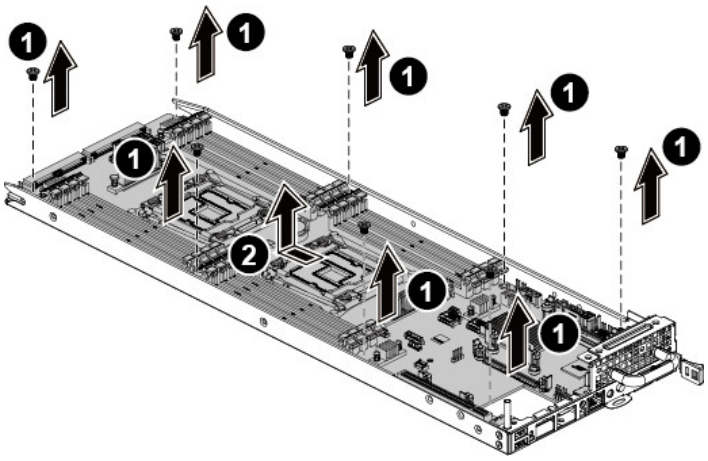
Before you remove or install the node, please follow the steps below:

1. Make sure the server is not turned on or connected to AC power.
2. Remove the node. To remove the node, see Section 3.5.1, “Removing a Mainboard Module”
3. Remove the expansion-card assembly and rear HDD assembly. To remove the expansion-card assembly and rear HDD assembly, see Section 3.12.1, “To remove the rear HDD”
4. Remove the fan duct. To remove the fan duct, see Section 3.14, “Fan Duct”
5. Disconnect all necessary cables.

3.15.1. To remove the motherboard

1. Loosen the eight screws.
2. Slide the motherboard back, up and out of the assembly.

Figure 3.51. Removing the Motherboard



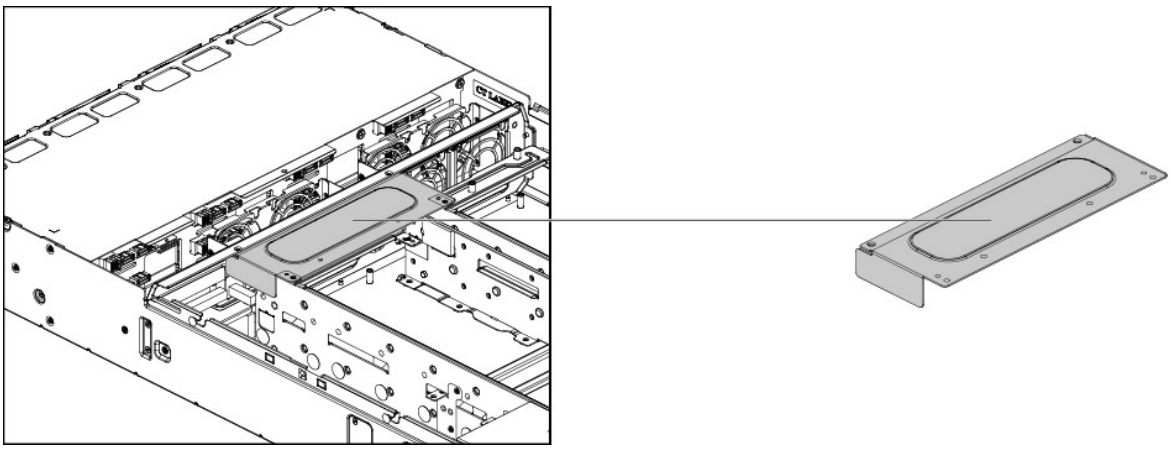
3.15.2. To install the motherboard

Reverse the steps above to install the motherboard.

3.16. Strong Plate

The location of the strong plate on the server is shown below:

Figure 3.52. Strong Plate Location



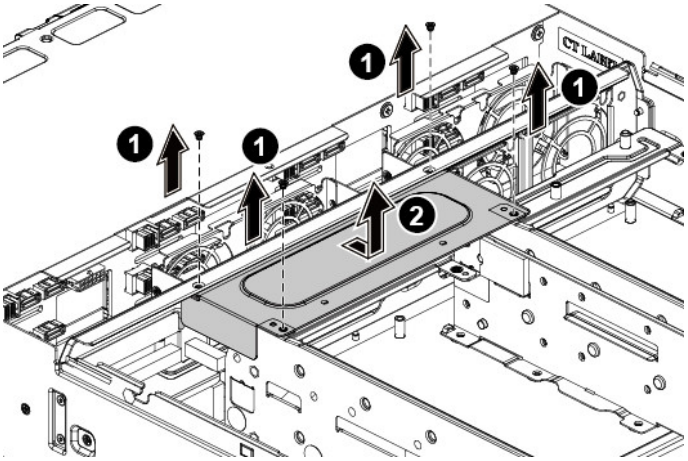
Before you remove or install the strong plate, please follow the steps below:

1. Make sure the server is not turned on or connected to AC power.
2. Remove the chassis cover. To remove the chassis cover, see Section 3.2, “Top Cover”
3. Disconnect all necessary cables.

3.16.1. To remove the strong plate

1. Loosen the screws that secure the strong plate.
2. Remove the strong plate out of the chassis.

Figure 3.53. Removing the Strong Plate



3.16.2. To install the strong plate

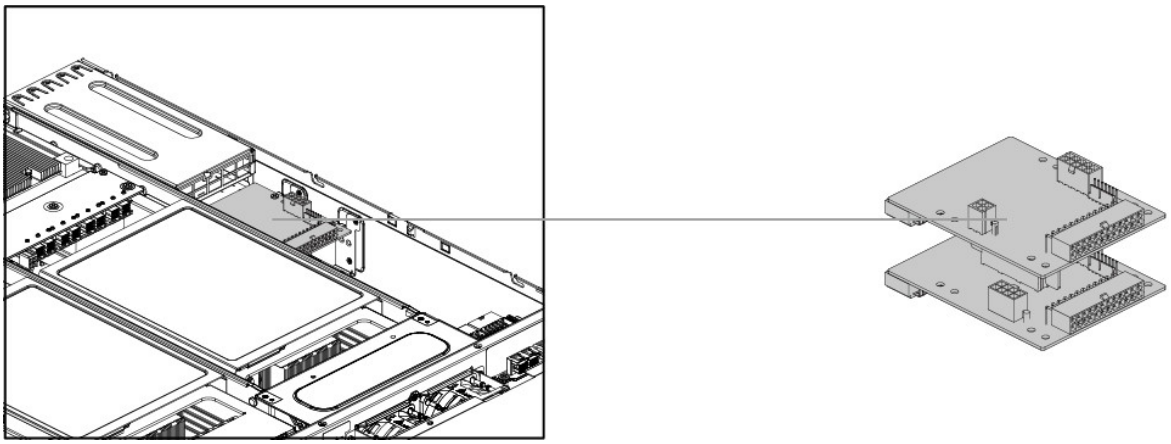
Reverse the steps above to install the strong plate.

3.17. Power Distribution Boards

The two 1400W hot-swappable power supplies are respectively designed with two power distribution boards. All the power cables come out from the power distribution board.

The location of power distribution boards is shown below:

Figure 3.54. Power Distribution Board Locations



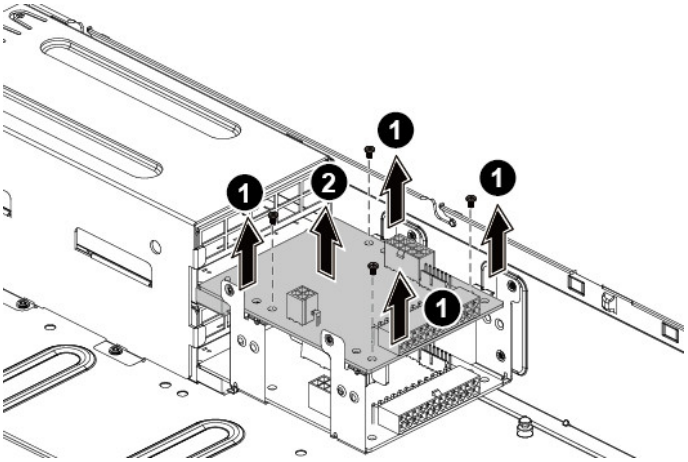
Before you remove or install the power distribution boards, please follow the steps below:

1. Make sure the server is not turned on or connected to AC power.
2. Remove the chassis cover. To remove the chassis cover, see Section 3.2, “Top Cover”
3. Remove the power supply. To remove the power supply, see Section 3.3.1, “Removing a Power Supply Unit”
4. Disconnect all the necessary cables.

3.17.1. To remove the power distribution boards

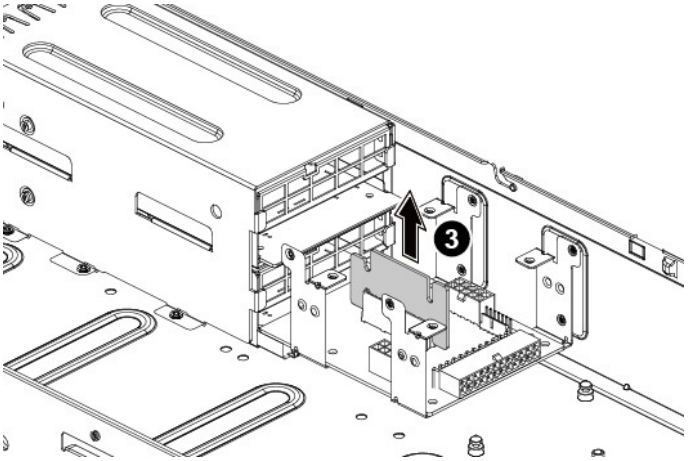
1. Loosen the four screws that secure the upper power distribution board.
2. Lift the upper power distribution board out of the chassis.

Figure 3.55. Removing the Upper Power Distribution Board



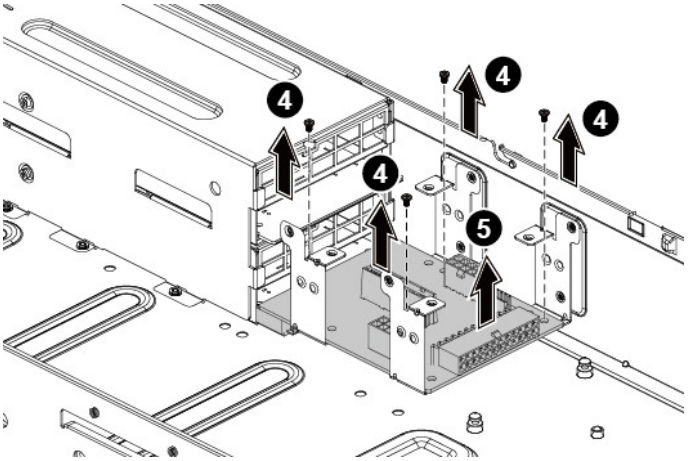
3. Remove the bridge card.

Figure 3.56. Removing the Bridge Card



4. Loosen the four screws that secure the lower power distribution board.
5. Lift the lower power distribution board out of the chassis.

Figure 3.57. Removing the Lower Power Distribution Board



3.17.2. To install the power distribution board

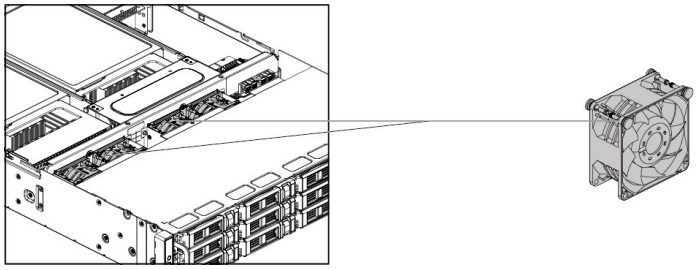
Reverse the steps above to install the power distribution boards.

3.18. System Fans

Subdividing the node area and the backplane area is a metal cage that holds the system fans. This server contains four system fans which are located inside the chassis. These system fans maintain the ideal temperature for the node, backplane and disk drives.

The location of system fans is shown below:

Figure 3.58. System Fan Location



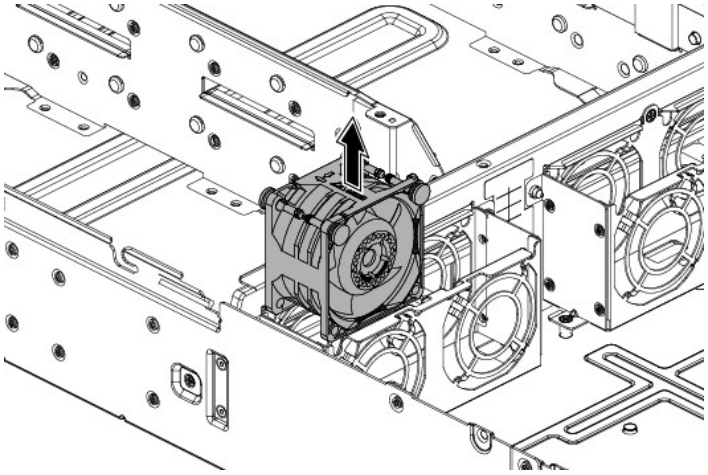
Before you remove or install a system fan, please follow the steps below:

1. Make sure the server is not turned on or connected to the AC power.
2. Remove the chassis cover. To remove the chassis cover, see Section 3.2, “Top Cover”
3. Disconnect all the necessary cables.

3.18.1. To remove a system fan

Lift a system fan out of the chassis directly.

Figure 3.59. Removing a System Fan



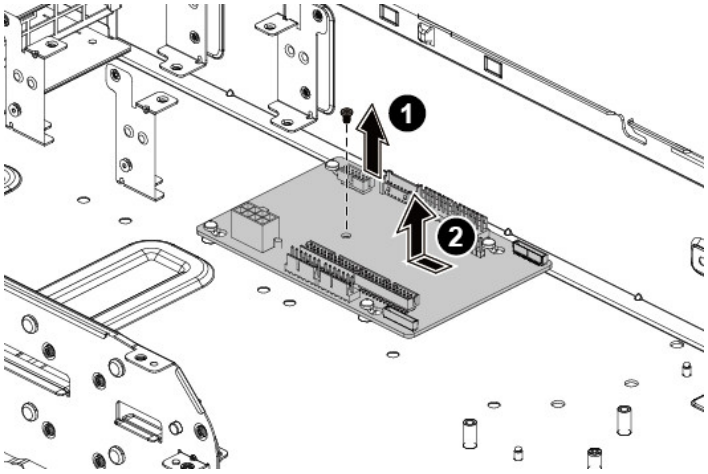
3.18.2. To install a system fan

Reverse the step above to install a system fan.

3.18.3. To remove the fan control board

1. Loosen the screw that secures the fan control board.
2. Remove the fan control board out of the chassis along the direction of the arrow.

Figure 3.60. Removing the Fan Control Board



3.18.4. To install the fan control board

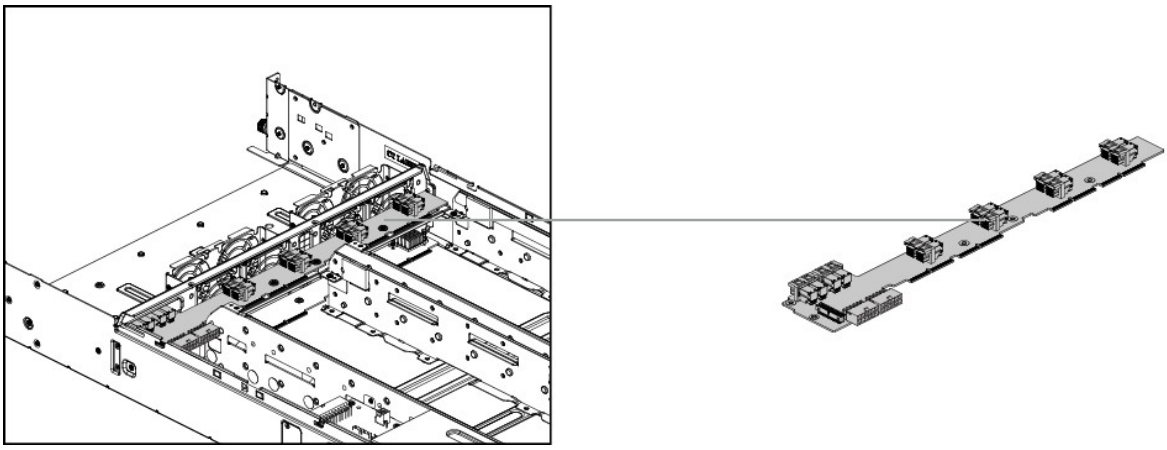
Reverse the steps above to install the fan control board.

3.19. Middle Plane

This server supports two middle planes: the upper one and the lower one. The lower middle plane supports NIC or NTB middle planes based on the storage OS.

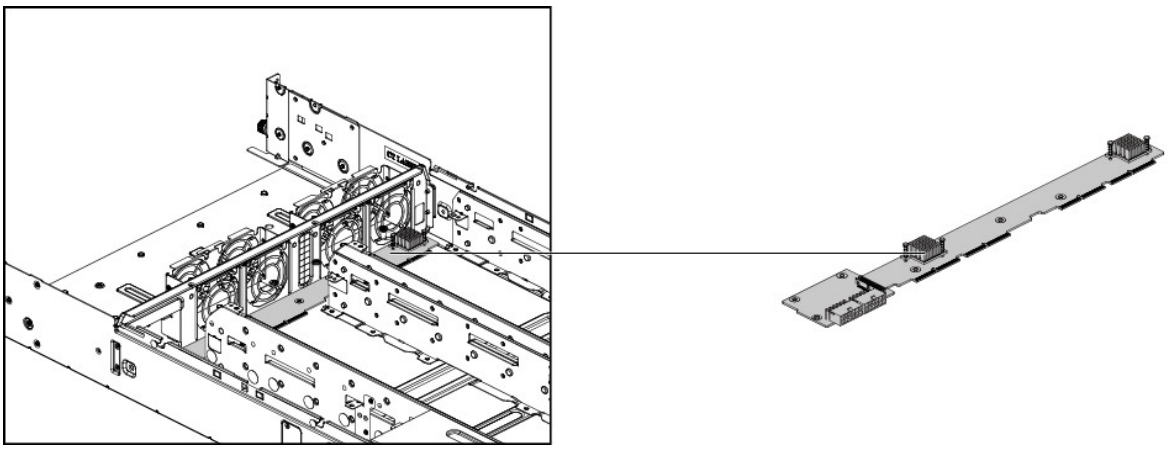
The location of upper middle plane is shown below:

Figure 3.61. Upper Middle Plane Location



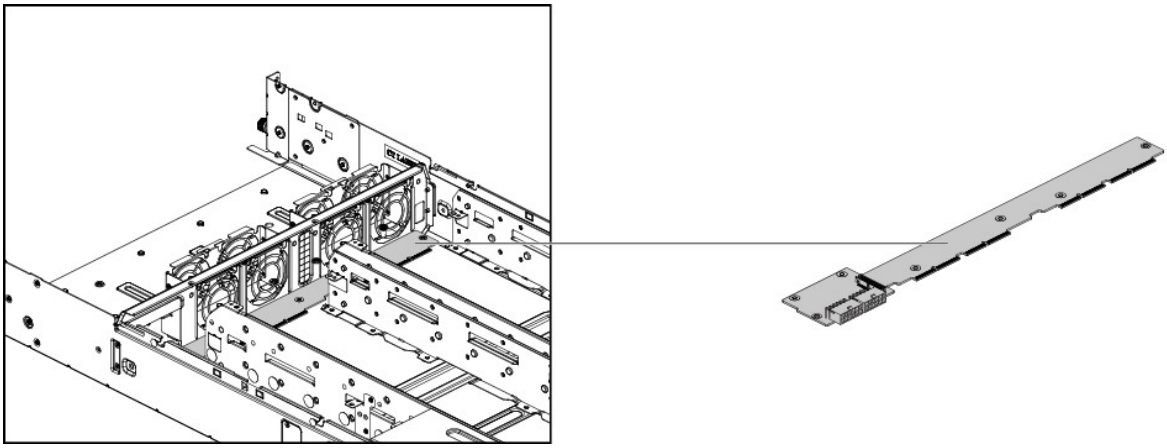
The location of lower NIC middle plane is shown below:

Figure 3.62. Lower NIC Middle Plane Location



The location of lower NTB middle plane is shown below:

Figure 3.63. Lower NTB Middle Plane Location



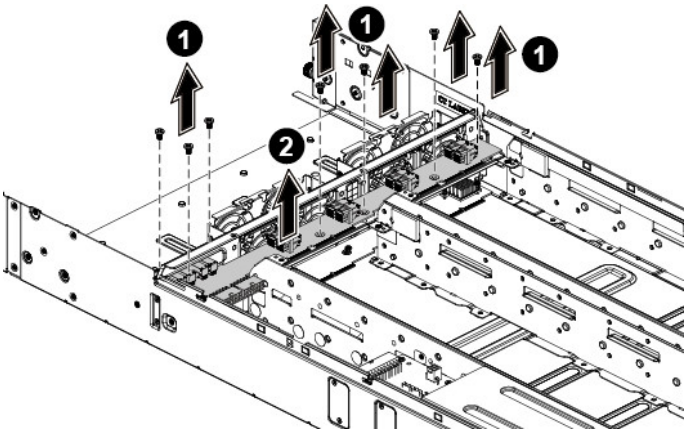
Before you remove or install the middle plane, please follow the steps below:

1. Make sure the server is not turned on or connected to the AC power.
2. Remove the chassis cover. To remove the chassis cover, see Section 3.2, “Top Cover”
3. Remove the node. To remove the node, see Section 3.5.1, “Removing a Mainboard Module”
4. Disconnect all the necessary cables.

3.19.1. To remove the middle planes

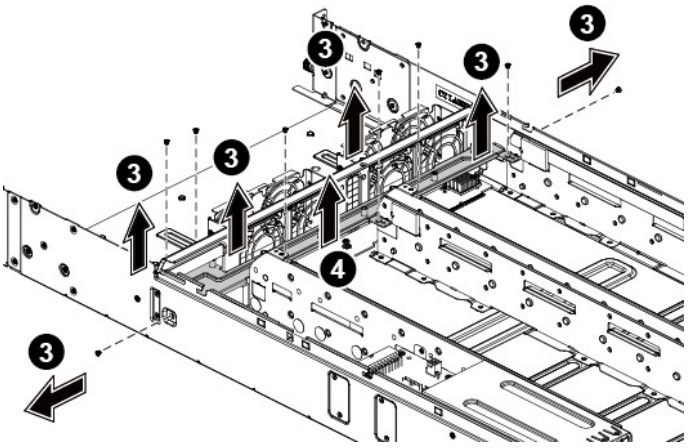
1. Loosen the screws that secure the upper middle plane.
2. Remove the upper middle plane out of the chassis.

Figure 3.64. Removing the Upper Middle Plane



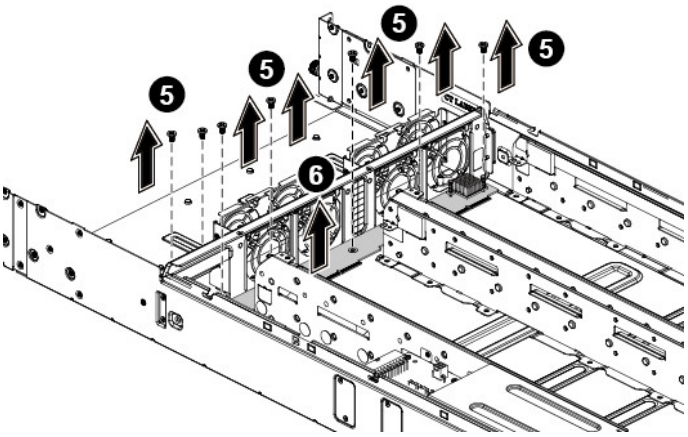
3. Loosen the screws that secure the middle plane bracket.
4. Remove the middle plane bracket out of the chassis.

Figure 3.65. Removing the Middle Plane Bracket



5. Loosen the screws that secure the lower middle plane.
6. Remove the lower middle plane out of the chassis.

Figure 3.66. Removing the Lower Middle Plane



3.19.2. To install the middle planes

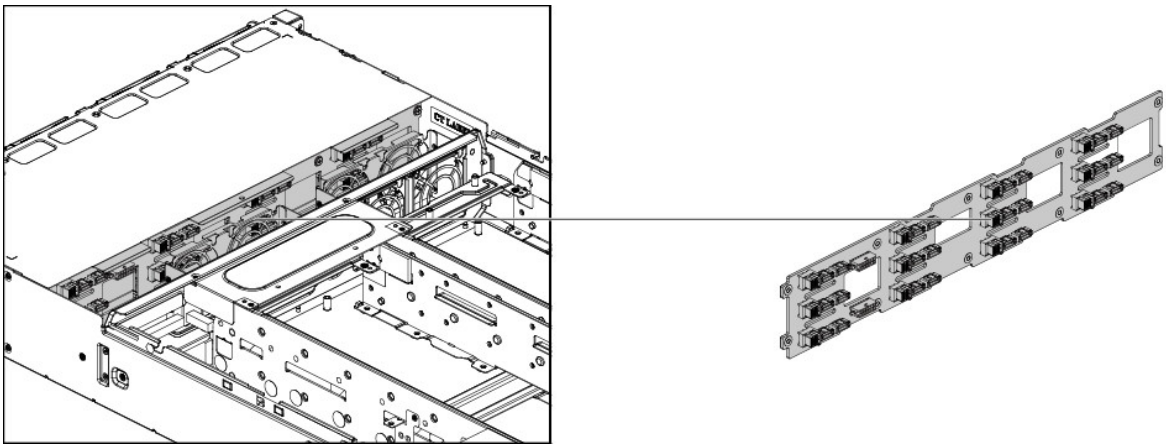
Reverse the steps above to install the middle planes.

3.20. 12x3.5” SATA / SAS HDD Backplane

The backplane supports up to 12 x 3.5” SATA/SAS HDDs in the system. The design incorporates a hot-swappable feature to allow easy replacement of HDDs. The SATA&SAS connectors on each backplane connect to the node to provide power and indicate HDD access and failure.

The location of 3.5” SATA&SAS HDD backplane is shown below:

Figure 3.67. 3.5” HDD Backplane Location



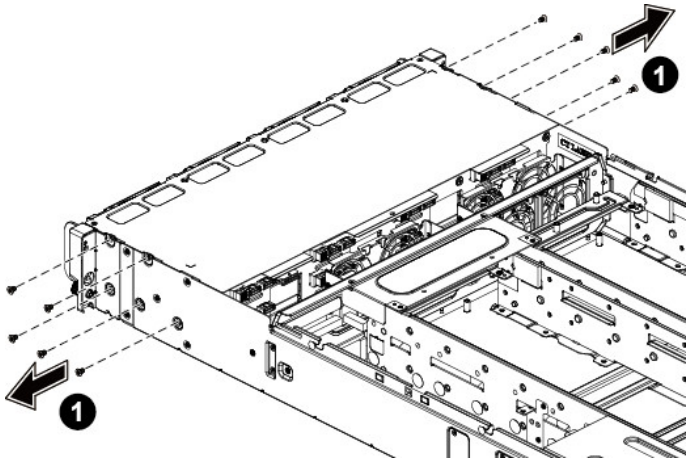
Before you remove or install the SATA/SAS HDD backplane, please follow the steps below:

1. Make sure the server is not turned on or connected to the AC power.
2. Remove the chassis cover. To remove the chassis cover, see Section 3.2, “Top Cover”
3. Remove the HDDs. To remove a HDD, see Section 3.4.2, “Removing a 3.5” Hard Drive tray”
4. Disconnect all the necessary cables.

3.20.1. To remove the backplane

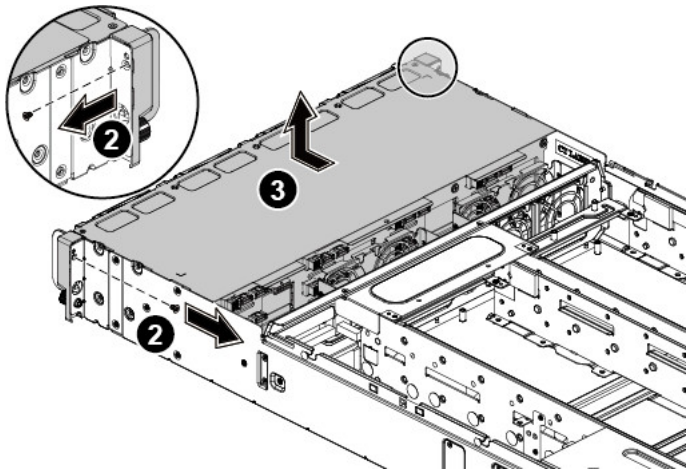
1. Remove the screws that secure the HDD cage.

Figure 3.68. Removing the Screws



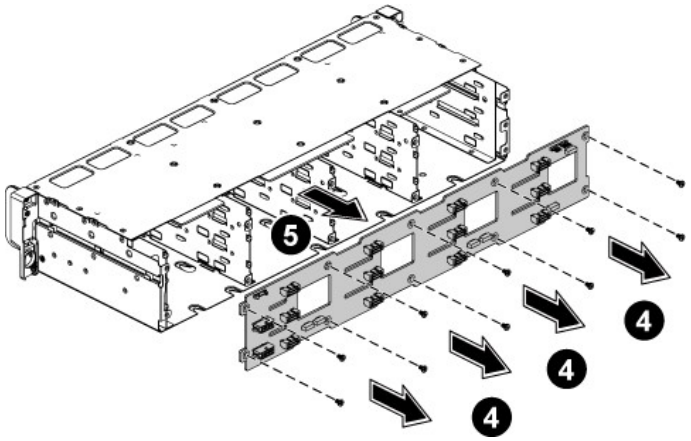
2. Remove the screws that secure the front panels.
3. Remove the HDD cage along the direction of the arrow.

Figure 3.69. Removing the HDD Cage



4. Loosen the screws that secure the backplane to the HDD cage.
5. Remove the backplane from the HDD cage.

Figure 3.70. Removing the backplane



3.20.2. To install the backplane

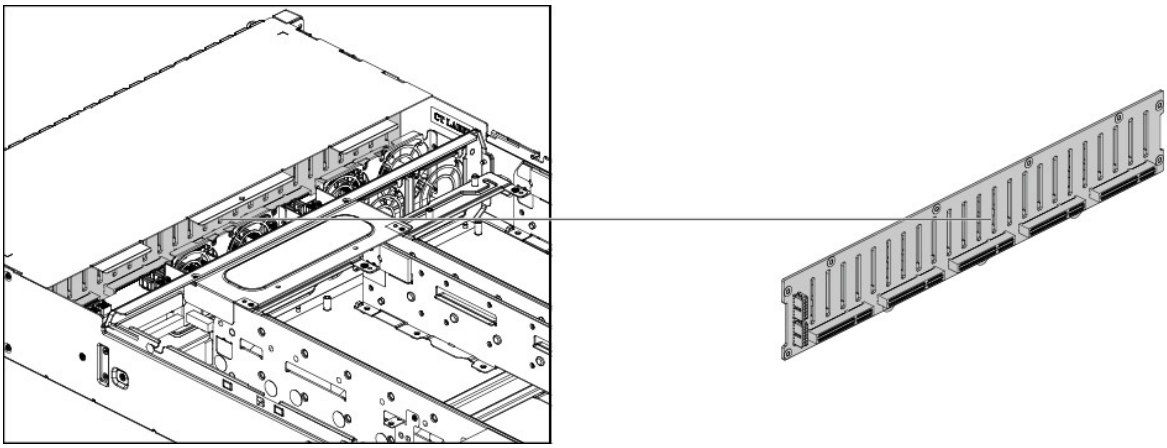
Reverse the steps above to install the backplane.

3.21. 24x2.5” SATA / SAS HDD Backplane

The backplane supports up to 24 x 2.5” SATA/SAS HDDs in the system. The design incorporates a hot-swappable feature to allow easy replacement of HDDs. The SATA&SAS connectors on each backplane connect to the node to provide power and indicate HDD access and failure.

The location of 2.5” SATA&SAS HDD backplane is shown below:

Figure 3.71. 24 x 2.5”HDD Backplane Location



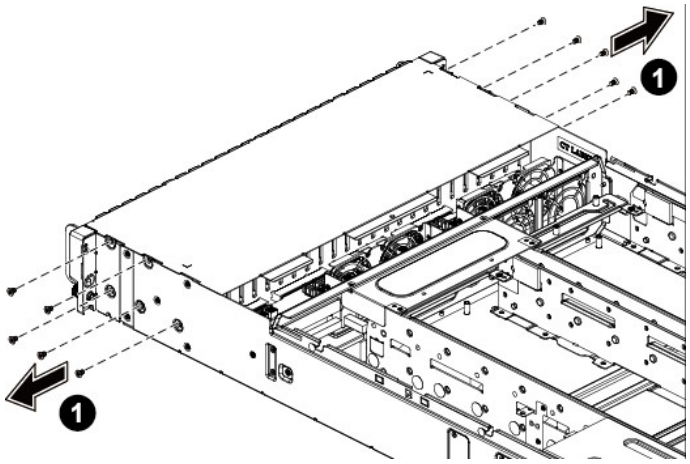
Before you remove or install the SATA/SAS HDD backplane, please follow the steps below:

1. Make sure the server is not turned on or connected to the AC power.
2. Remove the chassis cover. To remove the chassis cover, see Section 3.2, “Top Cover”
3. Remove the HDDs. To remove a HDD, see Section 3.4.2, “Removing a 3.5” Hard Drive tray”
4. Disconnect all the necessary cables.

3.21.1. To remove the backplane

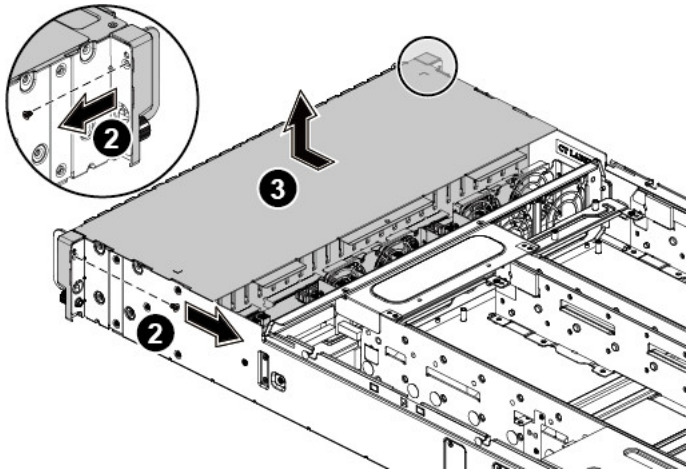
1. Remove the screws that secure the HDD cage.

Figure 3.72. Removing the Screws



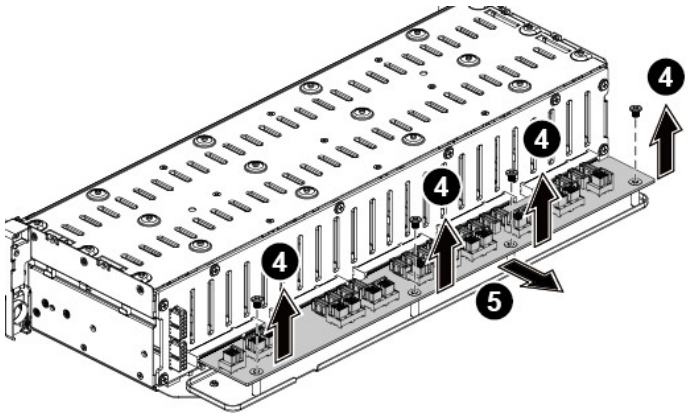
2. Remove the screws that secure the front panels.
3. Remove the HDD cage along the direction of the arrow.

Figure 3.73. Removing the HDD Cage



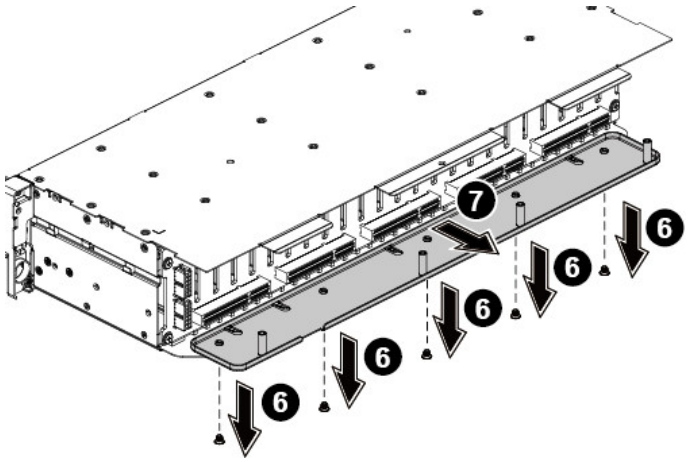
4. Loosen the screws that secure the bridge board to the bridge board bracket.
5. Remove the bridge board from the bridge board bracket.

Figure 3.74. Removing the Bridge Board



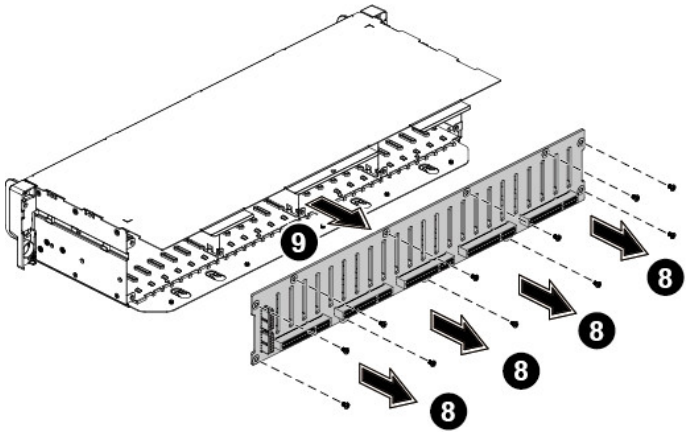
6. Loosen the screws that secure the bridge board bracket to the HDD cage.
7. Remove the bridge board bracket from the HDD cage.

Figure 3.75. Removing the Bridge Board Bracket



8. Loosen the screws that secure the backplane to the HDD cage.
9. Remove the backplane from the HDD cage.

Figure 3.76. Removing the Backplane



3.21.2. To install the backplane

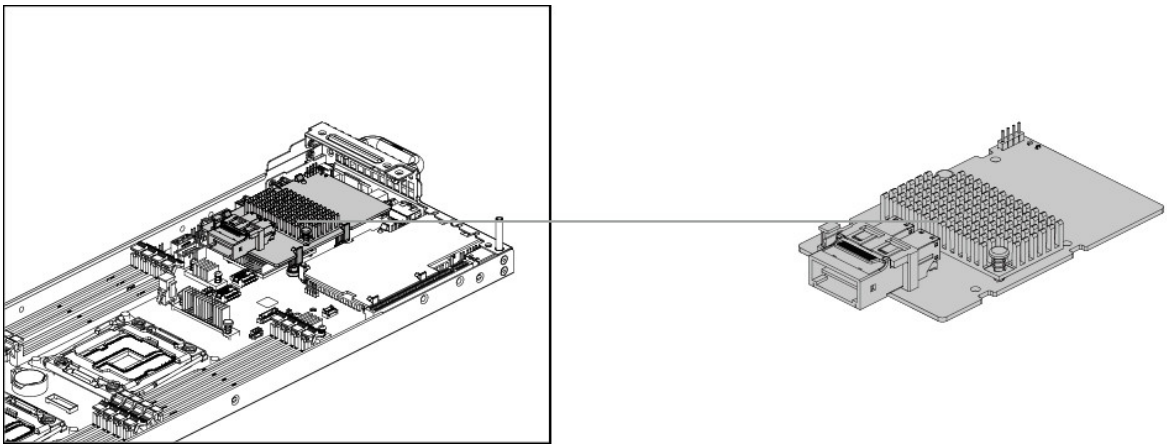
Reverse the steps above to install the backplane.

3.22. HBA Card

The server supports one HBA card.

The location of the HBA card on the server is as below:

Figure 3.77. HBA Card Location



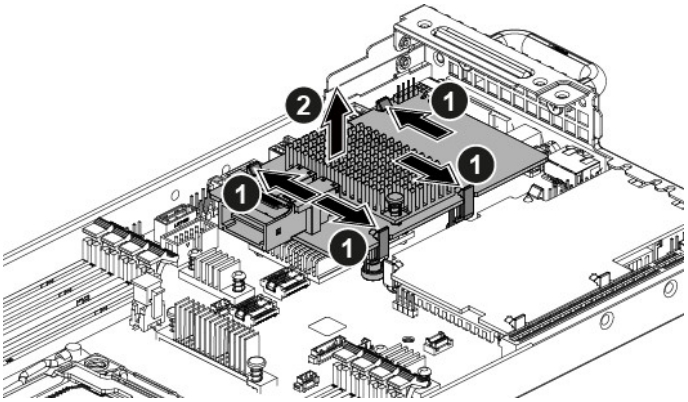
Before you remove or install the HBA card, please follow the steps below:

1. Make sure the server is not turned on or connected to AC power.
2. Remove the chassis cover. To remove the chassis cover, see Section 3.2, “Top Cover”
3. Remove the node. To remove the node, see Section 3.5.1, “Removing a Mainboard Module”
4. Disconnect all necessary cables.

3.22.1. To remove the HBA card

1. Open the locking clips that secure the HBA card.
2. Remove the HBA card out of the chassis.

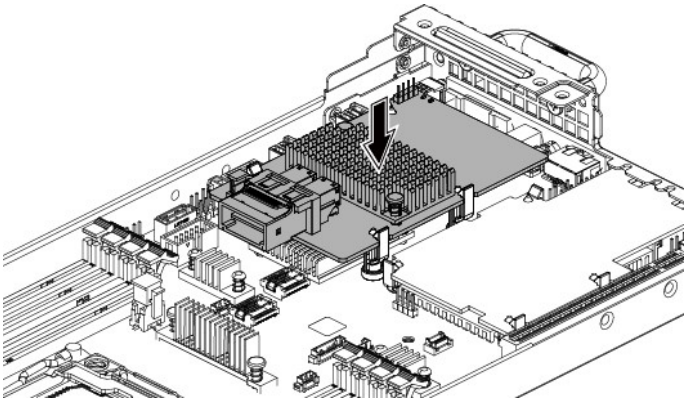
Figure 3.78. Removing the HBA Card



3.22.2. To install the HBA card

1. Align and press down the HBA card until it clicks in place and is secured by the locking clips.

Figure 3.79. Installing the HBA Card

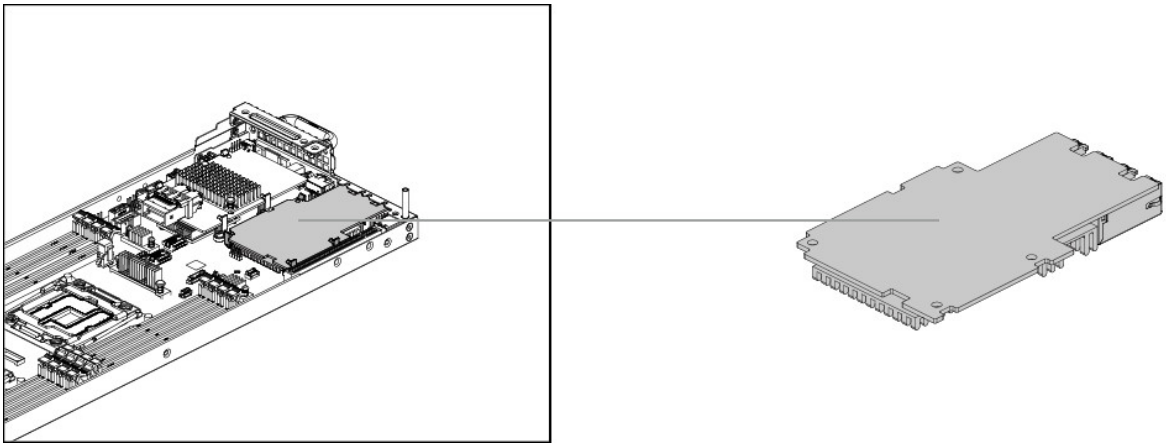


3.23. OCP Card

The server supports two types of OCP cards: OCP 1G/10G Base-T NIC, and OCP SFP+ NIC.

The location of the OCP card on the server is as below:

Figure 3.80. OCP Card Location



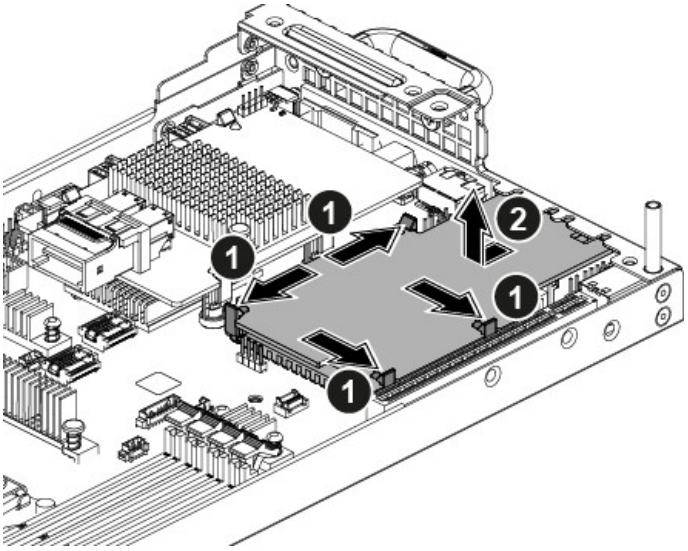
Before you remove or install the HBA card, please follow the steps below:

1. Make sure the server is not turned on or connected to AC power.
2. Remove the chassis cover. To remove the chassis cover, see Section 3.2, “Top Cover”
3. Remove the node. To remove the node, see Section 3.5.1, “Removing a Mainboard Module”
4. Disconnect all necessary cables.

3.23.1. To remove the OCP card

1. Open the locking clips that secure the OCP card.
2. Remove the OCP card out of the chassis.

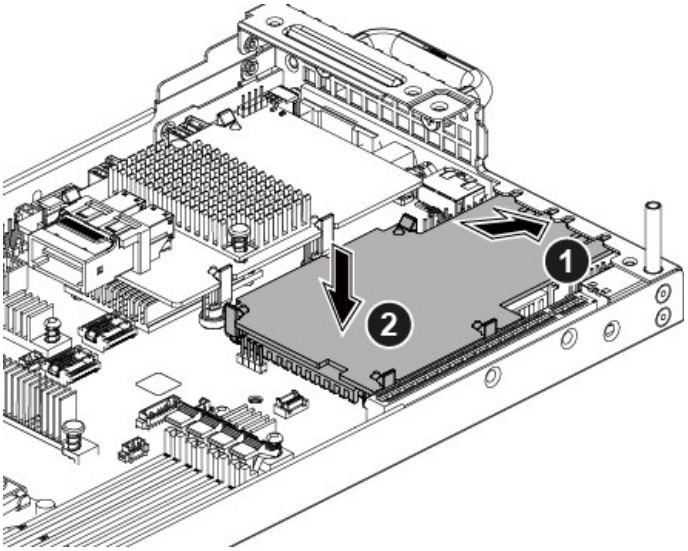
Figure 3.81. Removing the OCP Card



3.23.2. To install the OCP card

1. Align the OCP card in the direction as shown below.
2. Press down the OCP card until it clicks in place and is secured by the locking clips.

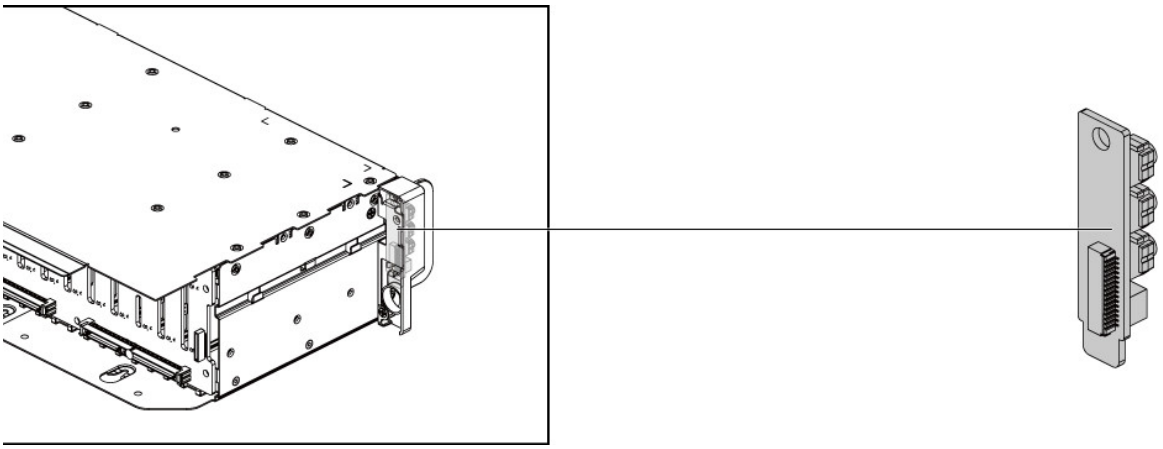
Figure 3.82. Installing the OCP Card



3.24. Front Panel

The location of the front panel on the server is shown below:

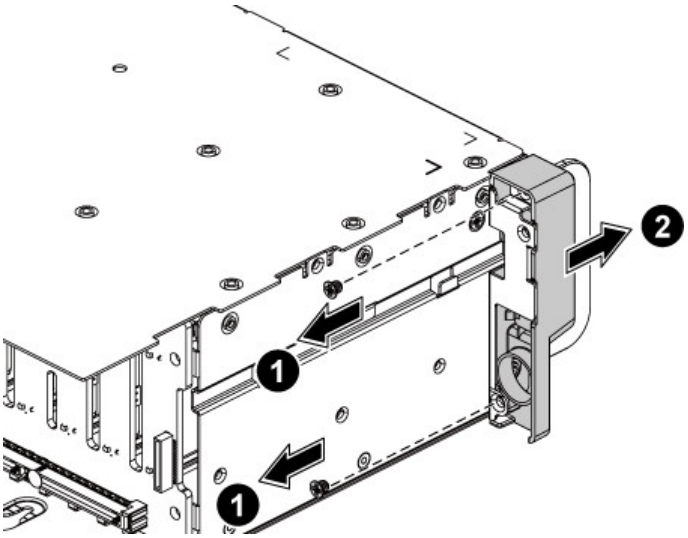
Figure 3.83. Front Panel Location



3.24.1. To remove the front panel

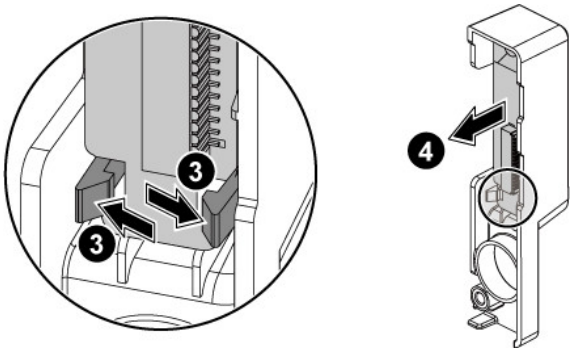
1. Loosen the screws that secure the front panel assembly.
2. Remove the frong panel assembly out of the chassis.

Figure 3.84. Removing the Front Panel Assembly



3. Push aside the retaining clip.
4. Remove the front panel out of the assembly.

Figure 3.85. Removing the Front Panel



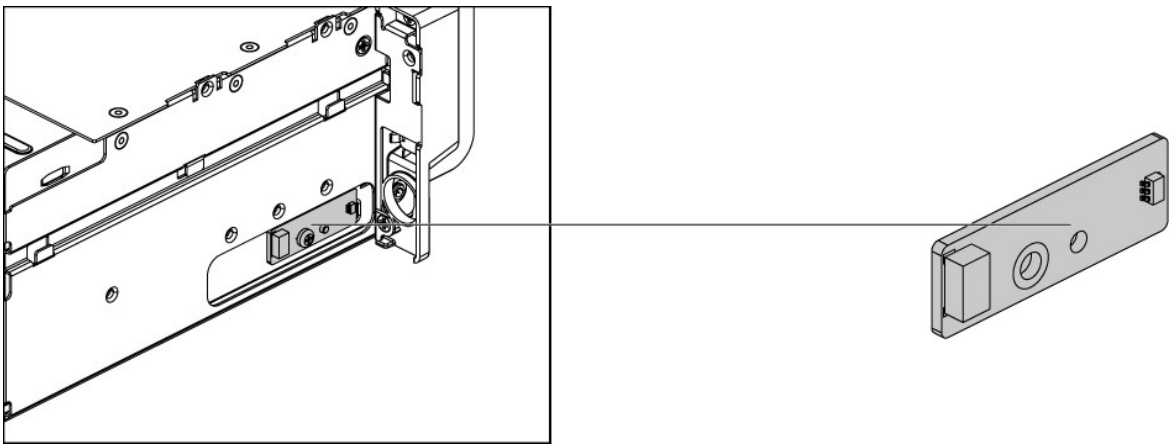
3.24.2. To install the front panel

Reverse the steps above to install the front panel.

3.25. Sensor Board

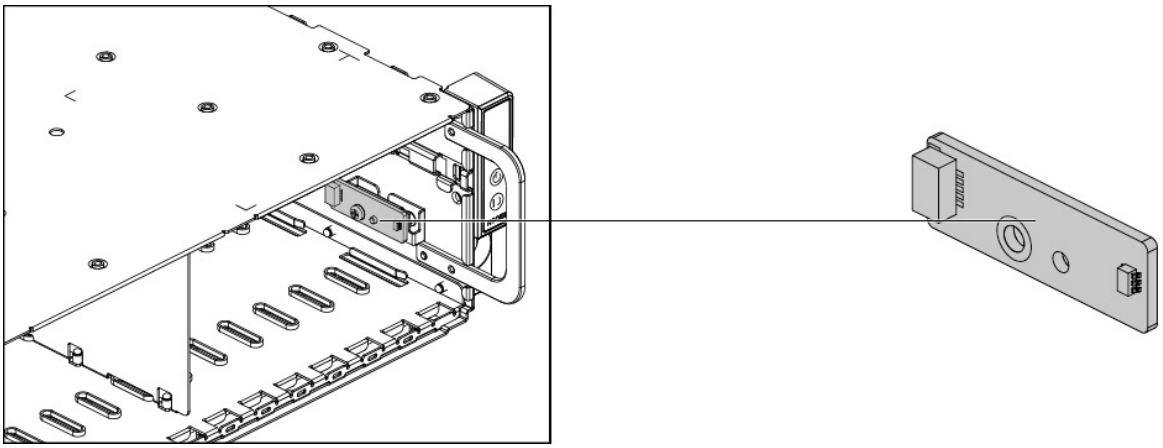
The location of the sensor board on the 12x3.5” HDD server is shown below:

Figure 3.86. 12x3.5” HDD Server Sensor Board Location



The location of the sensor board on the 24x2.5” HDD server is shown below:

Figure 3.87. 24x2.5” HDD Server Sensor Board Location



3.25.1. To remove the sensor board of 12 x 3.5” HDD Server

Before you remove or install the sensor board, please follow the steps below:

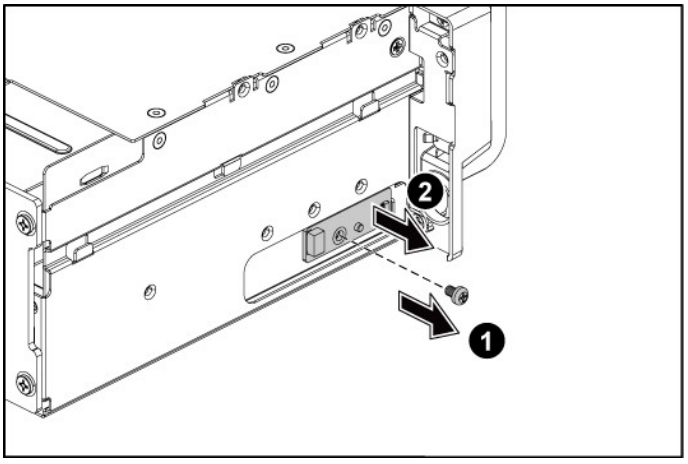
1. Make sure the server is not turned on or connected to the AC power.
2. Remove the chassis cover. To remove the chassis cover, see Section 3.2, “Top Cover”
3. Remove the HDDs.To remove a HDD, see Section 3.4.2, “Removing a 3.5” Hard Drive tray”
4. Remove the HDD cage. To remove the HDD cage, see the steps 1~2 in Section 3.20.1, “To remove the backplane”

5. Disconnect all the necessary cables.

Steps:

1. Loosen the screw that secures the sensor board.
2. Remove the sensor board.

Figure 3.88. Removing the Sensor Board



3.25.2. To install the sensor board of 12x3.5” HDD Server

Reverse the steps above to install the sensor board.

3.25.3. To remove the sensor board of 24 x 2.5” HDD Server

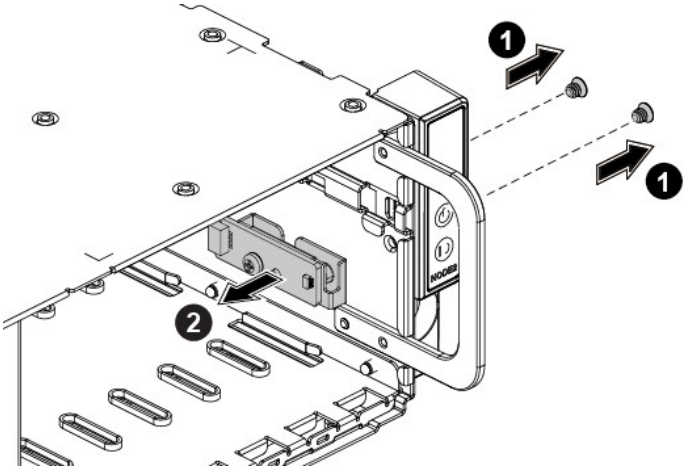
Before you remove or install the sensor board, please follow the steps below:

1. Make sure the server is not turned on or connected to the AC power.
2. Remove the chassis cover. To remove the chassis cover, see Section 3.2, “Top Cover”
3. Remove the HDDs.To remove a HDD, see Section 3.4.2, “Removing a 3.5” Hard Drive tray”
4. Remove the HDD cage. To remove the HDD cage, see the steps 1~2 in Section 3.21.1, “To remove the backplane”
5. Disconnect all the necessary cables.

Steps:

1. Loosen the screw that secures the sensor board.
2. Remove the sensor board.

Figure 3.89. Removing the Sensor Board



3.25.4. To install the sensor board of 24 x 2.5” HDD Server

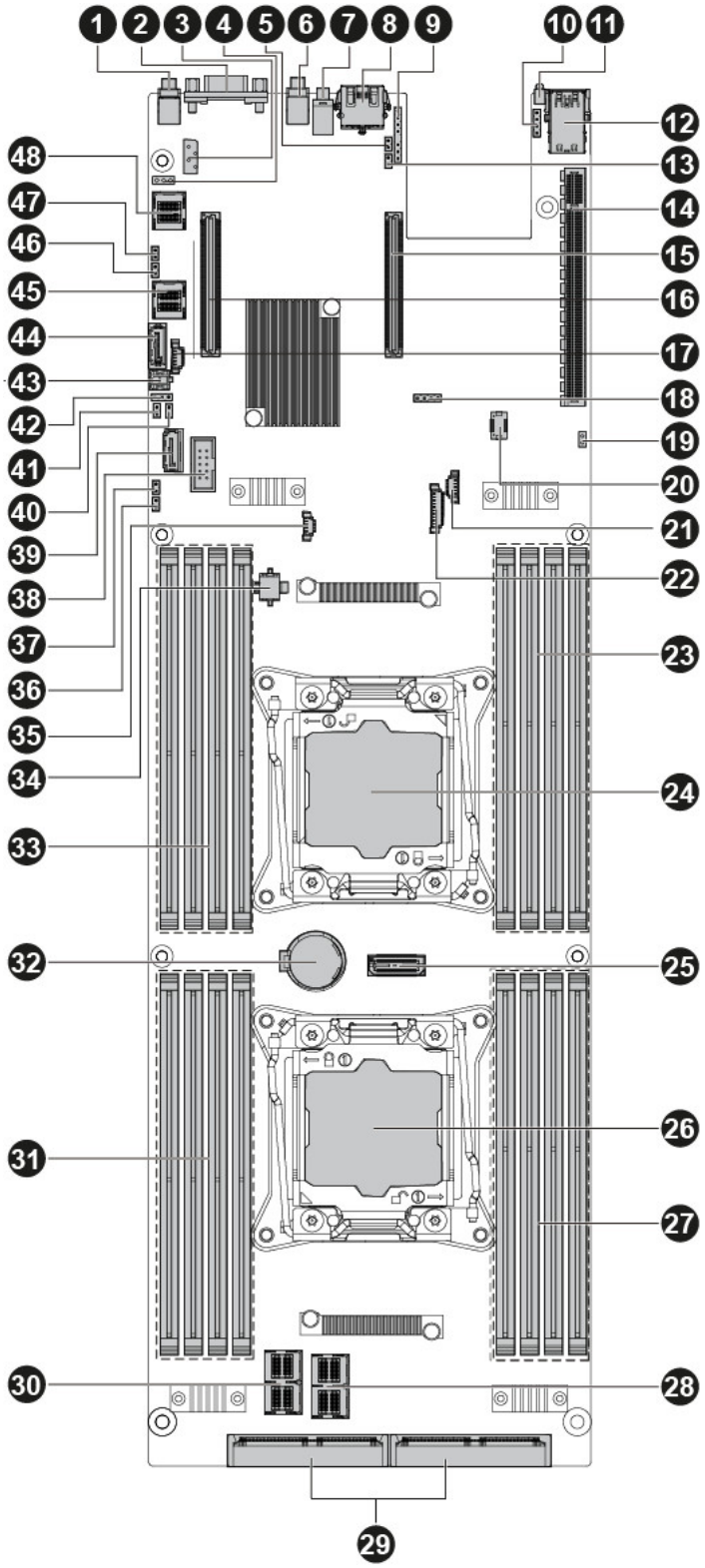
Reverse the steps above to install the sensor board.

Chapter 4. Connectors

4.1. Motherboard Connectors

This section provides information on basic connectors on system mainboard.

Figure 4.1. Mainboard Overview



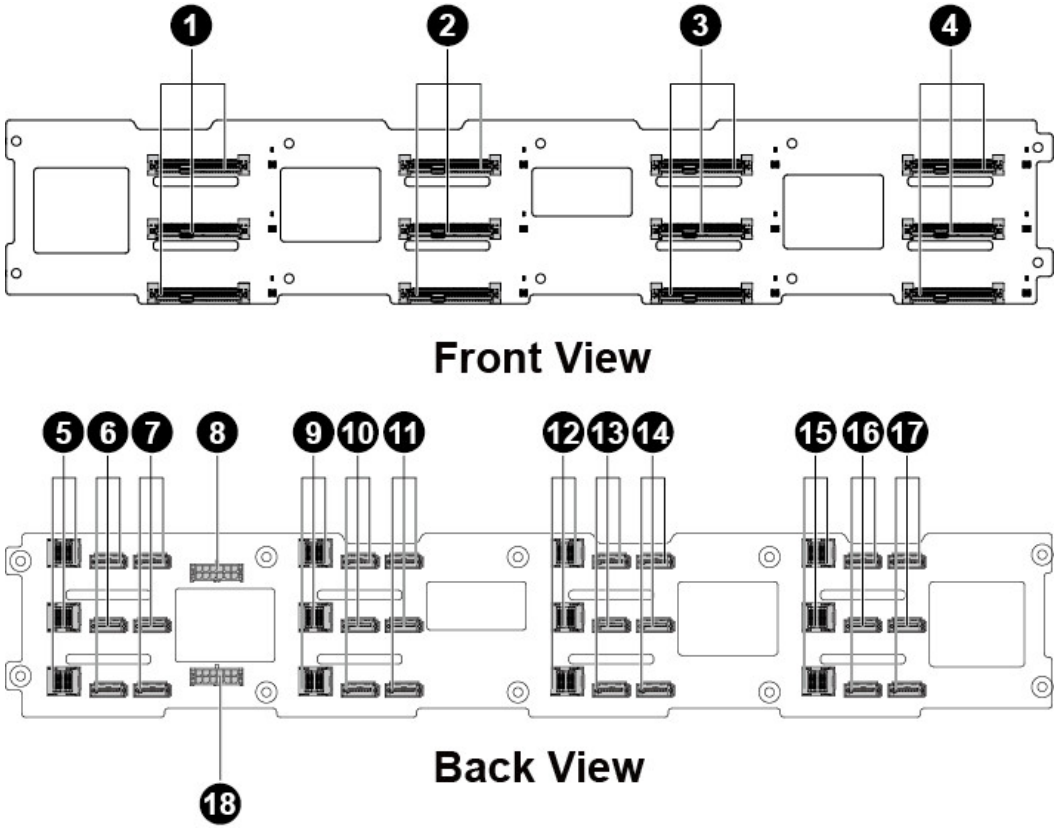
1. Mainboard Connectors

ITEM	DESCRIPTION
1	Power Button/LED (SW1)
2	VGA Connector (J39)
3	IPMB Connector (J62)
4	Host SMBus Connector (J52)
5	ME Upgrade Jumper (J63)
6	ID Button/LED (SW2)
7	BMC Reset Button (SW3)
8	Management Port (J50)
9	CPLD JTAG Connector (J60)
10	UART Connector (J29)
11	System Health LED (CR1)
12	USB Port (J33)
13	QPI Slow Jumper (J58)
14	PCI-E x16 Slot (J37)
15	Mezz Slot 1 (J26)
16	Mezz Slot 2 (J57)
17	SATA SGPIO Connector (J41)
18	BMC Debug Connector (J44)
19	Power Debug Header (J70)
20	TPM Connector (J2)
21	SGPIO Connector (J71)
22	BP LED Connector (J72)
23	DIMM Slots for Processor 0 (J11, J12, J13, J14)
24	Processor 0 (U25)
25	XDP Connector (J46)
26	Processor 1 (U26)
27	DIMM Slots for Processor 1 (J15, J16, J17, J18)
28	PCI-E Mini-SAS Connector (J3)
29	Backplane Connectors (J76, J77)
30	BP Mini-SAS Connector (J24)
31	DIMM Slots for Processor 1 (J19, J20, J21, J22)
32	Battery (BH1)
33	DIMM Slots for Processor 0 (J7, J8, J9, J10)
34	BP Power Connector (J64)

35	Power FW Flash Header (J125)
36	Clear Password Jumper (J51)
37	Clear CMOS Jumper (J59)
38	Internal USB Connector (J81)
39	PCH SATA Connector 0 (J32)
40	BIOS Recovery Jumper (J27)
41	Intruder Header (J53)
42	Repeater I2C Connector (J79)
43	SATA DOM Power Connector (J6)
44	PCH SATA Connector 1 (J34)
45	PCH SATA Connector 2~5 (J42)
46	NMI Jumper (J75)
47	ME Recovery Jumper (J49)
48	PCH SSATA Connector 0~3 (J1)

4.1.1. 12 x 3.5” HDD Backplane Connectors

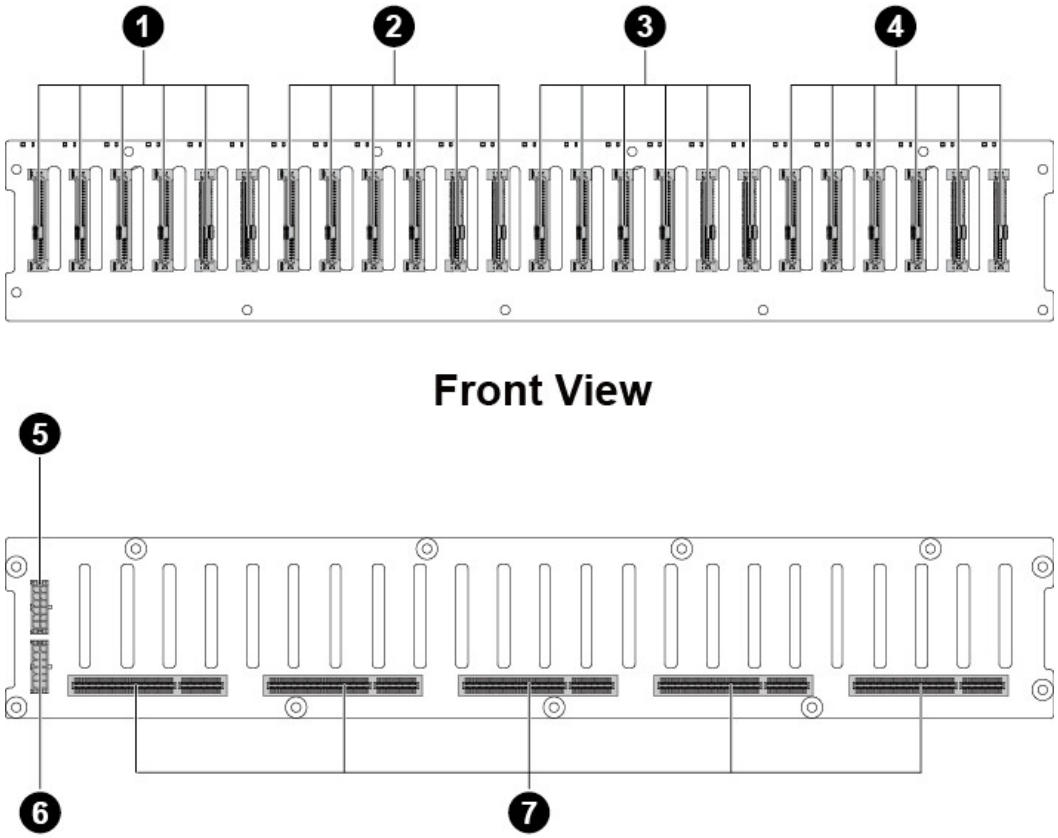
Figure 4.2. 12x3.5“ HDD Backplane



LOCATION		CONNECTOR	
1	SAS/NVMe HDD Connectors 0-2 (from top to bottom, the same after in this table)	10	SAS1 HDD Connectors 6-8
2	SAS/NVMe HDD Connectors 3-5	11	SAS0 HDD Connectors 6-8
3	SAS/NVMe HDD Connectors 6-8	12	PCIE Connectors 3-5
4	SAS/NVMe HDD Connectors 9-11	13	SAS1 HDD Connectors 3-5
5	PCIE Connectors 9-11	14	SAS0 HDD Connectors 3-5
6	SAS1 HDD Connectors 9-11	15	PCIE Connectors 0-2
7	SAS0 HDD Connectors 9-11	16	SAS1 HDD Connectors 0-2
8	Power Connector 1	17	SAS0 HDD Connectors 0-2
9	PCIE Connectors 6-8	18	Power Connector 2

4.1.2. 24 x 2.5” HDD Backplane Connectors

Figure 4.3. 24x2.5“ HDD Backplane

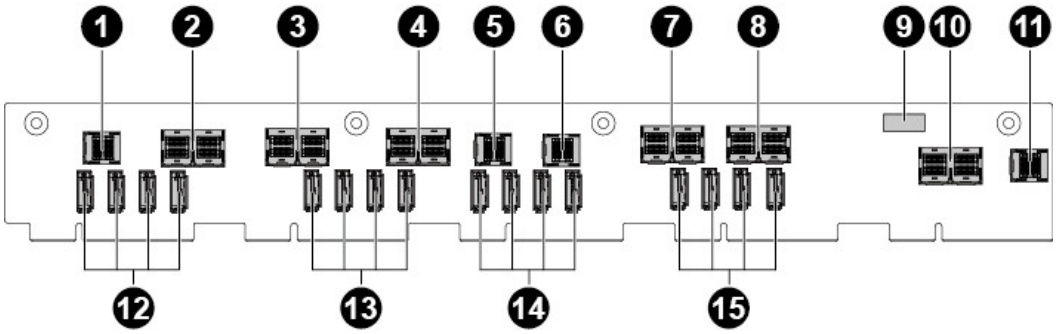


LOCATION	CONNECTOR

1	SAS HDD Connectors 0-3 SAS/NVMe Connectors 4-5	5	Power Connector 1
2	SAS HDD Connectors 6-9 SAS/NVMe Connectors 10-11	6	Power Connector 2
3	SAS HDD Connectors 12-15 SAS/ NVMe Connectors 16-17	7	Bridge Board Connectors
4	SAS HDD Connectors 18-21 SAS/ NVMe Connectors 22-23		

4.2. Bridge Board Connectors

Figure 4.4. Bridge Board

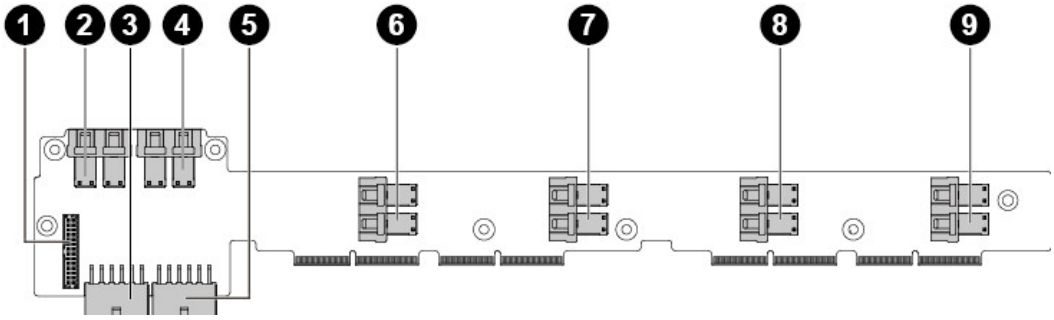


LOCATION		CONNECTOR	
1	SAS0 HDD Connectors 0-3	9	Power On Connector
2	PCIE Connectors 4-5	10	PCIE Connectors 22-23
3	SAS0 HDD Connectors 8-15	11	SAS1 HDD Connectors 20-23
4	PCIE Connectors 10-11	12	SAS0 HDD Connectors 4-7
5	SAS0 HDD Connectors 20-23	13	SAS0 HDD Connectors 16-19
6	SAS1 HDD Connectors 0-3	14	SAS1 HDD Connectors 4-7
7	SAS1 HDD Connectors 8-15	15	SAS1 HDD Connectors 16-19
8	PCIE Connectors 16-17		

4.3. Middle Plane Connectors

4.3.1. Upper Middle Plane Connectors

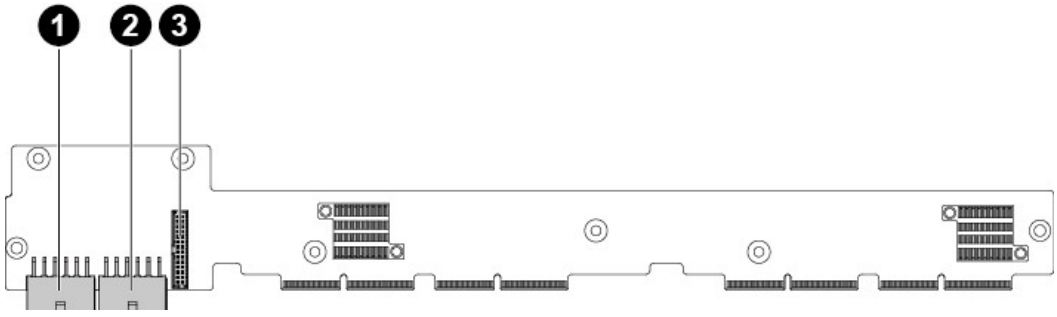
Figure 4.5. Upper Middle Plane



LOCATION		CONNECTOR	
1	FCB Connector	6	SAS1 HDD Connector 0-7
2	SAS1 HDD Connector 16-23	7	SAS0 HDD Connector 16-23
3	Power Connector for Node 1	8	SAS0 HDD Connector 8-15
4	SAS1 HDD Connector 8-15	9	SAS0 HDD Connector 0-7
5	Power Connector for Node 0		

4.3.2. NIC Middle Plane Connectors

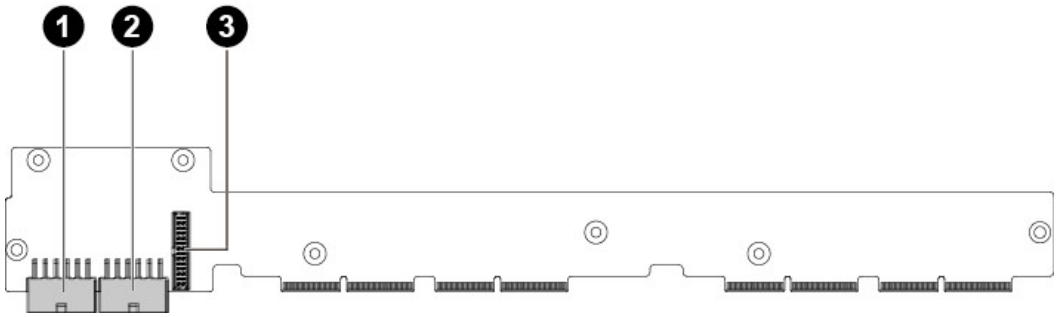
Figure 4.6. NIC Middle Plane



LOCATION		CONNECTOR	
1	Power Connector for Node 1	3	FCB Connector
2	Power Connector for Node 0		

4.3.3. NTB Middle Plane

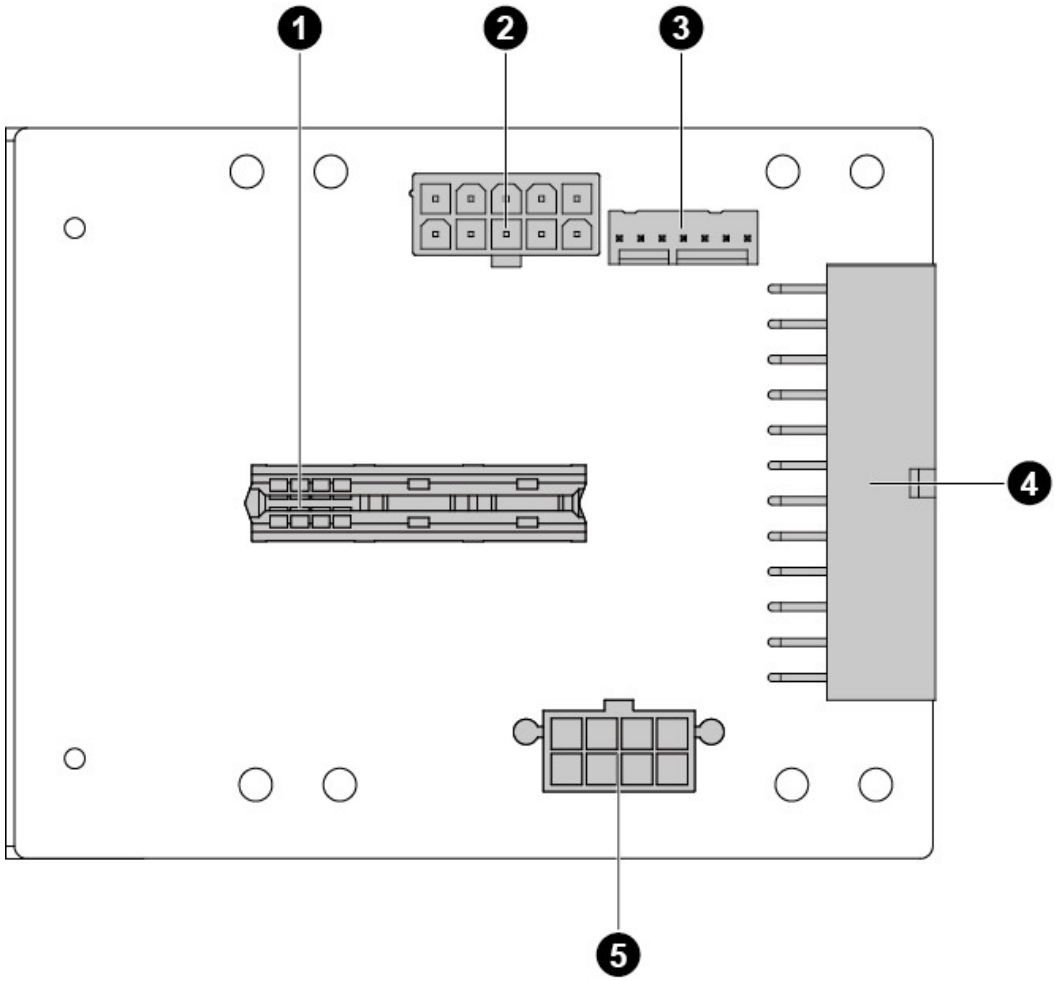
Figure 4.7. NTB Middle Plane



LOCATION		CONNECTOR	
1	Power Connector for Node 1	3	FCB Connector
2	Power Connector for Node 0		

4.4. Power Distribution Board Connectors

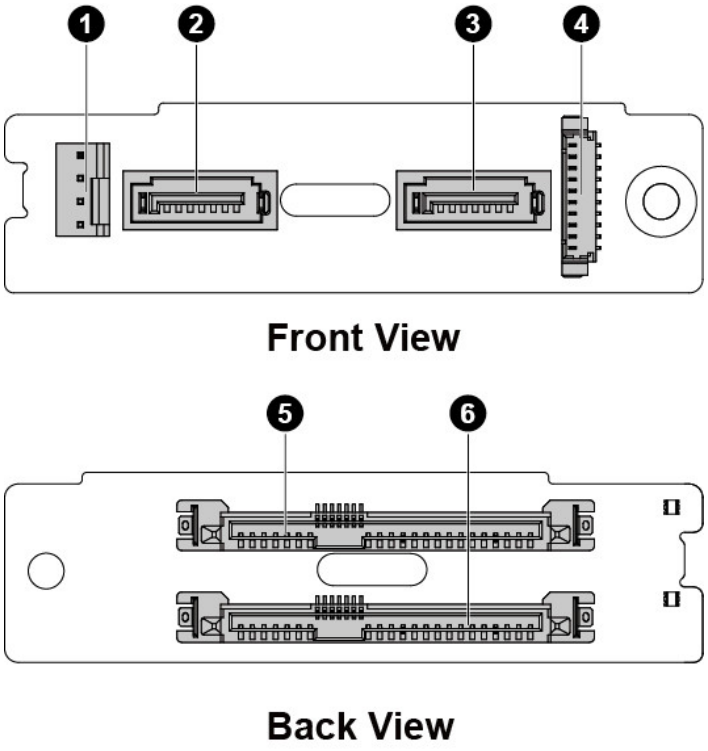
Figure 4.8. Power Distribution Board



LOCATION		CONNECTOR	
1	Bridge Board Connector	4	Main Power Connector for Mother-board
2	HDD Backplane Power Connector	5	FCB Power Connector
3	PMBUS Connector		

4.5. Rear HDD Backplane Connectors

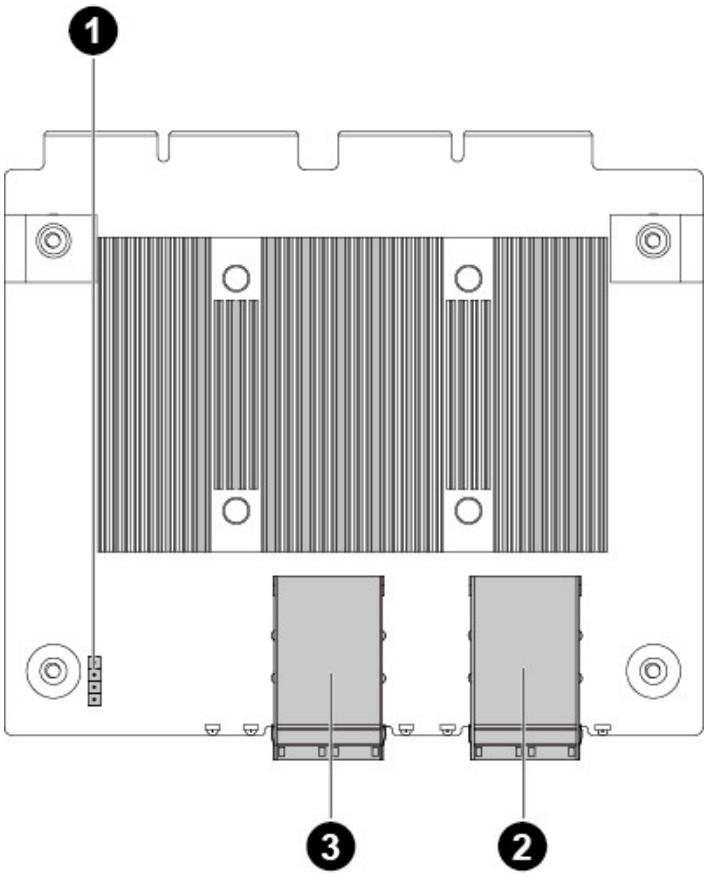
Figure 4.9. Rear HDD Backplane



LOCATION		CONNECTOR	
1	Power Connector	3	SATA Connector 1
2	SATA Connector 2	4	LED Connector
5	HDD Connector 1	6	HDD Connector 2

4.6. Expander Board Connectors

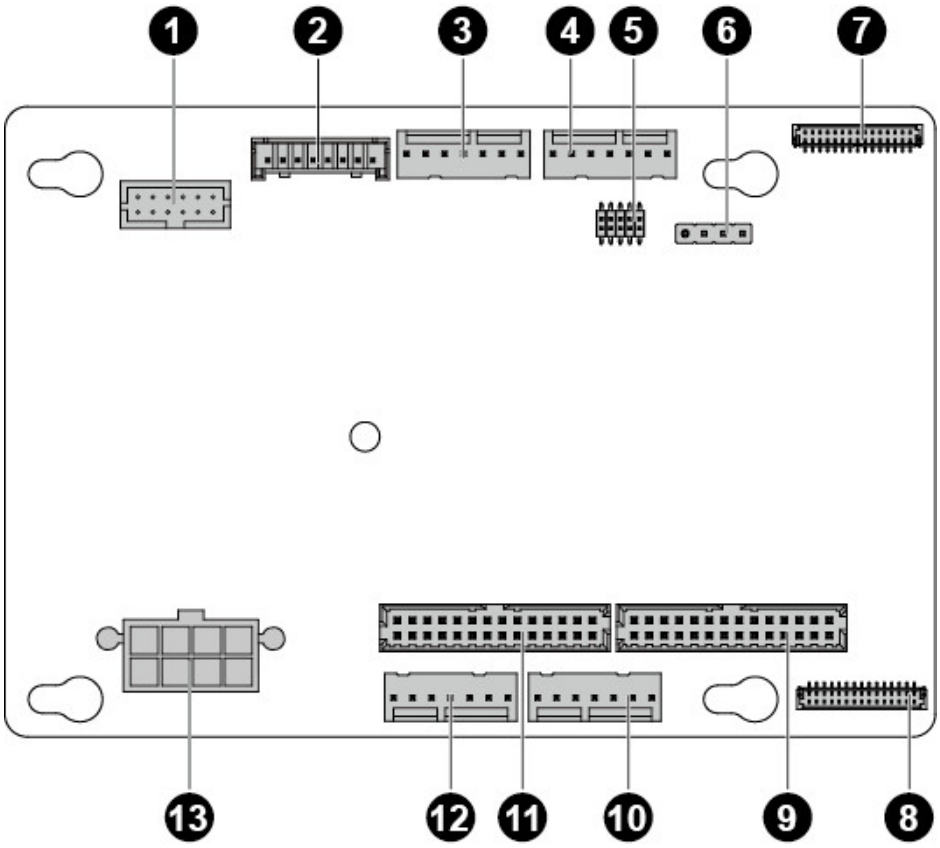
Figure 4.10. Expander Board



LOCATION		CONNECTOR	
1	UART Jumper	3	SAS External Port 1
2	SAS External Port 0		

4.7. Fan Control Board Connectors

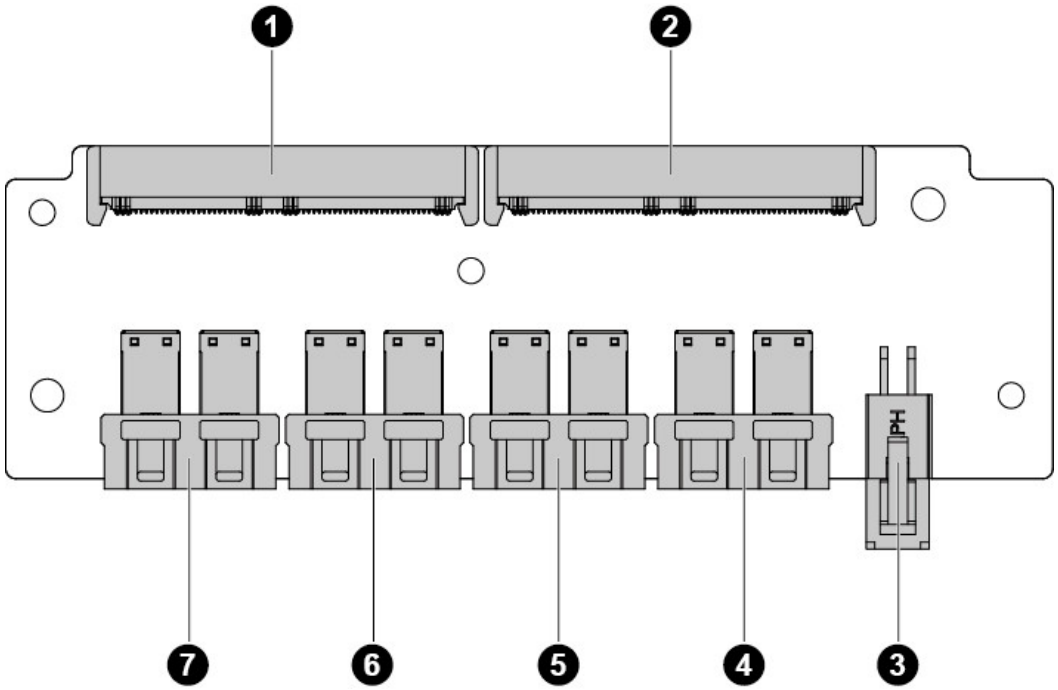
Figure 4.11. Fan Control Board



LOCATION		CONNECTOR	
1	PMBUS Connector	8	Front Panel 1 Connector
2	HDD Backplane Connector	9	Motherboard 1/3 Connector
3	Fan Connector 3	10	Fan Connector 2
4	Fan Connector 4	11	Motherboard 2/4 Connector
5	ARM JTAG Connector	12	Fan Connector 1
6	ARM Serial Port	13	Power Connector
7	Front Panel 2 Connector		

4.8. Interposer Board Connectors

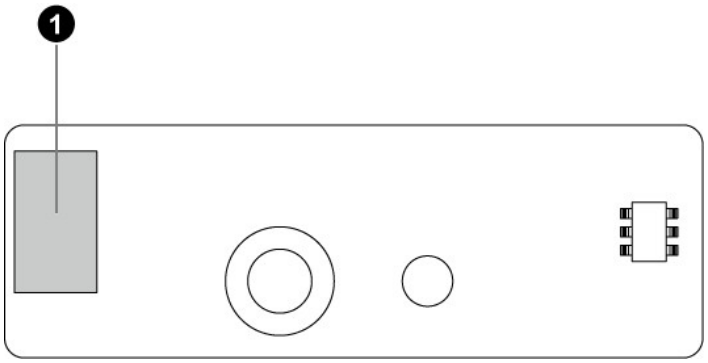
Figure 4.12. Interposer Board



LOCATION		CONNECTOR	
1	Expander/Upper Middle Plane Connector	5	SAS HDD Connector 0-7
2	Expander/Upper Middle Plane Connector	6	SAS HDD Connector 8-15
3	Power Connector	7	SAS HDD Connector 16-23
4	Mezz/Expander Card Connector		

4.9. Sensor Board Connectors

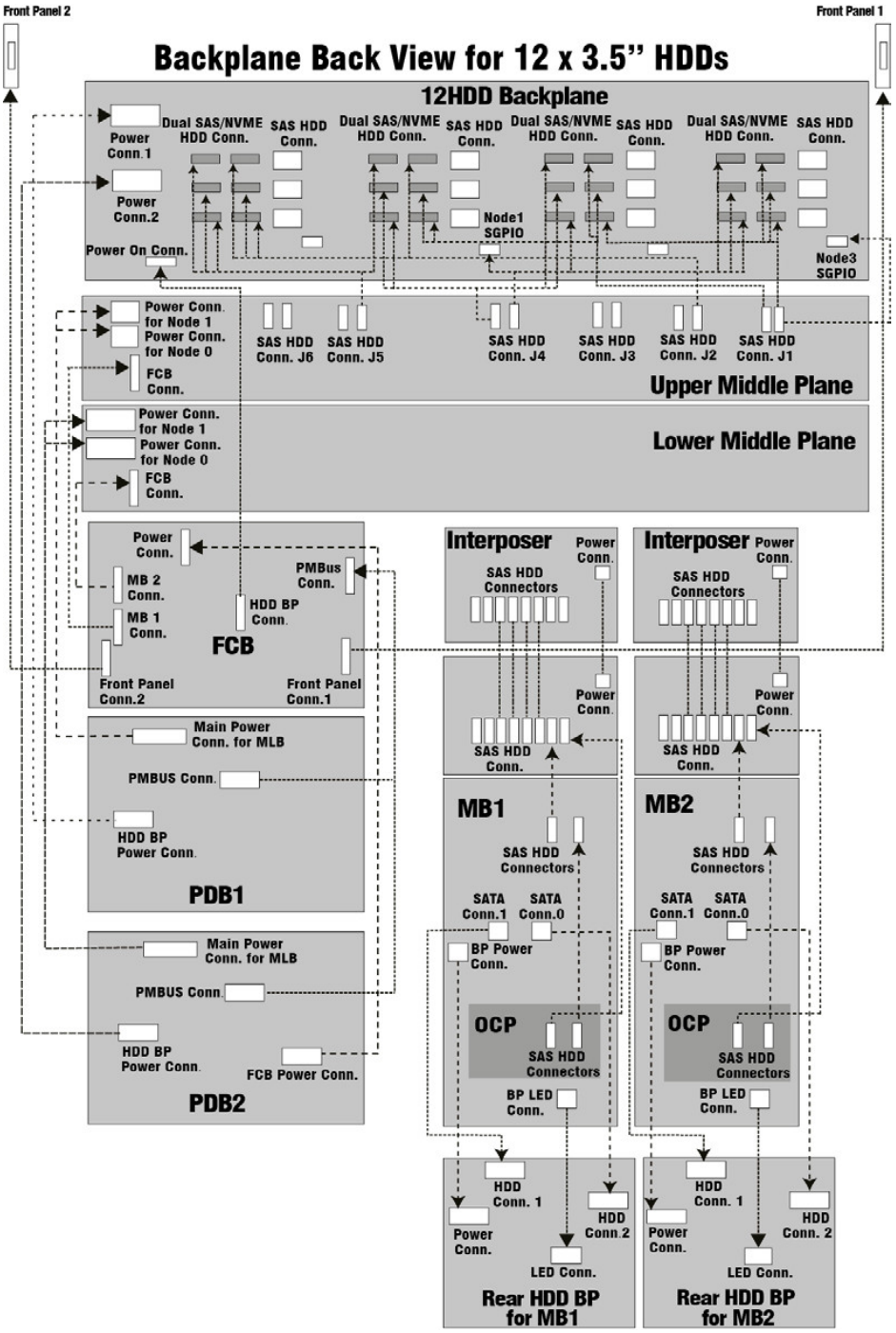
Figure 4.13. Sensor Board



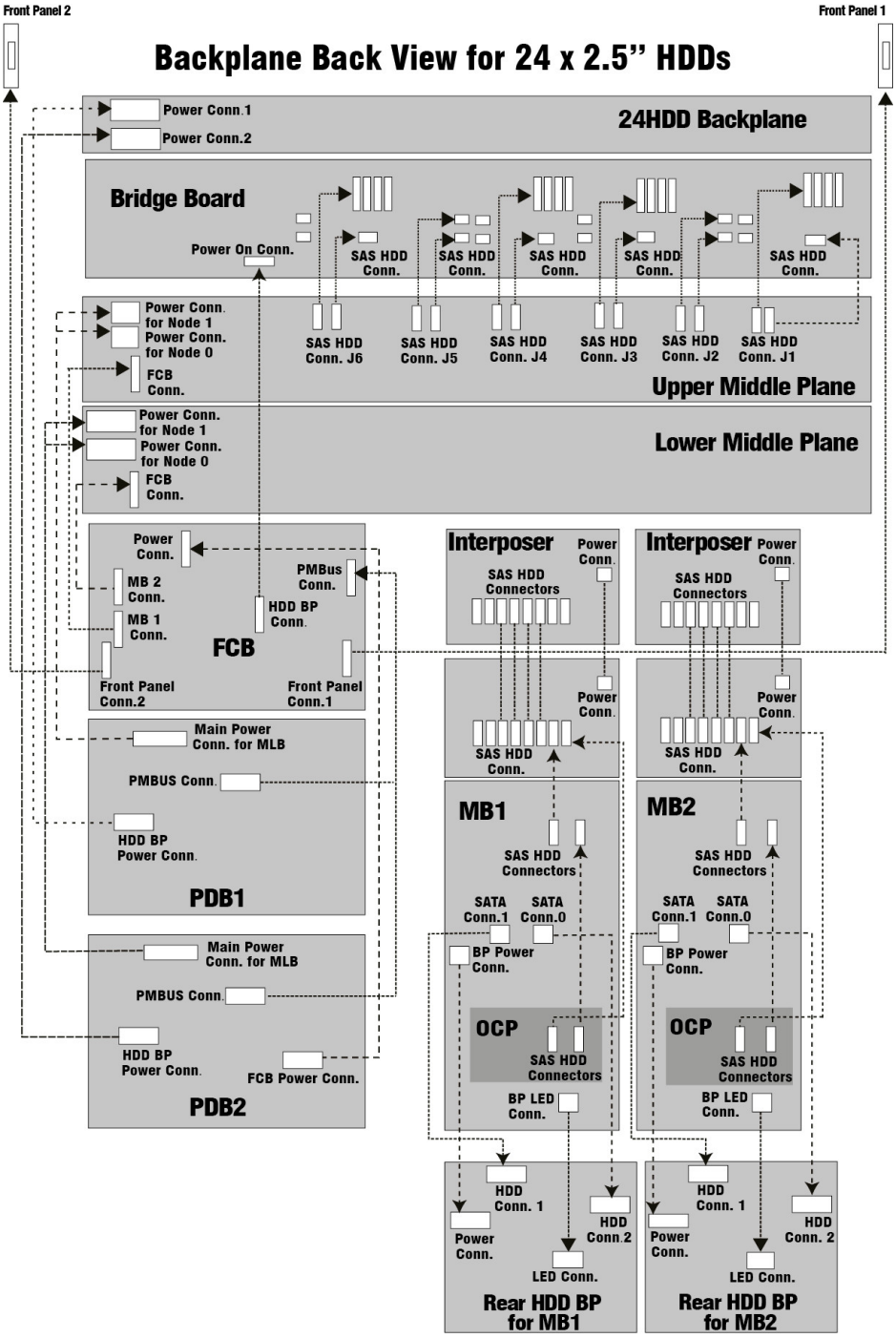
1. I2C Connector

Chapter 5. Cable Routing

5.1. Cable Routing for 12 x 3.5” Hard Drives Configuration



5.2. Cable Routing for 24 x 2.5” Hard Drives Configuration



Chapter 6. BIOS

6.1. BIOS Setup Utility

This section describes the BIOS Setup Utility options. You can run BIOS Setup with or without an operating system being present. Onboard devices are configured with the BIOS Setup utility that is embedded in flash ROM.

The configuration utilities allow you to modify the CMOS RAM and NVRAM. The actual hardware configuration is accomplished by the BIOS POST routines and the BIOS Plug-N-Play auto-configuration manager. The configuration utilities update a checksum for both areas, so potential data corruption is detected by the BIOS before the hardware configuration is saved. If the data is corrupted, the BIOS requests that the user reconfigure the system and reboot.

Because the BIOS code is the most often changed part of the motherboard design, the BIOS information described in this section may be a little different compared to the actual BIOS that contained in your motherboard.

In following table, Settings in bold are BIOS Setup Defaults.

6.1.1. Entering BIOS Setup

BIOS Setup is started by pressing <DEL> or <F2> during boot time when the logo is displayed.

When Quiet Boot is disabled, the message "press <DEL> or <F2> to enter setup" will be displayed on the diagnostics screen.

6.1.2. Main features

BIOS Setup has the following features: 1. The server board BIOS will only be available in English. 2. BIOS Setup is functional via console redirection over various terminal emulation standards. This may limit some functionality for compatibility, e.g., usage of colors, some keys or key sequences, or support of pointing devices.

6.1.3. Setup Page

The setup page layout is sectioned into functional areas. Each occupies a specific area of the screen and has dedicated functionality. The following table lists and describes each functional area.

Table 6.1. BIOS Setup Page Layout

FUNCTIONAL AREA	DESCRIPTION
Title Bar	The title bar is located at the top of the screen and It may also display navigational information. displays the title of the form (page) the user is currently viewing.
Setup Item List	The Setup Item List is a set of controllable and informational items. Each item in the list occupies the left column of the screen. A Setup Item may also open a new window with more options for that functionality on the board.

Item Specific Help Area	The Item Specific Help area is located on the right side of the screen and contains help text for the highlighted Setup Item. Help information may include the meaning and usage of the item, allowable values, effects of the options, etc.
Keyboard Command Bar	The Keyboard Command Bar is located at the bottom right of the screen and continuously displays help for keyboard special keys and navigation keys.

6.1.4. Keyboard Commands

The bottom right portion of the Setup screen provides a list of commands that are used to navigate through the Setup utility. These commands are displayed at all times.

Each Setup menu page contains a number of features. Except those used for informative purposes, each feature is associated with a value field. This field contains user-selectable parameters. Depending on the security option chosen and in effect by the password, a menu feature's value may or may not be changeable. If a value is non-changeable, the feature's value field is inaccessible and displays as grayed out.

Table 6.2. BIOS Setup: Keyboard Command

KEY	OPTION	DESCRIPTION
<Enter>	Execute	Command The <Enter> key is used to activate sub-menus when the selected feature is a sub-menu, or to display a pick list if a selected option has a value field, or to select a sub-field for multi-valued features like time and date. If a pick list is displayed, the <Enter> key will select the currently highlighted item, undo the pick list, and return the focus to the parent menu.
<Esc>	Exit	The <Esc> key provides a mechanism for backing out of any field. When the <Esc> key is pressed while editing any field or selecting features of a menu, the parent menu is re-entered.
		When the <Esc> key is pressed in any sub-menu, the parent menu is re-entered. When the <Esc> key is pressed in any major menu, the exit confirmation window is displayed and the user is asked whether changes can be discarded. If "No" is selected and the <Enter> key is pressed, or if the <Esc> key is pressed, the user is returned to where he/she was before <Esc> was pressed, without affecting any existing any settings. If "Yes" is selected and the <Enter> key is pressed, setup is exited and the BIOS returns to the main System Options Menu screen.
-	Select Item	The up arrow is used to select the previous value in a pick list, or the previous option in a menu item's option list. The selected item must then be activated by pressing the <Enter> key.
Down arrow	Select Item	The down arrow is used to select the next value in a menu item's option list, or a value field's pick list. The selected item must then be activated by pressing the <Enter> key.

Left and right arrows	Select Menu	The left and right arrow keys are used to move between the major menu pages. The keys have no affect if a sub-menu or pick list is displayed.
<Tab>	Select Field	The <Tab> key is used to move between fields. For example, <Tab> can be used to move from hours to minutes in the time item in the main menu.
-	Change Value	The minus key on the keypad is used to change the value of the current item to the previous value. This key scrolls through the values in the associated pick list without displaying the full list.
+	Change Value	The plus key on the keypad is used to change the value of the current menu item to the next value. This key scrolls through the values in the associated pick list without displaying the full list. On 106-key Japanese keyboards, the plus key has a different scan code than the plus key on the other keyboard, but will have the same effect.
F8	Previous Values	Pressing <F8> makes the following message to appear: Load Previous Values? Yes/No If Yes is highlighted and <Enter> is pressed, all Setup fields are set to their previous values. If No is highlighted and <Enter> is pressed, or if the <Esc> key is pressed, the user is returned to where they were before <F8> was pressed without affecting any existing field values.
F9	Setup Defaults	Pressing <F9> makes the following message to appear: Load Optimized Defaults? Yes/No If Yes is highlighted and <Enter> is pressed, all Setup fields are set to their default values. If No is highlighted and <Enter> is pressed, or if the <Esc> key is pressed, the user is returned to where they were before <F9> was pressed without affecting any existing field values.
F10	Save and Exit	Pressing <F10> makes the following message to appear: Save configuration and exit? Yes/No If Yes is highlighted and <Enter> is pressed, all changes are saved and Setup is exited. If No is highlighted and <Enter> is pressed, or the <Esc> key is pressed, the user is returned to where they were before <F10> was pressed without affecting any existing values.

6.1.5. Menu Selection Bar

The Menu Selection Bar is located at the top of the BIOS Setup Utility screen. It displays the major menu selections available to the user. By using the left and right arrow keys, the user can select the menus listed here.

6.1.6. Server Platform Setup Utility Screens

The sections below describe the screens available for the configuration of a server platform. In these sections, tables are used to describe the contents of each screen. These tables follow the following guidelines:

The text and values in the Setup Item, Options, and Help columns in the tables are displayed on the BIOS Setup screens.

- **Bold text** in the Options column of the tables indicates default values. These values are not displayed in bold on the setup screen. The bold text in this document is to serve as a reference point.
- The Comments column provides additional information where it may be helpful. This information does not appear in the BIOS Setup screens.
- Information in the screen shots that is enclosed in brackets (< >) indicates text that varies, depending on the option(s) installed. For example <Current Date> is replaced by the actual current date.
- Information that is enclosed in square brackets ([]) in the tables indicates areas where the user needs to type in text instead of selecting from a provided option.

Whenever information is changed (except Date and Time) the systems requires a save and reboot to take place. Pressing **<ESC>** will discard the changes and boot the system according to the boot order set from the last boot.

6.2. Main

The Main screen is the screen that is first displayed when BIOS Setup is entered, unless an error has occurred. If an error has occurred, the Error Manager screen will be displayed instead.

Figure 6.1. Main Screen

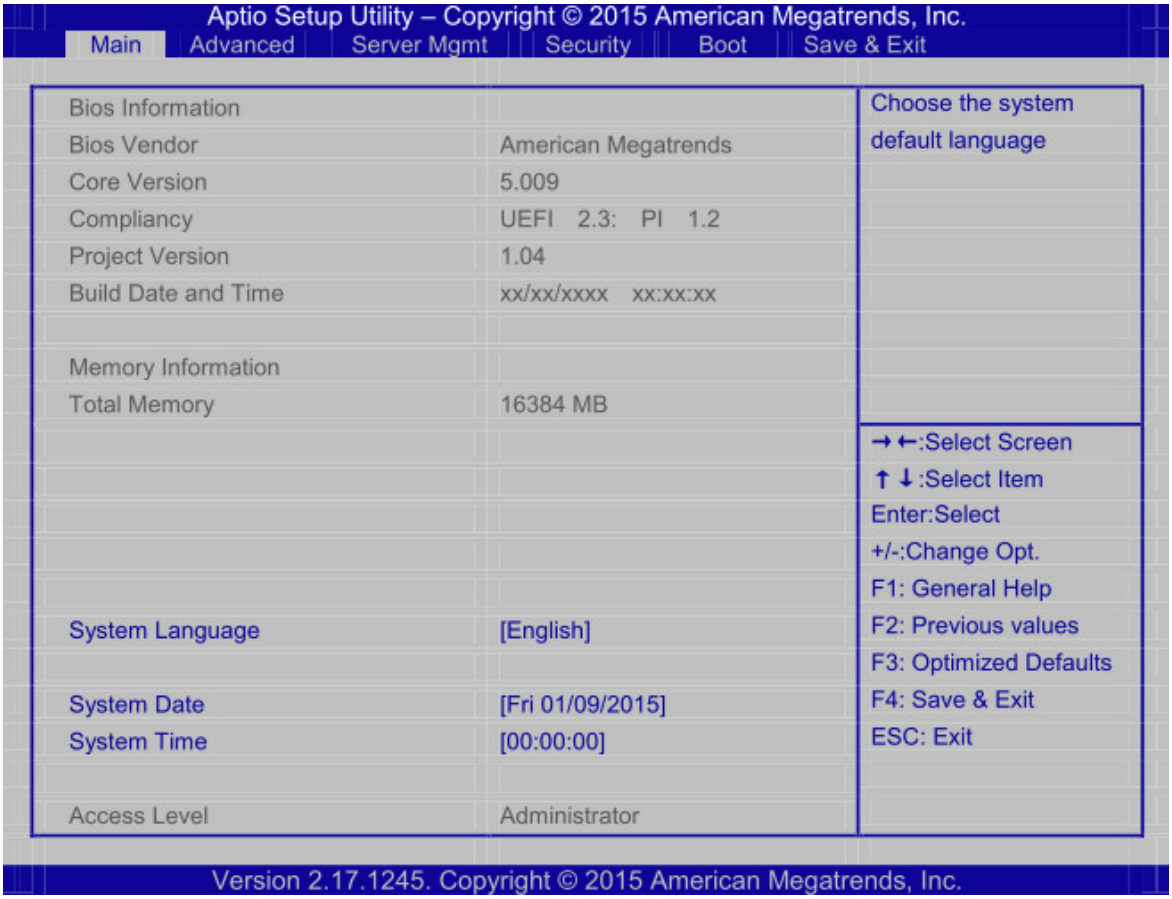


Table 6.3. Main Screen Fields

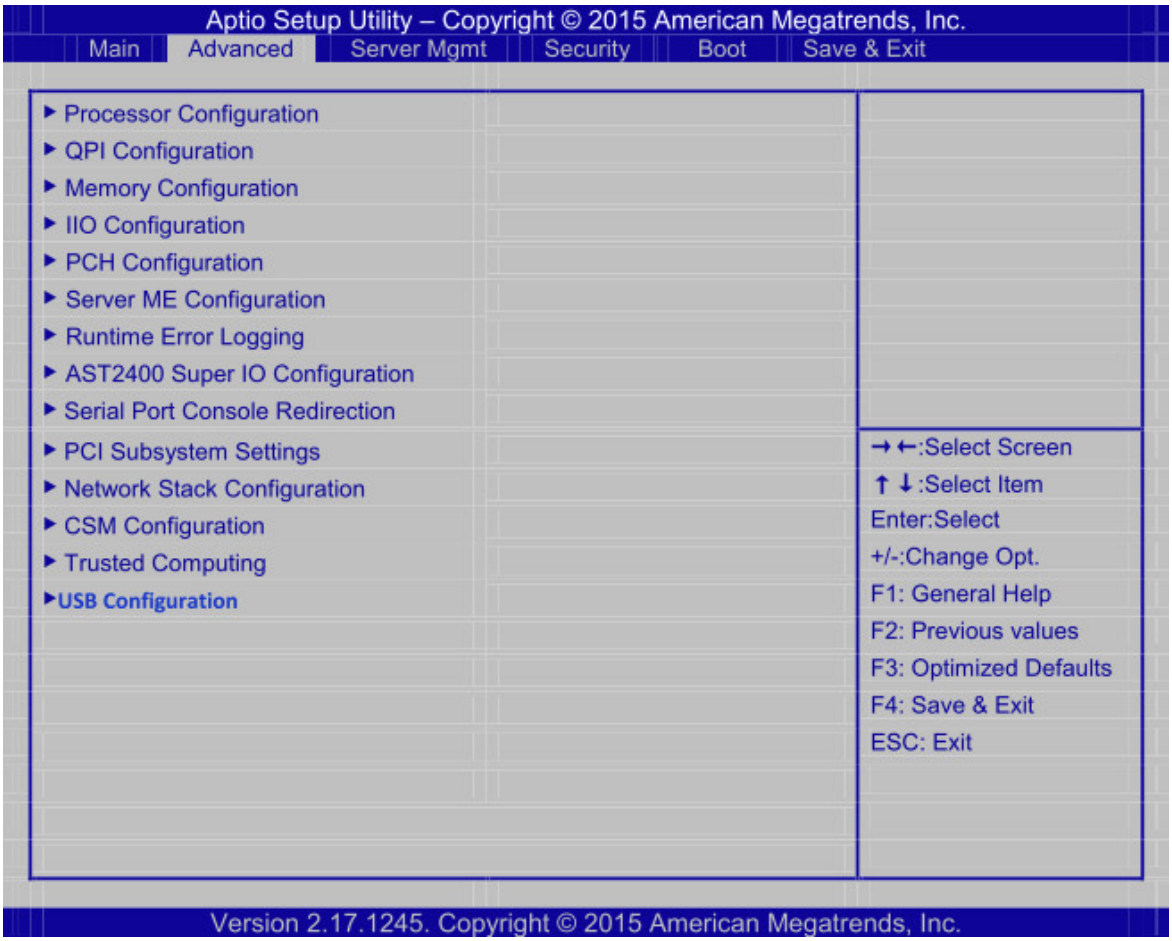
Menu Fields	Settings	Comments
Main		
System time	Current time	Displays the current time.
System date	Current date	Displays the current date.

6.3. Advanced Screen

The Advanced screen provides an access point to configure several options. On this screen, the user selects the option that is to be configured. Configurations are performed on the selected screen, not directly on Advanced screen.

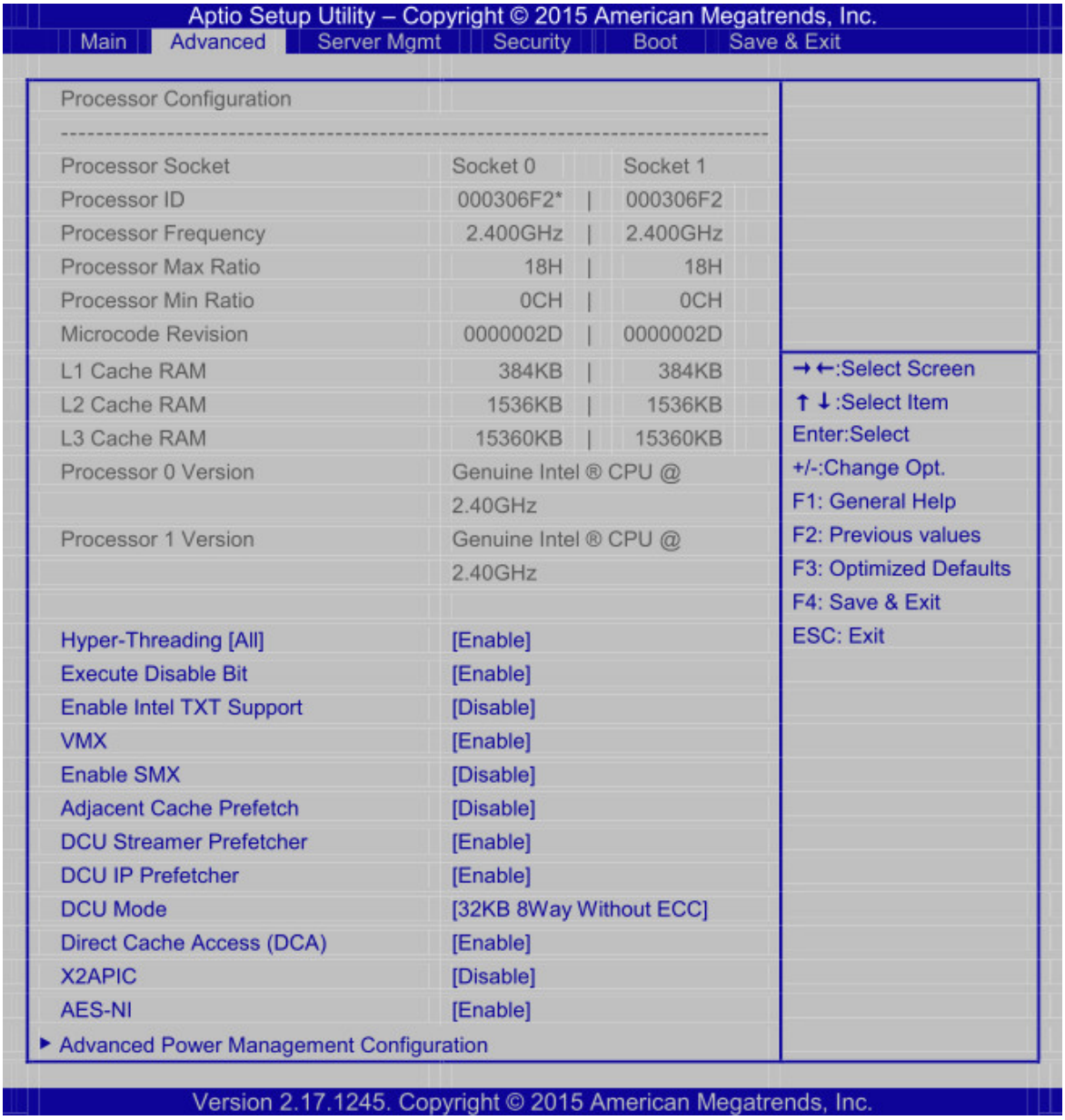
To access this screen from Main screen, press the right arrow until Advanced screen is chosen.

Figure 6.2. Advanced Screen



6.3.1. Processor Configuration

Figure 6.3. Processor Configuration

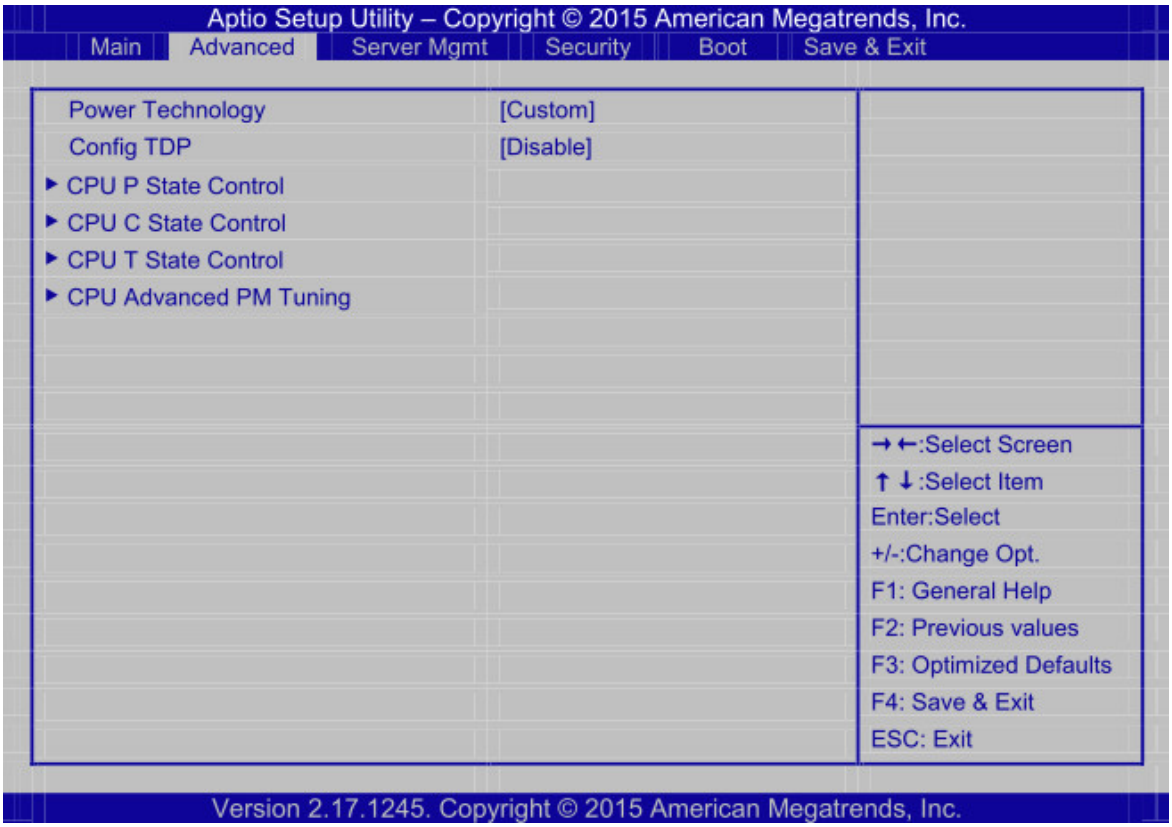


Menu Fields	Settings	Comments
Advanced \ Processor Configuration		
Hyper-Threading [ALL]		Enables Hyper Threading (Software Method to Enable/Disable Logical Processor threads.
Execute Disable Bit		When disabled, forces the XD feature flag to always return 0.

Menu Fields	Settings	Comments
Enable Intel TXT Support		Enables Intel Trusted Execution Technology Configuration. Please disable "EV DFX Features" when TXT is enabled.
VMX		Enables the Vanderpool Technology, takes effect after reboot.
Enable SMX		Enables Safer Mode Extensions.
Adjacent Cache Prefetch		MLC Spatial Prefetcher (MSR 1A4h Bit[1])
DCU Streamer Prefetcher		DCU streamer prefetcher is an L1 data cache prefetcher (MSR 1A4h [2]).
DCU IP Prefetcher		DCU IP prefetcher is an L1 data cache prefetcher (MSR 1A4h [3]).
DCU Mode		MSR 31h Bit [0] - A write of 1 selects the DCU mode as 16KB 4-way with ECC.
Direct Cache Access (DCA)		Enables Direct Cache Access
X2APIC		Enable/disable extended APIC support
AES-NI		Enable/disable AES-NI support

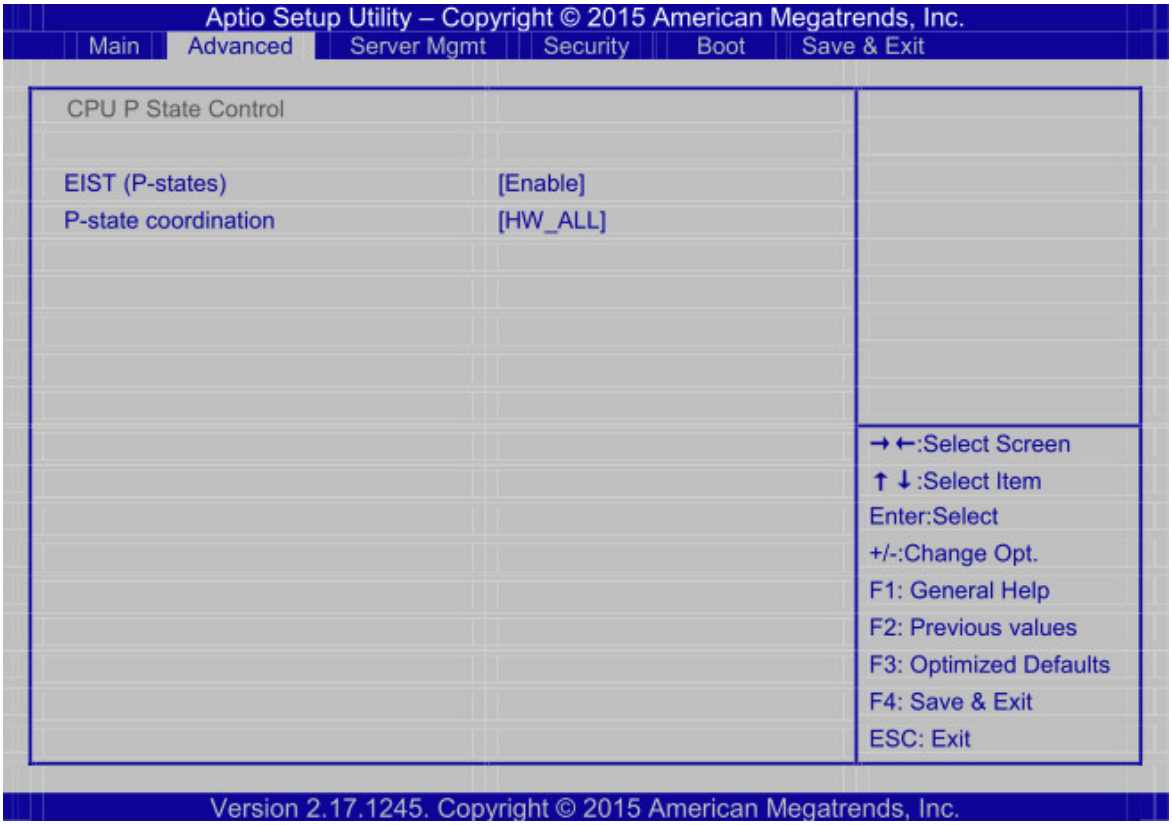
6.3.1.1. Advanced Power Management Configuration

Figure 6.4. Advanced Power Management Configuration



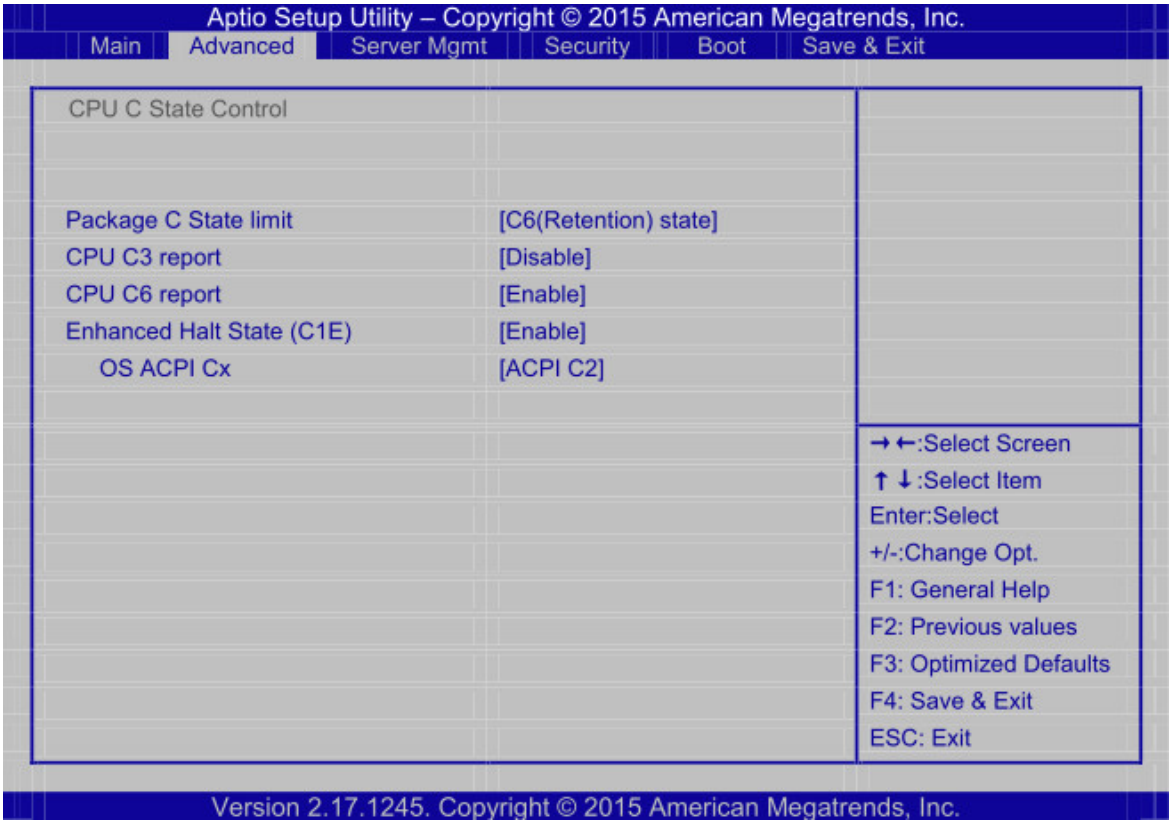
Menu Fields	Settings	Comments
Advanced \ Processor Configuration \ Advanced Power Management Configuration		
Power Technology		Enables the power management features.
Config TDP		Option to disable/enable Config TDP

6.3.1.2. CPU P State Control



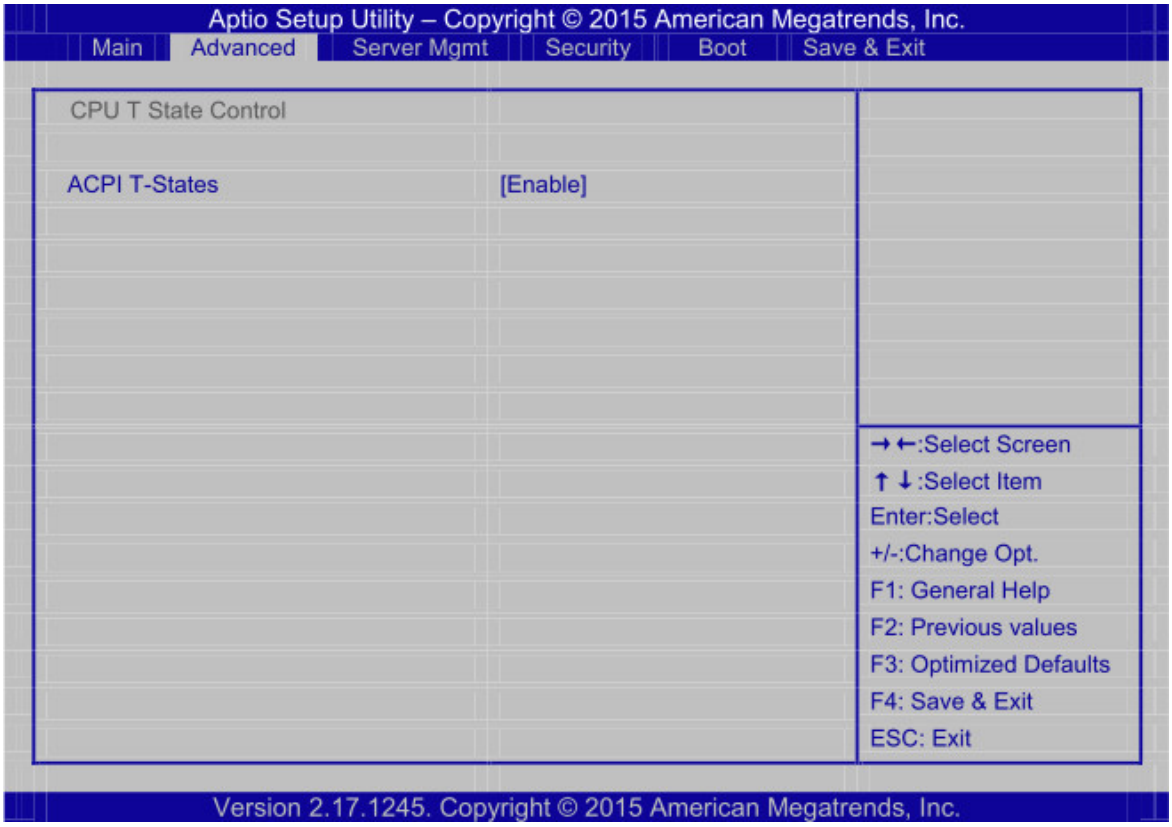
Menu Fields	Settings	Comments
Advanced \ Processor Configuration \ Advanced Power Management Configuration \ CPU P State Control		
EIST (P-states)		When enabled, OS sets CPU frequency according load. When disabled, CPU frequency is set at max non-turbo.
P-state coordination		HW_ALL (hardware) coordination is recommended over SW_ALL and SW_ANY (software coordination).

6.3.1.3. CPU C State Control



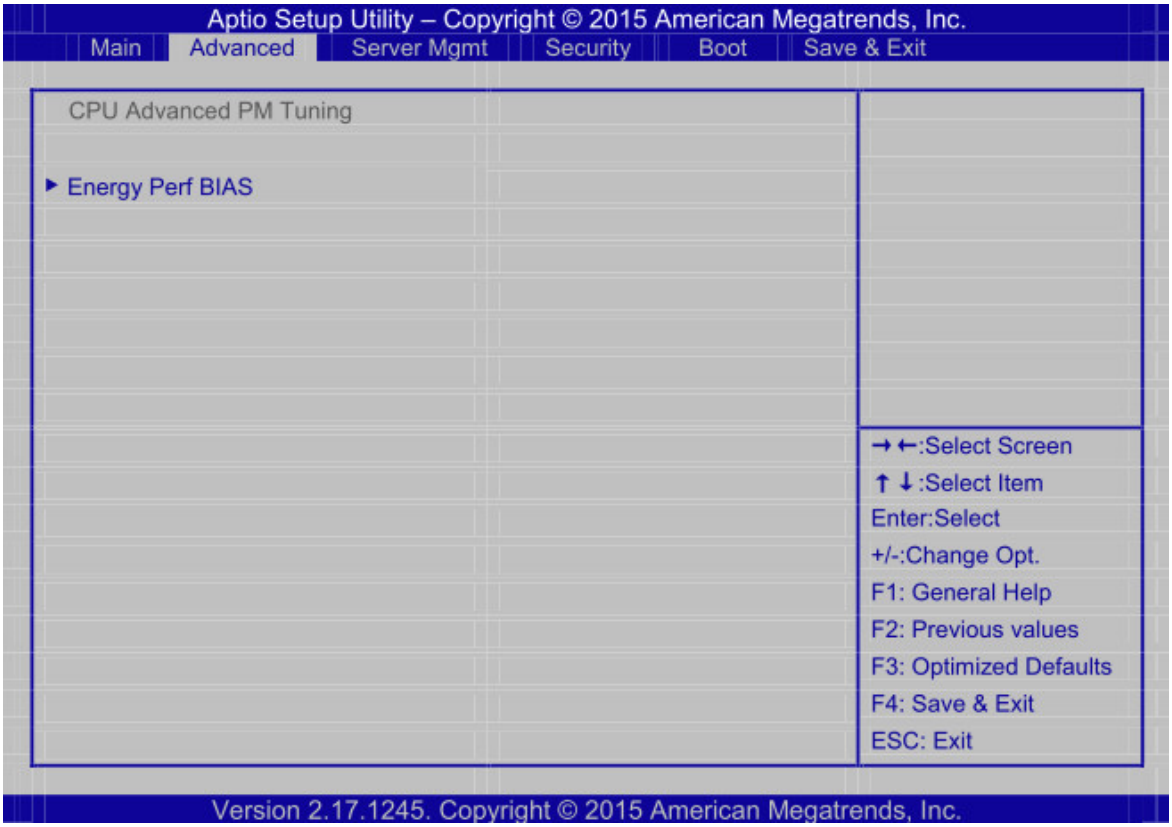
Menu Fields	Settings	Comments
Advanced \ Processor Configuration \ Advanced Power Management Configuration \ CPU C State Control		
Package C State limit		Package C State limit
CPU C3 report		Enable/Disable CPU C3 (ACPI C2) report to OS. Recommended to be disabled.
CPU C6 report		Enable/Disable CPU C6(ACPI C2) report to OS Recommended to be enabled.
Enhanced Halt State (C1E)		Enables the Enhanced C1E state of the CPU, takes effect after reboot.
OS ACPI Cx		Report CC3/CC6 to OS ACPI C2 or ACPI C3

6.3.1.4. CPU T State Control

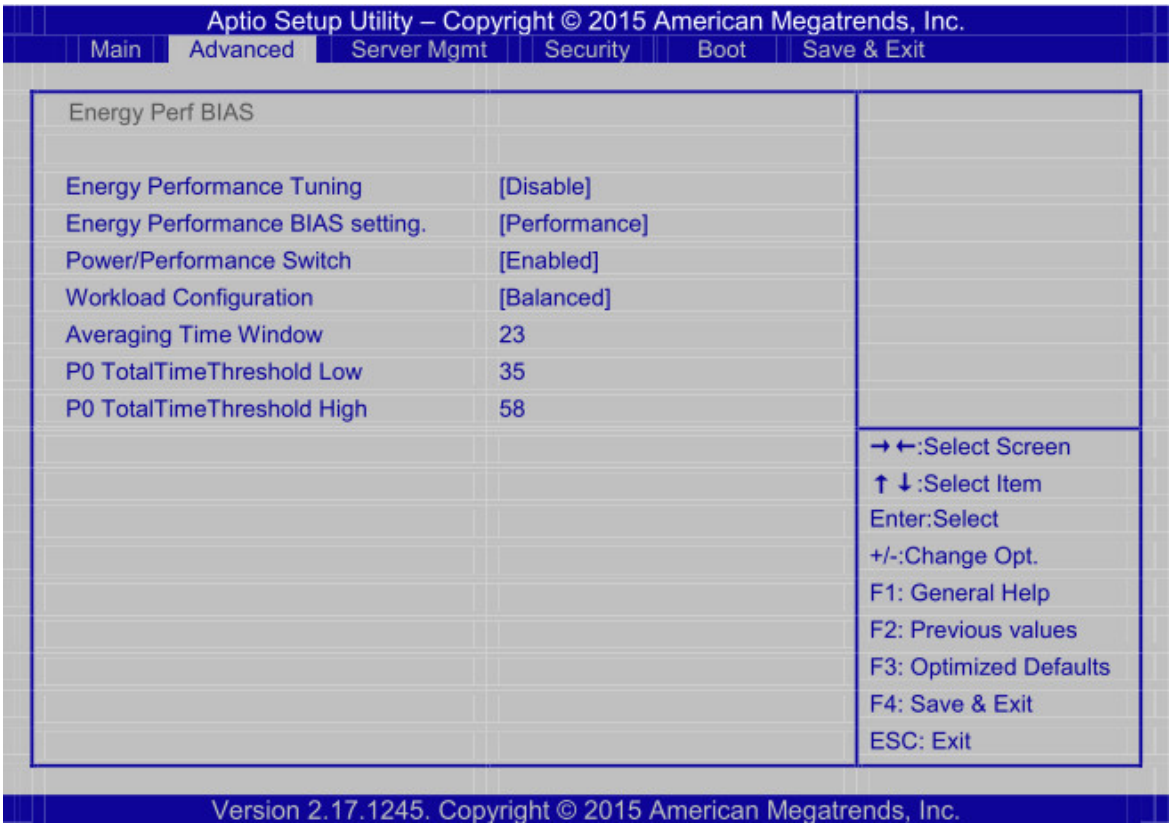


Menu Fields	Settings	Comments
Advanced \ Processor Configuration \ Advanced Power Management Configuration \ CPU T State Control		
ACPI T-States		Enable/Disable CPU throttling by OS. Throttling reduces power consumption.

6.3.1.5. CPU Advanced PM Tuning



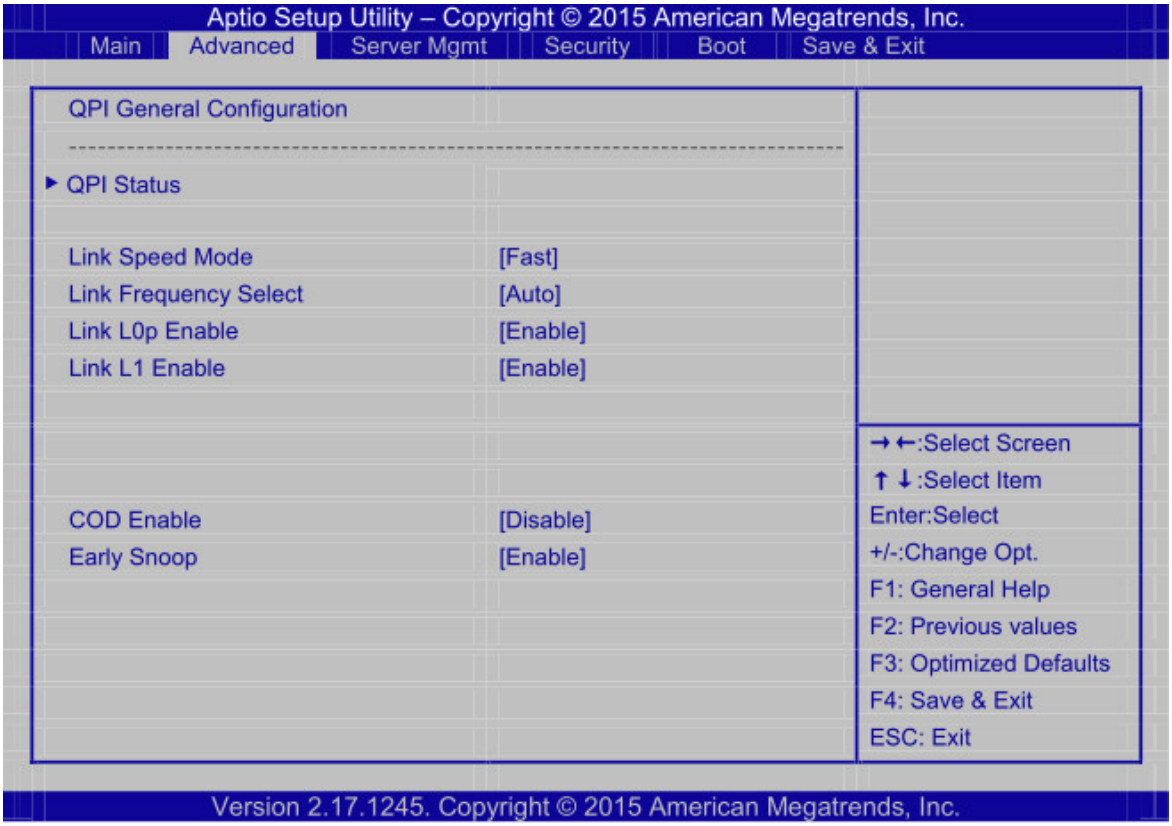
6.3.1.6. Energy Perf BIAS



Menu Fields	Settings	Comments
Advanced \ Processor Configuration \ Advanced Power Management Configuration \ CPU Advanced PM Tuning \ Energy Perf BIAS		
Energy Performance Tuning		Selects whether BIOS or Operating System chooses energy performance bias tuning.
Energy Performance BIAS setting		Set Energy Performance BIAS, which overrides OS setting.
Power/Performance Switch		
MSR 1FCh Bit[24] = PWR_PERF_TUNING_ENABLE_DYN_SWITCHING	Workload Configuration	
Optimization for the workload characterization. Balanced is recommended.	Averaging Time Window	23
This is used to control the effective window of the average for C0 an P0 time	P0 TotalTimeThreshold Low	35

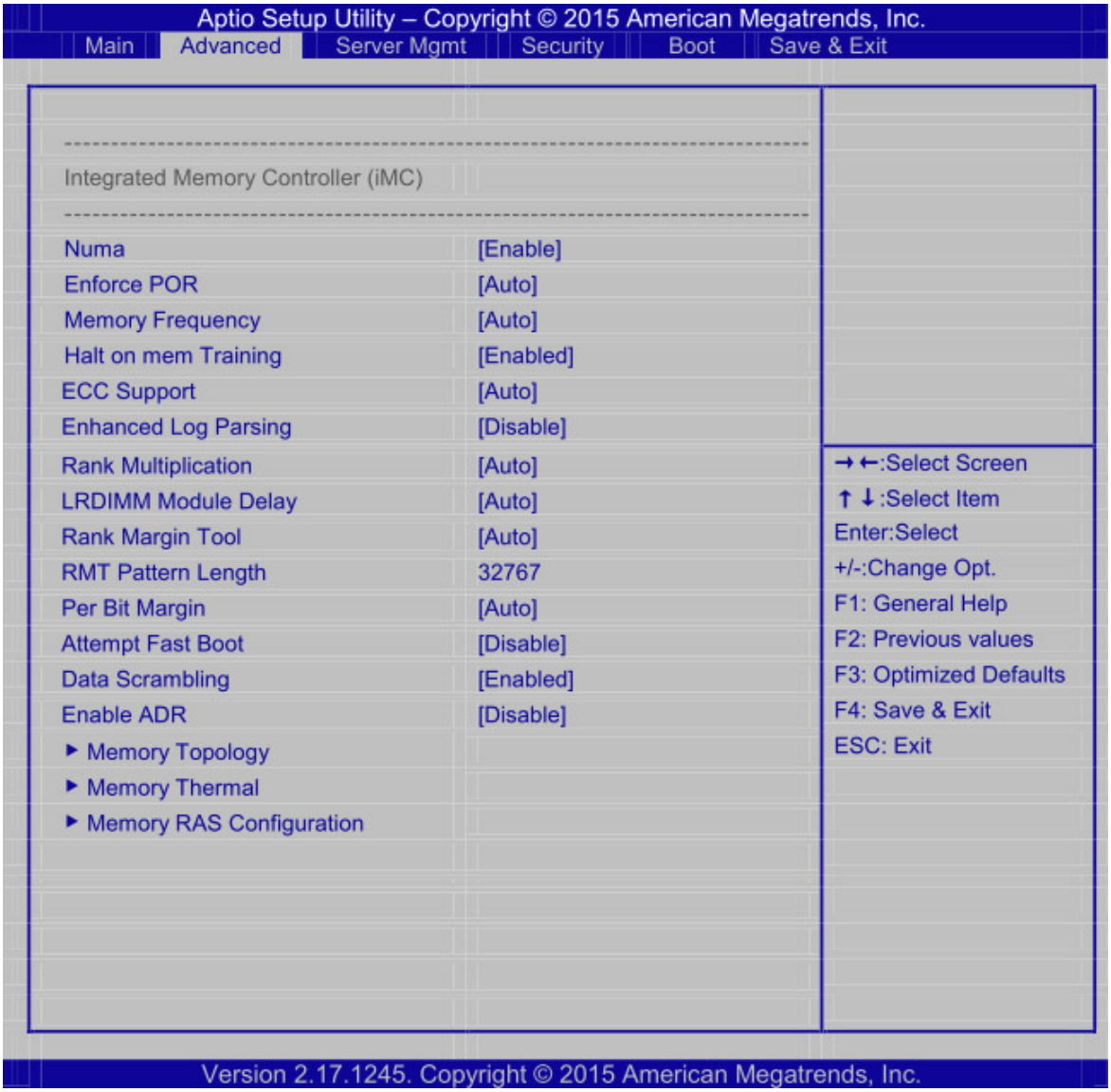
Menu Fields	Settings	Comments
The HW switching mechanism DISABLES the performance setting (0) when the total P0 time is less than this threshhold	P0 Total-TimeThreshold High	58

6.3.2. QPI Configuration



Menu Fields	Settings	Comments
Advanced \ QPI Configuration		
Link Speed Mode		Select the QPI link speed as either the POR speed (Fast) or default speed (Slow)
Link Frequency Select		Allows for selecting the QPI Link Frequency
Link L0p Enable		Link L0p Enable
Link L1 Enable		Link L1 Enable
COD Enable		Enable/disable Cluster on Die.
Early Snoop		Select Snoop Mode

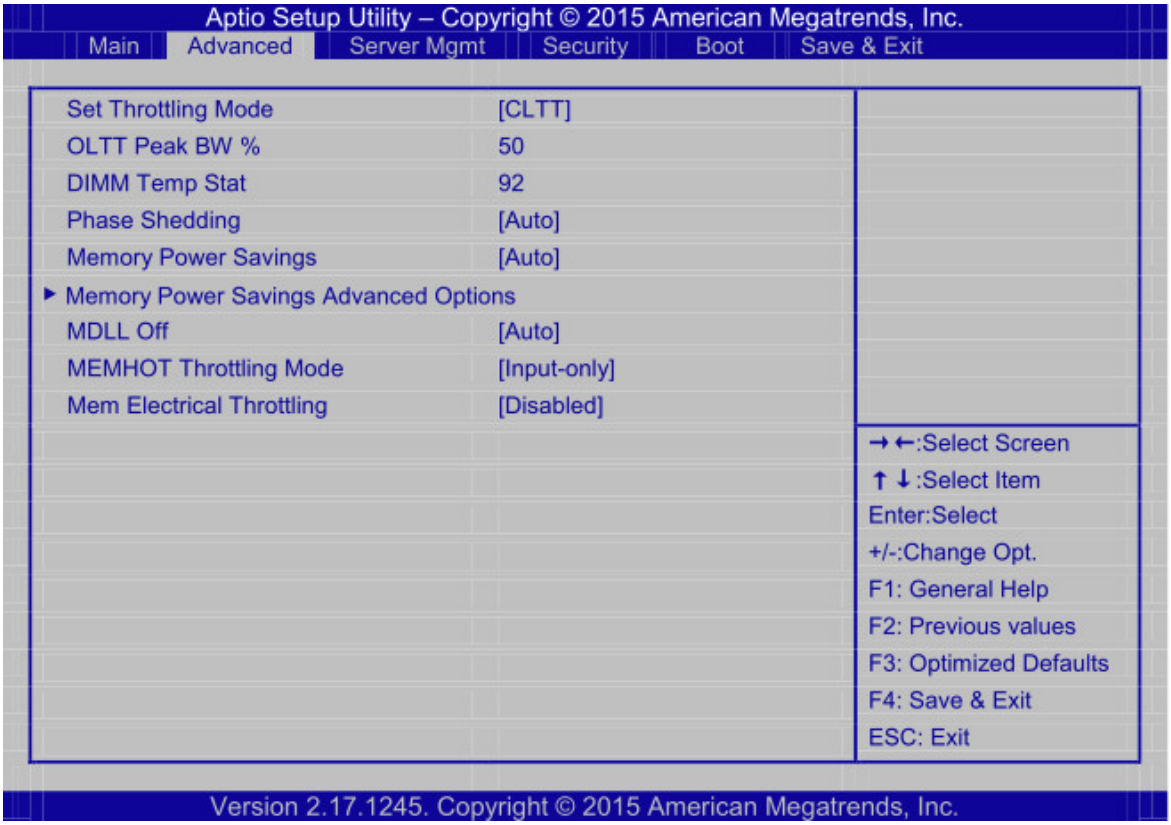
6.3.3. Memory Configuration



Menu Fields	Settings	Comments
Advanced \ Memory Configuration		
Numa		Enable or Disable Non uniform emory Access (NUMA).
Enforce POR		Enable to enforce POR restrictions for DDR4 frequency and voltage programming
Memory Frequency		Maximum Memory Frequency Selections in Mhz. Do not select Reserved

Menu Fields	Settings	Comments
Halt on Memory Training Error		Halt on Memory Training Error Disable/Enable
Multi-Threaded MRC		Enable to execute the Memory Reference Code multi-threaded
ECC Support		Enable/Disable DDR ECC support
Enhanced Log Parsing		Enables additional output in debug log for easier machine parsing
Rank Multiplication		Force the Rank Multiplication factor for LRDIMM
LRDIMM Module Delay		When Disabled, MRC will not use SPD bytes 90-95 for LRDIMM Module Delay. When Auto, MRC will boundary check the values and use default values, if SPD is 0 or out of range
Memory Type		Selects the Memory type supported by this platform.
Rank Margin Tool		Enables the rank margin tool to run after DDR4 memory training
RMT Pattern Length	32767	Sets the pattern length for the Rank Margin Tool
Per Bit Margin		Enables the per bit margining
Attempt Fast Boot		When enabled, portions of memory reference code will be skipped when possible to increase boot speed
Data Scrambling		Enables data scrambling
Enable ADR		Enables the detecting and enabling of ADR

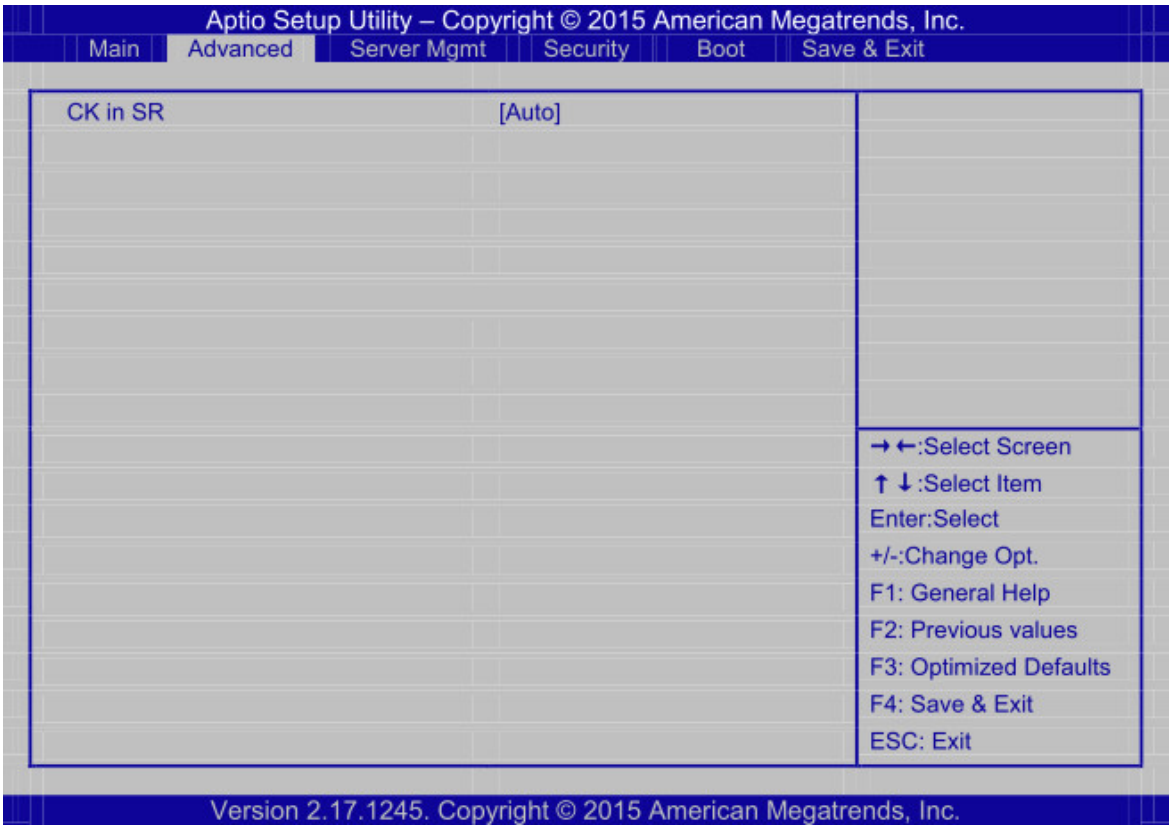
6.3.4. Memory Thermal



Menu Fields	Settings	Comments
Advanced \ Memory Configuration \ Memory Thermal		
Set Throttling Mode		Configure Thermal Throttling Mode. \nSelect OLTT or CLTT mode.
OLTT Peak BW %	50	Valid Offset 25 - 100. This is a percentage of the peak bandwidth allowed for OLTT
DIMM Temp Stat	92	Select DIMMTEMPSTAT as temp_mid or temp_hi.
Phase Shedding		VR Static Phase Shedding Support. PS0: full-phase, PS1: single-phase, typically <18A load, PS2: fixed loss, typically <5A load
Memory Power Savings		Configures CKE and related Memory Power Savings Features
MDLL Off		Enable to shut down MDLL during SR
MEMHOT Throttling Mode		Configure MEMHOT Input and Output Mode: Mem Hot Sense Therm Throt or Mem Hot Output Therm Throt.

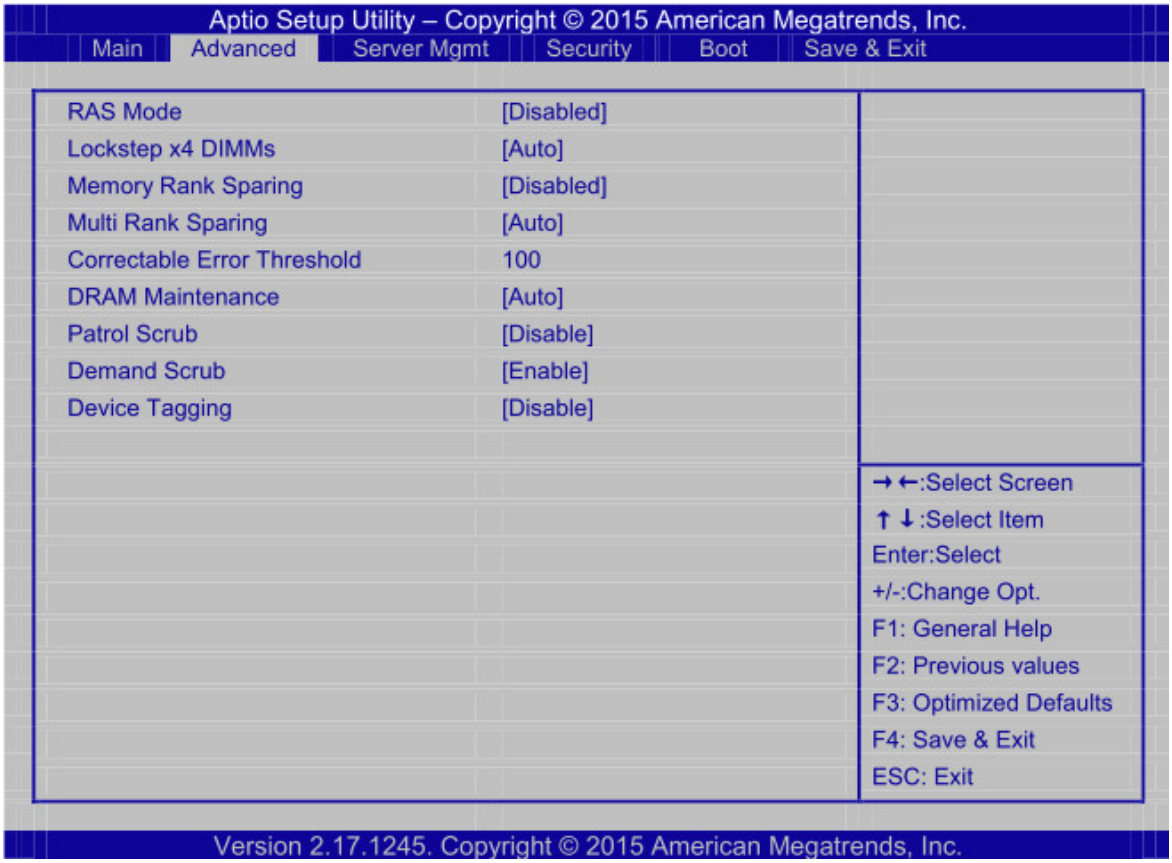
Menu Fields	Settings	Comments
Mem Electrical Throttling		Configure Memory Electrical Throttling

6.3.4.1. Memory Power Savings Advanced Options



Menu Fields	Settings	Comments
Advanced \ Memory Configuration \ Memory Thermal \ Memory Power Savings Advanced Options		
CK in SR		Configures CK behavior during self-refresh

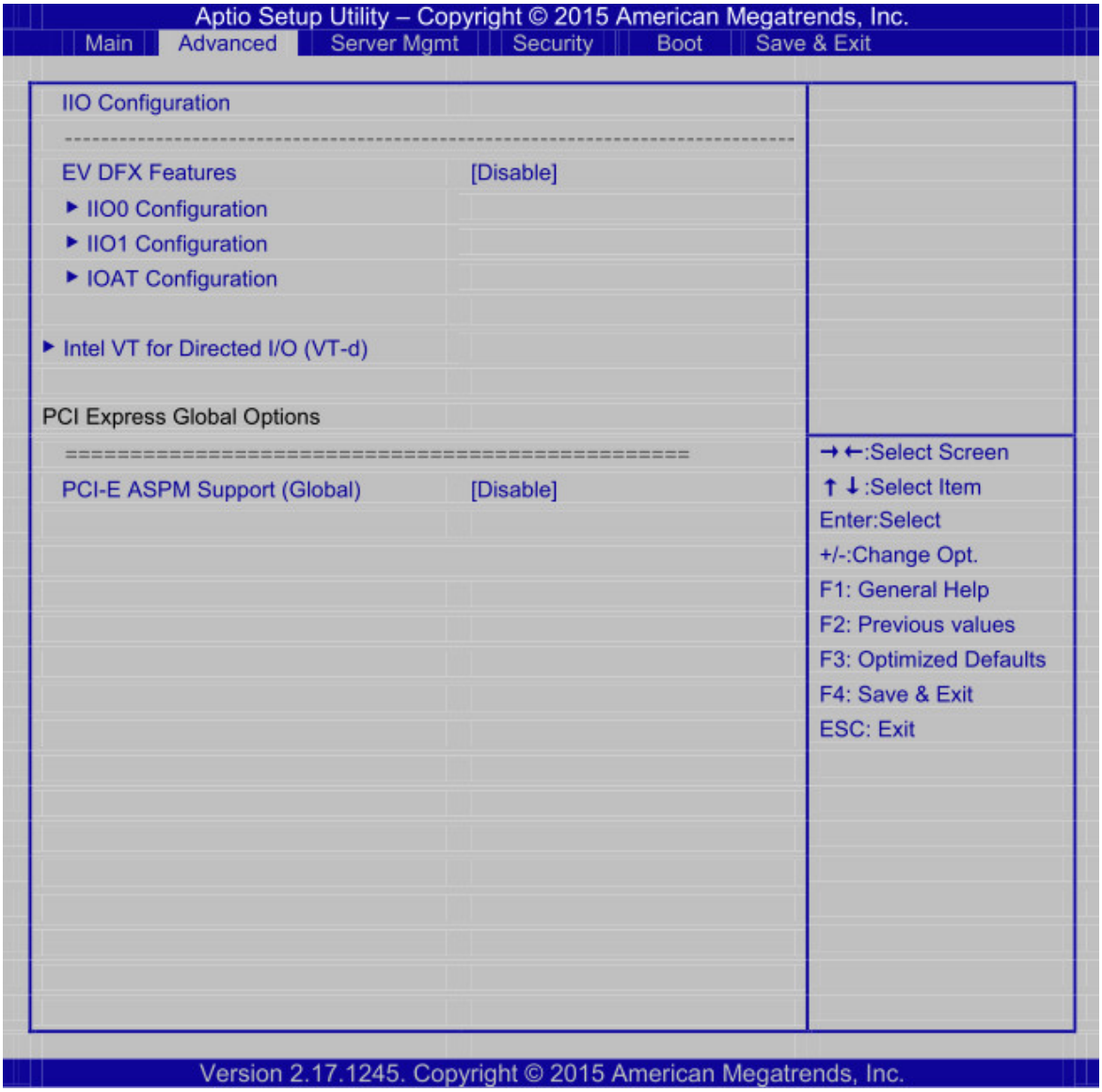
6.3.4.2. Memory RAS Configuration



Menu Fields	Settings	Comments
Advanced \ Memory Configuration \ Memory RAS Configuration		
RAS Mode		Enable/Disable RAS modes. Enabling Sparing and Mirroring is not supported. Incase if enabled, Sparing will be selected.
Lockstep x4 DIMMs		Enable/Disable Lockstep for x4 DIMMs
Memory Rank Sparing		Enable/Disable Memory Rank Sparing
Multi Rank Sparing		Set Multi Rank Sparing number, Auto can support 50% ranks per channel
Correctable Error Threshold	100	Correctable Error Threshold (1 - 32767) used for sparing, tagging, and leaky bucket
DRAM Maintenance		Select Manual to customize DRAM Maintenance settings

Menu Fields	Settings	Comments
Patrol Scrub		Enable/Disable Patrol Scrub
Demand Scrub		Enable/Disable Demand Scrub
Device Tagging		Enable/Disable Device Tagging

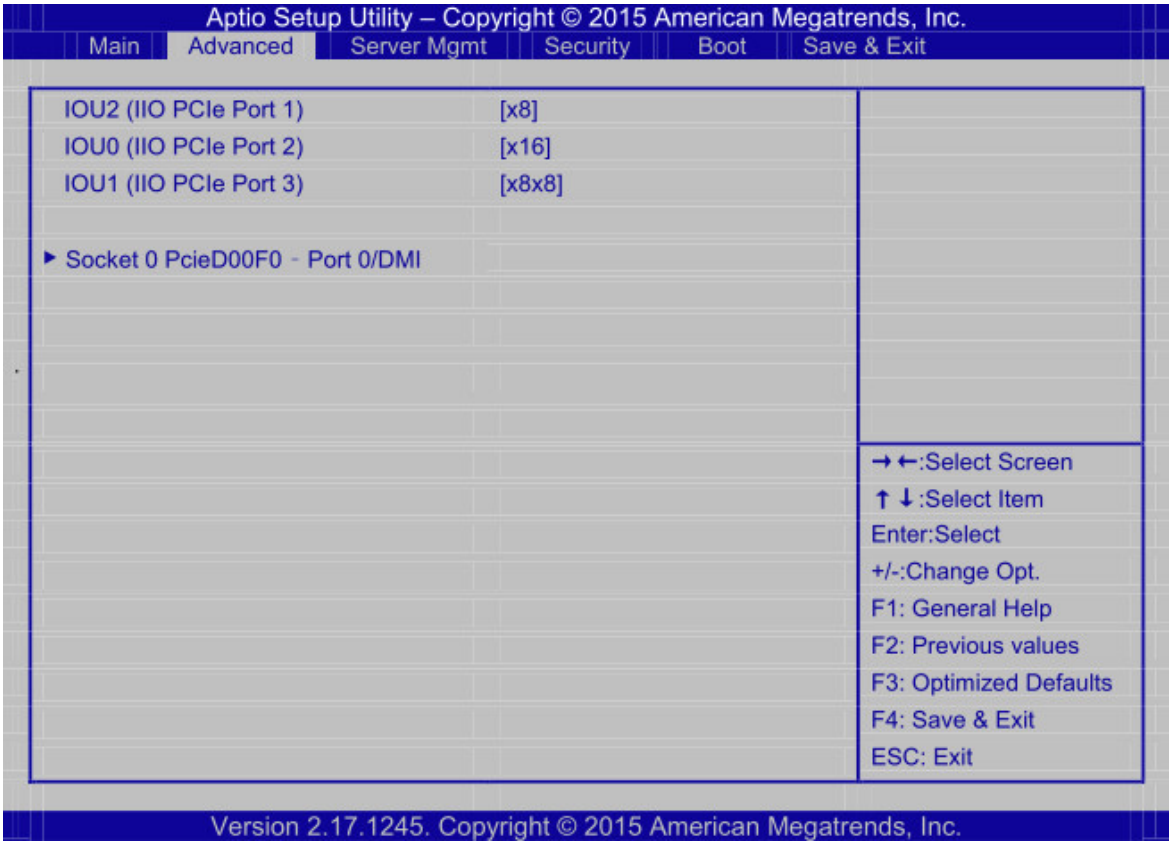
6.3.5. IIO Configuration



Menu Fields	Settings	Comments
Advanced \ IIO Configuration		
EV DFX Features		Set this option to allow DFX Lock Bits to remain clear

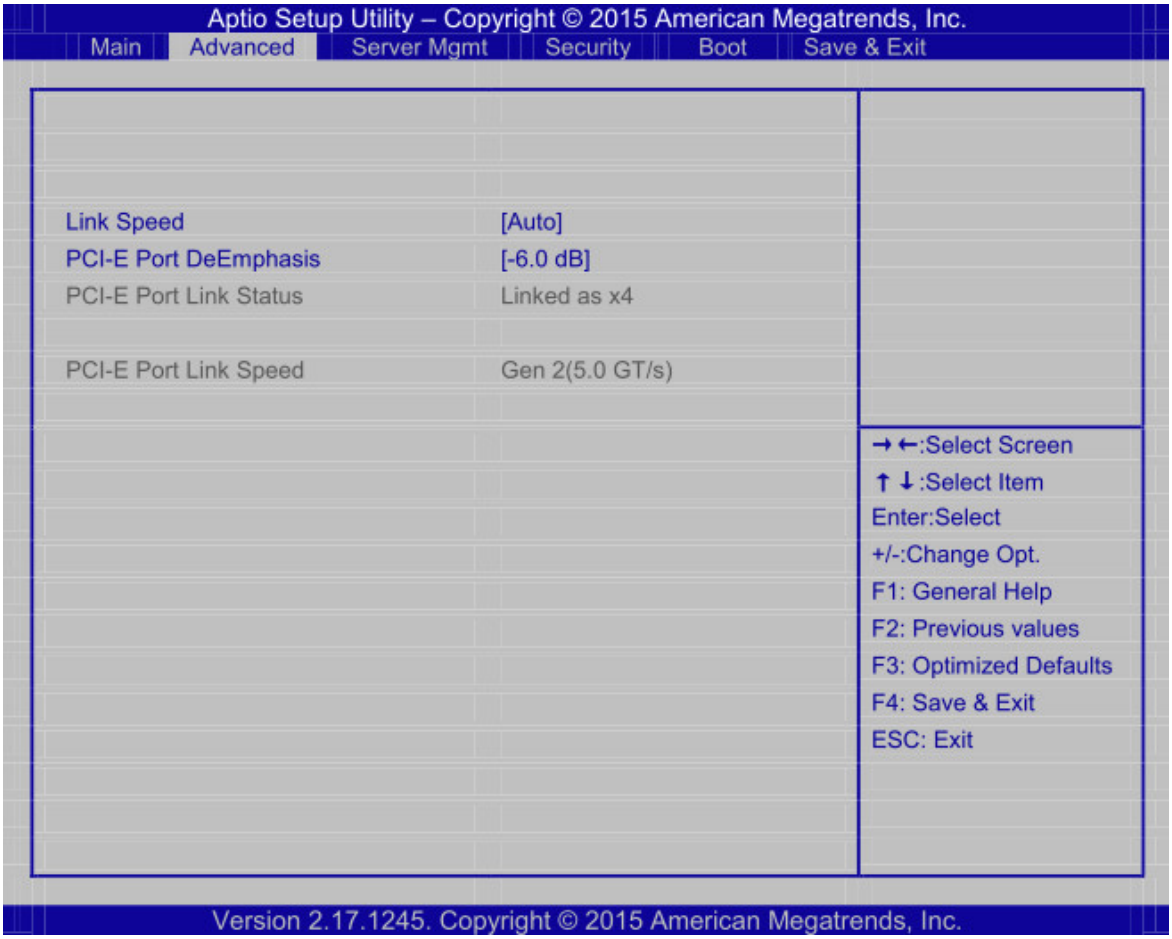
Menu Fields	Settings	Comments
PCI-E ASPM Support (Global)		This option enables / disables the ASPM support for all downstream devices.

6.3.5.1. IIO0 Configuration



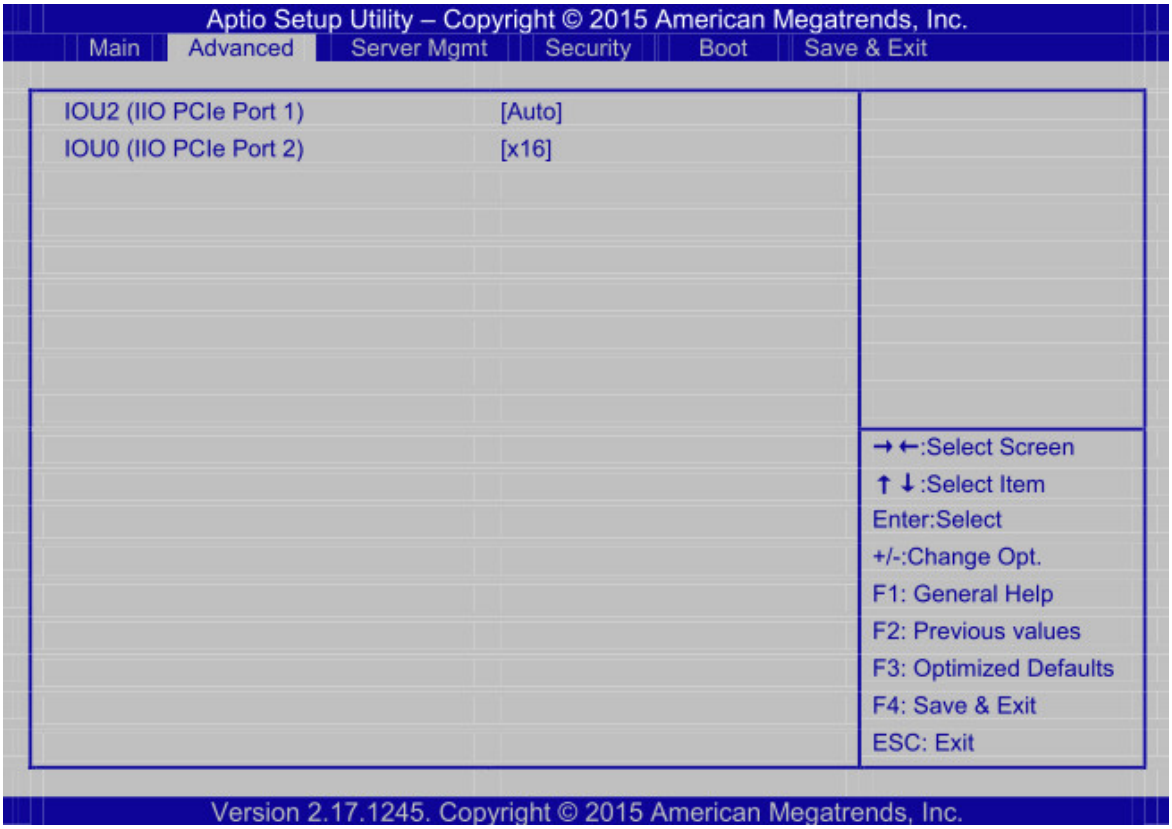
Menu Fields	Settings	Comments
Advanced \ IIO Configuration \ IIO0 Configuration		
IOU2 (IIO PCIe Port 1)		Selects PCIe port Bifurcation for selected slot(s)
IOU0 (IIO PCIe Port 2)		Selects PCIe port Bifurcation for selected slot(s)
IOU1 (IIO PCIe Port 3)		Selects PCIe port Bifurcation for selected slot(s)

6.3.5.2. Socket 0 PcieD00F0-Port0/DMI



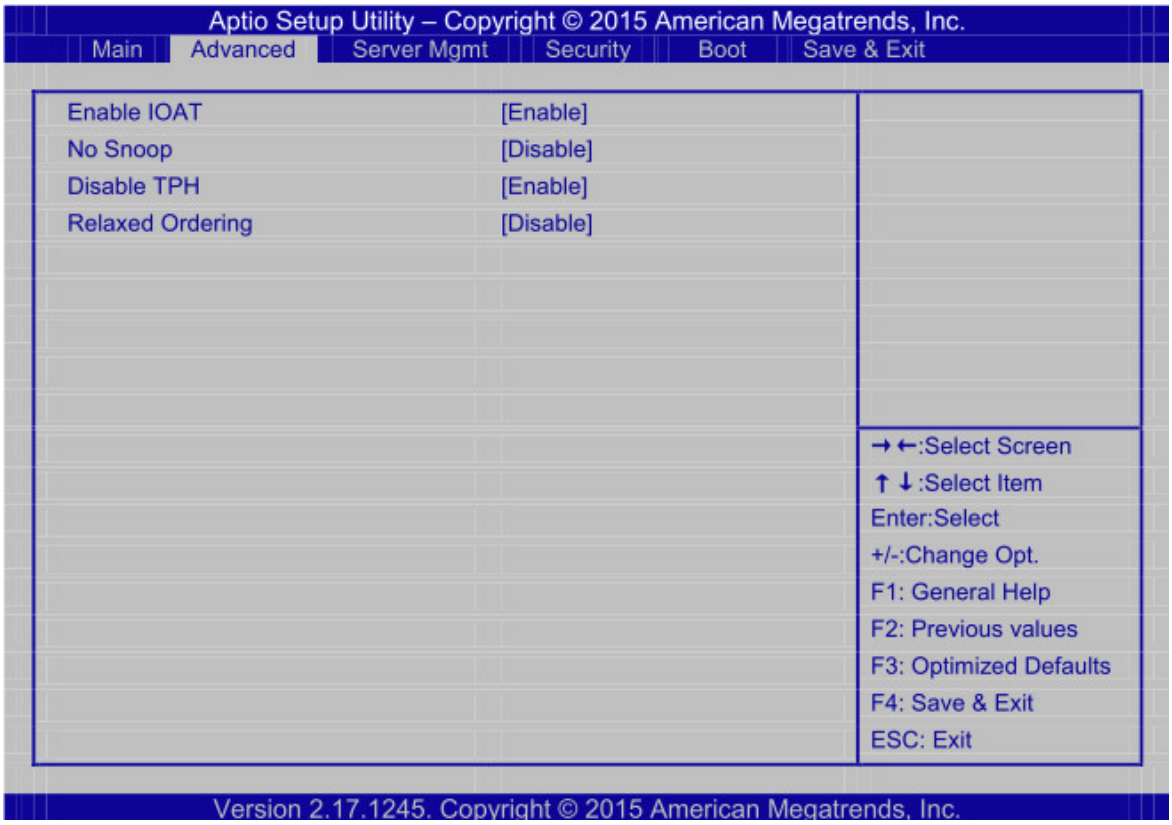
Menu Fields	Settings	Comments
Advanced \ IIO Configuration \ IIO0 Configuration \ Socket 0 PcieDxxFx – Port xx		
Link Speed		
PCI-E Port DeEmphasis		De-Emphasis control (LNKCON2[6]) for this PCIe port.

6.3.5.3. IIO1 Configuration



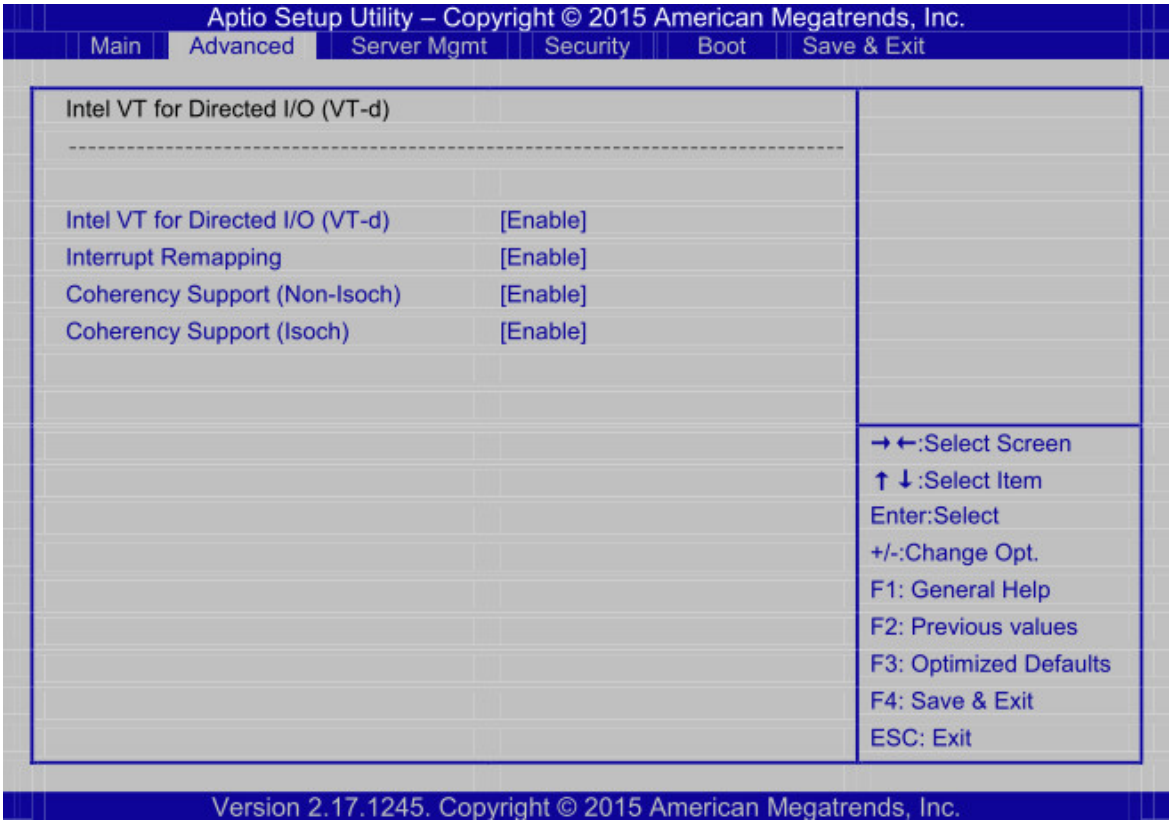
Menu Fields	Settings	Comments
Advanced \ IIO Configuration \ IIO1 Configuration		
IOU2 (IIO PCIe Port 1)		Selects PCIe port Bifurcation for selected slot(s)
IOU0 (IIO PCIe Port 2)		Selects PCIe port Bifurcation for selected slot(s)

6.3.5.4. IOAT Configuration



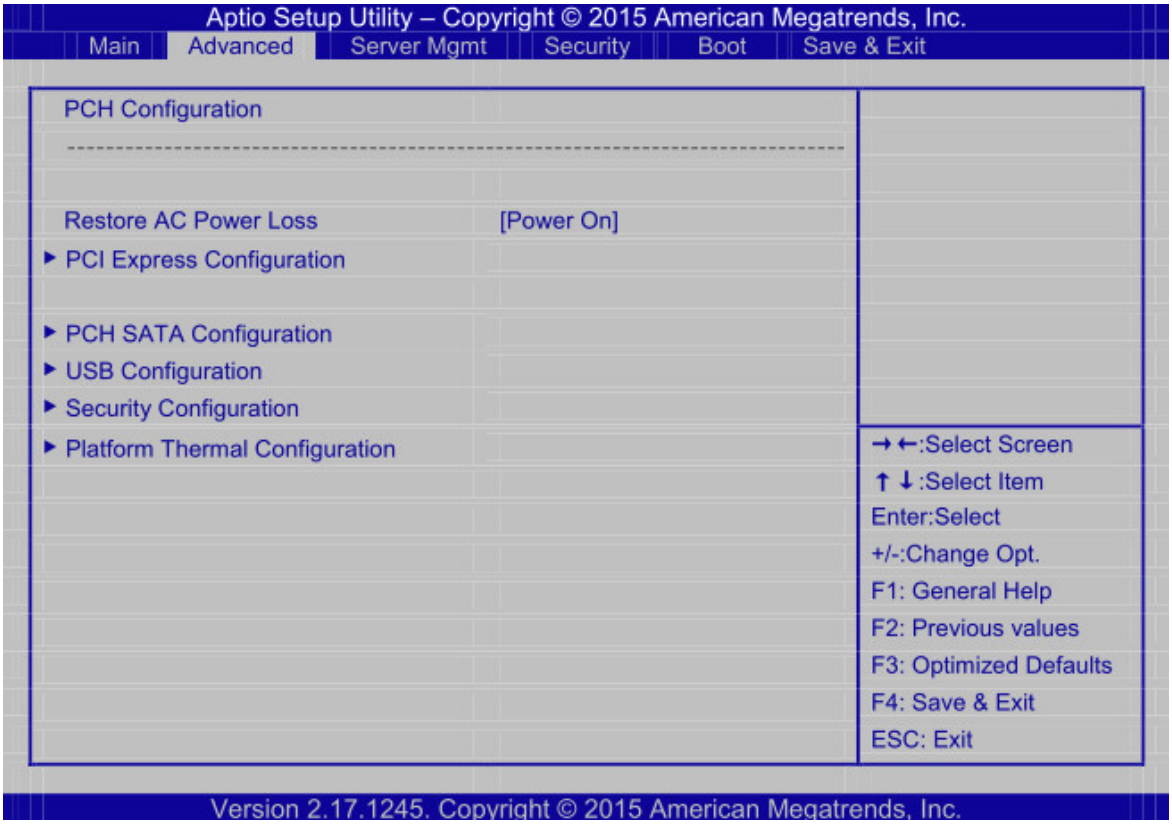
Menu Fields	Settings	Comments
Advanced \ IIO Configuration \ IOAT Configuration		
Enable IOAT		Control to enable/disable IOAT devices
No Snoop		No Snoop Enable/Disable for each CB device
Disable TPH		TLP Processing Hint disable
Relaxed Ordering		Relaxed Ordering Enable/Disable

6.3.5.5. Intel VT for Directed I/O (VT-d)



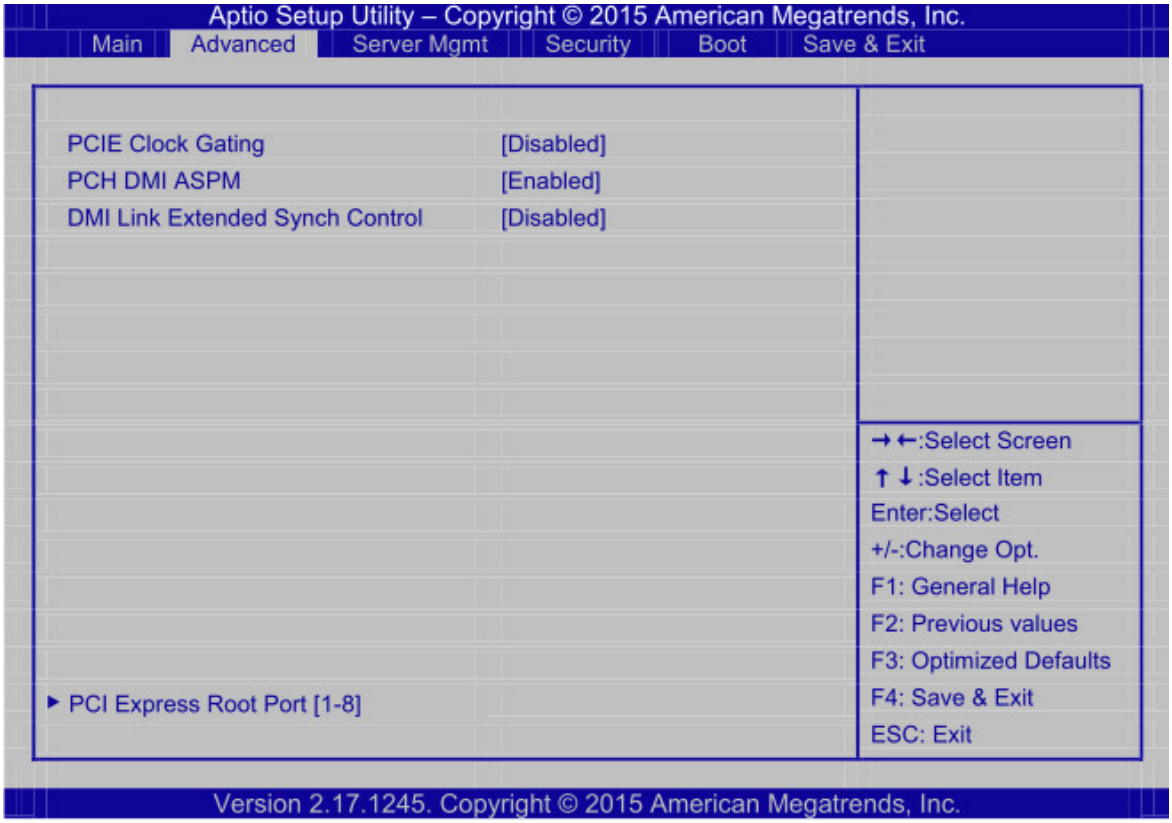
Menu Fields	Settings	Comments
Advanced \ IIO Configuration \ Intel VT for Directed I/O (VT-d)		
Intel VT for Directed I/O (VT-d)		Enable/Disable Intel Virtualization Technology for Directed I/O (VT-d) by reporting the I/O device assignment to VMM through DMAR ACPI Tables.
Interrupt Remapping		Enable/Disable VT_D Interrupt Remapping Support
Coherency Support (Non-Isoch)		Enable/Disable Non-Isoch VT_D Engine Coherency support
Coherency Support (Isoch)		Enable/Disable Isoch VT_D Engine Coherency support

6.3.6. PCH Configuration



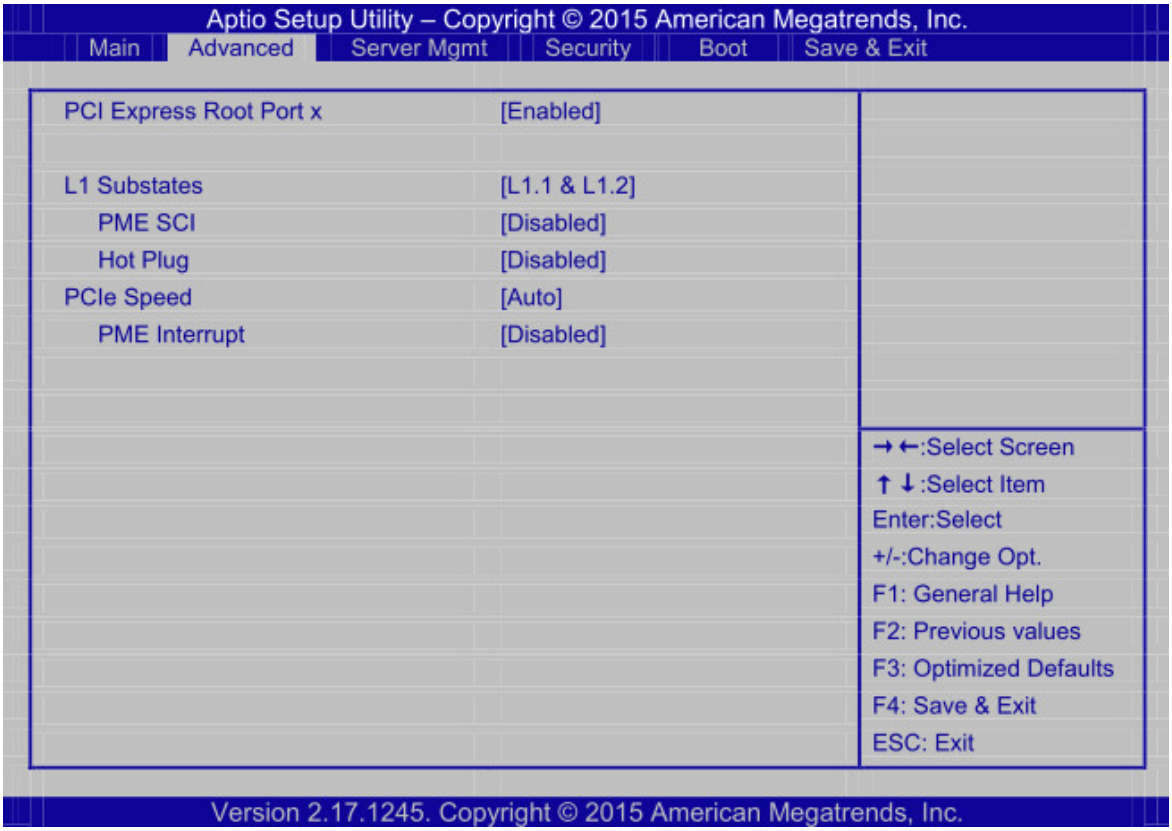
Menu Fields	Settings	Comments
Advanced \ PCH Configuration		
Restore AC Power Loss		Select AC power state when power is re-applied after a power failure.

6.3.6.1. PCI Express Configuration



Menu Fields	Settings	Comments
Advanced \ PCH Configuration \ PCI Express Configuration		
PCIE Clock Gating		PCIE Clock Gating Enable/Disable for all PCH PCIE Ports.
PCH DMI ASPM		PCH DMI ASPM Setting
DMI Link Extended Synch Control		The control of Extended Synch on SB side of the DMI Link.

6.3.6.2. PCI Express Root Port x



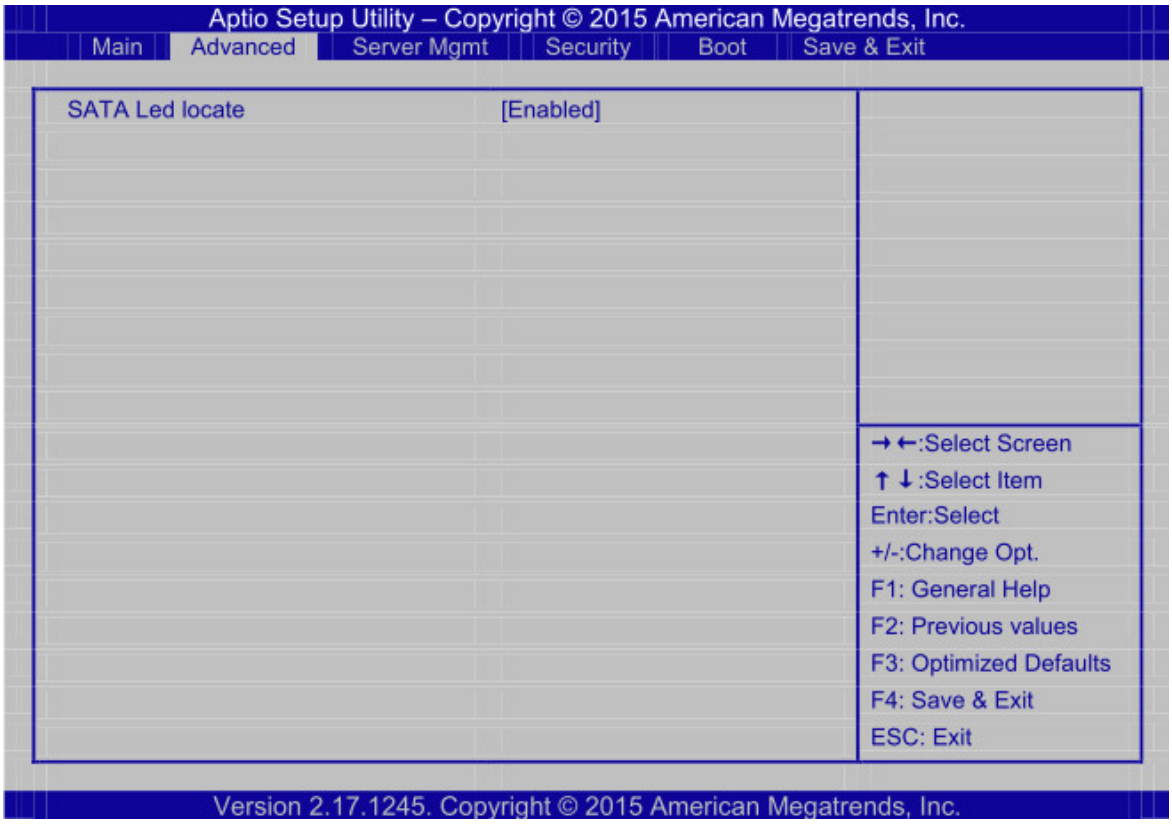
Menu Fields	Settings	Comments
Advanced \ PCH Configuration \ PCI Express Configuration \ PCI Express Root Port x		
PCI Express Root Port x		Control the PCI Express Root Port.
L1 Substates		PCI Express L1 Substates settings
PME SCI		PCI Express PME SCI Enable/Disable.
Hot Plug		PCI Express Hot Plug Enable/Disable.
PCIe Speed		Configure PCIe Speed
PME Interrupt		PCI Express PME Interrupt Enable/Disable.

6.3.6.3. PCH SATA Configuration

Menu Fields	Settings	Comments
Advanced \ PCH Configuration \ PCH SATA Configuration		
SATA Controller		Enable or Disable SATA Controller
Configure SATA as		This will configure SATA as IDE, RAID or AHCI.
SATA test mode		Enable/Disable SATA test mode

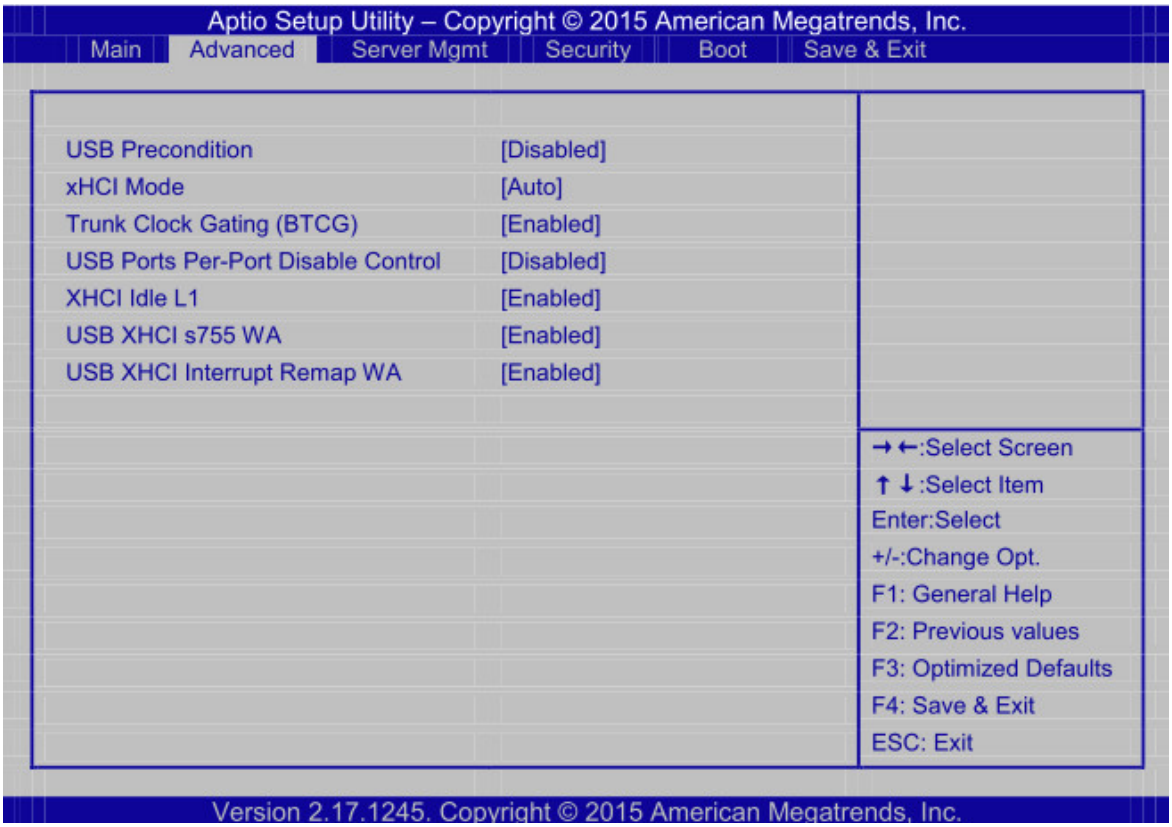
Menu Fields	Settings	Comments
Support Aggressive Link Power Management		Enables/Disables SALP
Hot Plug		Designates this port as Hot Pluggable.
Spin Up Device		If enabled for any of ports Staggered Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.
SATA Device Type		Identify the SATA port is connected to Solid State Drive or Hard Disk Drive

6.3.6.4. SATA Mode Options



Menu Fields	Settings	Comments
Advanced \ PCH Configuration \ PCH SATA Configuration \ SATA Mode options		
SATA Led locate		If enabled LED/SGPIO hardware is attached

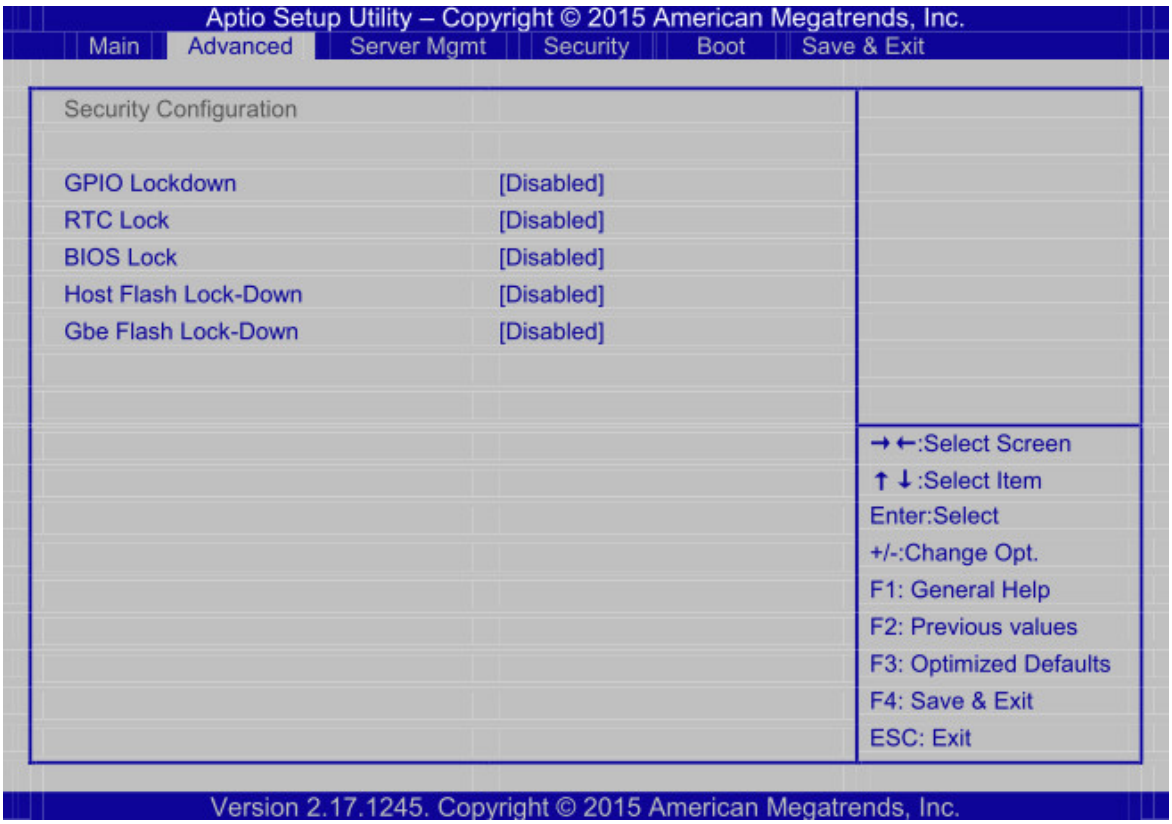
6.3.6.5. USB Configuration



Menu Fields	Settings	Comments
Advanced \ PCH Configuration \ USB Configuration		
USB Precondition		Precondition work on USB host controller and root ports for faster enumeration.
xHCI Mode		Mode of operation of xHCI controller.
Trunk Clock Gating (BTCG)		Enable/Disable BTCG
USB Ports Per-Port Disable Control		Control each of the USB ports (0~13) disabling.
XHCI Idle L1		Enabled XHCI Idle L1. Disabled to workaround USB3 hot plug will fail after 1 hot plug removal. Please put the system to G3 for the new settings to take effect.
USB XHCI s755 WA		ONLY for WBG < B1! Enable/Disable USB XHCI s755 WA to avoid CATERRs.

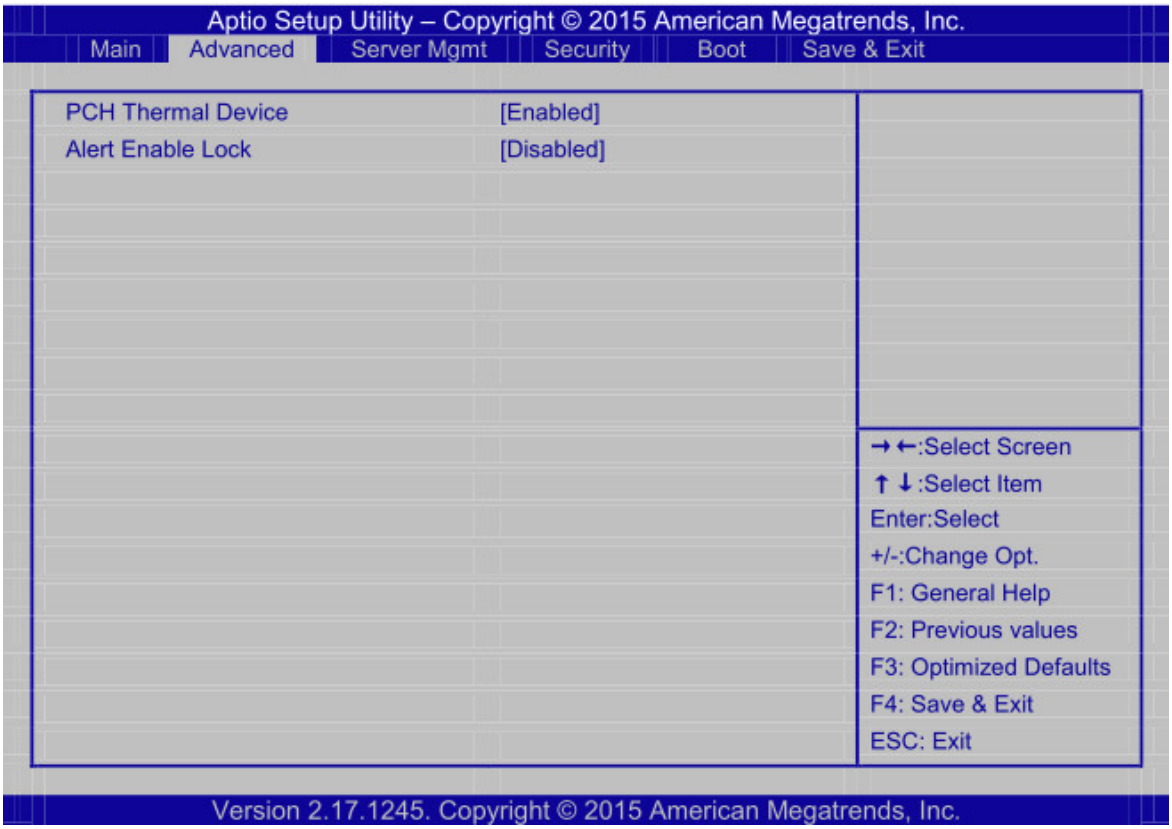
Menu Fields	Settings	Comments
USB XHCI Interrupt Remap WA		Enable/Disable USB XHCI s116 WA. ENABLE = hides MSI capability on XHCI

6.3.6.6. Security Configuration



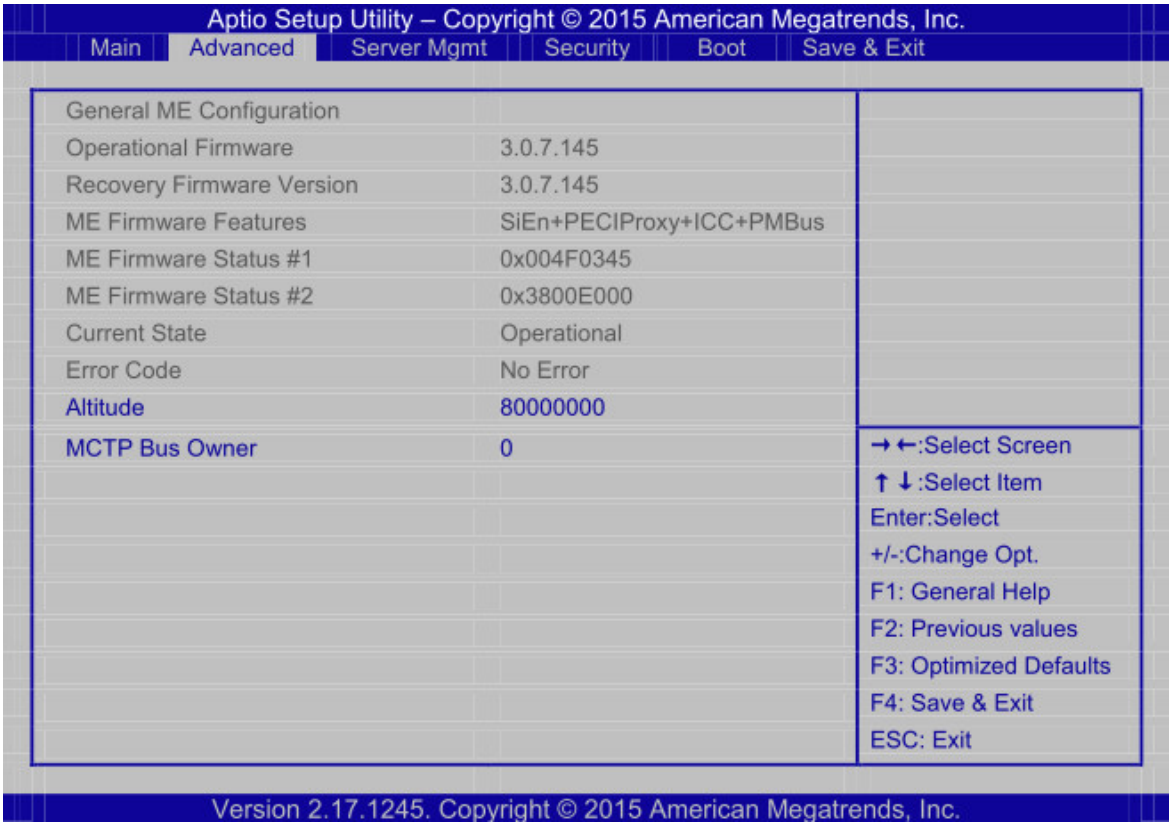
Menu Fields	Settings	Comments
Advanced \ PCH Configuration \ Security Configuration		
GPIO Lockdown		Enable/Disable the PCH GPIO Lock-down feature.
RTC Lock		Enable will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM
BIOS Lock		Enable/Disable the PCH BIOS Lock Enable feature.
Host Flash Lock-Down		Enable/Disable Host Flash Lock-Down
Gbe Flash Lock-Down		Enable/Disable Gbe Flash Lock-Down

6.3.6.7. Platform Thermal Configuration



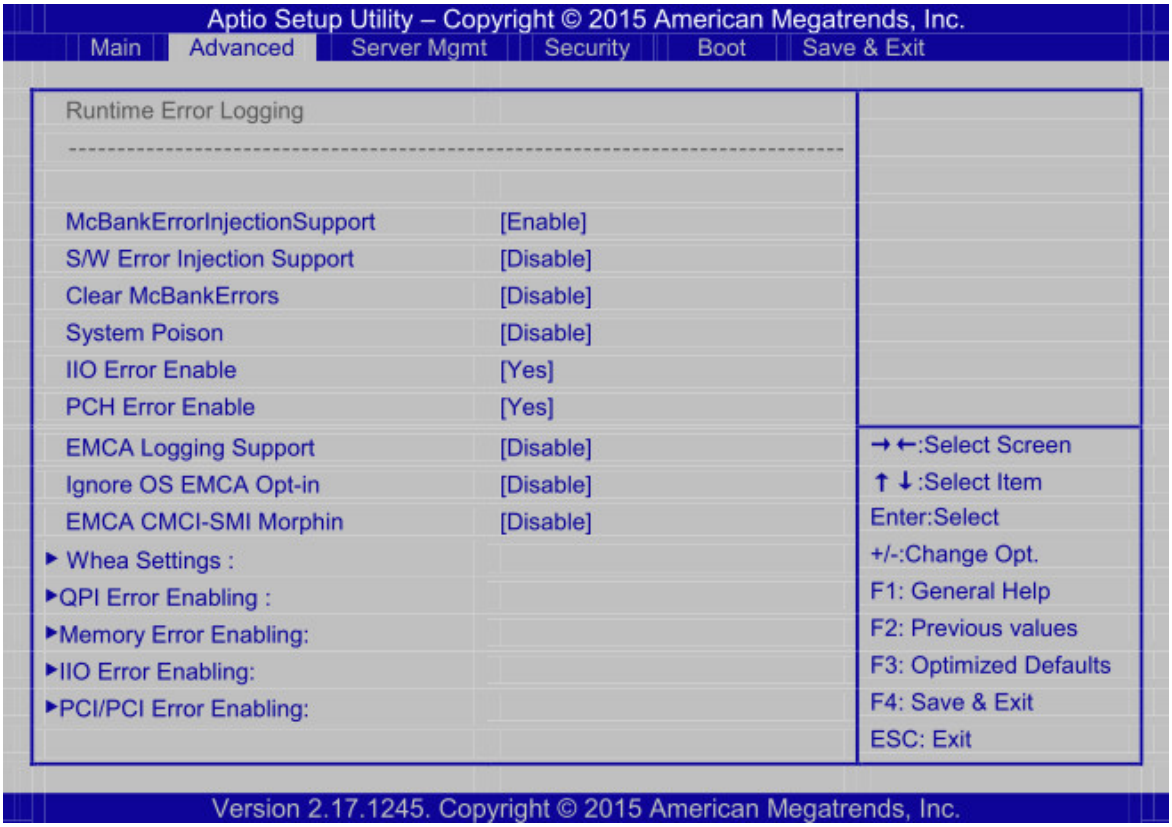
Menu Fields	Settings	Comments
Advanced \ PCH Configuration \ Platform Thermal Configuration		
PCH Thermal Device		Enable/Disable PCH Thermal Device(D31:F6)
Alert Enable Lock		Lock all Alert Enable settings

6.3.7. Server ME Configuration



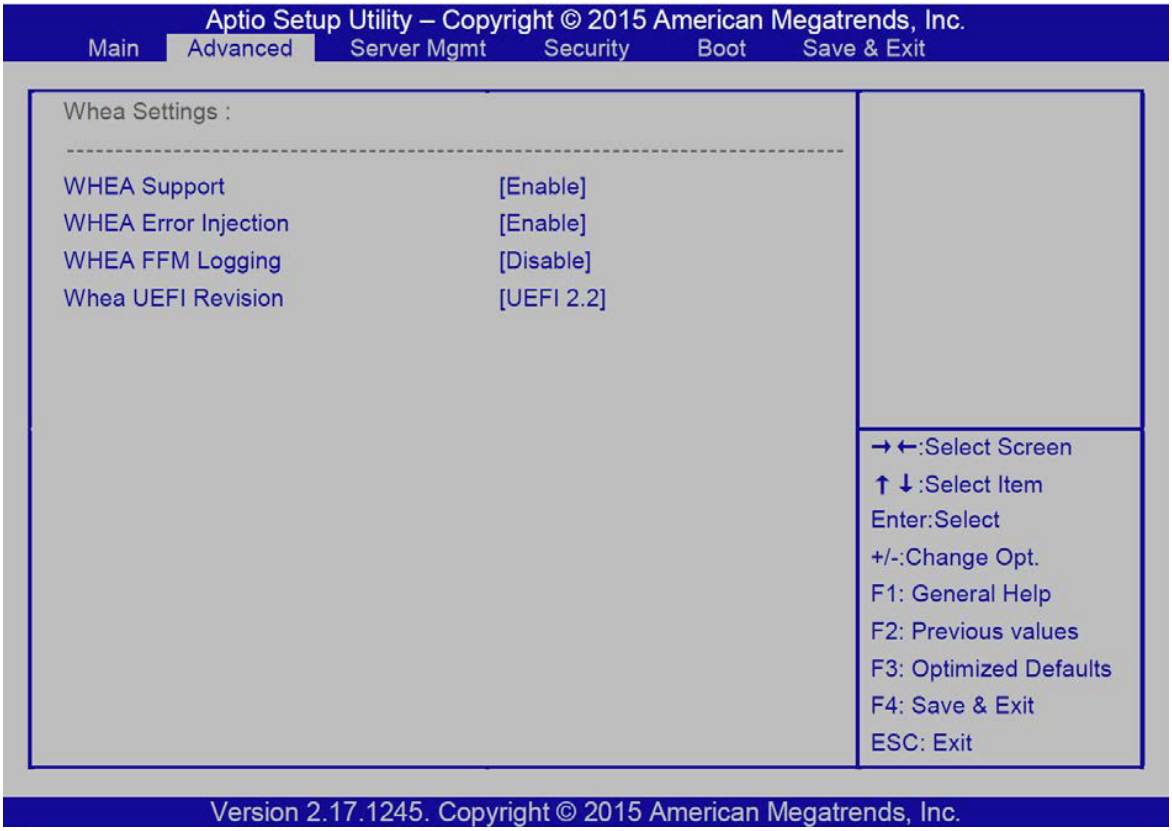
Menu Fields	Settings	Comments
Advanced \ Server ME Configuration		
Altitude	80000000	The altitude of the platform location above the see level, expressed in meters. The hex number is decoded as 2's complement signed integer. Provide the 80000000 value if the altitude is unknown.
MCTP Bus Owner	0	MCTP bus owner location on PCIe: [15:8] bus, [7:3] device, [2:0] function. If all zeros sending bus owner is disabled.

6.3.8. Runtime Error Logging



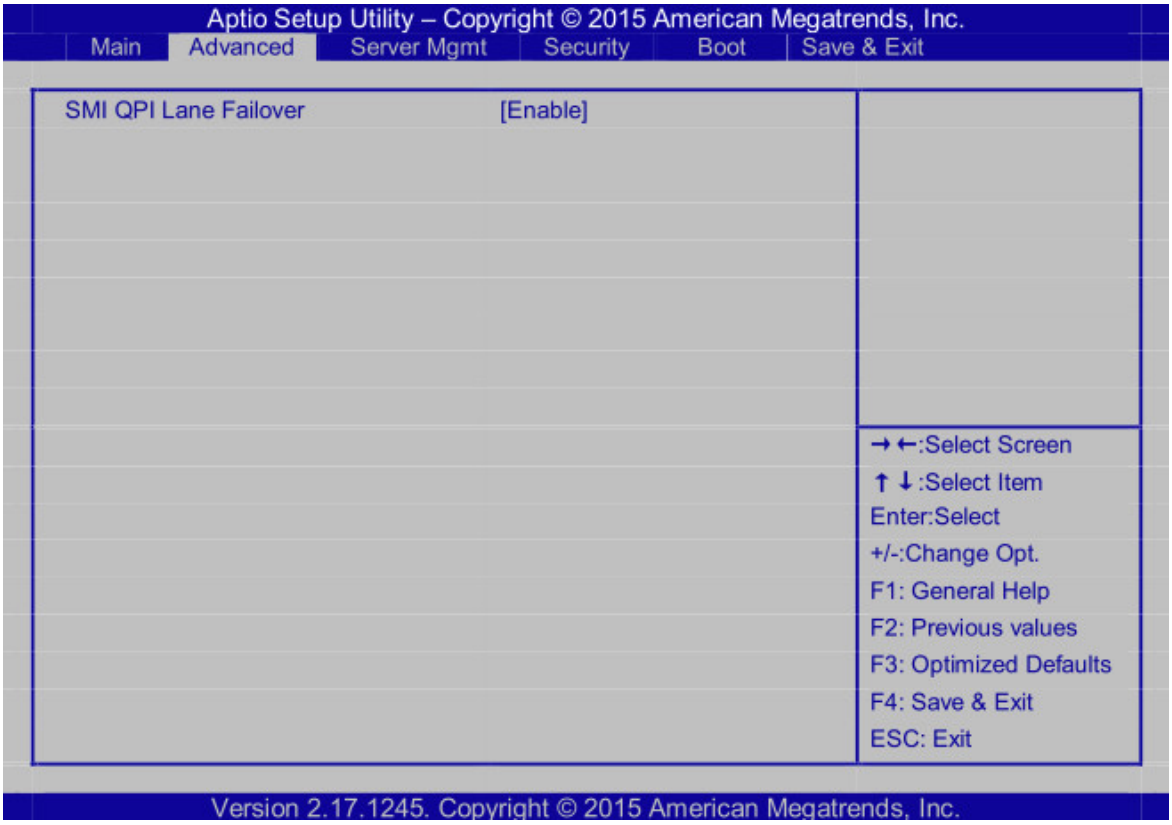
Menu Fields	Settings	Comments
Advanced \ Runtime Error Logging		
McBankErrorInjectionSupport		Enables or Disables McBank Error Injection Support.
S/W Error Injection Support		When Enabled S/W Error Injection is supported by unlocking MSR 0x790
Clear McBankErrors		Enables or Disables clearing MCBank errors on warm reset.
System Poison		Enable/Disable Core, Uncore and IIO Poison
IIO Error Enable		
PCH Error Enable		
EMCA Logging Support		Enable/Disable EMCA Logging
Ignore OS EMCA Opt-in		Enable/Disable Ignore OS EMCA Opt-in and log
EMCA CMCI-SMI Morphin		Enable/Disable EMCA CSMI

6.3.8.1. Whea Settings



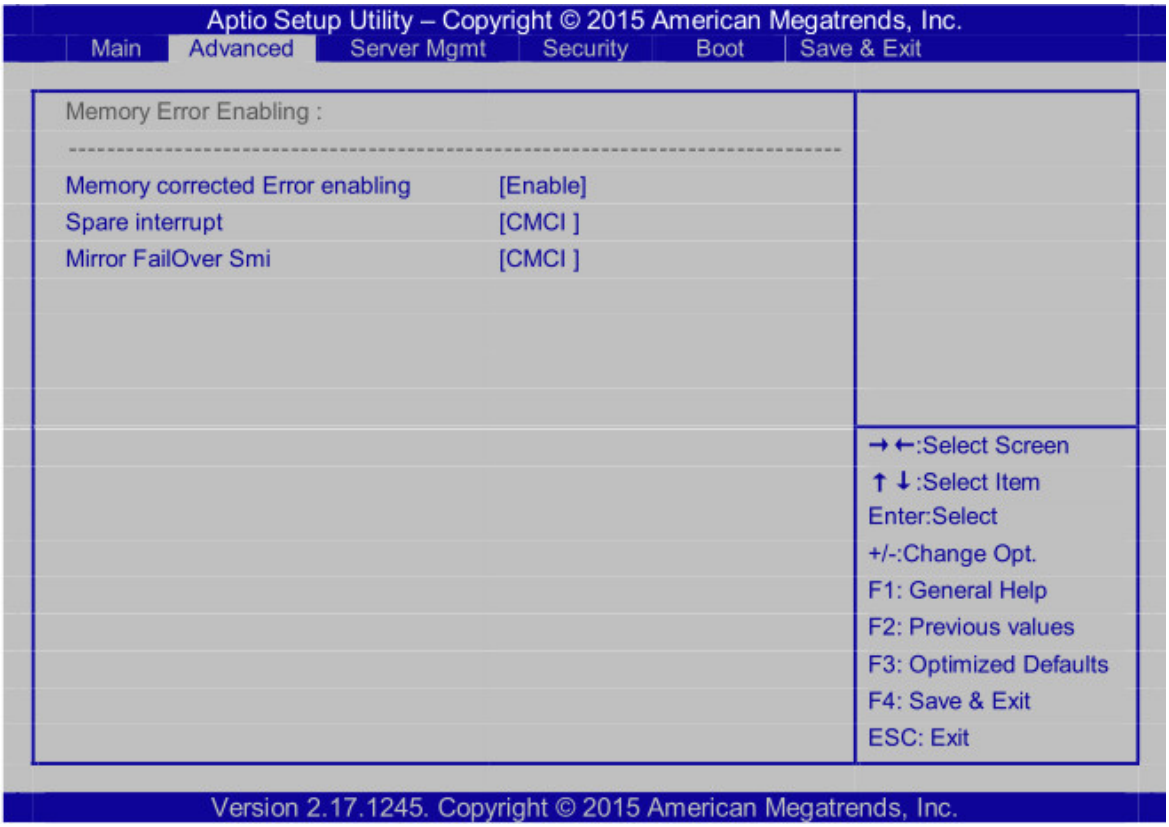
Menu Fields	Settings	Comments
Advanced \ Runtime Error Logging \ WHEA Settings		
WHEA Support		Enable or disable the WHEA support
WHEA Error Injection		Whea EINJ ACPI 5.0 support for set error type with address and vendor extensions.
WHEA FFM Logging		Enable/Disable Whea FFM logging of errors.
Whea UEFI Revision		UEFI revision of Whea error format.

6.3.8.2. QPI Error Enabling



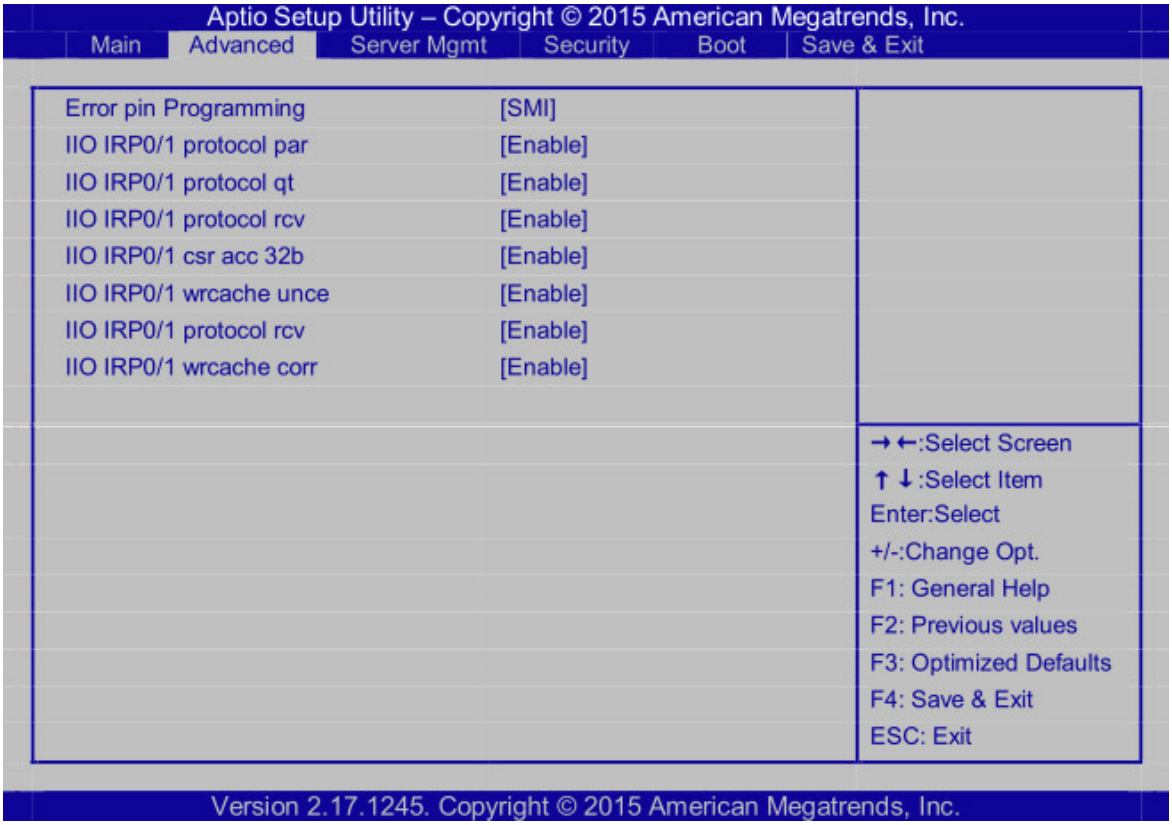
Menu Fields	Settings	Comments
Advanced \ Runtime Error Logging \ QPI Error Enabling		
SMI QPI Lane Failover		Enable/disables SMI when clock/data failover is set.

6.3.8.3. Memory Error Enabling



Menu Fields	Settings	Comments
Advanced \ Runtime Error Logging \ Memory Error Enabling		
Memory corrected Error enabling		Enable / Disables Memory corrected Errors
Spare interrupt		Select SMI/CMCI/ErrPin for spare interrupt
Mirror FailOver Smi		Enable/Disable Mirror FailOver SMI generation

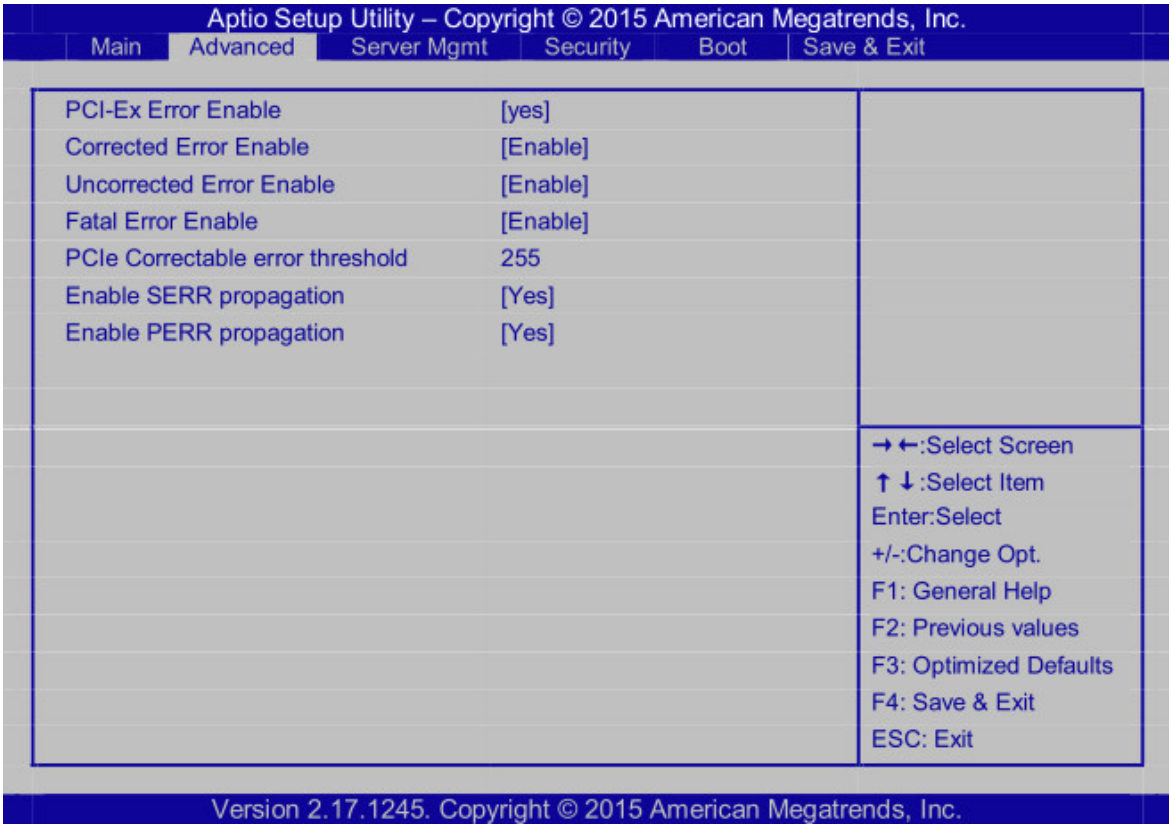
6.3.8.4. IIO Error Enabling



Menu Fields	Settings	Comments
Advanced \ Runtime Error Logging \ IIO Error Enabling		
Error pin Programming		Error pin Programming.
IIO IRP0/1 protocol par		Enable or disable Coherent Interface protocol IIO parity error reporting.
IIO IRP0/1 protocol qt		Enable or disable IIO Coherent Interface protocol queue table overflow or underflow error reporting.
IIO IRP0/1 protocol rcv		Enable or disable IIO Coherent Interface protocol layer received unexpected response or completion error reporting.
IIO IRP0/1 csr acc 32b		Enable or disable IIO Coherent Interface CSR Access Crossing 32-bit Boundary error reporting.
IIO IRP0/1 wrcache unce		Enable or disable IIO Coherent Interface Write Cache Un-correctable ECC error reporting.

Menu Fields	Settings	Comments
IIO IRP0/1 protocol rcv		Enable or disable IIO Coherent Interface Protocol Layer Received Poisoned Packet error reporting.
IIO IRP0/1 wrcache corr		Enable or disable IIO Coherent Interface Write Cache Correctable ECC error reporting.

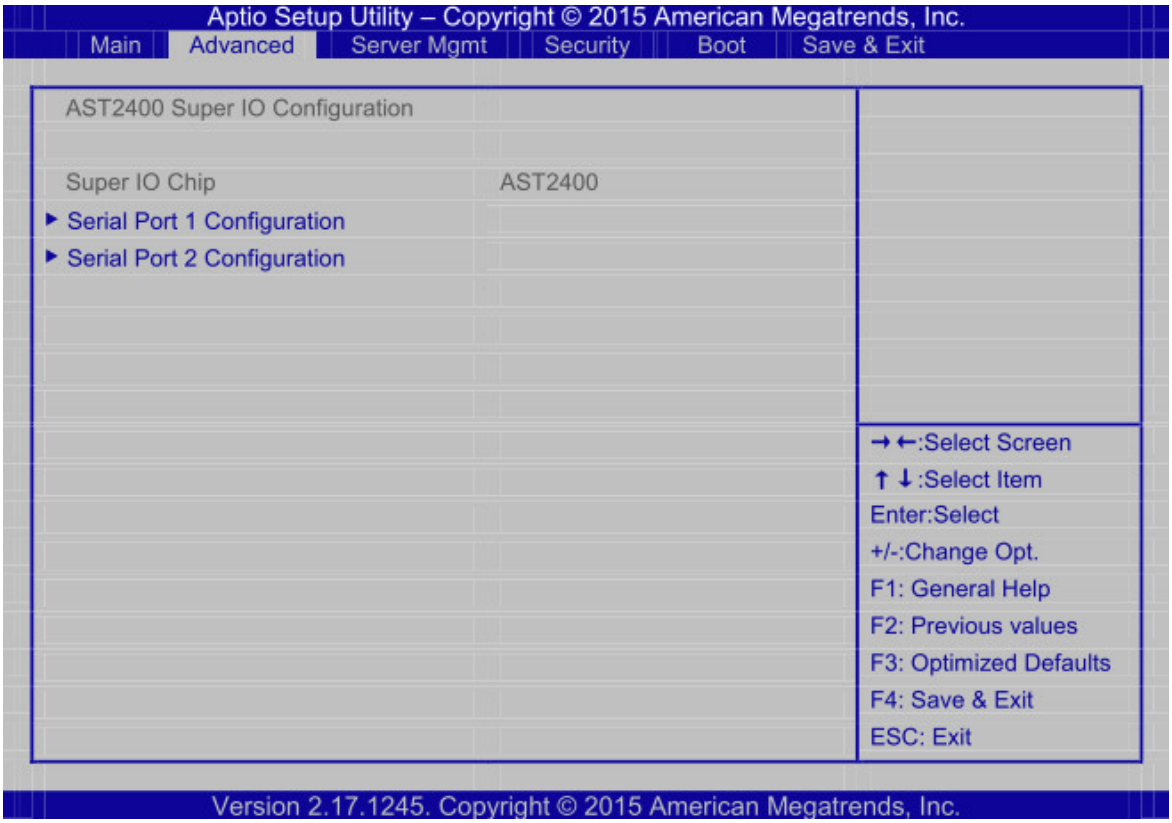
6.3.8.5. PCI/PCI Error Enabling



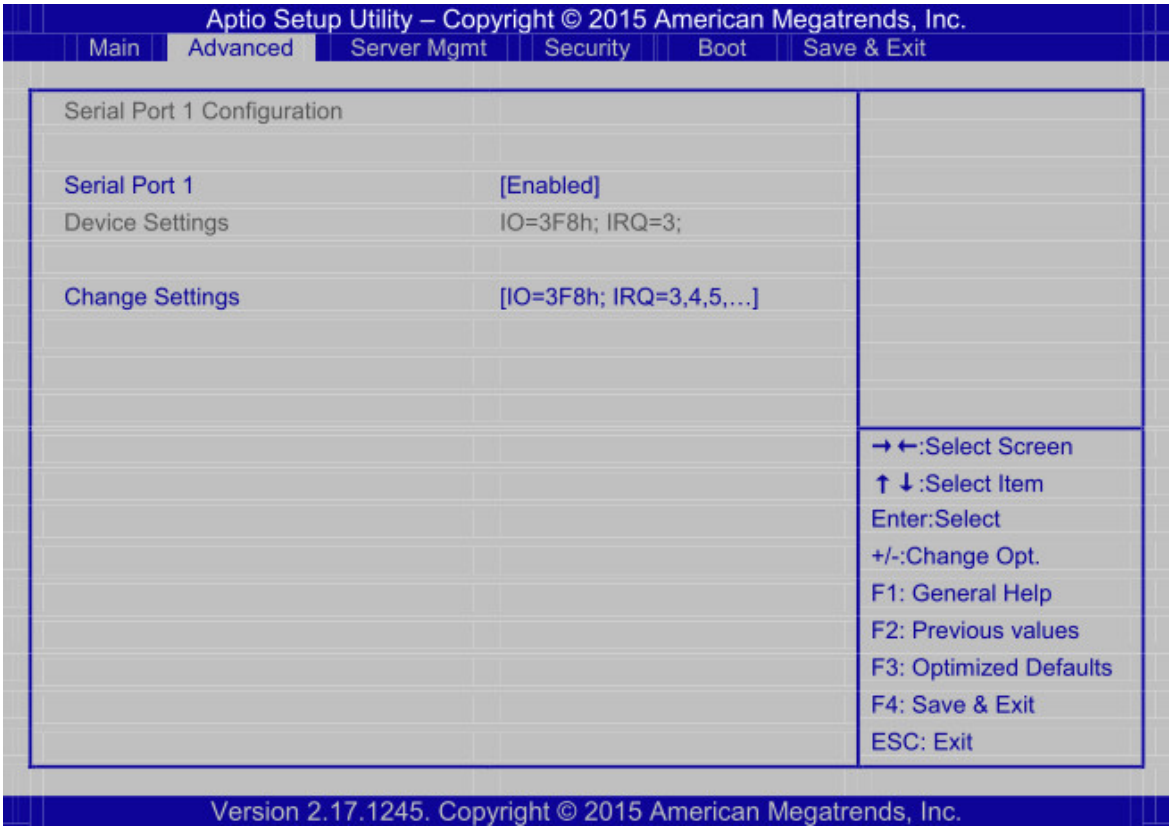
Menu Fields	Settings	Comments
Advanced \ Runtime Error Logging \ PCI/PCI Error Enabling :		
PCI-Ex Error Enable		
Corrected Error Enable		Enable/Disable PCIe Correctable errors.
Uncorrected Error Enable		Enable/Disable PCIe Uncorrectable errors.
Fatal Error Enable		Enable/Disable PCIe Fatal errors.
PCIe Correctable error threshold	255	PCIe CE threshold (1-255), 0-No threshold.

Menu Fields	Settings	Comments
Enable SERR propagation		
Enable PERR propagation		

6.3.9. AST2400 Super IO Configuration

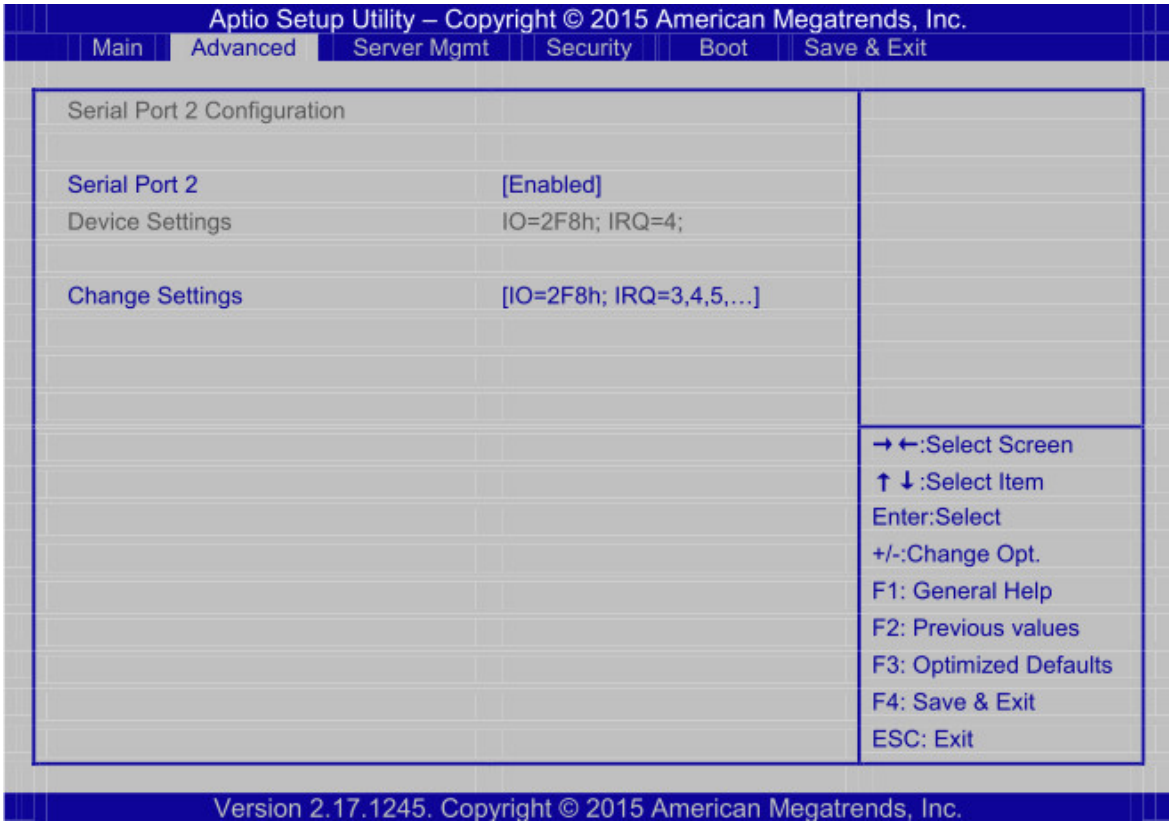


6.3.9.1. Serial Port 1 Configuration



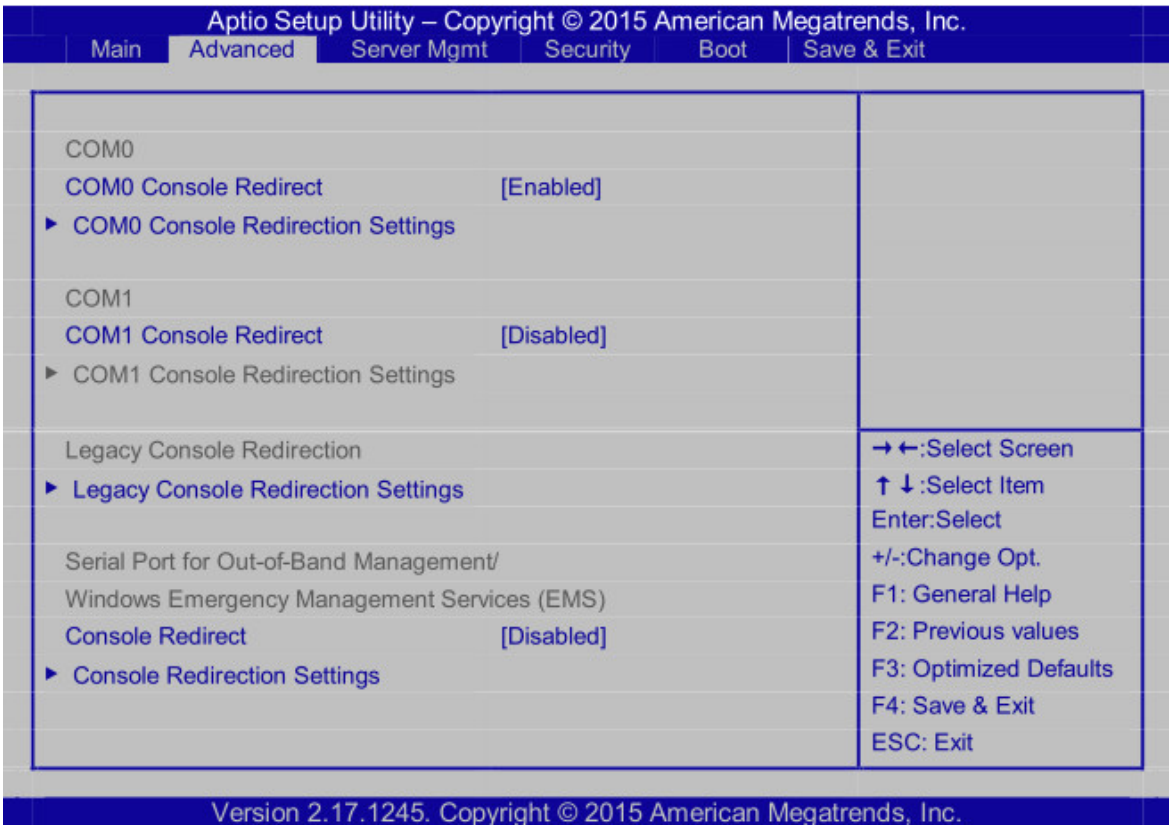
Menu Fields	Settings	Comments
Advanced \ AST2400 Super IO Configuration \ Serial Port 1 Configuration		
Serial Port 1		Enable or Disable Serial Port (COM)
Change Settings		Select an optimal settings for Super IO Device

6.3.9.2. Serial Port 2 Configuration



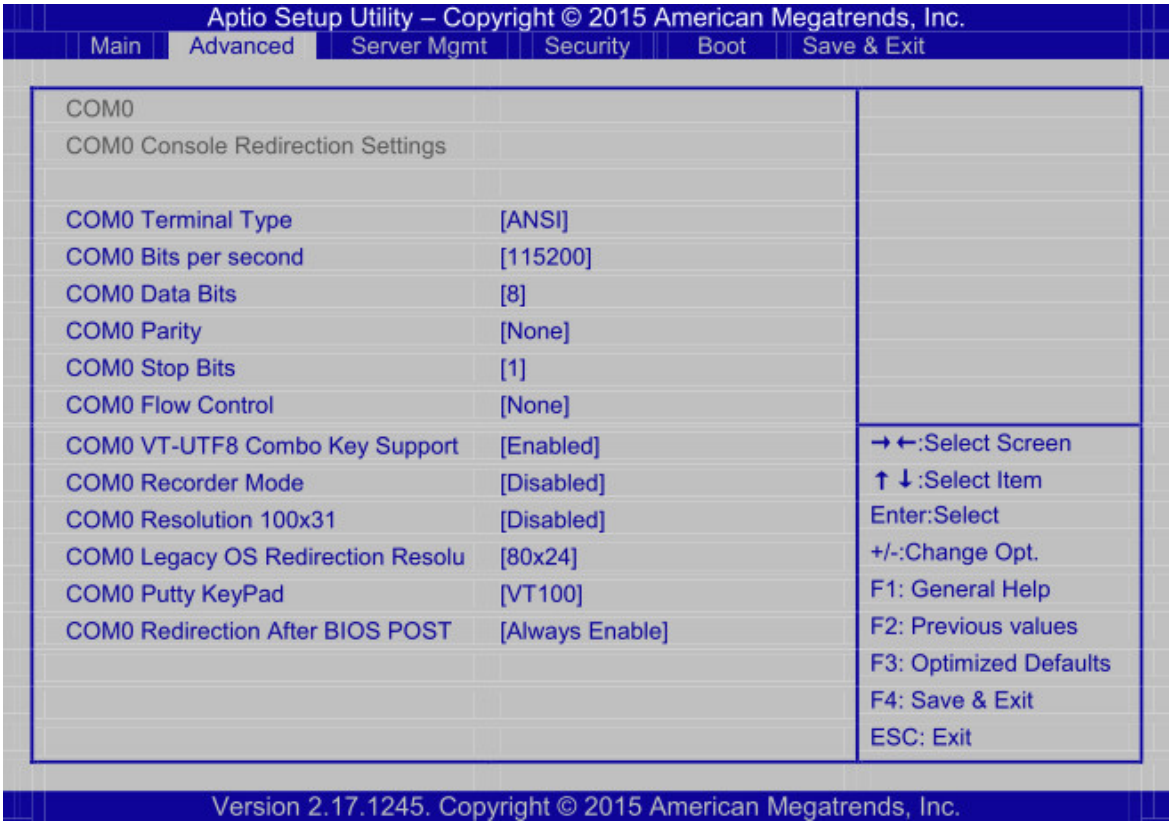
Menu Fields	Settings	Comments
Advanced \ AST2400 Super IO Configuration \ Serial Port 2 Configuration		
Serial Port 2		Enable or Disable Serial Port (COM)
Change Settings		Select an optimal settings for Super IO Device

6.3.10. Serial Port Console Redirection



Menu Fields	Settings	Comments
Advanced \ Serial Port Console Redirection		
COM0 Console Redirection		Console Redirection Enable or Disable.
COM1 Console Redirection		Console Redirection Enable or Disable.
Console Redirect		Console Redirection Enable or Disable.

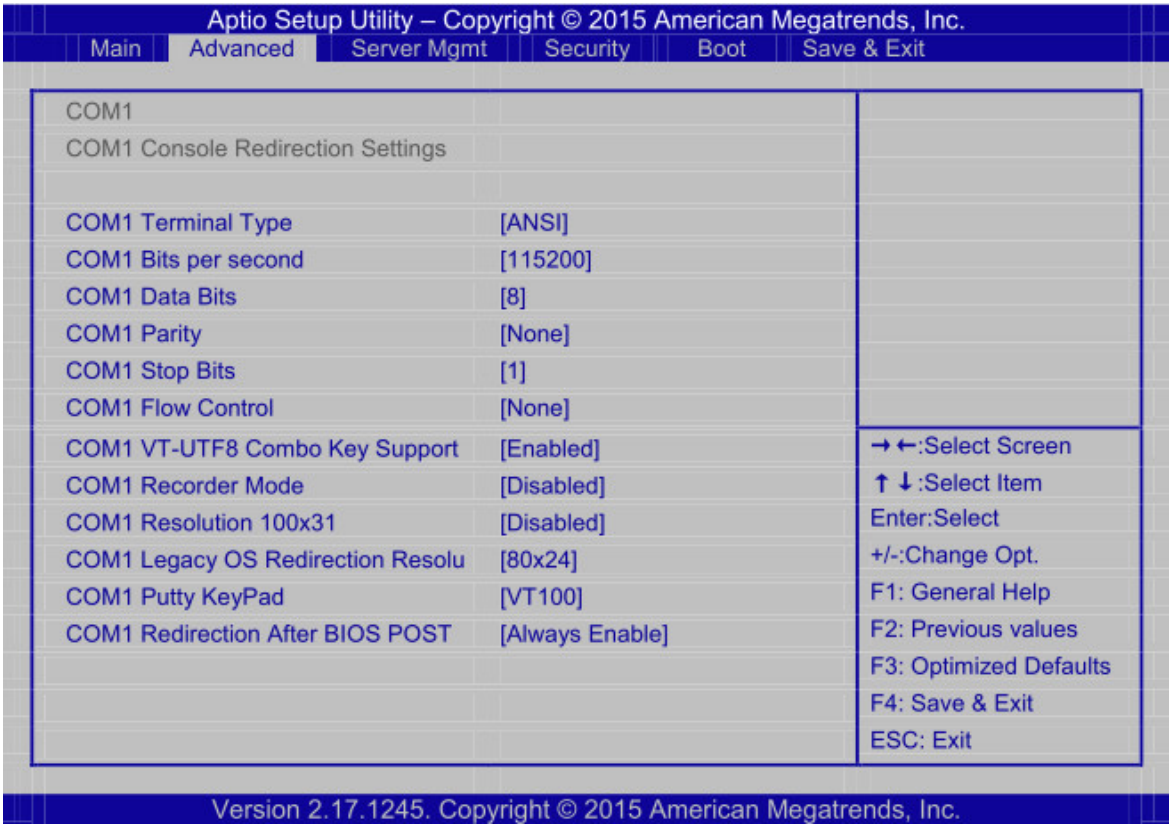
6.3.10.1. COM0 Console Redirection Settings



Menu Fields	Settings	Comments
Advanced \ Serial Port Console Redirection \ COM0 Console Redirection Settings		
COM0 Terminal Type		Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color,function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
COM0 Bits per second		Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
COM0 Data Bits		Data Bits
COM0 Parity		A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always 1. Space: Parity bit is always 0. Mark and Space Parity do not allow for er-

Menu Fields	Settings	Comments
		ror detection. They can be used as an additional data bit.
COM0 Stop Bits		Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit
COM0 Flow Control		Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a *stop* signal can be sent to stop the data flow. Once the buffers are empty, a *start* signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.
COM0 VT-UTF8 Combo Key Support		Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals
COM0 Recorder Mode		With this mode enabled only text will be sent. This is to capture Terminal data
COM0 Resolution 100x31		Enables or disables extended terminal resolution
COM0 Legacy OS Redirection Resolution		On Legacy OS, the Number of Rows and Columns supported redirection
COM0 Putty Keypad		Select FunctionKey and KeyPad on Putty
COM0 Redirection After BIOS POST		The Settings specify if BootLoader is selected than Legacy console redirection is disabled before booting to Legacy OS. Default value is Always Enable which means Legacy console Redirection is enabled for Legacy OS.

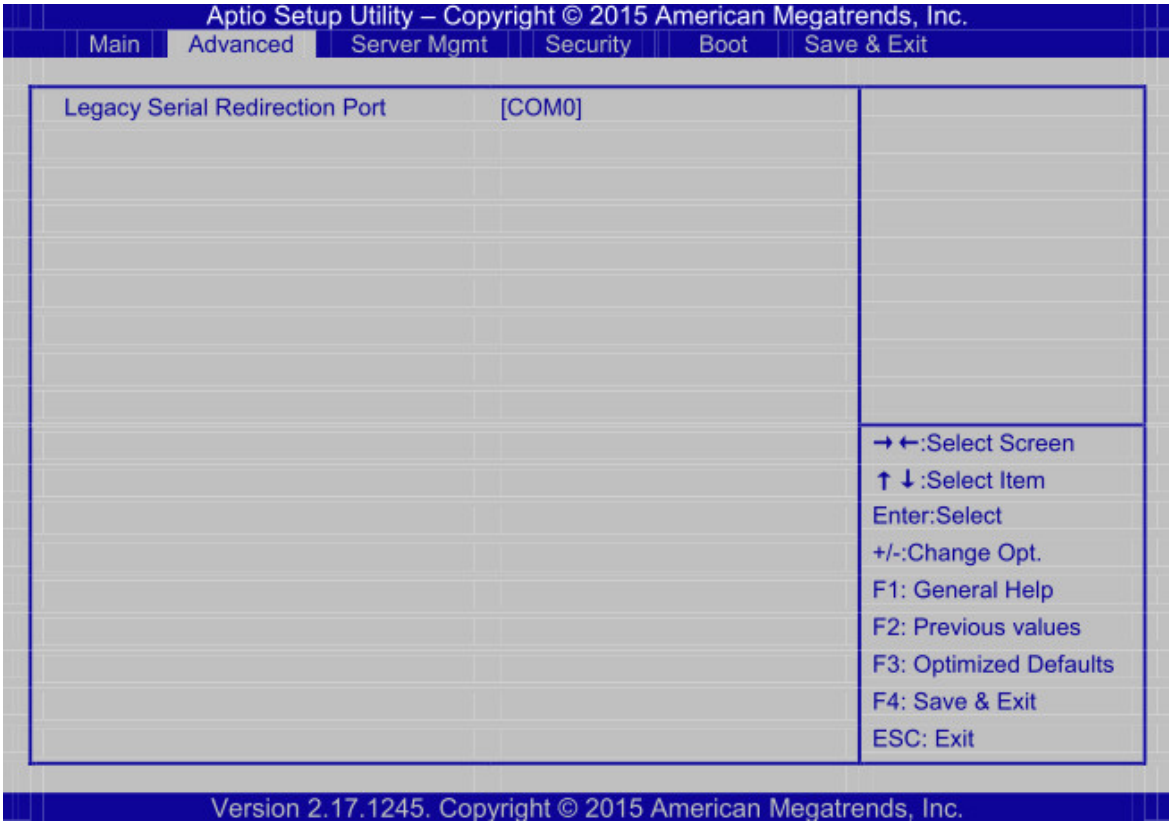
6.3.10.2. COM1 Console Redirection Settings



Menu Fields	Settings	Comments
Advanced \ Serial Port Console Redirection \ COM1 Console Redirection Settings		
COM1 Terminal Type		Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color,function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
COM1 Bits per second		Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
COM1 Data Bits		Data Bits
COM1 Parity		A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always 1. Space: Parity bit is always 0. Mark and Space Parity do not allow for er-

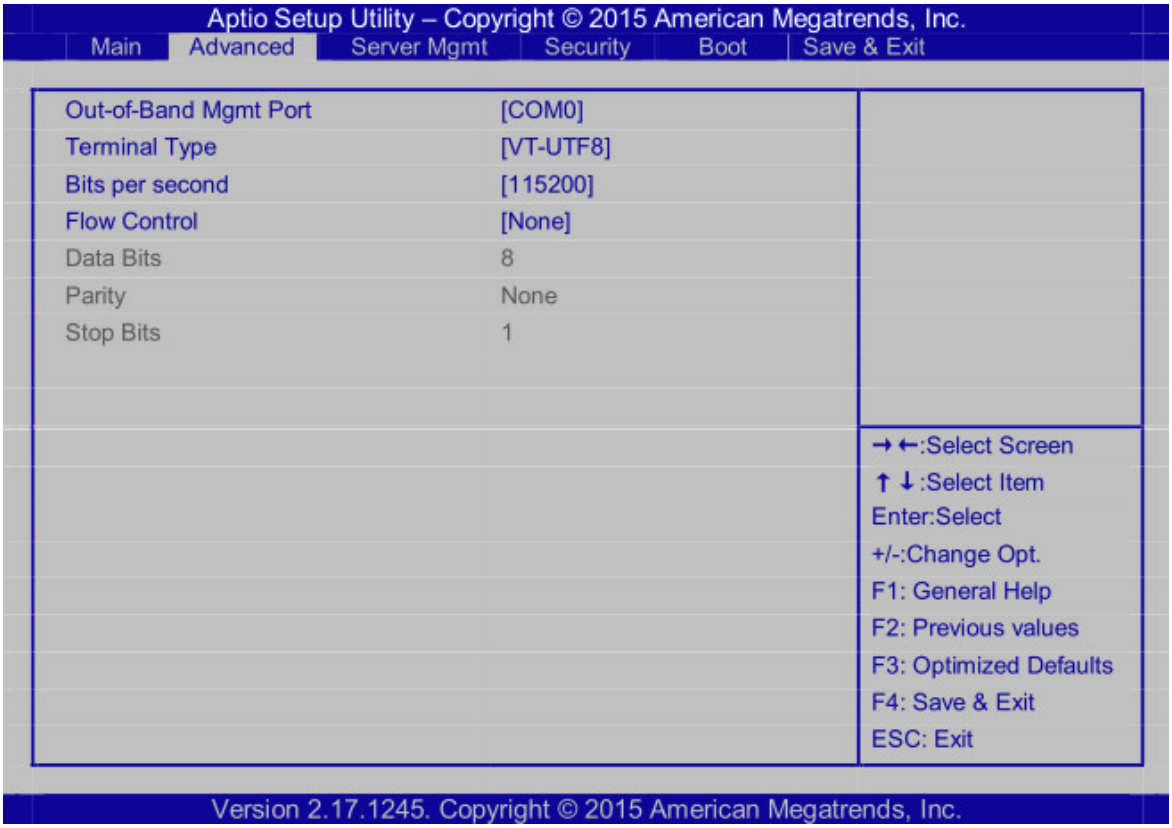
Menu Fields	Settings	Comments
		ror detection. They can be used as an additional data bit.
COM1 Stop Bits		Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit
COM1 Flow Control		Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a *stop* signal can be sent to stop the data flow. Once the buffers are empty, a *start* signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.
COM1 VT-UTF8 Combo Key Support		Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals
COM1 Recorder Mode		With this mode enabled only text will be sent. This is to capture Terminal data
COM1 Resolution 100x31		Enables or disables extended terminal resolution
COM1 Legacy OS Redirection Resolution		On Legacy OS, the Number of Rows and Columns supported redirection
COM1 Putty Keypad		Select FunctionKey and KeyPad on Putty
COM1 Redirection After BIOS POST		The Settings specify if BootLoader is selected than Legacy console redirection is disabled before booting to Legacy OS. Default value is Always Enable which means Legacy console Redirection is enabled for Legacy OS.

6.3.10.3. Legacy Console Redirection Settings



Menu Fields	Settings	Comments
Advanced \ Serial Port Console Redirection \ Legacy Console Redirection Settings		
Legacy Serial Redirection Port		Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages

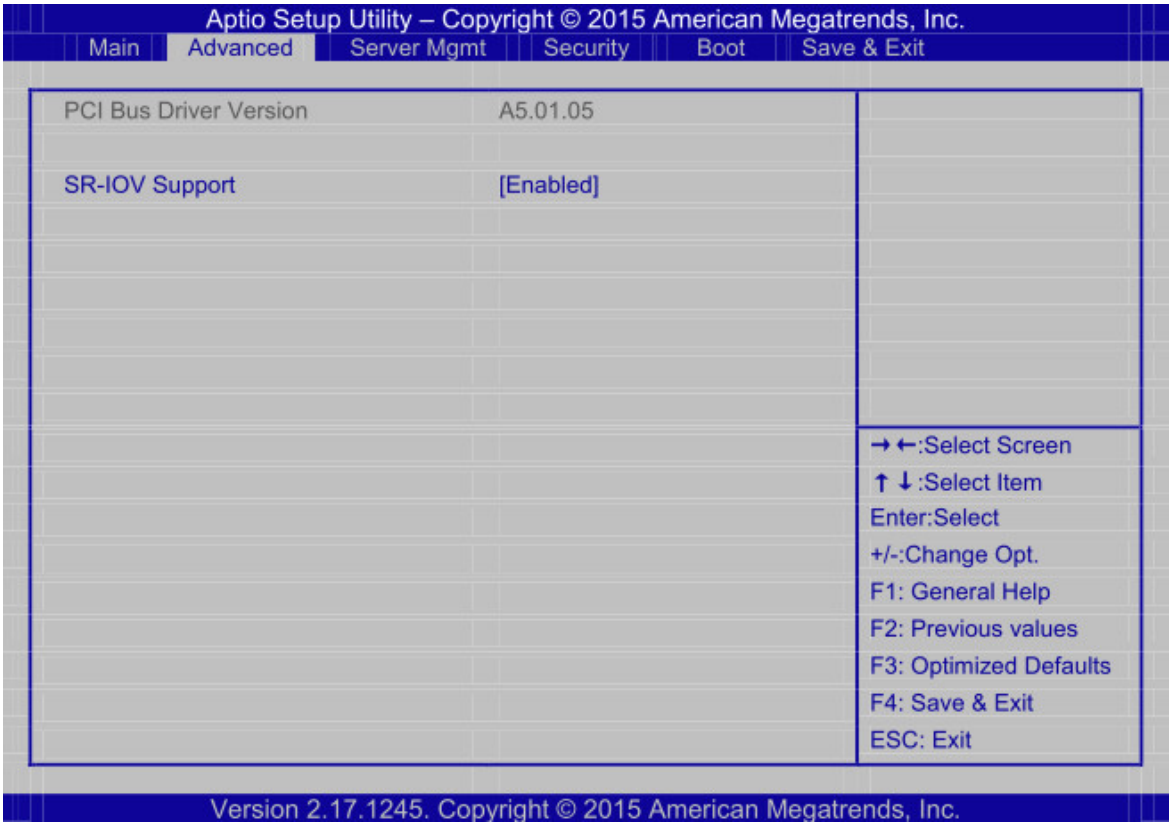
6.3.10.4. Console Redirection Settings



Menu Fields	Settings	Comments
Advanced \ Serial Port Console Redirection \ Console Redirection Settings		
Out-of-Band Mgmt Port		Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.
Terminal Type		VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100. See above, in Console Redirection Settings page, for more Help with Terminal Type/Emulation.
Bits per second		Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
Flow Control		Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a

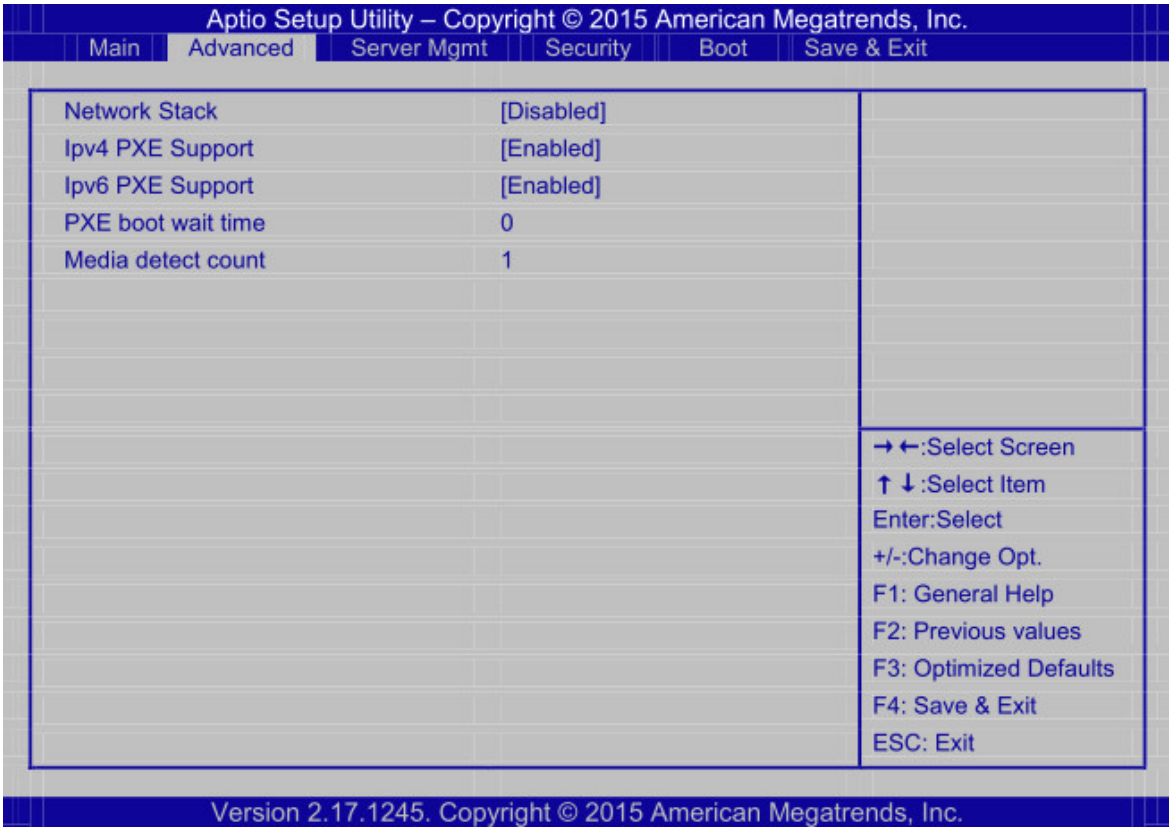
Menu Fields	Settings	Comments
		stop signal can be sent to stop the data flow. Once the buffers are empty, a *start* signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.

6.3.11. PCI Subsystem Settings



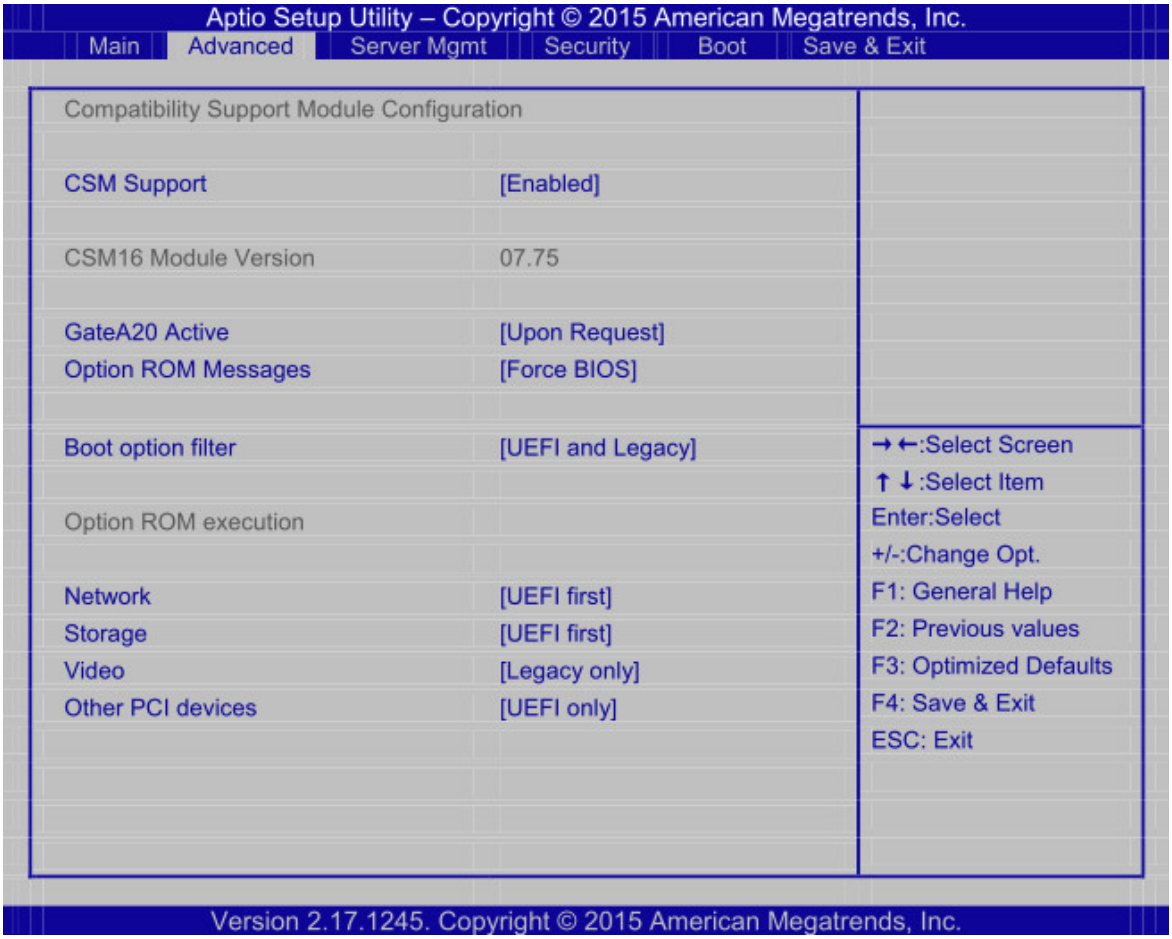
Menu Fields	Settings	Comments
Advanced \ PCI Subsystem Settings		
SR-IOV Support		If system has SR-IOV capable PCIe Devices, this option Enables or Disables Single Root IO Virtualization Support

6.3.12. Network Stack Configuration



Menu Fields	Settings	Comments
Advanced \ Network Stack Configuration		
Network Stack		Enable/Disable UEFI Network Stack
Ipv4 PXE Support		Enable Ipv4 PXE Boot Support. If disabled IPV4 PXE boot option will not be created
Ipv6 PXE Support		Enable Ipv6 PXE Boot Support. If disabled IPV6 PXE boot option will not be created
PXE boot wait time	0	Wait time to press ESC key to abort the PXE boot
Media detect count	1	Number of times presence of media will be checked

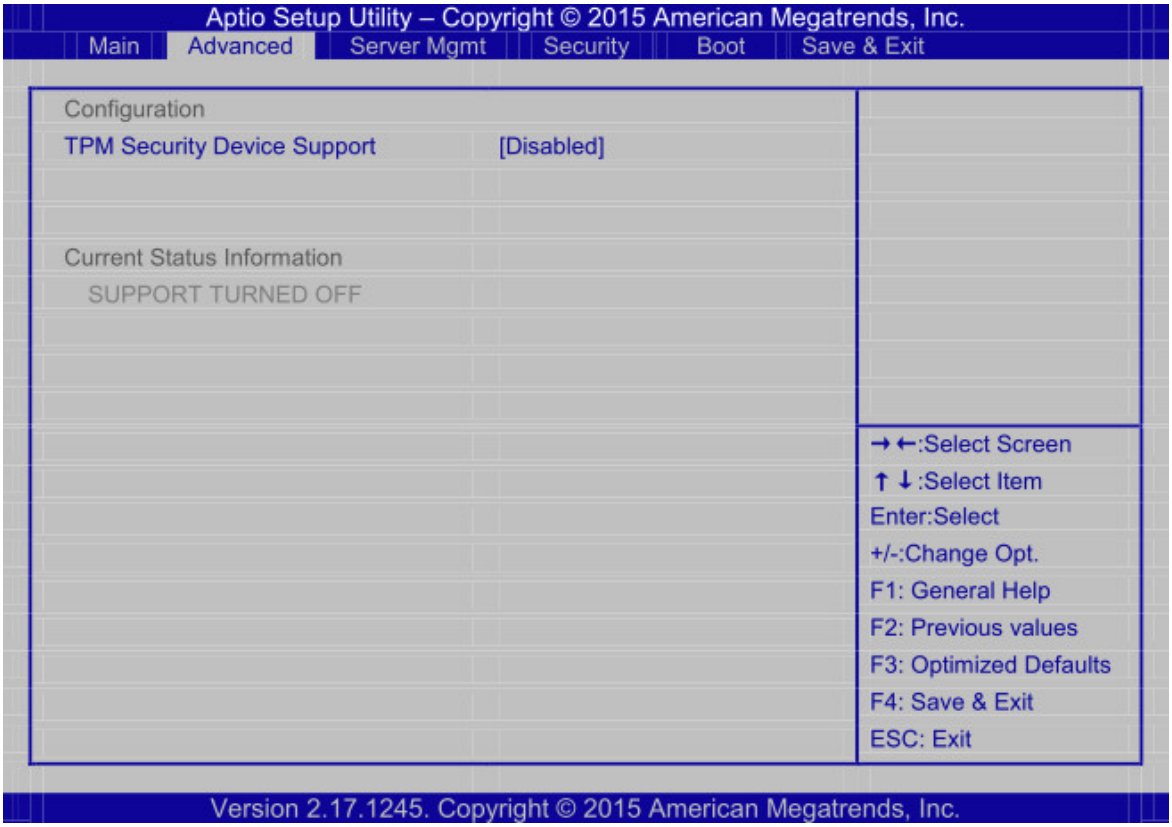
6.3.13. CSM Configuration



Menu Fields	Settings	Comments
Advanced \ CSM Configuration		
CSM Support		Enable/Disable CSM Support.
GateA20 Active		UPON REQUEST - GA20 can be disabled using BIOS services. ALWAYS - do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.
Option ROM Messages		Set display mode for Option ROM
Boot option filter		This option controls Legacy/UEFI ROMs priority
Network		Controls the execution of UEFI and Legacy PXE OpROM
Storage		Controls the execution of UEFI and Legacy Storage OpROM

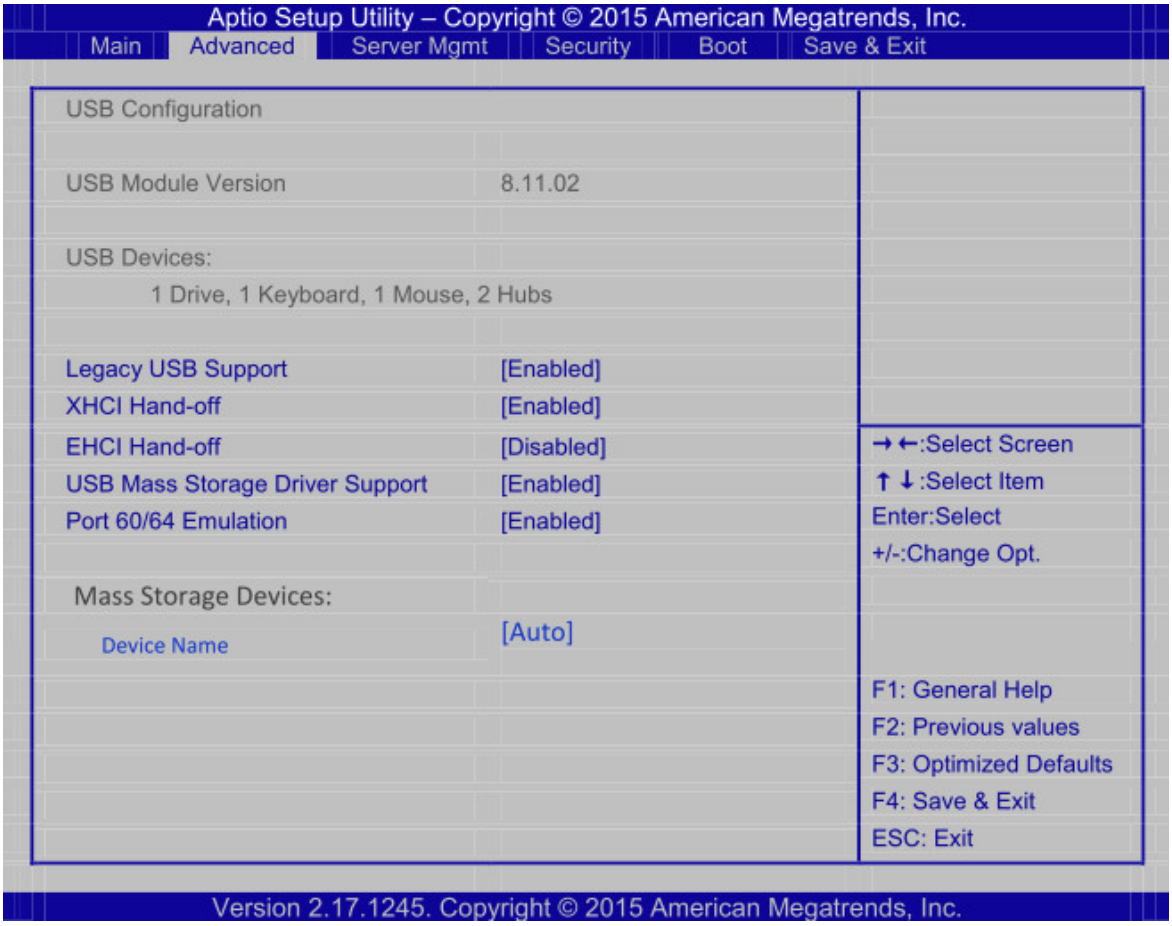
Menu Fields	Settings	Comments
Video		Controls the execution of UEFI and Legacy Video OpROM
Other PCI devices		Determines OpROM execution policy for devices other than Network, Storage, or Video

6.3.14. Trusted Computing



Menu Fields	Settings	Comments
Advanced \Trusted Computing		
TPM Security Device Support		Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

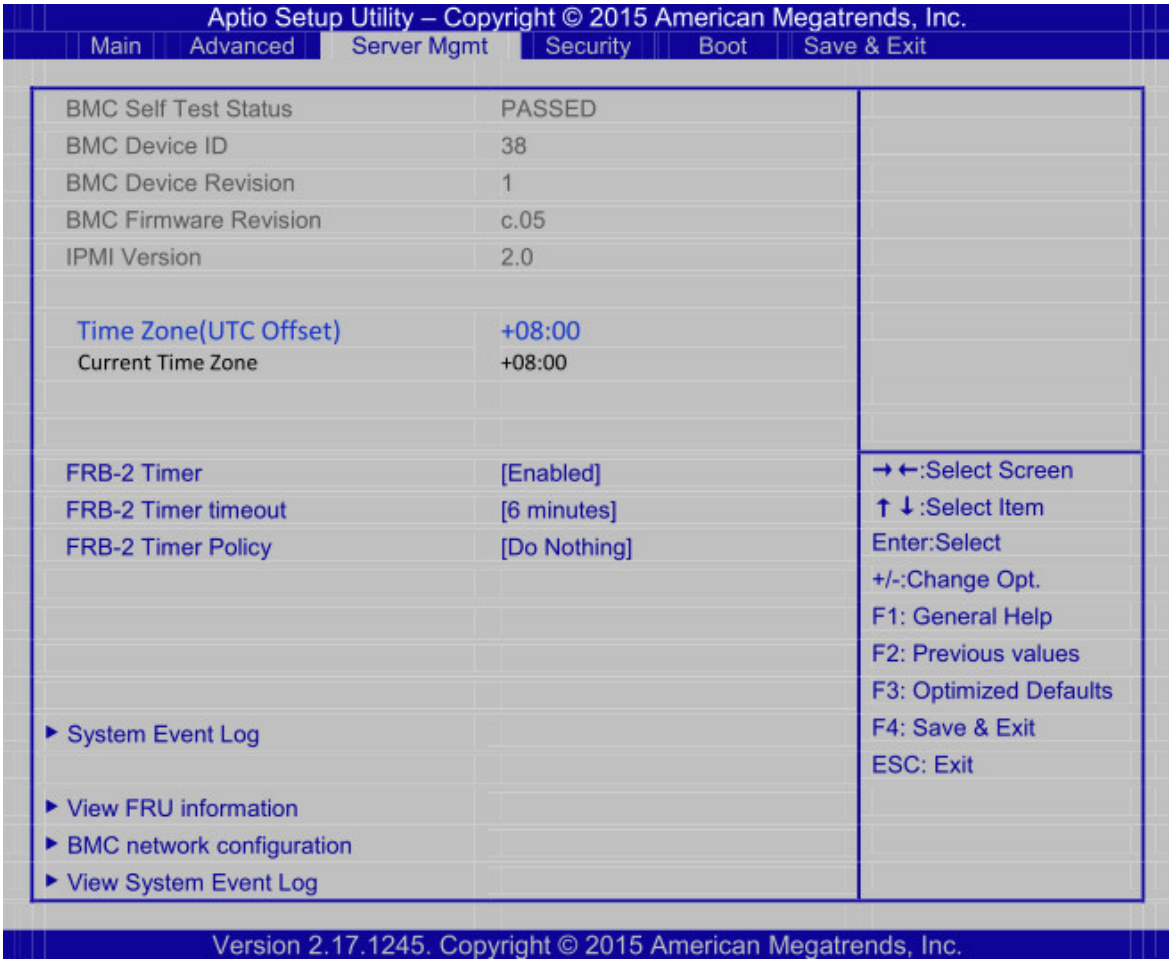
6.3.15. USB Configuration



Menu Fields	Settings	Comments
Advanced \ USB Configuration		
Legacy USB Support		Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
XHCI Hand-off		This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
EHCI Hand-off		This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.

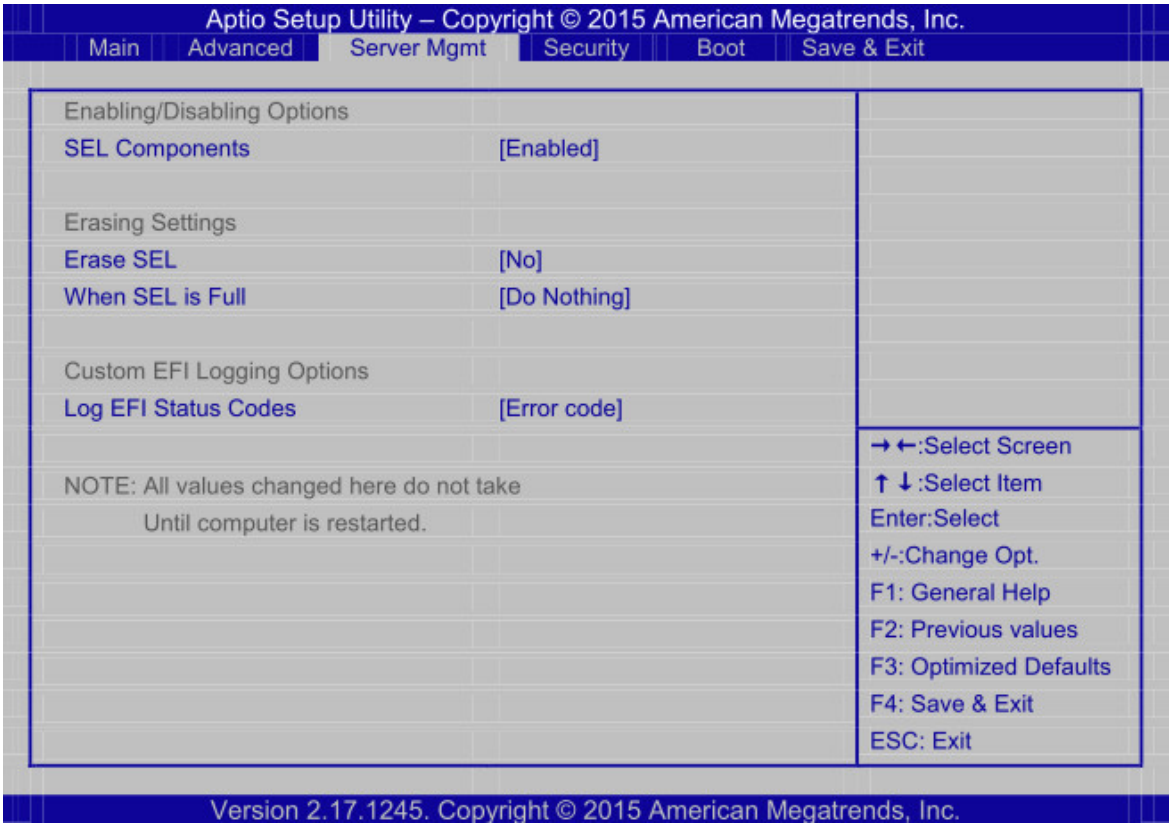
Menu Fields	Settings	Comments
USB Mass Storage Driver Support		Enable/Disable USB Mass Storage Driver Support
Port 60/64 Emulation		Enables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard l
Device Name (1)		Mass storage device emulation type. *AUTO* enumerates devices according to their media format. Optical drives are emulated as *CDROM*, drives with no media will be emulated according to a drive type.

6.4. Server Management



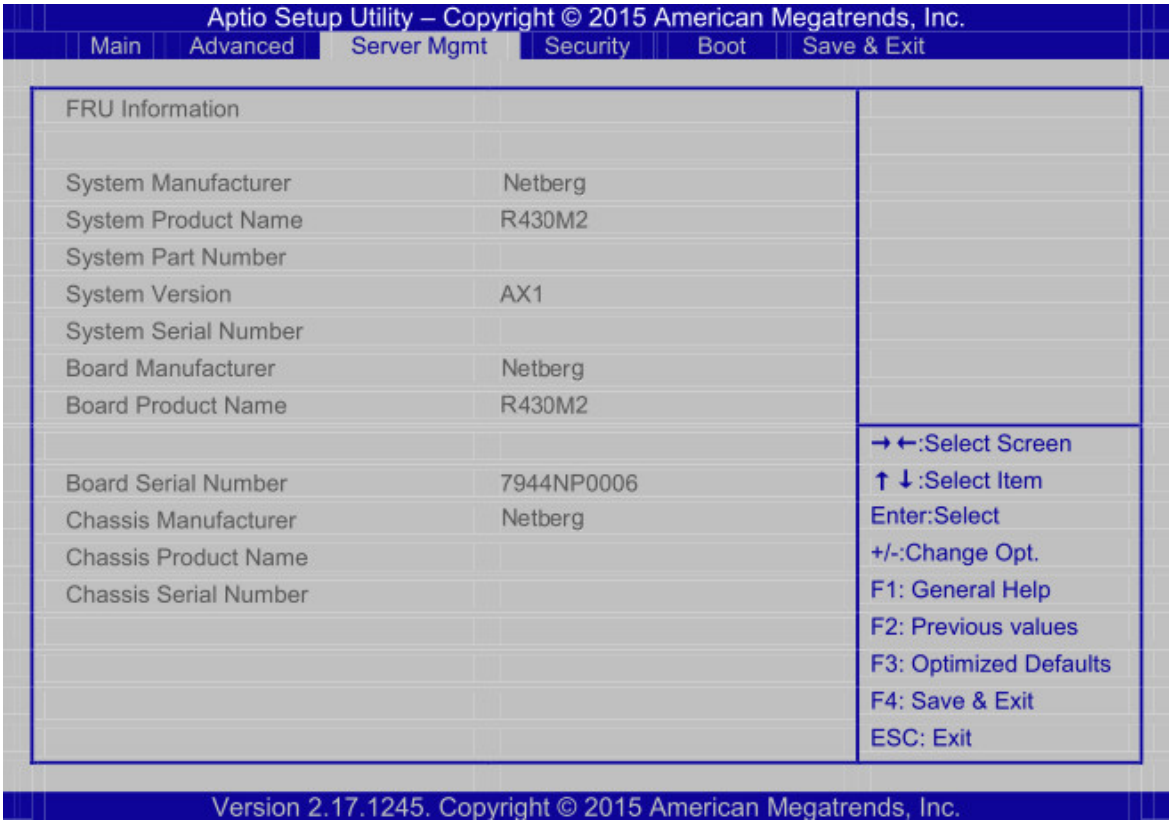
Menu Fields	Settings	Comments
Server Mgmt		
Time Zone(UTC Offset)	+08:00	Enter UTC Offset in hours i.e. from -24:00 to +24:00. These values will be converted into minutes and programmed to BMC. Enter 0x7FFF to consider BIOS time as local time.
FRB-2 Timer		Enable or Disable FRB2 timer(POST timer)
FRB-2 Timer timeout		Enter value Between 3 to 6 min for FRB2 Timer Expiration value
FRB-2 Timer Policy		Configure how the system should respond if the FRB2 Timer expires. Not available if FRB2 Timer is disabled.

6.4.1. System Event Log

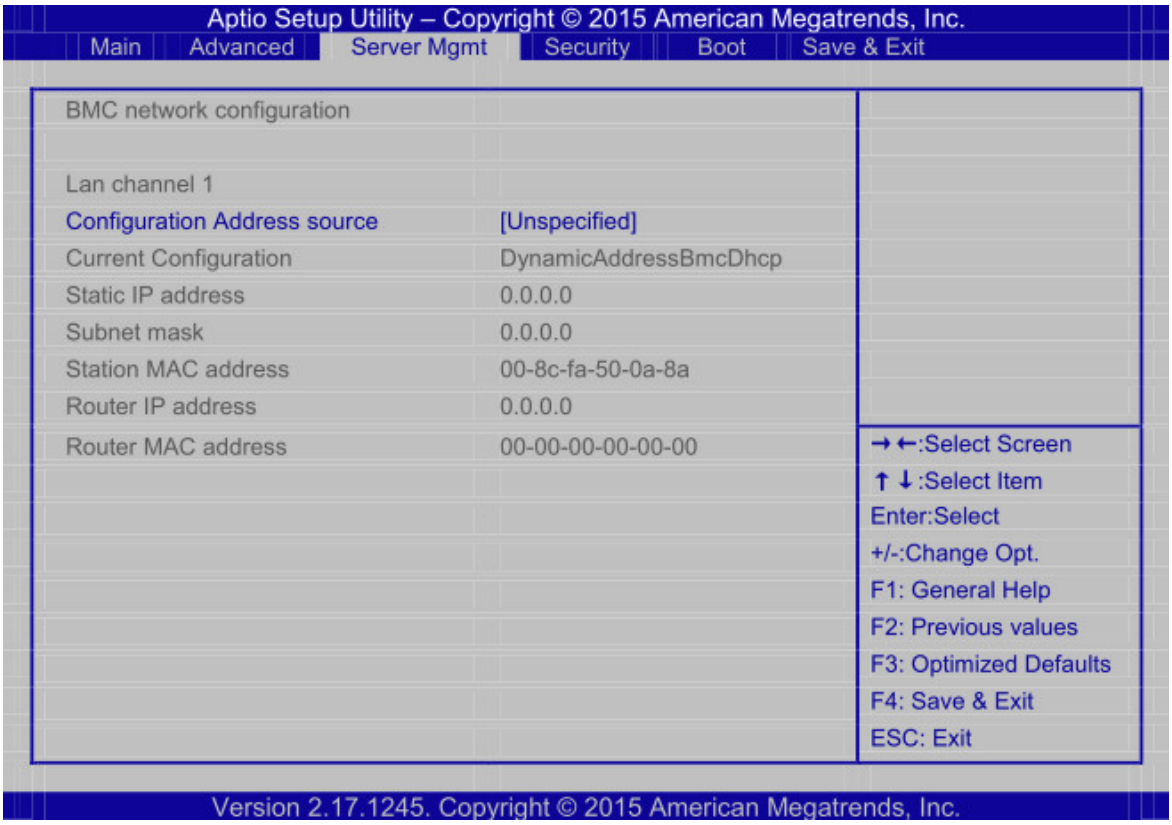


Menu Fields	Settings	Comments
Server Mgmt \ System Event Log		
SEL Components		Change this to enable or disable all features of System Event Logging during boot.
Erase SEL		Choose options for erasing SEL.
When log is full		Choose options for reactions to a full SEL.
Log EFI Status Codes		Disable the logging of EFI Status Codes or log only error code or only progress code or both.

6.4.2. View FRU Information

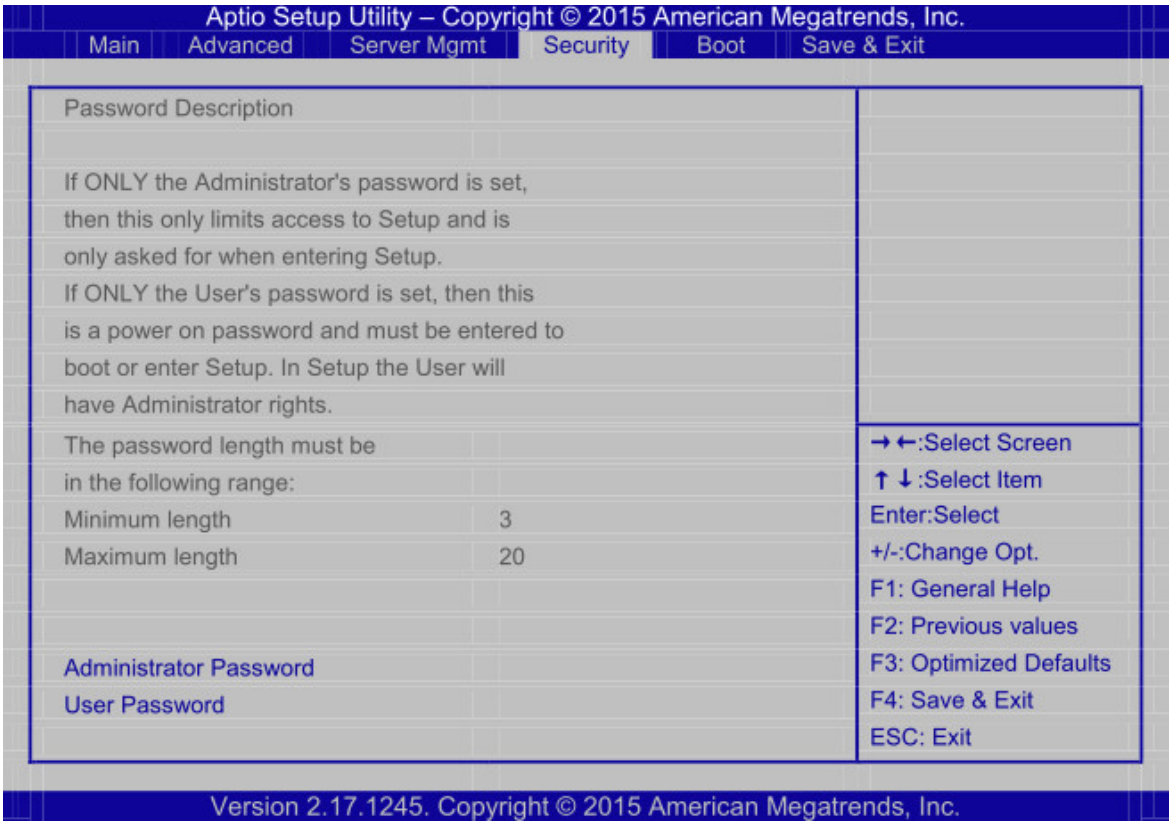


6.4.3. BMC Network Configuration



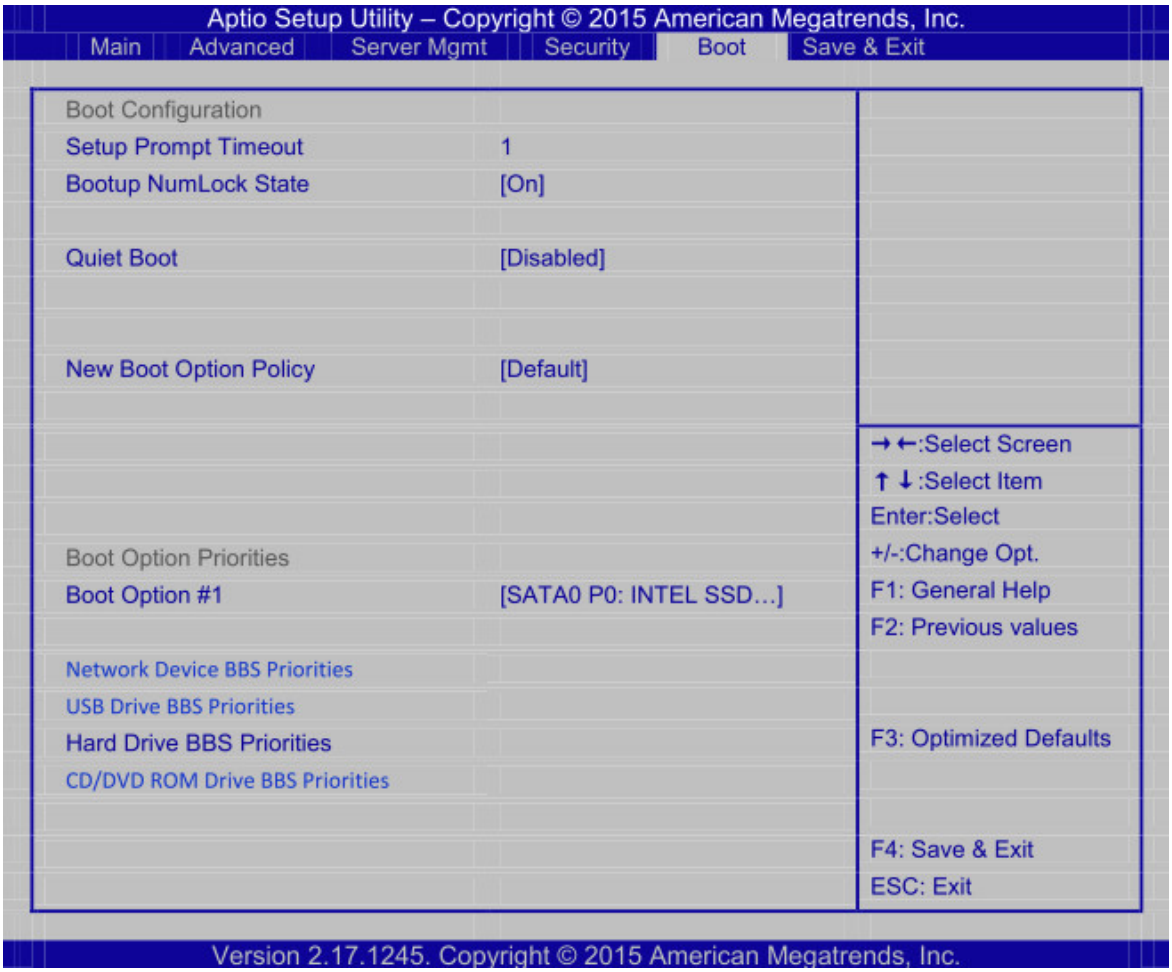
Menu Fields	Settings	Comments
Server Mgmt \ BMC network Configuration		
Configuration Address source		Select to configure LAN channel parameters statically or dynamically(by BIOS or BMC). Keep Current Address Source option will not modify any BMC network parameters during BIOS phase.

6.5. Security Menu



Menu Fields	Settings	Comments
Security		
Administrator Password		Set Administrator Password.
User Password		Set User Password.

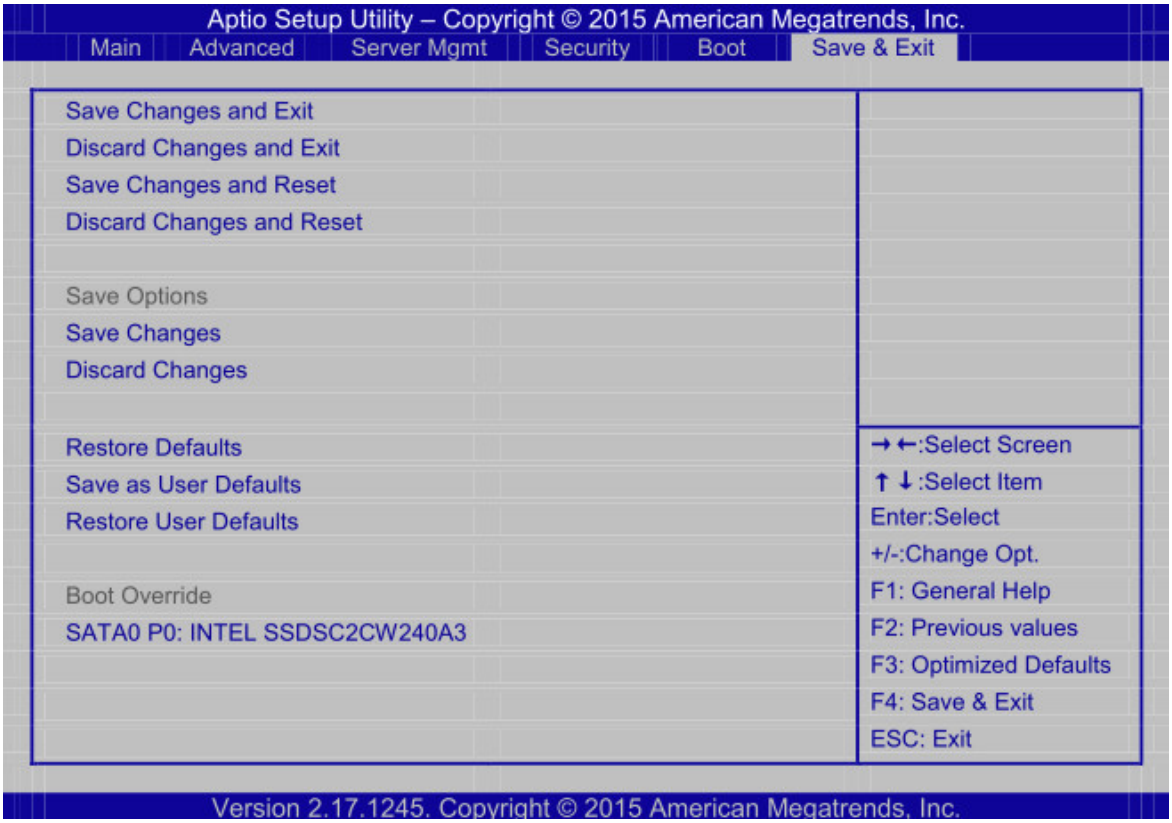
6.6. Boot



Menu Fields	Settings	Comments
Boot		
Setup Prompt Timeout	1	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting
Bootup NumLock State		Select the keyboard NumLock state
Quiet Boot		Enables or disables Quiet Boot option
New Boot Option Polic		Controls the placement of newly de-fected UEFI boot optons
Floppy Drive BBS Priorities (1) Hard Drive BBS Priorities (1) CD/DVD ROM Drive BBS Priorities (1)		Set the order of the legacy devices in this group

Menu Fields	Settings	Comments
Network Device BBS Priorities (1)		

6.7. Save&Exit Menu



Menu Fields	Settings	Comments
Save & Exit		
Save Changes and Exit		Exit system setup after saving the changes.
Discard Changes and Exit		Exit system setup without saving any changes.
Save Changes and Reset		Reset the system after saving the changes.
Discard Changes and Reset		Reset the system without saving any changes.
Save Changes		Save Changes done so far to any of the setup options.
Discard Changes		Discard Changes done so far to any of the setup options.
Restore Defaults		Restore/Load Default values for all the setup options.
Save as User Defaults		Save the changes done so far as User Defaults.

Menu Fields	Settings	Comments
Restore User Defaults		Restore the User Defaults to all the setup options.
Boot Override		Choose Boot Path.

6.8. Utility

6.8.1. BIOS Requirements

Table 6.4. BIOS Requirements Description

Utilities	File Name	Description
Flash BIOS Image under DOS	AFUDOS.EXE xxxxxxxx.ROM FBB.BAT	AMI Aptio Flash Utility & ROM image
Flash BIOS Image under EFI	AfuEfix64.EFI xxxxxxxx.ROM FBBefi.NSH	AMI Aptio Flash Utility & ROM image
Flash BIOS Image under Linux	afulnx_64 xxxxxxxx.ROM FBBlnx.SH	AMI Aptio Flash Utility & ROM image
Flash BIOS Image under Windows	AFUWINx64.EXE xxxxxxxx.ROM FBBwin.BAT	AMI Aptio Flash Utility & ROM image
Recovery Mode	ROM image file	ROM image
Flash BIOS and ME Image under DOS	AFUDOS.EXE xxxxxxxx.BIN FBBME.BAT	AMI Aptio Flash Utility & FW image
Flash BIOS and ME Image under EFI	AfuEfix64.EFI xxxxxxxx.BIN FBBMEefi.NSH	AMI Aptio Flash Utility & FW image
Flash BIOS and ME Image under Linux	afulnx_64 xxxxxxxx.BIN FBBMElnx.SH	AMI Aptio Flash Utility & FW image
Flash BIOS and ME Image under Windows	AFUWINx64.EXE xxxxxxxx.BIN FBBMEwin.BAT	AMI Aptio Flash Utility & FW image
Flash FW Image under EFI	spsFPT.EFI	Intel ME update utility & FW image

Utilities	File Name	Description
	Fparts.txt xxxxxxxx.BIN	

6.8.2. ROM Flash

6.8.2.1. Update under DOS prompt:

1. Copy AFUDOS.EXE, FBB.BAT and RomFileName.rom (ROM image) to bootable storage.
2. Plug the bootable storage (ex :USB disk) and boot to dos prompt (no Himem).
3. Run FBB.BAT (depending on if Boot Block needs to be updated).

   FBB.BAT: Update BIOS with boot lock.
4. Restart the system and load the BIOS default values.

6.8.2.2. Update under EFI Shell

1. Copy AfuEfix64.efi, FBB.nsh and RomFileName.rom (ROM image) to bootable storage.
2. Boot into BIOS setup and select Built-in EFI Shell to boot.
3. Run FBB.nsh
4. Restart system & load BIOS default value.

6.8.2.3. Update ME FW with the whole image file under Linux environment

1. Copy afulnx_64, FBBMElnx.sh and XXXXXXXX.BIN to USB disk.
2. Plug the USB disk and boot into Linux environment.
3. Copy afulnx_64, FBBMElnx.sh and XXXXXXXX.BIN to desktop from USB disk.
4. Open Terminal and key command below:
   - “chmod 777 afulnx_64”
   - “chmod 777 FBBMElnx.sh”
   - “chmod 777 XXXXXXXX.BIN”
5. Run “FBBMElnx.sh” or “AfuEfix64 XXXXXXXX.BIN /P /B /N /X /ME”

After flash programming is done, turn off SUT and then power on the system.

6.8.2.4. BIOS Recovery

A BIOS recovery can be accomplished from one of the following devices: an USB Disk-On-Key/CD-ROM, an ATAPI CD-ROM/DVD. The recovery media must include the BIOS image file, RomFileName.rom in the root directory.

Enter recovery mode:

1. Set the recovery jumper (J2).
2. Damaging the ROM image, which will cause the system to enter recovery and update the system ROM without the boot lock.

The recovery mode procedure:

1. Insert or plug-in the recovery media with the RomFileName.rom file.
2. Power on system and wait for recovery process complete.
3. Restart system and load BIOS default.

Chapter 7. Rail Kit Assembly

7.1. Unpacking the System

Unpack your system and identify each item.

Whenever you need to lift the system, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.

The system is not fixed to the rack or mounted on the rails. To avoid personal injury or damage to the system, you must adequately support the system during installation and removal.

To avoid a potential electrical shock hazard, a third wire safety grounding conductor is necessary for the rack installation. The rack equipment must provide sufficient airflow to the system to maintain proper cooling.

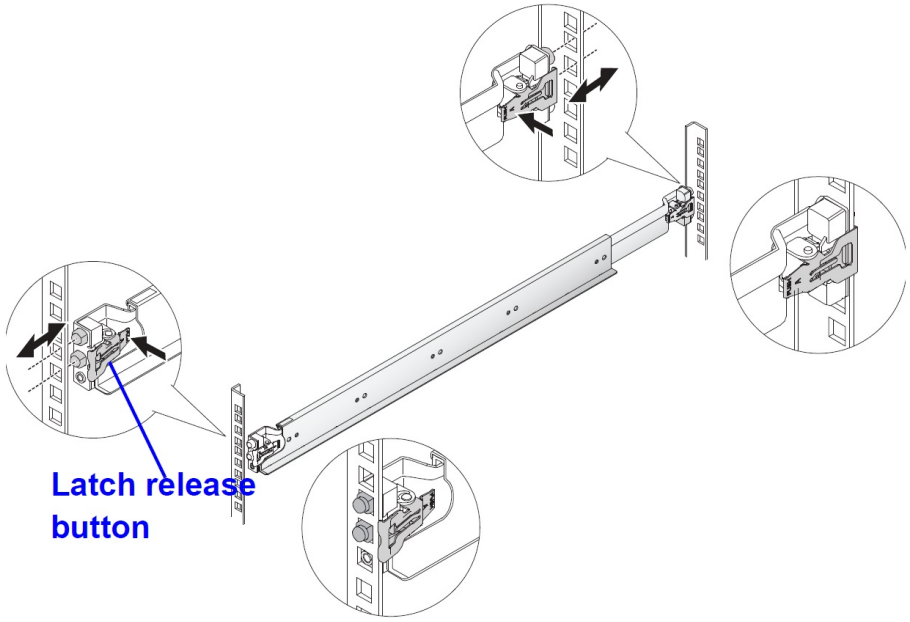
WHEN INSTALLING RAILS IN A SQUARE-HOLE RACK IT IS IMPORTANT TO ENSURE THAT THE SQUARE PEG SLIDES THROUGH THE SQUARE HOLES.

SQUARE STUDS MUST BE FLUSH WITH THE RACK POSTS TO INSTALL PROPERLY.

7.2. Installing the Rails

1. Push on the latch release buttons on the end piece midpoints to open the rail latches.

Figure 7.1. Installing the Rails



2. Align the end pieces of the rails on the vertical rack flanges to seat the pegs in the bottom hole of the first U and the top hole of the second U. Engage the back end of the rail until the latch locks in place.

The rails can be used in both square-hole and round-hole racks.

3. Repeat steps 1 to 2 to position and seat the front end piece on the vertical flange.

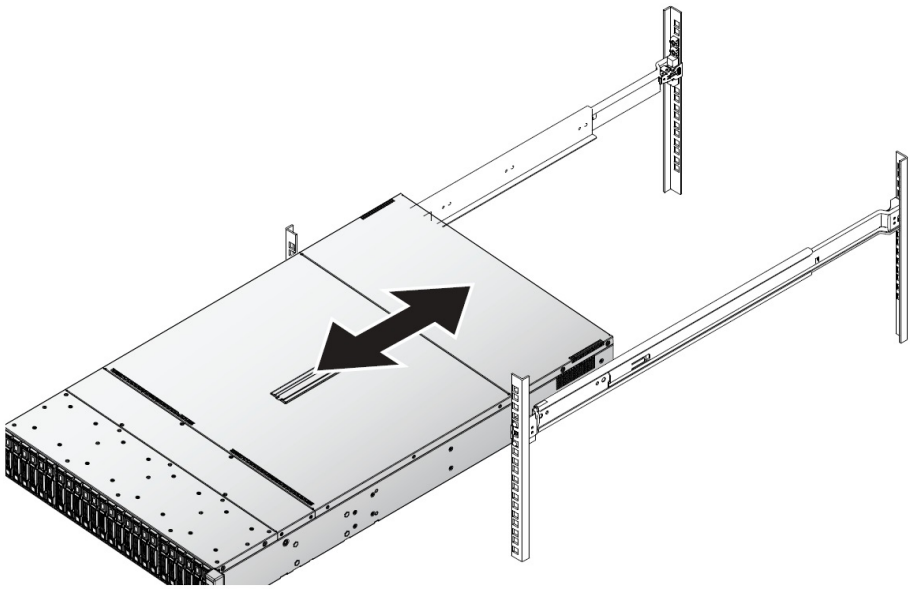
To remove the rails, pull on the latch release button on the end piece midpoint and un-seat each rail.

7.3. Installing the System Into the Rack

Whenever you need to lift the system, get others to assist you. To avoid injury, do not attempt to lift the system by yourself.

1. Slide the system into the rack.

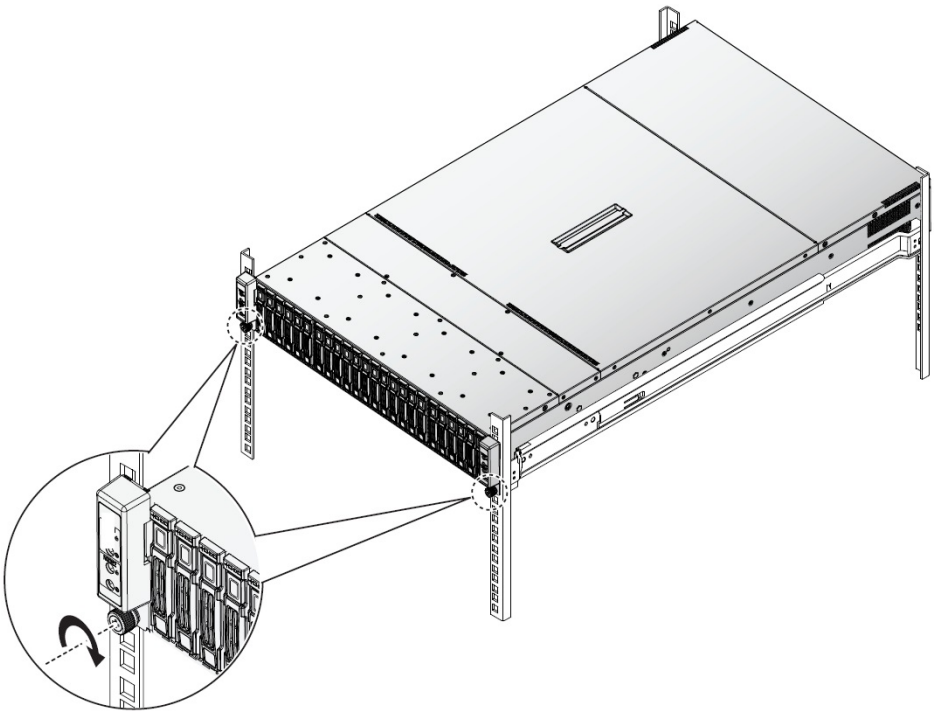
Figure 7.2. Sliding the System into the Rack



2. Tighten the captive thumbscrews to secure the ears of the system to the front of the rack.

Make sure the latch release mechanism is engaged correctly.

Figure 7.3. Tightening the Thumbscrews



Chapter 8. Troubleshooting

8.1. Server Boot Issue Topics

System does not Boot after initial installation:

- “Power Cord Not Plugged In”
- Mainboard Module Configuration Issues
- “Processor Issues”
- “Memory Issues”
- “Monitor Issues”
- “Power Supply, Chassis and Fan Issues”
- “Cable Issues”
- “Electrical Short or Overload”
- “Defective Components”

System does not boot after configuration changes:

- “Hardware Changes”
- “Software Changes”
- “BIOS Changes”
- “Installation Problems”
- “Troubleshooting External Connections”

8.2. System does not Boot after Initial Installation

8.2.1. Power Cord Not Plugged In

If the power supply cable is not plugged into the chassis power connector, the system cannot boot up, even though chassis front panel LEDs and the fan may be operational. Verify that the power connections are good.

8.2.2. Processor Issues

Boot failure situations are also caused by the following: Incompatible processor - ensure the selected processor model is correct for your server board. If the processor is compatible, try removing and reinstalling the processor to ensure it is installed correctly.

Processor overheat - the system does not boot or shuts down shortly after booting.

- Ensure that the cooling fans are correctly installed and running.
- Ensure that the correct thermal interface material or the thermal grease is applied to the processor.
- Ensure that the power supply fan is running.
- Ensure that the air intakes for the fans are unobstructed.

8.2.3. Memory Issues

If you have installed incompatible memory modules, the system may not boot. Verify the memory you've installed has been tested with your board (Please refer to www.etegro.com for details on valid memory). If the installed memory is compatible, remove and reinstall the memory modules. Defective memory modules may cause boot errors. To isolate a specific memory module as defective, boot the system with just one memory module installed at a time.

8.2.4. Monitor Issues

Monitor configurations can cause boot failure. Run through the following checklist to verify monitor operation:

- Ensure the monitor is plugged in and turned on.
- Ensure all cables are connected properly between the monitor and the computer.
- Check the brightness and contrast controls on the monitor are not too low.

Most monitors employ indicator LEDs showing status. Refer to the monitor's documentation to confirm operation. If the probem still persists, try replacing the monitor or test the monitor on a different AC outlet/different system.

8.2.5. Power Supply, Chassis and Fan Issues

- Ensure that the chassis and power supply is appropriate for system requirement.
- Ensure all power cables and connectors are firmly connected to the power supply and the AC outlet.
- If the power supply or the AC outlet has an on/off switch, make sure that it is on and verify that the outlet is supplying current.
- Check for foreign objects inside the chassis such as screws that can short circuit connections.
- To isolate a specific PSU as defective, boot the system with just one PSU installed at a time.
- Check fan speed in WEBUI & event log to find out if there are any defective fans. If failure happens, please contact your dealer for assistance.

8.2.6. Cable Issues

Ensure that all cable connections, both internal and external, are attached correctly and securely.

8.2.7. Electrical Short or Overload

Remove non-essential items such as extra controller cards (e.g SAS 6G Mezz/B, 10G Mezz/B) or HDD devices to check for shorts and overloads.

If the system boots correctly, there may be a short or overload associated with one of the components.

Replace each of non-essential items one at a time to isolate which one is causing the problem.

If the problem occurs even after removing the non-essential components, the problem has to be with the server board, power supply, memory, or processor.

8.2.8. Defective Components

Defective components, especially processor and memory, can cause system boot issues.

- Swap the memory modules with known good memory. Verify correct operation of the suspected memory in a known working system.
- Swap the processor with a known good processor. Verify correct operation of the suspected processor in a known working system.

8.3. System does not boot after Configuration Changes

8.3.1. Hardware Changes

If the system does not boot after making changes to hardware or adding new components, verify that the component installed is compatible with the server.

8.3.2. Software Changes

If you recently installed new software or new device drivers:

- Try booting into Safe Mode and uninstall the new software or driver. If you can now boot normally, there may be a compatibility issue between the new software or driver and some component in your system. Contact the soft- ware manufacturer for assistance.

8.3.3. BIOS Changes

Changes to some advanced BIOS settings can cause boot issues. Changes to Advanced BIOS settings should only be made by experienced users.

If the BIOS Setup Utility is accessible by pressing **F2** during boot, reset the BIOS to factory defaults by pressing **F9**. Save and exit the BIOS Setup

If you cannot access the BIOS Setup Utility, clear the CMOS by performing the following steps:

1. Power down the server. Do not unplug the power cord.
2. Open the server chassis
3. Move the CMOS CLEAR jumper from the default operation position, covering pins 1 and 2, to the reset / clear CMOS, covering pins 2 and 3.
4. Remove AC power.
5. Wait 5 seconds.
6. Move the jumper back to default position, covering pins 1 and 2.
7. Close the server chassis and power up the server.

The CMOS is now cleared and can be reset by going into BIOS setup.

Please refer to www.etegro.com for the BIOS update.

8.3.4. Installation Problems

Perform the following checks if you are troubleshooting an installation problem:

Check all cable and power connections (including all rack cable connections). Unplug the power cord, and wait one minute. Then reconnect the power cord and try again. If the network is report-

ing an error, see if the server has enough memory and disk space available. Remove all added options, one at a time, and try to power up the system. If after removing an option the server works, you may find that it is a problem with the option or a configuration problem between the option and the server. Contact the option vendor for assistance.

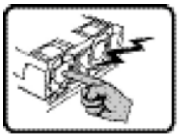
- If the system doesn't power on, check the LED display. If the power LED is not on, you may not be receiving AC power. Check the AC power cord to make sure that it is securely connected.

8.3.5. Troubleshooting External Connections

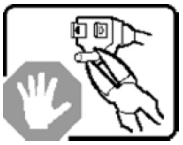
Loose or improperly connected cables are the most likely source of problems for the system, monitor, and other peripherals (such as a keyboard, mouse, or other external device). Ensure that all external cables are securely attached to the external connectors on your system.

Chapter 9. Installation and Assembly Safety Instructions

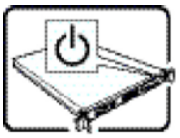
Guidelines



The power supply in this product contains no user-serviceable parts. Refer servicing only to qualified personnel.



Do not attempt to modify or use the supplied AC power cord if it is not the exact type required. A product with more than one power supply will have a separate AC power cord for each supply.



The power button on the system does not turn off system AC power.

To remove AC power from the system, you must unplug each AC power cord from the wall outlet or power supply.

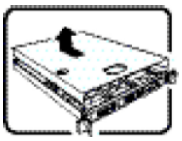
The power cord(s) is considered the disconnect device to the main (AC) power. The socket outlet that the system plugs into shall be installed near the equipment and shall be easily accessible.

SAFETY STEPS: Whenever you remove the chassis covers to access the inside of the system, follow these steps:

1. Turn off all peripheral devices connected to the system.
2. Turn off the system by pressing the power button.
3. Unplug all AC power cords from the system or from wall outlets.
4. Label and disconnect all cables connected to I/O connectors or ports on the back of the system.

5. Provide some electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to chassis ground of the system - any unpainted metal surface - when handling components.

6. Do not operate the system with the chassis covers removed.

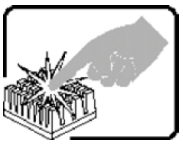


After you have completed the six SAFETY steps above, you can remove the system covers. To do this:

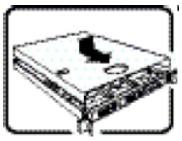
1. Unlock and remove the padlock from the back of the system if a padlock has been installed.

2. Remove and save all screws from the covers.

3. Remove the cover(s).



A microprocessor and heat sink may be hot if the system has been running. Also, there may be sharp pins and edges on some board and chassis parts. Contact should be made with care. Consider wearing protective gloves.



For proper cooling and airflow, always reinstall the chassis covers before turning on the system. Operating the system without the covers in place can damage system parts. To install the covers:

1. Check first to make sure you have not left loose tools or parts inside the system.

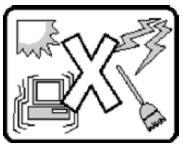
2. Check that cables, add-in cards, and other components are properly installed.

3. Attach the covers to the chassis with the screws removed earlier, and tighten them firmly.

4. Insert and lock the padlock to the system to prevent unauthorized access inside the system.

5. Connect all external cables and the AC power cord(s) to the system.

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



The system is designed to operate in a typical office environment.

Choose a site that is:

- Clean and free of airborne particles (other than normal room dust).
- Well ventilated and away from sources of heat including direct sunlight.
- Away from sources of vibration or physical shock.
- Isolated from strong electromagnetic fields produced by electrical devices.
- In regions that are susceptible to electrical storms, we recommend you plug your system into a surge suppressor and disconnect telecommunication lines to your modem during an electrical storm.
- Provided with a properly grounded wall outlet.
- Provided with sufficient space to access the power supply cord(s), because they serve as the product's main power disconnect.

The server system is safety certified as rack-mounted equipment for use in a server room or computer room, using the customer rack kit.

The rail racks are designed to carry only the weight of the server system. Do not place additional load onto any rail-mounted equipment.

System rack kits are intended to be installed in a rack by trained service technicians.

Heavy object. Indicates two people are required to safely handle the system.

Chapter 10. Server Safety Information

To reduce the risk of bodily injury, electrical shock, fire, and equipment damage, read this document and observe all warnings and precautions in this guide before installing or maintaining your server product.

In the event of a conflict between the information in this document and information provided with the product or on the website for a particular product, the product documentation takes precedence.

Your server should be integrated and serviced only by technically qualified persons.

You must adhere to the guidelines in this guide and the assembly instructions in your server manuals to ensure and maintain compliance with existing product certifications and approvals. Use only the described, regulated components specified in this guide. Use of other products / components will void the UL Listing and other regulatory approvals of the product, and may result in noncompliance with product regulations in the region(s) in which the product is sold.

10.1. Safety Warnings and Cautions

To avoid personal injury or property damage, before you begin installing the product, read, observe, and adhere to all of the following safety instructions and information. The following safety symbols may be used throughout the documentation and may be marked on the product and / or the product packaging.

Indicates the presence of a hazard that may cause minor personal injury or property damage if the CAUTION is ignored.

Indicates the presence of a hazard that may result in serious personal injury if the WARNING is ignored.

Indicates potential hazard if indicated information is ignored.

Indicates shock hazards that result in serious injury or death if safety instructions are not followed.

Indicates hot components or surfaces.

Indicates do not touch fan blades, may result in injury.

Indicates to unplug all AC power cord(s) to disconnect AC power.

Please recycle battery.

The rail racks are designed to carry only the weight of the server system. Do not use rail-mounted equipment as a workspace. Do not place additional load onto any rail-mounted equipment.

Indicates two people are required to safely handle the system.

Restricted Access Location: The server is intended for installation only in a Server Room or Computer Room where both these conditions apply:

- access can only be gained by SERVICE PERSONS or by USERS who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken; and
- access is through the use of a TOOL or lock and key, or other means of security, and is controlled by the authority responsible for the location.

10.2. Intended Application Uses

This product was evaluated as Information Technology Equipment (ITE), which may be installed in offices, schools, computer rooms, and similar commercial type locations. The suitability of this product for other product categories and environments (such as medical, industrial, residential, alarm systems, and test equipment), other than an ITE application, may require further evaluation.

10.3. Site Selection

The system is designed to operate in a typical office environment. Choose a site that is:

- Clean, dry, and free of airborne particles (other than normal room dust).
- Well-ventilated and away from sources of heat including direct sunlight and radiators.
- Away from sources of vibration or physical shock.
- Isolated from strong electromagnetic fields produced by electrical devices.
- In regions that are susceptible to electrical storms, we recommend you plug your system into a surge suppressor and disconnect telecommunication lines to your modem during an electrical storm.
- Provided with a properly grounded wall outlet.
- Provided with sufficient space to access the power supply cord(s), because they serve as the product’s main power disconnect.
- Provided with either two independent AC power sources or two independent phases from a s single source.

10.4. Equipment Handling Practices

Reduce the risk of personal injury or equipment damage:

- Conform to local occupational health and safety requirements when moving and lifting equipment.
- Use mechanical assistance or other suitable assistance when moving and lifting equipment.
- To reduce the weight for easier handling, remove any easily detachable components.

10.5. Power and Electrical Warnings

THE POWER BUTTON, INDICATED BY THE STAND-BY POWER MARKING, DOES NOT COMPLETELY TURN OFF THE SYSTEM AC POWER, 5V STANDBY POWER IS ACTIVE WHENEVER THE SYSTEM IS PLUGGED IN. TO REMOVE POWER FROM SYSTEM, YOU MUST UNPLUG THE AC POWER CORD FROM THE WALL OUTLET. YOUR SYSTEM MAY USE MORE THAN ONE AC POWER CORD. MAKE SURE ALL AC POWER CORDS ARE UNPLUGGED. MAKE SURE THE AC POWER CORD(S) IS / ARE UNPLUGGED BEFORE YOU OPEN THE CHASSIS, OR ADD OR REMOVE ANY NON HOT-PLUG COMPONENTS.

DO NOT ATTEMPT TO MODIFY OR USE AN AC POWER CORD IF IT IS NOT THE EXACT TYPE REQUIRED. A SEPARATE AC CORD IS REQUIRED FOR EACH SYSTEM POWER SUPPLY.

SOME POWER SUPPLIES IN SERVERS USE NEUTRAL POLE FUSING. TO AVOID RISK OF SHOCK USE CAUTION WHEN WORKING WITH POWER SUPPLIES THAT USE NEUTRAL POLE FUSING.

SOME POWER SUPPLIES IN SERVERS USE NEUTRAL POLE FUSING. TO AVOID RISK OF SHOCK USE CAUTION WHEN WORKING WITH POWER SUPPLIES THAT USE NEUTRAL POLE FUSING.

THE POWER SUPPLY IN THIS PRODUCT CONTAINS NO USER-SERVICEABLE PARTS. DO NOT OPEN THE POWER SUPPLY. HAZARDOUS VOLTAGE, CURRENT AND ENERGY LEVELS ARE PRESENT INSIDE THE POWER SUPPLY. RETURN TO MANUFACTURER FOR SERVICING.

WHEN REPLACING A HOT-PLUG POWER SUPPLY, UNPLUG THE POWER CORD TO THE POWER SUPPLY BEING REPLACED BEFORE REMOVING IT FROM THE SERVER.

TO AVOID RISK OF ELECTRIC SHOCK, TURN OFF THE SERVER AND DISCONNECT THE POWER CORD, TELECOMMUNICATIONS SYSTEMS, NETWORKS, AND MODEMS ATTACHED TO THE SERVER BEFORE OPENING IT.

10.6. Power Cord Warnings

If an AC power cord was not provided with your product, purchase one that is approved for use in your country.

TO AVOID ELECTRICAL SHOCK OR FIRE, CHECK THE POWER CORD(S) THAT WILL BE USED WITH THE PRODUCT AS FOLLOWS:

- Do not attempt to modify or use the AC power cord(s) if they are not the exact type required to fit into the grounded electrical outlets.
- The power cord(s) must meet the following criteria: The power cord must have an electrical rating that is greater than that of the electrical current rating marked on the product.

THE POWER CORD MUST HAVE SAFETY GROUND PIN OR CONTACT THAT IS SUITABLE FOR THE ELECTRICAL OUTLET.

THE POWER SUPPLY CORD(S) IS / ARE THE MAIN DISCONNECT DEVICE TO AC POWER. THE SOCKET OUTLET(S) MUST BE NEAR THE EQUIPMENT AND READILY ACCESSIBLE FOR DISCONNECTION.

THE POWER SUPPLY CORD(S) MUST BE PLUGGED INTO SOCKET-OUTLET(S) THAT IS /ARE PROVIDED WITH A SUITABLE EARTH GROUND.

10.7. System Access Warnings

TO AVOID PERSONAL INJURY OR PROPERTY DAMAGE, THE FOLLOWING SAFETY INSTRUCTIONS APPLY WHENEVER ACCESSING THE INSIDE OF THE PRODUCT:

- Turn off all peripheral devices connected to this product.
- Turn off the system by pressing the power button to off.
- Disconnect the AC power by unplugging all AC power cords from the system or wall outlet.
- Disconnect all cables and telecommunication lines that are connected to the system.
- Retain all screws or other fasteners when removing access cover(s). Upon completion of accessing inside the product, refasten access cover with original screws or fasteners.
- Do not access the inside of the power supply. There are no serviceable parts in the power supply. Return to manufacturer for servicing.
- Power down the server and disconnect all power cords before adding or replacing any non hot-plug component. When replacing a hot-plug power supply, unplug the power cord to the power supply being replaced before removing the power supply from the server.

IF THE SERVER HAS BEEN RUNNING, ANY INSTALLED PROCESSOR(S) AND HEAT SINK(S) MAY BE HOT.

UNLESS YOU ARE ADDING OR REMOVING A HOT-PLUG COMPONENT, ALLOW THE SYSTEM TO COOL BEFORE OPENING THE COVERS. TO AVOID THE POSSIBILITY OF COMING INTO CONTACT WITH HOT COMPONENT(S) DURING A HOT-PLUG INSTALLATION, BE CAREFUL WHEN REMOVING OR INSTALLING THE HOT-PLUG COMPONENT(S).

TO AVOID INJURY DO NOT CONTACT MOVING FAN BLADES. IF YOUR SYSTEM IS SUPPLIED WITH A GUARD OVER THE FAN, DO NOT OPERATE THE SYSTEM WITHOUT THE FAN GUARD IN PLACE.

10.8. Rack Mount Warnings

The following installation guidelines are required by UL for maintaining safety compliance when installing your system into a rack.

The equipment rack must be anchored to an unmovable support to prevent it from tipping when a server or piece of equipment is extended from it. The equipment rack must be installed according to the rack manufacturer's instructions.

Install equipment in the rack from the bottom up, with the heaviest equipment at the bottom of the rack. Extend only one piece of equipment from the rack at a time. You are responsible for installing a main power disconnect for the entire rack unit. This main disconnect must be readily accessible, and it must be labeled as controlling power to the entire unit, not just to the server(s).

To avoid risk of potential electric shock, a proper safety ground must be implemented for the rack and each piece of equipment installed in it.

Elevated Operating Ambient - If installed in a closed or multiunit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.

Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained.

Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

10.9. Electrostatic Discharge (ESD)

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

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

10.10. Other Hazards

Battery Replacement

THERE IS THE DANGER OF EXPLOSION IF THE BATTERY IS INCORRECTLY REPLACED. WHEN REPLACING THE BATTERY, USE ONLY THE BATTERY RECOMMENDED BY THE EQUIPMENT MANUFACTURER.

DISPOSE OF BATTERIES ACCORDING TO LOCAL ORDINANCES AND REGULATIONS.

DO NOT ATTEMPT TO RECHARGE A BATTERY.

DO NOT ATTEMPT TO DISASSEMBLE, PUNCTURE, OR OTHERWISE DAMAGE A BATTERY.

10.11. Cooling and Airflow

CAREFULLY ROUTE CABLES AS DIRECTED TO MINIMIZE AIRFLOW BLOCKAGE AND COOLING PROBLEMS. FOR PROPER COOLING AND AIRFLOW, OPERATE THE SYSTEM ONLY WITH THE CHASSIS COVERS INSTALLED. OPERATING THE SYSTEM WITHOUT THE COVERS IN PLACE CAN DAMAGE SYSTEM PARTS. TO INSTALL THE COVERS:

- Check first to make sure you have not left loose tools or parts inside the system.
- Check that cables, add-in cards, and other components are properly installed.

Attach the covers to the chassis according to the product instructions.

10.12. Laser Peripherals or Devices

TO AVOID RISK OF RADIATION EXPOSURE AND / OR PERSONAL INJURY: - Do not open the enclosure of any laser peripheral or device. - Laser peripherals or devices are not serviceable. Return to manufacturer for servicing.

Use certified and rated Laser Class I for Optical Transceiver product.

Chapter 11. Regulatory and Compliance Information

This server complies with the following safety requirements:

Table 11.1. Product Safety Requirements

IEC 60950-1	Safety of Information Technology Equipment
EN 60950-1	Safety of Information Technology Equipment Including Electrical Business Equipment, European Committee for Electrotechnical Standardization (CEN-ELEC)
UL 60950-1	Safety of Information Technology Equipment
UL 94	Tests for Flammability of Plastic Materials for Parts in Devices & Appliances
GB4943	Safety of Information Technology Equipment

11.1. Electromagnetic Compatibility Notices

11.1.1. FCC Verification Statement (USA)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver
- Connect the equipment to an outlet on a circuit other than the one to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment. The customer is responsible for ensuring compliance of the modified product.

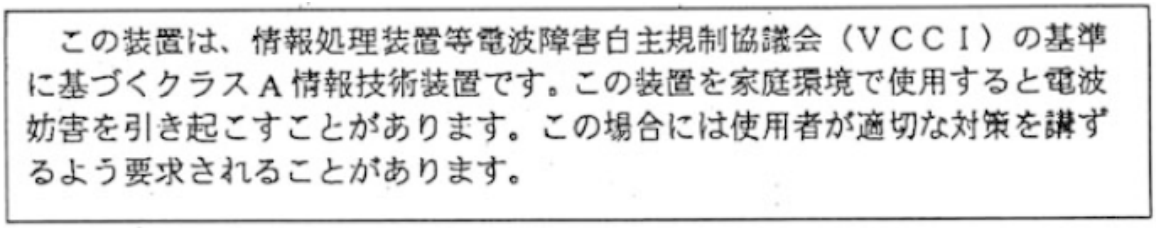
Only peripherals (computer input/output devices, terminals, printers, etc.) that comply with FCC Class A or B limits may be attached to this computer product. Operation with noncompliant peripherals is likely to result in interference to radio and TV reception.

All cables used to connect to peripherals must be shielded and grounded. Operation with cables, connected to peripherals, that are not shielded and grounded may result in interference to radio and TV reception.

11.1.2. Europe (CE Declaration of Conformity)

This product has been tested in accordance too, and complies with the Low Voltage Directive (73/23/EEC) and EMC Directive (89/336/EEC). The product has been marked with the CE Mark to illustrate its compliance.

11.1.3. VCCI (Japan)


この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

English translation of the notice above:

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI) from Information Technology Equipment. If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

11.1.4. Regulated Specified Components

To maintain the UL listing and compliance to other regulatory certifications and/or declarations, the following regulated components must be used and conditions adhered to. Interchanging or use of other component will void the UL listing and other product certifications and approvals.

Updated product information for configurations can be found on the site at the following URL:

www.etegro.com

If you do not have access to the Web address, please contact your local representative.

- Add-in cards: must have a printed wiring board flammability rating of minimum UL94V-1. Add-in cards containing external power connectors and/or lithium batteries must be UL recognized or UL listed. Any add-in card containing modem telecommunication circuitry must be UL listed. In addition, the modem must have the appropriate telecommunications, safety, and EMC approvals for the region in which it is sold.

- Peripheral Storage Devices: must be UL recognized or UL listed accessory and TUV or VDE licensed. Maximum power rating of any one device is 19 watts. Total server configuration is not to exceed the maximum loading conditions of the power supply.

11.1.5. Restriction of Hazardous Substances (RoHS) Compliance

ETegro Technologies, inc. has a system in place to restrict the use of banned substances in accordance with the European Directive 2002/95/EC. Compliance is based on declaration that materials banned in the RoHS Directive are either (1) below all applicable threshold limits or (2) an approved / pending RoHS exemption applies.

RoHS implementation details are not fully defined and may change.

Threshold limits and banned substances are noted below:

- Quantity limit of 0.1% by mass (1000 PPM) for:
  - Lead
  - Mercury
  - Hexavalent Chromium
  - Polybrominated Biphenyls Diphenyl Ethers (PBDE)
- Quantity limit of 0.01% by mass (100 PPM) for:
  - Cadmium

11.1.6. End of Life / Product Recycling

Product recycling and end-of-life take-back systems and requirements vary by country. Contact the retailer or distributor of this product for information about product recycling and / or take-back.