

QuantaGrid Series

D51BP-1U

**Energy Efficient 2-Socket Server with
Extreme Storage IOP/S
User's Guide**

Quanta

Version: 1.0

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Regulatory and Compliance Information

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.



WARNING!

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



CAUTION!

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.

Note:

Highlights general or useful information and tips.

Precautionary Measures

Read all caution and safety statements in this document before performing any of the instructions. To reduce the risk of bodily injury, electrical shock, fire, and equipment damage, read and observe all warnings and precautions in this chapter before installing or maintaining your system. To avoid personal injury or property damage, before you begin installing the product, read, observe, and adhere to all of the following instructions and information. The following symbols may be used throughout this guide and may be marked on the product and / or the product packaging.

Safety Instructions about your system

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

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

You must adhere to the guidelines in this guide and the assembly instructions in related chapters 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.

Table 1: Warning and Cautions

CAUTION	Indicates the presence of a hazard that may cause minor personal injury or property damage if the CAUTION is ignored.
WARNING	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.
	Remove the system from the rack to disconnect power system.

Table 1: Warning and Cautions (Continued)

	The enclosure is designed to carry only the weight of the system sled. Do not use this equipment as a workspace. Do not place additional load onto any equipment in this system.
	Indicates two people are required to safely handle the system.
	Restricted Access Location: The system 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.

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.

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 system, because they serve as the product's main power disconnect.
- Provided with either two independent DC power system or two independent phases from a single power system.

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.
- Never lift or move your system solely by the handle on the component.

Power and Electrical Warnings



CAUTION!

MAKE SURE THE SYSTEM IS REMOVED FROM THE RACK BEFORE SERVICING ANY NON-HOT PLUG COMPONENTS. THE BUS BAR CLIPS MUST BE DISCONNECTED FROM THE POWER SYSTEM IN ORDER TO FULLY SEPARATE THE SYSTEM FROM THE POWER SOURCE.



CAUTION!

TO AVOID RISK OF ELECTRIC SHOCK, DISCONNECT ALL CABLING FROM THE SYSTEM AND REMOVE THE SYSTEM FROM THE RACK.

System Access Warnings



CAUTION!

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

- Disconnect from the power source by removing the system from the rack.
- Disconnect all cabling running into the system.
- Retain all screws or other fasteners when servicing. Upon completion servicing, secure with original screws or fasteners.



CAUTION!

IF THE SERVER HAS BEEN RUNNING, ANY INSTALLED HDD MODULES MAY BE HOT.



CAUTION!

UNLESS YOU ARE ADDING OR REMOVING A HOT-PLUG COMPONENT, ALLOW THE SYSTEM TO COOL BEFORE SERVICING.



CAUTION!

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.

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 your system 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 system(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 multi-unit 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 (T_{ma}) 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 over-current 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).

Electrostatic Discharge (ESD)



CAUTION!

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

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

Cooling and Airflow



CAUTION!

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* / AIR DUCT INSTALLED. OPERATING THE SYSTEM WITHOUT THE COVERS / AIR DUCT IN PLACE CAN DAMAGE SYSTEM PARTS . TO INSTALL THE COVERS* / AIR DUCT:

- 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* / air duct to the chassis according to the product instructions.

* May not apply to all systems.

Please be aware that slots and openings on the front and rear side of the chassis are designed for ventilation; to make sure reliable operation of your system and to protect it from overheating, these openings must not be covered or blocked. The openings should never be covered or blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register, or in a built-in installation unless proper ventilation is provided.

Laser Peripherals or Devices



CAUTION!

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.

Heed safety instructions: Before working with the system, 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 spec-

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

Hazardous conditions, devices and cables: Hazardous electrical conditions may be present on power, telephone, and communication cables. Turn off the system and disconnect the cables attached to the system before 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.

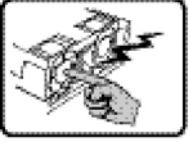
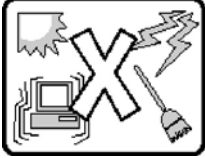
General Information

The information about rack and the wording “rack” in this technical guide supports the organization of Open Compute definition.

The term *Rack* as found in this technical guide refers to the term *Rack* or *Open Rack* as described and used in the Open Compute Project definition.

Before servicing this system, it is recommended to read this technical guide completely to be aware of any safety issues or requirements involved in the servicing of this system.

Assembly Safety Guidelines

	The power system in this product contains no user-serviceable parts. Refer servicing only to qualified personnel.
	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 system, because they serve as the product's main power disconnect.
	WARNING! The system is safety certified as rack-mounted equipment for use in a server room or computer room, using an approved customer rack. The enclosure is designed to carry only the weight of the system sled. Do not place additional load onto any equipment.
	Heavy object. Indicates two people are required to safely handle the system.

Structure of this guide

- Chapter 1: About the System

“This section introduces the system, its different configuration(s) and the main features.”
- Chapter 2: BIOS

“This section provides information regarding the BIOS architecture, BIOS update utility, server management, checkpoints, and error handling found in the system.”
- Chapter 3: BMC

“This section provides information and key features of BMC (Baseboard Management Controller).”
- Chapter 4: Regulatory and Compliance Information

“This section provides regulatory and compliance information applicable to this system.”

About the System

Chapter 1

This section introduces the system, its different configuration(s) and the main features.

1.1 Introduction

QuantaGrid D51BP-1U is a revolutionary 1U rackmount server that dramatically increases data storage IOPS. All ten 2.5" front-access drive bays support hot-pluggable SATA/SAS/PCIe I/O interface. Owners can tailor system storage architecture by mixing traditional hard disk drives and Non-Volatile Memory Express (NVMe) SSD.

- Greener and More Powerful

Powered by Intel® Xeon® processor E5-2600 v3 product family and the DDR4 memory technology, it allows owners to upgrade computing performance without compromising power consumption. Also with QCT's enhanced thermal and power design, the server can operate under 35°C ambient temperature without throttling even if a fan rotor fails. This allows you to save unnecessary datacenter cooling cost and achieve higher DCIE (Data center infrastructure efficiency) value.

- Ultra Low Latency NVMe Solution

NVMe is an innovative host controller interface specification for SSDs to be accessed through the PCIe bus. The data bandwidth increases to five times the traditional SATAIII interface (6Gb/s compared with 31.5Gb/s of PCIe3.0x4), and the new interface significantly reduces the latency caused by register access. This solution efficiently supports multi-core architectures and SR-IOV for data-intensive virtualization workloads. On QuantaGrid D51BP-1U, all ten 2.5" front-access drive bays support hot-pluggable SATA/SAS/PCIe I/O interface. Owners can combine traditional hard disk drives and NVMe-based SSDs to tailor system storage architecture to their needs.

- Flexible and Scalable I/O options

QuantaGrid D51BP-1U provides flexible I/O scalability for today's diverse data center application requirements. It features OCP LAN mezzanine card solutions in addition to dual GbE or 10GbE LAN on motherboards (LoM). With various controller vendors and different speed and technology options, customers can choose from 1GbE to 56GbE bandwidth, copper or fiber-optic cabling, basic Ethernet function or FCoE and ISCSI SAN connectivity. The onboard SAS controller offers multiple Quanta SAS mezzanine card options with different RAID levels and data transfer bandwidth so customers can tailor the SAS controller for specific application needs.

Specifications

Table 1.1: System Specifications

SPECIFICATIONS	DESCRIPTION
Form factor	1U rack mount
Dimensions	W x H x D (inch): 17.244 x 10.97 x 29.21 W x H x D (mm): 438 x 43.2 x 742

Table 1.1: System Specifications (Continued)

SPECIFICATIONS	DESCRIPTION
Processor	Processor type: Intel® Xeon® processor E5-2600 v3 product family Max. TDP support: 145W with limited HDD Qty 135W with max configuration Number of processors: 2 Internal Interconnect: 6.4 / 8.0 / 9.6 GT/s Last Level Cache (LLC): Up to 45 MB
Chipset	Intel® C610
Memory	Total slots: 20 Capacity: Up to 640GB RDIMM / Up to 1280GB LRDIMM Memory type: 2133 MHz DDR4 RDIMM / LRDIMM Memory size: 32GB, 16 GB, 8 GB RDIMM / 64GB, 32 GB LRDIMM
Storage controller	Onboard (Intel® C610): 10x SATA 6Gb/s ports - SATA RAID 0, 1, 10 Optional controller: - Quanta LSI® 2308 6Gb/s SAS mezzanine, RAID 0, 1, 10 - Quanta LSI® 3008 12Gb/s SAS mezzanine, RAID 0, 1, 10 - Quanta LSI® 2208 6Gb/s RAID mezzanine, RAID 0, 1, 5, 10; RAID 6 with additional RAID key
Networking	LOM: Option 1: Intel® I350 dual-port 1 GbE, Dedicated 1 GbE management port Option 2: Intel® X540 dual-port 10 G BASE-T, Dedicated 1 GbE management port Optional NIC: (more options refer to the CCL) - Quanta Intel® I350 dual-port OCP mezzanine - Quanta Intel® X540 dual-port 10 G BASE-T OCP mezzanine - Quanta Intel® 82599ES dual-port 10G SFP+ OCP mezzanine
Expansion slots	Option 1 (default): - One x8 PCIe 3.0 SAS mezzanine slot - One x8 PCIe 3.0 OCP LAN mezzanine slot - Two x8 PCIe 3.0, LP MD-2 Option 2 (this sku does not support any 2.5" PCIe SSD): - One x8 PCIe 3.0 SAS mezzanine slot - One x8 PCIe 3.0 OCP LAN mezzanine slot - Two x16 PCIe 3.0, LP MD-2
Storage	10x 2.5" hot-plug (support SATA / SAS/ PCIe-based interface)
Onboard storage	Support 2x SATADOM
Video	Integrated Aspeed AST2400 with 8MB DDR3 video memory

Table 1.1: System Specifications (Continued)

SPECIFICATIONS	DESCRIPTION
Rear I/O	• 2x USB 3.0 ports • 1x VGA port • 1x RS232 serial Port • 2x 1 GbE or 10G BASE-T RJ45 port • 1x GbE RJ45 management port • 1x ID LED • 1x Port 80 Debug Port (optional)
TPM	Yes (optional)
Power supply	1+1 High efficiency redundant hot-plug PSU (default with one PSU only; detailed PSU options please refer to "ordering info" or "CCL")
Fan	6x dual rotor fans (11+1 redundant)
System management	IPMI v2.0 Compliant, on board "KVM over IP" support
Operating environment	• Operating temperature: 5°C to 35°C (41°F to 95°F) • Non-operating temperature: -40°C to 65°C (-40°F to 149°F) • Operating relative humidity: 50% to 85%RH • Non-operating relative humidity: 20% to 90%RH

1.2 Package Contents

- (1) D51BP-1U system
- (2) processor heat sinks
- (1) power supply unit
- (1) power cord (optional)
- (1) utility CD (User's Guide included)
- (1) rail kit

Note:

Note: For exact shipping contents, contact your Quanta sales representative.

1.3 A Tour of the System

System Overview

The system overview is displayed in the following image:

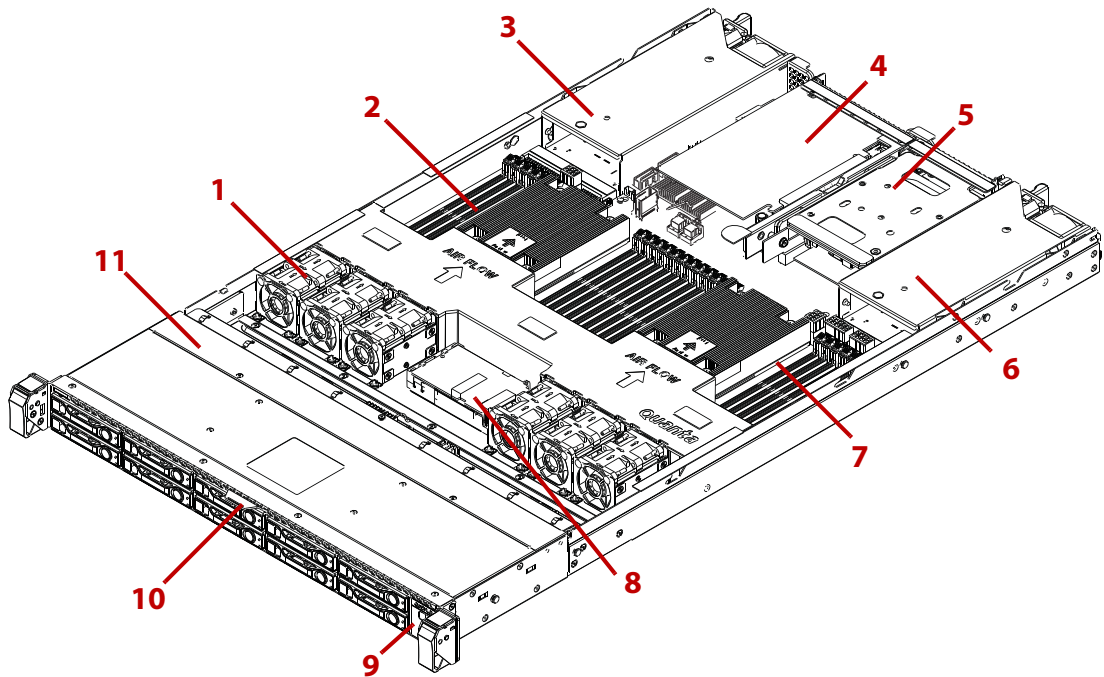


Figure 1-1. System Component Overview

Table 2: Component Overview

No.	ITEM	DESCRIPTION
1	Fan module	(6) System fan modules
2	DIMM slots	(10) DDR4 DIMM slots
3	PSU assembly	Redundant power supply unit assembly
4	Riser assembly	Up to two x8 PCIe slots
5	Riser assembly	
6	PSU assembly	Redundant power supply unit assembly
7	Mainboard	System mainboard
8	Backup battery	Backup battery for mezzanine card
9	Front control panel	See <i>Front Control Panel</i> on page 1-6
10	HDD assembly	10 x 2.5" storage device assemblies
11	Mid-Top cover	Houses the chassis and secure the top cover

Note:
The system features one standard PCIe Riser Assembly supporting standard PCIe cards (see item 4 in previous illustration) and one low profile PCIe riser assembly (available in certain models) supporting low profile PCIe cards (see item 5 in previous illustration).

System Front View

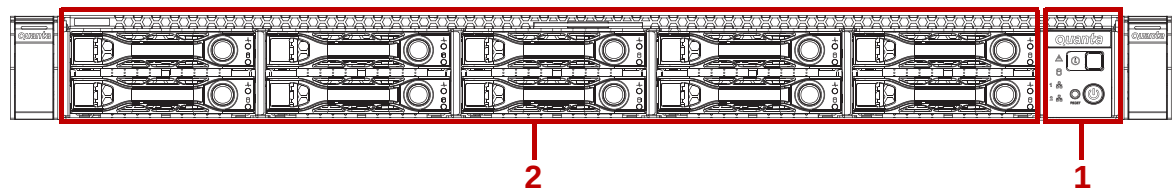


Figure 1-2. System Front View

Table 3: Front Panel View

No.	NAME	DESCRIPTION
1	Front control panel	See <i>Front Control Panel LED</i> on page 1-9 for further information.
2	HDD bays	10 x2.5" SAS HDD / SSD

Front Control Panel

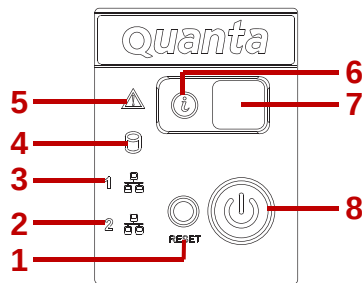


Figure 1-3. Front Control Panel

Table 4: Front Control Panel Definition

No.	ICON	NAME	DESCRIPTION
1		Reset button	Soft reset system function
2		LAN2 LED	LAN access
3		LAN1 LED	LAN access
4		HDD activity LED	Hard disk drive access

Table 4: Front Control Panel Definition (Continued)

No.	ICON	NAME	DESCRIPTION
5		Fault LED	Provides critical and non-critical failure notification
6		Identification LED	Activate ID LED to identify system
7		ID button	Toggles ID LED
8		Power button	Power on / off

System Rear View

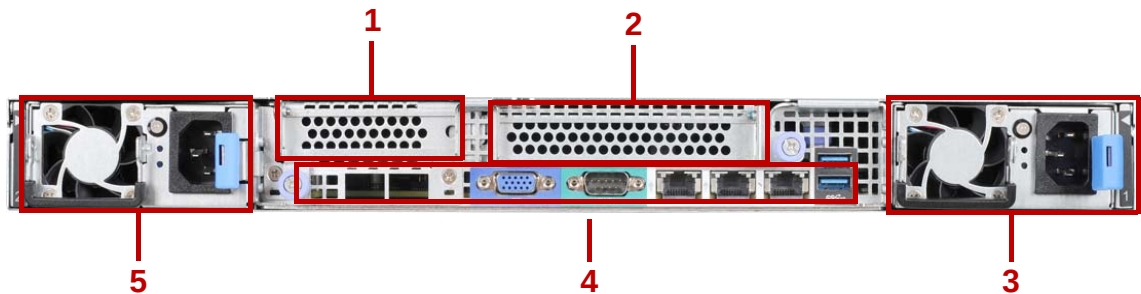


Figure 1-4. System Rear View

Table 5: System Rear View

No.	FEATURE	DESCRIPTION
1	Expansion slot	PCIe expansion slot with PCIe x8 signal
2	Expansion slot	
3	Power sub-system	Main power supply unit (PSU1). See <i>Power Sub-System</i> on page 1-8.
4	System I/O ports	See <i>System Rear I/O</i> on page 1-7
5	Power sub-system	Secondary power supply unit (PSU2). See <i>Power Sub-System</i> on page 1-8

System Rear I/O

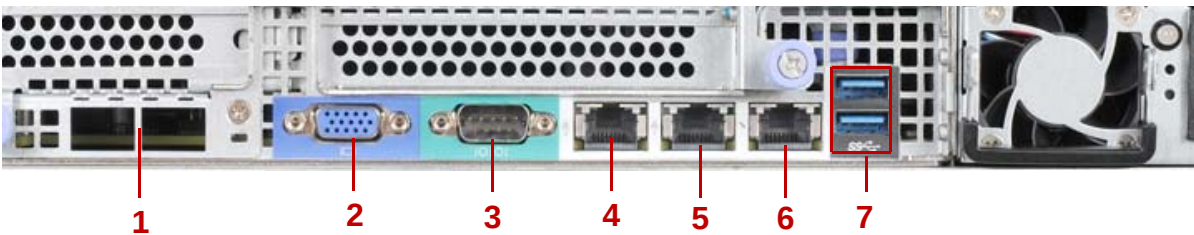


Figure 1-5. System Rear I/O

Table 6: System Rear I/O Defintition

No.	ICON	NAME	DESCRIPTION
1		OCP connector	OCP debug connector (optional)
2		VGA connector	Maximum display resolution: 1920x1200 32bpp@60Hz (reduced blanking)
3		COM port A	DB9 port (Serial_A) for debug or terminal concentrator
4		NIC2	RJ45 connector
5		NIC1	RJ45 connector
6		Dedicated NIC	Dedicated RJ45 connector
7		USB ports	USB ports (2.0 / 3.0)

Power Sub-System

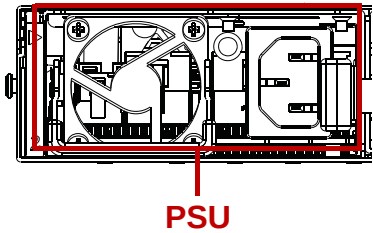


Figure 1-6. PSU to Mainboard Module Description

A single power supply unit (default) and power distribution board (PDB) are supplied in the system. A secondary PSU is available for redundancy functionality.

Table 7: Power Supply Units by Model

PSU	AC INPUT
2 x 750W high efficiency redundant PSU	100-240V AC 50/60Hz

LED Status Definitions

Front Control Panel LED

For further information and location of the FCP LEDs, see *Front Control Panel LED* on page 1-9.

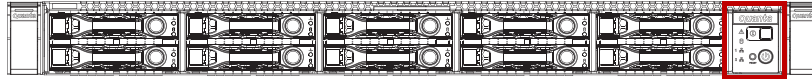


Figure 1-7. Front Control Panel LEDs

Table 8: Front Control Panel LED Behavior

NAME	COLOR	CONDITION	DESCRIPTION
Power LED	Blue	On	System power on
		Off	System power off
Identification	Blue	On	Unit selected for identification
		Off	No identification request
Fault LED	Amber	Blinking	Critical Failure: critical fan, voltage, temperature state.
			Non-Critical Failure: non-critical fan, voltage, temperature state, CPU thermal trip, DC off.
		Off	SEL cleared
			Last pending warning or error has been de-asserted.
HDD activity	Blue	Blinking	Hard disk drive access (only on board SATA port)
		Off	No access (non-SAS)
LAN1 LED	Blue	On	Link
		Blinking	LAN access (off when there is traffic)
LAN2 LED	Blue	On	Link
		Blinking	LAN access (off when there is traffic)

LAN LED

The system mainboard includes an optional dual 1GbE network with 1GbE dedicated management port with an optional 10G SPF+ OCP network mezzanine card. Each RJ45 connector has two built-in LEDs. See the following illustration and table for details.

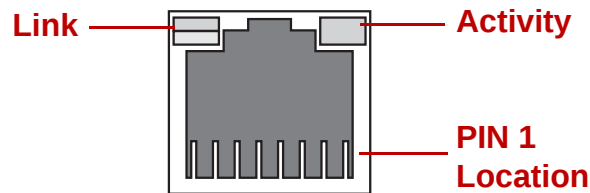


Figure 1-8. RJ45 LAN Connector

Table 9: RJ45 LED Description

CONDITION	LINK	ACTIVITY
Unplugged	Off	Off
1G active link	On amber	Blinking green
100M active link	On green	Blinking green
10M active link	Off	Blinking green

BMC Management Port LED

Table 10: BMC Management Port LED Behaviour

NAME		COLOR	CONDITION	BEHAVIOUR
BMC Dedicated LAN	Speed 1G (Left LED)	Amber	ON	LAN link
			OFF	No link
	Speed 100M (Left LED)	Green	ON	LAN link
			OFF	No link
	Activity (Right LED)	Green	Blinking	LAN Access
			OFF	Disconnected

HDD LED

The following LED behavior table represents LED conditions when a driver is online and the slot is not empty.

Table 11: HDD LED Status Behavior

NAME	COLOR	CONDITION	DESCRIPTION
HDD Status*	Blue	On	Drive is online
		Off	Slot is empty

Table 11: HDD LED Status Behavior (Continued)

NAME	COLOR	CONDITION	DESCRIPTION
HDD Activity	Blue	On	HDD access is active
		Off	No access
HDD Fault	Amber	On	HDD failure
		Off	No failure detected

* Only support SATA/SAS HDD/SSD.

BIOS

Chapter 2

This section provides information regarding the BIOS architecture, BIOS update utility, server management, checkpoints, and error handling found in the system.

2.1 BIOS Setup Utility

The BIOS Setup utility is provided to perform system configuration changes and to display current settings and environment information.

The BIOS Setup utility stores configuration settings in system non-volatile storage. Changes affected by BIOS Setup will not take effect until the system is rebooted. The BIOS Setup Utility can be accessed during POST by using the <**DEL**> or <**F2**> key.

The following sections describe the look and behavior for platform Setup.

Operation

BIOS Setup has the following features:

- The server board BIOS will only be available in English.
- 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.

Setup Page Layout

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 1: BIOS Setup Page Layout

FUNCTIONAL AREA	DESCRIPTION
Title Bar	The title bar is located at the top of the screen and displays the title of the form (page) the user is currently viewing. It may also display navigational information.
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.

Entering BIOS Setup

BIOS Setup is started by pressing <**DEL**> or <**F2**> during boot time when the OEM (Quanta) logo is displayed.

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

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 2: Keyboard Commands

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 screen is returned to the one before pressing the <Esc> key, 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.
↓	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.
←→	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.

Table 2: Keyboard Commands (Continued)

KEY	OPTION	DESCRIPTION
-	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> causes the following to appear: Load Optimized Defaults? 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 screen is returned to the one before <F8> was pressed without affecting any existing field values
<F9>	Setup Defaults	Pressing <F9> causes the following 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 screen is returned to the one before <F9> was pressed without affecting any existing field values
<F10>	Save and Reset	Pressing <F10> causes the following message to appear: Save configuration and Reset? Yes No If Yes is highlighted and <Enter> is pressed, all changes are saved and system resets. If No is highlighted and <Enter> is pressed, or the <Esc> key is pressed, the screen is returned to the one before <F10> was pressed without affecting any existing values.

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.

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.

Main Screen

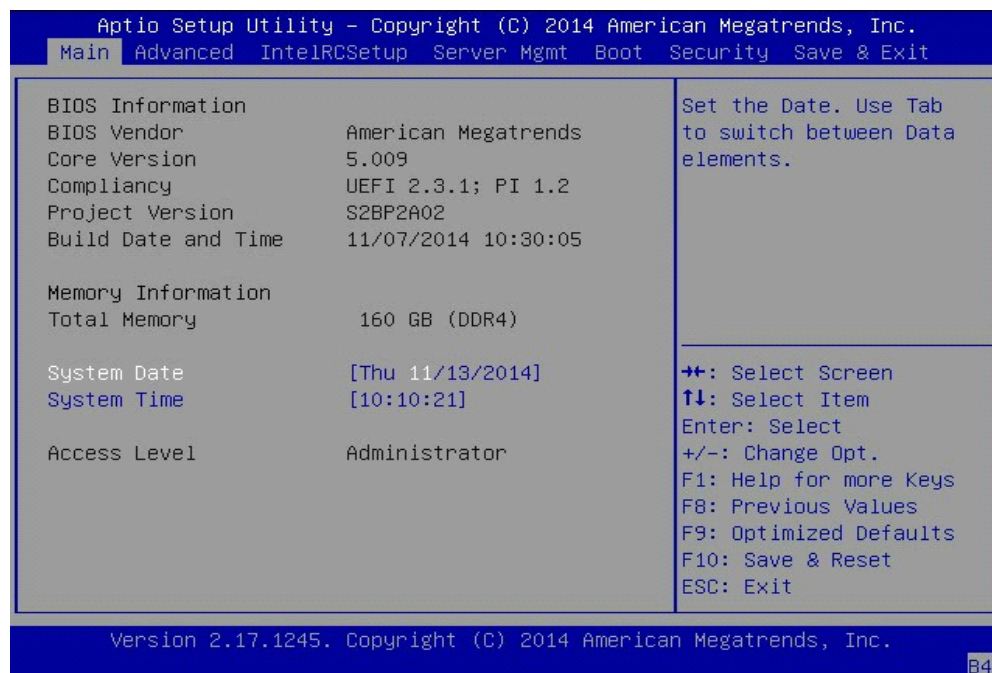


Figure 2-1. Main Screen

Table 3: Main Screen Description

SETUP ITEM	OPTIONS	HELP TEXT	COMMENTS
BIOS Vendor			Information only. Displays the BIOS Vendor.
Core Version			Information only. Displays the AMI BIOS Core version.
Compliance			Information only. Displays the BIOS compliance.
Project Version			Information only. Displays the Project version.
Build Date and Time			Information only. Displays the BIOS build date.
Total Memory			Information only. Displays the Total System Memory Size.
System Date	[Day of week MM/DD/YYYY]	Set the Date. Use Tab to switch between Date elements.	
System Time	[HH:MM:SS]	Set the Time. Use Tab to switch between Time elements.	
Access Level			Information only. Displays the Access Level.

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 the Advanced screen.

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

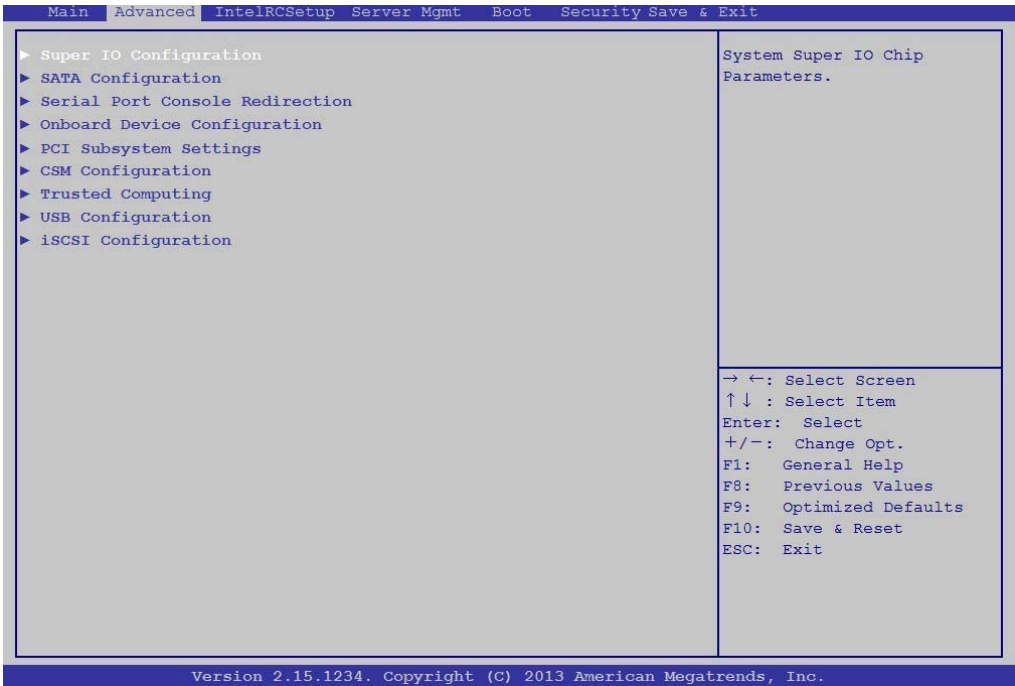


Figure 2-2. Advanced Screen

Table 4: Advanced Screen Description

SETUP ITEM	OPTIONS	HELP TEXT	COMMENTS
Super IO Configuration		System Super IO Chip Parameters.	
SATA Configuration		SATA Devices Configuration set.	
Serial Port Console Redirection		Serial Port Console Redirection	
Onboard Device Configuration		Onboard Device Parameters	
PCI Subsystem Settings		PCI, PCI-X and PCI Express Settings.	
CSM Configuration		CSM configuration: Enable/Disable, Option ROM execution settings, etc.	
Trusted Computing		Trusted Computing Settings	
USB Configuration		USB Configuration Parameters	
iSCSI Configuration		Configure the iSCSI Parameters	Dynamic

IntelRCS Setup Screen

The IntelRCS setup 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 the IntelRCS setup screen.

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

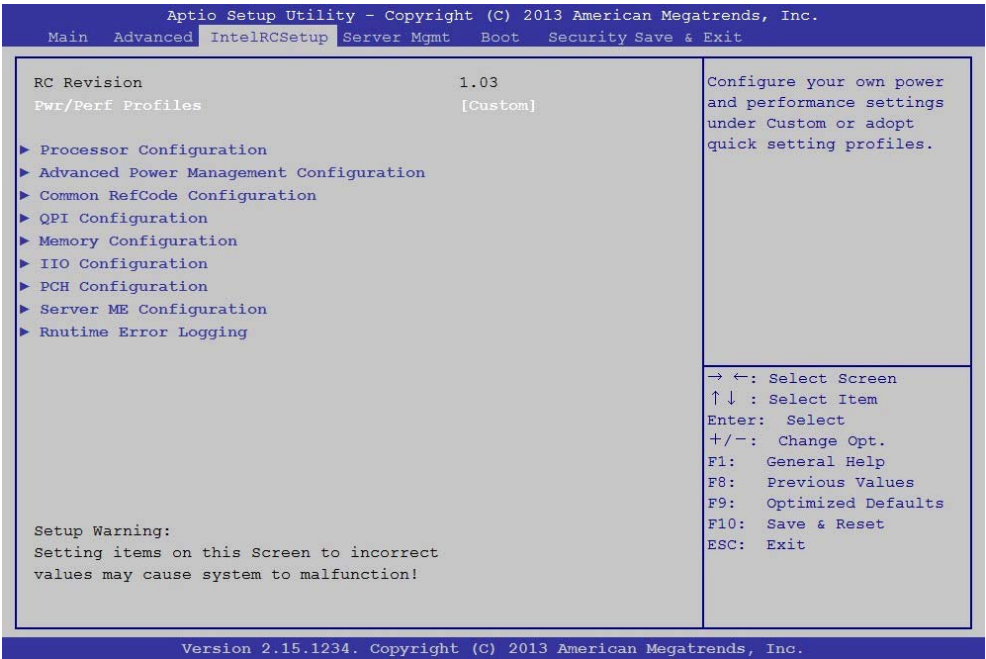


Figure 2-3. IntelRCS Setup Screen

Table 5: IntelRCS Setup Screen Description

SETUP ITEM	OPTIONS	HELP TEXT	COMMENTS
Pwr/Perf Profiles	[Custom] [Energy-Saving] [Balanced] [Virtualization] [High Performance]	Configure your own power and performance settings under Custom or adopt quick setting profiles.	
Processor Configuration		Displays and provides option to change the Processor Settings	
Advanced Power Management Configuration		Displays and provides option to change the Power Management Settings	
Common Ref-Code Configuration		Displays and provides option to change the Common RefCode Settings	
QPI Configuration		Displays and provides option to change the QPI Settings	

Table 5: IntelRCSetup Screen Description (Continued)

SETUP ITEM	OPTIONS	HELP TEXT	COMMENTS
Memory Configuration		Displays and provides option to change the Memory Settings	
IIO Configuration		Displays and provides option to change the IIO Settings	
PCH Configuration		Displays and provides option to change the PCH Settings	
Server ME Configuration		Configure Server ME Technology Parameters	
Runtime Error Logging		Press <Enter> to view or change the runtime error log configuration.	

Server Management Screen

The Server Management screen displays information of the BMC, and allows the user to configure desired settings.

To access this screen from the Main screen, select Server Mgmt Options.



Figure 2-4. Server Management Screen

Table 6: Server Management Screen Description

SETUP ITEM	OPTIONS	HELP TEXT	COMMENTS
BMC Self Test Status			Information only. Displays the BMC Self Test Status.

Table 6: Server Management Screen Description (Continued)

SETUP ITEM	OPTIONS	HELP TEXT	COMMENTS
BMC firmware version			Information only. Displays the BMC firmware version.
IPMI version			Information only. Displays the IPMI version.
FRB-2 Timer	[Disabled] [Enabled]	Enable or Disable FRB-2 timer (POST timer)	Not available if FRB2 Timer is disabled.
FRB-2 Timer timeout	[3 minutes] [4 minutes] [5 minutes] [6 minutes]	Enter value Between 3 to 6 min for FRB-2 Timer Expiration value	Not available if FRB2 Timer is disabled.
FRB-2 Timer Policy	[Do Nothing] [Reset] [Power Down] [Power Cycle]	Configure how the system should respond if the FRB-2 Timer expires. Not available if FRB-2 Timer is disabled.	
OS Watchdog Timer	[Disabled] [Enabled]	If enabled, starts a BIOS timer which can only be shut off by Intel Management Software after the OS loads. Helps determine that the OS successfully loaded or follows the OS Boot Watchdog Timer policy.	
OS Wtd Timer Timeout	[5 minutes] [10 minutes] [15 minutes] [20 minutes]	Configure the length of the OS Boot Watchdog Timer. Not available if OS Boot Watchdog Timer is disabled.	Not available if watchdog Timer is disabled.
OS Wtd Timer Policy	[Do Nothing] [Reset] [Power Down]	Configure how the system should respond if the OS Boot Watchdog Timer expires. Not available if OS Boot Watchdog Timer is disabled.	Not available if watchdog Timer is disabled.
System Event Log		Press < Enter > to change the SEL event log configuration.	
View FRU information		Press < Enter > to view FRU information.	
BMC network configuration		Configure BMC network parameters	
Restore on AC Power Loss	[Power Off] [Power On] [Last State] [No Change]	System action to take on AC power loss	
Current Restore on AC Power Loss			Information only. Displays current system action to take on AC power loss.

Boot Options Screen

The Boot Options screen displays any bootable media encountered during POST, and allows the user to configure desired boot device.

If no boot devices are available – for example, both onboard LAN are disabled and no bootable device connected when Boot Mode is set to Legacy – the system will auto boot into BIOS setup menu.

To access this screen from the Main screen, select Boot Options.

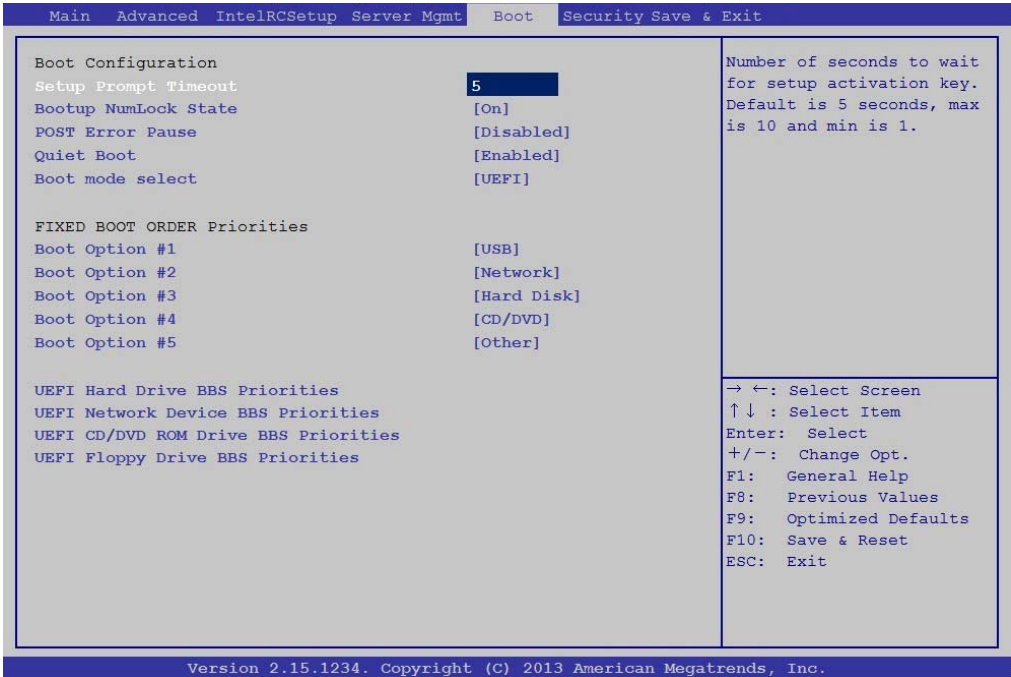


Figure 2-5. Boot Options Screen

Table 7: Boot Options Screen Description

SETUP ITEM	OPTIONS	HELP TEXT	COMMENTS
Setup Prompt Timeout	[<number>]	Number of seconds to wait for setup activation key. Default is 5 seconds, max is 10 and min is 1.	
Bootup Num-Lock State	[On] [Off]	Select the keyboard NumLock state	
POST Error Pause	[Disabled] [Enabled]	Enables or disables POST Error Pause	
Quiet Boot	[Disabled] [Enabled]	Enables or disables Quiet Boot option	

Table 7: Boot Options Screen Description (Continued)

SETUP ITEM	OPTIONS	HELP TEXT	COMMENTS
Boot mode select	[LEGACY] [UEFI]	Select boot mode LEGACY/UEFI	This item decides what devices (Legacy or UEFI) BIOS should try to boot when let the system auto boot up without manually select boot device.
Boot Option #1 Boot Option #2 Boot Option #3 Boot Option #4 Boot Option #5		Sets the system boot order	Default priority: 1st: USB 2nd: Network 3rd: Hard Disk 4th: CD/DVD 5th: Other
Hard Drive BBS Priorities		Set the order of the legacy devices in this group	Only appears when at least one Hard Disk is detected.
Network Device BBS Priorities		Set the order of the legacy devices in this group	Only appears when at least one Network Device is detected.
Hard Drive BBS Priorities		Set the order of the legacy devices in this group	Only appears when at least one Hard Disk is detected.
CD/DVD ROM Drive BBS Priorities		Set the order of the legacy devices in this group	Only appears when at least one CD/DVD Drive is detected.
Floppy Drive BBS Priorities		Set the order of the legacy devices in this group	Only appears when at least one Floppy Device is detected.

Security Screen

The Security screen provides fields to enable and set the user and administrative password and to lockout the front panel buttons so they cannot be used.

To access this screen from the Main screen, select the Security option.

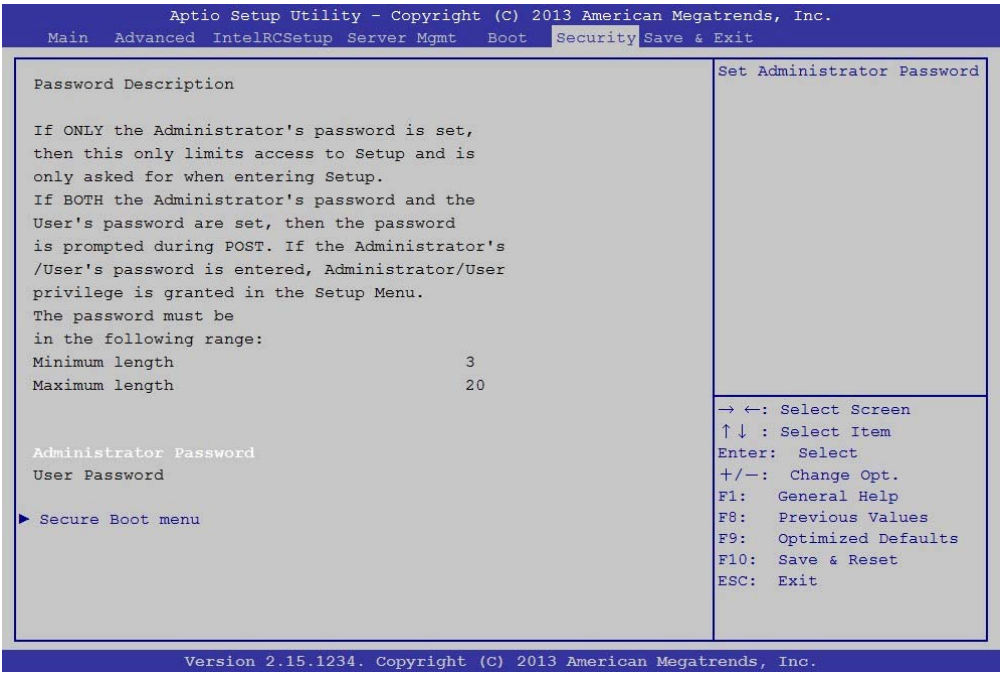


Figure 2-6. Security Screen

Table 8: BIOS Screen Description

SETUP ITEM	OPTIONS	HELP TEXT	COMMENTS
Administrator Password		Set Administrator Password	
User Password		Set User Password	
Secure Boot menu		Customizable Secure Boot settings	

Exit Screen

The Exit screen allows the user to choose to save or discard the configuration changes made on the other screens. It also provides a method to restore the server to the factory defaults or to save or restore a set of user defined default values. If Restore Defaults is selected, the default settings, noted in bold in the tables in this chapter, will be applied. If

Restore User Default Values is selected, the system is restored to the default values that the user saved earlier, instead of being restored to the factory defaults.

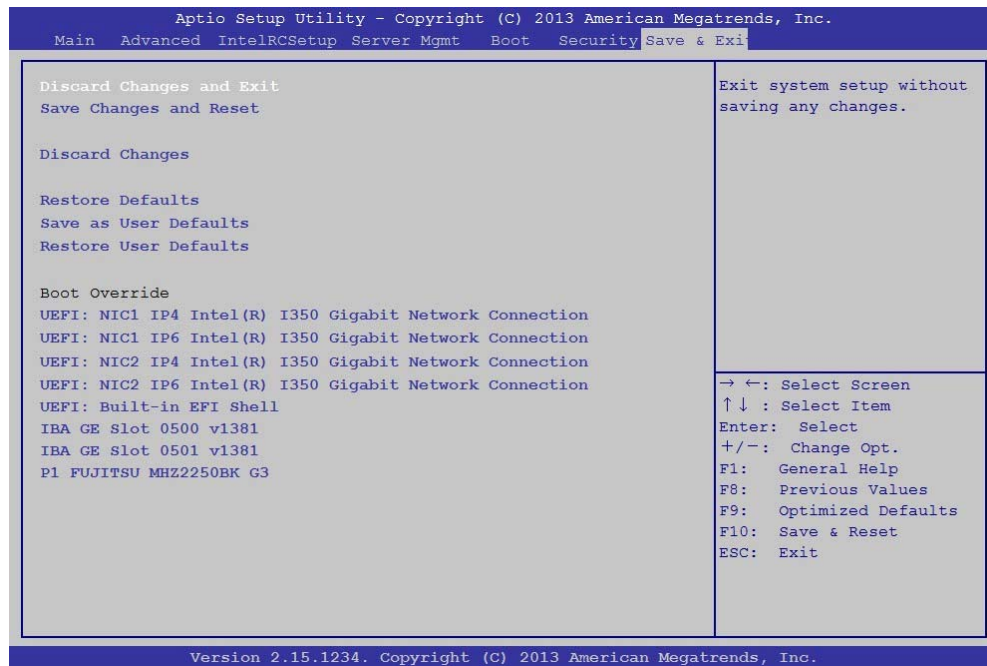


Figure 2-7. Exit Screen

Table 9: Exit Screen Description

SETUP ITEM	OPTIONS	HELP TEXT	COMMENTS
Discard Changes and Exit		Exit system setup without saving any changes.	
Save Changes and Reset		Reset the system after saving the changes.	
Discard Changes		Discards 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.	
Restore User Defaults		Restore the User Defaults to all the setup options.	
[<Device String 1>]			Boot with Device <Device String 1>
[<Device String 2>]			Boot with Device <Device String 2>
[<Device String 3>]			Boot with Device <Device String 3>
[<Device String 4>]			Boot with Device <Device String 4>
[<Device String 5>]			Boot with Device <Device String 5>
[<Device String 6>]			Boot with Device <Device String 6>

Loading BIOS Defaults

Different mechanisms exist for resetting the system configuration to the default values. When a request to reset the system configuration is detected, the BIOS loads the default system configuration values during the next POST. The request to reset the system to the defaults can be sent in the following ways:

- Pressing <**F9**> from within the BIOS Setup utility
- Load BIOS defaults by jumper as follows:
 1. Power down the system.
 2. Move CMOS clear jumper from pins 1-2 to pins 2-3 for a few seconds.
 3. Move CMOS clear jumper back to pins 1-2.
 4. System automatically powers on.
 5. Check BIOS defaults are loaded.

2.2 BIOS Update Utility

The flash ROM contains system initialization routines, the BIOS Setup Utility, and runtime support routines. The exact layout is subject to change, as determined by BIOS. The flash ROM also contains initialization code in compressed form for onboard peripherals, like SCSI, NIC and video controllers. The complete ROM is visible, starting at physical address 4 GB minus the size of the flash ROM device.

A 16-KB parameter block in the flash ROM is dedicated to storing configuration data that controls the system configuration (ESCD). Application software must use standard APIs to access these areas; application software cannot access the data directly.

BIOS Update Utility

Server platforms support DOS-based, Windows-based, and Linux-based firmware update utilities. It is very important to follow the rule, and use official provided package to update BIOS under DOS/Linux/ EFI shell environment. Using incorrect flash option to flash BIOS may cause damage to your system. This utility loads a fresh copy of the BIOS into the flash ROM.

The BIOS update may affect the following items:

- The system BIOS, including the setup utility and strings.
- Onboard video BIOS, RAID BIOS, and other option ROMs for the devices embedded on the server board.
- Memory reference code.
- Microcode updates.

AFULNX: v2.39

1. Copy `afulnx_26_64`, BIOS BIN and Windmill batch file to installed linux OS, execute `biosupdate.sh` under linux base environment and update finishes automatically.
2. Reboot system then new BIOS runs.

ME Region Update

Update utility also provide ME region update function, please refer to the README.txt that each official release BIOS attached.

The BIOS update may affect the following items:

- The system BIOS, including the setup utility and strings.
- Onboard video BIOS, RAID BIOS, and other option ROMs for the devices embedded on the server board.
- Memory reference code.

- Microcode updates.
- ME Firmware.

BIOS Setting Utility

Use AMISCE to import/export BIOS setting in Linux:

1. Export BIOS setting and generate script file:
/o /s NVRAM.txt
2. Import BIOS setting with script file:
/i /s NVRAM.txt

BIOS Revision

The BIOS revision is used to identify the BIOS image and BIOS phase.

Clear CMOS

The following steps will load the BIOS defaults by jumper:

1. Power down the system.
2. Move CMOS clear jumper from pins 1-2 to pins 2-3 for a few seconds.
3. Move CMOS clear jumper back to pins 1-2.
4. System automatically powers on.
5. Check BIOS defaults are loaded.

Clear Password

1. Power down the system.
2. Move password clear jumper from pins 1-2 to pins 2-3.
3. Power on the system.
4. Make sure password is cleared.
5. Power down the system.
6. Move password clear jumper from pins 2-3 back to pins 1-2.
7. Power on the system.
8. Set new password.

2.3 Server Management

The BIOS supports many standard-based server management features and several proprietary features. The Intelligent Platform Management Interface (IPMI) is an industry standard and defines standardized, abstracted interfaces to platform management hardware. The BIOS implements many proprietary features that are allowed by the IPMI specification, but these features are outside the scope of the IPMI specification. This section describes the implementation of the standard and proprietary features.

Console Redirection

The BIOS supports redirection of both video and keyboard via a serial link (serial port). When console redirection is enabled, the local, or host server, keyboard input and video output are passed both to the local keyboard and video connections, and to the remote console through the serial link. Keyboard inputs from both sources are considered valid and video is displayed to both outputs.

As an option, the system can be operated without a host keyboard or monitor attached to the system and run entirely via the remote console. Utilities that can be executed remotely include BIOS Setup.

Serial Configuration Settings

The BIOS does not require that the splash logo be turned off for console redirection to function. The BIOS supports multiple consoles, some of which are in graphics mode and some in text mode. The graphics consoles can display the logo and the text consoles receive the redirected text.

Keystroke Mapping

During console redirection, the remote terminal sends keystrokes to the local server. The remote terminal can be a dumb terminal with a direct connection and running a communication program. The keystroke mapping follows VT-UTF8 format with the following extensions.

Table 10: Keystroke Mappings

KEY	ANSI ESCAPE SEQUENCE	WINDOWS PLATFORM DESIGN NOTE
F1	<ESC><Shift>op	<ESC>1
F2	<ESC><Shift>oq	<ESC>2
F3	<ESC><Shift>or	<ESC>3
F4	<ESC><Shift>os	<ESC>4
F5		<ESC>5
F6		<ESC>6
F7		<ESC>7

Table 10: Keystroke Mappings (Continued)

KEY	ANSI ESCAPE SEQUENCE	WINDOWS PLATFORM DESIGN NOTE
F8		<ESC>8
F9		<ESC>9
F10		<ESC>0
F11		<ESC>!
F12		<ESC>@
Home	<ESC>[<Shift>h	<ESC>h
End	<ESC>[<Shift>k	<ESC>k
Ins		<ESC>+
Del		<ESC>-
Page Up		<ESC>?
Page Down		<ESC>/
Reset		<ESC>R<ESC>r<ESC>R

Standalone <Esc> Key for Headless Operation

The Microsoft Headless Design Guidelines describes a specific implementation for the <Esc> key as a single standalone keystroke:

To complete an escape sequence, the timeout must be two seconds for entering additional characters following an escape.

- <Esc> followed by a two-second pause must be interpreted as a single escape.
- <Esc> followed within two seconds by one or more characters that do not form a sequence described in this specification must be interpreted as <Esc> plus the character or characters, not as an escape sequence.

The escape sequence in the following table is an input sequence. This means it is sent to the BIOS from the remote terminal.

Reset

BIOS provides another friendly method to reset system from console. User could use <Ctrl> + <Shift> + '-' to reboot system from remote console.

Limitations

- BIOS Console redirection terminates after an operating system has being loaded. The operating system is responsible for continuing console redirection after that.
- BIOS console redirection is a text console. Graphical data, such as a logo, are not redirected.

Interface to Server Management (Optional)

If the BIOS determines that console redirection is enabled, it will read the current baud rate and pass this value to the appropriate management controller via the Intelligent Platform Management Bus (IPMB).

Network BIOS Support

PXE Boot

The BIOS supports the EFI PXE implementation. To utilize this, the user must load EFI Simple Network Protocol driver and the UNDI driver specific for the network interface card being used. The UNDI driver should be included with the network interface card. The Simple Network Protocol driver can be obtained from <http://developer.intel.com/technology/framework>.

The BIOS supports legacy PXE option ROMs in legacy mode and includes the necessary PXE ROMs in the BIOS image for the onboard controllers. The legacy PXE ROM is required to boot a non-EFI operating system over the network.

Checkpoints

A checkpoint is either a byte or word value output to Debug port. The BIOS outputs checkpoints throughout bootblock and Power-On Self Test (POST) to indicate the task the system is currently executing. Checkpoints are very useful in aiding software developers or technicians in debugging problems that occur during the pre-boot process.

Checkpoints can be defined as follow:

- Standard Checkpoint
- ACPI/ASL Checkpoint
- OEM-Reserved Checkpoint
- MRC POST Code Checkpoints

Debug Header

Windmill has one debug header placed in front of the motherboard. Debug card can be plugged in vertically and forward facing. The debug head support functions:

- Support Hot-Plug
- Provide RS232 serial port connector, for use of console redirection
- Two 7-segment LED displays
 - a. CheckPoint

- b. Error code (POST Error/ MRC Fatal/Warning Code)
- One reset switch (To trigger system reset)

BMC

Chapter 3

This section provides information and key features of BMC (Baseboard Management Controller).

3.1 Server Management Software

Server System Overview

In a server system, BMC is an independent system of the host server system. This independent system has its own processor and memory; the host system can be managed by the BMC system even if the host hardware or OS hangs or is unable to function.

BMC Key Features and Functions

- Supports IPMI v1.5 and v2.0.
- Support SNMP v1,v2c and v3.
- Support SMASH.
- Support delivers alerts such as SNMP traps in the Platform Event Trap (PET) format.
- Out-of-band monitoring and control for sever management over LAN.
- Share NIC for remote management via network.
- The FRU information report includes main board part number, product name, manufacturer, etc.).
- Health status/Hardware monitoring report.
- Events log, view, and clear.
- Event notification via lighting chassis LED indicator and Platform Event Trap (by SNMP trap) or Mail (by Simple Mail Transfer Protocol).
- Platform Event Filtering (PEF) to take selected actions for selected events, including NMI.
- Chassis management includes power control and a status report, front panel buttons and LED control.
- Watchdog and auto server restart and recovery.
- Supports multi-session users, and alert destination for LAN channel.
- Support IPMB connector that advanced server management card can communicate with BMC.

Power System

BMC controls system power through GPIO pins and IPMI chassis commands.

Front Panel User Interface

The BMC provides control panel interface functionality including indicators (Fault/status and Identify LEDs) and buttons (Power/ID).

Power Button

The Power buttons allow to control the system status.

ID Button

The control panel Chassis Identify button toggles the state of the Chassis ID LED. If the ID LED is off, then a button press will turn the LED on (blinking). If the LED is on, a button press or IPMI Chassis Identify command will turn the LED off.

LEDs

The following table contains information on Status, ID and Heartbeat LED's.

Table 3.1: Status LED, ID LED, and Heartbeat LED

LEDs	COLOR	STATUS	DESCRIPTION
Status LED	Amber (Status LED)	Blinking	System Event
		Off	Normal status
	Blue	On	Power on
		Off	Power off
ID LED	Blue	Off	Normal status
		Blinking	Identify the system with interval
		Solid ON	Identify the system
Heartbeat LED	Green	On/Off	BMC is not Ready
		Blinking	BMC is Ready

LAN Interface

BMC LAN interface in AST2400 is assigned to its Shared NIC LAN and a dedicated NIC (Default) in the system. IPMI Specification v2.0 defines how IPMI messages, encapsulated in RMCP/RMCP+ packet format, can be sent to and from the BMC. This capability allows a remote console application to access the BMC and perform the following operations:

- Chassis control: obtain chassis status, reset and power-up the chassis
- Obtain system sensor status
- Obtain and Set system boot options
- Obtain Field Replaceable Unit (FRU) information

- Obtain System Event Log (SEL) entries
- Obtain Sensor Data Records (SDR)
- Set Platform Event Filtering (PEF)
- Set LAN configurations

In addition, the BMC supports LAN alerting in the form of SNMP traps that conform to the IPMI Platform Event Trap (PET) format.

Session and User

This BMC supports ten (10) user accounts. Each can have a different user name, password and privilege level. Four accounts can login simultaneously. The available user privilege levels are User, Operator, and Administrator.

Serial Over LAN

BMC supports 1 IPMI (Spec v2.0) specific SOL session. BMC supports redirect data from UART interface.

Time Sync

In BMC design, BMC does not have a local RTC to know what time it is. Each time BMC will get the current time from system PCH after BMC boot. The current time is updated periodically from the PCH. The remote console program interpret this time as pre-initial.

SEL

BMC supports IPMI 1.5/2.0 standard SEL operation. It can keep SEL log. Event happened in BIOS side will be logged by using Add SEL Entry command. BMC will store them in FLASH, the time stamp field will be filled by BMC. When SEL is full, the new SEL won't be logged but will go through PEF as usual. If AC powers off, all SELs will remain in NV.

Platform Event

Platform Event Filter

The BMC implements selectable action on an event or LAN alerting base on event. By default, no any PEF entries or actions exist, applications need to configure it to enable.

- Dedicated and Shared NIC
- The policy to match an event to Platform Event Filter Table entry is IPMI 1.5 standard.
- The action support Power off, Power Reset, Power Cycle and NMI.

- All Platform Event Filter Table is default disabled.
- PEF Startup Delay and Last Processed Event tracking is not supported.
- PEF table lookup isn't correlated to log SEL to SEL Repository.
- Serial Alerting is no support.

BMC Firmware Update

The BMC will allow users to upgrade firmware image on following entities:

- BMC
- All other upgradable entities

The update capability is provided by local and remote interfaces.

DOS Recovery Utility

SOCFLASH Utility.

WebUI Update

Remote update can be performed through the remote Web console.

3.2 BMC Recovery

This section provides guidelines on BMC recovery process in DOS and Linux systems.

Recovery Process in DOS System

To recover BMC on a DOS system, do as follows:

1. Copy BMC firmware package to your USB key.
2. Boot into DOS.
3. Run *dos.bat*.

The BMC recovery is complete.

Recovery Process in Linux System

To recover BMC on a Linux system, do as follows:

1. Copy BMC firmware package to your USB drive.
2. Boot into Linux.
3. Run *linux.sh*.

The BMC recovery is complete.

Recovery Process in Windows System

To recover BMC on a Windows system, do as follows:

1. Copy BMC firmware package to your USB key.
2. Boot into Windows.
3. Run *win.bat*.

The BMC recovery is complete.

3.3 SMASH

Quanta SMASH is a tool that allows you to use Secure Shell (SSH) to login in the embedded Linux of BMC from remote terminal and gather information as well as give you control over things like power resets, power off. The basic structure is shown as below:

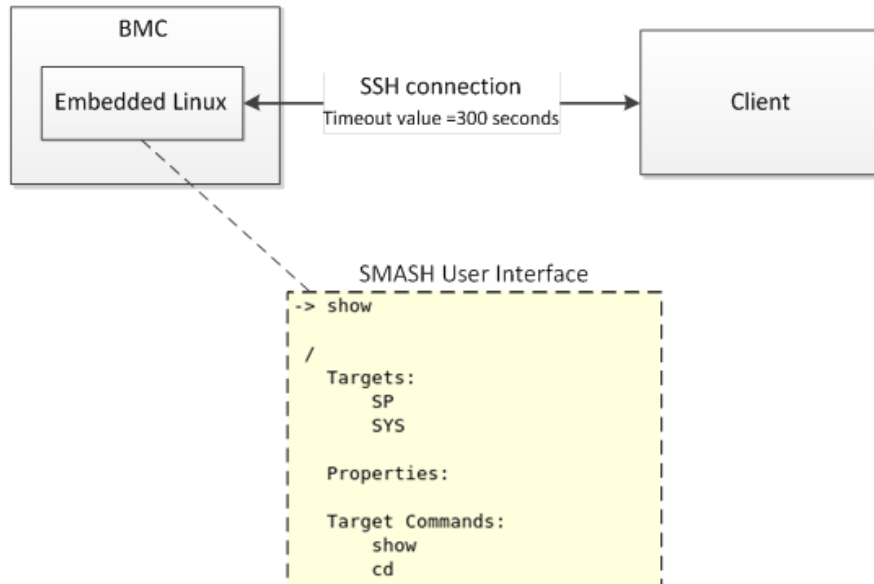


Figure 3-1. Using SSH to login in

Here presents an activity diagram, user could use SSH to login in embedded Linux of BMC from remote terminal. After login in successfully, SMASH would be executed automatically. In this time, SMASH is running and allowing user to input commands. The connection will be terminated if the terminal console is idle more than five minutes.

Default SSH UserName / Password (User Account in Linux): **sysadmin / superuser**

Input command in Linux: **ssh sysadmin@<Server IP>**

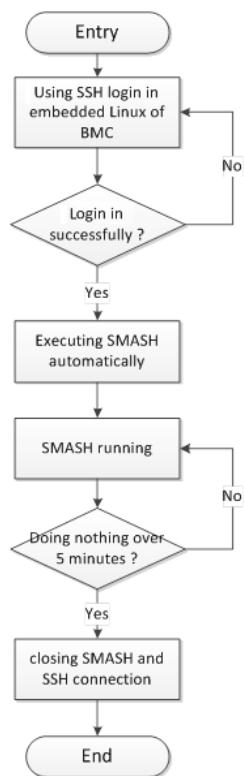


Figure 3-2. SMASH Activity Diagram

Here provides you the commands about system level and BMC level.

System Level Commands

The system level commands provide you the information and power state control.

Table 3.2: Targets and Verbs

RELATED TARGETS	SUPPORTED VERBS										
	CD	EXIT	HELP	CREATE	DELETE	SET	SHOW	RESET	START	STOP	VERSION
/	v	v	v				v				v
/SYS	v	v	v				v	v	v	v	v
/SYS/voltage	v	v	v				v				v
/SYS/fan	v	v	v				v				v
/SYS/tempera- ture	v	v	v				v				v
/SYS/powerSup- ply	v	v	v				v				v

Displays information for the board

```
show /SYS
```

Power-on system

start /SYS

Power-off system

stop /SYS

Power-reset system

reset /SYS

Display all system voltage

show /SYS/voltage

Display all system fan

show /SYS/fan

Display all system temperature

show /SYS/temperature

Display all system power supply

show /SYS/powerSupply

/SYS

This command provides you the high-level status of the system chassis and main power subsystem.

Table 3.3: /SYS

PROPERTY NAME	VALID VALUE	ACCESS	DESCRIPTION
SystemMAC0		R	Display system MAC0 address
SystemMAC1		R	Display system MAC1 address
ChassisStatus	powerIsOFF powerIsON	R	PowerIsOFF indicates the system power is off PowerIsON indicates the system power is on.

Q&A

Q: I tried to turn system power off by IPMI command “**power off**” when there is no response from operating system and system could not be shutdown. What is the Chassis Status?

A: The status of ChassisStatus is “**powerIsON.**”

/SYS/voltage

This command returns a high level version of the system voltages health status.

Table 3.4: /SYS/voltage

PROPERTY NAME	VALID VALUE	ACCESS	DESCRIPTION
Sensor name list of voltage	na ok nonCritical critical	R	na indicates the status not available /unknown (typically because system power is off) ok indicates the monitored parameters within normal operating ranges nonCritical indicates the hardware outside normal operating range critical indicates the hardware exceeding specified ratings

*The sensor name list depends on the Server Hardware.

/SYS/fan

This command returns a high level version of the system fan health status.

Table 3.5: /SYS/fan

PROPERTY NAME	VALID VALUE	ACCESS	DESCRIPTION
Sensor name list of fan	na ok nonCritical critical	R	na indicates the status not available /unknown (typically because system power is off) ok indicates the monitored parameters within normal operating ranges nonCritical indicates the hardware outside normal operating range critical indicates the hardware exceeding specified ratings

*The sensor name list depends on the Server Hardware.

/SYS/temperature

This command returns a high level version of the system temperature health status.

Table 3.6: /SYS/temperature

PROPERTY NAME	VALID VALUE	ACCESS	DESCRIPTION
Sensor name list of temperature	na ok nonCritical critical	R	na indicates the status not available /unknown (typically because system power is off) ok indicates the monitored parameters within normal operating ranges nonCritical indicates the hardware outside normal operating range critical indicates the hardware exceeding specified ratings

*The sensor name list depends on the Server Hardware.

/SYS/powerSupply

This command provides the specification of the Sensor Type sensor-specific event.

Table 3.7: /SYS/powerSupply

PROPERTY NAME	VALID VALUE	ACCESS	DESCRIPTION
Sensor name list of power supply	Presence* FailDetected* PredictiveFail* InputLost(AC/DC)* AllDeasserted (*Note: Only for certain models.)	R	Presence indicates the Power Supply Presence detected FailDetected indicates the Power Supply Failure detected PredictiveFail indicates the Power Supply Predictive Failure, the status supported or not depends on project InputLost(AC/DC) indicates the Power Supply input lost, such as power cord not inserted AllDeasserted indicates the power supply is not inserted
Redundancy	FullyRedundant RedundancyLost	R	The property is provided depend on project. FullyRedundant Indicates the power redundancy is OK. RedundancyLost Indicates the power redundancy is fail. One PSU is removed or AC lost.

*The sensor name list depends on the Server Hardware.

Q&A:

Q1: My system supports two power supply slots and only one power supply unit connected. What is the other power supply status?

A1: The other power supply status is " AllDeasserted ".

Q2: My system supports two power supply slots and two power supply units connected. But only one power cord plugged. What is the other power supply status?

A2: The other power supply status shows "Presence, PredictiveFail, InputLost(AC/DC) ".

BMC Information

The BMC level commands provide several options to configure and display parameters of the management agent.

Table 3.8: Targets and Verbs

RELATED TARGETS	SUPPORTED VERBS										
	CD	EXIT	HELP	CREATE	DELETE	SET	SHOW	RESET	START	STOP	VERSION
/	v	v	v				v				v
/SP	v	v	v			v	v	v			v

Displays information for the board

show /SP

Reset BMC

reset /SP

Set server identify LED to be off

set /SP ServerIdentify=off

Set server identify LED to be on

set /SP ServerIdentify=on

Set server identify LED to be blinking

set /SP ServerIdentify=blinking

/SP

Table 3.9: /SYS/fan

PROPERTY NAME	VALID VALUE	ACCESS	DESCRIPTION
BMCVersion		R	Display BMC firmware revision
BMCGUID		R	Display BMC GUID

Table 3.9: /SYS/fan (Continued)

PROPERTY NAME	VALID VALUE	ACCESS	DESCRIPTION
ServerIdentify	off on blinking	R/W	Configuring server identify LED
BMCMAC		R	Display the NIC physical address used by server management agent

3.4 Web Graphical User Interface (GUI) for ESMS

Using the Web GUI

The BMC firmware features an embedded web server enabling users to connect to the BMC using a Web browser (e.g. Microsoft Internet Explorer). The Web GUI shows system information, system events, system status of managed servers, and other system-related information.

The Web-based GUI is supported on the following browsers:

- Internet Explorer 7 and above
- Firefox 8.0 and above
- Google Chrome 2.0 and above

Login

Enter the IP address or URL (default DHCP\static IP address) into the address bar of the web browser.

When connecting to the BMC the Login screen prompts for the username and password. This authentication with SSL protection prevents unauthorized intruders from gaining access to the BMC web server.

When a user is authenticated they can manage the server according to the privilege of their role.

The OEM Proprietary, Administrator and Operator privilege levels are authorized to login to the web interface. The User and No Access privilege levels do not allow access through the BMC web GUI.



Figure 3-3. Login Web Page

Table 4: Default Username and Password

FIELD	DEFAULT
Username	admin
Password	admin

After passing authentication, the following web page appears.

Note:

The default username and password are in lowercase characters. It is advised to change the admin password once you have logged in.

Click the **Help** button on the right corner of the page for assistance, the **Refresh** button to refresh the page, or the **Logout** button to exit.

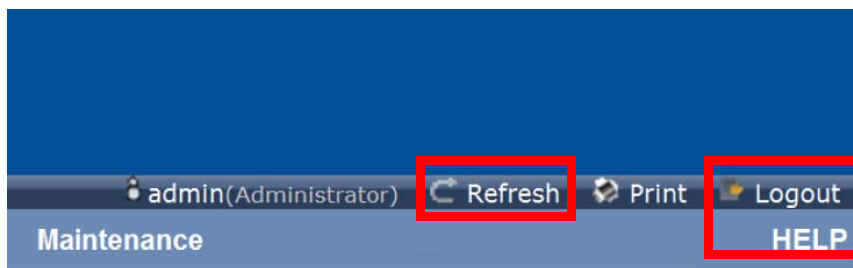


Figure 3-4. Main Web Page

Table 5: Main Web Page

MENU ITEM	DESCRIPTION
Dashboard	Displays the device, network, sensor monitoring and event logs information.
Server information	Shows system information.
Server Health	Monitoring status of the server.
Configuration	Configuration of the IPMI settings.
Remote Control	Launch KVM console and perform power control.
Maintenance	Allows the user to do firmware update.

Dashboard

In MegaRAC GUI, the Dashboard page displays the overall information on status of the device.

To open the **Dashboard** page, click Dashboard from the main menu. A sample screenshot of the Dashboard page is as follows:

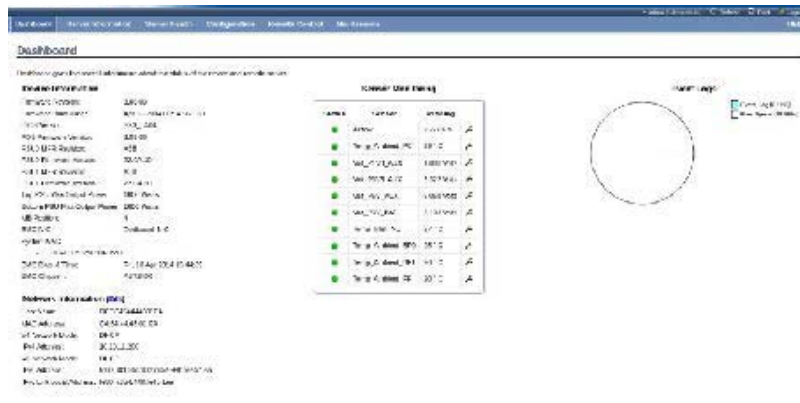


Figure 3-5. Dashboard

A brief description of the Dashboard page is given in the next section.

Device Information

The Device Information displays the following information:

Table 6: Device Information Page

ITEM	DESCRIPTION
Firmware Revision	The revision number of the firmware.
Firmware Build Time	Firmware date and time.
BIOS Version	The current BIOS firmware version.
PSU0 MFR Revision	Display PSU0 manufacture revision.
PSU0 Firmware version	Display PSU0 Firmware version.
PSU1 MFR Revision	Display PSU1 manufacture revision.
PSU1 Firmware version	Display PSU1 firmware version.
PDB Firmware Version	The current PDB (Power Distribution Board) firmware version.
FCB Version	The current FCB (Fan Control Board) firmware version.
Top PSU Max output Power	Display Top power supply max output power (Watts).
Bottom PSU Max output Power	Display Bottom power supply max output power (Watts).
MB Position	Display the current position of the mainboard within the chassis.
Blackplane F/W version	Display backplane firmware version.
BMC NIC	Display current used NIC.
System MAC	The maximum MAC address of system LAN port is 8. From Grantley platform, BMC supports to show LAN Card Type (LOM/OCF Mezzanine/Quanta Mezzanine) for System MAC.
BMC Date & Time	The current time of BMC system.
BMC Chipset	This field shows BMC chipset type.

Note:

BMC Chipset type support list:

- (1) AST2300/AST2400: support virtual KVM function and related setting item.
- (2) AST2300/AST2400 without RKVM: not support virtual KVM function and related setting item.
- (3) AST2050/AST2150: support virtual KVM function and related setting item.
- If BMC Chipset type is "AST2300/AST2400 without RKVM", will remove Console Redirection, Mouse Mode, Remote Session, and Virtual Media menu item.

Network Information

The Network Information of the device with the following fields is shown in the following table. To edit the network Information, click **Edit**.

Table 7: Network Information

ITEM	DESCRIPTION
Host Name	Read only field showing the DNS Hostname of the device.
MAC Address	Read only field showing the IP address of the device.
V4 Network Mode	The v4 network mode options are the following disable, static, or DHCP.
IPv4 Address	The IPv4 address of the device (could be static or DHCP).
V6 Network Mode	The v6 network mode options are disable, static, or DHCP.
IPv6 Address:	The IPv6 address of the device.
IPv6 Link Local Address	The IPv6 link local address of the device.

Sensor Monitoring

Lists all the available sensors on the device.

The status column displays the state of the device as follows:

Table 3-1:

STATUS (ICON)	DESCRIPTION
	Normal state
	Warning state
	Critical state

If you click on  , the sensor page for that particular sensor will be displayed.

Event Logs

A graphical representation of all events incurred by various sensors as well as occupied/available space in logs. Clicking on the color-coded rectangle in the Legend for the chart, allows to view a list of specific events only.

Server Information

The Server Information Group consists of the following items:

- FRU Information
- Server Component
- Server Identify
- BIOS POST Code

The following screenshot displays the Server Information menu items:

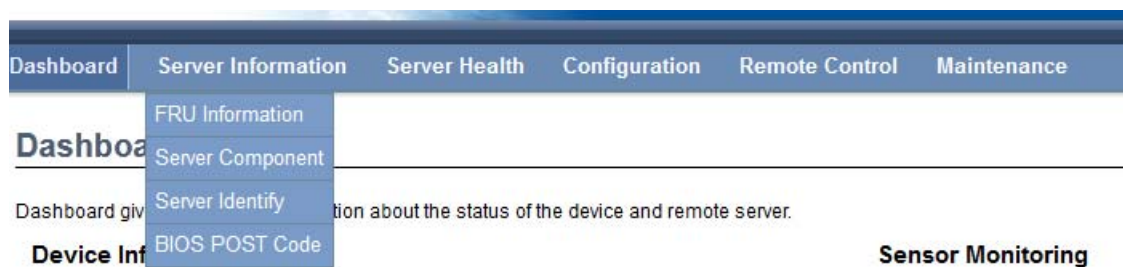


Figure 3-6. Server Information – Menu

FRU Information

In the MegaRAC GUI, the FRU Information Page displays the BMC FRU file information. The information displayed in this page is Basic Information, Common Header Information, Chassis Information, Board Information and Product Information of the FRU device.

To open the FRU Information Page, click on **FRU Information** on top menu. Select a FRU Device ID from the Basic Information section to view the details of the selected device. A screenshot of FRU Information page is shown as follows:

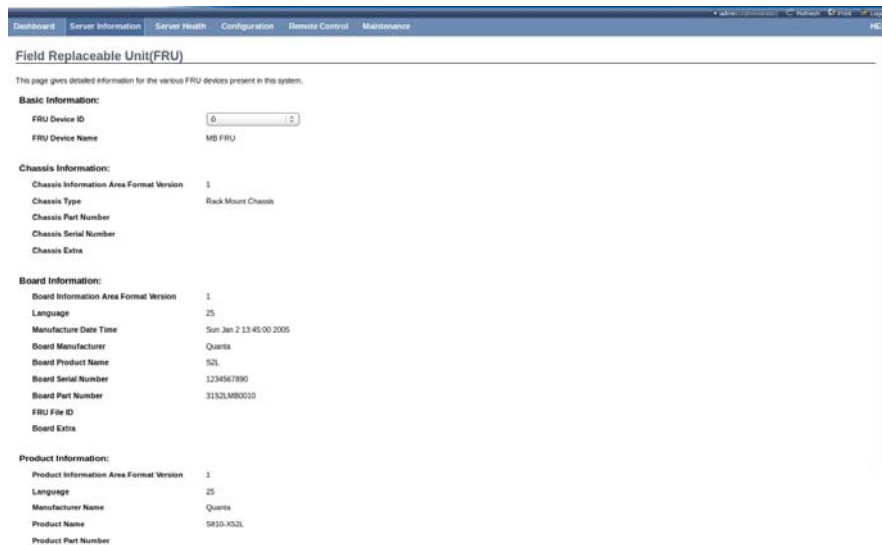


Figure 3-7. FRU Information Page

A brief description of the fields is given in the following sections.

Basic Information

Table 4: Basic Information

ITEM	DESCRIPTION
FRU device ID	The ID of the device.
FRU Device Name	The device name of the selected FRU device.

Chassis Information

- Chassis Information Area Format Version
- Chassis Type
- Chassis Part Number
- Chassis Serial Number
- Chassis Extra

Board Information

- Board Information Area Format Version
- Language
- Manufacture Date Time
- Board Manufacturer

- Board Product Name
- Board Serial Number
- Board Part Number
- FRU File ID
- Board Extra

Product Information

- Product Information Area Format Version
- Language
- Manufacturer Name
- Product Name
- Product Part Number
- Product Version
- Product Serial Number
- Asset Tag

Server Component

The Component Information page displays the CPU and memory information. The Number of CPU Socket field and the Number of Memory Slot field display the total number of the motherboard supported.

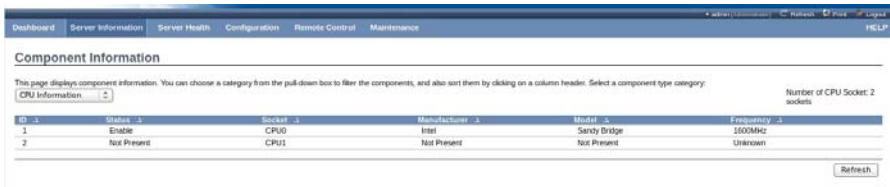


Figure 3-8. Component Information Page

Table 5: Component Information Page

ITEM	DESCRIPTION
CPU Information	Displays the following information: • CPU ID, • Status, • Socket, • Manufacturer, • Model, • Frequency

Table 5: Component Information Page (Continued)

ITEM	DESCRIPTION
Memory Information	Displays the following information: • Memory ID, • Status, • Socket, • Module Size, • Model, • Frequency

Server identify

The Server Identify page displays the indicator LED status. You can select a Server Identify Operation to control the indicator LED.

Figure 3-9. Server Identify Page

Table 6: Server Identify Page

ITEM	DESCRIPTION
Current Server Identify Status	The server status: On or Off.
Server Identify Operation	Server identify LED operation with the following options: • ON • OFF • Blink
Server Identify Timeout	Server timeout value when a Blink Identify Operation is selected. For Blink Operation the time period must be from 1 to 255 seconds. When 255 seconds is selected, the blinking is continuous.
Perform Action	Executes the selected Server Identify Operation.

BIOS POST Code

The page displays recent BIOS Port 80h POST code.

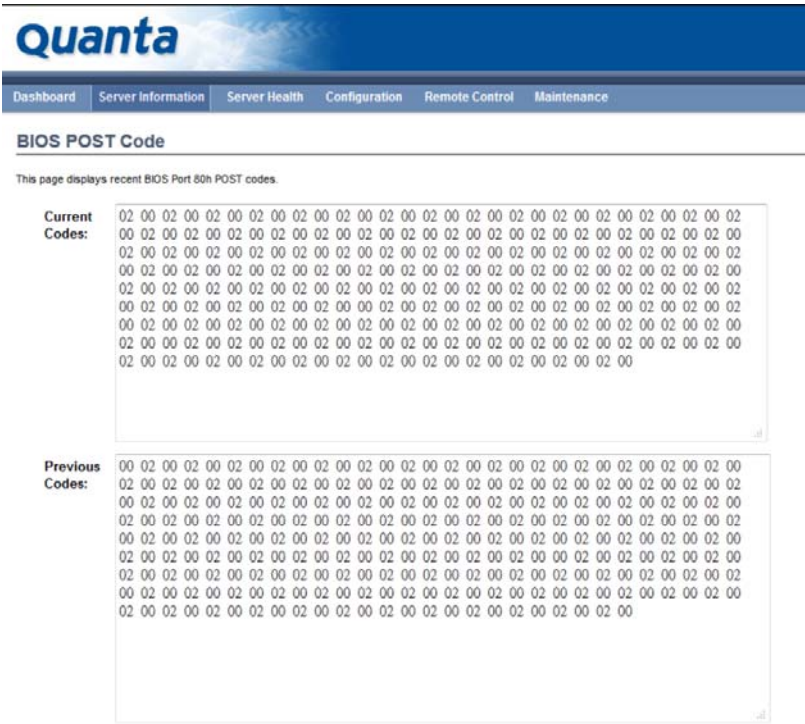


Figure 3-10. BIOS POST Code

Table 7: BIOS POST Code Page

ITEM	DESCRIPTION
Current Codes	Current BIOS Port 80h POST code
Previous Codes	Current BIOS Port 80h POST code

Server Health Group

The Server Health Group consists of the following items:

- Sensor Readings
- Event Log

The Server Health screenshot allows to select Sensor Readings or Event Log as shown in the following image:



Figure 3-11. Server Health – Menu

Sensor Readings

In MegaRAC GUI, the Sensor Readings page displays all the sensor related information.

To open the Sensor readings page, click **Server Health > Sensor Readings** from the top menu. Click on a record to display more information on a particular sensor, including thresholds and a graphical representation of all associated events. A screenshot of Sensor Readings page is shown in the following image:

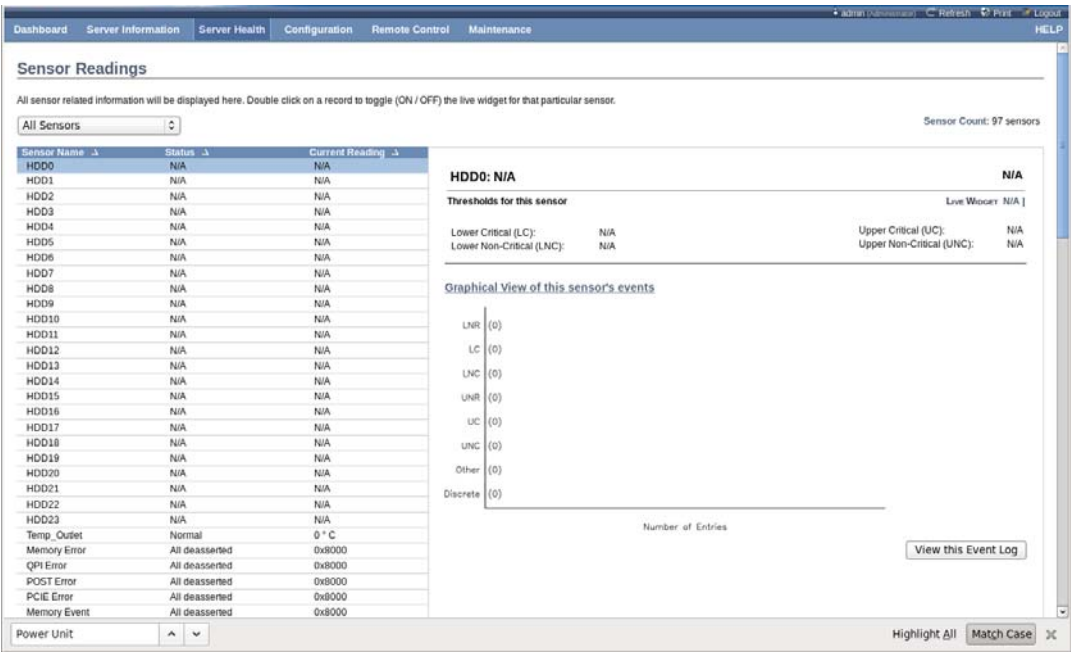


Figure 3-12. Sensor Readings Page

A brief description of the Sensor Readings page fields is given in the following sections.

Sensor Type

This drop down menu allows you to select the type of sensor. The List of sensors with the Sensor Name, Status and Current Reading will be displayed in the list. If you select All Sensors, all the available sensor details will appear else you can choose the sensor type that

you want to display in the list. Some examples of other sensors include Temperature Sensors, Fan Sensors, and Voltage Sensors etc.

Select a particular sensor from the list. On the right hand side of the screen you can view the Thresholds for this sensor.

Thresholds are of six types:

- Lower Non-Recoverable (LNR)
- Lower Critical (LC)
- Lower Non-Critical (LNC)
- Upper Non-Recoverable (UNR)
- Upper Critical (UC)
- Upper Non-Critical (UNC)

The threshold states could be:

Lower Non-critical - going low,
Lower Non-critical - going high,
Lower Critical - going low,
Lower Critical - going high,
Lower Non-recoverable - going low,
Lower Non-recoverable - going high,
Upper Non-critical - going low,
Upper Non-critical - going high,
Upper Critical - going low,
Upper Critical - going high,
Upper Non-recoverable - going low,
Upper Non-recoverable - going high.

A graphical view of these events (Number of event logs vs. Thresholds) can be viewed as shown in the Sensor Readings Page screenshot.

Live Widget

The widget window can be turned On and Off for a selected sensor. Widget provides a dynamic representation of the readings for the sensor. The following image shows an example widget:

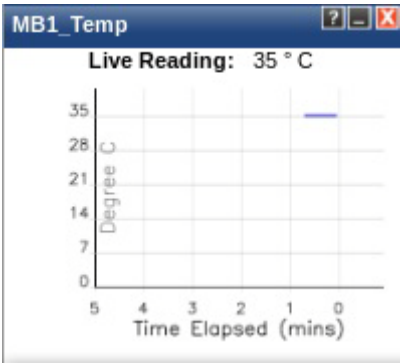


Figure 3-13. Widget Window

Note:

Widgets are little gadgets, which provide real time information about a particular sensor. User can track a sensor's behavior over a specific amount of time at specific intervals. The result will be displayed as a line graph in the widget. The session will not expire, until the widgets get a live data of the last widget that is kept opened.

View this Event Log

View the Event Log page for the selected sensor.

Sensor Reading status

You can read currently sensor status in this page, each sensor name have its SDR setting data, the status according SDR setting will display as following matrix:

Table 8: Sensor Readings status

STATUS	CURRENT READING
N/A	N/A
All deasserted	0x80xx(*2)
Normal	Value with unit
Event string(*1)	
(*1) Please refer IPMI2.0 standard specification chapter 42.	
(*2) Please refer IPMI2.0 standard specification chapter 42 and SDR setting in BMC function specification.	

Event Log

In MegaRAC GUI, this page displays the list of event logs occurred by the different sensors on this device. Double click on a record to see the details of that entry. You can use the

sensor type or sensor name filter options to view those specific events or you can also sort the list of entries by clicking on any of the column headers.

To open the Event Log page, click **Server Health** > **Event Log** from the top menu. A sample screenshot of the Event Log page is shown as follows.



Figure 3-14. Event Log Page

The Event Log page consists of the following fields.

Table 9: Event Log Page

ITEM	DESCRIPTION
Event Log Category	The category options: • All Events, • System Event Records, • BIOS Generated Events, • SMI Handler Events, • System Management Software Events, • System Software - OEM Events, • Remote Console software Events, • Terminal Mode Remote Console software Events.
Filter Type	Filtering can be done with the sensors mentioned in the list. Once the Event Log category and Filter type are selected, the list of events will be displayed with: • Event ID • Time Stamp • Sensor Type • Sensor Name • Description
BMC Timezone	BMC UTC offset timestamp value of the events.
Client Timezone	Events of client UTC offset timestamp.
Clear All Event Logs	Deletes all the existing records for all the sensors.
Download All Event Logs (Text format):	To download all existing records for all sensors. Default filename is SEL.txt.
Download All Event Logs (Hex format)	To download all existing records for all sensors. Default filename is SEL_Hex.txt.

Procedure:

1. Select the event categories from the **Event Log Category** drop-down menu.
2. Select the sensor name filter to view the event for the selected filter from the **Filter Type** drop-down list.
3. Select either **BMC Timezone** or **Client Timezone**. The list of events is listed.
4. Click the **Clear All Event Logs** button to clear all events from the list.

SEL Severity

The Event Log page specifies the severity of the SEL to identify the event severity code as follows:

- : Severity Information
- : Severity Warning
- : Severity Critical
- : Severity Non-Recoverable
- : Severity Unspecified

Configuration Group

Configuration Group page allows access to various configuration settings. A screenshot of the Configuration Group menu is shown in the following figure:

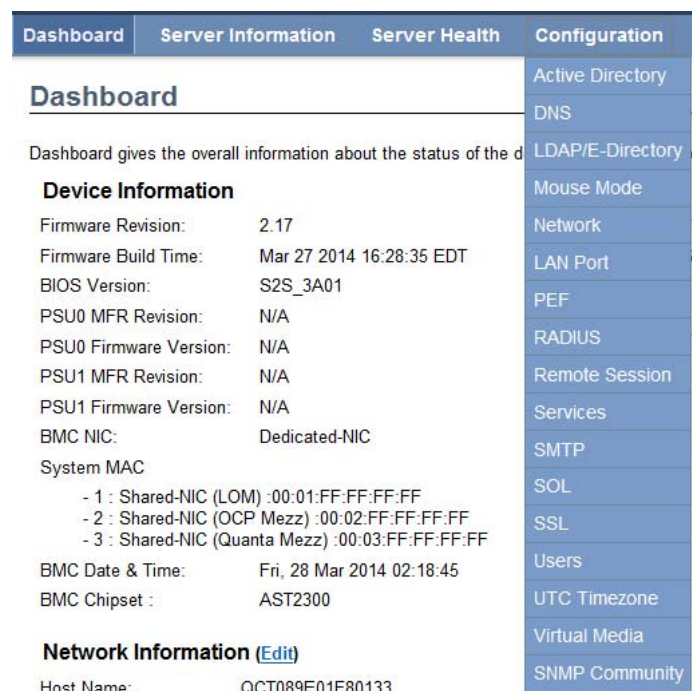


Figure 3-15. Configuration Group Menu

A detailed description of the Configuration menu is given in the following sections.

Active Directory

An active directory is a directory structure used on Microsoft Windows-based computers and servers to store information and data about networks and domains. An active directory (sometimes referred to as an AD) does a variety of functions including the ability to provide information on objects, helps organize these objects for easy retrieval and access, allows access by end users and administrators and allows the administrator to set security up for the directory.

This page in MegaRAC SP-X, allows you to Configure Active Directory Server Settings.

To open Active Directory Settings page, click **Configuration > Active Directory** from the main menu. A sample screenshot of Active Directory Settings Page is shown in the screenshot below.

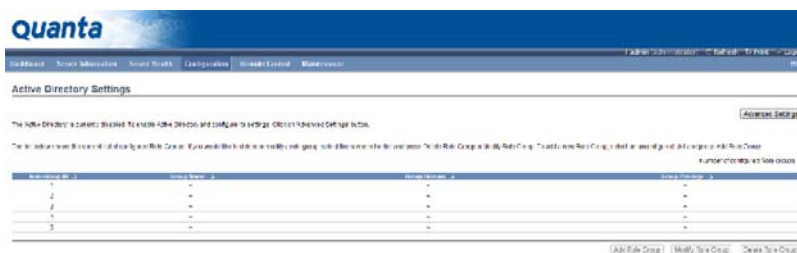


Figure 3-16. Active Directory Settings Page

Table 10: Active Directory Settings Page

ITEM	DESCRIPTION
Advanced Settings	This option is used to configure Active Directory Advanced Settings. Options are Enable Active Directory Authentication, User Domain name, Time Out and up to three Domain Controller Server Addresses.
Role Group ID	The name that identifies the role group in the Active Directory.
Group Name	This name identifies the role group in Active Directory. Note: - Role Group Name is a string of 64 alpha-numeric characters. - Special symbols (hyphen and underscore) are allowed.
Group Domain	The domain where the role group is located. Note: - Domain Name is a string of 255 alpha-numeric characters. - Special symbols (hyphen and underscore) and dot are allowed.
Group Privilege	The level of privilege to assign to this role group.
Add Role Group	To add a new role group to the device.
Modify Role Group	To modify that role group. Alternatively, double click on the configured slot.
Delete Role Group	To delete an existing Role Group.

Procedure:

Entering the details in Advanced Active Directory Settings Page

1. Click on **Advanced Settings** to open the Advanced Active Directory Settings Page.

Figure 3-17. Active Directory Settings Page

2. In the Active Directory Settings Page, enter the following details.
3. **Active Directory Authentication:** To enable/disable Active Directory, check or uncheck the Enable checkbox respectively.
4. Specify the Domain Name for the user in the **User Domain Name** field. e.g. MyDomain.com.
5. Specify the time (in seconds) to wait for Active Directory queries to complete in the **Time Out** field.

Note:

- If you have enabled Active Directory Authentication, enter the required information to access the Active Directory server.
6. Configure IP addresses in **Domain Controller Server Address1**, **Domain Controller Server Address2** & **Domain Controller Server Address3**.

Note:

IP address of Active Directory server: At least one Domain Controller Server Address must be configured.

- IP Address made of 4 numbers separated by dots as in "xxx.xxx.xxx.xxx".
- Each number ranges from 0 to 255.
- First number must not be 0.

Domain Controller Server Addresses will supports IPv4 Address format and IPv6 Address format.

7. Click **Save** to save the entered settings and return to Active Directory Settings Page.
8. Click **Cancel** to cancel the entry and return to Active Directory Settings Page.

To add a Role Group

9. In the Active Directory Settings Page, select a blank row and click **Add Role Group** to open the Add Role group Page as shown in the screenshot below.

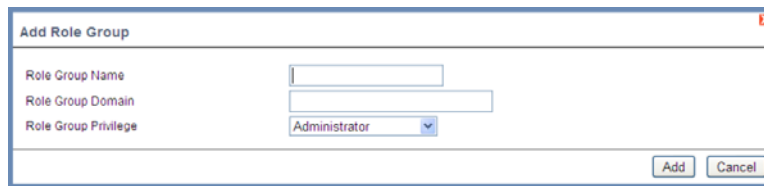


Figure 3-18. Add Role group Page

10. In the **Role Group Name** field, enter the name that identifies the role group in the Active Directory.

Note:

- Role Group Name is a string of 64 alpha-numeric characters.
- Special symbols hyphen and underscore are allowed.

11. In the **Role Group Domain** field, enter the domain where the role group is located.

Note:

- Domain Name is a string of 255 alpha-numeric characters.
- Special symbols hyphen, underscore and dot are allowed.

12. In the **Role Group Privilege** field, enter the level of privilege to assign to this role group.
13. Click **Add** to save the new role group and return to the Role Group List.
14. Click **Cancel** to cancel the settings and return to the Role Group List.

To modify a Role Group

15. In the Advanced Directory Settings Page, select the row that you wish to modify and click **Modify Role Group**.
16. Make the necessary changes and click **Save**.

To delete a Role Group

17. In the Advanced Directory Settings Page, select the row that you wish to delete and click **Delete Role Group**.

DNS

The **Domain Name System (DNS)** is a distributed hierarchical naming system for computers, services, or any resource connected to the Internet or a private network. It associates the information with domain names assigned to each of the participants. Most importantly, it translates domain names meaningful to humans into the numerical (binary) identifiers associated with networking equipment for the purpose of locating and addressing these devices worldwide.

In Mega-RAC GUI, the DNS Server settings page is used to manage the DNS settings of a device.

In DNS Server Settings page, user can click **Configuration > DNS** from the main menu. A sample screenshot of DNS Server Settings Page is shown in the screenshot below.

Figure 3-19. DNS Server Settings Page

The fields of DNS Server Settings page are explained below.

Table 11: DNS Server Settings Page

ITEM	DESCRIPTION
Host configuration	
Host Settings	Choose either Automatic or Manual settings.
Host Name	It displays hostname of the device. If the Host setting is chosen as Manual, then specify the hostname of the device.
Register BMC	
Register BMC	To enable/disable Register BMC.
Domain Name Configuration	
Domain Settings	It lists the option for domain interface as Manual, v4 or v6 for multiLAN channels. Note: If you choose DHCP, then select v4 or v6 for DHCP servers.
Domain Name	It displays the domain name of the device. If the Domain setting is chosen as Manual, then specify the domain name of the device. If you chose Automatic, the Domain Name cannot be configured as it will be done automatically. The field will be disabled.
Domain Name Server Configuration	
DNS Server Settings:	It lists the option for DNS settings for the device, Manual and available LAN interfaces. If you choose Manual setting, you have to configure the DNS Server IP addresses. If you have chosen DHCP, then you have to select the interface from which the IP address is to be received.

Table 11: DNS Server Settings Page (Continued)

ITEM	DESCRIPTION
IP Priority	If IP Priority is IPv4, it will have 2 IPv4 DNS servers and 1 IPv6 DNS server. If IP Priority is IPv6, it will have 2 IPv6 DNS servers and 1 IPv4 DNS server. Note: It is not applicable for Manual configuration.
DNS Server1, DNS Server2, and DNS Server3	Specify the DNS (Domain Name System) server address to be configured for the BMC. - IPv4 Address made of 4 numbers separated by dots as in "xxx.xxx.xxx.xxx". - Each number ranges from 0 to 255. - First number must not be 0. DNS Server Address will support the following: - IPv4 Address format. - IPv6 Address format. Note: - If IP Priority is IPv4 then DNS Server1, DNS Server2 will be IPv4 and DNS Server3 will be IPv6. - If IP Priority is IPv6 then DNS Server1, DNS Server2 will be IPv6 and DNS Server3 will be IPv4. - If no IP, DNS Server field will be empty.
Save	To save the entered changes.
Reset	To reset the entered changes.

Procedure:

1. Choose the **Host Configuration** either Automatic or Manual.

Note:

If you choose Automatic, you need not enter the Host Name and if you choose Manual, you need to enter the Host Name.

2. Enter the **Host Name** in the given field if you have chosen Manual Configuration.
3. Under **Register BMC**,
 - Check the option **Register BMC** to register with this DNS settings.
4. In the **Domain name Configuration**,
 - Select the **Domain Settings** from the drop-down list.
 - Enter the **Domain Name** in the given field.
5. In the **Domain Name Server Configuration**,
 - Select the **DNS Server Settings**, from the drop-down list.
 - In the **IP Priority**, IPV4 or IPV6 as a top priority.
 - In the **DNS Server1/DNS Server2/DNS Server3** field,

If the DNS Server Settings is setting to Manual mode, user needs to fill those fields with DNS IP address manually according to IPv4 or IPv6 format. Otherwise, if it is in non-Manual mode, DNS server IP address is assigned by DHCP server.

6. Click **Save** to save the entries.
7. Click **Reset** to reset the entries.

LDAP/E-Directory

The **Lightweight Directory Access Protocol (LDAP)** is an application protocol for querying and modifying data of directory services implemented in Internet Protocol (IP) networks.

In MegaRAC GUI, LDAP is an Internet protocol that MegaRAC® card can use to authenticate users. If you have an LDAP server configured on your network, you can use it as an easy way to add, manage and authenticate MegaRAC® card users. This is done by passing login requests to your LDAP Server. This means that there is no need to define an additional authentication mechanism, when using the MegaRAC card. Since your existing LDAP Server keeps an authentication centralized, you will always know who is accessing the network resources and can easily define the user or group-based policies to control access.

To open LDAP Settings page, click **Configuration > LDAP** from the main menu. A sample screenshot of LDAP Settings Page is shown in the screenshot below.

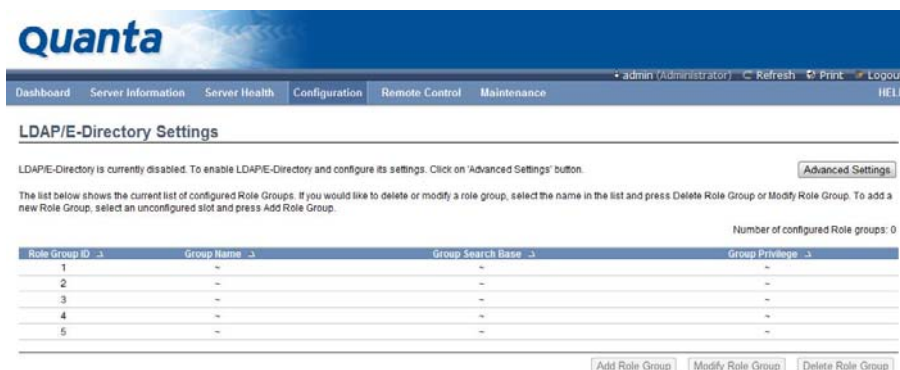


Figure 3-20. LDAP Settings Page

The fields of LDAP Settings Page are explained below.

Table 12: LDAP Settings Page

ITEM	DESCRIPTION
Advanced Settings	To configure LDAP Advanced Settings. Options are Enable LDAP Authentication, IP Address, Port and Search base.
Add Role Group	To add a new role group to the device. Alternatively, double click on a free slot to add a role group.
Modify Role Group	To modify the particular role group.
Delete Role Group	To be delete a role group from the list.

Procedure:**Entering the details in Advanced LDAP Settings Page**

1. In the LDAP Settings Page, click Advanced Settings. A sample screenshot of LDAP Settings page is given below.

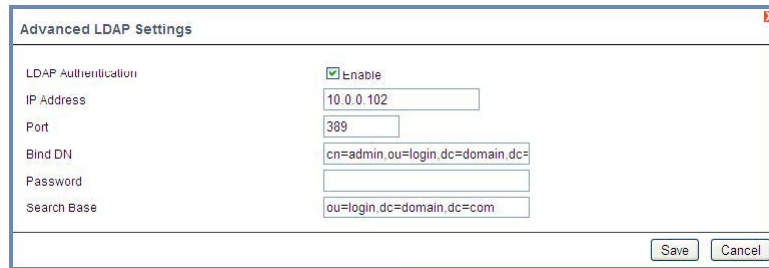


Figure 3-21. Advanced LDAP Settings

2. To enable/disable LDAP Authentication, check or uncheck the **Enable** checkbox respectively.

Note:

During login prompt, use username to login as an LDAP Group member.

3. Enter the IP address of LDAP server in the **IP Address** field.

Note:

- IP Address made of 4 numbers separated by dots as in 'xxx.xxx.xxx.xxx'.
- Each Number ranges from 0 to 255.
- First Number must not be 0.
- Supports IPv4 Address format and IPv6 Address format.

4. Specify the LDAP Port in the **Port** field.

Note:

Default Port is 389. For Secure connection, default port is 636.

5. Enter the **Search Base**. The Search base tells the LDAP server which part of the external directory tree to search. The search base may be something equivalent to the organization, group of external directory.

Note:

- Search base is a string of 4 to 63 alpha-numeric characters.
- It must start with an alphabetical character.
- Special Symbols like dot (.), comma (,), hyphen(?), underscore (_), equal-to (=) are allowed.
- Example: ou=login,dc=domain,dc=com

6. Click **Save** to save the settings.
7. Click **Cancel** to cancel the modified changes.

To add a Role Group

8. In the LDAP Settings Page, select a blank row and click **Add Role Group** to open the Add Role Group Page as shown in the screenshot below.

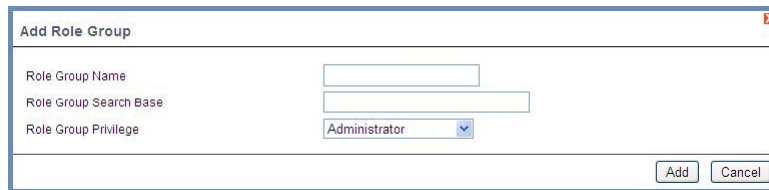


Figure 3-22. Add Role Group Page

9. In the **Role Group Name** field, enter the name that identifies the role group.

Note:

- Role Group Name is a string of 64 alpha-numeric characters.
- Special symbols hyphen and underscore are allowed.

10. In the **Role Group Search Base** field, enter the path from where the role group is located to Base DN.

Note:

- Search Base is a string of 255 alpha-numeric characters.
- Special symbols hyphen, underscore and dot are allowed.

11. In the **Role Group Privilege** field, enter the level of privilege to assign to this role group.
12. Click **Add** to save the new role group and return to the Role Group List.
13. Click **Cancel** to cancel the settings and return to the Role Group List.

To Modify Role Group

14. In the LDAP Settings Page, select the row that you wish to modify and click **Modify Role Group**.
15. Make the necessary changes and click **Save**.

To Delete a Role Group

16. In the LDAP Settings Page, select the row that you wish to delete and click **Delete Role Group**.

Mouse Mode

In MegaRAC GUI, Redirection Console handles mouse emulation from local window to remote screen in either of two methods. User has to be an Administrator to configure this option. To open Mouse Mode page, click **Configuration > Mouse Mode** from the main

menu. A sample screenshot of Mouse Mode Settings Page is shown in the screenshot below.



Figure 3-23. Mouse Mode Settings Page

The fields of Mouse Mode Settings page are explained below.

Table 13: Mouse Mode Settings Page

ITEM	DESCRIPTION
Absolute Mode	The absolute position of the local mouse is sent to the server.
Relative Mode	Relative mode sends the calculated relative mouse position displacement to the server.
Other Mode	For the Host OS which is neither Absolute Mode nor Relative Mode.
Save	To save any changes made.
Reset	To Reset the modified changes.

Procedure:

1. Choose either of the following as your requirement:

- Set mode to Absolute

Note:

Applicable for all Windows versions; RHEL Linux versions not below than RHEL6; Fedora Linux versions not below than FC14.

- Set mode to Relative

Note:

Applicable for RHEL Linux versions below than RHEL6; Fedora Linux versions below than FC14; SLES Linux versions below than SLES11.

- Set mode to Other

Note:

Applicable for SLES Linux version SLES11.

2. Click **Save** button to save the changes made.
3. Click **Reset** to reset the modified changes.

Network

In MegaRAC GUI, the Network Settings Page is used to configure the network settings for the available LAN channels.

To open Network Settings page, click **Configuration > Network** from the main menu. A sample screenshot of Network Settings Page is shown in the screenshot below.

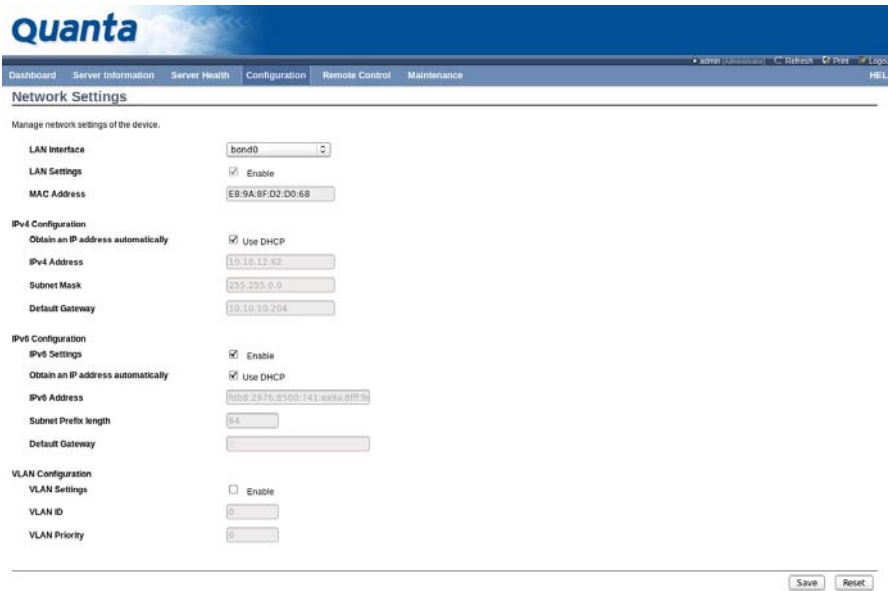


Figure 3-24. Network Settings Page

The fields of Network Settings page are explained below.

Table 14: Network Settings Page

ITEM	DESCRIPTION
LAN Interface	Lists the LAN interfaces.
LAN Settings	To enable or disable the LAN Settings.
MAC Address	This field displays the MAC Address of the device. This is a read only field.
IPv4 Settings	This option lists the IPv4 configuration settings. - Obtain IP Address automatically: This option is to dynamically configure IPv4 address using DHCP (Dynamic Host Configuration Protocol). - IPv4 Address, Subnet Mask, and Default Gateway: These fields are for specifying the static IPv4 address, Subnet Mask and Default Gateway to be configured to the device. Note: - IP Address made of 4 numbers separated by dots as in "xxx.xxx.xxx.xxx". - Each Number ranges from 0 to 255. - First Number must not be 0.
IPv6 Configuration	This option lists the following IPv6 configuration settings. - IPv6 Settings: This option is to enable the IPv6 settings in the device. - Obtain an IPv6 address automatically: This option is to dynamically configure IPv6 address using DHCP (Dynamic Host Configuration Protocol). - IPv6 Address: To specify a static IPv6 address to be configured to the device. Eg: 2004:2010 - Subnet prefix length: To specify the subnet prefix length for the IPv6 settings. Note: - Value ranges from 0 to 128. - Default Gateway: Specify v6 default gateway for the IPv6 settings. - Reserved IPv6 Address: Some IPv6 addresses are reserved by IETF. List is showed as below, so when users set these Blocking IPv6 addresses, WebUI will pop-up warning message.
VLAN Configuration	It lists the VLAN configuration settings. - VLAN Settings: To enable/disable the VLAN support for selected interface. - VLAN ID: The Identification for VLAN configuration. - Value ranges from 1 to 4095. - VLAN Priority: The priority for VLAN configuration. - Value ranges from 1 to 7. 7 is the highest priority for VLAN.
Save	To save the entries.
Reset	To Reset the modified changes.

Table 15: Reserved IPv6 Address

IPv6 PREFIX	ALLOCATION	REFERENCE	IPv6 PREFIX	ALLOCATION	REFERENCE
0000::/8	Reserved by IETF	[RFC4291]	c000::/3	Reserved by IETF	[RFC4291]
0100::/8	Reserved by IETF	[RFC4291]	e000::/4	Reserved by IETF	[RFC4291]
0200::/7	Reserved by IETF	[RFC4048]	f000::/5	Reserved by IETF	[RFC4291]
0400::/6	Reserved by IETF	[RFC4291]	f800::/6	Reserved by IETF	[RFC4291]
0800::/5	Reserved by IETF	[RFC4291]	fe00::/9	Reserved by IETF	[RFC4291]
1000::/4	Reserved by IETF	[RFC4291]	fe80::/10	Reserved by IETF	[RFC4291]
1000::/4	Reserved by IETF	[RFC4291]	fec0::/10	Reserved by IETF	[RFC3879]
6000::/3	Reserved by IETF	[RFC4291]	ff00::/8	Reserved by IETF	[RFC4291]
8000::/3	Reserved by IETF	[RFC4291]	2001::/32	Reserved by IETF	[RFC4380]
a000::/3	Reserved by IETF	[RFC4291]			

PEF

Platform Event Filtering (PEF) provides a mechanism for configuring the BMC to take selected actions on event messages that it receives or has internally generated. These actions include operations such as system power?off, system reset, as well as triggering the generation of an alert.

In MegaRAC GUI, the PEF Management is used to configure the following:

- Event Filter
- Alert Policy
- LAN Destination

To open PEF Management Settings page, click **Configurations > PEF** from the main menu. A sample screenshot of PEF Management Settings Page is shown in the screen shot below. Each tab is explained below.

Event Filter Tab

A PEF implementation is recommended to provide at least 16 entries in the event filter table. A subset of these entries should be pre-configured for common system failure events, such as over-temperature, power system failure, fan failure events, etc. Remaining entries can be made available for OEM or System Management Software configured events. Note that individual entries can be tagged as being reserved for system use so

this ratio of pre?]configured entries to run?]time configurable entries can be reallocated if necessary.

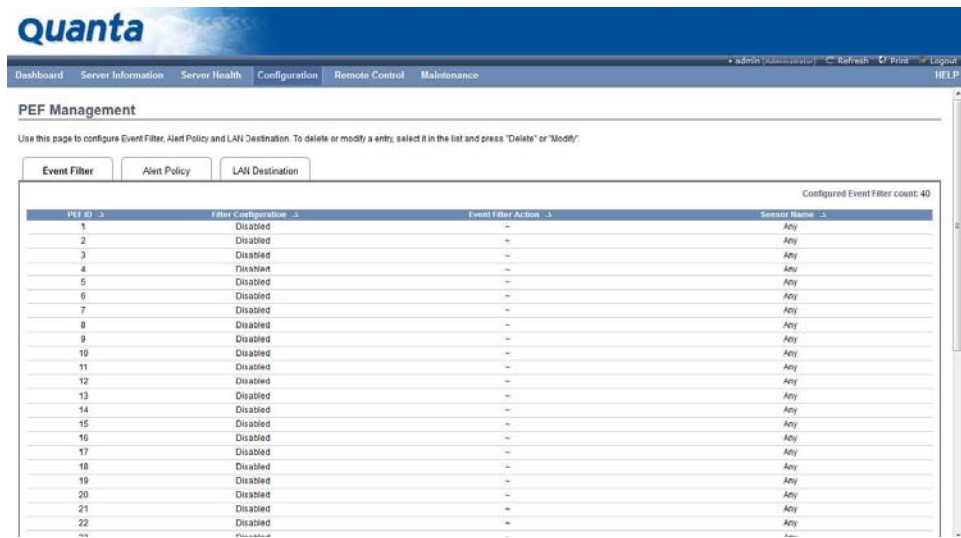


Figure 3-25. PEF Management – Event Filter

The fields of PEF Management – Event Filter Tab are explained below.

This page contains the list of configured PEF’s.

Table 16: PET Management - Event Filter

ITEM	DESCRIPTION
PEF ID	This field displays the ID for the newly configured PEF entry (read-only).
Filter configuration	Check box to enable the PEF settings.
Event Filter Action	Check box to enable PEF Alert action. This is a mandatory field.
Sensor Name	To choose the particular sensor from the sensor list.
Modify	To modify the existing entries.
Delete	To delete Event filter list.

Procedure:

1. Click the **Event Filter** Tab to configure the event filters in the available slots.

2. Select one of PEF ID list and click Modify to modify event Filter entry page. A sample screenshot of modify Event Filter Page is in seen the screenshot below.

Figure 3-26. Add Event Filter Entry Page

3. In the Event Filter Configuration section,
 - PEF ID displays the ID for configured PEF entry (read-only).
 - In filter configuration, check the box to enable the PEF settings.
4. In the Filter Action configuration section,
 - Event Filter Action is a mandatory field and checked by default, which enable PEF Alert action (read-only).
 - Select any one of the Power action either Power down, Power reset or Power cycle from the drop down list
 - Choose any one of the configured alert policy number from the drop down list.

Note:

Alert Policy has to be configured - under **Configuration** -> **PEF** -> **Alert Policy**.

5. In the Sensor configuration section,
 - Select the s type of sensor that will trigger the event filter action.
 - In the sensor name field, choose the particular sensor from the sensor list.
 - Choose event option to be either All Events or Sensor Specific Events.
6. Click **Modify** to accept the modification and return to Event filter list.
7. Click **Reset** to reset the modification done.
8. Click on **Cancel** to cancel the modification and return to Event filter list.
9. In the **Event filter list**, to modify a configuration, select the slot to be modified and click **Modify**.
10. In the **Event filter list**, click **Delete** to delete the existing filter.

Alert Policy Tab

This page is used to configure the Alert Policy and LAN destination. You can add, delete or modify an entry in this page.

Figure 3-27. PEF Management – Alert Policy

The fields of the PEF Management – Alert Policy Tab are explained below.

Table 17: PEF Management - Alert Policy

ITEM	DESCRIPTION
Policy Entry #	Displays Policy entry number for the newly configured entry (read-only).
Policy Number	Displays the Policy number of the configuration.
Policy Configuration	To enable or disable the policy settings.
Policy Set	To choose any one of the Policy set values from the list. 0: Always send alert to this destination. 1: If alert to previous destination was successful, do not send alert to this destination. Proceed to next entry in this policy set. 2: If alert to previous destination was successful, do not send alert to this destination. Do not process any more entries in this policy set. 3: If alert to previous destination was successful, do not send alert to this destination. Proceed to next entry in this policy set that is to a different channel. 4: If alert to previous destination was successful, do not send alert to this destination. Proceed to next entry in this policy set that is to a different destination type.
Channel Number	To choose a particular channel from the available channel list.

Table 17: PEF Management - Alert Policy (Continued)

ITEM	DESCRIPTION
Destination Selector	To choose a particular destination from the configured destination list. Note: LAN Destination has to be configured - under Configuration -> PEF -> LAN Destination .
Modify	To modify the existing entries.
Delete	To delete Alert Policy list.

Procedure:

1. In the Alert Policy Tab, select the slot for which you have to configure the Alert policy. That is, In the **Event Filter Entry Page**, if you have chosen Alert Policy number as 4, you have to configure the 4th slot (the slot with Policy Number 4) in the Alert Policy Tab.
2. Double click the slot and click **Modify** to open the **Add Alert Policy Entry Page** as shown in the screenshot below.

The screenshot shows a window titled "Add Alert Policy entry". It contains the following fields and values:

- Policy Entry#: 3
- Policy Number: 1
- Policy Configuration: ☐ Enable
- Policy Set: 0
- Channel Number: 1
- Destination Selector: 1
- Alert String: ☐ Event Specific
- Alert String Key: 0

At the bottom right, there are "Add" and "Cancel" buttons.

Figure 3-28. Add Alert Policy Entry Page

3. **Policy Entry #** is a read only field.
4. Select the **Policy Number** from the list.
5. In the **Policy Configuration** field, check **Enable** if you wish to enable the policy settings.
6. In the **Policy Set** field, choose any of the Policy set from the list.
7. In the **Channel Number field**, choose particular channel from the available channel list.
8. In the **Destination Selector field**, choose particular destination from the configured destination list.

Note:

LAN Destination has to be configured under **Configuration** -> **PEF** -> **LAN Destination**. That is if you select the number 4 for destination selector in Alert Policy Entry page, then you have to configure the 4th slot (LAN Destination Number 4) in the LAN Destination tab.

9. In the **Alert String field**, enable the check box if the Alert policy entry is Event Specific.

10. In the **Alert String Key field**, choose any one value that is used to look up the Alert String to send for this Alert Policy entry.
11. Click **Add** to save the new alert policy and return to Alert Policy list.
12. Click **Cancel** to cancel the modification and return to Alert Policy list.
13. In the **Alert Policy Page**, to modify a configuration, select the slot to be modified and click **Modify**.
14. In the **Alert Policy Page**, to delete a configuration, select the slot and click **Delete**.

PEF Management LAN Destination Page

This page is used to configure the Event filter, Alert Policy and LAN destination. A sample screenshot of PEF Management LAN Destination Page is given below.

The screenshot shows the Quanta PEF Management interface. The 'LAN Destination' tab is selected. The table has the following structure:

LAN Destination	Destination Type	Destination Address
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

Buttons at the bottom right: Send Test Alert, Modify, Delete.

Figure 3-29. PEF Management - LAN Destination

The fields of PEF Management – LAN Destination Tab are explained below.

Table 18: PEF Management - LAN Destination

ITEM	DESCRIPTION
LAN Destination	Displays Destination number for the newly configured entry (read-only).
Destination Type	Destination type can be either an SNMP Trap or an Email alert. For Email alerts, the 3 fields – Username, Subject and body of the message needs to be filled. The SMTP server information also has to be added - under Configuration -> SMTP . For SNMP Trap, only the destination IP address has to be filled.

Table 18: PEF Management - LAN Destination (Continued)

ITEM	DESCRIPTION
Destination Address	If Destination type is SNMP Trap, then enter the IP address of the system that will receive the alert. Destination address will support the following: - IPv4 address format. - IPv6 address format.
Send Test Alert	These fields must be configured if email alert or SNMP Trap is chosen as destination type. This field will send a test message in the message field's content to specified destination.
Modify	To modify existing LAN destination list.
Delete	To delete LAN destination list.

Procedure:

1. In the **LAN Destination Tab**, choose the slot to be configured. This should be the same slot that you have selected in the Alert Policy Entry? Destination Selector field. That is if you have chosen the Destination Selector as 4 in the Alert Policy Entry page of Alert Policy Tab, then you have to configure the 4th slot of LAN Destination Page.
2. Double click the slot and click **Modify**. This opens the **Add LAN Destination entry**.

Figure 3-30. Add LAN Destination entry Page

3. In the **LAN Destination** field, the destination for the newly configured entry is displayed and this is a read only field.
4. In the **Destination Type** field, select the one of the types.
5. In the **Destination Address** field, enter the destination address.
6. Select the **User Name** from the list of users.
7. In the **Subject** field, enter the subject.
8. In the **Message** field, enter the message.
9. Click **Add** to save the new LAN destination and return to LAN destination list.
10. Click **Cancel** to cancel the modification and return to LAN destination list.
11. In the **LAN Destination Tab**, to modify a configuration, select the row to be modified and click **Modify**.
12. In the **LAN Destination Tab**, to delete a configuration, select the slot and click **Delete**.

Configuring the SNMP:

1. Navigate to **PEF Management**.
2. Select **LAN Destination** tab in **Configuration** section.
3. Select from **LAN Destination** menu **SNMP Trap**.

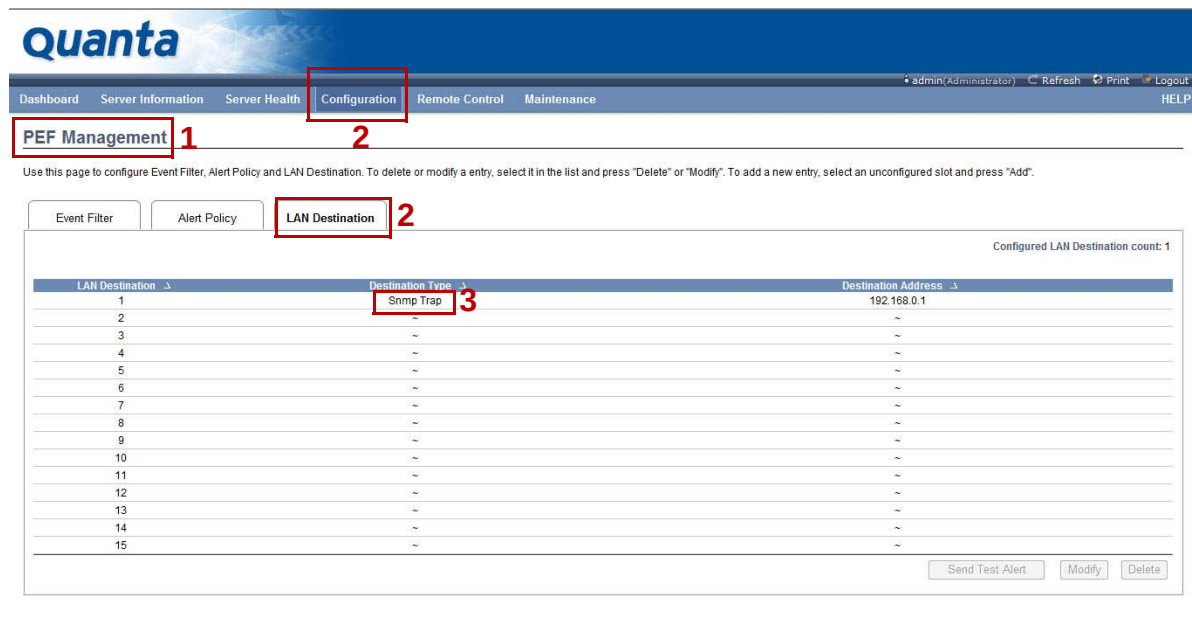


Figure 3-31. Selecting SNMP Trap

A **Modify LAN Destination entry** menu opens.

4. Key in an IP address to the **Destination Address** field.
5. To complete the SNMP configuration procedure, click **Modify**.

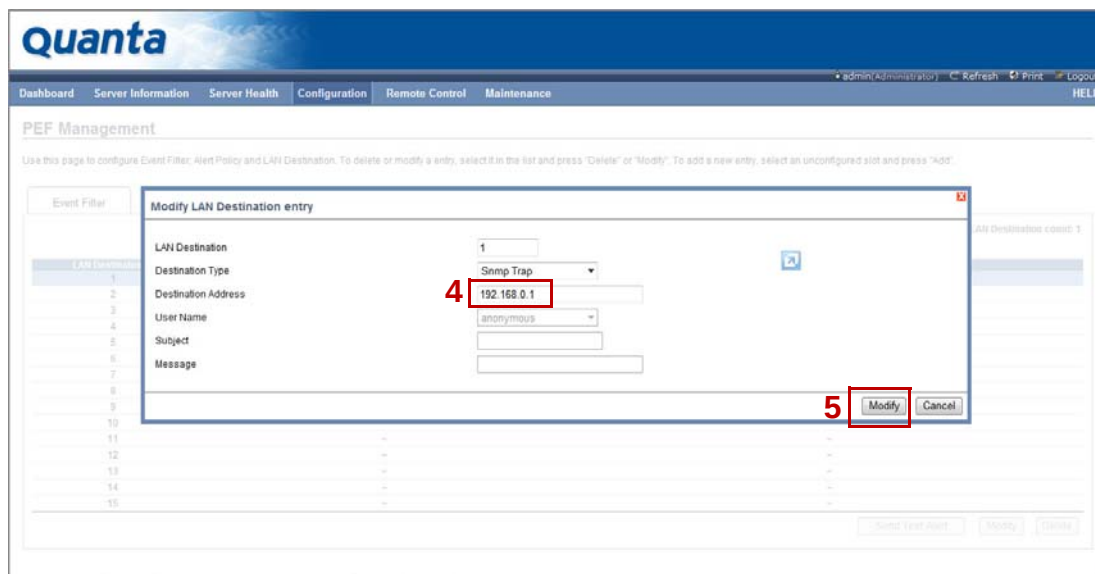


Figure 3-32. Inserting the IP Address

RADIUS

RADIUS is a modular, high performance and feature-rich RADIUS suite including server, clients, development libraries and numerous additional RADIUS related utilities.

In MegaRAC GUI, this page is used to set the RADIUS Authentication.

To open RADIUS Settings page, click Configuration > RADIUS from the main menu. A sample screenshot of RADIUS Settings Page is shown in the screenshot below.

Figure 3-33. RADIUS Settings Page

The fields of RADIUS Settings Page are explained below.

Table 19: RADIUS Settings Page

ITEM	DESCRIPTION
RADIUS Authentication	Option to enable RADIUS authentication.
Port	The RADIUS Port number. Note: Default Port is 1812.
Time Out	The Time out value in seconds. Note: - Default Timeout value is 3seconds. - Timeout value ranges from 3 to 300.
Server Address	The IP address of RADIUS server. Note: - IP Address made of 4 numbers separated by dots as in "xxx.xxx.xxx.xxx". - Each Number ranges from 0 to 255. - First Number must not be 0.
Secret	The Authentication Secret for RADIUS server. Note: - This field will not allow more than 31 characters. - Secret phrase must be at least 4 characters long. - No more than 64 characters are allowed.

Table 19: RADIUS Settings Page (Continued)

ITEM	DESCRIPTION
Save	To save the settings.
Reset	To reset the modified changes.

Procedure:

1. Enable the **RADIUS Authentication** checkbox to authenticate the RADIUS.
2. Enter the port number in the **Port Number** field.
3. Enter the time out value in seconds in the **Time out** field.
4. Enter the address of the server in the **Server Address** field.
5. Enter the authentication secret for RADIUS Server in the **Secret** field.
6. Click **Save** to save the entered details.
7. Click **Reset** to reset the entered details.

Remote Session

In MegaRAC SP, use this page to configure virtual media configuration settings for the next redirection session. Encryption is disabled by default.

To open Remote Session page, click **Configuration > Remote Session** from the main menu. A sample screenshot of Remote Session Page is shown in the screenshot below.

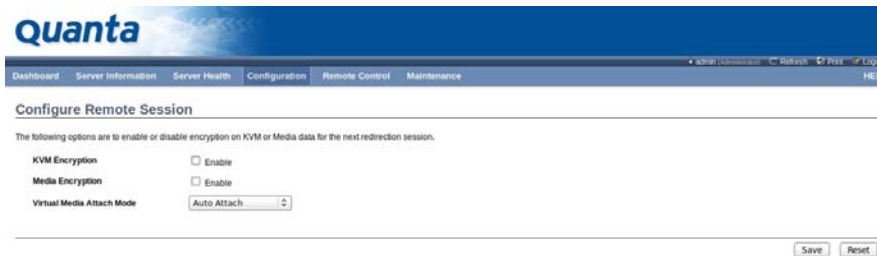


Figure 3-34. Remote Session

The fields of Remote Session Settings Page are explained below.

Table 20: Remote Session Settings Page

ITEM	DESCRIPTION
KVM Encryption	Enable/Disable encryption on KVM data for the next redirection session.
Media Encryption	Enable/Disable encryption on Media data for the next redirection session.

Table 20: Remote Session Settings Page (Continued)

ITEM	DESCRIPTION
Virtual Media Attach Mode	Two types of VM attach mode are available: ● Attach: Immediately attaches Virtual Media to the server upon bootup. ● Auto Attach: Attaches Virtual Media to the server only when a virtual media session is started.
Save	To save the current changes. Note: It will automatically close the existing remote redirection either KVM or Virtual media sessions, if any.
Reset	To reset the modified changes.

Procedure:

1. In **KVM encryption**, check or uncheck the option **Enable**.
2. In **Media Encryption**, check or uncheck the option **Enable**.
3. In **Virtual media Attach mode**, select **Auto Attach** or **Attach** from the dropdown list as required.
4. Click **Save** to save the entries.
5. Click **Reset** to reset the entries

Note:

- If we choose more than one virtual CDROMs, then the RHEL5 host displays only one CDROM in the "Computer" window. When we redirect second CDROM, the second CDROM device will appear in "Computer" window.
- If we choose more than 2 virtual Hard disks, then the RHEL5 host displays only two hard disks in "Computer" window. When we redirect third hard disk, the third hard disk will appear in "Computer" window

SMTP

Simple Mail Transfer Protocol (SMTP) is an Internet standard for electronic mail (e-mail) transmission across Internet Protocol (IP) networks.

Using MegaRAC GUI, you can configure the SMTP settings of the device.

To open SMTP Settings page, click **Configuration > SMTP** from the main menu. A sample screenshot of SMTP Settings Page is shown in the screenshot below.

Figure 3-35. SMTP Settings Page

The fields of SMTP Settings Page are explained below.

Table 21: SMTP Settings Page

ITEM	DESCRIPTION
LAN Channel Number	Displays the list of LAN channels available.
Sender Address	The 'Sender Address' valid on the SMTP Server.
Machine Name	The 'Machine Name' of the SMTP Server. - Machine Name is a string of maximum 15 alpha-numeric characters. - Space, special characters are not allowed.
Primary SMTP Server	Lists the Primary SMTP Server configuration.
Server Address	The 'IP address' of the SMTP Server. It is a mandatory field. Note: - IP Address made of 4 numbers separated by dots as in "xxx.xxx.xxx.xxx". - Each Number ranges from 0 to 255. - First Number must not be 0. - Supports IPv4 Address format and IPv6 Address format.
SMTP Server requires Authentication	To enable/disable SMTP Authentication. Note: SMTP Server Authentication Types supported are: - CRAM-MD5 - LOGIN - PLAIN If the SMTP server does not support any one of the above authentication types, the user will get an error message stating, "Authentication type is not supported by SMTP Server"

Table 21: SMTP Settings Page (Continued)

ITEM	DESCRIPTION
Username	The username to access SMTP Accounts. Note: • User Name can be of length 4 to 64 alpha-numeric characters. • It must start with an alphabet. • Special characters ','(comma), ':'(colon), ';'(semicolon), ' '(space) and '\'(backslash) are not allowed.
Password	The password for the SMTP User Account. Note: • Password must be at least 4 characters long. • White space is not allowed. • This field will not allow more than 20 characters if "20 Bytes" option is chosen.
Secondary SMTP Server	It lists the Secondary SMTP Server configuration. It is an optional field. If the Primary SMTP server is not working fine, then it tries with Secondary SMTP Server configuration.
Save	To save the new SMTP server configuration.
Reset	To reset the modified changes.

Procedure:

1. Select the **LAN Channel Number** from the dropdown list.
2. Enter the **Sender Address** in the specified field.
3. Enter the **Machine Name** in the specified field.
4. In Primary SMTP Server, enter the **Server Address** in the specified field.
5. Enable the check box **SMTP Server requires Authentication** if you want to authenticate SMTP Server.
6. Enter your **User name** and **Password** in the respective fields.
7. In Secondary SMTP Server, enter the **Server Address** in the specific field.
8. Enable the check box **SMTP Server requires Authentication** if you want to authenticate SMTP Server.
9. Enter your **User name** and **Password** in the respective fields.
10. Click **Save** to save the entered details.
11. Click **Reset** to update the entered details.

SOL

Here, you can configure the Serial over LAN settings, select or change values for each attribute and click the Save button to save any changes.

Figure 3-36. SOL Settings Page

The fields of SOL Settings Page are explained below.

Table 22: SOL Settings Page

ITEM	DESCRIPTION
Enable Serial over LAN	Checked=Enabled; Unchecked=Disabled.
Channel Privilege Level Limit	Select the IPMI Serial over LAN minimum user privilege: - Administrator - Operator - User
Save	Use this button to save your settings.
Advanced SOL Settings	Use this button to go to advanced SOL page.

SSL

The Secure Socket Layer protocol was created by Netscape to ensure secure transactions between web servers and browsers. The protocol uses a third party, a Certificate Authority (CA), to identify one end or both end of the transactions.

Using MegaRAC GUI, configure SSL certificate into the BMC. Using this, the device can be accessed in a secured mode.

To open SSL Certificate Configuration page, click **Configuration > SSL** from the main menu. There are three tabs on this page.

- Upload SSL option is used to upload the certificate and private key file into the BMC.
- Generate SSL option is used to generate the SSL certificate based on configuration details.

- View SSL option is used to view the uploaded SSL certificate in readable format.

A sample screenshot of SSL Management Page is shown in the screenshot below.

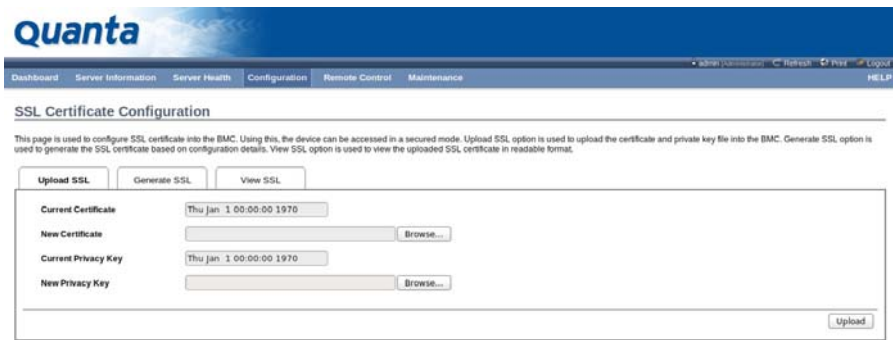


Figure 3-37. SSL Certificate Configuration – Upload SSL

The fields of SSL Certificate Configuration – Upload SSL tab are explained below.

Table 23: SSL Certificate Configuration - Upload SSL

ITEM	DESCRIPTION
Current Certificate	Current certificate information will be displayed (read-only).
New Certificate	Certificate file should be of pem type
Current Privacy Key	Current privacy key information will be displayed (read-only).
New Privacy Key	Privacy key file should be of pem type.
Upload	To upload the SSL certificate and privacy key into the BMC.

Note:

Upon successful upload, HTTPs service will get restarted to use the newly uploaded SSL certificate.

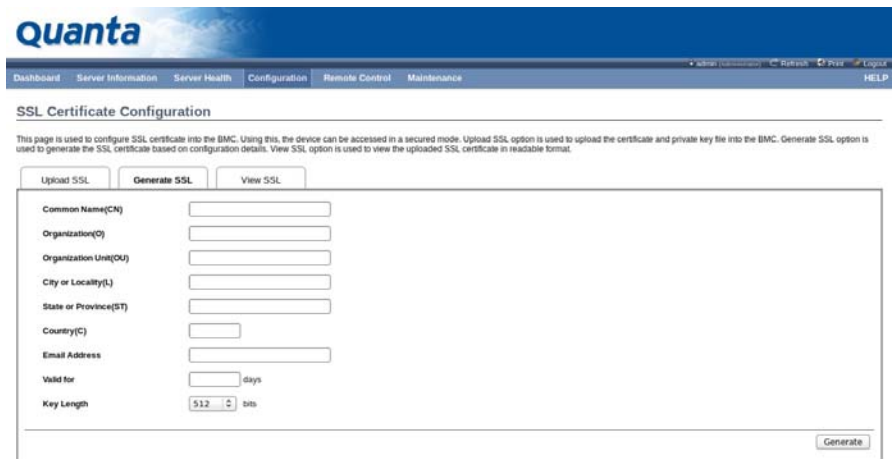


Figure 3-38. SSL Certificate Configuration – Generate SSL

The fields of SSL Certificate Configuration – Generate SSL tab are explained below.

Table 24: SSL Certificate Configuration - Generate SSL

ITEM	DESCRIPTION
Common Name (CN)	Common name for which certificate is to be generated. - Maximum length of 64 characters. - Special characters '#' and '\$' are not allowed.
Organization (O)	Organization name for which the certificate is to be generated. - Maximum length of 64 characters. - Special characters '#' and '\$' are not allowed.
Organization Unit (OU)	Over all organization section unit name for which certificate is to be generated. - Maximum length of 64 characters. - Special characters '#' and '\$' are not allowed.
City or Locality (L)	City or Locality of the organization (mandatory). - Maximum length of 64 characters. - Special characters '#' and '\$' are not allowed.
State or Province (ST)	State or Province of the organization (mandatory). - Maximum length of 64 characters. - Special characters '#' and '\$' are not allowed.
Country (C)	Country code of the organization (mandatory). - Only two characters are allowed. - Special characters are not allowed.
Email Address	Email Address of the organization (mandatory).
Valid for	Validity of the certificate. Value ranges from 1 to 3650 days.
Key Length	The key length bit value of the certificate.
Generate	To generate the new SSL certificate.

Note:

HTTPs service will get restarted, to use the newly generated SSL certificate.

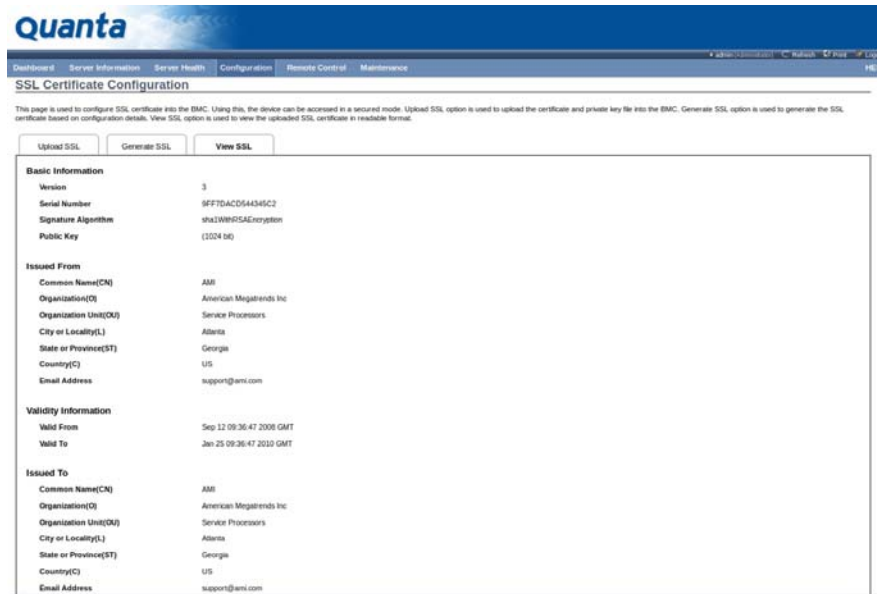


Figure 3-39. SSL Certificate Configuration – View SSL

The fields of SSL Certificate Configuration – View SSL tab are explained below.

Table 25: SSL Certificate Configuration – View SSL

ITEM	DESCRIPTION
Basic Information	This section displays the basic information about the uploaded SSL certificate. It displays the following fields. ● Version ● Serial Number ● Signature Algorithm ● Public Key
Issued From	This section describes the following Certificate Issuer information. ● Common Name (CN) ● Organization (O) ● Organization Unit(OU) ● City or Locality (L) ● State or Province (ST) ● Country (C) ● Email Address
Validity Information	This section displays the validity period of the uploaded certificate. ● Valid From ● Valid To
Issued To	This section display the information about the certificate issuer. ● Common Name (CN) ● Organization (O) ● Organization Unit (OU) ● City or Locality (L) ● State or Province (ST) ● Country (C) ● Email Address

Procedure:

1. Click the Upload SSL Tab, **Browse** the **New Certificate** and **New Privacy** key.
2. Click **Upload** to upload the new certificate and privacy key.
3. In **Generate SSL** tab, enter the following details in the respective fields
 - The **Common Name** for which the certificate is to be generated.
 - The **Name of the Organization** for which the certificate is to be generated.
 - The **Overall Organization Section Unit** name for which certificate to be generated.
 - The **City or Locality** of the organization.
 - The **State or Province** of the organization.
 - The **Country** of the organization.
 - The **email address** of the organization.
 - The number of days the certificate will be valid in the **Valid For** field.
4. Choose the **Key Length** bit value of the certificate.
5. Click **Generate** to generate the certificate.
6. Click **View SSL** tab to view the uploaded SSL certificate in user readable format.

Note:

- Once you Upload/Generate the certificates, only HTTPs service will get restarted.
- You can now access your Generic MegaRAC[®] SP securely using the following format in your IP Address field from your Internet browser: https://<your MegaRAC[®] SP's IP address here>
- For example, if your MegaRAC[®] SP's IP address is 192.168.0.30, enter the following: https://192.168.0.30
- Please note the <s> after <http>. You must accept the certificate before you are able to access your Generic MegaRAC[®] SP.

User Management

In MegaRAC GUI, the User Management page allows you to view the current list of user slots for the server. You can add a new user and modify or delete the existing users.

To open User Management page, click **Configuration > Users** from the main menu. A sample screenshot of User Management Page is shown in the screenshot below.

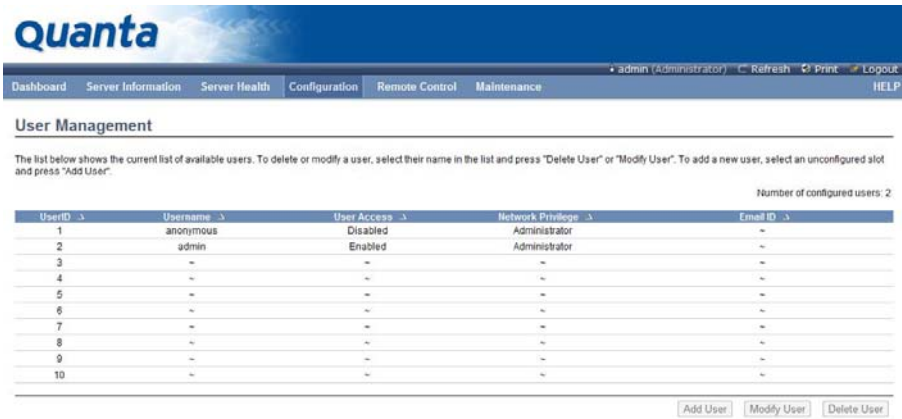


Figure 3-40. User Management

The fields of User Management Page are explained below.

Table 26: User Management Page

ITEM	DESCRIPTION
User ID	Displays the ID number of the user. Note: The list contains a maximum of ten users only.
User Name	Displays the name of the user.
User Access	To enable or disable the access privilege of the user.
Network Privilege	Displays the network access privilege of the user.
SNMP Status	Displays if the SNMP status for the user is enabled or Disabled.
Email ID	Displays email address of the user.
Add User	To add a new user.
Modify User	To modify an existing user.
Delete User	To delete an existing user.

Procedure:

Note:
The Free slots are denoted by "~" in all columns for the slot.

Add a new user:

1. To add a new user, select a free slot and click **Add User**. This opens the Add User screen as shown in the screenshot below.

Figure 3-41. Add User Page

2. Enter the name of the user in the **User Name** field.

Note:

- User Name is a string of 4 to 16 alpha-numeric characters.
- It must start with an alphabetical character.
- It is case-sensitive.
- Special characters ','(comma), '.'(period), ':'(colon), ';' (semicolon), ' '(space), '/'(slash), '\' (backslash), '['(left bracket) and ']'(right bracket) are not allowed.

3. In the **Password** and **Confirm Password** fields, enter and confirm your new password.

Note:

- Password must be at least 4 characters long.
- White space is not allowed.
- No more than 64 characters are allowed if "20 Bytes" option is chosen.

4. Enable or Disable the **User Access** Privilege.
5. In the **Network Privilege** field, enter the network privilege assigned to the user which could be Administrator, Operator, User or No Access.
6. Check the **SNMP Status** check box to enable SNMP access for the user.

Note:

Password field is mandatory, if SNMP Status is enabled.

7. Choose the SNMP Access level option for user from the **SNMP Access** dropdown list. Either it can be Read Only or Read Write.
8. Choose the **Authentication Protocol** to use for SNMP settings from the drop down list.

Note:

Password field is mandatory, if Authentication protocol is changed.

9. Choose the Encryption algorithm to use for SNMP settings from the **Privacy protocol** dropdown list.
10. In the **Email ID** field, enter the email ID of the user. If the user forgets the password, the new password will be mailed to the configured email address.

Note:

SMTP Server must be configured to send emails.

- Email Format: Two types of formats are available:
 - AMI-Format: The subject of this mail format is 'Alert from (your Hostname)'. The mail content shows sensor information, ex: Sensor type and Description.
 - Fixed-Subject Format: This format displays the message according to user's setting. You must set the subject and message for email alert.
11. In the **New SSK Key** field, click Browse and select the SSH key file.

Note:

SSH key file should be of pub type.

12. Click **Add** to save the new user and return to the users list.
13. Click **Cancel** to cancel the modification and return to the users list.

Modify an existing user:

14. Select an existing user from the list and click **Modify User**. This opens the Add User screen as shown in the screenshot below.

Figure 3-42. Modify User Page

15. Edit the required fields.
16. To change the password, enable the **Change Password** option.
17. After editing the changes, click **Modify** to return to the users list page.

Note:

SNMP related fields will not show at setting page while BMC did not support this function

Delete an existing User

18. To delete an existing user, select the user from the list and click **Delete User**.

Note:

There is a list of reserved users which cannot be added / modified as BMC users. Please Refer "MEGARAC SP-X Platform Porting Guide" section "Changing the Configurations in PMC File-> User Configurations in PMC File" for the list of reserved users.

Virtual Media

In MegaRAC GUI, this page to configure Virtual Media device settings. If you change the configuration of the virtual media in this page, it shows the appropriate device in the JViewer Vmedia dialog. For example, if you select two floppy devices in Configure Virtual Media page, then in JViewer > Vmedia, you can view two floppy device panel.

To open Virtual Media page, click **Configuration > Virtual Media** from the main menu. A sample screenshot of User Management Page is shown in the screenshot below.

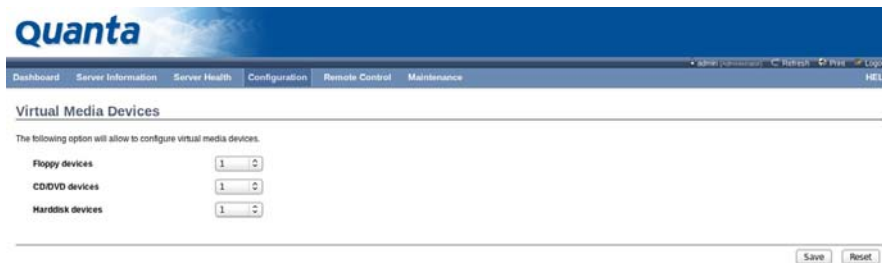


Figure 3-43. Configure Virtual Media Devices

The following fields are displayed in this page.

Table 27: Configure Virtual Media Devices

ITEM	DESCRIPTION
Floppy devices	The number of floppy devices that support for Virtual Media redirection.
CD/DVD devices	The number of CD/DVD devices that support for Virtual Media redirection.
Hard disk devices	The number of hard disk devices that support for Virtual Media redirection.
Local Media Support	To enable or disable the local media support for Virtual Media redirection.
Save	To save the configured settings.
Reset	To reset the previously-saved values.

Procedure:

1. Select the number of Floppy devices, CD/DVD devices and Hard disk devices from the dropdown list.

Note:
Maximum of two devices can be added in Floppy, CD/DVD and Hard disk drives.

- 2. Enable the **Local Media Support** if needed.
- 3. Click **Save** to save the changes made else click Reset to reset the previously saved values.

Note:
If there are two device panels for each device, and when you click the Connect button, then the redirected device panel will be disabled.

SNMP

This page is used to set the configuration for SNMP. User could set the SNMP community string and trap in this page. It just display when the project support SNMP.

General support as below:

SNMP Settings

Use the page to configure various SNMP agent settings.

☒ Enable SNMPv1/v2

Read-Only Community String

public

Read-Write Community String

private

☐ Enable Trap

Version

☐ V1 ☒ V2

Community Strings

Destination 1 IP

Destination 2 IP

Destination 3 IP

Destination 4 IP

Destination 5 IP

Optional

Save

Reset

The following fields are displayed in this page.

Table 28: SNMP Settings

ITEM	DESCRIPTION
Enable SNMPv1/v2	The selection enable or disable the SNMP feature for query.
Read-Only Community String	Display or set the read-only community string.
Read-Write Community String	Display or set the read-write community string.

UTC Timezone

Note:
The feature “UTC Timezone” used for port setting supported from Grantley platform.

Here you can configure UTC timezone setting of the clock in BMC.

UTC Timezone Settings

Here you can configure UTC timezone setting of the clock in BMC.

UTC Timezone:

(GMT+/-0)

(GMT-09:30)

(GMT-09:00)

(GMT-08:30)

(GMT-08:00)

(GMT-07:30)

(GMT-07:00)

(GMT-06:30)

(GMT-06:00)

(GMT-05:30)

(GMT-05:00)

(GMT-04:30)

(GMT-04:00)

(GMT-03:30)

(GMT-03:00)

(GMT-02:30)

(GMT-02:00)

(GMT-01:30)

(GMT-01:00)

(GMT-00:30)

(GMT+/-0)

Hour(s)

Save

Reset

Figure 3-44. UTC Timezone

Table 29: UTC Timezone

ITEM	DESCRIPTION
UTC Timezone	Timezone of the clock in BMC

Procedure:

1. Select UTC Timezone from the dropdown list
2. Click **Save** to save the change else click **Reset** to reset the previously saved values.

LAN Port Settings

Note:

The feature “LAN Port” used for LAN port setting supported from Grantley platform.

Here you can configure LAN Port setting of the BMC NIC.

LAN Port Settings

You can configure LAN Port Settings on this page.

WARNING: Please make sure the selected device has been properly configured with IP and it's connected to switch. Changing to an un-configured device will result in BMC connection lost, and require manually re-install the HW connection.

Select LAN port

Dedicated-NIC

Dedicated-NIC

Shared-NIC (Quanta Mezz)

Save

Reset

Figure 3-45. LAN Port Settings

3-61

Procedure:

1. Select **LAN Port** from the dropdown list
2. Click **Save** to save the change or click **Reset** to reset the previously saved values.

Remote Control

The Remote Control consists of the following menu items.

- Console Redirection
- Server Power Control

A sample screenshot of the Remote Control menu is given below.



Figure 3-46. Remote Control Menu

A detailed description of the menu items are given ahead

Console Redirection

The remote console application, which is started using the WebGUI, allows you to control your server's operating system remotely, using the screen, mouse, and keyboard, and to redirect local CD/DVD, Floppy diskette and Hard disk/USB thumb drives as if they were connected directly to the server.

List of Supported Client Operating Systems

- WinXP
- W2K3 - 32 bit
- W2K3 - 64 bit
- RHEL 4 - 32 bit
- RHEL 4 - 64 bit
- RHEL 5.4 - 32 bit
- RHEL 5.4 - 64 bit
- RHEL 6.0 - 64 bit
- RHEL 6.0 - 32 bit

- Ubuntu 9.10 LTS - 32
- Ubuntu 9.10 LTS - 64
- Ubuntu 8.10 -32
- Ubuntu 8.10 -64
- OpenSuse 11.2 -32
- OpenSuse 11.2 -64
- FC 9 - 32
- FC 9 - 64
- FC 10 - 32
- FC 10 - 64
- FC 12 - 32
- FC 12 - 64
- FC 13 - 32
- FC 13 - 64
- FC 14 - 32
- FC 14 - 64
- MAC -32
- MAC-64

List of Supported Host OS

- RHEL 5
- RHEL 6
- W2K3
- W2K8
- RHEL 4
- OpenSuse 11.2
- OpenSuse 10.x
- Ubuntu 8.10
- Ubuntu 9.10
- Ubuntu 11.04

Browser Settings

For Launching the KVM, pop-up block should be disabled. For Internet explorer, enable the download file options from the settings.

Java Console

This is an OS independent plug-in which can be used in Windows as well as Linux with the help of JRE. JRE should be installed in the client's system. You can install JRE from the following link.

<http://www.java.com/en/download/manual.jsp>

Procedure:

In MegaRAC GUI, the Java Console can be launched in two ways:

1. Open the Dashboard Page and in Remote control section, click Launch for Java Console.
2. Open **Remote Control > Console Redirection** Page and click **Java Console**.

This will download the **.jnlp** file from BMC.

To open the **.jnlp** file, use the appropriate JRE version (Javaws).

When the downloading is done, it opens the Console Redirection window.

Note:

Web page will timeout after open 30 minutes, but it will connection continually if open RKVM.

The Console Redirection main menu consists of the following menu items.

- Video
- Keyboard
- Mouse
- Options
- Media
- Keyboard Layout
- Video Record
- Active Users
- Help

A detailed explanation of these menu items are given below.

Video

This menu contains the following sub menu items.

Table 30: Video

ITEM	DESCRIPTION
Pause redirection	This option is used for pausing Console Redirection.
Resume Redirection	This option is used to resume the Console Redirection when the session is paused.
Refresh Video	This option can be used to update the display shown in the Console Redirection window.
Compression mode	This option is used to select the video compression mode which includes YUV 420, YUV 444, YUV 444 + 2 colors VQ and YUV 444 + 4 colors VQ in Java console.
DCT Quantization table	There are eight levels to select the Video quality.
Host video output	If you enable this option, the server display will be blank but you can view the screen in Console Redirection. If you disable this option, the display will be back in the server screen.
Full Screen	This option is used to view the Console Redirection in full screen mode (Maximize). This menu is enabled only when both the client and host resolution are same.
Exit	This option is used to exit the console redirection screen.

Keyboard

This menu contains the following sub menu items.

Table 31: Keyboard

ITEM	DESCRIPTION
Hold Right Ctrl Key	This menu item can be used to act as the right-side <CTRL> key when in Console Redirection.
Hold Right Alt Key	This menu item can be used to act as the right-side <ALT> key when in Console Redirection.
Hold Left Ctrl Key	This menu item can be used to act as the left-side <CTRL> key when in Console Redirection.
Hold Left Alt Key	This menu item can be used to act as the left-side <ALT> key when in Console Redirection.
Left Windows Key	This menu item can be used to act as the left-side <WIN> key when in Console Redirection. You can also decide how the key should be pressed: Hold Down or Press and Release.

Table 31: Keyboard (Continued)

ITEM	DESCRIPTION
Right Windows Key	This menu item can be used to act as the right-side <WIN> key when in Console Redirection. You can also decide how the key should be pressed: Hold Down or Press and Release.
Alt+Ctrl+Del	This menu item can be used to act as if you depressed the <CTRL>, <ALT> and keys down simultaneously on the server that you are redirecting.
Full keyboard support	This menu item can be used to act as totally host OS keyboard in Console Redirection. It will disable the hotkey of RKVM when enable "Full Keyboard Support". If the hotkey is used in client OS, It can't be used in RKVM host OS. Because the hotkey is used by client OS first.
Context menu	This menu item can be used to act as <Context Menu> key in Console Redirection.

Mouse

This menu contains the following sub menu items.

Table 32: Mouse

ITEM	DESCRIPTION
Show cursor	This option is used to display or hide the client mouse cursor in Java Console.
Mouse calibration	It is used to adjust the mouse calibration.
Mouse mode	• Absolute mouse mode: To select mouse mode to "Absolute", depending upon the Host Operating System (All Windows versions; RHEL Linux versions not below than RHEL6; Fedora Linux versions not below than FC14). • Relative mouse mode: To select mouse mode to "Relative", depending upon the Host Operating System (RHEL Linux versions below than RHEL6; Fedora Linux versions below than FC14; SLES Linux versions below than SLES11). • Other mouse mode: For the Host Operating System which is neither "Absolute" nor "Relative" mouse mode (SLES Linux version SLES11).

Options

This menu contains the following sub menu items.

Table 33: Options

ITEM	DESCRIPTION
Bandwidth	This option is used to select the bandwidth manually or automatically.
Keyboard/Mouse Encryption	This option is used to enable or disable encryption for the data payload of Keyboard/Mouse transferring.
Zoom	This option is used to adjust the video screen for zoom in or zoom out.

Table 33: Options

ITEM	DESCRIPTION
Note: A behavior changed from Grantley as follows: When [Keyboard->Full Keyboard Support] and [Mouse->Other mouse mode] enabled at the same time, the mouse will NOT be moved to outside window unless to press "Alt+Tab" to switch window.	

Media

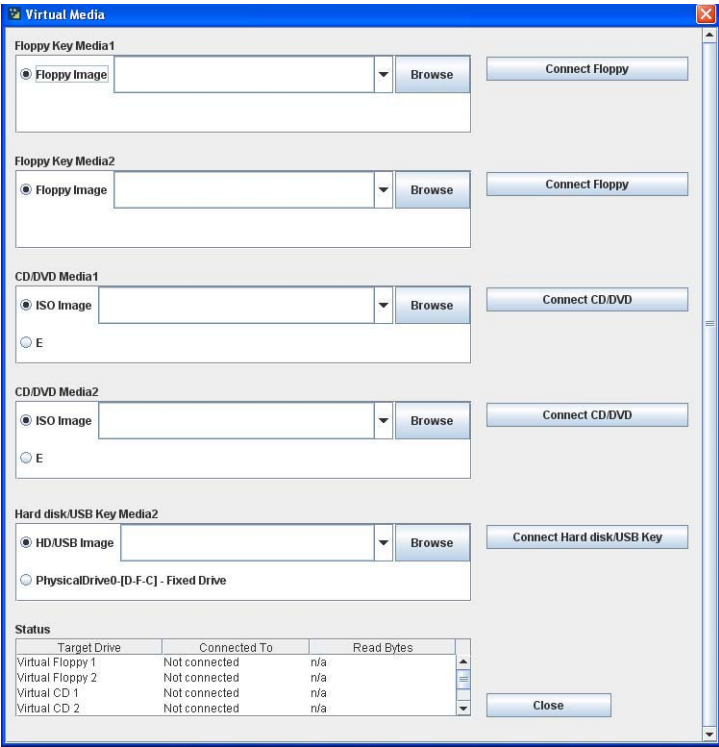


Figure 3-47. Virtual Media

Table 34: Virtual Media

ITEM	DESCRIPTION
Floppy Key Media	This menu item can be used to start or stop the redirection of a physical floppy drive and floppy image types such as *.img. Note: Floppy Redirection is not an available feature on all versions of the Meg-aRACR SPs.
CD/DVD Media	This menu item can be used to start or stop the redirection of a physical DVD/CD-ROM drive and cd image types such as iso.

Table 34: Virtual Media (Continued)

ITEM	DESCRIPTION
Hard disc/USB Key Media	This menu item can be used to start or stop the redirection of a Hard Disk/USB key image and USB key image such as *.img. Note: - For windows client, if the logical drive of the physical drive is dismount then the logical device is redirected with Read/Write Permission else it is redirected with Read permission only. - For MAC client, External USB Hard disk redirection is only supported. - For Linux client, fixed hard drive is redirected only as Read Mode. It is not Write mode supported. - For USB key image redirection, support FAT 16, FAT 32 and NTFS.

Keyboard Layout

Table 35: Keyboard Layout

ITEM	DESCRIPTION
Auto Detect	This option is used to detect keyboard layout automatically. The languages supported automatically are English – US, French – France, Spanish – Spain, German- Germany, Japanese- Japan. If the client and host languages are same, then for all the languages other than English mentioned above, you must select this option to avoid typo errors.
Soft Keyboard	This option allows you to select the keyboard layout. It will show the dialog as similar to onscreen keyboard. If the client and host languages are different, then for all the languages other than English mentioned above, you must select the appropriate language in the list shown in JViewer and use the soft keyboard to avoid typo errors. Note: Soft keyboard is applicable only for JViewer Application not for other application in the client system.

Video Record

Note:

This option is available only when you launch the Java Console.

Table 36: Video Record

ITEM	DESCRIPTION
Important	To view this menu option you must download the Java Media Framework (JMF). It can be downloaded from the link http://www.oracle.com/technetwork/java/javase/download-142937.html
Start Record	This option is to start recording the screen.
Stop Record	This option is used to stop the recording.
Settings	To set the settings for video recording.

Procedure:**Note:**

Before you start recording, you have to enter the settings.

1. Click **Video Record > Settings** to open the settings page as shown in the screenshot below.

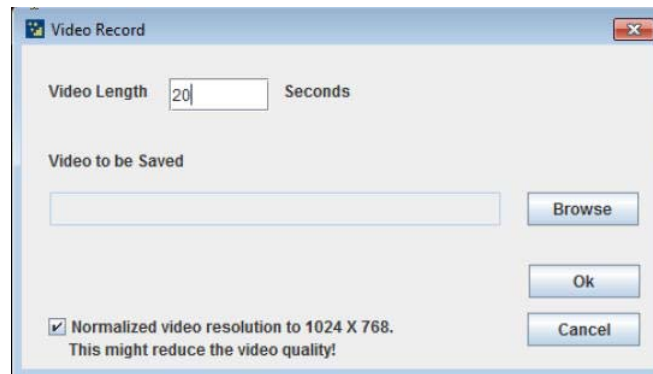


Figure 3-48. Video Record Settings Page

2. Enter the **Video Length** in seconds.
3. **Browse** and enter the location where you want the video to be saved.
4. Enable the option **Normalized video resolution to 1024X768**.
5. Click **OK** to save the entries and return to the Console Redirection screen.
6. Click **Cancel** if you don't wish to save the entries.
7. In the Console Redirection window, click **Video Record > Start Record**.
8. Record the process.
9. To stop the recording, click **Video Record > Stop Record**.

Active Users

Click this option to displays the active users and their system IP address.

Help

Jviewer: Displays the copyright and version information

Quick Buttons

The lower right of Console Redirection windows displays all the quick buttons. These quick buttons helps you to perform these functions by just clicking them.

Note:

This option is available only when you launch the Java Console.

Server Power Control

This page allows you to view and control the power of your server.

To open Power Control and Status page, click **Remote Control > Server Power Control** from the main menu. A sample screenshot of Power Control and Status page is shown in the screenshot below.

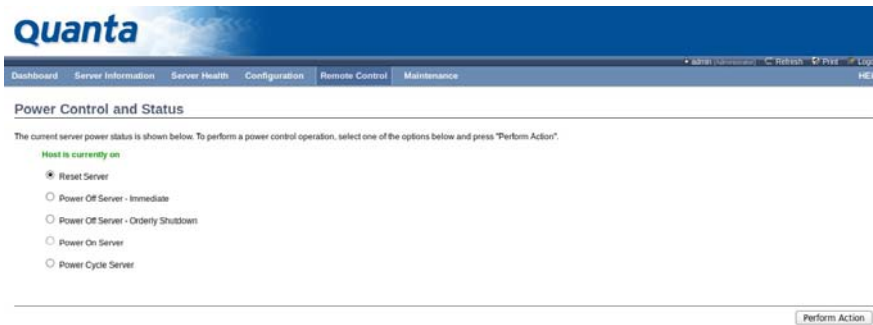


Figure 3-49. Power Control and Status Page

The various options of Power Control are given below.

Table 37: Server Power Control

ITEM	DESCRIPTION
Reset Server	This option will reboot the system without powering off (warm boot).
Power off Server – Immediate	This option will immediately power off the server.
Power off Server – Orderly Shut-down	This option will initiate operating system shutdown prior to the shut-down.
Power On Server	This option will power on the server.
Power Cycle Server	This option will first power off, and then reboot the system (cold boot).
Perform Action	Click this option to perform the selected operation.

Procedure:

Select an action and click Perform Action to proceed with the selected action.

Note:

You will be asked to confirm your choice. Upon confirmation, the command will be executed and you will be informed of the status.

Maintenance Group

This group of pages allows you to do maintenance tasks on the device. The menu contains the following items:

- BMC Firmware Update
- BIOS Update

- Preserve Configuration
- Restore Factory Defaults

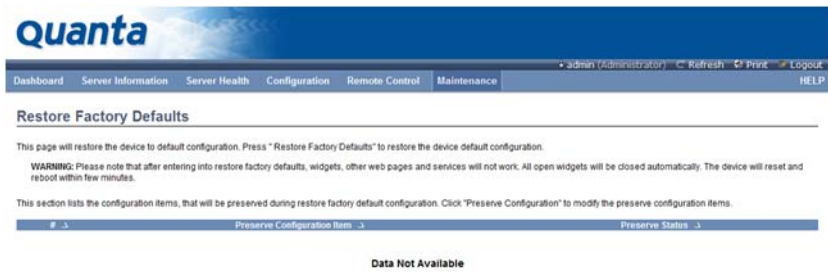


Figure 3-50. Restore Factory Defaults

BMC Firmware Update

In MegaRAC GUI, this wizard takes you through the process of firmware up gradation. A reset of the box will automatically follow if the upgrade is completed or cancelled. An option to preserve configuration will be presented. Enable it, if you wish to preserve configured settings through the upgrade.



WARNING!

Please note that after entering update mode widgets, other web pages and services will not work. All open widgets will be closed automatically. If upgrade process is cancelled in the middle of the wizard, the device will be reset.

Note:

The firmware upgrade process is a crucial operation. Make sure that the chances of a power or connectivity loss are minimal when performing this operation.

Once you enter into Update Mode and choose to cancel the firmware flash operation, the MegaRAC® card must be reset. This means that you must close the Internet browser and log back onto the MegaRAC® card before you can perform any other types of operations.

To open Firmware Update page, click **Maintenance > Firmware Update** from the main menu. A sample screenshot of Firmware Update Page is shown in the screenshot below.

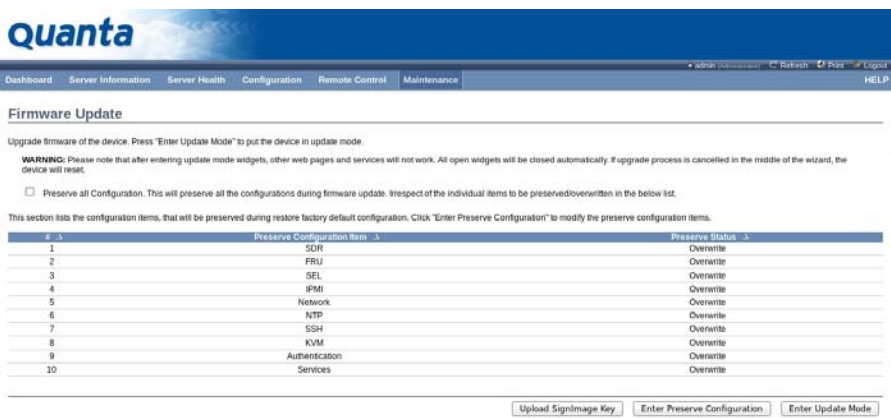


Figure 3-51. Firmware Update Page

Procedure:

Click **Enter Update Mode** to upgrade the current device firmware. As below step by step:

1. Closing all active client requests.
2. Preparing device for firmware upgrade.
3. Uploading firmware image.
4. Verifying firmware image.
5. Flashing firmware image.
6. Resetting Device.

Note:

You can now follow the instructions presented in the subsequent pages to successfully update the card's firmware. The device will reset if update is canceled. The device will also reset upon successful completion of firmware update.

BIOS Update

This page allow user to update BIOS image, but only works when DC is off. Please note the filename extension of BIOS image shall be bin. For example: BIOS3A22.bin. After BIOS update complete, system must perform AC cycle to take effect.

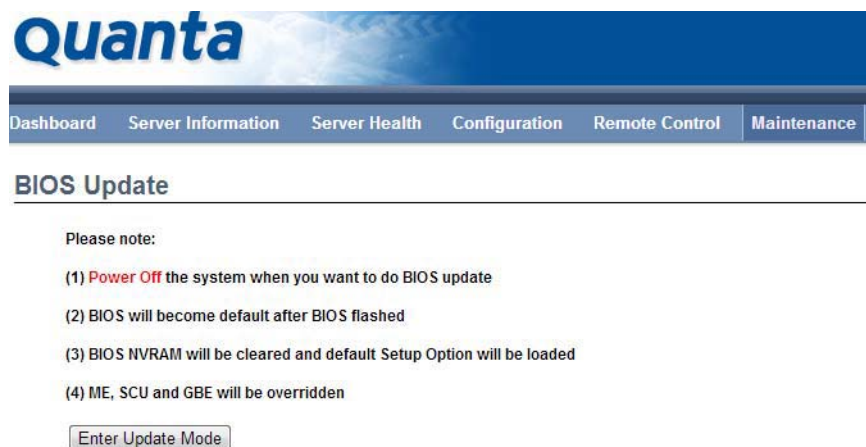


Figure 3-52. BIOS Update Page

Preserve Configuration

This page allows the user to configure the preserve configuration items, which will be used by the Restore factory defaults to preserve the existing configuration without overwriting with default configuration.

Item Verification Procedure

1. SDR

Step 1: add OEM record (Please refer to IPMI 2.0 Spec. page 468/644)

Command: ipmitool raw 0x0a 0x24 0x0 0x0 0x51 0xc0 4 0x57 0x01 0x0 0xf5

Response: 55 00 „» 55 is the last record ID

Step 2: get OEM record, to use the last record ID to check if added successfully (Please refer to IPMI 2.0 Spec. page 466/644)

Command: ipmitool raw 0x0a 0x23 0x0 0x0 0x55 0x0 0x0 0xff

Response: ff ff 55 00 51 c0 04 57 01 0 f5 „» ff ff means record ID 55 is the last record ID

Step 3: go to Web.UI to check “SDR” to be preserved

Step 4: upgrade firmware

Step 5: after Step 4, go to Step 2 and check if the OEM record is still preserved (if preserved then PASS else FAIL)

2. SEL

Step 1: Please use IPMI command to add an event. Ex: ipmitool event 1

Step 2: go to Event Log to check if the event added

Step 3: go to Web.UI to check “SEL” to be preserved

Step 4: upgrade firmware

Step 5: after Step 4, go to Step 2 and check if the event is still preserved (if preserved then PASS else FAIL)

3. IPMI

Step 1: Please add a new user by Web.

Step 2: check if the user added

Step 3: go to Web.UI to check “IPMI” to be preserved

Step 4: upgrade firmware

Step 5: after Step 4, go to Step 2 and check if the user is still exist (if preserved then PASS else FAIL)

4. Network

Step 1: Please change BMC IPv4 address source to be STATIC or DHCP mode by Web.

Step 2: check if the mode changed

Step 3: go to Web.UI to check “Network” to be preserved

Step 4: upgrade firmware

Step 5: after Step 4, go to Step 2 and check if the mode is still preserved (if preserved then PASS else FAIL)

5. SNMP (supported from Grantley platform)

Step 1: Please go to add a new user and enable SNMP function.

Step 2: check if the user added and SNMP function enabled

Step 3: go to Web-UI to check “SNMP” to be preserved

Step 4: upgrade firmware

Step 5: after Step 4, go to Step 2 and check if the setting is still preserved (if preserved then PASS else FAIL)

6. SSH

Step 1: Please go to add a new user and update the NEW SSH key.

Step 2: check if the user added SSH key updated

Step 3: go to Web-UI to check "SSH" to be preserved

Step 4: upgrade firmware

Step 5: after Step 4, go to Step 2 and check if the mode is still preserved (if preserved then PASS else FAIL)

7. KVM

Step 1: Please modify the "Remote Session", "Mouse Mode", and "Virtual Media Devices" setting by Web.

Step 2: check if the setting changed

Step 3: go to Web-UI to check "KVM" to be preserved

Step 4: upgrade firmware

Step 5: after Step 4, go to Step 2 and check if the setting is still preserved (if preserved then PASS else FAIL)

8. Services (supported from Grantley and Microserver platform)

Step 1: Please change the default value of each item by Web.

Step 2: check if the setting changed

Step 3: go to Web-UI to check "Services" to be preserved

Step 4: upgrade firmware

Step 5: after Step 4, go to Step 2 and check if the setting is still preserved (if preserved then PASS else FAIL)

Restore Factory Defaults

In MegaRAC GUI, this option is used to restore the factory defaults of the device firmware.



WARNING!

Please note that after entering restore factory widgets, other web pages and services will not work. All open widgets will be closed automatically. The device will reset and reboot within a few minutes.

To open Restore Factory Defaults page, click **Maintenance > Restore Factory Defaults** from the main menu. A sample screenshot of Restore Factory Defaults Page is shown in the screenshot below.



Figure 3-53. Restore Factory Defaults Page

Procedure:

Click Restore Factory to restore the factory defaults of the device firmware.

Log Out

To log out of the MegaRAC GUI, click the logout link on the top right corner of the screen.

User Privilege

Table 38: User Privilege

WEB GUI PRIVILEGE LIST	PRIVILEGE ASSOCIATION BETWEEN IPMI AND WEB GUI			
	ADMINISTRATOR	OPERATOR	USER	OEM
login BMC from Web GUI, SSH	O	O	X	O
configure BMC from Web GUI	O	X	X	X
configure users from Web GUI	O	X	X	X
clear logs from Web GUI	O	X	X	X
execute server power control from Web GUI	O	X	X	X
virtual KVM redirection	O	X	X	X
virtual media	O	X	X	X
View Users	O	O	X	X
View DNS	O	O	X	X
View Network	O	O	X	X
View PEF	O	O	X	X

This page left blank intentionally.

Regulatory and Compliance Information

Chapter 4

This section provides regulatory and compliance information applicable to this system.

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.

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.

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

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.

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 single source.

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.

Power and Electrical Warnings

Caution: 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.

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.

Power Cord Warnings

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

Caution: 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.

System Access Warnings

Caution: 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.

Caution: 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).

Caution: 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.

Rack Mount Warnings

Note: *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 multi-unit 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 (T_{ma}) 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).

Electrostatic Discharge (ESD)

Caution: *ESD can damage drives, boards, and other parts. We recommend that you perform all procedures at an ESD workstation. If one is not available, provide some ESD protection by wearing an 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 wrapper. Do not slide board over any surface.

Other Hazards

Battery Replacement

Caution: *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.

Cooling and Airflow

Caution: *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:*

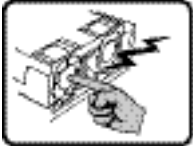
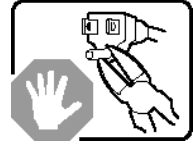
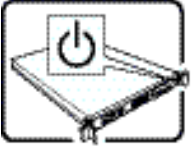
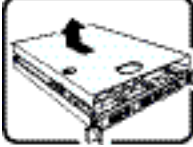
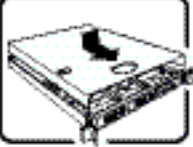
- Check first to make sure you have not left loose tools or parts inside the system.
- Check that cables, add-in cards, and other components are properly installed.
- Attach the covers to the chassis according to the product instructions.

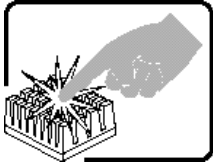
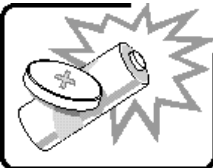
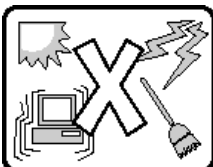
Laser Peripherals or Devices

Caution: 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 have are not serviceable
- Return to manufacturer for servicing

Use certified Optical Fiber Transceiver Class I Laser Product

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

Product Regulatory Compliance Markings

This product is marked with the following Product Certification Markings:

Product Regulatory Compliance Markings

Regulatory Compliance	Region	Marking
cULus Listing Mark	USA / Canada	
CE Mark	Europe	

FCC Marking (Class A)	USA	This device complies with Part 15 of the FCC Rules. Operation of this device 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.
ICES	Canada	CAN ICES-3 (A)/NMB-3(A)
VCCI Marking (Class A)	Japan	この装置は、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。 VCCI-A
BSMI Certification Number & Class A Warning	Taiwan	 警告使用者： 此為甲類資訊技術設備，於居住環境使用中時，可能會造成射頻擾動，在此種情況下，使用者會被要求採取某些適當的對策。
EAC Marking	Russia	
Recycling Package Mark	Other than China	
MSIP	Korea	 A급 기기 (업무용 정보통신기기) 이 기기는 업무용으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 만약 잘못판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.

Electromagnetic Compatibility Notices

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 when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Europe (CE Declaration of Conformity)

This product has been tested in accordance too, and complies with the Low voltage Directive (2006/95/EC) and EMC Directive (2004/108/EC). The product has been marked with the CE Mark to illustrate its compliance.

VCCI (Japan)

この装置は、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。

VCCI-A

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.

BSMI (Taiwan)

The BSMI Certification Marking and EMC warning is located on the outside rear area of the

警告使用者：

此為甲類資訊技術設備，於居住環境中使用時，可能會造成射頻擾動，在此種情況下，使用者會被要求採取某些適當的對策。

MSIP (Korea)

Ministry of Science, ICT & Future Planning (MSIP) Class A Statement:

A급 기기 (업무용 정보통신기기)

이 기기는 업무용으로 전자파적합등록을 한 기기이오니
판매자 또는 사용자는 이 점을 주의하시기 바라며, 만약
잘못판매 또는 구입하였을 때에는 가정용으로 교환하시기
바랍니다.

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.QuantaQCT.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.

Restriction of Hazardous Substances (RoHS) Compliance

Quanta® Computer Inc. has a system in place to restrict the use of banned substances in accordance with the European Directive 2011/65/EU. 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 Diphenyl Ethers (PBDE)
- Quantity limit of 0.01% by mass (100 PPM) for:
 - Cadmium

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.