Inspur Server User Manual

NF8260M5

Edition: 1.8

May,2021

Editon Statement:Add numbers and names for some figures and tables.

Abstract

This manual contains technical information such as specifications, hardware operations, software configuration, fault diagnosis, etc., that are relevant to the maintenance and operation of this server.

It is recommended that server installation, configuration, and maintenance is performed by experienced technicians only.

Target Audience

This manual is intended for:

- Technical support engineers
- Product maintenance engineers
- Technicians

Warnings

This manual introduces the NF5270M5server's technical features, system installation and setup, which will help the userto understand how best to utilize the server and all its functionalities.

1.For your safety, please do not disassemble the server's components arbitrarily. Please do not extend configuration or connect other peripheral devices arbitrarily. If needed, please contactInspur for our support and guidance.

2.Before disassembling the server's components, please be sure to disconnect all the power cords connected to the server.

3.BIOS and BMC setup is a significant factor in correctly configuring your server. If there are no special requirements, it is suggested to use the Default Values and not alter the parameter settings arbitrarily. After the first login, please change the BMC user password in time.

4.Please install the product-compatible operating system and use the driver provided by Inspur. If you use an incompatible operating system or non-Inspur driver, it may cause compatibility issues and affect the normal use of the product, Inspur will not assume any responsibility or liability.

Inspur is not responsible for any damages, including loss of profits, loss of information, interruption of business, personal injury, and/or any damage or consequential damage without limitation, incurred before, during, or after the use of our products.

Contents

1 Safety Instructions

⚠ WARNING: Please be advised to follow the instructions below for safety. Failure to do so could result to potential dangers that may cause property loss, personal injury or death.

1. The power supplies in the system may produce high voltages and energy hazards that may cause personal injury. For your safety, please do not attempt to remove the cover of the system to remove or replace any component without assistance provided by Inspur. Only service technicians trained by Inspur are authorized to remove the cover of the host, and to remove and replace internal components.
2. Please connect the equipment to the appropriate power supply. Use only power supplies with the correct voltage and electrical specifications according to the label. To protect your equipment from damages caused by a momentary spike or plunge of the voltage, please use relevant voltage stabilizing equipment, or uninterruptible power supplies.
3. If you must use an extension cable, please use a three-core cable with properly grounded plugs. Observe extension cable ratings. Ensure that the total rating of all equipment plugged into the extension cable does not exceed 80 percent of the ratings limit for the extension cable.
4. Please be sure to use the power supply components that come with the server, such as power lines, power socket (if provided with the server) etc. For your safety, please do not replace power cables or plugs randomly.
5. To prevent electric shock dangers caused by leakage in the system, please make sure that the power cables of the system and peripheral equipment are correctly connected to the earthed/grounded power socket. Please connect the three-core power line plug to the three-core AC power socket that is well earthed and easy to access. Be sure to use earthing /grounding pin of power lines and do not use the patch plug or the earthing/grounding pin unplugged with cables. In the case that the earthing/grounding conductors are not installed and it is uncertain whether there are appropriate earthing/ grounding protections, please do not use or attempt to operate the equipment. Contact and consult an electrician.

6. Please do not push any objects into the openings of the system. Doing so may cause fire or electric shock.
7. Please place the system far away from the cooling plate and heat sources, and be sure not to block the air vents.
8. Please be sure not to scatter food or liquid in the system or on other components, and do not use the product in humid or dusty environments.
9. Using an incompatible battery may cause explosion. When battery replacement is required, please consult the manufacturer first, and choose batteries of the same or equivalent type. Do not disassemble, crush, puncture the batteries or make the external connection point short circuit, and do not expose them in the environment over 60°C. Never throw batteries into fire or water. Please do not attempt to open or repair the batteries. Dispose of used batteries according to instructions. For battery recycling, please contact the local waste recycling center.
10. Before installing equipment into the rack, please install all front and side stabilizers on the independent rack first. Please install the front stabilizers first, if connecting with other racks. Please install stabilizers before installing equipment into the rack. Failure to install the corresponding stabilizers before installing equipment into the rack may cause the cabinet to tip over, possibly resulting to severe injury. After installing the equipment and other components into the rack, only one component can be pulled out from the rack through its sliding part at one time. Pulling out several components at the same time may cause the rack to turn over, resulting to serious personal injury.
11. A minimum of two people are required to safely move a rack. The racks are extremely awkward and heavy, moving them without adequate, trained personnel could result in severe injury or death.
12. It is prohibited to directly short-circuit the copper busbar. Please do not touch the copper busbar when the rack is powered on.
13. This is Class A product, and may cause radio interference. In such case, users may need to take necessary measures to mitigate the interference.
14. The equipment is intended for installation in a Restricted Access Location.

⚠ Note: The following considerations may help avoid the occurrence of problems that could damage the components or cause data loss, etc.

1. In the event of the following, please unplug the power line plug from the power socket and contact Inspur’s customer service department:
   1) The power cables, extension cables or power plugs are damaged.
   2) The products get wet.
   3) The products have fallen or have been damaged.
   4) Other objects have fallen into the products.
   5) The products do not or are unable to function normally even when attempting to operate according to the instructions.
2. If the system becomes wet or damp, please follow these steps:
   1) Power off the equipment, disconnect them with the power socket, wait for 10 to 20 seconds, and then open the host cover.
   2) Move the equipment to a well-ventilated place to dry the system at least for 24 hours and make sure that the system is fully dried.
   3) Close the host cover, reconnect the system to the power socket, and then power on.
   4) In case of operation failure or other abnormal situations, please contact Inspur and get technical support.
3. Pay attention to the position of system cables and power cables-avoid placing wires in high foot traffic locations. Please do not place objects on the cables.
4. Before removing the host cover, and/or touching the internal components, please allow for the equipment to cool first. To avoid damaging the mainboard, please power off the system and wait for five seconds, and then remove the components from the mainboard and/or disconnect the peripheral device from the system. Please remember that only service technicians trained by Inspur are authorized to remove the cover of the host, and to remove and replace internal components.
5. If there is modem, telecom or LAN options installed in the equipment, please pay attention to the followings:
   1) In the case of thunder and lightning, please do not connect or use the modem.
   2) Never connect or use the modem in a damp environment.
   3) Never insert the modem or telephone cables into the socket of network interface controller (NIC).
   4) Before unpacking the product package, installing internal components, touching uninsulated cables or jacks of the modem, please disconnect the modem cables.

6. In order to prevent electrostatic discharge from damaging the electronic components in the equipment, please pay attention to the followings:
    1) Please remove any static electricity on your body before dismounting or touching any electronic component in the equipment, to prevent the static electricity from conducting itself to the sensitive components. You may remove the static electricity on the body by touching the metal earthing objects (such as the unpainted metal surface on the rack).
    2) Please do not take electrostatic sensitive components that are not ready to be installed for application out of the antistatic package materials.
    3) While working, please touch the earthing conductor or the unpainted metal surface on the cabinet regularly to remove any static electricity from the body that may damage the internal components.
7. Upon receiving the proper authorization from Inspur and dismounting the internal components, please pay attention to the following:
    1) Switch the system power supply off and disconnect the cables, including all connections of the system. When disconnecting the cables, please hold the connector of the cables and slowly pull the plugs out. Never pull on the cables.
    2) The products need to completely cool down before dismounting the host cover or touching the internal components.
    3) During the dismounting process, avoid making large movement ranges to prevent damage to the components or scratching arms.
    4) Handle components and plug-in cards with care. Please do not touch the components or connection points on the plug-in cards. When handling the plug-in cards or components, firmly grab the edges of the plug-in cards and components, and/or their metal fixed supports.
8. During the process of rack installation and application, please pay attention to the followings:
    1) After the rack installation is finished, please ensure that the stabilizers have been fixed to the rack and supported to ground, and the weight of the rack is firm on ground.
    2) Always load from the bottom up, and load the heaviest items first.
    3) When pulling out the components from the rack, apply slight force to keep the rack balanced.

4) When pressing down the release latch and the rail of components is sliding, please be careful; as the sliding may hurt your fingers.
5) Do not overload the AC power supply branch circuits in the rack. The total load of the rack should not exceed 80% of the ratings of the branch circuits.
6) Ensure that components in the rack have good ventilation conditions.
7) When repairing components in the rack, never step on any other components.

2 Product Specification

2.1 Introduction

Inspur NF8260M5 is a 2U4S rack-mounted server, which is designed based on the new generation of Intel® Xeon® scalable processor, to satisfy the requirements of virtualization, data base (OLAP/OLTP), CRM, SAP, HANA, HPC and other compute-intensive scenarios. This server has high quality and high reliability on the performance, storage and extension, and makes innovations and breakthroughs on computing performance, flexible configuration and intelligent management, particularly suitable for telecom operators, financial industry, internet companies and other large-scale enterprises.

- Main features:

✧ Excellent computing, storage and scalability

Supports a new generation of Intel® Xeon® scalable processors, and up to 4 CPUs (TDP 205W); supports up to 48 DIMMs (RDIMM and LRDIMM), supports 2400/2666/2933MHz memories, with computing performance increased by 65% over the previous generation. The product density is doubled, supporting 24 2.5" hard drives (SAS/SATA HDD/SSD) in 2U space, supporting 6 U.2 SSDs as well. Supports different types of disks for tiered storage and improves storage performance.In addition to one PCIE OCP card, 7*PCIEX8 + 1*PCIEX16 ports can be extended through the PCIE expansion slot, which is easy for users to extend.

✧ Application optimization

Storage modules, I/O modules, network modules, GPU modules can achieve a variety of different combinations of scenarios, users can configure the flexibility according to business needs.

Provides ample I/O and offers up to 8 PCI-E 3.0 slots in a small 2U chassis; 4 full-width GPU cards are supported to meet the needs of high-end customers on system function and performance.

✧ Excellent low-noise and thermal design

With the systematic low-noise design, the server can achieve "quiet" work under high load. The hot-plug fan design has both maintainability and 5+1 redundant backup capability.

✧ Intelligent monitoring, three-dimensional management

In order to simplify the device management in data center, Inspur Dashboard visual management module is provided. With the help of Inspur Light Path Diagnostics, administrators can quickly locate the device to be maintained, which greatly reduces the workload of the administrators.

Supports embedded high-capacity flash memory, built-in Inspur InCloud Manager, greatly simplifies the user’s equipment deployment, management and maintenance.

- 2.5 x 24 configuration (i.e. Full Configuration)

Supports 24 2.5-inch SAS/SATA/SSD/NVME drives in the front, as shown in the figure below.

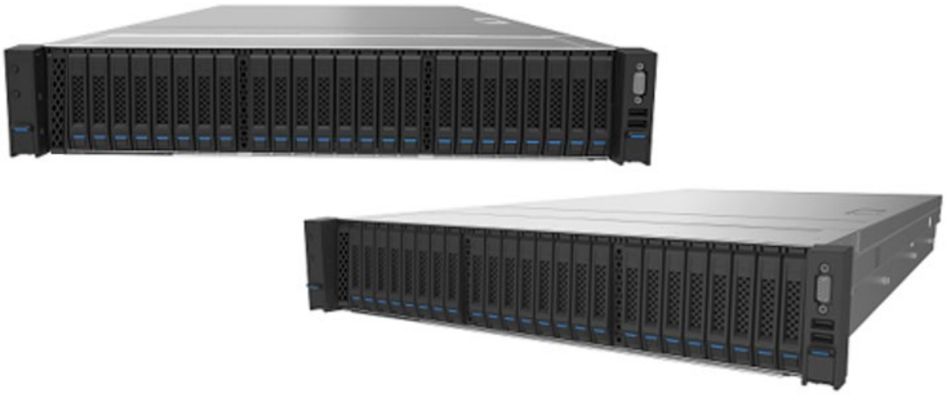


Figure 2-1

2.2 Features and Specifications

Table 2-1

Processor	
Processor Type	Supports 2/4 Skylake&Cascadelake Intel® Xeon® scalable processors Supports 81/82/61/62/51/52 series, TDP 205W
Chipset	
Chipset Type	Intel® C620 Series Chipset
Memory	
Memory Type	DDR4 RDIMM/LRDIMM 2400/2666MHZ, supports NVDIMM
Memory Slot Qty.	48
Total Memory Capacity	Supports up to 3072GB (64GB per memory)
I/O	
USB	1 front USB 3.0 port, 1 front USB 2.0 port, 2 rear USB 3.0 ports, 1 internal USB 3.0 port
VGA	1 front VGA port 1 rear VGA port
Serial Port	1 rear system serial port, 1 internal BMC Debug serial port
Display	
Controller Type	Integrated in the AST2500 chip, supports up to 1920*1200 resolution
PCIE Expansion	
PCI Expansion Slot	• 3 onboard PCI Express 3.0 x24 slots, used to support PCI-E Riser cards • Riser card can be inserted horizontally and supports full-height cards • 1 onboard Type A/C slot, used to support OCP/PHY card

Drive	
Drive Type	SSD/SATA/SAS/NVME: supports up to 24 2.5” SAS/SATA/SSD disks, and up to 6 NVME SSDs
External Storage Drive	
Optical Drive	Supports external USB drive
TF Card	Built-in TF card
Power	
Specification	Dual power supply with 800W/1300W/1600W/2000Wand above output power; 1+1 redundancy
Power Input	Please refer to the power input on the nameplate label of the host.
Physical	
External Dimensions of Packing box	651 width × 295 height × 1031 depth (unit: mm)
Size of Host Machine	435 width × 87 height × 779.5 depth (unit: mm)
Product Weight	2.5*24 full configuration (24 hard drives) Gross weight: 37.2kg (Gross weight includes: Host + Packing Box + Rails + Accessory Box)
Environmental	
Operating Temperature	10℃ -35℃
Storage & Transportation Temperature	-40℃ -60℃
Operating Humidity	20％ -80％ relative humidity
Storage & Transportation Humidity	20％ -93％ (40℃) relative humidity

2.3 Power Efficiency

Table 2-2

Efficiency Level	Rated Power	Efficiency			PF
		@20% Load	@50% Load	@100% Load	@50% Load
Platinum	800W	90%	94%	91%	0.98
	1300W	90%	94%	91%	0.98
	1600W	90%	94%	91%	0.98
	2000W	90%	94%	91%	0.98

Table 2-3

EU Regulation 2019/424 Server configurations	**High-end performance configuration**	**Low-end performance configuration**
(h) idle state power	342.8W	270.1W
(i) list of all components for additional idle power allowances, if any (additional PSU, HDDs or SSDs, additional memory, additional buffered DDR channels, additional I/O devices);	NA	NA
(j) maximum power, expressed in Watts and rounded to the first decimal place;	1268W	618.4W
(k) declared operating condition class, as detailed in Table 6;	A2	A2
(l) idle state power (Watts) at the higher boundary temperature of the declared operating condition class;	361.4W	286.1W
(m) the active state efficiency and the performance in active state of the server;	23.3	12.6

3 Component Identification

3.1 Front Panel Components

- 2.5” × 24 HDD Bays

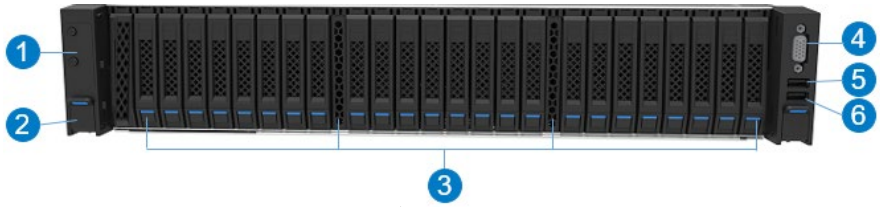


Figure 3-1

Figure 3-1

Item	Description
1	Front control panel buttons and LEDs
2	Quick release lever
3	HDD bays
4	VGA port
5	USB3.0 port
6	USB2.0 + LCD port

2.5” × 24 HDD sequence diagram

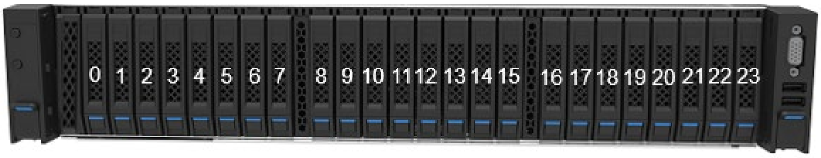


Figure 3-2

- Front Control Panel Buttons and LEDs

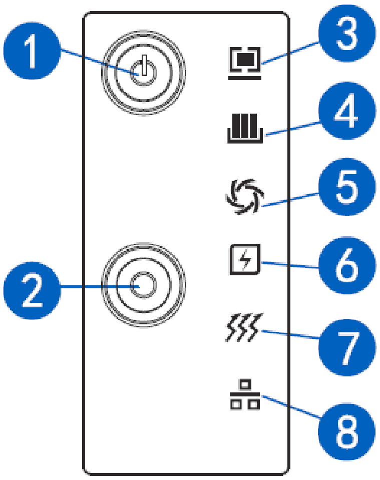


Figure 3-3

Figure 3-2

Item	Description
1	Power button
2	UID丨RST button
3	System failure LED
4	Memory failure LED
5	Fan failure LED
6	Power failure LED
7	System overheat LED
8	Network status LED

- HDD Tray LEDs

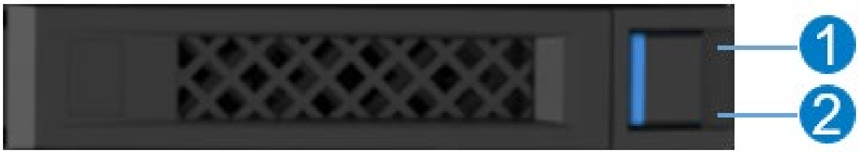


Figure 3-4

Figure 3-3

Item	Description	Status & Interpretation
1	Fault alarm LED	Steady red: An HDD failure occurs Steady blue: HDD positioning Steady pink: RAID rebuilding
2	Activity status LED	Steady green: Normal Flashing green: Read and write activity

3.2 Rear Panel Components

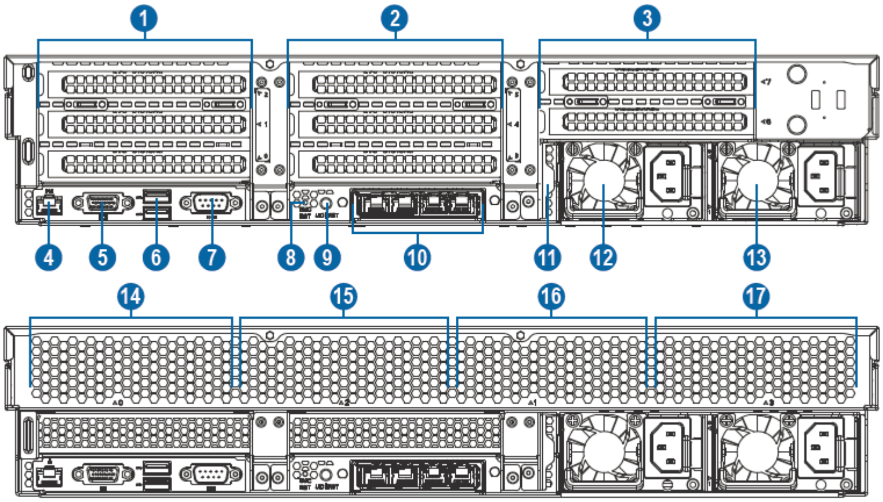


Figure 3-5

Figure 3-4

Item	Description
1	PCIE slots (CPU0/3)
2	PCIE slots (CPU0/1)
3	PCIE slots (CPU1)
4	MLAN port
5	VGA port
6	USB3.0 ports (2)
7	Serial port
8	BMC_RST button
9	UID│RST button
10	OCP card
11	RJ45 latch
12	PSU0
13	PSU1
14	GPU0
15	GPU2
16	GPU1
17	GPU3

3.3 Motherboard Components

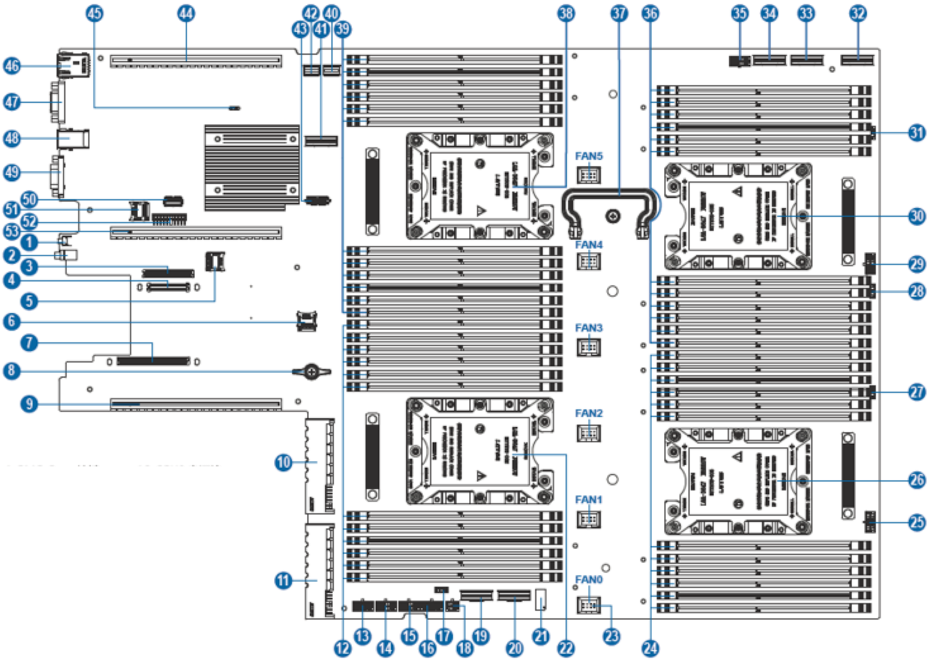


Figure 3-6

Figure 3-5

Item	Description
1	BMC_RST button
2	UID│RST button
3	OCPB connector
4	OCPC connector
5	PCH TF card slot
6	PSOC TF card slot
7	OCPA connector
8	Motherboard handle0
9	PCIE2_CPU1 slot
10	PSU0 connector
11	PSU1 connector
12	DIMM slots (CPU1)
13	GPU3 power connector0
14	GPU2 power connector
15	GPU1 power connector
16	GPU0 power connector
17	GPU3 I2C connector
18	GPU3 power connector1
19	PCIEX8_CPU2 Slimline connector0
20	PCIEX8_CPU2 Slimline connector1
21	Front panel left lug connector
22	CPU1 socket
23	Fan connectors (0-5)
24	DIMM slots (CPU2)
25	HDD_BP0 power connector
26	CPU2 socket
27	HDD_BP0 I2C connector
28	HDD_BP1 I2C connector
29	HDD_BP1 power connector
30	CPU3 socket
31	HDD_BP2 I2C connector
32	HDD_BP1 NVME connector
33	HDD_BP0 NVME connector
34	HDD_BP2 NVME connector
35	HDD_BP2 power connector
36	DIMM slots (CPU3)
37	Motherboard handle1

Item	Description
38	CPU0 socket
39	DIMM slots (CPU0)
40	Front panel right lug connector
41	M2_RISER connector
42	SATA0-3 connector
43	TPM_SPI connector
44	PCIE0_CPU0/3 slot
45	CLR_CMOS
46	Network management port
47	VGA port
48	USB3.0 ports (2)
49	Serial port
50	USB3.0 port (1)
51	BMC_TF connector
52	TPM_LPC connector
53	PCIE1_CPU0/1 slot

- Motherboard Jumper Introduction

See [3.3 Motherboard Components] for the jumper position.

Figure 3-6

Item	Description	Function
CLR_CMOS	CMOS clear jumper	Short-circuit pin1-2, normal status; Short-circuit pi n2-3, clear CMOS.

⚠ Note:

It is required to shut down the system, as well as disconnect the power supply during CMOS clearing. Short-circuit Pin2-3, hold for 5 seconds, and then short-circuit Pin1 and Pin2 (default setting) to restore to its original status.

4 Operations

4.1 Power up the Server

Insert the power cord plug, then press the Power Button.

4.2 Power down the Server

⚠ WARNING: To reduce the risk of personal injury, electric shock, or damage to the equipment, remove the power cord to remove power from the server. The front panel Power Button does not completely shut off system power. Portions of the power supply and some internal circuitry remain active until AC power is removed.

IMPORTANT: If installing a hot-plug device, it is not necessary to power down the server.

1. Back up the server data.
2. Shut down the operating system.
3. Disconnect the power cords.

The system is now without power.

4.3 Extend the Server from the Rack

1. Pull down the quick release levers on both sides of the server.
2. Extend the server from the rack.

⚠ WARNING: To reduce the risk of personal injury or equipment damage, be sure that the rack is adequately stabilized before extending a component from the rack.

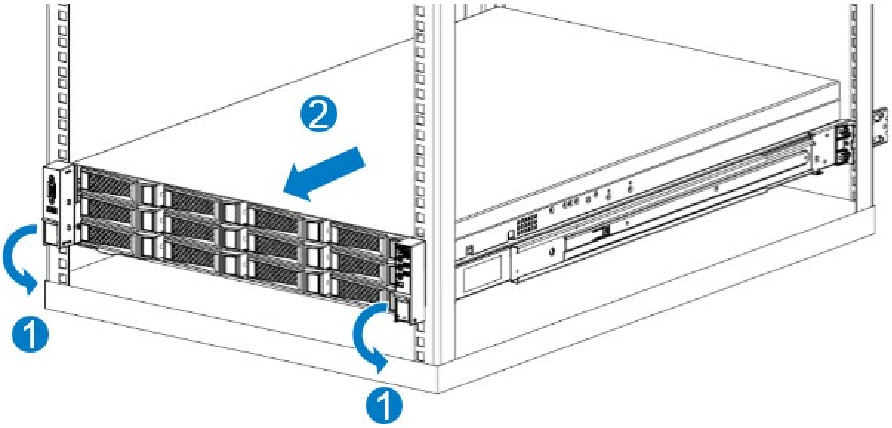


Figure 4-1

3. After performing the installation or maintenance procedure, slide the server back into the rack until it clicks into place.

⚠ WARNING: To reduce the risk of personal injury, be careful when sliding the server into the rack. The sliding rails could pinch your fingers.

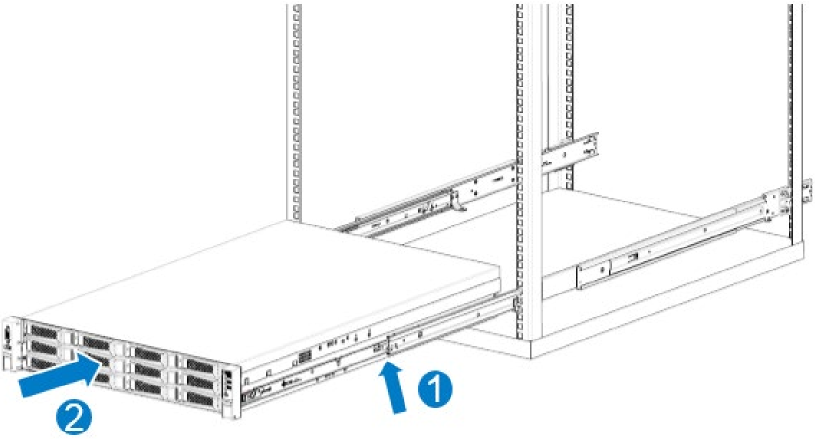


Figure 4-2

4.4 Remove the Access Panel

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

⚠ CAUTION: For proper cooling, do not operate the server without the access panel, air baffle, or fan installed. If the server supports hot-plug components, minimize the amount of time the access panel is open.

To remove the component:

1. Power down the server if performing a non-hot-plug installation or maintenance procedure.
2. Extend the server from the rack.
3. Loosen the security screws on the back of access panel.
4. Lift up on the hood latch handle, and then remove the front access panel.

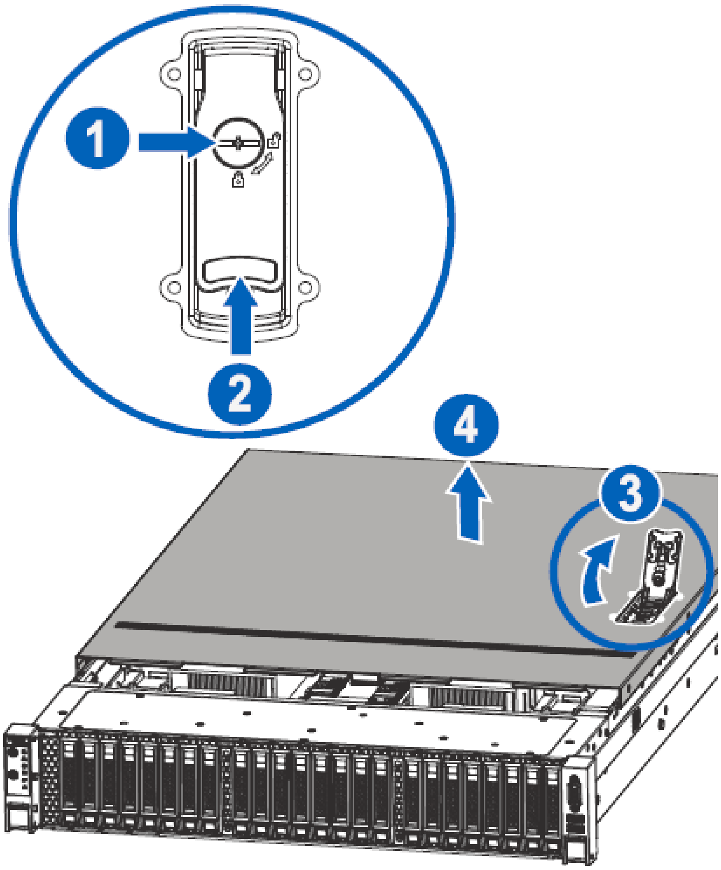


Figure 4-3

4.5 Install the Access Panel

1. Place the access panel on top of the server with the hood latch open. Allow the panel to extend past the rear of the server.
2. Push down on the hood latch. The access panel slides to a closed position.
3. Use the screwdriver to tighten the security screw on the hood latch.

4.6 Remove the PCIE Riser Cage

⚠ CAUTION: To prevent damage to the server or expansion boards, power down the server and remove all AC power cords before removing or installing the PCIE riser cage.

1. Power down the server.
2. Extend the server from the rack.
3. Remove the access panel.
4. Remove the PCIE Riser cage.

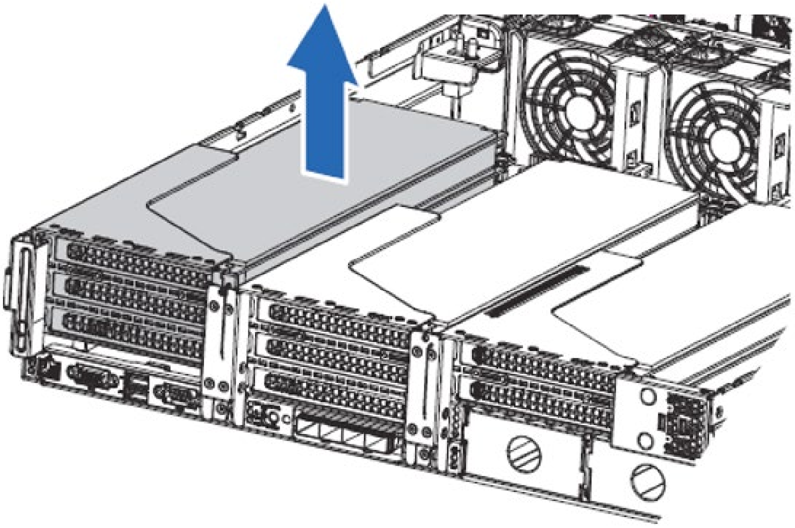


Figure 4-4

4.7 Install the PCIE Riser Cage

1. Power down the server.
2. Extend the server from the rack.
3. Remove the access panel.
4. Install the PCIE Riser cage.
5. Install the access panel.
6. Install the server into the rack.
7. Power up the server.

4.8 Remove the Air Baffle

⚠ CAUTION: For proper cooling, do not operate the server without the access panel, air baffle, or fan installed. If the server supports hot-plug components, minimize the amount of time the access panel is open.

1. Power down the server.
2. Extend or remove the server from the rack.
3. Remove the access panel.
4. Remove the air baffle.

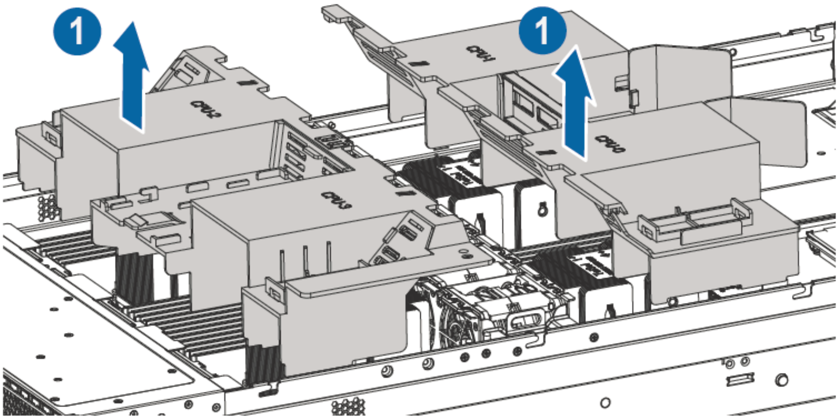


Figure 4-5

5 Setup

5.1 Optimum Environment

When installing the server in a rack, select a location that meets the environmental standards described in this section.

5.1.1 Space and Airflow Requirements

To allow for servicing and adequate airflow, observe the following space and airflow requirements when deciding where to install a rack:

- Leave a minimum clearance of 99 cm (39 in) in front of the rack.
- Leave a minimum clearance of 76.2 cm (30 in) behind the rack.
- Leave a minimum clearance of 121.9 cm (48 in) from the back of the rack to the back of another rack or row of racks.

Inspur servers draw in cool air through the front door and expel warm air through the rear door. Therefore, the front and rear rack doors must be adequately ventilated to allow ambient room air to enter the cabinet, and the rear door must be adequately ventilated to allow the warm air to escape from the cabinet.

⚠ CAUTION: To prevent improper cooling and damage to the equipment, do not block the ventilation openings.

When vertical space in the rack is not filled by a server or rack component, the gaps between the components cause changes in airflow through the rack and across the servers. Cover all gaps with blanking panels to maintain proper airflow.

⚠ CAUTION: Always use blanking panels to fill empty vertical spaces in the rack. This arrangement ensures proper airflow. Using a rack without blanking panels results in improper cooling that can lead to thermal damage.

⚠ CAUTION: If a third-party rack is used, observe the following additional requirements to ensure adequate airflow and to prevent damage to the equipment:

- Front and rear doors—If the 42U rack includes closing front and rear doors, you must allow 5,350 sq cm (830 sq in) of holes evenly distributed from top to bottom to permit adequate airflow (equivalent to the required 64 percent open area for ventilation).
- Side—The clearance between the installed rack component and the side panels of the rack must be a minimum of 7 cm (2.75 in).

5.1.2 Temperature Requirements

To ensure continued safe and reliable equipment operation, install or position the system in a well-ventilated, climate-controlled environment.

The maximum recommended ambient operating temperature (TMRA) for most server products is 35°C (95°F). The temperature in the room where the rack is located must not exceed 35°C (95°F).

⚠ CAUTION: To reduce the risk of damage to the equipment when installing third-party options:

- Do not permit optional equipment to impede airflow around the server or to increase the internal rack temperature beyond the maximum allowable limits.
- Do not exceed the manufacturer's TMRA.

5.1.3 Power Requirements

Installation of this equipment must comply with local and regional electrical regulations governing the installation of information technology equipment by licensed electricians. This equipment is designed to operate in installations covered by NFPA 70, 1999 Edition (National Electric Code) and NFPA-75, 1992 (code for Protection of Electronic Computer/ Data Processing Equipment). For electrical power ratings on options, refer to the product rating label or the user documentation supplied with that option.

⚠ WARNING: To reduce the risk of personal injury, fire, or damage to the equipment, do not overload the AC supply branch circuit that provides power to the rack. Consult the electrical authority having jurisdiction over wiring and installation requirements of your facility.

⚠ CAUTION: Protect the server from power fluctuations and temporary interruptions with a regulating uninterruptible power supply (UPS). This device protects the hardware from damage caused by power surges and voltage spikes and keeps the system in operation during a power failure.

When installing more than one server, you may need to use additional power distribution devices to safely provide power to all devices. Observe the following guidelines:

- Balance the server power load between available AC supply branch circuits.
- Do not allow the overall system AC current load to exceed 80 percent of the branch circuit AC current rating.
- Do not use common power outlet strips for this equipment.
- Provide a separate electrical circuit for the server.

5.1.4 Electrical Grounding Requirements

The server must be grounded properly for optimal operation and safety. In the United States, you must install the equipment in accordance with NFPA 70, 1999 Edition (National Electric Code), Article 250, as well as any local and regional building codes.

In Canada, you must install the equipment in accordance with Canadian Standards Association, CSA C22.1, and Canadian Electrical Code. In all other countries, you must install the equipment in accordance with any regional or national electrical wiring codes, such as the International Electrotechnical Commission (IEC) Code 364, parts 1 through 7. Furthermore, you must be sure that all power distribution devices used in the installation, such as branch wiring and receptacles, are listed or certified grounding-type devices.

Because of the high ground-leakage currents associated with multiple servers connected to the same power source, Inspur recommends the use of a PDU that is either permanently wired to the building’s branch circuit or includes a nondetachable cord that is wired to an industrial-style plug. NEMA locking-style plugs or those complying with IEC 60309 are considered suitable for this purpose. Using common power outlet strips for the server is not recommended.

5.2 Rack Warnings

⚠ WARNING: To reduce the risk of personal injury or damage to the equipment, please be sure of the following:

- The leveling jacks are extended to the floor.
- The full weight of the rack rests on the leveling jacks.
- The stabilizing feet are attached to the rack if it is a single-rack installation.
- The racks are coupled together in multiple-rack installations.
- Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.

⚠ WARNING: To reduce the risk of personal injury or equipment damage when unloading a rack:

- At least two people are needed to safely unload the rack from the pallet. An empty 42U rack can weigh as much as 115 kg (253 lb), can stand more than 2.1 m (7 ft) tall, and may become unstable when being moved on its casters.
- Never stand in front of the rack when it is rolling down the ramp from the pallet. Always handle the rack from both sides.

5.3 Identifying the Contents of the Server Shipping Carton

Unpack the server shipping carton and locate the materials and documentation necessary for installing the server. All the rack mounting hardware necessary for installing the server into the rack is included with the rack or the server.

The contents of the server shipping carton include:

- Server (containing the software driver TF card)
- Power cord
- Rack-mounting hardware

In addition to the supplied items, you may need:

- Operating system or application software
- Hardware options

5.4 Installing Hardware Options

Install any hardware options before initializing the server. For options installation information, refer to the option documentation. For server-specific information, refer to “Hardware options installation”.

5.5 Installing the Server into the Rack

⚠ CAUTION: Always plan the rack installation so that the heaviest item is on the bottom of the rack. Install the heaviest item first, and continue to populate the rack from the bottom to the top.

1. Install the server and cable management arm into the rack. For more information, see the installation instructions included with the 2U Slide Rail System.
2. Connect peripheral devices to the server. For connector identification information, see “Rear panel components” in this guide.

⚠ WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into RJ-45 connectors.

3. Connect the power cord to the rear of the server.
4. Connect the power cord to the AC power source.

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

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

5.6 Installing the Operating System

To operate properly, the server must have a supported operating system installed. For the latest information on supported operating systems, refer to the Inspur website (http://www.inspur.com/eportal/ui?pageId=2317460).

To install the operating system on the server, you can download from the official website directly.

6 Hardware Options Installation

6.1 Introduction

If more than one option is being installed, read the installation instructions for all the hardware options and identify similar steps to streamline the installation process.

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

⚠ CAUTION: To prevent damage to electrical components, properly ground the server before beginning any installation procedure. Improper grounding can cause electrostatic discharge.

6.2 Processor Option

The server supports single- and dual-processor operation.

⚠ CAUTION: To avoid damage to the processor and system board, only authorized personnel should attempt to replace or install the processor in this server.
To help avoid damage to the processor and system board, do not install the processor without using the processor installation tool.

⚠ CAUTION: To prevent possible server malfunction and damage to the equipment, multiprocessor configurations must contain processors with the same part number.

⚠ CAUTION: To install a faster processor, update the system ROM before installing the processor.

To install the component:

1. Power down the server.
2. Extend the server from the rack.
3. Remove the access panel.
4. Remove the air baffle.
5. Remove the heatsink.
6. Install the processor:

Step 1: Align the Clip's triangle mark with the CPU's corner mark, and then assemble the Clip and CPU together.

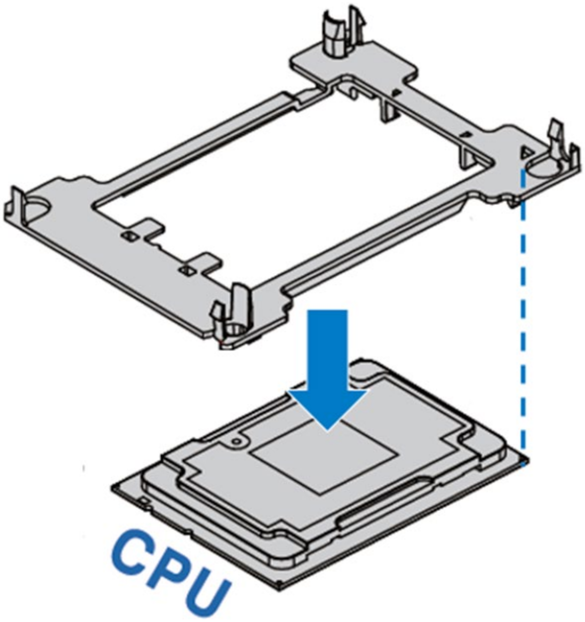


Figure 6-1

Step 2: Align the heatsink position marked by “1” with the Clip’s triangle mark, vertically align the mounting holes on the heatsink with those on the Clip, and assemble the heatsink and Clip together.

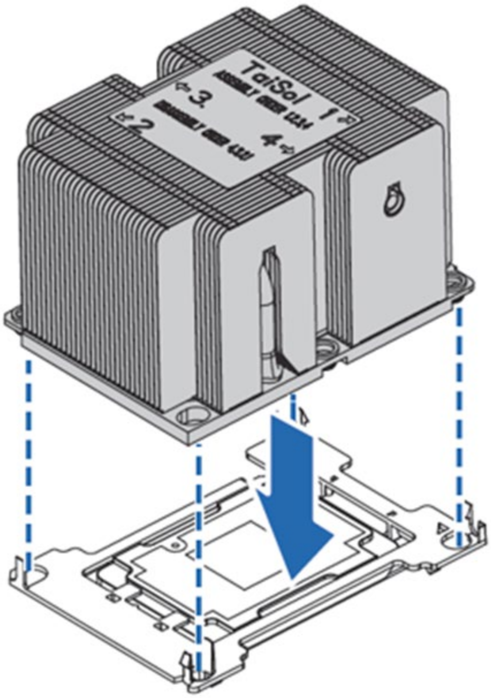


Figure 6-2

Step 3: Install the assembled heatsink module onto the CPU socket, and the position marked by “1” should be aligned with the triangle mark on the CPU socket. Tighten the screws according to the sequence of 1, 2, 3, 4.

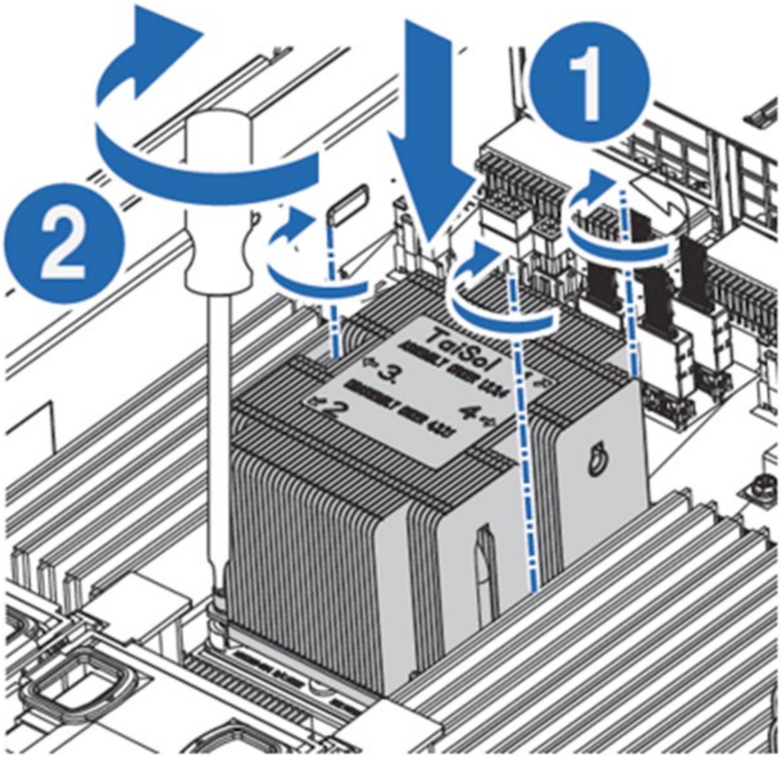


Figure 6-3

⚠ Notes:

● It is required to coat thermal grease evenly onto the contact position between CPU heatsink and CPU.

● During fixing CPU heatsink, it is required to fasten bolts according to the sequence accordingly.

6.3 Memory Option

IMPORTANT:

This server does not support mixing DIMMs. Attempting to mix the DIMMs of different types may cause the server stops running during initialization.

All DIMMs installed in the server must be the same type.

● DIMM slot layout is as shown in the following figure:

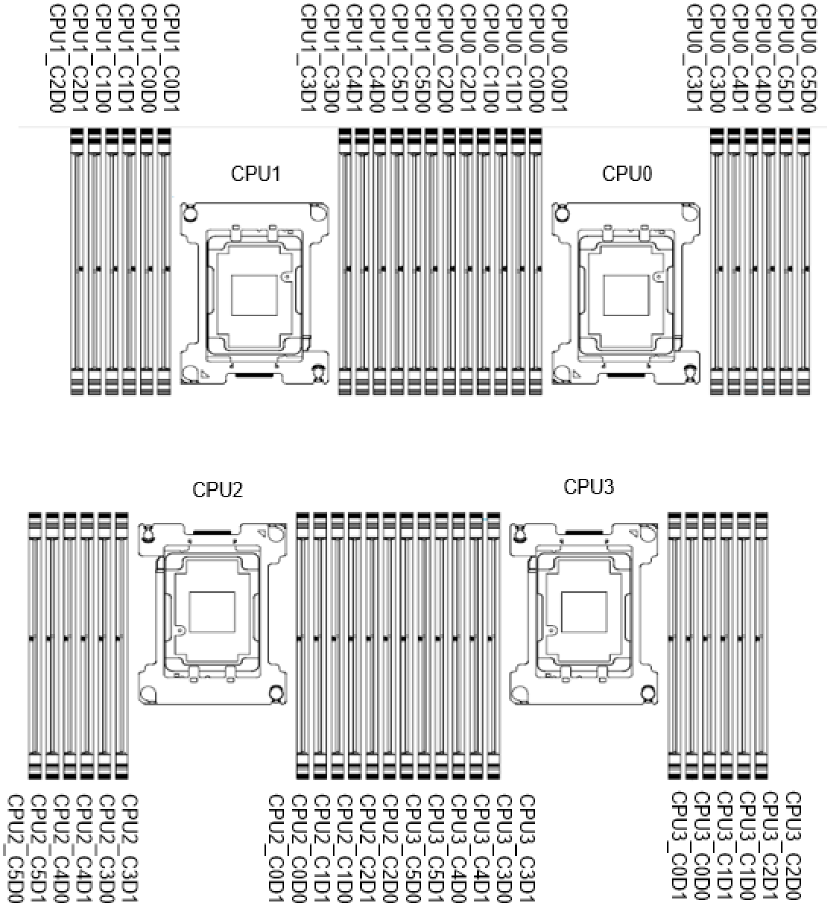
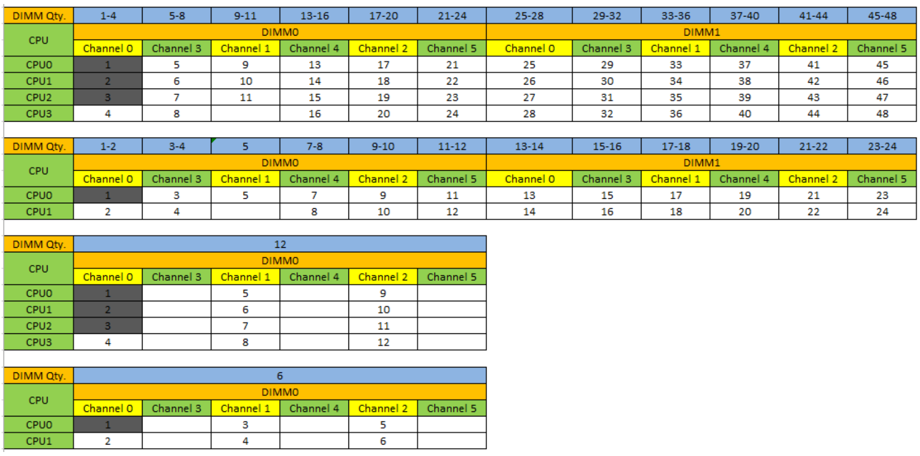


Figure 6-4

- DIMM population guidelines:



DIMM Qty.	1-4	5-8	9-11	13-16	17-20	21-24	25-28	29-32	33-36	37-40	41-44	45-48
CPU	DIMM0						DIMM1					
	Channel 0	Channel 3	Channel 1	Channel 4	Channel 2	Channel 5	Channel 0	Channel 3	Channel 1	Channel 4	Channel 2	Channel 5
CPU0	1	5	9	13	17	21	25	29	33	37	41	45
CPU1	2	6	10	14	18	22	26	30	34	38	42	46
CPU2	3	7	11	15	19	23	27	31	35	39	43	47
CPU3	4	8		16	20	24	28	32	36	40	44	48

DIMM Qty.	1-2	3-4	5	7-8	9-10	11-12	13-14	15-16	17-18	19-20	21-22	23-24
CPU	DIMM0						DIMM1					
	Channel 0	Channel 3	Channel 1	Channel 4	Channel 2	Channel 5	Channel 0	Channel 3	Channel 1	Channel 4	Channel 2	Channel 5
CPU0	1	3	5	7	9	11	13	15	17	19	21	23
CPU1	2	4		8	10	12	14	16	18	20	22	24

DIMM Qty.	12					
CPU	DIMM0					
	Channel 0	Channel 3	Channel 1	Channel 4	Channel 2	Channel 5
CPU0	1		5		9	
CPU1	2		6		10	
CPU2	3		7		11	
CPU3	4		8		12	

DIMM Qty.	6					
CPU	DIMM0					
	Channel 0	Channel 3	Channel 1	Channel 4	Channel 2	Channel 5
CPU0	1		3		5	
CPU1	2		4		6	

Figure 6-5

C=Channel D=DIMM   C0D0=Channel0 DIMM0

1. Each CPU should be installed with 1 DIMM at least. If there is only 1 DIMM, install it into C0-D0.

2. DIMMs are evenly distributed to each CPU by the amount of DIMM quantity/4. If the total number is not a multiple of 4, install them in order of CPU0/1/2/3.

Step 1: Open the lock tabs on both ends of the DIMM slot.

Step 2: Align the bottom key with the receptive point on the slot, press both ends of the DIMM with your thumbs. Insert the DIMM into the slot completely, and the lock tabs will automatically secure the DIMM, locking it into place.

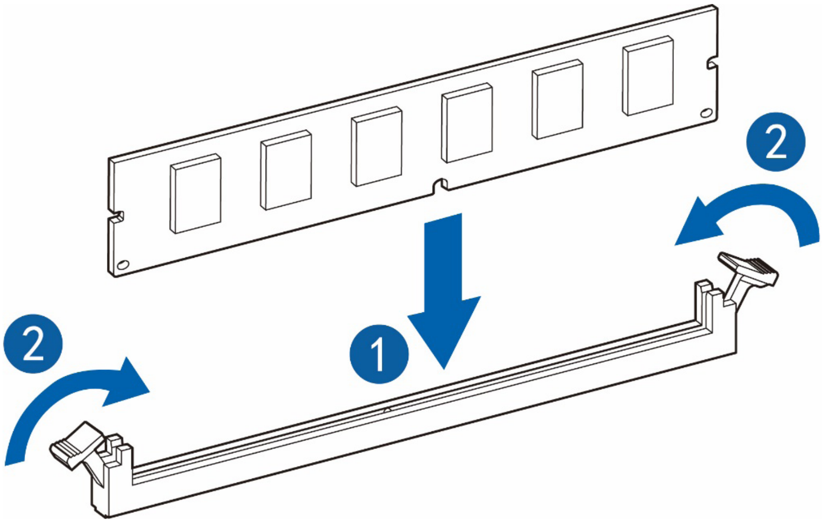


Figure 6-6

6.4 Hot-plug HDD Option

⚠

⚠ CAUTION: For proper cooling, do not operate the server without the access panel, baffles, expansion slot covers, or blanks installed. If the server supports hot-plug components, minimize the amount of time the access panel is open.

1. Check the status of the hard disk drive through the LED on the HDD tray.
2. Back up all data on the hard disk drive.
3. Remove the hard disk drive.

Step 1: Press the HDD panel button.

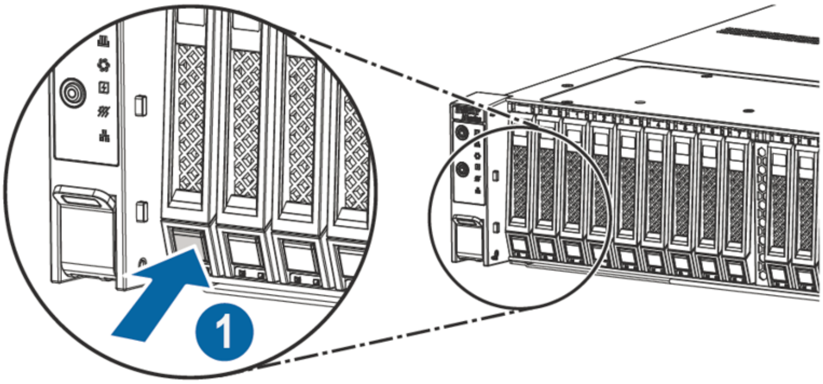


Figure 6-7

Step 2: The lever on HDD tray pops up automatically, pull it outwards and remove the HDD tray.

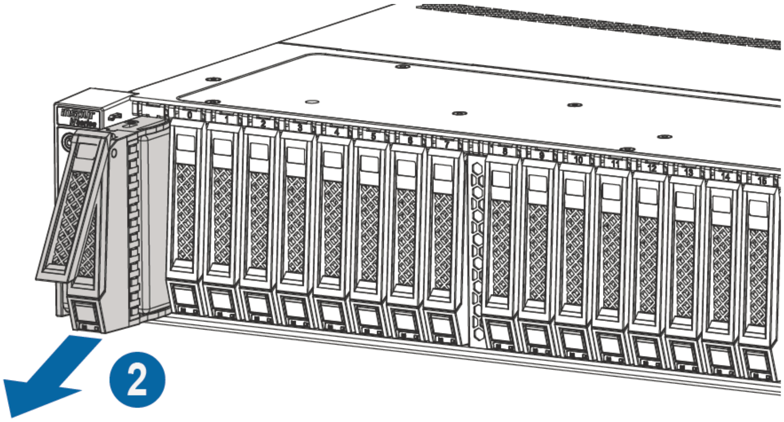


Figure 6-8

Step 3: Use four screws to fix the HDD into the tray.

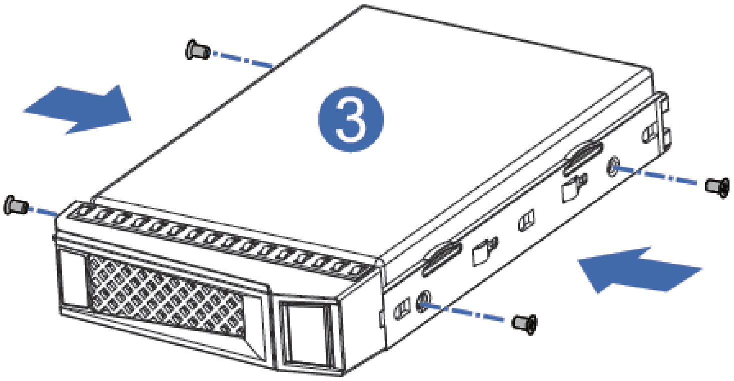


Figure 6-9

Step 4: Install the HDD into the chassis, and lock the lever firmly.

6.5 Redundant Hot-plug Power Supply Option

⚠ CAUTION: To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

1. Access the product rear panel.
2. Remove the power supply blank.

⚠ WARNING: To reduce the risk of personal injury from hot surfaces, allow the power supply or power supply blank to cool before touching it.

3. Install the power supply into the power supply bay.

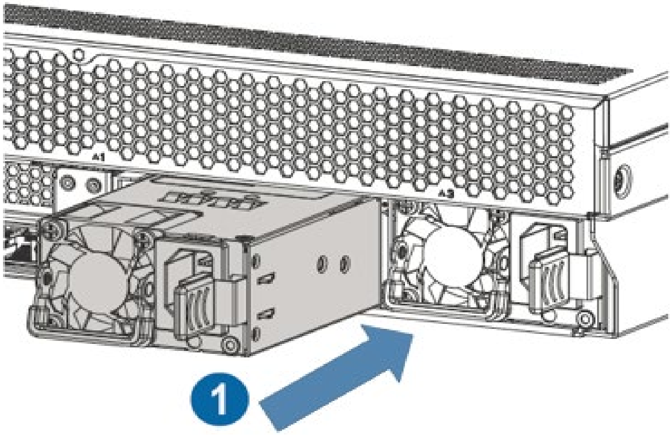


Figure 6-10

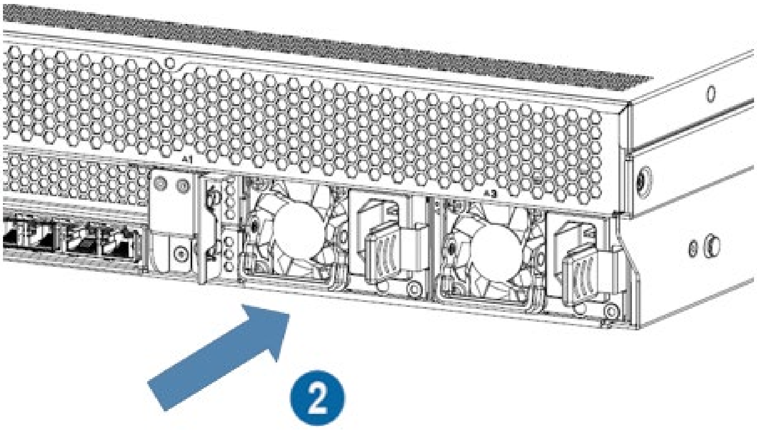


Figure 6-11

4. Connect the power cord to the power supply.
5. Route the power cord through the power cord anchor or cable management arm.
6. Reposition the cable management arm into the operating position.
7. Connect the power cord to the power source.
8. Verify that the corresponding power supply LED is green.

6.6 Air Baffle Option

CAUTION: For proper cooling, do not operate the server without the access panel, baffles, expansion slot covers, or blanks installed. If the server supports hot-plug components, minimize the amount of time the access panel is open.

1. Power down the server.
2. Extend the server from the rack.

WARNING: To reduce the risk of personal injury from hot surfaces, allow the machine to cool before touching it.

3. Remove the access panel.
4. Hold the air baffle with two hands, and remove it vertically to replace it with a new one.

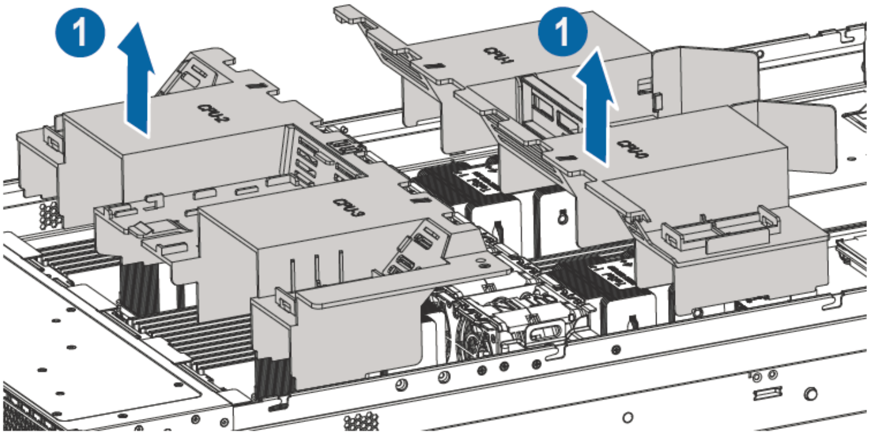


Figure 6-12

7 BIOS Setup

BIOS is the basic input/output system, which is the basic program code loaded in the motherboard chipset. It stores the computer's most important input/output program, POST program and system auto-boot program. It provides the most basic and most direct hardware settings and control, detects the boot device, and boots the system or other preboot execution environment.

NF8260M5 server is developed on the basis of AMI Codebase, supporting Legacy and UEFI operating environments, with abundant in-band and out-of-band configuration functions and scalability. It can meet the customization needs of different customers.

⚠ Notes:

1. We recommend that you record the original BIOS settings before you modify them so it can safely revert to its previous state if required.

2. The factory default settings are the optimal settings. It is advised not to alter the parameters before understanding their denotations.

3. The common settings are introduced in detail in this chapter, but less common ones are not.

4. The BIOS content varies according to different configurations of the products; hence the detailed introduction is elided.

7.1 Common Operations

7.1.1 Login to BIOS Interface

Power on the server. The system will then start to boot. When "Press <DEL> to Setup or <TAB> to post or <F11> to Boot Menu or <F12> to PXE Boot." appears below Inspur logo on the screen, press DEL key. When "Entering Setup …" appears in the lower right corner of the screen, it will enter the BIOS setup soon. In the BIOS main menu, you could select the subitem through direction keys to enter the submenu.

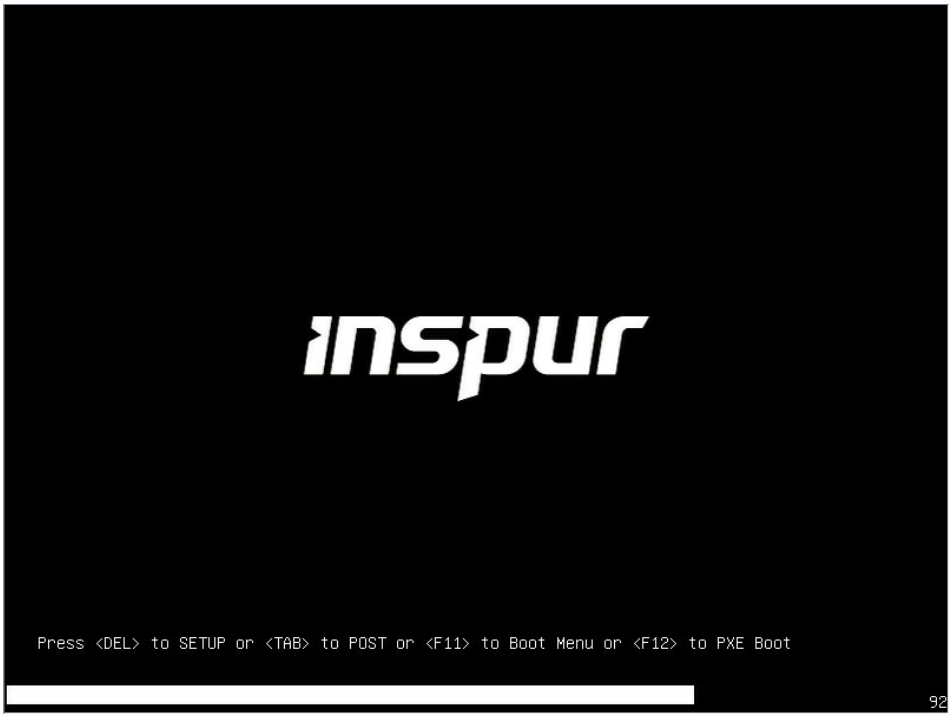
Other hotkeys function:

- Press F2 to enter BIOS Setup interface.
- Press TAB to display the system information during POST.
- Press F11 to enter the BIOS Boot Manager interface, select the boot device.
- Press F12 to boot the PXE.

Table 7-1 BIOS Setup Interface Control Key Instruction Table

Key	**Function**
<Esc>	Exit or return from submenu to main menu
<←> or <→>	Select a menu
<↑> or <↓>	Move the cursor up or down
<Home> or <End>	Move the cursor to the top or bottom of the screen
<+> or <->	Select the previous or next numerical value or setting of the current one
<F1>	Help
<F2>	Restore to the last configuration
<F9>	Restore to the default configuration
<F10>	Save and exit
<Enter>	Execute commands or select a submenu

⚠ Note: Options in grey are not available. Options with symbol "▶" have a sub-menu.



```
Press <DEL> to SETUP or <TAB> to POST or <F11> to Boot Menu or <F12> to PXE Boot
```

92

Figure 7-1

7.1.2 UEFI/Legacy Mode Switch

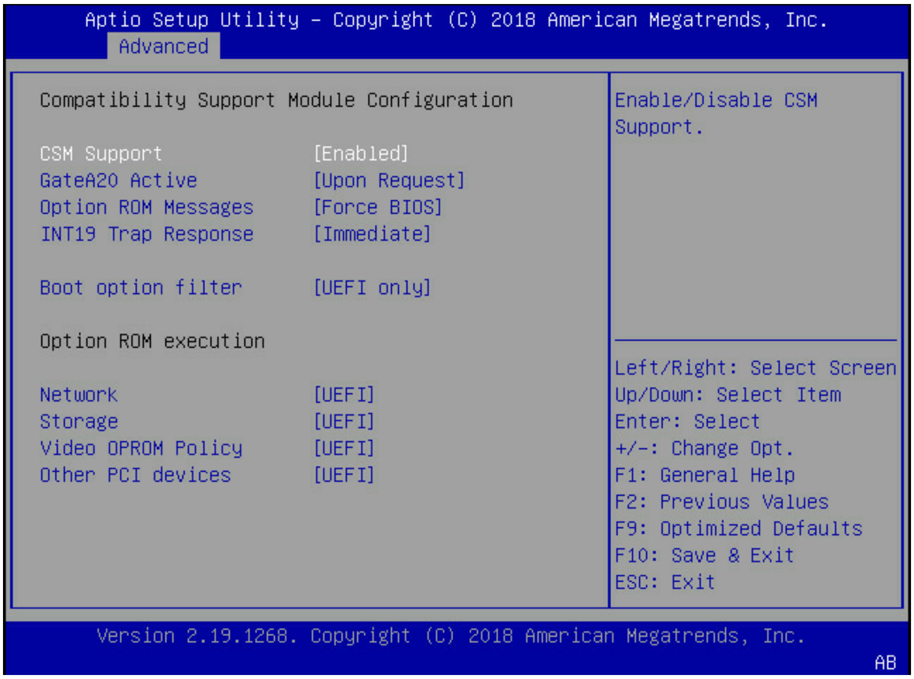
Login to the BIOS Setup interface, select "Advanced -> CSM Configuration". Press Enter, to set the Boot Mode (UEFI Mode/Legacy Mode). Set the Option ROM execution mode of

Network, Storage, Video Oprom Policy and Other PCI devices, as shown in the following figure.

At present, NF8260M5 server is set to UEFI Mode by default. Compared with Legacy mode, UEFI mode has many advantages: it supports boot from the GPT disk, supports IPv6/IPv4 PXE boot, and provides UEFI Shell environment. This option can be set according to customer's demand.

If the Boot Option Filter is set to Legacy Only, the Option ROM execution mode of Network, Storage, Video OPROM Policy and Other PCI devices must be set to Legacy.

If the Boot Option Filter is set to UEFI Only, the Option ROM execution mode of Network must be set to UEFI, and the Option ROM execution mode of Storage, Video OPROM Policy and Other PCI devices is suggested to set to UEFI.

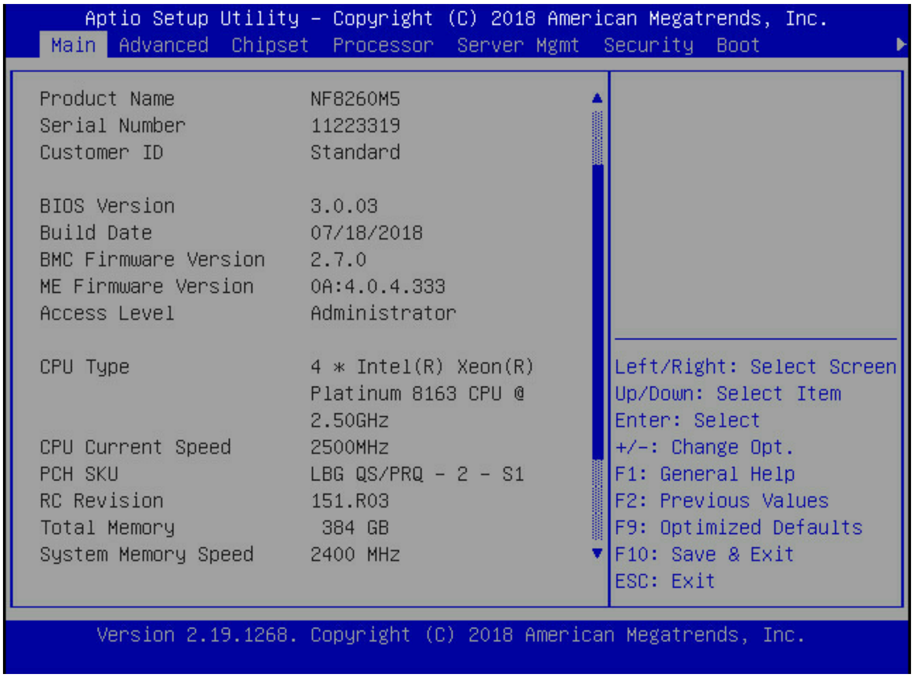


```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
     Advanced

Compatibility Support Module Configuration          Enable/Disable CSM
                                                    Support.
CSM Support               [Enabled]
GateA20 Active            [Upon Request]
Option ROM Messages       [Force BIOS]
INT19 Trap Response       [Immediate]

Boot option filter        [UEFI only]

Option ROM execution
                                                    Left/Right: Select Screen
Network                   [UEFI]                    Up/Down: Select Item
Storage                   [UEFI]                    Enter: Select
Video OPROM Policy        [UEFI]                    +/-: Change Opt.
Other PCI devices         [UEFI]                    F1: General Help
                                                    F2: Previous Values
                                                    F9: Optimized Defaults
                                                    F10: Save & Exit
                                                    ESC: Exit

Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                AB
```

Figure 7-2

7.1.3 View System Information

Login to the BIOS Setup interface, and the Main menu displays the current system information, including BIOS/BMC/ME version, CPU/PCH SKU/RC version, memory and other information, as shown in the following figure.

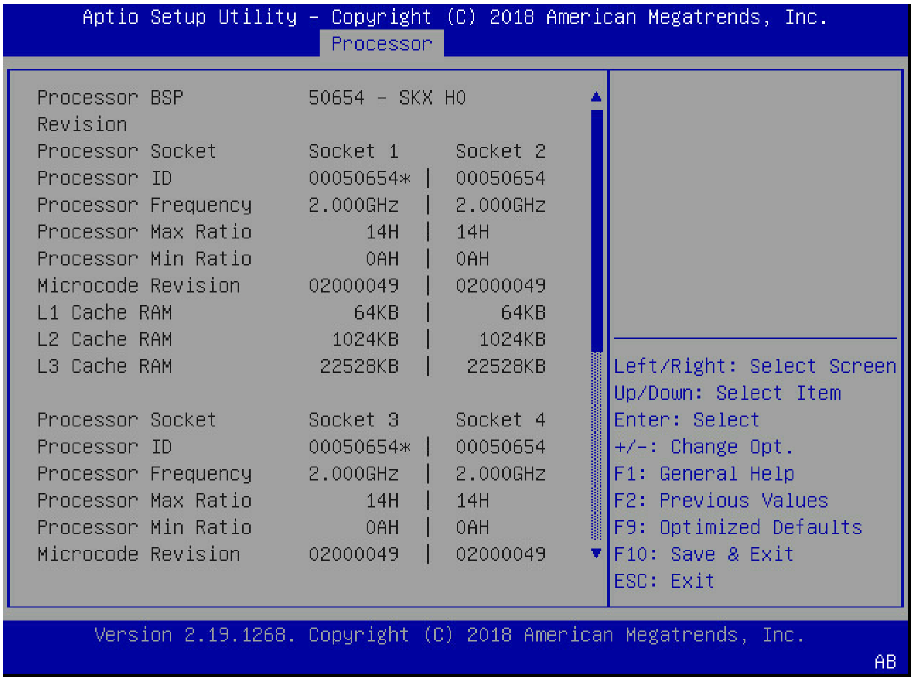


```
        Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
    Main  Advanced  Chipset  Processor  Server Mgmt  Security  Boot              ►

  Product Name             NF8260M5                 ▲
  Serial Number            11223319
  Customer ID              Standard

  BIOS Version             3.0.03
  Build Date               07/18/2018
  BMC Firmware Version     2.7.0
  ME Firmware Version      0A:4.0.4.333
  Access Level             Administrator

  CPU Type                 4 * Intel(R) Xeon(R)          Left/Right: Select Screen
                           Platinum 8163 CPU @           Up/Down: Select Item
                           2.50GHz                       Enter: Select
  CPU Current Speed        2500MHz                       +/-: Change Opt.
  PCH SKU                  LBG QS/PRQ - 2 - S1           F1: General Help
  RC Revision              151.R03                       F2: Previous Values
  Total Memory              384 GB                       F9: Optimized Defaults
  System Memory Speed      2400 MHz                 ▼    F10: Save & Exit
                                                         ESC: Exit

         Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
```

Figure 7-3

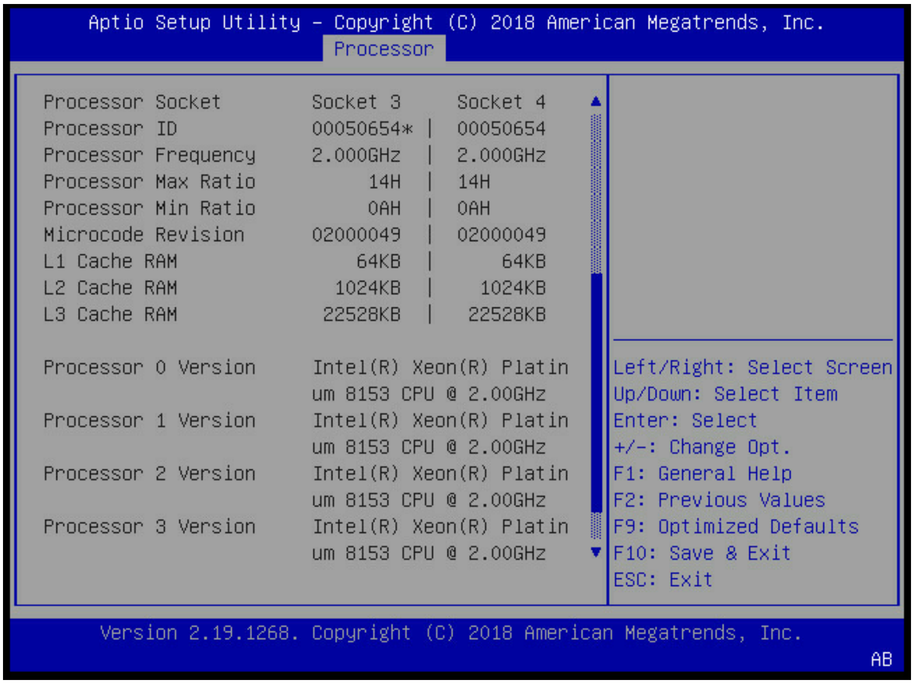
7.1.4 View CPU Information

Login to the BIOS interface, select "Processor -> Processor Configuration -> Processor Information", and press Enter to display the CPU detailed information, as shown in the following figure.



```
        Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
                                   Processor

  Processor BSP            50654 - SKX H0                ▲
  Revision
  Processor Socket         Socket 1      Socket 2
  Processor ID             00050654* |   00050654
  Processor Frequency      2.000GHz  |   2.000GHz
  Processor Max Ratio           14H  |   14H
  Processor Min Ratio           0AH  |   0AH
  Microcode Revision       02000049  |   02000049
  L1 Cache RAM                 64KB  |       64KB
  L2 Cache RAM               1024KB  |     1024KB
  L3 Cache RAM              22528KB  |    22528KB             Left/Right: Select Screen
                                                              Up/Down: Select Item
  Processor Socket         Socket 3      Socket 4             Enter: Select
  Processor ID             00050654* |   00050654             +/-: Change Opt.
  Processor Frequency      2.000GHz  |   2.000GHz             F1: General Help
  Processor Max Ratio           14H  |   14H                  F2: Previous Values
  Processor Min Ratio           0AH  |   0AH                  F9: Optimized Defaults
  Microcode Revision       02000049  |   02000049        ▼    F10: Save & Exit
                                                              ESC: Exit

         Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                           AB
```

Figure 7-4

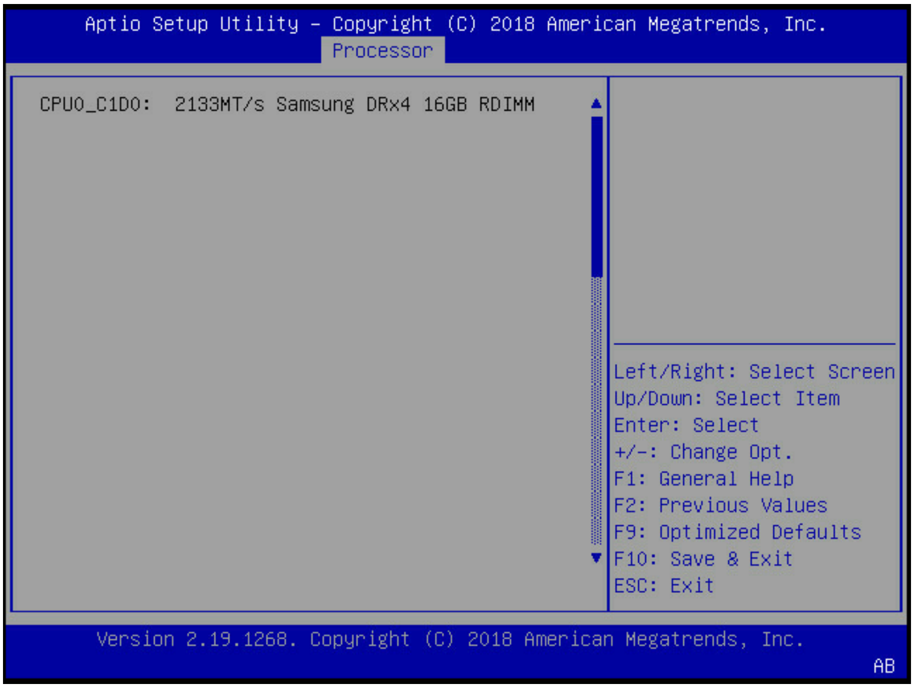


```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                          Processor

Processor Socket        Socket 3      Socket 4       ▲
Processor ID            00050654* |  00050654
Processor Frequency     2.000GHz  |  2.000GHz
Processor Max Ratio          14H  |  14H
Processor Min Ratio          0AH  |  0AH
Microcode Revision      02000049  |  02000049
L1 Cache RAM                64KB  |      64KB
L2 Cache RAM              1024KB  |    1024KB
L3 Cache RAM             22528KB  |   22528KB

Processor 0 Version     Intel(R) Xeon(R) Platin     Left/Right: Select Screen
                        um 8153 CPU @ 2.00GHz       Up/Down: Select Item
Processor 1 Version     Intel(R) Xeon(R) Platin     Enter: Select
                        um 8153 CPU @ 2.00GHz       +/-: Change Opt.
Processor 2 Version     Intel(R) Xeon(R) Platin     F1: General Help
                        um 8153 CPU @ 2.00GHz       F2: Previous Values
Processor 3 Version     Intel(R) Xeon(R) Platin     F9: Optimized Defaults
                        um 8153 CPU @ 2.00GHz  ▼    F10: Save & Exit
                                                    ESC: Exit

Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                              AB
```

Figure 7-5

7.1.5 View Memory Information

Login to the BIOS interface, select “Processor -> Memory Configuration -> Memory Topology”, and press Enter to display the manufacturer, speed, capacity and other information of the memories in position, as shown in the following figure.



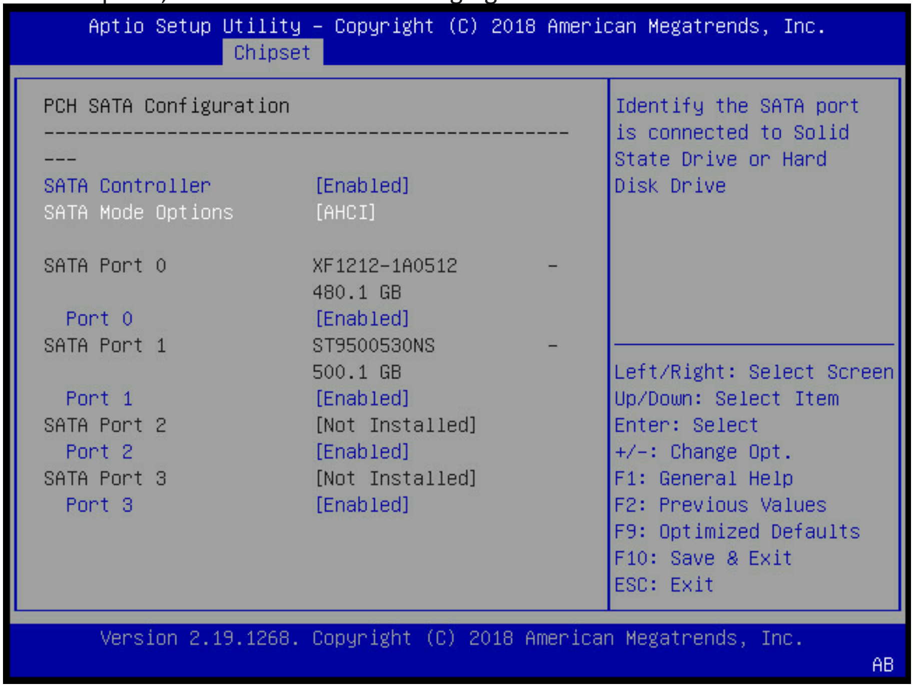
```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                          Processor

CPU0_C1D0:  2133MT/s Samsung DRx4 16GB RDIMM         ▲

                                                    Left/Right: Select Screen
                                                    Up/Down: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F9: Optimized Defaults
                                                 ▼  F10: Save & Exit
                                                    ESC: Exit

Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                              AB
```

Figure 7-6

7.1.6 View HDD Information and RAID Configuration

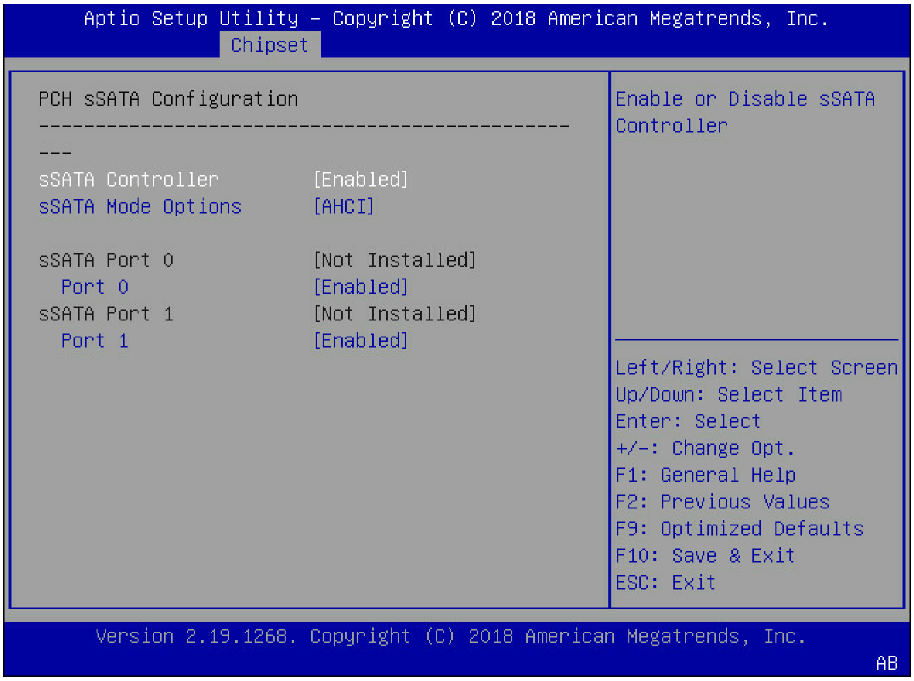
7.1.6.1 View HDD Information

Login to the BIOS interface, select “Chipset -> PCH SATA Configuration/PCH sSATA Configuration”, and press Enter to display the HDD information of the current onboard SATA ports or sSATA ports, as shown in the following figures.



```
      Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
                         Chipset

 PCH SATA Configuration                         Identify the SATA port
 -----------------------------------------------is connected to Solid
 ---                                            State Drive or Hard
 SATA Controller          [Enabled]             Disk Drive
 SATA Mode Options        [AHCI]

 SATA Port 0              XF1212-1A0512      -
                          480.1 GB
   Port 0                 [Enabled]
 SATA Port 1              ST9500530NS        -
                          500.1 GB              Left/Right: Select Screen
   Port 1                 [Enabled]             Up/Down: Select Item
 SATA Port 2              [Not Installed]       Enter: Select
   Port 2                 [Enabled]             +/-: Change Opt.
 SATA Port 3              [Not Installed]       F1: General Help
   Port 3                 [Enabled]             F2: Previous Values
                                                F9: Optimized Defaults
                                                F10: Save & Exit
                                                ESC: Exit

      Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                     AB
```

Figure 7-7



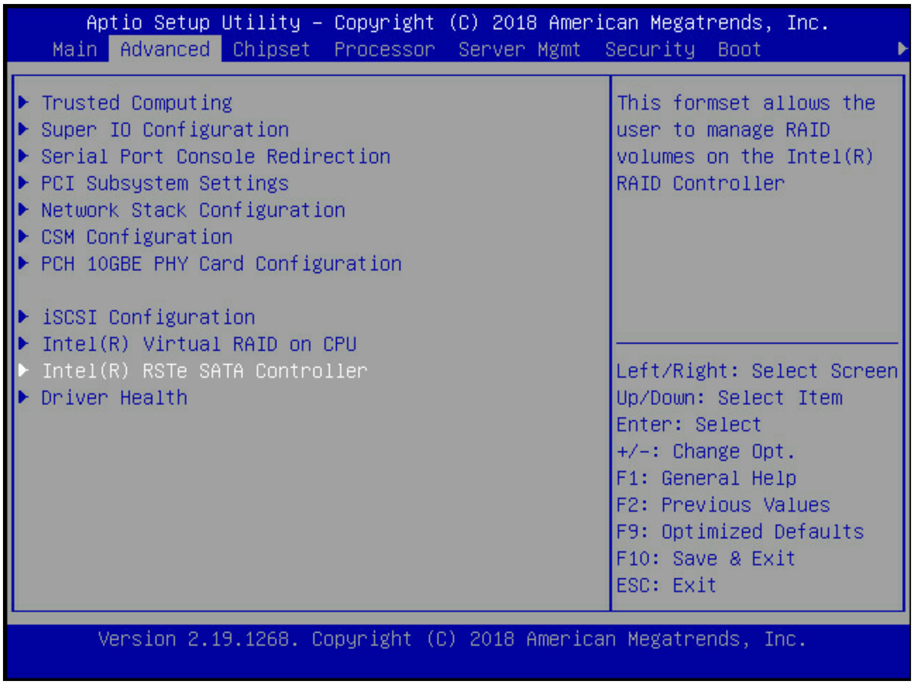
```
      Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
                         Chipset

 PCH sSATA Configuration                        Enable or Disable sSATA
 -----------------------------------------------Controller
 ---
 sSATA Controller         [Enabled]
 sSATA Mode Options       [AHCI]

 sSATA Port 0             [Not Installed]
   Port 0                 [Enabled]
 sSATA Port 1             [Not Installed]
   Port 1                 [Enabled]
                                                Left/Right: Select Screen
                                                Up/Down: Select Item
                                                Enter: Select
                                                +/-: Change Opt.
                                                F1: General Help
                                                F2: Previous Values
                                                F9: Optimized Defaults
                                                F10: Save & Exit
                                                ESC: Exit

      Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                     AB
```

Figure 7-8

7.1.6.2 HDD RAID Mode Settings

1. Set the SATA Mode Option to [RAID], press F10 to save the setting, and the system reboots.

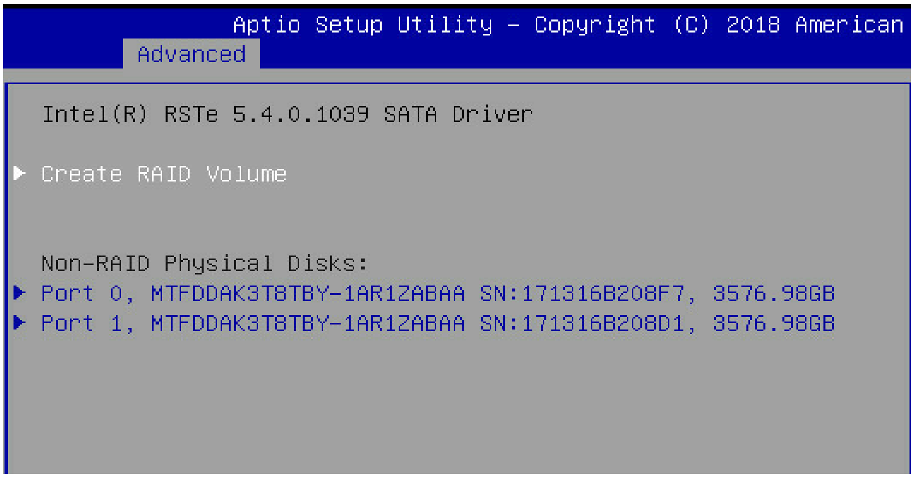
2. When Boot Mode is set to UEFI mode, in the BIOS Setup Advanced interface, there will be the Intel(R) RSTe SATA Controller menu, as shown in the following figure.



```
        Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
     Main  Advanced  Chipset  Processor  Server Mgmt  Security  Boot        ▶

 ▶ Trusted Computing                                   This formset allows the
 ▶ Super IO Configuration                              user to manage RAID
 ▶ Serial Port Console Redirection                     volumes on the Intel(R)
 ▶ PCI Subsystem Settings                              RAID Controller
 ▶ Network Stack Configuration
 ▶ CSM Configuration
 ▶ PCH 10GBE PHY Card Configuration

 ▶ iSCSI Configuration
 ▶ Intel(R) Virtual RAID on CPU
 ▶ Intel(R) RSTe SATA Controller                       Left/Right: Select Screen
 ▶ Driver Health                                       Up/Down: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F9: Optimized Defaults
                                                       F10: Save & Exit
                                                       ESC: Exit

          Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
```

Figure 7-9

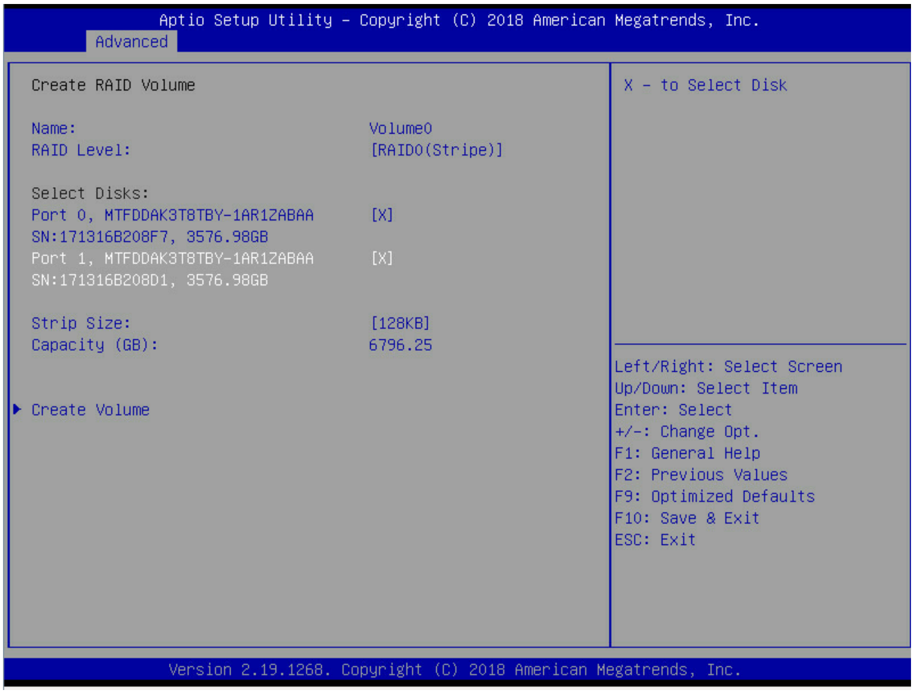
2.1 Press Enter, the executable operation and the current HDD information will be displayed, as shown in the following figure.



```
                Aptio Setup Utility – Copyright (C) 2018 American
           Advanced

   Intel(R) RSTe 5.4.0.1039 SATA Driver

 ▶ Create RAID Volume


   Non-RAID Physical Disks:
 ▶ Port 0, MTFDDAK3T8TBY-1AR1ZABAA SN:171316B208F7, 3576.98GB
 ▶ Port 1, MTFDDAK3T8TBY-1AR1ZABAA SN:171316B208D1, 3576.98GB
```

Figure 7-10

2.2 Create RAID volume. Select Create RAID Volume option, and press Enter, as shown in the following figure.



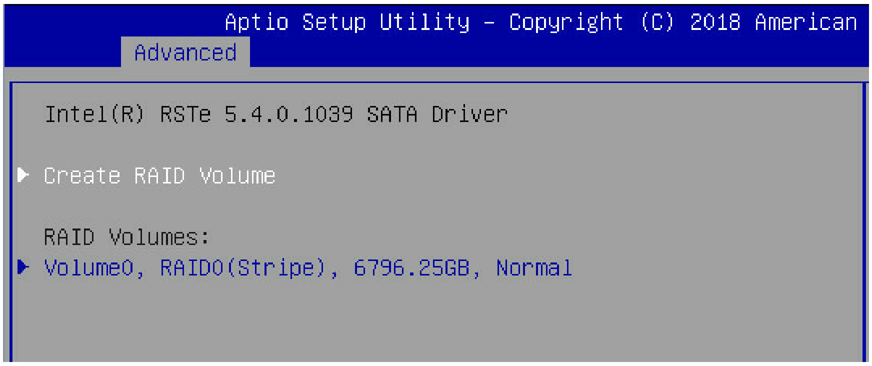
```
          Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
        Advanced
 Create RAID Volume                                   X – to Select Disk

 Name:                          Volume0
 RAID Level:                    [RAID0(Stripe)]

 Select Disks:
 Port 0, MTFDDAK3T8TBY-1AR1ZABAA    [X]
 SN:171316B208F7, 3576.98GB
 Port 1, MTFDDAK3T8TBY-1AR1ZABAA    [X]
 SN:171316B208D1, 3576.98GB

 Strip Size:                    [128KB]
 Capacity (GB):                 6796.25              Left/Right: Select Screen
                                                     Up/Down: Select Item
▶ Create Volume                                      Enter: Select
                                                     +/-: Change Opt.
                                                     F1: General Help
                                                     F2: Previous Values
                                                     F9: Optimized Defaults
                                                     F10: Save & Exit
                                                     ESC: Exit

          Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
```

Figure 7-11

Table 7-2 Create RAID Menu Instruction Table

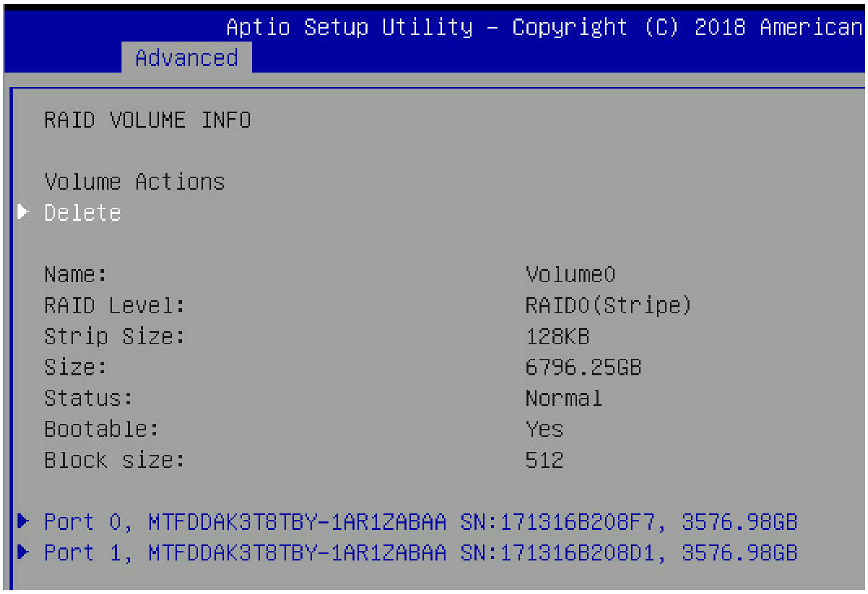
Interface Parameters	Function Description
Name	Please enter a volume name less than 16 characters without containing any special characters.
RAID Level	Please select the RAID volume level. If no volume has been created at present, there are four volume levels of RAID0 (Stripe), RAID1 (Mirror), RAID10 (RAID0+1) and RAID5 (Parity) for selection. Please select the volume level according to actual requirements. RAID0: This RAID volume is allowed to be made on 2 or above HDDs. RAID1: This RAID volume is allowed to be made on 2 HDDs. RAID10: This RAID volume is allowed to be made on 4 HDDs, which is only available when HDD quantity is 4 or above. RAID5 (Parity): This RAID volume is allowed to be made on 3 or above HDDs.
Select Disks	Select HDDs to make RAID volume, press Enter, select X, and then press Enter to return to Create RAID Volume interface.
Strip Size	Please select the strip size, only RAID0 and RAID5 volumes could enable this option.
Capacity	Set the volume capacity, and the maximum capacity is shown in the Help information on the right side.
Create Volume	After finishing the above settings, select this option to create RAID volume.

2.3 Delete RAID volume. Select a created RAID Volume, press Enter. Select “Delete”, there will be a prompt. To delete the volume, select “Yes” and press Enter; to cancel the deletion, select “No” and press Enter.



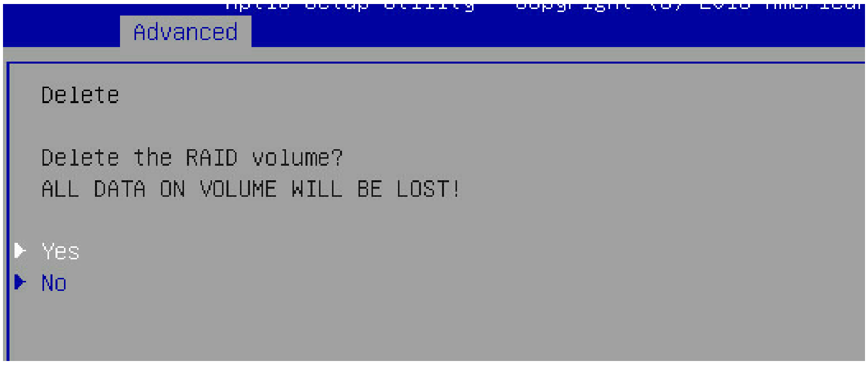
```
                Aptio Setup Utility – Copyright (C) 2018 American
        Advanced

  Intel(R) RSTe 5.4.0.1039 SATA Driver

▶ Create RAID Volume

  RAID Volumes:
▶ Volume0, RAID0(Stripe), 6796.25GB, Normal
```

Figure 7-12



```
                Aptio Setup Utility – Copyright (C) 2018 American
        Advanced

  RAID VOLUME INFO

  Volume Actions
▶ Delete

  Name:                                 Volume0
  RAID Level:                           RAID0(Stripe)
  Strip Size:                           128KB
  Size:                                 6796.25GB
  Status:                               Normal
  Bootable:                             Yes
  Block size:                           512

▶ Port 0, MTFDDAK3T8TBY-1AR1ZABAA SN:171316B208F7, 3576.98GB
▶ Port 1, MTFDDAK3T8TBY-1AR1ZABAA SN:171316B208D1, 3576.98GB
```

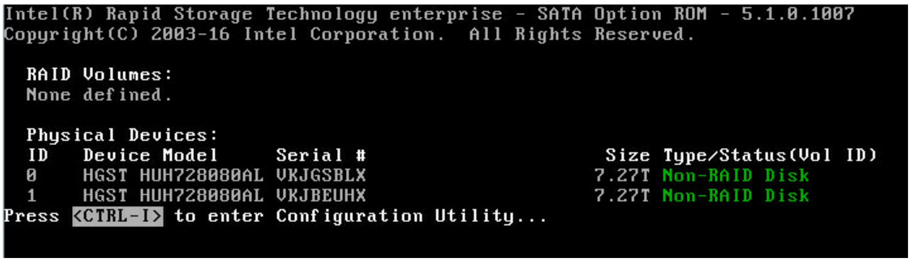
Figure 7-13



```
                Aptio Setup Utility – Copyright (C) 2018 American
        Advanced

  Delete

  Delete the RAID volume?
  ALL DATA ON VOLUME WILL BE LOST!

▶ Yes
▶ No
```

Figure 7-14

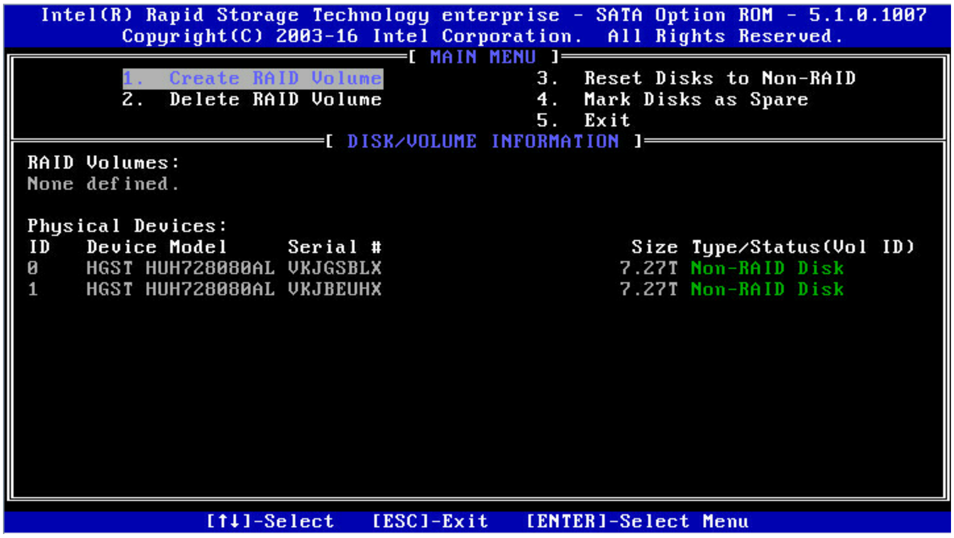
3. When Boot Mode is set to Legacy, a prompt “Press <CTRL-I> to enter Configuration Utility…” will appear on the screen during system booting. Press [Ctrl] and [I] keys at the same time to enter SATA RAID configuration, as shown in the following figure.



```
Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 5.1.0.1007
Copyright(C) 2003-16 Intel Corporation.  All Rights Reserved.

  RAID Volumes:
  None defined.

  Physical Devices:
  ID   Device Model     Serial #                     Size Type/Status(Vol ID)
  0    HGST HUH728080AL VKJGSBLX                    7.27T Non-RAID Disk
  1    HGST HUH728080AL VKJBEUHX                    7.27T Non-RAID Disk
Press <CTRL-I> to enter Configuration Utility...
```

Figure 7-15

3.1 After entering SATA RAID configuration interface, it will display the main menu list, the information (HDD ID, HDD type, HDD capacity, volume member or not) of HDDs connected to SATA controller, and the existed RAID volumes information (including volume ID, name, RAID level, capacity, status, bootable or not). There are 5 executable menus in the SATA RAID configuration interface, as shown in the following figure.



```
   Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 5.1.0.1007
          Copyright(C) 2003-16 Intel Corporation.  All Rights Reserved.
                                [ MAIN MENU ]
           1.  Create RAID Volume                3.  Reset Disks to Non-RAID
           2.  Delete RAID Volume                4.  Mark Disks as Spare
                                                 5.  Exit
                          [ DISK/VOLUME INFORMATION ]
 RAID Volumes:
 None defined.

 Physical Devices:
 ID   Device Model     Serial #                     Size Type/Status(Vol ID)
 0    HGST HUH728080AL VKJGSBLX                    7.27T Non-RAID Disk
 1    HGST HUH728080AL VKJBEUHX                    7.27T Non-RAID Disk

             [↑↓]-Select    [ESC]-Exit    [ENTER]-Select Menu
```

Figure 7-16

Table 7-3 Key Instruction Table

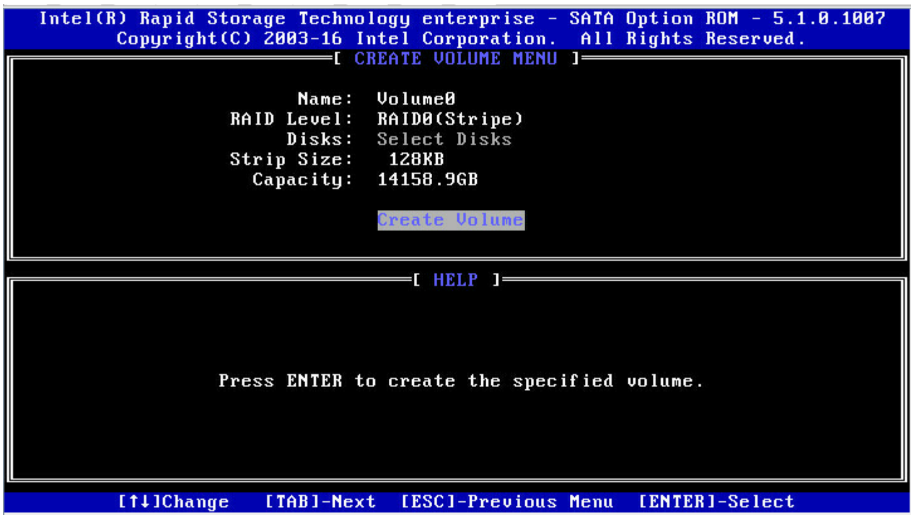
Key	Description
↑↓	Used to move cursor in different menus or to change values of menu options.
TAB	To select the next menu option.
Enter	To select a menu.
Esc	To exit menu or return to previous menu from sub-menu.

Menu Instruction Table

Create RAID Volume	To create an RAID volume.
Delete RAID Volume	To delete an existed RAID volume.
Reset Disks to Non-RAID	To reset HDDs in RAID volume, and to restore them to non-RAID status.
Mask Disk as Spare	To mask the HDDs as spare disks. The data will be cleared, and these HDDs can not be selected during RAID setting. It can be restored through the Reset Disks to Non-RAID menu.
Exit	To exit SATA Host RAID configuration interface.

3.2 Create RAID Volume menu. After entering SATA RAID configuration interface, you could use up and down arrow keys to select this menu, and then press Enter to enter the Create RAID Volume menu, or directly input the number before the menu to enter the Create RAID Volume menu. For other menu operations that are similar, it will not be repeated here.

A Create RAID Volume instance is shown in the following figure:



```
     Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 5.1.0.1007
                Copyright(C) 2003-16 Intel Corporation.  All Rights Reserved.
                            [ CREATE VOLUME MENU ]

                                     Name:  Volume0
                               RAID Level:  RAID0(Stripe)
                                    Disks:  Select Disks
                               Strip Size:   128KB
                                 Capacity:  14158.9GB

                                            Create Volume

                                        [ HELP ]

                   Press ENTER to create the specified volume.

          [↑↓]Change   [TAB]-Next  [ESC]-Previous Menu  [ENTER]-Select
```

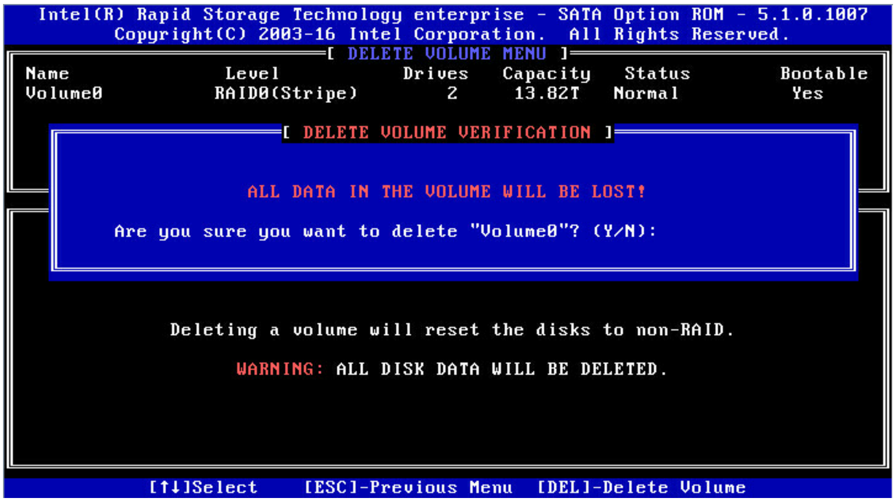
Figure 7-17

Table 7-4 Create RAID Menu Instruction Table

Interface Parameters	Function Description
Name	Please enter a volume label name less than 16 characters without containing any special characters.
RAID Level	Please select RAID volume level. If no volume has been created at present, there are four volume levels of RAID0 (Stripe), RAID1 (Mirror), RAID10 (RAID0+1) and RAID5 (Parity) for selection. Please select volume level according to actual requirements. RAID0: This RAID volume is allowed to be made on 2 or above HDDs. RAID1: This RAID volume is allowed to be made on 2 HDDs. RAID10: This RAID volume is allowed to be made on 4 HDDs, which is only available when HDD quantity is 4 or above. RAID5 (Parity): This RAID volume is allowed to be made on 3 or above HDDs.
Select Disks	Select HDDs to make RAID volume, press Enter, select X, and then press Enter to return to Create RAID Volume interface.
Strip Size	Please select the strip size, only RAID0 and RAID5 volumes could enable this option.
Capacity	Set the volume capacity.

After completing the above settings, please select [Create Volume], and press Enter. The system will prompt “WARNING: ALL DATA ON THE SELECTED DISKS WILL BE LOST. Are you sure you want to create this volume? (Y/N)”. To create an RAID volume, please enter “Y”. A volume will be created, and all data on the selected disks will be lost. Otherwise, please enter “N”, to exit volume creation. Here we enter “Y” to create an RAID volume. After the creation is completed, return to MAIN MENU interface, the created RAID volume will be displayed.

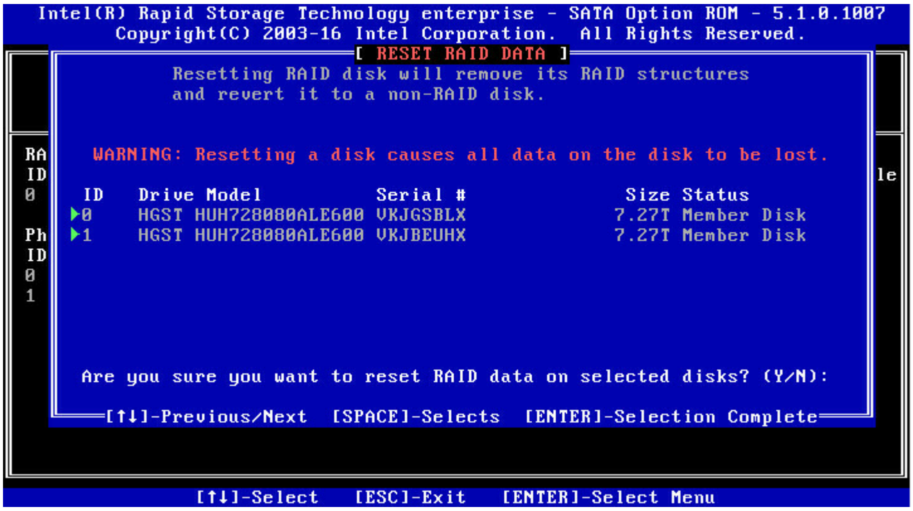
3.3 Delete RAID Volume menu. After entering Delete RAID Volume menu, press [DEL] to delete the selected RAID volume, and the system will prompt “ALL DATA IN THE VOLUME WILL BE LOST! Are you sure you want to delete “Volume0*”? (Y/N)”. To delete this RAID volume, please enter “Y”, to cancel the deletion, please enter “N”.



```
   Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 5.1.0.1007
          Copyright(C) 2003-16 Intel Corporation.  All Rights Reserved.
                          [ DELETE VOLUME MENU ]
 Name                Level           Drives   Capacity   Status        Bootable
 Volume0             RAID0(Stripe)      2      13.82T   Normal           Yes

                      [ DELETE VOLUME VERIFICATION ]

                  ALL DATA IN THE VOLUME WILL BE LOST!

          Are you sure you want to delete "Volume0"? (Y/N):


                Deleting a volume will reset the disks to non-RAID.

                   WARNING: ALL DISK DATA WILL BE DELETED.

             [↑↓]Select     [ESC]-Previous Menu  [DEL]-Delete Volume
```

Figure 7-18

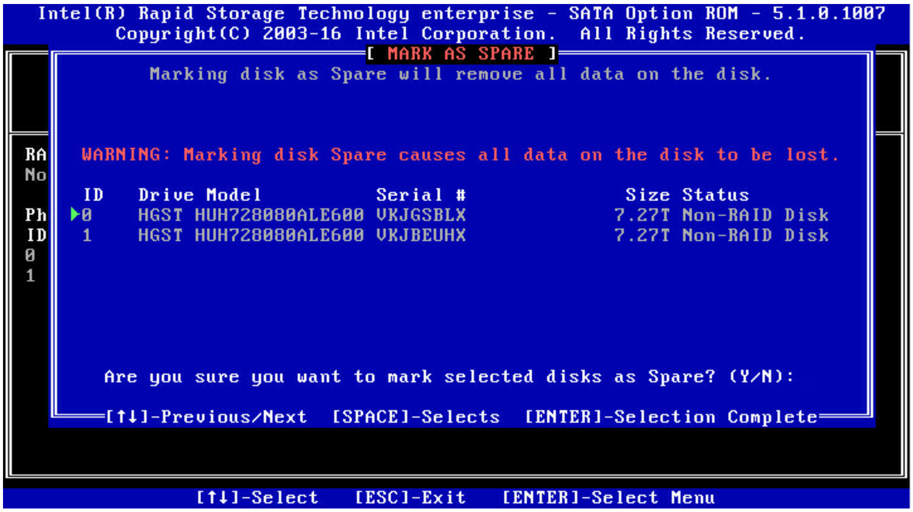
3.4 Reset Disks to Non-RAID menu. After entering Reset Disks to Non-RAID menu, system will display all HDDs in RAID volume. Please use the space key to select the HDD to reset according to the actual demand, and then press Enter to reset the HDD. The system will prompt “Are you sure you want to reset RAID data on selected disks? (Y/N)” again, enter “Y” or “N” according to the prompt. It is to be noted that all data on this disk will be lost after reset. Meanwhile, this disk will not belong to RAID volume any more.



```
  Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 5.1.0.1007
         Copyright(C) 2003-16 Intel Corporation.  All Rights Reserved.
                            [ RESET RAID DATA ]
               Resetting RAID disk will remove its RAID structures
               and revert it to a non-RAID disk.

 RA    WARNING: Resetting a disk causes all data on the disk to be lost.
 ID                                                                       le
 0      ID   Drive Model          Serial #              Size Status
       ▶0    HGST HUH728080ALE600 VKJGSBLX             7.27T Member Disk
 Ph    ▶1    HGST HUH728080ALE600 VKJBEUHX             7.27T Member Disk
 ID
 0
 1



        Are you sure you want to reset RAID data on selected disks? (Y/N):
          [↑↓]-Previous/Next  [SPACE]-Selects  [ENTER]-Selection Complete

                 [↑↓]-Select   [ESC]-Exit   [ENTER]-Select Menu
```

Figure 7-19

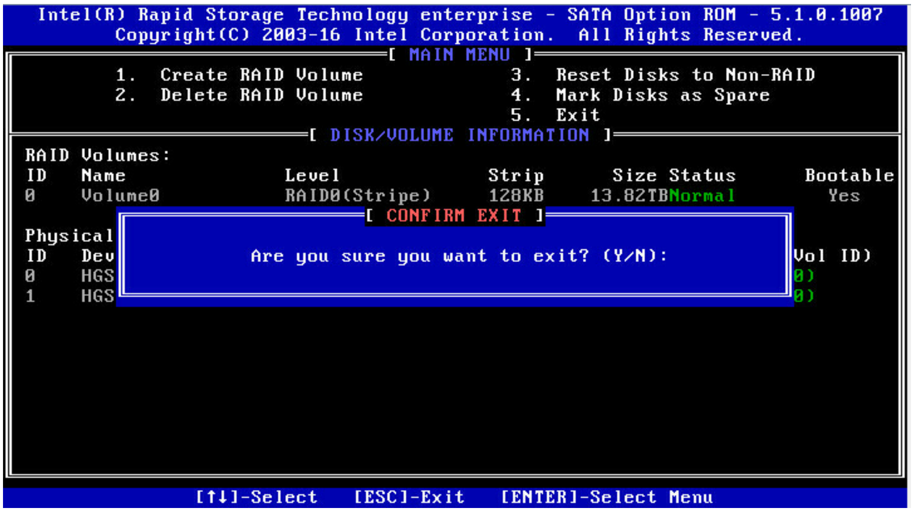
3.5 Mask Disk as Spare menu. After entering Mask Disk as Spare menu, system will display the HDDs not in RAID volume. Please use the space key to select the HDDs according to the actual demand, and then press Enter. The system will prompt “Are you sure you want to mask selected disks as Spare? (Y/N)”, enter “Y” or “N” according to the prompt. It is to be noted that all data on this disk will be lost as the spare disk.



```
 Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 5.1.0.1007
          Copyright(C) 2003-16 Intel Corporation.  All Rights Reserved.
                            [ MARK AS SPARE ]
              Marking disk as Spare will remove all data on the disk.


 RA   WARNING: Marking disk Spare causes all data on the disk to be lost.
 No
        ID   Drive Model         Serial #              Size Status
 Ph    ▶0    HGST HUH728080ALE600 VKJGSBLX             7.27T Non-RAID Disk
 ID     1    HGST HUH728080ALE600 VKJBEUHX             7.27T Non-RAID Disk
 0
 1



      Are you sure you want to mark selected disks as Spare? (Y/N):
     [↑↓]-Previous/Next  [SPACE]-Selects  [ENTER]-Selection Complete

             [↑↓]-Select    [ESC]-Exit    [ENTER]-Select Menu
```

Figure 7-20

3.6 Exit menu. Select Exit menu through up and down keys, or press ESC to exit SATA RAID configuration interface, as shown in the following figure. The system will prompt “Are you sure you want to exit? (Y/N)”, enter “Y” to exit, or enter “N” to cancel the exit operation.



```
 Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 5.1.0.1007
          Copyright(C) 2003-16 Intel Corporation.  All Rights Reserved.
                              [ MAIN MENU ]
         1.  Create RAID Volume                3.  Reset Disks to Non-RAID
         2.  Delete RAID Volume                4.  Mark Disks as Spare
                                               5.  Exit
                      [ DISK/VOLUME INFORMATION ]
 RAID Volumes:
 ID   Name                Level            Strip      Size Status       Bootable
 0    Volume0             RAID0(Stripe)    128KB   13.82TBNormal          Yes
                            [ CONFIRM EXIT ]
 Physical
 ID   Dev              Are you sure you want to exit? (Y/N):          Vol ID)
 0    HGS                                                             0)
 1    HGS                                                             0)






             [↑↓]-Select    [ESC]-Exit    [ENTER]-Select Menu
```

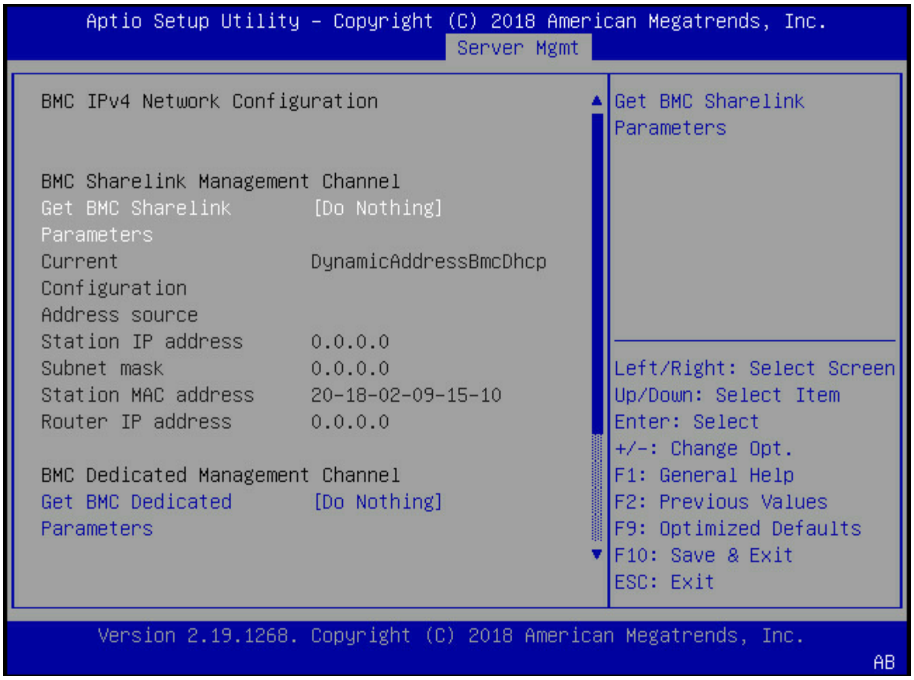
Figure 7-21

7.1.7 BMC Network Parameters View and Settings

7.1.7.1 View BMC Network Parameters

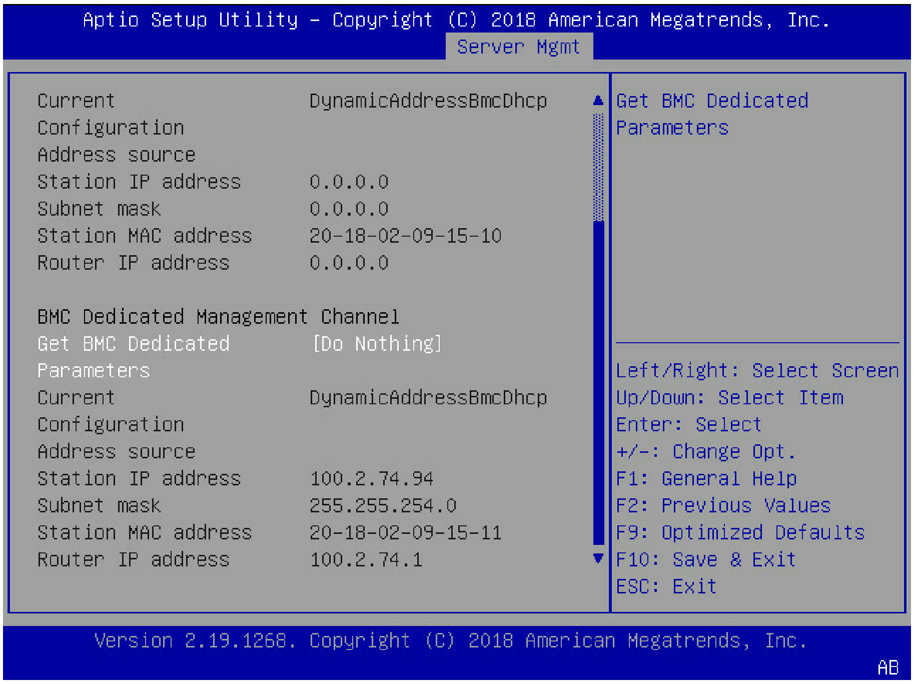
Login to the BIOS interface, select “Server Mgmt -> BMC Network Configuration -> BMC IPv4

Network Configuration/BMC IPv6 Network Configuration". Press Enter to view the current configuration of BMC IPv4 and BMC IPv6 network, as shown in the following figures.



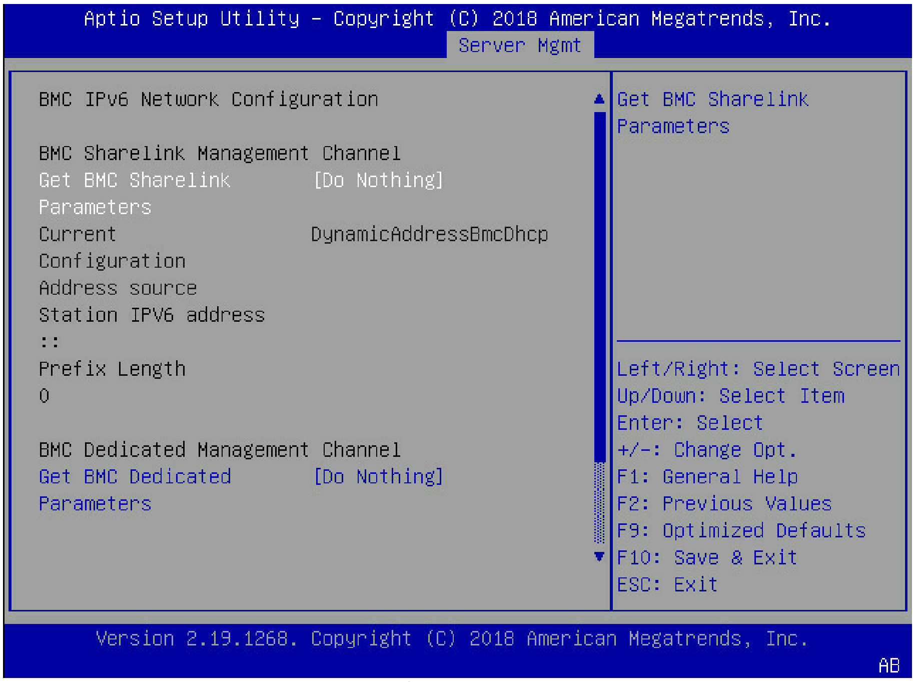
```
        Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                                 Server Mgmt

  BMC IPv4 Network Configuration                    Get BMC Sharelink
                                                    Parameters

  BMC Sharelink Management Channel
  Get BMC Sharelink        [Do Nothing]
  Parameters
  Current                  DynamicAddressBmcDhcp
  Configuration
  Address source
  Station IP address       0.0.0.0                  Left/Right: Select Screen
  Subnet mask              0.0.0.0                  Up/Down: Select Item
  Station MAC address      20-18-02-09-15-10        Enter: Select
  Router IP address        0.0.0.0                  +/-: Change Opt.
                                                    F1: General Help
  BMC Dedicated Management Channel                  F2: Previous Values
  Get BMC Dedicated        [Do Nothing]             F9: Optimized Defaults
  Parameters                                        F10: Save & Exit
                                                    ESC: Exit

        Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                        AB
```

Figure 7-22



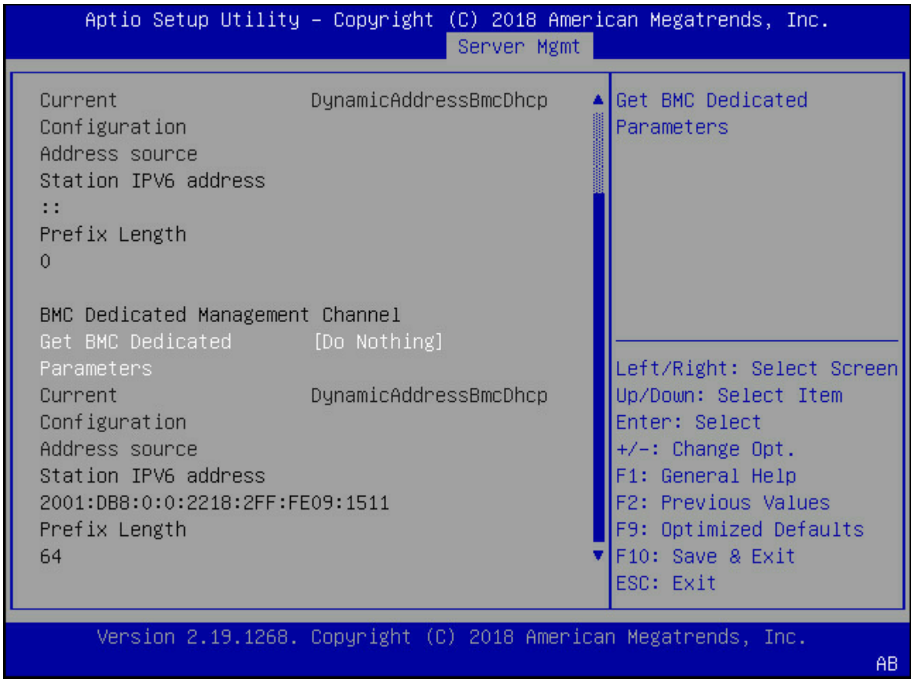
```
        Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                                 Server Mgmt

  Current                  DynamicAddressBmcDhcp    Get BMC Dedicated
  Configuration                                     Parameters
  Address source
  Station IP address       0.0.0.0
  Subnet mask              0.0.0.0
  Station MAC address      20-18-02-09-15-10
  Router IP address        0.0.0.0

  BMC Dedicated Management Channel
  Get BMC Dedicated        [Do Nothing]
  Parameters                                        Left/Right: Select Screen
  Current                  DynamicAddressBmcDhcp    Up/Down: Select Item
  Configuration                                     Enter: Select
  Address source                                    +/-: Change Opt.
  Station IP address       100.2.74.94              F1: General Help
  Subnet mask              255.255.254.0            F2: Previous Values
  Station MAC address      20-18-02-09-15-11        F9: Optimized Defaults
  Router IP address        100.2.74.1               F10: Save & Exit
                                                    ESC: Exit

        Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                        AB
```

Figure 7-23



```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
                         Server Mgmt

BMC IPv6 Network Configuration                      Get BMC Sharelink
                                                    Parameters
BMC Sharelink Management Channel
Get BMC Sharelink        [Do Nothing]
Parameters
Current                  DynamicAddressBmcDhcp
Configuration
Address source
Station IPV6 address
::
Prefix Length                                       Left/Right: Select Screen
0                                                   Up/Down: Select Item
                                                    Enter: Select
BMC Dedicated Management Channel                    +/-: Change Opt.
Get BMC Dedicated        [Do Nothing]               F1: General Help
Parameters                                          F2: Previous Values
                                                    F9: Optimized Defaults
                                                    F10: Save & Exit
                                                    ESC: Exit

Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                AB
```

Figure 7-24



```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
                         Server Mgmt

Current                  DynamicAddressBmcDhcp      Get BMC Dedicated
Configuration                                       Parameters
Address source
Station IPV6 address
::
Prefix Length
0

BMC Dedicated Management Channel
Get BMC Dedicated        [Do Nothing]
Parameters                                          Left/Right: Select Screen
Current                  DynamicAddressBmcDhcp      Up/Down: Select Item
Configuration                                       Enter: Select
Address source                                      +/-: Change Opt.
Station IPV6 address                                F1: General Help
2001:DB8:0:0:2218:2FF:FE09:1511                     F2: Previous Values
Prefix Length                                       F9: Optimized Defaults
64                                                  F10: Save & Exit
                                                    ESC: Exit

Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                AB
```

Figure 7-25

7.1.7.2 BMC Network Settings

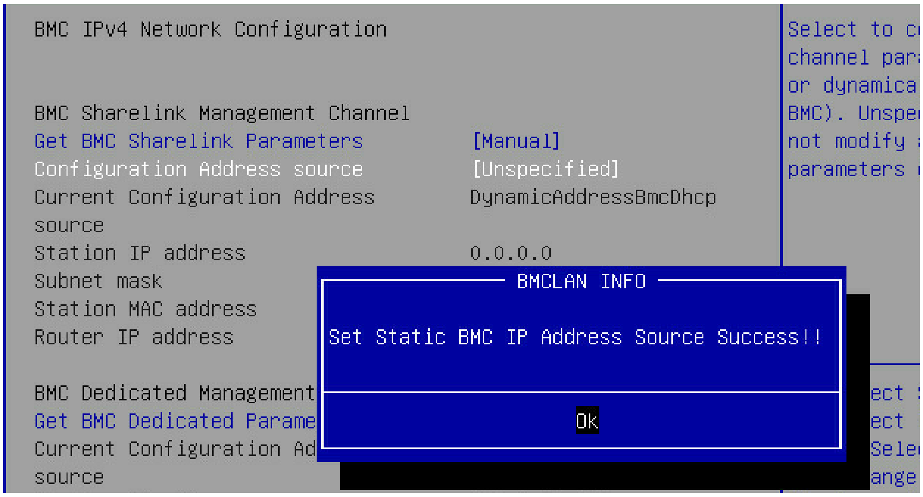
Take BMC Sharelink port as an example to introduce the settings of BMC IPv4 network parameters, as shown in the following table.

Table 7-5 BMC Network Configuration Instruction Table

Interface Parameters	Function Description	Default Value
Get BMC Sharelink /Dedicated Parameters	Set the way to get BMC network parameters, options include: Do Nothing Auto Manual	Do Nothing
Configuration Address Source	Configure BMC network status parameters. When Get BMC Dedicated Parameters is set to [Manual], this option will be displayed. Options include: Unspecified Static DynamicBmcDhcp The static and dynamic settings take effect immediately.	Unspecified
Current Configuration Address	Display the current BMC network parameters configuration	----
Station IP address	BMC station IP address	----
Subnet mask	Subnet mask	----
Station MAC address	BMC station MAC address	----
Router IP address	BMC router IP address	----

7.1.7.3 Set BMC Static Network Parameters

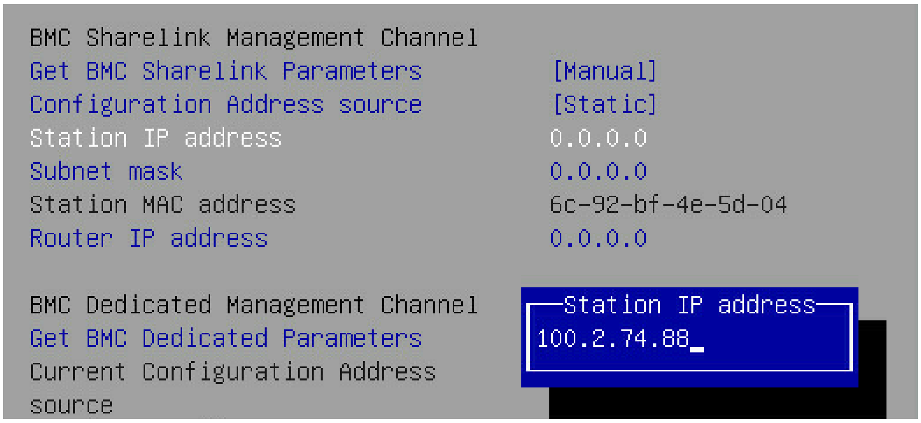
Set the Configuration Address Source option to [Static]. If the setting succeeds, the system will prompt “Set Static BMC IP Address Source Success!!”, as shown in the following figure.



```
BMC IPv4 Network Configuration                                       Select to c
                                                                     channel par
                                                                     or dynamica
BMC Sharelink Management Channel                                     BMC). Unspe
Get BMC Sharelink Parameters          [Manual]                       not modify
Configuration Address source          [Unspecified]                  parameters
Current Configuration Address         DynamicAddressBmcDhcp
source
Station IP address                    0.0.0.0
Subnet mask                  ─────── BMCLAN INFO ────────
Station MAC address
Router IP address            Set Static BMC IP Address Source Success!!

BMC Dedicated Management                                              ect
Get BMC Dedicated Parame                    Ok                        ect
Current Configuration Ad                                              Sele
source                                                                ange
```

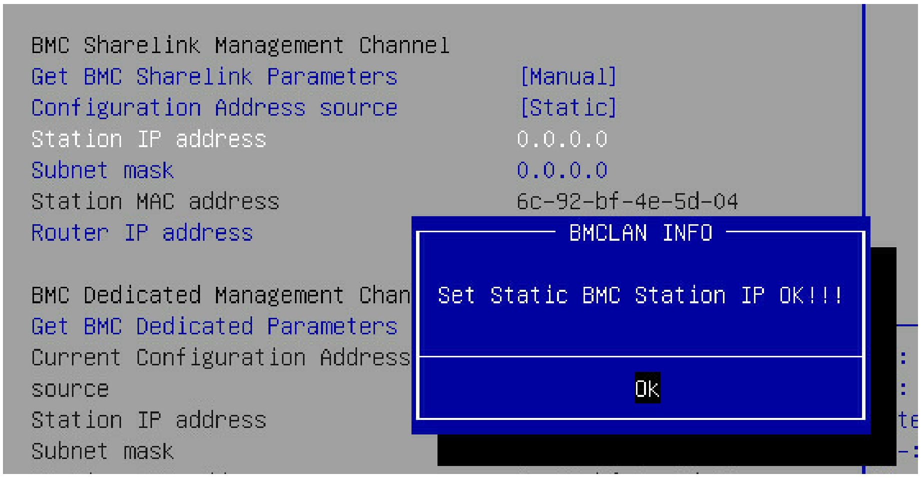
Figure 7-26

Select the Station IP Address option. Press Enter, the Station IP Address window pops up. Input the Static IP manually. After the setting is complete, press Enter to confirm, as shown in the following figures:



```
BMC Sharelink Management Channel
Get BMC Sharelink Parameters               [Manual]
Configuration Address source               [Static]
Station IP address                         0.0.0.0
Subnet mask                                0.0.0.0
Station MAC address                        6c-92-bf-4e-5d-04
Router IP address                          0.0.0.0

BMC Dedicated Management Channel      ┌─Station IP address──┐
Get BMC Dedicated Parameters          │100.2.74.88_          │
Current Configuration Address         └──────────────────────┘
source
```

Figure 7-27



```
BMC Sharelink Management Channel
Get BMC Sharelink Parameters               [Manual]
Configuration Address source               [Static]
Station IP address                         0.0.0.0
Subnet mask                                0.0.0.0
Station MAC address                        6c-92-bf-4e-5d-04
Router IP address                 ┌──────── BMCLAN INFO ────────┐
                                  │                              │
BMC Dedicated Management Chan     │ Set Static BMC Station IP OK!!! │
Get BMC Dedicated Parameters      │                              │
Current Configuration Address     ├──────────────────────────────┤   :
source                            │              Ok              │   :
Station IP address                └──────────────────────────────┘   te
Subnet mask                                                          -:
```

Figure 7-28

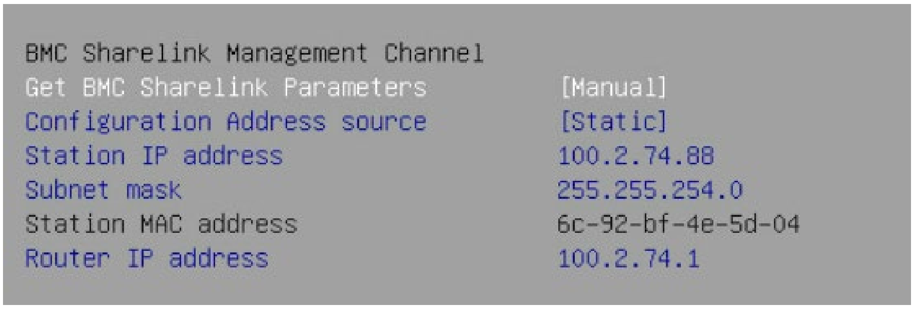
If the setting succeeds, the system prompts “Set Static BMC Station IP OK!!!” Press Enter to confirm, and the IP will take effect immediately.

If the setting fails, the system prompts “Set Static BMC Station IP Fail!!!”

If the IP does not change, the system prompts “Static BMC Station IP Not Change!!!”

If the input IP is invalid, the system prompts “Invalid Station IP Entered!!!”, and assign 0.0.0.0 to the IP address. The assignment only changes the IP address in BIOS Setup interface, and does not notify BMC to change the IP settings.

The prompts of Subnet mask and Router IP address settings are similar to those of Station IP address setting, there is no more detailed description here. As shown in the following figure, the BMC network parameters have taken effect, you can login to BMC Web interface to operate.

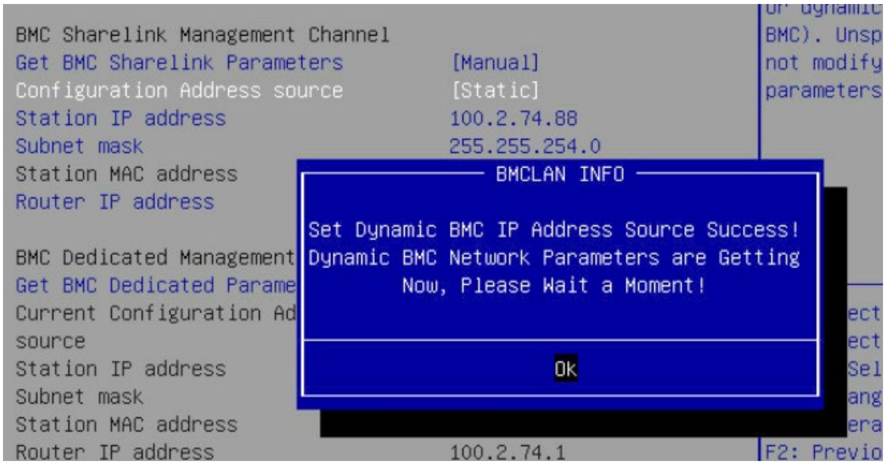


```
BMC Sharelink Management Channel
Get BMC Sharelink Parameters          [Manual]
Configuration Address source          [Static]
Station IP address                    100.2.74.88
Subnet mask                           255.255.254.0
Station MAC address                   6c-92-bf-4e-5d-04
Router IP address                     100.2.74.1
```

Figure 7-29

7.1.7.4 Set BMC Dynamic Network Parameters

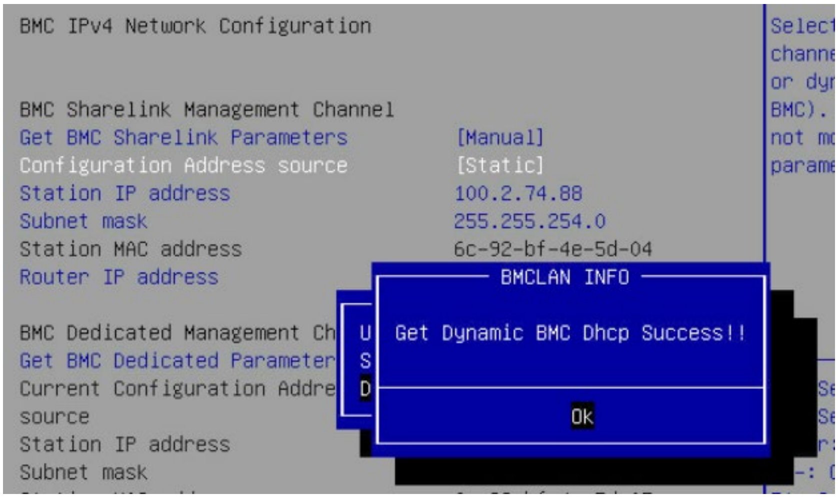
Set the Configuration Address Source option to [DynamiBmcDhcp]. If the setting succeeds, the system will prompt “Set Dynamic BMC IP Address Source Success! Dynamic BMC Network Parameters are Getting Now, Please Wait a Moment!”, as shown in the following figure.



```
                                                          or dynamic
BMC Sharelink Management Channel                          BMC). Unsp
Get BMC Sharelink Parameters          [Manual]            not modify
Configuration Address source          [Static]            parameters
Station IP address                    100.2.74.88
Subnet mask                           255.255.254.0
Station MAC address       ---------- BMCLAN INFO ----------
Router IP address
                          Set Dynamic BMC IP Address Source Success!
BMC Dedicated Management  Dynamic BMC Network Parameters are Getting
Get BMC Dedicated Parame          Now, Please Wait a Moment!
Current Configuration Ad                                          ect
source                                                            ect
Station IP address                        Ok                      Sel
Subnet mask                                                       ang
Station MAC address                                               era
Router IP address                     100.2.74.1                  F2: Previo
```

Figure 7-30

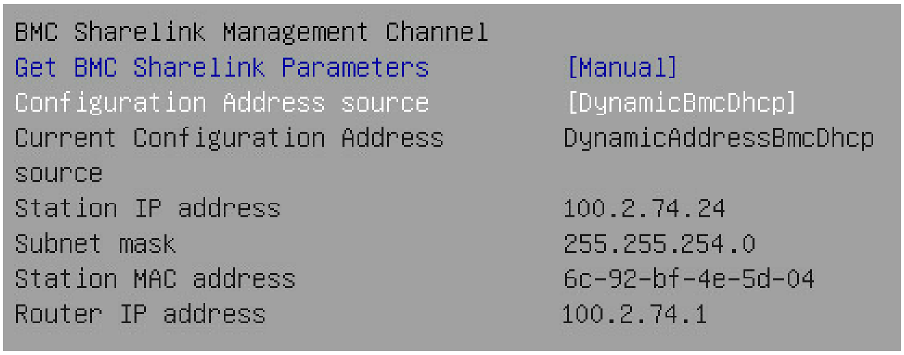
After pressing Enter to confirm, the following interface will stay for 30s, please wait patiently.



```
BMC IPv4 Network Configuration                          Select
                                                        channe
                                                        or dyn
BMC Sharelink Management Channel                        BMC).
Get BMC Sharelink Parameters          [Manual]          not mo
Configuration Address source          [Static]          parame
Station IP address                    100.2.74.88
Subnet mask                           255.255.254.0
Station MAC address                   6c-92-bf-4e-5d-04
Router IP address             ------- BMCLAN INFO -------

BMC Dedicated Management Ch U  Get Dynamic BMC Dhcp Success!!
Get BMC Dedicated Parameter S
Current Configuration Addre D                                   Se
source                                     Ok                   Se
Station IP address                                              r:
Subnet mask                                                     -: (
```

Figure 7-31

After the dynamic network takes effect, the system will prompt “Get Dynamic BMC Dhcp Success!!”, and the interface will be shown as the following figure.



```
BMC Sharelink Management Channel
Get BMC Sharelink Parameters          [Manual]
Configuration Address source          [DynamicBmcDhcp]
Current Configuration Address         DynamicAddressBmcDhcp
source
Station IP address                    100.2.74.24
Subnet mask                           255.255.254.0
Station MAC address                   6c-92-bf-4e-5d-04
Router IP address                     100.2.74.1
```

Figure 7-32

Note:

Please make sure that the BMC management port is connected to the network when you use the Manual setting options.

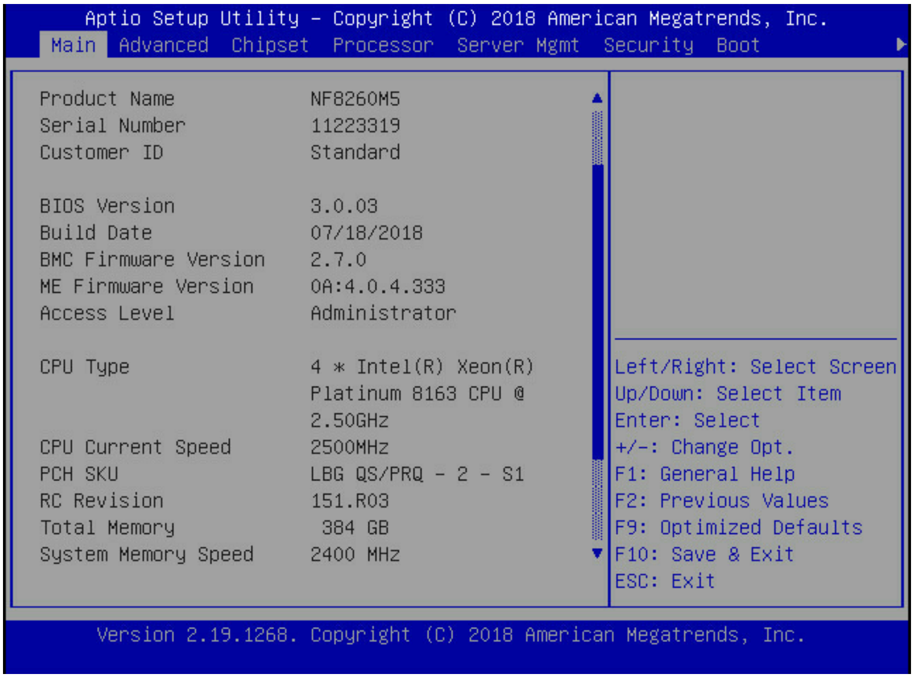
The options that take effect immediately in the BIOS Setup interface are implemented by calling the Callback function. Callback functions are only called when the options in the BIOS Setup interface are changed. Otherwise, the function will not take effect. For example, if you want to automatically get BMC parameters again, you need to set Get BMC Sharelink Parameters to [Do nothing] or [Manual], then set to [Auto], the function will take effect.

The settings of BMC IPv6 network parameters are similar to this, which will be omitted here.

7.2 BIOS Parameter Description

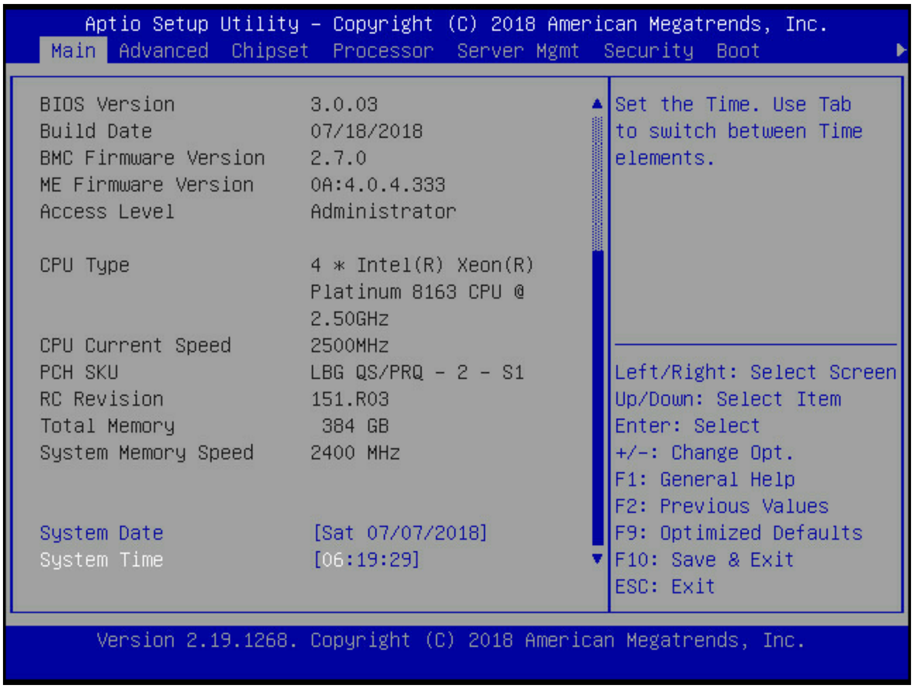
7.2.1 Main

Press [DEL] or [F2] key to enter the BIOS Setup Main interface when the logo appears. The BIOS Main interface displays the basic information of BIOS system, including BIOS/BMC/ME version, CPU type, total memory capacity and system time.



```
        Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
   Main  Advanced  Chipset  Processor  Server Mgmt  Security  Boot

  Product Name            NF8260M5
  Serial Number           11223319
  Customer ID             Standard

  BIOS Version            3.0.03
  Build Date              07/18/2018
  BMC Firmware Version    2.7.0
  ME Firmware Version     0A:4.0.4.333
  Access Level            Administrator

  CPU Type                4 * Intel(R) Xeon(R)      Left/Right: Select Screen
                          Platinum 8163 CPU @       Up/Down: Select Item
                          2.50GHz                   Enter: Select
  CPU Current Speed       2500MHz                   +/-: Change Opt.
  PCH SKU                 LBG QS/PRQ – 2 – S1       F1: General Help
  RC Revision             151.R03                   F2: Previous Values
  Total Memory             384 GB                   F9: Optimized Defaults
  System Memory Speed     2400 MHz                  F10: Save & Exit
                                                    ESC: Exit

          Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
```

Figure 7-33



```
        Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
   Main  Advanced  Chipset  Processor  Server Mgmt  Security  Boot

  BIOS Version            3.0.03                    Set the Time. Use Tab
  Build Date              07/18/2018                to switch between Time
  BMC Firmware Version    2.7.0                     elements.
  ME Firmware Version     0A:4.0.4.333
  Access Level            Administrator

  CPU Type                4 * Intel(R) Xeon(R)
                          Platinum 8163 CPU @
                          2.50GHz
  CPU Current Speed       2500MHz                   Left/Right: Select Screen
  PCH SKU                 LBG QS/PRQ – 2 – S1       Up/Down: Select Item
  RC Revision             151.R03                   Enter: Select
  Total Memory             384 GB                   +/-: Change Opt.
  System Memory Speed     2400 MHz                  F1: General Help
                                                    F2: Previous Values
                                                    F9: Optimized Defaults
  System Date             [Sat 07/07/2018]          F10: Save & Exit
  System Time             [06:19:29]                ESC: Exit

          Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
```

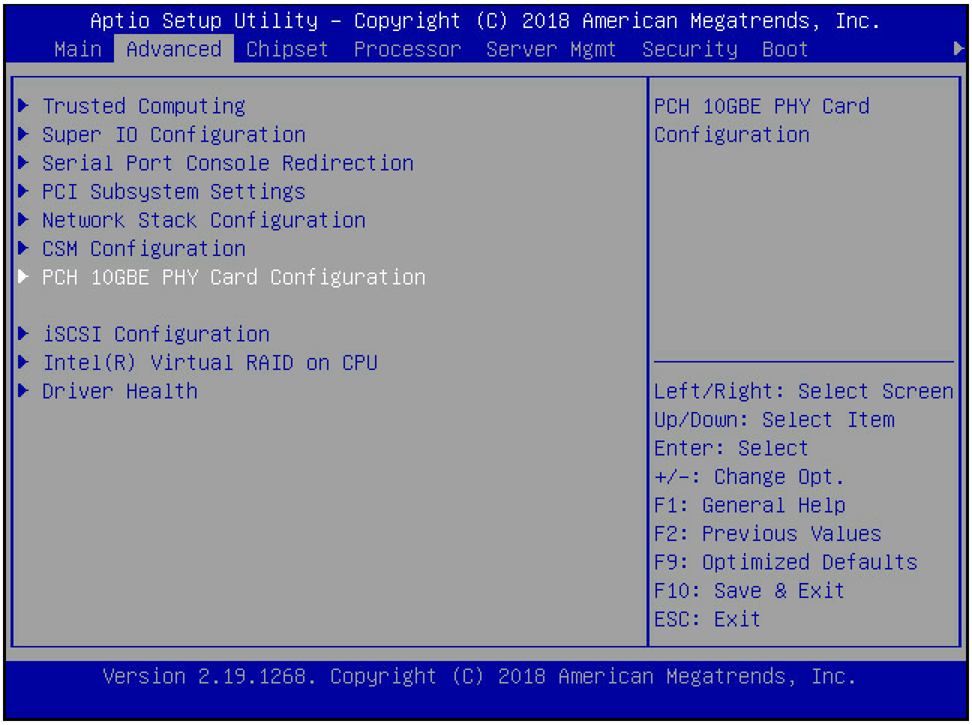
Figure 7-34

Table 7-6 Main Interface Instruction Table

Interface Parameters	Function Description
Product Name	Product name
Serial Number	Serial number
Customer ID	Customer ID
BIOS Version	BIOS version
Build Date	Build date
BMC Firmware Version	BMC Firmware version
ME Firmware Version	ME Firmware version
Access Level	Current access level
CPU Type	CPU information
CPU Current Speed	CPU current speed
PCH SKU	PCH version
RC Revision	Current RC revision
Total Memory	System total memory
System Memory Speed	Memory speed
System Date (Day mm/dd/yyyy)	Display and set system date. Use [Tab] or [Enter] key to switch between system date and time, directly input the value or use +/- keys to change the value (Press + key, the value increases by 1, and press – key, the value decreases by 1).
System Time (hh/mm/ss)	Display and set system time. Use [Tab] or [Enter] key to switch between system date and time, directly input the value or use +/- keys to change the value (Press + key, the value increases by 1, and press – key, the value decreases by 1).

7.2.2 Advanced Menu

Advanced interface includes the BIOS system parameters and related function settings.



```
        Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
    Main  Advanced  Chipset  Processor  Server Mgmt  Security  Boot           ▶

 ▶ Trusted Computing                                   PCH 10GBE PHY Card
 ▶ Super IO Configuration                              Configuration
 ▶ Serial Port Console Redirection
 ▶ PCI Subsystem Settings
 ▶ Network Stack Configuration
 ▶ CSM Configuration
 ▶ PCH 10GBE PHY Card Configuration

 ▶ iSCSI Configuration
 ▶ Intel(R) Virtual RAID on CPU
 ▶ Driver Health                                       Left/Right: Select Screen
                                                       Up/Down: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F9: Optimized Defaults
                                                       F10: Save & Exit
                                                       ESC: Exit

          Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
```

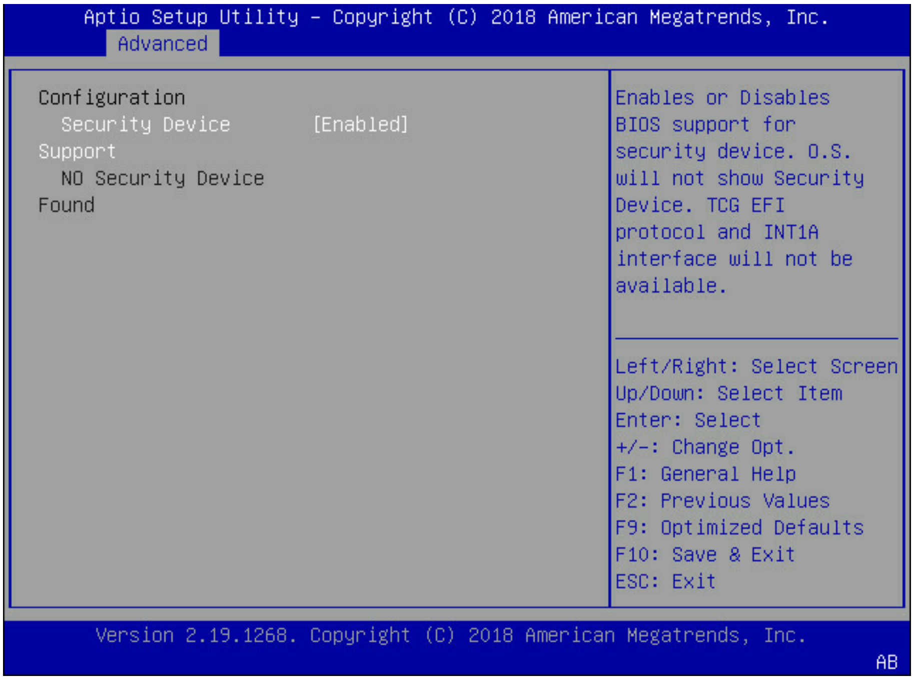
Figure 7-35

Table 7-7 Advanced Interface Instruction Table

Interface Parameters	Function Description
Trusted Computing	Trusted computing configuration
Super IO Configuration	Super I/O chip parameter configuration
Serial Port Console Redirection	Serial port console redirection settings
PCI Subsystem Settings	PCI subsystem settings
Network Stack Configuration	Network stack configuration
CSM Configuration	CSM configuration
NVMe Configuration	NVMe configuration (displayed in Legacy Mode)
PCH 10GBE PHY Card Configuration	PCH 10GBE PHY card configuration
iSCSI Configuration	iSCSI configuration
Intel(R) Virtual RAID on CPU	Intel virtual RAID configuration menu, used to configure NVME VMD function
Driver Health	Driver health menu

7.2.2.1 Trusted Computing

Trusted Computing interface is used to enable or disable BIOS support for security device.



```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
Advanced

Configuration                               Enables or Disables
  Security Device        [Enabled]          BIOS support for
Support                                     security device. O.S.
  NO Security Device                        will not show Security
Found                                       Device. TCG EFI
                                            protocol and INT1A
                                            interface will not be
                                            available.

                                            Left/Right: Select Screen
                                            Up/Down: Select Item
                                            Enter: Select
                                            +/-: Change Opt.
                                            F1: General Help
                                            F2: Previous Values
                                            F9: Optimized Defaults
                                            F10: Save & Exit
                                            ESC: Exit

Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                              AB
```

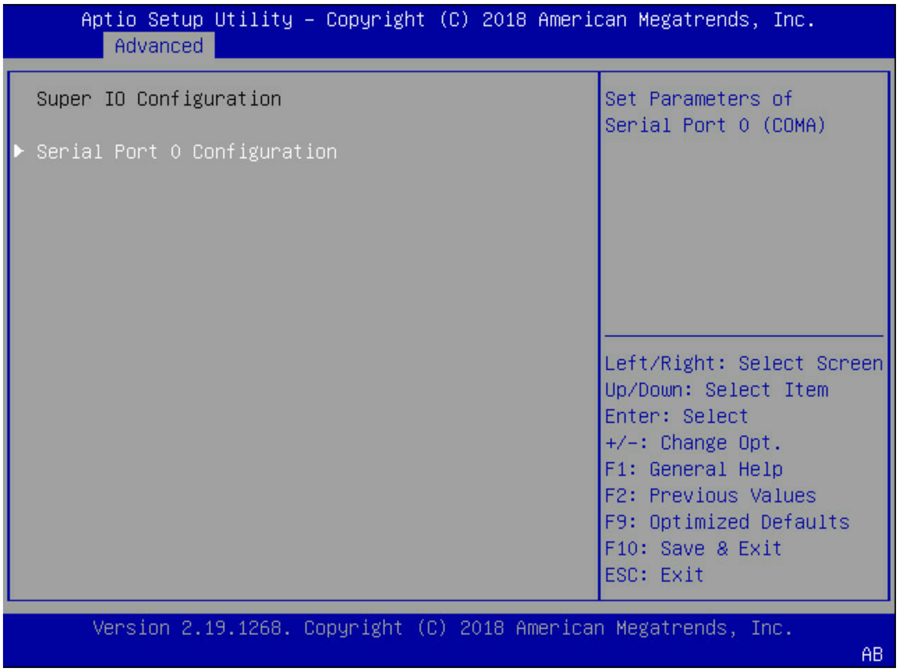
Figure 7-36

Table 7-8 Trusted Computing Interface Instruction Table

Interface Parameters	Function Description	Default Value
Security Device Support	Security device support settings. Options include: Enabled Disabled BIOS supports TPM TCG version 1.2/2.0. BIOS supports TPM module through TPM software binding, when the verification of software binding fails, BIOS will record the error to SEL.	Enabled
No Security Device Found	Display the status of security device. There is no information displayed at present, to enable this function, it needs to install TPM chip.	----

7.2.2.2 Super IO Configuration

Super IO Configuration interface is used to set the options related with I/O chip.



```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
      Advanced

  Super IO Configuration                         Set Parameters of
                                                 Serial Port 0 (COMA)
▶ Serial Port 0 Configuration


                                                 Left/Right: Select Screen
                                                 Up/Down: Select Item
                                                 Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F9: Optimized Defaults
                                                 F10: Save & Exit
                                                 ESC: Exit

      Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                    AB
```

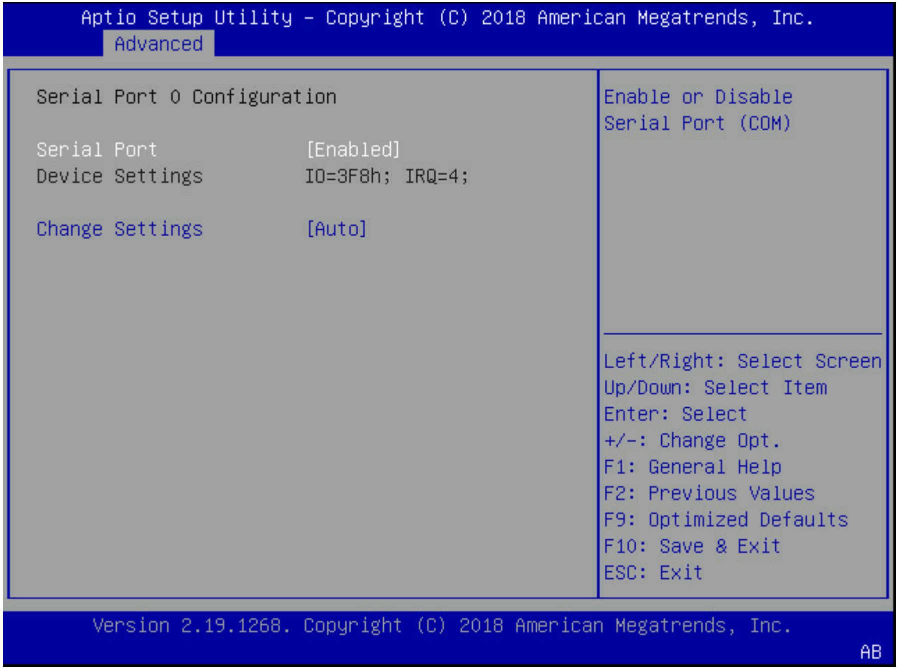
Figure 7-37

Table 7-9 Super IO Configuration Interface Instruction Table

Interface Parameters	Function Description
Serial Port 0 Configuration	Serial port 0 configuration, the configuration interface provides this serial port's on-off control and resource allocation control. Users can manually adjust the IO PORT and IRQ number that COM PORT uses.

7.2.2.2.1 Serial Port 0 Configuration

Serial Port 0 Configuration interface is used to set the options related with serial port 0.



```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
      Advanced

  Serial Port 0 Configuration                    Enable or Disable
                                                 Serial Port (COM)
  Serial Port              [Enabled]
  Device Settings          IO=3F8h; IRQ=4;

  Change Settings          [Auto]


                                                 Left/Right: Select Screen
                                                 Up/Down: Select Item
                                                 Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F9: Optimized Defaults
                                                 F10: Save & Exit
                                                 ESC: Exit

      Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                    AB
```

Figure 7-38

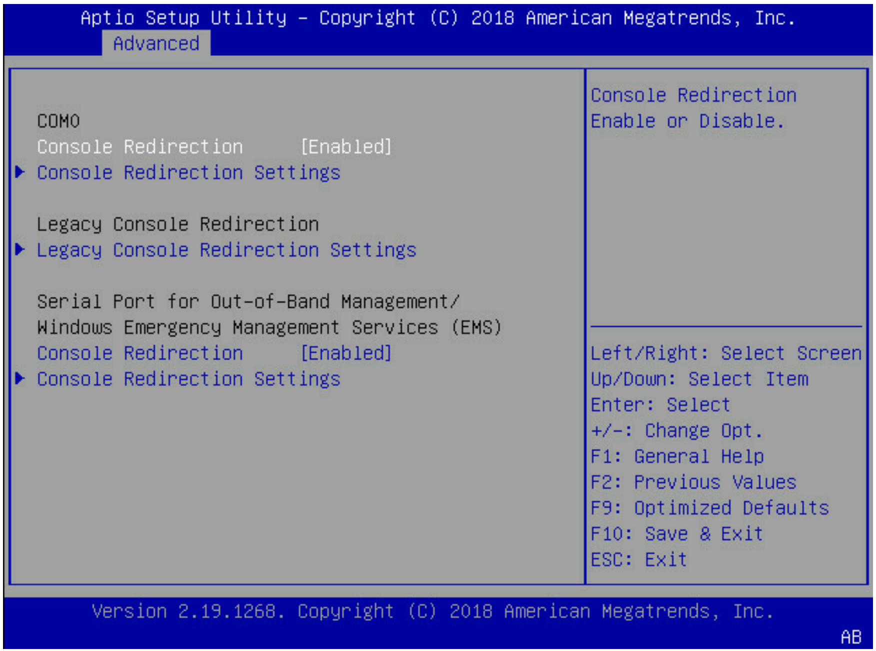
Table 7-10 Serial Port 0 Configuration Interface Instruction Table

Interface Parameters	**Function Description**	**Default Value**
Serial Port	Serial port 0 on-off settings. Options include: Enabled Disabled	Enabled

Change Settings	Select the optimal setting according to the demand. Options include:
	Auto
	I0=3F8h; IRQ=4;
	I0=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;
	I0=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;
	I0=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;
		Auto

7.2.2.3 Serial Port Console Redirection

Serial Port Console Redirection interface is used to set the options related with the serial port redirection.



```
      Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
         Advanced

  COM0                                       Console Redirection
  Console Redirection      [Enabled]         Enable or Disable.
▶ Console Redirection Settings

  Legacy Console Redirection
▶ Legacy Console Redirection Settings

  Serial Port for Out-of-Band Management/
  Windows Emergency Management Services (EMS)
  Console Redirection      [Enabled]         Left/Right: Select Screen
▶ Console Redirection Settings               Up/Down: Select Item
                                             Enter: Select
                                             +/-: Change Opt.
                                             F1: General Help
                                             F2: Previous Values
                                             F9: Optimized Defaults
                                             F10: Save & Exit
                                             ESC: Exit

        Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                      AB
```

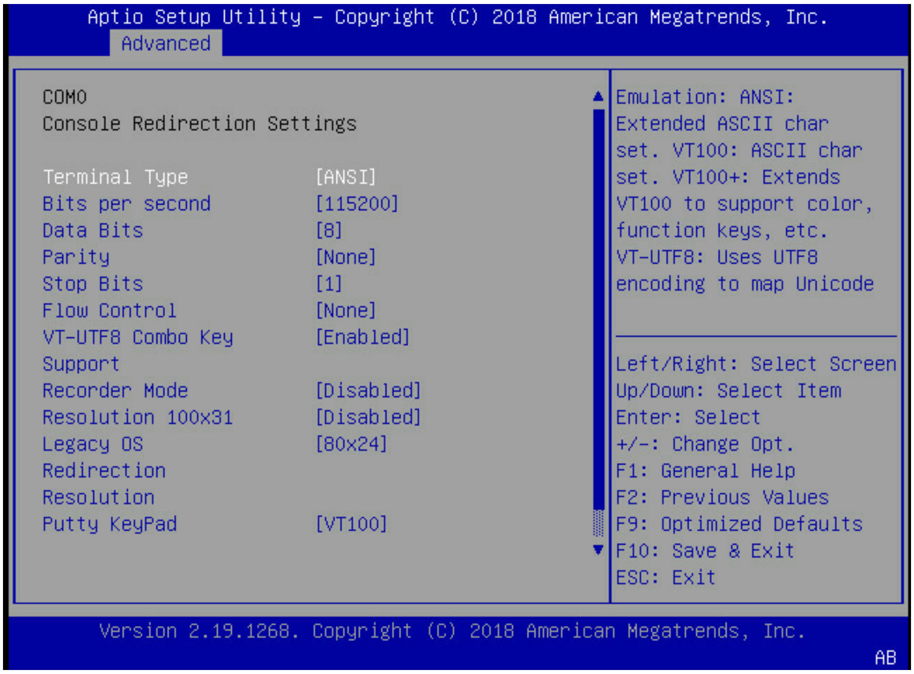
Figure 7-39

Table 7-11 Serial Port Console Redirection Interface Instruction Table

Interface Parameters	Function Description	Default Value
Console Redirection (Com0)	Serial port console redirection on-off settings. Options include: Enabled Disabled	Enabled
Console Redirection Settings (Com0)	Serial port console redirection parameter settings	----
Legacy Console Redirection Settings	Legacy serial port console redirection parameter settings	----
Console Redirection (EMS)	System serial port console redirection on-off settings. Options include: Enabled Disabled	Enabled
Console Redirection Settings (EMS)	System serial port console redirection parameter settings	----

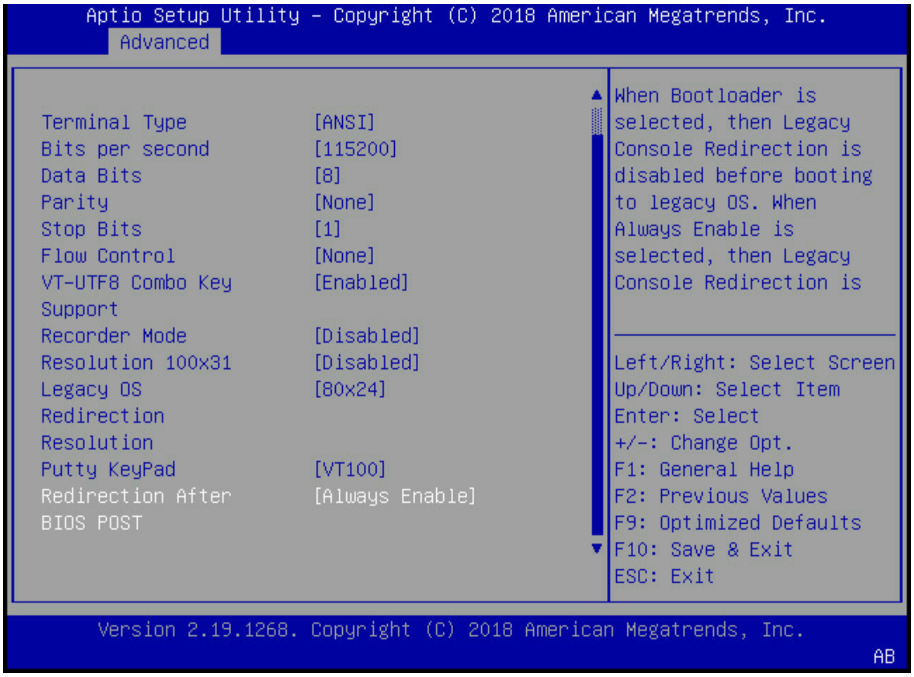
7.2.2.3.1 Console Redirection (COM0)

When the Console Redirection is set to [Enabled], the Console Redirection Settings menu will be displayed.



```
        Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
            Advanced

 COM0                                              Emulation: ANSI:
 Console Redirection Settings                      Extended ASCII char
                                                   set. VT100: ASCII char
 Terminal Type            [ANSI]                   set. VT100+: Extends
 Bits per second          [115200]                 VT100 to support color,
 Data Bits                [8]                      function keys, etc.
 Parity                   [None]                   VT-UTF8: Uses UTF8
 Stop Bits                [1]                      encoding to map Unicode
 Flow Control             [None]
 VT-UTF8 Combo Key        [Enabled]
 Support                                           Left/Right: Select Screen
 Recorder Mode            [Disabled]               Up/Down: Select Item
 Resolution 100x31        [Disabled]               Enter: Select
 Legacy OS                [80x24]                  +/-: Change Opt.
 Redirection                                       F1: General Help
 Resolution                                        F2: Previous Values
 Putty KeyPad             [VT100]                  F9: Optimized Defaults
                                                   F10: Save & Exit
                                                   ESC: Exit

          Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                        AB
```

Figure 7-40



```
        Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
            Advanced

                                                   When Bootloader is
 Terminal Type            [ANSI]                   selected, then Legacy
 Bits per second          [115200]                 Console Redirection is
 Data Bits                [8]                      disabled before booting
 Parity                   [None]                   to legacy OS. When
 Stop Bits                [1]                      Always Enable is
 Flow Control             [None]                   selected, then Legacy
 VT-UTF8 Combo Key        [Enabled]                Console Redirection is
 Support
 Recorder Mode            [Disabled]
 Resolution 100x31        [Disabled]               Left/Right: Select Screen
 Legacy OS                [80x24]                  Up/Down: Select Item
 Redirection                                       Enter: Select
 Resolution                                        +/-: Change Opt.
 Putty KeyPad             [VT100]                  F1: General Help
 Redirection After        [Always Enable]          F2: Previous Values
 BIOS POST                                         F9: Optimized Defaults
                                                   F10: Save & Exit
                                                   ESC: Exit

          Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                        AB
```

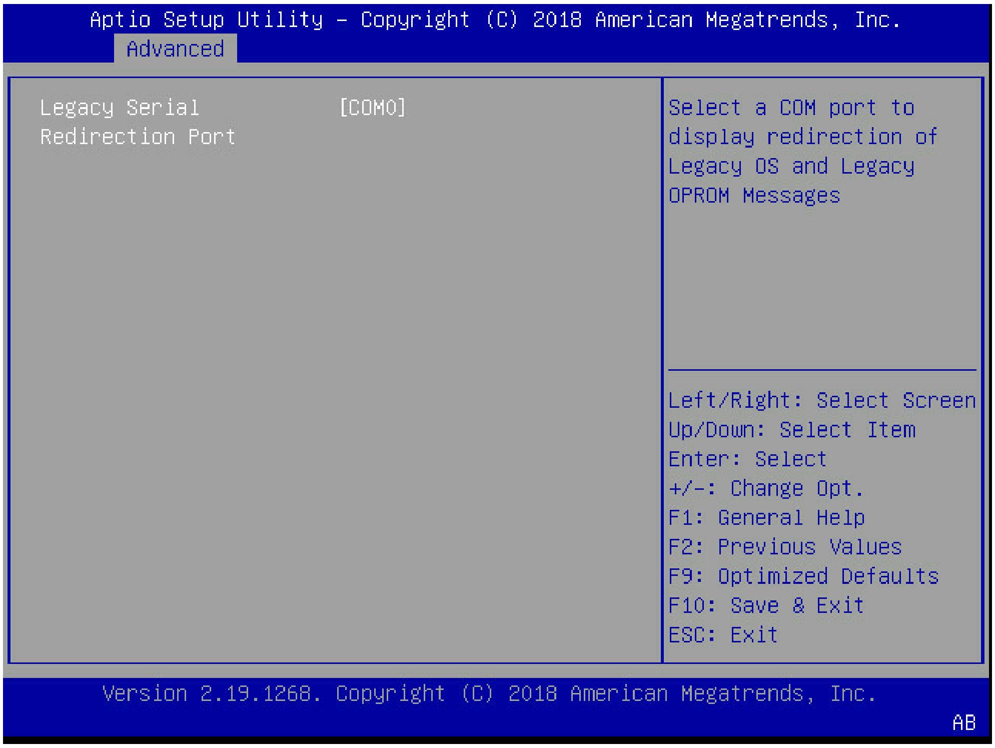
Figure 7-41

Table 7-12 Console Redirection Settings Interface Instruction Table

Interface Parameters	Function Description	Default Value
Terminal Type	Terminal type settings. Options include: VT100 VT100+ VT-UTF8 ANSI	ANSI
Bits per second	Baud rate settings. Options include: 9600 19200 38400 57600 115200	115200
Data Bits	Serial port data width settings. Options include: 7 8	8
Parity	Parity settings. Options include: None Even Odd Mark (odd-even check) Space (storage parity check)	None
Stop Bits	Stop bit settings. Options include: 1 2	1
Flow Control	Flow control settings. Options include: None Hardware RTS/CTS	None
VT-UTF8 Combo Key Support	VT-UTF8 combination key support on-off settings. Options include: Enabled Disabled	Enabled
Recorder Mode	Recorder mode on-off settings. Options include: Enabled Disabled	Disabled
Redirection 100×31	Expanded redirection resolution 100×31 on-off settings. Options include: Enabled Disabled	Disabled
Legacy OS Redirection Resolution	Legacy OS redirection resolution settings. Options include: 80×24 80×25	80×24
Putty KeyPad	Putty function keys and keyboard settings. Options include: VT100 LINUX XTERMR6 SCO ESCN VT400	VT100
Redirection After BIOS POST	Redirection after BIOS POST settings. Options include: Always Enable BootLoader	Always Enable

7.2.2.3.2 Legacy Console Redirection Settings

Legacy Console Redirection Settings interface is used to set the Legacy console redirections.



```
      Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
           Advanced

   Legacy Serial              [COM0]        Select a COM port to
   Redirection Port                         display redirection of
                                            Legacy OS and Legacy
                                            OPROM Messages

                                            Left/Right: Select Screen
                                            Up/Down: Select Item
                                            Enter: Select
                                            +/-: Change Opt.
                                            F1: General Help
                                            F2: Previous Values
                                            F9: Optimized Defaults
                                            F10: Save & Exit
                                            ESC: Exit

       Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                     AB
```

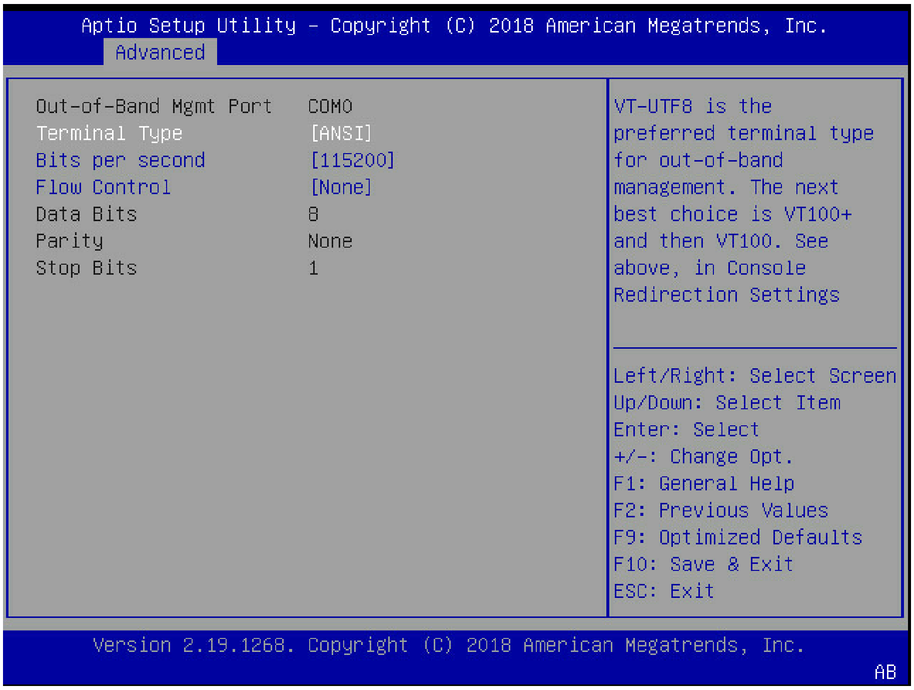
Figure 7-42

Table 7-13 Legacy Console Redirection Settings Interface Instruction Table

Interface Parameters	Function Description	Default Value
Legacy Console Redirection Setting	Select one serial port to display the Legacy system and Option ROM information	COM0

7.2.2.3.3 Console Redirection Settings (EMS)

Console Redirection Settings (EMS) interface is used to set the console redirection in Windows system.



```
        Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
              Advanced
  Out-of-Band Mgmt Port       COM0                VT-UTF8 is the
  Terminal Type               [ANSI]              preferred terminal type
  Bits per second             [115200]            for out-of-band
  Flow Control                [None]              management. The next
  Data Bits                   8                   best choice is VT100+
  Parity                      None                and then VT100. See
  Stop Bits                   1                   above, in Console
                                                  Redirection Settings

                                                  Left/Right: Select Screen
                                                  Up/Down: Select Item
                                                  Enter: Select
                                                  +/-: Change Opt.
                                                  F1: General Help
                                                  F2: Previous Values
                                                  F9: Optimized Defaults
                                                  F10: Save & Exit
                                                  ESC: Exit
        Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                       AB
```

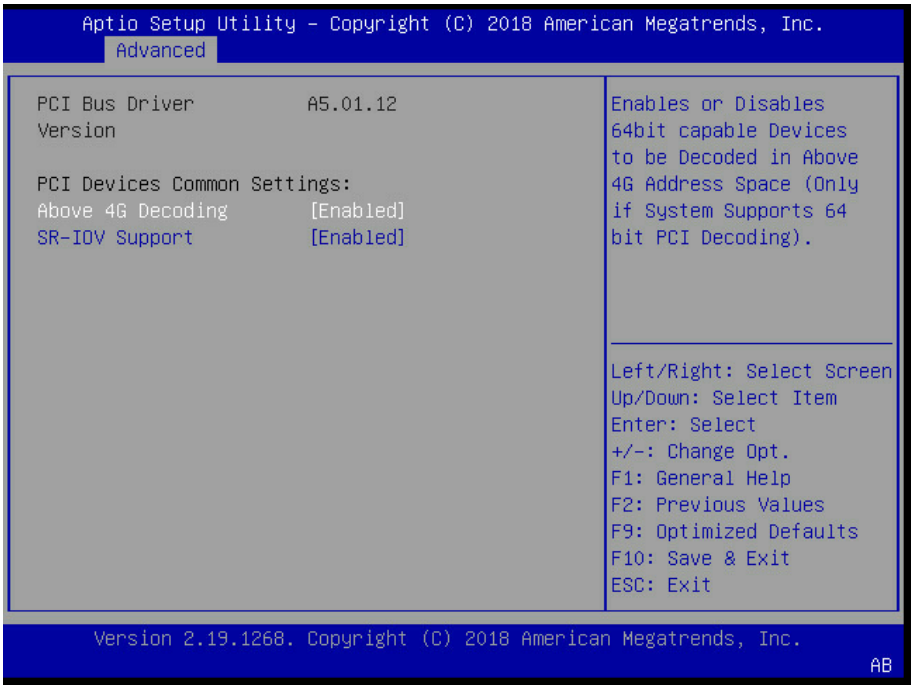
Figure 7-43

Table 7-14 Console Redirection Settings Interface Instruction Table

Interface Parameters	Function Description	Default Value
Terminal Type	Terminal type settings. Options include: VT100 VT100+ VT-UTF8 ANSI	ANSI
Bits per second	Baud rate settings. Options include: 9600 19200 38400 57600 115200	115200
Flow Control	Flow control settings. Options include: None Hardware RTS/CTS	None
Data Bits	Serial port data width settings. Options include: 7 8	8
Parity	Parity settings. Options include: None Even Odd Mark (odd-even check) Space (storage parity check)	None
Stop Bits	Stop bit settings. Options include: 1 2	1

7.2.2.4 PCI Subsystem Settings

PCI Subsystem Settings interface is used to set the options related with PCI subsystem.



```
        Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
      Advanced
 PCI Bus Driver           A5.01.12        Enables or Disables
 Version                                  64bit capable Devices
                                          to be Decoded in Above
 PCI Devices Common Settings:             4G Address Space (Only
 Above 4G Decoding        [Enabled]       if System Supports 64
 SR-IOV Support           [Enabled]       bit PCI Decoding).

                                          Left/Right: Select Screen
                                          Up/Down: Select Item
                                          Enter: Select
                                          +/-: Change Opt.
                                          F1: General Help
                                          F2: Previous Values
                                          F9: Optimized Defaults
                                          F10: Save & Exit
                                          ESC: Exit
        Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                      AB
```

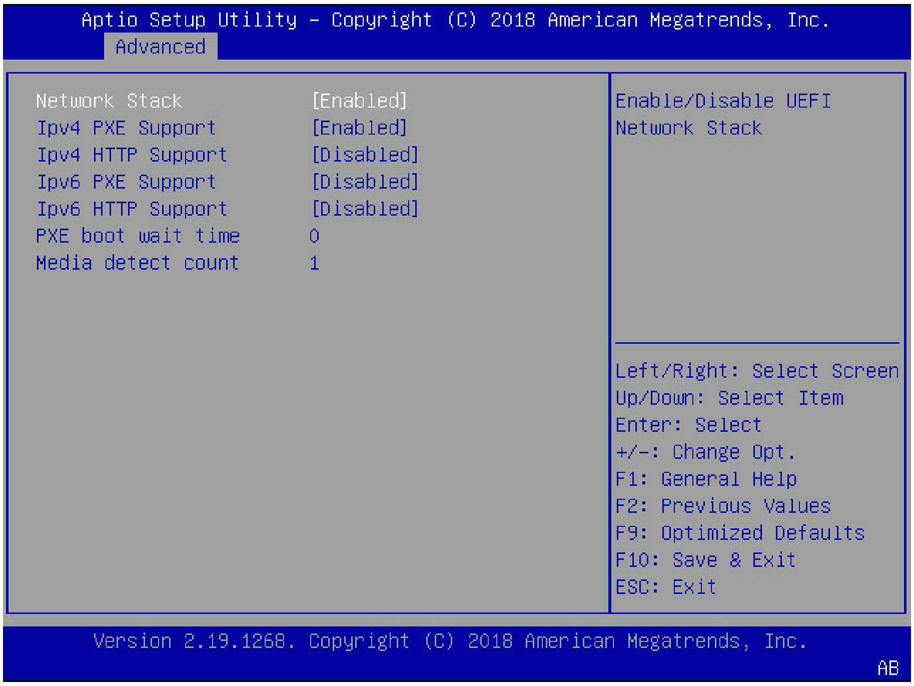
Figure 7-44

Table 7-15 PCI Subsystem Settings Interface Instruction Table

Interface Parameters	Function Description	Default Value
Above 4G Decoding	Above 4G memory access control on-off settings. Options include: Enabled Disabled	Enabled
SR-IOV Support	SR-IOV support on-off settings. Options include: Enabled Disabled	Enabled

7.2.2.5 Network Stack Configuration

Network Stack Configuration interface is used to set the options related with Network UEFI PXE.



```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
Advanced

Network Stack          [Enabled]      Enable/Disable UEFI
Ipv4 PXE Support       [Enabled]      Network Stack
Ipv4 HTTP Support      [Disabled]
Ipv6 PXE Support       [Disabled]
Ipv6 HTTP Support      [Disabled]
PXE boot wait time     0
Media detect count     1

                                      Left/Right: Select Screen
                                      Up/Down: Select Item
                                      Enter: Select
                                      +/-: Change Opt.
                                      F1: General Help
                                      F2: Previous Values
                                      F9: Optimized Defaults
                                      F10: Save & Exit
                                      ESC: Exit

Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                              AB
```

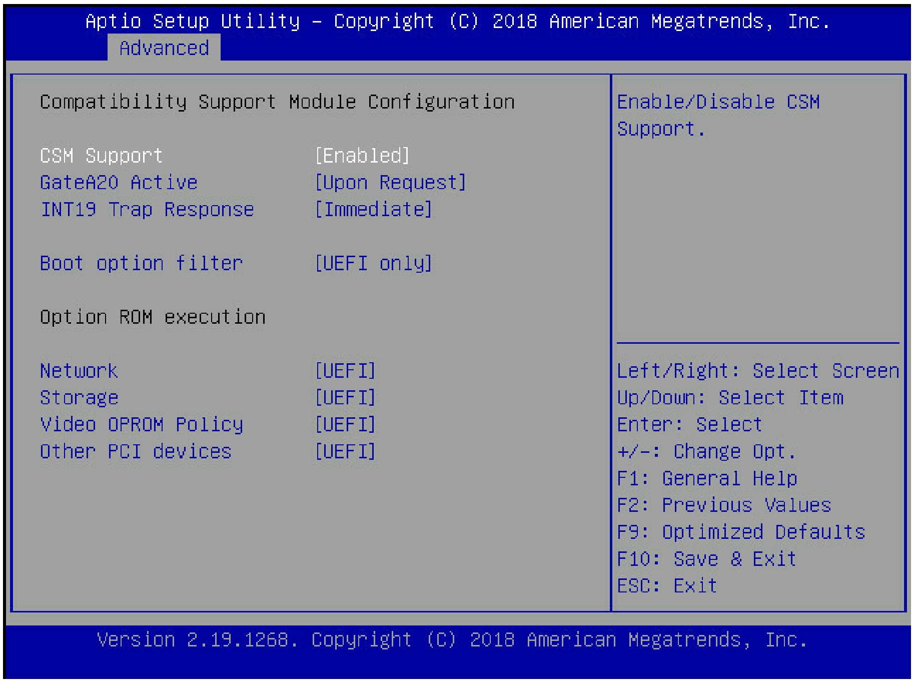
Figure 7-45

Table 7-16 Network Stack Configuration Interface Instruction Table

Interface Parameters	Function Description	Default Value
Network Stack	Network stack on-off settings. Options include: Enabled Disabled Only this option is enabled, the following options can be displayed and the functions can be set.	Enabled
Ipv4 PXE Support	UEFI Ipv4 PXE support on-off settings. Options include: Enabled Disabled	Enabled
Ipv4 HTTP Support	Ipv4 HTTP support on-off settings. Options include: Enabled Disabled	Disabled
Ipv6 PXE Support	UEFI Ipv6 PXE support on-off settings. Options include: Enabled Disabled	Disabled
Ipv6 HTTP Support	Ipv6 HTTP support on-off settings. Options include: Enabled Disabled	Disabled
PXE boot wait time	Set the wait time to cancel PXE boot after pressing ESC key, the setting range is 0~5.	0
Media detect count	Device detect count settings, the setting range is 1~50.	1

7.2.2.6 CSM Configuration

CSM Configuration interface is used to set the options related with the compatibility support module.



```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
        Advanced

Compatibility Support Module Configuration              Enable/Disable CSM
                                                        Support.
CSM Support               [Enabled]
GateA20 Active            [Upon Request]
INT19 Trap Response       [Immediate]

Boot option filter        [UEFI only]

Option ROM execution

Network                   [UEFI]                        Left/Right: Select Screen
Storage                   [UEFI]                        Up/Down: Select Item
Video OPROM Policy        [UEFI]                        Enter: Select
Other PCI devices         [UEFI]                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F9: Optimized Defaults
                                                        F10: Save & Exit
                                                        ESC: Exit

Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
```

Figure 7-46

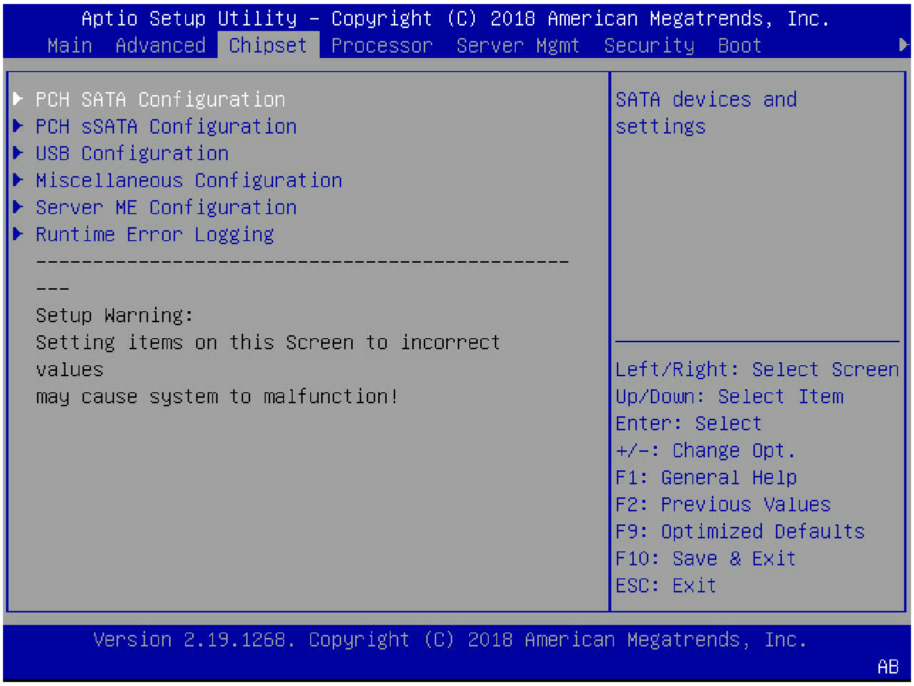
Table 7-17 CSM Configuration Interface Instruction Table

Interface Parameters	Function Description	Default Value
CSM Support	CSM support on-off settings. Options include: Enabled Disabled	Disabled
GateA20 Active	A20 line control mode settings. Options include: Upon Request Always A20 is an address line, which controls the system how to access the memory space larger than 1MB.	Upon Request
INT19 Trap Response	Interrupt/Capture signal response settings. Options include: Immediate Postponed	Immediate
Boot Option Filter	Boot mode settings. Options include: UEFI Only Legacy Only	UEFI Only
Network	NIC Option ROM execution mode settings. Options include: Do not launch Legacy UEFI	UEFI
Storage	Storage device Option ROM execution mode settings. Options include: Do not launch Legacy UEFI	UEFI

Video OPROM Policy	Video device Option ROM execution mode settings. Options include: Do not launch Legacy UEFI	UEFI
Other PCI devices	Other PCI devices Option ROM execution mode settings. Options include: Do not launch Legacy UEFI	UEFI

7.2.3 Chipset

Chipset interface includes the information settings and runtime error logging settings of PCH SATA/sSATA, USB and ME devices.



```
        Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
    Main  Advanced  Chipset  Processor  Server Mgmt  Security  Boot

 ▶ PCH SATA Configuration                              SATA devices and
 ▶ PCH sSATA Configuration                             settings
 ▶ USB Configuration
 ▶ Miscellaneous Configuration
 ▶ Server ME Configuration
 ▶ Runtime Error Logging
   -----------------------------------------------
   ---
   Setup Warning:
   Setting items on this Screen to incorrect
   values
   may cause system to malfunction!                    Left/Right: Select Screen
                                                       Up/Down: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F9: Optimized Defaults
                                                       F10: Save & Exit
                                                       ESC: Exit

        Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                        AB
```

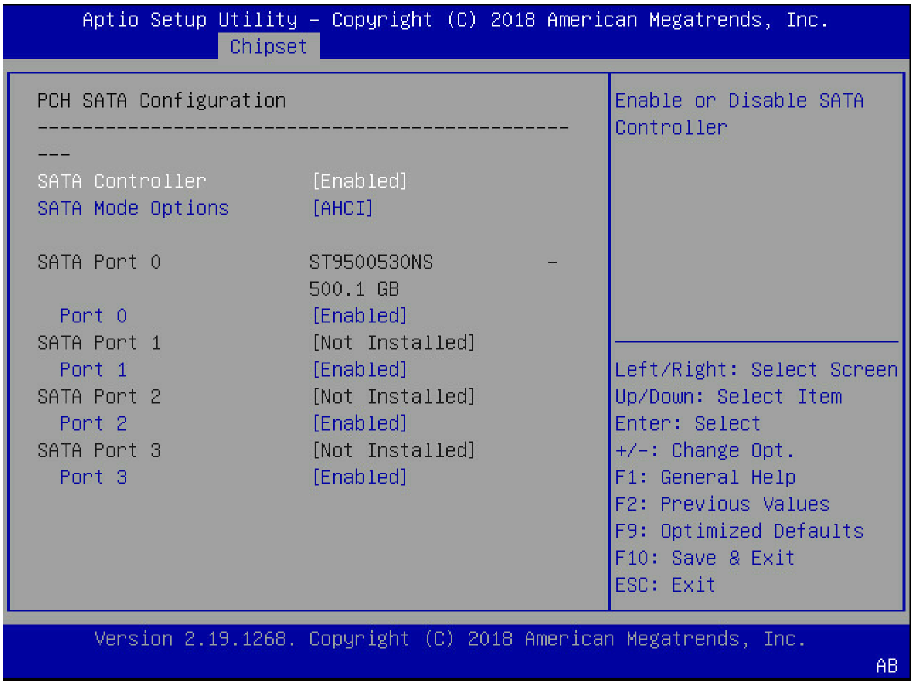
Figure 7-47

Table 7-18 Chipset Interface Instruction Table

Interface Parameters	**Function Description**
PCH SATA Configuration	PCH SATA configuration
PCH sSATA Configuration	PCH sSATA configuration
USB Configuration	USB configuration
Miscellaneous Configuration	Miscellaneous configuration
Server ME Configuration	Server ME configuration
Runtime Error Logging	Runtime error logging

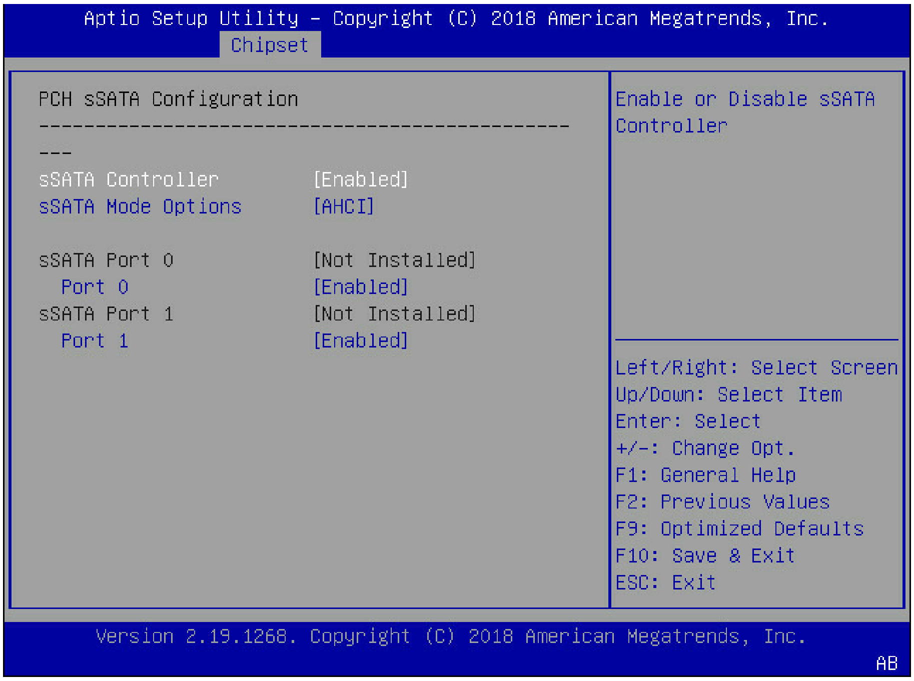
7.2.3.1 PCH SATA Configuration/PCH sSATA Configuration

PCH sSATA Configuration and PCH SATA Configuration interfaces are used to set the options related with the onboard sSATA/SATA ports. Take PCH SATA Configuration menu as an example, as shown in the following figure.



```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                    Chipset

PCH SATA Configuration                           Enable or Disable SATA
-----------------------------------------------  Controller
---
SATA Controller            [Enabled]
SATA Mode Options          [AHCI]

SATA Port 0                ST9500530NS        –
                           500.1 GB
  Port 0                   [Enabled]
SATA Port 1                [Not Installed]       Left/Right: Select Screen
  Port 1                   [Enabled]             Up/Down: Select Item
SATA Port 2                [Not Installed]       Enter: Select
  Port 2                   [Enabled]             +/-: Change Opt.
SATA Port 3                [Not Installed]       F1: General Help
  Port 3                   [Enabled]             F2: Previous Values
                                                 F9: Optimized Defaults
                                                 F10: Save & Exit
                                                 ESC: Exit

Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                   AB
```

Figure 7-48



```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                    Chipset

PCH sSATA Configuration                          Enable or Disable sSATA
-----------------------------------------------  Controller
---
sSATA Controller           [Enabled]
sSATA Mode Options         [AHCI]

sSATA Port 0               [Not Installed]
  Port 0                   [Enabled]
sSATA Port 1               [Not Installed]
  Port 1                   [Enabled]
                                                 Left/Right: Select Screen
                                                 Up/Down: Select Item
                                                 Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F9: Optimized Defaults
                                                 F10: Save & Exit
                                                 ESC: Exit

Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                   AB
```

Figure 7-49

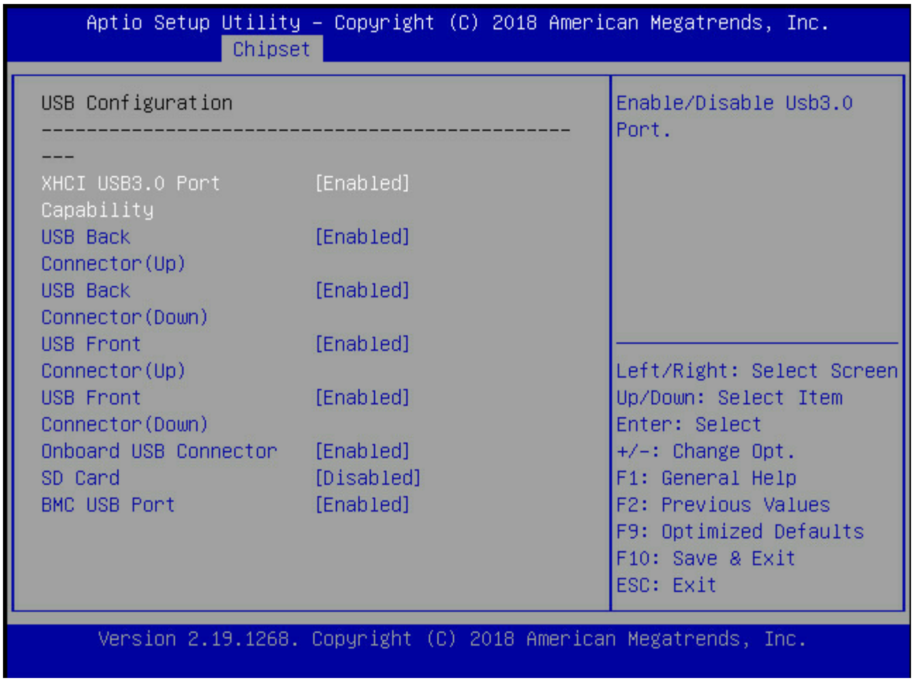
Table 7-19 PCH SATA Configuration Interface Instruction Table

Interface Parameters	Function Description	Default Value
SATA Controller	SATA controller on-off settings. Options include: Enabled Disabled	Enabled
SATA Mode Options	SATA mode settings. Options include: AHCI RAID	AHCI
SATA Port 0~3	SATA port 0~3 HDD information	----
Port 0~3	SATA port on-off settings. Options include: Enabled Disabled	Enabled

PCH sSATA Configuration Interface Instruction Table is omitted here.

7.2.3.2 USB Configuration

USB Configuration is used to set the options related with the onboard USB ports.



```
      Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                    Chipset

  USB Configuration                                 Enable/Disable Usb3.0
  ----------------------------------------------    Port.
  ---
  XHCI USB3.0 Port        [Enabled]
  Capability
  USB Back                [Enabled]
  Connector(Up)
  USB Back                [Enabled]
  Connector(Down)
  USB Front               [Enabled]
  Connector(Up)                                     Left/Right: Select Screen
  USB Front               [Enabled]                 Up/Down: Select Item
  Connector(Down)                                   Enter: Select
  Onboard USB Connector   [Enabled]                 +/-: Change Opt.
  SD Card                 [Disabled]                F1: General Help
  BMC USB Port            [Enabled]                 F2: Previous Values
                                                    F9: Optimized Defaults
                                                    F10: Save & Exit
                                                    ESC: Exit

       Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
```

Figure 7-50

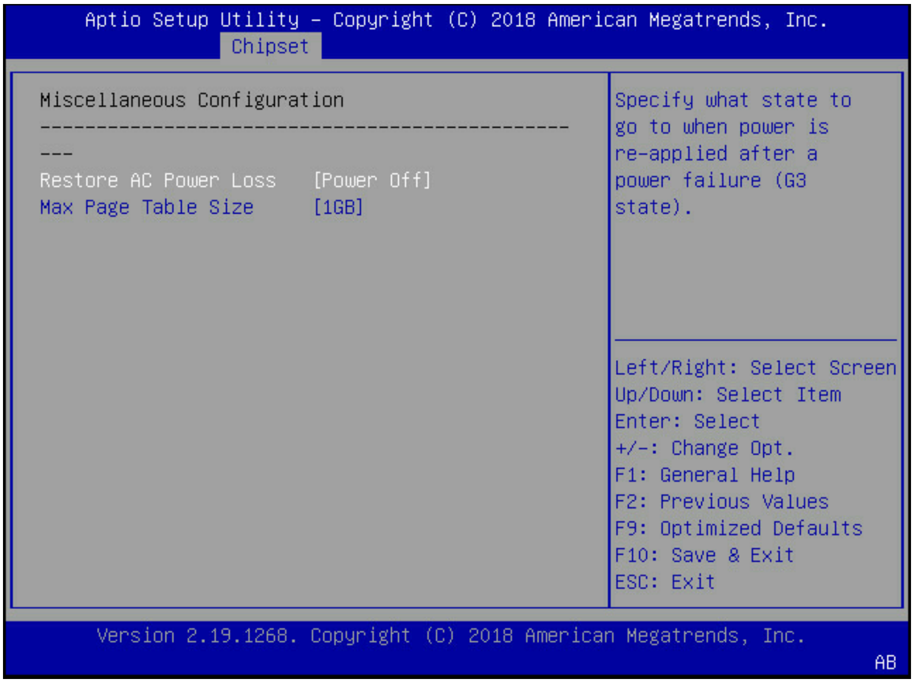
Table 7-20 USB Configuration Interface Instruction Table

Interface Parameters	Function Description	Default Value
XHCI USB3.0 Port Capability	USB3.0 on-off settings. Options include: Enabled Disabled	Disabled
USB Back Connector (Up)	Chassis back-up USB connector on-off settings. Options include: Enabled Disabled	Enabled
USB Back Connector (Down)	Chassis back-down USB connector on-off settings. Options include: Enabled Disabled	Enabled

USB Front Connector (Up)	Chassis front-up USB connector on-off settings. Options include: Enabled Disabled	Enabled
USB Front Connector (Down)	Chassis front-down USB connector on-off settings. Options include: Enabled Disabled	Enabled
Onboard USB Connector	Onboard USB connector on-off settings. Options include: Enabled Disabled	Enabled
SD Card	Onboard SD card on-off settings. Options include: Enabled Disabled	Disabled
BMC USB Port	BMC USB connector on-off settings. Options include: Enabled Disabled	Enabled

7.2.3.3 Miscellaneous Configuration

Miscellaneous Configuration interface is used to set some other common options.



```
      Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                           Chipset
  Miscellaneous Configuration                       Specify what state to
  -----------------------------------------------  go to when power is
  ---                                               re-applied after a
  Restore AC Power Loss     [Power Off]             power failure (G3
  Max Page Table Size       [1GB]                   state).

                                                    Left/Right: Select Screen
                                                    Up/Down: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F9: Optimized Defaults
                                                    F10: Save & Exit
                                                    ESC: Exit
      Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                      AB
```

Figure 7-51

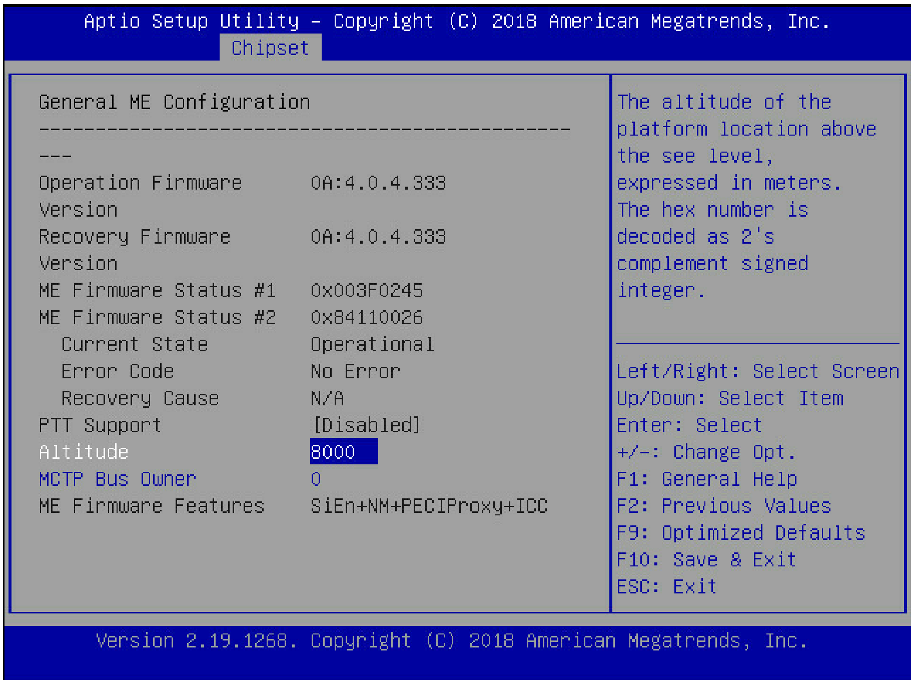
Table 7-21 Miscellaneous Configuration Interface Instruction Table

Interface Parameters	Function Description	Default Value
Restore AC Power Loss	Power state settings when restoring on AC power loss. Options include: Power OFF Last State Power ON	Power OFF
Max Page Table Size	The maximum page table size settings. Options include: 1GB 2MB For older OS, please select 2MB, otherwise, it may cause a problem.	1GB

VGA Priority	Onboard/Offboard VGA device priority settings. Options include: Onboard Device Offboard Device	Offboard Device

7.2.3.4 Server ME Configuration

Server ME Configuration interface is used to display and set the options related with server ME configuration.



```
        Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                         Chipset

  General ME Configuration                         The altitude of the
  -----------------------------------------------  platform location above
  ---                                              the see level,
  Operation Firmware        0A:4.0.4.333           expressed in meters.
  Version                                          The hex number is
  Recovery Firmware         0A:4.0.4.333           decoded as 2's
  Version                                          complement signed
  ME Firmware Status #1     0x003F0245             integer.
  ME Firmware Status #2     0x84110026
    Current State           Operational            ------------------------
    Error Code              No Error               Left/Right: Select Screen
    Recovery Cause          N/A                    Up/Down: Select Item
  PTT Support               [Disabled]             Enter: Select
  Altitude                  8000                   +/-: Change Opt.
  MCTP Bus Owner            0                      F1: General Help
  ME Firmware Features      SiEn+NM+PECIProxy+ICC  F2: Previous Values
                                                   F9: Optimized Defaults
                                                   F10: Save & Exit
                                                   ESC: Exit

          Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
```

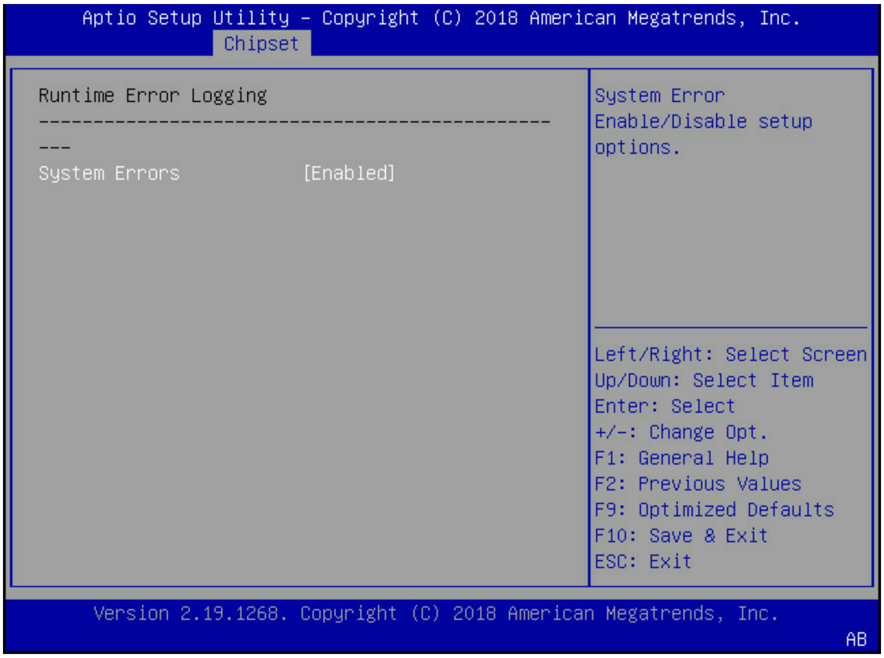
Figure 7-52

Table 7-22 Server ME Configuration Interface Instruction Table

Interface Parameters	Function Description	Default Value
Operational Firmware Version	Operational ME firmware version	----
Recovery Firmware Version	Recovery ME firmware version	----
ME Firmware Status #1	ME FW status value #1	----
ME Firmware Status #2	ME FW status value #2	----
Current State	Current state	----
Error code	ME FW error code	----
Recovery Cause	Recovery cause	N/A
PTT Support	PTT support on-off settings. Options include: Enabled Disabled	Disabled
Altitude	Altitude settings	8000
MCTP Bus Owner	MCTP bus owner is located in PCIe: [15:8] bus, [7:3] device, [2:0] function. If set to 0, it means disabled.	0
ME Firmware Features	ME FW features	----

7.2.3.5 Runtime Error Logging

Runtime Error Logging interface is used to set the runtime error logs.



```
        Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                      Chipset
 Runtime Error Logging                              System Error
 ------------------------------------------------   Enable/Disable setup
 ---                                                options.
 System Errors             [Enabled]

                                                    Left/Right: Select Screen
                                                    Up/Down: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F9: Optimized Defaults
                                                    F10: Save & Exit
                                                    ESC: Exit
        Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                        AB
```

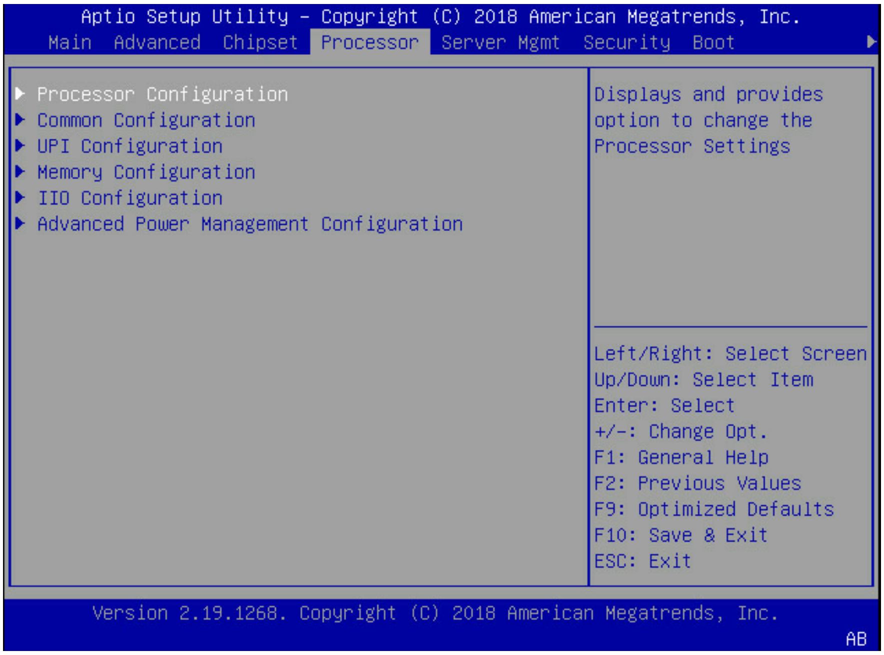
Figure 7-53

Table 7-23 Runtime Error Logging Interface Instruction Table

Interface Parameters	Function Description	Default Value
System Errors	System error log record settings. Options include: Enabled Disabled	Enabled

7.2.4 Processor

Processor interface is used to set the options related with the processor and memory.



```
        Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
  Main  Advanced  Chipset  Processor  Server Mgmt  Security  Boot         ►
 ► Processor Configuration                          Displays and provides
 ► Common Configuration                             option to change the
 ► UPI Configuration                                Processor Settings
 ► Memory Configuration
 ► IIO Configuration
 ► Advanced Power Management Configuration

                                                    Left/Right: Select Screen
                                                    Up/Down: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F9: Optimized Defaults
                                                    F10: Save & Exit
                                                    ESC: Exit
        Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                        AB
```

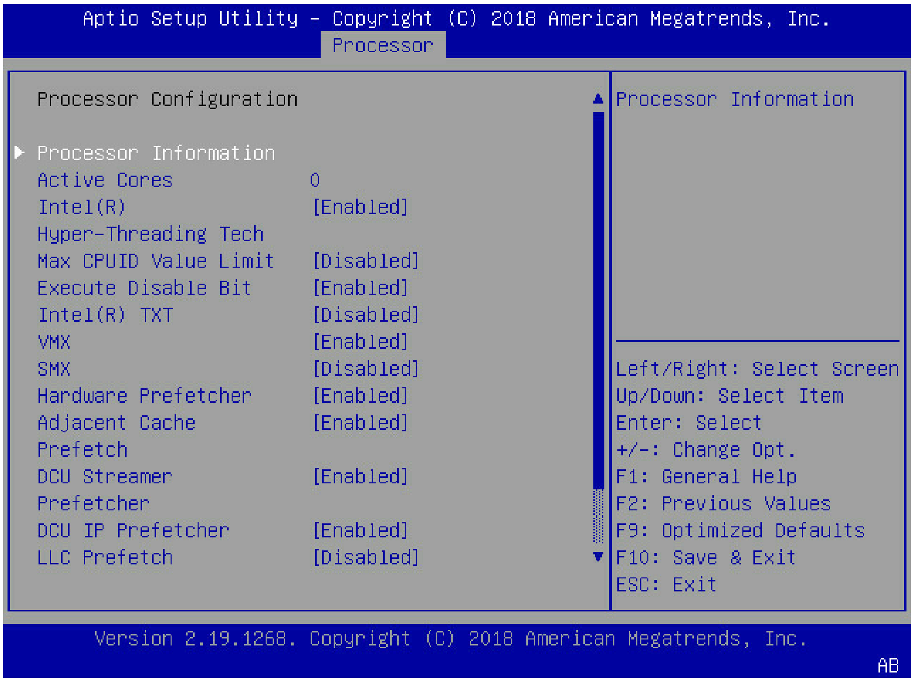
Figure 7-54

Table 7-24 Processor Interface Instruction Table

Interface Parameters	**Function Description**
Processor Configuration	Processor configuration
Common Configuration	Common configuration
UPI Configuration	UPI configuration
Memory Configuration	Memory configuration
IIO Configuration	IIO configuration
Advanced Power Management Configuration	Advanced power management configuration

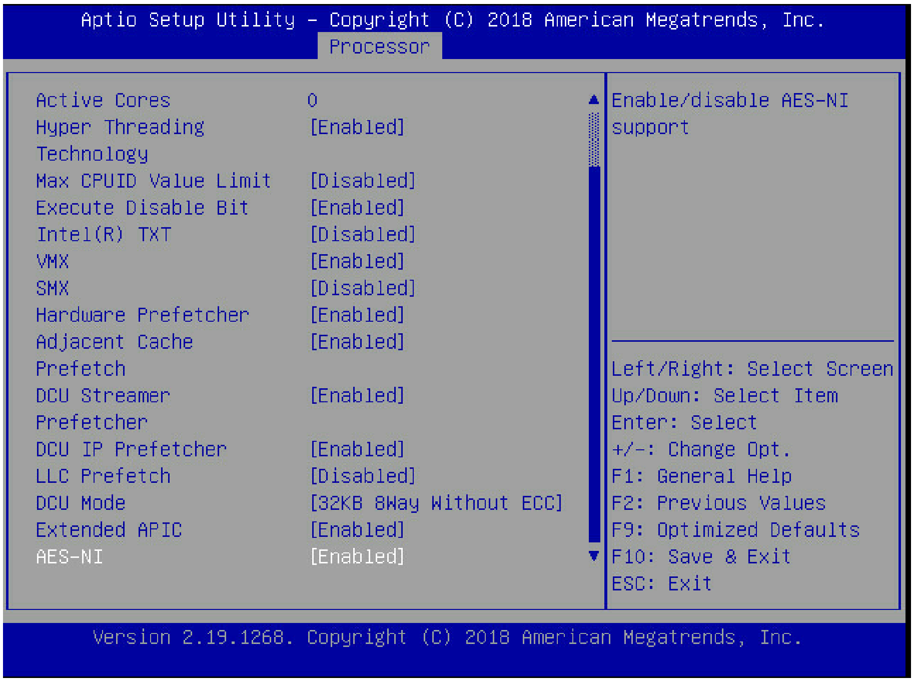
7.2.4.1 Processor Configuration

Processor Configuration interface is used to set the options related with the processor.



```
      Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                              Processor
 Processor Configuration                        ▲ Processor Information

▶ Processor Information
 Active Cores              0
 Intel(R)                  [Enabled]
 Hyper-Threading Tech
 Max CPUID Value Limit     [Disabled]
 Execute Disable Bit       [Enabled]
 Intel(R) TXT              [Disabled]
 VMX                       [Enabled]
 SMX                       [Disabled]            Left/Right: Select Screen
 Hardware Prefetcher       [Enabled]             Up/Down: Select Item
 Adjacent Cache            [Enabled]             Enter: Select
 Prefetch                                        +/-: Change Opt.
 DCU Streamer              [Enabled]             F1: General Help
 Prefetcher                                      F2: Previous Values
 DCU IP Prefetcher         [Enabled]             F9: Optimized Defaults
 LLC Prefetch              [Disabled]          ▼ F10: Save & Exit
                                                 ESC: Exit
      Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                       AB
```

Figure 7-55



```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                            Processor

Active Cores              0                      Enable/disable AES-NI
Hyper Threading           [Enabled]              support
Technology
Max CPUID Value Limit     [Disabled]
Execute Disable Bit       [Enabled]
Intel(R) TXT              [Disabled]
VMX                       [Enabled]
SMX                       [Disabled]
Hardware Prefetcher       [Enabled]
Adjacent Cache            [Enabled]
Prefetch                                         Left/Right: Select Screen
DCU Streamer              [Enabled]              Up/Down: Select Item
Prefetcher                                       Enter: Select
DCU IP Prefetcher         [Enabled]              +/-: Change Opt.
LLC Prefetch              [Disabled]             F1: General Help
DCU Mode                  [32KB 8Way Without ECC] F2: Previous Values
Extended APIC             [Enabled]              F9: Optimized Defaults
AES-NI                    [Enabled]              F10: Save & Exit
                                                 ESC: Exit

    Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
```

Figure 7-56

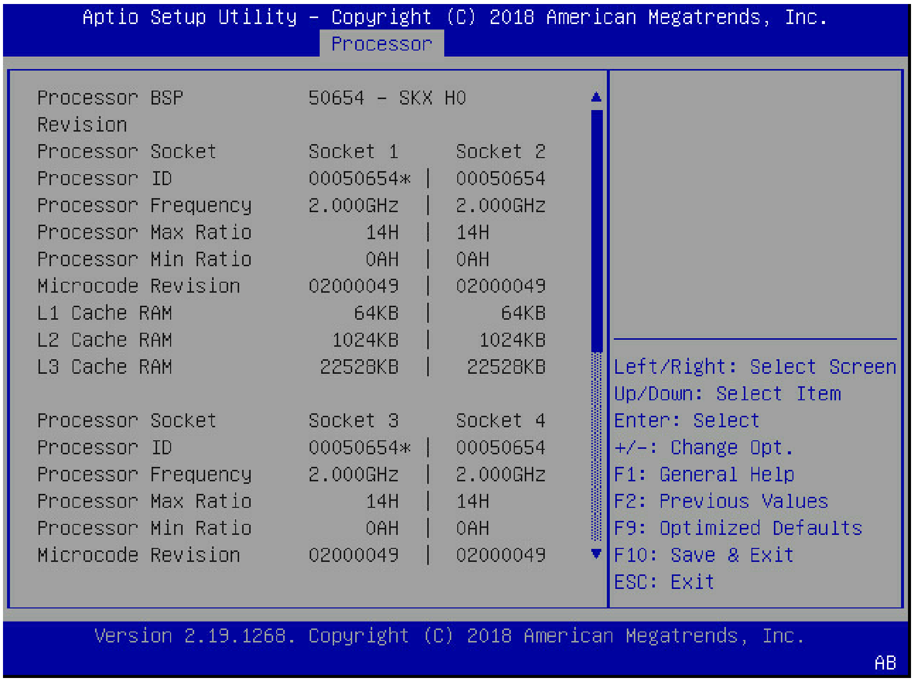
Table 7-25 Processor Configuration Interface Instruction Table

Interface Parameters	Function Description	Default Value
Processor Information	Processor information submenu, the processor's detailed information	----
Active Cores	CPU core settings. Input the number of CPU cores you want to enable. In the Help information, it will display the effective values you can set and the maximum number of physical cores according to the current CPU usage. The default value is 0, all cores enabled.	0
Intel(R) Hyper Threading Tech	Hyper threading technology on-off settings. Options include: Enabled Disabled	Enabled
Max CPUID Value Limit	The max CPUID value limit on-off settings. Enabled Disabled When the legacy OS boot does not support CPUID function, please enable this option.	Disabled
Execute Disable Bit	Execute disable bit on-off setting. Options include: Enabled Disabled	Enabled
Intel(R) TXT	Intel trusted execution technology on-off settings. Options include: Enabled Disabled	Disabled

VMX	Intel virtual machine extensions technology on-off settings. Options include: Enabled Disabled	Enabled
SMX	Safe mode extension on-off settings. Options include: Enabled Disabled	Disabled
Hardware Prefetcher	Hardware prefetcher on-off settings. Options include: Enabled Disabled Before CPU processing instructions or data, it will prefetch these instructions or data from memory to L2 cache, to shorten the amount of time that reading memory takes, to help eliminate potential bottlenecks and to improve system performance.	Enabled
Adjacent Cache Prefetch	Adjacent cache prefetch on-off settings. Options include: Enabled Disabled If this function is enabled, during computer data reading, it will intelligently consider the adjacent data is needed as well, and it will prefetch these data during processing, to speed up the reading process.	Enabled
DCU Streamer Prefetcher	DCU streamer prefetcher on-off settings. Options include: Enabled Disabled This function can prefetch CPU data to shorten the data reading time.	Enabled
DCU IP Prefectcher	DCU IP prefectcher on-off settings. Options include: Enabled Disabled This function can judge whether there is data to prefetch, to shorten the data reading time.	Enabled
LLC Prefetcher	All threads LLC prefetcher on-off settings. Options include: Enabled Disabled	Disabled
DCU Mode	DCU mode settings. Options include: 32KB 8Way Without ECC 16KB 4Way With ECC	32KB 8Way Without ECC
Extended APIC	Extended APIC on-off settings. Options include: Enabled Disabled	Enabled
AES-NI	AES instruction on-off settings. Options include: Enabled Disabled This menu mainly controls whether the CPU supports AES instruction. These instructions are mainly used for system virtualization. Enable this instruction, system performance will be improved.	Enabled

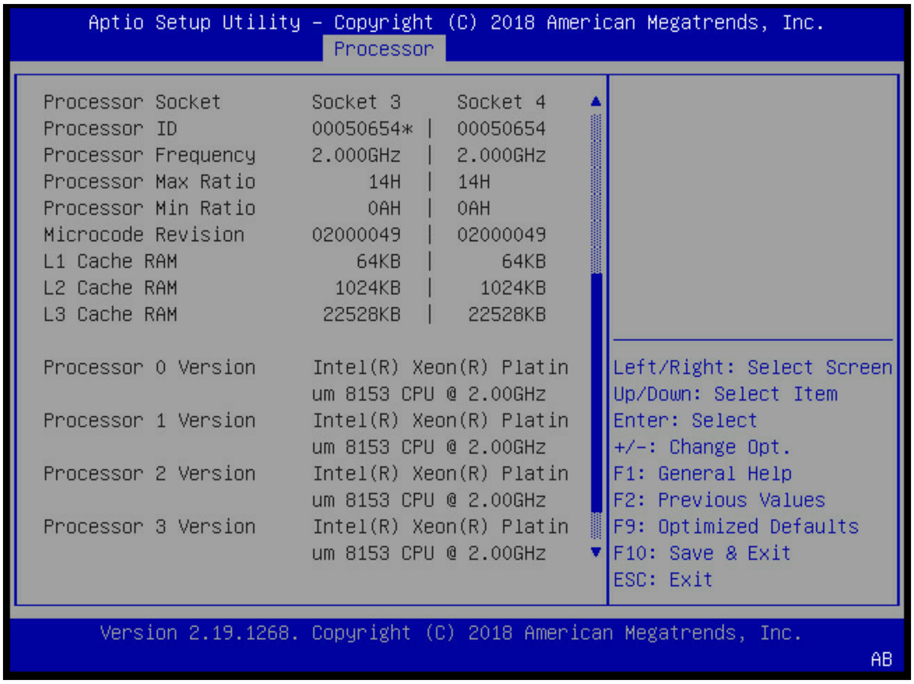
7.2.4.1.1 Processor Information

Processor Information interface displays the detailed CPU information, as shown below.



```
        Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
                                  Processor

  Processor BSP           50654 - SKX H0             ▲
  Revision
  Processor Socket        Socket 1     Socket 2
  Processor ID            00050654* |  00050654
  Processor Frequency     2.000GHz  |  2.000GHz
  Processor Max Ratio          14H  |  14H
  Processor Min Ratio          0AH  |  0AH
  Microcode Revision      02000049  |  02000049
  L1 Cache RAM                64KB  |      64KB
  L2 Cache RAM              1024KB  |    1024KB
  L3 Cache RAM             22528KB  |   22528KB     Left/Right: Select Screen
                                                    Up/Down: Select Item
  Processor Socket        Socket 3     Socket 4     Enter: Select
  Processor ID            00050654* |  00050654     +/-: Change Opt.
  Processor Frequency     2.000GHz  |  2.000GHz     F1: General Help
  Processor Max Ratio          14H  |  14H          F2: Previous Values
  Processor Min Ratio          0AH  |  0AH          F9: Optimized Defaults
  Microcode Revision      02000049  |  02000049  ▼  F10: Save & Exit
                                                    ESC: Exit

        Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                        AB
```

Figure 7-57

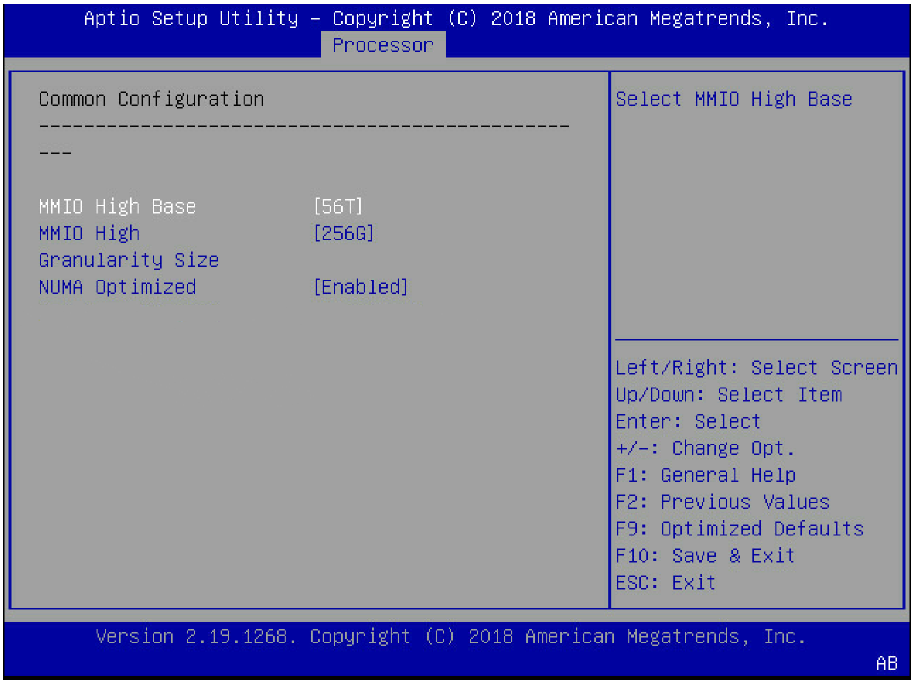


```
        Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
                                  Processor

  Processor Socket        Socket 3     Socket 4      ▲
  Processor ID            00050654* |  00050654
  Processor Frequency     2.000GHz  |  2.000GHz
  Processor Max Ratio          14H  |  14H
  Processor Min Ratio          0AH  |  0AH
  Microcode Revision      02000049  |  02000049
  L1 Cache RAM                64KB  |      64KB
  L2 Cache RAM              1024KB  |    1024KB
  L3 Cache RAM             22528KB  |   22528KB

  Processor 0 Version     Intel(R) Xeon(R) Platin   Left/Right: Select Screen
                          um 8153 CPU @ 2.00GHz     Up/Down: Select Item
  Processor 1 Version     Intel(R) Xeon(R) Platin   Enter: Select
                          um 8153 CPU @ 2.00GHz     +/-: Change Opt.
  Processor 2 Version     Intel(R) Xeon(R) Platin   F1: General Help
                          um 8153 CPU @ 2.00GHz     F2: Previous Values
  Processor 3 Version     Intel(R) Xeon(R) Platin   F9: Optimized Defaults
                          um 8153 CPU @ 2.00GHz  ▼  F10: Save & Exit
                                                    ESC: Exit

        Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                        AB
```

Figure 7-58

7.2.4.2 Common Configuration

Common Configuration interface is used to set the common options.



```
        Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                              Processor
  Common Configuration                           Select MMIO High Base
  ----------------------------------------------
  ---

  MMIO High Base            [56T]
  MMIO High                 [256G]
  Granularity Size
  NUMA Optimized            [Enabled]
                                                 Left/Right: Select Screen
                                                 Up/Down: Select Item
                                                 Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F9: Optimized Defaults
                                                 F10: Save & Exit
                                                 ESC: Exit
        Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                      AB
```

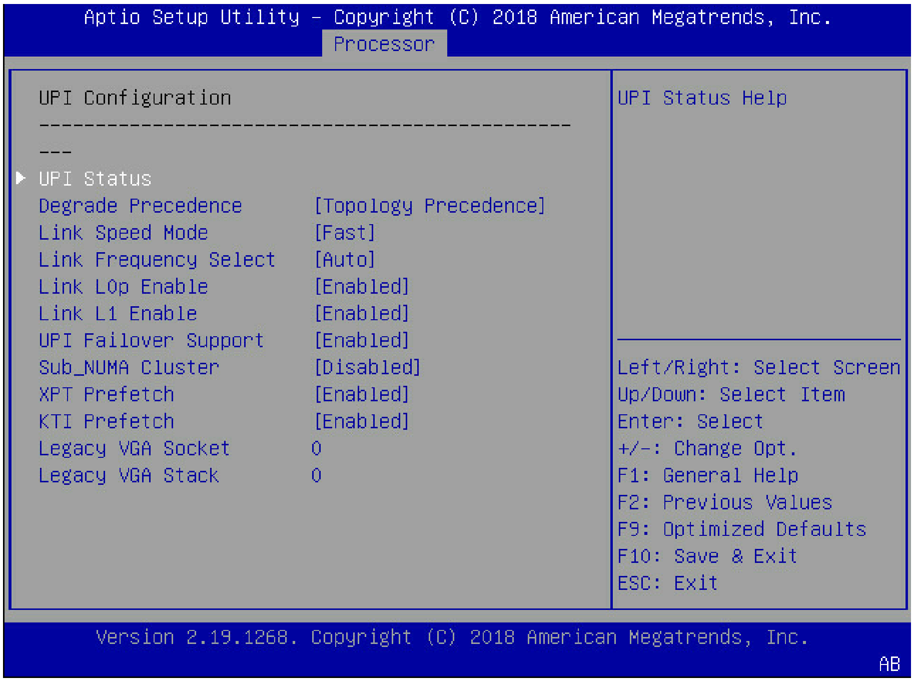
Figure 7-59

Table 7-26 Common Configuration Interface Instruction Table

Interface Parameters	**Function Description**	**Default Value**
MMIO High Base	MMIO high base settings. Options include: 56T 40T 24T 16T 4T 1T	56T
MMIO High Granularity Size	MMIO high granularity size settings. Options include: 1G 4G 16G 64G 256G 1024G	256G
Numa	Numa on-off settings. Options include: Enabled Disabled	Enabled

7.2.4.3 UPI Configuration

UPI Configuration interface is used to set the options related with UPI.



```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                          Processor

UPI Configuration                                  UPI Status Help
------------------------------------------------
---
▶ UPI Status
  Degrade Precedence       [Topology Precedence]
  Link Speed Mode          [Fast]
  Link Frequency Select    [Auto]
  Link L0p Enable          [Enabled]
  Link L1 Enable           [Enabled]
  UPI Failover Support     [Enabled]
  Sub_NUMA Cluster         [Disabled]              Left/Right: Select Screen
  XPT Prefetch             [Enabled]               Up/Down: Select Item
  KTI Prefetch             [Enabled]               Enter: Select
  Legacy VGA Socket        0                       +/-: Change Opt.
  Legacy VGA Stack         0                       F1: General Help
                                                   F2: Previous Values
                                                   F9: Optimized Defaults
                                                   F10: Save & Exit
                                                   ESC: Exit

     Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                      AB
```

Figure 7-60

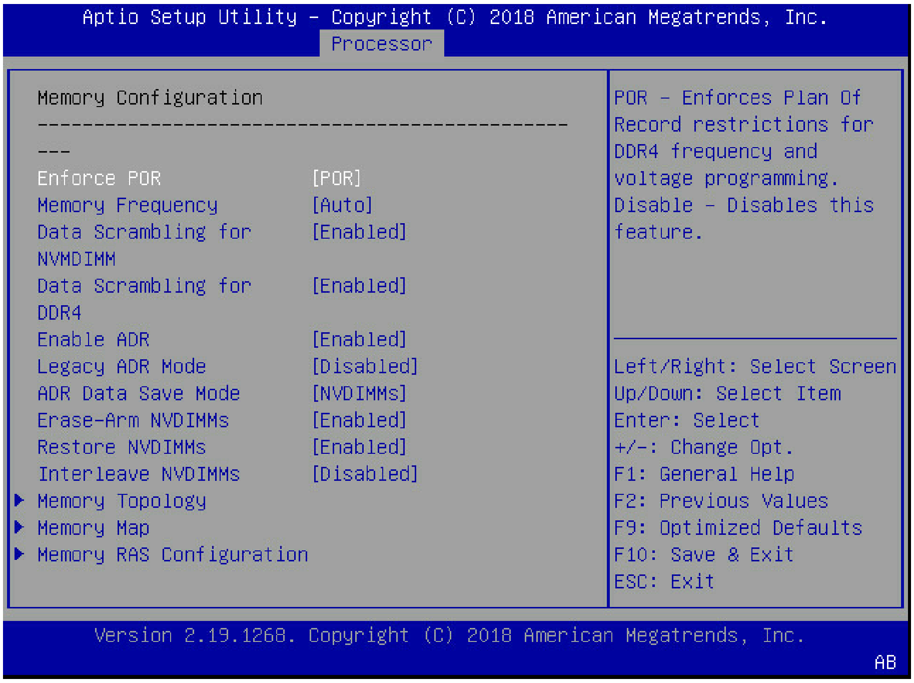
Table 7-27 UPI Configuration Interface Instruction Table

Interface Parameters	Function Description	**Default Value**
UPI Status	UPI status submenu, displaying the current UPI link status	----
Degrade Precedence	Degrade precedence settings. Options include: Topology Precedence Feature Precedence When the system settings conflict, set it to Topology Precedence to reduce Feature; or set it to Feature Precedence to reduce Topology.	Topology Precedence
Link Speed Mode	Link speed mode settings. Options include: Fast Slow	Fast
Link Frequency Select	Link frequency select settings. Options include: Auto 9.6 GT/s 10.4GT/s Use Per Link Setting	Auto
Link L0p Enable	Link L0p on-off settings. Options include: Enabled Disabled Link power-saving mode setting, which is set when the bandwidth is half of the peak bandwidth	Disabled
Link L1 Enable	Link L1 on-off settings. Options include: Enabled Disabled In the case that system is extremely idle, turn off QPI Link.	Disabled
UPI Failover Support	UPI failover support on-off settings. Options include: Enabled Disabled	Enabled

Sub_NUMA Cluster	Sub NUMA cluster settings. Options include: Auto: Support 1-cluster or 2-clusters according to IMC interleave. Enabled: Support all SNC clusters (2-clusters) and 1-way IMC interleave. Disabled: SNC function not supported.	Disabled
XPT Prefetch	XPT Prefetch on-off settings: Enabled Disabled	Disabled
KTI Prefetch	KTI Prefetch on-off settings: Enabled Disabled	Enabled
Legacy VGA Socket	Legacy VGA socket settings	0
Legacy VGA Stack	Legacy VGA stack settings	0

7.2.4.4 Memory Configuration

Memory Configuration interface is used to set the options related with the memory.



```
      Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                                 Processor
  Memory Configuration                               POR – Enforces Plan Of
  -----------------------------------------------    Record restrictions for
  ---                                                DDR4 frequency and
  Enforce POR              [POR]                     voltage programming.
  Memory Frequency         [Auto]                    Disable – Disables this
  Data Scrambling for      [Enabled]                 feature.
  NVMDIMM
  Data Scrambling for      [Enabled]
  DDR4
  Enable ADR               [Enabled]
  Legacy ADR Mode          [Disabled]                Left/Right: Select Screen
  ADR Data Save Mode       [NVDIMMs]                 Up/Down: Select Item
  Erase-Arm NVDIMMs        [Enabled]                 Enter: Select
  Restore NVDIMMs          [Enabled]                 +/-: Change Opt.
  Interleave NVDIMMs       [Disabled]                F1: General Help
▶ Memory Topology                                    F2: Previous Values
▶ Memory Map                                         F9: Optimized Defaults
▶ Memory RAS Configuration                           F10: Save & Exit
                                                     ESC: Exit
       Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                     AB
```

Figure 7-61

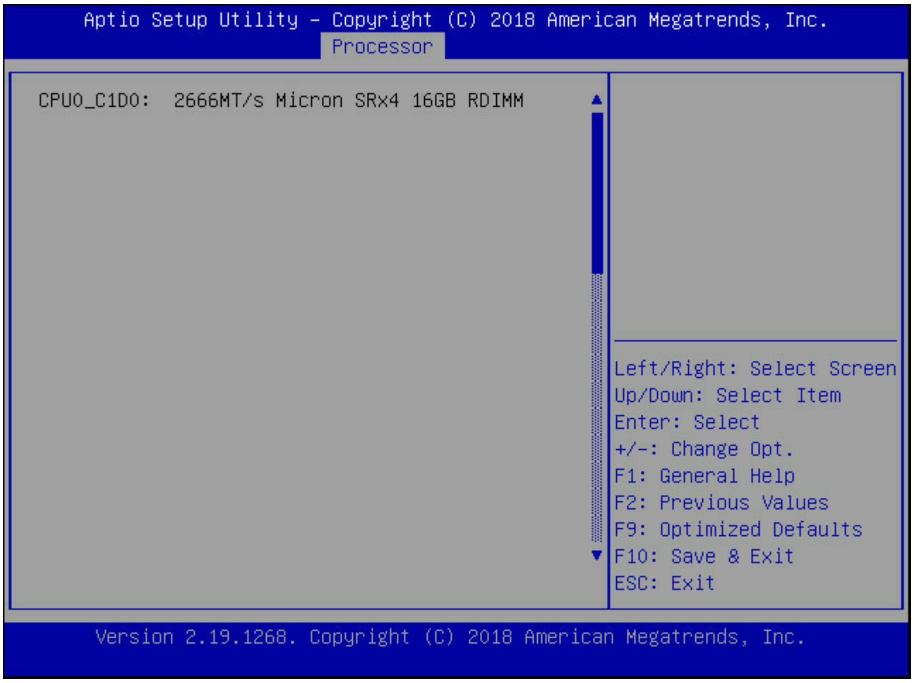
Table 7-28 Memory Configuration Interface Instruction Table

Interface Parameters	Function Description	Default Value
Enforce POR	Enforce POR settings. Options include: POR Disabled	POR
Memory Frequency	Memory frequency settings. Options include: Auto 1600 1866 2133 2400 2666 ……	Auto

Data Scrambling for NVMDIMM	NVMDIMM data scrambling on-off settings. Options include: Enabled Disabled	Enabled
Data Scrambling for DDR4	DDR4 data scrambling on-off settings. Options include: Auto Enabled Disabled	Enabled
Enable ADR	ADR on-off settings. Options include: Enabled Disabled	Enabled
Legacy ADR Mode	Legacy ADR mode on-off settings. Options include: Enabled Disabled	Disabled
ADR Data Save Mode	ADR data save mode settings. Options include: Disabled Batterybacked DIMMs NVDIMMs	NVDIMMs
Erase-Arm NVDIMMs	Erase-Arm NVDIMMs on-off settings. Options include: Enabled Disabled	Enabled
Restore NVDIMMs	Restore NVDIMMs on-off settings. Options include: Enabled Disabled	Enabled
Interleave NVDIMMs	Interleave NVDIMMs on-off settings. Options include: Enabled Disabled	Disabled
Memory Topology	Memory topology submenu, displaying the detailed information of the current installed memories.	----
Memory Map	Memory Map submenu	----
Memory RAS Configuration	Memory RAS configuration submenu	----

7.2.4.4.1 Memory Topology

Memory Topology interface displays the present memory information.

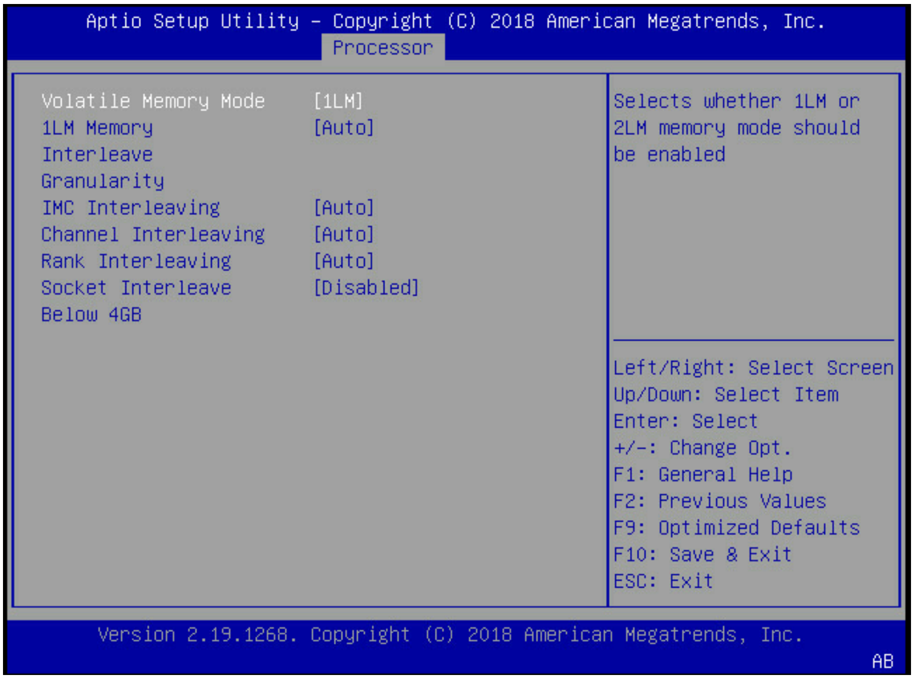


```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                              Processor

CPU0_C1D0:  2666MT/s Micron SRx4 16GB RDIMM

                                             Left/Right: Select Screen
                                             Up/Down: Select Item
                                             Enter: Select
                                             +/-: Change Opt.
                                             F1: General Help
                                             F2: Previous Values
                                             F9: Optimized Defaults
                                             F10: Save & Exit
                                             ESC: Exit

     Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
```

Figure 7-62

7.2.4.4.2 Memory Map

Memory Map interface is used to set some modes of the memory.



```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                              Processor

Volatile Memory Mode      [1LM]            Selects whether 1LM or
1LM Memory                [Auto]           2LM memory mode should
Interleave                                 be enabled
Granularity
IMC Interleaving          [Auto]
Channel Interleaving      [Auto]
Rank Interleaving         [Auto]
Socket Interleave         [Disabled]
Below 4GB
                                           Left/Right: Select Screen
                                           Up/Down: Select Item
                                           Enter: Select
                                           +/-: Change Opt.
                                           F1: General Help
                                           F2: Previous Values
                                           F9: Optimized Defaults
                                           F10: Save & Exit
                                           ESC: Exit

     Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                    AB
```

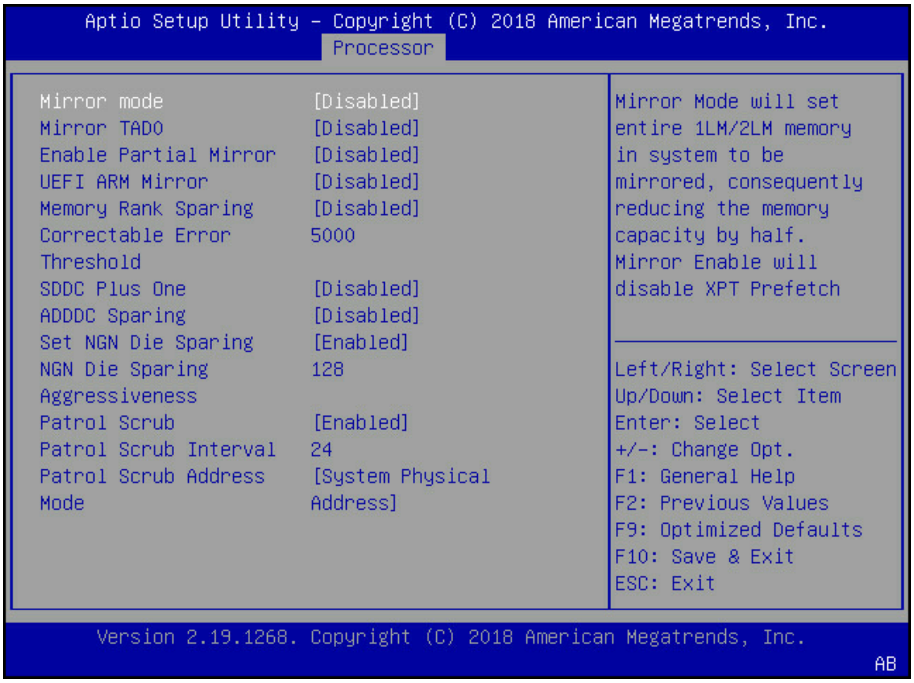
Figure 7-63

Table 7-29 Memory Map Interface Instruction Table

Interface Parameters	Function Description	Default Value
Volatile Memory Mode	Volatile memory mode settings. Options include: 1LM 2LM Auto	1LM
1LM Memory Interleave Granularity	1LM memory interleave granularity settings. Options include: Auto 256B Target, 256B Channel 64B Target, 64B Channel ·	Auto
IMC Interleaving	IMC interleaving settings. Options include: Auto 1-way Interleave 2-way Interleave	Auto
Channel Interleaving	Channel interleaving settings. Options include: Auto 1-way Interleave 2-way Interleave 3-way Interleave	Auto
Rank Interleaving	Rank interleaving settings. Options include: Auto 1-way Interleave 2-way Interleave 4-way Interleave 8-way Interleave	Auto
Socket Interleave Below 4GB	On-off settings of 4GB or less address space processor interleave. Options include: Enabled Disabled	Disabled

7.2.4.4.3 Memory RAS Configuration

Memory RAS Configuration interface is used to set the options related with the memory RAS feature.



```
       Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                                  Processor
  Mirror mode                [Disabled]            Mirror Mode will set
  Mirror TAD0                [Disabled]            entire 1LM/2LM memory
  Enable Partial Mirror      [Disabled]            in system to be
  UEFI ARM Mirror            [Disabled]            mirrored, consequently
  Memory Rank Sparing        [Disabled]            reducing the memory
  Correctable Error          5000                  capacity by half.
  Threshold                                        Mirror Enable will
  SDDC Plus One              [Disabled]            disable XPT Prefetch
  ADDDC Sparing              [Disabled]
  Set NGN Die Sparing        [Enabled]
  NGN Die Sparing            128                   Left/Right: Select Screen
  Aggressiveness                                   Up/Down: Select Item
  Patrol Scrub               [Enabled]             Enter: Select
  Patrol Scrub Interval      24                    +/-: Change Opt.
  Patrol Scrub Address       [System Physical      F1: General Help
  Mode                       Address]              F2: Previous Values
                                                   F9: Optimized Defaults
                                                   F10: Save & Exit
                                                   ESC: Exit
        Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                        AB
```

Figure 7-64

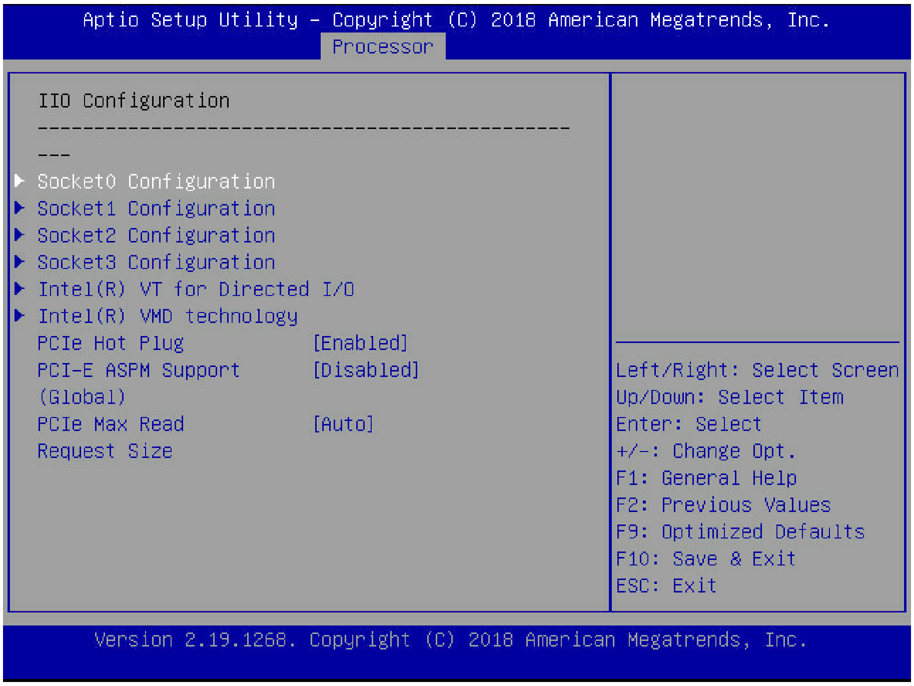
Table 7-30 Memory RAS Configuration Interface Instruction Table

Interface Parameters	Function Description	Default Value
Mirror Mode	Mirror mode settings. Options include: Disabled Mirror Mode 1LM Mirror Mode 2LM	Disabled
Mirror TAD0	Mirror TAD0 mode on-off settings. Options include: Enabled Disabled	Disabled
Enable Partial Mirror	Enable partial mirror mode. Options include: Disabled Partial Mirror mode 1LM Partial Mirror mode 2LM	Disabled
UEFI ARM Mirror	UEFI ARM mirror mode on-off settings. Options include: Enabled Disabled	Disabled
Memory Rank Sparing	Memory Rank sparing on-off settings. Options include: Enabled Disabled When it is set to Enabled, users can select the memory sparing mode. It is a kind of memory channel sparing in Rank, the total memory capacity varies with sparing modes, and it supports at most half of the memory capacity to be used for sparing.	Disabled
Correctable Error Threshold	Correctable error threshold settings	5000
SDDC Plus One	SDDC+1 on-off settings. Options include: Enabled Disabled	Disabled

ADDDC Sparing	ADDDC sparing on-off settings. Options include: Enabled Disabled	Disabled
Set NGN Die Sparing	NGN Die sparing on-off settings. Options include: Enabled Disabled	Enabled
NGN Die Sparing Aggressiveness	NGN Die sparing aggressiveness settings, the value range is 0~255, and 0 means no sparing Die.	128
Patrol Scrub	Patrol Scrub on-off settings. Options include: Enabled Disabled	Enabled
Patrol Scrub Interval	Patrol Scrub interval settings, the unit is hour and the range is 0~24.	24
Patrol Scrub Address Mode	Patrol Scrub address mode settings. Options include: System Physical Address Reverse Address	System Physical Address

7.2.4.5 IIO Configuration

IIO Configuration interface is used to set the options related with the PCIe sockets.



```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                         Processor

IIO Configuration
-----------------------------------------------
---
▶ Socket0 Configuration
▶ Socket1 Configuration
▶ Socket2 Configuration
▶ Socket3 Configuration
▶ Intel(R) VT for Directed I/O
▶ Intel(R) VMD technology
PCIe Hot Plug            [Enabled]
PCI-E ASPM Support       [Disabled]
(Global)
PCIe Max Read            [Auto]
Request Size

Left/Right: Select Screen
Up/Down: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit

Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
```

Figure 7-65

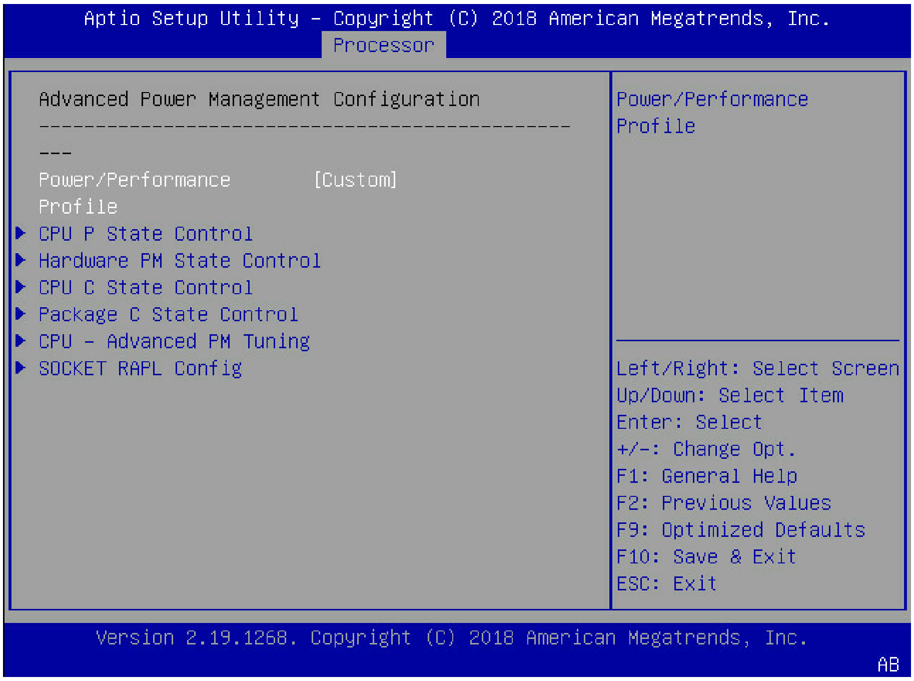
Table 7-31 IIO Configuration Interface Instruction Table

Interface Parameters	**Function Description**	Default Value
Socket N Configuration	Socket N configuration submenu, used to set the Link speed, Max Payload Size and ASPM of the CPU0's PCIE device, and to display the link status, maximum link and current link speed of the PCIE port.	----
Intel VT for Directed I/O (VT-d)	Intel VT-d settings submenu, Intel VT-d on-off settings	----
Intel VMD Technology	Intel VMD settings submenu, VMD on-off settings of each PStack of each CPU.	----

Intel AIC Rtimer/AIC SSD Technology (Non-VMD)	Intel AIC Retimer/AIC SSD settings submenu, AIC Retimer/ AIC SSD on-off settings of each PStack of each CPU.	----
PCIe Hot Plug	PCIe hot plug on-off settings. Options include: Enabled Disabled	Enabled
PCI-E ASPM Support (Global)	PCIE ASPM support on-off settings. Options include: Disabled Per-Port L1 Only	Disabled
PCIe Max Read Request Size	PCIe max read request size settings. Options include: Auto 128B 256B 512B 1024B 2048B 4096B	Auto

7.2.4.6 Advanced Power Management Configuration

Advanced Power Management Configuration interface is used to set the options related with the CPU power management.



```
        Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                                  Processor
  Advanced Power Management Configuration          Power/Performance
  -----------------------------------------------  Profile
  ---
  Power/Performance       [Custom]
  Profile
▶ CPU P State Control
▶ Hardware PM State Control
▶ CPU C State Control
▶ Package C State Control
▶ CPU – Advanced PM Tuning
▶ SOCKET RAPL Config                               Left/Right: Select Screen
                                                   Up/Down: Select Item
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F9: Optimized Defaults
                                                   F10: Save & Exit
                                                   ESC: Exit
          Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                        AB
```

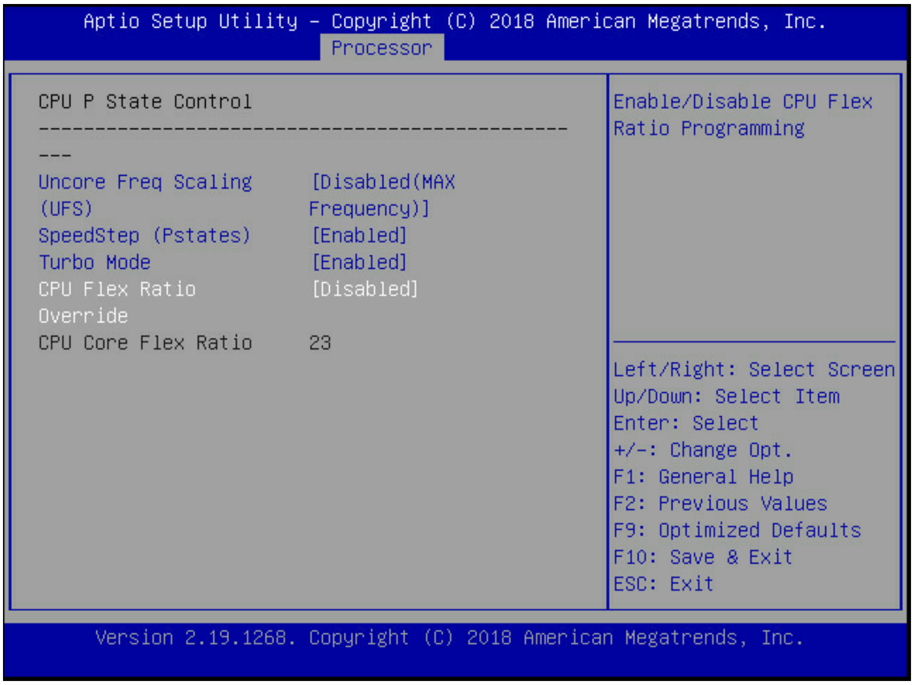
Figure 7-66

Table 7-32 Advanced Power Management Configuration Interface Instruction Table

Interface Parameters	**Function Description**
Power/Performance Profile	Switch between Power & Performance mode, Custom by default
CPU P State Control	CPU P state control submenu
Hardware PM State Control	Hardware PM state control submenu
CPU C State Control	CPU C state control submenu
Package C State Control	Package C state control submenu
CPU-Advanced PM Tuning	CPU power-saving performance tuning submenu
Socket RAPL Configuration	Socket RAPL configuration submenu

7.2.4.6.1 CPU P State Control

CPU P State Control interface is used to set the options related with the CPU P state.



```
        Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                                   Processor
 CPU P State Control                                    Enable/Disable CPU Flex
 -----------------------------------------------        Ratio Programming
 ---
 Uncore Freq Scaling       [Disabled(MAX
 (UFS)                     Frequency)]
 SpeedStep (Pstates)       [Enabled]
 Turbo Mode                [Enabled]
 CPU Flex Ratio            [Disabled]
 Override
 CPU Core Flex Ratio       23
                                                        Left/Right: Select Screen
                                                        Up/Down: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F9: Optimized Defaults
                                                        F10: Save & Exit
                                                        ESC: Exit
         Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
```

Figure 7-67

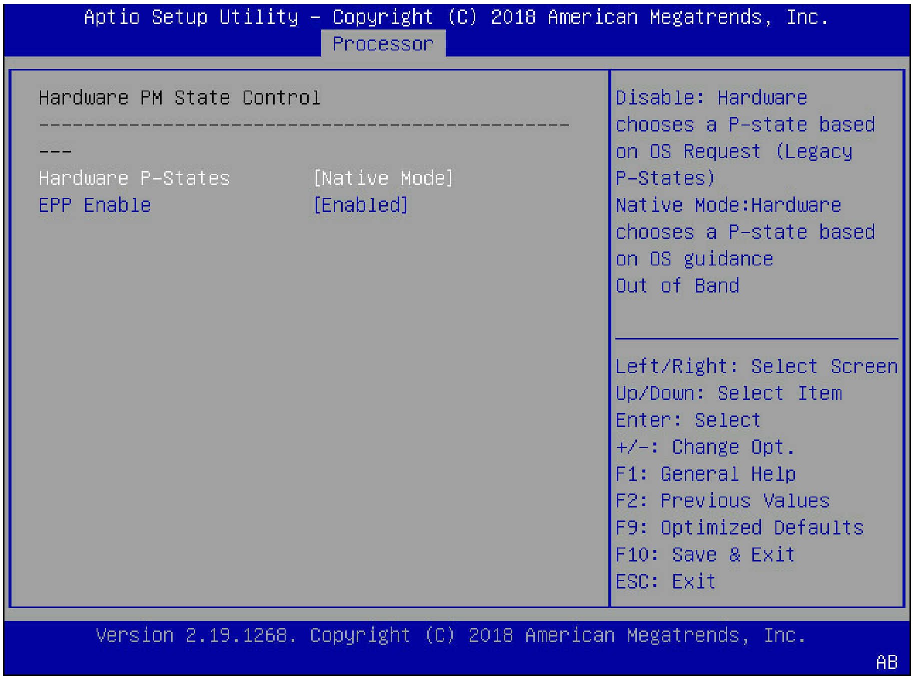
Table 7-33 CPU P State Control Interface Instruction Table

Interface Parameters	Function Description	Default Value
Uncore Freq Scaling (UFS)	Uncore frequency scaling settings. Options include: Enabled Disabled (Min Frequency) Disabled (MAX Frequency) Custom	Enabled
Uncore Frequency	Uncore frequency settings. The range is 1300-2300, displayed when Uncore Freq Scaling (UFS) is set to Custom.	1300
SpeedStep (Pstates)	SpeedStep on-off settings. Options include: Enabled Disabled	Enabled

Turbo Mode	Turbo mode on-off settings. Options include: Enabled Disabled	Enabled
CPU Flex Ration Override	CPU flex ration programmable update function on-off settings. Options include: Enabled Disabled	Disabled
CPU Core Flex Ratio	CPU flex ratio settings in non-Turbo mode, the setting range is 0-100. It can be set when CPU Flex Ration Override is set to Enabled.	23

7.2.4.6.2 Hardware PM State Control

Hardware PM State Control interface is used to set the options related with the hardware PM state.



```
        Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                                  Processor
  Hardware PM State Control                          Disable: Hardware
  -----------------------------------------------    chooses a P-state based
  ---                                                on OS Request (Legacy
  Hardware P-States         [Native Mode]            P-States)
  EPP Enable                [Enabled]                Native Mode:Hardware
                                                     chooses a P-state based
                                                     on OS guidance
                                                     Out of Band

                                                     Left/Right: Select Screen
                                                     Up/Down: Select Item
                                                     Enter: Select
                                                     +/-: Change Opt.
                                                     F1: General Help
                                                     F2: Previous Values
                                                     F9: Optimized Defaults
                                                     F10: Save & Exit
                                                     ESC: Exit
        Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                        AB
```

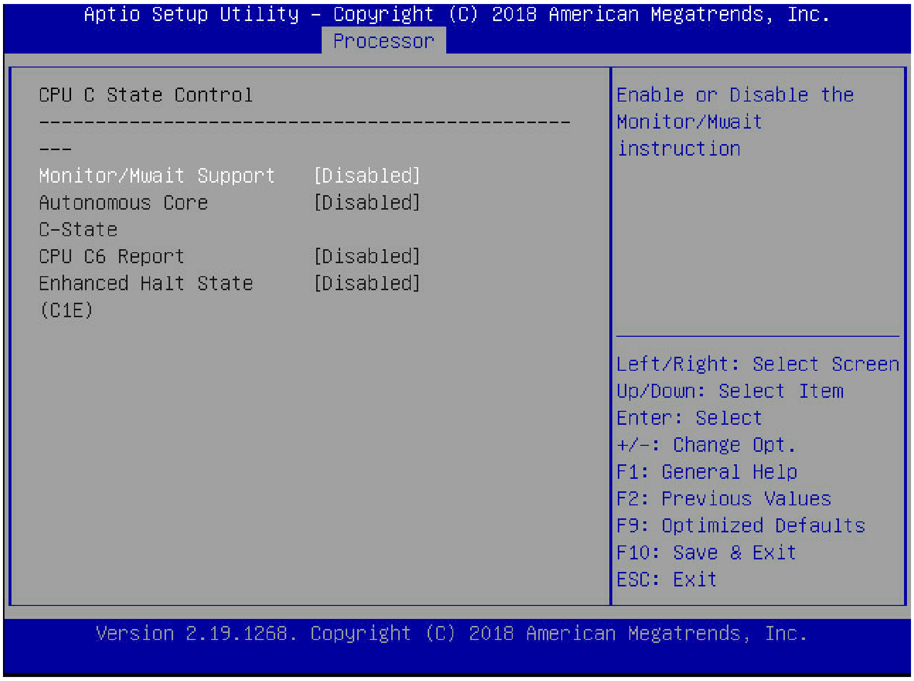
Figure 7-68

Table 7-34 Hardware PM State Control Interface Instruction Table

Interface Parameters	Function Description	**Default Value**
Hardware P-States	Hardware P-States is set by OS automatically or not, the default value is decided based on the actual test. Options include: Disabled: based on legacy OS request Native Mode: based on legacy OS boot Out of Band Mode: hardware auto select, no OS boot Native Mode with No Legacy Support	Native Mode
EPP Enable	EPP on-off settings. Options include: Enabled Disabled	Enabled

7.2.4.6.3 CPU C State Control

CPU C State Control interface is used to set the options related with the CPU C state, for controlling the power consumption of CPU in idle state.



```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
                              Processor

CPU C State Control                               Enable or Disable the
-----------------------------------------------   Monitor/Mwait
---                                               instruction
Monitor/Mwait Support    [Disabled]
Autonomous Core          [Disabled]
C-State
CPU C6 Report            [Disabled]
Enhanced Halt State      [Disabled]
(C1E)
                                                  Left/Right: Select Screen
                                                  Up/Down: Select Item
                                                  Enter: Select
                                                  +/-: Change Opt.
                                                  F1: General Help
                                                  F2: Previous Values
                                                  F9: Optimized Defaults
                                                  F10: Save & Exit
                                                  ESC: Exit

Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
```

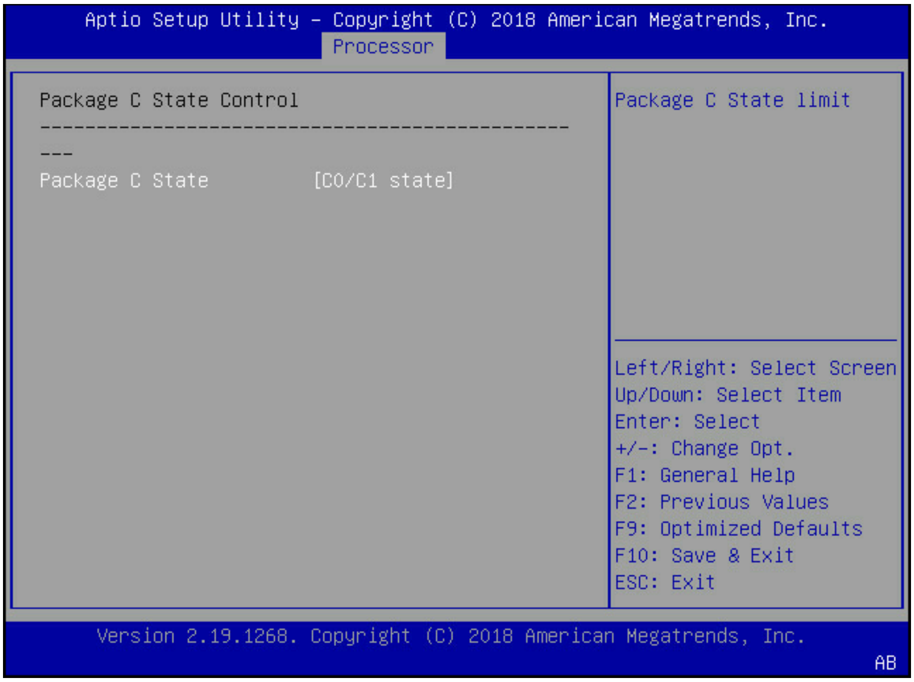
Figure 7-69

Table 7-35 CPU C State Control Interface Instruction Table

Interface Parameters	Function Description	Default Value
Monitor/Mwait Support	Monitor/Mwait support on-off settings. Options include: Enabled Disabled	Disabled
Autonomous Core C-State	Autonomous core C-state on-off settings. Options include: Enabled Disabled	Disabled
CPU C6 report	On-off settings of reporting C6 state to OS. Options include: Enabled Disabled	Disabled
Enhanced Halt State (C1E)	C1E on-off settings. Options include: Enabled Disabled	Disabled

7.2.4.6.4 Package C State Control

Package C State Control interface is used to set the options related to the Package C state.



```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
                        Processor

Package C State Control                        Package C State limit
-----------------------------------------------
---
Package C State         [C0/C1 state]

                                               Left/Right: Select Screen
                                               Up/Down: Select Item
                                               Enter: Select
                                               +/-: Change Opt.
                                               F1: General Help
                                               F2: Previous Values
                                               F9: Optimized Defaults
                                               F10: Save & Exit
                                               ESC: Exit

Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                               AB
```

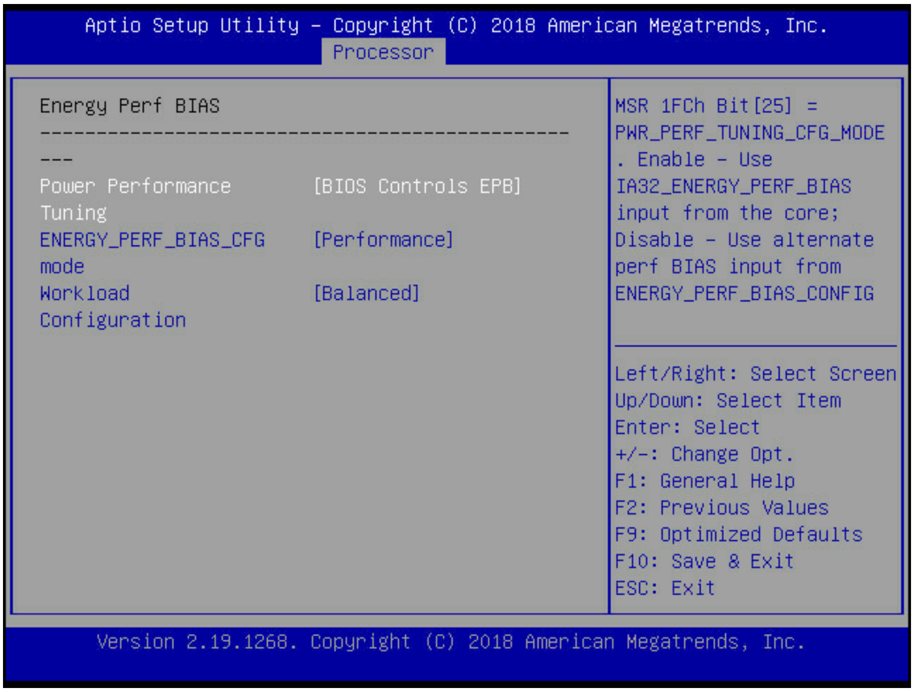
Figure 7-70

Table 7-36 Package C State Control Interface Instruction Table

Interface Parameters	Function Description	Default Value
Package C State	Package C state settings. Options include: C0/C1 state C2 state C6 (Non Retention) state C6 (Retention) state No Limit	C0/C1 state

7.2.4.6.5 CPU-Advanced PM Tuning

CPU-Advanced PM Tuning interface is used to set the options related with the CPU power-saving performance, with an Energy Perf BIAS submenu.



```
        Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                                 Processor
  Energy Perf BIAS                                  MSR 1FCh Bit[25] =
  ------------------------------------------------  PWR_PERF_TUNING_CFG_MODE
  ---                                               . Enable – Use
  Power Performance         [BIOS Controls EPB]     IA32_ENERGY_PERF_BIAS
  Tuning                                            input from the core;
  ENERGY_PERF_BIAS_CFG      [Performance]           Disable – Use alternate
  mode                                              perf BIAS input from
  Workload                  [Balanced]              ENERGY_PERF_BIAS_CONFIG
  Configuration
                                                    Left/Right: Select Screen
                                                    Up/Down: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F9: Optimized Defaults
                                                    F10: Save & Exit
                                                    ESC: Exit
        Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
```

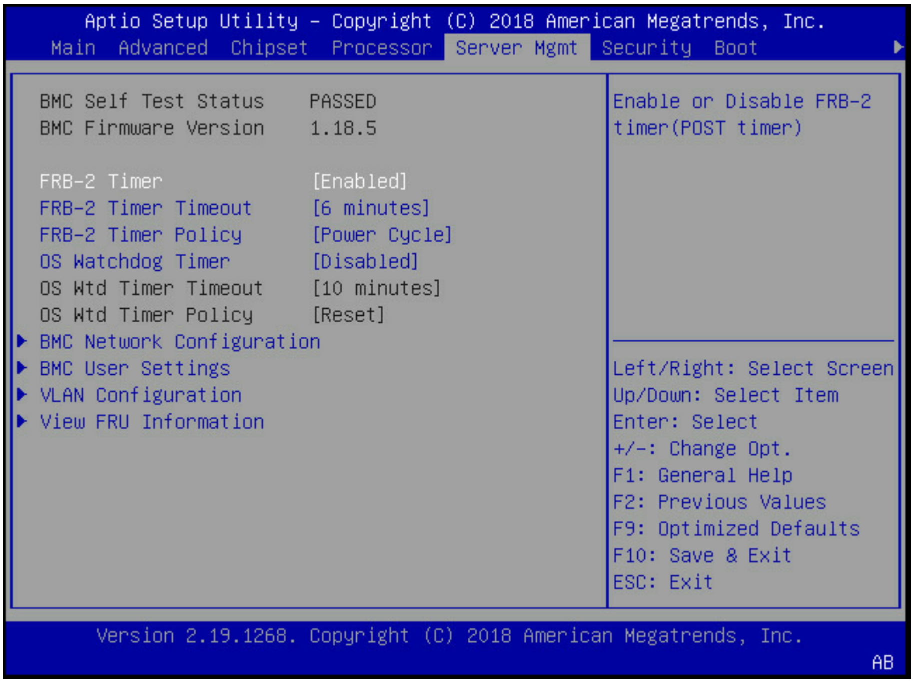
Figure 7-71

Table 7-37 Energy Perf BIAS Interface Instruction Table

Interface Parameters	Function Description	Default Value
Power Performance Tuning	Power performance tuning settings. Options include: OS Controls EPB BIOS Controls EPB	BIOS Controls EPB
ENERGY_PERF_BIAS_CFG Mode	Power performance management settings. Options include: Performance Balanced Performance Balanced Power Power When the Power Performance Tuning is set to BIOS Controls EPB, this option can be set.	Performance
Workload Configuration	Workload optimization settings. Options include: Balanced I/O Sensitive	Balanced

7.2.5 Sever Mgmt

Server Mgmt interface is used to set the options related with server management, including watchdog, BMC network configuration, BMC user settings, system health information, etc.



```
      Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
   Main  Advanced  Chipset  Processor  Server Mgmt  Security  Boot        ▶

    BMC Self Test Status     PASSED                  Enable or Disable FRB-2
    BMC Firmware Version     1.18.5                  timer(POST timer)

    FRB-2 Timer              [Enabled]
    FRB-2 Timer Timeout      [6 minutes]
    FRB-2 Timer Policy       [Power Cycle]
    OS Watchdog Timer        [Disabled]
    OS Wtd Timer Timeout     [10 minutes]
    OS Wtd Timer Policy      [Reset]
  ▶ BMC Network Configuration
  ▶ BMC User Settings                                Left/Right: Select Screen
  ▶ VLAN Configuration                               Up/Down: Select Item
  ▶ View FRU Information                             Enter: Select
                                                     +/-: Change Opt.
                                                     F1: General Help
                                                     F2: Previous Values
                                                     F9: Optimized Defaults
                                                     F10: Save & Exit
                                                     ESC: Exit

        Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                          AB
```

Figure 7-72

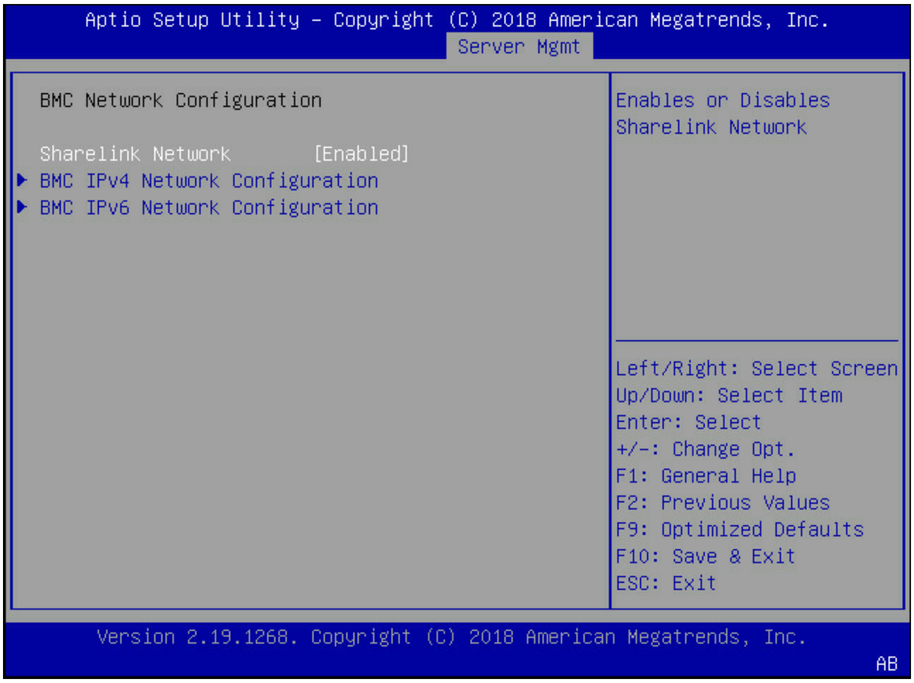
Table 7-38 Server Mgmt Interface Instruction Table

Interface Parameters	Function Description	Default Value
BMC Self Test Status	BMC self-test status	----
BMC Firmware Version	Current motherboard’s BMC firmware version	----
FRB-2 Timer	FRB-2 timer on-off settings. Options include: Enabled Disabled	Enabled
FRB-2 Timer Timeout	FRB-2 timer timeout settings. Options include: 3 minutes 4 minutes 5 minutes 6 minutes	6 minutes
FRB-2 Timer Policy	FRB-2 timer policy settings. Options include: Do Nothing Reset Power Down Power Cycle	Power Cycle
OS Watchdog Timer	OS watchdog timer settings. Options include: Enabled Disabled	Disabled
OS Wtd Timer Timeout	OS watchdog timer timeout settings. Options include: 5 minutes 10 minutes 15 minutes 20 minutes	10 minutes
OS Wtd Timer Policy	OS watchdog timer policy settings. Options include: Do Nothing Reset Power Down Power Cycle	Reset

BMC Network Configuration	BMC network configuration submenu	----
BMC User Settings	BMC user settings submenu	----
VLAN Configuration	VLAN configuration submenu	----
View FRU Information	View FRU information submenu	----

7.2.5.1 BMC Network Configuration

BMC Network Configuration interface is used to configure the BMC network through BIOS.



```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                                        Server Mgmt

  BMC Network Configuration                         Enables or Disables
                                                    Sharelink Network
  Sharelink Network          [Enabled]
▶ BMC IPv4 Network Configuration
▶ BMC IPv6 Network Configuration

                                                    Left/Right: Select Screen
                                                    Up/Down: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F9: Optimized Defaults
                                                    F10: Save & Exit
                                                    ESC: Exit

      Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                  AB
```

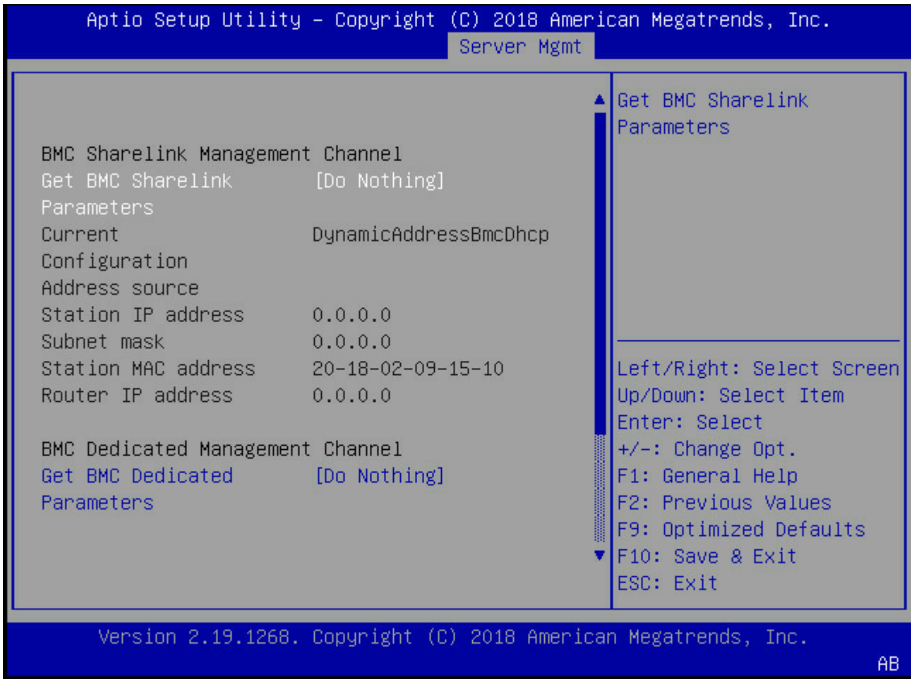
Figure 7-73

Table 7-39 BMC Network Configuration Interface Instruction Table

Interface Parameters	Function Description	Default Value
Sharelink Network	BMC Sharelink network on-off settings, take effect immediately	Enabled
BMC IPv4 Network Configuration	BMC IPv4 network configuration	----
BMC IPv6 Network Configuration	BMC IPv6 network configuration	----

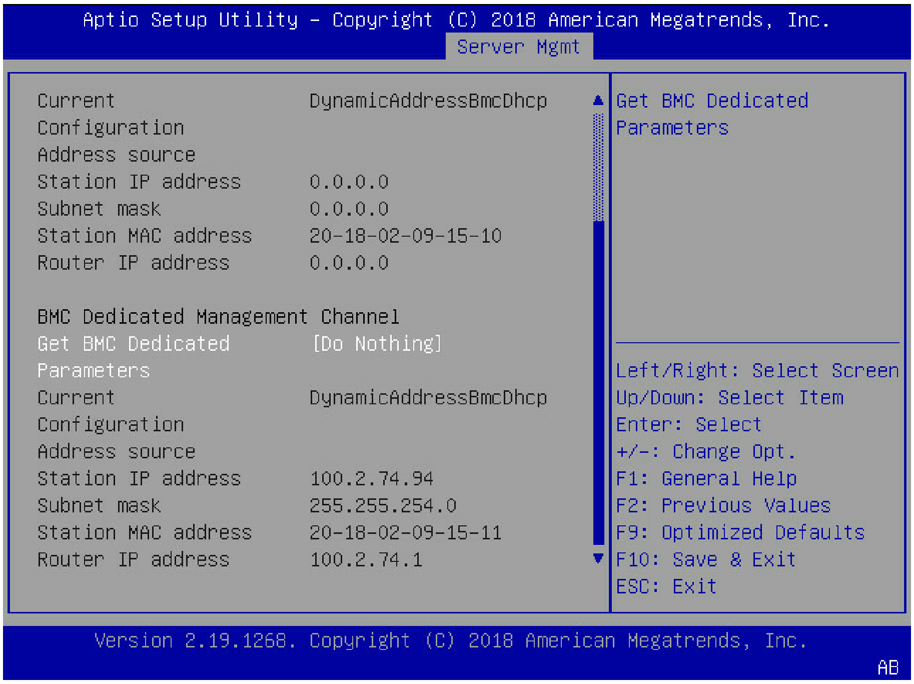
7.2.5.1.1 BMC IPv4 Network Configuration

BMC IPv4 Network Configuration interface is used to configure the BMC IPv4 management network through BIOS.



```
        Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
                                  Server Mgmt

                                                      Get BMC Sharelink
                                                      Parameters
  BMC Sharelink Management Channel
  Get BMC Sharelink        [Do Nothing]
  Parameters
  Current                  DynamicAddressBmcDhcp
  Configuration
  Address source
  Station IP address       0.0.0.0
  Subnet mask              0.0.0.0
  Station MAC address      20-18-02-09-15-10      Left/Right: Select Screen
  Router IP address        0.0.0.0                Up/Down: Select Item
                                                  Enter: Select
  BMC Dedicated Management Channel                +/-: Change Opt.
  Get BMC Dedicated        [Do Nothing]           F1: General Help
  Parameters                                      F2: Previous Values
                                                  F9: Optimized Defaults
                                                  F10: Save & Exit
                                                  ESC: Exit

          Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                          AB
```

Figure 7-74



```
        Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
                                  Server Mgmt

  Current                  DynamicAddressBmcDhcp  Get BMC Dedicated
  Configuration                                   Parameters
  Address source
  Station IP address       0.0.0.0
  Subnet mask              0.0.0.0
  Station MAC address      20-18-02-09-15-10
  Router IP address        0.0.0.0

  BMC Dedicated Management Channel
  Get BMC Dedicated        [Do Nothing]
  Parameters                                      Left/Right: Select Screen
  Current                  DynamicAddressBmcDhcp  Up/Down: Select Item
  Configuration                                   Enter: Select
  Address source                                  +/-: Change Opt.
  Station IP address       100.2.74.94            F1: General Help
  Subnet mask              255.255.254.0          F2: Previous Values
  Station MAC address      20-18-02-09-15-11      F9: Optimized Defaults
  Router IP address        100.2.74.1             F10: Save & Exit
                                                  ESC: Exit

          Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                          AB
```

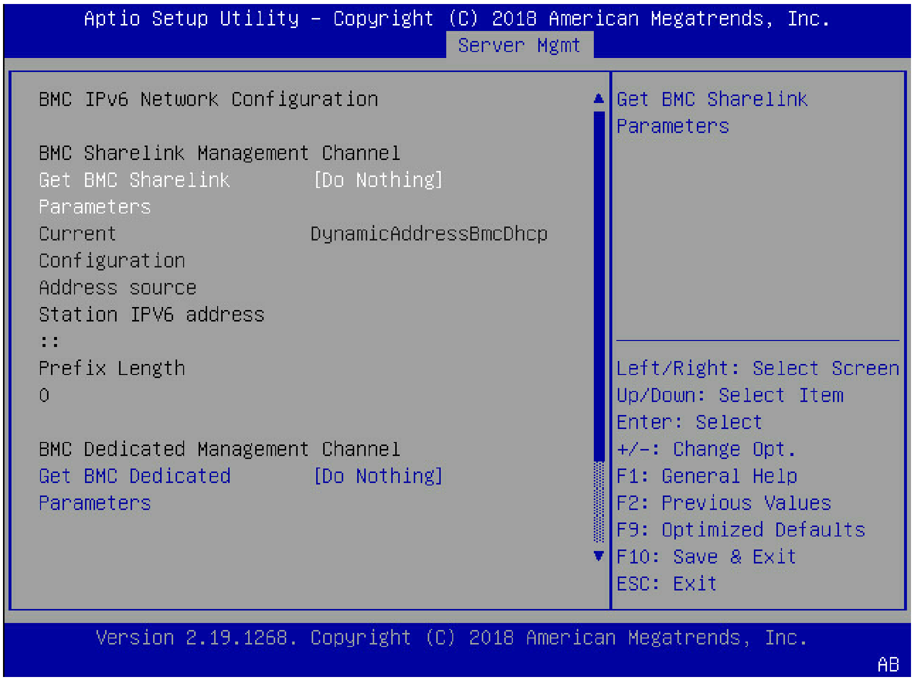
Figure 7-75

Table 7-40 BMC IPv4 Network Configuration Interface Instruction Table

Interface Parameters	Function Description	Default Value
Get BMC Sharelink/Dedicated Parameters	Set the method to get the BMC sharelink/dedicated parameters. Options include: Do Nothing Auto Manual	Do Nothing
Configuration Address Source	Set BMC network status. Options include: Unspecified Static DynamicBmcDhcp The setting takes effect immediately.	Unspecified
Current Configuration Address	Current BMC configuration address status	----
Station IP address	Station IP address	----
Subnet mask	Subnet mask	----
Station MAC address	Station MAC address	----
Router IP address	Router IP address	----

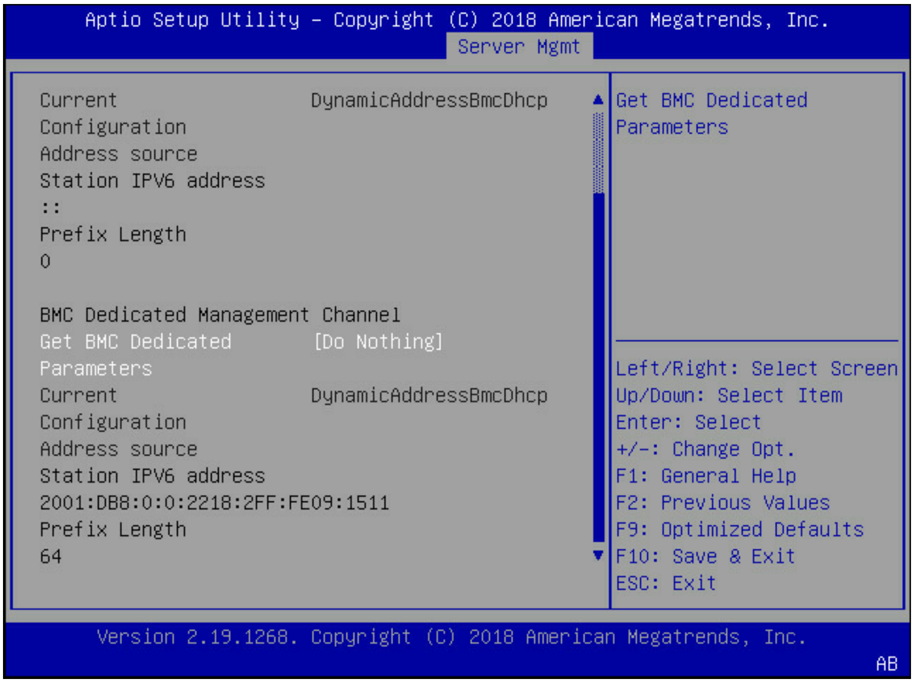
7.2.5.1.2 BMC IPv6 Network Configuration

BMC IPv6 Network Configuration interface is used to configure the BMC IPv6 management network through BIOS.



```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                          Server Mgmt

BMC IPv6 Network Configuration                  Get BMC Sharelink
                                                Parameters
BMC Sharelink Management Channel
Get BMC Sharelink        [Do Nothing]
Parameters
Current                  DynamicAddressBmcDhcp
Configuration
Address source
Station IPV6 address
::
Prefix Length                                   Left/Right: Select Screen
0                                               Up/Down: Select Item
                                                Enter: Select
BMC Dedicated Management Channel                +/-: Change Opt.
Get BMC Dedicated        [Do Nothing]           F1: General Help
Parameters                                      F2: Previous Values
                                                F9: Optimized Defaults
                                                F10: Save & Exit
                                                ESC: Exit

Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                              AB
```

Figure 7-76



```
        Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                                   Server Mgmt
  Current                  DynamicAddressBmcDhcp   Get BMC Dedicated
  Configuration                                    Parameters
  Address source
  Station IPV6 address
  ::
  Prefix Length
  0

  BMC Dedicated Management Channel
  Get BMC Dedicated        [Do Nothing]
  Parameters                                       Left/Right: Select Screen
  Current                  DynamicAddressBmcDhcp   Up/Down: Select Item
  Configuration                                    Enter: Select
  Address source                                   +/-: Change Opt.
  Station IPV6 address                             F1: General Help
  2001:DB8:0:0:2218:2FF:FE09:1511                  F2: Previous Values
  Prefix Length                                    F9: Optimized Defaults
  64                                               F10: Save & Exit
                                                   ESC: Exit
        Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                       AB
```

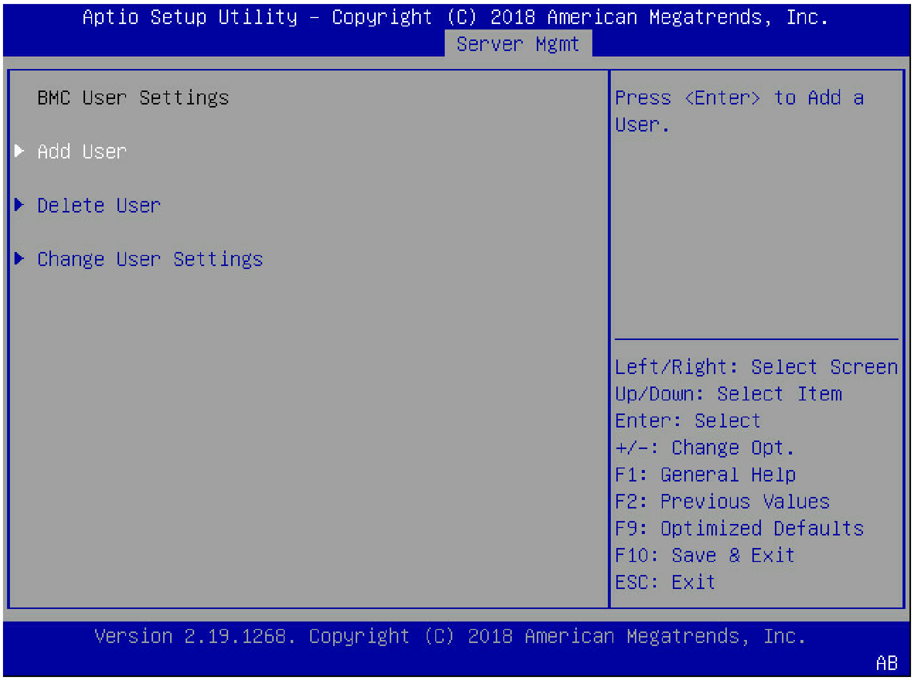
Figure 7-77

Table 7-41 BMC IPv6 Network Configuration Interface Instruction Table

Interface Parameters	Function Description	Default Value
Get BMC Sharelink/Dedicated Parameters	Set the method to get the BMC sharelink/dedicated parameters. Options include: Do Nothing Auto Manual	Do Nothing
Configuration Address Source	Set BMC network status. Options include: Unspecified Static DynamicBmcDhcp The setting takes effect immediately.	Unspecified
Current Configuration Address	Current BMC configuration address status	----
Station IPv6 address	Station IPv6 address	----
Prefix Length	IPv6 prefix length	----

7.2.5.2 BMC User Settings

BMC User Settings interface is used to configure BMC users through BIOS.



```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
Server Mgmt

BMC User Settings                    Press <Enter> to Add a
                                     User.
▶ Add User

▶ Delete User

▶ Change User Settings
                                     Left/Right: Select Screen
                                     Up/Down: Select Item
                                     Enter: Select
                                     +/-: Change Opt.
                                     F1: General Help
                                     F2: Previous Values
                                     F9: Optimized Defaults
                                     F10: Save & Exit
                                     ESC: Exit

Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                             AB
```

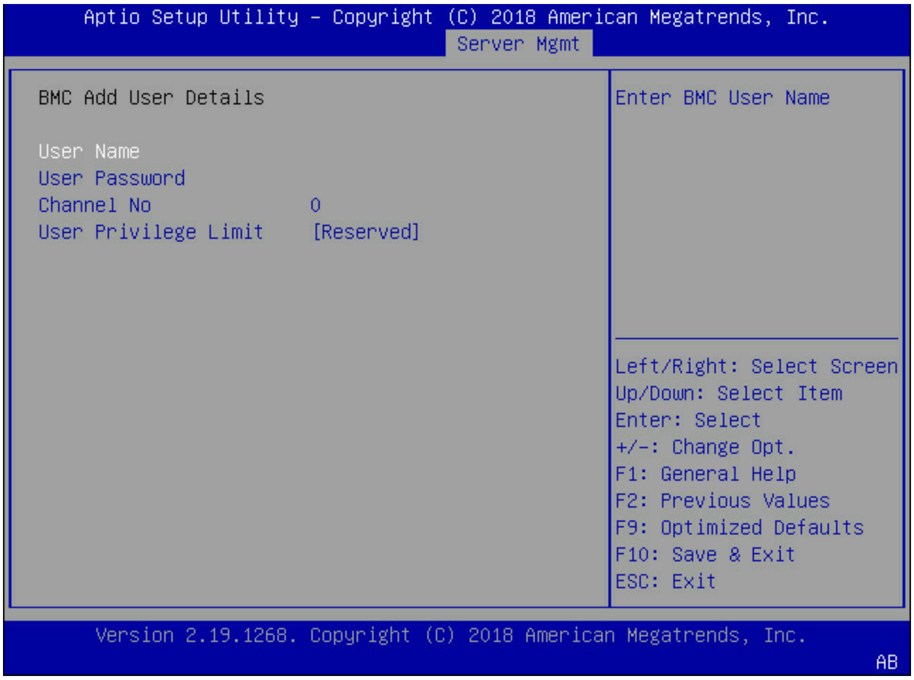
Figure 7-78

Table 7-42 BMC User Settings Interface Instruction Table

Interface Parameters	**Function Description**
Add User	Add user submenu
Delete User	Delete user submenu
Change User Settings	Change user settings submenu

7.2.5.2.1 Add User

Add User interface is used to add a BMC user through BIOS. The addition takes effect immediately, and the user will be added to the BMC user list.



```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                                   Server Mgmt

BMC Add User Details                           Enter BMC User Name

User Name
User Password
Channel No                 0
User Privilege Limit       [Reserved]
                                               Left/Right: Select Screen
                                               Up/Down: Select Item
                                               Enter: Select
                                               +/-: Change Opt.
                                               F1: General Help
                                               F2: Previous Values
                                               F9: Optimized Defaults
                                               F10: Save & Exit
                                               ESC: Exit

     Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                    AB
```

Figure 7-79

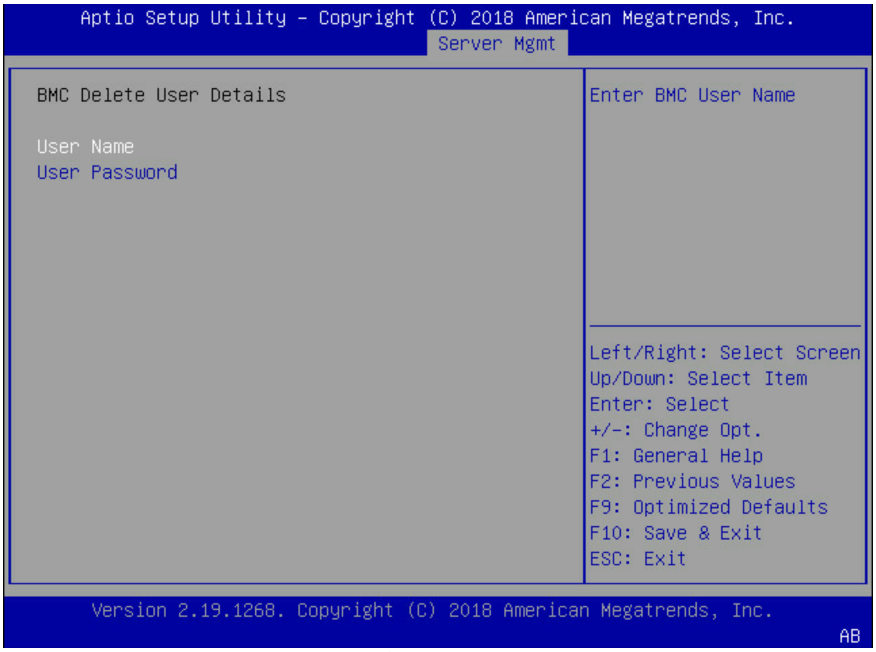
Table 7-43 Add User Interface Instruction Table

Interface Parameters	Function Description	**Default Value**
User Name	Set user name, supporting up to 16 characters.	----
User Password	Set user password. It must contain uppercase and lowercase letters, special characters and numbers, within 8-20 characters.	----
Channel NO	Set BMC channel, input 1 or 8.	0
User Privilege Limit	User privilege settings. Options include: Reserved Callback User Operator Administrator If the setting succeeds, it will prompt “Set User Access Command Passed”, and the BMC User takes effect immediately.	Reserved

⚠ Note: To enable the new user, it needs to set the User option in the Change User Settings interface to [Enabled], and then this user can login to the BMC Web interface.

7.2.5.2.2 Delete User

Delete User interface is used to delete a BMC user through BIOS. The deletion takes effect immediately, and this user can not login to the BMC Web interface any more.



```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
                          Server Mgmt

BMC Delete User Details                    Enter BMC User Name

User Name
User Password
                                           Left/Right: Select Screen
                                           Up/Down: Select Item
                                           Enter: Select
                                           +/-: Change Opt.
                                           F1: General Help
                                           F2: Previous Values
                                           F9: Optimized Defaults
                                           F10: Save & Exit
                                           ESC: Exit

Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                              AB
```

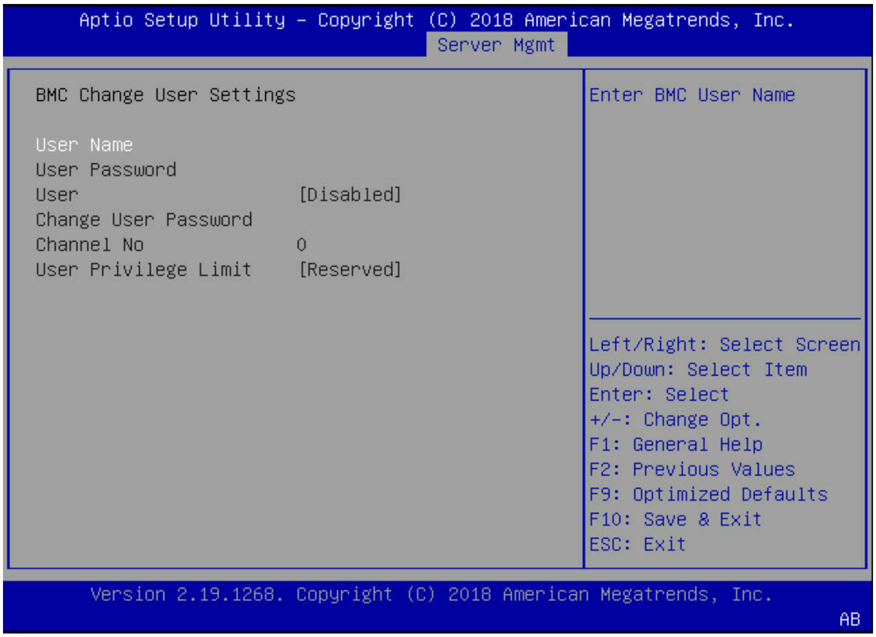
Figure 7-80

Table 7-44 Delete User Interface Instruction Table

Interface Parameters	**Function Description**
User Name	Input the name of user to delete
User Password	Input the password of user to delete. If the password is correct, it pops up "User Deleted!!!" The deletion takes effect immediately in BMC, and this user can not login to the BMC Web interface any more.

7.2.5.2.3 Change User Settings

Change User Settings interface is used to modify the BMC user settings through BIOS.



```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
                          Server Mgmt

BMC Change User Settings                   Enter BMC User Name

User Name
User Password
User                    [Disabled]
Change User Password
Channel No              0
User Privilege Limit    [Reserved]
                                           Left/Right: Select Screen
                                           Up/Down: Select Item
                                           Enter: Select
                                           +/-: Change Opt.
                                           F1: General Help
                                           F2: Previous Values
                                           F9: Optimized Defaults
                                           F10: Save & Exit
                                           ESC: Exit

Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                              AB
```

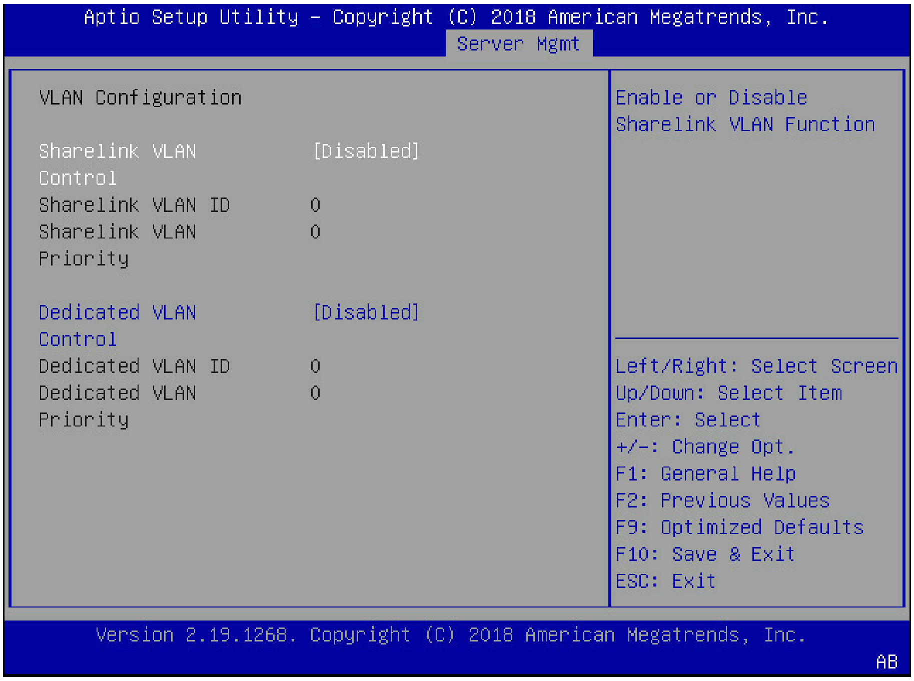
Figure 7-81

Table 7-45 Change User Settings Interface Instruction Table

Interface Parameters	Function Description	Default Value
User Name	Input the name of user to modify	----
User Password	Input the password of user to modify. Only both the name and password are correct, the following options can be modified.	----
User	User privilege on-off settings. Options include: Enabled Disabled	Disabled
Change User Password	Change the user password. It must contain uppercase and lowercase letters, special characters and numbers, within 8-20 characters.	----
Channel NO	Set BMC channel, input 1 or 8.	0
User Privilege Limit	Modify the user privilege. Options include: Reserved Callback User Operator Administrator	Reserved

7.2.5.3 VLAN Configuration

VLAN Configuration interface is used to set the BMC VLAN parameters through BIOS.



```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                                   Server Mgmt

 VLAN Configuration                              Enable or Disable
                                                 Sharelink VLAN Function
 Sharelink VLAN            [Disabled]
 Control
 Sharelink VLAN ID         0
 Sharelink VLAN            0
 Priority

 Dedicated VLAN            [Disabled]
 Control
 Dedicated VLAN ID         0                     Left/Right: Select Screen
 Dedicated VLAN            0                     Up/Down: Select Item
 Priority                                        Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F9: Optimized Defaults
                                                 F10: Save & Exit
                                                 ESC: Exit

     Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                     AB
```

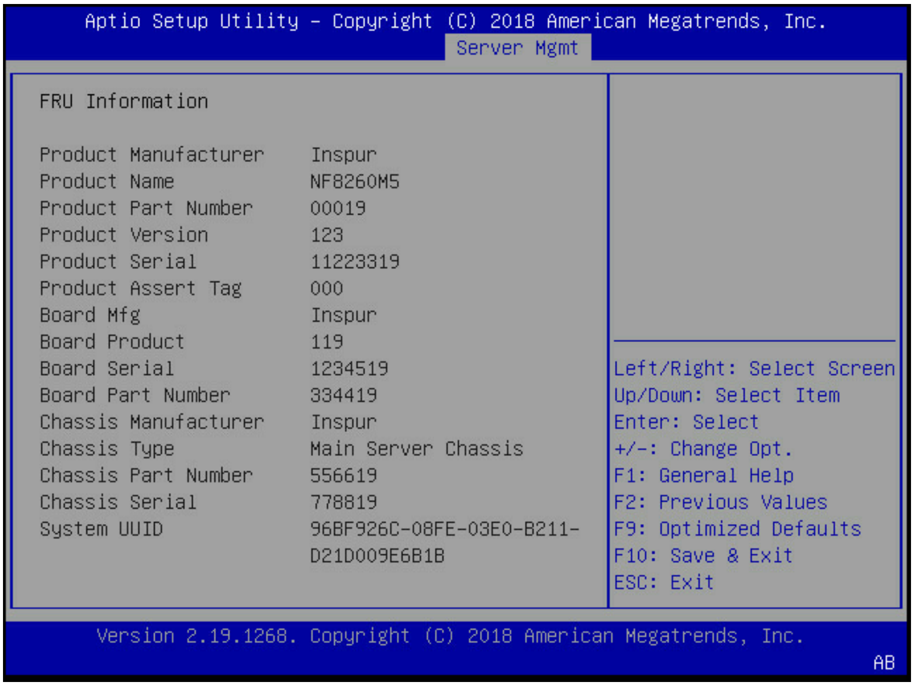
Figure 7-82

Table 7-46 VLAN Configuration Interface Instruction Table

Interface Parameters	Function Description	Default Value
Sharelink/Dedicated VLAN Control	BMC sharelink/dedicated VLAN control on-off settings. Options include: Enabled Disabled To enable VLAN, it needs to set the VLAN ID first.	Disabled
Sharelink/Dedicated VLAN ID	BMC sharelink/dedicated VLAN ID settings, the range is 2~4094. The setting takes effect immediately.	0
Sharelink/Dedicated VLAN Priority	BMC sharelink/dedicated VLAN priority settings, the range is 1~7. The setting takes effect immediately.	0

7.2.5.4 View FRU Configuration

View FRU Information interface displays the BMC FRU information read by BIOS. On each system reboot, BIOS interacts with BMC to keep the FRU information synchronized.



```
        Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                                  Server Mgmt

  FRU Information

  Product Manufacturer     Inspur
  Product Name             NF8260M5
  Product Part Number      00019
  Product Version          123
  Product Serial           11223319
  Product Assert Tag       000
  Board Mfg                Inspur
  Board Product            119
  Board Serial             1234519                  Left/Right: Select Screen
  Board Part Number        334419                   Up/Down: Select Item
  Chassis Manufacturer     Inspur                   Enter: Select
  Chassis Type             Main Server Chassis      +/-: Change Opt.
  Chassis Part Number      556619                   F1: General Help
  Chassis Serial           778819                   F2: Previous Values
  System UUID              96BF926C-08FE-03E0-B211- F9: Optimized Defaults
                           D21D009E6B1B             F10: Save & Exit
                                                    ESC: Exit

         Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                        AB
```

Figure 7-83

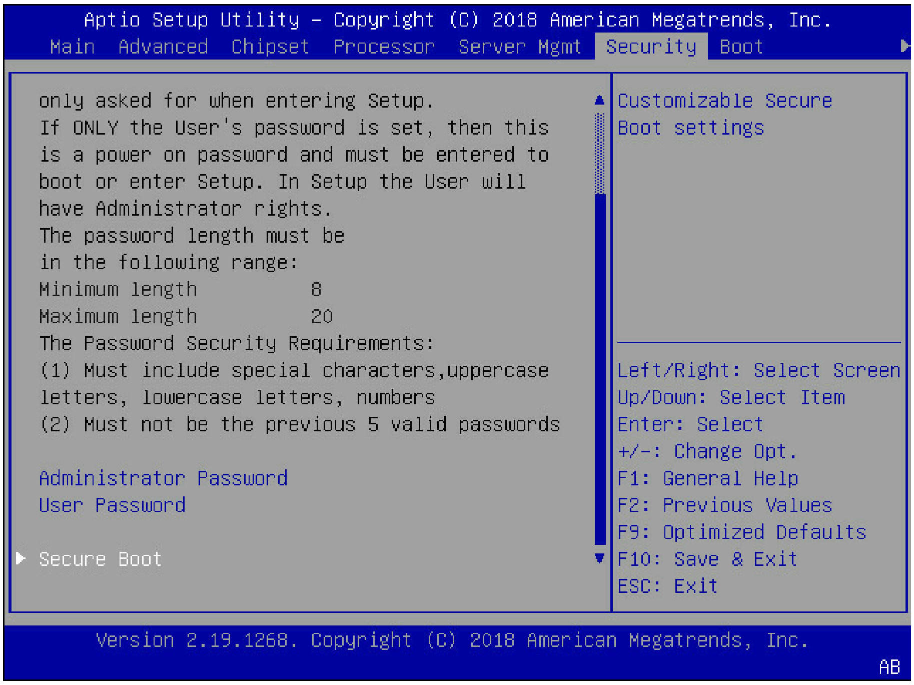
Table 7-47 View FRU Information Interface Instruction Table

Interface Parameters	**Function Description**
Product Manufacturer	Product manufacturer
Product Name	Product name
Product Part Number	Product part number
Product Version	Product version
Product Serial	Product serial number
Product Assert Tag	Product assert tag

Board Mfg	Board manufacturer
Board Product	Board product name
Board Serial	Board serial number
Board Part Number	Board part number
Chassis Manufacturer	Chassis manufacturer
Chassis Type	Chassis type
Chassis Part Number	Chassis part number
Chassis Serial	Chassis serial number
System UUID	System UUID

7.2.6 Security

Security interface is used to set the password of the administrator and user.



```
        Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
    Main  Advanced  Chipset  Processor  Server Mgmt  Security  Boot

  only asked for when entering Setup.                 Customizable Secure
  If ONLY the User's password is set, then this       Boot settings
  is a power on password and must be entered to
  boot or enter Setup. In Setup the User will
  have Administrator rights.
  The password length must be
  in the following range:
  Minimum length         8
  Maximum length         20
  The Password Security Requirements:
  (1) Must include special characters,uppercase       Left/Right: Select Screen
  letters, lowercase letters, numbers                 Up/Down: Select Item
  (2) Must not be the previous 5 valid passwords      Enter: Select
                                                      +/-: Change Opt.
  Administrator Password                              F1: General Help
  User Password                                       F2: Previous Values
                                                      F9: Optimized Defaults
▶ Secure Boot                                         F10: Save & Exit
                                                      ESC: Exit

        Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                        AB
```

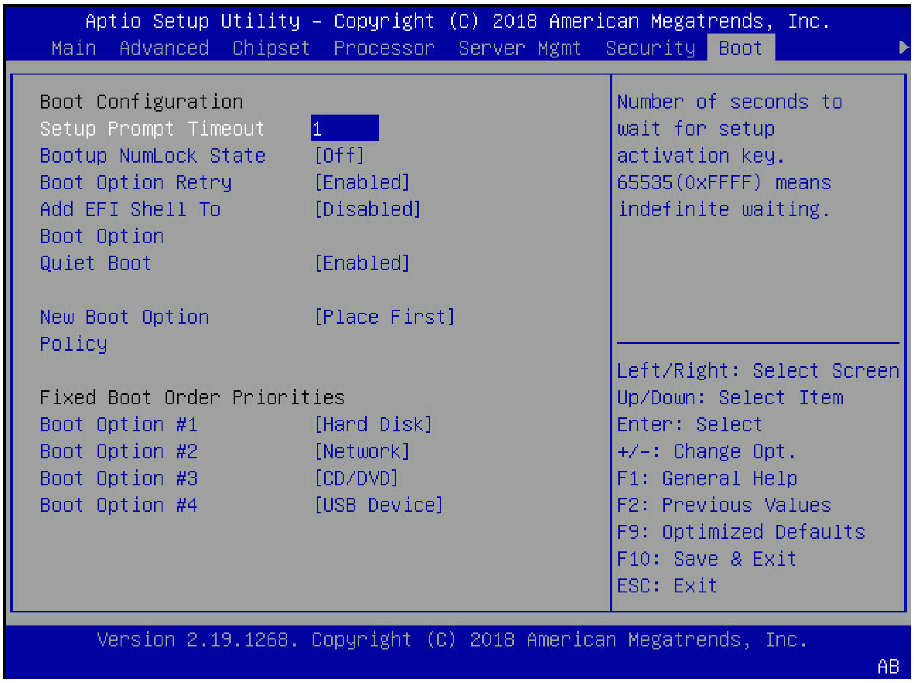
Figure 7-84

Table 7-48 Security Interface Instruction Table

Interface Parameters	**Function Description**
Administrator Password	Create an administrator password. It must contain uppercase and lowercase letters, special characters and numbers, within 8-20 characters.
User Password	Create a user password. It must contain uppercase and lowercase letters, special characters and numbers, within 8-20 characters.
Secure Boot	Secure boot menu

7.2.7 Boot Menu

Boot interface is used to set the options related with system boot, including boot mode, boot priority, boot procedure, etc.



```
    Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
 Main  Advanced  Chipset  Processor  Server Mgmt  Security  Boot

 Boot Configuration                               Number of seconds to
 Setup Prompt Timeout       1                     wait for setup
 Bootup NumLock State       [Off]                 activation key.
 Boot Option Retry          [Enabled]             65535(0xFFFF) means
 Add EFI Shell To           [Disabled]            indefinite waiting.
 Boot Option
 Quiet Boot                 [Enabled]

 New Boot Option            [Place First]
 Policy
                                                  Left/Right: Select Screen
 Fixed Boot Order Priorities                      Up/Down: Select Item
 Boot Option #1             [Hard Disk]           Enter: Select
 Boot Option #2             [Network]             +/-: Change Opt.
 Boot Option #3             [CD/DVD]              F1: General Help
 Boot Option #4             [USB Device]          F2: Previous Values
                                                  F9: Optimized Defaults
                                                  F10: Save & Exit
                                                  ESC: Exit

      Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                      AB
```

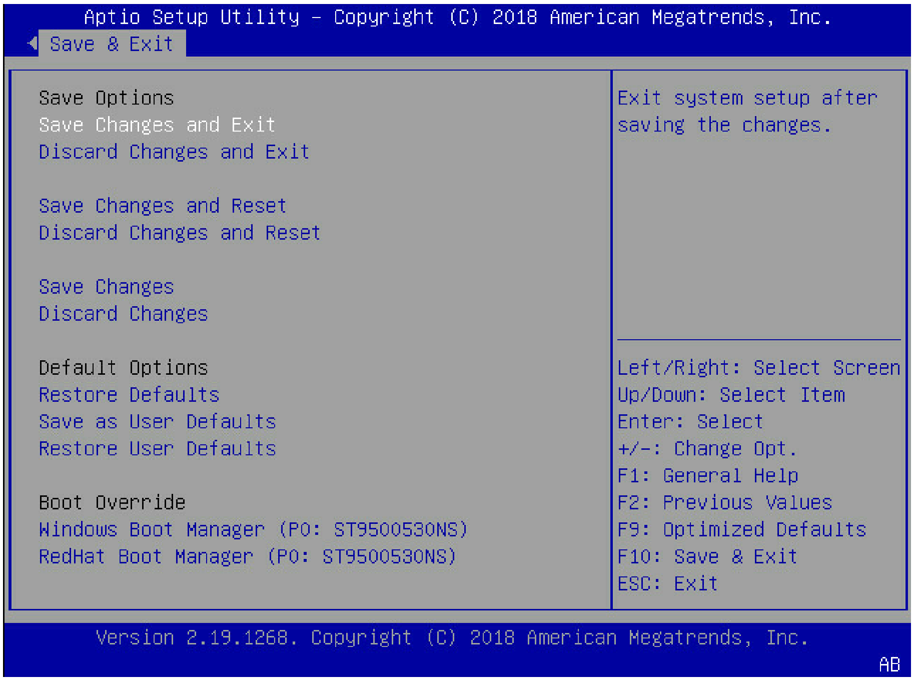
Figure 7-85

Table 7-49 Boot Configuration Interface Instruction Table

Interface Parameters	Function Description	Default Value
Setup Prompt Timeout	Setup prompt timeout settings. Set the time to wait for the Setup activate key, and the maximum value is 65535 seconds.	1
Bootup NumLock State	Bootup Numlock state on-off settings. Options include: On Off	Off
Boot Options Retry	Boot options retry on-off settings. Options include: Enabled Disabled	Enabled
Add EFI Shell To Boot Option	Add EFI Shell to boot option	Disabled
Quiet Boot	Quite boot on-off settings. Options include: Enabled Disabled If it is set to Enabled, the boot logo displays as that set by manufacturer, if set to Disabled, the boot screen displays as the text-mode POST interface.	Enabled
New Boot Option Policy	New UEFI boot option policy settings. Options include: Default Place First Place Last	Place First
Fixed Boot Order Priorities Boot Option #X	Boot options priority settings	----
XXXX Driver BBS Priorities	XXXX driver BBS priority settings	---

7.2.8 Save & Exit

Save & Exit interface is used to set the options related with BIOS parameters saving and exit.



```
        Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
  Save & Exit

  Save Options                                      Exit system setup after
  Save Changes and Exit                             saving the changes.
  Discard Changes and Exit

  Save Changes and Reset
  Discard Changes and Reset

  Save Changes
  Discard Changes

  Default Options                                   Left/Right: Select Screen
  Restore Defaults                                  Up/Down: Select Item
  Save as User Defaults                             Enter: Select
  Restore User Defaults                             +/-: Change Opt.
                                                    F1: General Help
  Boot Override                                     F2: Previous Values
  Windows Boot Manager (P0: ST9500530NS)            F9: Optimized Defaults
  RedHat Boot Manager (P0: ST9500530NS)             F10: Save & Exit
                                                    ESC: Exit

        Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
                                                                        AB
```

Figure 7-86

Table 7-50 Save & Exit Interface Instruction Table

Interface Parameters	**Function Description**
Save Changes and Exit	To save changes and exit
Discard Changes and Exit	To discard changes and exit
Save Changes and Reset	To save changes and reset
Discard Changes and Reset	To discard changes and reset
Save Changes	To save changes
Discard Changes	To discard changes
Restore Defaults	To restore defaults
Save as User Defaults	To save as user defaults
Restore User Defaults	To restore user defaults
Boot Override	To override the boot option, you could select the boot device from the following options

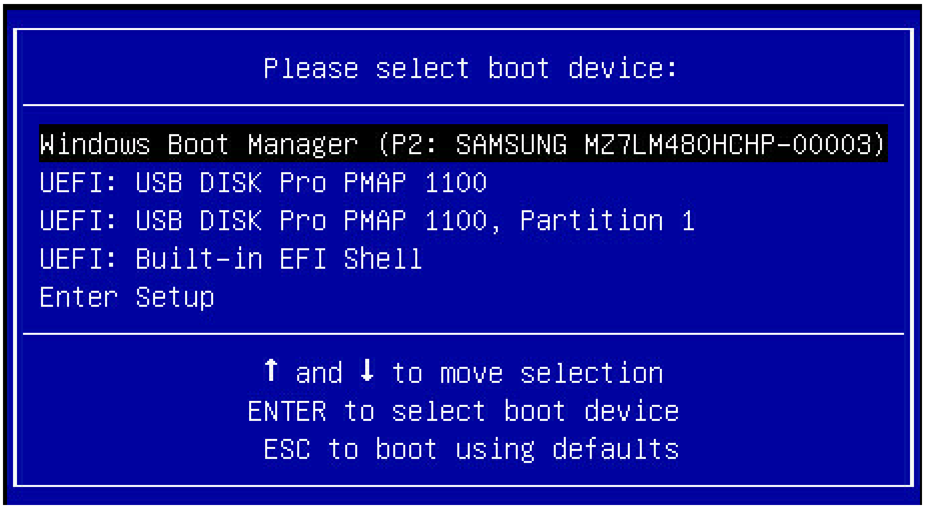
7.3 Firmware Update

For BIOS update, you could select to update in UEFI Shell or OS.

7.3.1 Update BIOS in UEFI Shell

1) When Inspur Logo appears on the screen during system booting, there is a prompt “Press

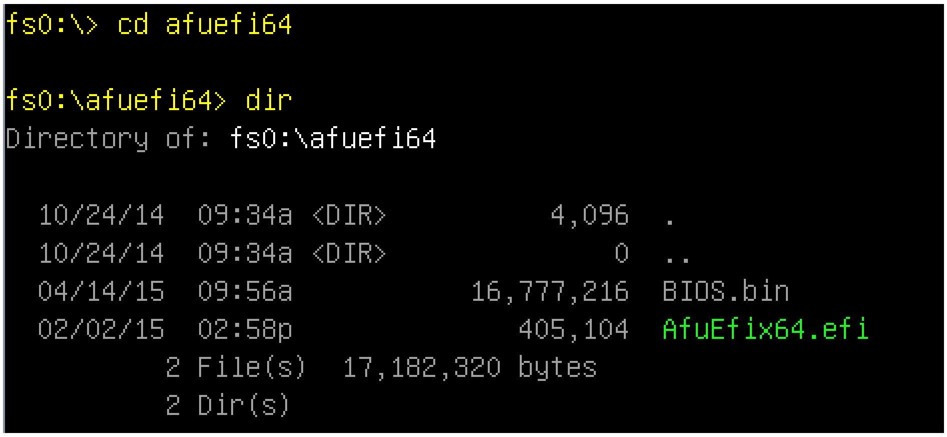
<DEL> to SETUP or <TAB> to POST or <F11> to Boot Menu or <F12> to PXE Boot" below. Press F11 key to open the Boot Menu, as shown in the following figure. Enter the item: UEFI: Built-in EFI Shell.



```
Please select boot device:

Windows Boot Manager (P2: SAMSUNG MZ7LM480HCHP-00003)
UEFI: USB DISK Pro PMAP 1100
UEFI: USB DISK Pro PMAP 1100, Partition 1
UEFI: Built-in EFI Shell
Enter Setup

↑ and ↓ to move selection
ENTER to select boot device
ESC to boot using defaults
```

Figure 7-87

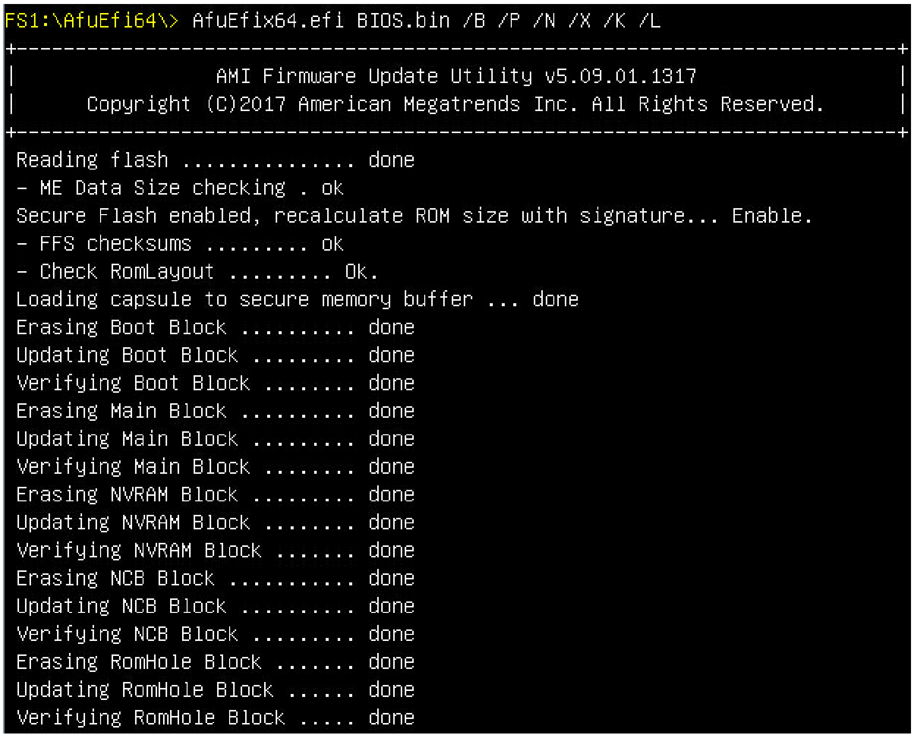
2) Enter the disk where the AfuEfi64 package resides, and enter the AfuEfi64 folder. The BIOS.bin file is the 32M BIOS+ME file to update, as shown in the following figure.



```
fs0:\> cd afuefi64

fs0:\afuefi64> dir
Directory of: fs0:\afuefi64

  10/24/14  09:34a <DIR>          4,096  .
  10/24/14  09:34a <DIR>              0  ..
  04/14/15  09:56a           16,777,216  BIOS.bin
  02/02/15  02:58p              405,104  AfuEfix64.efi
          2 File(s)   17,182,320 bytes
          2 Dir(s)
```

Figure 7-88

3) When there is no change in ME part, execute the command to update 16M BIOS: AfuEfix64.efi BIOS.bin /b /p /n /x /k /l, and the process is as shown in the following figure. After the update is complete, it is recommended to power cycle the system.



```
FS1:\AfuEfi64\> AfuEfix64.efi BIOS.bin /B /P /N /X /K /L
+---------------------------------------------------------------------------+
|                 AMI Firmware Update Utility v5.09.01.1317                 |
|      Copyright (C)2017 American Megatrends Inc. All Rights Reserved.      |
+---------------------------------------------------------------------------+
 Reading flash ............... done
 - ME Data Size checking . ok
 Secure Flash enabled, recalculate ROM size with signature... Enable.
 - FFS checksums ......... ok
 - Check RomLayout ......... Ok.
 Loading capsule to secure memory buffer ... done
 Erasing Boot Block .......... done
 Updating Boot Block ......... done
 Verifying Boot Block ........ done
 Erasing Main Block .......... done
 Updating Main Block ......... done
 Verifying Main Block ........ done
 Erasing NVRAM Block ......... done
 Updating NVRAM Block ........ done
 Verifying NVRAM Block ....... done
 Erasing NCB Block ........... done
 Updating NCB Block .......... done
 Verifying NCB Block ......... done
 Erasing RomHole Block ....... done
 Updating RomHole Block ...... done
 Verifying RomHole Block ..... done
```

Figure 7-89

4) If there are any changes in ME part, execute the command to update 32M ME+BIOS: AfuEfix64.efi BIOS.bin /b /p /n /x /k /l /me, and the process is as shown in the following figure.

Parameter instructions:

- /B Program Boot Block

- /P Program main bios image

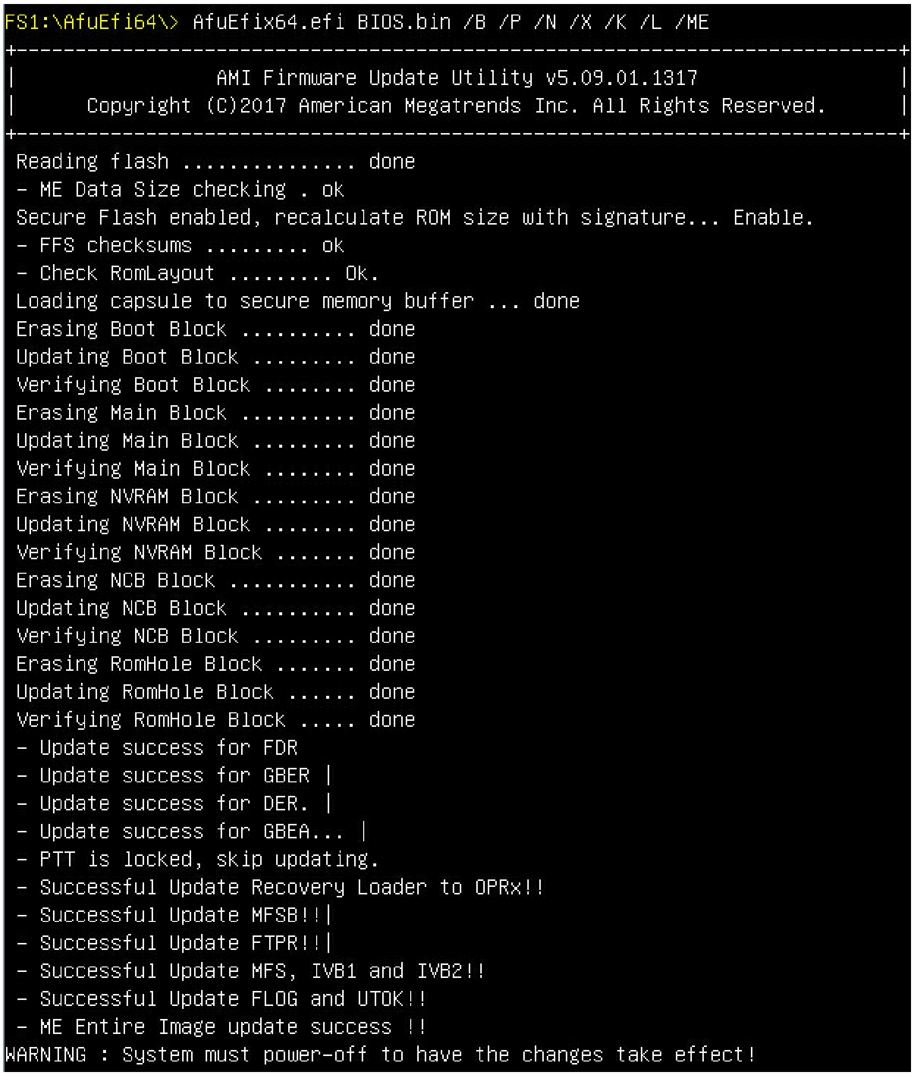
- /N Program NVRAM

- /X Do not check ROM ID

- /K Program all non-critical blocks

- /L Program all ROM Holes

- /ME Program ME Entire Firmware Block



```
FS1:\AfuEfi64\> AfuEfix64.efi BIOS.bin /B /P /N /X /K /L /ME
+---------------------------------------------------------------------------+
|                 AMI Firmware Update Utility v5.09.01.1317                 |
|      Copyright (C)2017 American Megatrends Inc. All Rights Reserved.      |
+---------------------------------------------------------------------------+
 Reading flash ............... done
 - ME Data Size checking . ok
 Secure Flash enabled, recalculate ROM size with signature... Enable.
 - FFS checksums ......... ok
 - Check RomLayout ......... Ok.
 Loading capsule to secure memory buffer ... done
 Erasing Boot Block .......... done
 Updating Boot Block ......... done
 Verifying Boot Block ........ done
 Erasing Main Block .......... done
 Updating Main Block ......... done
 Verifying Main Block ........ done
 Erasing NVRAM Block ......... done
 Updating NVRAM Block ........ done
 Verifying NVRAM Block ....... done
 Erasing NCB Block ........... done
 Updating NCB Block .......... done
 Verifying NCB Block ......... done
 Erasing RomHole Block ....... done
 Updating RomHole Block ...... done
 Verifying RomHole Block ..... done
 - Update success for FDR
 - Update success for GBER |
 - Update success for DER. |
 - Update success for GBEA... |
 - PTT is locked, skip updating.
 - Successful Update Recovery Loader to OPRx!!
 - Successful Update MFSB!!|
 - Successful Update FTPR!!|
 - Successful Update MFS, IVB1 and IVB2!!
 - Successful Update FLOG and UTOK!!
 - ME Entire Image update success !!
WARNING : System must power-off to have the changes take effect!
```

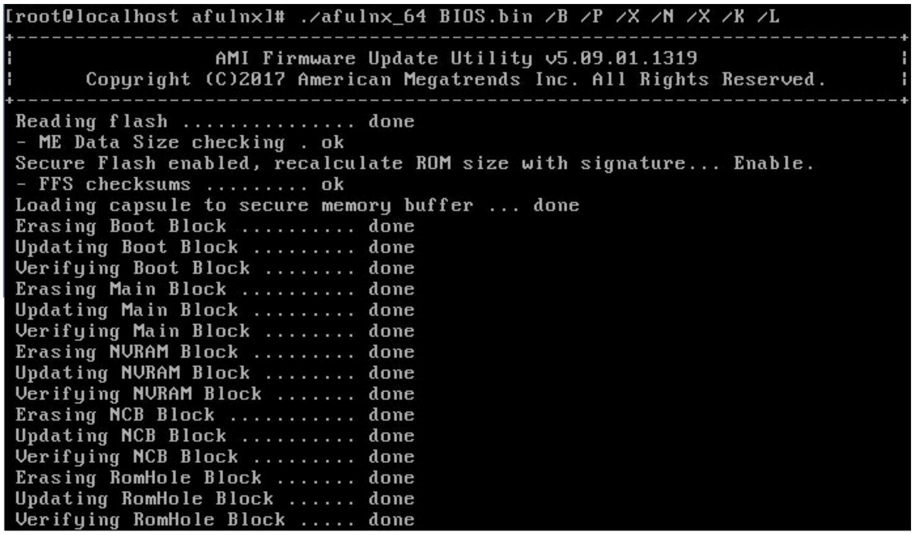
Figure 7-90

Note: After the update is complete, please power off the machine, confirm that there is no residual electricity on the motherboard, and then power it on.

7.3.2 Update BIOS in Linux

There are 32bit and 64bit Linux OS afulnx tools. Taking Linux 64bit OS as an example, use the afulnx_64 tool to enter the directory containing afulnx_64 tool. Meanwhile, put the corresponding BIOS bin file into this folder.

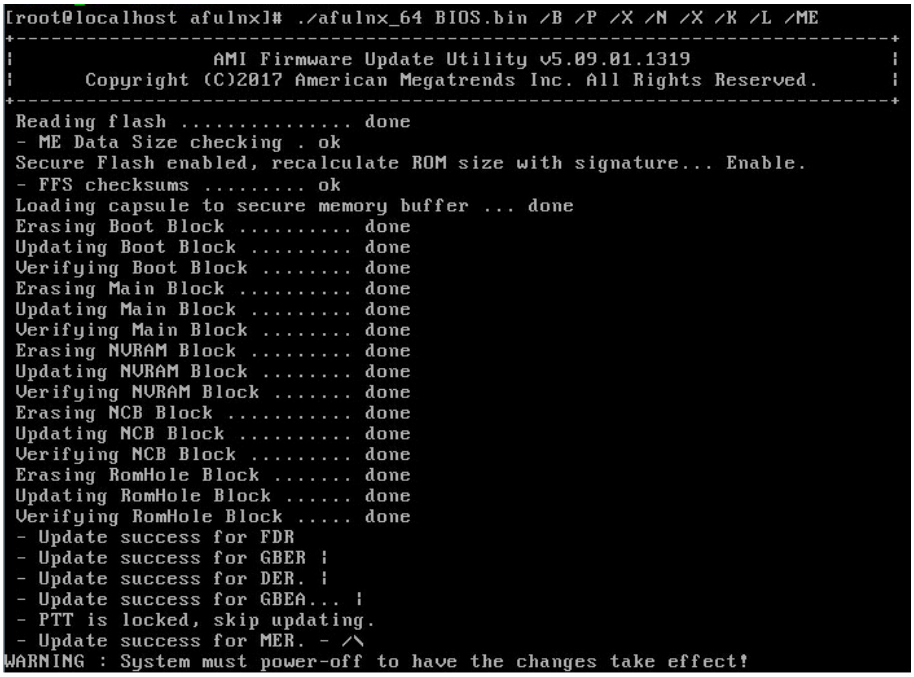
When there is no change in ME part, execute the command to update BIOS: ./afulnx_64 BIOS.bin /b /p /n /x /k /l, as shown in the following figure.



```
[root@localhost afulnx]# ./afulnx_64 BIOS.bin /B /P /X /N /X /K /L
+---------------------------------------------------------------------------+
|                  AMI Firmware Update Utility v5.09.01.1319                |
|      Copyright (C)2017 American Megatrends Inc. All Rights Reserved.      |
+---------------------------------------------------------------------------+
 Reading flash .............. done
 - ME Data Size checking . ok
 Secure Flash enabled, recalculate ROM size with signature... Enable.
 - FFS checksums ......... ok
 Loading capsule to secure memory buffer ... done
 Erasing Boot Block .......... done
 Updating Boot Block ......... done
 Verifying Boot Block ........ done
 Erasing Main Block .......... done
 Updating Main Block ......... done
 Verifying Main Block ........ done
 Erasing NVRAM Block ......... done
 Updating NVRAM Block ........ done
 Verifying NVRAM Block ....... done
 Erasing NCB Block ........... done
 Updating NCB Block .......... done
 Verifying NCB Block ......... done
 Erasing RomHole Block ....... done
 Updating RomHole Block ...... done
 Verifying RomHole Block ..... done
```

Figure 7-91

If there are any changes in ME part, execute the command to update BIOS and ME simultaneously: ./afulnx_64 BIOS.bin /b /p /n /x /k /l /me, as shown in the following figure.



```
[root@localhost afulnx]# ./afulnx_64 BIOS.bin /B /P /X /N /X /K /L /ME
+---------------------------------------------------------------------------+
|                  AMI Firmware Update Utility v5.09.01.1319                |
|      Copyright (C)2017 American Megatrends Inc. All Rights Reserved.      |
+---------------------------------------------------------------------------+
 Reading flash .............. done
 - ME Data Size checking . ok
 Secure Flash enabled, recalculate ROM size with signature... Enable.
 - FFS checksums ......... ok
 Loading capsule to secure memory buffer ... done
 Erasing Boot Block .......... done
 Updating Boot Block ......... done
 Verifying Boot Block ........ done
 Erasing Main Block .......... done
 Updating Main Block ......... done
 Verifying Main Block ........ done
 Erasing NVRAM Block ......... done
 Updating NVRAM Block ........ done
 Verifying NVRAM Block ....... done
 Erasing NCB Block ........... done
 Updating NCB Block .......... done
 Verifying NCB Block ......... done
 Erasing RomHole Block ....... done
 Updating RomHole Block ...... done
 Verifying RomHole Block ..... done
 - Update success for FDR
 - Update success for GBER |
 - Update success for DER. |
 - Update success for GBEA... |
 - PTT is locked, skip updating.
 - Update success for MER. - /\
WARNING : System must power-off to have the changes take effect!
```

Figure 7-92

Notes:

1. For Linux system, it needs to run the afulnx_64 tool as root.

2. After the update is complete, please power off the machine, and confirm that there is no residual electricity on the motherboard, and then power it on.

8 BMC Settings

8.1 Introduction

This Specification describes the functional specifications for the Baseboard Management Controller (BMC). It also describes the feature's detail information.

This document is written for software developers, system integrators, testers, server management users.

8.2 Server System Overview

BMC is an independent system of host server system. This independent system has its own processor and memory; the host system can be managed by BMC system even if host hardware or OS hang or went down.

8.2.1 Main Feature

- Support IPMI 2.0, IPMI Interface includes KCS, Lan, IPMB
- Management Protocol, IPMI2.0, HTTPS, SNMP, Smash CLI
- Web GUI
- Redfish
- Management Network Interface, Dedicated/NCSI
- Console Redirection (KVM) and Virtual Media
- Serial Over Lan (SOL)
- Diagnostic Logs, System Event Log (SEL), Blackbox Log, Audit Log
- Hardware watchdog timer; Fans will full speed when BMC no response in 4 mins
- Intel® Intelligent Power Node Manager 4.0 support
- Event Alert, SNMP Trap (v1/v2c/v3), Email Alert and Syslog
- Dual BMC firmware image support
- Storage, Monitor RAID Controller/HDD/Virtual HDD
- Firmware update, BMC/BIOS/CPLD
- Device State Monitor and Diagnostic
- RAID Monitor/Configure

8.2.2 Integrated BMC Hardware

ASPEED AST2500 is the processor of server management subsystem, based on ARM1176JZF-S 32-bit RISC CPU microcontroller.

The following functionality is integrated into the component:

- Baseboard Management Controller (BMC) with peripherals
- Server-class Super I/O (SIO)
- Graphics controller
- Remote KVM redirection, USB media redirection, and HW Encryption

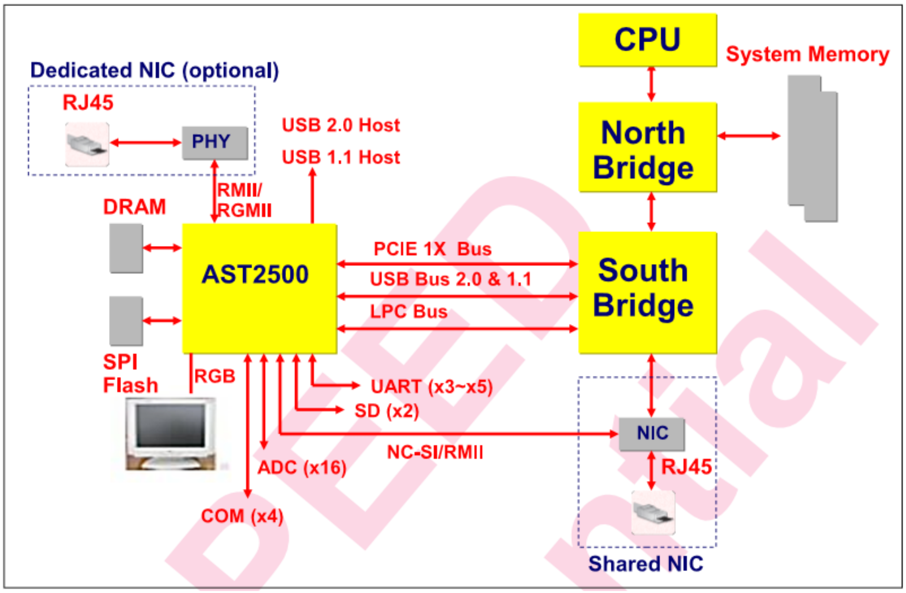


Figure 8-1 BMC Hardware Architecture

The eSPI/LPC interface to the host is used for SIO and BMC communication. The eSPI/LPC Bus interface provides IPMI Compliant KCS and BT interfaces.

The PCI Express interface is mainly used for the graphics controller interface to communicate with the host. The graphics controller is a VGA-compliant controller with 2D hardware acceleration and full bus master support. The graphics controller can support up to 1920x1200 32bpp@60Hz resolution at high refresh rates. The PCI Express interface is also used for BMC messaging to other system devices using MCTP protocol.

The USB 2.0 Hub interface is used for remote keyboard and mouse, and remote storage support. BMC supports various storage devices such as CDROM, DVDROM, CDROM (ISO image), floppy and USB flash disk. Any of the storage devices can be used as a boot device and the host can boot from this remote media via redirection over the USB interface.

8.3 IPMI2.0

8.3.1 Channel ID Assignment for Each Interface

Table 8-1 Channel ID Assignment for Each Interface

Channel ID	Interface	Support Sessions
0h	Primary IPMB	No
6h	Secondary IPMB	No
0Ah	Third IPMB	No
1h	Primary LAN	Yes
8h	Secondary LAN	Yes
0Fh	KCS / SMS	No

8.3.2 System Interface

Support LPC interface, and LPC provides hardware path for KCS messaging.

8.3.3 IPMB Interface

BMC supports Intel NM4.0. Now, Secondary IPMB is used as the communication interface.

8.3.4 LAN Interface

BMC supports IPMI V2.0, compatible with V1.5, supports receiving and sending IPMI messages based on RMCP or RMCP+ format.

BMC supports up to 2 LAN Interfaces (Dedicated NIC and Shared NIC).

List of supported cipher suites in IPMI:

Table 8-2 Supported Cipher Suites in IPMI

ID	**Authentication Algorithm**	**Integrity Algorithm**	**Confidentiality Algorithm**
0	RAKP - NONE	NONE	NONE
1	RAKP-HMAC-SHA1	NONE	NONE
2	RAKP-HMAC-SHA1	HMAC-SHA1-96	NONE
3	RAKP-HMAC-SHA1	HMAC-SHA1-96	AES-CBC-128
6	RAKP-HMAC-MD5	NONE	NONE
7	RAKP-HMAC-MD5	HMAC-MD5-128	NONE
8	RAKP-HMAC-MD5	HMAC-MD5-128	AES-CBC-128
11	RAKP-HMAC-MD5	MD5-128	NONE
12	RAKP-HMAC-MD5	MD5-128	AES-CBC-128
15	RAKP_HMAC_ SHA256	NONE	NONE
16	RAKP_HMAC_ SHA256	HMAC-SHA256-128	NONE
17	RAKP_HMAC_ SHA256	HMAC-SHA256-128	AES-CBC-128

8.3.5 IPMI Commands

Tables below define the IPMI commands supported by the BMC.

IPMI SPEC standard command:

Table 8-3 IPMI NetFn

NetFn	**App**	**Chassis**	**S/E**	**Storage**	**Transport**	**Bridge**
Value	0x06	0x00	0x04	0x0A	0x0C	0x02

Table 8-4 IPMI Spec Standard Command

IPMI Device “Global” Commands	**NetFn**	**CMD**	**SUPPORT**
Get Device ID	App	01h	YES
Broadcast ‘Get Device ID’ [1]	App	01h	YES
Cold Reset	App	02h	YES
Warm Reset	App	03h	YES
Get Self Test Results	App	04h	YES
Manufacturing Test On	App	05h	YES
Set ACPI Power State	App	06h	YES
Get ACPI Power State	App	07h	YES
Get Device GUID	App	08h	YES
Get NetFn Support	App	09h	YES
Get Command Support	App	0Ah	YES
Get Command Sub-function Support	App	0Bh	YES
Get Configurable Commands	App	0Ch	YES
Get Configurable Command Sub-functions	App	0Dh	YES
Set Command Enables	App	60h	YES
Get Command Enables	App	61h	YES
Set Command Sub-function Enables	App	62h	YES
Get Command Sub-function Enables	App	63h	YES
Get OEM NetFn IANA Support	App	64h	YES
BMC Watchdog Timer Commands			
Reset Watchdog Timer	App	22h	YES
Set Watchdog Timer	App	24h	YES
Get Watchdog Timer	App	25h	YES
BMC Device and Messaging Commands			
Set BMC Global Enables	App	2Eh	YES
Get BMC Global Enables	App	2Fh	YES
Clear Message Flags	App	30h	YES
Get Message Flags	App	31h	YES
Enable Message Channel Receive	App	32h	YES
Get Message	App	33h	YES
Send Message	App	34h	YES
Read Event Message Buffer	App	35h	YES
Get BT Interface Capabilities	App	36h	YES

Get System GUID	App	37h	YES
Set System Info Parameters	App	58h	YES
Get System Info Parameters	App	59h	YES
Get Channel Authentication Capabilities	App	38h	YES
Get Session Challenge	App	39h	YES
Activate Session	App	3Ah	YES
Set Session Privilege Level	App	3Bh	YES
Close Session	App	3Ch	YES
Get Session Info	App	3Dh	YES
Get AuthCode	App	3Fh	YES
Set Channel Access	App	40h	YES
Get Channel Access	App	41h	YES
Get Channel Info Command	App	42h	YES
Set User Access Command	App	43h	YES
Get User Access Command	App	44h	YES
Set User Name	App	45h	YES
Get User Name Command	App	46h	YES
Set User Password Command	App	47h	YES
Activate Payload	App	48h	YES
Deactivate Payload	App	49h	YES
Get Payload Activation Status	App	4Ah	YES
Get Payload Instance Info	App	4Bh	YES
Set User Payload Access	App	4Ch	YES
Get User Payload Access	App	4Dh	YES
Get Channel Payload Support	App	4Eh	YES
Get Channel Payload Version	App	4Fh	YES
Get Channel OEM Payload Info	App	50h	YES
Master Write-Read	App	52h	YES
Get Channel Cipher Suites	App	54h	YES
Suspend/Resume Payload Encryption	App	55h	YES
Set Channel Security Keys	App	56h	YES
Get System Interface Capabilities	App	57h	YES
Firmware Firewall Configuration	App	60h-64h	NO
Chassis Device Commands			
Get Chassis Capabilities	Chassis	00h	YES
Get Chassis Status	Chassis	01h	YES
Chassis Control	Chassis	02h	YES
Chassis Reset	Chassis	03h	YES
Chassis Identify	Chassis	04h	YES
Set Front Panel Button Enables	Chassis	0Ah	YES
Set Chassis Capabilities	Chassis	05h	YES
Set Power Restore Policy	Chassis	06h	YES

Set Power Cycle Interval	Chassis	0Bh	YES
Get System Restart Cause	Chassis	07h	YES
Set System Boot Options	Chassis	08h	YES
Get System Boot Options	Chassis	09h	YES
Get POH Counter	Chassis	0Fh	YES
Event Commands			
Set Event Receiver	S/E	00h	YES
Get Event Receiver	S/E	01h	YES
Platform Event (a.k.a. “Event Message”)	S/E	02h	YES
PEF and Alerting Commands			
Get PEF Capabilities	S/E	10h	YES
Arm PEF Postpone Timer	S/E	11h	YES
Set PEF Configuration Parameters	S/E	12h	YES
Get PEF Configuration Parameters	S/E	13h	YES
Set Last Processed Event ID	S/E	14h	YES
Get Last Processed Event ID	S/E	15h	YES
Alert Immediate	S/E	16h	YES
PET Acknowledge	S/E	17h	YES
Sensor Device Commands			
Get Device SDR Info	S/E	20h	YES
Get Device SDR	S/E	21h	YES
Reserve Device SDR Repository	S/E	22h	YES
Get Sensor Reading Factors	S/E	23h	YES
Set Sensor Hysteresis	S/E	24h	YES
Get Sensor Hysteresis	S/E	25h	YES
Set Sensor Threshold	S/E	26h	YES
Get Sensor Threshold	S/E	27h	YES
Set Sensor Event Enable	S/E	28h	YES
Get Sensor Event Enable	S/E	29h	YES
Re-arm Sensor Events	S/E	2Ah	YES
Get Sensor Event Status	S/E	2Bh	YES
Get Sensor Reading	S/E	2Dh	YES
Set Sensor Type	S/E	2Eh	YES
Get Sensor Type	S/E	2Fh	YES
Set Sensor Reading And Event Status	S/E	30h	YES
FRU Device Commands			
Get FRU Inventory Area Info	Storage	10h	YES
Read FRU Data	Storage	11h	YES
Write FRU Data	Storage	12h	YES
SDR Device Commands			
Get SDR Repository Info	Storage	20h	YES
Get SDR Repository Allocation Info	Storage	21h	YES

Reserve SDR Repository	Storage	22h	YES
Get SDR	Storage	23h	YES
Add SDR	Storage	24h	YES
Partial Add SDR	Storage	25h	YES
Delete SDR	Storage	26h	YES
Clear SDR Repository	Storage	27h	YES
Get SDR Repository Time	Storage	28h	YES
Set SDR Repository Time	Storage	29h	YES
Enter SDR Repository Update Mode	Storage	2Ah	YES
Exit SDR Repository Update Mode	Storage	2Bh	YES
Run Initialization Agent	Storage	2Ch	YES
SEL Device Commands			
Get SEL Info	Storage	40h	YES
Get SEL Allocation Info	Storage	41h	YES
Reserve SEL	Storage	42h	YES
Get SEL Entry	Storage	43h	YES
Add SEL Entry	Storage	44h	YES
Partial Add SEL Entry	Storage	45h	YES
Delete SEL Entry	Storage	46h	YES
Clear SEL	Storage	47h	YES
Get SEL Time	Storage	48h	YES
Set SEL Time	Storage	49h	YES
Get Auxiliary Log Status	Storage	5Ah	YES
Set Auxiliary Log Status	Storage	5Bh	YES
Get SEL Time UTC Offset	Storage	5Ch	YES
Set SEL Time UTC Offset	Storage	5Dh	YES
LAN Device Commands			
Set LAN Configuration Parameters	Transport	01h	YES
Get LAN Configuration Parameters	Transport	02h	YES
Suspend BMC ARPs	Transport	03h	YES
Get IP/UDP/RMCP Statistics	Transport	04h	NO
Serial/Modem Device Commands			
Set Serial/Modem Configuration	Transport	10h	YES
Get Serial/Modem Configuration	Transport	11h	YES
Set Serial/Modem Mux	Transport	12h	YES
Get TAP Response Codes	Transport	13h	NO
Set PPP UDP Proxy Transmit Data	Transport	14h	NO
Get PPP UDP Proxy Transmit Data	Transport	15h	NO
Send PPP UDP Proxy Packet	Transport	16h	NO
Get PPP UDP Proxy Receive Data	Transport	17h	NO
Serial/Modem Connection Active	Transport	18h	NO
Callback	Transport	19h	YES

Set User Callback Options	Transport	1Ah	YES
Get User Callback Options	Transport	1Bh	YES
Set Serial Routing Mux	Transport	1Ch	NO
SOL Activating	Transport	20h	NO
Set SOL Configuration Parameters	Transport	21h	YES
Get SOL Configuration Parameters	Transport	22h	YES
Command Forwarding Commands			
Forwarded Command	Bridge	30h	NO
Set Forwarded Commands	Bridge	31h	NO
Get Forwarded Commands	Bridge	32h	NO
Enable Forwarded Commands	Bridge	33h	NO
Bridge Management Commands (ICMB)			
Get Bridge State	Bridge	00h	NO
Set Bridge State	Bridge	01h	NO
Get ICMB Address	Bridge	02h	NO
Set ICMB Address	Bridge	03h	NO
Set Bridge Proxy Address	Bridge	04h	NO
Get Bridge Statistics	Bridge	05h	NO
Get ICMB Capabilities	Bridge	06h	NO
Clear Bridge Statistics	Bridge	08h	NO
Get Bridge Proxy Address	Bridge	09h	NO
Get ICMB Connector Info	Bridge	0Ah	NO
Get ICMB Connection ID	Bridge	0Bh	NO
Send ICMB Connection ID	Bridge	0Ch	NO
Discovery Commands (ICMB)			
Prepare For Discovery	Bridge	10h	NO
Get Addresses	Bridge	11h	NO
Set Discovered	Bridge	12h	NO
Get Chassis Device Id	Bridge	13h	NO
Set Chassis Device Id	Bridge	14h	NO
Bridging Commands (ICMB)			
Bridge Request	Bridge	20h	NO
Bridge Message	Bridge	21h	NO
Event Commands (ICMB)			
Get Event Count	Bridge	30h	NO
Set Event Destination	Bridge	31h	NO
Set Event Reception State	Bridge	32h	NO
Send ICMB Event Message	Bridge	33h	NO
Get Event Destination (optional)	Bridge	34h	NO
Get Event Reception State (optional)	Bridge	35h	NO

8.4 Management Web GUI

HTTPS (Port 443) is supported to access Web GUI. HTTP is disabled by default, users can enable it by IPMI OEM CMD.

The Management Web GUI provides management interface for users to view the system information, system event and status, and to control the managed server.

The Web GUI is supported by following browsers:

Table 8-5 Supported Browsers

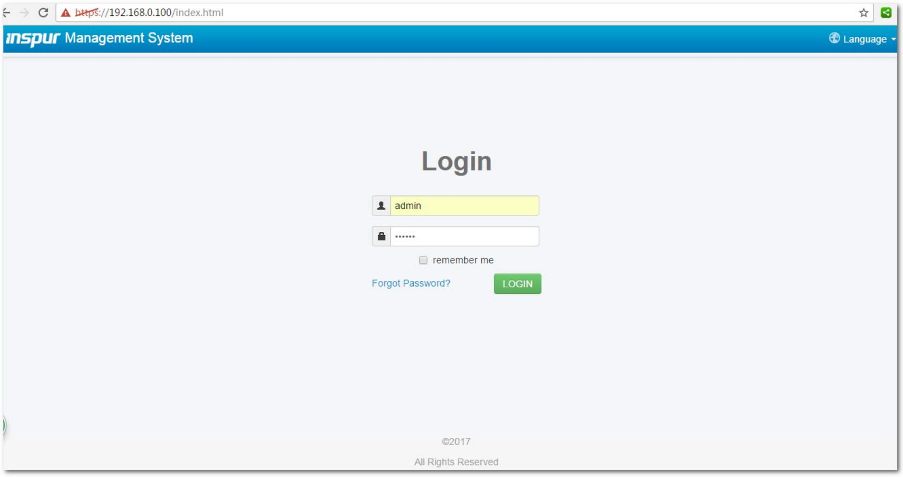
Client OS	Browser Versions
Windows 7.1 x64 Windows 8 x64 Windows 10 x64 Ubuntu 14.04.03 LTS x64 MAC OS X Fedora 23 x64 CentOS 7 x64	**On Windows Clients:** Edge, Firefox 43, Chrome 47+, IE 11+ **On Linux Clients:** Firefox 43, Chrome 47+ **On MAC Client:** Safari

Step 1

Enter “https: // BMC_IP” in browser address bar. Port number is modifiable (See the “Services” section) and the http port number is 80, https port number is 443. If you modify the port number, you need to specify the port number when login, such as https: // BMC_ IP: sslport.

Step 2

In the WEB login interface, enter the user name and password, click the “Login” button to enter the home page, as the figure shows.



https://192.168.0.100/index.html

Figure 8-2 Web Login

When you forget password, you can click “Forgot Password?” link to get a new password by Email. Be sure to configure the Email address in advance in “User Management” page and configure SMTP server information in “SMTP” page.

Main features supported in Web GUI.

Table 8-6 Features Supported in Web GUI

Menus	Subdirectory	Auto Refresh Support	**Main content**
Overview Information	General Information	YES	System Running State
			BMC Information
			Quick Launch Tasks
			Active Session
			FW Version Information
			Recent System Event Log Information
Information	System Info	YES	Device asset info and health state, include: CPU Memory Device Inventory Network Hard Disk Power Supply Unit Fan Temperature Voltage
	BOIS Setup Options	NO	Display main setup options
	History Record	YES	Last Day/Last Month/Last Year - Inlet history curve, and total power history curve, Current Power, Minimum Power, Maximum Power, Average Power
Storage	Controller	YES	RAID/SAS controller asset info and running state
	Physical Drives	YES	Physical drives lists, asset info and running state
	Logical Drives	YES	Logical drives lists, asset info and running state
	Enclosure	YES	Topology of RAID/SAS controller
Remote Control	Console Redirection	NO	HTML5 KVM Java KVM Console Redirection Setting
	Locate Server	YES	Display UID status Turn on/off UID
	Virtual Media		Virtual Media settings
Power and Fan	Power Supply Monitor	YES	Display PSU present/health state, temperature, input/output voltage/current/power, firmware version
	Power Supply Configure	YES	Manually Active/Standby switch
	Server Power Control	YES	Power on/off/reset/cycle Power Restore Setting
	Power Peak	NO	Server power on with random delay
	Power Consumption	NO	Power limit setting
	Fan Speed Control	YES	Display fan speed and state; Switch to manually fan control

BMC Settings	BMC Network	NO	BMC Network Setting BMC DNS Setting Network Bonding Network Link Setting
	Services	NO	Supported service or protocol setting
	NTP	NO	BMC time setting
	SMTP	NO	SMTP setting for email alert
	Alerts	NO	SNMP Trap and email alert setting
	Threshold	NO	Threshold setting for sensors
	Access Control	NO	IP/MAC access limit policy
	BMC Share NIC Switch	NO	NCSI NIC switch
	BIOS Boot Options	NO	BIOS Boot Options setting
Logs	System Event Log	YES	Display SEL
	BMC Audit Log	YES	Display audit Log
	Black Box Log	NO	Export Black Box Log
	Event Log Setting	NO	SEL Log store policy setting
	BMC Syslog Setting	NO	BMC Syslog setting
Fault Diagnosis	BMC Self-inspection Result	YES	Display BMC self-inspection result
	BMC Recovery	NO	Manually reset BMC or KVM
	Capture Screen	NO	Auto Capture and Manual Capture
	Host POST Code	YES	Display current and history POST code
Administration	User Administration	NO	Local Users setting BMC System Administrator Directory Group setting
	Security	NO	LDAP setting AD setting
	Dual Image configuration	NO	Set image start order
	BMC Firmware Update	NO	Upgrade BMC firmware
	BIOS Firmware Update	NO	Upgrade BIOS firmware
	CPLD Update	NO	Upgrade CPLD
	Restore Factory Defaults	NO	Restore BMC settings to factory defaults

8.5 SNMP

Simple Network Management Protocol (SNMP), consists of a set of standards for network management, including an application layer protocol, a database schema, and a set of data objects. It is an Internet Standard protocol for collecting and organizing information about managed devices on IP networks and for modifying that information to change device behavior.

In the BMC, the agent can obtain the server information such as network information, user information, temperature/voltage/fan speed and so on through the SNMP service. At the same time we can configure parameters and manage the server through BMC.

- Support SNMP Get/Set/Trap.
- Support V1/V2C/V3 version.
- SNMPv3 supports authentication algorithm MD5 or SHA, and encryption algorithm to DES or AES.
- SNMP Get supports querying system health status, sensor status, hardware status, device asset information, etc.
- SNMP Set supports local users or network users to switch machine and other operations.
- SNMP Trap supports IPM-based Trap messages.

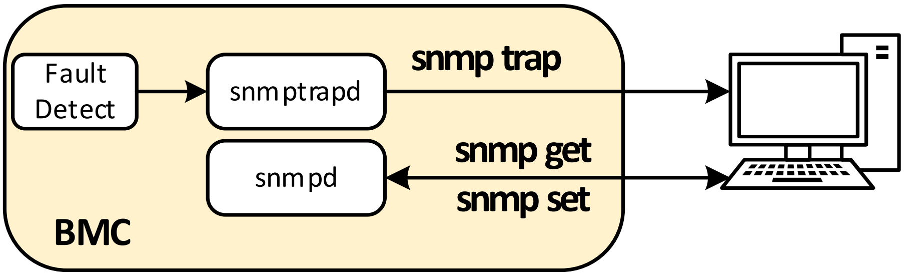
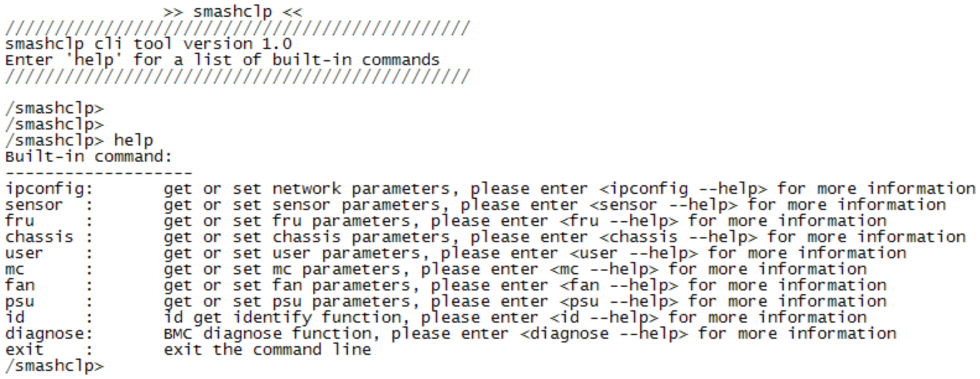


Figure 8-3 SNMP Schematic

8.6 Smash-Lite CLI

BMC supports Smash-Lite CLI, users can login to BMC via SSH and enter Smash-Lite CLI. And it supports ipconfig, sensor, fru, chassis, user, mc, fan, psu, id, diagnose commands, as the figure shows.

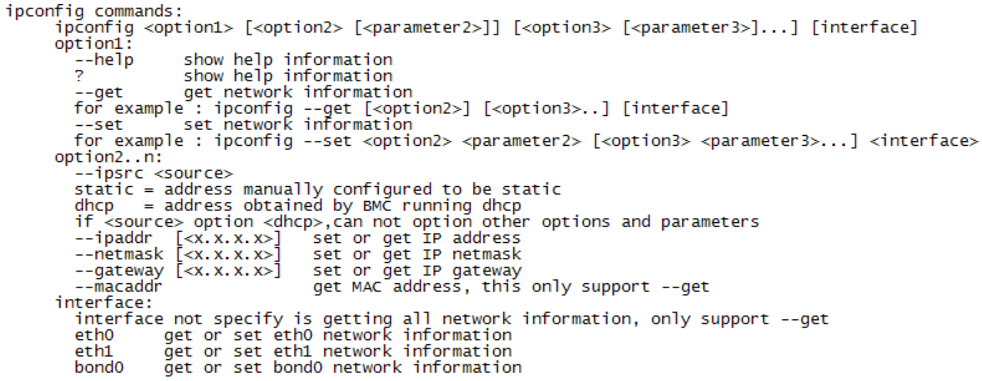
- Smash-Lite help:



```
                >> smashclp <<
///////////////////////////////////////////////
smashclp cli tool version 1.0
Enter 'help' for a list of built-in commands
///////////////////////////////////////////////

/smashclp>
/smashclp>
/smashclp> help
Built-in command:
-------------------
ipconfig:       get or set network parameters, please enter <ipconfig --help> for more information
sensor  :       get or set sensor parameters, please enter <sensor --help> for more information
fru     :       get or set fru parameters, please enter <fru --help> for more information
chassis :       get or set chassis parameters, please enter <chassis --help> for more information
user    :       get or set user parameters, please enter <user --help> for more information
mc      :       get or set mc parameters, please enter <mc --help> for more information
fan     :       get or set fan parameters, please enter <fan --help> for more information
psu     :       get or set psu parameters, please enter <psu --help> for more information
id      :       id get identify function, please enter <id --help> for more information
diagnose:       BMC diagnose function, please enter <diagnose --help> for more information
exit    :       exit the command line
/smashclp>
```

Figure 8-4 Smash Help

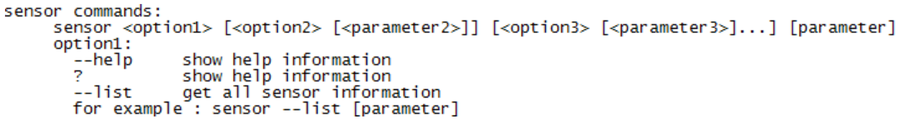
- Ipconfig



```
ipconfig commands:
     ipconfig <option1> [<option2> [<parameter2>]] [<option3> [<parameter3>]...] [interface]
     option1:
       --help     show help information
       ?          show help information
       --get      get network information
       for example : ipconfig --get [<option2>] [<option3>..] [interface]
       --set      set network information
       for example : ipconfig --set <option2> <parameter2> [<option3> <parameter3>...] <interface>
     option2..n:
       --ipsrc <source>
       static = address manually configured to be static
       dhcp   = address obtained by BMC running dhcp
       if <source> option <dhcp>,can not option other options and parameters
       --ipaddr  [<x.x.x.x>]    set or get IP address
       --netmask [<x.x.x.x>]    set or get IP netmask
       --gateway [<x.x.x.x>]    set or get IP gateway
       --macaddr                get MAC address, this only support --get
     interface:
       interface not specify is getting all network information, only support --get
       eth0     get or set eth0 network information
       eth1     get or set eth1 network information
       bond0    get or set bond0 network information
```

Figure 8-5 Ipconfig

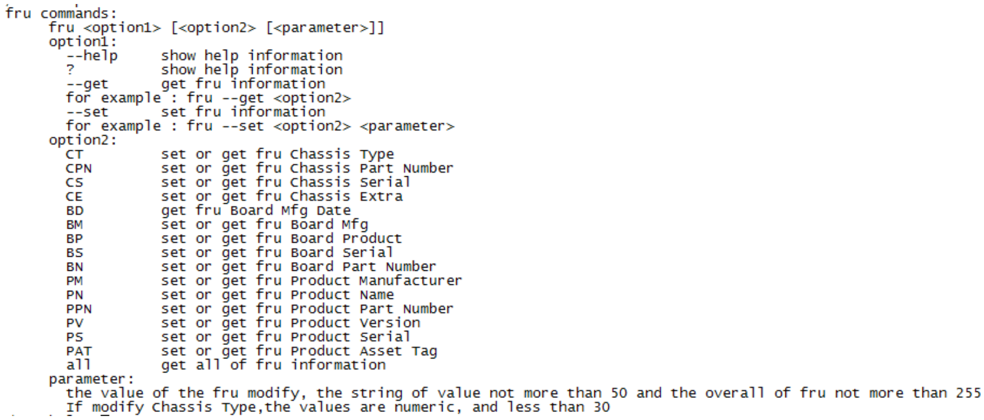
- sensor



```
sensor commands:
     sensor <option1> [<option2> [<parameter2>]] [<option3> [<parameter3>]...] [parameter]
     option1:
       --help     show help information
       ?          show help information
       --list     get all sensor information
       for example : sensor --list [parameter]
```

Figure 8-6 Sensor

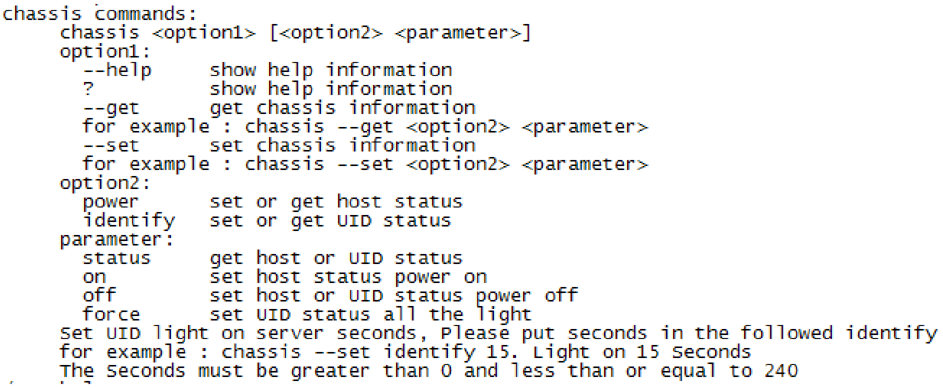
- fru



```
fru commands:
     fru <option1> [<option2> [<parameter>]]
     option1:
       --help     show help information
       ?          show help information
       --get      get fru information
       for example : fru --get <option2>
       --set      set fru information
       for example : fru --set <option2> <parameter>
     option2:
       CT         set or get fru Chassis Type
       CPN        set or get fru Chassis Part Number
       CS         set or get fru Chassis Serial
       CE         set or get fru Chassis Extra
       BD         get fru Board Mfg Date
       BM         set or get fru Board Mfg
       BP         set or get fru Board Product
       BS         set or get fru Board Serial
       BN         set or get fru Board Part Number
       PM         set or get fru Product Manufacturer
       PN         set or get fru Product Name
       PPN        set or get fru Product Part Number
       PV         set or get fru Product Version
       PS         set or get fru Product Serial
       PAT        set or get fru Product Asset Tag
       all        get all of fru information
     parameter:
       the value of the fru modify, the string of value not more than 50 and the overall of fru not more than 255
       If modify Chassis Type,the values are numeric, and less than 30
```

Figure 8-7 Fru

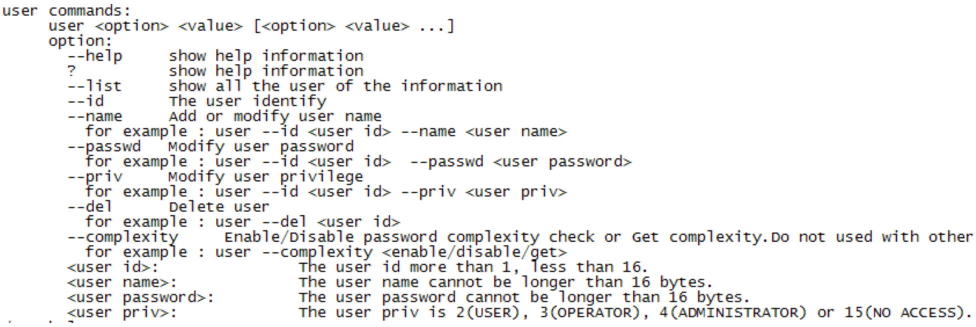
- chassis



```
chassis commands:
     chassis <option1> [<option2> <parameter>]
     option1:
       --help      show help information
       ?           show help information
       --get       get chassis information
       for example : chassis --get <option2> <parameter>
       --set       set chassis information
       for example : chassis --set <option2> <parameter>
     option2:
       power       set or get host status
       identify    set or get UID status
     parameter:
       status      get host or UID status
       on          set host status power on
       off         set host or UID status power off
       force       set UID status all the light
     Set UID light on server seconds, Please put seconds in the followed identify
     for example : chassis --set identify 15. Light on 15 Seconds
     The Seconds must be greater than 0 and less than or equal to 240
```

Figure 8-8 Chassis

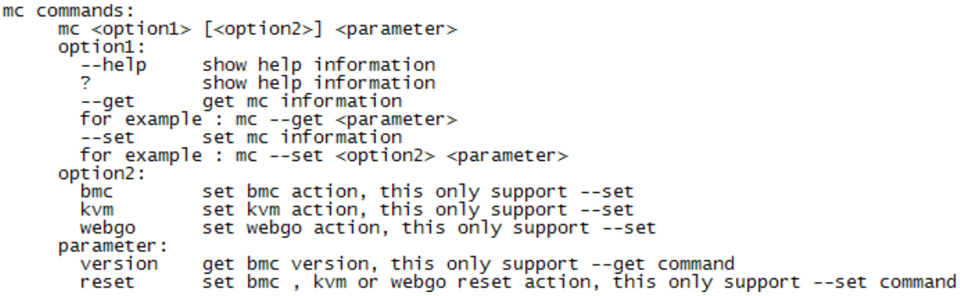
- user



```
user commands:
     user <option> <value> [<option> <value> ...]
     option:
       --help     show help information
       ?          show help information
       --list     show all the user of the information
       --id       The user identify
       --name     Add or modify user name
         for example : user --id <user id> --name <user name>
       --passwd   Modify user password
         for example : user --id <user id>  --passwd <user password>
       --priv     Modify user privilege
         for example : user --id <user id> --priv <user priv>
       --del      Delete user
         for example : user --del <user id>
       --complexity     Enable/Disable password complexity check or Get complexity.Do not used with other
         for example : user --complexity <enable/disable/get>
       <user id>:                The user id more than 1, less than 16.
       <user name>:              The user name cannot be longer than 16 bytes.
       <user password>:          The user password cannot be longer than 16 bytes.
       <user priv>:              The user priv is 2(USER), 3(OPERATOR), 4(ADMINISTRATOR) or 15(NO ACCESS).
```

Figure 8-9 User

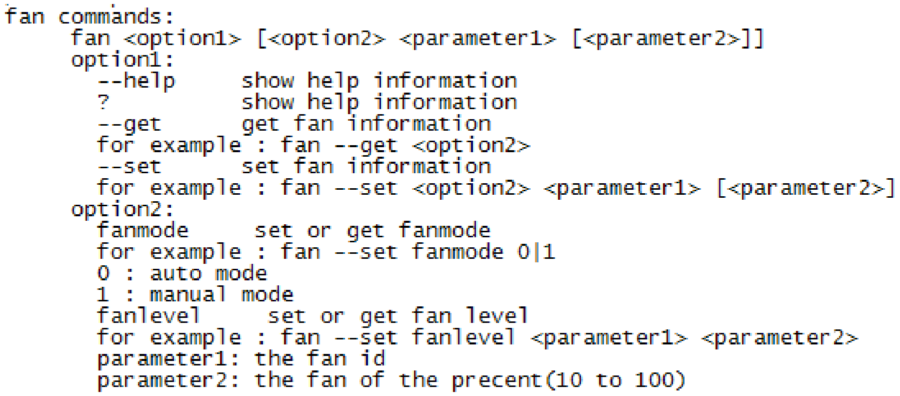
- mc



```
mc commands:
     mc <option1> [<option2>] <parameter>
     option1:
       --help      show help information
       ?           show help information
       --get       get mc information
       for example : mc --get <parameter>
       --set       set mc information
       for example : mc --set <option2> <parameter>
     option2:
       bmc         set bmc action, this only support --set
       kvm         set kvm action, this only support --set
       webgo       set webgo action, this only support --set
     parameter:
       version     get bmc version, this only support --get command
       reset       set bmc , kvm or webgo reset action, this only support --set command
```

Figure 8-10 MC

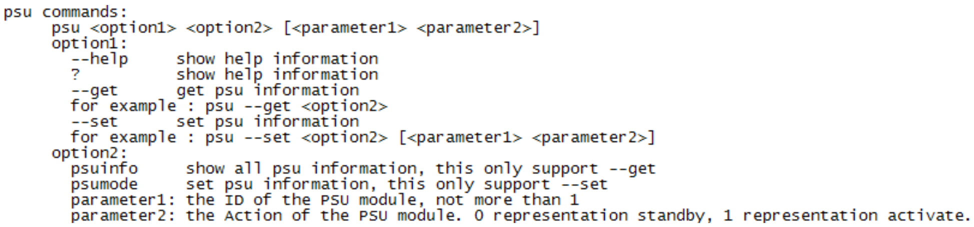
- fan



```
fan commands:
     fan <option1> [<option2> <parameter1> [<parameter2>]]
     option1:
       --help     show help information
       ?          show help information
       --get      get fan information
       for example : fan --get <option2>
       --set      set fan information
       for example : fan --set <option2> <parameter1> [<parameter2>]
     option2:
       fanmode     set or get fanmode
       for example : fan --set fanmode 0|1
       0 : auto mode
       1 : manual mode
       fanlevel     set or get fan level
       for example : fan --set fanlevel <parameter1> <parameter2>
       parameter1: the fan id
       parameter2: the fan of the precent(10 to 100)
```

Figure 8-11 Fan

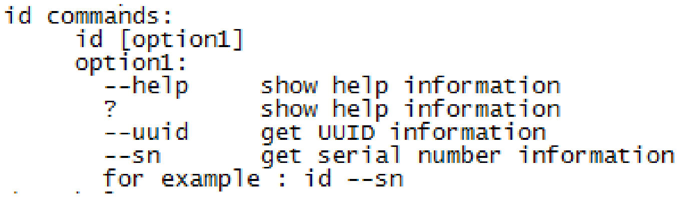
- psu



```
psu commands:
     psu <option1> <option2> [<parameter1> <parameter2>]
     option1:
       --help     show help information
       ?          show help information
       --get      get psu information
       for example : psu --get <option2>
       --set      set psu information
       for example : psu --set <option2> [<parameter1> <parameter2>]
     option2:
       psuinfo     show all psu information, this only support --get
       psumode     set psu information, this only support --set
       parameter1: the ID of the PSU module, not more than 1
       parameter2: the Action of the PSU module. 0 representation standby, 1 representation activate.
```

Figure 8-12 Psu

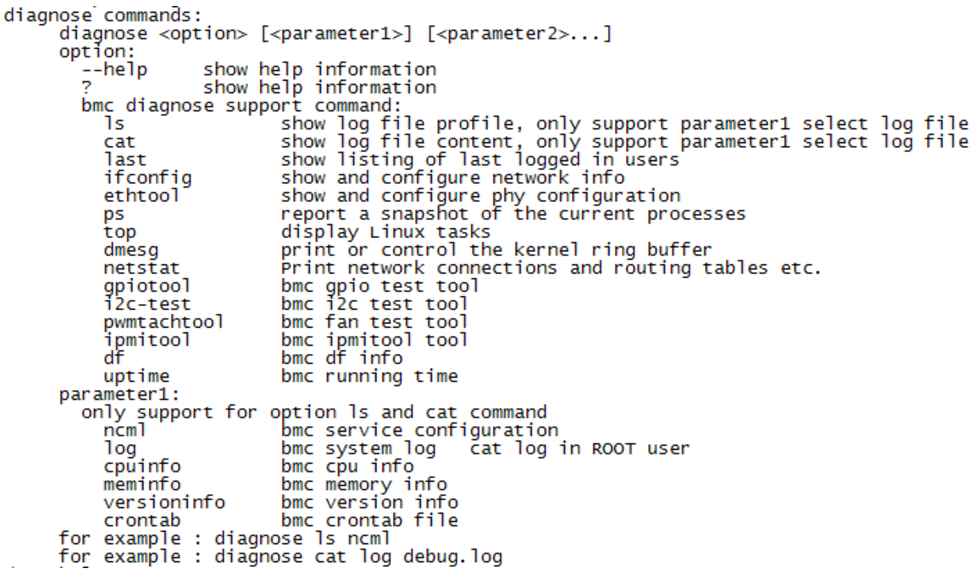
- id



```
id commands:
     id [option1]
     option1:
       --help     show help information
       ?          show help information
       --uuid     get UUID information
       --sn       get serial number information
       for example : id --sn
```

Figure 8-13 Id

- diagnose



```
diagnose commands:
     diagnose <option> [<parameter1>] [<parameter2>...]
     option:
       --help      show help information
       ?           show help information
       bmc diagnose support command:
         ls               show log file profile, only support parameter1 select log file
         cat              show log file content, only support parameter1 select log file
         last             show listing of last logged in users
         ifconfig         show and configure network info
         ethtool          show and configure phy configuration
         ps               report a snapshot of the current processes
         top              display Linux tasks
         dmesg            print or control the kernel ring buffer
         netstat          Print network connections and routing tables etc.
         gpiotool         bmc gpio test tool
         i2c-test         bmc i2c test tool
         pwmtachtool      bmc fan test tool
         ipmitool         bmc ipmitool tool
         df               bmc df info
         uptime           bmc running time
     parameter1:
       only support for option ls and cat command
         ncml             bmc service configuration
         log              bmc system log    cat log in ROOT user
         cpuinfo          bmc cpu info
         meminfo          bmc memory info
         versioninfo      bmc version info
         crontab          bmc crontab file
     for example : diagnose ls ncml
     for example : diagnose cat log debug.log
```

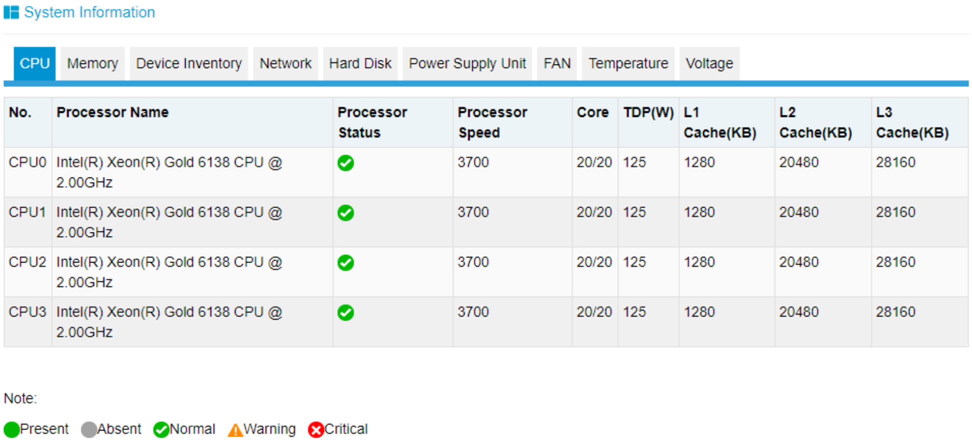
Figure 8-14 Diagnose

8.7 System Information and State

Login WEB GUI, go to page “Information-> System Information”, this page displays information and health status of main components of platform, including CPU, Memory, PCIE Device, Network, Hard Disk Backplane, Power Supply Unit, Fan, Temperature, and Voltage.

8.7.1 CPU

Go to table “CPU” in System Information page.



No.	Processor Name	Processor Status	Processor Speed	Core	TDP(W)	L1 Cache(KB)	L2 Cache(KB)	L3 Cache(KB)
CPU0	Intel(R) Xeon(R) Gold 6138 CPU @ 2.00GHz	✓	3700	20/20	125	1280	20480	28160
CPU1	Intel(R) Xeon(R) Gold 6138 CPU @ 2.00GHz	✓	3700	20/20	125	1280	20480	28160
CPU2	Intel(R) Xeon(R) Gold 6138 CPU @ 2.00GHz	✓	3700	20/20	125	1280	20480	28160
CPU3	Intel(R) Xeon(R) Gold 6138 CPU @ 2.00GHz	✓	3700	20/20	125	1280	20480	28160

Note:

● Present ● Absent ✓ Normal ⚠ Warning ✗ Critical

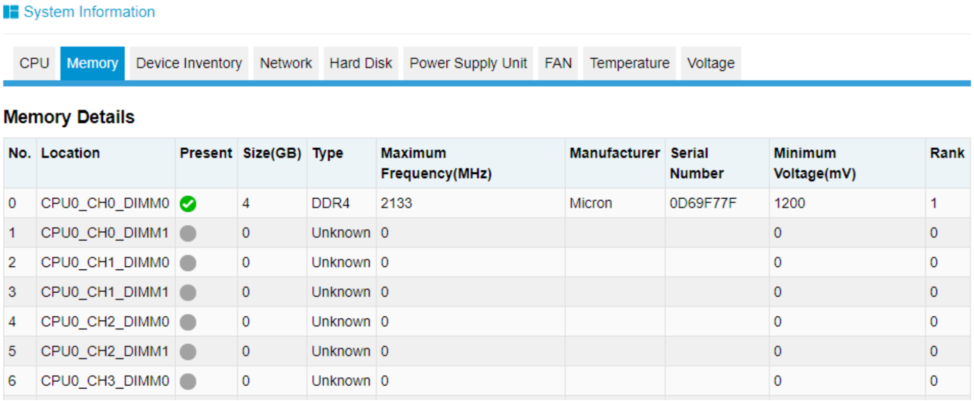
Figure 8-15 CPU Information

Table 8-7 CPU Information

Attribute	Value
No.	CPUx, x is CPU No., starting from 0.
Processor Name	Product Model
Processor Status	✓ Normal State ⚠ Warning State ✖ Critical State ● State unavailable or current power is off The State depends on CPUx_Status sensors.
Processor Speed (MHz)	Processor Speed
Core	x/y, x is Current Used Core Number, y is All Core Number.
TDP	Rated Power
L1 Cache (KB)	L1 Cache
L2 Cache (KB)	L2 Cache
L3 Cache (KB)	L3 Cache

8.7.2 Memory

Go to table “Memory” in System Information page.



Memory Details

No.	Location	Present	Size(GB)	Type	Maximum Frequency(MHz)	Manufacturer	Serial Number	Minimum Voltage(mV)	Rank
0	CPU0_CH0_DIMM0	✓	4	DDR4	2133	Micron	0D69F77F	1200	1
1	CPU0_CH0_DIMM1	●	0	Unknown	0			0	0
2	CPU0_CH1_DIMM0	●	0	Unknown	0			0	0
3	CPU0_CH1_DIMM1	●	0	Unknown	0			0	0
4	CPU0_CH2_DIMM0	●	0	Unknown	0			0	0
5	CPU0_CH2_DIMM1	●	0	Unknown	0			0	0
6	CPU0_CH3_DIMM0	●	0	Unknown	0			0	0

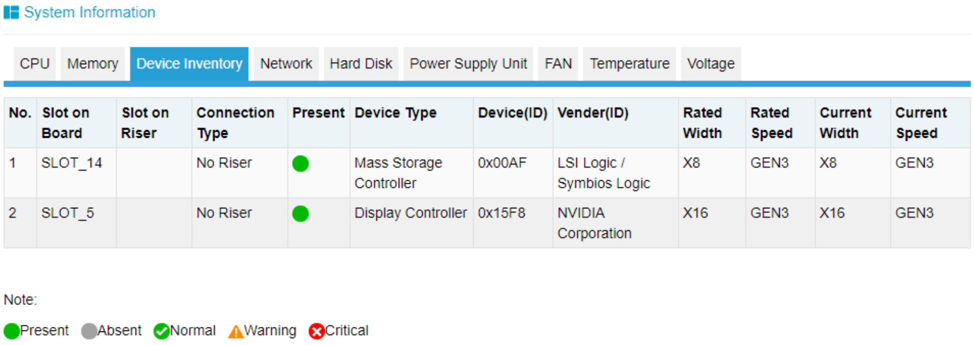
Figure 8-16 Memory Information

Table 8-8 Memory Information

Attribute	Value
No.	x, x denotes the number of Memory.
Location	CPUx_CHy_DIMMz, x, y, z starting from 0.
Present	● Present ● Absent or power is off
Size (GB)	Size of memory
Type	DDR3 or DDR4
Maximum Frequency (MHz)	Maximum Frequency
Manufacture	Manufacture
Serial Number	Serial Number
Rank	Rank

8.7.3 Device Inventory

Go to table “Device Inventory” in System Information page.



System Information

CPU | Memory | Device Inventory | Network | Hard Disk | Power Supply Unit | FAN | Temperature | Voltage

No.	Slot on Board	Slot on Riser	Connection Type	Present	Device Type	Device(ID)	Vender(ID)	Rated Width	Rated Speed	Current Width	Current Speed
1	SLOT_14		No Riser	●	Mass Storage Controller	0x00AF	LSI Logic / Symbios Logic	X8	GEN3	X8	GEN3
2	SLOT_5		No Riser	●	Display Controller	0x15F8	NVIDIA Corporation	X16	GEN3	X16	GEN3

Note:

●Present ●Absent ✓Normal ⚠Warning ✗Critical

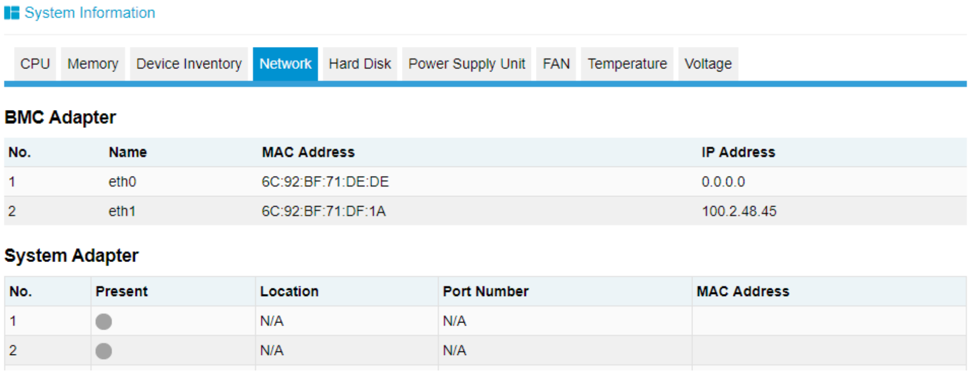
Figure 8-17 PCIE Information

Table 8-9 PCIE Information

Attribute	Value
No.	x, x is PCIE device number, starting from 0.
Slot on Board	Onboard slot number where device is located.
Slot on Riser	Riser slot number where the device is located.
Connection Type	Connection Type
Present	● Present ● Absent or power is off
Device Type	Device Type
Device (ID)	Device ID
Vender (ID)	Vendor ID
Rated Width	Rated Width
Rated Speed	Rated Speed
Current Width	Current Width
Current Speed	Current Speed

8.7.4 Network

Go to table “Network” in System Information page.



System Information

CPU | Memory | Device Inventory | Network | Hard Disk | Power Supply Unit | FAN | Temperature | Voltage

BMC Adapter

No.	Name	MAC Address	IP Address
1	eth0	6C:92:BF:71:DE:DE	0.0.0.0
2	eth1	6C:92:BF:71:DF:1A	100.2.48.45

System Adapter

No.	Present	Location	Port Number	MAC Address
1	●	N/A	N/A	
2	●	N/A	N/A	

Figure 8-18 Network Information

Table 8-10 BMC Adapter

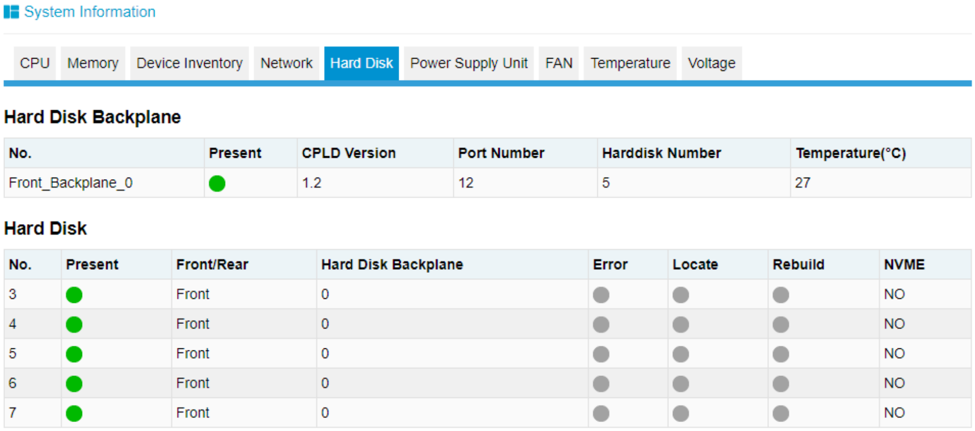
Attribute	Value
No.	x, x denotes the device number.
Name	eth0 or eth1
MAC Address	Mac Address
IP Address	IP Address

Table 8-11 System Adapter

Attribute	**Value**
No.	x, x denotes the device number.
Present	🟢 Present ● Absent
Location	Location
Port Number	Port Number
MAC Address	MAC Address

8.7.5 Hard Disk

Go to table “Hard Disk” in System Information page.



Hard Disk Backplane

No.	Present	CPLD Version	Port Number	Harddisk Number	Temperature(°C)
Front_Backplane_0	🟢	1.2	12	5	27

Hard Disk

No.	Present	Front/Rear	Hard Disk Backplane	Error	Locate	Rebuild	NVME
3	🟢	Front	0	●	●	●	NO
4	🟢	Front	0	●	●	●	NO
5	🟢	Front	0	●	●	●	NO
6	🟢	Front	0	●	●	●	NO
7	🟢	Front	0	●	●	●	NO

Figure 8-19 Hard Disk Information

Table 8-12 Hard Disk Backplane

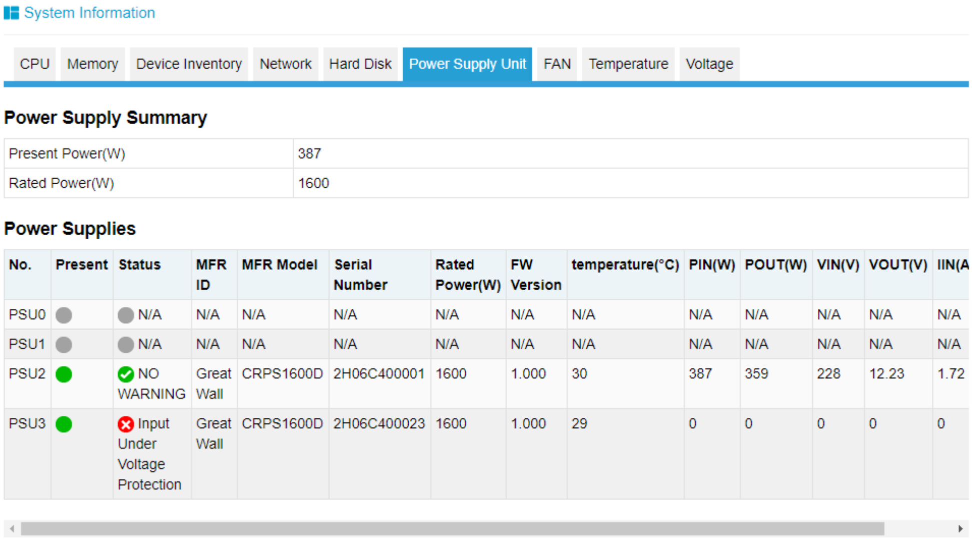
Attribute	**Value**
No.	x, x denotes the device number.
Present	🟢 Present ● Absent
Port Number	Port Number
Hard Disk Number	Hard Disk Number

Table 8-13 Hard Disk

Attribute	Value
No.	x, x denotes the device number.
Present	🟢 Present ⚪ Absent
Front/Rear	Hard disk location, front or rear
Hard Disk Backplane	Hard Disk Backplane Number
Error	✅ Normal State ❌ Error State ⚪ Absent
Locate	🟢 Locating ⚪ Absent or Non Locate
Rebuild	🟢 Rebuilding ⚪ Absent or Non Locate
NVME	YES or NO

8.7.6 Power Supply Unit

Go to table “Power Supply Unit” in System Information page.



Power Supply Summary

Present Power(W)	387
Rated Power(W)	1600

Power Supplies

No.	Present	Status	MFR ID	MFR Model	Serial Number	Rated Power(W)	FW Version	temperature(°C)	PIN(W)	POUT(W)	VIN(V)	VOUT(V)	IIN(A
PSU0	⚪	⚪ N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PSU1	⚪	⚪ N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PSU2	🟢	✅ NO WARNING	Great Wall	CRPS1600D	2H06C400001	1600	1.000	30	387	359	228	12.23	1.72
PSU3	🟢	❌ Input Under Voltage Protection	Great Wall	CRPS1600D	2H06C400023	1600	1.000	29	0	0	0	0	0

Figure 8-20 Power Supply Unit Information

Table 8-14 Power Supply Summary

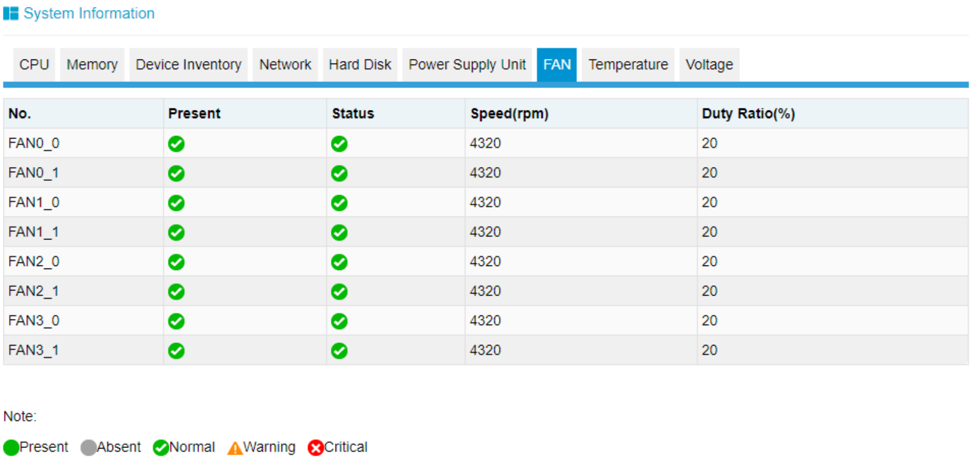
Attribute	Value
Present Power (W)	Total Power
Rated Power (W)	Rated Power

Table 8-15 Power Supplies

Attribute	Value
No.	PSUx, x denotes the power supply number.
Present	● Present ● Absent
Status	Error Status, depends on PMBus Status Word command, 97h.
MFR ID	Manufacture ID
MFR Model	Manufacture Model
Serial Number	Serial Number
Rated Power (W)	Rated Power
FW Version	Firmware Version
Temperature (°C)	Temperature
PIN (W)	Input Power
POUT (W)	Output Power
VIN (V)	Input Voltage
VOUT (V)	Output Voltage
IIN (A)	Input Current
IOUT (A)	Output Current

8.7.7 FAN

Go to table “FAN” in System Information page.



No.	Present	Status	Speed(rpm)	Duty Ratio(%)
FAN0_0	✓	✓	4320	20
FAN0_1	✓	✓	4320	20
FAN1_0	✓	✓	4320	20
FAN1_1	✓	✓	4320	20
FAN2_0	✓	✓	4320	20
FAN2_1	✓	✓	4320	20
FAN3_0	✓	✓	4320	20
FAN3_1	✓	✓	4320	20

Note:

● Present ● Absent ✓ Normal ⚠ Warning ⊗ Critical

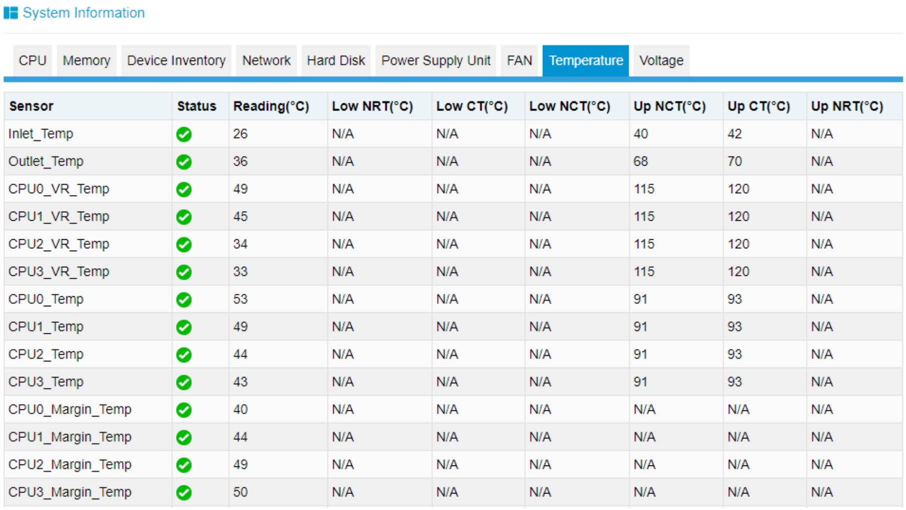
Figure 8-21 Fan Information

Table 8-16 Fan Information

Attribute	Value
No.	FANx_y, x denotes FAN or FAN group number, y denotes FAN number in group.
Present	● Present ● Absent
Status	✓ Normal State ✗ Critical State ● State unavailable or current power is off
Speed (rpm)	Speed in rpm
Duty Ratio (%)	Speed in duty
Fan Power (Optional)	All FANs total power

8.7.8 Temperature

Go to table “Temperature” in System Information page.



Sensor	Status	Reading(°C)	Low NRT(°C)	Low CT(°C)	Low NCT(°C)	Up NCT(°C)	Up CT(°C)	Up NRT(°C)
Inlet_Temp	✓	26	N/A	N/A	N/A	40	42	N/A
Outlet_Temp	✓	36	N/A	N/A	N/A	68	70	N/A
CPU0_VR_Temp	✓	49	N/A	N/A	N/A	115	120	N/A
CPU1_VR_Temp	✓	45	N/A	N/A	N/A	115	120	N/A
CPU2_VR_Temp	✓	34	N/A	N/A	N/A	115	120	N/A
CPU3_VR_Temp	✓	33	N/A	N/A	N/A	115	120	N/A
CPU0_Temp	✓	53	N/A	N/A	N/A	91	93	N/A
CPU1_Temp	✓	49	N/A	N/A	N/A	91	93	N/A
CPU2_Temp	✓	44	N/A	N/A	N/A	91	93	N/A
CPU3_Temp	✓	43	N/A	N/A	N/A	91	93	N/A
CPU0_Margin_Temp	✓	40	N/A	N/A	N/A	N/A	N/A	N/A
CPU1_Margin_Temp	✓	44	N/A	N/A	N/A	N/A	N/A	N/A
CPU2_Margin_Temp	✓	49	N/A	N/A	N/A	N/A	N/A	N/A
CPU3_Margin_Temp	✓	50	N/A	N/A	N/A	N/A	N/A	N/A

Figure 8-22 Temperature Information

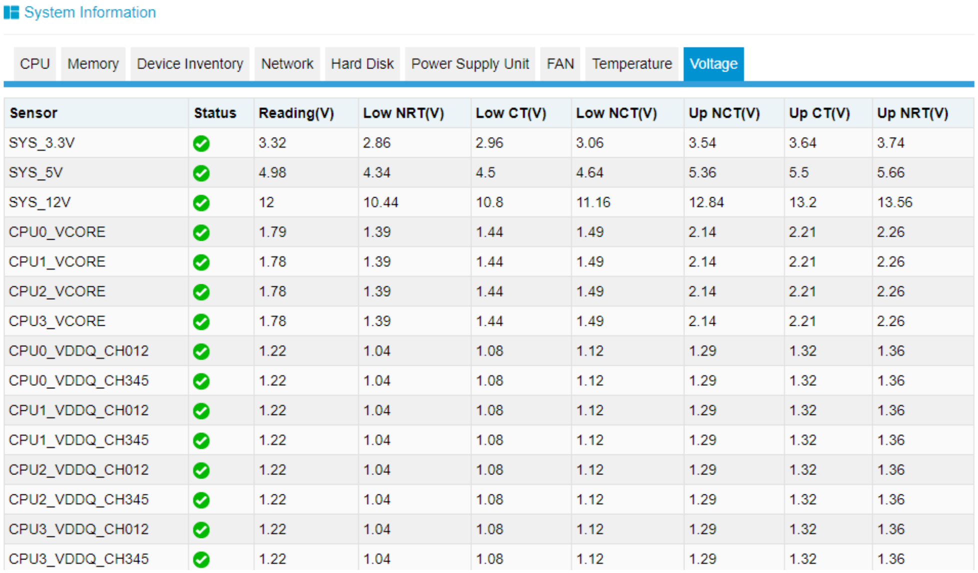
Table 8-17 Temperature Information

Attribute	Value
Sensor	Sensor Name
Status	✓ Normal State ⚠ Warning State ✗ Critical State ● State unavailable or current power is off
Reading (°C)	Temperature Reading
Lower NRT (°C)	Lower Non Recoverable Threshold
Lower CT (°C)	Lower Critical Threshold
Lower NCT (°C)	Lower Non Critical Threshold
Up NCT (°C)	Up Non Critical Threshold
Up CT (°C)	Up Critical Threshold
Up NRT (°C)	Up Non Recoverable Threshold

Note： Threshold value N/A means not configured.

8.7.9 Voltage

Go to table “Voltage” in System Information page.



Sensor	Status	Reading(V)	Low NRT(V)	Low CT(V)	Low NCT(V)	Up NCT(V)	Up CT(V)	Up NRT(V)
SYS_3.3V	✓	3.32	2.86	2.96	3.06	3.54	3.64	3.74
SYS_5V	✓	4.98	4.34	4.5	4.64	5.36	5.5	5.66
SYS_12V	✓	12	10.44	10.8	11.16	12.84	13.2	13.56
CPU0_VCORE	✓	1.79	1.39	1.44	1.49	2.14	2.21	2.26
CPU1_VCORE	✓	1.78	1.39	1.44	1.49	2.14	2.21	2.26
CPU2_VCORE	✓	1.78	1.39	1.44	1.49	2.14	2.21	2.26
CPU3_VCORE	✓	1.78	1.39	1.44	1.49	2.14	2.21	2.26
CPU0_VDDQ_CH012	✓	1.22	1.04	1.08	1.12	1.29	1.32	1.36
CPU0_VDDQ_CH345	✓	1.22	1.04	1.08	1.12	1.29	1.32	1.36
CPU1_VDDQ_CH012	✓	1.22	1.04	1.08	1.12	1.29	1.32	1.36
CPU1_VDDQ_CH345	✓	1.22	1.04	1.08	1.12	1.29	1.32	1.36
CPU2_VDDQ_CH012	✓	1.22	1.04	1.08	1.12	1.29	1.32	1.36
CPU2_VDDQ_CH345	✓	1.22	1.04	1.08	1.12	1.29	1.32	1.36
CPU3_VDDQ_CH012	✓	1.22	1.04	1.08	1.12	1.29	1.32	1.36
CPU3_VDDQ_CH345	✓	1.22	1.04	1.08	1.12	1.29	1.32	1.36

Figure 8-23 Voltage Information

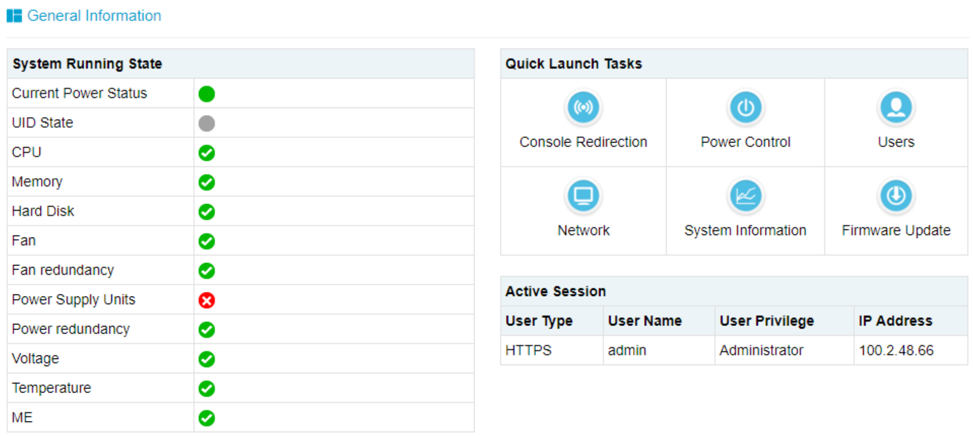
Table 8-18 Voltage Information

Attribute	**Value**
Sensor	Sensor Name
Status	✓ Normal State ⚠ Warning State ✖ Critical State ● State unavailable or current power is off
Reading (V)	Temperature Reading
Lower NRT (V)	Lower Non Recoverable Threshold
Lower CT (V)	Lower Critical Threshold
Lower NCT (V)	Lower Non Critical Threshold
Up NCT (V)	Up Non Critical Threshold
Up CT (V)	Up Critical Threshold
Up NRT (V)	Up Non Recoverable Threshold

Note: Threshold value N/A means not configured.

8.7.10 Global Running State

Login WEB GUI, go to first page “Overview”, main devices’ running state are displayed.



General Information

System Running State	
Current Power Status	🟢
UID State	⚪
CPU	✓
Memory	✓
Hard Disk	✓
Fan	✓
Fan redundancy	✓
Power Supply Units	✗
Power redundancy	✓
Voltage	✓
Temperature	✓
ME	✓

Quick Launch Tasks

Active Session

User Type	User Name	User Privilege	IP Address
HTTPS	admin	Administrator	100.2.48.66

Figure 8-24 Global Running State

Table 8-19 System Running State

Device	State Denotation
Current Power Status	🟢 Power On ⚪ Power Off
UID Status	🟢 UID LED On ⚪ UID LED Off
CPU	CPU Healthy state: ✓ Normal – All CPU Normal ⚠ Warning State – One or more CPUx_Status warning ✗ Critical State – One or more CPUx_Status critical ⚪ Power Off
Memory	Memory Healthy state: ✓ Normal – All Memory Normal. ⚠ Warning State – One or more CPUx_CHy_DIMMz warning ✗ Critical State – One or more CPUx_CHy_DIMMz critical ⚪ Power Off
Hard Disk	Hard Disk Healthy state: ✓ Normal – All Disk Normal. ⚠ Warning State – One or more DISKx_Status warning ✗ Critical State – One or more DISKx_Status critical ⚪ Power Off
Fan	Fan Healthy state: ✓ Normal – All Fan Normal. ✗ Critical State – One or more Fan failure ⚪ Power Off
Fan Redundancy	Fan Healthy state: ✓ Normal – All Fan Normal ✗ Critical State – One or more Fan absent or cannot be read ⚪ Power Off

Power Supply Unit	PSU Healthy state: ✅ Normal State ⚠ Warning State – One or more PSUx_Status warning ❌ Critical State – One or more PSUx_Status critical ● Power Off
Power Redundancy	PSU Redundant state: ✅ Normal State ⚠ Warning State –PSU_Redundant Sensor warning ❌ Critical State – PSU_Redundant Sensor critical ● Power Off
Voltage	Voltage Sensor state: ✅ Normal State ⚠ Warning State – One or more Voltage Sensor warning ❌ Critical State – One or more Voltage Sensor critical ● Power Off
Temperature	Temperature Sensor state: ✅ Normal State ⚠ Warning State – One or more Temperature Sensor warning ❌ Critical State – One or more Temperature Sensor critical ● Power Off
ME	ME state: ✅ Normal State ⚠ Warning State – ME_FW_Status Sensor warning ❌ Critical State – ME_FW_Status Sensor critical ● State unavailable or current power is off

8.7.11 Firmware Version

Page “Firmware Version Information” displays version of firmware residing in the platform, including BMC, BIOS, ME, PSU, PCVVIN VR, PVCCIO VR, PVDDQ VR, CPLD and BP CPLD.

Table 8-20 All Firmware Which Monitored by BMC

Firmware	**Revision information**
BMC	Revision and Build Time
BIOS	Revision and Build Time
ME	Revision
CPLD	Revision
BP CPLD	Revision
PCVVIN VR	Revision
PVCCIO VR	Revision
PVDDQ VR	Revision
FPGA (if present)	Revision
PSOC (if present)	Revision

8.7.12 FRU

FRU stores in EEPROM, BMC will read FRU from EEPROM when BMC boots, FRU will not lose after BMC firmware upgraded.

Table 8-21 FRU Information

Category	Items
Basic Information	FRU Device ID: 0
	FRU Device Name: BMC_FRU
Chassis Information	Chassis Information Area Format Version: *
	Chassis Type: Tower
	Chassis Part Number: **
	Chassis Serial Number: **
Board Information	Board Information Area Format Version: *
	Language: *
	Manufacture Date Time: weekday month day time year
	Board Manufacturer: Inspur
	Board Product Name: *****
	Board Serial Number: **
	Board Part Number: **
	Board Extra: *****
Product Information	Product Information Area Format Version: *
	Language: *
	Manufacture Name: Inspur
	Product Name: *****
	Product Part Number: **
	Product Version: **
	Product Serial Number: **
	Asset Tag: *

8.8 Device State Monitor and Diagnostic

8.8.1 Sensors

8.8.1.1 Physical Sensor

Physical sensors monitor main devices state change. The information gathered from physical sensors is transmitted into IPMI sensors.

- Device State Sensors: BMC monitors CPU/DIMM/PSU/HDD error state based on IPMI

Sensor type.

- Temperature: BMC monitors temperature of system components like CPU, PCH, DIMM, PSU and HSBP, and monitors Inlet/Outlet temperatures.
- Voltage: System P12V, P5V, P3V3, PVNN, PVDDQ, PVCCIO, PVCCIN.
- Fan Speed: System fan.
- Power Consumption: BMC monitors Total Power, CPU Power, Memory Power, PSU Input Power. Fan Power and HDD Power are platform-specific.
- System Main Component Health: BMC monitors system component's health like, CPU Status, PCH Status, MEM Hot, HDD Status, PSU Supply, ME FW Status.
- Intrusion: Optional - An assertion event will be logged, when chassis cover is opened.
- Button: An assertion event will be logged, when Power Button or Reset Button is pressed.

8.8.1.2 Virtual Sensor

BMC also reports various system state changes by maintaining virtual sensors that are not specifically tied to physical hardware.

- IPMI Watchdog: BMC supports an IPMI Watchdog sensor as a means to log SEL events due to expirations of the IPMI 2.0 compliant Watchdog Timer.
- Event Log: The Event Log sensor is used to indicate when the event log is cleared. An assertion event is logged against this sensor when the SEL is cleared. This discrete sensor also supports offsets that indicate when the SEL is full and almost full.
- Clear CMOS: If BIOS CMOS is cleared by BMC, an assertion event will be logged.
- System Restart: When system is cold reset, or hard reset, an assertion event will be logged indicating system ever being cold reset or hard reset.
- BMC Boot Up: When BMC boots up, an assertion event will be logged.
- BIOS Boot: When BIOS boots up and host boots to OS, an assertion event will be logged.

8.8.1.3 Event-Only Sensor

Event-Only discrete sensors are used for event generation only and are not accessible through IPMI sensor commands like the Get Sensor Reading (IPMI command). BIOS/OS or other third-part client uses Add SEL Entry (IPMI command) to add event log to SEL.

8.8.1.4 Sensor Attribute

- Sensor Type: Please refer to Sensor Type Codes table in IPMI Specification, Version 2.0.
- Event Type: Please refer to Event/reading Type Code Ranges table in IPMI Specification, Version 2.0.

- Event Offset:

If sensor event type is generic, please refer to Generic Event/Reading Type Code table in IPMI Specification, Version 2.0.

If sensor event type is sensor-specific, please refer to Sensor Type Code tables in IPMI Specification, Version 2.0.

- Assertion/De-assertion

Assertion and de-assertion indicators reveal the type of events this sensor generates.

8.8.2 CPU

Table 8-22 CPU Health State Monitored

State	Level	Related Model
Present	Info	SDR/SEL
Thermal Trip	Critical	SDR/SEL
Processor Hot	Critical	SDR/SEL
Catt Error	Critical	SDR/SEL
Error0	Warning	Blackbox
Error1	Warning	Blackbox
Error2	Critical	Blackbox
CPU VR Hot	Critical	Blackbox
PCH Thermal Trip	Critical	Blackbox

8.8.3 Memory

Table 8-23 Memory Health State Monitored

State	Level	Related Model
Mem Hot	Critical	Blackbox
Mem VR Hot	Critical	Blackbox
ECC	Warning	SDR/SEL
Uncorrectable ECC	Critical	SDR/SEL

8.8.4 HDD

Table 8-24 HDD Health State Monitored

State	Level	Related Model
Present	Info	SDR/SEL
Error	Critical	SDR/SEL
Rebuild	Warning	SDR/SEL

8.8.5 PSU

Table 8-25 PSU Health State Monitored

State	Level	Related Model
Present	Info	SDR/SEL/ Blackbox
Power Supply Failure	Critical	SDR/SEL/ Blackbox
Predictive Failure	Warning	SDR/SEL/ Blackbox
Power Supply AC lost	Critical	SDR/SEL/ Blackbox

8.9 Logs

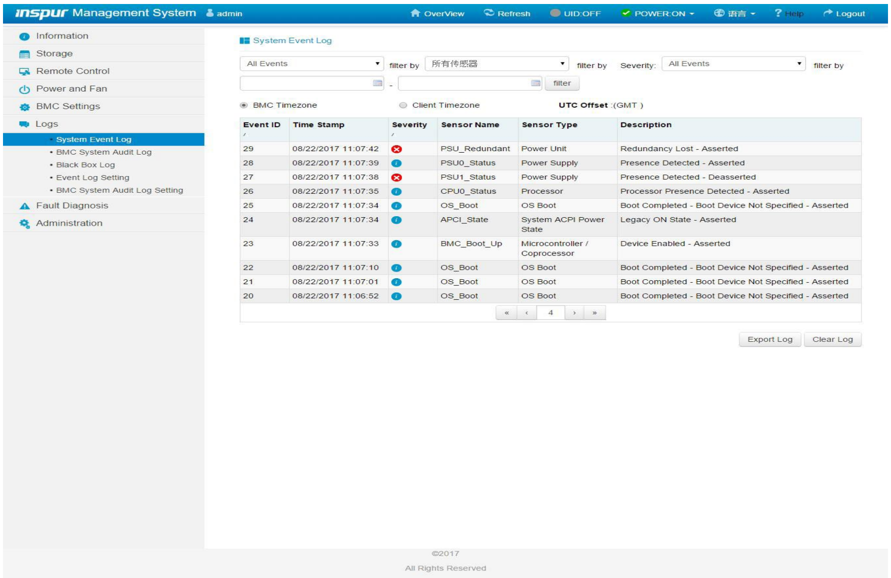
Logs provide the history record of main devices state changes, used for fault diagnostic.

8.9.1 System Event Log

BMC provides the ability to record IPMI sensor based event history. System event log outputs following items and user can get the sensor event information by WEB or IPMI CMD.

- Support up to 3639 items.
- Support linear mode. When SEL is full, new log will be discarded.
- Support cycle mode, default mode. When SEL is full, oldest log will be discarded.
- When SEL is almost full (75%), then Almost full log will be recorded in SEL.
- When SEL is full in linear mode, Full log will be recorded in SEL.
- When SEL is clear, Clear log will be recorded in SEL.
- Support exporting SEL by WEB or IPMI CMD.
- Support informing event to remote client by SNMP Trap, Email Alert, Syslog.

Go to page “Logs -> System Event Log” in Web GUI, all sensor based logs are displayed, users can filter events by event severity, time, or sensor.



All Events filter by 所有传感器 filter by Severity: All Events filter by

● BMC Timezone ○ Client Timezone UTC Offset :(GMT)

Event ID	Time Stamp	Severity	Sensor Name	Sensor Type	Description
29	08/22/2017 11:07:42	⊗	PSU_Redundant	Power Unit	Redundancy Lost - Asserted
28	08/22/2017 11:07:39	ⓘ	PSU0_Status	Power Supply	Presence Detected - Asserted
27	08/22/2017 11:07:38	⊗	PSU1_Status	Power Supply	Presence Detected - Deasserted
26	08/22/2017 11:07:35	ⓘ	CPU0_Status	Processor	Processor Presence Detected - Asserted
25	08/22/2017 11:07:34	ⓘ	OS_Boot	OS Boot	Boot Completed - Boot Device Not Specified - Asserted
24	08/22/2017 11:07:34	ⓘ	APCI_State	System ACPI Power State	Legacy ON State - Asserted
23	08/22/2017 11:07:33	ⓘ	BMC_Boot_Up	Microcontroller / Coprocessor	Device Enabled - Asserted
22	08/22/2017 11:07:10	ⓘ	OS_Boot	OS Boot	Boot Completed - Boot Device Not Specified - Asserted
21	08/22/2017 11:07:01	ⓘ	OS_Boot	OS Boot	Boot Completed - Boot Device Not Specified - Asserted
20	08/22/2017 11:06:52	ⓘ	OS_Boot	OS Boot	Boot Completed - Boot Device Not Specified - Asserted

Figure 8-25 System Event Log

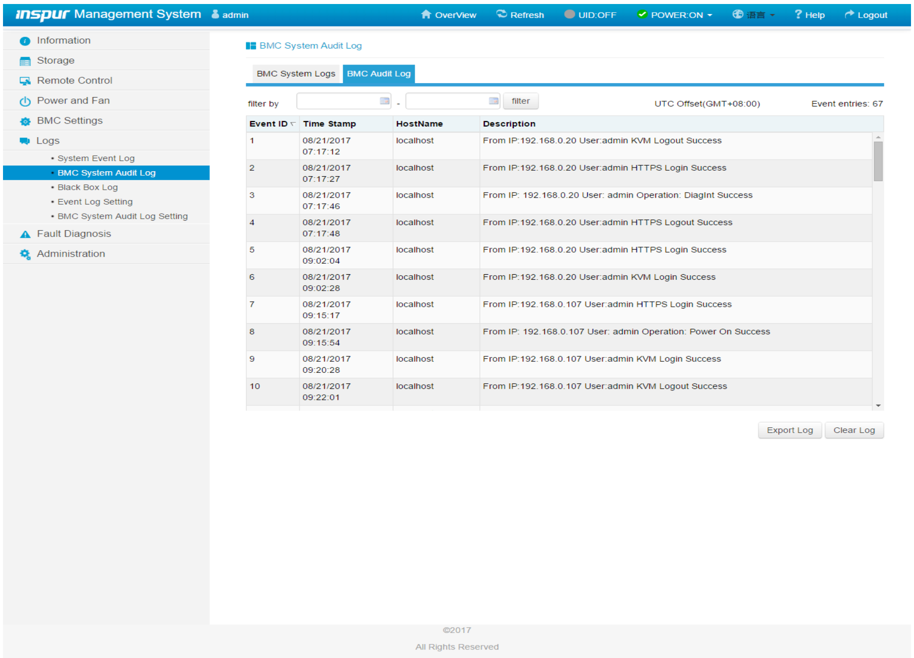
Table 8-26 SEL Attributes

Event ID	Event ID in SEL
Time Stamp	Event generate time
Severity	Event error level, include Error, Warning, Information
Sensor Name	Sensor Name, locate the device
Sensor Type	Sensor Type defined in IPMI2.0
Description	Event details

8.9.2 Audit Log

BMC provides ability to record BMC system audit log.

- All Web setting operating actions will be recorded.
- Web/SSH/Telnet login and logout will be recorded.
- Audit log supported size is 50K, if more than 50K, log will be cleared.
- Support exporting log by Web.



UTC Offset(GMT+08:00) Event entries: 67

Event ID	Time Stamp	HostName	Description
1	08/21/2017 07:17:12	localhost	From IP:192.168.0.20 User:admin KVM Logout Success
2	08/21/2017 07:17:27	localhost	From IP:192.168.0.20 User:admin HTTPS Login Success
3	08/21/2017 07:17:46	localhost	From IP: 192.168.0.20 User: admin Operation: DiagInt Success
4	08/21/2017 07:17:48	localhost	From IP:192.168.0.20 User:admin HTTPS Logout Success
5	08/21/2017 09:02:04	localhost	From IP:192.168.0.20 User:admin HTTPS Login Success
6	08/21/2017 09:02:28	localhost	From IP:192.168.0.20 User:admin KVM Login Success
7	08/21/2017 09:15:17	localhost	From IP:192.168.0.107 User:admin HTTPS Login Success
8	08/21/2017 09:15:54	localhost	From IP: 192.168.0.107 User: admin Operation: Power On Success
9	08/21/2017 09:20:28	localhost	From IP:192.168.0.107 User:admin KVM Login Success
10	08/21/2017 09:22:01	localhost	From IP:192.168.0.107 User:admin KVM Logout Success

Figure 8-26 BMC Audit log

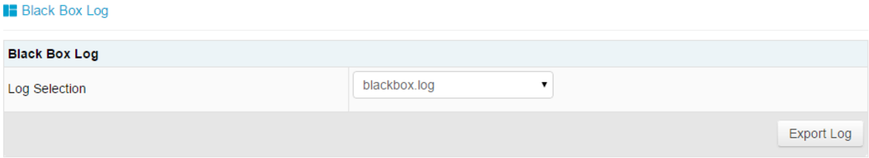
Table 8-27 Audit Log Attributes

Event ID	Event ID
Time Stamp	Event generate time
Host Name	BMC host name
Description	Event details

8.9.3 Blackbox Log

BMC supports blackbox function used to record some details when event occurred.

- Record each CPU’s MSR, CSR Registers, used for fault diagnostic. CPU Catterr, Thermal Trip, Error2, Uncorrectable ECC will trigger the record of CPU Registers.
- Record event details for Non-IPMI events, used for diagnostic.
- When more than 3M, log will loop to store, and the old log content will be deleted.
- Support exporting log by WEB.



Log Selection: blackbox.log

Figure 8-27 Blackbox Log

8.9.4 System Serial Log

Refer to section “Serial over LAN (SOL) and System Serial Log Recording”.

8.10 Event Alerting

BMC supports SNMP Trap and SMTP email alerts.

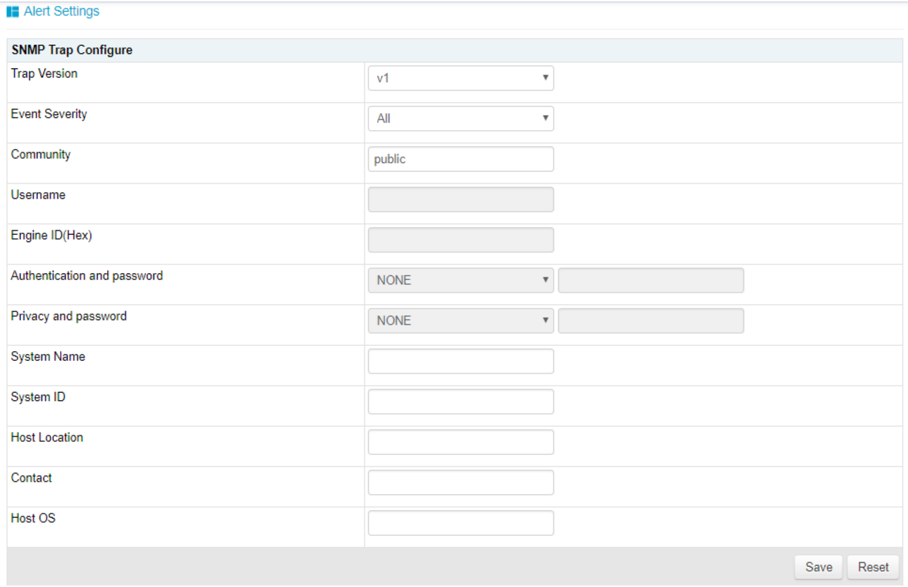
8.10.1 SNMP Trap Alert

BMC supports SNMP Trap. Users open trap receiver and set trap destination IP in BMC Web GUI. When BMC detects event, BMC will send event to the trap receiver.

- BMC supports SNMP v1, v2, v3 traps. Default Trap v1.
- A Modular Information Block (MIB) file associated with the traps should be provided with the BMC firmware to help SNMP Trap receiver to translate the trap.
- SNMP default port number is 162, users can set port in Chapter “Service”.
- Only IPMI sensor based log supports SNMP Traps.

Step 1

Set SNMP Trap protocol, including Trap version, event severity filtering, and community .etc. As bellow:



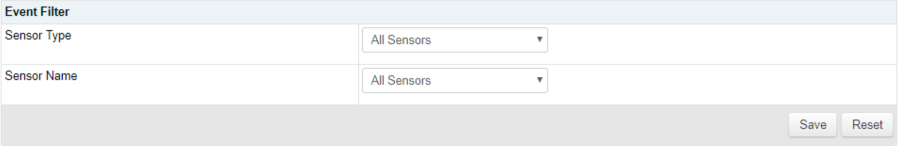
SNMP Trap Configure

Trap Version	v1
Event Severity	All
Community	public
Username	
Engine ID(Hex)	
Authentication and password	NONE
Privacy and password	NONE
System Name	
System ID	
Host Location	
Contact	
Host OS	

Figure 8-28 Alert Settings

Step 2

Set event filter, users can select sensor type or sensor name.

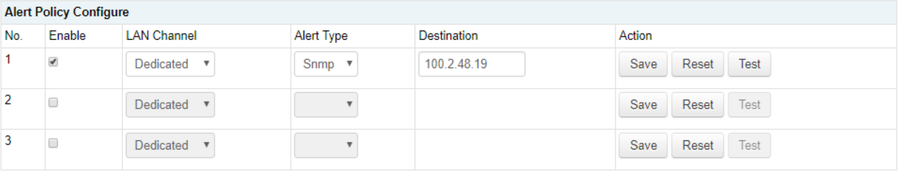


Event Filter	
Sensor Type	All Sensors ▾
Sensor Name	All Sensors ▾
	Save Reset

Figure 8-29 Event Filter

Step 3

Set alert type and destination. Firstly enable one of three items. If SNMP selected, user should set destination to his IP, if Email selected, user should set LAN Channel to dedicated or shared network, then set destination to a user configured email.



Alert Policy Configure

No.	Enable	LAN Channel	Alert Type	Destination	Action
1	☑	Dedicated ▾	Snmp ▾	100.2.48.19	Save Reset Test
2	☐	Dedicated ▾	▾		Save Reset Test
3	☐	Dedicated ▾	▾		Save Reset Test

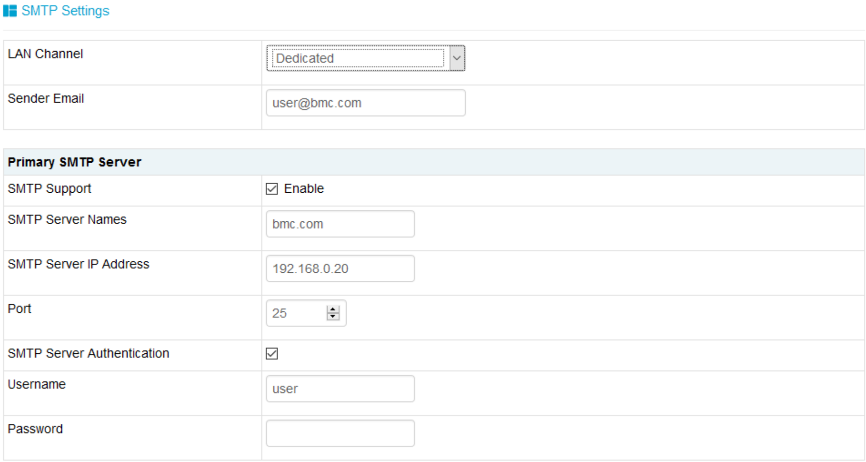
Figure 8-30 Alert Policy Configure

8.10.2 SMTP Email Alert

SMTP (Simple Mail Transport Protocol, defined in RFC821) email alert is supported. The email alert provides text information about the event.

Step 1

Configure SMTP settings. Users should set SMTP server for used LAN channel, if an event occurs, Sender Email will send an email to destination email.



SMTP Settings

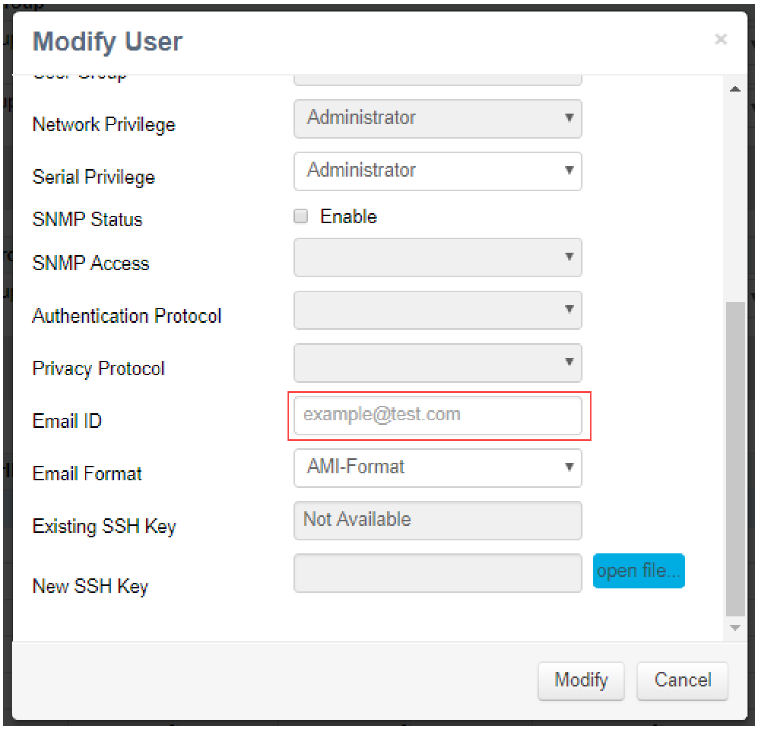
LAN Channel	Dedicated
Sender Email	user@bmc.com

Primary SMTP Server	
SMTP Support	☑ Enable
SMTP Server Names	bmc.com
SMTP Server IP Address	192.168.0.20
Port	25
SMTP Server Authentication	☑
Username	user
Password	

Figure 8-31 SMTP Settings

Step 2

Configure destination email for related user.



Modify User

Network Privilege	Administrator
Serial Privilege	Administrator
SNMP Status	□ Enable
SNMP Access	
Authentication Protocol	
Privacy Protocol	
Email ID	example@test.com
Email Format	AMI-Format
Existing SSH Key	Not Available
New SSH Key	

Figure 8-32 Email Settings

Step 3

Set destination in Figure "Alert Policy Configure" like SNMP Trap Alert Step 3.

8.10.3 Syslog

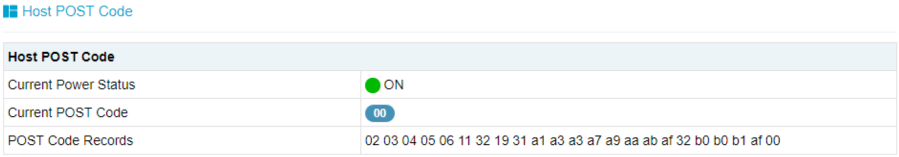
Syslog supports on/off, supports log level filtering, supports 4 receiving targets and every target can configure the receiving server address (IPv4 / IPv6 / FQDN), port number, log type, enable status and send test information. Report log supports security log, operation log and system event log and it is configurable. These logs carry host log. Considering security, Syslog report logs support TLS encryption, and support bidirectional authentication based on imported certificate.

8.11 Diagnostics

Diagnostic tool provides the ability of check and verification for BMC or Host system to check whether there is something out of function or something does not work correctly.

8.11.1 BIOS Post Code (Port 80h)

BIOS sends Post code to IO port 80h. If there are any errors during power on, the last post code is on port 80h. BMC is able to trace post code via port 80h to figure out the cause of issue happened.



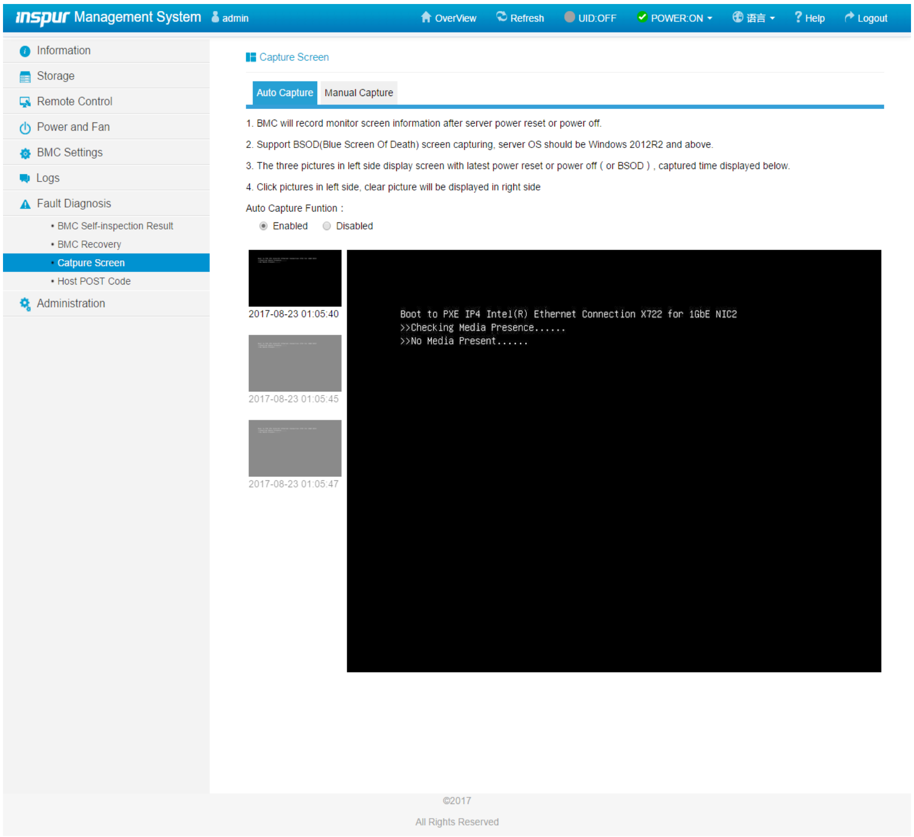
Host POST Code

Host POST Code	
Current Power Status	● ON
Current POST Code	00
POST Code Records	02 03 04 05 06 11 32 19 31 a1 a3 a3 a7 a9 aa ab af 32 b0 b0 b1 af 00

Figure 8-33 BIOS Post Code

8.11.2 Screen Capture

BMC will record monitor screen after server power reset or power off. BMC also supports BSOD (Blue Screen of Death) screen capturing, server OS should be Windows 2012R2 and above.



1. BMC will record monitor screen information after server power reset or power off.
2. Support BSOD(Blue Screen Of Death) screen capturing, server OS should be Windows 2012R2 and above.
3. The three pictures in left side display screen with latest power reset or power off (or BSOD) , captured time displayed below.
4. Click pictures in left side, clear picture will be displayed in right side

Auto Capture Funtion :

● Enabled ○ Disabled

2017-08-23 01:05:40

2017-08-23 01:05:45

2017-08-23 01:05:47

```
Boot to PXE IP4 Intel(R) Ethernet Connection X722 for 1GbE NIC2
>>Checking Media Presence......
>>No Media Present......
```

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Figure 8-34 Screen Capture

8.11.3 BMC Watchdog for System

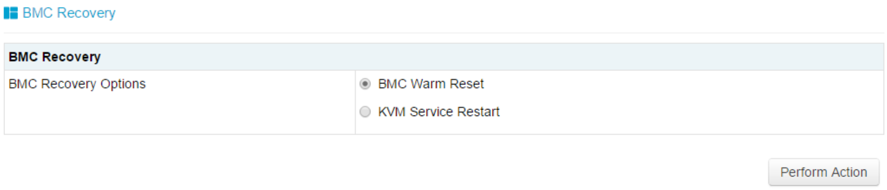
Software watchdog can be used for a number of system timeout function by system management or by BIOS. If software watchdog is triggered, the following actions are available.

- System Reset
- System Power Off
- System Power Cycle
- When BMC watchdog working, BMC will record SEL log.

8.11.4 BMC Recovery

Users can reset BMC from WEB or IPMI interface in case of abnormal situation.

- Warm reset BMC, use “ipmitool mc reset warm”, IPMI Server, KVM Server, WEB Server will be reset.
- Cold reset BMC, use WEB or “ipmtool mc reset cold”, BMC will be reset.
- KVM reset, user WEB and KVM server will be reset.



BMC Recovery

BMC Recovery	
BMC Recovery Options	● BMC Warm Reset ○ KVM Service Restart

Figure 8-35 BMC Recovery

8.12 BMC Self Recovery

BMC Self Recovery provides the ability of automatic repair operations as well if necessary.

8.12.1 Hardware Watchdog

Known fault scenarios:

- Kernel panic
- System resources exhausted or error, system can’t create a new task, but the original task can continue to run.

Hardware watchdog:

- Watchdog starts when uboot loads kernel, and the timeout is 5 minutes. If BMC boot timeout occurs, BMC will reset.
- After the BMC system starts, the main process resets the Watchdog every minute. If the

timeout is more than 1 minute, BMC will reset.

- When entering the flash mode, set watchdog time to 20 mins, if timeout BMC will reset automatically. When flashing image starts, the watchdog will update to 20 mins, if timeout BMC will reset automatically.

8.12.2 Software Watchdog

BMC regularly detects the working status of internal services. When the progress is abnormal, BMC will restart the corresponding service:

- IPMI Server
- KVM Server
- Virtual Media Server

8.13 LED

The system provides LEDs to indicate the health of the system.

Table 8-28 LEDs Indicating the Health of the System

LED name	**Color**	**Status**	**Description**
SYS LED	Red	OFF	1.When system is off, SYS LED is OFF. 2.System works fine, SYS LED is OFF.
SYS LED	Red	ON	The following CPU events occur: 1. CPU IERR 2. CPU Thermal Trip 3. PCIE Error
SYS LED	Red	BLINK	The following warning about CPU appears: Processor Automatically Throttled
Power LED	Yellow	ON	Power plugged in, but not powered on
Power LED	Green	ON	1. Power on 2. Power button is pressed
BMC Heartbeat	Green	BLINK	BMC status OK
BMC Heartbeat	Green	ON/OFF	BMC error
DIMM Error	Red	ON	DIMM ECC or uncorrectable ECC occurred
PSU Error	Red	ON	PSU sensors error
FAN Error	Red	ON	Fan sensors error
CPU Hot	Red	ON	CPU Proc Hot PIN detected

8.14 BMC Network

8.14.1 LAN Interface

BMC usually supports an LAN controller dedicated to BMC and an LAN controller shared for both BMC and system.

- Maximum bandwidth: Dedicated NIC – 1000M, Shared NIC – 100M.
- BMC network interface compatibly supports IPV4 and IPV6, supports automatic access or IP address manual setting, and MAC address is stored in the EEPROM.
- Support VLAN.
- By default, IPMI LAN channels are assigned as below:

Table 8-29 BMC LAN Interface

Channel ID	Interface	Support Sessions
1h	Primary LAN (eth1)	Yes
8h	Secondary LAN (eth0)	Yes

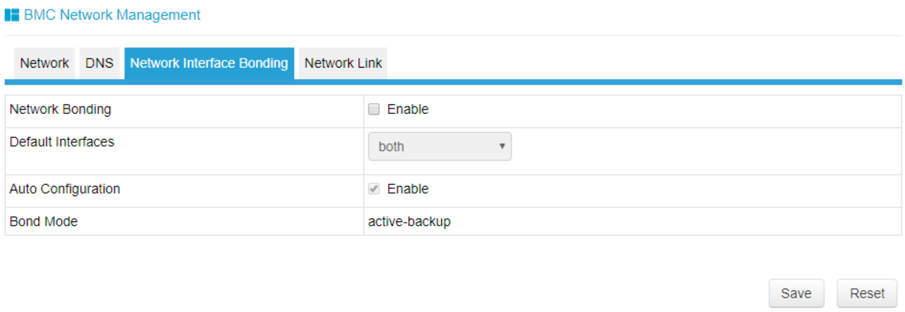
- BMC network interface supports enable/disable, enabled by default.

8.14.2 BMC Network Bonding

Bonding feature provides a method for aggregating multiple network interfaces into a single logical bonded network interface. Although multiple network interfaces are bonded, only one is available at a time. In run-time, the netif_carrier (network link state) is monitored by polling periodically.

- Bonding function is disabled by default, users can enable it in WEB GUI or IPMI CMD.
- Only support Active-backup bonding mode. Default bonding on both NICs (Dedicated and Shared NICs), means network will be working on the NIC plugged with cable. If both NICs plugged with cable before BMC bootup, shared NIC will be primary network to be working. If one NIC plugged with cable before BMC bootup, then anther plugged later, the first NIC will be working.
- After bonding, bonding interface uses shared NIC’s MAC to access network, including bonding to dedicated or shared NIC.

In WEB GUI, go to page “BMC Settings->BMC Network->Network Interface Bonding” to check and configure bonding function.



Network Bonding	□ Enable
Default Interfaces	both
Auto Configuration	☑ Enable
Bond Mode	active-backup

Figure 8-36 Network Bonding

Network Bonding: Enable/Disable the Network Bonding. If VLAN is enabled, Network Bonding cannot be enabled.

Default Interface: Select the default network interface.

Auto Configuration: Enable/Disable Auto Configuration.

If Auto Configuration is disabled, then interface service can be configured via IPMI command.

If Auto Configuration is enabled, then all services will restart automatically.

Bond Mode: Display the current bond mode. (This field is read-only.)

8.14.3 NCSI

NC-SI ("Network Controller Sideband Interface") is an electrical interface and protocol defined by the Distributed Management Task Force (DMTF), which enables the connection of a Baseboard Management Controller (BMC) to a set of Network Interface Controllers (NICs) in server computer systems for the purpose of enabling out-of-band remote manageability. It mainly includes: a management controller (MC), one or more (support up to 4 NCSI electrical characteristics) network controllers (NC). The network controller, on the one hand, connects the external network interface to the internal host interface, and on the other hand, there is an out-of-band interface between the management controllers.

The network management module structure of the server is shown as bellow.

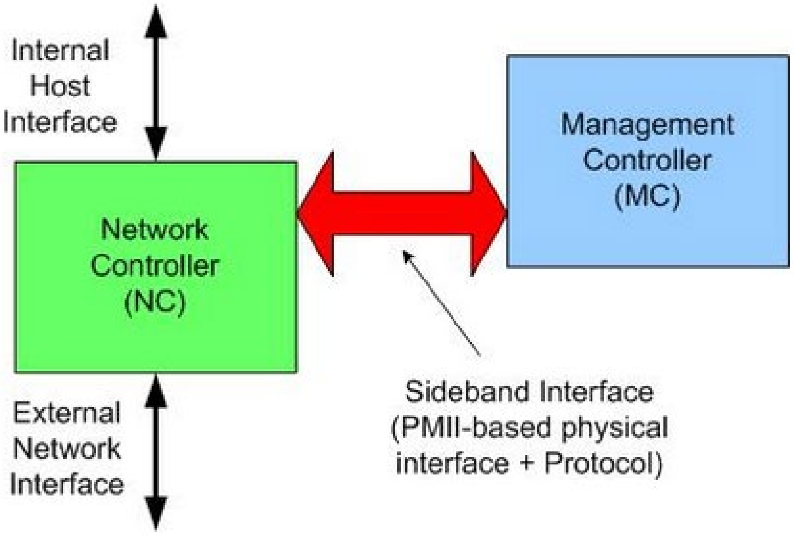

Internal Host Interface
Network Controller (NC)
Management Controller (MC)
External Network Interface
Sideband Interface (PMII-based physical interface + Protocol)

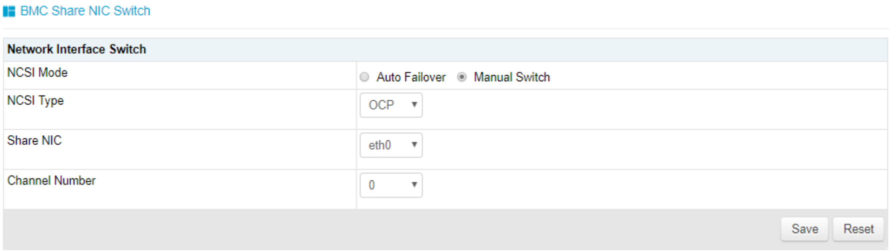
Figure 8-37 Network Management Module Structure

8.14.3.1 Shared NIC Switch

Normally BMC supports two or more NCSI NICs, and only allows one NIC on NCSI bus. If it needs to switch NCSI to anther NIC, user should set in Web GUI.

Supported NCSI cards on PURLEY platform, include onboard NIC, PHY card, OCP A/B/C card, Inspur designed and NCSI-supported PCIE NIC. Different projects support one or more NCSI cards.

Login Management Web GUI, enter “BMC Settings > BMC Shared NIC Switch”, as shown below.



BMC Share NIC Switch

Network Interface Switch	
NCSI Mode	○ Auto Failover ● Manual Switch
NCSI Type	OCP
Share NIC	eth0
Channel Number	0

Figure 8-38 BMC Shared NIC Switch

NCSI Type: Select NIC type you wanted to switch to, then click Save. The available types are “PHY”, “OCP” and “PCIE”.

8.14.3.2 NCSI Auto-Failover

Normally, NCSI NIC has two or more ports, and BMC supports Auto-Failover to switch to other port when working port link is disconnected.

Default NCSI mode is Manual Switch to port0.

NCSI Failover setting, as shown in figure "BMC Shared NIC Switch".

NCSI Mode: Select the supported NCSI mode. The available modes are "Auto Failover" and "Manual Switch".

BMC Shared NIC: Select the port of shared NIC. The available port is eth0.

Channel Number: Select the channel number of the selected NIC. Channel 0, 1, 2, or 3 can be selected.

8.15 Users

BMC supports multiple types of users, including IPMI, WEB, BMC OS and SNMP users.

- BMC supports unified user management mechanism to manage IPMI, WEB and BMC OS users. Users created by IPMI or WEB will have IPMI, WEB and BMC OS user privilege. As BMC OS user, it only has common user privilege, without root user privilege.
- Sysadmin is BMC OS root user, it only has BMC OS root privilege, and cannot access IPMI and WEB.
- SNMP user is used for SNMP Get/Set.

8.15.1 IPMI/WEB/BMC OS Unified User

- BMC supports IPMI 2.0 user model. Unified user could be created by IPMI CMD or Web GUI.
- Up to 16 users are supported.
- The 16 users can be assigned to any channel, including dedicated LAN and NCSI LAN.
- All of the created users can login simultaneously.
- The available user privilege levels are Administrator, Operator, User, No Access.

Table 8-30 IPMI Users

User ID	User Name	Password	Status	Default Privilege	Characteristics
1	admin	admin	Enabled	Administrator	User Name fixed(cannot be changed), password can be changed
2 - 16	undefined	undefined	Disabled	Administrator	User Name/Password can be changed

8.15.1.1 User Security

Username

- User Name is a string of 1 to 16 alpha-numeric characters, including '-','_'and'@'.
- It must start with an alphabetical character.

- It is case-sensitive.
- Special characters ‘,’ (comma), ‘.’ (period), ‘:’ (colon), ‘;’ (semicolon), ‘ ‘ (space), ‘/’ (slash), ‘\\’ (backslash), ‘(‘ (left bracket) ,’)’ (right bracket) and so on are not allowed.

Password Authentication

- Password encryption scheme: 64Bit Blowfish. Password is encrypted to store in BMC flash.

Password Complexity

- When password complexity check is disabled, password must be 1-16 characters long.
- When password complexity check is enabled, password must include special characters, uppercase and lowercase letters, and numbers, 8-16 characters long.
- Complexity check is disabled by default, we strongly suggest you enable this function for security.

Password Expiration

- Password Expiration, the range of the expiration is 0~90 days, and 0 presents forever.
- Disabled by default, we strongly suggest you enable this function for security.
- If enabled, you need change password in expiration time. If password will be expired less than 15 days, when you login Web GUI, Web will alert “Days until password expires: xx”.
- If password expired, you need disable this function in HOST OS by OEM IPMI CMD.
- Password Expiration is only supported in Web GUI.

Password Failed Locking

- Login Fail Retry Count: The retry count should be a number between 0 and 5.
- Lock Time: The range of the time is 5 ~ 60 minutes.
- If login failed time reaches Login Fail Retry Count, Web will alert “Input times of wrong password exceeds the limit, user is locked, please retry later!”, and the user will be locked for Lock Time.
- Disabled by default, we strongly suggest you enable this function for security.
- Password Failed Locking is only supported in Web GUI.

Password History Record

- Password History Records: The range is 0 ~ 5.
- Disabled by default. If enabled, you could not set password same to Password History Records (last N passwords).
- Password History Record is only supported in Web GUI.

8.15.2 BMC System Root User

System root user in BMC Linux OS, can be used to access BMC by ssh or telnet.

User name: sysadmin (Fixed, cannot be changed)

Default password: superuser

8.15.2.1 User Security

Username and Password Security

- Username is fixed, cannot be changed.

- Password must be at least 8 characters long.

- Password must include special characters, uppercase/lowercase letters and numbers.

- White space is not allowed.

- No more than 64 characters.

8.15.3 SNMP User

SNMP user is used to support SNMP Get/Set.

- Default read community: cmccread and inspur@0531
- Default write community: cmccwrite
- SNMPV3 supports user authentication, supported authentication algorithm is SHA and MD5;
- SNMPV3 supports user privacy , supported privacy algorithm is DES and AES;
- Default SNMPV3 user is sysadmin, authentication algorithm is MD5, authentication password is rootuser; privacy algorithm is DES, privacy password is rootuser.

8.15.3.1 User Security

- SNMPV3 supports user authentication, supported authentication algorithm is SHA and MD5;
- SNMPV3 supports user privacy, supported privacy algorithm is DES and AES.

8.15.4 User Privilege

8.15.4.1 User Privilege for IPMI

BMC has two ways to receive IPMI CMD, out-band and in-band.

- Out-band mode means sending IPMI CMD to BMC by LAN, BMC will authenticate user and password.

- In-band mode means sending IPMI CMD in HOST OS. In this mode, IPMI CMD does not need to authenticate user and password, because he will get the highest privilege if someone accesses the HOST OS. So if the user forgets password or password expires, this is a way to change password or disable password security rules.

Please refer to IPMI 2.0 Spec, Appendix G - Command Assignments. Common privilege as below:

Table 8-31 User Privilege for IPMI

User Privilege	Supported Operation
Administrator	Write/Read
Operator	Read Only
User	Read Only
No Access	Non

8.15.4.2 User Privilege for Management Web GUI

Only IPMI/WEB/BMC OS Unified User supports Web GUI.

Table 8-32 User Privilege for Management Web GUI

Menu	Subdirectory	N	U	O	A
Information	System Information	NA	RO	RO	RW
	History Record	NA	RO	RO	RW
Remote Control	Console Redirection	NA	NA	NA	RW
	Locate Server	NA	NA	NA	RW
	Remote Session	NA	RO	RO	RW
	Virtual Media	NA	RO	RO	RW
	Mouse Mode	NA	RO	RO	RW
Power and Fan	Power Supply Monitor	NA	RO	RO	RW
	Server Power Control	NA	RO	RO	RW
	Power Peak	NA	RO	RO	RW
	Fan Speed Control	NA	RO	RO	RW
BMC Setting	BMC Network	NA	NA	RO	RW
	Services	NA	RO	RO	RW
	NTP	NA	RO	RO	RW
	SMTP	NA	NA	NA	RW
	Alerts	NA	NA	RO	RW
	BMC Share NIC Switch	NA	NA	NA	RW
	BIOS Boot Options	NA	RO	RO	RW

Logs	System Event Log	NA	RO	RO	RW
	BMC System Audit Log	NA	RO	RO	RW
	Black Box Log	NA	NA	RO	RW
	Event Log Setting	NA	RO	RO	RW
	BMC System Audit Log Setting	NA	RO	RO	RW
Fault Diagnosis	BMC Self-inspection Result	NA	RO	RO	RW
	BMC Recovery	NA	RO	RO	RW
	Capture Screen	NA	NA	NA	RW
	Host POST Code	NA	RO	RO	RW
Administrator	User Administration	NA	NA	RO	RW
	Security	NA	RO	RO	RW
	Dual Image configuration	NA	NA	NA	RW
	Dual Firmware Update	NA	NA	NA	RW
	BIOS FW Update	NA	NA	NA	RW
	CPLD Update	NA	NA	NA	RW
	PSOC Update	NA	NA	NA	RW
	Restore Factory Default	NA	NA	NA	RW

⚠ Note

N = No Access Privilege level

U = User Privilege level

O = Operator Privilege level

A = Administrator Privilege level

RW = Support Read and Write operation

RO = Support Read operation only

For “Operator” and “User” privilege, if with RO attribute, the settings are visible, but the input fields and buttons are disabled, so users cannot modify the settings; if with NA attribute, the settings are invisible and no operation can be taken.

When “No Access” privilege cannot login Web GUI.

8.15.4.3 User Privilege for Smash-Lite

Table 8-33

CMD	Sub CMD	N	U	O	A	R
ipconfig	get	NO	YES	YES	YES	YES
	set	NO	NO	NO	YES	YES
sensor	get	NO	YES	YES	YES	YES
fru	get	NO	YES	YES	YES	YES
	set	NPO	NO	NO	YES	YES
chassis	get	NO	YES	YES	YES	YES
	set	NO	NO	NO	YES	YES
user	get	NO	YES	YES	YES	YES
	set	NO	NO	NO	YES	YES
mc	get	NO	YES	YES	YES	YES
	set	NO	NO	NO	YES	YES
fan	get	NO	YES	YES	YES	YES
	set	NO	NO	NO	YES	YES
psu	get	NO	YES	YES	YES	YES
	set	NO	NO	NO	YES	YES
password	get	NO	NO	NO	NO	YES
sol	get	NO	NO	NO	YES	YES
id	set	NO	YES	YES	YES	YES
register	get	NO	NO	NO	YES	YES
	set	NO	NO	NO	YES	YES
diagnose	get	NO	NO	NO	YES	YES
diaglog	get	NO	NO	NO	NO	YES

⚠ Note

N = No Access Privilege level of Unified User

U = User Privilege level of Unified User

O = Operator Privilege level of Unified User

A = Administrator Privilege level of Unified User

R = Root user - sysadmin of BMC OS

YES = Support

NO = Not Support

8.16 Protocol and Ports

BMC supports network connection manager library to configure networking services configuration in run-time. RCMP+, HTTP/HTTPS, KVM, CD-MEDIA, FD-MEDIA, HD-MEDIA, SSH, TELNET and SOLSSH services are supported so far. Users can enable or disable theses services, configure communication port, session timeout value of the service and the maximum number of allowed sessions for the services.

Table 8-34 Protocols and Ports

Service	Usage	Default State	Non-Security Port	Security Port	Default Port	Timeout(s)	Max Session
RMCP+	IPMI	Enable	623	N/A	N/A	1800	20
HTTP/HTTPS	Web GUI	Enable	80(Http)	443(Https)	443(Https)	1800	20
KVM	Console Redirection	Enable	7578	7582	7578	1800	4
cd-media	Virtual Media	Enable	5120	5124	5120	N/A	4
fd-media	Virtual Media	Enable	5122	5126	5122	N/A	4
hd-media	Virtual Media	Enable	5123	5127	5123	N/A	4
Ssh	ssh	Disable	N/A	22	22	600	N/A
telnet	telnet	Disable	23	N/A	23	600	N/A
solssh	sol by ssh	Enable	52123	N/A	N/A	60	N/A

⚠ Note1: Http/Https (WEB) Timeout, if there is no web request in Timeout, web session will be deleted, and new web request will not respond. If the web page has no auto update, it will be logged out when you switch pages or refresh the page after timeout.

Note2: Telnet is a non-security protocol, if not used, we suggest you disable it.

Fixed protocols can not be configured.

Table 8-35 Fixed Protocols

Service	Usage	State	Port
SNMP	SNMP Get/Set	Enable	161
syslog	syslog	Enable	514
Websockify	KVM on HTML5	Enable	9666
Websockify	Virtual Media on HTML5	Enable	9999
srvloc	Sever location	Enable	427
smux		Enable	199

8.17 Time and NTP

BMC supports that system describes instants in time. It's defined as the number of seconds that have elapsed since 00:00:00 1970/01/01 and the time can be referenced as timestamp for other BMC application.

By interface such as WEB UI, users are able to get current system date and time information, or configure date and time, or synchronize date and time through NTP.

Table 8-36 Time and NTP

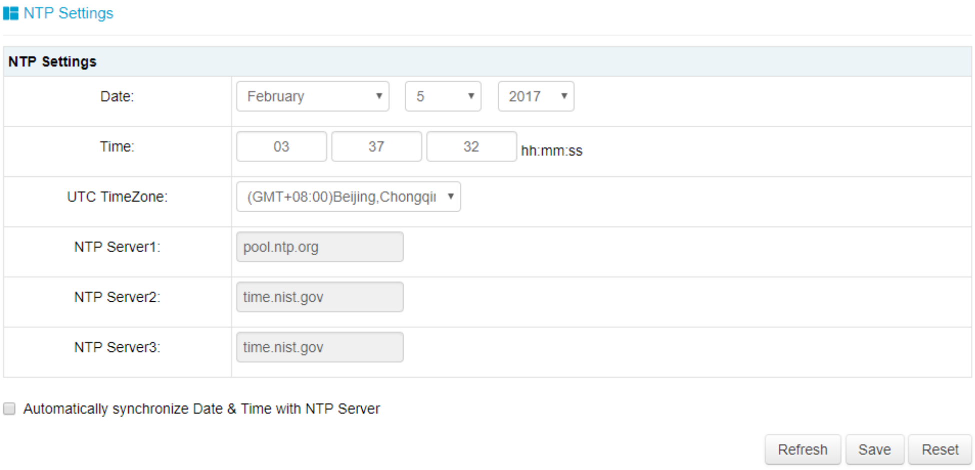
Mode	State	UTC Timezone	NTP Server1	NTP server2	NTP Server3
Manual	Disable	N/A	N/A	N/A	N/A
NTP	Enable	GMT+/-0	pool.ntp.org	time.nist.gov	time.nist.gov

Time Synchronization

- BMC will synchronize time with ME after BMC running.
- BIOS will synchronize time to BMC when beginning of BIOS POST.

If NTP is enabled and NTP servers are accessible, BMC will synchronize time with NTP servers per hour.

Page "BMC Settings->NTP" in Web GUI displays the current BMC time and NTP settings.



NTP Settings

NTP Settings	
Date:	February ▾ 5 ▾ 2017 ▾
Time:	03 37 32 hh:mm:ss
UTC TimeZone:	(GMT+08:00)Beijing,Chongqi ▾
NTP Server1:	pool.ntp.org
NTP Server2:	time.nist.gov
NTP Server3:	time.nist.gov

☐ Automatically synchronize Date & Time with NTP Server

Figure 8-39 NTP

8.18 BIOS and BMC

BIOS and BMC cooperate very closely in the server. BIOS uses IPMI command to communicate with BMC by means of KCS interface on LPC bus.

BIOS provides following features to BMC.

- Sync Host RTC time with BMC by “Set SEL Time Command”.
- Provide BMC information and configure BMC in BIOS Setup Menu.
- Provide System Inventory information, like CPU and DIMM to BMC.

BMC provides following features to BIOS.

- FRB2 supported by means of IPMI Watchdog Timer Command (Please refer BMC Watchdog Chapter)
- BIOS firmware update and ME firmware update
- BIOS Setup Menu Configuration
- SEL repository device for system event logging
- BIOS Port80 POST code redirection to certain BMC GPIO group
- NMI to PCH, Non Maskable Interrupt. The highest priority interrupt in the system, after SMI. This interrupt has traditionally been used to notify the operating system fatal system hardware error conditions, such as parity errors and unrecoverable bus errors. It is also used as a Diagnostic Interrupt for generating diagnostic traces and ‘core dumps’ from the operating system.

The AST2500 SOC also acts as a Super I/O (SIO), which provides system serial port to host. When SOL is activated, BMC redirects the System UART to BMC UART to reach SOL feature. For details, please refer to “Serial over LAN” chapter.

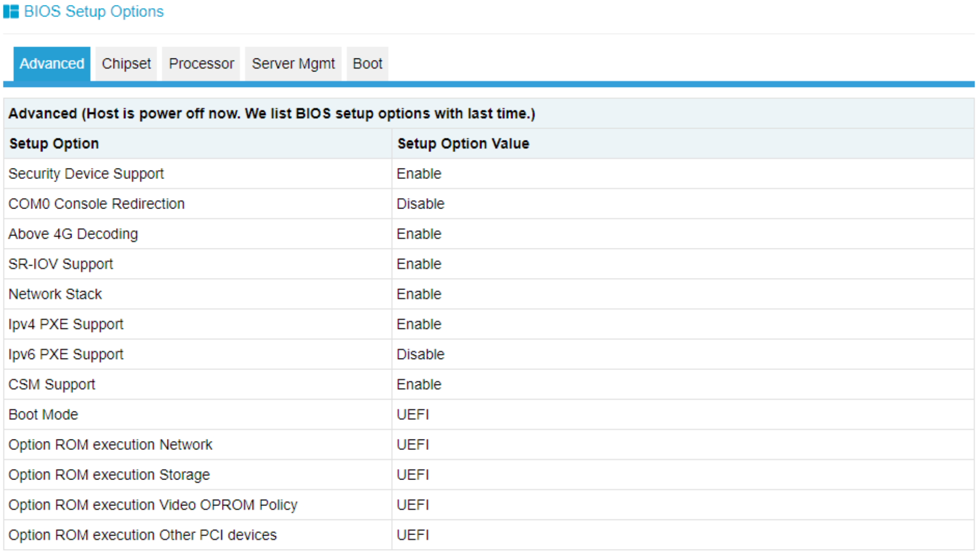
⚠ Note: The LPC interface to the host is used for SIO and BMC communication. The LPC addressing of SIO and BMC could be different. For example, the BMC LPC addressing is 0x2E, and the SIO addressing is 0x4E.

8.18.1 BIOS Setup Options

BMC supports BIOS Setup Option getting and setting.

- BIOS sends BIOS Setup Options to BMC When BIOS POST completes.
- Users can use IPMI OEM CMD to change setup option value. BIOS will update setup option after next system restart.

Page “Information-> BIOS Setup Options” in Web GUI displays BIOS Setup Options.



Advanced (Host is power off now. We list BIOS setup options with last time.)

Setup Option	Setup Option Value
Security Device Support	Enable
COM0 Console Redirection	Disable
Above 4G Decoding	Enable
SR-IOV Support	Enable
Network Stack	Enable
Ipv4 PXE Support	Enable
Ipv6 PXE Support	Disable
CSM Support	Enable
Boot Mode	UEFI
Option ROM execution Network	UEFI
Option ROM execution Storage	UEFI
Option ROM execution Video OPROM Policy	UEFI
Option ROM execution Other PCI devices	UEFI

Figure 8-40 BIOS Setup Options

8.18.2 BIOS Boot Options

BMC supports BIOS startup options, including timeliness and startup options.

- BMC must restart within 60 seconds, otherwise the BIOS startup option action will be invalid.
- Timeliness: Selectable timeliness is only used for the next boot or applies to all boot.
- Startup options:

■ No override

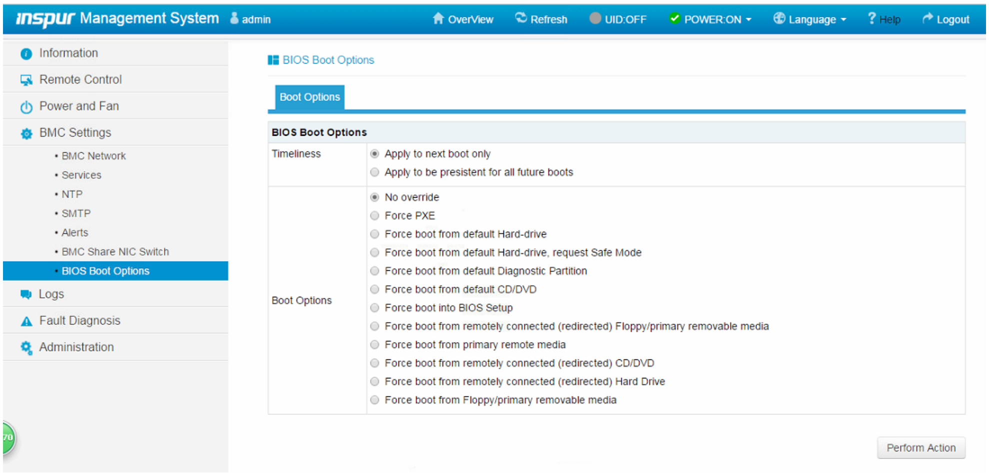
■ Force PXE

■ Force boot from default Hard-drive

■ Force boot from default CD/DVD

■ Force boot into BIOS Setup

Enter “BMC settings->BIOS Boot Options” page to check and set BIOS Boot Options.



BIOS Boot Options

Timeliness
● Apply to next boot only
○ Apply to be presistent for all future boots

Boot Options
● No override
○ Force PXE
○ Force boot from default Hard-drive
○ Force boot from default Hard-drive, request Safe Mode
○ Force boot from default Diagnostic Partition
○ Force boot from default CD/DVD
○ Force boot into BIOS Setup
○ Force boot from remotely connected (redirected) Floppy/primary removable media
○ Force boot from primary remote media
○ Force boot from remotely connected (redirected) CD/DVD
○ Force boot from remotely connected (redirected) Hard Drive
○ Force boot from Floppy/primary removable media

Figure 8-41 Boot Option

8.19 Storage

Server storage subsystem generally consists of RAID and SAS hard disks. BMC physically interacts with the RAID and SAS controllers through I2C to obtain information such as controllers, disks, and arrays, and to set RAID.

Table 8-37 Currently Supported RAID and SAS

Model	Type	Manufacturer	Speed(G)	Firmware Version	Configuration of RAID under WEB
9361-8i	RAID	Broadcom	12	ALL	Supported
3108	RAID	Broadcom	12	ALL	Supported
3008 IT	SAS	Broadcom	12	14.00.02.00	Not Supported
3008 IR	SAS	Broadcom	12	14.00.02.00	Not Supported
3008 iMR	RAID	Broadcom	12	ALL	Supported
9305-16i	SAS	Broadcom	12		Not supported
9361-16i	RAID	Broadcom	12		Supported
2208-8i	RAID	Broadcom	6	X	Not Supported
9364-8i	RAID	Broadcom	12	ALL	Supported
8060	RAID	Microsemi	12	33083 and above	Not Supported
9300-8e	SAS	Broadcom	12		Not Supported
9305-24i	SAS	Broadcom	12		Not Supported
9460-8i	RAID	Broadcom	12		Supported
9460-16i	RAID	Broadcom	12		Supported
9400-8i	SAS	Broadcom	12		Not Supported
9400-16i	SAS	Broadcom	12		Not Supported
9440-8i	RAID	Broadcom	12		Supported

9440-16i	RAID	Broadcom	12		Supported
3408 IT	SAS	Broadcom	12		Not Supported
3408 iMR	RAID	Broadcom	12		Supported
3508	RAID	Broadcom	12		Supported
3154-8i	RAID	Broadcom	12		Not Supported
HBA1100	SAS	Microsemi	12		Not Supported
SmartHBA2100	SAS	Microsemi	12		Not Supported
3152-8i	RAID	Microsemi	12		Not Supported
3154-8i	RAID	Microsemi	12		Not Supported

Schematic that BMC access RAID/SAS controller:

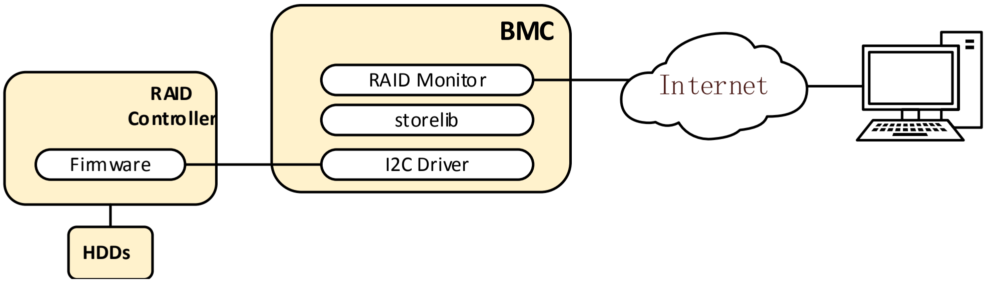


Figure 8-42 Schematic that BMC Access RAID/SAS Controller

Table 8-38 Storage Management Information

Device	Monitored Information
RAID controller	Product Name Serial Number Vendor (ID) SubVendor (ID) Device (ID) SubDevice (ID) Host Interface Firmware Version WebBIOS Version BIOS Version Firmware Package Version Firmware Time Device Interface Chip Temperature (Cel) Unconfigured Good Spin Down Hot Spare Spin Down Cluster Mode NCQ Coercion Mode Alarm Control Smart Copyback Enabled Auto Rebuild SAS Address Port Count Drive Count Virtual Drive Count NVRAM Size (KB) Memory Size (MB)

	Flash Size (MB) Min Strip Size (KB) Max Strip Size (KB) Spin Down Time (Minutes) Rebuild Rate Back Ground Init (BGI) Rate Consistency Check (CC) Rate Reconstruction Rate S.M.A.R.T Polling Cache Flush Interval (s) Spinup Drive Count Spinup Delay Controller BIOS Shield State Supported Maintain PD Fail History Battery Warning
Hard disk	Device ID Enclosure ID Firmware State Media Type Vendor (ID) Product Revision Level Max Speed (Gbps) Temperature (Cel) Raw Size (GB) Media Error Count User Data Block Size (B) Certified Disabled for Removal FW Download Allowed Security Rebuild Locate Copy Back Slot Number Connected Port Power State Device Interface Product ID Vendor Specific Info Negotiated Link Speed (Gbps) SAS Address Coerced size (GB) Predictive Fail Count Emulated Block Size (B) Is Path Broken FDE Capable Emergency Spare Commissioned Hotspare Clear All Data Secure Erase Patrol Read
Array	
Enclosure	Device ID Enclosure is Faulty Slot Count Internal Index Enclosure Type Drive Count

8.20 Server Control

8.20.1 Server Location

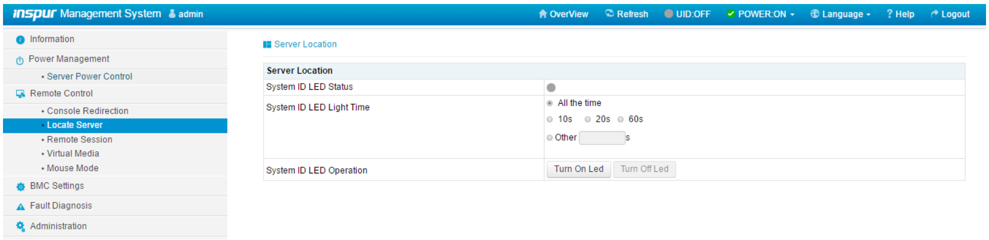
The managed server can be located by means of UID LED.

- Users can control UID LED by BMC IPMI CMD and UID Button separately.
- UID can be turned on/off by UID Button even BMC crashed.

The “Remote Control -> Locate Server” page shows the status of UID.

Turn on UID: Specify the light time period, and click “Turn On Led” button to turn on UID for specified time.

Turn off UID: Click “Turn Off Led” button to turn off UID.



Server Location	
System ID LED Status	●
System ID LED Light Time	◉ All the time ○ 10s ○ 20s ○ 60s ○ Other s
System ID LED Operation	Turn On Led Turn Off Led

Figure 8-43 Server Location

8.20.2 Server Virtual Power Button

This function allows users to power on, off, and reset the managed server via BMC.

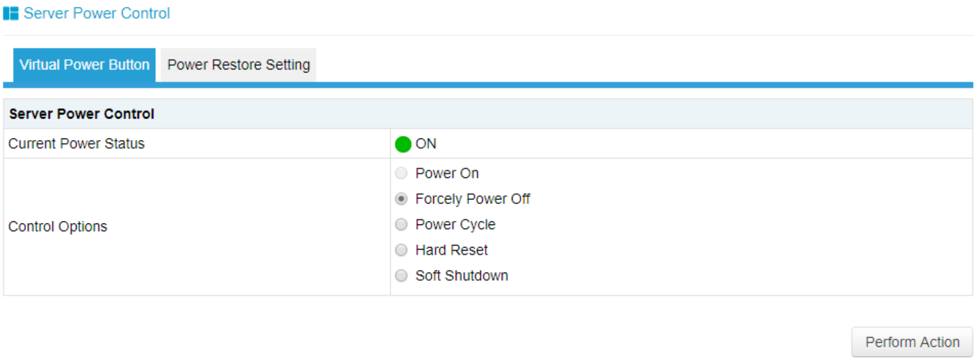
- Power on, same to short time pressing power button.
- Forcedly power off, same to long time pressing power button.
- Power cycle, power off, delay 10s, power on.
- Hard reset, same to short time pressing reset button (if present).
- Soft shutdown, orderly power off, same to short time pressing power button.

Supported:

Web GUI

IPMI command based on IPMI2.0.

Page “Remote Control -> Server Power Control” shows current power status. Users can perform power control actions.



Server Power Control	
Current Power Status	● ON
Control Options	○ Power On ● Forcely Power Off ○ Power Cycle ○ Hard Reset ○ Soft Shutdown

Figure 8-44 Virtual Power Button

8.21 Power Supply and Power Consumption

8.21.1 Power Supply Redundancy

BMC usually supports PSU Redundancy, which means if one or more PSUs cannot normally output power, server will work normally powered by other power supply.

8.21.2 PSU Active Standby

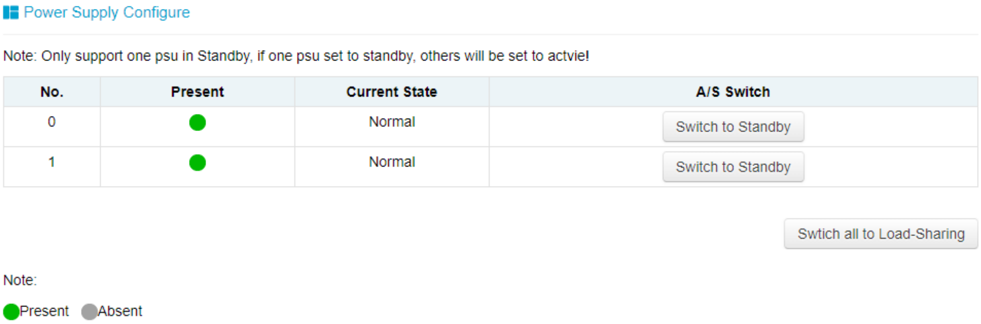
In the case of meeting the normal work, BMC provides a way to manually set the power supply to standby to improve power conversion efficiency.

PSU defaults to Activate-Activate mode, and if it need switch to Active-Standby mode, as the power supply is critical, the work need to do under the guidance of professional engineer.

In the case of meeting business power consumption, reduce part of the power supply by 0.3V, suppress the standby current output by the voltage difference, and the system will be powered by the main power system. The power supply is in a hot standby state, once the main power supply is abnormal, standby power will switch to the main power supply smoothly without affecting the service.

Conditions that standby power switches to the main power:

1. Main power supply is pulled out;
2. Main power supply output voltage is low or no output;
3. Main power supply temperature is too high, input loss, overcurrent, or overvoltage;
4. System power as a percentage of main power supply rated power reaches the upper limit.



Power Supply Configure

Note: Only support one psu in Standby, if one psu set to standby, others will be set to actvie!

No.	Present	Current State	A/S Switch
0	●	Normal	Switch to Standby
1	●	Normal	Switch to Standby

Swtich all to Load-Sharing

Note:

●Present ●Absent

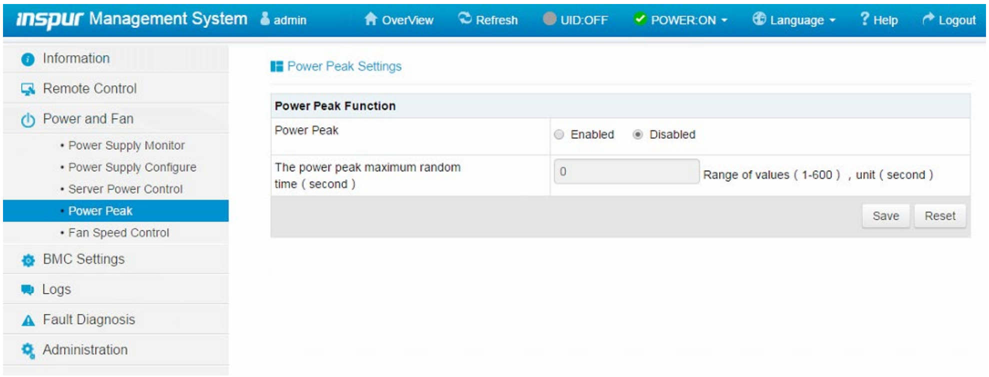
Figure 8-45 PSU Active Standby

8.21.3 Power Peak

Power peak is used to prevent many servers from being started at the same time when first time A/C power is restored, which would cause heavy power loading.

- Power peak can be enabled or disabled. Disabled by default.
- When it is enabled, users can configure the maximum random time.
- BMC will power on server with a random time delay within the time configured.

Click “Power and Fan -> Power Peak” to go to the configuration page.



Power Peak Settings

Power Peak Function	
Power Peak	○ Enabled ● Disabled
The power peak maximum random time (second)	0 Range of values (1-600) , unit (second)

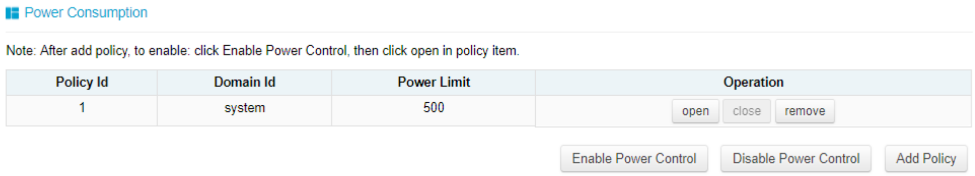
Save Reset

Figure 8-46 Power Peak

8.21.4 Power Limit

BMC provides power cap function, power cap function sets the power limit for the system, and when the system power exceeds this upper limit, Intel ME will slow down the CPU to reduce power consumption. Power cap will affect the server performance, professional maintenance personnel will operate when needed.

Go to page “Power and Fan->Power Consumption” to check and configure.



Power Consumption

Note: After add policy, to enable: click Enable Power Control, then click open in policy item.

Policy Id	Domain Id	Power Limit	Operation
1	system	500	open close remove

Figure 8-47 Power Limits

8.21.5 Power Consumption Statistics and History Record

BMC provides curve-based inlet temperature and power monitoring statistics. Administrators can gain insight into the actual use of electricity and cooling resources through energy monitoring devices. Users can optimize the server's energy savings based on historical data.

Go to page "Power Management-> Power statistics", and this page displays the system current power, CPU total power, total memory power and a specific period of peak power, average power, and the cumulative power consumption.

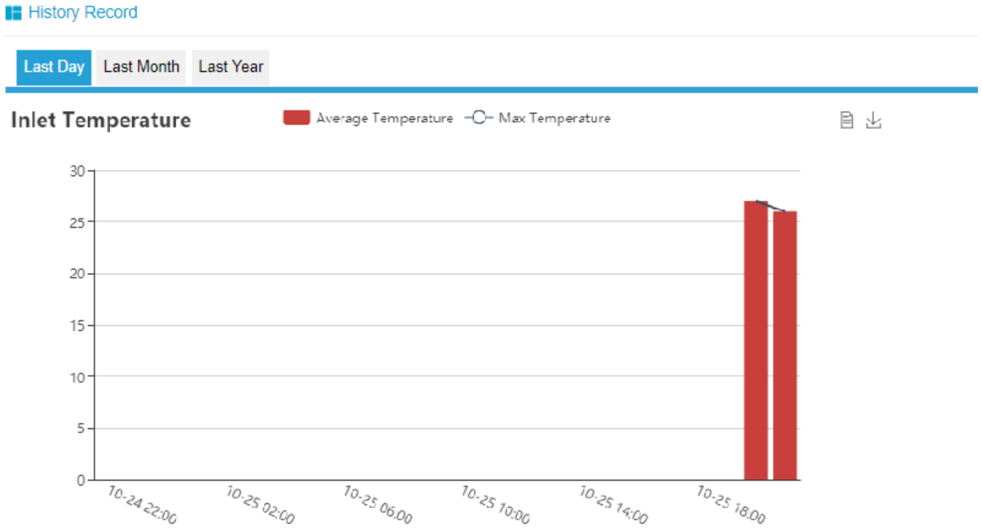
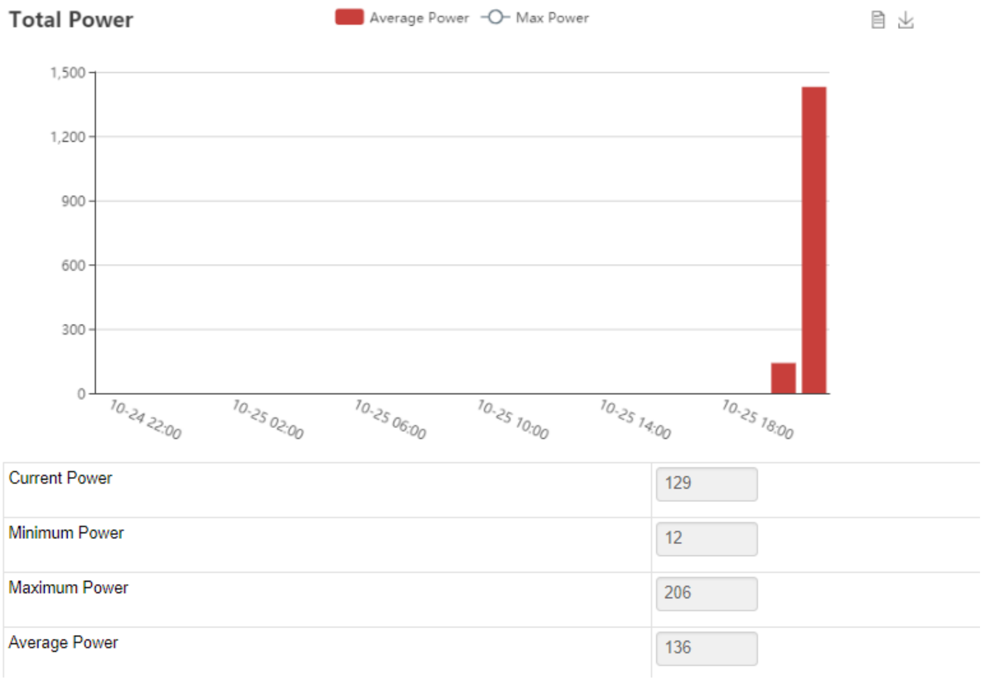


Figure 8-48 Inlet Temperature History Record



Current Power	129
Minimum Power	12
Maximum Power	206
Average Power	136

Figure 8-49 Total Power History Record

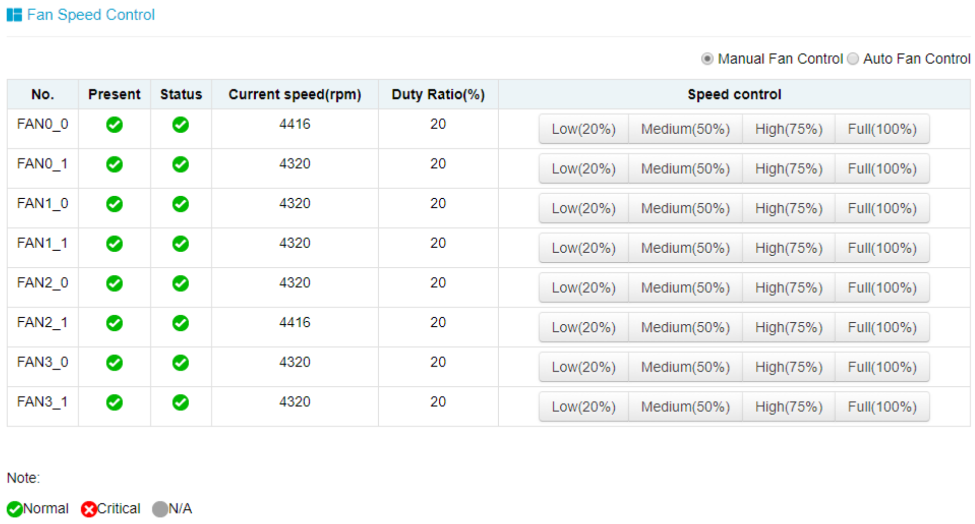
8.22 Fan Speed Control (FSC)

8.22.1 Fan Speed Control

BMC supports Auto Fan Control by default, and the fan module speed is controlled by the algorithm provided by thermal team.

Users can enable Manually Fan Control in Web GUI, if enabled, users can select one of four fan speeds predefined for each fan module. These predefined fan speed are Low, Medium, High and Full.

Click “Power and Fan -> Fan Speed Control” to go to the configuration page. Select Manually Fan Control, and click the fan speed you want. In the Duty Ratio filed, users can see the duty ratio of the fan module. In this page, users can know the presence of the fan module, and their status as well.



Fan Speed Control

● Manual Fan Control ○ Auto Fan Control

No.	Present	Status	Current speed(rpm)	Duty Ratio(%)	Speed control
FAN0_0	✓	✓	4416	20	Low(20%) Medium(50%) High(75%) Full(100%)
FAN0_1	✓	✓	4320	20	Low(20%) Medium(50%) High(75%) Full(100%)
FAN1_0	✓	✓	4320	20	Low(20%) Medium(50%) High(75%) Full(100%)
FAN1_1	✓	✓	4320	20	Low(20%) Medium(50%) High(75%) Full(100%)
FAN2_0	✓	✓	4320	20	Low(20%) Medium(50%) High(75%) Full(100%)
FAN2_1	✓	✓	4416	20	Low(20%) Medium(50%) High(75%) Full(100%)
FAN3_0	✓	✓	4320	20	Low(20%) Medium(50%) High(75%) Full(100%)
FAN3_1	✓	✓	4320	20	Low(20%) Medium(50%) High(75%) Full(100%)

Note:

✓Normal ✗Critical ●N/A

Figure 8-50 Fan Speed Control

8.22.2 Fan Speed Control (FSC) Watchdog

MCU or CPLD will monitor BMC Fan control task by receiving BMC watchdog signal.

If MCU or CPLD cannot receive watchdog signal in 4 Mins, all Fans will be set to full speed to avoid system overheating.

8.23 Firmware Update

8.23.1 BMC Firmware Update

BMC supports dual BMC firmware image. BMC flash contains two images (BMC flash size is 64M, BMC firmware image size is 32M).

Supported update modes:

- WEB update, users login Web GUI and enter flash page to update firmware. This is a sideband mode, it supports Firmware Integrity Checking and preserving configurations. It is a suggested update mode.
- SOCflash tool update, SOCflash tool is used in DOS/Windows/Linux OS. SOCflash will directly erase and overwrite flash with new image without Firmware Integrity Checking. All configuration will be erased. This is an inband mode, users should accept user permission.

8.23.1.1 Firmware Integrity Checking

Each firmware image has a MD5 code calculated by MD5 tool (Hash.exe). Before firmware update, users must check integrity using MD5 tool to make sure the firmware image file is the correct one.

8.23.1.2 Dual image

Dual image means BMC supporting two images in flash, when active image cannot boot, BMC will try another image to boot.

8.23.1.3 WEB Update

BMC firmware update is supported via the Management Web GUI.

- Support hardware watchdog, please refer to “Hardware watchdog” in section “BMC Self Recovery”.

When updating BMC firmware, users can specify which image to update.

- Image-1
- Image-2
- Inactive image
- Both images (Default)

Configurations can be preserved separately. Please refer to section “Restore Factory Default”.

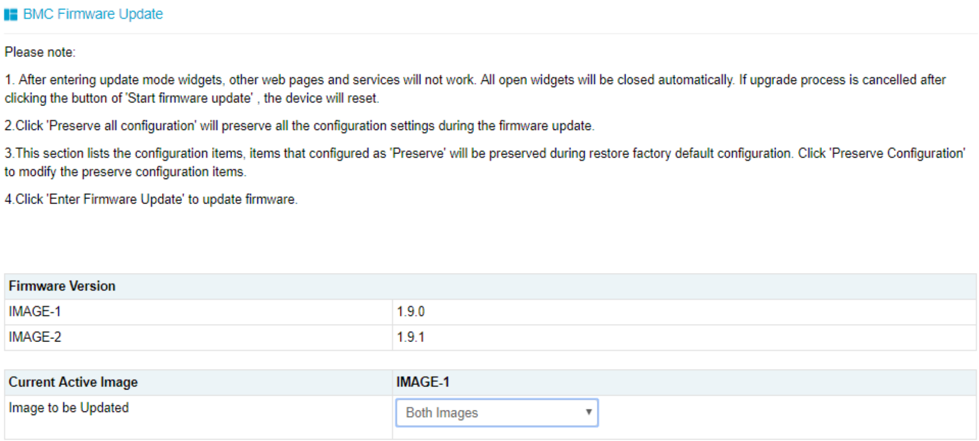
⚠ Note: The firmware upgrade process is a crucial operation. Make sure that the chances of a power or connectivity loss are minimal when performing this operation.

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

It defaults to boot the higher version of the two images. You can change the value from the Web GUI.

Step 1

Go to “Administration->Dual Image Update” page, and select image to update. It defaults to Both Images, which means both image will be updated. If configuration should be preserved, click “Enter Preserve Configuration” to select items that need to be preserved. Click “Enter Update Mode” to go to update page.



BMC Firmware Update

Please note:

1. 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 after clicking the button of 'Start firmware update' , the device will reset.

2.Click 'Preserve all configuration' will preserve all the configuration settings during the firmware update.

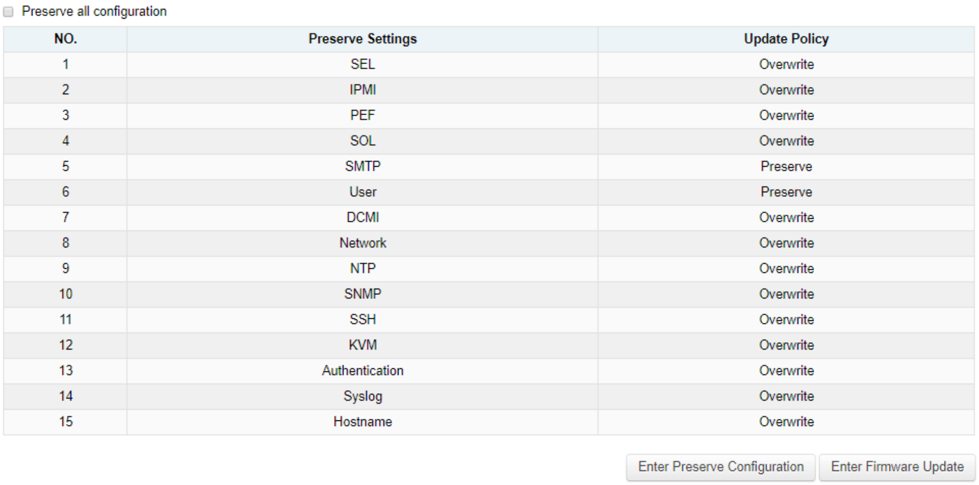
3.This section lists the configuration items, items that configured as 'Preserve' will be preserved during restore factory default configuration. Click 'Preserve Configuration' to modify the preserve configuration items.

4.Click 'Enter Firmware Update' to update firmware.

Firmware Version	
IMAGE-1	1.9.0
IMAGE-2	1.9.1

Current Active Image	IMAGE-1
Image to be Updated	Both Images ▾

Figure 8-51



□ Preserve all configuration

NO.	Preserve Settings	Update Policy
1	SEL	Overwrite
2	IPMI	Overwrite
3	PEF	Overwrite
4	SOL	Overwrite
5	SMTP	Preserve
6	User	Preserve
7	DCMI	Overwrite
8	Network	Overwrite
9	NTP	Overwrite
10	SNMP	Overwrite
11	SSH	Overwrite
12	KVM	Overwrite
13	Authentication	Overwrite
14	Syslog	Overwrite
15	Hostname	Overwrite

Figure 8-52 BMC Update Step 1

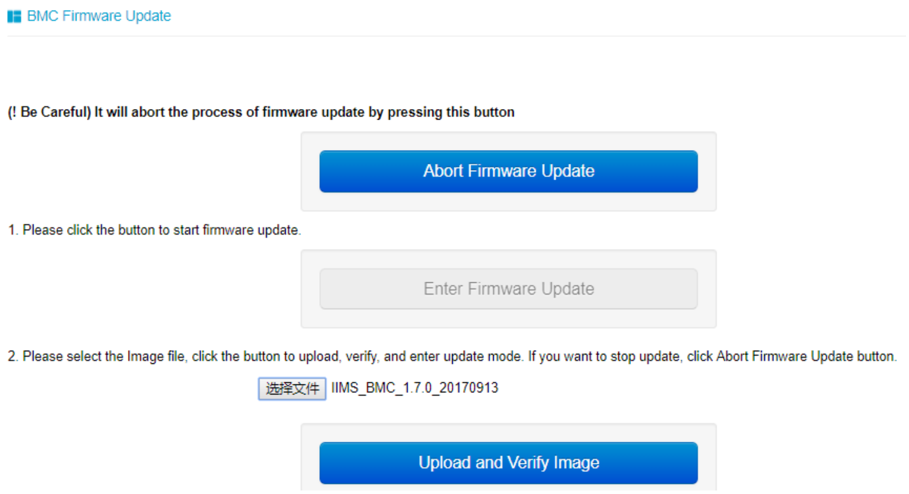
Step 2

Select image file, click Upload button to upload file, BMC will enter flash mode, IPMI service will stop, and then BMC will verify image. Verify:

Size should be 32M.

Verify image integrity, it will make sure this is BMC image.

If the verification fails, BMC will stop flash and restart.



(! Be Careful) It will abort the process of firmware update by pressing this button

1. Please click the button to start firmware update.

2. Please select the Image file, click the button to upload, verify, and enter update mode. If you want to stop update, click Abort Firmware Update button.

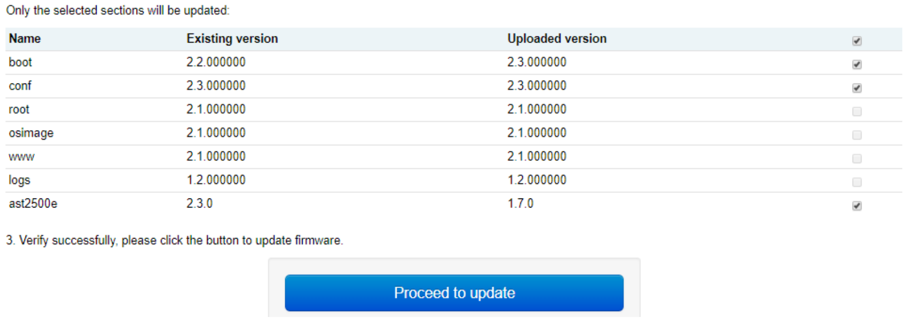
IIMS_BMC_1.7.0_20170913

Figure 8-53 BMC Update Step 2

Step 3

Check image version and current image version, then click “Proceed to Update” button to start update.

Wait for about 15mins (both images), then flash is complete.



Only the selected sections will be updated:

Name	Existing version	Uploaded version	☑
boot	2.2.000000	2.3.000000	☑
conf	2.3.000000	2.3.000000	☑
root	2.1.000000	2.1.000000	□
osimage	2.1.000000	2.1.000000	□
www	2.1.000000	2.1.000000	□
logs	1.2.000000	1.2.000000	□
ast2500e	2.3.0	1.7.0	☑

3. Verify successfully, please click the button to update firmware.

Figure 8-54 BMC Update Step 3

8.23.1.4 SOC Flash Update

SOCflash tool will directly erase and overwrite flash with new image without Firmware Integrity Checking. All configuration will be erased.

To update BMC in Windows/Linux/DOS, enter DOS or Linux shell or Windows cmd line, execute the following CMDs:

socflash if=Imagefile will update the Image1;

socflash if=Imagefile offset=0x2000000 will update the Image2.

8.23.2 BIOS Firmware Update

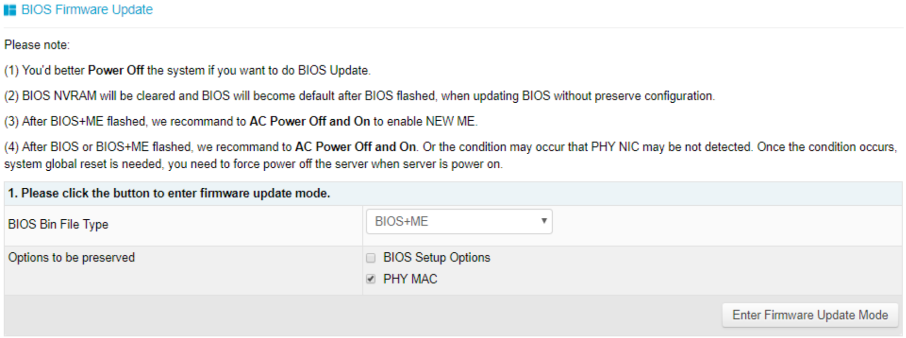
BMC supports BIOS Firmware update via the Management Web GUI.

Intel ME firmware is packaged with BIOS firmware as a single firmware image.

- Support two upgrade modes: “BIOS+ME” and “BIOS Only”.
- Power off the system before performing BIOS firmware update.
- After BIOS firmware update, BIOS NVRAM will be cleared, all BIOS configurations will be reset to defaults.
- If we update both BIOS and ME images, in order to make ME firmware take effort, it is suggested to start the server after AC power off.

Step 1

Login Management Web GUI, enter “Administrator -> BIOS Firmware Update”, as shown below. Select BIOS+ME or BIOS only, BIOS+ME by default. If you want to preserve BIOS setup options, users need select “BIOS Setup Options”. PHY MAC is selected to be preserved by default. Click “Enter Firmware Update Mode” button to enter update mode.



BIOS Firmware Update

Please note:

(1) You'd better **Power Off** the system if you want to do BIOS Update.

(2) BIOS NVRAM will be cleared and BIOS will become default after BIOS flashed, when updating BIOS without preserve configuration.

(3) After BIOS+ME flashed, we recommand to **AC Power Off and On** to enable NEW ME.

(4) After BIOS or BIOS+ME flashed, we recommand to **AC Power Off and On**. Or the condition may occur that PHY NIC may be not detected. Once the condition occurs, system global reset is needed, you need to force power off the server when server is power on.

1. Please click the button to enter firmware update mode.

BIOS Bin File Type	BIOS+ME ▾
Options to be preserved	☐ BIOS Setup Options ☑ PHY MAC

Figure 8-55 BIOS Update Step 1

Step 2

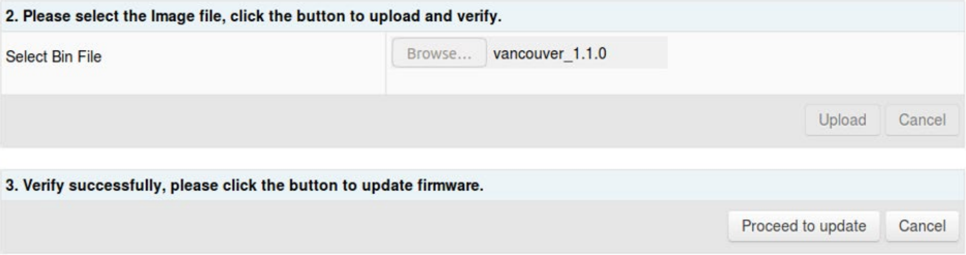
Select image file, and click Upload button to upload file. ME will enter recovery mode, and then BMC will verify the image. Verify:

Size should be 32M.

Verify image integrity, it will make sure this is BIOS image.

If the verification fails, BMC will stop flash and change ME to normal mode.

If the verification succeeds, click “Proceed to Update” button to start update. Wait for about 3mins, then the flash is complete, and ME will enter the normal mode.



2. Please select the Image file, click the button to upload and verify.

Select Bin File — Browse... vancouver_1.1.0

3. Verify successfully, please click the button to update firmware.

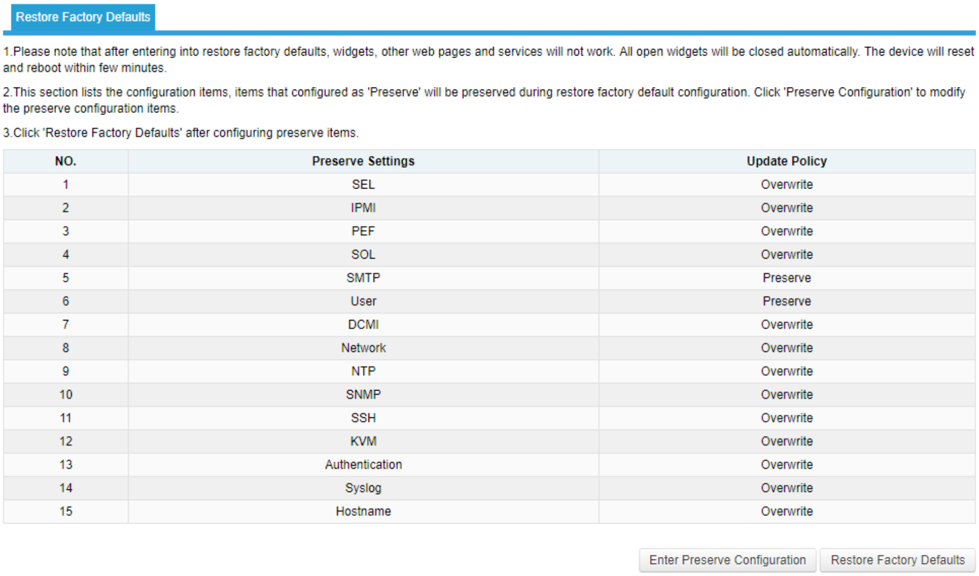
Figure 8-56 BIOS Update Step 2

8.23.3 CPLD FW update

BMC uses JTAG to update CPLD. Support Web GUI update.

8.24 Restore Factory Default

BMC supports to restore factory default in Web GUI. Go to page “Administration->Restore Factory Defaults” to check and configure.



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

2.This section lists the configuration items, items that configured as 'Preserve' will be preserved during restore factory default configuration. Click 'Preserve Configuration' to modify the preserve configuration items.

3.Click 'Restore Factory Defaults' after configuring preserve items.

NO.	Preserve Settings	Update Policy
1	SEL	Overwrite
2	IPMI	Overwrite
3	PEF	Overwrite
4	SOL	Overwrite
5	SMTP	Preserve
6	User	Preserve
7	DCMI	Overwrite
8	Network	Overwrite
9	NTP	Overwrite
10	SNMP	Overwrite
11	SSH	Overwrite
12	KVM	Overwrite
13	Authentication	Overwrite
14	Syslog	Overwrite
15	Hostname	Overwrite

Figure 8-57 Restore Factory Default

⚠ Note: Update policy “Overwrite” means selected items will be overwritten to defaults after clicking “Restore Factory Default” or upgrading BMC; “Preserve” means selected items will be restored after clicking “Restore Factory Default” or upgrading BMC.

Table 39 Restore Factory Default

Table 8-39

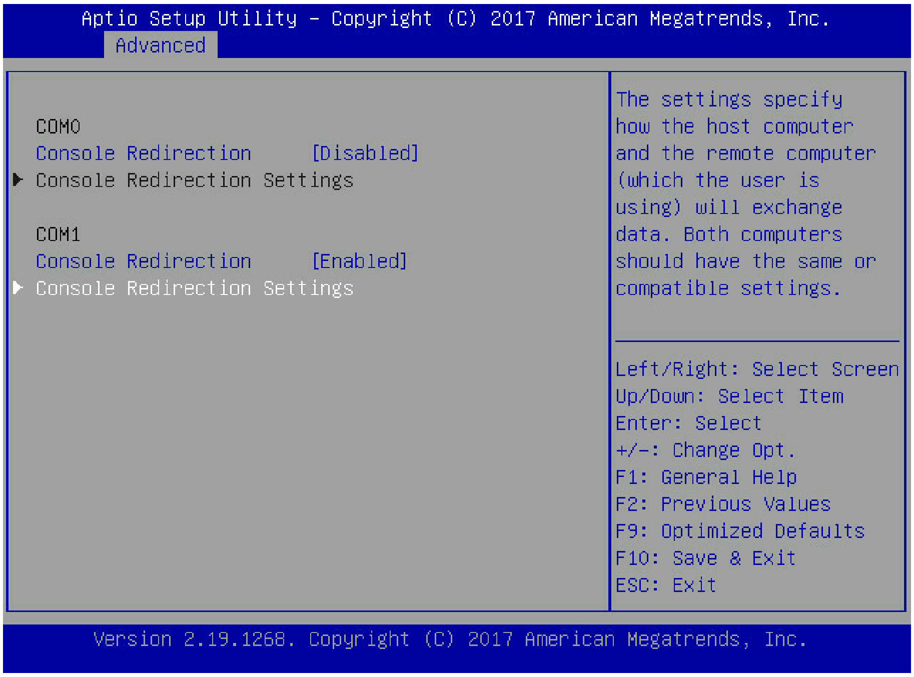
Items	Preserved configuration	Note
SEL	SEL Log	
IPMI	IPMI, including PEF data, SOL data, IPMI user information, SMTP, DCMI data, etc.	
PEF	PEF	Select IPMI option while including this configuration.
SOL	SOL	Select IPMI option while including this configuration.
SMTP	SMTP	Select IPMI option while including this configuration.
User	IPMI User	Select IPMI option while including this configuration.
DCMI	DCMI	Select IPMI option while including this configuration.
Network	BMC Network	
NTP	NTP	
SNMP	SNMP	
SSH	SSH	
KVM	KVM and Virtual Media Devices	
Authentication	Authentication, including LADP and superuser	
Syslog	Syslog	
Hostname	Hostname	

8.25 Serial Over LAN (SOL) and System Serial Log Recording

8.25.1 Serial Over LAN

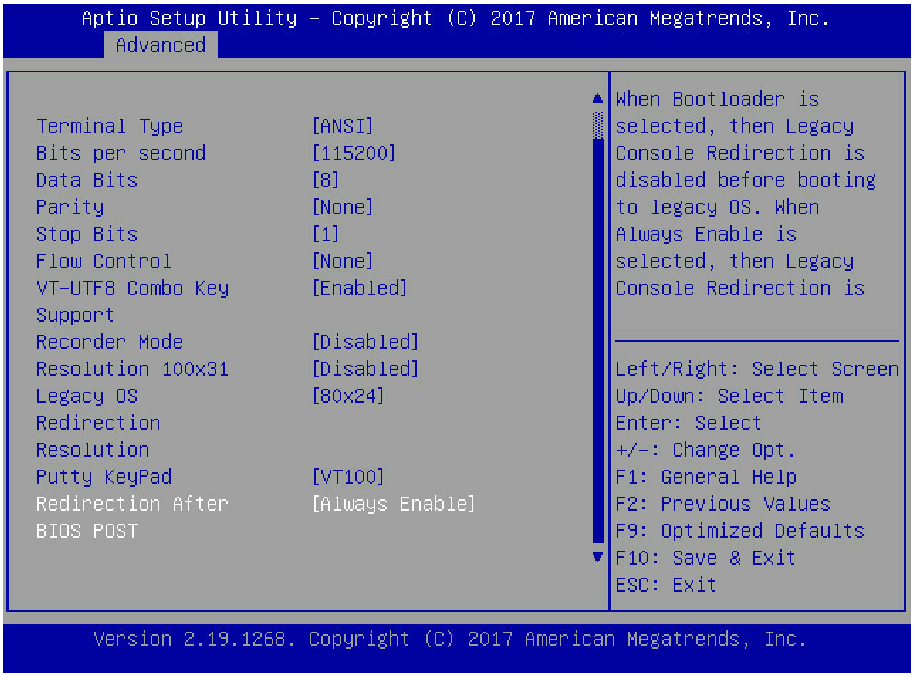
Serial Over LAN (SOL) redirects the system serial port to the remote network client. Users connect to the BMC on the local PC, open the serial port redirection function with the standard IPMI command (sol activate), view the system serial output, and enter the system serial port.

- COM0 and COM1 both support SOL. COM0 port has connector on the motherboard. The COM1 port is dedicated for SOL function.
- SOL is enabled on COM0 (some projects on COM1) by default, users should configure SOL in BIOS Setup (Serial Port Console Redirection), if needed.



```
        Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
                 Advanced

   COM0                                       The settings specify
   Console Redirection      [Disabled]        how the host computer
 ▶ Console Redirection Settings               and the remote computer
                                              (which the user is
   COM1                                       using) will exchange
   Console Redirection      [Enabled]         data. Both computers
 ▶ Console Redirection Settings               should have the same or
                                              compatible settings.

                                              Left/Right: Select Screen
                                              Up/Down: Select Item
                                              Enter: Select
                                              +/-: Change Opt.
                                              F1: General Help
                                              F2: Previous Values
                                              F9: Optimized Defaults
                                              F10: Save & Exit
                                              ESC: Exit

      Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.
```

Figure 8-58 SOL Setting in BIOS



```
        Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
                 Advanced

   Terminal Type            [ANSI]            When Bootloader is
   Bits per second          [115200]          selected, then Legacy
   Data Bits                [8]               Console Redirection is
   Parity                   [None]            disabled before booting
   Stop Bits                [1]               to legacy OS. When
   Flow Control             [None]            Always Enable is
   VT-UTF8 Combo Key        [Enabled]         selected, then Legacy
   Support                                    Console Redirection is
   Recorder Mode            [Disabled]
   Resolution 100x31        [Disabled]        Left/Right: Select Screen
   Legacy OS                [80x24]           Up/Down: Select Item
   Redirection                                Enter: Select
   Resolution                                 +/-: Change Opt.
   Putty KeyPad             [VT100]           F1: General Help
   Redirection After        [Always Enable]   F2: Previous Values
   BIOS POST                                  F9: Optimized Defaults
                                              F10: Save & Exit
                                              ESC: Exit

      Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.
```

Figure 8-59 Default Serial Setting

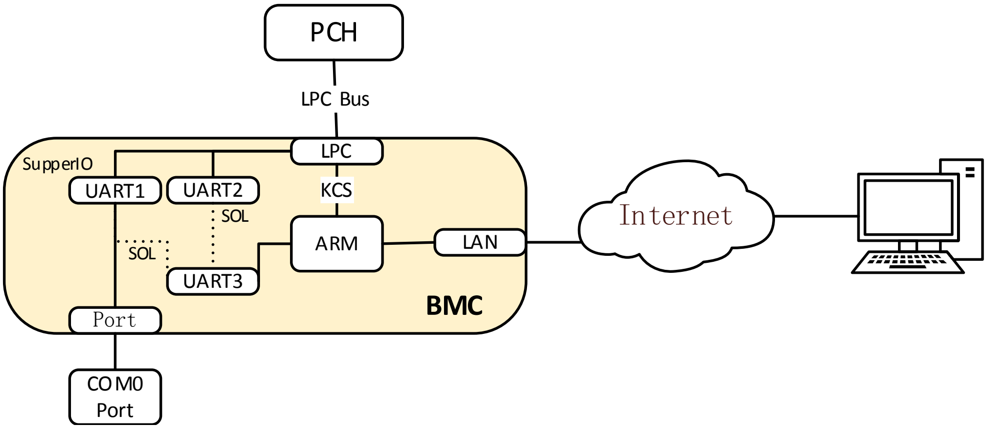


Figure 8-60 SOL Schematic

8.25.2 System Serial Log Recording

BMC can record system serial information. The logs BIOS or OS sends to the serial port will be recorded to the BMC's DDR, and keep up to 2M bytes of system serial logs. When more than 2M, log will loop to store, and the old log content will be deleted. When the system crashes or restarts, system serial log can be exported, and fault information can be used for fault diagnosis.

8.26 Console Redirection (KVM)

Remote KVM redirects the host system's console to user's PC by BMC. Users login BMC and open KVM, then host's screen will be displayed in KVM application. User PC's keyboard and mouse can be used to control server.

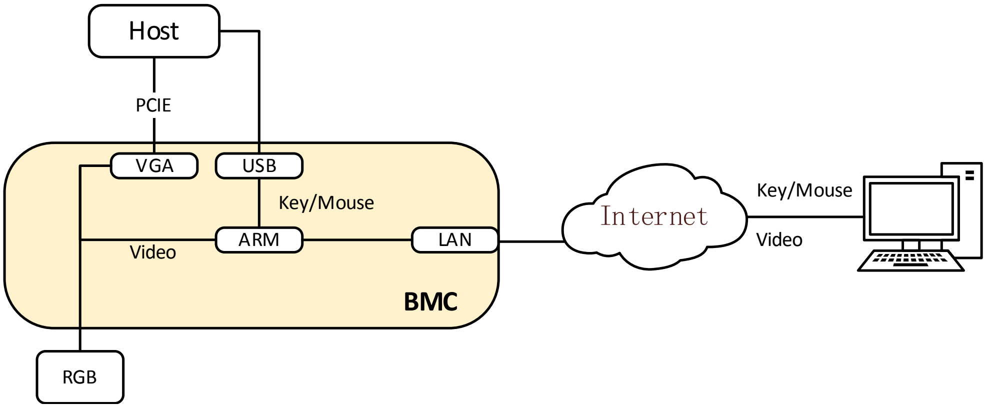
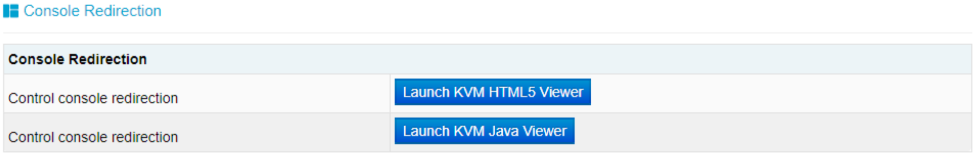


Figure 8-61 KVM Schematic

8.26.1 HTML5 KVM

BMC supports HTML5 KVM, supported on Chrome 58 and above, IE 11 and above. Not depend on JAVA, .NET.

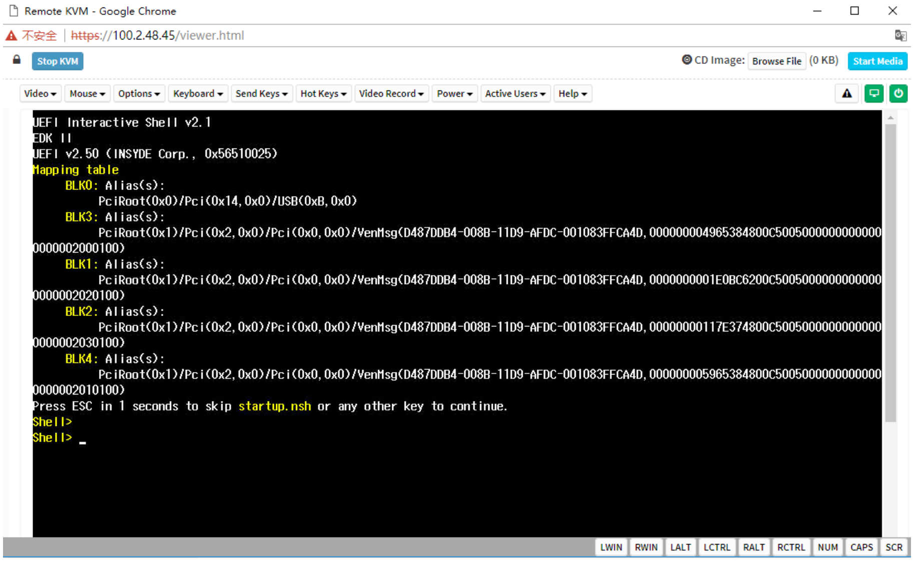
Go to “Remote Control -> Console Redirection” in WEB GUI, click “Launch KVM HTML5 Viewer” to launch HTML5 KVM.



Console Redirection

Console Redirection	
Control console redirection	Launch KVM HTML5 Viewer
Control console redirection	Launch KVM Java Viewer

Figure 8-62 Console Redirection



```
UEFI Interactive Shell v2.1
EDK II
UEFI v2.50 (INSYDE Corp., 0x56510025)
Mapping table
     BLK0: Alias(s):
          PciRoot(0x0)/Pci(0x14,0x0)/USB(0xB,0x0)
     BLK3: Alias(s):
          PciRoot(0x1)/Pci(0x2,0x0)/Pci(0x0,0x0)/VenMsg(D487DDB4-008B-11D9-AFDC-001083FFCA4D,000000004965384800C5005000000000000
0000002000100)
     BLK1: Alias(s):
          PciRoot(0x1)/Pci(0x2,0x0)/Pci(0x0,0x0)/VenMsg(D487DDB4-008B-11D9-AFDC-001083FFCA4D,0000000001E0BC6200C5005000000000000
0000002020100)
     BLK2: Alias(s):
          PciRoot(0x1)/Pci(0x2,0x0)/Pci(0x0,0x0)/VenMsg(D487DDB4-008B-11D9-AFDC-001083FFCA4D,00000000117E374800C5005000000000000
0000002030100)
     BLK4: Alias(s):
          PciRoot(0x1)/Pci(0x2,0x0)/Pci(0x0,0x0)/VenMsg(D487DDB4-008B-11D9-AFDC-001083FFCA4D,000000005965384800C5005000000000000
0000002010100)
Press ESC in 1 seconds to skip startup.nsh or any other key to continue.
Shell>
Shell> _
```

Figure 8-63 KVM Screen

8.26.2 Java KVM

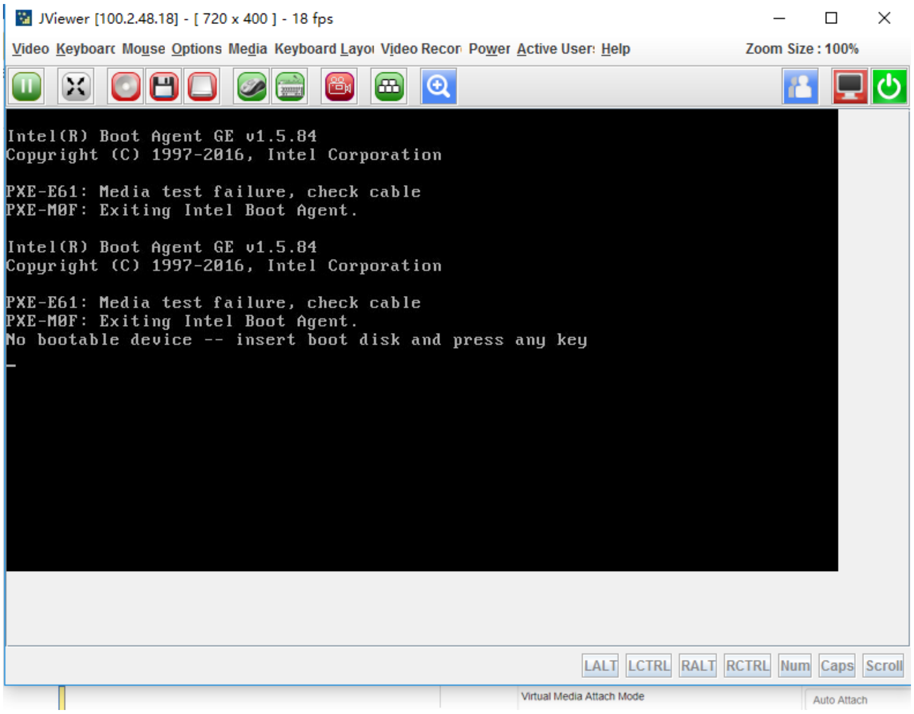
Support Java KVM, users should download and open JNLP (Java Application), and JRE environment should be ready.

Supported JRE version:

jre-7u40 and above;

jre-8u45 and above.

Go to “Remote Control -> Console Redirection” in WEB GUI, click “Launch KVM Java Viewer” to launch Java KVM.

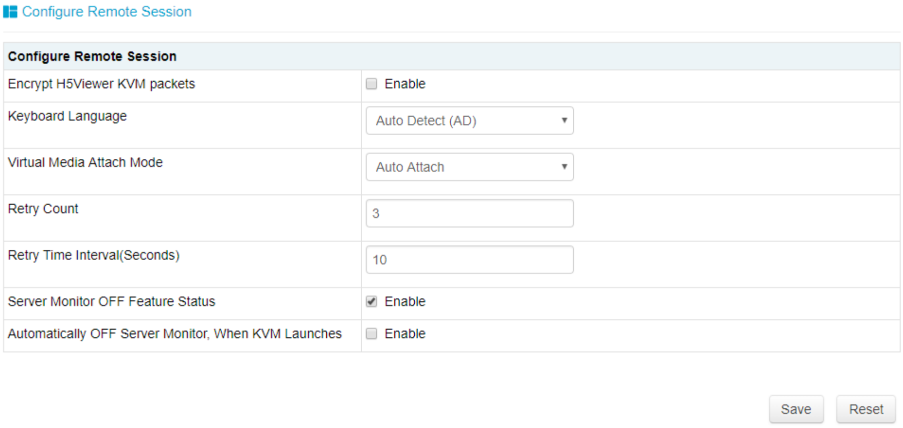

JViewer [100.2.48.18] - [720 x 400] - 18 fps
Video Keyboard Mouse Options Media Keyboard Layo Video Recor Power Active User: Help
Zoom Size : 100%
LALT LCTRL RALT RCTRL Num Caps Scroll

```
Intel(R) Boot Agent GE v1.5.84
Copyright (C) 1997-2016, Intel Corporation

PXE-E61: Media test failure, check cable
PXE-M0F: Exiting Intel Boot Agent.

Intel(R) Boot Agent GE v1.5.84
Copyright (C) 1997-2016, Intel Corporation

PXE-E61: Media test failure, check cable
PXE-M0F: Exiting Intel Boot Agent.
No bootable device -- insert boot disk and press any key
_
```

Figure 8-64 Java KVM

8.26.3 KVM Reconnect

Support reconnection after network disconnection, the retry count is 3 by default, and the retry time interval is 10s. Users could change reconnect setting in page “Remote Control -> Configure Remote Session”. Retry count ranges from 1 to 6, time interval ranges from 5 to 30 seconds.

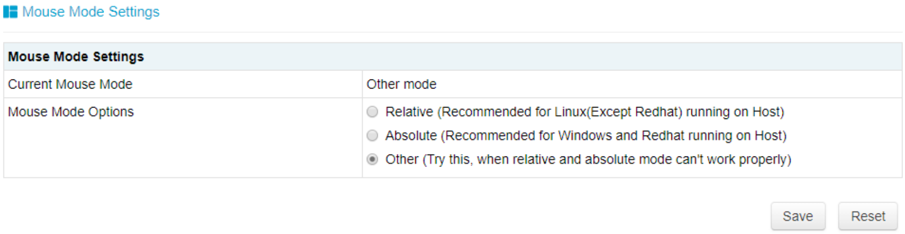

Configure Remote Session

Configure Remote Session	
Encrypt H5Viewer KVM packets	□ Enable
Keyboard Language	Auto Detect (AD) ▾
Virtual Media Attach Mode	Auto Attach ▾
Retry Count	3
Retry Time Interval(Seconds)	10
Server Monitor OFF Feature Status	☑ Enable
Automatically OFF Server Monitor, When KVM Launches	□ Enable

Figure 8-65 KVM Reconnect

8.26.4 Mouse Mode

To open KVM Mouse setting page, click “Remote Control -> Mouse Mode”.



Mouse Mode Settings

Mouse Mode Settings	
Current Mouse Mode	Other mode
Mouse Mode Options	○ Relative (Recommended for Linux(Except Redhat) running on Host) ○ Absolute (Recommended for Windows and Redhat running on Host) ● Other (Try this, when relative and absolute mode can't work properly)

Figure 8-66 Mouse Mode Settings

Table 8-40 KVM Mouse Mode

Host OS	Client OS			
	Windows 8	Windows 7	Windows Server 2012	Windows Server 2008 R2
RHEL 5.2	Relative	Relative	Relative	Relative
RHEL 5.4	Relative	Relative	Relative	Relative
RHEL 5.6	Relative	Relative	Relative	Relative
RHEL 6.0	Absolute	Absolute	Absolute	Absolute
RHEL 6.4	Absolute	Absolute	Absolute	Absolute
RHEL 7.0	Absolute	Absolute	Absolute	Absolute
Fedora10	Relative	Relative	Relative	Relative
Fedora11	Absolute	Absolute	Absolute	Absolute
Fedora12	Absolute	Absolute	Absolute	Absolute
Fedora14	Absolute	Absolute	Absolute	Absolute
Fedora15	Absolute	Absolute	Absolute	Absolute
Fedora18	Absolute	Absolute	Absolute	Absolute
Fedora19	Absolute	Absolute	Absolute	Absolute
Fedora 20	Absolute	Absolute	Absolute	Absolute
Cent OS 5.4	Absolute	Absolute	Absolute	Absolute
Cent OS 6.0	Relative	Relative	Relative	Relative
Cent OS 6.1	Absolute	Absolute	Absolute	Absolute
Cent OS 6.2	Absolute	Absolute	Absolute	Absolute
Ubuntu 8.10	Absolute	Absolute	Absolute	Absolute
Ubuntu 9.10	Absolute	Absolute	Absolute	Absolute
Ubuntu 11.04	Absolute	Absolute	Absolute	Absolute
Ubuntu 12.04	Absolute	Absolute	Absolute	Absolute
Ubuntu 14.04	Absolute	Absolute	Absolute	Absolute
OpenSuse 11.1	Absolute	Absolute	Absolute	Absolute
OpenSuse 12.1	Relative	Relative	Relative	Relative
Windows 2008	Absolute	Absolute	Absolute	Absolute
Windows server 2012	Absolute	Absolute	Absolute	Absolute

8.27 Virtual Media

The media redirection will allow users to take various media devices and images that presented on the client side (Local Media Support) or remote (Remote Media Support), and attach them as virtual USB on the server side in which the BMC is resident.

The virtual media supports:

- Simultaneous hard disk, floppy, USB key, CD/DVD, folder redirection.
- Efficient USB 2.0 based CD/DVD redirection with a typical speed of 20XCD.
- Completely secured (Authenticated or Encrypted).
- The media image can be mounted on NFS or CIFS server as Remote Media Support.

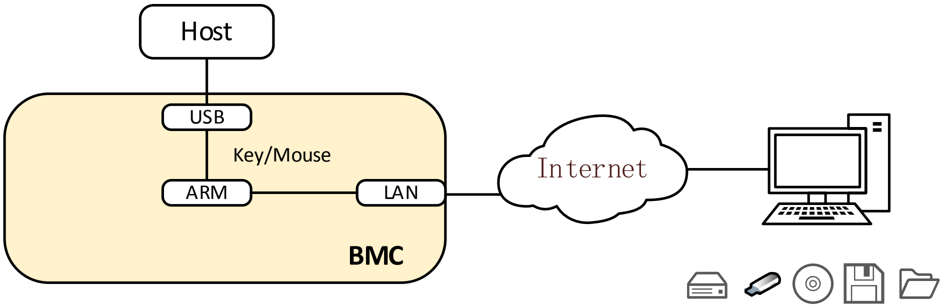
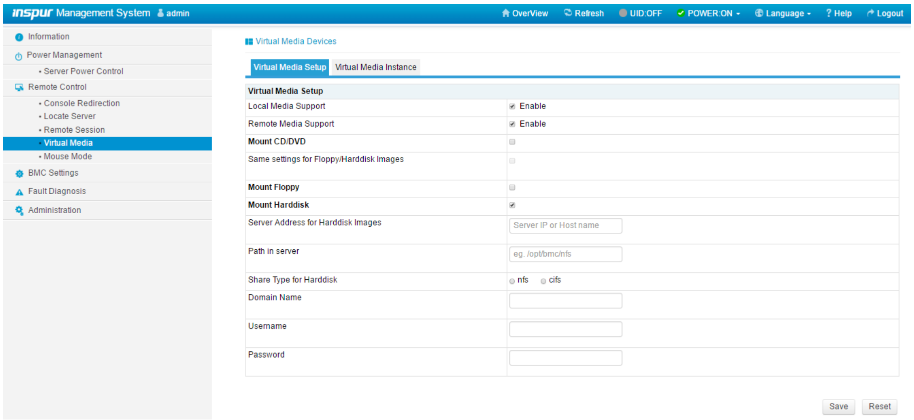


Figure 8-67 Virtual Media Schematic

To open virtual media configuration, click “Remote Control -> Virtual Media”.



Virtual Media Setup	
Local Media Support	☑ Enable
Remote Media Support	☑ Enable
Mount CD/DVD	□
Same settings for Floppy/Harddisk Images	□
Mount Floppy	□
Mount Harddisk	☑
Server Address for Harddisk Images	Server IP or Host name
Path in server	eg. /opt/bmc/nfs
Share Type for Harddisk	○ nfs ○ cifs
Domain Name	
Username	
Password	

Figure 8-68 Virtual Media Settings

Local Media Support: To enable or disable Local Media support, check/uncheck the ‘Enable’ check box.

Remote Media Support: To enable or disable Remote Media support, check/uncheck the ‘Enable’ check box.

Mount CD/DVD:

To enable or disable Mount CD/DVD support, check/uncheck the ‘Enable’ check box.

Note: You can also select all the media types simultaneously.

Server Address for CD/DVD Images: Displays the address of the server where the remote media images are stored.

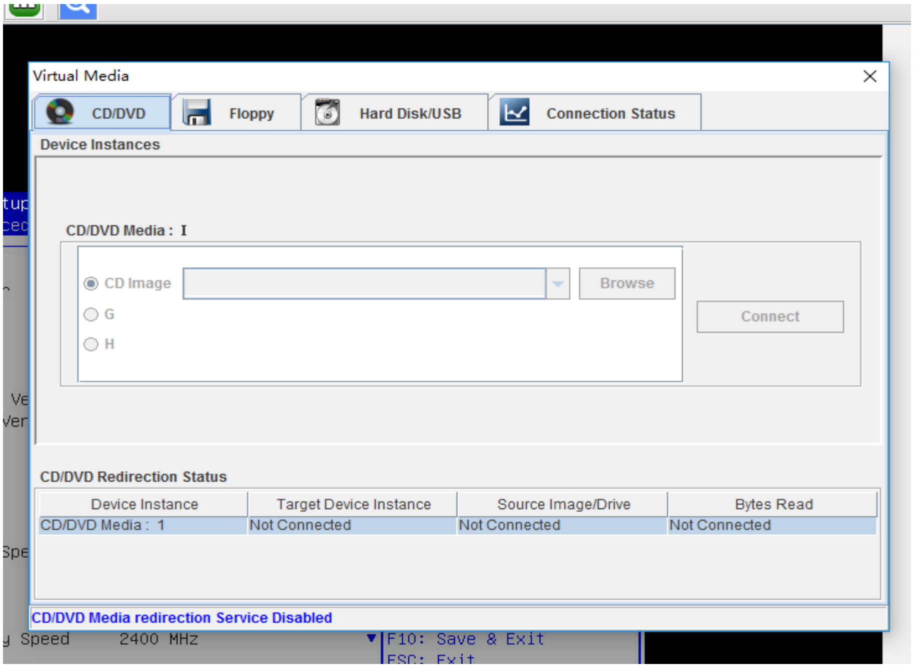
Path in server: Displays the Source path to the remote media images.

Share Type for CD/DVD: Displays the Share Type of the remote media server either NFS or CIFS.

Domain Name, Username, and Password: If share Type is Samba (CIFS), then enter user credentials to authenticate on the server.

Same settings for Floppy/Hard disk Images.

Users can mount virtual media in KVM as below.



CD/DVD Redirection Status

Device Instance	Target Device Instance	Source Image/Drive	Bytes Read
CD/DVD Media : 1	Not Connected	Not Connected	Not Connected

CD/DVD Media redirection Service Disabled

Figure 8-69 Virtual Media in KVM

8.28 Redfish

Redfish is a new management standard that uses the hypermedia RESTful interface to express data. It is oriented to the model, can express the relationship between modern system components and the semantics of services and components, and be easy to expand. For servers that provide Redfish, the client can obtain the BMC information by sending HTTP request and specify the operation for the BMC.

The client can access the Redfish service through the HTTP client. The following is the use of curl in Linux to send the request to access redfish. The usual request operation is “GET”, “PUT”, “POST”, “PATCH”, “DELETE” and so on. The sending and receiving data are all in json format.

The username and password below must be BMC users with administrator privileges.

8.28.1 GET

The client gets the data of the specified URL via HTTP GET. The basic format is as follows:

curl -k -u username:password https://BMC_IP:8080/redfish/v1/Chassis/1

8.28.2 POST

The client sends data to the specified URL via HTTP POST, and the server is configured according to the POST data. The basic format is as follows:

curl -k -u username:password https://BMC_IP:8080/redfish/v1/Systems/System1/Actions/ComputerSystem.Reset -X POST -H ‘Content-Type: application/json’ -d ‘{“ResetType”:”ForceOff”}’

⚠ Note:

https://BMC_IP:8080/redfish/v1/Systems/System1/Actions/ComputerSystem.Reset is the requested URL.

-H The parameter is the format of the requested data.

-d The parameter is the requested data.

8.28.3 DELETE

The client deletes the data of the specified URL via HTTP DELTE, and the server deletes configurations according to the URL. The basic format is as follows:

curl -k -u username:password https://BMC_IP:8080/redfish/v1/SessionService/Sessions/1 -X DELETE

Note:

https://BMC_IP:8080/redfish/v1/SessionService/Sessions/1 is the deleted address.

8.28.4 Steps

1. Get the resources provided by Redfish, Redfish’s root directory visit does not require authorization. Get the accessible resource URL through visiting the Redfish root directory.

Request:

curl -k -u username:password https://BMC_IP:8080/redfish/v1/

Response:

```
{
 “@Redfish.Copyright”: “Copyright 2014-2016 Distributed Management Task Force,
Inc. (DMTF). For the full DMTF copyright policy, see http://www.dmtf.org/about/
policies/copyright.”,
 “@odata.context”: “/redfish/v1/$metadata#ServiceRoot.ServiceRoot”,
 “@odata.id”: “/redfish/v1/”,
 “@odata.type”: “#ServiceRoot.v1_1_0.ServiceRoot”,
 “AccountService”: {
  “@odata.id”: “/redfish/v1/AccountService”
 },
 “Chassis”: {
  “@odata.id”: “/redfish/v1/Chassis”
 },
 “EventService”: {
  “@odata.id”: “/redfish/v1/EventService”
 },
 “Id”: “RootService”,
 “Links”: {
  “Sessions”: {
   “@odata.id”: “/redfish/v1/SessionService/Sessions”
  }
 },
 “Managers”: {
  “@odata.id”: “/redfish/v1/Managers”
 },
 “Name”: “Root Service”,
 “Oem”: {},
 “RedfishVersion”: “1.1.0”,
 “SessionService”: {
  “@odata.id”: “/redfish/v1/SessionService”
 },
 “Systems”: {
  “@odata.id”: “/redfish/v1/Systems”
 },
 “Tasks”: {
  “@odata.id”: “/redfish/v1/TaskService”
 },
 “UUID”: “92384634-2938-2342-8820-489239905423”
}
```

Figure 70 Response of Get the Accessible Resource URL

2. Get the URL of the device category based on the acquired resource.

Eg: Get the URL for the Chassis category: / redfish / v1 / Chassis:

Request:

curl -k -u username:password https://BMC_IP:8080/redfish/v1/Chassis

Response:

```
{
  “@Redfish.Copyright”: “Copyright 2014-2016 Distributed Management Task Force, 
Inc. (DMTF). For the full DMTF copyright policy, see http://www.dmtf.org/about/
policies/copyright.”,
  “@odata.context”: “/redfish/v1/$metadata#ChassisCollection.ChassisCollection”,
  “@odata.id”: “/redfish/v1/Chassis”,
  “@odata.type”: “#ChassisCollection.ChassisCollection”,
  “Members”: [
    {
      “@odata.id”: “/redfish/v1/Chassis/1”
    }
  ],
  “Members@odata.count”: 1,
  “Name”: “Chassis Collection”
}
```

Figure 71 Response of Get the URL for the Chassis Category

3. Access the URL of the resource that is ultimately needed by step-by-step access.

Eg: Get the URL for Chassis specific information: /redfish/v1/Chassis/Chassis1:

Request:

curl -k -u username:password https://BMC_IP:8080/redfish/v1/Chassis/Chassis1

Response:

```
{
   “@odata.type”: “#Chassis.v1_2_0.Chassis”,
   “Id”: “1”,
   “Name”: “Computer System Chassis”,
   “ChassisType”: “RackMount”,
   “AssetTag”: “5280”,
   “Manufacturer”: “Inspur”,
   “Model”: “5280”,
   “SKU”: “8675309”,
   “SerialNumber”: “5280”,
   “PartNumber”: “224071-J23”,
   “PowerState”: “On”,
   “IndicatorLED”: “Lit”,
   “Status”: {
      “State”: “Enabled”,
      “Health”: “OK”
   },
   “Thermal”: {
      “@odata.id”: “/redfish/v1/Chassis/1/Thermal”
   },
   “Power”: {
      “@odata.id”: “/redfish/v1/Chassis/1/Power”
   },
   “Links”: {
      “ComputerSystems”: [
         {
            “@odata.id”: “/redfish/v1/Systems/5280”
         }
      ],
      “ManagedBy”: [
         {
            “@odata.id”: “/redfish/v1/Managers/BMC”
         }
      ],
      “ManagersInChassis”: [
         {
            “@odata.id”: “/redfish/v1/Managers/BMC”
         }
      ]
   },
   “@odata.context”: “/redfish/v1/$metadata#Chassis.Chassis”,
   “@odata.id”: “/redfish/v1/Chassis/1”,
   “@Redfish.Copyright”: “Copyright 2014-2016 Distributed Management Task Force,
Inc. (DMTF). For the full DMTF copyright policy, see http://www.dmtf.org/about/policies/
copyright.”
}
```

Figure 72 Response of Get the URL for Chassis Specific Information

8.29 Appendix

Table 8-41 BMC Self-Inspection Code Table

Self-Inspection code	Description
0x55	SFT_CODE_OK
0x56	SFT_CODE_NOT_IMPLEMENTED
0x57	SFT_CODE_DEV_CORRUPTED
0x58	SFT_CODE_FATAL_ERROR
0xff	SFT_CODE_RESERVED
0x80	SEL_ERROR
0x40	SDR_ERROR
0x20	FRU_ERROR
0x10	IPMB_ERROR
0x08	SDRR_EMPTY
0x04	INTERNAL_USE
0x02	FW_BOOTBLOCK
0x01	FW_CORRUPTED

9 Common Faults, Diagnosis and Troubleshooting

This chapter introduces the common server faults, as well as corresponding diagnosis and troubleshooting suggestions.

9.1 Hardware Problems

1) Power-on failure at startup

Description: After pressing the power button, the LED (power status LED, HDD status LED) on server's front control panel is off. Meanwhile, no KVM (display) output is displayed, and server chassis fans do not rotate.

Suggestions:

a. Check the power supply situation: If the power module LED is on, it indicates normal power supply. If the power module LED is off or red, please check whether the power supply is normal, and whether the power cord is connected well.

b. If the power supply is normal, insert the power module again, and then power on for verification.

c. If there is a machine and a power module of the same type, you could change the power module to test whether there is a power module fault.

d. If the instructions above do not resolve the problem, please contact Inspur customer service.

2) No display after power on

Description: After pressing the power button, the power LED on server's front control panel is on, the chassis fans rotate normally, but there's no output on the display.

Suggestions:

a. Firstly check whether the monitor is powered up normally.

b. If the monitor is powered up normally, check whether it is connected normally with the server's VGA port.

c. Test on another monitor.

d. If there is no output on the new monitor, login to the BMC Web interface. Open BMC remote KVM to check whether there is output on the monitor. If there is normal output, it indicates the VGA port may be abnormal, please contact Inspur customer service.

e. If above operations could not resolve the problem, please contact Inspur customer service.

3) Status LED on front panel is abnormal

Description: The server is under normal operation, but the status LED on front panel turns red.

Suggestions:

a. Firstly confirm which LED is abnormal according to the previous chapter about the LEDs on the front panel.

b. If the system failure LED is abnormal, check whether the system runs normally; if the system runs normally, you can login to the BMC Web interface to view the BMC logs, to check whether there are errors reported.

c. If the power failure LED is abnormal, check whether the power module LED is normal; if the power module LED is normal, you can login to the BMC Web interface to view the BMC logs, to check whether there are errors reported.

d. If other LEDs are abnormal, you can login to the BMC Web interface to view the BMC logs, to check whether there are errors reported.

e. If above operations could not resolve the problem, please contact Inspur customer service.

4) Power module LED is off or red

Description: The server is under normal operation, but a certain power module LED is off or red.

Suggestions:

a. Firstly check whether all power cables are normal, and plug in the power cables again.

b. If the fault still exists, insert the power module again.

c. If shutdown is allowed, you could exchange the two power modules to judge whether it is a power module fault.

d. If above operations could not resolve the problem, please contact Inspur customer service.

5) HDD status LED is abnormal

Description: The server is under normal operation, but the HDD status LED is off or red.

Suggestions:

a. If it is caused by manual operations, restore the array through RAID configuration.

b. If there is no manual operations, check whether the HDDs are identified normally. If the server is configured with an RAID card, login to the RAID management interface to check whether there is an HDD failure.

c. If there is an HDD failure, or the above operations could not resolve the problem, please contact Inspur customer service.

⚠ Note: Hot-plugging HDD allows users to take out or replace the HDD without system shutdown and power off, which improves the system disaster recovery capability, scalability and flexibility. It only means the hot-plug HDD can be plugged in and out online without damage, and the following two items need to be noticed: ① Depending on the RAID level, hot plugging the HDD in the RAID will cause RAID degradation or failure. When installing a new HDD, different RAID cards have different policies, you may need to login to the RAID card management interface for recovery. ② Remove the HDD until the HDD motor stops completely, to prevent damage to the motor. For the operations on the RAID card management interface, please refer to Inspur technical website: www.4008600011.com.

6) Chassis fans make excessive noise

Suggestions:

a. Firstly check whether the chassis fans operate at a high speed caused by the over-temperature chassis.

b. If the chassis has a high temperature, check the temperature of server room, if it is excessively high, open the air conditioner to cool the room.

c. If the server room's temperature is normal, check whether the front panel or chassis interior is jammed with dust, or the air inlet is blocked. It needs to improve the server room's environment, to avoid server over-temperature running because of too much dust.

d. Check whether the server runs under high load.

e. If above operations could not resolve the problem, please contact Inspur customer service.

7) There is alarm sound during startup

Suggestions:

Firstly identify the source of alarm sound:

a. If the alarm sound comes from the power supply, check the power LED's status. If the power LED is abnormal, refer to item 3) to handle it.

b. If the alarm sound comes from the chassis interior, open the chassis to identify the specific source.

c. If the alarm sound comes from the RAID card, check the HDD LED status or login to the RAID management interface to check the HDD status. For the operations about the RAID management interface, please refer to Inspur technical website: www.4008600011.com.

d. If above operations could not resolve the problem, please contact Inspur customer service.

8) Keyboard and mouse are not available

Description: Neither keyboard nor mouse could be operated normally.

Suggestions:

a. Make sure the keyboard or mouse has been connected correctly and firmly.

b. Replace other parts to test whether it is a mouse or keyboard fault.

c. Power cycle the server and retest.

d. Reboot and enter BIOS or RAID configuration interface to test keyboard or mouse performance. When tested in a non-system situation, if the keyboard or mouse performance turns out to be normal, a system fault could be considered. If the keyboard or mouse fault still exists, a mainboard interface fault could be considered, and Inspur technical hotline can be called for support.

9) USB interface problem

Description: Unable to use devices with a USB interface.

Suggestions:

a. Make sure the operating system on server supports USB devices.

b. Make sure the system has been installed with correct USB device driver.

c. Power off the server, and then power on again to test.

d. Check whether the USB device is normal when connected to other hosts.

e. If the USB device is normal when connected to other hosts, the server may be abnormal: please contact Inspur customer service.

f. If the USB device turns out to be abnormal when connecting to other hosts, please replace the USB device.

9.2 Software Problems

1) System installation problems

Description: It fails to load the RAID driver or to create partitions larger than 2T during system installation, C disk utilization is too large, and other problems.

Suggestions:

a. If it fails to load the driver during system installation, check the RAID driver's version, please visit Inspur website (http://www.inspur.com) to download the correct RAID driver. For some RAID drivers, it needs to load several times.

b. If it fails to create 2T partitions, check BIOS Advance -> CSM Configuration-> Boot option filter, enable the UEFI option, and select UEFI mode to boot the system. It needs to enter the CMD command line to change the HDD format to GPT, and then partitions larger than 2T can be created.

c. If the C disk utilization is too large after system installation, open Computer Property-> Advanced System Property-> Advanced-> Performance-> Settings-> Change Virtual Memory,

turn down the virtual memory or allocate the virtual memory to other partitions.
d. If above operations could not resolve the problem, please contact Inspur customer service.

2) Abnormal memory capacity

Description: The memory capacity displayed in the OS and the physical memory capacity are inconsistent.

Suggestions:
a. Check the OS version, the supported memory capacity varies with the version of Windows OS. Enter BIOS Setup to view the memory capacity, if the memory is identified completely, the operating system may have limits to the memory capacity, e.g. Windows server 2008 x86 supports 4G memory at most.
b. If the memory is not identified completely in BIOS Setup, confirm that the corresponding slots have been installed with memories of correct type.
c. If above operations could not resolve the problem, please contact Inspur customer service.

3) Abnormal network

Description: The network is disconnected, or the rate is lower than the actual rate of the network port.

Suggestions:
a. Check whether the network cable is connected well and whether the network LED flashes normally, re-insert the network cable to test again.
b. If the problem still exists, use a computer to connect with the server directly. If the direct connection is normal, check whether the network cable or the switch port is normal.
c. If the direct connection is abnormal, please visit Inspur website (http://www.inspur.com) to download the latest NIC driver.
d. If above operations could not resolve the problem, please contact Inspur customer service.

10 Battery Replacement

If the server no longer automatically displays the correct date and time, you may need to replace the battery that provides power to the real-time clock.

⚠ WARNING: The computer contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. A risk of fire and burns exists if the battery pack is not properly handled. To reduce the risk of personal injury:

- Do not attempt to recharge the battery.
- Do not expose the battery to temperatures higher than 60°C (140°F).
- Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
- Replace only with the spare designated for this product.

To remove the component:

1. Power down the server.
2. Extend the server from the rack.
3. Remove the access panel.
4. Remove the full-length expansion board retainer if any full-length expansion boards are installed.
5. Remove the PCI riser cage.
6. Remove the air baffle.
7. Remove the battery.

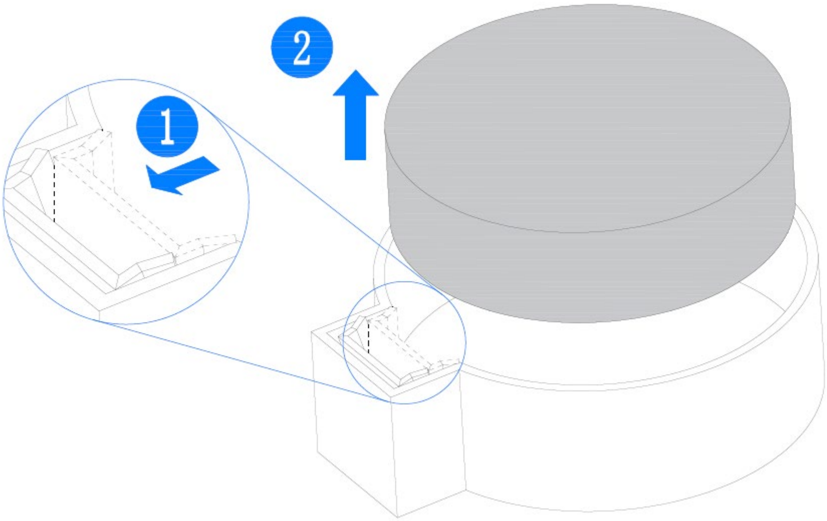


Figure 10-1

11 Regulatory Compliance Notices

11.1 Regulatory Compliance Identification Numbers

For the purpose of regulatory compliance certifications and identification, this product has been assigned a unique regulatory model number. The regulatory model number can be found on the product nameplate label, along with all required approval markings and information. When requesting compliance information for this product, always refer to this regulatory model number. The regulatory model number is not the marketing name or model number of the product.

11.2 Federal Communications Commission Notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (for example, personal computers). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

11.2.1 FCC Rating Label

The FCC rating label on the device shows the classification (A or B) of the equipment. Class B devices have an FCC logo or ID on the label. Class A devices do not have an FCC logo or ID on the label. After you determine the class of the device, refer to the corresponding statement.

Class A Equipment

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 instructions, 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 personal expense.

11.3 European Union Regulatory Notice

Products bearing the CE marking comply with the following EU Directives:

- Low Voltage Directive 2014/35/EU
- EMC Directive 2014/30/EU

CE compliance of this product is valid if powered with the correct CE-marked AC adapter provided by INSPUR.

Compliance with these directives implies conformity to applicable harmonized European standards (European Norms) that are listed in the EU Declaration of Conformity issued by INSPUR for this product or product family and available (in English only) within the product documentation.

The compliance is indicated by one of the following conformity markings placed on the product:

Please refer to the regulatory label provided on the product.

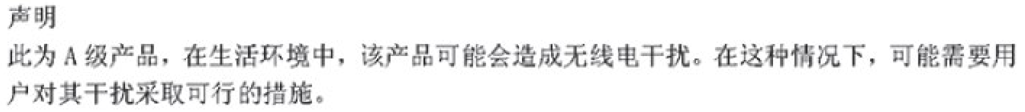
Please refer to the regulatory label provided on the product.

11.4 Disposal of Waste Equipment by Users in the European Union

This symbol on the product or on its packaging indicates that this product must not be disposed of with other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

11.5 Chinese Notice

Class A Equipment



声明

此为A级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取可行的措施。

11.6 Battery Replacement Notice

⚠ **CAUTION:** Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instruct ions.

⚠ **ATTENTION:** Risque d’explosion si la batterie est remplacée par un type incorrect. Mettre au rebus les batteries usagées selon les instructions.

Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. To forward them to recycling or proper disposal, use the public collection system or return them to Inspur, an authorized Inspur Partner, or their agents

11.7 Battery Caution

11.7.1 Battery use caution

When battery is used, avoid:

● High or low extreme temperatures during use, storage and transportation.

● Extremely low air pressure, or low air pressure at high altitude.

● Battery replacement.

Use the battery properly. Improper use of the battery such as the following may cause risks of fire, explosion or leakage of flammable liquid or gas.

● Replace battery with an incorrect type;

● Dispose of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery;

Dispose the used battery according to your local regulations or the battery manufacturer's instructions.

11.7.2 Avertis sement de l'utilisation de la batterie

Lorsque utiliser la batterie, évitez:

● Températures extrêmement élevées ou basses pendant l'utilisation, le stockage et le transport;

● Pression d'air extrêmement basse, ou pression d'air basse à haute altitude.

● Remplacement de la batterie.

Utilisez la batterie correctement. Mauvaise utilisation de la batterie comme celles mentionnées ici, peut entraîner des risques d'incendie, d'explosion ou de fuite liquide de gaz inflammables.

● Remplacer la batterie par un type incorrect;

● Disposer d'une batterie dans le feu ou un four chaud, écraser mécaniquement ou couper la batterie;

Disposer la batterie utilisée conformément à vos règlements locaux ou aux instructions du fabricant de la batterie.

11.7.3 Personal safety warnings

● Chemical Burn Hazard. This product contains a coin cell battery. Do not ingest battery. If the coin cell battery is swallowed, it can cause severe internal burns in just 2 hours and can lead to death.

● Keep new and used batteries away from children.

● If the battery compartment does not close securely, stop using the product and keep it away from children.

● If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention.

11.7.4 Avertissements de sécurité personnelle:

● Risque de brûlure chimique. Ce produit contient une batterie de

cellules. N'ingérer pas la batterie. Si la batterie de cellule est avalée, elle peut causer de graves brûlures internes en seulement 2 heures et peut entraîner la mort.

● Gardez les batteries nouvelles ou utilisées à l'écart des enfants.

● Si le compartiment de la batterie ne se ferme pas en toute sécurité, cessez d'utiliser le produit et gardez-le à l'écart des enfants.

● Si vous pensez que des piles ont pu être avalées ou placées à l'intérieur d'une partie du corps, consultez immédiatement un médecin.

11.8 Restricted Access Area

Equipment is intended for installation in Restricted Access Area.

Les matériels sont destinés à être installés dans des EMPLACEMENTS À ACCÈS RESTREINT.

12 Electrostatic Discharge

12.1 Preventing Electrostatic Discharge

To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly.

12.2 Grounding Methods to Prevent Electrostatic Discharge

Several methods are used for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm ±10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an authorized reseller install the part.

For more information on static electricity or assistance with product installation, contact Inspur Customer Service.

13 Warranty

13.1 Introduction

Inspur warrants that all Inspur-branded hardware products shall provide a period of three (3) year warranty. This document describes Warranty Service, including a detailed description of service-level.

The warranty terms and conditions may vary by country, and some services and/or parts may not be available in all countries. For more information about warranty services in your country, contact Inspur technical support or Inspur local office.

13.2 Warranty Service

13.2.1 Service Overview

Table 13-1

Type	**Duration**
Remote Services	3 years
RMA Services	3 years

13.2.2 Warranty Service Terms & Conditions

i. Remote Services

Inspur provides 24x7 remote service through Hotline, E-mail and Website. Through Hotline and E-mail Services, Inspur engineer helps customers determine the cause of the malfunction and provide solution. Website service provides a number of resources to help customers resolve problems, and learn about our products, such as product manuals, drivers and Firmware.

Below is how to obtain our remote service:

Table 13-2

Type	Description	Response time

Hotline	1-844-860-0011(English)
	1-646-517-4966(English)
	86-800-860-0011(Chinese)
		Within 2hrs

E-mail	serversupport@inspur.com	Within 2hrs
Website	http://en.inspur.com/	

ii. RMA Services

Customers could return defective parts to the designated Inspur site after submitting a service request. Inspur may, at its discretion, repair or replace the defective parts. Repair or replacement parts may be new, used, or equivalent to new in performance and reliability. Replaced or repaired parts are warranted to be free of defects in material or workmanship for ninety (90) calendar days or, for the remainder of the warranty period of the product, whichever is longer.

13.3 Warranty Exclusions

Inspur does not guarantee that there will be no interruptions or mistakes during the use of the products. Inspur will not undertake any responsibility for the losses arising from any operation not conducted according to Inspur Hardware Products.

The Warranty Service Terms & Conditions do not apply to consumable parts, as well as any products the serial number of which falls off, is damaged or obscure for the following reasons:

- Accident, misuse, abuse, defiling, improper maintenance or calibration or other external causes
- Operating beyond the parameters as stipulated in the user documentation
- Use of the software, interface, parts or supplies not provided by Inspur
- Improper preparation place or maintenance
- Virus infection
- Loss or damage in transit
- Alterations or repairs have been made by unauthorized persons, or service organizations

Inspur does not undertake any responsibility for the damages or losses of any application, data or removable storage medium. Except for the software installed by Inspur in its production of this product, Inspur is not responsible for the restoration or reinstallation of any programs or data.

14 Appendix

14.1 Drive Neodymium Content Reference

Seagate drive neodymium content reference range:

Table 14-1

Product Series Name	Neodymium Content Range		
	＜ 5g	5g - 25g	＞ 25g
Cimarron（2T/4T）	√		
Cimarron（6T/8T）		√	
Evans		√	
Kestrel	√		
MakaraBP		√	
MakaraPLUS		√	
Mobula		√	
MobulaBP		√	
Skybolt	√		
Tatsu		√	

WD drive neodymium content reference range:

Table 14-2

Product Series Name	Neodymium Content Range		
	＜ 5g	5g - 25g	＞ 25g
Rainier	√		
Libra He10		√	
Leo A		√	
Vela-A		√	
Vela-AX		√	
Vela-AP		√	
Hs14		√	
Leo-B		√	

Toshiba drive neodymium content reference range:

Table 14-3

Product Series Name	Neodymium Content Range		
	＜ 5g	5g - 25g	＞ 25g
AL14SE-Lite	√		
AL15SE	√		
AL14SX	√		
MG04 Tomcat-R SAS		√	
MG04 Tomcat-R SATA		√	
MG04 Tomcat SATA		√	
MG06 SAS		√	
MG06 SATA		√	
MG07 SAS		√	
MG07 SATA		√	