AXE-5100R7

1U 19” Network Appliance with AMD® Ryzen 7000E Family Processor

User’s Manual



Manual Rev.:	0.1 Preliminary
Revision Date:	May 26, 2025
Part No.:	50M-31828-2000

LEADING EDGE COMPUTING

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Preface

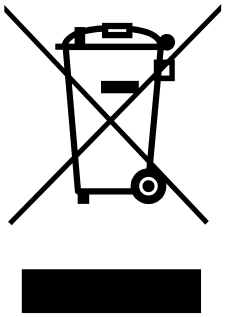
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Revision History

Revision	Release Date	Description of Change(s)
0.1	2025-05-26	Preliminary release

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Conventions



Information to prevent minor physical injury, component damage, data loss, and/or program corruption when trying to complete a task.

Informations destinées à prévenir les blessures corporelles mineures, les dommages aux composants, la perte de données et/ou la corruption de programme lors de l'exécution d'une tâche.



Information to prevent serious physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

Informations destinées à prévenir les blessures corporelles graves, les dommages aux composants, la perte de données et/ou la corruption de programme lors de l'exécution d'une tâche spécifique.

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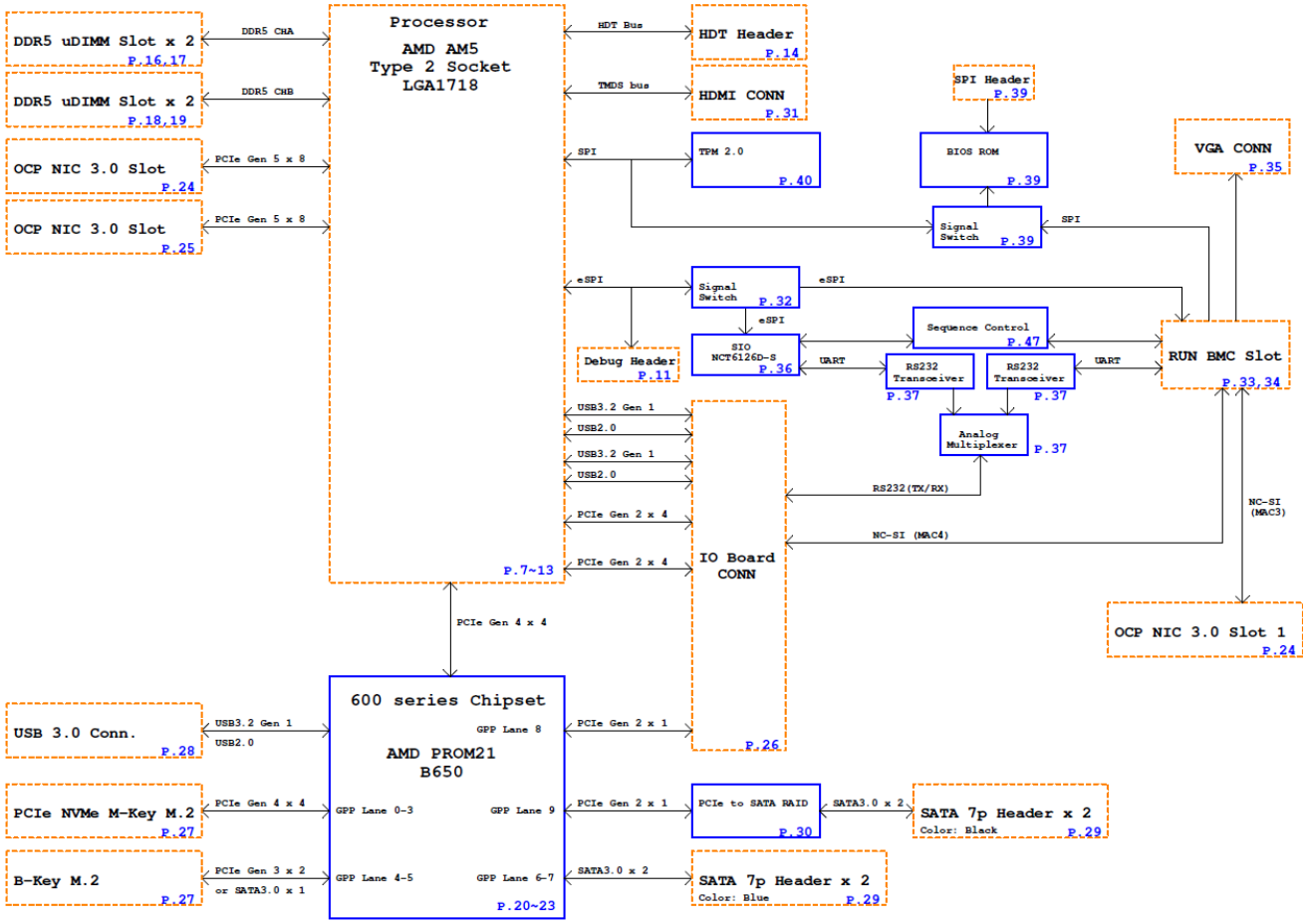
1 Overview

1.1 Introduction

The ADLINK AXE-5100R7 is a compact (440mm depth) 1U rackmount edge computing server with an AMD Ryzen 7000 Series Processor, designed for SD-WAN, end-to-end encryption, NGFW secure gateway. The AXE-5100R7 features a single AMD Ryzen Family APU (up to 105W), with the AMD B650 chipset. It supports 4x DDR5 DIMMs (total up to 128GB). The base model includes 8x GbE RJ45 Ethernet Ports (customizable), 2x OCPv3 NIC, and 1x optional PCIe x8 slot for expansion. It also provides 2x 2.5” SATA (hot-swappable) and 2x M.2 bays for storage.

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1.2 Block Diagram

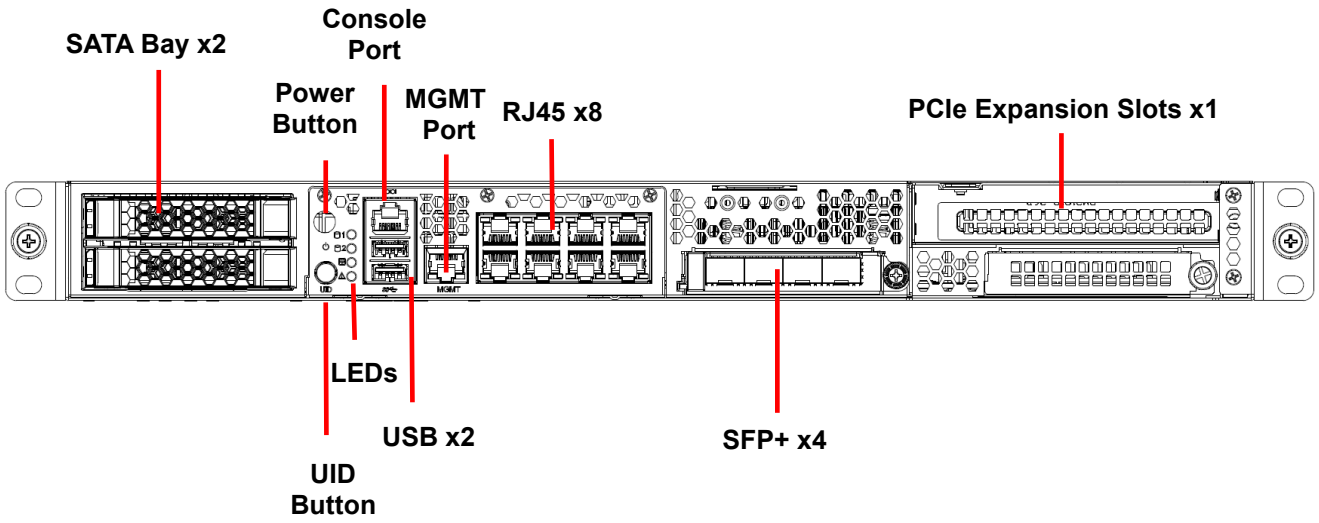


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1.3 Mechanical Overview

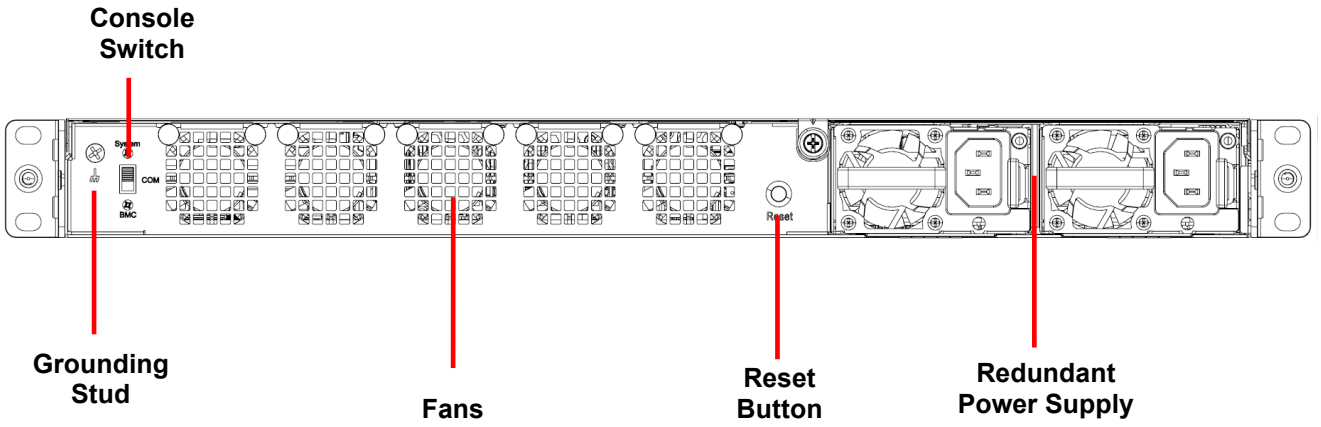
1.3.1 AXE-5100R7 Front Panel

PCIe SKU:



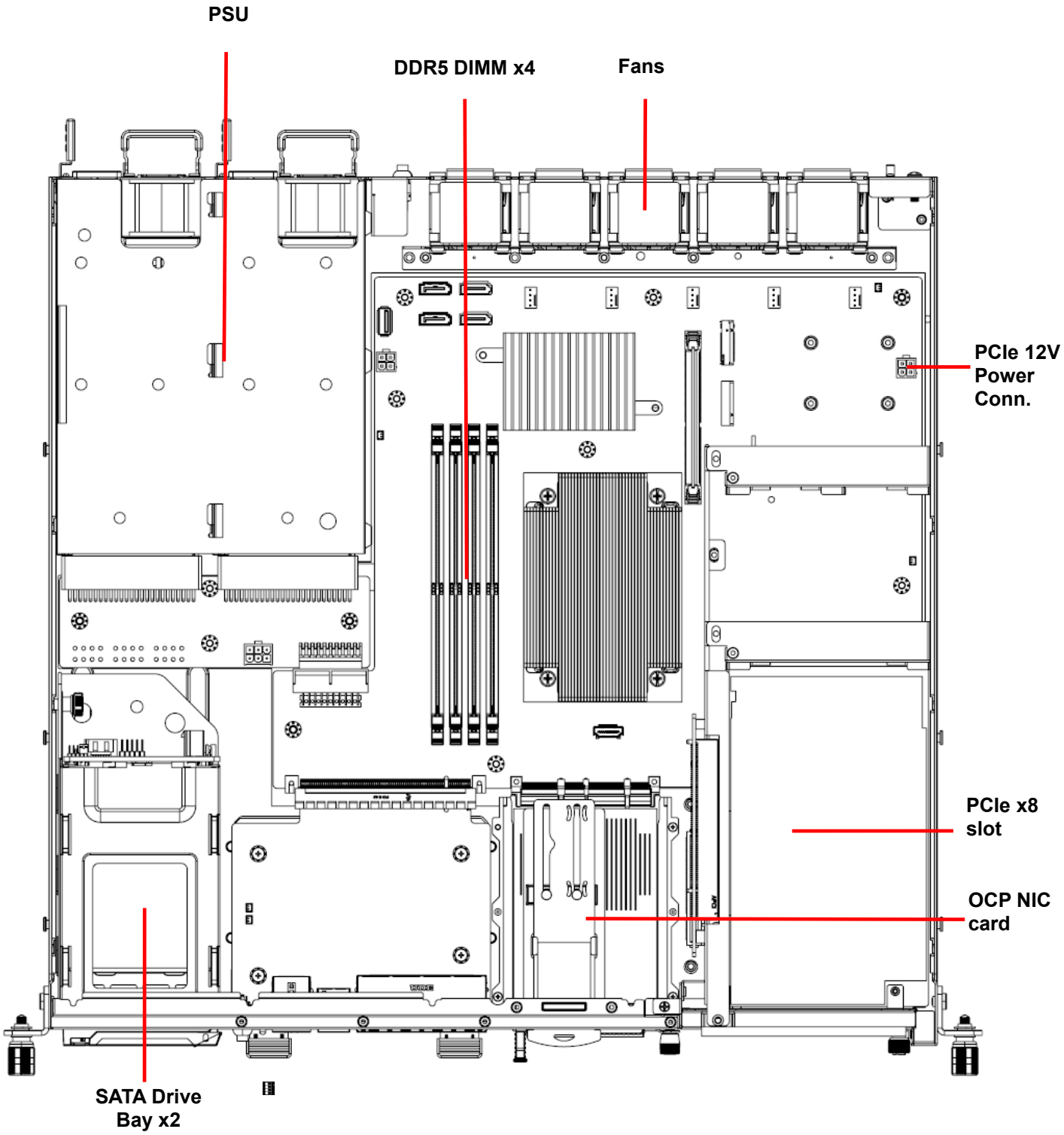
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1.3.2 AXE-5100R7 Rear Panel



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1.3.3 AXE-5100R7 Internal Layout

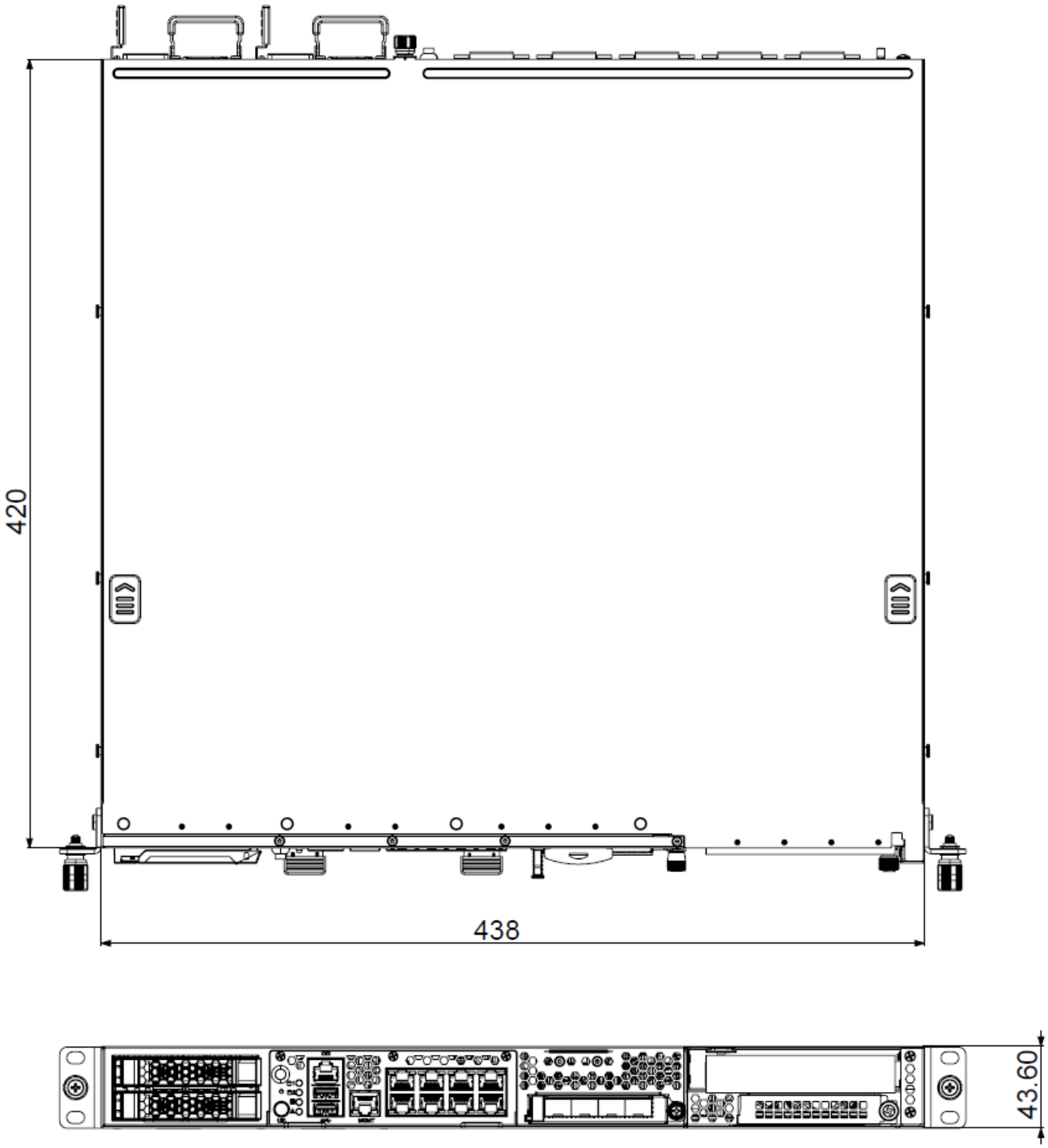


See *3.1, Removing the Chassis Cover,* on page 155 for instructions on removing the cover.

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1.4 Mechanical Dimensions

Units: mm



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2 Specifications

2.1 AXE-5100R7Specifications

Main System

CPU	1x AMD Ryzen Family Processor CPUs up to 105W
Chipset	B650
Memory	4x DDR5 DIMM sockets -Maximum capacity per DIMM 32GB -Total capacity up to 128G -Non ECC 8G & 16 -ECC 32G - 5200MHz (1DPC); 3600MHz (2DPC)
BIOS	AMI BIOS on SPI flash memory
Operating System	Ubuntu 22.04 LTS or above (64-bit)
Trusted Platform Module	On-board TPM 1.2/ 2.0 module

Interfaces

Expansion (SKU dependent)	Option1: 2x OCP slots + PICe x8
Ethernet	1x RJ-45 Ethernet port
Remote Console	1x RJ-45 COM port
USB	2x USB3.0 (5V/1.5A) /2.0
Management	1x RJ-45 COM port
LEDs	Health, Alert, HDD, Power, UID
Control Buttons	1x Power button (front) 1x UID button (front)
Internal	1x COM port 1x VGA header 3x 1PPS SMA header 1x 10M SMA header

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Storage

Drive Bays	2x 2.5” hot-swappable SATA
Internal	2x M-key M.2 (PCIe x2, SATA)

Mechanical & Environmental

Form Factor	1U 19” rackmount, 440mm depth
Fans	5x fans, smart fan speed control
Power	300W 1+1 redundant PSUs AC: 100V to 240V AC @50-60Hz
Temperature	Operating temp.: 0°C to 45°C Storage temp.: -40°C to 70°C **Note:** Not including SATA drives and PCIe cards.
Humidity	Operating: 5% to 95% RH @40°C, non-condensing Storage: 5% to 90% RH, non-condensing
Shock	Operating: Half-sine 2G, 11ms pulse, 100 pulses in each direction
	Non-operating: Trapezoidal, 25G, 170 inches/sec delta V, three drops in each direction
Vibration	Operating: 0.5Grms random vibration, 5~500Hz, 30min/axis.
Acoustic	Sound pressure < 75 dBA @1m with all fans maximum speed
Certifications (TBC)	FCC Part 15B Class A,CE: EN55032 Class A + EN55035, UL, CB and RoHS compliant **Note:** Certifications were passed with 450W PSU installed.
MTBF	150,000 hours in 25℃

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3 Getting Started

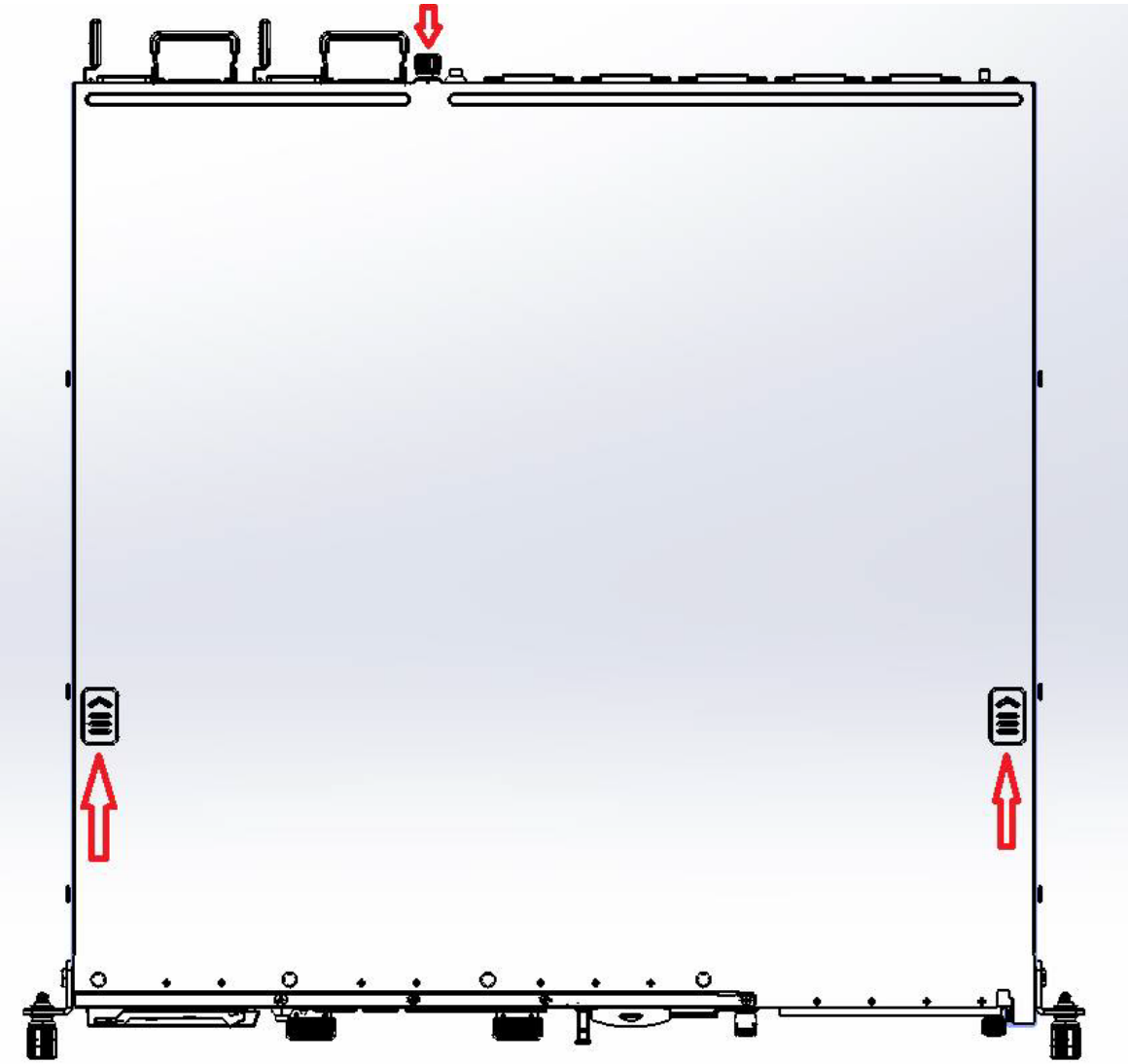
3.1 Removing the Chassis Cover

Follow the instructions below to remove the chassis top cover.

CAUTION:
mise en garde

All installation procedures are restricted to skilled personnel.
Toutes les procédures d'installation sont réservées au personnel qualifié.

1. Loosen the one captive screws at the rear of the cover (arrows).
2. Press down on the two depressions with your thumbs, slide the cover towards the rear of the chassis, and remove the cover.

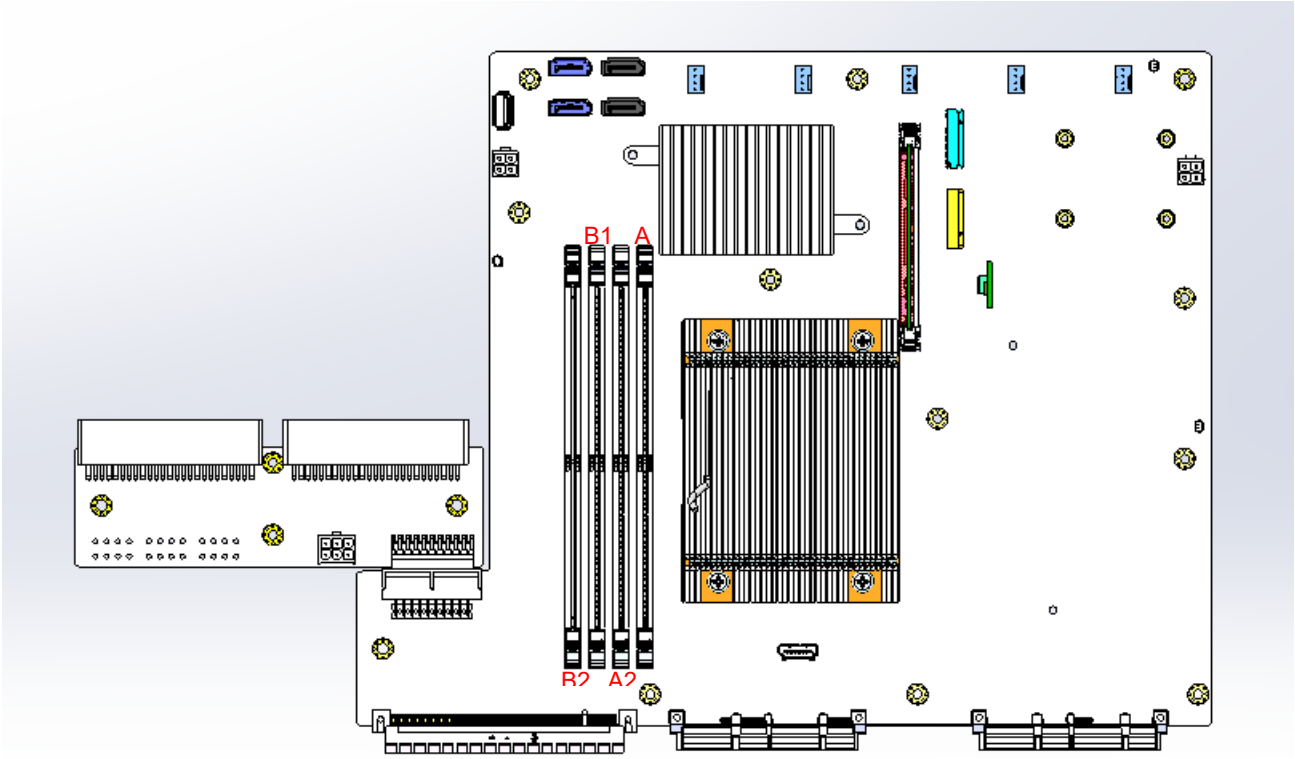


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3.2 Installing Memory Modules

Memory modules configurations Diagram

DIMM Quantity	AXE-5100R7 DIMM			
	DIMM_A1	DIMM_A2	DIMM_B1	DIMM_B2
1DIMM	V			
1DIMM			V	
2DIMM	V		V	
3DIMM	V		V	V
4DIMM	V	V	V	V



CAUTION:
mise en garde

All installation procedures are restricted to skilled personnel.
Toutes les procédures d'installation sont réservées au personnel qualifié.

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3.3 PCIe Card Installation

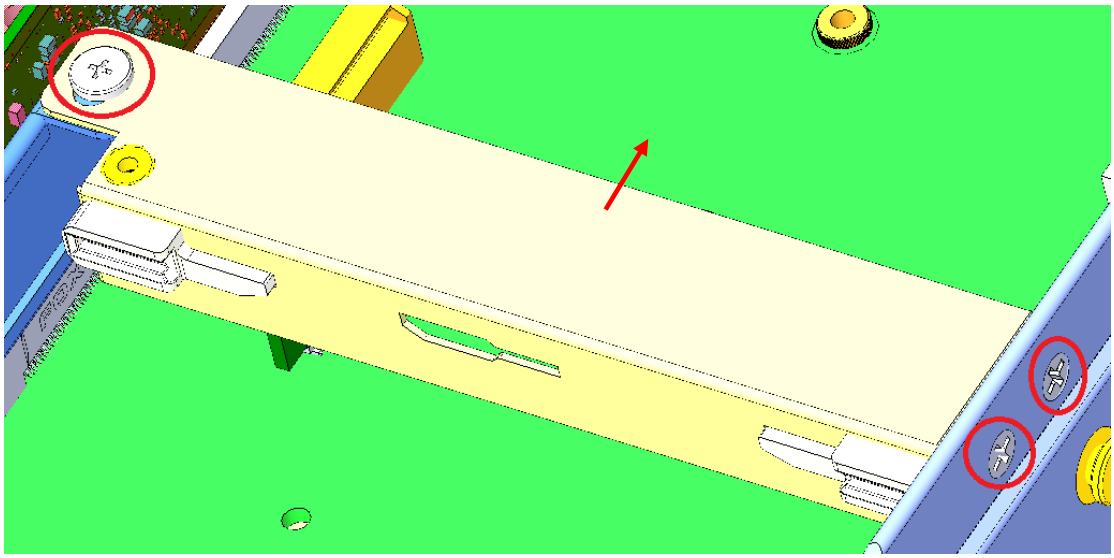
Sample installation instructions for FHFL PCIe expansion cards are described below. For detailed information on the specific installation procedures for your cards, please contact your ADLINK representative.

CAUTION:
mise en garde

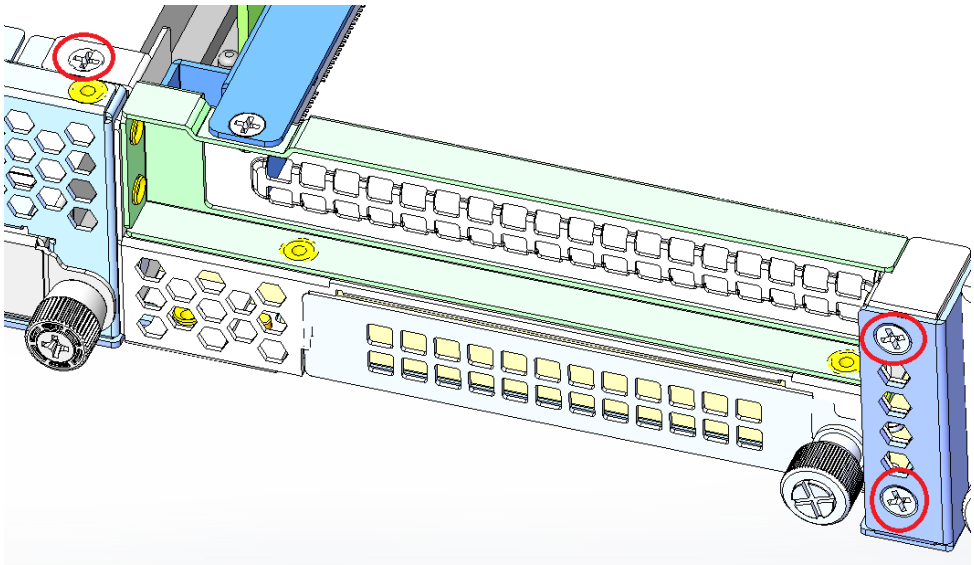
All installation procedures are restricted to skilled personnel. Only UL listed PCIe expansion cards or PCIe cards with openings less than 5 mm in any dimension are recommended

Toutes les procédures d'installation sont réservées au personnel qualifié. Seules les cartes d'extension PCIe répertoriées UL ou les cartes PCIe avec des ouvertures inférieures à 5 mm dans n'importe quelle dimension sont recommandées.

1. Remove the three screws, then remove the PCIE bracket

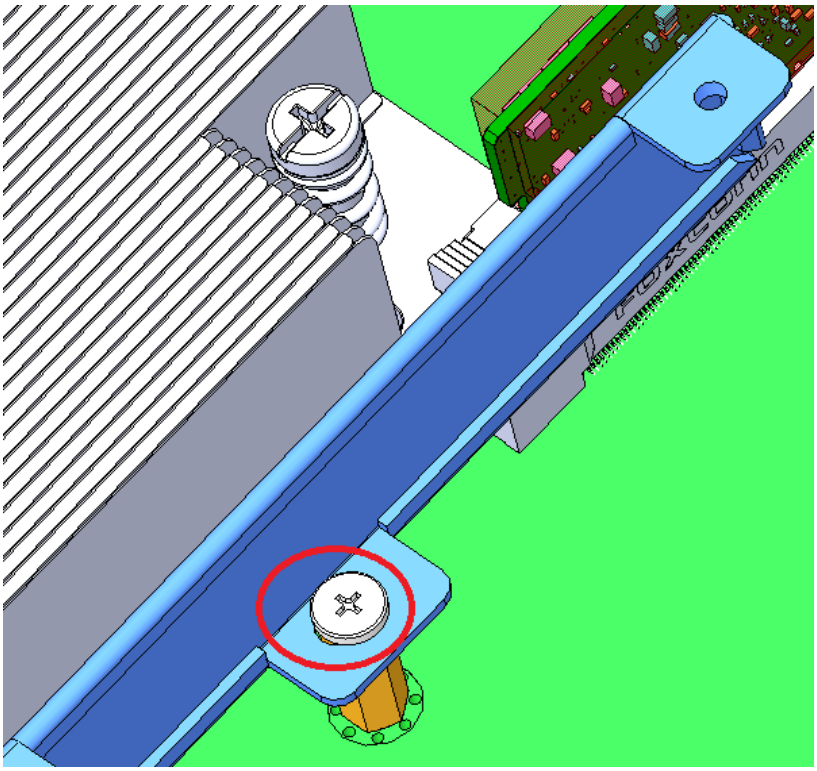


2. Remove the three screws from the front panel as shown.

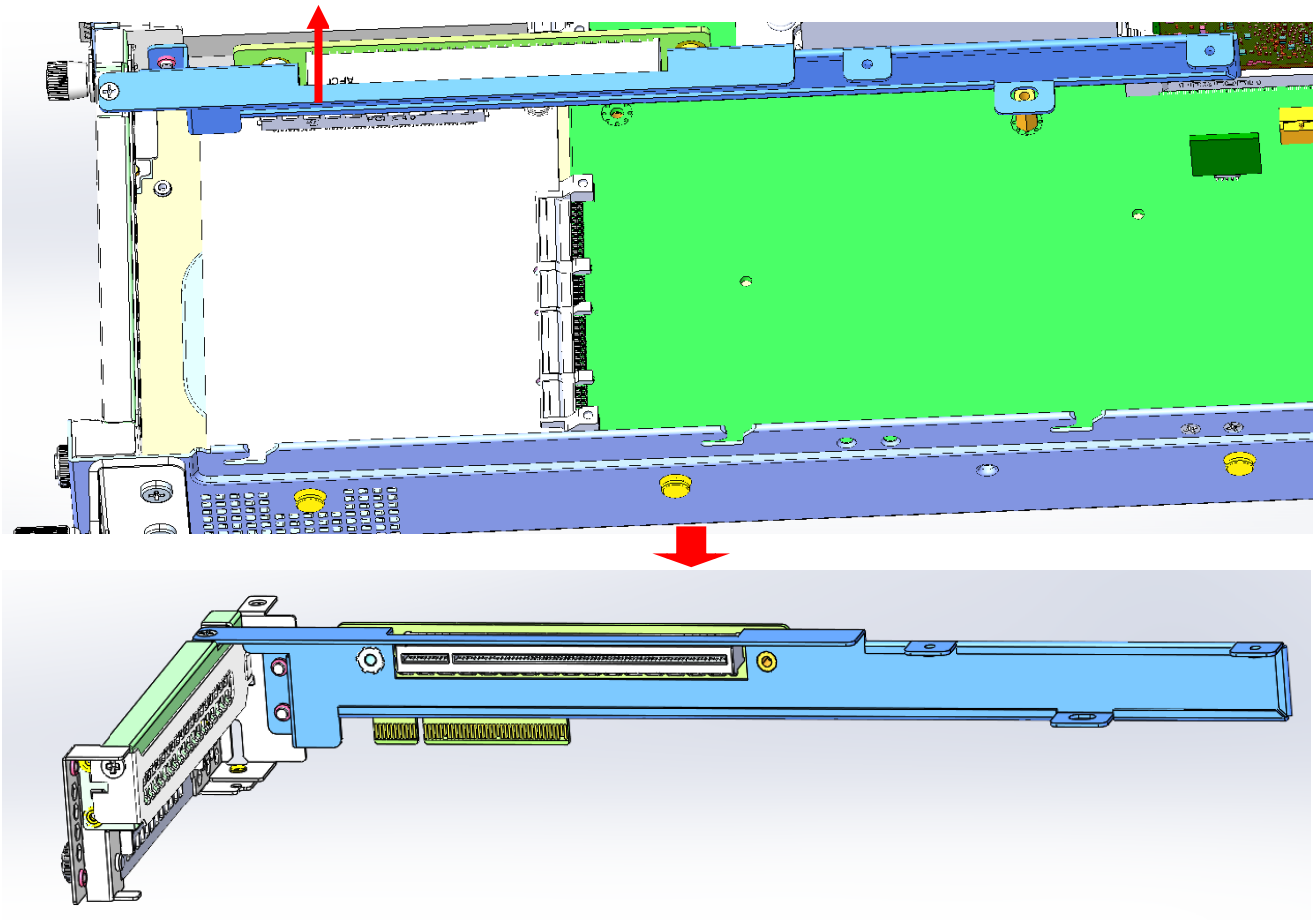


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3. Remove the one screws from the BKT as shown.

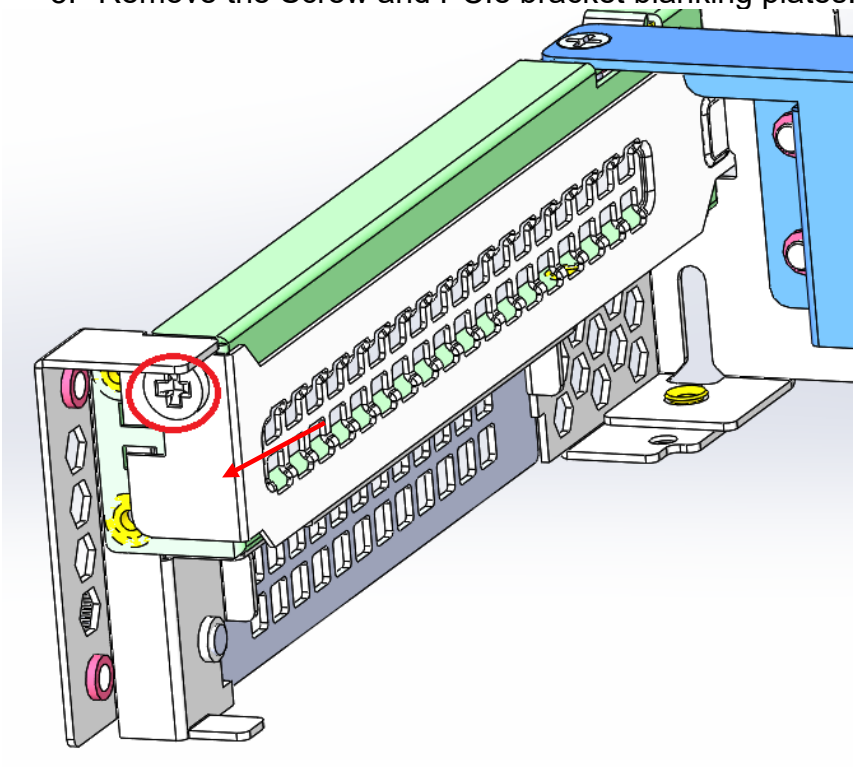


4. Remove the bracket securing the PCIe bracket blanking plates.

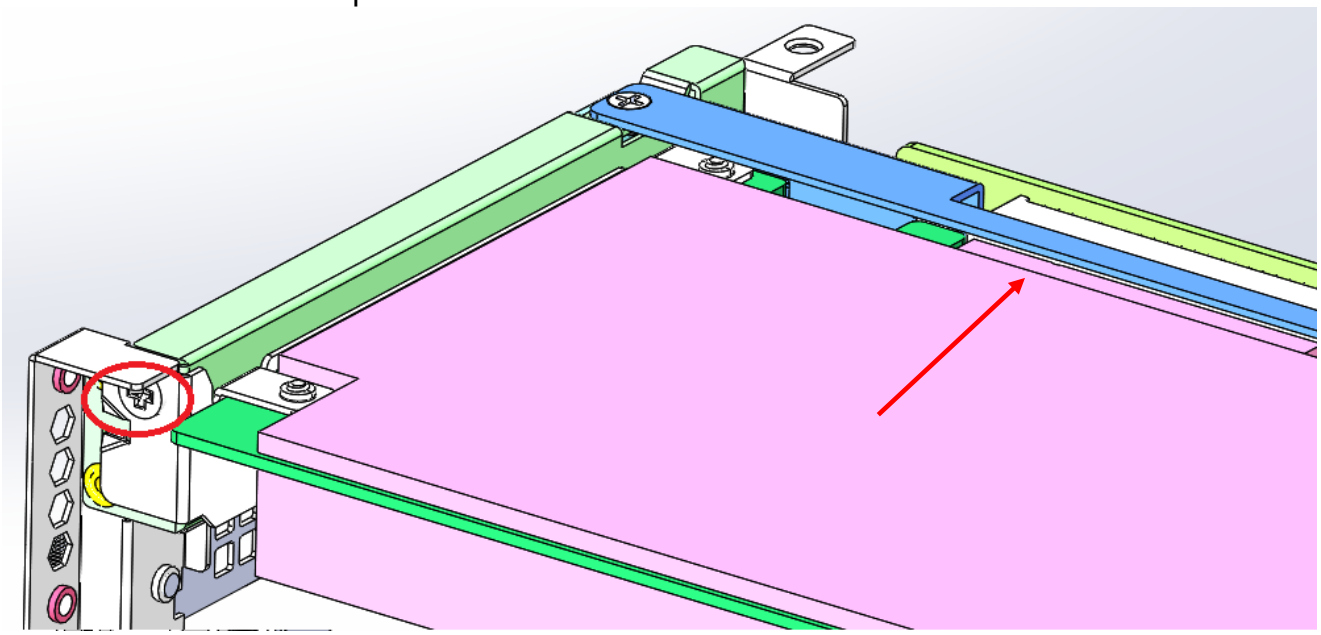


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5. Remove the Screw and PCIe bracket blanking plates.

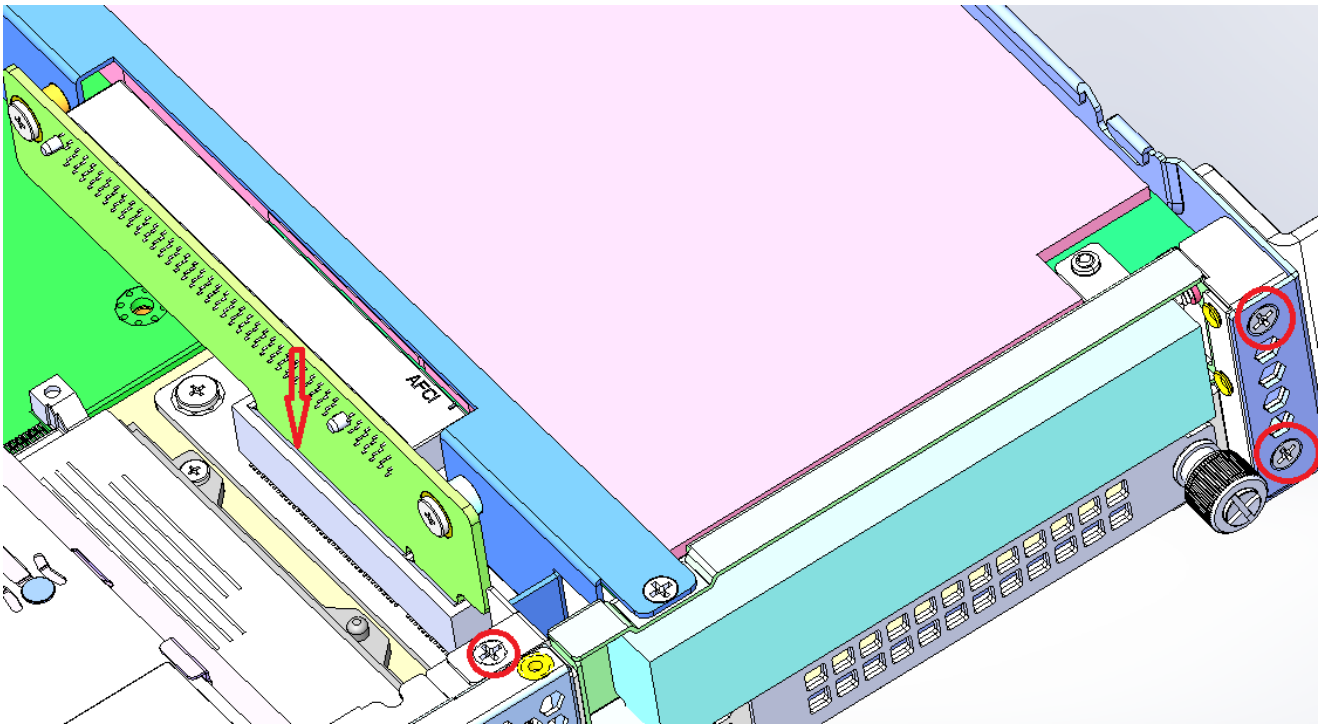


6. Insert the PCIe card into the connector of the PCIe riser board and secure it with a screw at the front panel.

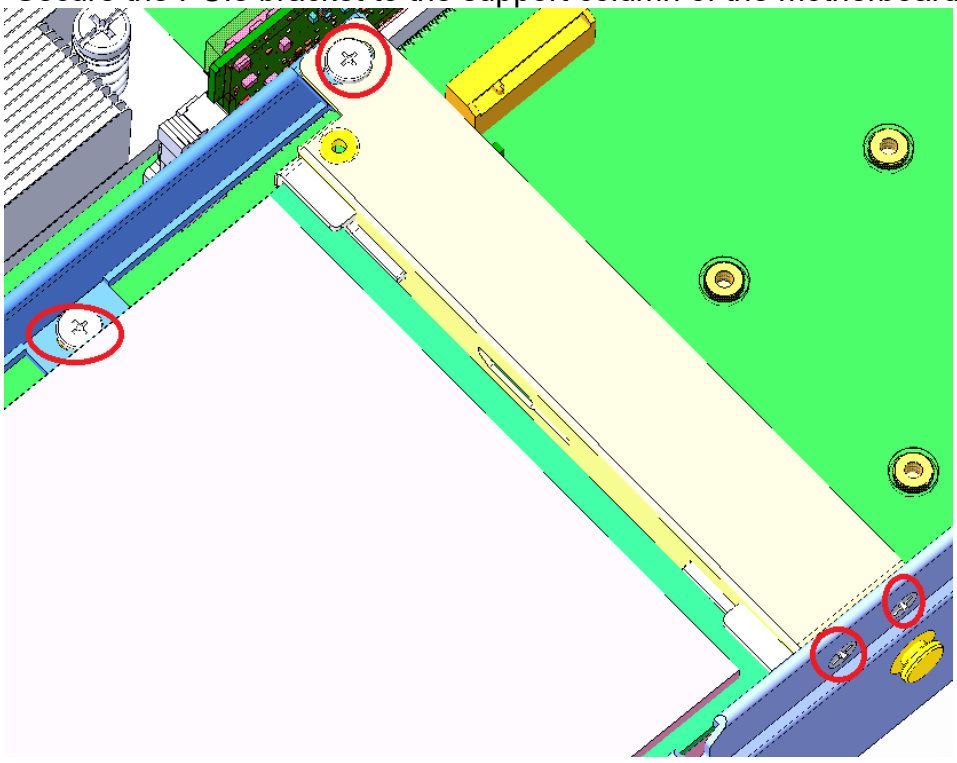


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7. Insert the assembled PCIE module downwards into the CONN of the PCIe expansion board. secure it with three screws at the front panel.



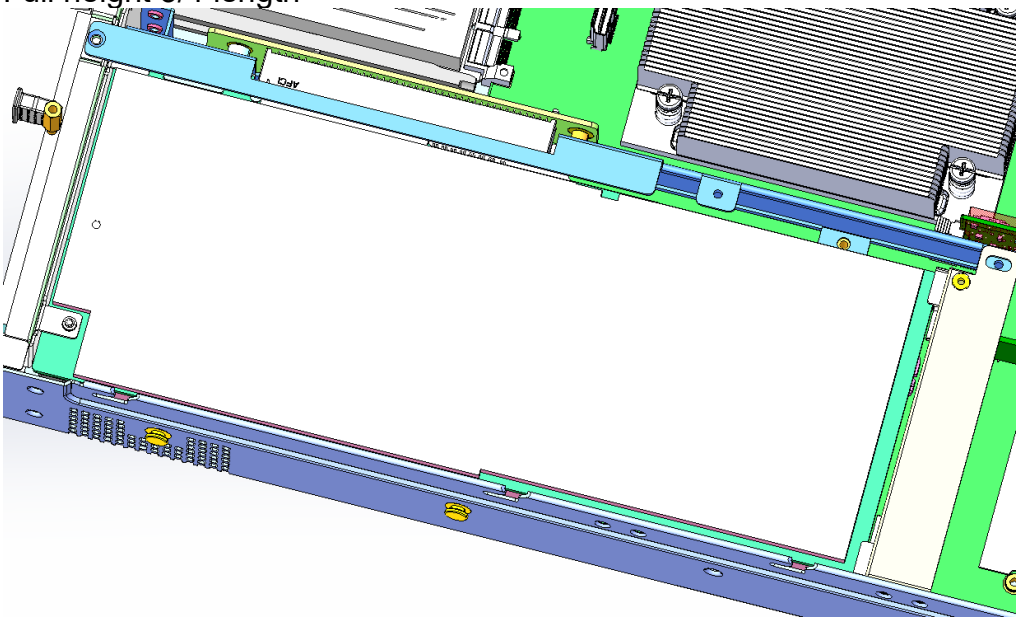
8. Clip the PCIe rear bracket onto the PCIe board and secure it with three screws. Secure the PCIe bracket to the support column of the motherboard with a screw.



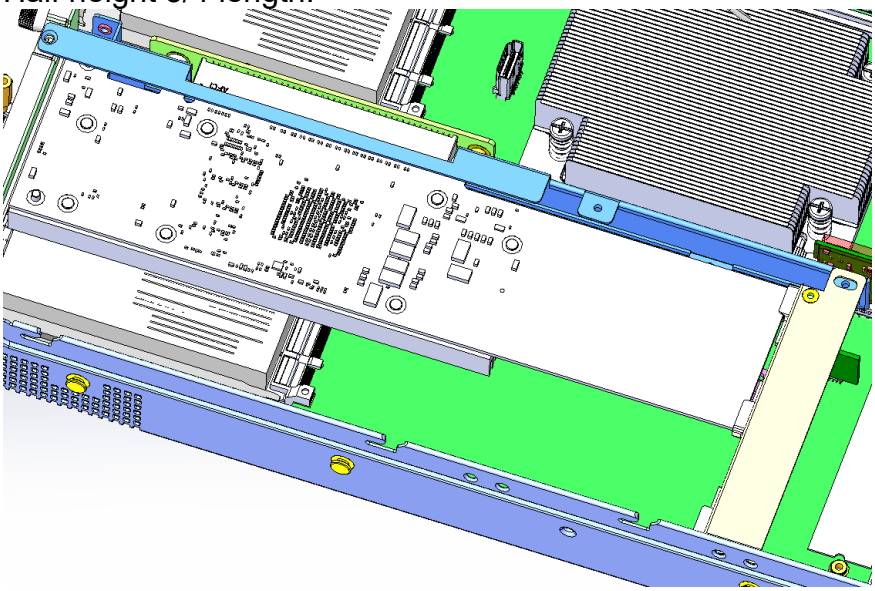
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9. The PCIe rear bracket can support 4 different sizes of PCIe cards.

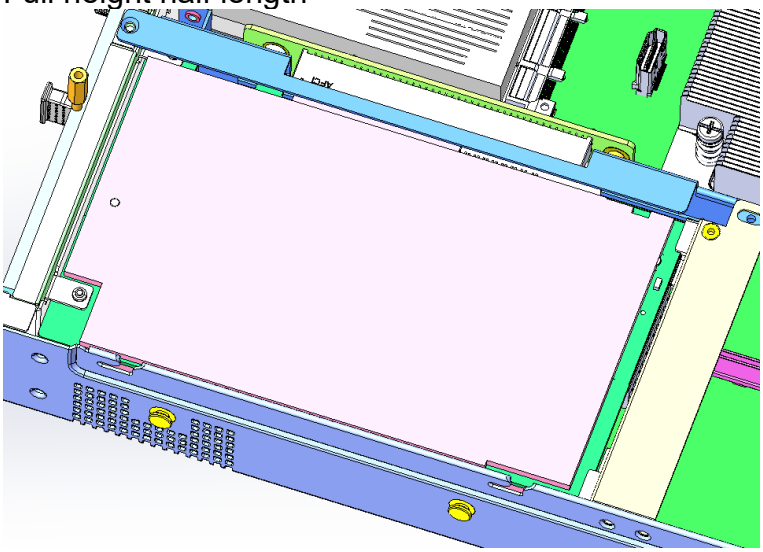
Full height 3/4 length



Half height 3/4 length.

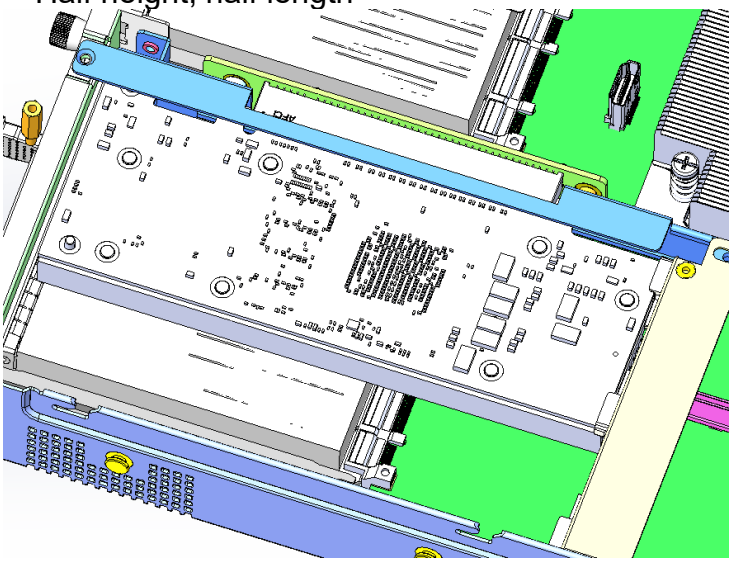


Full height half length

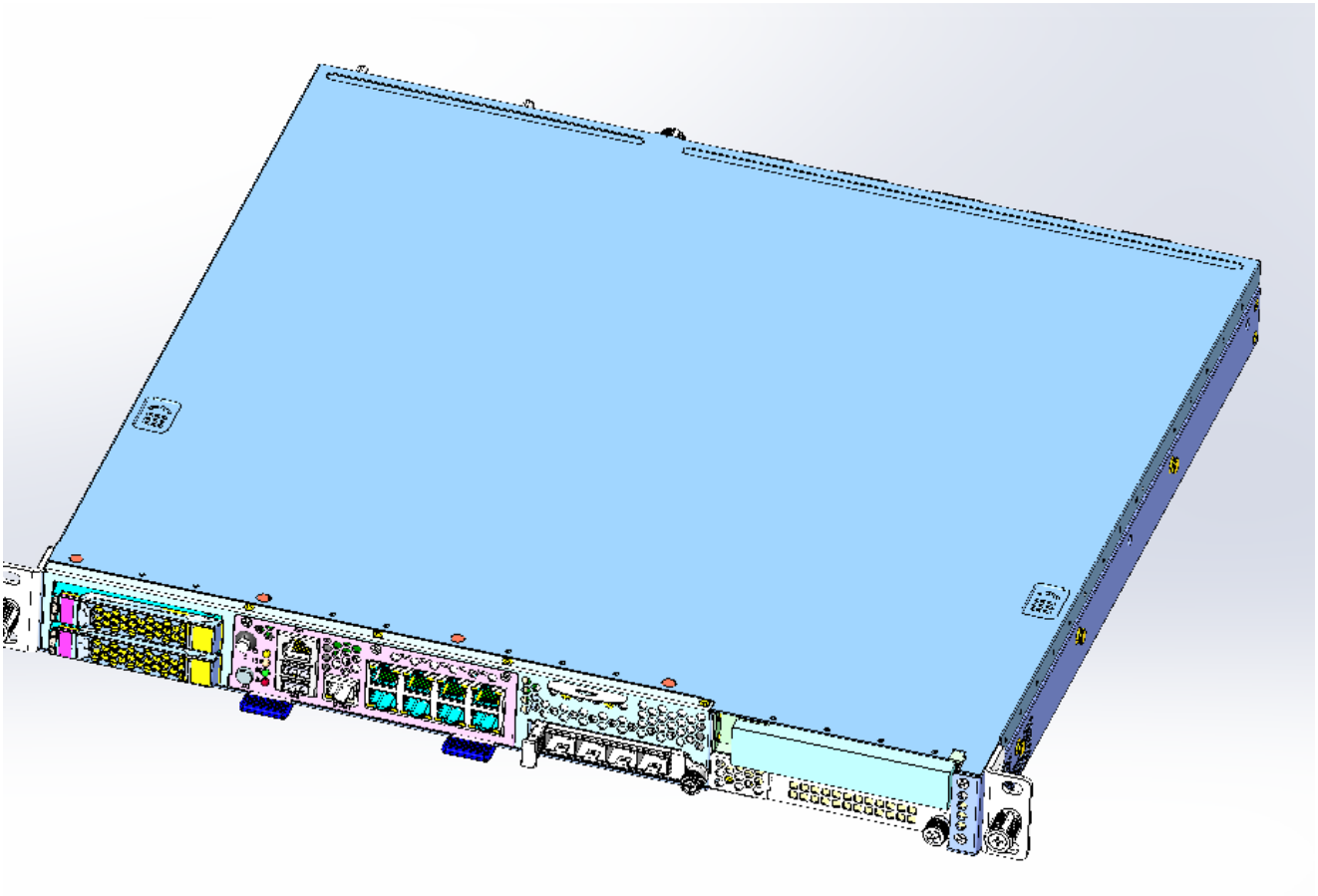


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Half height, half length



10. Install the TOP cover.



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3.4 PCIe Slot Secondary Power Supply

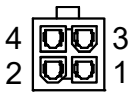
The AXE-5100R7 is equipped with a 4-pin 12V power connector on the mainboard (see *1.3.3 AXE-5100R7 Internal Layout* on page 11) to provide secondary power for PCIe expansion cards, if required. One adapter cable is included. The pin definitions of the connectors and cables are described below.

CAUTION:
mise en garde

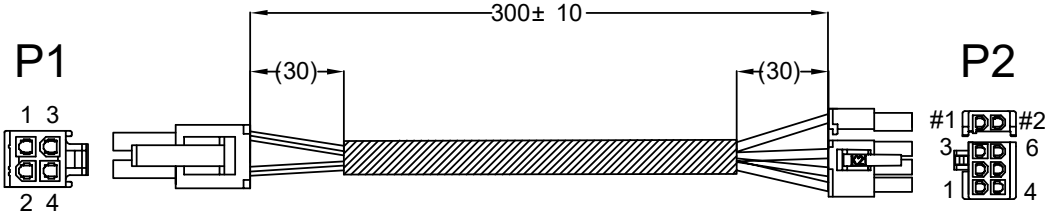
All installation procedures are restricted to skilled personnel.
Toutes les procédures d'installation sont réservées au personnel qualifié.

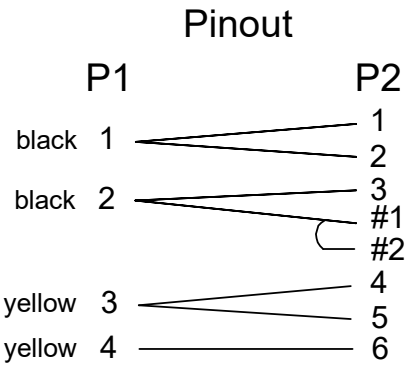
4-pin 12V Power Connector Pinout

Pin #	Signal	Color
1	GND	black
2	GND	black
3	P12V	yellow
4	P12V	yellow



Adapter Cable Connector Pinout

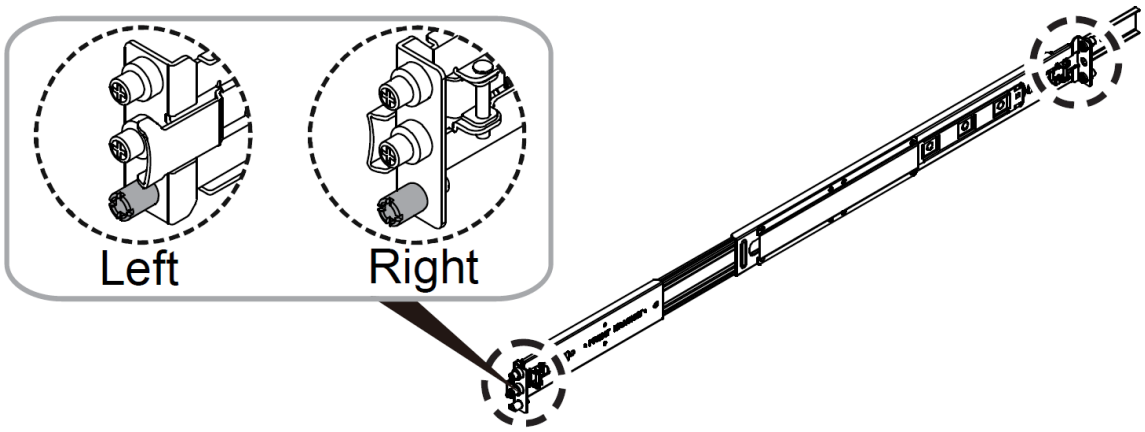




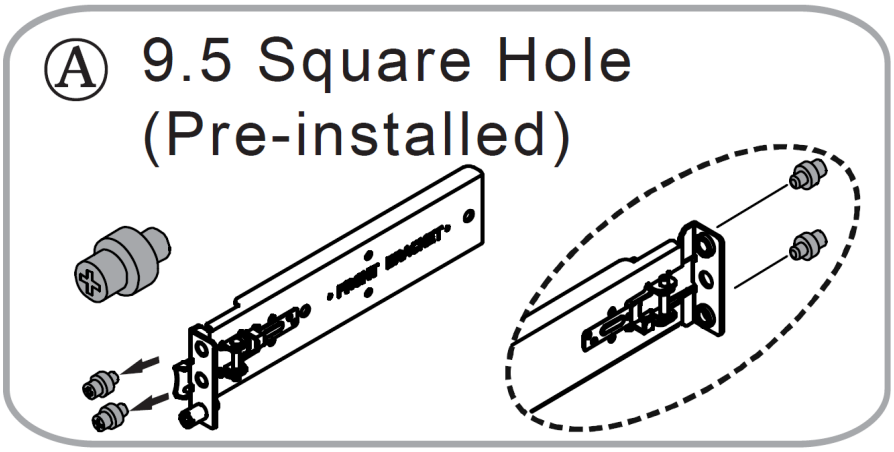
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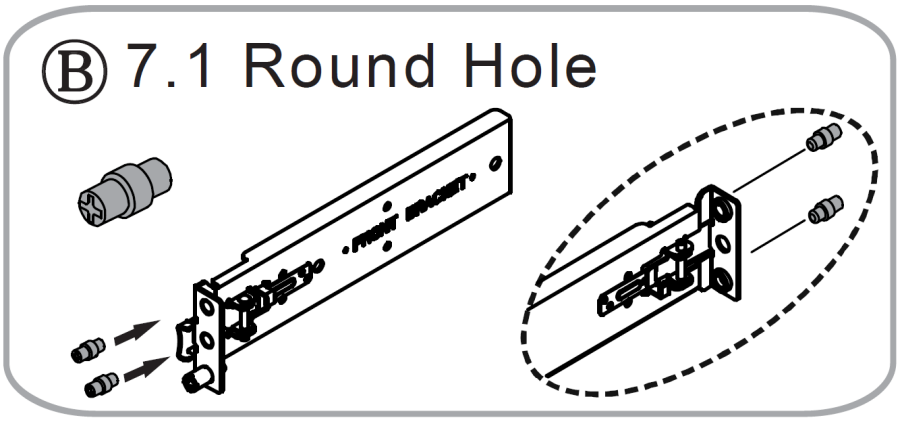
3.5 Rails Assembly and Rack Installation

Note: Please check rack post type before proceeding. The pre-installed rail type is for square hole posts. If the rack post has round holes, please switch to the appropriate screws as shown below.



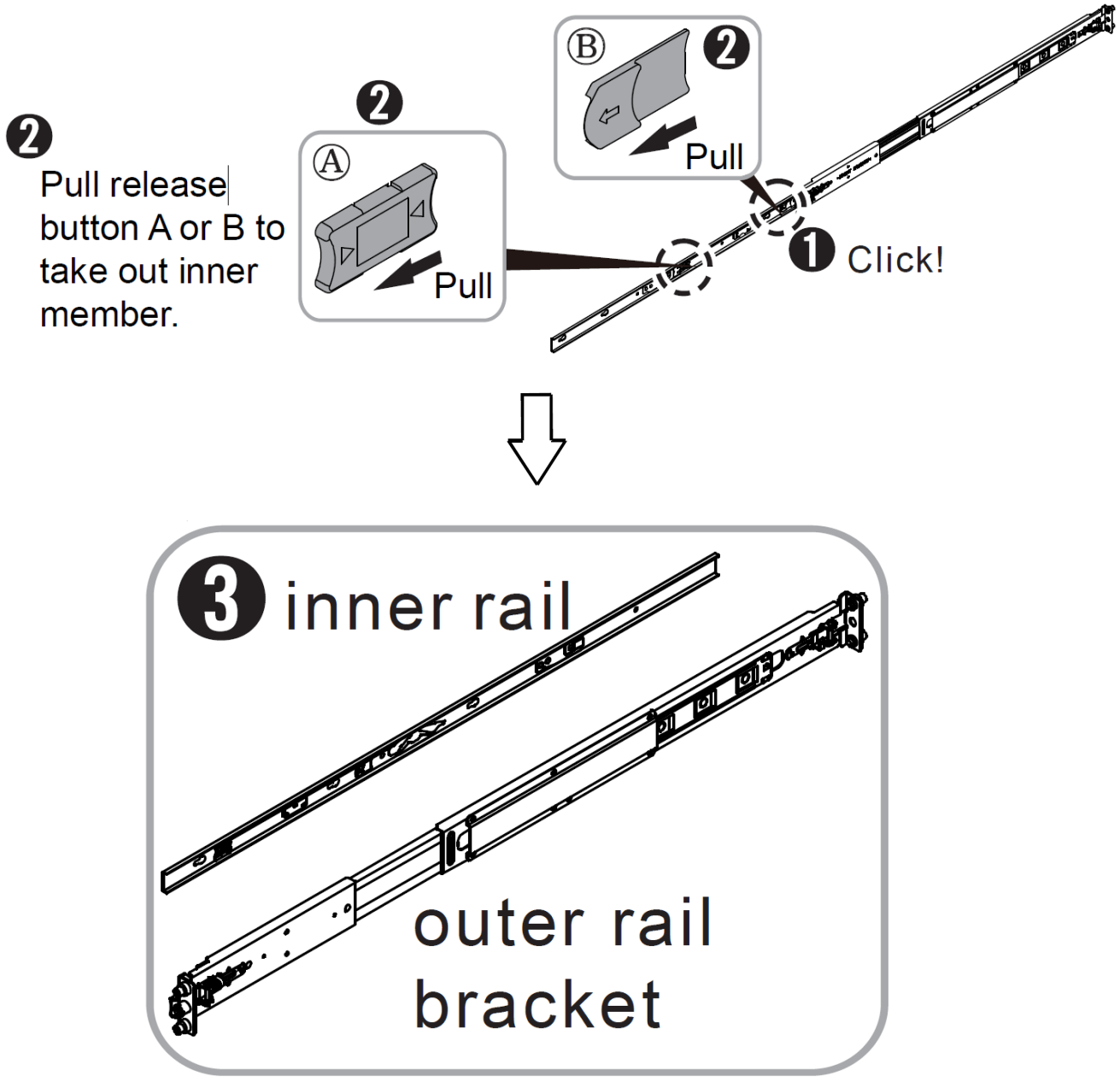
To switch from round holes to square holes, remove the “A” type screws (pre-installed) and replace them with “B” type screws.





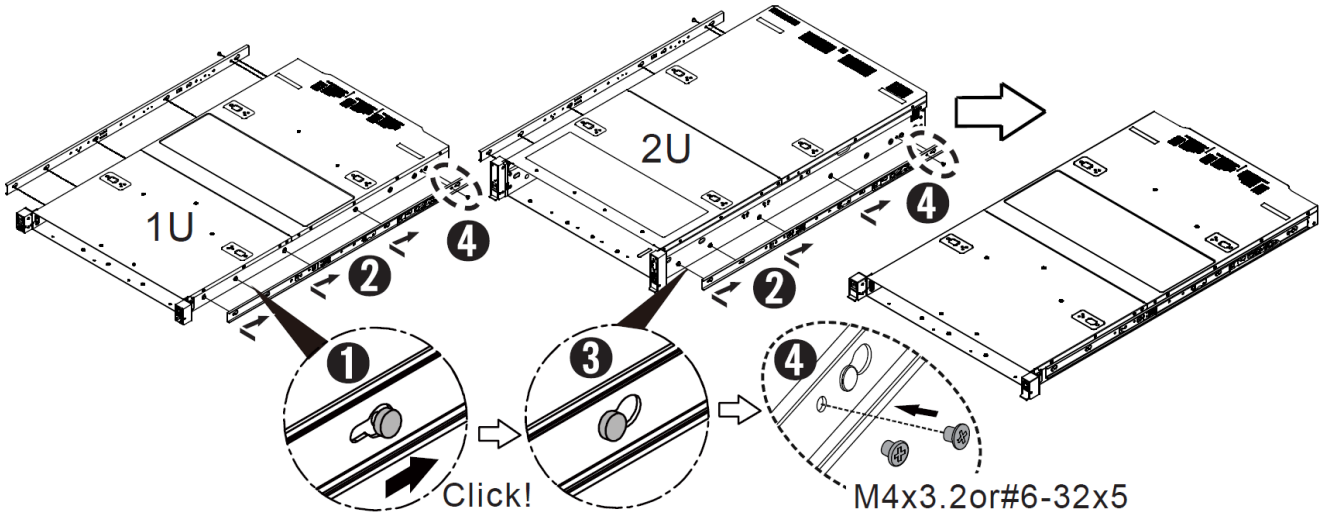
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1. Remove the inner rail.

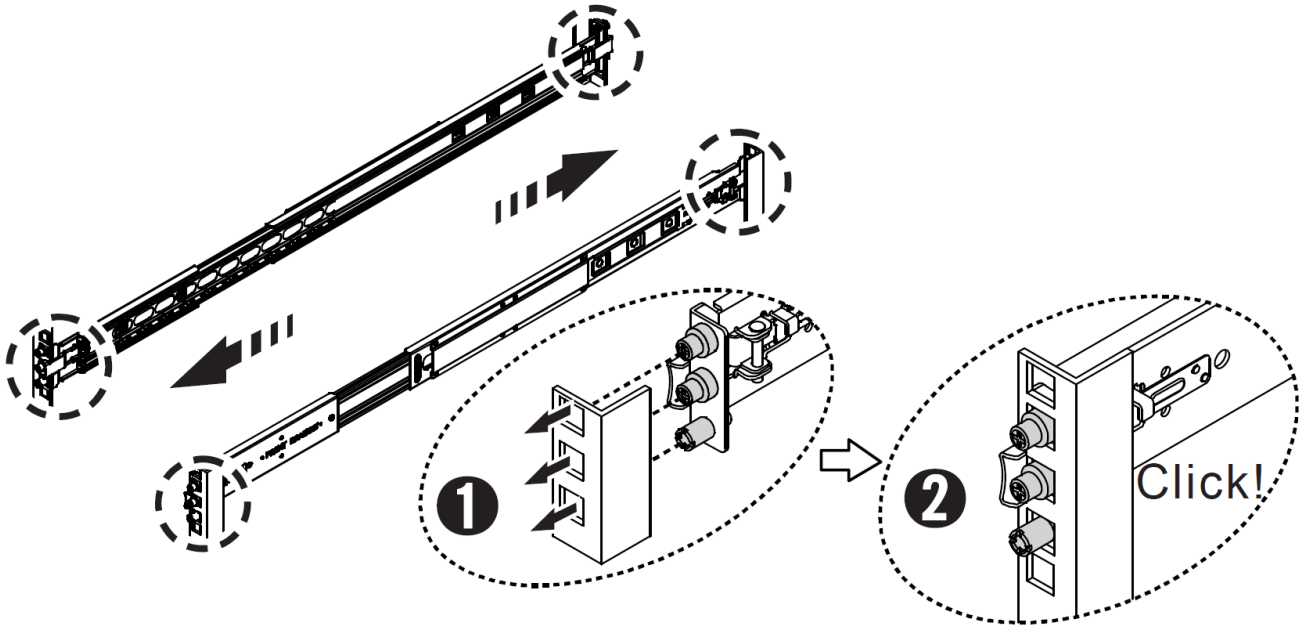


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2. Install the inner rail onto the chassis.



3. Attach the outer rail/bracket assembly to the rack.

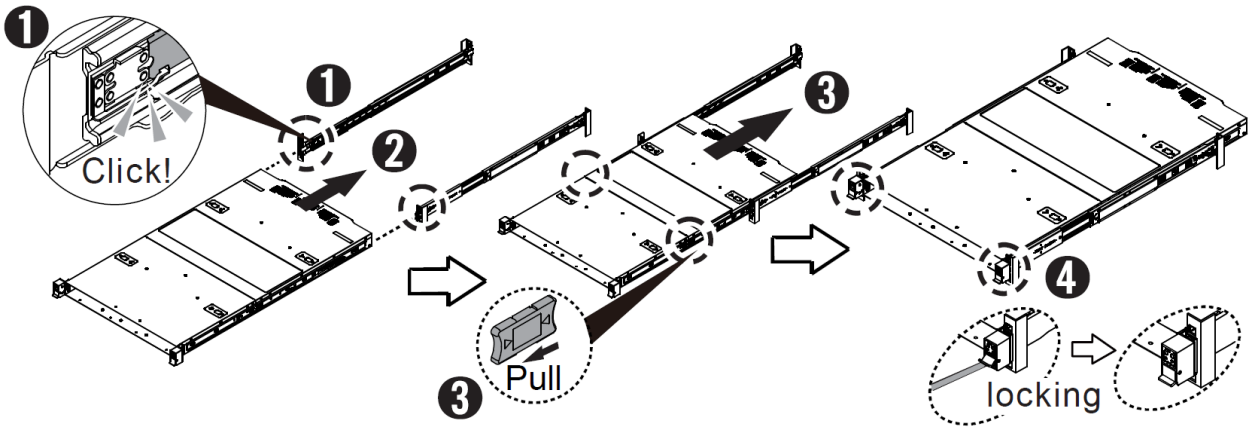


Note: Front and rear bracket installation procedures are the same. The left and right sides of the rail are symmetrical. Repeat the installation steps for the other side.

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4. Insert chassis with the mounted inner rails to complete the installation.

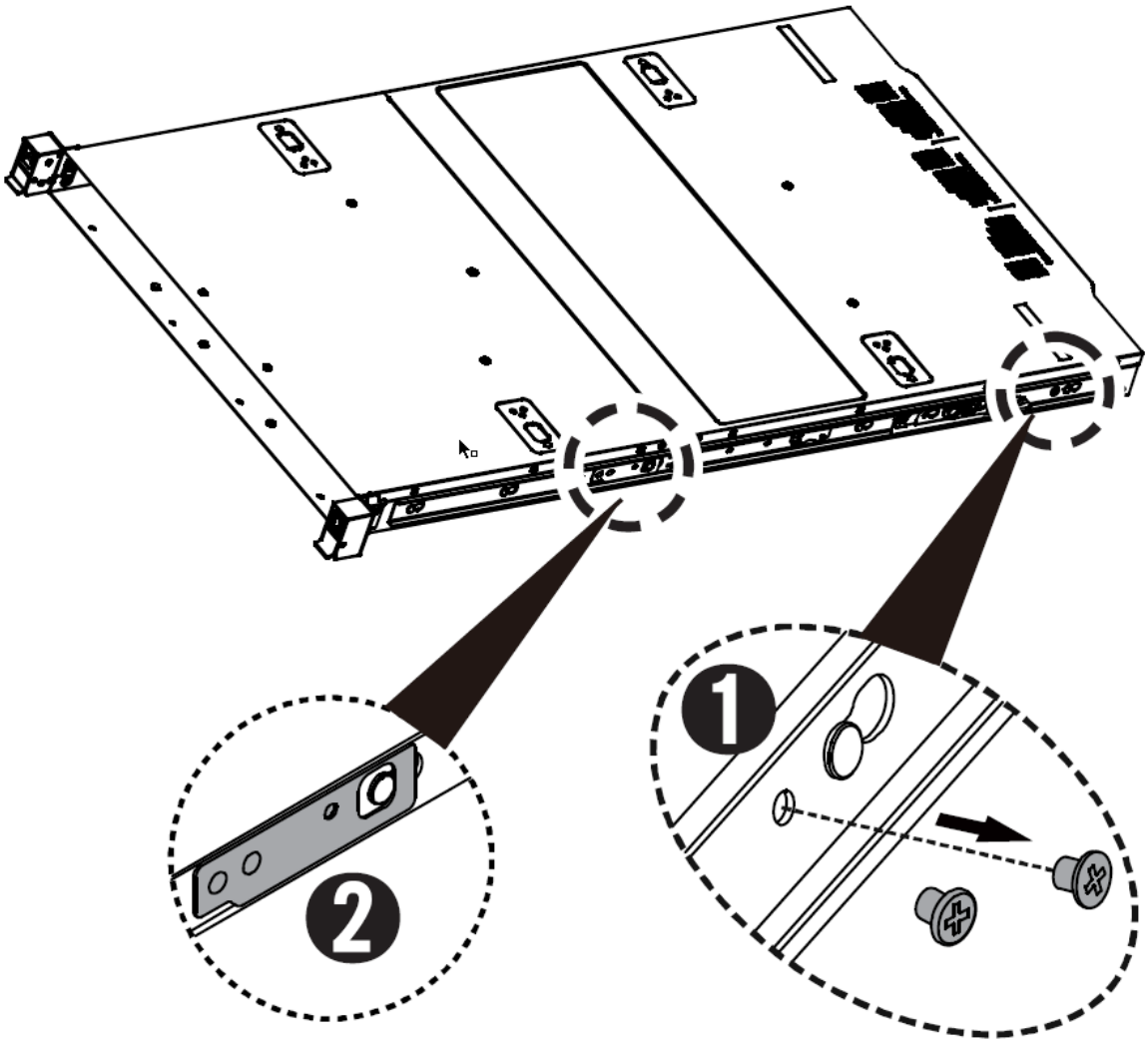
❶ Ensure the ball bearing retainer is located at the front of the rail.
❷ Insert the chassis into the outer rails.
❸ When the chassis is fully inserted, pull/push the release tab on the inner rails.
❹ Secure the system to the rack using the captive screws located on the rack handles of the system.



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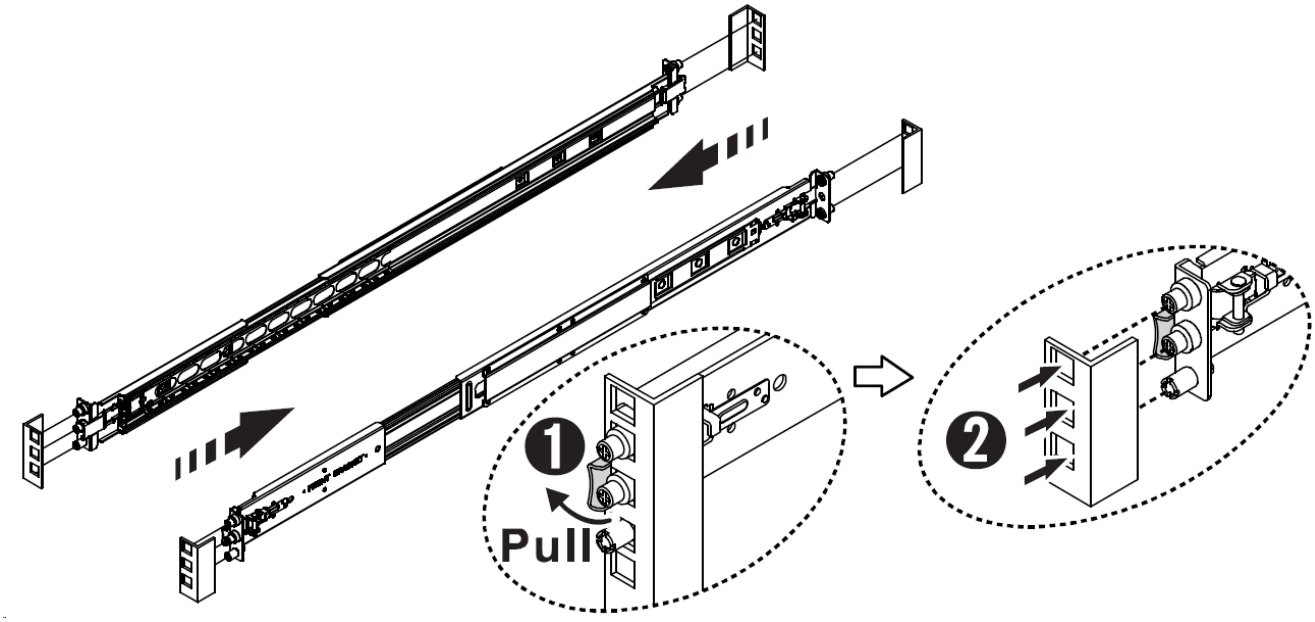
3.6 Uninstalling the Rails from the Chassis

❶ M4 x3.2 or #6-32 x5
❷ Release the latch to detach the inner rail.



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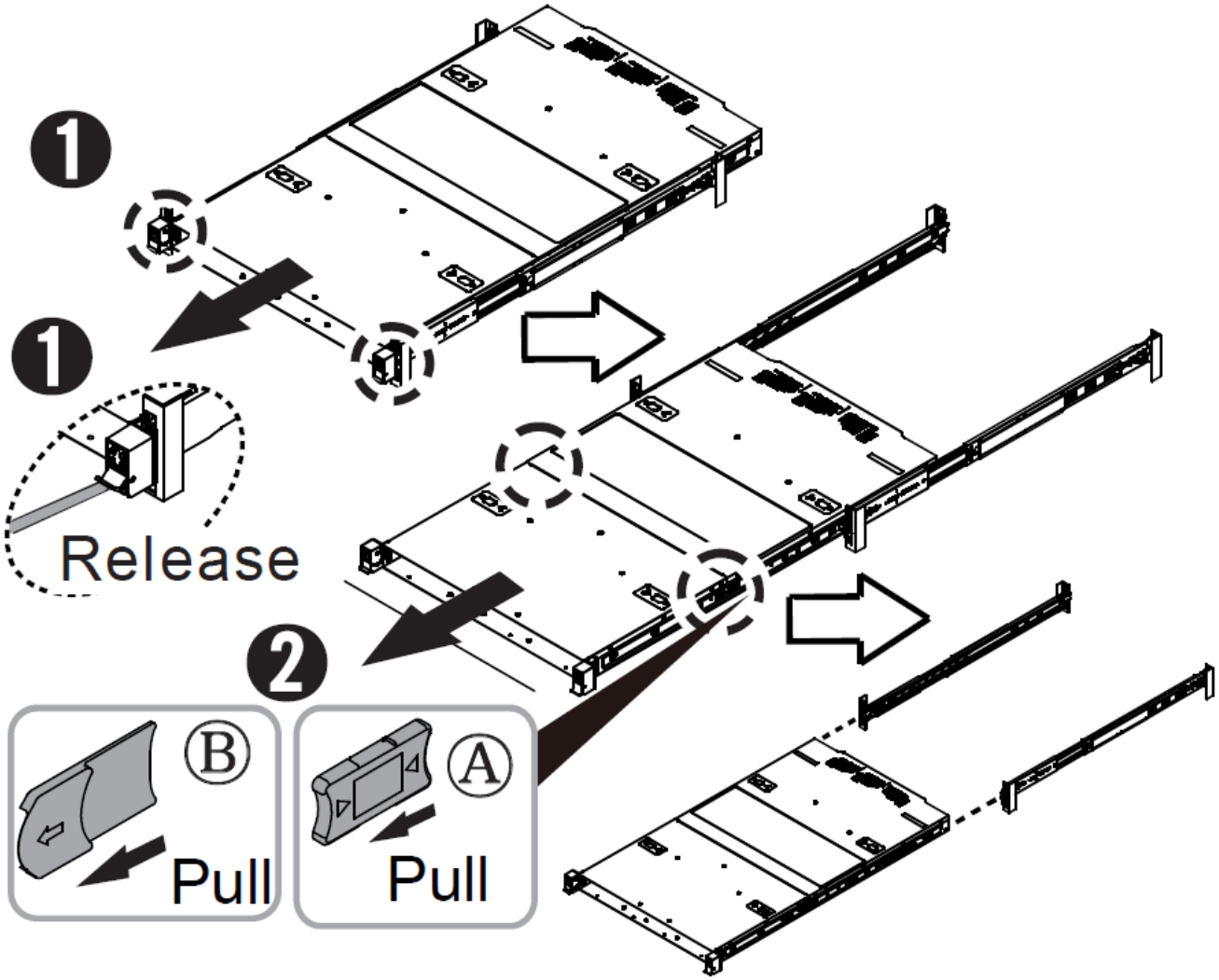
Detach the outer rail/bracket assembly from the rack.



Note: Front and rear bracket detachment procedures are the same. The left and right sides of the rail are symmetrical. Repeat the steps for the other side.

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❶ Loosen the captive screws and then pull out the chassis.
❷ Pull release button A or B to remove the chassis.

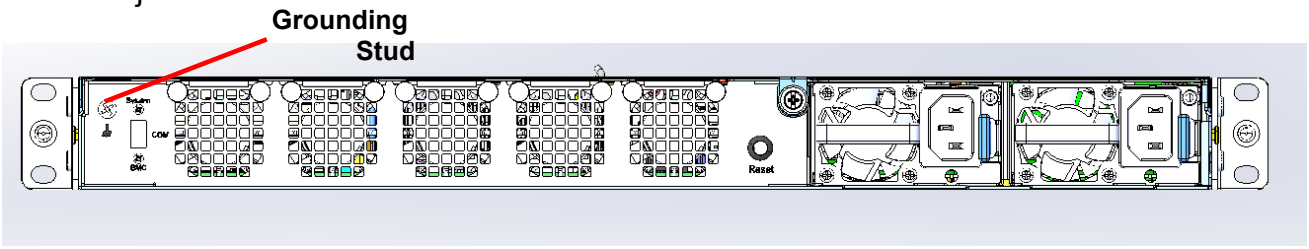


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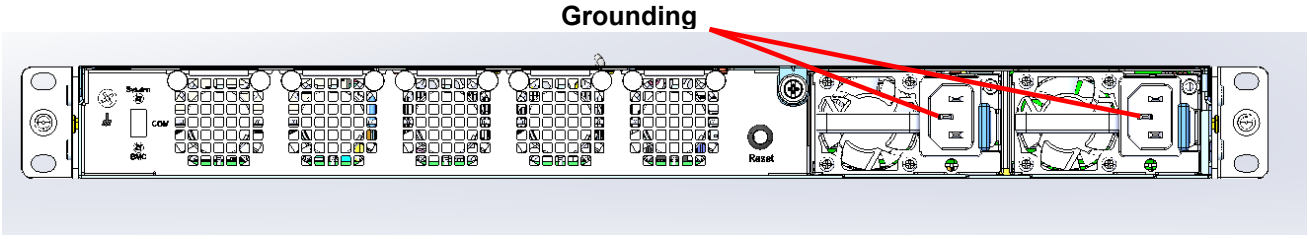
3.7 Connecting the System to Ground

AC Version

A grounding stud (M4 size) is provided on the rear of the chassis for an additional connection to ground. The bonding wire shall be a minimum 14 AWG and with green-and yellow insulation jacket.

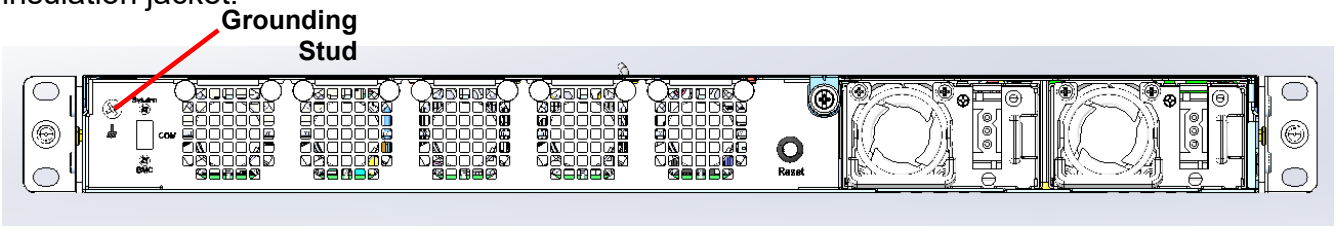


The others are connected to ground by the PSU ground pin of the 3-prong IEC power cord. Please use the power cord provided with the system for your region.

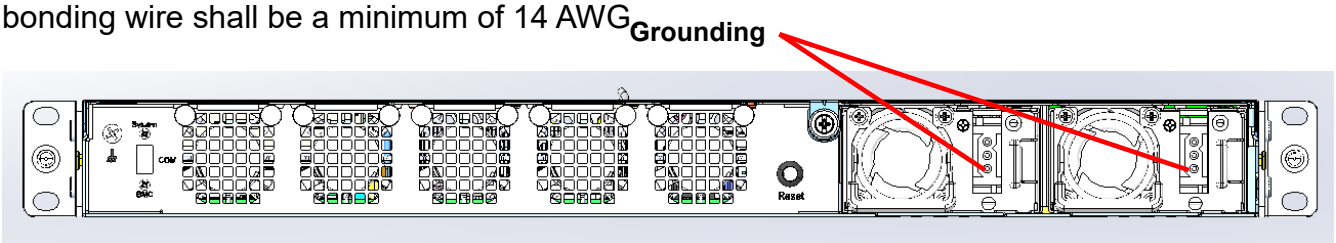


DC Version

A grounding stud (M4 size) is provided on the rear of the chassis for an additional connection to ground. The bonding wire shall be a minimum 14 AWG and with green-and yellow insulation jacket.



The others are connected to ground by the PSU ground pin of the DC power cord. The bonding wire shall be a minimum of 14 AWG

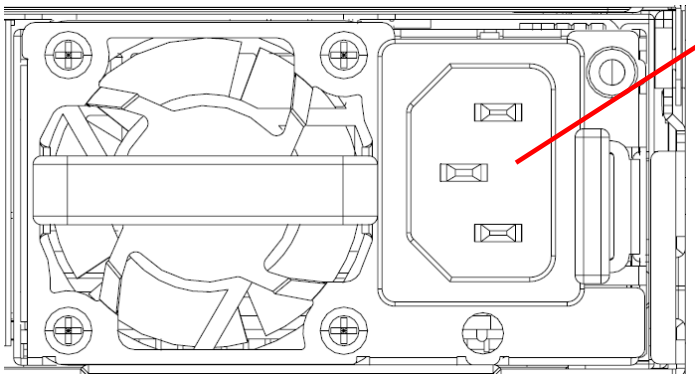


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3.8 System Power Cable Installation

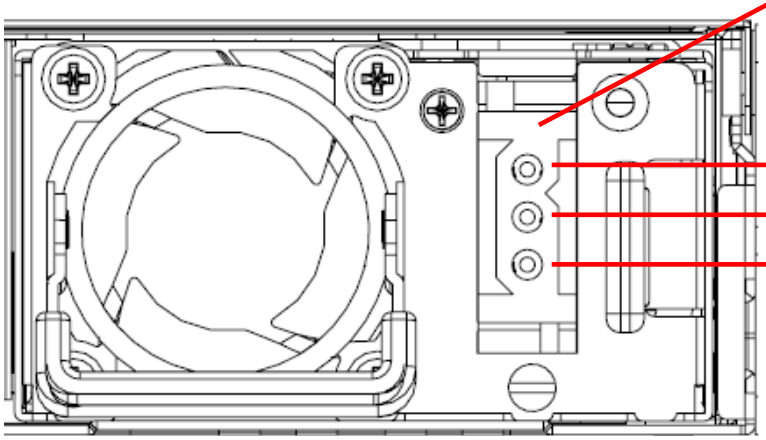
AC PSU Input

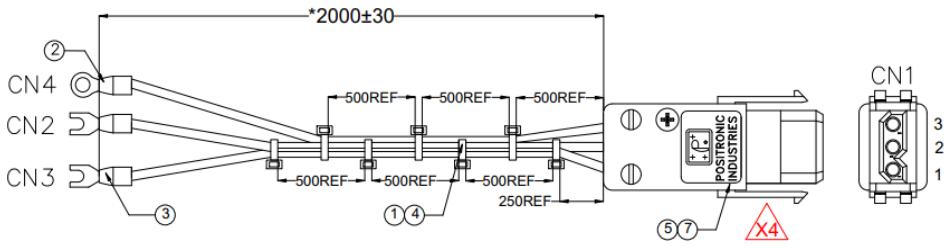
3-prong IEC power cord



DC PSU Input

Use the included cable to the DC power inlet (PLA03M8000/AA).







CAUTION:
mise en garde

All installation procedures are restricted to skilled personnel.

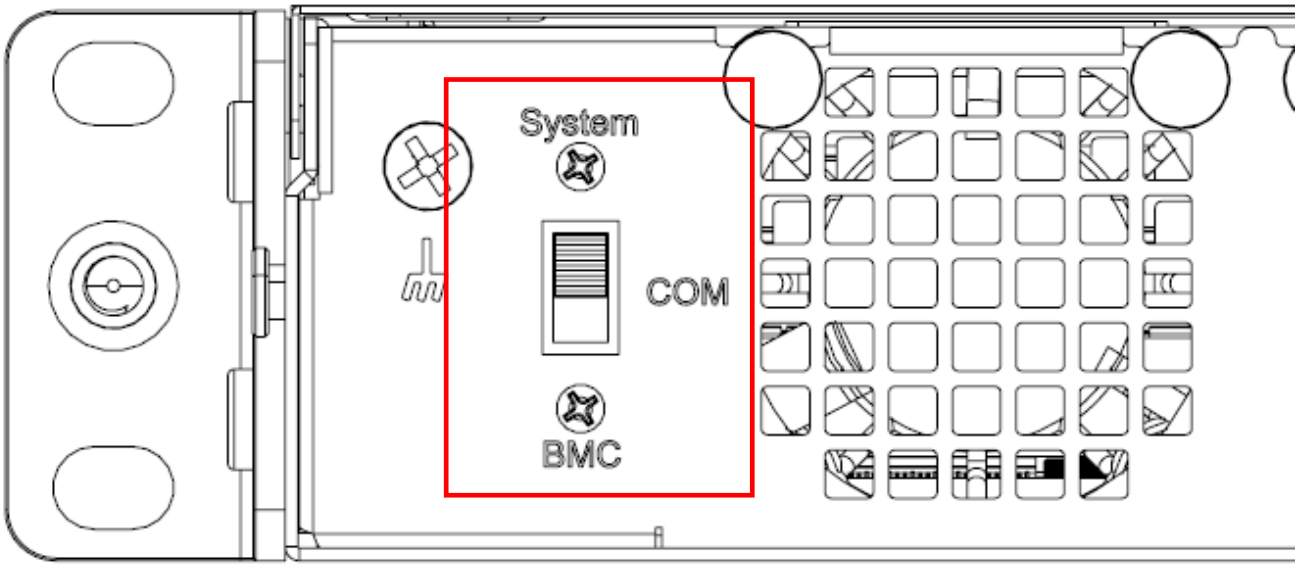
The terminal block is suitable for a minimum 14 AWG, minimum 60V, minimum 105 °C, VW-1 power cord. Torque value is 1.2 N·m.

Toutes les procédures d'installation sont réservées au personnel qualifié. Le bornier est adapté à un cordon d'alimentation VW-1 minimum de 14 AWG, minimum 60 V, minimum 105 °C. La valeur de couple est de 1,2 N·m.

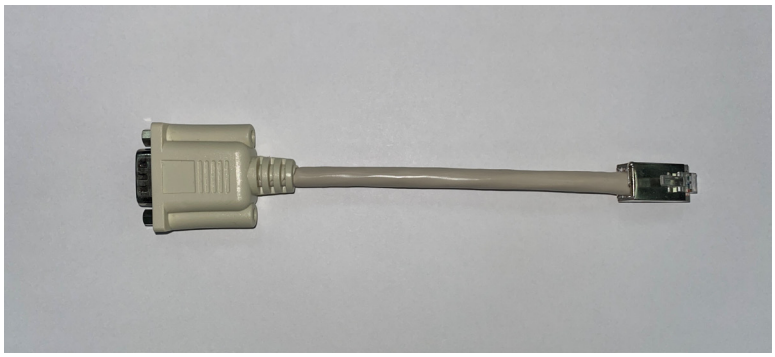
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3.9 Login to the BMC via Console Port

Step 1
Set Console Port to BMC mode using the wall mount switch on the chassis rear panel. (see 1.3.2 *AXE-5100R7 Rear Panel*).



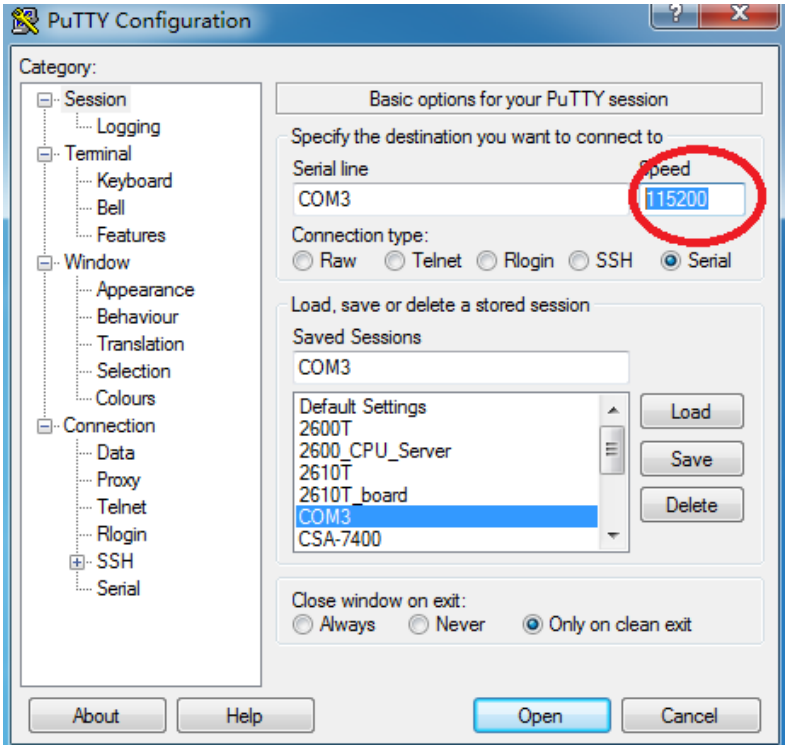
Step 2
Use the included RJ-45 to DB-9 console port adapter cable to connect the PC to the RJ-45 console port of the AXE-5100R7 (see *1.3.1 AXE-5100R7 Front Panel*). See *4.3 Dual USB 3.0 and RJ-45 Console Port* on page 52 for the adapter cable pin definition.



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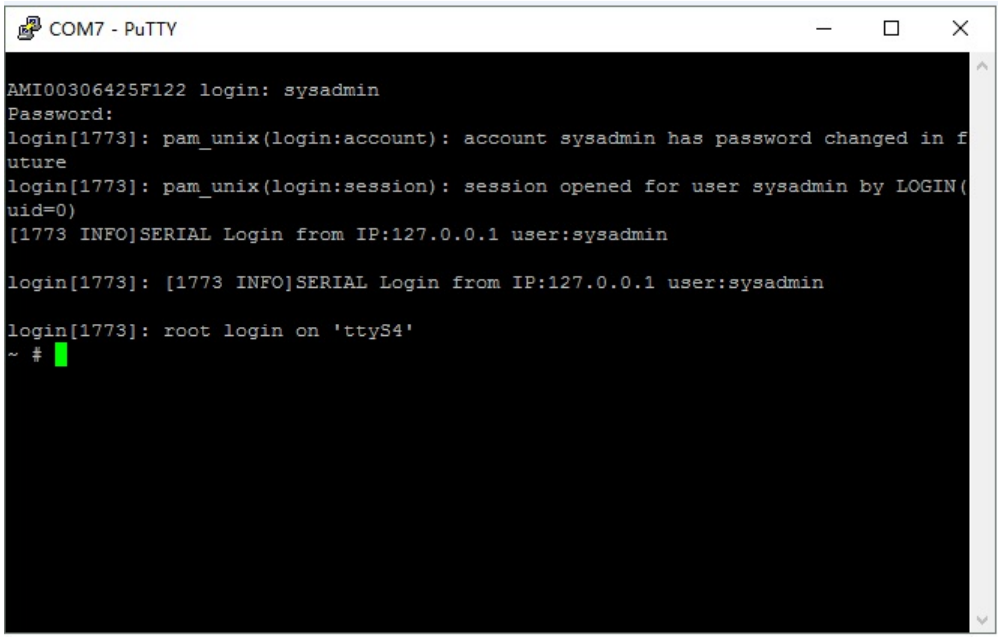
Step 3

Open a serial port console tool (such as PuTTY), choose the higher COM port (it may be different depending on the computer), then set the baud rate to 115200.



Step 3

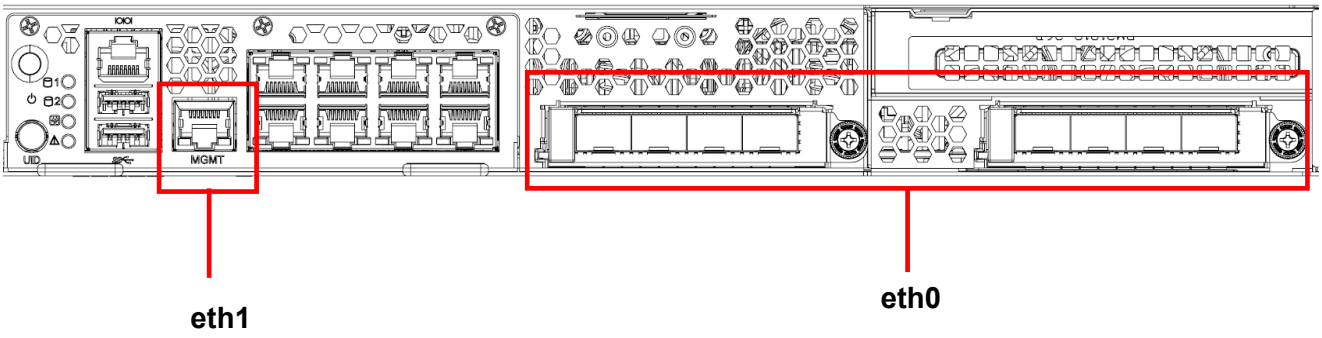
Input the username “sysadmin” and password “superuser” to login to the system.



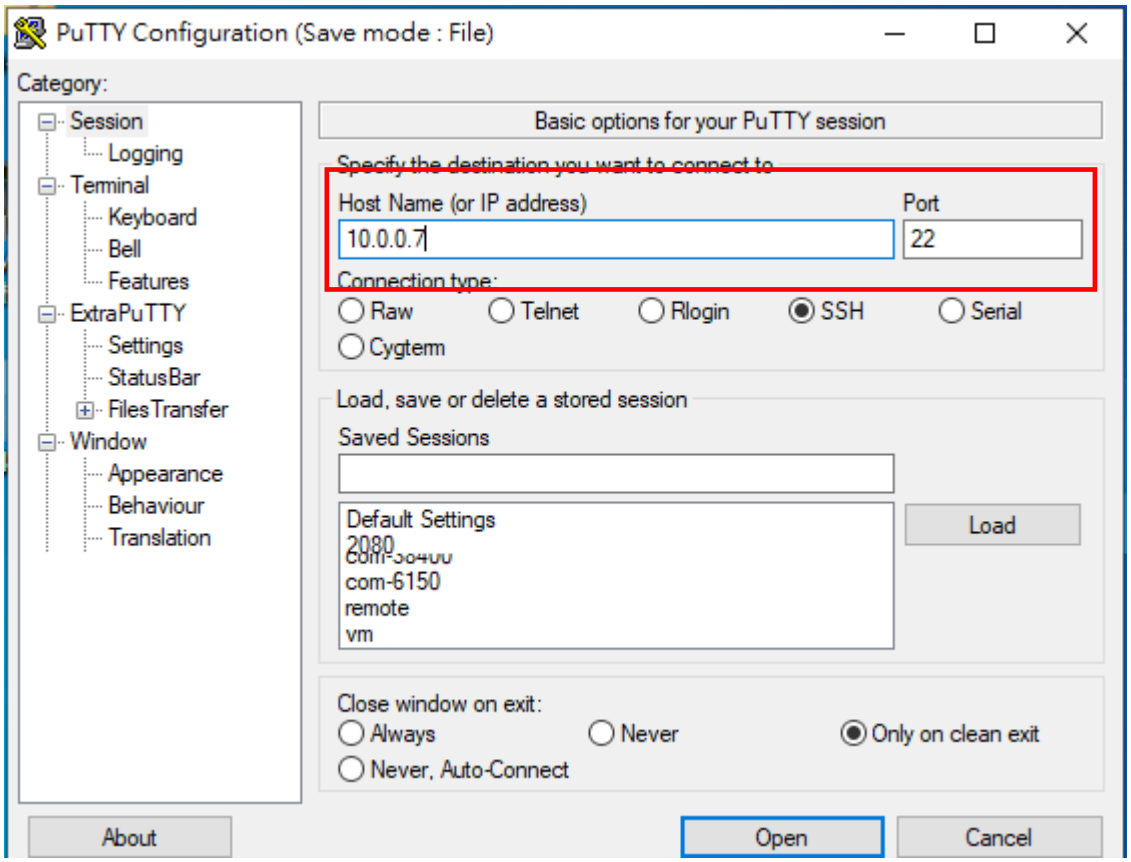
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3.10 Login to the BMC via Network

Step 1
Use a LAN cable to connect eth1 of the AXE-5100R7 to the PC;



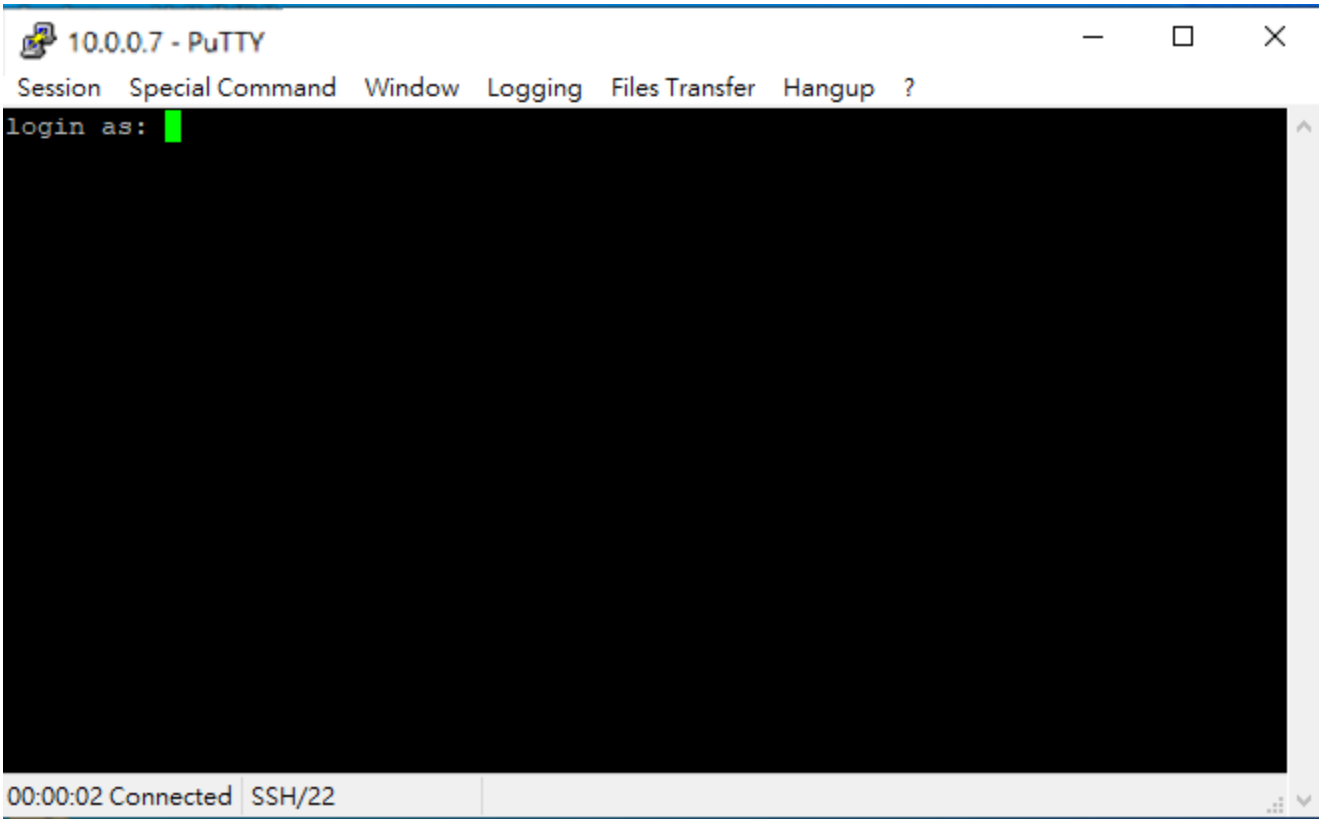
Step 2
Open a serial port console tool (such as PuTTY) enter the IP address, and open a connection to the BMC (login using serial console first to check the IP address).



Note:10.0.0.7 is an example.

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Step 3
Input the username “admin” and password “admin” to login to the system.



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3.11 BMC eth0 Default and Static IP Settings

The default IP setting is DHCP. Users can login to the BMC to modify the IP.

Static IP Settings:

Show the current LAN setting
☐ ipmitool lan print 1

Set the IP source to static
☐ ipmitool lan set 1 ipsrc static

Set the IP address
☐ ipmitool lan set 1 ipaddr xxx.xxx.xxx.xxx

Set the netmask address
☐ ipmitool lan set 1 netmask xxx.xxx.xxx.xxx

Set the gateway address
☐ ipmitool lan set 1 defgw ipaddr xxx.xxx.xxx.xxx

Restore Default:

Set IP source to DHCP
☐ ipmitool lan set 1 ipsrc dhcp

Note: BMC IP can be set in the BIOS. See *5.6.1 BMC Network Configuration* on page 92.

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3.12 BMC eth1 Default and Static IP Settings

The default IP setting is DHCP. Users can login to the BMC to modify the IP.

Static IP Settings:

Show the current LAN setting
☐ ipmitool lan print 8

Set the IP source to static
☐ ipmitool lan set 8 ipsrc static

Set the IP address
☐ ipmitool lan set 8 ipaddr xxx.xxx.xxx.xxx

Set the netmask address
☐ ipmitool lan set 8 netmask xxx.xxx.xxx.xxx

Set the gateway address
☐ ipmitool lan set 8 defgw ipaddr xxx.xxx.xxx.xxx

Restore Default:

Set IP source to DHCP
☐ ipmitool lan set 8 ipsrc dhcp

Note: BMC IP can be set in the BIOS. See *5.6.1 BMC Network Configuration* on page 92.

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3.13 BIOS Update

Users can update the AXE-5100R7 system BIOS over various interfaces (Gigabit LAN, KCS, console port).

3.13.1 Updating BIOS via Host with BIOS Tool

1. Boot/Login to Shell
2. Update the BIOS over host with the following commands.

   Execute pBIOS.nsh

```
fs3:\ADLink\CSA-5100A> cd CSA-5100A_01010_FullImage

fs3:\ADLink\CSA-5100A\CSA-5100A_01010_FullImage> dir
Directory of: fs3:\ADLink\CSA-5100A\CSA-5100A_01010_FullImage

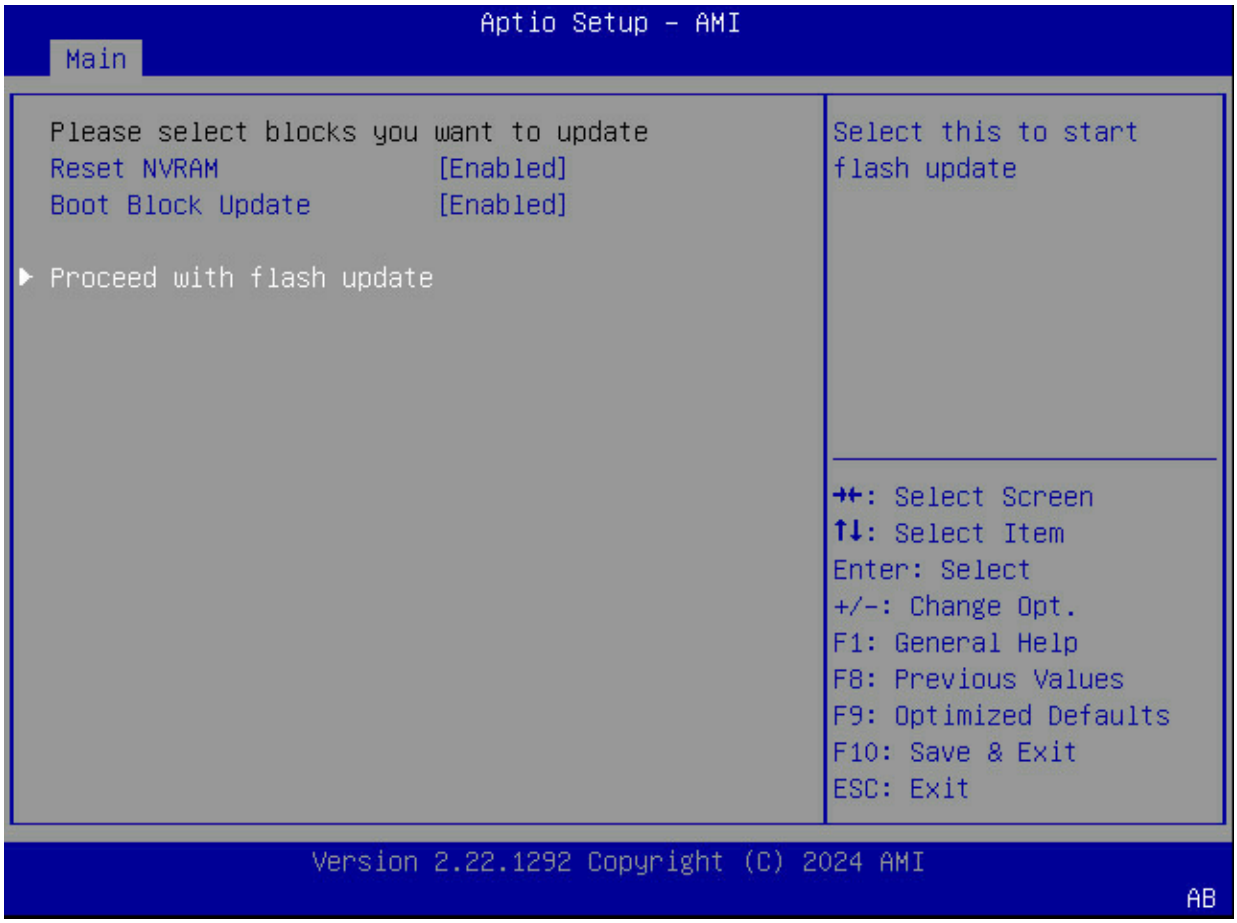
  11/21/24  04:44p <DIR>          16,384  .
  11/21/24  04:44p <DIR>          16,384  ..
  11/14/24  01:14a               629,680  AfuEfix64.efi
  11/14/24  01:14a            33,554,432  CSA-5100A_01010.BIN
  11/14/24  01:14a                 9,346  HISTORY.txt
  11/14/24  01:14a                   589  pBIOS.nsh
          4 File(s)  34,194,047 bytes
          2 Dir(s)

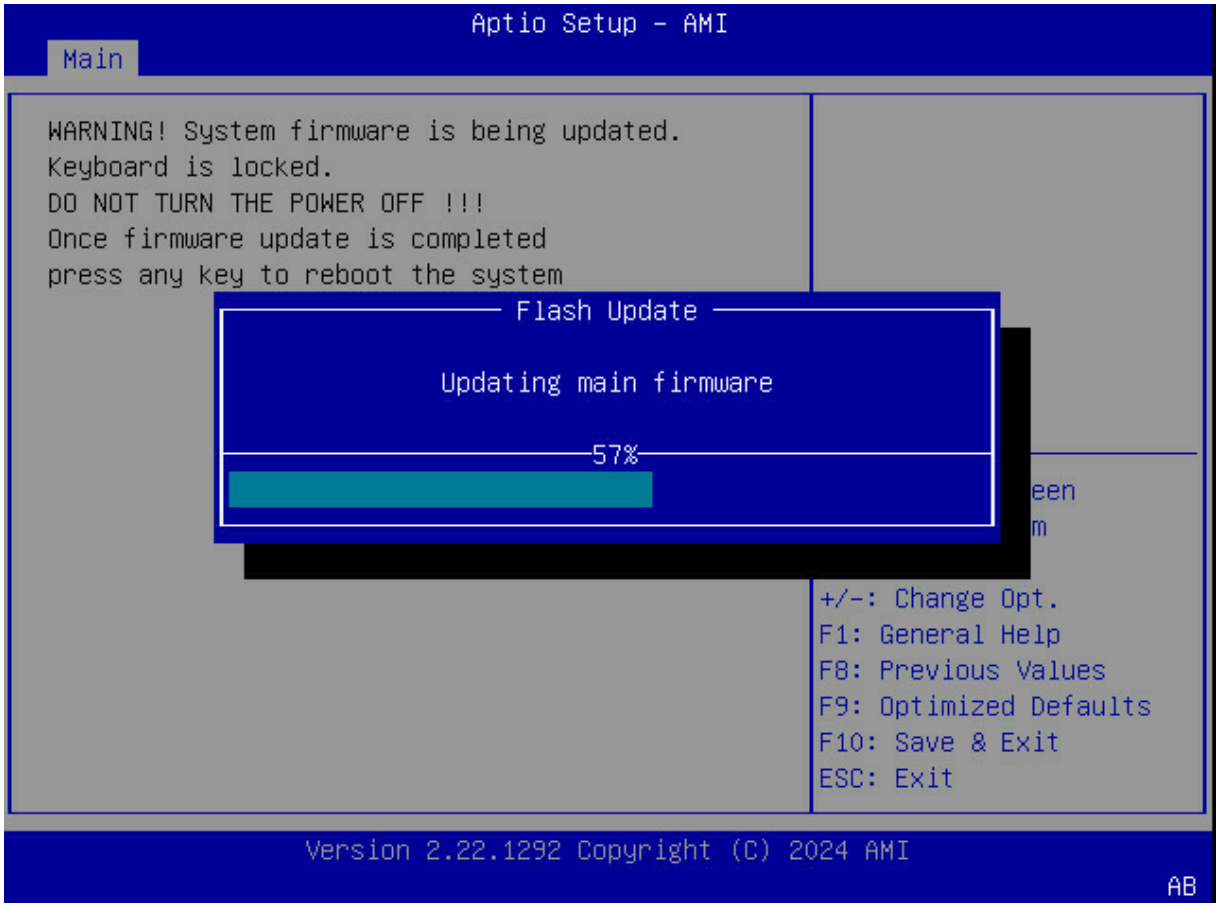

fs3:\ADLink\CSA-5100A\CSA-5100A_01010_FullImage> pBIOS.nsh_
```

```
WARNING: This utility will reprogram the system BIOS!!!
WARNING: Do NOT continue unless you are 100 percent sure you want to do this.
WARNING: To stop, turn off your computer and remove the update media.
pBIOS.nsh> pause
Enter 'q' to quit, any other key to continue:
The system will be restarted and enter Recovery Page within 20 seconds.
Please continue to complete the BIOS update processes.
pBIOS.nsh> AfuEfix64.efi CSA-5100A_01010.BIN /FAB /P /N /RLC:F /CAPSULE /Q /X
+-------------------------------------------------------------------------------+
|                 AMI Firmware Update Utility v5.16.01.0109                     |
|      Copyright (c) 1985-2023, American Megatrends International LLC.         |
|         All rights reserved. Subject to AMI licensing agreement.              |
+-------------------------------------------------------------------------------+
_
```

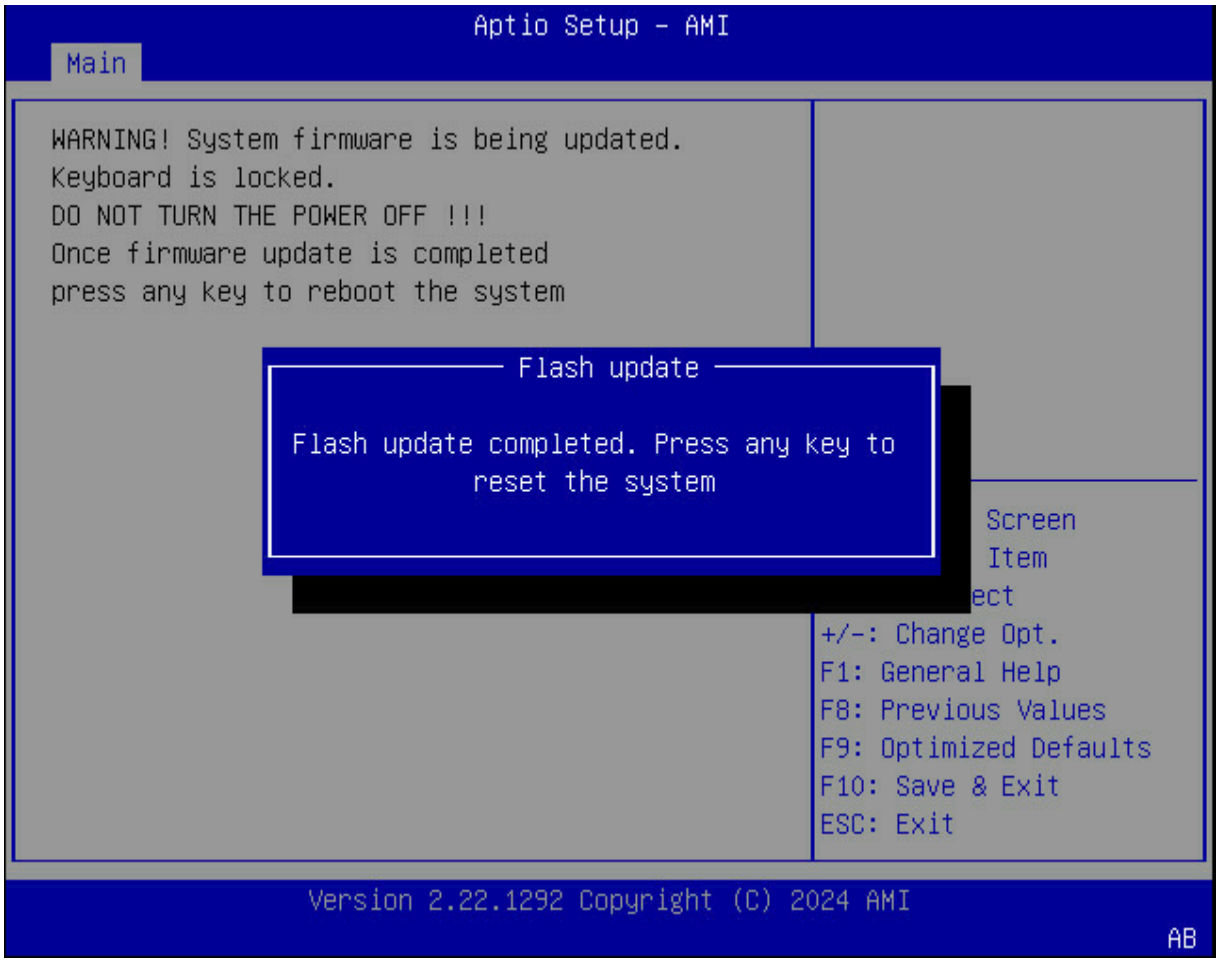
3. Wait for a while for the system to reboot.
4. Select “Proceed with flash update”

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3.14 BMC Firmware Update via Network

This section outlines the various methods available for updating the BMC firmware. BMC firmware updates can be performed through four primary methods:

1. **Web interface update**
   For detailed steps and guidelines, please refer to Section 6.2.8.1.1 BMC Update.
2. **Redfish update**
   For detailed steps and guidelines, please refer to Section 6.4.5 BMC Update.
3. **Yafuflash tool update**
   See below for detailed steps and guidelines.

Yafuflash is a command-line utility designed for updating BMC firmware in a fast and reliable manner. This tool is specifically tailored for systems requiring regular firmware updates and supports a range of BMC firmware formats.

After extracting, the following files and directories are available:

AMI_Yafuflash_Release_Notes.pdf	Release notes for Yafuflash.
AMI_Yafuflash_User_Guide.pdf	Detailed user manual.
DOS	Yafuflash for DOS systems.
Linux_ARM_64	Yafuflash for ARM64 Linux systems.
Linux_x86_64	Yafuflash for x86_64 Linux systems.
MegaRAC SP-X - AMI YAFU Commands Specification.pdf'	
README.md	
Win32	Yafuflash for 32-bit Windows.
Win64	Yafuflash for 64-bit Windows.

Yafuflash supports three primary methods for updating BMC firmware: via Network, USB, and KCS. Below are example via Network and steps for each method.

Network Medium:

./Yafuflash -nw -ip [BMC_ip] -u [username] -p [user password] [FW_IMAGE_FILE]
Example:
./Yafuflash -nw -ip 192.168.0.1 -u admin -p admin.123 rom.ima
This command uses the network to upgrade BMC.

Step-by-Step Guide (Using Network Update as an Example):

1. Initiating Update Command:

```
root@bmc-MECS-7120:/home/bmc/yafu/v7-LTS-v13/Linux_x86_64# ./Yafuflash -nw -ip 172.20.2.36 -u
admin -p admin.123 rom.ima
INFO: Yafu INI Configuration File not found... Default options will not be applied...

Creating IPMI session via network with address 172.20.2.36...Done

+-------------------------------------------------------+
|      YAFUFlash - Firmware Upgrade Utility v7.01.0111      |
| Copyright (c) 2020 American Megatrends International, LLC |
+-------------------------------------------------------+
Image to be updated is Inactive Image (Image-2)
Please type (Y/y) to proceed or (N/n) to change the Image:
```


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Note:

- *The system will prompt if you want to proceed with updating the inactive image.*
- *Typing **Y** will proceed with the update, while **N** will lead to the image selection interface.*

2. Selecting the Image to Update:

If **Y** is selected The system will prompt if you want to proceed with updating the inactive image:

```
+-------------------------------------------------------------+
|     YAFUFlash - Firmware Upgrade Utility v7.01.0111      |
| Copyright (c) 2020 American Megatrends International, LLC |
+-------------------------------------------------------------+
Image to be updated is Inactive Image (Image-2)
Please type (Y/y) to proceed or (N/n) to change the Image:y
The Module root allocated size is different from the one in the Image
The Module osimage location is different from the one in the Image
The Module www location is different from the one in the Image
The Module extlog location is different from the one in the Image
The Module extlog location is different from the one in the Image
The Module bootlogo location is different from the one in the Image
The Module arcity size is different from the one in the Image
So, type (Y/y) to do Full Firmware Upgrade or (N/n) to exit
Enter your Option :
```

If **N** is selected:

```
INFO: Yafu INI Configuration File not found... Default options will not be applied...

Creating IPMI session via network with address 172.20.2.36...Done

+-------------------------------------------------------------+
|     YAFUFlash - Firmware Upgrade Utility v7.01.0111      |
| Copyright (c) 2020 American Megatrends International, LLC |
+-------------------------------------------------------------+
Image to be updated is Inactive Image (Image-2)
Please type (Y/y) to proceed or (N/n) to change the Image:n
Please type Option '0' : to Flash Inactive Image Image-2
                       '1' : to Flash Image-1
                       '2' : to Flash Image-2
                       '3' : to Flash both Images :
```

***Note:** User will be presented with options to choose which image to update: inactive image, Image-1, Image-2, or both.*

3. Firmware Update Process:

After making the selection, you will be prompted to confirm the update by typing Y.

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```
================================================================================
                        Firmware Details
================================================================================
                                        RomImage      Image 1       Image 2
   ModuleName          Description      Version       Version       Version
1. boot                BootLoader       13.5.000000   13.5.000000   13.5.000000
2. conf                ConfigParams     13.5.000000   13.5.000000   13.5.000000
3. root                Root             13.5.000000   13.5.000000   13.5.000000
4. osimage             Linux OS         13.5.000000   13.5.000000   13.5.000000
5. www                 Web Pages        13.5.000000   13.5.000000   13.5.000000
6. extlog              ExtendedLog      13.5.000000   13.5.000000   13.5.000000
7. extlog              ExtendedLog      13.5.000000   13.5.000000   13.5.000000
8. bootlogo                             1.0.000000    1.0.000000    1.0.000000
9. arcity                               13.5.010003   13.5.010003   13.5.010003
Existing Image and Current Image are Same
So, type (Y/y) to do Full Firmware Upgrade or (N/n) to exit
Enter your Option :
```

Upon confirmation, the BMC firmware update will begin. The BMC will automatically reboot after the update is completed.

```
********************************************************************************
 WARNING!
       FIRMWARE UPGRADE MUST NOT BE INTERRUPTED ONCE IT IS STARTED.
       PLEASE DO NOT USE THIS FLASH TOOL FROM THE REDIRECTION CONSOLE.
********************************************************************************
Preserving Env Variables...            done
Uploading Firmware Image : 100%... done
Skipping [boot] Module ....
Flashing [conf] Module ....
Flashing  Firmware Image : 100%... done
Verifying Firmware Image : 100%... done
Flashing [root] Module ....
Flashing  Firmware Image : 100%... done
Verifying Firmware Image : 100%... done
Flashing [osimage] Module ....
Flashing  Firmware Image : 100%... done
Verifying Firmware Image : 100%... done
Flashing [www] Module ....
Flashing  Firmware Image : 100%... done
Verifying Firmware Image : 100%... done
Flashing [extlog] Module ....
Flashing  Firmware Image : 100%... done
Verifying Firmware Image : 100%... done
Flashing [extlog] Module ....
Flashing  Firmware Image : 100%... done
Verifying Firmware Image : 100%... done
Flashing [bootlogo] Module ....
Flashing  Firmware Image : 100%... done
Verifying Firmware Image : 100%... done
Flashing [arcity] Module ....
Flashing  Firmware Image : 100%... done
Verifying Firmware Image : 100%... done
Resetting the firmware.....
```


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3.15 BMC Firmware Update via Host with Yafuflash

The AXE-5100R7 supports a BMC Chassis Management firmware, IPMI v2.0 compliant. To update the BMC firmware via host with Yafuflash, perform the following steps.

1. Log in to the OS with root user permission.
2. Update the BMC over host using the commands below:

Example:

```
$ sudo ./Yafuflash -kcs rom.ima

YAFUFlash - Firmware Upgrade Utility (Version 4.117.7)
-----------------------------------------------
(C)Copyright 2016, American Megatrends Inc.
The Module root allocated size is different from the one in the Image
So,Type (Y/y) to do Full Firmware Upgrade or (N/n) to exit
Enter your Option : Y

*******************************************************************************
 WARNING!
        FIRMWARE UPGRADE MUST NOT BE INTERRUPTED ONCE IT IS STARTED.
        PLEASE DO NOT USE THIS FLASH TOOL FROM THE REDIRECTION CONSOLE.
*******************************************************************************
Uploading Firmware Image : 100%... done
Skipping [boot] Module ....
Flashing [conf] Module ....
Flashing  Firmware Image : 100%... done
Verifying Firmware Image : 100%... done
Flashing [root] Module ....
Flashing  Firmware Image : 100%... done
Verifying Firmware Image : 100%... done
Flashing [osimage] Module ....
Flashing  Firmware Image : 100%... done
Verifying Firmware Image : 100%... done
Flashing [www] Module ....
Flashing  Firmware Image : 100%... done
Verifying Firmware Image : 100%... done
Flashing [testapps] Module ....
Flashing  Firmware Image : 100%... done
Verifying Firmware Image : 100%... done
Flashing [ast2500e] Module ....
Flashing  Firmware Image : 100%... done
Verifying Firmware Image : 100%... done
Resetting the firmware..........
-----------------------------------------------
Open IPMI Drivers
-----------------------------------------------
Loading Open IPMI Driver:ipmi_devintf
BMC is booting up, Please load ipmi_si Open IPMI Driver after the BMC
Boots up!!!!
Loading Open IPMI Driver:ipmi_msghandler
```


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3.16 Enter BIOS Setup

To enter the BIOS setup screen, follow these steps:

1. Power on the AXE-5100R7.
2. Press the <Delete> or <ESC> key on your keyboard when you see the following text prompt: “Press DEL or ESC to enter Setup”.
   (Note: If Quick Boot is enabled, the screen below will not display, but pressing the <Delete> or <ESC> key will still allow you to enter the BIOS setup screen.)

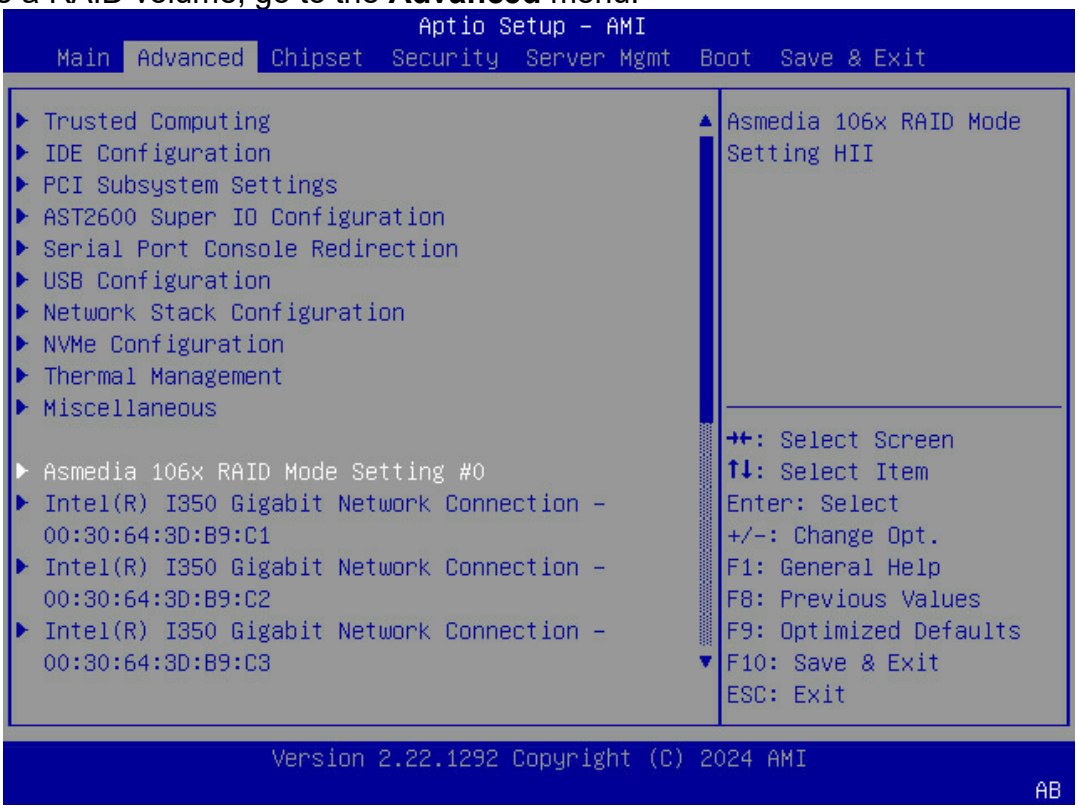


3. After pressing the <Delete> or <ESC> key, the main BIOS setup menu will display. You can access the other setup screens from the main BIOS setup menu, such as Chipset and Power menus.

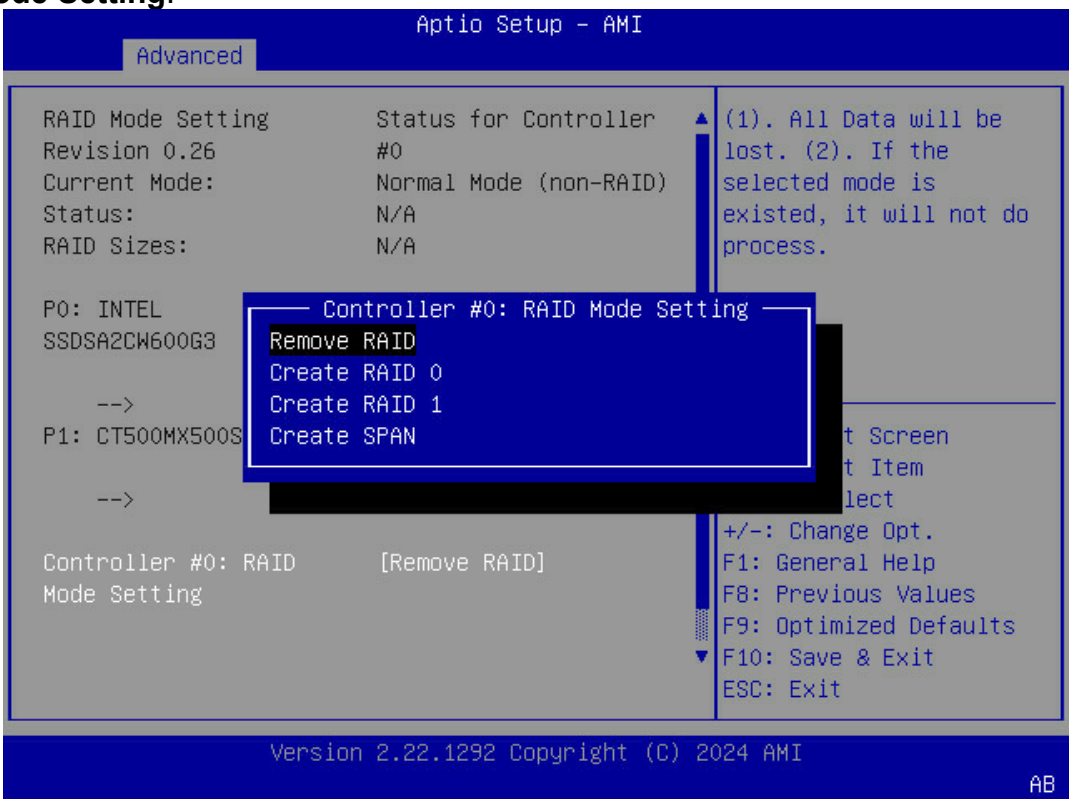
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3.17 Create a RAID Volume

To create a RAID volume, go to the **Advanced** menu.



Enter the **Asmedia 106x RAID Mode Setting #0** submenu and click on **Controller #0: RAID Mode Setting**.



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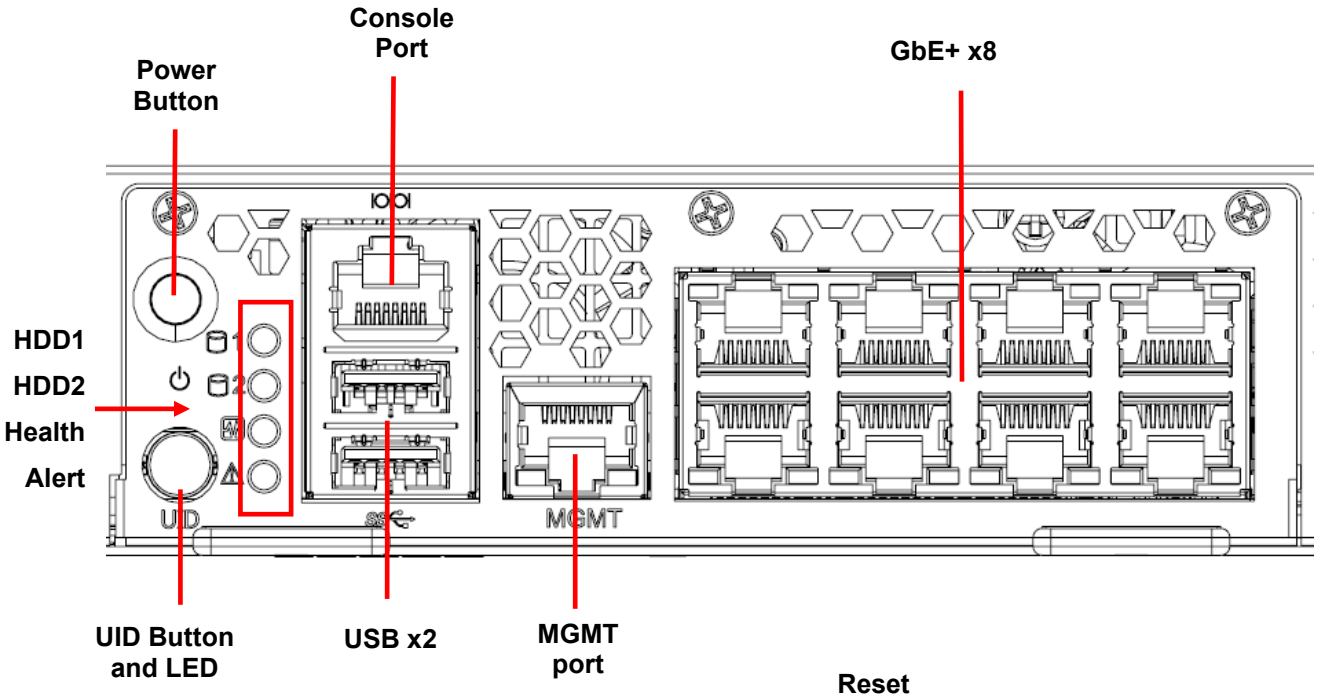
3.18 Clear CMOS

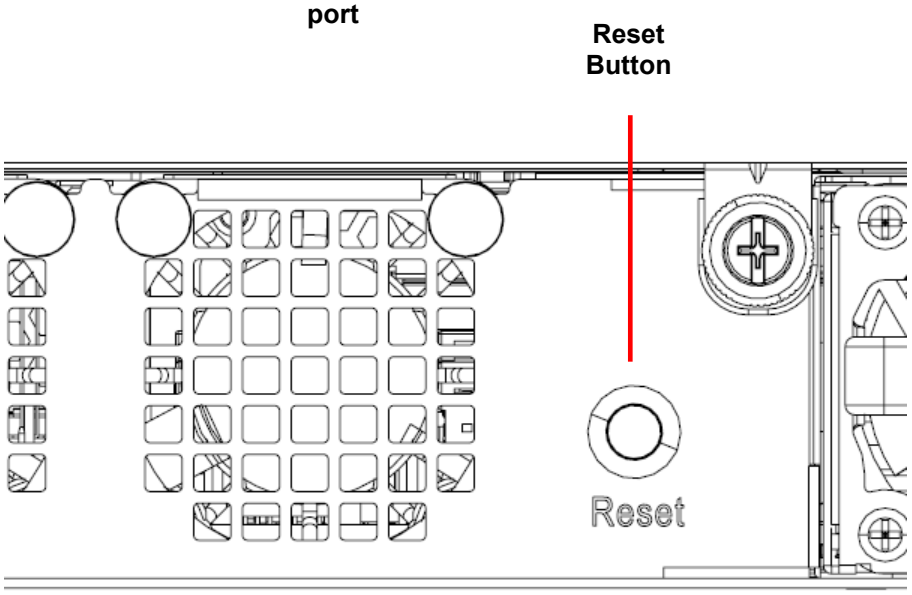
See *4.8 Board Layout* on page 55 for the location of the Clear CMOS jumper (RTCCLR1).

RTCCLR1	Setting
1-2	default
2-3	Clear CMOS

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4 System Interfaces





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4.1 Status LEDs

Alert LED (red)
Off: Indicates normal system operation. On: Indicates a critical alarm.

Drive Activity (HDD) LED (yellow)
Yellow LED for 1st HDD activity from RAID controller and Orange LED for 2nd HDD activity form RAID controller.
Note: This LED can also be user defined. See *4.6 HDD/User LED Jumper* and *4.7 User LED Commands* on pages 53 and 53.

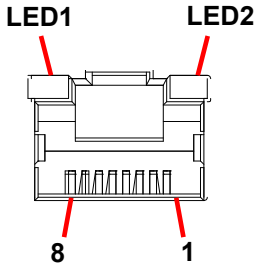
UID Button and LED (blue)
The UID button/indicator is used to conveniently locate the server. The LED can be turned off or on manually by pressing the UID button or remotely controlled by management command.

Health Behavior LED (green/red)
Green LED to indicate the BIOS post health status

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4.2 LAN Ports

Pin #	Signal
1	TX1+
2	TX1-
3	TX2+
4	TX2-
5	TX3+
6	TX3-
7	TX4+
8	TX4-



LAN LED Behaviour

The LAN LEDs are integrated into the RJ-45 connector. Their behavior is as follows:

The LED1 (Speed) indicates the speed of the LAN connection.

LED1 (Speed)	
100 Mbps	Green
1000 Mbps	Yellow

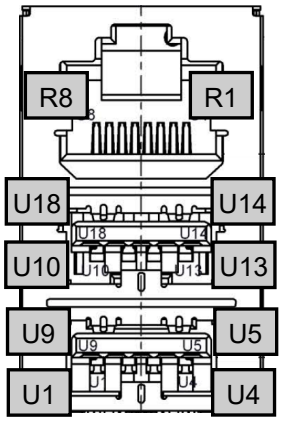
The LED2 (Link/Activity) indicates that a link has been established by lighting orange. When data is transmitted the LED blinks orange.

LED2 (Link/Activity)	
Link with no activity	Green
Link with activity	Yellow

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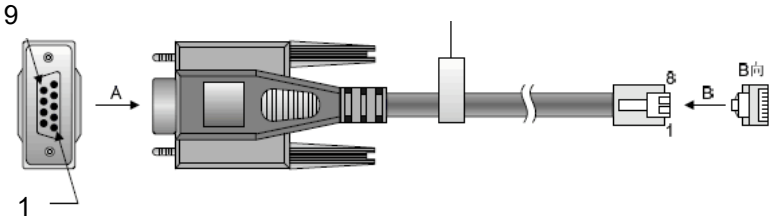
4.3 Dual USB 3.0 and RJ-45 Console Port

Pin	Signal Name
R1	N/C
R2	N/C
R3	COM_TXD
R4	GND
R5	GND
R6	COM_RXD
R7	N/C
R8	N/C
U1	5V
U2	USB2_N
U3	USB2_P
U4	GND
U5	SSRX_N
U6	SSRX_P
U7	GND
U8	SSTX_N
U9	SSTX_P
U10	5V
U11	USB2_N
U12	USB2_P
U13	GND
U14	SSRX_N
U15	SSRX_P
U16	GND
U17	SSTX_N
U18	SSTX_P



The AXE-5100R7 comes with an RJ-45 to DB-9 console port adapter cable.

DB-9 Pin	Signal
1	—
2	RXD
3	TXD
4	DTR
5	SG
6	DSR
7	RTS
8	CTS
9	—



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4.4 User LED Commands

4.4.1 OEM ADLINK Set LED Status

NetFn=2Eh, Cmd=10h

Byte	Data Field
1-3	ADLINK Manufacturer ID – 005F13h, LS byte first.
4	LED ID: 01h= UID LED (blue) 03h = Alert LED (red) 04h = LED1 (green) Other values: reserved
5	LED Function: 00h = LED OFF override. 01h - 1Eh = LED BLINKING override. The off duration is specified by the value of this byte, and the on duration is specified by the value of byte 5. Both values specify the time in hundreds of milliseconds (100 ms-3 s). 1Fh = LED state is restored to Local Control state 20h-FEh Reserved FF = LED ON override
6	On-duration: The LED on-time in hundreds of milliseconds if (01h < = Byte 6 < = 1Eh) and ignored otherwise. Otherwise, this field is ignored and is set to 0h.
	Response Field
1	Completion Code
2-4	ADLINK Manufacturer ID – 005F13h, LS byte first.

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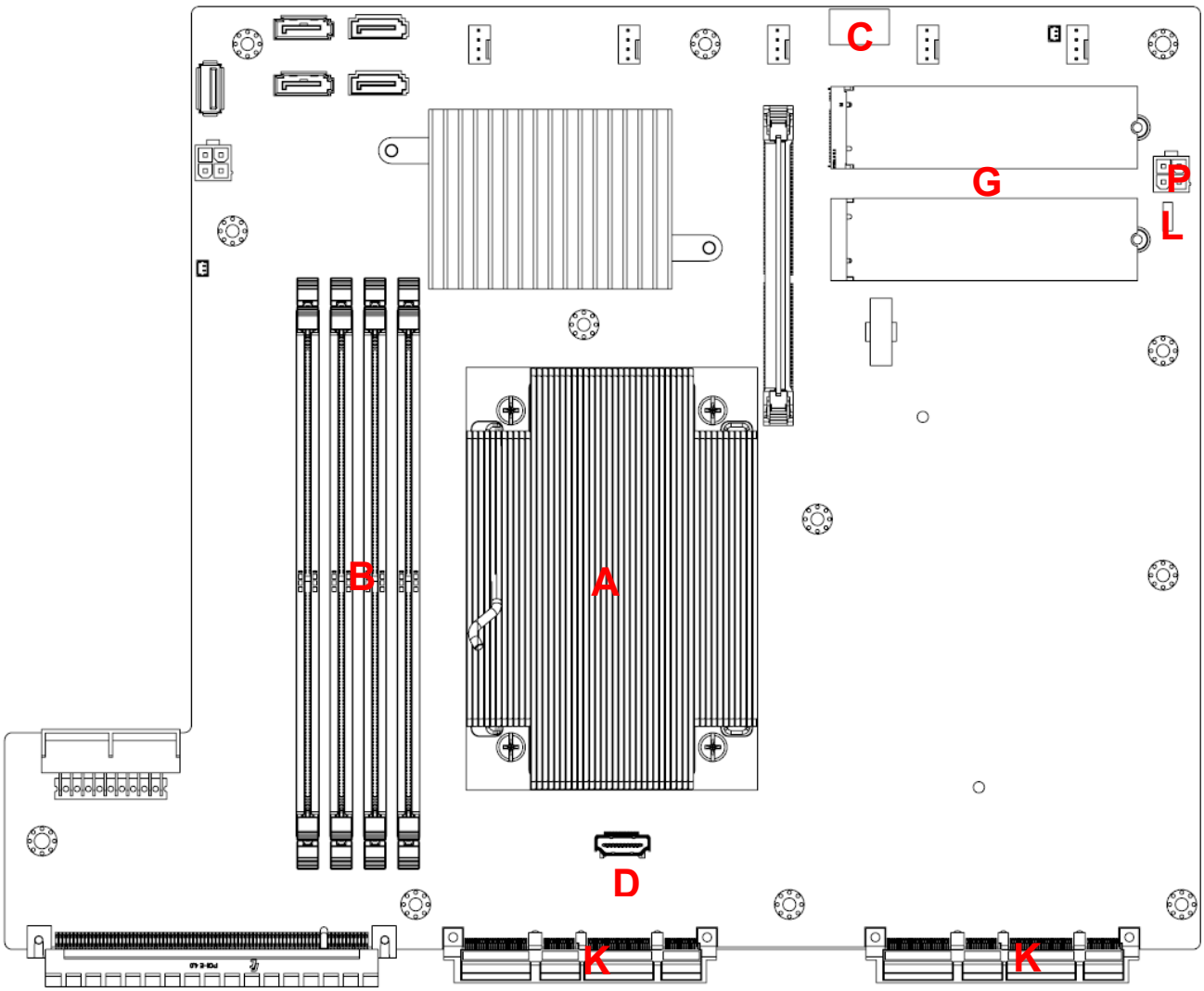
4.4.2 OEM ADLINK Get LED Status

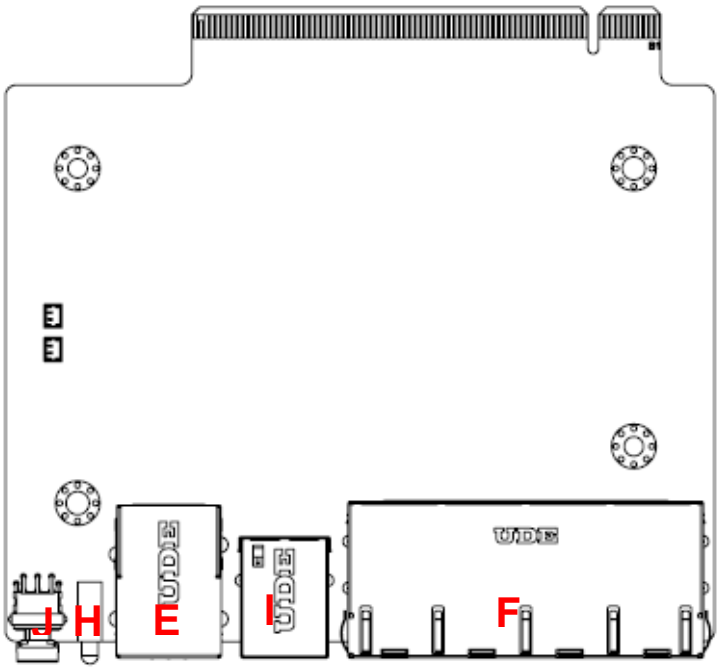
NetFn=2Eh, Cmd=11h

Byte	Data Field
1-3	ADLINK Manufacturer ID – 005F13h, LS byte first.
4	LED ID: 01h= UID LED (blue, UID led) 03h = Alert LED (red) 04h = LED1 (green, default blink) Other values: reserved
	Response Field
1	Completion Code
2-4	ADLINK Manufacturer ID D of ran, LS byte first.
5	LED ID: 01h= UID LED (blue) 02h = USR LED (yellow, HDD shared) 03h = Alert LED (red) 04h = LED1 (green, default blink) 05h = LED2 (red) Other values: reserved
6	LED Function: 00h = LED OFF override. 01h - 1Eh = LED BLINKING override. The off duration is specified by the value of this byte, and the on duration is specified by the value of byte 7. Both values specify the time in hundreds of milliseconds (100 ms-3 s). 1Fh = LED is in Local Control state 20h-FEh Reserved FF = LED ON override
7	On-duration : The LED on-time in hundreds of milliseconds if (01h Byte 6 1Eh) and ignored otherwise set to 0h.

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4.5 Board Layout





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A	AMD Ryzen Family Processor	**G**	M.2 Slot
B	DDR5 Socket	**H**	Status LEDs
C	VGA Port	**I**	BMC/AXE-5100R7 LAN RJ-45
D	HDMI Port	**J**	Power Button
E	Console Port RJ-45 + USB 3.0	**K**	OCP Connector
F	AXE-5100R7 LAN RJ-45	**L**	Clear CMOS Jumper (RTCCLR1)

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5 BIOS Settings

5.1 BIOS Setup Menu

The BIOS setup utility is invoked by pressing <ESC> or <DEL> keys. User can change BIOS settings during setup utility runs. A system reset is required for new settings to take effect.

In the BIOS setup utility, there are several hot keys are designed for specific purposes, as listed below.

- <F1>: General help in setup menu
- <F8>: Load previous BIOS values
- <F9>: Load BIOS default in setup utility
- <F10>: Save & Exit setup utility
- <ESC>: Exit

To navigate through the BIOS setup menu, use the following.

→←	Left/Right. The *Left and Right* < Arrow > keys allow you to select a setup screen. For example: Main screen, Advanced screen, Chipset screen, and so on.
↑↓	Up/Down The *Up and Down* < Arrow > keys allow you to select a setup item or sub-screen.
+-	Plus/Minus The *Plus and Minus* < Arrow > keys allow you to change the field value of a particular setup item. For example: Date and Time.
Tab	The < Tab > key allows you to select setup fields.

5.1.1 Menu Selection Bar

The Menu Selection Bar is located at the top of the screen. It displays the top level available menus to the user:

- Main Menu
- Advanced Menu
- Platform Configuration Menu
- Server Mgmt
- Security Menu
- Boot Menu
- Save & Exit Menu

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5.1.2 Menu Conventions

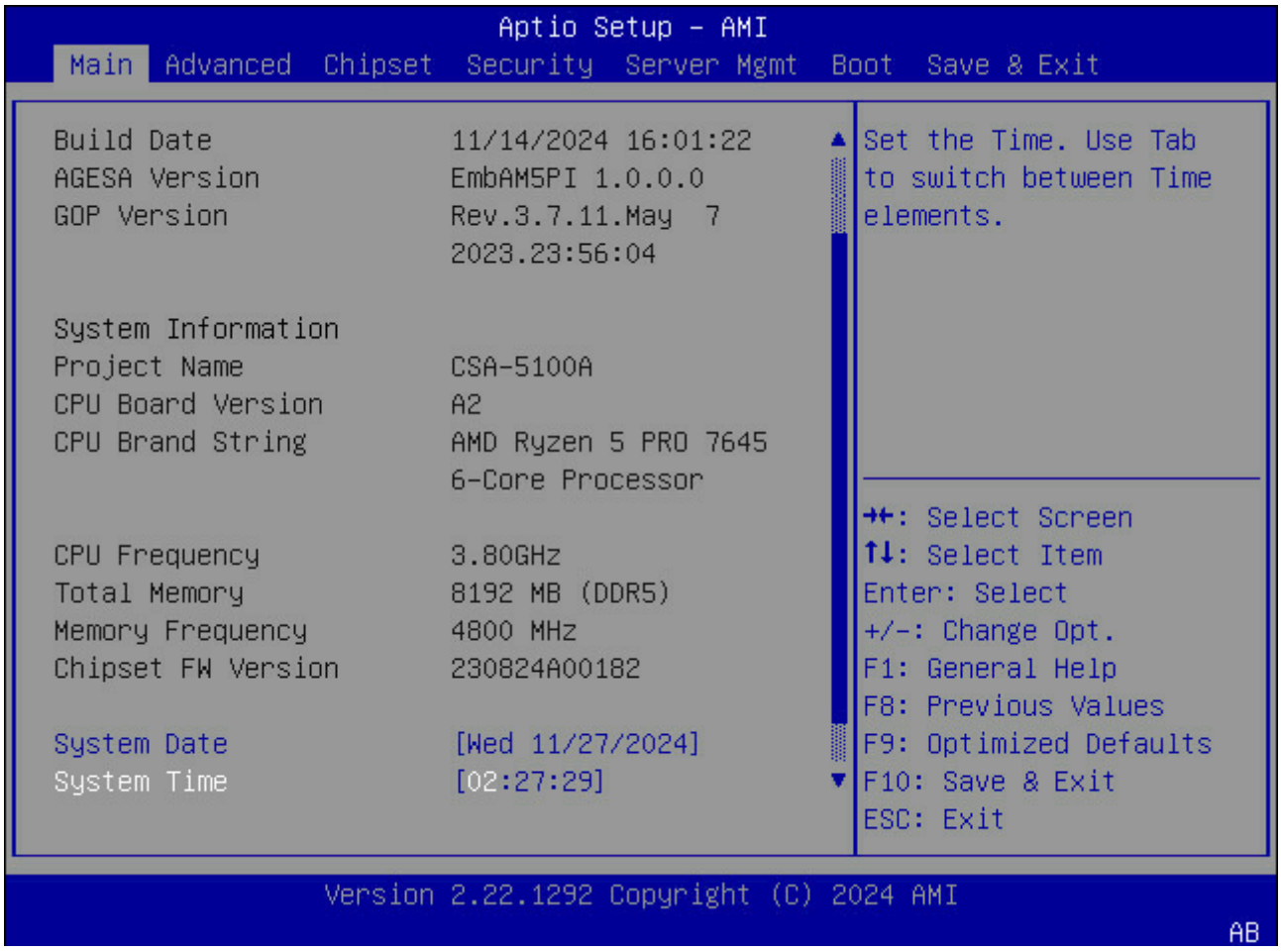
The appearance of the setup menu listed in this chapter is a sample to describe the item list. It is shown on a VT100 terminal via serial console. The menu conventions are as follows.

Using color
The mandatory BIOS setup fields are in black. The BIOS setup fields currently not used are in grey. The display only strings are in black.

Using brackets
Editable menu options are marketed with squares '[' and ']' to distinguish them from display only fields that can't be modified.

5.2 Main Menu

The Main Menu provides read-only information about the system and also allows you to set the system date and time. The tables below show screen shots of the Main menu details, submenus and settings.



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5.2.1 BIOS Information

BIOS Item	Options	Description
BIOS Vendor	**Info-only.** American Megatrends	Display vendor name of system BIOS.
BIOS Version	**Info-only.** x.yy.zz	Display version of booting BIOS.
Build Date	**Info-only.** MM/DD/YYYY	It shows the date that BIOS was built.
AGESA Version	**Info-only.** EmbAM5PI w.x.y.z	Display the revision of AMD Generic Encapsulated Software Architecture.
GOP Version	**Info-only.** Rev. x.yy.zz. build date	Display the version of Graphics Output Protocol

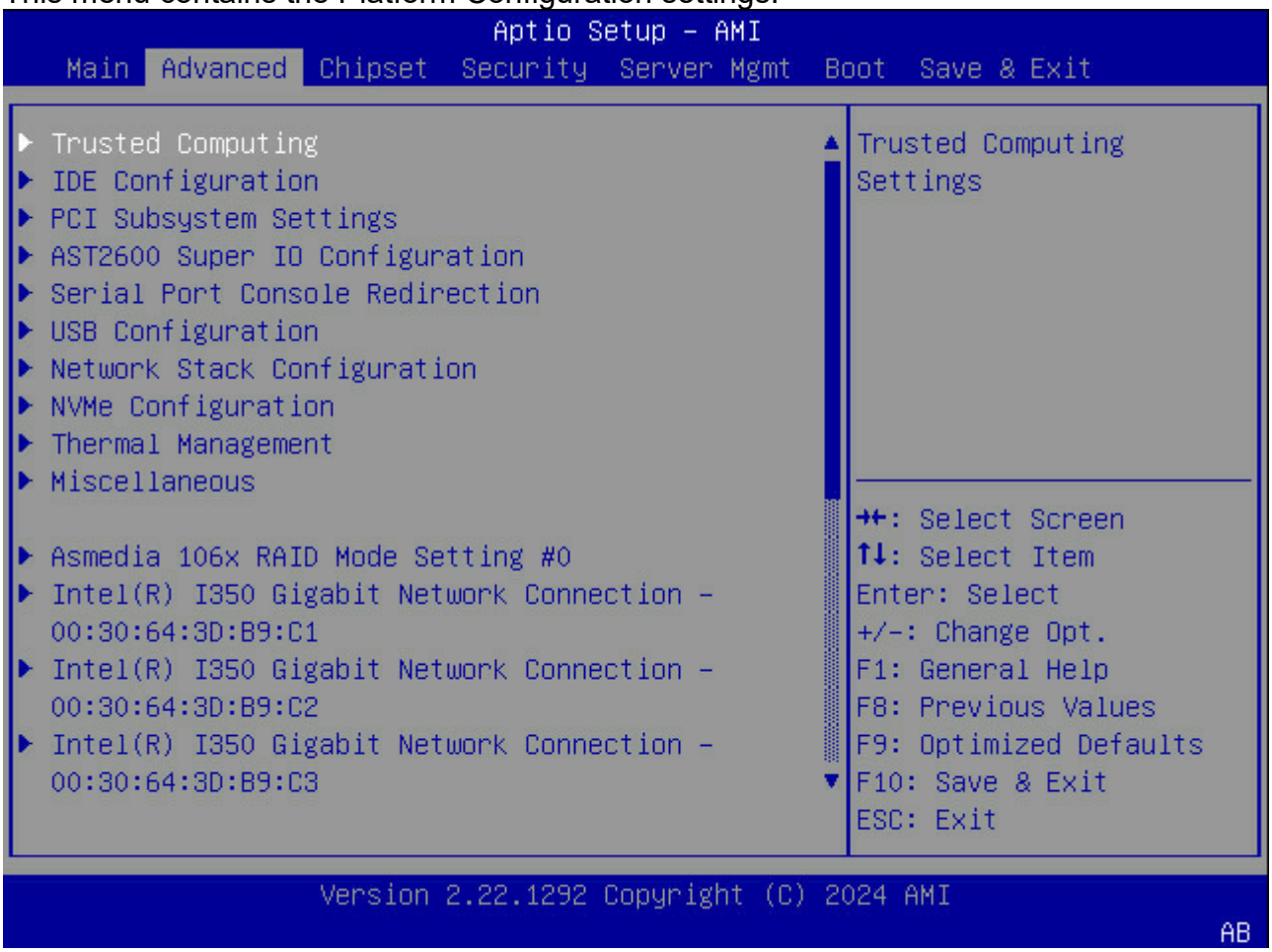
5.2.2 System Information

BIOS Item	Options	Description
Project Name	**Info-only.**	Shows Project Name
CPU Board Version	**Info-only.**	Shows Main Board Version
CPU Brand String	**Info-only.** AMD, …	Shows what CPU is booting the system.
CPU Frequency	**Info-only.** XXXX MHz	Shows CPU frequency.
Total Memory	**Info-only.** XXXX MB (DDR5)	Shows total memory size used on the motherboard and memory type.
Memory Frequency	**Info-only.** XXXX MHz	Shows memory frequency.
Chipset FW Version	**Info-only.**	Display the version of chipset FW
System Date	MM/DD/YYYY	For configuring/showing system date. When setting the Date, use <Tab> key to switch between Date elements.
System Time	HH:MM:SS	For configuring/showing system time. When setting the Time, use <Tab> key to switch between Time elements.
Access Level	**Info-only.** Administrator/User	It shows what access level is used to enter BIOS setup menu.

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5.3 Advanced Menu

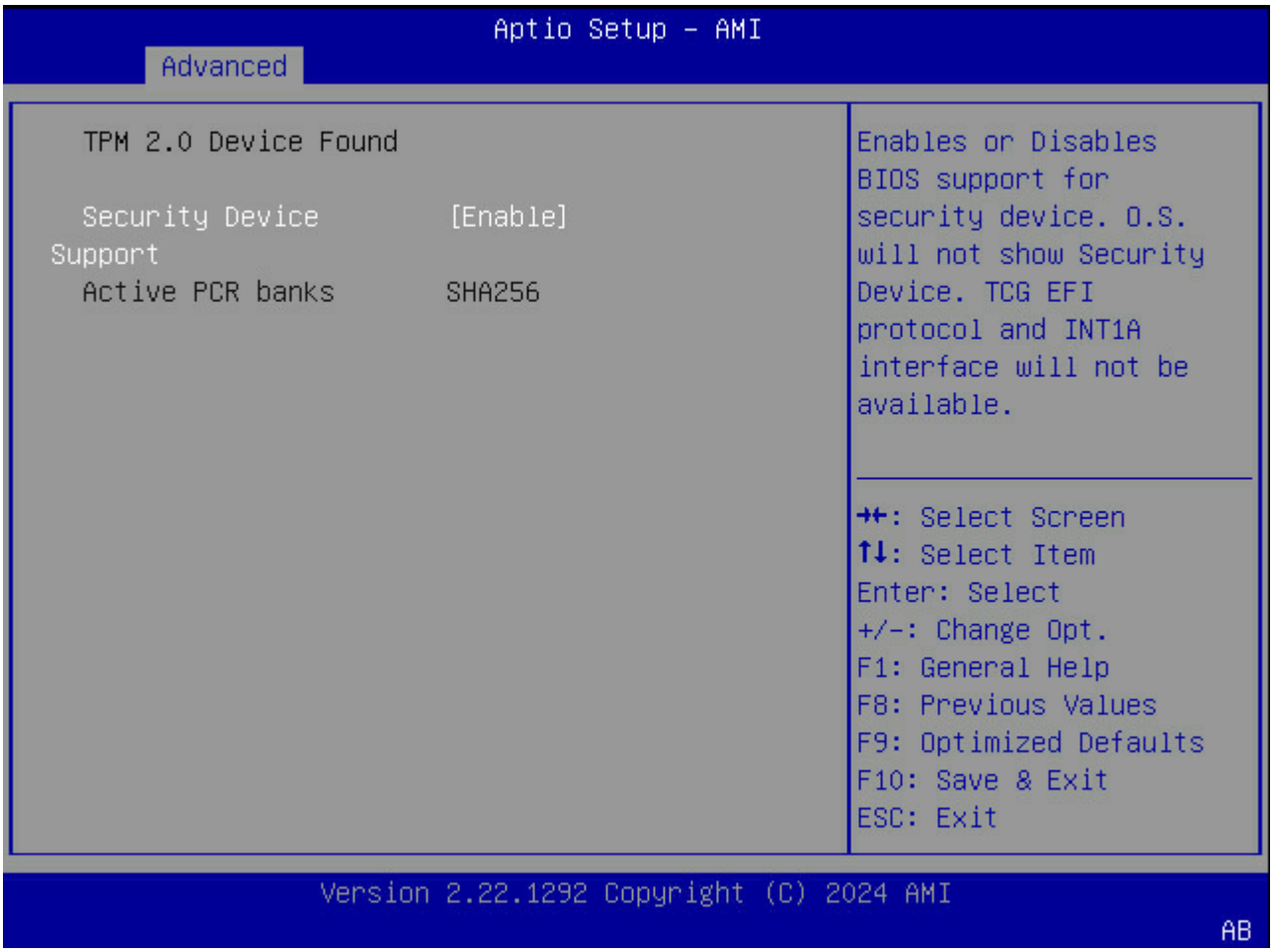
This menu contains the Platform Configuration settings.



BIOS Item	Options	Description
Trusted Computing	**Sub-Menu**	For TPM settings
IDE Configuration	**Sub-Menu**	IDE Configuration
PCI Subsystem Settings	**Sub-Menu**	PCI settings
AST2600 Super IO Configuration	**Sub-Menu**	System Super IO Chip Parameters.
Serial Port Console Redirection	**Sub-Menu**	Serial Port Console Redirection
USB Configuration	**Sub-Menu**	USB Configuration Parameters
Network Stack Configuration	**Sub-Menu**	Network Stack Settings
NVMe Configuration	**Sub-Menu**	NVMe Device Options Settings
Thermal Management	**Sub-Menu**	Thermal Management
Miscellaneous	**Sub-Menu**	Miscellaneous
Asmedia 106x RAID Mode Setting #0	**Sub-Menu**	Asmedia 106x RAID Mode Setting HII
Intel(R) I210 Gigabit Network Connection - … Intel(R) I350 Gigabit Network Connection - …	**Sub-Menu**	Onboard Ethernet controller configuration loaded by EFI driver. The setup page is designed by Intel and is shown when running the Ethernet EFI driver. It is related to the “Network” settings on the Boot setup page.

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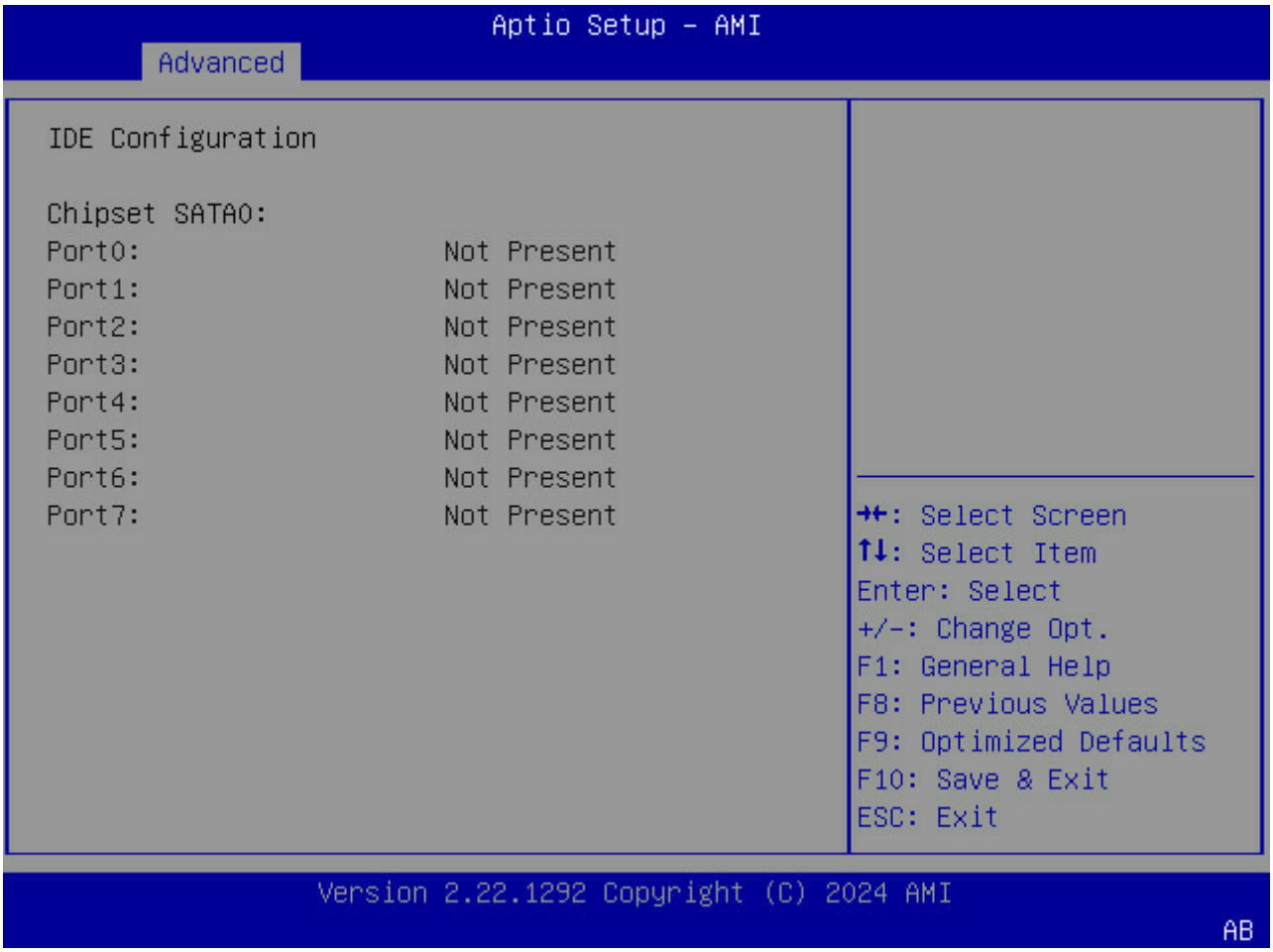
5.3.1 Trusting Computing



BIOS Item	Options	Description
Security Device Support	**Enabled** Disabled	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
Active PCR banks	**Info-only.** **SHA256**	

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5.3.2 IDE Configuration



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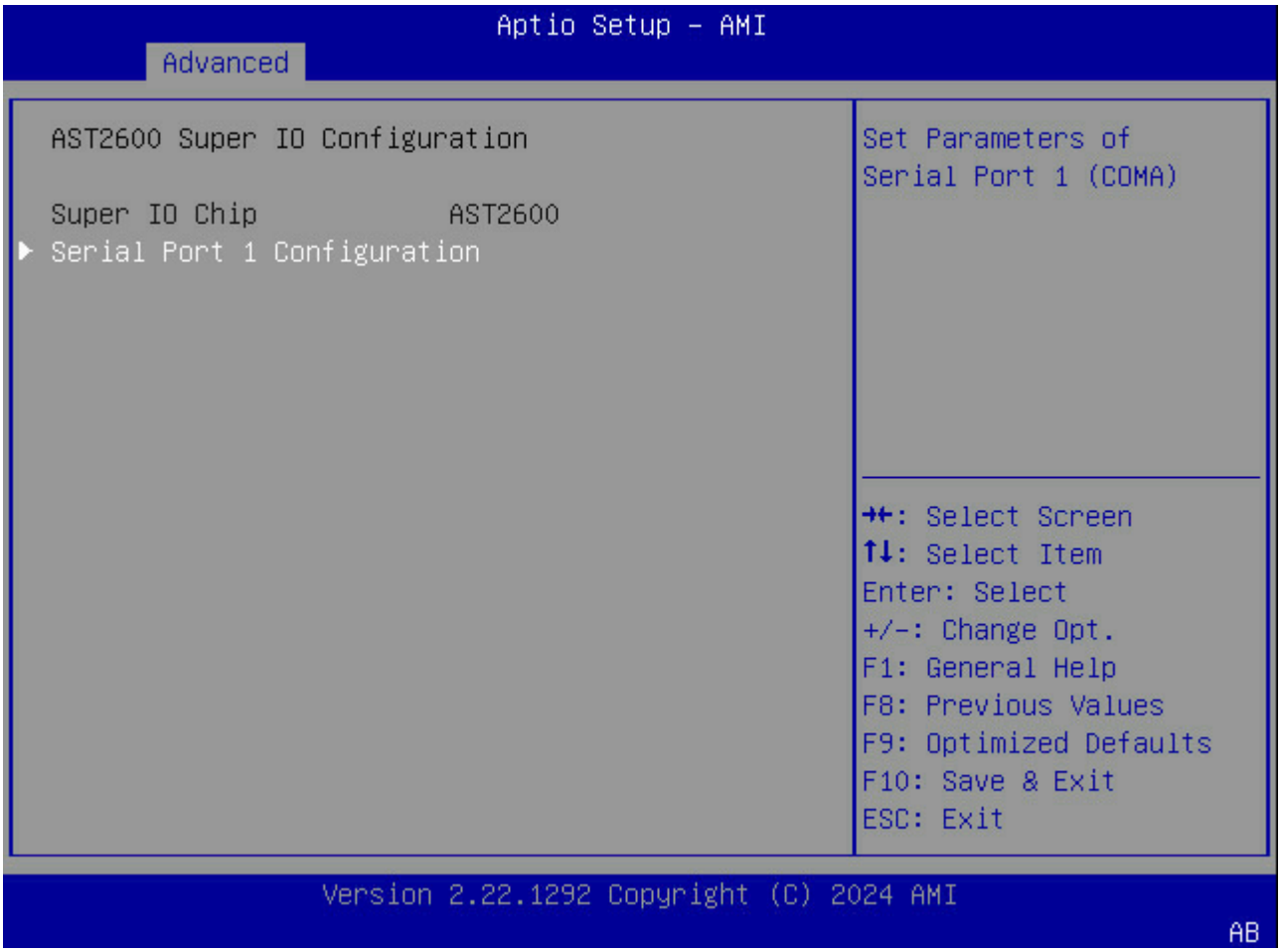
5.3.3 PCI Subsystem Settings



BIOS Item	Options	Description
Above 4G Decoding	Disabled **Enabled**	To enable or disable decoded in above 4G address space.
SR-IOV Support	Disabled **Enabled**	Enable or disable Single Root IO virtualization support

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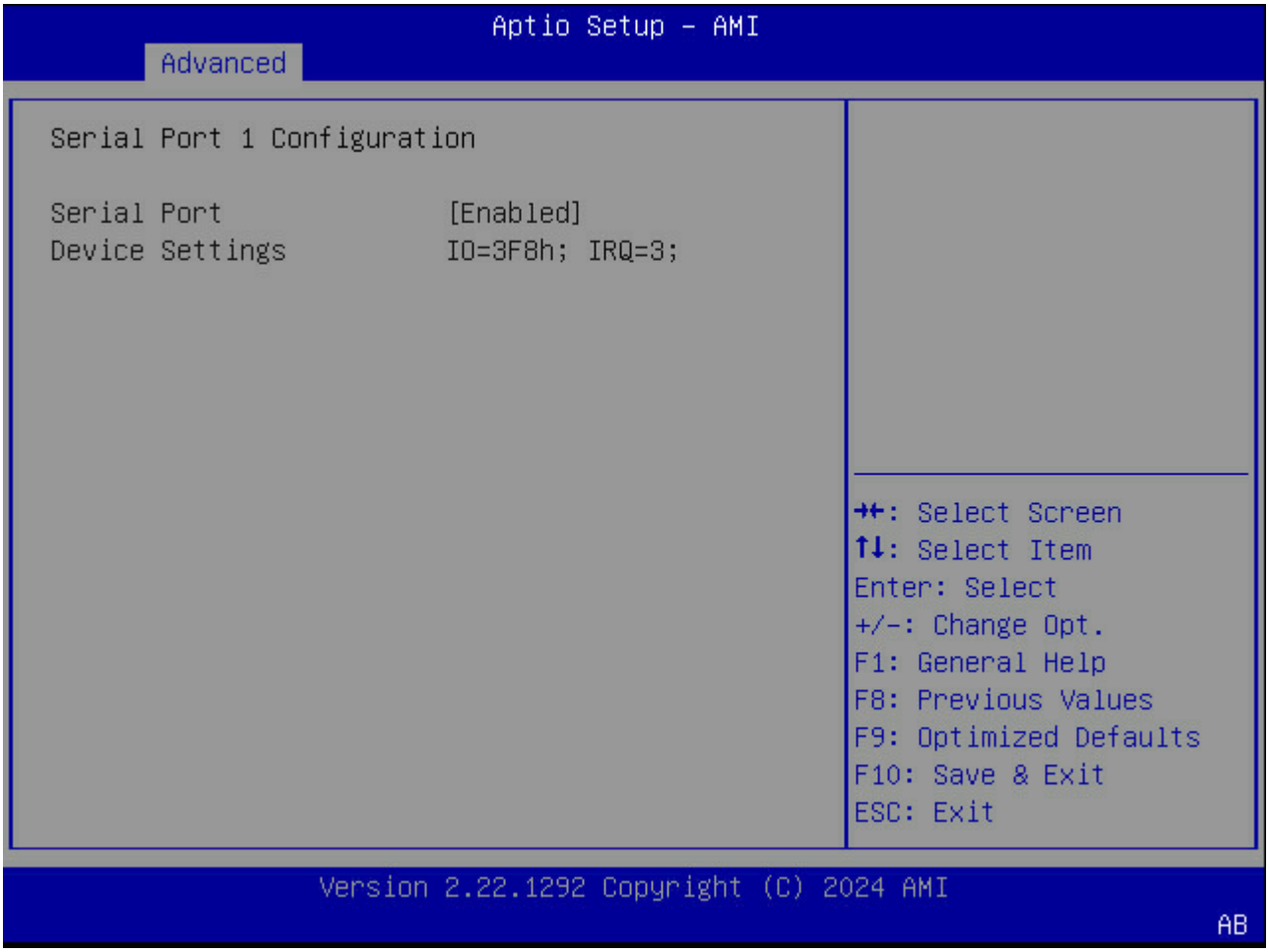
5.3.4 AST2600 Super I/O Configuration



BIOS Item	Options	Description
Serial Port 1 Configuration	**Sub-Menu**	Set Parameters of Serial Port 1 (COMA)

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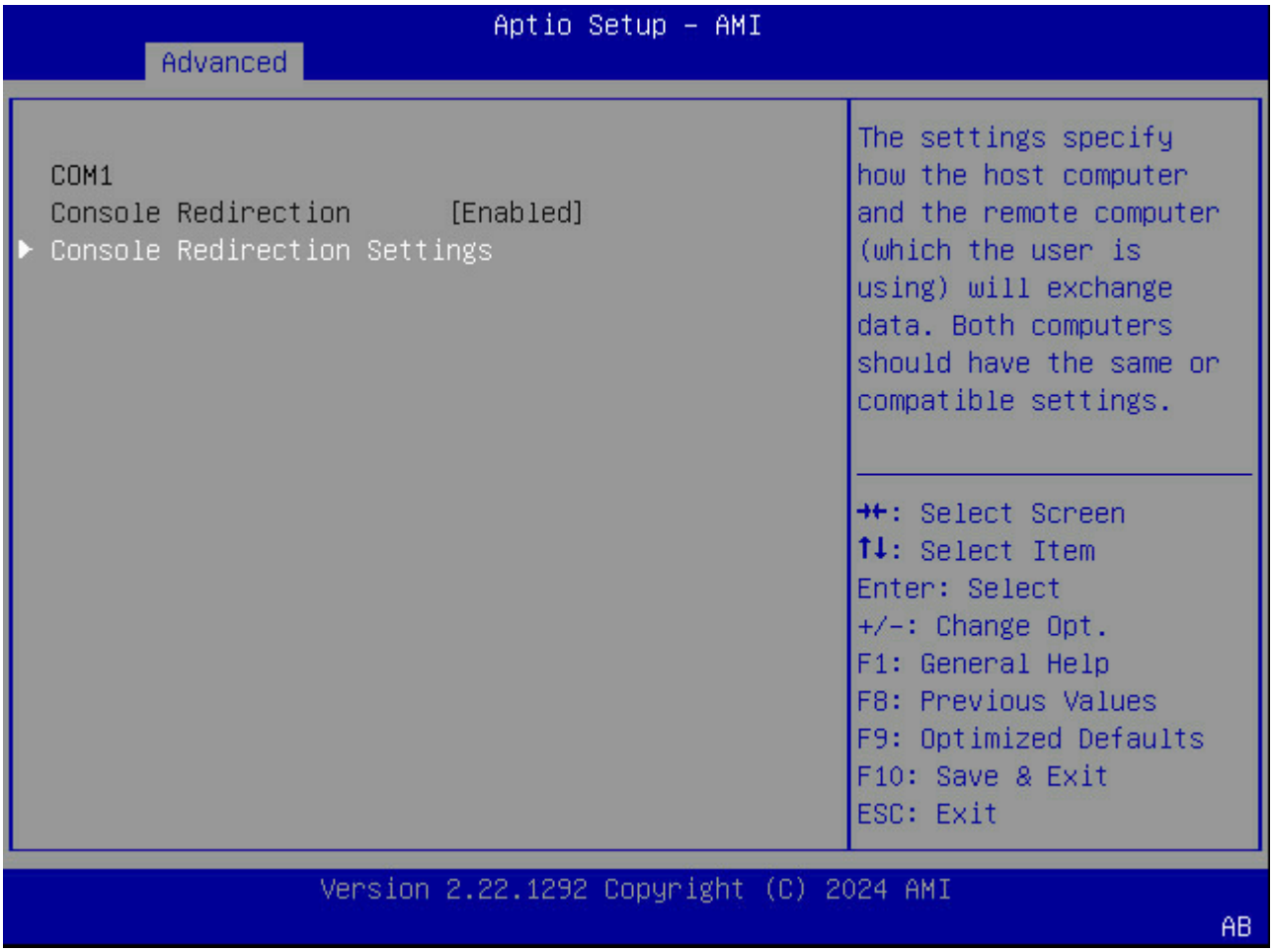
5.3.4.1 Serial Port 1 Configuration



BIOS Item	Options	Description
Serial Port	**Info-only.** Enabled	Enabled/Disabled Serial Port
Device Settings	**Info-only.** IO=3F8h; IRQ=3;	Device resource mapping

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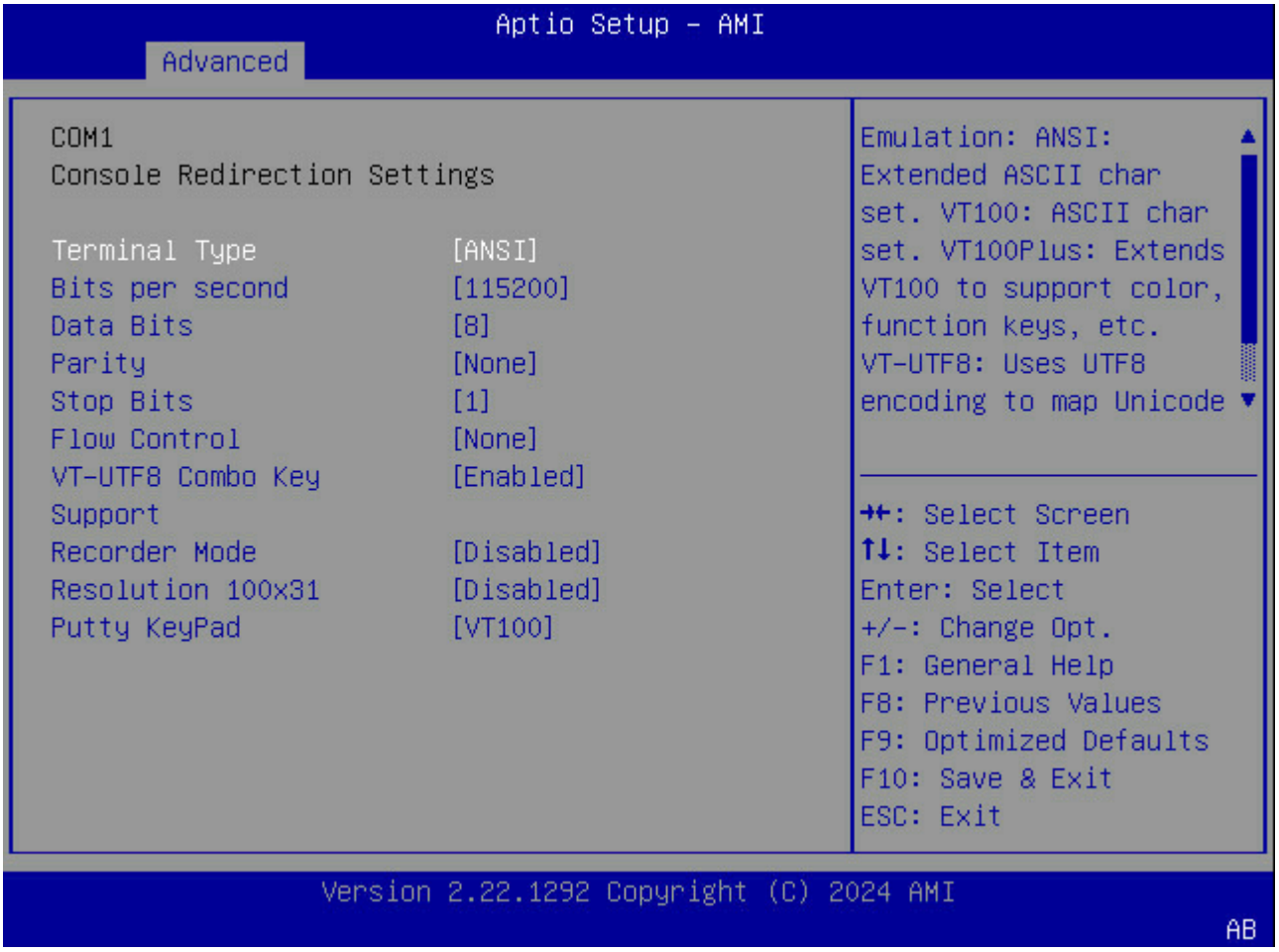
5.3.5 Serial Port Console Redirection



BIOS Item	Options	Description
Console Redirection Settings	**Sub-Menu**	The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

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5.3.5.1. Console Redirection Settings



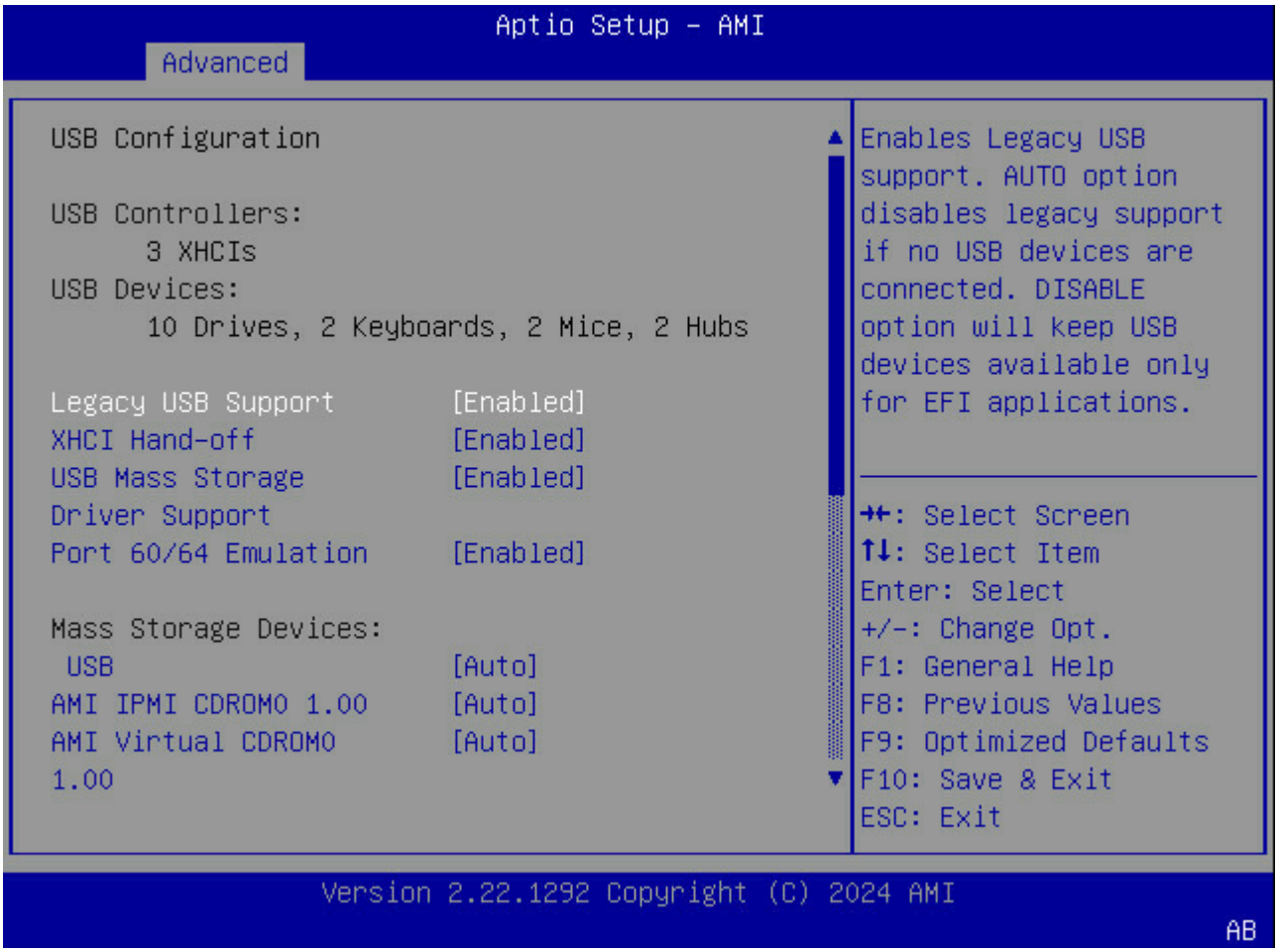
BIOS Item	Options	Description
Terminal Type	VT100 VT100+ VT-UTF8 **ANSI**	Configure type of console emulation. Emulation: **ANSI:** Extended ASCII char set. **VT100:** ASCII char set. **VT100+:** Extends VT100 to support color, function keys, etc. **VT-UTF8:** Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
Bits per second	9600 19200 38400 57600 **115200** 230400 460800 921600	Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speed.
Data Bits	7 **8**	Configure the number of data bits in each transmitted or received serial character for both serial ports.
Parity	**None** Even Odd	Configures if parity bit is generated (transmit data) or checked. A parity bit can be sent with the data bits

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BIOS Item	Options	Description
	Mark Space	to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always 1. Space: Parity bit is always 0. Mark and Space Parity do not allow for error detection. They can be used as an additional data bit.
Stop Bits	**1** 2	Configures the number of stop bits transmitted and received in each serial character for both serial ports. Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.
Flow Control	**None** Hardware RTS/CTS	Configures flow control for console redirection. Hardware flow control uses RTC/CTS.
VT-UTF8 Combo Key Support	Disabled **Enabled**	Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals
Recorder Mode	**Disabled** Enabled	This mode only text wil be sent
Resolution 100x31	**Disabled** Enabled	To enable or disable extended terminal resolution
Putty Keypad	**VT100** LINUX XTERMR6 SCO ESCN VT400	Select Function Key and keypad on Putty

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5.3.6 USB Configuration



BIOS Item	Options	Description
Legacy USB Support	**Enabled** Disabled Auto	Enables Legacy USB Support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
XHCI Hand-off	**Enabled** Disabled	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Disabled **Enabled**	Enable/Disable USB Mass Storage Driver Support.
Port 60/64 Emulation	Disabled **Enabled**	Enables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.
Mass Storage Devices: USB	**Auto** Floppy Forced FDD Hard Disk CD-ROM	Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.
Mass Storage Devices:	**Auto**	Mass storage device emulation type.

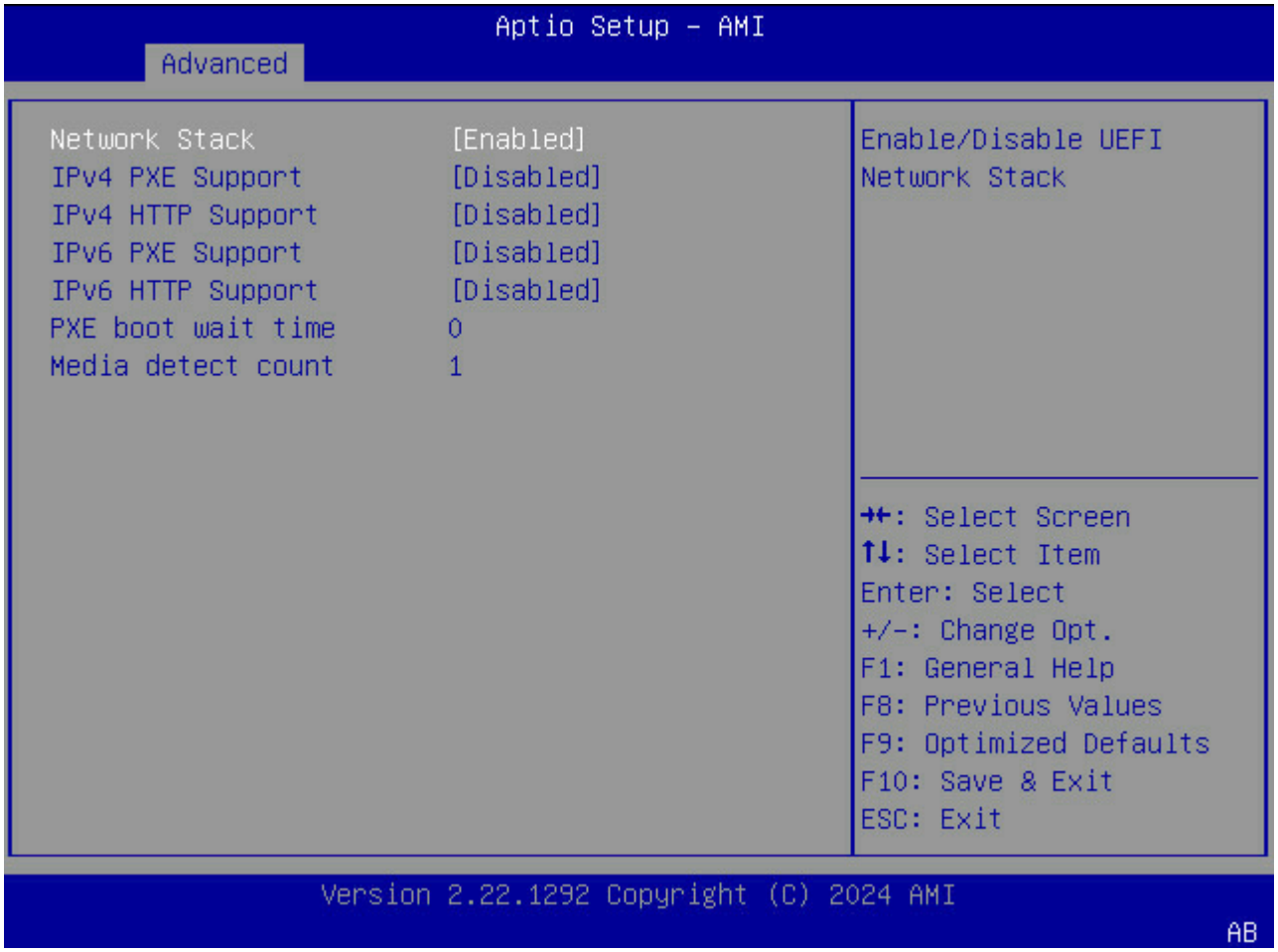
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BIOS Item	Options	Description
AMI IPMI CDROM0 1.00	Floppy Forced FDD Hard Disk CD-ROM	'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.
Mass Storage Devices: AMI IPMI CDROM0 1.00	**Auto** Floppy Forced FDD Hard Disk CD-ROM	Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.
Mass Storage Devices: AMI Virtual CDROM0 1.00	**Auto** Floppy Forced FDD Hard Disk CD-ROM	Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.
Mass Storage Devices: AMI Virtual HDisk0 1.00	**Auto** Floppy Forced FDD Hard Disk CD-ROM	Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.
Mass Storage Devices: AMI Virtual CDROM1 1.00	**Auto** Floppy Forced FDD Hard Disk CD-ROM	Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.
Mass Storage Devices: AMI Virtual CDROM2 1.00	**Auto** Floppy Forced FDD Hard Disk CD-ROM	Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.
Mass Storage Devices: AMI Virtual CDROM3 1.00	**Auto** Floppy Forced FDD Hard Disk CD-ROM	Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.
Mass Storage Devices: AMI Virtual HDisk1 1.00	**Auto** Floppy Forced FDD Hard Disk CD-ROM	Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.
Mass Storage Devices: AMI Virtual HDisk2 1.00	**Auto** Floppy Forced FDD Hard Disk CD-ROM	Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.
Mass Storage Devices:	**Auto**	Mass storage device emulation type.

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BIOS Item	Options	Description
AMI Virtual HDisk3 1.00	Floppy Forced FDD Hard Disk CD-ROM	'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.

5.3.7 Network Stack Configuration

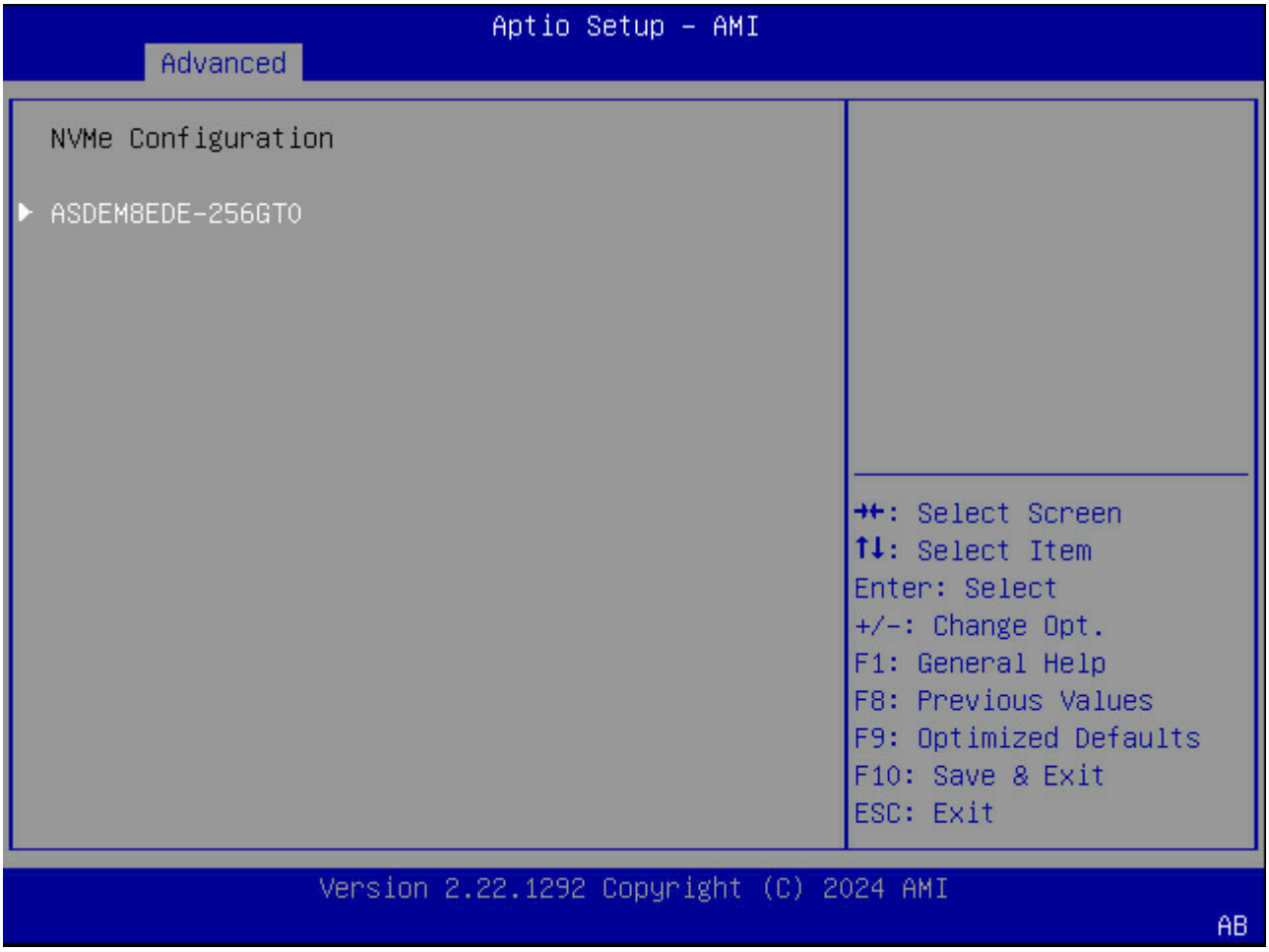


BIOS Item	Options	Description
Network Stack	Disable **Enable**	Enable/Disable UEFI Network Stack
IPv4 PXE Support	**Disable** Enable	Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.
IPv4 HTTP Support	**Disable** Enable	Enable/Disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.
IPv6 PXE Support	**Disable** Enable	Enable/Disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.

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IPv6 HTTP Support	**Disable** Enable	Enable/Disable IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available.
PXE boot wait time	**0** [0-5] seconds	Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.
Media detect count	**1** [1-50]	Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

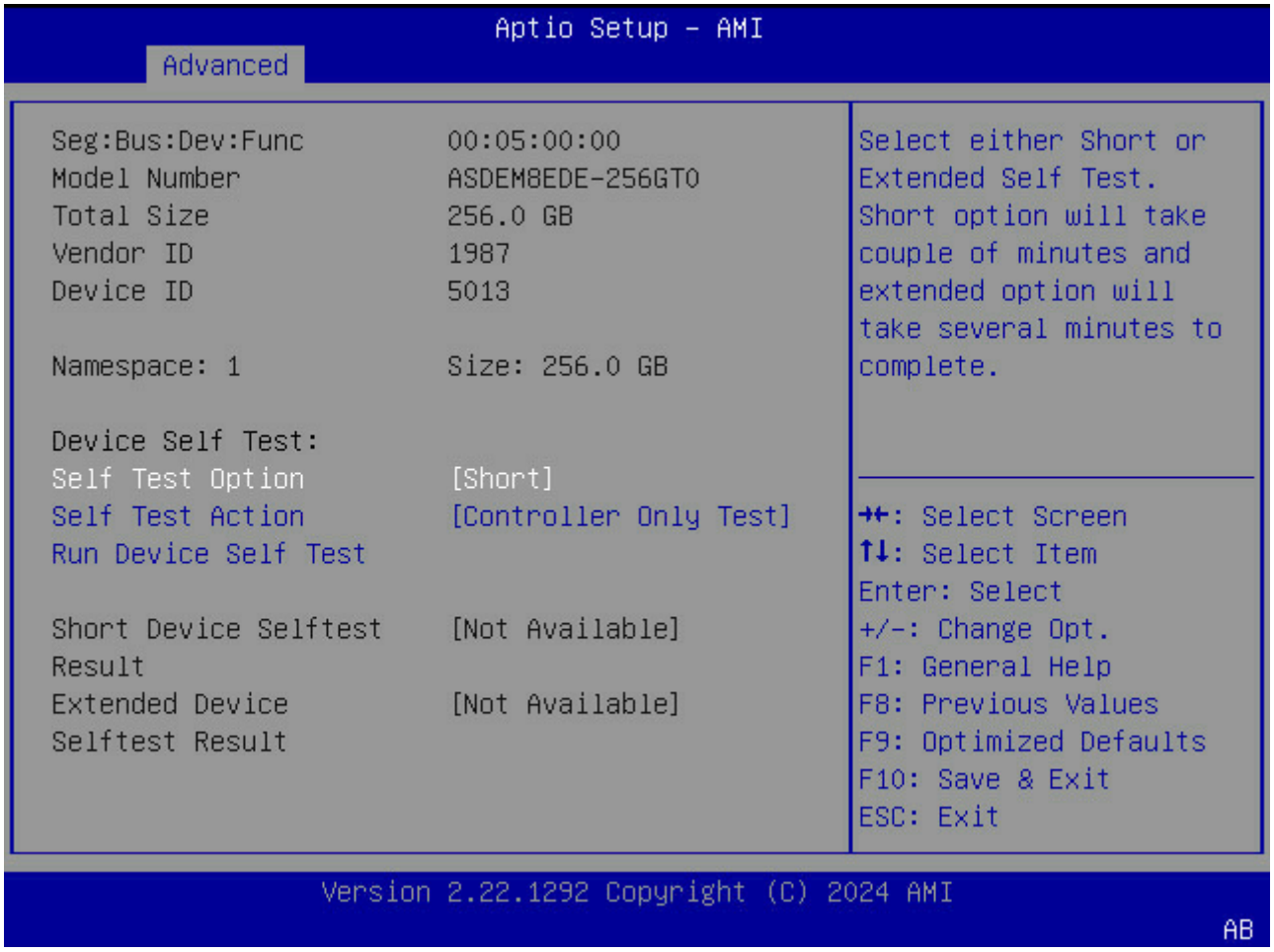
5.3.8 NVMe Configuration



BIOS Item	Options	Description
Storage Device	**Sub-Menu**	Detail information of the device

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5.3.8.1. NVMe storage device

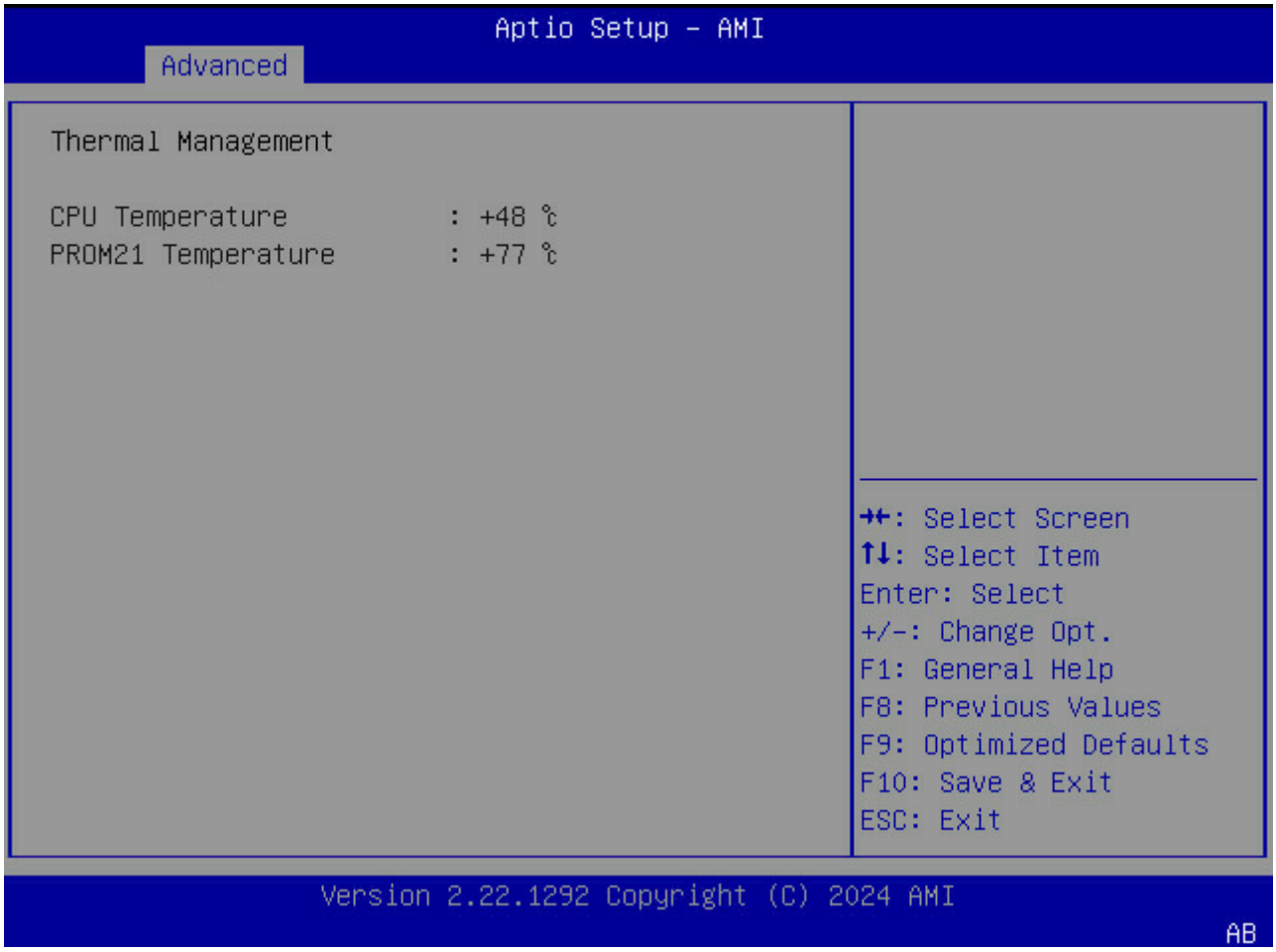


BIOS Item	Options	Description
Seg:Bus:Dev:Func	**Info-only.** WW:XX:YY:ZZ	
Model Number	**Info-only.** Device Model name	
Total Size	**Info-only.** XXXX GB	
Vendor ID	**Info-only.** XXXX	
Device ID	**Info-only.** XXXX	
Namespace: 1	**Info-only.** Size: XXXX GB	
Self Test Option	**Short** Extended	Select either Short or Extended Self Test. Short option will take couple of minutes and extended option will take several minutes to complete.
Self Test Action	**Controller Only Test** Controller and NameSpace Test	Select either to test Controller alone or Controller and NameSpace. Selecting Controller and Namespace option will take lot longer to complete the test.

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Run Device Self-Test	**Start testing**	Perform device self-test for the corresponding Option and Action selected by user. Pressing 'Esc' key will abort the test. Result shown below is the recent result
Short Device Self-test Result	**Show the result of the test**	
Extended Device Self-test Result	**Show the result of the test**	

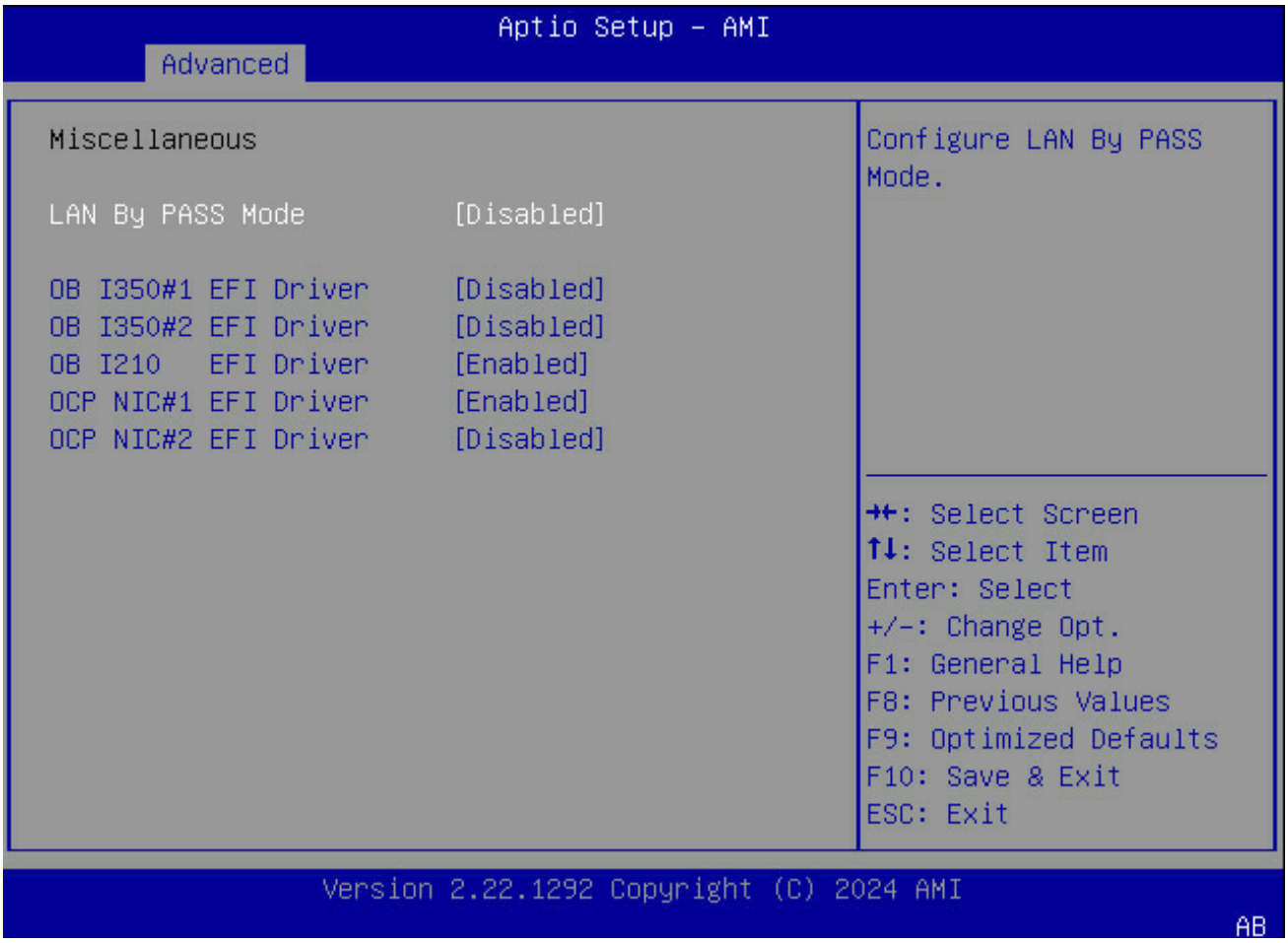
5.3.9 Thermal Management



BIOS Item	Options	Description
CPU Temperature	**Info-only.**	
PROM21 Temperature	**Info-only.**	

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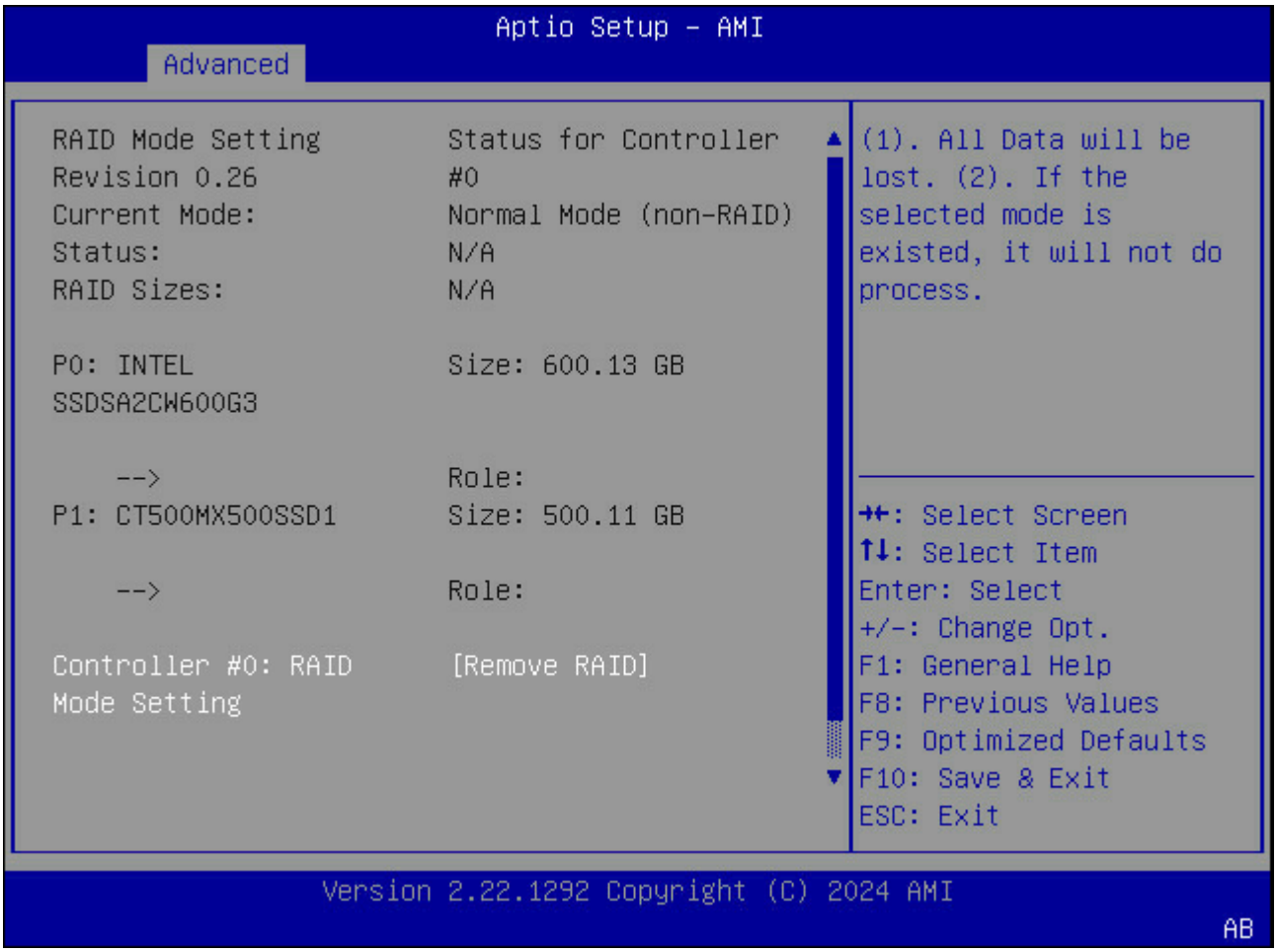
5.3.10 Miscellaneous



BIOS Item	Options	Description
LAN By PASS Mode	**Disable** Enable	Configure LAN By PASS Mode.
OB I350#1 EFI Driver	**Disable** Enable	Configure EFI LAN Driver for each NIC Device.
OB I350#2 EFI Driver	**Disable** Enable	Configure EFI LAN Driver for each NIC Device.
OB I210 EFI Driver	Disable **Enable**	Configure EFI LAN Driver for each NIC Device.
OCP NIC#1 EFI Driver	Disable **Enable**	Configure EFI LAN Driver for each NIC Device.
OCP NIC#2 EFI Driver	**Disable** Enable	Configure EFI LAN Driver for each NIC Device.

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5.3.11 Asmedia 106x RAID Mode Setting #0

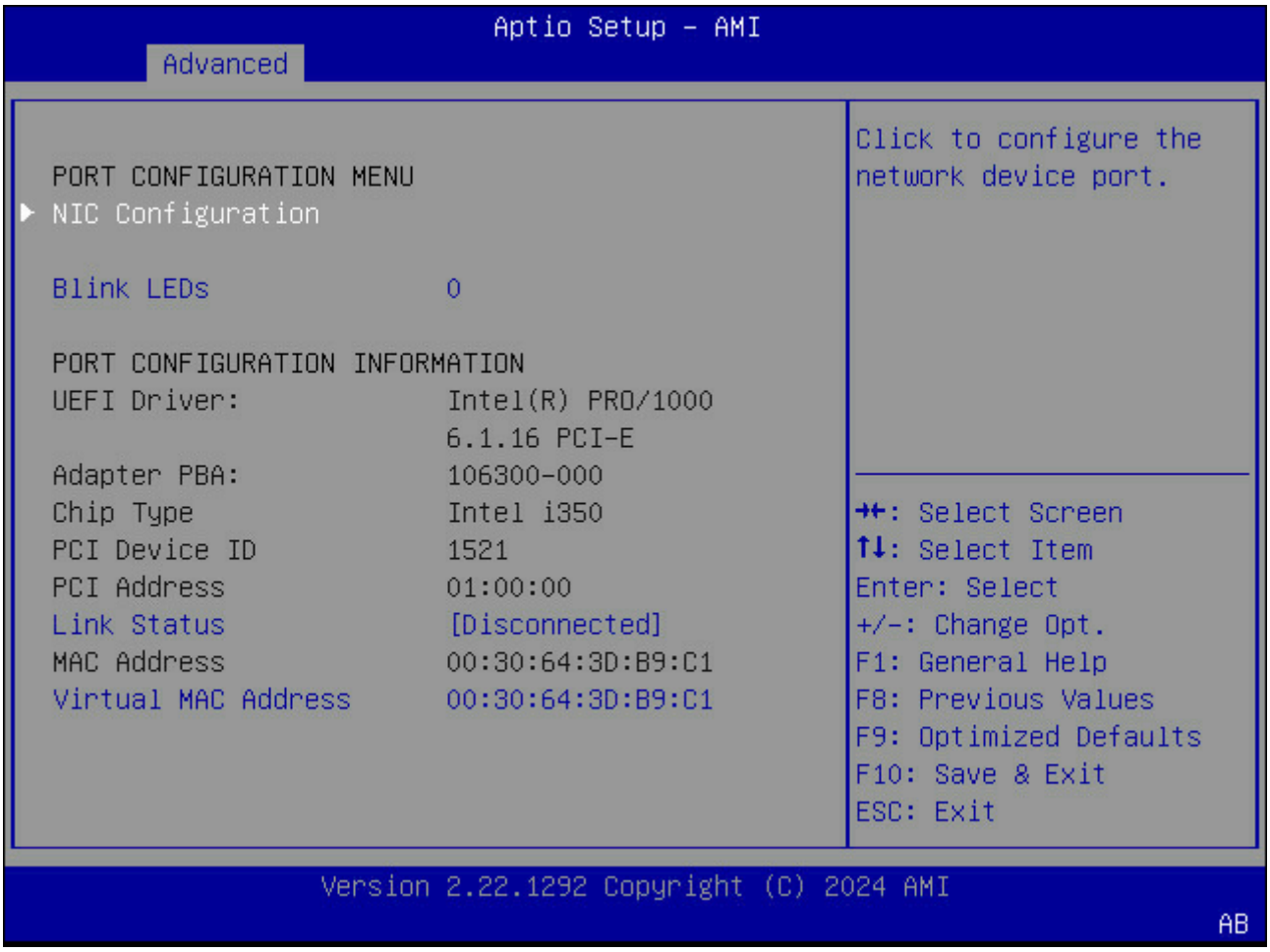


BIOS Item	Options	Description
Controller #0: RAID Mode Setting	**Remove RAID** Create RAID 0 Create RAID 1 Create SPAN	(1). All Data will be lost. (2). If the selected mode is existed, it will not do process.
Controller #0: RAID Mode Change for next Reset	**No** Yes	All Data will be lost, sure do process?

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5.3.12 Intel(R) I350 Gigabit Network Connection

When the BIOS boots the system, it will launch the onboard Intel® Ethernet I350 controller's UEFI driver. The driver provides a setup page for configuring Ethernet parameters and shows information about Ethernet controller. When EFI Network is disabled, the Ethernet UEFI driver is not executed and this setup page will not be shown (see *5.3.7 Network Configuration*).

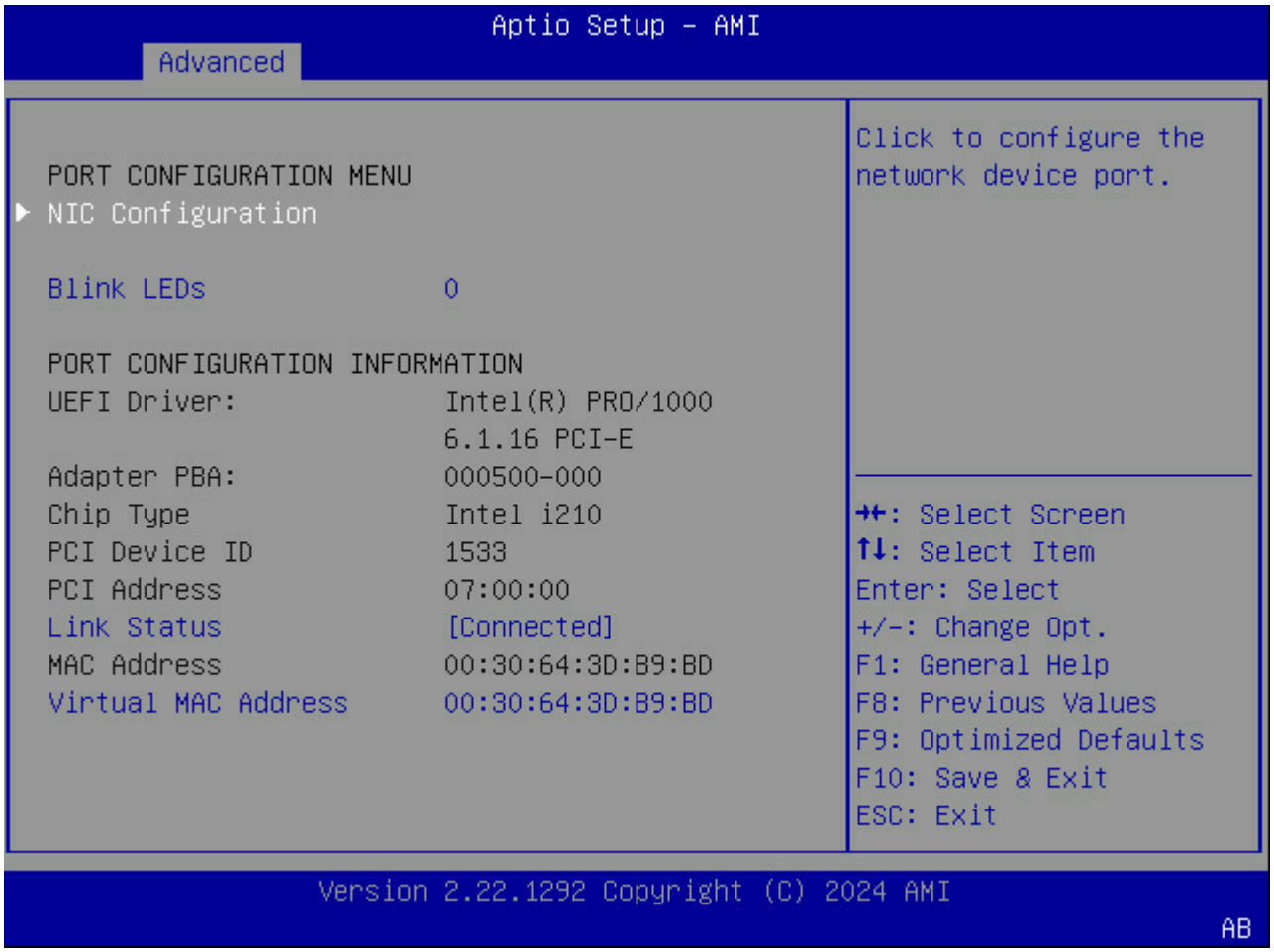


BIOS Item	Options	Description
NIC Configuration		For configuring link speed and wake function.

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5.3.13 Intel(R) I210 Gigabit Network Connection

When the BIOS boots the system, it will launch the onboard 5.3.13 Intel(R) I210 controller's UEFI driver. The driver provides a setup page for configuring Ethernet parameters and shows information about Ethernet controller. When EFI Network is disabled, the Ethernet UEFI driver is not executed and this setup page will not be shown (see *5.3.7 Network Configuration*).



BIOS Item	Options	Description
NIC Configuration		For configuring link speed and wake function.

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5.4 Chipset Menu

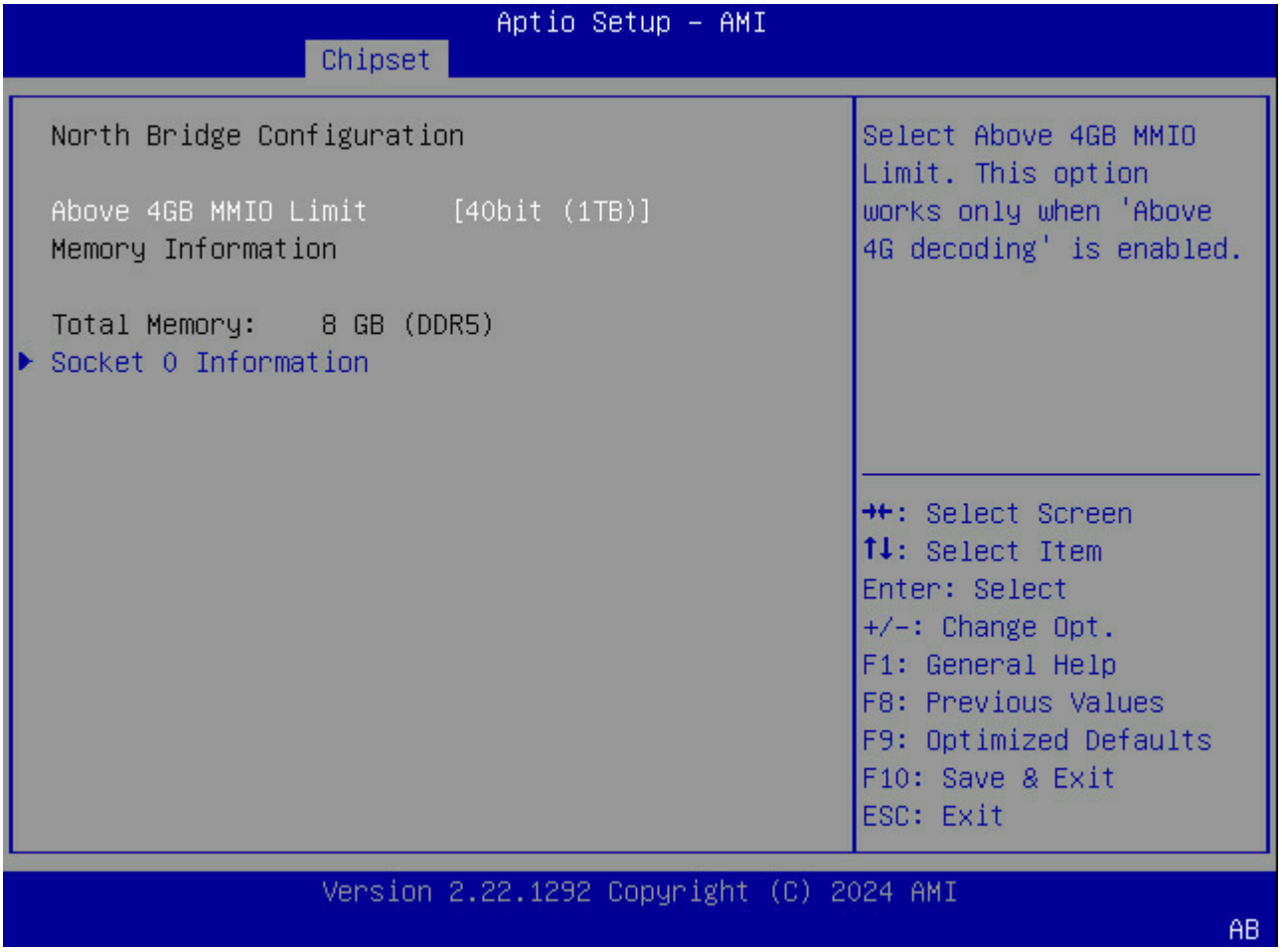
This menu contains the settings for chipset.



BIOS Item	Options	Description
North Bridge	Sub-Menu	For North Bridge Parameters
AMD CBS	Sub-Menu	For AMD CBS Setup Page

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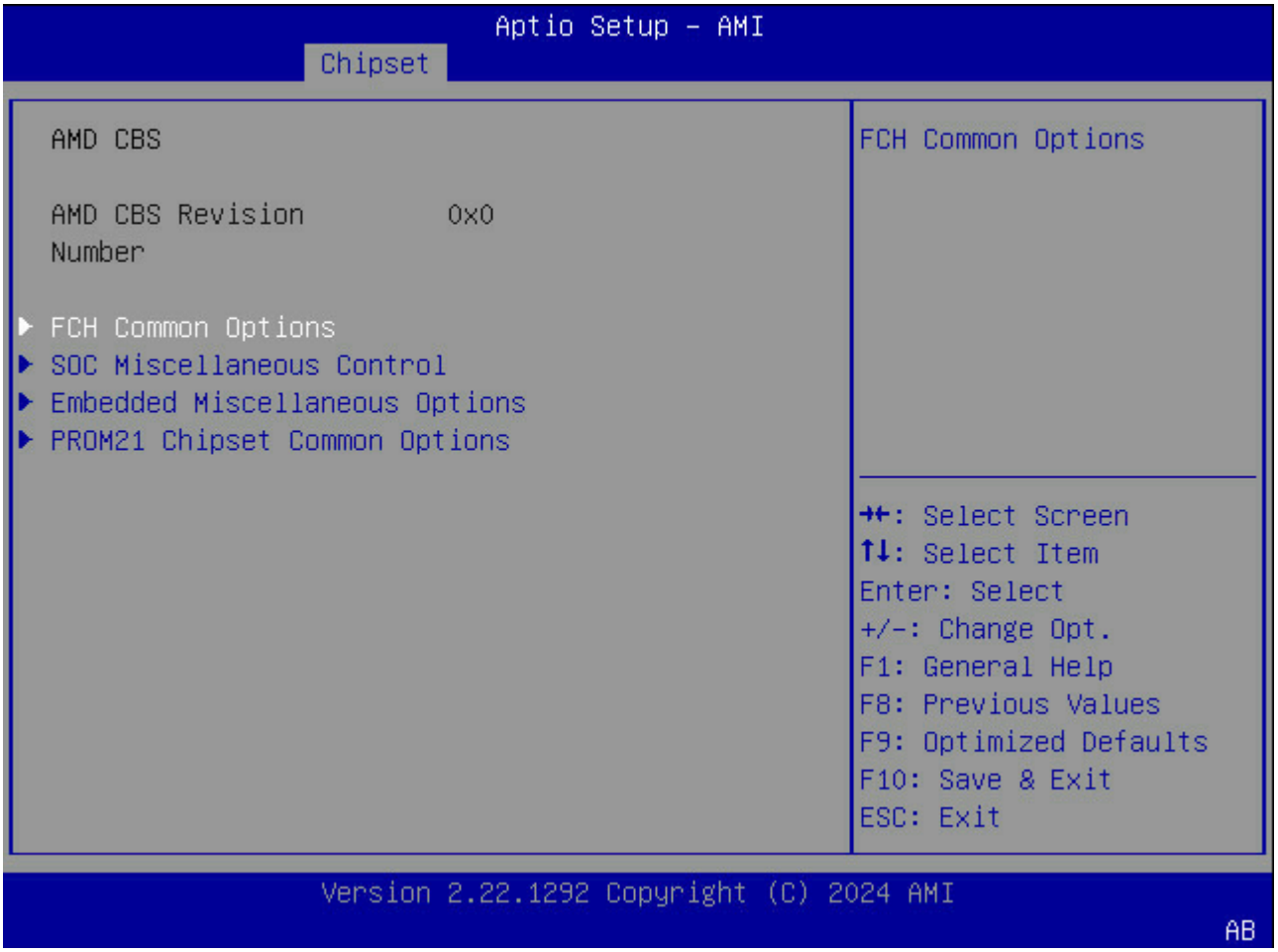
5.4.1 North Bridge Configuration



BIOS Item	Options	Description
Above 4GB MMIO Limit	**40bit (1TB)** 41bit (2TB) 42bit (4TB) 43bit (8TB) 44bit (16TB) 45bit (32TB) 46bit (64TB) 47bit (128TB) 48bit (256TB)	Select Above 4GB MMIO Limit. This option works only when 'Above 4G decoding' is enabled.
Total Memory:	**Info-only.** XX GB (DDR5)	
Socket 0 Information	**Info-only.** **Sub-Menu.**	Show the detail of the Dimm socket.

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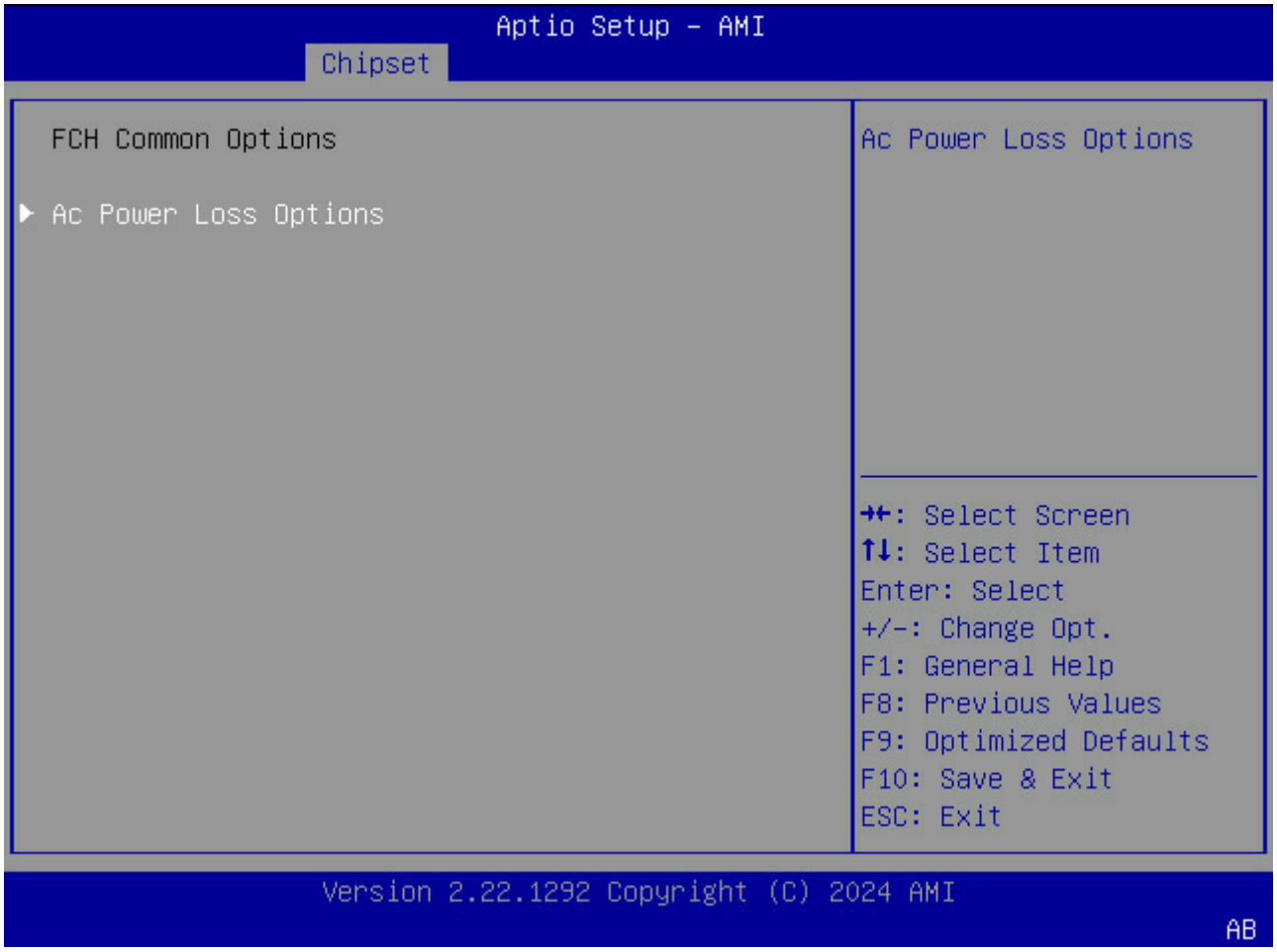
5.4.2 AMD CBS



BIOS Item	Options	Description
FCH Common Options	**Sub-Menu.**	FCH Common Options
SOC Miscellaneous Control	**Sub-Menu.**	SOC Miscellaneous Control
Embedded Miscellaneous Options	**Sub-Menu.**	Embedded Miscellaneous Options
PROM21 Chipset Common Options	**Sub-Menu.**	PROM21 Chipset Common Options

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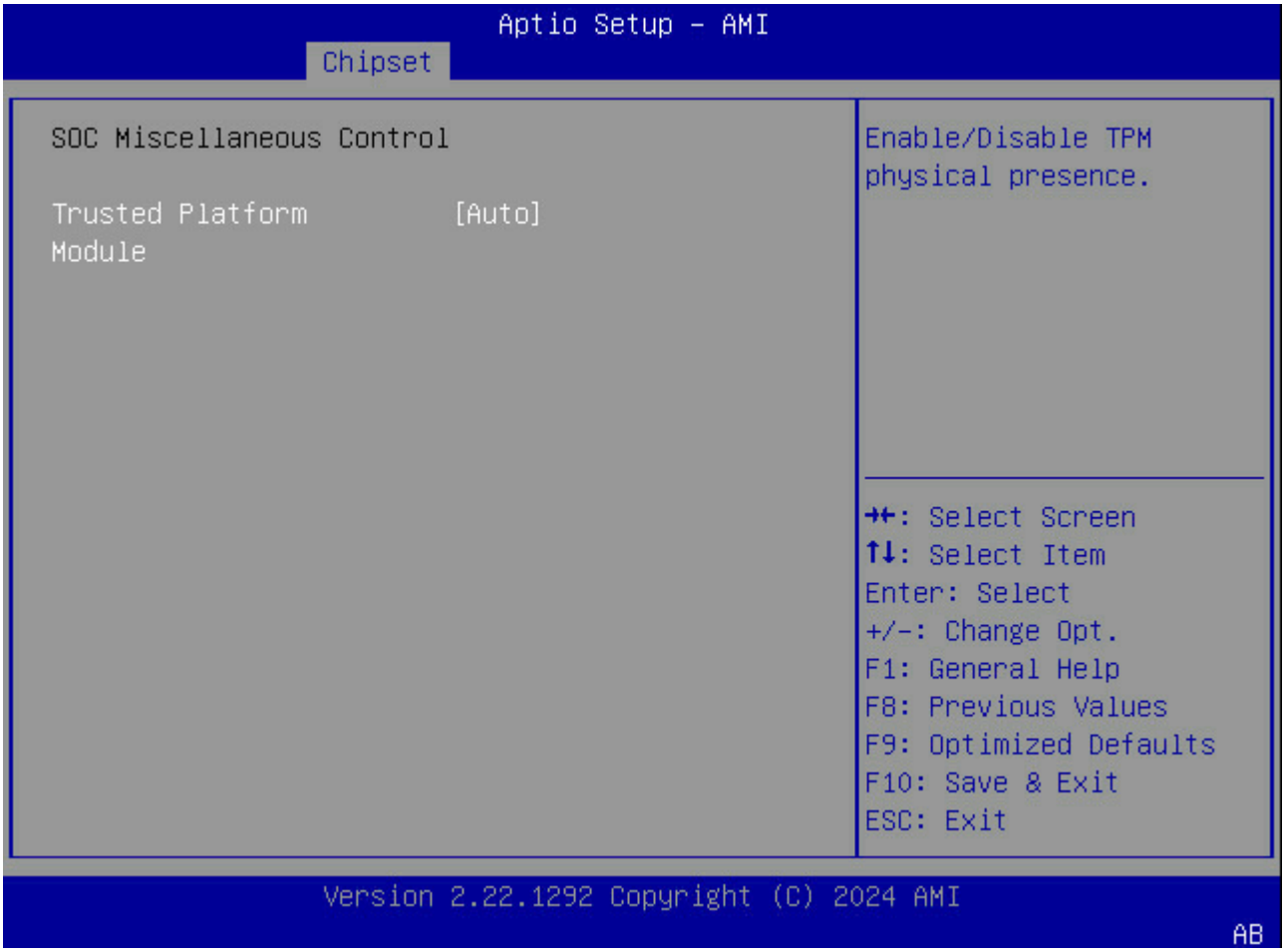
5.4.2.1. FCH Common Options



BIOS Item	Options	Description
Ac Loss Control	Always Off **Always On** Previous	Select Ac Loss Control Method

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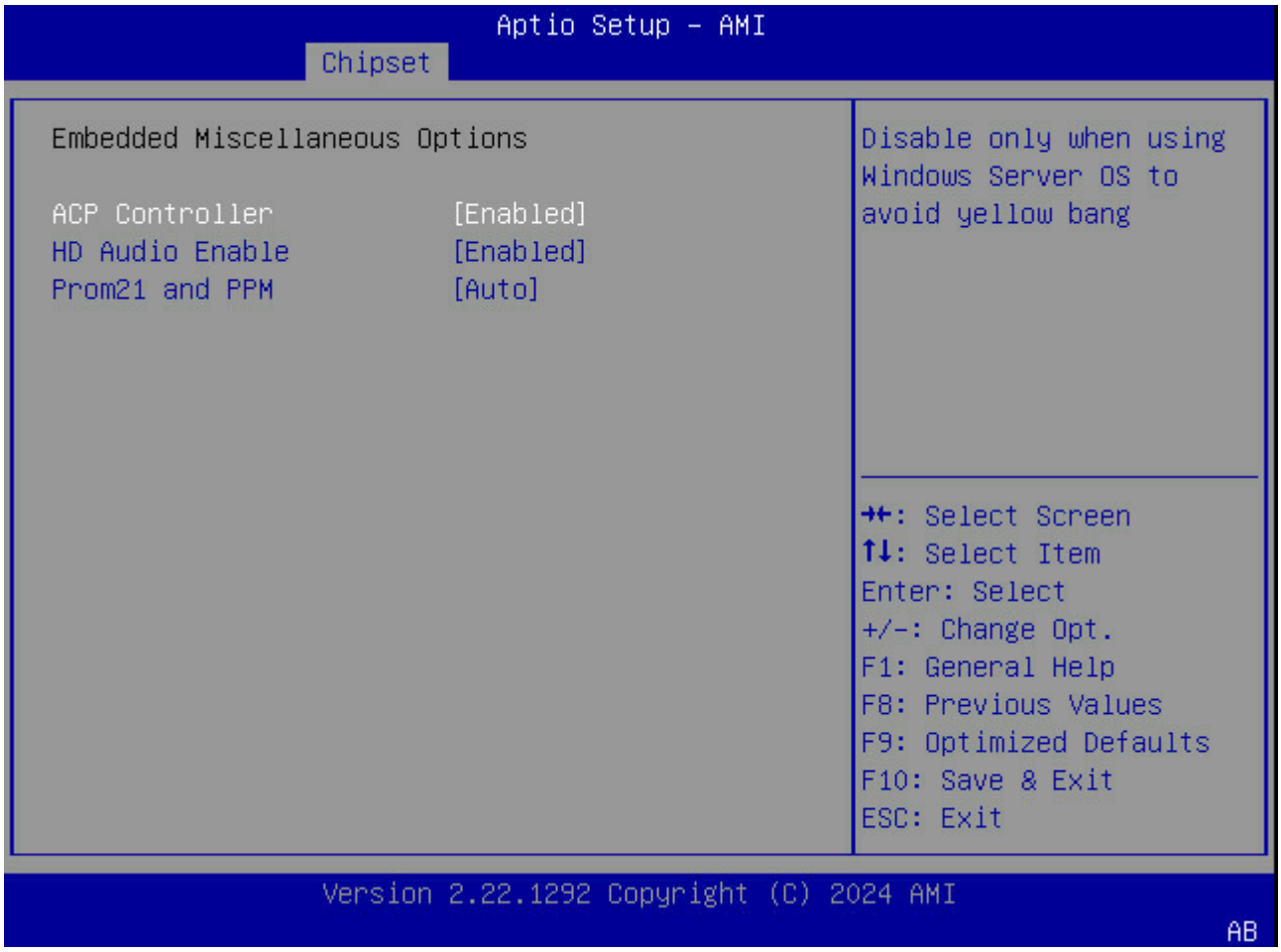
5.4.2.2. SOC Miscellaneous Control



BIOS Item	Options	Description
Trusted Platform Module	**Auto** Disabled Enable dTPM Enable PSP fTPM Enable Pluton fTPM	Enable/Disable TPM physical presence.

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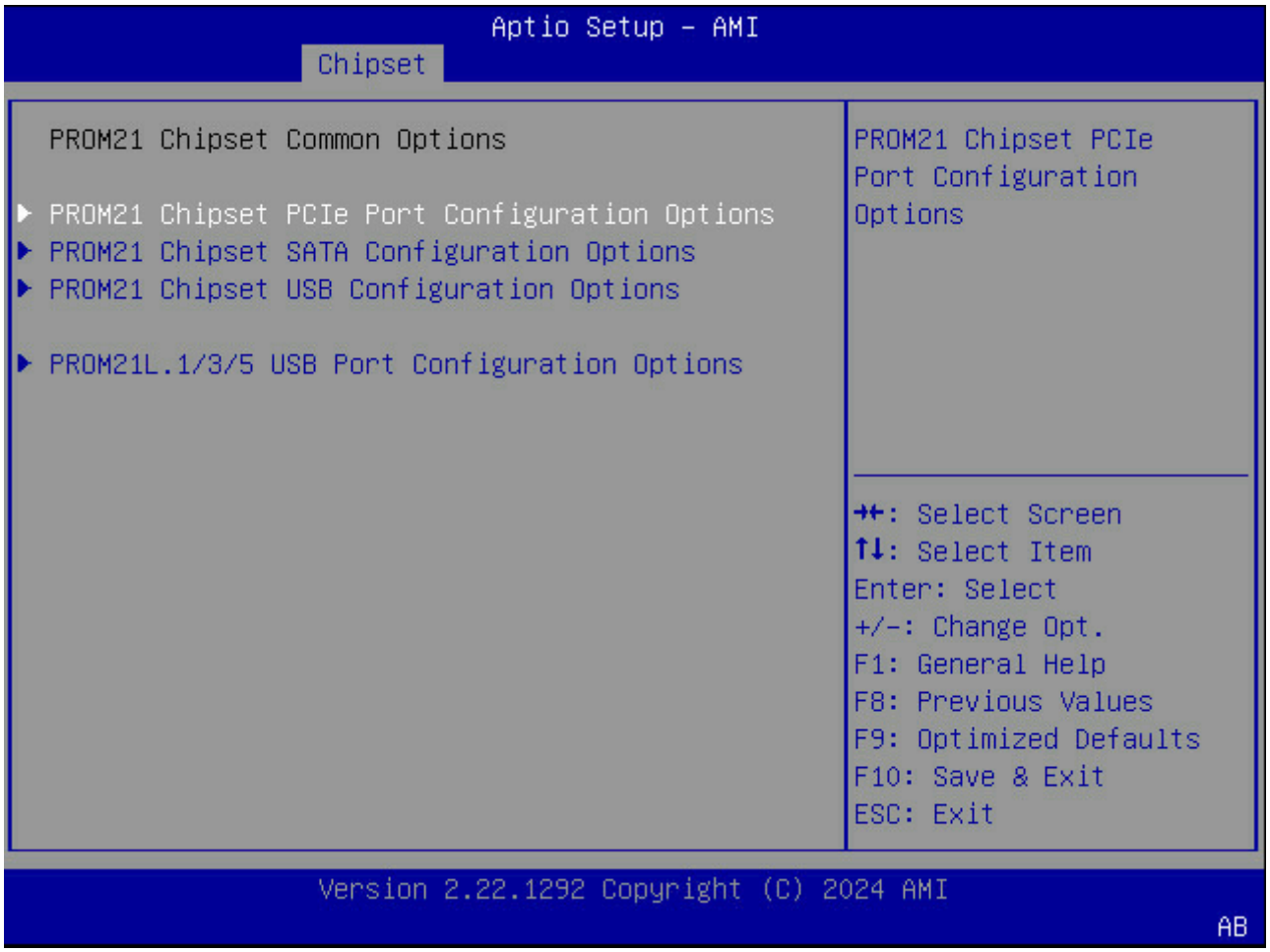
5.4.2.3. Embedded Miscellaneous Options



BIOS Item	Options	Description
ACP Controller	Disabled **Enabled**	Disable only when using Windows Server OS to avoid yellow bang
HD Audio Enable	Disabled **Enabled**	Disable only when using Windows Server OS to avoid yellow bang
Prom21 and PPM	Disabled Enabled **Auto**	This option can be used to disable for Windows Server OS to avoid driver issues with AMDIF031 and AMDI0052 devices

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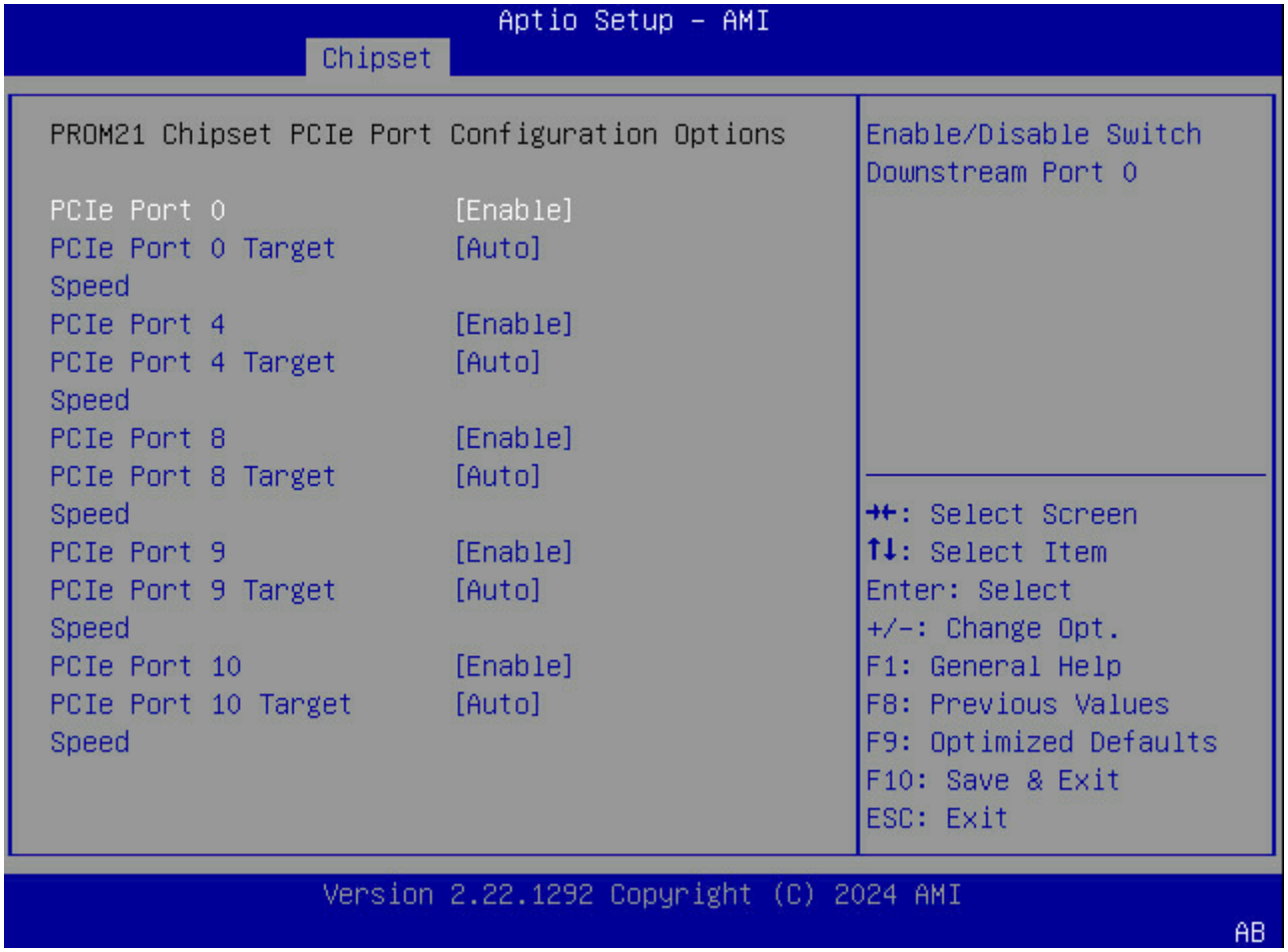
5.4.2.4. PROM21 Chipset Common Options



BIOS Item	Options	Description
PROM21 Chipset PCIe Port Configuration Options	**Sub-Menu.**	PROM21 Chipset PCIe Port Configuration Options
PROM21 Chipset SATA Configuration Options	**Sub-Menu.**	PROM21 Chipset SATA Configuration Options
PROM21 Chipset USB Configuration Options	**Sub-Menu.**	PROM21 Chipset USB Configuration Options
PROM21L.1/3/5 USB Port Configuration Options	**Sub-Menu.**	PROM21L.1/3/5 USB Port Configuration Options

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5.4.2.4.1. PROM21 Chipset PCIe Port Configuration Options

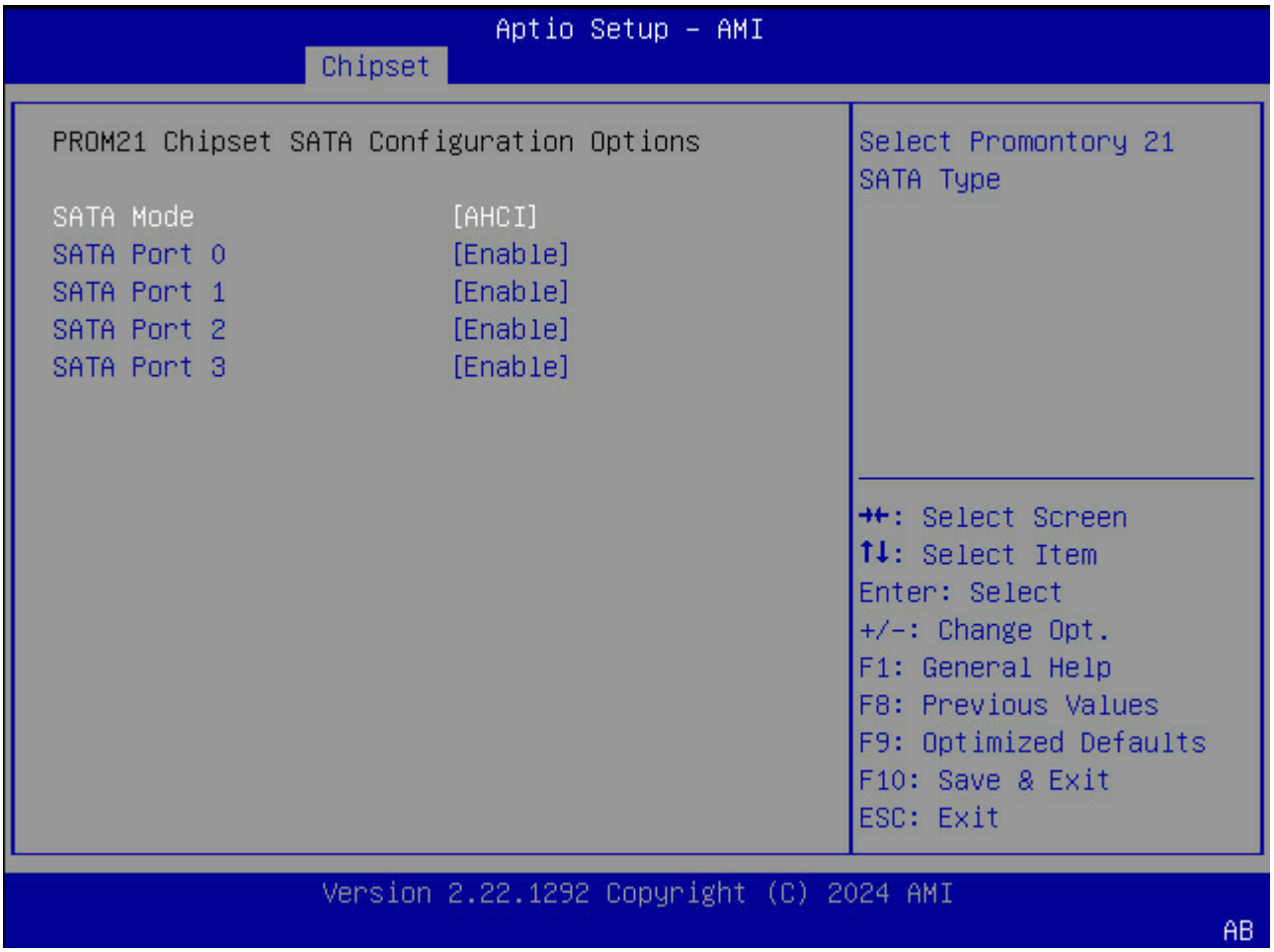


BIOS Item	Options	Description
PCIe Port 0	Disabled **Enabled** Auto	Enable/Disable Switch Downstream Port 0
PCIe Port 0 Target Speed	GEN1 GEN2 GEN3 GEN4 **Auto**	
PCIe Port 4	Disabled **Enabled** Auto	Enable/Disable Switch Downstream Port 4
PCIe Port 4 Target Speed	GEN1 GEN2 GEN3 GEN4 **Auto**	
PCIe Port 8	Disabled **Enabled** Auto	Enable/Disable Switch Downstream Port 8
PCIe Port 8 Target Speed	GEN1 GEN2 GEN3 GEN4	

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	Auto	
PCIe Port 9	Disabled **Enabled** Auto	Enable/Disable Switch Downstream Port 9
PCIe Port 9 Target Speed	GEN1 GEN2 GEN3 GEN4 **Auto**	
PCIe Port 10	Disabled **Enabled** Auto	Enable/Disable Switch Downstream Port 10
PCIe Port 10 Target Speed	GEN1 GEN2 GEN3 GEN4 **Auto**	

5.4.2.4.2. PROM21 Chipset SATA Configuration Options

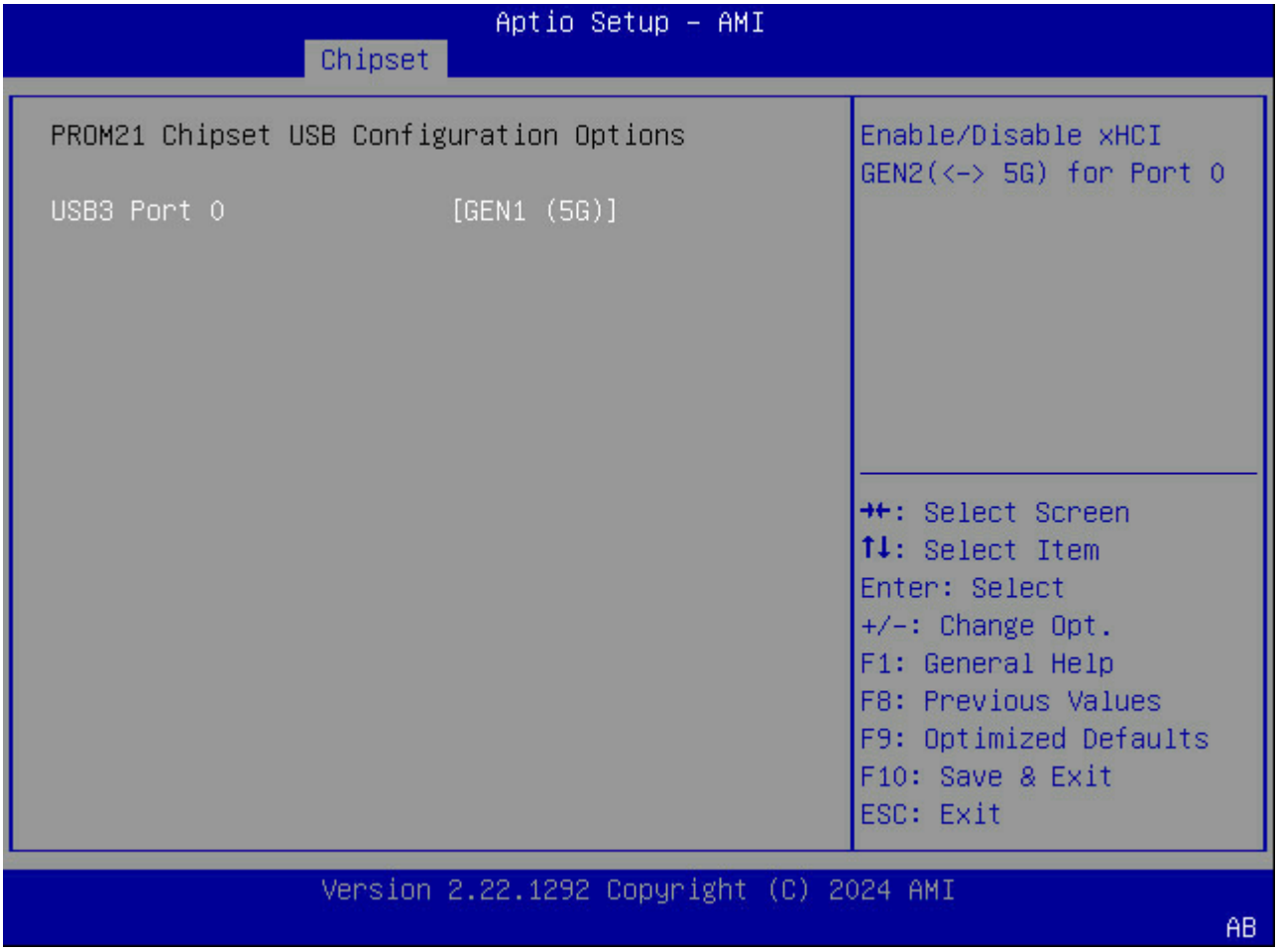


BIOS Item	Options	Description
SATA Mode	**AHCI**	Select Promontory 21 SATA Type
SATA Port 0	Disabled **Enabled**	AHCI SATA port 0 enable

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	Auto	
SATA Port 1	Disabled **Enabled** Auto	AHCI SATA port 1 enable
SATA Port 2	Disabled **Enabled** Auto	AHCI SATA port 2 enable
SATA Port 3	Disabled **Enabled** Auto	AHCI SATA port 3 enable

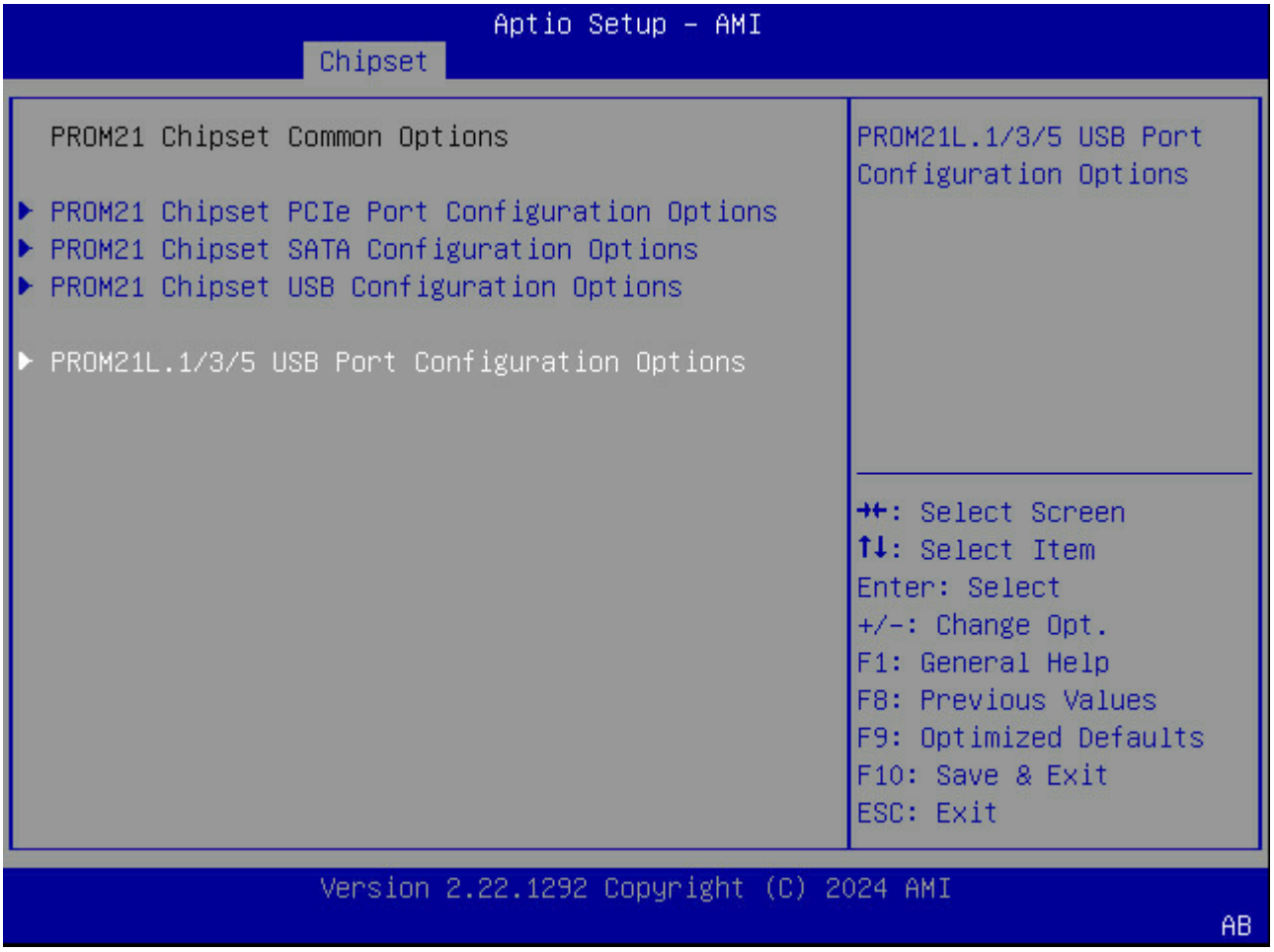
5.4.2.4.3. PROM21 Chipset USB Configuration Options



BIOS Item	Options	Description
USB3 Port 0	**GEN1 (5G)** GEN2 Auto	Enable/Disable xHCI GEN2(<-> 5G) for Port 0

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5.4.2.4.4. PROM21L.1/3/5 USB Port Configuration Options

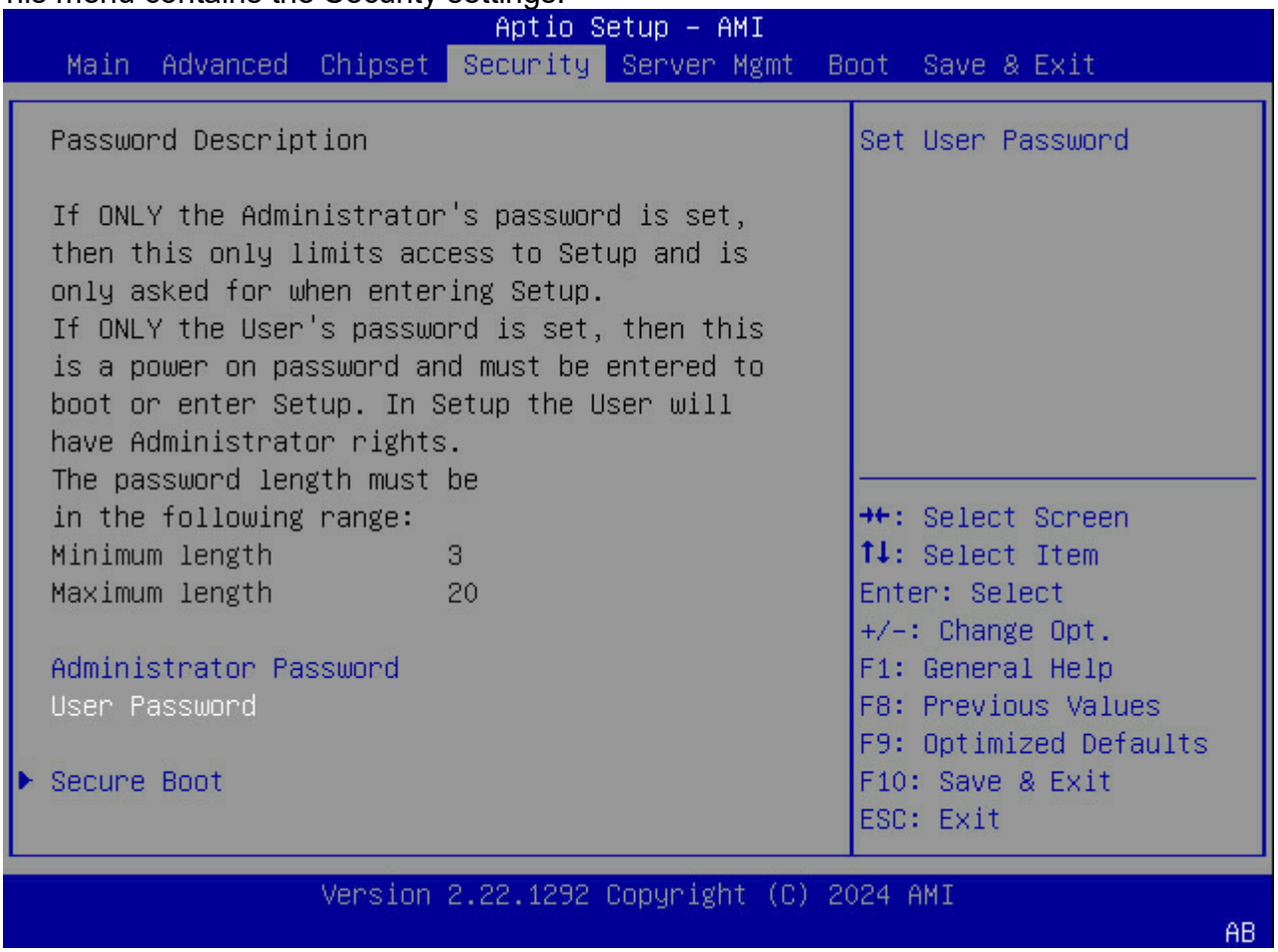


BIOS Item	Options	Description
USB3 Port 0	Disabled **Enabled** Auto	Enable/Disable xHCI GEN2(<-> 5G) for Port 0
USB2 Port 0	Disabled **Enabled** Auto	USB_HSD*0

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5.5 Security Menu

This menu contains the Security settings.

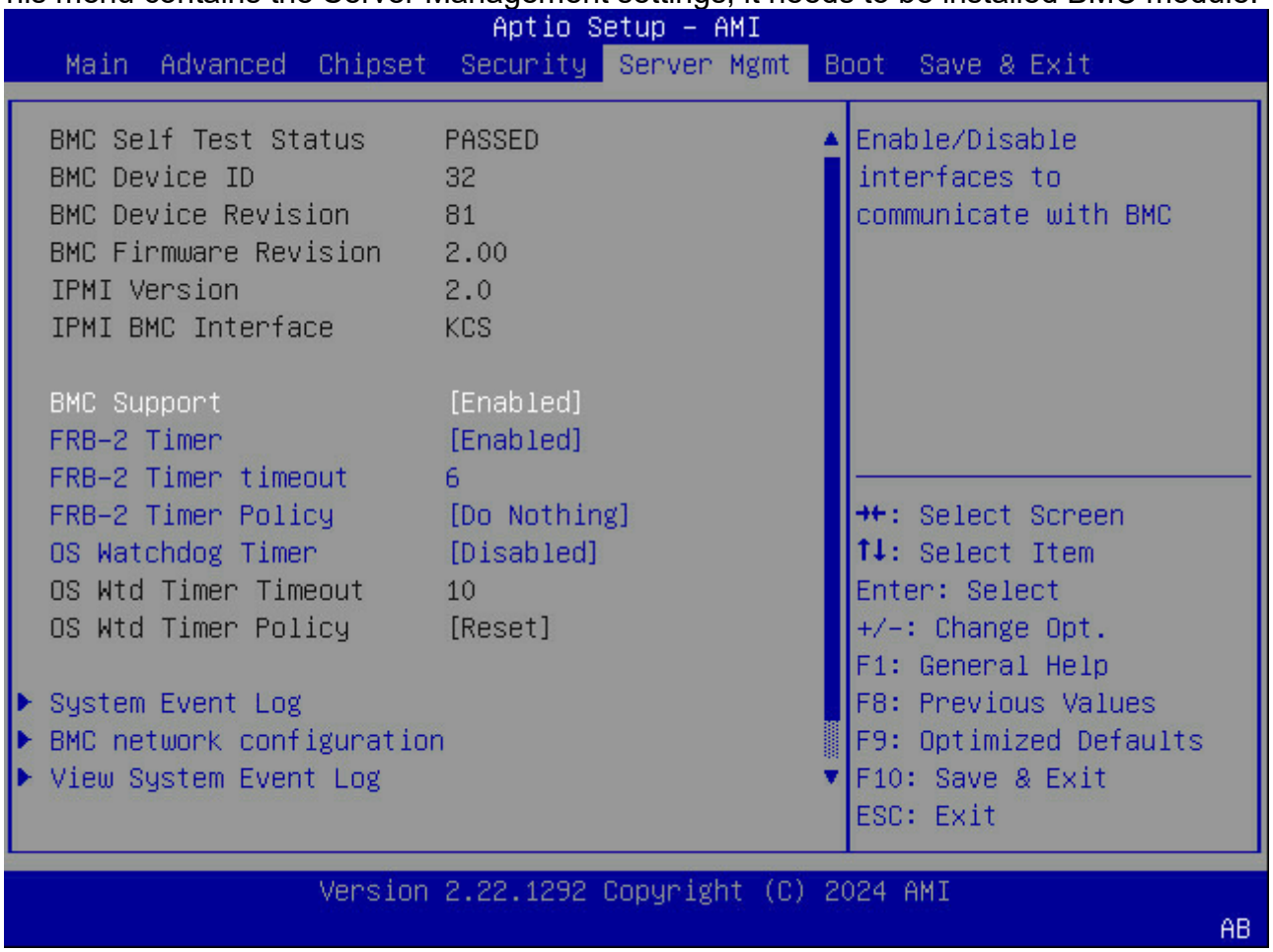


BIOS Item	Options	Description
Administrator Password	**Enter to set password**	Configure/Clear Administrator Password. When pressing enter, a menu will be popped up for creating new password. When password installed, press enter without inputting password, it will clear password.
User Password	**Enter to set password**	Configure/Clear User Password. When pressing enter, a menu will be popped up for creating new password. When password installed, press enter without inputting password, it will clear password.
Secure Boot	**Sub-Menu**	Secure Boot Menu. Default is Disabled.

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5.6 Server Mgmt Menu (Optional)

This menu contains the Server Management settings, it needs to be installed BMC module.



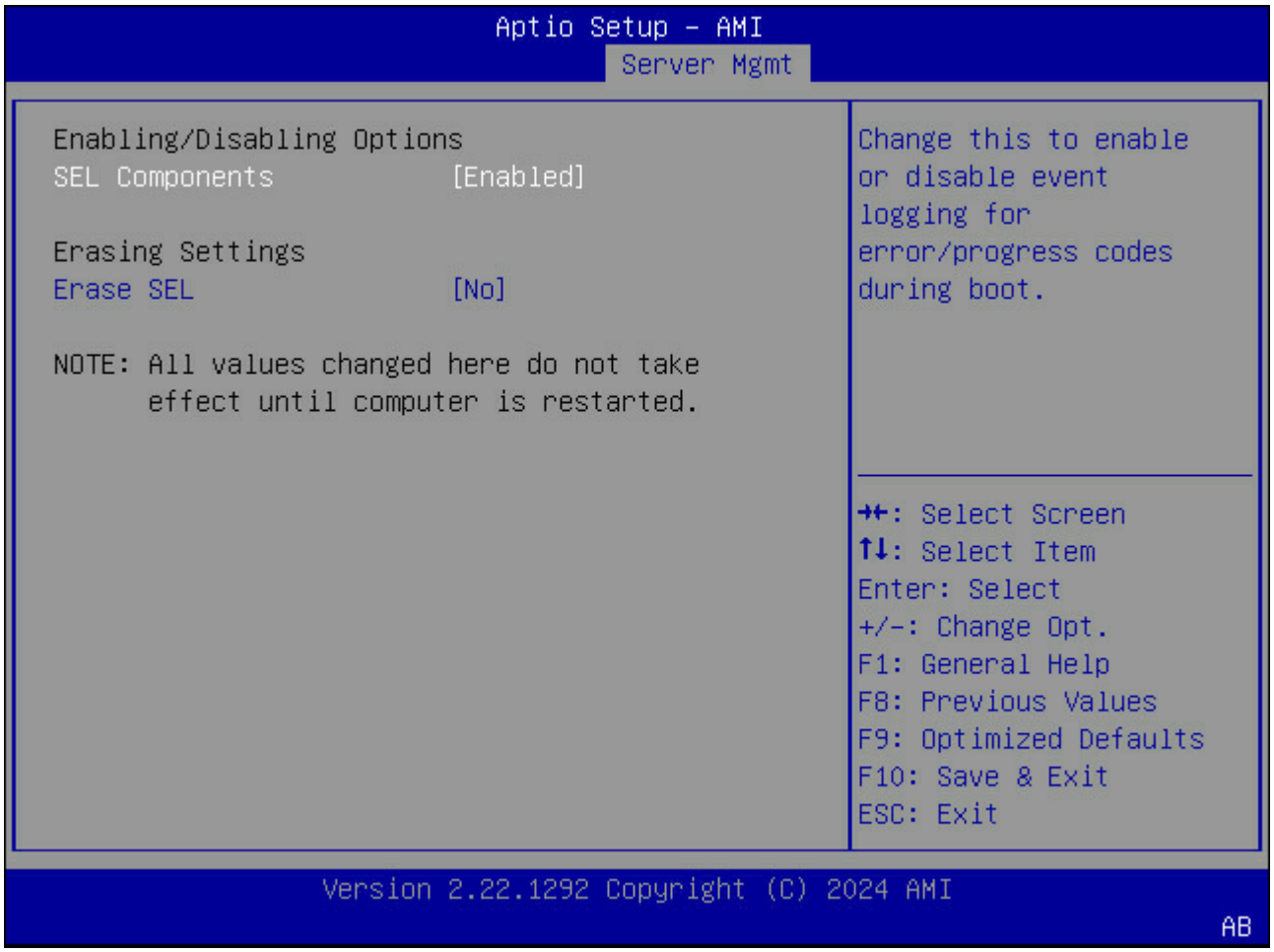
BIOS Item	Options	Description
BMC Self Test Status	**Info-only**	To show BMC self test status
BMC Device ID	**Info-only**	To show BMC Device ID
BMC Device Revision	**Info-only**	To show BMC Device Revision
BMC Firmware Revison	**Info-only**	To show BMC Firmware version
IPMI Version	**Info-only**	To show IPMI version
BMC Interfaces(s)	**Info-only**	To show BMC interface such as KCS
BMC support	**Enabled** Disabled	To enable or disable communicate with BMC
FRB-2 Timer	**Enabled** Disabled	Enable or Disable FRB-2 timer(POST timer)
FRB-2 Timer timeout	**6**	Enter value Between 1 to 30 min for FRB-2 Timer Expiration
FRB-2 Timer Policy	**Do Nothing** Reset Power Down Power Cycle	Configure how the system should respond if the FRB-2 Timer expires. Not available if FRB-2 Timer is disabled.

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BIOS Item	Options	Description
OS Watchdog Timer	Enabled **Disabled**	If enabled, starts a BIOS timer which can only be shut off by Management Software after the OS loads. Helps determine that the OS successfully loaded or follows the OS Boot Watchdog Timer policy.
OS Watchdog timeout	**10**	Enter the value Between 1 to 30 min for OS Boot Watchdog Timer Expiration. Not available if OS Boot Watchdog Timer is disabled.
OS Watchdog Timer Policy	Do Nothing **Reset** Power Down Power Cycle	Configure how the system should respond if the OS Boot Watchdog Timer expires. Not available if OS Boot Watchdog Timer is disabled.
System Event Log	**Sub-Menu**	Press <Enter> to change the SEL event log configuration.
BMC network configuration	**Sub-Menu**	Configure BMC network parameters
View System Event Log	**Sub-Menu**	Press <Enter> to view the System Event Log Records.

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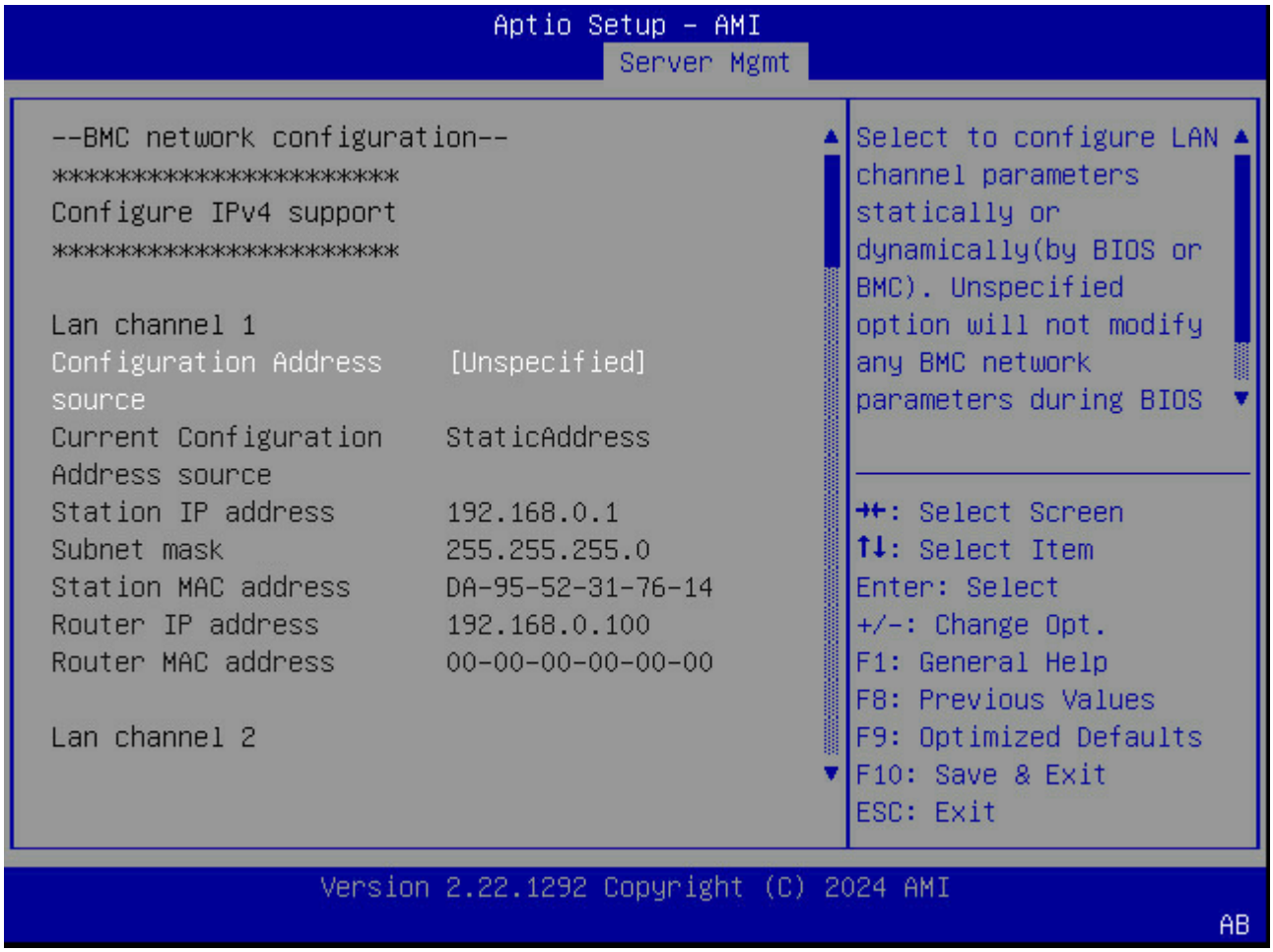
5.6.1 System Event Log



BIOS Item	Options	Description
SEL Components	Disabled **Enabled**	Change this to enable or disable event logging for error/progress codes during boot.
Erase SEL	**No** Yes, On next reset Yes, On every reset	Choose options for erasing SEL.

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5.6.2 BMC Network Configuration

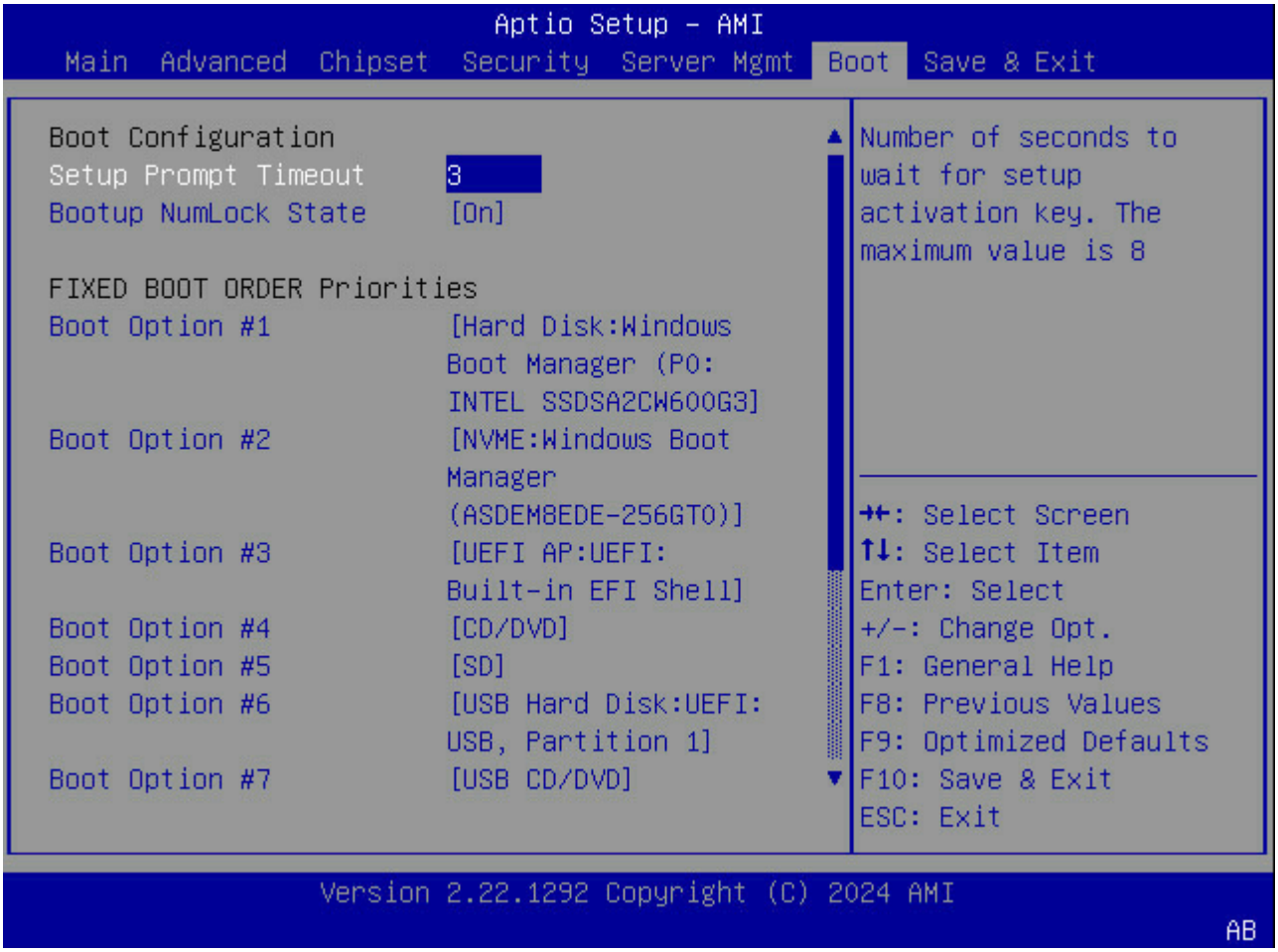


BIOS Item	Options	Description
Configure IPV4 support	**Read only**	
Configuration Address source	**Unspecified** Static DynamicBmcDhcp	Select to configure LAN channel parameters statically or dynamically(by BIOS or BMC). Unspecified option will not modify any BMC network parameters during BIOS phase.
Configure IPV6 support	**Read only**	
IPV6 Support	**Disable** / Enable	Enable or Disable LAN IPV6 Support
Configuration Address source	**Unspecified** Static DynamicBmcDhcp	Select to configure LAN channel parameters statically or dynamically(by BIOS or BMC). Unspecified option will not modify any BMC network parameters during BIOS phase.

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5.7 Boot Menu

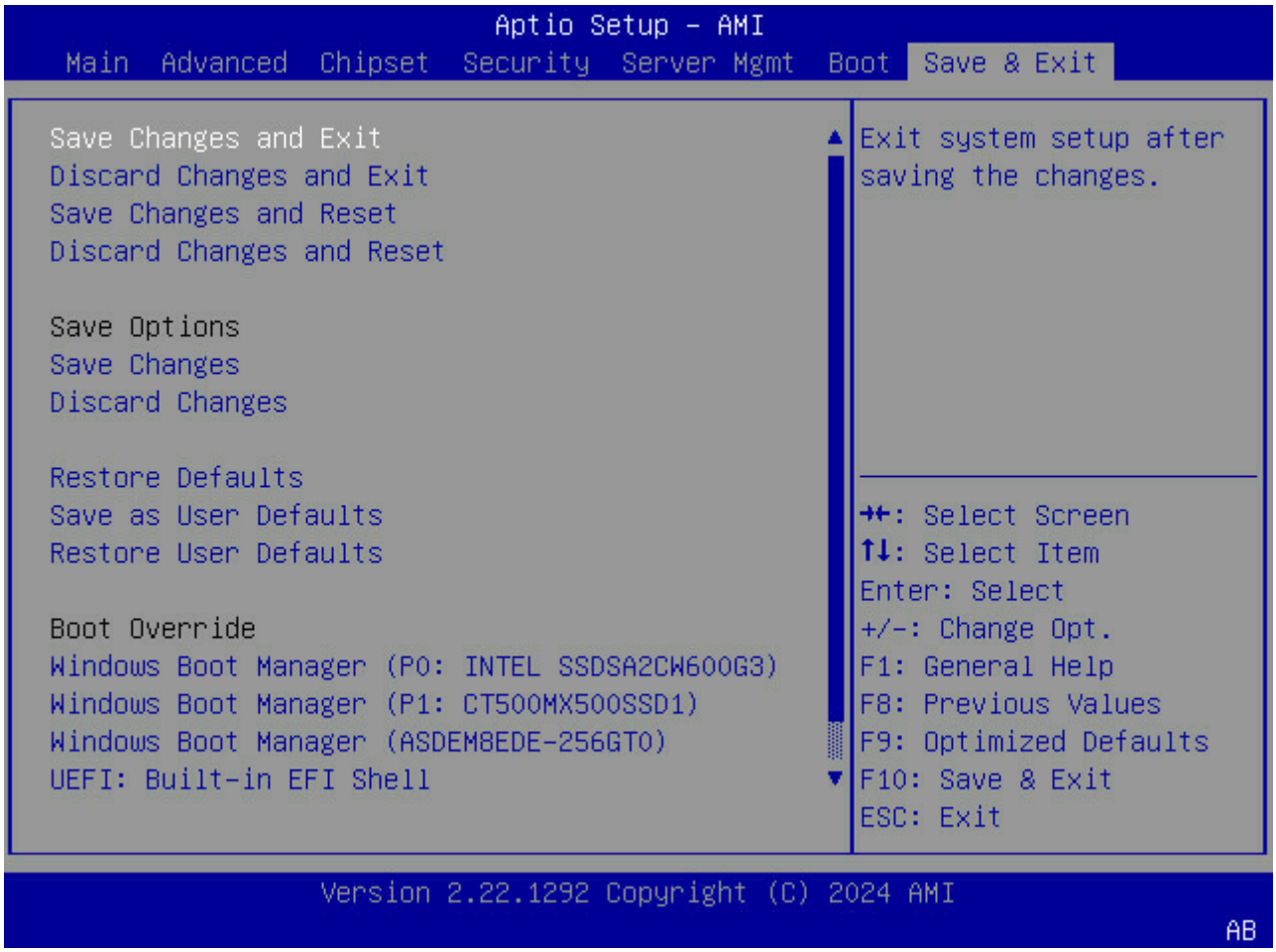
This menu contains the settings for bootable devices in the system.



BIOS Item	Options	Description
Setup Prompt Timeout	3	Number of seconds to wait for setup activation
Bootup NumLock State	**On** Off	
Boot Option #1 ~ #9	#1: Hard Disk #2: CD/DVD #3: SD #4: USB Hard Disk #5: USB CD/DVD #6: USB Key #7: USB Floppy #8: USB LAN #9: Network	For boot priority setting.
XXXX Drive BBS Priorities	**Sub-Menu**	When the bootable device is attached to system and found by BIOS, it will be listed at boot option #. If there are many devices with the same device type found, it can set priority among these devices through this sub-menu.

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5.8 Save & Exit Menu



BIOS Item	Options	Description
Save Changes and Exit	**Enter**	Save changed settings and exit BIOS setup utility.
Discard Changes and Exit	**Enter**	Skip changed setting and exit BIOS setup utility.
Save Changes and Reset	**Enter**	Save all changed settings and let system do reset to boot system.
Discard Changes and Reset	**Enter**	Discard all changed settings and let system do reset to boot system.
Save Changes	**Enter**	Save all changed settings.
Discard Changes	**Enter**	Discard changes done so far to any of the setup options.
Restore Default	**Enter**	Load the default made when BIOS was built.
Save as User Default	**Enter**	Save all changed done so far as User Defaults.
Restore User Default	**Enter**	Load the default that user save as user defaults.
Boot Override	**Info-only**	

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6 BMC Setup BMC

This chapter provides detailed information on understanding, configuring, and managing the BMC, intended for system administrators who are involved in using ADLINK MECS edge server.

Abbreviation	Description
BMC	Baseboard management controller
CLI	Command line interface
FRU	Field replaceable unit
GUI	Graphical user interface
IPMI	Intelligent platform management interface
IPU	Intelligence Processing Unit
NTP	Network time protocol
PSU	Power supply unit
SDR	Sensor data record
SEL	System event log
SNMP	Simple network management protocol
SoL	Serial over LAN

6.1 BMC Introduction

6.1.1 Software Interface

BMC (Baseboard Management Controller) is equipped with a multitude of interfaces, each designed to cater to different aspects of server management and monitoring. These interfaces provide comprehensive control and insight, ensuring administrators can effectively oversee server operations.

6.1.1.1 Web GUI

The product supports Web GUI access through HTTPS (port 443), with HTTP disabled by default for enhanced security. The Web GUI offers a management interface, enabling users to view system information, system events, and status, as well as to control the managed servers.

6.1.1.2 IPMI Interface

The IPMI (Intelligent Platform Management Interface) is a standardized interface used for remote monitoring and management of server systems. It provides a powerful set of tools for

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system administrators to control and monitor servers independently of the operating system.

Features of IPMI

Remote Management: IPMI allows for remote management of servers, including power control, rebooting, and accessing BIOS configurations.
Health Monitoring: It enables monitoring of physical attributes such as temperature, fan speeds, and power supply status.
Event Logging: Critical system events and hardware status changes are logged, facilitating efficient troubleshooting.
Security: IPMI supports secure interfaces and protocols for safe remote management.

6.1.1.3 Redfish

Redfish is a modern, RESTful API used for the management of servers, storage, and networking equipment in data centers and large-scale enterprise environments. It's designed to replace older, less efficient management interfaces with a standardized, scalable, and secure approach.

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6.2 Web GUI Introduction

The Web GUI of BMC is a critical component that offers an intuitive and user-friendly platform for managing and monitoring server operations remotely. This web-based interface ensures administrators can efficiently interact with the server’s BMC from anywhere.

6.2.1 Web Login

Web login to the BMC interface is a straightforward process designed to provide secure and easy access to server management tools.

6.2.1.1 Environment Setup

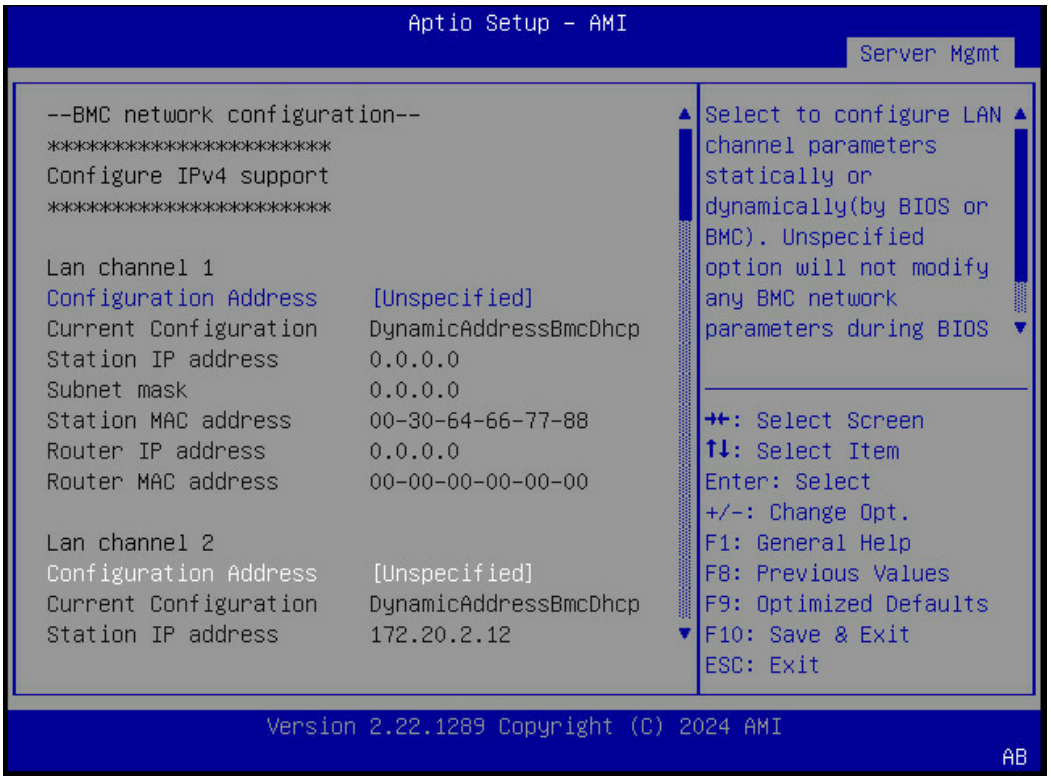
Before logging into the BMC's Web GUI, certain environmental prerequisites must be met:

- Network Configuration
  Ensure the server and the device used for access are on the same network or have a route to connect.

- Browser Requirements:
  Verify that the web browser used is compatible with the BMC's Web GUI. Commonly supported browsers include Chrome, Firefox, Safari, and Edge.

- BMC IP Address
  Since the BMC is configured to use a dynamic IP address, you will need to retrieve the current IP address from the server’s BIOS interface.
  Navigate to the "Server Mgmt" tab and select the "BMC network configuration" option.

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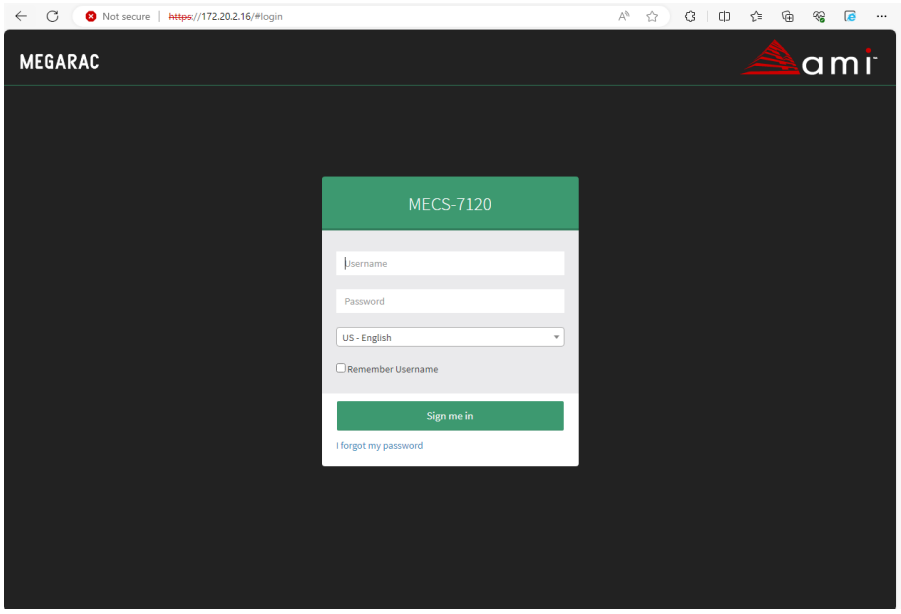


- Security Considerations
  For security reasons, access to the BMC Web GUI is exclusively through HTTPS.

6.2.1.2 User Sign-In

- Accessing the Login Page
  Open your web browser and type in the BMC's IP address, obtained from the BIOS, preceded by "https://". For example, https://[BMC-IP-Address].

  This action will direct you to the BMC Web GUI login page.



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- Selecting Language
  Below the login fields, there is an option to select your preferred language.
  The BMC Web GUI supports multiple languages, including Simplified Chinese, Traditional Chinese, and English.
  Choose your desired language from the dropdown menu before logging in.

- Entering Login Credentials
  On the login page, you will be prompted to enter your username and password.

  The default username: admin
  The default password: admin.123

  After entering these credentials, click the "**Sign me in**" button to proceed.

- Other fields

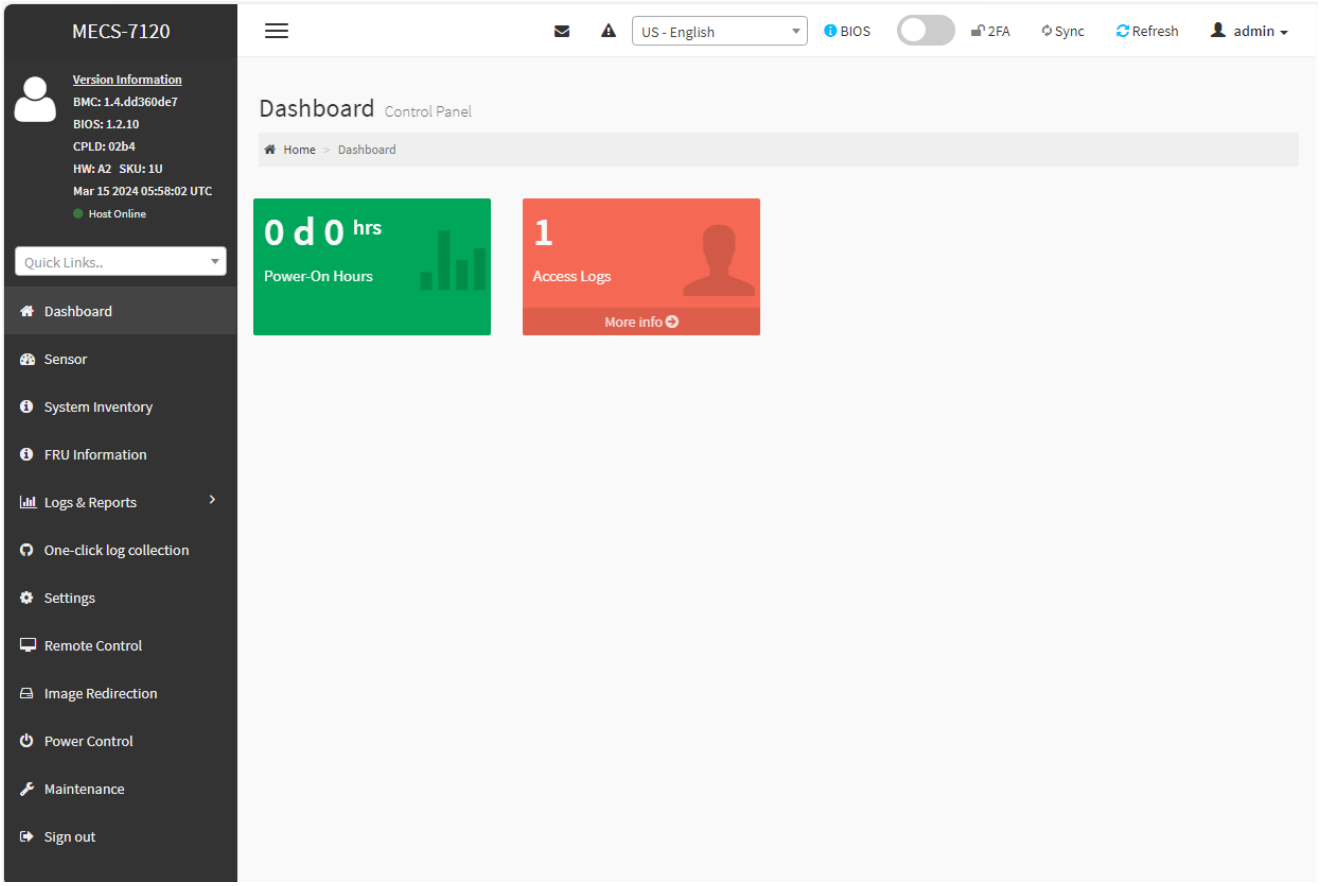
  Remember Username: Check this option to remember your login Username. If you select this option, the browser will save your credentials internally in its memory, and when you open that site the next time, it will auto-fill Username for you.

  I Forgot my Password: If you forget your password, you can generate a new password using this link.

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6.2.2 Web Interface Overview

This section provides an overview of the BMC's Web Interface, emphasizing the functionalities and information displayed on the main interface. The primary purpose of the main interface is to offer a quick and comprehensive understanding of the current status of the BMC.



The BMC Web GUI is primarily divided into three sections, each offering specific functionalities and information crucial for server management.

1. Top Menu Bar

Functionality: The top menu bar is designed for receiving and viewing server messages, setting BMC global configurations, and accessing the BIOS configuration interface. This area serves as a quick access point for important notifications and system adjustments.

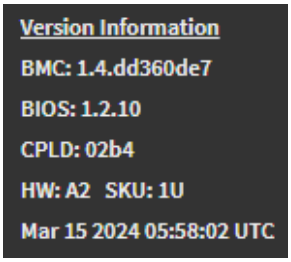
Function	Icon	Detailed Description
Message		Display the messages received.
Notification		Display the notifications received.
Language		Set Board Language.
Bios interface		Open the new window or popup to configure the BIOS settings.

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Function	Icon	Detailed Description
Dashboard Expansion		Show/Hide limited Dashboard Widgets.
2FA		Enable/Disable Two Factor Authentication.
Synchronization		On/Off to synchronize with latest Sensor and Event Log updates.
Refresh		Reload the current page.
Profile		Set the User Profile.

2. Server Version Information

This section of the interface displays the current version information of various server components, listed in the following order:



- BMC Version Information
- BIOS Version Information
- CPLD Version Information
- Hardware Version Information
- SKU Version Information
- BMC Image Build Date and Time

The version information window provides a quick overview of the server's hardware and firmware status, ensuring that administrators are immediately aware of the current versions and operational status.

3. Function Menu bar

The menu bar displays the following.

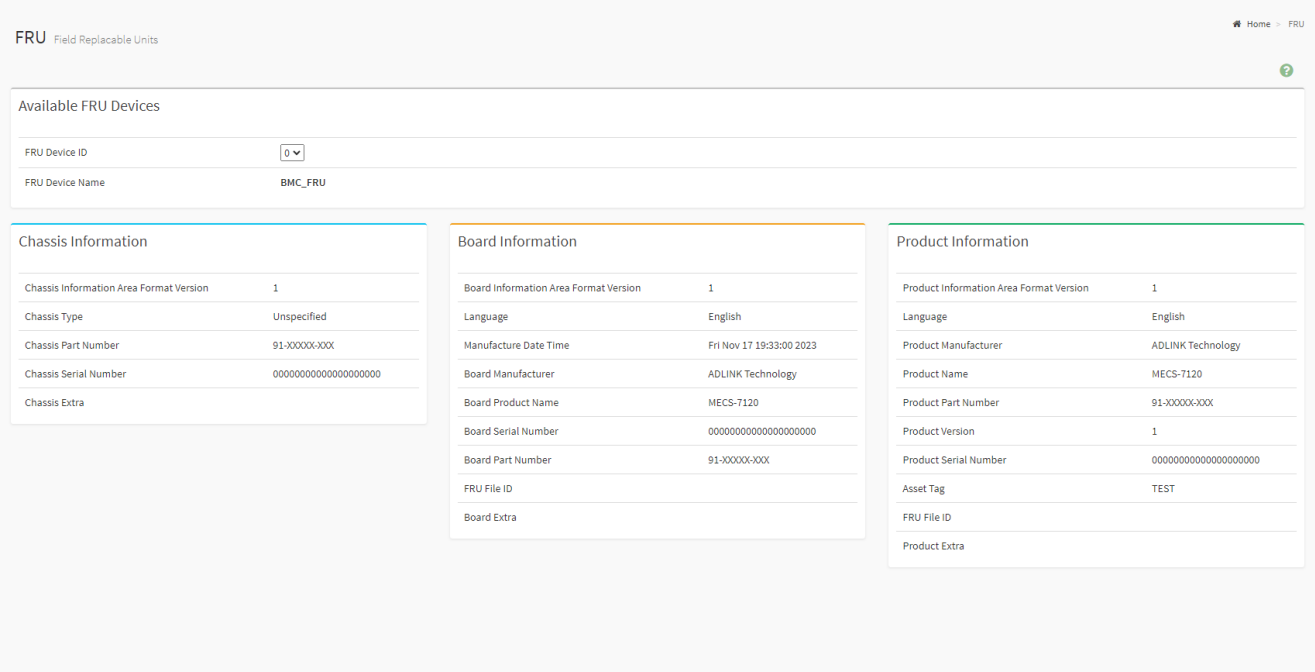
Version Information will be displayed with the latest version, date and time details. Power Control Status will be displayed as Host Online. To Change the Power Control Status, click Host Online link.

- ✧ Dashboard
- ✧ Sensor
- ✧ System Inventory
- ✧ FRU Information
- ✧ Logs & Reports
- ✧ One-click log collection
- ✧ Settings
- ✧ Remote Control
- ✧ Image Redirection
- ✧ Power Control
- ✧ Maintenance
- ✧ Sign out

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6.2.3 Server Information

6.2.3.1 FRU Information



The FRU (Field Replaceable Unit) Information interface in the BMC Web GUI is accessed by clicking on the "FRU Information" option in the left-hand function bar. This feature allows users to view electronic label information for the motherboard and other components, providing detailed FRU data.

Structure and Functionality of the FRU Information Interface. The FRU information is divided into four main sections, each offering specific insights:

Information Category	Description
Available FRU Devices	Details about each FRU device: FRU Device ID FRU Device Name
Chassis Information	Information related to the server's chassis, featuring: Chassis Information Area Format Version Chassis Type Chassis Part Number Chassis Serial Number Chassis Extra
Board Information	Data about the server's mainboard, encompassing: Board Information Area Format Version Language Manufacture Date Time Board Manufacturer Board Product Name Board Serial Number Board Part Number FRU File ID

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Information Category	Description
	Board Extra
Product Information	Comprehensive details about the product, including: Product Information Area Format Version Language Product Manufacturer Product Name Product Part Number Product Version Product Serial Number Asset Tag FRU File ID Product Extra

6.2.3.2 Sensor Information

The Sensor Information panel in the BMC Web GUI provides a detailed overview of the current status and readings from various sensors within the server. Accessing and understanding this data is essential for maintaining the server's health and performance.

- Accessing the Sensor Information Panel
- Navigating to the Panel
- Click on the "Sensor" button located on the left side of the BMC Web GUI

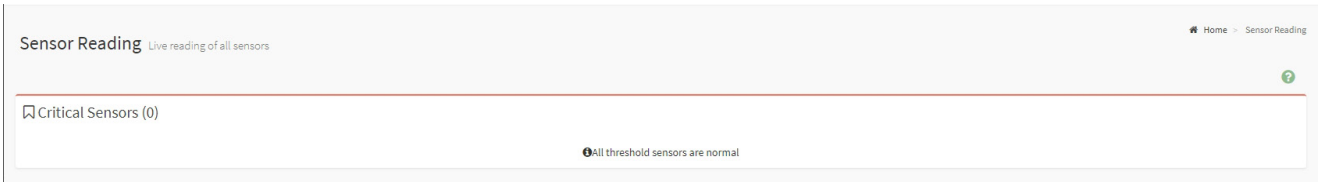
6.2.3.2.1 Introduction to sensor interface

This will lead you to the Sensor Information interface, which is central for real-time sensor status monitoring.

Sensor Information Interface Layout

The Sensor Information interface is divided into four distinct sections, each providing specific types of sensor data:

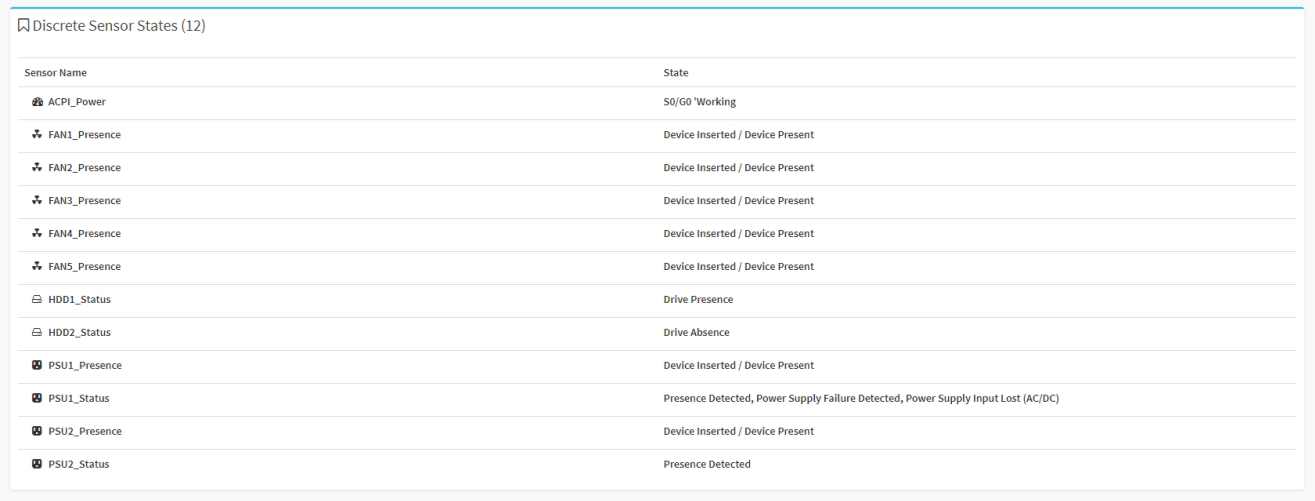
1. Critical Sensors



This section displays the status of critical sensors, highlighting if any sensor has exceeded its threshold or is showing abnormal readings.
It's a focal point for quickly identifying potential issues that require immediate attention.

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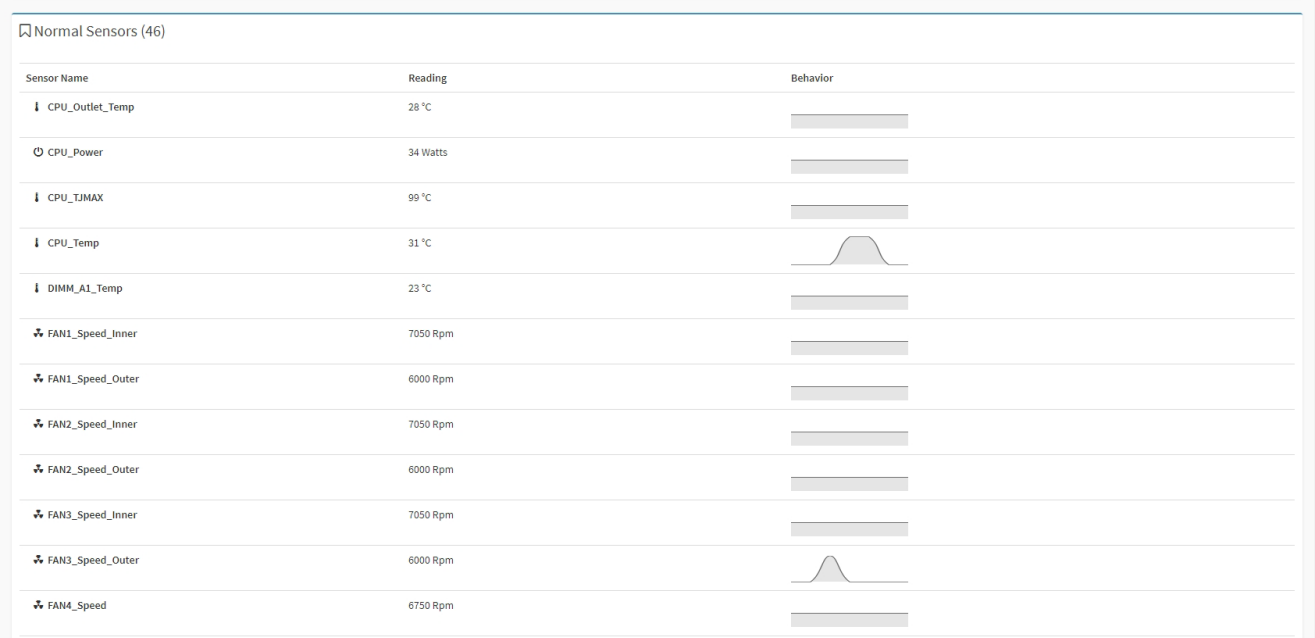
2. Discrete Sensor States


Discrete Sensor States (12)

Sensor Name	State
ACPI_Power	S0/G0 'Working
FAN1_Presence	Device Inserted / Device Present
FAN2_Presence	Device Inserted / Device Present
FAN3_Presence	Device Inserted / Device Present
FAN4_Presence	Device Inserted / Device Present
FAN5_Presence	Device Inserted / Device Present
HDD1_Status	Drive Presence
HDD2_Status	Drive Absence
PSU1_Presence	Device Inserted / Device Present
PSU1_Status	Presence Detected, Power Supply Failure Detected, Power Supply Input Lost (AC/DC)
PSU2_Presence	Device Inserted / Device Present
PSU2_Status	Presence Detected

Shows the status of discrete sensors, particularly focusing on those that are offline.
This part is crucial for identifying sensors that are not functioning or are disconnected.

3. Normal Sensors

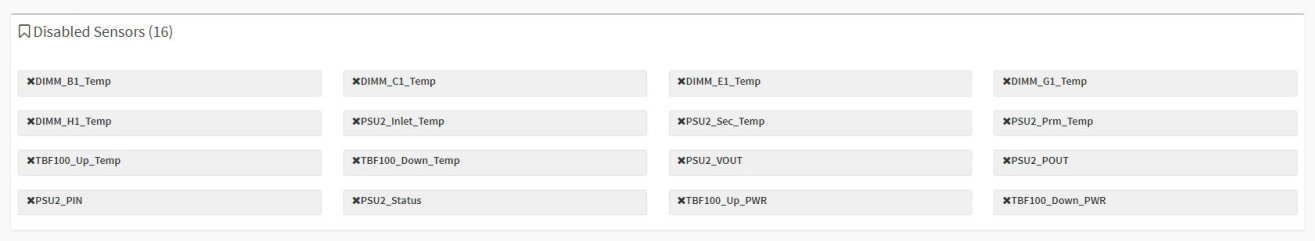

Normal Sensors (46)

Sensor Name	Reading	Behavior
CPU_Outlet_Temp	28 °C	
CPU_Power	34 Watts	
CPU_TJMAX	99 °C	
CPU_Temp	31 °C	
DIMM_A1_Temp	23 °C	
FAN1_Speed_Inner	7050 Rpm	
FAN1_Speed_Outer	6000 Rpm	
FAN2_Speed_Inner	7050 Rpm	
FAN2_Speed_Outer	6000 Rpm	
FAN3_Speed_Inner	7050 Rpm	
FAN3_Speed_Outer	6000 Rpm	
FAN4_Speed	6750 Rpm	

Displays the actual readings from various sensors.
These readings include data such as temperature, fan speeds, voltage levels, and more.
The section provides a comprehensive view of the real-time operating conditions of the server.

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4. Disabled Sensors

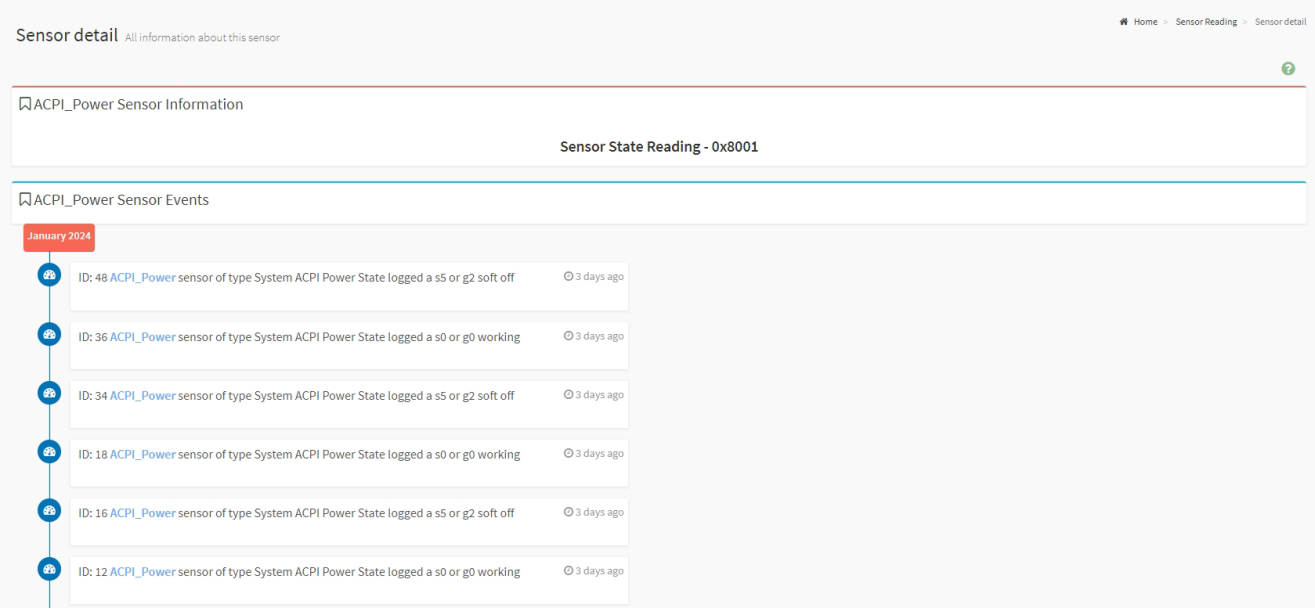


Lists sensors that are currently not in operation or are disabled.
This section helps in identifying which sensors are not contributing to the monitoring process and may need reactivation or maintenance.

6.2.3.2.2 Detailed Sensor Information

Accessing and Viewing Sensor Details. To view detailed information about a specific sensor, simply click on the desired sensor listed in the Sensor Information panel. This action will lead you to a dedicated detail page for that sensor.

On this detailed page, extensive information about the selected sensor is displayed, including its current operational status, various parameters, and any unique specifications.

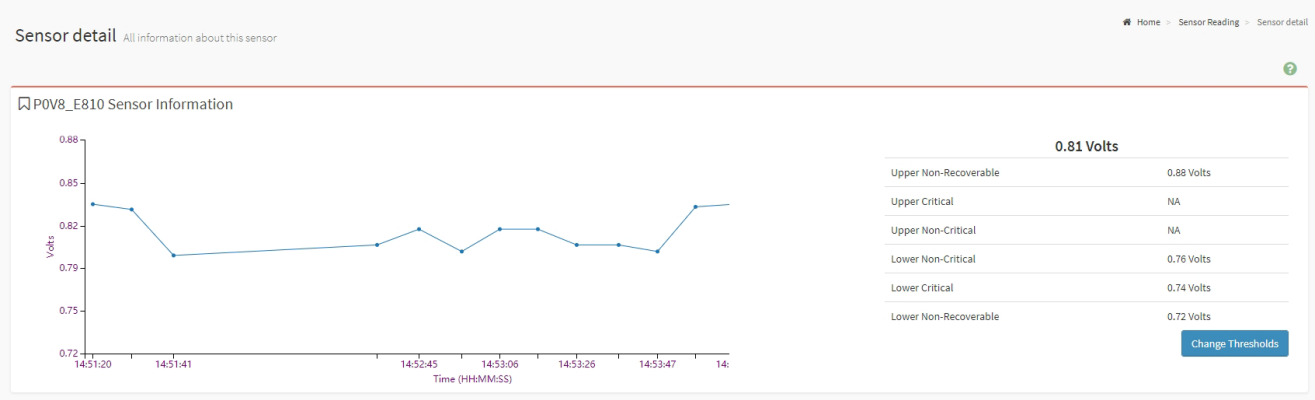


Customizing Sensor Thresholds:
For general sensors, the detailed interface provides the capability to adjust various sensor threshold parameters. Administrators have the flexibility to modify several threshold levels including:

Upper Non-Recoverable
Upper Critical
Upper Non-Critical
Lower Non-Critical
Lower Critical
Lower Non-Recoverable

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Practical Application:
Adjusting these thresholds is vital for preemptive alerts and ensuring that sensors are operating within safe and optimal ranges.

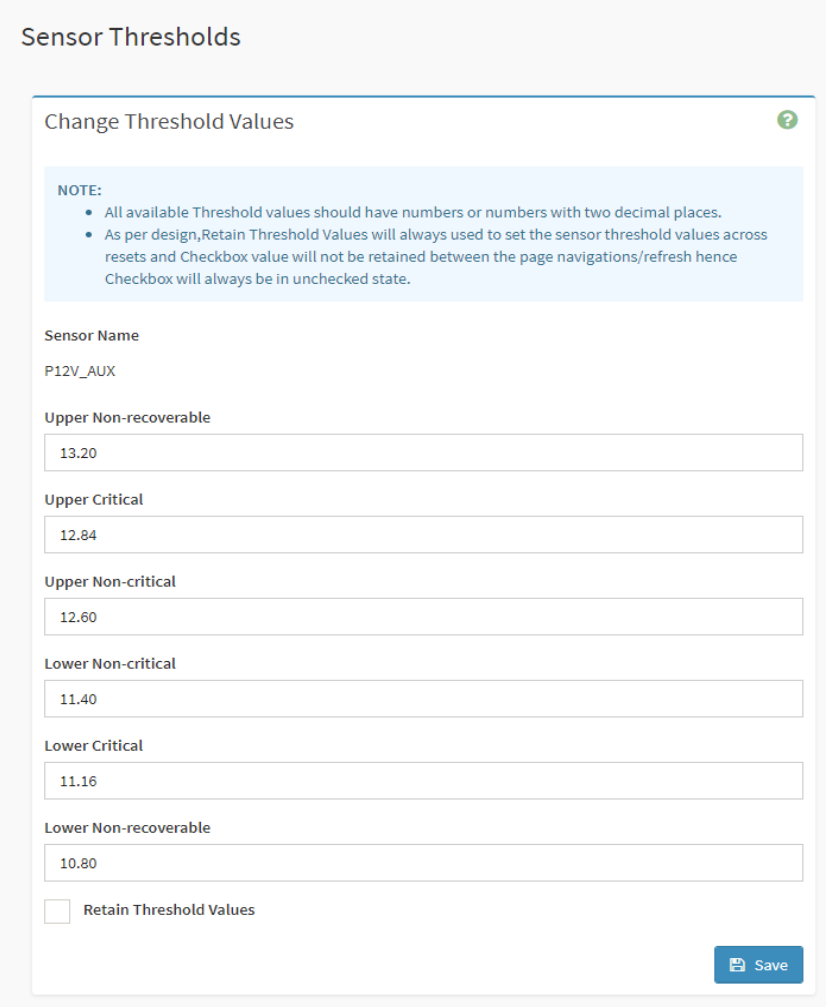


If the synchronization button in the top menu bar is active, accessing the detail interface for a general sensor will enable a graphing feature. This feature provides a line graph depicting the sensor's data over time. It serves as a visual tool for quickly assessing the sensor's performance.

6.2.3.2.3 Modifying Sensor Thresholds

Accessing Sensor Thresholds Modification Interface. In the Sensor Details interface, locate and click on the "Change Thresholds" button. This action will redirect you to the Sensor Thresholds interface.

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Sensor Thresholds Interface:

- The Sensor Thresholds interface displays each sensor's name along with its threshold values.
- Users can view and modify thresholds for each sensor, including upper and lower warning and critical limits.
- Thresholds not applicable or unavailable for a sensor are marked as "NA".

Retaining Threshold Values
At the bottom of the interface, a "**Retain Threshold Values**" checkbox is provided.

Note: *If this option is not selected, threshold adjustments will be temporary, reverting to default upon BMC reboot or power loss.*

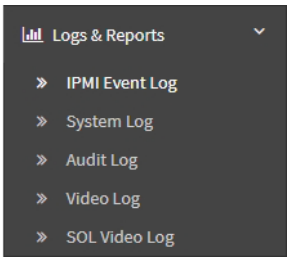
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6.2.4 Server Information

BMC provides various logging functions that are crucial for system diagnosis, monitoring, and security. Logs are divided into different types, each with a specific purpose.

Accessing BMC Logs
To view these logs, navigate to the BMC web interface:

- From the left-side functional panel, click on "Logs & Reports".
- A dropdown menu will appear, listing the following types of logs available for viewing:

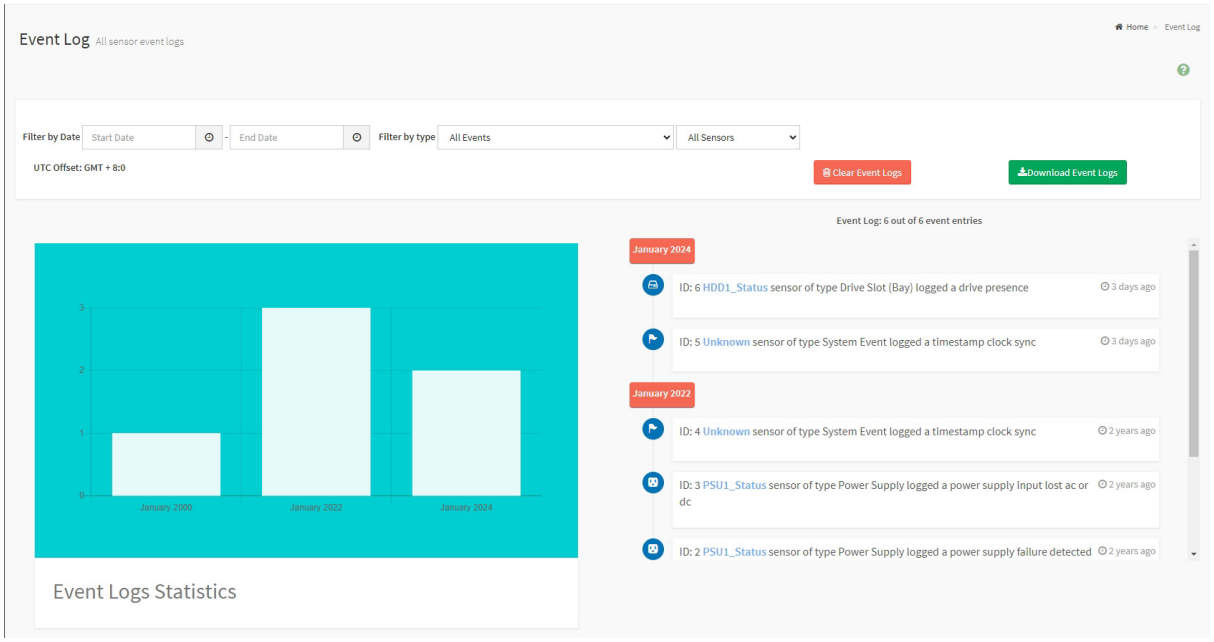


- IPMI Event Log
- System Log
- Audit Log
- Video Log
- SOL Video Log

6.2.4.1 IPMI Event Log

This page displays the list of event logs occurred by the different sensors on this device. Double click on a record to see the details of that entry. You can use the sensor type or sensor name filter options to view those specific events or you can also sort the list of entries by clicking on any of the column headers.

To open the Event Log page, click **Logs & Reports -> Event Log** from the menu bar. A sample screenshot of Event Log page is shown below.



The Event Log page consists of the following Fields.

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Filter By Date: Filtering can be done by selecting Start Date and End Date using Calendar.

Note: *Date should be in MM/DD/YYYY format.*
By default, all log time will be displayed in BMC time zone.

Filter By Type: The category could be either All Events, System Event Records, OEM Event Records, BIOS Generated Events, SMI Handler Events, System Management Software Events, System Software - OEM Events, Remote Console Software Events, Terminal Mode Remote Console software Events.

Note: *Once the Filter By Date and Filter type are selected, the list of events will be displayed with the Event ID, Time Stamp, Sensor Type, Sensor Name and Description.*

UTC Offset: Displays the current UTC Offset value based on which event Time Stamps will be updated. Navigational arrows can be used to selectively access different pages of the Event Log.

Event Log Statistics: Displays the statistical graph for the selected date.

Clear Event Logs: To delete all the event logs.

Download Event Logs: To download the event logs.

Procedure

1. From the Filter ByDate field, select the time period by Start Date and End Date using Calendar for the event categories. The events will be displayed according to the selected date.

2. From the Filter By Type field, select the Type of the event and Sensor name to view the events for the date. The events will be displayed based on the selected time period.

3. To clear all events from the list, click Clear All Event Logs.

4. To download the event logs, click Download Event Logs.

Note: *When Clear All Event Logs action is performed, there might be some events present even after clearing those events are generated after performing clear operation which can be verified using its timestamp.*

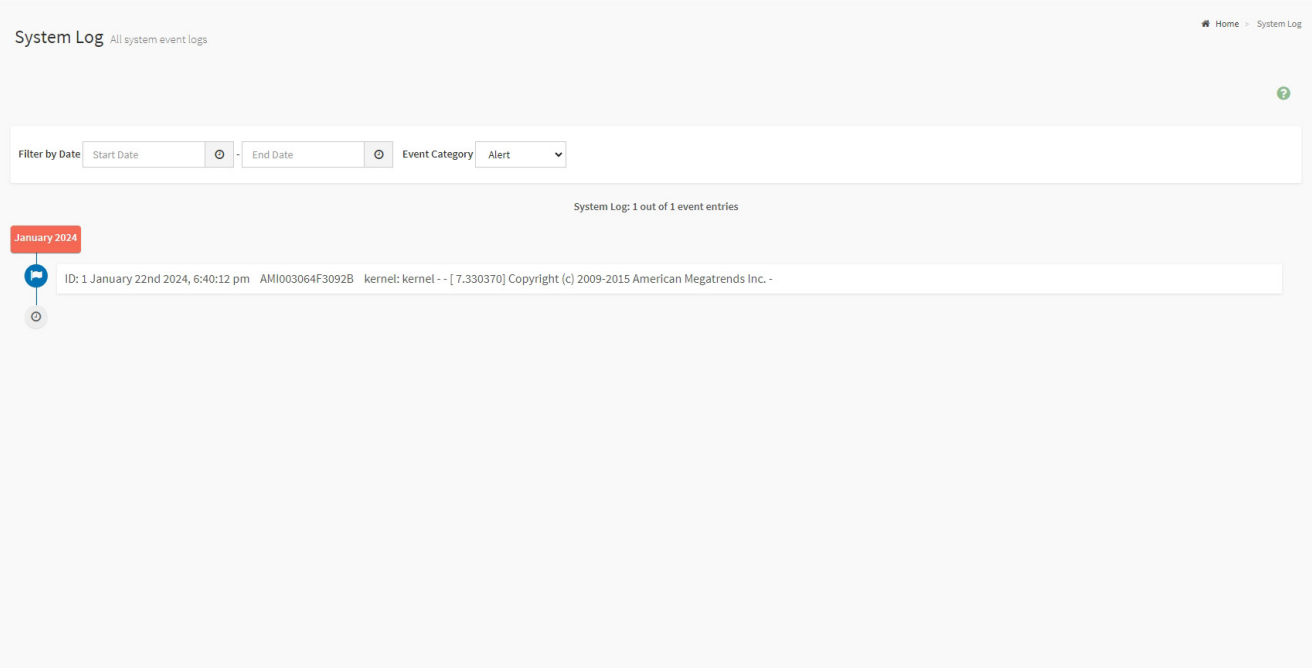
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6.2.4.2 System Log

System Log page will display all the system events occurred in this device that has been already configured.

Note: *Logs have to be configured under* ***Settings -> Log Settings*** *in order to display any entries.*

To open the Event Log page, click **Logs & Reports -> System Log** from the menu bar.



Procedure

To view System Log, click the **System Log** tab to view all system events. Entries can be filtered based on Filter By Date (Start Date and End Date) and Event Category like Alert, Critical, Error, Notification, Warning, Debug, Emergency and Information.

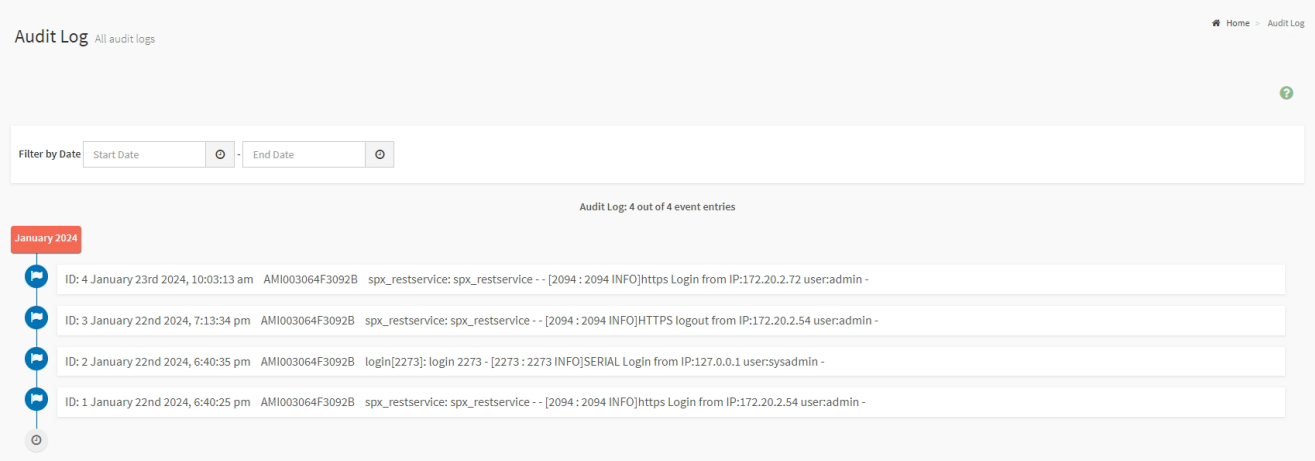
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6.2.4.3 Audit Log

Audit Log page will display all the system events occurred in this device that has been already configured.

Note: *Logs have to be configured under* ***Settings -> Log Settings -> Advanced Log Settings*** *in order to display any entries.*

To open the Event Log page, click **Logs & Reports -> Audit Log** from the menu bar.

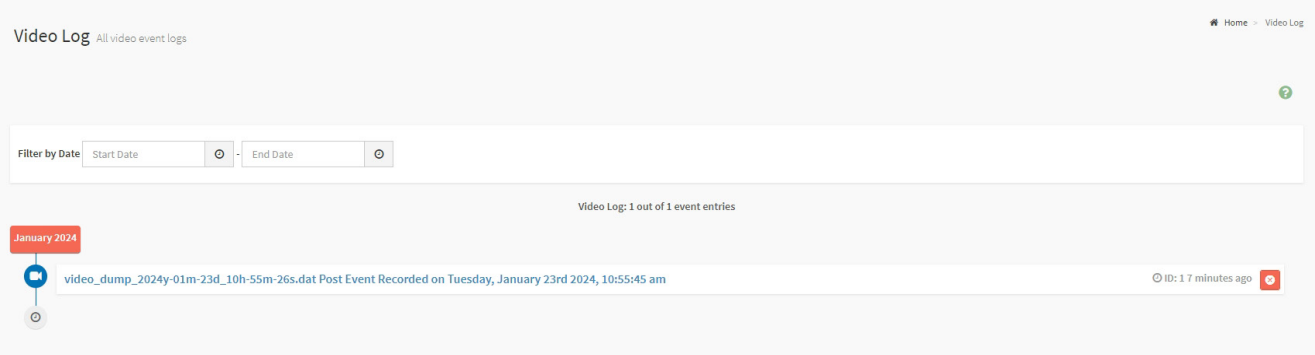


6.2.4.4 Video Log

The video log page will record the configured system events in the device in a video format that has been already configured.

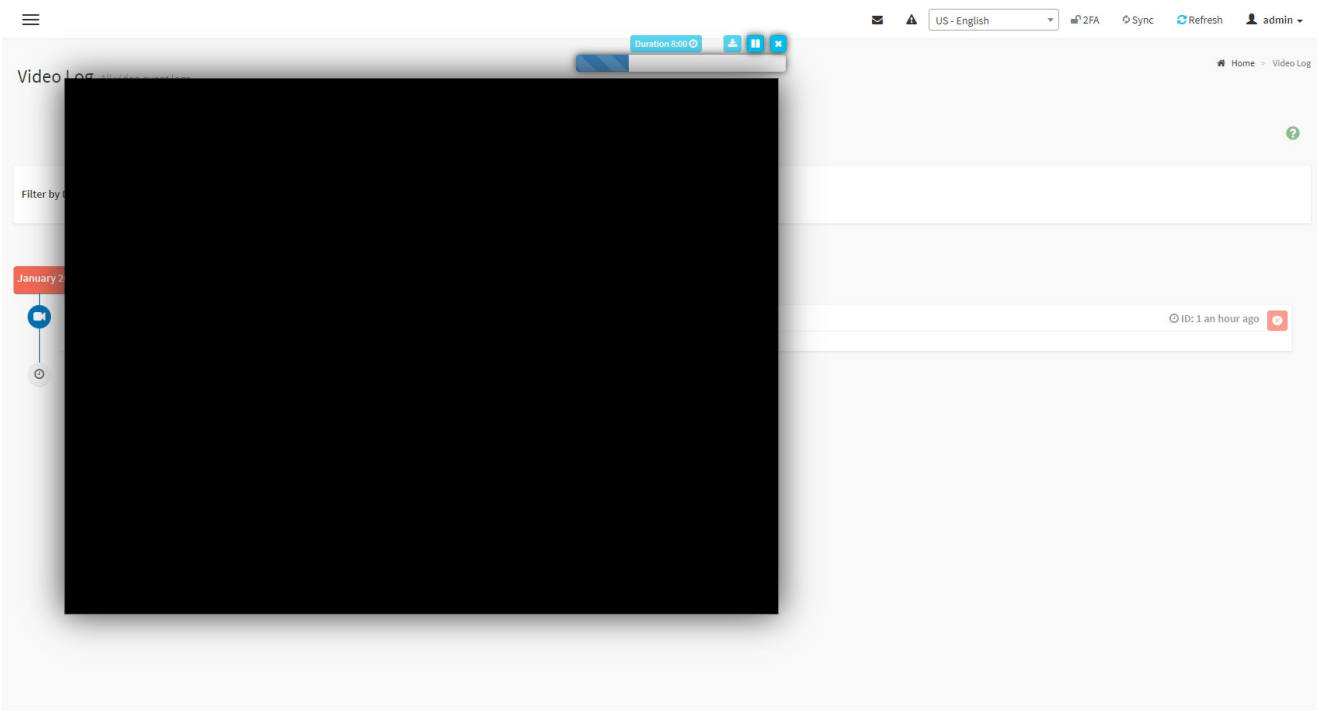
Note: *Video Trigger Settings should be enabled, to display the Video Log page. Video Trigger Settings can be configured under* ***Settings -> Video Recording -> Auto Video Settings -> Video Trigger Settings****.*

To open the Video Log page, click **Logs & Reports -> Video Log** from the menu bar. A sample screenshot of Video Log page is shown below



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After clicking on the video event, the video conversation box will pop up. Play the current video. In this interface, you can choose to download or delete the current video log.



Note: *Video will be allowed to play/download only if file size is lesser than 40MB. Browsers have various memory restrictions, due to this browser cannot store and process data greater than 40MB (approximately). If file size is greater than 40MB, user will be notified with a message to use Java player Application.*

The video data may not be proper if the browser zoom in/out settings are changed during video playback.

To download a video, you need to wait for the video buffering to complete before downloading.

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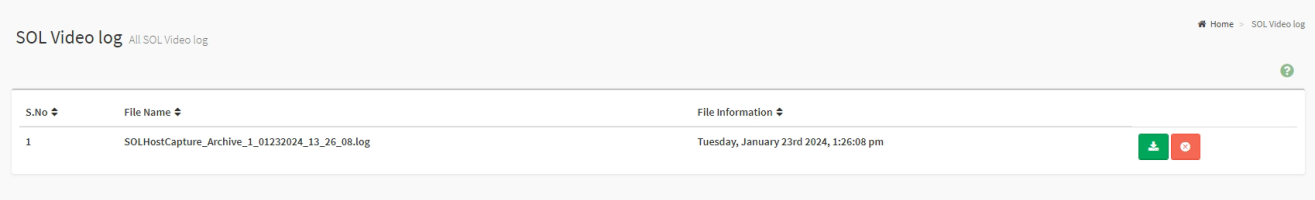
6.2.4.5 SOL Video Log

The sol log page will record configured system events through sol.

Note: *SOL Trigger Settings should be enabled, to display the SOL Log page. SOL Trigger Settings can be configured under* ***Settings -> Video Recording -> SOL Settings -> SOL Trigger Settings****.*

SOL Configurations can set the baud rate of the serial port.

To open the Video Log page, click **Logs & Reports -> SOL Log** from the menu bar. A sample screenshot of SOL Log page is shown below.



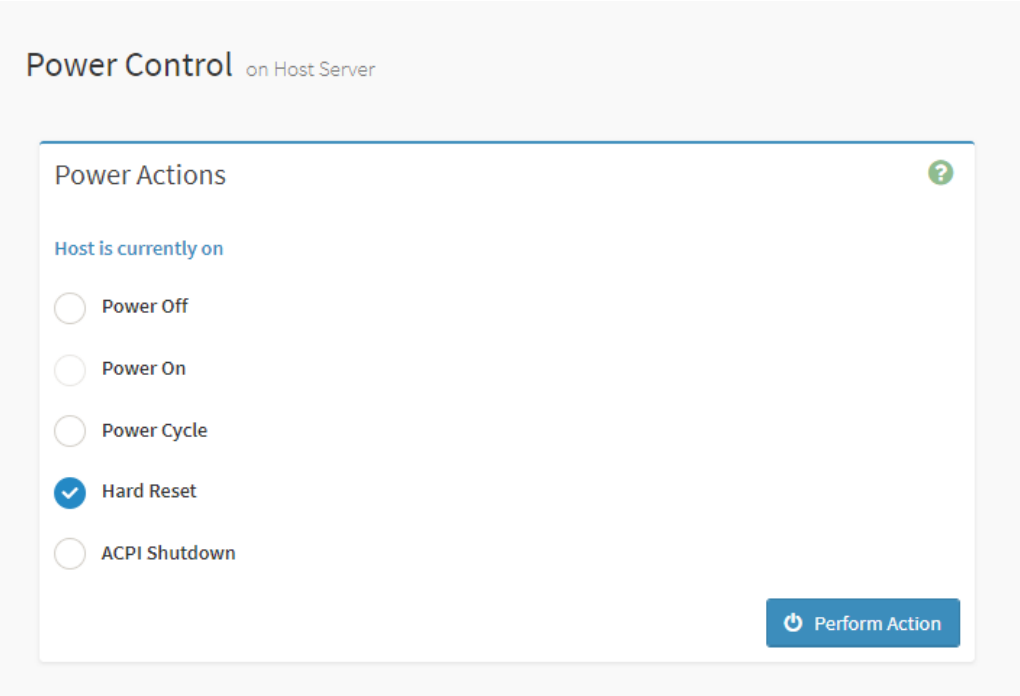
S.No - The serial number
File Name - The video filename
File Information - Day, date and time of video upload
Download - To download the selected video
Delete - To delete the selected video.

Note: *The timestamp displayed in the file information represents last modified time, and it will be updated (if the file is modified) when the webpage is refreshed.*

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6.2.5 Power Control

It is used to control power on the WEB. A sample screenshot of service management is shown as below.



The power control consists of the following items.

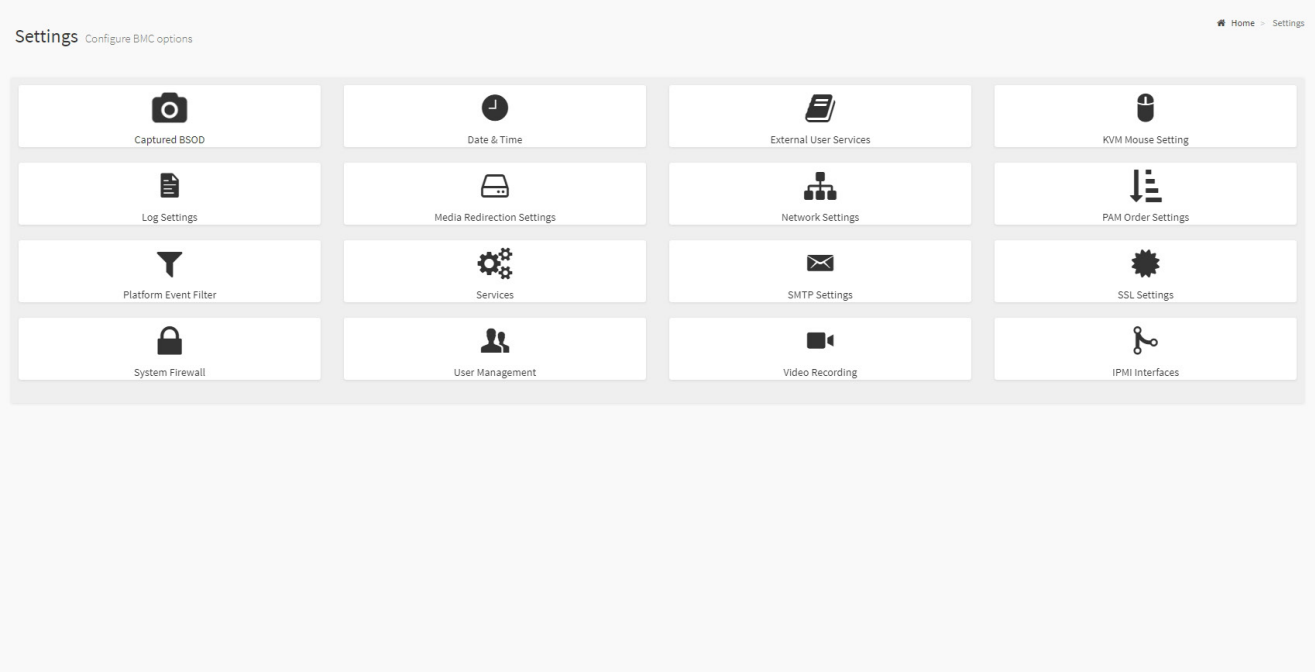
- **Power off:** Power on the chassis.
- **Power on:** Power off the chassis.
- **Power Cycle:** Power off the chassis and power on the chassis.
- **Hard Reset:** Restart the chassis.
- **ACPI Shutdown:** Soft power off the chassis.

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6.2.6 BMC Settings

The BMC Settings section in the BMC web interface is a centralized location for accessing and modifying a wide range of configuration settings for the BMC.

1. In the BMC web interface, click on the "**Settings**" button located in the functional menu on the left side.
2. This action will open a group menu that displays various configurable options and settings.



Features

Comprehensive Configuration: This interface allows you to adjust and set most of the BMC's configurations, tailoring the controller to your specific needs and preferences.

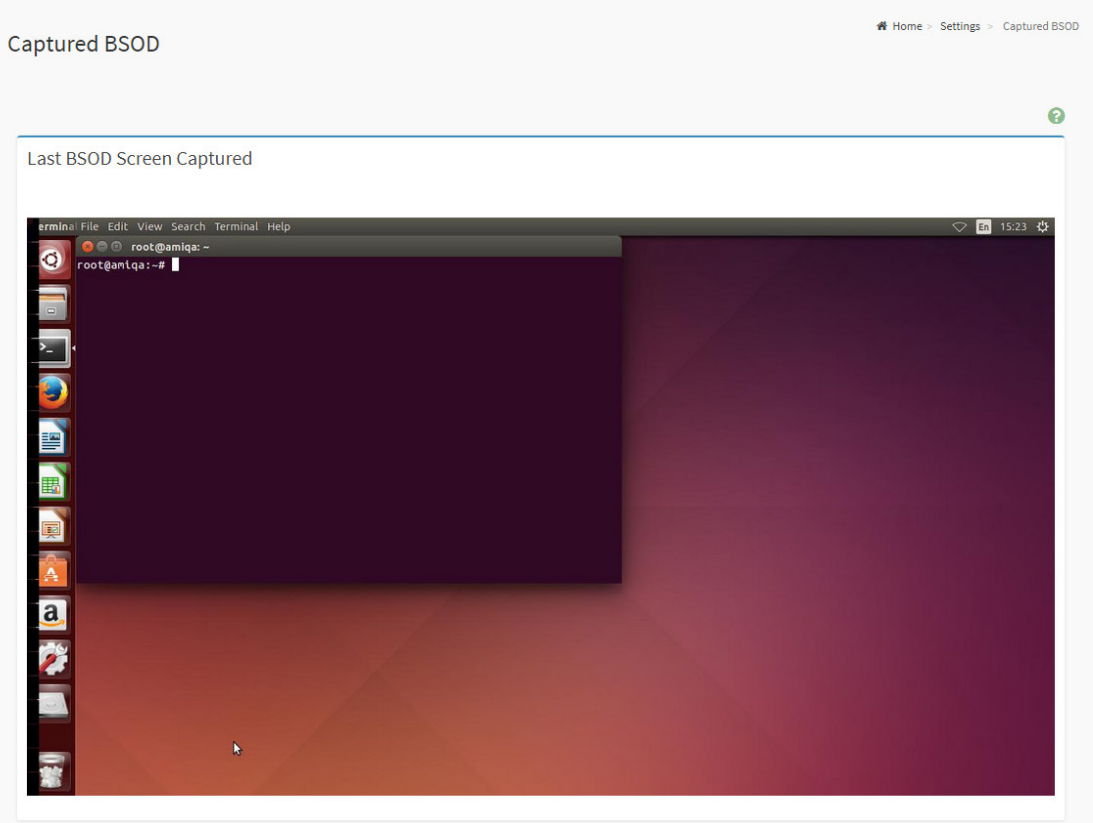
Information Retrieval: Besides configuration, this section also provides access to essential information about the BMC and the server it manages.

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6.2.6.1 Captured BSOD

This page displays a snapshot of the blue screen captured if the host system crashed since last reboot.

A screenshot of Captured BSOD is shown below.



Note: *KVM service should be enabled to display the BSOD screen. KVM Service can be configured under* ***Settings -> Services -> KVM****.*

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6.2.6.2 Date & Time

This field is used to set the date and time on the BMC. A sample screenshot of Date & Time is shown as below.



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The Date & Time section consists of the following fields.

Configure Date & Time: Displays Time zone list containing the UTC offset along with the locations and Navigational line to select the location which can be used to display the exact local time.

Select Time Zone: This field is used to set the date and time on the BMC.
Note: *Based on the manual selection of GMT or ETC/GMT, time zone alone will be changed and date & time will remain the same.*

Automatic NTP Date & Time: To automatically synchronize Date and Time with the NTP Server.

- **Primary NTP Server:** To configure a primary NTP server to use when automatically setting the date and time.

  The following address formats & Domain name format are supported:
  ✧ IPv4 Address format
  ✧ IPv6 Address format
  ✧ Domain name format allowed ‘A-Z’, ‘a-z’, ‘0-9’, dash (-), underscore (_) and dot(.) characters

- **Secondary NTP Server:** To configure a secondary NTP server to use when automatically setting the date and time.

  The following address formats & Domain name format are supported
  ✧ IPv4 Address format
  ✧ IPv6 Address format
  ✧ Domain name format allowed ‘A-Z’, ‘a-z’, ‘0-9’, dash (-), underscore (_) and dot(.) characters

- **Automatic PTP Date & Time:** To enable/disable the use of PTP servers to automatically set the date and time.

- **PTP Interface:** To configure a PTP server interface to use when automatically setting the date and time.

- **PTP Preset:** To configure a PTP Preset type to use when automatically setting the date and time.

- **PTP Transport:** To configure a PTP Transport type to use when automatically setting the date and time.

- **PTP Ipmode:** To configure a PTP Ipmode type to use when automatically setting the date and time.

- **PTP Unicast IP:** To configure a Unicast IP when ipmode is unicast and server to use when automatically setting the date and time.

- **PTP Delay Mechanism:** To configure a PTP Delay Mechanism type to use when automatically setting the date and time.

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- **PTP Inbound Latency:** To configure an Inbound latency of the server to use when automatically setting the date and time.
- **PTP Outbound Latency:** To configure a PTP outbound latency server to use when automatically setting the date and time.
- **PTP Priority1:** To configure a priority of PTP clock to use when automatically setting the date and time.
- **PTP Max Master capacity:** To configure a max master capacity of the PTP clock to use when automatically setting the date and time.
- **Panic Mode:** To configure a PTP clock to not reset if jump is more than 1 second, use when automatically setting the date and time.

Save: To save the settings.

Note: *If the time zone is selected as Manual Offset, the map selection will be disabled. The Time-Zone settings will be reflected only after saving the settings.*
If disable the Automatic Date & Time, the time needs to select by users themselves or the time would not change.

Procedure

1. Select the Timezone location either using drop down or Map.
2. Enable **Automatic Date &Time** option to enable/disable the use of NTP servers to automatically set the date and time.

   a) In the Primary NTP Server and Secondary NTP Server fields, specify the NTP servers of the device respectively.

   Note: *Secondary NTP server is optional field. If the Primary NTP server is not working fine, then the Secondary NTP Server will be tried.*

3. Enable **Automatic PTP Date &Time** to enable/disable the use of PTP servers to automatically set the date and time.

   a) Enter the Interface, Preset, Transport, Ipmode, Unicast IP, Delay Mechanism, Inbound Latency, Outbound Latency, Priority1, Max Master capacity and Log request delay details in their corresponding fields.

   b) Enable/Disable Panic Mode to not reset if jump is more than 1 second, use when automatically setting the date and time.

4. Click **Save** button to save the settings.

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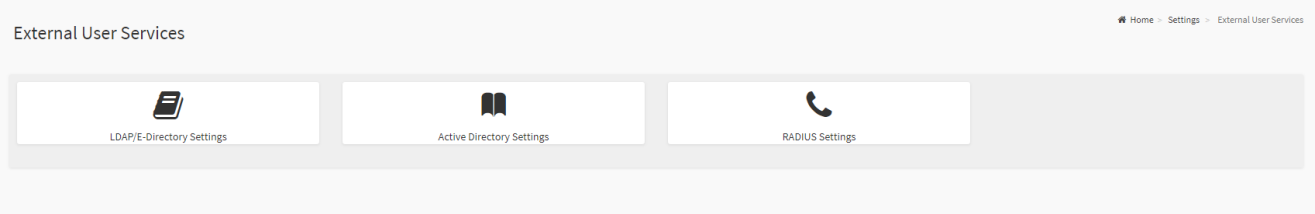
6.2.6.3 External User Services

6.2.6.3.1 LDAP/E-Directory Settings

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

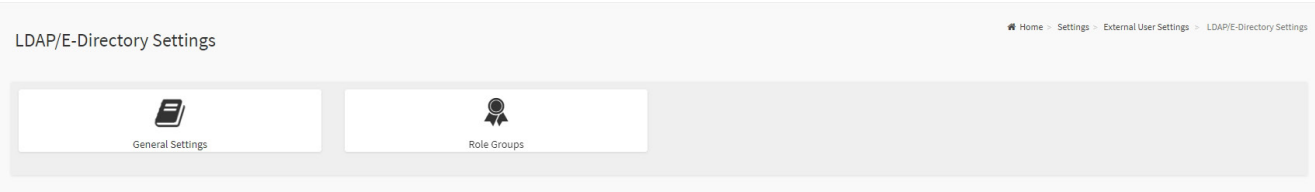
In MegaRAC GUI, LDAP is an Internet protocol that MegaRAC® card can use to authenticate users. If you have an LDAP server configured on your network, you can use it as an easy way to add, manage and authenticate MegaRAC® card users. This is done by passing login requests to your LDAP Server. This means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

To open External User Services page, click **Settings -> External User Services** from the menu bar. A sample screenshot of External User Services page is shown below.



To open LDAP/E-DIRECTORY Settings page, click **Settings -> External User Services -> LDAP/E-Directory Settings** from the menu bar.

A sample screenshot of External User Services page is shown below.



The fields of LDAP/E-Directory Settings Page are explained below.

General Settings: To configure LDAP/E-Directory Settings. Options are Enable LDAP/E-Directory Authentication, IP Address, Port and Search base.

Role Groups: To add a new role group to the device. Alternatively, double click on a free slot to add a role group.

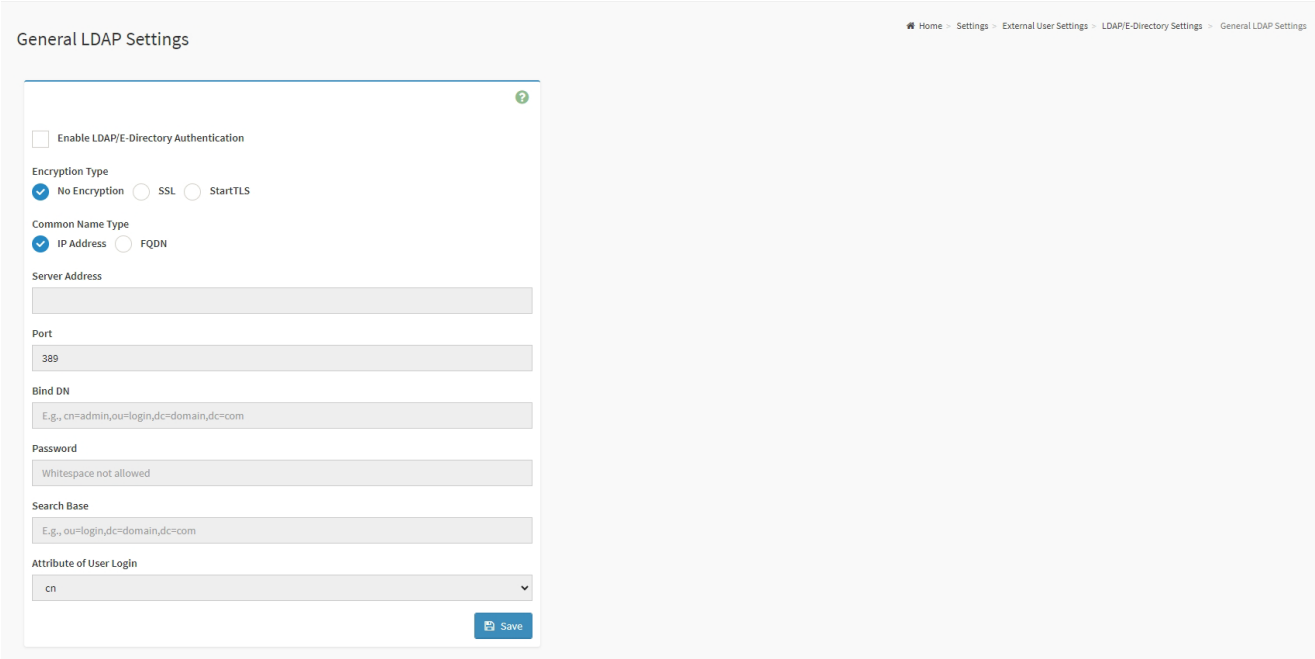
Note: *It is recommended to Enable LDAP configuration from configure general settings page otherwise error message will pop-up stating that "LDAP configuration is not enabled" while trying to create/view LDAP role groups.*

Procedure

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Entering the details in General LDAP/E-Directory Settings Page.

1. In the LDAP/E-Directory Settings Page, click General Settings. A sample screenshot of General LDAP Settings page is given below.



2. Click Enable LDAP/E-Directory Authentication, to enable LDAP/E-Directory Settings.
   Note: *During login prompt, use username to login as an LDAP Group member.*

3. Select the encryption type for LDAP/E-Directory from the Encryption Type.
   Note: *Configure proper port number, when SSL is enabled.*

4. Select the Common Name Type as IP Address.

5. Enter the IP address of LDAP server in the Server Address field.
   Note:
   IP Address made of 4 numbers separated by dots as in 'xxx.xxx.xxx.xxx'.
   Each Number ranges from 0 to 255.
   First Number must not be 0.
   Supports IPv4 Address format and IPv6 Address format.
   Configure FQDN address, when using StartTLS with FQDN.

6. Specify the LDAP Port in the Port field.
   Note:
   Default Port is 389. For SSL connections, default port is 636. The Port value ranges from 1 to 65535.

7. Specify the Bind DN that is used during bind operation, which authenticates the client to the server.
   Note:
   Bind DN is a string of 4 to 253 alpha-numeric characters.
   It must start with an alphabetical character.

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Special Symbols like dot(.), comma(,), hyphen(-), underscore(_), equal-to(=) are allowed.
Example: cn=manager,ou=login, dc=domain,dc=com

8. Enter the password in the Password field.
   Note:
   Password must be at least 1 character long.
   White space is not allowed.
   This field will not allow more than 48 characters.

9. Enter the Search Base. The Search base allows the LDAP server to find which part of the external directory tree to be searched. The search base may be something equivalent to the organization, group of external directory.
   Note:
   Search base is a string of 4 to 253 alpha-numeric characters.
   It must start with an alphabetical character.
   Special Symbols like dot(.), comma(,), hyphen(-), underscore(_), equal-to(=) are allowed.
   Example: ou=login,dc=domain,dc=com.

10. Select Attribute of User Login to find the LDAP/E-Directory server which attribute should be used to identify the user.
    Note: *It only supports cn or uid.*

11. Select CA Certificate File from the Browse field to identify the certificate of the trusted CA certs.

12. Select the **Certificate File** to find the client certificate filename.

13. Select **Private Key** to find the client private key filename.
    Note: *All the 3 files are required, when SSL or StartTLS is enabled.*

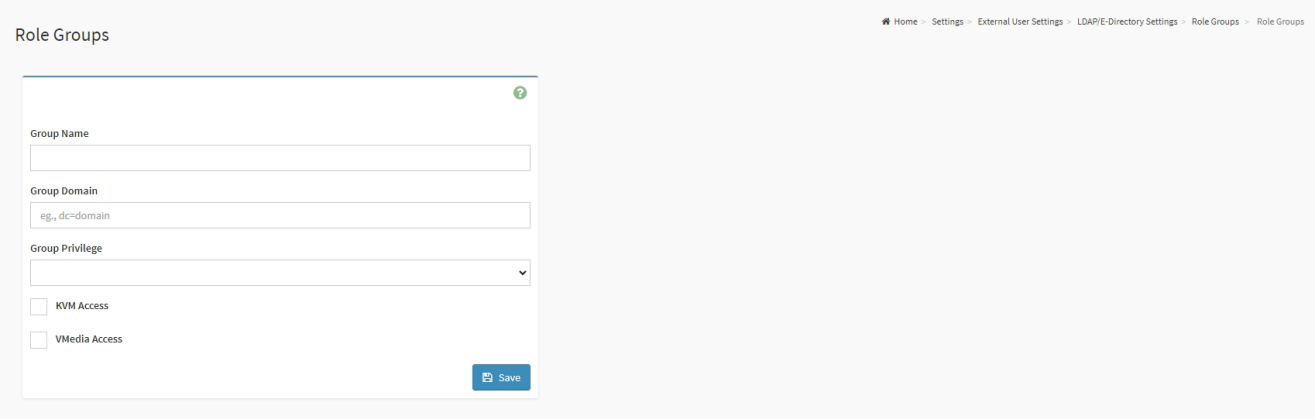
14. Click **Save** to save the settings.

To add a new Role Group

1. In the LDAP/E-Directory Settings Page, Click Role Groups and select a blank row.
   Note: *It is recommended to Enable LDAP configuration from configure general settings page otherwise error message will pop-up stating that "LDAP configuration is not enabled" while trying to create/view LDAP role groups.*

2. Click Add Role Group or alternatively double click on the blank row to open the Add Role group Page as shown in the screenshot below.

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3. In the Group Name field, enter the name that identifies the role group.
   Note:
   Maximum size of Role Group Name is 255 bytes.
   Special symbols hyphen and underscore are allowed.

4. In the Group Domain field. Enter the Role Group Domain where the role group is located.
   Note:
   Maximum size of Group Domain Name is 255 bytes.
   It must start with an alphabetical character.
   Special Symbols like dot(.), comma(,), hyphen(-), underscore(_), equal-to(=) are allowed.
   Example: cn=manager,ou=login, dc=domain,dc=com

5. In the Group Privilege field, enter the level of privilege (User, Administrator, Operator, None) to assign to this role group.

6. Select the required options or both.
   - ✧ KVM Access
   - ✧ VMedia Access

   Note: *VMedia privilege is not applicable for LMedia and RMedia clients.*

7. Click **Save** to save the new role group and return to the Role Group List.
8.

6.2.6.3.2 Active Directory Settings

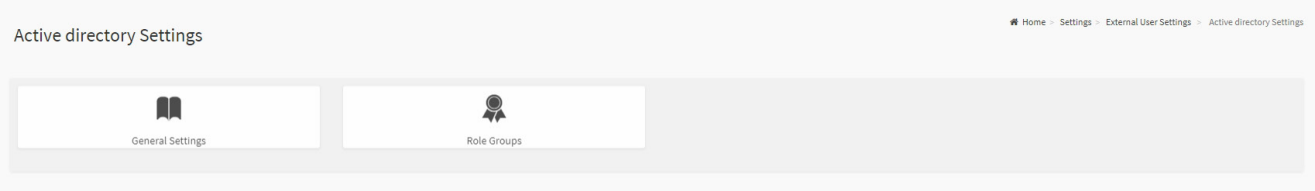
An active directory is a directory structure used on Microsoft Windows based computers and servers to store information and data about networks and domains. An active directory (sometimes referred to as AD) does a variety of functions including the ability to provide information on objects. It also helps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

In MegaRAC SP-X application, Active Directory allows you to configure the Active Directory Server Settings. The displayed table shows any configured Role Groups and the available slots. You can modify, add or delete role groups from here. Group domain can be the AD domain or a trusted domain. Group Name should correspond to the name of an actual AD group.

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Note: *To view the page, you must be at least a User and to modify or add a group, you must be an Administrator.*

To open Active Directory Settings page, click **Settings -> External User Settings -> Active Directory** from the menu bar. A sample screenshot of Active Directory Settings page is shown below.



The fields of Active Directory page are explained below.

General Settings: This option is used to configure Active Directory General Settings. Options are Enable Active Directory Authentication, Secret User Name, Secret Password, User Domain name, and up to three Domain Controller Server Addresses.

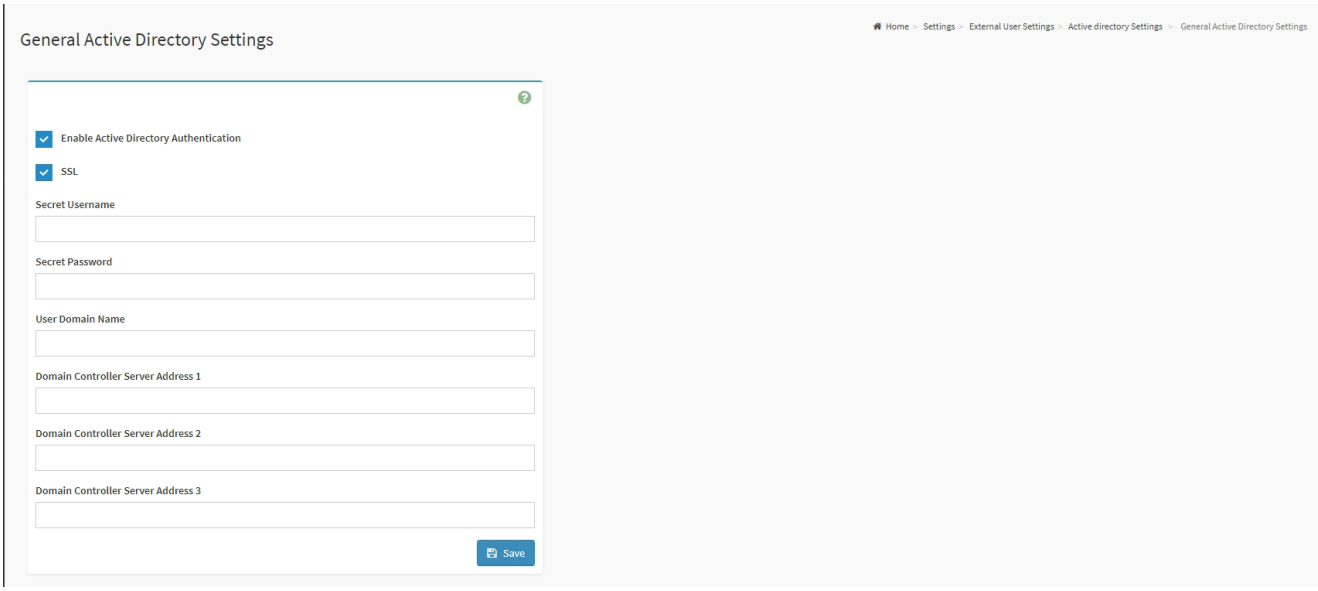
Role Groups: To add a new role group to the device. Alternatively, double click on a free slot to add a role group.

Note: *It is recommended to Enable AD configuration from configure general settings page otherwise error message will pop-up stating that "AD configuration is not enabled" while trying to create/view AD role groups.*

Procedure

Entering the details in General Active Directory Settings Page

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



2. In the Active Directory Settings page, check or uncheck the **Enable Active directory Authentication** check box to enable or disable Active Directory Authentication

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respectively.
Note: *If you have enabled Active Directory Authentication, enter the required information to access the Active Directory server.*

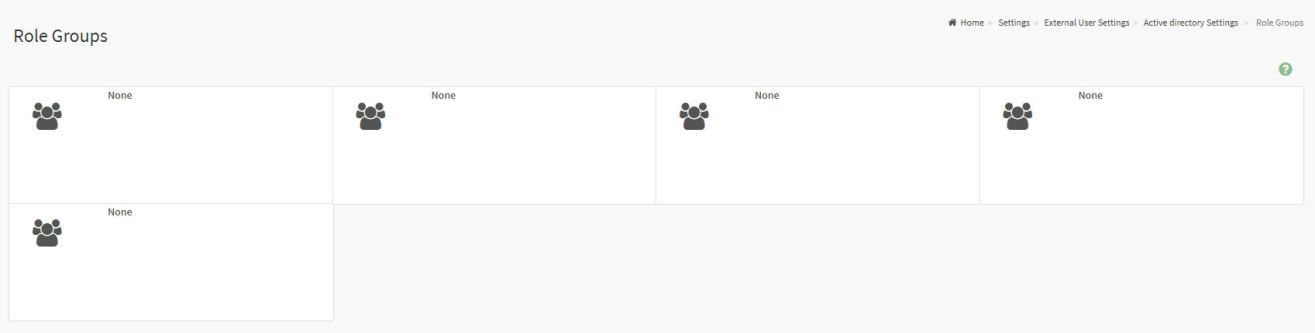
3. **SSL:** Check or uncheck to enable or disable the SSL.

4. Specify the Secret user name and password in the **Secret UserName** and **Secret Password** fields respectively.
   Note:
   - *Secret username/password for AD is not mandatory. When secret username & password is empty, Authentication fails will be always treated as Invalid Password error. For Invalid Password error PAM will not try other Authentication Methods.*
   - *User Name is a string of 1 to 64 alpha-numeric characters.*
   - *It must start with an alphabetical character.*
   - *It is case-sensitive.*
   - *Special characters like comma, period, colon, semicolon, slash, backslash, square brackets, angle brackets, pipe, equal, plus, asterisk, question mark, ampersand, double quotes, space are not allowed.*
   - *Password must be at least 6 character long and will not allow more than 127 characters.*
   - *White space is not allowed.*

5. Specify the Domain Name for the user in the **User Domain Name** field. E.g. MyDomain.com

6. Configure IP addresses in **Domain Controller Server Address1**, **Domain Controller Server Address2** and **Domain Controller Server Address3**.
   Note:
   IP address of Active Directory server: At least one Domain Controller Server Address must be configured.
   - *IP Address made of 4 numbers separated by dots as in "xxx.xxx.xxx.xxx".*
   - *Each number ranges from 0 to 255.*
   - *First number must not be 0.*
   - *Domain Controller Server Addresses will supports IPv4 Address format and IPv6 Address format.*

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



The fields of Role Group page are explained below.

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Role Group Name: The name that identifies the role group in the Active Directory.

Note:
- *Maximum size of Role Group Name is 255 bytes.*
- *Special symbols hyphen and underscore are allowed.*

Group Domain: The domain where the role group is located.
Note:
- *Maximum size of Group Domain Name is 255 bytes.*
- *Special symbols hyphen, underscore and dot are allowed.*

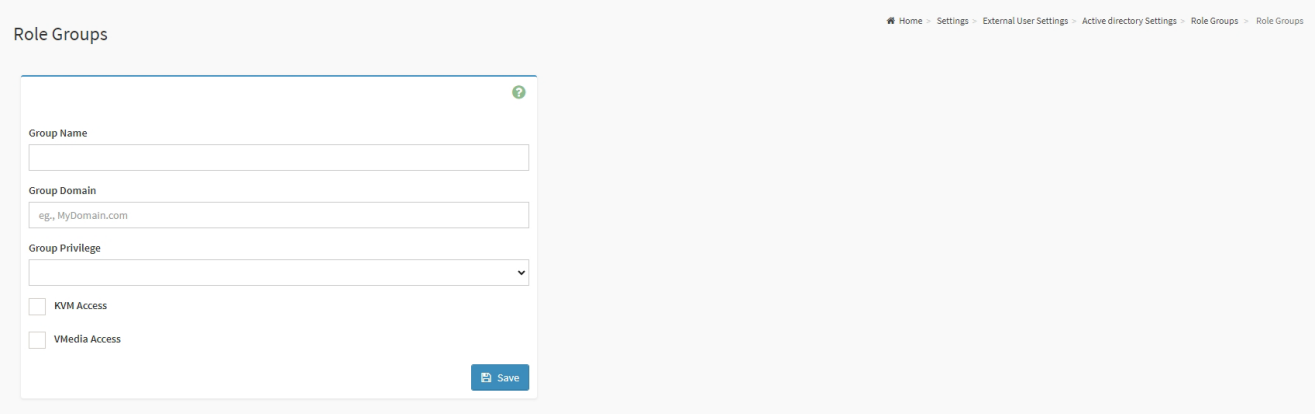
Group Privilege: The level of privilege to assign to this role group.

KVM Access: To provide access to KVM for AD authenticated role group user.

VMedia Access: To provide access to VMedia for AD authenticated role group user.

To add a new Role Group

1. In the Active Directory Settings Page, select a Role Group and click Add Role Group or alternatively double click on the blank row to open the Add Role group Page as shown in the screenshot below.
Note: *It is recommended to Enable AD configuration from configure general settings page otherwise error message will pop-up stating that "AD configuration is not enabled" while trying to create/view AD role groups.*



2. In the **Group Name** field, enter the name that identifies the role group in the Active Directory.
Note:
- *Maximum size of Role Group Name is 255 bytes.*
- *Special symbols hyphen and underscore are allowed.*

3. In the **Group Domain** field, enter the domain where the role group is located.
Note:
- *Maximum size of Group Domain Name is 255 bytes.*
- *Special symbols hyphen, underscore and dot are allowed.*

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4. In the **Group Privilege** field, enter the level of privilege to assign to this role group.

5. Select the required options
   - ✧ KVM Access
   - ✧ VMedia Access

   Note: *VMedia privilege is not applicable for LMedia and RMedia clients.*

6. Click Save to add the new role group and return to the Role Group List.

To Delete a Role Group

1. In the Role Groups Page, select the row that you wish to delete.

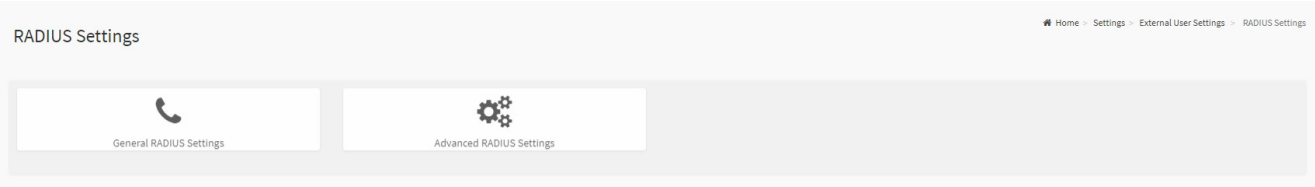
2. Click Delete Role Group.

6.2.6.3.3 RADIUS Settings

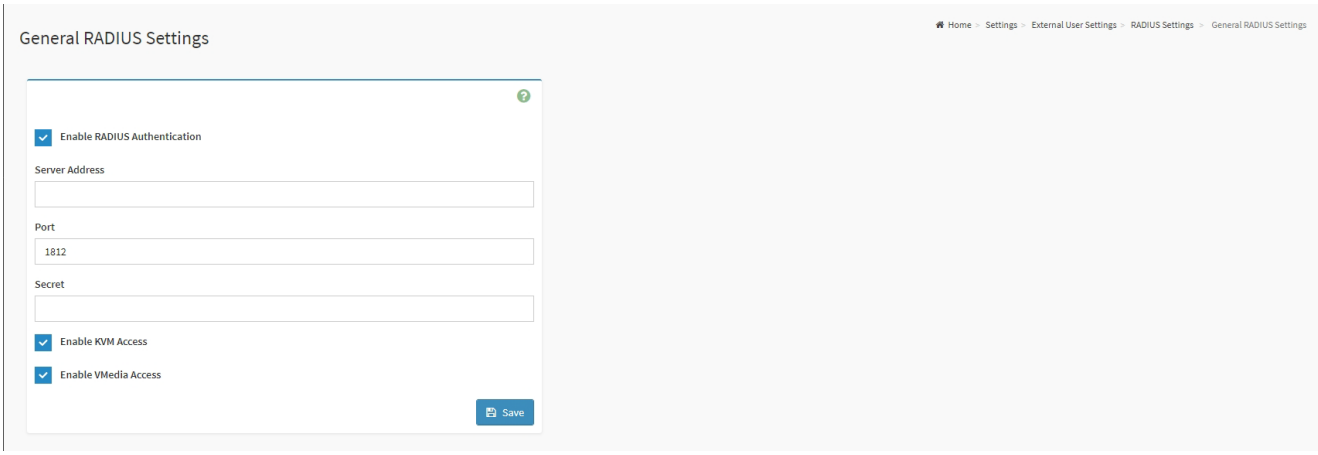
RADIUS is a modular, high performance and feature-rich RADIUS suite including server, clients, development libraries and numerous additional RADIUS related utilities.

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

To open RADIUS Settings page, click **Settings -> External User Settings -> RADIUS Settings** from the menu bar. A sample screenshot of RADIUS Settings page is shown below.



General RADIUS Settings



The fields of General RADIUS Settings page are explained below.

Enable RADIUS Authentication: Option to enable/disable RADIUS authentication.

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Server Address: The IP address of RADIUS server.
Note:

- *IP Address (Both IPv4 and IPv6 format).*
- *FQDN (Fully Qualified Domain Name) format.*

Port: The RADIUS Port number.
Note:

- *Default Port is 1812.*
- *Port value ranges from 1 to 65535.*

Secret: The Authentication Secret for RADIUS server.
Note:

- *This field will not allow more than 31 characters.*
- *Secret must be at least 4 characters long.*
- *White space is not allowed.*

Enable KVM Access: This field provides access to KVM for RADIUS authenticated users.

Enable VMedia Access: This field provides access to VMedia for RADIUS authenticated users.

Save: To save the settings.

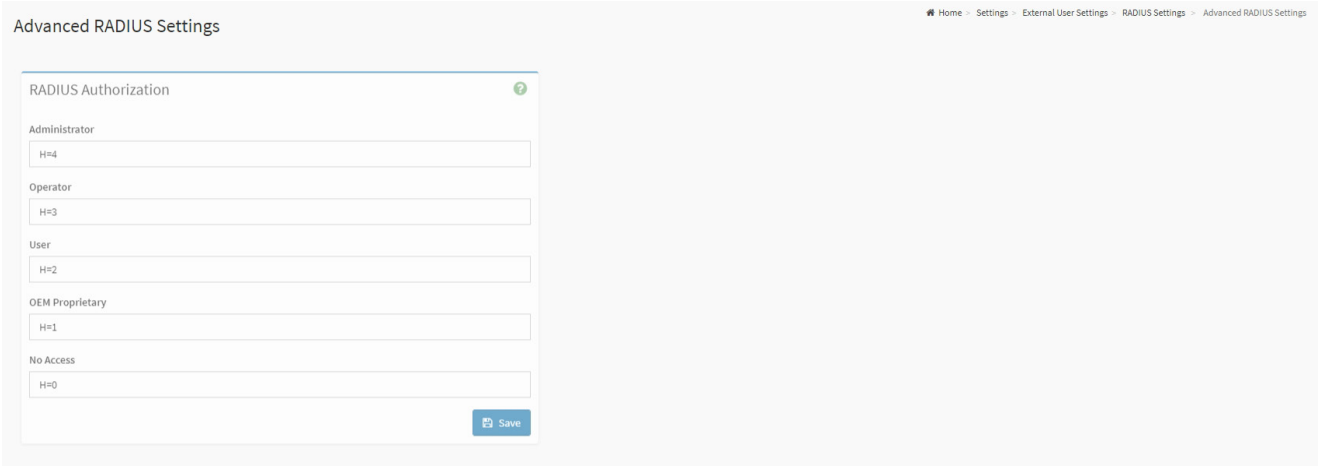
Procedure

1. Enable the RADIUS Authentication check box to authenticate the RADIUS.

2. Click Advanced RADIUS Settings. This opens the Radius Authorization window as shown below.

Note:

It will not allow more than 127 characters. Special characters like ';' and '#' are not allowed.
It is recommended to Enable Radius configuration from configure general RADIUS settings page otherwise error message will pop-up stating that "Radius configuration is not enabled" while trying to create/view Advanced RADIUS Settings.



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For Authorization Purpose, configure the Radius user with Vendor Specific Attribute in Server side.

Example:1
testadmin Auth-Type :=PAP,Cleartext-Password:= "admin"

Auth-Type :=PAP, Vendor-Specific="H=4"

Example:2
testoperator Auth-Type := PAP, Cleartext-Password := "operator"

Auth-Type :=PAP, Vendor-Specific="H=3"

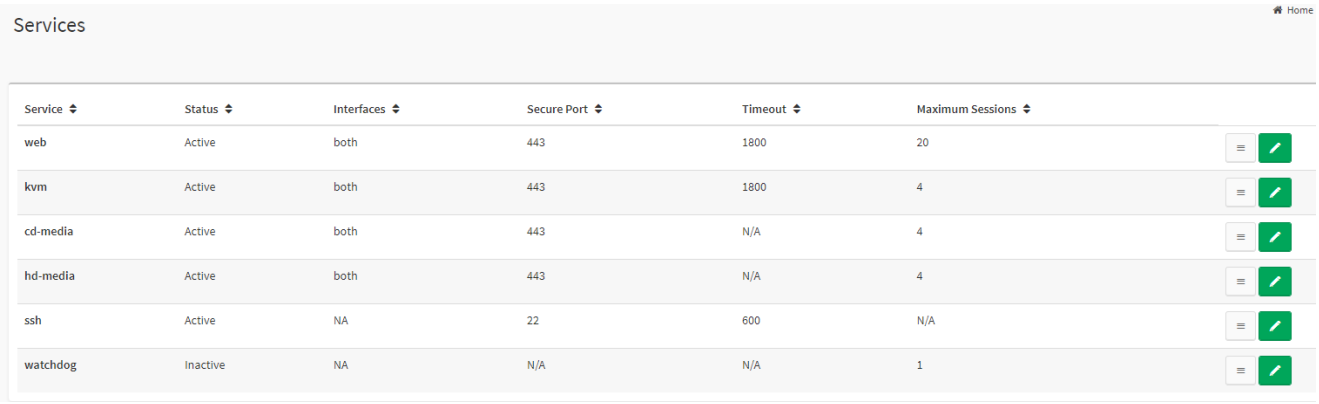
If you change the Vendor-Specific value in server then you should change the same values in this page.

3. Click **Save** to save the changes made.

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6.2.6.4 Service Management

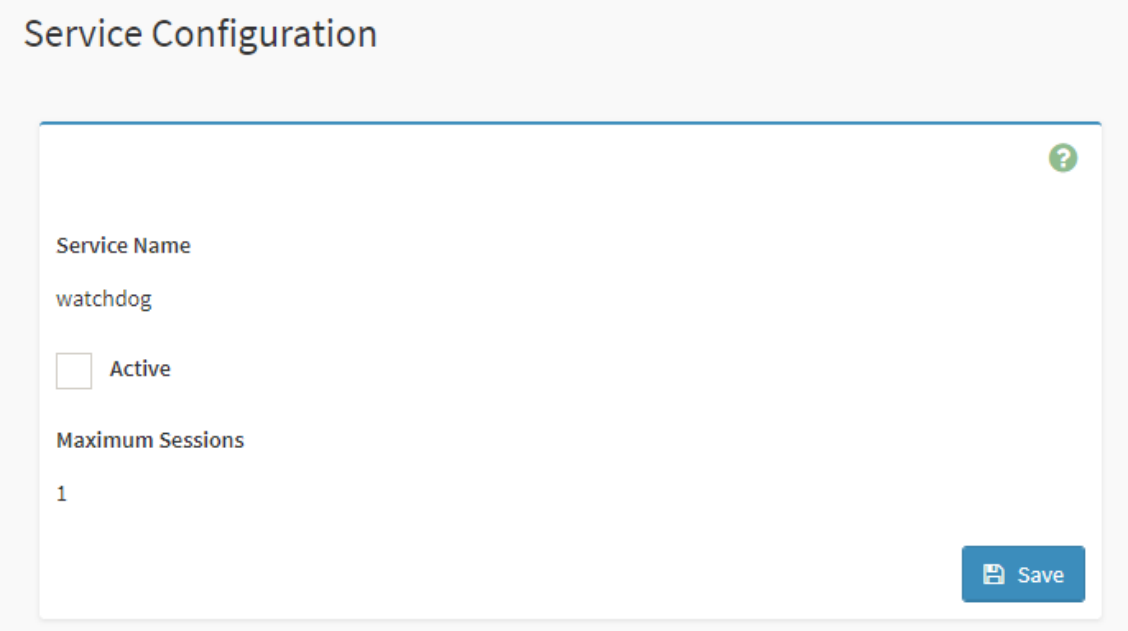
It is used to set service information on the BMC. A sample screenshot of service management is shown as below.



The service management consists of the following items.

- web
- kvm
- cd-media
- hd-media
- ssh
- watchdog

(Click the "edit" button in the "watchdog" column to enter the "watchdog" configuration interface (the interface is as follows), watchdog default state is inactive, if watchdog is set to the active state, it will monitor the BMC in real time.)



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6.2.6.5 Network Configuration

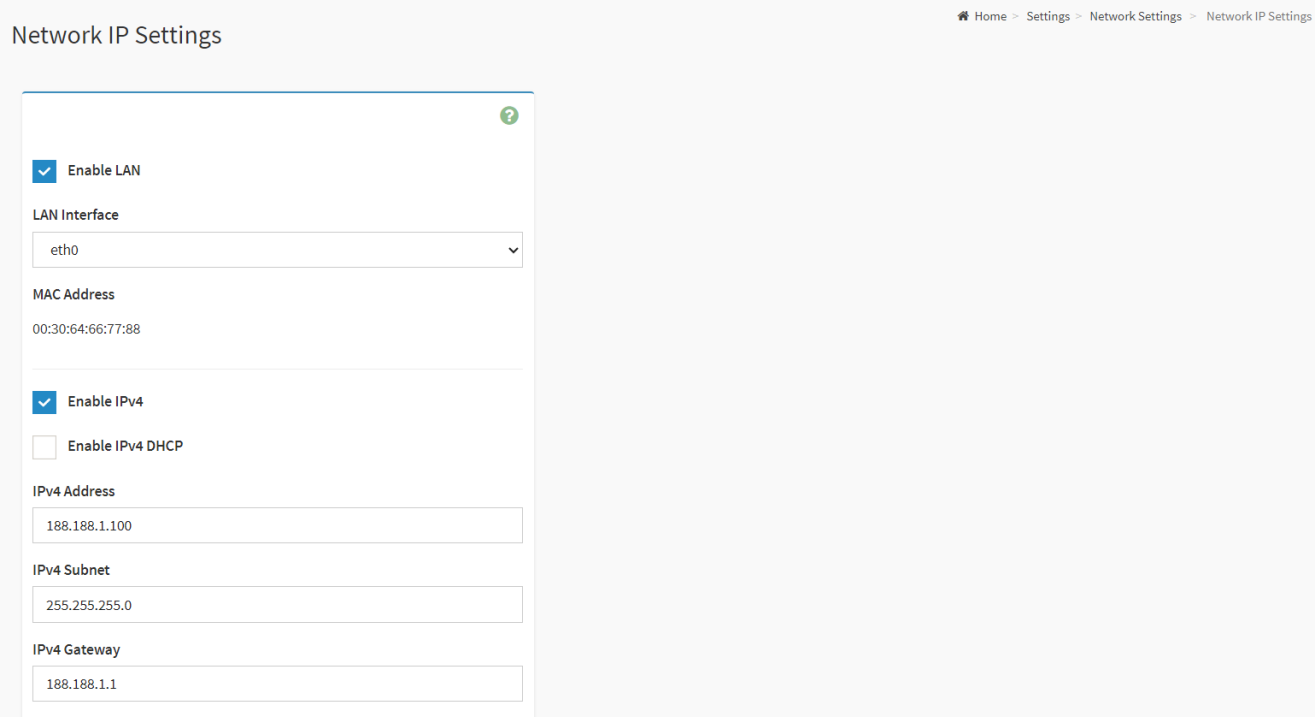
Note: *Change the IP settings of the management ports will disconnect the network.*

This section is used to configure the network settings for the available LAN channels.

6.2.6.5.1 Network IP Settings

This section is used to configure the network IP settings.

To open the Network IP Settings page, click **Settings -> Network Settings -> Network IP Settings**.

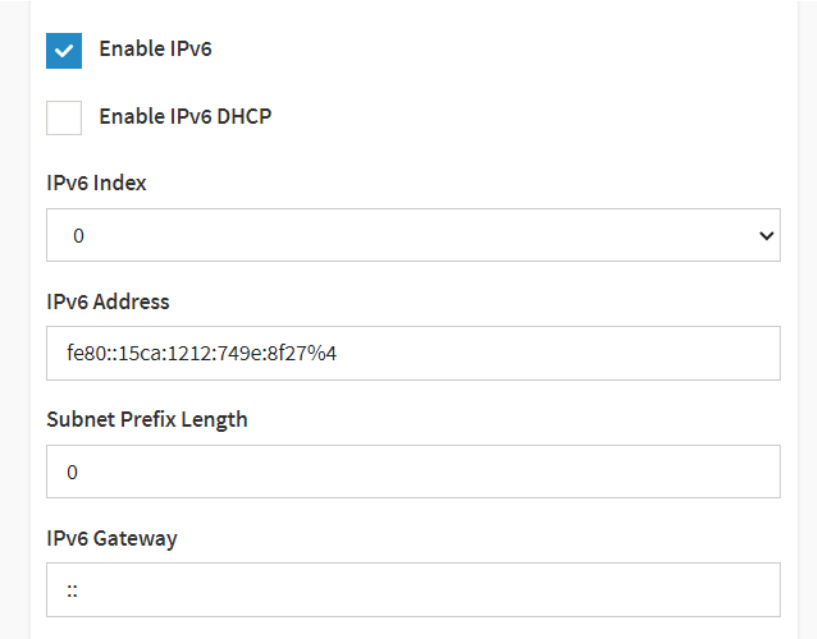


The fields of Network IP Settings page are explained below.

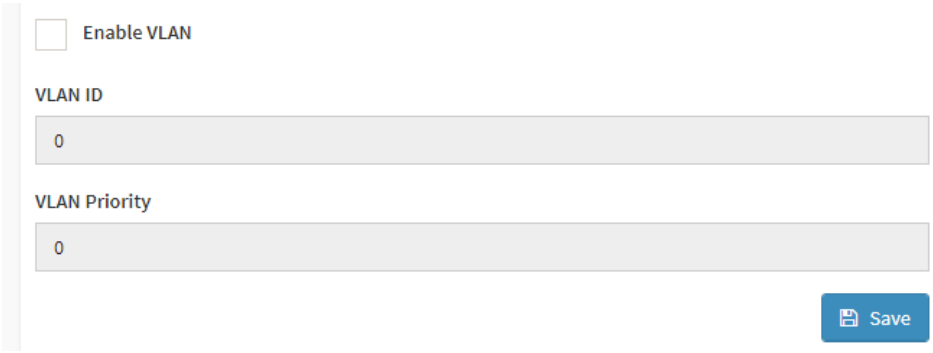
- **Enable LAN:** Enable or disable the LAN settings.
- **LAN Interface:** Select the LAN interface to be configured.
- **MAC Address:** Display the read-only MAC Address of the selected interface.
- **Enable IPv4:** Enable or disable the IPv4 settings for the selected interface.
- **Enable IPv4 DHCP:** Enable or disable the IPv4 DHCP support for the selected interface. If disable the IPv4 DHCP support, then **static IP address** is selected, configure the static **IPv4 Address**, **IPv4 Subnet**, and **IPv4 Gateway**.

  Notes:
  - ✓ *An IP address consists of 4 numbers separated by dots, as in "xxx.xxx.xxx.xxx".*
  - ✓ *Each number ranges from 0 to 255.*
  - ✓ *The first number must not be 0.*

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- **Enable IPv6:** Enable or disable the IPv6 configuration settings.
- **Enable IPv6 DHCP:** Enable or disable the IPv6 DHCP support for the selected interface. It dynamically configures IPv6 address using DHCP (Dynamic Host Configuration Protocol).
  Note: *Disable this* ***Enable IPv6 DHCP*** *field and enter the values in following fields such as* ***IPv6 Index***, ***IPv6 Address***, ***Subnet Prefix Length*** *and* ***IPv6 Gateway***.
- **IPv6 Index:** Specify a static IPv6 index to be configured to the device. E.g.: 0
- **IPv6 Address:** Specify a static IPv6 address to be configured to the device. E.g.: 2004::2010.
- **Subnet Prefix Length:** Specify the subnet prefix length for the IPv6 settings. The value ranges from 0 to 128.
- **IPv6 Gateway:** Specify an IPv6 default gateway for the IPv6 settings.



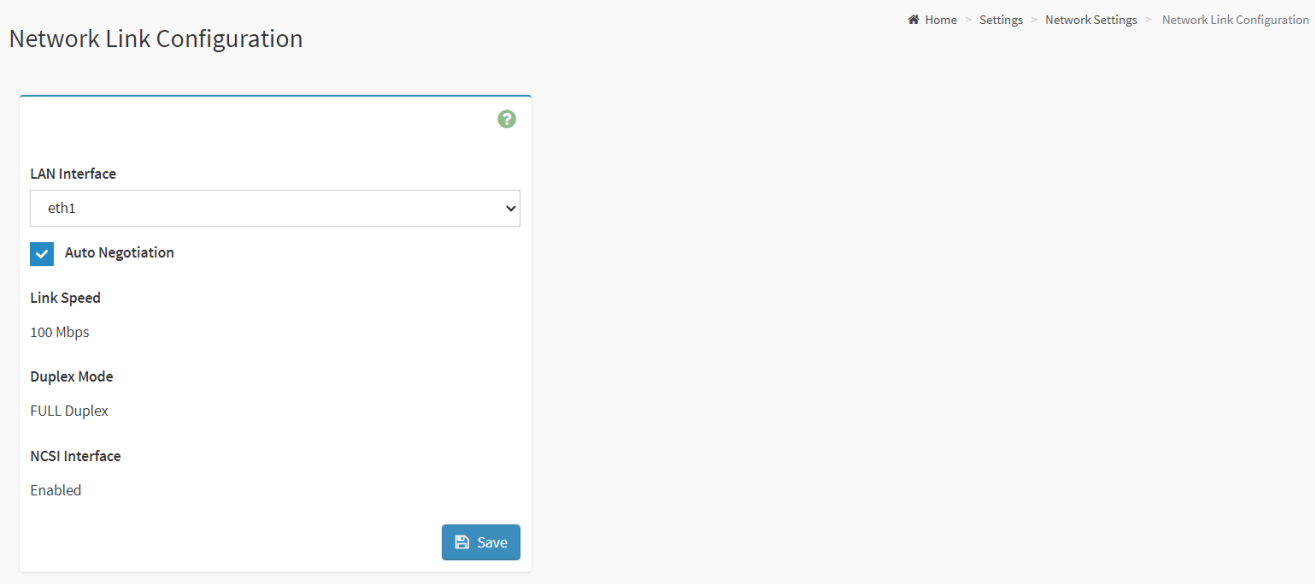
- **Enable VLAN:** Enable or disable VLAN support for the selected interface.
- **VLAN ID:** Value ranges from 2 to 4094. VLAN ID 0, 1 & 4095 are reserved VLAN IDs.
- **VLAN Priority:** Value ranges from 0 to 7. 7 is the highest priority for VLAN.
- **Save:** Save the entries.

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6.2.6.5.2 Network Link Configuration

This section is used to configure the network link.

To open Network Link Configuration page, click **Settings ->Network Settings -> Network Link Configuration**.



The fields of the Network Link Configuration page are explained below.

- **LAN Interface:** Select the required network interface from the list to which the link speed and duplex mode are to be configured.
- **Auto Negotiation:** Enable to allow the device to perform automatic configuration to achieve the best possible mode of operation (speed and duplex) over a link.
- **Link Speed:** Link speed will list all the supported capabilities of the network interface. It can be 10/100/1000 Mbps.
  Note: *Link speed of 1000 Mbps is not applicable when* ***Auto Negotiation*** *is OFF.*
- **Duplex Mode:** This field could be either **Half Duplex** or **Full Duplex**.
- **NCSI Interface:** The NCSI interface status could be either **Enabled** or **Disabled** for the selected LAN interface.
- **Save:** Save the settings.

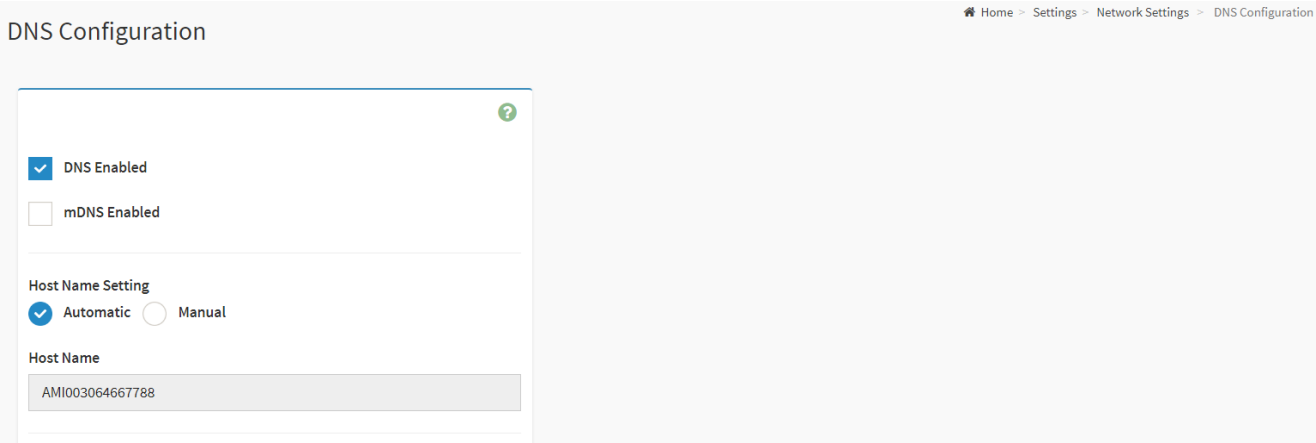
6.2.6.5.3 DNS Configuration

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

This section is used to manage the DNS settings of a device.

To open DNS Configuration page, click **Settings > Network Settings > DNS Configuration**.

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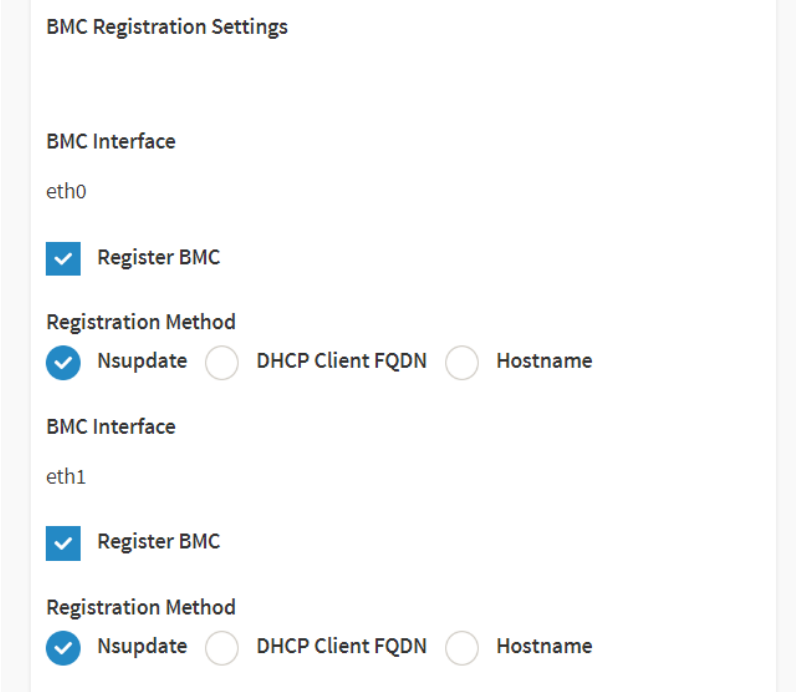
The fields of DNS Configuration page are explained below.

Domain Name Service Configuration

- ✧ **DNS Enabled:** Enable or disable all the DNS service configurations.
- ✧ **mDNS Enabled:** Enable or disable the multicast DNS.
- ✧ **Host Name Setting:** Choose either **Automatic** or **Manual** settings.
- ✧ **Host Name:** Display host name of the device.
  - If the Host setting is chosen as **Manual**, then specify the host name of the device.

Notes:

- ✓ *Value ranges from 1 to 64 alpha-numeric characters.*
- ✓ *Special character '-'(hyphen) is allowed.*
- ✓ *It must not start or end with a '-'(hyphen).*
- ✓ *The underscore (_) character and double hyphen (--) character are not a legal character for use in host names.*

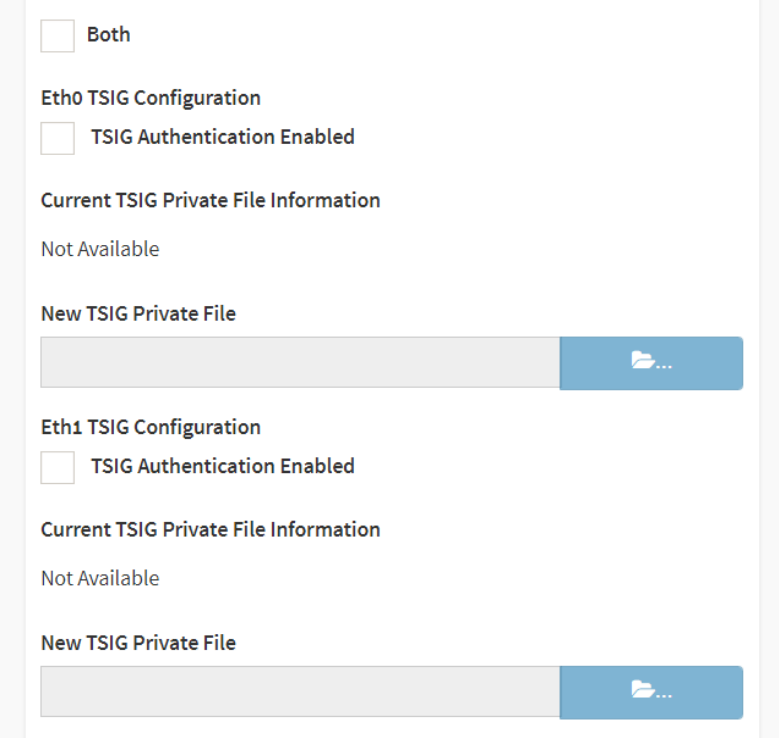


BMC Registration Settings

- ✧ **BMC Interface:** Options to register the BMC through the Interfaces (eth0&eth1).

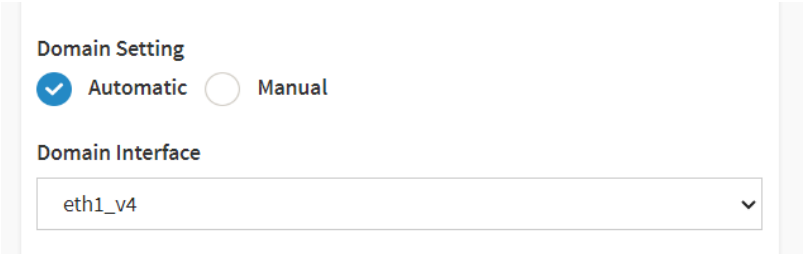
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- ✧ **Register BMC:** Register BMC through registration method.
- ✧ **Registration Method:** Options to register the BMC through **Nsupdate** or **DHCP Client FQDN** or **Hostname**.



TSIG Configuration

- ✧ **Both:** Check this option to modify TSIG authentication for both interfaces.
- ✧ **Eth 0&1:**
  - **TSIG Authentication Enabled:** Check this box to enable TSIG authentication while registering DNS via nsupdate. Separate TSIG files can be uploaded for each LAN interface.
  - **Current TSIG Private File Information:** The information of current TSIG private file along with its uploaded date and time will be displayed (read only).
  - **New TSIG Private File:** Browse and navigate to the TSIG private file.



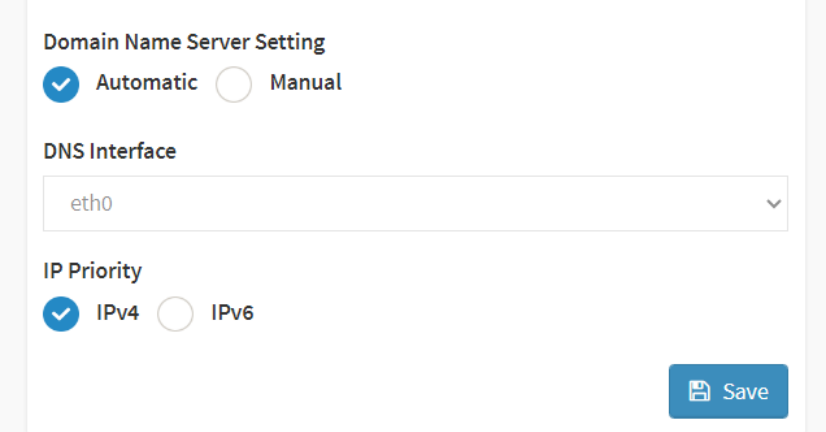
- ✧ **Domain Setting:** Select whether the domain interface will be configured manually or automatically.
  - **Automatic:** If you select **Automatic**, the Domain Name cannot be configured as it will be done automatically.
  - **Manual:** If you select **Manual**, then specify the domain name of the device.

Notes:

- ✓ *If you select **Automatic**, it displays the **Domain Interface** option. If you select **Manual**, it displays **Domain name**.*

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- ✓ *Domain name must be a string of 4 to 253 alphanumeric characters. (254 characters are allowed only if the last byte is dot.)*
- ✓ *Domain name must start with a letter and end with a letter or digit. (Must contain at least one dot character) Only letters, digits, dot and hyphen are allowed.*



- ✧ **Domain Name Server Setting:**
  - **Automatic** - If you select **Automatic**, **DNS Interface** option should be explained.
  - **Manual** - Specify the DNS (Domain Name System) server address to be configured for the BMC.
- ✧ **IP Priority:**
  - **IPv4:** It will have 2 IPv4 DNS servers and 1 IPv6 DNS server.
  - **IPv6:** It will have 2 IPv6 DNS servers and 1 IPv4 DNS server.

    Note: *This is not applicable for Manual configuration.*
- ✧ **DNS Server 1, 2 & 3:**

  Specify the DNS (Domain Name System) server address to be configured for the BMC.

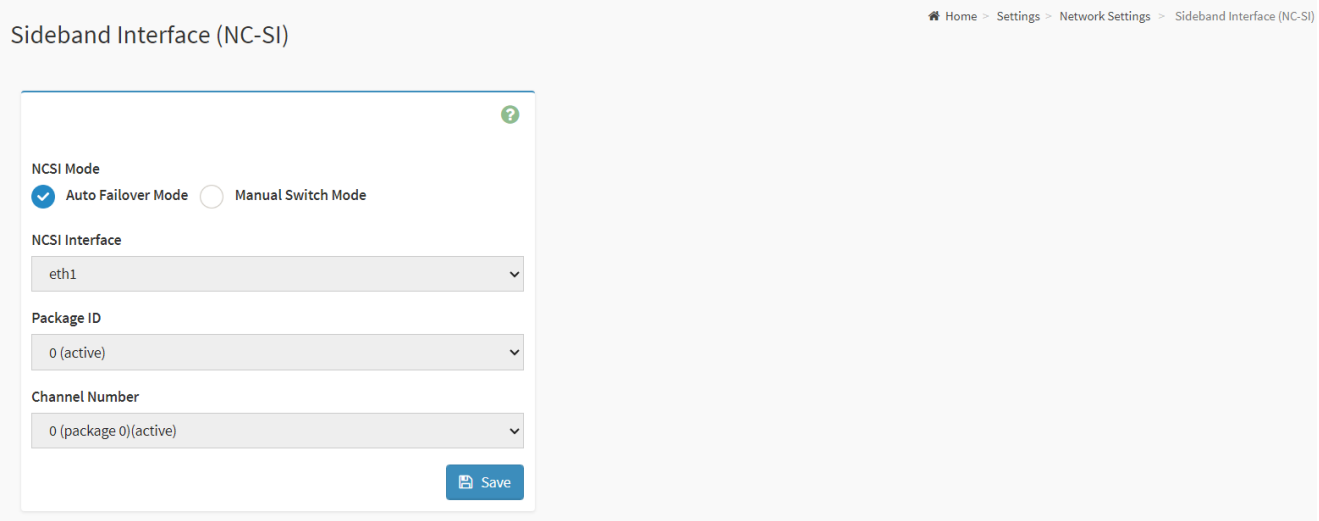
  Notes:
  - *IPv4 Addresses should be given in dotted decimal representation.*
  - *IPv6 Addresses are supported and must be global unicast addresses.*
  - *DNS Server Address will support the following:*
    - ◆ *IPv4 Address format.*
    - ◆ *IPv6 Address format.*
- ✧ **Save:** Save the entered changes.

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6.2.6.5.4 Sideband Interface (NC-SI)

This section is used to configure Network Controller Sideband Interface (NCSI) settings.

To open the Sideband Interface (NC-SI) page, click **Settings -> Network Settings -> Sideband Interface (NC-SI)**.



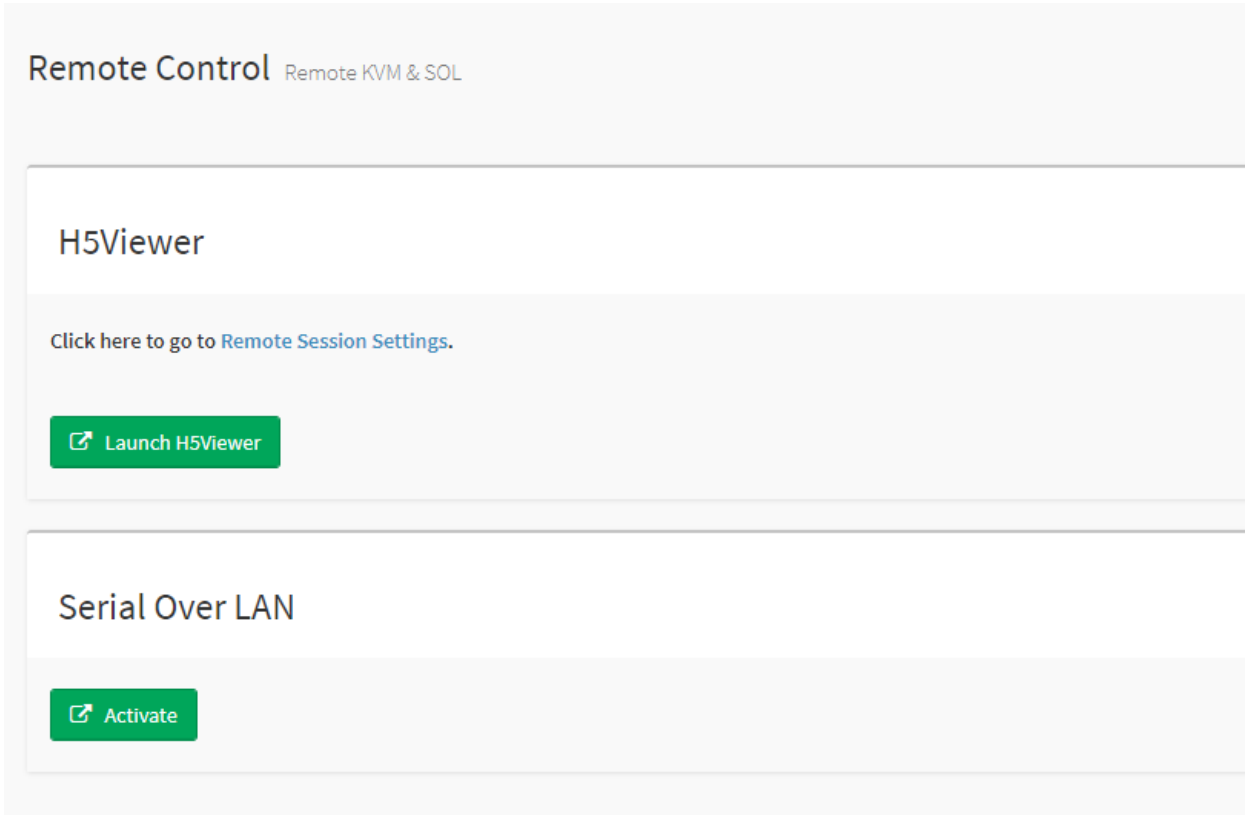
The fields of the Sideband Interface (NC-SI) page are explained below.

- **NCSI Mode:**
  - If you select **Auto Failover Mode**, the NCSI interface and other settings will be configured automatically.
  - If you select **Manual Switch Mode**, you are allowed to configure the below settings.
- **NCSI Interface:** Select the NSCI interface for which you need to configure NCSI settings.
- **Package ID:** Select the package ID to be configured for the selected interface.
- **Channel Number:** Select the channel number to be configured for the selected interface.
- **Save:** Save the settings.

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6.2.7 Remote Management

The "Remote Control" includes two functions: KVM and SOL, KVM is mainly used to remotely access the x86 system through WEB, and SOL is mainly to access x86 BIOS configuration information through WEB, WEB UI is as follows.



6.2.7.1 KVM

Launch H5Viewer

The system and browser requirements for Remote Control are given below.

System Requirements

Client machine with 8GB RAM.
If the client machine has 4GB RAM or lower, there will be lag in Video/Keyboard/ Mouse/Media redirection functionality.

Supported Browsers

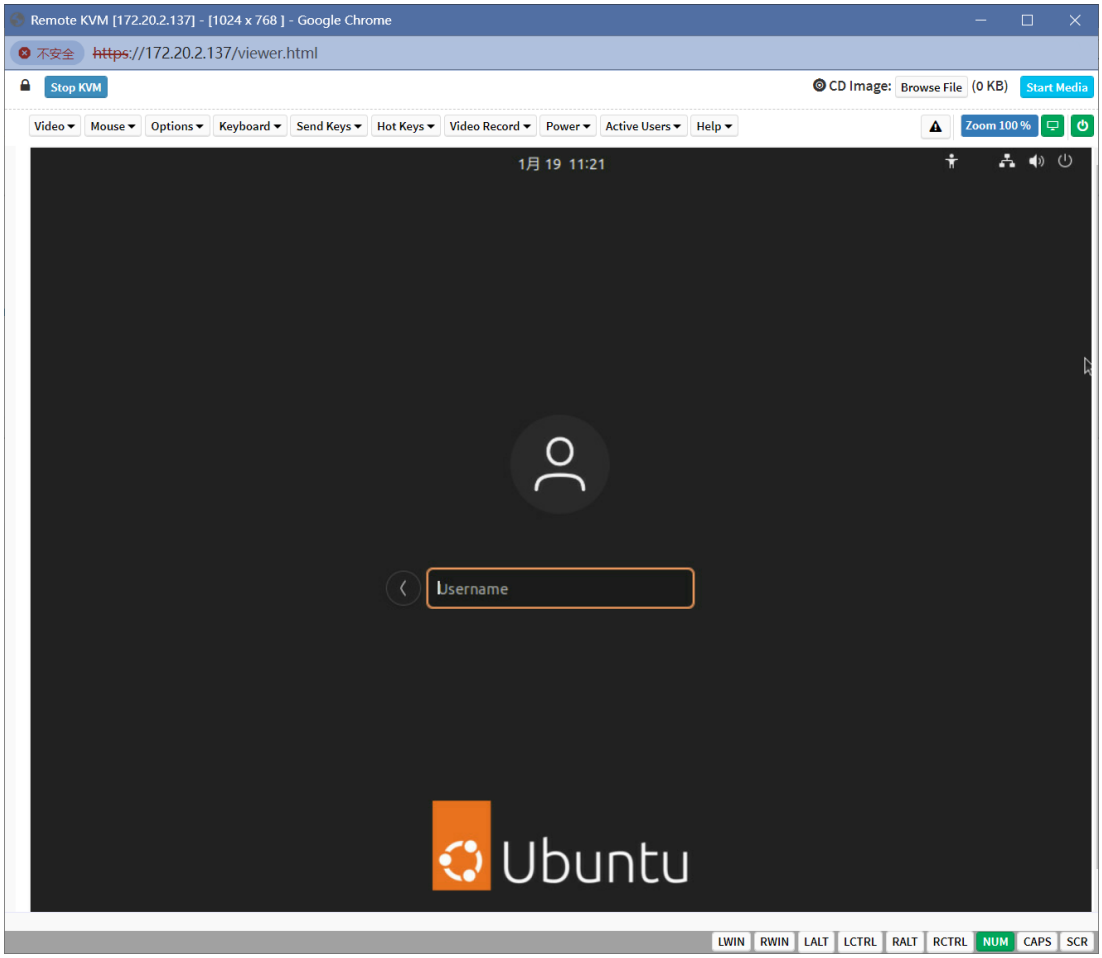
- ✧ Chrome latest version
- ✧ IE11 and above
- ✧ Firefox (with limited support)
- ✧ Edge
- ✧ Safari (On Mac only)

Note: *It is advisable to use Chrome or IE for H5Viewer, since Firefox has its own memory limitations.*

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To open Remote Control page, click Remote Control from the menu bar. A detailed description of the menu items is given below.

Open the **"Remote Control"** page, click **"Launch H5Viewer"**. A sample screenshot of the Remote KVM page is shown below.



Procedure to Start KVM

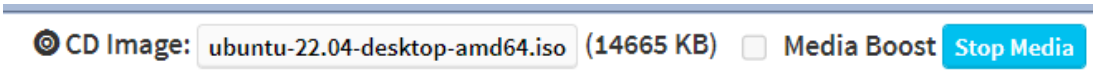
1. Click Launch H5Viewer to open the Remote Control KVM page.

2. To stop the H5Viewer video redirection, click Stop KVM.

Procedure to Start /Stop Media

1. Click **Browse File** to select CD Image. After selecting the image, **Select/Unselect** media boost option.
2. Click **Start Media** to redirect the selected CD image file to the Host. A sample screenshot is as shown below.
   Note: *If media boost mode is selected, the processes related to media redirection will have high priority than other processes. This will improve media performance but other processes will have limited access to CPU cycle.*

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3. To stop the CD Image redirection, click **Stop Media**.

A detailed description of menu items are given below.

Video

This menu contains the following sub menu items.
Pause Video: This option is used for pausing Console Redirection.
Resume Video: This option is used to resume the Console Redirection when the session is paused.
Refresh Video: This option can be used to update the display shown in the Console Redirection window.
Capture Screen: This option helps to take the screenshot of the host screen and save it in the client s system.

Mouse

Show Client Cursor: This menu item can be used to show or hide the local mouse cursor on the remote client system.
Mouse Mode: This option handles mouse emulation from local window to remote screen using either of the two methods. Only Administrator has the right to configure this option.

- **Absolute mouse mode**: The absolute position of the local mouse is sent to the server if this option is selected.
- **Relative mouse mode**: The Relative mode sends the calculated relative mouse position displacement to the server if this option is selected.
- **Other mouse mode**: This mouse mode sets the client cursor in the middle of the client system and sends the deviation to the host. This mouse mode is specific for SUSE Linux installation.
  Note: *AMI MegaRAC SP-X suggests users to use Linux version of OS except SUSE11.4 with BMC to avoid mouse sync issue in absolute mouse mode.*
  Client cursor will be hidden always. If you want to enable, use Alt + C to access the menu.

Options

Zoom:
Normal - By default, this option is selected.
Zoom In - For increasing the screen size. This zoom varies from 100% to 150% with an interval of 10%
Zoom Out - For decreasing the screen size. This zoom varies from 100% to 50% with an interval of 10%
Block Privilege Request: To enable or disable the access privilege of the user.
***Compression Mode:** This option helps to compress the Video data transfer to the specific mode.
***DTC Quantization Table:** This option helps to choose the video quality.
Note: **Specific to AST SOC.*

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Keyboard

Keyboard Layout: This feature is fully compatible when host and client has the same keyboard language layout. If the client and host language layouts differ, some special characters will not be compatible.
List of Host Physical Keyboard languages supported in SPX H5Viewer.

- English U.S.
- German.
- Japanese.

Send Keys

This option is used to key items. This menu contains the following sub menu items.
Hold Down
Press and Release

Hold Down

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

Press and Release

Ctrl+Alt+Del: This menu item can be used to act as if you depressed the <CTRL>, <ALT>and<DEL> keys down simultaneously on the server that you are redirecting.
Left Windows Key: This menu item can be used to act as the left-side <WIN> key when in Console Redirection. You can also decide how the key should be pressed: Hold Down or Press and Release.
Right Windows Key: This menu item can be used to act as the right-side <WIN> key when in Console Redirection.
Context Menu Key: This menu item can be used to act as the context menu key, when in Console Redirection.
Print Screen Key: This menu item can be used to act as the print screen key, when in Console Redirection.

Hot Keys

This menu is used to add the user configurable shortcut keys to invoke in the host machine. The configured key events are saved in the BMC.
This menu contains the following sub menu items.

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- **Add Hot Keys** - This menu is used to enable macros. Click **Add** to macros.

Video Record

This menu contains the following sub menu items.
Record Video: This option is to start recording the screen.
Stop Recording: This option is used to stop the recording.
Record Settings: This option is used to set video record duration and video compression value. Video record duration value should be in the range of 1 to 1800 seconds. Video Compression value should be in the range of 0.1 (Low image quality) to 1.0 (High image quality).

Normalized video resolution to 1024 X 768 (*specific to AST SOC): Host video will be scaled to 1024 x 768 in the recorded video file. Enabling this option improves client side video recording performance in H5Viewer.

Disable this option to record video at same resolution as host video. The host video capture depends on client system performance. If this option is disabled, recorded video file may have inconsistency. (i.e., Recorded video file duration may not be the same as configured value).

Note:

The Maximum video file size allowed is around 40MB. If the video file size reaches its max size limit, the recorded file is downloaded and recording will be in progress until the configured video recording time is reached. The video file is saved as video date-month-year hr-min-sec part no in client side video recording.

User have to take care of saving the video files in different browsers.

When H5Viewer focus is lost and if video recording is in progress, the recording will be stopped with a notification message and the recorded video file will be discarded.

Due to browser limitation, Set timeout/set interval will be delayed from specified time of interval when browser window loses focus, hence video server will not send the video packets to H5Viewer and so the video recording will be stopped.

Power

The power options are to perform any power cycle operation. Click on the required option to perform the following operation.
Reset Server: To reboot the system without powering off (warm boot).
Immediate Shutdown: To perform Power OFF Immediately.
Orderly Shutdown: To Power OFF the server in proper order.
Power ON Server: To Power ON the server.
Power Cycle Serve: To first power off, and then reboot the system (cold boot).

Active Users

Click this option to display the active users and their system ip address.
Active KVM Session can be terminated when there are multiple KVM Session from Master [FULL Privilege KVM Session].

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Help

Click this option to get more information About H5Viewer. The KVM Remote Console utility version and plugin version will be displayed.

Quick Buttons

Quick Buttons: The upper right of H5Viewer window displays all the quick buttons. These quick buttons allow you to perform the below functions by clicking them.

Quick Buttons	Explanation
	This quick button will show / hide notifications dropdown menu, which will contains the list of notifications displayed by H5Viewer.
	It shows the current zoom value in percentage.
	This quick button is used to display the current host monitor status. If icon is in green color then host monitor is unlocked. If the icon is in red color host monitor is locked. By clicking the button, host monitor status can be toggled.
	This quick button is used to display the current server power status. If the icon is in green color, the server status is powered on. If the icon is in red color, the server status is powered off. Click the button to toggle immediate power off / power on the host.

Status barbuttons



Num/Caps/Scroll lock buttons are LED status buttons that denotes the current status of Num/Caps/ Scroll lock in the host.

Keyboard LED Sync

When the H5Viewer is launched, the keyboard locks status and LEDs denoting the lock status of the host machine, should be in sync with the client machine. That is, if the Num/Caps/Scroll lock is enabled/disabled in the client machine, the same should be updated in the host machine as well.

Note:

Client Side Limitations

Due to web browser related security concerns, this feature has following limitations.

- *Host LED status will be synced with client LED status, only if user presses any key in client keyboard when H5Viewer window is in focus.*

- *Client keyboard LED status cannot be updated from web browsers.*

Host Side Limitations

- In some Linux hosts, when the host is booted into text mode, CAPS LOCK LED status will

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not be updated properly. CAPS LOCK LED will not turn ON/OFF while changing the CAPS lock status in the host OS.

- In such cases, H5Viewer CAPS LOCK synchronization functionality will not work properly.

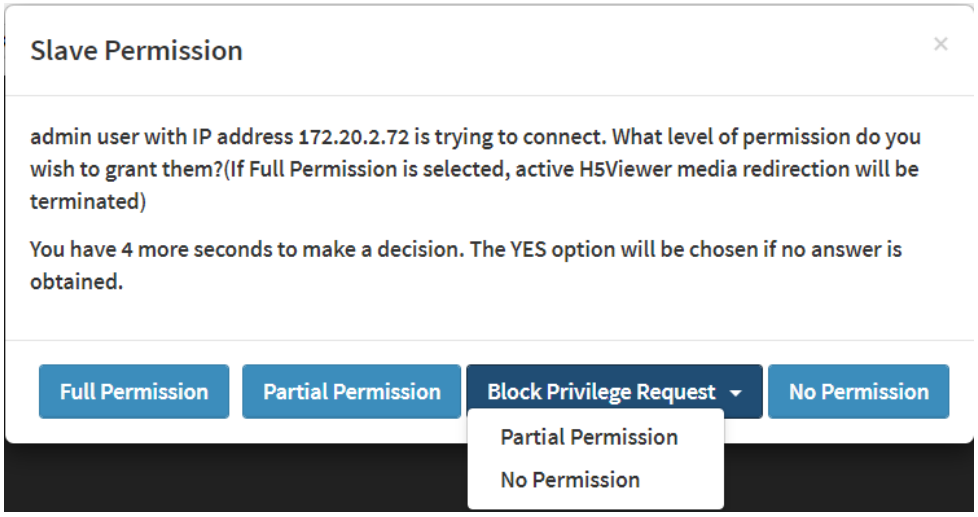
-Example - Typing letters in H5Viewer (after pressing CAPS LOCK) will toggle between lower to upper case inside host.

KVM Sharing

MegaRAC SP-X stack supports N number of KVM redirection sessions. Only one full permission H5Viewer session at a time. With Full permission in H5Viewer, the user can control the KVM redirection, and the other H5Viewer users can only view the video redirected from the server without intervention.

When the First user launches H5Viewer, the user will get full permission to control the host during KVM redirection. When another H5Viewer session is launched, the Video server will send KVM sharing permission request packet to the current session, for the new Requesting session.

Once the requesting session is authenticated, a packet containing the information such as the client IP/hostname and user name of the newly authenticated or logged in user, will be send to the current session. The first client shows the dialog as a shown below:



Clicking the button in the dialog box will trigger specified action:

Full Permission: When this button is clicked, the requesting session will receive full access permission, and the current (full permission) session will have a partial KVM access permission only.

Partial Permission: When this button is clicked, the requesting session will receive partial permission and can only view server display (Video only).

Block Privilege Request -> Partial Permission: Once this option is selected, both newly requesting session and active partial privileged session will get partial permission as auto response and can only view server display. Further request will be served by auto response mechanism.

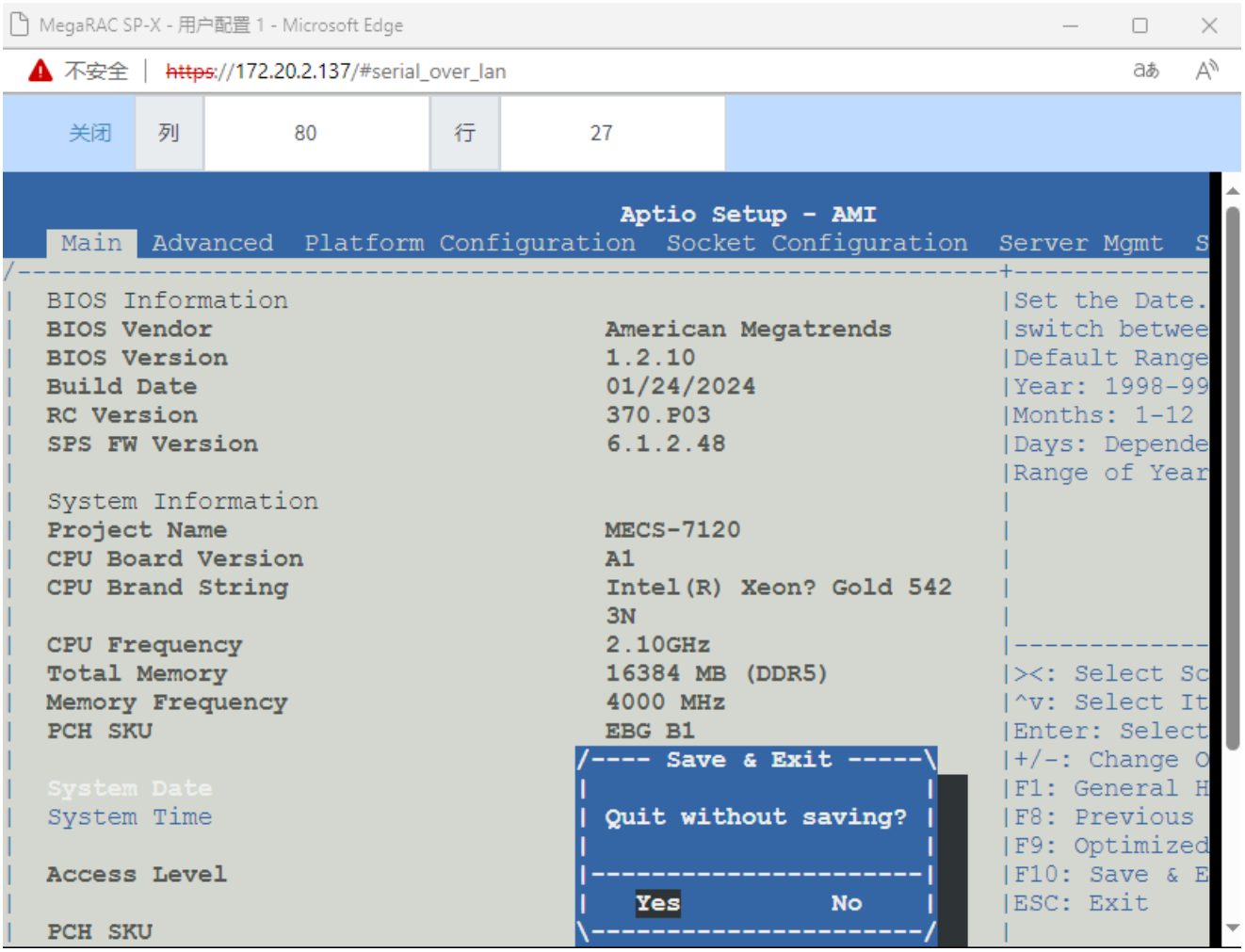
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Block Privilege Request -> No Permission: Once this option is selected, both newly requesting session and active partial privileged session access will be denied as auto response. Further request will be served by auto response mechanism.

No Permission: When this button is clicked, the requesting session access will be denied.

6.2.7.2 SOL

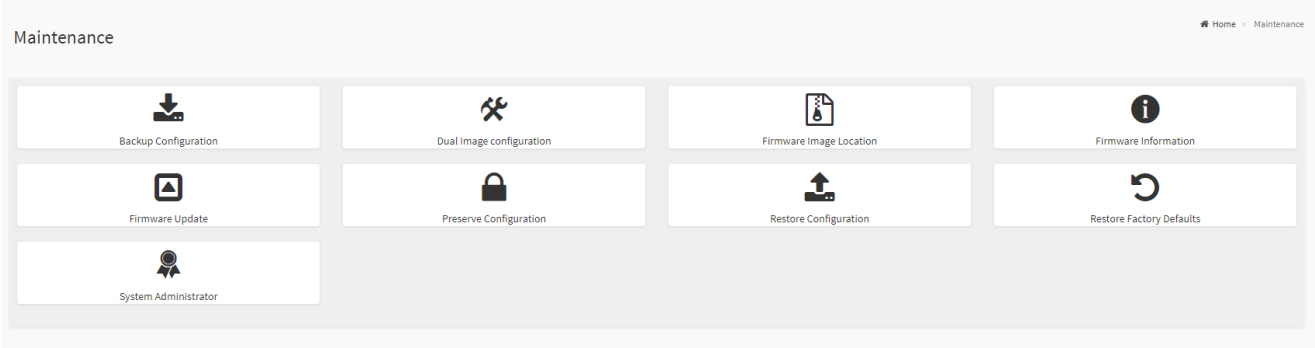
The serial over LAN (SOL) feature is very useful, and the SOL redirects the local serial interface via an IPMI session, allowing remote access to the console.
Click the "**Active**" button on the "Remote Control" interface to enter the SOL output window, and then enter the BIOS configuration interface, and the content of the BIOS configuration will be redirected to the WEB UI, as shown in the following figure.



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6.2.8 Server Maintenance

This function is mainly maintenance tasks on the device. Click Maintenance on the left function bar to enter the following interface.



6.2.8.1 Firmware Update

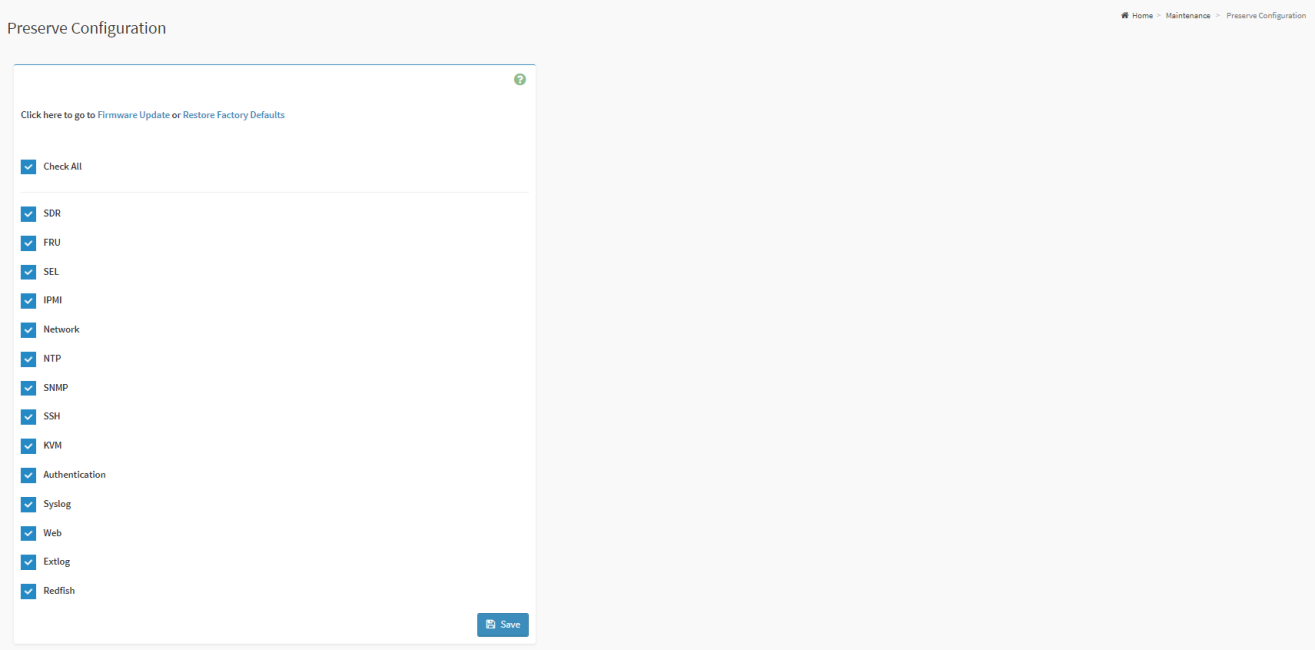
The system upgrade function is for updating and maintaining the system. Mainly used to update BMC and BIOS. Here's how to update via the Web.

6.2.8.1.1 BMC Update

Preserve Configuration

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

To open Preserve Configuration page, click **Maintenance -> Preserve Configuration** from the menu bar. A sample screenshot of Preserve Configuration page is shown below.



The various fields of Preserve Configuration are as follows.

Click here to go to Firmware Update or Restore Factory Defaults: This link will redirect

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to the Firmware Update or Restore Factory Defaults page which needs to be preserved.

Check All: To check the entire configuration list.

Save: To save any changes made.

Procedure

1. Click **Firmware Update** or **Restore Configuration** link to view Firmware Update or Restore Configuration page accordingly.

2. Select the required Preserve Configuration items by either choosing the items individually by selecting the appropriate check boxes or by selecting all or none using Check All.

3. Click **Save** to save the changes.

Firmware Update

This wizard takes you through the process of firmware upgradation. A reset of the box will automatically follow if the upgrade is completed or cancelled. An option to Preserve All Configuration is available. Enable it, if you wish to preserve configured settings through the upgrade.

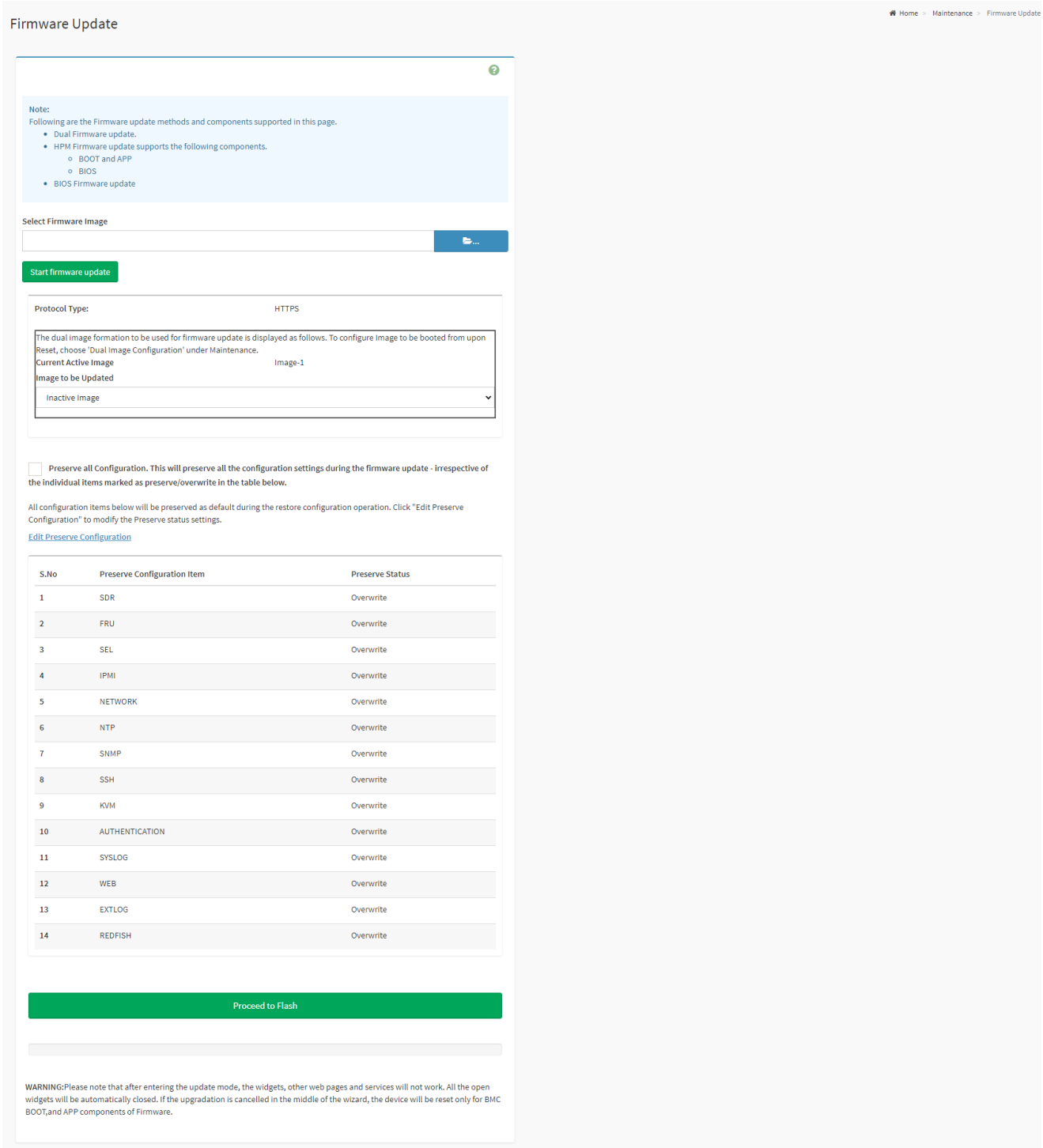
To perform Dual Firmware Update operation, click **Maintenance -> Firmware Update** from the menu bar.

Procedure

1. Click **Browse** to select firmware image.
   Note: *A file upload pop-up will be displayed for http/https but in the case of tftp files, the file is automatically uploaded displaying the status of upload.*

2. Click **Start firmware update** to load the Firmware Update information. A sample screenshot is displayed below.

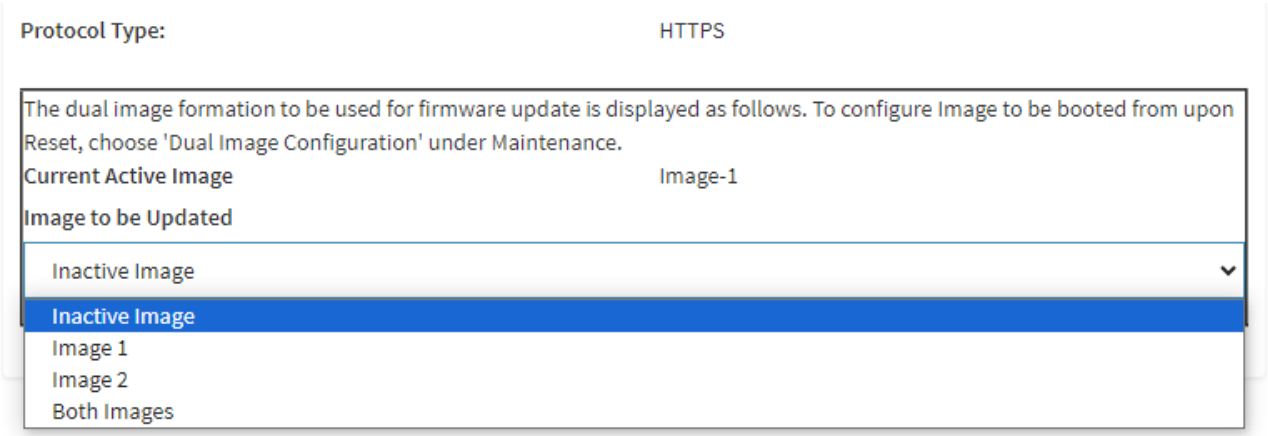
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3. Select an Image (Inactive Image, Image 1, Image 2 or Both Image) from Image to be Updated drop-down list. The selected image will be getting flashed.

• **Image to be Updated:** To update an Image (Inactive, Image 1, Image 2 or Both) to be flashed. If You select an Inactive image, the Inactive image will be flashed. If you select both images, then Both Image 1 and Image 2 will be flashed with uploaded image file.
• **reboot the device after update:** This option is used to reboot the device after the firmware update.

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4. Click **Preserve** all Configuration to preserve all configuration.
   - **Preserve all Configuration:** To preserve all configuration.
   - **Edit Preserve Configuration:** To modify the Preserve status settings.

5. Click **Proceed** to Flash, it will prompt you with the warning message. Click **Ok** to start the Firmware update.

The Dual Firmware Update undergoes the following steps:

a) Closing all active client requests
b) Preparing Device for Firmware Upgrade
c) Uploading Firmware Image
d) Verifying Firmware Image:

- In **Section Based Firmware Update**, you can configure the firmware image for section based flashing. Check the required sections and click **Proceed** to update the firmware.

- If flashing is required for all images, select the option **Full Flash**.

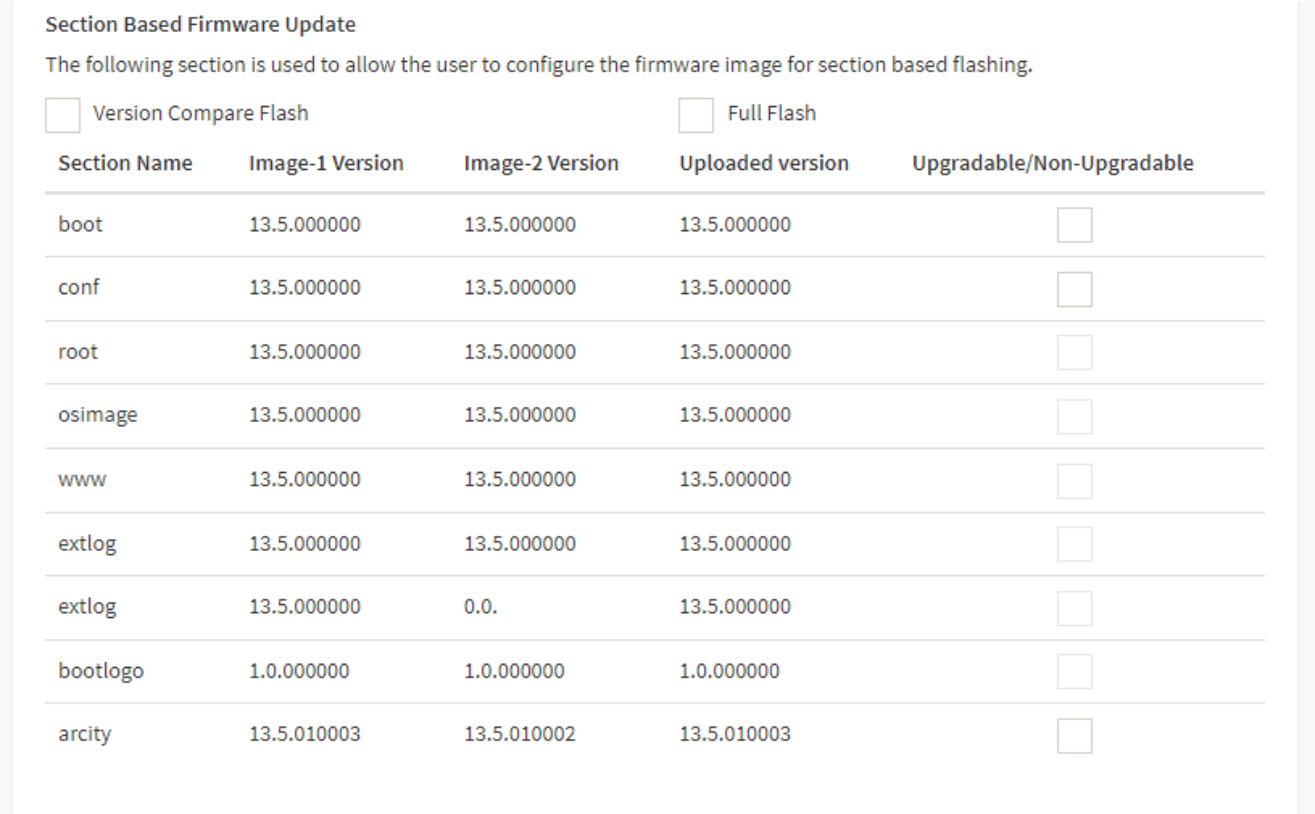
- If you select **Version Compare Flash** option from web, the current and uploaded module versions, FMHlocation, size will be compared.

- If the modules differ in size and location, proceed with force firmware upgrade.

- If all the module versions are same, restart BMC by saying all the module versions are similar.

- If only few module versions are differ, those modules will be flashed.

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Section Based Firmware Update

The following section is used to allow the user to configure the firmware image for section based flashing.

Version Compare Flash Full Flash

Section Name	Image-1 Version	Image-2 Version	Uploaded version	Upgradable/Non-Upgradable
boot	13.5.000000	13.5.000000	13.5.000000	
conf	13.5.000000	13.5.000000	13.5.000000	
root	13.5.000000	13.5.000000	13.5.000000	
osimage	13.5.000000	13.5.000000	13.5.000000	
www	13.5.000000	13.5.000000	13.5.000000	
extlog	13.5.000000	13.5.000000	13.5.000000	
extlog	13.5.000000	0.0.	13.5.000000	
bootlogo	1.0.000000	1.0.000000	1.0.000000	
arcity	13.5.010003	13.5.010002	13.5.010003	

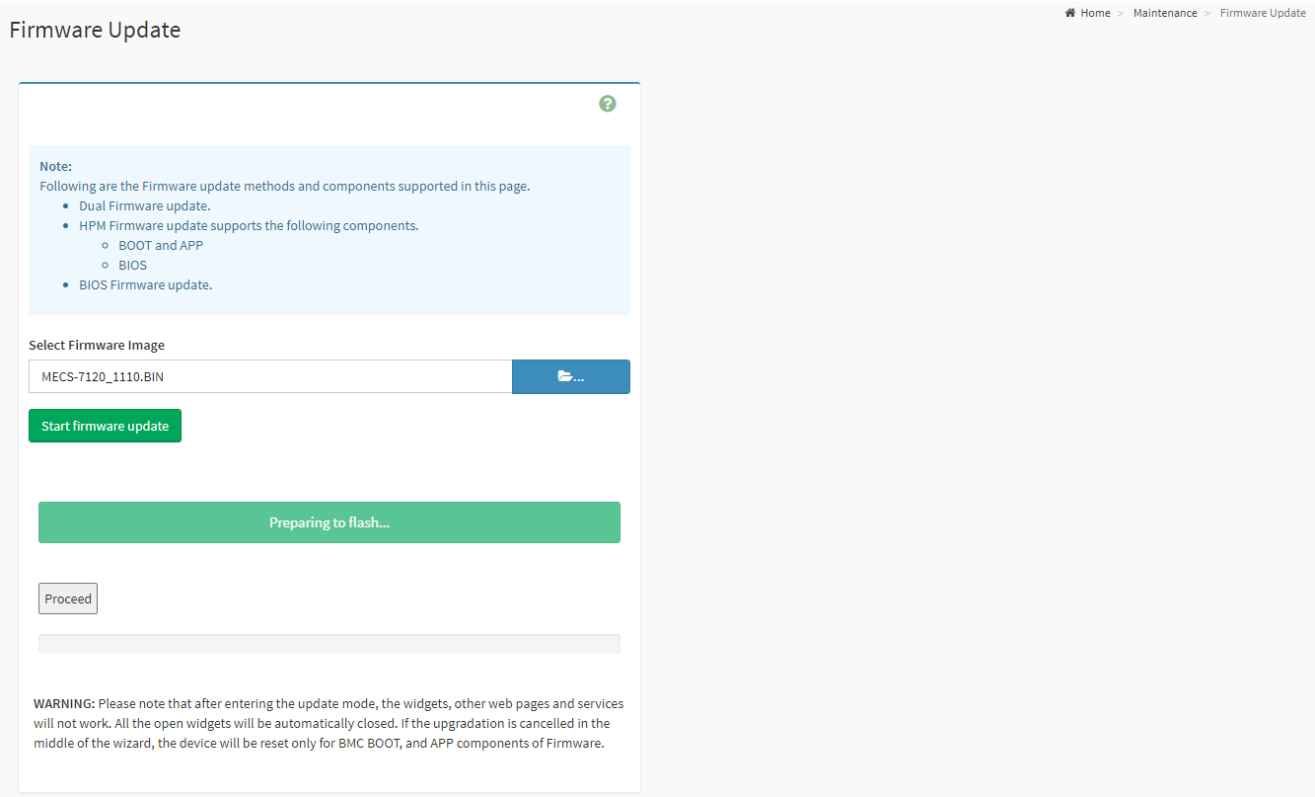
e) Flashing Firmware Image
f) Resetting the image

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6.2.8.1.2 BIOS Update

This wizard takes you through the process of BIOS firmware upgradation.

To perform BIOS Firmware Update operation, click **Maintenance -> Firmware Update**.

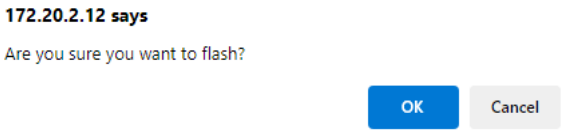


Procedure

1. Click **Browse** to select BIOS Firmware Image.
   Note: *Firmware update wizard will detect .bin and .bin_enc extensions, and validate as BIOS firmware image.*

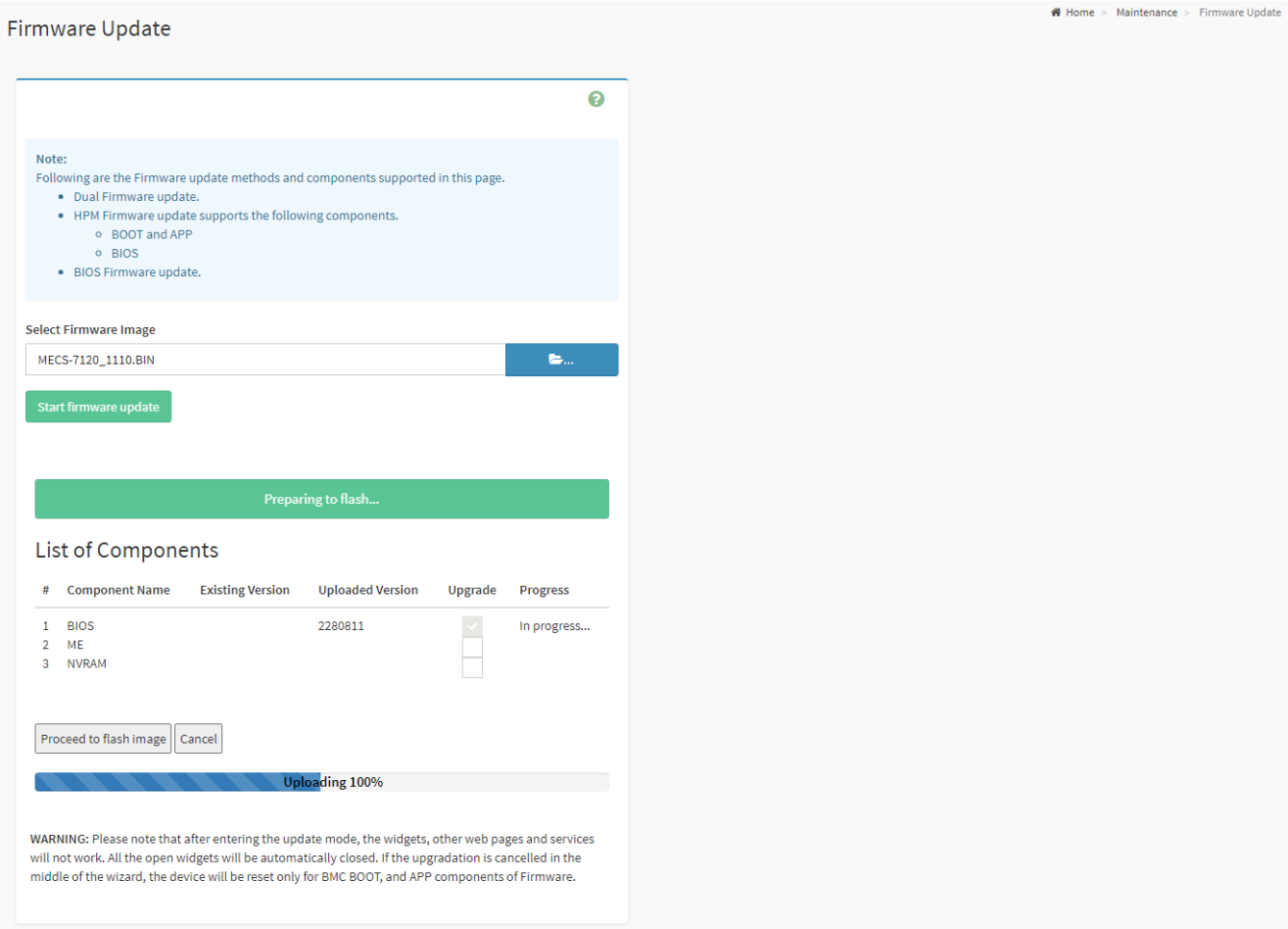
2. Click **Start firmware update** to load the BIOS firmware image information.

3. Click **Proceed**, it will prompt you with the warning message. Click **OK** to start the firmware update.

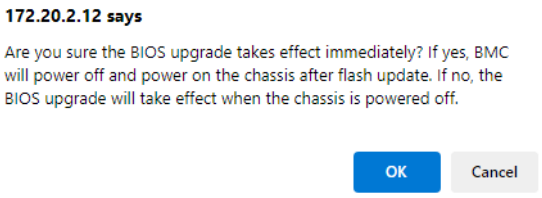


4. Select the components from the list to flash. **BIOS** is mandatory, **ME** and **NVRAM** are optional.

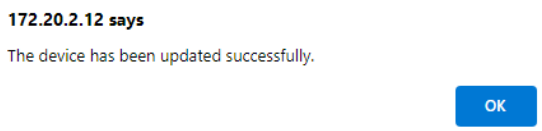
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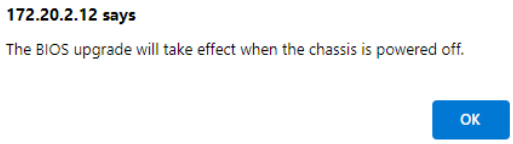
5. Click **Proceed to flash image**, it will prompt you with the selection message. Click **Cancel**, the update will be cancelled.



- Click **OK**: Update the device immediately, the chassis will be powered cycle. Once the BIOS firmware update is completed, it will prompt you with the success message. Click **OK** to complete the process.



- Click **Cancel**: Update the device when the chassis is powered off. It will prompt you with the notification message. Click **OK** to complete the process.



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6.2.8.1.3 HPM Firmware Update – CPLD/BIOS

To perform HPM Firmware Update operation, click **Maintenance -> Firmware Update** from the menu bar.

Note: *For BIOS or CPLD firmware update, it is required to hash its uploaded image via creating HPM image utility.*

Create HPM Image

```
./CreateHPMImage create hpmimage.conf
```

CreateHPMImage is the creating HPM image utility from AMI.

Sample of hpmimage.conf

```
[GLOBAL]

DeviceID = 0x20                          ;1B Device ID as per IPMI

ManufacturerID = 0x005f13                ;3B Manufacturer ID as per IPMI

ProductID = 0x7120                       ;2B Product ID

HPMImage = /home/bmc/outputjbc 02b4.hpm  ;Path & Filename of final output HPM Image

[CPLD]                                   ;Component Type: BIOS, CPLD

UpgradeActionType = 0x02                 ;1B Upgrade Action Type: 0x02 = Upload, 0x03 - 0xFF =
Reserved

FwVersionMajor = 0x02                    ;1B This component's Major Version

FwVersionMinor = 0x04                    ;1B This component's Minor Version

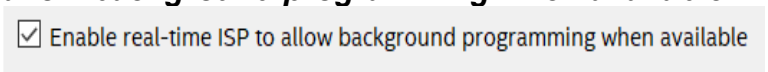
FwVersionAux = 0x02200000                ;4B This component's Aux Version

FwDescription = "cpld"                   ;21B Firmware Description String to be used

FwData = /home/bmc/cpld_02b4.jbc         ;Path & Filename of Component's Image

SectionFlash = 0x0                       ;For Section based flashing of the particular component 0 -
disabled 1 - enabled
```

Note: *The CPLD Image should be a* ***.jbc*** *file and enable the option* ***"Enable real-time ISP to allow background programming when available"****.*

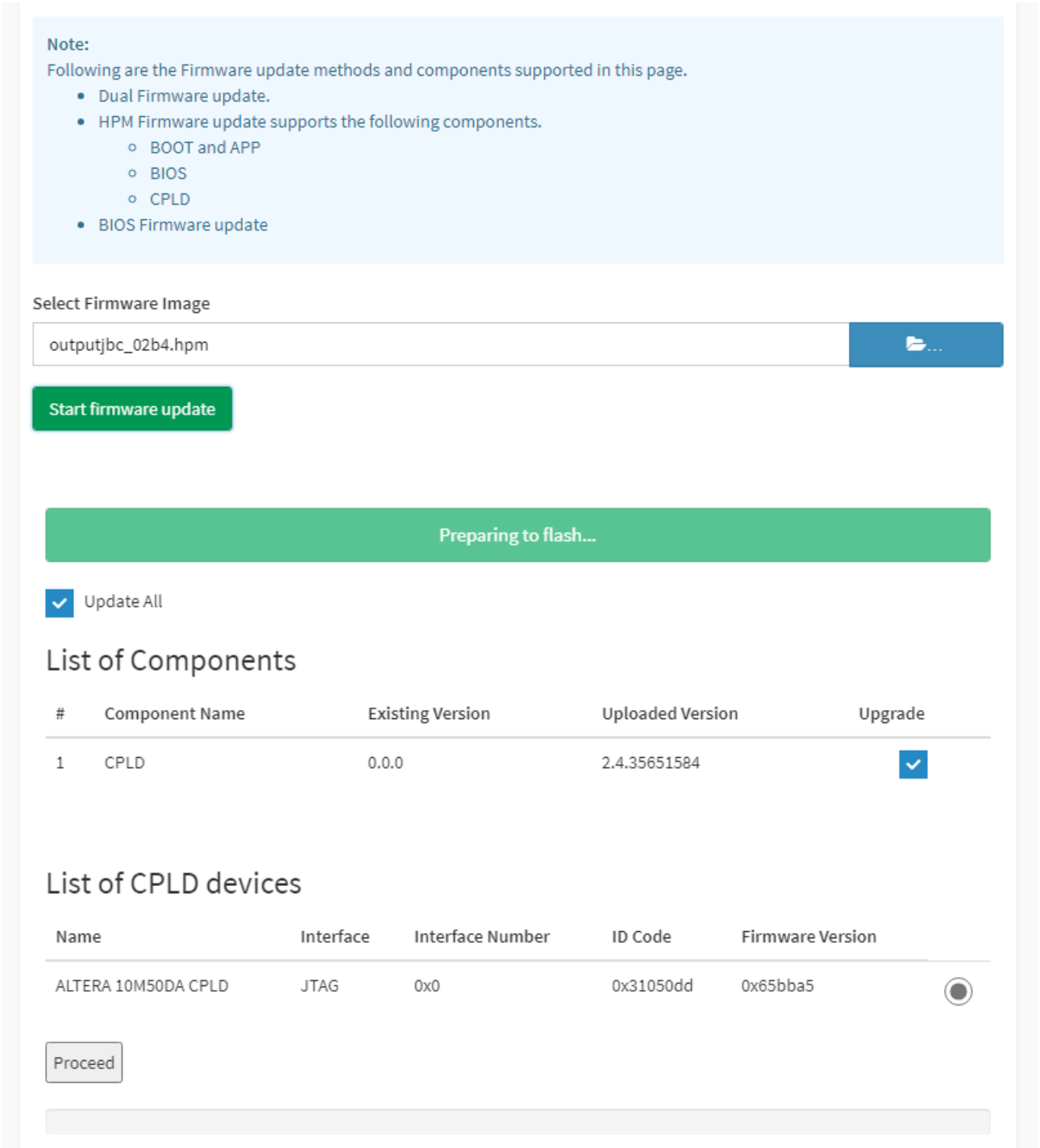


Procedure for CPLD Firmware Update

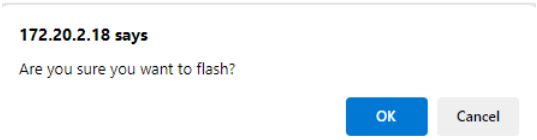
1. Select HPM format of CPLD supported image to perform the CPLD Firmware Update.

2. Click **Start firmware update** to load the Firmware Update information. Once the image is successfully uploaded, the uploaded image information such as **Component Name**, **Existing Version**, **Uploaded Version** and **Upgrade** will be displayed as shown in the screenshot below. In addition, all the CPLD devices information such as **Name**, **Interface**, **Interface Number**, **ID code** and **Firmware Version** will be displayed as well. User can select the device that needs to be updated.

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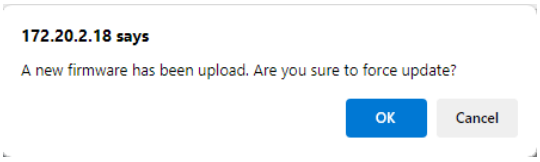


3. Click **Proceed**, it will prompt you with the warning message. Click **OK** to start the firmware update.

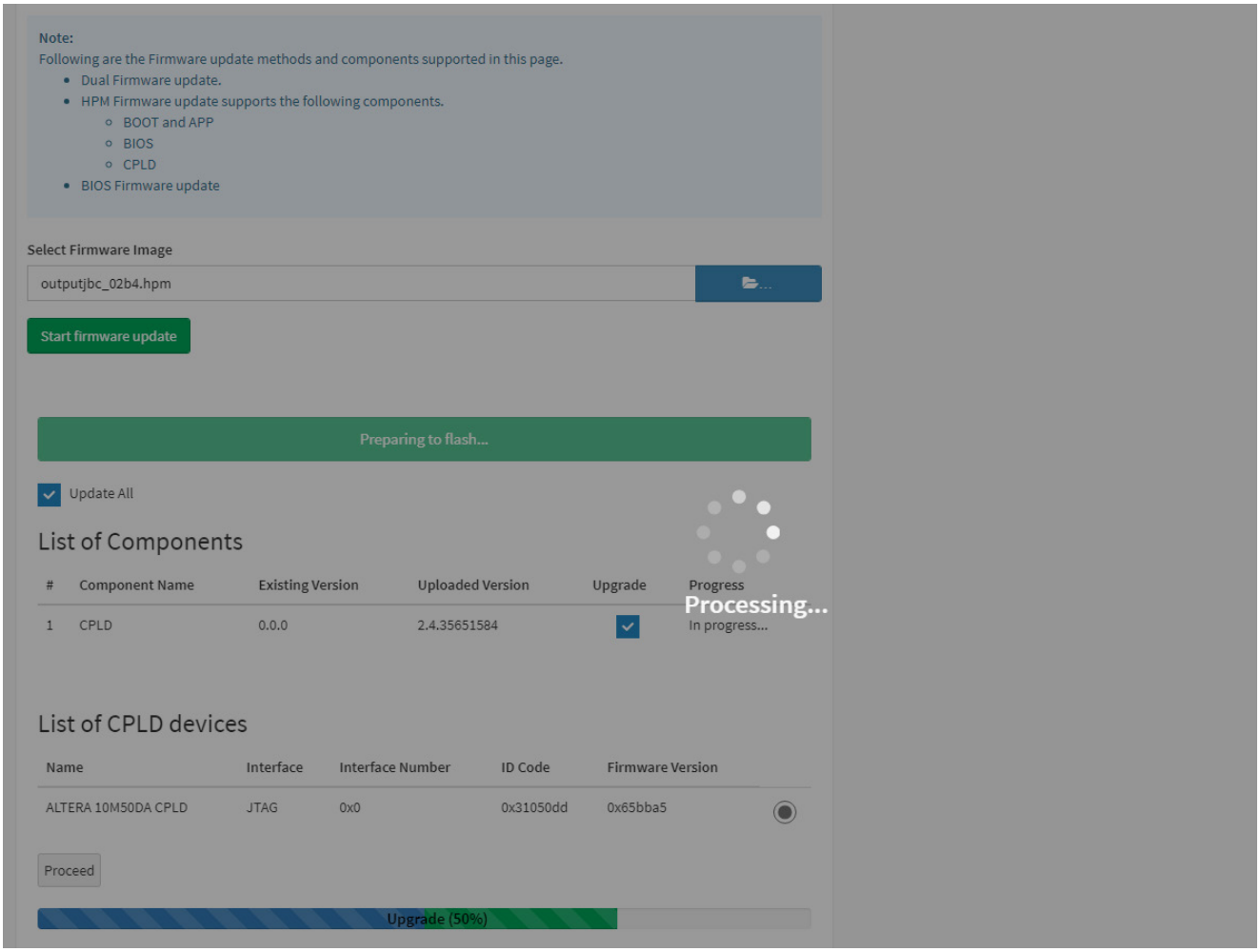


If a CPLD firmware has been uploaded, it will prompt you with the selection message. Click **Cancel**, the update will be cancelled.

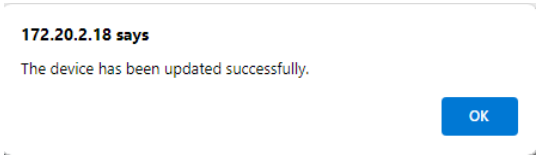
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A sample screenshot is displayed below.



4. Once the CPLD Firmware Update process is completed, an alert message will be displayed as shown in the screenshot below.



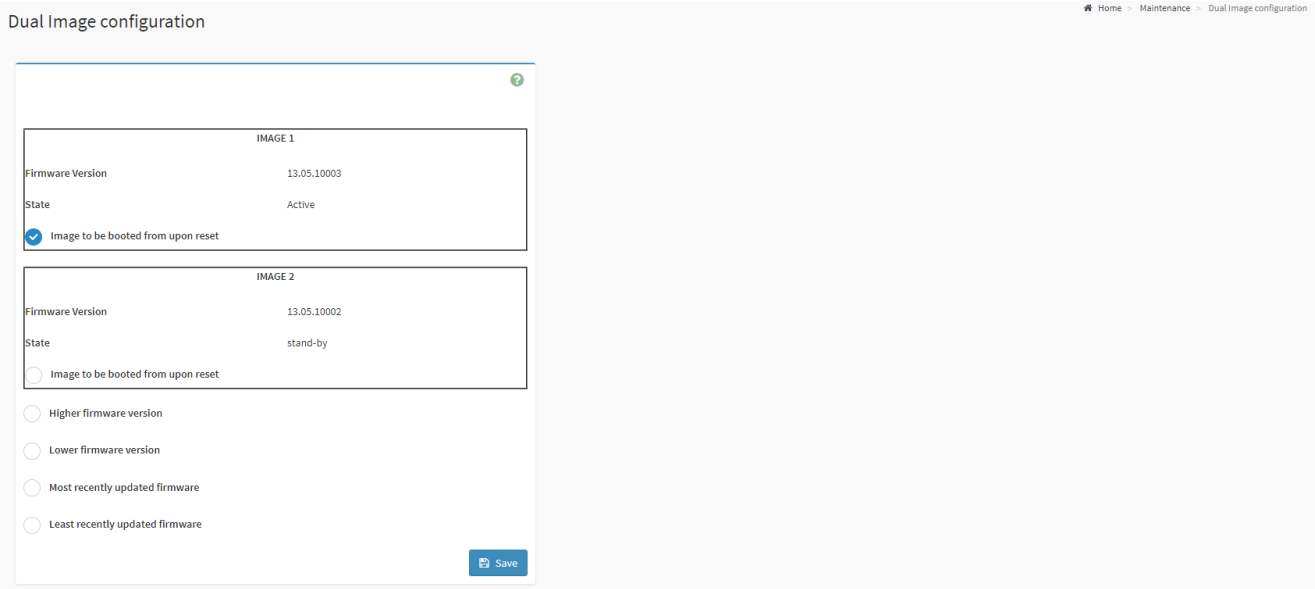
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6.2.8.2 Firmware Configuration
6.2.8.2.1 Dual Image Configuration

This page is used to configure the dual image information. Dual Image support feature is helpful to store two firmware images on two SPI flash, and boot any of the image according to users request.

The running firmware is responsible for setting the Boot Selector options and Firmware Upload Selector options.

To open Dual Image Configuration, click **Maintenance -> Dual Image Configuration** from the menu bar. A sample screenshot of Dual Image Configuration page is shown below.



The various options of Dual Image Configuration are given below.

Firmware Version: Displays the firmware version of both images.

State: Displays the current state of both images.

Image to be booted from upon reset: This option is to boot particular image (either 1 or 2) in the next boot up process.

Higher firmware version: This option is to boot higher firmware version image among the dual images in the next boot up process.

Lower firmware version: This option is to boot lower firmware version image among the dual images in the next boot up process.

Most recently updated firmware: This option is to boot most recently updated firmware image among the dual images in the next boot up process.

Least recently updated firmware: This option is to boot least recently updated firmware image among the dual images in the next boot up process.

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Procedure

1. Select the required image to be configured or the required option for Image setting.

2. Click **Save** to save the changes.

Fail Safe Booting Configuration:

Hardware based fail safe boot support: This feature supports switching to secondary image as failsafe using hardware configurations. Using this feature, the user can boot into secondary image, even though primary uboot is crashed. Please verify whether SOC supports this feature.

Software FailSafe Boot: Legacy AMI dual image support. This feature uses common UBOOT which switches between 2 different images based on user requirement. This feature does not requires a special hardware support.

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6.2.9 One-Click Log Collection

The One-Click Log Collection feature enables users to download essential BMC information data for detailed analysis of BMC status or issue identification.

To open the One-Click Log Collection, click **One-click Log collection** from the menu bar. A sample screenshot of Event Log page is shown below.



Click the "**Download**" button to automatically download the Log to the system.

The log package is named:
One-Click_Collection_Log_[time].zip

Inside the zip file, you will find the following folders:

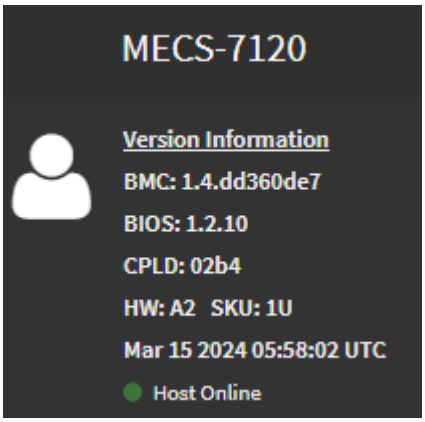
- conf: Configuration files
- tmp: Temporary files
- var: Variable files

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6.2.10 Firmware and Hardware versions

To get the version info of BMC, BIOS, CPLD and hardware, please refer to home page, up-left corner.

For example:



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6.3 IPMI

Intelligent Platform Management Interface (IPMI) is a standardized interface used for managing a computer system and monitoring its operation. It provides a set of specifications for hardware-based management, independent of the operating system.

6.3.1 Overview of ipmitool

The ipmitool is a command-line utility that interfaces with the IPMI system. It allows administrators to execute a range of IPMI commands to manage and monitor servers. This tool is essential for system management, providing an interface to the IPMI functionalities of the server's BMC.

6.3.1.1 General Usage of ipmitool

The ipmitool allows for a range of operations through its command-line interface. The general syntax includes various parameters for network communication and authentication.

Common Parameters:

-H or --hostname: Hostname or IP address of the target server (for network interfaces).
-U or --user: Username for login.
-P or --password: Password for login (it's recommended to input interactively for security).

Parameter	Alias	Description
-H	--hostname	Hostname or IP address of the target server (for network interfaces).
-U	--user	Username for login.
-P	--password	Password for login (recommended to be input interactively for security).

6.3.1.2 Specific Interface Options

LAN Interface (lan)

Usage: ipmitool -I lan -H [hostname] -U [username] -P [password] [command]

Note: *The LAN interface is suitable for local communication with IPMI. For remote management capabilities, the LANplus interface should be used.*

Example:

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```
~ # ipmitool -I lan -H 127.0.0.1 -U admin -P admin.123 mc info
IOCTL to get IP failed: -1
Device ID                 : 32
Device Revision           : 1
Firmware Revision         : 1.03
IPMI Version              : 2.0
Manufacturer ID           : 24339
Manufacturer Name         : ADLINK Technology Inc.
Product ID                : 28960 (0x7120)
Product Name              : Unknown (0x7120)
Device Available          : yes
Provides Device SDRs      : yes
Additional Device Support :
    Sensor Device
    SDR Repository Device
    SEL Device
    FRU Inventory Device
    IPMB Event Receiver
    IPMB Event Generator
    Chassis Device
Aux Firmware Rev Info     :
    0x11
    0x0d
    0x10
    0xb9
```

LANplus Interface (lanplus)

Usage: ipmitool -I lanplus -H [hostname] -U [username] -P [password] [command]
Enhanced LAN interface with better encryption and additional features for secure remote communication.

Example:

```
root@adlink-Default-string:/home/adlink# ipmitool -I lanplus -H 172.20.2.137 -U admin -P admin.123 mc info
Device ID                 : 32
Device Revision           : 1
Firmware Revision         : 1.03
IPMI Version              : 2.0
Manufacturer ID           : 24339
Manufacturer Name         : ADLINK Technology Inc.
Product ID                : 28960 (0x7120)
Product Name              : Unknown (0x7120)
Device Available          : yes
Provides Device SDRs      : yes
Additional Device Support :
    Sensor Device
    SDR Repository Device
    SEL Device
    FRU Inventory Device
    IPMB Event Receiver
    IPMB Event Generator
    Chassis Device
Aux Firmware Rev Info     :
    0x11
    0x0d
    0x10
    0xb9
```

KCS Interface (kcs)

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Usage: ipmitool [command]
KCS (Keyboard Controller Style) is used for communication between the x86 segment and the BMC directly, without needing the -I parameter. It's used for local, direct communication with BMC.

Example:

```
root@adlink-Default-string:/home/adlink#
root@adlink-Default-string:/home/adlink# ipmitool mc info
Device ID                 : 32
Device Revision           : 1
Firmware Revision         : 1.03
IPMI Version              : 2.0
Manufacturer ID           : 24339
Manufacturer Name         : ADLINK Technology Inc.
Product ID                : 28960 (0x7120)
Product Name              : Unknown (0x7120)
Device Available          : yes
Provides Device SDRs      : yes
Additional Device Support :
    Sensor Device
    SDR Repository Device
    SEL Device
    FRU Inventory Device
    IPMB Event Receiver
    IPMB Event Generator
    Chassis Device
Aux Firmware Rev Info     :
    0x11
    0x0d
    0x10
    0xb9
root@adlink-Default-string:/home/adlink#
```


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6.3.2 ipmitool Command Introduction

This section is dedicated to introducing and explaining a variety of ipmitool commands, with detailed descriptions of their specific uses.

6.3.2.1 Fan Control

The ipmitool provides capabilities to manage and monitor fan control settings, including reading the current fan level and switching between manual and automatic control modes.

Get Fan Level
To retrieve the current fan level, the following specific OEM command is used for systems:

Command:
(NetFn = 2Eh, Cmd = 81h)

```
ipmitool raw 0x2e 0x81 0x13 0x5f 0x00 <Fan Number>
```

	Byte	Data Field
Request Data	1~3	ADLINK Manufacturer ID - 005F13h, LS byte first.
	4	Fan Number: Fan Tray Site Number start from 0.
Response Data	1	Completion Code
	2~4	ADLINK Manufacturer ID - 005F13h, LS byte first.
	5	The current mode of the fan: 00h: Fan in local (automatic) control mode. 01h: Fan level in override (manual) control mode with a fixed speed. 02h: Minimum fan level in override control mode. Other values are invalid.
	6	Minimum FAN level, value range (1~max)
	7	Current FAN level, value range (1~max)

Example:

```
root@adlink-MECS-7120:/# ipmitool raw 0x2e 0x81 0x13 0x5f 0x00 1
 13 5f 00 00 01 01
root@adlink-MECS-7120:/#
root@adlink-MECS-7120:/# ipmitool raw 0x2e 0x81 0x13 0x5f 0x00 0
 13 5f 00 00 01 01
```

Cmd Manufacturer ID Fan num

Manufacturer ID
Fan control mode
mini fan level
Current fan level

Set Fan Level

The ipmitool is the ability to set the fan level, allowing administrators to manually control the speed of the fans within their server system.

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Command:

(NetFn = 2Eh, Cmd = 80h)

ipmitool raw 0x2e 0x80 0x13 0x5f 0x00 <Fan Number> <Fan Control Mode> [<Fan Level>]

	Byte	Data Field
Request Data	1~3	ADLINK Manufacturer ID - 005F13h, LS byte first.
	4	Fan Number: Fan Tray Site Number start from 0. FFh: Control all fans.
	5	Fan Control Mode: Set the desired control mode for the fan. 00h: Fan in local (automatic) control mode. 01h: Fan level in override (manual) control mode with a fixed speed. 02h: Minimum fan level in override control mode.
	6	Fan Level: FAN level to set, value range (1~max). Ignored when byte 5 is set to 00h. Fix the current FAN level when byte 5 is set to 01h. Fix the mini FAN level when byte 5 is set to 02h.
Response Data	1	Completion Code
	2~4	ADLINK Manufacturer ID - 005F13h, LS byte first.

Example:

```
root@adlink-Default-string:/home/adlink# ipmitool raw 0x2e 0x81 0x13 0x5f 0x00 0
 13 5f 00 00 01 01
root@adlink-Default-string:/home/adlink# ipmitool raw 0x2e 0x80 0x13 0x5f 0x00 0 0x01 3
 13 5f 00
root@adlink-Default-string:/home/adlink# ipmitool raw 0x2e 0x81 0x13 0x5f 0x00 0
 13 5f 00 01 00 03
root@adlink-Default-string:/home/adlink#
root@adlink-Default-string:/home/adlink#
root@adlink-Default-string:/home/adlink# ipmitool raw 0x2e 0x80 0x13 0x5f 0x00 0 0x00
 13 5f 00
root@adlink-Default-string:/home/adlink# ipmitool raw 0x2e 0x81 0x13 0x5f 0x00 0
 13 5f 00 00 01 01
root@adlink-Default-string:/home/adlink#
root@adlink-Default-string:/home/adlink# ipmitool raw 0x2e 0x80 0x13 0x5f 0x00 0 0x02 4
 13 5f 00
root@adlink-Default-string:/home/adlink# ipmitool raw 0x2e 0x81 0x13 0x5f 0x00 0
 13 5f 00 02 04 04
root@adlink-Default-string:/home/adlink#
root@adlink-Default-string:/home/adlink#
root@adlink-Default-string:/home/adlink# ipmitool raw 0x2e 0x80 0x13 0x5f 0x00 0 0x00
 13 5f 00
root@adlink-Default-string:/home/adlink# ipmitool raw 0x2e 0x81 0x13 0x5f 0x00 0
 13 5f 00 00 01 04
root@adlink-Default-string:/home/adlink# ipmitool raw 0x2e 0x81 0x13 0x5f 0x00 0
 13 5f 00 00 01 01
```

Setting Fan to Manual Mode

Setting Fan to local control Mode

Setting Minimum Fan Level Mode

Setting Fan to local control Mode

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6.3.2.2 Sensor Information

The ipmitool command is used to retrieve sensor information, allowing system users to monitor various hardware sensors within the server. These sensors can include temperature, voltage, fan speed, and other key operating metrics.

List sensor information using ipmitool command:

Command:

```
ipmitool sensor
ipmitool sensor list
```

Return Details:

Return Details	Description
Sensor Name	Identifies the sensor.
Reading	The current value or status reported by the sensor.
Units	The measurement units for the sensor reading.
Status	Indicates the operational status of the sensor.
Lower/Upper Thresholds	The predefined limits for the sensor values, indicating warning or critical conditions.

Example:

```
root@adlink-Default-string:/home/adlink# ipmitool sensor list
P12V_PSU         | 12.230     | Volts       | ok    | 10.800    | 11.160    | 11.400    | 12.600    | 12.840    | 13.200
P12V_AUX         | 12.200     | Volts       | ok    | 10.800    | 11.160    | 11.400    | 12.600    | 12.840    | 13.200
P3V3             | 3.315      | Volts       | ok    | 2.970     | 3.069     | 3.135     | 3.465     | 3.531     | 3.630
P5V              | 5.120      | Volts       | ok    | 4.500     | 4.650     | 4.750     | 5.250     | 5.350     | 5.500
PVNN_PCH_AUX     | 0.905      | Volts       | ok    | 0.810     | 0.837     | 0.855     | 0.941     | 0.963     | 0.990
P1V05_PCH_AUX    | 1.057      | Volts       | ok    | 0.945     | 0.977     | 0.998     | 1.082     | 1.124     | 1.155
P1V8_AUX         | 1.816      | Volts       | ok    | 1.620     | 1.674     | 1.728     | 1.864     | 1.926     | 1.980
P3V_BAT          | 2.998      | Volts       | ok    | 2.002     | 2.302     | 2.500     | 3.148     | 3.208     | 3.298
PVCCIN_CPU       | 1.813      | Volts       | ok    | 1.441     | 1.489     | 1.519     | 1.891     | 1.927     | 1.981
P0V8_E810        | 0.822      | Volts       | ok    | 0.720     | 0.744     | 0.760     | na        | na        | 0.880
PVCCINFAON       | 1.090      | Volts       | ok    | 0.856     | 0.900     | 0.930     | 1.130     | 1.150     | 1.180
P3V3_AUX         | 3.300      | Volts       | ok    | 2.970     | 3.069     | 3.135     | 3.465     | 3.531     | 3.630
PVCCFA_EHV_FIVRA  | 1.812      | Volts       | ok    | 1.620     | 1.674     | 1.710     | 1.890     | 1.926     | 1.980
P0V9_E810        | 0.888      | Volts       | ok    | 0.810     | 0.837     | 0.855     | 0.945     | 0.963     | 0.990
PVCCD_HV         | 1.124      | Volts       | ok    | 0.990     | 1.030     | 1.050     | 1.192     | 1.220     | 1.270
P12V_S3_DIMM     | 12.060     | Volts       | ok    | 10.800    | 11.160    | 11.400    | 12.600    | 12.840    | 13.200
PCIE_Outlet_Temp | 27.000     | degrees C   | ok    | na        | na        | na        | 55.000    | 60.000    | 65.000
CPU_Outlet_Temp  | 33.000     | degrees C   | ok    | na        | na        | na        | na        | na        | na
SYS_Inlet_Temp   | 28.000     | degrees C   | ok    | na        | na        | na        | na        | na        | na
HDD_BP_Temp      | 22.000     | degrees C   | ok    | na        | na        | na        | 47.000    | 51.000    | 55.000
CPU_Temp         | 37.000     | degrees C   | ok    | na        | na        | na        | 91.000    | 95.000    | 99.000
CPU_TJMAX        | 97.000     | degrees C   | ok    | na        | na        | na        | na        | na        | na
PCH_Temp         | 31.000     | degrees C   | ok    | na        | na        | na        | na        | na        | na
DIMM_A1_Temp     | na         | degrees C   | na    | na        | na        | na        | 106.000   | 116.000   | 125.000
DIMM_B1_Temp     | na         | degrees C   | na    | na        | na        | na        | 106.000   | 116.000   | 125.000
DIMM_C1_Temp     | na         | degrees C   | na    | na        | na        | na        | 106.000   | 116.000   | 125.000
DIMM_E1_Temp     | 31.000     | degrees C   | ok    | na        | na        | na        | 106.000   | 116.000   | 125.000
DIMM_G1_Temp     | na         | degrees C   | na    | na        | na        | na        | 106.000   | 116.000   | 125.000
DIMM_H1_Temp     | na         | degrees C   | na    | na        | na        | na        | 106.000   | 116.000   | 125.000
ACPI_Power       | 0x0        | discrete    | 0x0180| na        | na        | na        | na        | na        | na
```

Other ipmitool Commands Related to Sensor Information

Below is a table summarizing additional ipmitool commands pertinent to sensor management and monitoring:

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Command Element	Description
ipmitool sdr list	Lists all Sensor Data Records (SDR) in a compact format.
ipmitool sensor get <sensor name>	Retrieves detailed information for a specific sensor.
ipmitool sensor thresh <sensor name>	Displays the threshold values for a specific sensor.
ipmitool sdr elist all	Lists all Sensor Data Records (SDR) in an extended format, providing more details.
ipmitool sensor thresh <sensor name> <thresh setting> <value>	Sets a specific threshold value for a sensor, such as upper or lower limits.

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6.3.2.3 Power Control

Using ipmitool commands, you can effectively control the power mode, check the status of the power supply unit (PSU), and view its output power. This includes viewing and setting PSU redundancy modes.

6.3.2.3.1 Redundancy Mode

Changing this mode with ipmitool commands directly affects the Power LED's status. The LED's behavior—solid, blinking, or off—visually indicates the current redundancy setting. For understanding these LED states, refer to *6.2.4 Power LED*.

Get PSU Redundancy Mode

Command:
(NetFn = 2Eh, Cmd = 59h)

```
ipmitool raw 0x2e 0x59 0x13 0x5f 0x00 <PSU Number>
```

	Byte	Data Field
Request Data	1~3	ADLINK Manufacturer ID - 005F13h, LS byte first.
	4	PSU Number: Start from 1.
Response Data	1	Completion Code
	2~4	ADLINK Manufacturer ID - 005F13h, LS byte first.
	5	PSU redundancy mode.

Set PSU Redundancy Mode

Command:
(NetFn = 2Eh, Cmd = 58h)

```
ipmitool raw 0x2e 0x58 0x13 0x5f 0x00 <PSU Number> <Redundancy Mode>
```

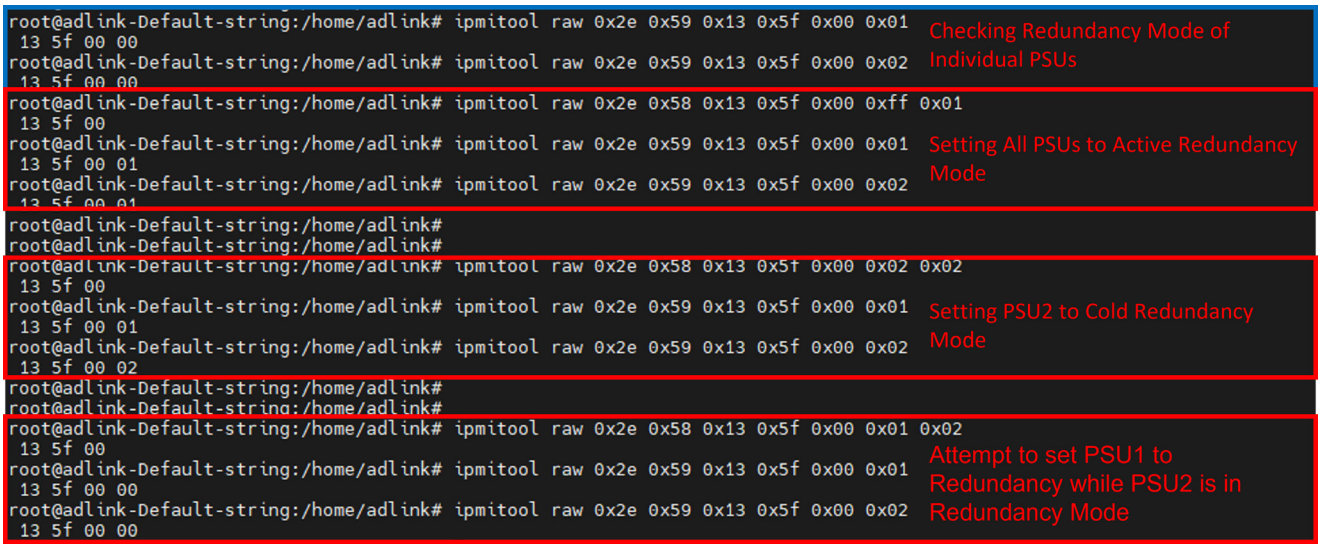
	Byte	Data Field
Request Data	1~3	ADLINK Manufacturer ID - 005F13h, LS byte first.
	4	PSU Number. 0x1 -> PSU1 0x2 -> PSU2 0x3 -> PSU3 ... 0xFE -> PSU254 0xFF -> all PSUs are set together.
	5	Redundancy Mode: Set PSU redundancy mode. 0x00: Standard redundancy (default power-on state). 0x01: Cold redundancy active. 0x02 - 0x05: Various levels of cold standby. 0x06 - 0xFF: Reserved for future use or manufacturer-specific modes.
Response Data	1	Completion Code

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Byte	Data Field
2~4	ADLINK Manufacturer ID - 005F13h, LS byte first.

Example:

This example shows using ipmitool to manage PSU redundancy modes in a server. It covers checking PSU statuses, changing their redundancy modes, and seeing how the system responds to these changes.



Note:
Both PSUs in redundancy mode is not a valid configuration, the system reverts all PSUs to the default mode.

6.3.2.3.2 Power Supply Reading

This section explains two methods to read power consumption data from a server's PSUs using ipmitool.

Method 1: Using ipmitool sensor list
Refer to *6.13.2 Sensor Information* for details on using ipmitool sensor list to read PSU power metrics.

Method 2: Using ipmitool dcmi Command

Command:

```
ipmitool dcmi power reading [sample time]
```

With sample time
The sample time parameter determines the length of time over which the power readings are averaged or analyzed, which include:
5_sec, 15_sec, 30_sec, 1_min, 3_min, 7_min, 15_min, 30_min, and 1_hour.

Without sample time

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If the sample time parameter is omitted, the command will automatically default to providing power readings that encompass the entire duration from the system's last startup to the present time.

This command is used to get detailed power readings from the server's PSU.

Return Details	Description
Instantaneous Power Reading	Shows the current power usage in Watts.
Minimum During Sampling Period	The lowest power usage recorded during the period.
Maximum During Sampling Period	The highest power usage recorded during the period.
Average Power Reading Over Sample Period	Average power usage over the entire period.
IPMI Timestamp	Timestamp of the reading.
Sampling Period	Duration of the power reading sample.
Power Reading State	Current state of the power reading.

Example:

```
root@adlink-Default-string:/home/adlink# ipmitool dcmi power reading

    Instantaneous power reading:                   88 Watts
    Minimum during sampling period:                84 Watts
    Maximum during sampling period:                96 Watts
    Average power reading over sample period:      80 Watts
    IPMI timestamp:                           Thu Jan 18 16:50:55 2024
    Sampling period:                          00004473 Seconds.
    Power reading state is:                   activated
```

General Power Reading

```
root@adlink-Default-string:/home/adlink# ipmitool dcmi power reading 0

Invalid sample time. Valid times are:
    5_sec
    15_sec
    30_sec
    1_min
    3_min
    7_min
    15_min
    30_min
    1_hour
 |  |  |  |  |  |  |  |
```

Viewing Available Parameters

```
root@adlink-Default-string:/home/adlink# ipmitool dcmi power reading 5_sec

    Instantaneous power reading:                  164 Watts
    Minimum during sampling period:                88 Watts
    Maximum during sampling period:               164 Watts
    Average power reading over sample period:     148 Watts
    IPMI timestamp:                           Thu Jan 18 16:51:17 2024
    Sampling period:                          5_sec
    Power reading state is:                   activated
```

Reading Power Over 5 Seconds

```
root@adlink-Default-string:/home/adlink# ipmitool dcmi power reading 15_min

    Instantaneous power reading:                   92 Watts
    Minimum during sampling period:                84 Watts
    Maximum during sampling period:               164 Watts
    Average power reading over sample period:      88 Watts
    IPMI timestamp:                           Thu Jan 18 16:51:29 2024
    Sampling period:                          15_min
    Power reading state is:                   activated
```

Reading Power Over 15 Minutes

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6.3.2.3.3 Chassis Power Reboot Reasons

To understand the reasons behind a chassis reboot, ipmitool provides a specific command that reveals the cause of the last system restart.

Command:

```
ipmitool chassis restart  cause
```

Return Details:

Restart Cause	Description
OEM	System restarts from within the operating system.
Chassis Power Control Command	The system was rebooted using a web interface or an ipmitool command.
Power-up via Pushbutton	Suggests that the system was restarted using the power button on the front panel.

6.3.2.3.4 Power Control Method

Using ipmitool command, it can control the power, such as power on, power off, power cycle, power reset.

Command:

```
ipmitool power <on | off | cycle | reset>
```

Command Element	Description
ipmitool power on	Power on the chassis.
ipmitool power off	Power off the chassis.
ipmitool power cycle	Power off the chassis and power on the chassis.
ipmitool power reset	Restart the chassis.

Example:

```
root@bmc:/# ipmitool power on
Chassis Power Control: Up/On

root@bmc:/# ipmitool power off
Chassis Power Control: Down/Off

root@bmc:/# ipmitool power cycle
Chassis Power Control: Cycle

root@bmc:/# ipmitool power reset
Chassis Power Control: Reset
```


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6.3.2.4 LED Control

This section details how to use ipmitool commands for controlling the operational status of LEDs on a server.

6.3.2.4.1 OEM Command

Servers come with OEM commands to control certain LEDs, including the USR LED (Yellow, HDD shared), Alert LED (Red), and Health LED (Green).

Get LED Status

Command:

(NetFn = 2Eh, Cmd = 11h)

```
ipmitool raw 0x2e 0x11 0x13 0x5f 0x00 <LED ID>
```

	Byte	Data Field
Request Data	1~3	ADLINK Manufacturer ID - 005F13h, LS byte first.
	4	LED ID: 02h = USR LED (Yellow, HDD shared) 03h = Alert LED (Red) 04h = Health LED (Green)
Response Data	1	Completion Code
	2~4	ADLINK Manufacturer ID - 005F13h, LS byte first.
	5	LED ID: 02h = USR LED (Yellow, HDD shared) 03h = Alert LED (Red) 04h = Health LED1 (Green) Other values: reserved
	6	LED Function: 00h = LED OFF override. 01h - 1Eh = LED BLINKING override. The off duration is specified by the value of this byte, and the on duration is specified by the value of byte 7. Both values specify the time in hundreds of milliseconds (100 ms-3 s). 1Fh = LED is in Local Control state 20h-FEh Reserved FFh = LED ON override
	7	On-duration: The LED on-time in hundreds of milliseconds if (01h Byte 6 1Eh) and ignored otherwise set to 0h.

Set LED Status

Command:

(NetFn = 2Eh, Cmd = 10h)

```
ipmitool raw 0x2e 0x10 0x13 0x5f 0x00 <LED ID> <LED Function> <On Duration>
```

	Byte	Data Field
Request Data	1~3	ADLINK Manufacturer ID - 005F13h, LS byte first.
	4	LED ID: 02h = USR LED (Yellow, HDD shared)

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	Byte	Data Field
		03h = Alert LED (Red) 04h = Health LED (Green) Other values: reserved
	5	LED Function: 00h = LED OFF override. 01h - 1Eh = LED BLINKING override. The off duration is specified by the value of this byte, and the on duration is specified by the value of byte 5. Both values specify the time in hundreds of milliseconds (100 ms-3 s). 1Fh = LED state is restored to Local Control state 20h-FEh Reserved FFh = LED ON override
	6	On Duration: The LED on-time in hundreds of milliseconds if (01h <=Byte 6<=1Eh) and ignored otherwise. Otherwise, this field is ignored and is set to 0h.
Response Data	1	Completion Code
	2~4	ADLINK Manufacturer ID - 005F13h, LS byte first.

Note:
USR LED: By default, it is not controlled by the BMC and acts as an HDD activity indicator. Manual control requires hardware changes (e.g., dip switch adjustments).

Example:

```
root@adlink-Default-string:/# ipmitool raw 0x2e 0x11 0x13 0x5f 0x00 0x02
 13 5f 00 02 1f
root@adlink-Default-string:/# ipmitool raw 0x2e 0x11 0x13 0x5f 0x00 0x03
 13 5f 00 03 1f
root@adlink-Default-string:/# ipmitool raw 0x2e 0x11 0x13 0x5f 0x00 0x04
 13 5f 00 04 1f
```
Reading Initial LED States

```
root@adlink-Default-string:/#
root@adlink-Default-string:/# ipmitool raw 0x2e 0x10 0x13 0x5f 0x00 0x02 0x00
 13 5f 00
root@adlink-Default-string:/# ipmitool raw 0x2e 0x10 0x13 0x5f 0x00 0x03 0x00
 13 5f 00
root@adlink-Default-string:/# ipmitool raw 0x2e 0x11 0x13 0x5f 0x00 0x02
 13 5f 00 02 00
root@adlink-Default-string:/# ipmitool raw 0x2e 0x11 0x13 0x5f 0x00 0x03
 13 5f 00 03 00
```
Turning Off USR LED and Alert LED

```
root@adlink-Default-string:/#
root@adlink-Default-string:/# ipmitool raw 0x2e 0x10 0x13 0x5f 0x00 0x03 0x05 0x05
 13 5f 00
root@adlink-Default-string:/# ipmitool raw 0x2e 0x11 0x13 0x5f 0x00 0x03
 13 5f 00 03 05 05
```
Setting Alert LED to Blink
Blink 0.5 sec; Stay lit 0.5 sec

```
root@adlink-Default-string:/#
root@adlink-Default-string:/# ipmitool raw 0x2e 0x10 0x13 0x5f 0x00 0x04 0x0a 0x05
 13 5f 00
root@adlink-Default-string:/# ipmitool raw 0x2e 0x11 0x13 0x5f 0x00 0x04
 13 5f 00 04 0a 05
```
Setting Health LED to Blink
Blink 1 sec; Stay lit 0.5 sec

```
root@adlink-Default-string:/#
root@adlink-Default-string:/# ipmitool raw 0x2e 0x10 0x13 0x5f 0x00 0x02 0x1f
 13 5f 00
root@adlink-Default-string:/# ipmitool raw 0x2e 0x10 0x13 0x5f 0x00 0x03 0x1f
 13 5f 00
root@adlink-Default-string:/# ipmitool raw 0x2e 0x10 0x13 0x5f 0x00 0x04 0x1f
 13 5f 00
root@adlink-Default-string:/# ipmitool raw 0x2e 0x11 0x13 0x5f 0x00 0x02
 13 5f 00 02 1f
root@adlink-Default-string:/# ipmitool raw 0x2e 0x11 0x13 0x5f 0x00 0x03
 13 5f 00 03 1f
root@adlink-Default-string:/# ipmitool raw 0x2e 0x11 0x13 0x5f 0x00 0x04
 13 5f 00 04 1f
```
Restoring Initial LED States

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6.3.2.4.2 ipmitool for UID LED

The control of the UID LED can be managed using standard IPMI commands through ipmitool. These commands allow for the activation of the UID LED for a specified duration or indefinitely.

Command:

```
ipmitool chassis identify [<second> | force]
```

seconds: Specifies the duration for which the UID LED should remain active. The duration is set in seconds.
force: This parameter keeps the UID LED on indefinitely, without any time limit.

If no parameter is provided, the UID LED will default to a 15-second active period.

Example:

```
root@bmc:/# ipmitool chassis identify
Activates the UID LED for 15 seconds, which is the default time period.

root@bmc:/# ipmitool chassis identify 50
Turns on the UID LED for 50 seconds.

root@bmc:/# ipmitool chassis identify 100
Turns on the UID LED for 100 seconds.

root@bmc:/# ipmitool chassis identify force
Keeps the UID LED on.
```

Note:
The UID LED's behavior controlled by ipmitool commands can be overridden by physical interactions with the server's chassis, and vice versa.

Command Overrides Physical Button:
If the UID LED is activated using the ipmitool chassis identify command and then the physical UID button on the server is pressed, the LED will turn off, overriding the command's action.

Physical Button Overrides Command:
Conversely, if the UID LED is turned on using the physical button and subsequently a command is executed to change its state (e.g., ipmitool chassis identify 0 to turn it off), the command will take precedence and alter the LED's state as specified.

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6.3.2.5 Network Configuration

6.3.2.5.1 Get the current configuration of the management port

```
ipmitool lan print [<channel number>]
```

Note: *To determine on which channel the LAN interface is located, issue the 'ipmitool channel info number' command until you come across a valid 802.3 LAN channel.*

Example:

```
root@bmc:/# ipmitool lan print 8
Set in Progress         : Set Complete
Auth Type Support       :
Auth Type Enable        : Callback :
                        : User     :
                        : Operator :
                        : Admin    :
                        : OEM      :
IP Address Source       : DHCP Address
IP Address              : 192.168.1.12
Subnet Mask             : 255.255.255.0
MAC Address             : 00:30:64:a8:7b:04
SNMP Community String   : AMI
IP Header               : TTL=0x40 Flags=0x40 Precedence=0x00 TOS=0x10
BMC ARP Control         : ARP Responses Enabled, Gratuitous ARP Disabled
Gratituous ARP Intrvl   : 1.0 seconds
Default Gateway IP      : 192.168.1.1
Default Gateway MAC     : 50:7b:9d:25:56:a1
Backup Gateway IP       : 0.0.0.0
Backup Gateway MAC      : 00:00:00:00:00:00
802.1q VLAN ID          : Disabled
802.1q VLAN Priority    : 0
RMCP+ Cipher Suites     : 3,17
Cipher Suite Priv Max   : XXXaXXXXXXXaXXX
                        :     X=Cipher Suite Unused
                        :     c=CALLBACK
                        :     u=USER
                        :     o=OPERATOR
                        :     a=ADMIN
                        :     O=OEM
Bad Password Threshold  : 0
Invalid password disable: no
Attempt Count Reset Int.: 0
User Lockout Interval   : 0
```

6.3.2.5.2 Set the IP address source

```
ipmitool lan set <channel number> ipsrc <source>
```

source:

- ✧ static: manually configured static IP address
- ✧ dhcp: address obtained by BMC running DHCP

6.3.2.5.3 Set the IP address

```
ipmitool lan set <channel number> ipaddr <x.x.x.x>
```

Example:

```
root@bmc:/# ipmitool lan set 8 ipaddr 192.168.1.100
Setting LAN IP Address to 192.168.1.100
```


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6.3.2.5.4 Set the netmask

```
ipmitool lan set <channel number> netmask <x.x.x.x>
```

6.3.2.5.5 Set the default gateway IP address

```
ipmitool lan set <channel number> defgw ipaddr <x.x.x.x>
```

Note: *Make sure the gateway IP address is pingable.*

6.3.2.5.6 Set network configuration via BIOS

Enter **BIOS Setup -> Server Mgmt -> BMC network configuration**.

```
                              Aptio Setup - AMI
                                                                  Server Mgmt
/-----------------------------------------------------+-------------------------\
|  --BMC network configuration--                     ^|Select to configure LAN ^|
|  **********************                            *|channel parameters      *|
|  Configure IPv4 support                            *|statically or           *|
|  **********************                            *|dynamically(by BIOS or  *|
|                                                    +|BMC). Unspecified       *|
|  Lan channel 1                                     +|option will not modify  *|
|  Configuration Address    [Unspecified]            +|any BMC network         +|
|  Current Configuration    DynamicAddressBmcDhcp    +|parameters during BIOS  v|
|  Station IP address       0.0.0.0                  +|                         |
|  Subnet mask              0.0.0.0                  +|-------------------------|
|  Station MAC address      00-30-64-66-77-88        +|><: Select Screen        |
|  Router IP address        0.0.0.0                  +|^v: Select Item          |
|  Router MAC address       00-00-00-00-00-00        +|Enter: Select            |
|                                                    +|+/-: Change Opt.         |
|  Lan channel 2                                     +|F1: General Help         |
|  Configuration Address    [Unspecified]            +|F8: Previous Values      |
|  Current Configuration    DynamicAddressBmcDhcp    +|F9: Optimized Defaults   |
|  Station IP address       192.168.1.12             v|F10: Save & Exit         |
|                                                     |ESC: Exit                |
\-----------------------------------------------------+-------------------------/
                    Version 2.22.1289 Copyright (C) 2024 AMI
```

```
                              Aptio Setup - AMI
                                                                  Server Mgmt
/-----------------------------------------------------+-------------------------\
|  --BMC network configuration--                     ^|Select to configure LAN ^|
|  **********************                            *|channel parameters      *|
|  Configure IPv4 support                            *|statically or           *|
|  **********************                            *|dynamically(by BIOS or  *|
|                                                    +|BMC). Unspecified       *|
|  Lan channel 1                                     +|option will not modify  *|
|  Configuration Address    [Static]                 +|any BMC network         +|
|  Station IP address       188.188.1.2              +|parameters during BIOS  v|
|  Subnet mask              255.255.255.0            +|                         |
|  Station MAC address      00-30-64-66-77-88        +|-------------------------|
|  Router IP address        188.188.1.1              +|><: Select Screen        |
|  Router MAC address       00-00-00-00-00-00        +|^v: Select Item          |
|                                                    +|Enter: Select            |
|  Lan channel 2                                     +|+/-: Change Opt.         |
|  Configuration Address    [Unspecified]            +|F1: General Help         |
|  Current Configuration    DynamicAddressBmcDhcp    +|F8: Previous Values      |
|  Station IP address       192.168.1.12             +|F9: Optimized Defaults   |
```


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```
|  Subnet mask              255.255.255.0          v|F10: Save & Exit         |
|                                                   |ESC: Exit                 |
\---------------------------------------------------+--------------------------/
                    Version 2.22.1289 Copyright (C) 2024 AMI
```

BIOS Item	Options	Description
Configuration Address source	Static DynamicBmcDhcp	Set the IP address source
Station IP address	x.x.x.x	Set the IP address
Subnet mask	x.x.x.x	Set the netmask
Router IP address	x.x.x.x	Set the default gateway IP address
Router MAC address	xx:xx:xx:xx:xx:xx	Set the default gateway MAC address

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6.3.2.6 x86 Watchdog Configuration

The x86 watchdog is used to guard the x86 system health.

6.3.2.6.1 Configure the watchdog via BIOS

Enter **BIOS Setup -> Server Mgmt**.

```
                              Aptio Setup - AMI
    Main  Advanced  Platform Configuration  Socket Configuration  Server Mgmt  >
/-------------------------------------------------+-------------------------\
|  BMC Self Test Status     PASSED                ^|If enabled, starts a    ^|
|  BMC Device ID            32                    *|BIOS timer which can    *|
|  BMC Device Revision      81                    *|only be shut off by     *|
|  BMC Firmware Revision    1.03                  *|Management Software      *|
|  IPMI Version             2.0                   *|after the OS loads.     *|
|  IPMI BMC Interface       KCS                   *|Helps determine that    *|
|                                                 *|the OS successfully     +|
|  BMC Support              [Enabled]             *|loaded or follows the   v|
|  IPMI Interface Type      [Kcs Interface]       *|                         |
|  Wait For BMC             [Enabled]             *|-------------------------|
|  FRB-2 Timer              [Enabled]             *|><: Select Screen        |
|  FRB-2 Timer timeout      6                     *|^v: Select Item          |
|  FRB-2 Timer Policy       [Do Nothing]          *|Enter: Select            |
|  OS Watchdog Timer        [Enabled]             *|+/-: Change Opt.         |
|  OS Wtd Timer Timeout     10                    *|F1: General Help         |
|  OS Wtd Timer Policy      [Reset]               *|F8: Previous Values      |
|> Bmc self test log                              +|F9: Optimized Defaults   |
|> BMC network configuration                      v|F10: Save & Exit         |
|                                                   |ESC: Exit               |
\-------------------------------------------------+-------------------------/
                  Version 2.22.1289 Copyright (C) 2024 AMI
```

BIOS Item	Options	Description
FRB-2 Timer	Enabled Disabled	Enable or disable FRB-2 Watchdog Timer.
FRB-2 Timer timeout	Number	Set FRB-2 Watchdog Timer expiration time. Unit is minutes. Not available if FRB-2 Watchdog Timer is disabled.
FRB-2 Timer Policy	Do Nothing Reset Power Down Power Cycle	Configure how the system should respond if the FRB-2 Watchdog Timer expires. Not available if FRB-2 Watchdog Timer is disabled.
OS Watchdog Timer	Enabled Disabled	Enable or disable OS Watchdog Timer.
OS Wtd Timer Timeout	Number	Set OS Watchdog Timer expiration time. Unit is minutes. Not available if OS Watchdog Timer is disabled.
OS Wtd Timer Policy	Do Nothing Reset Power Down Power Cycle	Configure how the system should respond if the OS Watchdog Timer expires. Not available if OS Watchdog Timer is disabled.

6.3.2.6.2 Get Watchdog Timer

```
ipmitool mc watchdog get
```


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Example:

```
root@bmc:/# ipmitool mc watchdog get
Watchdog Timer Use:     OS Load (0x43)
Watchdog Timer Is:      Started/Running
Watchdog Timer Actions: Power Down (0x02)
Pre-timeout interval:   0 seconds
Timer Expiration Flags: 0x00
Initial Countdown:      300 sec
Present Countdown:      229 sec
```

6.3.2.6.3 Set Watchdog Timer

This command is used for initializing and configuring the watchdog timer.

(NetFn = 06h, Cmd = 24h)

ipmitool raw 0x06 0x24 <Timer Use> <Timer Actions> <Pre-timeout interval> <Timer Expiration Flags> <Initial Countdown, lsbyte> <Initial Countdown, msbyte>

	Byte	Data Field
Request Data	1	Timer Use [7] - 1b [6] - 1b = don't stop timer on 'Set Watchdog Timer' command new parameters take effect immediately. If timer is already running, countdown value will get set to given value ahs countdown will continue from that point. If timer is already stopped, it will remain stopped. If the pre-timeout interrupt bit is set, it will get cleared. 0b = timer stops automatically when 'Set Watchdog Timer' command is received [5:3] - reserved [2:0] - timer use (logged on expiration when "don't log" bit = 0b) 000b = reserved 001b = BIOS FRB2 010b = BIOS/POST 011b = OS Load 100b = SMS/OS 101b = OEM 110b - 111b = reserved
	2	Timer Actions [7] - reserved [6:4] - pre-timeout interrupt (logged on expiration when "don't log" bit = 0b) 000b = none 001b = SMI (optional) 010b = NMI / Diagnostic Interrupt (optional) 011b = Messaging Interrupt 100b - 111b = reserved [3] - reserved [2:0] - timeout action 000b = no action 001b = Hard Reset 010b = Power Down 011b = Power Cycle 100b - 111b = reserved
	3	Pre-timeout interval in seconds.
	4	Timer Use Expiration flags clear (0b = leave alone, 1b = clear timer use expiration bit)

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	Byte	Data Field
		[7] - reserved [6] - reserved [5] - OEM [4] - SMS/OS [3] - OS Load [2] - BIOS/POST [1] - BIOS FRB2 [0] - reserved
	5	Initial countdown value, lsbyte (100 ms/count)
	6	Initial countdown value, msbyte
Response Data	1	Completion Code

Example:

```
root@bmc:/# ipmitool raw 0x06 0x24 0x04 0x02 0x00 0x10 0xb8 0x0b

root@bmc:/# ipmitool mc watchdog get
Watchdog Timer Use:     SMS/OS (0x04)
Watchdog Timer Is:      Stopped
Watchdog Timer Actions: Power Down (0x02)
Pre-timeout interval:   0 seconds
Timer Expiration Flags: 0x00
Initial Countdown:      300 sec
Present Countdown:      300 sec
```

6.3.2.6.4 Reset Watchdog Timer

This command is used for starting and restarting the Watchdog Timer from the initial countdown value that was specified in the 'Set Watchdog Timer' command.

```
ipmitool mc watchdog reset
```

6.3.2.6.5 Shutoff Watchdog Timer

```
ipmitool mc watchdog off
```


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6.3.2.7 BIOS POST Code

6.3.2.7.1 Read Latest BIOS POST Code

(NetFn = 2Eh, Cmd = 92h)

```
ipmitool raw 0x2e 0x92 0x13 0x5f 0x00
```

	Byte	Data Field
Request Data	1~3	ADLINK Manufacturer ID - 005F13h, LS byte first.
Response Data	1	Completion Code
	2~4	ADLINK Manufacturer ID - 005F13h, LS byte first.
	5	Latest BIOS POST Code

Example:

```
root@bmc:/# ipmitool raw 0x2e 0x92 0x13 0x5f 0x00
13 5f 00 e3
```

6.3.2.7.2 Read BIOS POST Codes

(NetFn = 32h, Cmd = 73h)

```
ipmitool raw 0x32 0x73 <Code>
```

	Byte	Data Field
Request Data	1	Code: read old/current data 00h = Current BIOS POST Codes 01h = Previous BIOS POST Codes
Response Data	1	Completion Code
	2~n	BIOS POST Codes

Example:

```
root@bmc:/# ipmitool raw 0x32 0x73 0x00
 50 10 01 02 03 04 05 06 03 03 23 23 00 02 7f 48
 0e 49 4a 4d 15 52 55 19 f4 31 00 a1 a3 a3 a7 a9
 a9 a2 a2 a7 a7 a7 a9 a9 a8 aa ae e0 e0 e0 e1 e4
 e3 e5 af b0 b5 7e cf 7e 73 cd b0 7e c1 70 b1 b1
 7e 7e c2 7e 7e 7e b1 b1 b1 b6 7e b4 b8 b2 c6 b3
 b3 b6 b6 b6 b0 b7 b6 b6 7e 7e 7e 7e b7 b7 b7 b7
 7e 70 70 70 70 7e b7 b7 be be 7e 7e d2 7e d2 d6
 70 b9 7e cc b7 b7 b7 b7 b8 b8 d7 da db ba 70 70
 7e 70 70 7e 70 7e 7e cb bb bb bb bb bb bb bb bb
 bb bb 7e 7e d0 7e d0 7e d0 7e d1 d1 7e 70 7e b7
 ca ca dc 7e cc bc bc bc bc bc ce c6 7e bf af af
 e7 e9 eb ec ed ee 03 23 02 22 00 02 7f 48 0e 49
 4a 4d 15 52 55 02 22 00 04 06 0b 0c 0d 15 7f 00
 7f 40 41 42 47 4f 33 60 61 68 70 90 91 92 94 94
 94 94 94 94 94 94 94 94 94 94 95 96 ef 92 92 92
 92 92 92 99 91 92 92 92 92 92 92 92 97 98 9d 9a
 9c b4 b4 b4 b4 b4 b4 b4 b4 98 b4 b4 b4 b4 b4 b4
 92 a0 a2 a2 a2 a2 a2 a0 a2 a2 a2 a2 99 92 92 92
 92 92 92 ad af b0 b1 b1 84 ee aa e3 e3 e3
```


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6.3.2.8 MAC Address Burning

6.3.2.8.1 Burning ethx MAC Address Preparation

(NetFn = 0Ch, Cmd = 01h)

```
ipmitool raw 0x0c 0x01 <eth0|eth1> 0xc2
```

	Byte	Data Field
Request Data	1	Which eth? 0x01 is for eth0 0x08 is for eth1
	2	0xC2 is for burning MAC preparation
Response Data	1	Completion Code

Example:

```
root@bmc:/# ipmitool raw 0x0c 0x01 0x01 0xc2
```

6.3.2.8.2 Burning ethx MAC Address

(NetFn = 0Ch, Cmd = 01h)

```
ipmitool raw 0x0c 0x01 <eth0|eth1> 0x05 <MAC address>
```

	Byte	Data Field
Request Data	1	Which eth? 0x01 is for eth0 0x08 is for eth1
	2	0x05 is for burning MAC
	3~8	Ethernet MAC address
Response Data	1	Completion Code

Example:

```
root@bmc:/# ipmitool raw 0x0c 0x01 0x01 0x05 0x00 0x30 0x64 0x11 0x22 0x33
```

Note: *Config the eth0 MAC address to run the first ipmitool command (**ipmitool raw 0x0c 0x01 0x01 0xc2**) and then execute the second ipmitool command (**ipmitool raw 0x0c 0x01 0x01 0x05 0x00 0x30 0x64 0x11 0x22 0x33**).*

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6.3.2.9 SOL

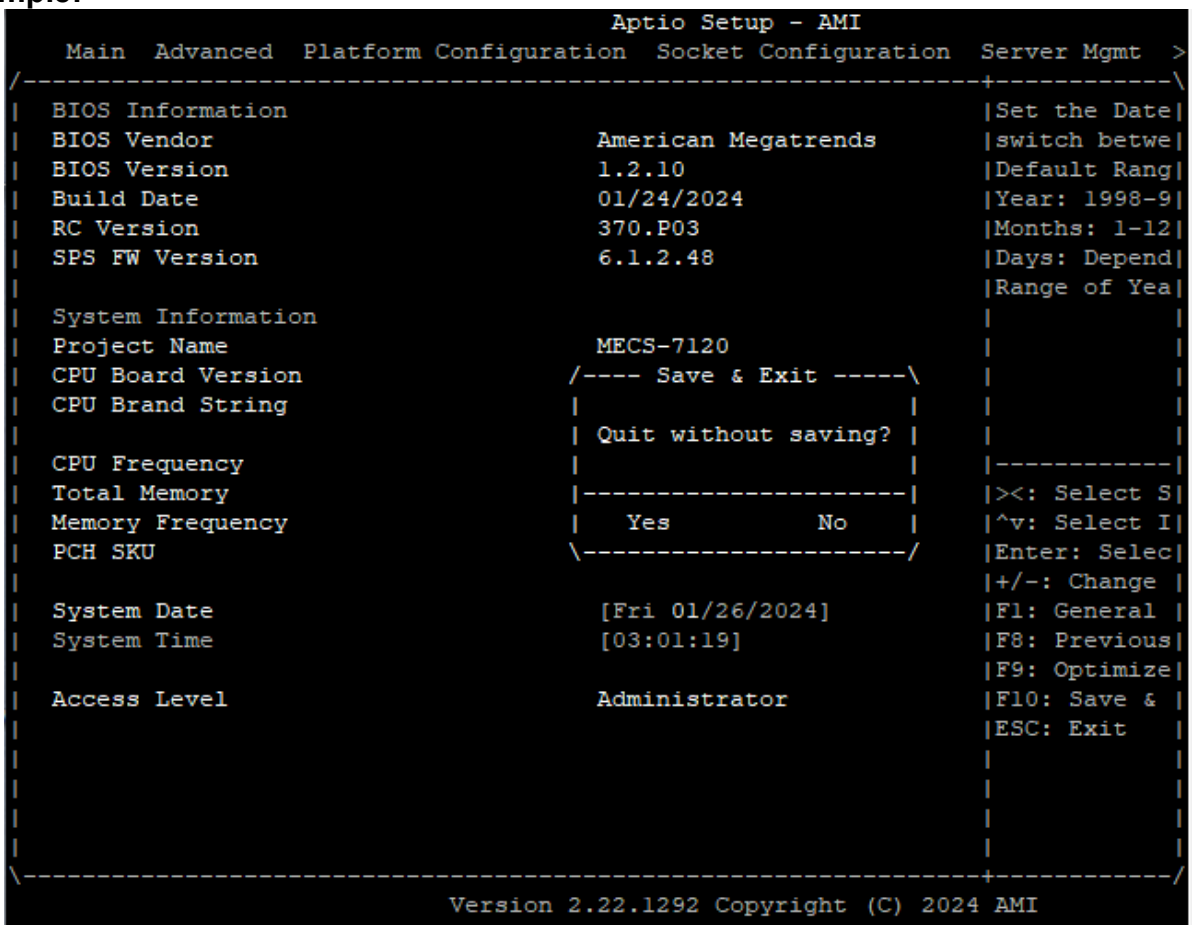
The serial over LAN (SOL) feature is very useful, and the SOL redirects the local serial interface via an IPMI session, allowing remote access to the console.

Open SOL functionality using ipmitool command:

Command:

```
ipmitool sol activate
```

Example:



Enter the "ipmitool sol activate" command on CLI to enter the SOL output window, then enter the BIOS configuration interface, and the content of the BIOS field interface will be redirected to the local terminal, as shown in the above figure.

Other ipmitool Commands Related to SOL

Below is a table summarizing additional ipmitool commands related to SOL:

Command Element	Description
ipmitool sol deactivate	Close SOL functionality
ipmitool sol info	Show SOL detailed information

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Command Element	Description
ipmitool sol set <set-in-progress | enabled | force-encryption | force-authentication | privilege-level | character-accumulate-level | character-send-threshold | retry-count | retry-interval | non-volatile-bit-rate | volatile-bit-rate> <value>	Set SOL parameter value
ipmitool sol payload <enable | disable | status>	Set SOL payload value
ipmitool sol looptest	SOL connection stress test

6.3.2.10 Firmware and Hardware Versions

Normally there should be the following firmware components on board which all have version control.

- BMC
- BIOS
- CPLD

6.3.2.10.1 Get Device ID

Besides, some of the products also provide PCB revision and hardware SKU version.
To get the information via ipmitool please refer to the following command:

```
ipmitool mc info
```

For example:

```
root@bmc:/# ipmitool mc info
Device ID                 : 32
Device Revision           : 1
Firmware Revision         : 1.03
IPMI Version              : 2.0
Manufacturer ID           : 24339
Manufacturer Name         : ADLINK Technology Inc.
Product ID                : 28960 (0x7120)
Product Name              : Unknown (0x7120)
Device Available          : yes
Provides Device SDRs      : yes
Additional Device Support :
Sensor Device
SDR Repository Device
SEL Device
FRU Inventory Device
IPMB Event Receiver
IPMB Event Generator
Chassis Device
Aux Firmware Rev Info     :
0x12
0x22
0x10
0xb3
```

BMC version:

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Refer to "**Firmware Revision**".
Please be noted that due to the fixed format of ipmitool, minor version number always takes two digits, and do not consider it as a decimal.
Such as "1.03", means the version number is "1.3".

BIOS, CPLD, PCB, SKU versions:
They are all in "**Aux Firmware Rev Info**", assign numbers to them as following

Aux Firmware Rev Info:
0x12 ➔ Byte 1
0x22 ➔ Byte 2
0x10 ➔ Byte 3
0xb3 ➔ Byte 4

Byte 1
Low 4 bits - PCB version. In this case, 0x2, means A2.
High 4 bits - SKU version. In this case, 0x1, means SKU 1.

Byte 2 and byte 3
BIOS version.
High 3 bits of byte 2 - Leading version. In this case, 0b001, for 1.
Low 5 bits of byte 2 - Major version. In this case, 0b00010, for 2.
Byte 3 - Minor version. In this case, 0x10.

Please pay special attention that **minor version** of BIOS is **always represented in hexadecimal number**.
Combined version number should be 1.2.10.

Byte 4
CPLD version. In this case, 0xb3.

6.3.2.10.2 Get CPLD Version and SKU Version

(NetFn = 2Eh, Cmd = 20h)

```
ipmitool raw 0x2e 0x20 0x13 0x5f 0x00
```

	Byte	Data Field
Request Data	1~3	ADLINK Manufacturer ID - 005F13h, LS byte first.
Response Data	1	Completion Code
	2~4	ADLINK Manufacturer ID - 005F13h, LS byte first.
	5~5+N	CPLD Version, "N" is the length of CPLD Version. Byte 5+N is 0.
	6+N~15+N	SKU Version (ASCII text).

Example:

```
root@bmc:/# ipmitool raw 0x2e 0x20 0x13 0x5f 0x00
 13 5f 00 b4 02 00 31 55 00 00 00 00 00 00 00 00
```


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CPLD Version is 02b4.
SKU Version is "31 55"(ASCII) -> "1U".

6.3.2.11 CPLD Update

```
ipmitool -z 0x3fff hpm upgrade <hpm  file> component 5 force
```

Note: *If a CPLD firmware has been uploaded, it will print "Firmware upgrade procedure failed".*

Example:

```
root@bmc:/# ipmitool -I lanplus -H 172.20.2.18 -U admin -P admin.123 -z 0x3fff hpm upgrade
outputjbc_02b4.hpm component 5 force
Setting large buffer to 16383

PICMG HPM.1 Upgrade Agent 1.0.9:

Validating firmware image integrity...OK
Performing preparation stage...
Services may be affected during upgrade. Do you wish to continue? (y/n): y
OK

Performing upgrade stage:

--------------------------------------------------------------------------------
|ID  | Name        |                    Versions                          | %  |
|    |             |      Active     |      Backup     |      File       |    |
|----|-------------|-----------------|-----------------|-----------------|----|
|*  5|CPLD         |   0.00 00000000 | ---.-- -------- |   2.04 00002002 |100%|
|    |Upload Time: 00:00             | Image Size:  454924 bytes             |
--------------------------------------------------------------------------------
(*) Component requires Payload Cold Reset

Firmware upgrade procedure successful
```


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6.4 Redfish

Redfish is a modern, RESTful API used for the management of servers, storage, and networking equipment in data centers and large-scale enterprise environments. It's designed to replace older, less efficient management interfaces with a standardized, scalable, and secure approach.

6.4.1 Network Configuration

6.4.1.1 GET - Ethernet Interface Collection

Request:

```
GET https://{{bmc_ip}}/redfish/v1/Managers/Self/EthernetInterfaces
```

Response:
The response status is 200 OK.

Example:




```
{
    "@odata.context": "/redfish/v1/$metadata#EthernetInterfaceCollection.EthernetInterfaceCollection",
    "@odata.etag": "\"1705564980\"",
    "@odata.id": "/redfish/v1/Managers/Self/EthernetInterfaces",
    "@odata.type": "#EthernetInterfaceCollection.EthernetInterfaceCollection",
    "Description": "Collection of Ethernet Interfaces for this Manager",
    "Members": [
        {
            "@odata.id": "/redfish/v1/Managers/Self/EthernetInterfaces/eth0"
        },
        {
            "@odata.id": "/redfish/v1/Managers/Self/EthernetInterfaces/eth1"
        },
        {
            "@odata.id": "/redfish/v1/Managers/Self/EthernetInterfaces/usb0"
        }
    ],
    "Members@odata.count": 3,
    "Name": "Ethernet Network Interface Collection"
}
```


6.4.1.2 GET - Ethernet Interface Instance

Request:

```
GET https://{{bmc_ip}}/redfish/v1/Managers/Self/EthernetInterfaces/{{instance}}
```


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Response:
The response status is 200 OK. The format is JSON.

Ethernet Interface Properties:

Name	Type	Read Only	Description
AutoNeg	Boolean	×	Auto negotiation of speed and duplex on this interface is enabled or not.
DHCPv4	Object	×	Refer to DHCPv4 properties.
DHCPv6	Object	×	Refer to DHCPv6 properties.
Description	String	√	
FullDuplex	Boolean	×	The value of this property shall represent the duplex status of the Ethernet connection on this interface.
HostName	String	×	DNS Hostname without any domain information. Maximum string size limit is 64. Minimum string size limit is 2.
IPv4Addresses	Array of Objects	√	Refer to IPv4 Address properties.
IPv4StaticAddresses	Array of Objects	×	Refer to IPv4 Address properties.
IPv6Addresses	Array of Objects	√	Refer to IPv6 Address properties.
IPv6StaticAddresses	Array of Objects	×	Refer to IPv6 Address properties.
IPv6DefaultGateway	String	√	
Id	String	√	
InterfaceEnabled	Boolean	×	
LinkStatus	String	√	
MACAddress	String	√	
MTUSize	Number	×	Maximum size limit is 1500. Minimum size limit is 576.
MaxIPv6StaticAddresses	Number	√	
Name	String	√	
NameServers	Array of Strings	√	
Oem	Object	√	
PermanentMACAddress	String	√	
SpeedMbps	Number	×	The current link speed of the interface in Mbps.
StatelessAddressAutoConfig	Object	×	This object shall contain the IPv4 and IPv6 Stateless Address Automatic Configuration (SLAAC) properties for this interface.
StaticNameServers	Array of Strings	×	Statically-defined set of DNS server IPv4 and IPv6 addresses.
Status	Object	√	
VLAN	Object	×	VLANId: 0~4094.

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DHCPv4 properties:

Name	Type	Read Only	Description
DHCPEnabled	Boolean	×	Determines whether DHCPv4 is enabled on this interface.

DHCPv6 properties:

Name	Type	Read Only	Description
OperatingMode	Boolean	×	This property shall control the operating mode of DHCPv6 on this interface. DHCPv6 stateful mode is used to configure addresses, and when it is enabled, stateless mode is also implicitly enabled.

IPv4 Address properties:

Name	Type	Read Only	Description
Address	String	-	IPv4 address.
AddressOrigin	String	-	IPv4 address source.
Gateway	String	-	IPv4 default gateway IP address.
SubnetMask	String	-	IPv4 netmask.

IPv6 Address properties:

Name	Type	Read Only	Description
Address	String	-	IPv6 address.
AddressOrigin	String	-	IPv6 address source.
PrefixLength	String	-	IPv6 network prefix length in bits. Max is 128.

Example:




```
{
    "@odata.context": "/redfish/v1/$metadata#EthernetInterface.EthernetInterface",
    "@odata.etag": "\"1705564980\"",
    "@odata.id": "/redfish/v1/Managers/Self/EthernetInterfaces/eth1",
    "@odata.type": "#EthernetInterface.v1_6_2.EthernetInterface",
    "AutoNeg": true,
    "DHCPv4": {
        "DHCPEnabled": true
    },
    "DHCPv6": {
        "OperatingMode": "Stateless"
    },
    "Description": "Ethernet Interface eth1",
    "FullDuplex": true,
    "HostName": "AMI003064667788",
```


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```
"IPv4Addresses": [
    {
        "Address": "172.20.2.12",
        "AddressOrigin": "DHCP",
        "Gateway": "172.20.2.1",
        "SubnetMask": "255.255.255.0"
    }
],
"IPv6Addresses": [
    {
        "Address": "fe80::230:64ff:fea1:b104",
        "AddressOrigin": "LinkLocal",
        "PrefixLength": 64
    }
],
"IPv6DefaultGateway": null,
"Id": "eth1",
"InterfaceEnabled": true,
"LinkStatus": "LinkUp",
"MACAddress": "00:30:64:A1:B1:04",
"MTUSize": 1500,
"MaxIPv6StaticAddresses": 16,
"Name": "eth1",
"NameServers": [
    "192.168.1.213",
    "192.168.1.214"
],
"Oem": {
    "Ami": {
        "@odata.type": "#AMIDNSConfiguration.v1_0_0.AMIDNSConfiguration",
        "DNSEnabled": true,
        "HostNameSetting": "Auto"
    }
},
"PermanentMACAddress": "00:30:64:A1:B1:04",
"SpeedMbps": 100,
"StatelessAddressAutoConfig": {
    "IPv4AutoConfigEnabled": false,
    "IPv6AutoConfigEnabled": false
},
"StaticNameServers": [
    null,
    null,
    null
],
"Status": {
    "Health": "OK",
    "State": "Enabled"
},
"VLAN": {
    "VLANEnable": false,
    "VLANId": 0
```


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```
    }
}
```

6.4.1.3 PATCH - Ethernet Interface Instance

Request:

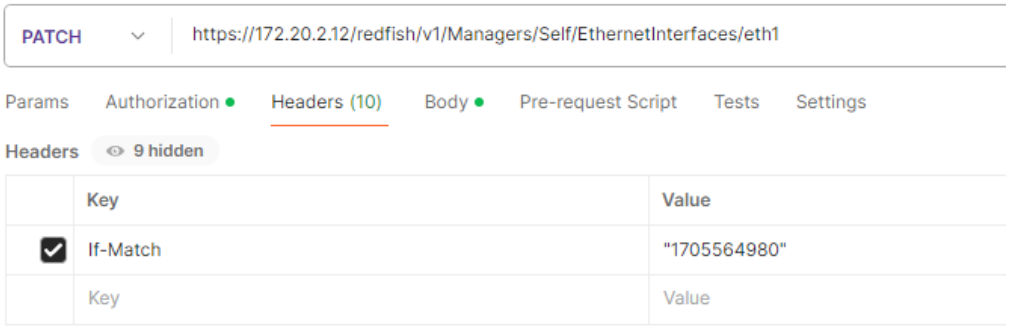
```
PATCH https://{{bmc  ip}}/redfish/v1/Managers/Self/EthernetInterfaces/{{instance}}
```

Please refer to the **Ethernet Interface Properties** that are patchable for which Read Only is False that can be sent as Request body in JSON format.

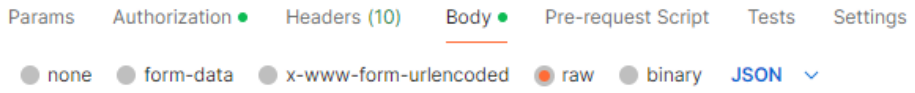
Response:
The response status is 202 Accepted, with newly created Task details.

Example: Disable IPv4 DHCP and set static IPv4 address.

Add a key "**If-Match**" in request **Headers** tab. The value is your **ETag** value.



Add **raw** body data in request **Body** tab. The data format is **JSON**.




```
{
    "DHCPv4": {
        "DHCPEnabled": false
    },
    "IPv4StaticAddresses": [
        {
            "Address": "172.20.2.234",
            "Gateway": "172.20.2.1",
            "SubnetMask": "255.255.255.0"
        }
    ]
}
```

Response body content.

```
{
    "@odata.context": "/redfish/v1/$metadata#Task.Task",
    "@odata.id": "/redfish/v1/TaskService/Tasks/1",
    "@odata.type": "#Task.v1_4_2.Task",
```


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```
    "Description": "Task for EthernetInterface Action",
    "Id": "1",
    "Name": "EthernetInterface Action",
    "TaskMonitor": "/redfish/v1/TaskService/TaskMonitors/1",
    "TaskState": "New"
}
```


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6.4.2 BIOS Configuration

6.4.2.1 GET - HostInterface Instance

Request:

```
GET https://{{bmc  ip}}/redfish/v1/Managers/Self/HostInterfaces/Self
```

Response:
The response status is 200 OK.

Example:

GET https://172.20.2.12/redfish/v1/Managers/Self/HostInterfaces/Self


```
{
    "@odata.context": "/redfish/v1/$metadata#HostInterface.HostInterface",
    "@odata.etag": "\"1705997262\"",
    "@odata.id": "/redfish/v1/Managers/Self/HostInterfaces/Self",
    "@odata.type": "#HostInterface.v1_3_0.HostInterface",
    "AuthenticationModes": [
        "BasicAuth",
        "RedfishSessionAuth"
    ],
    "CredentialBootstrapping": {
        "EnableAfterReset": false,
        "Enabled": true,
        "RoleId": "HostInterfaceAdministrator"
    },
    "Description": "Host Interface",
    "ExternallyAccessible": false,
    "HostEthernetInterfaces": {
        "@odata.id": "/redfish/v1/Managers/Self/HostInterfaces/Self/HostEthernetInterfaces"
    },
    "HostInterfaceType": "NetworkHostInterface",
    "Id": "Self",
    "InterfaceEnabled": true,
    "Links": {
        "ComputerSystems": [
            {
                "@odata.id": "/redfish/v1/Systems/Self"
            }
        ],
        "ComputerSystems@odata.count": 1,
        "CredentialBootstrappingRole": {
            "@odata.id": "/redfish/v1/AccountService/Roles/HostInterfaceAdministrator"
        }
    },
    "ManagerEthernetInterface": {
        "@odata.id": "/redfish/v1/Managers/Self/EthernetInterfaces/usb0"
```


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```
    },
    "Name": "Host Interface",
    "NetworkProtocol": {
        "@odata.id": "/redfish/v1/Managers/Self/NetworkProtocol"
    },
    "Status": {
        "Health": "OK",
        "State": "Enabled"
    }
}
```


6.4.2.2 GET – BIOS and BIOS/SD

Request:

Get current BIOS Settings:

```
GET https://{{bmc_ip}}/redfish/v1/Systems/Self/Bios
```

Get future BIOS Settings:

```
GET https://{{bmc_ip}}/redfish/v1/Systems/Self/Bios/SD
```

Response:
The response status is 200 OK.

Example:




```
{
    "@Redfish.Settings": {
        "@odata.type": "#Settings.v1_2_2.Settings",
        "SettingsObject": {
            "@odata.id": "/redfish/v1/Systems/Self/Bios/SD"
        }
    },
    "@odata.context": "/redfish/v1/$metadata#Bios.Bios",
    "@odata.etag": "\"1705640880\"",
    "@odata.id": "/redfish/v1/Systems/Self/Bios",
    "@odata.type": "#Bios.v1_2_0.Bios",
    "Actions": {
        "#Bios.ChangePassword": {
            "@Redfish.ActionInfo": "/redfish/v1/Systems/Self/Bios/ChangePasswordActionInfo",
            "target": "/redfish/v1/Systems/Self/Bios/Actions/Bios.ChangePassword"
        },
        "#Bios.ResetBios": {
            "target": "/redfish/v1/Systems/Self/Bios/Actions/Bios.ResetBios"
        }
    },
    "AttributeRegistry": "BiosAttributeRegistry22808.1.1.0",
```


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```
    "Attributes": {
        "ACPI004": false,
        "CRCS005": "CRCS005Enable",
        "FBO001": "FBO001UEFI",
        "FBO101": "FBO101HardDisk",
        "FBO102": "FBO102NVME",
        ...
    },
    "Description": "Current BIOS Settings",
    "Id": "Bios",
    "Name": "Current BIOS Settings",
    "ResetBiosToDefaultsPending": false
}
```

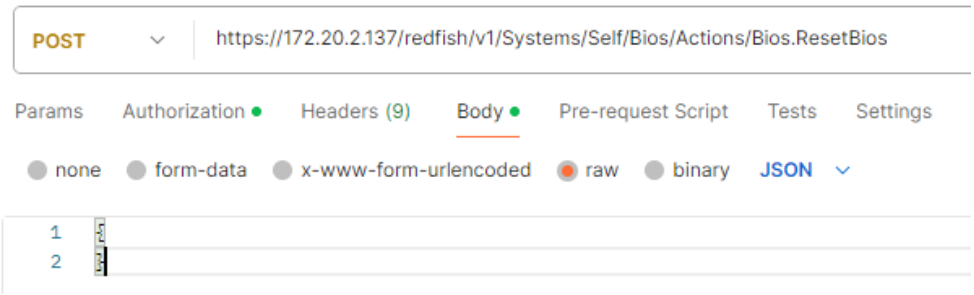

6.4.2.3 POST – Reset BIOS Settings

Request:

```
POST https://{{bmc_ip}}/redfish/v1/Systems/Self/Bios/Actions/Bios.ResetBios
```

Response:
The response status is 204 No Content.

Example:
Add **raw** body data in request **Body** tab. The data format is **JSON**.



6.4.2.4 POST – Change BIOS Password

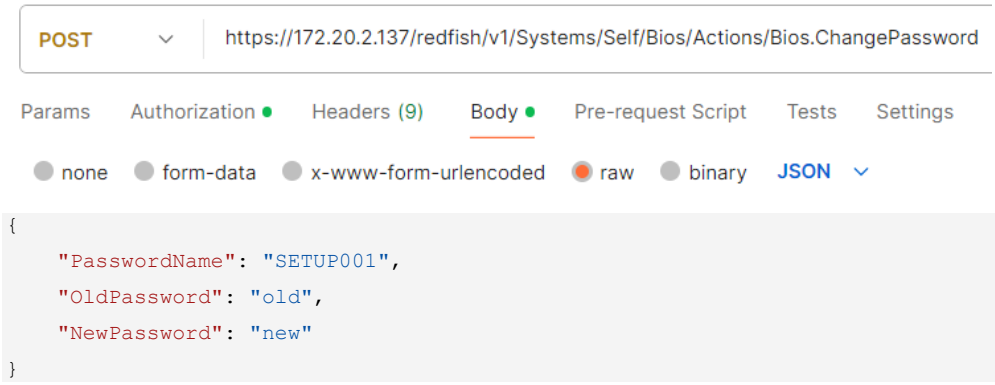
Request:

```
POST https://{{bmc_ip}}/redfish/v1/Systems/Self/Bios/Actions/Bios.ChangePassword
```

Response:
The response status is 204 No Content.

Example:
Add **raw** body data in request **Body** tab. The data format is **JSON**.

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6.4.2.5 PATCH – BIOS SD

Change the values of the attributes.

Request:

```
PATCH https://{{bmc_ip}}/redfish/v1/Systems/Self/Bios/SD
```

Response:
The response status is 204 No Content.

Refer to **PATCH - BIOS Watchdog Configuration**.

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6.4.3 x86 Watchdog Configuration

6.4.3.1 GET - BIOS Watchdog Configuration

Request:

Get current BIOS Settings:

```
GET https://{{bmc_ip}}/redfish/v1/Systems/Self/Bios
```

Get future BIOS Settings:

```
GET https://{{bmc_ip}}/redfish/v1/Systems/Self/Bios/SD
```

BIOS Item	Redfish Attribute	Redfish Value
FRB-2 Timer	IPMI100	IPMI100Enabled IPMI100Disabled
FRB-2 Timer timeout	IPMI101	Number: 1~30
FRB-2 Timer Policy	IPMI102	IPMI102DoNothing IPMI102Reset IPMI102PowerDown IPMI102PowerCycle
OS Watchdog Timer	IPMI103	IPMI103Disabled IPMI103Enabled
OS Wtd Timer Timeout	IPMI104	Number: 1~30
OS Wtd Timer Policy	IPMI105	IPMI105DoNothing IPMI105Reset IPMI105PowerDown IPMI105PowerCycle

Response:
The response status is 200 OK.

Example:




```
{
    "@odata.etag": "\"1705653894\"",      ← Used in PATCH method
    ...
    "AttributeRegistry": "BiosAttributeRegistry22808.1.1.0",
    "Attributes": {
        ...
        "IPMI100": "IPMI100Enabled",
        "IPMI101": 6,
        "IPMI102": "IPMI102DoNothing",
        "IPMI103": "IPMI103Enabled",
        "IPMI104": 5,
        "IPMI105": "IPMI105PowerDown",
        ...
```


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```
    },
    "Description": "Current BIOS Settings",
    "Id": "Bios",
    "Name": "Current BIOS Settings",
    "ResetBiosToDefaultsPending": false
}
```


6.4.3.2 PATCH - BIOS Watchdog Configuration

Request:

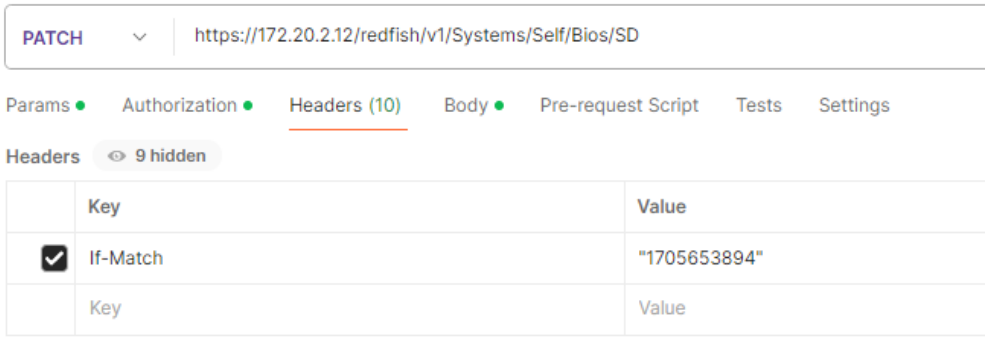
```
PATCH https://{{bmc_ip}}/redfish/v1/Systems/Self/Bios/SD
```

Please refer to the **GET - BIOS Watchdog Configuration** to get “etag”.

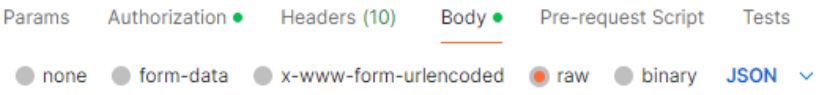
Response:
The response status is 204 No Content.

Example: Enable the OS Watchdog Timer, set the expiration time and action.

Add a key "**If-Match**" in request **Headers** tab. The value is your **ETag** value.



Add **raw** body data in request **Body** tab. The data format is **JSON**.




```
{
    "Attributes": {
        "IPMI103": "IPMI103Enabled",
        "IPMI104": 5,
        "IPMI105": "IPMI105PowerCycle"
    }
}
```


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6.4.4 Sensor Information

This section is dedicated to explaining how to obtain sensor information through Redfish. Users can obtain the specific data of the required sensor through the following command.

Request:

```
GET https://{{bmc_ip}}/redfish/v1/Chassis/Self/Sensors/{{Sensor_ID}}
```

Response:
The response status is 200 OK.

Example:




```
{
    "@odata.context": "/redfish/v1/$metadata#Sensor.Sensor",
    "@odata.etag": "\"1708661966\"",
    "@odata.id": "/redfish/v1/Chassis/Self/Sensors/1",
    "@odata.type": "#Sensor.v1_0_2.Sensor",
    "Accuracy": null,
    "AdjustedMaxAllowableOperatingValue": null,
    "AdjustedMinAllowableOperatingValue": null,
    "ApparentVA": null,
    "Description": null,
    "ElectricalContext": null,
    "Id": "1",
    "LoadPercent": null,
    "Location": {
        "AltitudeMeters": null,
        "Contacts": [
            null
        ],
        "Latitude": null,
        "Longitude": null,
        "PartLocation": {
            "LocationOrdinalValue": null,
            "LocationType": null,
            "Orientation": null,
            "Reference": null,
            "ServiceLabel": null
        },
        "Placement": {
            "AdditionalInfo": null,
            "Rack": null,
            "RackOffset": null,
            "RackOffsetUnits": null,
            "Row": null
        },
```


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```
        "PostalAddress": {
            "AdditionalCode": null,
            "AdditionalInfo": null,
            "Building": null,
            "City": null,
            "Community": null,
            "Country": null,
            "District": null,
            "Division": null,
            "Floor": null,
            "HouseNumber": null,
            "HouseNumberSuffix": null,
            "Landmark": null,
            "LeadingStreetDirection": null,
            "Name": null,
            "Neighborhood": null,
            "POBox": null,
            "PlaceType": null,
            "PostalCode": null,
            "Road": null,
            "RoadBranch": null,
            "RoadPostModifier": null,
            "RoadPreModifier": null,
            "RoadSection": null,
            "RoadSubBranch": null,
            "Room": null,
            "Seat": null,
            "Street": null,
            "StreetSuffix": null,
            "Territory": null,
            "TrailingStreetSuffix": null,
            "Unit": null
        }
    },
    "MaxAllowableOperatingValue": null,
    "MinAllowableOperatingValue": null,
    "Name": "P12V_PSU",
    "PeakReading": null,
    "PeakReadingTime": null,
    "PhysicalContext": "VoltageRegulator",
    "PhysicalSubContext": null,
    "PowerFactor": null,
    "Precision": null,
    "ReactiveVAR": null,
    "Reading": 12.22,
    "ReadingRangeMax": 13.25,
    "ReadingRangeMin": 10.7,
    "ReadingType": "Voltage",
    "ReadingUnits": null,
    "SensingFrequency": null,
    "SensorResetTime": null,
    "Status": {
```


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```
        "Health": "OK",
        "HealthRollup": null,
        "State": "Enabled"
    },
    "Thresholds": {
        "LowerCaution": {
            "Activation": null,
            "DwellTime": null,
            "Reading": 11.4
        },
        "LowerCritical": {
            "Activation": null,
            "DwellTime": null,
            "Reading": 11.16
        },
        "LowerFatal": {
            "Activation": null,
            "DwellTime": null,
            "Reading": 10.8
        },
        "UpperCaution": {
            "Activation": null,
            "DwellTime": null,
            "Reading": 12.6
        },
        "UpperCritical": {
            "Activation": null,
            "DwellTime": null,
            "Reading": 12.84
        },
        "UpperFatal": {
            "Activation": null,
            "DwellTime": null,
            "Reading": 13.2
        }
    },
    "VoltageType": null
}
```


Other commands to access sensor information using Redfish:

General Thermal Sensors Information

```
GET https://{{bmc_ip}}/redfish/v1/Chassis/Self/Thermal
```

Retrieves detailed information about the server's thermal sensors, including current temperature readings.

Temperature Sensor IDs

```
GET https://{{bmc_ip}}/redfish/v1/Chassis/Self/ThermalSubsystem/ThermalMetrics
```

Retrieves IDs and specific metrics of temperature-related sensors.

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General Power Sensors Information

```
GET https://{{bmc_ip}}/redfish/v1/Chassis/Self/Power
```

Retrieves comprehensive data about power-related sensors, including power supply status and output power.

Power Sensor IDs

```
GET https://{{bmc_ip}}/redfish/v1/Chassis/Self/PowerSubsystem
```

Retrieves IDs and detailed metrics related to power sensors.

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6.4.5 BMC Update

This section specifically explains how to obtain and upgrade BMC through Redfish. Users can upgrade BMC and set Preserve Configuration through the following commands.

6.4.5.1 GET - Preserve Configuration

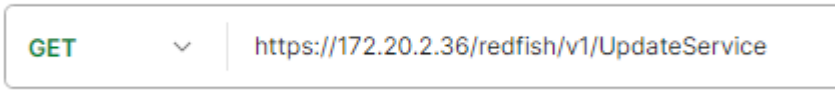
This section describes how to use redfish to **Get** Preserve Configuration before upgrading BMC.

Request:

```
GET https://{{bmc  ip}}/redfish/v1/UpdateService
```

Response:
The response status is 200 OK.

Example:




```
{
    "@odata.context": "/redfish/v1/$metadata#UpdateService.UpdateService",
    "@odata.etag": "\"1708925760\"",
    "@odata.id": "/redfish/v1/UpdateService",
    "@odata.type": "#UpdateService.v1_6_0.UpdateService",
    "Actions": {
        "#UpdateService.SimpleUpdate": {
            "@Redfish.ActionInfo": "/redfish/v1/UpdateService/SimpleUpdateActionInfo",
            "target": "/redfish/v1/UpdateService/Actions/SimpleUpdate"
        },
        "Oem": {
            "#UpdateService.UploadCABundle": {
                "@Redfish.ActionInfo": "/redfish/v1/UpdateService/UploadCABundleActionInfo",
                "target": "/redfish/v1/UpdateService/Actions/Oem/UpdateService.UploadCABundle"
            }
        }
    },
    "Description": "Redfish Update Service",
    "FirmwareInventory": {
        "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory"
    },
    "Id": "UpdateService",
    "MaxImageSizeBytes": 496611328,
    "MultipartHttpPushUri": "/redfish/v1/UpdateService/upload",
    "Name": "Update Service",
    "Oem": {
        "AMIUpdateService": {
            "@odata.type": "#AMIUpdateService.v1_0_0.AMIUpdateService",
```


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```
            "FlashPercentage": null,
            "PreserveConfiguration": {
                "Authentication": false,
                "EXTLOG": false,
                "FRU": false,
                "IPMI": false,
                "KVM": false,
                "NTP": false,
                "Network": false,
                "REDFISH": false,
                "SDR": false,
                "SEL": false,
                "SNMP": false,
                "SSH": false,
                "Syslog": false,
                "WEB": false
            },
            "UpdateStatus": null,
            "UpdateTarget": null
        },
        "BMC": {
            "@odata.type": "#AMIUpdateService.v1_0_0.BMC",
            "DualImageConfigurations": {
                "ActiveImage": "2",
                "BootImage": "2",
                "FirmwareImage1Name": "Image1",
                "FirmwareImage1Version": "13.05.010004",
                "FirmwareImage2Name": "Image2",
                "FirmwareImage2Version": "13.05.010003"
            }
        }
    },
    "ServiceEnabled": true,
    "Status": {
        "Health": "OK",
        "State": "Enabled"
    }
}
```


6.4.5.2 PATCH - Preserve Configuration

This section describes how to use redfish to **Set** Preserve Configuration before upgrading BMC.

Request:

```
PATCH https://{{bmc_ip}}/redfish/v1/UpdateService
```

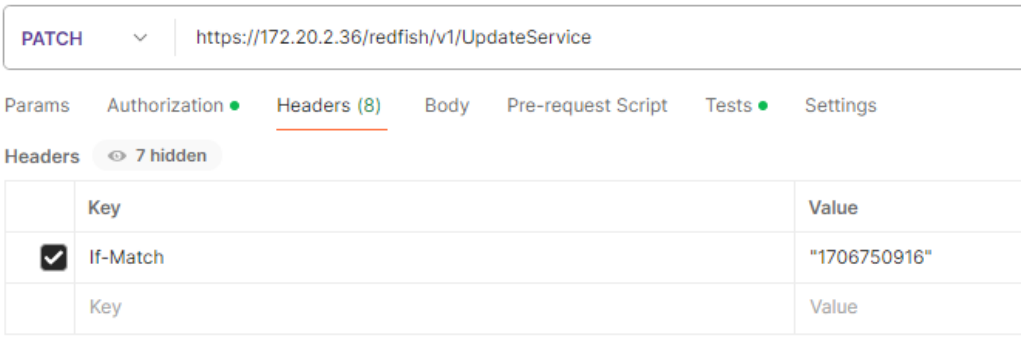
Please refer to the **GET - Preserve Configuration**.

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Response:
The response status is 204 No Content.

Example: Enable saving IPMI and SEL when upgrading BMC.

Add a key "**If-Match**" in request **Headers** tab. The value is your **ETag** value. This value can be obtained from **GET - Preserve Configuration**.



Add **raw** body data in request **Body** tab. The data format is **JSON**.




```
{
    "Oem": {
        "AMIUpdateService": {
            "PreserveConfiguration": {
                "IPMI": true,
                "SEL": true
            }
        }
    }
}
```

6.4.5.3 POST – Firmware Update

This section describes how to use redfish to **Update BMC firmware**.

Request:

```
POST https://{{bmc_ip}}/redfish/v1/UpdateService/upload
```

Response:
The response status is 202 Accepted.

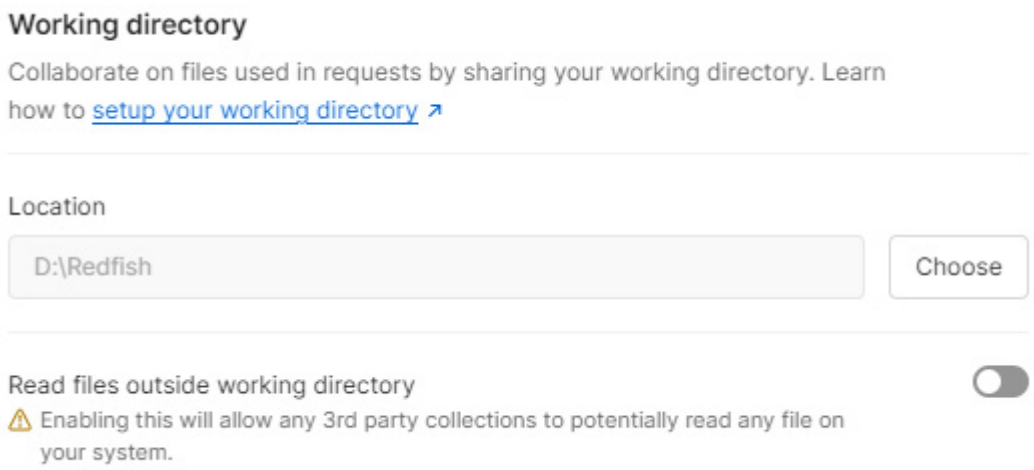
Example:

Using POSTMAN, please follow the steps as given below.

1. Ensure that all necessary files mentioned in the subsequent steps are placed in your working directory. Go to the top right corner of POSTMAN and click on the **settings**

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button. In the general settings, make the necessary adjustments.



2. Create a JSON file **parameters.json** with content like below.

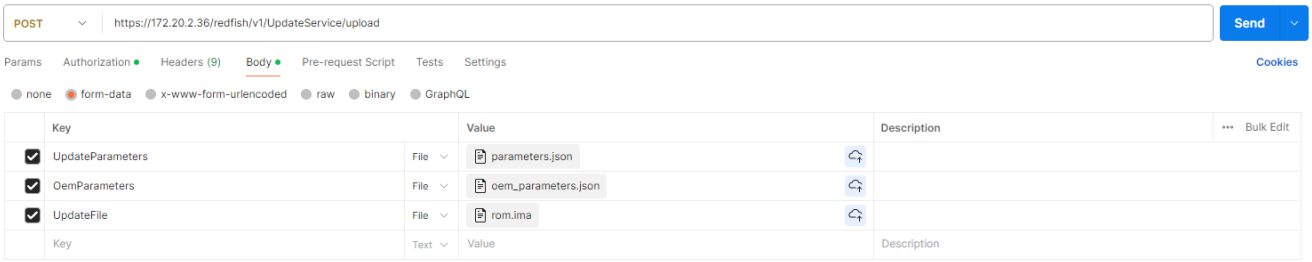
```
{
    "Targets" : [
        "/redfish/v1/UpdateService/FirmwareInventory/BMCImage1"
    ]
}
```

3. Create a JSON file **oem_parameters.json** with content like below.

```
{
    "ImageType" : "BMC"
}
```

4. Open POSTMAN and enter the **URI** to POST the request.
5. Select **POST** method.
6. In the **Authorization** tab, select Basic Auth and update request.
7. In the **Body** tab, select form-data and provide the key name as **UpdateFile** in the KEY section and change its type from **Text** to File.
8. Click on **Select File** in the **VALUE** section to select the signed image which is available in your local machine to update.
9. Like step 7 and 8, provide key name **UpdateParameters** and select **parameters.json** created in step 2.
10. Like step 7 and 8, provide key name **OemParameters** and select **oem_parameters.json** created in step 3.
11. Click **Send**.

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Response:



Note:

The details of UpdateParameters are given in the table below.

Allowed value	Description
redfish/v1/UpdateService/FirmwareInventory/BMC	When the system does not support Dual Flash
redfish/v1/UpdateService/FirmwareInventory/BMCImage1	For systems with Dual Flash support, to upgrade Image 1
redfish/v1/UpdateService/FirmwareInventory/BMCImage2	For systems with Dual Flash support, to upgrade Image 2

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6.4.6 BIOS Update

This section specifically explains how to obtain and upgrade BIOS through Redfish. Users can upgrade BIOS through the following commands.

6.4.6.1 GET - BIOS Update Status

Request:

```
GET https://{{bmc  ip}}/redfish/v1/UpdateService
```

Response:
The response status is 200 OK.

Name	Type	Read Only	Description
BIOSFlashEffectStatus	String	√	Indicates the BIOS update effect status: Waiting: there is a BIOS update task waiting to take effect. Updating: someone is updating BIOS. null: no BIOS update task.

Example:




```
{
    "@odata.context": "/redfish/v1/$metadata#UpdateService.UpdateService",
    "@odata.etag": "\"1708587273\"",
    "@odata.id": "/redfish/v1/UpdateService",
    "@odata.type": "#UpdateService.v1_6_0.UpdateService",
    "Actions": {
        "#UpdateService.SimpleUpdate": {
            "@Redfish.ActionInfo": "/redfish/v1/UpdateService/SimpleUpdateActionInfo",
            "target": "/redfish/v1/UpdateService/Actions/SimpleUpdate"
        },
        "Oem": {
            "#UpdateService.UploadCABundle": {
                "@Redfish.ActionInfo": "/redfish/v1/UpdateService/UploadCABundleActionInfo",
                "target": "/redfish/v1/UpdateService/Actions/Oem/UpdateService.UploadCABundle"
            }
        }
    },
    "Description": "Redfish Update Service",
    "FirmwareInventory": {
        "@odata.id": "/redfish/v1/UpdateService/FirmwareInventory"
    },
    "Id": "UpdateService",
    "MaxImageSizeBytes": 496717824,
    "MultipartHttpPushUri": "/redfish/v1/UpdateService/upload",
    "Name": "Update Service",
```


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```
    "Oem": {
        "AMIUpdateService": {
            "@odata.type": "#AMIUpdateService.v1_0_0.AMIUpdateService",
            "BIOSFlashEffectStatus": null,
            "FlashPercentage": null,
            "PreserveConfiguration": {
                "Authentication": false,
                "EXTLOG": false,
                "FRU": false,
                "IPMI": false,
                "KVM": false,
                "NTP": false,
                "Network": false,
                "REDFISH": false,
                "SDR": false,
                "SEL": false,
                "SNMP": false,
                "SSH": false,
                "Syslog": false,
                "WEB": false
            },
            "UpdateStatus": null,
            "UpdateTarget": null
        },
        "BMC": {
            "@odata.type": "#AMIUpdateService.v1_0_0.BMC",
            "DualImageConfigurations": {
                "ActiveImage": "1",
                "BootImage": "1",
                "FirmwareImage1Name": "Image1",
                "FirmwareImage1Version": "13.05.010004",
                "FirmwareImage2Name": "Image2",
                "FirmwareImage2Version": "13.05.010003"
            }
        }
    },
    "ServiceEnabled": true,
    "Status": {
        "Health": "OK",
        "State": "Enabled"
    }
}
```


6.4.6.2 POST – Firmware Update

This section describes how to use redfish to **Update BIOS firmware**.

Request:

```
POST https://{{bmc_ip}}/redfish/v1/UpdateService/upload
```

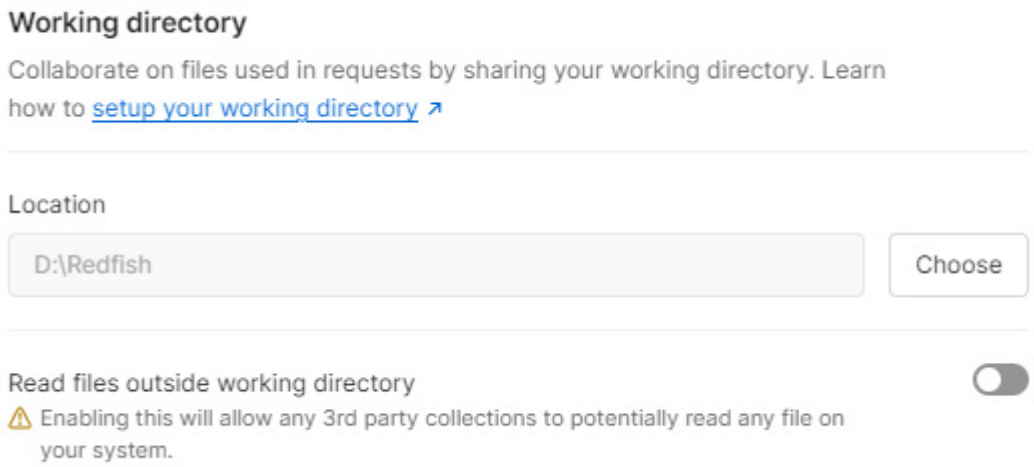

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Response:
The response status is 202 Accepted.

Example:

Using POSTMAN, please follow the steps as given below.

1. Ensure that all necessary files mentioned in the subsequent steps are placed in your working directory. Go to the top right corner of POSTMAN and click on the **settings button**. In the general settings, make the necessary adjustments.



2. Create a JSON file **parameters.json** with content like below.

```
{
    "Targets" : [
        "/redfish/v1/UpdateService/FirmwareInventory/BIOS"
    ]
}
```

3. Create a JSON file **oem_parameters.json** with content like below.

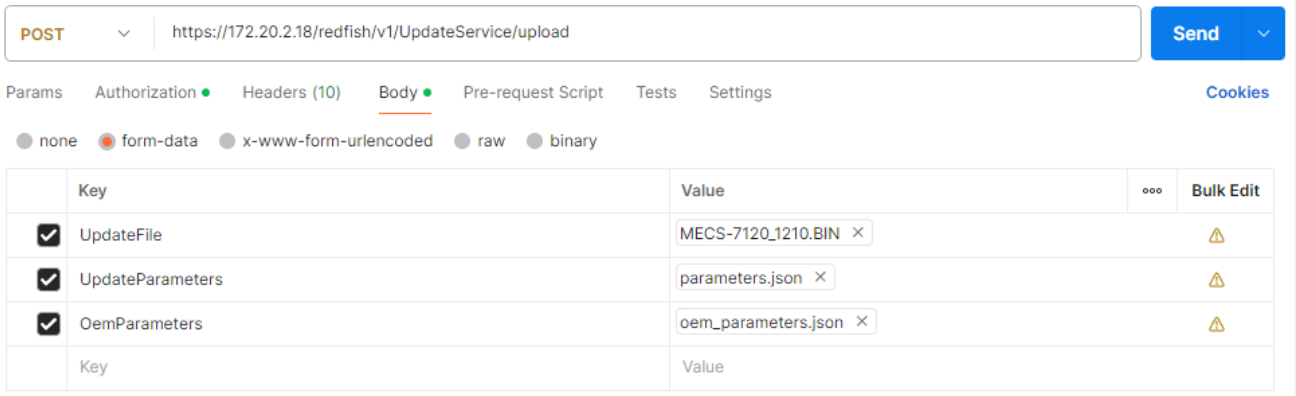
```
{
    "ImageType" : "BIOS",
    "update_me" : false,
    "update_nvram" : false,
    "effect_poweroff" : false,
    "force_update" : false
}
```

Name	Type	Description
update_me	Boolean	Optional. Default value is false. true: update ME. false: skip ME.
update_nvram	Boolean	Optional. Default value is false. true: update NVRAM. false: skip NVRAM.
effect_poweroff	Boolean	Optional. Default value is false. true: take effect when powered off.

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Name	Type	Description
		false: take effect immediately.
force_update	Boolean	Optional. Default value is false. true: force to update. false: do not update when other user is in in update mode or a BIOS firmware has been uploaded.

4. Open POSTMAN and enter the **URI** to POST the request.
5. Select **POST** method.
6. In the **Authorization** tab, select Basic Auth and update request.
7. In the **Body** tab, select form-data and provide the key name as **UpdateFile** in the KEY section and change its type from **Text** to File.
8. Click on **Select File** in the **VALUE** section to select the signed image which is available in your local machine to update.
9. Like step 7 and 8, provide key name **UpdateParameters** and select **parameters.json** created in step 2.
10. Like step 7 and 8, provide key name **OemParameters** and select **oem_parameters.json** created in step 3.
11. Click **Send**.



Response:


```
{
    "@odata.type": "#UpdateService.v1_6_0.UpdateService",
    "Messages": [
        {
            "@odata.type": "#Message.v1_0_8.Message",
            "Message": "A new task /redfish/v1/TaskService/Tasks/1 was created.",
            "MessageArgs": [
                "/redfish/v1/TaskService/Tasks/1"
            ],
            "MessageId": "Task.1.0.New",
            "Resolution": "None",
```


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```
            "Severity": "OK"
        },
        {
            "@odata.type": "#Message.v1_0_8.Message",
            "Message": "The action UpdateService.MultipartPush was submitted to do firmware update.",
            "MessageArgs": [
                "UpdateService.MultipartPush"
            ],
            "MessageId": "UpdateService.1.0.StartFirmwareUpdate",
            "Resolution": "None",
            "Severity": "OK"
        }
    ]
}
```


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6.4.7 CPLD Update

This section specifically explains how to obtain and upgrade BIOS through Redfish. Users can upgrade BIOS through the following commands.

6.4.7.1 GET - CPLD Update Status

Request:

```
GET https://{{bmc  ip}}/redfish/v1/UpdateService
```

Response:
The response status is 200 OK.

Name	Type	Read Only	Description
CPLDFlashEffectStatus	String	√	Indicates the CPLD update effect status: Waiting: there is a CPLD update waiting to take effect. Updating: someone is updating Firmware. null: no CPLD update.

Example:




```
{
...
    "Oem": {
        "AMIUpdateService": {
            "@odata.type": "#AMIUpdateService.v1_0_0.AMIUpdateService",
            "BIOSFlashEffectStatus": null,
            "CPLDFlashEffectStatus": null,
            "FlashPercentage": null,
...
}
```


6.4.7.2 POST – Firmware Update

This section describes how to use redfish to **Update CPLD firmware**.

Request:

```
POST https://{{bmc  ip}}/redfish/v1/UpdateService/upload
```

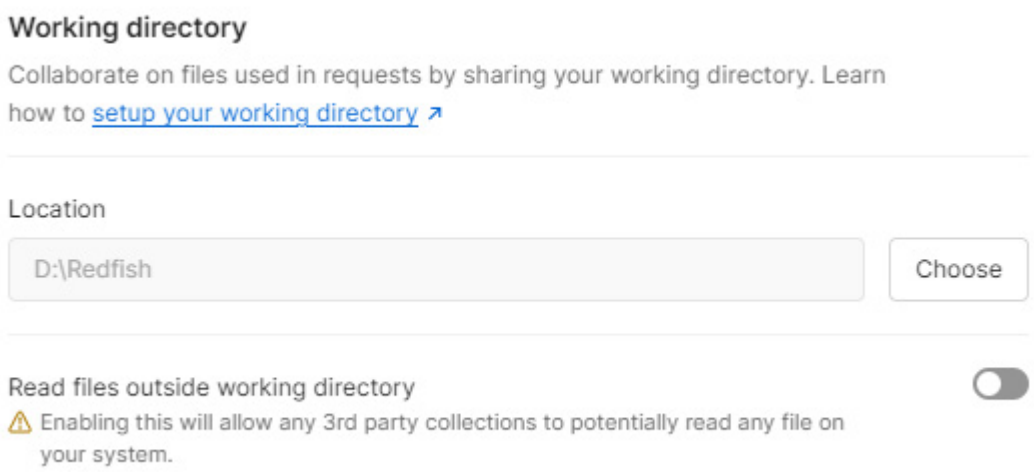
Response:
The response status is 202 Accepted.

Example:

Using POSTMAN, please follow the steps as given below.

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1. Ensure that all necessary files mentioned in the subsequent steps are placed in your working directory. Go to the top right corner of POSTMAN and click on the **settings button**. In the general settings, make the necessary adjustments.



2. Create a JSON file **parameters.json** with content like below.

```
{
    "Targets" : [
        "/redfish/v1/UpdateService/FirmwareInventory/CPLD"
    ]
}
```

3. Create a JSON file **oem_parameters.json** with content like below.

```
{
    "ImageType" : "HPM",
    "force_update" : false
}
```

Name	Type	Description
force_update	Boolean	Optional. Default value is false. true: force to update. false: do not update when other user is in in update mode or a CPLD firmware has been uploaded.

4. Open POSTMAN and enter the **URI** to POST the request.

5. Select **POST** method.

6. In the **Authorization** tab, select Basic Auth and update request.

7. In the **Body** tab, select form-data and provide the key name as **UpdateFile** in the KEY section and change its type from **Text** to File.

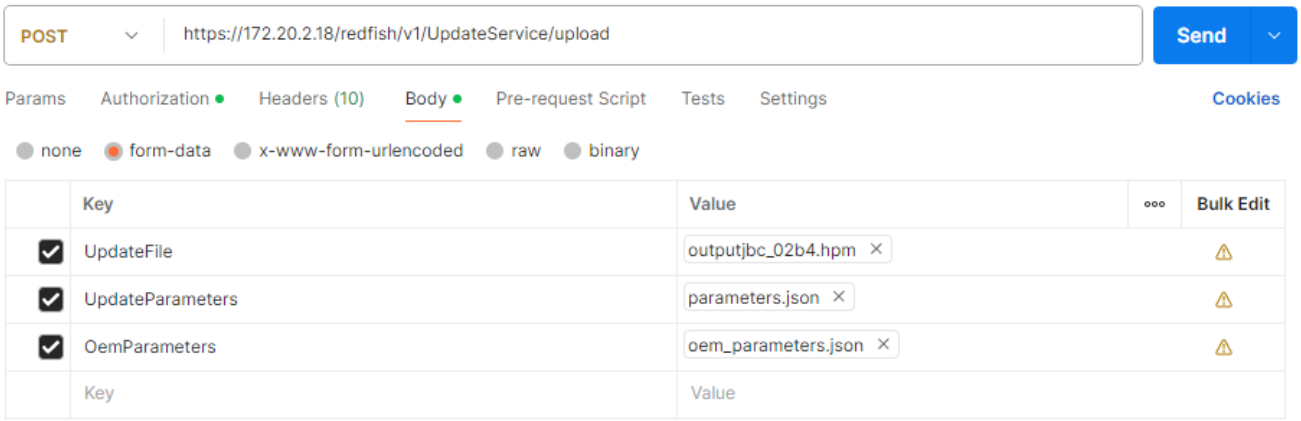
8. Click on **Select File** in the **VALUE** section to select the signed image which is available in your local machine to update.

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9. Like step 7 and 8, provide key name **UpdateParameters** and select **parameters.json** created in step 2.

10. Like step 7 and 8, provide key name **OemParameters** and select **oem_parameters.json** created in step 3.

11. Click **Send**.



Response:


```
{
    "@odata.type": "#UpdateService.v1_6_0.UpdateService",
    "Messages": [
        {
            "@odata.type": "#Message.v1_0_8.Message",
            "Message": "A new task /redfish/v1/TaskService/Tasks/1 was created.",
            "MessageArgs": [
                "/redfish/v1/TaskService/Tasks/1"
            ],
            "MessageId": "Task.1.0.New",
            "Resolution": "None",
            "Severity": "OK"
        },
        {
            "@odata.type": "#Message.v1_0_8.Message",
            "Message": "The action UpdateService.MultipartPush was submitted to do firmware update.",
            "MessageArgs": [
                "UpdateService.MultipartPush"
            ],
            "MessageId": "UpdateService.1.0.StartFirmwareUpdate",
            "Resolution": "None",
            "Severity": "OK"
        }
    ]
}
```


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6.4.8 Power Control

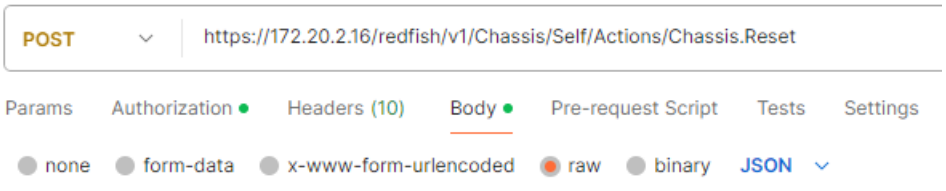
This section is dedicated to explaining how to control power through Redfish.

Request:

```
POST https://{{bmc_ip}}/redfish/v1/Chassis/Self/Actions/Chassis.Reset
```

Response:
The response status is 202 Accepted.

Example:




```
{
    "ResetType": "ForceRestart"
}
```

***Note:** The ResetType can be one of the following values: "On", "ForceOff", "GracefulShutdown", "ForceRestart", "PowerCycle".*

Response:

```
{
    "@odata.context": "/redfish/v1/$metadata#Task.Task",
    "@odata.id": "/redfish/v1/TaskService/Tasks/1",
    "@odata.type": "#Task.v1_4_2.Task",
    "Description": "Task for Chassis Reset",
    "Id": "1",
    "Name": "Chassis Reset",
    "TaskMonitor": "/redfish/v1/TaskService/TaskMonitors/1",
    "TaskState": "New"
}
```


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6.4.9 Firmware and Hardware Versions

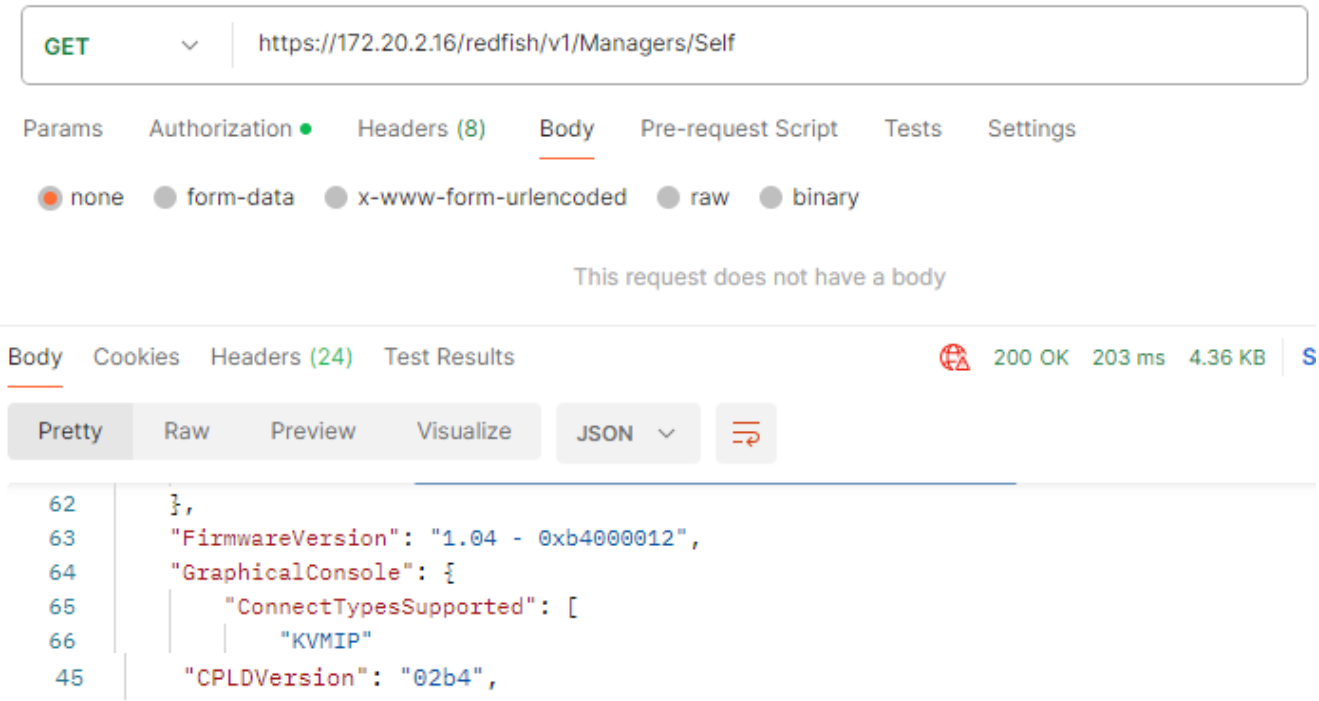
To get BMC version, CPLD version and hardware version, use "Managers" class.

Request:

```
POST https://{{bmc_ip}}/redfish/v1/Managers/Self
```

Response:
The response status is 202 OK.

Example:



Member "FirmwareVersion" consists of:

BMC version - 1.4
CPLD version - 02b4
Hardware version - 2.1 (PCB A2 SKU 1)

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6.4.10 BIOS Version

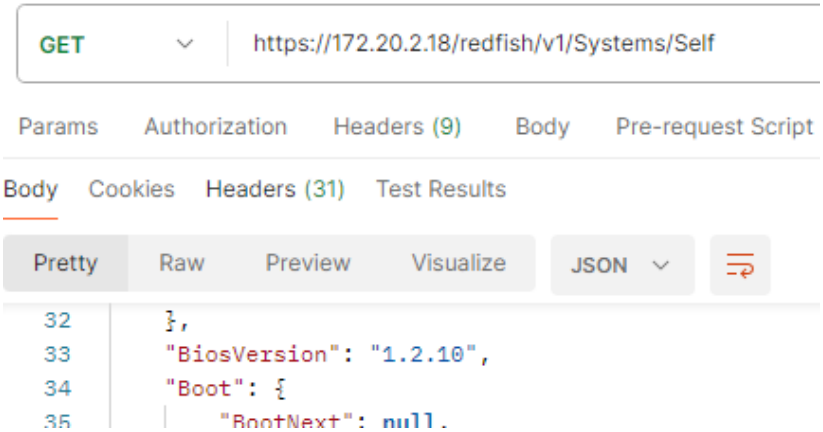
To get BIOS version, use "Systems" class.

Request:

```
POST https://{{bmc_ip}}/redfish/v1/Systems/Self
```

Response:
The response status is 202 OK.

Example:



Member "BiosVersion" has the value.
"1.2.10" - Leading version.Major version.Minor version

Please pay special attention that **minor version** of BIOS is **always represented in hexadecimal number**.

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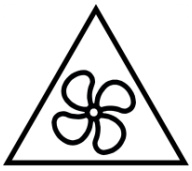
Important Safety Instructions

For user safety, please read and follow all **instructions**, **WARNINGS**, **CAUTIONS,** and **NOTES** marked in this manual and on the associated equipment before handling/operating the equipment.

1. Read these safety instructions carefully.
2. Keep this user's manual for future reference.
3. Read the specifications section of this manual for detailed information on the operating environment of this equipment.
4. The equipment can be operated at an ambient temperature of 45°C.
5. When installing/mounting or uninstalling/removing equipment; or when removal of the chassis lid required for user servicing (Section 3.1-3.5):
   - Turn off power and unplug any power cords/cables, and
   - Reinstall the chassis lid before restoring power.



Hazardous moving parts. Keep body parts out of the motion path.



6. To avoid electrical shock and/or damage to equipment:
   - Keep equipment away from water or liquid sources;
   - Keep equipment away from high heat or high humidity;
   - Keep equipment properly ventilated (do not block or cover ventilation openings);
   - Make sure to use recommended voltage and power source settings;
   - Always install and operate equipment near an easily accessible electrical socket-outlet;
   - Secure the power cord (do not place any object on/over the power cord);
   - Only install/attach and operate equipment on stable surfaces and/or recommended mountings;
   - If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.
   - The power cord must be connected to a socket or outlet with a ground connection.
7. Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.
8. An RTC battery may be provided for uninterrupted, backup or emergency power.



Risk of explosion if battery is replaced with one of an incorrect type. Discard used batteries according to the manufacturer's instructions.

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8. This equipment is not suitable for use in locations where children are likely to be present.
9. Equipment must be serviced by authorized technicians when:
   - The power cord or plug is damaged;
   - Liquid has penetrated the equipment;
   - It has been exposed to high humidity/moisture;
   - It is not functioning or does not function according to the user's manual;
   - It has been dropped and/or damaged; and/or,
   - It has an obvious sign of breakage.
10. Please pay strict attention to all warnings and advisories appearing on the device, to avoid injury or damage.
11. The equipment may have more than one power supply input. To reduce the risk of electrical shock, trained personnel should disconnect all power supply inputs before servicing.



Shock hazard! Disconnect all power supply inputs before servicing.



Shock hazard!



Multiple power sources

12. It is recommended that equipment be installed only in a server room or computer room where access is:
    - Restricted to qualified service personnel or users familiar with restrictions applied to the location, reasons therefor, and any precautions required;
    - Only afforded by the use of a tool or lock and key, or other means of security, and is controlled by the authority responsible for the location.
13. Suitable for installation in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.
14. This product is intended to be supplied by a certified DC power source providing reinforced/double insulation from AC mains with an output rating of -48V to -60V DC, 12A min., Tma = 55°C. All power connection wiring must be performed by a qualified electrician in accordance with National Electrical Code, ANSI/NFPA 70 and Canadian Electrical Code, Part I, CSA C22.1. The DC power supply should be well-grounded to ensure safe operation. The protective earthing conductor shall be minimum 14 AWG and having green-and-yellow insulation. The ground wire should be installed first (before "+" and "-") and then removed.
15. When using a Fiber Optic Small-Form Pluggable (SFP) module, ensure it is IEC 60825-1, IEC 60825-2 and IEC 60950-1 or IEC 62368-1 certified and a Class 1 Laser Product.

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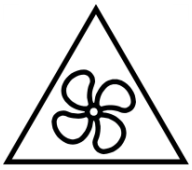
Consignes de Sécurité Importantes

*Pour assurer la sécurité de l'utilisateur, veuillez lire et suivre toutes les **directives**, ainsi que les **AVERTISSEMENTS**, **MISES EN GARDE** et **REMARQUES** de ce manuel et indiqués sur l'équipement associé avant de manipuler ou utiliser l'équipement.*

1. *Veuillez lire attentivement ces instructions de sécurité avec soin.*
2. *Veuillez conserver ce manuel pour référence future.*
3. *Veuillez lire la section des spécifications de ce manuel pour avoir des informations détaillées sur l'environnement d'exploitation de cet équipement.*
4. *L'équipement peut être utilisé à une température ambiante de 45 °C.*
5. *Lors de l'installation ou du montage et de la désinstallation ou de la dépose de l'équipement; ou lors de la dépose du couvercle du châssis pour procéder à l'entretien par l'utilisateur (Sections 3.1-3.5):*
   - *Coupez l'alimentation et débranchez les cordons et les câbles d'alimentation, et*
   - *Reposez le couvercle du châssis avant de remettre l'alimentation.*



***Pièces mobiles dangereuses.** Gardez les parties du corps hors de la trajectoire.*



6. *Pour éviter un risque d'électrocution et pour éviter d'endommager l'équipement :*
   - *Éloignez l'équipement de l'eau et de toute source liquide;*
   - *Éloignez l'équipement de toute source de chaleur ou d'humidité élevée;*
   - *Gardez l'équipement correctement ventilé (ne pas bloquer ou couvrir les ouvertures de ventilation);*
   - *Veillez à utiliser la tension recommandée et les réglages adéquats pour la source d'alimentation;*
   - *Veuillez toujours installer et exploiter l'équipement à proximité d'une prise de courant facilement accessible;*
   - *Assurez-vous que le cordon d'alimentation est acheminé de manière sécuritaire (ne déposez aucun objet dessus);*
   - *Installez, fixez et utilisez l'équipement sur des surfaces stables ou sur les fixations recommandées uniquement;*
   - *Si l'équipement n'est pas utilisé pendant une longue période, éteignez-le et débranchez-le de sa source d'alimentation.*
   - *Le cordon d'alimentation doit être connecté à une prise ou à une prise de courant avec mise à la terre.*
7. *N'essayez jamais de réparer l'équipement. L'équipement ne doit être réparé que par du personnel qualifié.*

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8. *Une pile au lithium peut être installée pour assurer l'alimentation de secours ou d'urgence en continu.*



mise en garde

***Risque d'explosion** si la batterie est remplacée par une batterie d'un type incorrect. Jetez les piles usagées conformément aux instructions du fabricant.*

9. *Cet équipement ne convient pas à une utilisation dans des lieux pouvant accueillir des enfants.*
10. *L'équipement doit être entretenu par des techniciens agréés lorsque :*
    - *le cordon d'alimentation est endommagé ou lorsque la fiche électrique est endommagée;*
    - *du liquide a pénétré à l'intérieur de l'équipement;*
    - *l'équipement a été exposé à un taux d'humidité élevé;*
    - *l'équipement ne fonctionne pas ou ne fonctionne pas conformément au manuel de l'utilisateur;*
    - *l'équipement est tombé ou lorsqu'il a été endommagé;*
    - *l'équipement présente un signe évident de défaillance.*
11. *Veuillez porter une attention rigoureuse à tous les avertissements et à tous les avis figurant sur l'appareil, pour éviter des blessures ou des dommages.*
12. *L'équipement peut avoir plus d'une entrée d'alimentation. Pour réduire le risque d'électrocution, le personnel qualifié devrait déconnecter toutes les entrées d'alimentation avant de procéder à l'entretien.*



mise en garde

***Risque d'électrocution!** Débranchez toutes les entrées d'alimentation avant de procéder à l'entretien.*


Shock hazard!
Risque d'électrocution!


Multiple power sources
Sources d'alimentation multiples

13. *Il est recommandé que l'équipement soit installé que dans une salle de serveur ou de la salle informatique où:*
    - *L'accès est limité au personnel de maintenance qualifié ou utilisateurs familiers avec les restrictions appliquées à l'emplacement, motifs, et tout les précautions nécessaires, et;*
    - *L'accès est uniquement assurée par l'utilisation d'un outil ou clé, ou d'autres moyens de sécurité, et est contrôlé par l'autorité responsable de l'emplacement.*
14. *Peut être installé dans des salles de matériel de traitement de l'information conformément à l'article 645 du National Electrical Code et à la NFPA 75.*
15. *Ce produit est destiné à être alimenté par une source d'alimentation CC certifiée fournissant une isolation renforcée/double du secteur CA avec une puissance de sortie de -48 V à -60 V CC, 12 A min., Tma = 55°C. Tout le câblage de connexion d'alimentation doit être effectué par un électricien qualifié conformément au Code national de l'électricité, ANSI / NFPA 70 et au Code canadien de l'électricité, Partie I, CSA C22.1. L'alimentation CC doit être bien mise à la terre pour garantir un fonctionnement sûr. Le conducteur de mise à la terre de protection doit être au minimum 14 AWG et avoir une isolation verte et jaune. Le fil de terre doit être installé en premier (avant «+» et «-») puis retiré.*

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