J4076-01

SAS/SATA JBOD SERIES

User's Manual

UM_J4076-01_v.3_090315

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PREFACE

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  The material in this document is for information purposes only and is subject to change without notice.

- **Warning**

  1. A shielded-type power cord is required in order to meet FCC emission limits and also to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used.
  2. Use only shielded cables to connect I/O devices to this equipment.
  3. You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

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SAFETY INSTRUCTIONS

- Before getting started, please read the following important cautions:
- All cautions and warnings on the equipment or in the manuals should be noted.
- Most electronic components are sensitive to electrical static discharge. Therefore, be sure to ground yourself at all times when installing the internal components.
- Use a grounding wrist strap and place all electronic components in static-shielded devices. Grounding wrist straps can be purchased in any electronic supply store.
- Be sure to turn off the power and then disconnect the power cords from your system before performing any installation or servicing. A sudden surge of power could damage sensitive electronic components.
- Do not open the system's top cover. If opening the cover for maintenance is a must, only a trained technician should do so. Integrated circuits on computer boards are sensitive to static electricity. Before handling a board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. This will help to discharge any static electricity on your body.
- Place this equipment on a stable surface when install. A drop or fall could cause injury.
- Please keep this equipment away from humidity.
- Carefully mount the equipment into the rack, in such manner, that it won't be hazardous due to uneven mechanical loading.
- This equipment is to be installed for operation in an environment with maximum ambient temperature below 35°C.
- The openings on the enclosure are for air convection to protect the equipment from overheating. DO NOT COVER THE OPENINGS.
- Never pour any liquid into ventilation openings. This could cause fire or electrical shock.
- Make sure the voltage of the power source is within the specification on the label when connecting the equipment to the power outlet. The current load and output power of loads shall be within the specification.
- This equipment must be connected to reliable grounding before using. Pay special attention to power supplied other than direct connections, e.g. using of power strips.
- Place the power cord out of the way of foot traffic. Do not place anything over the power cord. The power cord must be rated for the

- product, voltage and current marked on the product's electrical ratings label. The voltage and current rating of the cord should be greater than the voltage and current rating marked on the product.
- If the equipment is not used for a long time, disconnect the equipment from mains to avoid being damaged by transient over-voltage.
- Never open the equipment. For safety reasons, only qualified service personnel should open the equipment.
- If one of the following situations arise, the equipment should be checked by service personnel:
  1. The power cord or plug is damaged.
  2. Liquid has penetrated the equipment.
  3. The equipment has been exposed to moisture.
  4. The equipment does not work well or will not work according to its user manual.
  5. The equipment has been dropped and/or damaged.
  6. The equipment has obvious signs of breakage.
  7. Please disconnect this equipment from the AC outlet before cleaning. Do not use liquid or detergent for cleaning. The use of a moisture sheet or cloth is recommended for cleaning.
- Module and drive bays must not be empty! They must have a dummy cover.

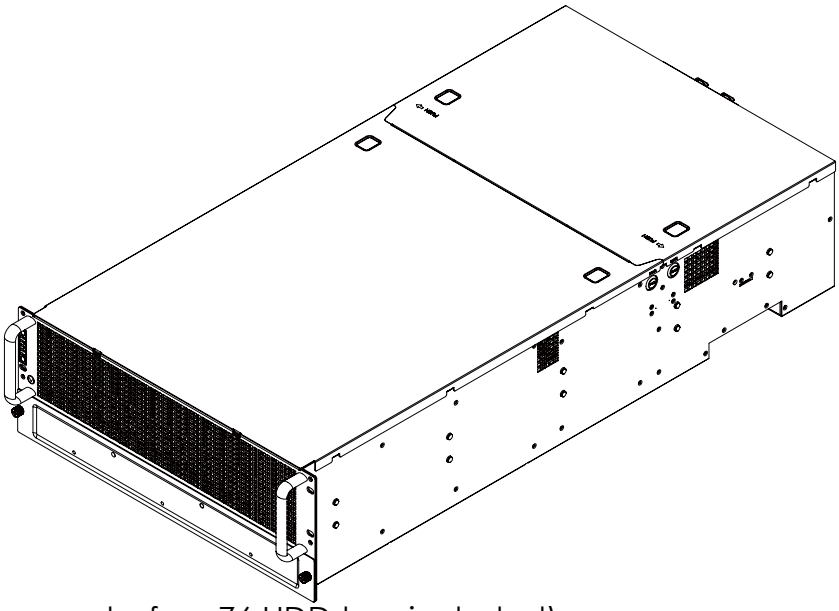
Product features and specifications are subject to change without notice.

CAUTION :
RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE.
DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.
AFTER PERFORMING ANY INSTALLATION OR SERVICING, MAKE SURE THE ENCLOSURE ARE LOCK AND SCREW IN POSITION, TURN ON THE POWER.

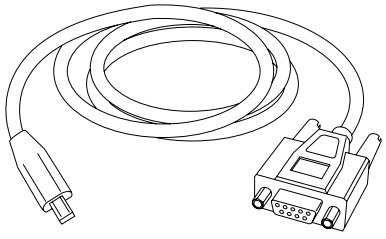
Chapter 1. Prodcut Introduction

1.1 Box Content

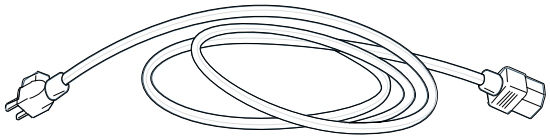
Before removing the subsystem from the shipping carton, visually inspect the physical condition of the shipping carton. Exterior damage to the shipping carton may indicate that the contents of the carton are damaged. If any damage is found, do not remove the components; contact the dealer where the subsystem was purchased for further instructions. Before continuing, first unpack the subsystem and verify that the contents of the shipping carton are all there and in good condition.



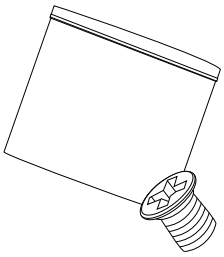
- Enclosure (Power supply, fan, 76 HDD tray included)



- RS232 cable x 1pcs

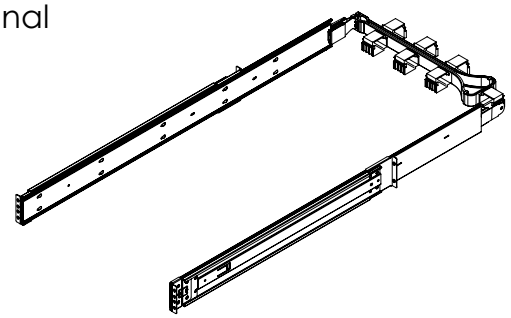


- Power cord x 2pcs



- Screws kit x 1set

- Mounting Optional Slide Rail x 1set



If any items are missing, please contact your authorized reseller or sales representative.

1.2 Specifications

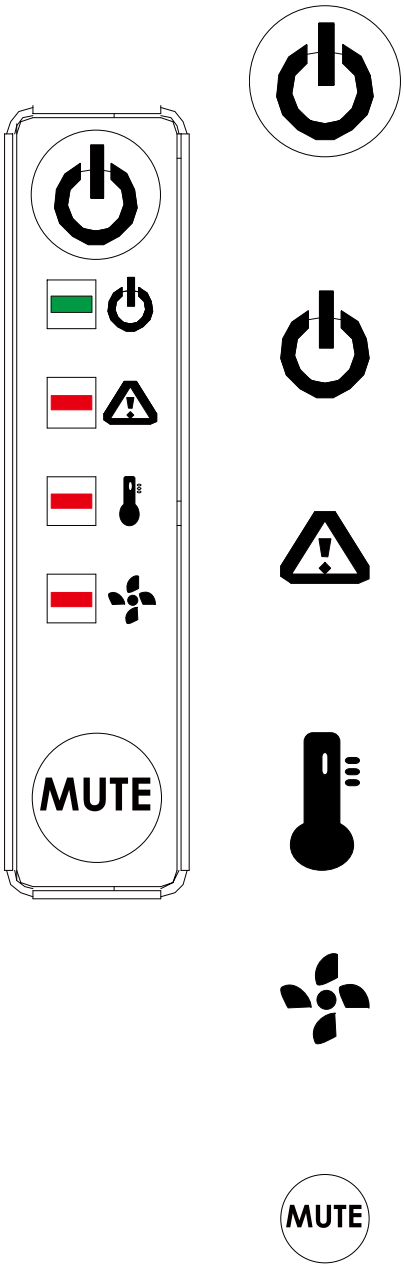
General	Number of Expander	2 x External expanders 6 x Internal expanders
	Expander Chip	LSI SAS3x36R + LSI SAS3x48
	Host/Expansion Interface	6 x Mini SAS HD (SFF-8644) per expander tray
Drives Supported	Drive Interface	12Gb & 6Gb SAS if using dual expanders 12Gb & 6Gb SAS/SATA if using single expander
	Form Factor	SFF 2.5" and 3.5"
Administration / Management	Admin/Firmware Upgrade	In-band & Serial port interface IEM port (Optional)
	LED indicators, Audible Alarm	Yes
Hot swap and Redundancy	Disk Drive	Hot swap 60 x 3.5" & 16 x 2.5" Bay(Option)
	Cooling	6cm and 8cm fans
	Power Supply	1400W 1+1 hot swap redundant 80+ Platinum
	Power Entry	Dual AC inlet
	Expander	Dual expanders

Electrical and Environmental	Universal A/C Input	100~240V AC full range
	Operating Environment	Temperature : 0°C to 35°C Relative humidity : 20% to 80%
	Non-operating Environment	Temperature : -20°C to 60°C Relative humidity : 10% to 90%
Physical Specification	Dimensions (W x D x H) (with chassis ears)	mm : 480 x 865.25 x 175.75
		inches : 18.9 x 34 x 6.9
	Gross Weight (w/ PSU & Rail, w/o Disks)	kgs : 52.76
		lbs : 116.31
	Packaging Dimensions (W x D x H)	mm : 603 x 1095 x 408
		inches : 23.74 x 43.11 x 16
Mounting	Standard	Slide rail
	Option	Cable management kit

1.3 General Information

J4076-01 is a 4U rackmount chassis with 60 x 3.5" HDDs hot swap bay / 16 x 2.5" HDDs hot swap bay and dual expander module JBOD, which is a high performance, high density, scalable storage product.

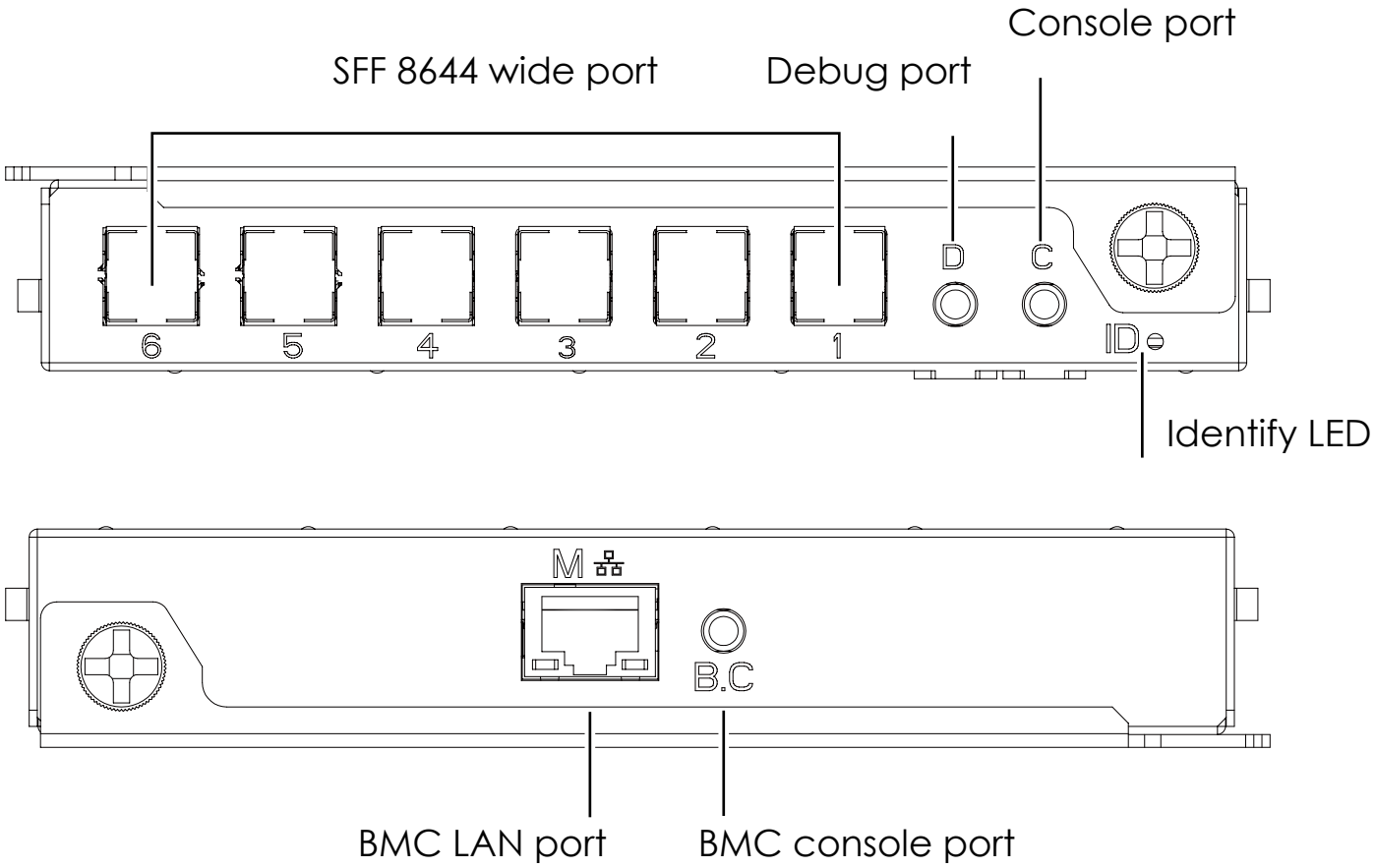
- Front Panel



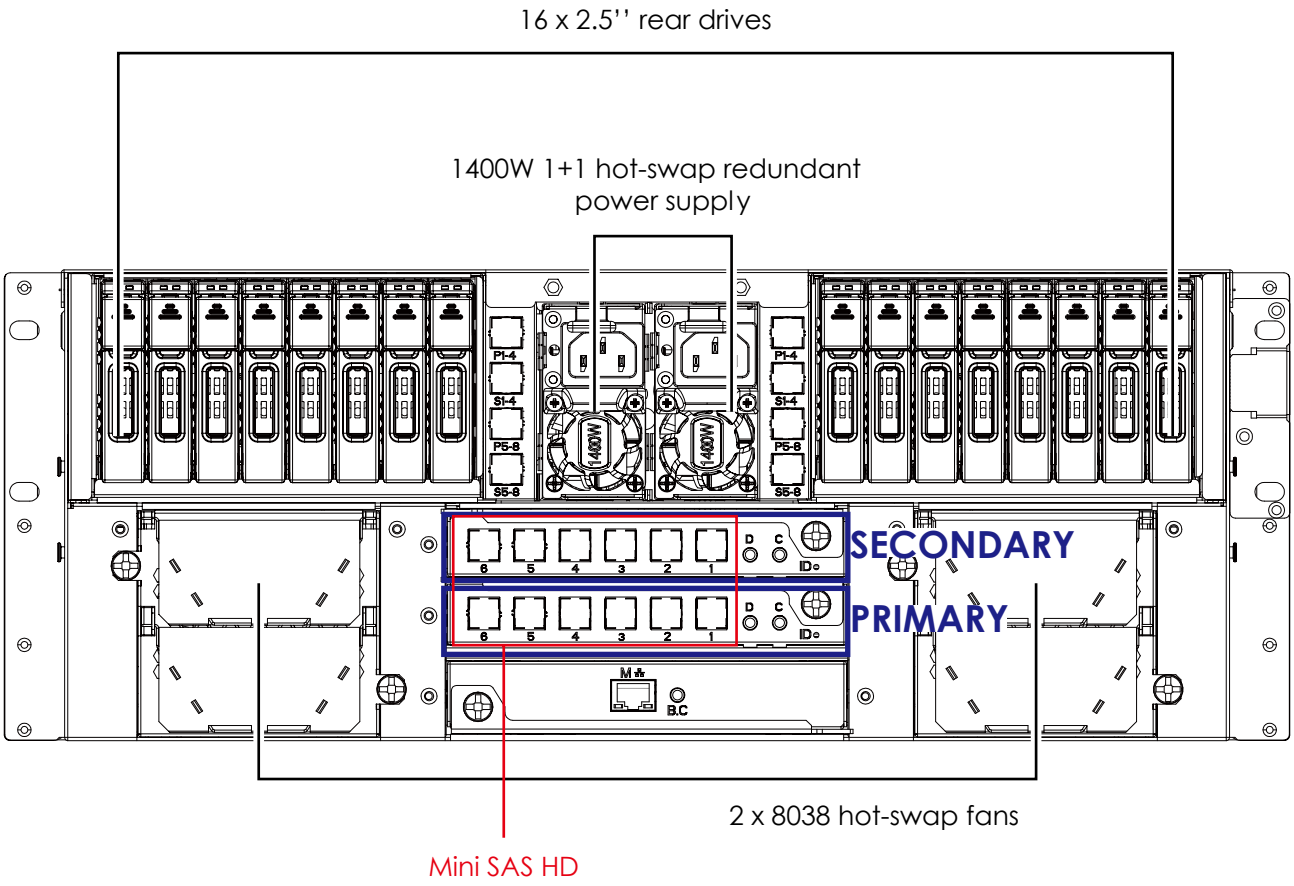
System PWR Switch	
Behavior	Status
Normal	Off
Press	Boot up
Long Press	system shutdown

Power LED	
Behavior	LED Status
On	Green
Off	No Light
Power Fail LED/ Enclosure Warning/ Enclosure Failure	
Behavior	LED Status
Normal	Off
Failed	Red
Temperature(Overheat) LED	
Behavior	LED Status
Normal	Off
Failed	Red
Fan fault LED	
Behavior	LED Status
Normal	Off
Failed	Red
System Alert Mute Switch	
Behavior	Status
Normal	Off
Press	Alert mute

- Rear Expander Panel



- Rear Panel

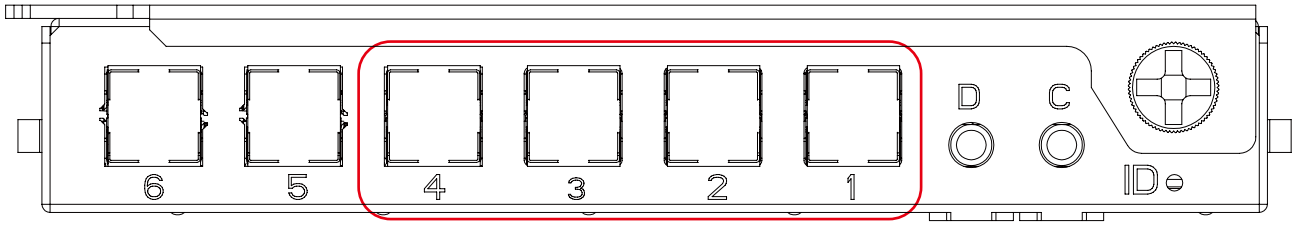

16 x 2.5'' rear drives
1400W 1+1 hot-swap redundant
power supply
SECONDARY
PRIMARY
2 x 8038 hot-swap fans
Mini SAS HD

1.4 8644 with Zoning Configuration and 8644 port definition

There are 3 kinds of zoning options that can be implemented by Command Line interface operation (see Chapter 3 for reference). By using the zoning option, four of the 8644 ports will have a variety of zone group settings. Port 5 and Port 6 will always be able to access all disk.

Zone count 1:
76 drives per zone. All SFF8644 ports and drives are at the same zone group.(SEE FIGURE BELOW).

Zone count 1:



GROUP 1

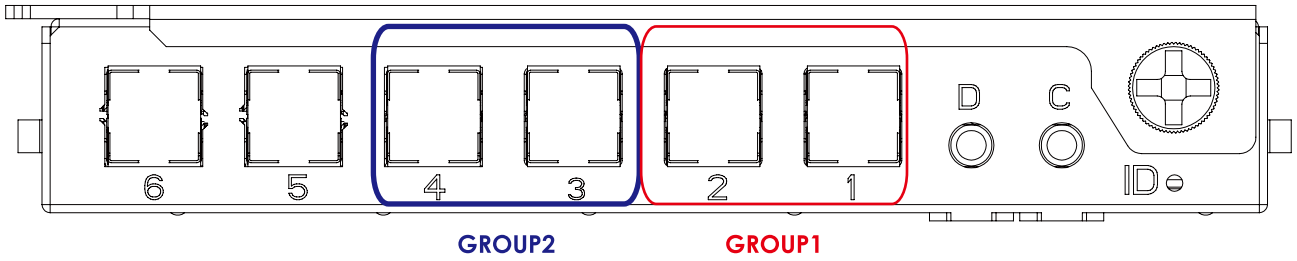
Left Edge expander						Center Edge expander				Right Edge expander					
78	77	76	75	74	73	72	71	68	67	66	65	64	63	62	61

Left Edge expander					Center Edge expander					Right Edge expander				
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

GROUP 1

Zone count 2:
38 drives per zone. Port 1 & Port 2 are at zone group 1, Port 3 & Port 4 are at zone group 2 (SEE FIGURE BELOW).

Zone count 2:



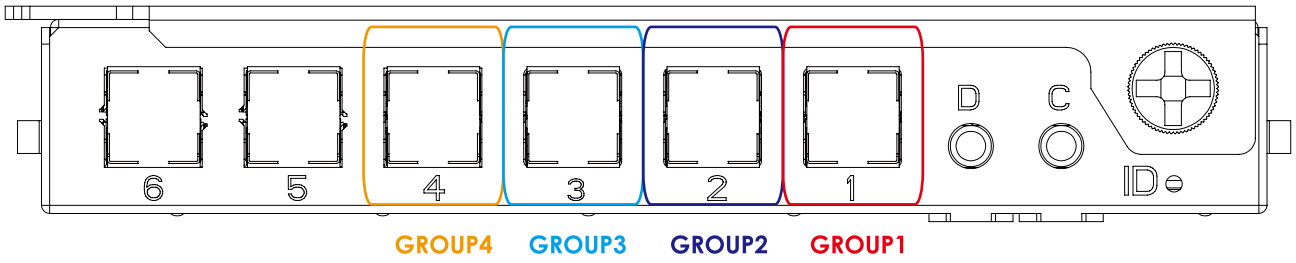
Left Edge expander						Center Edge expander		Right Edge expander							
78	77	76	75	74	73	72	71	68	67	66	65	64	63	62	61

GROUP2 GROUP1

Left Edge expander					Center Edge expander					Right Edge expander					
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	GROUP2
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	GROUP1
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	

Zone count 4:
15 drives & Port 1 are at zone group 1, 15 drives & Port 2 are at zone group 2, 23 drives & Port 3 are at zone group 3, 23 drives & port 4 are at zone group 4.
(SEE FIGURE BELOW)

Zone count 4:



Left Edge expander						Center Edge expander				Right Edge expander					
78	77	76	75	74	73	72	71	68	67	66	65	64	63	62	61

GROUP4 GROUP3

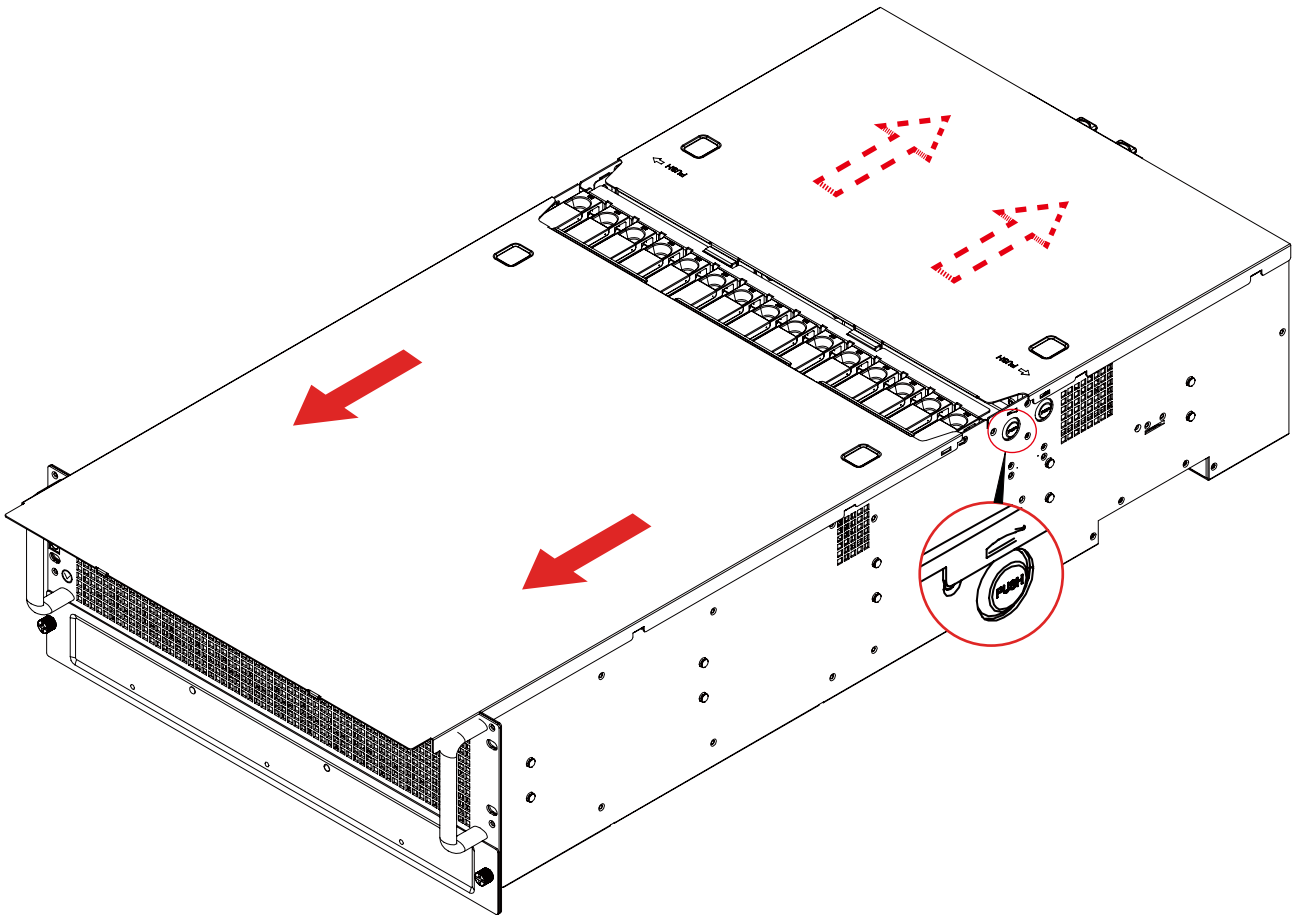
Left Edge expander						Center Edge expander				Right Edge expander					
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	GROUP4
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	GROUP3
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	GROUP2
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	GROUP1

Chapter 2. Hardware Installation

This chapter provides detailed instructions on hardware installation.

2.1 Removing and Installing Top Cover

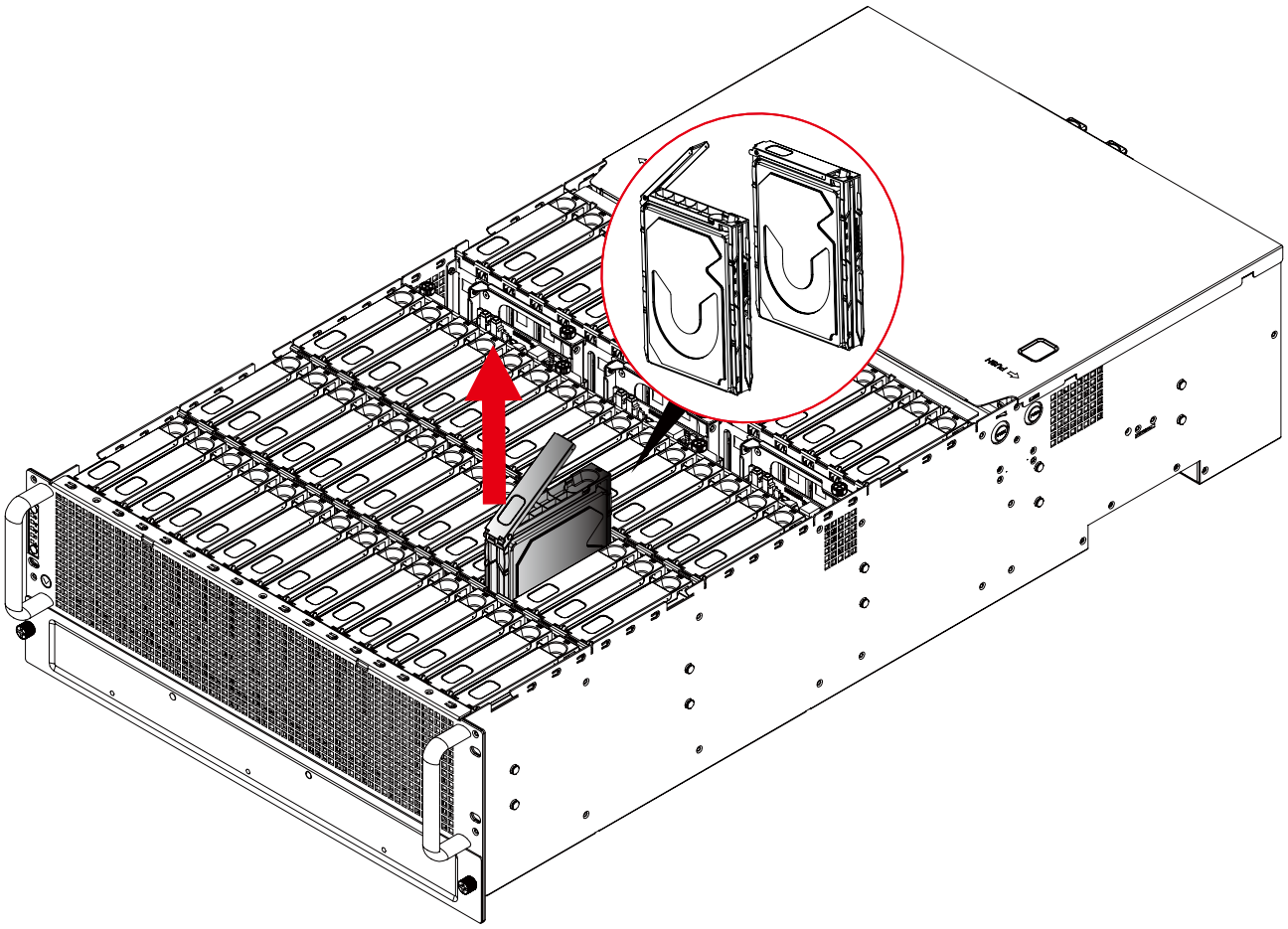
Pushing release button on both side and slide forward the top cover to open cover.



2.2 Removing/Installing a Drive Tray/ Hard Drive/ Drive Slot Map

2.2.1 Removing a Disk Drive

Release a drive tray by pressing the unlock button and pinching the lock lever slightly and pulling out the drive tray.

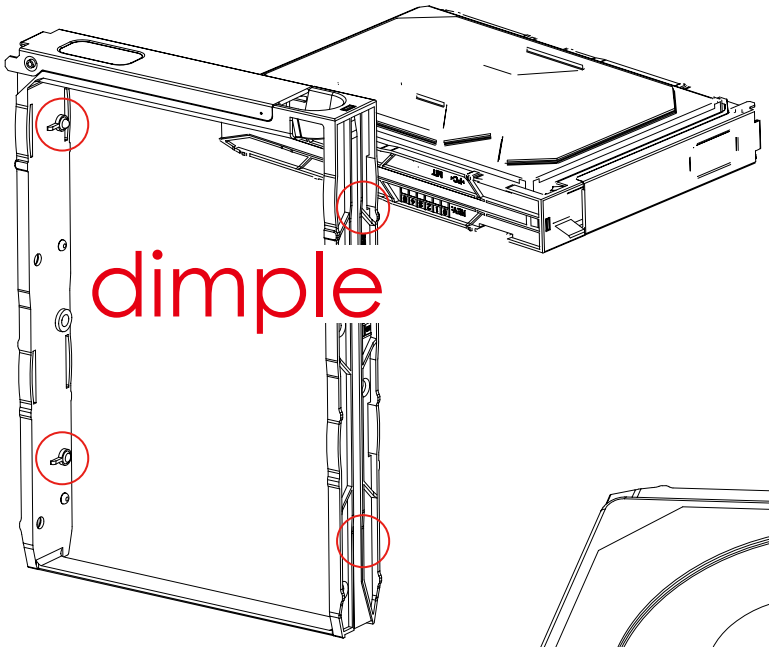


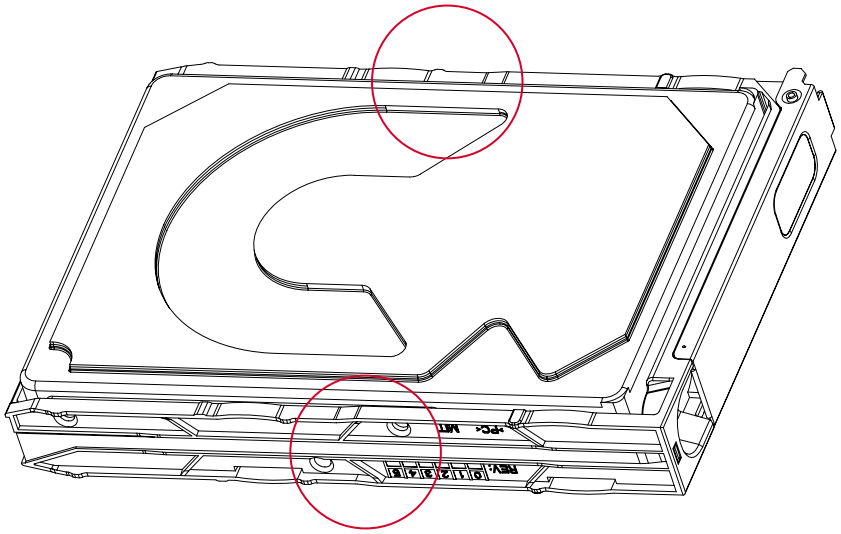
2.2.2 Installing a Hard Disk Drive Tray

Insert the drive carrier into its bay. Push the tray lever until it clicks. Make sure the drive tray is correctly secured in place when its front edge aligns with the bay edge. (follow the reverse order)

2.2.3 Installing a 3.5" Disk Drive

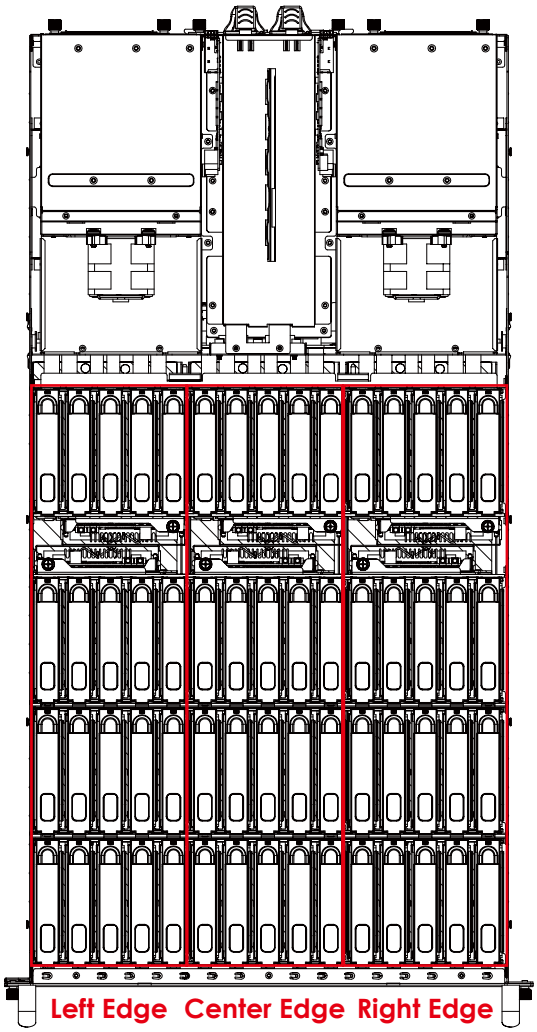
- Directly place HDD into tool-less HDD tray until it snaps. Please check if the screw holes on HDD match the dimples on HDD tray.
- HDD can also be screwed on HDD tray by fastening two screws as picture showed.





2.2.4 Drive Slot Map

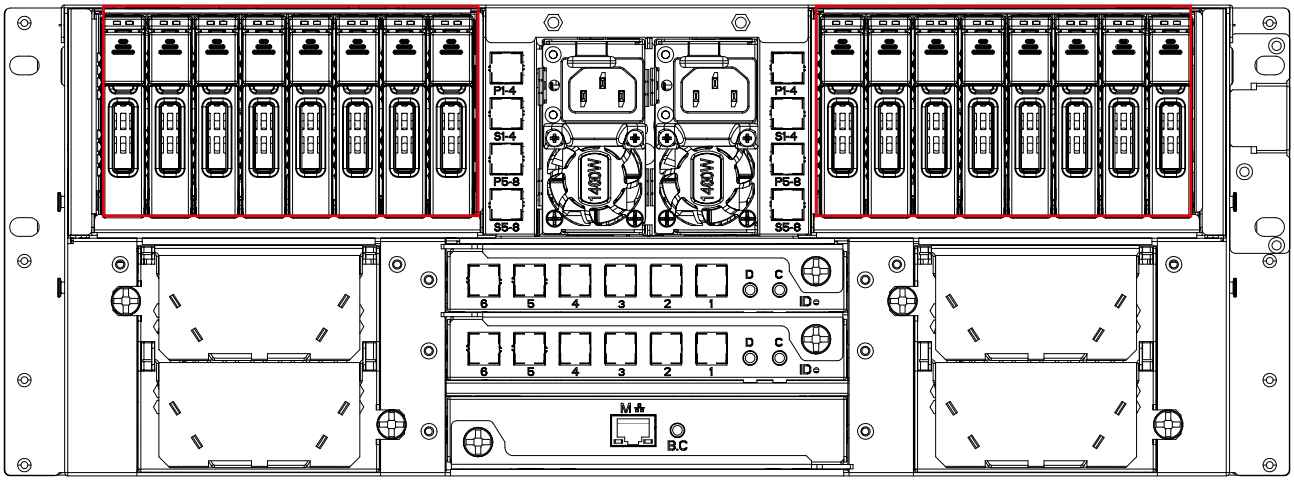
The drive slot map follows.



MegaRaid Card														
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

HBA Card														
15	16	17	18	19	15	16	17	18	19	15	16	17	18	19
10	11	12	13	14	10	11	12	13	14	10	11	12	13	14
5	6	7	8	9	5	6	7	8	9	5	6	7	8	9
0	1	2	3	4	0	1	2	3	4	0	1	2	3	4

The drive slot map follows.



MegaRaid Card															
61	62	63	64	65	66	67	68	71	72	73	74	75	76	77	78

HBA Card															
20	21	22	23	24	25	20	21	22	23	20	21	22	23	24	25

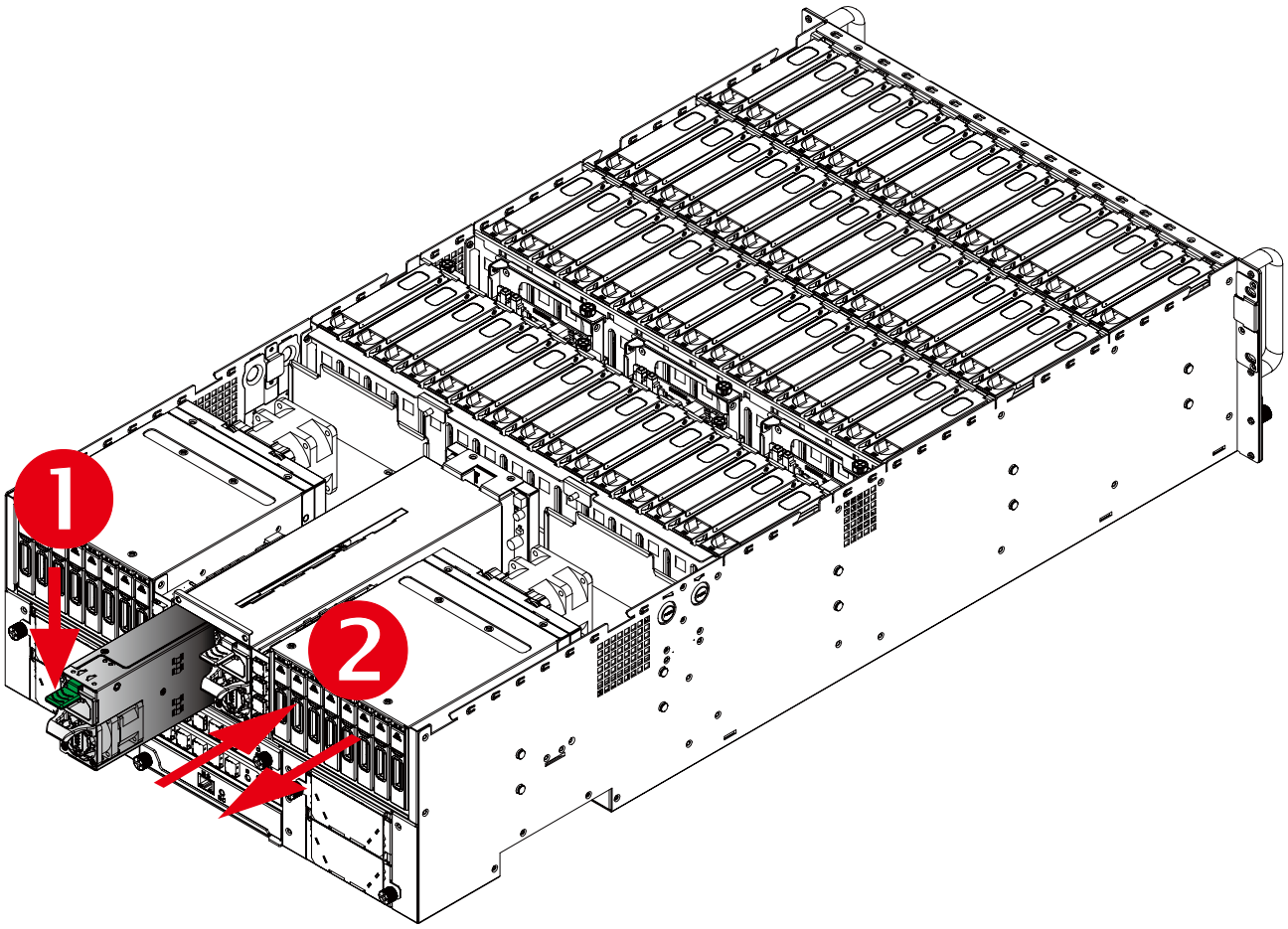
2.3 Removing and Installing a PSU Module

2.3.1 Removing a PSU module

- Remove power cables connected to the PSU module.
- Allow a minute for fan to spin down.
- Pushing the latch then hold the tray handle tab. Then pull the PSU module gently until it slides out of the JBOD.

2.3.2 Installing a PSU Module

- Slide in PSU module.
- Make sure the latch on the module is fully hooked onto the PSU housing.



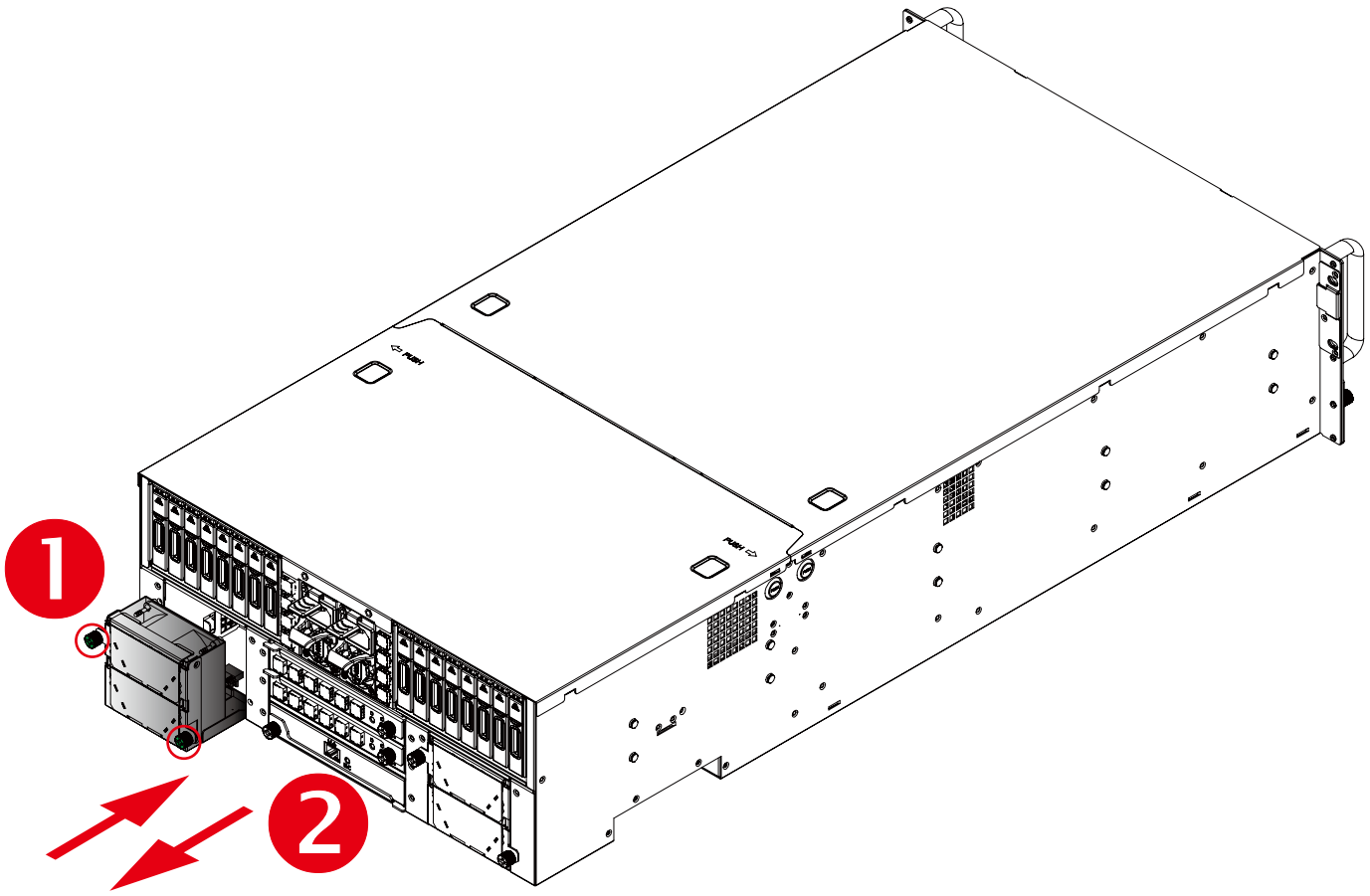
2.4 Removing and Installing a Fan Module

2.4.1 Removing a Fan module

- Loosen the thumb screws on each sides in front of fan module.
- Hold the fan module from both sides.
- Pull the fan module gently and firmly until it clears the enclosure chassis.

2.4.2 Installing a Fan Module

- Align the fan module with the opening in the enclosure.
- Insert the fan module into JBOD.



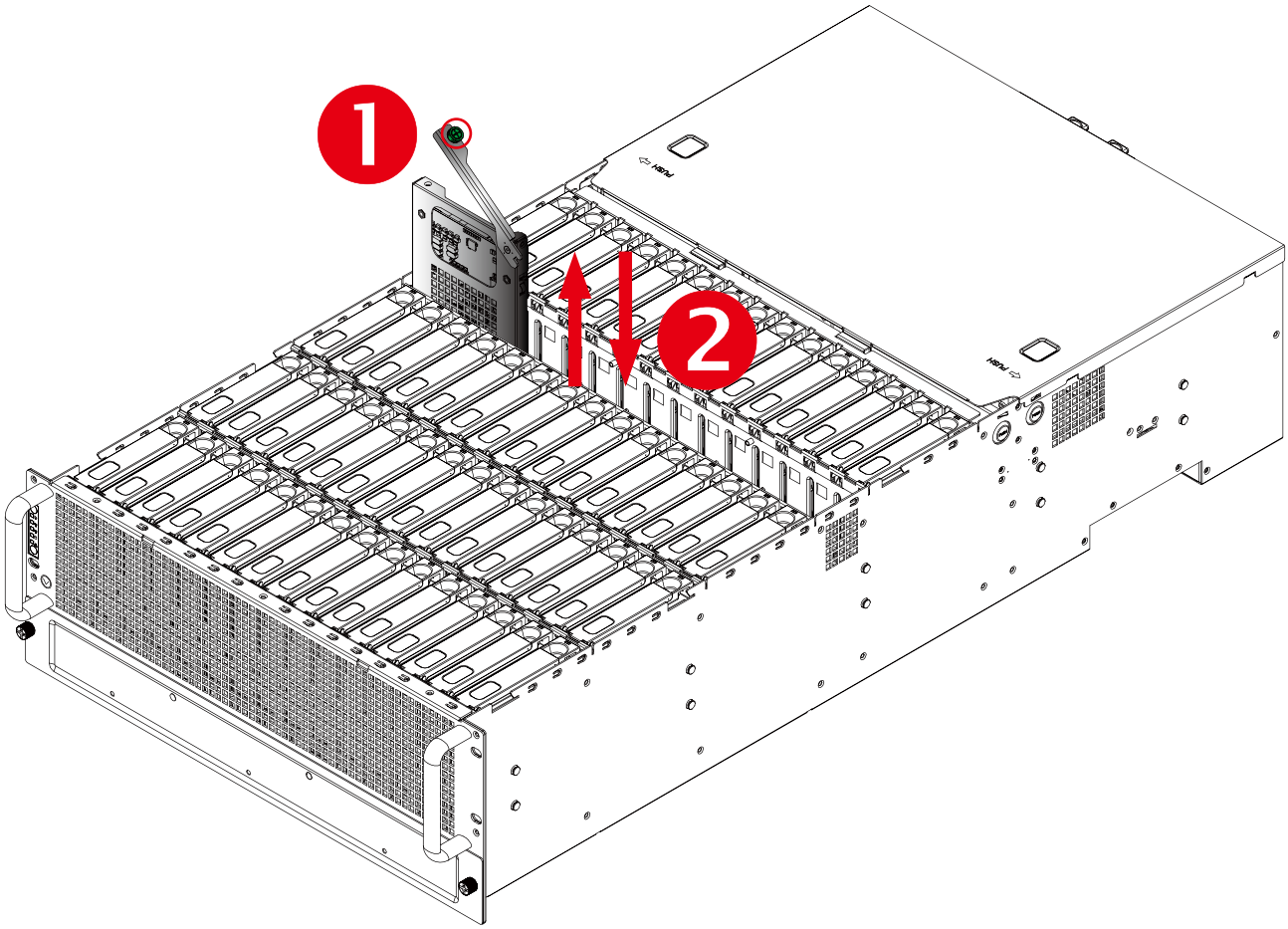
2.5 Removing and Installing External Expander Module

2.5.1 Removing an expander module

- Loosen the thumb screw to release expander tray lever.
- Hold the lever to pull the expander out of JBOD.

2.5.2 Installing an expander module

- Align the expander module with the opening in front of the enclosure, and insert it into the enclosure firmly.
- Close the lever and secure the retaining screw.



2.6 Removing and Installing the HDD backplane Module

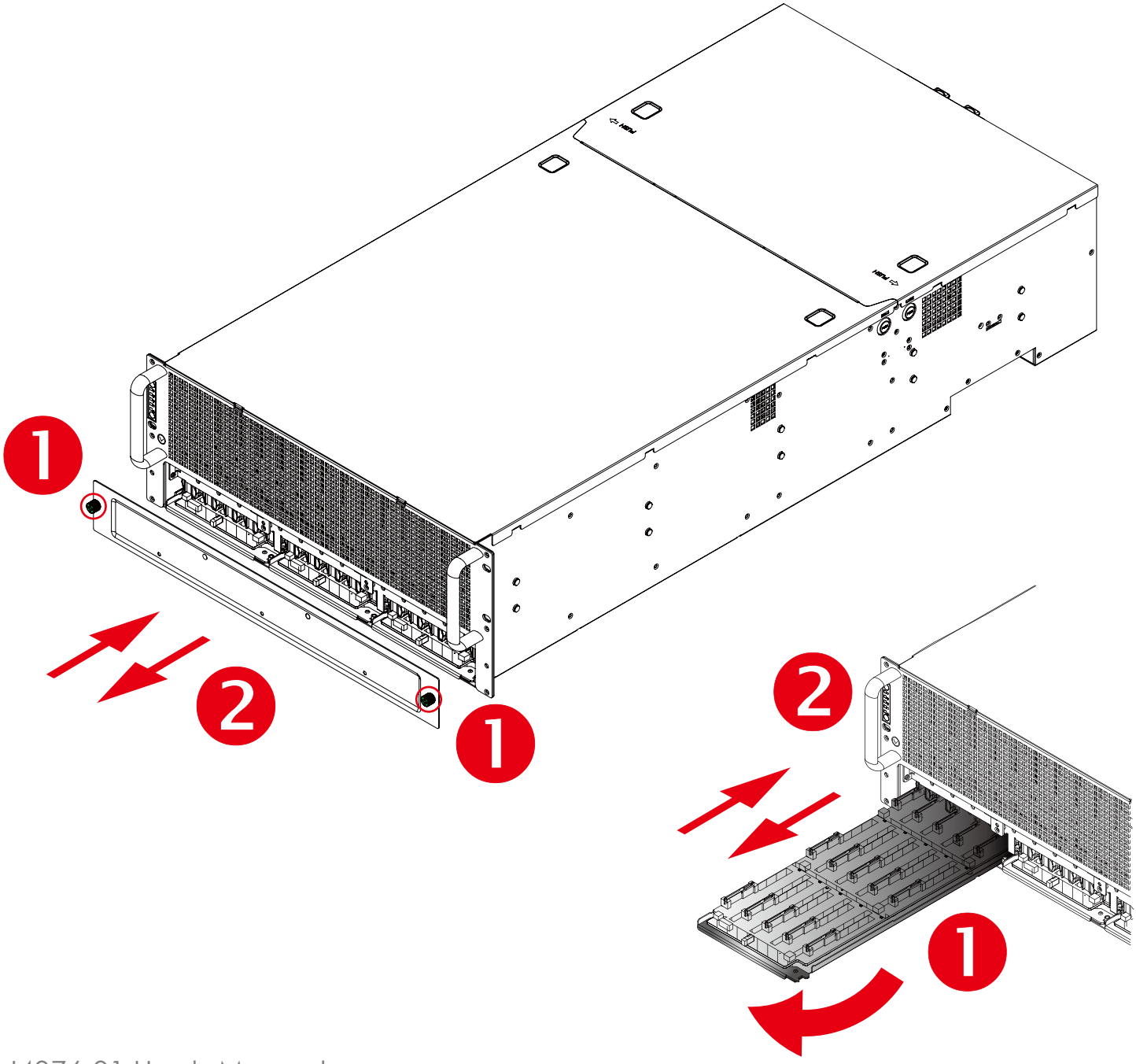
2.6.1 Removing a HDD backplane module

- Unscrew both sides of the front panel to release LED board.
- Hold the backplane module to pull the backplane module out of JBOD.

2.6.2 Installing a HDD backplane module

- Slide the HDD backplane module into JBOD and close the lever.
- Cover JBOD with LED front board and screw both sides.

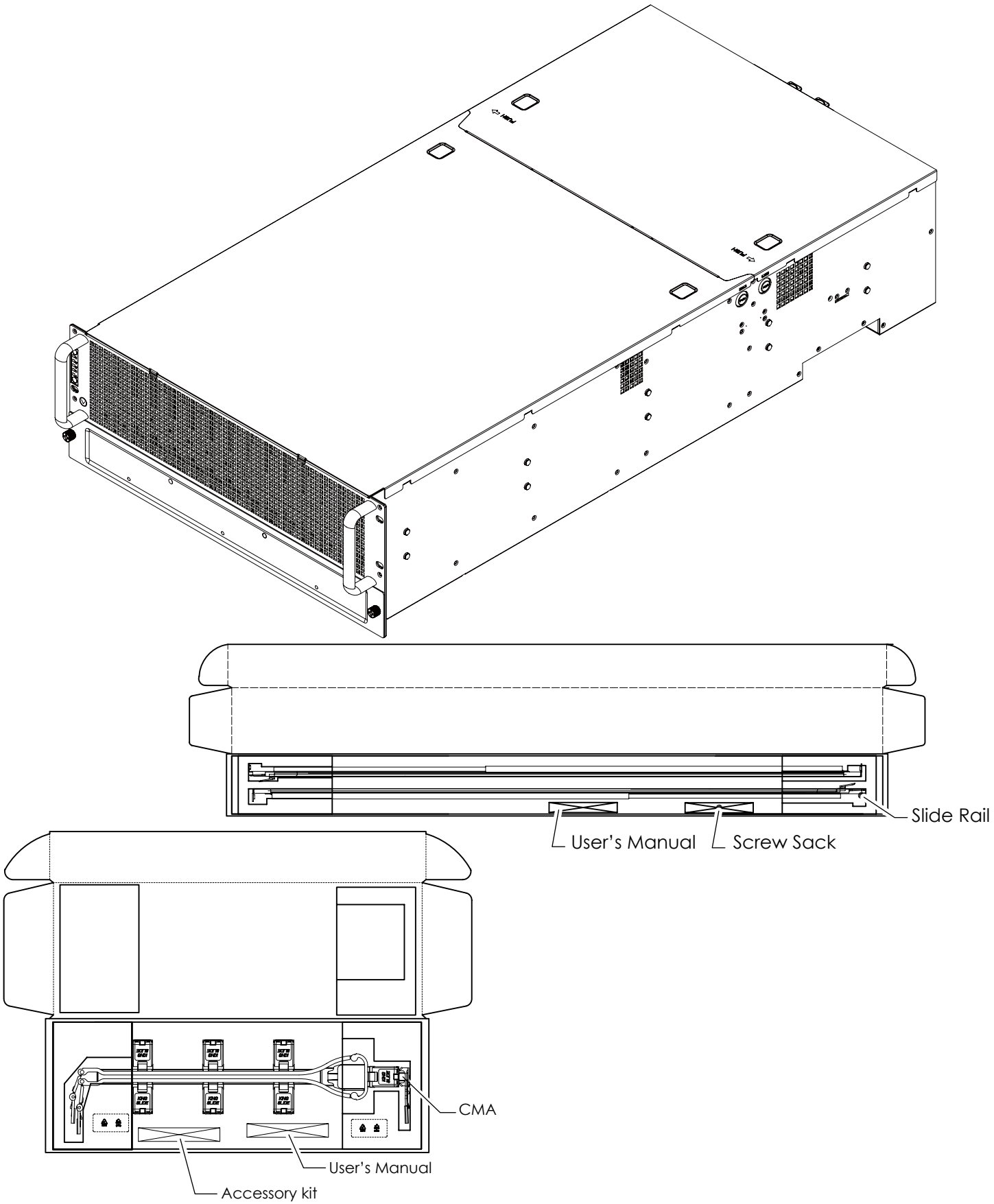
WARNING : BEFORE YOU PULL OUT THE HDD BACKPLANE, MUST REMOVE ALL THE HDD TRAYS AND EXPANDER MODULES FIRST.



2.7 Installing Slide Rail

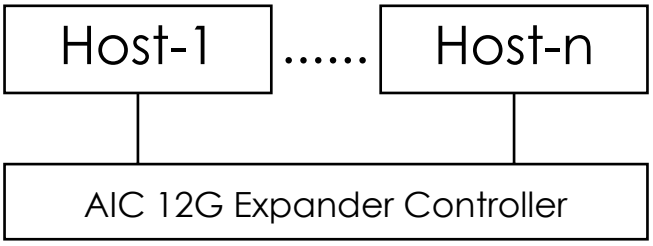
2.7.1 Installing slide rail

To install the slide rail, please refer to the manual in the slide rail kit.



Chapter 3. Sub-System Configuration Setup

3.1 Supported Configuration



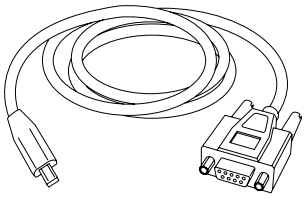
NOTE :

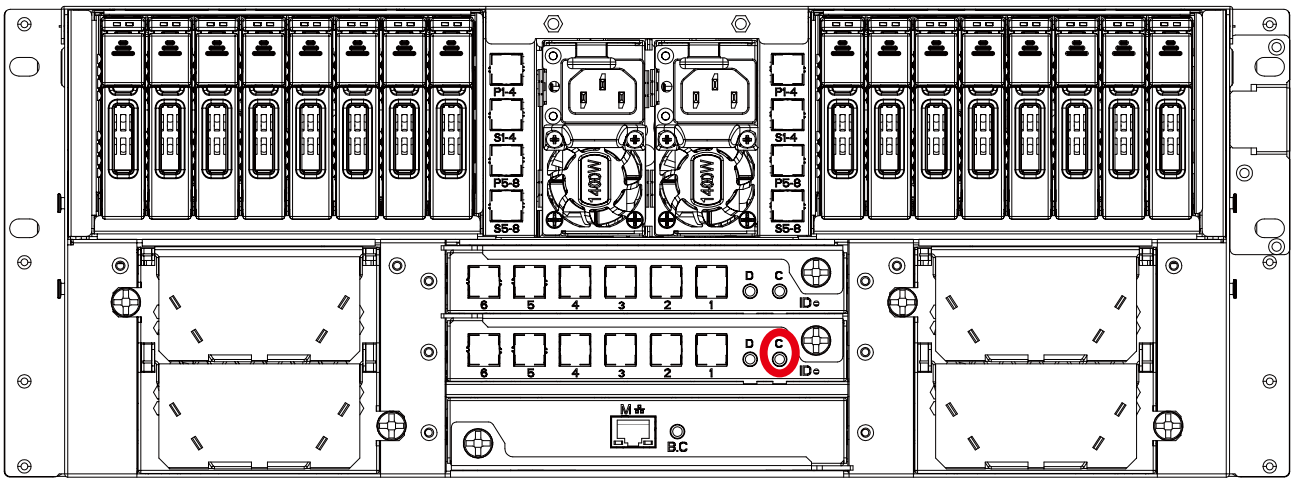
To have multiple host access support (the host number can be up to the number of wide ports on each AIC 12G Expander Controller), only the following drives are supported for shared access:

1. SAS drive / nearline SAS drive
2. SATA drive with an interposer which provides SATA-to-SAS convertion

3.2 Connect Host to JBOD via RS232

Use a RS-232 DB9 cable to connect the console port of JBOD with host's PC COM port (see figures below for DB9 RS-232 cable and SAS expander COM port).





3.3 Utility Set up on Host

Step 1: Set up host RS232 connection

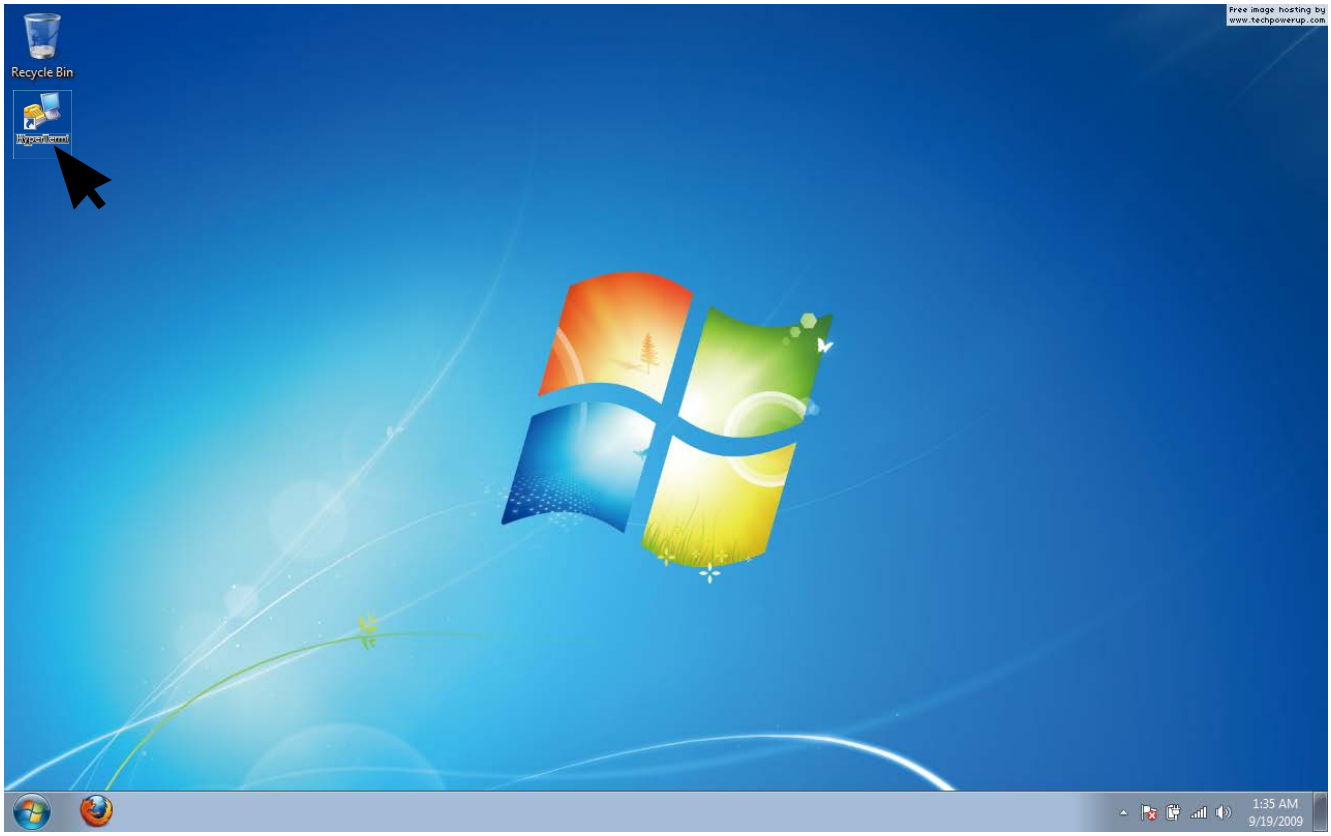
Set up RS232 connection application into your host as shown in the example process below.

For example:

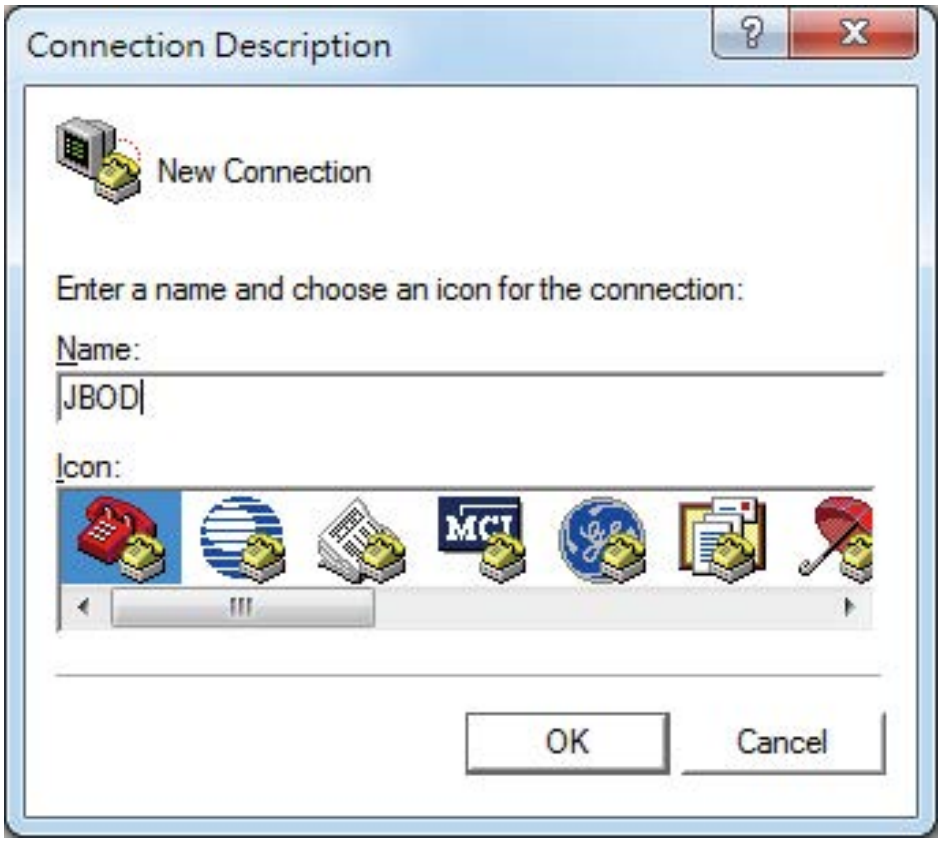
OS: Microsoft Windows Server 2008

RS232 connection application: Hyperterminal

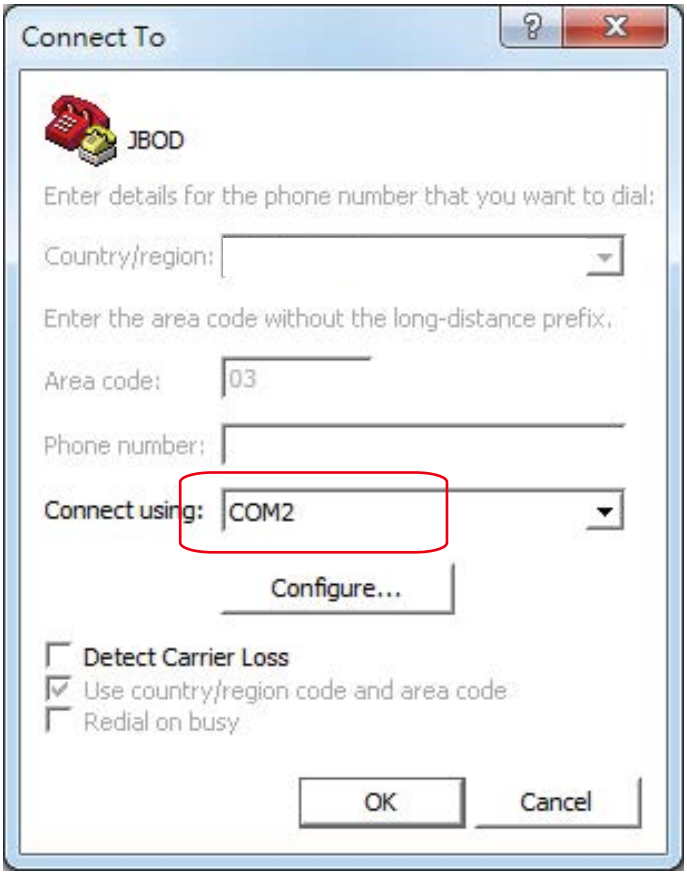
Step 2: Install HyperTrm.exe



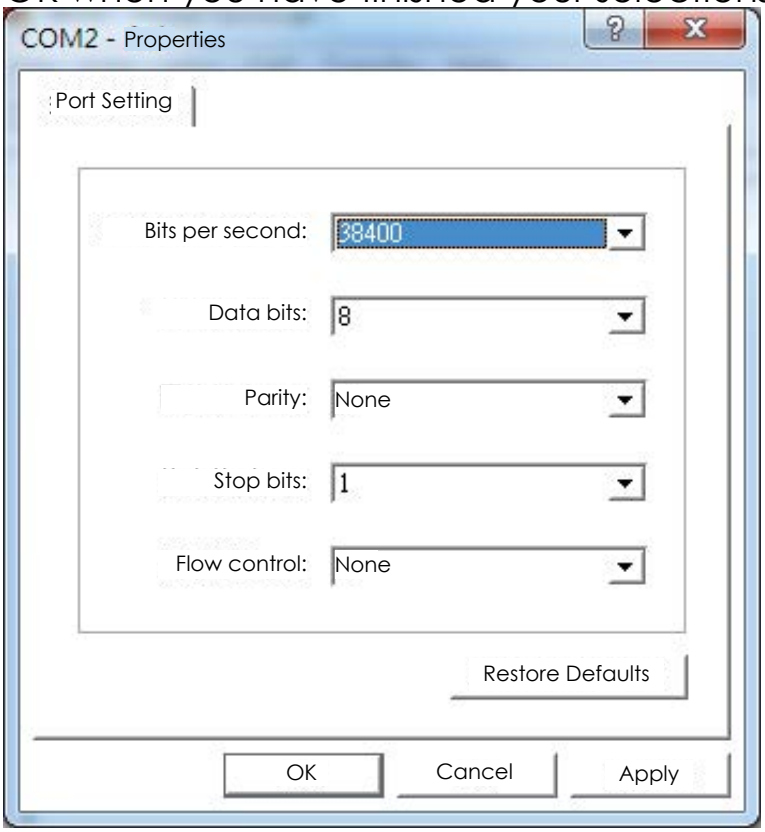
Step 3: Enter a new name for the icon in the field below and click OK.



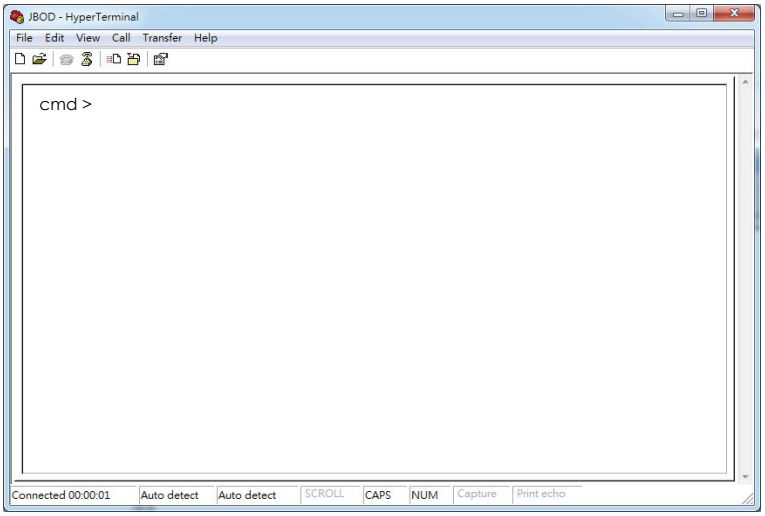
Step 4: Connect by using selecting an option in the drop down menu circled in red below (we selected COM2 in this example) and click OK.



Step 5: For “Bits per second”, select 38400. For “Flow control”, select: None. Click OK when you have finished your selections.

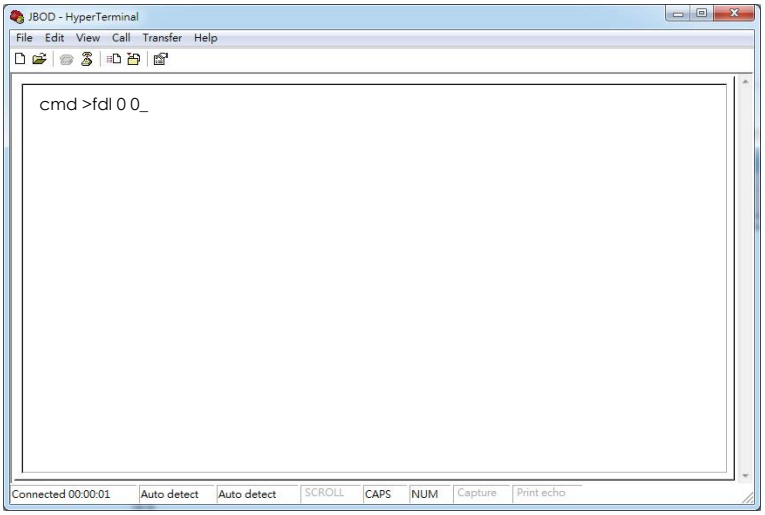


Step 6 : After steps 5, you will enter hyper terminal screen and then please press "Enter" key, the screen will appear the cmd line.

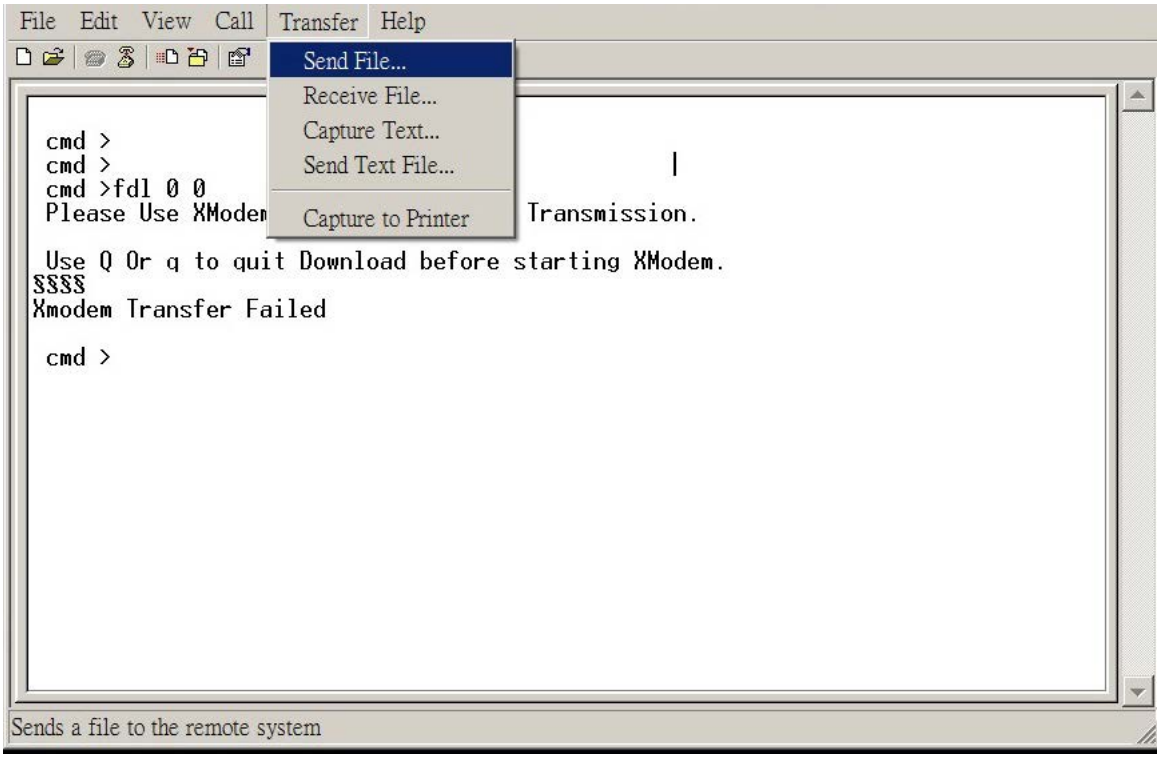


3.4 Updating Firmware and MFG through Console Port

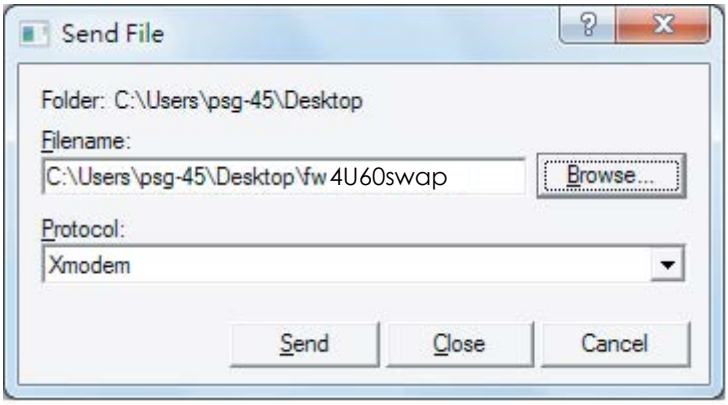
Step1：Please input “fdl 0 0” in command line to update the firmware.



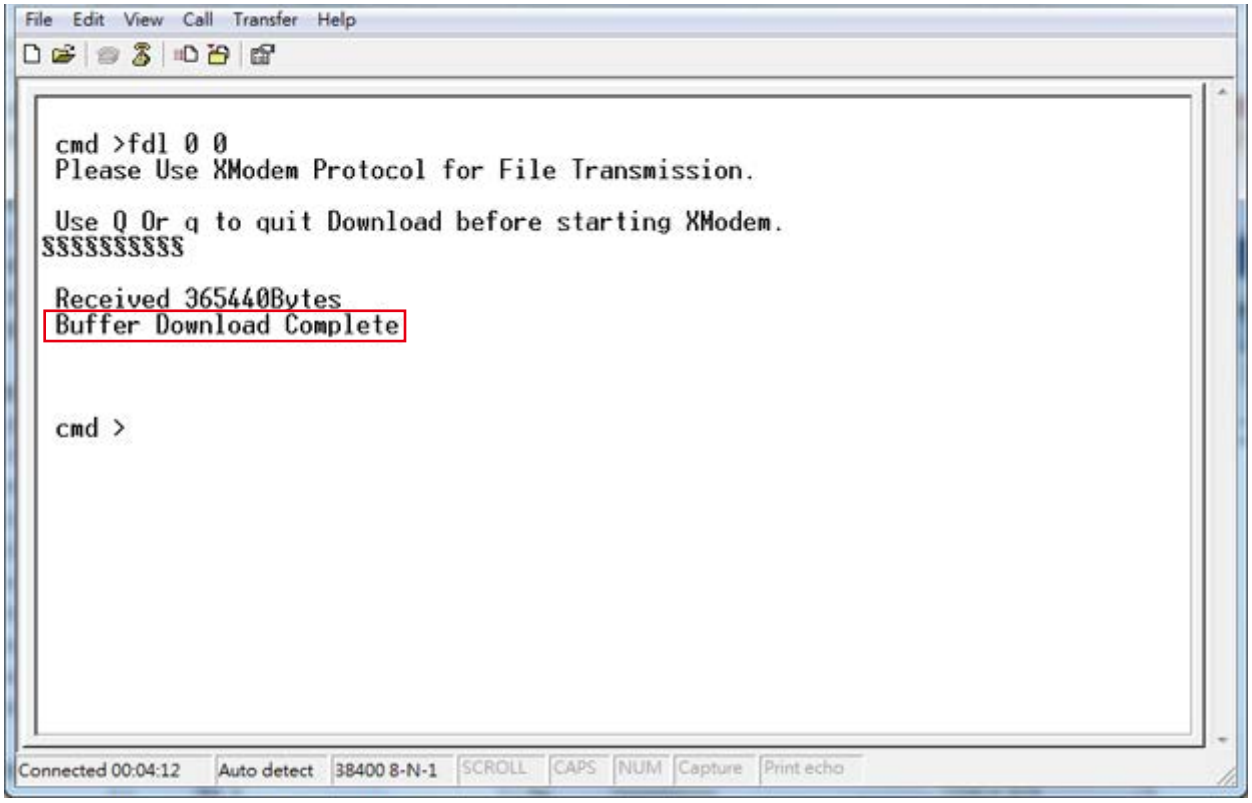
Step2：Select the tool bar "Transfer" -> "Send File" within 10 seconds.



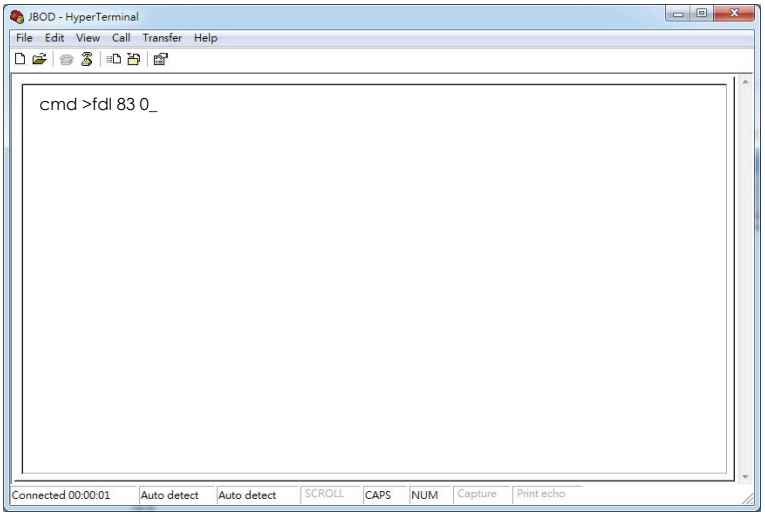
Step3：Select the Firmware file and set the Protocol type is “Xmodem” and then press the “Send” button.



Step4：After finished the FW updated, the screen will show “ Buffer Download Complete”.



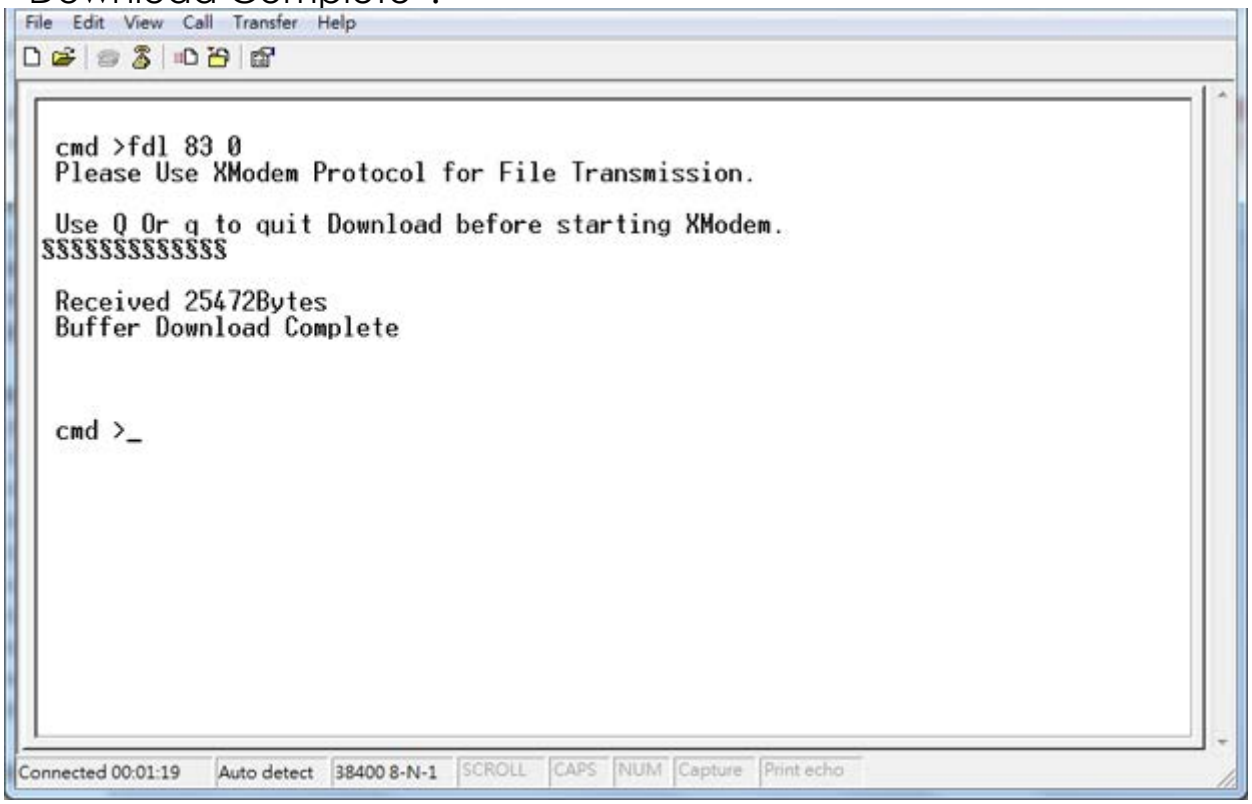
Step5：input “fdl 83 0 ” in commond line to update the MFG.



Step6：Go to the Transfer menu, and then select “Send file” within 10 seconds.

Step7：Select the MFG file and set the Protocol type is “Xmodem” and then press the “Send” button.

Step8：After finished the MFG updated, the screen will show “ Buffer Download Complete”.



3.5 Configure command Line Interface Operation

3.5.1 How to enable/disable T10 zoning

The default T10 zoning configuration is off.

(A) Check the current zoning state

cmd> phyzone state

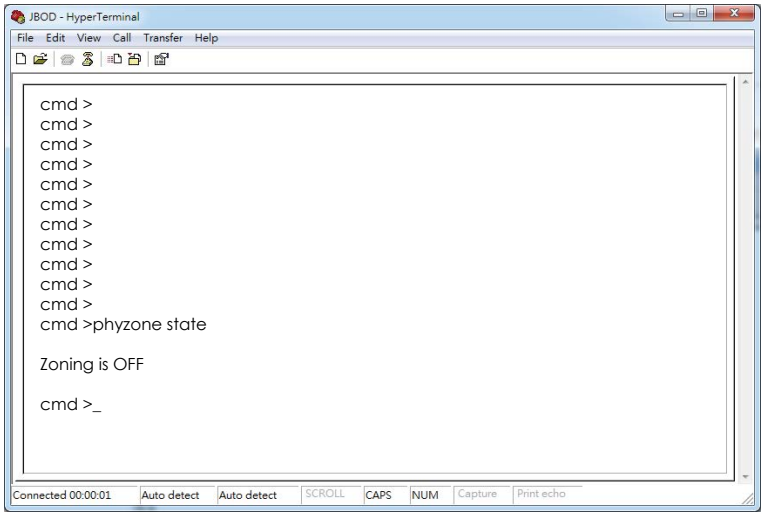
Zoning is OFF

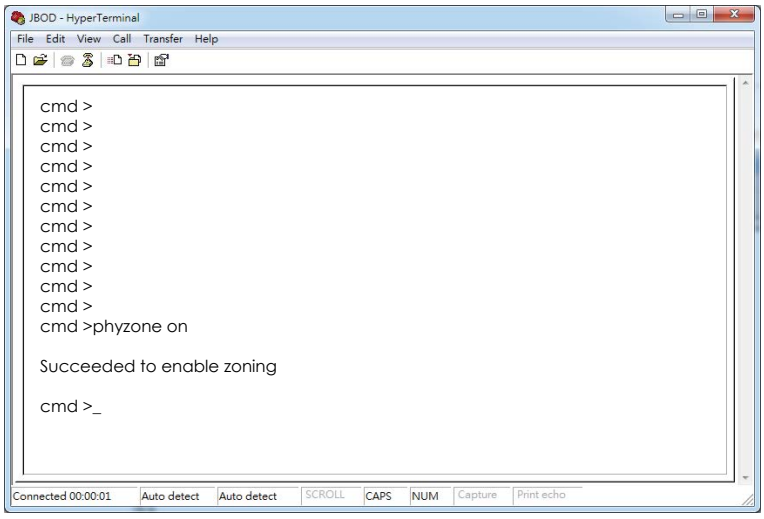
(B) Enable zoning

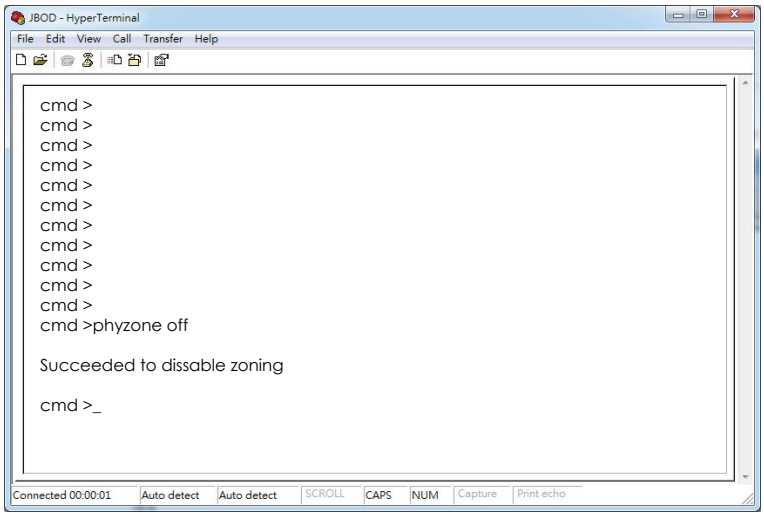
cmd> phyzone on

(C) Disable zoning

cmd> phyzone off







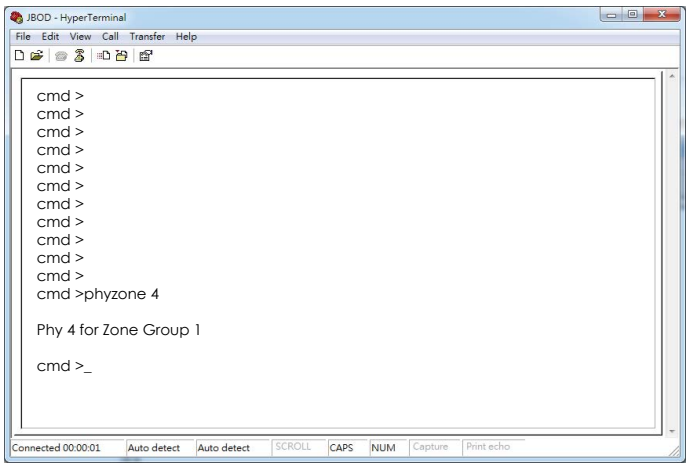
3.5.2 How to configure T10 zoning

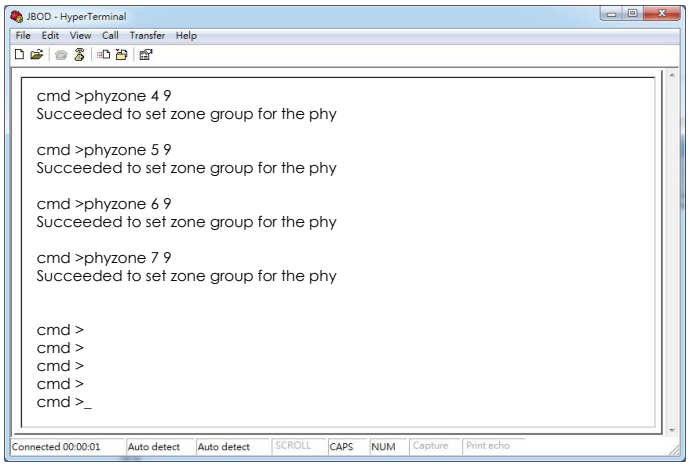
After enabling T10 zoning, senven predefined groups are Group1, Group8, Group9, Group10, Group11, Group 12 and Group 13.
Each PHY should be in one of the seven groups, and all PHYs in a wide port should be in the same group.
Each PHY in Group1 can access any PHY in other groups, and vice versa. Each PHY in Group8 cannot access any PHY in groups other than Group8, and vice versa.

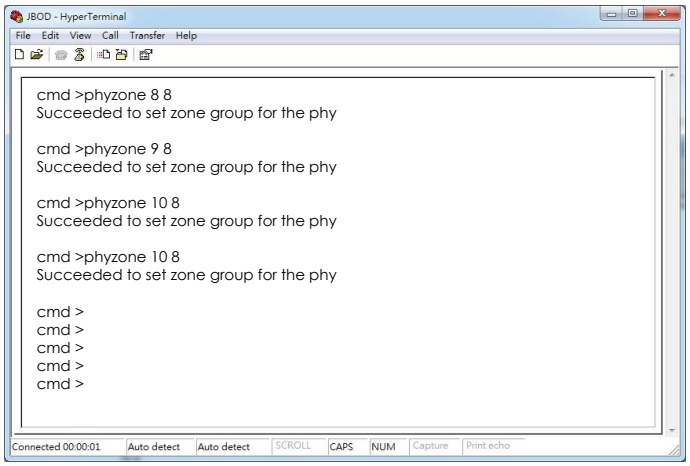
The command syntax is "phyzone phy_index group". The following example shows how to setup one drive accessed only the first port and another drive accessed only by the second port.

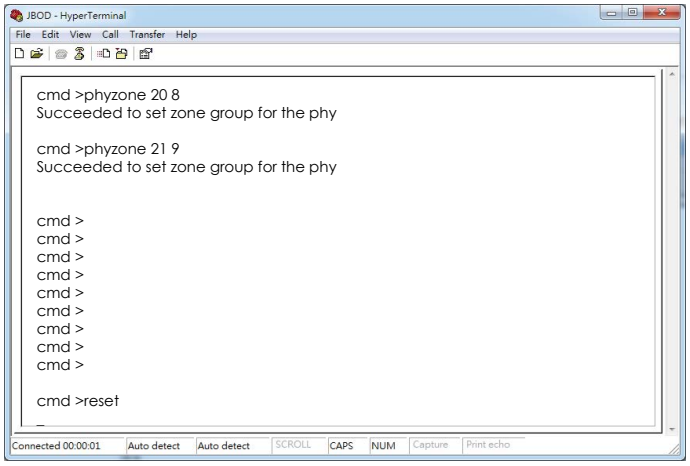
The configuration for the example is
(A) PHY8 - PHY11 for the first wide port of HUB
(B) PHY4 - PHY7 for the second wide port of HUB
(C) PHY20 - PHY21 for drives on EDGE

Step 1: Read the current group for PHY4 of HUB
cmd> phyzone 4
Phy 4 for Zone Group 1
Step 2: Assign the second port (PHY4 - PHY7) for Group9
cmd> phyzone 4 9
cmd> phyzone 5 9
cmd> phyzone 6 9
cmd> phyzone 7 9
Step 3: Assign the first port (PHY8 - PHY11) of HUB for Group8
cmd> phyzone 8 8
cmd> phyzone 9 8
cmd> phyzone 10 8
cmd> phyzone 11 8
Step 4: Assign the drive on PHY20 of EDGE to be accessed only by the first port of HUB instead of the second port
cmd> phyzone 20 8
Step 5: Assign the drive on PHY21 of EDGE to be accessed only by the second port of HUB instead of the first port
cmd> phyzone 21 9
Step 6: Rest HUB and EDGE for taking effect with the new settings.
cmd> reset


JBOD - HyperTerminal
File Edit View Call Transfer Help
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >phyzone 4
Phy 4 for Zone Group 1
cmd >_
Connected 00:00:01 Auto detect Auto detect SCROLL CAPS NUM Capture Print echo

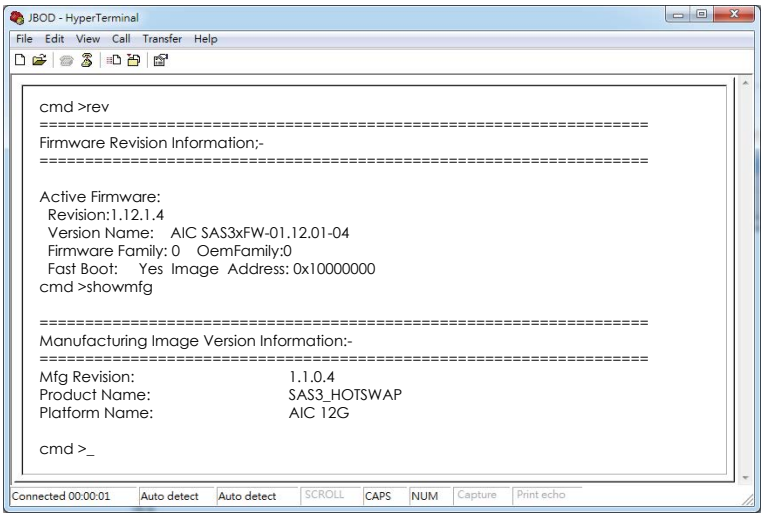

JBOD - HyperTerminal
File Edit View Call Transfer Help
cmd >phyzone 4 9
Succeeded to set zone group for the phy
cmd >phyzone 5 9
Succeeded to set zone group for the phy
cmd >phyzone 6 9
Succeeded to set zone group for the phy
cmd >phyzone 7 9
Succeeded to set zone group for the phy
cmd >
cmd >
cmd >
cmd >
cmd >_
Connected 00:00:01 Auto detect Auto detect SCROLL CAPS NUM Capture Print echo

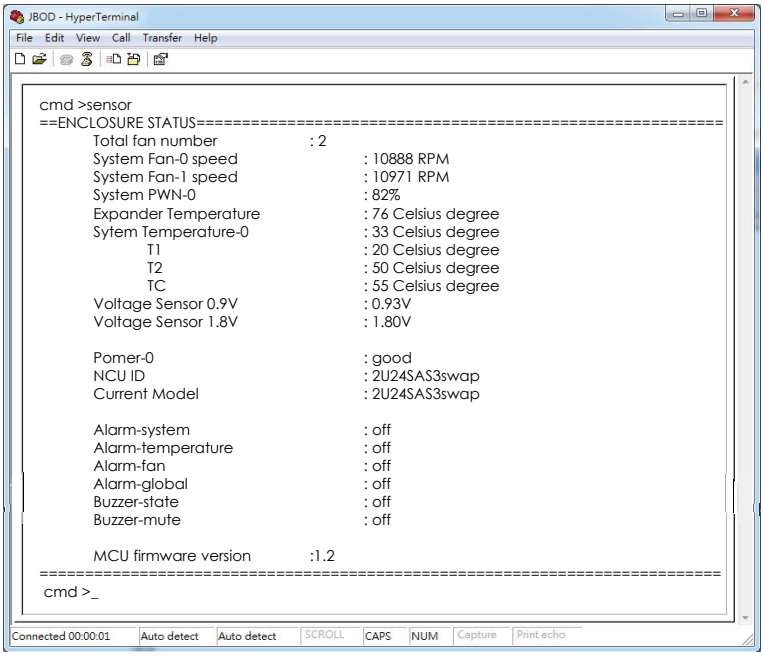

JBOD - HyperTerminal
File Edit View Call Transfer Help
cmd >phyzone 8 8
Succeeded to set zone group for the phy
cmd >phyzone 9 8
Succeeded to set zone group for the phy
cmd >phyzone 10 8
Succeeded to set zone group for the phy
cmd >phyzone 10 8
Succeeded to set zone group for the phy
cmd >
cmd >
cmd >
cmd >
cmd >
Connected 00:00:01 Auto detect Auto detect SCROLL CAPS NUM Capture Print echo


JBOD - HyperTerminal
File Edit View Call Transfer Help
cmd >phyzone 20 8
Succeeded to set zone group for the phy
cmd >phyzone 21 9
Succeeded to set zone group for the phy
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >reset
Connected 00:00:01 Auto detect Auto detect SCROLL CAPS NUM Capture Print echo

3.5.3 How to get all revisions in AIC SAS 12G Expander

(A) Expander firmware revision
cmd> rev
(B) Expander configuration revision
cmd> showmfg
(C) MCU firmware revision or sensor information (MCU firmware revision is reported by Hub only)
cmd> sensor





3.5.4 How to configure temperature sensor(HUB only)

Four temperature settings in Celsius are T1, T2, warning threshold, and alarm (critical) threshold. The T1, T2 and alarm (critical) threshold are applied to the smart fan funcion.

(A) Get the current temperature settings

cmd> temperature

Temperature in Celsius (t1=20 C, t2=55 C, warning=50 C, alarm=55 C)

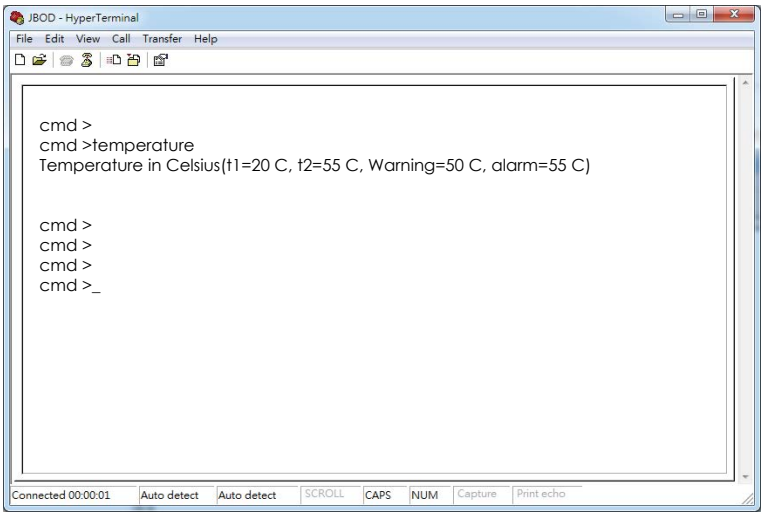
(B) Set temperature with new T1=18 C, T2=52 C, warning threshold=48 C, and alarm threshold=54 C. The new setting will take effect after reset.

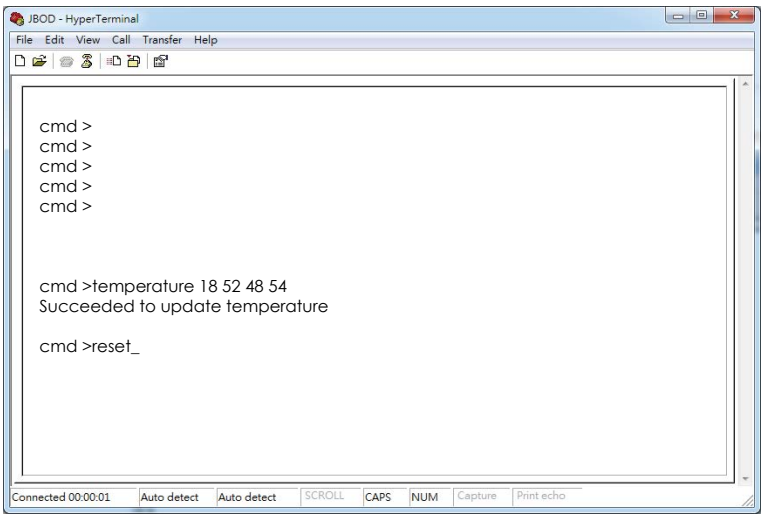
cmd> temperature 18 52 48 54

cmd> reset

(C) We also take expander temperature into consideration, and the temperature parameters for expander are non-changeable. Expander temperature parameters: T1=40, T2=86 (max 115*0.75) ,and no warning or alarm.

The smart fan feature will use the highest PWM output which is calculated from system and expander temperature parameters.





3.5.5 How to configure enclosure address

(A) Get the current enclosure address

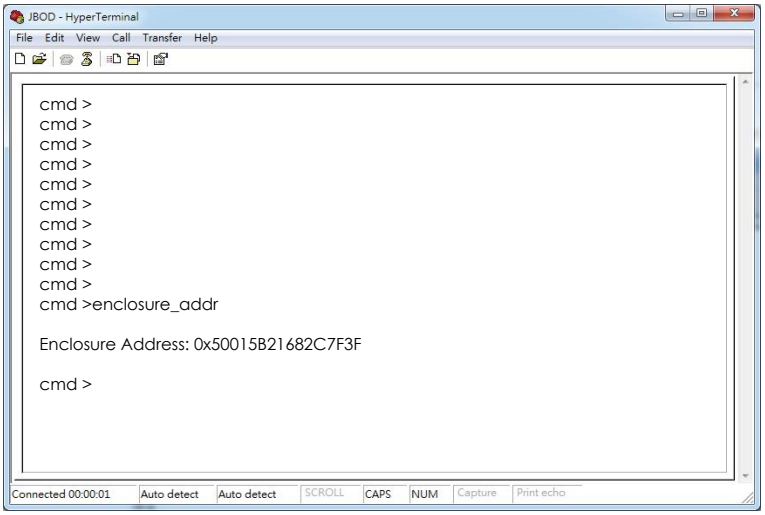
cmd> enclosure_addr

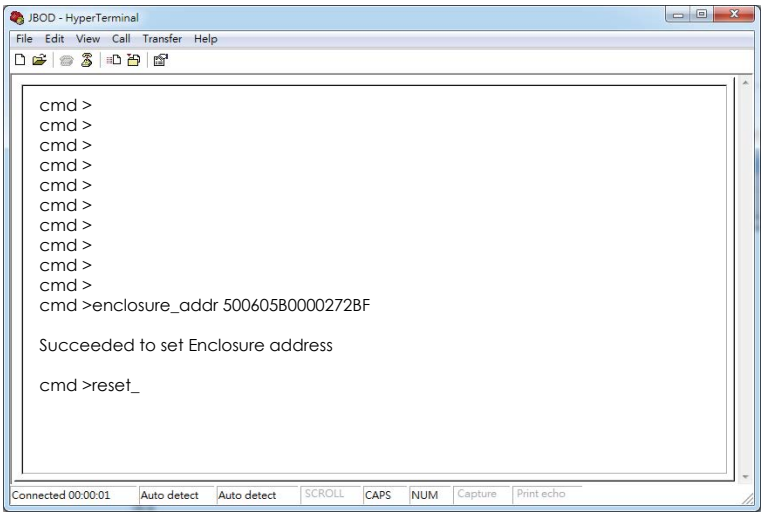
Enclosure Address: 0x500605B0000272BF

(B) Set the enclosure address with 0x500605B0000272BF. The new setting will take effect after reset.

cmd> enclosure_addr 500605B0000272BF

cmd> reset





3.5.6 How to configure standby timer for all disk drives(EDGE only)

This feature is applicable for SAS/SATA drives. Standby timer is in units of minutes. Setting standby timer with 0 minute disables this feature.

(A) Get current standby timer

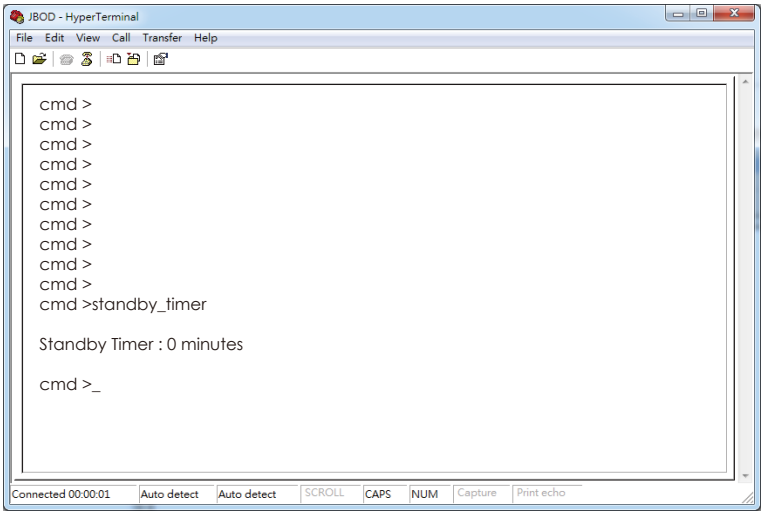
cmd> standby_timer

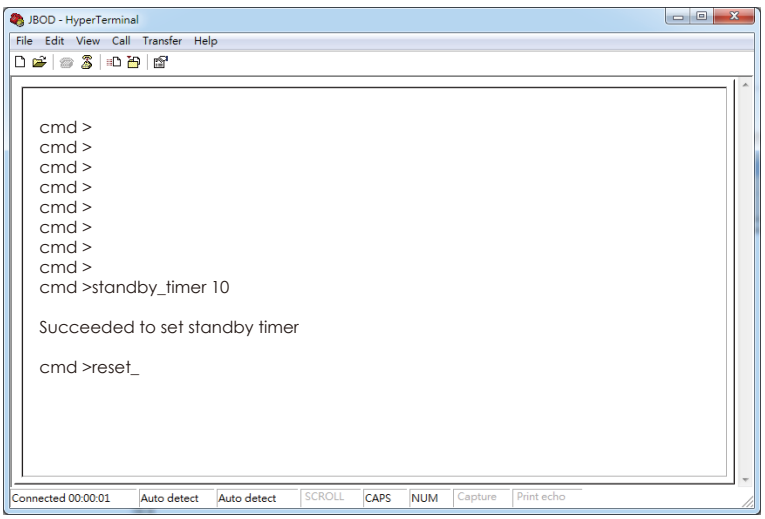
Standby Timer : 0 minutes

(B) Set the standby timer with 10 minutes. The new setting will take effect after reset.

cmd> standby_timer 10

cmd> reset





WARNING : THIS FUNCTION IS NOT RECOMMENDED TO USE WITH RAID CARD SINCE RAID CARD LIMITATION.

3.5.7 How to configure wide port checker

This feature is applicable for SAS drives instead of SATA drives. If there is no connection with any active SAS initiator by checking all wide ports, AIC Expander Controller stops all attached SAS drives to save power consumption of SAS drives. Otherwise, AIC Expander Controller starts all attached SAS drives to provide drive access service to any active SAS initiator. The same setting should be applied to HUB and EGDE.

(A) Get the current state of wide port checker

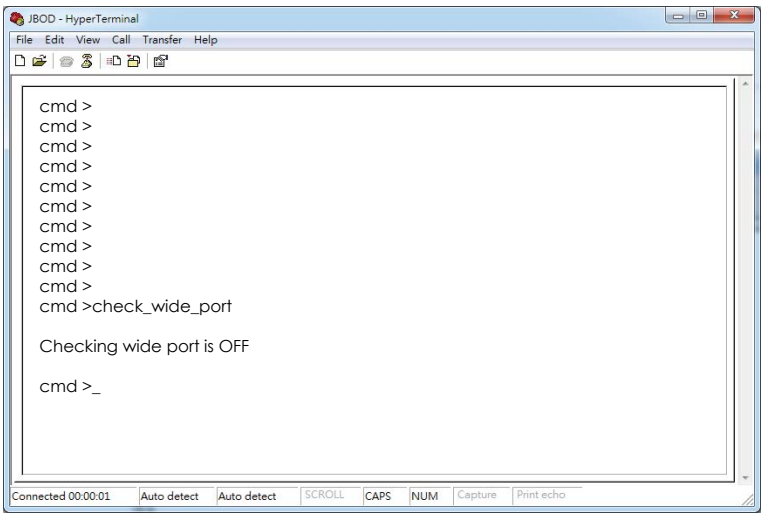
```
cmd> check_wide_port
Checking wide port is OFF
```

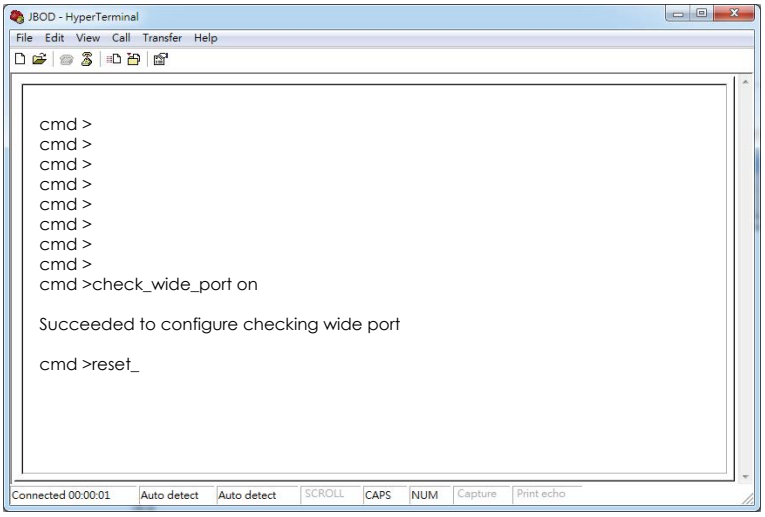
(B) Enable checking wide port. The new setting will take effect after reset.

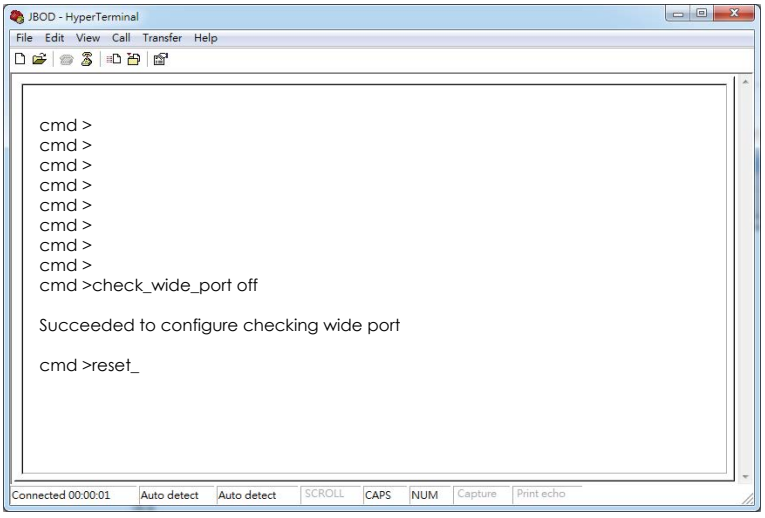
```
cmd> check_wide_port on
cmd> reset
```

(C) Disable checking wide port. The new setting will take effect after reset.

```
cmd> check_wide_port off
cmd> reset
```


JBOD - HyperTerminal
File Edit View Call Transfer Help
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >check_wide_port
Checking wide port is OFF
cmd >_
Connected 00:00:01
Auto detect
Auto detect
SCROLL
CAPS
NUM
Capture
Print echo


JBOD - HyperTerminal
File Edit View Call Transfer Help
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >check_wide_port on
Succeeded to configure checking wide port
cmd >reset_
Connected 00:00:01
Auto detect
Auto detect
SCROLL
CAPS
NUM
Capture
Print echo

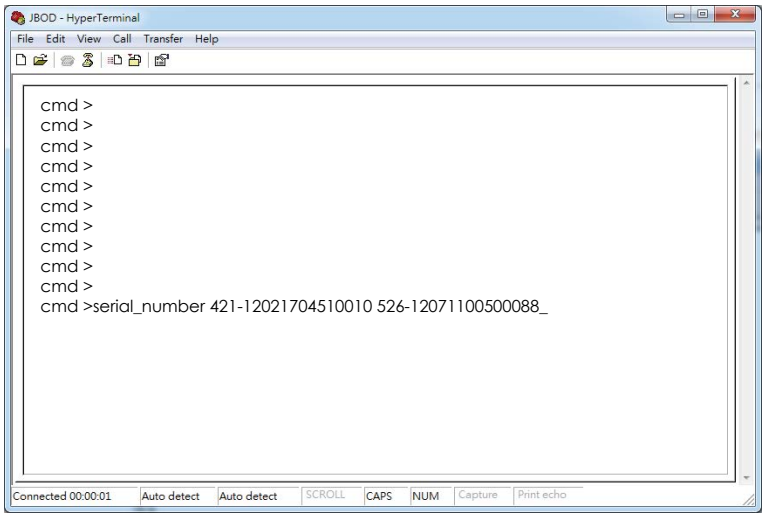

JBOD - HyperTerminal
File Edit View Call Transfer Help
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >check_wide_port off
Succeeded to configure checking wide port
cmd >reset_
Connected 00:00:01
Auto detect
Auto detect
SCROLL
CAPS
NUM
Capture
Print echo

3.5.8 How to configure serial number

(A) Get the current serial number
cmd> serial_number
Expander number: 421-12021704510010 or Expander number: 421-12021704510010 Enclosure number: 526-12071100500088

(B) Only set Expander serial number with 421-12021704510010.
cmd> serial_number 421-12021704510010

(C) Set both of Expander serial number (421-12021704510010) and Enclosure serial number (526-12071100500088).
cmd> serial_number 421-12021704510010 526-12071100500088



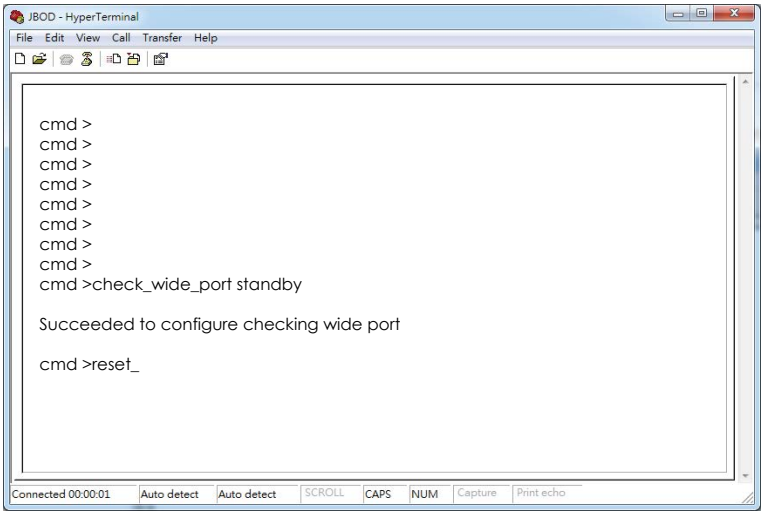
3.5.9 How to power off/on all disk drives automatically

This feature is applicable for SAS/SATA drives. If there is no connection with any active SAS initiator by checking all wide ports, AIC Expander Controller powers off all attached SAS/SATA drives to save power consumption. Otherwise, AIC Expander Controller powers on all attached SAS/SATA drives to provide drive access service to any active SAS initiator. The same setting should be applied to HUB and EDGE.

(A) Apply the following commands on the COM port.

cmd> check_wide_port standby

cmd> reset



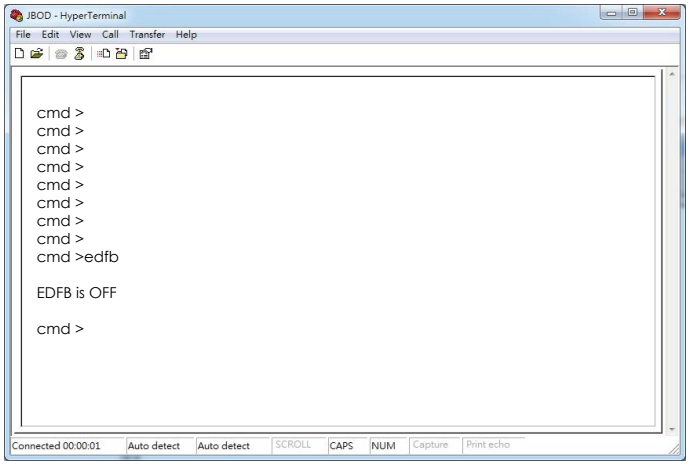
3.5.10 How to configure EDFB (EDGE only)

The default EDFB configuration is off.

(A) Check the current configuration

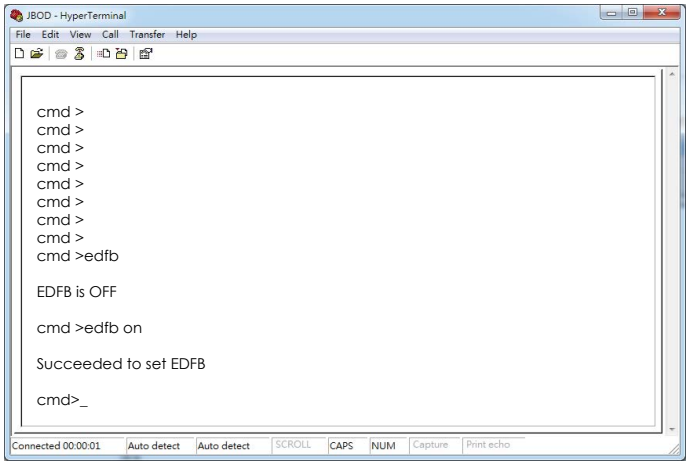
cmd> edfb

EDFB is OFF



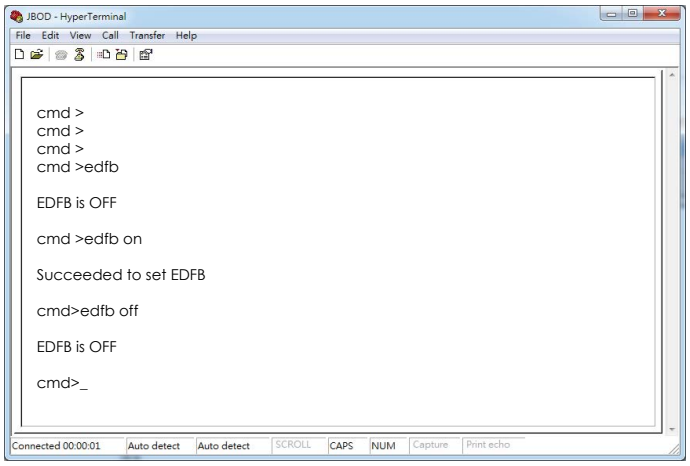
(B)Enable the edfb

cmd>edfb on



(C)Disable the edfb

cmd> edfb off



3.5.11 How to configure powe setting (HUB only)

This feature is for restoring on AC power loss. Three supported options are "keep off", "keep on", and "keep last state". The default setting is "keep off".

(A) Get the current power setting

```
cmd> power_setting
Power setting: keep off
```

(B) Set "keep off"

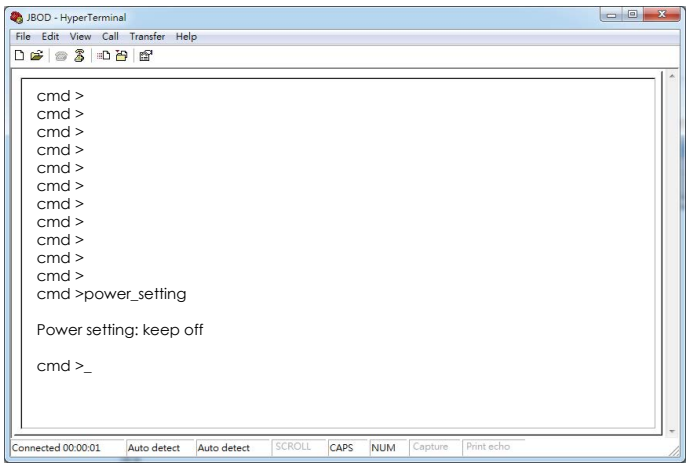
```
cmd> power_setting keep_off
```

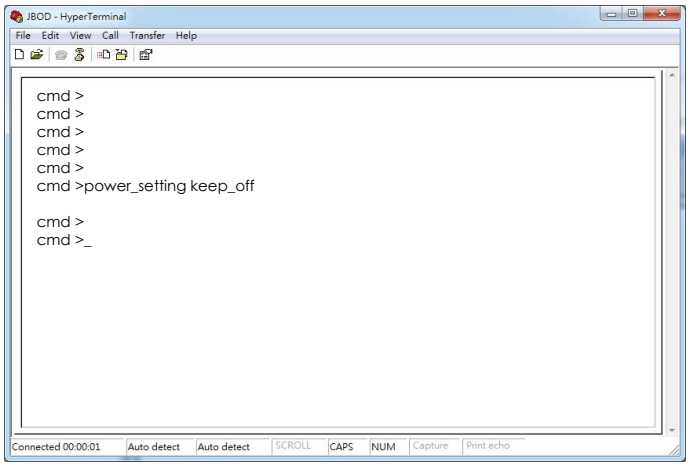
(C) Set "keep on"

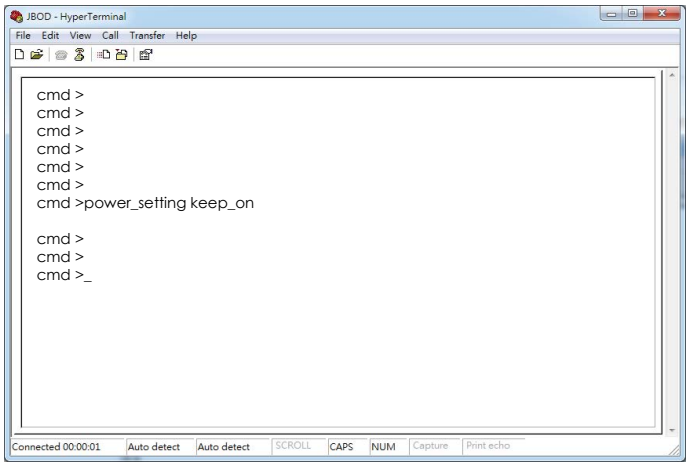
```
cmd> power_setting keep_on
```

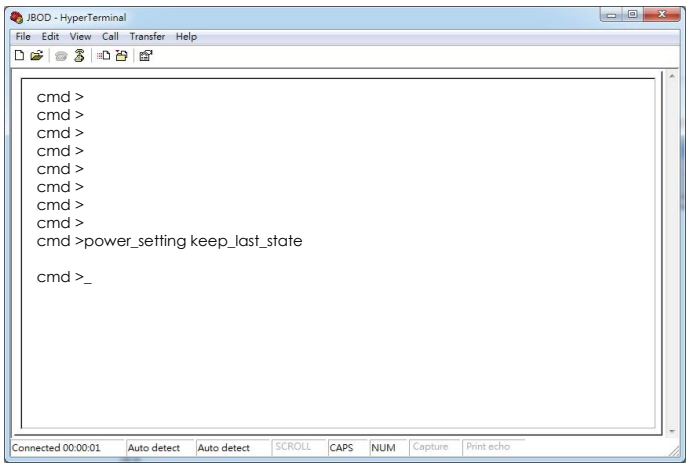
(D) Set "keep last state"

```
cmd> power_setting keep_last_state
```


JBOD - HyperTerminal
File Edit View Call Transfer Help
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >power_setting
Power setting: keep off
cmd >_
Connected 00:00:01
Auto detect
Auto detect
SCROLL
CAPS
NUM
Capture
Print echo


JBOD - HyperTerminal
File Edit View Call Transfer Help
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >power_setting keep_off
cmd >
cmd >_
Connected 00:00:01
Auto detect
Auto detect
SCROLL
CAPS
NUM
Capture
Print echo


JBOD - HyperTerminal
File Edit View Call Transfer Help
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >power_setting keep_on
cmd >
cmd >
cmd >_
Connected 00:00:01
Auto detect
Auto detect
SCROLL
CAPS
NUM
Capture
Print echo

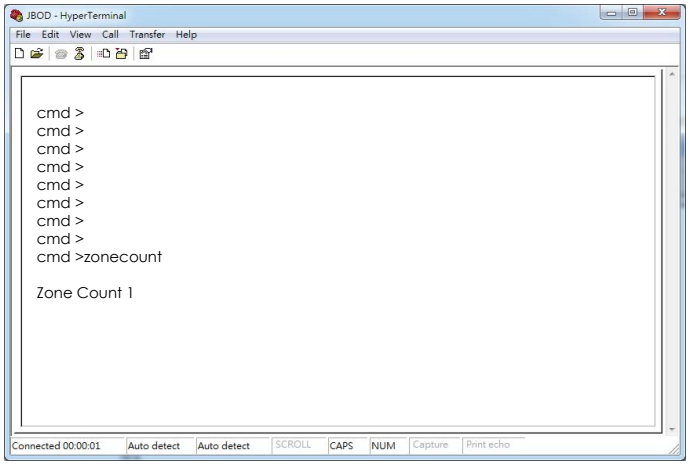

JBOD - HyperTerminal
File Edit View Call Transfer Help
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >
cmd >power_setting keep_last_state
cmd >_
Connected 00:00:01
Auto detect
Auto detect
SCROLL
CAPS
NUM
Capture
Print echo

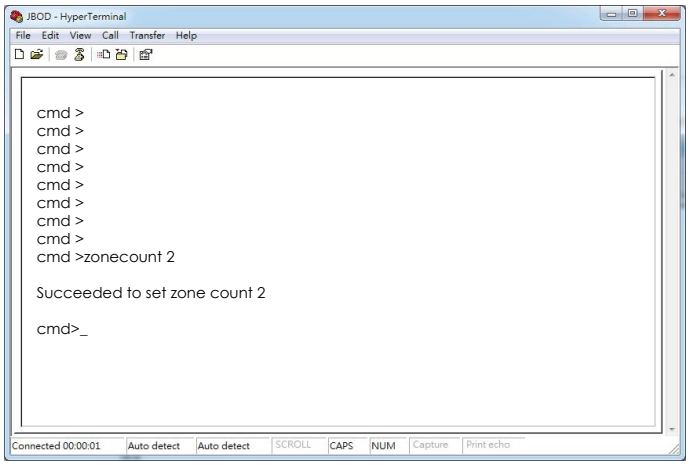
3.5.12 How to configure zone count

Remove the SAS cable between the HBA/RAID card and the 4U76-01before configuring zone count. Power the 4U76-01 off after configuring zone count. Power on the 4U76-01, and then insert the SAS cable.
Three zone configurations supported are one zone, two zones, and four zones. The default configuration is one zone of which T10 zoning configuration is disabled. T10 zoning configuration of the other configurations (two zones and four zones) is enabled. All COM ports for HUB and EDGE should be applied with the same configuration.

(A)Get current zone count
cmd> zonecount
Zone Count 1

(B) Set zone count = 2
cmd> zonecount 2
Succeeded to set zone count 2





(C) Predefined zones follow.

(C-1) When Zone Count = 1, T10 zoning is disabled.

HUB:

Zone #	1
Wideport	1,2,3,4

EDGE:

Zone #	1
Slot	1~60, 61~68, 71~78

(C-2) When Zone Count = 2, T10 zoning is enabled.

HUB:

Zone #	1	2
Wideport	1,2	3,4

EDGE:

Zone #	1	2
Slot	1~30, 61~68	31~60, 71~78

(C-3) When Zone Count = 4, T10 zoning is enabled.

HUB:

Zone #	1	2	3	4
Wideport	1	2	3	4

EDGE:

Zone #	1	2	3	4
Slot	1~15	16~30	31~45, 61~68	46~60, 71~78

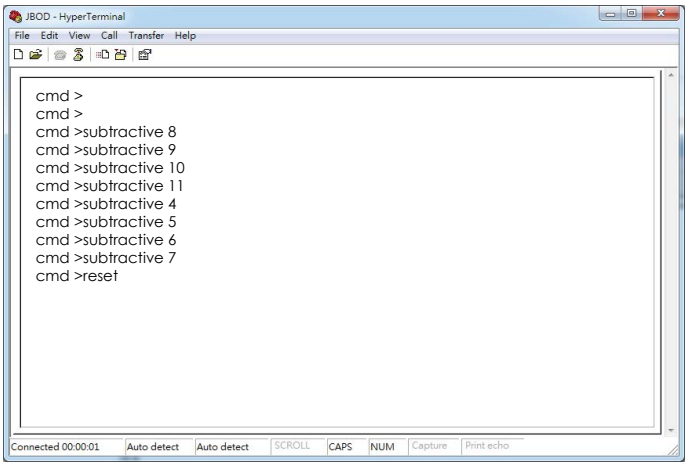
3.5.13 How to configure multiple "up" ports (HUB only)

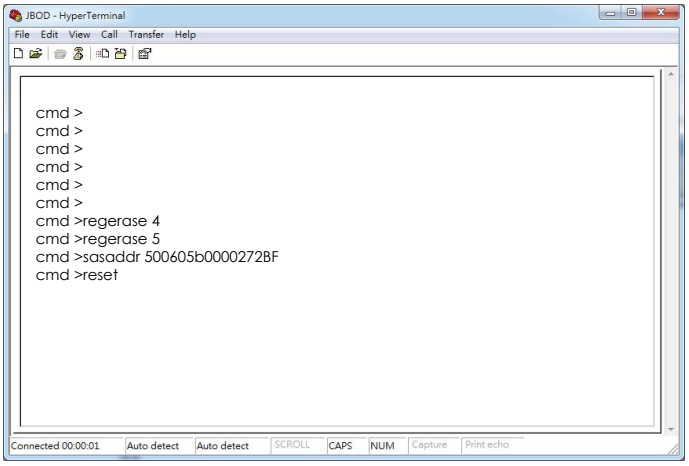
This feature can support multiple "up" ports when the zone count = 1.
(A) Configure Port-1 and Port-2 to be "up" ports. Port-1 is composed of PHY 8 ~ 11, and Port-2 is composed of PHY 4 ~ 7.

```
cmd> subtractive 8
cmd> subtractive 9
cmd> subtractive 10
cmd> subtractive 11
cmd> subtractive 4
cmd> subtractive 5
cmd> subtractive 6
cmd> subtractive 7
cmd> reset
```

(B) Restore the default of the zone count = 1 after keeping the SAS address. The SAS address (500605B0:000272BF) is used for HUB.

```
cmd> regerase 4
cmd> regerase 5
cmd> sasaddr 500605B0000272BF
cmd> reset
```





3.6 SES Inband Features

To ensure J4076-01 can work properly and provide high performance, durability. J4076-01 has implemented SCSI Enclosure Services to monitor the status of power supply, system cooling fan and working temperature. It also has the indicators to deliver the status of fail devices such as power supply or cooling fan. You can get the information directly from the front indicators to know how your enclosure works.

For detailed information, please visit http://www.t10.org

If you are a member of the T10 working group, the Standard which controlled by T10 technical committee, could be found at

http://www.t10.org/cgi-bin/ac.pl?t=f&f=ses2r19a.pdf

3.6.1 SES pages supported are listed below

00h - List of supported diagnostic pages
01h - SES configuration
02h - SES enclosure control / enclosure status
04h – SES String In (HUB only)
05h – SES Threshold Out / In
07h - SES element descriptor
0Ah - SES additional element (EDGE only)
0Eh - SES download microcode control / SES download microcode status
82h – SES Vendor specific page : Chassis Number (HUB only)
83h – SES Vendor specific page : Canister Number (HUB only)

3.6.2 SES elements supported are listed below.

02h - Power Supply
03h – Cooling (HUB only)
04h - Temperature Sensor
0Eh - Enclosure
12h - Voltage
17h - Array Device (EDGE only)

3.6.3 Implementation on SES Pages

3.6.3.1 SES String In Page (HUB only)

Get PMBUS information with String In Page.

String In Format

Byte 0	I2C congestion status (0: no congestion, 1: congestion or failure)
Byte 1~2	PSU Module1 STATUS_WORD
Byte 3~4	PSU Module2 STATUS_WORD
Byte 5~14	Reserved (0xFF)

3.6.3.2 SES Threshold Out / In

It includes only Temperature Sensor and Voltage Sensor elements.

Threshold control element format

BYTE/BIT	7	6	5	4	3	2	1	0
0	REQUESTED HIGH CRITICAL THRESHOLD							
1	REQUESTED HIGH WARNING THRESHOLD							
2	REQUESTED LOW WARNING THRESHOLD							
3	REQUESTED LOW CRITICAL THRESHOLD							

Threshold control element format

BYTE/BIT	7	6	5	4	3	2	1	0
0	HIGH CRITICAL THRESHOLD							
1	HIGH WARNING THRESHOLD							
2	LOW WARNING THRESHOLD							
3	LOW CRITICAL THRESHOLD							

3.6.3.3 SES Vendor specific page: Chassis Number (page code 82h) Out / In (HUB only)

The length N of chassis number can be 0 to 30 bytes. If no chassis number is entered (N=0), then chassis number is cleared.

Chassis Number control format

BYTE/BIT	7	6	5	4	3	2	1	0
0~N	Chassis Number							

If no chassis number is found, return Status = 1 (failed) only, else return Status=0 (success) followed by chassis number.

Chassis Number status format

BYTE/BIT	7	6	5	4	3	2	1	0
0	Status (0: success, 1: failed)							
1~N (if success)	Chassis Number							

3.6.3.4 SES Vendor specific page: Canister Number (page code 83h)
Out / In (HUB only)

The length N of canister number can be 0~30 bytes. If no canister number is entered (N=0), then canister number is restored to default: 0x20 0x20 0x20 0x20 0x20 0x20 0x20 0x20 (8 spaces in ASCII).

Canister Number control format

BYTE/BIT	7	6	5	4	3	2	1	0
0~N	Canister Number							

If no canister number is found, return Status = 1 (failed) only, else return Status=0 (success) followed by canister number.

Canister Number status format

BYTE/BIT	7	6	5	4	3	2	1	0
0	Status (0: success, 1: failed)							
1~N (if success)	Canister Number							

3.6.4 Implementation on SES Elements

Only the fields highlighted in green are supported.

3.6.4.1. Power Supply Element

(A) Power Supply Control Element

BYTE/BIT	7	6	5	4	3	2	1	0
0	COMMON CONTROL							
	SELECT	PRDFAIL	DISABLE	RST SWAP	Reserved			
1	RQST IDENT	Reserved						
2	Reserved							
3	Reserved	RQST FAIL	RQST ON	Reserved				

Field	Value
RQST ON	Please refer to section "SES Element Control Functions" for details.

(B) Power Supply Status Element

BYTE/BIT	7	6	5	4	3	2	1	0
0	COMMON STATUS							
	Reserved	PRDFAIL	DISABLE	SWAP	ELEMENT STATUS CODE			
1	IDENT	Reserved						
2	Reserved				DC OVER VOLTAGE	DC UNDER VOLTAGE	DC OVER CURRENT	Reserved
3	HOT SWAP	FAIL	RQSTED ON	OFF	OVERTMP FAIL	TEMP WARN	AC FAIL	DC FAIL

Field	Value
ELEMENT STATUS CODE	OK: No failure or warning conditions detected CRITICAL: FAIL bit is set due to one or more failure condition
FAIL	A failure condition is detected
RQSTED ON	1: On 0: Off for Disk Power Supply
OFF	1: Off for Disk Power Supply 0: On
AC FAIL	A failure condition is detected
DC FAIL	A failure condition is detected

3.6.4.2 Cooling Element (HUB only)

(A) Cooling Control Element

BYTE/BIT	7	6	5	4	3	2	1	0
0	COMMON CONTROL							
	SELECT	PRDFAIL	DISABLE	RST SWAP	Reserved			
1	RQST IDENT	Reserved						
2								
3	Reserved	RQST FAIL	RQST ON	Reserved		REQUESTED SPEED CODE		

Field	Value
RQST IDENT	Please refer to section "SES Element Control Functions" for details.
REQUESTED SPEED CODE	Please refer to section "SES Element Control Functions" for details.

(B) Cooling Status Element

BYTE/BIT	7	6	5	4	3	2	1	0
0	COMMON STATUS							
	Reserved	PRDFAIL	DISABLE	SWAP	ELEMENT STATUS CODE			
1	IDENT	Reserved				ACTUAL FAN SPEED (MSB)		
2	ACTUAL FAN SPEED (LSB)							
3	HOT SWAP	FAIL	RQST ON	OFF	Reserved	ACTUAL SPEED CODE		

Field	Value
ELEMENT STATUS CODE	OK: Actual fan speed > 0 CRITICAL: The fan RPM can't be detected or equal to 0.
IDENT	Applicable only for Cooling element 0 0: Enable the smart fan function 1: Disable the smart fan function
ACTUAL FAN SPEED	Current fan RPM
FAIL	The fan RPM can't be detected or equal to 0.
ACTUAL SPEED CODE	Speed code level bases on current fan RPM.

3.6.4.3 Temperature Sensor Element

(A) Temperature Sensor Control Element

BYTE/BIT	7	6	5	4	3	2	1	0
0	COMMON CONTROL							
	SELECT	PRDFAIL	DISABLE	RST SWAP	Reserved			
1	RQST IDENT	RQST FAIL	Reserved					
2	Reserved							
3	Reserved							

(B) Temperature Sensor Status Element

BYTE/BIT	7	6	5	4	3	2	1	0
0	COMMON STATUS							
	Reserved	PRDFAIL	DISABLE	SWAP	ELEMENT STATUS CODE			
1	IDENT	FAIL	Reserved					
2	TEMPERATURE							
3	Reserved				OT FAILURE	OT WARNING	UT FAILURE	UT WARNING

Field	Value
ELEMENT STATUS CODE	OK: Everything is Ok NON-CRITICAL: If either warning limit is exceeded CRITICAL: If either failure limit is exceeded
FAIL	A warning or failure condition is detected
TEMPERATURE	Temperature reading
OT FAILURE	Temperature has exceeded the failure high threshold value
OT WARNING	Temperature has exceeded the warning high threshold value
UT FAILURE	Temperature is below the failure low threshold value
UT WARNING	Temperature is below the warning low threshold value

3.6.4.4 Enclosure Element (HUB only)

(A) Enclosure Control Element

BYTE/BIT	7	6	5	4	3	2	1	0
0	COMMON CONTROL							
	SELECT	PRDFAIL	DISABLE	RST SWAP	Reserved			
1	RQST IDENT	Reserved						
2	POWER CYCLE REQUEST	POWER CYCLE DELAY						
3	POWER OFF DURATION						REQUEST FAILURE	REQUEST WARNING

Field	Value
RQST IDENT	Please refer to section "SES Element Control Functions" for details.
REQUEST FAILURE	Please refer to section "SES Element Control Functions" for details.
REQUEST WARNING	Please refer to section "SES Element Control Functions" for details.

(B) Enclosure Status Element

BYTE/BIT	7	6	5	4	3	2	1	0
0	COMMON STATUS							
	Reserved	PRDFAIL	DISABLE	SWAP	ELEMENT STATUS CODE			
1	IDENT	Reserved						
2	TIME UNTIL POWER CYCLE						FAILURE INDICATION	WARNING INDICATION
3	REQUEST POWER OFF DURATION						FAILURE REQUESTED	WARNING REQUESTED

Field	Value
ELEMENT STATUS CODE	OK
IDENT	0: Identify LED of Hub is OFF 1: Identify LED of Hub is solid ON
FAILURE REQUESTED	Set by the REQUEST FAILURE on Enclosure Control Element
WARNING REQUESTED	Set by the REQUEST WARNING on Enclosure Control Element

3.6.4.5 Voltage Element

(A) Voltage Control Element

BYTE/BIT	7	6	5	4	3	2	1	0
0	COMMON CONTROL							
	SELECT	PRDFAIL	DISABLE	RST SWAP	Reserved			
1	RQST IDENT	RQST FAIL	Reserved					
2	Reserved							
3	Reserved							

(B) Voltage Status Element

BYTE/BIT	7	6	5	4	3	2	1	0
0	COMMON STATUS							
	Reserved	PRDFAIL	DISABLE	SWAP	ELEMENT STATUS CODE			
1	IDENT	FAIL	Reserved		WARN OVER	WARN UNDER	CRIT OVER	CRIT UNDER
2	VOLTAGE							
3								

Field	Value
ELEMENT STATUS CODE	OK: Everything is Ok NON-CRITICAL: If either warning limit is exceeded CRITICAL: If either failure limit is exceeded
FAIL	A warning or failure condition is detected
VOLTAGE	Voltage reading

3.6.4.6 Array Device Element (EDGE only)

(A) Array Device Control Element

BYTE/BIT	7	6	5	4	3	2	1	0
0	COMMON CONTROL							
	SELECT	PRDFAIL	DISABLE	RST SWAP	Reserved			
1	RQST OK	RQST RSVD DEVICE	RQST HOT SPARE	RQST CONS CHECK	RQST IN CRIT ARRAY	RQST IN FAILED ARRAY	RQST REBULD/ REMAP	RQST R/R ABORT
2	RQST ACTIVE	DO NOT REMOVE	Reserved	RQST MISSING	RQST INSERT	RQST REMOVE	RQST IDENT	Reserved
3	Reserved		RQST FAULT	DEVICE OFF	ENABLE BYP A	ENABLE BYP B	Reserved	

Field	Value
PRDFAIL	Please refer to section “SES Element Control Functions” for details.
RQST OK	Please refer to section “SES Element Control Functions” for details.
RQST RSVD DEVICE	Please refer to section “SES Element Control Functions” for details.
RQST HOT SPARE	Please refer to section “SES Element Control Functions” for details.
RQST CONS CHECK	Please refer to section “SES Element Control Functions” for details.
RQST IN CRIT ARRAY	Please refer to section “SES Element Control Functions” for details.
RQST IN FAILED ARRAY	Please refer to section “SES Element Control Functions” for details.
RQST REBUILD/ REMAP	Please refer to section “SES Element Control Functions” for details.
RQST R/R ABORT	Please refer to section “SES Element Control Functions” for details.
RQST ACTIVE	Please refer to section “SES Element Control Functions” for details.
DO NOT REMOVE	Please refer to section “SES Element Control Functions” for details.
RQST MISSING	Please refer to section “SES Element Control Functions” for details.
RQST INSERT	Please refer to section “SES Element Control Functions” for details.
RQST REMOVE	Please refer to section “SES Element Control Functions” for details.
RQST IDENT	Please refer to section “SES Element Control Functions” for details.
RQST FAULT	Please refer to section “SES Element Control Functions” for details.
DEVICE OFF	Please refer to section “SES Element Control Functions” for details.

(B) Array Device Status Element

BYTE/BIT	7	6	5	4	3	2	1	0
0	COMMON STATUS							
	Reserved	PRDFAIL	DISABLE	SWAP	ELEMENT STATUS CODE			
1	OK	RSVD DEVICE	HOT SPARE	CONS CHK	IN CRIT ARRAY	IN FAILED ARRAY	REBUILD/ REMAP	R/R ABORT
2	APP CLIENT BYPASSED A	DO NOT REMOVE	ENCLOSURE BYPASSED A	ENCLOSURE BYPASSED B	READY TO INSERT	RMV	IDENT	REPORT
3	APP CLIENT BYPASSED B	FAULT SENSED	FAULT REQSTD	DEVICE OFF	BYPASSED A	BYPASSED B	DEVICE BYPASSED A	DEVICE BYPASSED B

Field	Value
PRDFAIL	Set by the PRDFAIL on Array Device Control Element
ELEMENT STATUS CODE	OK: A drive is detected in the slot NOT INSTALLED: No drive is installed in the slot
OK	Set by the RQST OK on Array Device Control Element
RSVD DEVICE	Set by the RQST RSVD DEVICE on Array Device Control Element
HOT SPARE	Set by the RQST HOT SPARE on Array Device Control Element
CONS CHK	Set by the RQST CONS CHECK on Array Device Control Element
IN CRIT ARRAY	Set by the RQST IN CRIT ARRAY on Array Device Control Element
IN FAILED ARRAY	Set by the RQST IN FAILED ARRAY on Array Device Control Element
REBUILD/REMAP	Set by the RQST REBUILD/REMAP on Array Device Control Element
R/R ABORT	Set by the RQST R/R ABORT on Array Device Control Element
DO NOT REMOVE	Set by the DO NOT REMOVE on Array Device Control Element
READY TO INSERT	Set by the RQST INSERT on Array Device Control Element
RMV	Set by the RQST REMOVE on Array Device Control Element
IDENT	Set by the RQST IDENT on Array Device Control Element
FAULT REQSTD	Set by the RQST FAULT on Array Device Control Element
DEVICE OFF	Set by the DEVICE OFF on Array Device Control Element

3.6.5 SES Element Control Functions

3.6.5.1 LED indicators (blue and red) associated with an attached disk drive (EDGE only)

Array Device Slot control element

BYTE/BIT	7	6	5	4	3	2	1	0
0	COMMON CONTROL							
	SELECT	PRDFAIL	DISABLE	RST SWAP	Reserved			
1	RQST OK	RQST RSVD DEVICE	RQST HOT SPARE	RQST CONS CHECK	RQST IN CRIT ARRAY	RQST IN FAILED ARRAY	RQST REBULD/ REMAP	RQST R/R ABORT
2	RQST ACTIVE	DO NOT REMOVE	Reserved	RQST MISSING	RQST INSERT	RQST REMOVE	RQST IDENT	Reserved
3	Reserved		RQST FAULT	DEVICE OFF	ENABLE BYP A	ENABLE BYP B	Reserved	

The default behavior for blue LED is "LED is on when the disk is not busy, and off when the disk is executing a command". When the "RQST IDENT" bit is set, the blue LED overwrites its default behavior with a slow blink while the red LED is off. The blue LED is set "Activity" for not overwriting its default behavior.

The behavior “Fast Blink” is “LED is blinking at 2Hz frequency”.

The behavior “Slow Blink” is “LED is blinking at 1Hz frequency”.

The behavior “ON”/”OFF” is “LED is solid ON/OFF without blinking”.

Slot Control Bit	Blue LED	Red LED
RQST OK	Activity	OFF
RQST RSVD DEVICE	Activity	OFF
RQST HOT SPARE	Activity	OFF
RQST CONS CHECK	Activity	Fast Blink
RQST IN CRIT ARRAY	Activity	Slow Blink
RQST IN FAILED ARRAY	Activity	Slow Blink
RQST REBUILD/REMAP	Activity	Fast Blink
RQST R/R ABORT	Activity	Slow Blink
RQST ACTIVE	Activity	OFF
DO NOT REMOVE	Activity	OFF
RQST MISSING	ON	ON
RQST INSERT	Activity	Slow Blink
RQST REMOVE	Activity	Slow Blink
RQST IDENT	Slow Blink	OFF
RQST FAULT	ON	ON
DEVICE OFF	OFF	OFF
PRDFAIL	Activity	Slow Blink

3.6.5.2 How to turn on/off the power of a drive slot (EDGE only)

Array Device Slot control element

BYTE/BIT	7	6	5	4	3	2	1	0
0	COMMON CONTROL							
	SELECT	PRDFAIL	DISABLE	RST SWAP	Reserved			
1	RQST OK	RQST RSVD DEVICE	RQST HOT SPARE	RQST CONS CHECK	RQST IN CRIT ARRAY	RQST IN FAILED ARRAY	RQST REBULD/ REMAP	RQST R/R ABORT
2	RQST ACTIVE	DO NOT REMOVE	Reserved	RQST MISSING	RQST INSERT	RQST REMOVE	RQST IDENT	Reserved
3	Reserved		RQST FAULT	DEVICE OFF	ENABLE BYP A	ENABLE BYP B	Reserved	

The "DEVICE OFF" for a drive slot is defined in the bit4, byte3 of the "Array Device Slot control element" in the SES specification. Set the bit to turn off a slot power, and vice versa. We use the software package "sg3_utils" on Linux for example, and have a SAS HBA and a cable to connect your host with the expander.

(A) Show the device for AIC Expander Controller (canister)

```
$ sg_map -i
/dev/sg2  AIC 12G   4U76swap: Edge-L  0c08
```

(B) Get the current state of a slot power. The "Device off=0" means the slot power is on.

```
$ sg_ses --page=2 /dev/sg2
Element 0 descriptor:
  App client bypass B=0, Fault sensed=0, Fault reqstd=0, Device off=0
```

(C) Get the descriptor of a slot power

```
$ sg_ses --page=7 /dev/sg2
Element 0 descriptor: Disk001
```

(D) Turn off a slot power

```
$ sg_ses --descriptor=Disk001 --set=3:4:1 /dev/sg2
```

(E) Turn on a slot power

```
$ sg_ses --descriptor=Disk001 --clear=3:4:1 /dev/sg2
```

WARNING : THIS FUNCTION IS NOT RECOMMENDED TO USE WITH RAID CARD SINCE RAID CARD LIMITATION.

3.6.5.3 How to power off/on all disk drives on a disk backplane manually (EDGE only)

Power Supply control element

BYTE/BIT	7	6	5	4	3	2	1	0
0	COMMON CONTROL							
	SELECT	PRDFAIL	DISABLE	RST SWAP	Reserved			
1	RQST IDENT	Reserved						
2	Reserved							
3	Reserved	RQST FAIL	RQST ON	Reserved				

The "RQST ON" for Power Supply is defined in the bit5, byte3 of the "Power Supply control element" in the SES specification. Clear the bit on Power Supply Element “DiskPowerSupply” to power off all disk drives. Set the bit on Power Supply Element “DiskPowerSupply” to power on all disk drives. We use the software package "sg3_utils" on Linux for example, and have a SAS HBA and a cable to connect your host with the expander.

(A) Show the device for AIC Expander Controller (canister) on a disk backplane

```
$ sg_map -i

/dev/sg2  AIC 12G   4U76swap: Edge-L  0c08
```

(B) Power off all disk drives on the disk backplane

```
$ sg_ses --descriptor=DiskPowerSupply --clear=3:5:1 /dev/sg2
```

(C) Power on all disk drives on the disk backplane

```
$ sg_ses --descriptor=DiskPowerSupply --set=3:5:1 /dev/sg2
```

3.6.5.4 How to power off the entire enclosure (HUB only)

Power Supply control element

BYTE/BIT	7	6	5	4	3	2	1	0
0	COMMON CONTROL							
	SELECT	PRDFAIL	DISABLE	RST SWAP	Reserved			
1	RQST IDENT	Reserved						
2	Reserved							
3	Reserved	RQST FAIL	RQST ON	Reserved				

The "RQST ON" for Power Supply is defined in the bit5, byte3 of the "Power Supply control element" in the SES specification. Clear the bit on Power Supply Element “PowerSupply01” or “PowerSupply02” to power off the entire enclosure. We use the software package "sg3_utils" on Linux for example, and have a SAS HBA and a cable to connect your host with the expander.

(A) Show the device for AIC Expander Controller (canister)

```
$ sg_map -i

/dev/sg2  AIC 12G   4U76swap: Hub     0c07
```

(B) Power off the entire enclosure

```
$ sg_ses --descriptor=PowerSupply01 --clear=3:5:1 /dev/sg2
```

3.6.5.5 How to identify the enclosure (HUB only)

Enclosure control element

BYTE/BIT	7	6	5	4	3	2	1	0
0	COMMON CONTROL							
	SELECT	PRDFAIL	DISABLE	RST SWAP	Reserved			
1	RQST IDENT	Reserved						
2	POWER CYCLE REQUEST	POWER CYCLE DELAY						
3	POWER OFF DURATION						REQUEST FAILURE	REQUEST WARNING

When the identify LED of Hub is off, the identity is disabled. When solid on, the identity is enabled. The "RQST IDENT" for Enclosure is defined in the bit7, byte1 of the "Enclosure control element" in the SES specification. Set the bit to enable the identity. Clear the bit to disable the identity. We use the software package "sg3_utils" on Linux for example, and have a SAS HBA and a cable to connect your host with the expander.

(A) Show the device for AIC Expander Controller (canister)

```
$ sg_map -i

/dev/sg2  AIC 12G   4U76swap: Hub     0c07
```

(B) Enable the identity

```
$ sg_ses --descriptor=EnclosureElement01 --set=1:7:1 /dev/sg2
```

(C) Disable the identity

```
$ sg_ses --descriptor=EnclosureElement01 --clear=1:7:1 /dev/sg2
```

3.6.5.6 How to enable/disable the enclosure alarm by your software (HUB only)

Enclosure control element

BYTE/BIT	7	6	5	4	3	2	1	0
0	COMMON CONTROL							
	SELECT	PRDFAIL	DISABLE	RST SWAP	Reserved			
1	RQST IDENT	Reserved						
2	POWER CYCLE REQUEST	POWER CYCLE DELAY						
3	POWER OFF DURATION						REQUEST FAILURE	REQUEST WARNING

The system alarm LED is used for the enclosure alarm and power alarm. The "REQUEST FAILURE" and “REQUEST WARNING” for Enclosure are defined in the bit1, byte3 and bit0, byte3 of the "Enclosure control element" in the SES specification. Setting either bit can enable the enclosure alarm. Clearing both bits disables the enclosure alarm. We use the software package "sg3_utils" on Linux for example, and have a SAS HBA and a cable to connect your host with the expander.

(A) Show the device for AIC Expander Controller (canister)

```
$ sg_map -i

/dev/sg2  AIC 12G   4U76swap: Hub     0c07
```

(B) Enable the enclosure alarm

```
$ sg_ses --descriptor=EnclosureElement01 --set=3:1:1 /dev/sg2
or
$ sg_ses --descriptor=EnclosureElement01 --set=3:0:1 /dev/sg2
```

(C) Disable the enclosure alarm

```
$ sg_ses --descriptor=EnclosureElement01 --clear=3:1:1 /dev/sg2
and
$ sg_ses --descriptor=EnclosureElement01 --clear=3:0:1 /dev/sg2
```

3.6.5.7 How to manually change PWM (fan speed) for all Cooling elements (HUB only)

Cooling control element

BYTE/BIT	7	6	5	4	3	2	1	0
0	COMMON CONTROL							
	SELECT	PRDFAIL	DISABLE	RST SWAP	Reserved			
1	RQST IDENT	Reserved						
2	Reserved							
3	Reserved	RQST FAIL	RQST ON	Reserved		REQUESTED SPEED CODE		

The "RQST IDENT" for Cooling is defined in the bit7, byte1 and the "REQUESTED SPEED CODE" is defined in the bit2 ~ 0, byte3 of the "Cooling control element" in the SES specification. Set "RQST IDENT" bit to disable the smart fan function, and then change PWM or fan speed for all Cooling elements by setting the "REQUESTED SPEED CODE" bits. Clear "RQST IDENT" bit to enable the smart fan function again. Please disable the smart fan function before changing PWM or fan speed. Only Cooling element 0 supports this feature. We use the software package "sg3_utils" on Linux for example, and have a SAS HBA and a cable to connect your host with the expander.

(A) Show the device for AIC Expander Controller (canister)

```
$ sg_map -i

/dev/sg2  AIC 12G   4U76swap: Hub     0c07
```

(B) Set "RQST IDENT" of Cooling element 0 to disable the smart fan function

```
$ sg_ses --descriptor=SystemCoolingElement01 --set=1:7:1 /dev/sg2
```

(C) Set "REQUESTED SPEED CODE" of Cooling element 0 to change PWM or fan speed for all Cooling elements. Set "REQUESTED SPEED CODE"=7 (100% PWM) for example.

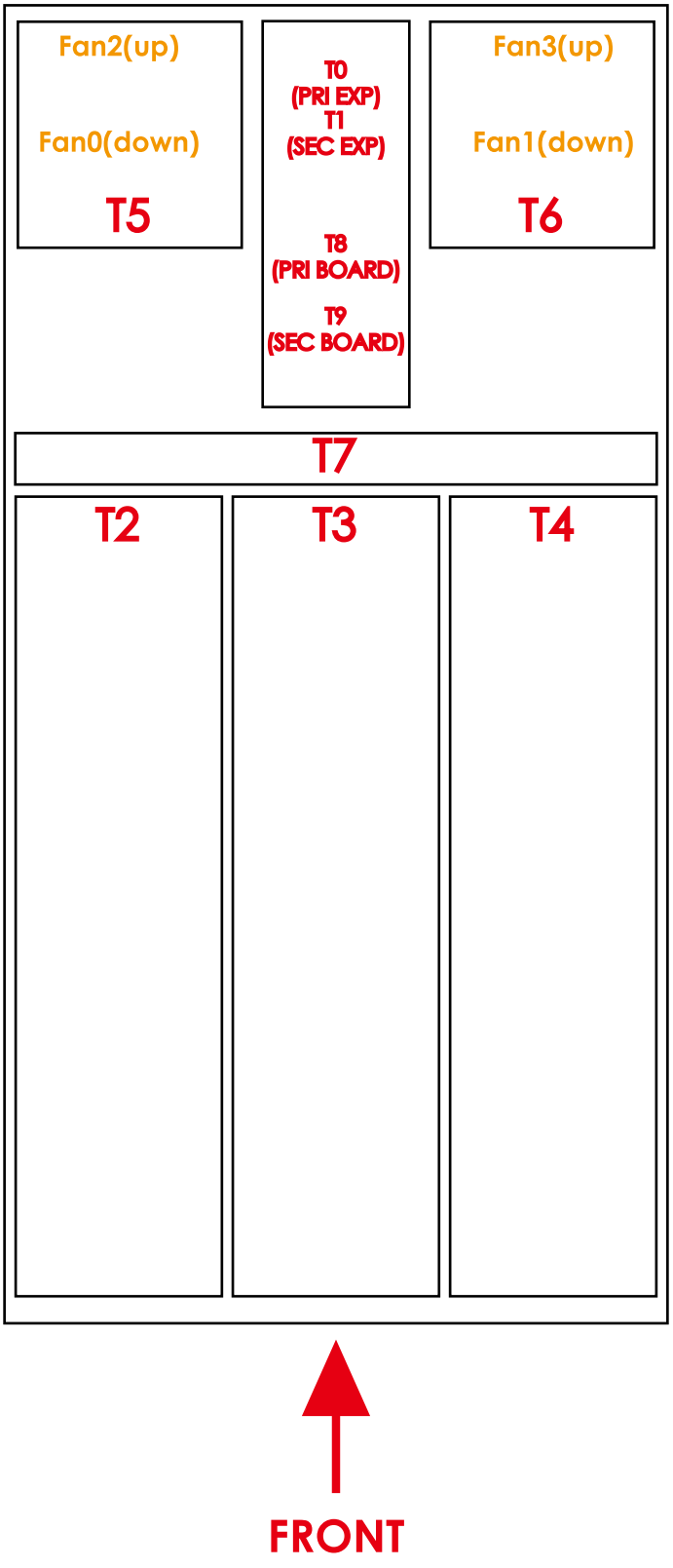
```
$ sg_ses --descriptor=SystemCoolingElement01 --set 3:2:3=7 /dev/sg2
```

REQUESTED SPEED CODE	PWM
7	100%
6	90%
5	80%
4	70%
3	60%
2	50%
1	40%
0	Leave at current speed

Chapter 4. BMC Configuration and Settings

4.1 Sensor's location for Fan & Temperature

EXP: expander chip

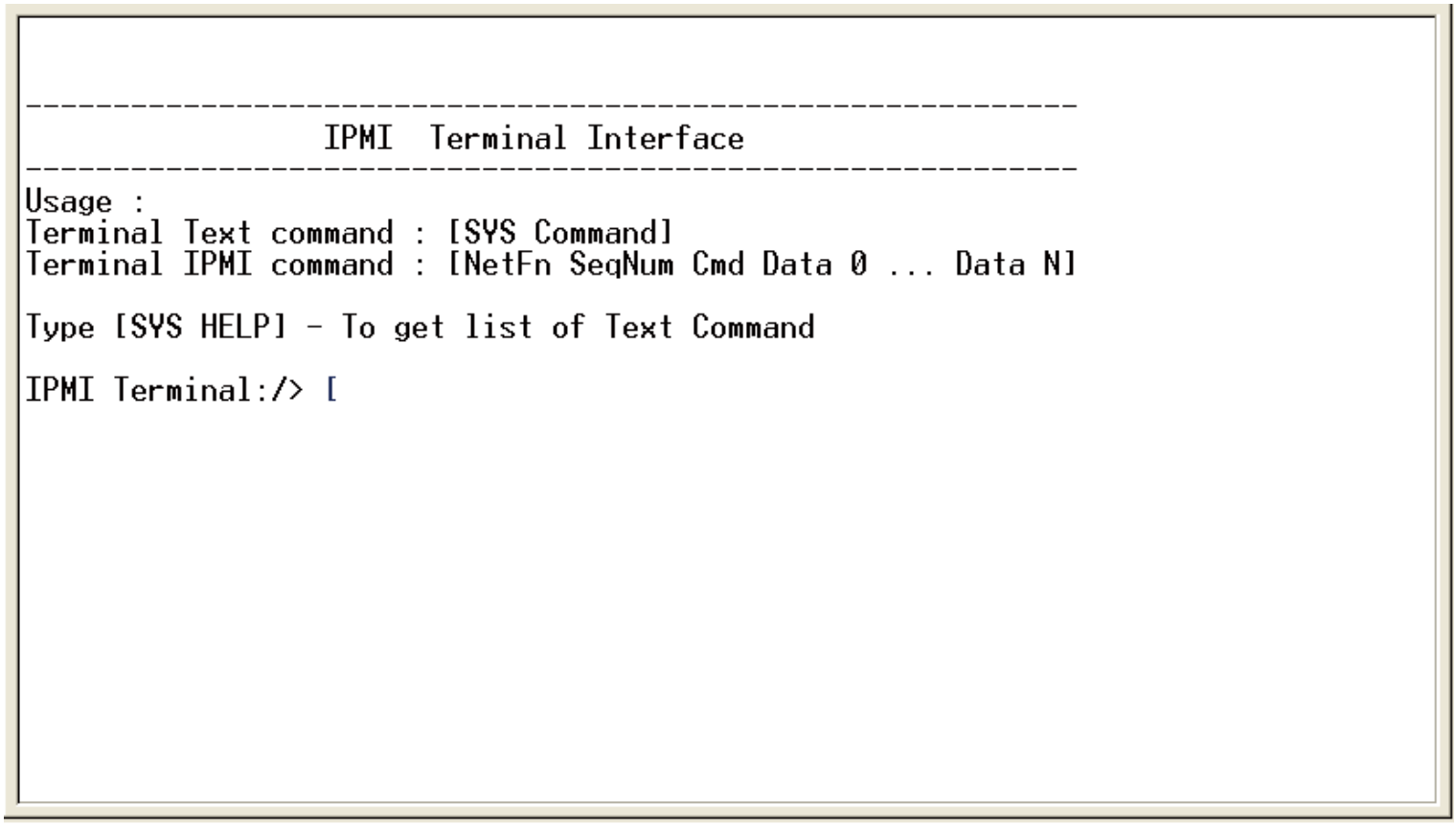


4.2 Utility setup on Host

Please refer to Section 3.2

4.3 Connect Host to BMC by RS232

1. Type the "[" , it will show the IPMI serial interface

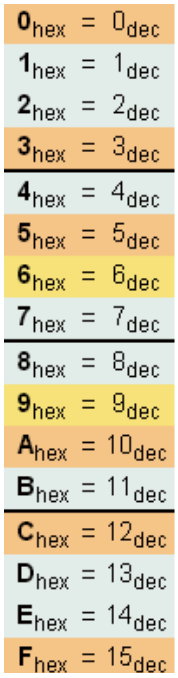


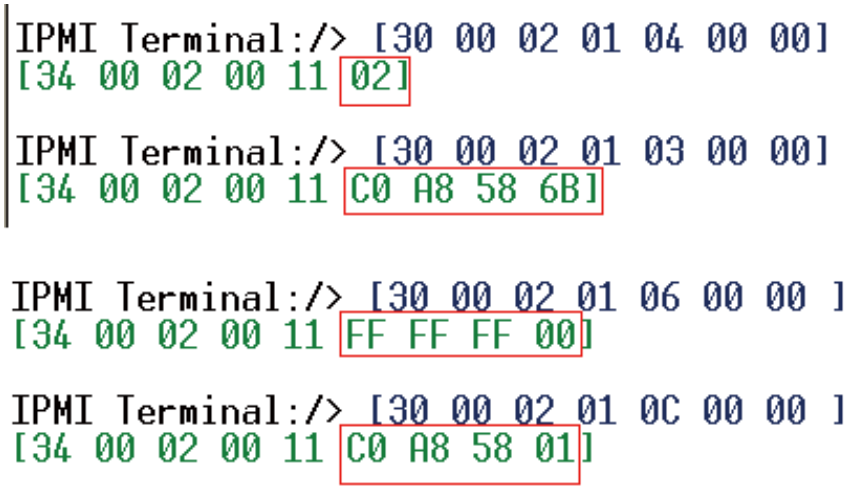
Type command for login the interface.
#[sys pwd –u admin admin]
It will response [OK]

```
IPMI Terminal:/> [sys pwd -u admin admin ]
[OK]
```

2. Get LAN information

Get LAN static IP /DHCP [30 00 02 01 04 00 00]
Get LAN IP [30 00 02 01 03 00 00]
Get submask [30 00 02 01 06 00 00]
Get gateway [30 00 02 01 0C 00 00]





Get LAN static IP /DHCP: **01 is static IP, 02 is DHCP.**
The red box is hexadecimal, according to the left picture, the IP is 16*12 + 0 = 192, 16*10 + 8 = 168, 16*5 + 8 = 88, 16*6 + 11 = 107, It is **192.168.88.107**

3. Set LAN information

Set LAN information

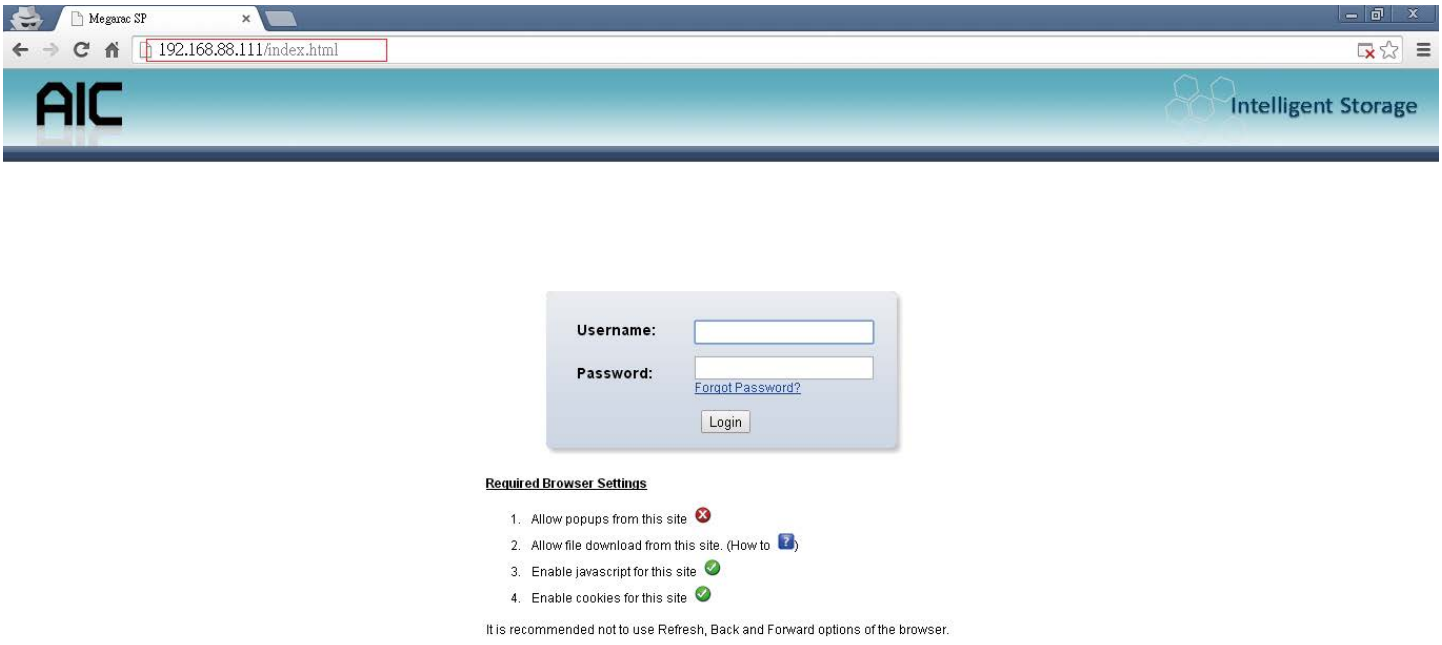
Set LAN static IP /DHCP	[30 00 01 01 04 01/02]
Set LAN IP	[30 00 01 01 03 C0 A8 00 0A]
Set submask	[30 00 01 01 06 FF FF FF 00]
Set gateway	[30 00 01 01 0C C0 A8 00 01]

```
IPMI Terminal:/> [30 00 01 01 04 01 ]
[34 00 01 00]

IPMI Terminal:/> [30 00 01 01 03 C0 A8 00 0A ]
[34 00 01 00]

IPMI Terminal:/> [30 00 01 01 06 FF FF FF 00 ]
[34 00 01 00]

IPMI Terminal:/> [30 00 01 01 0C C0 A8 00 01 ]
[34 00 01 00]
```

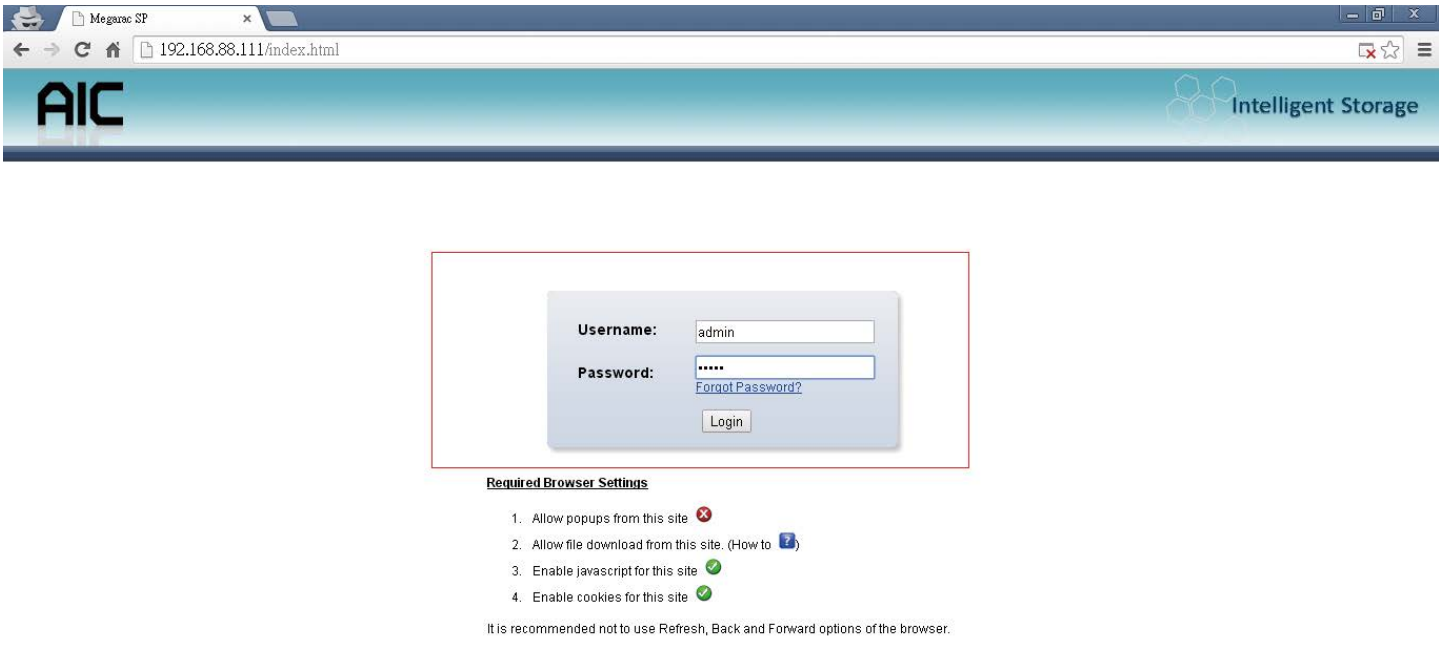
The Green returns text that in red box is completion code, **00 means OK**, The blue text can change the value what you want, if you want to change the IP address, must **set the LAN status to static.**

4. Login the web page

Open a browser, type the IP in the address bar

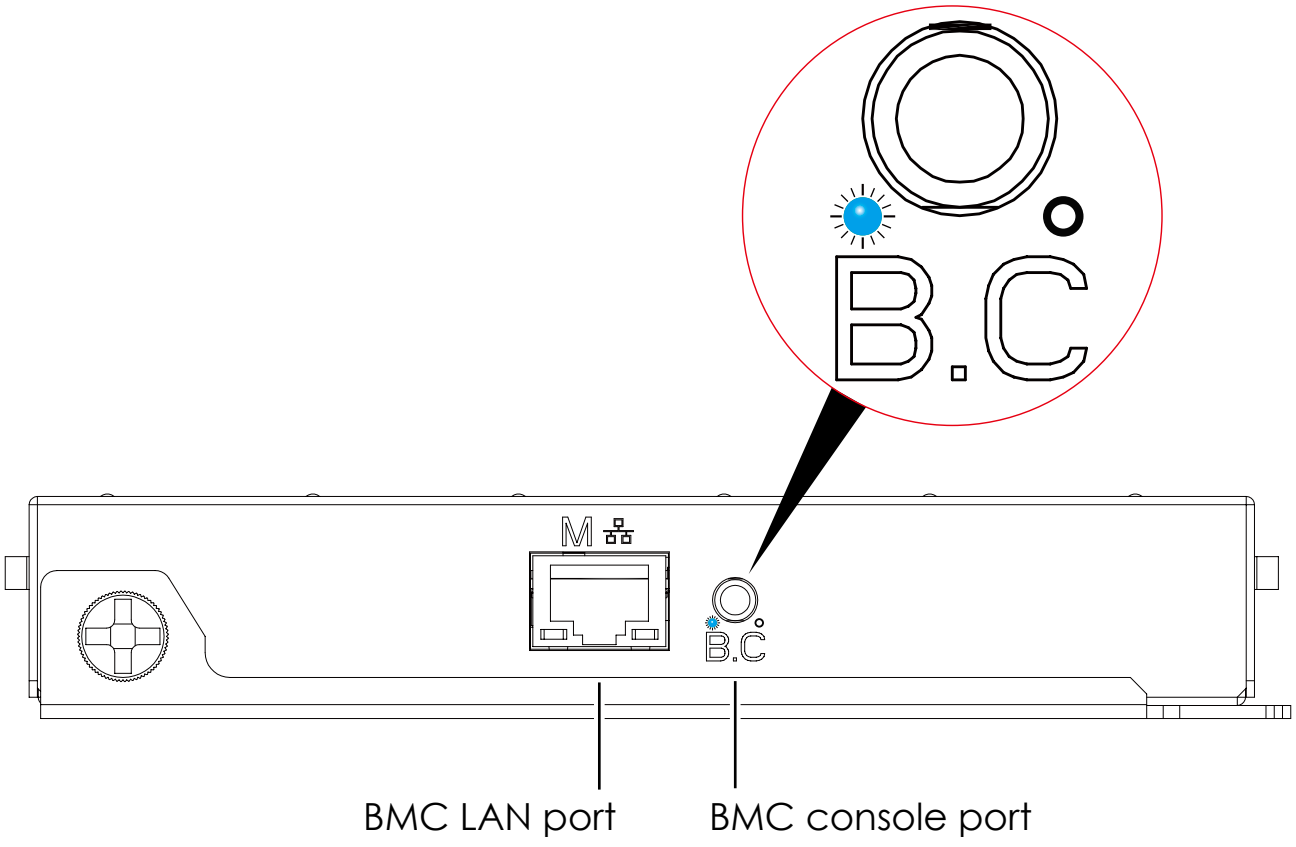


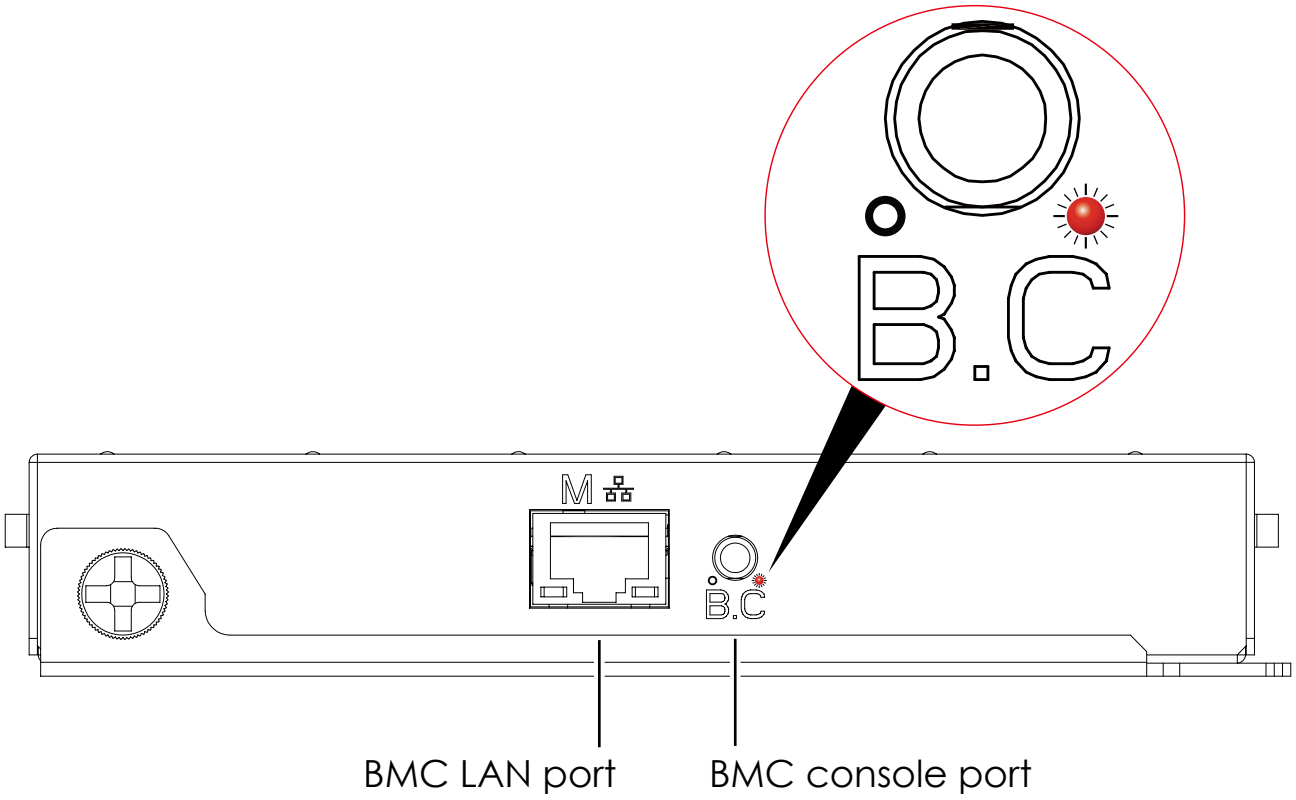
Type the default account and password
Account:admin
Password:admin



4.4 BMC LED signal

There are have two LEDs under the BMC console.
Blue LED Light- Identify LED.
Red LED Light- When the light keep blinking, means BMC got error.





4.5 Web UI

4.5.1 Dashboard

Device Information

Displays the Firmware Revision and Firmware Build Time (Date and Time).

Network Information

Shows network settings for the device. Click on the link Edit to view the Network Settings Page.

Remote Control

Not support this function.

Remote Console Preview Box

It will show the console preview of the remote server using java application. Click on 'Refresh' button to reload the console preview.

Sensor Monitoring

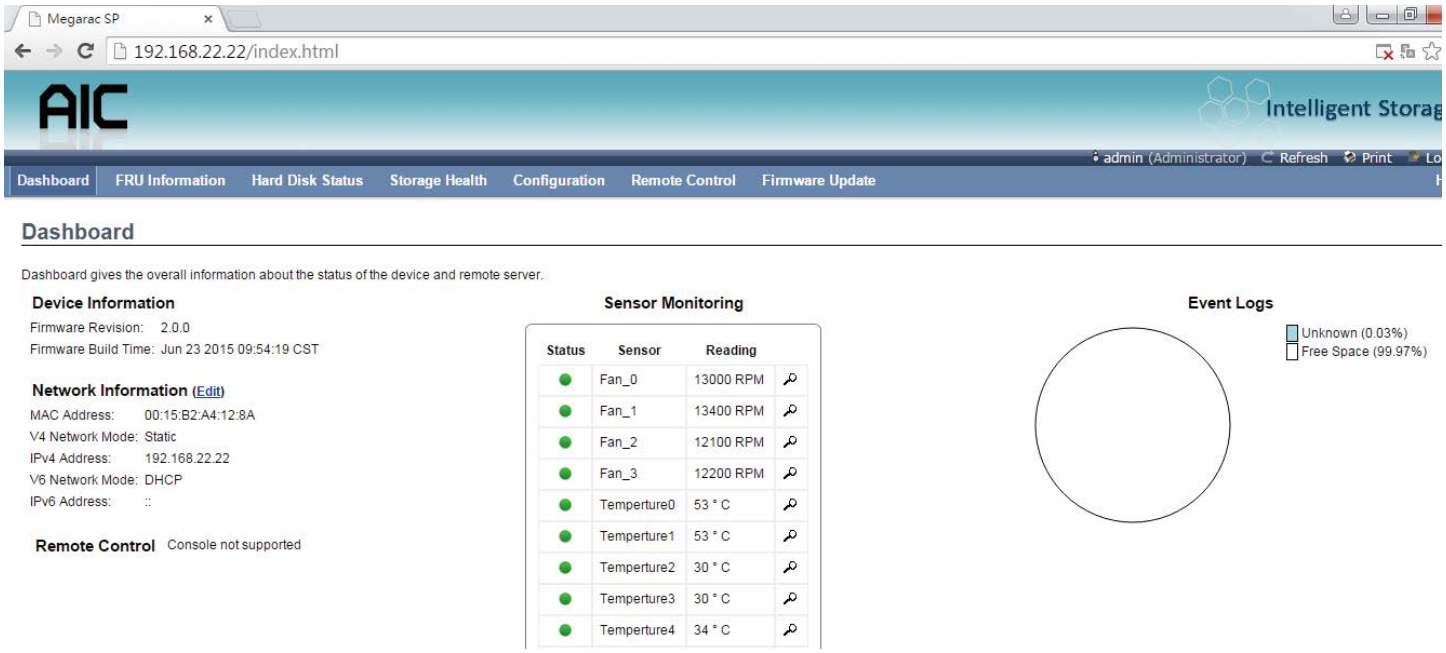
It lists all available sensors on the device, with information such as status, name, reading, and status icon, as well as a link to that sensor's page. There are 3 possible states for a Sensor:

- Green dot denotes a Normal state.
- Yellow exclamation mark denotes a Warning state.
- Red x denotes a Critical state.

The magnifying glass allows access to the Sensor details page for that sensor.

Event Logs

A graphical representation of all events incurred by the various sensors and % occupied/available space in logs. If you click on the color-coded rectangle in the Legend for the chart, you can view a list of those specific events only.



4.5.2 FRU information

This page displays the BMC FRU file information. On selecting a particular FRU Device ID its corresponding FRU information will be displayed.

Basic Information

It displays the FRU device ID and device name for the selected FRU device ID.

Chassis Information

It displays the following Chassis information fields.

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

Board Information

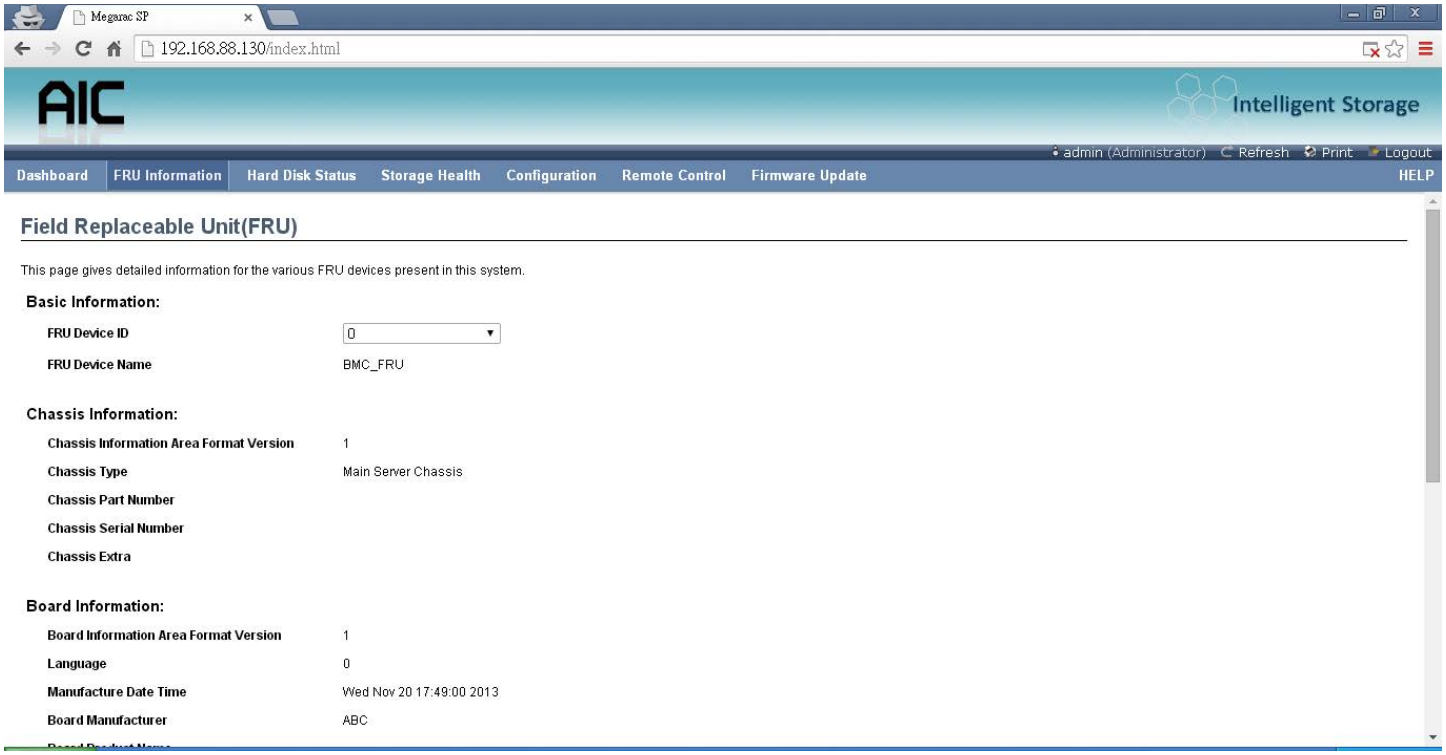
It displays the following Board information fields.

- Area Format Version
- Language
- Manufacture Date Time
- Board Manufacturer
- Board Product Name
- Board Serial Number
- Board Part Number
- FRU File ID
- Board Extra

Product Information

It displays the following Product information fields.

- Area Format Version
- Language
- Manufacturer Name
- Product Name
- Product Part Number
- Product Version
- Product Serial Number
- Asset Tag
- FRU File ID
- Product Extra

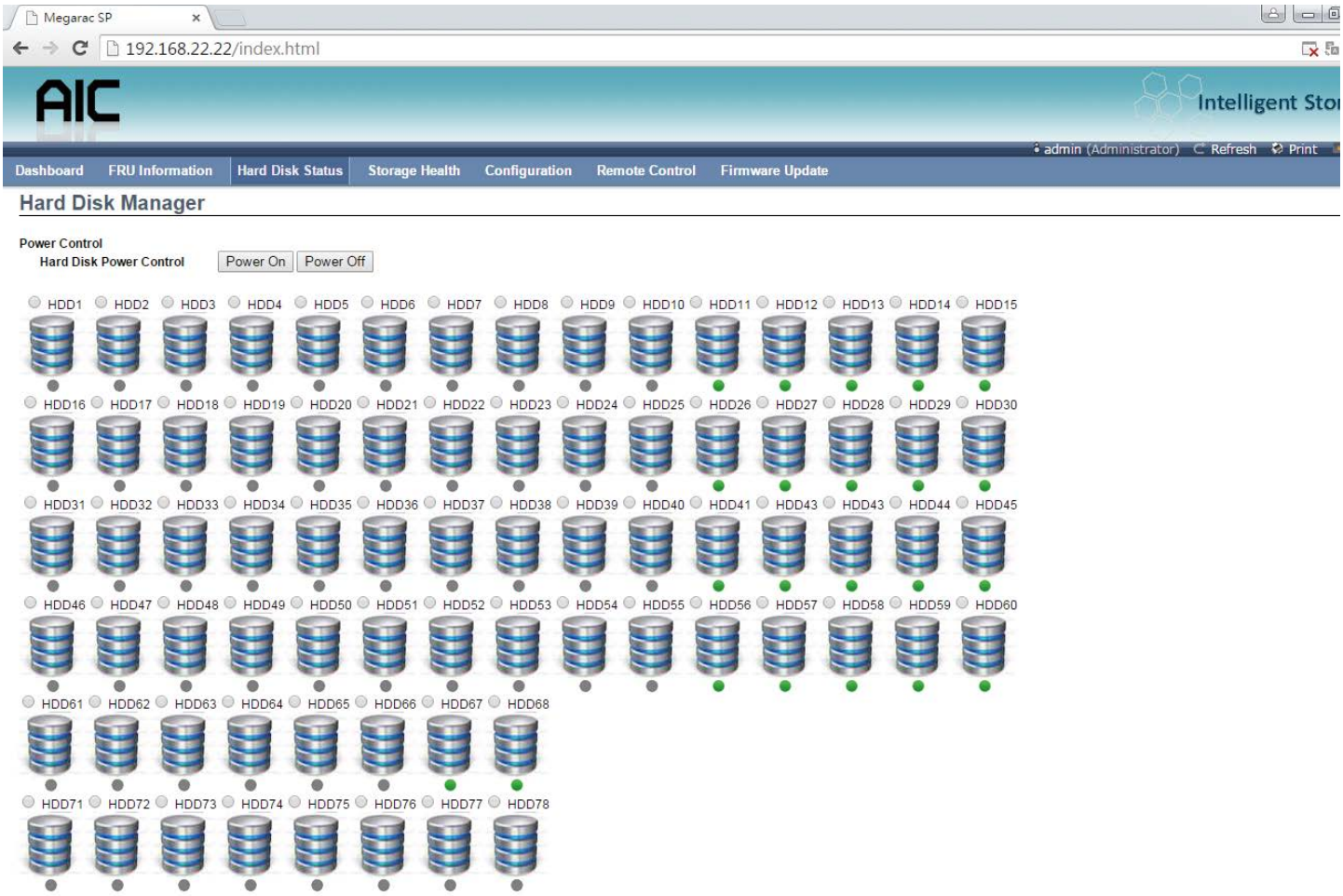


4.5.3 Hard Disk Status

This page displays all the HDD power on/off status, using the "Power On" and "Power Off" button to control HDD status.

ACTIONS

Power On
Select a HDD to turn it power on.
Power off
Select a HDD to turn it power off.
Icon status
Green: This slot inserted HDD and power on.
Blue: This slot inserted HDD and power off.
Red: This slot inserted HDD and got error.
Gray: This slot not inserted HDD.
Orange: This slot is rebuilding.



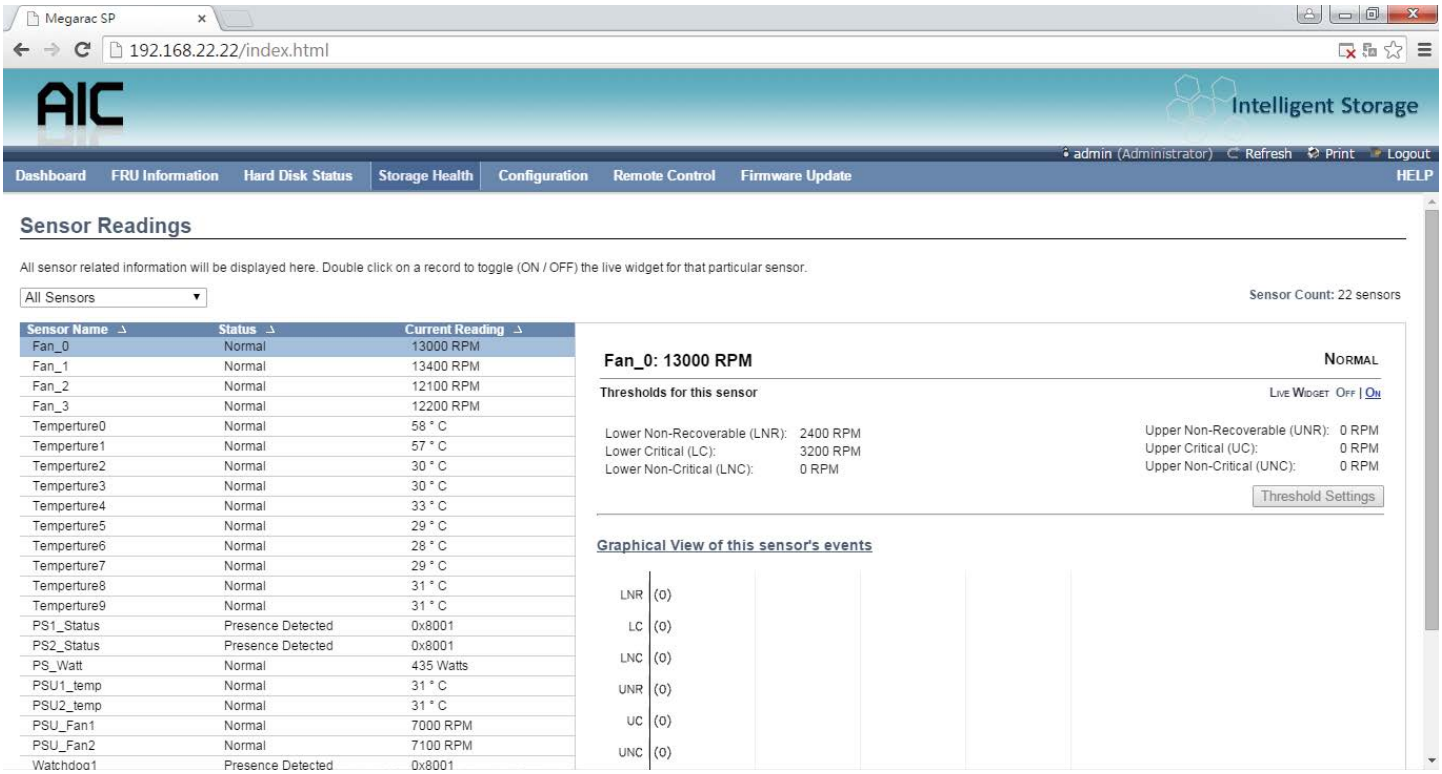
4.5.4 Storage Heath

4.5.4.1 Sensor Readings

A list of sensor readings will be displayed here. Click on a record to show more information about that particular sensor, including thresholds and a graphical representation of all associated events. Double click on a record to toggle (ON / OFF) the live widget for that particular sensor. You can filter the list to view particular sensors only using the drop-down list box.

> NOTE :
> N/A REPRESENTS NOT APPLICABLE.

Live Widget
Turn On or Off the live widget for this sensor. This widget gives a dynamic representation of the readings for the sensor.
View this Event Log
Click this button to go the event log page for the viewed sensor.



4.5.4.2 Event Log

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

BMC Timezone

Check this option to display the event log entries logged with the BMC Timezone value.

Client Timezone

Check this option to display the event log entries logged with the Client (user's) Timezone value.

UTC Offset

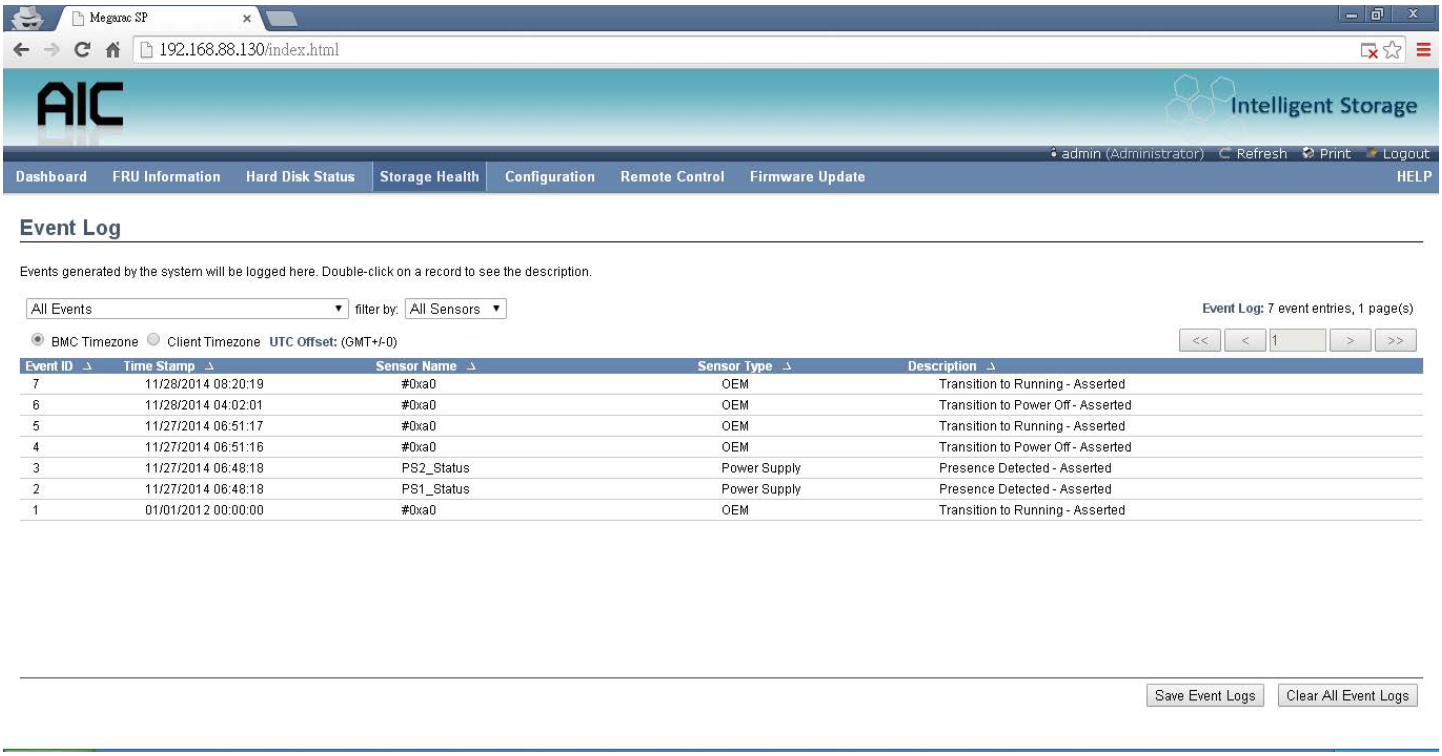
Displays the current UTC Offset value based on which event Time Stamps will be updated. Navigational arrows can be used to selectively access different pages of the Event Log.

Clear All Event Logs

Clear All Event Logs option will delete all existing records for all sensors.

Save All Event Logs

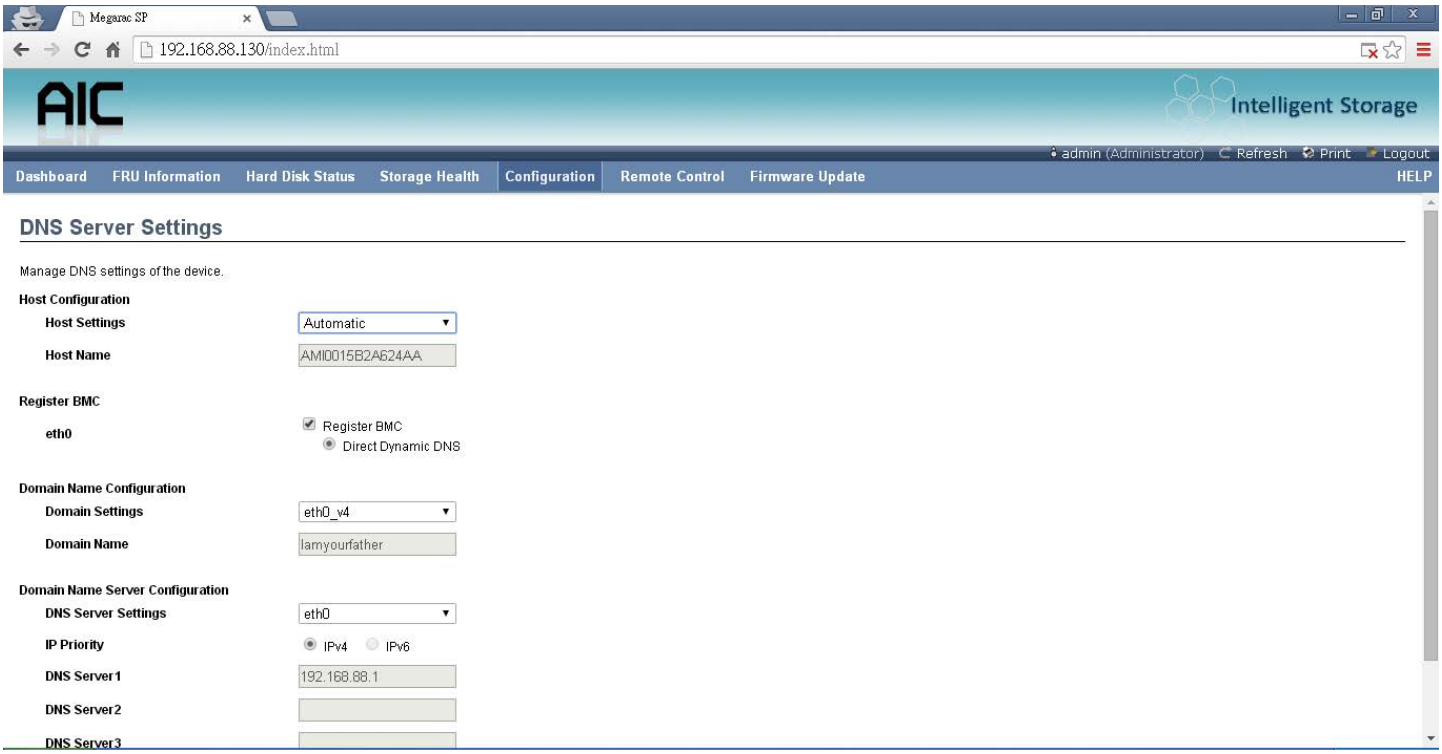
Save All Event Logs option will save all existing records for all sensors.



4.5.5 Configuration

4.5.5.1 DNS

This page is used to configure the Host name and Domain Name Server configuration of the device.



Host configuration

Host Settings Choose either Automatic or Manual settings.

Host Name It displays the hostname of the device if Auto is selected. If the Host setting is chosen as Manual, then specify the hostname of the device.

Register BMC Choose the BMC's network port to register with the DNS settings. Check the option 'Register BMC' to register with the DNS settings. Choose the option 'Direct Dynamic DNS' to register with direct dynamic DNS or choose 'DHCP Client FQDN' to register through a DHCP server.

Domain Name Configuration

Domain Settings It lists the options for the domain interface as Manual, v4 or v6 for multi LAN channels.

Domain Name It displays the domain name of the device if Auto is selected. If the Domain setting is chosen as Manual, then specify the domain name of the device.

Domain Name Server Configuration

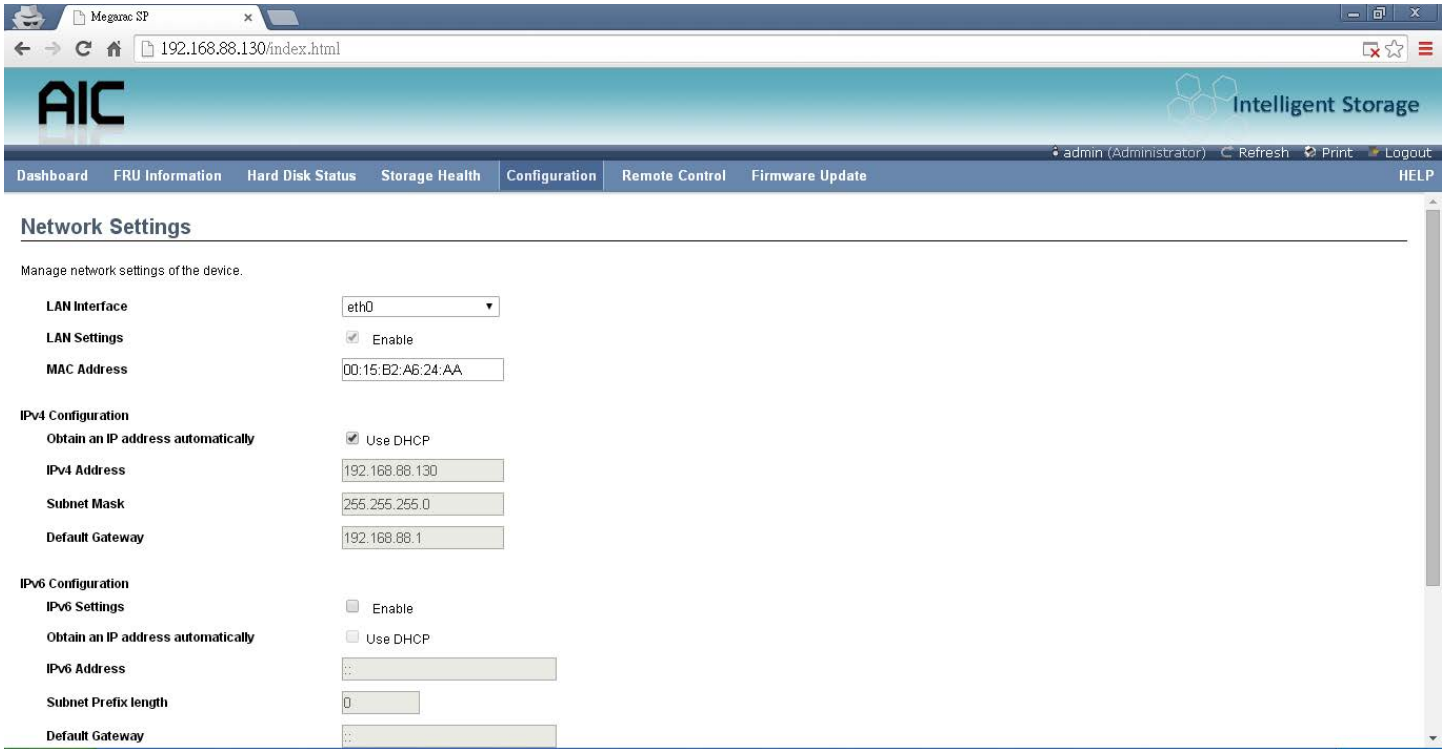
DNS Server Settings It lists the options for the DNS interface, Manual and available LAN interfaces.
IP Priority If the IP Priority is IPv4, it will have 2 IPv4 DNS servers and 1 IPv6 DNS server. If the IP Priority is IPv6, it will have 2 IPv6 DNS servers and 1 IPv4 DNS server.

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.
• An IPv4 Address is made 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.
DNS Server Address will support the following:
• IPv4 Address format.
• IPv6 Address format.
Save
Click 'Save' to save any changes made. You will be logged out of current UI session and will need to log back in.
Reset
Reset the modified changes.

4.5.5.2 Network

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



LAN Interface
Select the LAN interface to be configured.
LAN Settings
Check this option to enable LAN support for the selected interface.
MAC Address
This field displays the MAC address of the selected interface (read only).
IPv4 Configuration
It lists the IPv4 configuration settings.
Obtain an IP address automatically
Enable 'Use DHCP' to dynamically configure the IPv4 address using Dynamic Host Configuration Protocol (DHCP).
IPv4 Address, Subnet Mask, Default Gateway
If DHCP is disabled, specify a static IPv4 address, Subnet Mask and Default Gateway to be configured for the selected interface.
• An IP Address consists of 4 sets of numbers separated by dots as in "xxx.xxx.xxx.xxx".
• Each set ranges from 0 to 255.
• The first Number must not be 0.
IPv6 Configuration
It lists the IPv6 configuration settings.

IPv6 Settings

Check this option to enable IPv6 support for the selected interface.

Obtain an IP address automatically

Enable 'Use DHCP' to dynamically configure the IPv4 address using Dynamic Host Configuration Protocol (DHCP).

IPv6 Address

Specify a static IPv6 address to be configured for the selected interface.

Subnet Prefix length

Specify the subnet prefix length for the IPv6 settings.

• Value ranges from 0 to 128.

Default Gateway

Specify the v6 default gateway for IPv6 settings.

Save

Click 'Save' to save any changes made. You will be prompted to log out of the current UI session and log back in at the new IP address.

Reset

Click 'Reset' to reset the modified changes.

4.5.5.3 Network Link

This page is used to configure the network link option for the available network interfaces.

LAN Interface
Select the network interface from the list for which the Link speed and duplex mode are to be configured.

Auto Negotiation
This option is enabled 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.

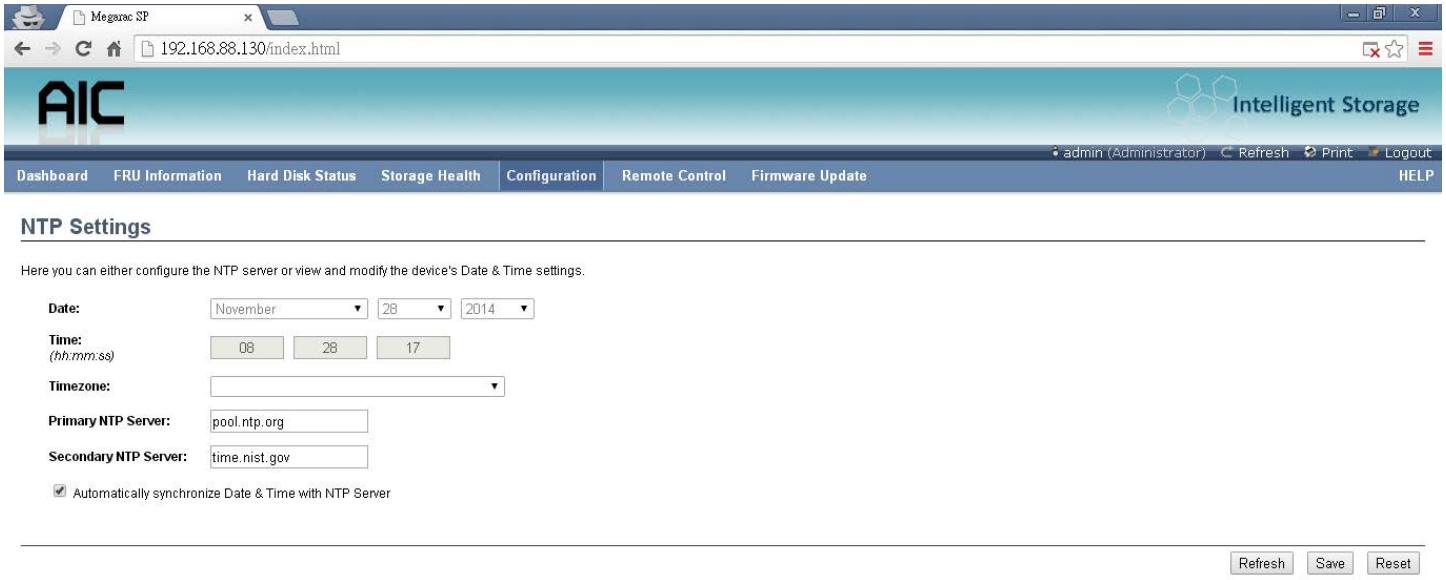
Duplex Mode
Select any one of the following Duplex Modes.
- Half Duplex
- Full Duplex

Save
Click 'Save' to save the settings.

Reset
Click 'Reset' to reset the modified changes.

4.5.5.4 NTP

This page displays the device's current Date & Time Settings. It can be used to configure either Date & Time or NTP (Network Time Protocol) server settings for the device.



Date
Specify the current Date for the device.
Time
Specify the current Time for the device.

> NOTE :
> AS A YEAR 2038 PROBLEM EXISTS, THE ACCEPTABLE DATE RANGE IS FROM 01-01-2005 TO 01-18-2038.

NTP Server
Specify the NTP Server for the device. Check the 'Automatically synchronize' option to configure the NTP Server. The NTP Server will support the following:

- IP Address (Both IPv4 and IPv6 format).
- FQDN (Fully qualified domain name) format.

UTC Offset

UTC Offset list contains the UTC offset values for the NTP server, which can be used to display the exact local time.

> NOTE :
> USE THE CORRECT UTC OFFSET AFTER ADJUSTING FOR DST.
> AUTOMATICALLY SYNCHRONIZE

Check this option to automatically synchronize Date and Time with the NTP Server.

Refresh

Click 'Refresh' to reload the current date & time settings.

Save

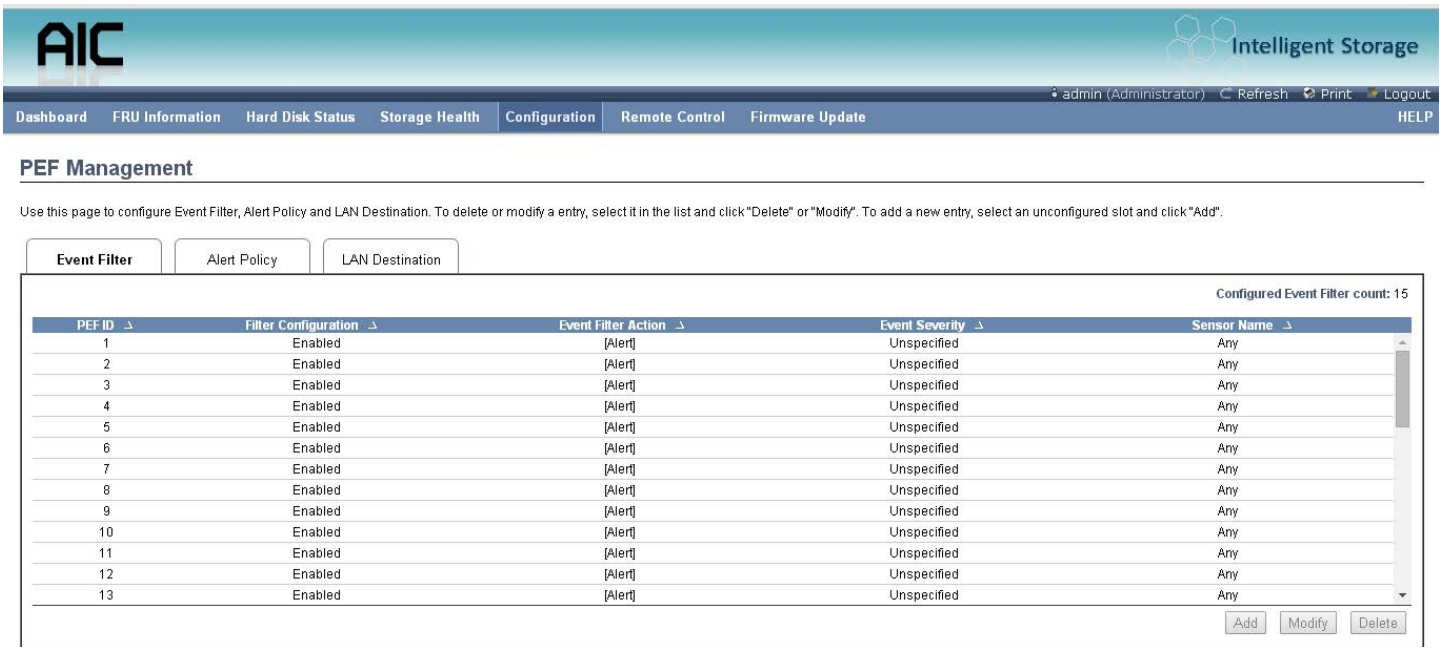
Click 'Save' to save any changes made.

Reset

Click 'Reset' to reset the modified changes.

4.5.5.5 PEF

This page is used to configure the Event Filter, Alert Policy and LAN Destination. To view the page, the user must at least be an Operator. To modify or add a PEF, the user must be an Administrator.



NOTE :

FREE SLOTS ARE DENOTED BY '~' IN ALL COLUMNS FOR THE SLOT. FOR MORE INFORMATION, REFER THE PLATFORM EVENT FILTERING (PEF) SECTION IN IPMI SPECIFICATION.

Event Filter

Click the Event Filter tab to show configured Event filters and available slots. You can modify or add new event filter entries here. A maximum of 40 slots are available and include the default of 15 event filter configurations.

Alert Policy

Click the Alert policy tab to show configured Alert policies and available slots. You can modify or add new alert policy entries here. A maximum of 60 slots are available.

LAN Destination

Click the LAN Destination tab to show configured LAN destinations and available slots. You can modify or add new LAN destination entries here. A maximum of 15 slots are available

Send Test Alert

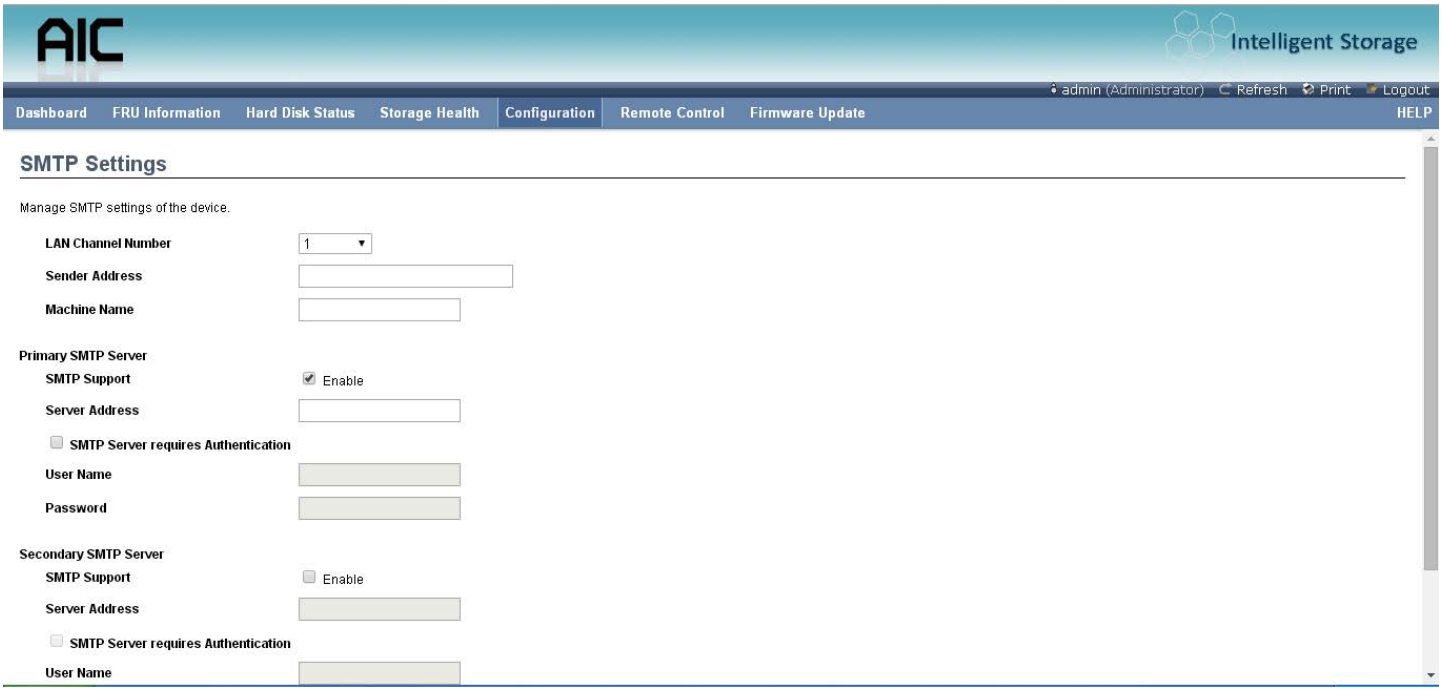
Select a configured slot in the LAN Destination tab and click 'Send Test Alert' to send a sample alert to the configured destination.

NOTE :
TEST ALERTS CAN BE SENT ONLY WITH SMTP CONFIGURATIONS SET TO ENABLED. SMTP SUPPORT CAN BE ENABLED UNDER CONFIGURATION->SMTP.

Add
Select a free slot and click 'Add' to add a new entry to the device. Alternatively, double click on a free slot.
Modify
Select a configured slot and click 'Modify' to modify that entry. Alternatively, double click on the configured slot.
Delete
Select the desired configured slot to be deleted and click 'Delete'.

4.5.5.6 SMTP

This page is used to configure the SMTP settings.



LAN Channel Number

Select the LAN channel to which the SMTP information needs to be configured.

Sender Address

Enter the 'Sender Address' valid on the SMTP Server.

Machine Name

Enter the 'Machine Name' of the SMTP Server.

- Machine Name is a string of maximum 15 alpha-numeric characters.
- Space, special characters are not allowed.

Primary SMTP Server

It lists the Primary SMTP Server configuration.

SMTP Support

Check this option to enable SMTP support for the BMC.

Server Address

Enter the 'IP address' of the SMTP Server. It is a mandatory field.

- An IP Address is made 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.

The server address will support the following:

- IPv4 Address format.
- IPv6 Address format.

SMTP Server requires Authentication

Check the option 'Enable' to enable SMTP Authentication.

NOTE :

SMTP Server Authentication Types supported are:

- CRAM-MD5
- LOGIN
- PLAIN

If the SMTP server does not support any one of the above authentication types, the user will get an error message stating, "Authentication type is not supported by SMTP Server"

Username

Enter the username to access SMTP Accounts.

• The User Name can be 4 to 64 alpha-numeric characters.
• It must start with an alphabet.
• Special characters ',' (comma), ':' (colon), ';' (semicolon), ' ' (space) and '\' (backslash) are not allowed.

Password

Enter the password for the SMTP User Account.

• Passwords must be at least 4 characters long.
• Space is not allowed.

NOTE :

This field will not allow more than 64 characters.

Secondary SMTP Server

It lists the Secondary SMTP Server configuration. It is an optional field. If the Primary SMTP server is not working, then it tries the Secondary SMTP Server configuration.

Save

Click 'Save' to save the new SMTP server configuration.

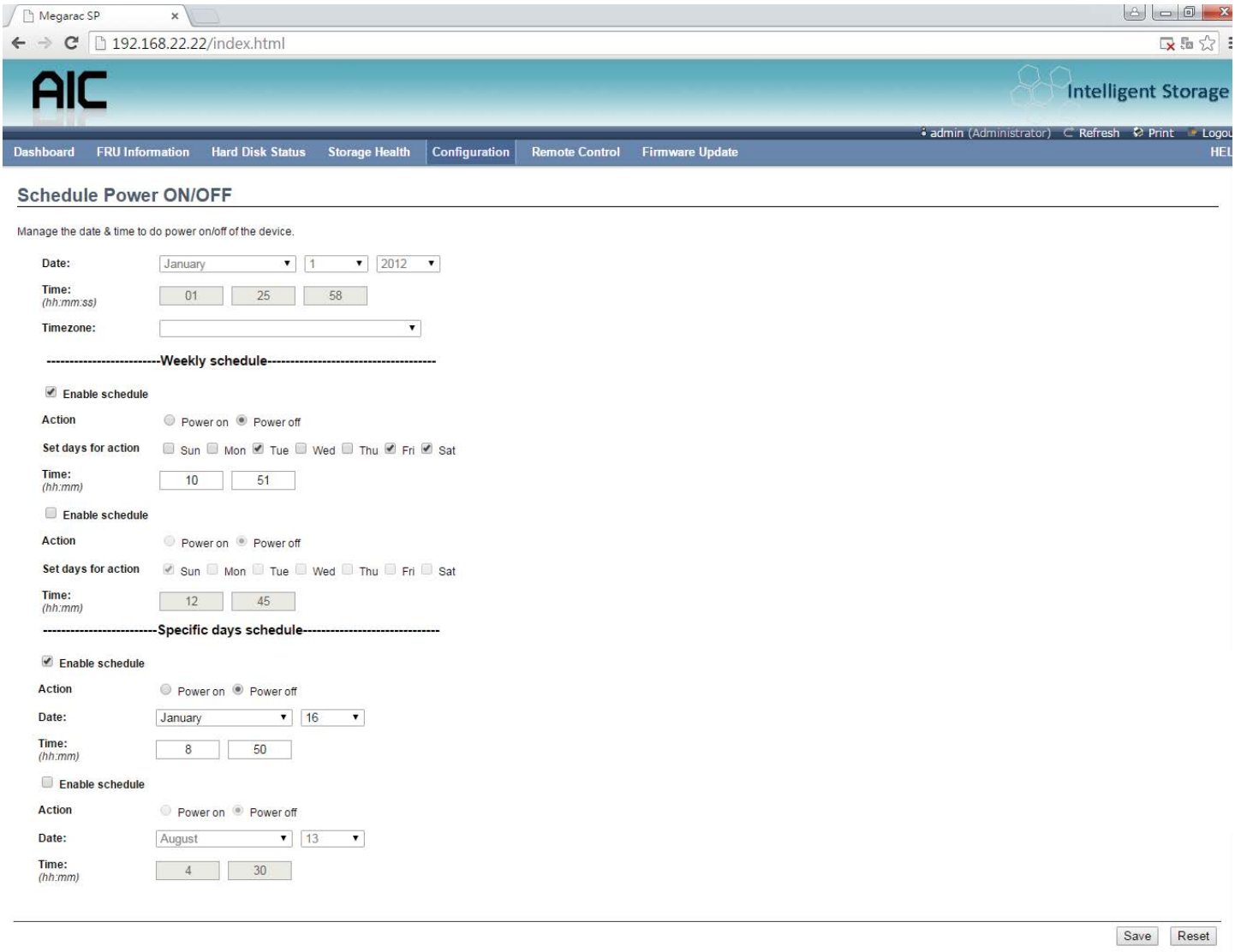
Reset

Click 'Reset' to reset the modified changes.

4.5.5.7 Schedule

This page displays the device's current date & time. It can be used to configure dates within a week or specific a date to power on/off the device.

If you want to change the device date & time, please go to the NTP page.



ACTIONS

Enable schedule

Check this option for enable/disable the schedule.

Action

Check a action to do power on/off for the device.

Set days for action

Setting dates within a week to do power on/off for the device.

Date

Specify a date for the device.

Time

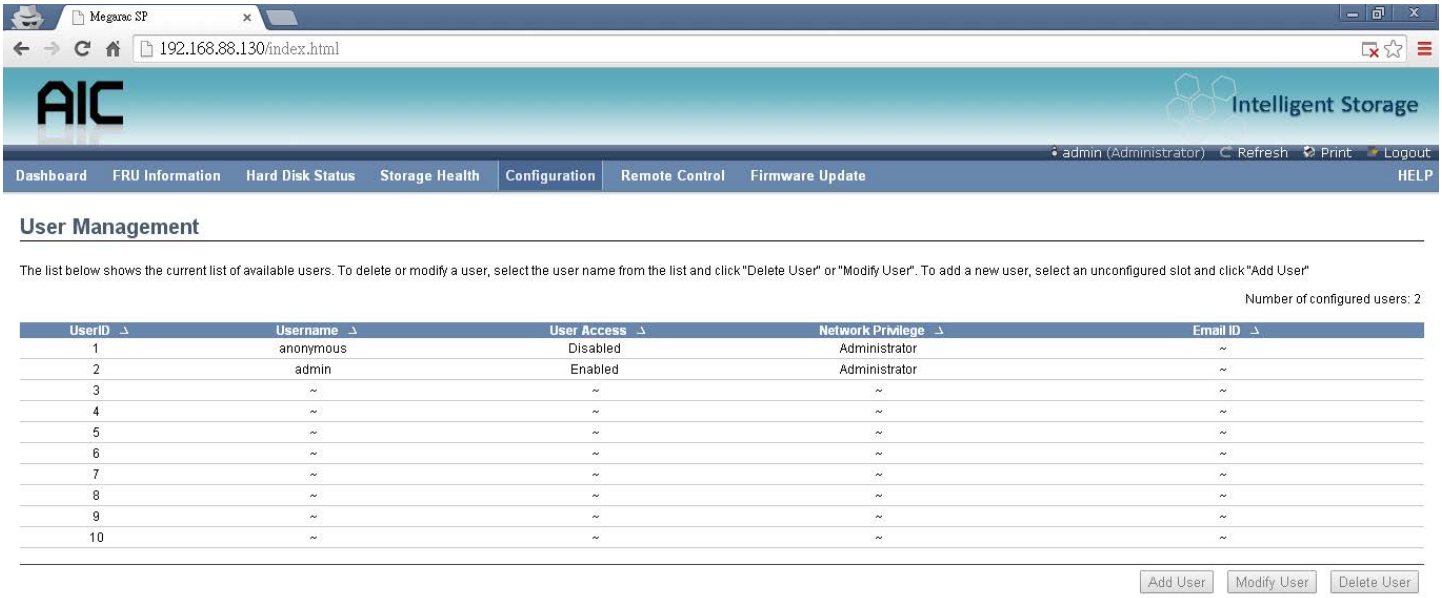
Specify a time for the device.

4.5.5.8 User

The displayed table shows any configured Users and available slots. You can modify or add new users from here. A maximum of 10 slots are available, including the default admin and anonymous. It is advised that the anonymous user's privilege and password should be modified as a security measure. To view the page, you must have Operator privileges. To modify or add a user, You must have Administrator privileges.

> NOTE :
> FREE SLOTS ARE DENOTED BY "~" IN ALL COLUMNS FOR THE SLOT.

Add User
Select a free slot and click 'Add User' to add a new user to the device. Alternatively, double click on a free slot to add a user.
Modify User
Select a configured slot and click 'Modify User' to modify that user. Alternatively, double click on the configured slot.
Delete User
Select the desired user to be deleted and click 'Delete User'



4.5.6 Remote Control

4.5.6.1 Storage power control

This page helps you to view or perform any host power cycle operations.

Reset Expander

Select an expander to do cold reset.

Power Off Storage

Select this option to immediately power off the storage.

Power On Storage

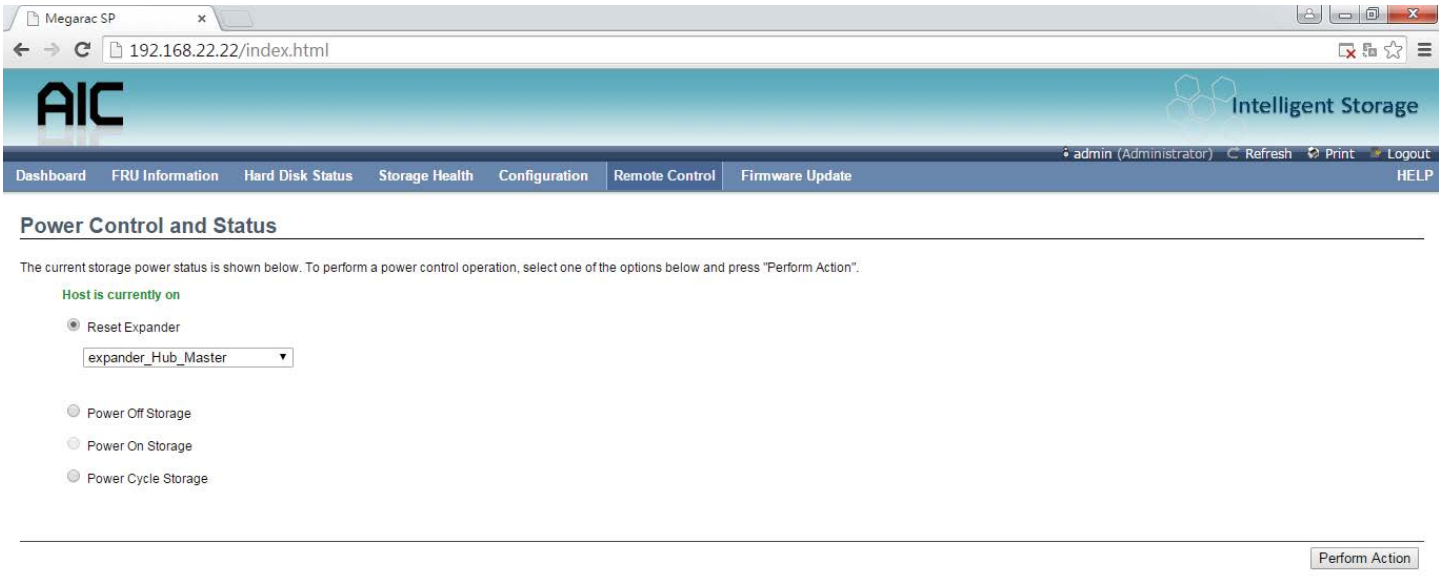
Select this option to power on the storage.

Power Cycle Storage

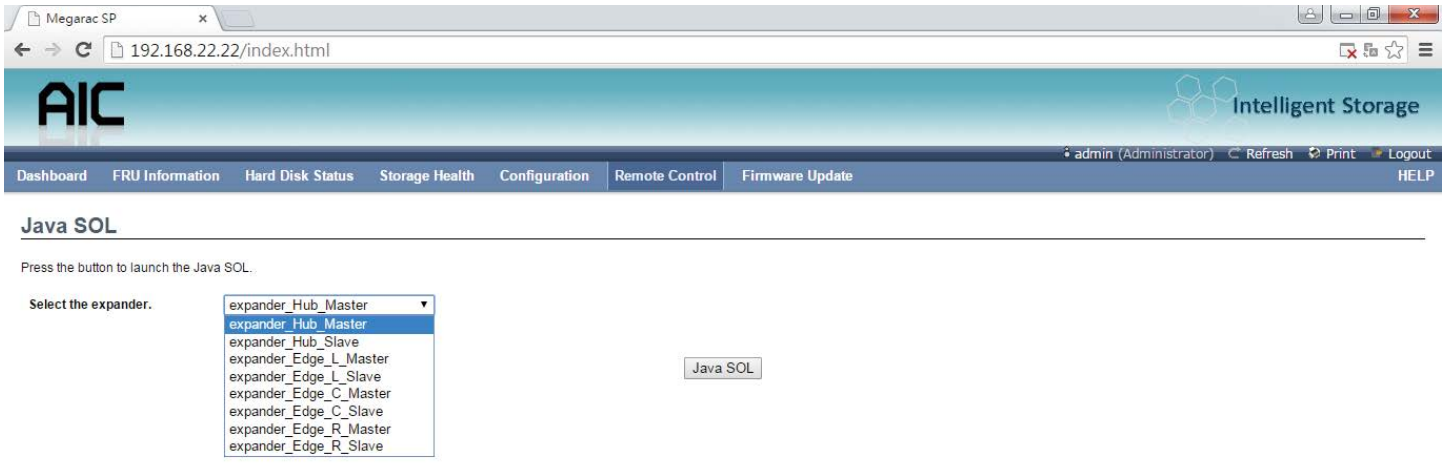
Select this option to first power off, and then reboot the system (cold boot).

Perform Action

Click 'Perform Action' to perform the selected option.

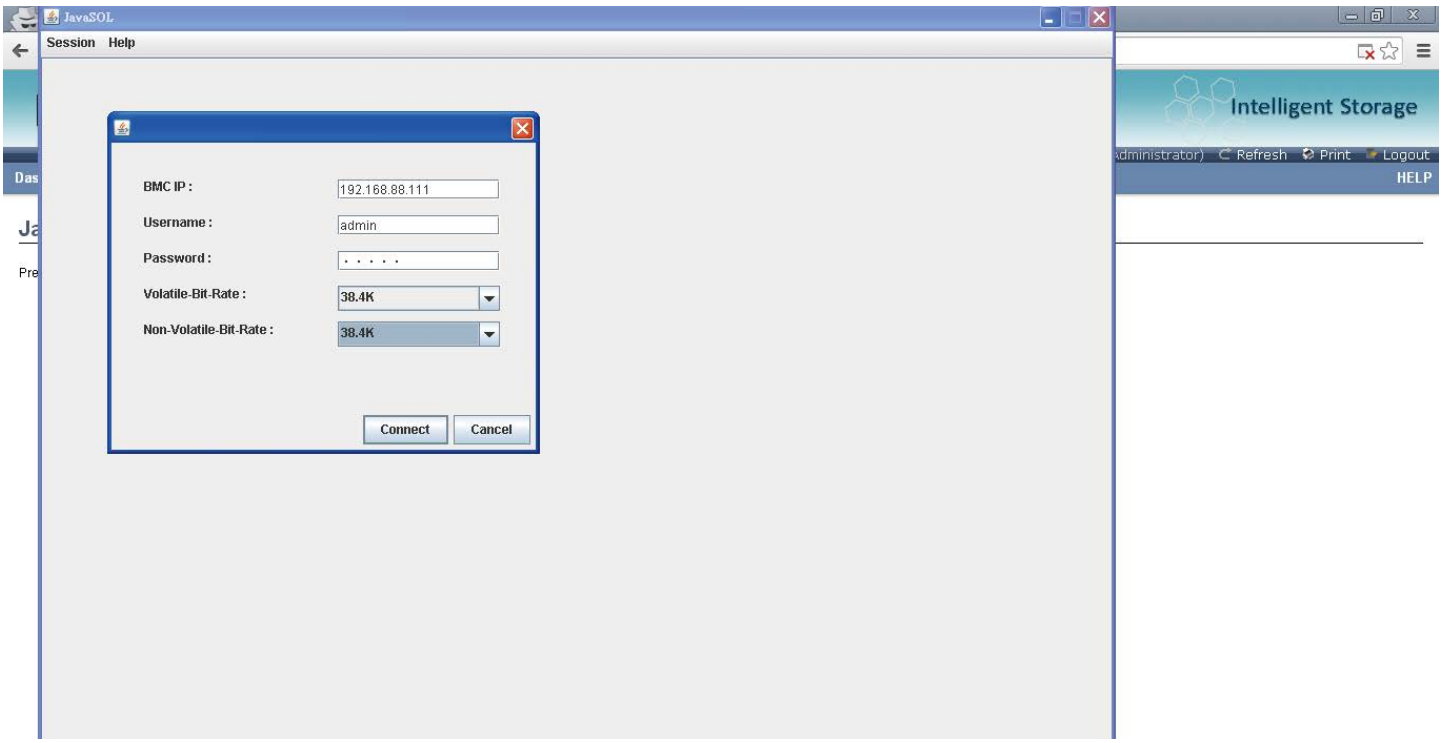


4.5.6.2 JAVA SOL



NOTE :

A COMPATIBLE JRE MUST BE INSTALLED IN THE SYSTEM PRIOR TO THE LAUNCH OF THE JNLP FILE.



Please set 38.4K
Non-Volatile-Bit-Rate

Please set 38.4K

This function can connect to expander command line mode.

4.6 Firmware Update

4.6.1 Requirement

Browsers:

FireFox 24.0 or later version
Chrome 35.0 or later version
I.E. 7.0 or later version

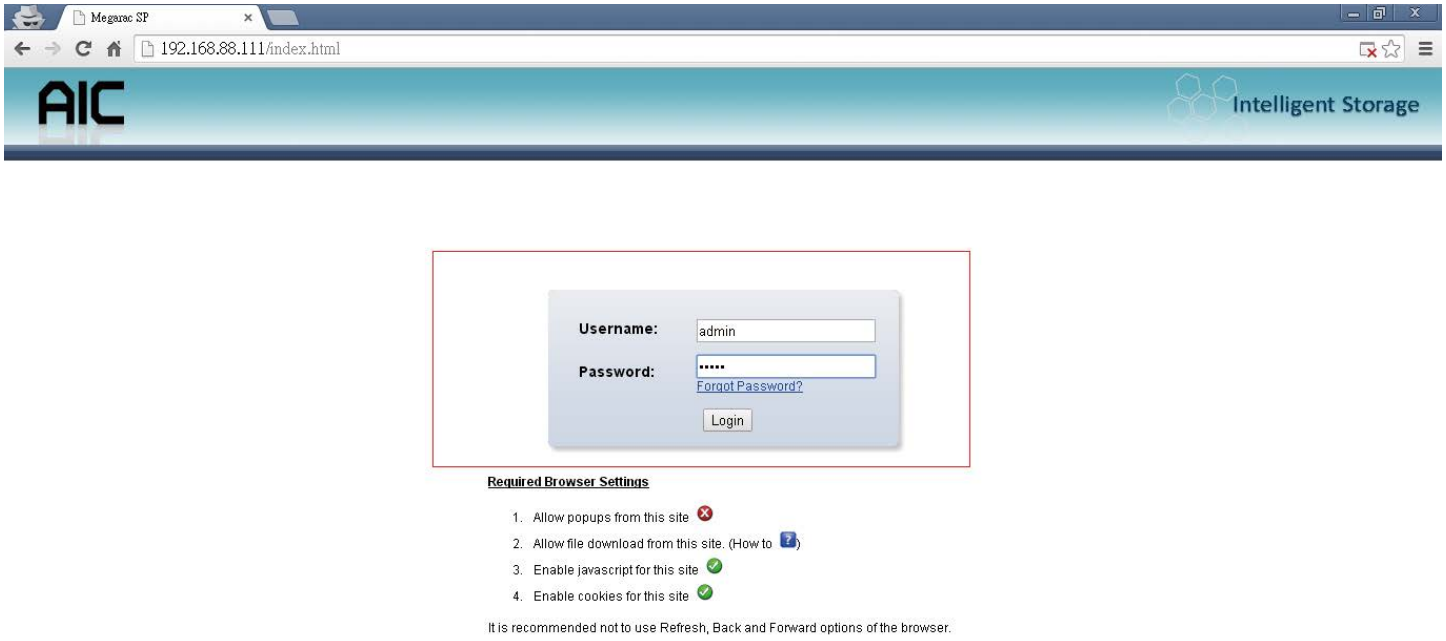
Linux:

Redhat 6.4

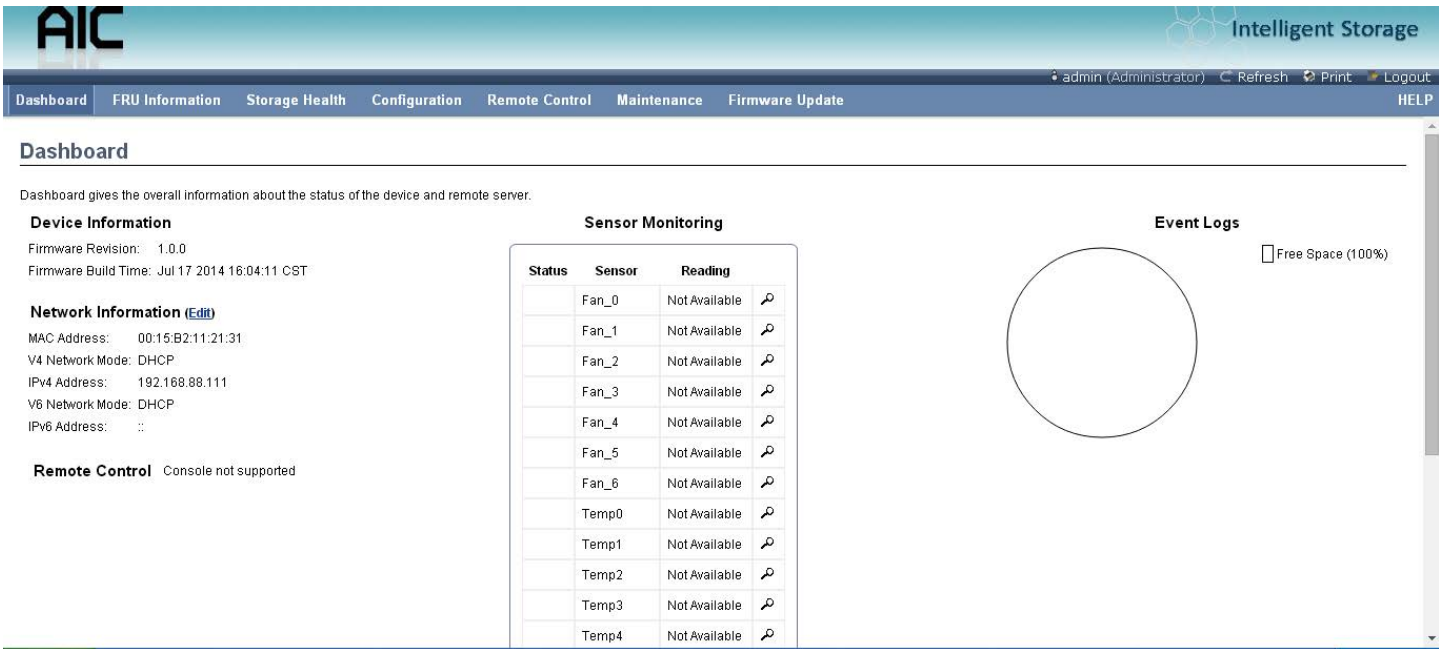
> NOTE :
> IF YOU WANT TO UPDATE A NEW VERSION FIRMWARE FOR BMC, WHEN FINISHED ALL THE UPDATE PROCESS, PLEASE CLEAR THE WEB BROWSER COOKIES.

4.6.2 Web update

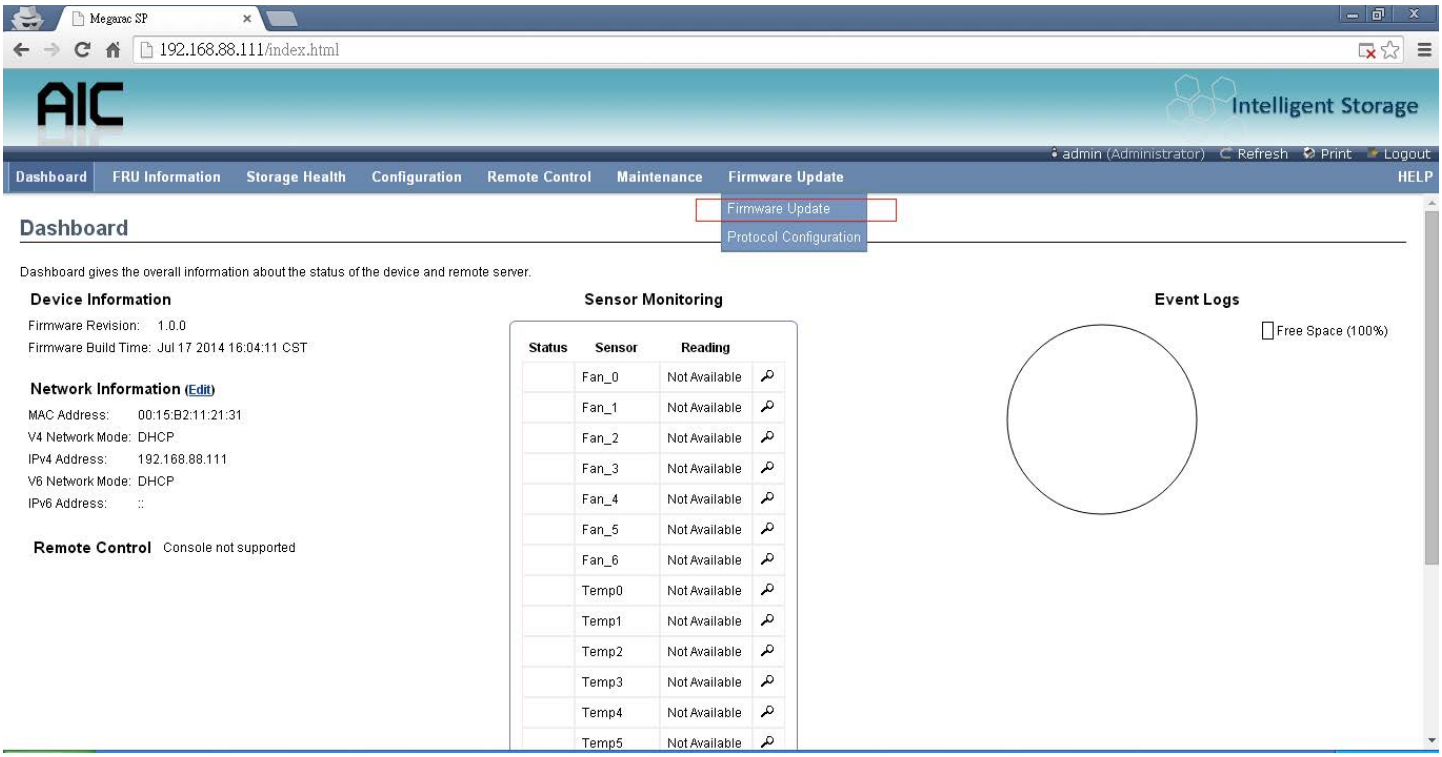
1. Check the BMC IP is valid.
2. Open a browser, type in the BMC IP, it will show the BMC web UI, type the default account, or have administrator privileges account.
   Username: admin
   Password: admin



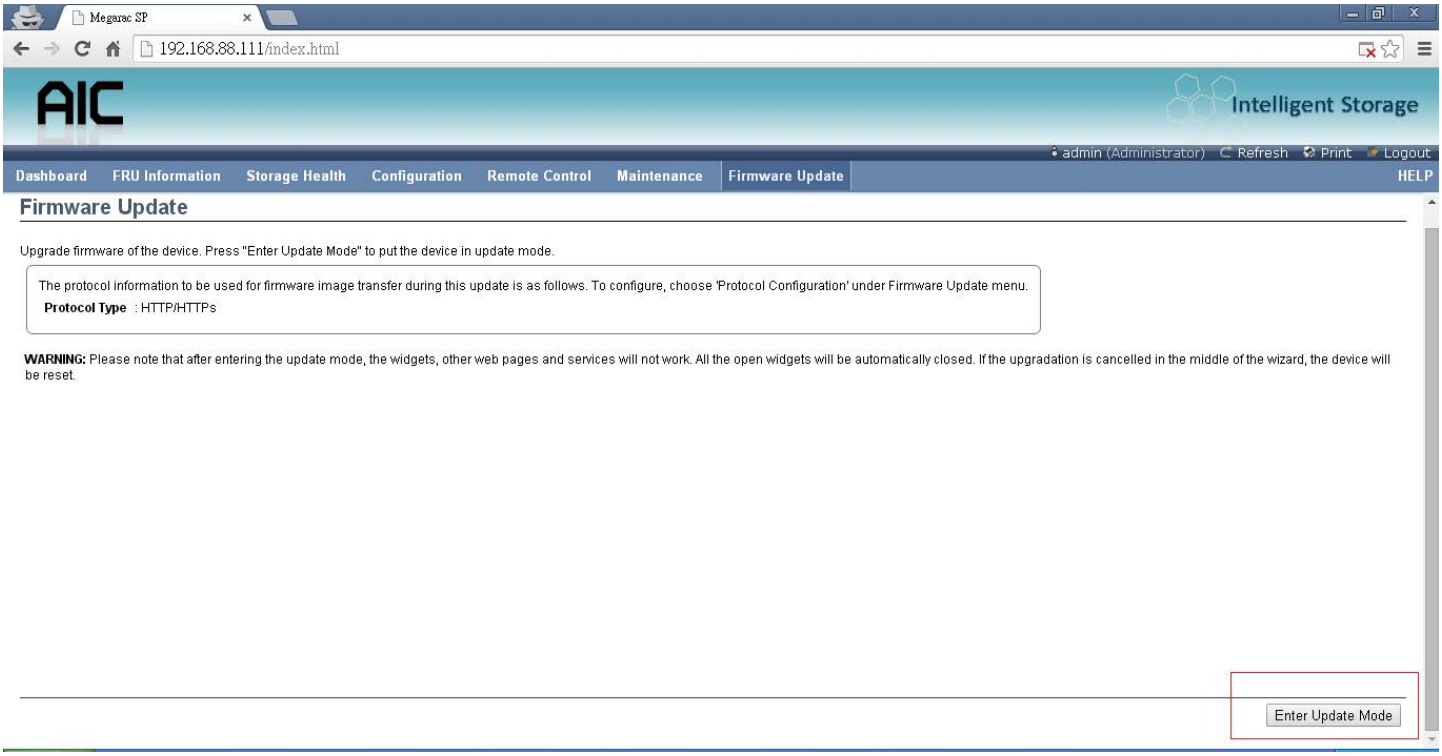
3. This is login main page.



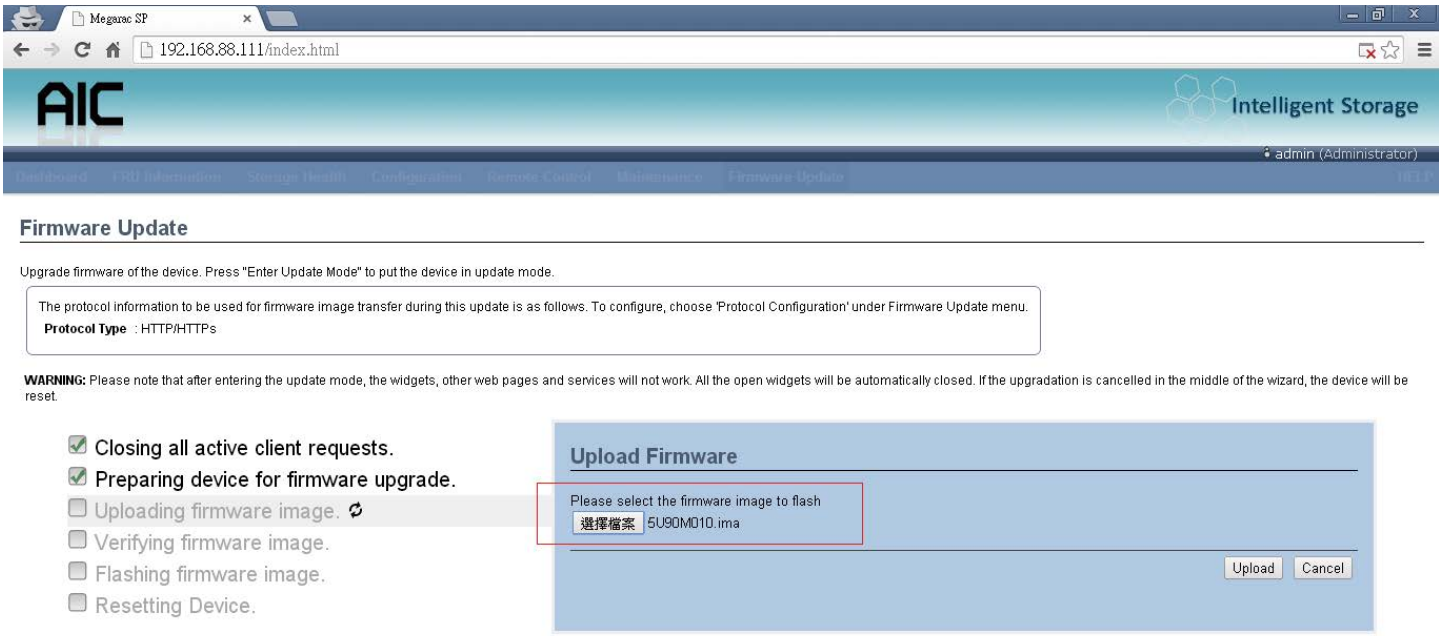
4. Click the "Firmware Update", it will pop a drop-down menu, click the "Firmware Update"



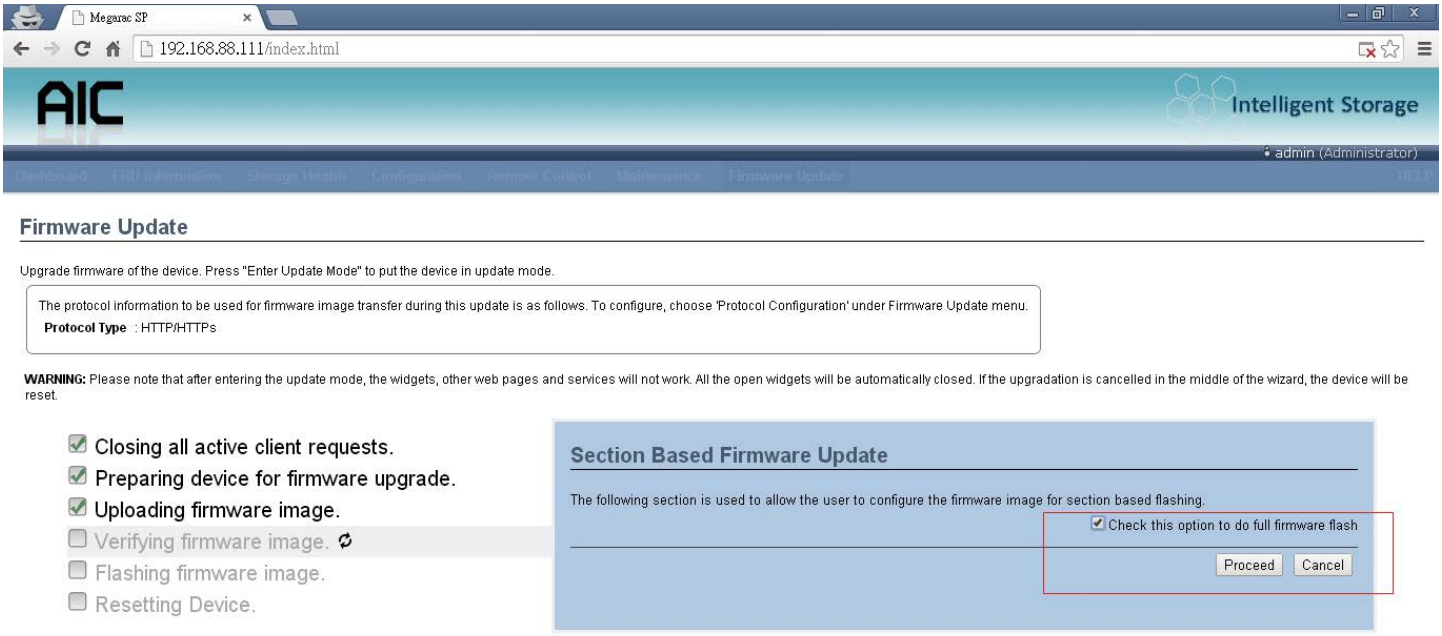
5. This page will show the update warning, if you really want to update BMC firmware, click the “Enter Update Mode” button.



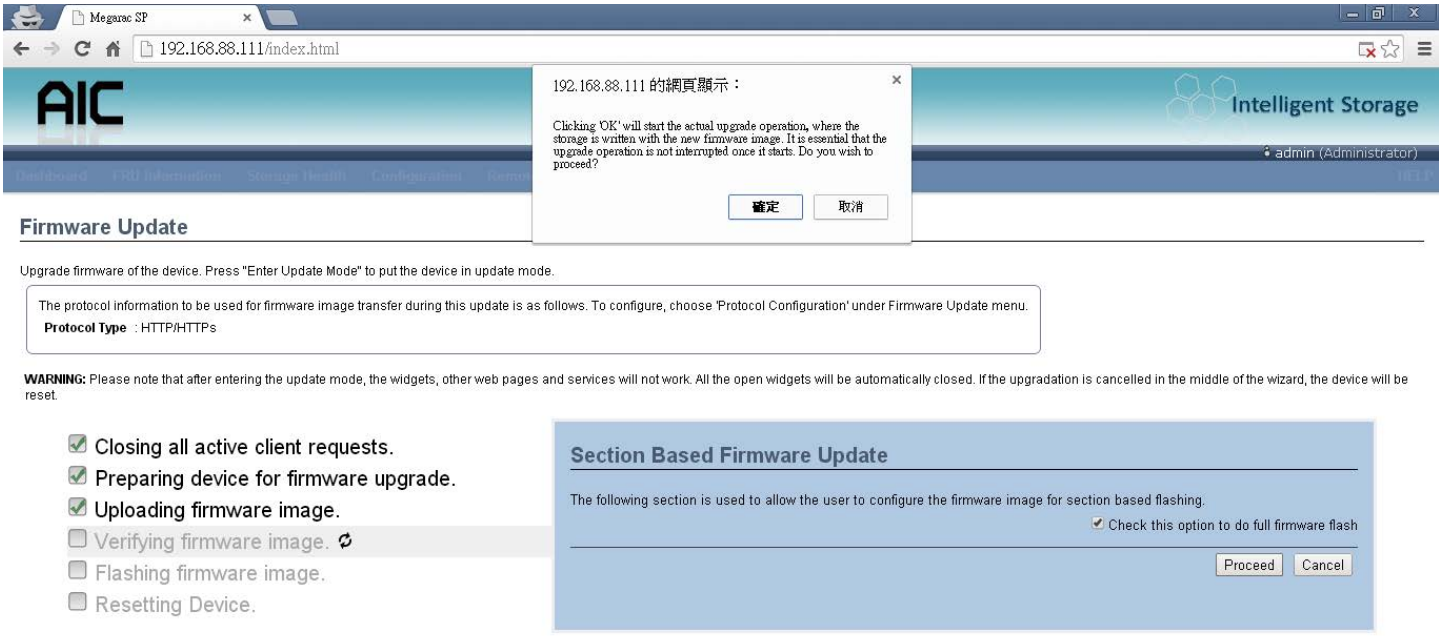
6. Wait few minutes, it will pop a window, click the “Select file” to upload firmware file that you want update.



7. Wait a minutes, it will pop a window for check update section, just check the “Check this option to do all full firmware flash” option.

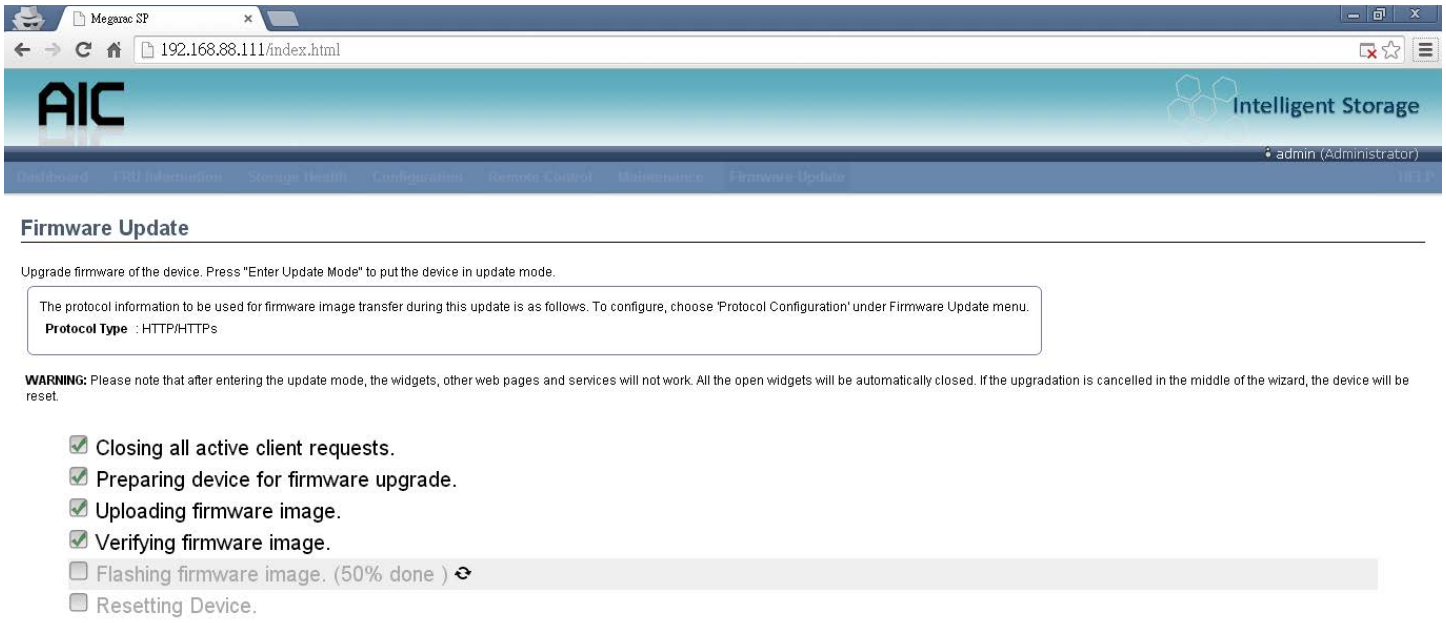


8. Click “OK” the firmware will started update operation.

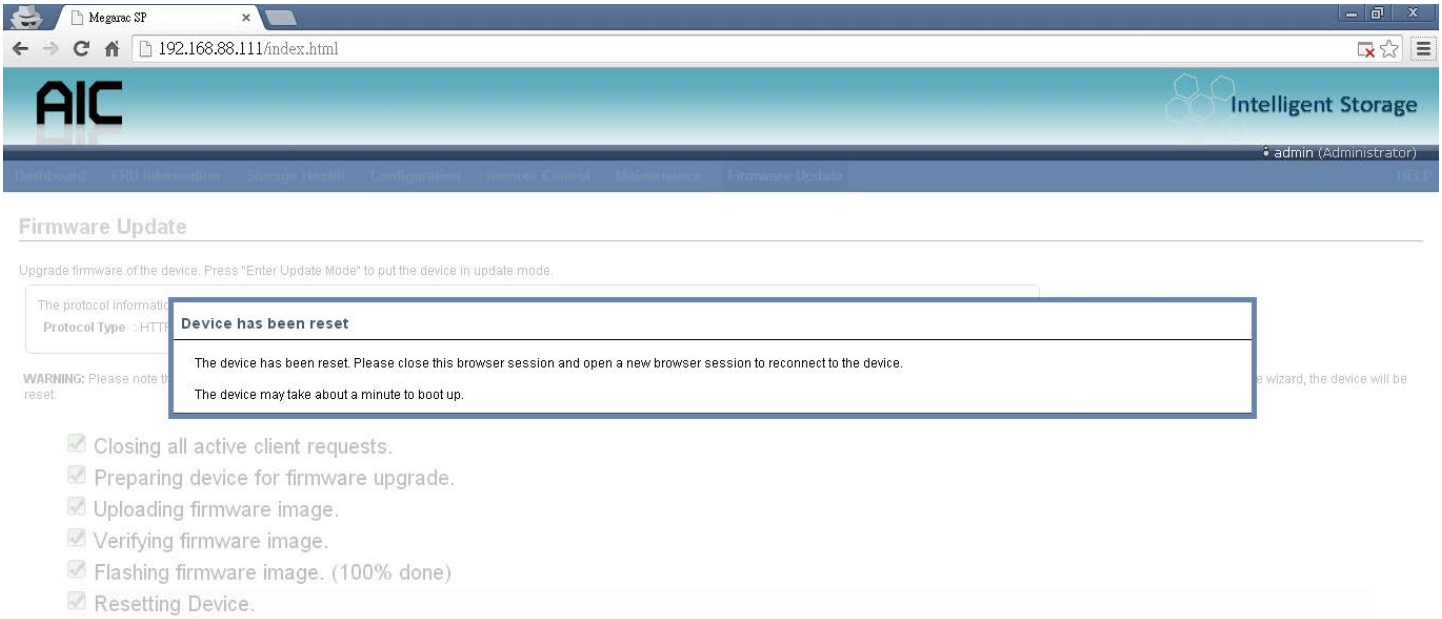


9. In the update processes, it will take 3~5 minutes.

> **CAUTION:**
> **PLEASE DO NOT CLOSE THIS WEBPAGE!! OR IT WILL LET THE FIRMWARE DEATH**

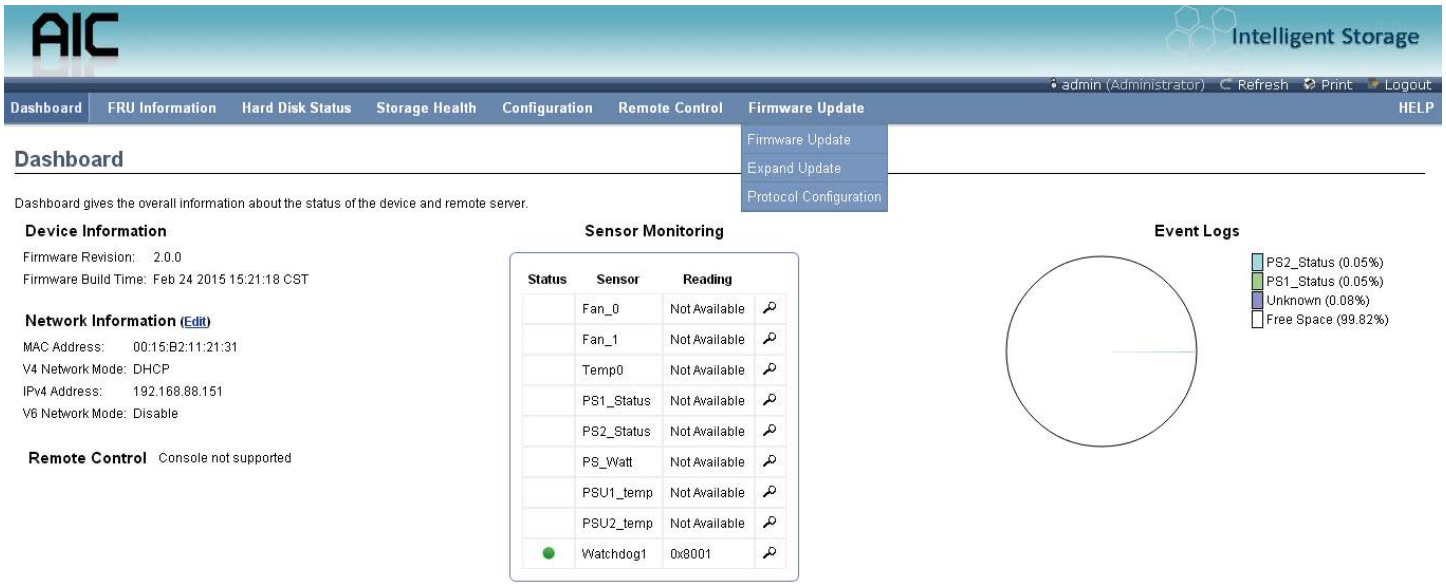


10. When show the "Device has been reset" window, it means firmware update successful, wait 90 seconds for BMC restarted.

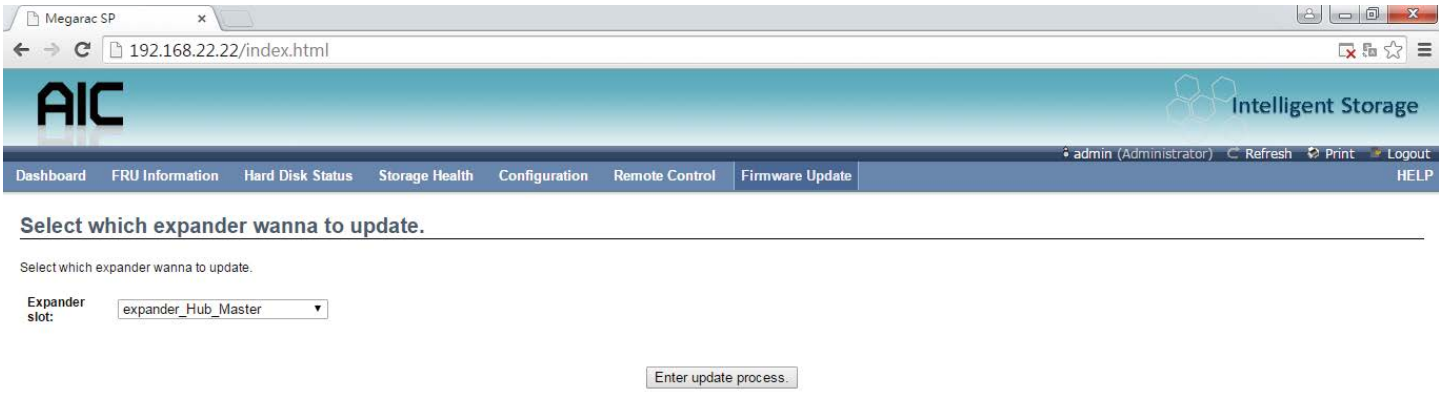


4.7 Expander firmware update

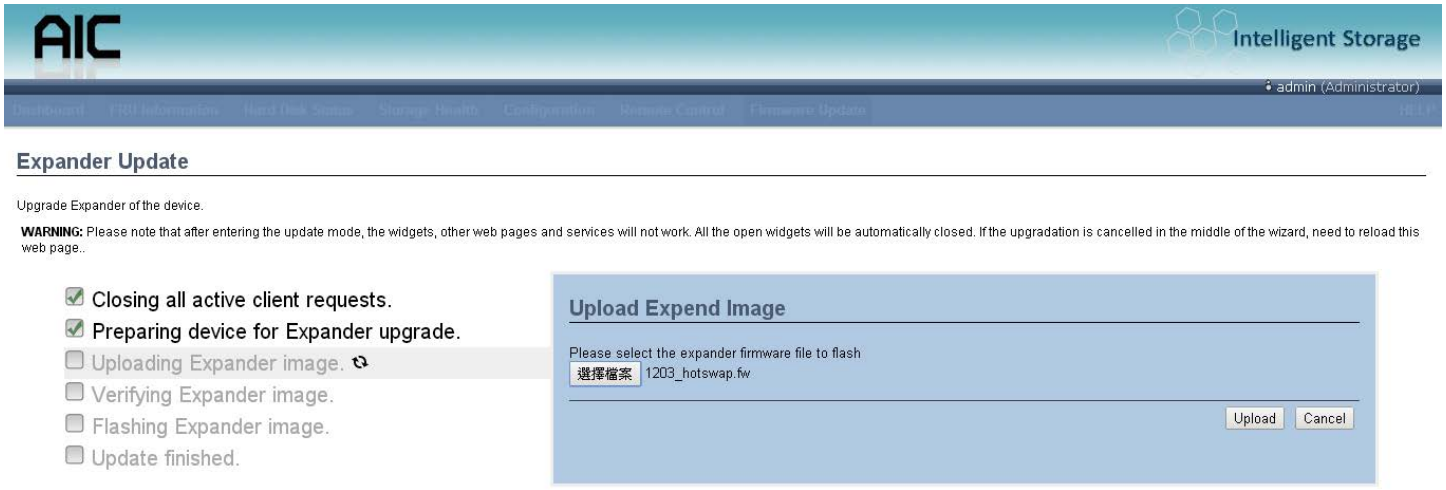
1. Click the "Firmware Update", it will pop a drop-down menu, click the "Expand Update"



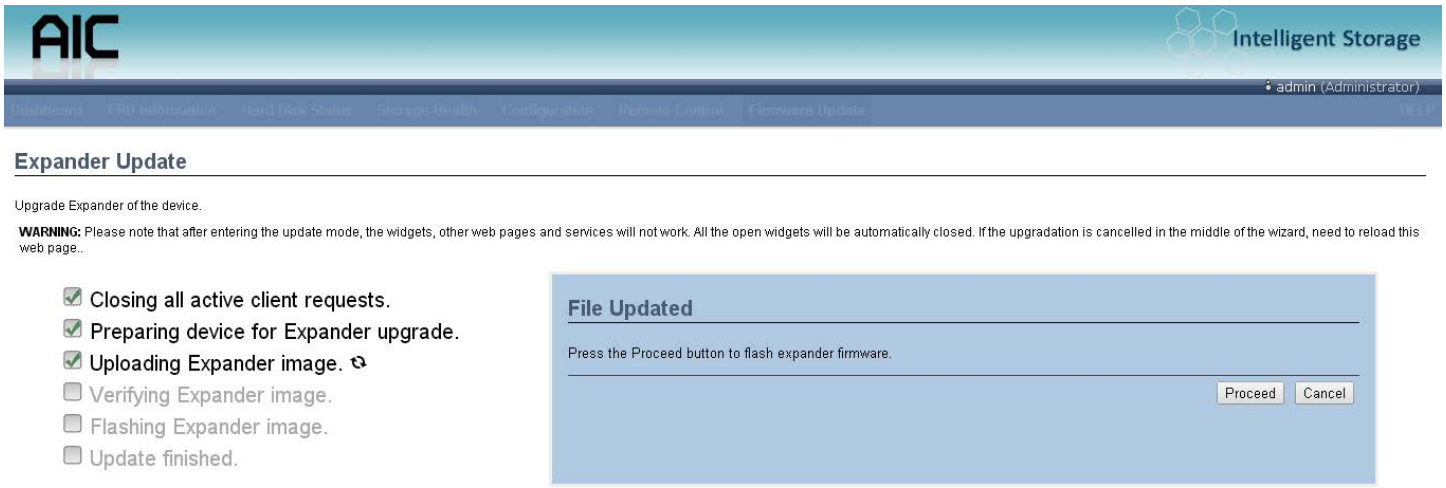
2. Chose the expander firmware file that want to update.



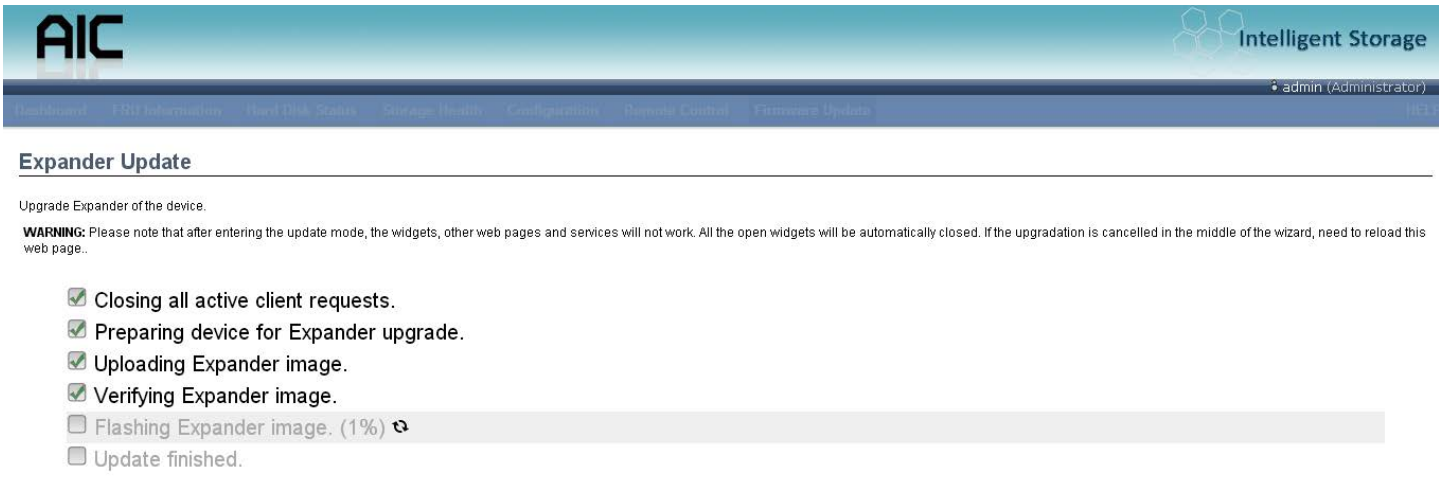
3. Chose the expander firmware file then click the “upload” button.



4. Click the "Proceed" button.

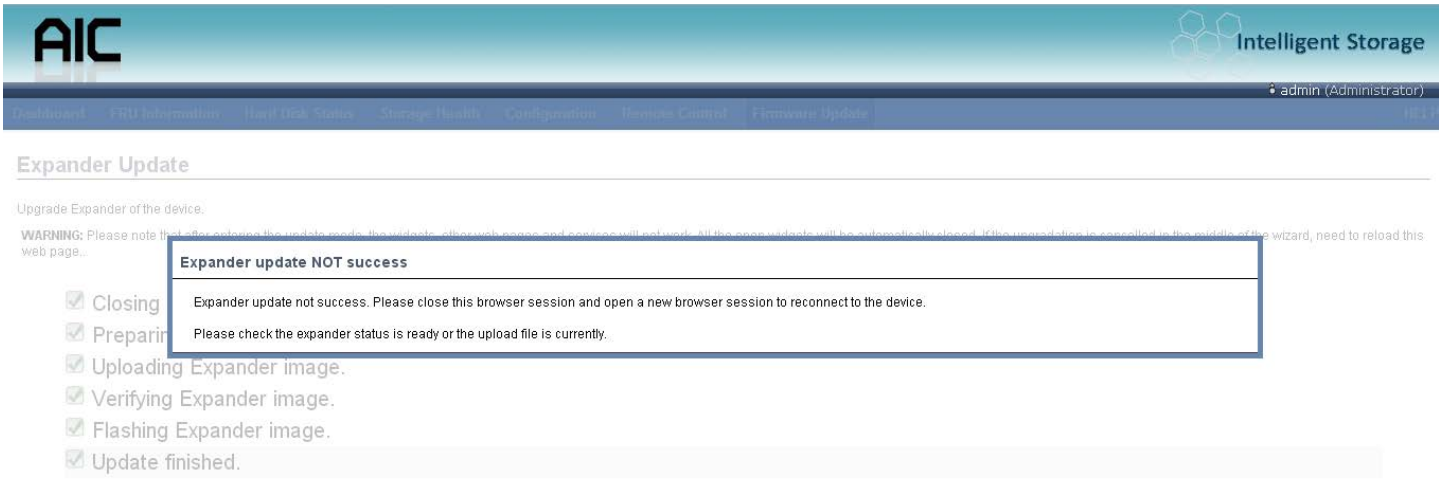


5. Processing



6. Update successful

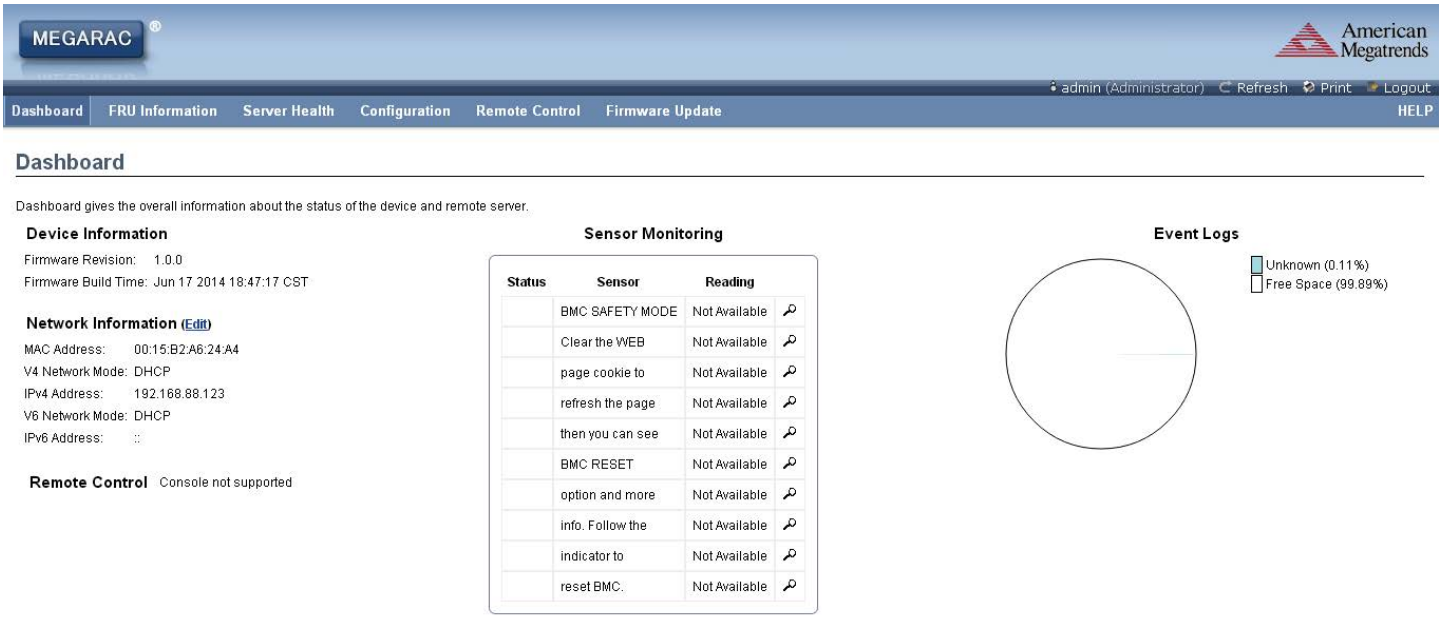
7. If the update processes not success, please check the expander firmware is currently version or the system is already power off.

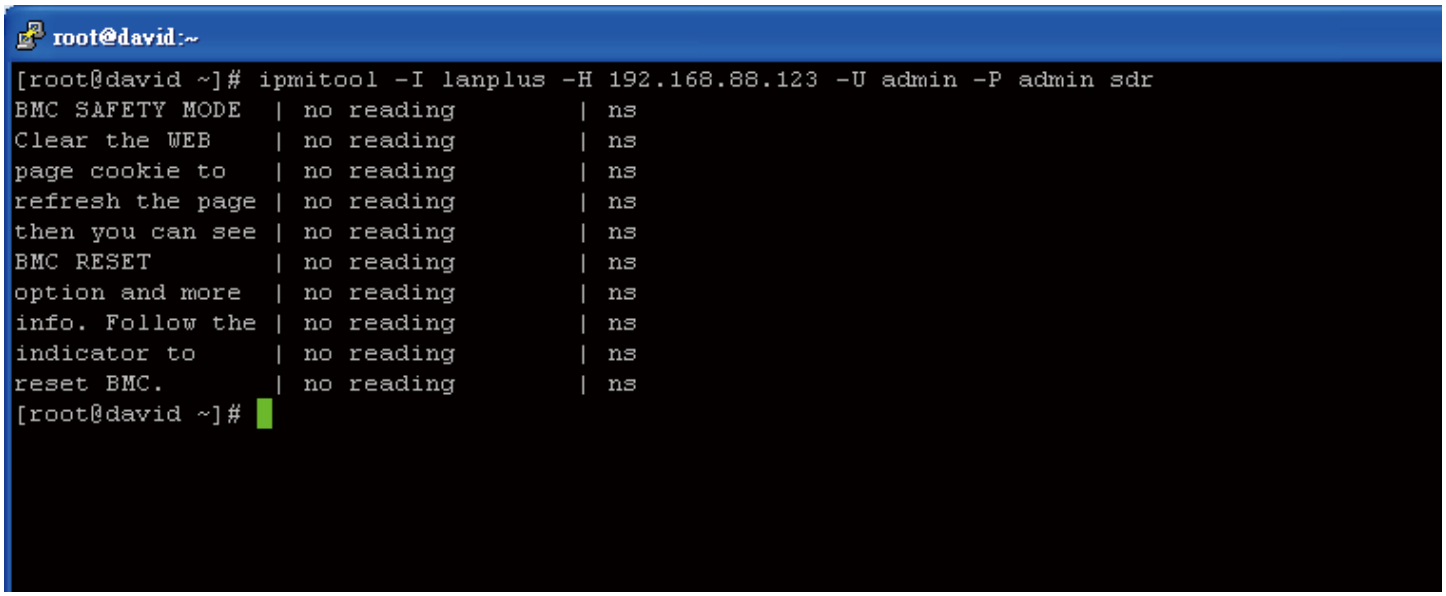


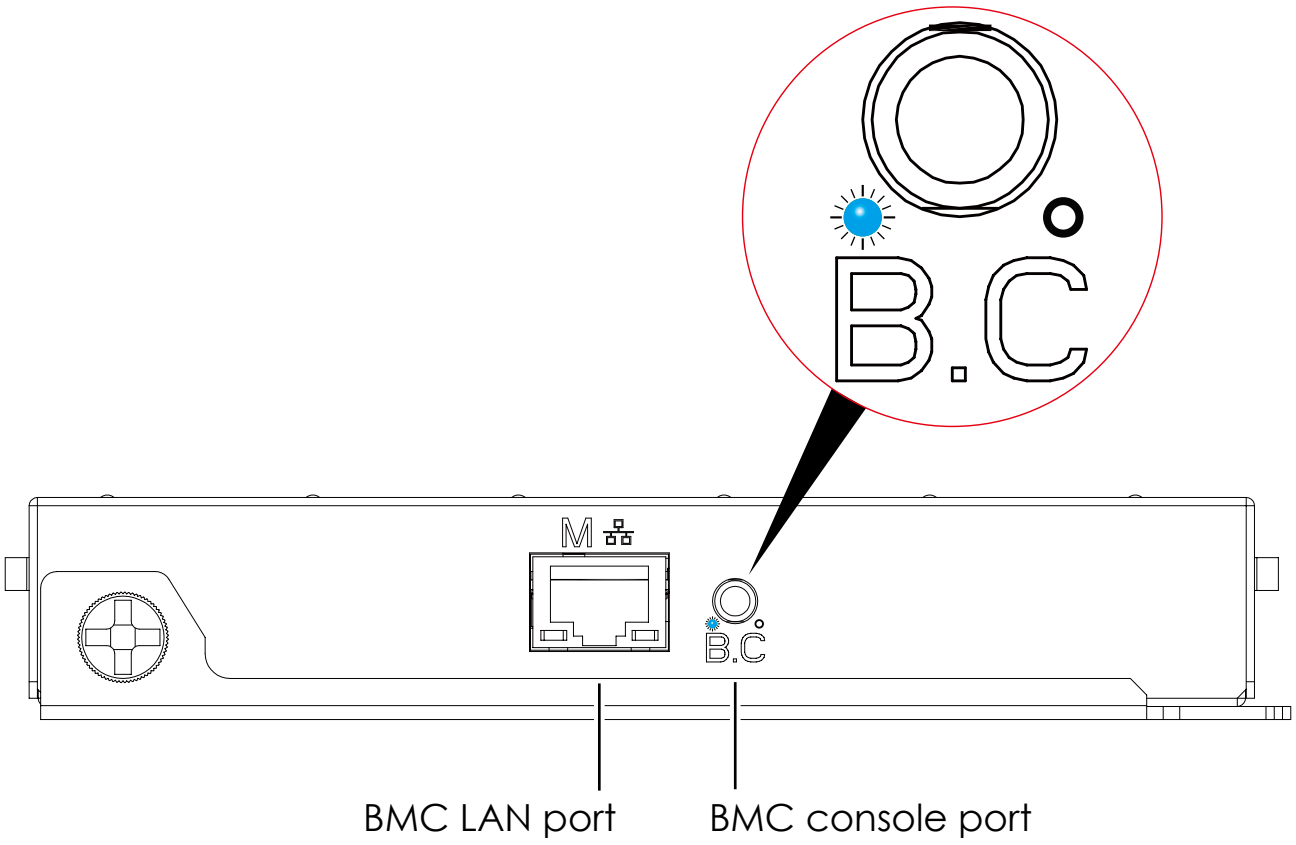
4.8 Firmware safety mode

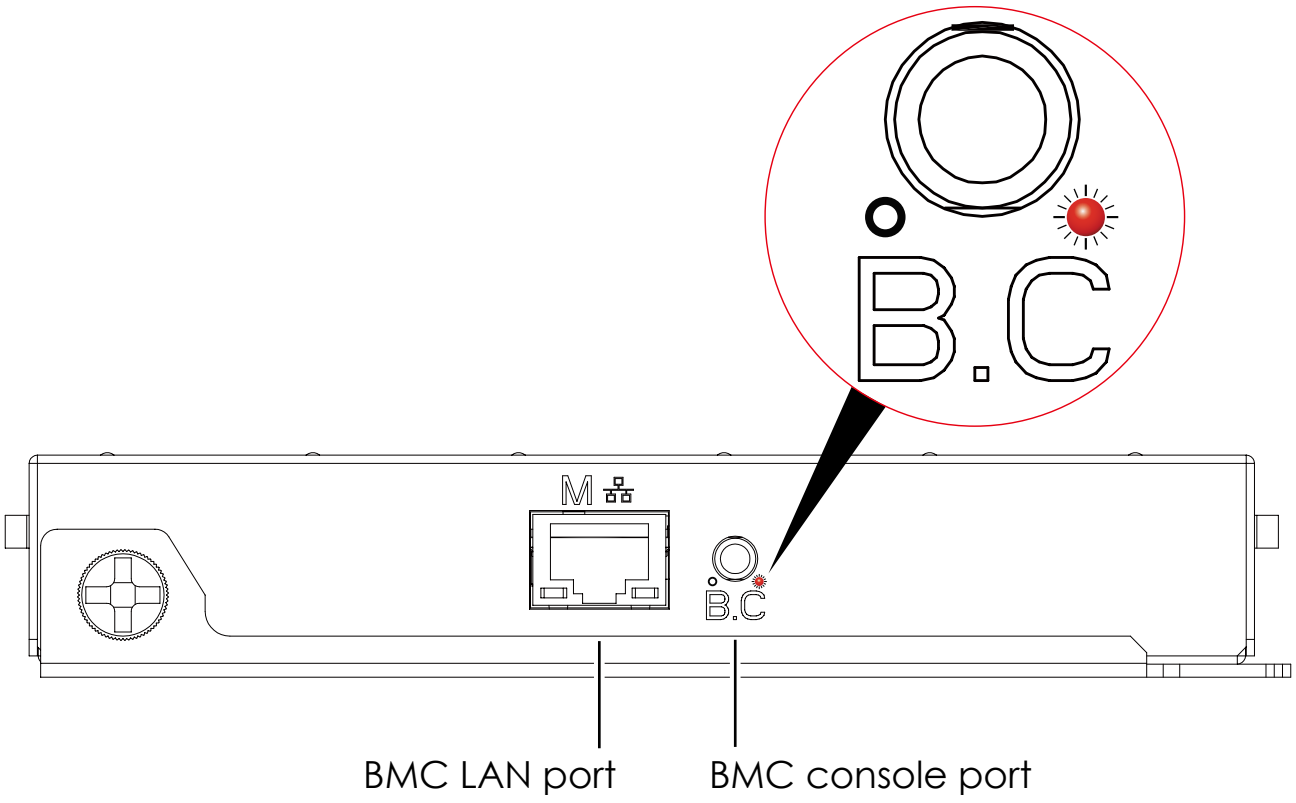
If you update process fail or primary firmware suffers some error, it will boot in safety mode.

1. If you saw the sensor name, status LED and ID LED are abnormal, the LEDs are cross blinking, it means firmware is in safety mode, in safety mode some function will be useless!

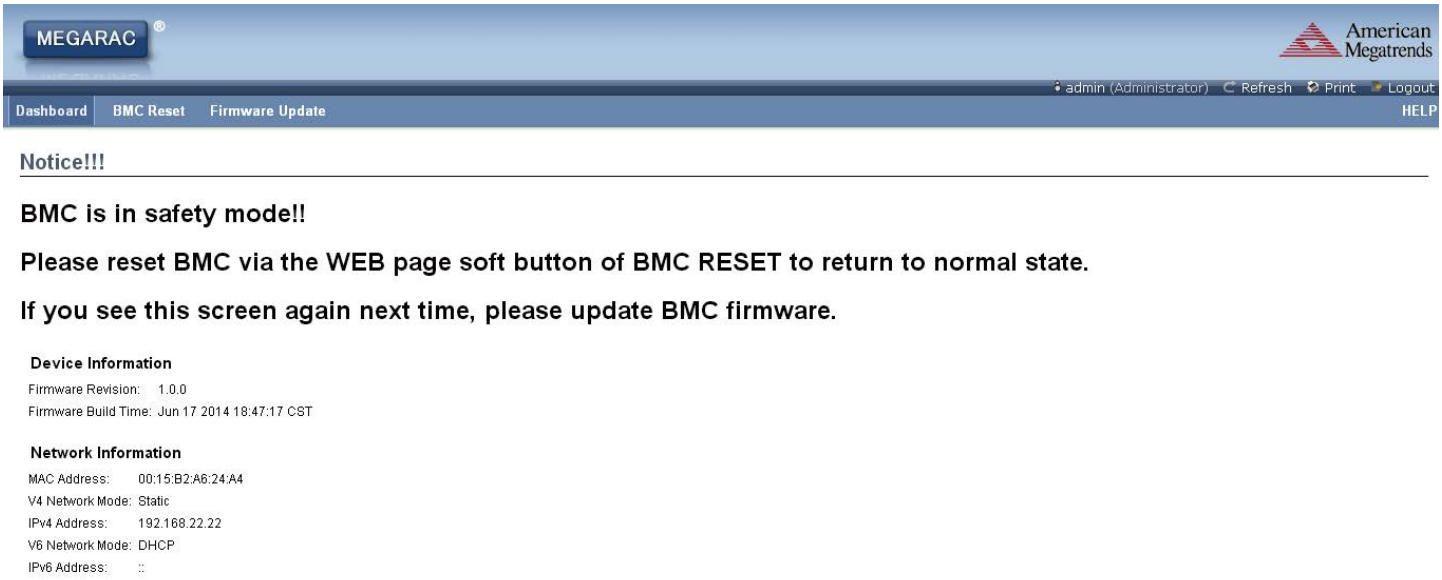





B.C
M
B.C
BMC LAN port
BMC console port

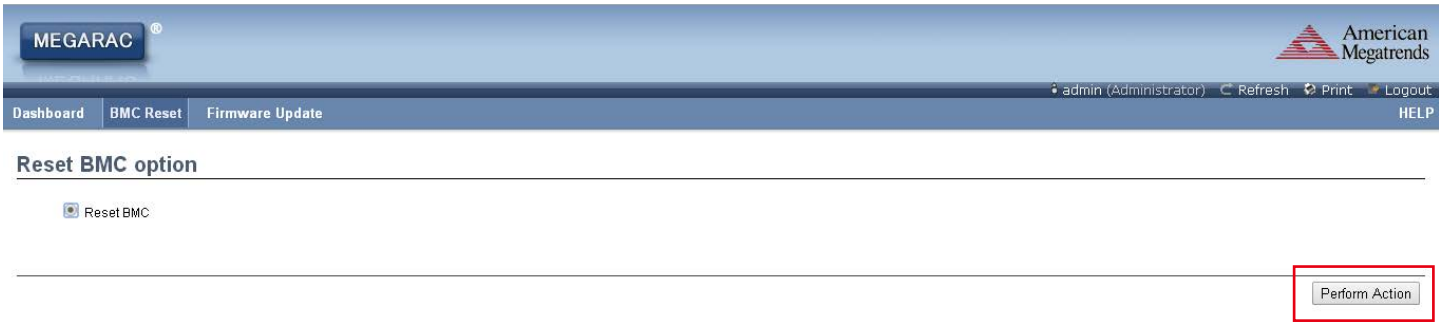

B.C
M
B.C
BMC LAN port
BMC console port

2. Please clear browser cookies, and re-start browser, BMC web UI will refresh web page object.

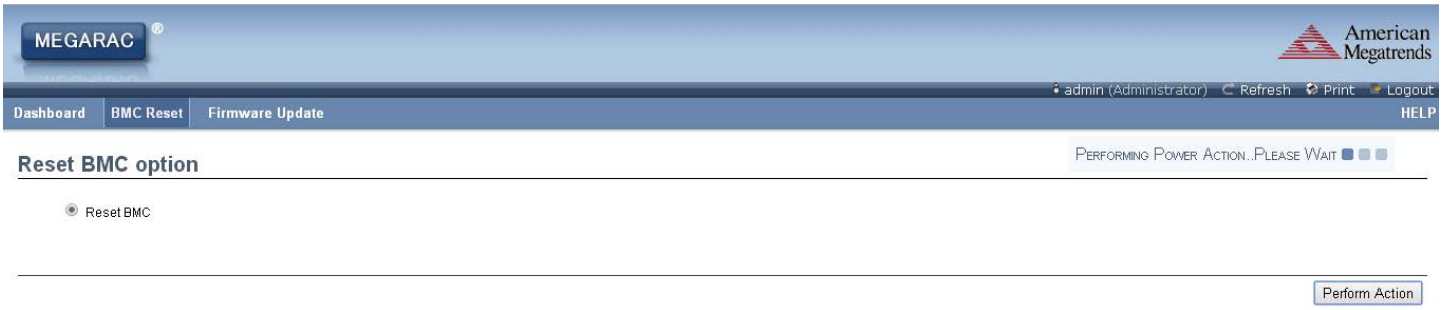


3. Click the “BMC Reset” button, into the reset page

4. Select the “BMC reset”, and Click the “Perform Action” button.



5. The page will show "Requesting" status, because reset BMC, this web page will be invalid, wait 90 seconds and clear browser cookies, re-login web UI again.



6. If still see the safety mode page, please follow section 4.5 web update to do firmware update.

Chapter 5. Technical Support

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