NS388P-D2

2U 24-Bay NVMe JBOF

(NS388P-D2 only supports dual port 2x2 U.2 SSDs)

User Manual

Second edition, Jan. 2019

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1. Package Checklist

Before the installation of the enclosure, verify that the items below are included in the package:

- A. NS388P enclosure × 1
- B. U.2 SSD drive tray (already installed in NS388P) × 24
- C. U.2 SSD mounting screw × 96
- D. Key for U.2 SSD drive tray × 2
- E. Power cords × 2

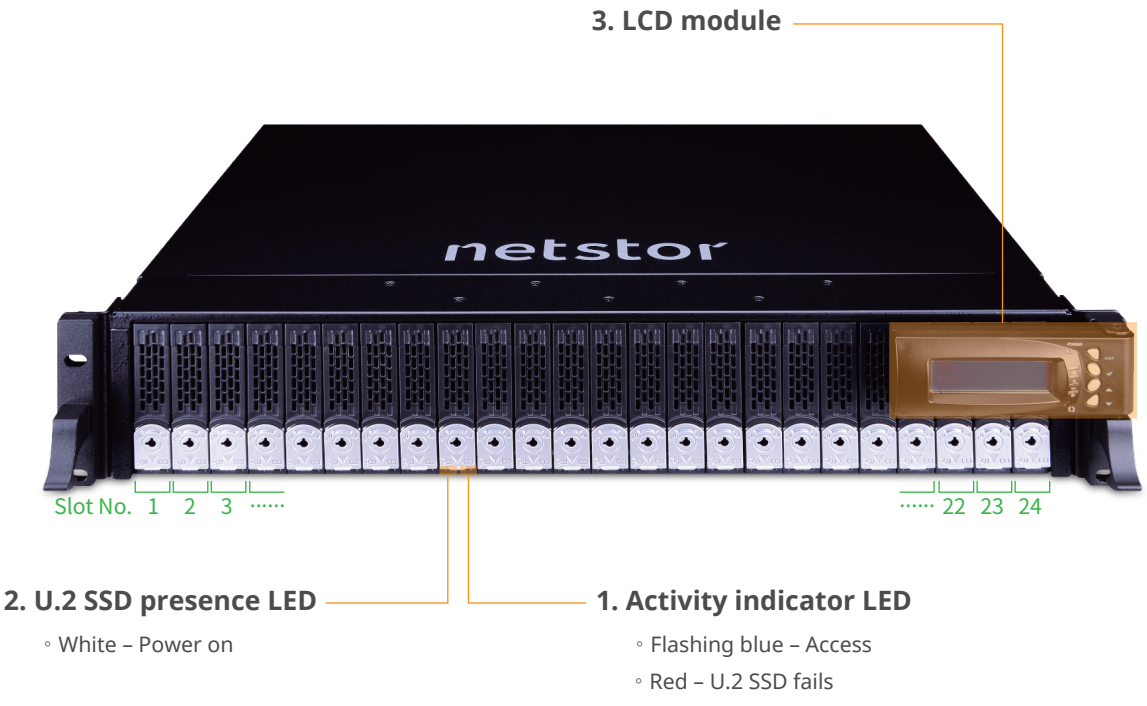
Optional: (number of host cards and cables depends on which mode selected; see section 4)

- F. Host card
- G. HD mini-SAS (SFF-8644) to HD mini-SAS (SFF-8644) data cables

* Please check the requirements in **Section 4.**

2. Storage Enclosure Description

2.1 Front panel



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2.2 Rear panel

A.

2. Mute button
- To mute buzzer beeping inside the enclosure

3. Link indicator LED
- Solid red – PCIe link is not at full lanes
- No light – PCIe link is at full lanes

7. System status LED
- Green – normal
- Red – failure event occurs

4. Upstream/downstream port indicator LED
- Solid blue – upstream port
- Flashing blue – downstream port

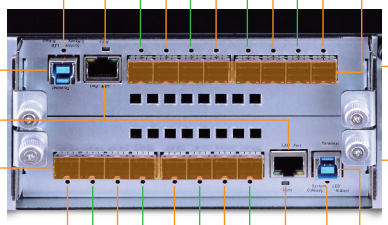
6. USB Type-B port supporting full CLI configuration

8. Quad port HD mini-SAS (SFF-8644) connectors

5. RJ-45 LAN port supporting CLI configuration without firmware update function

11. PCIe switch board B

10. PCIe switch board A



9. Quad port HD mini-SAS (SFF-8644) connectors

6. USB Type-B port supporting full CLI configuration

3. Link indicator LED
- Solid red – PCIe link is not at full lanes
- No light – PCIe link is at full lanes

7. System status LED
- Green – normal
- Red – failure event occurs

4. Upstream/downstream port indicator LED
- Solid blue – upstream port
- Flashing blue – downstream port

2. Mute button
- To mute buzzer beeping inside the enclosure

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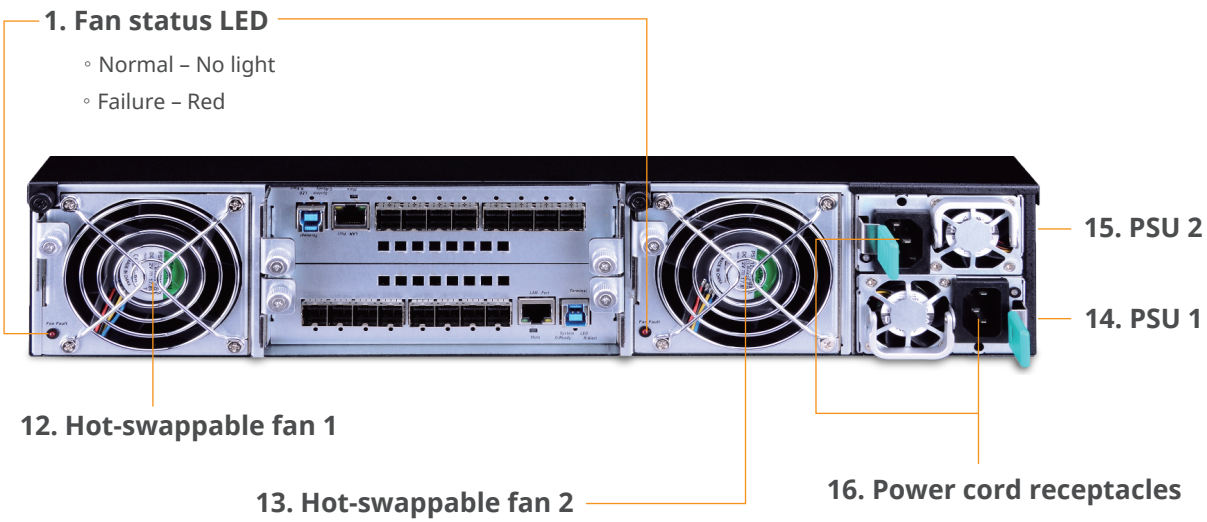
B.



2.3 Alarm Mute

As any of the followings **(a)** through **(e)** occurs, the buzzer on the switch board inside NS388P enclosure will beep.

(a) rear cooling fan failure

(b) over-temperature within the enclosure

(c) voltage abnormal

(d) electric current abnormal

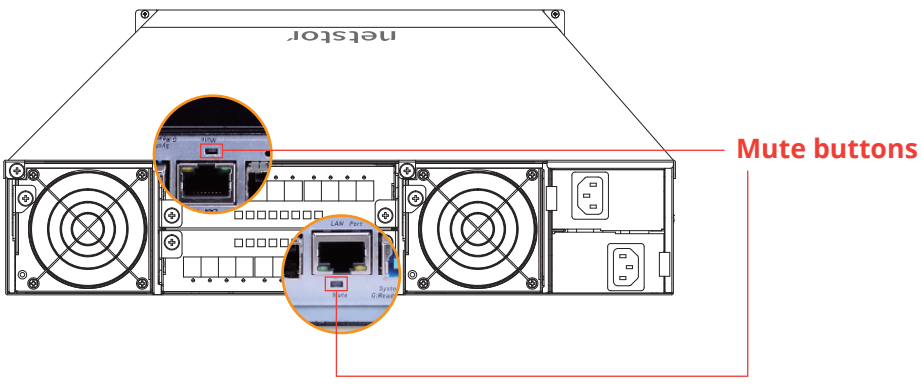
(e) power supply unit failure

There are three ways to mute the buzzer beeping; either of the three methods can be used to conduct the mute action:

[1] press PCIe switch board A or B's mute button under the LAN port at rear of the enclosure.

[2] press the mute button on LCD module (see page 16)

[3] use the 'buz off' command at CLI (see page 26)



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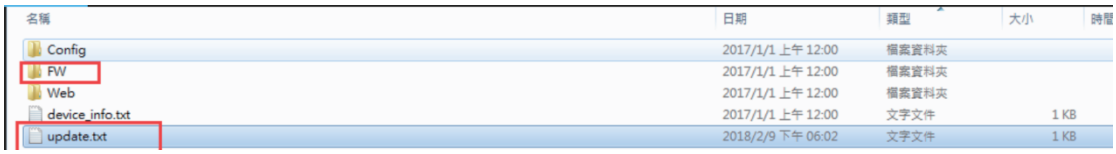
2.4 Firmware Update for Microprocessor

The user can use LCD module for updating switch board's microprocessor firmware. After you have finished the LCD firmware update steps on **page 18**, follow the procedure below for the completion of the firmware update.

On operating system's desktop, a virtual USB window folder will pop up.



Copy and paste the new firmware file (.srec) into the FW folder, and then copy and paste the update.txt file into the virtual USB window folder as shown in the above screenshot. After that, the firmware update will progress automatically.

Note: Both switch controller boards A and B must be done with the firmware update.

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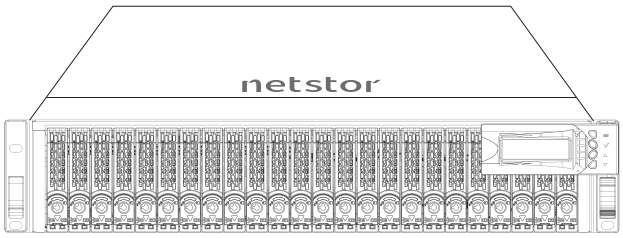
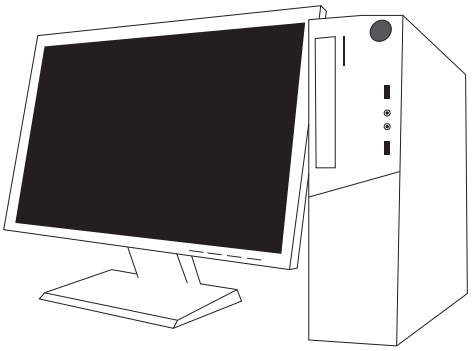
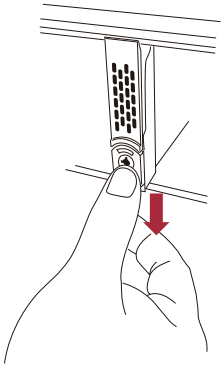
3. Enclosure Installation

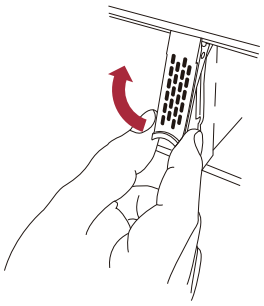
1. Remove the Netstor NS388P enclosure from its packaging, and place the enclosure next to computer, server, or workstation.

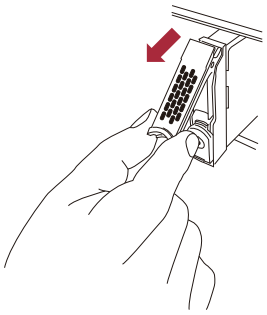




2. Hold one of the U.2 drive trays from the enclosure and push its button downward for the release of the lever until the lever pops out.







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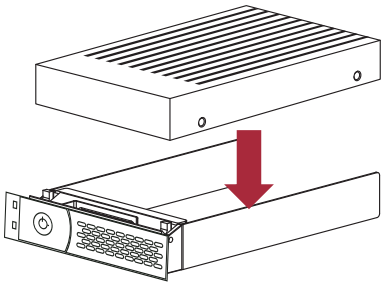
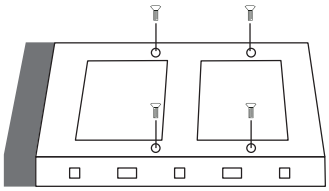
3. Place a U.2 drive tray on a flat and level surface, and then attach the 2.5” U.2 NVMe SSD into the tray.

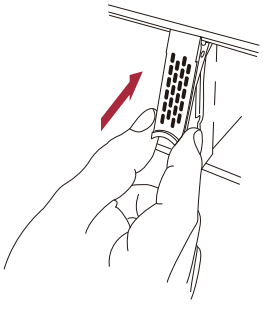


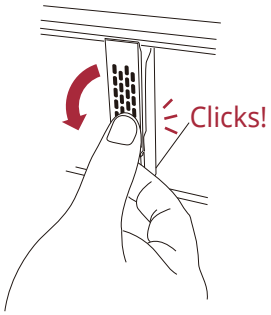
4. Adopt four of the screws provided, and fasten the U.2 NVMe SSD on the tray. Tighten each screw to fasten the U.2 NVMe SSD snugly to the drive tray. Do not tighten the screws overly.



※ You must verify the heads of the four screws are level with the U.2 drive tray while the 2.5” U.2 NVMe SSD is attached to the tray; otherwise, a screw may take hold of the tray from the bottom side and prevent you to pull the tray out of the enclosure.

5. Insert the U.2 drive module into the NS388P enclosure correctly until its lever appears to shut, and then press the lever to close until it clicks to ensure that the U.2 drive module is within the enclosure.





※ Do not force the levers to close while you insert U.2 drive modules into the enclosure. If a lever does not close smoothly, draw out and insert the U.2 drive module again, and then press the lever to close.

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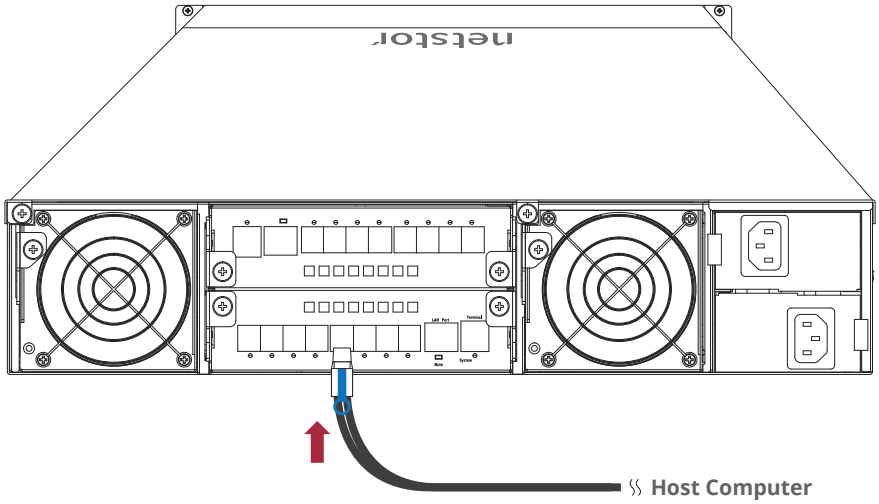
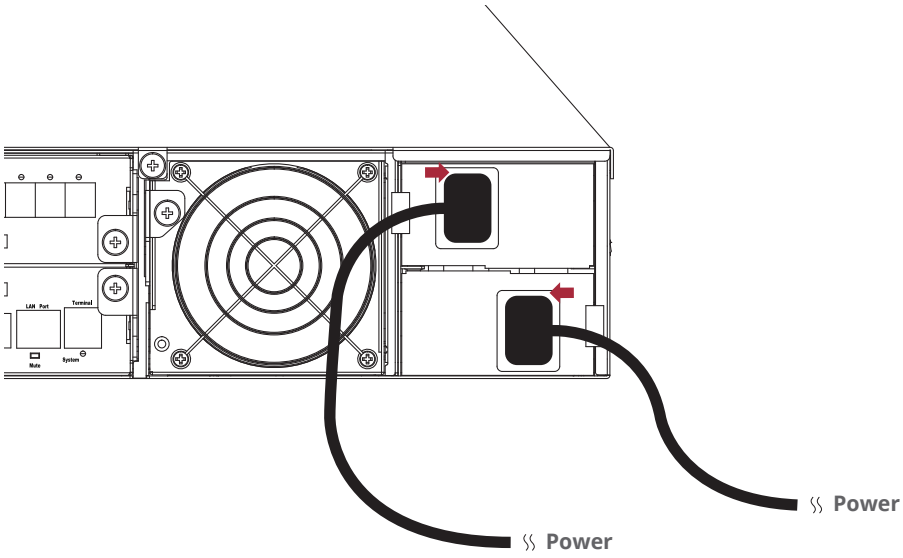
6. Repeat steps 2 to 5 for further U.2 NVMe SSD drives.

7. Connect NS388P enclosure to the host card in server/computer through the HD mini-SAS (SFF-8644) to HD mini-SAS (SFF-8644) data cables. Connection types between NS388P and host server are shown at **section 4** of the user's manual.



8. The NS388P enclosure is with redundant PSU, so connect one end of the two power cords to the two power receptacles at rear of NS388P enclosure, and then connect the other end of the two power cords to the power outlets.



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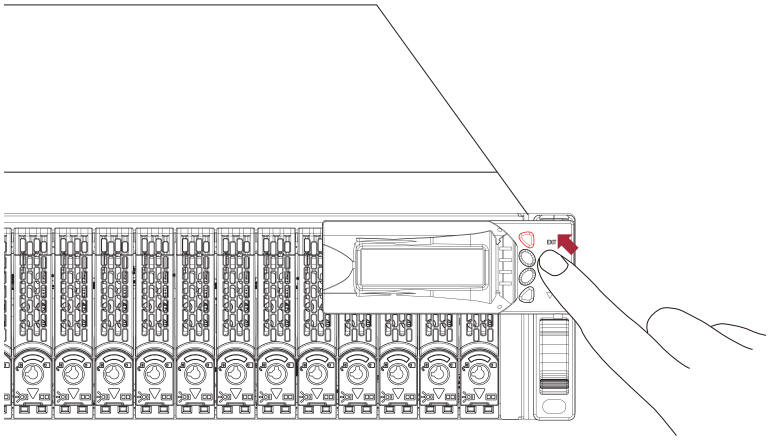
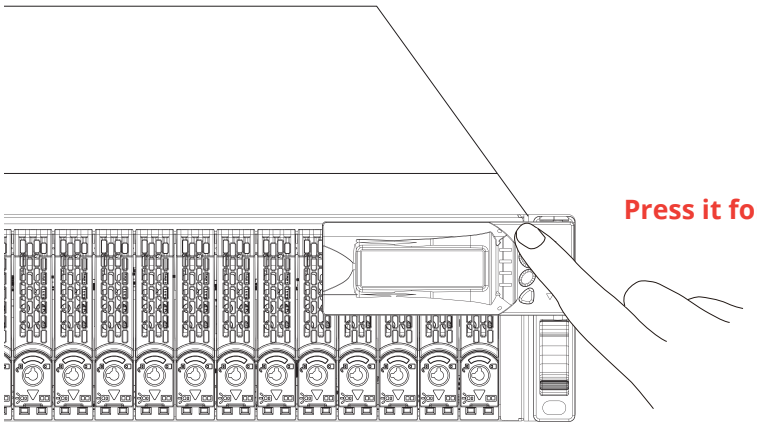
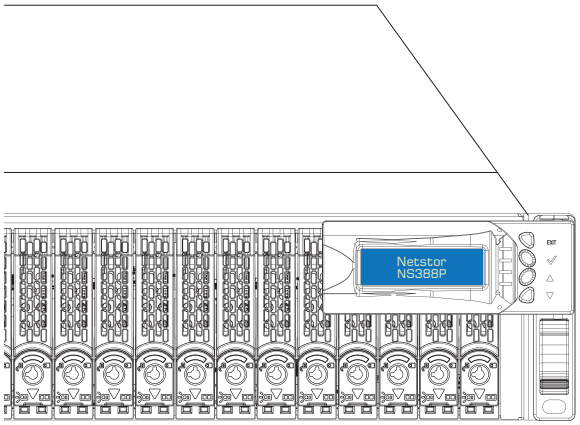
9. After the two power cords are connected, you can press the power button for one second on the LCD module in front of NS388P to power on the Netstor unit, and then power on the server/computer.





Press it for 1 second.



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4. Switch Mode

Users can use CLI command to set the switch mode. Netstor NS388P NVMe JBOF storage provides 3 modes for selection in support of application.

1. Mode 1 (Default)

Connection Type A :

When using only one server, one host card, and wishing host connection throughput up to 128 Gbps, please use connection Type A for the system.
Connection type A is for one server that will have access to all the twenty-four U.2 NVMe SSDs within the NS388P storage.

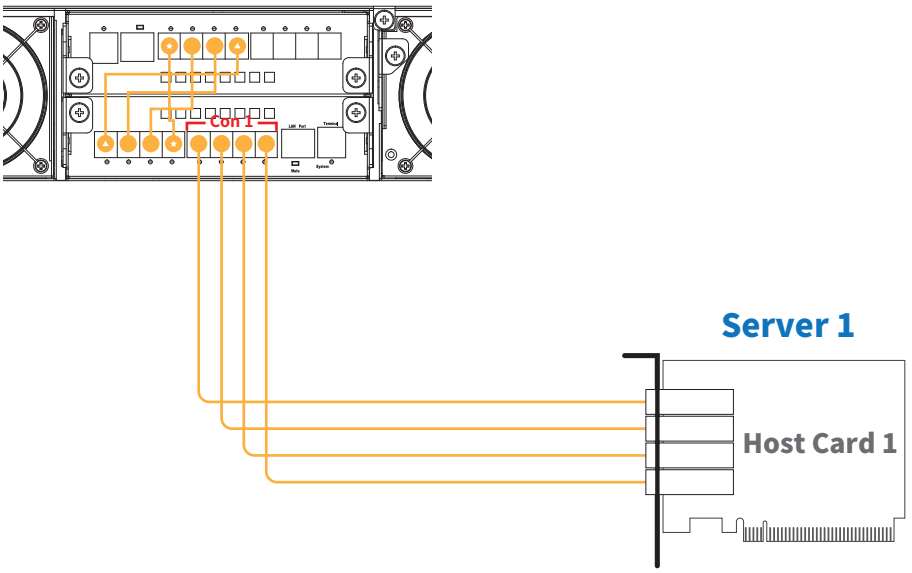
Requirement : 1 x server, 1 x host card, 8 x cables

Bandwidth :

PCIe switch board A + B: PCIe Gen3 ×16, 128 Gbps

U.2 NVMe SSD :

Server 1 can access U.2 NVMe SSDs from slot 1 through slot 24



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Connection Type B :

When using only one server, two host cards, and wishing doubled host connection throughput up to 256 Gbps, please use connection Type B for the system.
Connection type B is for one server with two host cards installed having access to all the twenty-four U.2 NVMe SSDs within the NS388P storage.

Requirement : 1 x server, 2 x host cards, 8 x cables

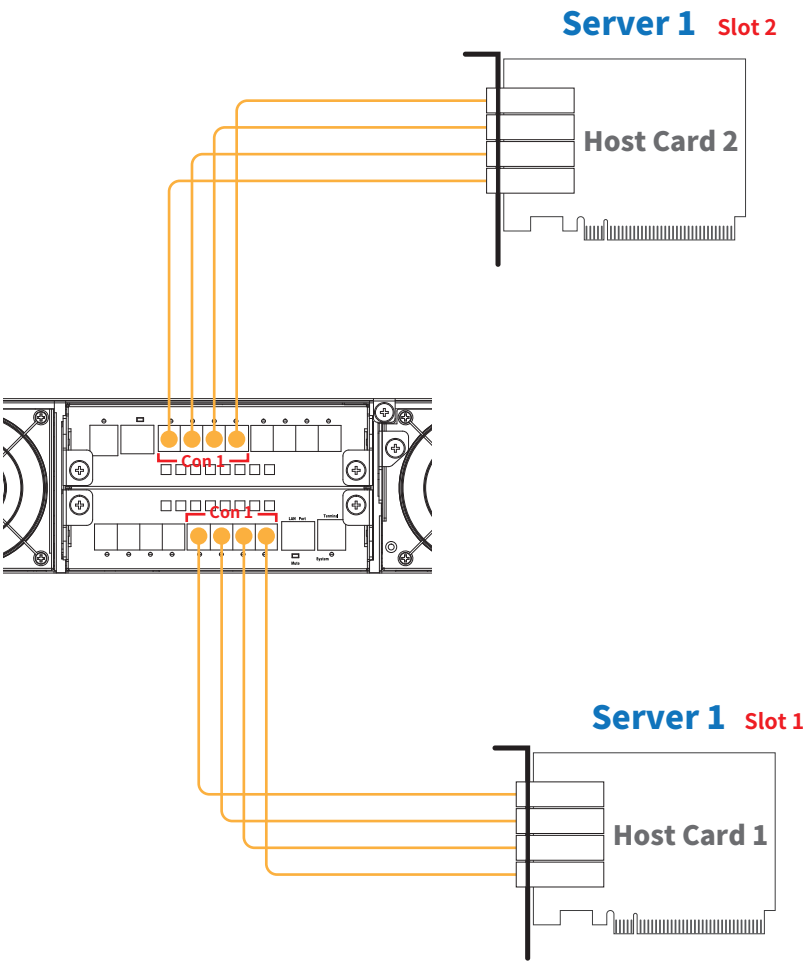
Bandwidth :

PCIe switch board A: PCIe Gen3 ×16, 128 Gbps

PCIe switch board B: PCIe Gen3 ×16, 128 Gbps

U.2 NVMe SSD :

Server 1 can access U.2 NVMe SSDs from slot 1 through slot 24



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Connection Type C :

Connection type C is for connecting to two servers with each server having access to twenty-four U.2 NVMe SSDs within the NS388P storage.

Requirement : 2 x servers, 2 x host cards, 8 x cables

Bandwidth :

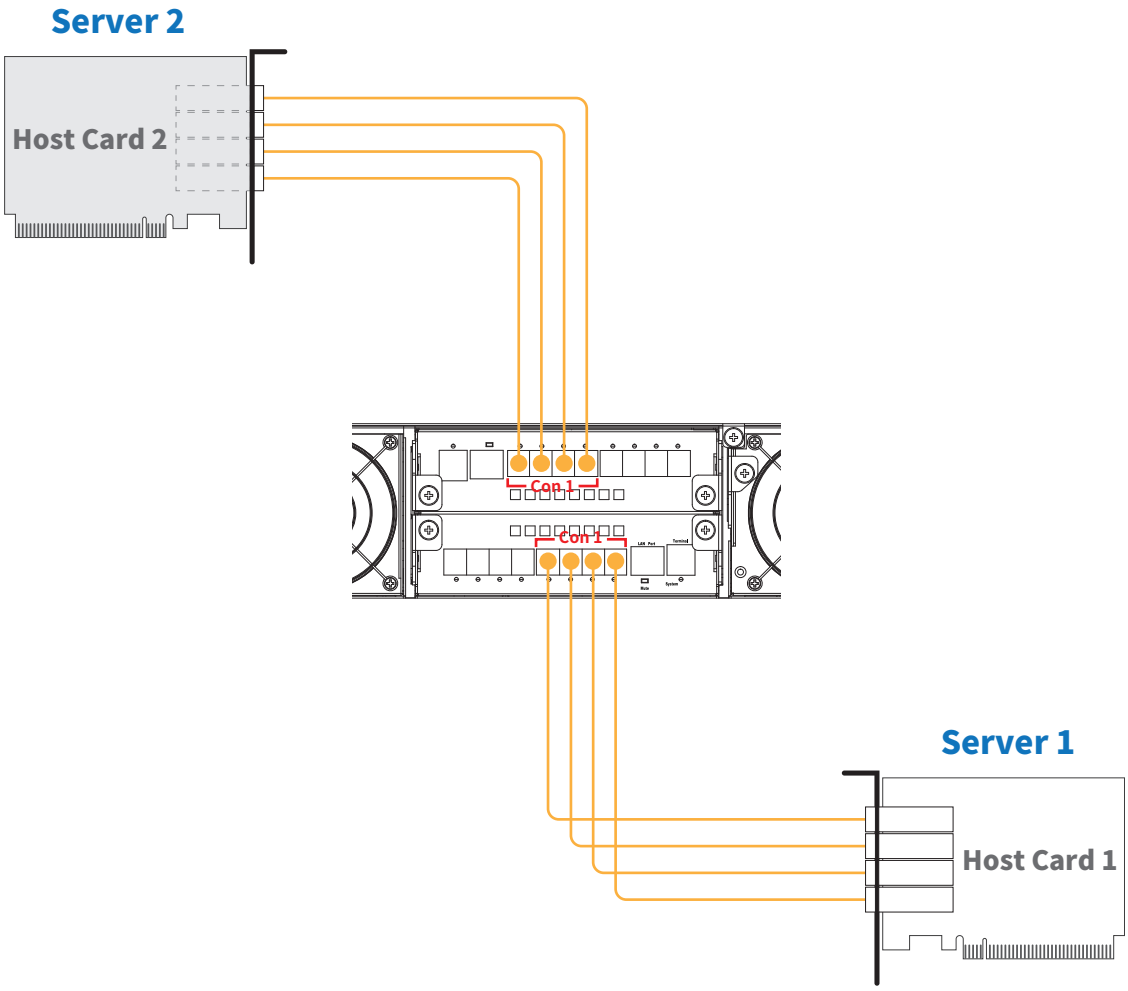
PCIe switch board A: PCIe Gen3 ×16, 128 Gbps

PCIe switch board B: PCIe Gen3 ×16, 128 Gbps

U.2 NVMe SSD :

Server 1 can access U.2 NVMe SSDs from slot 1 through slot 24 (primary x2 port)

Server 2 can access U.2 NVMe SSDs from slot 1 through slot 24 (secondary x2 port)



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2. Mode 2

Mode 2 is for connecting to up to four servers with each server having access to twelve U.2 NVMe SSDs within the NS388P storage.

Requirement : 4 x servers, 4 x host cards, 16 x cables

Bandwidth :

PCIe switch board A: PCIe Gen3 ×32, 256 Gbps

PCIe switch board B: PCIe Gen3 ×32, 256 Gbps

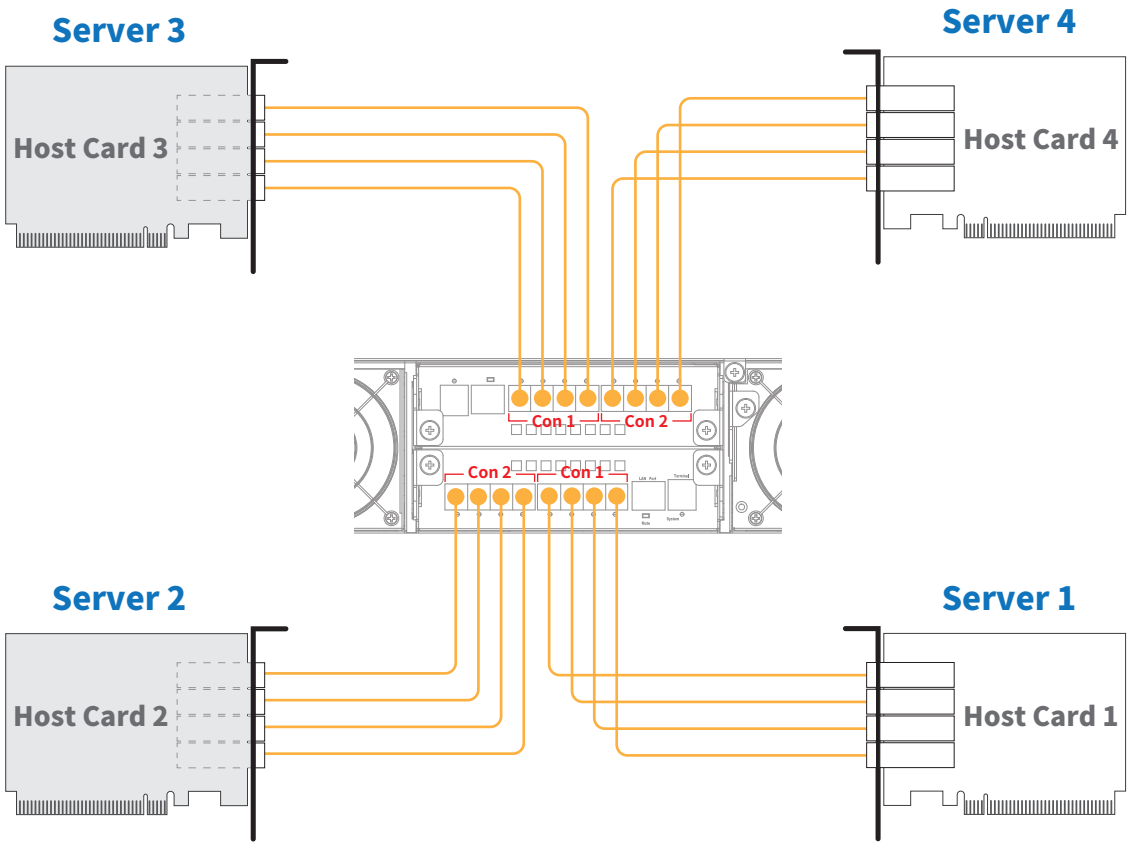
U.2 NVMe SSD :

Server 1 can access U.2 NVMe SSDs from slot 1 through slot 12 (primary x2 port)

Server 2 can access U.2 NVMe SSDs from slot 13 through slot 24 (primary x2 port)

Server 3 can access U.2 NVMe SSDs from slot 13 through slot 24 (secondary x2 port)

Server 4 can access U.2 NVMe SSDs from slot 1 through slot 12 (secondary x2 port)



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3. Mode 3

Mode 3 is for connecting to up to eight servers with each server having access to six U.2 NVMe SSDs within the NS388P storage.

Requirement : 8 x servers, 8 x host cards, 16 x cables

Bandwidth :

PCIe switch board A: PCIe Gen3 ×32, 256 Gbps

PCIe switch board B: PCIe Gen3 ×32, 256 Gbps

U.2 NVMe SSD :

Server 1 can access U.2 NVMe SSDs from slot 7 through slot 12 (primary x2 port)

Server 2 can access U.2 NVMe SSDs from slot 1 through slot 6 (primary x2 port)

Server 3 can access U.2 NVMe SSDs from slot 19 through slot 24 (primary x2 port)

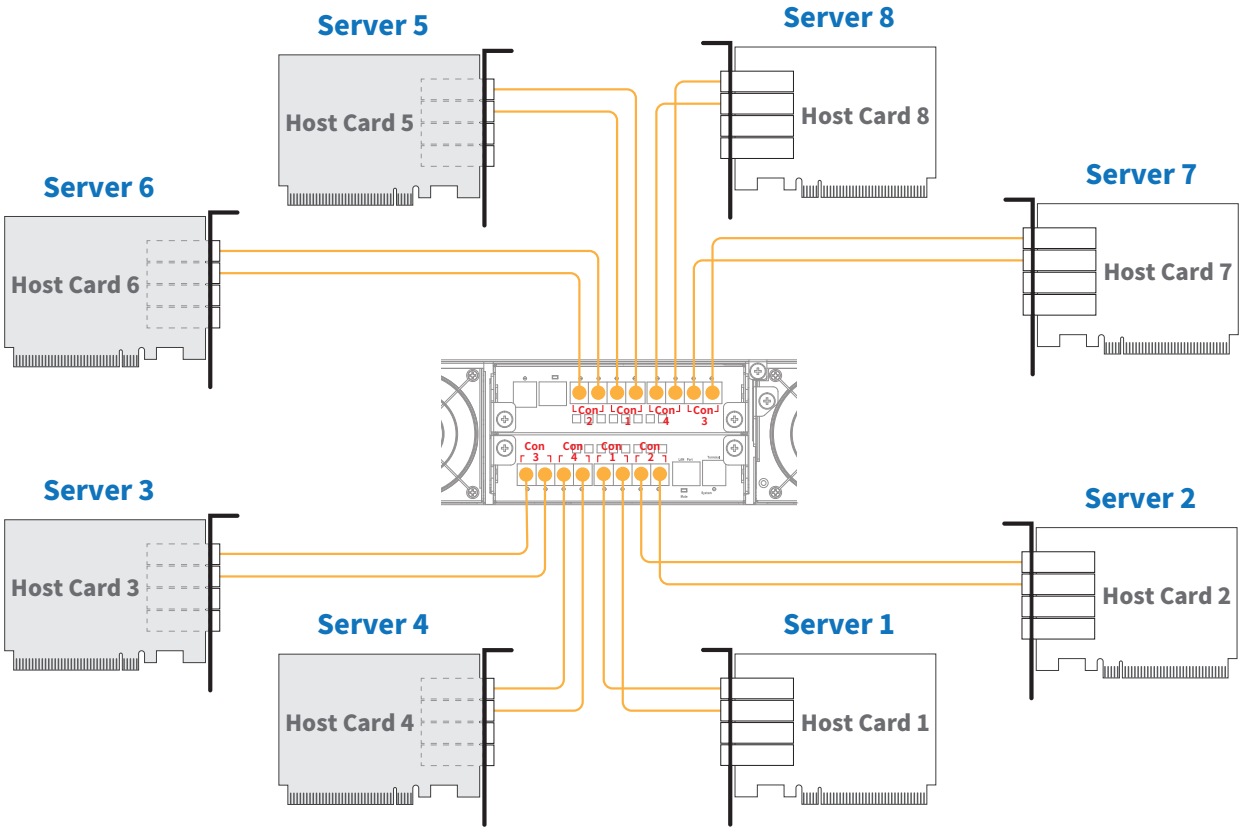
Server 4 can access U.2 NVMe SSDs from slot 13 through slot 18 (primary x2 port)

Server 5 can access U.2 NVMe SSDs from slot 13 through slot 18 (secondary x2 port)

Server 6 can access U.2 NVMe SSDs from slot 19 through slot 24 (secondary x2 port)

Server 7 can access U.2 NVMe SSDs from slot 1 through slot 6 (secondary x2 port)

Server 8 can access U.2 NVMe SSDs from slot 7 through slot 12 (secondary x2 port)



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5. LCD Configuration

This section gives the info on using the front LCD module to monitor and configure the NS388P storage. The LCD module shows the display of menu, information and status. The LCD screen is able to display up to two lines at a time for menu items and other info.

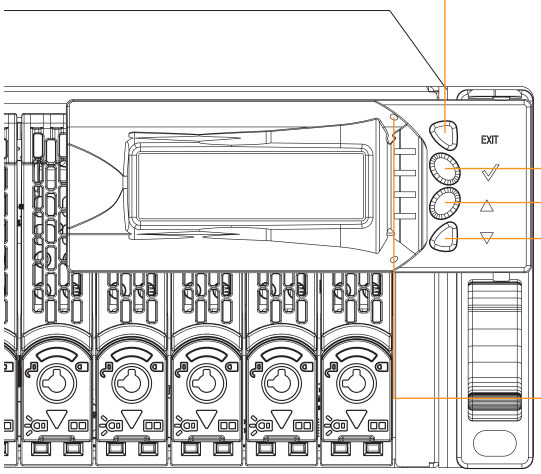
The four function keys with the LEDs on the LCD module in front of the NS388P storage.

1. Power on / Mute / Return button

Power on: press one second to power on the NS388P storage

Mute: press one second to disable buzzer beeping of system failure event

Return: press to go back to previous display of screen



2. Enter button

Confirm a selected item

3. Up button

To scroll upward or rightward

4. Down button

To scroll downward or leftward

5. Standby LED

Active mode – no light

Standby mode – blue

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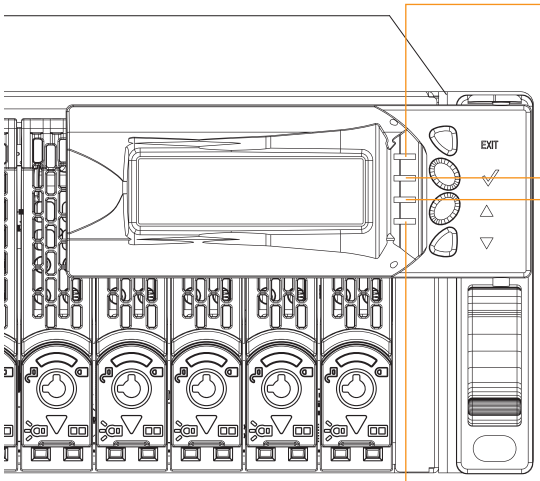


6. PSU LED

PSU normal – no light

PSU failure – red

7. Fan LED

Fan normal – no light

Fan failure - red

8. Temp LED

Temp normal – no light

Over-temperature – red

9. Power LED

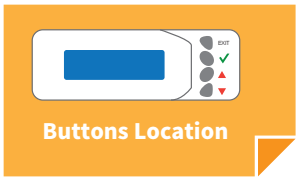
Storage power-on – green

Storage power-off – no light

Use the Down/Up button to move downward/upward, browse the selection, and select the item. Press Enter button to confirm the selected item; press Return button to go back to the previous display of screen.

As a main item is selected, the related information or sub items will be shown under the main item.

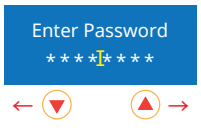
The following flow is an expansion of LCD setup item hierarchical menu.



- EXIT - Return button
- Enter button
- Up button
- Down button

LCM Functions

- Fan Info
  - Fan 1 RPM
  - Fan 2 RPM
- Temp Info
  - Temp 1 °C
  - Temp 2 °C
  - Temp 3 °C
- PSU Info
  - PSU 1
    - Temp 1 °C
    - Temp 2 °C
  - PSU 2
    - Temp 1 °C
    - Temp 2 °C
- Slot Info
  - Switch A
    - Slot 1
    - (Slot 2, Slot 3, ...Slot 24)
  - Switch B
    - Slot 1
    - (Slot 2, Slot 3, ...Slot 24)
- Port Info
  - Switch A
    - Port 1
    - (Port 2, Port 3, Port 4)
  - Switch B
    - Port 1
    - (Port 2, Port 3, Port 4)
- Ethernet IP Info
  - Link Status
- Firmware Upgrade
  - Enter Password
    - [********]
    - Default: 00000000
    - Switch A
    - Switch B
- Firmware Version



- System Power Off
  - Enter Password
    - [********]
    - Default: 00000000
- Set Password
  - Enter old password
    - Enter new password

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6. CLI Manager

Users can use the Command Line Interface (CLI) to manage the NVMe controller functions. The CLI is useful in environment where a graphical user interface (GUI) is not available.

NS388P NVMe JBOF enclosure utilizes the USB port as the serial port interface. Please use USB Type-A male to USB Type-B male cable to connect between NS388P's switch controller board and the computer/workstation; the operation system will detect a new USB-to-Serial COM Port. Please use this serial port to configure the switch controller.

Please visit NS388P storage's official webpage to download and install the Windows driver for NS388P's USB port.

USB port location :

Establish the Connection for the USB Port

The CLI function can be managed by using an ANSI/VT-100 compatible terminal emulation program. The program installation procedure must be done before proceeding to the CLI function. Whichever terminal emulation program is used, it must support the XMODEM file transfer protocol.

Start up VT100 Screen

By connecting a VT100 compatible terminal or a computer operating in an equivalent terminal emulation mode, all CLI administration functions can be executed by the VT100 terminal.

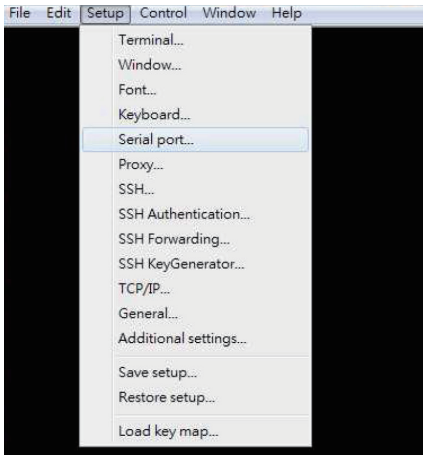
There are a wide variety of Terminal Emulation packages; most of them are very similar. The following setup procedure is an example from VT100 Terminal in Windows 10 operating system using the Tera Term tool.

※ **Notice :** Tera Term is a VT100 Terminal Emulation program which is an open-source, free, software implemented, Terminal Emulator tool.

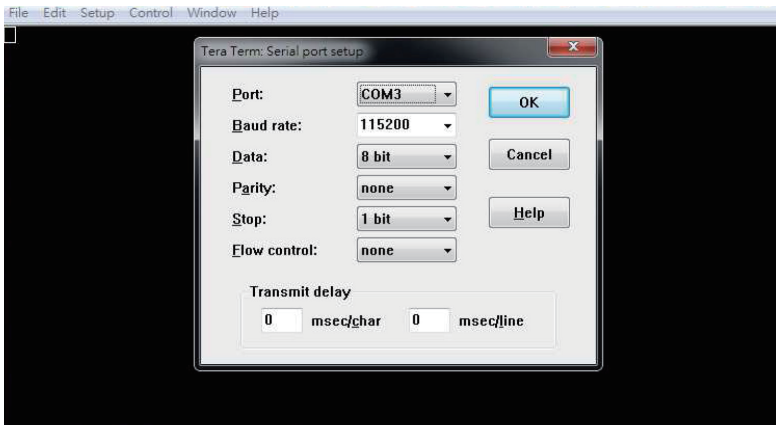
The Tera Term needs to be downloaded; here is the reference site:
https://tera-term.en.lo4d.com/

Step 1. Install and launch Tera Term program.

Step 2. To ensure proper communication between NS388P NVMe JBOF switch controller and the VT100 Terminal emulation, please configure the VT100 Terminal emulation settings to the values as below:



For "**Port**", select **COM3**.
(COM3 is the example; actual COM number will depend on the COM port that is used on the host computer)
For "**Baud rate**", select **115200**.
For "**Data**", select **8 bit**. For "**Parity**", select **none**.
For "**Stop**", select **1 bit**. For "**Flow control**", select **none**.
Click **OK** when the selection is finished.



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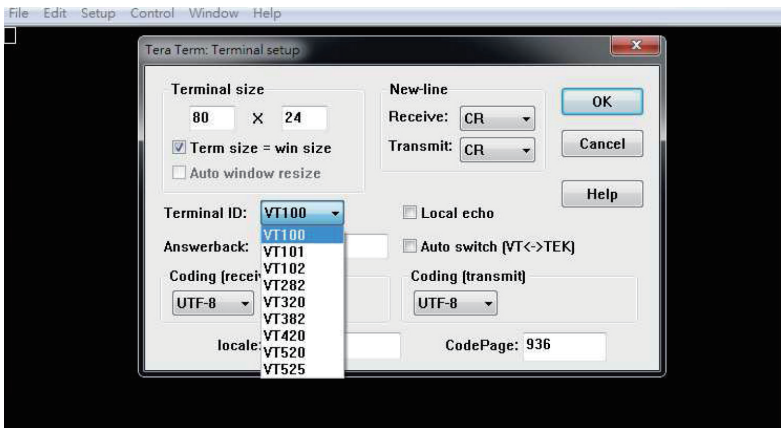
Step 3. Select the Terminal emulation type, please go to the Terminal section as shown below:

For "**Terminal ID**", select **VT100**.

Click **OK** when the selection is finished.



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CLI Command

This section provides detailed information about NS388P NVMe JBOF enclosure's CLI function. All the commands please type in lower case.

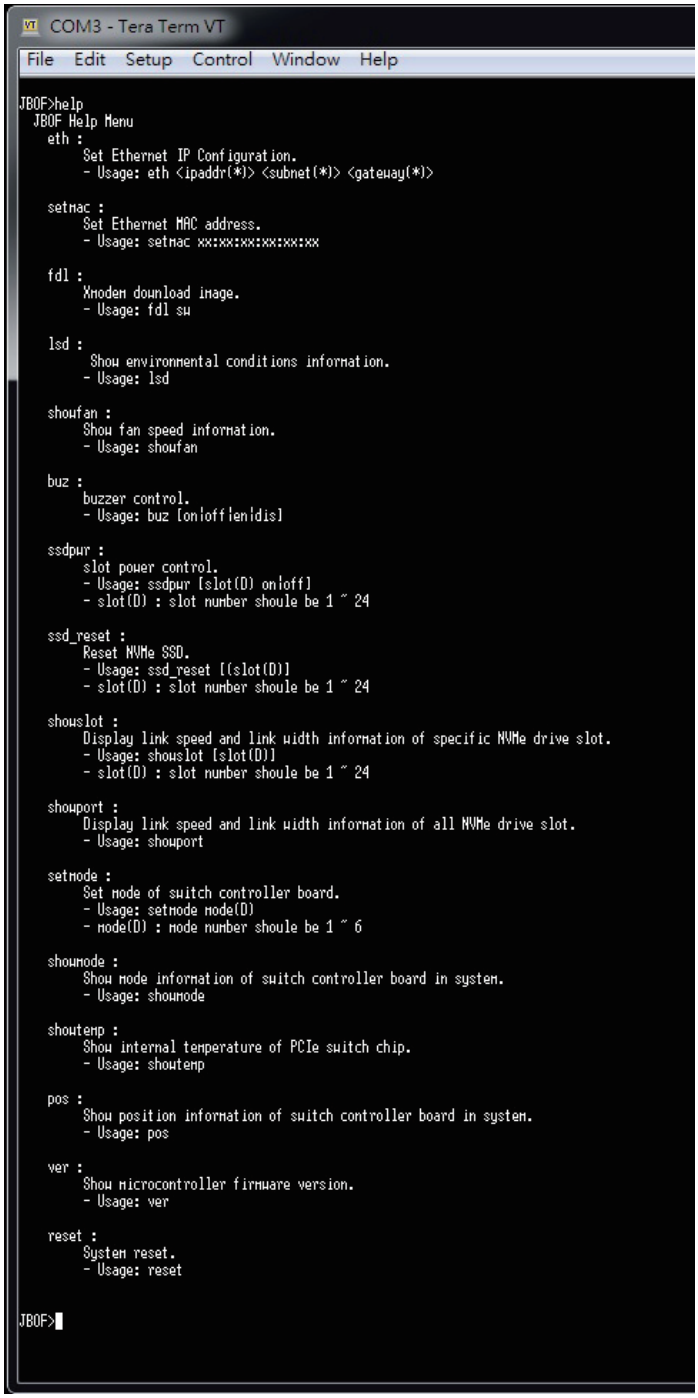
Function	Command	Syntax
Show list of commands	help	help [enter]
Ethernet IP configuration	eth	eth [enter]
Set Ethernet MAC address	setmac	setmac [enter]
Update controller board PCIe switch's firmware	fdl	fdl sw [enter]
Show environmental info (temp, fan, voltage) on NS388P NVMe JBOF enclosure	lsd	lsd [enter]
Show fan speed info on switch controller board	showfan	showfan [enter]
Control the buzzer of switch controller board	buz	buz [en] / [dis] / [on] / [off] [enter]
Control the power of each U.2 NVMe drive slot	ssdpwr	ssdpwr [Slot No.] [on or off] [enter]
To reset each U.2 NVMe SSD	ssd_reset	ssd_reset [Slot No.] [enter]
Show link speed and link width info on specific U.2 NVMe drive slot	showslot	showslot [Slot No.] [enter]
* Show link speed and link width info on all U.2 NVMe drive slots	showport	showport [-t] / [-b] [enter]
Set configuration mode for switch controller board	setmode	setmode [1] / [2] / [3] [enter]
* Show configuration mode for each switch controller board	showmode	showmode [enter]
Show position information for switch controller board within NS388P storage enclosure	pos	pos [enter]
Show controller firmware version on switch controller board	ver	ver [enter]
To reset the switch controller board	reset	reset [enter]

help command

The command provides a list of all commands the user can use for NS388P, also giving a brief description of the supported commands.

The help command can be used to get the detailed information about the CLI commands' summary. Both switch controller boards will show the same list result.

Syntax: JBOF > help [enter]



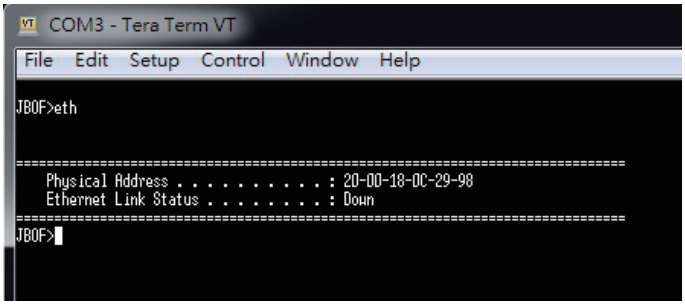
↳ CLI Command List

eth command

Ethernet IP configuration.

(If necessary, both switch boards need command)

Syntax: JBOF > eth [enter]



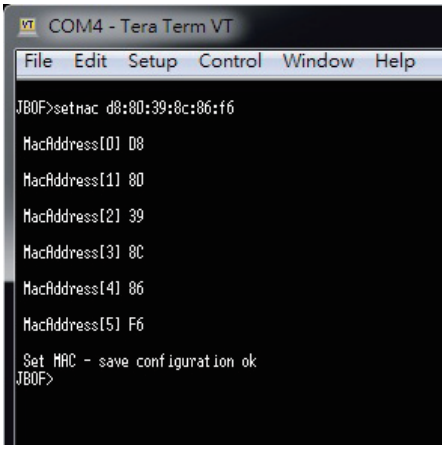
CLI Command List

setmac command

Set Ethernet MAC (Media Access Control) address.

(If necessary, both switch boards need command)

Syntax: JBOF > setmac [enter]



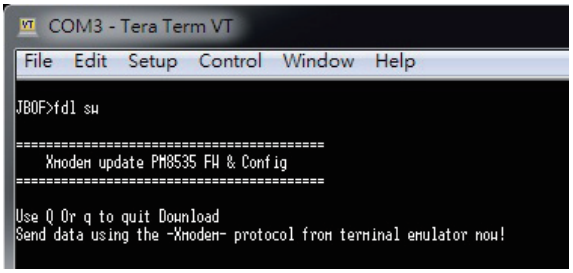
CLI Command List

fdl command

Update switch controller board's PM8535 PCIe switch's firmware.

For this function, the NS388P storage must be connected to the host computer via NS388P's rear USB Type-B port rather than its rear RJ-45 LAN port.
(If necessary, both switch boards need command)

Syntax: JBOF > fdl sw [enter]



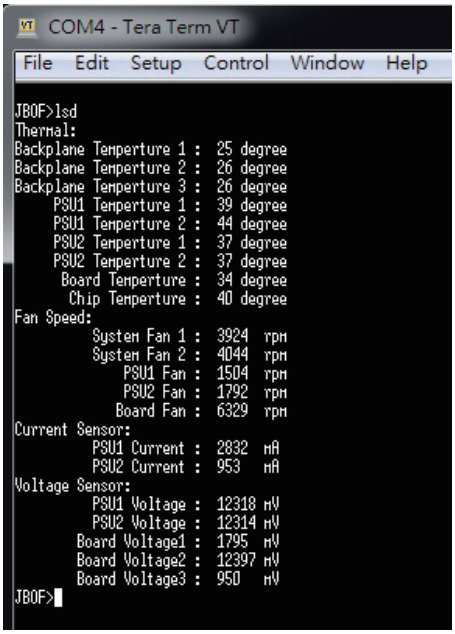
After executing the fdl sw command, click **File** on Tera Term's top menu, select **Transfer**, select **XMODEM**, and select **Send**. Browse to the PM8535 PCIe switch firmware file, and click OK to proceed and complete the firmware update.

CLI Command List

lsd command

The command shows environmental information (temperature, fan, voltage) on NS388P NVMe JBOF system.
(If necessary, both switch boards need command)

Syntax: JBOF > lsd [enter]



CLI Command List

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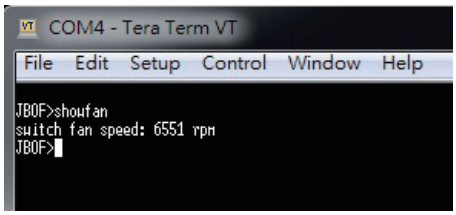
showfan command

The command shows fan speed information on switch controller board.

(If necessary, both switch boards need command)

Syntax: JBOF > showfan [enter]



CLI Command List

buz Command

The command is for controlling the buzzer on switch controller board.

(If necessary, both switch boards need command)

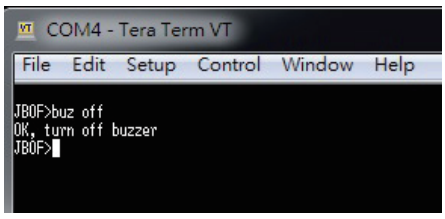
Syntax: JBOF > buz [en] / [dis] / [on] / [off] [enter]

[en]: enable the buzzer function for all time

[dis]: disable the buzzer function for all time

[on]: allow buzzer to beep for one time

[off]: mute the buzzer beeping



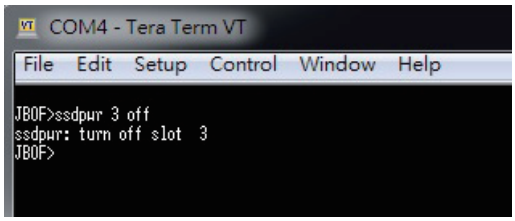
CLI Command List

ssdpwr command

The command is for controlling the power of each U.2 NVMe drive slot.

(If necessary, both switch boards need command)

Syntax: JBOF > ssdpwr [Slot No.] [on or off] [enter]



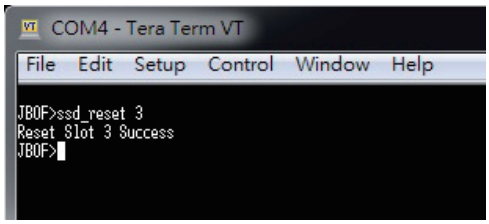
CLI Command List

ssd_reset command

To reset each U.2 NVMe dual port SSD.

(If necessary, both switch boards need command)

Syntax: JBOF > ssd_reset [Slot No.] [enter]

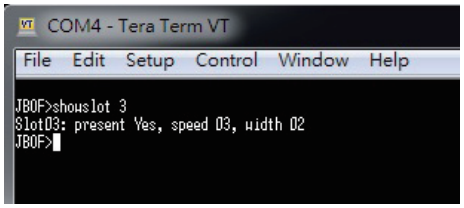


CLI Command List

showslot command

The command shows link speed and link width information on specific U.2 NVMe drive slot. (If necessary, both switch boards need command)

Syntax: JBOF > showslot [Slot No.] [enter]



CLI Command List

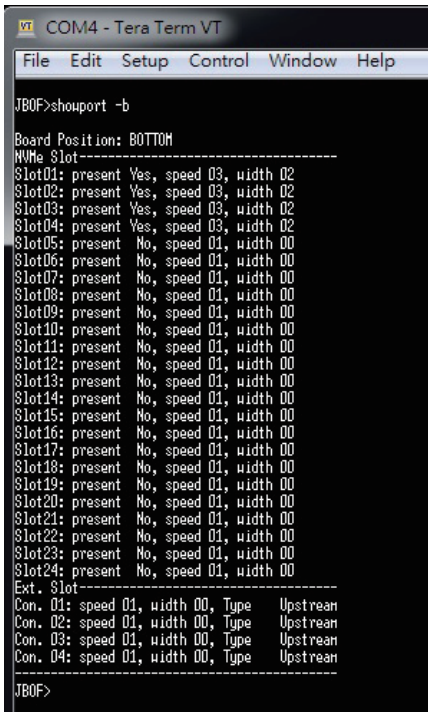
showport command

The command shows link speed and link width information on all U.2 NVMe drive slots. (Either switch board needs command)

Syntax: JBOF > showport [-t] / [-b] [enter]

[-t]: top switch controller board

[-b]: bottom switch controller board



CLI Command List

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setmode command

The command is for setting configuration mode for switch controller board.

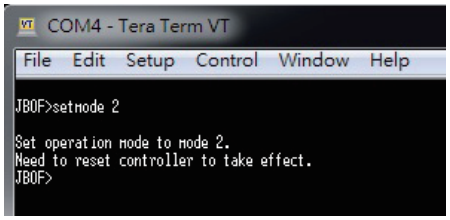
(If necessary, both switch boards need command)

Syntax: JBOF > setmode [1] / [2] / [3] [enter]

[1]: set for mode 1

[2]: set for mode 2

[3]: set for mode 3



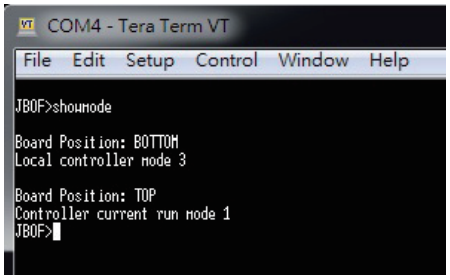
CLI Command List

showmode command

The command shows configuration mode for each switch controller board.

(Either switch board needs command)

Syntax: JBOF > showmode [enter]

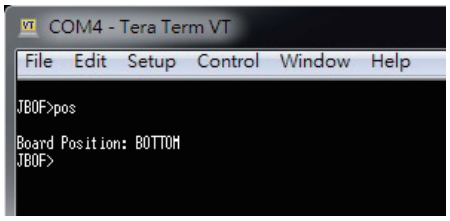


CLI Command List

pos command

The command shows position information for switch controller board within NS388P storage enclosure. (If necessary, both switch boards need command)

Syntax: JBOF > pos [enter]

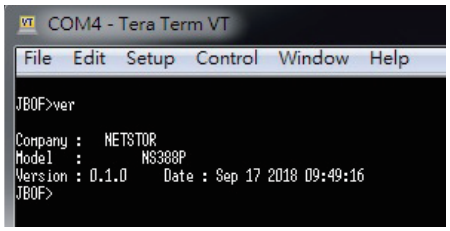


CLI Command List

ver command

The command shows controller firmware version on switch controller board. (If necessary, both switch boards need command)

Syntax: JBOF > ver [enter]



CLI Command List

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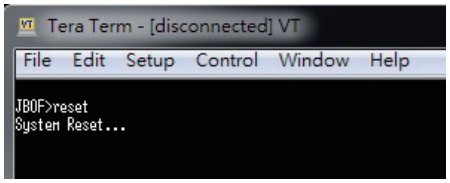
reset command

To reset the switch controller board.

(If necessary, both switch boards need command)

Syntax: JBOF > reset [enter]



CLI Command List

If you have any questions, please contact your regional distributor,

or Netstor Technology, Taiwan.

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