PCI-ENC8G-24UM-2X2

2U 24-Bay NVMe JBOF

User's Manual

First edition, Mar. 2020

1. Package Checklist

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

- A. PCI-ENC8G-24UM-2X2 enclosure × 1
- B. U.2 SSD drive tray (already installed in PCI-ENC8G-24UM-2X2) × 24
- C. U.2 SSD mounting screw × 96
- D. Power cords × 2

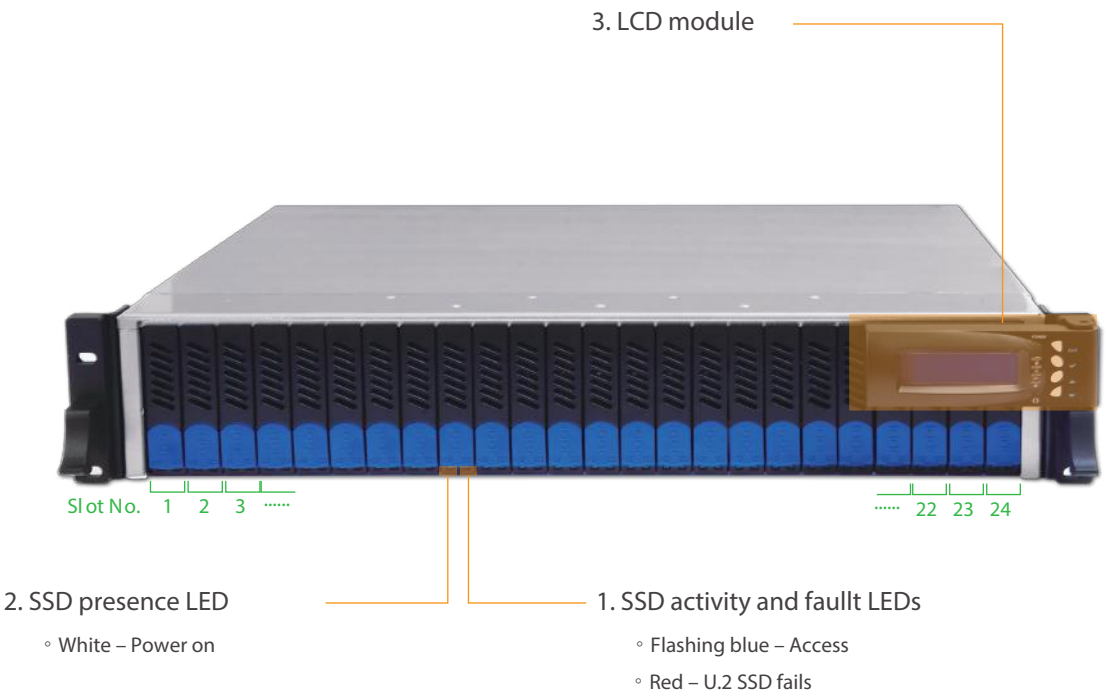
Optional: (number of host cards and cables depends on which mode selected; see section 4)

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

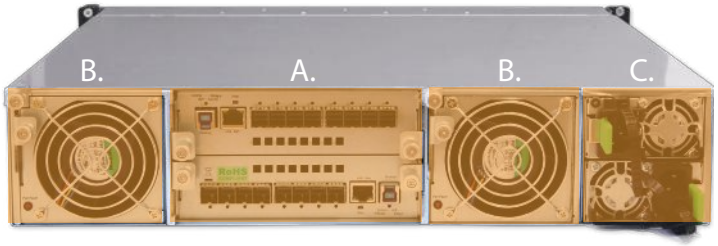
* Please check the requirements in Section 4.

2. Storage Enclosure Description

2.1 Front panel



2.2 Rear panel



A.

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

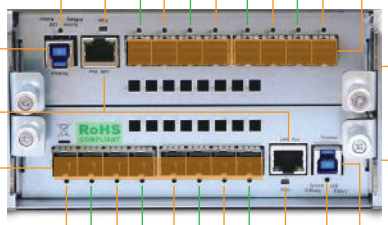
3. Link indicator LED
   - Solid red – PCIe link is not at full lanes
   - No light – PCIe link is at full lanes

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

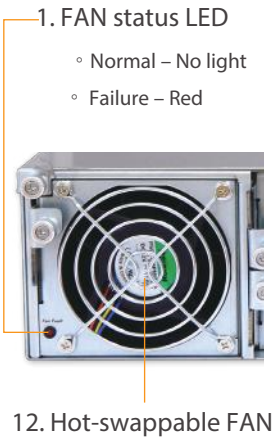
3. Link indicator LED
   - Solid red – PCIe link is not at full lanes
   - No light – PCIe link is at full lanes

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

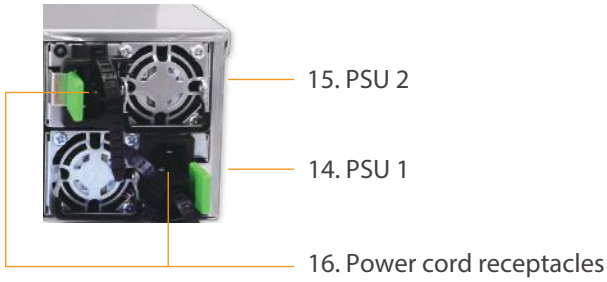
4. Upstream/downstream port indicator LED
   - Solid blue – upstream port
   - Flashing blue – downstream port

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

B.



C.



the switch board inside

2.3 Alarm Mute

As any of the following occurs, the buzzer on the switch board inside PCI-ENC8G-24UM-2X2 NVMe JBOF will beep. To mute the buzzer beeping, press PCIe switch board A and B's mute buttons under th e LAN ports at rear of the enclosure.

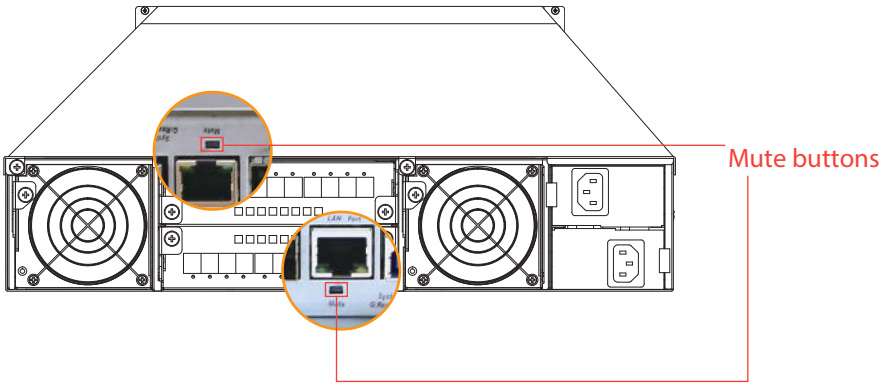
(a) rear cooling fan failure

(b) over-temperature within the enclosure

(c) voltage abnormal

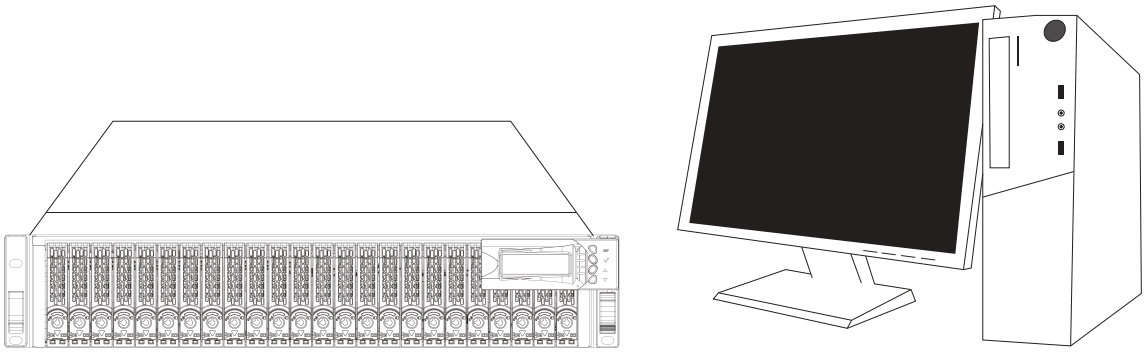
(d) electric current abnormal

(e) power supply unit failure

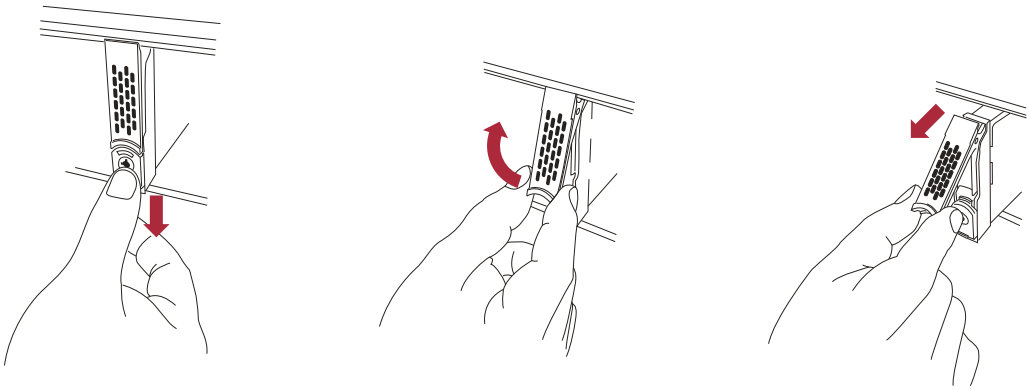


3. Enclosure Installation

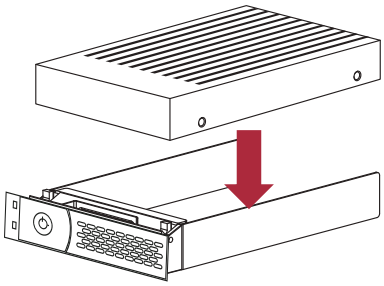
1. Remove the UTran PCI-ENC8G-24UM-2X2 enclosure from its packaging, and place the enclosure next to computer, server, or workstation.



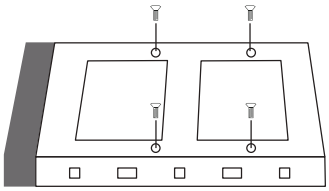
2. Hold one of the U.2 drive trays from the enclosure and push its button downward for the release of the lever until the lever pops out.



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.

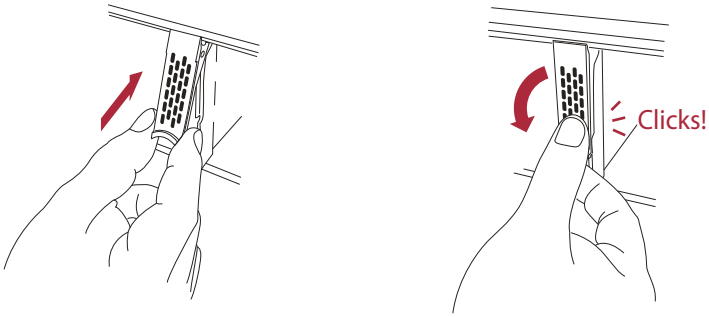


4. Adopt four of the screws provided, and fasten the U.2 NVMe SSD on the tray. Tighten each screw to fasten the U.2 NVMe SSD snugly to the drive tray. Do not tighten the screws overly.



※ 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.

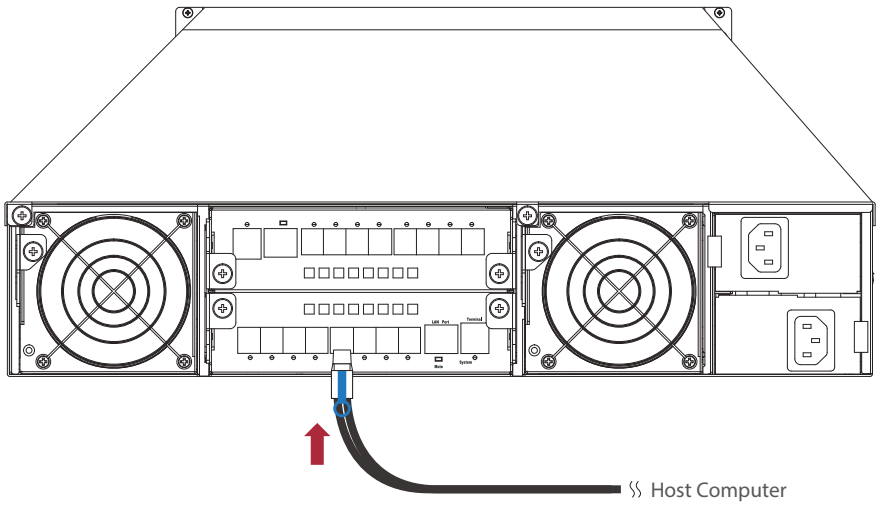
5. Insert the U.2 drive module into the PCI-ENC8G-24UM-2X2 enclosure until its lever appears to shut, and then press the lever to close until it clicks to ensure that the U.2 drive module is within the enclosure.



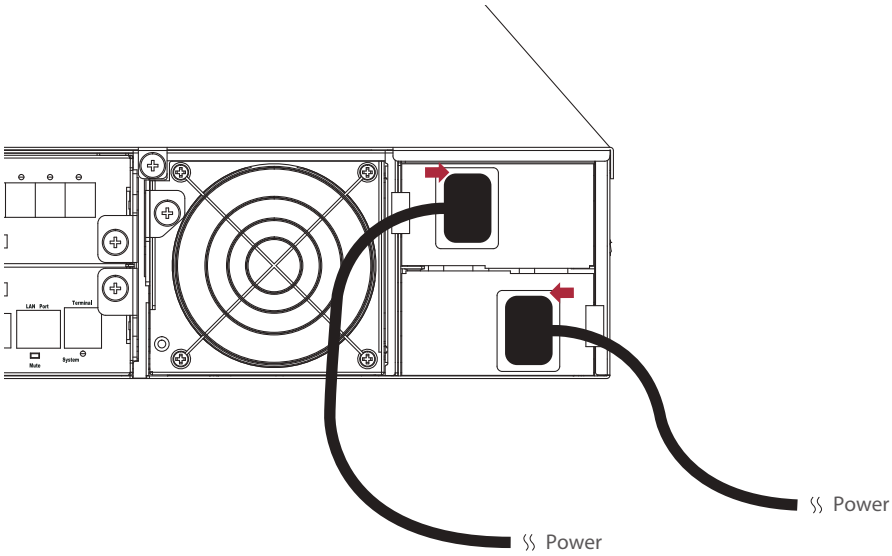
※ Do not force the levers to close while you insert U.2 drive modules into the enclosure. If a lever does not close smoothly, draw out and insert the U.2 drive module again, and then press the lever to close.

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

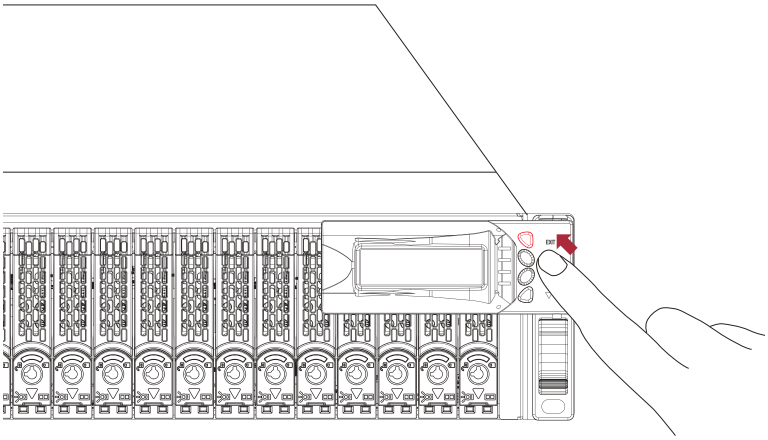
7. Connect US_PM-2425 enclosure to the host card in server/computer through the HD mini-SAS (SFF-8644) to HD mini-SAS (SFF-8644) data cables. Connection types between PCI-ENC8G-24UM-2X2 and host server are shown at section 4 of the user's manual.

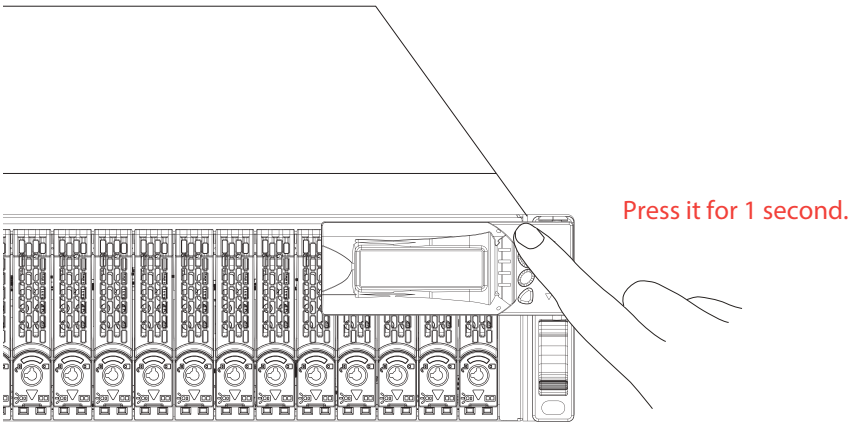


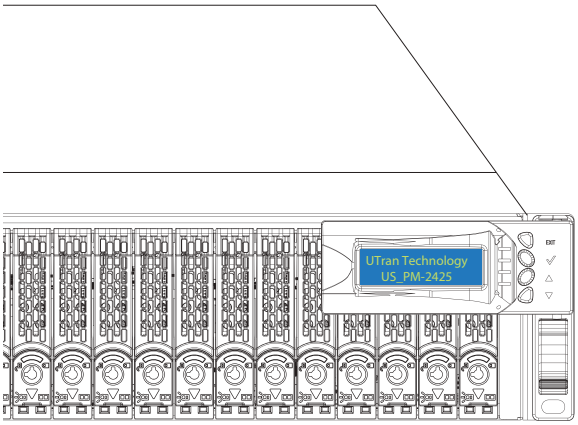
8. The PCI-ENC8G-24UM-2X2 enclosure is with redundant PSU, so connect one end of the two power cords to the two power receptacles at rear of US_PM-2425 enclosure, and then connect the other end of the two power cords to the power outlets.



9. After the two power cords are connected, you can press the power button for one second on the LCD module in front of PCI-ENC8G-24UM-2X2 to power on the NVMe JBOF, and then power on the server/computer.







4. Switch Mode

Users can use CLI command to set the switch mod e. PCI-ENC8G-24UM-2X2 NVMe JBOF 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 PCI-ENC8G-24UM-2X2 NVMe JBOF.

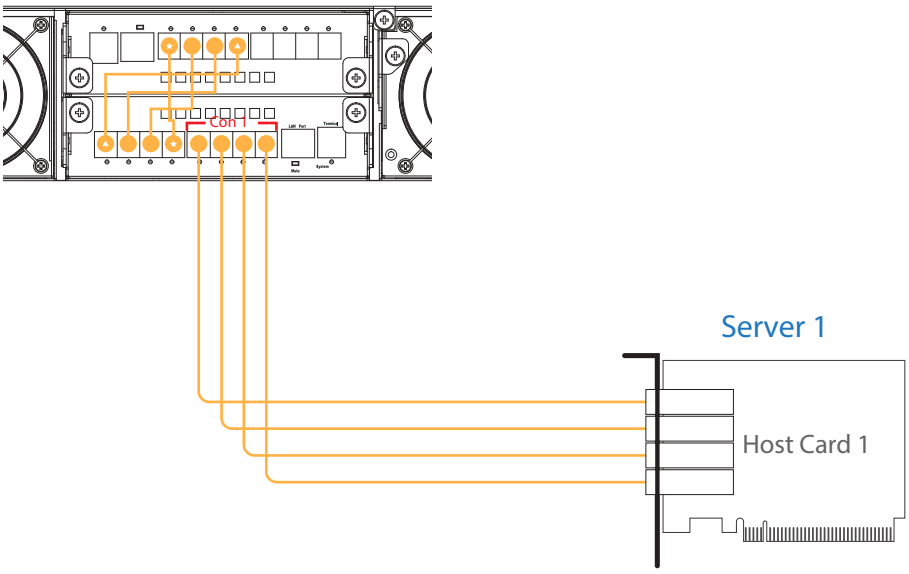
Requirement : 1 x server, 1 x host card, 8 x cables

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



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 PCI-ENC8G-24UM-2X2 NVMe JBOF.

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

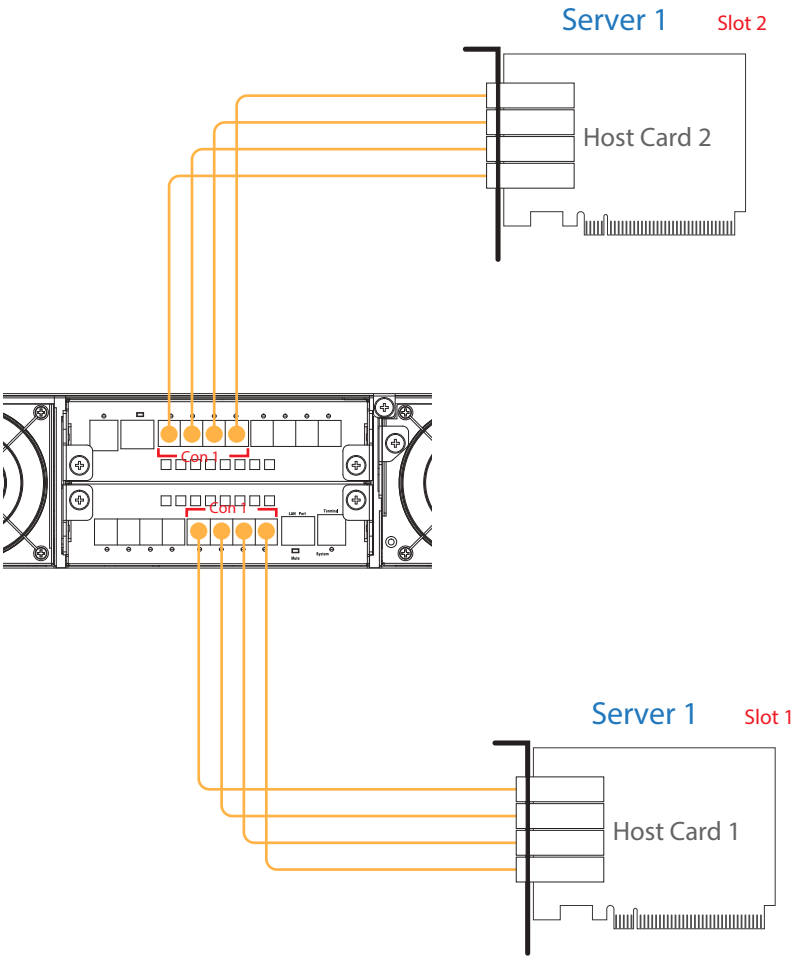
Bandwidth :

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



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 PCI-ENC8G-24UM-2X2 NVMe JBOF.

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

Bandwidth :

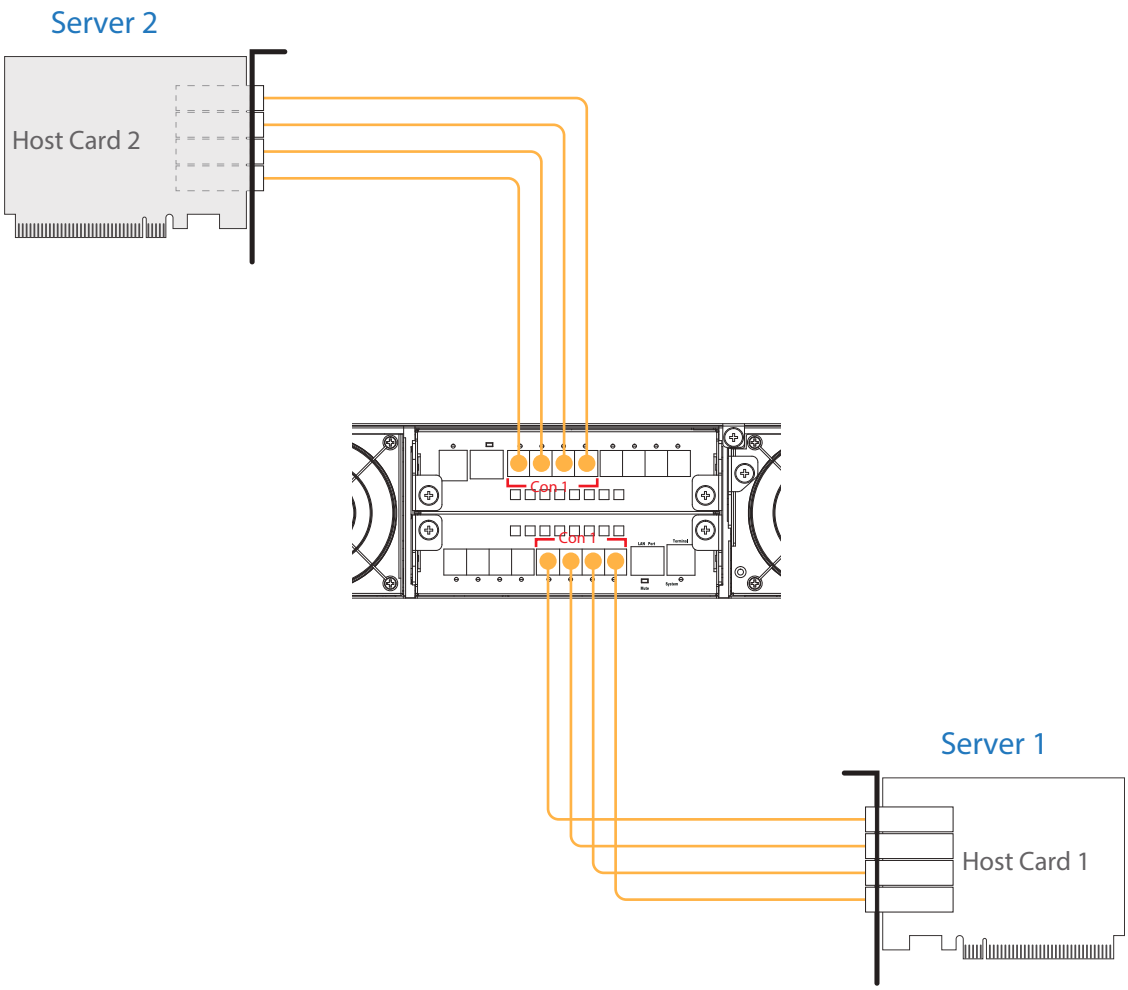
PCIe switch board A: PCIe Gen3 ×16, 128 Gbps

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

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



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 PCI-ENC8G-24UM-2X2NVMe JBOF.

Requirement : 4 x servers, 4 x host cards, 1 6 x cables

Bandwidth :

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

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

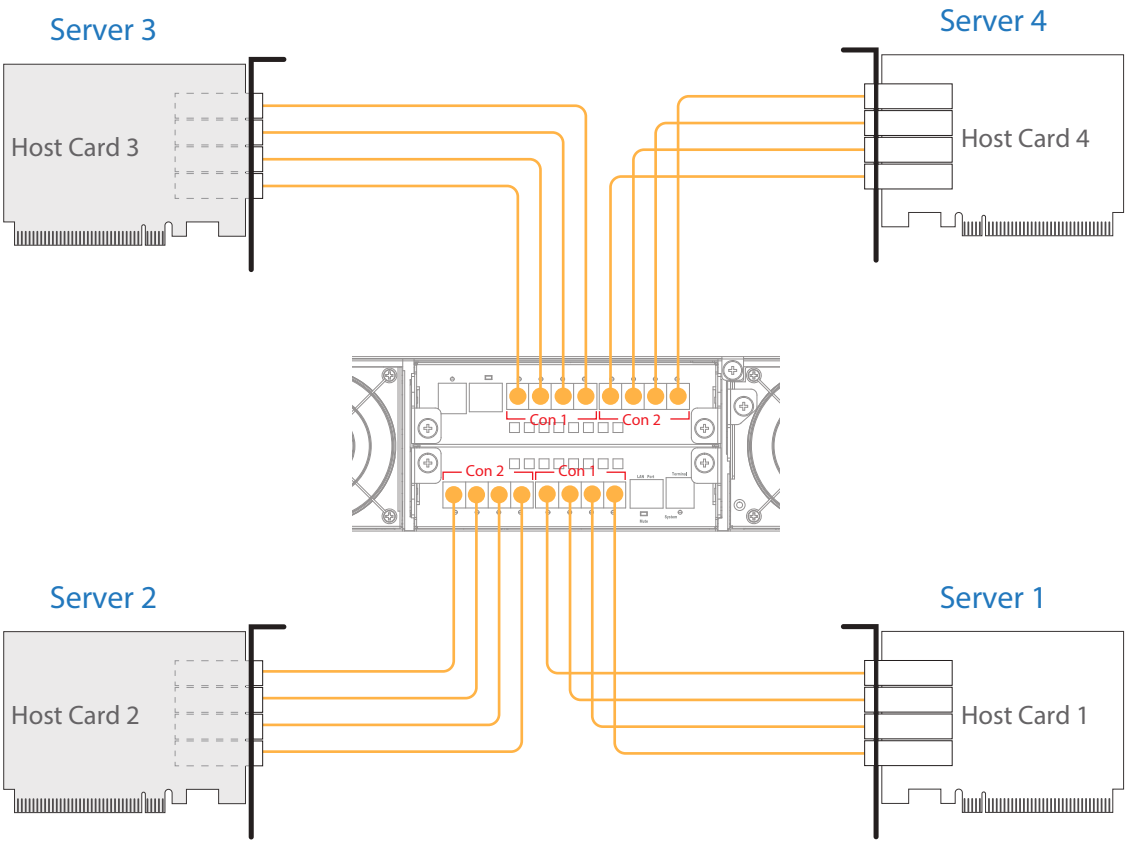
U.2 NVMe SSD :

Server 1 can access U.2 NVMe SSDs from slot 1 through slot 12

Server 2 can access U.2 NVMe SSDs from slot 13 through slot 24

Server 3 can access U.2 NVMe SSDs from slot 13 through slot 24

Server 4 can access U.2 NVMe SSDs from slot 1 through slot 12



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 PCI-ENC8G-24UM-2X2 NVMe JBOF.

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

Server 2 can access U.2 NVMe SSDs from slot 1 through slot 6

Server 3 can access U.2 NVMe SSDs from slot 19 through slot 24

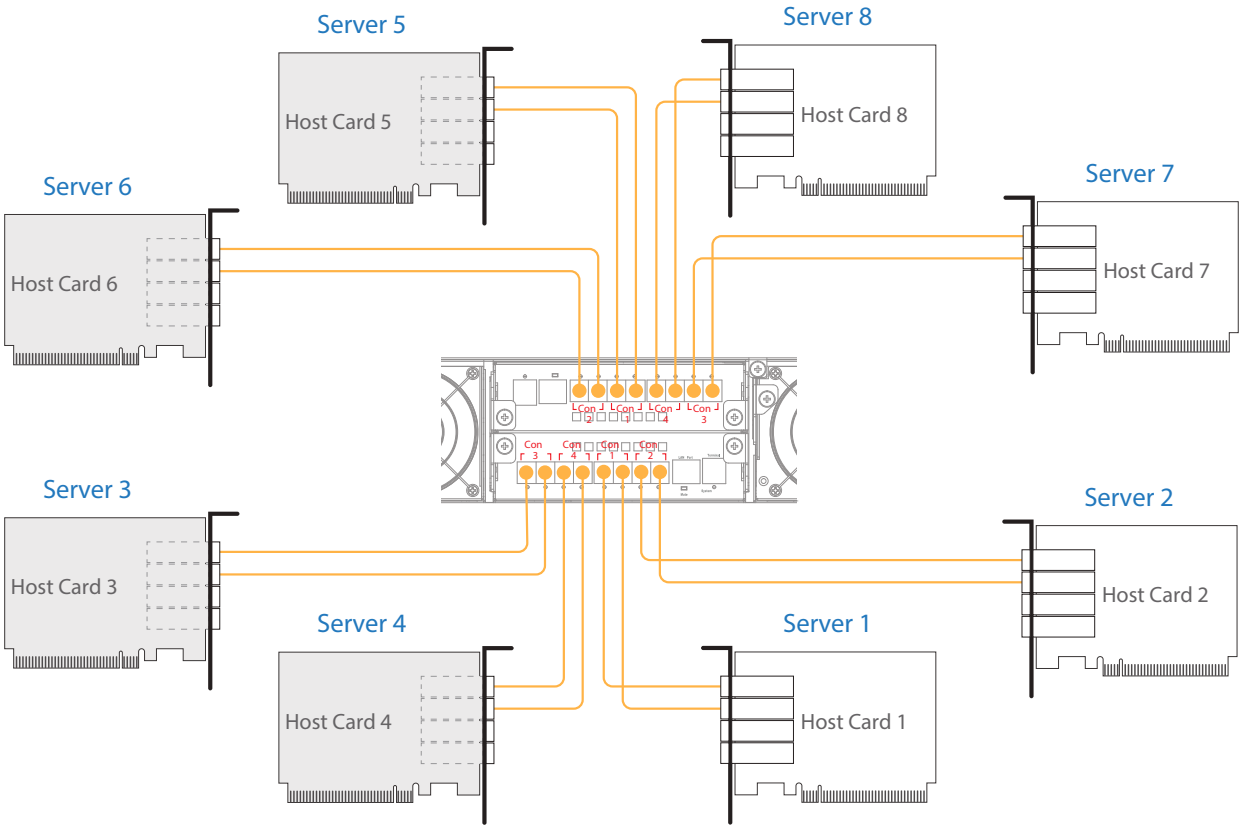
Server 4 can access U.2 NVMe SSDs from slot 13 through slot 18

Server 5 can access U.2 NVMe SSDs from slot 13 through slot 18

Server 6 can access U.2 NVMe SSDs from slot 19 through slot 24

Server 7 can access U.2 NVMe SSDs from slot 1 through slot 6

Server 8 can access U.2 NVMe SSDs from slot 7 through slot 12



5. LCD Configuration

This section gives the info on using the front LCD module to monitor and configure the PCI-ENC8G-24UM-2X2 NVMe JBOF. 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.

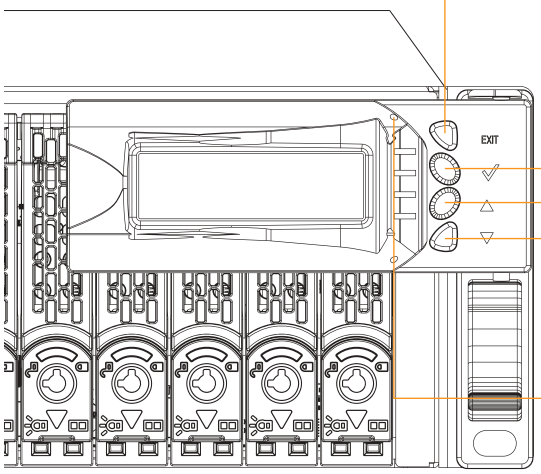
The four function keys with the LEDs on the LCD module in front of the PCI-ENC8G-24UM-2X2 NVMe JBOF.

1. Power on / Mute / Return button

   Power on: press one second to power on the PCI-ENC8G-24UM-2X2 NVMe JBOF

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

   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

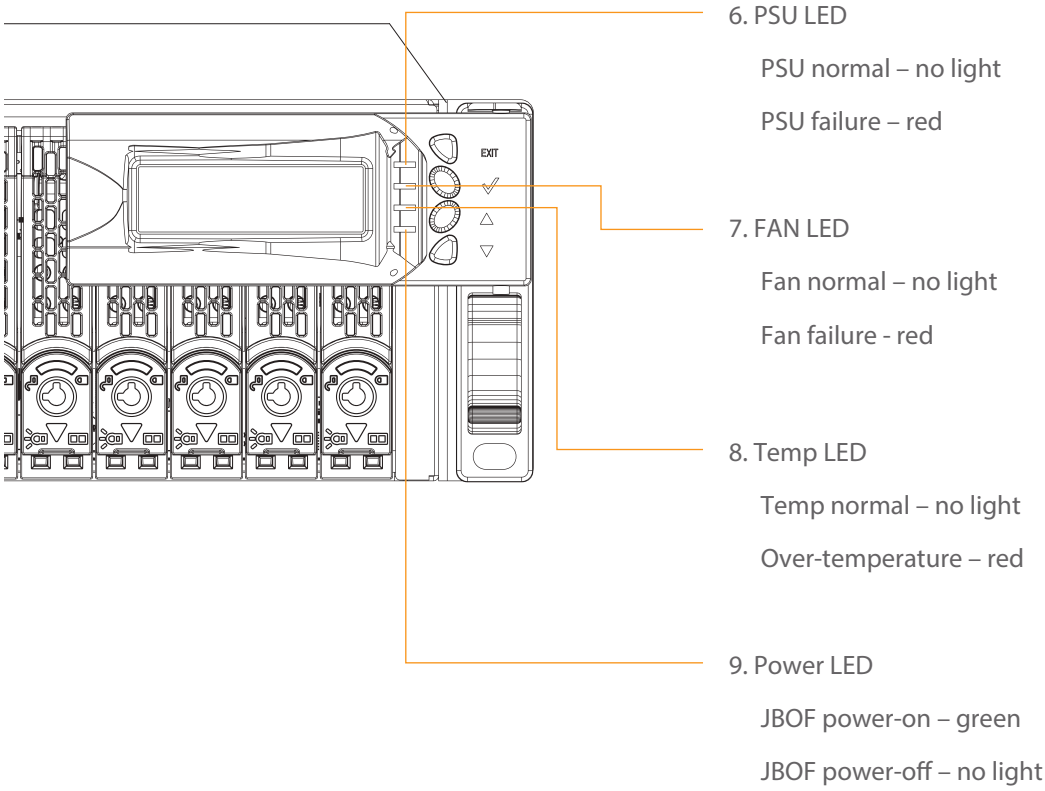
4. Down button

   To scroll downward or leftward

5. Standby LED

   Active mode – no light

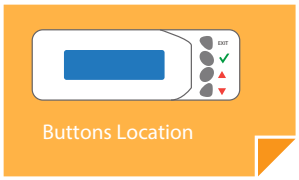
   Standby mode – blue



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.

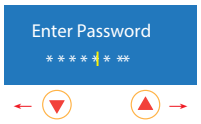
The following flow is an expansion of LCD setup item hierarchical menu.



- EXIT - Return button
- ✓ - Enter button
- ▲ - Up button
- ▼ - Down button

LCM Functions

- Fan Info
  - Fan 1 RPM
  - Fan 2 RPM
- Temp Info
  - Temp 1 ℃
  - Temp 2 ℃
  - Temp 3 ℃
- PSU Info
  - PSU 1
    - Temp 1 ℃
    - Temp 2 ℃
  - PSU 2
    - Temp 1 ℃
    - Temp 2 ℃
- 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



6. CLI Manager

Users can use the Command Line Interface (CLI) to manage the NVMe JBOF functions.

US_PM-2425 NVMe JBOF utilizes the USB port as the serial port interface. Please use USB Type-A male to USB Type-B male cable to connect between US_PM-2425's switch controller 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.

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.

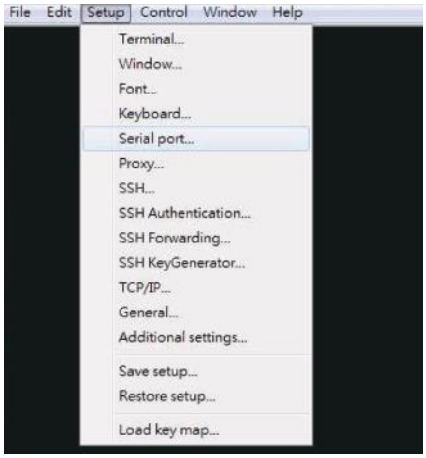
※ Notice : Tera Term is a VT100 Terminal Emulation program which is an open-source, free, software implemented , Terminal Emulator tool.

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 PCI-ENC8G-24UM-2X2 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)

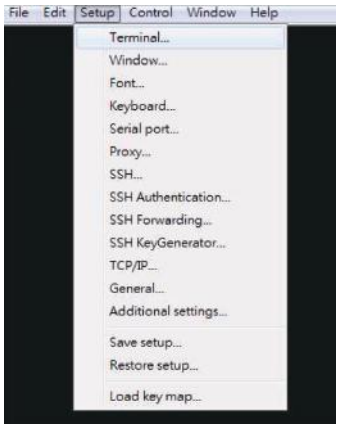
For " Baud rate ", select 115200 .

For " Data ", select 8 bit . For " Parity ", select none .

For " Stop ", select 1 bit . For " Flow control ", select none .

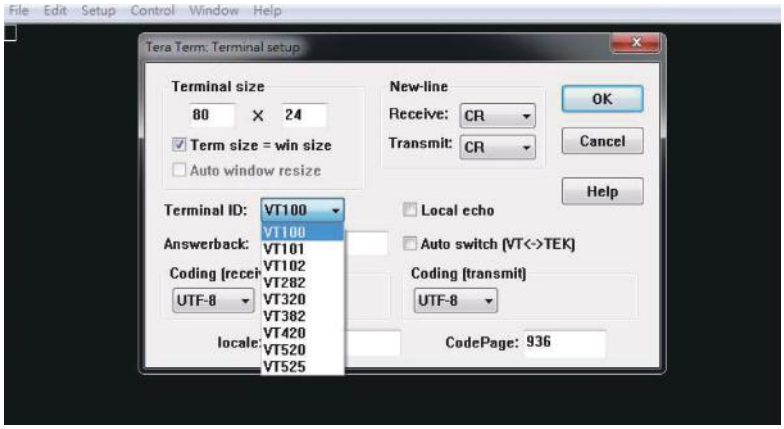
Click OK when the selection is finished.

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.



CLI Command

This section provides detailed information about PCI-ENC8G-24UM-2X2 NVMe JBOF CLI functions.

Function	Command	Syntax
* Show list of commands	help	help [enter]
Ethernet IP configuration	eth	eth [enter]
Set Ethernet MAC address	setmac	setmac [enter]
Update PCIe switch firmware	fdl	fdl sw [enter]
Show environmental info (temps, FANs, voltages) on US_PM-2425 NVMe JBOF	lsd	lsd [enter]
Show FAN speed info on PCIe switch board	showfan	showfan [enter]
Control the buzzer of PCIe switch board	buz	buz [en] / [dis] / [on] / [off] [enter]
Control the power of each U.2 NVMe drive slot	ssdpwr	ssdpwr [Slot No.] [on o r 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 and ports	showport	showport [-t] / [-b] [enter]
Set configuration mode for PCIe switch board	setmode	setmode [1] / [2] / [3] [enter]
* Show configuration mode for each PCIe switch board	showmode	showmode [enter]
Show internal temperature of PCIe switch	showtemp	showtemp [enter]
Bind any/all ports into switch group	bind	bind [Slot No.] [enter]
Unbind any/all ports from switch group	unbind	unbind [Slot No.] [enter]
Show binding info	showbind	showbind [Slot No.] [enter]
Show position information for PCIe switch board within US_PM-2425 NVMe JBOF	pos	pos [enter]
Show controller firmware version on PCIe switch board	ver	ver [enter]
To reset the PCIe switch board	reset	reset [enter]

* In addition to the above three commands (No. 1: help, No. 11: showport, and No. 13: showmode) which need connecting to only one switch controller board for getting the info, the rest thirteen commands require connecting to Both switch controller boards for gaining the information, firmware update, and configuration.

help command

This command provides an online table of contents, providing brief description of the supported command groups and built-in commands.

The help command can be used to get the detailed information about the CLI commands' summary.

Syntax: JBOF > help [enter]

```
COM11 - Tera Term VT
File  Edit  Setup  Control  Window  Help

JBOF>help
 JBOF Help Menu
    eth :
         Set Ethernet IP Configuration.
         - Usage: eth [<ipaddr(*)> <subnet(*)> <gateway(*)>]

    setmac :
         Set Ethernet MAC address.
         - Usage: setmac <xx:xx:xx:xx:xx:xx>

    fdl :
         Xmodem download image.
         - Usage: fdl sw

    lsd :
          Show environmental conditions information.
         - Usage: lsd

    showfan :
         Show fan speed information.
         - Usage: showfan

    buz :
         buzzer control.
         - Usage: buz [on|off|en|dis]

    ssdpwr :
         slot power control.
         - Usage: ssdpwr [<slot(D)> <on|off>]
         - slot(D) : slot number should be 1 ~ 24

    ssd_reset :
         Reset NVMe SSD.
         - Usage: ssd_reset <slot(D)>
         - slot(D) : slot number should be 1 ~ 24

    showslot :
         Display link speed and link width information of specific NVMe drive slot.
         - Usage: showslot [slot(D)]
         - slot(D) : slot number should be 1 ~ 24

    showport :
         Display link speed and link width information of all NVMe drive slot.
         - Usage: showport

    setmode :
         Set mode of switch controller board.
         - Usage: setmode <mode(D)>
         - mode(D) : mode number should be 1 ~ 6

    showmode :
         Show mode information of switch controller board in system.
         - Usage: showmode

    showtemp :
         Show internal temperature of PCIe switch chip.
         - Usage: showtemp

    bind :
         Bind switch logical and physical ports.
         - Usage: bind <slot(D)|all>
         - slot(D) : slot number should be 1 ~ 24

    unbind :
         Unbind switch logical port from physical port.
         - Usage: unbind <slot(D)|all>
         - slot(D) : slot number should be 1 ~ 24

    showbind :
         Show binding info.
         - Usage: showbind <slot(D)>
         - slot(D) : slot number should be 1 ~ 24

    pos :
         Show position information of switch controller board in system.
         - Usage: pos

    quit :
         Close telnet.
         - Usage: quit

    ver :
         Show microcontroller firmware version.
         - Usage: ver

    reset :
         System reset.
         - Usage: reset

JBOF>
```

eth command

Ethernet IP configuration.

Syntax: JBOF > eth [enter]

```
COM11 - Tera Term VT
File  Edit  Setup  Control  Window  Help
JBOF>eth

================================================================================
    Physical Address . . . . . . . . . . : 38-26-2B-00-01-48
    Ethernet Link Status . . . . . . . . : Up
    IP Address . . . . . . . . . . . . . : 192.168.100.215
    Subnet Mask  . . . . . . . . . . . . : 255.255.255.0
    Gateway  . . . . . . . . . . . . . . : 0.0.0.0
    MTU  . . . . . . . . . . . . . . . . : 1500
================================================================================
JBOF>
```

setmac command

Set Ethernet MAC (Media Access Control) address.

Syntax: JBOF > setmac [enter]

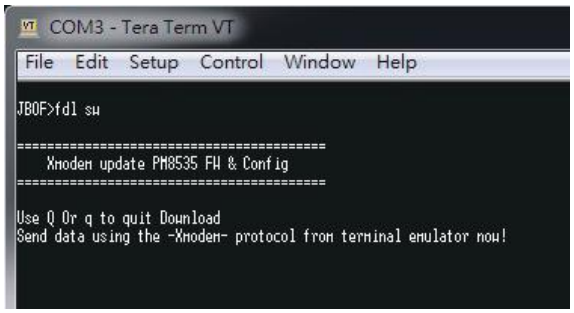
```
COM11 - Tera Term VT
File  Edit  Setup  Control  Window  Help
JBOF>setmac 38:26:2B:00:01:48
 MacAddress[0] 38
 MacAddress[1] 26
 MacAddress[2] 2B
 MacAddress[3]  0
 MacAddress[4]  1
 MacAddress[5] 48
 Set MAC - save configuration ok
JBOF>
```

fdl command

Update PCIe switch firmware.

For this function, the US_PM-2425 NVMe JBOF must be connected to the host computer via PCI-ENC8G-24UM-2X2's rear USB Type-B port rather than its rear RJ-45 LAN port.

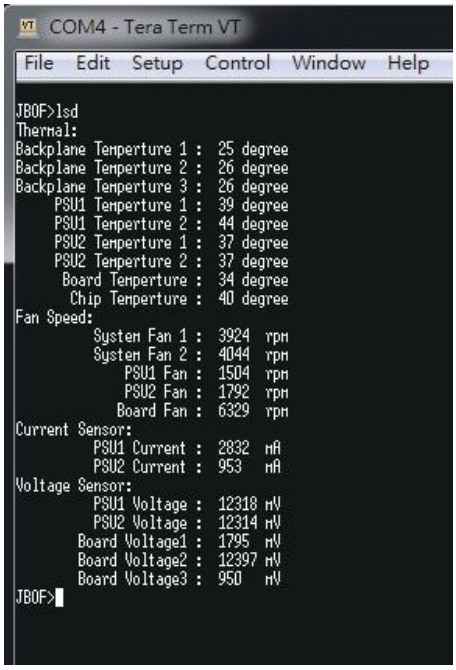
Syntax: JBOF > fdl sw [enter]



lsd command

The command shows environmental information (temperatures, FANs, voltages) on PCI-ENC8G-24UM-2X2 NVMe JBOF.

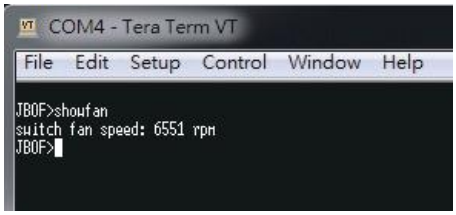
Syntax: JBOF > lsd [enter]



showfan command

The command shows FAN speed info on PCIe switch board.

Syntax: JBOF > showfan [enter]



buz Command

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

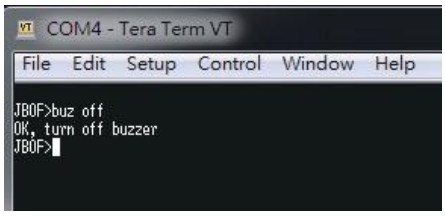
Syntax: JBOF > buz [en] / [dis] / [on] / [off] [enter]

[en]: enable the buzzer function for all time

[dis]: disable the buzzer function for all time

[on]: allow buzzer to beep for one time

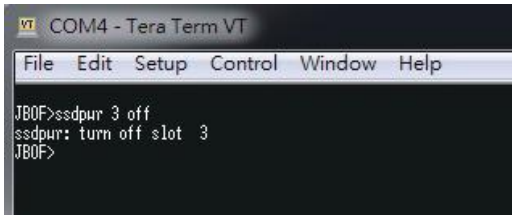
[off]: mute the buzzer beeping



ssdpwr command

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

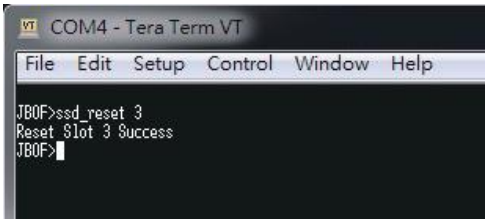
Syntax: JBOF > ssdpwr [Slot No.] [on or off] [enter]



ssd_reset command

To reset each U.2 NVMe SSD.

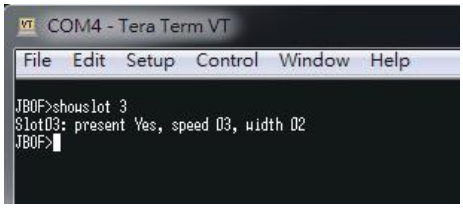
Syntax: JBOF > ssd_reset [Slot No.] [enter]



showslot command

The command shows link speed and link width information on specific U.2 NVMe drive slot.

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



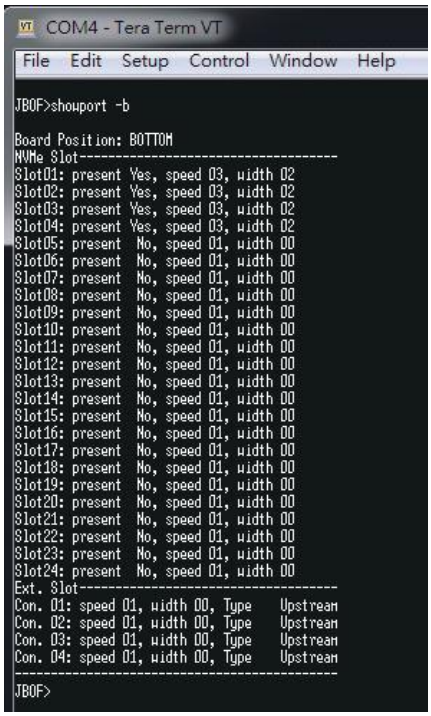
showport command

The command shows link speed and link width information on all U.2 NVMe drive slots and ports.

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

[-t]: top switch controller board

[-b]: bottom switch controller board



setmode command

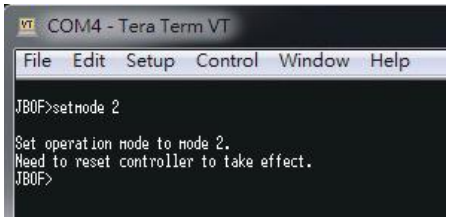
The command is for setting configuration mode for PCIe switch board.

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

[1]: set for mode 1

[2]: set for mode 2

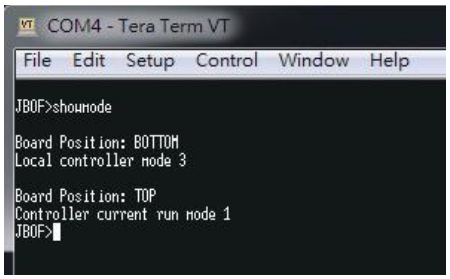
[3]: set for mode 3



showmode command

The command shows configuration mode for each PCIe switch board.

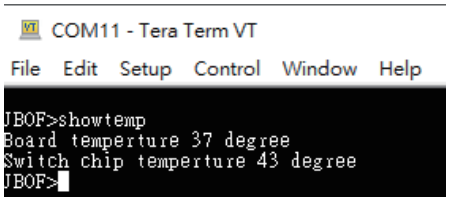
Syntax: JBOF > showmode [enter]



showtemp command

The command show internal temperature of PCIe switch.

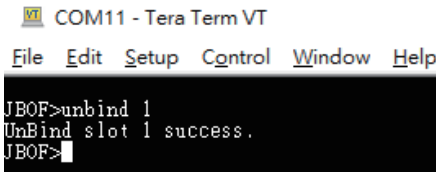
Syntax: JBOF > showtemp [enter]



bind command (Applicate in Mode 4 only)

The command bind any/all ports into switch group.

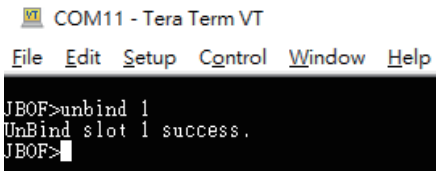
Syntax: JBOF > bind [Slot No.] [enter]



unbind command (Applicate in Mode 4 only)

The command unbind any/all ports from switch group.

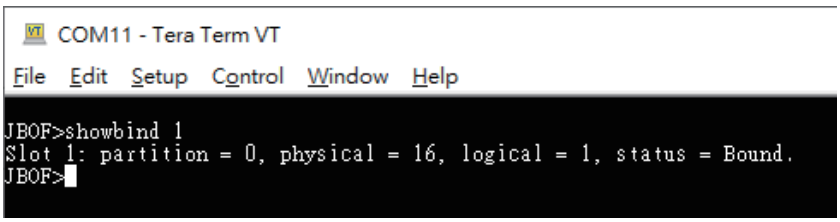
Syntax: JBOF > unbind [Slot No.] [enter]



showbind command (Applicate in Mode 4 only)

The command show binding info.

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



pos command

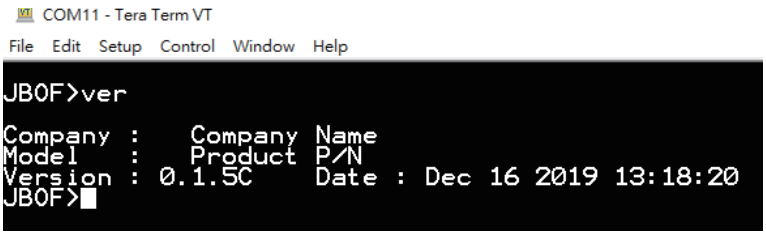
The command shows position information for switch controller board within PCI-ENC8G-24UM-2X2 NVMe JBOF.

Syntax: JBOF > pos [enter]

ver command

The command shows controller firmware version on PCIe switch board.

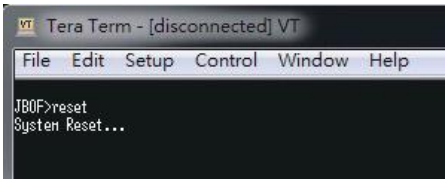
Syntax: JBOF > ver [enter]



reset command

To reset the PCIe switch board.

Syntax: JBOF > reset [enter]



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

or Serial Cables, LLC.

Serial Cables, LLC

8811 American Way, Suite 110
Englewood, CO 80112

www.serialcables.com

sales@serialcables.com

(303) 495-2320