PCI-ENC8G-024U NVMe

2U24Bay JBOF

User's Manual

Revision 1.0

Preface

Change Notice

The information in this document is for information purposes only, it is subject to change without notice ahead.

SAFETY PRECAUTIONS

Please read this section carefully before proceeding. These precautions explain the correct and safe use of this device, thereby helping to prevent injury to you or others, and also help you to minimize the risk of damaging the device.

Warnings

Always follow the basic warnings listed here to avoid the risk of serious injury or death from electrical shock, short-circuiting, fire, and other hazards. These warnings include, but are not limited to:

- With the exception of the user-swappable parts, do no attempt to disassemble or modify the enclosure. If this device appears to be malfunctioning, contact Serial Cables Customer Service.
- Do not drop the enclosures or any of its drive modules; dropping or mishandling of the enclosure or drive modules may result in a malfunction.
- Do not insert your fingers or foreign objects inside the enclosure; take particular care when small children are present.
- Do not expose the device to rain, use it near water or containers that contain liquids which might spill into any openings, or in damp or wet conditions.
- If unusual smells, sounds, or smoke come from the device, or if liquids enter it, switch it off immediately and unplug it from the electrical outlet.
- Follow the instructions in this manual carefully; contact Serial Cables Customer Service for additional advice not covered in this User's Guide.

Copyright© 2015 by Serial Cables Technology, Inc. All rights reserved

Table of contents

1. INTRODUCTION

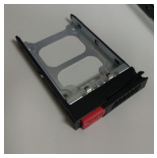
1.1 Overview

Serial Cables's 2U24bay PCIe NVMe JBOF enclosure is designed to provide external NVMe storage solution, The enclosure equipped with two PCIe switch controller supporting total twenty-four (24) high-speed U.2 (SFF-8639) NVMe SSD. Each controller integrates Broadcom ExpressFabric Capella 2 PCIe switch PEX9781 with eight external mini-SAS HD connectors, designed to provide PCIe expansion. The total maximum bandwidth is PCIe gen3 x64 512GT/s and allows up to 8 head-nodes access the NVMe JBOF enclosure.

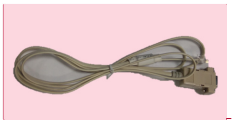
1.2 Package Checklist

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

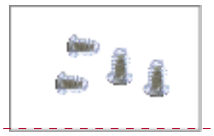
A. Enclosure × 1



B. HDD tray (installed in the PCI-ENC8G-024U) × 24



C. Standard Type C USB cable x1



D. Hard disk drive mounting screw × 96

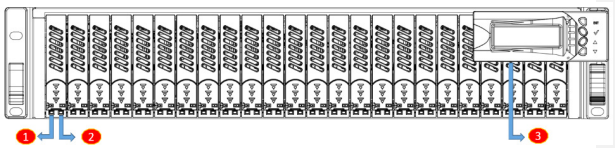
Commented [社畜君1]: Change picture

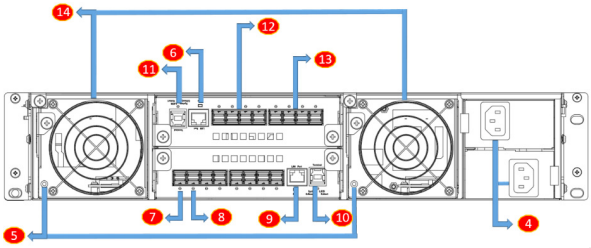
If any of the items listed above is missing or damaged, please contact the sales representative.

2. Hardware Installation

This section gives the layout of the panel and describes the procedures for setting up the PCI-ENC8G-024U enclosure.

2.1 Panel Layout





1. Activity indicator LED
   - Flash Blue – Access
   - Red – HDD failure
2. SSD presence LED
   - White – Power On
3. LCD module
4. Power cord receptacle
5. Fan status LED
   - Normal – No light
   - Failure – Red
6. Mute button
   - To mute buzzer beeping of enclosure failure
7. Port Link width indication LED
   - One Red LED– configure as one x16 port
   - Two Red LEDs—configure as two x8 ports
8. Upstream/Downstream port indication
   - Flash Blue – Downstream port
   - Blue – Upstream port
9. LAN port
10. USB port
11. System healthy LED
    - Green – Normal
    - Red – Failure events occurred
12. Quad port mini-SAS HD (SFF-8644) connector
13. Quad port mini-SAS HD (SFF-8644) connector
14. Swappable fan

Note :

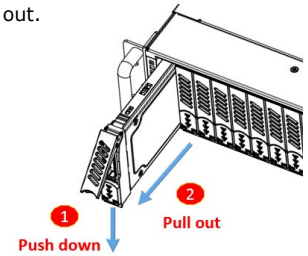
When any one of environmental sensors is abnormal or drive status failure, the buzzer on the PCI-ENC8G-024U switch board will beep. To mute the buzzer, press the mute button near LAN port at the rear of the enclosure.
Environmental sensors include:

i. Cooling elements (Fan)
ii. Temperature elements
iii. Voltage elements
iv. Current element
v. Power Supply element

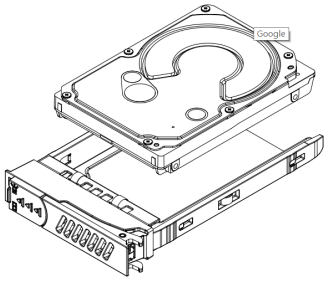
2.2 Enclosure Setup

1. Remove the PCI-ENC8G-024U enclosure from its packaging, and place the enclosure next to PC, server, or workstation.

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



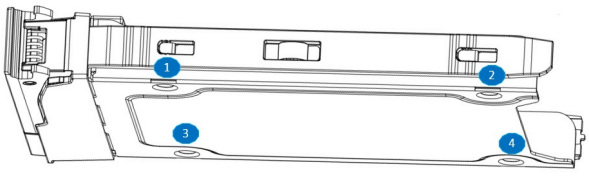
3. Place a drive tray on a flat and level surface, and then attach the HDD into the tray.



WARNING:

You must verify the heads of the four screws are level with the drive tray while the HDD 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.

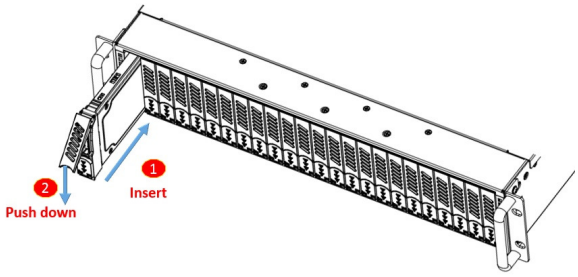
4. Adopt four of the screws provided, and fasten the HDD on the tray. Tighten each screw to fasten the HDD snugly to the drive tray. Do not tighten the screws overly.



WARNING:

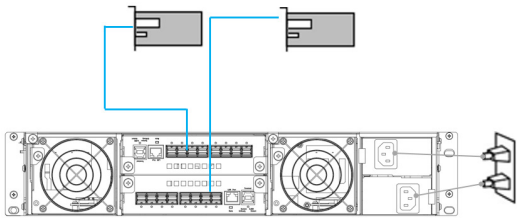
Do not force the levers to close while you insert drive modules into the PCI-ENC8G-024U enclosure. If a lever does not close smoothly, draw out and insert the drive module again, and then press the lever to close.

5. Insert the drive module into the PCI-ENC8G-024U enclosure correctly until its lever appears to shut, and then press the lever to close until it clicks to ensure that the drive module is within the enclosure.



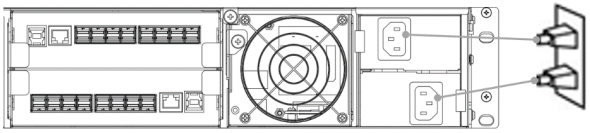
6. Repeat steps 2 to 5 for further drives.

7. Connect PCI-ENC8G-024U enclosure to the host interface: An external PCIe host adapter card through the SFF-8644 mini-SAS HD data cable. Connection between PCI-ENC8G-024U enclosure and an external PCIe host adapter RAID card port is shown as follows:



8. Connecting PCI-ENC8G-024U enclosure's USB Port (optional)
   PCI-ENC8G-024U enclosure's system functions can be managed via a com port running a VT-100 terminal emulation program, or a VT-100 compatible terminal. PCI-ENC8G-024U building a USB to RS-232 transceiver that converts the USB to RS-232 signals.

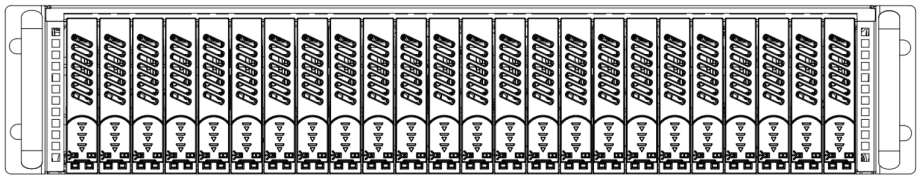
9. The PCI-ENC8G-024U enclosure provides redundant power supply unit, so connect one end of the two power cords to the two receptacles on rear of PCI-ENC8G-024U enclosure, and then connect the other end of the two power cords to the power outlets.



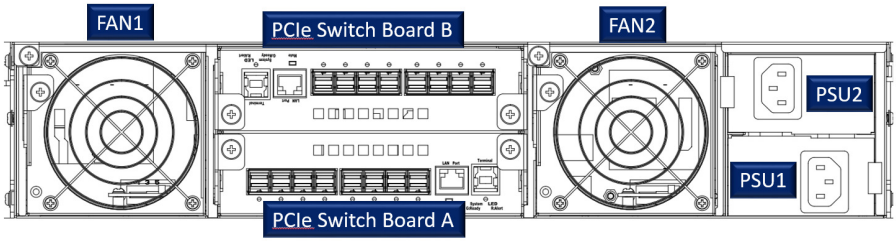
11. After the two power cords are connected, you can power on PCI-ENC8G-024U enclosure and the computer.

2.3 Components location definition

1. **Slots location definition**



2. **PSU, FAN and PCIe switch board definition**

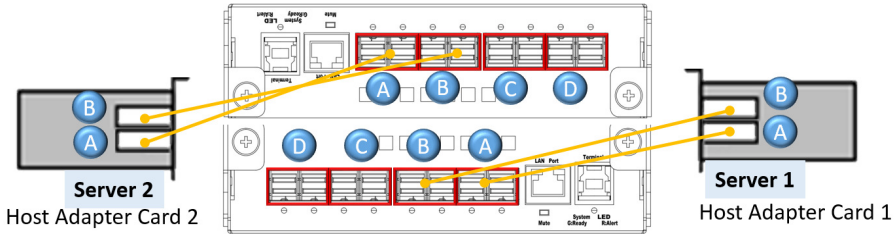


2.4 Switch mode selection

User can utilize CLI command to set the switch mode, 2U24bay NVMe JBOF support 3 modes, base mode, Two VR mode, Four VR mode.

1. **Mode 1: Base mode, x16 configuration.**

Connection A:



Bandwidth:

PCIe switch board A: PCIe Gen3 x16 128GT/s

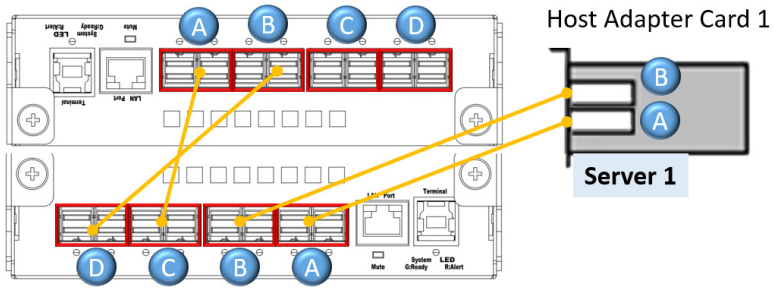
PCIe switch board B: PCIe Gen3 x16 128GT/s

NVMe SSD:

Server 1 can assess NVMe SSDs in Slot 1 to 12.

Server 2 can assess NVMe SSDs in Slot 13 to 24.

Connection B:



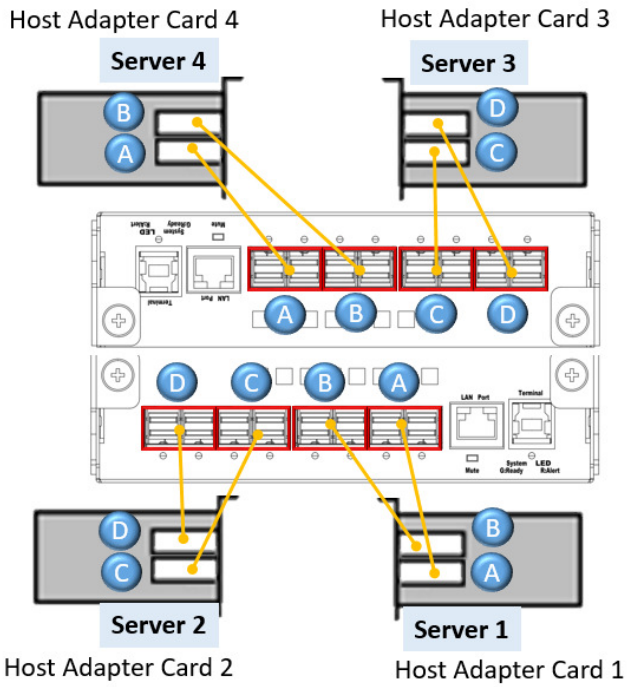
Bandwidth:

PCIe switch board A+B: PCIe Gen3 x16 128GT/s

NVMe SSD:

Server 1 can assess NVMe SSDs in Slot 1 to 24.

2. Mode 2: Two VR mode, x16 configuration



Bandwidth:

PCIe switch board A: PCIe Gen3 x32 256GT/s

PCIe switch board B: PCIe Gen3 x32 256GT/s

NVMe SSD:

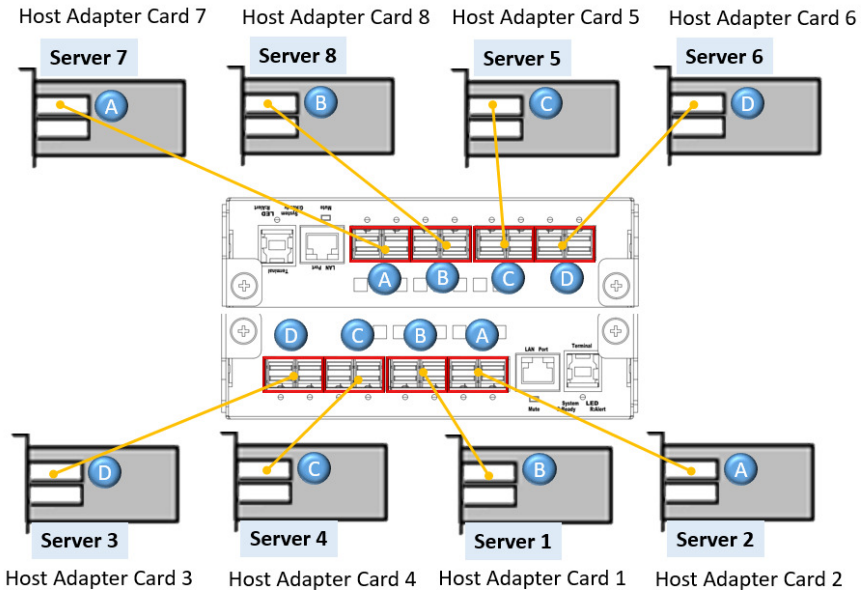
Server 1 can assess NVMe SSDs in Slot 1 to 6.

Server 2 can assess NVMe SSDs in Slot 7 to 12.

Server 3 can assess NVMe SSDs in Slot 13 to 18.

Server 4 can assess NVMe SSDs in Slot 19 to 24.

3. Mode 3: Four VR mode, x16 configuration



Bandwidth:

PCIe switch board A: PCIe Gen3 x32 256GT/s

PCIe switch board B: PCIe Gen3 x32 256GT/s

NVMe SSD:

Server 1 can assess NVMe SSDs in Slot 1 to 3.

Server 2 can assess NVMe SSDs in Slot 4 to 6.

Server 3 can assess NVMe SSDs in Slot 7 to 9.

Server 4 can assess NVMe SSDs in Slot 10 to 12.

Server 5 can assess NVMe SSDs in Slot 13 to 15.

Server 6 can assess NVMe SSDs in Slot 16 to 18.

Server 7 can assess NVMe SSDs in Slot 19 to 21.

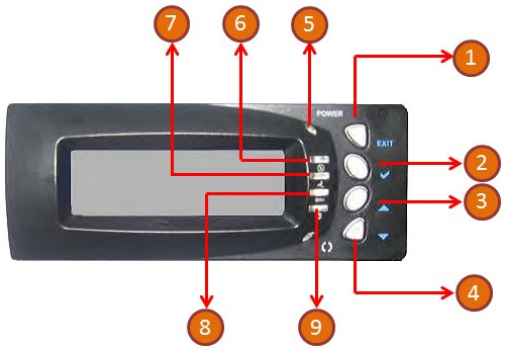
Server 8 can assess NVMe SSDs in Slot 22 to 24.

3. LCD configurations

This technical manual provides, in quick reference form, procedures that use the built-in LCD panel to configure and operate the controller. The LCD provides a system of screens with areas for information, status indication, or menus. The LCD screen displays up to two lines at a time of menu items or other information.

3.1 Function key definitions

The four function keys at the front panel of the button perform the following functions:



	Function	Description
1	Exit/Mute Key	1. Power On→press 1s to power on the system. 2. Mute→Press 1s to disable the beeping of system failure events. 3. Return→Press to previous screen.
2	Enter Key ✔	Submit selected icon function (Confirm a selected item)
3	Up Key ▲	Use to scroll the cursor Upward / Rightward
4	Down Key ▼	Use to scroll the cursor Downward / Leftward
5	Stanby status LED	OFF – No light ON – Blue
6	PSU status LED	Normal – No light Failure – Red
7	FAN status LED	Normal – No light Failure – Red
8	Temp status LED	Normal – No light Failure – Red
9	Power status LED	OFF – No light ON – Green

3.2 Function key definitions

The main menu appears on the LCD screen as shown below:
Use the UP/DOWN to move left and right and highlight a menu item. Press ENT to select the highlighted item. Press the UP/DOWN to browse the selection. Press ESC to return to the previous screen.

Select an option, related information or submenu items to display beneath it.
The LCD configuration main menu are:

Functions	Description
Fan Info	Show system FANs TACH info.
Temp Info	Show system temperatures info.
PSU Info	Show system PSU info, including voltage, current, FAN info and temperature.
Slot Info	Show link width and speed for NVMe slots.
Port Info	Show link width and speed for ports of PCIe switch board.
Ethernet IP Info	Show Ethernet port info of PCIe switch board.
Firmware Upgrade	Step1: Enter password Step2: Choose switch board A/B, notify PCIe switch board upgrade FW.
Firmware Version	Show all FW versions, including LCD and PCIe switch boards.
System Power OFF	Enter password (default is "00000000") -> power off
Set Password	Step1: Enter old password Step2: Enter New password Step3: Verify new password LCD displays new password been changed

4. CLI MANAGER

This Command Line Interface (CLI) is provided for you to manage the NVMe controller functions. The CLI is useful in environments where a graphical user interface (GUI) is not available.

Locations of RS-232C Port

NVMe JBOF enclosure uses the RJ11 port as the serial port interface. Please use the cable included on the shipping box to configure the switch controller.

To Be Updated

Establishing the Connection for the RS-232 Port

The CLI function can be done by using an ANSI/VT-100 compatible terminal emulation program. You must complete the appropriate installation procedure before proceeding with the CLI function. Whichever terminal emulation program is used must support the 1K XMODEM file transfer protocol.

4.1 Expander RS-232C Port Pin Assignment

The controller RJ11 connector pin assignments are defined as below.

Action			
Pin	Description	Pin	Description
1	NC	3	TXD
2	RXD	4	GND

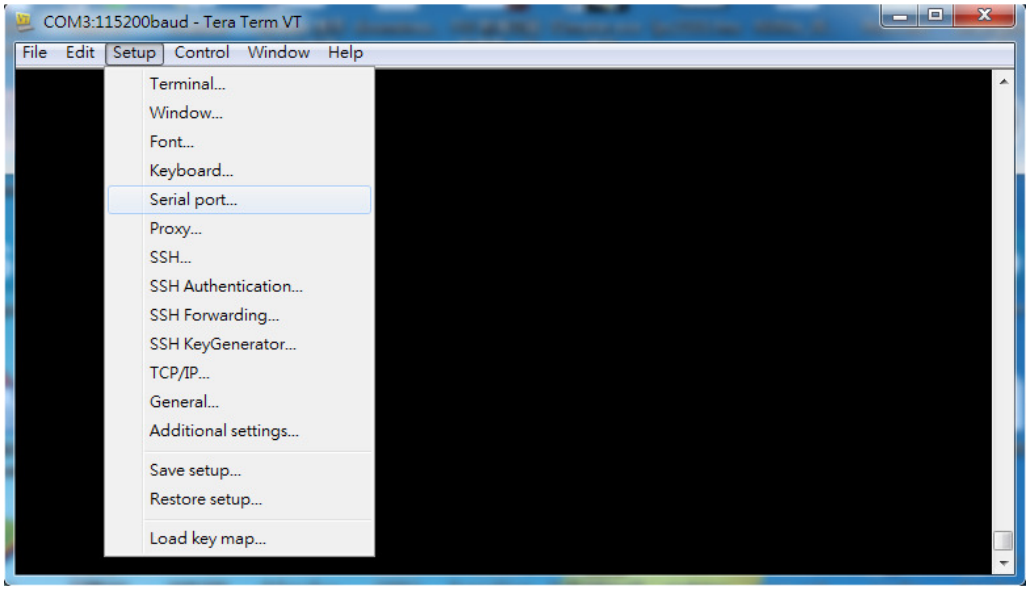
4.2 Start-up VT100 Screen

By connecting a VT100 compatible terminal, or a PC operating in an equivalent terminal emulation mode, all CLI administration functions can be exercised from the VT100 terminal.

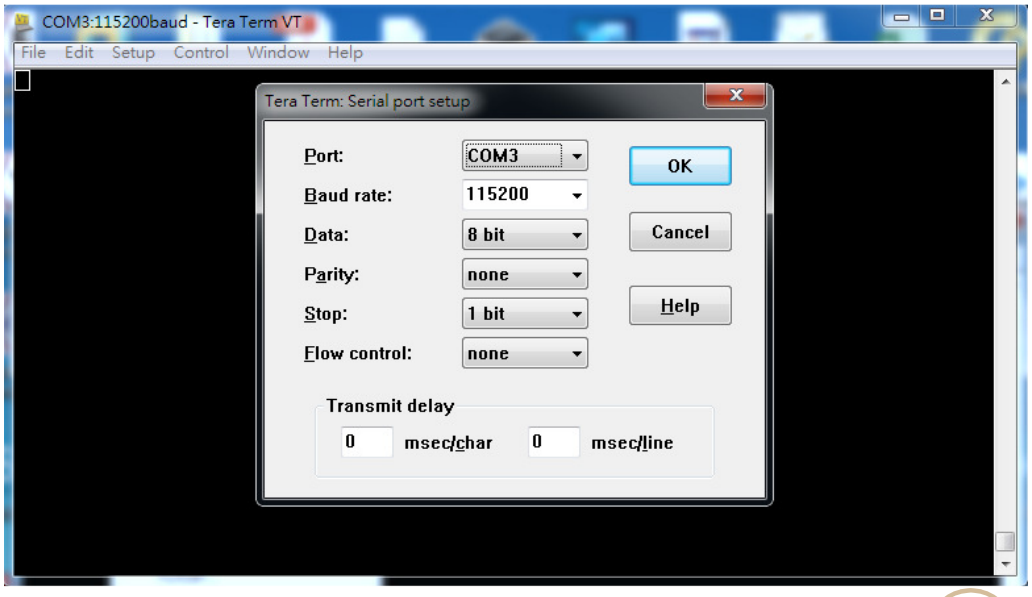
There are a wide variety of Terminal Emulation packages, but for the most part they should be very similar. The following setup procedure is an example setup VT100 Terminal in Windows 7 system using Tera Term 4.89 (a VT100 Terminal Emulation program and it's an open-source, free, software implemented, Terminal Emulator program).

Step 1. Install and launch Tera Term application (or Hyper Terminal requires version 3.0 or higher).

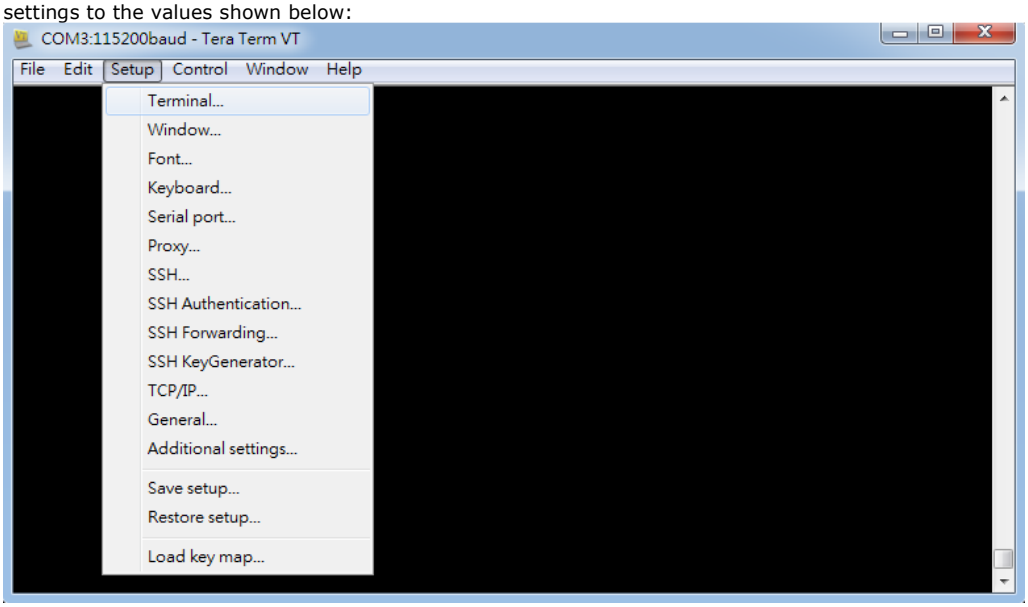
Step 2: To ensure proper communications between NVMe JBOF controller and the VT100 Terminal emulation, please configure the VT100 Terminal emulation settings to the values shown below:



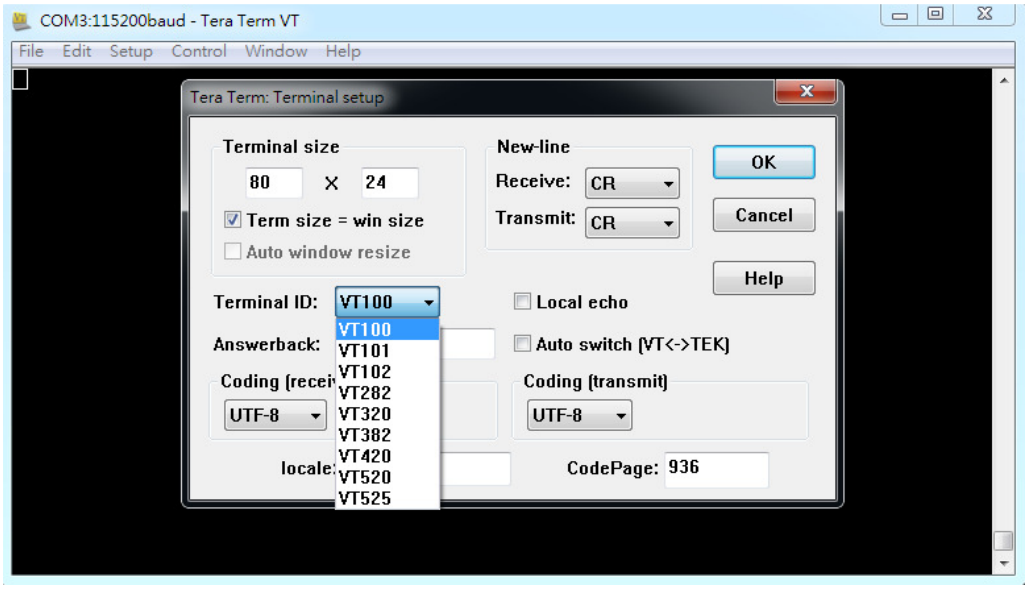
For "Port", select COM3 in this example. (Depend on which COM port used on Host)
For "Baud rate", select 115200.
For "Data", select 8 bit. For "Parity", select none.
For "Stop", select 1 bit. For "Flow control", select: none.
Click OK when you have finished your selections.



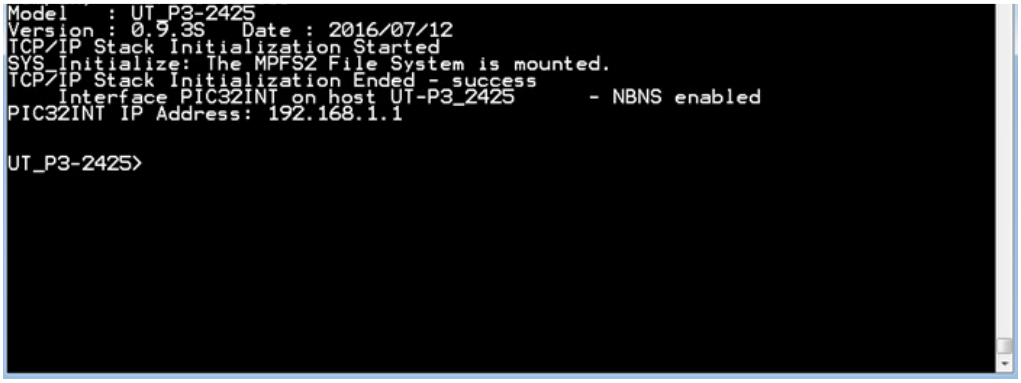
Step 3: Configure Terminal emulation type, please configure the VT100 Terminal emulation settings to the values shown below:



For "Terminal ID", select VT100.
Click OK when you have finished your selections.



Step 4: Setup is complete. When system boot up, screen will print information shown below:



4.3 CLI Command

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

- **HELP Command**

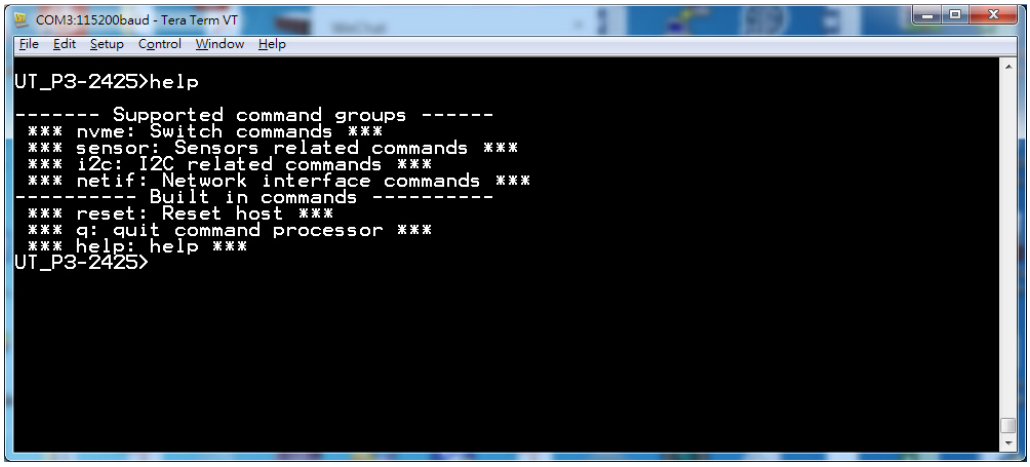
This command provides an on-line table of contents, providing brief descriptions of the supported command groups and built-in commands.

You can use "help" to get detail information about the CLI commands summary.

Syntax

PCI-ENC8G-024U>help[Enter]

Example:



There are 4 command groups, if user want to check CLI commands in one of any groups.

Example:

PCI-ENC8G-024U>help netif [Enter]

5. Firmware Upgrade

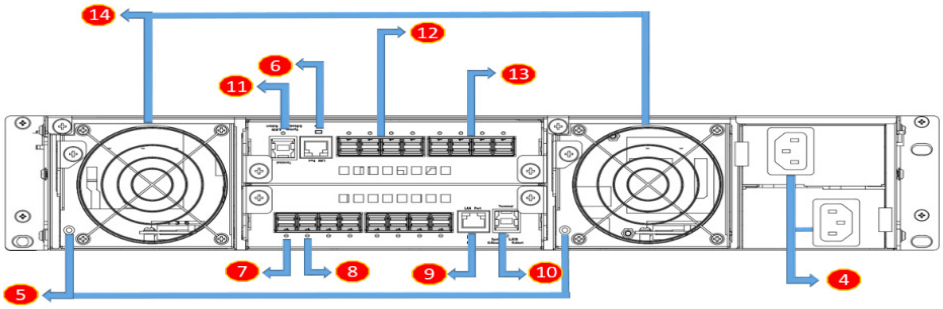
Enter the firmware upgrade mode

There are two ways to enter the firmware upgrade mode

From LCD panel, select upgrade firmware option Or

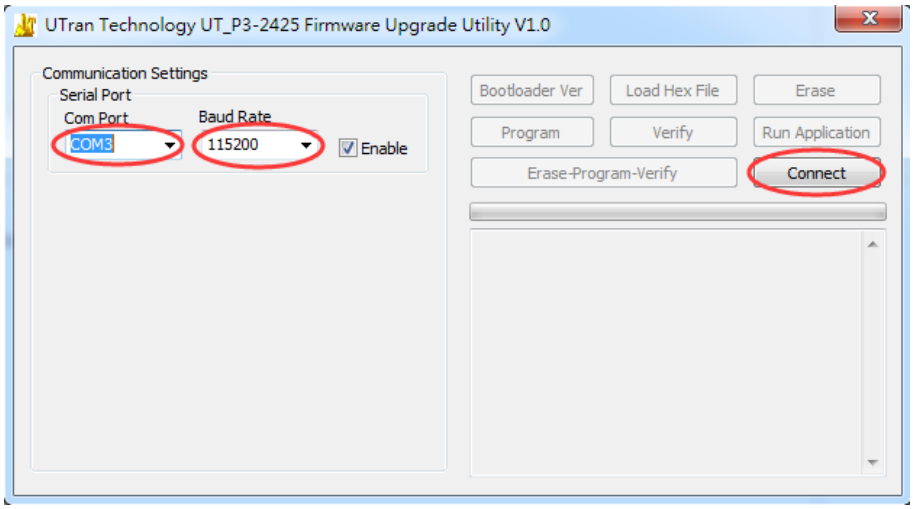
Before power on system, press and hold mute button (6 -> near LAN port) then power on system

If enter firmware upgrade mode success, user can check "System healthy LED 11 " is blinking (Green/Red)

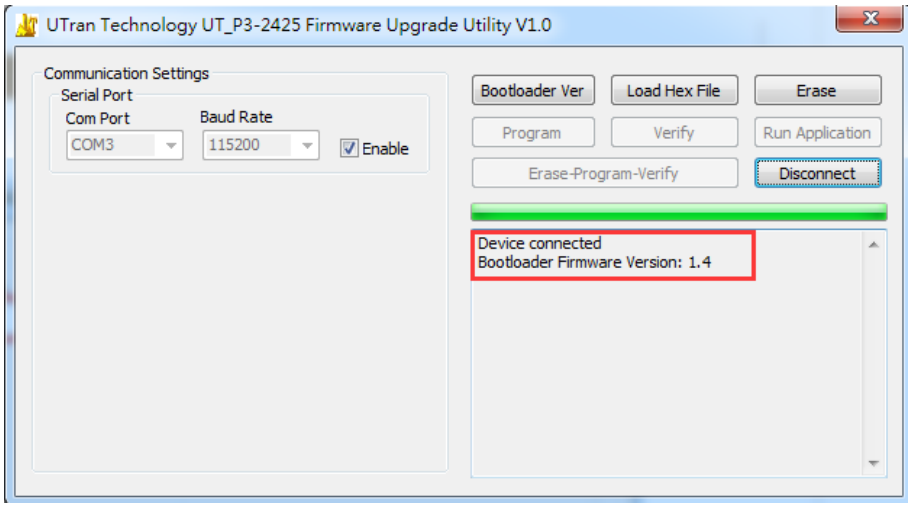


Launch the firmware upgrade application and setting

After launch application, select the "Com Port" used to upgrade firmware and the baud rate is 115200 then click connect

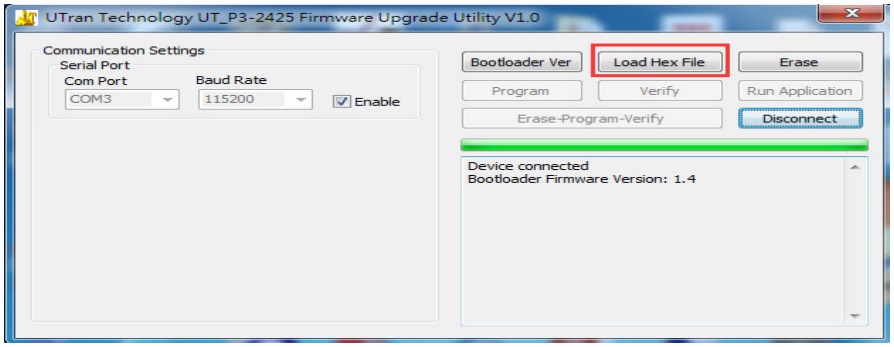


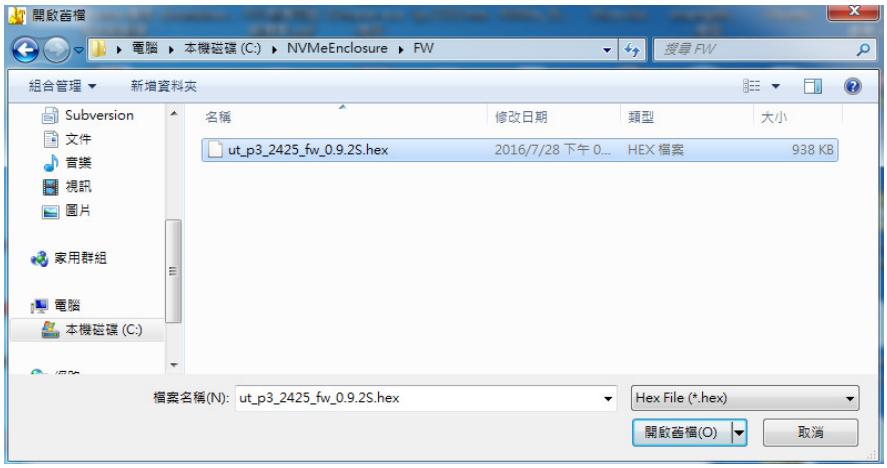
Check the message to make sure device is connected.

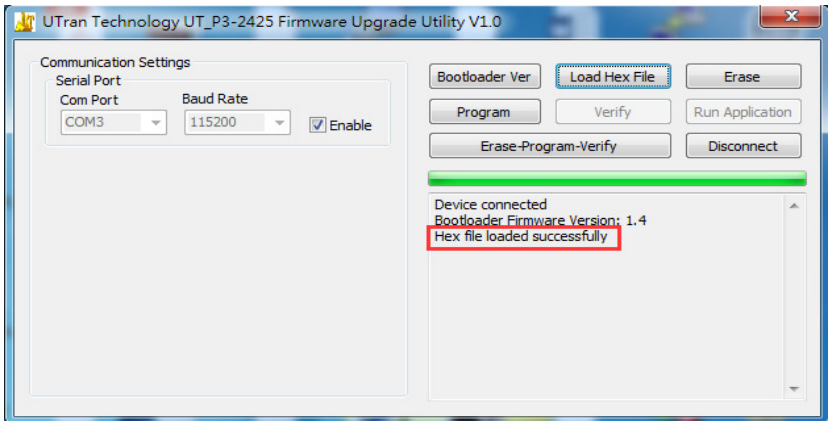


Load firmware file

Click "Load Hex File" button to select firmware file

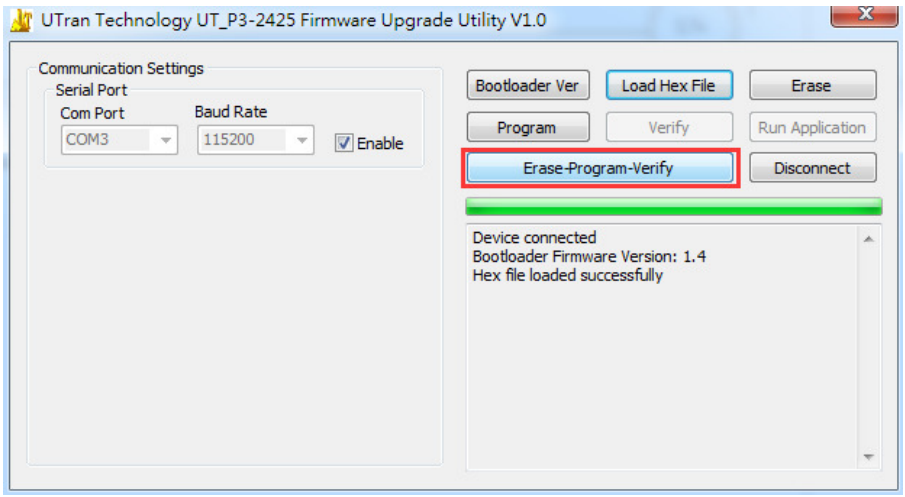


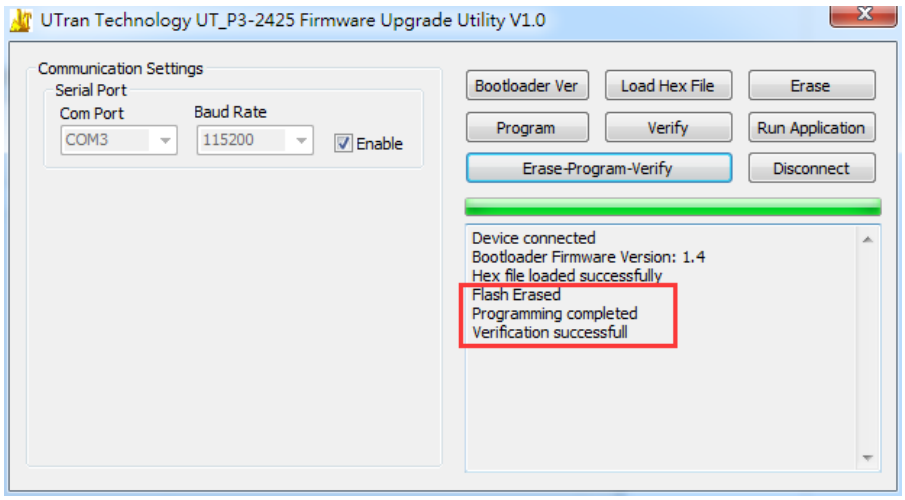




Begin to upgrade firmware process

After load firmware file, click "Erase-Program-Verify" button to start upgrade process.





Disconnect serial port and power cycle the system