# UT_P3-2425 NVMe

# 2U24Bay JBOF

## User's Manual

Revision 1.2

# 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 UTran 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 UTran Customer Service for additional advice not covered in this User's Guide.

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# 1. INTRODUCTION

## 1.1 Overview

UTran's 2U24bay PCIe NVMe JBOF enclosure is designed to provide external NVMe storage solution, The enclosure equipped with two PCIe switch controller supportinh total twenty-four (24) high-speed SFF-8639 NVMe SSD. Each controller integrates Avago Technologies 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 UT_P3-2425) × 24

C. Hard disk drive mounting screw × 96

D: AC Power cord x2

E. Package of slide rail× 1

Visit the website below that gives instructions on how to install the slide rails on enclosure.

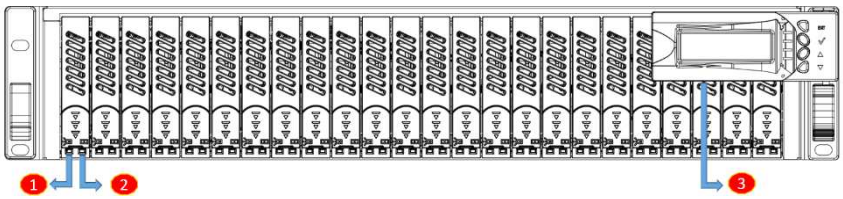
https://www.youtube.com/watch?v=s41XnpJoAmA

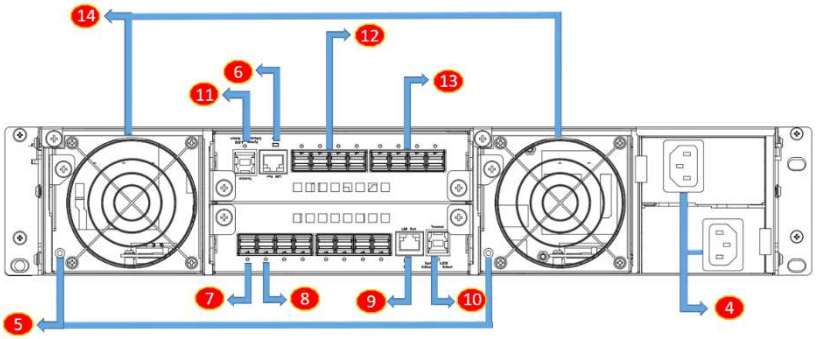
If any of the items listed above is missing or damaged, please contact the sales representative.

# 2. HARDWARE INSTALLATION

This section gives the layout of the panel and describes the procedures for setting up the UT_P3-2425 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 :**

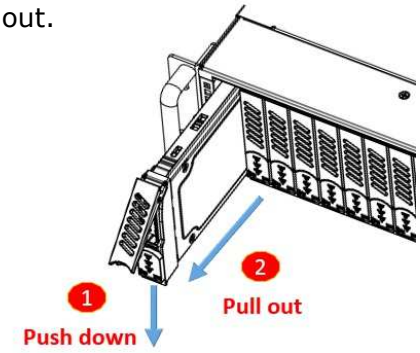
When any one of environmental sensors is abnormal or drive status failure, the buzzer on the UT_P3-2425 switch board will beep. To mute the buzzer, press the mute button near LAN port at the rear of the enclosure.
Environmental sensors include:

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

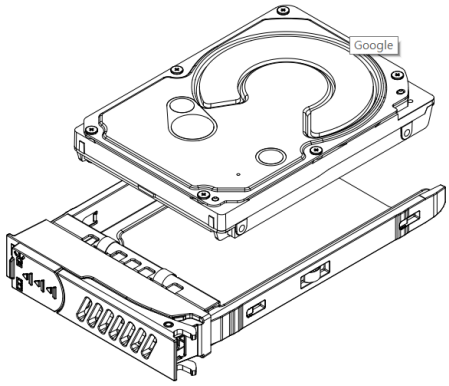
## 2.2 Enclosure Setup

1. Remove the UT_P3-2425 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.



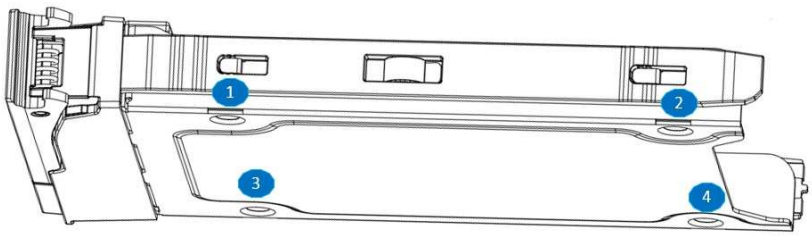

3. Place a drive tray on a flat and level surface, and then attach the HDD into the tray.




**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.

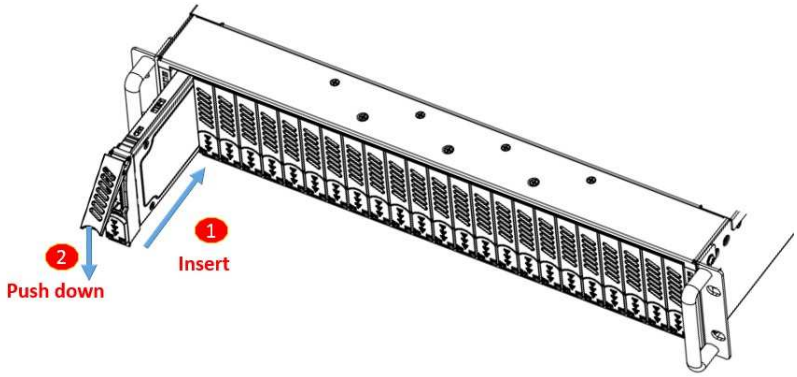
4. Adopt four of the screws provided, and fasten the HDD on the tray. Tighten each screw to fasten the HDD snugly to the drive tray. Do not tighten the screws overly.




**WARNING:**

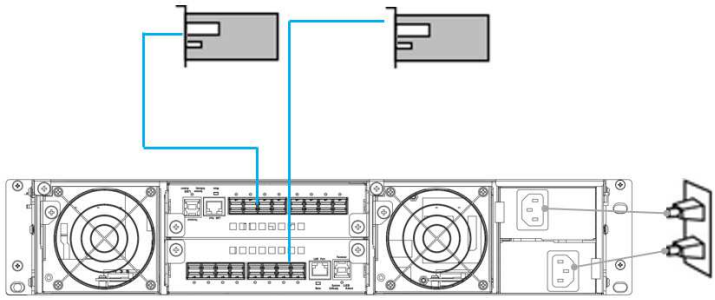
Do not force the levers to close while you insert drive modules into the UT_P3-2425 enclosure. If a lever does not close smoothly, draw out and insert the drive module again, and then press the lever to close.

5. Insert the drive module into the UT_P3-2425 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.



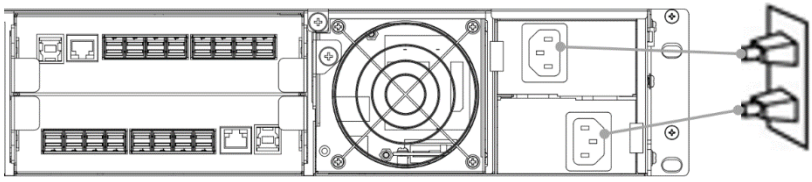

6. Repeat steps 2 to 5 for further drives.

7. Connect UT_P3-2425 enclosure to the host interface: An external PCIe host adapter card through the SFF-8644 mini-SAS HD data cable. Connection between UT_P3-2425 enclosure and an external PCIe host adapter RAID card port is shown as follows:



8. Connecting UT_P3-2425 enclosure's USB Port (optional)
   - UT_P3-2425 enclosure's system functions can be managed via a com port running a VT-100 terminal emulation program, or a VT-100 compatible terminal. UT_P3-2425 building a USB to RS-232 transceiver that converts the USB to RS-232 signals.

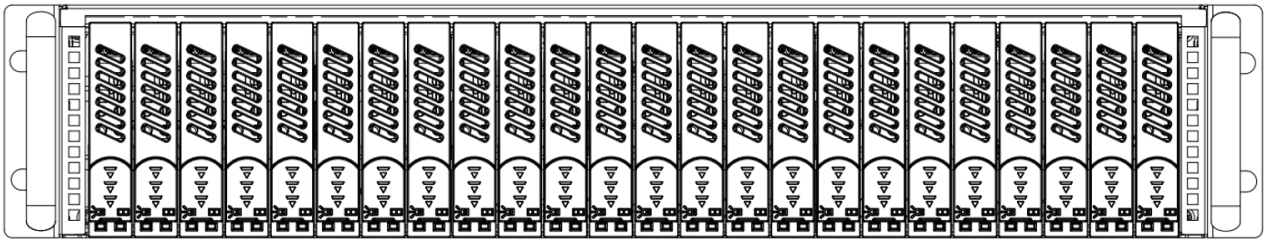
9. The UT_P3-2425 enclosure provides redundant power supply unit, so connect one end of the two power cords to the two receptacles on rear of UT_P3-2425 enclosure, and then connect the other end of the two power cords to the power outlets.



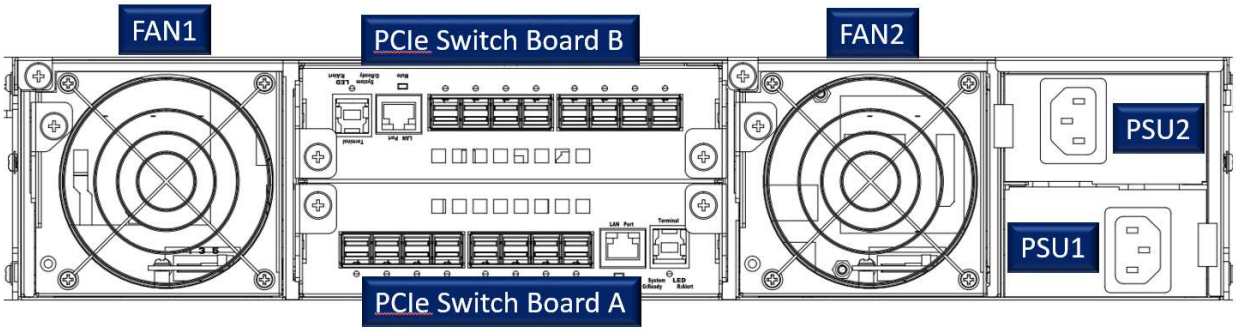
11. After the two power cords are connected, you can power on UT_P3-2425 enclosure and the computer.

## 2.3 Components location definition

### 1. Slots location definition




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

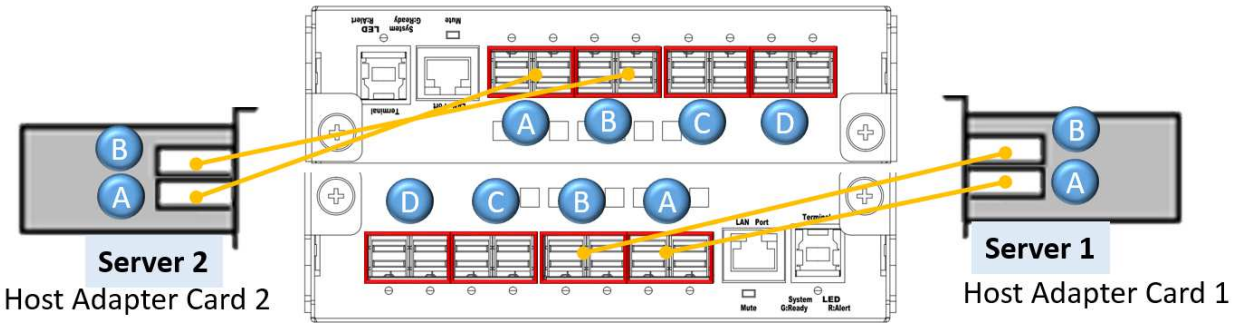


## 2.4 Switch mode selection

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

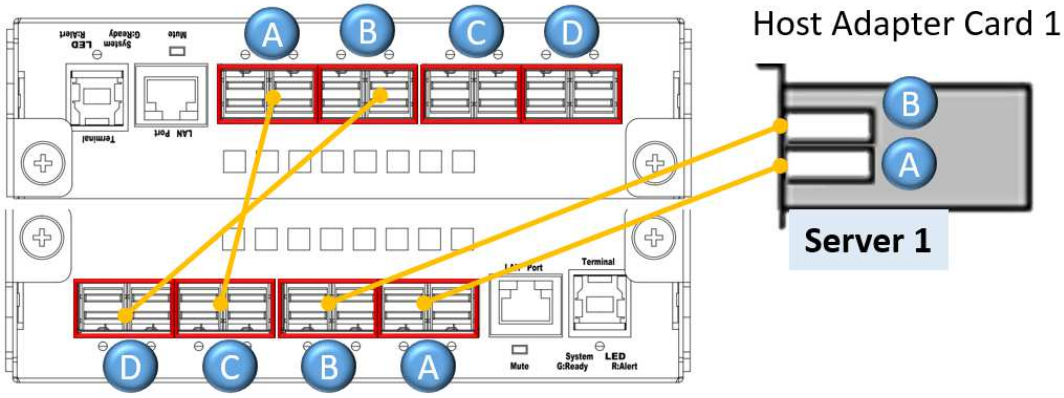
PCIe switch board B: PCIe Gen3 x16 128GT/s

**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:**



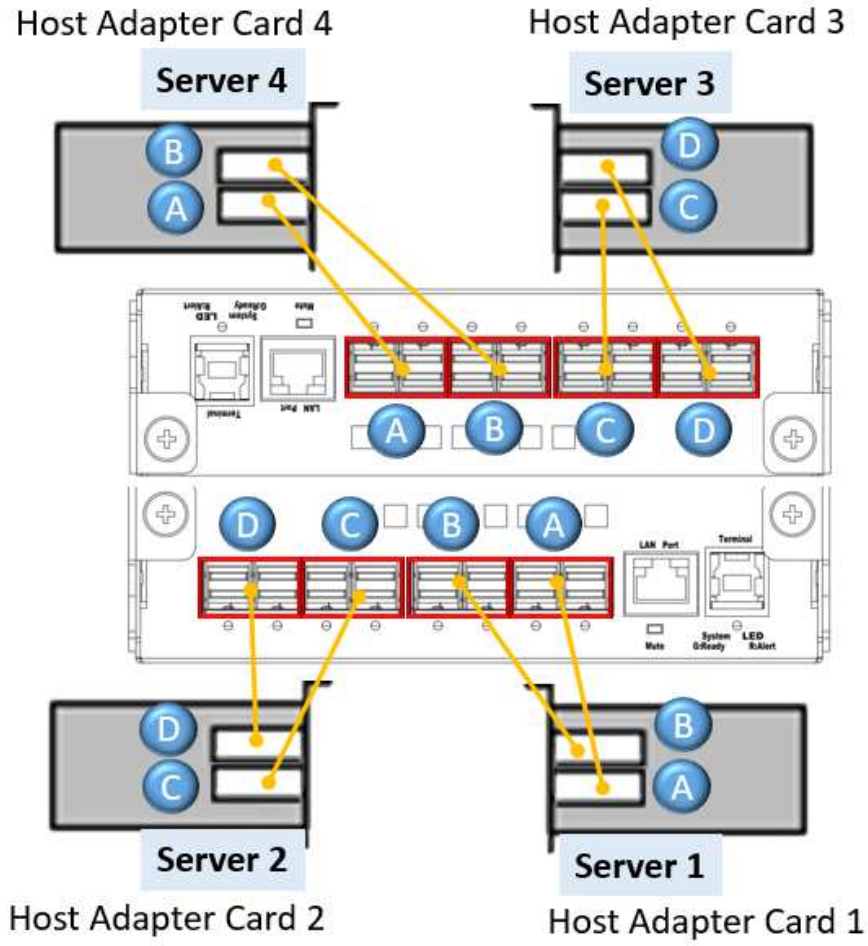

**Bandwidth:**

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:**

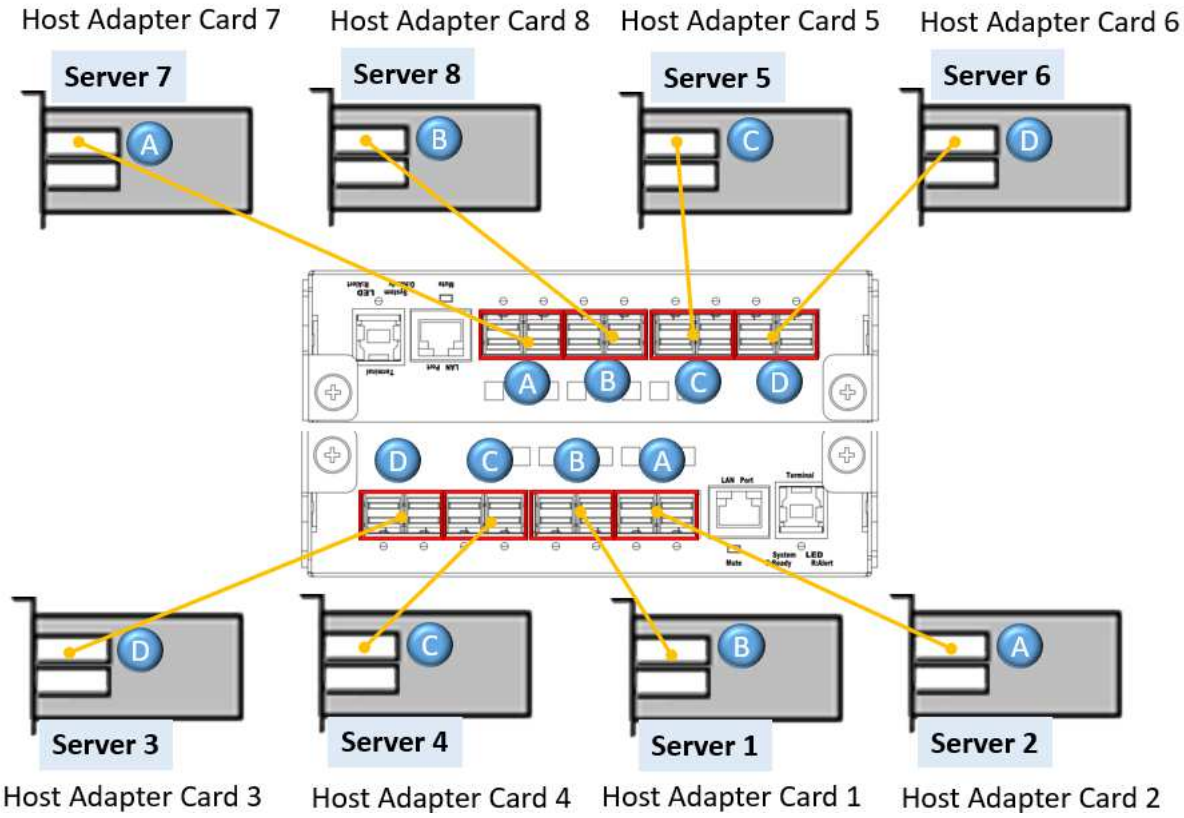
Server 1 can assess NVMe SSDs in Slot 1 to 6.

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.

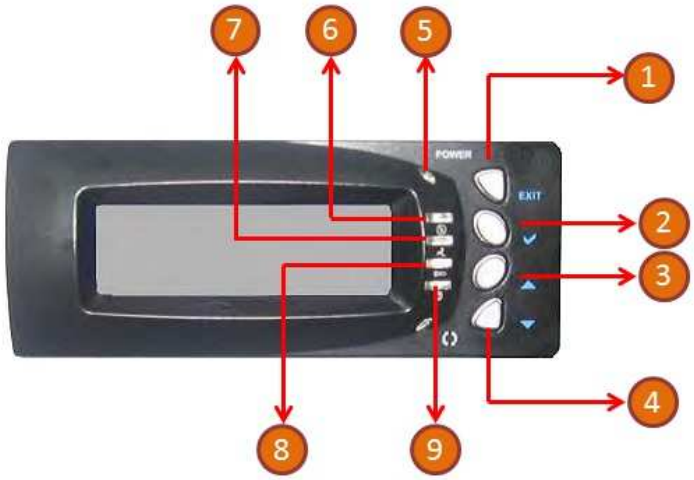
Server 8 can assess NVMe SSDs in Slot 22 to 24.

# 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.<br>2. Mute→Press 1s to disable the beeping of system failure events.<br>3. Return→Press to previous screen. |
| 2 | Enter Key<br>✔ | Submit selected icon function<br>(Confirm a selected item) |
| 3 | Up Key<br>▲ | Use to scroll the cursor Upward / Rightward |
| 4 | Down Key<br>▼ | Use to scroll the cursor Downward / Leftward |
| 5 | Stanby status LED | OFF – No light<br>ON – Blue |
| 6 | PSU status LED | Normal – No light<br>Failure – Red |
| 7 | FAN status LED | Normal – No light<br>Failure – Red |
| 8 | Temp status LED | Normal – No light<br>Failure – Red |
| 9 | Power status LED | OFF – No light<br>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<br>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<br>Step2: Enter New password<br>Step3: Verify new password<br>LCD displays new password been changed |

# 4. CLI MANAGER

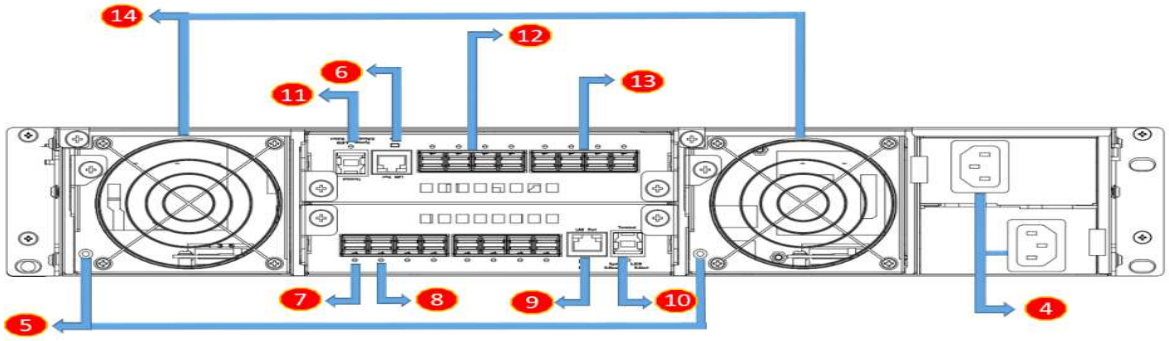
This Command Line Interface (CLI) is provided for you to manage the NVMe controller functions. The CLI is useful in environments where a graphical user interface (GUI) is not available.

**· Locations of USB Port**

NVMe JBOF enclosure uses the USB port as the serial port interface. Please use the USB type A male to Type B male cable to connect switch controller to PC and operation system will detect a new "USB-to-Serial COM Port". Please use this serial port to configure the switch controller.

Note: USB-to-Serial bridge chip is Prolific PL2303, user can download Windows, Mac OS X driver from http://www.prolific.com.tw

USB port location: 10




**· Establishing the Connection for the USB 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 XMODEM file transfer protocol.

## 4.1 Start-up VT100 Screen

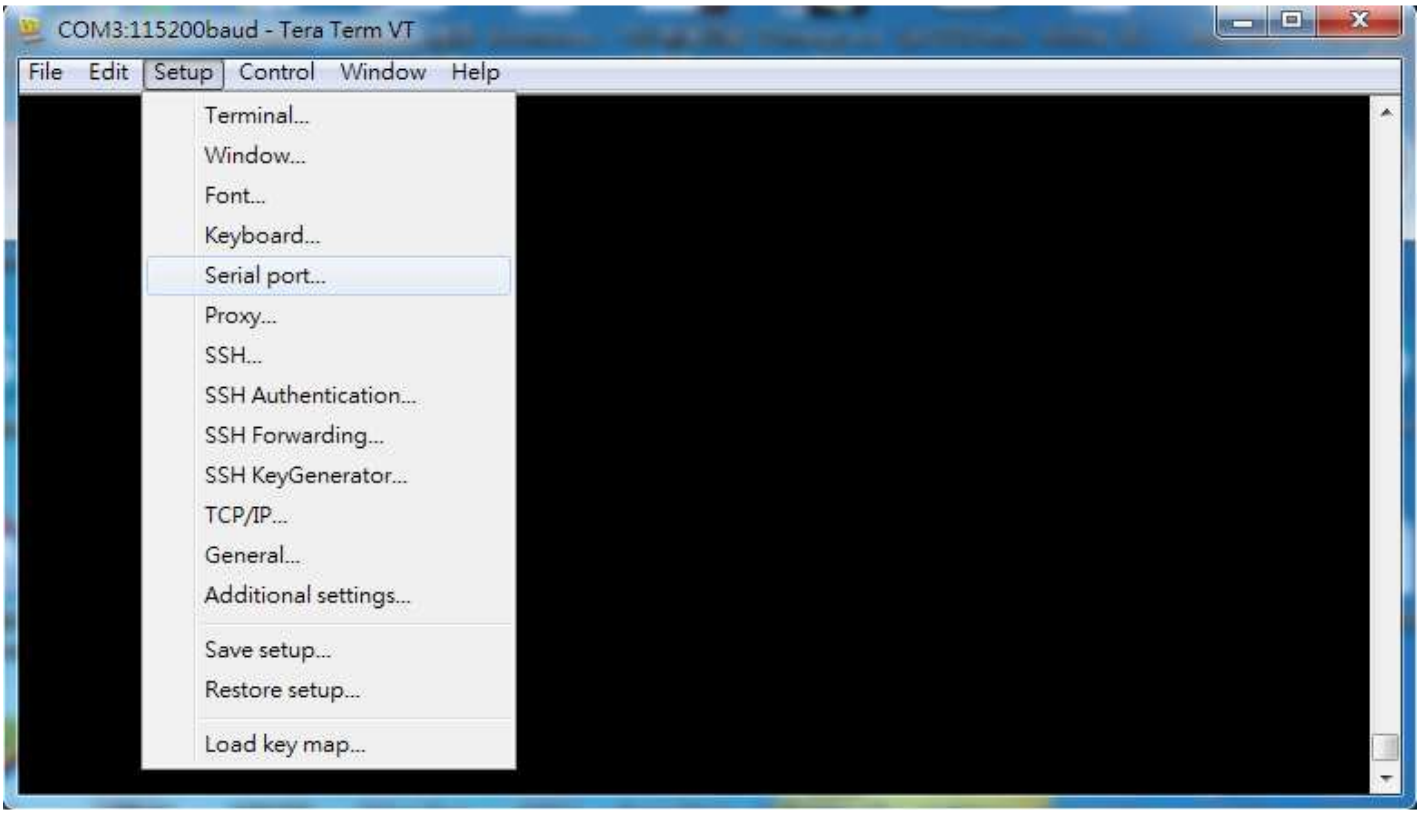
By connecting a VT100 compatible terminal, or a PC operating in an equivalent terminal emulation mode, all CLI administration functions can be exercised from the VT100 terminal.

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 4.83 (a VT100 Terminal Emulation program and it's an open-source, free, software implemented, Terminal Emulator program).

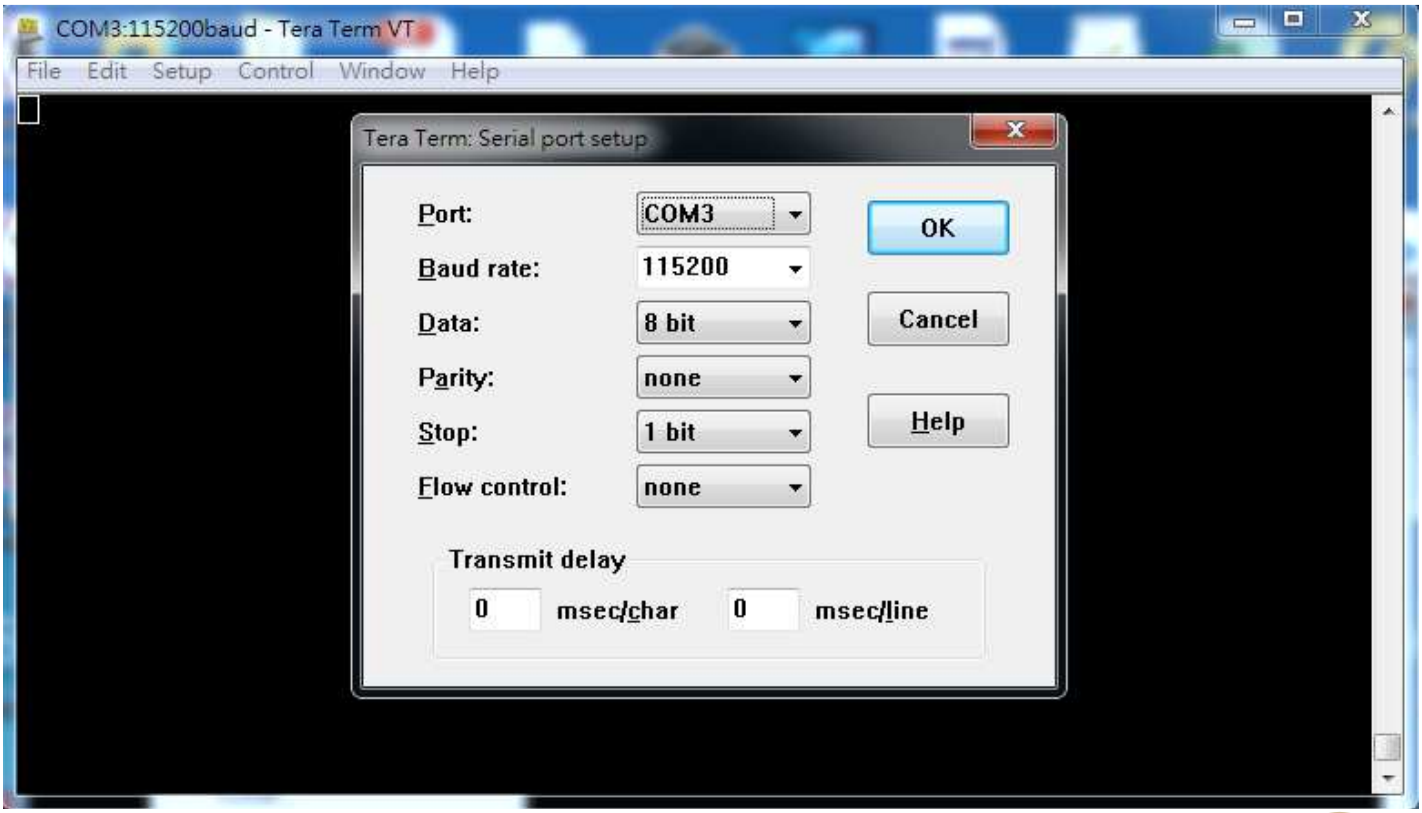
**Note: If you have encountered an issue with newer version of Tera Term, we recommend you to use old version Tera Term. (4.83 or older version)**

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

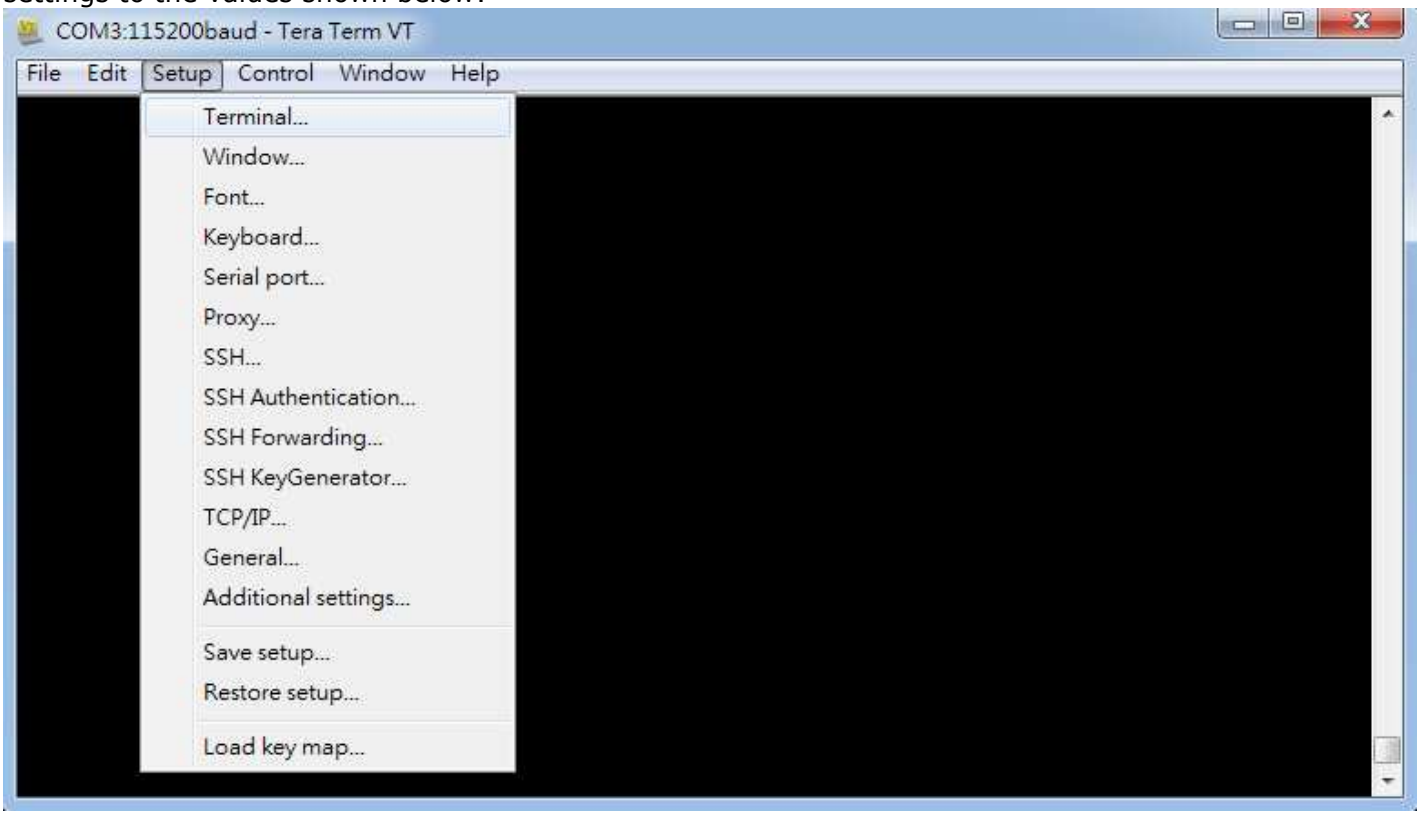
**Step 2:** To ensure proper communications between NVMe JBOF controller and the VT100 Terminal emulation, please configure the VT100 Terminal emulation settings to the values shown below:



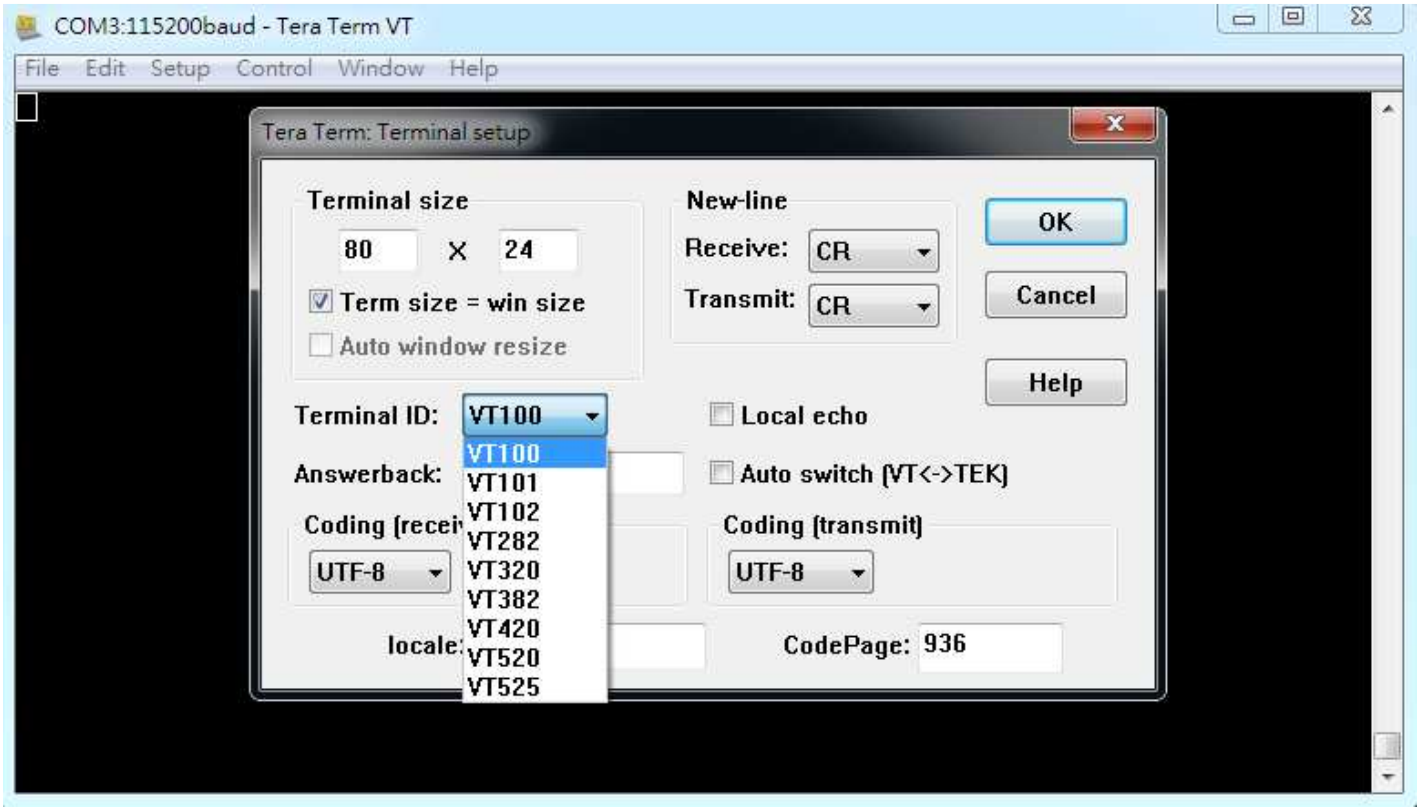

For "Port", select COM3 in this example. (Depend on which COM port used on Host)
For "Baud rate", select 115200.
For "Data", select 8 bit. For "Parity", select none.
For "Stop", select 1 bit. For "Flow control", select: none.
Click OK when you have finished your selections.



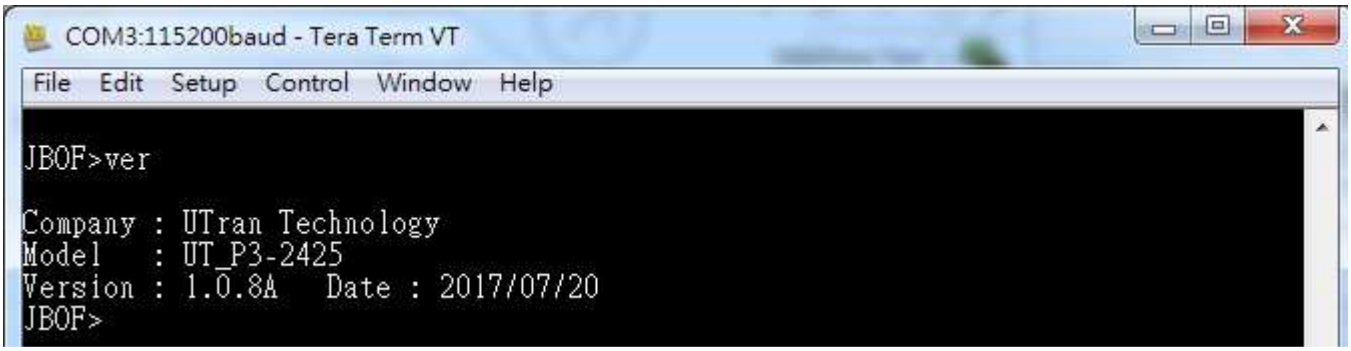
**Step 3:** Configure Terminal emulation type, please configure the VT100 Terminal emulation settings to the values shown below:




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



**Step 4:** Setup is complete. Type "ver" [Enter] to check terminal, 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**

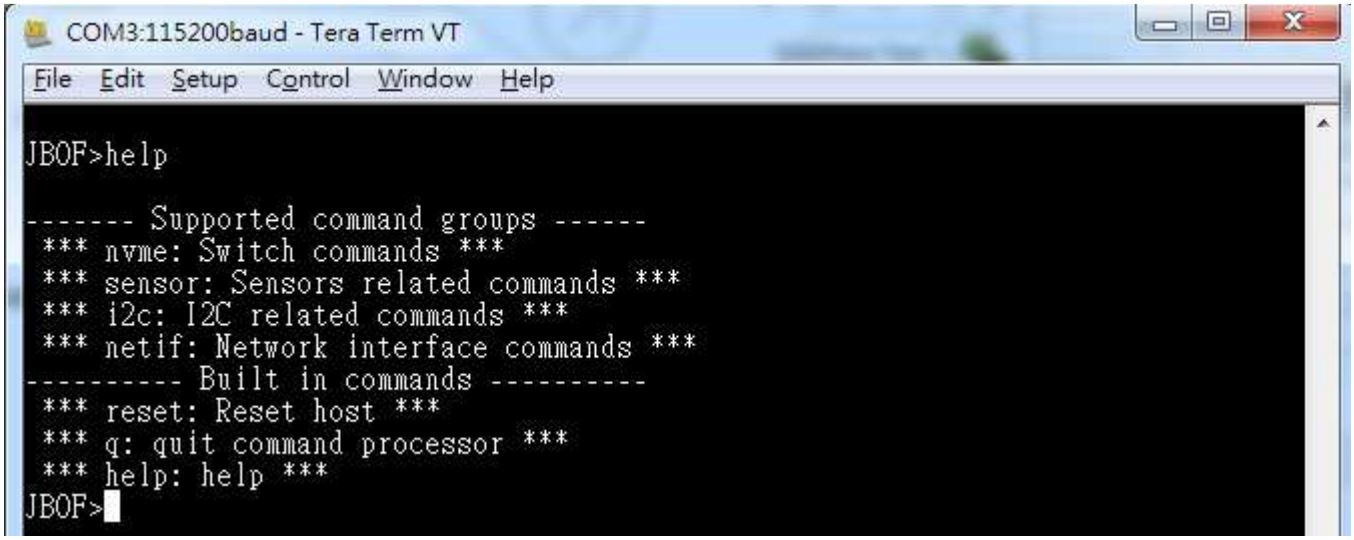
This command provides an on-line table of contents, providing brief descriptions of the supported command groups and built-in commands.

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

**Syntax**

JBOF>help[Enter]

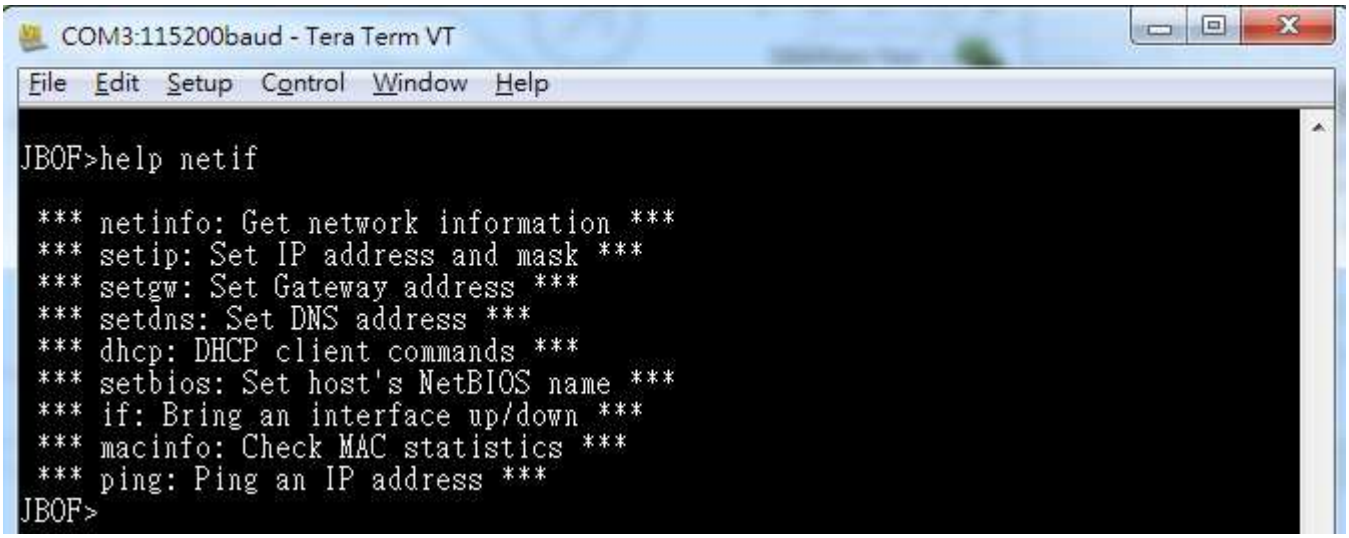
Example:




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

Example:

JBOF>help netif [Enter]


COM3:115200baud - Tera Term VT
File Edit Setup Control Window Help
JBOF>help netif
*** netinfo: Get network information ***
*** setip: Set IP address and mask ***
*** setgw: Set Gateway address ***
*** setdns: Set DNS address ***
*** dhcp: DHCP client commands ***
*** setbios: Set host's NetBIOS name ***
*** if: Bring an interface up/down ***
*** macinfo: Check MAC statistics ***
*** ping: Ping an IP address ***
JBOF>

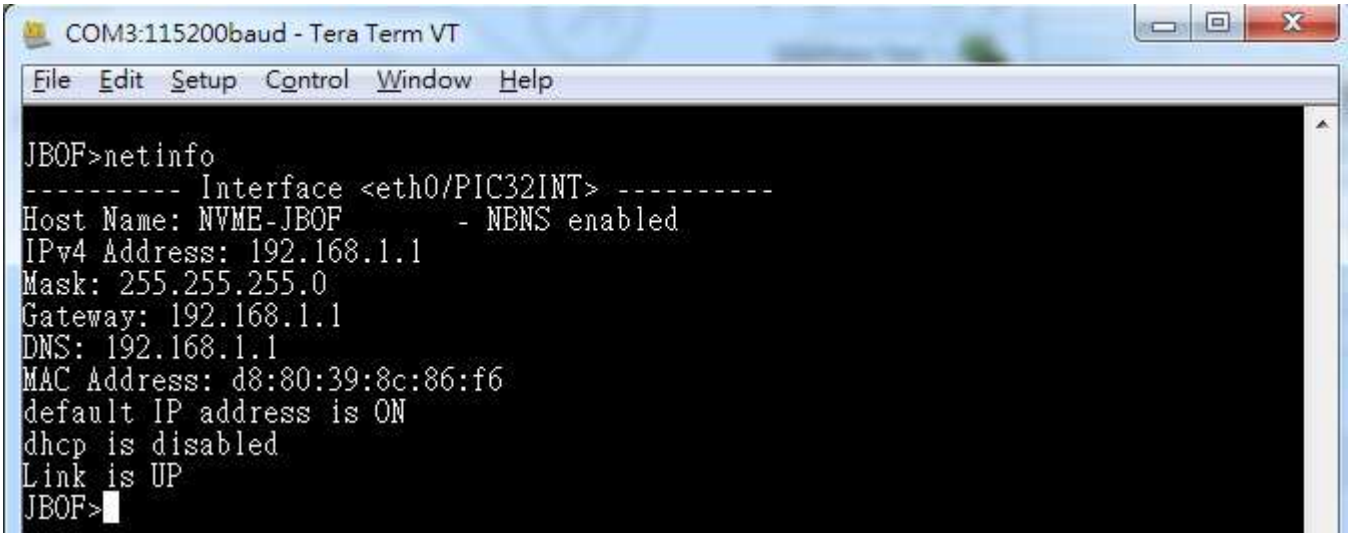
- **netinfo Command**

This command provides detail information of Ethernet interface.
You can use "netinfo" to get detail information about the Ethernet interface.

**Syntax**

JBOF>netinfo[Enter]

Example:




NBNS – NetBIOS Name Service protocol

IPv4 Address – IP address of Interface

Mask – Netmask mask

Gateway – Default Gateway

DNS – IP address of DNS

MAC Address – A unique MAC address of Interface

default IP address On/Off

dhcp function enable/disable

Link status of Interface

- **setip Command**

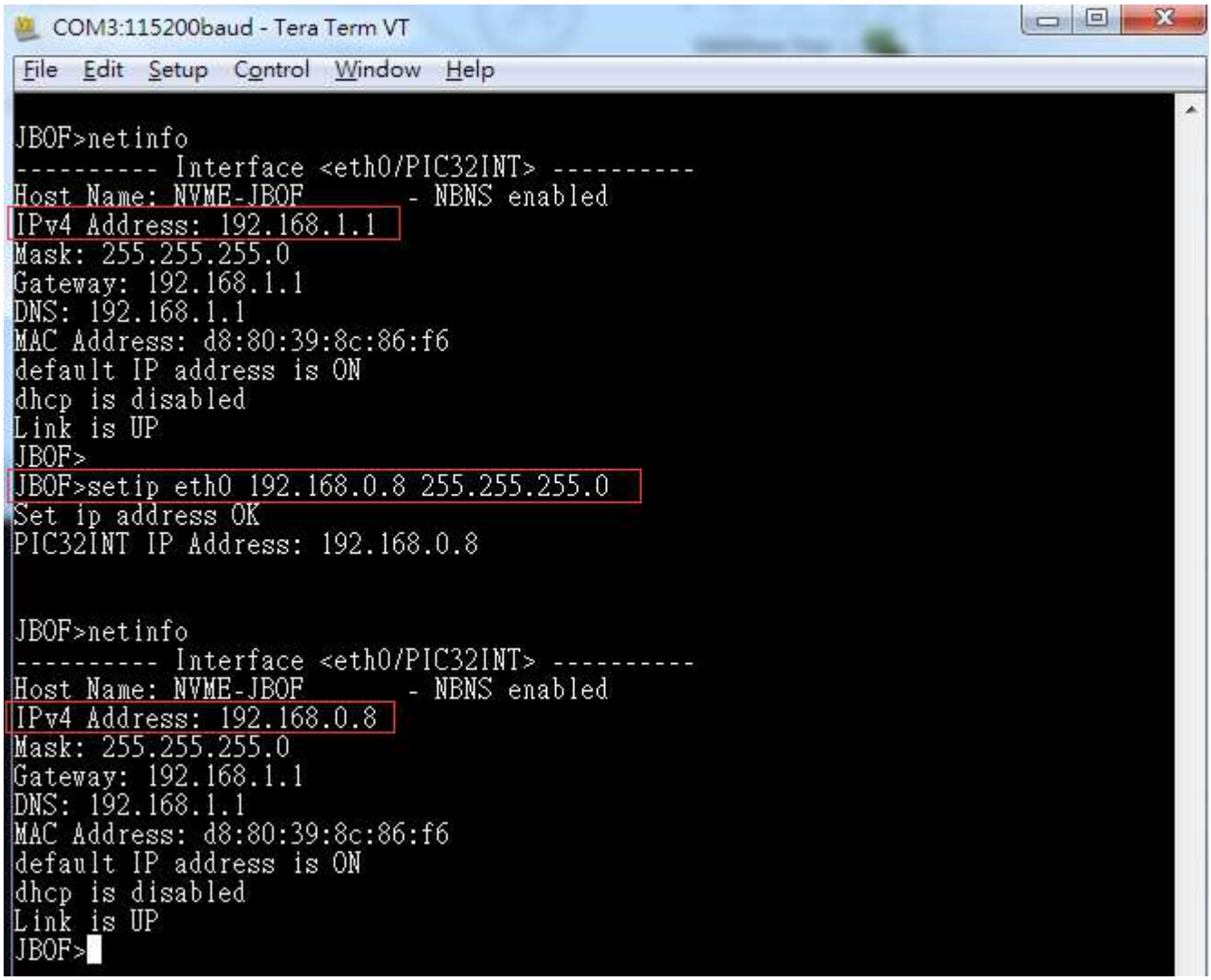
Set IP address and Subnetwork mask of Ethernet interface.

**Syntax**

Usage: setip <interface> <ipv4/6 address> <ipv4mask/ipv6 prefix len>

Example: Change Ethernet port IP address of interface eth0 to 192.168.0.8

setip eth0 192.168.0.8 255.255.255.0



- **setgw Command**

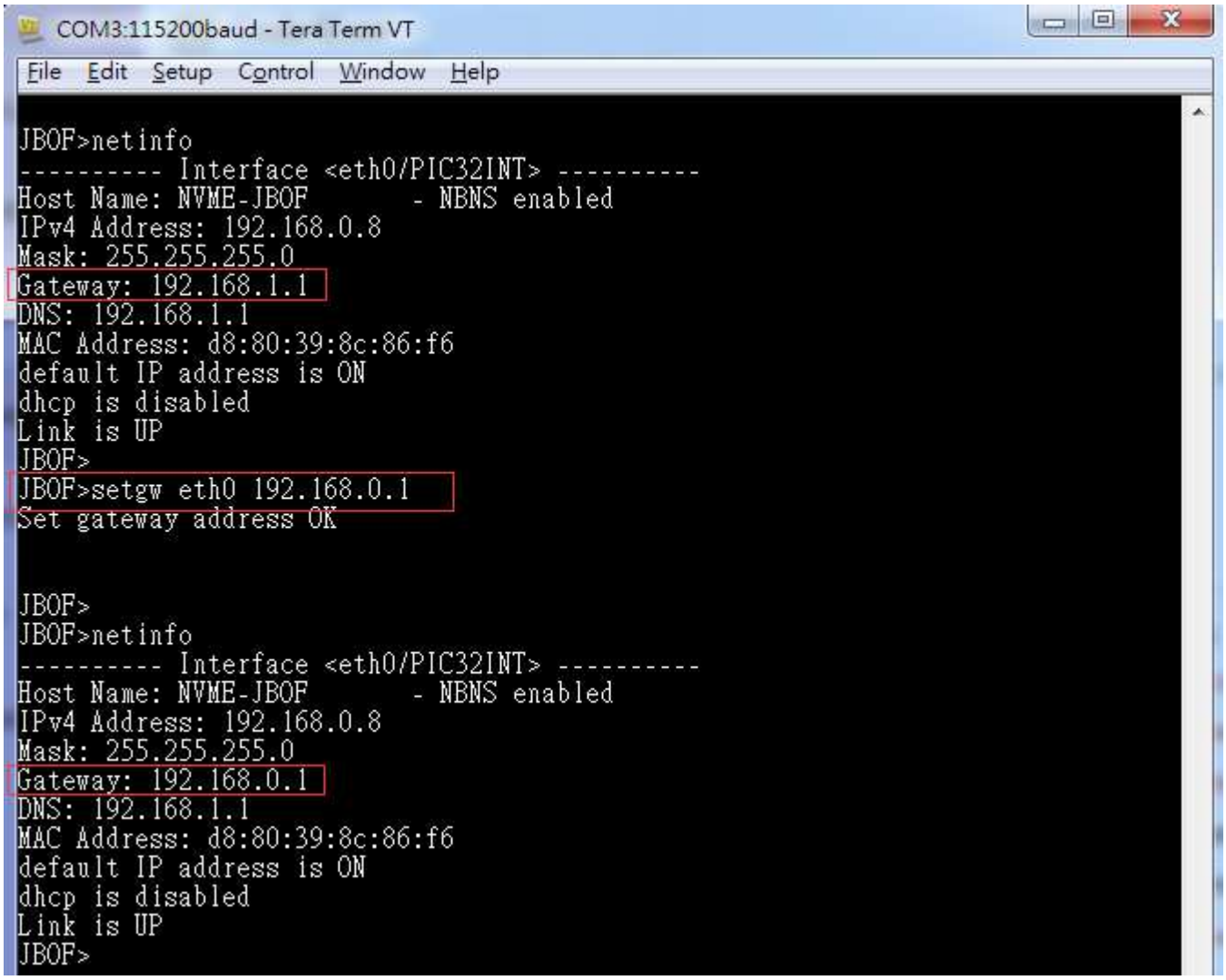
Set gateway IP address

**Syntax**

Usage: setgw <interface> <ipv4/6 address> <validTime>

Example: Change gateway IP address of interface eth0 to 192.168.0.1

setgw eth0 192.168.0.1



- **setdns Command**

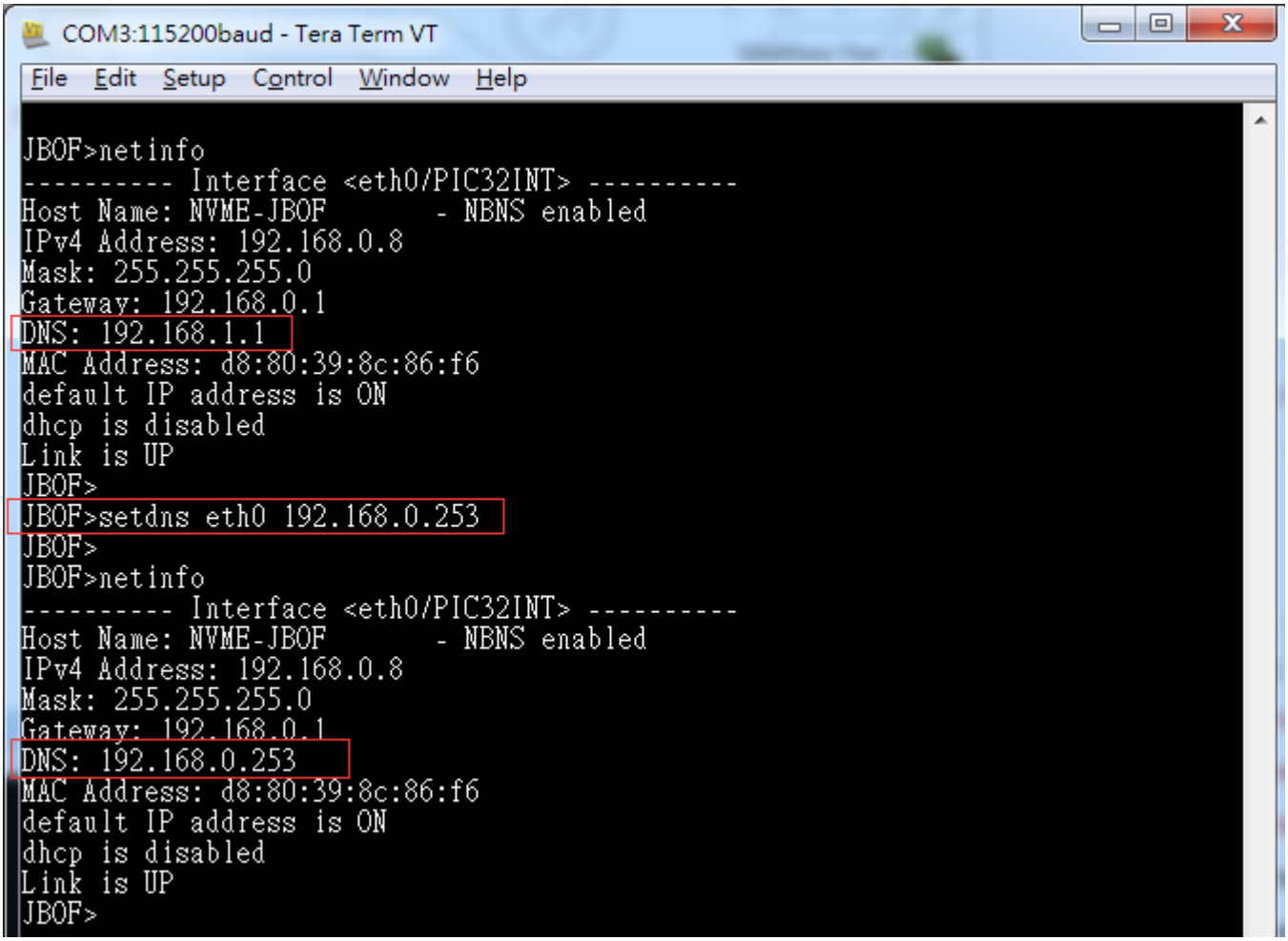
Set DNS  IP address.

**Syntax**

Usage: setdns <interface> <x.x.x.x>

Example: Change DNS server IP address of interface eth0 to 192.168.0.253

setdns eth0 192.168.0.253



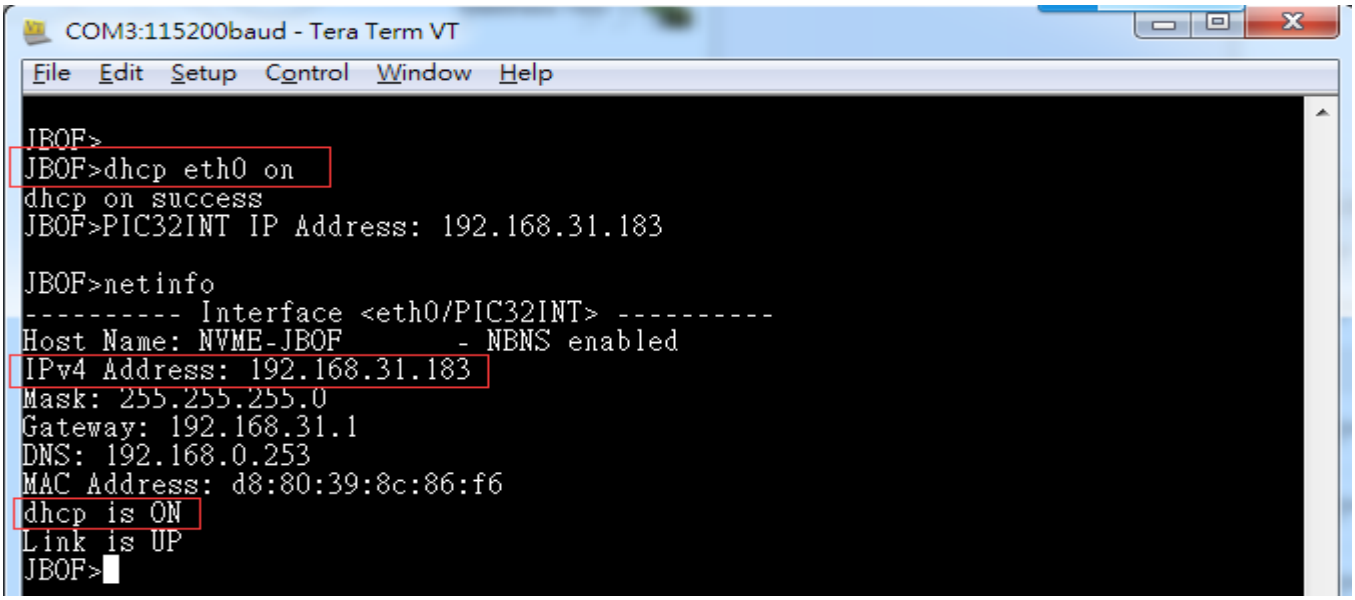
- **dhcp Command**

DHCP client command.

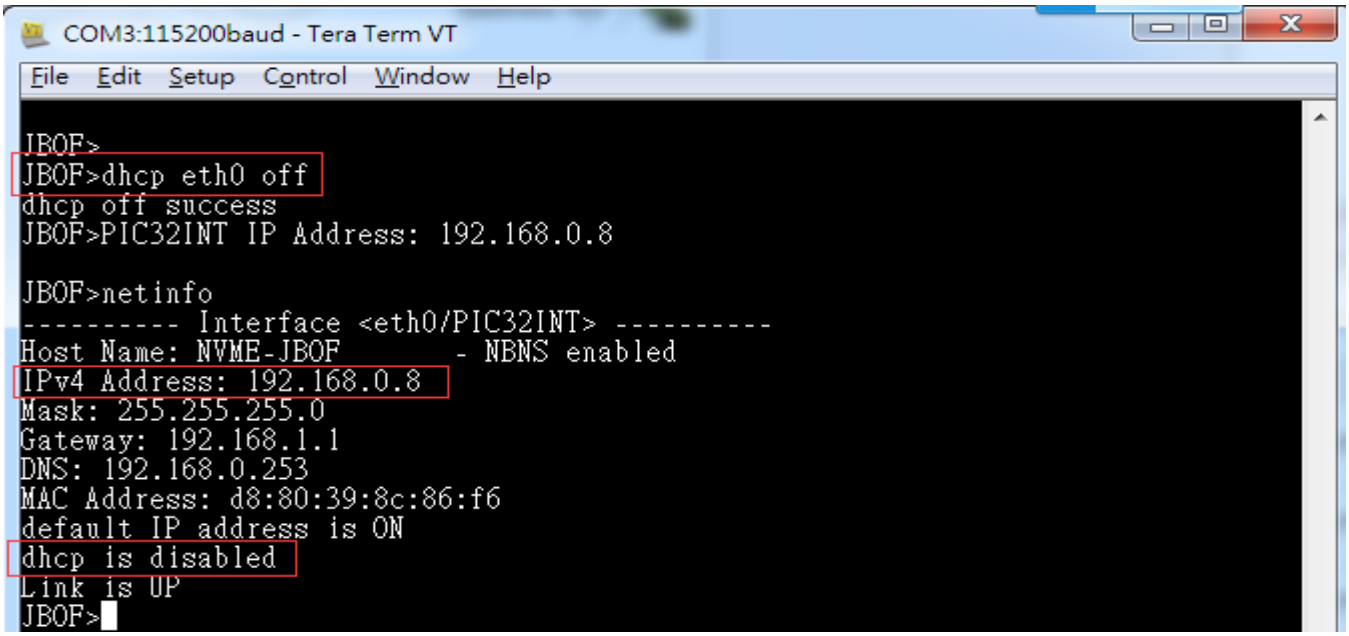
**Syntax**

Usage: dhcp <interface> <on/off/renew/request/info>

Example: dhcp eth0 on




Example: dhcp eth0 off



- **setbios Command**

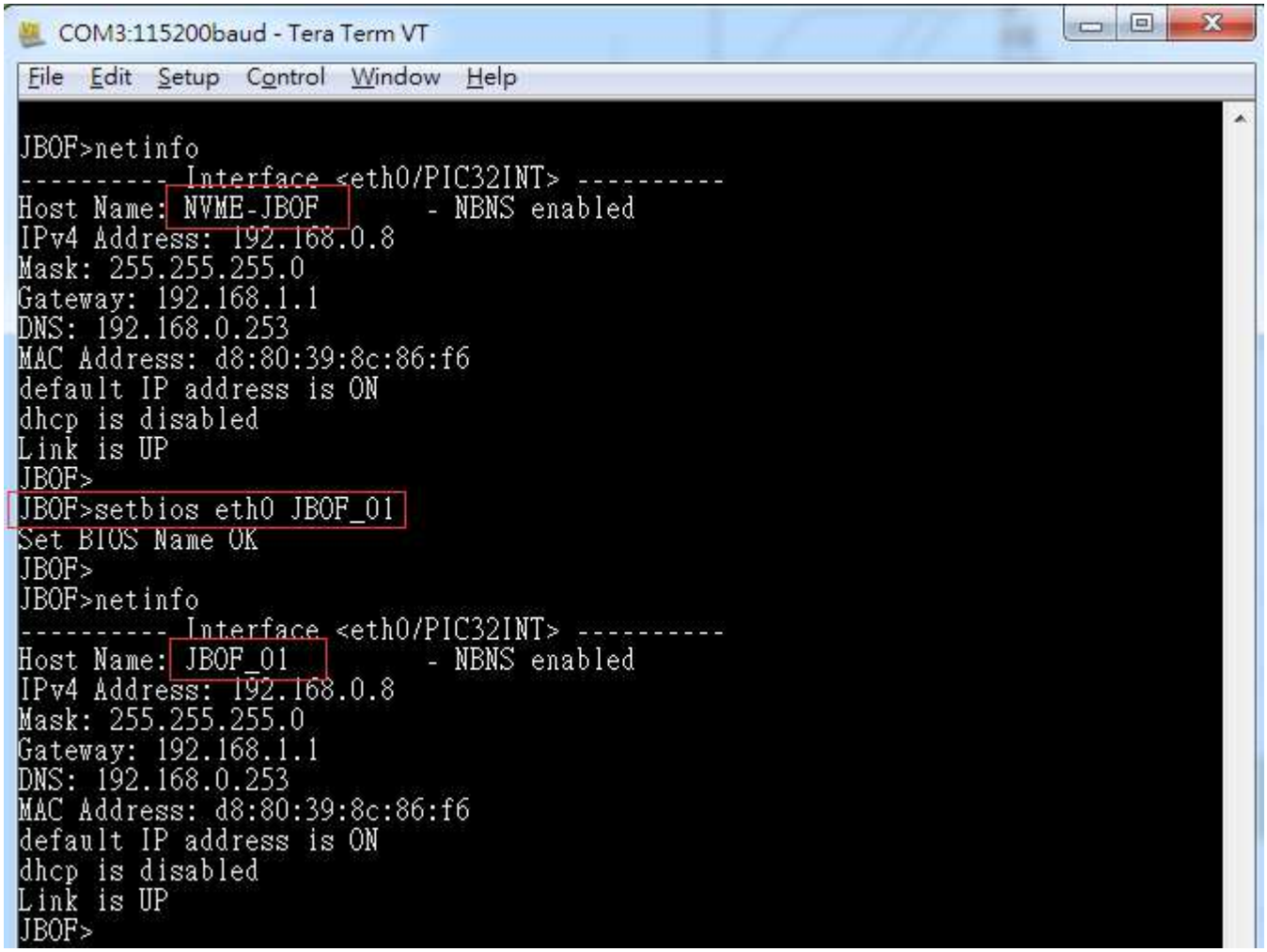
Set host's NetBIOS name.

**Syntax**

Usage: setbios <interface> <string>

Example:

setbios eth0 JBOF_01



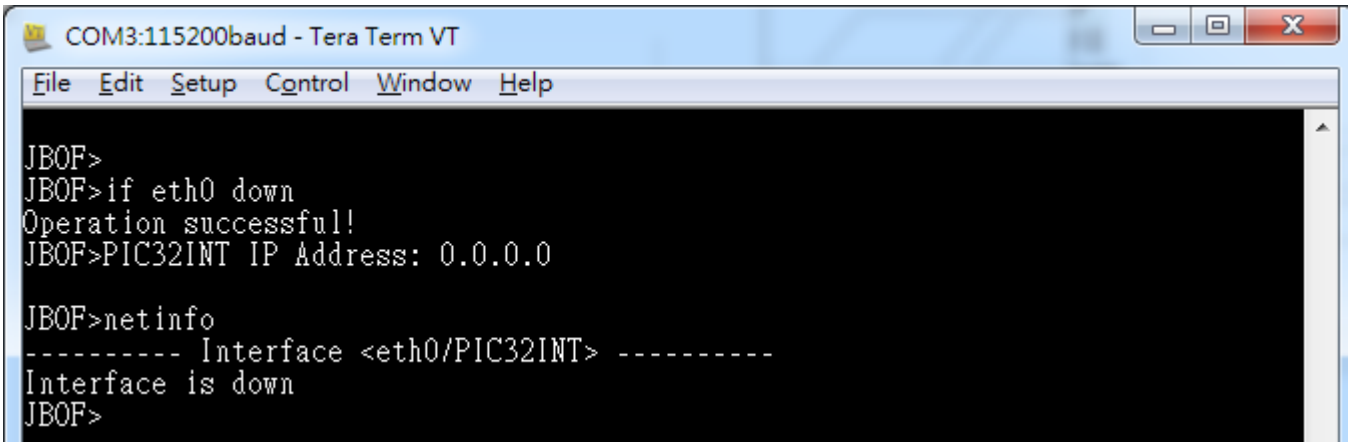
- **if Command**

Ethernet interface enable/disable.

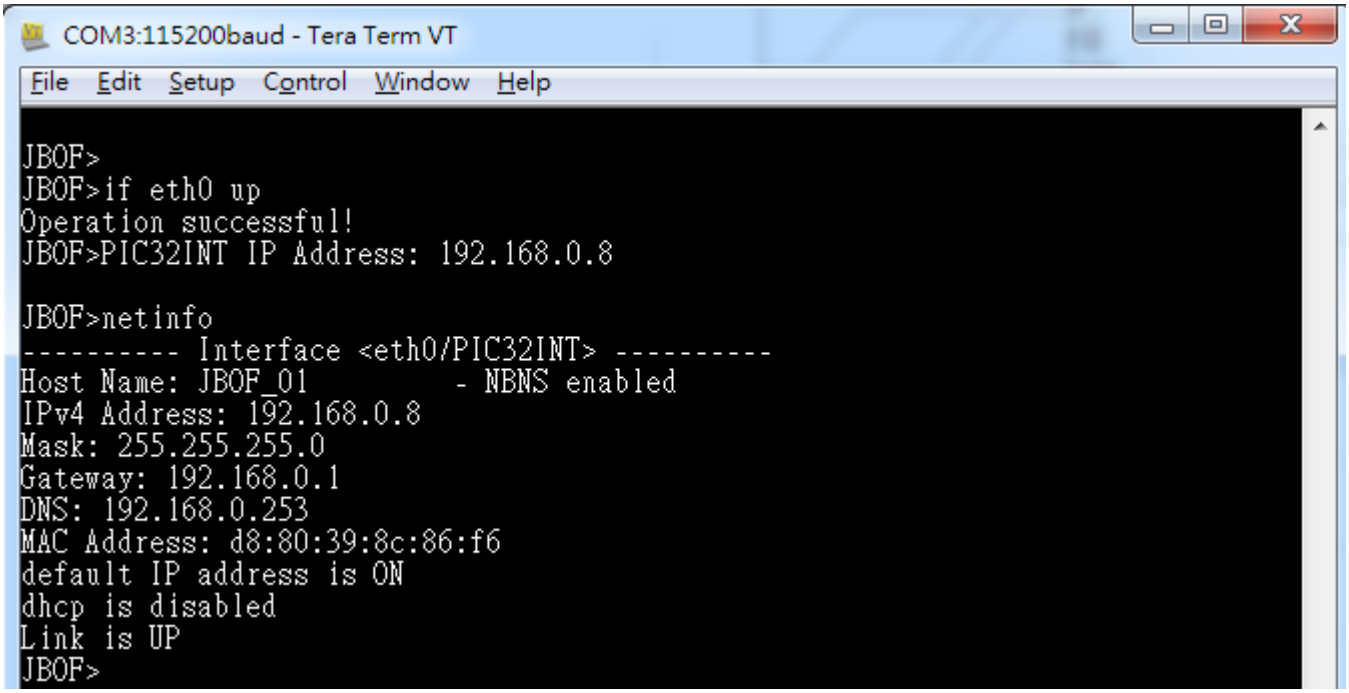
**Syntax**

Usage: if <interface> <down/up>

Example: if eth0 down




Example: if eth0 up



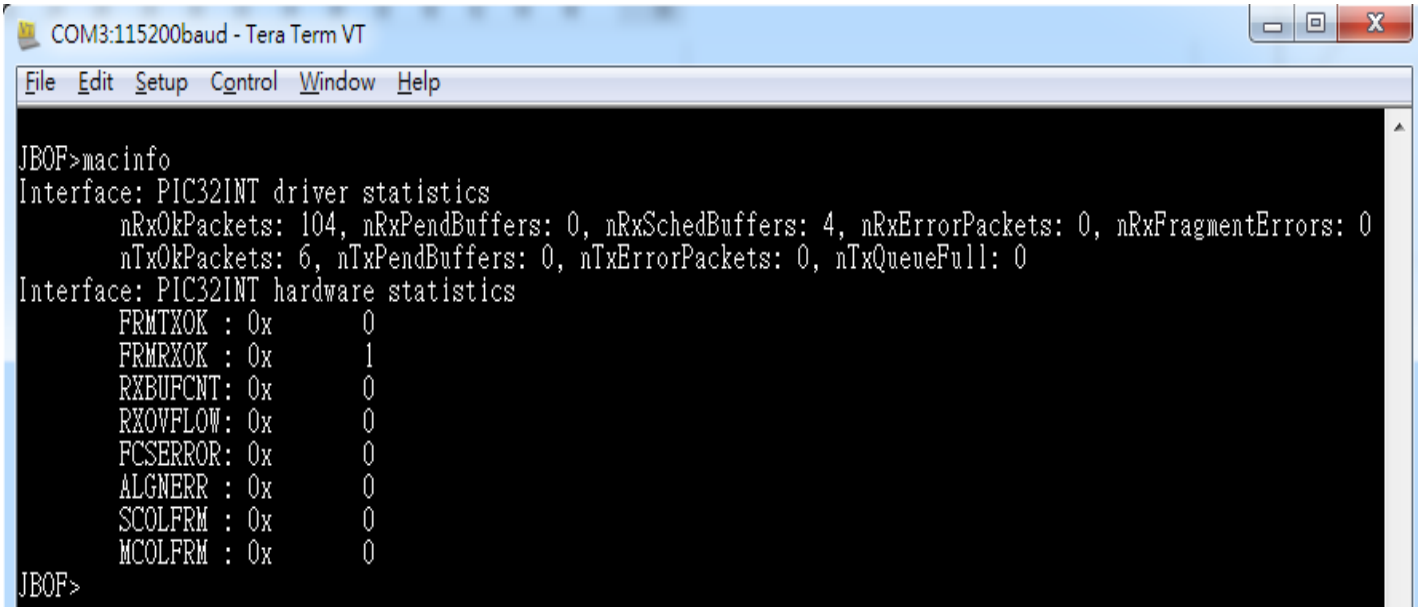
- **macinfo Command**

Check MAC statistics.

**Syntax**

Usage: macinfo

Example:
macinfo



- **ping Command**

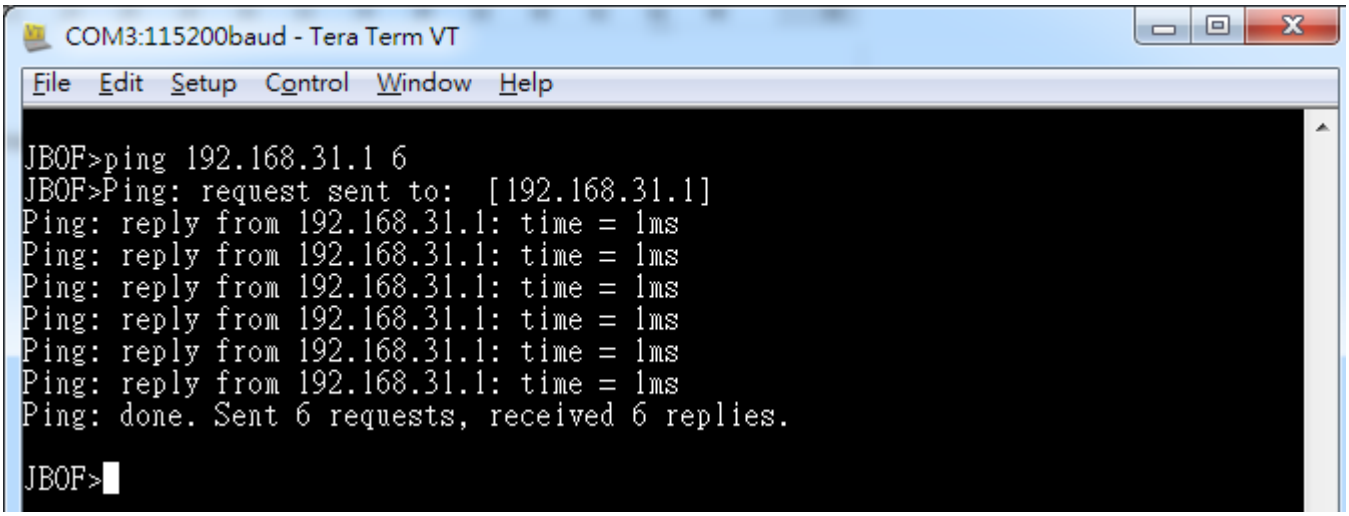
ICMP client ping command.

**Syntax**

Usage: ping <stop> <if> <name/address> <n> <msDelay>

Example: ping IP address 192.168.31.1 6 times

Ping 192.168.31.1 6



- **showslot Command**

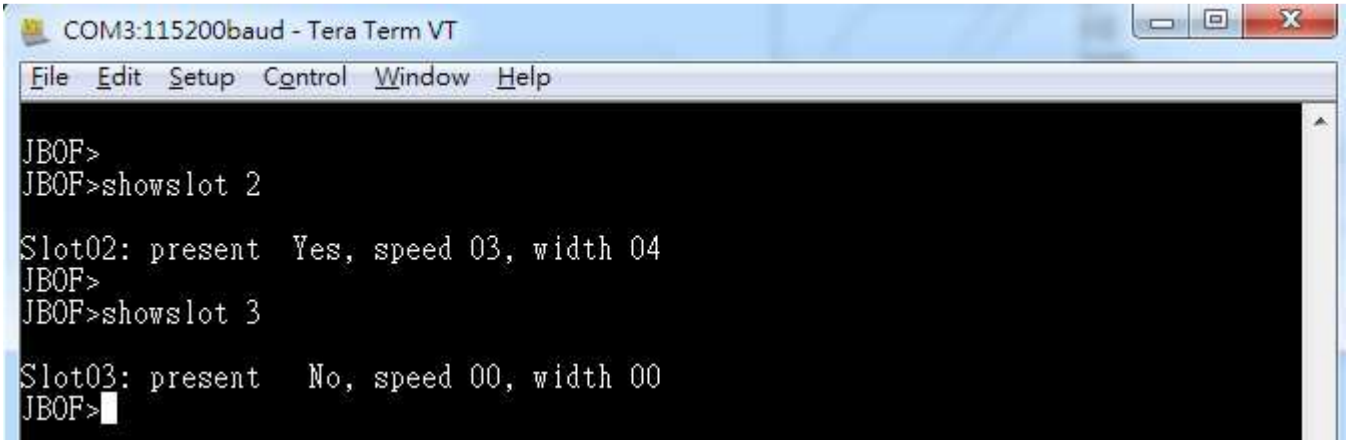
This command is for display link speed and link width information of specific NVMe drive slot.

**Syntax**

Usage: showslot slot(D)

Example:  Show link speed and link width of slot 2, 3

Note: There is one Gen3 x4 NVMe SSD installed in Slot02




present:  Yes -> drive presence in slot

No  -> no drive presence in slot

speed  :  01->Gen1, 02->Gen2, 03->Gen3

width  :  00->link down, 02-> x2, 04-> x4

- **ssdpwr Command**

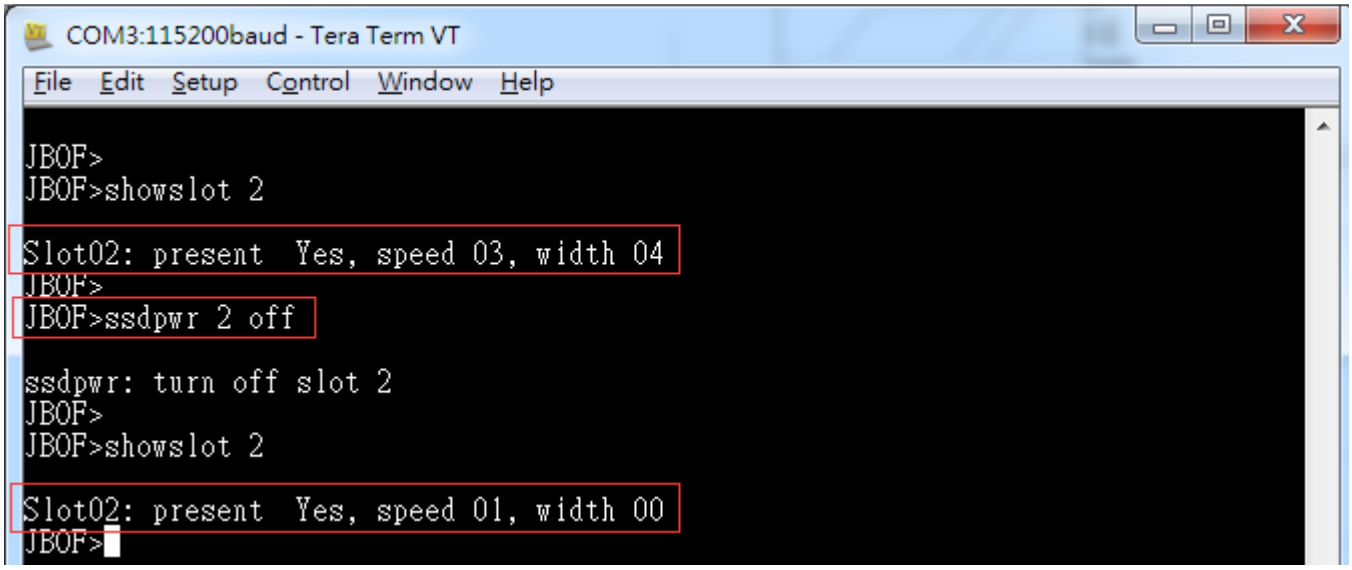
This command is for control the power of each NVMe drive slot.

**Syntax**

Usage: ssdpwr slot(D) on/off

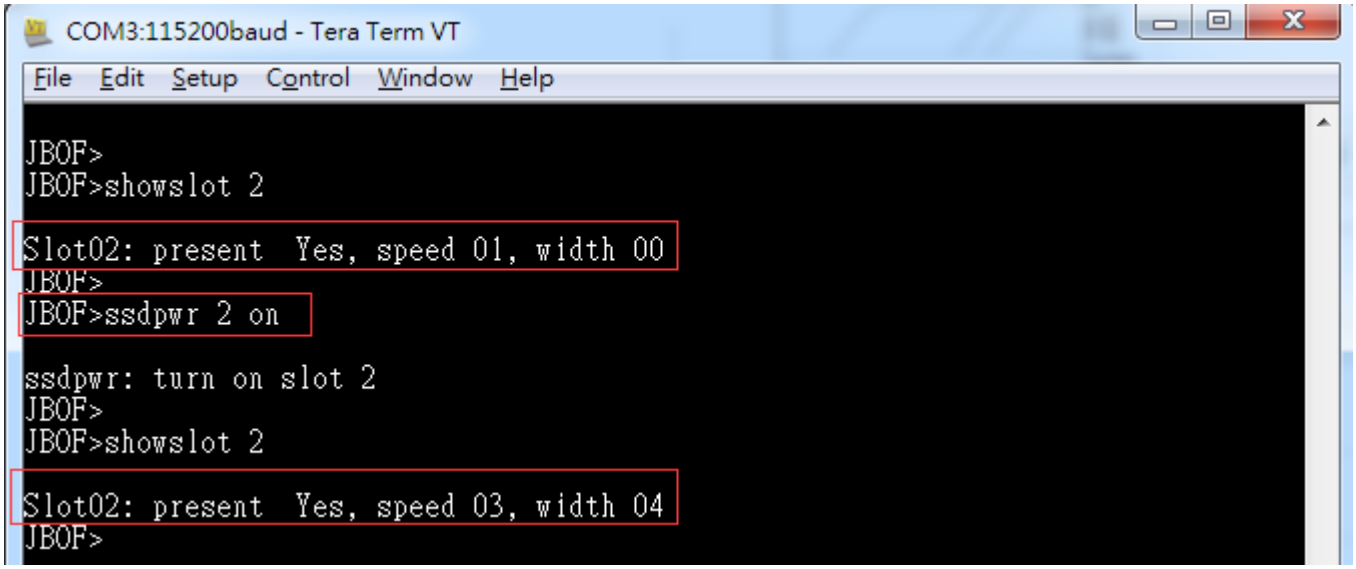
slot(D) : slot number shoule be 1 ~ 12

Example: There is one Gen3 x4 NVMe SSD installed in Slot02 and turn off power of Slot02




After turn off power of Slot02, drive presence but link is down (speed 01 width is 00)

Example: Turn on power of Slot02




After turn on power of Slot02, link is back (Gen3 x4)

- **buz Command**

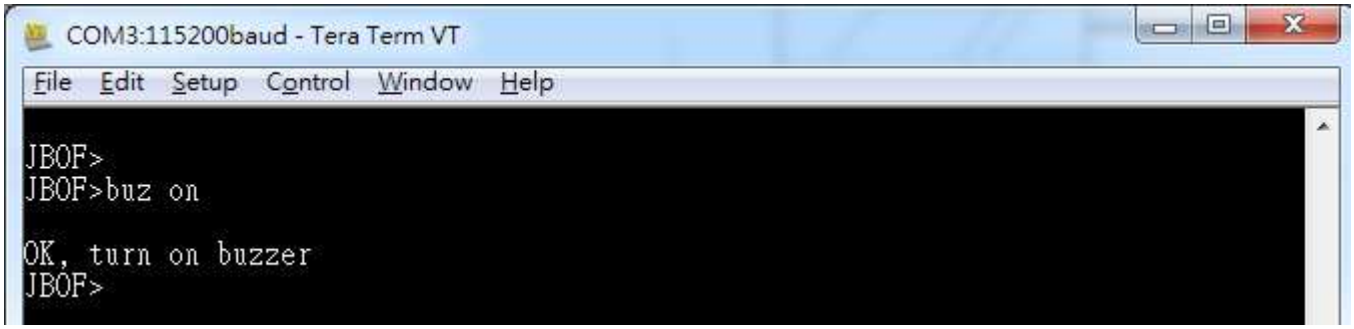
This command is for control the buzzer of switch controller board.

**Syntax**

Usage: buz on/off

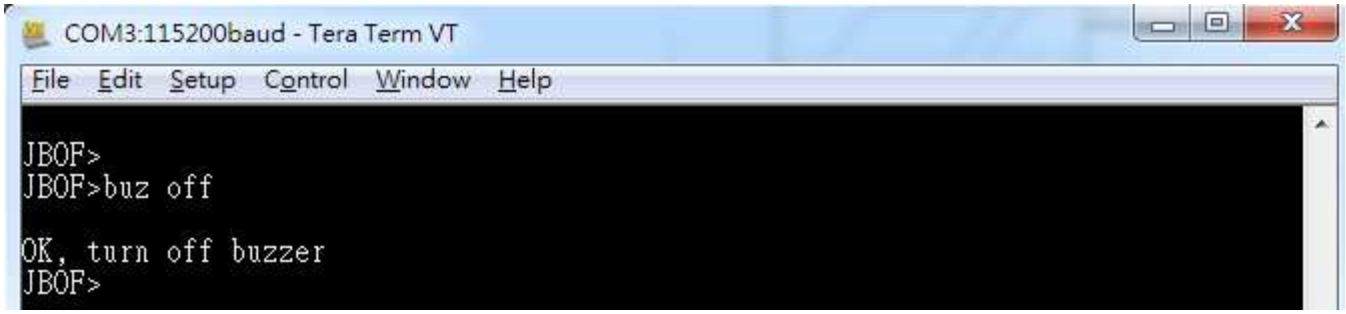
Example: Turn on buzzer

buz on




Example: Turn off buzzer

buz off



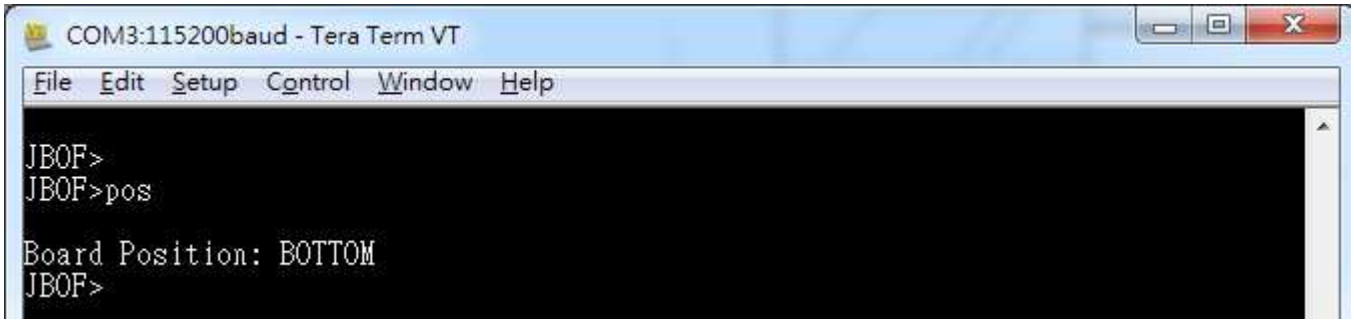
- **pos Command**

This command is for show position information of switch controller board in system.

**Syntax**

Usage: pos

Example: Check controller board position



- **showport Command**

This command is for display link speed and link width information of all NVMe drive slot.

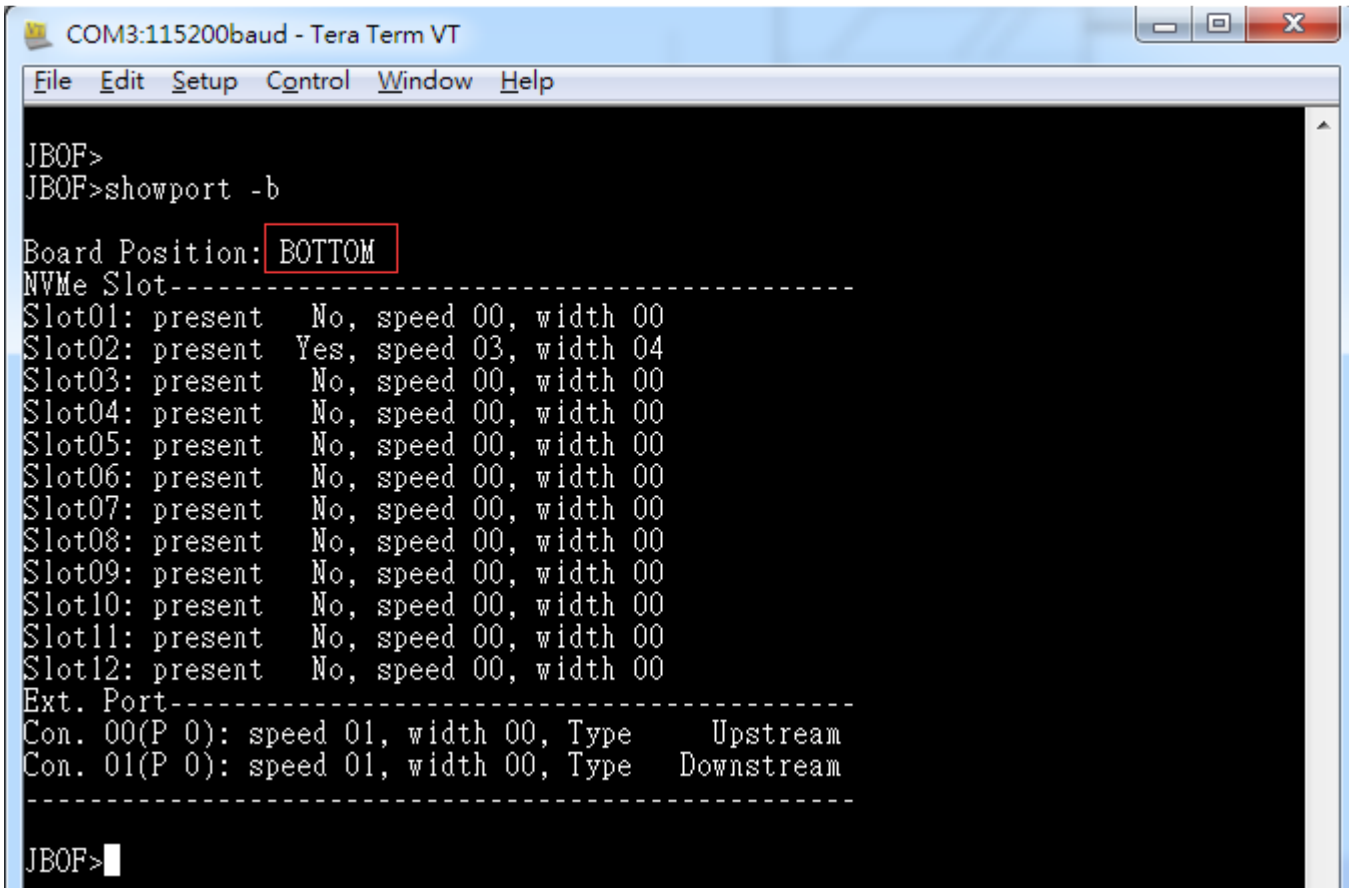
**Syntax**

Usage: showport <-t –b>

-t: Top controller board, -b: Bottom controller board

Example:  Show link speed and link width of bottom controller board

showport -b



- **setmode Command**

This command is for set configuration of switch controller board.

**Syntax**

Usage: setmode mode(D) option(D)

mode 1 ~ 3

1 : Base mode

2 : 2 Virtual switch

3 : 4 Virtual switch

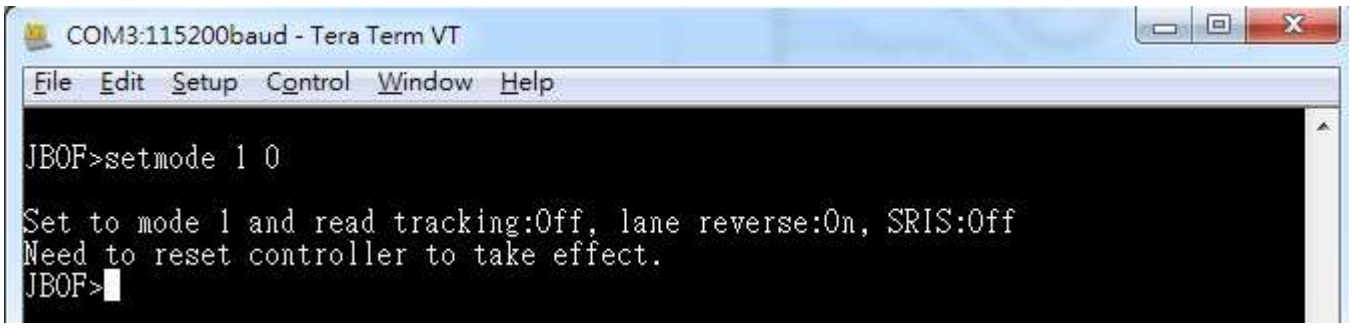
option 0 ~ 2

0 : read tracking disable, lane reverse enable, SRIS disable

1 : read tracking enable, lane reverse disable, SRIS disable

2 : read tracking disable, lane reverse enable, SRIS enable

Example 1: select mode 1 with read tracking disable, lane reverse enable, SRIS disable



- **showmode Command**

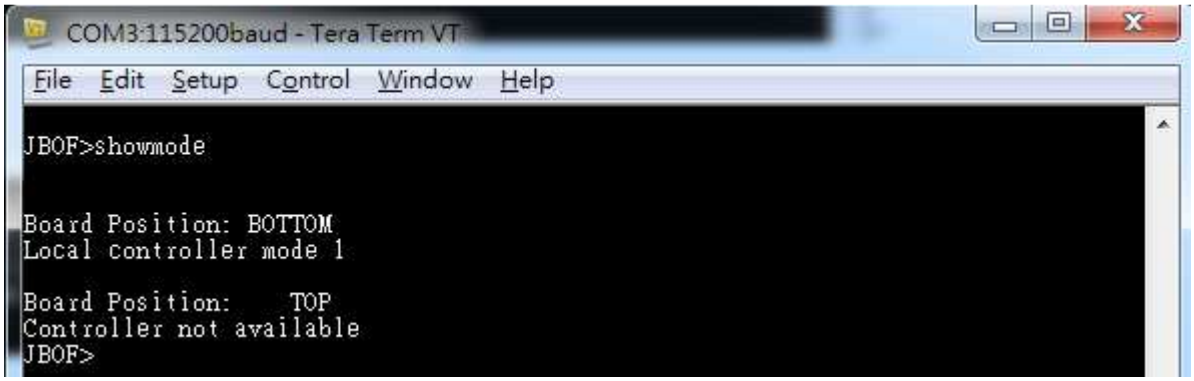
This command is for show configuration of each switch controller board in system.

**Syntax**

Usage: showmode

Example:  Show mode information of switch controller board in system (TOP and BOTTOM)

showmode



- **ver Command**

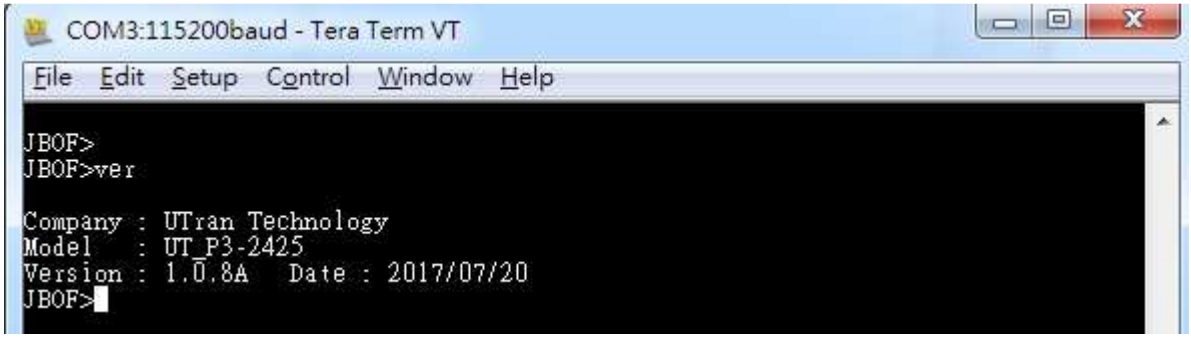
This command is for show microcontroller firmware version of switch controller board.

**Syntax**

Usage: ver

Example:

ver



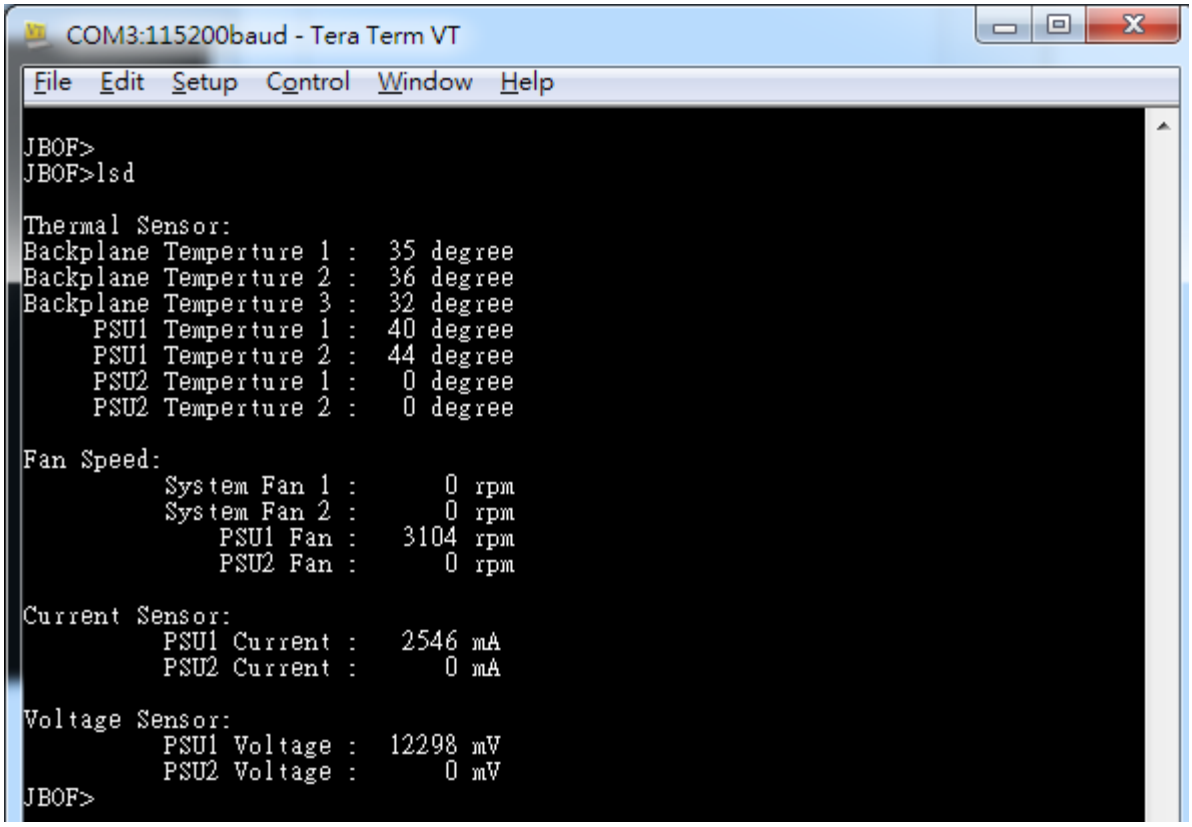
- **lsd Command**

This command is for show environmental conditions information of NVMe JBOF system.

**Syntax**

Usage: lsd

Example: lsd




(Note: During test, PSU2 and System Fan 1,2 are not installed)

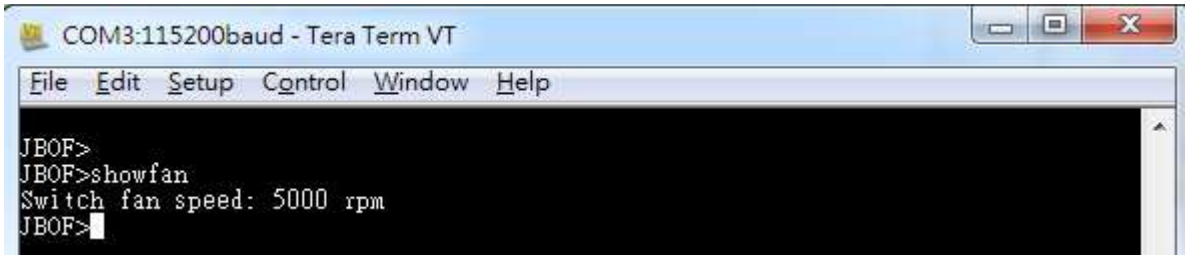
- **showfan Command**

This command is for show fan speed information on the switch controller board.

**Syntax**

Usage: showfan

Example: showfan



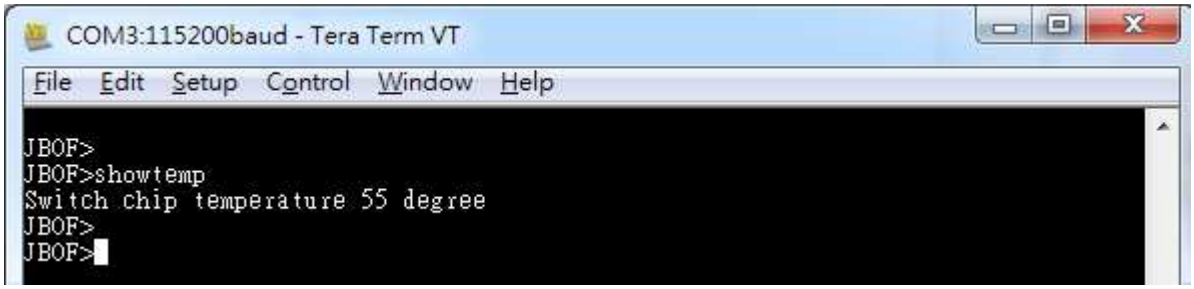
- **showtemp Command**

This command is for show internal temperature of PCIe switch chip.

**Syntax**

Usage: showtemp

Example: showtemp



# 5. Firmware Upgrade

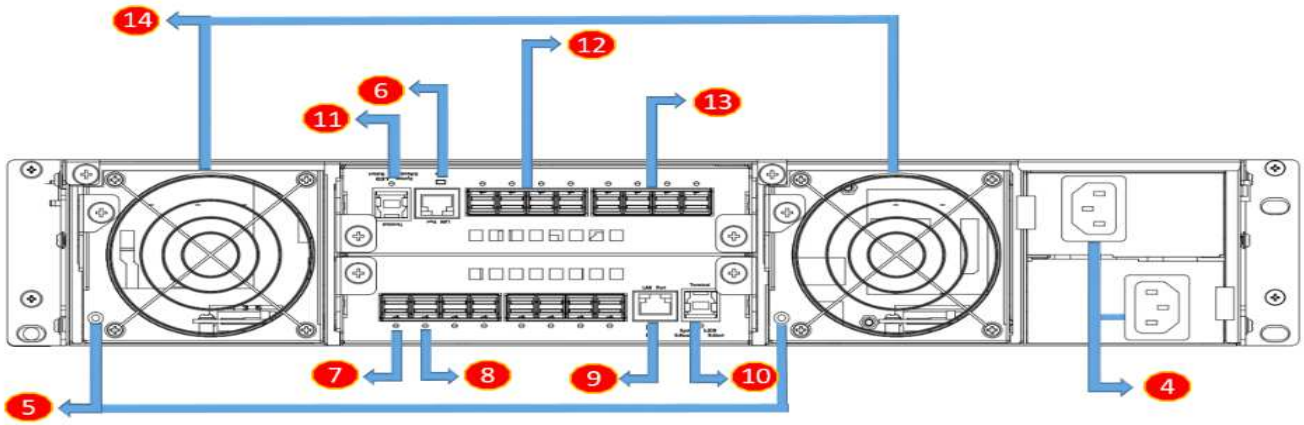
## Enter the firmware upgrade mode

There are two ways to enter the firmware upgrade mode

From LCD panel, select upgrade firmware option Or

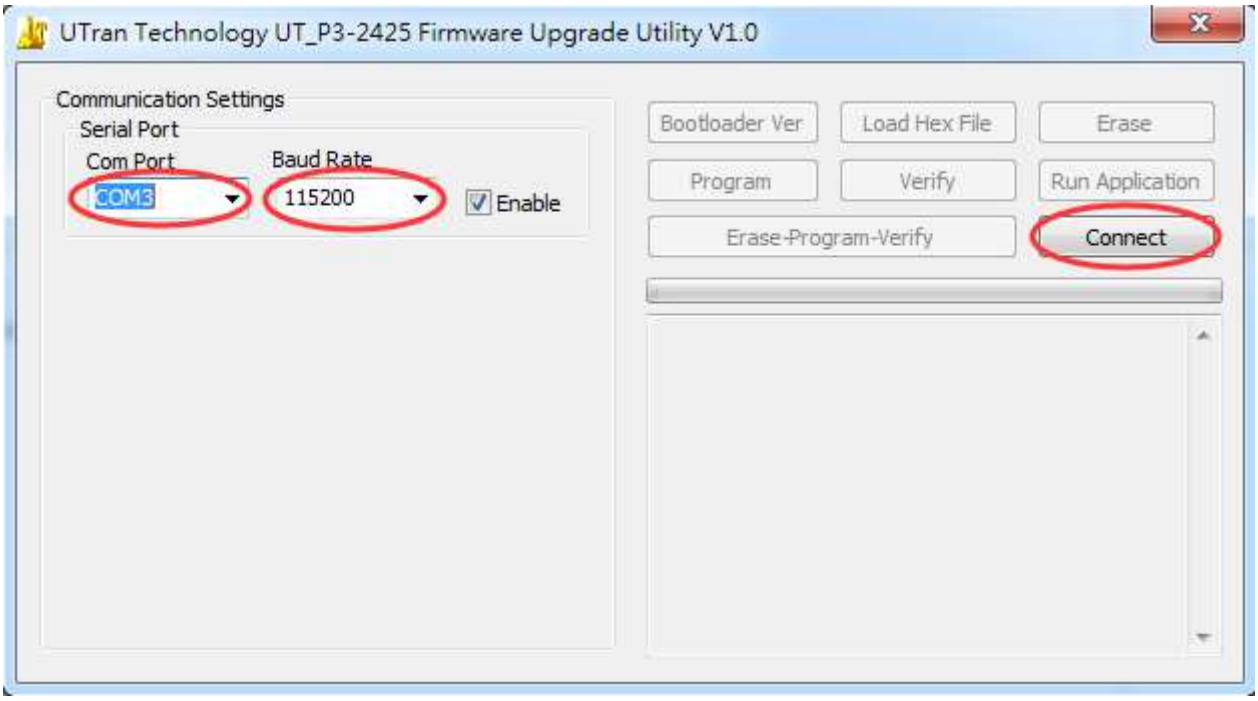
Before power on system, press and hold mute button ( 6 -> near LAN port ) then power on system

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

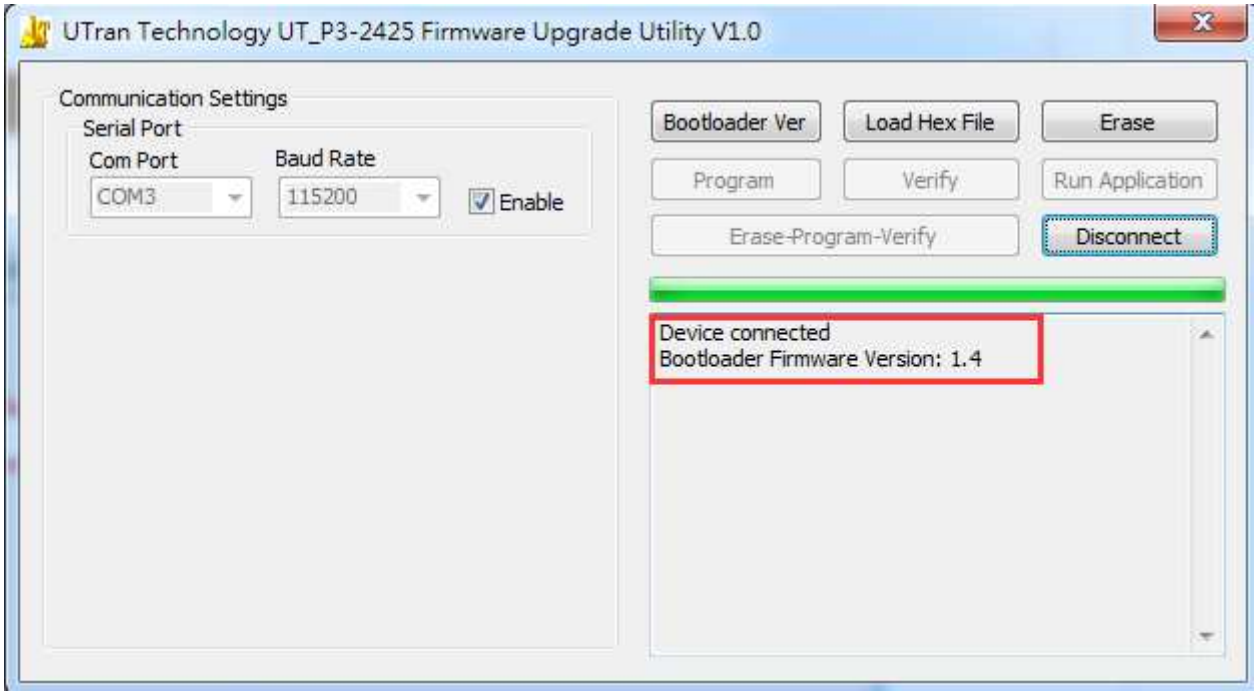


## Launch the firmware upgrade application and setting

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

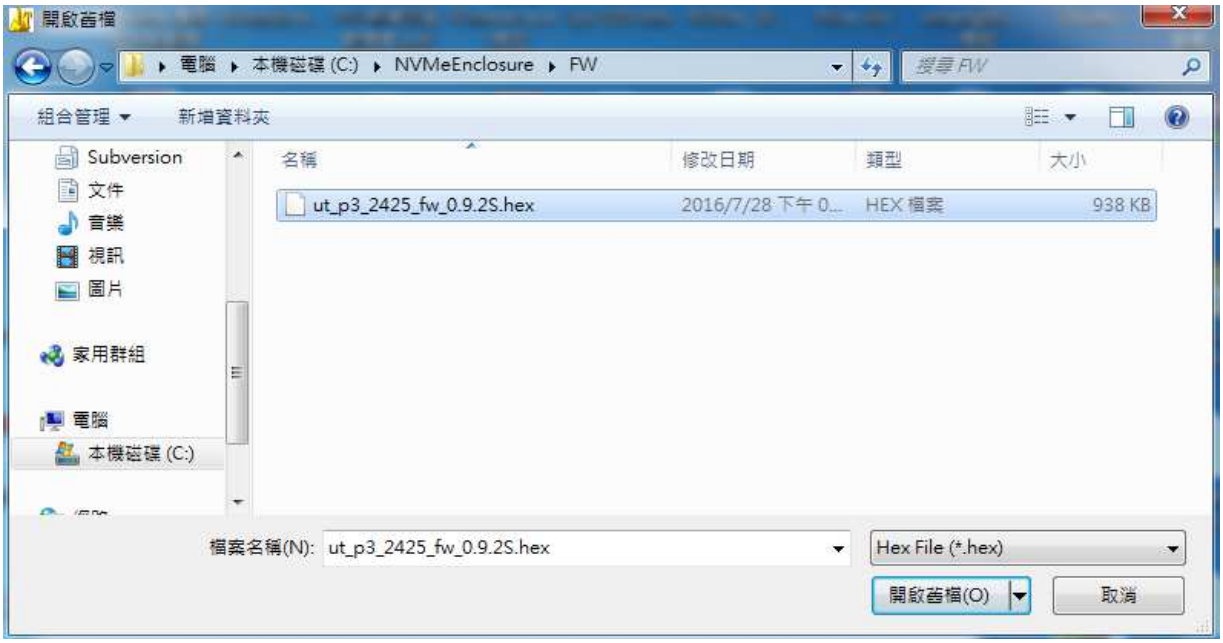


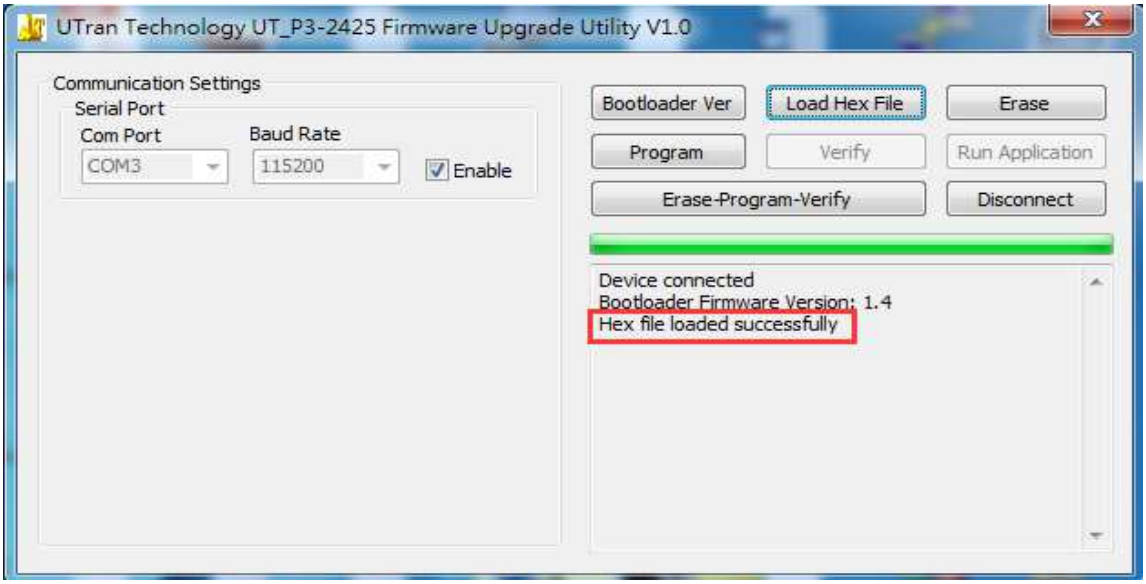

Check the message to make sure device is connected.



## Load firmware file

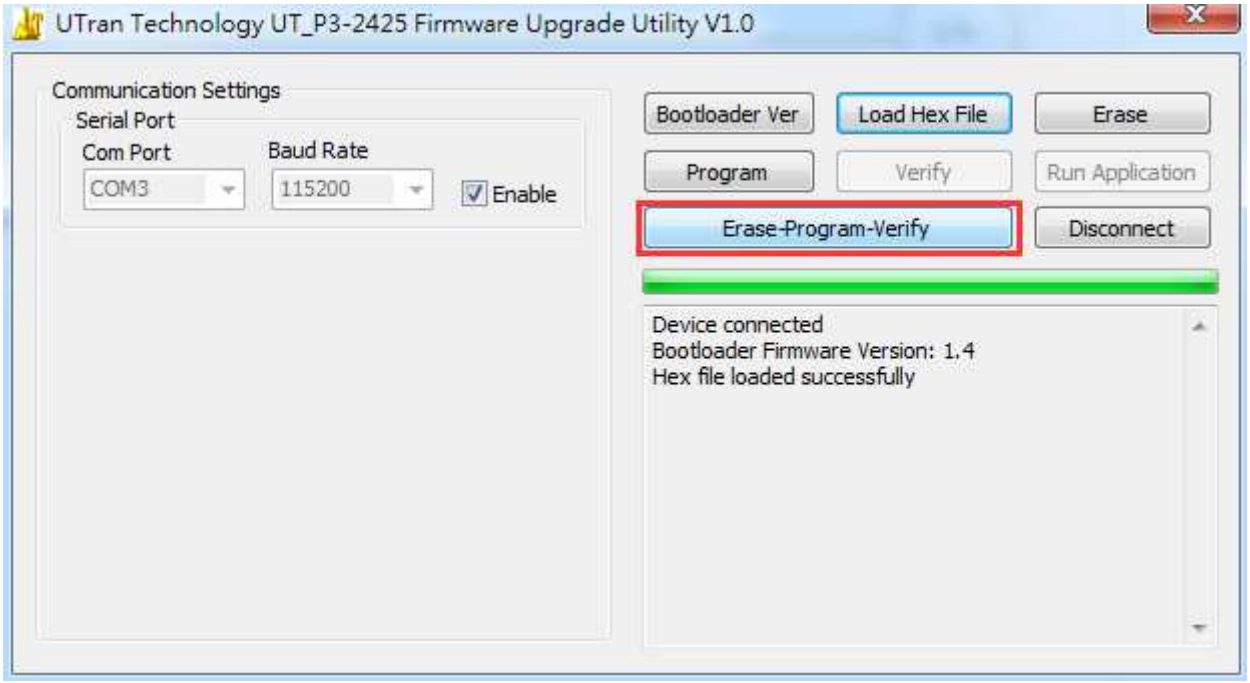
Click "Load Hex File" button to select firmware file

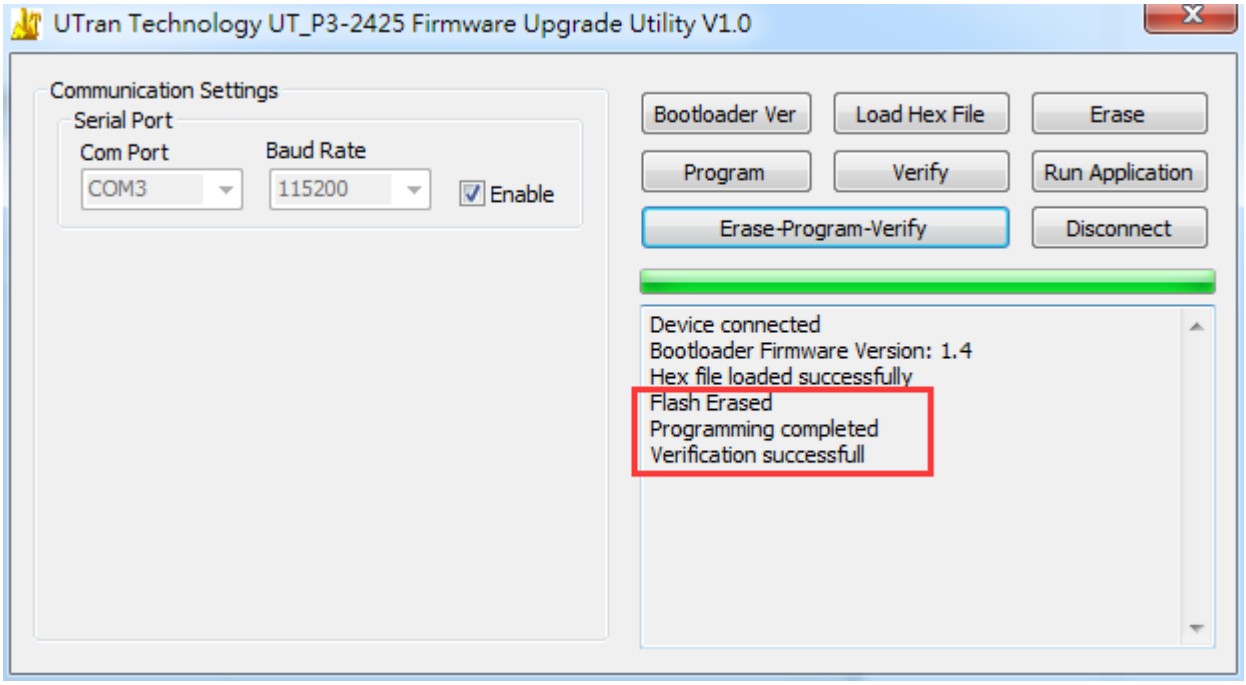


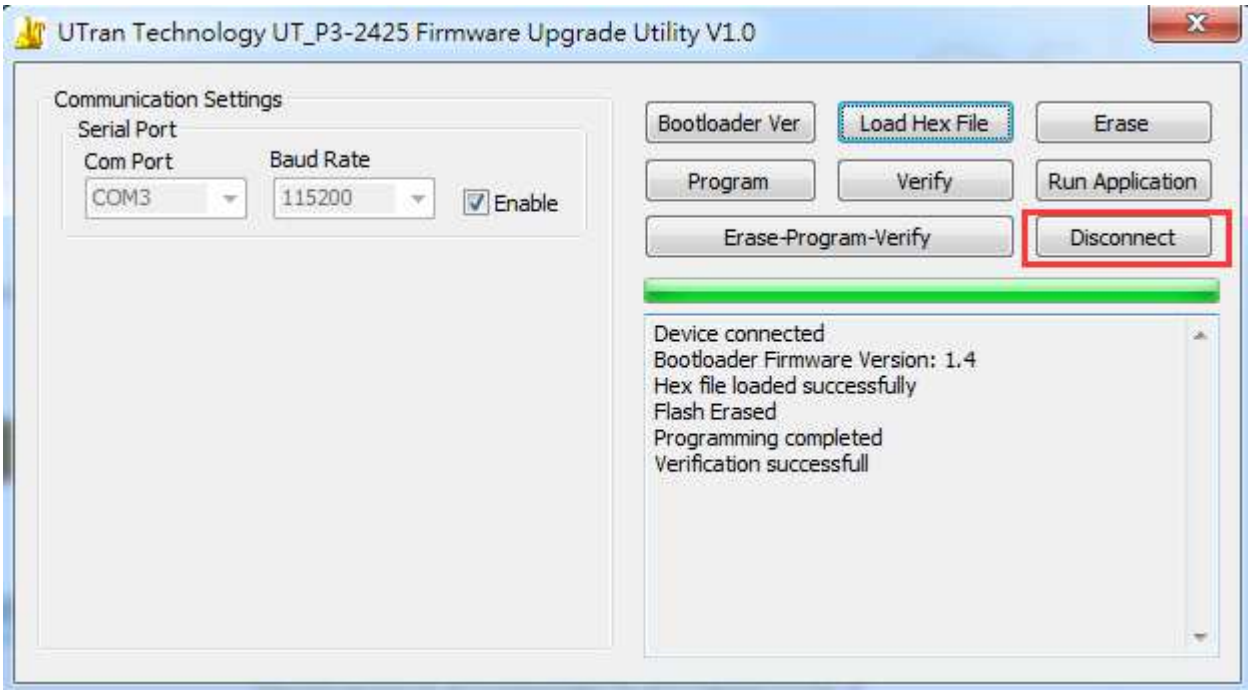
## Begin to upgrade firmware process

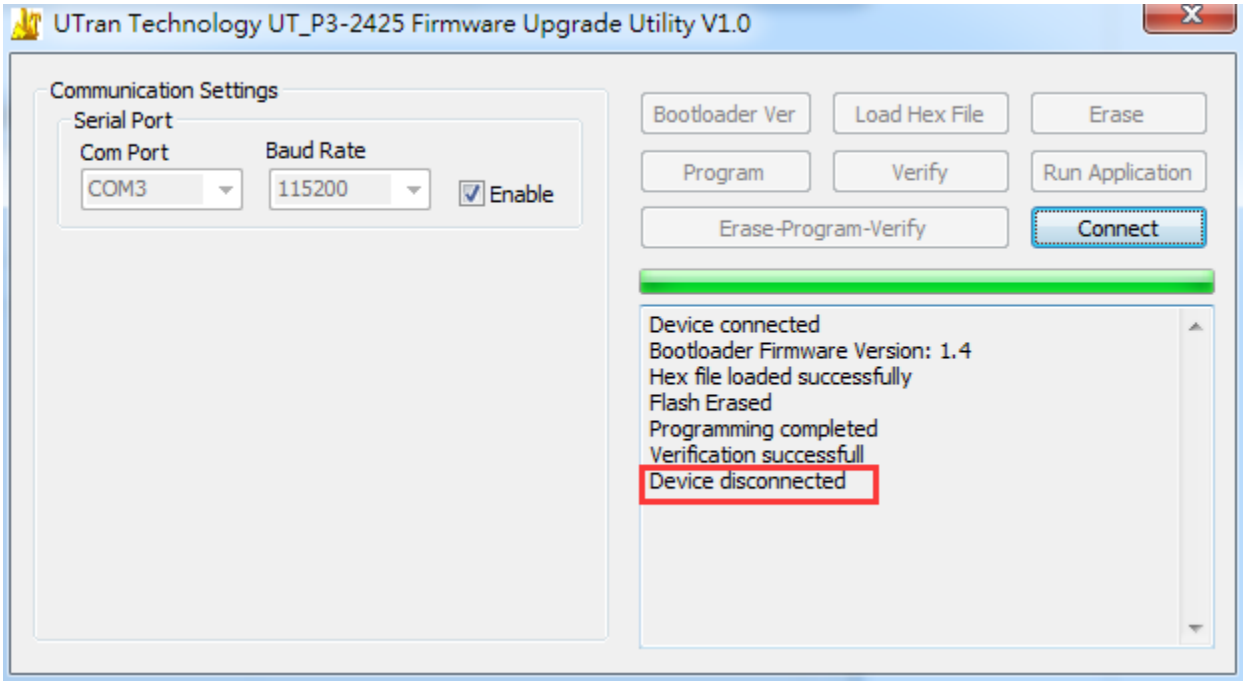
After load firmware file, click "Erase-Program-Verify" button to start upgrade process.



## Disconnect serial port and power cycle the system



History

| Publication History | | |
|---|---|---|
| Revision | Date | Description of Changes |
| 1.0 | 2017/01/09 | Original (Based on FW version 0.9.2S) |
| 1.1 | 2017/08/31 | Based on FW version 1.0.8A<br>Refine CLI command portion.<br>Minor changes, corrections. |
| 1.2 | 2018/3/15 | Add pictures and descriptions for accessories in package |