



# Direct Attached NVMe JBOD 2U Rackmount Rugged Storage Enclosures

RSC2403 | RSC2424



**User Guide**

## Warranty

For warranty information, please visit our website: <https://www.trentonsystems.com/policies-government-information>

## Warnings

**Caution:** No user serviceable parts inside unit. High voltages are present inside unit. Contact Trenton Systems for Technical Support, if necessary.

**Warning:** Host Cards are static-sensitive. Ensure proper anti-static procedures are followed when preparing and installing Host Cards.

## Disclaimer

This manual is as complete and factual as possible at the time of printing; however, the information in this manual may have been updated since that time. Trenton Systems, Inc. reserves the right to change the functions, features or specifications of their products at any time, without notice.

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Revision History			
Revision	Date	Owner	Notes
Preliminary	05/09/19	A. LAPIDO	For internal review
0	05/16/19	A. LAPIDO	Initial release
1	3/24/20	C. Curtis, N. Young	Hotswap (Vega) details, formatting, reorganization



Trenton Systems has proudly **designed, manufactured and supported** our products in the USA for **more than 30 years.**

[www.TrentonSystems.com](http://www.TrentonSystems.com)

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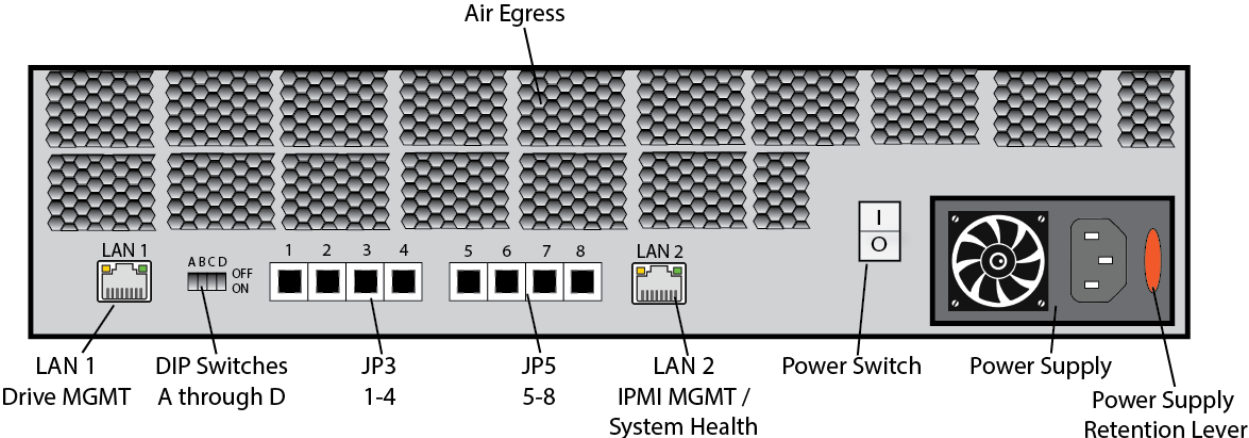
# 1. System Overview

Trenton Systems’ 2U Rugged Rackmount Storage Chassis (RSC) product line is a transparent PCIe direct-attached storage appliance that provides a non-blocking switch fabric in a lightweight, short-depth aluminum enclosure, allowing up to 24 NVMe devices to be attached to a compatible host computer. Drives are numbered 0-23 from **right to left** of the chassis when viewed from the front.

For full performance, the upstream host computer must provide at least 32 lanes of PCIe through two (2) available half-height, half length x16 PCIe HBA (host bus adapter) cards and requisite cabling. Details of this connection are provided in the **System Setup** of this guide. Future firmware development efforts are planned to support additional operational modes. Contact Trenton for the latest capabilities information.

Drive configuration management is provided by DIP switches or an ethernet interface (“LAN 1” on the rear of the JBOD). System health and a subset of IPMI base functionality can be accessed via “LAN 2” on the rear of the enclosure.

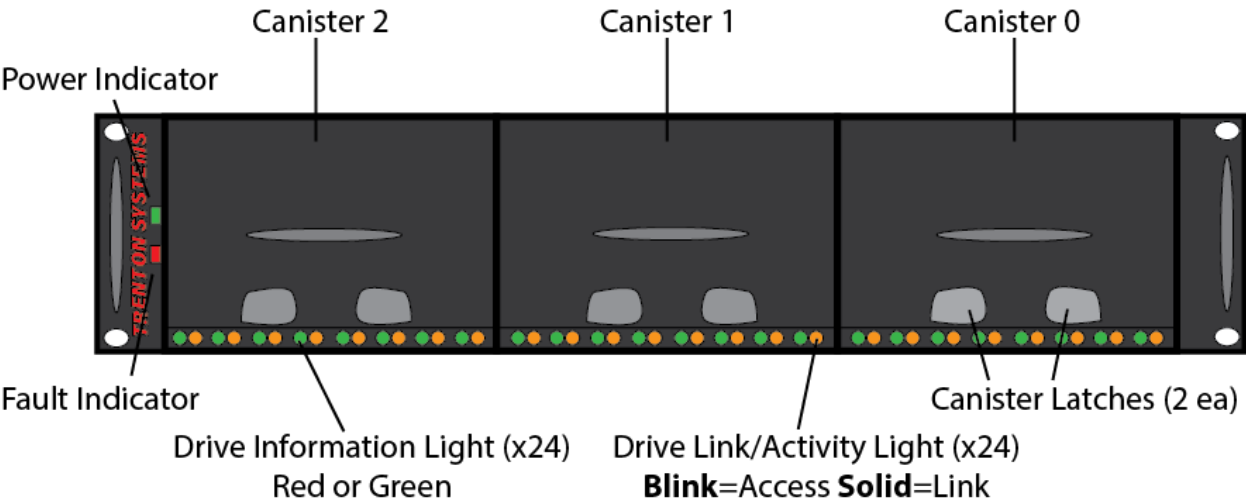
The power supply is toollessly removable and replaceable and is rated for 90-264v AC 50/60Hz.



Critical Specifications	
Chassis Type	2U rugged rackmount
Dimensions	3.5" H x 17"/19" W x 19" D

## 1.1. RSC2403

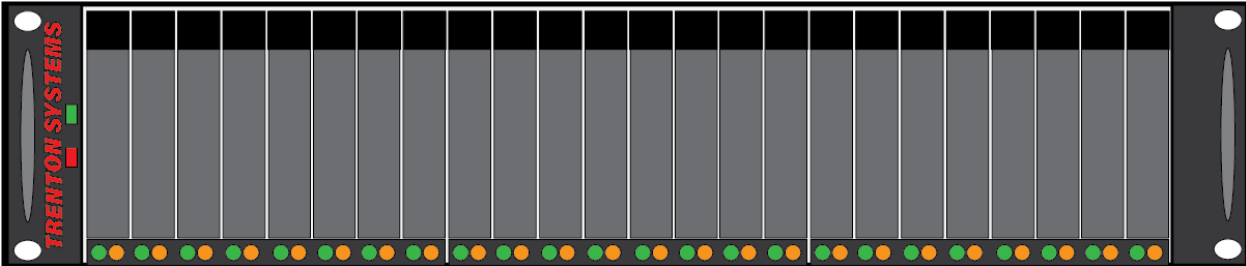
The RSC2403 utilizes three storage canisters of 8 drives each to allow operators to quickly add or remove drives.



RSC2403 Front Detail

1.2. RSC2424

The RSC2424 has 24 individual drive bays for added flexibility in drive addition and removal.



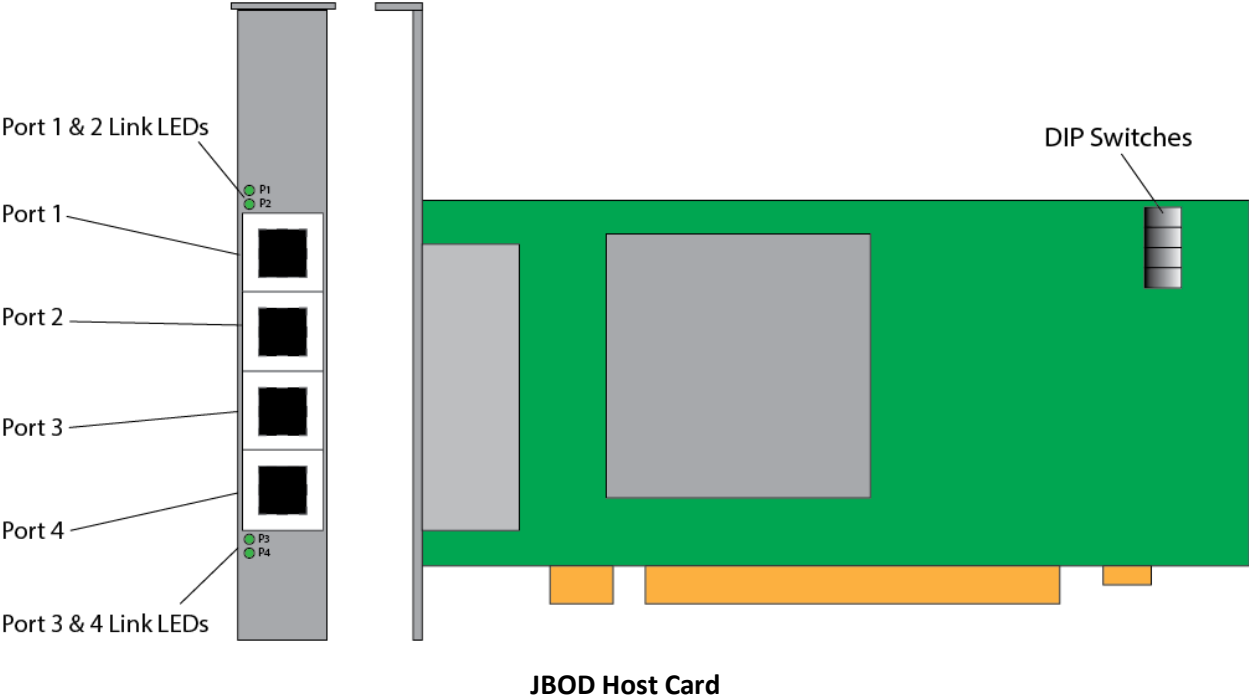
## 2. System Setup

There are two sets of DIP switches – one on the HBAs (e.g. Dolphin PXH832) and one on the JBOD – that must be properly configured and in the same mode (e.g. x4x4x4x4/x8x8/x16) for proper operation.

Trenton recommends the x8/x8 configuration for best performance. Care should also be taken to ensure cabling is installed per this guide’s “Cabling Setup” section. Carefully follow all steps in this guide to ensure proper functionality.

### 2.1. HBA Card Setup

The HBA DIP switch is located on the rear of the card near the top edge. Switches 1-4 modify the HBA’s bifurcation and match the settings to the length of cables being used.



Host Card Dip Switch Settings				
Cable Type, Port Config	Switch 1	Switch 2	Switch 3	Switch 4
1M Cable, x16	ON	OFF	OFF	OFF
1M Cable, x8/x8	ON	OFF	ON	OFF
1M Cable, x4/x4/x4/x4	OFF	OFF	OFF	OFF
3M Cable, x16	ON	OFF	OFF	ON
3M Cable, x8/x8	ON	OFF	ON	ON
3M Cable, x4x4x4x4	OFF	OFF	OFF	ON

### 2.2. JBOD Setup

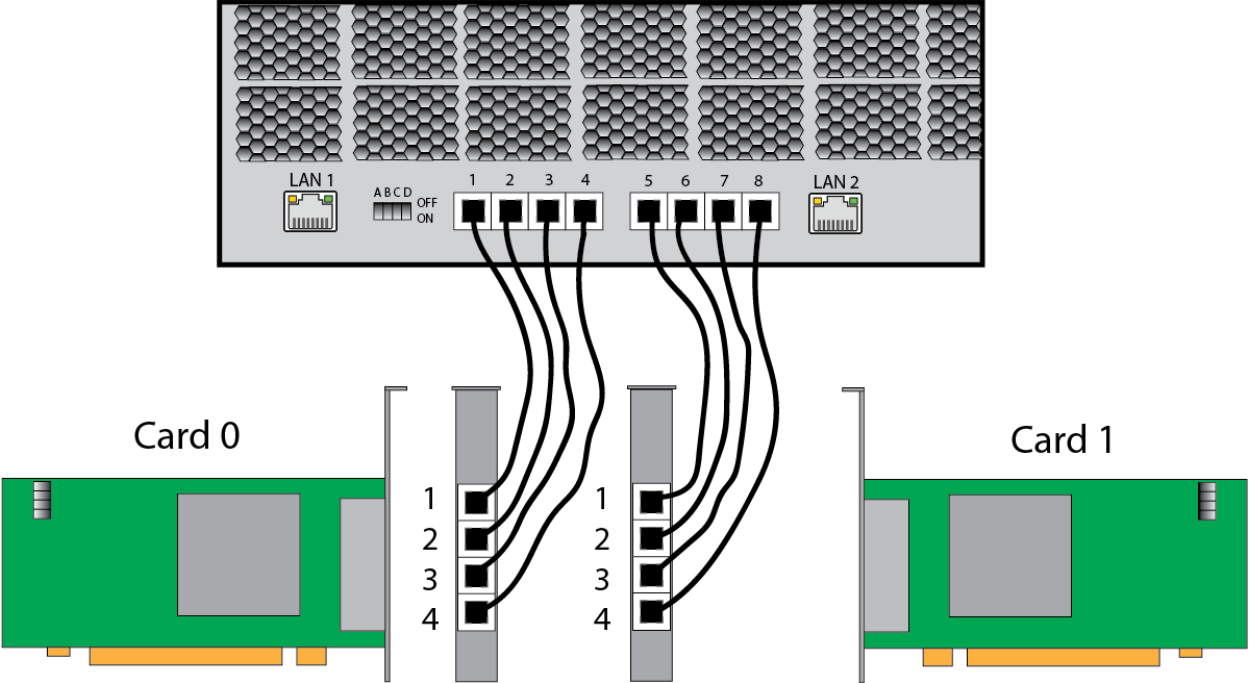
The DIP switch is located on the rear left-hand side of the JBOD.

JBOD Enclosure Dip Switch Settings				
Port Config	Switch A	Switch B	Switch C	Switch D
X4/x4/x4/x4	OFF	ON	OFF	OFF
X8/x8	ON	OFF	OFF	OFF
X16	OFF	OFF	ON	OFF

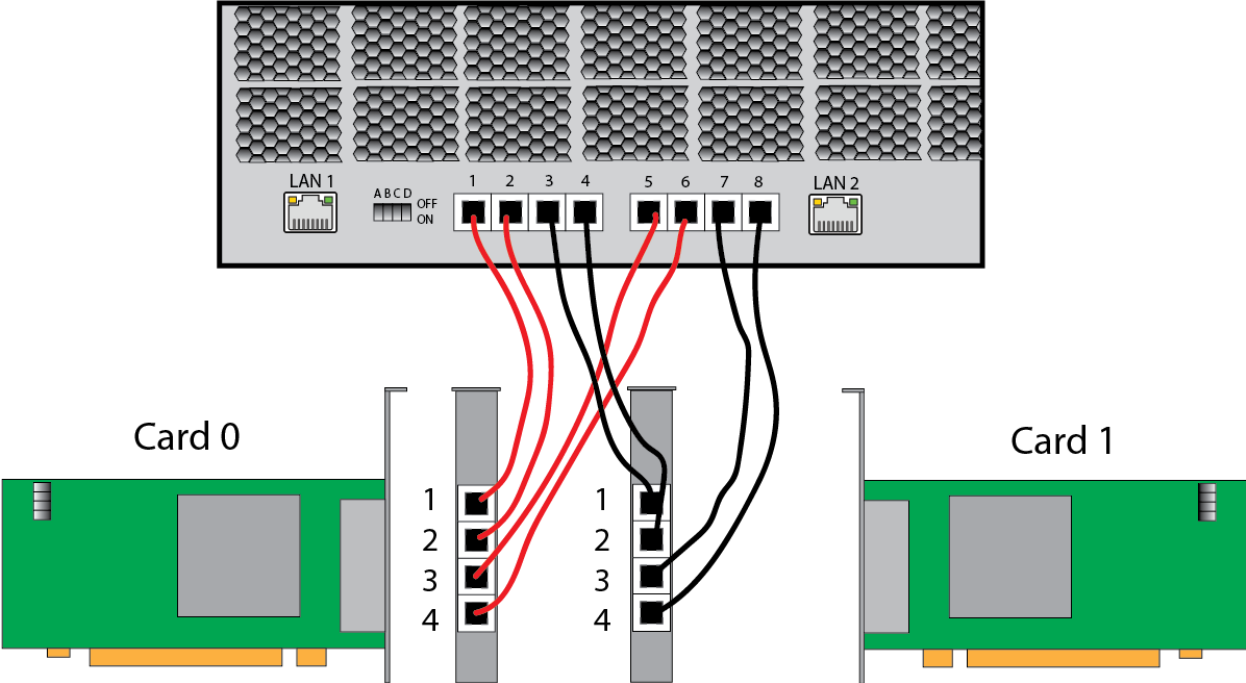
2.3. Cabling Setup

Cabling between the host server and JBOF varies based on port configuration. Refer to the table below for cabling guidelines.

Port Config	Card 0 Port 1	Card 0 Port 2	Card 0 Port 3	Card 0 Port 4	Card 1 Port 1	Card 1 Port 2	Card 1 Port 3	Card 1 Port 4
X4/x4/x4/x4	1	2	3	4	5	6	7	8
X8/x8	1	2	3	4	5	6	7	8
X16	1	2	5	6	3	4	7	8



X4/x4/x4/x4 and x8/x8 Cabling Illustration



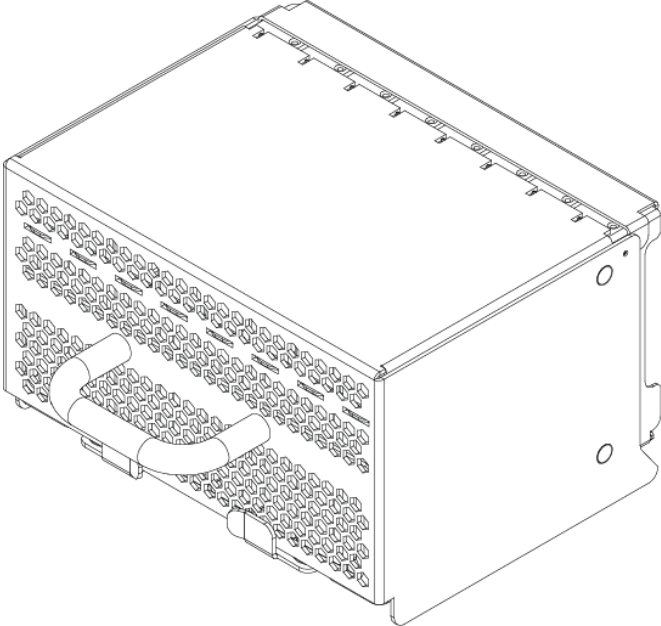
**X16 Cabling Illustration**

**2.4. Drive Setup**

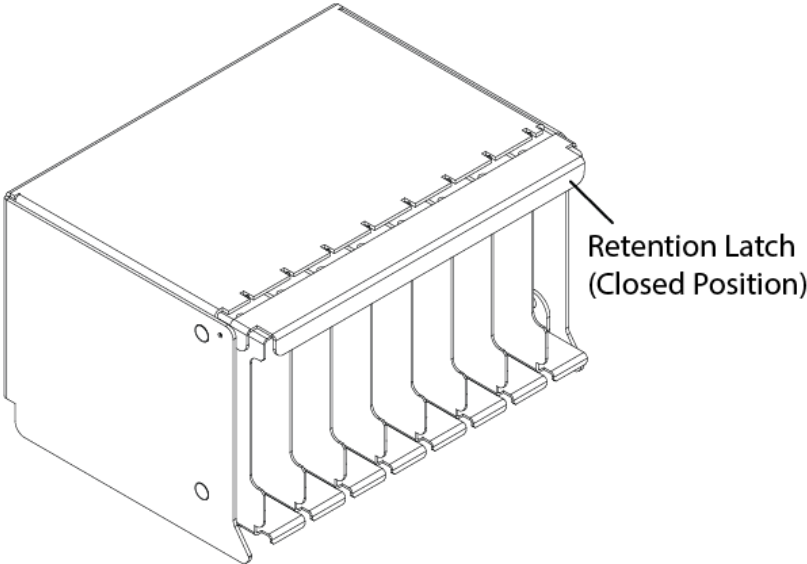
2.4.1. RSC2403

There are two latches for each Canister which can be rotated from the inside outward to release the canister. Once removed, the retention latch at the top can be rotated upward and drives inserted or removed individually. Once drive replacements are complete, replace the retention latch to the operational position to retain drives safely.





**RSC2403 Drive Canister Detail**

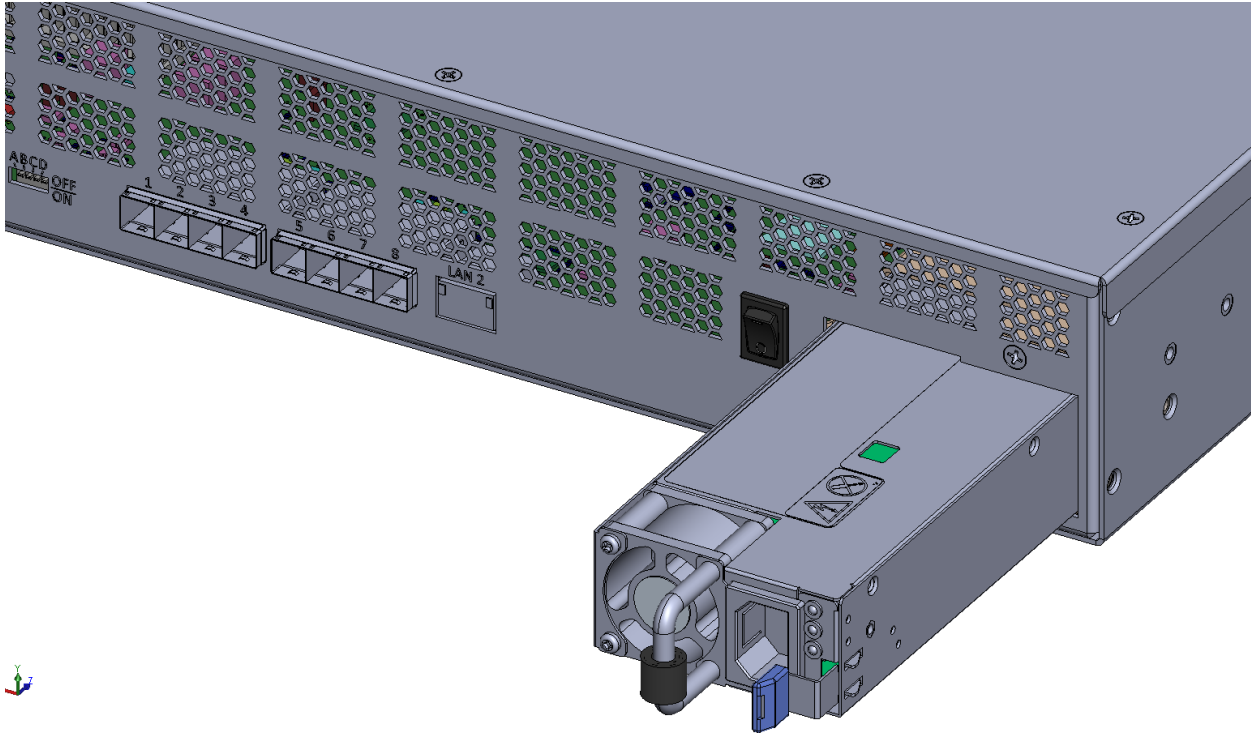


**RSC2403 Drive Canister Retention Mechanism Detail**

2.4.2. RSC2424  
Information on drive operations for this model is forthcoming.

## 2.5. Power Supply Setup

The removable power supply ships installed in the unit, but should you need to remove and or replace the power supply, shut down the host computer and switch the unit off using the switch on the rear of the unit. Remove the power plug from the supply. Depress the power supply retention lever on the right of the supply (typically either orange or purple in color) and pull outward until the power supply slides fully out. Replace the power supply by sliding a new supply slowly into the enclosure all the way until the retention lever locks into place. Replace the power plug and return the power switch to the operational mode.



**Power Supply Removal/Insertion**

## 2.6. HBA Installation

Install the HBA cards into the host computer following the manufacturer's instructions for option card installation ensuring proper anti-static procedures are adhered to.

Cable the JBOF to the HBAs per the table in "Cabling Setup."

### 3. Operation

After the system is fully configured and cabled, ensure the power switch on the rear of the unit is set to the “On” position. Turn on the host computer. The JBOD must have power applied to it before host computer boot to ensure proper PCIe enumeration.

## 4. IPMI/System Health

The IPMI/System health interface can be accessed through LAN2. The static IP address to access the IPMI is **192.168.1.10/24**. You can interface with this functionality through a web GUI or through the utility *ipmitool*.

BMC Login Credentials:

**username:** root

**password:** root

Changing to a different static IP:

```
ipmitool -H 192.168.1.10 -P root -U root lan 2 set ipaddr xxx.xxx.xxx.xxx
```

Changing from static to DHCP IP assignment (warning – will need to review DHCP server logs or other mechanism to determine BMC IP address after this change):

```
ipmitool -H 192.168.1.10 -P root -U root lan set 2 ipsrc dhcp
```

For more information, refer to the ipmitool documentation: <https://github.com/ipmitool/ipmitool>

## 5. Fabric Mode

When configured for fabric mode, the JBOD supports drive hotswap. This mode of operation requires a co-processor referred to as the Vega. Normal operation does not require interfacing with this co-processor directly, but advanced configurations (e.g. dynamically re-assigning drives to different hosts) may require interactions with the Vega via the “LAN 1” Ethernet port.

By default, the JBOD is configured for x16 mode, so the JBOD will have 2 x16 upstream ports to one or more hosts. The default configuration of the Vega assigns 12 drives to one x16 upstream port (ports 1, 2, 5, and 6) and the other 12 drives to the second x16 upstream port (ports 3, 4, 7, and 8). To configure drive assignments for a different allocation, please contact Trenton support.

### 5.1. Host Configuration

#### 5.1.1. Kernel Boot parameters

Hotswap functionality has been verified w/ CentOS 8.0 with kernel 4.18.0-80.el8.x86\_64.

At the time of this writing, Intel indicates that the Linux NVMe driver support for surprise hotplug starts with the Linux mainline kernel 3.14.

It is required to set the following host OS kernel boot parameters via grub configuration:

```
pci=assign-busses,realloc,pcie_bus_safe
```

**assign-busses:** Always assign all PCI bus numbers ourselves, overriding whatever the firmware may have done.

**realloc:** Enable/disable reallocating PCI bridge resources if allocations done by BIOS are too small to accommodate resources required by all child devices.

**pcie\_bus\_safe:** Set every device's MPS to the largest value supported by all devices below the root complex.

#### 5.1.2. BIOS Settings

It is recommended to set certain Host BIOS parameters as specified below:

Clock Spread Spectrum	[Disable]
Hyper-Threading (ALL)	[Disable]
PCI PERR/SERR Support	[Disabled]
Above 4G Decoding	[Enabled]
SR-IOV Support	[Enabled]
Maximum Payload	[2048 Bytes]
Maximum Read Request	[4096 Bytes]
ASPM Support	[Disabled]
MMIOHBase	[56T]
MMIO High Size	[256G]

## 6. Technical Support

### 6.1. Support

To contact our support team, call us at (800) 875-6031 or (770) 287-3100, 8AM to 5PM Eastern Time or email the team at [support@TrentonSystems.com](mailto:support@TrentonSystems.com).

Before you call, please have your system part number (2625xxxxxxx-xx) and serial number available. This is located on a silver label on the right-hand side of the unit.

### 6.2. Troubleshooting

The most likely point of failure of the Enclosure is a result of improper configuration. Review the “System Setup” portion of this Guide and confirm the DIP switches and Cabling are properly configured for the setup desired by your application.

### 6.3. Returns

A Return Material Authorization (RMA) number, obtained from Trenton Systems prior to return, must accompany products returned for repair. The customer must prepay freight on all returned items, and the customer is responsible for any loss or damage caused by common carrier in transit. Items will be returned from Trenton via Ground, unless prior arrangements are made by the customer for an alternative shipping method.

To obtain an RMA number, call us at (800) 875-6031 or (770) 287-3100, or email our in-house support team at [support@TrentonSystems.com](mailto:support@TrentonSystems.com). We will need the following information:

- Return company address and contact
- Model name/serial number from the label on the product
- Description of the failure

An RMA number will be issued. Mark the RMA number clearly on the outside of each box, include a failure report and return the product(s) to our Lawrenceville, Georgia facility:

- Trenton Systems, Inc.
- 1725 MacLeod Drive
- Lawrenceville, Georgia 30043
- Attn: Support

Contact Trenton Systems for our complete service and repair policy.

## 7. Technical Annex

### 7.1. Sensors

There are a variety of system health monitors integrated into the JBOD Enclosure. Available sensors include:

SYS PWR OK  
INLET TEMP  
EXH TEMP  
PEX TEMP 0  
PEX TEMP 1  
SYS FAN 0  
SYS FAN 1  
SYS FAN 2  
SYS FAN 3  
SYS FAN 4  
SYS FAN 5  
SYS FAN 6  
SYS FAN 7  
SYS FAN 8  
SYS FAN 9  
SYS FAN 10  
NVMe B0P0 Temp  
NVMe B0P1 Temp  
NVMe B0P2 Temp  
NVMe B0P3 Temp  
NVMe B0P4 Temp  
NVMe B0P5 Temp  
NVMe B0P6 Temp  
NVMe B0P7 Temp  
NVMe B1P0 Temp  
NVMe B1P1 Temp  
NVMe B1P2 Temp  
NVMe B1P3 Temp  
NVMe B1P4 Temp  
NVMe B1P5 Temp  
NVMe B1P6 Temp  
NVMe B1P7 Temp  
NVMe B2P0 Temp  
NVMe B2P1 Temp  
NVMe B2P2 Temp  
NVMe B2P3 Temp  
NVMe B2P4 Temp  
NVMe B2P5 Temp  
NVMe B2P6 Temp  
NVMe B2P7 Temp  
1.0 V  
1.2 V  
3.3 V  
5 V  
12 V  
1.15 V BMC  
1.35 V BMC  
3.3 V AUX  
1.8 V  
12 V AUX

## 7.2. Vega Co-processor Firmware Update

The default static IP address of the Vega co-processor is 192.168.1.22/24.

### 7.2.1. Vega Default Root user password

The default Root User password is Trenton234

### 7.2.2. Uploading Firmware to Vega

Make sure you can ping the Vega from the PC:

```
ping 192.168.1.22
```

From a Linux host, scp the firmware to the JBOF:

```
scp firmware.fw root@192.168.1.22:/tmp
```

Enter password

### 7.2.3. Upgrading the firmware

SSH into the Vega from the PC linux window:

```
ssh root@192.168.1.22
```

Enter password, then change directories to /tmp:

```
# cd /tmp
```

1. To see the currently active / backup firmware regions:

```
# flashmcpuImage -G
```

The backup firmware region will be the region in which the application will flash the new firmware.

```
# flashmcpuImage -F -I -f firmware.fw
```

This will flash the firmware in the backup FW region. For example, if the active FW region is 1 (i.e. firmwarereg1) and backup FW region is 2 (i.e. firmwarereg2), this command will upgrade the firmware in FW region 2.

3. To toggle to new firmware region:

```
# flashmcpuImage -S -r (1 or 2)
```

Note: -s : For Setting the next active region

-r : For specifying next active region(1 or 2). Mention the backup region number here in which the new FW is upgraded.

This command will make the new FW region as active region. It will be effective after reboot.

4. Reboot to make the new FW effective.

```
# reboot
```